



FCC RF Test Report

APPLICANT : Nokia Shanghai Bell Co., Ltd.
EQUIPMENT : Nokia FastMile 5G Receiver High Gain
BRAND NAME : Nokia
MODEL NAME : 5G16-A
FCC ID : 2ADZR5G16A
STANDARD : 47 CFR Part 2, 22(H), 24(E), 27(F), 27(L), 27(H),
27(M), 27(N), 96
CLASSIFICATION : PCS Licensed Transmitter (PCB)
TEST DATE(S) : May 30, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



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SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|----------------|---|---|---|-------------|---|
| - | §2.1046 | Conducted Output Power (Band 2) (Band 26) (Band 12) (Band 13) (Band 71) (Band 4) (Band 66) (Band 48) | - | Report Only | 1 |
| - | §2.1046 §27.50(h)(2) | Conducted Output Power (Band 7) | < 2Watt | PASS | 1 |
| - | §22.913(a)(5) | Effective Radiated Power (Band 26) | ERP < 7 Watt | PASS | 1 |
| - | §24.232(c) | Equivalent Isotropic Radiated Power (Band 2) | EIRP < 2Watt | | 1 |
| - | §27.50(b)(2) §27.50(c)(1) | Effective Radiated Power (Band 12) (Band 13) | ERP < 1000 Watt | | 1 |
| - | §27.50(c)(10) | Effective Radiated Power (Band 71) | ERP < 3 Watt | | 1 |
| - | §27.50(d)(4) | Equivalent Isotropic Radiated Power (Band 4) (Band 66) | EIRP < 1Watt | | 1 |
| - | §96.41 | Maximum E.I.R.P (Band 48) Maximum Power Spectral Density | EIRP < 47 dBm/10MHz PSD < 37 dBm/MHz | | 1 |
| - | §24.232(d) | Peak-to-Average Ratio | <13 dB | | PASS |
| - | §2.1049 | Occupied Bandwidth | - | Report Only | 1 |
| - | §2.1051 §22.917(a) §24.238(a) §27.53(c)(2)(4) §27.53(g) §27.53(h) §27.53(m)(2)(v) | Conducted Band Edge Measurement (Band 2) (Band 4) (Band 12) (Band 13) (Band 71) (Band 26) (Band 66) (Band 7) | < 43+10log ₁₀ (P[Watts]) | PASS | 1 |
| - | §2.1051 §96.41 | Conducted Band Edge Measurement (Band 48) | §96.41 | | |
| - | §2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h) §27.53(m)(2)(v) | Conducted Spurious Emission (Band 2) (Band 4) (Band 12) (Band 13) (Band 71) (Band 26) (Band 66) (Band 7) | < 43+10log ₁₀ (P[Watts]) | PASS | 1 |
| - | §2.1051 §96.41 | Conducted Spurious Emission (Band 48) | -40dBm/MHz | | |
| - | §2.1055 §22.355 | Frequency Stability Temperature & Voltage | < 2.5 ppm for Part 22 | PASS | 1 |
| - | §2.1055 §24.235 §27.54 | | Within Authorized Band | | |
| 3.4 | §2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(f) §27.53(g) §27.53(h) §27.53(m)(2)(v) | Radiated Spurious Emission (Band 2) (Band 4) (Band 12) (Band 13) (Band 71) (Band 26) (Band 66) (Band 7) | < 43+10log ₁₀ (P[Watts]) | PASS | Under limit 9.14 dB at 7236.00 MHz |
| | §2.1051 §96.41 | Radiated Spurious Emission (Band 48) | -40dBm/MHz | | |

Remark 1 : The test items of inter band CA were cover by LTE single carrier due to the CA power is reduced according to 3GPP MPR.



1 General Description

1.1 Applicant

Nokia Shanghai Bell Co., Ltd.

388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

1.2 Manufacturer

Nokia Solutions and Networks Oy

Karakaari 7, 02610 Espoo, Finland

1.3 Product Feature of Equipment Under Test

| Product Feature | |
|-----------------|--|
| Equipment | Nokia FastMile 5G Receiver High Gain |
| Brand Name | Nokia |
| Model Name | 5G16-A |
| FCC ID | 2ADZR5G16A |
| IMEI Code | Conducted: 355231280005192 Radiation: 355231280005010 |
| HW Version | 3TG02369Axxx, x:A~Z |
| SW Version | 5GReceiver-HG-2_D230200B31T0001E0147 |
| EUT Stage | Identical Prototype |

1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification | | | | | | | | | | | | | | | | | | | | | |
|---|--|--------|---------|---------|---------|---------|-------|--------|--------|---------|---------|-------|--------|--------|---------|--|-------|--------|--------|---------|--|
| Tx Frequency | LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 26 : 824 MHz ~ 849 MHz LTE Band 48 : 3550 MHz ~ 3700 MHz LTE Band 66 : 1710 MHz ~ 1755 MHz LTE Band 71: 663 MHz ~ 698 MHz | | | | | | | | | | | | | | | | | | | | |
| Rx Frequency | LTE Band 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 7 : 2620 MHz ~ 2690 MHz LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 13 : 746 MHz ~ 756 MHz LTE Band 26 : 824 MHz ~ 849 MHz LTE Band 48 : 3550 MHz ~ 3700 MHz LTE Band 66 : 2110 MHz ~ 2155 MHz LTE Band 71: 617 MHz ~ 652 MHz | | | | | | | | | | | | | | | | | | | | |
| Uplink CA Bands Under test | <table border="1"> <tbody> <tr> <td>2A-4A</td> <td>2A-12A</td> <td>2A-66A</td> <td>12A-66A</td> <td>48A-71A</td> </tr> <tr> <td>4A-2A</td> <td>12A-2A</td> <td>66A-2A</td> <td>66A-12A</td> <td>71A-48A</td> </tr> <tr> <td>2A-7A</td> <td>2A-13A</td> <td>7A-26A</td> <td>66A-71A</td> <td></td> </tr> <tr> <td>7A-2A</td> <td>13A-2A</td> <td>26A-7A</td> <td>71A-66A</td> <td></td> </tr> </tbody> </table> | 2A-4A | 2A-12A | 2A-66A | 12A-66A | 48A-71A | 4A-2A | 12A-2A | 66A-2A | 66A-12A | 71A-48A | 2A-7A | 2A-13A | 7A-26A | 66A-71A | | 7A-2A | 13A-2A | 26A-7A | 71A-66A | |
| 2A-4A | 2A-12A | 2A-66A | 12A-66A | 48A-71A | | | | | | | | | | | | | | | | | |
| 4A-2A | 12A-2A | 66A-2A | 66A-12A | 71A-48A | | | | | | | | | | | | | | | | | |
| 2A-7A | 2A-13A | 7A-26A | 66A-71A | | | | | | | | | | | | | | | | | | |
| 7A-2A | 13A-2A | 26A-7A | 71A-66A | | | | | | | | | | | | | | | | | | |



| | |
|--------------------|-------------------------------|
| Type of Modulation | QPSK / 16QAM / 64QAM / 256QAM |
|--------------------|-------------------------------|

Note: For all uplink inter-band CA combination, only the worst combination is tested and reflected in the report.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

| | | | |
|--------------------|--|---------------------|--------------------------------|
| Test Firm | Sporton International Inc. (Kunshan) | | |
| Test Site Location | No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 | | |
| Test Site No. | Sporton Site No. | FCC Designation No. | FCC Test Firm Registration No. |
| | 03CH04-KS | CN1257 | 314309 |

1.7 Test Software

| Item | Site | Manufacture | Name | Version |
|------|-----------|-------------|------|---------------|
| 1. | 03CH04-KS | AUDIX | E3 | 6.2009-8-24al |



1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2, 22(H), 24(E), 27(F), 27(L), 27(H), 27(M), 27(N), 96
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

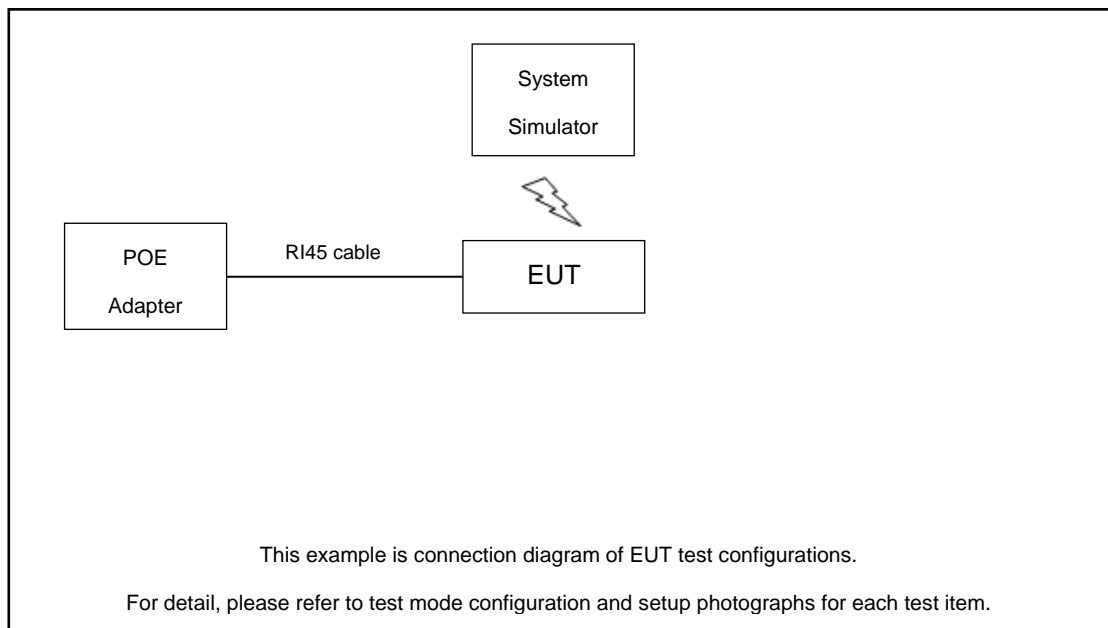
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (Y-Plane)

| Test Items | Band | Bandwidth (MHz) | | | | | | Modulation | | | | RB # | | | Test Channel | | | | |
|----------------------------|--|-----------------|---|---|----|----|----|------------|-------|-------|--------|------|------|------|--------------|---|---|---|--|
| | | 1.4 | 3 | 5 | 10 | 15 | 20 | QPSK | 16QAM | 64QAM | 256QAM | 1 | Half | Full | L | M | H | | |
| Radiated Spurious Emission | 4A-2A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 7A-2A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 12A-2A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 13A-2A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 66A-2A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 7A-26A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 12A-66A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 71A-66A | Worst Case | | | | | | | | | | | | | | | | v | |
| | 48A-71A | Worst Case | | | | | | | | | | | | | | | | v | |
| Note | <ol style="list-style-type: none"> 1. The mark "v" means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. | | | | | | | | | | | | | | | | | | |

2.2 Connection Diagram of Test System





2.3 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable | Power Cord |
|------|------------------|------------|-----------|--------|------------|-------------------|
| 1. | LTE Base Station | Anritsu | MT8821C | N/A | N/A | Unshielded, 1.8 m |

2.4 Frequency List of Low/Middle/High Channels

| LTE Band 2 Channel and Frequency List | | | | |
|---------------------------------------|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 18700 | 18900 | 19100 |
| | Frequency | 1860 | 1880 | 1900 |
| 15 | Channel | 18675 | 18900 | 19125 |
| | Frequency | 1857.5 | 1880 | 1902.5 |
| 10 | Channel | 18650 | 18900 | 19150 |
| | Frequency | 1855 | 1880 | 1905 |
| 5 | Channel | 18625 | 18900 | 19175 |
| | Frequency | 1852.5 | 1880 | 1907.5 |
| 3 | Channel | 18615 | 18900 | 19185 |
| | Frequency | 1851.5 | 1880 | 1908.5 |
| 1.4 | Channel | 18607 | 18900 | 19193 |
| | Frequency | 1850.7 | 1880 | 1909.3 |

| LTE Band 4 Channel and Frequency List | | | | |
|---------------------------------------|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 20050 | 20175 | 20300 |
| | Frequency | 1720 | 1732.5 | 1745 |
| 15 | Channel | 20025 | 20175 | 20325 |
| | Frequency | 1717.5 | 1732.5 | 1747.5 |
| 10 | Channel | 20000 | 20175 | 20350 |
| | Frequency | 1715 | 1732.5 | 1750 |
| 5 | Channel | 19975 | 20175 | 20375 |
| | Frequency | 1712.5 | 1732.5 | 1752.5 |
| 3 | Channel | 19965 | 20175 | 20385 |
| | Frequency | 1711.5 | 1732.5 | 1753.5 |
| 1.4 | Channel | 19957 | 20175 | 20393 |
| | Frequency | 1710.7 | 1732.5 | 1754.3 |



| LTE Band 7 Channel and Frequency List | | | | |
|---------------------------------------|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 20850 | 21100 | 21350 |
| | Frequency | 2510 | 2535 | 2560 |
| 15 | Channel | 20825 | 21100 | 21375 |
| | Frequency | 2507.5 | 2535 | 2562.5 |
| 10 | Channel | 20800 | 21100 | 21400 |
| | Frequency | 2505 | 2535 | 2565 |
| 5 | Channel | 20775 | 21100 | 21425 |
| | Frequency | 2502.5 | 2535 | 2567.5 |

| LTE Band 12 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 10 | Channel | 23060 | 23095 | 23130 |
| | Frequency | 704 | 707.5 | 711 |
| 5 | Channel | 23035 | 23095 | 23155 |
| | Frequency | 701.5 | 707.5 | 713.5 |
| 3 | Channel | 23025 | 23095 | 23165 |
| | Frequency | 700.5 | 707.5 | 714.5 |
| 1.4 | Channel | 23017 | 23095 | 23173 |
| | Frequency | 699.7 | 707.5 | 715.3 |

| LTE Band 13 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 10 | Channel | - | 23230 | - |
| | Frequency | - | 782 | - |
| 5 | Channel | 23205 | 23230 | 23255 |
| | Frequency | 779.5 | 782 | 784.5 |



| LTE Band 26 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 15 | Channel | 26865 | 26915 | 26965 |
| | Frequency | 831.5 | 836.5 | 841.5 |
| 10 | Channel | 26840 | 26915 | 26990 |
| | Frequency | 829 | 836.5 | 844 |
| 5 | Channel | 26815 | 26915 | 27015 |
| | Frequency | 826.5 | 836.5 | 846.5 |
| 3 | Channel | 26805 | 26915 | 27025 |
| | Frequency | 825.5 | 836.5 | 847.5 |
| 1.4 | Channel | 26797 | 26915 | 27033 |
| | Frequency | 824.7 | 836.5 | 848.3 |

| LTE Band 48 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 55340 | 55990 | 56640 |
| | Frequency | 3560.0 | 3625.0 | 3690.0 |
| 15 | Channel | 55315 | 55990 | 56665 |
| | Frequency | 3557.5 | 3625.0 | 3692.5 |
| 10 | Channel | 55290 | 55990 | 56690 |
| | Frequency | 3555.0 | 3625.0 | 3695.0 |
| 5 | Channel | 55265 | 55990 | 56715 |
| | Frequency | 3552.5 | 3625.0 | 3697.5 |



| LTE Band 66 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 132072 | 132197 | 132322 |
| | Frequency | 1720 | 1732.5 | 1745 |
| 15 | Channel | 132047 | 132197 | 132347 |
| | Frequency | 1717.5 | 1732.5 | 1747.5 |
| 10 | Channel | 132022 | 132197 | 132372 |
| | Frequency | 1715 | 1732.5 | 1750 |
| 5 | Channel | 131997 | 132197 | 132397 |
| | Frequency | 1712.5 | 1732.5 | 1752.5 |
| 3 | Channel | 131987 | 132197 | 132407 |
| | Frequency | 1711.5 | 1732.5 | 1753.5 |
| 1.4 | Channel | 131979 | 132197 | 132415 |
| | Frequency | 1710.7 | 1732.5 | 1754.3 |

| LTE Band 71 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 133222 | 133322 | 133372 |
| | Frequency | 673.0 | 680.5 | 688.0 |
| 15 | Channel | 133197 | 133297 | 133397 |
| | Frequency | 670.5 | 680.5 | 690.5 |
| 10 | Channel | 133172 | 133272 | 133422 |
| | Frequency | 668.0 | 678.0 | 693.0 |
| 5 | Channel | 133147 | 133247 | 133447 |
| | Frequency | 665.5 | 675.5 | 695.5 |

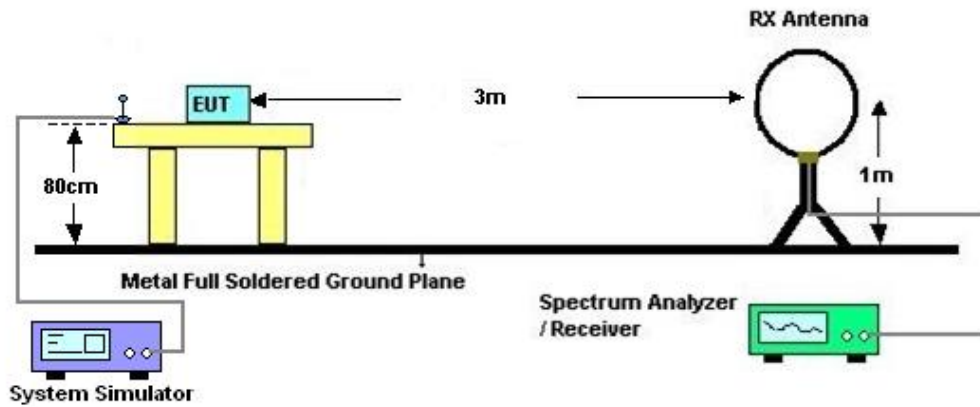
3 Radiated Test Items

3.1 Measuring Instruments

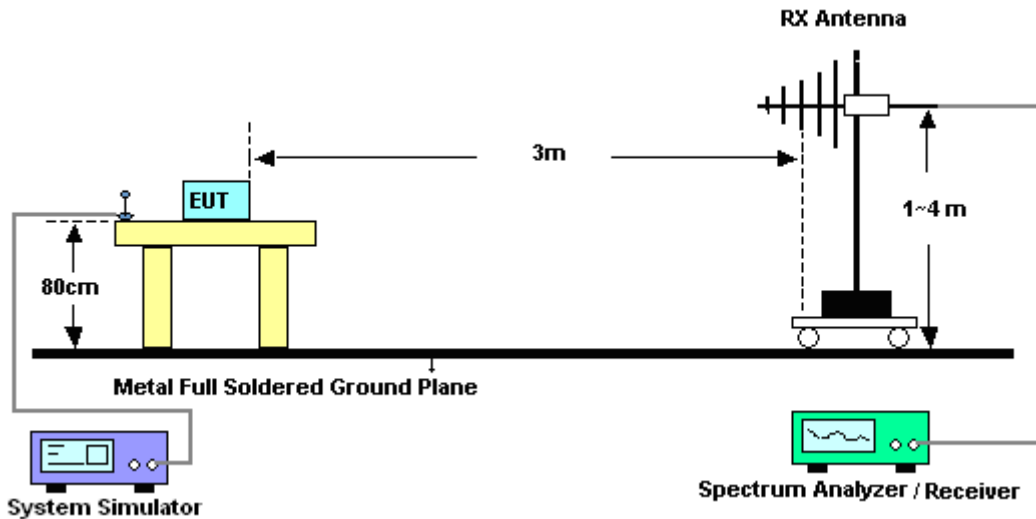
See list of measuring instruments of this test report.

3.2 Test Setup

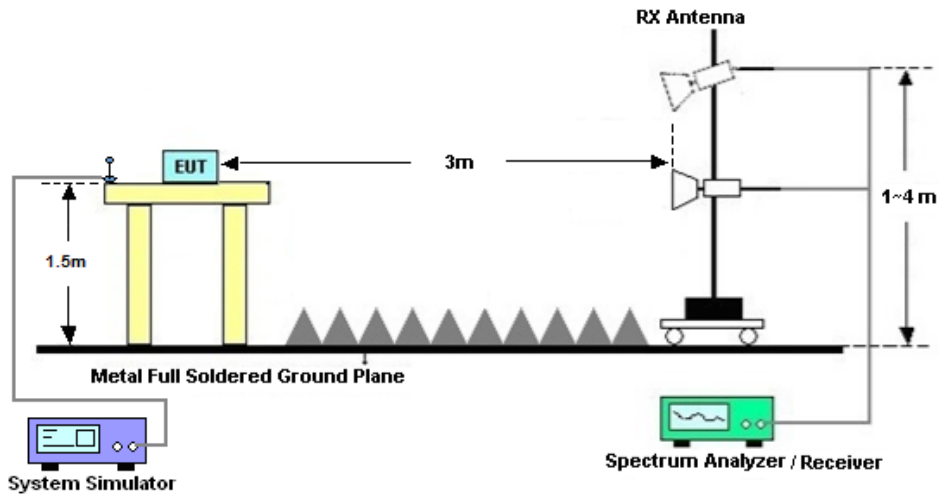
3.2.1 For radiated test below 30MHz



3.2.2 For radiated test from 30MHz to 1GHz



3.2.3 For radiated test above 1GHz



3.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix A.



3.4 Radiated Spurious Emission

3.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26.

For LTE Band 2, 4, 7, 12, 26, 66, 71

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

For LTE Band 48

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40 dBm / MHz.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. $EIRP (dBm) = S.G. Power - Tx Cable Loss + Tx Antenna Gain$
11. $ERP (dBm) = EIRP - 2.15$



12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

For LTE Band 2, 4, 7, 12, 13, 26, 66, 71:

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm.}$$

For Band 48:

The limit line is -40dBm/MHz



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-----------------------|--------------|-------------|------------|-------------------|------------------|--------------|---------------|-----------------------|
| EXA Spectrum Analyzer | Keysight | N9010B | MY57471079 | 10Hz-44G,MAX 30dB | Oct. 12, 2022 | May 30, 2023 | Oct. 11, 2023 | Radiation (03CH04-KS) |
| Loop Antenna | R&S | HFH2-Z2 | 100321 | 9kHz~30MHz | Oct. 16, 2022 | May 30, 2023 | Oct. 15, 2023 | Radiation (03CH04-KS) |
| Bilog Antenna | TeseQ | CBL6111D | 49922 | 30MHz-1GHz | Apr. 09, 2023 | May 30, 2023 | Apr. 08, 2024 | Radiation (03CH04-KS) |
| Horn Antenna | Schwarzbeck | BBHA9120D | 1284 | 1GHz~18GHz | Oct. 16, 2022 | May 30, 2023 | Oct. 15, 2023 | Radiation (03CH04-KS) |
| SHF-EHF Horn | Com-power | AH-840 | 101070 | 18GHz~40GHz | Jan. 08, 2023 | May 30, 2023 | Jan. 07, 2024 | Radiation (03CH04-KS) |
| Amplifier | SONOMA | 310N | 380827 | 9KHz-1GHz | Jul. 11, 2022 | May 30, 2023 | Jul. 10, 2023 | Radiation (03CH04-KS) |
| Amplifier | MITEQ | EM18G40G GA | 060728 | 18~40GHz | Jan. 05, 2023 | May 30, 2023 | Jan. 04, 2024 | Radiation (03CH04-KS) |
| high gain Amplifier | EM | EM01G18G A | 060840 | 1Ghz-18Ghz | Oct. 12, 2022 | May 30, 2023 | Oct. 11, 2023 | Radiation (03CH04-KS) |
| Amplifier | Agilent | 8449B | 3008A02370 | 1Ghz-18Ghz | Oct. 12, 2022 | May 30, 2023 | Oct. 11, 2023 | Radiation (03CH04-KS) |
| AC Power Source | Chroma | 61601 | F104090004 | N/A | NCR | May 30, 2023 | NCR | Radiation (03CH04-KS) |
| Turn Table | ChamPro | EM 1000-T | 060762-T | 0~360 degree | NCR | May 30, 2023 | NCR | Radiation (03CH04-KS) |
| Antenna Mast | ChamPro | EM 1000-A | 060762-A | 1 m~4 m | NCR | May 30, 2023 | NCR | Radiation (03CH04-KS) |

NCR: No Calibration Required



5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|---------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.82 dB |
|---|---------|

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

| | |
|---|---------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.56 dB |
|---|---------|

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

| | |
|---|--------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.54dB |
|---|--------|



Appendix A. Test Results of Radiated Test

Radiated Spurious Emission

| | | | |
|-----------------|---------|---------------------|---------|
| Test Engineer : | Carl Ni | Temperature : | 23~25°C |
| | | Relative Humidity : | 41~42% |

Note: Pre-scanned harmonic for the different antennas, we choose the worst antenna mode to test.

| ULCA_4A-2A (ANT0+1) | | | | | | | | |
|---|-------------------|--------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B4 BW 20MHz Middle 1RB0,QPSK | 3450 | -56.28 | -13 | -43.28 | -68.54 | 2.64 | 14.90 | H |
| | 5175 | -56.79 | -13 | -43.79 | -68.65 | 2.94 | 14.80 | H |
| | 6900 | -53.15 | -13 | -40.15 | -62.92 | 3.39 | 13.16 | H |
| | 3450 | -57.79 | -13 | -44.79 | -70.05 | 2.64 | 14.90 | V |
| | 5175 | -56.56 | -13 | -43.56 | -68.42 | 2.94 | 14.80 | V |
| | 6900 | -55.78 | -13 | -42.78 | -65.55 | 3.39 | 13.16 | V |
| LTE B2 BW 20MHz Middle 1RB0,QPSK | 3735 | -58.9 | -13 | -45.90 | -69.64 | 2.604 | 13.34 | H |
| | 5610 | -46.38 | -13 | -33.38 | -56.89 | 3.011 | 13.52 | H |
| | 7485 | -52.07 | -13 | -39.07 | -62.27 | 3.271 | 13.47 | H |
| | 3735 | -58.72 | -13 | -45.72 | -69.46 | 2.604 | 13.34 | V |
| | 5610 | -50.57 | -13 | -37.57 | -61.08 | 3.011 | 13.52 | V |
| | 7485 | -53.87 | -13 | -40.87 | -64.07 | 3.271 | 13.47 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| ULCA_7A-2A (ANT0+1) | | | | | | | | |
|---|-------------------|--------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B7 BW 20MHz Middle 1RB0,QPSK | 5050 | -32.59 | -13 | -19.59 | -39.56 | 1.58 | 10.70 | H |
| | 7580 | -32.53 | -13 | -19.53 | -40.78 | 2.102 | 12.50 | H |
| | 10100 | -54.28 | -13 | -41.28 | -63.17 | 2.856 | 13.90 | H |
| | 12630 | -48.86 | -13 | -35.86 | -57.11 | 2.102 | 12.50 | H |
| | 5050 | -32.15 | -13 | -19.15 | -39.12 | 1.58 | 10.70 | V |
| | 7580 | -35.02 | -13 | -22.02 | -43.27 | 2.10 | 12.50 | V |
| | 10100 | -60.93 | -13 | -47.93 | -69.82 | 2.86 | 13.90 | V |
| | 12630 | -50.43 | -13 | -37.43 | -60.80 | 4.77 | 15.14 | V |
| LTE B2 BW 20MHz Middle 1RB0,QPSK | 3740 | -59.22 | -13 | -46.22 | -71.48 | 2.64 | 14.90 | H |
| | 5615 | -45.11 | -13 | -32.11 | -56.97 | 2.94 | 14.80 | H |
| | 7485 | -48.57 | -13 | -35.57 | -58.34 | 3.39 | 13.16 | H |
| | 3740 | -59.3 | -13 | -46.30 | -71.56 | 2.64 | 14.90 | V |
| | 5615 | -44.08 | -13 | -31.08 | -55.94 | 2.94 | 14.80 | V |
| | 7485 | -47.18 | -13 | -34.18 | -56.95 | 3.39 | 13.16 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



| ULCA_12A-2A (ANT5+0) | | | | | | | | |
|--|-------------------|------------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP/EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B12 BW 10MHz Middle 1RB0,QPSK | 1406 | -60.36 | -13 | -47.36 | -62.99 | 1.09 | 5.87 | H |
| | 2108 | -61.26 | -13 | -48.26 | -63.66 | 1.37 | 5.92 | H |
| | 2812 | -58.19 | -13 | -45.19 | -62.08 | 1.64 | 7.68 | H |
| | 1406 | -60.93 | -13 | -47.93 | -63.56 | 1.09 | 5.87 | V |
| | 2108 | -60 | -13 | -47.00 | -62.40 | 1.37 | 5.92 | V |
| | 2812 | -58.02 | -13 | -45.02 | -61.91 | 1.64 | 7.68 | V |
| LTE B2 BW 20MHz Middle 1RB0,QPSK | 3735 | -59.31 | -13 | -46.31 | -71.57 | 2.64 | 14.90 | H |
| | 5610 | -46.75 | -13 | -33.75 | -58.61 | 2.94 | 14.80 | H |
| | 7485 | -53.84 | -13 | -40.84 | -63.61 | 3.39 | 13.16 | H |
| | 3735 | -58.98 | -13 | -45.98 | -71.24 | 2.64 | 14.90 | V |
| | 5610 | -51.75 | -13 | -38.75 | -63.61 | 2.94 | 14.80 | V |
| | 7485 | -53.61 | -13 | -40.61 | -63.38 | 3.39 | 13.16 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| ULCA_13A-2A (ANT5+0) | | | | | | | | |
|--|-------------------|------------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP/EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B13 BW 10MHz Middle 1RB0,QPSK | 1556 | -49.45 | -13 | -36.45 | -52.08 | 1.09 | 5.87 | H |
| | 2332 | -56.49 | -13 | -43.49 | -58.89 | 1.37 | 5.92 | H |
| | 3105 | -55.24 | -13 | -42.24 | -59.13 | 1.64 | 7.68 | H |
| | 1556 | -48.15 | -13 | -35.15 | -50.78 | 1.09 | 5.87 | V |
| | 2332 | -58.3 | -13 | -45.30 | -60.70 | 1.37 | 5.92 | V |
| | 3105 | -54.3 | -13 | -41.30 | -58.19 | 1.64 | 7.68 | V |
| LTE B2 BW 20MHz Middle 1RB0,QPSK | 3735 | -58.77 | -13 | -45.77 | -69.51 | 2.604 | 13.34 | H |
| | 5610 | -46.87 | -13 | -33.87 | -57.38 | 3.011 | 13.52 | H |
| | 7485 | -53.95 | -13 | -40.95 | -64.15 | 3.271 | 13.47 | H |
| | 3735 | -59.03 | -13 | -46.03 | -69.77 | 2.604 | 13.34 | V |
| | 5610 | -54.53 | -13 | -41.53 | -65.04 | 3.011 | 13.52 | V |
| | 7485 | -50.22 | -13 | -37.22 | -60.42 | 3.271 | 13.47 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



| ULCA_66A-2A (ANT0+1) | | | | | | | | |
|--|-------------------|--------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B66 BW 20MHz Middle 1RB0,QPSK | 3465 | -56.68 | -13 | -43.68 | -67.42 | 2.604 | 13.34 | H |
| | 5205 | -55.62 | -13 | -42.62 | -66.13 | 3.011 | 13.52 | H |
| | 6945 | -50.46 | -13 | -37.46 | -60.66 | 3.271 | 13.47 | H |
| | 3465 | -57.65 | -13 | -44.65 | -68.39 | 2.604 | 13.34 | V |
| | 5205 | -55.46 | -13 | -42.46 | -65.97 | 3.011 | 13.52 | V |
| | 6945 | -49.61 | -13 | -36.61 | -59.81 | 3.271 | 13.47 | V |
| LTE B2 BW 20MHz Middle 1RB0,QPSK | 3735 | -59.05 | -13 | -46.05 | -71.31 | 2.64 | 14.90 | H |
| | 5610 | -45.33 | -13 | -32.33 | -57.19 | 2.94 | 14.80 | H |
| | 7485 | -47.14 | -13 | -34.14 | -56.91 | 3.39 | 13.16 | H |
| | 3735 | -58.84 | -13 | -45.84 | -71.10 | 2.64 | 14.90 | V |
| | 5610 | -51.13 | -13 | -38.13 | -62.99 | 2.94 | 14.80 | V |
| | 7485 | -54.14 | -13 | -41.14 | -63.91 | 3.39 | 13.16 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| ULCA_7A-26A (ANT0+5) | | | | | | | | |
|--|-------------------|------------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP/EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B7 BW 20MHz Middle 1RB0,QPSK | 5050 | -39.71 | -13 | -26.71 | -48.83 | 1.58 | 10.70 | H |
| | 7580 | -35.3 | -13 | -22.30 | -45.70 | 2.102 | 12.50 | H |
| | 10100 | -37.36 | -13 | -24.36 | -48.40 | 2.856 | 13.90 | H |
| | 5050 | -44.29 | -13 | -31.29 | -53.41 | 1.58 | 10.70 | V |
| | 7580 | -39.94 | -13 | -26.94 | -50.34 | 2.10 | 12.50 | V |
| | 10100 | -45.61 | -13 | -32.61 | -56.65 | 2.86 | 13.90 | V |
| LTE B26 BW 15MHz Middle 1RB0,QPSK | 1660 | -65.27 | -13 | -52.27 | -72.24 | 1.58 | 10.70 | H |
| | 2488 | -56.71 | -13 | -43.71 | -64.96 | 2.102 | 12.50 | H |
| | 3320 | -66.13 | -13 | -53.13 | -75.02 | 2.856 | 13.90 | H |
| | 1660 | -63.62 | -13 | -50.62 | -70.59 | 1.58 | 10.70 | V |
| | 2488 | -54.77 | -13 | -41.77 | -63.02 | 2.10 | 12.50 | V |
| | 3320 | -66.17 | -13 | -53.17 | -75.06 | 2.86 | 13.90 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



| ULCA 12A-66A (ANT4+1) | | | | | | | | |
|--|-------------------|------------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP/EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B12 BW 10MHz Middle 1RB0,QPSK | 1406 | -36.11 | -13 | -23.11 | -39.36 | 4.00 | 9.40 | H |
| | 2108 | -47.13 | -13 | -34.13 | -50.70 | 4.88 | 10.60 | H |
| | 2812 | -53.74 | -13 | -40.74 | -58.67 | 5.52 | 12.60 | H |
| | 1406 | -38.46 | -13 | -25.46 | -41.71 | 4.00 | 9.40 | V |
| | 2108 | -45.2 | -13 | -32.20 | -48.77 | 4.88 | 10.60 | V |
| | 2812 | -53.33 | -13 | -40.33 | -58.26 | 5.52 | 12.60 | V |
| LTE B66 BW 20MHz Middle 1RB0,QPSK | 3465 | -57.31 | -13 | -44.31 | -64.16 | 5.65 | 12.50 | H |
| | 5205 | -56.23 | -13 | -43.23 | -61.90 | 7.13 | 12.80 | H |
| | 6945 | -56.05 | -13 | -43.05 | -59.45 | 8.40 | 11.80 | H |
| | 3465 | -57.38 | -13 | -44.38 | -64.23 | 5.65 | 12.50 | V |
| | 5205 | -56.33 | -13 | -43.33 | -62.00 | 7.13 | 12.80 | V |
| | 6945 | -55.89 | -13 | -42.89 | -59.29 | 8.40 | 11.80 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| ULCA 71A-66A (ANT5+0) | | | | | | | | |
|--|-------------------|------------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP/EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B71 BW 20MHz Middle 1RB0,QPSK | 1344 | -67.9 | -13 | -54.90 | -74.87 | 1.58 | 10.70 | H |
| | 2014 | -63.13 | -13 | -50.13 | -71.38 | 2.102 | 12.50 | H |
| | 2686 | -60.81 | -13 | -47.81 | -69.70 | 2.856 | 13.90 | H |
| | 1344 | -66.46 | -13 | -53.46 | -73.43 | 1.58 | 10.70 | V |
| | 2014 | -62.74 | -13 | -49.74 | -70.99 | 2.10 | 12.50 | V |
| | 2686 | -60.36 | -13 | -47.36 | -69.25 | 2.86 | 13.90 | V |
| LTE B66 BW 20MHz Middle 1RB0,QPSK | 3465 | -56.42 | -13 | -43.42 | -67.16 | 2.604 | 13.34 | H |
| | 5205 | -56.22 | -13 | -43.22 | -66.73 | 3.011 | 13.52 | H |
| | 6945 | -56.17 | -13 | -43.17 | -66.37 | 3.271 | 13.47 | H |
| | 3465 | -57.67 | -13 | -44.67 | -68.41 | 2.604 | 13.34 | V |
| | 5205 | -56.36 | -13 | -43.36 | -66.87 | 3.011 | 13.52 | V |
| | 6945 | -56.06 | -13 | -43.06 | -66.26 | 3.271 | 13.47 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



| ULCA 48A-71A (ANT1+4) | | | | | | | | |
|--|-------------------|------------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP/EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B48 BW 20MHz Middle 1RB0,QPSK | 7236 | -49.14 | -40 | -9.14 | -52.44 | 8.30 | 11.60 | H |
| | 10848 | -54.45 | -40 | -14.45 | -55.97 | 10.48 | 12.00 | H |
| | 14460 | -57.81 | -40 | -17.81 | -59.51 | 11.80 | 13.50 | H |
| | 7236 | -51.92 | -40 | -11.92 | -55.22 | 8.30 | 11.60 | V |
| | 10848 | -52.53 | -40 | -12.53 | -54.05 | 10.48 | 12.00 | V |
| | 14460 | -62.89 | -40 | -22.89 | -64.59 | 11.80 | 13.50 | V |
| LTE B71 BW 20MHz Middle 1RB0,QPSK | 1345 | -53.89 | -13 | -40.89 | -58.59 | 5.65 | 12.50 | H |
| | 2015 | -57.47 | -13 | -44.47 | -60.99 | 7.13 | 12.80 | H |
| | 2685 | -48.5 | -13 | -35.50 | -49.75 | 8.40 | 11.80 | H |
| | 1345 | -57.1 | -13 | -44.10 | -61.80 | 5.65 | 12.50 | V |
| | 2015 | -53.61 | -13 | -40.61 | -57.13 | 7.13 | 12.80 | V |
| | 2685 | -47.86 | -13 | -34.86 | -49.11 | 8.40 | 11.80 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.