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Dates of Tests: September 10 ~ September 28, 2017  
Test Report S/N: LR500111710D  
Test Site : LTA CO., LTD.

## CERTIFICATION OF COMPLIANCE

FCC ID.

**2ANM8IDM42**

APPLICANT

**INDI TAG Co.,Ltd.**

|                           |   |                                              |
|---------------------------|---|----------------------------------------------|
| Equipment Class           | : | Digital Transmission System (DTS)            |
| Manufacturing Description | : | Zigbee Tag                                   |
| Manufacturer              | : | INDI TAG Co.,Ltd.                            |
| Model name                | : | IDM42                                        |
| Test Device Serial No.:   | : | Identical prototype                          |
| Rule Part(s)              | : | FCC Part 15.247 Subpart C ; ANSI C-63.4-2014 |
| Frequency Range           | : | 2405 MHz ~ 2480 MHz                          |
| Max. Output Power         | : | Max 7.04 dBm – Conducted                     |
| Data of issue             | : | September 30, 2017                           |

This test report is issued under the authority of:

Yong-Cheol, Wang / Manager

The test was supervised by:

Jung-won, Seo / 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. 17159  
 Web site : <http://www.ltalab.com>  
 E-mail : [chahn@ltalab.com](mailto: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   | 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             | 2021-08-20 | KOLAS accredited Lab. |

## 2. Information about test item

### 2-1 Client & Manufacturer

Company name : INDI TAG Co., Ltd.  
Address : Nambusunhwan-ro 347-gil Seocho-gu, Seoul, Korea  
Tel / Fax : TEL No : +82-2-3272-0068

### 2-3 Equipment Under Test (EUT)

Trade name : INDI TAG Co.,Ltd.  
Model name : IDM42  
Serial number : Identical prototype  
Date of receipt : September 10, 2017  
EUT condition : Pre-production, not damaged  
Antenna type : IFA antenna - Max Gain 0 dBi  
Frequency Range : 2405 MHz ~ 2480 MHz  
RF output power : Max 7.04 dBm – Conducted  
Number of channels : 16  
Type of Modulation : Direct Sequence Spread Spectrum(DSSS)  
Power Source : 9 Vdc  
Firmware Version : V1.0.0

**2-3 Tested frequency**

| Zigbee          | LOW  | MID  | HIGH |
|-----------------|------|------|------|
| Frequency (MHz) | 2405 | 2440 | 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      | N/A             |
| 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 INDI TAG Co.,Ltd. FCC ID: 2ANM8IDM42 unit complies with the requirement of §15.203.

The antenna type is IFA Antenna

The sample was tested according to the following specification:

\*FCC Parts 15.247; ANSI C-63.4-2014

\*FCC KDB Publication No. 558074 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<br>(MHz) | Test Results             |          |
|--------------------|--------------------------|----------|
|                    | Measured Bandwidth (MHz) | Result   |
| 2405               | 1.664                    | Complies |
| 2440               | 1.512                    | Complies |
| 2480               | 1.483                    | Complies |

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

6 dB Bandwidth > 500 kHz

#### Measurement Setup

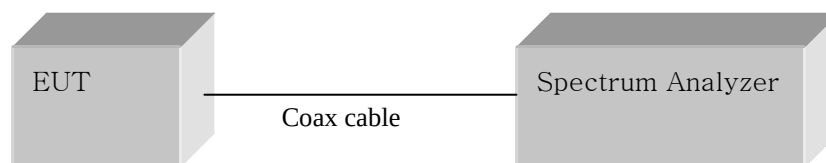
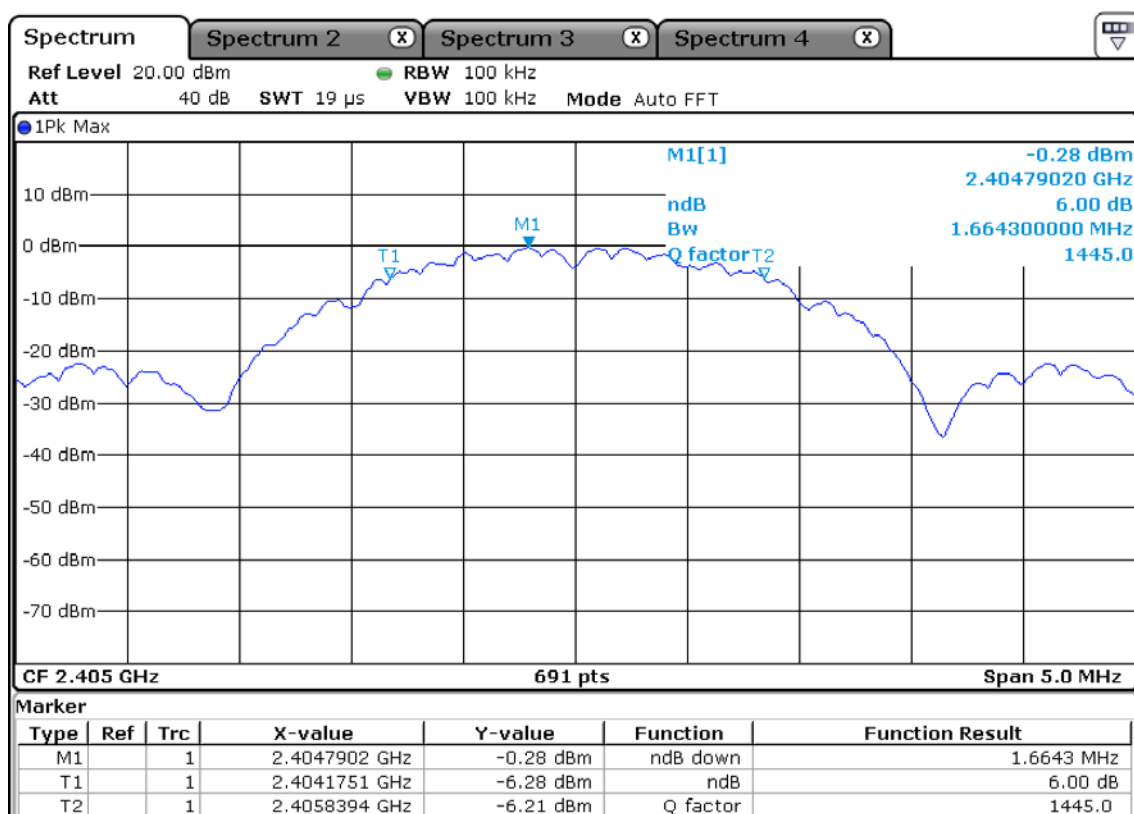
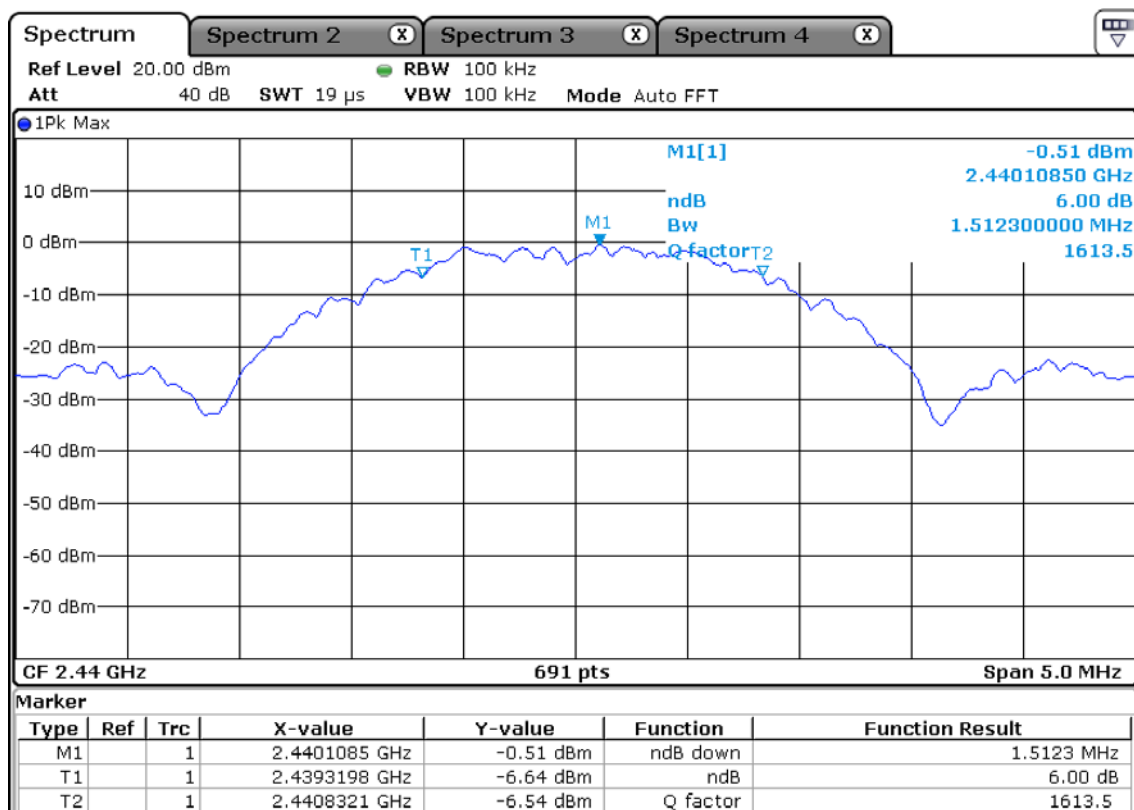


Figure 1: Measurement setup for the carrier frequency separation

## Low Channel

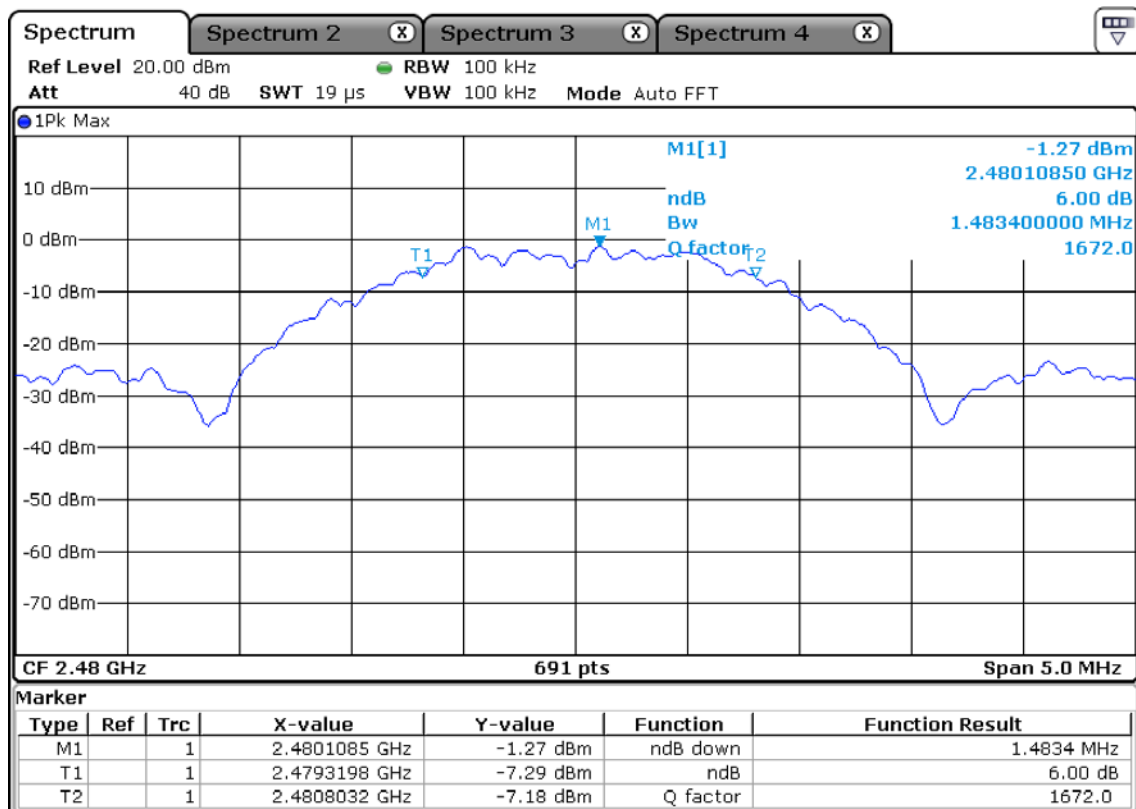


## Middle Channel





## High Channel



### 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 = 1MHz

Span = auto

VBW = 1MHz (VBW  $\geq$  RBW)

Sweep = auto

Detector function = peak

#### Measurement Data (Port 1) : **Complies**

| Frequency<br>(MHz) | Test Results |        |          |
|--------------------|--------------|--------|----------|
|                    | dBm          | W      | Result   |
| 2405               | 7.04         | 0.0050 | Complies |
| 2440               | 6.64         | 0.0046 | Complies |
| 2480               | 6.10         | 0.0041 | Complies |

- See next pages for actual measured spectrum plots.

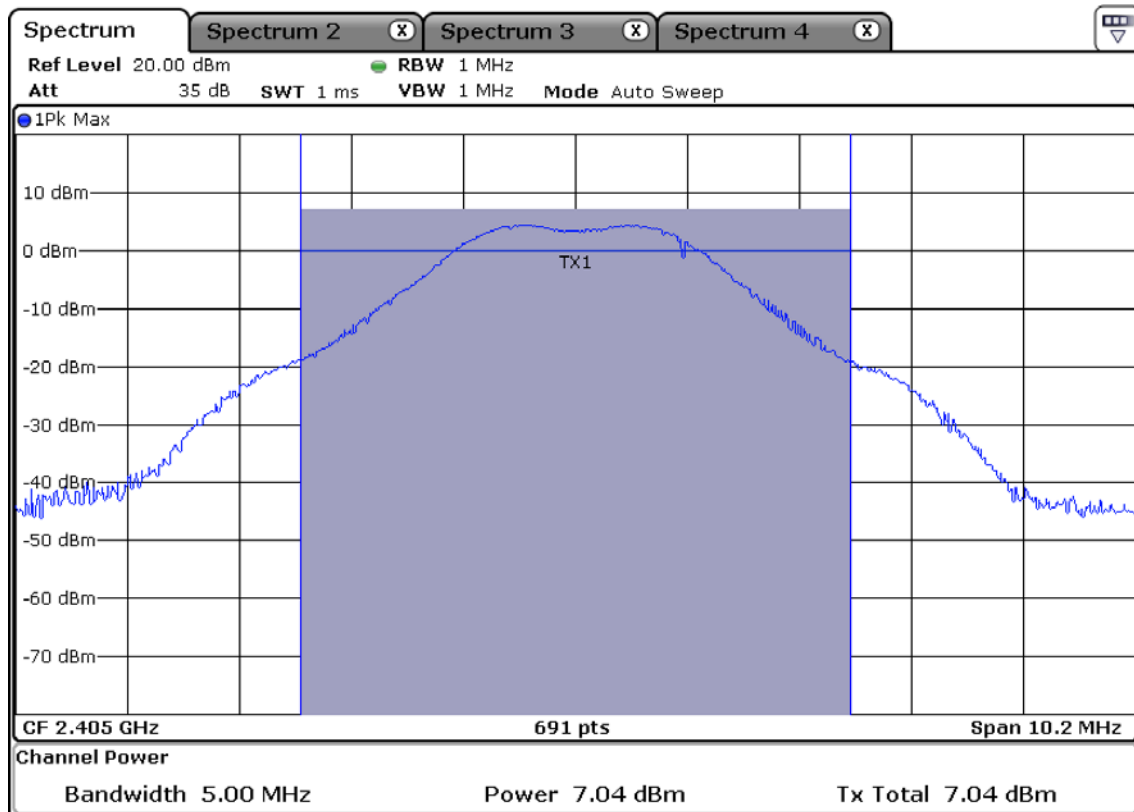
#### Minimum Standard:

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

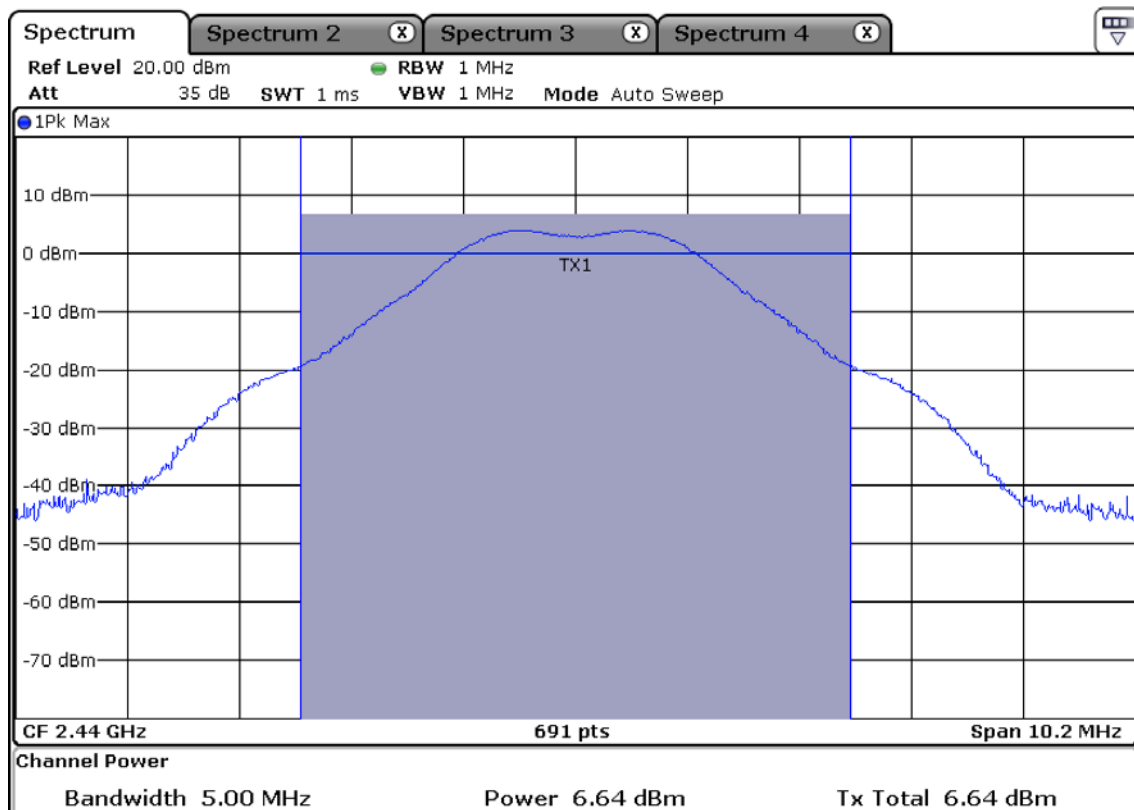
#### Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

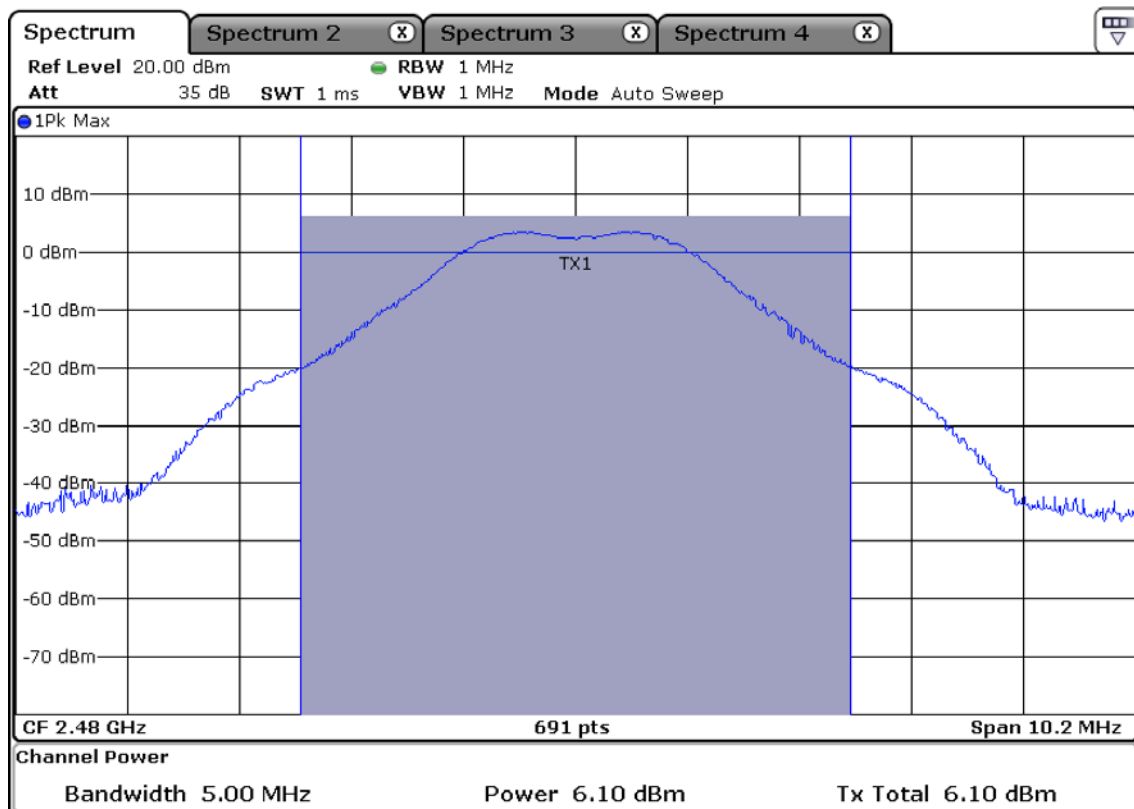
## Low Channel



## Middle Channel



## High Channel



### 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 (Port 1) : **Complies**

| Frequency<br>(MHz) | Test Results |          |
|--------------------|--------------|----------|
|                    | dBm @ 3kHz   | Result   |
| 2405               | -9.79        | Complies |
| 2440               | -10.60       | Complies |
| 2480               | -10.24       | Complies |

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

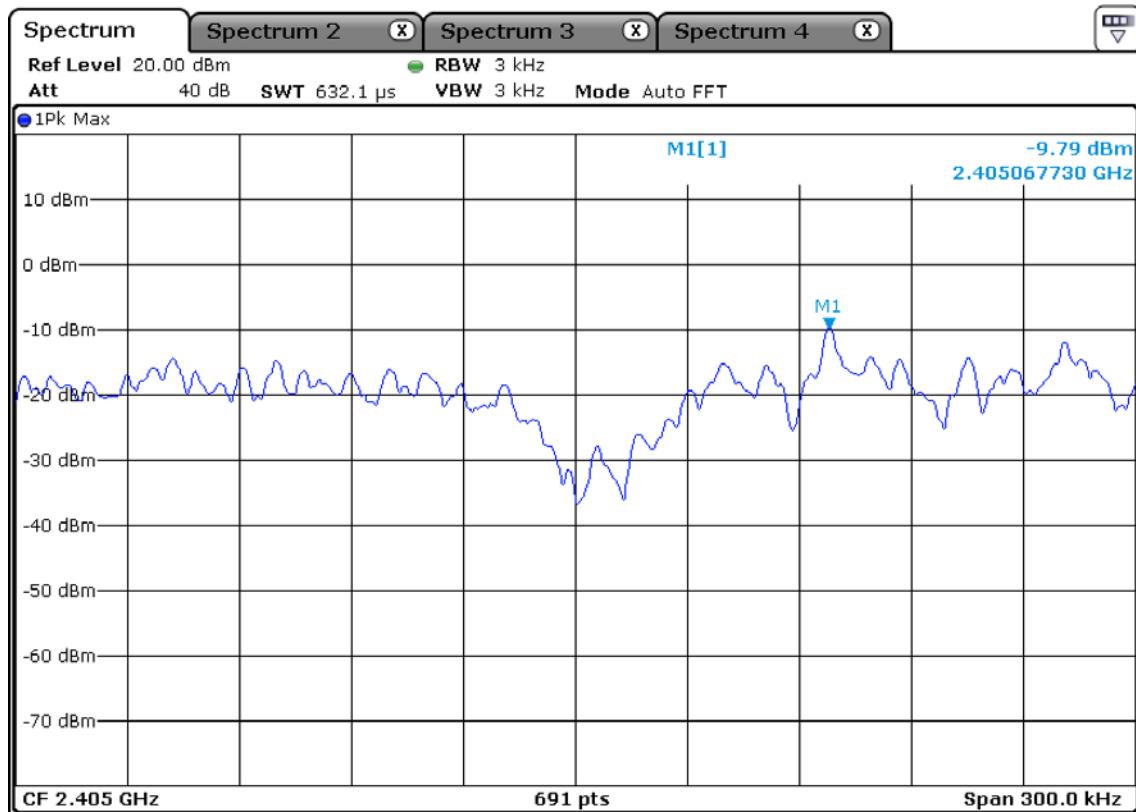
|                        |                    |
|------------------------|--------------------|
| Power Spectral Density | < 8 dBm @ 3 kHz BW |
|------------------------|--------------------|

#### Measurement Setup

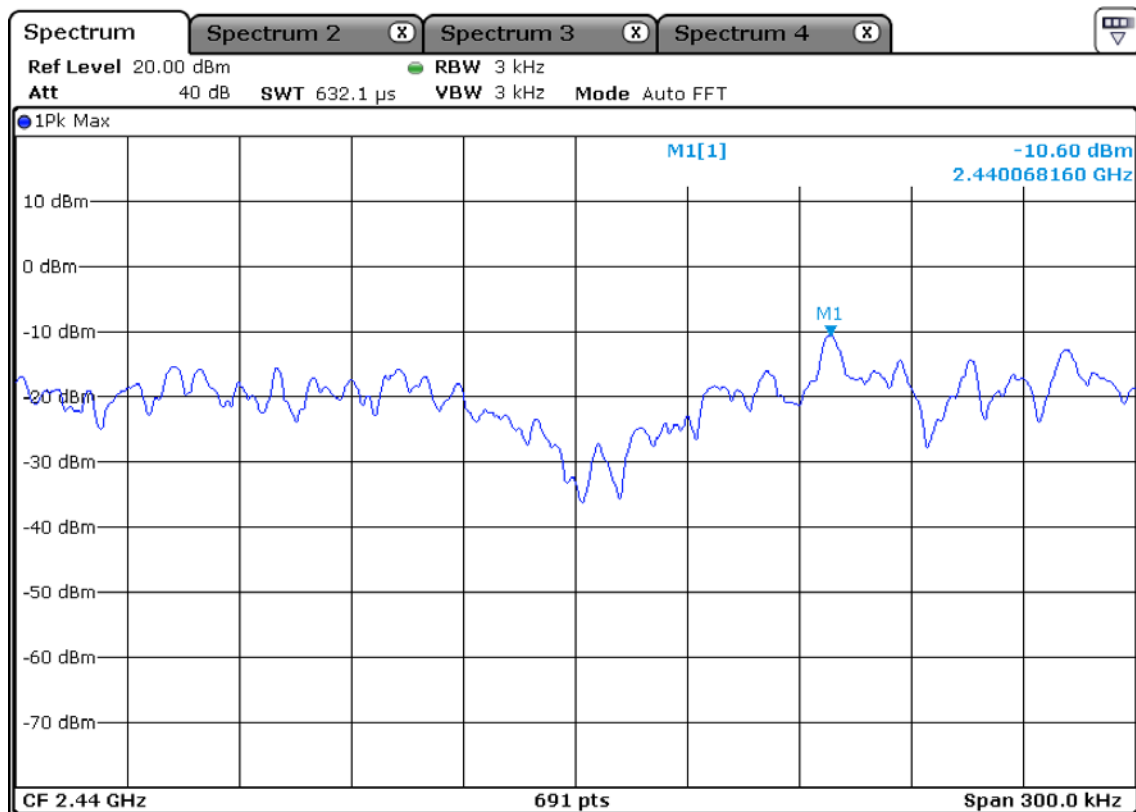
Same as the Chapter 3.2.1 (Figure 1)

## Power Density Measurement

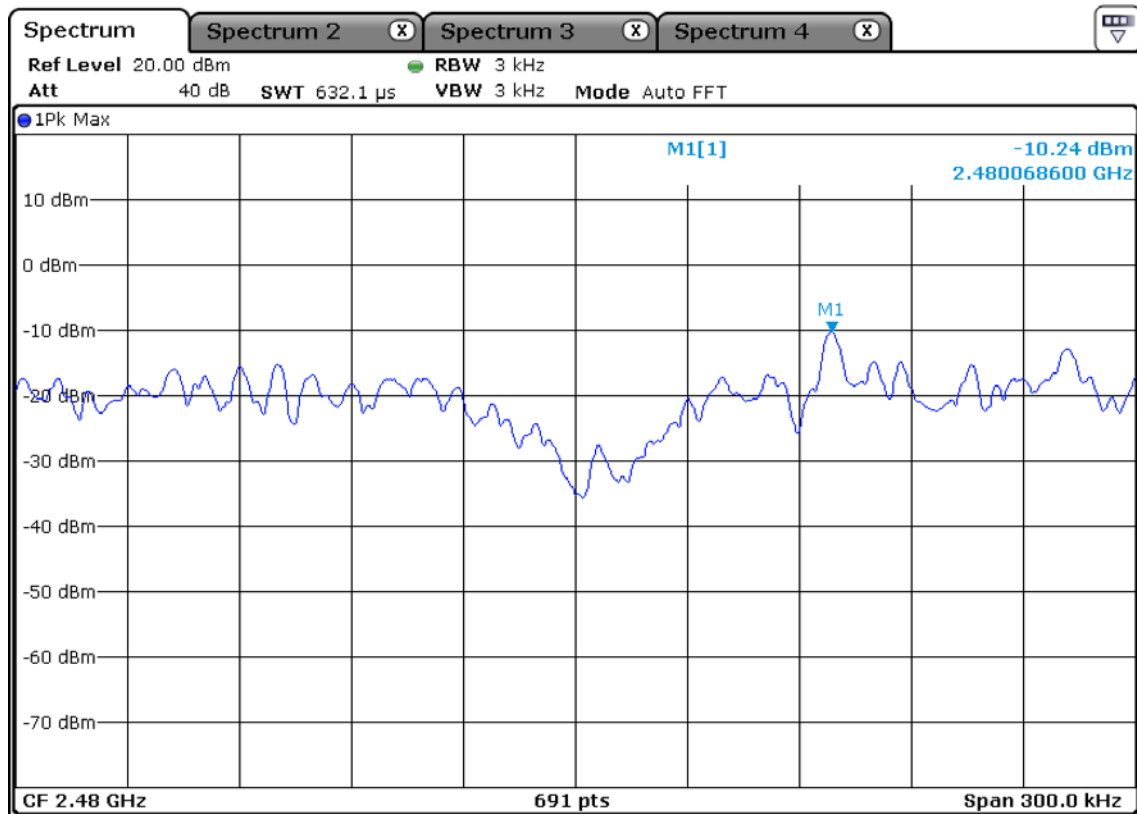
### Low Channel



### Middle Channel



## High Channel



### 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

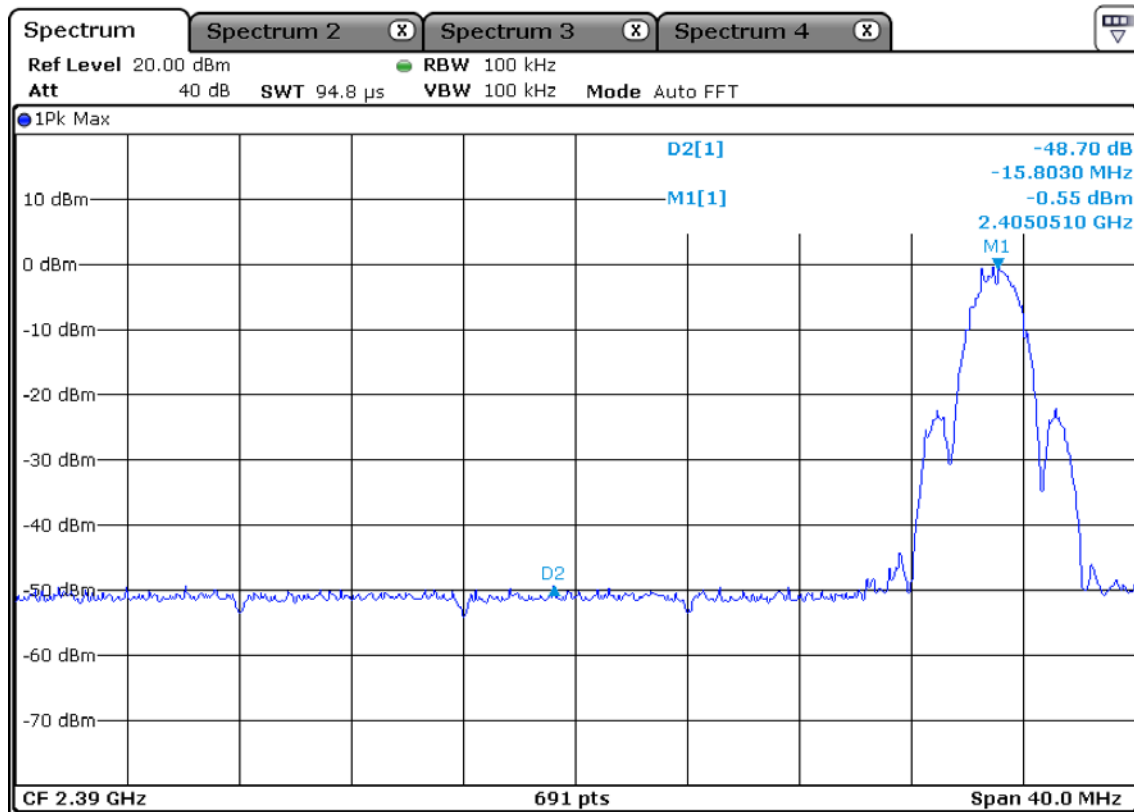
#### Measurement Data: Complies

- 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.

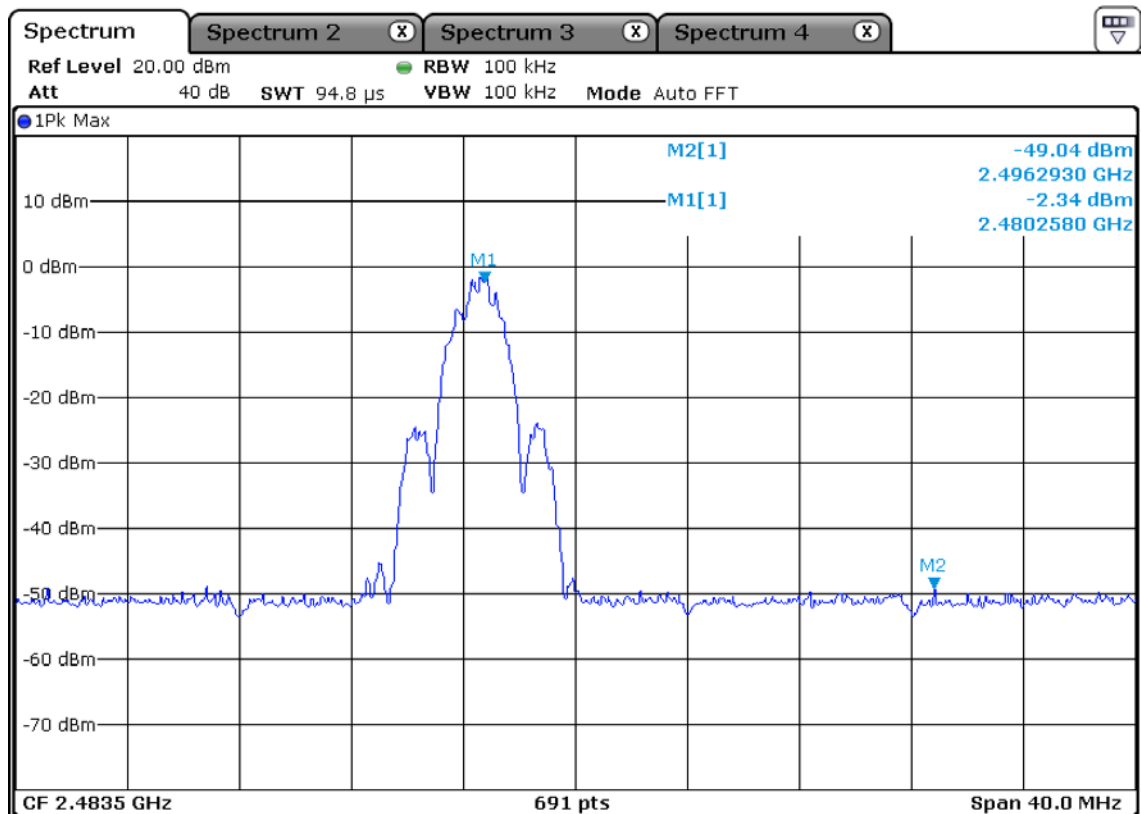
|                          |          |
|--------------------------|----------|
| <b>Minimum Standard:</b> | > 20 dBc |
|--------------------------|----------|



## Band edge Lower edge



## Upper edge



**Radiated Band-edges in the restricted band 2310-2390 MHz measurement**

| Frequency<br><br>[MHz] | Reading<br>[dBuV / m] |      | Pol. | Correction<br><br>Factor |                           | Limits<br>[dBuV / m] |           | Result<br>[dBuV / m] |           | Margin<br>[dB] |       |
|------------------------|-----------------------|------|------|--------------------------|---------------------------|----------------------|-----------|----------------------|-----------|----------------|-------|
|                        | AV / Peak             |      |      | Antenna                  | Amp. Gain<br>+ Cable Loss | AV / Peak            | AV / Peak | AV / Peak            | AV / Peak |                |       |
|                        |                       |      |      |                          |                           |                      |           |                      |           |                |       |
| 2389.2                 | 34.7                  | 49.5 | V    | 27.86                    | 22.92                     | 54                   | 74        | 39.64                | 54.44     | 14.36          | 19.56 |

**Radiated Band-edges in the restricted band 2483.5-2500 MHz measurement**

| Frequency<br><br>[MHz] | Reading<br>[dBuV / m] |      | Pol. | Correction<br><br>Factor |                           | Limits<br>[dBuV / m] |           | Result<br>[dBuV / m] |       | Margin<br>[dB] |      |
|------------------------|-----------------------|------|------|--------------------------|---------------------------|----------------------|-----------|----------------------|-------|----------------|------|
|                        | AV / Peak             |      |      | Antenna                  | Amp. Gain<br>+ Cable Loss | AV / Peak            | AV / Peak | AV / Peak            |       |                |      |
|                        |                       |      |      |                          |                           |                      |           |                      |       |                |      |
| 2483.9                 | 44.7                  | 61.8 | V    | 27.86                    | 22.92                     | 54                   | 74        | 49.64                | 66.74 | 4.36           | 7.26 |

**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.

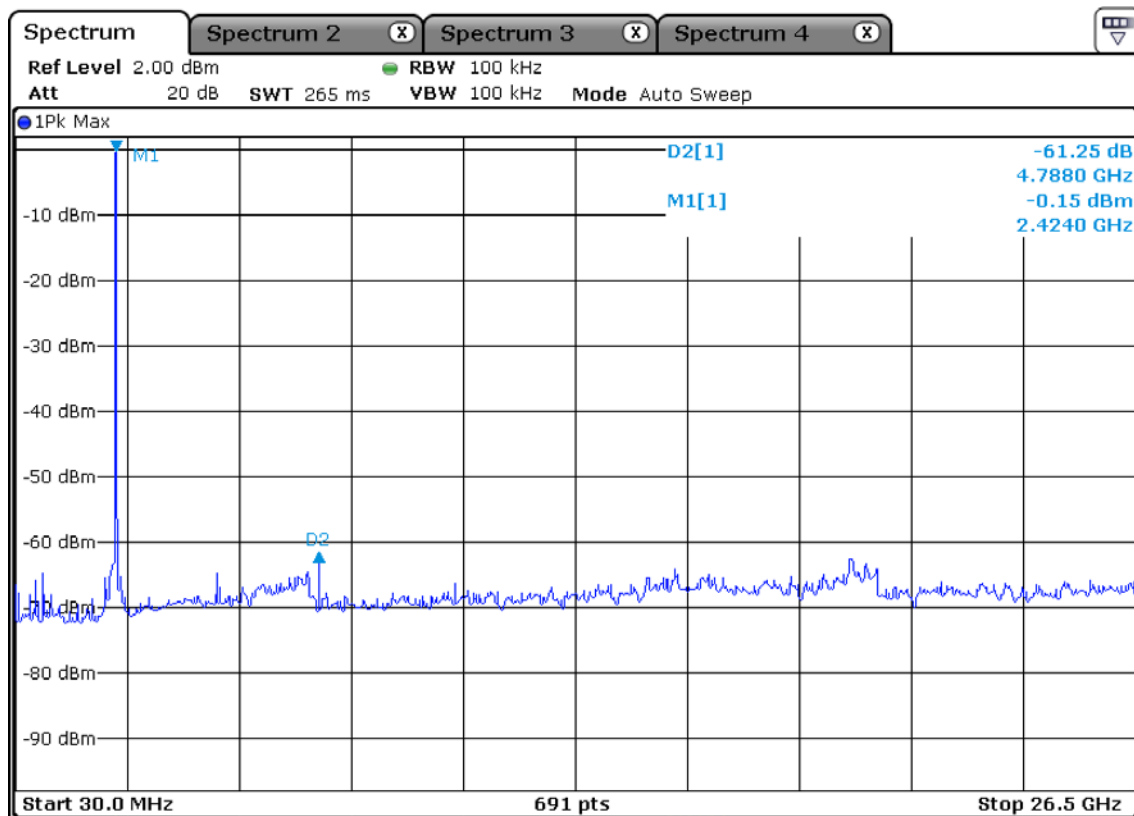
|                          |          |
|--------------------------|----------|
| <b>Minimum Standard:</b> | > 20 dBc |
|--------------------------|----------|

**Measurement Setup**

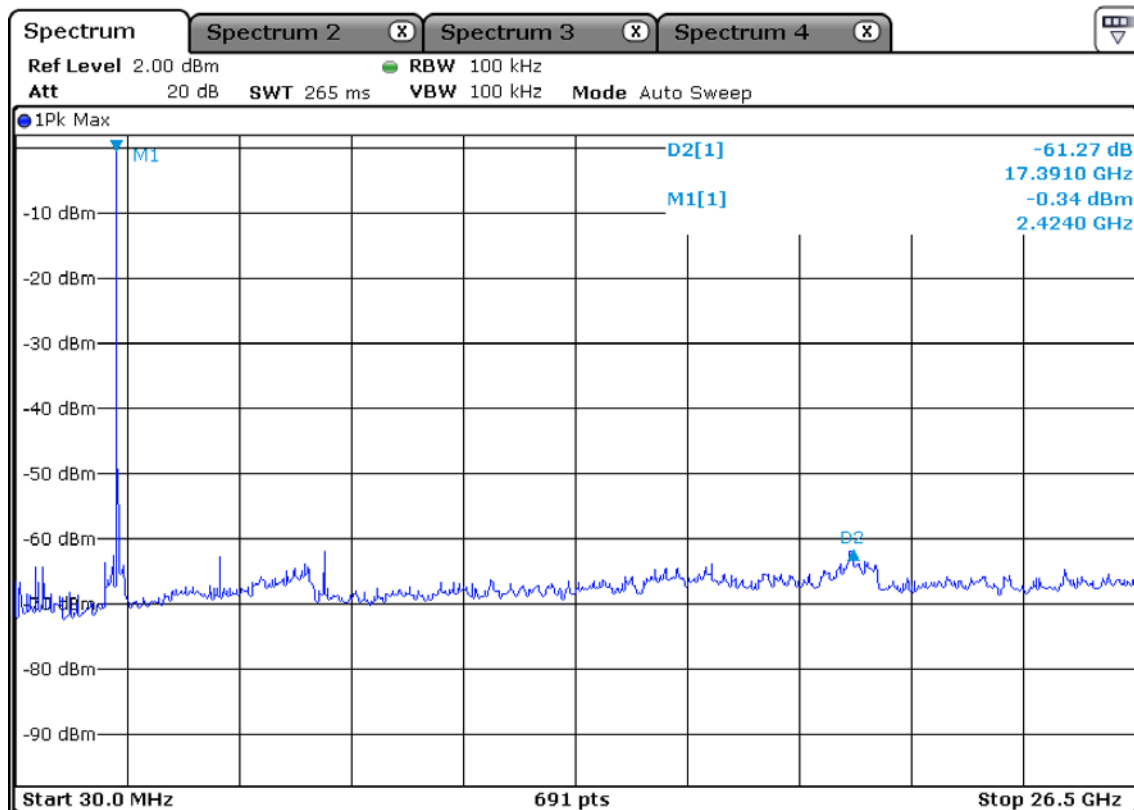
Same as the Chapter 3.2.1 (Figure 1)

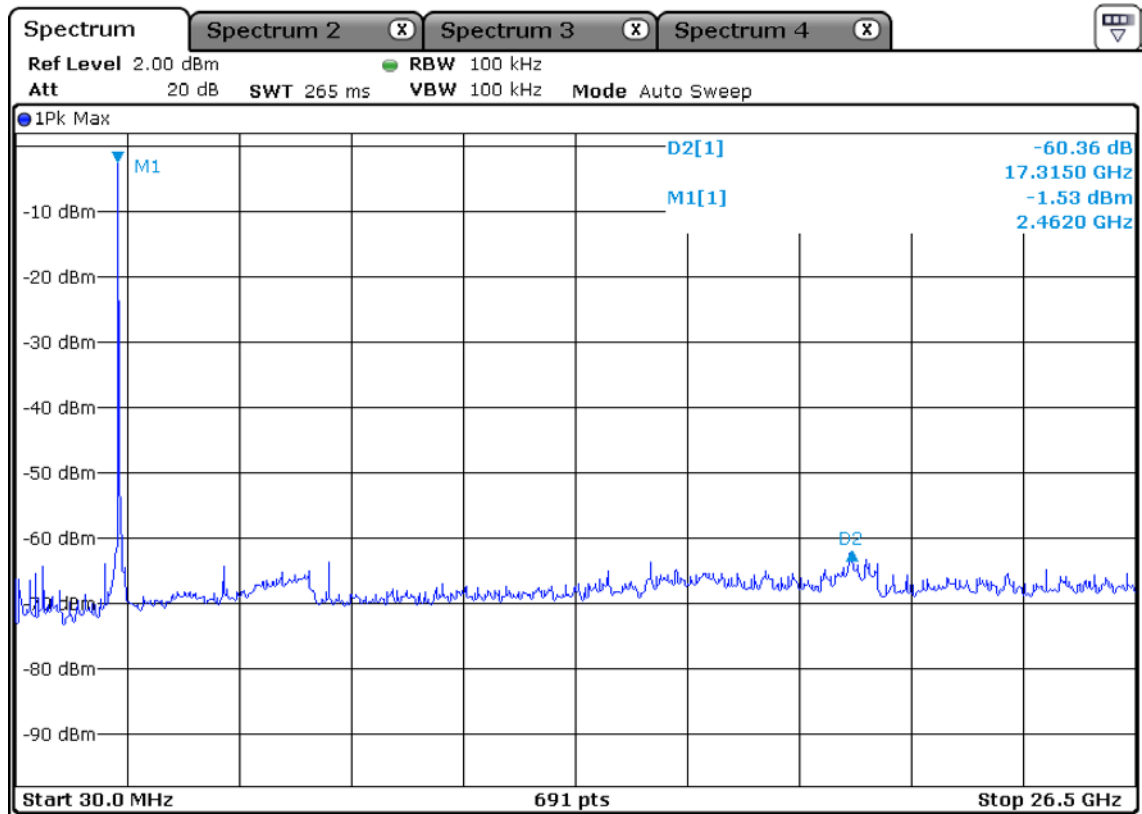
## Unwanted Emission – Low Channel

### Frequency Range = 30 MHz ~ 26.5 GHz



## Middle Channel



**High Channel**

### 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 ~ 10<sup>th</sup> harmonic.

RBW = 100 kHz ( 30 MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

Span = 100 MHz

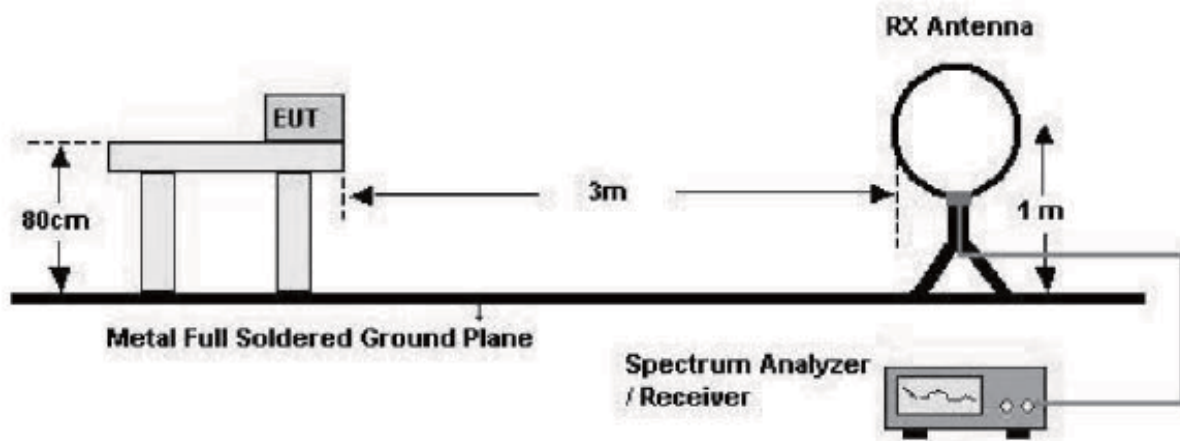
Trace = max hold

VBW  $\geq$  RBW

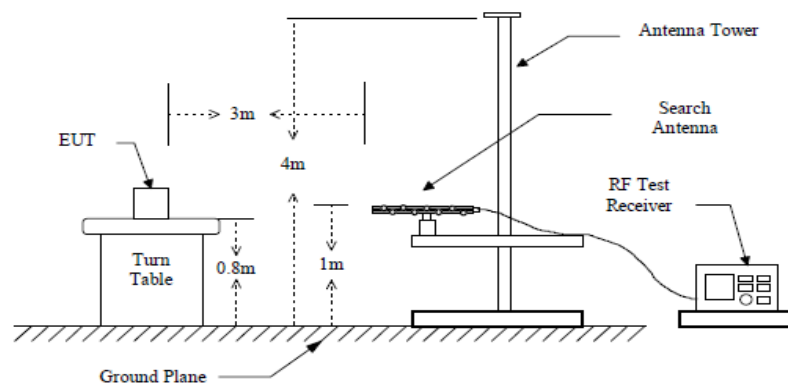
Detector function = peak

Sweep = auto

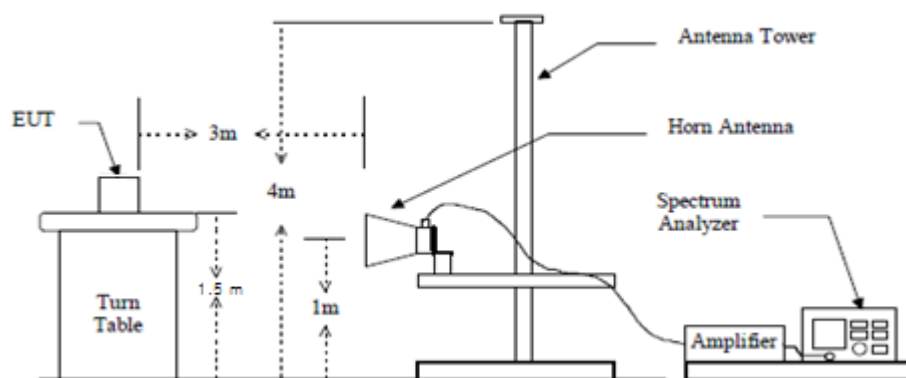
**below 30 MHz**



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)**

| Frequency<br><br>[MHz] | Reading<br>[dBuV / m] |      | Pol. | Correction<br><br>Factor |                | Limits<br>[dBuV / m] |    | Result<br>[dBuV / m] |       | Margin<br>[dB] |       |
|------------------------|-----------------------|------|------|--------------------------|----------------|----------------------|----|----------------------|-------|----------------|-------|
|                        | AV / Peak             |      |      | Antenna                  | Amp.Gain+Cable | AV/Peak              |    | AV/Peak              |       | AV / Peak      |       |
|                        |                       |      |      |                          |                |                      |    |                      |       |                |       |
| 2845.6                 | 32.2                  | 45.3 | H    | 28.91                    | 22.83          | 54                   | 74 | 38.28                | 51.38 | 15.72          | 22.62 |
| 2905.3                 | 31.1                  | 45.2 | V    | 28.91                    | 22.11          | 54                   | 74 | 37.90                | 52.00 | 16.10          | 22.00 |
| 2995.3                 | 31.7                  | 45.2 | V    | 28.91                    | 21.13          | 54                   | 74 | 39.48                | 52.98 | 14.52          | 21.02 |

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

**Measurement Data : (Below 1 GHz)**

| Frequency<br><br>[MHz] | Reading<br><br>[dBuV / m] |      | Pol. | Correction<br><br>Factor |                | Limits<br><br>[dBuV / m] |    | Result<br><br>[dBuV / m] |       | Margin<br><br>[dB] |       |
|------------------------|---------------------------|------|------|--------------------------|----------------|--------------------------|----|--------------------------|-------|--------------------|-------|
|                        | AV / Peak                 |      |      | Antenna                  | Amp.Gain+Cable | AV/Peak                  |    | AV/Peak                  |       | AV / Peak          |       |
|                        |                           |      |      |                          |                |                          |    |                          |       |                    |       |
| 38.7                   | 49.9                      | 57.9 | V    | 11.9                     | 26.3           | 54                       | 74 | 35.50                    | 43.51 | 18.50              | 30.49 |
| 38.7                   | 50.8                      | 58.4 | V    | 11.9                     | 26.3           | 54                       | 74 | 36.38                    | 44.01 | 17.62              | 29.99 |
| 38.73                  | 51.4                      | 60.1 | V    | 11.9                     | 26.3           | 54                       | 74 | 37.01                    | 45.71 | 16.99              | 28.29 |

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

**Measurement Data: (9 kHz – 30 MHz)**

| Frequency<br>[MHz]                                                    | Reading<br>[dBuV / m] | Pol. | Correction<br>Factor    | Limits<br>[dBuV / m] | Result<br>[dBuV / m] | Margin<br>[dB] |
|-----------------------------------------------------------------------|-----------------------|------|-------------------------|----------------------|----------------------|----------------|
|                                                                       | Peak                  |      | Antenna +Cable-Amp.Gain | Peak                 | Peak                 | 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) – 2.4 GHz Zigbee(Low) mode, Vertical**

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Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: IDM42

Temp/Humi: 24 / 58

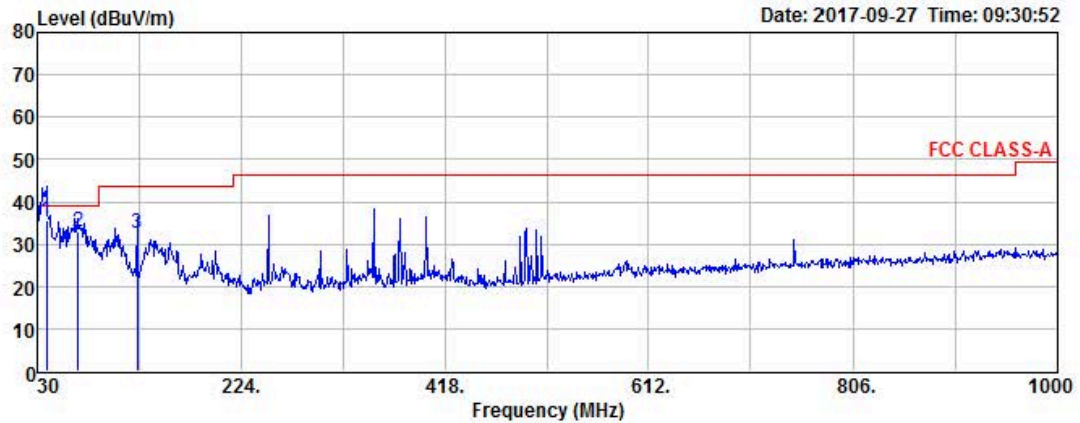
Test Mode : Wireless mode (LOW)

Tested by: LEE H W

Data: 1581

File: C:\Program Files (x86)\e3\1709-1.EM6 (1680)

Date: 2017-09-27 Time: 09:30:52



| Freq   | Reading | C.F    | Result       | Limit  | Margin | Height | Angle | Polarity |
|--------|---------|--------|--------------|--------|--------|--------|-------|----------|
| MHz    | dBuV    | dB     | QP<br>dBuV/m | dBuV/m | dB     | cm     | deg   |          |
| 38.73  | 49.89   | -14.35 | 35.54        | 39.00  | 3.46   | 284    | 121   | VERTICAL |
| 68.80  | 48.72   | -15.64 | 33.08        | 39.00  | 5.92   | 263    | 30    | VERTICAL |
| 125.06 | 45.66   | -13.31 | 32.35        | 43.50  | 11.15  | 167    | 281   | VERTICAL |

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

**Radiated Emissions (Below 1 GHz) – 2.4GHz Zigbee(Middle) mode, Vertical**

4, Songjiuro 236Beon-gil, yanggi-myeon,  
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EUT/Model No.: IDM42

Temp/Humi: 24 / 58

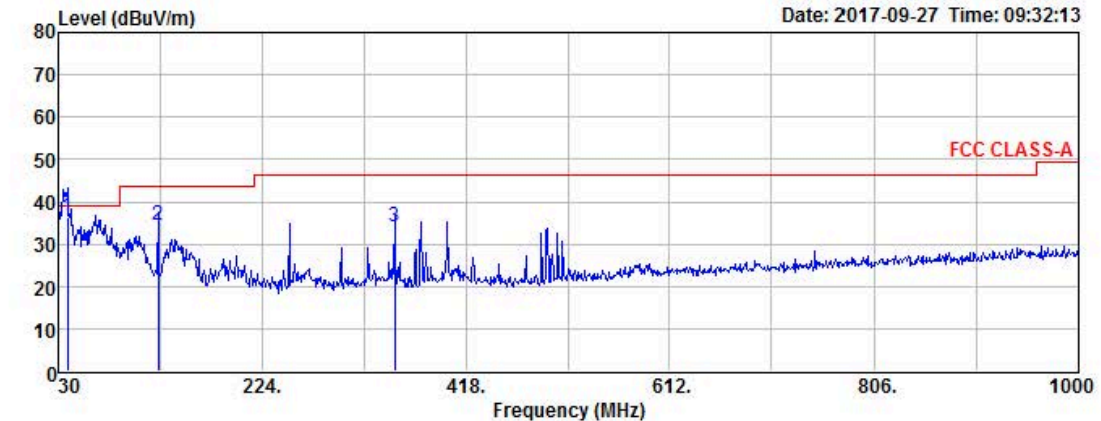
Test Mode : Wireless mode (MID)

Tested by: LEE H W

Data: 1583

File: C:\Program Files (x86)\e3\1709-1.EM6 (1680)

Date: 2017-09-27 Time: 09:32:13



| Freq   | Reading | C.F    | Result       | Limit  | Margin | Height | Angle | Polarity |
|--------|---------|--------|--------------|--------|--------|--------|-------|----------|
| MHz    | dBuV    | dB     | QP<br>dBUV/m | dBUV/m | dB     | cm     | deg   |          |
| 38.73  | 50.77   | -14.35 | 36.42        | 39.00  | 2.58   | 184    | 311   | VERTICAL |
| 125.06 | 47.83   | -13.31 | 34.52        | 43.50  | 8.98   | 103    | 318   | VERTICAL |
| 350.10 | 43.49   | -9.59  | 33.90        | 46.40  | 12.50  | 127    | 11    | VERTICAL |

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

**Radiated Emissions (Below 1 GHz) – 2.4GHz Zigbee(High) mode, Vertical**

4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: IDM42

Temp/Humi: 24 / 58

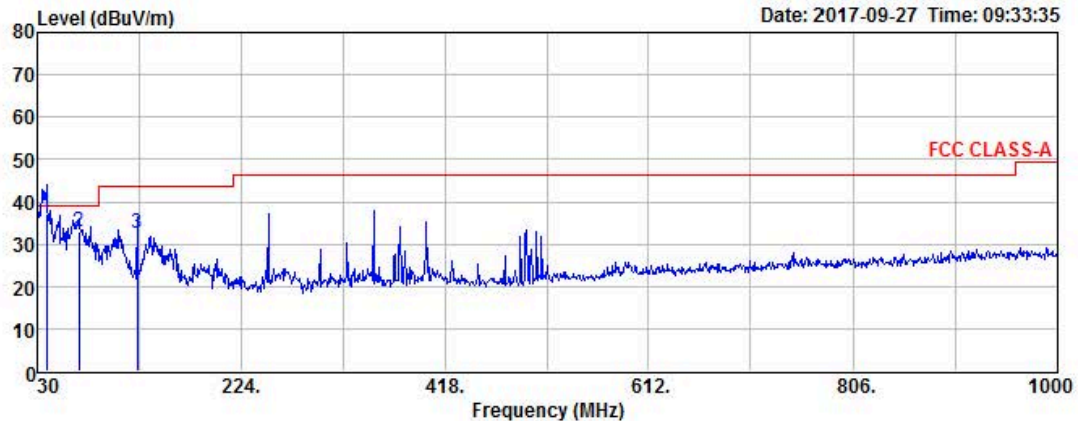
Test Mode : Wireless mode (HIGH)

Tested by: LEE H W

Data: 1585

File: C:\Program Files (x86)\e3\1709-1.EM6 (1680)

Date: 2017-09-27 Time: 09:33:35



| Freq   | Reading | C.F    | Result       | Limit  | Margin | Height | Angle | Polarity |
|--------|---------|--------|--------------|--------|--------|--------|-------|----------|
| MHz    | dBuV    | dB     | QP<br>dBuV/m | dBuV/m | dB     | cm     | deg   |          |
| 38.73  | 51.36   | -14.35 | 37.01        | 39.00  | 1.99   | 294    | 52    | VERTICAL |
| 69.77  | 48.77   | -15.75 | 33.02        | 39.00  | 5.98   | 166    | 287   | VERTICAL |
| 125.06 | 45.70   | -13.31 | 32.39        | 43.50  | 11.11  | 206    | 163   | VERTICAL |

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

**Radiated Emissions (Below 1 GHz) – 2.4 GHz Zigbee(Low) mode, Horizontal**

4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: IDM42

Temp/Humi: 24 / 58

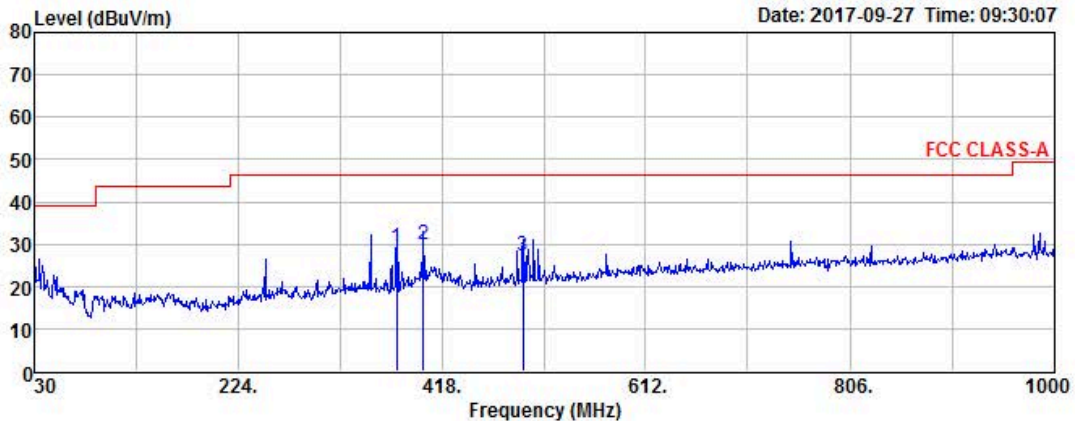
Test Mode : Wireless mode (LOW)

Tested by: LEE H W

Data: 1580

File: C:\Program Files (x86)\e3\1709-1.EM6 (1680)

Date: 2017-09-27 Time: 09:30:07



| Freq   | Reading | C.F   | Result       | Limit  | Margin | Height | Angle | Polarity   |
|--------|---------|-------|--------------|--------|--------|--------|-------|------------|
| MHz    | dBuV    | dB    | QP<br>dBuV/m | dBuV/m | dB     | cm     | deg   |            |
| 375.32 | 38.20   | -8.94 | 29.26        | 46.40  | 17.14  | 136    | 244   | HORIZONTAL |
| 400.54 | 38.34   | -8.49 | 29.85        | 46.40  | 16.55  | 118    | 260   | HORIZONTAL |
| 495.60 | 33.86   | -6.73 | 27.13        | 46.40  | 19.27  | 262    | 201   | HORIZONTAL |

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

**Radiated Emissions (Below 1 GHz) – 2.4GHz Zigbee(Middle) mode, Horizontal**

4, Songjiuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: IDM42

Temp/Humi: 24 / 58

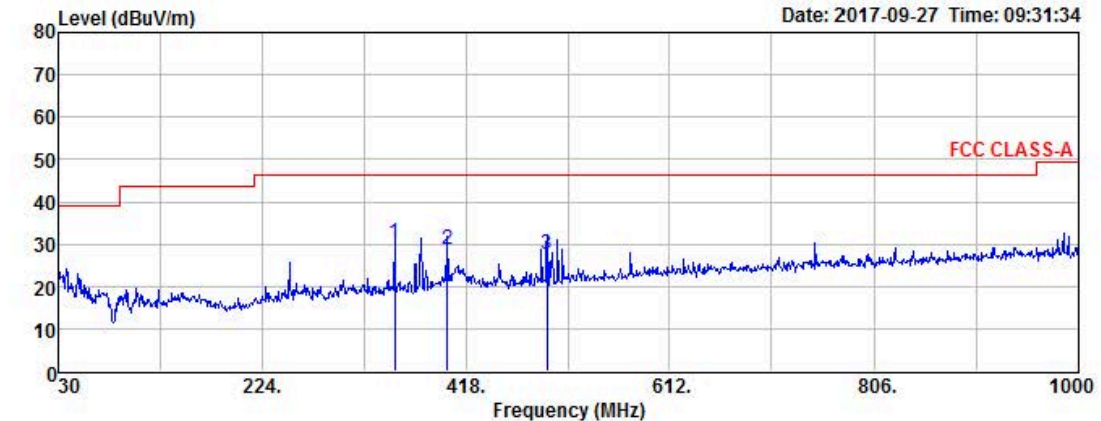
Test Mode : Wireless mode (MID)

Tested by: LEE H W

Data: 1582

File: C:\Program Files (x86)\e3\1709-1.EM6 (1680)

Date: 2017-09-27 Time: 09:31:34



| Freq   | Reading | C.F   | Result       | Limit  | Margin | Height | Angle | Polarity   |
|--------|---------|-------|--------------|--------|--------|--------|-------|------------|
| MHz    | dBuV    | dB    | QP<br>dBuV/m | dBuV/m | dB     | cm     | deg   |            |
| 350.10 | 40.02   | -9.59 | 30.43        | 46.40  | 15.97  | 107    | 244   | HORIZONTAL |
| 400.54 | 37.07   | -8.49 | 28.58        | 46.40  | 17.82  | 292    | 23    | HORIZONTAL |
| 495.60 | 34.40   | -6.73 | 27.67        | 46.40  | 18.73  | 170    | 277   | HORIZONTAL |

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



**Radiated Emissions (Below 1 GHz) – 2.4GHz Zigbee(High) mode, Horizontal**

4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: IDM42

Temp/Humi: 24 / 58

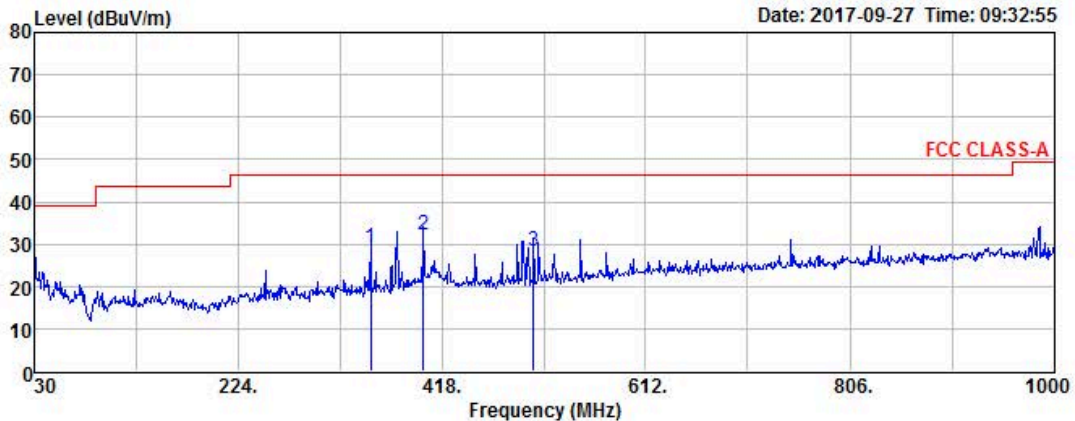
Test Mode : Wireless mode (HIGH)

Tested by: LEE H W

Data: 1584

File: C:\Program Files (x86)\e3\1709-1.EM6 (1680)

Date: 2017-09-27 Time: 09:32:55



| Freq   | Reading | C.F   | Result       | Limit  | Margin | Height | Angle | Polarity   |
|--------|---------|-------|--------------|--------|--------|--------|-------|------------|
| MHz    | dBuV    | dB    | QP<br>dBuV/m | dBuV/m | dB     | cm     | deg   |            |
| 350.10 | 38.82   | -9.59 | 29.23        | 46.40  | 17.17  | 205    | 163   | HORIZONTAL |
| 400.54 | 40.75   | -8.49 | 32.26        | 46.40  | 14.14  | 139    | 82    | HORIZONTAL |
| 505.30 | 34.84   | -6.54 | 28.30        | 46.40  | 18.10  | 117    | 244   | HORIZONTAL |

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

**Radiated Emissions (Above 1 GHz) – 2.4 GHz Zigbee(Low) mode, Vertical**

EMI Chamber of LTA CO.,LTD.  
 4, Songjuro236Beon-gil, Yangji-myeon,  
 Yongin-si, Gyeonggi-do, Korea Autho.by NVLAP  
 Tel :+82-31-3236008,9 www.ltalab.com  
 Fax:+82-31-3236010

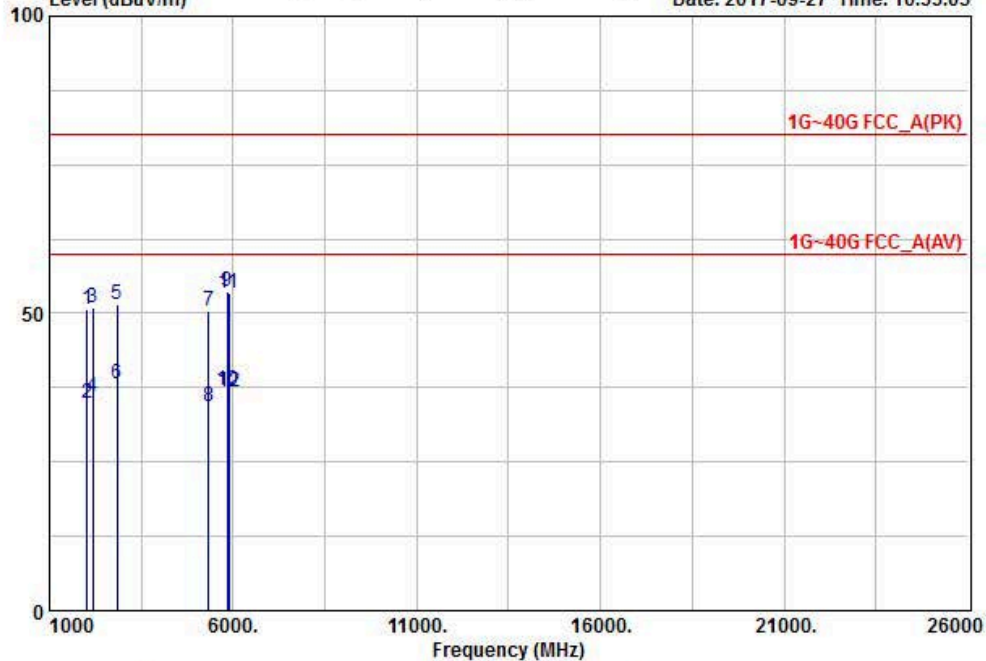
EUT/Model No. : IDM42

Test Mode: Wireless mode (LOW)

Tested by : LEE H W

Temp/Humi: 24 / 58

Data: 13 File: D:\LTA\_e3\3\_backup\1GHz 이상\2017\CH1\_ABOVE 1GHz\_1709-1.EMI (17)  
 Level (dBuV/m) Date: 2017-09-27 Time: 10:33:05



|    | Freq    | Reading | C.F   | Result       | Limit  | Margin | Polarity   |
|----|---------|---------|-------|--------------|--------|--------|------------|
|    | MHz     | dBuV    | dB    | PK<br>dBuV/m | dBuV/m | dB     |            |
| 1  | 2021.60 | 48.90   | 1.69  | 50.59        | 80.00  | 29.41  | VERTICAL   |
| 2  | 2021.60 | 33.20   | 1.69  | 34.89        | 60.00  | 25.11  | VERTICAL   |
| 3  | 2185.60 | 48.70   | 2.20  | 50.90        | 80.00  | 29.10  | VERTICAL   |
| 4  | 2185.60 | 33.90   | 2.20  | 36.10        | 60.00  | 23.90  | VERTICAL   |
| 5  | 2845.60 | 45.30   | 6.08  | 51.38        | 80.00  | 28.62  | HORIZONTAL |
| 6  | 2845.60 | 32.20   | 6.08  | 38.28        | 60.00  | 21.72  | HORIZONTAL |
| 7  | 5333.10 | 31.50   | 19.03 | 50.53        | 80.00  | 29.47  | HORIZONTAL |
| 8  | 5333.10 | 15.30   | 19.03 | 34.33        | 60.00  | 25.67  | HORIZONTAL |
| 9  | 5845.30 | 32.80   | 20.84 | 53.64        | 80.00  | 26.36  | HORIZONTAL |
| 10 | 5845.30 | 16.20   | 20.84 | 37.04        | 60.00  | 22.96  | HORIZONTAL |
| 11 | 5877.30 | 32.40   | 21.04 | 53.44        | 80.00  | 26.56  | VERTICAL   |
| 12 | 5877.30 | 15.80   | 21.04 | 36.84        | 60.00  | 23.16  | VERTICAL   |

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

**Radiated Emissions (Above 1 GHz) – 2.4 GHz Zigbee(Middle) mode**

EMI Chamber of LTA CO.,LTD.  
 4, Songjuro236Beon-gil, Yangji-myeon,  
 Yongin-si, Gyeonggi-do, Korea Autho.by NVLAP  
 Tel :+82-31-3236008,9 www.ltalab.com  
 Fax:+82-31-3236010

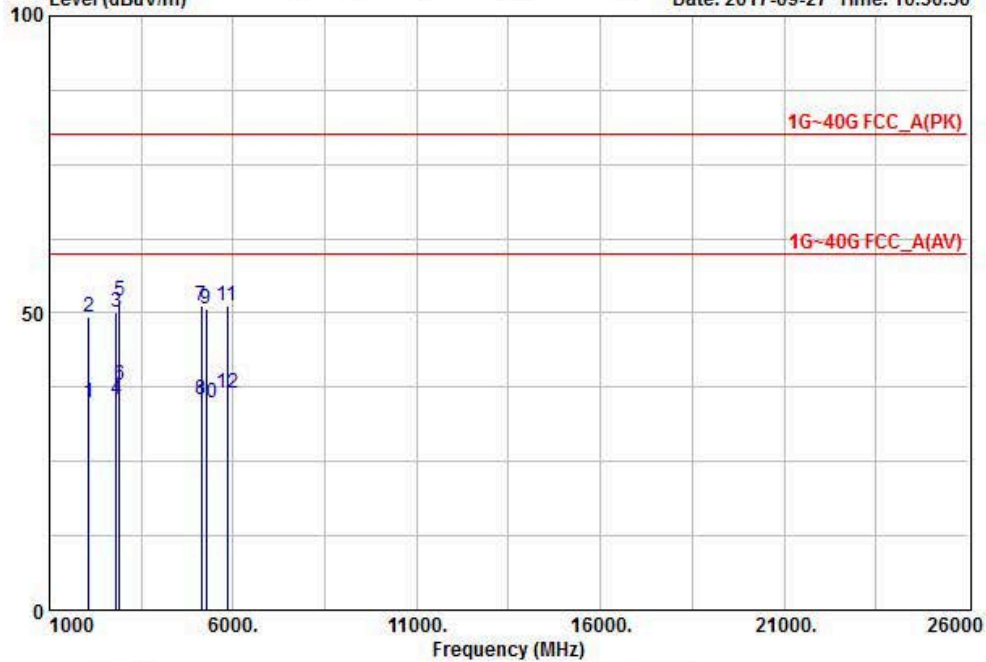
EUT/Model No. : IDM42

Test Mode: Wireless mode (MID)

Tested by : LEE H W

Temp/Humi: 24 / 58

Data: 12 File: D:\LTA\_e3\3\_backup\1GHz 이상\2017\CH1\_ABOVE 1GHz\_1709-1.EMI (17)  
 Level (dBuV/m) Date: 2017-09-27 Time: 10:30:50



|    | Freq    | Reading | C.F   | Result       | Limit  | Margin | Polarity   |
|----|---------|---------|-------|--------------|--------|--------|------------|
|    | MHz     | dBuV    | dB    | PK<br>dBuV/m | dBuV/m | dB     |            |
| 1  | 2074.50 | 32.80   | 2.00  | 34.80        | 60.00  | 25.20  | HORIZONTAL |
| 2  | 2074.50 | 47.20   | 2.00  | 49.20        | 80.00  | 30.80  | HORIZONTAL |
| 3  | 2828.60 | 44.20   | 6.00  | 50.20        | 80.00  | 29.80  | HORIZONTAL |
| 4  | 2828.60 | 29.50   | 6.00  | 35.50        | 60.00  | 24.50  | HORIZONTAL |
| 5  | 2905.30 | 45.20   | 6.80  | 52.00        | 80.00  | 28.00  | VERTICAL   |
| 6  | 2905.30 | 31.10   | 6.80  | 37.90        | 60.00  | 22.10  | VERTICAL   |
| 7  | 5132.50 | 32.80   | 18.49 | 51.29        | 80.00  | 28.71  | HORIZONTAL |
| 8  | 5132.50 | 16.80   | 18.49 | 35.29        | 60.00  | 24.71  | HORIZONTAL |
| 9  | 5263.50 | 31.90   | 18.70 | 50.60        | 80.00  | 29.40  | VERTICAL   |
| 10 | 5263.50 | 16.20   | 18.70 | 34.90        | 60.00  | 25.10  | VERTICAL   |
| 11 | 5844.90 | 30.50   | 20.84 | 51.34        | 80.00  | 28.66  | VERTICAL   |
| 12 | 5844.90 | 15.80   | 20.84 | 36.64        | 60.00  | 23.36  | VERTICAL   |

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



**Radiated Emissions (Above 1 GHz) – 2.4 GHz Zigbee(High) mode**

EMI Chamber of LTA CO.,LTD.  
 4, Songjuro236Beon-gil, Yangji-myeon,  
 Yongin-si, Gyeonggi-do, Korea Autho.by NVLAP  
 Tel :+82-31-3236008,9 www.ltalab.com  
 Fax:+82-31-3236010

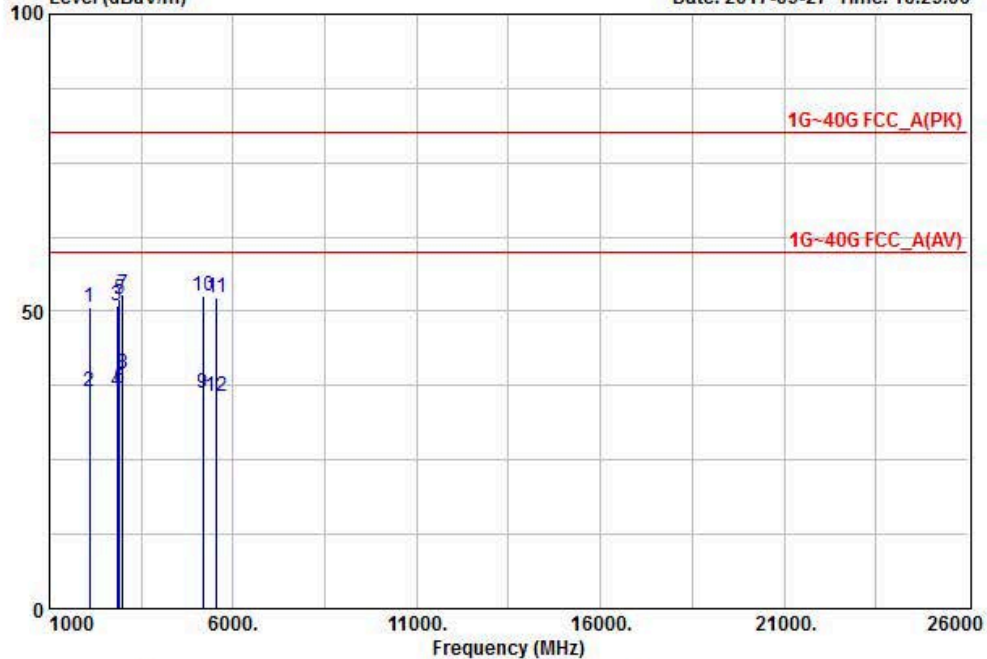
EUT/Model No. : IDM42

Test Mode: Wireless mode (HIGH)

Tested by : LEE H W

Temp/Humi: 24 / 58

Data: 11 File: D:\LTA\_e3\3\_backup\1GHz 이상\2017\CH1\_ABOVE 1GHz\_1709-1.EMI (17)  
 Level (dBuV/m) Date: 2017-09-27 Time: 10:29:06



|    | Freq    | Reading | C.F   | Result       | Limit  | Margin | Polarity   |
|----|---------|---------|-------|--------------|--------|--------|------------|
|    | MHz     | dBuV    | dB    | PK<br>dBuV/m | dBuV/m | dB     |            |
| 1  | 2085.30 | 48.70   | 2.05  | 50.75        | 80.00  | 29.25  | HORIZONTAL |
| 2  | 2085.30 | 34.50   | 2.05  | 36.55        | 60.00  | 23.45  | HORIZONTAL |
| 3  | 2845.30 | 45.00   | 6.08  | 51.08        | 80.00  | 28.92  | HORIZONTAL |
| 4  | 2845.30 | 30.40   | 6.08  | 36.48        | 60.00  | 23.52  | HORIZONTAL |
| 5  | 2908.30 | 45.30   | 6.82  | 52.12        | 80.00  | 27.88  | HORIZONTAL |
| 6  | 2908.30 | 30.10   | 6.82  | 36.92        | 60.00  | 23.08  | HORIZONTAL |
| 7  | 2995.30 | 45.20   | 7.78  | 52.98        | 80.00  | 27.02  | VERTICAL   |
| 8  | 2995.30 | 31.70   | 7.78  | 39.48        | 60.00  | 20.52  | VERTICAL   |
| 9  | 5188.10 | 17.50   | 18.73 | 36.23        | 60.00  | 23.77  | VERTICAL   |
| 10 | 5188.10 | 33.80   | 18.73 | 52.53        | 80.00  | 27.47  | VERTICAL   |
| 11 | 5542.20 | 32.50   | 19.77 | 52.27        | 80.00  | 27.73  | VERTICAL   |
| 12 | 5542.20 | 15.90   | 19.77 | 35.67        | 60.00  | 24.33  | VERTICAL   |

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

### 3.2.6 AC Conducted Emissions

**Procedure:**

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:** N/A

**Minimum Standard: FCC Part 15.207(a )**

Class B

| Frequency Range | 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

## 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   | 2017-09-07     |
| 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   | 2017-09-07     |
| 5  |     | Attenuator (10 dB)                   | 8491A            | 63196       | HP                     | 1 year   | 2017-09-07     |
| 6  |     | EMI Test Receiver (~7 GHz)           | ESCI7            | 100722      | R&S                    | 1 year   | 2017-09-07     |
| 7  | ■   | RF Amplifier (~1.3 GHz)              | 8447D OPT 010    | 2944A07684  | HP                     | 1 year   | 2017-09-07     |
| 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   | 2017-04-17     |
| 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 | ■   | DC Power Supply                      | 6674A            | 3637A01657  | Agilent                | -        | -              |
| 16 |     | Frequency Counter                    | 5342A            | 2826A12411  | HP                     | 1 year   | 2017-03-21     |
| 17 | ■   | Power Meter                          | EPM-441A         | GB32481702  | HP                     | 1 year   | 2017-03-20     |
| 18 | ■   | Power Sensor                         | 8481A            | 3318A94972  | HP                     | 1 year   | 2016-12-30     |
| 19 |     | Audio Analyzer                       | 8903B            | 3729A18901  | HP                     | 1 year   | 2017-09-07     |
| 20 |     | Modulation Analyzer                  | 8901B            | 3749A05878  | HP                     | 1 year   | 2017-09-07     |
| 21 | ■   | TEMP & HUMIDITY Chamber              | YJ-500           | LTAS06041   | JinYoung Tech          | 1 year   | 2017-09-07     |
| 22 |     | Stop Watch                           | HS-3             | 812Q08R     | CASIO                  | 2 year   | 2017-03-21     |
| 23 |     | LISN                                 | KNW-407          | 8-1430-1    | Kyoritsu               | 1 year   | 2017-09-07     |
| 24 |     | Two-Lime V-Network                   | ESH3-Z5          | 893045/017  | R&S                    | 1 year   | 2017-03-20     |
| 25 |     | UNIVERSAL RADIO COMMUNICATION TESTER | CMU200           | 106243      | R&S                    | 1 year   | 2017-03-20     |
| 26 |     | Highpass Filter                      | WHKX1.5/15G-10SS | 74          | Wainwright Instruments | 1 year   | 2017-03-20     |
| 27 |     | Highpass Filter                      | WHKX3.0/18G-10SS | 118         | Wainwright Instruments | 1 year   | 2017-03-20     |
| 28 | ■   | OSP120 BASE UNIT                     | OSP120           | 101230      | R&S                    | 1 year   | 2017-03-21     |
| 29 |     | Signal Generator(100 kHz ~ 40 GHz)   | SMB100A03        | 177621      | R&S                    | 1 year   | 2017-03-23     |
| 30 |     | Signal Analyzer (10 Hz ~ 40 GHz)     | FSV40            | 101367      | R&S                    | 1 year   | 2017-03-21     |