

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

Test Report No. : W176R-D047

AGR No. : A173A-398

Applicant : Wearable Healthcare Inc.

Address : A1708, Heungdeok IT Valley, 13 Heungdeok 1-ro, Giheung-gu, Yongin-si,  
Gyeonggi-do, KOREA

Manufacturer : Wearable Healthcare Inc.

Address : A1708, Heungdeok IT Valley, 13 Heungdeok 1-ro, Giheung-gu, Yongin-si,  
Gyeonggi-do, KOREA

Type of Equipment : Fashionable Smart Accessory

FCC ID. : 2AMHQWHC-RUARK100

Model Name : RK100

Multiple Model Name : MK100

Serial number : N/A

Total page of Report : 32 pages (including this page)

Date of Incoming : April 10, 2017

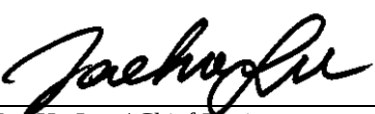
Date of issue : June 09, 2017

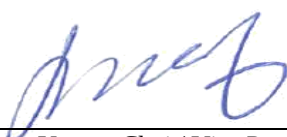
## SUMMARY

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:   
Jae-Ho Lee / Chief Engineer  
ONETECH Corp.

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

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### Revision History

| Issued Report No. | Issued Date   | Revisions     | Effect Section |
|-------------------|---------------|---------------|----------------|
| W176R-D047        | June 09, 2017 | Initial Issue | All            |
|                   |               |               |                |
|                   |               |               |                |

## 1. VERIFICATION OF COMPLIANCE

Applicant : Wearable Healthcare Inc.  
Address : A1708, Heungdeok IT Valley, 13 Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, KOREA  
Contact Person : Woo Young Sim / CTO  
Telephone No. : +82-31-8065-5634  
FCC ID : 2AMHQWHC-RUARK100  
Model Name : RK100  
Serial Number : N/A  
Date : June 09, 2017

|                                                         |                                      |
|---------------------------------------------------------|--------------------------------------|
| EQUIPMENT CLASS                                         | DTS – DIGITAL TRNSMISSION SYSTEM     |
| KIND OF EQUIPMENT                                       | Fashionable Smart Accessory          |
| THIS REPORT CONCERNS                                    | Original Grant                       |
| MEASUREMENT PROCEDURES                                  | ANSI C63.10: 2013                    |
| TYPE OF EQUIPMENT TESTED                                | Pre-Production                       |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED            | Certification                        |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | FCC PART 15 SUBPART C Section 15.247 |
| Modifications on the Equipment to Achieve<br>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                                    | Met the Limit / PASS   |
| 15.203         | Antenna Requirement                                 | Met requirement / PASS |

### 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-4617/ 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 Wearable Healthcare Inc., Model RK100 (referred to as the EUT in this report) is a Fashionable Smart Accessory. The product specification described herein was obtained from product data sheet or user's manual.

|                                                    |                             |
|----------------------------------------------------|-----------------------------|
| Device Type                                        | Fashionable Smart Accessory |
| Operating Frequency                                | 2 402 MHz ~ 2 480 MHz       |
| RF Output Power                                    | 2.08 dBm                    |
| Number of Channel                                  | 40 Channel                  |
| Modulation Type                                    | GFSK                        |
| Antenna Type                                       | SMD Antenna                 |
| Antenna Gain                                       | 0.8 dBi                     |
| List of each Osc. or crystal Freq.(Freq. >= 1 MHz) | 16 MHz, 32.768 kHz          |
| Rated Supply Voltage                               | DC 3.7 V                    |

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

-. The following lists consist of the added model and their differences.

| Model Name | Differences                                                                                 | Tested                              |
|------------|---------------------------------------------------------------------------------------------|-------------------------------------|
| RK100      | Basic Model                                                                                 | <input checked="" type="checkbox"/> |
| MK100      | No difference in hardware. Software and application for target customer are only different. | <input type="checkbox"/>            |

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacture is responsible for the compliance of all variants.

### 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  | N/A          | N/A               | -      |
| Battery     | N/A          | N/A               | -      |

### 5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

| Model | Manufacturer | Description | Connected to |
|-------|--------------|-------------|--------------|
| N/A   | N/A          | N/A         | N/A          |

### 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 2 402 MHz, 2 440 MHz, and 2 480 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:** The EUT was tested in a Charging & Transmitting mode. The EUT was connected to USB and the power of USB was connected to Adapter. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

**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 SMD 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) |
|------------------------------|-------------------------------------------------------|
| Charging & Transmitting mode | X                                                     |

### 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                                                     |

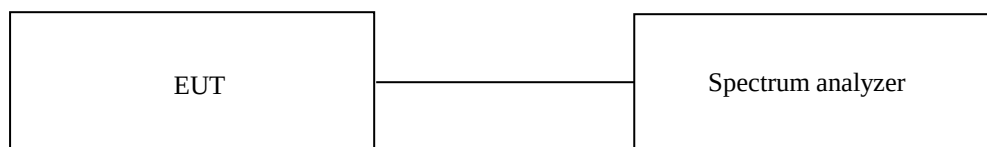
## 7. MINIMUM 6 dB BANDWIDTH

### 7.1 Operating environment

Temperature : 23 °C  
Relative humidity : 43 % 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        | Apr. 05, 2017 (1Y) |

All test equipment used is calibrated on a regular basis.

## 7.4 Test data

-. Test Date : June 01, 2017

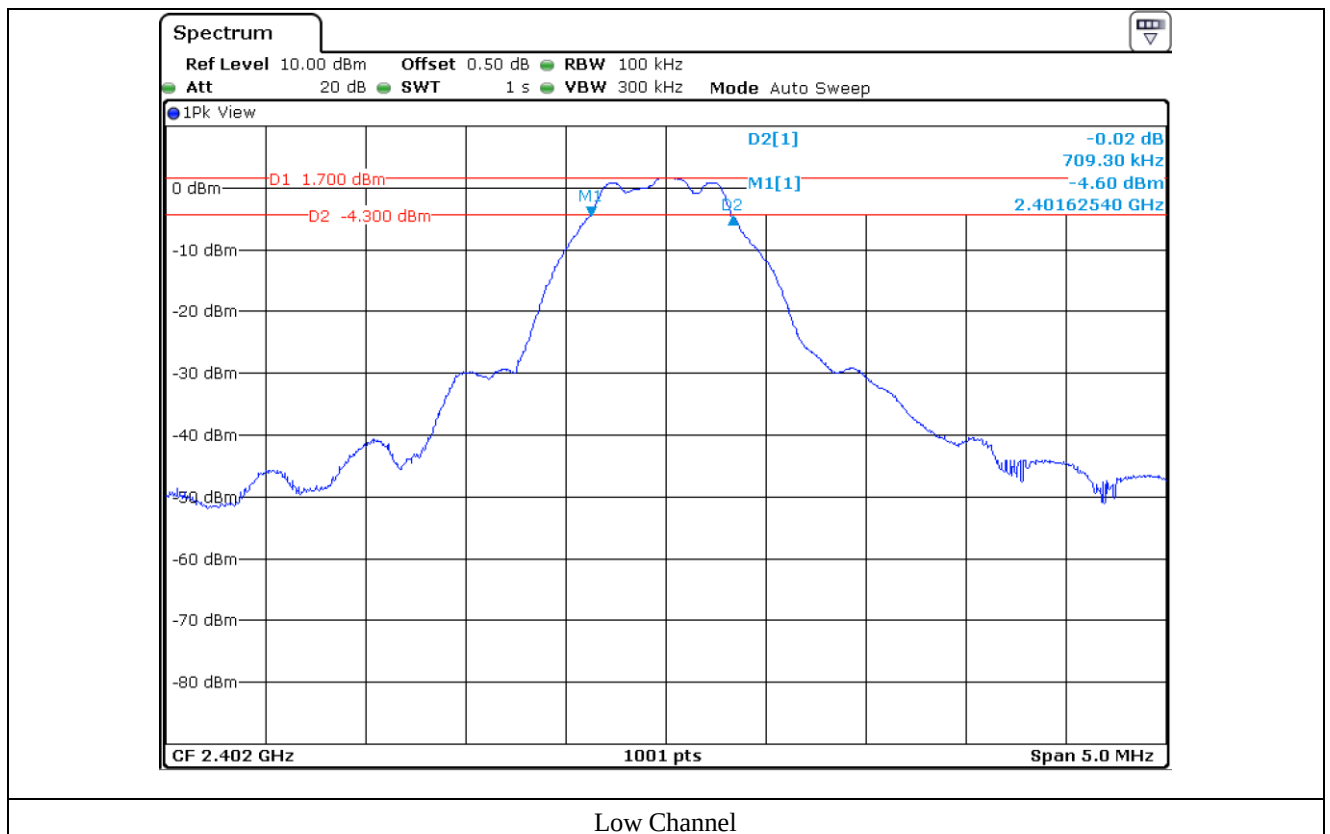
-. Test Result : Pass

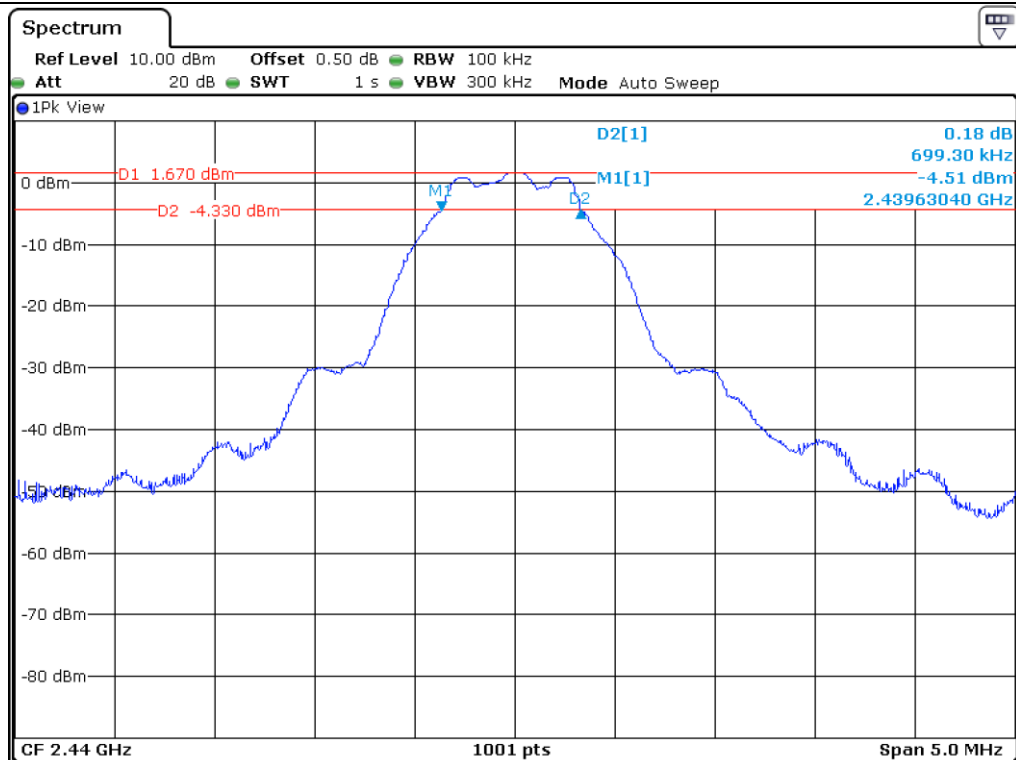
| CHANNEL | FREQUENCY(MHz) | MEASURED VALUE (kHz) | LIMIT (kHz) | MARGIN (kHz) |
|---------|----------------|----------------------|-------------|--------------|
| Low     | 2 402          | 709.30               | 500         | 209.30       |
| Middle  | 2 440          | 699.30               | 500         | 199.30       |
| High    | 2 480          | 709.30               | 500         | 209.30       |

Remark. Margin = Measured Value - Limit

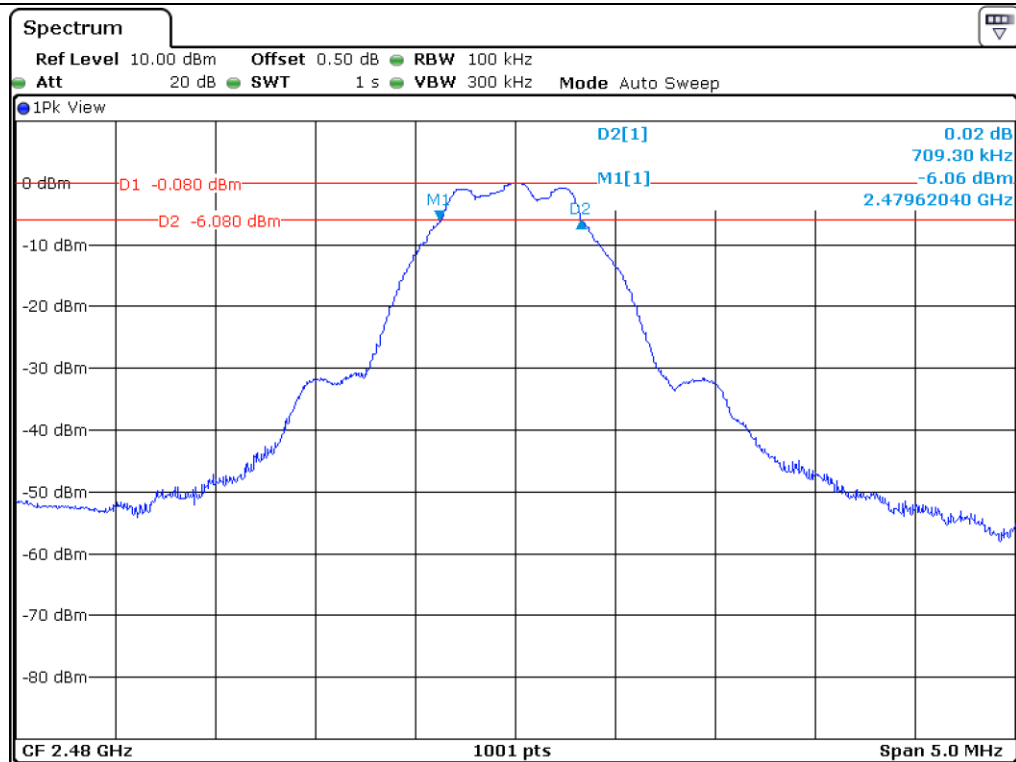


Tested by: Min-Gu Ji / Assistant Manager





Middle Channel



High Channel

## 8. MAXIMUM PEAK OUTPUT POWER

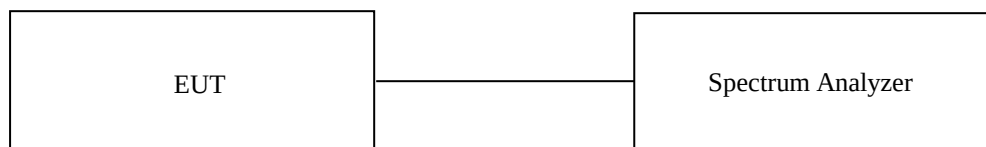
### 8.1 Operating environment

Temperature : 23 °C  
Relative humidity : 43 % 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        | Apr. 05, 2017 (1Y) |

All test equipment used is calibrated on a regular basis.

## 8.4 Test data

-. Test Date : June 01, 2017

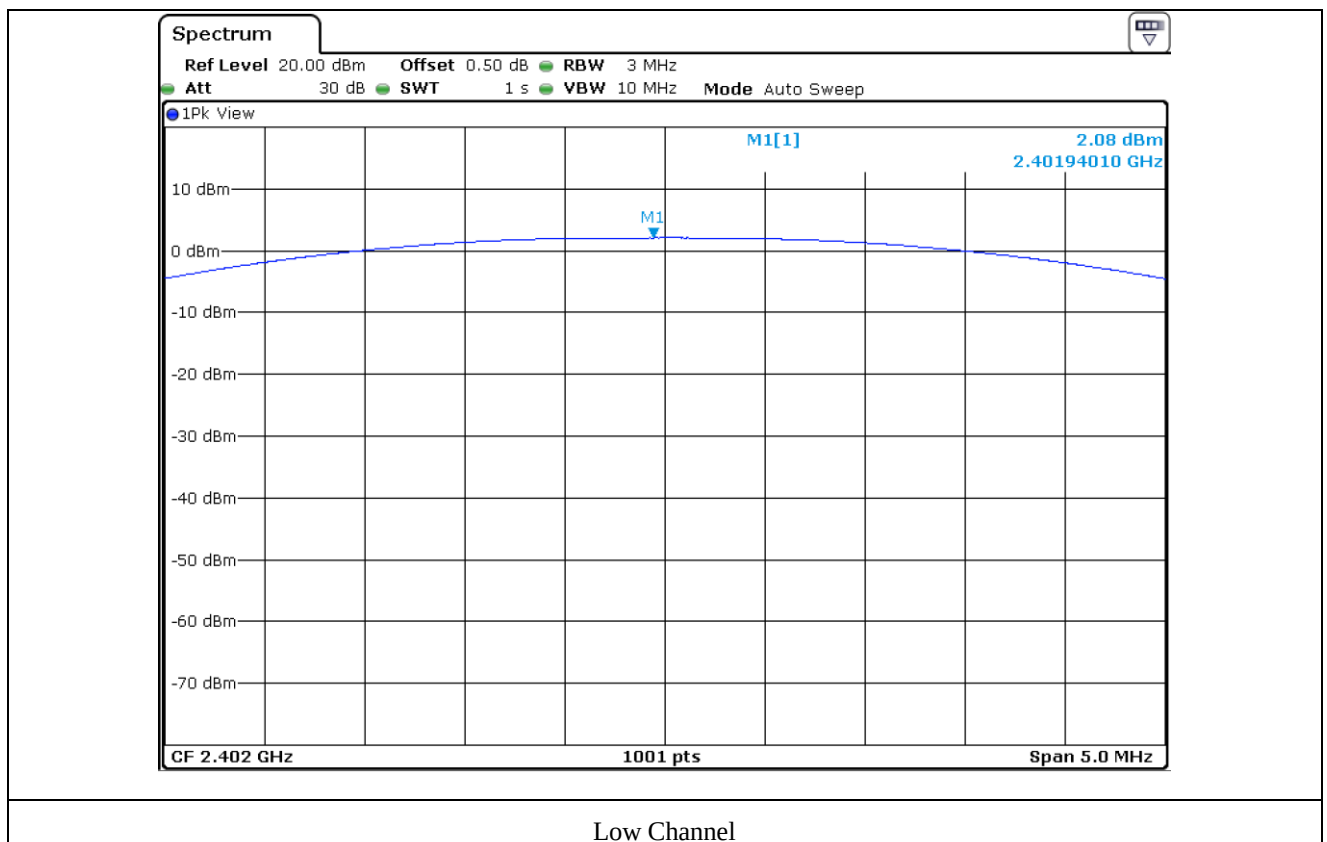
-. Test Result : Pass

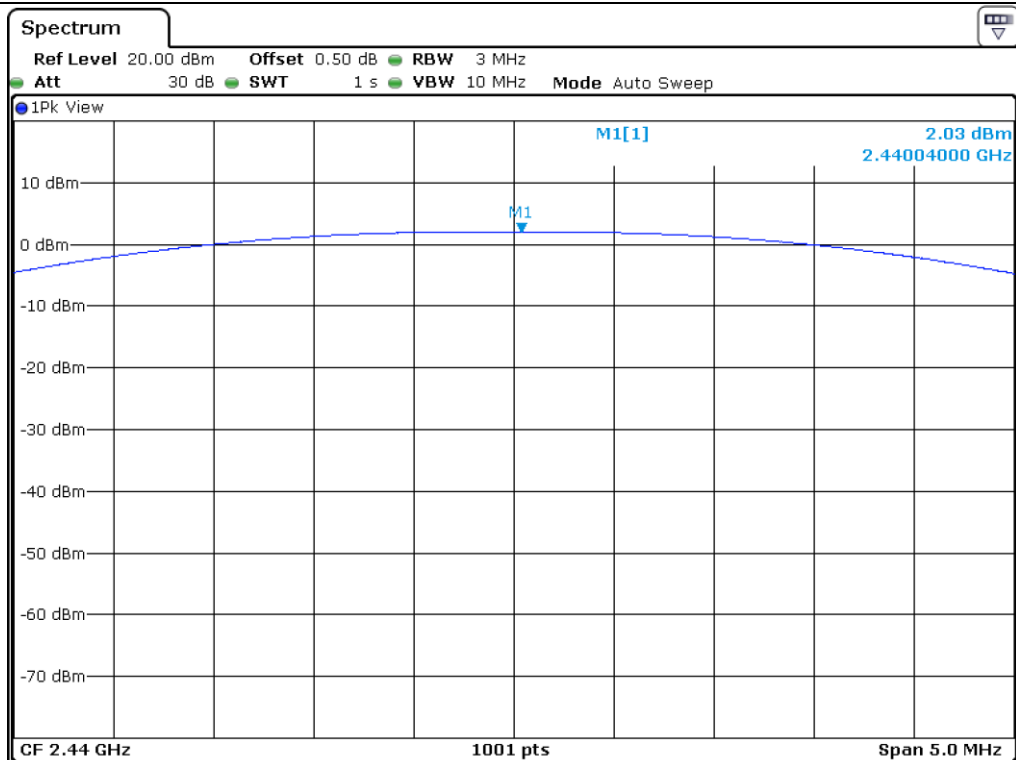
| CHANNEL | FREQUENCY<br>(MHz) | MEASURED VALUE<br>(dBm) | LIMIT<br>(dBm) | MARGIN<br>(dB) |
|---------|--------------------|-------------------------|----------------|----------------|
| LOW     | 2 402              | 2.08                    | 30.00          | 27.92          |
| MIDDLE  | 2 440              | 2.03                    | 30.00          | 27.97          |
| HIGH    | 2 480              | 1.79                    | 30.00          | 28.21          |

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

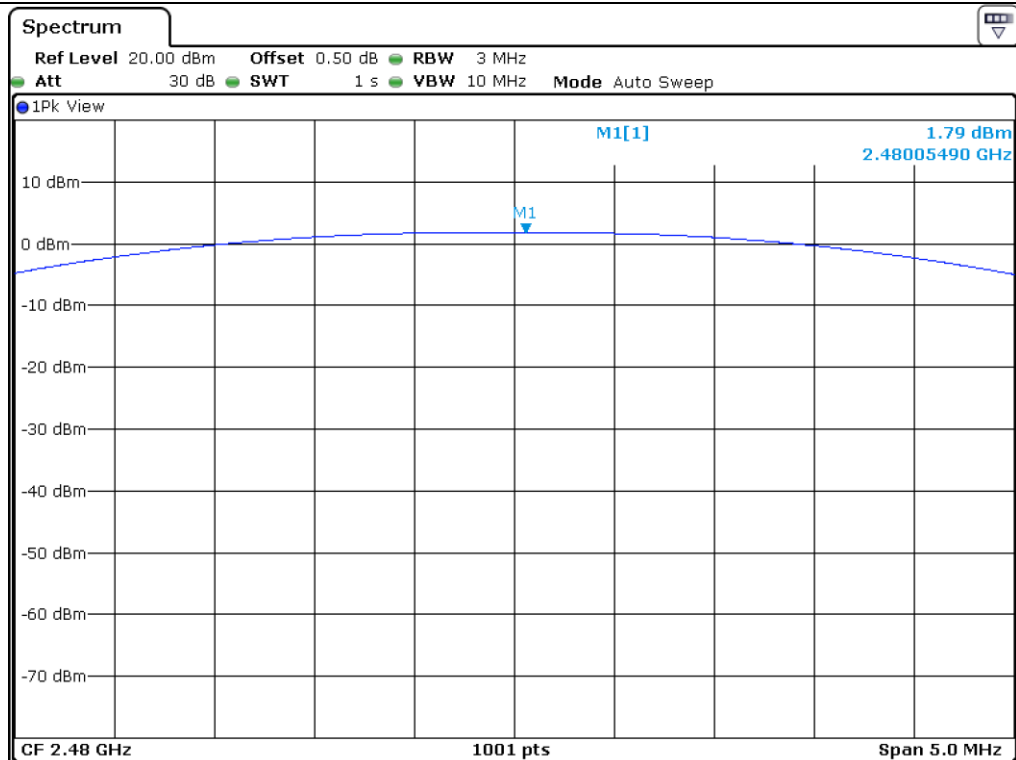


Tested by: Min-Gu Ji / Assistant Manager





Middle Channel



High Channel

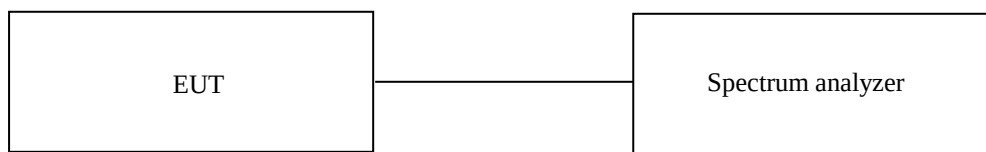
## 9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

### 9.1 Operating environment

Temperature : 23 °C  
Relative humidity : 43 % R.H.

### 9.2 Test set-up for conducted measurement

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

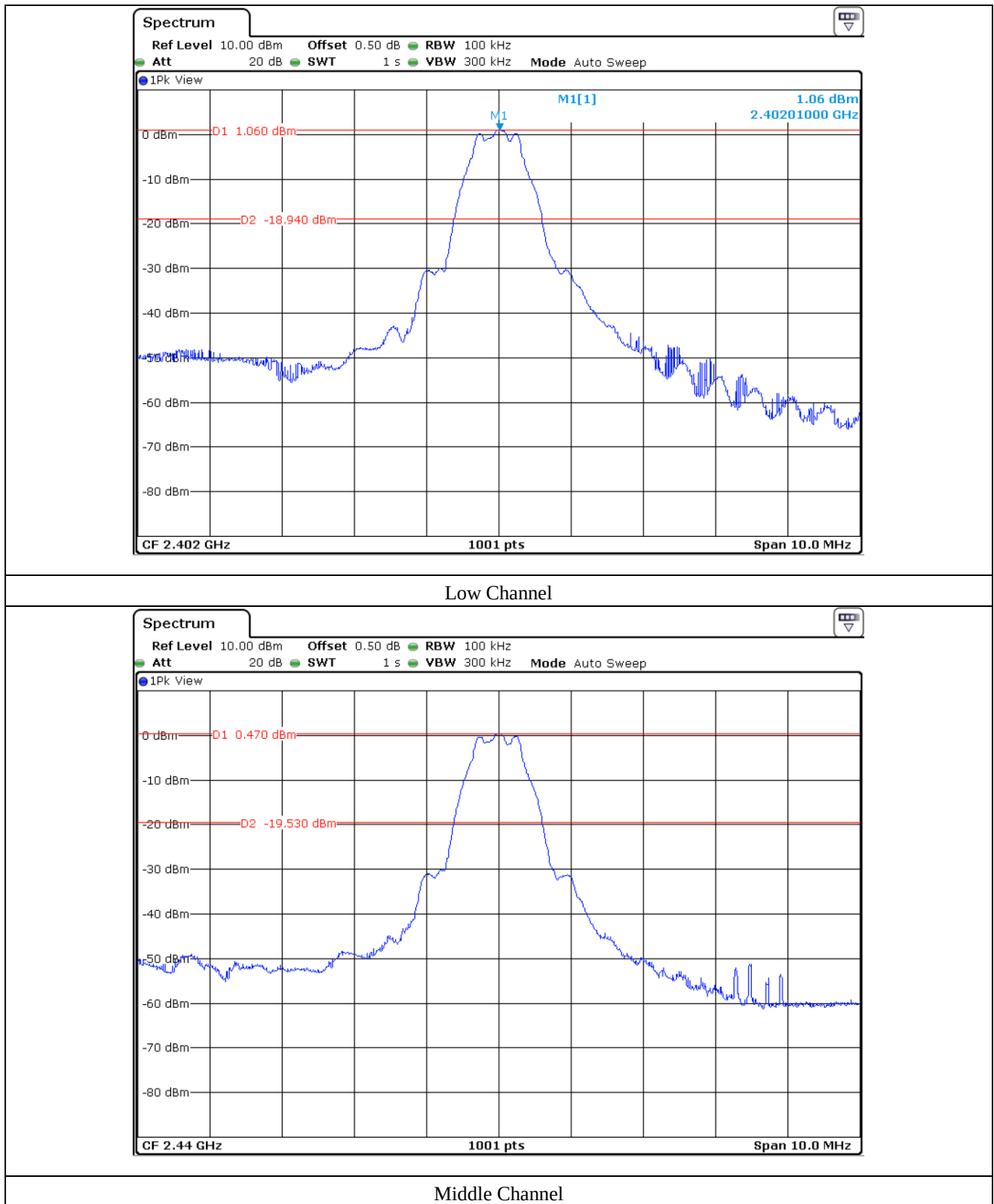
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal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

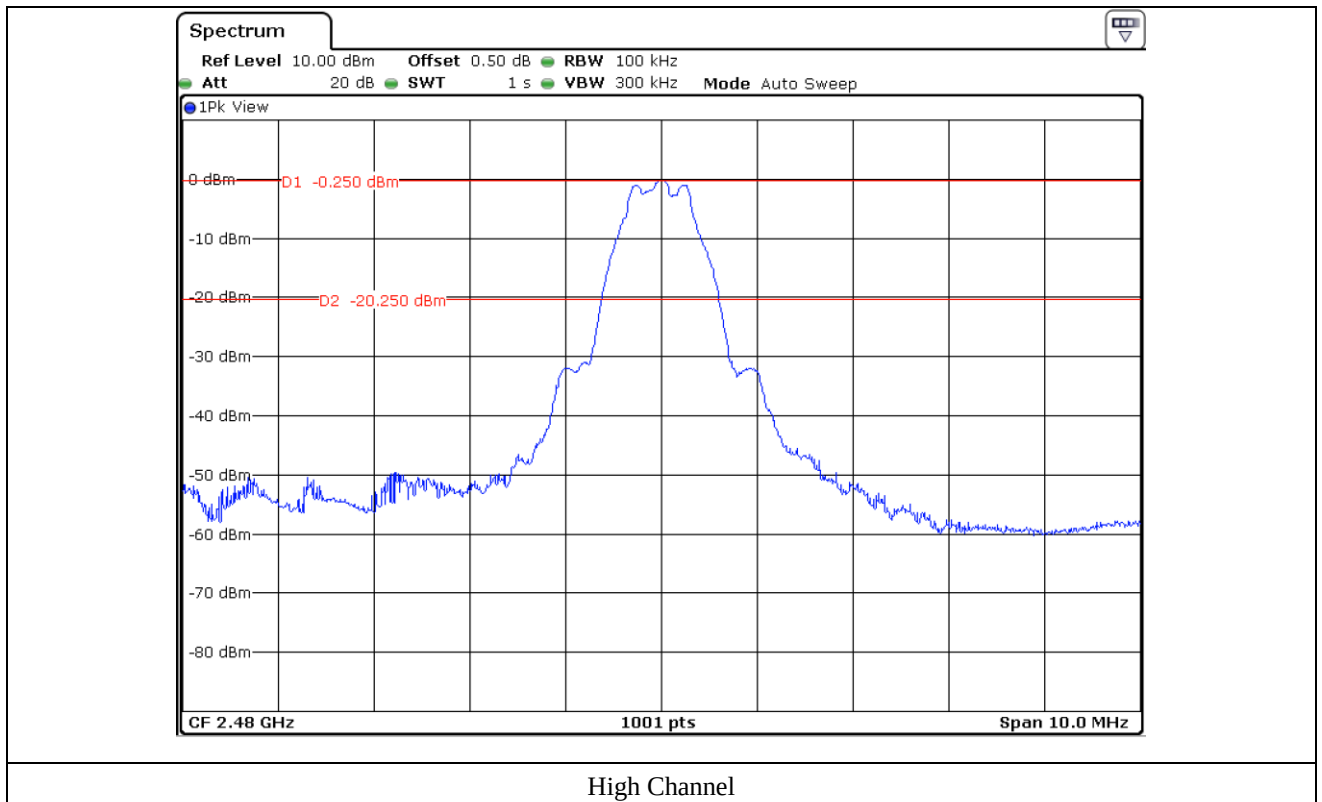
### 9.4 Test equipment used

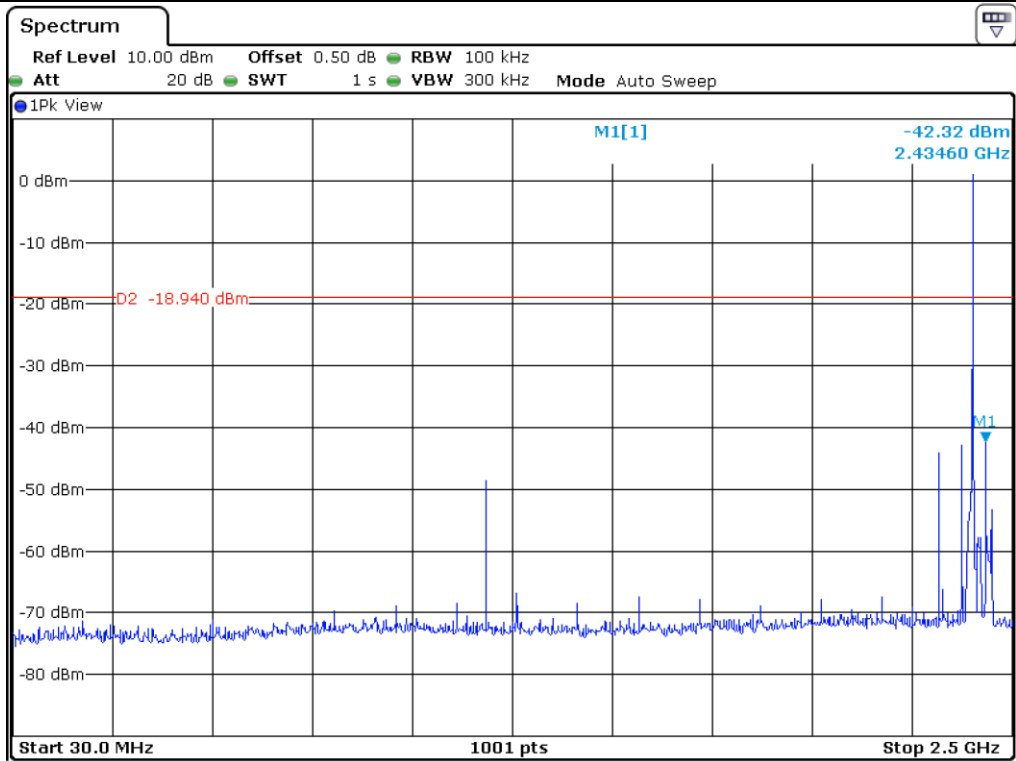
|     | Model Number | Manufacturer      | Description              | Serial Number | Last Cal.(Interval) |
|-----|--------------|-------------------|--------------------------|---------------|---------------------|
| ■ - | FSV40        | Rohde & Schwarz   | Signal Analyzer          | 101009        | Apr. 05, 2017 (1Y)  |
| ■ - | ESU          | Rohde & Schwarz   | EMI Test Receiver        | 100261        | Apr. 05, 2017 (1Y)  |
| ■ - | 310N         | Sonoma Instrument | Pre-Amplifier            | 312544        | Apr. 04, 2017 (1Y)  |
| ■ - | SCU-18       | Rohde & Schwarz   | Pre-Amplifier            | 102266        | Apr. 04, 2017 (1Y)  |
| ■ - | DT3000       | Innco System      | Turn Table               | 930611        | N/A                 |
| ■ - | MA4000-EP    | Innco System      | Antenna Master           | 3320611       | N/A                 |
| ■ - | VULB9163     | Schwarzbeck       | TRILOG Broadband Antenna | 9163-421      | Apr. 15, 2016 (2Y)  |
| ■ - | BBHA9120D    | Schwarzbeck       | Horn Antenna             | BBHA9120D1349 | Aug. 31, 2015 (2Y)  |
| ■ - | BBHA9170     | Schwarzbeck       | Horn Antenna             | BBHA9170178   | Apr. 30, 2015 (2Y)  |

All test equipment used is calibrated on a regular basis.

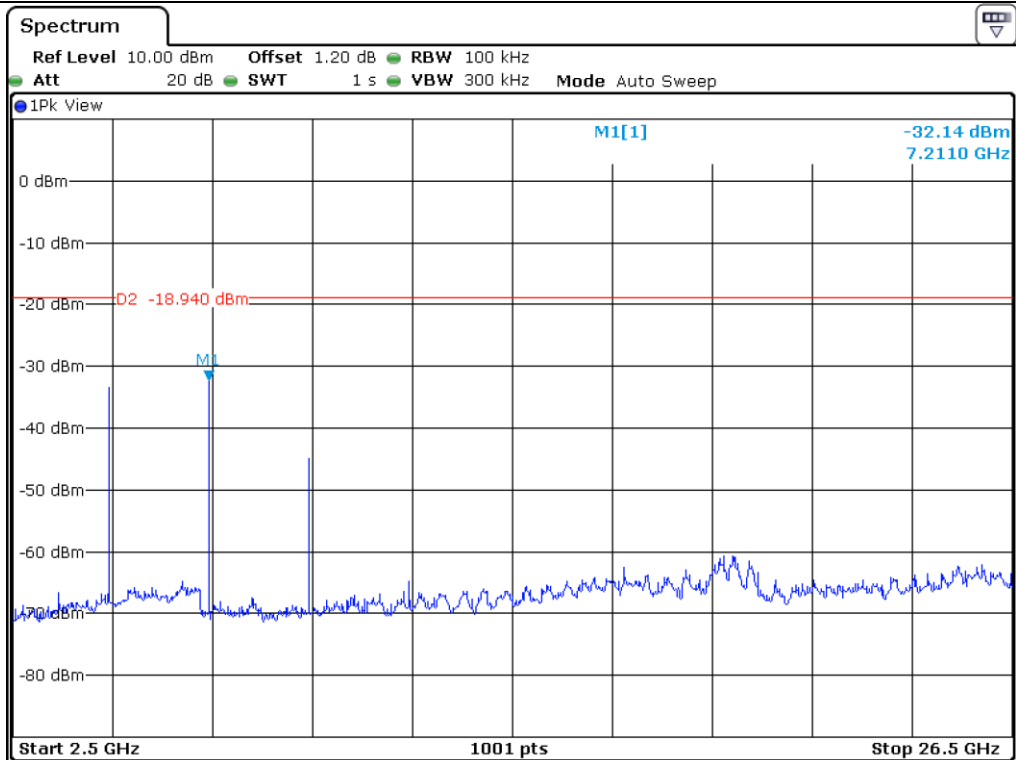
## 9.5 Test data for conducted emission



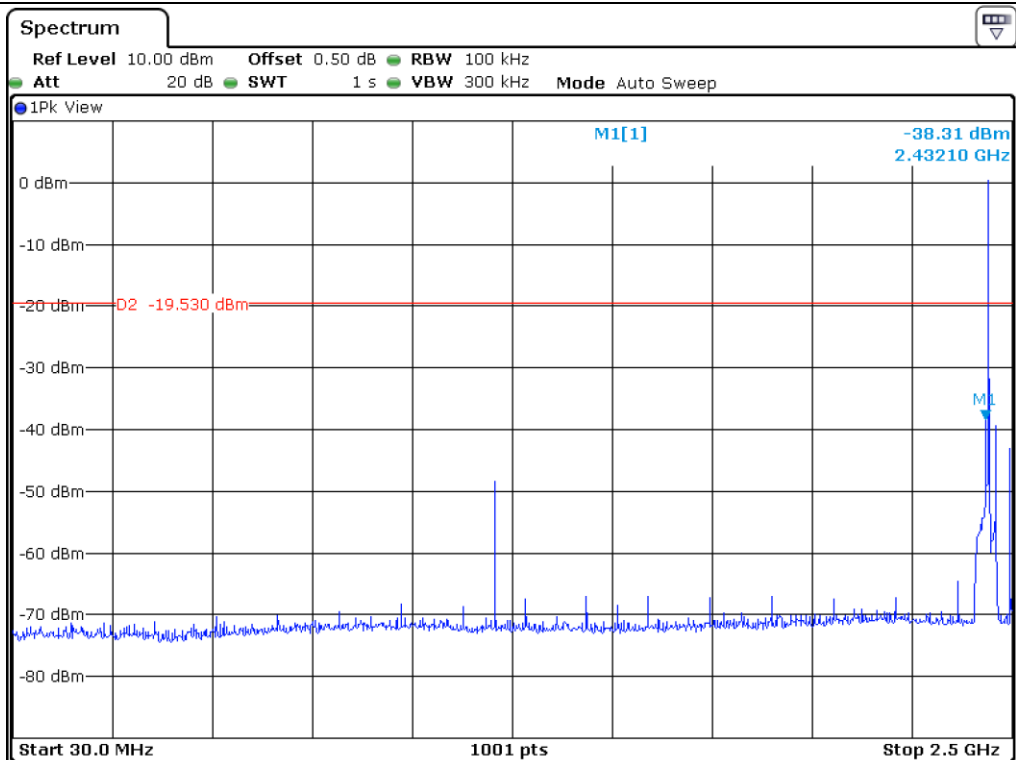




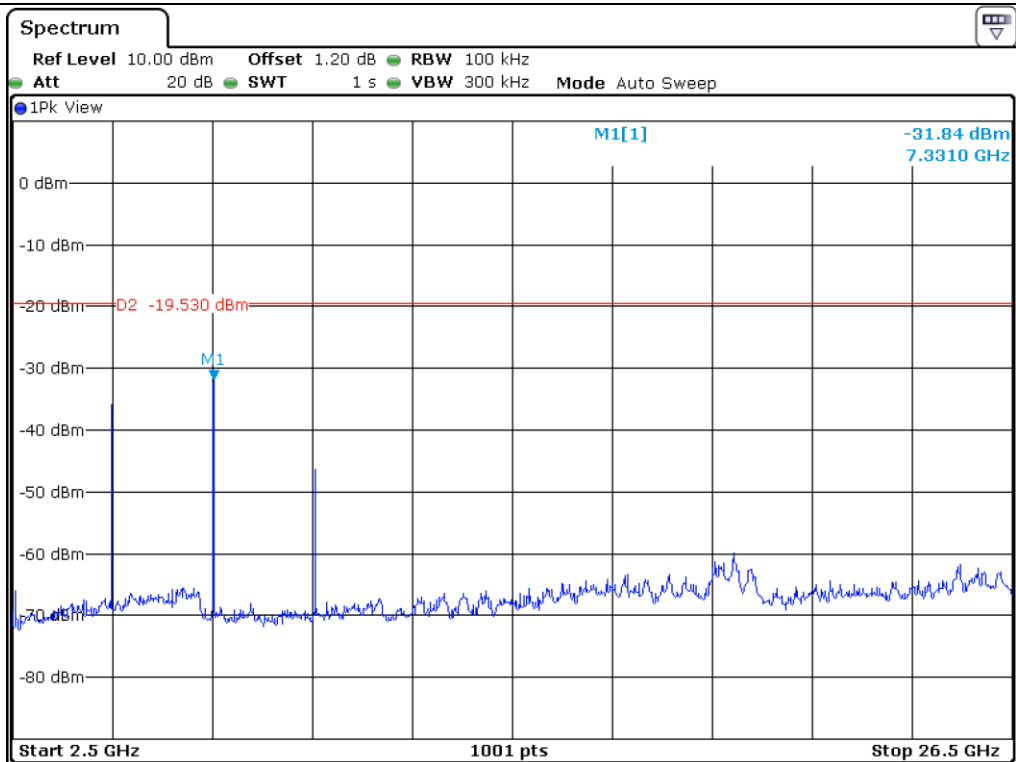
Low Channel



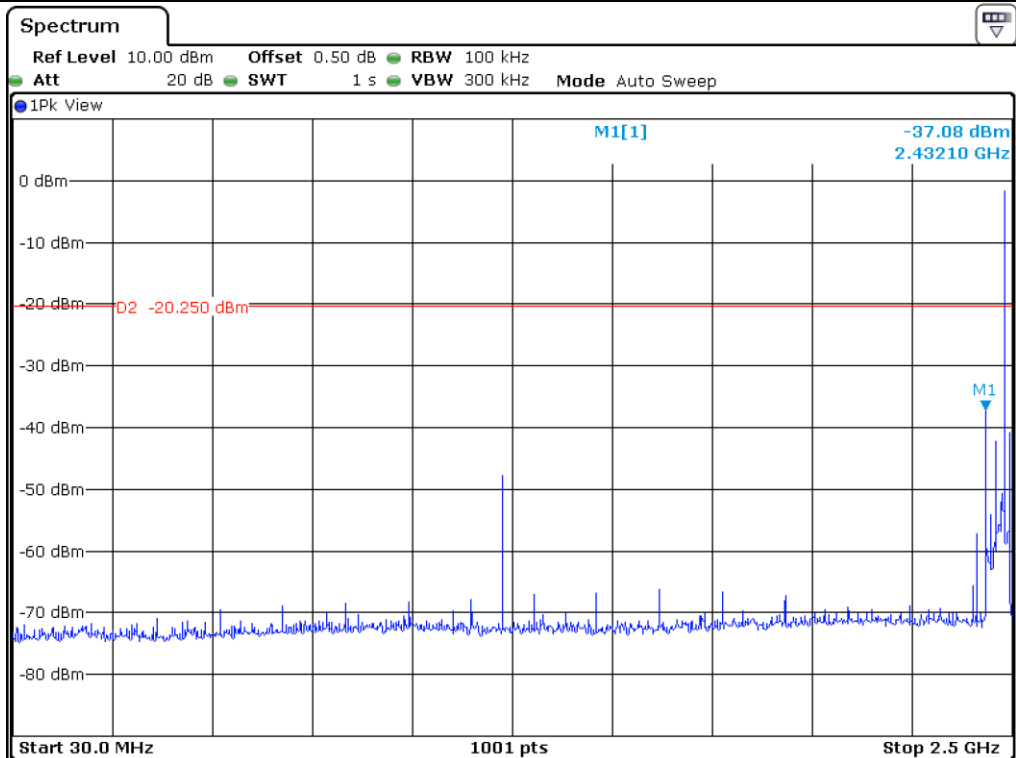
Low Channel



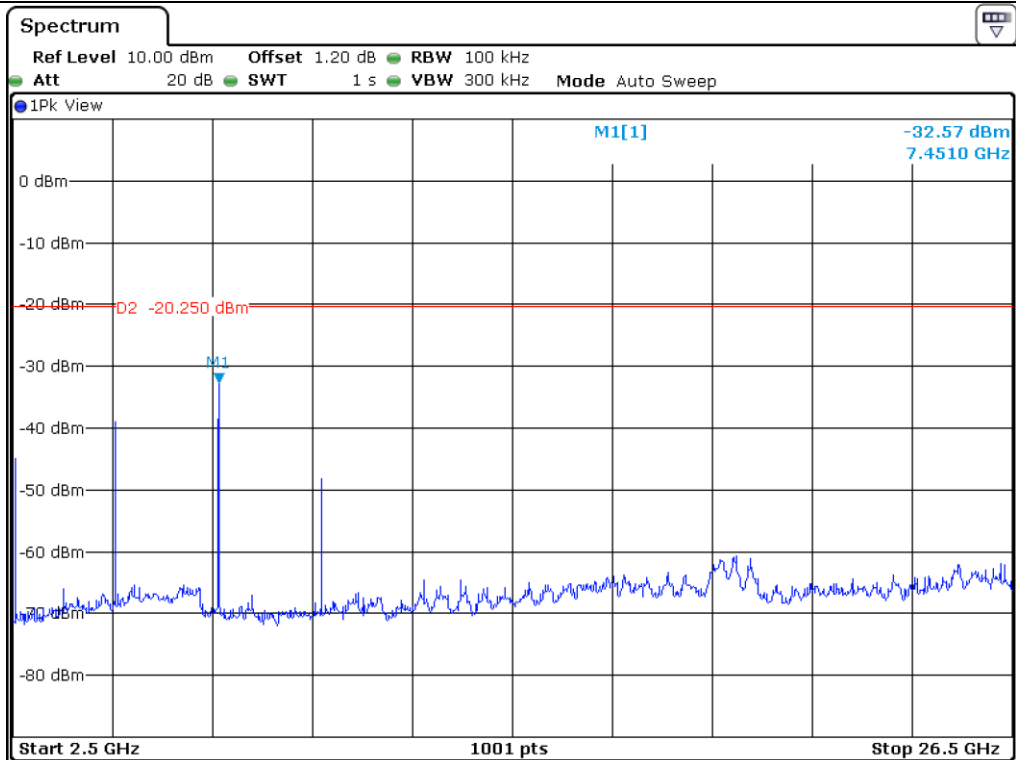
Middle Channel



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 : May 31, 2017
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Detector : Peak Mode(Peak), Average Mode(RMS)
- Measurement distance : 3 m
- Result : PASSED

| Frequency<br>(MHz)         | Reading<br>(dBμV) | Detector<br>Mode | Ant. Pol.<br>(H/V) | Ant.<br>Factor | Cable<br>Loss | Amp<br>Gain | Total<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) |
|----------------------------|-------------------|------------------|--------------------|----------------|---------------|-------------|-------------------|--------------------|----------------|
| Test Data for Low Channel  |                   |                  |                    |                |               |             |                   |                    |                |
| 2 380.53                   | 40.47             | Peak             | H                  | 27.20          | 11.40         | 40.20       | 38.87             | 74.00              | 35.13          |
|                            | 24.80             | Average          | H                  |                |               |             | 23.20             | 54.00              | 30.80          |
| 2 389.96                   | 44.50             | Peak             | V                  |                |               |             | 42.90             | 74.00              | 31.10          |
|                            | 29.43             | Average          | V                  |                |               |             | 27.83             | 54.00              | 26.17          |
| Test Data for High Channel |                   |                  |                    |                |               |             |                   |                    |                |
| 2 496.78                   | 42.72             | Peak             | H                  | 27.20          | 11.40         | 40.20       | 41.12             | 74.00              | 32.88          |
|                            | 26.90             | Average          | H                  |                |               |             | 25.30             | 54.00              | 28.70          |
| 2 494.93                   | 40.18             | Peak             | V                  |                |               |             | 38.58             | 74.00              | 35.42          |
|                            | 25.90             | Average          | V                  |                |               |             | 24.30             | 54.00              | 29.70          |

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: Min-Gu Ji / Assistant Manager

## 9.6.2 Spurious & Harmonic Radiated Emission

- Test Date : May 31, 2017
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Detector : Peak Mode(Peak), Average Mode(RMS)
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

| Frequency<br>(GHz)           | Reading<br>(dBμV) | Detector<br>Mode | Ant. Pol.<br>(H/V) | Ant.<br>Factor | Cable<br>Loss | Amp<br>Gain | Total<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) |
|------------------------------|-------------------|------------------|--------------------|----------------|---------------|-------------|-------------------|--------------------|----------------|
| Test Data for Low Channel    |                   |                  |                    |                |               |             |                   |                    |                |
| 4 804.00                     | 58.99             | Peak             | H                  | 30.80          | 16.10         | 43.80       | 62.09             | 74.00              | 11.91          |
|                              | 45.46             | Average          | H                  |                |               |             | 48.56             | 54.00              | 5.44           |
|                              | 48.94             | Peak             | V                  |                |               |             | 52.04             | 74.00              | 21.96          |
|                              | 35.73             | Average          | V                  |                |               |             | 38.83             | 54.00              | 15.17          |
| Test Data for Middle Channel |                   |                  |                    |                |               |             |                   |                    |                |
| 4 880.00                     | 58.63             | Peak             | H                  | 30.90          | 16.10         | 43.80       | 61.83             | 74.00              | 12.17          |
|                              | 45.52             | Average          | H                  |                |               |             | 48.72             | 54.00              | 5.28           |
|                              | 49.33             | Peak             | V                  |                |               |             | 52.53             | 74.00              | 21.47          |
|                              | 39.49             | Average          | V                  |                |               |             | 42.69             | 54.00              | 11.31          |
| Test Data for High Channel   |                   |                  |                    |                |               |             |                   |                    |                |
| 4 960.00                     | 57.68             | Peak             | H                  | 31.00          | 16.10         | 43.80       | 60.98             | 74.00              | 13.02          |
|                              | 44.37             | Average          | H                  |                |               |             | 47.67             | 54.00              | 6.33           |
|                              | 49.77             | Peak             | V                  |                |               |             | 53.07             | 74.00              | 20.93          |
|                              | 37.55             | Average          | V                  |                |               |             | 40.85             | 54.00              | 13.15          |

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Min-Gu Ji / Assistant Manager

## 10. PEAK POWER SPECTRAL DENSITY

### 10.1 Operating environment

Temperature : 23 °C  
Relative humidity : 43 % 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        | Apr. 05, 2017 (1Y) |

All test equipment used is calibrated on a regular basis.

#### 10.4 Test data

-. Test Date : June 01, 2017

-. Test Result : Pass

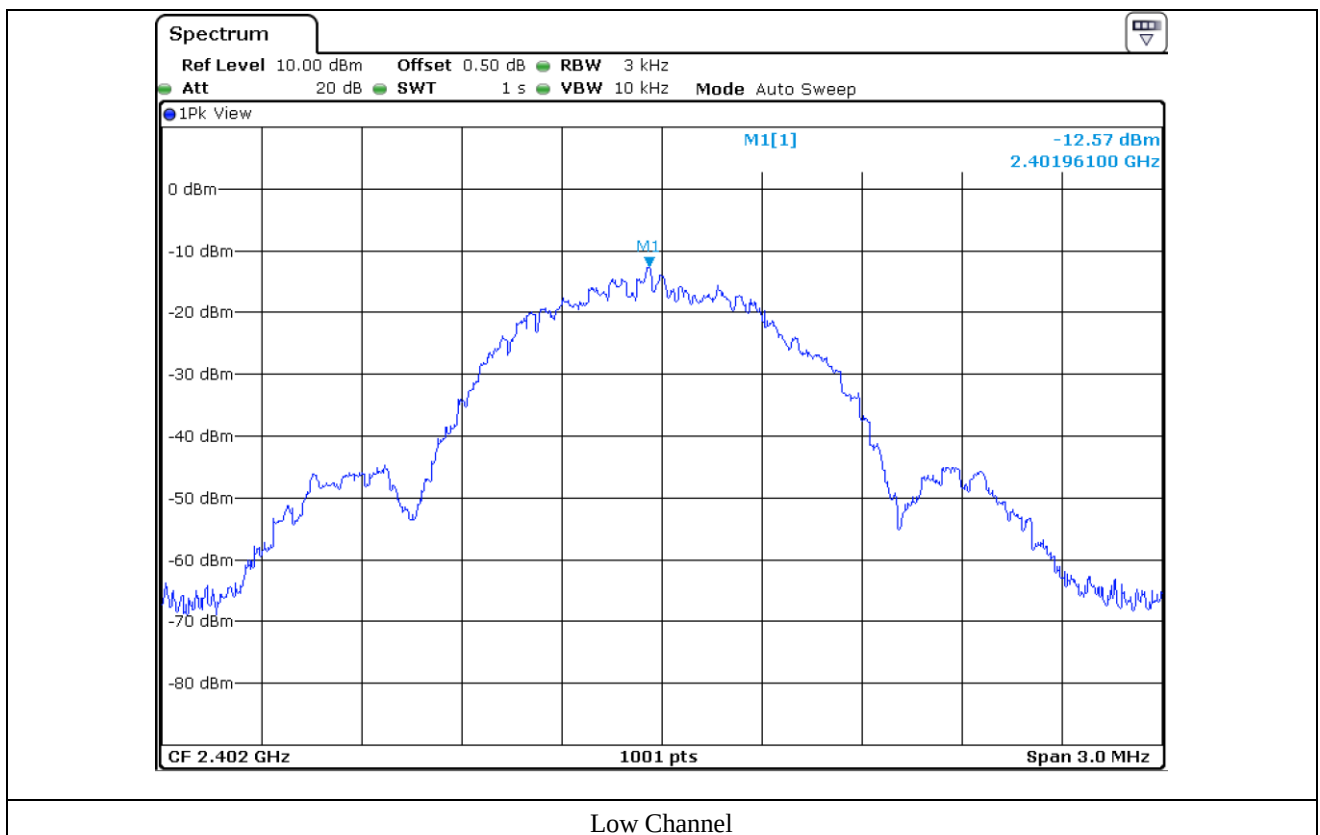
-. Operating Condition : Continuous transmitting mode

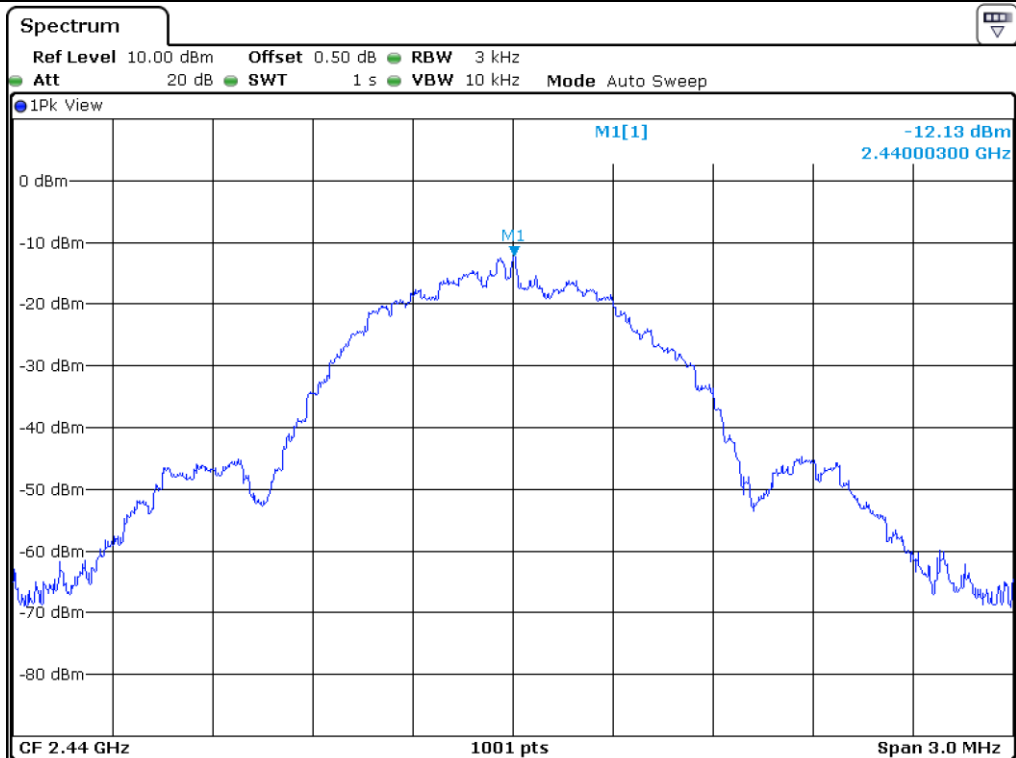
| CHANNEL | FREQUENCY(MHz) | MEASURED VALUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---------|----------------|----------------------|-------------|-------------|
| Low     | 2 402          | -12.57               | 8.00        | 20.57       |
| Middle  | 2 440          | -12.13               | 8.00        | 20.13       |
| High    | 2 480          | -12.26               | 8.00        | 20.26       |

Remark. Margin = Limit – Measured value

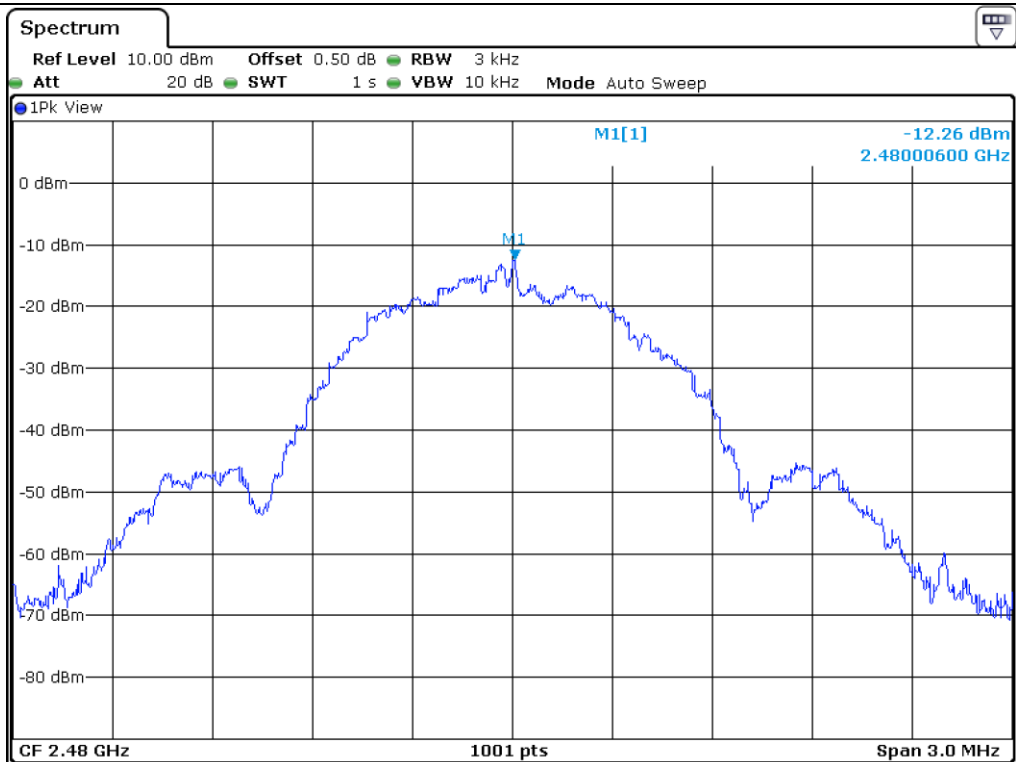


Tested by: Min-Gu Ji / Assistant Manager





Middle Channel



High Channel

## 11. RADIATED EMISSION TEST

### 11.1 Operating environment

Temperature : 23 °C  
Relative humidity : 53 % 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.(Interval) |
|---------------|-------------------|--------------------------|---------------|---------------------|
| ■ - FSV40     | Rohde & Schwarz   | Signal Analyzer          | 101009        | Apr. 05, 2017 (1Y)  |
| ■ - ESCI      | Rohde & Schwarz   | Test Receiver            | 101012        | Nov. 01, 2016 (1Y)  |
| ■ - 310N      | Sonoma Instrument | Pre-Amplifier            | 312544        | Apr. 04, 2017 (1Y)  |
| ■ - SCU-18    | Rohde & Schwarz   | Pre-Amplifier            | 10041         | Nov. 02, 2016 (1Y)  |
| ■ - DT3000    | Innco System      | Turn Table               | 930611        | N/A                 |
| ■ - MA4000-EP | Innco System      | Antenna Master           | 3320611       | N/A                 |
| ■ - VULB9163  | Schwarzbeck       | TRILOG Broadband Antenna | 9163-421      | Apr. 15, 2016 (2Y)  |
| ■ - BBHA9120D | Schwarzbeck       | Horn Antenna             | BBHA9120D295  | Aug. 31, 2015 (2Y)  |
| ■ - BBHA9170  | Schwarzbeck       | Horn Antenna             | BBHA9170178   | Apr. 30, 2015 (2Y)  |

All test equipment used is calibrated on a regular basis.

## 11.4 Test data for Transmitting Mode

### 11.4.1 Test data for 30 MHz ~ 1 GHz

Humidity Level : 53 % R.H.

Temperature: 23 °C

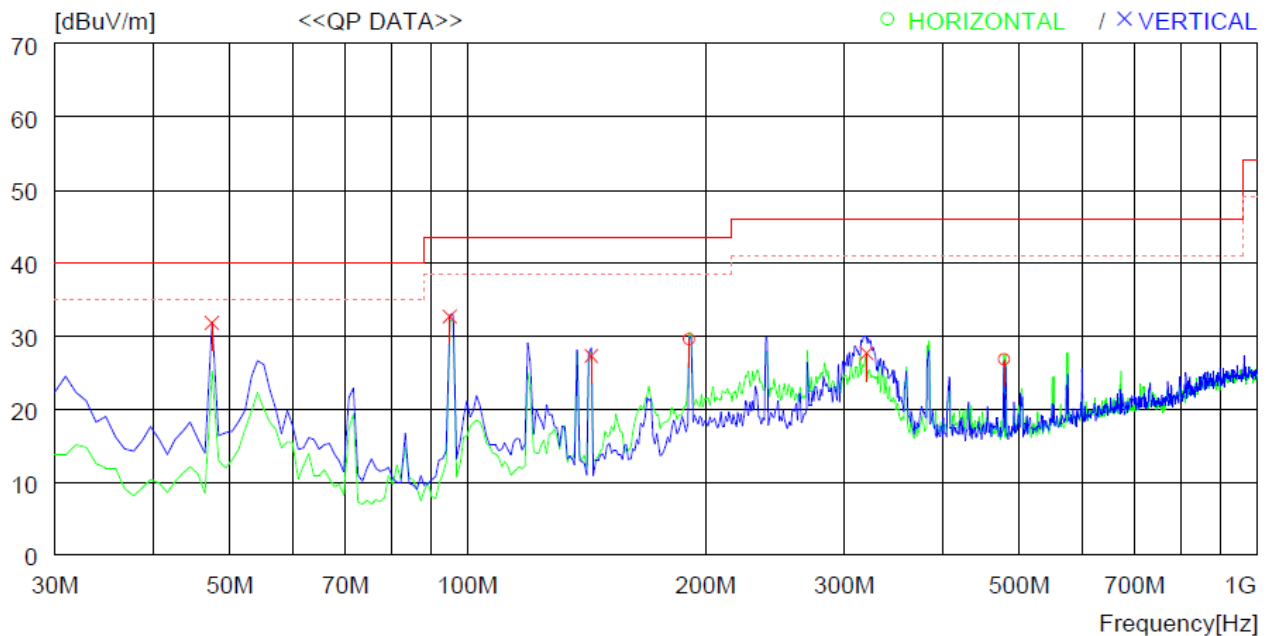
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Fashionable Smart Accessory

Date: May 31, 2017

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



| No.                    | FREQ    | READING | ANT    | LOSS | GAIN | RESULT   | LIMIT    | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
|                        | [MHz]   | QP      | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB]   | [cm]    | [DEG] |
| ----- Horizontal ----- |         |         |        |      |      |          |          |        |         |       |
| 1                      | 191.020 | 48.2    | 11.0   | 3.3  | 33.0 | 29.5     | 43.5     | 14.0   | 200     | 302   |
| 2                      | 478.141 | 38.3    | 16.6   | 5.1  | 33.2 | 26.8     | 46.0     | 19.2   | 100     | 127   |
| ----- Vertical -----   |         |         |        |      |      |          |          |        |         |       |
| 3                      | 47.460  | 48.8    | 14.3   | 1.7  | 33.0 | 31.8     | 40.0     | 8.2    | 100     | 359   |
| 4                      | 94.990  | 52.0    | 11.5   | 2.3  | 33.1 | 32.7     | 43.5     | 10.8   | 100     | 115   |
| 5                      | 143.490 | 49.1    | 8.5    | 2.8  | 33.1 | 27.3     | 43.5     | 16.2   | 300     | 359   |
| 6                      | 320.030 | 42.5    | 14.0   | 4.1  | 33.0 | 27.6     | 46.0     | 18.4   | 200     | 195   |

Tested by: Min-Gu Ji / Assistant Manager

#### 11.4.2 Test data for Below 30 MHz

- . Test Date : May 31, 2017
- . 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) |
|------------------------------------------------------------------|----------------|-----------------|-----------------|-----------|--------------------|------------|------------------------|-----------------|-------------|
| Any emissions less than 20 dB below the limit were not observed. |                |                 |                 |           |                    |            |                        |                 |             |

#### 11.4.3 Test data for above 1 GHz

- . Test Date : May 31, 2017
- . 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) |
|------------------------------------------------------------------|----------------|-----------------|-----------------|-----------|--------------------|------------|------------------------|-----------------|-------------|
| Any emissions less than 20 dB below the limit were not observed. |                |                 |                 |           |                    |            |                        |                 |             |



Tested by: Min-Gu Ji / Assistant Manager

## 12. CONDUCTED EMISSION TEST

### 12.1 Operating environment

Temperature : 23 °C  
Relative humidity : 44 % R.H.

### 12.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50  $\Omega$  / 50  $\mu$ H + 5  $\Omega$  Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

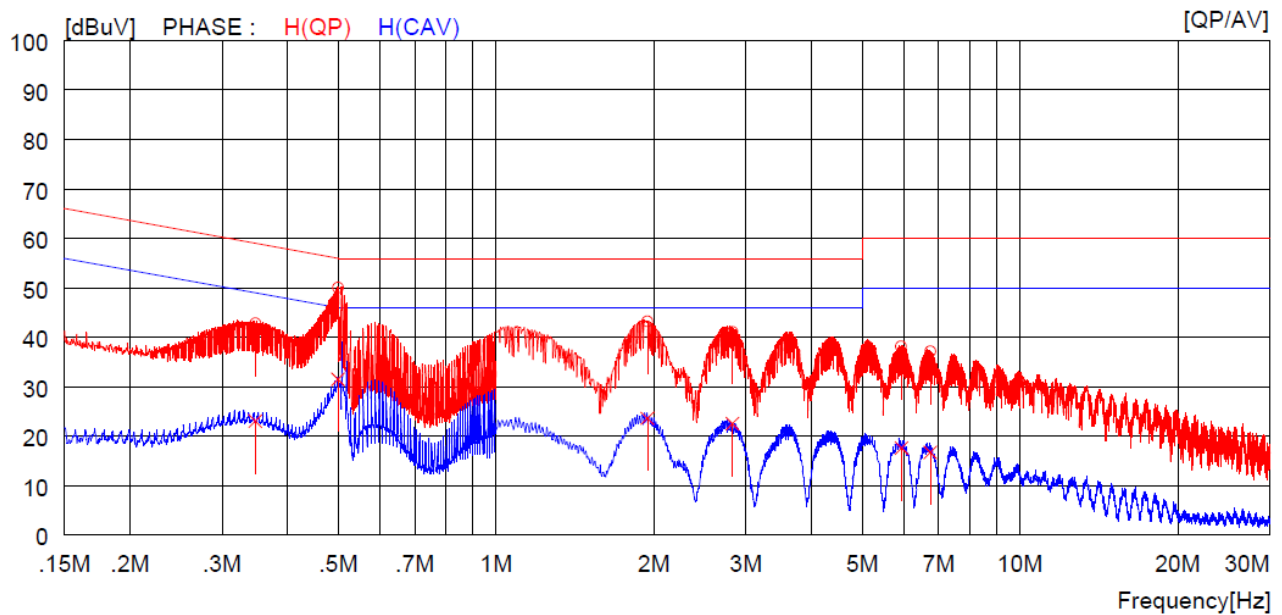
### 12.3 Test equipment used

|      | Model Number | Manufacturer    | Description       | Serial Number | Last Cal. (Interval) |
|------|--------------|-----------------|-------------------|---------------|----------------------|
| ■ -  | ESPI         | Rohde & Schwarz | EMI Test Receiver | 101278        | Nov. 01, 2016 (1Y)   |
| □ -  | ESHS10       | Rohde & Schwarz | EMI Test Receiver | 834467/007    | Apr. 03, 2017 (1Y)   |
| □    | NSLK8128     | Schwarzbeck     | AMN               | 8128-216      | Apr. 05, 2017 (1Y)   |
| ■ -  | NSLK8126     | Schwarzbeck     | AMN               | 8126-404      | Apr. 03, 2017 (1Y)   |
| □ -  | 3825/2       | EMCO            | AMN               | 9109-1869     | Apr. 06, 2017 (1Y)   |
| ■ -- | 3825/2       | EMCO            | AMN               | 9109-1867     | Apr. 07, 2017 (1Y)   |

All test equipment used is calibrated on a regular basis.

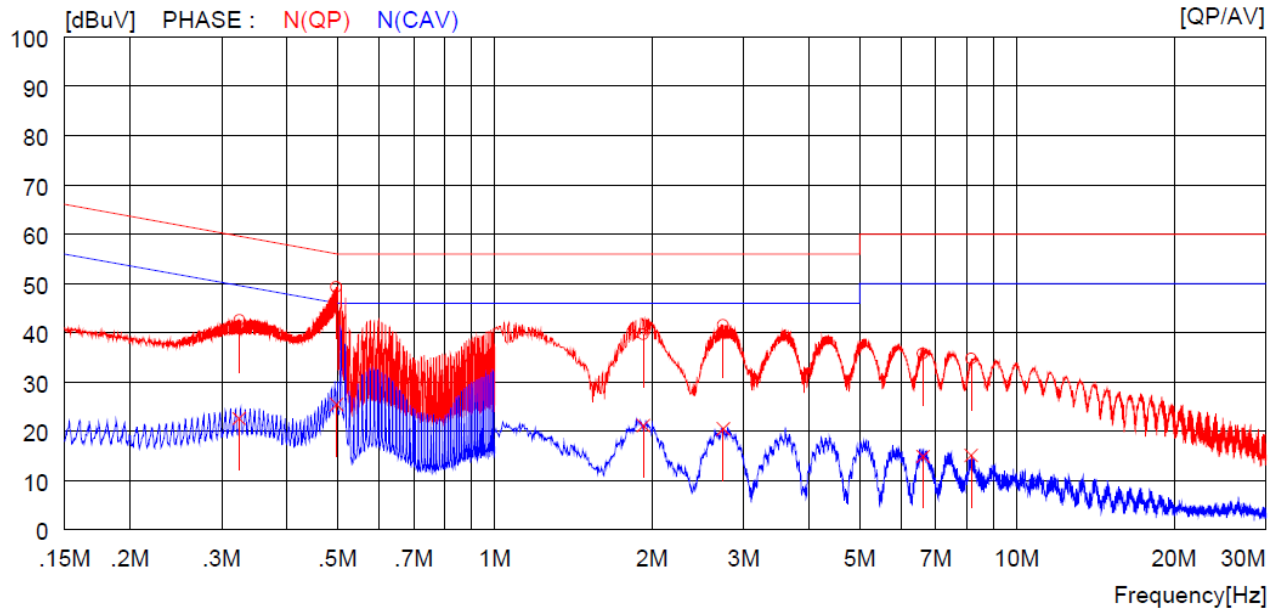
## 12.4 Test data

- Test Date : June 01, 2017
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE



| NO | FREQ    |        | READING |      | C.FACTOR |        | RESULT |        | LIMIT  |        | MARGIN |        | PHASE |    |
|----|---------|--------|---------|------|----------|--------|--------|--------|--------|--------|--------|--------|-------|----|
|    | QP      | AV     | QP      | AV   | QP       | AV     | QP     | AV     | QP     | AV     | QP     | AV     | QP    | AV |
|    | [MHz]   | [dBuV] | [dBuV]  | [dB] | [dBuV]   | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] |       |    |
| 1  | 0.34700 | 42.7   | ----    | 0.1  | 42.8     | ----   | 59.0   | ----   | 16.2   | ----   | H(QP)  |        |       |    |
| 2  | 0.49900 | 49.9   | ----    | 0.1  | 50.0     | ----   | 56.0   | ----   | 6.0    | ----   | H(QP)  |        |       |    |
| 3  | 1.94400 | 43.1   | ----    | 0.1  | 43.2     | ----   | 56.0   | ----   | 12.8   | ----   | H(QP)  |        |       |    |
| 4  | 2.82800 | 40.9   | ----    | 0.2  | 41.1     | ----   | 56.0   | ----   | 14.9   | ----   | H(QP)  |        |       |    |
| 5  | 5.93500 | 37.9   | ----    | 0.2  | 38.1     | ----   | 60.0   | ----   | 21.9   | ----   | H(QP)  |        |       |    |
| 6  | 6.74500 | 36.8   | ----    | 0.3  | 37.1     | ----   | 60.0   | ----   | 22.9   | ----   | H(QP)  |        |       |    |
| 7  | 0.34700 | ----   | 22.9    | 0.1  | ----     | 23.0   | ----   | 49.0   | ----   | 26.0   | H(CAV) |        |       |    |
| 8  | 0.49900 | ----   | 31.4    | 0.1  | ----     | 31.5   | ----   | 46.0   | ----   | 14.5   | H(CAV) |        |       |    |
| 9  | 1.94400 | ----   | 23.5    | 0.1  | ----     | 23.6   | ----   | 46.0   | ----   | 22.4   | H(CAV) |        |       |    |
| 10 | 2.82800 | ----   | 22.3    | 0.2  | ----     | 22.5   | ----   | 46.0   | ----   | 23.5   | H(CAV) |        |       |    |
| 11 | 5.93500 | ----   | 17.4    | 0.2  | ----     | 17.6   | ----   | 50.0   | ----   | 32.4   | H(CAV) |        |       |    |
| 12 | 6.74500 | ----   | 16.4    | 0.3  | ----     | 16.7   | ----   | 50.0   | ----   | 33.3   | H(CAV) |        |       |    |

-. Tested Line : NEGATIVE LINE



| NO | FREQ<br>[MHz] | READING      |              | C.FACTOR<br>[dB] | RESULT       |              | LIMIT        |              | MARGIN       |              | PHASE  |
|----|---------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
|    |               | QP<br>[dBuV] | AV<br>[dBuV] |                  | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] | QP<br>[dBuV] | AV<br>[dBuV] |        |
| 1  | 0.32400       | 42.4         | ----         | 0.1              | 42.5         | ----         | 59.6         | ----         | 17.1         | ----         | N(QP)  |
| 2  | 0.49700       | 49.2         | ----         | 0.1              | 49.3         | ----         | 56.0         | ----         | 6.7          | ----         | N(QP)  |
| 3  | 1.92400       | 39.5         | ----         | 0.1              | 39.6         | ----         | 56.0         | ----         | 16.4         | ----         | N(QP)  |
| 4  | 2.74000       | 41.3         | ----         | 0.2              | 41.5         | ----         | 56.0         | ----         | 14.5         | ----         | N(QP)  |
| 5  | 6.60500       | 35.5         | ----         | 0.3              | 35.8         | ----         | 60.0         | ----         | 24.2         | ----         | N(QP)  |
| 6  | 8.17500       | 34.5         | ----         | 0.3              | 34.8         | ----         | 60.0         | ----         | 25.2         | ----         | N(QP)  |
| 7  | 0.32400       | ----         | 22.5         | 0.1              | ----         | 22.6         | ----         | 49.6         | ----         | 27.0         | N(CAV) |
| 8  | 0.49700       | ----         | 25.3         | 0.1              | ----         | 25.4         | ----         | 46.0         | ----         | 20.6         | N(CAV) |
| 9  | 1.92400       | ----         | 21.0         | 0.1              | ----         | 21.1         | ----         | 46.0         | ----         | 24.9         | N(CAV) |
| 10 | 2.74000       | ----         | 20.3         | 0.2              | ----         | 20.5         | ----         | 46.0         | ----         | 25.5         | N(CAV) |
| 11 | 6.60500       | ----         | 14.6         | 0.3              | ----         | 14.9         | ----         | 50.0         | ----         | 35.1         | N(CAV) |
| 12 | 8.17500       | ----         | 14.8         | 0.3              | ----         | 15.1         | ----         | 50.0         | ----         | 34.9         | N(CAV) |

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

*[Signature]*

Tested by: Min-Gu Ji / Assistant Manager