

# TEST REPORT

For

**Sensor**

In conformity with

**FCC CFR 47 Part15 Subpart C**

**Model : RC-K3E**

**FCC ID : AORMETROLRCS001**

**Report No. : ERY1807Z18R2**

**Issue Date : July 18, 2018**

**Prepared for**

Metrol Co., Ltd.

1-100 Takamatsu-cho, Tachikawa City, Tokyo 190-0011 Japan

**Prepared by**

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## History

| Report No.   | Date          | Revisions                               | Issued By |
|--------------|---------------|---|-----------|
| ERY1805Z11R1 | May 11, 2018  | Initial Issue                           | K. Onishi |
| ERY1807Z18R2 | July 18, 2018 | Correction of antenna gain (Clause 1.1) | K. Onishi |

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# 1 General information

## 1.1 Product description

Test item : Sensor  
 Manufacturer : Metrol Co., Ltd.  
 Address : 1-100 Takamatsu-cho, Tachikawa City, Tokyo 190-0011 Japan  
 Model : RC-K3E  
 FCC ID : AORMETROLRCS001  
 Serial number : K1 (RF conducted), K3 (RF radiated)  
 Hardware version : RCS001  
 Software version : RCS001  
 Operating frequency : 2404 - 2476 MHz  
 Modulation : GFSK  
 Antenna Gain : +4.87 dBi  
 Receipt date of EUT : March 5, 2018  
 Nominal power source voltages : DC 3.6 V (Battery)

## 1.2 Test(s) performed/ Summary of test result


Test specification(s) : FCC CFR 47 Part 15 Subpart C (01 Oct. 2017)  
 Test method(s) : ANSI C63.10: 2013  
 Test(s) started : March 7, 2018  
 Test(s) completed : March 15, 2018

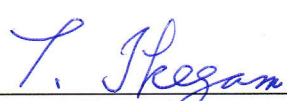
Summary of test result : Complied

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result.

The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory.

Compliance of the EUT is more probable than non-compliance is case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer :   
 K. Onishi  
 Wireless testing laboratory

Reviewer :   
 T. Ikegami  
 Manager  
 Wireless testing laboratory

### 1.3 Test facility

#### [Yokohama Laboratory]

Address: 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan  
TEL: +81-45-534-0645  
FAX: +81-45-592-7506

Accredited by National Voluntary Laboratory Accreditation Program (NVLAP) for the emission tests stated in the scope of the certificate under Certificate Number 200780-0

Registered by Innovation, Science and Economic Development Canada (ISED):

The registered facility number is as follows;

Test site (Semi-Anechoic chamber 3m): 6974A-1

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI)

Each registered facility number is as follows;

Test site A-0045

#### [Kitayamata laboratory]

Address: 3-5-23, Kitayamata, Tsuzuki-ku, Yokohama, 224-0021, Japan  
TEL: +81-45-550-3520  
FAX: +81-45-592-7506

Accredited by National Voluntary Laboratory Accreditation Program (NVLAP) for the emission tests stated in the scope of the certificate under Certificate Number 200780-0

Registered by Innovation, Science and Economic Development Canada (ISED):

The registered facility number is as follows;

Test site (Semi-Anechoic chamber 3m): 21105-1

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI)

Each registered facility number is as follows;

Test site A-0212

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



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## 1.4 Measurement uncertainty

The treatment of uncertainty is based on the general matters on the definition of uncertainty in “Guide to the expression of uncertainty in measurement (GUM)” published by ISO. The Lab’s uncertainty is determined by referring ETSI TR 100 028-1 V1.4.1 (2001-12).

The uncertainty of the measurement result in the level of confidence of approximately 95% (k=2) is as follows;

|  |          |
|--|----------|
| Conducted emission (150 kHz - 30 MHz): | ± 3.4 dB |
| Radiated emission (9 kHz - 30 MHz):    | ± 5.1 dB |
| Radiated emission (30 MHz - 1000 MHz): | ± 5.3 dB |
| Radiated emission (1 GHz - 6 GHz):     | ± 5.2 dB |
| Radiated emission (6 GHz - 18 GHz):    | ± 5.2 dB |
| Radiated emission (18 GHz - 26 GHz):   | ± 5.7 dB |

## 1.5 Summary of test results

| Requirement                       | Section in FCC        | Result   | Section in this report |
|-----------------------------------|-----------------------|----------|------------------------|
| Occupied Bandwidth (99 %)         | 2.1049                | Complied | 2.1                    |
| 6 dB Bandwidth                    | 15.247 (a) (2)        | Complied | 2.2                    |
| Conducted Output Power            | 15.247 (b) (3)        | Complied | 2.3                    |
| Conducted Spurious Emission       | 15.247 (d)            | Complied | 2.4                    |
| Power Spectral Density            | 15.247 (e)            | Complied | 2.5                    |
| Radiated Emissions                | 15.247(d), 15.205 (a) | Complied | 2.6                    |
| AC power line conducted emissions | 15.207                | N/A      | 2.7                    |

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## 1.6 Setup of equipment under test (EUT)

### 1.6.1 Test configuration of EUT

#### Equipment(s) under test

| No. | Item    | Manufacture      | Model No. | Serial No. |
|-----|---------|------------------|-----------|------------|
| A1  | Sensor  | Metrol Co., Ltd. | RC-K3E    | K1         |
| A2  | Sensor  | Metrol Co., Ltd. | RC-K3E    | K3         |
| B   | Battery | -                | -         | -          |

#### Support Equipment(s)

| No. | Item | Manufacture | Model No. | Serial No. |
|-----|------|-------------|-----------|------------|
| -   | -    | -           | -         | -          |
| -   | -    | -           | -         | -          |

#### Connected cable(s)

| No. | Item | Identification<br>(Manu.etc.) | Cable<br>Shielded | Ferrite<br>Core | Length<br>[m] |
|-----|------|-------------------------------|-------------------|-----------------|---------------|
| -   | -    | -                             | -                 | -               | -             |
| -   | -    | -                             | -                 | -               | -             |

### 1.6.2 Operating condition:

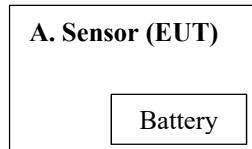
- Tx (2404MHz): The EUT is in normal transmission mode at 2404MHz
- Tx (2440MHz): The EUT is in normal transmission mode at 2440MHz
- Tx (2476MHz): The EUT is in normal transmission mode at 2476MHz

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### 1.6.3 Setup diagram of tested system

[Configuration 1]



## 1.7 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the applicable standards described in clause 1.2.

## 1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

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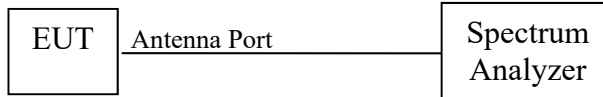
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## 2 Test procedure and test data

### 2.1 Occupied Bandwidth (99%)

#### Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



#### Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 6.9

- RBW: 1 to 5 % of OBW
- VBW > 3 x RBW
- Span: OBW x 1.5 to 5
- Trace: Max hold

#### Limitation

There are no limitations.  
 The measurement value is used for the emission designator.

#### Test equipment used (refer to List of utilized test equipment)

|      |      |   |   |   |   |
|------|------|---|---|---|---|
| SA06 | CL31 | - | - | - | - |
|------|------|---|---|---|---|

#### Test results

Test sample: K1  
 Configuration: 1

| Transmission Frequency [MHz] | Occupied Bandwidth [kHz] |
|------------------------------|--------------------------|
| 2404                         | 456.5                    |
| 2440                         | 476.5                    |
| 2476                         | 465.0                    |

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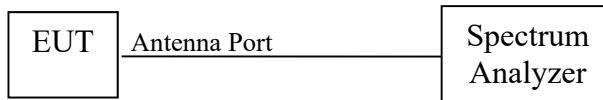




## 2.2 6dB Bandwidth

### Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



### Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 11.8

- RBW: 100 kHz
- VBW: 300 kHz
- Detector: Peak
- Trace: Max hold

### Applicable rule and limitation

15.247 (a) (2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### Test equipment used (refer to List of utilized test equipment)

|      |      |   |   |   |   |
|------|------|---|---|---|---|
| SA06 | CL31 | - | - | - | - |
|------|------|---|---|---|---|

### Test results - Complied with requirement

### Test Data

Test sample: K1  
 Configuration: 1

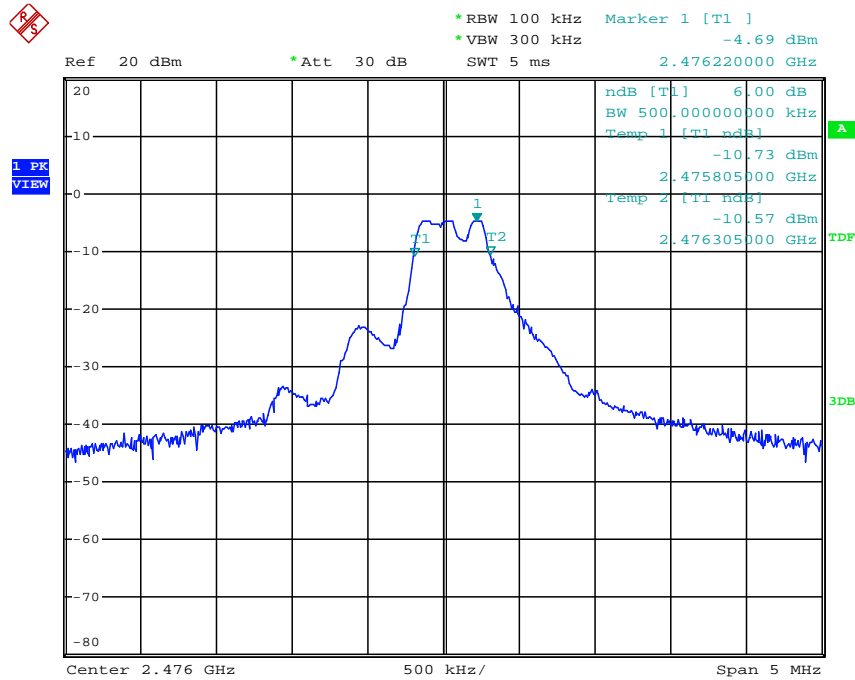
| Transmission Frequency [MHz] | 6 dB Bandwidth [kHz] |
|------------------------------|----------------------|
| 2404                         | 505                  |
| 2440                         | 510                  |
| 2476                         | 500                  |

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[Chart]

Tx (2476 MHz)



Tested Date: March 15, 2018  
 Humidity: 49 %

Temperature: 21 degC  
 Atmos. Press: 1017 hPa

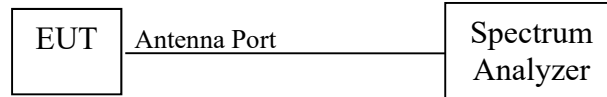
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## 2.3 Peak Output Power

### Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



### Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 11.9

- RBW > 6dB BW
- Span > 3 x RBW
- Trace: Max hold
- VBW > 3 x RBW
- Detector: Peak

### Applicable rule and limitation

15.247(b) (3); For systems using digital modulation in the 902–928 MHz, 2400–2483.5MHz, and 5725–5850 MHz bands: 1 Watt (30 dBm).

### Test equipment used (refer to List of utilized test equipment)

|      |      |   |   |   |   |
|------|------|---|---|---|---|
| SA06 | CL31 | - | - | - | - |
|------|------|---|---|---|---|

### Test results - Complied with requirement

### Test Data

Test sample: K1  
 Configuration: 1

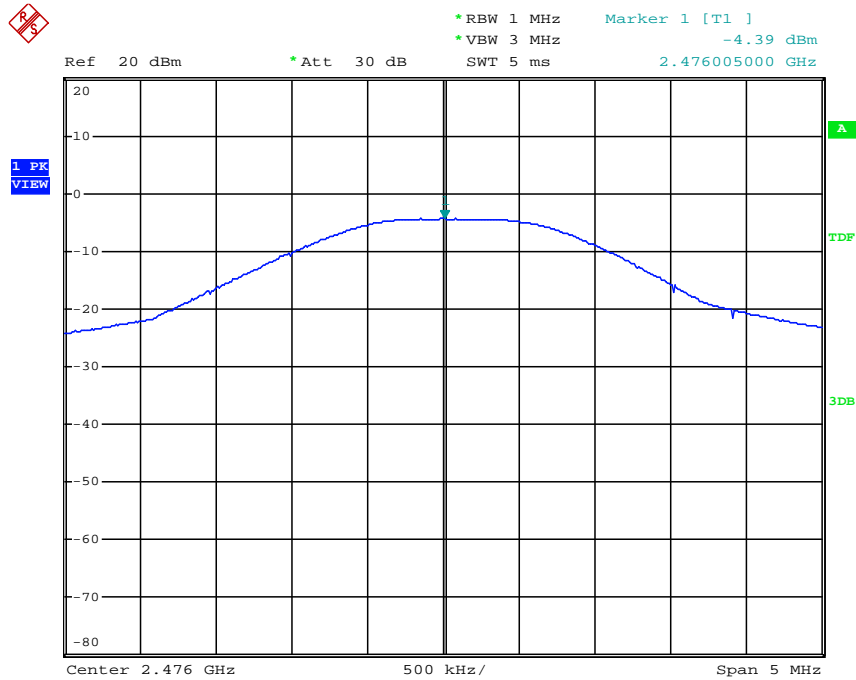
| Transmission Frequency [MHz] | Output Power [dBm] |
|------------------------------|--------------------|
| 2404                         | -4.80              |
| 2440                         | -4.72              |
| 2476                         | -4.39              |

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[Chart]

Tx (2476 MHz)



Tested Date: March 15, 2018  
 Humidity: 49 %

Temperature: 21 degC  
 Atmos. Press: 1017 hPa

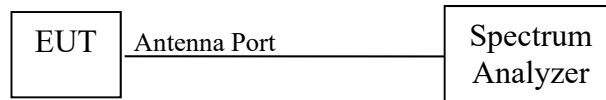
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## 2.4 Conducted Spurious Emissions

### Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



### Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 7.8.8

- RBW: 100 kHz
- VBW: 300 kHz
- Detector: Peak
- Trace: Max hold

### Limitation

15.247(d); In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

### Test equipment used (refer to List of utilized test equipment)

|      |      |   |   |   |   |
|------|------|---|---|---|---|
| SA06 | CL31 | - | - | - | - |
|------|------|---|---|---|---|

### Test results - Complied with requirement

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## Test Data

Test sample: K1  
 Configuration: 1

### Operating mode: Tx (2404 MHz)

| Frequency [GHz] | Spurious level [dBm] | Carrier level [dBm] | 20dB below [dBm] |
|-----------------|----------------------|---------------------|------------------|
| 1.238           | -45.45               | -4.50               | -24.50           |
| 9.903           | -44.98               | -4.50               | -24.50           |

### Operating mode: Tx (2440 MHz)

| Frequency [GHz] | Spurious level [dBm] | Carrier level [dBm] | 20dB below [dBm] |
|-----------------|----------------------|---------------------|------------------|
| 1.220           | -45.94               | -4.87               | -24.87           |
| 4.880           | -46.85               | -4.87               | -24.87           |
| 9.761           | -44.31               | -4.87               | -24.87           |

### Operating mode: Tx (2476 MHz)

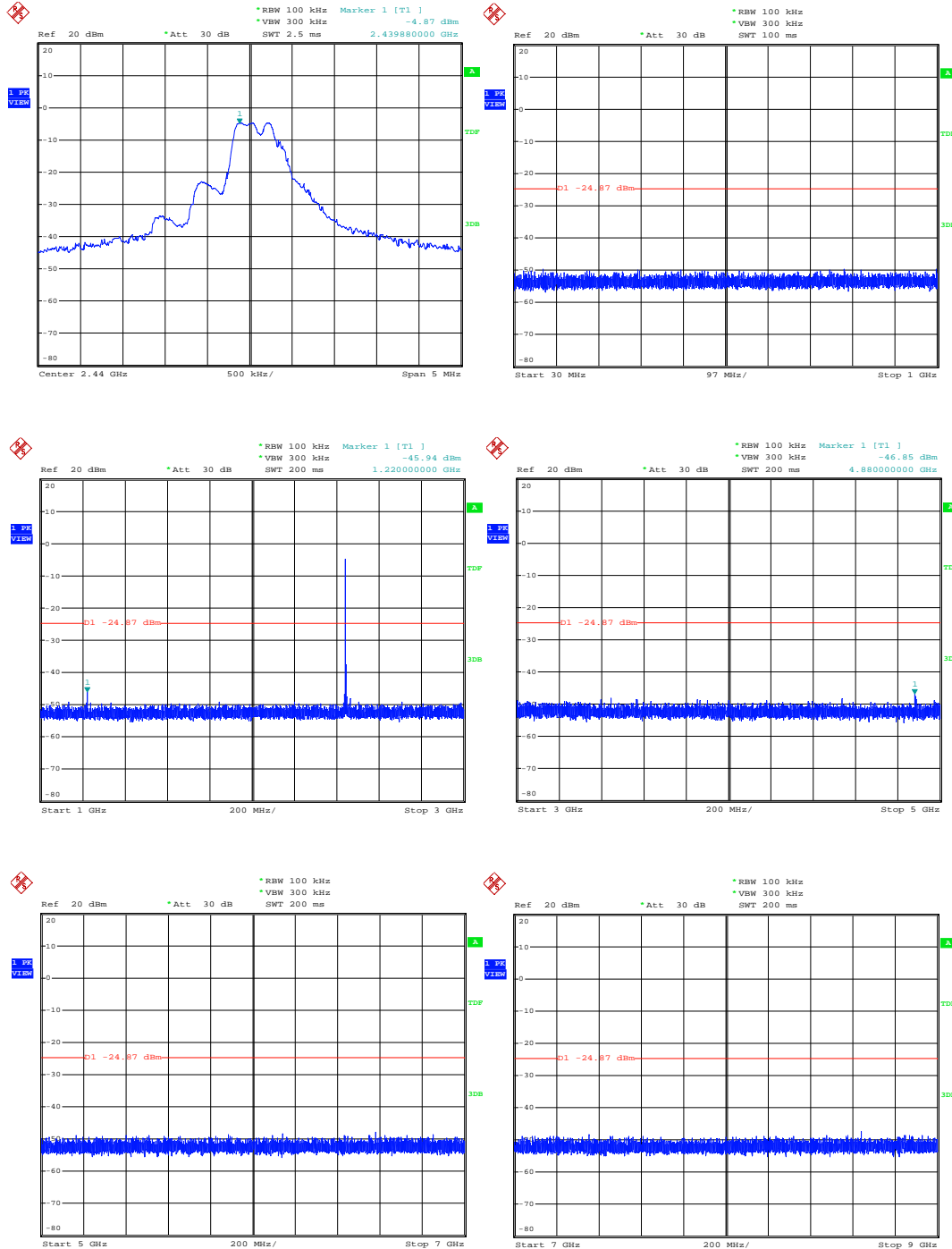
| Frequency [GHz] | Spurious level [dBm] | Carrier level [dBm] | 20dB below [dBm] |
|-----------------|----------------------|---------------------|------------------|
| 1.238           | -46.61               | -4.52               | -24.52           |
| 4.952           | -46.63               | -4.52               | -24.52           |
| 9.903           | -45.67               | -4.52               | -24.52           |

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[Chart]

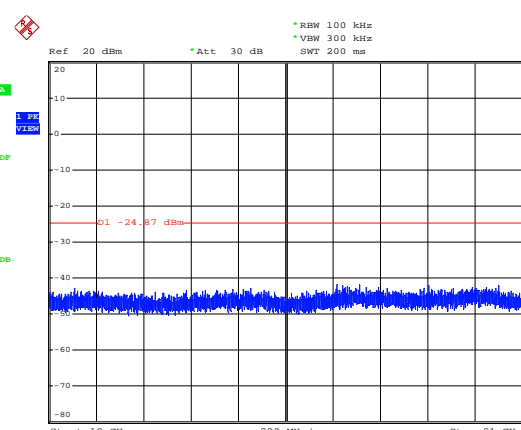
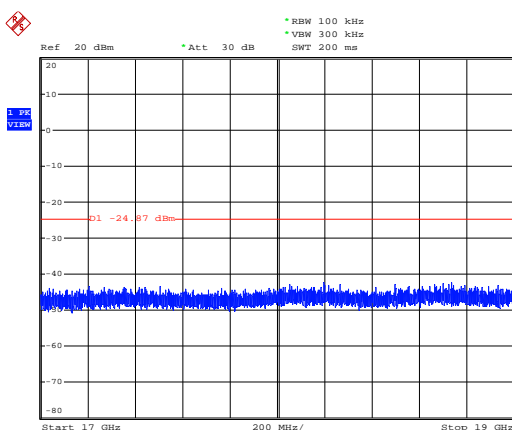
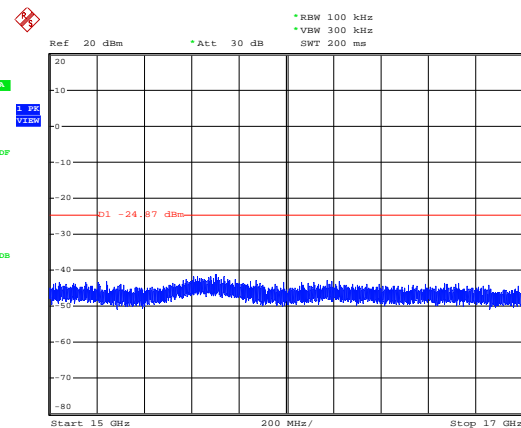
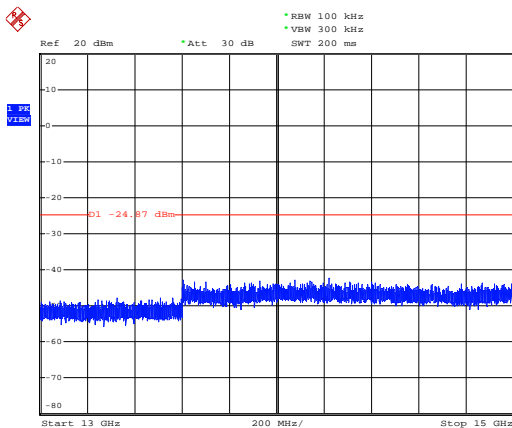
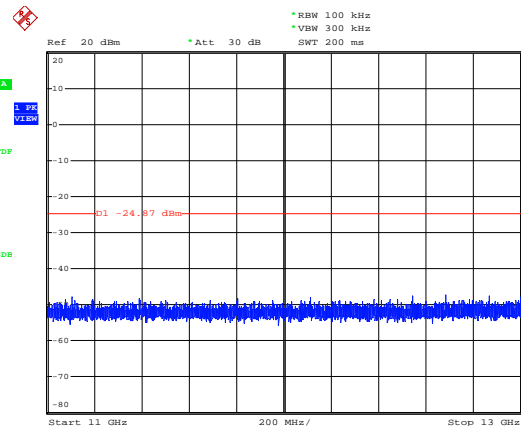
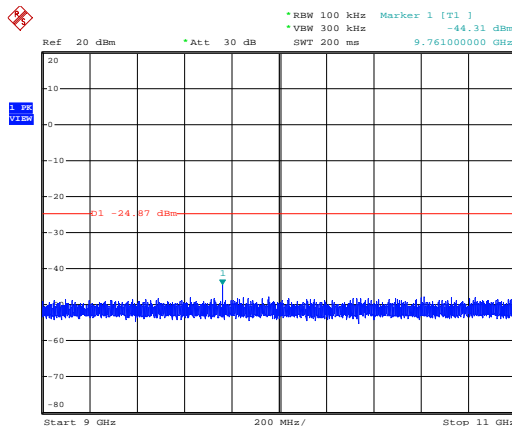
## Tx 2440 MHz



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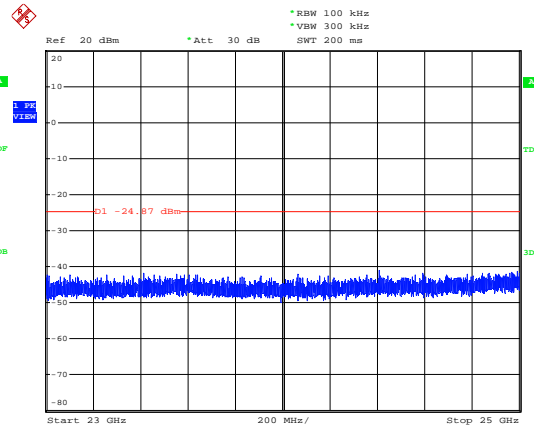
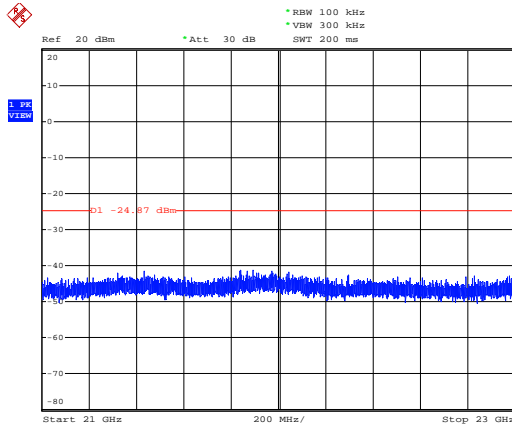
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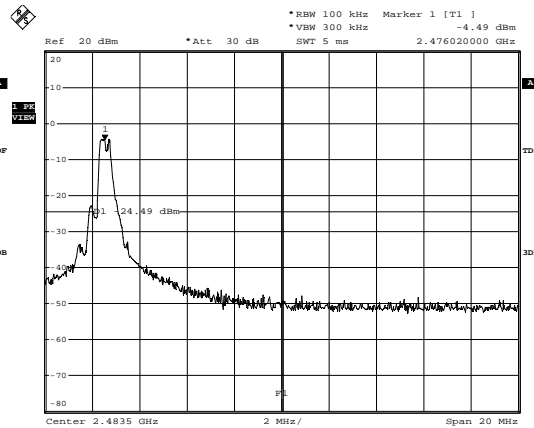
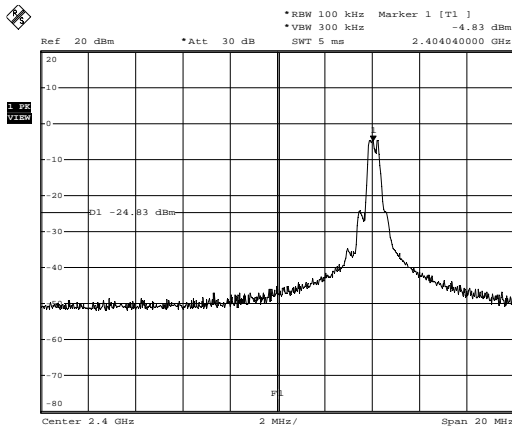


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[Bandedge]



Tested Date: March 15, 2018  
 Humidity: 49 %

Temperature: 21 degC  
 Atmos. Press: 1017 hPa

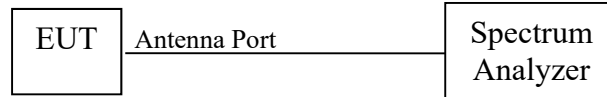
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## 2.5 Power Spectral density

### Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



### Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 11.10

- RBW: 3 kHz
- Span > 1.5 x 6dB BW
- Trace: Max hold
- VBW: 10 kHz
- Detector: Peak

### Limitation

15.247(e); For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### Test equipment used (refer to List of utilized test equipment)

|      |      |   |   |   |   |
|------|------|---|---|---|---|
| SA06 | CL31 | - | - | - | - |
|------|------|---|---|---|---|

### Test results - Complied with requirement

### Test Data

Test sample: K1  
 Configuration: 1

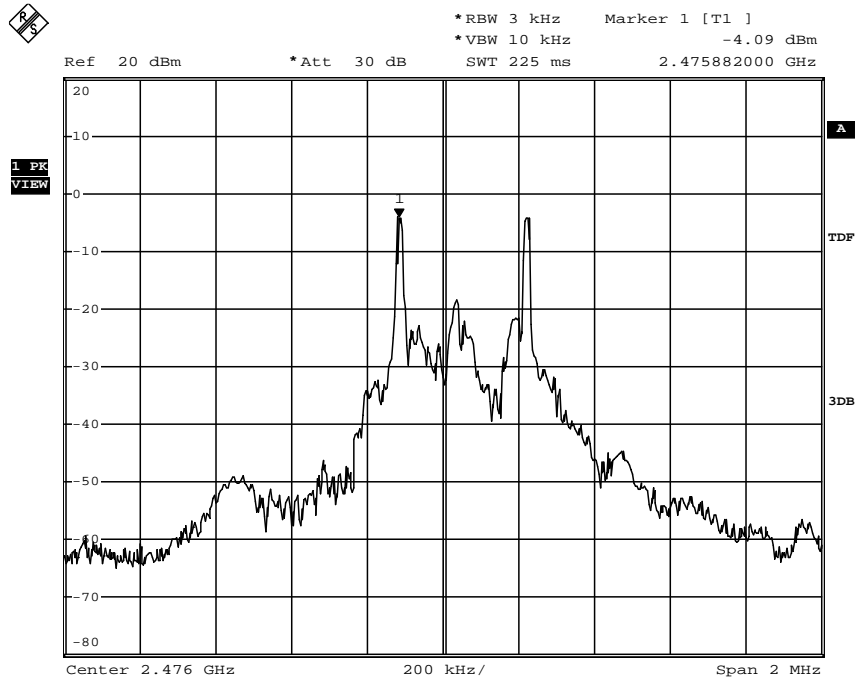
| Transmission Frequency [MHz] | Spectral Density [dBm] |
|------------------------------|------------------------|
| 2404                         | -4.28                  |
| 2440                         | -4.26                  |
| 2476                         | -4.09                  |

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[Chart]

Tx (2476 MHz)



Tested Date: March 15, 2018  
 Humidity: 49 %

Temperature: 21 degC  
 Atmos. Press: 1017 hPa

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## 2.6 Radiated emissions (for restricted frequency band)

### Test setup

Test setup was implemented according to the method of ANSI C63.10 clause 6.

### Test procedure

Measurement procedures were implemented according to the method of ANSI C63.10 clauses 6.  
 The test receiver is set as below

- [9 - 150 kHz]  
RBW: 200 Hz, Detector: QP
- [150 kHz - 30 MHz]  
RBW: 9 kHz, Detector: QP
- [30 - 1000 MHz]  
RBW: 120 kHz, Detector: QP
- [above 1000 MHz]  
RBW: 1 MHz, Detector: Ave/PK

### Applicable rule and limitation

FCC 15.205 restricted bands of operation

Except as shown in paragraph 15.205 (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                 | MHz                   | MHz             | GHz           |
|---------------------|-----------------------|-----------------|---------------|
| 0.090 - 0.110       | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15    |
| 0.490 - 0.510       | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46   |
| 2.1735 - 2.1905     | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75   |
| 4.125 - 4.128       | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5   |
| 4.17725 - 4.17775   | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2     |
| 4.20725 - 4.20775   | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5     |
| 6.215 - 6.218       | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7   |
| 6.26775 - 6.26825   | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4  |
| 6.31175 - 6.31225   | 123 - 138             | 2200 - 2300     | 14.47 - 14.5  |
| 8.291 - 8.294       | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2  |
| 8.362 - 8.366       | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4   |
| 8.37625 - 8.38675   | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12 |
| 8.41425 - 8.41475   | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0   |
| 12.29 - 12.293      | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8   |
| 12.51975 - 12.52025 | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5  |
| 12.57675 - 12.57725 | 322 - 335.4           | 3600 - 4400     | 38.6 -        |

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in FCC 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in FCC 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions.

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FCC 15.209; Field strength limits

| Frequency [MHz] | Field Strength [ $\mu\text{V/m}$ ] | Measurement Distance [m] | Field Strength [ $\text{dB}\mu\text{V/m}$ ] |
|-----------------|------------------------------------|--------------------------|---|
| 30 – 88         | 100                                | 3                        | 40.0  |
| 88 – 216        | 150                                | 3                        | 43.5  |
| 216 – 960       | 200                                | 3                        | 46.0  |
| Above 960       | 500                                | 3                        | 53.9  |

In the emission table above, the tighter limit applies at the band edges.

The emission limits shown in the above table are based on measurements employing a quasi-peak detector.

**Test results - Complied with requirement**

**Test equipment used (refer to List of utilized test equipment)**

|      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| AC01 | CL11 | TR06 | PR21 | BA07 | CL30 | CL38 | PR12 |
| DH06 | CH01 | SH01 | LP06 | AT33 | HPF4 | -    | -    |

**Test software used**

EMI1 Ver. 5.7

**Calculation method**

The Correction Factor and Result are calculated as followings.

$$\text{Correction Factor [dB/m]} = \text{Ant. Factor [dB/m]} + \text{Loss [dB]} - \text{Gain [dB]}$$

$$\text{Result [dB}\mu\text{V/m]} = \text{Reading [dB}\mu\text{V]} + \text{Correction Factor [dB/m]}$$

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## Test Data (9 kHz - 30MHz)

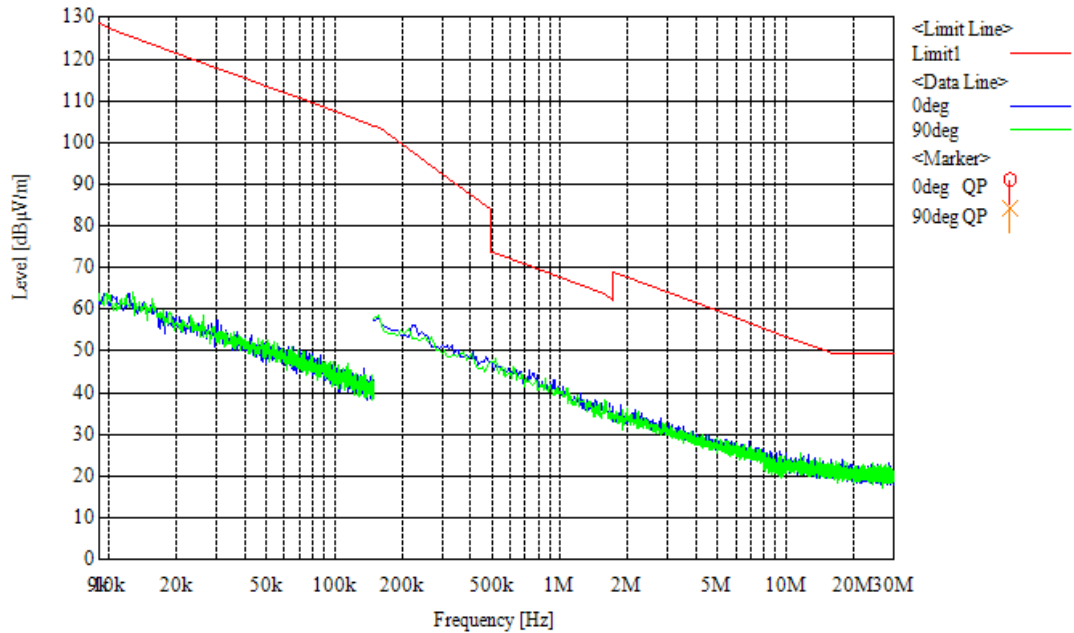
Test sample: K3  
 Configuration: 1  
 Operating mode: 2404MHz, Z-plane (Worst)  
 Test site: Yokohama Laboratory  
 Measurement distance: 3 m

### [Emission level]

| No. | Frequency [MHz] | Reading [dBμV] | Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Ant. |
|-----|-----------------|----------------|---------------|-----------|-----------|-----------------|----------------|-------------|------|
| -   | -               | -              | -             | -         | -         | -               | -              | -           | -    |
| -   | -               | -              | -             | -         | -         | -               | -              | -           | -    |

Note: All other emissions were under noise floor.

### [Chart]



Tested Date: March 8, 2018  
 Humidity: 35 %

Temperature: 18 degC  
 Atmos. Press: 1029 hPa

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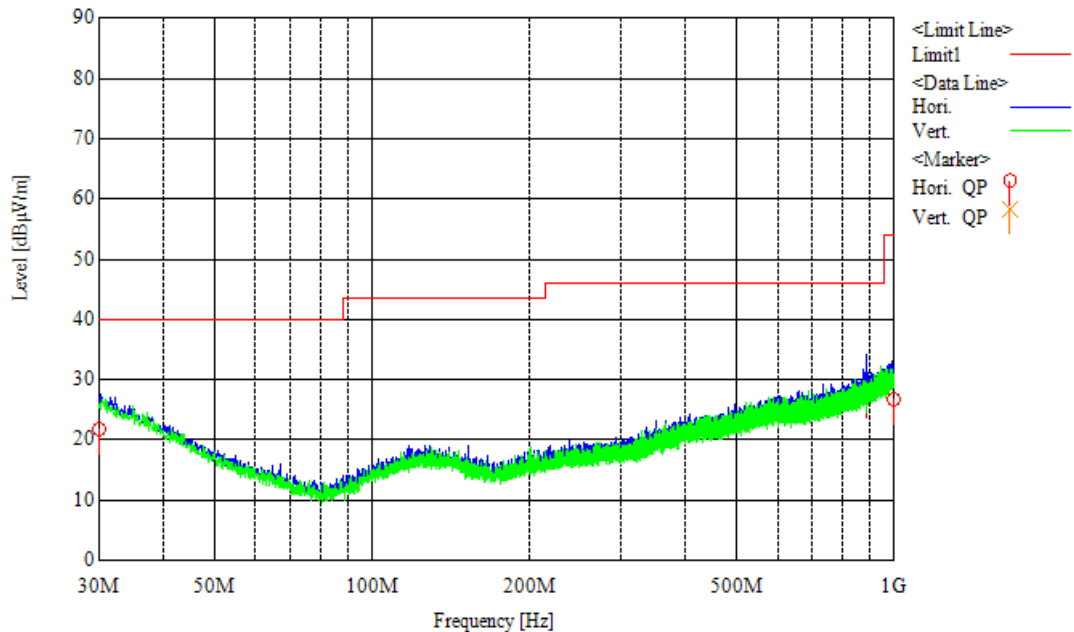
## Test Data (30 - 1000MHz)

Test sample: K3  
 Configuration: 1  
 Operating mode: 2404MHz, Z-plane (Worst)  
 Test site: Yokohama Laboratory  
 Measurement distance: 3 m

### [Emission level]

| No. | Frequency [MHz] | Reading [dBμV] | Factor [dB/m] | Loss [dB]   | Gain [dB]   | Result [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Ant.         |
|-----|-----------------|----------------|---------------|-------------|-------------|-----------------|----------------|-------------|--------------|
| 1   | 30.000          | 23.0           | 22.5          | 6.8         | 30.4        | 21.9            | 40.0           | 18.1        | Hori.        |
| 2   | <b>888.164</b>  | <b>24.6</b>    | <b>20.2</b>   | <b>12.5</b> | <b>29.4</b> | <b>27.9</b>     | <b>46.0</b>    | <b>18.1</b> | <b>Hori.</b> |
| 3   | 1000.000        | 20.7           | 21.4          | 13.0        | 28.3        | 26.8            | 53.9           | 27.1        | Hori.        |

### [Chart]



Tested Date: March 8, 2018  
 Humidity: 35 %

Temperature: 18 degC  
 Atmos. Press: 1029 hPa

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**Test Data (above 1000MHz)**

Test sample: K3  
 Configuration: 1  
 Operating mode: 2404MHz  
 Test site: Yokohama Laboratory  
 Measurement distance: 3 m

[Emission level] X-plane

| No. | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.  |
|-----|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|-------|
| 1   | 4808.000        | 51.6              | 49.8               | 2.7           | 54.3               | 52.5                | 73.9              | 53.9               | 19.6           | 1.4             | Hori. |
| 2   | 4808.000        | 50.5              | 48.7               | 2.7           | 53.2               | 51.4                | 73.9              | 53.9               | 20.7           | 2.5             | Vert. |

[Emission level] Z-plane

| No.      | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.         |
|----------|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|--------------|
| 1        | 4808.000        | 47.8              | 44.3               | 2.7           | 50.5               | 47.0                | 73.9              | 53.9               | 23.4           | 6.9             | Hori.        |
| <b>2</b> | <b>4808.000</b> | <b>52.1</b>       | <b>49.9</b>        | <b>2.7</b>    | <b>54.8</b>        | <b>52.6</b>         | <b>73.9</b>       | <b>53.9</b>        | <b>19.1</b>    | <b>1.3</b>      | <b>Vert.</b> |
| 3        | 12020.000       | 42.7              | 36.5               | 4.5           | 47.2               | 41.0                | 73.9              | 53.9               | 26.7           | 12.9            | Hori.        |

Test sample: K3  
 Configuration: 1  
 Operating mode: 2440MHz  
 Test site: Yokohama Laboratory  
 Measurement distance: 3 m

[Emission level] X-plane

| No.      | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.         |
|----------|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|--------------|
| <b>1</b> | <b>4880.000</b> | <b>50.1</b>       | <b>48.0</b>        | <b>2.9</b>    | <b>53.0</b>        | <b>50.9</b>         | <b>73.9</b>       | <b>53.9</b>        | <b>20.9</b>    | <b>3.0</b>      | <b>Hori.</b> |
| 2        | 4880.000        | 50.2              | 47.8               | 2.9           | 53.1               | 50.7                | 73.9              | 53.9               | 20.8           | 3.2             | Vert.        |

[Emission level] Z-plane

| No. | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.  |
|-----|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|-------|
| 1   | 4880.000        | 46.2              | 42.4               | 2.9           | 49.1               | 45.3                | 73.9              | 53.9               | 24.8           | 8.6             | Hori. |
| 2   | 4880.000        | 50.2              | 47.9               | 2.9           | 53.1               | 50.8                | 73.9              | 53.9               | 20.8           | 3.1             | Vert. |
| 3   | 7320.000        | 44.1              | 38.0               | 7.4           | 51.5               | 45.4                | 73.9              | 53.9               | 22.4           | 8.5             | Vert. |

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Test sample: K3  
 Configuration: 1  
 Operating mode: 2476MHz  
 Test site: Yokohama Laboratory  
 Measurement distance: 3 m

[Emission level] X-plane

| No.      | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.         |
|----------|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|--------------|
| 1        | 4952.000        | 49.0              | 46.5               | 3.4           | 52.4               | 49.9                | 73.9              | 53.9               | 21.5           | 4.0             | Hori.        |
| 2        | 7428.000        | 42.6              | 37.2               | 7.3           | 49.9               | 44.5                | 73.9              | 53.9               | 24.0           | 9.4             | Hori.        |
| <b>3</b> | <b>4952.000</b> | <b>49.4</b>       | <b>47.7</b>        | <b>3.4</b>    | <b>52.8</b>        | <b>51.1</b>         | <b>73.9</b>       | <b>53.9</b>        | <b>21.1</b>    | <b>2.8</b>      | <b>Vert.</b> |

[Emission level] Z-plane

| No. | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.  |
|-----|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|-------|
| 1   | 4952.000        | 45.1              | 40.2               | 3.4           | 48.5               | 43.6                | 73.9              | 53.9               | 25.4           | 10.3            | Hori. |
| 2   | 7428.000        | 43.6              | 36.7               | 7.3           | 50.9               | 44.0                | 73.9              | 53.9               | 23.0           | 9.9             | Hori. |
| 3   | 4952.000        | 50.1              | 47.1               | 3.4           | 53.5               | 50.5                | 73.9              | 53.9               | 20.4           | 3.4             | Vert. |
| 4   | 7428.000        | 45.2              | 40.5               | 7.3           | 52.5               | 47.8                | 73.9              | 53.9               | 21.4           | 6.1             | Vert. |

Tested Date: March 7, 2018  
 Humidity: 36 %

Temperature: 16 degC  
 Atmos. Press: 1034 hPa

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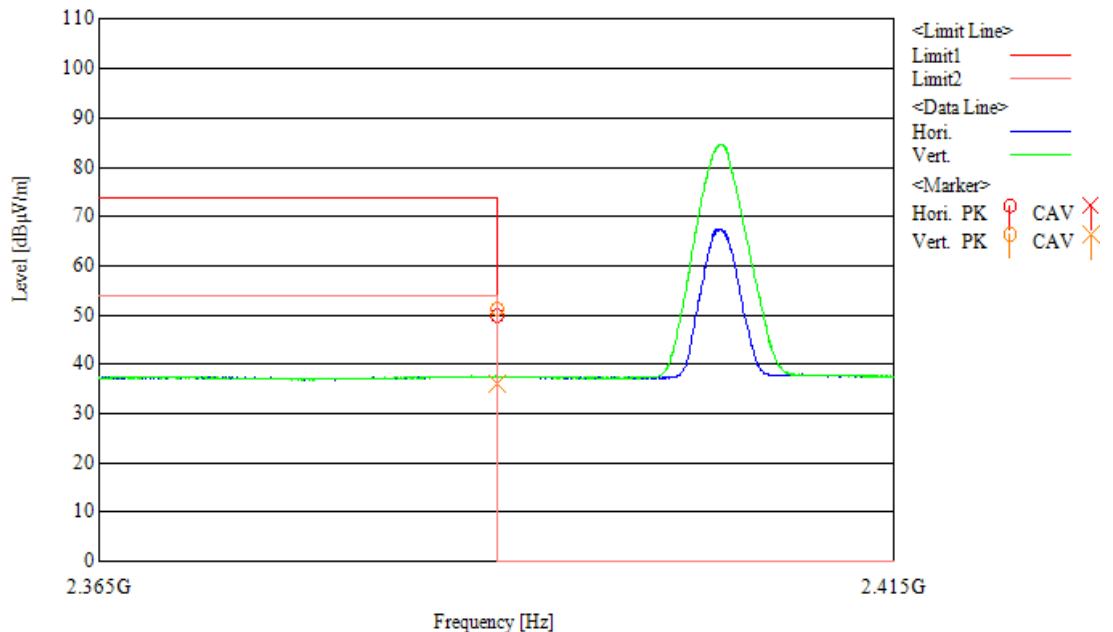
### Restricted bandedge measurement

Test sample: K3  
 Configuration: 1  
 Operating mode: 2404MHz  
 Test site: Yokohama Laboratory  
 Measurement distance: 3 m

#### [Emission level] Z-plane (Worst)

| No. | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.  |
|-----|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|-------|
| 1   | 2390.000        | 44.9              | 31.2               | 5.0           | 49.9               | 36.2                | 73.9              | 53.9               | 24.0           | 17.7            | Hori. |
| 2   | 2390.000        | 46.3              | 31.2               | 5.0           | 51.3               | 36.2                | 73.9              | 53.9               | 22.6           | 17.7            | Vert. |

#### [Chart]



Tested Date: March 7, 2018  
 Humidity: 36 %

Temperature: 16 degC  
 Atmos. Press: 1034 hPa

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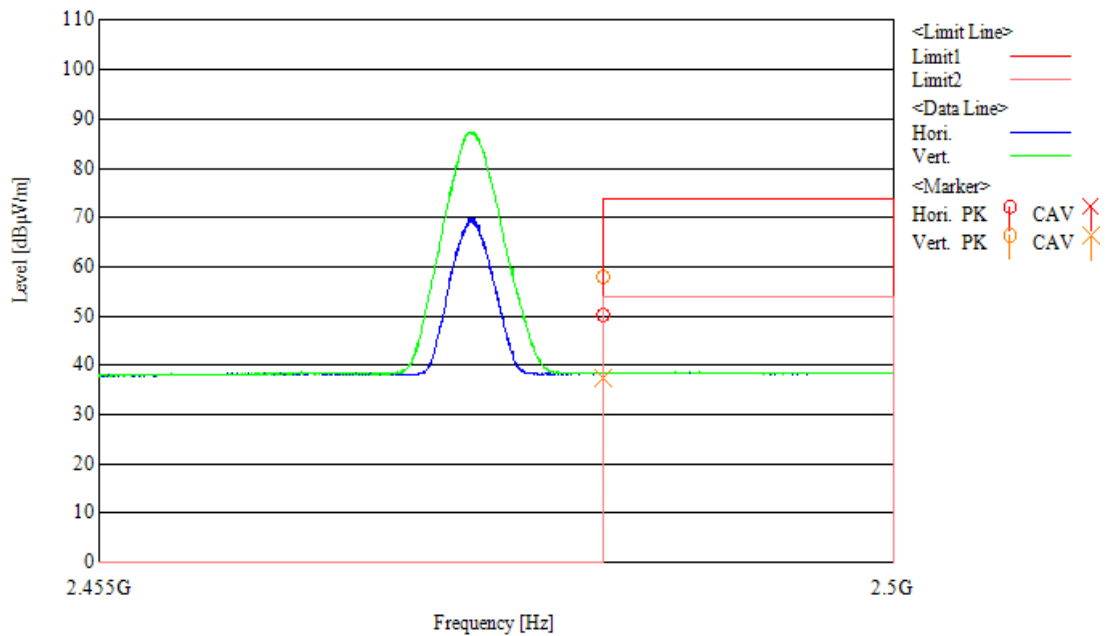
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Test sample: K3  
 Configuration: 1  
 Operating mode: 2476MHz  
 Test site: Yokohama Laboratory  
 Measurement distance: 3 m

[Emission level] Z-plane (Worst)

| No. | Frequency [MHz] | Reading PK [dBμV] | Reading Ave [dBμV] | C.Factor [dB] | Result PK [dBμV/m] | Result Ave [dBμV/m] | Limit PK [dBμV/m] | Limit Ave [dBμV/m] | Margin PK [dB] | Margin Ave [dB] | Ant.  |
|-----|-----------------|-------------------|--------------------|---------------|--------------------|---------------------|-------------------|--------------------|----------------|-----------------|-------|
| 1   | 2483.500        | 44.3              | 31.4               | 6.0           | 50.3               | 37.4                | 73.9              | 53.9               | 23.6           | 16.5            | Hori. |
| 2   | 2483.500        | 51.8              | 31.5               | 6.0           | 57.8               | 37.5                | 73.9              | 53.9               | 16.1           | 16.4            | Vert. |

[Chart]



Tested Date: March 7, 2018      Temperature: 16 degC  
 Humidity: 36 %      Atmos. Press: 1034 hPa

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## 2.7 AC power line conducted emissions

### Test setup

Test setup was implemented according to the method of ANSI C63.10 clause 6.2.

### Test procedure

Measurement procedures were implemented according to the method of ANSI C63.10 clause 6.2.

### Applicable rule and limitation

FCC 15.207; AC power line conducted emissions limits

| Frequency of Emission<br>[MHz] | Conducted emissions Limit [dB $\mu$ V] |            |
|--------------------------------|--|------------|
|                                | Quasi-peak                             | Average    |
| 0.15 - 0.5                     | 66 to 56 *                             | 56 to 46 * |
| 0.5 - 5                        | 56                                     | 46         |
| 5 - 30                         | 60                                     | 50         |

\* Decreases with the logarithm of the frequency. The lower limit applies at the band edges.

### Test equipment used (refer to List of utilized test equipment)

|   |   |   |
|---|---|---|
| - | - | - |
|---|---|---|

### Test software used

EMI Ver. 5.7

### Calculation method

The Correction Factor and Result are calculated as followings.

$$\begin{aligned} \text{Correction Factor [dB]} &= \text{ISN Factor [dB]} + \text{Loss [dB]} \\ \text{Result [dB}\mu\text{V]} &= \text{Reading [dB}\mu\text{V]} + \text{Correction Factor [dB]} \end{aligned}$$

### Test results - Not Applicable

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## Test Data

Configuration: -  
 Operating mode: -  
 Test site: -

| No. | Frequency [MHz] | Reading   |           | C.F. [dB] | Result    |           | Limit     |           | Margin  |         | PHASE |
|-----|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|---------|-------|
|     |                 | QP [dBuV] | AV [dBuV] |           | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dB] | AV [dB] |       |
| -   | -               | -         | -         | -         | -         | -         | -         | -         | -       | -       | -     |
| -   | -               | -         | -         | -         | -         | -         | -         | -         | -       | -       | -     |
| -   | -               | -         | -         | -         | -         | -         | -         | -         | -       | -       | -     |
| -   | -               | -         | -         | -         | -         | -         | -         | -         | -       | -       | -     |
| -   | -               | -         | -         | -         | -         | -         | -         | -         | -       | -       | -     |
| -   | -               | -         | -         | -         | -         | -         | -         | -         | -       | -       | -     |
| -   | -               | -         | -         | -         | -         | -         | -         | -         | -       | -       | -     |

[Chart]

Tested Date: -  
 Humidity: - %

Temperature: - degC  
 Atmos. Press: - hPa

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## 4 List of utilized test equipment / calibration

| RFT ID No. | Kind of Equipment and Precision   | Manufacturer         | Model No.     | Serial Number | Calibration Date | Calibrated until |
|------------|-----------------------------------|----------------------|---------------|---------------|------------------|------------------|
| AC01(EM)   | Anechoic Chamber (1st test room)  | JSE                  | 203397C       | -             | 2018/04/14       | 2019/04/30       |
| AC01(EG)   | Anechoic Chamber (1st test room)  | JSE                  | 203397C       | -             | 2018/03/21       | 2019/03/31       |
| AT33       | Attenuator 10dB 26GHz             | INMET                | 26A-10        | -             | 2017/07/31       | 2018/07/31       |
| BA07       | Biological Antenna                | TESEQ                | CBL6143A      | 26670         | 2017/12/05       | 2018/12/31       |
| CH01       | Conical Horn Antenna (12-18GHz)   | ETS-Lindgren         | 3163-05       | 00126641      | 2017/03/29       | 2019/03/31       |
| CL11       | RF Cable for RE                   | RFT                  | -             | -             | 2018/03/26       | 2019/03/31       |
| CL30       | RF Cable 5 m                      | SUHNER               | SUCOFLEX104PE | MY3599        | 2018/01/29       | 2019/01/31       |
| CL31       | RF Cable 1 m                      | Junkosha             | MWX221        | 1303S118      | 2018/01/29       | 2019/01/31       |
| CL38       | RF Cable 2 m                      | Junkosha             | MWX221        | 1603S626      | 2018/01/29       | 2019/01/31       |
| DH06       | DRG Horn Antenna                  | A.H. Systems         | SAS-571       | 1339          | 2016/06/01       | 2018/06/30       |
| HPF4       | High Pass Filter (3000MHz)        | Tokyo KEIKI          | TF23LCCZGA    | 9001          | 2017/11/08       | 2018/11/30       |
| LP06       | Loop Antenna                      | ETS-Lindgren         | 6502          | 00164299      | 2017/05/25       | 2018/05/31       |
| PR12       | Pre. Amplifier (1-26G)            | Agilent Technologies | 8449B         | 3008A02513    | 2018/01/29       | 2019/01/31       |
| PR21       | Pre. Amplifier                    | Anritsu              | MH648A        | 6200467119    | 2017/12/04       | 2018/12/31       |
| SA06       | Spectrum Analyzer (F/W: 4.50 SP4) | Rohde & Schwarz      | FSP40         | 100071        | 2017/12/05       | 2018/12/31       |
| SH01       | Standard Horn Antenna (18-26G)    | A.H. Systems         | SAS-572       | 208           | 2016/07/05       | 2018/07/31       |
| TR06       | Test Receiver (F/W : 4.73 SP4)    | Rohde & Schwarz      | ESU26         | 100002        | 2017/10/17       | 2018/10/31       |

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

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