

Dates of Tests: June 18, 2017 ~ June 27, 2017
Test Report S/N: LR50011706P
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.
APPLICANT

2AMMI-MIR-B001
MIRO Corporation

| | | |
|----------------------------------|---|---|
| Equipment Class | : | Digital Transmission System (DTS) |
| Manufacturing Description | : | Bluetooth wireless devices |
| Manufacturer | : | MIRO Corporation |
| Model name | : | MIR-B001 |
| Test Device Serial No.: | : | Identical prototype |
| Rule Part(s) | : | FCC Part 15.247 Subpart C ; ANSI C-63.4-2014 / ANSI C-63.10-2013 |
| Frequency Range | : | 2402 ~ 2480 MHz (BLE) |
| Max. Output Power | : | Max -11.16 dBm – Conducted |
| Data of issue | : | June 27, 2017 |

This test report is issued under the authority of:



Yong-Cheol, Wang / Manager

The test was supervised by:



Hee-Cheon, Kwon / Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The 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.



NVLAP LAB Code.: 200723-0

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1. General information

1-1 Test Performed

Company name : LTA Co., Ltd.
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
 Web site : <http://www.ltalab.com>
 E-mail : chahn@ltalab.com
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

| Agency | Country | Accreditation No. | Validity | Reference |
|--------|---------|--------------------|------------|-----------------------|
| NVLAP | U.S.A | 200723-0 | 2017-09-30 | ECT accredited Lab. |
| RRA | KOREA | KR0049 | - | EMC accredited Lab. |
| FCC | U.S.A | 610755 | 2019-04-21 | FCC filing |
| FCC | U.S.A | 649054 | 2019-04-13 | FCC CAB |
| VCCI | JAPAN | R2133(10 m), C2307 | UPDATING | VCCI registration |
| VCCI | JAPAN | T-2009 | 2017-12-23 | VCCI registration |
| VCCI | JAPAN | G-563 | 2018-12-13 | VCCI registration |
| IC | CANADA | 5799A-1 | 2019-11-07 | IC filing |
| KOLAS | KOREA | NO.551 | UPDATING | KOLAS accredited Lab. |

2. Information about test item

2-1 Client & Manufacturer

Company name : MIRO Corporation
 Address : 26F, M, 32, Songdogwahak-ro, Yeonsu-gu, Incheon, Korea
 Tel / Fax : TEL No : +82-70-4603-5057 / FAX No : +82-70-4032-5030

2-2 Equipment Under Test (EUT)

Model name : MIR-B001
 Serial number : Identical prototype
 Date of receipt : June 12, 2017
 EUT condition : Pre-production, not damaged
 Antenna type : Pattern Antenna: 3.5 dBi
 Frequency Range : 2402 ~ 2480 MHz
 RF output power : **Max -11.16 dBm – Conducted**
 Number of channels : 40 (BLE)
 Type of Modulation : GFSK (BLE)
 Power Source : 6.0 Vdc
 Firmware Version : V 1.0.0

2-3 Tested frequency

| | LOW | MID | HIGH |
|-----------------------|------|------|------|
| Frequency (MHz) (BLE) | 2402 | 2442 | 2480 |

2-4 Ancillary Equipment

| Equipment | Model No. | Serial No. | Manufacturer |
|-----------|-----------|------------|--------------|
| NOTEBOOK | CR720 | MS-1736 | MSI |

3. Test Report

3.1 Summary of tests

| FCC Part Section(s) | Parameter | Limit | Test Condition | Status (note 1) |
|---------------------|------------------------------------|-----------------|----------------|-----------------|
| 15.247(a) | 6 dB Bandwidth | > 500 kHz | Conducted | C |
| 15.247(b) | Transmitter Peak Output Power | < 1 Watt | | C |
| 15.247(d) | Transmitter Power Spectral Density | < 8 dBm @ 3 kHz | | C |
| 15.247(d) | Band Edge | > 20 dBc | | C |
| 15.209 | Field Strength of Harmonics | Emission | Radiated | C |
| 15.207 | AC Conducted Emissions | Emissions | Conducted | C |
| 15.203 | Antenna requirement | - | - | C |

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

→ Antenna Requirement

The MIRO Corporation FCC ID: 2AMMI-MIR-B001 unit complies with the requirement of §15.203.

The antenna type is Pattern Antenna.

The sample was tested according to the following specification:

*FCC Parts 15.247; ANSI C-63.4-2014; ANSI C-63.10-2013

*FCC KDB Publication No. 558074 D01 v03r05

*FCC TCB Workshop 2012, April

3.2 Technical Characteristics Test

3.2.1 6 dB Bandwidth

Procedure:

The bandwidth at 6 dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 5 MHz

VBW = 100 kHz (VBW \geq RBW)

Sweep = auto

Trace = max hold

Detector function = peak

Measurement Data : **Complies**

| Frequency (MHz) | Test Results | |
|--------------------|--------------------------|----------|
| | Measured Bandwidth (MHz) | Result |
| BLE | | |
| 2402 | 0.687 | Complies |
| 2442 | 0.723 | Complies |
| 2480 | 0.687 | Complies |

- See next pages for actual measured spectrum plots.

Minimum Standard:

6 dB Bandwidth > 500 kHz

Measurement Setup

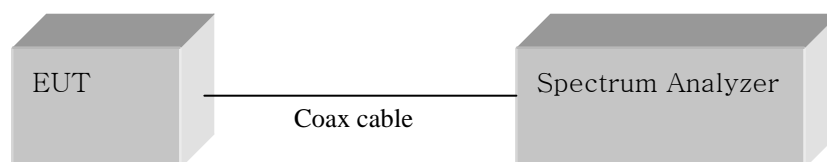
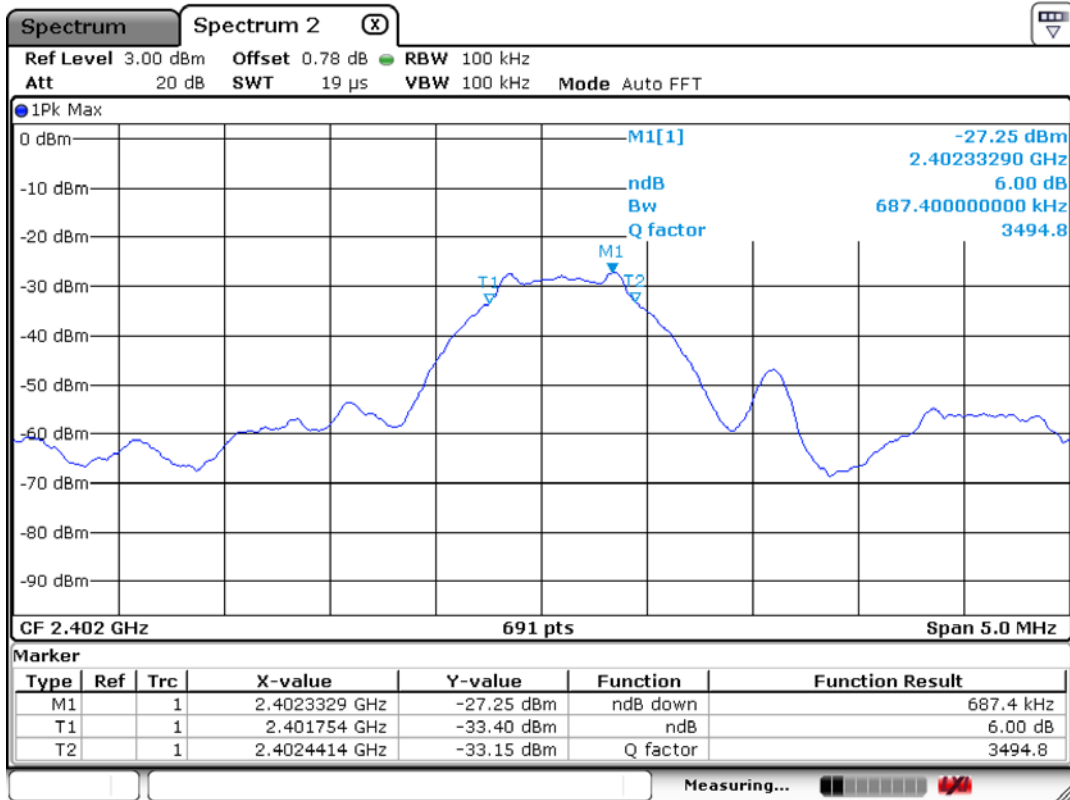
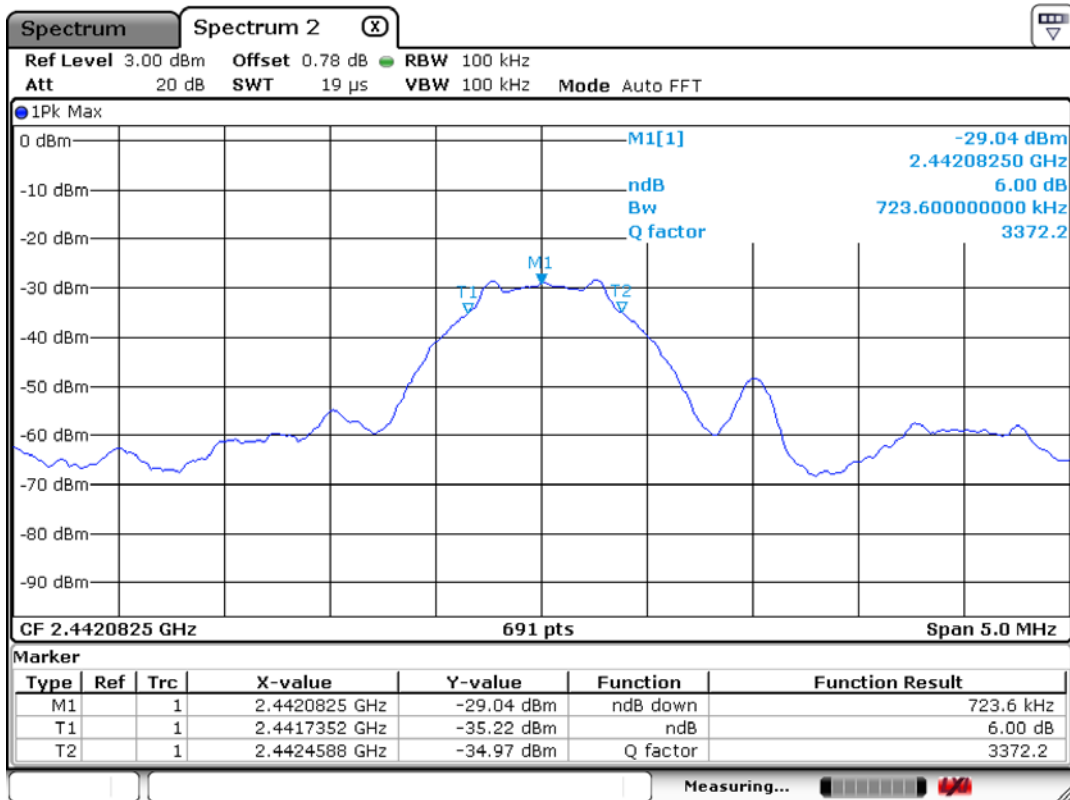


Figure 1: Measurement setup for the carrier frequency separation

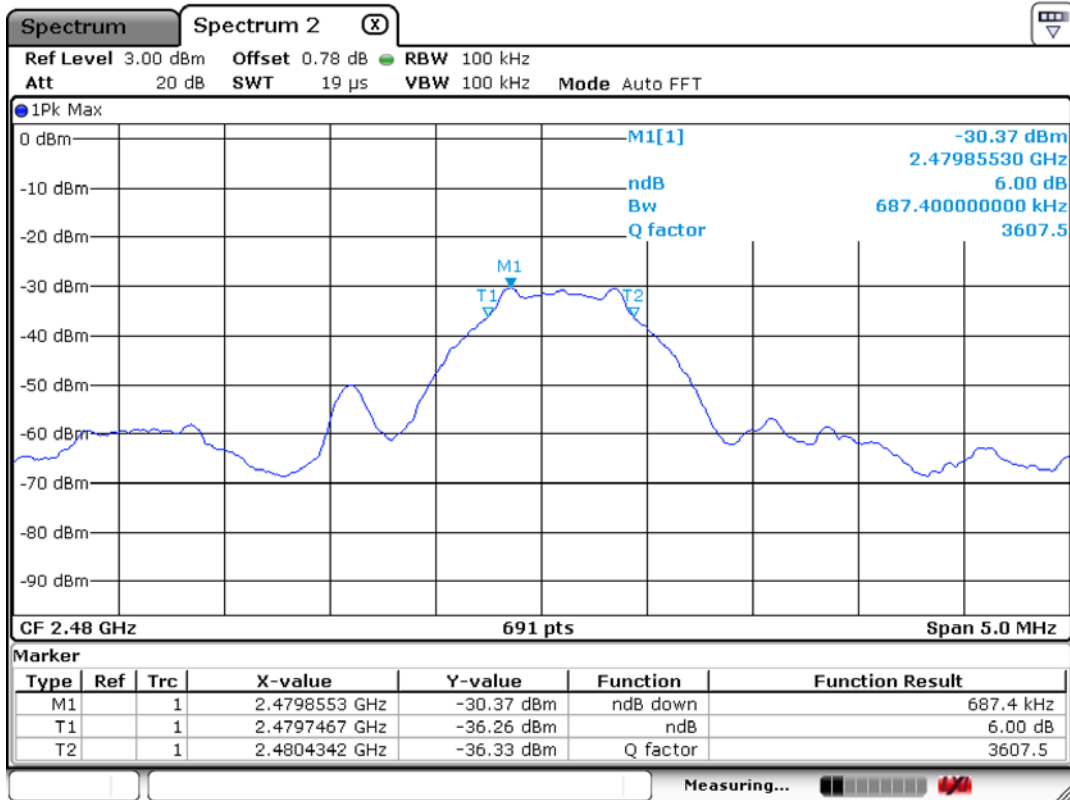
Low Channel (BLE)



Middle Channel (BLE)



High Channel (BLE)



3.2.2 Peak Output Power Measurement

Procedure:

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 1 MHz

Span = auto

VBW = 1 MHz (VBW \geq RBW)

Sweep = auto

Detector function = peak

Measurement Data : **Complies**

| Frequency (MHz) | Test Results | | |
|--------------------|--------------|------|----------|
| | dBm | mW | Result |
| BLE | | | |
| 2402 | -11.16 | 0.07 | Complies |
| 2442 | -12.14 | 0.06 | Complies |
| 2480 | -13.06 | 0.04 | Complies |

- See next pages for actual measured spectrum plots.

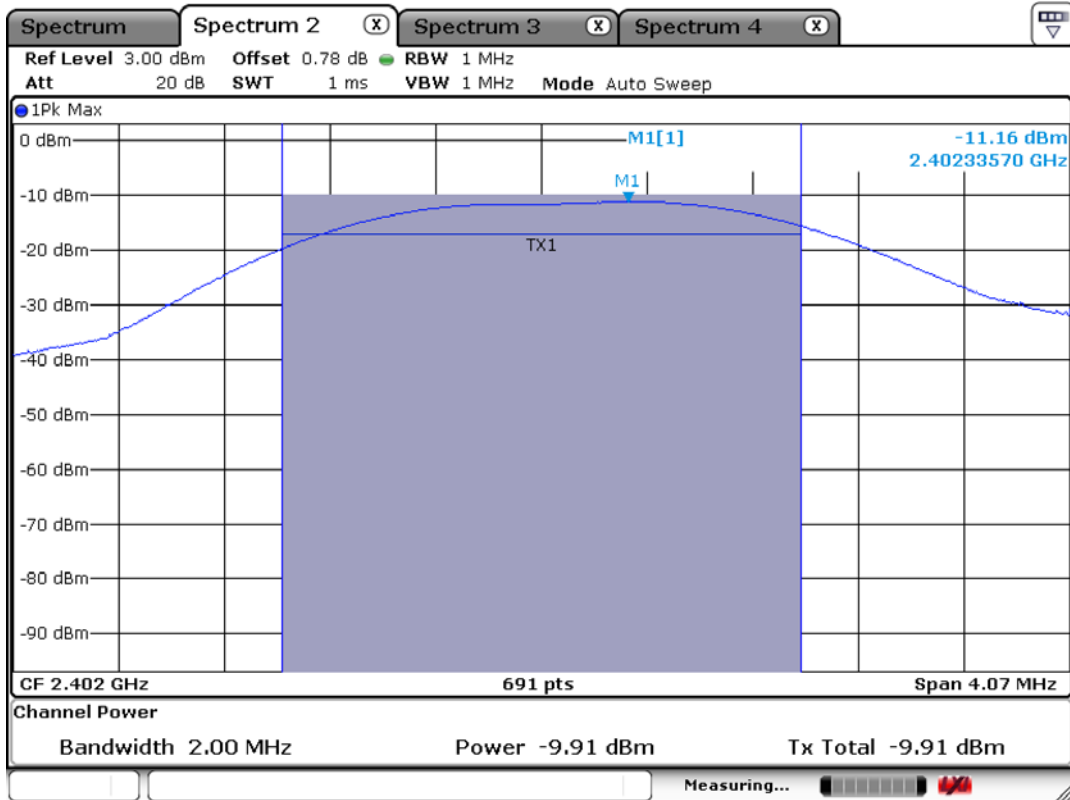
Minimum Standard:

| | |
|-------------------|-------|
| Peak output power | < 1 W |
|-------------------|-------|

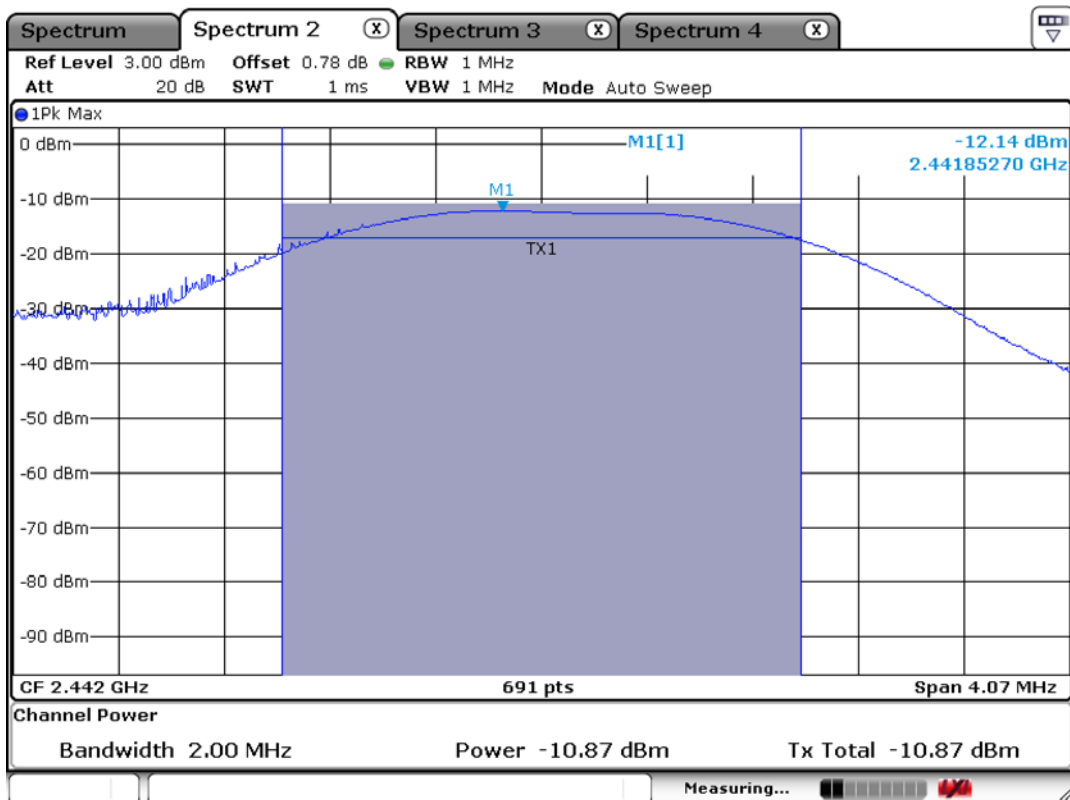
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

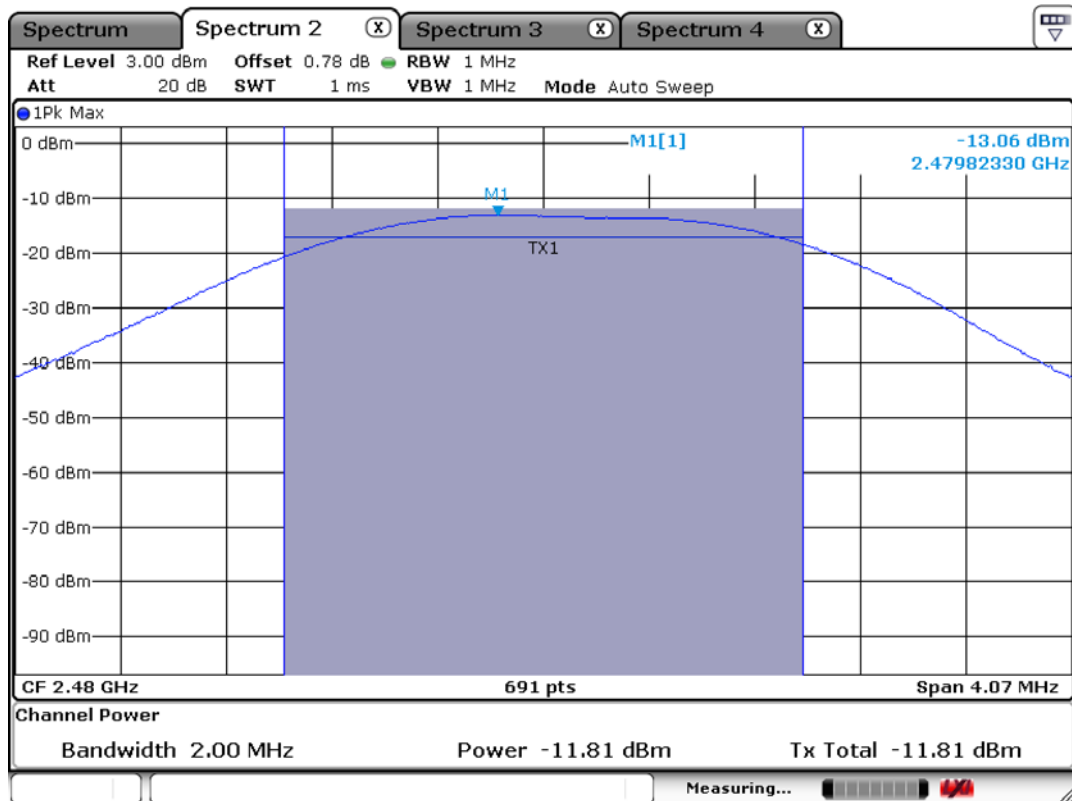
Low Channel (BLE)



Middle Channel (BLE)



High Channel (Bluetooth)



3.2.3 Power Spectral Density

Procedure:

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The spectrum analyzer is set to:

RBW = 3 kHz

Span = 300 kHz

VBW = 3 kHz

Sweep = auto

Detector function = peak

Trace = max hold

Measurement Data : **Complies**

| Frequency (MHz) | Test Results | |
|--------------------|--------------|----------|
| | dBm / 3 kHz | Result |
| BLE | | |
| 2402 | -23.48 | Complies |
| 2442 | -25.32 | Complies |
| 2480 | -25.30 | Complies |

- See next pages for actual measured spectrum plots.

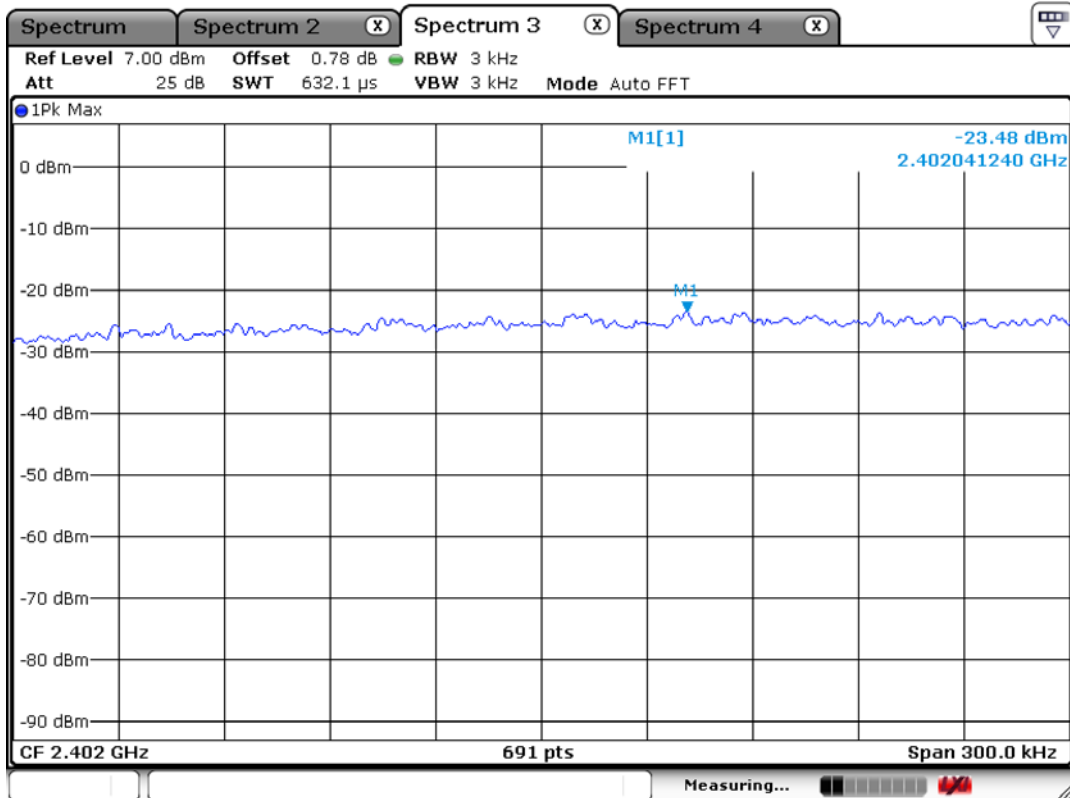
Minimum Standard:

| | |
|------------------------|--------------------|
| Power Spectral Density | < 8 dBm @ 3 kHz BW |
|------------------------|--------------------|

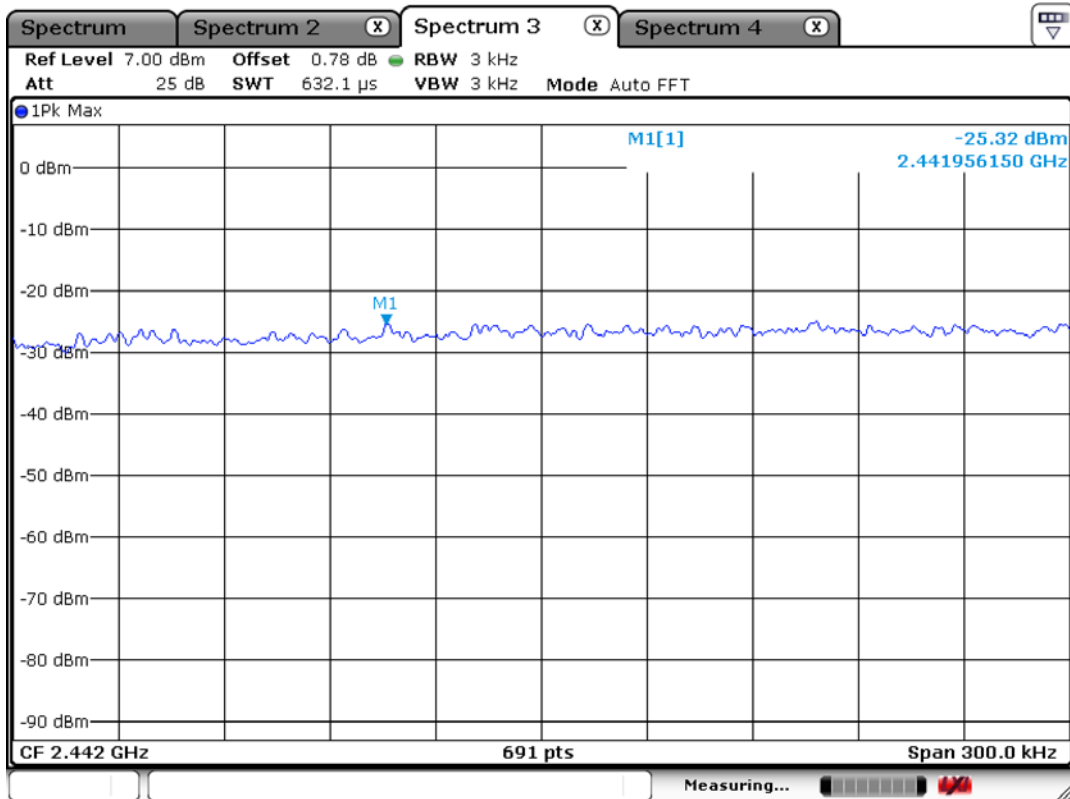
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

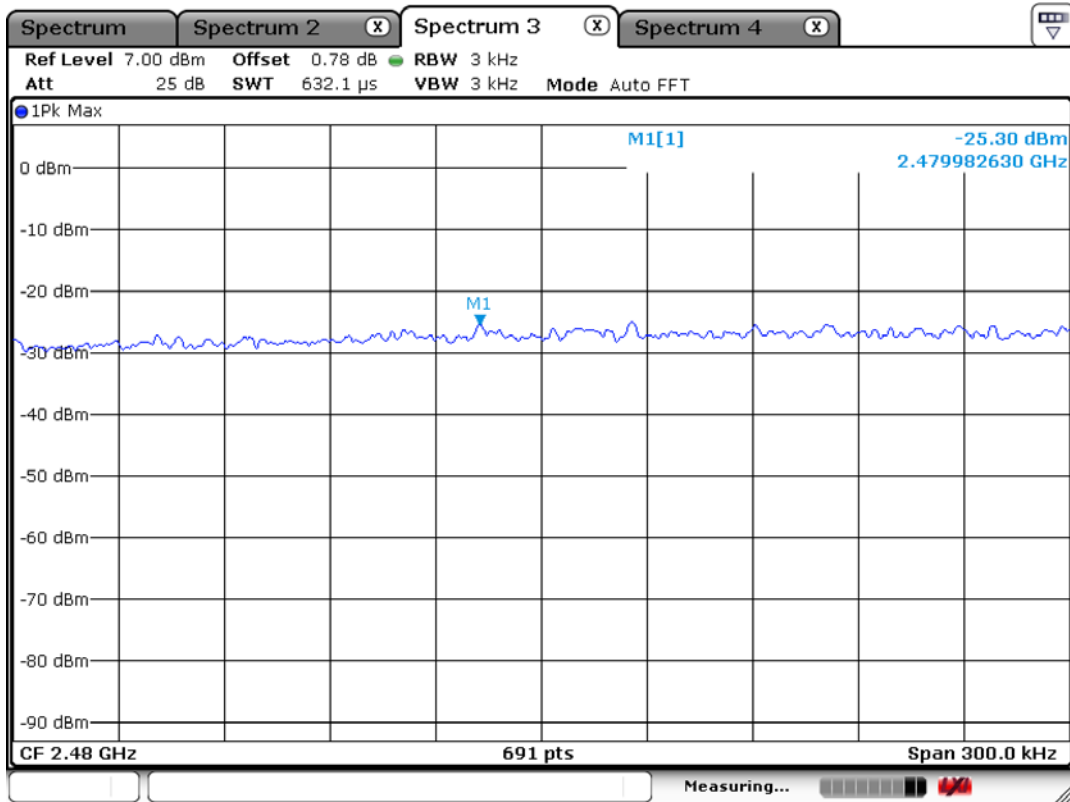
Power Density Measurement Low Channel (BLE)



Middle Channel (BLE)



High Channel (Bluetooth)



3.2.4 Band Edge

Procedure:

The bandwidth at 20 dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 40 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

The spectrum analyzer is set to:

Center frequency = the highest, the lowest channels

PEAK:

RBW = VBW = 1 MHz, Sweep=Auto

Average:

RBW = 1 MHz, VBW=10 Hz, Sweep=Auto

Measurement Distance:

3 m

Polarization:

Horizontal / Vertical

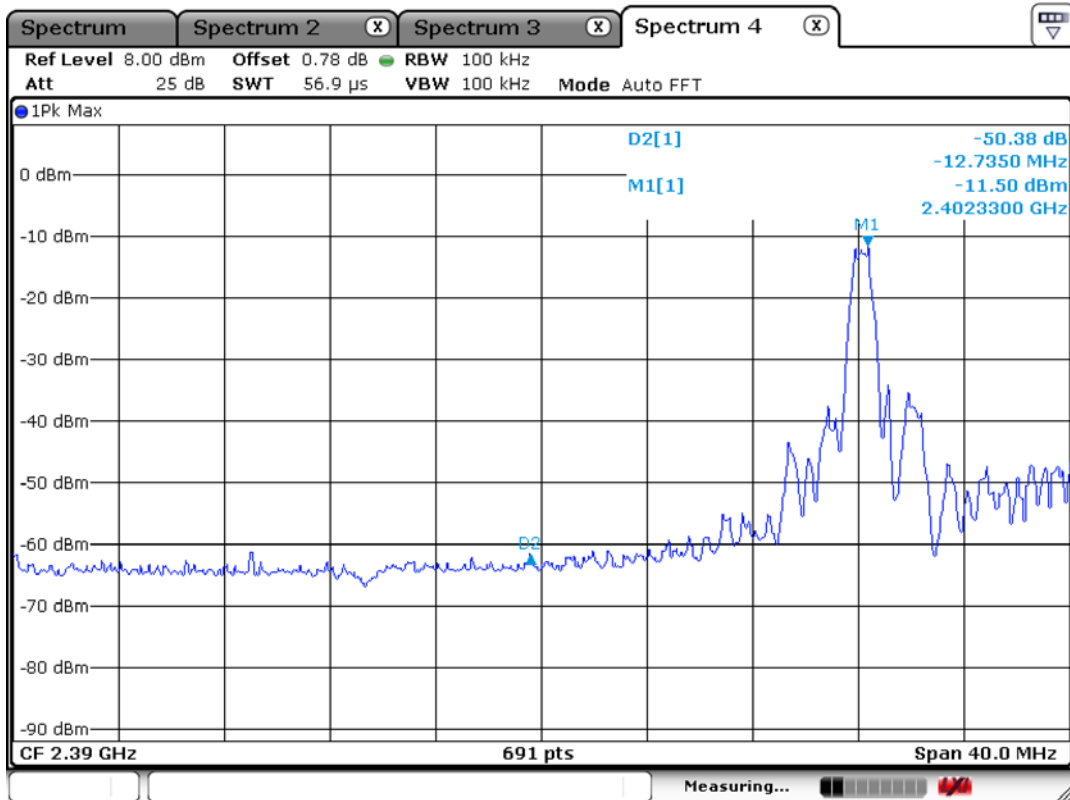
Measurement Data: Complies

- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20 dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

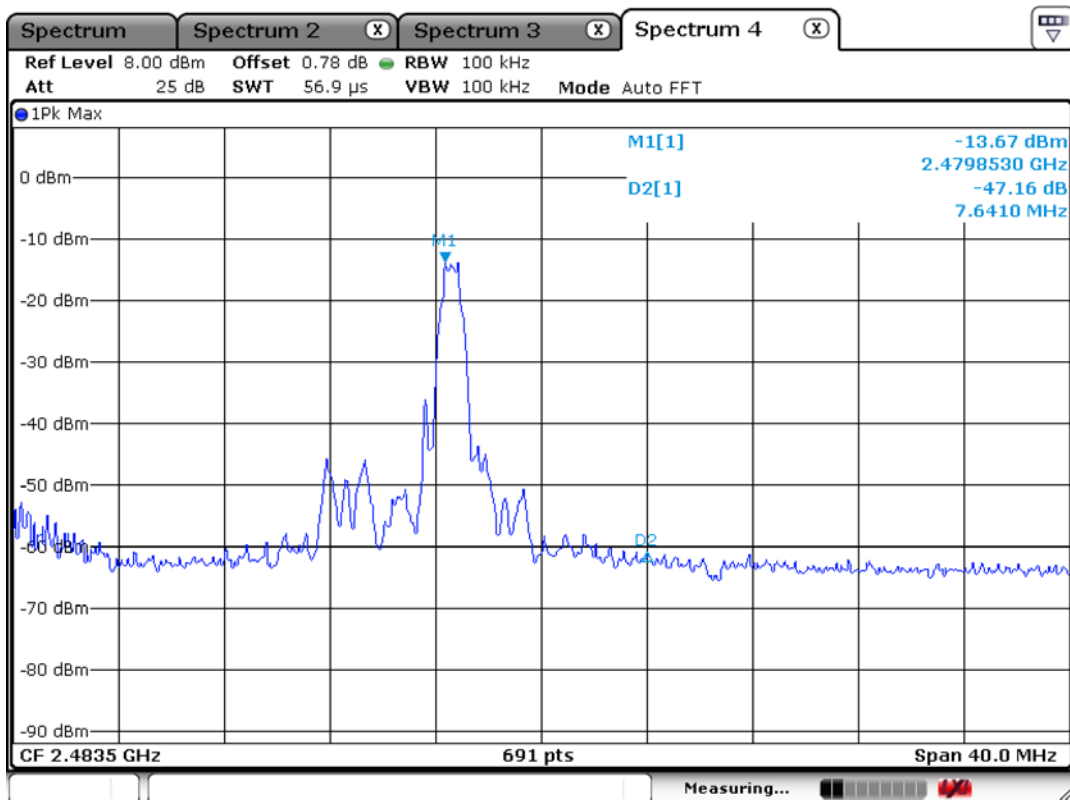
| | |
|--------------------------|----------|
| Minimum Standard: | > 20 dBc |
|--------------------------|----------|

Band edge

Lower edge (BLE)



Upper edge (BLE)



Radiated Band-edges in the restricted band 2310-2390 MHz measurement_ Bluetooth

| Frequency [MHz] | Reading [dBuV/m] | | Pol. | Correction Factor | | Limits [dBuV/m] | | Result [dBuV/m] | | Margin [dB] | |
|--------------------|---------------------|------|------|----------------------|---------------------------|--------------------|------|--------------------|------|----------------|------|
| | AV / Peak | | | Antenna | Amp. Gain + Cable Loss | AV / Peak | | AV / Peak | | AV / Peak | |
| 2390.0 | 27.1 | 35.3 | H | 27.9 | 22.9 | 54.0 | 74.0 | 32.1 | 40.3 | 21.9 | 33.7 |

Radiated Band-edges in the restricted band 2483.5-2500 MHz measurement_ Bluetooth

| Frequency [MHz] | Reading [dBuV/m] | | Pol. | Correction Factor | | Limits [dBuV/m] | | Result [dBuV/m] | | Margin [dB] | |
|--------------------|---------------------|------|------|----------------------|---------------------------|--------------------|------|--------------------|------|----------------|------|
| | AV / Peak | | | Antenna | Amp. Gain + Cable Loss | AV / Peak | | AV / Peak | | AV / Peak | |
| 2483.5 | 26.7 | 34.8 | H | 27.9 | 22.9 | 54.0 | 74.0 | 31.7 | 39.8 | 22.3 | 34.2 |

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

3.2.5 Conducted Spurious Emissions

Procedure:

The test follows KDB558074. The conducted spurious emissions were measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, set the marker on the peak of any spurious emission recorded.

The spectrum analyzer is set to:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions

RBW = 100 kHz

Sweep = auto

VBW = 100 kHz

Detector function = peak

Trace = max hold

Measurement Data: **Complies**

- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20 dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

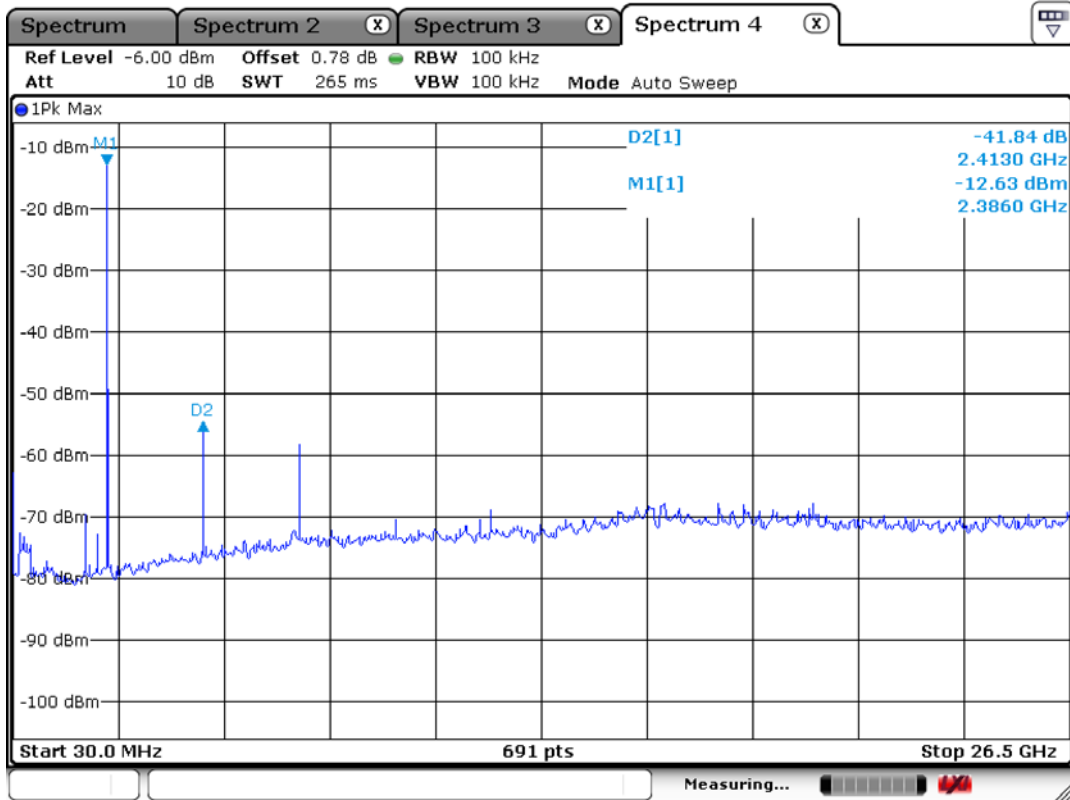
| | |
|--------------------------|----------|
| Minimum Standard: | > 20 dBc |
|--------------------------|----------|

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

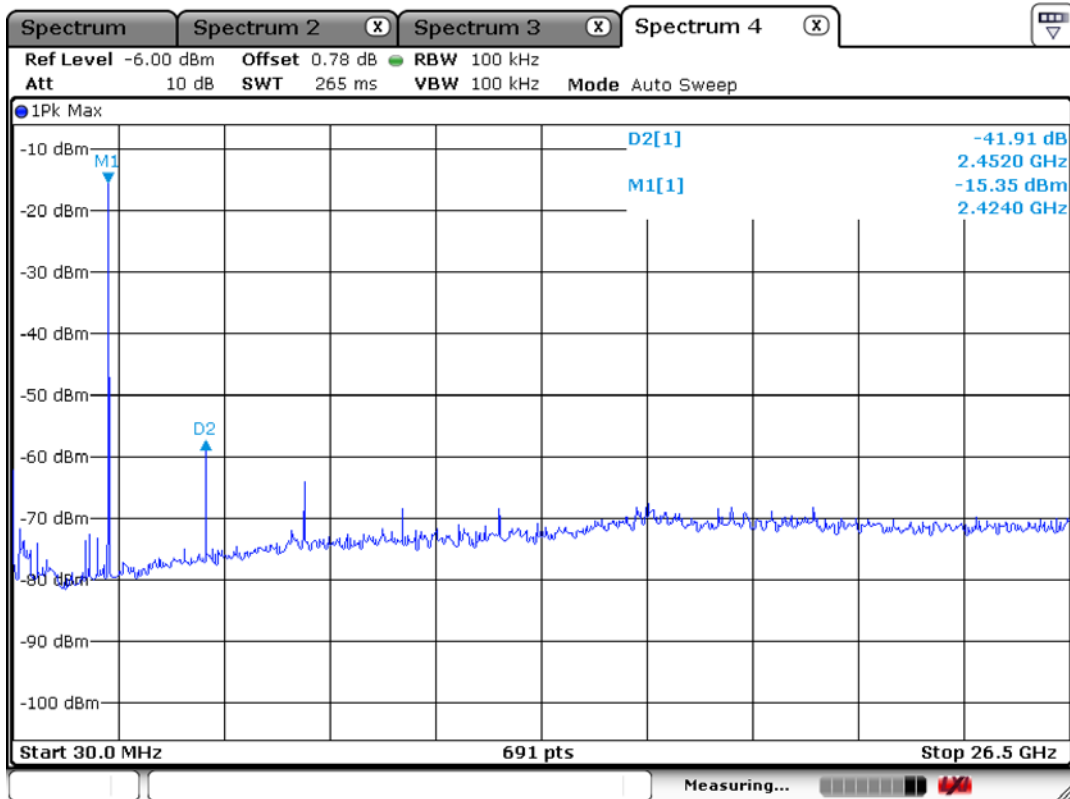
Unwanted Emission – Low Channel (Bluetooth)

Frequency Range = 30 MHz ~ 26.5 GHz

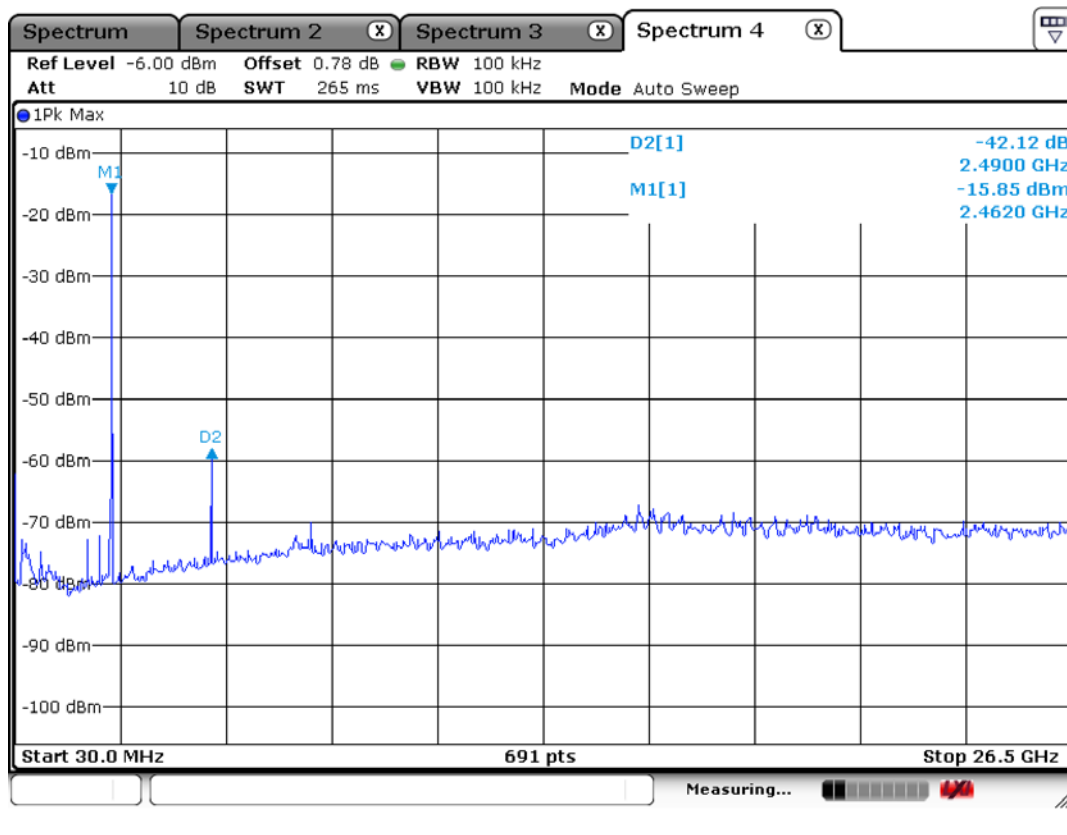


Unwanted Emission – Middle Channel (Bluetooth)

Frequency Range = 30 MHz ~ 26.5 GHz



Unwanted Emission – High Channel (Bluetooth)
Frequency Range = 30 MHz ~ 26.5 GHz



3.2.6 Radiated Spurious Emissions

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 9 kHz ~ 10th harmonic.

RBW = 100 kHz (30 MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

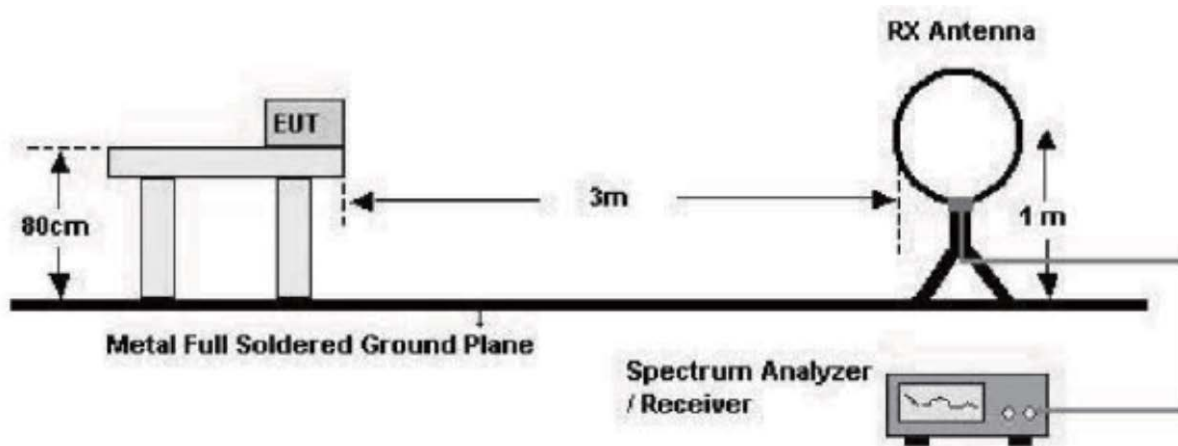
Trace = max hold

VBW \geq RBW

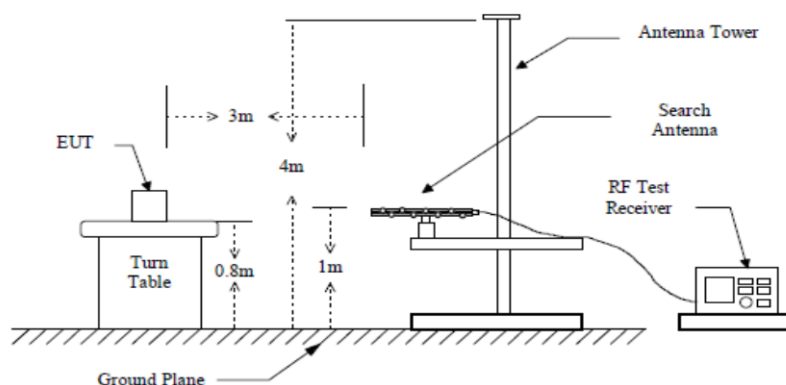
Detector function = peak

Sweep = auto

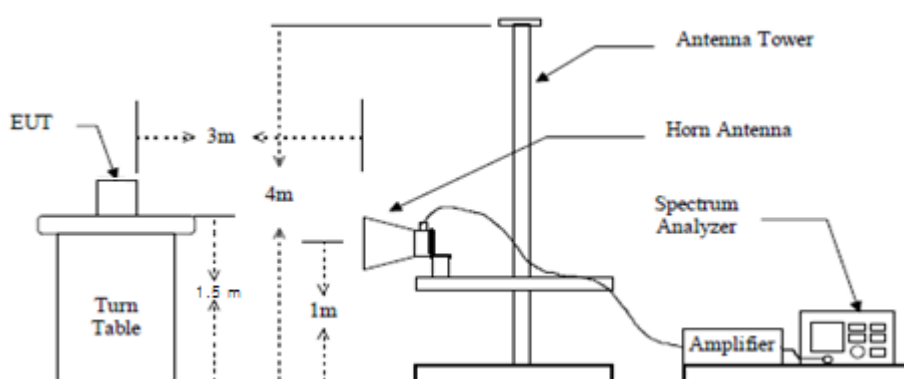
below 30 MHz



below 1 GHz (30 MHz to 1 GHz)



above 1 GHz



Measurement Data: **Complies**

- See next pages for actual measured data.
- No other emissions were detected at a level greater than 20 dB below limit include from 9 kHz to 30 MHz.

Minimum Standard: FCC Part 15.209(a)

| Frequency (MHz) | Limit (uV/m) @ 3 m |
|-----------------|-----------------------|
| 0.009 ~ 0.490 | 2400/F(kHz) (@ 300 m) |
| 0.490 ~ 1.705 | 24000/F(kHz) (@ 30 m) |
| 1.705 ~ 30 | 30(@ 30 m) |
| 30 ~ 88 | 100 ** |
| 88 ~ 216 | 150 ** |
| 216 ~ 960 | 200 ** |
| Above 960 | 500 |

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data : (Above 1 GHz) – BLE

| Frequency [MHz] | Reading [dBuV/m] | | Pol. | Correction Factor | | Limits [dBuV/m] | | Result [dBuV/m] | | Margin [dB] | |
|--------------------|---------------------|-------|------|---------------------------|--|--------------------|------|--------------------|-------|----------------|--|
| | AV / Peak | | | Antenna+ (Cable-Amp.Gain) | | AV/Peak | | AV/Peak | | AV / Peak | |
| 10484.23 | 20.84 | 31.05 | V | 26.57 | | 54.0 | 74.0 | 48.40 | 58.40 | | |
| 10980.47 | 21.65 | 34.64 | V | 21.65 | | 54.0 | 74.0 | 49.05 | 59.05 | | |
| 10393.71 | 23.71 | 34.79 | V | 23.71 | | 54.0 | 74.0 | 49.65 | 59.65 | | |

- No other emissions were detected at a level greater than 20 dB below limit.

Measurement Data : (9 kHz – 30 MHz)

| Frequency [MHz] | Reading [dBuV/m] | | Pol. | Correction Factor | | Limits [dBuV/m] | | Result [dBuV/m] | | Margin [dB] | |
|---|---------------------|---|------|---------------------------|---|--------------------|---|--------------------|---|----------------|---|
| | AV / Peak | | | Antenna+ (Cable-Amp.Gain) | | AV / Peak | | AV / Peak | | AV / Peak | |
| - | - | - | - | - | - | - | - | - | - | - | - |
| No emissions were detected at a level greater than 20 dB below limit. | | | | | | | | | | | |
| - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - |

*No emissions were detected at a level greater than 20 dB below limit.

Radiated Emissions (Below 1 GHz) – 2.4GHz BLE mode



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EUT/Model No.: MIR-B001

Temp/Humi: 25 / 49

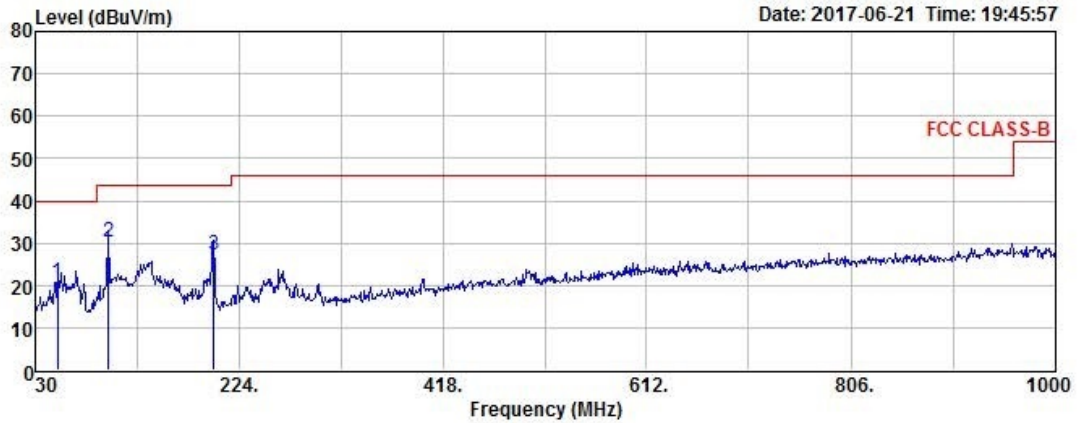
Test Mode : BLE mode

Tested by: BANG Y H

Data: 415

File: C:\Program Files (x86)\e3\1706-1.EM6 (420)

Date: 2017-06-21 Time: 19:45:57



| Freq MHz | Reading dBuV | C.F dB | Result QP dBuV/m | Limit dBuV/m | Margin dB | Height cm | Angle deg | Polarity |
|-------------|-----------------|-----------|------------------------|-----------------|--------------|--------------|--------------|------------|
| 51.34 | 34.50 | -13.86 | 20.64 | 40.00 | 19.36 | 152 | 233 | HORIZONTAL |
| 99.84 | 46.50 | -16.42 | 30.08 | 43.50 | 13.42 | 200 | 153 | HORIZONTAL |
| 199.75 | 42.10 | -14.75 | 27.35 | 43.50 | 16.15 | 311 | 50 | HORIZONTAL |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

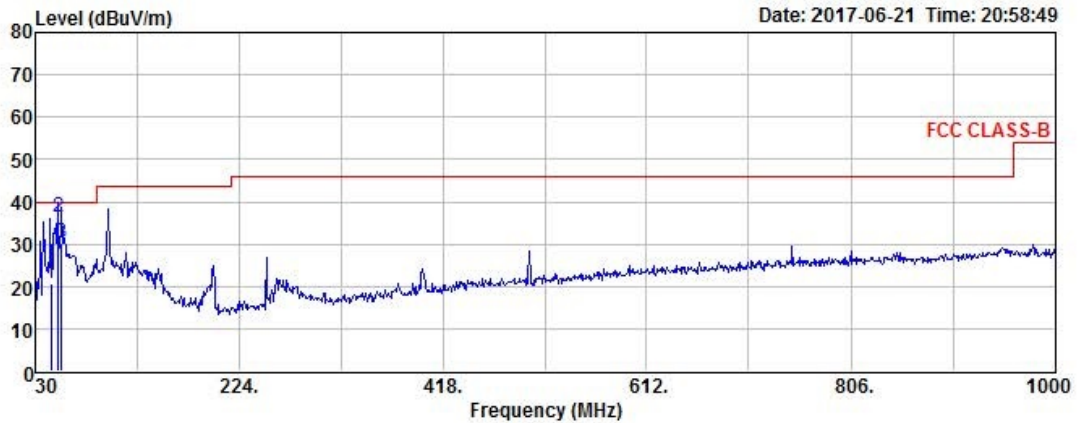


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EUT/Model No.: MIR-B001 Temp/Humi: 25 / 49

Test Mode : BLE mode Tested by: BANG Y H

Data: 425 File: C:\Program Files (x86)\e3\1706-1.EM6 (425)



| Freq MHz | Reading dBuV | C.F dB | Result QP dBuV/m | Limit dBuV/m | Margin dB | Height cm | Angle deg | Polarity |
|-------------|-----------------|-----------|------------------------|-----------------|--------------|--------------|--------------|----------|
| 44.98 | 34.39 | -13.86 | 20.53 | 40.00 | 19.47 | 132 | 164 | VERTICAL |
| 51.85 | 50.11 | -13.87 | 36.24 | 40.00 | 3.76 | 107 | 150 | VERTICAL |
| 55.20 | 44.09 | -13.95 | 30.14 | 40.00 | 9.86 | 100 | 144 | VERTICAL |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 2.4GHz BLE mode (LOW)



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 Fax:+82-31-3236010

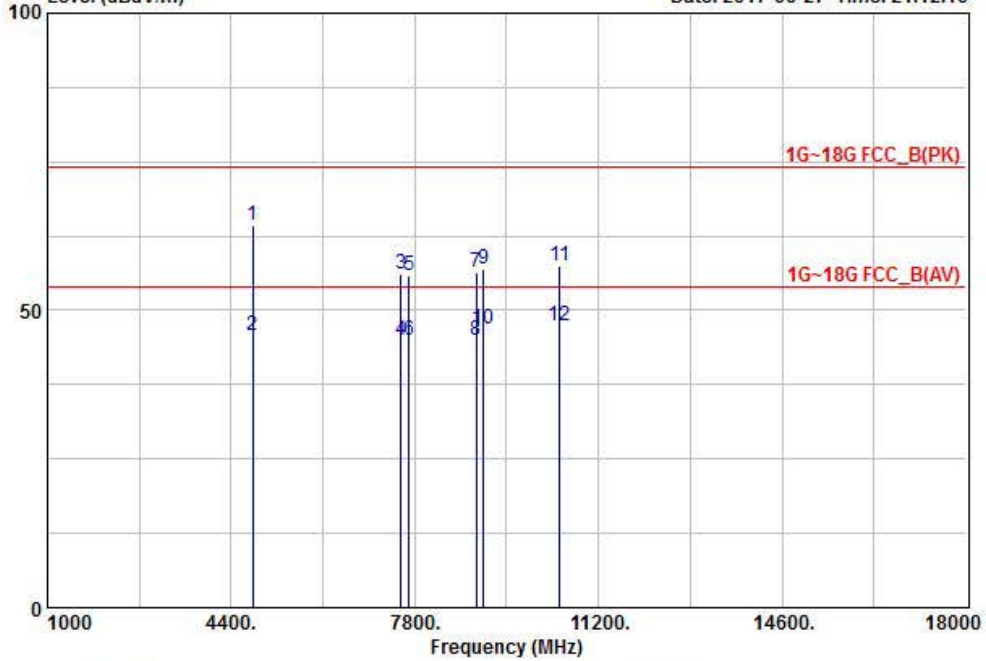
EUT/Model No. : MIR-B001

Test Mode: BLE (low) mode

Tested by : BANG Y H

Temp/Humi: 24 / 52

Data: 228 File: D:\LTA_e3\3_backup\1GHz 이상\2017\CH1_ABOVE 1GHz_1706-1.EMI (228) Date: 2017-06-27 Time: 21:12:10



| Freq MHz | Reading dBuV | C.F dB | Result PK dBuV/m | Limit dBuV/m | Margin dB | Polarity |
|-------------|-----------------|-----------|------------------------|-----------------|--------------|------------|
| 1 4806.15 | 48.68 | 15.54 | 64.22 | 74.00 | 9.78 | VERTICAL |
| 2 4806.15 | 30.24 | 15.54 | 45.78 | 54.00 | 8.22 | VERTICAL |
| 3 7541.10 | 30.07 | 26.04 | 56.11 | 74.00 | 17.89 | VERTICAL |
| 4 7541.10 | 18.95 | 26.04 | 44.99 | 54.00 | 9.01 | VERTICAL |
| 5 7695.24 | 30.47 | 25.46 | 55.93 | 74.00 | 18.07 | VERTICAL |
| 6 7695.24 | 19.42 | 25.46 | 44.88 | 54.00 | 9.12 | VERTICAL |
| 7 8943.27 | 30.82 | 25.62 | 56.44 | 74.00 | 17.56 | HORIZONTAL |
| 8 8943.27 | 19.25 | 25.62 | 44.87 | 54.00 | 9.13 | HORIZONTAL |
| 9 9073.27 | 31.05 | 25.86 | 56.91 | 74.00 | 17.09 | VERTICAL |
| 10 9073.27 | 20.95 | 25.86 | 46.81 | 54.00 | 7.19 | VERTICAL |
| 1110484.23 | 31.05 | 26.57 | 57.62 | 74.00 | 16.38 | HORIZONTAL |
| 1210484.23 | 20.84 | 26.57 | 47.41 | 54.00 | 6.59 | HORIZONTAL |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
 Blue : Vertical Black : Horizontal



EMI Chamber of LTA CO.,LTD.
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 Yongin-si, Gyeonggi-do, Korea Autho.by NVLAP
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EUT/Model No. : MIR-B001 Test Mode: BLE (low) mode
 Tested by : BANG Y H Temp/Humi: 24 / 52

Data: 228 File: D:\LTA_e3\3_backup\1GHz 이상\2017\CH1_ABOVE 1GHz_1706-1.EMI (228) Date: 2017-06-27 Time: 21:12:10
 Level (dBuV/m)



| Freq | Reading | C.F | Result | Limit | Margin | Polarity |
|-----------|---------|-------|--------------|--------|--------|------------|
| MHz | dBuV | dB | PK dBuV/m | dBuV/m | dB | |
| 118133.60 | 40.20 | 13.13 | 53.33 | 74.00 | 20.67 | HORIZONTAL |
| 218133.60 | 30.20 | 13.13 | 43.33 | 54.00 | 10.67 | HORIZONTAL |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
 Blue : Vertical Black : Horizontal

Radiated Emissions (Above 1 GHz) – 2.4GHz BLE mode (MID)



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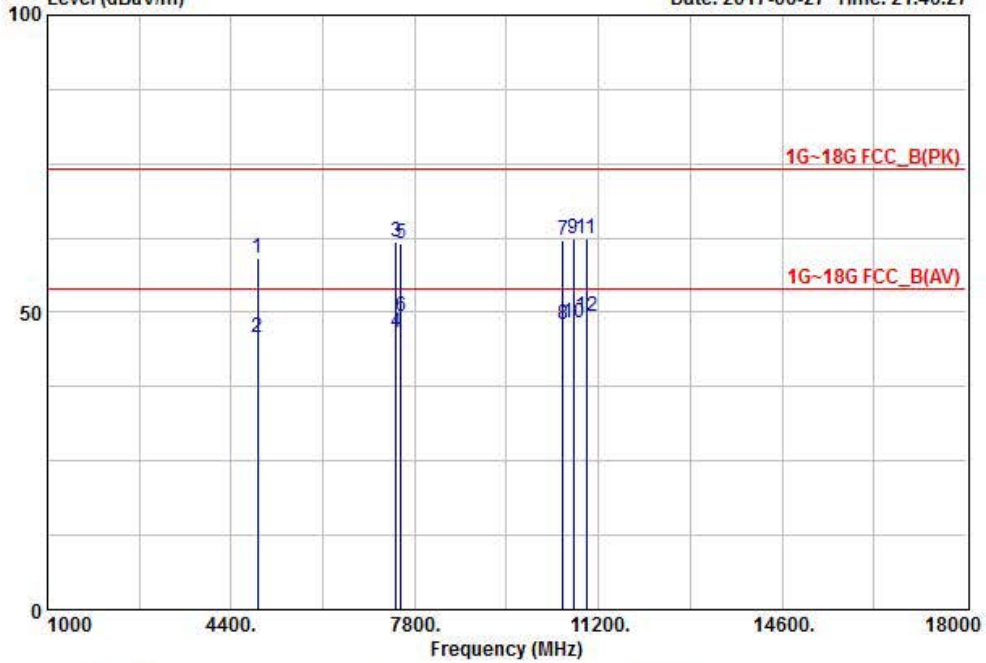
EUT/Model No. : MIR-B001

Test Mode: BLE (mid) mode

Tested by : BANG Y H

Temp/Humi: 24 / 52

Data: 231 File: D:\LTA_e3\3_backup\1GHz 이상\2017\CH1_ABOVE 1GHz_1706-1.EMI (231) Date: 2017-06-27 Time: 21:46:27



| Freq MHz | Reading dBuV | C.F dB | Result PK dBuV/m | Limit dBuV/m | Margin dB | Polarity |
|-------------|-----------------|-----------|------------------------|-----------------|--------------|------------|
| 1 4884.97 | 43.28 | 15.86 | 59.14 | 74.00 | 14.86 | VERTICAL |
| 2 4884.97 | 30.05 | 15.86 | 45.91 | 54.00 | 8.09 | VERTICAL |
| 3 7454.43 | 36.00 | 25.72 | 61.72 | 74.00 | 12.28 | VERTICAL |
| 4 7454.43 | 20.94 | 25.72 | 46.66 | 54.00 | 7.34 | VERTICAL |
| 5 7541.11 | 35.48 | 26.04 | 61.52 | 74.00 | 12.48 | HORIZONTAL |
| 6 7541.11 | 23.24 | 26.04 | 49.28 | 54.00 | 4.72 | HORIZONTAL |
| 710541.58 | 35.36 | 26.69 | 62.05 | 74.00 | 11.95 | VERTICAL |
| 810541.58 | 21.28 | 26.69 | 47.97 | 54.00 | 6.03 | VERTICAL |
| 910729.48 | 35.22 | 27.15 | 62.37 | 74.00 | 11.63 | VERTICAL |
| 1010729.48 | 21.08 | 27.15 | 48.23 | 54.00 | 5.77 | VERTICAL |
| 1110980.47 | 34.64 | 27.75 | 62.39 | 74.00 | 11.61 | VERTICAL |
| 1210980.47 | 21.65 | 27.75 | 49.40 | 54.00 | 4.60 | VERTICAL |

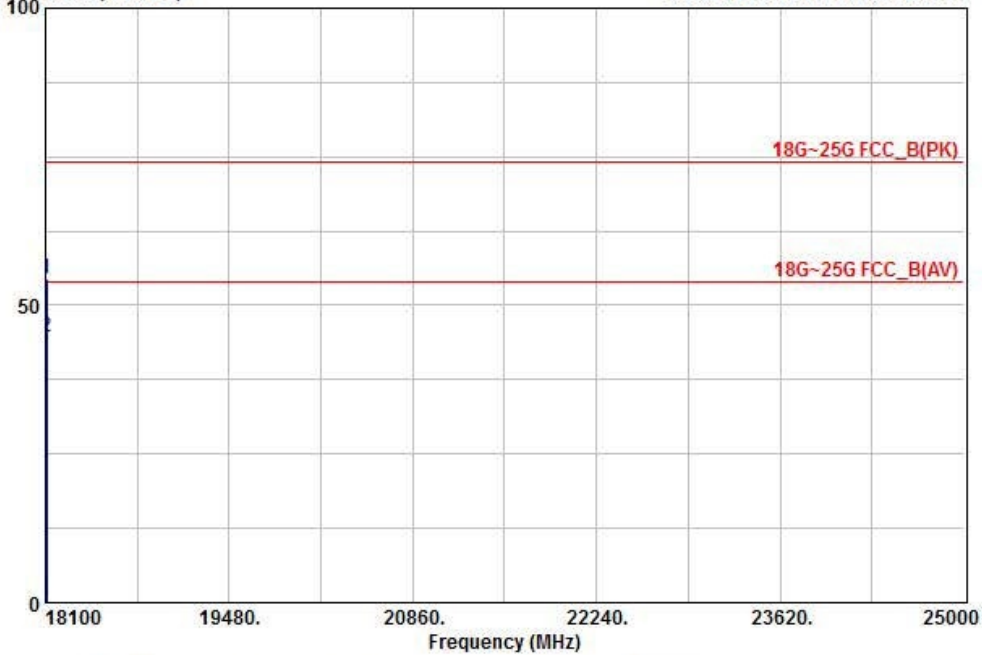
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
 Blue : Vertical Black : Horizontal



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EUT/Model No. : MIR-B001 Test Mode: BLE(mid) mode
 Tested by : BANG Y H Temp/Humi: 24 / 52

Data: 231 File: D:\LTA_e3\3_backup\1GHz 이상\2017\CH1_ABOVE 1GHz_1706-1.EMI (231) Date: 2017-06-27 Time: 21:46:27
 Level (dBuV/m)



| Freq | Reading | C.F | Result | Limit | Margin | Polarity |
|-----------|---------|-------|--------------|--------|--------|------------|
| MHz | dBuV | dB | PK dBuV/m | dBuV/m | dB | |
| 118111.40 | 41.50 | 13.11 | 54.61 | 74.00 | 19.39 | HORIZONTAL |
| 218111.40 | 31.50 | 13.11 | 44.61 | 54.00 | 9.39 | HORIZONTAL |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
 Blue : Vertical Black : Horizontal

Radiated Emissions (Above 1 GHz) – 2.4GHz BLE mode (HIGH)



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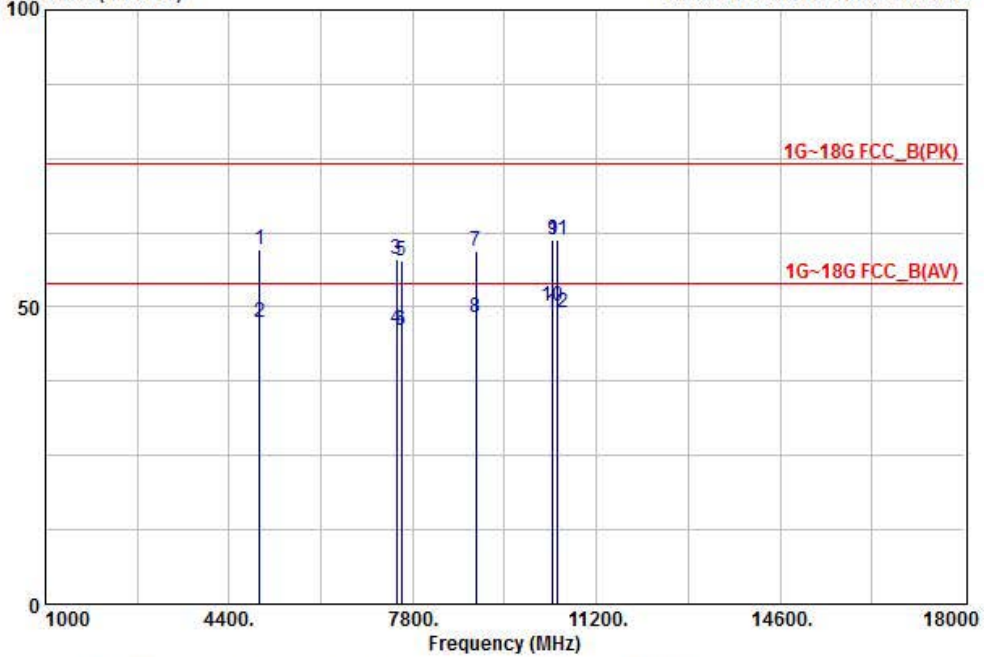
EUT/Model No. : MIR-B001

Test Mode: BLE(high) mode

Tested by : BANG Y H

Temp/Humi: 24 / 52

Data: 232 File: D:\LTA_e3\3_backup\1GHz 이상\2017\CH1_ABOVE 1GHz_1706-1.EMI (232) Date: 2017-06-27 Time: 21:55:58
 Level (dBuV/m)



| Freq MHz | Reading dBuV | C.F dB | Result PK dBuV/m | Limit dBuV/m | Margin dB | Polarity |
|---------------|-----------------|-----------|------------------------|-----------------|--------------|------------|
| 1 4962.67 | 43.58 | 16.17 | 59.75 | 74.00 | 14.25 | VERTICAL |
| 2 4962.67 | 31.27 | 16.17 | 47.44 | 54.00 | 6.56 | VERTICAL |
| 3 7497.65 | 31.90 | 26.17 | 58.07 | 74.00 | 15.93 | VERTICAL |
| 4 7497.65 | 20.27 | 26.17 | 46.44 | 54.00 | 7.56 | VERTICAL |
| 5 7584.83 | 31.76 | 25.87 | 57.63 | 74.00 | 16.37 | HORIZONTAL |
| 6 7584.83 | 20.09 | 25.87 | 45.96 | 54.00 | 8.04 | HORIZONTAL |
| 7 8969.16 | 33.69 | 25.76 | 59.45 | 74.00 | 14.55 | VERTICAL |
| 8 8969.16 | 22.47 | 25.76 | 48.23 | 54.00 | 5.77 | VERTICAL |
| 9 10393.71 | 34.79 | 26.44 | 61.23 | 74.00 | 12.77 | VERTICAL |
| 10 10393.71 | 23.71 | 26.44 | 50.15 | 54.00 | 3.85 | VERTICAL |
| 11 110484.23 | 34.79 | 26.57 | 61.36 | 74.00 | 12.64 | HORIZONTAL |
| 12 1210484.23 | 22.48 | 26.57 | 49.05 | 54.00 | 4.95 | HORIZONTAL |

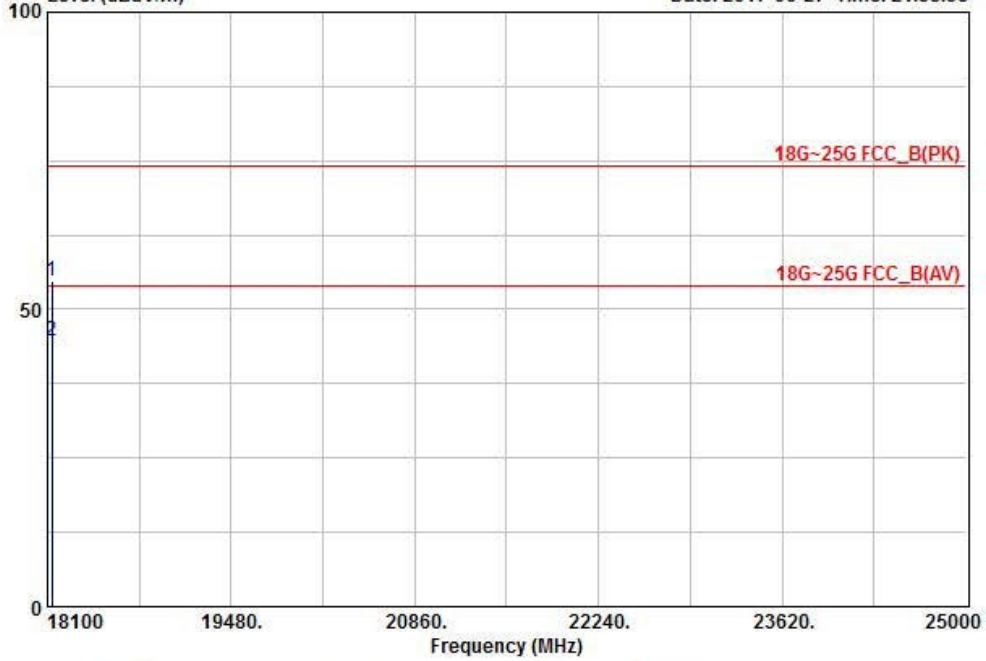
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
 Blue : Vertical Black : Horizontal



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EUT/Model No. : MIR-B001 Test Mode: BLE (high) mode
 Tested by : BANG Y H Temp/Humi: 24 / 52

Data: 232 File: D:\LTA_e3\3_backup\1GHz 이상\2017\CH1_ABOVE 1GHz_1706-1.EMI (232)
 Level (dBuV/m) Date: 2017-06-27 Time: 21:55:58



| Freq | Reading | C.F | Result | Limit | Margin | Polarity |
|-----------|---------|-------|--------------|--------|--------|------------|
| MHz | dBuV | dB | PK dBuV/m | dBuV/m | dB | |
| 118136.45 | 41.60 | 13.13 | 54.73 | 74.00 | 19.27 | HORIZONTAL |
| 218136.45 | 31.60 | 13.13 | 44.73 | 54.00 | 9.27 | HORIZONTAL |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
 Blue : Vertical Black : Horizontal

3.3.7 AC Conducted Emissions

Procedure:

AC power line conducted emissions from the EUT were measured according to the dictates of ANSI C63.4:2003.

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: **Complie**

- Refer to the next page.
- No other emissions were detected at a level greater than 20dB below limit
- It gave the worse case emissions

Minimum Standard: FCC Part 15.207(a)/EN 55022

| Frequency Range (MHz) | Conducted Limit (d. 1t892 ̢ BuV) | |
|--------------------------|-------------------------------------|------------|
| | Quasi-Peak | Average |
| 0.15 ~ 0.5 | 66 to 56 * | 56 to 46 * |
| 0.5 ~ 5 | 56 | 46 |
| 5 ~ 30 | 60 | 50 |

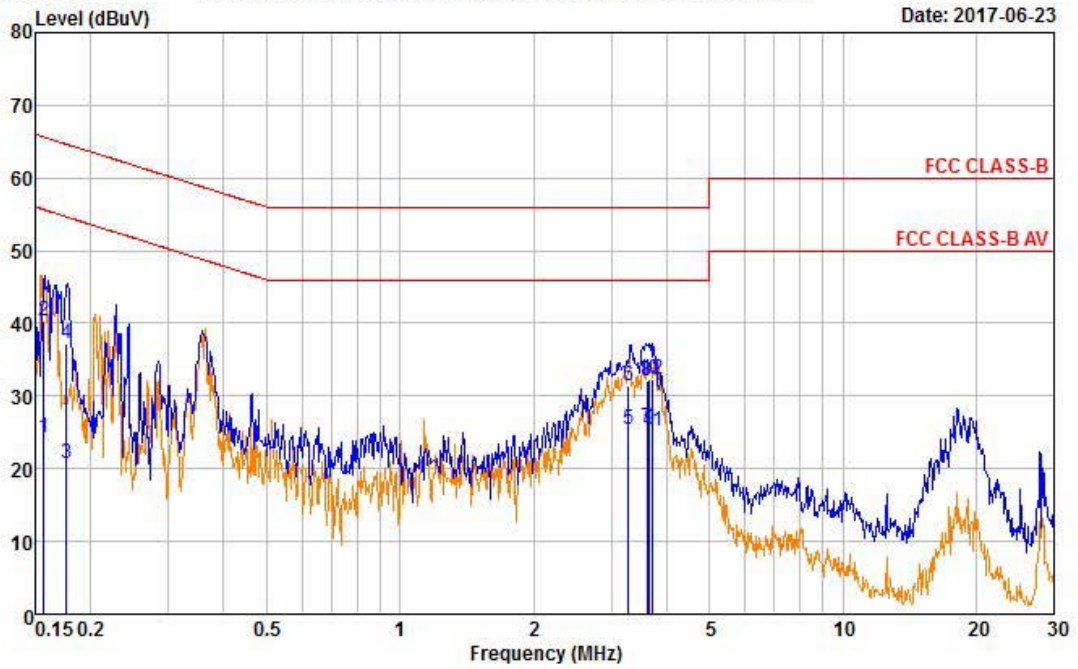
* Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz



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EUT / Model No. : MIR-B001 Phase : LINE
 Test Mode : BLE(low) mode Test Power : 120 / 60
 Temp. / Humi. : 21 / 42 Test Engineer : BANG Y H

Data: 2156 File: D:\Conducted Data\2017\LTA_Conduction_2017_06.EM6 (2156)



| Freq | RD | RD | C.F | Result | Result | Limit | Limit | Margin | Margin |
|-------|-------|-------|-------|--------|--------|-------|-------|--------|--------|
| MHz | QP | AV | dB | QP | AV | QP | AV | QP | AV |
| 0.157 | 30.33 | 14.21 | 10.10 | 40.43 | 24.31 | 65.64 | 55.64 | 25.21 | 31.33 |
| 0.177 | 27.05 | 10.58 | 10.10 | 37.15 | 20.68 | 64.64 | 54.64 | 27.49 | 33.96 |
| 3.281 | 21.10 | 15.13 | 10.24 | 31.34 | 25.37 | 56.00 | 46.00 | 24.66 | 20.63 |
| 3.607 | 21.94 | 15.34 | 10.25 | 32.19 | 25.59 | 56.00 | 46.00 | 23.81 | 20.41 |
| 3.667 | 22.15 | 15.16 | 10.25 | 32.40 | 25.41 | 56.00 | 46.00 | 23.60 | 20.59 |
| 3.715 | 22.16 | 14.92 | 10.25 | 32.41 | 25.17 | 56.00 | 46.00 | 23.59 | 20.83 |

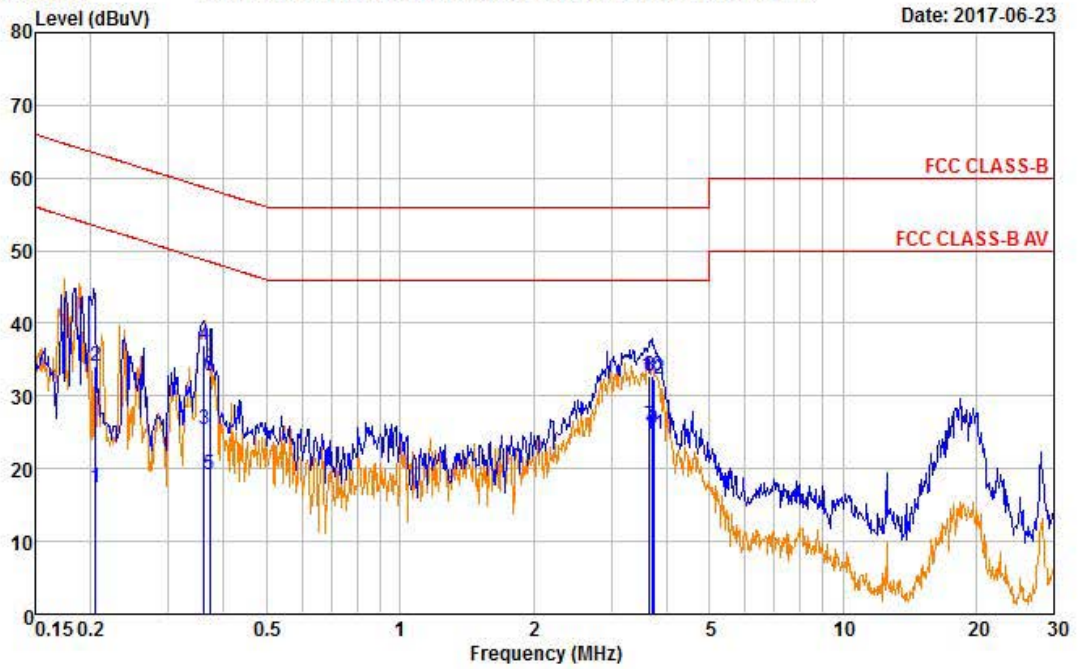
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter



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EUT / Model No. : MIR-B001 Phase : NEUTRAL
 Test Mode : BLE(low) mode Test Power : 120 / 60
 Temp. / Humi. : 21 / 42 Test Engineer : BANG Y H

Data: 2143 File: D:\Conducted Data\2017\LTA_Conduction_2017_06.EM6 (2152)



| Freq | RD | RD | C.F | Result | Result | Limit | Limit | Margin | Margin |
|-------|-------|-------|-------|--------|--------|-------|-------|--------|--------|
| MHz | QP | AV | dB | QP | AV | QP | AV | QP | AV |
| 0.205 | 23.95 | 7.23 | 10.17 | 34.12 | 17.40 | 63.41 | 53.41 | 29.29 | 36.01 |
| 0.361 | 26.82 | 15.24 | 10.19 | 37.01 | 25.43 | 58.72 | 48.72 | 21.71 | 23.29 |
| 0.372 | 22.47 | 9.08 | 10.19 | 32.66 | 19.27 | 58.46 | 48.46 | 25.80 | 29.19 |
| 3.657 | 22.53 | 15.61 | 10.30 | 32.83 | 25.91 | 56.00 | 46.00 | 23.17 | 20.09 |
| 3.723 | 22.52 | 15.01 | 10.30 | 32.82 | 25.31 | 56.00 | 46.00 | 23.18 | 20.69 |
| 3.751 | 21.99 | 14.46 | 10.30 | 32.29 | 24.76 | 56.00 | 46.00 | 23.71 | 21.24 |

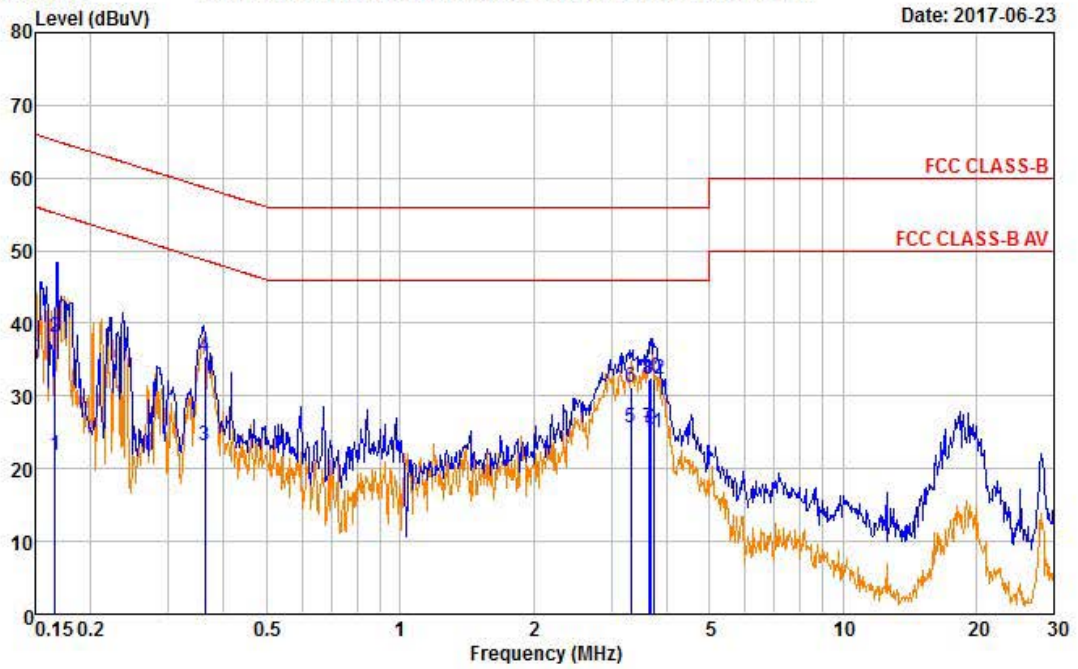
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter



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EUT / Model No. : MIR-B001 Phase : LINE
 Test Mode : BLE(mid) mode Test Power : 120 / 60
 Temp. / Humi. : 21 / 42 Test Engineer : BANG Y H

Data: 2160 File: D:\Conducted Data\2017\LTA_Conduction_2017_06.EM6 (2160)



| Freq | RD | RD | C.F | Result | Result | Limit | Limit | Margin | Margin |
|-------|-------|-------|-------|--------|--------|-------|-------|--------|--------|
| MHz | QP | AV | dB | QP | AV | QP | AV | QP | AV |
| 0.166 | 28.07 | 11.84 | 10.10 | 38.17 | 21.94 | 65.16 | 55.16 | 26.99 | 33.22 |
| 0.362 | 25.40 | 13.05 | 10.11 | 35.51 | 23.16 | 58.67 | 48.67 | 23.16 | 25.51 |
| 3.319 | 21.01 | 15.28 | 10.24 | 31.25 | 25.52 | 56.00 | 46.00 | 24.75 | 20.48 |
| 3.644 | 22.11 | 15.34 | 10.25 | 32.36 | 25.59 | 56.00 | 46.00 | 23.64 | 20.41 |
| 3.692 | 22.32 | 15.25 | 10.25 | 32.57 | 25.50 | 56.00 | 46.00 | 23.43 | 20.50 |
| 3.730 | 22.02 | 14.69 | 10.25 | 32.27 | 24.94 | 56.00 | 46.00 | 23.73 | 21.06 |

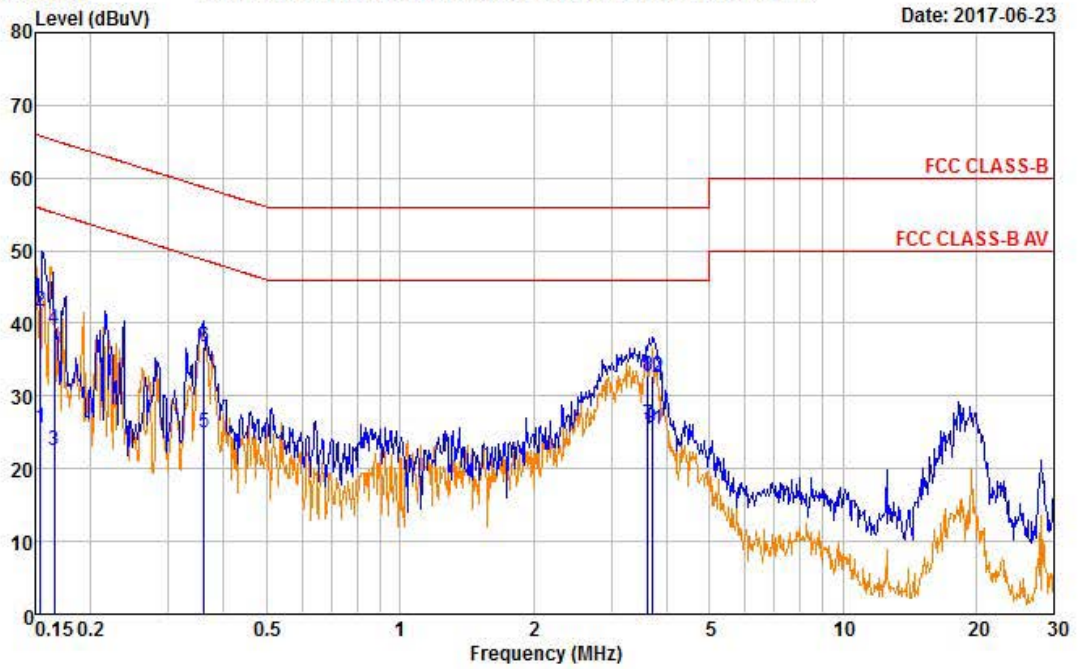
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter



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EUT / Model No. : MIR-B001 Phase : NEUTRAL
 Test Mode : BLE(mid) mode Test Power : 120 / 60
 Temp. / Humi. : 21 / 42 Test Engineer : BANG Y H

Data: 2147 File: D:\Conducted Data\2017\LTA_Conduction_2017_06.EM6 (2152)



| Freq | RD | RD | C.F | Result | Result | Limit | Limit | Margin | Margin |
|-------|-------|-------|-------|--------|--------|-------|-------|--------|--------|
| MHz | QP | AV | dB | QP | AV | QP | AV | QP | AV |
| 0.154 | 31.48 | 15.37 | 10.15 | 41.63 | 25.52 | 65.78 | 55.78 | 24.15 | 30.26 |
| 0.166 | 29.03 | 12.32 | 10.16 | 39.19 | 22.48 | 65.17 | 55.17 | 25.98 | 32.69 |
| 0.362 | 26.65 | 14.69 | 10.19 | 36.84 | 24.88 | 58.69 | 48.69 | 21.85 | 23.81 |
| 3.629 | 22.42 | 15.68 | 10.30 | 32.72 | 25.98 | 56.00 | 46.00 | 23.28 | 20.02 |
| 3.702 | 22.38 | 15.35 | 10.30 | 32.68 | 25.65 | 56.00 | 46.00 | 23.32 | 20.35 |
| 3.722 | 22.25 | 15.01 | 10.30 | 32.55 | 25.31 | 56.00 | 46.00 | 23.45 | 20.69 |

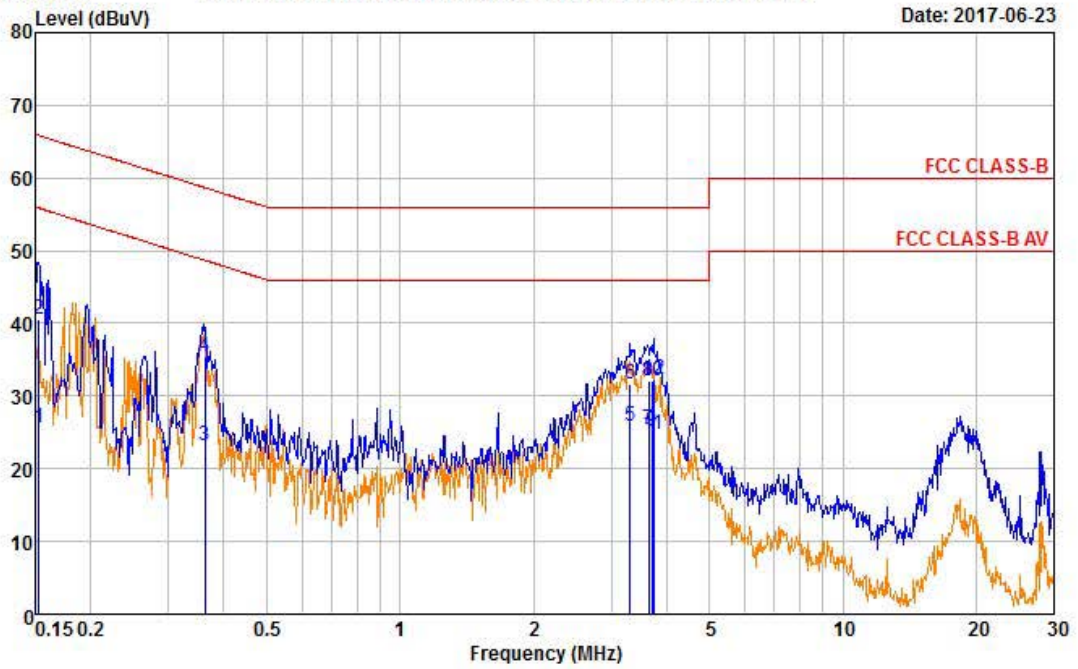
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter



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EUT / Model No. : MIR-B001 Phase : LINE
 Test Mode : BLE(high) mode Test Power : 120 / 60
 Temp. / Humi. : 21 / 42 Test Engineer : BANG Y H

Data: 2164 File: D:\Conducted Data\2017\LTA_Conduction_2017_06.EM6 (2164)



| Freq | RD | RD | C.F | Result | Result | Limit | Limit | Margin | Margin |
|-------|-------|-------|-------|--------|--------|-------|-------|--------|--------|
| MHz | QP | AV | dB | QP | AV | QP | AV | QP | AV |
| 0.153 | 30.51 | 15.46 | 10.10 | 40.61 | 25.56 | 65.83 | 55.83 | 25.22 | 30.27 |
| 0.362 | 25.35 | 13.09 | 10.11 | 35.46 | 23.20 | 58.67 | 48.67 | 23.21 | 25.47 |
| 3.302 | 21.45 | 15.72 | 10.24 | 31.69 | 25.96 | 56.00 | 46.00 | 24.31 | 20.04 |
| 3.642 | 21.88 | 15.05 | 10.25 | 32.13 | 25.30 | 56.00 | 46.00 | 23.87 | 20.70 |
| 3.705 | 21.94 | 14.84 | 10.25 | 32.19 | 25.09 | 56.00 | 46.00 | 23.81 | 20.91 |
| 3.735 | 22.00 | 14.58 | 10.25 | 32.25 | 24.83 | 56.00 | 46.00 | 23.75 | 21.17 |

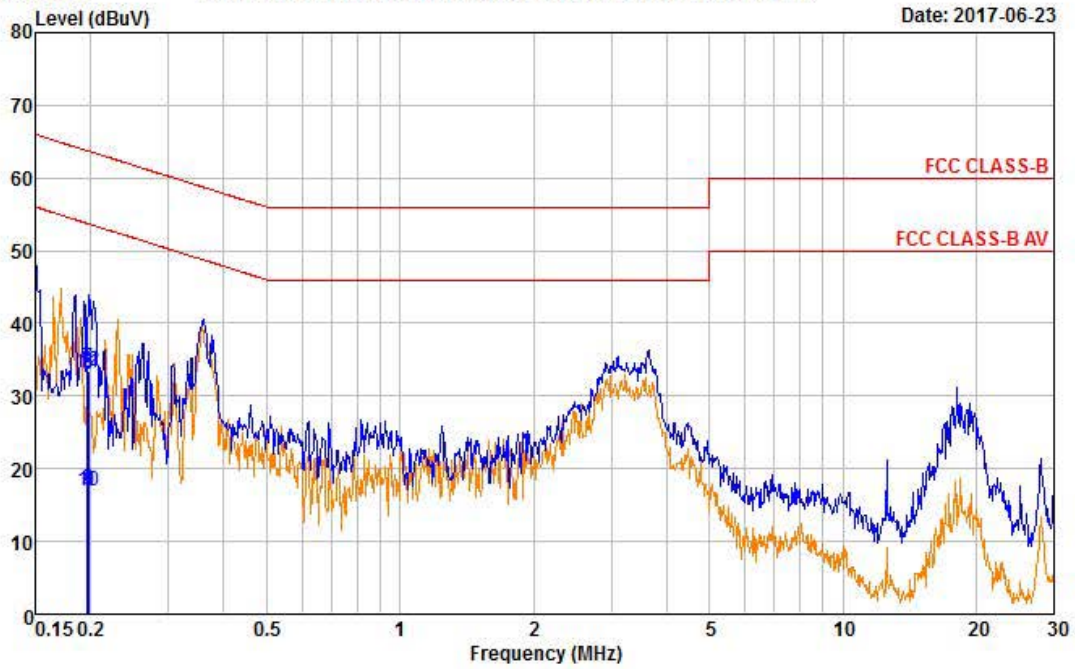
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter



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EUT / Model No. : MIR-B001 Phase : NEUTRAL
 Test Mode : BLE(high) mode Test Power : 120 / 60
 Temp. / Humi. : 21 / 42 Test Engineer : BANG Y H

Data: 2152 File: D:\Conducted Data\2017\LTA_Conduction_2017_06.EM6 (2152)



| Freq | RD | RD | C.F | Result | Result | Limit | Limit | Margin | Margin |
|-------|-------|------|-------|--------|--------|-------|-------|--------|--------|
| MHz | QP | AV | dB | QP | AV | QP | AV | QP | AV |
| | dBuV | dBuV | | dBuV | dBuV | dBuV | dBuV | dB | dB |
| 0.197 | 22.82 | 7.15 | 10.16 | 32.98 | 17.31 | 63.75 | 53.75 | 30.77 | 36.44 |
| 0.199 | 23.35 | 6.87 | 10.16 | 33.51 | 17.03 | 63.67 | 53.67 | 30.16 | 36.64 |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

APPENDIX
TEST EQUIPMENT USED FOR TESTS

| | Use | Description | Model No. | Serial No. | Manufacturer | Interval | Last Cal. Date |
|----|-----|--------------------------------------|------------------|-------------|------------------------|----------|----------------|
| 1 | ■ | Signal Analyzer (9 kHz ~ 30 GHz) | FSV30 | 100757 | R&S | 1 year | 2016-10-11 |
| 2 | ■ | Signal Generator (~3.2 GHz) | 8648C | 3623A02597 | HP | 1 year | 2017-03-20 |
| 3 | | SYNTHESIZED CW GENERATOR | 83711B | US34490456 | HP | 1 year | 2017-03-20 |
| 4 | | Attenuator (3 dB) | 8491A | 37822 | HP | 1 year | 2016-09-12 |
| 5 | | Attenuator (10 dB) | 8491A | 63196 | HP | 1 year | 2016-09-12 |
| 6 | ■ | EMI Test Receiver (~7 GHz) | ESCI7 | 100722 | R&S | 1 year | 2016-09-12 |
| 7 | ■ | RF Amplifier (~1.3 GHz) | 8447D OPT 010 | 2944A07684 | HP | 1 year | 2016-09-12 |
| 8 | ■ | RF Amplifier (1~26.5 GHz) | 8449B | 3008A02126 | HP | 1 year | 2017-03-21 |
| 9 | ■ | Horn Antenna (1~18 GHz) | 3115 | 00114105 | ETS | 2 year | 2016-08-04 |
| 10 | | DRG Horn (Small) | 3116B | 81109 | ETS-Lindgren | 2 year | 2016-05-03 |
| 11 | ■ | DRG Horn (Small) | 3116B | 133350 | ETS-Lindgren | 2 year | 2016-05-03 |
| 12 | ■ | TRILOG Antenna | VULB 9160 | 9160-3237 | SCHWARZBECK | 2 year | 2015-07-13 |
| 13 | | Temp.Humidity Data Logger | SK-L200TH II A | 00801 | SATO | 1 year | 2017-03-21 |
| 14 | | Splitter (SMA) | ZFSC-2-2500 | SF617800326 | Mini-Circuits | - | - |
| 15 | | Power Divider | 11636A | 06243 | HP | 1 year | 2016-09-12 |
| 16 | ■ | DC Power Supply | 6674A | 3637A01657 | Agilent | - | - |
| 17 | | Frequency Counter | 5342A | 2826A12411 | HP | 1 year | 2017-03-21 |
| 18 | ■ | Power Meter | EPM-441A | GB32481702 | HP | 1 year | 2017-03-20 |
| 19 | ■ | Power Sensor | 8481A | 3318A94972 | HP | 1 year | 2016-12-30 |
| 20 | | Audio Analyzer | 8903B | 3729A18901 | HP | 1 year | 2016-09-12 |
| 21 | | Modulation Analyzer | 8901B | 3749A05878 | HP | 1 year | 2016-09-12 |
| 22 | | TEMP & HUMIDITY Chamber | YJ-500 | LTAS06041 | JinYoung Tech | 1 year | 2016-09-12 |
| 23 | | Stop Watch | HS-3 | 812Q08R | CASIO | 2 year | 2017-03-21 |
| 24 | | LISN | KNW-407 | 8-1430-1 | Kyoritsu | 1 year | 2016-09-12 |
| 25 | ■ | Two-Lime V-Network | ESH3-Z5 | 893045/017 | R&S | 1 year | 2017-03-20 |
| 26 | | UNIVERSAL RADIO COMMUNICATION TESTER | CMU200 | 106243 | R&S | 1 year | 2017-03-20 |
| 27 | | Highpass Filter | WHKX1.5/15G-10SS | 74 | Wainwright Instruments | 1 year | 2017-03-20 |
| 28 | | Highpass Filter | WHKX3.0/18G-10SS | 118 | Wainwright Instruments | 1 year | 2017-03-20 |
| 29 | ■ | Active Loop Antenna | FMZB1519 | 1519-031 | SCHWARZBECK | 2 year | 2016-01-12 |
| 30 | | OSP120 BASE UNIT | OSP120 | 101230 | R&S | 1 year | 2017-03-21 |
| 31 | | Signal Generator(100 kHz ~ 40 GHz) | SMB100A03 | 177621 | R&S | 1 year | 2017-03-23 |
| 32 | | Signal Analyzer (10 Hz ~ 40 GHz) | FSV40 | 101367 | R&S | 1 year | 2017-03-21 |