



# **RADIO TEST REPORT**

**Test Report No. : 13128136H-A-R4**

**Applicant** : silex technology, Inc.  
**Type of EUT** : Embedded Wireless Module  
**Model Number of EUT** : SX-NEWAH  
**FCC ID** : N6C-SXNEWAH  
**Test regulation** : FCC Part 15 Subpart C: 2019  
**Test Result** : Complied (Refer to SECTION 3.2)

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report covers Radio technical requirements.  
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.
8. The information provided from the customer for this report is identified in SECTION 1.
9. This report is a revised version of 13128136H-A-R3. 13128136H-A-R3 is replaced with this report.

**Date of test:** March 13 to 23, 2020

**Representative test engineer:**

*T. Noguchi*

Takafumi Noguchi  
Engineer

Consumer Technology Division

**Approved by:**

*S. Matsuyama*

Satofumi Matsuyama  
Engineer

Consumer Technology Division



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,  
[http://japan.ul.com/resources/emc\\_accredited/](http://japan.ul.com/resources/emc_accredited/)

- ☐ This report contains data that are not covered by the NVLAP accreditation.  
☒ There is no testing item of "Non-accreditation".

**UL Japan, Inc.**  
**Ise EMC Lab.**

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# REVISION HISTORY

## Original Test Report No.: 13128136H-A

| Revision        | Test report No.   | Date              | Page revised | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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|---|------|---|--|---|------|---|--|---|-------|---|--|---|-------|---|--|-----------------|-------------------|-------------------|--------|---|------|------|------|---|------|---|--|---|------|---|--|---|------|---|--|---|------|---|--|---|------|---|--|---|------|---|--|---|------|---|--|-----------------|-------------------|-------------------|--------|---|------|------|------|---|------|---|--|---|------|---|--|---|------|---|--|---|------|---|--|---|------|---|--|---|-------|---|--|---|-------|---|--|
| - (Original)    | 13128136H-A       | April 6, 2020     | -            | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| 1               | 13128136H-A-R1    | April 23, 2020    | P 9          | <div>• Correction of Power settings in SECTION 4.1</div> <div><table><tr><th>1MHz</th><th>903.5MHz</th><th>915.5MHz</th><th>926.5MHz</th></tr><tr><td></td><td>26</td><td>26</td><td>25</td></tr><tr><th>2MHz</th><th>905.0MHz</th><th>917.0MHz</th><th>925.0MHz</th></tr><tr><td></td><td>26</td><td>26</td><td>25</td></tr><tr><th>4MHz</th><th>910.0MHz</th><th>918.0MHz</th><th>922.0MHz</th></tr><tr><td></td><td>25</td><td>25</td><td>25</td></tr></table><div>→</div><table><tr><th>1MHz</th><th>903.5MHz</th><th>915.5MHz</th><th>926.5MHz</th></tr><tr><td>0.1.2.3.4.5.10</td><td>26</td><td>26</td><td>25</td></tr><tr><td>6</td><td>22</td><td>22</td><td>22</td></tr><tr><td>7</td><td>19</td><td>19</td><td>19</td></tr><tr><th>2MHz</th><th>905.0MHz</th><th>917.0MHz</th><th>925.0MHz</th></tr><tr><td>0.1.2.3.4.</td><td>26</td><td>26</td><td>25</td></tr><tr><td>5</td><td>25</td><td>25</td><td>25</td></tr><tr><td>6</td><td>20</td><td>20</td><td>20</td></tr><tr><td>7</td><td>19</td><td>19</td><td>19</td></tr><tr><th>4MHz</th><th>910.0MHz</th><th>918.0MHz</th><th>922.0MHz</th></tr><tr><td>0.1.2.3.4.5</td><td>25</td><td>25</td><td>25</td></tr><tr><td>6</td><td>20</td><td>20</td><td>20</td></tr><tr><td>7</td><td>19</td><td>19</td><td>19</td></tr></table></div> <div>• Correction of Remarks of IEEE 802.11ah (2 MHz) in SECTION 4.1 MCS 7→MCS 0</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1MHz     | 903.5MHz          | 915.5MHz          | 926.5MHz |    | 26   | 26   | 25   | 2MHz | 905.0MHz | 917.0MHz | 925.0MHz |   | 26   | 26 | 25 | 4MHz | 910.0MHz | 918.0MHz | 922.0MHz |   | 25   | 25 | 25 | 1MHz | 903.5MHz | 915.5MHz | 926.5MHz | 0.1.2.3.4.5.10 | 26   | 26 | 25 | 6 | 22   | 22 | 22 | 7 | 19   | 19 | 19 | 2MHz     | 905.0MHz          | 917.0MHz          | 925.0MHz | 0.1.2.3.4. | 26   | 26   | 25   | 5 | 25   | 25 | 25 | 6 | 20   | 20 | 20 | 7 | 19   | 19 | 19 | 4MHz | 910.0MHz | 918.0MHz | 922.0MHz | 0.1.2.3.4.5 | 25   | 25 | 25 | 6 | 20   | 20 | 20 | 7 | 19   | 19 | 19 |   |       |   |  |          |                   |                   |        |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |      |      |          |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |       |   |  |   |       |   |  |                 |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |                 |                   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| 1MHz            | 903.5MHz          | 915.5MHz          | 926.5MHz     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|                 | 26                | 26                | 25           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2MHz            | 905.0MHz          | 917.0MHz          | 925.0MHz     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|                 | 26                | 26                | 25           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4MHz            | 910.0MHz          | 918.0MHz          | 922.0MHz     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|                 | 25                | 25                | 25           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 1MHz            | 903.5MHz          | 915.5MHz          | 926.5MHz     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0.1.2.3.4.5.10  | 26                | 26                | 25           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | 22                | 22                | 22           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | 19                | 19                | 19           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2MHz            | 905.0MHz          | 917.0MHz          | 925.0MHz     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0.1.2.3.4.      | 26                | 26                | 25           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5               | 25                | 25                | 25           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | 20                | 20                | 20           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | 19                | 19                | 19           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4MHz            | 910.0MHz          | 918.0MHz          | 922.0MHz     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0.1.2.3.4.5     | 25                | 25                | 25           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | 20                | 20                | 20           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | 19                | 19                | 19           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 1               | 13128136H-A-R1    | April 23, 2020    | P 15         | <div>• Correction of Span, Detector and Trace for Peak Power Density in Test Procedure of SECTION 7<br/>Span:1.5 times the 6dB Bandwidth→1.5 times the OBW<br/>Detector: Peak→Average<br/>Trace: Max Hold→100 traces</div> <div>• Correction of explanatory note *2) in Test Procedure of SECTION 7<br/>‘Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".’<br/>→ ‘Section 11.10.3 Method AVGPSD-1 of "ANSI C63.10-2013".’</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| 1               | 13128136H-A-R1    | April 23, 2020    | P 33, 34, 35 | <div>• Addition of below explanatory note *1. of Maximum Average Output Power in APPENDIX 1: Test data<br/>*1.Duty factor is 98% or more, so Duty factor is not added.</div> <div>• Correction of rate of Maximum Average Output Power in APPENDIX 1: Test data 1 MHz:</div> <div><div><div>915.5MHz</div><table><tr><th>Rate MCS</th><th>Reading LGI [dBm]</th><th>Reading SGI [dBm]</th><th>Remark</th></tr><tr><td>10</td><td>7.81</td><td>7.74</td><td>*LGI</td></tr><tr><td>0</td><td>7.69</td><td>-</td><td></td></tr><tr><td>1</td><td>7.71</td><td>-</td><td></td></tr><tr><td>2</td><td>7.67</td><td>-</td><td></td></tr><tr><td>3</td><td>7.69</td><td>-</td><td></td></tr><tr><td>4</td><td>7.73</td><td>-</td><td></td></tr><tr><td>5</td><td>7.75</td><td>-</td><td></td></tr><tr><td>6</td><td>7.76</td><td>-</td><td></td></tr><tr><td>7</td><td>7.77</td><td>-</td><td></td></tr></table><div>*: Worst Rate</div></div><div>→</div><div><div>915.5MHz</div><table><tr><th>Rate MCS</th><th>Reading LGI [dBm]</th><th>Reading SGI [dBm]</th><th>Remark</th></tr><tr><td>10</td><td>6.77</td><td>6.73</td><td>*LGI</td></tr><tr><td>0</td><td>6.51</td><td>-</td><td></td></tr><tr><td>1</td><td>6.35</td><td>-</td><td></td></tr><tr><td>2</td><td>6.72</td><td>-</td><td></td></tr><tr><td>3</td><td>6.67</td><td>-</td><td></td></tr><tr><td>4</td><td>6.58</td><td>-</td><td></td></tr><tr><td>5</td><td>6.53</td><td>-</td><td></td></tr><tr><td>6</td><td>0.79</td><td>-</td><td></td></tr><tr><td>7</td><td>-0.99</td><td>-</td><td></td></tr></table><div>*: Worst Rate</div></div></div> <div>2 MHz:</div> <div><div><div>917.0MHz</div><table><tr><th>Rate MCS</th><th>Reading LGI [dBm]</th><th>Reading SGI [dBm]</th><th>Remark</th></tr><tr><td>0</td><td>7.76</td><td>-</td><td></td></tr><tr><td>1</td><td>7.56</td><td>-</td><td></td></tr><tr><td>2</td><td>7.73</td><td>-</td><td></td></tr><tr><td>3</td><td>7.75</td><td>-</td><td></td></tr><tr><td>4</td><td>7.84</td><td>-</td><td></td></tr><tr><td>5</td><td>7.85</td><td>-</td><td></td></tr><tr><td>6</td><td>7.87</td><td>-</td><td></td></tr><tr><td>7</td><td>7.97</td><td>7.82</td><td>*LGI</td></tr></table><div>*: Worst Rate</div></div><div>→</div><div><div>917.0MHz</div><table><tr><th>Rate MCS</th><th>Reading LGI [dBm]</th><th>Reading SGI [dBm]</th><th>Remark</th></tr><tr><td>0</td><td>6.50</td><td>6.48</td><td>*LGI</td></tr><tr><td>1</td><td>6.44</td><td>-</td><td></td></tr><tr><td>2</td><td>6.41</td><td>-</td><td></td></tr><tr><td>3</td><td>6.46</td><td>-</td><td></td></tr><tr><td>4</td><td>6.44</td><td>-</td><td></td></tr><tr><td>5</td><td>5.16</td><td>-</td><td></td></tr><tr><td>6</td><td>-2.01</td><td>-</td><td></td></tr><tr><td>7</td><td>-3.03</td><td>-</td><td></td></tr></table><div>*: Worst Rate</div></div></div> <div>4 MHz:</div> <div><div><div>918MHz</div><table><tr><th>Rate MCS [Mbps]</th><th>Reading LGI [dBm]</th><th>Reading SGI [dBm]</th><th>Remark</th></tr><tr><td>0</td><td>7.47</td><td>7.41</td><td>*LGI</td></tr><tr><td>1</td><td>7.34</td><td>-</td><td></td></tr><tr><td>2</td><td>7.35</td><td>-</td><td></td></tr><tr><td>3</td><td>7.30</td><td>-</td><td></td></tr><tr><td>4</td><td>7.33</td><td>-</td><td></td></tr><tr><td>5</td><td>7.30</td><td>-</td><td></td></tr><tr><td>6</td><td>7.33</td><td>-</td><td></td></tr><tr><td>7</td><td>7.37</td><td>-</td><td></td></tr></table><div>*: Worst Rate</div></div><div>→</div><div><div>918MHz</div><table><tr><th>Rate MCS [Mbps]</th><th>Reading LGI [dBm]</th><th>Reading SGI [dBm]</th><th>Remark</th></tr><tr><td>0</td><td>4.60</td><td>4.57</td><td>*LGI</td></tr><tr><td>1</td><td>4.50</td><td>-</td><td></td></tr><tr><td>2</td><td>4.56</td><td>-</td><td></td></tr><tr><td>3</td><td>4.49</td><td>-</td><td></td></tr><tr><td>4</td><td>4.51</td><td>-</td><td></td></tr><tr><td>5</td><td>4.55</td><td>-</td><td></td></tr><tr><td>6</td><td>-1.79</td><td>-</td><td></td></tr><tr><td>7</td><td>-2.46</td><td>-</td><td></td></tr></table><div>*: Worst Rate</div></div></div> | Rate MCS | Reading LGI [dBm] | Reading SGI [dBm] | Remark   | 10 | 7.81 | 7.74 | *LGI | 0    | 7.69     | -        |          | 1 | 7.71 | -  |    | 2    | 7.67     | -        |          | 3 | 7.69 | -  |    | 4    | 7.73     | -        |          | 5              | 7.75 | -  |    | 6 | 7.76 | -  |    | 7 | 7.77 | -  |    | Rate MCS | Reading LGI [dBm] | Reading SGI [dBm] | Remark   | 10         | 6.77 | 6.73 | *LGI | 0 | 6.51 | -  |    | 1 | 6.35 | -  |    | 2 | 6.72 | -  |    | 3    | 6.67     | -        |          | 4           | 6.58 | -  |    | 5 | 6.53 | -  |    | 6 | 0.79 | -  |    | 7 | -0.99 | - |  | Rate MCS | Reading LGI [dBm] | Reading SGI [dBm] | Remark | 0 | 7.76 | - |  | 1 | 7.56 | - |  | 2 | 7.73 | - |  | 3 | 7.75 | - |  | 4 | 7.84 | - |  | 5 | 7.85 | - |  | 6 | 7.87 | - |  | 7 | 7.97 | 7.82 | *LGI | Rate MCS | Reading LGI [dBm] | Reading SGI [dBm] | Remark | 0 | 6.50 | 6.48 | *LGI | 1 | 6.44 | - |  | 2 | 6.41 | - |  | 3 | 6.46 | - |  | 4 | 6.44 | - |  | 5 | 5.16 | - |  | 6 | -2.01 | - |  | 7 | -3.03 | - |  | Rate MCS [Mbps] | Reading LGI [dBm] | Reading SGI [dBm] | Remark | 0 | 7.47 | 7.41 | *LGI | 1 | 7.34 | - |  | 2 | 7.35 | - |  | 3 | 7.30 | - |  | 4 | 7.33 | - |  | 5 | 7.30 | - |  | 6 | 7.33 | - |  | 7 | 7.37 | - |  | Rate MCS [Mbps] | Reading LGI [dBm] | Reading SGI [dBm] | Remark | 0 | 4.60 | 4.57 | *LGI | 1 | 4.50 | - |  | 2 | 4.56 | - |  | 3 | 4.49 | - |  | 4 | 4.51 | - |  | 5 | 4.55 | - |  | 6 | -1.79 | - |  | 7 | -2.46 | - |  |
| Rate MCS        | Reading LGI [dBm] | Reading SGI [dBm] | Remark       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 10              | 7.81              | 7.74              | *LGI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0               | 7.69              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|      |   |  |   |      |   |  |   |       |   |  |   |       |   |  |                 |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |                 |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |       |   |  |   |       |   |  |
| 1               | 7.71              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|      |   |  |   |      |   |  |   |       |   |  |   |       |   |  |                 |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |                 |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |       |   |  |   |       |   |  |
| 2               | 7.67              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|      |   |  |   |      |   |  |   |       |   |  |   |       |   |  |                 |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |                 |                   |                   |        |   |      |      |      |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |      |   |  |   |       |   |  |   |       |   |  |
| 3               | 7.69              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4               | 7.73              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5               | 7.75              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | 7.76              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | 7.77              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| Rate MCS        | Reading LGI [dBm] | Reading SGI [dBm] | Remark       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 10              | 6.77              | 6.73              | *LGI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0               | 6.51              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 1               | 6.35              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2               | 6.72              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 3               | 6.67              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4               | 6.58              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5               | 6.53              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | 0.79              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | -0.99             | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| Rate MCS        | Reading LGI [dBm] | Reading SGI [dBm] | Remark       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0               | 7.76              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 1               | 7.56              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2               | 7.73              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 3               | 7.75              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4               | 7.84              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5               | 7.85              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | 7.87              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | 7.97              | 7.82              | *LGI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| Rate MCS        | Reading LGI [dBm] | Reading SGI [dBm] | Remark       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0               | 6.50              | 6.48              | *LGI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 1               | 6.44              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2               | 6.41              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 3               | 6.46              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4               | 6.44              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5               | 5.16              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | -2.01             | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | -3.03             | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| Rate MCS [Mbps] | Reading LGI [dBm] | Reading SGI [dBm] | Remark       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0               | 7.47              | 7.41              | *LGI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 1               | 7.34              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2               | 7.35              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 3               | 7.30              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4               | 7.33              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5               | 7.30              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | 7.33              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | 7.37              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| Rate MCS [Mbps] | Reading LGI [dBm] | Reading SGI [dBm] | Remark       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 0               | 4.60              | 4.57              | *LGI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 1               | 4.50              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2               | 4.56              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 3               | 4.49              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 4               | 4.51              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5               | 4.55              | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 6               | -1.79             | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 7               | -2.46             | -                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2               | 13128136H-A-R2    | April 24, 2020    | P 15         | Addition of Span for 6dB Bandwidth in Test Procedure of SECTION 7 3 MHz (for 1MHz) /5 MHz (for 2MHz) /7 MHz (for 4MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 3               | 13128136H-A-R3    | May 14, 2020      | P 6          | Correction of Sentences of FCC Part 15.31 (e) in SECTION 3.2<br>The RF Module has its own regulator. The RF Module is constantly provided voltage through the regulator regardless of input voltage.<br>→The EUT has the power supply regulator. However one of the input voltages to RF part doesn’t go through the regulator. The stable voltage will be supplied by the end product, which will be required to have a power supply regulator.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 4               | 13128136H-A-R4    | May 21, 2020      | P 6          | Correction of Sentences of FCC Part 15.31 (e) in SECTION 3.2<br>The stable voltage will be supplied by the end product, which will be required to have a power supply regulator.→<br>The stable voltage was supplied to the EUT from the host jig during the tests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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## Reference: Abbreviations (Including words undescribed in this report)

|                |                                                                 |         |                                                     |
|----------------|-----------------------------------------------------------------|---------|-----------------------------------------------------|
| A2LA           | The American Association for Laboratory Accreditation           | MCS     | Modulation and Coding Scheme                        |
| AC             | Alternating Current                                             | MRA     | Mutual Recognition Arrangement                      |
| AFH            | Adaptive Frequency Hopping                                      | N/A     | Not Applicable                                      |
| AM             | Amplitude Modulation                                            | NIST    | National Institute of Standards and Technology      |
| Amp, AMP       | Amplifier                                                       | NS      | No signal detect.                                   |
| ANSI           | American National Standards Institute                           | NSA     | Normalized Site Attenuation                         |
| Ant, ANT       | Antenna                                                         | NVLAP   | National Voluntary Laboratory Accreditation Program |
| AP             | Access Point                                                    | OBW     | Occupied Band Width                                 |
| ASK            | Amplitude Shift Keying                                          | OFDM    | Orthogonal Frequency Division Multiplexing          |
| Atten., ATT    | Attenuator                                                      | P/M     | Power meter                                         |
| AV             | Average                                                         | PCB     | Printed Circuit Board                               |
| BPSK           | Binary Phase-Shift Keying                                       | PER     | Packet Error Rate                                   |
| BR             | Bluetooth Basic Rate                                            | PHY     | Physical Layer                                      |
| BT             | Bluetooth                                                       | PK      | Peak                                                |
| BT LE          | Bluetooth Low Energy                                            | PN      | Pseudo random Noise                                 |
| BW             | BandWidth                                                       | PRBS    | Pseudo-Random Bit Sequence                          |
| Cal Int        | Calibration Interval                                            | PSD     | Power Spectral Density                              |
| CCK            | Complementary Code Keying                                       | QAM     | Quadrature Amplitude Modulation                     |
| Ch., CH        | Channel                                                         | QP      | Quasi-Peak                                          |
| CISPR          | Comite International Special des Perturbations Radioelectriques | QPSK    | Quadri-Phase Shift Keying                           |
| CW             | Continuous Wave                                                 | RBW     | Resolution Band Width                               |
| DBPSK          | Differential BPSK                                               | RDS     | Radio Data System                                   |
| DC             | Direct Current                                                  | RE      | Radio Equipment                                     |
| D-factor       | Distance factor                                                 | RF      | Radio Frequency                                     |
| DFS            | Dynamic Frequency Selection                                     | RMS     | Root Mean Square                                    |
| DQPSK          | Differential QPSK                                               | RSS     | Radio Standards Specifications                      |
| DSSS           | Direct Sequence Spread Spectrum                                 | Rx      | Receiving                                           |
| EDR            | Enhanced Data Rate                                              | SA, S/A | Spectrum Analyzer                                   |
| EIRP, e.i.r.p. | Equivalent Isotropically Radiated Power                         | SG      | Signal Generator                                    |
| EMC            | ElectroMagnetic Compatibility                                   | SVSWR   | Site-Voltage Standing Wave Ratio                    |
| EMI            | ElectroMagnetic Interference                                    | TR      | Test Receiver                                       |
| EN             | European Norm                                                   | Tx      | Transmitting                                        |
| ERP, e.r.p.    | Effective Radiated Power                                        | VBW     | Video BandWidth                                     |
| EU             | European Union                                                  | Vert.   | Vertical                                            |
| EUT            | Equipment Under Test                                            | WLAN    | Wireless LAN                                        |
| Fac.           | Factor                                                          |         |                                                     |
| FCC            | Federal Communications Commission                               |         |                                                     |
| FHSS           | Frequency Hopping Spread Spectrum                               |         |                                                     |
| FM             | Frequency Modulation                                            |         |                                                     |
| Freq.          | Frequency                                                       |         |                                                     |
| FSK            | Frequency Shift Keying                                          |         |                                                     |
| GFSK           | Gaussian Frequency-Shift Keying                                 |         |                                                     |
| GNSS           | Global Navigation Satellite System                              |         |                                                     |
| GPS            | Global Positioning System                                       |         |                                                     |
| Hori.          | Horizontal                                                      |         |                                                     |
| ICES           | Interference-Causing Equipment Standard                         |         |                                                     |
| IEC            | International Electrotechnical Commission                       |         |                                                     |
| IEEE           | Institute of Electrical and Electronics Engineers               |         |                                                     |
| IF             | Intermediate Frequency                                          |         |                                                     |
| ILAC           | International Laboratory Accreditation Conference               |         |                                                     |
| ISED           | Innovation, Science and Economic Development Canada             |         |                                                     |
| ISO            | International Organization for Standardization                  |         |                                                     |
| JAB            | Japan Accreditation Board                                       |         |                                                     |
| LAN            | Local Area Network                                              |         |                                                     |
| LIMS           | Laboratory Information Management System                        |         |                                                     |

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## **SECTION 1: Customer information**

|                  |   |                                                               |
|------------------|---|---------------------------------------------------------------|
| Company Name     | : | silex technology, Inc.                                        |
| Address          | : | 2-3-1 Hikaridai, Seika-cho, Soraku-gun, Kyoto 619-0237, Japan |
| Telephone Number | : | +81-774-98-3878                                               |
| Facsimile Number | : | +81-774-98-3758                                               |
| Contact Person   | : | Katsutoshi Daikoku                                            |

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (E.U.T.), other than Receipt Date
- SECTION 4: Operation of E.U.T. during testing

\* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

## **SECTION 2: Equipment under test (EUT)**

### **2.1 Identification of EUT**

|                            |   |                                                                                           |
|----------------------------|---|-------------------------------------------------------------------------------------------|
| Type                       | : | Embedded Wireless Module                                                                  |
| Model Number               | : | SX-NEWAH                                                                                  |
| Serial Number              | : | Refer to SECTION 4.2                                                                      |
| Rating                     | : | DC 4 V, DC 3.3 V                                                                          |
| Receipt Date               | : | February 16, 2020                                                                         |
| Country of Mass-production | : | Japan                                                                                     |
| Condition                  | : | Production prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification               | : | No Modification by the test lab.                                                          |

### **2.2 Product Description**

Model: SX-NEWAH (referred to as the EUT in this report) is a Embedded Wireless Module.

## **Radio Specification**

|                           |   |                                                                                                 |
|---------------------------|---|-------------------------------------------------------------------------------------------------|
| Radio Type                | : | Transceiver                                                                                     |
| Frequency of Operation    | : | 1 MHz: 903.5 MHz to 926.5 MHz<br>2 MHz: 905.0 MHz to 925.0 MHz<br>4 MHz: 910.0 MHz to 922.0 MHz |
| Modulation                | : | OFDM with BPSK, QPSK, 16QAM, 64QAM                                                              |
| Antenna type              | : | PCB Antenna<br>ROD Antenna                                                                      |
| Antenna Gain              | : | PCB Antenna: 3.0 dBi<br>ROD Antenna: 3.4 dBi                                                    |
| Clock frequency (Maximum) | : | 32 MHz                                                                                          |

## SECTION 3: Test specification, procedures & results

### 3.1 Test Specification

Test Specification : FCC Part 15 Subpart C  
FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019 except 15.258

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz,  
and 5725-5850 MHz

### 3.2 Procedures and results

| Item                                          | Test Procedure                                                              | Specification                                                              | Worst margin                                             | Results             | Remarks                                                           |
|-----------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------|---------------------|-------------------------------------------------------------------|
| Conducted Emission                            | FCC: ANSI C63.10-2013<br>6. Standard test methods<br>ISED: RSS-Gen 8.8      | FCC: Section 15.207<br>ISED: RSS-Gen 8.8                                   | 10.18 dB<br>0.28050 MHz, QP                              | Complied<br>a)      | -                                                                 |
| 6dB Bandwidth                                 | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: -            | FCC: Section<br>15.247(a)(2)<br>ISED: RSS-247 5.2(a)                       | See data.                                                | Complied<br>b)      | Conducted                                                         |
| Maximum Average Output Power                  | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: RSS-Gen 6.12 | FCC: Section<br>15.247(b)(3)<br>ISED: RSS-247 5.4(d)                       |                                                          | Complied<br>c)      | Conducted                                                         |
| Power Density                                 | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(e)<br>ISED: RSS-247 5.2(b)                             |                                                          | Complied<br>d)      | Conducted                                                         |
| Spurious Emission<br>Restricted Band<br>Edges | FCC: KDB 558074 D01<br>15.247<br>Meas Guidance v05r02<br>ISED: RSS-Gen 6.13 | FCC: Section 15.247(d)<br>ISED: RSS-247 5.5<br>RSS-Gen 8.9<br>RSS-Gen 8.10 | 2.1 dB<br>960.000 MHz<br>QP, Horizontal<br>(PCB Antenna) | Complied#<br>e), f) | Conducted<br>(below 30 MHz)/<br>Radiated<br>(above 30 MHz)<br>*1) |

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

\*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.

- a) Refer to APPENDIX 1 (data of Conducted Emission)
- b) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)
- c) Refer to APPENDIX 1 (data of Maximum Average Output Power)
- d) Refer to APPENDIX 1 (data of Power Density)
- e) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
- f) Refer to APPENDIX 1 (data of Radiated Spurious Emission)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

\* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

#### FCC Part 15.31 (e)

The EUT has the power supply regulator.  
However one of the input voltages to RF part doesn't go through the regulator.  
The stable voltage was supplied to the EUT from the host jig during the tests.  
Therefore, the EUT complies with the requirement.

#### FCC Part 15.203 Antenna requirement

The EUT has an external antenna connector, but it is installed by the professionals.  
Therefore, the equipment complies with the antenna requirement of Section 15.203.

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### 3.3 Addition to standard

| Item                                                                        | Test Procedure | Specification | Worst margin | Results | Remarks   |
|-----------------------------------------------------------------------------|----------------|---------------|--------------|---------|-----------|
| 99% Occupied Bandwidth                                                      | RSS-Gen 6.7    | ISED: -       | N/A          | -<br>a) | Conducted |
| a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth) |                |               |              |         |           |

Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k=2$ .  
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#### Antenna Terminal test

| Test Item                                        | Uncertainty (+/-) |
|--------------------------------------------------|-------------------|
| 20 dB Bandwidth / 99 % Occupied Bandwidth        | 0.96 %            |
| Maximum Peak Output Power / Average Output Power | 1.4 dB            |
| Carrier Frequency Separation                     | 0.42 %            |
| Dwell time / Burst rate                          | 0.10 %            |
| Conducted Spurious Emission                      | 2.6 dB            |

#### Conducted emission

| using Item | Frequency range       | Uncertainty (+/-) |
|------------|-----------------------|-------------------|
| AMN (LISN) | 0.009 MHz to 0.15 MHz | 3.4 dB            |
|            | 0.15 MHz to 30 MHz    | 2.9 dB            |

#### Radiated emission

| Measurement distance | Frequency range                                | Uncertainty (+/-) |
|----------------------|------------------------------------------------|-------------------|
| 3 m                  | 9 kHz to 30 MHz                                | 3.3 dB            |
| 10 m                 |                                                | 3.2 dB            |
| 3 m                  | 30 MHz to 200 MHz (Horizontal)<br>(Vertical)   | 4.8 dB            |
|                      |                                                | 5.0 dB            |
|                      | 200 MHz to 1000 MHz (Horizontal)<br>(Vertical) | 5.2 dB            |
|                      |                                                | 6.3 dB            |
| 10 m                 | 30 MHz to 200 MHz (Horizontal)<br>(Vertical)   | 4.8 dB            |
|                      |                                                | 4.8 dB            |
|                      | 200 MHz to 1000 MHz (Horizontal)<br>(Vertical) | 5.0 dB            |
|                      |                                                | 5.0 dB            |
| 3 m                  | 1 GHz to 6 GHz                                 | 4.9 dB            |
|                      | 6 GHz to 18 GHz                                | 5.2 dB            |
| 1 m                  | 10 GHz to 26.5 GHz                             | 5.5 dB            |
|                      | 26.5 GHz to 40 GHz                             | 5.5 dB            |
| 10 m                 | 1 GHz to 18 GHz                                | 5.2 dB            |

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### 3.5 Test Location

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\*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

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| Test site                  | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms            | Maximum measurement distance |
|----------------------------|----------------------------|------------------------------------------------------------------|------------------------|------------------------------|
| No.1 semi-anechoic chamber | 19.2 x 11.2 x 7.7          | 7.0 x 6.0                                                        | No.1 Power source room | 10 m                         |
| No.2 semi-anechoic chamber | 7.5 x 5.8 x 5.2            | 4.0 x 4.0                                                        | -                      | 3 m                          |
| No.3 semi-anechoic chamber | 12.0 x 8.5 x 5.9           | 6.8 x 5.75                                                       | No.3 Preparation room  | 3 m                          |
| No.3 shielded room         | 4.0 x 6.0 x 2.7            | N/A                                                              | -                      | -                            |
| No.4 semi-anechoic chamber | 12.0 x 8.5 x 5.9           | 6.8 x 5.75                                                       | No.4 Preparation room  | 3 m                          |
| No.4 shielded room         | 4.0 x 6.0 x 2.7            | N/A                                                              | -                      | -                            |
| No.5 semi-anechoic chamber | 6.0 x 6.0 x 3.9            | 6.0 x 6.0                                                        | -                      | -                            |
| No.5 measurement room      | 6.4 x 6.4 x 3.0            | 6.4 x 6.4                                                        | -                      | -                            |
| No.6 shielded room         | 4.0 x 4.5 x 2.7            | 4.0 x 4.5                                                        | -                      | -                            |
| No.6 measurement room      | 4.75 x 5.4 x 3.0           | 4.75 x 4.15                                                      | -                      | -                            |
| No.7 shielded room         | 4.7 x 7.5 x 2.7            | 4.7 x 7.5                                                        | -                      | -                            |
| No.8 measurement room      | 3.1 x 5.0 x 2.7            | 3.1 x 5.0                                                        | -                      | -                            |
| No.9 measurement room      | 8.8 x 4.6 x 2.8            | 2.4 x 2.4                                                        | -                      | -                            |
| No.11 measurement room     | 6.2 x 4.7 x 3.0            | 4.8 x 4.6                                                        | -                      | -                            |

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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## SECTION 4: Operation of EUT during testing

### 4.1 Operating Mode(s)

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009

| Mode                                                                                                                                                                                                                 | Remarks*    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| IEEE 802.11ah (1 MHz)                                                                                                                                                                                                | MCS 10, PN9 |
| IEEE 802.11ah (2 MHz)                                                                                                                                                                                                | MCS 0, PN9  |
| IEEE 802.11ah (4 MHz)                                                                                                                                                                                                | MCS 0, PN9  |
| *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)                                                                                                              |             |
| *Power of the EUT was set by the software as follows;<br>Power settings: Refer to below table<br>Software: nrc7292_lmactest_freertos.bin<br>nrc7292_boot.bin                                                         |             |
| *This setting of software is the worst case.<br>Any conditions under the normal use do not exceed the condition of setting.<br>In addition, end users cannot change the settings of the output power of the product. |             |

<Power settings>

| 1MHz           | 903.5MHz | 915.5MHz | 926.5MHz |
|----------------|----------|----------|----------|
| 0.1.2.3.4.5.10 | 26       | 26       | 25       |
| 6              | 22       | 22       | 22       |
| 7              | 19       | 19       | 19       |
| 2MHz           | 905.0MHz | 917.0MHz | 925.0MHz |
| 0.1.2.3.4.     | 26       | 26       | 25       |
| 5              | 25       | 25       | 25       |
| 6              | 20       | 20       | 20       |
| 7              | 19       | 19       | 19       |
| 4MHz           | 910.0MHz | 918.0MHz | 922.0MHz |
| 0.1.2.3.4.5    | 25       | 25       | 25       |
| 6              | 20       | 20       | 20       |
| 7              | 19       | 19       | 19       |

\*The details of Operating mode(s)

| Test Item                                                                                                                                              | Operating Mode | Tested frequency |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|
| Conducted Emission *1)                                                                                                                                 | Tx (1MHz)      | 915.5 MHz        |
|                                                                                                                                                        | Tx (2MHz)      | 917.0 MHz        |
|                                                                                                                                                        | Tx (4 MHz)     | 910.0 MHz        |
| 6dB Bandwidth<br>99 % Occupied Bandwidth<br>Maximum Average Output Power<br>Radiated Spurious Emission<br>Conducted Spurious Emission<br>Power Density | Tx (1MHz)      | 903.5 MHz        |
|                                                                                                                                                        |                | 915.5 MHz        |
|                                                                                                                                                        |                | 926.5 MHz        |
|                                                                                                                                                        | Tx (2MHz)      | 905.0 MHz        |
|                                                                                                                                                        |                | 917.0 MHz        |
|                                                                                                                                                        |                | 925.0 MHz        |
|                                                                                                                                                        | Tx (4 MHz)     | 910.0 MHz        |
|                                                                                                                                                        |                | 918.0 MHz        |
|                                                                                                                                                        |                | 922.0 MHz        |
| *1) The mode was tested as a representative, because it had the highest power at antenna terminal test.                                                |                |                  |

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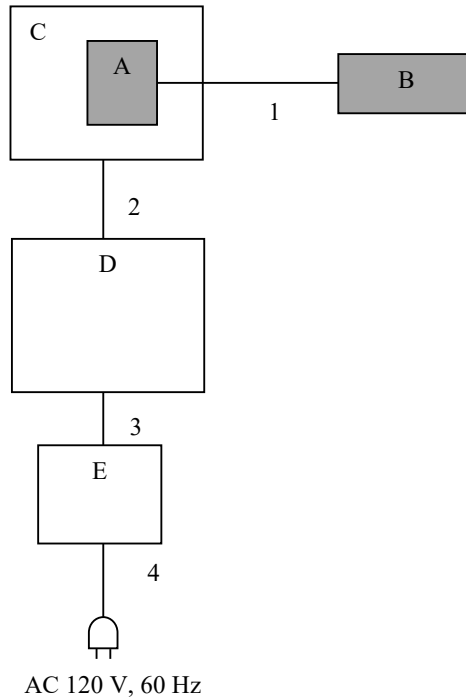
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## 4.2 Configuration and peripherals



\* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

### Description of EUT and Support equipment

| No. | Item                     | Model number   | Serial number               | Manufacturer           | Remarks |
|-----|--------------------------|----------------|-----------------------------|------------------------|---------|
| A   | Embedded Wireless Module | SX-NEWAH       | 84253F014013                | silex technology, Inc. | EUT     |
| B   | PCB Antenna              | T16-062-1022   | 001                         | STAF                   | EUT     |
|     | ROD Antenna              | 9000984-XLPDNB | 001                         | ethertronics           | EUT     |
| C   | Jig board                | SX-NEWAH-EVK   | ZXE04198                    | silex technology, Inc. | -       |
| D   | Laptop PC                | Latitude 5590  | 8178787478                  | Dell                   | -       |
| E   | AC adaptor               | LA90PM130      | CN-05GT3K-L0C00-8A-4F28-A02 | Dell                   | -       |

### List of cables used

| No. | Name          | Length (m) | Shield     |            | Remarks |
|-----|---------------|------------|------------|------------|---------|
|     |               |            | Cable      | Connector  |         |
| 1   | Antenna Cable | 0.15       | Shielded   | Shielded   | -       |
| 2   | USB Cable     | 1.90       | Shielded   | Shielded   | -       |
| 3   | DC Cable      | 1.80       | Unshielded | Unshielded | -       |
| 4   | AC Cable      | 1.00       | Unshielded | Unshielded | -       |

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## **SECTION 5: Conducted Emission**

### **Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

#### 1) For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

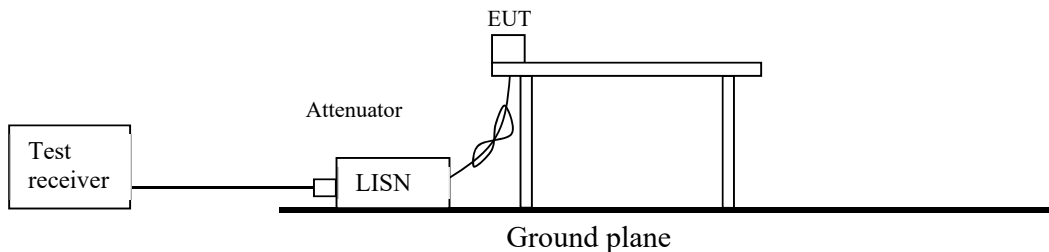
The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

|                          |                            |
|--------------------------|----------------------------|
| <b>Detector</b>          | <b>: QP and CISPR AV</b>   |
| <b>Measurement range</b> | <b>: 0.15 MHz - 30 MHz</b> |
| <b>Test data</b>         | <b>: APPENDIX</b>          |
| <b>Test result</b>       | <b>: Pass</b>              |

**Figure 1: Test Setup**



## **SECTION 6: Radiated Spurious Emission**

### **Test Procedure**

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

#### **Test Antennas are used as below;**

|              |                   |                  |             |
|--------------|-------------------|------------------|-------------|
| Frequency    | 30 MHz to 200 MHz | 200 MHz to 1 GHz | Above 1 GHz |
| Antenna Type | Biconical         | Logperiodic      | Horn        |

In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

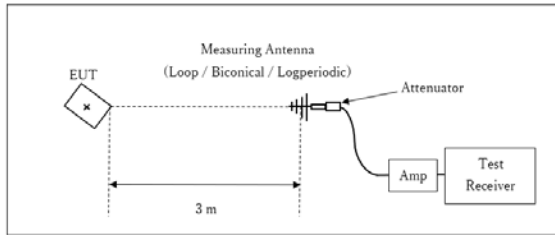
**30 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).**

| Frequency       | Below 1 GHz   | Above 1 GHz              |                                                                                                                                                                                                                                             | 30 dBc                       |
|-----------------|---------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Instrument used | Test Receiver | Spectrum Analyzer        |                                                                                                                                                                                                                                             | Spectrum Analyzer            |
| Detector        | QP            | PK                       | AV *1)                                                                                                                                                                                                                                      | PK                           |
| IF Bandwidth    | BW 120 kHz    | RBW: 1 MHz<br>VBW: 3 MHz | <u>11.12.2.5.1</u><br>RBW: 1 MHz<br>VBW: 3 MHz<br>Detector:<br>Power Averaging (RMS)<br>Trace: 100 traces<br><u>11.12.2.5.2</u><br>The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results. | RBW: 100 kHz<br>VBW: 300 kHz |

\*1) Average Power Measurement was performed based on ANSI C63.10-2013.

**Figure 2: Test Setup**

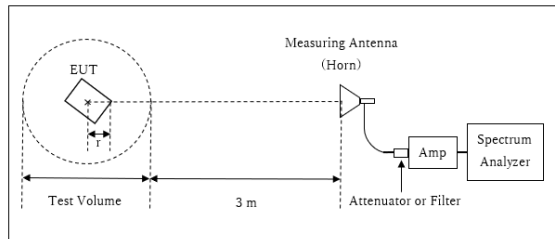
Below 1 GHz



x : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



r : Radius of an outer periphery of EUT

x : Center of turn table

Distance Factor:  $20 \times \log (3.9 \text{ m} / 3.0 \text{ m}) = 2.28 \text{ dB}$

\* Test Distance:  $(3 + \text{Test Volume} / 2) - r = 3.9 \text{ m}$

Test Volume : 2.0 m

(Test Volume has been calibrated based on CISPR 16-1-4.)

$r = 0.1 \text{ m}$

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT and antennas to see the position of maximum noise, and the test was made at the position that has the maximum noise.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

|                   |                  |
|-------------------|------------------|
| Measurement range | : 30 MHz -10 GHz |
| Test data         | : APPENDIX       |
| Test result       | : Pass           |

## SECTION 7: Antenna Terminal Conducted Tests

### Test Procedure

The tests were made with below setting connected to the antenna port.

| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Span                                                     | RBW             | VBW                | Sweep time | Detector | Trace      | Instrument used                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------|--------------------|------------|----------|------------|---------------------------------|
| 6dB Bandwidth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3 MHz (for 1MHz)<br>5 MHz (for 2MHz)<br>7 MHz (for 4MHz) | 100 kHz         | 300 kHz            | Auto       | Peak     | Max Hold   | Spectrum Analyzer               |
| 99% Occupied Bandwidth *1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Enough width to display emission skirts                  | 1 to 5 % of OBW | Three times of RBW | Auto       | Peak     | Max Hold   | Spectrum Analyzer               |
| Maximum Average Output Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -                                                        | -               | -                  | Auto       | Average  | -          | Power Meter (Sensor: 50 MHz BW) |
| Peak Power Density                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.5 times the OBW                                        | 3 kHz           | 10 kHz             | Auto       | Average  | 100 traces | Spectrum Analyzer               |
| Conducted Spurious Emission *3) *4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 9kHz to 150kHz                                           | 200 Hz          | 620 Hz             | Auto       | Peak     | Max Hold   | Spectrum Analyzer               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 150kHz to 30MHz                                          | 9.1 kHz         | 27 kHz             |            |          |            |                                 |
| <p>*1) Peak hold was applied as Worst-case measurement.</p> <p>*2) Section 11.10.3 Method AVGPSD-1 of "ANSI C63.10-2013".</p> <p>*3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.</p> <p>Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.</p> <p>(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz)</p> <p>*4) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to 45.5 – 51.5 = -6.0 dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.</p> |                                                          |                 |                    |            |          |            |                                 |

The test results and limit are rounded off to two decimals place, so some differences might be observed.  
The equipment and cables were not used for factor 0 dB of the data sheets.

Test data : APPENDIX  
Test result : Pass

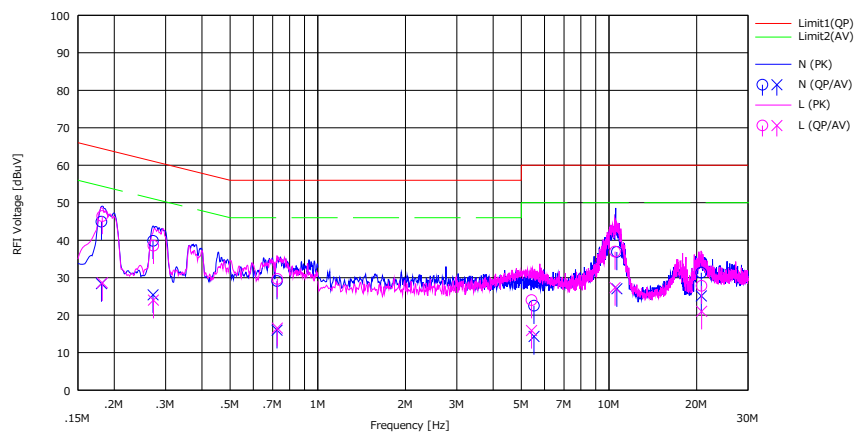
## APPENDIX 1: Test data

### Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 915.5 MHz (1 MHz)

(PCB Antenna)

Limit : FCC\_Part 15 Subpart C(15.207)

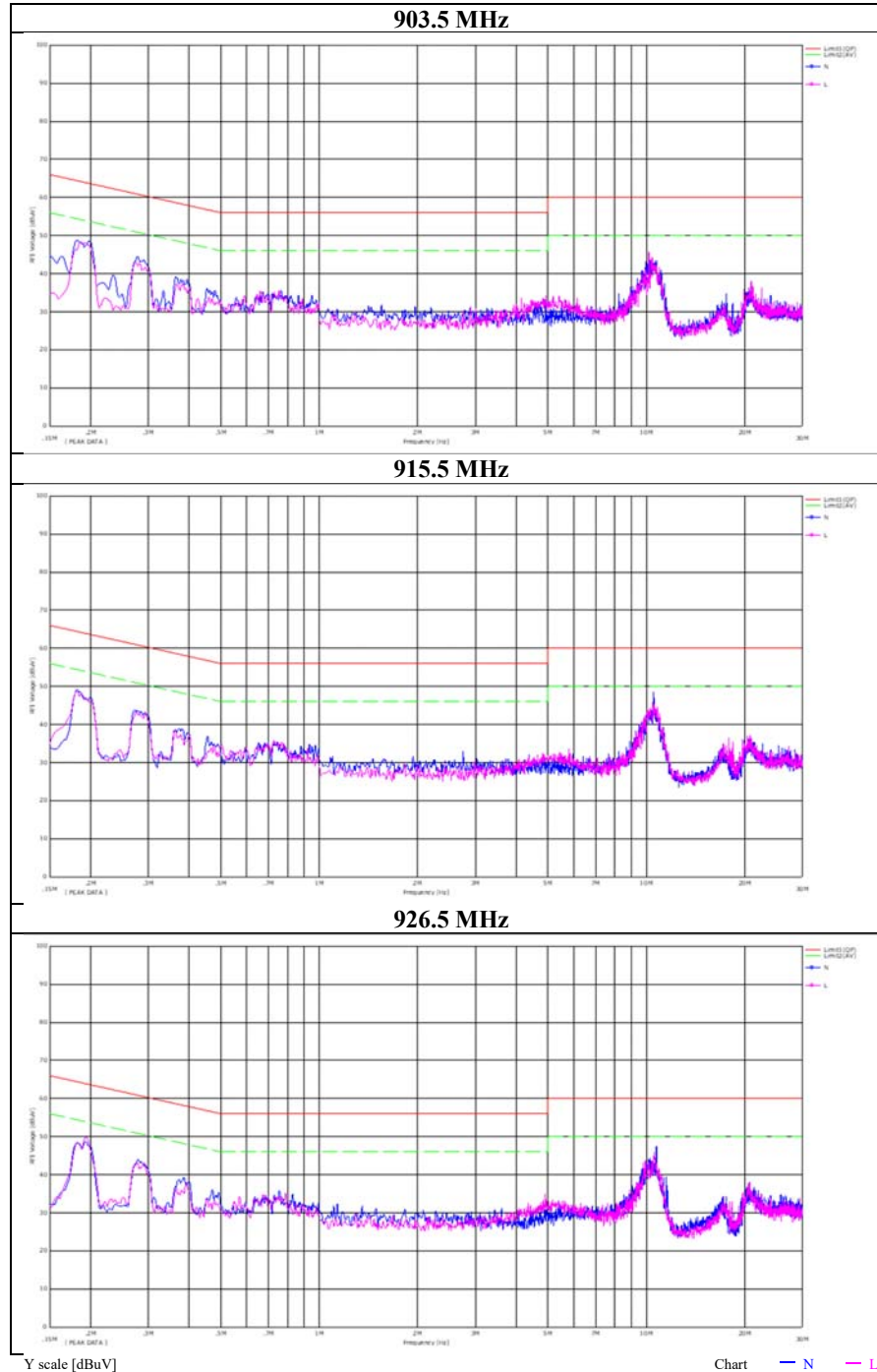


| No. | Freq.<br>[MHz] | Reading        |                | USN  | LOSS  | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|------|-------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | [QP]<br>[dBuV] | [AV]<br>[dBuV] |      |       | [QP]<br>[dBuV] | [AV]<br>[dBuV] | [QP]<br>[dBuV] | [AV]<br>[dBuV] | [QP]<br>[dB] | [AV]<br>[dB] |       |         |
| 1   | 0.18080        | 31.70          | 15.20          | 0.07 | 13.14 | 44.91          | 28.41          | 64.40          | 54.40          | 19.49        | 25.99        | N     |         |
| 2   | 0.27170        | 26.60          | 12.20          | 0.07 | 13.15 | 39.82          | 25.42          | 61.10          | 51.10          | 21.28        | 25.68        | N     |         |
| 3   | 0.72430        | 15.80          | 2.70           | 0.08 | 13.19 | 29.07          | 15.97          | 56.00          | 46.00          | 26.93        | 30.03        | N     |         |
| 4   | 5.52400        | 8.90           | 0.70           | 0.15 | 13.46 | 22.51          | 14.31          | 60.00          | 50.00          | 37.49        | 35.69        | N     |         |
| 5   | 10.64000       | 23.00          | 13.20          | 0.23 | 13.61 | 36.84          | 27.04          | 60.00          | 50.00          | 23.16        | 22.96        | N     |         |
| 6   | 20.74000       | 17.10          | 10.90          | 0.39 | 13.84 | 31.33          | 25.13          | 60.00          | 50.00          | 28.67        | 24.87        | N     |         |
| 7   | 0.18190        | 33.20          | 15.40          | 0.07 | 13.14 | 46.41          | 28.61          | 64.40          | 54.40          | 17.99        | 25.79        | L     |         |
| 8   | 0.27250        | 25.30          | 10.80          | 0.06 | 13.15 | 38.51          | 24.01          | 61.00          | 51.00          | 22.49        | 26.99        | L     |         |
| 9   | 0.72590        | 16.40          | 3.30           | 0.05 | 13.19 | 29.64          | 16.54          | 56.00          | 46.00          | 26.36        | 29.46        | L     |         |
| 10  | 5.42000        | 10.40          | 2.30           | 0.16 | 13.44 | 24.00          | 15.90          | 60.00          | 50.00          | 36.00        | 34.10        | L     |         |
| 11  | 10.49000       | 23.10          | 13.50          | 0.25 | 13.60 | 36.95          | 27.35          | 60.00          | 50.00          | 23.05        | 22.65        | L     |         |
| 12  | 20.78000       | 13.50          | 6.70           | 0.48 | 13.84 | 27.82          | 21.02          | 60.00          | 50.00          | 32.18        | 28.98        | L     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 915.5 MHz (1 MHz)



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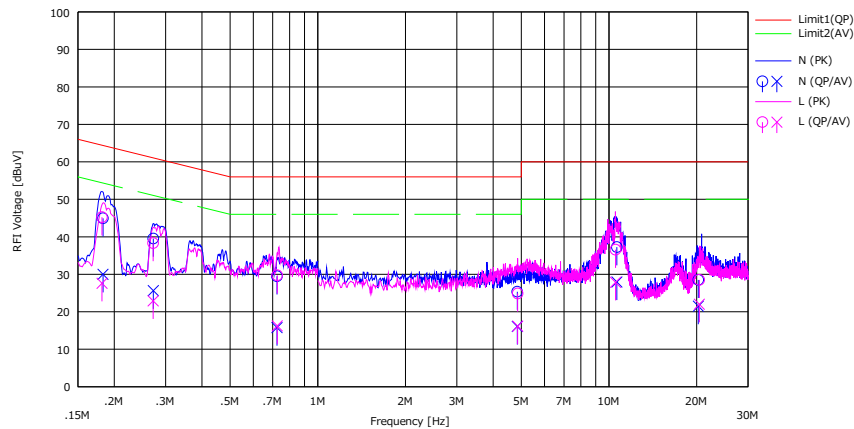
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 917.0 MHz (2 MHz)

Limit : FCC\_Part 15 Subpart C(15.207)

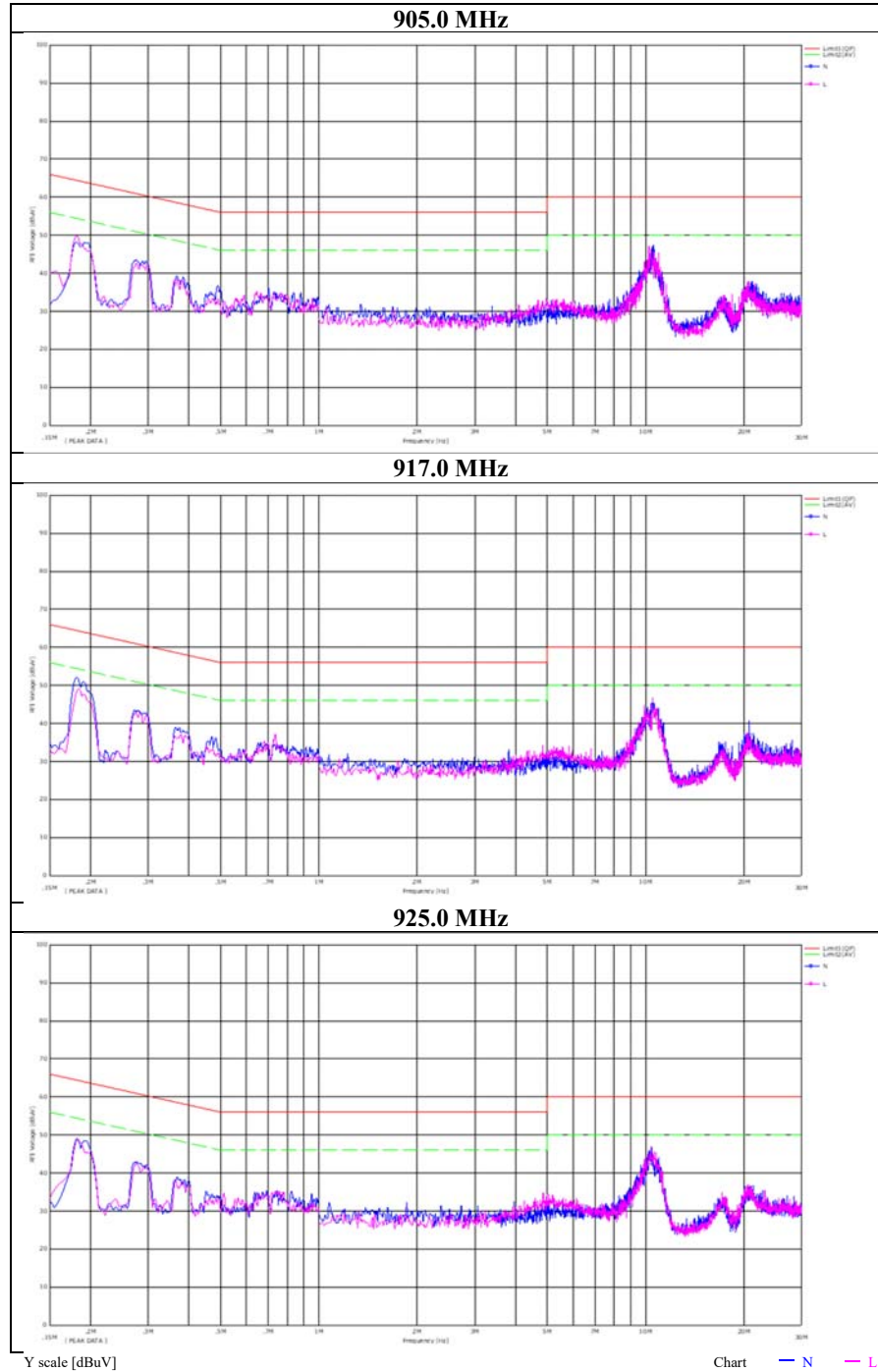


| No. | Freq.<br>[MHz] | Reading        |                | LISN<br>[dB] | LOSS<br>[dB] | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|--------------|--------------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | <QP><br>[dBuV] | <AV><br>[dBuV] |              |              | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dB] | <AV><br>[dB] |       |         |
| 1   | 0.18300        | 31.70          | 16.80          | 0.07         | 13.14        | 44.91          | 30.01          | 64.30          | 54.30          | 19.39        | 24.29        | N     |         |
| 2   | 0.27230        | 26.30          | 12.40          | 0.07         | 13.15        | 39.52          | 25.62          | 61.00          | 51.00          | 21.48        | 25.38        | N     |         |
| 3   | 0.72380        | 16.20          | 2.50           | 0.08         | 13.19        | 29.47          | 15.77          | 56.00          | 46.00          | 26.53        | 30.23        | N     |         |
| 4   | 4.84060        | 11.80          | 2.50           | 0.14         | 13.42        | 25.36          | 16.06          | 56.00          | 46.00          | 30.64        | 29.94        | N     |         |
| 5   | 10.64000       | 23.40          | 14.10          | 0.23         | 13.61        | 37.24          | 27.94          | 60.00          | 50.00          | 22.76        | 22.06        | N     |         |
| 6   | 20.26000       | 14.30          | 7.30           | 0.38         | 13.83        | 28.51          | 21.51          | 60.00          | 50.00          | 31.49        | 28.49        | N     |         |
| 7   | 0.18150        | 32.00          | 14.40          | 0.07         | 13.14        | 45.21          | 27.61          | 64.40          | 54.40          | 19.19        | 26.79        | L     |         |
| 8   | 0.27190        | 25.10          | 9.70           | 0.06         | 13.15        | 38.31          | 22.91          | 61.10          | 51.10          | 22.79        | 28.19        | L     |         |
| 9   | 0.72530        | 16.50          | 3.00           | 0.05         | 13.19        | 29.74          | 16.24          | 56.00          | 46.00          | 26.26        | 29.76        | L     |         |
| 10  | 4.85680        | 11.30          | 2.60           | 0.15         | 13.42        | 24.87          | 16.17          | 56.00          | 46.00          | 31.13        | 29.83        | L     |         |
| 11  | 10.53000       | 22.70          | 14.00          | 0.25         | 13.60        | 36.55          | 27.85          | 60.00          | 50.00          | 23.45        | 22.15        | L     |         |
| 12  | 20.42000       | 14.20          | 7.70           | 0.47         | 13.84        | 28.51          | 22.01          | 60.00          | 50.00          | 31.49        | 27.99        | L     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 917.0 MHz (2 MHz)



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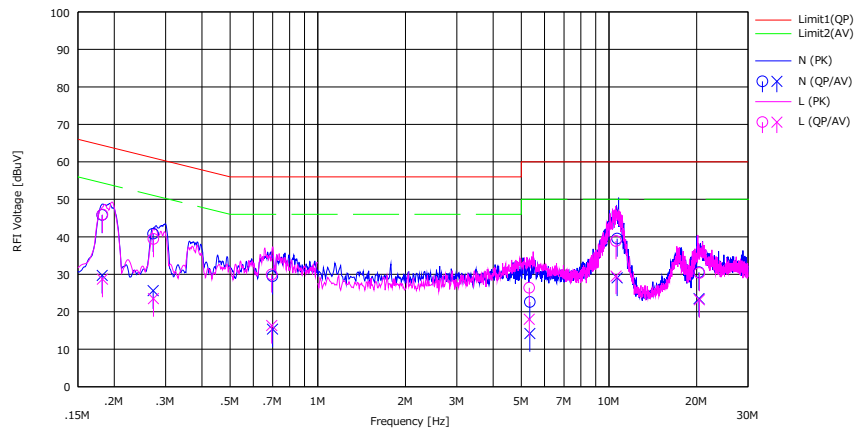
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 910.0 MHz (4 MHz)

Limit : FCC\_Part 15 Subpart C(15.207)

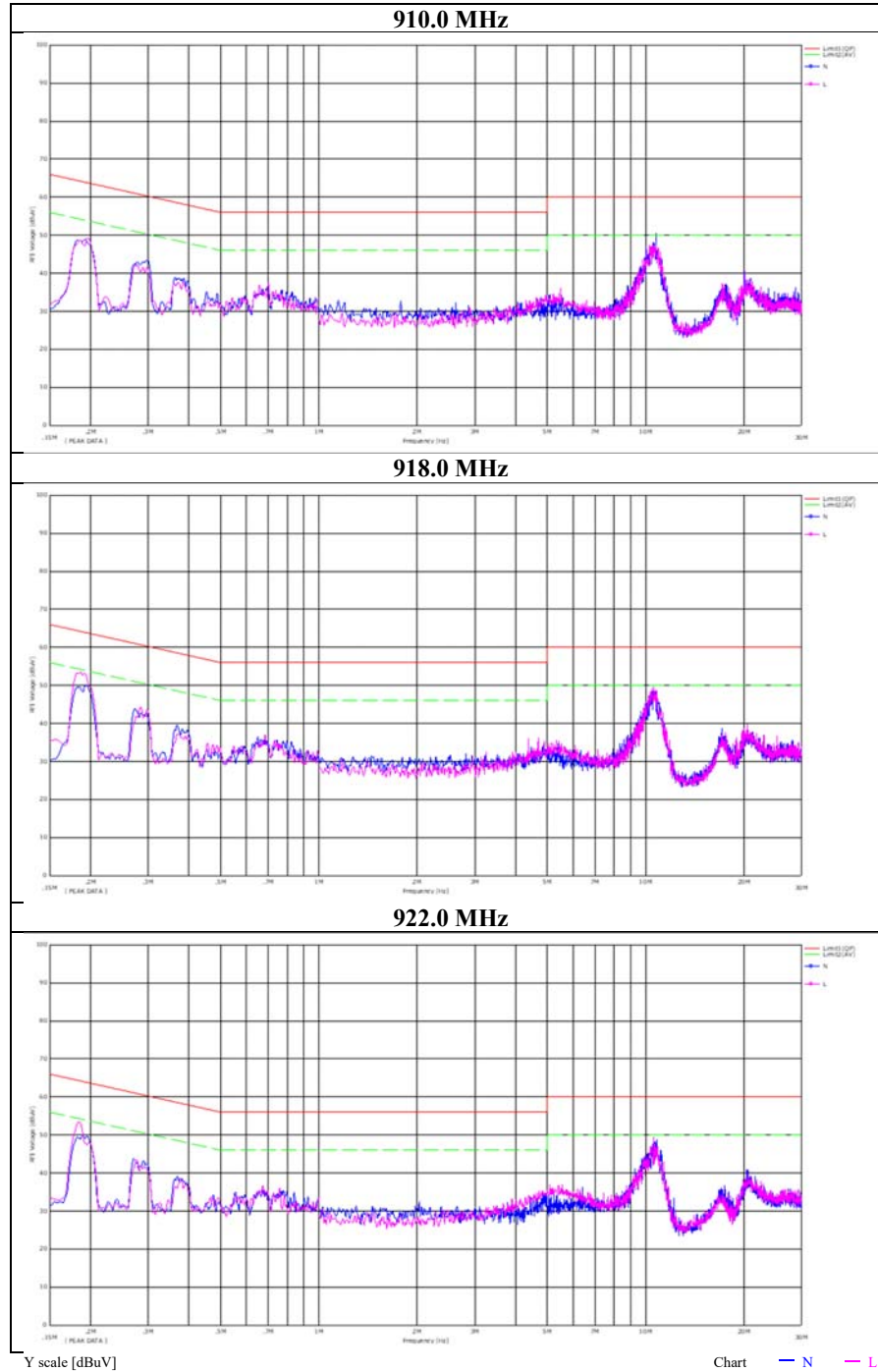


| No. | Freq.<br>[MHz] | Reading        |                | LISN | LOSS  | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|------|-------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | <QP><br>[dBuV] | <AV><br>[dBuV] |      |       | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dB] | <AV><br>[dB] |       |         |
| 1   | 0.18180        | 32.60          | 16.50          | 0.07 | 13.14 | 45.81          | 29.71          | 64.40          | 54.40          | 18.59        | 24.69        | N     |         |
| 2   | 0.27200        | 27.60          | 12.40          | 0.07 | 13.15 | 40.82          | 25.62          | 61.10          | 51.10          | 20.28        | 25.48        | N     |         |
| 3   | 0.69845        | 16.20          | 2.10           | 0.08 | 13.19 | 29.47          | 15.37          | 56.00          | 46.00          | 26.53        | 30.63        | N     |         |
| 4   | 5.34700        | 9.00           | 0.60           | 0.15 | 13.44 | 22.59          | 14.19          | 60.00          | 50.00          | 37.41        | 35.81        | N     |         |
| 5   | 10.66000       | 25.70          | 15.20          | 0.23 | 13.61 | 39.54          | 29.04          | 60.00          | 50.00          | 20.46        | 20.96        | N     |         |
| 6   | 20.36000       | 16.30          | 9.30           | 0.38 | 13.84 | 30.52          | 23.52          | 60.00          | 50.00          | 29.48        | 26.48        | N     |         |
| 7   | 0.18220        | 32.70          | 15.50          | 0.07 | 13.14 | 45.91          | 28.71          | 64.40          | 54.40          | 18.49        | 25.69        | L     |         |
| 8   | 0.27250        | 26.20          | 10.30          | 0.06 | 13.15 | 39.41          | 23.51          | 61.00          | 51.00          | 21.59        | 27.49        | L     |         |
| 9   | 0.69490        | 16.70          | 3.10           | 0.05 | 13.19 | 29.94          | 16.34          | 56.00          | 46.00          | 26.06        | 29.66        | L     |         |
| 10  | 5.32000        | 12.80          | 4.40           | 0.16 | 13.44 | 26.40          | 18.00          | 60.00          | 50.00          | 33.60        | 32.00        | L     |         |
| 11  | 10.56400       | 25.00          | 15.70          | 0.25 | 13.60 | 38.85          | 29.55          | 60.00          | 50.00          | 21.15        | 20.45        | L     |         |
| 12  | 20.44000       | 16.00          | 8.90           | 0.47 | 13.84 | 30.31          | 23.21          | 60.00          | 50.00          | 29.69        | 26.79        | L     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 910.0 MHz (4 MHz)



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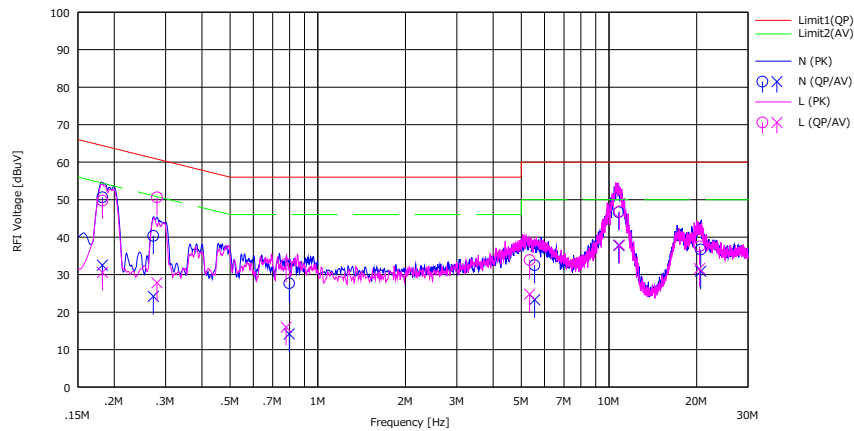
Facsimile : +81 596 24 8124

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 915.5 MHz (1 MHz)

(ROD Antenna)

Limit : FCC\_Part 15 Subpart C(15.207)



| No. | Freq.<br>[MHz] | Reading        |                | USN  | LOSS  | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|------|-------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | (QP)<br>[dBuV] | (AV)<br>[dBuV] |      |       | (QP)<br>[dBuV] | (AV)<br>[dBuV] | (QP)<br>[dBuV] | (AV)<br>[dBuV] | (QP)<br>[dB] | (AV)<br>[dB] |       |         |
| 1   | 0.18200        | 37.40          | 19.30          | 0.07 | 13.14 | 50.61          | 32.51          | 64.40          | 54.40          | 13.79        | 21.89        | N     |         |
| 2   | 0.27229        | 27.10          | 11.00          | 0.07 | 13.15 | 40.32          | 24.22          | 61.00          | 51.00          | 20.68        | 26.78        | N     |         |
| 3   | 0.79800        | 14.40          | 0.90           | 0.08 | 13.20 | 27.68          | 14.18          | 56.00          | 46.00          | 28.32        | 31.82        | N     |         |
| 4   | 5.55000        | 18.90          | 9.70           | 0.15 | 13.46 | 32.51          | 23.31          | 60.00          | 50.00          | 27.49        | 26.69        | N     |         |
| 5   | 10.79000       | 32.80          | 24.00          | 0.23 | 13.61 | 46.64          | 37.84          | 60.00          | 50.00          | 13.36        | 12.16        | N     |         |
| 6   | 20.64000       | 22.50          | 16.70          | 0.39 | 13.84 | 36.73          | 30.93          | 60.00          | 50.00          | 23.27        | 19.07        | N     |         |
| 7   | 0.18220        | 36.50          | 17.40          | 0.07 | 13.14 | 49.71          | 30.61          | 64.40          | 54.40          | 14.69        | 23.79        | L     |         |
| 8   | 0.28050        | 37.40          | 14.60          | 0.06 | 13.16 | 50.62          | 27.82          | 60.80          | 50.80          | 10.18        | 22.98        | L     |         |
| 9   | 0.77880        | 19.60          | 2.70           | 0.06 | 13.20 | 32.86          | 15.96          | 56.00          | 46.00          | 23.14        | 30.04        | L     |         |
| 10  | 5.34000        | 20.30          | 11.20          | 0.16 | 13.44 | 33.90          | 24.80          | 60.00          | 50.00          | 26.10        | 25.20        | L     |         |
| 11  | 10.86800       | 33.00          | 24.00          | 0.26 | 13.61 | 46.87          | 37.87          | 60.00          | 50.00          | 13.13        | 12.13        | L     |         |
| 12  | 20.46000       | 23.20          | 17.30          | 0.47 | 13.84 | 37.51          | 31.61          | 60.00          | 50.00          | 22.49        | 18.39        | L     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

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**Ise EMC Lab.**

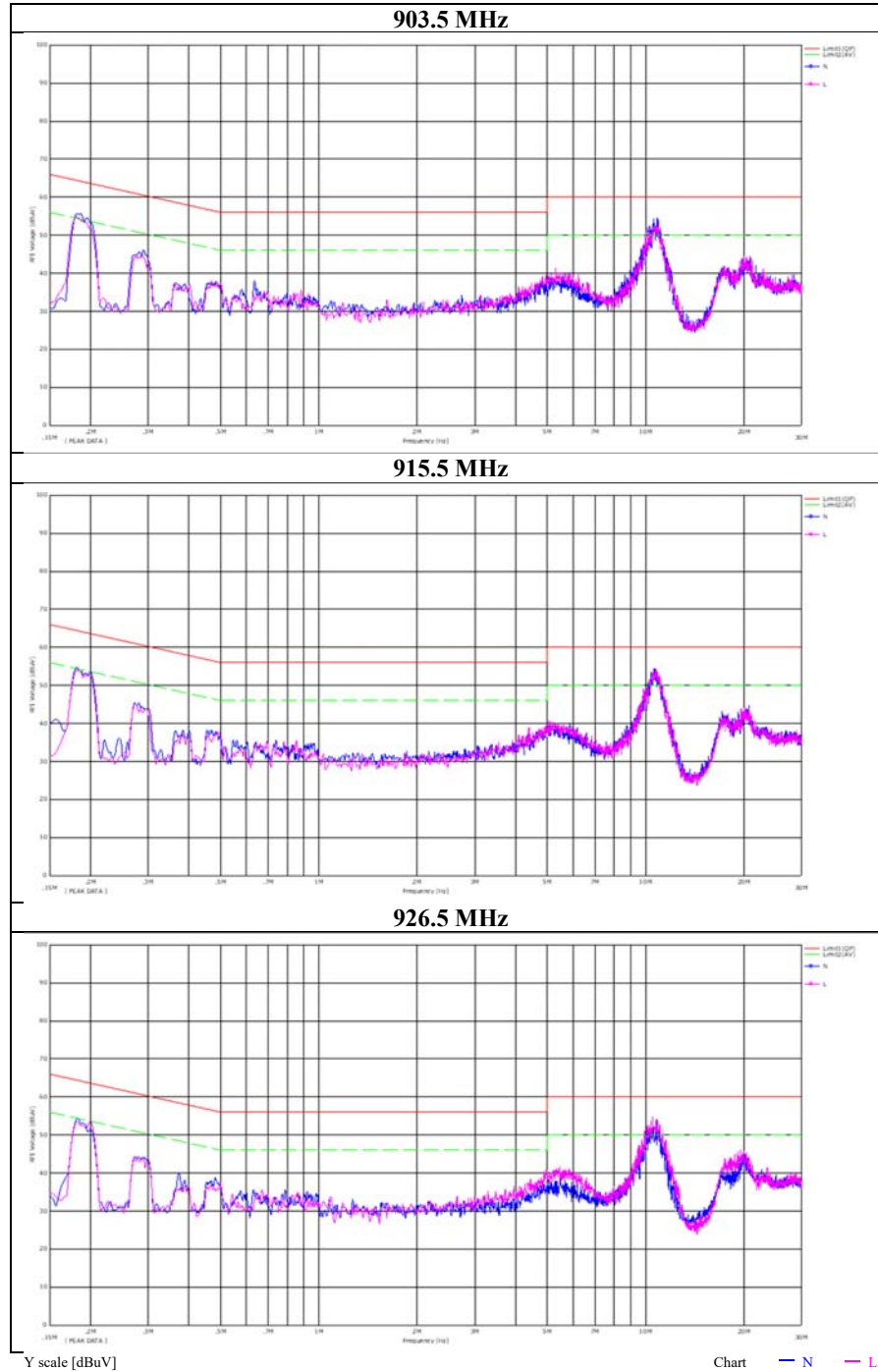
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 915.5 MHz (1 MHz)



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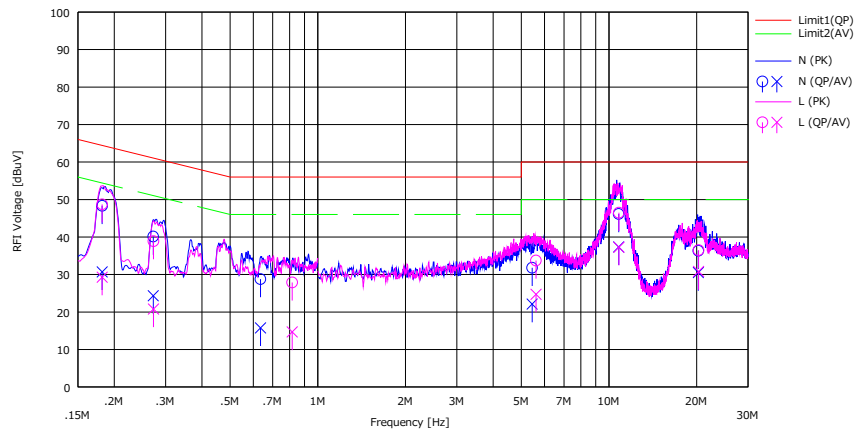
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 917.0 MHz (2 MHz)

Limit : FCC\_Part 15 Subpart C(15.207)

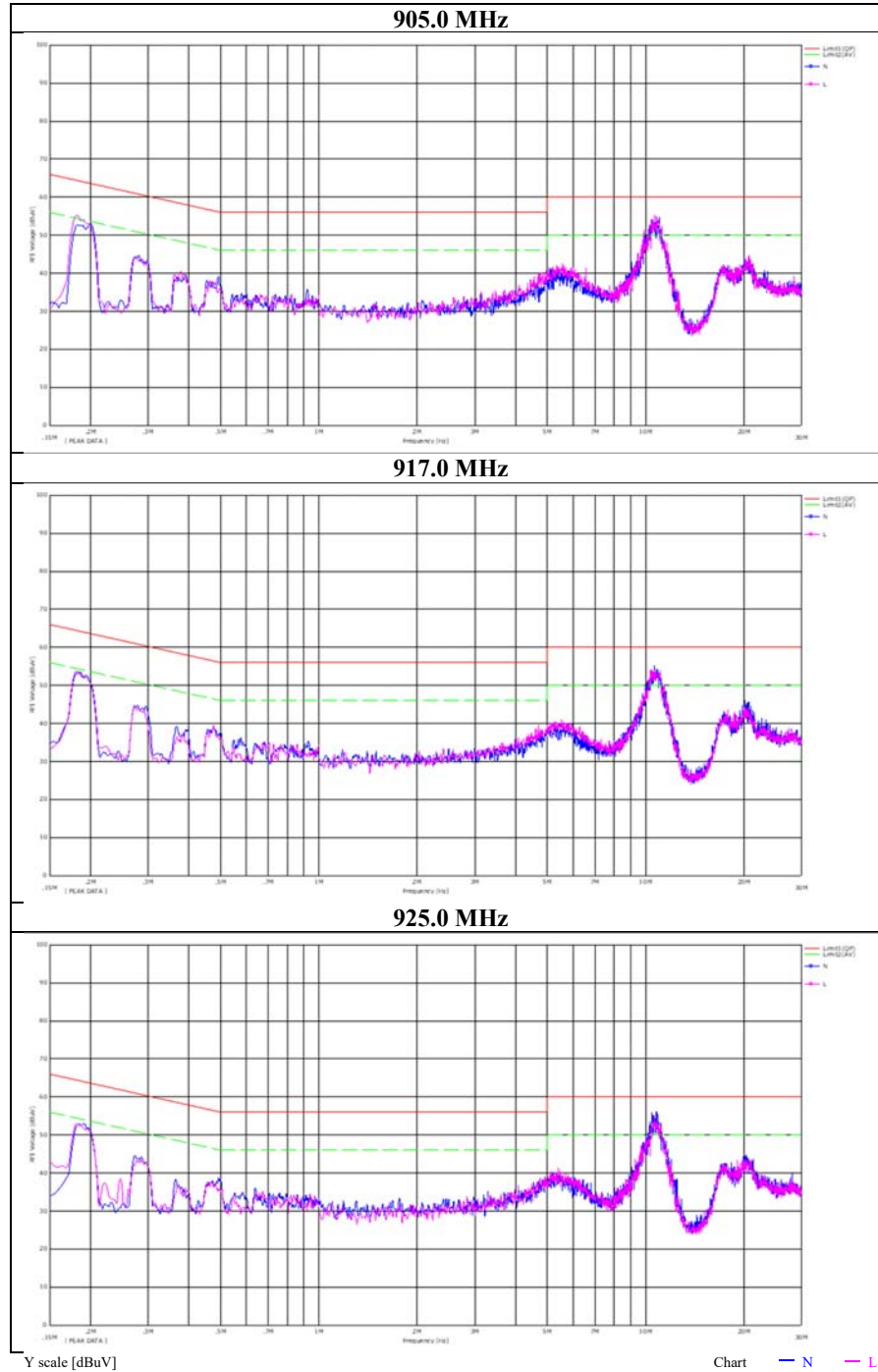


| No. | Freq.<br>[MHz] | Reading        |                | LISN | LOSS  | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|------|-------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | (QP)<br>[dBuV] | (AV)<br>[dBuV] |      |       | (QP)<br>[dBuV] | (AV)<br>[dBuV] | (QP)<br>[dBuV] | (AV)<br>[dBuV] | (QP)<br>[dB] | (AV)<br>[dB] |       |         |
| 1   | 0.18180        | 35.10          | 17.50          | 0.07 | 13.14 | 48.31          | 30.71          | 64.40          | 54.40          | 16.09        | 23.69        | N     |         |
| 2   | 0.27215        | 26.90          | 11.10          | 0.07 | 13.15 | 40.12          | 24.32          | 61.10          | 51.10          | 20.98        | 26.78        | N     |         |
| 3   | 0.63530        | 15.50          | 2.50           | 0.08 | 13.18 | 28.76          | 15.76          | 56.00          | 46.00          | 27.24        | 30.24        | N     |         |
| 4   | 5.44400        | 18.20          | 8.50           | 0.15 | 13.44 | 31.79          | 22.09          | 60.00          | 50.00          | 28.21        | 27.91        | N     |         |
| 5   | 10.79000       | 32.30          | 23.50          | 0.23 | 13.61 | 46.14          | 37.34          | 60.00          | 50.00          | 13.86        | 12.66        | N     |         |
| 6   | 20.26000       | 22.10          | 16.30          | 0.38 | 13.83 | 36.31          | 30.51          | 60.00          | 50.00          | 23.69        | 19.49        | N     |         |
| 7   | 0.18180        | 35.50          | 16.10          | 0.07 | 13.14 | 48.71          | 29.31          | 64.40          | 54.40          | 15.69        | 25.09        | L     |         |
| 8   | 0.27275        | 25.70          | 7.60           | 0.06 | 13.15 | 38.91          | 20.81          | 61.00          | 51.00          | 22.09        | 30.19        | L     |         |
| 9   | 0.81660        | 14.60          | 1.40           | 0.06 | 13.20 | 27.86          | 14.66          | 56.00          | 46.00          | 28.14        | 31.34        | L     |         |
| 10  | 5.61400        | 20.10          | 11.10          | 0.16 | 13.46 | 33.72          | 24.72          | 60.00          | 50.00          | 26.28        | 25.28        | L     |         |
| 11  | 10.80800       | 32.60          | 23.40          | 0.26 | 13.61 | 46.47          | 37.27          | 60.00          | 50.00          | 13.53        | 12.73        | L     |         |
| 12  | 20.30000       | 22.20          | 16.50          | 0.46 | 13.84 | 36.50          | 30.80          | 60.00          | 50.00          | 23.50        | 19.20        | L     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 917.0 MHz (2 MHz)



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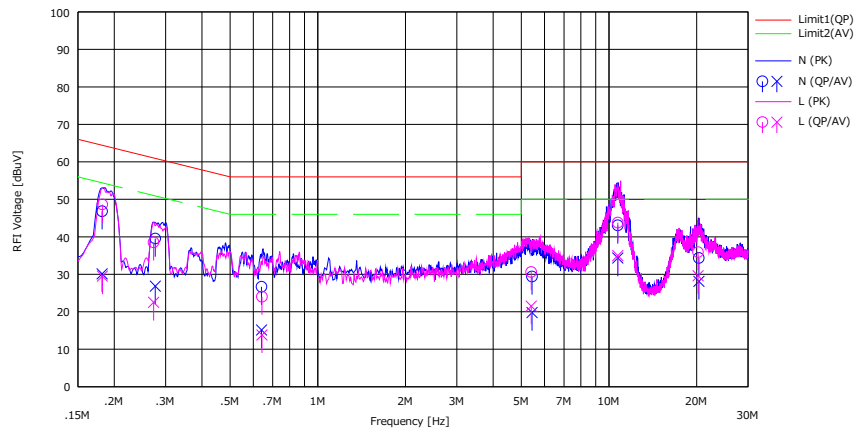
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 910.0 MHz (4 MHz)

Limit : FCC\_Part 15 Subpart C(15.207)

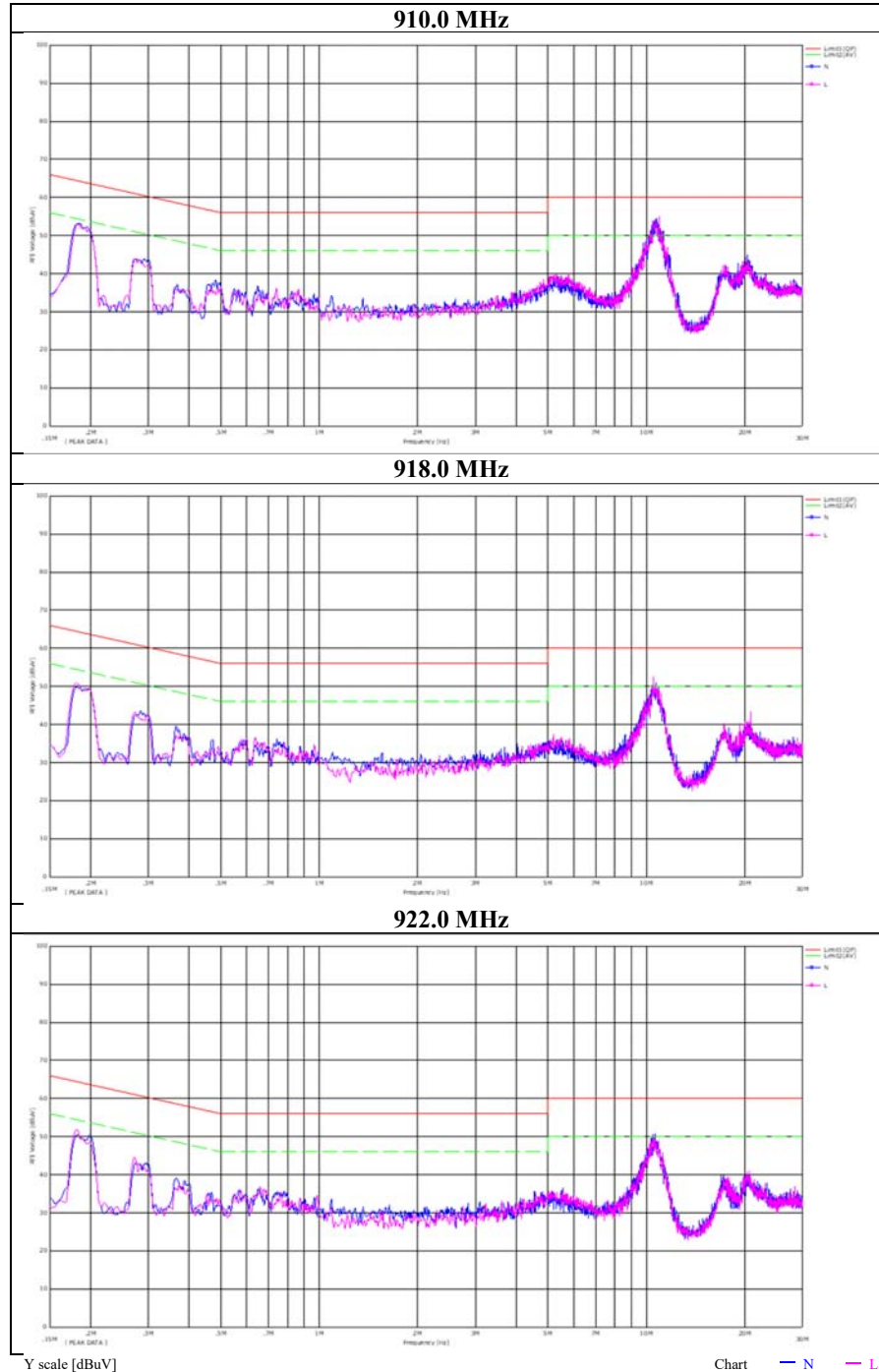


| No. | Freq.<br>[MHz] | Reading        |                | LISN | LOSS  | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|------|-------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | <QP><br>[dBuV] | <AV><br>[dBuV] |      |       | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dB] | <AV><br>[dB] |       |         |
| 1   | 0.18170        | 33.60          | 16.90          | 0.07 | 13.14 | 46.81          | 30.11          | 64.40          | 54.40          | 17.59        | 24.29        | N     |         |
| 2   | 0.27670        | 26.30          | 13.60          | 0.07 | 13.16 | 39.53          | 26.83          | 60.90          | 50.90          | 21.37        | 24.07        | N     |         |
| 3   | 0.64090        | 13.40          | 1.90           | 0.08 | 13.18 | 26.66          | 15.16          | 56.00          | 46.00          | 29.34        | 30.84        | N     |         |
| 4   | 5.43800        | 15.80          | 6.20           | 0.15 | 13.44 | 29.39          | 19.79          | 60.00          | 50.00          | 30.61        | 30.21        | N     |         |
| 5   | 10.72000       | 29.20          | 20.50          | 0.23 | 13.61 | 43.04          | 34.34          | 60.00          | 50.00          | 16.96        | 15.66        | N     |         |
| 6   | 20.34000       | 20.10          | 13.90          | 0.38 | 13.84 | 34.32          | 28.12          | 60.00          | 50.00          | 25.68        | 21.88        | N     |         |
| 7   | 0.18200        | 35.40          | 16.30          | 0.07 | 13.14 | 48.61          | 29.51          | 64.40          | 54.40          | 15.79        | 24.89        | L     |         |
| 8   | 0.27300        | 25.30          | 9.30           | 0.06 | 13.15 | 38.51          | 22.51          | 61.00          | 51.00          | 22.49        | 28.49        | L     |         |
| 9   | 0.64340        | 10.80          | 0.60           | 0.05 | 13.18 | 24.03          | 13.83          | 56.00          | 46.00          | 31.97        | 32.17        | L     |         |
| 10  | 5.40600        | 17.00          | 7.90           | 0.16 | 13.44 | 30.60          | 21.50          | 60.00          | 50.00          | 29.40        | 28.50        | L     |         |
| 11  | 10.71600       | 29.90          | 21.10          | 0.26 | 13.61 | 43.77          | 34.97          | 60.00          | 50.00          | 16.23        | 15.03        | L     |         |
| 12  | 20.22000       | 21.60          | 15.30          | 0.46 | 13.83 | 35.89          | 29.59          | 60.00          | 50.00          | 24.11        | 20.41        | L     |         |

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)  
Except for the above table: adequate margin data below the limits.

## Conducted Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Date March 23, 2020  
Temperature / Humidity 23 deg. C / 35 % RH  
Engineer Yuta Moriya  
Mode Tx 910.0 MHz (4 MHz)



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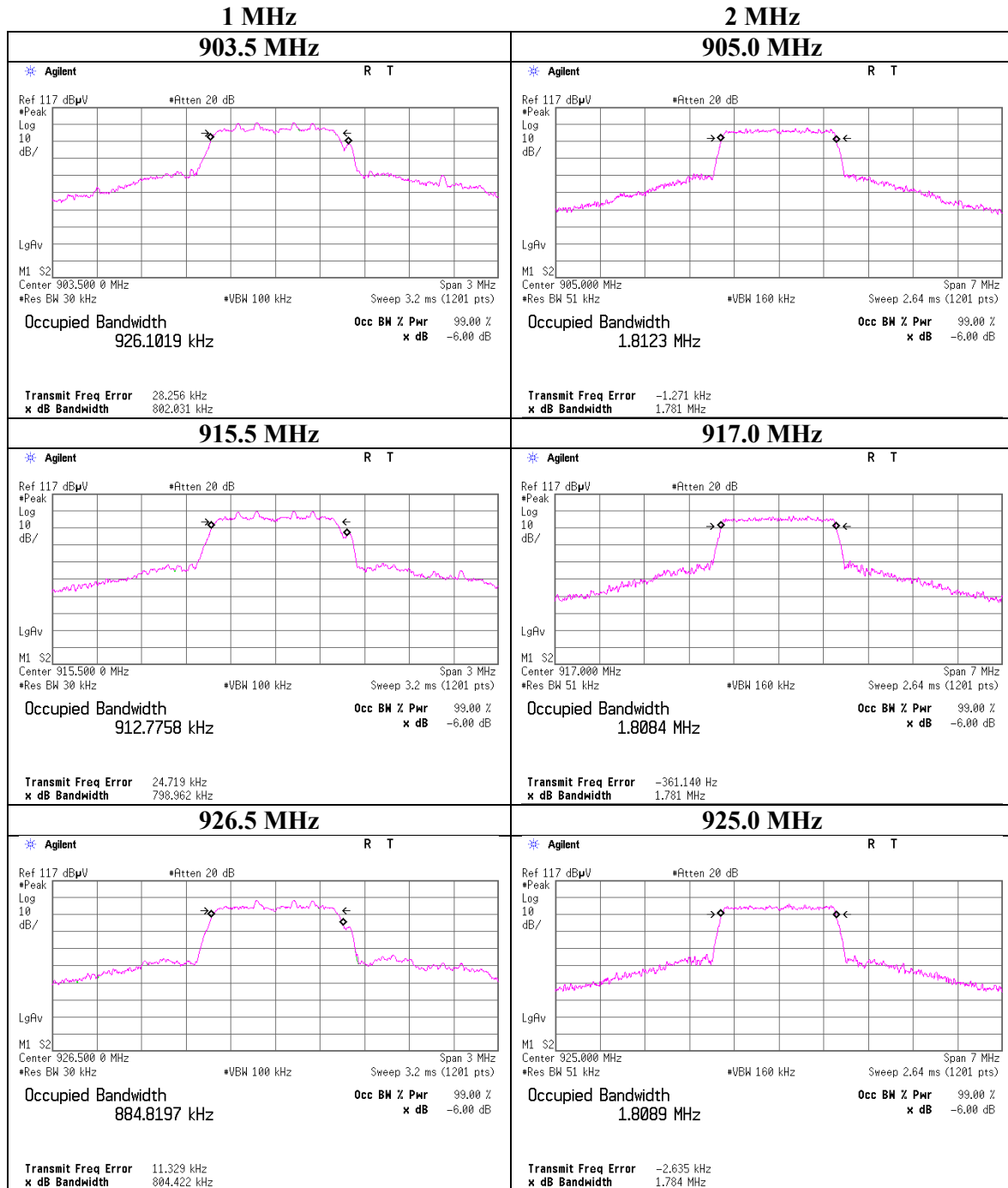
Facsimile : +81 596 24 8124

### **6 dB Bandwidth and 99 % Occupied Bandwidth**

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx

| Mode<br>(Bandwidth) | Frequency<br>[MHz] | 99% Occupied<br>Bandwidth<br>[kHz] | 6 dB Bandwidth<br>[MHz] | Limit for<br>6 dB Bandwidth<br>[MHz] |
|---------------------|--------------------|------------------------------------|-------------------------|--------------------------------------|
| 1 MHz               | 903.5              | 926.1                              | 0.863                   | > 0.5000                             |
|                     | 915.5              | 912.8                              | 0.841                   | > 0.5000                             |
|                     | 926.5              | 884.8                              | 0.834                   | > 0.5000                             |
| 2 MHz               | 905.0              | 1812.3                             | 1.802                   | > 0.5000                             |
|                     | 917.0              | 1808.4                             | 1.771                   | > 0.5000                             |
|                     | 925.0              | 1808.9                             | 1.811                   | > 0.5000                             |
| 4 MHz               | 910.0              | 3651.6                             | 3.630                   | > 0.5000                             |
|                     | 918.0              | 3674.3                             | 3.638                   | > 0.5000                             |
|                     | 922.0              | 3671.8                             | 3.634                   | > 0.5000                             |

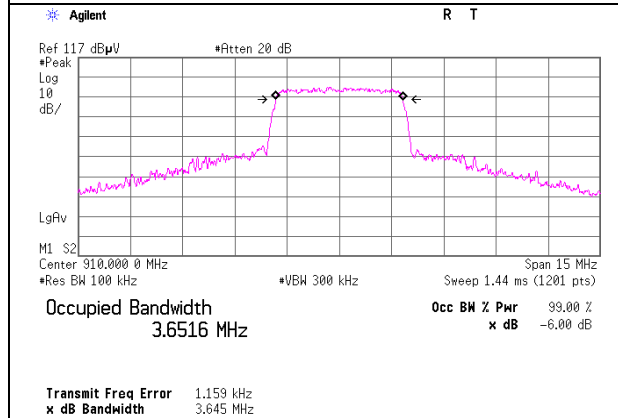
## 99 % Occupied Bandwidth



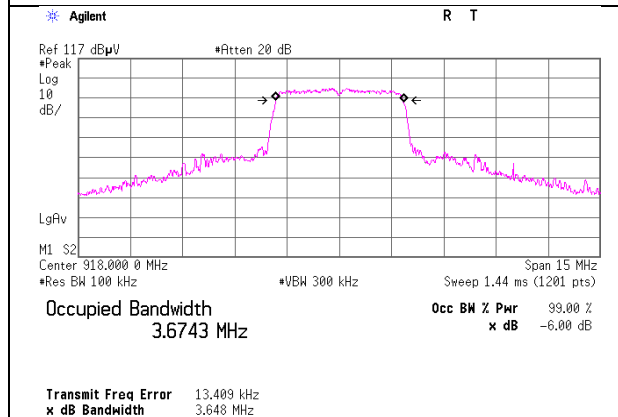
## 99 % Occupied Bandwidth

4 MHz

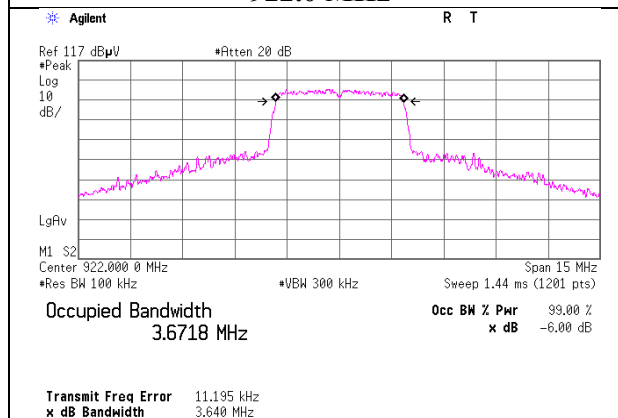
910.0 MHz



918.0 MHz



922.0 MHz



UL Japan, Inc.

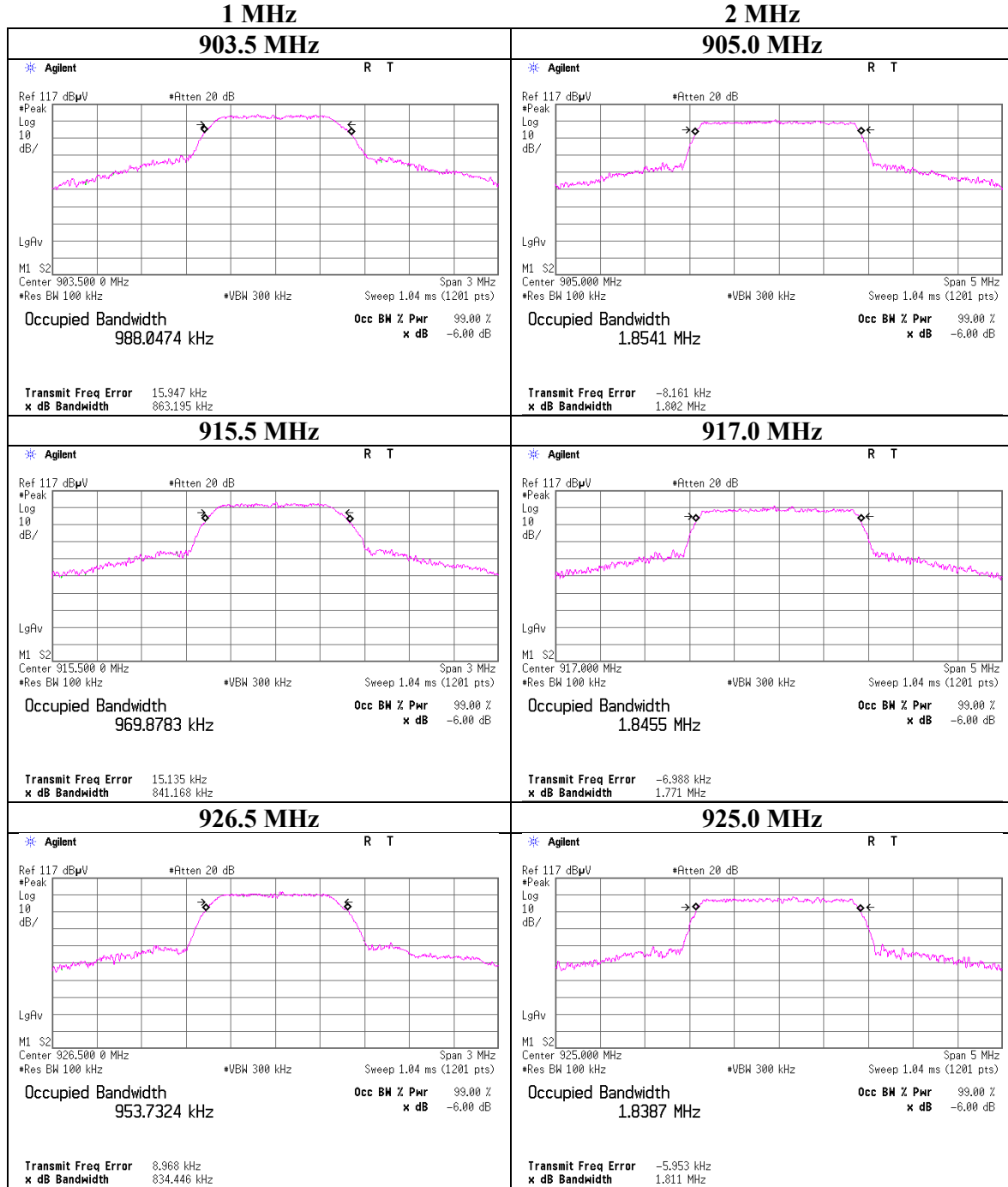
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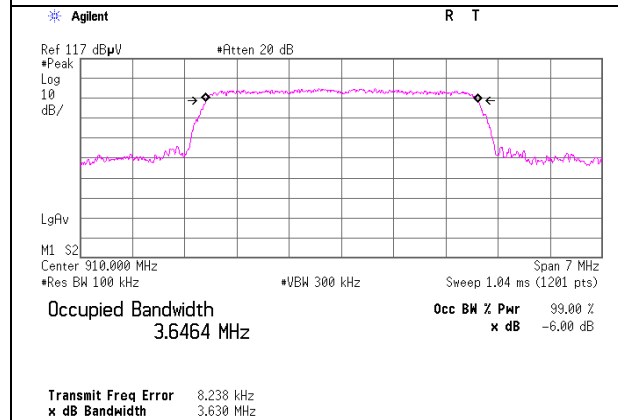
## 6 dB Bandwidth



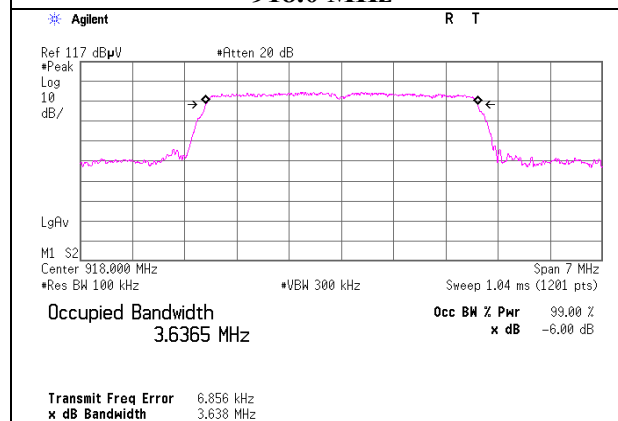
## 6 dB Bandwidth

4 MHz

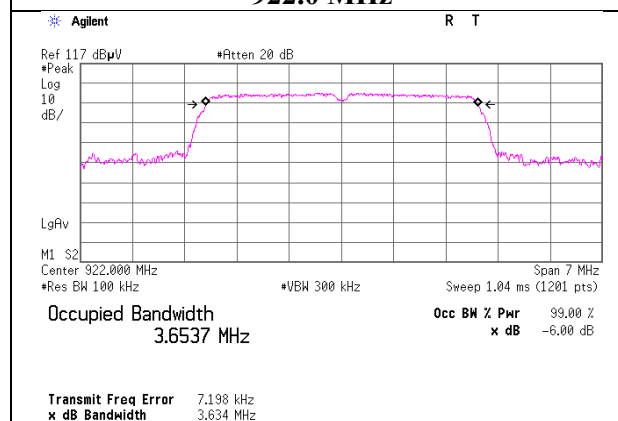
910.0 MHz



918.0 MHz



922.0 MHz



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## Maximum Average Output Power

|                        |                       |                       |                     |
|------------------------|-----------------------|-----------------------|---------------------|
| Report No.             | 13128136H             |                       |                     |
| Test place             | Ise EMC Lab.          |                       |                     |
|                        | No.1 Measurement Room | No.4 Measurement Room |                     |
| Date                   | March 13, 2020        |                       | March 22, 2020      |
| Temperature / Humidity | 21 deg. C / 33 % RH   |                       | 24 deg. C / 35 % RH |
| Engineer               | Yuta Moriya           | Junya Okuno           |                     |
| Mode                   | Tx 1 MHz              |                       |                     |

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Conducted Power |        |       |      |        | e.i.r.p. for RSS-247     |        |        |       |      |        |
|----------------|------------------|-----------------------|------------------------|-----------------|--------|-------|------|--------|--------------------------|--------|--------|-------|------|--------|
|                |                  |                       |                        | Result          |        | Limit |      | Margin | Antenna<br>Gain<br>[dBi] | Result |        | Limit |      | Margin |
|                |                  |                       |                        | [dBm]           | [mW]   | [dBm] | [mW] |        |                          | [dBm]  | [mW]   | [dBm] | [mW] |        |
| 903.5          | 2.95             | 0.36                  | 19.92                  | 23.23           | 210.38 | 30.00 | 1000 | 6.77   | 3.40                     | 26.63  | 460.26 | 36.02 | 4000 | 9.39   |
| 915.5          | 3.10             | 0.36                  | 19.92                  | 23.38           | 217.77 | 30.00 | 1000 | 6.62   | 3.40                     | 26.78  | 476.43 | 36.02 | 4000 | 9.24   |
| 926.5          | 1.90             | 0.36                  | 19.92                  | 22.18           | 165.20 | 30.00 | 1000 | 7.82   | 3.40                     | 25.58  | 361.41 | 36.02 | 4000 | 10.44  |

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss(\*1)

e.i.r.p. Result = Conducted Power Result + Antenna Gain

\*1.Duty factor is 98% or more, so Duty factor is not added.

915.5MHz

| Rate<br>MCS | Reading<br>LGI<br>[dBm] | Reading<br>SGI<br>[dBm] | Remark |
|-------------|-------------------------|-------------------------|--------|
| 10          | 6.77                    | 6.73                    | *LGI   |
| 0           | 6.51                    | -                       |        |
| 1           | 6.35                    | -                       |        |
| 2           | 6.72                    | -                       |        |
| 3           | 6.67                    | -                       |        |
| 4           | 6.58                    | -                       |        |
| 5           | 6.53                    | -                       |        |
| 6           | 0.79                    | -                       |        |
| 7           | -0.99                   | -                       |        |

\*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Measured value is gating with the on-power.

\*Difference between worst rate check data and formal test result is due to the different test condition.

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## Maximum Average Output Power

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 13, 2020  
Temperature / Humidity 21 deg. C / 33 % RH  
Engineer Yuta Moriya  
Mode Tx 2 MHz

|       |         |            |             | Conducted Power |        |       |      |        | e.i.r.p. for RSS-247 |        |        |       |      |        |
|-------|---------|------------|-------------|-----------------|--------|-------|------|--------|----------------------|--------|--------|-------|------|--------|
| Freq. | Reading | Cable Loss | Atten. Loss | Result          |        | Limit |      | Margin | Antenna Gain         | Result |        | Limit |      | Margin |
| [MHz] | [dBm]   | [dB]       | [dB]        | [dBm]           | [mW]   | [dBm] | [mW] | [dB]   | [dBi]                | [dBm]  | [mW]   | [dBm] | [mW] | [dB]   |
| 905.0 | 3.22    | 0.36       | 19.92       | 23.50           | 223.87 | 30.00 | 1000 | 6.50   | 3.40                 | 26.90  | 489.78 | 36.02 | 4000 | 9.12   |
| 917.0 | 3.53    | 0.36       | 19.92       | 23.81           | 240.44 | 30.00 | 1000 | 6.19   | 3.40                 | 27.21  | 526.02 | 36.02 | 4000 | 8.81   |
| 925.0 | 2.07    | 0.36       | 19.92       | 22.35           | 171.79 | 30.00 | 1000 | 7.65   | 3.40                 | 25.75  | 375.84 | 36.02 | 4000 | 10.27  |

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss (\*1)

e.i.r.p. Result = Conducted Power Result + Antenna Gain

\*1.Duty factor is 98% or more, so Duty factor is not added.

917.0MHz

| Rate | Reading | Reading | Remark |
|------|---------|---------|--------|
| MCS  | LGI     | SGI     |        |
|      | [dBm]   | [dBm]   |        |
| 0    | 6.50    | 6.48    | *LGI   |
| 1    | 6.44    | -       |        |
| 2    | 6.41    | -       |        |
| 3    | 6.46    | -       |        |
| 4    | 6.44    | -       |        |
| 5    | 5.16    | -       |        |
| 6    | -2.01   | -       |        |
| 7    | -3.03   | -       |        |

\*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Measured value is gating with the on-power.

\*Difference between worst rate check data and formal test result is due to the different test condition.

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Maximum Average Output Power

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 13, 2020  
Temperature / Humidity 21 deg. C / 33 % RH  
Engineer Yuta Moriya  
Mode Tx 4 MHz

| Freq. | Reading | Cable Loss | Atten. Loss | Conducted Power |        |       |      |        | e.i.r.p. for RSS-247 |        |        |       |      |        |
|-------|---------|------------|-------------|-----------------|--------|-------|------|--------|----------------------|--------|--------|-------|------|--------|
|       |         |            |             | Result          |        | Limit |      | Margin | Antenna Gain         | Result |        | Limit |      | Margin |
|       |         |            |             | [dBm]           | [mW]   | [dBm] | [mW] |        |                      | [dBm]  | [mW]   | [dBm] | [mW] |        |
| [MHz] | [dBm]   | [dB]       | [dB]        |                 |        |       |      | [dB]   | [dBi]                |        |        |       |      | [dB]   |
| 910.0 | 1.76    | 0.36       | 19.92       | 22.04           | 159.96 | 30.00 | 1000 | 7.96   | 3.40                 | 25.44  | 349.95 | 36.02 | 4000 | 10.58  |
| 918.0 | 0.94    | 0.36       | 19.92       | 21.22           | 132.43 | 30.00 | 1000 | 8.78   | 3.40                 | 24.62  | 289.73 | 36.02 | 4000 | 11.40  |
| 922.0 | 1.58    | 0.36       | 19.92       | 21.86           | 153.46 | 30.00 | 1000 | 8.14   | 3.40                 | 25.26  | 335.74 | 36.02 | 4000 | 10.76  |

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss (\*1)

e.i.r.p. Result = Conducted Power Result + Antenna Gain

\*1. Duty factor is 98% or more, so Duty factor is not added.

918MHz

| Rate   | Reading | Reading | Remark |
|--------|---------|---------|--------|
| MCS    | LGI     | SGI     |        |
| [Mbps] | [dBm]   | [dBm]   |        |
| 0      | 4.60    | 4.57    | *LGI   |
| 1      | 4.50    | -       |        |
| 2      | 4.56    | -       |        |
| 3      | 4.49    | -       |        |
| 4      | 4.51    | -       |        |
| 5      | 4.55    | -       |        |
| 6      | -1.79   | -       |        |
| 7      | -2.46   | -       |        |

\*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

\*Difference between worst rate check data and formal test result is due to the different test condition.

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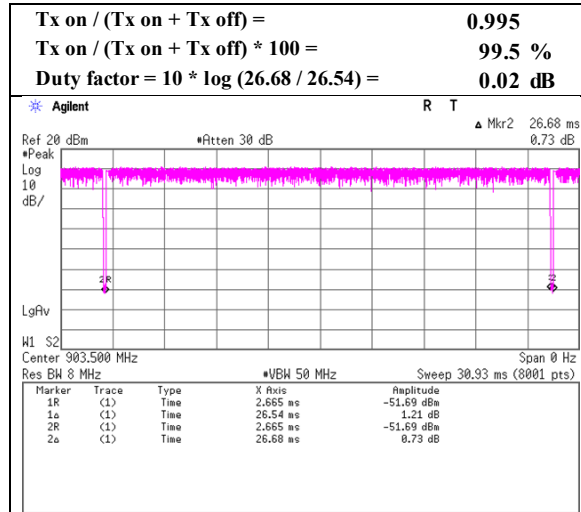
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

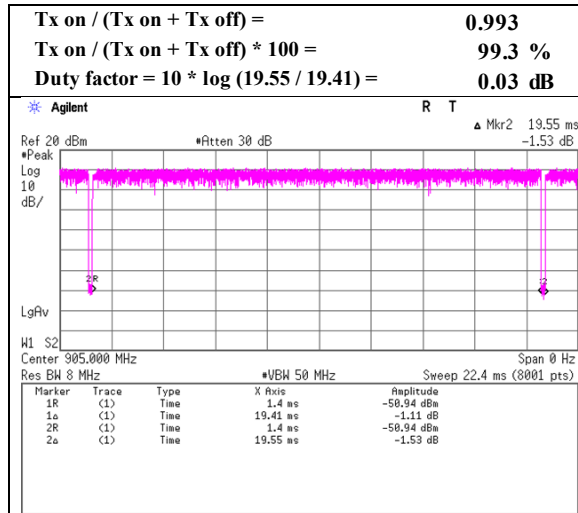
## Burst rate confirmation

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx

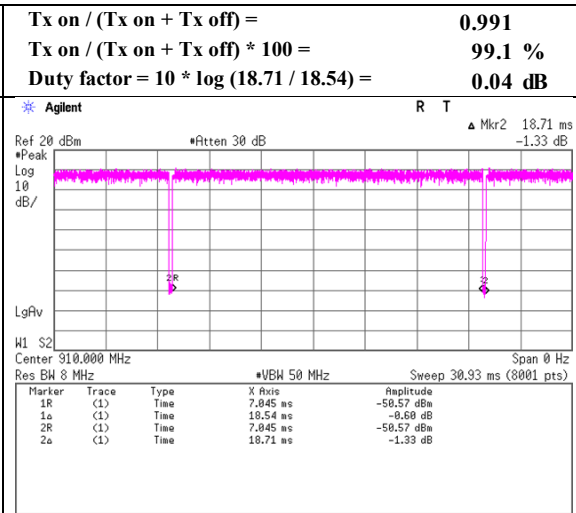
### 1 MHz



### 2 MHz



### 4 MHz



\* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

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## Radiated Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3 No.3  
Date March 15, 2020 March 16, 2020  
Temperature / Humidity 22 deg. C / 30 % RH 22 deg. C / 30 % RH  
Engineer Takafumi Noguchi Takafumi Noguchi  
(Below 1 GHz) (Above 1 GHz)  
Mode Tx 903.5 MHz (1 MHz)

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.1              | 22.2               | 14.8         | 30.6         | -                   | 43.5               | 46.0              | 2.5            |             |
| Hori.    | 2710.500           | PK       | 60.9              | 28.1               | 5.7          | 32.6         | -                   | 62.1               | 73.9              | 11.9           |             |
| Hori.    | 3614.000           | PK       | 56.2              | 29.2               | 6.0          | 32.2         | -                   | 59.2               | 73.9              | 14.7           |             |
| Hori.    | 4517.500           | PK       | 41.3              | 30.7               | 6.5          | 31.9         | -                   | 46.6               | 73.9              | 27.3           | Floor noise |
| Hori.    | 5421.000           | PK       | 41.1              | 31.6               | 6.9          | 31.9         | -                   | 47.8               | 73.9              | 26.2           | Floor noise |
| Hori.    | 7228.000           | PK       | 42.0              | 36.0               | 7.4          | 32.7         | -                   | 52.7               | 73.9              | 21.2           | Floor noise |
| Hori.    | 8131.500           | PK       | 41.5              | 36.6               | 7.8          | 32.8         | -                   | 53.0               | 73.9              | 20.9           | Floor noise |
| Hori.    | 9035.000           | PK       | 41.7              | 37.5               | 8.2          | 33.1         | -                   | 54.3               | 73.9              | 19.6           | Floor noise |
| Hori.    | 2710.500           | AV       | 48.4              | 28.1               | 5.7          | 32.6         | -                   | 49.6               | 53.9              | 4.3            |             |
| Hori.    | 3614.000           | AV       | 42.5              | 29.2               | 6.0          | 32.2         | -                   | 45.5               | 53.9              | 8.4            |             |
| Hori.    | 4517.500           | AV       | 33.3              | 30.7               | 6.5          | 31.9         | -                   | 38.6               | 53.9              | 15.3           | Floor noise |
| Hori.    | 5421.000           | AV       | 32.4              | 31.6               | 6.9          | 31.9         | -                   | 39.1               | 53.9              | 14.9           | Floor noise |
| Hori.    | 7228.000           | AV       | 34.0              | 36.0               | 7.4          | 32.7         | -                   | 44.7               | 53.9              | 9.2            | Floor noise |
| Hori.    | 8131.500           | AV       | 33.5              | 36.6               | 7.8          | 32.8         | -                   | 45.0               | 53.9              | 8.9            | Floor noise |
| Hori.    | 9035.000           | AV       | 33.8              | 37.5               | 8.2          | 33.1         | -                   | 46.5               | 53.9              | 7.4            | Floor noise |
| Vert.    | 960.000            | QP       | 34.9              | 22.2               | 14.8         | 30.6         | -                   | 41.3               | 46.0              | 4.7            |             |
| Vert.    | 2710.500           | PK       | 59.4              | 28.1               | 5.7          | 32.6         | -                   | 60.5               | 73.9              | 13.4           |             |
| Vert.    | 3614.000           | PK       | 57.1              | 29.2               | 6.0          | 32.2         | -                   | 60.1               | 73.9              | 13.8           |             |
| Vert.    | 4517.500           | PK       | 41.4              | 30.7               | 6.5          | 31.9         | -                   | 46.7               | 73.9              | 27.2           | Floor noise |
| Vert.    | 5421.000           | PK       | 41.1              | 31.6               | 6.9          | 31.9         | -                   | 47.8               | 73.9              | 26.2           | Floor noise |
| Vert.    | 7228.000           | PK       | 42.0              | 36.0               | 7.4          | 32.7         | -                   | 52.7               | 73.9              | 21.2           | Floor noise |
| Vert.    | 8131.500           | PK       | 41.5              | 36.6               | 7.8          | 32.8         | -                   | 53.0               | 73.9              | 20.9           | Floor noise |
| Vert.    | 9035.000           | PK       | 41.5              | 37.5               | 8.2          | 33.1         | -                   | 54.2               | 73.9              | 19.8           | Floor noise |
| Vert.    | 2710.500           | AV       | 47.0              | 28.1               | 5.7          | 32.6         | -                   | 48.1               | 53.9              | 5.8            |             |
| Vert.    | 3614.000           | AV       | 43.6              | 29.2               | 6.0          | 32.2         | -                   | 46.6               | 53.9              | 7.3            |             |
| Vert.    | 4517.500           | AV       | 32.9              | 30.7               | 6.5          | 31.9         | -                   | 38.2               | 53.9              | 15.7           | Floor noise |
| Vert.    | 5421.000           | AV       | 32.5              | 31.6               | 6.9          | 31.9         | -                   | 39.1               | 53.9              | 14.8           | Floor noise |
| Vert.    | 7228.000           | AV       | 34.0              | 36.0               | 7.4          | 32.7         | -                   | 44.7               | 53.9              | 9.2            | Floor noise |
| Vert.    | 8131.500           | AV       | 33.5              | 36.6               | 7.8          | 32.8         | -                   | 45.0               | 53.9              | 8.9            | Floor noise |
| Vert.    | 9035.000           | AV       | 33.7              | 37.5               | 8.2          | 33.1         | -                   | 46.4               | 53.9              | 7.5            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                                   |                                   |
|------------------------|-----------------------------------|-----------------------------------|
| Report No.             | 13128136H                         |                                   |
| Test place             | Ise EMC Lab.                      |                                   |
| Semi Anechoic Chamber  | No.3                              | No.3                              |
| Date                   | March 15, 2020                    | March 16, 2020                    |
| Temperature / Humidity | 22 deg. C / 30 % RH               | 22 deg. C / 30 % RH               |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takafumi Noguchi<br>(Above 1 GHz) |
| Mode                   | Tx 903.5 MHz (1 MHz)              |                                   |

### (PCB Antenna)

30dBc Data Sheet

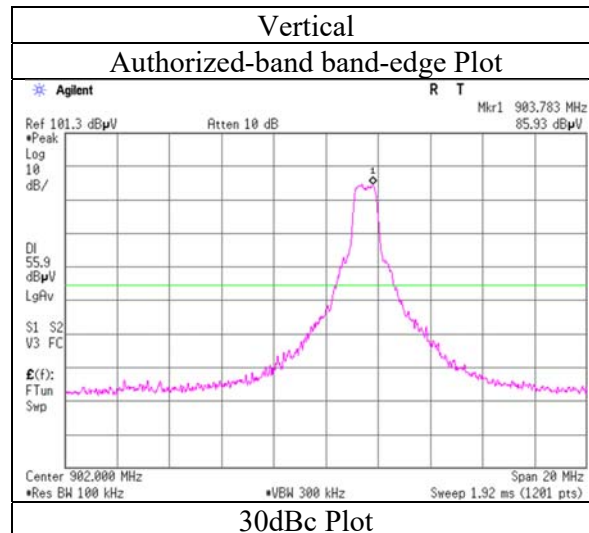
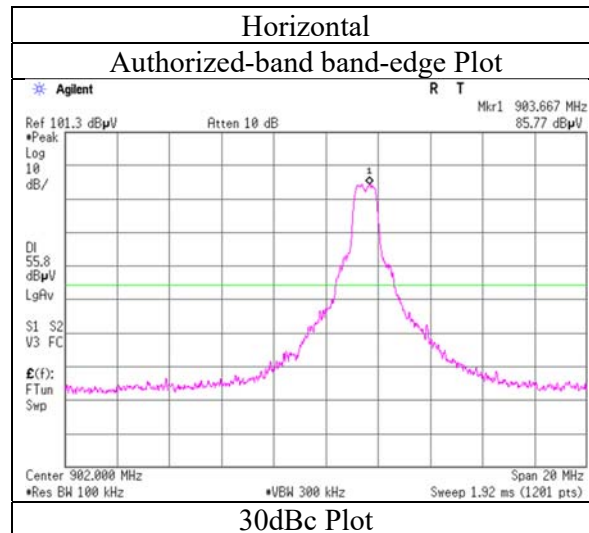
| Polarity | Frequency | Detector | Reading | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|---------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 903.500   | PK       | 85.8    | 22.2          | 13.5 | 0.0  | 121.5    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 33.1    | 19.8          | 13.4 | 32.0 | 34.2     | 91.5     | 57.2   |         |
| Hori.    | 711.500   | PK       | 33.0    | 20.0          | 13.4 | 31.9 | 34.5     | 91.5     | 57.0   |         |
| Hori.    | 736.000   | PK       | 37.4    | 20.1          | 13.5 | 31.8 | 39.2     | 91.5     | 52.3   |         |
| Hori.    | 768.000   | PK       | 45.5    | 20.5          | 13.7 | 31.6 | 48.1     | 91.5     | 43.4   |         |
| Hori.    | 800.000   | PK       | 40.1    | 20.8          | 13.9 | 31.4 | 43.3     | 91.5     | 48.2   |         |
| Hori.    | 832.000   | PK       | 46.1    | 21.1          | 14.0 | 31.3 | 49.9     | 91.5     | 41.6   |         |
| Hori.    | 864.000   | PK       | 52.1    | 21.8          | 14.3 | 31.1 | 57.1     | 91.5     | 34.4   |         |
| Hori.    | 902.000   | PK       | 49.8    | 22.2          | 13.5 | 0.0  | 85.5     | 91.5     | 6.0    |         |
| Hori.    | 935.500   | PK       | 50.6    | 22.0          | 15.1 | 30.7 | 57.0     | 91.5     | 34.5   |         |
| Hori.    | 1807.000  | PK       | 71.8    | 25.2          | 5.4  | 33.4 | 69.0     | 91.5     | 22.5   |         |
| Hori.    | 6324.500  | PK       | 35.7    | 33.0          | 7.2  | 32.2 | 43.8     | 91.5     | 47.7   |         |
| Vert.    | 903.500   | PK       | 85.9    | 22.2          | 13.5 | 0.0  | 121.6    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 33.0    | 19.8          | 13.4 | 32.0 | 34.2     | 91.6     | 57.5   |         |
| Vert.    | 711.500   | PK       | 32.9    | 20.0          | 13.4 | 31.9 | 34.3     | 91.6     | 57.3   |         |
| Vert.    | 736.000   | PK       | 34.7    | 20.1          | 13.5 | 31.8 | 36.5     | 91.6     | 55.1   |         |
| Vert.    | 768.000   | PK       | 43.9    | 20.5          | 13.7 | 31.6 | 46.4     | 91.6     | 45.2   |         |
| Vert.    | 800.000   | PK       | 43.3    | 20.8          | 13.9 | 31.4 | 46.5     | 91.6     | 45.2   |         |
| Vert.    | 832.000   | PK       | 47.9    | 21.1          | 14.0 | 31.3 | 51.7     | 91.6     | 40.0   |         |
| Vert.    | 864.000   | PK       | 52.4    | 21.8          | 14.3 | 31.1 | 57.4     | 91.6     | 34.3   |         |
| Vert.    | 902.000   | PK       | 50.1    | 22.2          | 13.5 | 0.0  | 85.8     | 91.6     | 5.8    |         |
| Vert.    | 935.500   | PK       | 49.0    | 22.0          | 15.1 | 30.7 | 55.4     | 91.6     | 36.2   |         |
| Vert.    | 1807.000  | PK       | 73.1    | 25.2          | 5.4  | 33.4 | 70.3     | 91.6     | 21.4   |         |
| Vert.    | 6324.500  | PK       | 35.9    | 33.0          | 7.2  | 32.2 | 44.0     | 91.6     | 47.6   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                                   |
|------------------------|-----------------------------------|
| Report No.             | 13128136H                         |
| Test place             | Ise EMC Lab.                      |
| Semi Anechoic Chamber  | No.3                              |
| Date                   | March 15, 2020                    |
| Temperature / Humidity | 22 deg. C / 30 % RH               |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) |
| Mode                   | Tx 903.5 MHz (1 MHz)              |

(PCB Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3 No.3  
Date March 16, 2020 March 16, 2020  
Temperature / Humidity 21 deg. C / 31 % RH 22 deg. C / 30 % RH  
Engineer Takafumi Noguchi Takafumi Noguchi  
(Below 1 GHz) (Above 1 GHz)  
Mode Tx 915.5 MHz (1 MHz)

### (PCB Antenna)

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark      |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| Hori.    | 960.000         | QP       | 37.5           | 22.2            | 14.8      | 30.6      | -                | 43.9            | 46.0           | 2.1         |             |
| Hori.    | 2746.500        | PK       | 55.6           | 28.3            | 5.7       | 32.6      | -                | 57.0            | 73.9           | 16.9        |             |
| Hori.    | 3662.000        | PK       | 53.2           | 29.2            | 6.1       | 32.2      | -                | 56.4            | 73.9           | 17.5        |             |
| Hori.    | 4577.500        | PK       | 41.1           | 30.9            | 6.5       | 31.9      | -                | 46.6            | 73.9           | 27.3        | Floor noise |
| Hori.    | 5493.000        | PK       | 40.8           | 31.7            | 7.0       | 31.9      | -                | 47.6            | 73.9           | 26.3        | Floor noise |
| Hori.    | 7324.000        | PK       | 42.6           | 36.2            | 7.4       | 32.7      | -                | 53.5            | 73.9           | 20.4        | Floor noise |
| Hori.    | 8239.500        | PK       | 42.4           | 36.4            | 7.8       | 32.9      | -                | 53.7            | 73.9           | 20.2        | Floor noise |
| Hori.    | 9155.000        | PK       | 42.0           | 38.2            | 8.2       | 33.1      | -                | 55.3            | 73.9           | 18.7        | Floor noise |
| Hori.    | 2746.500        | AV       | 47.9           | 28.3            | 5.7       | 32.6      | -                | 49.3            | 53.9           | 4.6         |             |
| Hori.    | 3662.000        | AV       | 44.2           | 29.2            | 6.1       | 32.2      | -                | 47.4            | 53.9           | 6.6         |             |
| Hori.    | 4577.500        | AV       | 32.8           | 30.9            | 6.5       | 31.9      | -                | 38.3            | 53.9           | 15.6        | Floor noise |
| Hori.    | 5493.000        | AV       | 32.2           | 31.7            | 7.0       | 31.9      | -                | 38.9            | 53.9           | 15.0        | Floor noise |
| Hori.    | 7324.000        | AV       | 34.2           | 36.2            | 7.4       | 32.7      | -                | 45.1            | 53.9           | 8.8         | Floor noise |
| Hori.    | 8239.500        | AV       | 33.6           | 36.4            | 7.8       | 32.9      | -                | 45.0            | 53.9           | 8.9         | Floor noise |
| Hori.    | 9155.000        | AV       | 33.8           | 38.2            | 8.2       | 33.1      | -                | 47.1            | 53.9           | 6.8         | Floor noise |
| Vert.    | 960.000         | QP       | 35.5           | 22.2            | 14.8      | 30.6      | -                | 41.9            | 46.0           | 4.1         |             |
| Vert.    | 2746.500        | PK       | 54.0           | 28.3            | 5.7       | 32.6      | -                | 55.4            | 73.9           | 18.5        |             |
| Vert.    | 3662.000        | PK       | 52.1           | 29.2            | 6.1       | 32.2      | -                | 55.2            | 73.9           | 18.7        |             |
| Vert.    | 4577.500        | PK       | 40.8           | 30.9            | 6.5       | 31.9      | -                | 46.3            | 73.9           | 27.6        | Floor noise |
| Vert.    | 5493.000        | PK       | 40.3           | 31.7            | 7.0       | 31.9      | -                | 47.1            | 73.9           | 26.8        | Floor noise |
| Vert.    | 7324.000        | PK       | 42.5           | 36.2            | 7.4       | 32.7      | -                | 53.4            | 73.9           | 20.5        | Floor noise |
| Vert.    | 8239.500        | PK       | 42.0           | 36.4            | 7.8       | 32.9      | -                | 53.4            | 73.9           | 20.5        | Floor noise |
| Vert.    | 9155.000        | PK       | 42.1           | 38.2            | 8.2       | 33.1      | -                | 55.3            | 73.9           | 18.6        | Floor noise |
| Vert.    | 2746.500        | AV       | 46.2           | 28.3            | 5.7       | 32.6      | -                | 47.5            | 53.9           | 6.4         |             |
| Vert.    | 3662.000        | AV       | 42.7           | 29.2            | 6.1       | 32.2      | -                | 45.8            | 53.9           | 8.1         |             |
| Vert.    | 4577.500        | AV       | 32.4           | 30.9            | 6.5       | 31.9      | -                | 38.0            | 53.9           | 15.9        | Floor noise |
| Vert.    | 5493.000        | AV       | 32.4           | 31.7            | 7.0       | 31.9      | -                | 39.1            | 53.9           | 14.8        | Floor noise |
| Vert.    | 7324.000        | AV       | 34.3           | 36.2            | 7.4       | 32.7      | -                | 45.2            | 53.9           | 8.7         | Floor noise |
| Vert.    | 8239.500        | AV       | 33.7           | 36.4            | 7.8       | 32.9      | -                | 45.0            | 53.9           | 8.9         | Floor noise |
| Vert.    | 9155.000        | AV       | 34.0           | 38.2            | 8.2       | 33.1      | -                | 47.2            | 53.9           | 6.7         | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB

## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 16, 2020       | March 16, 2020      |
| Temperature / Humidity | 21 deg. C / 31 % RH  | 22 deg. C / 30 % RH |
| Engineer               | Takafumi Noguchi     | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 915.5 MHz (1 MHz) |                     |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 915.500   | PK       | 86.8    | 22.2       | 13.6 | 0.0  | 122.5    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 32.2    | 19.8       | 13.4 | 32.0 | 33.4     | 92.5     | 59.1   |         |
| Hori.    | 723.500   | PK       | 32.7    | 20.1       | 13.5 | 31.9 | 34.4     | 92.5     | 58.2   |         |
| Hori.    | 736.000   | PK       | 32.1    | 20.1       | 13.5 | 31.8 | 33.9     | 92.5     | 58.6   |         |
| Hori.    | 768.000   | PK       | 41.6    | 20.5       | 13.7 | 31.6 | 44.1     | 92.5     | 48.4   |         |
| Hori.    | 800.000   | PK       | 41.6    | 20.8       | 13.9 | 31.4 | 44.8     | 92.5     | 47.7   |         |
| Hori.    | 832.000   | PK       | 46.1    | 21.1       | 14.0 | 31.3 | 49.9     | 92.5     | 42.6   |         |
| Hori.    | 864.000   | PK       | 49.5    | 21.8       | 14.3 | 31.1 | 54.5     | 92.5     | 38.0   |         |
| Hori.    | 883.500   | PK       | 49.4    | 22.0       | 14.7 | 31.0 | 55.1     | 92.5     | 37.5   |         |
| Hori.    | 896.000   | PK       | 49.0    | 22.1       | 14.9 | 30.9 | 55.1     | 92.5     | 37.5   |         |
| Hori.    | 947.500   | PK       | 47.9    | 22.0       | 14.8 | 30.6 | 54.1     | 92.5     | 38.4   |         |
| Hori.    | 1831.000  | PK       | 67.4    | 25.3       | 5.4  | 33.3 | 64.7     | 92.5     | 27.8   |         |
| Hori.    | 6408.500  | PK       | 38.5    | 33.5       | 7.2  | 32.2 | 46.9     | 92.5     | 45.6   |         |
| Vert.    | 915.500   | PK       | 85.4    | 22.2       | 13.6 | 0.0  | 121.2    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 33.0    | 19.8       | 13.4 | 32.0 | 34.2     | 91.2     | 57.0   |         |
| Vert.    | 723.500   | PK       | 33.0    | 20.1       | 13.5 | 31.9 | 34.7     | 91.2     | 56.5   |         |
| Vert.    | 736.000   | PK       | 32.6    | 20.1       | 13.5 | 31.8 | 34.4     | 91.2     | 56.8   |         |
| Vert.    | 768.000   | PK       | 42.8    | 20.5       | 13.7 | 31.6 | 45.3     | 91.2     | 45.8   |         |
| Vert.    | 800.000   | PK       | 42.7    | 20.8       | 13.9 | 31.4 | 45.9     | 91.2     | 45.2   |         |
| Vert.    | 832.000   | PK       | 49.6    | 21.1       | 14.0 | 31.3 | 53.4     | 91.2     | 37.8   |         |
| Vert.    | 864.000   | PK       | 52.2    | 21.8       | 14.3 | 31.1 | 57.2     | 91.2     | 34.0   |         |
| Vert.    | 883.500   | PK       | 50.3    | 22.0       | 14.7 | 31.0 | 56.0     | 91.2     | 35.2   |         |
| Vert.    | 896.000   | PK       | 49.8    | 22.1       | 14.9 | 30.9 | 55.9     | 91.2     | 35.3   |         |
| Vert.    | 947.500   | PK       | 46.7    | 22.0       | 14.8 | 30.6 | 52.9     | 91.2     | 38.3   |         |
| Vert.    | 1831.000  | PK       | 69.9    | 25.3       | 5.4  | 33.3 | 67.3     | 91.2     | 23.9   |         |
| Vert.    | 6408.500  | PK       | 36.0    | 33.5       | 7.2  | 32.2 | 44.4     | 91.2     | 46.8   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

## Radiated Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3 No.3  
Date March 16, 2020 March 16, 2020  
Temperature / Humidity 21 deg. C / 31 % RH 22 deg. C / 30 % RH  
Engineer Takafumi Noguchi Takafumi Noguchi  
(Below 1 GHz) (Above 1 GHz)  
Mode Tx 926.5 MHz (1 MHz)

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.2              | 22.2               | 14.8         | 30.6         | -                   | 43.6               | 46.0              | 2.4            |             |
| Hori.    | 2779.500           | PK       | 55.7              | 28.5               | 5.7          | 32.6         | -                   | 57.3               | 73.9              | 16.6           |             |
| Hori.    | 3706.000           | PK       | 54.6              | 29.4               | 6.1          | 32.2         | -                   | 57.9               | 73.9              | 16.0           |             |
| Hori.    | 4632.500           | PK       | 40.5              | 31.1               | 6.5          | 31.9         | -                   | 46.2               | 73.9              | 27.7           | Floor noise |
| Hori.    | 5559.000           | PK       | 40.4              | 31.7               | 7.0          | 31.9         | -                   | 47.2               | 73.9              | 26.7           | Floor noise |
| Hori.    | 7412.000           | PK       | 42.6              | 36.3               | 7.5          | 32.7         | -                   | 53.6               | 73.9              | 20.3           | Floor noise |
| Hori.    | 8338.500           | PK       | 42.0              | 36.2               | 7.9          | 32.9         | -                   | 53.2               | 73.9              | 20.7           | Floor noise |
| Hori.    | 9265.000           | PK       | 42.5              | 38.8               | 8.2          | 33.2         | -                   | 56.3               | 73.9              | 17.6           | Floor noise |
| Hori.    | 2779.500           | AV       | 46.9              | 28.5               | 5.7          | 32.6         | -                   | 48.5               | 53.9              | 5.5            |             |
| Hori.    | 3706.000           | AV       | 42.8              | 29.4               | 6.1          | 32.2         | -                   | 46.1               | 53.9              | 7.8            |             |
| Hori.    | 4632.500           | AV       | 32.6              | 31.1               | 6.5          | 31.9         | -                   | 38.3               | 53.9              | 15.6           | Floor noise |
| Hori.    | 5559.000           | AV       | 32.0              | 31.7               | 7.0          | 31.9         | -                   | 38.7               | 53.9              | 15.2           | Floor noise |
| Hori.    | 7412.000           | AV       | 34.0              | 36.3               | 7.5          | 32.7         | -                   | 45.1               | 53.9              | 8.8            | Floor noise |
| Hori.    | 8338.500           | AV       | 34.1              | 36.2               | 7.9          | 32.9         | -                   | 45.3               | 53.9              | 8.6            | Floor noise |
| Hori.    | 9265.000           | AV       | 34.1              | 38.8               | 8.2          | 33.2         | -                   | 48.0               | 53.9              | 6.0            | Floor noise |
| Vert.    | 960.000            | QP       | 35.0              | 22.2               | 14.8         | 30.6         | -                   | 41.4               | 46.0              | 4.6            |             |
| Vert.    | 2779.500           | PK       | 54.1              | 28.5               | 5.7          | 32.6         | -                   | 55.6               | 73.9              | 18.3           |             |
| Vert.    | 3706.000           | PK       | 53.8              | 29.4               | 6.1          | 32.2         | -                   | 57.1               | 73.9              | 16.8           |             |
| Vert.    | 4632.500           | PK       | 40.7              | 31.1               | 6.5          | 31.9         | -                   | 46.4               | 73.9              | 27.5           | Floor noise |
| Vert.    | 5559.000           | PK       | 40.6              | 31.7               | 7.0          | 31.9         | -                   | 47.4               | 73.9              | 26.5           | Floor noise |
| Vert.    | 7412.000           | PK       | 42.8              | 36.3               | 7.5          | 32.7         | -                   | 53.8               | 73.9              | 20.1           | Floor noise |
| Vert.    | 8338.500           | PK       | 42.1              | 36.2               | 7.9          | 32.9         | -                   | 53.3               | 73.9              | 20.6           | Floor noise |
| Vert.    | 9265.000           | PK       | 42.7              | 38.8               | 8.2          | 33.2         | -                   | 56.6               | 73.9              | 17.3           | Floor noise |
| Vert.    | 2779.500           | AV       | 45.2              | 28.5               | 5.7          | 32.6         | -                   | 46.8               | 53.9              | 7.1            |             |
| Vert.    | 3706.000           | AV       | 41.6              | 29.4               | 6.1          | 32.2         | -                   | 44.9               | 53.9              | 9.0            |             |
| Vert.    | 4632.500           | AV       | 32.6              | 31.1               | 6.5          | 31.9         | -                   | 38.4               | 53.9              | 15.5           | Floor noise |
| Vert.    | 5559.000           | AV       | 32.0              | 31.7               | 7.0          | 31.9         | -                   | 38.8               | 53.9              | 15.1           | Floor noise |
| Vert.    | 7412.000           | AV       | 34.1              | 36.3               | 7.5          | 32.7         | -                   | 45.1               | 53.9              | 8.8            | Floor noise |
| Vert.    | 8338.500           | AV       | 34.0              | 36.2               | 7.9          | 32.9         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Vert.    | 9265.000           | AV       | 34.1              | 38.8               | 8.2          | 33.2         | -                   | 48.0               | 53.9              | 6.0            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 16, 2020       | March 16, 2020      |
| Temperature / Humidity | 21 deg. C / 31 % RH  | 22 deg. C / 30 % RH |
| Engineer               | Takafumi Noguchi     | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 926.5 MHz (1 MHz) |                     |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 926.500   | PK       | 86.0    | 22.1       | 13.6 | 0.0  | 121.7    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 31.7    | 19.8       | 13.4 | 32.0 | 32.9     | 91.7     | 58.8   |         |
| Hori.    | 736.000   | PK       | 31.3    | 20.1       | 13.5 | 31.8 | 33.1     | 91.7     | 58.6   |         |
| Hori.    | 768.000   | PK       | 40.4    | 20.5       | 13.7 | 31.6 | 43.0     | 91.7     | 48.7   |         |
| Hori.    | 800.000   | PK       | 38.4    | 20.8       | 13.9 | 31.4 | 41.6     | 91.7     | 50.1   |         |
| Hori.    | 832.000   | PK       | 44.2    | 21.1       | 14.0 | 31.3 | 48.0     | 91.7     | 43.7   |         |
| Hori.    | 864.000   | PK       | 49.3    | 21.8       | 14.3 | 31.1 | 54.3     | 91.7     | 37.4   |         |
| Hori.    | 896.000   | PK       | 47.0    | 22.1       | 14.9 | 30.9 | 53.0     | 91.7     | 38.6   |         |
| Hori.    | 928.000   | PK       | 47.7    | 22.0       | 13.7 | 0.0  | 83.4     | 91.7     | 8.3    |         |
| Hori.    | 958.500   | PK       | 46.3    | 22.1       | 14.8 | 30.6 | 52.7     | 91.7     | 39.0   |         |
| Hori.    | 1853.000  | PK       | 66.1    | 25.4       | 5.4  | 33.3 | 63.6     | 91.7     | 28.1   |         |
| Hori.    | 6485.500  | PK       | 39.0    | 33.9       | 7.3  | 32.3 | 47.8     | 91.7     | 43.8   |         |
| Vert.    | 926.500   | PK       | 85.0    | 22.1       | 13.6 | 0.0  | 120.7    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 32.3    | 19.8       | 13.4 | 32.0 | 33.4     | 90.7     | 57.3   |         |
| Vert.    | 736.000   | PK       | 31.7    | 20.1       | 13.5 | 31.8 | 33.5     | 90.7     | 57.2   |         |
| Vert.    | 768.000   | PK       | 40.7    | 20.5       | 13.7 | 31.6 | 43.3     | 90.7     | 47.5   |         |
| Vert.    | 800.000   | PK       | 41.0    | 20.8       | 13.9 | 31.4 | 44.2     | 90.7     | 46.5   |         |
| Vert.    | 832.000   | PK       | 48.1    | 21.1       | 14.0 | 31.3 | 51.9     | 90.7     | 38.8   |         |
| Vert.    | 864.000   | PK       | 51.3    | 21.8       | 14.3 | 31.1 | 56.3     | 90.7     | 34.4   |         |
| Vert.    | 896.000   | PK       | 48.0    | 22.1       | 14.9 | 30.9 | 54.1     | 90.7     | 36.6   |         |
| Vert.    | 928.000   | PK       | 46.8    | 22.0       | 13.7 | 0.0  | 82.5     | 90.7     | 8.2    |         |
| Vert.    | 958.500   | PK       | 44.7    | 22.1       | 14.8 | 30.6 | 51.1     | 90.7     | 39.6   |         |
| Vert.    | 1853.000  | PK       | 66.4    | 25.4       | 5.4  | 33.3 | 63.9     | 90.7     | 26.8   |         |
| Vert.    | 6485.500  | PK       | 36.5    | 33.9       | 7.3  | 32.3 | 45.4     | 90.7     | 45.4   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

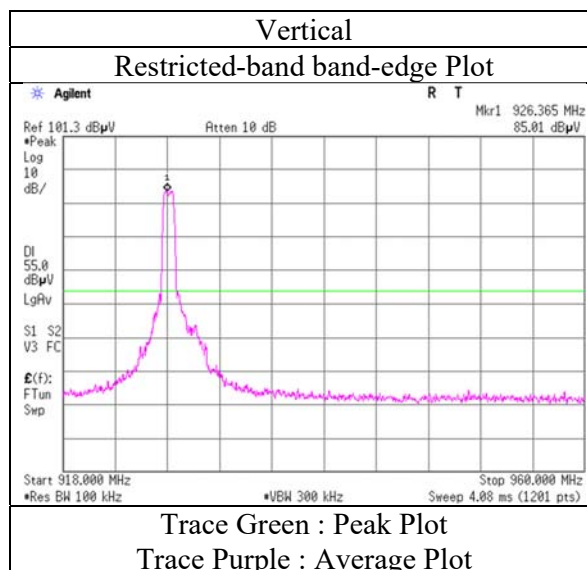
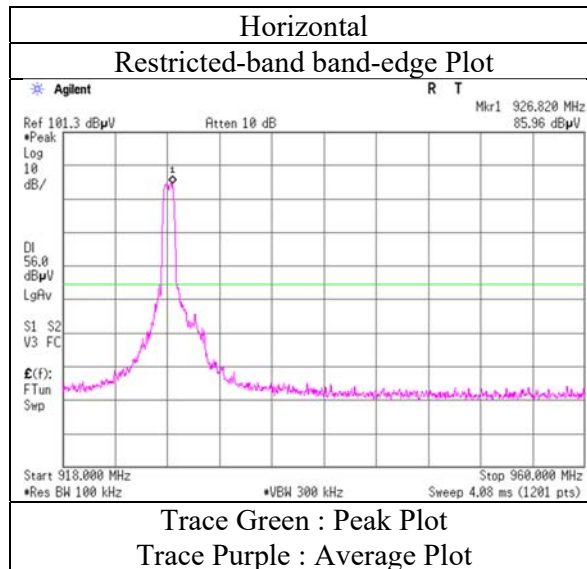
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                      |
|------------------------|----------------------|
| Report No.             | 13128136H            |
| Test place             | Ise EMC Lab.         |
| Semi Anechoic Chamber  | No.3                 |
| Date                   | March 16, 2020       |
| Temperature / Humidity | 21 deg. C / 31 % RH  |
| Engineer               | Takafumi Noguchi     |
|                        | (Below 1 GHz)        |
| Mode                   | Tx 926.5 MHz (1 MHz) |

(PCB Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Radiated Spurious Emission

|                        |                                   |                                 |  |
|------------------------|-----------------------------------|---------------------------------|--|
| Report No.             | 13128136H                         |                                 |  |
| Test place             | Ise EMC Lab.                      |                                 |  |
| Semi Anechoic Chamber  | No.3                              | No.3                            |  |
| Date                   | March 16, 2020                    | March 18, 2020                  |  |
| Temperature / Humidity | 21 deg. C / 31 % RH               | 23 deg. C / 35 % RH             |  |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takumi Shimada<br>(Above 1 GHz) |  |
| Mode                   | Tx 905 MHz (2 MHz)                |                                 |  |

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.2              | 22.2               | 14.8         | 30.6         | -                   | 43.6               | 46.0              | 2.4            |             |
| Hori.    | 2715.000           | PK       | 51.0              | 28.1               | 5.7          | 32.6         | -                   | 52.2               | 73.9              | 21.7           |             |
| Hori.    | 3620.000           | PK       | 49.3              | 29.2               | 6.0          | 32.2         | -                   | 52.3               | 73.9              | 21.6           |             |
| Hori.    | 4525.000           | PK       | 40.0              | 30.8               | 6.5          | 31.9         | -                   | 45.4               | 73.9              | 28.6           | Floor noise |
| Hori.    | 5430.000           | PK       | 40.8              | 31.6               | 6.9          | 31.9         | -                   | 47.5               | 73.9              | 26.4           | Floor noise |
| Hori.    | 8145.000           | PK       | 40.9              | 36.5               | 7.8          | 32.8         | -                   | 52.4               | 73.9              | 21.5           | Floor noise |
| Hori.    | 9050.000           | PK       | 40.9              | 37.6               | 8.2          | 33.1         | -                   | 53.6               | 73.9              | 20.3           | Floor noise |
| Hori.    | 9955.000           | PK       | 41.0              | 38.9               | 8.4          | 33.5         | -                   | 54.8               | 73.9              | 19.1           | Floor noise |
| Hori.    | 2715.000           | AV       | 40.0              | 28.1               | 5.7          | 32.6         | -                   | 41.2               | 53.9              | 12.7           |             |
| Hori.    | 3620.000           | AV       | 39.7              | 29.2               | 6.0          | 32.2         | -                   | 42.7               | 53.9              | 11.2           |             |
| Hori.    | 4525.000           | AV       | 32.5              | 30.8               | 6.5          | 31.9         | -                   | 37.9               | 53.9              | 16.1           | Floor noise |
| Hori.    | 5430.000           | AV       | 32.3              | 31.6               | 6.9          | 31.9         | -                   | 39.0               | 53.9              | 14.9           | Floor noise |
| Hori.    | 8145.000           | AV       | 33.8              | 36.5               | 7.8          | 32.8         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Hori.    | 9050.000           | AV       | 32.2              | 37.6               | 8.2          | 33.1         | -                   | 44.9               | 53.9              | 9.0            | Floor noise |
| Hori.    | 9955.000           | AV       | 33.3              | 38.9               | 8.4          | 33.5         | -                   | 47.1               | 53.9              | 6.8            | Floor noise |
| Vert.    | 960.000            | QP       | 35.1              | 22.2               | 14.8         | 30.6         | -                   | 41.5               | 46.0              | 4.5            |             |
| Vert.    | 2715.000           | PK       | 55.6              | 28.1               | 5.7          | 32.6         | -                   | 56.8               | 73.9              | 17.1           |             |
| Vert.    | 3620.000           | PK       | 49.8              | 29.2               | 6.0          | 32.2         | -                   | 52.8               | 73.9              | 21.1           |             |
| Vert.    | 4525.000           | PK       | 40.3              | 30.8               | 6.5          | 31.9         | -                   | 45.6               | 73.9              | 28.3           | Floor noise |
| Vert.    | 5430.000           | PK       | 40.4              | 31.6               | 6.9          | 31.9         | -                   | 47.0               | 73.9              | 26.9           | Floor noise |
| Vert.    | 8145.000           | PK       | 40.7              | 36.5               | 7.8          | 32.8         | -                   | 52.2               | 73.9              | 21.7           | Floor noise |
| Vert.    | 9050.000           | PK       | 40.8              | 37.6               | 8.2          | 33.1         | -                   | 53.4               | 73.9              | 20.5           | Floor noise |
| Vert.    | 9955.000           | PK       | 41.7              | 38.9               | 8.4          | 33.5         | -                   | 55.5               | 73.9              | 18.4           | Floor noise |
| Vert.    | 2715.000           | AV       | 43.9              | 28.1               | 5.7          | 32.6         | -                   | 45.0               | 53.9              | 8.9            |             |
| Vert.    | 3620.000           | AV       | 39.5              | 29.2               | 6.0          | 32.2         | -                   | 42.5               | 53.9              | 11.4           |             |
| Vert.    | 4525.000           | AV       | 33.7              | 30.8               | 6.5          | 31.9         | -                   | 39.0               | 53.9              | 14.9           | Floor noise |
| Vert.    | 5430.000           | AV       | 32.2              | 31.6               | 6.9          | 31.9         | -                   | 38.8               | 53.9              | 15.1           | Floor noise |
| Vert.    | 8145.000           | AV       | 33.4              | 36.5               | 7.8          | 32.8         | -                   | 44.8               | 53.9              | 9.1            | Floor noise |
| Vert.    | 9050.000           | AV       | 33.4              | 37.6               | 8.2          | 33.1         | -                   | 46.0               | 53.9              | 7.9            | Floor noise |
| Vert.    | 9955.000           | AV       | 34.1              | 38.9               | 8.4          | 33.5         | -                   | 47.9               | 53.9              | 6.0            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                                   |                                 |
|------------------------|-----------------------------------|---------------------------------|
| Report No.             | 13128136H                         |                                 |
| Test place             | Ise EMC Lab.                      |                                 |
| Semi Anechoic Chamber  | No.3                              | No.3                            |
| Date                   | March 16, 2020                    | March 18, 2020                  |
| Temperature / Humidity | 21 deg. C / 31 % RH               | 23 deg. C / 35 % RH             |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takumi Shimada<br>(Above 1 GHz) |
| Mode                   | Tx 905 MHz (2 MHz)                |                                 |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|---------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 905.000   | PK       | 81.8    | 22.2          | 13.5 | 0.0  | 117.5    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 32.0    | 19.8          | 13.4 | 32.0 | 33.2     | 87.5     | 54.3   |         |
| Hori.    | 713.000   | PK       | 31.2    | 20.0          | 13.4 | 31.9 | 32.7     | 87.5     | 54.8   |         |
| Hori.    | 736.000   | PK       | 33.2    | 20.1          | 13.5 | 31.8 | 35.0     | 87.5     | 52.5   |         |
| Hori.    | 768.000   | PK       | 41.9    | 20.5          | 13.7 | 31.6 | 44.4     | 87.5     | 43.1   |         |
| Hori.    | 800.000   | PK       | 41.6    | 20.8          | 13.9 | 31.4 | 44.8     | 87.5     | 42.7   |         |
| Hori.    | 832.000   | PK       | 43.9    | 21.1          | 14.0 | 31.3 | 47.7     | 87.5     | 39.9   |         |
| Hori.    | 864.000   | PK       | 48.6    | 21.8          | 14.3 | 31.1 | 53.6     | 87.5     | 33.9   |         |
| Hori.    | 902.000   | PK       | 43.7    | 22.2          | 13.5 | 0.0  | 79.4     | 87.5     | 8.1    |         |
| Hori.    | 937.000   | PK       | 46.7    | 22.0          | 15.1 | 30.7 | 53.1     | 87.5     | 34.4   |         |
| Hori.    | 1810.000  | PK       | 68.0    | 25.2          | 5.4  | 33.4 | 65.2     | 87.5     | 22.3   |         |
| Hori.    | 6335.000  | PK       | 33.2    | 33.1          | 7.2  | 32.2 | 41.4     | 87.5     | 46.1   |         |
| Hori.    | 7240.000  | PK       | 35.3    | 36.0          | 7.4  | 32.7 | 46.0     | 87.5     | 41.5   |         |
| Vert.    | 905.000   | PK       | 82.0    | 22.2          | 13.5 | 0.0  | 117.7    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 32.0    | 19.8          | 13.4 | 32.0 | 33.2     | 87.7     | 54.5   |         |
| Vert.    | 713.000   | PK       | 32.3    | 20.0          | 13.4 | 31.9 | 33.8     | 87.7     | 53.9   |         |
| Vert.    | 736.000   | PK       | 33.7    | 20.1          | 13.5 | 31.8 | 35.6     | 87.7     | 52.1   |         |
| Vert.    | 768.000   | PK       | 42.9    | 20.5          | 13.7 | 31.6 | 45.5     | 87.7     | 42.2   |         |
| Vert.    | 800.000   | PK       | 42.0    | 20.8          | 13.9 | 31.4 | 45.2     | 87.7     | 42.5   |         |
| Vert.    | 832.000   | PK       | 47.8    | 21.1          | 14.0 | 31.3 | 51.6     | 87.7     | 36.2   |         |
| Vert.    | 864.000   | PK       | 50.1    | 21.8          | 14.3 | 31.1 | 55.1     | 87.7     | 32.6   |         |
| Vert.    | 902.000   | PK       | 45.5    | 22.2          | 13.5 | 0.0  | 81.2     | 87.7     | 6.5    |         |
| Vert.    | 937.000   | PK       | 45.1    | 22.0          | 15.1 | 30.7 | 51.5     | 87.7     | 36.2   |         |
| Vert.    | 1810.000  | PK       | 69.2    | 25.2          | 5.4  | 33.4 | 66.4     | 87.7     | 21.3   |         |
| Vert.    | 6335.000  | PK       | 33.2    | 33.1          | 7.2  | 32.2 | 41.4     | 87.7     | 46.3   |         |
| Vert.    | 7240.000  | PK       | 36.2    | 36.0          | 7.4  | 32.7 | 47.0     | 87.7     | 40.7   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

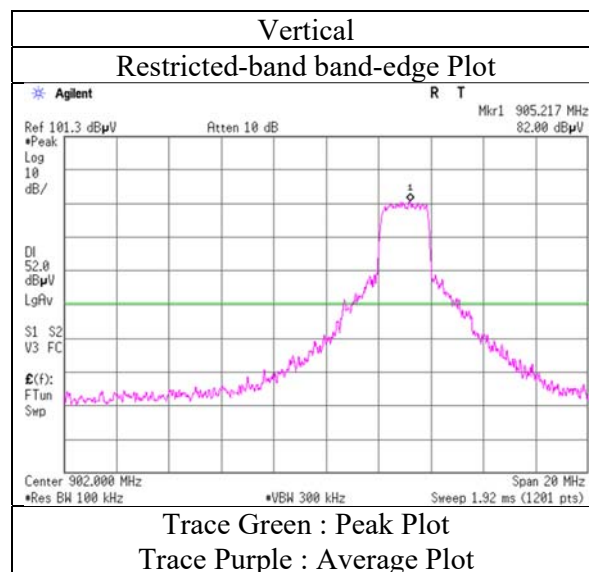
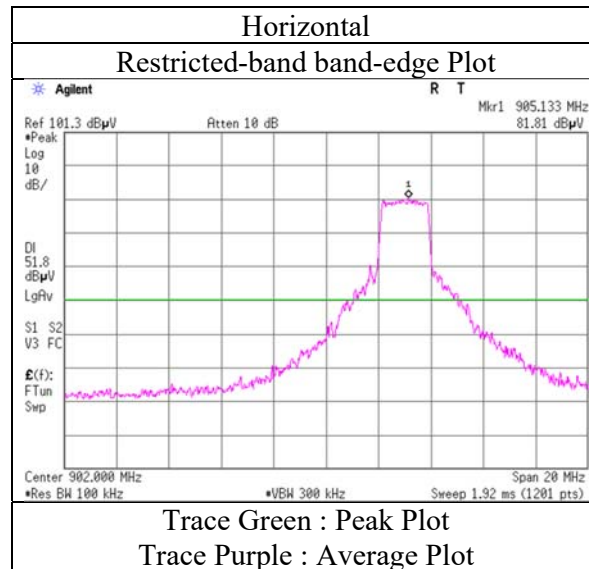
Telephone : +81 596 24 8999

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## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                                   |
|------------------------|-----------------------------------|
| Report No.             | 13128136H                         |
| Test place             | Ise EMC Lab.                      |
| Semi Anechoic Chamber  | No.3                              |
| Date                   | March 16, 2020                    |
| Temperature / Humidity | 21 deg. C / 31 % RH               |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) |
| Mode                   | Tx 905 MHz (2 MHz)                |

(PCB Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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## Radiated Spurious Emission

|                        |                                   |                                 |
|------------------------|-----------------------------------|---------------------------------|
| Report No.             | 13128136H                         |                                 |
| Test place             | Ise EMC Lab.                      |                                 |
| Semi Anechoic Chamber  | No.3                              | No.3                            |
| Date                   | March 16, 2020                    | March 18, 2020                  |
| Temperature / Humidity | 21 deg. C / 31 % RH               | 23 deg. C / 35 % RH             |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takumi Shimada<br>(Above 1 GHz) |
| Mode                   | Tx 917 MHz (2 MHz)                |                                 |

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.5              | 22.2               | 14.8         | 30.6         | -                   | 43.9               | 46.0              | 2.1            |             |
| Hori.    | 2751.000           | PK       | 46.4              | 28.3               | 5.7          | 32.6         | -                   | 47.8               | 73.9              | 26.1           |             |
| Hori.    | 3668.000           | PK       | 46.6              | 29.3               | 6.1          | 32.2         | -                   | 49.8               | 73.9              | 24.2           |             |
| Hori.    | 4585.000           | PK       | 41.1              | 31.0               | 6.5          | 31.9         | -                   | 46.7               | 73.9              | 27.3           | Floor noise |
| Hori.    | 5502.000           | PK       | 40.0              | 31.7               | 7.0          | 31.9         | -                   | 46.8               | 73.9              | 27.1           | Floor noise |
| Hori.    | 7336.000           | PK       | 41.2              | 36.2               | 7.4          | 32.7         | -                   | 52.1               | 73.9              | 21.8           | Floor noise |
| Hori.    | 8253.000           | PK       | 41.9              | 36.4               | 7.8          | 32.9         | -                   | 53.3               | 73.9              | 20.7           | Floor noise |
| Hori.    | 9170.000           | PK       | 41.3              | 38.3               | 8.2          | 33.1         | -                   | 54.6               | 73.9              | 19.3           | Floor noise |
| Hori.    | 2751.000           | AV       | 38.2              | 28.3               | 5.7          | 32.6         | -                   | 39.5               | 53.9              | 14.4           |             |
| Hori.    | 3668.000           | AV       | 37.5              | 29.3               | 6.1          | 32.2         | -                   | 40.6               | 53.9              | 13.3           |             |
| Hori.    | 4585.000           | AV       | 32.4              | 31.0               | 6.5          | 31.9         | -                   | 38.0               | 53.9              | 15.9           | Floor noise |
| Hori.    | 5502.000           | AV       | 31.8              | 31.7               | 7.0          | 31.9         | -                   | 38.6               | 53.9              | 15.3           | Floor noise |
| Hori.    | 7336.000           | AV       | 33.6              | 36.2               | 7.4          | 32.7         | -                   | 44.5               | 53.9              | 9.4            | Floor noise |
| Hori.    | 8253.000           | AV       | 33.6              | 36.4               | 7.8          | 32.9         | -                   | 45.0               | 53.9              | 8.9            | Floor noise |
| Hori.    | 9170.000           | AV       | 33.8              | 38.3               | 8.2          | 33.1         | -                   | 47.2               | 53.9              | 6.7            | Floor noise |
| Vert.    | 960.000            | QP       | 36.6              | 22.2               | 14.8         | 30.6         | -                   | 43.0               | 46.0              | 3.0            |             |
| Vert.    | 2751.000           | PK       | 53.1              | 28.3               | 5.7          | 32.6         | -                   | 54.4               | 73.9              | 19.5           |             |
| Vert.    | 3668.000           | PK       | 50.5              | 29.3               | 6.1          | 32.2         | -                   | 53.6               | 73.9              | 20.3           |             |
| Vert.    | 4585.000           | PK       | 40.1              | 31.0               | 6.5          | 31.9         | -                   | 45.7               | 73.9              | 28.2           | Floor noise |
| Vert.    | 5502.000           | PK       | 40.0              | 31.7               | 7.0          | 31.9         | -                   | 46.8               | 73.9              | 27.1           | Floor noise |
| Vert.    | 7336.000           | PK       | 42.0              | 36.2               | 7.4          | 32.7         | -                   | 52.9               | 73.9              | 21.0           | Floor noise |
| Vert.    | 8253.000           | PK       | 40.9              | 36.4               | 7.8          | 32.9         | -                   | 52.3               | 73.9              | 21.6           | Floor noise |
| Vert.    | 9170.000           | PK       | 41.2              | 38.3               | 8.2          | 33.1         | -                   | 54.6               | 73.9              | 19.3           | Floor noise |
| Vert.    | 2751.000           | AV       | 45.2              | 28.3               | 5.7          | 32.6         | -                   | 46.6               | 53.9              | 7.3            |             |
| Vert.    | 3668.000           | AV       | 42.2              | 29.3               | 6.1          | 32.2         | -                   | 45.4               | 53.9              | 8.5            |             |
| Vert.    | 4585.000           | AV       | 32.7              | 31.0               | 6.5          | 31.9         | -                   | 38.3               | 53.9              | 15.6           | Floor noise |
| Vert.    | 5502.000           | AV       | 32.4              | 31.7               | 7.0          | 31.9         | -                   | 39.1               | 53.9              | 14.8           | Floor noise |
| Vert.    | 7336.000           | AV       | 33.3              | 36.2               | 7.4          | 32.7         | -                   | 44.2               | 53.9              | 9.7            | Floor noise |
| Vert.    | 8253.000           | AV       | 33.4              | 36.4               | 7.8          | 32.9         | -                   | 44.8               | 53.9              | 9.1            | Floor noise |
| Vert.    | 9170.000           | AV       | 34.0              | 38.3               | 8.2          | 33.1         | -                   | 47.4               | 53.9              | 6.5            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                                   |                                 |
|------------------------|-----------------------------------|---------------------------------|
| Report No.             | 13128136H                         |                                 |
| Test place             | Ise EMC Lab.                      |                                 |
| Semi Anechoic Chamber  | No.3                              | No.3                            |
| Date                   | March 16, 2020                    | March 18, 2020                  |
| Temperature / Humidity | 21 deg. C / 31 % RH               | 23 deg. C / 35 % RH             |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takumi Shimada<br>(Above 1 GHz) |
| Mode                   | Tx 917 MHz (2 MHz)                |                                 |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|---------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 917.000   | PK       | 83.5    | 22.2          | 13.6 | 0.0  | 119.3    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 32.3    | 19.8          | 13.4 | 32.0 | 33.5     | 89.3     | 55.8   |         |
| Hori.    | 725.000   | PK       | 32.1    | 20.1          | 13.5 | 31.9 | 33.8     | 89.3     | 55.4   |         |
| Hori.    | 736.000   | PK       | 33.3    | 20.1          | 13.5 | 31.8 | 35.2     | 89.3     | 54.1   |         |
| Hori.    | 768.000   | PK       | 42.2    | 20.5          | 13.7 | 31.6 | 44.7     | 89.3     | 44.5   |         |
| Hori.    | 800.000   | PK       | 40.1    | 20.8          | 13.9 | 31.4 | 43.3     | 89.3     | 46.0   |         |
| Hori.    | 832.000   | PK       | 45.6    | 21.1          | 14.0 | 31.3 | 49.4     | 89.3     | 39.8   |         |
| Hori.    | 864.000   | PK       | 50.4    | 21.8          | 14.3 | 31.1 | 55.4     | 89.3     | 33.9   |         |
| Hori.    | 885.000   | PK       | 48.2    | 22.1          | 14.7 | 31.0 | 53.9     | 89.3     | 35.3   |         |
| Hori.    | 896.000   | PK       | 48.5    | 22.1          | 14.9 | 30.9 | 54.6     | 89.3     | 34.7   |         |
| Hori.    | 949.000   | PK       | 47.2    | 22.0          | 14.8 | 30.6 | 53.3     | 89.3     | 35.9   |         |
| Hori.    | 1834.000  | PK       | 66.2    | 25.3          | 5.4  | 33.3 | 63.6     | 89.3     | 25.7   |         |
| Hori.    | 6419.000  | PK       | 33.7    | 33.5          | 7.2  | 32.2 | 42.2     | 89.3     | 47.1   |         |
| Vert.    | 917.000   | PK       | 82.9    | 22.2          | 13.6 | 0.0  | 118.7    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 31.9    | 19.8          | 13.4 | 32.0 | 33.1     | 88.7     | 55.6   |         |
| Vert.    | 725.000   | PK       | 32.1    | 20.1          | 13.5 | 31.9 | 33.9     | 88.7     | 54.8   |         |
| Vert.    | 736.000   | PK       | 32.7    | 20.1          | 13.5 | 31.8 | 34.6     | 88.7     | 54.1   |         |
| Vert.    | 768.000   | PK       | 42.9    | 20.5          | 13.7 | 31.6 | 45.4     | 88.7     | 43.3   |         |
| Vert.    | 800.000   | PK       | 42.4    | 20.8          | 13.9 | 31.4 | 45.6     | 88.7     | 43.1   |         |
| Vert.    | 832.000   | PK       | 49.1    | 21.1          | 14.0 | 31.3 | 52.9     | 88.7     | 35.8   |         |
| Vert.    | 864.000   | PK       | 51.5    | 21.8          | 14.3 | 31.1 | 56.5     | 88.7     | 32.2   |         |
| Vert.    | 885.000   | PK       | 48.4    | 22.1          | 14.7 | 31.0 | 54.1     | 88.7     | 34.6   |         |
| Vert.    | 896.000   | PK       | 48.9    | 22.1          | 14.9 | 30.9 | 55.0     | 88.7     | 33.7   |         |
| Vert.    | 949.000   | PK       | 45.3    | 22.0          | 14.8 | 30.6 | 51.5     | 88.7     | 37.2   |         |
| Vert.    | 1834.000  | PK       | 66.3    | 25.3          | 5.4  | 33.3 | 63.7     | 88.7     | 25.0   |         |
| Vert.    | 6419.000  | PK       | 33.4    | 33.5          | 7.2  | 32.2 | 41.9     | 88.7     | 46.7   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

## Radiated Spurious Emission

|                        |                                   |                                 |
|------------------------|-----------------------------------|---------------------------------|
| Report No.             | 13128136H                         |                                 |
| Test place             | Ise EMC Lab.                      |                                 |
| Semi Anechoic Chamber  | No.3                              | No.3                            |
| Date                   | March 16, 2020                    | March 18, 2020                  |
| Temperature / Humidity | 21 deg. C / 31 % RH               | 23 deg. C / 35 % RH             |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takumi Shimada<br>(Above 1 GHz) |
| Mode                   | Tx 925 MHz (2 MHz)                |                                 |

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.2              | 22.2               | 14.8         | 30.6         | -                   | 43.6               | 46.0              | 2.4            |             |
| Hori.    | 2775.000           | PK       | 47.5              | 28.4               | 5.7          | 32.6         | -                   | 49.0               | 73.9              | 24.9           |             |
| Hori.    | 3700.000           | PK       | 47.4              | 29.4               | 6.1          | 32.2         | -                   | 50.6               | 73.9              | 23.3           |             |
| Hori.    | 4625.000           | PK       | 40.4              | 31.1               | 6.5          | 31.9         | -                   | 46.2               | 73.9              | 27.8           | Floor noise |
| Hori.    | 5550.000           | PK       | 39.8              | 31.7               | 7.0          | 31.9         | -                   | 46.5               | 73.9              | 27.4           | Floor noise |
| Hori.    | 7400.000           | PK       | 41.9              | 36.3               | 7.5          | 32.7         | -                   | 52.9               | 73.9              | 21.0           | Floor noise |
| Hori.    | 8325.000           | PK       | 41.9              | 36.2               | 7.9          | 32.9         | -                   | 53.1               | 73.9              | 20.8           | Floor noise |
| Hori.    | 9250.000           | PK       | 41.7              | 38.7               | 8.2          | 33.2         | -                   | 55.5               | 73.9              | 18.4           | Floor noise |
| Hori.    | 2775.000           | AV       | 38.1              | 28.4               | 5.7          | 32.6         | -                   | 39.6               | 53.9              | 14.3           |             |
| Hori.    | 3700.000           | AV       | 38.8              | 29.4               | 6.1          | 32.2         | -                   | 42.1               | 53.9              | 11.8           |             |
| Hori.    | 4625.000           | AV       | 32.5              | 31.1               | 6.5          | 31.9         | -                   | 38.2               | 53.9              | 15.7           | Floor noise |
| Hori.    | 5550.000           | AV       | 31.7              | 31.7               | 7.0          | 31.9         | -                   | 38.5               | 53.9              | 15.4           | Floor noise |
| Hori.    | 7400.000           | AV       | 34.1              | 36.3               | 7.5          | 32.7         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Hori.    | 8325.000           | AV       | 34.2              | 36.2               | 7.9          | 32.9         | -                   | 45.4               | 53.9              | 8.5            | Floor noise |
| Hori.    | 9250.000           | AV       | 33.9              | 38.7               | 8.2          | 33.2         | -                   | 47.7               | 53.9              | 6.2            | Floor noise |
| Vert.    | 960.000            | QP       | 36.3              | 22.2               | 14.8         | 30.6         | -                   | 42.7               | 46.0              | 3.3            |             |
| Vert.    | 2775.000           | PK       | 52.5              | 28.4               | 5.7          | 32.6         | -                   | 54.0               | 73.9              | 19.9           |             |
| Vert.    | 3700.000           | PK       | 50.0              | 29.4               | 6.1          | 32.2         | -                   | 53.3               | 73.9              | 20.6           |             |
| Vert.    | 4625.000           | PK       | 39.7              | 31.1               | 6.5          | 31.9         | -                   | 45.5               | 73.9              | 28.5           | Floor noise |
| Vert.    | 5550.000           | PK       | 40.3              | 31.7               | 7.0          | 31.9         | -                   | 47.1               | 73.9              | 26.8           | Floor noise |
| Vert.    | 7400.000           | PK       | 40.9              | 36.3               | 7.5          | 32.7         | -                   | 51.9               | 73.9              | 22.0           | Floor noise |
| Vert.    | 8325.000           | PK       | 41.3              | 36.2               | 7.9          | 32.9         | -                   | 52.5               | 73.9              | 21.4           | Floor noise |
| Vert.    | 9250.000           | PK       | 41.6              | 38.7               | 8.2          | 33.2         | -                   | 55.4               | 73.9              | 18.6           | Floor noise |
| Vert.    | 2775.000           | AV       | 44.7              | 28.4               | 5.7          | 32.6         | -                   | 46.2               | 53.9              | 7.7            |             |
| Vert.    | 3700.000           | AV       | 41.4              | 29.4               | 6.1          | 32.2         | -                   | 44.6               | 53.9              | 9.3            |             |
| Vert.    | 4625.000           | AV       | 33.1              | 31.1               | 6.5          | 31.9         | -                   | 38.8               | 53.9              | 15.1           | Floor noise |
| Vert.    | 5550.000           | AV       | 32.2              | 31.7               | 7.0          | 31.9         | -                   | 38.9               | 53.9              | 15.0           | Floor noise |
| Vert.    | 7400.000           | AV       | 34.1              | 36.3               | 7.5          | 32.7         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Vert.    | 8325.000           | AV       | 34.1              | 36.2               | 7.9          | 32.9         | -                   | 45.3               | 53.9              | 8.6            | Floor noise |
| Vert.    | 9250.000           | AV       | 34.0              | 38.7               | 8.2          | 33.2         | -                   | 47.8               | 53.9              | 6.1            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                                   |                                 |
|------------------------|-----------------------------------|---------------------------------|
| Report No.             | 13128136H                         |                                 |
| Test place             | Ise EMC Lab.                      |                                 |
| Semi Anechoic Chamber  | No.3                              | No.3                            |
| Date                   | March 16, 2020                    | March 18, 2020                  |
| Temperature / Humidity | 21 deg. C / 31 % RH               | 23 deg. C / 35 % RH             |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takumi Shimada<br>(Above 1 GHz) |
| Mode                   | Tx 925 MHz (2 MHz)                |                                 |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|---------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 925.000   | PK       | 83.0    | 22.1          | 13.6 | 0.0  | 118.7    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 33.9    | 19.8          | 13.4 | 32.0 | 35.0     | 88.7     | 53.7   |         |
| Hori.    | 733.000   | PK       | 31.4    | 20.1          | 13.5 | 31.8 | 33.2     | 88.7     | 55.5   |         |
| Hori.    | 736.000   | PK       | 31.4    | 20.1          | 13.5 | 31.8 | 33.2     | 88.7     | 55.5   |         |
| Hori.    | 768.000   | PK       | 40.0    | 20.5          | 13.7 | 31.6 | 42.5     | 88.7     | 46.2   |         |
| Hori.    | 800.000   | PK       | 41.2    | 20.8          | 13.9 | 31.4 | 44.4     | 88.7     | 44.3   |         |
| Hori.    | 832.000   | PK       | 44.6    | 21.1          | 14.0 | 31.3 | 48.4     | 88.7     | 40.3   |         |
| Hori.    | 864.000   | PK       | 49.0    | 21.8          | 14.3 | 31.1 | 54.0     | 88.7     | 34.7   |         |
| Hori.    | 893.000   | PK       | 46.8    | 22.1          | 14.8 | 30.9 | 52.8     | 88.7     | 36.0   |         |
| Hori.    | 896.000   | PK       | 47.4    | 22.1          | 14.9 | 30.9 | 53.4     | 88.7     | 35.3   |         |
| Hori.    | 928.000   | PK       | 40.8    | 22.0          | 13.7 | 0.0  | 76.5     | 88.7     | 12.2   |         |
| Hori.    | 957.000   | PK       | 46.4    | 22.1          | 14.8 | 30.6 | 52.8     | 88.7     | 36.0   |         |
| Hori.    | 1850.000  | PK       | 63.4    | 25.4          | 5.4  | 33.3 | 60.9     | 88.7     | 27.8   |         |
| Hori.    | 6475.000  | PK       | 33.1    | 33.8          | 7.3  | 32.3 | 41.9     | 88.7     | 46.9   |         |
| Vert.    | 925.000   | PK       | 82.2    | 22.1          | 13.6 | 0.0  | 118.0    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 32.0    | 19.8          | 13.4 | 32.0 | 33.2     | 88.0     | 54.8   |         |
| Vert.    | 733.000   | PK       | 32.1    | 20.1          | 13.5 | 31.8 | 33.9     | 88.0     | 54.0   |         |
| Vert.    | 736.000   | PK       | 32.4    | 20.1          | 13.5 | 31.8 | 34.2     | 88.0     | 53.8   |         |
| Vert.    | 768.000   | PK       | 40.7    | 20.5          | 13.7 | 31.6 | 43.2     | 88.0     | 44.8   |         |
| Vert.    | 800.000   | PK       | 40.8    | 20.8          | 13.9 | 31.4 | 44.0     | 88.0     | 44.0   |         |
| Vert.    | 832.000   | PK       | 48.3    | 21.1          | 14.0 | 31.3 | 52.1     | 88.0     | 35.9   |         |
| Vert.    | 864.000   | PK       | 52.4    | 21.8          | 14.3 | 31.1 | 57.4     | 88.0     | 30.6   |         |
| Vert.    | 893.000   | PK       | 47.3    | 22.1          | 14.8 | 30.9 | 53.3     | 88.0     | 34.6   |         |
| Vert.    | 896.000   | PK       | 48.1    | 22.1          | 14.9 | 30.9 | 54.2     | 88.0     | 33.8   |         |
| Vert.    | 928.000   | PK       | 38.9    | 22.0          | 13.7 | 0.0  | 74.5     | 88.0     | 13.4   |         |
| Vert.    | 957.000   | PK       | 44.2    | 22.1          | 14.8 | 30.6 | 50.5     | 88.0     | 37.4   |         |
| Vert.    | 1850.000  | PK       | 63.4    | 25.4          | 5.4  | 33.3 | 60.8     | 88.0     | 27.1   |         |
| Vert.    | 6475.000  | PK       | 33.2    | 33.8          | 7.3  | 32.3 | 42.0     | 88.0     | 46.0   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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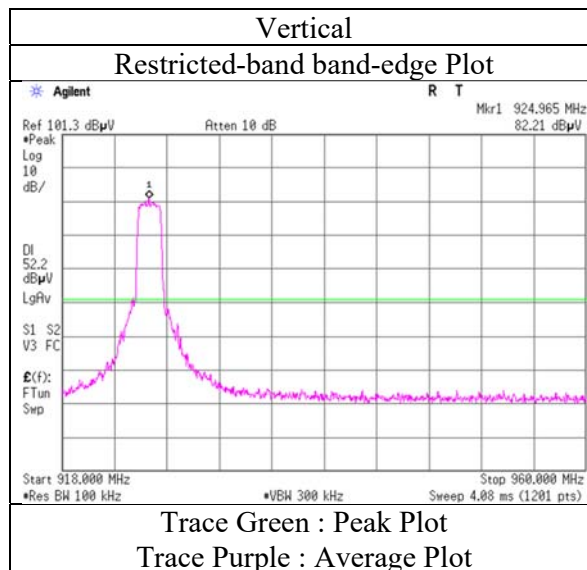
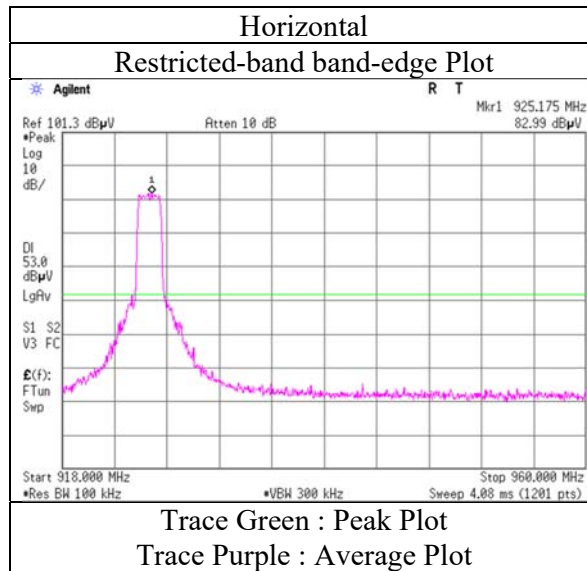
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## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                     |
|------------------------|---------------------|
| Report No.             | 13128136H           |
| Test place             | Ise EMC Lab.        |
| Semi Anechoic Chamber  | No.3                |
| Date                   | March 16, 2020      |
| Temperature / Humidity | 21 deg. C / 31 % RH |
| Engineer               | Takafumi Noguchi    |
|                        | (Below 1 GHz)       |
| Mode                   | Tx 925 MHz (2 MHz)  |

(PCB Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.4                 | No.3                |
| Date                   | March 22, 2020       | March 18, 2020      |
| Temperature / Humidity | 24 deg. C / 38 % RH  | 23 deg. C / 35 % RH |
| Engineer               | Junya Okuno          | Takumi Shimada      |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 910.0 MHz (4 MHz) |                     |

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 34.2              | 22.1               | 14.7         | 30.8         | -                   | 40.2               | 46.0              | 5.8            |             |
| Hori.    | 2730.000           | PK       | 44.9              | 28.2               | 5.7          | 32.6         | -                   | 46.1               | 73.9              | 27.8           |             |
| Hori.    | 3640.000           | PK       | 45.0              | 29.2               | 6.1          | 32.2         | -                   | 48.1               | 73.9              | 25.8           |             |
| Hori.    | 4550.000           | PK       | 40.4              | 30.8               | 6.5          | 31.9         | -                   | 45.8               | 73.9              | 28.1           | Floor noise |
| Hori.    | 5460.000           | PK       | 39.9              | 31.7               | 6.9          | 31.9         | -                   | 46.6               | 73.9              | 27.3           | Floor noise |
| Hori.    | 6370.000           | PK       | 41.2              | 33.3               | 7.2          | 32.2         | -                   | 49.5               | 73.9              | 24.4           | Floor noise |
| Hori.    | 7280.000           | PK       | 41.8              | 36.1               | 7.4          | 32.7         | -                   | 52.6               | 73.9              | 21.3           | Floor noise |
| Hori.    | 8190.000           | PK       | 40.9              | 36.4               | 7.8          | 32.8         | -                   | 52.2               | 73.9              | 21.7           | Floor noise |
| Hori.    | 9100.000           | PK       | 41.1              | 38.0               | 8.2          | 33.1         | -                   | 54.1               | 73.9              | 19.8           | Floor noise |
| Hori.    | 2730.000           | AV       | 35.8              | 28.2               | 5.7          | 32.6         | -                   | 37.1               | 53.9              | 16.9           |             |
| Hori.    | 3640.000           | AV       | 37.5              | 29.2               | 6.1          | 32.2         | -                   | 40.6               | 53.9              | 13.3           |             |
| Hori.    | 4550.000           | AV       | 32.6              | 30.8               | 6.5          | 31.9         | -                   | 38.0               | 53.9              | 15.9           | Floor noise |
| Hori.    | 5460.000           | AV       | 32.4              | 31.7               | 6.9          | 31.9         | -                   | 39.2               | 53.9              | 14.7           | Floor noise |
| Hori.    | 6370.000           | AV       | 32.4              | 33.3               | 7.2          | 32.2         | -                   | 40.7               | 53.9              | 13.2           | Floor noise |
| Hori.    | 7280.000           | AV       | 34.2              | 36.1               | 7.4          | 32.7         | -                   | 45.0               | 53.9              | 8.9            | Floor noise |
| Hori.    | 8190.000           | AV       | 33.5              | 36.4               | 7.8          | 32.8         | -                   | 44.8               | 53.9              | 9.1            | Floor noise |
| Hori.    | 9100.000           | AV       | 33.7              | 38.0               | 8.2          | 33.1         | -                   | 46.8               | 53.9              | 7.2            | Floor noise |
| Vert.    | 960.000            | QP       | 34.4              | 22.1               | 14.7         | 30.8         | -                   | 40.4               | 46.0              | 5.6            |             |
| Vert.    | 2730.000           | PK       | 49.2              | 28.2               | 5.7          | 32.6         | -                   | 50.4               | 73.9              | 23.5           |             |
| Vert.    | 3640.000           | PK       | 45.7              | 29.2               | 6.1          | 32.2         | -                   | 48.8               | 73.9              | 25.1           |             |
| Vert.    | 4550.000           | PK       | 40.0              | 30.8               | 6.5          | 31.9         | -                   | 45.4               | 73.9              | 28.5           | Floor noise |
| Vert.    | 5460.000           | PK       | 39.4              | 31.7               | 6.9          | 31.9         | -                   | 46.1               | 73.9              | 27.8           | Floor noise |
| Vert.    | 6370.000           | PK       | 40.6              | 33.3               | 7.2          | 32.2         | -                   | 48.9               | 73.9              | 25.0           | Floor noise |
| Vert.    | 7280.000           | PK       | 41.8              | 36.1               | 7.4          | 32.7         | -                   | 52.7               | 73.9              | 21.3           | Floor noise |
| Vert.    | 8190.001           | PK       | 41.7              | 36.4               | 7.8          | 32.8         | -                   | 53.0               | 73.9              | 20.9           | Floor noise |
| Vert.    | 9100.000           | PK       | 40.9              | 38.0               | 8.2          | 33.1         | -                   | 53.9               | 73.9              | 20.0           | Floor noise |
| Vert.    | 2730.000           | AV       | 41.2              | 28.2               | 5.7          | 32.6         | -                   | 42.4               | 53.9              | 11.5           |             |
| Vert.    | 3640.000           | AV       | 37.7              | 29.2               | 6.1          | 32.2         | -                   | 40.8               | 53.9              | 13.1           |             |
| Vert.    | 4550.000           | AV       | 32.7              | 30.8               | 6.5          | 31.9         | -                   | 38.1               | 53.9              | 15.8           | Floor noise |
| Vert.    | 5460.000           | AV       | 32.3              | 31.7               | 6.9          | 31.9         | -                   | 39.0               | 53.9              | 14.9           | Floor noise |
| Vert.    | 6370.000           | AV       | 32.9              | 33.3               | 7.2          | 32.2         | -                   | 41.2               | 53.9              | 12.7           | Floor noise |
| Vert.    | 7280.000           | AV       | 34.2              | 36.1               | 7.4          | 32.7         | -                   | 45.0               | 53.9              | 8.9            | Floor noise |
| Vert.    | 8190.001           | AV       | 34.0              | 36.4               | 7.8          | 32.8         | -                   | 45.3               | 53.9              | 8.6            | Floor noise |
| Vert.    | 9100.000           | AV       | 33.6              | 38.0               | 8.2          | 33.1         | -                   | 46.7               | 53.9              | 7.3            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.4                 | No.3                |
| Date                   | March 22, 2020       | March 18, 2020      |
| Temperature / Humidity | 24 deg. C / 38 % RH  | 23 deg. C / 35 % RH |
| Engineer               | Junya Okuno          | Takumi Shimada      |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 910.0 MHz (4 MHz) |                     |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant              | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | Factor<br>[dB/m] | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 910.000   | PK       | 75.6    | 21.9             | 13.5 | 0.0  | 111.0    | -        | -      | Carrier |
| Hori.    | 768.000   | PK       | 36.7    | 20.4             | 13.6 | 31.7 | 39.0     | 81.0     | 42.1   |         |
| Hori.    | 800.000   | PK       | 36.9    | 20.8             | 13.8 | 31.6 | 39.9     | 81.0     | 41.1   |         |
| Hori.    | 832.000   | PK       | 42.6    | 21.1             | 13.9 | 31.4 | 46.2     | 81.0     | 34.8   |         |
| Hori.    | 864.000   | PK       | 44.5    | 21.6             | 14.2 | 31.3 | 49.0     | 81.0     | 32.0   |         |
| Hori.    | 902.000   | PK       | 25.6    | 22.0             | 13.4 | 0.0  | 61.0     | 81.0     | 20.0   |         |
| Hori.    | 942.000   | PK       | 40.0    | 21.9             | 14.8 | 30.9 | 45.8     | 81.0     | 35.2   |         |
| Vert.    | 910.000   | PK       | 78.2    | 21.9             | 13.5 | 0.0  | 113.6    | -        | -      | Carrier |
| Vert.    | 768.000   | PK       | 40.1    | 20.4             | 13.6 | 31.7 | 42.4     | 83.6     | 41.2   |         |
| Vert.    | 800.000   | PK       | 39.2    | 20.8             | 13.8 | 31.6 | 42.2     | 83.6     | 41.4   |         |
| Vert.    | 832.000   | PK       | 45.9    | 21.1             | 13.9 | 31.4 | 49.5     | 83.6     | 34.1   |         |
| Vert.    | 864.000   | PK       | 50.2    | 21.6             | 14.2 | 31.3 | 54.7     | 83.6     | 28.9   |         |
| Vert.    | 902.000   | PK       | 27.8    | 22.0             | 13.4 | 0.0  | 63.2     | 83.6     | 20.4   |         |
| Vert.    | 942.000   | PK       | 41.0    | 21.9             | 14.8 | 30.9 | 46.8     | 83.6     | 36.8   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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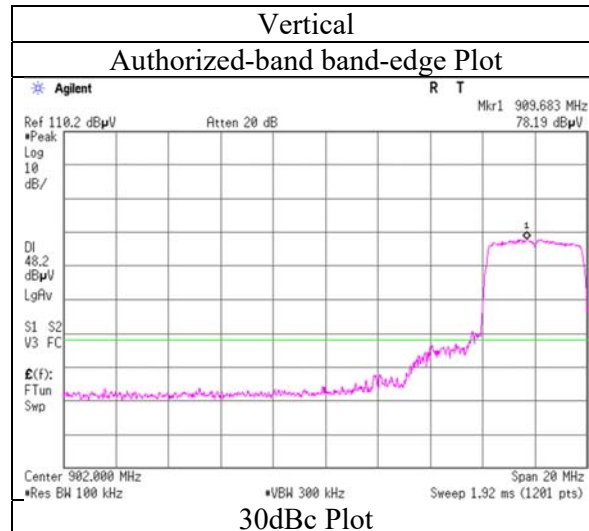
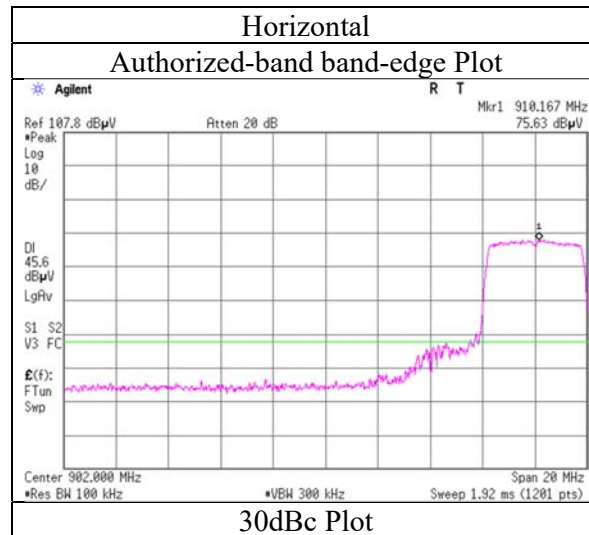
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Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                              |
|------------------------|------------------------------|
| Report No.             | 13128136H                    |
| Test place             | Ise EMC Lab.                 |
| Semi Anechoic Chamber  | No.4                         |
| Date                   | March 22, 2020               |
| Temperature / Humidity | 24 deg. C / 38 % RH          |
| Engineer               | Junya Okuno<br>(Below 1 GHz) |
| Mode                   | Tx 910.0 MHz (4 MHz)         |

(PCB Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

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**Ise EMC Lab.**

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## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 17, 2020       | March 18, 2020      |
| Temperature / Humidity | 23 deg. C / 68 % RH  | 24 deg. C / 32 % RH |
| Engineer               | Yuta Moriya          | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 918.0 MHz (4 MHz) |                     |

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.3              | 22.2               | 14.8         | 30.6         | -                   | 43.7               | 46.0              | 2.3            |             |
| Hori.    | 2754.000           | PK       | 52.3              | 28.3               | 5.7          | 32.6         | -                   | 53.7               | 73.9              | 20.2           |             |
| Hori.    | 3672.000           | PK       | 48.7              | 29.3               | 6.1          | 32.2         | -                   | 51.9               | 73.9              | 22.0           |             |
| Hori.    | 4590.000           | PK       | 40.8              | 31.0               | 6.5          | 31.9         | -                   | 46.4               | 73.9              | 27.5           | Floor noise |
| Hori.    | 5508.000           | PK       | 41.1              | 31.7               | 7.0          | 31.9         | -                   | 47.8               | 73.9              | 26.1           | Floor noise |
| Hori.    | 6426.000           | PK       | 42.1              | 33.6               | 7.3          | 32.3         | -                   | 50.6               | 73.9              | 23.3           | Floor noise |
| Hori.    | 7344.000           | PK       | 42.2              | 36.2               | 7.4          | 32.7         | -                   | 53.2               | 73.9              | 20.8           | Floor noise |
| Hori.    | 8262.000           | PK       | 41.4              | 36.4               | 7.8          | 32.9         | -                   | 52.8               | 73.9              | 21.1           | Floor noise |
| Hori.    | 9180.000           | PK       | 42.0              | 38.4               | 8.2          | 33.1         | -                   | 55.4               | 73.9              | 18.5           | Floor noise |
| Hori.    | 2754.000           | AV       | 41.8              | 28.3               | 5.7          | 32.6         | -                   | 43.2               | 53.9              | 10.7           |             |
| Hori.    | 3672.000           | AV       | 37.6              | 29.3               | 6.1          | 32.2         | -                   | 40.8               | 53.9              | 13.1           |             |
| Hori.    | 4590.000           | AV       | 32.4              | 31.0               | 6.5          | 31.9         | -                   | 38.0               | 53.9              | 15.9           | Floor noise |
| Hori.    | 5508.000           | AV       | 32.0              | 31.7               | 7.0          | 31.9         | -                   | 38.8               | 53.9              | 15.1           | Floor noise |
| Hori.    | 6426.000           | AV       | 32.5              | 33.6               | 7.3          | 32.3         | -                   | 41.1               | 53.9              | 12.9           | Floor noise |
| Hori.    | 7344.000           | AV       | 33.8              | 36.2               | 7.4          | 32.7         | -                   | 44.8               | 53.9              | 9.2            | Floor noise |
| Hori.    | 8262.000           | AV       | 33.5              | 36.4               | 7.8          | 32.9         | -                   | 44.8               | 53.9              | 9.1            | Floor noise |
| Hori.    | 9180.000           | AV       | 34.2              | 38.4               | 8.2          | 33.1         | -                   | 47.7               | 53.9              | 6.3            | Floor noise |
| Vert.    | 960.000            | QP       | 34.5              | 22.2               | 14.8         | 30.6         | -                   | 40.9               | 46.0              | 5.1            |             |
| Vert.    | 2754.000           | PK       | 50.8              | 28.3               | 5.7          | 32.6         | -                   | 52.2               | 73.9              | 21.7           |             |
| Vert.    | 3672.000           | PK       | 48.0              | 29.3               | 6.1          | 32.2         | -                   | 51.1               | 73.9              | 22.8           |             |
| Vert.    | 4590.000           | PK       | 40.8              | 31.0               | 6.5          | 31.9         | -                   | 46.4               | 73.9              | 27.5           | Floor noise |
| Vert.    | 5508.000           | PK       | 41.0              | 31.7               | 7.0          | 31.9         | -                   | 47.8               | 73.9              | 26.1           | Floor noise |
| Vert.    | 6426.000           | PK       | 42.0              | 33.6               | 7.3          | 32.3         | -                   | 50.6               | 73.9              | 23.3           | Floor noise |
| Vert.    | 7344.000           | PK       | 42.2              | 36.2               | 7.4          | 32.7         | -                   | 53.1               | 73.9              | 20.8           | Floor noise |
| Vert.    | 8262.000           | PK       | 41.3              | 36.4               | 7.8          | 32.9         | -                   | 52.6               | 73.9              | 21.3           | Floor noise |
| Vert.    | 9180.000           | PK       | 42.0              | 38.4               | 8.2          | 33.1         | -                   | 55.4               | 73.9              | 18.5           | Floor noise |
| Vert.    | 2754.000           | AV       | 40.5              | 28.3               | 5.7          | 32.6         | -                   | 41.9               | 53.9              | 12.0           |             |
| Vert.    | 3672.000           | AV       | 37.9              | 29.3               | 6.1          | 32.2         | -                   | 41.1               | 53.9              | 12.8           |             |
| Vert.    | 4590.000           | AV       | 32.8              | 31.0               | 6.5          | 31.9         | -                   | 38.4               | 53.9              | 15.5           | Floor noise |
| Vert.    | 5508.000           | AV       | 32.2              | 31.7               | 7.0          | 31.9         | -                   | 39.0               | 53.9              | 14.9           | Floor noise |
| Vert.    | 6426.000           | AV       | 32.3              | 33.6               | 7.3          | 32.3         | -                   | 40.8               | 53.9              | 13.1           | Floor noise |
| Vert.    | 7344.000           | AV       | 33.8              | 36.2               | 7.4          | 32.7         | -                   | 44.7               | 53.9              | 9.2            | Floor noise |
| Vert.    | 8262.000           | AV       | 33.2              | 36.4               | 7.8          | 32.9         | -                   | 44.6               | 53.9              | 9.3            | Floor noise |
| Vert.    | 9180.000           | AV       | 34.3              | 38.4               | 8.2          | 33.1         | -                   | 47.7               | 53.9              | 6.2            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB

## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 17, 2020       | March 18, 2020      |
| Temperature / Humidity | 23 deg. C / 68 % RH  | 24 deg. C / 32 % RH |
| Engineer               | Yuta Moriya          | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 918.0 MHz (4 MHz) |                     |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 918.000   | PK       | 77.3    | 22.2       | 13.6 | 0.0  | 113.0    | -        | -      | Carrier |
| Hori.    | 768.000   | PK       | 40.6    | 20.5       | 13.7 | 31.6 | 43.2     | 83.0     | 39.9   |         |
| Hori.    | 800.000   | PK       | 37.3    | 20.8       | 13.9 | 31.4 | 40.5     | 83.0     | 42.5   |         |
| Hori.    | 832.000   | PK       | 43.7    | 21.1       | 14.0 | 31.3 | 47.5     | 83.0     | 35.5   |         |
| Hori.    | 864.000   | PK       | 48.2    | 21.8       | 14.3 | 31.1 | 53.2     | 83.0     | 29.9   |         |
| Hori.    | 886.000   | PK       | 44.2    | 22.1       | 14.7 | 31.0 | 50.0     | 83.0     | 33.0   |         |
| Hori.    | 896.000   | PK       | 46.2    | 22.1       | 14.9 | 30.9 | 52.3     | 83.0     | 30.7   |         |
| Hori.    | 1836.000  | PK       | 58.8    | 25.3       | 5.4  | 33.3 | 56.2     | 83.0     | 26.8   |         |
| Vert.    | 918.000   | PK       | 77.4    | 22.2       | 13.6 | 0.0  | 113.2    | -        | -      | Carrier |
| Vert.    | 768.000   | PK       | 40.6    | 20.5       | 13.7 | 31.6 | 43.1     | 83.2     | 40.0   |         |
| Vert.    | 800.000   | PK       | 40.3    | 20.8       | 13.9 | 31.4 | 43.5     | 83.2     | 39.6   |         |
| Vert.    | 832.000   | PK       | 45.9    | 21.1       | 14.0 | 31.3 | 49.7     | 83.2     | 33.5   |         |
| Vert.    | 864.000   | PK       | 49.7    | 21.8       | 14.3 | 31.1 | 54.7     | 83.2     | 28.4   |         |
| Vert.    | 886.000   | PK       | 44.2    | 22.1       | 14.7 | 31.0 | 50.0     | 83.2     | 33.2   |         |
| Vert.    | 896.000   | PK       | 46.9    | 22.1       | 14.9 | 30.9 | 52.9     | 83.2     | 30.2   |         |
| Vert.    | 1836.000  | PK       | 60.8    | 25.3       | 5.4  | 33.3 | 58.2     | 83.2     | 25.0   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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## Radiated Spurious Emission

|                        |                              |                                   |
|------------------------|------------------------------|-----------------------------------|
| Report No.             | 13128136H                    |                                   |
| Test place             | Ise EMC Lab.                 |                                   |
| Semi Anechoic Chamber  | No.3                         | No.3                              |
| Date                   | March 17, 2020               | March 18, 2020                    |
| Temperature / Humidity | 23 deg. C / 68 % RH          | 24 deg. C / 32 % RH               |
| Engineer               | Yuta Moriya<br>(Below 1 GHz) | Takafumi Noguchi<br>(Above 1 GHz) |
| Mode                   | Tx 922.0 MHz (4 MHz)         |                                   |

### (PCB Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.5              | 22.2               | 14.8         | 30.6         | -                   | 43.9               | 46.0              | 2.1            |             |
| Hori.    | 2766.000           | PK       | 52.5              | 28.4               | 5.7          | 32.6         | -                   | 54.0               | 73.9              | 19.9           |             |
| Hori.    | 3688.000           | PK       | 49.2              | 29.3               | 6.1          | 32.2         | -                   | 52.4               | 73.9              | 21.5           |             |
| Hori.    | 4610.000           | PK       | 40.8              | 31.0               | 6.5          | 31.9         | -                   | 46.5               | 73.9              | 27.5           | Floor noise |
| Hori.    | 5532.000           | PK       | 40.6              | 31.7               | 7.0          | 31.9         | -                   | 47.3               | 73.9              | 26.6           | Floor noise |
| Hori.    | 6454.000           | PK       | 41.2              | 33.7               | 7.3          | 32.3         | -                   | 49.8               | 73.9              | 24.1           | Floor noise |
| Hori.    | 7376.000           | PK       | 41.9              | 36.3               | 7.4          | 32.7         | -                   | 52.9               | 73.9              | 21.0           | Floor noise |
| Hori.    | 8298.000           | PK       | 41.6              | 36.2               | 7.9          | 32.9         | -                   | 52.8               | 73.9              | 21.1           | Floor noise |
| Hori.    | 9220.000           | PK       | 41.9              | 38.6               | 8.2          | 33.1         | -                   | 55.5               | 73.9              | 18.4           | Floor noise |
| Hori.    | 2766.000           | AV       | 42.2              | 28.4               | 5.7          | 32.6         | -                   | 43.7               | 53.9              | 10.2           |             |
| Hori.    | 3688.000           | AV       | 37.8              | 29.3               | 6.1          | 32.2         | -                   | 41.1               | 53.9              | 12.8           |             |
| Hori.    | 4610.000           | AV       | 32.7              | 31.0               | 6.5          | 31.9         | -                   | 38.4               | 53.9              | 15.5           | Floor noise |
| Hori.    | 5532.000           | AV       | 32.5              | 31.7               | 7.0          | 31.9         | -                   | 39.3               | 53.9              | 14.6           | Floor noise |
| Hori.    | 6454.000           | AV       | 32.7              | 33.7               | 7.3          | 32.3         | -                   | 41.3               | 53.9              | 12.6           | Floor noise |
| Hori.    | 7376.000           | AV       | 34.0              | 36.3               | 7.4          | 32.7         | -                   | 45.0               | 53.9              | 8.9            | Floor noise |
| Hori.    | 8298.000           | AV       | 33.5              | 36.2               | 7.9          | 32.9         | -                   | 44.7               | 53.9              | 9.2            | Floor noise |
| Hori.    | 9220.000           | AV       | 34.2              | 38.6               | 8.2          | 33.1         | -                   | 47.9               | 53.9              | 6.0            | Floor noise |
| Vert.    | 960.000            | QP       | 36.3              | 22.2               | 14.8         | 30.6         | -                   | 42.7               | 46.0              | 3.3            |             |
| Vert.    | 2766.000           | PK       | 51.0              | 28.4               | 5.7          | 32.6         | -                   | 52.5               | 73.9              | 21.4           |             |
| Vert.    | 3688.000           | PK       | 49.0              | 29.3               | 6.1          | 32.2         | -                   | 52.2               | 73.9              | 21.7           |             |
| Vert.    | 4610.000           | PK       | 40.6              | 31.0               | 6.5          | 31.9         | -                   | 46.2               | 73.9              | 27.7           | Floor noise |
| Vert.    | 5532.000           | PK       | 40.9              | 31.7               | 7.0          | 31.9         | -                   | 47.7               | 73.9              | 26.3           | Floor noise |
| Vert.    | 6454.000           | PK       | 41.2              | 33.7               | 7.3          | 32.3         | -                   | 49.9               | 73.9              | 24.0           | Floor noise |
| Vert.    | 7376.000           | PK       | 41.9              | 36.3               | 7.4          | 32.7         | -                   | 52.9               | 73.9              | 21.1           | Floor noise |
| Vert.    | 8298.000           | PK       | 41.8              | 36.2               | 7.9          | 32.9         | -                   | 52.9               | 73.9              | 21.0           | Floor noise |
| Vert.    | 9220.000           | PK       | 41.7              | 38.6               | 8.2          | 33.1         | -                   | 55.4               | 73.9              | 18.5           | Floor noise |
| Vert.    | 2766.000           | AV       | 41.0              | 28.4               | 5.7          | 32.6         | -                   | 42.4               | 53.9              | 11.5           |             |
| Vert.    | 3688.000           | AV       | 38.3              | 29.3               | 6.1          | 32.2         | -                   | 41.5               | 53.9              | 12.4           |             |
| Vert.    | 4610.000           | AV       | 32.4              | 31.0               | 6.5          | 31.9         | -                   | 38.0               | 53.9              | 15.9           | Floor noise |
| Vert.    | 5532.000           | AV       | 32.3              | 31.7               | 7.0          | 31.9         | -                   | 39.1               | 53.9              | 14.8           | Floor noise |
| Vert.    | 6454.000           | AV       | 32.5              | 33.7               | 7.3          | 32.3         | -                   | 41.2               | 53.9              | 12.7           | Floor noise |
| Vert.    | 7376.000           | AV       | 33.8              | 36.3               | 7.4          | 32.7         | -                   | 44.8               | 53.9              | 9.1            | Floor noise |
| Vert.    | 8298.000           | AV       | 33.4              | 36.2               | 7.9          | 32.9         | -                   | 44.6               | 53.9              | 9.3            | Floor noise |
| Vert.    | 9220.000           | AV       | 34.2              | 38.6               | 8.2          | 33.1         | -                   | 47.9               | 53.9              | 6.0            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB

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## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 17, 2020       | March 18, 2020      |
| Temperature / Humidity | 23 deg. C / 68 % RH  | 24 deg. C / 32 % RH |
| Engineer               | Yuta Moriya          | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 922.0 MHz (4 MHz) |                     |

### (PCB Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 922.000   | PK       | 76.9    | 22.1       | 13.6 | 0.0  | 112.7    | -        | -      | Carrier |
| Hori.    | 768.000   | PK       | 40.8    | 20.5       | 13.7 | 31.6 | 43.4     | 82.7     | 39.3   |         |
| Hori.    | 800.000   | PK       | 38.8    | 20.8       | 13.9 | 31.4 | 42.0     | 82.7     | 40.7   |         |
| Hori.    | 832.000   | PK       | 45.5    | 21.1       | 14.0 | 31.3 | 49.3     | 82.7     | 33.4   |         |
| Hori.    | 864.000   | PK       | 49.8    | 21.8       | 14.3 | 31.1 | 54.8     | 82.7     | 27.9   |         |
| Hori.    | 890.000   | PK       | 45.1    | 22.1       | 14.8 | 31.0 | 51.0     | 82.7     | 31.7   |         |
| Hori.    | 896.000   | PK       | 45.4    | 22.1       | 14.9 | 30.9 | 51.5     | 82.7     | 31.2   |         |
| Hori.    | 928.000   | PK       | 36.2    | 22.0       | 13.7 | 0.0  | 71.9     | 82.7     | 10.8   |         |
| Hori.    | 954.000   | PK       | 44.2    | 22.1       | 14.8 | 30.6 | 50.4     | 82.7     | 32.3   |         |
| Hori.    | 1844.000  | PK       | 59.7    | 25.4       | 5.4  | 33.3 | 57.1     | 82.7     | 25.6   |         |
| Vert.    | 922.000   | PK       | 78.1    | 22.1       | 13.6 | 0.0  | 113.9    | -        | -      | Carrier |
| Vert.    | 768.000   | PK       | 39.3    | 20.5       | 13.7 | 31.6 | 41.9     | 83.9     | 42.0   |         |
| Vert.    | 800.000   | PK       | 38.9    | 20.8       | 13.9 | 31.4 | 42.1     | 83.9     | 41.7   |         |
| Vert.    | 832.000   | PK       | 47.1    | 21.1       | 14.0 | 31.3 | 50.9     | 83.9     | 33.0   |         |
| Vert.    | 864.000   | PK       | 50.2    | 21.8       | 14.3 | 31.1 | 55.2     | 83.9     | 28.7   |         |
| Vert.    | 890.000   | PK       | 46.3    | 22.1       | 14.8 | 31.0 | 52.2     | 83.9     | 31.7   |         |
| Vert.    | 896.000   | PK       | 47.8    | 22.1       | 14.9 | 30.9 | 53.9     | 83.9     | 30.0   |         |
| Vert.    | 928.000   | PK       | 36.3    | 22.0       | 13.7 | 0.0  | 71.9     | 83.9     | 11.9   |         |
| Vert.    | 954.000   | PK       | 41.4    | 22.1       | 14.8 | 30.6 | 47.7     | 83.9     | 36.2   |         |
| Vert.    | 1844.000  | PK       | 60.5    | 25.4       | 5.4  | 33.3 | 57.9     | 83.9     | 26.0   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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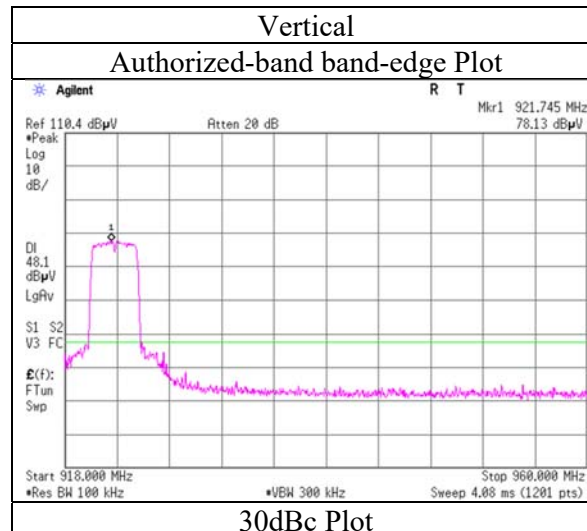
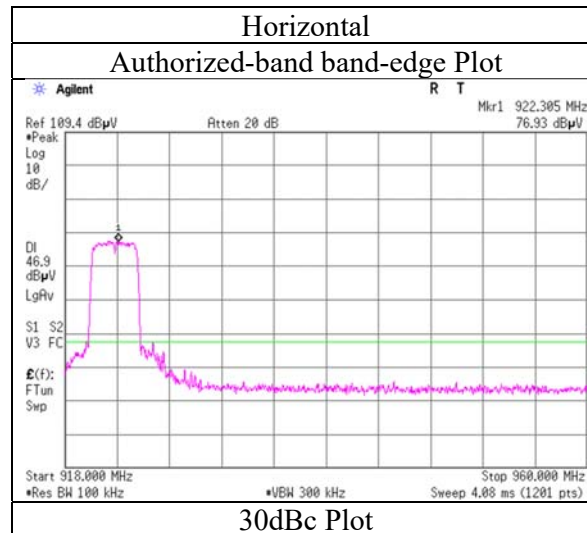
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3  
Date March 17, 2020  
Temperature / Humidity 23 deg. C / 68 % RH  
Engineer Yuta Moriya  
(Below 1 GHz)  
Mode Tx 922.0 MHz (4 MHz)

(PCB Antenna)

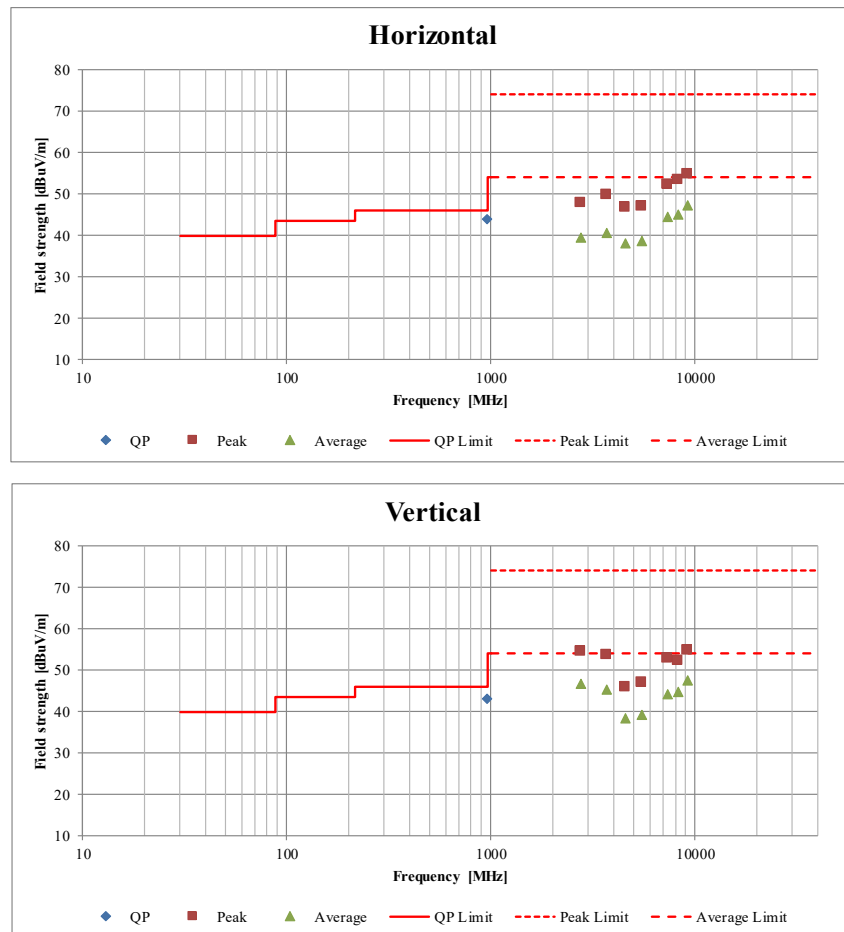


\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

### Radiated Spurious Emission (Plot data, Worst case)

|                        |                                   |                                 |
|------------------------|-----------------------------------|---------------------------------|
| Report No.             | 13128136H                         |                                 |
| Test place             | Ise EMC Lab.                      |                                 |
| Semi Anechoic Chamber  | No.3                              | No.3                            |
| Date                   | March 16, 2020                    | March 18, 2020                  |
| Temperature / Humidity | 21 deg. C / 31 % RH               | 23 deg. C / 35 % RH             |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Takumi Shimada<br>(Above 1 GHz) |
| Mode                   | Tx 917 MHz (2 MHz)                |                                 |

(PCB Antenna)



\*These plots data contains sufficient number to show the trend of characteristic features for EUT.

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## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 14, 2020       | March 18, 2020      |
| Temperature / Humidity | 22 deg. C / 35 % RH  | 24 deg. C / 32 % RH |
| Engineer               | Junya Okuno          | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 903.5 MHz (1 MHz) |                     |

(ROD Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.3              | 22.2               | 14.8         | 30.6         | -                   | 43.7               | 46.0              | 2.3            |             |
| Hori.    | 2710.500           | PK       | 56.1              | 28.1               | 5.7          | 32.6         | -                   | 57.2               | 73.9              | 16.7           |             |
| Hori.    | 3614.000           | PK       | 54.4              | 29.2               | 6.0          | 32.2         | -                   | 57.4               | 73.9              | 16.5           |             |
| Hori.    | 4517.500           | PK       | 47.7              | 30.7               | 6.5          | 31.9         | -                   | 53.0               | 73.9              | 21.0           |             |
| Hori.    | 5421.000           | PK       | 47.3              | 31.6               | 6.9          | 31.9         | -                   | 54.0               | 73.9              | 19.9           |             |
| Hori.    | 7228.000           | PK       | 42.2              | 36.0               | 7.4          | 32.7         | -                   | 52.9               | 73.9              | 21.0           | Floor noise |
| Hori.    | 8131.500           | PK       | 41.2              | 36.6               | 7.8          | 32.8         | -                   | 52.7               | 73.9              | 21.2           | Floor noise |
| Hori.    | 9035.000           | PK       | 42.0              | 37.5               | 8.2          | 33.1         | -                   | 54.6               | 73.9              | 19.3           | Floor noise |
| Hori.    | 2710.500           | AV       | 49.0              | 28.1               | 5.7          | 32.6         | -                   | 50.1               | 53.9              | 3.8            |             |
| Hori.    | 3614.000           | AV       | 45.0              | 29.2               | 6.0          | 32.2         | -                   | 48.0               | 53.9              | 5.9            |             |
| Hori.    | 4517.500           | AV       | 35.2              | 30.7               | 6.5          | 31.9         | -                   | 40.5               | 53.9              | 13.5           |             |
| Hori.    | 5421.000           | AV       | 34.8              | 31.6               | 6.9          | 31.9         | -                   | 41.5               | 53.9              | 12.5           |             |
| Hori.    | 7228.000           | AV       | 34.2              | 36.0               | 7.4          | 32.7         | -                   | 44.9               | 53.9              | 9.0            | Floor noise |
| Hori.    | 8131.500           | AV       | 33.8              | 36.6               | 7.8          | 32.8         | -                   | 45.3               | 53.9              | 8.6            | Floor noise |
| Hori.    | 9035.000           | AV       | 33.6              | 37.5               | 8.2          | 33.1         | -                   | 46.2               | 53.9              | 7.7            | Floor noise |
| Vert.    | 960.000            | QP       | 36.0              | 22.2               | 14.8         | 30.6         | -                   | 42.4               | 46.0              | 3.6            |             |
| Vert.    | 2710.500           | PK       | 56.2              | 28.1               | 5.7          | 32.6         | -                   | 57.3               | 73.9              | 16.6           |             |
| Vert.    | 3614.000           | PK       | 54.5              | 29.2               | 6.0          | 32.2         | -                   | 57.5               | 73.9              | 16.4           |             |
| Vert.    | 4517.500           | PK       | 46.3              | 30.7               | 6.5          | 31.9         | -                   | 51.5               | 73.9              | 22.4           |             |
| Vert.    | 5421.000           | PK       | 45.8              | 31.6               | 6.9          | 31.9         | -                   | 52.4               | 73.9              | 21.5           |             |
| Vert.    | 7228.000           | PK       | 42.3              | 36.0               | 7.4          | 32.7         | -                   | 53.0               | 73.9              | 20.9           | Floor noise |
| Vert.    | 8131.500           | PK       | 41.2              | 36.6               | 7.8          | 32.8         | -                   | 52.7               | 73.9              | 21.2           | Floor noise |
| Vert.    | 9035.000           | PK       | 42.1              | 37.5               | 8.2          | 33.1         | -                   | 54.7               | 73.9              | 19.2           | Floor noise |
| Vert.    | 2710.500           | AV       | 49.1              | 28.1               | 5.7          | 32.6         | -                   | 50.2               | 53.9              | 3.7            |             |
| Vert.    | 3614.000           | AV       | 45.1              | 29.2               | 6.0          | 32.2         | -                   | 48.1               | 53.9              | 5.8            |             |
| Vert.    | 4517.500           | AV       | 34.5              | 30.7               | 6.5          | 31.9         | -                   | 39.8               | 53.9              | 14.1           |             |
| Vert.    | 5421.000           | AV       | 33.6              | 31.6               | 6.9          | 31.9         | -                   | 40.2               | 53.9              | 13.7           |             |
| Vert.    | 7228.000           | AV       | 34.5              | 36.0               | 7.4          | 32.7         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Vert.    | 8131.500           | AV       | 33.8              | 36.6               | 7.8          | 32.8         | -                   | 45.3               | 53.9              | 8.6            | Floor noise |
| Vert.    | 9035.000           | AV       | 33.7              | 37.5               | 8.2          | 33.1         | -                   | 46.4               | 53.9              | 7.6            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 14, 2020       | March 18, 2020      |
| Temperature / Humidity | 22 deg. C / 35 % RH  | 24 deg. C / 32 % RH |
| Engineer               | Junya Okuno          | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 903.5 MHz (1 MHz) |                     |

(ROD Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 903.500   | PK       | 89.0    | 22.2       | 13.5 | 0.0  | 124.7    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 39.3    | 19.8       | 13.4 | 32.0 | 40.5     | 94.7     | 54.2   |         |
| Hori.    | 711.530   | PK       | 39.8    | 20.0       | 13.4 | 31.9 | 41.3     | 94.7     | 53.4   |         |
| Hori.    | 736.000   | PK       | 36.0    | 20.1       | 13.5 | 31.8 | 37.8     | 94.7     | 56.9   |         |
| Hori.    | 768.000   | PK       | 48.8    | 20.5       | 13.7 | 31.6 | 51.3     | 94.7     | 43.4   |         |
| Hori.    | 800.000   | PK       | 49.2    | 20.8       | 13.9 | 31.4 | 52.5     | 94.7     | 42.3   |         |
| Hori.    | 832.000   | PK       | 54.1    | 21.1       | 14.0 | 31.3 | 57.9     | 94.7     | 36.8   |         |
| Hori.    | 864.000   | PK       | 54.5    | 21.8       | 14.3 | 31.1 | 59.5     | 94.7     | 35.2   |         |
| Hori.    | 902.000   | PK       | 47.3    | 22.2       | 13.5 | 0.0  | 83.0     | 94.7     | 11.8   |         |
| Hori.    | 935.525   | PK       | 46.9    | 22.0       | 15.1 | 30.7 | 53.3     | 94.7     | 41.4   |         |
| Hori.    | 1807.000  | PK       | 76.5    | 25.2       | 5.4  | 33.4 | 73.7     | 94.7     | 21.0   |         |
| Hori.    | 6324.500  | PK       | 41.8    | 33.0       | 7.2  | 32.2 | 49.9     | 94.7     | 44.8   |         |
| Vert.    | 903.500   | PK       | 88.1    | 22.2       | 13.5 | 0.0  | 123.8    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 38.5    | 19.8       | 13.4 | 32.0 | 39.7     | 93.8     | 54.0   |         |
| Vert.    | 711.530   | PK       | 39.0    | 20.0       | 13.4 | 31.9 | 40.4     | 93.8     | 53.3   |         |
| Vert.    | 736.000   | PK       | 37.0    | 20.1       | 13.5 | 31.8 | 38.8     | 93.8     | 55.0   |         |
| Vert.    | 768.000   | PK       | 43.2    | 20.5       | 13.7 | 31.6 | 45.7     | 93.8     | 48.1   |         |
| Vert.    | 800.000   | PK       | 44.5    | 20.8       | 13.9 | 31.4 | 47.7     | 93.8     | 46.1   |         |
| Vert.    | 832.000   | PK       | 50.6    | 21.1       | 14.0 | 31.3 | 54.4     | 93.8     | 39.3   |         |
| Vert.    | 864.000   | PK       | 52.5    | 21.8       | 14.3 | 31.1 | 57.5     | 93.8     | 36.3   |         |
| Vert.    | 902.000   | PK       | 44.5    | 22.2       | 13.5 | 0.0  | 80.2     | 93.8     | 13.6   |         |
| Vert.    | 935.525   | PK       | 47.4    | 22.0       | 15.1 | 30.7 | 53.8     | 93.8     | 40.0   |         |
| Vert.    | 1807.000  | PK       | 74.4    | 25.2       | 5.4  | 33.4 | 71.6     | 93.8     | 22.1   |         |
| Vert.    | 6324.500  | PK       | 38.1    | 33.0       | 7.2  | 32.2 | 46.2     | 93.8     | 47.6   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

**UL Japan, Inc.**

**Ise EMC Lab.**

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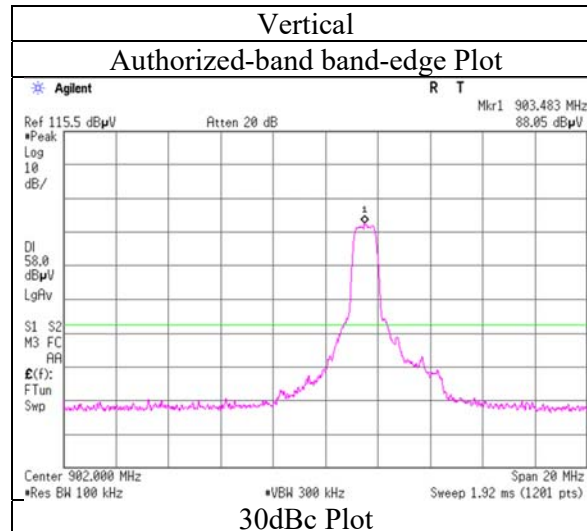
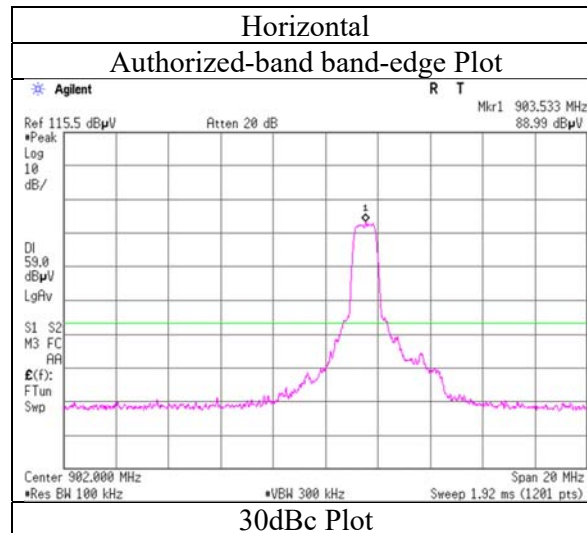
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Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                      |
|------------------------|----------------------|
| Report No.             | 13128136H            |
| Test place             | Ise EMC Lab.         |
| Semi Anechoic Chamber  | No.3                 |
| Date                   | March 14, 2020       |
| Temperature / Humidity | 22 deg. C / 35 % RH  |
| Engineer               | Junya Okuno          |
|                        | (Below 1 GHz)        |
| Mode                   | Tx 903.5 MHz (1 MHz) |

(ROD Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

|                        |                      |                     |  |
|------------------------|----------------------|---------------------|--|
| Report No.             | 13128136H            |                     |  |
| Test place             | Ise EMC Lab.         |                     |  |
| Semi Anechoic Chamber  | No.3                 | No.3                |  |
| Date                   | March 14, 2020       | March 18, 2020      |  |
| Temperature / Humidity | 22 deg. C / 35 % RH  | 24 deg. C / 32 % RH |  |
| Engineer               | Junya Okuno          | Takafumi Noguchi    |  |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |  |
| Mode                   | Tx 915.5 MHz (1 MHz) |                     |  |

(ROD Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.2              | 22.2               | 14.8         | 30.6         | -                   | 43.6               | 46.0              | 2.4            |             |
| Hori.    | 2746.500           | PK       | 58.6              | 28.3               | 5.7          | 32.6         | -                   | 59.9               | 73.9              | 14.0           |             |
| Hori.    | 3662.000           | PK       | 55.0              | 29.2               | 6.1          | 32.2         | -                   | 58.2               | 73.9              | 15.7           |             |
| Hori.    | 4577.500           | PK       | 46.6              | 30.9               | 6.5          | 31.9         | -                   | 52.1               | 73.9              | 21.8           |             |
| Hori.    | 5493.000           | PK       | 41.2              | 31.7               | 7.0          | 31.9         | -                   | 48.0               | 73.9              | 25.9           | Floor noise |
| Hori.    | 7324.000           | PK       | 42.4              | 36.2               | 7.4          | 32.7         | -                   | 53.3               | 73.9              | 20.6           | Floor noise |
| Hori.    | 8239.500           | PK       | 41.3              | 36.4               | 7.8          | 32.9         | -                   | 52.6               | 73.9              | 21.3           | Floor noise |
| Hori.    | 9155.000           | PK       | 41.8              | 38.2               | 8.2          | 33.1         | -                   | 55.0               | 73.9              | 18.9           | Floor noise |
| Hori.    | 2746.500           | AV       | 49.4              | 28.3               | 5.7          | 32.6         | -                   | 50.8               | 53.9              | 3.1            |             |
| Hori.    | 3662.000           | AV       | 44.1              | 29.2               | 6.1          | 32.2         | -                   | 47.3               | 53.9              | 6.7            |             |
| Hori.    | 4577.500           | AV       | 34.9              | 30.9               | 6.5          | 31.9         | -                   | 40.4               | 53.9              | 13.5           |             |
| Hori.    | 5493.000           | AV       | 32.2              | 31.7               | 7.0          | 31.9         | -                   | 39.0               | 53.9              | 14.9           | Floor noise |
| Hori.    | 7324.000           | AV       | 34.2              | 36.2               | 7.4          | 32.7         | -                   | 45.1               | 53.9              | 8.8            | Floor noise |
| Hori.    | 8239.500           | AV       | 33.4              | 36.4               | 7.8          | 32.9         | -                   | 44.8               | 53.9              | 9.1            | Floor noise |
| Hori.    | 9155.000           | AV       | 34.0              | 38.2               | 8.2          | 33.1         | -                   | 47.2               | 53.9              | 6.7            | Floor noise |
| Vert.    | 960.000            | QP       | 35.8              | 22.2               | 14.8         | 30.6         | -                   | 42.2               | 46.0              | 3.8            |             |
| Vert.    | 2746.500           | PK       | 58.2              | 28.3               | 5.7          | 32.6         | -                   | 59.5               | 73.9              | 14.4           |             |
| Vert.    | 3662.000           | PK       | 54.6              | 29.2               | 6.1          | 32.2         | -                   | 57.8               | 73.9              | 16.1           |             |
| Vert.    | 4577.500           | PK       | 45.7              | 30.9               | 6.5          | 31.9         | -                   | 51.2               | 73.9              | 22.7           |             |
| Vert.    | 5493.000           | PK       | 41.4              | 31.7               | 7.0          | 31.9         | -                   | 48.2               | 73.9              | 25.8           | Floor noise |
| Vert.    | 7324.000           | PK       | 42.3              | 36.2               | 7.4          | 32.7         | -                   | 53.2               | 73.9              | 20.7           | Floor noise |
| Vert.    | 8239.500           | PK       | 41.6              | 36.4               | 7.8          | 32.9         | -                   | 52.9               | 73.9              | 21.0           | Floor noise |
| Vert.    | 9155.000           | PK       | 41.7              | 38.2               | 8.2          | 33.1         | -                   | 54.9               | 73.9              | 19.0           | Floor noise |
| Vert.    | 2746.500           | AV       | 48.2              | 28.3               | 5.7          | 32.6         | -                   | 49.5               | 53.9              | 4.4            |             |
| Vert.    | 3662.000           | AV       | 43.9              | 29.2               | 6.1          | 32.2         | -                   | 47.0               | 53.9              | 6.9            |             |
| Vert.    | 4577.500           | AV       | 33.9              | 30.9               | 6.5          | 31.9         | -                   | 39.4               | 53.9              | 14.5           |             |
| Vert.    | 5493.000           | AV       | 32.2              | 31.7               | 7.0          | 31.9         | -                   | 39.0               | 53.9              | 14.9           | Floor noise |
| Vert.    | 7324.000           | AV       | 34.3              | 36.2               | 7.4          | 32.7         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Vert.    | 8239.500           | AV       | 33.5              | 36.4               | 7.8          | 32.9         | -                   | 44.9               | 53.9              | 9.0            | Floor noise |
| Vert.    | 9155.000           | AV       | 34.0              | 38.2               | 8.2          | 33.1         | -                   | 47.2               | 53.9              | 6.7            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                      |                     |  |
|------------------------|----------------------|---------------------|--|
| Report No.             | 13128136H            |                     |  |
| Test place             | Ise EMC Lab.         |                     |  |
| Semi Anechoic Chamber  | No.3                 | No.3                |  |
| Date                   | March 14, 2020       | March 18, 2020      |  |
| Temperature / Humidity | 22 deg. C / 35 % RH  | 24 deg. C / 32 % RH |  |
| Engineer               | Junya Okuno          | Takafumi Noguchi    |  |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |  |
| Mode                   | Tx 915.5 MHz (1 MHz) |                     |  |

### (ROD Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|---------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 915.500   | PK       | 87.1    | 22.2          | 13.6 | 0.0  | 122.9    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 38.7    | 19.8          | 13.4 | 32.0 | 39.8     | 92.9     | 53.1   |         |
| Hori.    | 723.500   | PK       | 40.6    | 20.1          | 13.5 | 31.9 | 42.3     | 92.9     | 50.6   |         |
| Hori.    | 736.000   | PK       | 35.2    | 20.1          | 13.5 | 31.8 | 37.0     | 92.9     | 55.9   |         |
| Hori.    | 768.000   | PK       | 47.9    | 20.5          | 13.7 | 31.6 | 50.5     | 92.9     | 42.4   |         |
| Hori.    | 800.000   | PK       | 48.0    | 20.8          | 13.9 | 31.4 | 51.2     | 92.9     | 41.7   |         |
| Hori.    | 832.000   | PK       | 53.1    | 21.1          | 14.0 | 31.3 | 56.9     | 92.9     | 35.9   |         |
| Hori.    | 864.000   | PK       | 53.8    | 21.8          | 14.3 | 31.1 | 58.8     | 92.9     | 34.1   |         |
| Hori.    | 883.520   | PK       | 50.0    | 22.0          | 14.7 | 31.0 | 55.7     | 92.9     | 37.2   |         |
| Hori.    | 896.000   | PK       | 50.5    | 22.1          | 14.9 | 30.9 | 56.6     | 92.9     | 36.3   |         |
| Hori.    | 947.520   | PK       | 47.6    | 22.0          | 14.8 | 30.6 | 53.8     | 92.9     | 39.1   |         |
| Hori.    | 1831.000  | PK       | 73.5    | 25.3          | 5.4  | 33.3 | 70.9     | 92.9     | 22.0   |         |
| Hori.    | 6408.500  | PK       | 41.5    | 33.5          | 7.2  | 32.2 | 50.0     | 92.9     | 42.9   |         |
| Vert.    | 915.500   | PK       | 84.6    | 22.2          | 13.6 | 0.0  | 120.4    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 38.0    | 19.8          | 13.4 | 32.0 | 39.1     | 90.4     | 51.2   |         |
| Vert.    | 723.500   | PK       | 39.4    | 20.1          | 13.5 | 31.9 | 41.1     | 90.4     | 49.2   |         |
| Vert.    | 736.000   | PK       | 35.2    | 20.1          | 13.5 | 31.8 | 37.0     | 90.4     | 53.4   |         |
| Vert.    | 768.000   | PK       | 41.4    | 20.5          | 13.7 | 31.6 | 44.0     | 90.4     | 46.4   |         |
| Vert.    | 800.000   | PK       | 43.4    | 20.8          | 13.9 | 31.4 | 46.6     | 90.4     | 43.7   |         |
| Vert.    | 832.000   | PK       | 50.3    | 21.1          | 14.0 | 31.3 | 54.1     | 90.4     | 36.2   |         |
| Vert.    | 864.000   | PK       | 52.3    | 21.8          | 14.3 | 31.1 | 57.3     | 90.4     | 33.0   |         |
| Vert.    | 883.520   | PK       | 50.2    | 22.0          | 14.7 | 31.0 | 55.9     | 90.4     | 34.5   |         |
| Vert.    | 896.000   | PK       | 48.1    | 22.1          | 14.9 | 30.9 | 54.2     | 90.4     | 36.1   |         |
| Vert.    | 947.520   | PK       | 44.9    | 22.0          | 14.8 | 30.6 | 51.1     | 90.4     | 39.3   |         |
| Vert.    | 1831.000  | PK       | 72.5    | 25.3          | 5.4  | 33.3 | 69.9     | 90.4     | 20.5   |         |
| Vert.    | 6408.500  | PK       | 37.8    | 33.5          | 7.2  | 32.2 | 46.3     | 90.4     | 44.1   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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Facsimile : +81 596 24 8124

## Radiated Spurious Emission

|                        |                      |                     |  |
|------------------------|----------------------|---------------------|--|
| Report No.             | 13128136H            |                     |  |
| Test place             | Ise EMC Lab.         |                     |  |
| Semi Anechoic Chamber  | No.3                 | No.3                |  |
| Date                   | March 14, 2020       | March 18, 2020      |  |
| Temperature / Humidity | 22 deg. C / 35 % RH  | 24 deg. C / 32 % RH |  |
| Engineer               | Junya Okuno          | Takafumi Noguchi    |  |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |  |
| Mode                   | Tx 926.5 MHz (1 MHz) |                     |  |

(ROD Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.1              | 22.2               | 14.8         | 30.6         | -                   | 43.5               | 46.0              | 2.5            |             |
| Hori.    | 2779.500           | PK       | 59.5              | 28.5               | 5.7          | 32.6         | -                   | 61.1               | 73.9              | 12.8           |             |
| Hori.    | 3706.000           | PK       | 54.5              | 29.4               | 6.1          | 32.2         | -                   | 57.8               | 73.9              | 16.1           |             |
| Hori.    | 4632.500           | PK       | 45.9              | 31.1               | 6.5          | 31.9         | -                   | 51.6               | 73.9              | 22.3           |             |
| Hori.    | 5559.000           | PK       | 41.0              | 31.7               | 7.0          | 31.9         | -                   | 47.8               | 73.9              | 26.2           | Floor noise |
| Hori.    | 7412.000           | PK       | 42.3              | 36.3               | 7.5          | 32.7         | -                   | 53.4               | 73.9              | 20.5           | Floor noise |
| Hori.    | 8338.500           | PK       | 42.1              | 36.2               | 7.9          | 32.9         | -                   | 53.4               | 73.9              | 20.6           | Floor noise |
| Hori.    | 9265.000           | PK       | 42.2              | 38.8               | 8.2          | 33.2         | -                   | 56.1               | 73.9              | 17.8           | Floor noise |
| Hori.    | 2779.500           | AV       | 48.5              | 28.5               | 5.7          | 32.6         | -                   | 50.1               | 53.9              | 3.8            |             |
| Hori.    | 3706.000           | AV       | 42.5              | 29.4               | 6.1          | 32.2         | -                   | 45.8               | 53.9              | 8.1            |             |
| Hori.    | 4632.500           | AV       | 34.0              | 31.1               | 6.5          | 31.9         | -                   | 39.7               | 53.9              | 14.2           |             |
| Hori.    | 5559.000           | AV       | 32.2              | 31.7               | 7.0          | 31.9         | -                   | 39.0               | 53.9              | 14.9           | Floor noise |
| Hori.    | 7412.000           | AV       | 33.8              | 36.3               | 7.5          | 32.7         | -                   | 44.9               | 53.9              | 9.0            | Floor noise |
| Hori.    | 8338.500           | AV       | 34.1              | 36.2               | 7.9          | 32.9         | -                   | 45.3               | 53.9              | 8.6            | Floor noise |
| Hori.    | 9265.000           | AV       | 34.0              | 38.8               | 8.2          | 33.2         | -                   | 47.9               | 53.9              | 6.1            | Floor noise |
| Vert.    | 960.000            | QP       | 35.5              | 22.2               | 14.8         | 30.6         | -                   | 41.9               | 46.0              | 4.1            |             |
| Vert.    | 2779.500           | PK       | 57.9              | 28.5               | 5.7          | 32.6         | -                   | 59.4               | 73.9              | 14.5           |             |
| Vert.    | 3706.000           | PK       | 53.7              | 29.4               | 6.1          | 32.2         | -                   | 57.0               | 73.9              | 16.9           |             |
| Vert.    | 4632.500           | PK       | 45.4              | 31.1               | 6.5          | 31.9         | -                   | 51.1               | 73.9              | 22.8           |             |
| Vert.    | 5559.000           | PK       | 40.7              | 31.7               | 7.0          | 31.9         | -                   | 47.4               | 73.9              | 26.5           | Floor noise |
| Vert.    | 7412.000           | PK       | 42.4              | 36.3               | 7.5          | 32.7         | -                   | 53.5               | 73.9              | 20.5           | Floor noise |
| Vert.    | 8338.500           | PK       | 41.7              | 36.2               | 7.9          | 32.9         | -                   | 52.9               | 73.9              | 21.0           | Floor noise |
| Vert.    | 9265.000           | PK       | 42.0              | 38.8               | 8.2          | 33.2         | -                   | 55.9               | 73.9              | 18.0           | Floor noise |
| Vert.    | 2779.500           | AV       | 47.0              | 28.5               | 5.7          | 32.6         | -                   | 48.6               | 53.9              | 5.4            |             |
| Vert.    | 3706.000           | AV       | 42.0              | 29.4               | 6.1          | 32.2         | -                   | 45.3               | 53.9              | 8.6            |             |
| Vert.    | 4632.500           | AV       | 33.2              | 31.1               | 6.5          | 31.9         | -                   | 38.9               | 53.9              | 15.0           |             |
| Vert.    | 5559.000           | AV       | 32.1              | 31.7               | 7.0          | 31.9         | -                   | 38.9               | 53.9              | 15.0           | Floor noise |
| Vert.    | 7412.000           | AV       | 34.2              | 36.3               | 7.5          | 32.7         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Vert.    | 8338.500           | AV       | 33.9              | 36.2               | 7.9          | 32.9         | -                   | 45.1               | 53.9              | 8.8            | Floor noise |
| Vert.    | 9265.000           | AV       | 34.0              | 38.8               | 8.2          | 33.2         | -                   | 47.9               | 53.9              | 6.1            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.3                |
| Date                   | March 14, 2020       | March 18, 2020      |
| Temperature / Humidity | 22 deg. C / 35 % RH  | 24 deg. C / 32 % RH |
| Engineer               | Junya Okuno          | Takafumi Noguchi    |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 926.5 MHz (1 MHz) |                     |

(ROD Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 926.500   | PK       | 86.7    | 22.1       | 13.6 | 0.0  | 122.4    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 38.2    | 19.8       | 13.4 | 32.0 | 39.3     | 92.4     | 53.0   |         |
| Hori.    | 736.000   | PK       | 33.9    | 20.1       | 13.5 | 31.8 | 35.7     | 92.4     | 56.6   |         |
| Hori.    | 768.000   | PK       | 43.8    | 20.5       | 13.7 | 31.6 | 46.3     | 92.4     | 46.0   |         |
| Hori.    | 800.000   | PK       | 42.3    | 20.8       | 13.9 | 31.4 | 45.5     | 92.4     | 46.8   |         |
| Hori.    | 832.000   | PK       | 50.7    | 21.1       | 14.0 | 31.3 | 54.5     | 92.4     | 37.9   |         |
| Hori.    | 864.000   | PK       | 53.3    | 21.8       | 14.3 | 31.1 | 58.3     | 92.4     | 34.1   |         |
| Hori.    | 896.000   | PK       | 50.2    | 22.1       | 14.9 | 30.9 | 56.3     | 92.4     | 36.1   |         |
| Hori.    | 928.000   | PK       | 46.6    | 22.0       | 13.7 | 0.0  | 82.3     | 92.4     | 10.1   |         |
| Hori.    | 958.513   | PK       | 46.6    | 22.1       | 14.8 | 30.6 | 53.0     | 92.4     | 39.4   |         |
| Hori.    | 1853.000  | PK       | 69.2    | 25.4       | 5.4  | 33.3 | 66.7     | 92.4     | 25.6   |         |
| Hori.    | 6485.500  | PK       | 40.7    | 33.9       | 7.3  | 32.3 | 49.5     | 92.4     | 42.9   |         |
| Vert.    | 926.500   | PK       | 84.7    | 22.1       | 13.6 | 0.0  | 120.4    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 35.6    | 19.8       | 13.4 | 32.0 | 36.8     | 90.4     | 53.6   |         |
| Vert.    | 736.000   | PK       | 35.0    | 20.1       | 13.5 | 31.8 | 36.9     | 90.4     | 53.5   |         |
| Vert.    | 768.000   | PK       | 40.5    | 20.5       | 13.7 | 31.6 | 43.0     | 90.4     | 47.4   |         |
| Vert.    | 800.000   | PK       | 41.4    | 20.8       | 13.9 | 31.4 | 44.6     | 90.4     | 45.8   |         |
| Vert.    | 832.000   | PK       | 49.6    | 21.1       | 14.0 | 31.3 | 53.4     | 90.4     | 37.0   |         |
| Vert.    | 864.000   | PK       | 51.1    | 21.8       | 14.3 | 31.1 | 56.1     | 90.4     | 34.3   |         |
| Vert.    | 896.000   | PK       | 46.6    | 22.1       | 14.9 | 30.9 | 52.7     | 90.4     | 37.7   |         |
| Vert.    | 928.000   | PK       | 40.8    | 22.0       | 13.7 | 0.0  | 76.4     | 90.4     | 13.9   |         |
| Vert.    | 958.513   | PK       | 44.5    | 22.1       | 14.8 | 30.6 | 50.8     | 90.4     | 39.5   |         |
| Vert.    | 1853.000  | PK       | 68.1    | 25.4       | 5.4  | 33.3 | 65.6     | 90.4     | 24.7   |         |
| Vert.    | 6485.500  | PK       | 36.6    | 33.9       | 7.3  | 32.3 | 45.4     | 90.4     | 45.0   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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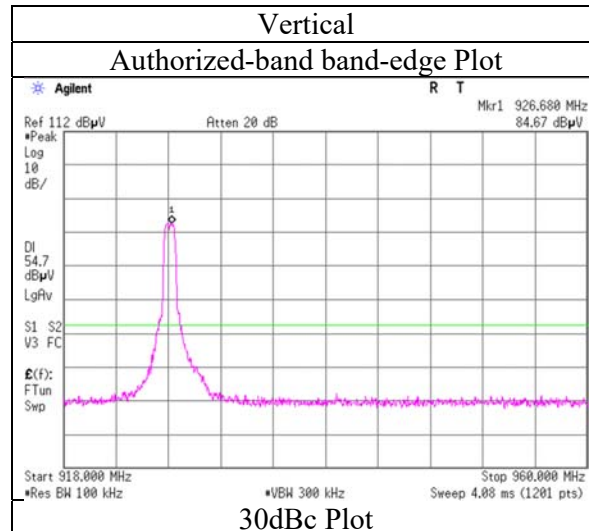
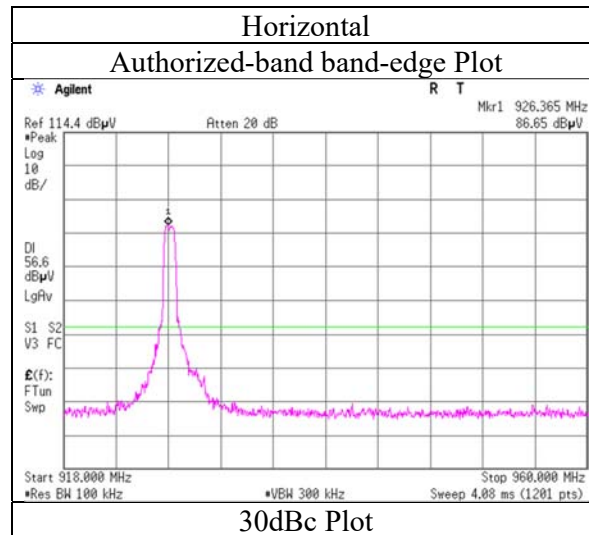
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Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                      |
|------------------------|----------------------|
| Report No.             | 13128136H            |
| Test place             | Ise EMC Lab.         |
| Semi Anechoic Chamber  | No.3                 |
| Date                   | March 14, 2020       |
| Temperature / Humidity | 22 deg. C / 35 % RH  |
| Engineer               | Junya Okuno          |
|                        | (Below 1 GHz)        |
| Mode                   | Tx 926.5 MHz (1 MHz) |

(ROD Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3 No.3  
Date March 15, 2020 March 18, 2020  
Temperature / Humidity 22 deg. C / 30 % RH 24 deg. C / 32 % RH  
Engineer Yuta Moriya Takafumi Noguchi  
(Below 1 GHz) (Above 1 GHz)  
Mode Tx 905.0 MHz (2 MHz)

(ROD Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 36.5              | 22.2               | 14.8         | 30.6         | -                   | 42.9               | 46.0              | 3.1            |             |
| Hori.    | 2715.000           | PK       | 55.7              | 28.1               | 5.7          | 32.6         | -                   | 56.9               | 73.9              | 17.0           |             |
| Hori.    | 3620.000           | PK       | 53.7              | 29.2               | 6.0          | 32.2         | -                   | 56.7               | 73.9              | 17.2           |             |
| Hori.    | 4525.000           | PK       | 41.0              | 30.8               | 6.5          | 31.9         | -                   | 46.3               | 73.9              | 27.6           | Floor noise |
| Hori.    | 5430.000           | PK       | 40.9              | 31.6               | 6.9          | 31.9         | -                   | 47.6               | 73.9              | 26.3           | Floor noise |
| Hori.    | 7240.000           | PK       | 42.2              | 36.0               | 7.4          | 32.7         | -                   | 53.0               | 73.9              | 21.0           | Floor noise |
| Hori.    | 8145.000           | PK       | 41.2              | 36.5               | 7.8          | 32.8         | -                   | 52.7               | 73.9              | 21.2           | Floor noise |
| Hori.    | 9050.000           | PK       | 41.9              | 37.6               | 8.2          | 33.1         | -                   | 54.5               | 73.9              | 19.4           | Floor noise |
| Hori.    | 2715.000           | AV       | 46.7              | 28.1               | 5.7          | 32.6         | -                   | 47.8               | 53.9              | 6.1            |             |
| Hori.    | 3620.000           | AV       | 42.3              | 29.2               | 6.0          | 32.2         | -                   | 45.4               | 53.9              | 8.5            |             |
| Hori.    | 4525.000           | AV       | 32.9              | 30.8               | 6.5          | 31.9         | -                   | 38.2               | 53.9              | 15.7           | Floor noise |
| Hori.    | 5430.000           | AV       | 32.8              | 31.6               | 6.9          | 31.9         | -                   | 39.5               | 53.9              | 14.4           | Floor noise |
| Hori.    | 7240.000           | AV       | 34.1              | 36.0               | 7.4          | 32.7         | -                   | 44.9               | 53.9              | 9.1            | Floor noise |
| Hori.    | 8145.000           | AV       | 33.5              | 36.5               | 7.8          | 32.8         | -                   | 44.9               | 53.9              | 9.0            | Floor noise |
| Hori.    | 9050.000           | AV       | 33.8              | 37.6               | 8.2          | 33.1         | -                   | 46.5               | 53.9              | 7.4            | Floor noise |
| Vert.    | 960.000            | QP       | 36.6              | 22.2               | 14.8         | 30.6         | -                   | 43.0               | 46.0              | 3.0            |             |
| Vert.    | 2715.000           | PK       | 55.5              | 28.1               | 5.7          | 32.6         | -                   | 56.7               | 73.9              | 17.2           |             |
| Vert.    | 3620.000           | PK       | 52.8              | 29.2               | 6.0          | 32.2         | -                   | 55.8               | 73.9              | 18.1           |             |
| Vert.    | 4525.000           | PK       | 41.0              | 30.8               | 6.5          | 31.9         | -                   | 46.3               | 73.9              | 27.6           | Floor noise |
| Vert.    | 5430.000           | PK       | 41.4              | 31.6               | 6.9          | 31.9         | -                   | 48.0               | 73.9              | 25.9           | Floor noise |
| Vert.    | 7240.000           | PK       | 42.3              | 36.0               | 7.4          | 32.7         | -                   | 53.0               | 73.9              | 20.9           | Floor noise |
| Vert.    | 8145.000           | PK       | 41.6              | 36.5               | 7.8          | 32.8         | -                   | 53.0               | 73.9              | 20.9           | Floor noise |
| Vert.    | 9050.000           | PK       | 41.4              | 37.6               | 8.2          | 33.1         | -                   | 54.1               | 73.9              | 19.8           | Floor noise |
| Vert.    | 2715.000           | AV       | 46.0              | 28.1               | 5.7          | 32.6         | -                   | 47.1               | 53.9              | 6.8            |             |
| Vert.    | 3620.000           | AV       | 41.2              | 29.2               | 6.0          | 32.2         | -                   | 44.2               | 53.9              | 9.7            |             |
| Vert.    | 4525.000           | AV       | 32.9              | 30.8               | 6.5          | 31.9         | -                   | 38.2               | 53.9              | 15.7           | Floor noise |
| Vert.    | 5430.000           | AV       | 32.7              | 31.6               | 6.9          | 31.9         | -                   | 39.3               | 53.9              | 14.6           | Floor noise |
| Vert.    | 7240.000           | AV       | 34.1              | 36.0               | 7.4          | 32.7         | -                   | 44.8               | 53.9              | 9.1            | Floor noise |
| Vert.    | 8145.000           | AV       | 33.5              | 36.5               | 7.8          | 32.8         | -                   | 44.9               | 53.9              | 9.0            | Floor noise |
| Vert.    | 9050.000           | AV       | 33.9              | 37.6               | 8.2          | 33.1         | -                   | 46.6               | 53.9              | 7.3            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3  
Date March 15, 2020  
Temperature / Humidity 22 deg. C / 30 % RH  
Engineer Yuta Moriya  
(Below 1 GHz)  
Mode Tx 905.0 MHz (2 MHz)

### (ROD Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 905.000   | PK       | 85.1    | 22.2       | 13.5 | 0.0  | 120.8    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 38.5    | 19.8       | 13.4 | 32.0 | 39.7     | 90.8     | 51.0   |         |
| Hori.    | 712.694   | PK       | 35.2    | 20.0       | 13.4 | 31.9 | 36.7     | 90.8     | 54.1   |         |
| Hori.    | 736.000   | PK       | 38.4    | 20.1       | 13.5 | 31.8 | 40.3     | 90.8     | 50.5   |         |
| Hori.    | 768.000   | PK       | 49.0    | 20.5       | 13.7 | 31.6 | 51.6     | 90.8     | 39.2   |         |
| Hori.    | 800.000   | PK       | 46.9    | 20.8       | 13.9 | 31.4 | 50.1     | 90.8     | 40.7   |         |
| Hori.    | 832.000   | PK       | 52.9    | 21.1       | 14.0 | 31.3 | 56.7     | 90.8     | 34.1   |         |
| Hori.    | 864.000   | PK       | 53.5    | 21.8       | 14.3 | 31.1 | 58.5     | 90.8     | 32.2   |         |
| Hori.    | 902.000   | PK       | 41.8    | 22.2       | 13.5 | 0.0  | 77.5     | 90.8     | 13.3   |         |
| Hori.    | 937.013   | PK       | 43.9    | 22.0       | 15.1 | 30.7 | 50.3     | 90.8     | 40.5   |         |
| Hori.    | 1810.000  | PK       | 72.1    | 25.2       | 5.4  | 33.4 | 69.3     | 90.8     | 21.5   |         |
| Hori.    | 6335.000  | PK       | 37.7    | 33.1       | 7.2  | 32.2 | 45.9     | 90.8     | 44.9   |         |
| Vert.    | 905.000   | PK       | 83.8    | 22.2       | 13.5 | 0.0  | 119.5    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 37.2    | 19.8       | 13.4 | 32.0 | 38.3     | 89.5     | 51.2   |         |
| Vert.    | 712.694   | PK       | 37.4    | 20.0       | 13.4 | 31.9 | 38.8     | 89.5     | 50.7   |         |
| Vert.    | 736.000   | PK       | 36.1    | 20.1       | 13.5 | 31.8 | 38.0     | 89.5     | 51.6   |         |
| Vert.    | 768.000   | PK       | 40.7    | 20.5       | 13.7 | 31.6 | 43.2     | 89.5     | 46.3   |         |
| Vert.    | 800.000   | PK       | 44.1    | 20.8       | 13.9 | 31.4 | 47.3     | 89.5     | 42.3   |         |
| Vert.    | 832.000   | PK       | 49.6    | 21.1       | 14.0 | 31.3 | 53.4     | 89.5     | 36.1   |         |
| Vert.    | 864.000   | PK       | 51.5    | 21.8       | 14.3 | 31.1 | 56.5     | 89.5     | 33.1   |         |
| Vert.    | 902.000   | PK       | 41.1    | 22.2       | 13.5 | 0.0  | 76.8     | 89.5     | 12.8   |         |
| Vert.    | 937.013   | PK       | 36.1    | 22.0       | 15.1 | 30.7 | 42.5     | 89.5     | 47.0   |         |
| Vert.    | 1810.000  | PK       | 71.3    | 25.2       | 5.4  | 33.4 | 68.6     | 89.5     | 21.0   |         |
| Vert.    | 6335.000  | PK       | 34.9    | 33.1       | 7.2  | 32.2 | 43.1     | 89.5     | 46.4   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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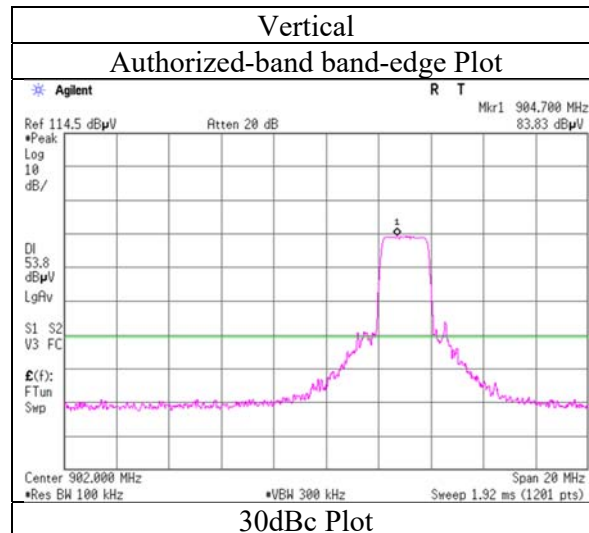
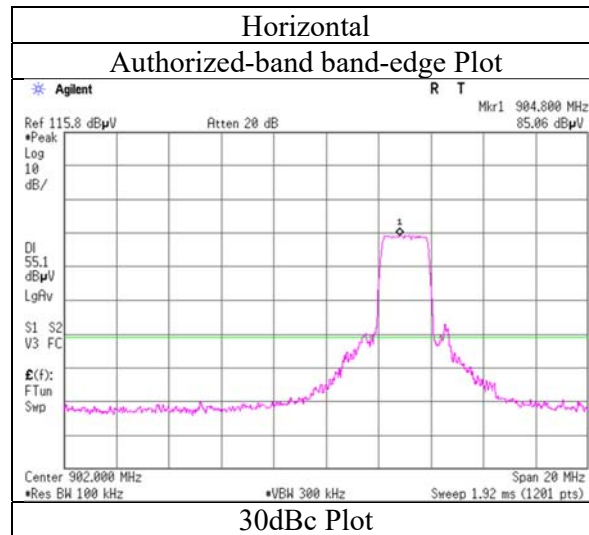
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Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                              |
|------------------------|------------------------------|
| Report No.             | 13128136H                    |
| Test place             | Ise EMC Lab.                 |
| Semi Anechoic Chamber  | No.3                         |
| Date                   | March 15, 2020               |
| Temperature / Humidity | 22 deg. C / 30 % RH          |
| Engineer               | Yuta Moriya<br>(Below 1 GHz) |
| Mode                   | Tx 905.0 MHz (2 MHz)         |

(ROD Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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## Radiated Spurious Emission

|                        |                      |                     |  |
|------------------------|----------------------|---------------------|--|
| Report No.             | 13128136H            |                     |  |
| Test place             | Ise EMC Lab.         |                     |  |
| Semi Anechoic Chamber  | No.3                 | No.4                |  |
| Date                   | March 15, 2020       | March 22, 2020      |  |
| Temperature / Humidity | 22 deg. C / 30 % RH  | 23 deg. C / 39 % RH |  |
| Engineer               | Yuta Moriya          | Yuta Moriya         |  |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |  |
| Mode                   | Tx 917.0 MHz (2 MHz) |                     |  |

(ROD Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 37.0              | 22.2               | 14.8         | 30.6         | -                   | 43.4               | 46.0              | 2.6            |             |
| Hori.    | 2751.000           | PK       | 55.2              | 28.4               | 5.9          | 31.7         | -                   | 57.7               | 73.9              | 16.2           |             |
| Hori.    | 3668.000           | PK       | 52.3              | 29.2               | 6.3          | 31.5         | -                   | 56.4               | 73.9              | 17.6           |             |
| Hori.    | 4585.000           | PK       | 42.2              | 31.0               | 6.7          | 31.3         | -                   | 48.7               | 73.9              | 25.3           |             |
| Hori.    | 5502.000           | PK       | 40.3              | 32.1               | 7.2          | 31.3         | -                   | 48.3               | 73.9              | 25.6           | Floor noise |
| Hori.    | 7336.000           | PK       | 40.8              | 36.5               | 7.8          | 32.5         | -                   | 52.6               | 73.9              | 21.3           | Floor noise |
| Hori.    | 8253.000           | PK       | 41.4              | 36.6               | 8.1          | 32.8         | -                   | 53.3               | 73.9              | 20.6           | Floor noise |
| Hori.    | 9170.000           | PK       | 39.8              | 37.6               | 8.7          | 32.6         | -                   | 53.5               | 73.9              | 20.4           | Floor noise |
| Hori.    | 2751.000           | AV       | 45.4              | 28.4               | 5.9          | 31.7         | -                   | 48.0               | 53.9              | 5.9            |             |
| Hori.    | 3668.000           | AV       | 41.7              | 29.2               | 6.3          | 31.5         | -                   | 45.7               | 53.9              | 8.2            |             |
| Hori.    | 4585.000           | AV       | 33.8              | 31.0               | 6.7          | 31.3         | -                   | 40.2               | 53.9              | 13.7           |             |
| Hori.    | 5502.000           | AV       | 32.2              | 32.1               | 7.2          | 31.3         | -                   | 40.1               | 53.9              | 13.8           | Floor noise |
| Hori.    | 7336.000           | AV       | 32.3              | 36.5               | 7.8          | 32.5         | -                   | 44.1               | 53.9              | 9.8            | Floor noise |
| Hori.    | 8253.000           | AV       | 33.2              | 36.6               | 8.1          | 32.8         | -                   | 45.1               | 53.9              | 8.8            | Floor noise |
| Hori.    | 9170.000           | AV       | 32.8              | 37.6               | 8.7          | 32.6         | -                   | 46.5               | 53.9              | 7.4            | Floor noise |
| Vert.    | 960.000            | QP       | 37.2              | 22.2               | 14.8         | 30.6         | -                   | 43.6               | 46.0              | 2.4            |             |
| Vert.    | 2751.000           | PK       | 56.9              | 28.4               | 5.9          | 31.7         | -                   | 59.4               | 73.9              | 14.5           |             |
| Vert.    | 3668.000           | PK       | 52.3              | 29.2               | 6.3          | 31.5         | -                   | 56.3               | 73.9              | 17.6           |             |
| Vert.    | 4585.000           | PK       | 42.8              | 31.0               | 6.7          | 31.3         | -                   | 49.2               | 73.9              | 24.7           |             |
| Vert.    | 5502.000           | PK       | 39.7              | 32.1               | 7.2          | 31.3         | -                   | 47.7               | 73.9              | 26.2           | Floor noise |
| Vert.    | 7336.000           | PK       | 41.8              | 36.5               | 7.8          | 32.5         | -                   | 53.6               | 73.9              | 20.3           | Floor noise |
| Vert.    | 8253.000           | PK       | 40.0              | 36.6               | 8.1          | 32.8         | -                   | 51.9               | 73.9              | 22.0           | Floor noise |
| Vert.    | 9170.000           | PK       | 39.8              | 37.6               | 8.7          | 32.6         | -                   | 53.5               | 73.9              | 20.4           | Floor noise |
| Vert.    | 2751.000           | AV       | 47.8              | 28.4               | 5.9          | 31.7         | -                   | 50.4               | 53.9              | 3.5            |             |
| Vert.    | 3668.000           | AV       | 44.2              | 29.2               | 6.3          | 31.5         | -                   | 48.3               | 53.9              | 5.6            |             |
| Vert.    | 4585.000           | AV       | 34.4              | 31.0               | 6.7          | 31.3         | -                   | 40.8               | 53.9              | 13.1           |             |
| Vert.    | 5502.000           | AV       | 31.9              | 32.1               | 7.2          | 31.3         | -                   | 39.9               | 53.9              | 14.0           | Floor noise |
| Vert.    | 7336.000           | AV       | 34.5              | 36.5               | 7.8          | 32.5         | -                   | 46.3               | 53.9              | 7.6            | Floor noise |
| Vert.    | 8253.000           | AV       | 33.6              | 36.6               | 8.1          | 32.8         | -                   | 45.5               | 53.9              | 8.4            | Floor noise |
| Vert.    | 9170.000           | AV       | 32.7              | 37.6               | 8.7          | 32.6         | -                   | 46.4               | 53.9              | 7.5            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                      |                     |  |
|------------------------|----------------------|---------------------|--|
| Report No.             | 13128136H            |                     |  |
| Test place             | Ise EMC Lab.         |                     |  |
| Semi Anechoic Chamber  | No.3                 | No.4                |  |
| Date                   | March 15, 2020       | March 22, 2020      |  |
| Temperature / Humidity | 22 deg. C / 30 % RH  | 23 deg. C / 39 % RH |  |
| Engineer               | Yuta Moriya          | Yuta Moriya         |  |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |  |
| Mode                   | Tx 917.0 MHz (2 MHz) |                     |  |

### (ROD Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant<br>Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|---------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]        | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 917.000   | PK       | 81.2    | 22.2          | 13.6 | 0.0  | 116.9    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 39.4    | 19.8          | 13.4 | 32.0 | 40.6     | 86.9     | 46.4   |         |
| Hori.    | 724.893   | PK       | 38.8    | 20.1          | 13.5 | 31.9 | 40.5     | 86.9     | 46.4   |         |
| Hori.    | 736.000   | PK       | 37.6    | 20.1          | 13.5 | 31.8 | 39.4     | 86.9     | 47.6   |         |
| Hori.    | 768.000   | PK       | 47.8    | 20.5          | 13.7 | 31.6 | 50.3     | 86.9     | 36.6   |         |
| Hori.    | 800.000   | PK       | 53.1    | 20.8          | 13.9 | 31.4 | 56.3     | 86.9     | 30.6   |         |
| Hori.    | 832.000   | PK       | 52.7    | 21.1          | 14.0 | 31.3 | 56.5     | 86.9     | 30.5   |         |
| Hori.    | 864.000   | PK       | 54.3    | 21.8          | 14.3 | 31.1 | 59.3     | 86.9     | 27.6   |         |
| Hori.    | 885.675   | PK       | 49.5    | 22.1          | 14.7 | 31.0 | 55.2     | 86.9     | 31.7   |         |
| Hori.    | 949.265   | PK       | 45.3    | 22.0          | 14.8 | 30.6 | 51.4     | 86.9     | 35.5   |         |
| Hori.    | 1834.000  | PK       | 69.3    | 25.4          | 3.3  | 32.5 | 65.5     | 86.9     | 21.4   |         |
| Hori.    | 6419.000  | PK       | 37.5    | 34.1          | 5.3  | 31.8 | 45.1     | 86.9     | 41.9   |         |
| Vert.    | 917.000   | PK       | 82.4    | 22.2          | 13.6 | 0.0  | 118.2    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 37.0    | 19.8          | 13.4 | 32.0 | 38.1     | 88.2     | 50.0   |         |
| Vert.    | 724.893   | PK       | 36.5    | 20.1          | 13.5 | 31.9 | 38.2     | 88.2     | 50.0   |         |
| Vert.    | 736.000   | PK       | 35.8    | 20.1          | 13.5 | 31.8 | 37.6     | 88.2     | 50.6   |         |
| Vert.    | 768.000   | PK       | 40.3    | 20.5          | 13.7 | 31.6 | 42.9     | 88.2     | 45.3   |         |
| Vert.    | 800.000   | PK       | 43.7    | 20.8          | 13.9 | 31.4 | 46.9     | 88.2     | 41.2   |         |
| Vert.    | 832.000   | PK       | 50.1    | 21.1          | 14.0 | 31.3 | 53.9     | 88.2     | 34.3   |         |
| Vert.    | 864.000   | PK       | 51.1    | 21.8          | 14.3 | 31.1 | 56.1     | 88.2     | 32.0   |         |
| Vert.    | 885.675   | PK       | 48.6    | 22.1          | 14.7 | 31.0 | 54.4     | 88.2     | 33.8   |         |
| Vert.    | 949.265   | PK       | 45.2    | 22.0          | 14.8 | 30.6 | 51.3     | 88.2     | 36.8   |         |
| Vert.    | 1834.000  | PK       | 68.7    | 25.4          | 3.3  | 32.5 | 65.0     | 88.2     | 23.2   |         |
| Vert.    | 6419.000  | PK       | 34.8    | 34.1          | 5.3  | 31.8 | 42.4     | 88.2     | 45.8   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

## Radiated Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3 No.4  
Date March 15, 2020 March 22, 2020  
Temperature / Humidity 22 deg. C / 30 % RH 23 deg. C / 39 % RH  
Engineer Yuta Moriya Yuta Moriya  
(Below 1 GHz) (Above 1 GHz)  
Mode Tx 925.0 MHz (2 MHz)

(ROD Antenna)

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark      |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| Hori.    | 960.000         | QP       | 36.3           | 22.2            | 14.8      | 30.6      | -                | 42.7            | 46.0           | 3.3         |             |
| Hori.    | 2775.000        | PK       | 57.1           | 28.5            | 5.9       | 31.7      | -                | 59.8            | 73.9           | 14.1        |             |
| Hori.    | 3700.000        | PK       | 50.2           | 29.3            | 6.3       | 31.5      | -                | 54.4            | 73.9           | 19.5        |             |
| Hori.    | 4625.000        | PK       | 40.4           | 31.2            | 6.7       | 31.3      | -                | 47.0            | 73.9           | 26.9        | Floor noise |
| Hori.    | 5550.000        | PK       | 41.2           | 32.1            | 7.3       | 31.4      | -                | 49.3            | 73.9           | 24.7        | Floor noise |
| Hori.    | 7400.000        | PK       | 42.1           | 36.5            | 7.8       | 32.5      | -                | 53.9            | 73.9           | 20.0        | Floor noise |
| Hori.    | 8325.000        | PK       | 41.9           | 36.4            | 8.1       | 32.8      | -                | 53.7            | 73.9           | 20.2        | Floor noise |
| Hori.    | 9250.000        | PK       | 40.2           | 38.0            | 8.7       | 32.6      | -                | 54.2            | 73.9           | 19.7        | Floor noise |
| Hori.    | 2775.000        | AV       | 46.8           | 28.5            | 5.9       | 31.7      | -                | 49.4            | 53.9           | 4.5         |             |
| Hori.    | 3700.000        | AV       | 39.8           | 29.3            | 6.3       | 31.5      | -                | 44.0            | 53.9           | 9.9         |             |
| Hori.    | 4625.000        | AV       | 32.2           | 31.2            | 6.7       | 31.3      | -                | 38.8            | 53.9           | 15.1        | Floor noise |
| Hori.    | 5550.000        | AV       | 31.8           | 32.1            | 7.3       | 31.4      | -                | 39.8            | 53.9           | 14.1        | Floor noise |
| Hori.    | 7400.000        | AV       | 34.3           | 36.5            | 7.8       | 32.5      | -                | 46.1            | 53.9           | 7.8         | Floor noise |
| Hori.    | 8325.000        | AV       | 33.0           | 36.4            | 8.1       | 32.8      | -                | 44.8            | 53.9           | 9.1         | Floor noise |
| Hori.    | 9250.000        | AV       | 32.5           | 38.0            | 8.7       | 32.6      | -                | 46.5            | 53.9           | 7.4         | Floor noise |
| Vert.    | 960.000         | QP       | 36.1           | 22.2            | 14.8      | 30.6      | -                | 42.5            | 46.0           | 3.5         |             |
| Vert.    | 2775.000        | PK       | 53.4           | 28.5            | 5.9       | 31.7      | -                | 56.1            | 73.9           | 17.9        |             |
| Vert.    | 3700.000        | PK       | 49.6           | 29.3            | 6.3       | 31.5      | -                | 53.7            | 73.9           | 20.2        |             |
| Vert.    | 4625.000        | PK       | 41.8           | 31.2            | 6.7       | 31.3      | -                | 48.3            | 73.9           | 25.6        | Floor noise |
| Vert.    | 5550.000        | PK       | 39.9           | 32.1            | 7.3       | 31.4      | -                | 48.0            | 73.9           | 26.0        | Floor noise |
| Vert.    | 7400.000        | PK       | 42.6           | 36.5            | 7.8       | 32.5      | -                | 54.4            | 73.9           | 19.6        | Floor noise |
| Vert.    | 8325.000        | PK       | 40.3           | 36.4            | 8.1       | 32.8      | -                | 52.1            | 73.9           | 21.8        | Floor noise |
| Vert.    | 9250.000        | PK       | 39.9           | 38.0            | 8.7       | 32.6      | -                | 53.9            | 73.9           | 20.0        | Floor noise |
| Vert.    | 2775.000        | AV       | 44.0           | 28.5            | 5.9       | 31.7      | -                | 46.6            | 53.9           | 7.3         |             |
| Vert.    | 3700.000        | AV       | 40.0           | 29.3            | 6.3       | 31.5      | -                | 44.2            | 53.9           | 9.7         |             |
| Vert.    | 4625.000        | AV       | 31.9           | 31.2            | 6.7       | 31.3      | -                | 38.5            | 53.9           | 15.4        | Floor noise |
| Vert.    | 5550.000        | AV       | 32.1           | 32.1            | 7.3       | 31.4      | -                | 40.1            | 53.9           | 13.8        | Floor noise |
| Vert.    | 7400.000        | AV       | 34.2           | 36.5            | 7.8       | 32.5      | -                | 46.0            | 53.9           | 7.9         | Floor noise |
| Vert.    | 8325.000        | AV       | 33.5           | 36.4            | 8.1       | 32.8      | -                | 45.2            | 53.9           | 8.7         | Floor noise |
| Vert.    | 9250.000        | AV       | 33.0           | 38.0            | 8.7       | 32.6      | -                | 47.1            | 53.9           | 6.8         | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB

## Radiated Spurious Emission

|                        |                      |                     |  |
|------------------------|----------------------|---------------------|--|
| Report No.             | 13128136H            |                     |  |
| Test place             | Ise EMC Lab.         |                     |  |
| Semi Anechoic Chamber  | No.3                 | No.4                |  |
| Date                   | March 15, 2020       | March 22, 2020      |  |
| Temperature / Humidity | 22 deg. C / 30 % RH  | 23 deg. C / 39 % RH |  |
| Engineer               | Yuta Moriya          | Yuta Moriya         |  |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |  |
| Mode                   | Tx 925.0 MHz (2 MHz) |                     |  |

### (ROD Antenna)

30dBc Data Sheet

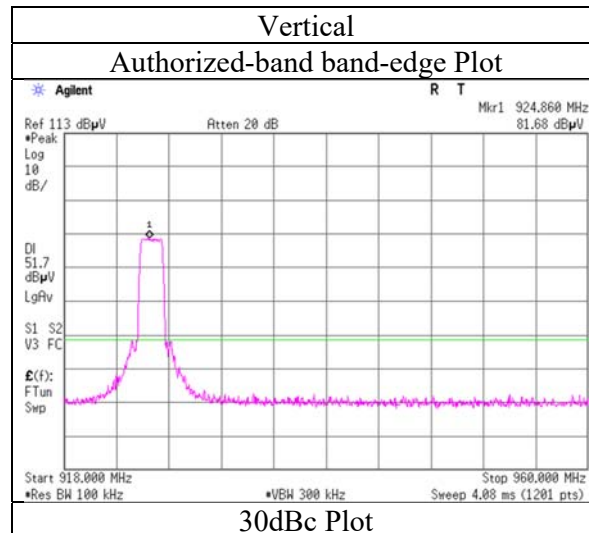
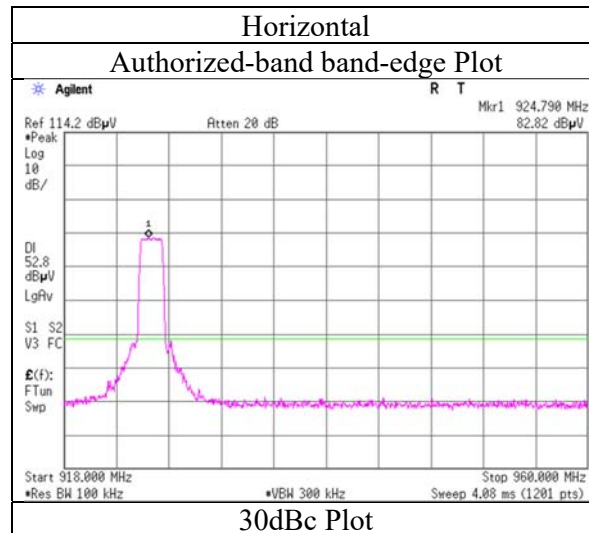
| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 925.000   | PK       | 82.8    | 22.1       | 13.6 | 0.0  | 118.6    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 38.2    | 19.8       | 13.4 | 32.0 | 39.4     | 88.6     | 49.2   |         |
| Hori.    | 732.875   | PK       | 37.2    | 20.1       | 13.5 | 31.8 | 39.0     | 88.6     | 49.6   |         |
| Hori.    | 736.000   | PK       | 36.1    | 20.1       | 13.5 | 31.8 | 37.9     | 88.6     | 50.7   |         |
| Hori.    | 768.000   | PK       | 39.5    | 20.5       | 13.7 | 31.6 | 42.0     | 88.6     | 46.6   |         |
| Hori.    | 800.000   | PK       | 45.9    | 20.8       | 13.9 | 31.4 | 49.1     | 88.6     | 39.4   |         |
| Hori.    | 832.000   | PK       | 51.2    | 21.1       | 14.0 | 31.3 | 55.0     | 88.6     | 33.5   |         |
| Hori.    | 864.000   | PK       | 53.8    | 21.8       | 14.3 | 31.1 | 58.8     | 88.6     | 29.8   |         |
| Hori.    | 893.050   | PK       | 48.6    | 22.1       | 14.8 | 30.9 | 54.6     | 88.6     | 34.0   |         |
| Hori.    | 896.000   | PK       | 48.8    | 22.1       | 14.9 | 30.9 | 54.8     | 88.6     | 33.7   |         |
| Hori.    | 928.000   | PK       | 40.0    | 22.0       | 13.7 | 0.0  | 75.7     | 88.6     | 12.9   |         |
| Hori.    | 956.734   | PK       | 43.6    | 22.1       | 14.8 | 30.6 | 50.0     | 88.6     | 38.6   |         |
| Hori.    | 1850.000  | PK       | 67.4    | 25.5       | 3.3  | 32.4 | 63.8     | 88.6     | 24.8   |         |
| Hori.    | 6475.000  | PK       | 33.7    | 34.3       | 5.3  | 31.8 | 41.5     | 88.6     | 47.1   |         |
| Vert.    | 925.000   | PK       | 81.7    | 22.1       | 13.6 | 0.0  | 117.4    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 37.0    | 19.8       | 13.4 | 32.0 | 38.2     | 87.4     | 49.3   |         |
| Vert.    | 732.875   | PK       | 36.4    | 20.1       | 13.5 | 31.8 | 38.2     | 87.4     | 49.2   |         |
| Vert.    | 736.000   | PK       | 34.0    | 20.1       | 13.5 | 31.8 | 35.8     | 87.4     | 51.6   |         |
| Vert.    | 768.000   | PK       | 38.6    | 20.5       | 13.7 | 31.6 | 41.1     | 87.4     | 46.3   |         |
| Vert.    | 800.000   | PK       | 42.3    | 20.8       | 13.9 | 31.4 | 45.5     | 87.4     | 42.0   |         |
| Vert.    | 832.000   | PK       | 49.6    | 21.1       | 14.0 | 31.3 | 53.4     | 87.4     | 34.0   |         |
| Vert.    | 864.000   | PK       | 52.1    | 21.8       | 14.3 | 31.1 | 57.1     | 87.4     | 30.4   |         |
| Vert.    | 893.050   | PK       | 47.2    | 22.1       | 14.8 | 30.9 | 53.2     | 87.4     | 34.3   |         |
| Vert.    | 896.000   | PK       | 48.0    | 22.1       | 14.9 | 30.9 | 54.1     | 87.4     | 33.3   |         |
| Vert.    | 928.000   | PK       | 39.2    | 22.0       | 13.7 | 0.0  | 74.8     | 87.4     | 12.6   |         |
| Vert.    | 956.734   | PK       | 44.0    | 22.1       | 14.8 | 30.6 | 50.3     | 87.4     | 37.1   |         |
| Vert.    | 1850.000  | PK       | 67.4    | 25.5       | 3.3  | 32.4 | 63.8     | 87.4     | 23.6   |         |
| Vert.    | 6475.000  | PK       | 33.7    | 34.3       | 5.3  | 31.8 | 41.5     | 87.4     | 45.9   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3  
Date March 15, 2020  
Temperature / Humidity 22 deg. C / 30 % RH  
Engineer Yuta Moriya  
(Below 1 GHz)  
Mode Tx 905.0 MHz (2 MHz)

(ROD Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Radiated Spurious Emission

|                        |                      |                     |  |
|------------------------|----------------------|---------------------|--|
| Report No.             | 13128136H            |                     |  |
| Test place             | Ise EMC Lab.         |                     |  |
| Semi Anechoic Chamber  | No.4                 | No.4                |  |
| Date                   | March 22, 2020       | March 22, 2020      |  |
| Temperature / Humidity | 24 deg. C / 38 % RH  | 23 deg. C / 39 % RH |  |
| Engineer               | Junya Okuno          | Yuta Moriya         |  |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |  |
| Mode                   | Tx 910.0 MHz (4 MHz) |                     |  |

(ROD Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 35.5              | 22.1               | 14.7         | 30.8         | -                   | 41.5               | 46.0              | 4.5            |             |
| Hori.    | 2730.000           | PK       | 52.1              | 28.3               | 5.9          | 31.7         | -                   | 54.5               | 73.9              | 19.4           |             |
| Hori.    | 3640.000           | PK       | 47.6              | 29.2               | 6.2          | 31.5         | -                   | 51.5               | 73.9              | 22.4           |             |
| Hori.    | 4550.000           | PK       | 40.1              | 30.9               | 6.7          | 31.3         | -                   | 46.3               | 73.9              | 27.6           | Floor noise |
| Hori.    | 5460.000           | PK       | 40.0              | 32.0               | 7.2          | 31.3         | -                   | 47.9               | 73.9              | 26.0           | Floor noise |
| Hori.    | 7280.000           | PK       | 41.5              | 36.4               | 7.7          | 32.4         | -                   | 53.1               | 73.9              | 20.8           | Floor noise |
| Hori.    | 8190.000           | PK       | 42.3              | 36.6               | 8.0          | 32.8         | -                   | 54.2               | 73.9              | 19.7           | Floor noise |
| Hori.    | 9100.000           | PK       | 39.6              | 37.2               | 8.7          | 32.5         | -                   | 53.0               | 73.9              | 21.0           | Floor noise |
| Hori.    | 2730.000           | AV       | 42.9              | 28.3               | 5.9          | 31.7         | -                   | 45.3               | 53.9              | 8.6            |             |
| Hori.    | 3640.000           | AV       | 38.2              | 29.2               | 6.2          | 31.5         | -                   | 42.1               | 53.9              | 11.8           |             |
| Hori.    | 4550.000           | AV       | 32.4              | 30.9               | 6.7          | 31.3         | -                   | 38.7               | 53.9              | 15.3           | Floor noise |
| Hori.    | 5460.000           | AV       | 31.9              | 32.0               | 7.2          | 31.3         | -                   | 39.8               | 53.9              | 14.1           | Floor noise |
| Hori.    | 7280.000           | AV       | 33.7              | 36.4               | 7.7          | 32.4         | -                   | 45.4               | 53.9              | 8.5            | Floor noise |
| Hori.    | 8190.000           | AV       | 33.3              | 36.6               | 8.0          | 32.8         | -                   | 45.1               | 53.9              | 8.8            | Floor noise |
| Hori.    | 9100.000           | AV       | 32.8              | 37.2               | 8.7          | 32.5         | -                   | 46.1               | 53.9              | 7.8            | Floor noise |
| Vert.    | 960.000            | QP       | 36.8              | 22.1               | 14.7         | 30.8         | -                   | 42.8               | 46.0              | 3.2            |             |
| Vert.    | 2730.000           | PK       | 50.7              | 28.3               | 5.9          | 31.7         | -                   | 53.1               | 73.9              | 20.8           |             |
| Vert.    | 3640.000           | PK       | 47.6              | 29.2               | 6.2          | 31.5         | -                   | 51.5               | 73.9              | 22.4           |             |
| Vert.    | 4550.000           | PK       | 39.8              | 30.9               | 6.7          | 31.3         | -                   | 46.0               | 73.9              | 27.9           | Floor noise |
| Vert.    | 5460.000           | PK       | 39.5              | 32.0               | 7.2          | 31.3         | -                   | 47.4               | 73.9              | 26.5           | Floor noise |
| Vert.    | 7280.000           | PK       | 41.7              | 36.4               | 7.7          | 32.4         | -                   | 53.3               | 73.9              | 20.6           | Floor noise |
| Vert.    | 8190.000           | PK       | 41.3              | 36.6               | 8.0          | 32.8         | -                   | 53.1               | 73.9              | 20.8           | Floor noise |
| Vert.    | 9100.000           | PK       | 41.4              | 37.2               | 8.7          | 32.5         | -                   | 54.7               | 73.9              | 19.2           | Floor noise |
| Vert.    | 2730.000           | AV       | 41.2              | 28.3               | 5.9          | 31.7         | -                   | 43.6               | 53.9              | 10.3           |             |
| Vert.    | 3640.000           | AV       | 37.9              | 29.2               | 6.2          | 31.5         | -                   | 41.8               | 53.9              | 12.1           |             |
| Vert.    | 4550.000           | AV       | 32.1              | 30.9               | 6.7          | 31.3         | -                   | 38.3               | 53.9              | 15.6           | Floor noise |
| Vert.    | 5460.000           | AV       | 32.0              | 32.0               | 7.2          | 31.3         | -                   | 39.9               | 53.9              | 14.0           | Floor noise |
| Vert.    | 7280.000           | AV       | 33.8              | 36.4               | 7.7          | 32.4         | -                   | 45.5               | 53.9              | 8.4            | Floor noise |
| Vert.    | 8190.000           | AV       | 33.2              | 36.6               | 8.0          | 32.8         | -                   | 45.0               | 53.9              | 8.9            | Floor noise |
| Vert.    | 9100.000           | AV       | 33.0              | 37.2               | 8.7          | 32.5         | -                   | 46.3               | 53.9              | 7.6            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.4                 | No.4                |
| Date                   | March 22, 2020       | March 22, 2020      |
| Temperature / Humidity | 24 deg. C / 38 % RH  | 23 deg. C / 39 % RH |
| Engineer               | Junya Okuno          | Yuta Moriya         |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 910.0 MHz (4 MHz) |                     |

### (ROD Antenna)

**30dBc Data Sheet**

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant<br>Factor<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>dBuV/m | Limit<br>dBuV/m | Margin<br>[dB] | Remark  |
|----------|--------------------|----------|-------------------|-------------------------|--------------|--------------|------------------|-----------------|----------------|---------|
| Hori.    | 910.000            | PK       | 78.6              | 21.9                    | 13.5         | 0.0          | 114.0            | -               | -              | Carrier |
| Hori.    | 704.000            | PK       | 37.6              | 19.8                    | 13.3         | 32.1         | 38.7             | 84.0            | 45.3           |         |
| Hori.    | 768.000            | PK       | 43.6              | 20.4                    | 13.6         | 31.7         | 45.9             | 84.0            | 38.1           |         |
| Hori.    | 800.000            | PK       | 43.4              | 20.8                    | 13.8         | 31.6         | 46.4             | 84.0            | 37.6           |         |
| Hori.    | 832.000            | PK       | 49.6              | 21.1                    | 13.9         | 31.4         | 53.2             | 84.0            | 30.8           |         |
| Hori.    | 864.000            | PK       | 51.5              | 21.6                    | 14.2         | 31.3         | 56.0             | 84.0            | 27.9           |         |
| Hori.    | 902.000            | PK       | 28.5              | 22.0                    | 13.4         | 0.0          | 64.0             | 84.0            | 20.0           |         |
| Hori.    | 942.000            | PK       | 42.5              | 21.9                    | 14.8         | 30.9         | 48.3             | 84.0            | 35.7           |         |
| Hori.    | 1820.000           | PK       | 65.9              | 25.4                    | 5.6          | 32.5         | 64.3             | 84.0            | 19.7           |         |
| Hori.    | 6370.000           | PK       | 33.5              | 33.8                    | 7.6          | 31.8         | 43.2             | 84.0            | 40.8           |         |
| Vert.    | 910.000            | PK       | 79.8              | 21.9                    | 13.5         | 0.0          | 115.2            | -               | -              | Carrier |
| Vert.    | 704.000            | PK       | 34.6              | 19.8                    | 13.3         | 32.1         | 35.7             | 85.2            | 49.5           |         |
| Vert.    | 768.000            | PK       | 40.1              | 20.4                    | 13.6         | 31.7         | 42.3             | 85.2            | 42.8           |         |
| Vert.    | 800.000            | PK       | 40.8              | 20.8                    | 13.8         | 31.6         | 43.8             | 85.2            | 41.4           |         |
| Vert.    | 832.000            | PK       | 49.0              | 21.1                    | 13.9         | 31.4         | 52.6             | 85.2            | 32.6           |         |
| Vert.    | 864.000            | PK       | 49.8              | 21.6                    | 14.2         | 31.3         | 54.3             | 85.2            | 30.8           |         |
| Vert.    | 902.000            | PK       | 29.6              | 22.0                    | 13.4         | 0.0          | 65.0             | 85.2            | 20.1           |         |
| Vert.    | 942.000            | PK       | 42.1              | 21.9                    | 14.8         | 30.9         | 47.9             | 85.2            | 37.3           |         |
| Vert.    | 1820.000           | PK       | 64.3              | 25.4                    | 3.3          | 32.5         | 60.4             | 85.2            | 24.8           |         |
| Vert.    | 6370.000           | PK       | 33.1              | 33.8                    | 5.3          | 31.8         | 40.4             | 85.2            | 44.7           |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

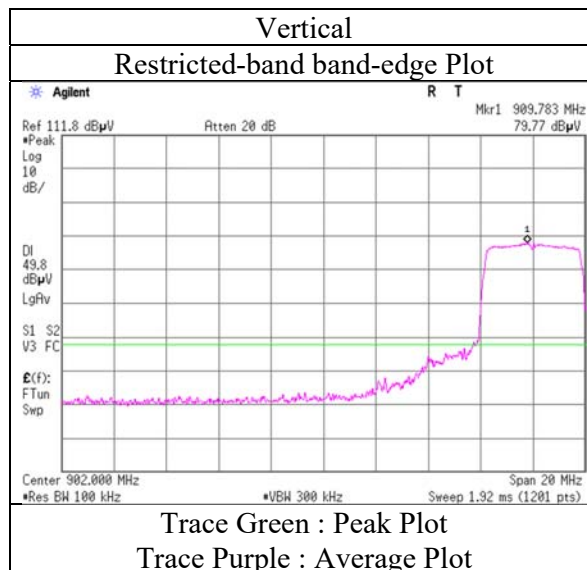
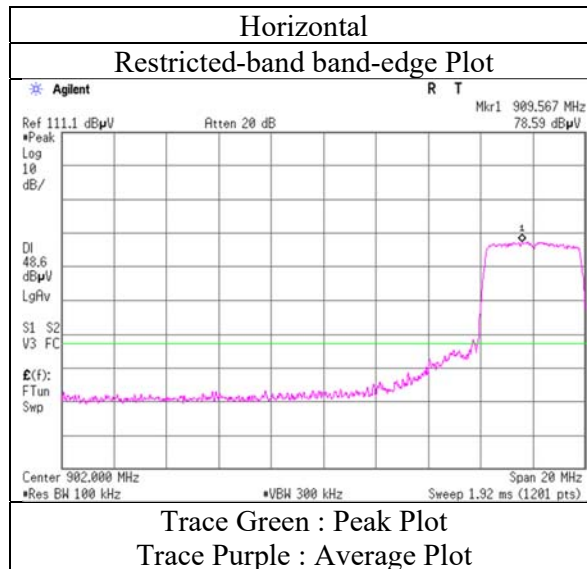
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                      |
|------------------------|----------------------|
| Report No.             | 13128136H            |
| Test place             | Ise EMC Lab.         |
| Semi Anechoic Chamber  | No.4                 |
| Date                   | March 22, 2020       |
| Temperature / Humidity | 24 deg. C / 38 % RH  |
| Engineer               | Junya Okuno          |
|                        | (Below 1 GHz)        |
| Mode                   | Tx 910.0 MHz (4 MHz) |

(ROD Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

|                        |                                   |                              |
|------------------------|-----------------------------------|------------------------------|
| Report No.             | 13128136H                         |                              |
| Test place             | Ise EMC Lab.                      |                              |
| Semi Anechoic Chamber  | No.3                              | No.4                         |
| Date                   | March 15, 2020                    | March 22, 2020               |
| Temperature / Humidity | 22 deg. C / 30 % RH               | 23 deg. C / 39 % RH          |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Yuta Moriya<br>(Above 1 GHz) |
| Mode                   | Tx 918.0 MHz (4 MHz)              |                              |

(ROD Antenna)

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark      |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|-------------|
| Hori.    | 960.000            | QP       | 36.2              | 22.2               | 14.8         | 30.6         | -                   | 42.6               | 46.0              | 3.4            |             |
| Hori.    | 2754.000           | PK       | 53.7              | 28.4               | 5.9          | 31.7         | -                   | 56.2               | 73.9              | 17.7           |             |
| Hori.    | 3672.000           | PK       | 48.4              | 29.2               | 6.3          | 31.5         | -                   | 52.5               | 73.9              | 21.5           |             |
| Hori.    | 4590.000           | PK       | 40.9              | 31.0               | 6.7          | 31.3         | -                   | 47.3               | 73.9              | 26.6           | Floor noise |
| Hori.    | 5508.000           | PK       | 41.2              | 32.1               | 7.2          | 31.3         | -                   | 49.2               | 73.9              | 24.7           | Floor noise |
| Hori.    | 7344.000           | PK       | 41.4              | 36.5               | 7.8          | 32.5         | -                   | 53.3               | 73.9              | 20.6           | Floor noise |
| Hori.    | 8262.000           | PK       | 40.2              | 36.5               | 8.1          | 32.8         | -                   | 52.1               | 73.9              | 21.9           | Floor noise |
| Hori.    | 9180.000           | PK       | 41.2              | 37.6               | 8.7          | 32.6         | -                   | 55.0               | 73.9              | 18.9           | Floor noise |
| Hori.    | 2754.000           | AV       | 43.9              | 28.4               | 5.9          | 31.7         | -                   | 46.4               | 53.9              | 7.5            |             |
| Hori.    | 3672.000           | AV       | 38.7              | 29.2               | 6.3          | 31.5         | -                   | 42.8               | 53.9              | 11.1           |             |
| Hori.    | 4590.000           | AV       | 32.8              | 31.0               | 6.7          | 31.3         | -                   | 39.3               | 53.9              | 14.6           | Floor noise |
| Hori.    | 5508.000           | AV       | 31.4              | 32.1               | 7.2          | 31.3         | -                   | 39.4               | 53.9              | 14.5           | Floor noise |
| Hori.    | 7344.000           | AV       | 33.7              | 36.5               | 7.8          | 32.5         | -                   | 45.5               | 53.9              | 8.4            | Floor noise |
| Hori.    | 8262.000           | AV       | 32.4              | 36.5               | 8.1          | 32.8         | -                   | 44.3               | 53.9              | 9.6            | Floor noise |
| Hori.    | 9180.000           | AV       | 32.2              | 37.6               | 8.7          | 32.6         | -                   | 46.0               | 53.9              | 8.0            | Floor noise |
| Vert.    | 960.000            | QP       | 36.3              | 22.2               | 14.8         | 30.6         | -                   | 42.7               | 46.0              | 3.3            |             |
| Vert.    | 2754.000           | PK       | 50.6              | 28.4               | 5.9          | 31.7         | -                   | 53.2               | 73.9              | 20.7           |             |
| Vert.    | 3672.000           | PK       | 47.4              | 29.2               | 6.3          | 31.5         | -                   | 51.5               | 73.9              | 22.4           |             |
| Vert.    | 4590.000           | PK       | 40.2              | 31.0               | 6.7          | 31.3         | -                   | 46.7               | 73.9              | 27.2           | Floor noise |
| Vert.    | 5508.000           | PK       | 39.2              | 32.1               | 7.2          | 31.3         | -                   | 47.2               | 73.9              | 26.7           | Floor noise |
| Vert.    | 7344.000           | PK       | 40.8              | 36.5               | 7.8          | 32.5         | -                   | 52.6               | 73.9              | 21.3           | Floor noise |
| Vert.    | 8262.000           | PK       | 41.3              | 36.5               | 8.1          | 32.8         | -                   | 53.2               | 73.9              | 20.7           | Floor noise |
| Vert.    | 9180.000           | PK       | 41.0              | 37.6               | 8.7          | 32.6         | -                   | 54.8               | 73.9              | 19.1           | Floor noise |
| Vert.    | 2754.000           | AV       | 40.9              | 28.4               | 5.9          | 31.7         | -                   | 43.4               | 53.9              | 10.5           |             |
| Vert.    | 3672.000           | AV       | 37.0              | 29.2               | 6.3          | 31.5         | -                   | 41.1               | 53.9              | 12.8           |             |
| Vert.    | 4590.000           | AV       | 32.1              | 31.0               | 6.7          | 31.3         | -                   | 38.6               | 53.9              | 15.3           | Floor noise |
| Vert.    | 5508.000           | AV       | 31.3              | 32.1               | 7.2          | 31.3         | -                   | 39.3               | 53.9              | 14.6           | Floor noise |
| Vert.    | 7344.000           | AV       | 33.6              | 36.5               | 7.8          | 32.5         | -                   | 45.4               | 53.9              | 8.5            | Floor noise |
| Vert.    | 8262.000           | AV       | 33.4              | 36.5               | 8.1          | 32.8         | -                   | 45.2               | 53.9              | 8.7            | Floor noise |
| Vert.    | 9180.000           | AV       | 32.7              | 37.6               | 8.7          | 32.6         | -                   | 46.5               | 53.9              | 7.4            | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

## Radiated Spurious Emission

|                        |                                   |                              |  |
|------------------------|-----------------------------------|------------------------------|--|
| Report No.             | 13128136H                         |                              |  |
| Test place             | Ise EMC Lab.                      |                              |  |
| Semi Anechoic Chamber  | No.3                              | No.4                         |  |
| Date                   | March 15, 2020                    | March 22, 2020               |  |
| Temperature / Humidity | 22 deg. C / 30 % RH               | 23 deg. C / 39 % RH          |  |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) | Yuta Moriya<br>(Above 1 GHz) |  |
| Mode                   | Tx 918.0 MHz (4 MHz)              |                              |  |

### (ROD Antenna)

30dBc Data Sheet

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant<br>Factor<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark  |
|----------|--------------------|----------|-------------------|-------------------------|--------------|--------------|--------------------|-------------------|----------------|---------|
| Hori.    | 918.000            | PK       | 79.5              | 22.2                    | 13.6         | 0.0          | 115.3              | -                 | -              | Carrier |
| Hori.    | 704.000            | PK       | 38.7              | 19.8                    | 13.4         | 32.0         | 39.9               | 85.3              | 45.4           |         |
| Hori.    | 726.000            | PK       | 36.0              | 20.1                    | 13.5         | 31.9         | 37.7               | 85.3              | 47.6           |         |
| Hori.    | 736.000            | PK       | 36.4              | 20.1                    | 13.5         | 31.8         | 38.3               | 85.3              | 47.0           |         |
| Hori.    | 768.000            | PK       | 46.9              | 20.5                    | 13.7         | 31.6         | 49.4               | 85.3              | 35.9           |         |
| Hori.    | 800.000            | PK       | 46.6              | 20.8                    | 13.9         | 31.4         | 49.8               | 85.3              | 35.5           |         |
| Hori.    | 832.000            | PK       | 51.8              | 21.1                    | 14.0         | 31.3         | 55.6               | 85.3              | 29.7           |         |
| Hori.    | 864.000            | PK       | 53.2              | 21.8                    | 14.3         | 31.1         | 58.2               | 85.3              | 27.1           |         |
| Hori.    | 886.000            | PK       | 49.4              | 22.1                    | 14.7         | 31.0         | 55.2               | 85.3              | 30.1           |         |
| Hori.    | 896.000            | PK       | 48.9              | 22.1                    | 14.9         | 30.9         | 55.0               | 85.3              | 30.3           |         |
| Hori.    | 950.000            | PK       | 42.7              | 22.0                    | 14.8         | 30.6         | 48.9               | 85.3              | 36.4           |         |
| Hori.    | 1836.000           | PK       | 62.9              | 25.4                    | 5.6          | 32.5         | 61.5               | 85.3              | 23.8           |         |
| Hori.    | 6426.000           | PK       | 33.2              | 34.1                    | 7.6          | 31.8         | 43.1               | 85.3              | 42.2           |         |
| Vert.    | 918.000            | PK       | 78.3              | 22.2                    | 13.6         | 0.0          | 114.0              | -                 | -              | Carrier |
| Vert.    | 704.000            | PK       | 36.2              | 19.8                    | 13.4         | 32.0         | 37.4               | 84.0              | 46.7           |         |
| Vert.    | 726.000            | PK       | 34.8              | 20.1                    | 13.5         | 31.9         | 36.5               | 84.0              | 47.5           |         |
| Vert.    | 736.000            | PK       | 34.5              | 20.1                    | 13.5         | 31.8         | 36.4               | 84.0              | 47.7           |         |
| Vert.    | 768.000            | PK       | 40.8              | 20.5                    | 13.7         | 31.6         | 43.3               | 84.0              | 40.7           |         |
| Vert.    | 800.000            | PK       | 43.7              | 20.8                    | 13.9         | 31.4         | 46.9               | 84.0              | 37.2           |         |
| Vert.    | 832.000            | PK       | 49.4              | 21.1                    | 14.0         | 31.3         | 53.2               | 84.0              | 30.9           |         |
| Vert.    | 864.000            | PK       | 51.7              | 21.8                    | 14.3         | 31.1         | 56.7               | 84.0              | 27.4           |         |
| Vert.    | 886.000            | PK       | 47.0              | 22.1                    | 14.7         | 31.0         | 52.8               | 84.0              | 31.2           |         |
| Vert.    | 896.000            | PK       | 47.3              | 22.1                    | 14.9         | 30.9         | 53.4               | 84.0              | 30.6           |         |
| Vert.    | 950.000            | PK       | 42.7              | 22.0                    | 14.8         | 30.6         | 48.9               | 84.0              | 35.1           |         |
| Vert.    | 1836.000           | PK       | 62.3              | 25.4                    | 5.6          | 32.5         | 60.9               | 84.0              | 23.2           |         |
| Vert.    | 6426.000           | PK       | 33.2              | 34.1                    | 7.6          | 31.8         | 43.1               | 84.0              | 40.9           |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

## Radiated Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3 No.4  
Date March 15, 2020 March 22, 2020  
Temperature / Humidity 22 deg. C / 30 % RH 24 deg. C / 38 % RH  
Engineer Takafumi Noguchi Junya Okuno  
(Below 1 GHz) (Above 1 GHz)  
Mode Tx 922.0 MHz (4 MHz)

(ROD Antenna)

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark      |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|------------------|-----------------|----------------|-------------|-------------|
| Hori.    | 960.000         | QP       | 37.1           | 22.2            | 14.8      | 30.6      | -                | 43.5            | 46.0           | 2.5         |             |
| Hori.    | 2766.000        | PK       | 52.0           | 28.4            | 5.9       | 31.7      | -                | 54.6            | 73.9           | 19.3        |             |
| Hori.    | 3688.000        | PK       | 47.8           | 29.3            | 6.3       | 31.5      | -                | 51.9            | 73.9           | 22.0        |             |
| Hori.    | 4610.000        | PK       | 40.7           | 31.1            | 6.7       | 31.3      | -                | 47.2            | 73.9           | 26.7        | Floor noise |
| Hori.    | 5532.000        | PK       | 39.7           | 32.1            | 7.3       | 31.4      | -                | 47.7            | 73.9           | 26.2        | Floor noise |
| Hori.    | 6454.000        | PK       | 40.3           | 34.2            | 7.6       | 31.8      | -                | 50.3            | 73.9           | 23.6        | Floor noise |
| Hori.    | 7376.000        | PK       | 41.1           | 36.5            | 7.8       | 32.5      | -                | 52.9            | 73.9           | 21.0        | Floor noise |
| Hori.    | 8298.000        | PK       | 41.2           | 36.4            | 8.1       | 32.8      | -                | 53.0            | 73.9           | 21.0        | Floor noise |
| Hori.    | 9220.000        | PK       | 40.9           | 37.8            | 8.7       | 32.6      | -                | 54.8            | 73.9           | 19.1        | Floor noise |
| Hori.    | 2766.000        | AV       | 43.6           | 28.4            | 5.9       | 31.7      | -                | 46.2            | 53.9           | 7.7         |             |
| Hori.    | 3688.000        | AV       | 38.6           | 29.3            | 6.3       | 31.5      | -                | 42.7            | 53.9           | 11.2        |             |
| Hori.    | 4610.000        | AV       | 31.9           | 31.1            | 6.7       | 31.3      | -                | 38.4            | 53.9           | 15.5        | Floor noise |
| Hori.    | 5532.000        | AV       | 31.8           | 32.1            | 7.3       | 31.4      | -                | 39.8            | 53.9           | 14.1        | Floor noise |
| Hori.    | 6454.000        | AV       | 33.0           | 34.2            | 7.6       | 31.8      | -                | 43.0            | 53.9           | 10.9        | Floor noise |
| Hori.    | 7376.000        | AV       | 33.6           | 36.5            | 7.8       | 32.5      | -                | 45.4            | 53.9           | 8.5         | Floor noise |
| Hori.    | 8298.000        | AV       | 33.6           | 36.4            | 8.1       | 32.8      | -                | 45.3            | 53.9           | 8.6         | Floor noise |
| Hori.    | 9220.000        | AV       | 32.8           | 37.8            | 8.7       | 32.6      | -                | 46.7            | 53.9           | 7.2         | Floor noise |
| Vert.    | 960.000         | QP       | 37.1           | 22.2            | 14.8      | 30.6      | -                | 43.5            | 46.0           | 2.5         |             |
| Vert.    | 2766.000        | PK       | 49.1           | 28.4            | 5.9       | 31.7      | -                | 51.7            | 73.9           | 22.2        |             |
| Vert.    | 3688.000        | PK       | 47.5           | 29.3            | 6.3       | 31.5      | -                | 51.6            | 73.9           | 22.3        |             |
| Vert.    | 4610.000        | PK       | 40.0           | 31.1            | 6.7       | 31.3      | -                | 46.6            | 73.9           | 27.3        | Floor noise |
| Vert.    | 5532.000        | PK       | 39.6           | 32.1            | 7.3       | 31.4      | -                | 47.6            | 73.9           | 26.3        | Floor noise |
| Vert.    | 6454.000        | PK       | 40.4           | 34.2            | 7.6       | 31.8      | -                | 50.4            | 73.9           | 23.5        | Floor noise |
| Vert.    | 7376.000        | PK       | 41.0           | 36.5            | 7.8       | 32.5      | -                | 52.8            | 73.9           | 21.1        | Floor noise |
| Vert.    | 8298.000        | PK       | 41.5           | 36.4            | 8.1       | 32.8      | -                | 53.3            | 73.9           | 20.7        | Floor noise |
| Vert.    | 9220.000        | PK       | 40.3           | 37.8            | 8.7       | 32.6      | -                | 54.3            | 73.9           | 19.7        | Floor noise |
| Vert.    | 2766.000        | AV       | 40.5           | 28.4            | 5.9       | 31.7      | -                | 43.1            | 53.9           | 10.8        |             |
| Vert.    | 3688.000        | AV       | 37.6           | 29.3            | 6.3       | 31.5      | -                | 41.7            | 53.9           | 12.2        |             |
| Vert.    | 4610.000        | AV       | 31.9           | 31.1            | 6.7       | 31.3      | -                | 38.4            | 53.9           | 15.5        | Floor noise |
| Vert.    | 5532.000        | AV       | 31.8           | 32.1            | 7.3       | 31.4      | -                | 39.8            | 53.9           | 14.1        | Floor noise |
| Vert.    | 6454.000        | AV       | 33.1           | 34.2            | 7.6       | 31.8      | -                | 43.1            | 53.9           | 10.8        | Floor noise |
| Vert.    | 7376.000        | AV       | 33.5           | 36.5            | 7.8       | 32.5      | -                | 45.4            | 53.9           | 8.6         | Floor noise |
| Vert.    | 8298.000        | AV       | 33.5           | 36.4            | 8.1       | 32.8      | -                | 45.2            | 53.9           | 8.7         | Floor noise |
| Vert.    | 9220.000        | AV       | 32.6           | 37.8            | 8.7       | 32.6      | -                | 46.6            | 53.9           | 7.3         | Floor noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Radiated Spurious Emission

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.4                |
| Date                   | March 15, 2020       | March 22, 2020      |
| Temperature / Humidity | 22 deg. C / 30 % RH  | 24 deg. C / 38 % RH |
| Engineer               | Takafumi Noguchi     | Junya Okuno         |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 922.0 MHz (4 MHz) |                     |

(ROD Antenna)

30dBc Data Sheet

| Polarity | Frequency | Detector | Reading | Ant Factor | Loss | Gain | Result   | Limit    | Margin | Remark  |
|----------|-----------|----------|---------|------------|------|------|----------|----------|--------|---------|
|          | [MHz]     |          | [dBuV]  | [dB/m]     | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   |         |
| Hori.    | 922.000   | PK       | 79.8    | 22.1       | 13.6 | 0.0  | 115.6    | -        | -      | Carrier |
| Hori.    | 704.000   | PK       | 38.6    | 19.8       | 13.4 | 32.0 | 39.8     | 85.6     | 45.8   |         |
| Hori.    | 730.000   | PK       | 36.2    | 20.1       | 13.5 | 31.8 | 38.0     | 85.6     | 47.6   |         |
| Hori.    | 736.000   | PK       | 35.3    | 20.1       | 13.5 | 31.8 | 37.1     | 85.6     | 48.5   |         |
| Hori.    | 768.000   | PK       | 46.8    | 20.5       | 13.7 | 31.6 | 49.3     | 85.6     | 36.2   |         |
| Hori.    | 800.000   | PK       | 46.5    | 20.8       | 13.9 | 31.4 | 49.7     | 85.6     | 35.8   |         |
| Hori.    | 832.000   | PK       | 52.7    | 21.1       | 14.0 | 31.3 | 56.5     | 85.6     | 29.1   |         |
| Hori.    | 864.000   | PK       | 54.5    | 21.8       | 14.3 | 31.1 | 59.5     | 85.6     | 26.1   |         |
| Hori.    | 890.000   | PK       | 48.8    | 22.1       | 14.8 | 31.0 | 54.7     | 85.6     | 30.8   |         |
| Hori.    | 896.000   | PK       | 49.9    | 22.1       | 14.9 | 30.9 | 56.0     | 85.6     | 29.6   |         |
| Hori.    | 928.000   | PK       | 35.1    | 22.0       | 13.7 | 0.0  | 70.8     | 85.6     | 14.8   |         |
| Hori.    | 954.000   | PK       | 43.8    | 22.1       | 14.8 | 30.6 | 50.0     | 85.6     | 35.5   |         |
| Hori.    | 1844.000  | PK       | 62.9    | 25.5       | 5.6  | 32.4 | 61.5     | 85.6     | 24.1   |         |
| Vert.    | 922.000   | PK       | 79.0    | 22.1       | 13.6 | 0.0  | 114.7    | -        | -      | Carrier |
| Vert.    | 704.000   | PK       | 36.4    | 19.8       | 13.4 | 32.0 | 37.6     | 84.7     | 47.2   |         |
| Vert.    | 730.000   | PK       | 34.4    | 20.1       | 13.5 | 31.8 | 36.2     | 84.7     | 48.6   |         |
| Vert.    | 736.000   | PK       | 34.3    | 20.1       | 13.5 | 31.8 | 36.1     | 84.7     | 48.6   |         |
| Vert.    | 768.000   | PK       | 40.5    | 20.5       | 13.7 | 31.6 | 43.0     | 84.7     | 41.7   |         |
| Vert.    | 800.000   | PK       | 43.6    | 20.8       | 13.9 | 31.4 | 46.8     | 84.7     | 37.9   |         |
| Vert.    | 832.000   | PK       | 50.4    | 21.1       | 14.0 | 31.3 | 54.2     | 84.7     | 30.6   |         |
| Vert.    | 864.000   | PK       | 52.4    | 21.8       | 14.3 | 31.1 | 57.4     | 84.7     | 27.3   |         |
| Vert.    | 890.000   | PK       | 47.5    | 22.1       | 14.8 | 31.0 | 53.5     | 84.7     | 31.3   |         |
| Vert.    | 896.000   | PK       | 48.4    | 22.1       | 14.9 | 30.9 | 54.5     | 84.7     | 30.2   |         |
| Vert.    | 928.000   | PK       | 36.5    | 22.0       | 13.7 | 0.0  | 72.2     | 84.7     | 12.6   |         |
| Vert.    | 954.000   | PK       | 43.1    | 22.1       | 14.8 | 30.6 | 49.4     | 84.7     | 35.3   |         |
| Vert.    | 1844.000  | PK       | 61.4    | 25.5       | 5.6  | 32.4 | 60.0     | 84.7     | 24.7   |         |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Distance factor: 1 GHz - 10 GHz  $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

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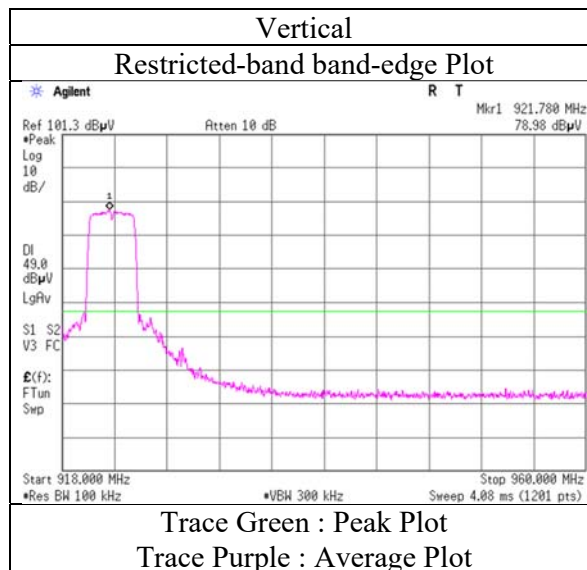
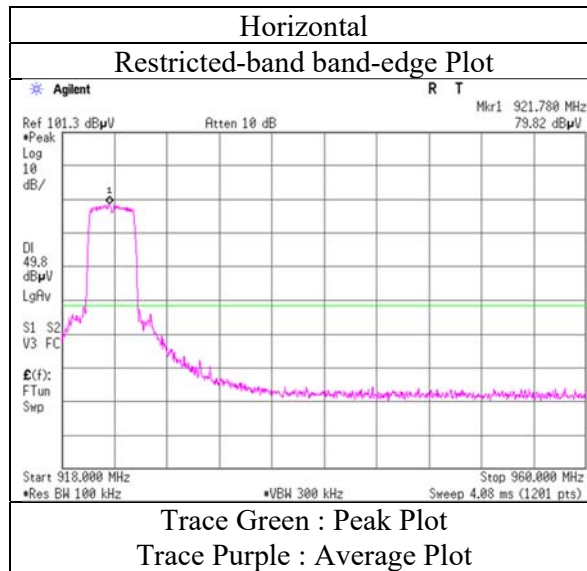
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Radiated Spurious Emission (Reference Plot for band-edge)

|                        |                                   |
|------------------------|-----------------------------------|
| Report No.             | 13128136H                         |
| Test place             | Ise EMC Lab.                      |
| Semi Anechoic Chamber  | No.3                              |
| Date                   | March 15, 2020                    |
| Temperature / Humidity | 22 deg. C / 30 % RH               |
| Engineer               | Takafumi Noguchi<br>(Below 1 GHz) |
| Mode                   | Tx 922.0 MHz (4 MHz)              |

(ROD Antenna)



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

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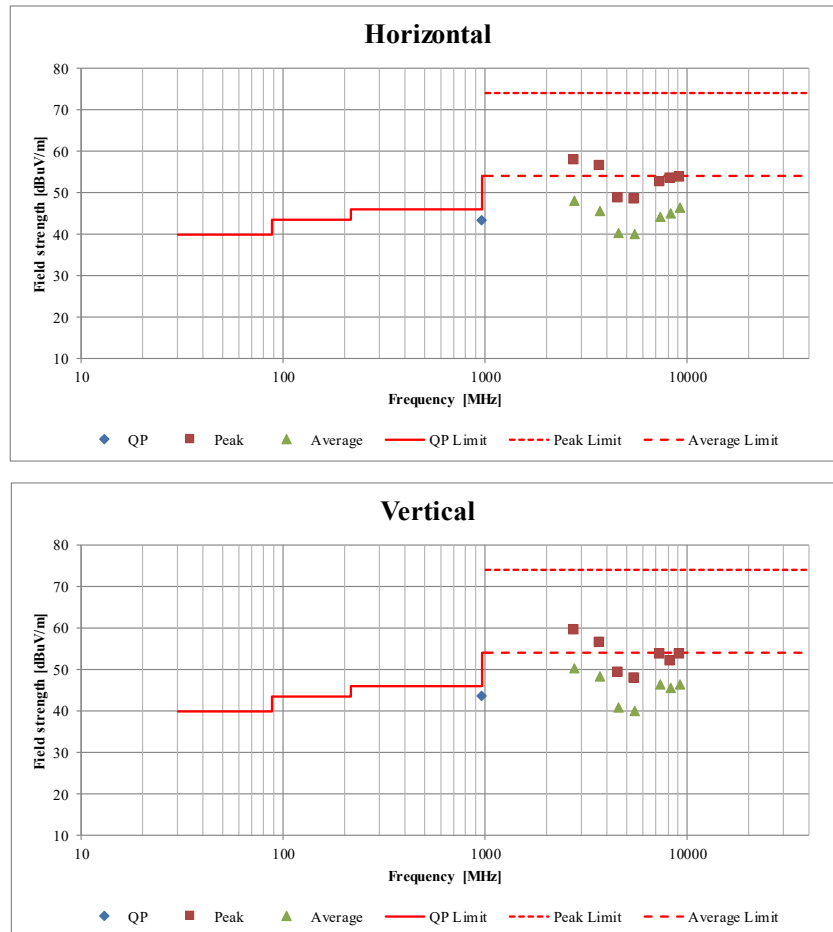
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Facsimile : +81 596 24 8124

### Radiated Spurious Emission (Plot data, Worst case)

|                        |                      |                     |
|------------------------|----------------------|---------------------|
| Report No.             | 13128136H            |                     |
| Test place             | Ise EMC Lab.         |                     |
| Semi Anechoic Chamber  | No.3                 | No.4                |
| Date                   | March 15, 2020       | March 22, 2020      |
| Temperature / Humidity | 22 deg. C / 30 % RH  | 23 deg. C / 39 % RH |
| Engineer               | Yuta Moriya          | Yuta Moriya         |
|                        | (Below 1 GHz)        | (Above 1 GHz)       |
| Mode                   | Tx 917.0 MHz (2 MHz) |                     |

(ROD Antenna)



\*These plots data contains sufficient number to show the trend of characteristic features for EUT.

**UL Japan, Inc.**

**Ise EMC Lab.**

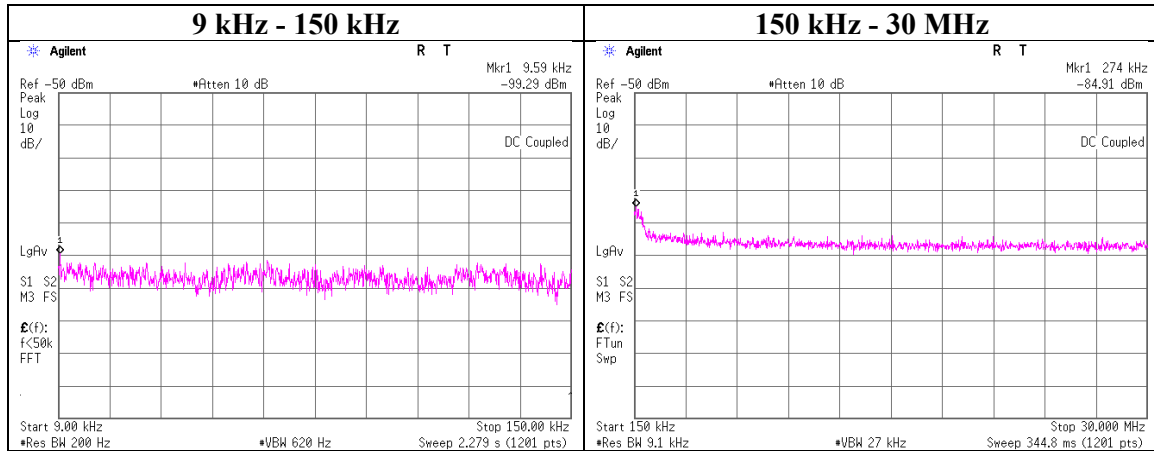
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## Conducted Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx 1 MHz Bandwidth 903.5 MHz



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 9.59               | -99.29           | 0.00                  | 19.87                      | 3.4                      | 1                          | -76.0         | 300             | 6.0                      | -14.8                             | 47.9              | 62.7           |        |
| 274.00             | -84.91           | 0.00                  | 19.86                      | 3.4                      | 1                          | -61.7         | 300             | 6.0                      | -0.4                              | 18.8              | 19.2           |        |

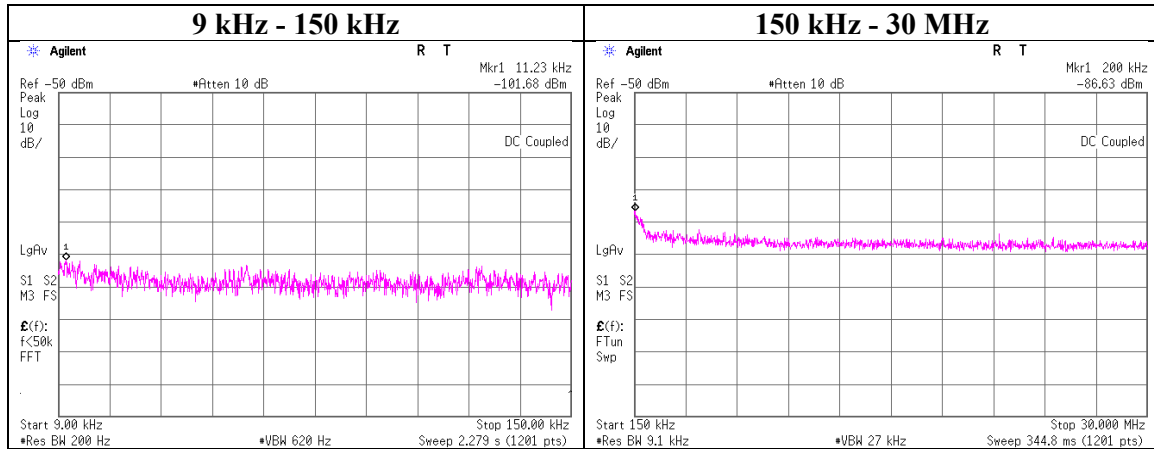
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

## Conducted Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx 1 MHz Bandwidth 915.5 MHz



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 11.23              | -101.68          | 0.00                  | 19.87                      | 3.4                      | 1                          | -78.4         | 300             | 6.0                      | -17.2                             | 46.5              | 63.7           |        |
| 200.00             | -86.63           | 0.00                  | 19.86                      | 3.4                      | 1                          | -63.4         | 300             | 6.0                      | -2.1                              | 21.5              | 23.6           |        |

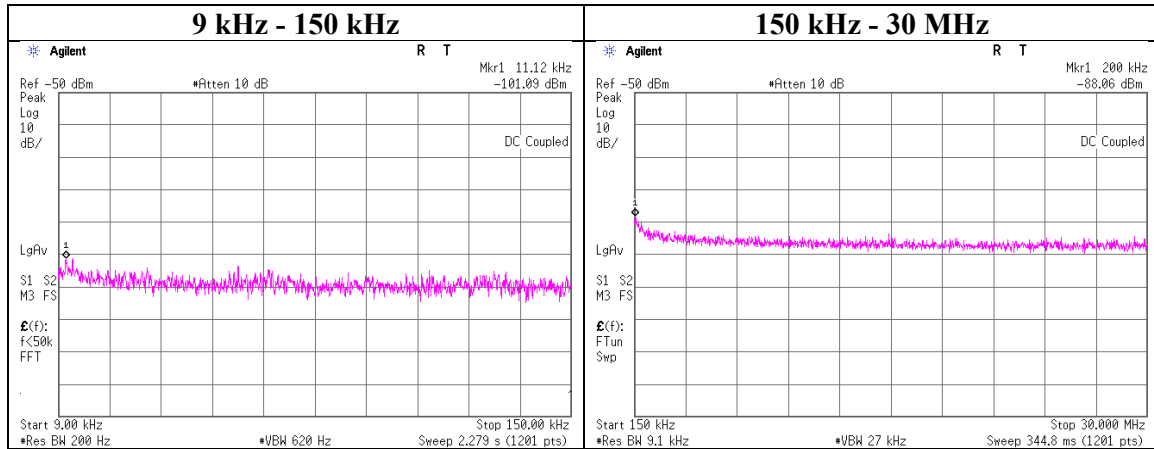
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

## Conducted Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx 1 MHz Bandwidth 926.5Hz



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 11.12              | -101.09          | 0.00                  | 19.87                      | 3.4                      | 1                          | -77.8         | 300             | 6.0                      | -16.6                             | 46.6              | 63.2           |        |
| 200.00             | -88.06           | 0.00                  | 19.86                      | 3.4                      | 1                          | -64.8         | 300             | 6.0                      | -3.5                              | 21.5              | 25.0           |        |

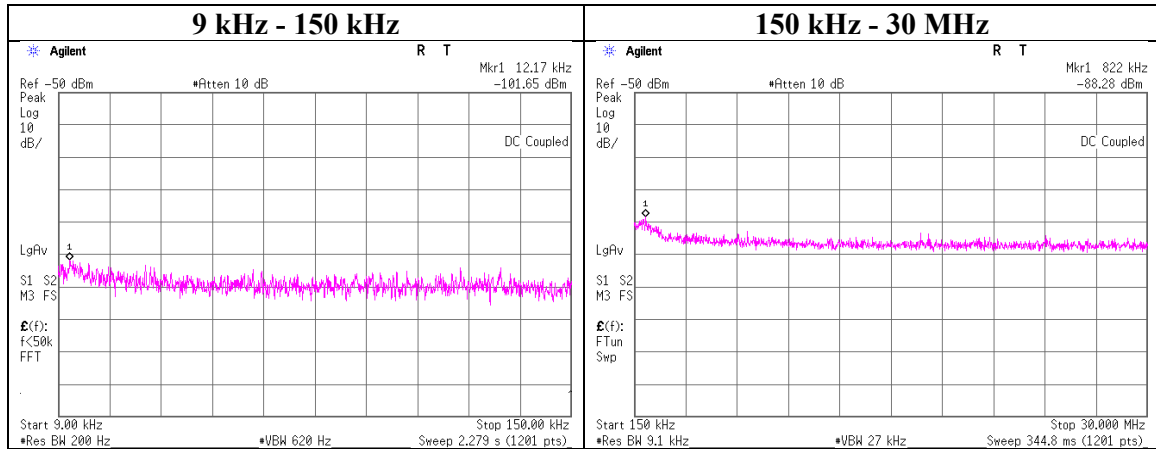
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

## Conducted Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx 2 MHz Bandwidth 905.0 MHz



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 12.17              | -101.65          | 0.00                  | 19.87                      | 3.4                      | 1                          | -78.4         | 300             | 6.0                      | -17.1                             | 45.8              | 62.9           |        |
| 822.00             | -88.28           | 0.00                  | 19.86                      | 3.4                      | 1                          | -65.0         | 30              | 6.0                      | 16.2                              | 29.3              | 13.1           |        |

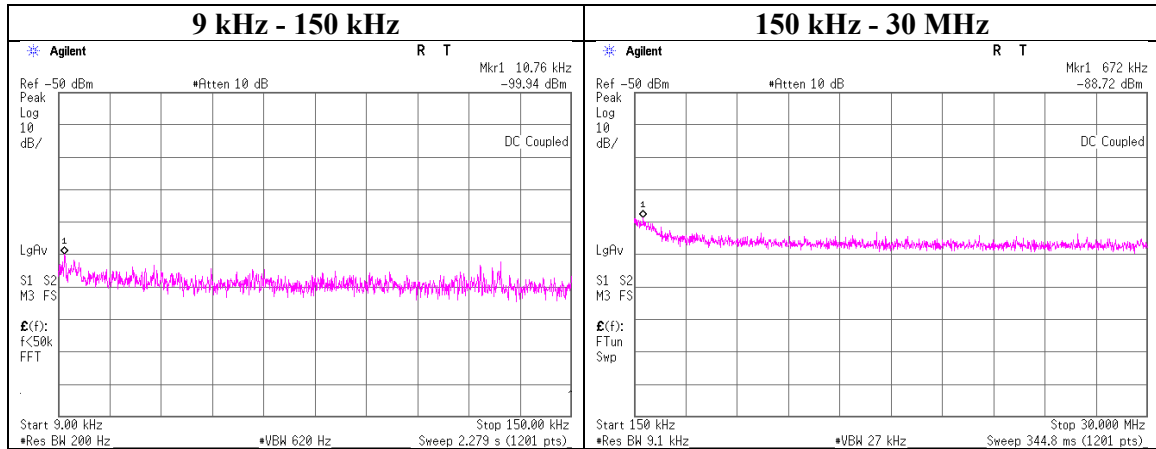
$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP [dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log (N)$

N: Number of output

## Conducted Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx 2 MHz Bandwidth 917.0 MHz



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 10.76              | -99.94           | 0.00                  | 19.87                      | 3.4                      | 1                          | -76.7         | 300             | 6.0                      | -15.4                             | 46.9              | 62.3           |        |
| 672.00             | -88.72           | 0.00                  | 19.86                      | 3.4                      | 1                          | -65.5         | 30              | 6.0                      | 15.8                              | 31.0              | 15.2           |        |

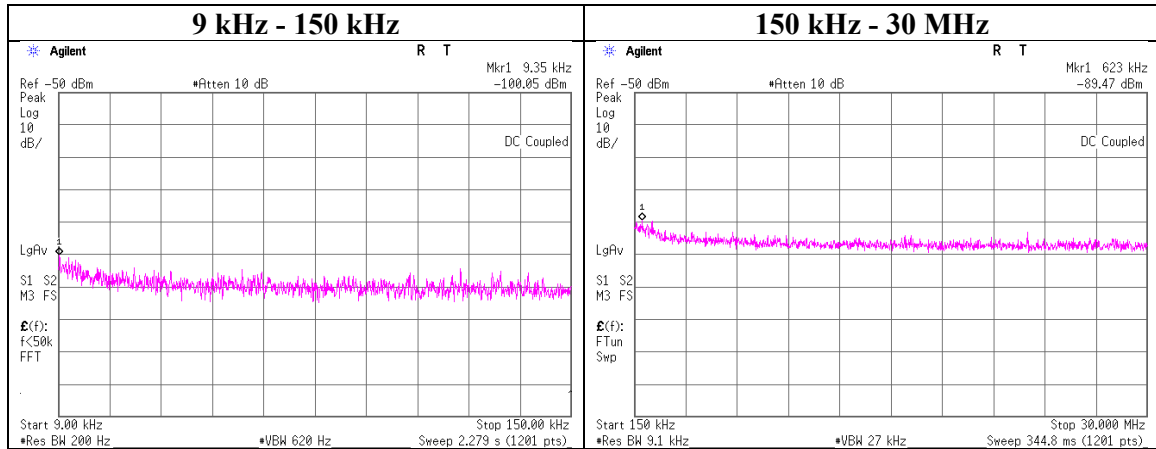
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

## Conducted Spurious Emission

|                        |                                    |
|------------------------|------------------------------------|
| Report No.             | 13128136H                          |
| Test place             | Ise EMC Lab. No.1 Measurement Room |
| Date                   | March 16, 2020                     |
| Temperature / Humidity | 23 deg. C / 32 % RH                |
| Engineer               | Yuta Moriya                        |
| Mode                   | Tx 2 MHz Bandwidth 925.0 MHz       |



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 9.35               | -100.05          | 0.00                  | 19.87                      | 3.4                      | 1                          | -76.8         | 300             | 6.0                      | -15.5                             | 48.1              | 63.6           |        |
| 623.00             | -89.47           | 0.00                  | 19.86                      | 3.4                      | 1                          | -66.2         | 30              | 6.0                      | 15.0                              | 31.7              | 16.7           |        |

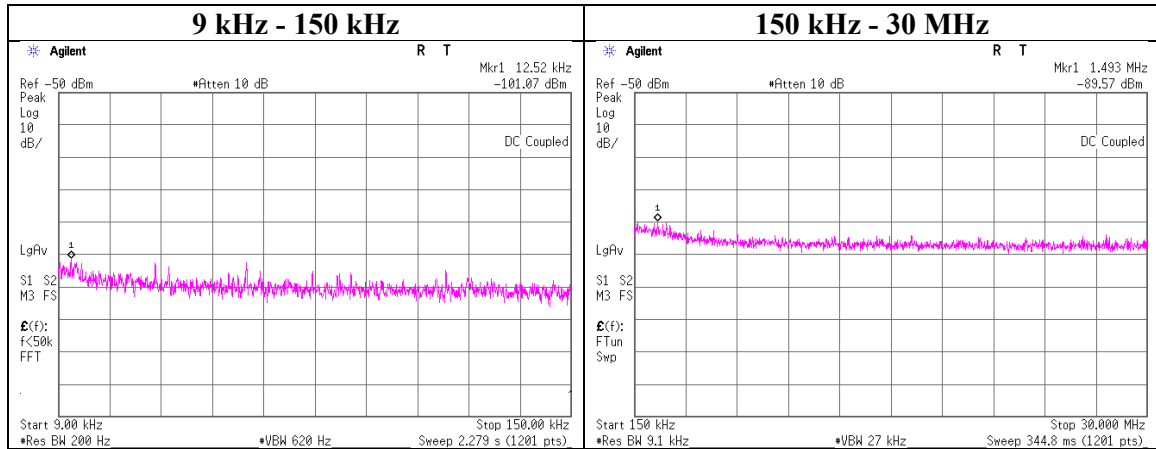
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

## Conducted Spurious Emission

|                        |                                    |
|------------------------|------------------------------------|
| Report No.             | 13128136H                          |
| Test place             | Ise EMC Lab. No.1 Measurement Room |
| Date                   | March 16, 2020                     |
| Temperature / Humidity | 23 deg. C / 32 % RH                |
| Engineer               | Yuta Moriya                        |
| Mode                   | Tx 4 MHz Bandwidth 910.0 MHz       |



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 12.52              | -101.07          | 0.00                  | 19.87                      | 3.4                      | 1                          | -77.8         | 300             | 6.0                      | -16.5                             | 45.6              | 62.1           |        |
| 1493.00            | -89.57           | 0.00                  | 19.87                      | 3.4                      | 1                          | -66.3         | 30              | 6.0                      | 15.0                              | 24.1              | 9.1            |        |

$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP [dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

**UL Japan, Inc.**

**Ise EMC Lab.**

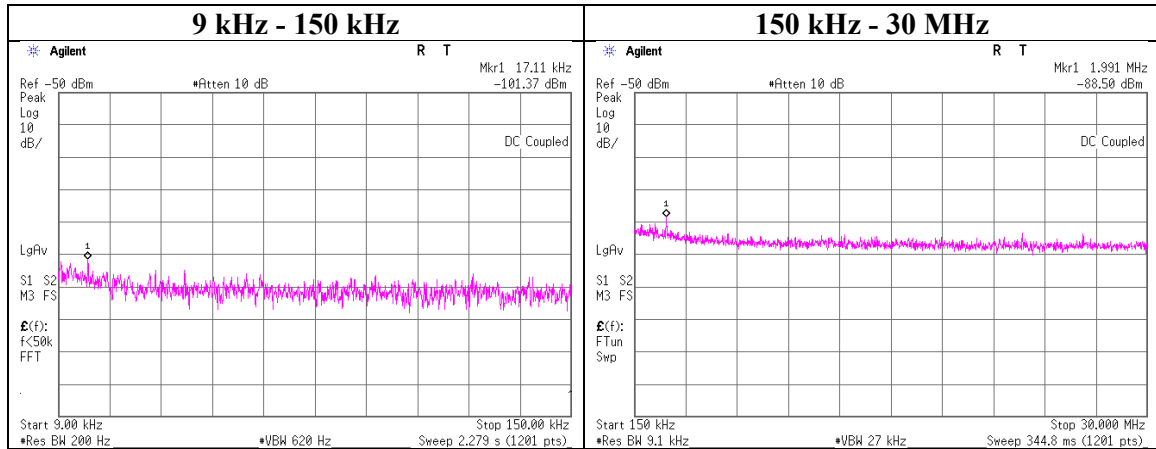
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Facsimile : +81 596 24 8124

## Conducted Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx 4 MHz Bandwidth 918.0 MHz



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 17.11              | -101.37          | 0.00                  | 19.87                      | 3.4                      | 1                          | -78.1         | 300             | 6.0                      | -16.8                             | 42.9              | 59.7           |        |
| 1991.00            | -88.50           | 0.00                  | 19.87                      | 3.4                      | 1                          | -65.2         | 30              | 6.0                      | 16.0                              | 29.5              | 13.5           |        |

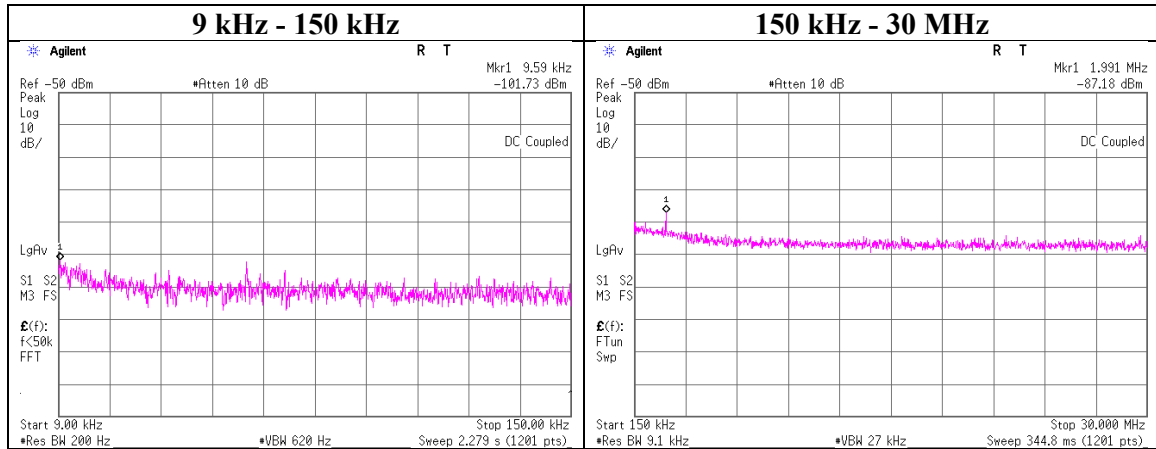
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

## Conducted Spurious Emission

Report No. 13128136H  
Test place Ise EMC Lab. No.1 Measurement Room  
Date March 16, 2020  
Temperature / Humidity 23 deg. C / 32 % RH  
Engineer Yuta Moriya  
Mode Tx 4 MHz Bandwidth 922.0 MHz



| Frequency<br>[kHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Attenuator<br>Loss<br>[dB] | Antenna<br>Gain<br>[dBi] | N<br>(Number<br>of Output) | EIRP<br>[dBm] | Distance<br>[m] | Ground<br>bounce<br>[dB] | E<br>(field strength)<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Remark |
|--------------------|------------------|-----------------------|----------------------------|--------------------------|----------------------------|---------------|-----------------|--------------------------|-----------------------------------|-------------------|----------------|--------|
| 9.59               | -101.73          | 0.00                  | 19.87                      | 3.4                      | 1                          | -78.5         | 300             | 6.0                      | -17.2                             | 47.9              | 65.1           |        |
| 1991.00            | -87.18           | 0.00                  | 19.87                      | 3.4                      | 1                          | -63.9         | 30              | 6.0                      | 17.3                              | 29.5              | 12.2           |        |

$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

### Power Density

Report No. 13128136H  
Test place Ise EMC Lab.  
No.1 Measurement Room No.4 Measurement Room  
Date March 16, 2020 March 22, 2020  
Temperature / Humidity 23 deg. C / 32 % RH 24 deg. C / 35 % RH  
Engineer Yuta Moriya Junya Okuno  
Mode Tx

#### **1 MHz**

| Freq. | Reading | Cable<br>Loss | Atten.<br>Loss | Result | Limit | Margin |
|-------|---------|---------------|----------------|--------|-------|--------|
| [MHz] | [dBm]   | [dB]          | [dB]           | [dBm]  | [dBm] | [dB]   |
| 903.5 | -15.14  | 0.37          | 19.92          | 5.16   | 8.00  | 2.85   |
| 915.5 | -16.57  | 0.37          | 19.92          | 3.72   | 8.00  | 4.28   |
| 926.5 | -19.83  | 0.37          | 19.92          | 0.46   | 8.00  | 7.54   |

#### **2 MHz**

| Freq. | Reading | Cable<br>Loss | Atten.<br>Loss | Result | Limit | Margin |
|-------|---------|---------------|----------------|--------|-------|--------|
| [MHz] | [dBm]   | [dB]          | [dB]           | [dBm]  | [dBm] | [dB]   |
| 905.0 | -15.49  | 0.37          | 19.92          | 4.81   | 8.00  | 3.20   |
| 917.0 | -16.78  | 0.37          | 19.92          | 3.51   | 8.00  | 4.49   |
| 925.0 | -22.44  | 0.37          | 19.92          | -2.15  | 8.00  | 10.15  |

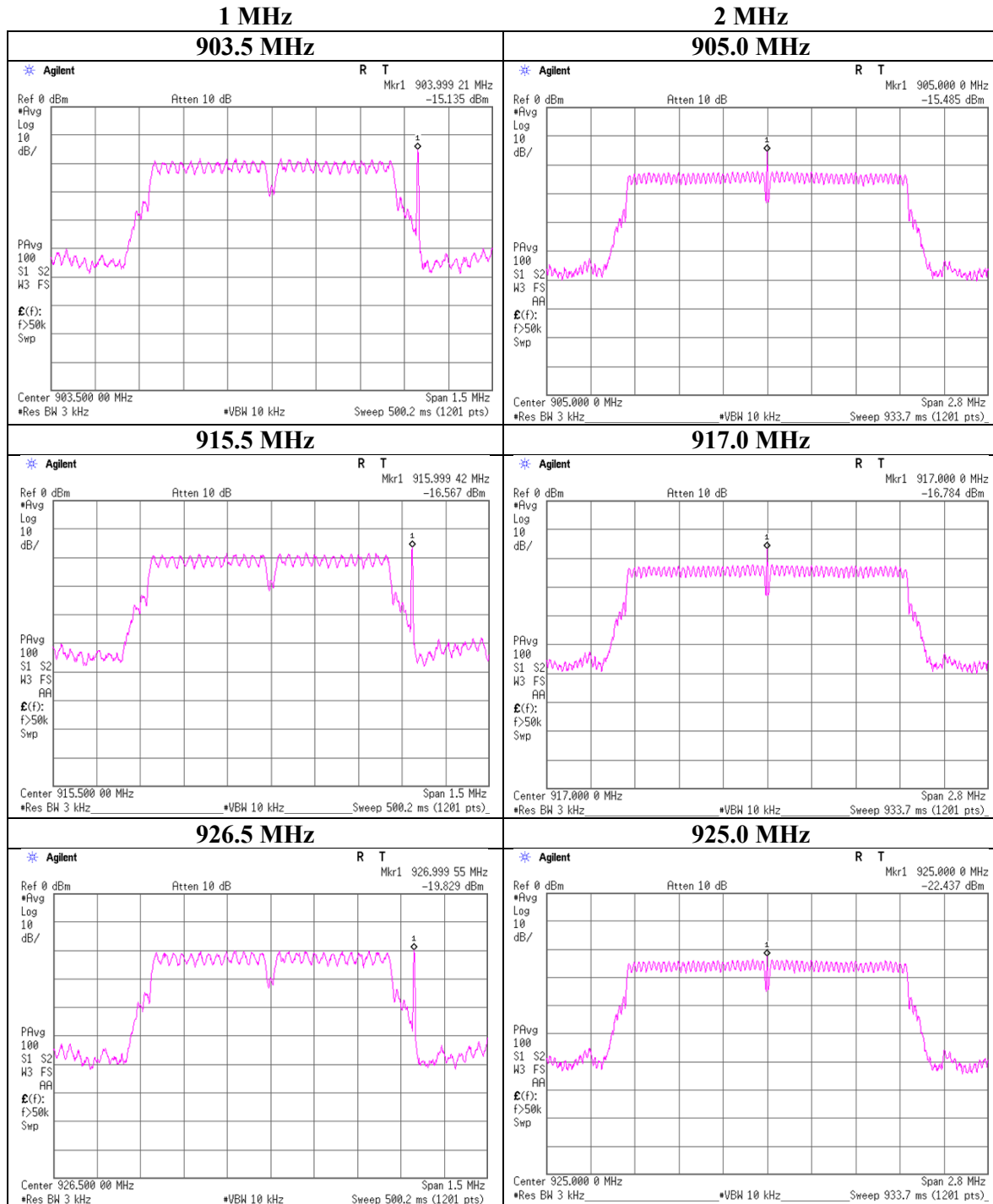
#### **4 MHz**

| Freq. | Reading | Cable<br>Loss | Atten.<br>Loss | Result | Limit | Margin |
|-------|---------|---------------|----------------|--------|-------|--------|
| [MHz] | [dBm]   | [dB]          | [dB]           | [dBm]  | [dBm] | [dB]   |
| 910.0 | -16.79  | 0.37          | 19.92          | 3.50   | 8.00  | 4.50   |
| 918.0 | -20.57  | 0.37          | 19.92          | -0.28  | 8.00  | 8.28   |
| 922.0 | -20.82  | 0.37          | 19.92          | -0.53  | 8.00  | 8.53   |

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

## Power Density



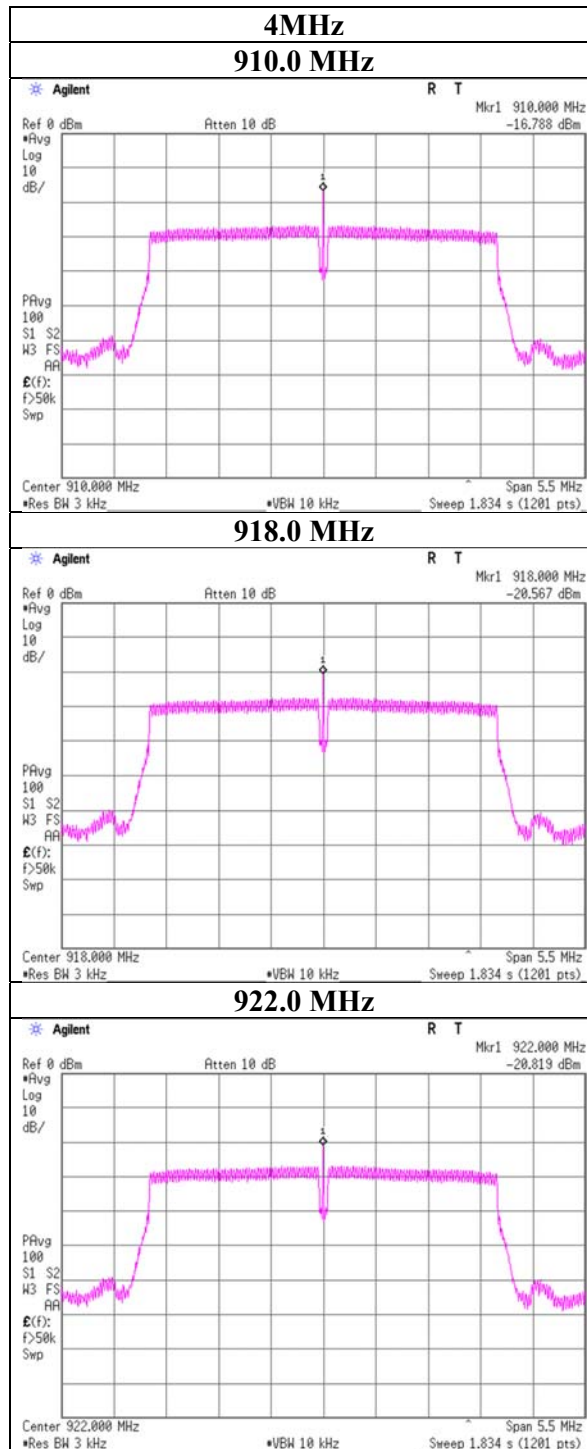
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## APPENDIX 2: Test instruments

### Test equipment (1/2)

| Test Item | Local ID      | LIMS ID | Description                       | Manufacturer                                | Model                    | Serial                        | Last Calibration Date | Cal Int |
|-----------|---------------|---------|-----------------------------------|---------------------------------------------|--------------------------|-------------------------------|-----------------------|---------|
| RE        | MHA-06        | 141512  | Horn Antenna 1-18GHz              | Schwarzbeck<br>Mess - Elektronik            | BBHA9120D                | 254                           | 2019/09/03            | 12      |
| RE        | MCC-141       | 141412  | Microwave Cable                   | Junkosha                                    | MWX221                   | 1305S002R(1m)<br>1405S146(5m) | 2019/06/17            | 12      |
| RE        | MPA-10        | 141579  | Pre Amplifier                     | Keysight<br>Technologies Inc                | 8449B                    | 3008A02142                    | 2020/01/07            | 12      |
| RE        | MAEC-02       | 142004  | AC2_Semi Anechoic Chamber(NSA)    | TDK                                         | Semi Anechoic Chamber 3m | DA-06902                      | 2018/06/29            | 24      |
| RE        | MOS-41        | 192300  | Thermo-Hygrometer                 | CUSTOM                                      | CTH-201                  | 0013                          | 2019/12/19            | 12      |
| RE        | MMM-01        | 141542  | Digital Tester                    | Fluke Corporation                           | FLUKE 26-3               | 78030611                      | 2019/08/20            | 12      |
| RE        | MJM-27        | 142228  | Measure                           | KOMELON                                     | KMC-36                   | -                             | -                     | -       |
| RE        | COTS-MEMI-02  | 178648  | EMI measurement program           | TSJ                                         | TEPTO-DV                 | -                             | -                     | -       |
| RE        | MHF-27        | 141297  | High Pass Filter (1.1-10GHz)      | TOKYO KEIKI                                 | TF219CD1                 | 1001                          | 2020/01/09            | 12      |
| RE        | MSA-03        | 141884  | Spectrum Analyzer                 | Keysight<br>Technologies Inc                | E4448A                   | MY44020357                    | 2020/03/04            | 12      |
| RE        | MAT-07        | 141203  | Attenuator(6dB)                   | Weinschel Corp                              | 2                        | BK7970                        | 2019/11/07            | 12      |
| RE        | MBA-08        | 141427  | Biconical Antenna                 | Schwarzbeck<br>Mess - Elektronik            | VHA9103B+<br>BBA9106     | 8031                          | 2019/08/23            | 12      |
| RE        | MCC-12        | 141317  | Coaxial Cable                     | Fujikura/Agilent                            | -                        | -                             | 2019/09/03            | 12      |
| RE        | MLA-21        | 141265  | Logperiodic Antenna (200-1000MHz) | Schwarzbeck<br>Mess - Elektronik            | VUSLP9111B               | 9111B-190                     | 2019/08/23            | 12      |
| RE        | MPA-09        | 141578  | Pre Amplifier                     | Keysight<br>Technologies Inc                | 8447D                    | 2944A10845                    | 2019/09/06            | 12      |
| RE        | MTR-03        | 141942  | Test Receiver                     | Rohde & Schwarz                             | ESCI                     | 100300                        | 2019/08/08            | 12      |
| RE        | MCC-64        | 141327  | Coaxial Cable                     | UL Japan                                    | -                        | -                             | 2020/02/04            | 12      |
| RE        | MRF-12        | 192072  | Band Rejection Filter(902-928MHz) | Wakoh Communication<br>Industrial Co., Ltd. | WFR-481                  | 19122541                      | 2020/03/16            | 12      |
| AT        | MAT-17        | 141171  | Attenuator(20dB)_DC-1GHz N        | Weinschel Corp                              | MODEL 1                  | BG0143                        | 2019/12/09            | 12      |
| AT        | MCC-211       | 141322  | Microwave Cable                   | RS Pro                                      | R-132G7210200CD          | -                             | 2019/04/17            | 12      |
| AT        | MPM-12        | 141809  | Power Meter                       | ANRITSU                                     | ML2495A                  | 825002                        | 2019/05/16            | 12      |
| AT        | MPSE-17       | 141830  | Power sensor                      | ANRITSU                                     | MA2411B                  | 738285                        | 2019/05/16            | 12      |
| RE        | MAEC-03       | 142008  | AC3_Semi Anechoic Chamber(NSA)    | TDK                                         | Semi Anechoic Chamber 3m | DA-10005                      | 2018/06/26            | 24      |
| RE        | MOS-13        | 141554  | Thermo-Hygrometer                 | CUSTOM                                      | CTH-201                  | 1301                          | 2020/01/07            | 12      |
| RE        | MMM-08        | 141532  | DIGITAL HiTESTER                  | Hioki                                       | 3805                     | 51201197                      | 2020/01/06            | 12      |
| RE        | MJM-16        | 142183  | Measure                           | KOMELON                                     | KMC-36                   | -                             | -                     | -       |
| RE        | COTS-MEMI-02  | 178648  | EMI measurement program           | TSJ                                         | TEPTO-DV                 | -                             | -                     | -       |
| RE        | MAT-95        | 142314  | Attenuator                        | Pasternack                                  | PE7390-6                 | D/C 1504                      | 2019/06/11            | 12      |
| RE        | MBA-03        | 141424  | Biconical Antenna                 | Schwarzbeck<br>Mess - Elektronik            | VHA9103<br>+BBA9106      | 1915                          | 2019/08/24            | 12      |
| RE        | MCC-51        | 141323  | Coaxial cable                     | UL Japan                                    | -                        | -                             | 2019/07/02            | 12      |
| RE        | MLA-22        | 141266  | Logperiodic Antenna (200-1000MHz) | Schwarzbeck<br>Mess - Elektronik            | VUSLP9111B               | 9111B-191                     | 2019/08/24            | 12      |
| RE        | MPA-13        | 141582  | Pre Amplifier                     | SONOMA<br>INSTRUMENT                        | 310                      | 260834                        | 2020/02/10            | 12      |
| RE        | MTR-08        | 141949  | Test Receiver                     | Rohde & Schwarz                             | ESCI                     | 100767                        | 2019/08/02            | 12      |
| RE        | MCC-64        | 141327  | Coaxial Cable                     | UL Japan                                    | -                        | -                             | 2020/02/04            | 12      |
| RE        | MRF-12        | 192072  | Band Rejection Filter(902-928MHz) | Wakoh Communication<br>Industrial Co., Ltd. | WFR-481                  | 19122541                      | 2020/03/16            | 12      |
| AT        | MSA-04        | 141885  | Spectrum Analyzer                 | Keysight<br>Technologies Inc                | E4448A                   | US44300523                    | 2019/11/21            | 12      |
| AT        | MOS-14        | 141561  | Thermo-Hygrometer                 | CUSTOM                                      | CTH-201                  | 1401                          | 2020/01/07            | 12      |
| RE        | MAEC-03-SVSWR | 142013  | AC3_Semi Anechoic Chamber(SVSWR)  | TDK                                         | Semi Anechoic Chamber 3m | DA-10005                      | 2019/04/08            | 24      |

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## Test equipment (2/2)

| Test Item | Local ID      | LIMS ID | Description                      | Manufacturer                  | Model                                                       | Serial                          | Last Calibration Date | Cal Int |
|-----------|---------------|---------|----------------------------------|-------------------------------|-------------------------------------------------------------|---------------------------------|-----------------------|---------|
| RE        | MHA-20        | 141507  | Horn Antenna 1-18GHz             | Schwarzbeck Mess – Elektronik | BBHA9120D                                                   | 258                             | 2019/09/26            | 12      |
| RE        | MPA-11        | 141580  | MicroWave System Amplifier       | Keysight Technologies Inc     | 83017A                                                      | MY39500779                      | 2020/03/24            | 12      |
| RE        | MCC-231       | 177964  | Microwave Cable                  | Junkosha INC.                 | MMX221                                                      | 1901S329(1m)/<br>1902S579(5m)   | 2020/03/02            | 12      |
| RE        | MHF-27        | 141297  | High Pass Filter (1.1-10GHz)     | TOKYO KEIKI                   | TF219CD1                                                    | 1001                            | 2020/01/09            | 12      |
| RE        | MOS-15        | 141562  | Thermo-Hygrometer                | CUSTOM                        | CTH-201                                                     | 0010                            | 2020/01/07            | 12      |
| RE        | MMM-10        | 141545  | DIGITAL HiTESTER                 | Hioki                         | 3805                                                        | 51201148                        | 2020/01/06            | 12      |
| RE        | MPA-12        | 141581  | MicroWave System Amplifier       | Keysight Technologies Inc     | 83017A                                                      | 650                             | 2019/10/16            | 12      |
| RE        | MSA-14        | 141901  | Spectrum Analyzer                | Keysight Technologies Inc     | E4440A                                                      | MY48250080                      | 2019/10/06            | 12      |
| RE        | MCC-141       | 141412  | Microwave Cable                  | Junkosha                      | MWX221                                                      | 1305S002R(1m)<br>/ 1405S146(5m) | 2019/06/17            | 12      |
| RE        | MHA-21        | 141508  | Horn Antenna 1-18GHz             | Schwarzbeck Mess – Elektronik | BBHA9120D                                                   | 9120D-557                       | 2019/09/26            | 12      |
| RE        | MAEC-04-SVSWR | 142017  | AC4_Semi Anechoic Chamber(SVSWR) | TDK                           | Semi Anechoic Chamber 3m                                    | DA-10005                        | 2019/04/04            | 24      |
| AT        | MSA-14        | 141901  | Spectrum Analyzer                | Keysight Technologies Inc     | E4440A                                                      | MY48250080                      | 2019/10/06            | 12      |
| AT        | MPM-08        | 141805  | Power Meter                      | ANRITSU                       | ML2495A                                                     | 6K00003338                      | 2019/10/03            | 12      |
| AT        | MPSE-11       | 141840  | Power sensor                     | ANRITSU                       | MA2411B                                                     | 11737                           | 2019/10/03            | 12      |
| AT        | MAT-17        | 141171  | Attenuator(20dB)_DC-1GHz_N       | Weinschel Corp                | MODEL 1                                                     | BG0143                          | 2019/12/09            | 12      |
| AT        | MCC-212       | 141391  | Microwave Cable                  | RS Pro                        | R-132G7210200CD                                             | -                               | 2019/04/17            | 12      |
| AT        | MCC-211       | 141322  | Microwave Cable                  | RS Pro                        | R-132G7210200CD                                             | -                               | 2019/04/17            | 12      |
| AT        | MOS-42        | 192303  | Thermo-Hygrometer                | CUSTOM                        | CTH-201                                                     | 0014                            | 2019/12/19            | 12      |
| RE        | MAEC-04       | 142011  | AC4_Semi Anechoic Chamber(NSA)   | TDK                           | Semi Anechoic Chamber 3m                                    | DA-10005                        | 2018/06/28            | 24      |
| RE        | MJM-26        | 142227  | Measure                          | KOMELON                       | KMC-36                                                      | -                               | -                     | -       |
| RE        | MAT-34        | 141331  | Attenuator(6dB)                  | TME                           | UFA-01                                                      | -                               | 2020/02/05            | 12      |
| RE        | MBA-05        | 141425  | Biconical Antenna                | Schwarzbeck Mess – Elektronik | VHA9103 +BBA9106                                            | 1302                            | 2019/08/24            | 12      |
| RE        | MCC-50        | 141397  | Coaxial Cable                    | UL Japan                      | -                                                           | -                               | 2020/03/24            | 12      |
| RE        | MLA-23        | 141267  | Logperiodic Antenna(200-1000MHz) | Schwarzbeck Mess – Elektronik | VUSLP9111B                                                  | 9111B-192                       | 2019/08/24            | 12      |
| RE        | MPA-14        | 141583  | Pre Amplifier                    | SONOMA INSTRUMENT             | 310                                                         | 260833                          | 2020/02/18            | 12      |
| CE        | MSA-13        | 141900  | Spectrum Analyzer                | Keysight Technologies Inc     | E4440A                                                      | MY46185823                      | 2019/11/20            | 12      |
| CE        | MTR-08        | 141949  | Test Receiver                    | Rohde & Schwarz               | ESCI                                                        | 100767                          | 2019/08/02            | 12      |
| CE        | MAT-66        | 141247  | Attenuator(13dB)                 | JFW Industries, Inc.          | 50FP-013H2 N                                                | -                               | 2019/12/02            | 12      |
| CE        | MCC-112       | 141216  | Coaxial cable                    | Fujikura/Suhner/TSJ           | 5D-2W/SFM14/<br>suciform141-<br>PE/421-010/<br>RFM-E321(SW) | -/00640                         | 2019/07/02            | 12      |
| CE        | MLS-23        | 141357  | LISN(AMN)                        | Schwarzbeck Mess – Elektronik | NSLK8127                                                    | 8127-729                        | 2019/07/05            | 12      |
| CE        | MOS-13        | 141554  | Thermo-Hygrometer                | CUSTOM                        | CTH-201                                                     | 1301                            | 2020/01/07            | 12      |
| CE        | MAEC-03       | 142008  | AC3_Semi Anechoic Chamber(NSA)   | TDK                           | Semi Anechoic Chamber 3m                                    | DA-10005                        | 2018/06/26            | 24      |
| CE        | COTS-MEMI-02  | 178648  | EMI measurement program          | TSJ                           | TEPTO-DV                                                    | -                               | -                     | -       |

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\*Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test item:       CE: Conducted Emission test  
                  RE: Radiated Emission test  
                  AT: Antenna Terminal Conducted test