


# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

**Test Report No.** : OT-18D-RWD-041  
**AGR No.** : A18DA-305  
**Applicant** : Samsung Electronics Co Ltd  
**Address** : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058, United States  
**Manufacturer** : Samsung Electronics Co Ltd  
**Address** : Maetan dong 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677, Korea  
**Type of Equipment** : SMART CONTROL  
**FCC ID.** : A3LRMCRMR1BP1  
**Model Name** : RMCRMR1BP1  
**Serial number** : N/A  
**Total page of Report** : 30 pages (including this page)  
**Date of Incoming** : December 19, 2018  
**Date of issue** : December 27, 2018

## SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*  
 This test report only contains the result of a single test of the sample supplied for the examination.  
 It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:   
 \_\_\_\_\_  
 Ki-Hong, Nam / Chief Engineer  
 ONETECH Corp.

Approved by:   
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 Keun-Young, Choi / Vice President  
 ONETECH Corp.

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**Revision History**

| Rev. No. | Issue Report No. | Issued Date | Revisions       | Section Affected |
|----------|------------------|-------------|-----------------|------------------|
| 0        | OT-18D-RWD-041   | 2018.12.27  | Initial Release | All              |
|          |                  |             |                 |                  |
|          |                  |             |                 |                  |

## 1. VERIFICATION OF COMPLIANCE

Applicant : Samsung Electronics Co Ltd  
Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058, United States

Manufacturer : Samsung Electronics Co Ltd  
Address : Maetan dong 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677, Korea

Factory 1 : Remote solution(H.K) LTD  
Address : Gaoli Industrial zone, Tangxia Town, Dongguan City, Guangdong Province postcode : 523710

Factory 2 : REMOTE SOLUTION VIETNAM CO., LTD.  
Address : Lot D-5H-CN, My Phuoc 3 Industrial Park, Thoi hoa Ward, Ben Cat Town, Binh Duong Province, Vietnam

Factory 3 : Qingdao Sanjin Electronics Co., Ltd.  
Address : Tonghe Industry Park, Pingdu Park, Qingdao City, Shandong Province, People's Republic of China  
Address : No.27 Tongkang Road, Tonghe Industry Park, Pingdu City, Shandong Province, People's Republic of China 266706

Factory 4 : PT. SAM JIN  
Address : Bekasi International Industrial Estate Blok C2 No.10, Lemahabang Bekasi 17550 Jawa Barat, Indonesia

Contact Person : minhyung, cho / Senior Engineer

Telephone No. : +82-31-277-2688

FCC ID : A3LRMCRM1BP1

Model Name : RMC1RM1BP1

Brand Name : 

Serial Number : N/A

Date : December 27, 2018

|  |                                      |
|--|--------------------------------------|
| EQUIPMENT CLASS                                      | DTS – DIGITAL TRNSMISSION SYSTEM     |
| E.U.T. DESCRIPTION                                   | SMART CONTROL                        |
| THIS REPORT CONCERNS                                 | Original Grant                       |
| MEASUREMENT PROCEDURES                               | ANSI C63.10: 2013                    |
| TYPE OF EQUIPMENT TESTED                             | Pre-Production                       |
| KIND OF EQUIPMENT AUTHORIZATION REQUESTED            | Certification                        |
| EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)   | FCC PART 15 SUBPART C Section 15.247 |
| Modifications on the Equipment to Achieve Compliance | None                                 |
| Final Test was Conducted On                          | 3 m, Semi Anechoic Chamber           |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. TEST SUMMARY

### 2.1 Test items and results

| SECTION        | TEST ITEMS  | RESULTS                |
|----------------|---|------------------------|
| 15.247 (a) (2) | Minimum 6 dB Bandwidth                              | Met the Limit / PASS   |
| 15.247 (b) (3) | Maximum Peak Conducted Output Power                 | Met the Limit / PASS   |
| 15.247 (d)     | 100 kHz Bandwidth Outside the Frequency Band        | Met the Limit / PASS   |
| 15.247 (d)     | Radiated Emission which fall in the Restricted Band | Met the Limit / PASS   |
| 15.247 (e)     | Peak Power Spectral Density                         | Met the Limit / PASS   |
| 15.209         | Radiated Emission Limits                            | Met the Limit / PASS   |
| 15.207         | Conducted Limits                                    | N/A (See Note)         |
| 15.203         | Antenna Requirement                                 | Met requirement / PASS |

Note: This test is not performed because the EUT is operated by DC battery.

### 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

### 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.247.

### 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

### 2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-14617/ G-10666 / T-1842

IC (Industry Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

### 3. GENERAL INFORMATION

#### 3.1 Product Description

The Samsung Electronics Co Ltd, Model RMCRM1BP1 (referred to as the EUT in this report) is a SMART CONTROL. The product specification described herein was obtained from product data sheet or user's manual.

|   |                       |
|---|-----------------------|
| Device Type   | SMART CONTROL         |
| Temperature Range                                     | 0 °C ~ 50 °C          |
| Operating Frequency                                   | 2 405 MHz ~ 2 475 MHz |
| RF Output Power                                       | 7.53 dBm              |
| Number of Channel                                     | 3 Channel             |
| Modulation Type                                       | O-QPSK (Zigbee)       |
| Antenna Type  | Chip Antenna          |
| Antenna Gain  | 0.97 dBi              |
| List of each Osc. or crystal<br>Freq.(Freq. >= 1 MHz) | 32.768 kHz, 32 MHz    |

#### 3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

### 4. EUT MODIFICATIONS

-. None



## 5. SYSTEM TEST CONFIGURATION

### 5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE | MANUFACTURER               | MODEL/PART NUMBER | FCC ID |
|-------------|----------------------------|-------------------|--------|
| Main Board  | Samsung Electronics Co Ltd | N/A               | N/A    |

### 5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

### 5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at 2 405 MHz, 2 440 MHz, and 2 475 MHz to get a maximum emission levels from the EUT. The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XZ” axis, but the worst data was recorded in this report.

### 5.4 Configuration of Test System

**Line Conducted Test:** It is not need to test this requirement, because the EUT shall be operated by DC battery.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

### 5.5 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

#### Antenna Construction:

The antenna of the EUT is a Chip Antenna on the main board in the EUT, so no consideration of replacement by the user.

## 6. PRELIMINARY TEST

### 6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

| Operation Mode  | The Worse operating condition (Please check one only) |
|---|---|
| It is not need to test this requirement, because the power of the EUT is supplied by battery. |   |

### 6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

| Operation Mode    | The Worse operating condition (Please check one only) |
|-------------------|---|
| Transmitting Mode | X   |

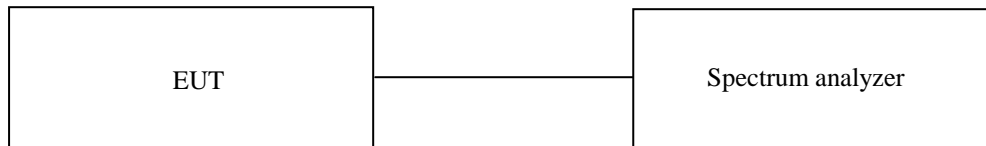
## 7. MINIMUM 6 dB BANDWIDTH

### 7.1 Operating environment

Temperature : 24.3 °C  
 Relative humidity : 43.9 % R.H.

### 7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



### 7.3 Test equipment used

| Model Number | Manufacturer    | Description     | Serial Number | Last Cal.          |
|--------------|-----------------|-----------------|---------------|--------------------|
| ■ - FSV40    | Rohde & Schwarz | Signal Analyzer | 101009        | Mar. 14, 2018 (1Y) |

All test equipment used is calibrated on a regular basis.

**7.4 Test data**

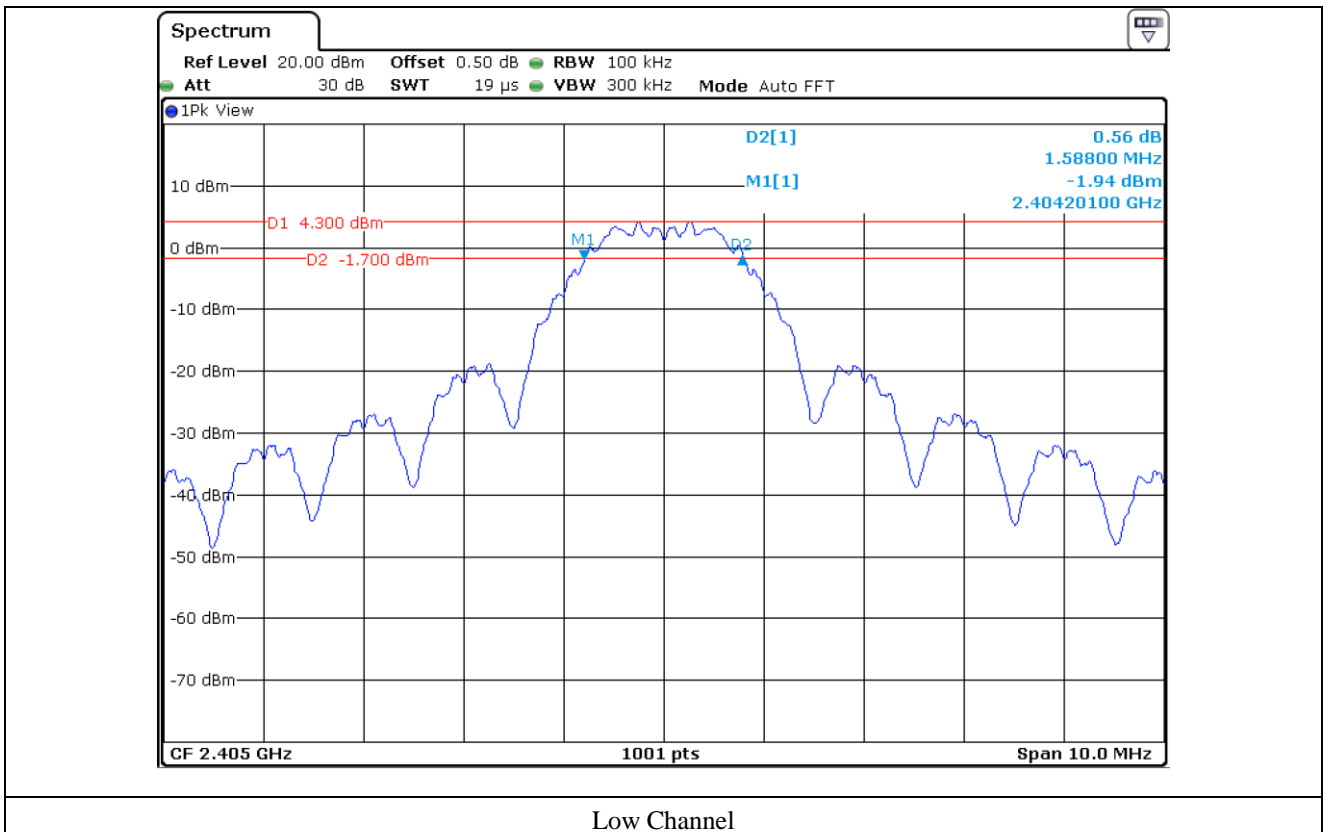
- Test Date : December 19, 2018 ~ December 26, 2018
- Test Result : Pass

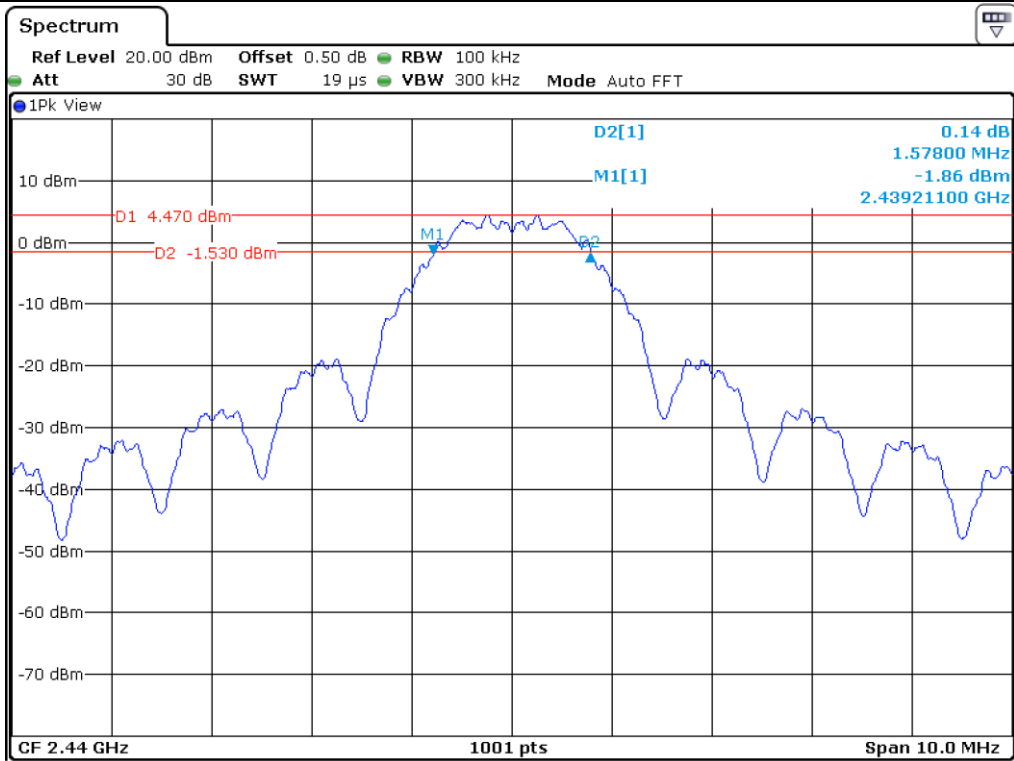
| CHANNEL | FREQUENCY(MHz) | MEASURED VALUE (MHz) | LIMIT (MHz) | MARGIN (MHz) |
|---------|----------------|----------------------|-------------|--------------|
| Low     | 2 405.00       | 1.59                 | 0.50        | 1.09         |
| Middle  | 2 440.00       | 1.58                 | 0.50        | 1.08         |
| High    | 2 475.00       | 1.58                 | 0.50        | 1.08         |

Remark. Margin = Measured Value - Limit

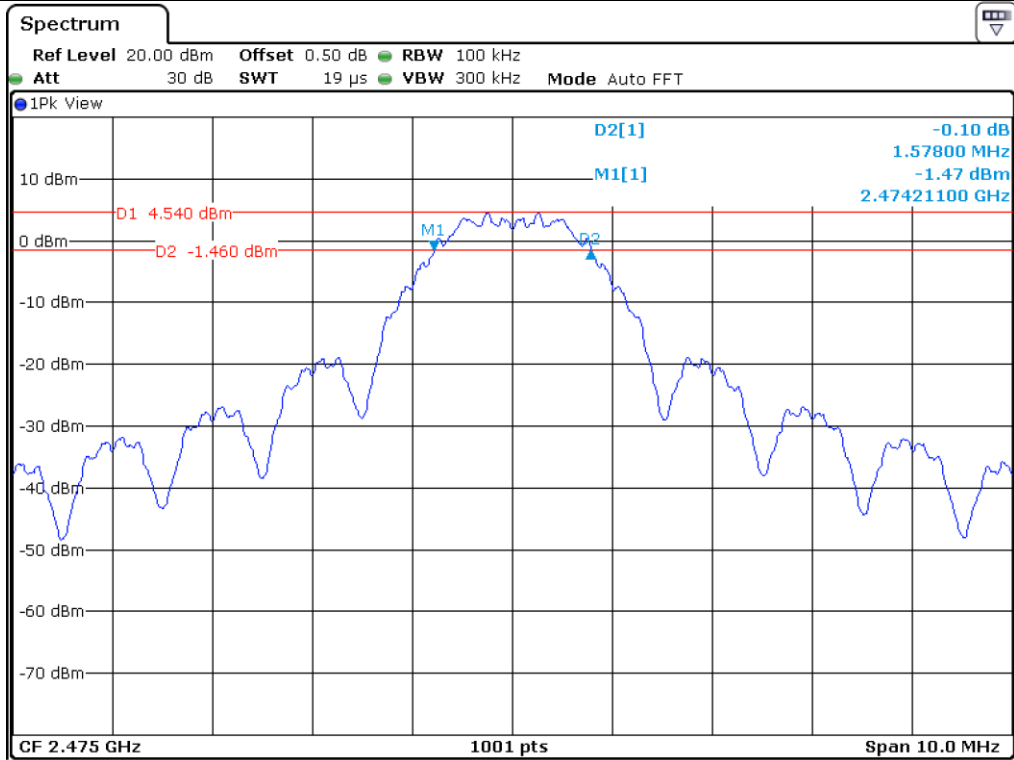


**Tested by: Hyung-Kwon, Oh / Assistant Manager**





Middle Channel



High Channel

## 8. MAXIMUM PEAK OUTPUT POWER

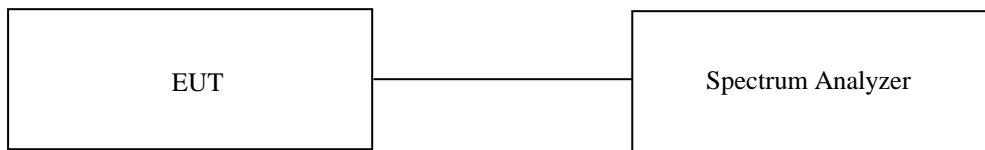
### 8.1 Operating environment

Temperature : 24.3 °C  
 Relative humidity : 43.9 % R.H.

### 8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to  $\geq$  DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



### 8.3 Test equipment used

| Model Number | Manufacturer    | Description     | Serial Number | Last Cal.          |
|--------------|-----------------|-----------------|---------------|--------------------|
| ■ - FSV40    | Rohde & Schwarz | Signal Analyzer | 101009        | Mar. 14, 2018 (1Y) |

All test equipment used is calibrated on a regular basis.

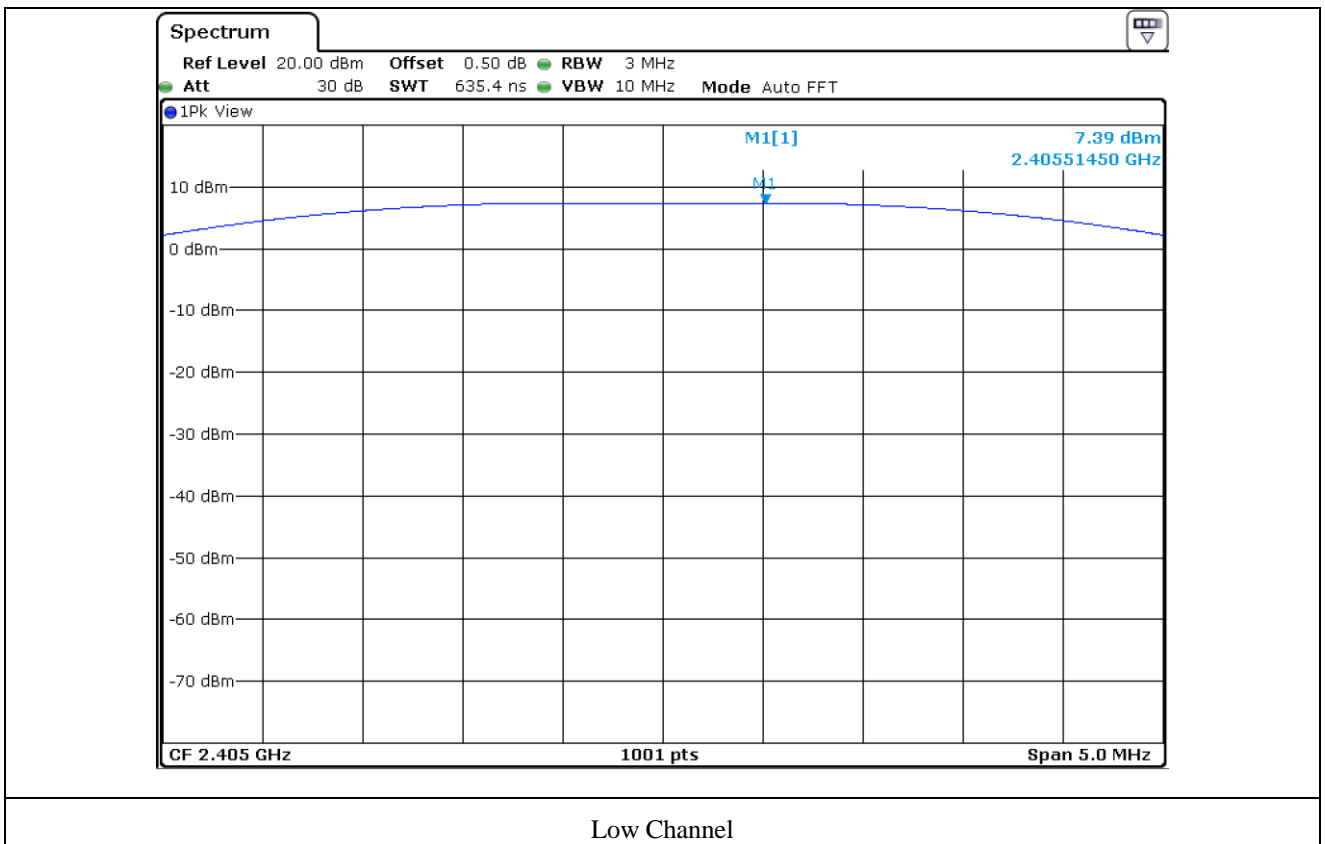
### 8.4 Test data

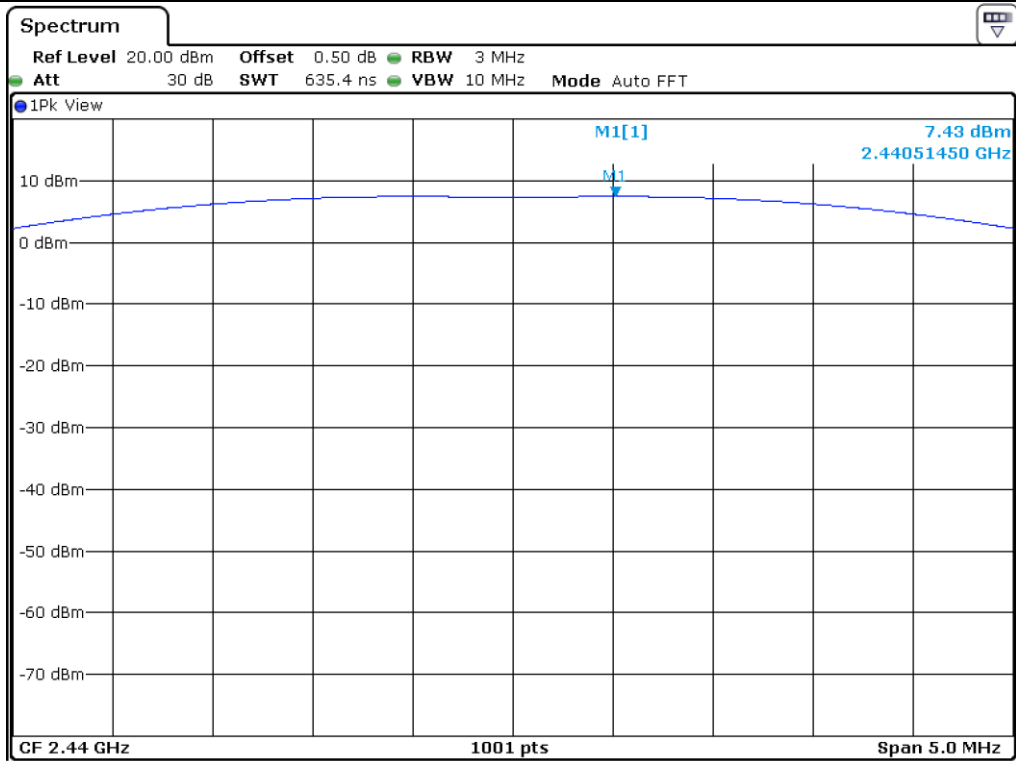
- Test Date : December 19, 2018 ~ December 26, 2018
- Test Result : Pass

| CHANNEL | FREQUENCY (MHz) | DTS (MHz) | MEASURED VALUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---------|-----------------|-----------|----------------------|-------------|-------------|
| LOW     | 2 405.00        | 1.59      | 7.39                 | 30.00       | 22.61       |
| MIDDLE  | 2 440.00        | 1.58      | 7.43                 | 30.00       | 22.57       |
| HIGH    | 2 475.00        | 1.58      | 7.53                 | 30.00       | 22.47       |

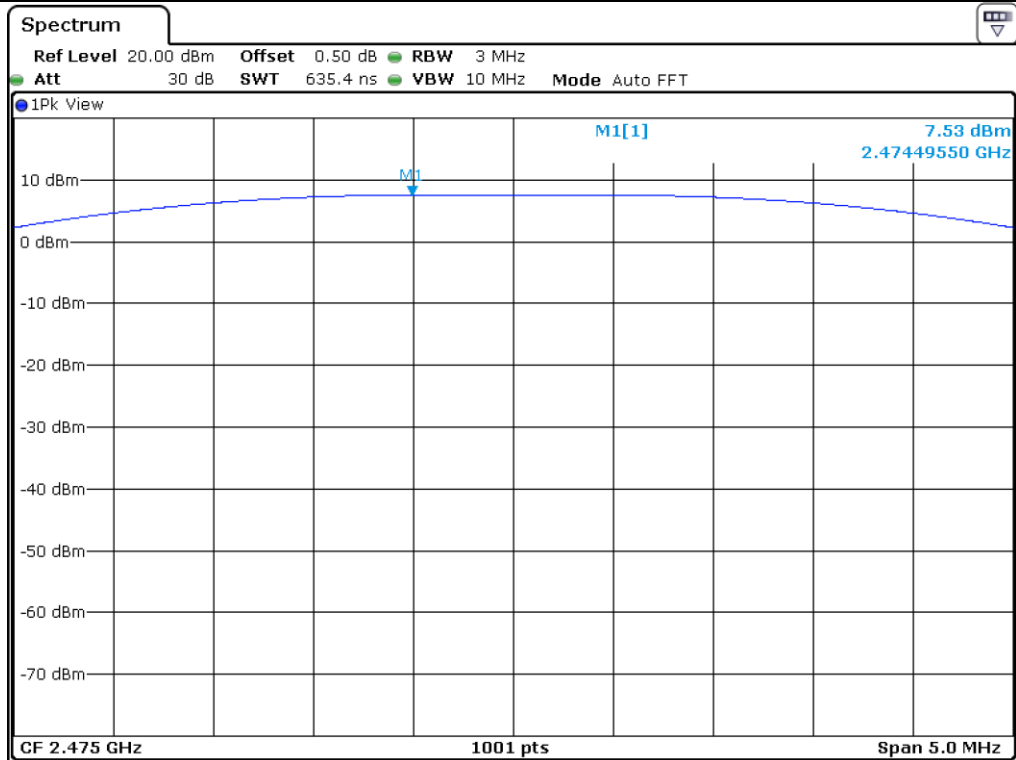
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

**Tested by: Hyung-Kwon, Oh / Assistant Manager**





Middle Channel



High Channel



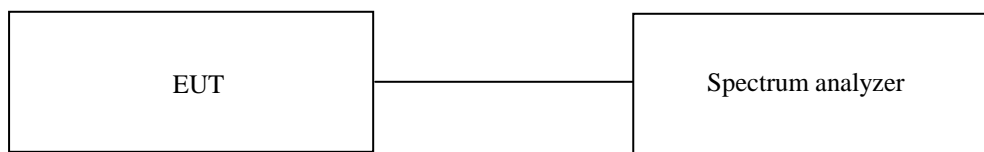
## 9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

### 9.1 Operating environment

Temperature : 24.3 °C  
 Relative humidity : 43.9 % R.H.

### 9.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, the video bandwidth is set to 3 times the resolution bandwidth and peak detection was used.



### 9.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

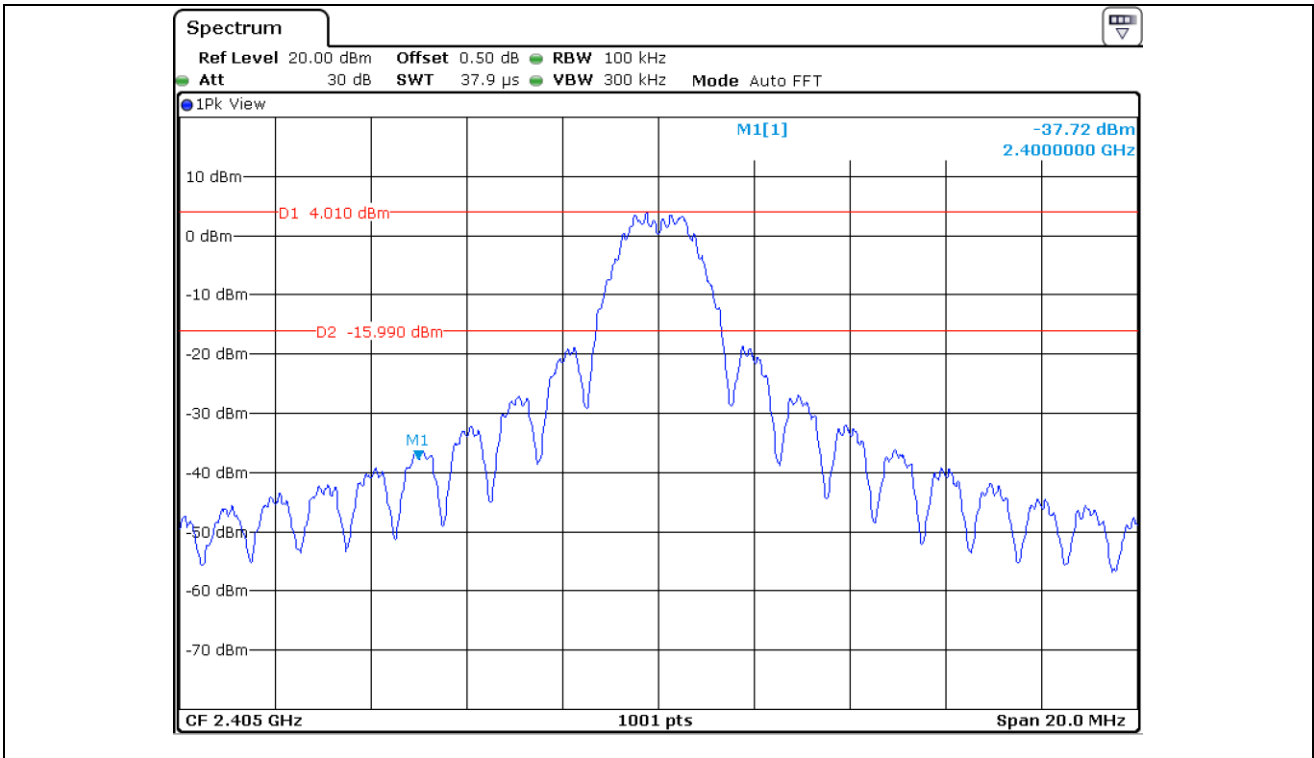
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

### 9.4 Test equipment used

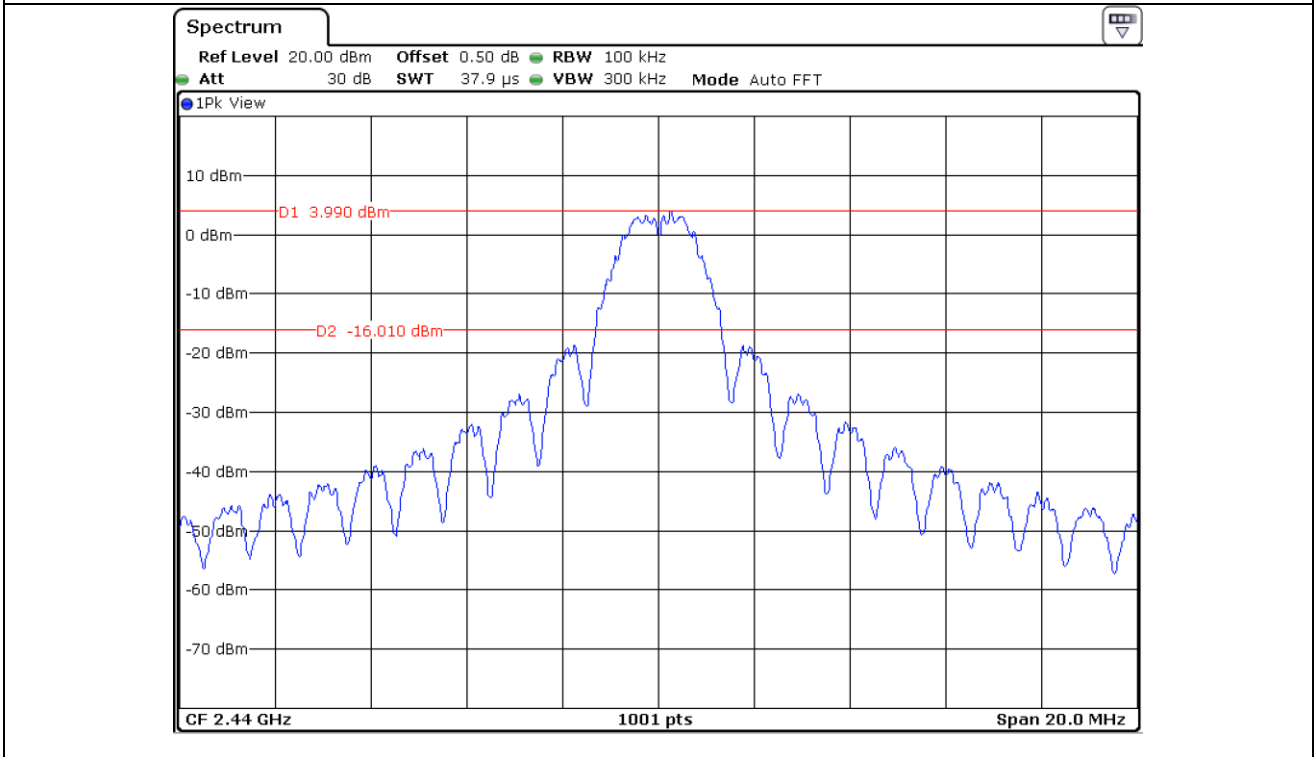
| Model Number    | Manufacturer      | Description              | Serial Number | Last Cal.          |
|-----------------|-------------------|--------------------------|---------------|--------------------|
| ■ - FSV40       | Rohde & Schwarz   | Signal Analyzer          | 101009        | Mar. 14, 2018 (1Y) |
| ■ - ESU         | Rohde & Schwarz   | EMI Test Receiver        | 100261        | Mar. 29, 2018 (1Y) |
| ■ - 310N        | Sonoma Instrument | Pre-Amplifier            | 312544        | Mar. 28, 2018 (1Y) |
| ■ - BBV9718     | Schwarzbeck       | Amplifier                | 310           | Mar. 30, 2018 (1Y) |
| ■ - SCU40A      | Rohde & Schwarz   | Signal Conditioning unit | 100436        | Mar. 15, 2018 (1Y) |
| ■ - DT3000-3t   | Innco System      | Turn Table               | DT3000/093    | N/A                |
| ■ - MA-4000XPET | Innco System      | Antenna Master           | MA4000/509    | N/A                |
| ■ - VULB9163    | Schwarzbeck       | TRILOG Broadband Antenna | 777           | Apr. 13, 2018 (2Y) |
| ■ - BBHA9120D   | Schwarzbeck       | Horn Antenna             | BBHA9120D295  | Aug. 16, 2017 (2Y) |
| ■ - BBHA9170    | Schwarzbeck       | Horn Antenna             | BBHA9170179   | Jul. 28, 2017 (2Y) |

All test equipment used is calibrated on a regular basis.

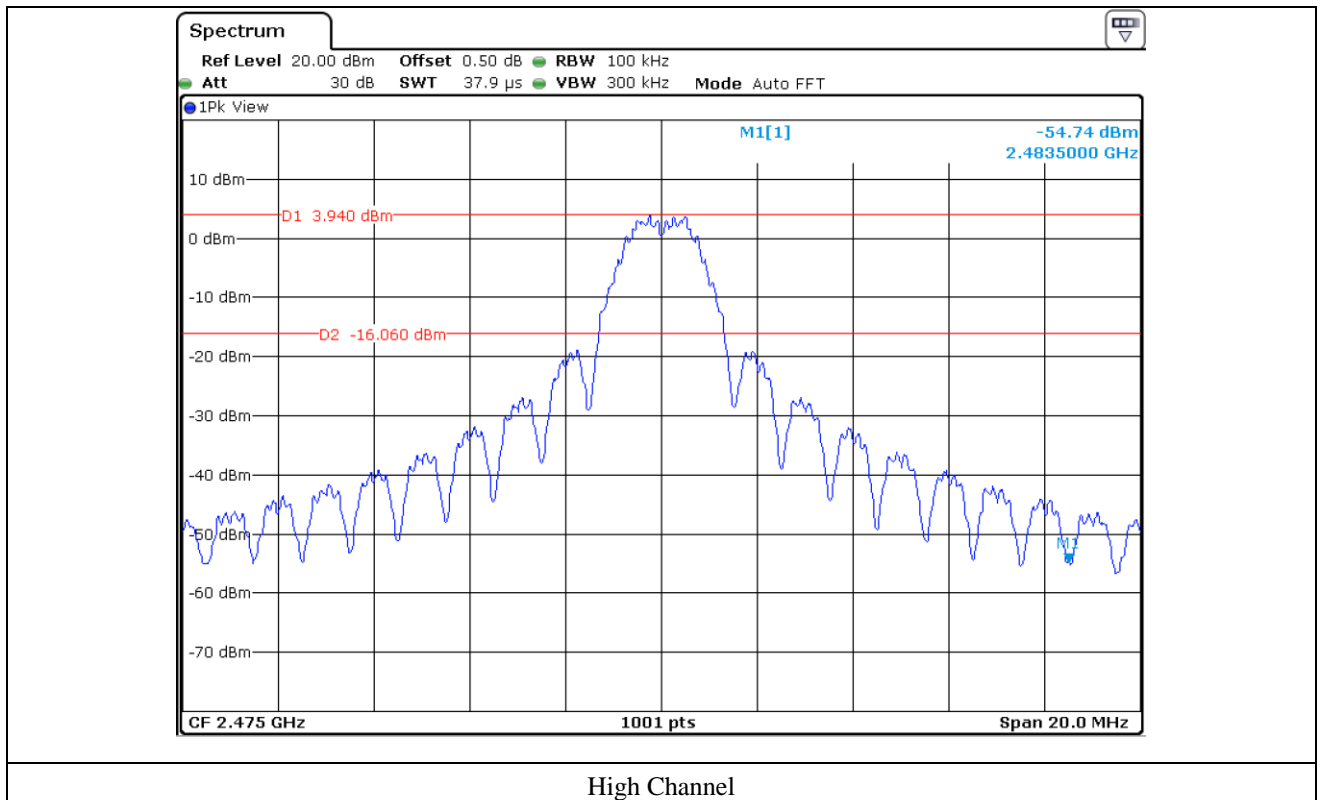
9.5 Test data for conducted emission

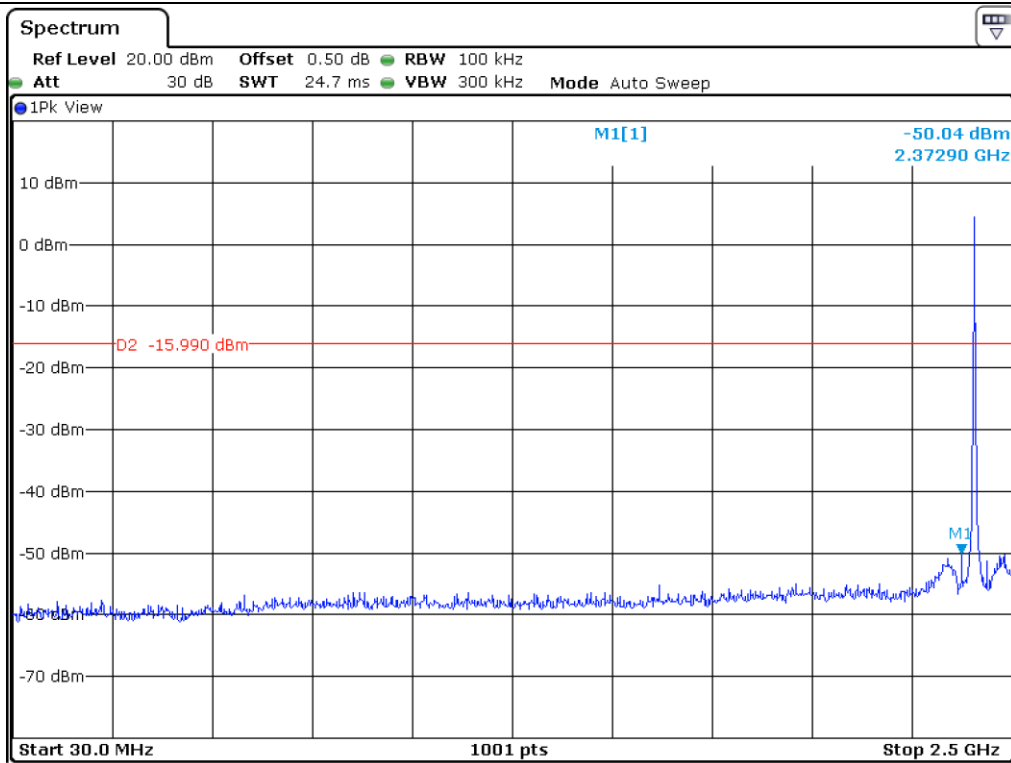


Low Channel

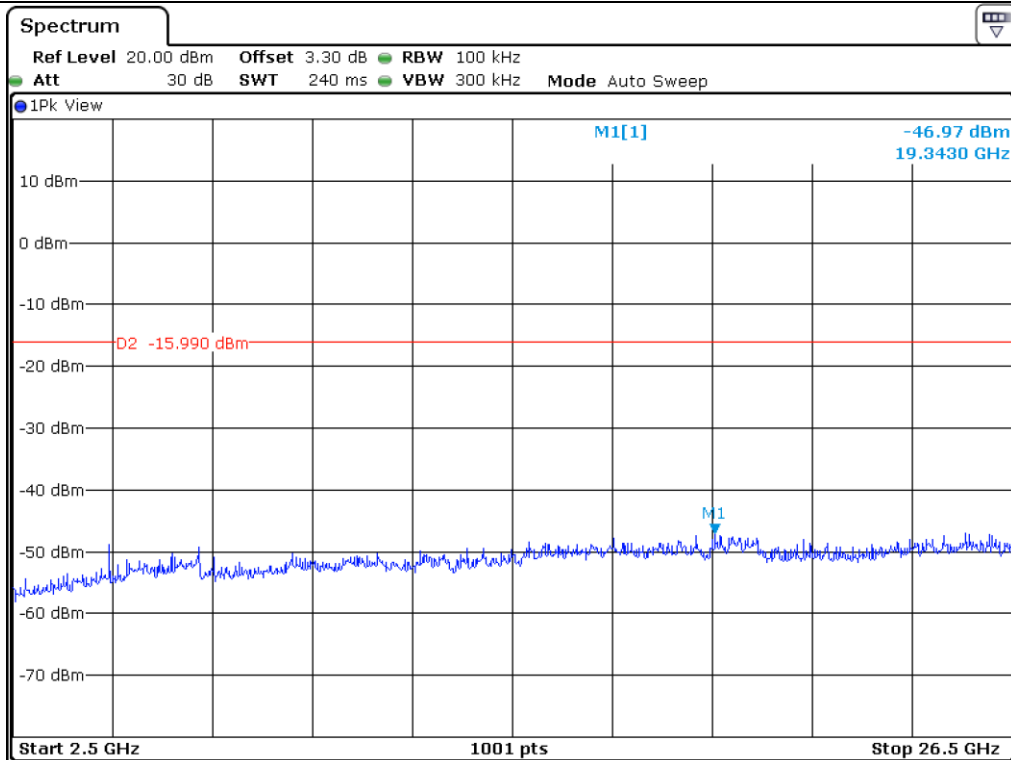


Middle Channel

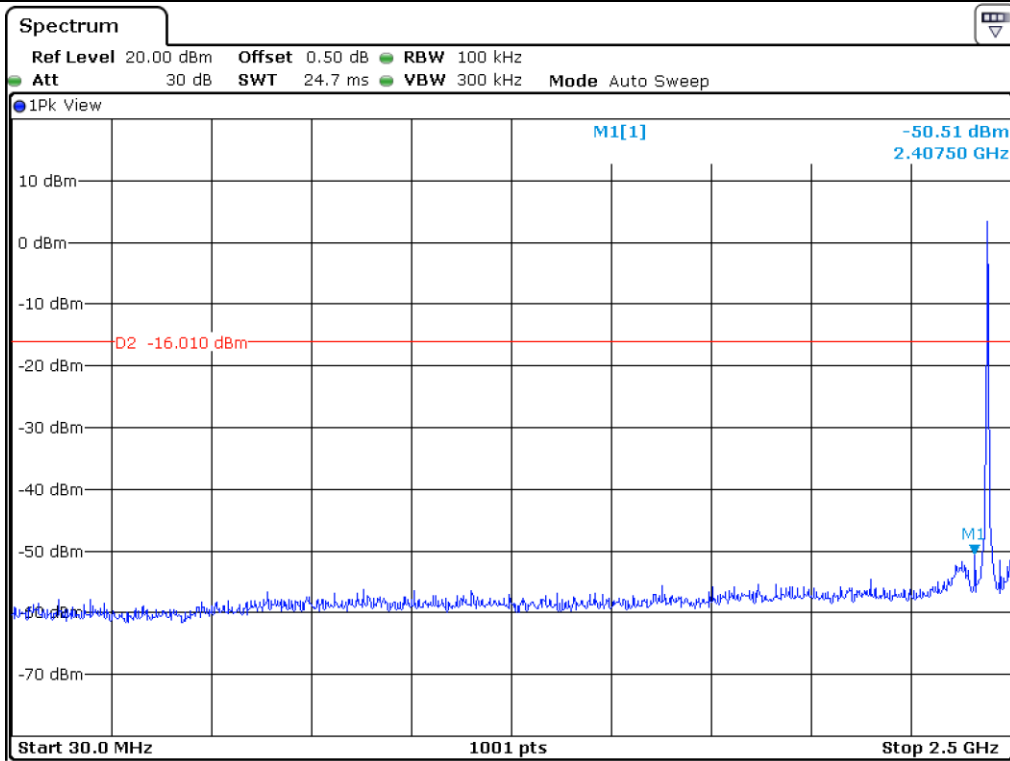




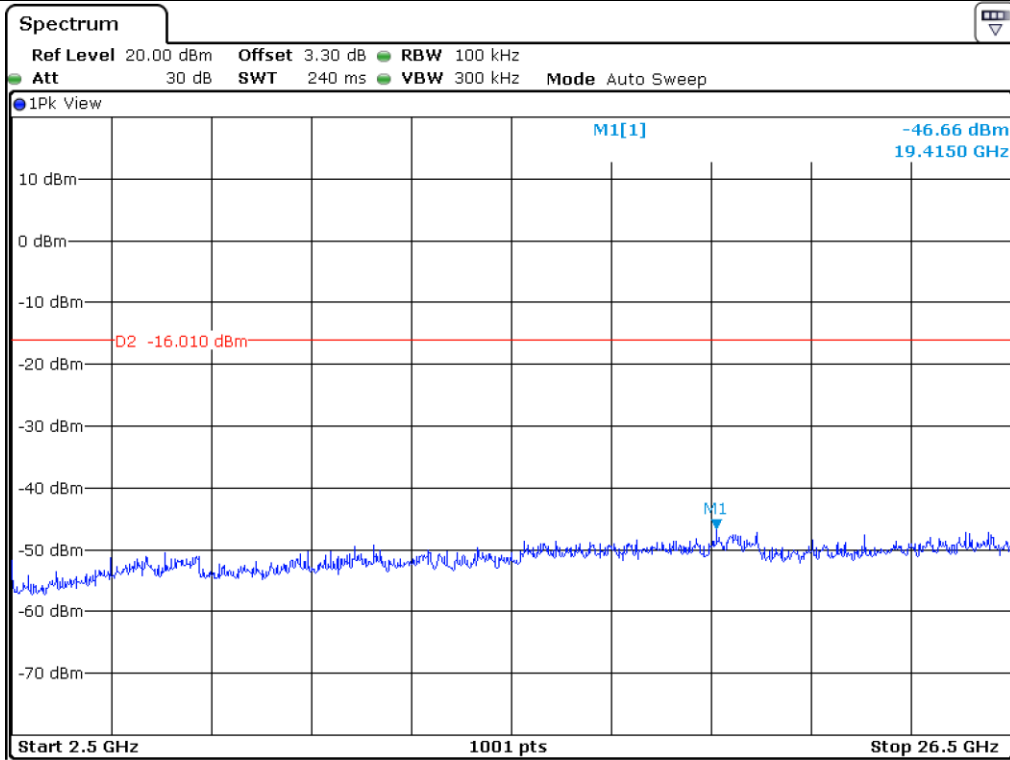
Low Channel



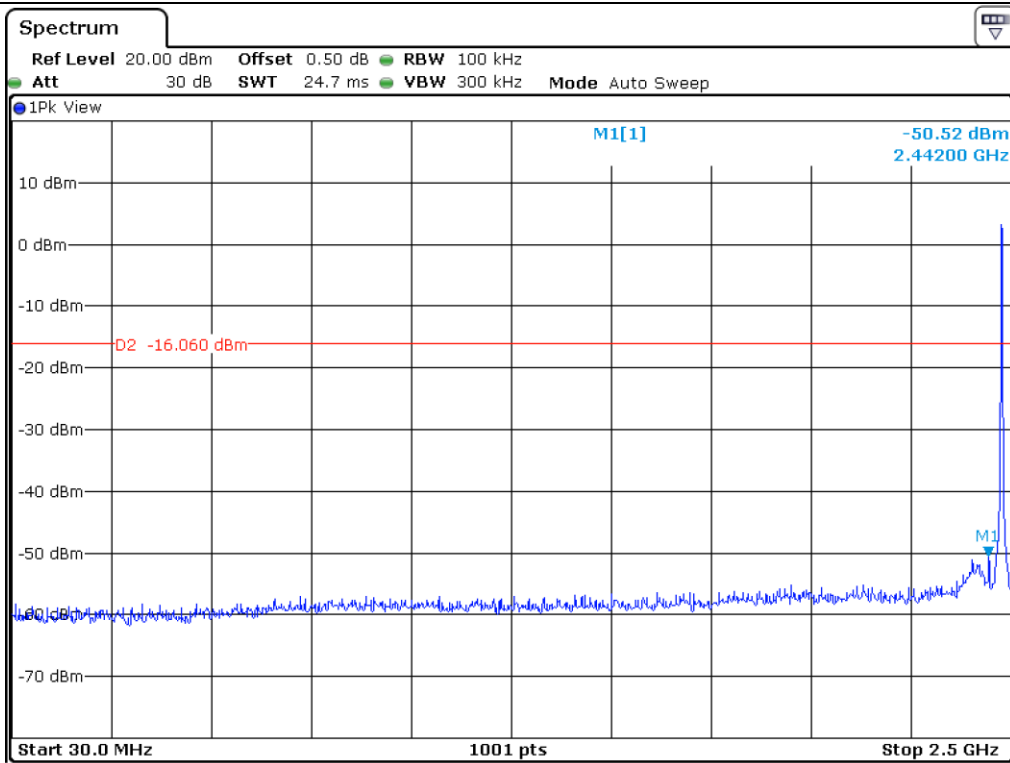
Low Channel



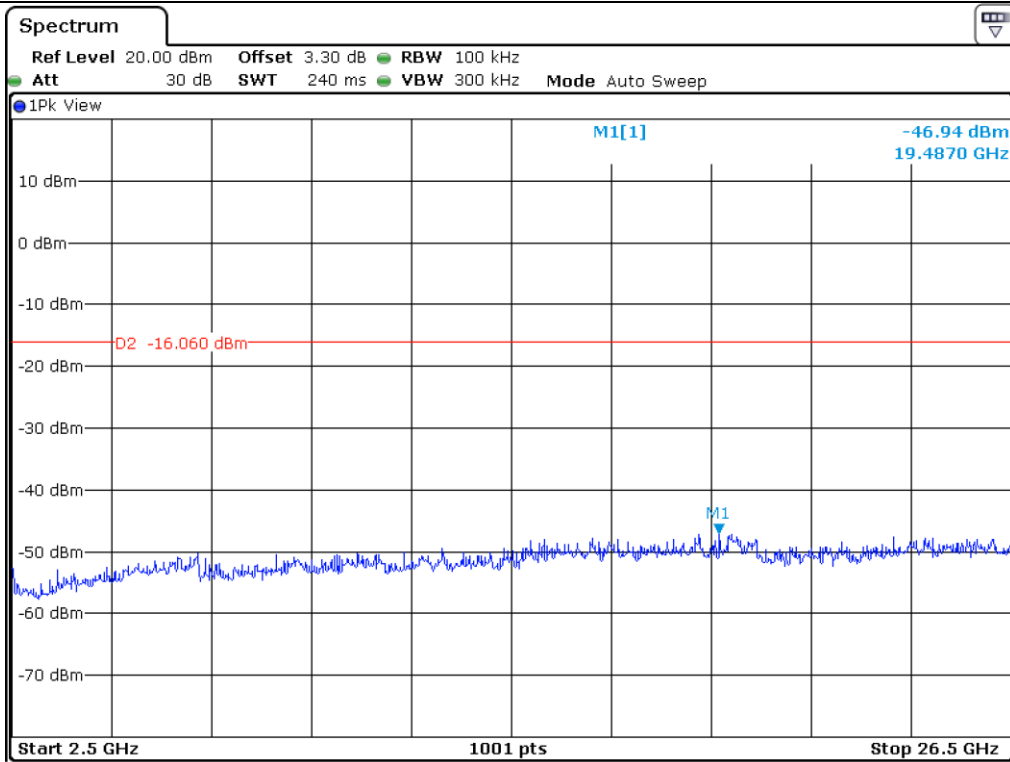
Middle Channel



Middle Channel



High Channel



High Channel

### 9.6 Test data for radiated emission

#### 9.6.1 Radiated Emission which fall in the Restricted Band

- Test Date : December 19, 2018 ~ December 26, 2018
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Result : PASSED

| Frequency (MHz)                   | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-----------------------------------|----------------|---------------|-----------------|-------------|------------|----------|----------------|-----------------|-------------|
| <b>Test Data for Low Channel</b>  |                |               |                 |             |            |          |                |                 |             |
| 2 341.553                         | 46.20          | Peak          | H               | 26.94       | 9.20       | 34.76    | 47.58          | 74.00           | 26.42       |
| 2 373.186                         | 36.56          | Average       | H               | 26.94       | 9.20       | 34.76    | 37.94          | 54.00           | 16.06       |
| 2 349.961                         | 45.32          | Peak          | V               | 26.94       | 9.20       | 34.76    | 46.70          | 74.00           | 27.30       |
| 2 341.249                         | 35.76          | Average       | V               | 26.94       | 9.20       | 34.76    | 37.14          | 54.00           | 16.86       |
| <b>Test Data for High Channel</b> |                |               |                 |             |            |          |                |                 |             |
| 2 483.508                         | 49.76          | Peak          | H               | 27.47       | 9.49       | 35.51    | 51.21          | 74.00           | 22.79       |
| 2 483.508                         | 39.02          | Average       | H               | 27.47       | 9.49       | 35.51    | 40.47          | 54.00           | 13.53       |
| 2 483.508                         | 47.64          | Peak          | V               | 27.47       | 9.49       | 35.51    | 49.09          | 74.00           | 24.91       |
| 2 483.508                         | 37.38          | Average       | V               | 27.47       | 9.49       | 35.51    | 38.83          | 54.00           | 15.17       |

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



**Tested by: Hyung-Kwon, Oh / Assistant Manager**

### 9.6.2 Spurious & Harmonic Radiated Emission

- Test Date : December 19, 2018 ~ December 26, 2018
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,  
1 MHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

| Frequency (GHz)                     | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-------------------------------------|----------------|---------------|-----------------|-------------|------------|----------|----------------|-----------------|-------------|
| <b>Test Data for Low Channel</b>    |                |               |                 |             |            |          |                |                 |             |
| 4 810.00                            | 41.54          | Peak          | H               | 30.84       | 12.31      | 35.74    | 48.95          | 73.98           | 25.03       |
|                                     | 32.85          | Average       | H               |             |            |          | 40.26          | 53.98           | 13.72       |
|                                     | 43.85          | Peak          | V               |             |            |          | 51.26          | 73.98           | 22.72       |
|                                     | 34.06          | Average       | V               |             |            |          | 41.47          | 53.98           | 12.51       |
| <b>Test Data for Middle Channel</b> |                |               |                 |             |            |          |                |                 |             |
| 4 880.00                            | 41.29          | Peak          | H               | 30.01       | 12.43      | 35.80    | 47.93          | 73.98           | 26.05       |
|                                     | 33.09          | Average       | H               |             |            |          | 39.73          | 53.98           | 14.25       |
|                                     | 42.15          | Peak          | V               |             |            |          | 48.79          | 73.98           | 25.19       |
|                                     | 33.48          | Average       | V               |             |            |          | 40.12          | 53.98           | 13.86       |
| <b>Test Data for High Channel</b>   |                |               |                 |             |            |          |                |                 |             |
| 4 950.00                            | 41.61          | Peak          | H               | 31.15       | 12.81      | 35.96    | 49.61          | 73.98           | 24.37       |
|                                     | 32.44          | Average       | H               |             |            |          | 40.44          | 53.98           | 13.54       |
|                                     | 41.85          | Peak          | V               |             |            |          | 49.85          | 73.98           | 24.13       |
|                                     | 32.06          | Average       | V               |             |            |          | 40.06          | 53.98           | 13.92       |

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



**Tested by: Hyung-Kwon, Oh / Assistant Manager**



## 10. PEAK POWER SPECTRAL DENSITY

### 10.1 Operating environment

Temperature : 24.3 °C  
 Relative humidity : 43.9 % R.H.

### 10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ , the video bandwidth is set to 3 times the resolution bandwidth.



### 10.3 Test equipment used

| Model Number | Manufacturer    | Description     | Serial Number | Last Cal.          |
|--------------|-----------------|-----------------|---------------|--------------------|
| ■ - FSV40    | Rohde & Schwarz | Signal Analyzer | 101009        | Mar. 14, 2018 (1Y) |

All test equipment used is calibrated on a regular basis.

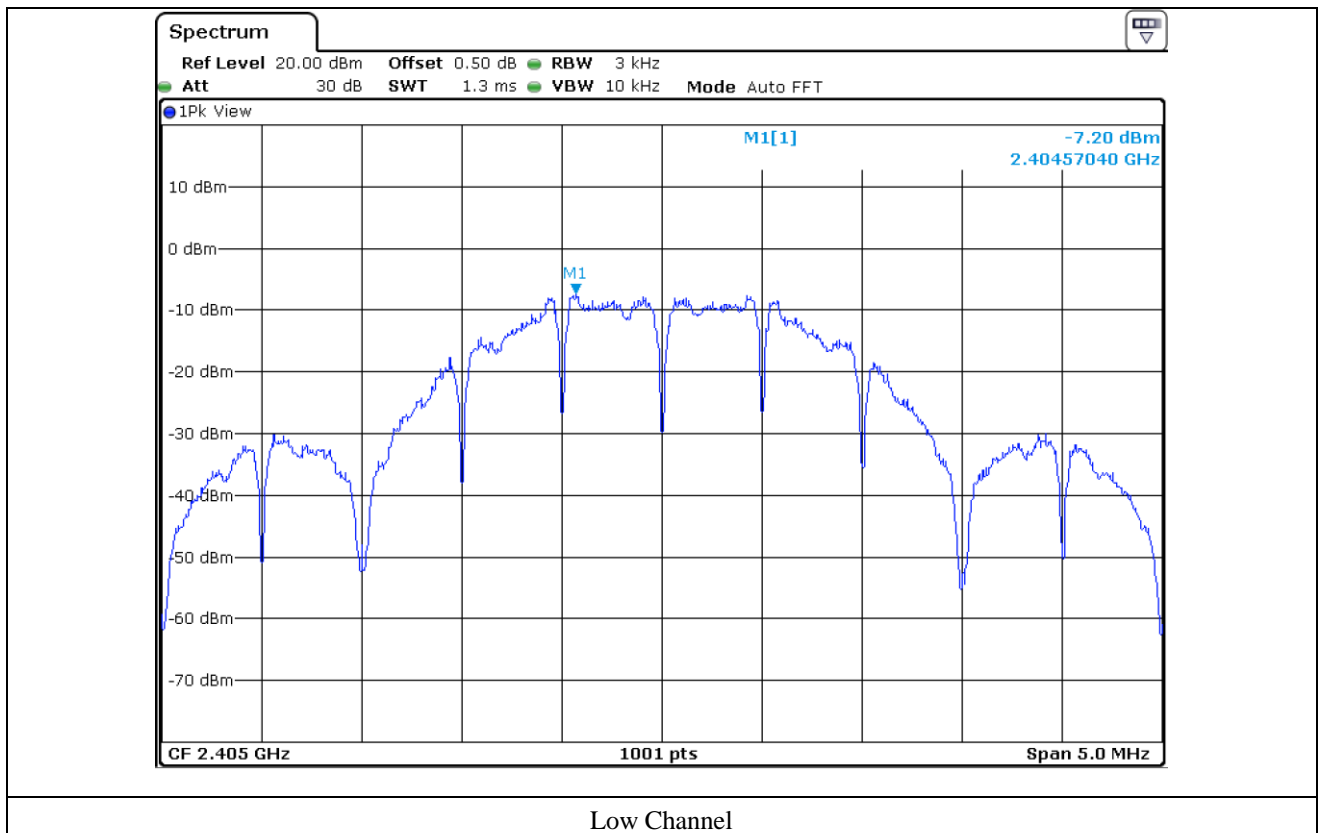
### 10.4 Test data

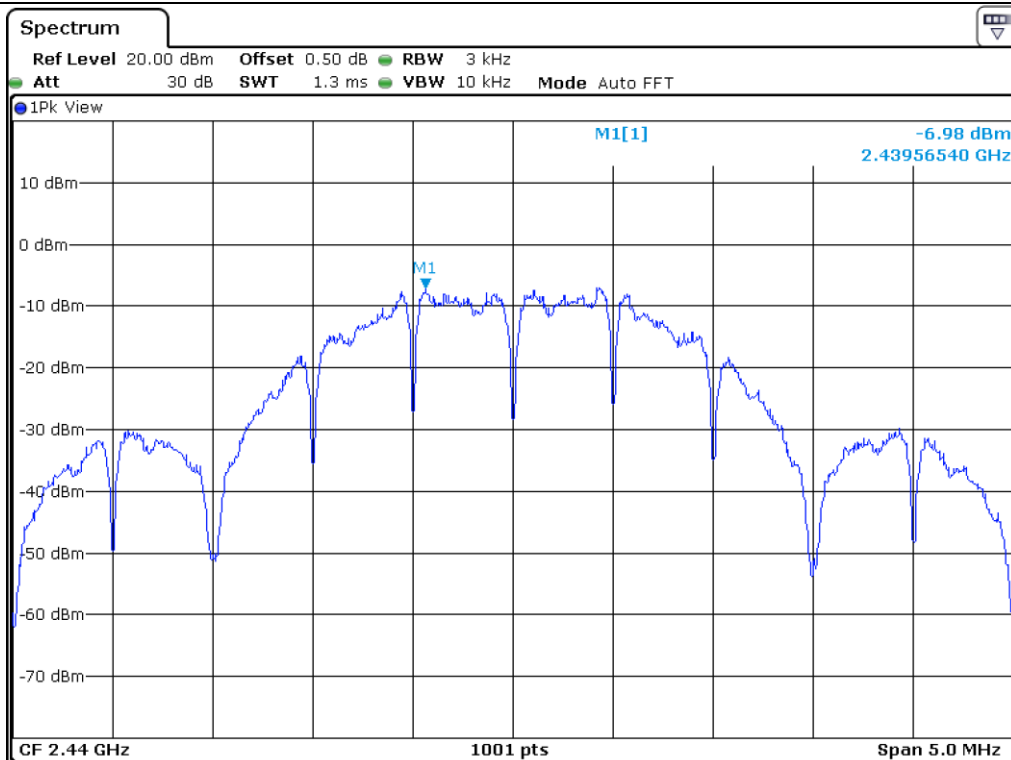
- Test Date : December 19, 2018 ~ December 26, 2018
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

| CHANNEL | FREQUENCY(MHz) | MEASURED VALUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---------|----------------|----------------------|-------------|-------------|
| Low     | 2 405.00       | -7.20                | 8.00        | 15.20       |
| Middle  | 2 440.00       | -6.98                | 8.00        | 14.98       |
| High    | 2 475.00       | -7.30                | 8.00        | 15.30       |

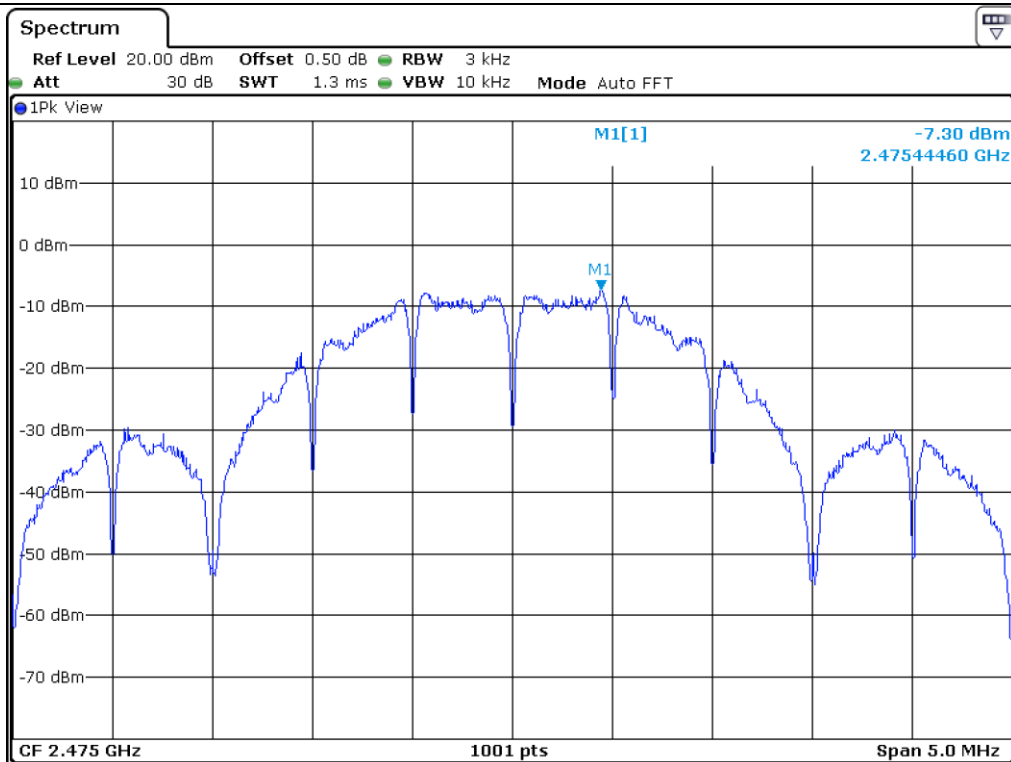
Remark. Margin = Limit – Measured value

Tested by: Hyung-Kwon, Oh / Assistant Manager





Middle Channel



High Channel

## 11. RADIATED EMISSION TEST

### 11.1 Operating environment

Temperature : 24.3 °C  
 Relative humidity : 43.9 % R.H.

### 11.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

### 11.3 Test equipment used

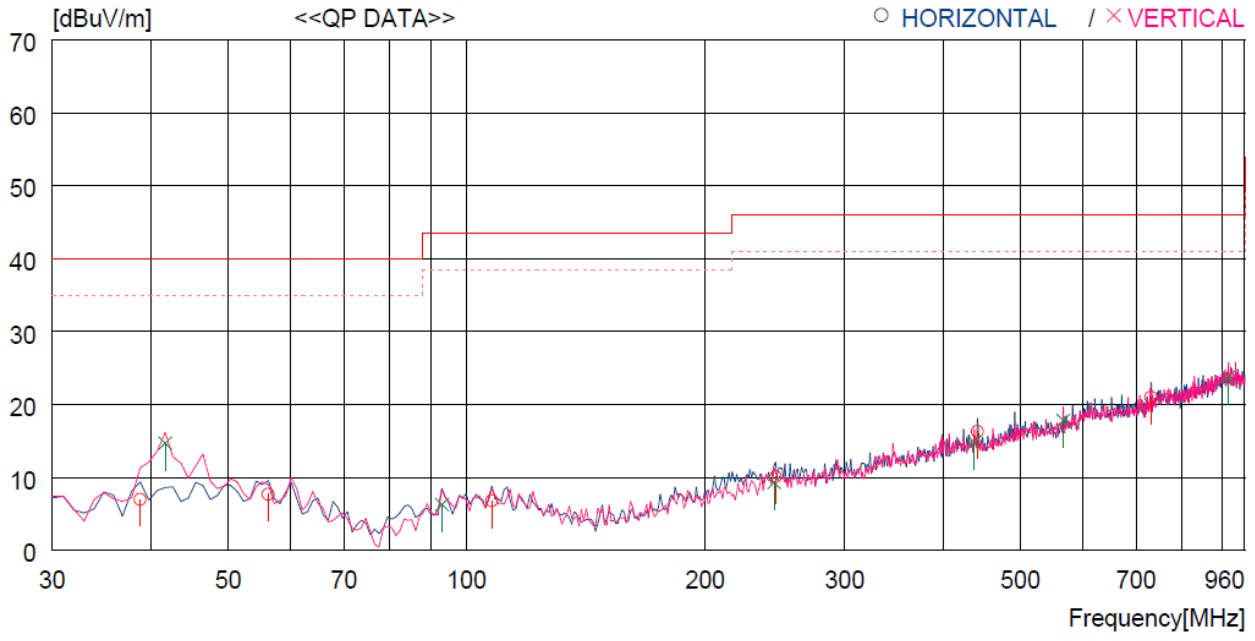
| Model Number    | Manufacturer      | Description              | Serial Number | Last Cal.          |
|-----------------|-------------------|--------------------------|---------------|--------------------|
| ■ - FSV40       | Rohde & Schwarz   | Signal Analyzer          | 101009        | Mar. 14, 2018 (1Y) |
| ■ - ESU         | Rohde & Schwarz   | EMI Test Receiver        | 100261        | Mar. 29, 2018 (1Y) |
| ■ - 310N        | Sonoma Instrument | Pre-Amplifier            | 312544        | Mar. 28, 2018 (1Y) |
| ■ - BBV9718     | Schwarzbeck       | Amplifier                | 310           | Mar. 30, 2018 (1Y) |
| ■ - DT3000-3t   | Innco System      | Turn Table               | DT3000/093    | N/A                |
| ■ - MA-4000XPET | Innco System      | Antenna Master           | MA4000/509    | N/A                |
| ■ - VULB9163    | Schwarzbeck       | TRILOG Broadband Antenna | 777           | Apr. 13, 2018 (2Y) |
| ■ - BBHA9120D   | Schwarzbeck       | Horn Antenna             | BBHA9120D295  | Aug. 16, 2017 (2Y) |
| ■ - BBHA9170    | Schwarzbeck       | Horn Antenna             | BBHA9170179   | Jul. 28, 2017 (2Y) |

All test equipment used is calibrated on a regular basis.

**11.4 Test data for 30 MHz ~ 1 GHz**

Humidity Level : 43.9 % R.H. Temperature: 24.3 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247  
 Result : PASSED

EUT : SMART CONTROL Date: December 19, 2018 ~ December 26, 2018  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



| No.                    | FREQ<br>[MHz] | READING<br>QP<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                      | 38.730        | 25.2                    | 13.4                  | 1.5          | 33.1         | 7.0                | 40.0              | 33.0           | 100             | 343            |
| 2                      | 56.190        | 25.3                    | 13.7                  | 1.8          | 33.1         | 7.7                | 40.0              | 32.3           | 100             | 343            |
| 3                      | 107.600       | 25.5                    | 11.9                  | 2.4          | 33.0         | 6.8                | 43.5              | 36.7           | 100             | 191            |
| 4                      | 245.340       | 26.9                    | 12.4                  | 3.7          | 32.9         | 10.1               | 46.0              | 35.9           | 100             | 343            |
| 5                      | 441.281       | 28.3                    | 16.3                  | 4.8          | 33.1         | 16.3               | 46.0              | 29.7           | 100             | 343            |
| 6                      | 730.334       | 27.7                    | 20.2                  | 6.3          | 33.2         | 21.0               | 46.0              | 25.0           | 100             | 10             |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 7                      | 41.640        | 32.5                    | 13.8                  | 1.5          | 33.1         | 14.7               | 40.0              | 25.3           | 100             | 249            |
| 8                      | 93.050        | 26.0                    | 11.1                  | 2.2          | 33.0         | 6.3                | 43.5              | 37.2           | 100             | 258            |
| 9                      | 244.370       | 26.2                    | 12.4                  | 3.6          | 32.9         | 9.3                | 46.0              | 36.7           | 100             | 51             |
| 10                     | 437.401       | 26.8                    | 16.3                  | 4.8          | 33.1         | 14.8               | 46.0              | 31.2           | 100             | 343            |
| 11                     | 566.409       | 27.5                    | 18.1                  | 5.5          | 33.3         | 17.8               | 46.0              | 28.2           | 100             | 193            |
| 12                     | 915.598       | 26.4                    | 22.5                  | 7.1          | 32.2         | 23.8               | 46.0              | 22.2           | 100             | 18             |

**Tested by: Hyung-Kwon, Oh / Assistant Manager**

**11.5 Test data for Below 30 MHz**

- . Test Date : December 19, 2018 ~ December 26, 2018
- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

| Frequency (MHz)                                 | Reading (dBμV) | Ant. Pol. (H/V) | Ant. Height (m) | Angle (°) | Ant. Factor (dB/m) | Cable Loss | Emission Level(dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|----------------|-----------------|-----------------|-----------|--------------------|------------|------------------------|-----------------|-------------|
| It was not observed any emissions from the EUT. |                |                 |                 |           |                    |            |                        |                 |             |

**11.6 Test data for above 1 GHz**

- . Test Date : December 19, 2018 ~ December 26, 2018
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

| Frequency (MHz)                                 | Reading (dBμV) | Ant. Pol. (H/V) | Ant. Height (m) | Angle (°) | Ant. Factor (dB/m) | Cable Loss | Emission Level(dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|----------------|-----------------|-----------------|-----------|--------------------|------------|------------------------|-----------------|-------------|
| It was not observed any emissions from the EUT. |                |                 |                 |           |                    |            |                        |                 |             |



**Tested by: Hyung-Kwon, Oh / Assistant Manager**