

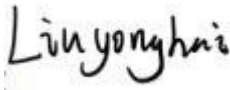
Test Report No.:  
**FCC2021-0024-RF-1**

## **RF Test Report**

**EUT** : Wireless on-ear headphones  
**MODEL** : TAH4205XT  
**BRAND NAME** : PHILIPS  
**APPLICANT** : MMD Hong Kong Holding Limited  
**Classification Of Test** : N/A

**CVC Testing Technology Co., Ltd.**



|                                                                                                                                                          |                                                                                                                 |                                                                                       |                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------|
| <b>Applicant</b>                                                                                                                                         | Name : MMD Hong Kong Holding Limited                                                                            |                                                                                       |                       |
|                                                                                                                                                          | Address : Unit 1006, 10th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong |                                                                                       |                       |
| <b>Manufacturer</b>                                                                                                                                      | Name : MMD Hong Kong Holding Limited                                                                            |                                                                                       |                       |
|                                                                                                                                                          | Address : Unit 1006, 10th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong |                                                                                       |                       |
| <b>Equipment Under Test</b>                                                                                                                              | Name : Wireless on-ear headphones                                                                               |                                                                                       |                       |
|                                                                                                                                                          | Model/Type: TAH4205XT                                                                                           |                                                                                       |                       |
|                                                                                                                                                          | Trade mark : PHILIPS                                                                                            |                                                                                       |                       |
|                                                                                                                                                          | SerialNO.:N/A                                                                                                   |                                                                                       |                       |
|                                                                                                                                                          | Sample NO.:1-1                                                                                                  |                                                                                       |                       |
| Date of Receipt.                                                                                                                                         | 2021.07.23                                                                                                      | Date of Testing                                                                       | 2021.08.03~2021.08.13 |
| <b>Test Specification</b>                                                                                                                                |                                                                                                                 | <b>Test Result</b>                                                                    |                       |
| FCC Part 15, Subpart C, Section 15.247<br>Canada RSS-Gen Issue 5(2018-04), Amendment 1(2019-03), Amendment 2(2021-02)<br>Canada RSS-247 Issue 2(2017-02) |                                                                                                                 | PASS                                                                                  |                       |
| <b>Evaluation of Test Result</b>                                                                                                                         | The equipment under test was found to comply with the requirements of the standards applied.                    |                                                                                       |                       |
|                                                                                                                                                          | <b>Issue Date: 2021.08.20</b>                                                                                   |                                                                                       |                       |
| Tested by:                                                                                                                                               | Reviewed by:                                                                                                    | Approved by:                                                                          |                       |
|                                                                       |                              |  |                       |
| <b>Xu ZhenFei</b><br>Name Signature                                                                                                                      | <b>Liu YongHai</b><br>Name Signature                                                                            | <b>Chen HuaWen</b><br>Name Signature                                                  |                       |
| <b>Other Aspects: NONE.</b>                                                                                                                              |                                                                                                                 |                                                                                       |                       |
| Abbreviations:OK, Pass= passed    Fail = failed    N/A= not applicable    EUT= equipment, sample(s) under tested                                         |                                                                                                                 |                                                                                       |                       |

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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## RELEASE CONTROL RECORD

| ISSUE NO.         | REASON FOR CHANGE | DATE ISSUED |
|-------------------|-------------------|-------------|
| FCC2021-0024-RF-1 | Original release  | 2021.08.20  |



## 1 GENERAL INFORMATION

### 1.1 GENERAL PRODUCT INFORMATION

|                              |                                      |
|------------------------------|--------------------------------------|
| <b>PRODUCT</b>               | Wireless on-ear headphones           |
| <b>BRAND</b>                 | PHILIPS                              |
| <b>MODEL</b>                 | TAH4205XT                            |
| <b>ADDITIONAL MODEL</b>      | N/A                                  |
| <b>FCC ID</b>                | 2AR2STAH4205XT                       |
| <b>IC ID</b>                 | 24589-TAH4205XT                      |
| <b>POWER SUPPLY</b>          | DC 5V or DC 3.7V From Battey         |
| <b>MODULATION TECHNOLOGY</b> | FHSS                                 |
| <b>MODULATION TYPE</b>       | GFSK, $\pi/4$ DQPSK, 8DPSK           |
| <b>OPERATING FREQUENCY</b>   | 2402MHz~2480MHz                      |
| <b>NUMBER OF CHANNEL</b>     | 79                                   |
| <b>PEAK OUTPUT POWER</b>     | 3.97dBm (Max. Measured)              |
| <b>ANTENNA TYPE</b>          | PCB Antenna, 0.81dBi Gain            |
| <b>I/O PORTS</b>             | Refer to user's manual               |
| <b>CABLE SUPPLIED</b>        | USB Line: Unshielded Detachable 0.7m |

Remark:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document for detailed product photo.



## 1.2 OTHER INFORMATION

| Operation Frequency Each of Channel  |             |         |             |         |             |         |             |
|--------------------------------------|-------------|---------|-------------|---------|-------------|---------|-------------|
| For BT (GFSK, $\pi/4$ DQPSK, 8 DPSK) |             |         |             |         |             |         |             |
| CHANNEL                              | FREQ. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) |
| 0                                    | 2402        | 20      | 2422        | 40      | 2442        | 60      | 2462        |
| 1                                    | 2403        | 21      | 2423        | 41      | 2443        | 61      | 2463        |
| 2                                    | 2404        | 22      | 2424        | 42      | 2444        | 62      | 2464        |
| 3                                    | 2405        | 23      | 2425        | 43      | 2445        | 63      | 2465        |
| 4                                    | 2406        | 24      | 2426        | 44      | 2446        | 64      | 2466        |
| 5                                    | 2407        | 25      | 2427        | 45      | 2447        | 65      | 2467        |
| 6                                    | 2408        | 26      | 2428        | 46      | 2448        | 66      | 2468        |
| 7                                    | 2409        | 27      | 2429        | 47      | 2449        | 67      | 2469        |
| 8                                    | 2410        | 28      | 2430        | 48      | 2450        | 68      | 2470        |
| 9                                    | 2411        | 29      | 2431        | 49      | 2451        | 69      | 2471        |
| 10                                   | 2412        | 30      | 2432        | 50      | 2452        | 70      | 2472        |
| 11                                   | 2413        | 31      | 2433        | 51      | 2453        | 71      | 2473        |
| 12                                   | 2414        | 32      | 2434        | 52      | 2454        | 72      | 2474        |
| 13                                   | 2415        | 33      | 2435        | 53      | 2455        | 73      | 2475        |
| 14                                   | 2416        | 34      | 2436        | 54      | 2456        | 74      | 2476        |
| 15                                   | 2417        | 35      | 2437        | 55      | 2457        | 75      | 2477        |
| 16                                   | 2418        | 36      | 2438        | 56      | 2458        | 76      | 2478        |
| 17                                   | 2419        | 37      | 2439        | 57      | 2459        | 77      | 2479        |
| 18                                   | 2420        | 38      | 2440        | 58      | 2460        | 78      | 2480        |
| 19                                   | 2421        | 39      | 2441        | 59      | 2461        |         |             |

## 1.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

The worst case was found when positioned on xaxis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

| EUT CONFIGURE MODE | APPLICABLE TEST ITEMS |        |     |      | DESCRIPTION |
|--------------------|-----------------------|--------|-----|------|-------------|
|                    | RSE<1G                | RSE≥1G | PLC | APCM |             |
| A                  | √                     | √      | -   | √    | BT Function |

Where **RSE<1G**: Radiated Emission below 1GHz.  
**PLC**: Power Line Conducted Emission.

**RSE≥1G**: Radiated Emission above 1GHz.  
**APCM**: Antenna Port Conducted Measurement.

**RADIATED EMISSION TEST (BELOW 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | PACKET TYPE |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| A                  | 0 to 78           | 39             | FHSS                  | GFSK            | DH5         |

For the test results, only the worst case was shown in test report.

**RADIATED EMISSION TEST (ABOVE 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | PACKET TYPE |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| A                  | 0 to 78           | 0, 39, 78      | FHSS                  | GFSK            | DH5         |
|                    | 0 to 78           | 0, 39, 78      | FHSS                  | 8DPSK           | 3DH5        |

**POWER LINE CONDUCTED EMISSION TEST:**

N/A

**ANTENNA PORT CONDUCTED MEASUREMENT:**

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | PACKET TYPE |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| A                  | 0 to 78           | 0, 39, 78      | FHSS                  | GFSK            | DH5         |
|                    | 0 to 78           | 0, 39, 78      | FHSS                  | 8DPSK           | 3DH5        |



**TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | TEST VOLTAGE (SYSTEM)     | TESTED BY  |
|---------------|--------------------------|---------------------------|------------|
| RSE<1G        | 25deg. C, 55%RH          | DC 5V From Adapter        | Li JiaLing |
| RSE≥1G        | 25deg. C, 55%RH          | DC 5V From Adapter        | Li JiaLing |
| PLC           | -                        | -                         | -          |
| APCM          | 25deg. C, 60%RH          | DC 3.7V From Full Battery | Liu ShiWei |

## 1.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

**FCC PART 15, Subpart C. Section 15.247**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

**ANSI C63.10-2013**

**Canada RSS-Gen Issue 5(2018-04), Amendment 1(2019-03), Amendment 2(2021-02)**

**Canada RSS-247 Issue 2(2017-02)**

All test items have been performed and recorded as per the above standards

## 1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

During the tests:

| Support Equipment |             |                   |                 |                      |                    |                |             |
|-------------------|-------------|-------------------|-----------------|----------------------|--------------------|----------------|-------------|
| NO                | Description | Brand             | Model No.       | Serial Number        | Supplied by        |                |             |
| 1                 | Adapter     | Amc               | ECVF+18120-1500 | N/A                  | Lab                |                |             |
|                   |             |                   |                 |                      |                    |                |             |
| Support Cable     |             |                   |                 |                      |                    |                |             |
| NO                | Description | Quantity (Number) | Length (m)      | Detachable (Yes/ No) | Shielded (Yes/ No) | Cores (Number) | Supplied by |
| 1                 | N/A         | N/A               | N/A             | N/A                  | N/A                | N/A            | N/A         |
|                   |             |                   |                 |                      |                    |                |             |



## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C & RSS-Gen & RSS-247

| FCC STANDARD SECTION | IC STANDARD SECTION                | TEST TYPE AND LIMIT                                                                                              | RESULT | REMARK                         |
|----------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------|--------|--------------------------------|
| 15.207               | RSS-Gen 8.8                        | AC Power Conducted Emission                                                                                      | N/A    | N/A                            |
| 15.247(a)(1) (iii)   | RSS-247 5.1(d)                     | Number of Hopping Frequency Used                                                                                 | PASS   | Meet the requirement of limit. |
| 15.247(a)(1) (iii)   | RSS-247 5.1(d)                     | Dwell Time on Each Channel                                                                                       | PASS   | Meet the requirement of limit. |
| 15.247(a)(1)         | RSS-247 5.1(b)                     | 1. Hopping Channel Separation<br>2. Spectrum Bandwidth of a Frequency Hopping Sequence<br>Spread Spectrum System | PASS   | Meet the requirement of limit. |
| /                    | RSS-Gen 6.7                        | Occupied Bandwidth Measurement                                                                                   | PASS   | Meet the requirement of limit  |
| 15.247(b)            | RSS-247 5.4(b)                     | Conducted Output Power                                                                                           | PASS   | Meet the requirement of limit. |
| 15.247(d)& 15.209    | RSS-Gen 8.9 Table 5 & 8.10 Table 7 | Radiated Spurious Emission and BANDEDGE MEASUREMENT                                                              | PASS   | Meet the requirement of limit. |
| 15.247(d)            | RSS-247 5.5                        | Out of band Emission Measurement                                                                                 | PASS   | Meet the requirement of limit. |
| 15.203               | /                                  | Antenna Requirement                                                                                              | PASS   | No antenna connector is used.  |

### 2.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Refer to Appendix A.

### 2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| No. | ITEM                        | FREQUENCY     | UNCERTAINTY |
|-----|-----------------------------|---------------|-------------|
| 1   | Conducted Emissions         | 9kHz~30MHz    | 2.7dB       |
| 2   | Radiated Spurious Emissions | 9KHz ~ 30MHz  | 5.6dB       |
|     |                             | 30MHz ~ 1GMHz | 4.6dB       |
|     |                             | 1GHz ~ 18GHz  | 4.4dB       |
|     |                             | 18GHz ~ 40GHz | 4.6dB       |

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:



## 2.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd

Address: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou, China

Post Code: 510663 Tel: 020-32293888

FAX: 020-32293889 E-mail: [office@cvc.org.cn](mailto:office@cvc.org.cn)

Test Firm Registration Number: 937273

CN Number: 26239 Wireless Test Site Registration Number: CN0103



## 3 TEST TYPES AND RESULTS

### 3.1 RADIATED SPURIOUS EMISSION AND BANDEDGE MEASUREMENT

#### 3.1.1 Limits

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

| FREQUENCIES (MHz) | FIELD STRENGTH<br>(Microvolts/Meter) | MEASUREMENT DISTANCE<br>(Meters) |
|-------------------|--------------------------------------|----------------------------------|
| 0.009 ~ 0.490     | 2400/F(kHz)                          | 300                              |
| 0.490 ~ 1.705     | 24000/F(kHz)                         | 30                               |
| 1.705 ~ 30.0      | 30                                   | 30                               |
| 30 ~ 88           | 100                                  | 3                                |
| 88 ~ 216          | 150                                  | 3                                |
| 216 ~ 960         | 200                                  | 3                                |
| Above 960         | 500                                  | 3                                |

NOTE: 1. The lower limit shall apply at the transition frequencies.  
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).  
NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 3.1.2 Measurement procedure

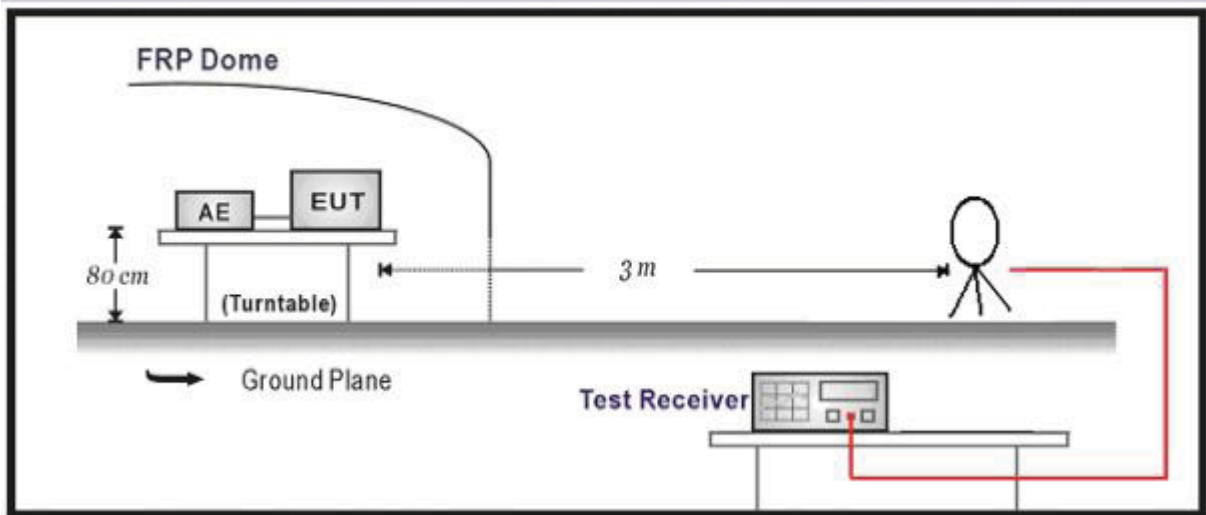
- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

**NOTE:**

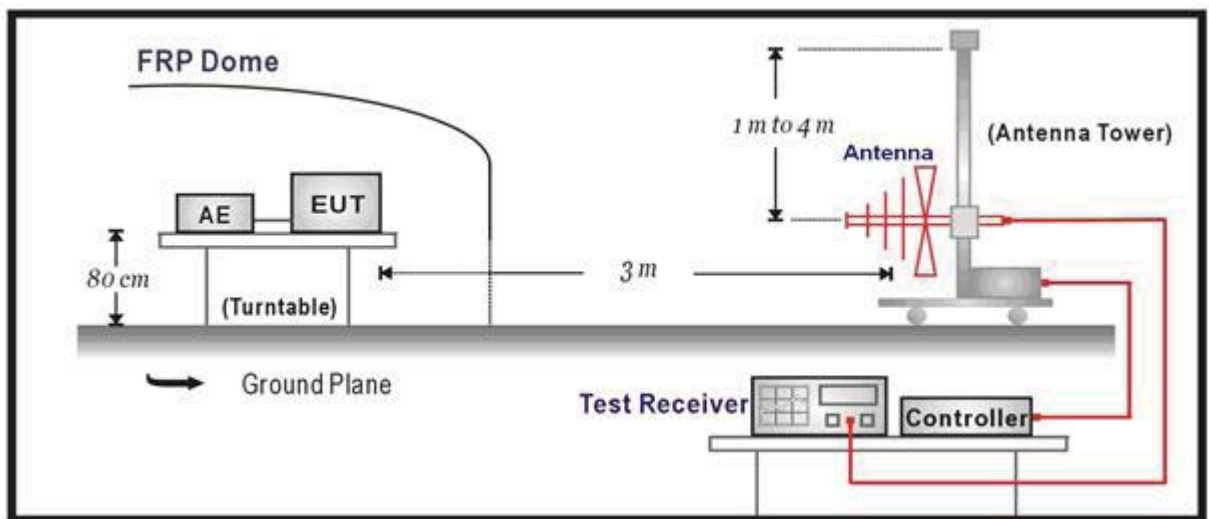
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

### 3.1.3 Test setup

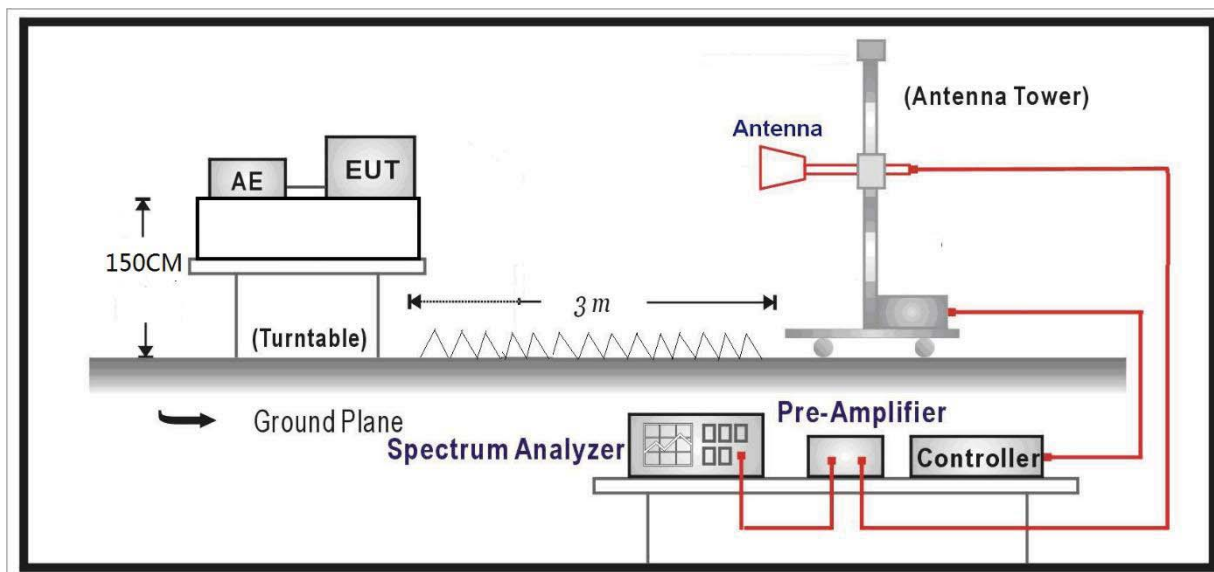
Below 30MHz Test Setup:



Below 1GHz Test Setup:



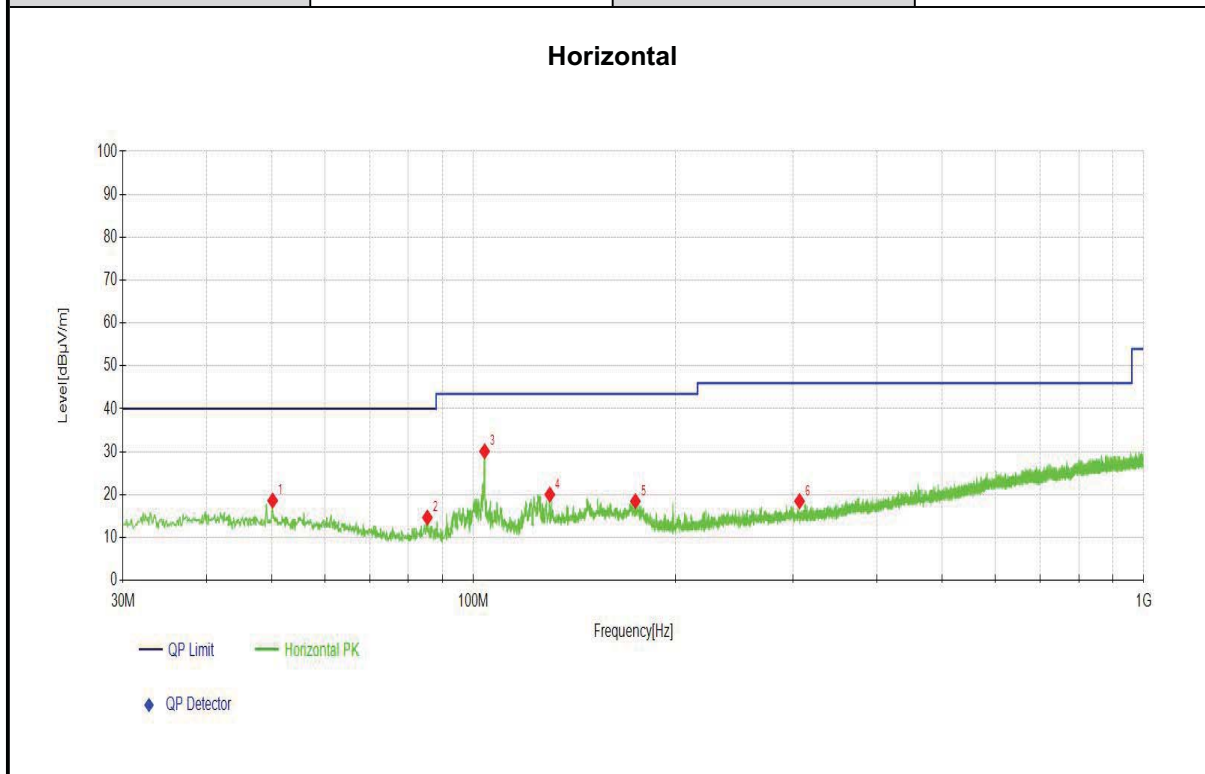
Above 1GHz Test Setup:



## 3.1.4 Test results

BELOW 1GHz WORST-CASE DATA:

|                 |             |                   |                 |
|-----------------|-------------|-------------------|-----------------|
| Worst Test Mode | DH5         | Channel           | CH 0            |
| Frequency Range | 9KHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |

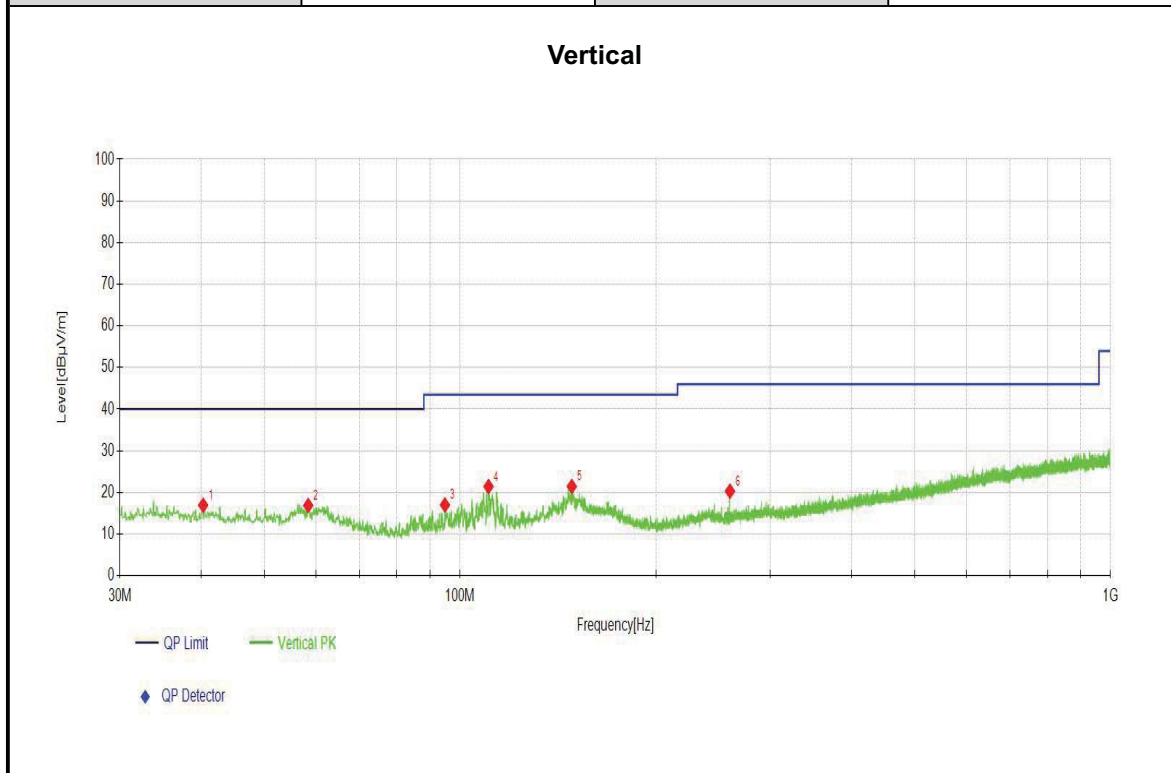


| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1   | 50.1780     | 18.61          | 14.27       | 40.00          | 21.39       | 200         | 217       | Horizontal |
| 2   | 85.3925     | 14.65          | 10.43       | 40.00          | 25.35       | 200         | 180       | Horizontal |
| 3   | 103.9214    | 30.10          | 11.52       | 43.50          | 13.40       | 100         | 121       | Horizontal |
| 4   | 130.0170    | 20.03          | 13.77       | 43.50          | 23.47       | 200         | 277       | Horizontal |
| 5   | 174.4474    | 18.47          | 14.31       | 43.50          | 25.03       | 200         | 16        | Horizontal |
| 6   | 306.5747    | 18.47          | 14.94       | 46.00          | 27.53       | 100         | 2         | Horizontal |

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.  
 2. The emission levels of other frequencies were greater than 20dB margin.  
 3. Result (dBμV/m) = Reading (dBμV) + Factor (dB/m).  
 4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
 5. Margin = Limit - Result.



|                 |             |                   |                 |
|-----------------|-------------|-------------------|-----------------|
| Worst Test Mode | DH5         | Channel           | CH 0            |
| Frequency Range | 9KHz ~ 1GHz | Detector Function | Quasi-Peak (QP) |

**Suspected Data List**

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1   | 40.2830     | 16.92          | 14.58       | 40.00          | 23.08       | 200         | 215       | Vertical |
| 2   | 58.4238     | 16.87          | 14.09       | 40.00          | 23.13       | 100         | 265       | Vertical |
| 3   | 94.8025     | 17.00          | 10.90       | 43.50          | 26.50       | 200         | 330       | Vertical |
| 4   | 110.6151    | 21.41          | 11.91       | 43.50          | 22.09       | 200         | 336       | Vertical |
| 5   | 148.5459    | 21.44          | 15.35       | 43.50          | 22.06       | 100         | 144       | Vertical |
| 6   | 260.0100    | 20.30          | 13.31       | 46.00          | 25.70       | 200         | 282       | Vertical |

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.

2. The emission levels of other frequencies were greater than 20dB margin.

3. Result (dBμV/m) = Reading (dBμV) + Factor (dB/m).

4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

5. Margin = Limit - Result.





## ABOVE 1GHz DATA

Please refer to Appandix A

## 3.2 NUMBER OF HOPPING FREQUENCY USED

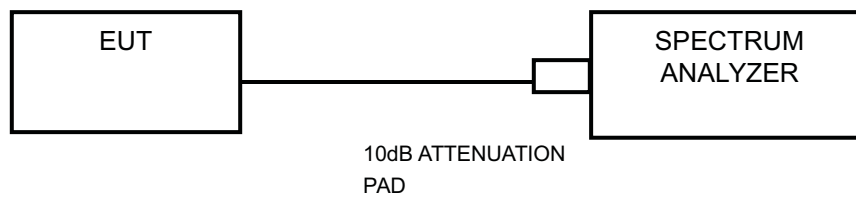
### 3.2.1 Limits

At least 15 channels frequencies, and should be equally spaced.

### 3.2.2 Measurement procedure

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- Set the SA on View mode and then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were completed.

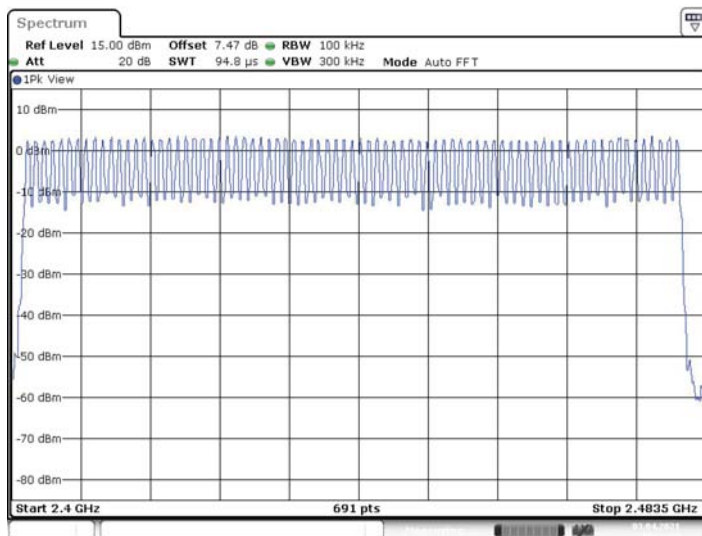
### 3.2.3 Test setup



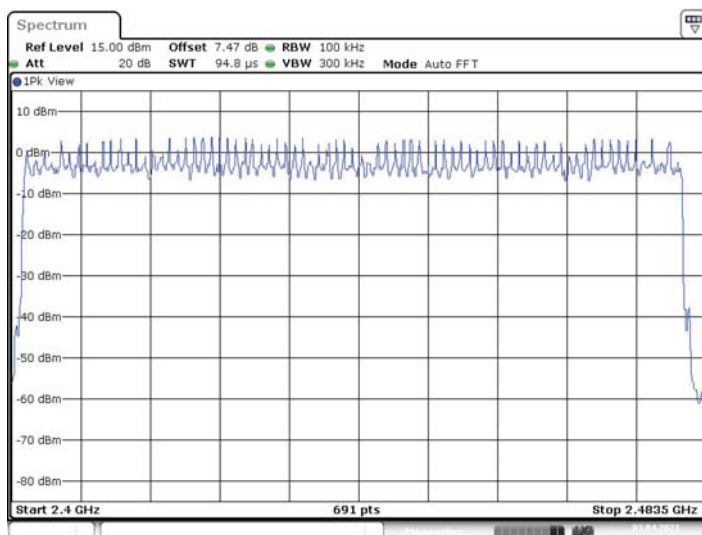
## 3.2.4 Test result

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

| Mode | Channel | Result[Num] | Limit[Num] | Verdict |
|------|---------|-------------|------------|---------|
| DH5  | Hop     | 79          | $\geq 15$  | PASS    |



| Mode | Channel | Result[Num] | Limit[Num] | Verdict |
|------|---------|-------------|------------|---------|
| 3DH5 | Hop     | 79          | $\geq 15$  | PASS    |



### 3.3 DWELL TIME ON EACH CHANNEL

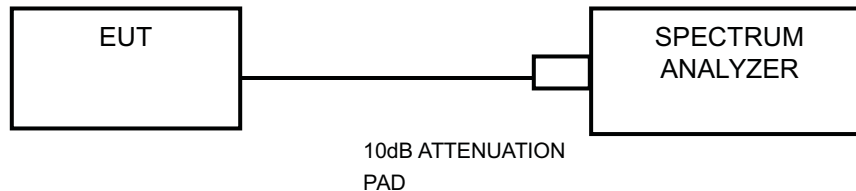
#### 3.3.1 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

#### 3.3.2 Measurement procedure

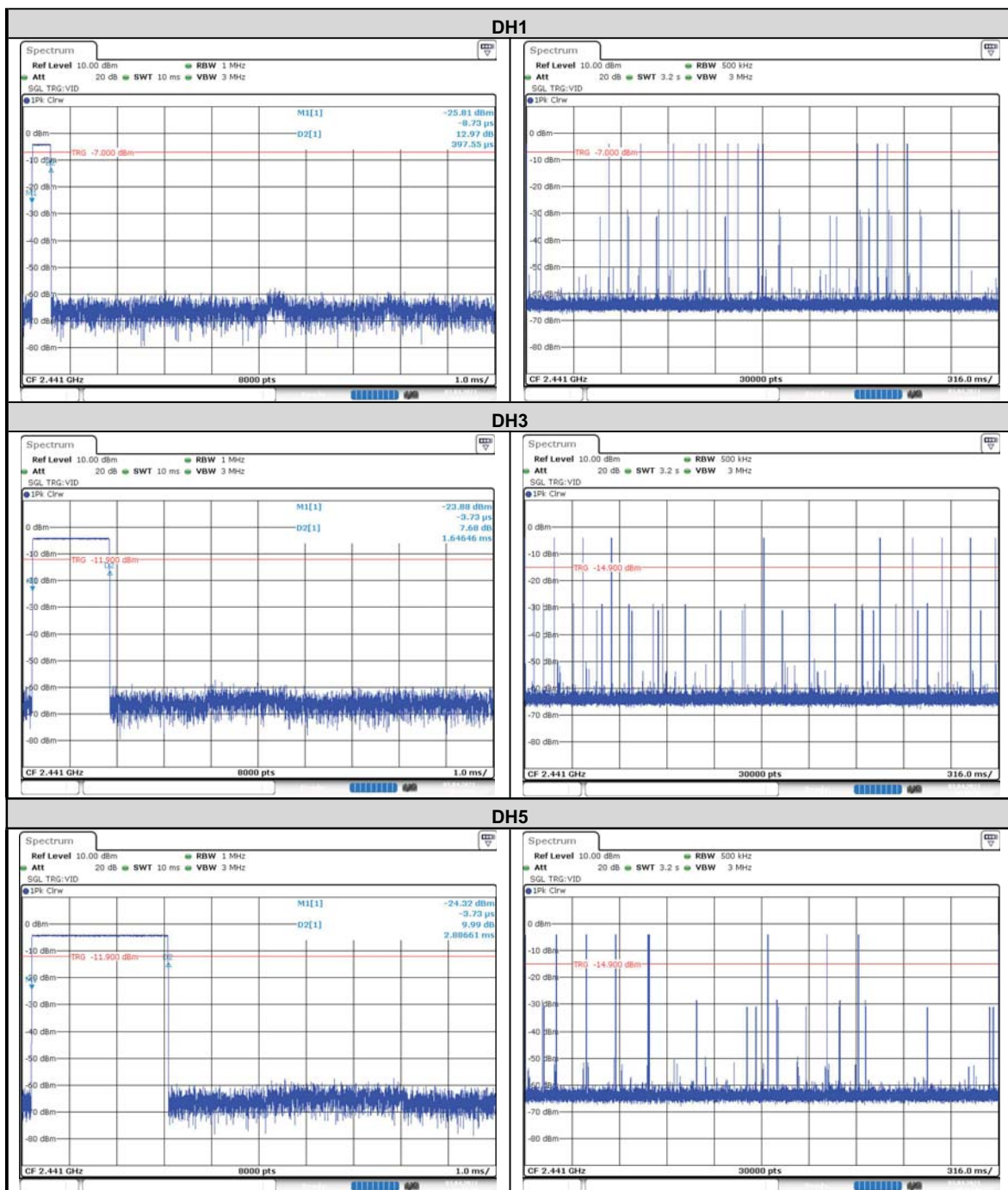
- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- Repeat above procedures until all different time-slot modes have been completed.

#### 3.3.3 Test setup



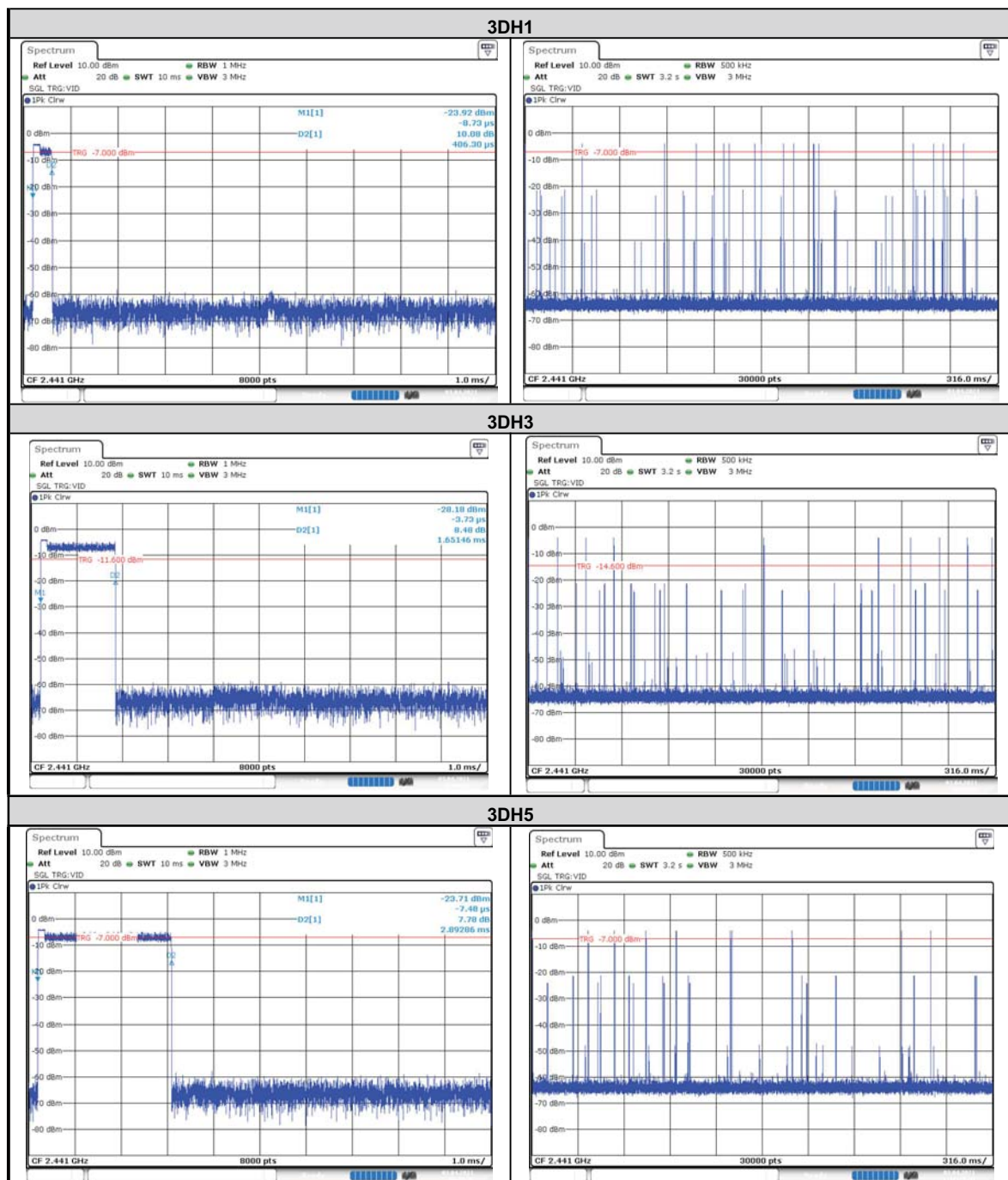
## 3.3.4 Test result

| Mode | Number of Hopping Channel | Number of transmission in a period(channel number*0.4 sec) | Length of transmission time (msec) | Result (msec) | Limit (msec) | Verdict |
|------|---------------------------|------------------------------------------------------------|------------------------------------|---------------|--------------|---------|
| DH1  | 79                        | $79 \times 0.4 \div 3.2 \times 14 = 138.25$                | 0.38                               | 0.116         | $\leq 0.4$   | PASS    |
| DH3  | 79                        | $79 \times 0.4 \div 3.2 \times 20 = 88.88$                 | 1.65                               | 0.147         | $\leq 0.4$   | PASS    |
| DH5  | 79                        | $79 \times 0.4 \div 3.2 \times 7 = 69.13$                  | 2.90                               | 0.201         | $\leq 0.4$   | PASS    |





| Mode | Number of Hopping Channel | Number of transmission in a period(channel number*0.4 sec) | Length of transmission time (msec) | Result (msec) | Limit (msec) | Verdict |
|------|---------------------------|------------------------------------------------------------|------------------------------------|---------------|--------------|---------|
| 3DH1 | 79                        | $79 \times 0.4 \div 3.2 \times 15 = 148.13$                | 0.41                               | 0.607         | $\leq 0.4$   | PASS    |
| 3DH3 | 79                        | $79 \times 0.4 \div 3.2 \times 9 = 88.88$                  | 1.65                               | 0.147         | $\leq 0.4$   | PASS    |
| 3DH5 | 79                        | $79 \times 0.4 \div 3.2 \times 9 = 88.88$                  | 2.89                               | 0.257         | $\leq 0.4$   | PASS    |



### 3.4 CHANNEL BANDWIDTH

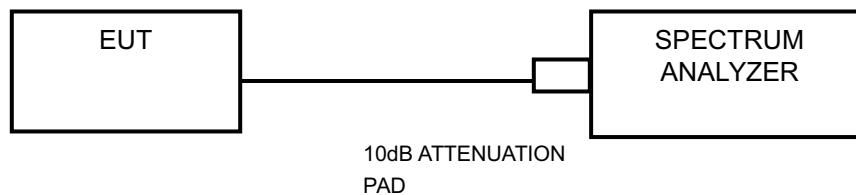
#### 3.4.1 Limits

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

#### 3.4.2 Measurement procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

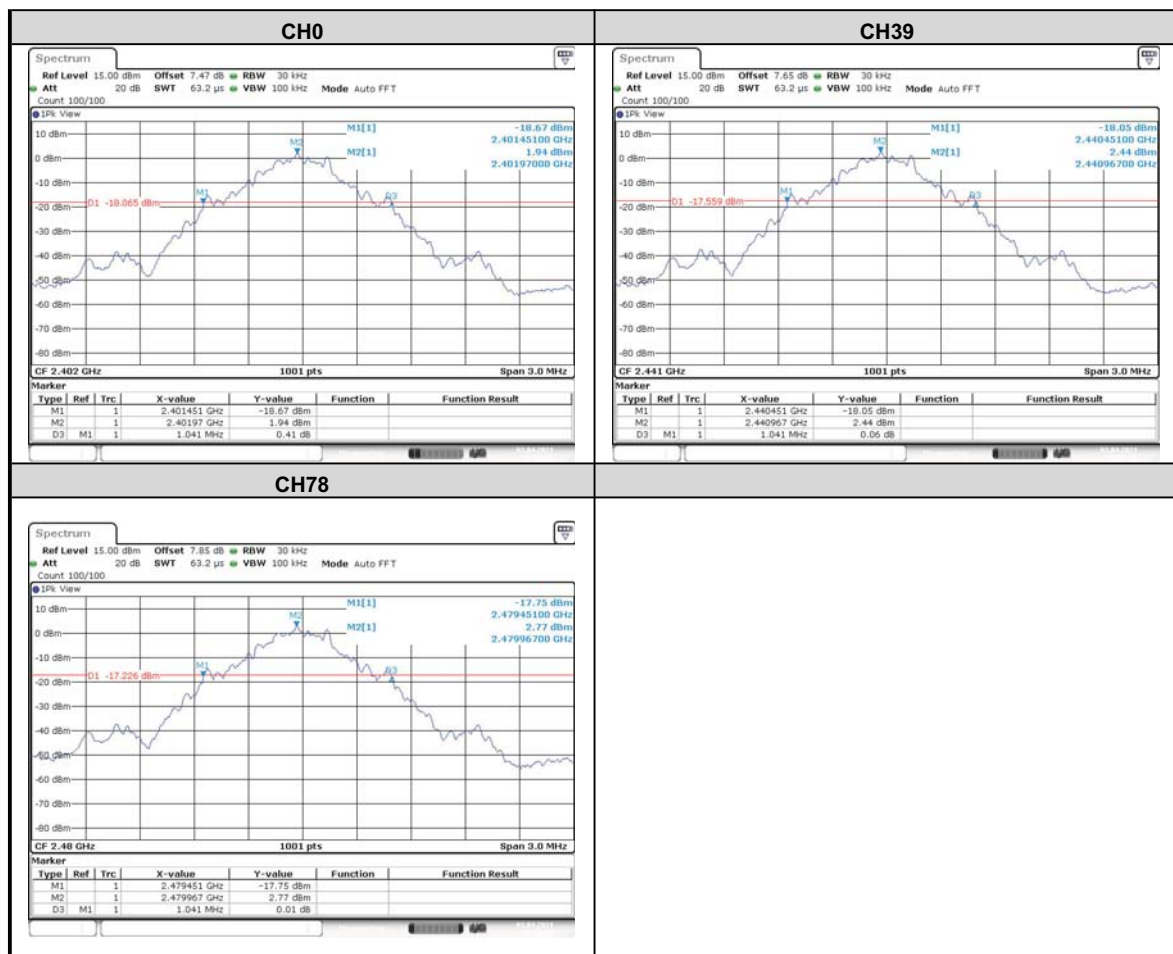
#### 3.4.3 Test setup





## 3.4.4 Test result

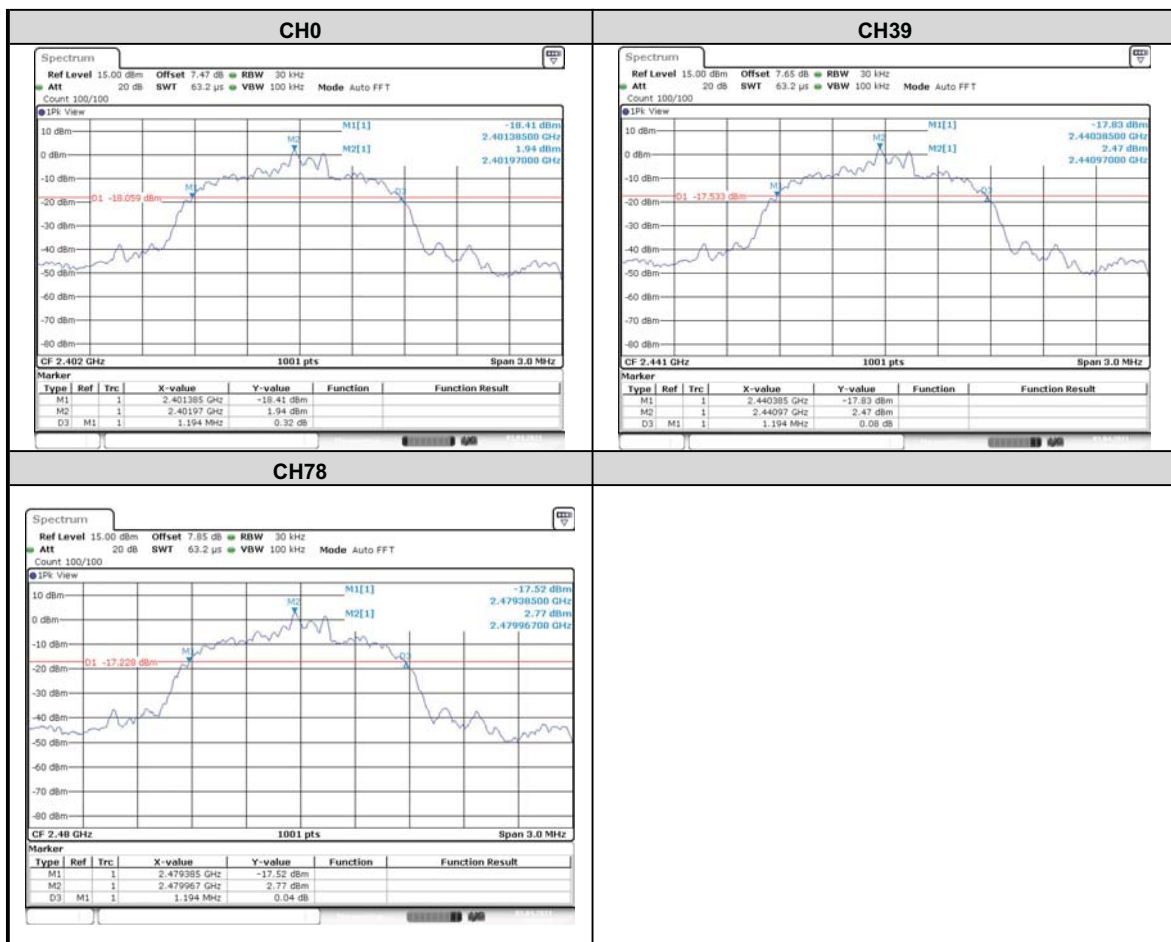
| Mode | Channel | Channel Frequency (MHz) | 20dB Bandwidth(MHz) |
|------|---------|-------------------------|---------------------|
| DH5  | 0       | 2402                    | 1.041               |
|      | 39      | 2441                    | 1.041               |
|      | 78      | 2480                    | 1.041               |







| Mode | Channel | Channel Frequency (MHz) | 20dB Bandwidth(MHz) |
|------|---------|-------------------------|---------------------|
| 3DH5 | 0       | 2402                    | 1.194               |
|      | 39      | 2441                    | 1.194               |
|      | 78      | 2480                    | 1.194               |



### 3.5 OCCUPIED BANDWIDTH MEASUREMENT

#### 3.5.1 Measurement procedure

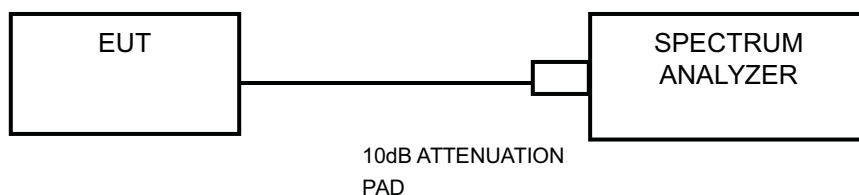
The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3 x the resolution bandwidth.

Below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

#### 3.5.2 DEVIATION FROM TEST STANDARD

No deviation.

#### 3.5.3 TEST SETUP



#### 3.5.4 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



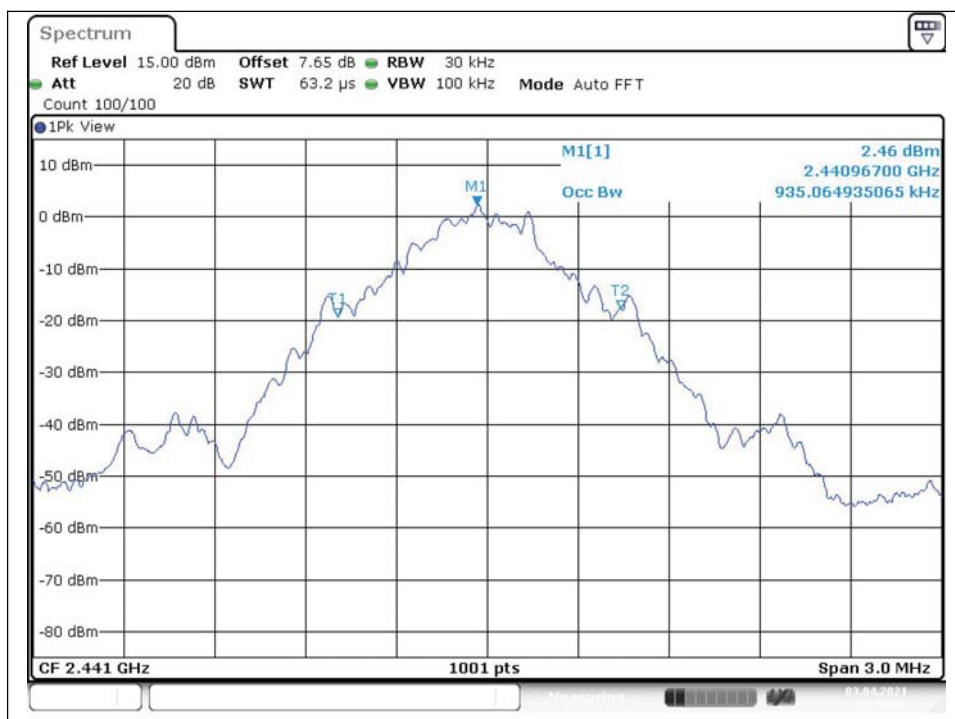
## GFSK DH5

| CHANNEL | CHANNEL<br>FREQUENCY (MHz) | OCCUPIED<br>BANDWIDTH (MHz) | PASS / FAIL |
|---------|----------------------------|-----------------------------|-------------|
| Low     | 2402                       | 0.93                        | PASS        |
| Middle  | 2441                       | 0.94                        | PASS        |
| High    | 2480                       | 0.93                        | PASS        |

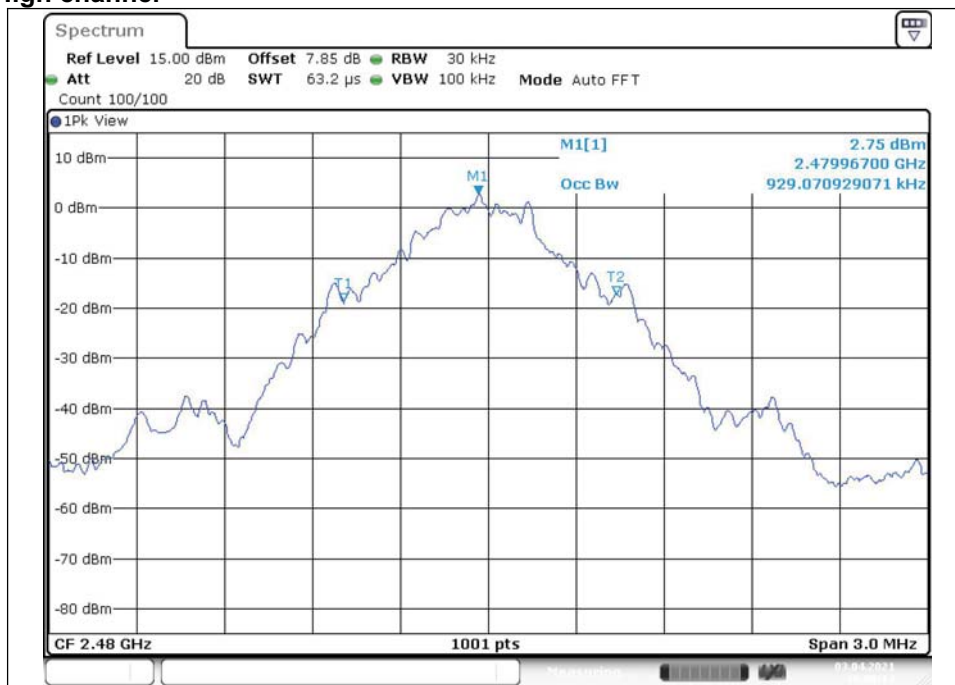




## Test Data: Middle channel



## Test Data: High channel

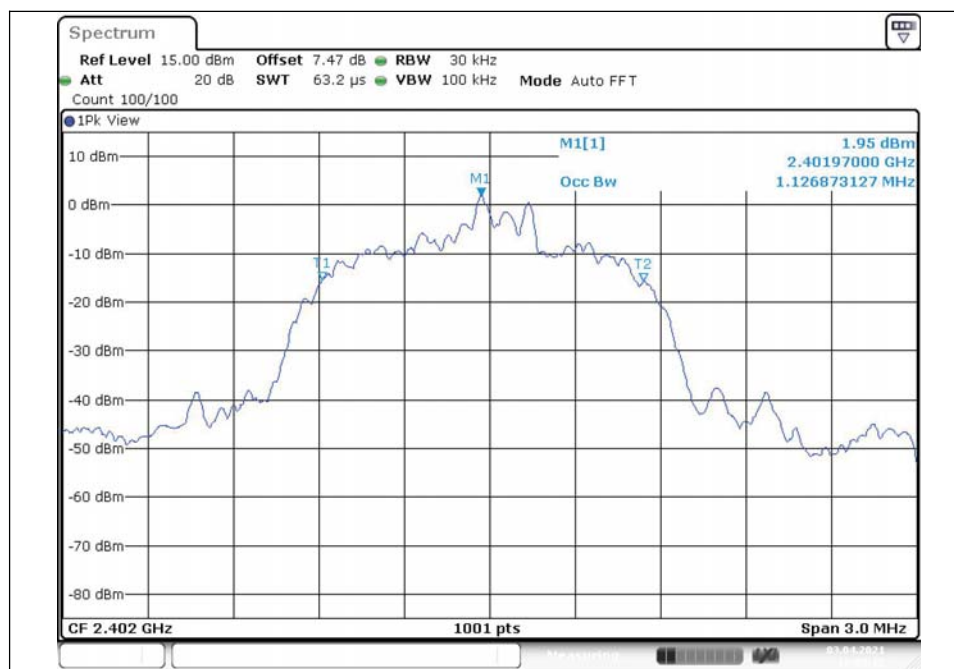




## 8DPSK 3DH5

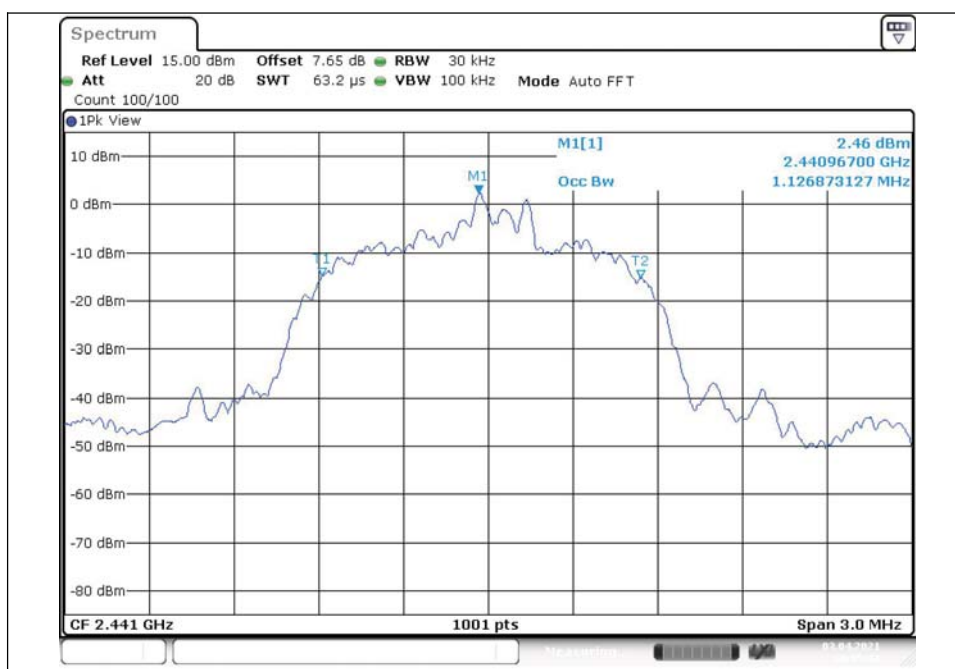
| CHANNEL | CHANNEL FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) | PASS / FAIL |
|---------|-------------------------|--------------------------|-------------|
| Low     | 2402                    | 1.13                     | PASS        |
| Middle  | 2441                    | 1.13                     | PASS        |
| High    | 2480                    | 1.13                     | PASS        |

### Test Data: Low channel





## Test Data: Middle channel



## Test Data: High channel



### 3.6 HOPPING CHANNEL SEPARATION

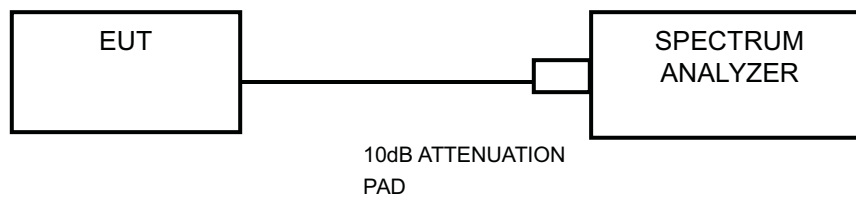
#### 3.6.1 Limits

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

#### 3.6.2 Measurement procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
- By using the MaxHold function record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

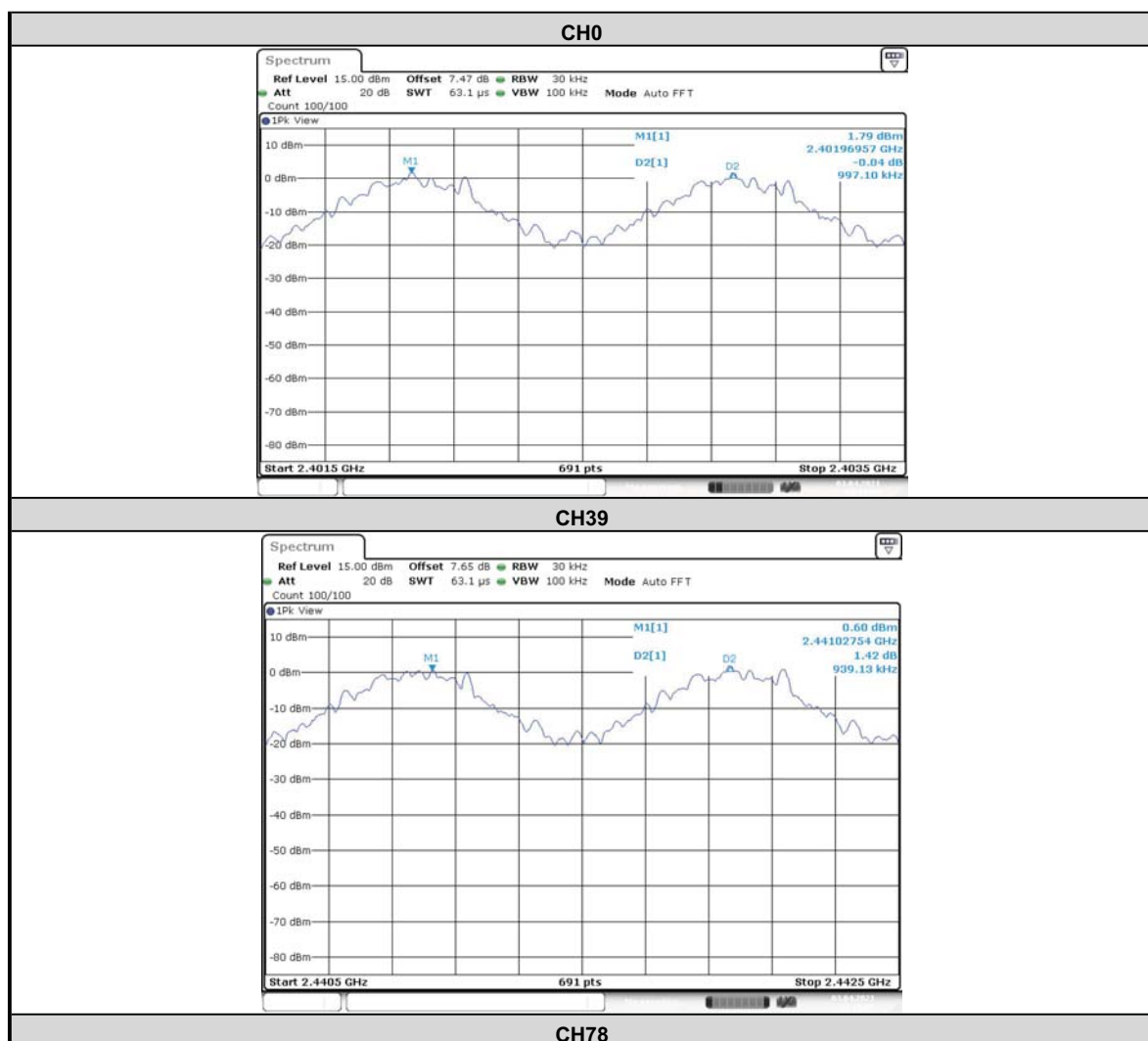
#### 3.6.3 Test setup





## 3.6.4 Test result

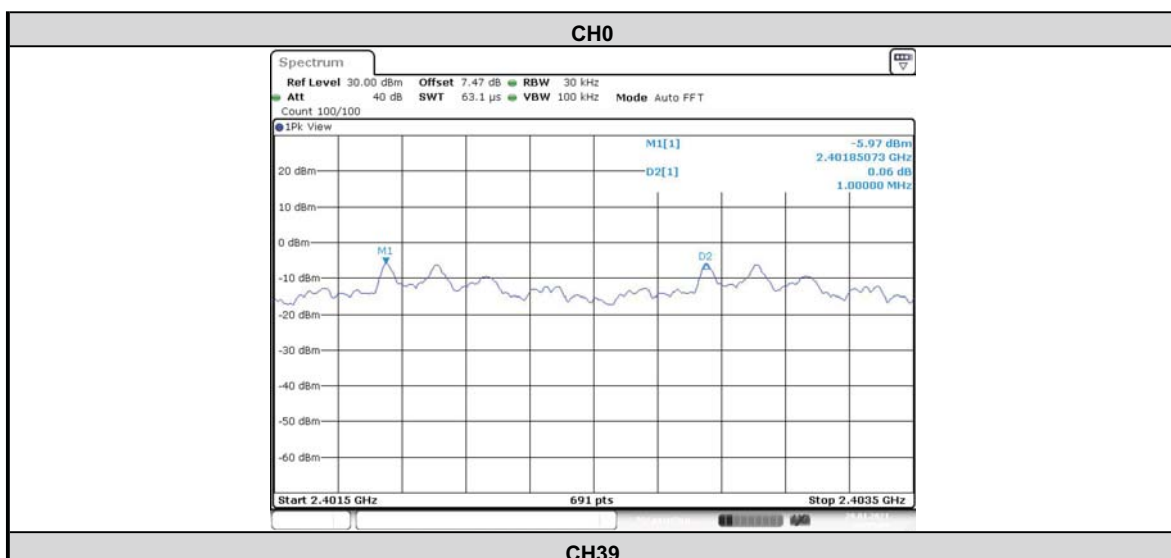
| Mode | Channel | Channel Frequency (MHz) | Adjacent Channel Separation (MHz) | Minimum Limit 2/3 20dB Bandwidth (MHz) | Verdict |
|------|---------|-------------------------|-----------------------------------|----------------------------------------|---------|
| DH5  | 0       | 2402                    | 1.00                              | 0.694                                  | PASS    |
|      | 39      | 2441                    | 0.94                              | 0.694                                  | PASS    |
|      | 78      | 2480                    | 1.06                              | 0.694                                  | PASS    |







| Mode | Channel | Channel Frequency (MHz) | Adjacent Channel Separation (MHz) | Minimum Limit 2/3 20dB Bandwidth (MHz) | Verdict |
|------|---------|-------------------------|-----------------------------------|----------------------------------------|---------|
| 3DH5 | 0       | 2402                    | 1.00                              | 0.796                                  | PASS    |
|      | 39      | 2441                    | 1.00                              | 0.796                                  | PASS    |
|      | 78      | 2480                    | 1.00                              | 0.796                                  | PASS    |





### 3.7 CONDUCTED OUTPUT POWER

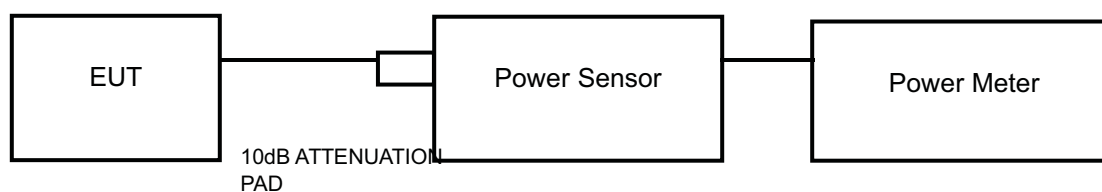
#### 3.7.1 Limits

The Maximum Output Power Measurement is 125mW.

#### 3.7.2 Measurement procedure

- a. A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.
- b. An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor and set the detector to AVERAGE. Record the power level.

#### 3.7.3 Test setup





## 3.7.4 Test result

### PEAK OUTPUT POWER

#### GFSK

| Mode | Channel Frequency (MHz) | Peak Power (dBm) | Peak Power (mW) | Peak Power Limit (mW) | Verdict |
|------|-------------------------|------------------|-----------------|-----------------------|---------|
| DH5  | 2402                    | 3.16             | 2.07            | 125                   | PASS    |
|      | 2441                    | 3.68             | 2.333           | 125                   | PASS    |
|      | 2480                    | 3.97             | 2.495           | 125                   | PASS    |

#### 8DPSK

| Mode | Channel Frequency (MHz) | Peak Power (dBm) | Peak Power (mW) | Peak Power Limit (mW) | Verdict |
|------|-------------------------|------------------|-----------------|-----------------------|---------|
| 3DH5 | 2402                    | 3.09             | 2.037           | 125                   | PASS    |
|      | 2441                    | 3.57             | 2.275           | 125                   | PASS    |
|      | 2480                    | 3.88             | 2.443           | 125                   | PASS    |

### AVERAGE OUTPUT POWER

#### GFSK

| Mode | Channel Frequency (MHz) | Average Power (dBm) | Average Power (mW) | Average Power Limit (mW) | Verdict |
|------|-------------------------|---------------------|--------------------|--------------------------|---------|
| DH5  | 2402                    | 1.24                | 1.33               | 125                      | PASS    |
|      | 2441                    | 1.84                | 1.528              | 125                      | PASS    |
|      | 2480                    | 2.10                | 1.622              | 125                      | PASS    |

#### 8DPSK

| Mode | Channel Frequency (MHz) | Average Power (dBm) | Average Power (mW) | Average Power Limit (mW) | Verdict |
|------|-------------------------|---------------------|--------------------|--------------------------|---------|
| 3DH5 | 2402                    | 1.21                | 1.321              | 125                      | PASS    |
|      | 2441                    | 1.75                | 1.496              | 125                      | PASS    |
|      | 2480                    | 1.98                | 1.578              | 125                      | PASS    |

### 3.8 OUT OF BAND EMISSION MEASUREMENT

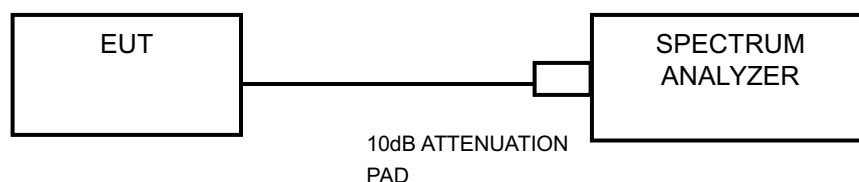
#### 3.8.1 Limits

Below -20dB of the highest emission level of operating band (in 100KHz RBW).

#### 3.8.2 Measurement procedure

The transmitter output was connected to the spectrum analyzer via a low loss cable. of Spectrum Analyzer was set RBW to 100 kHz and VBW to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. Detector = PEAK and Trace mode = Max Hold. The band edges was measured and recorded.

#### 3.8.3 Test setup

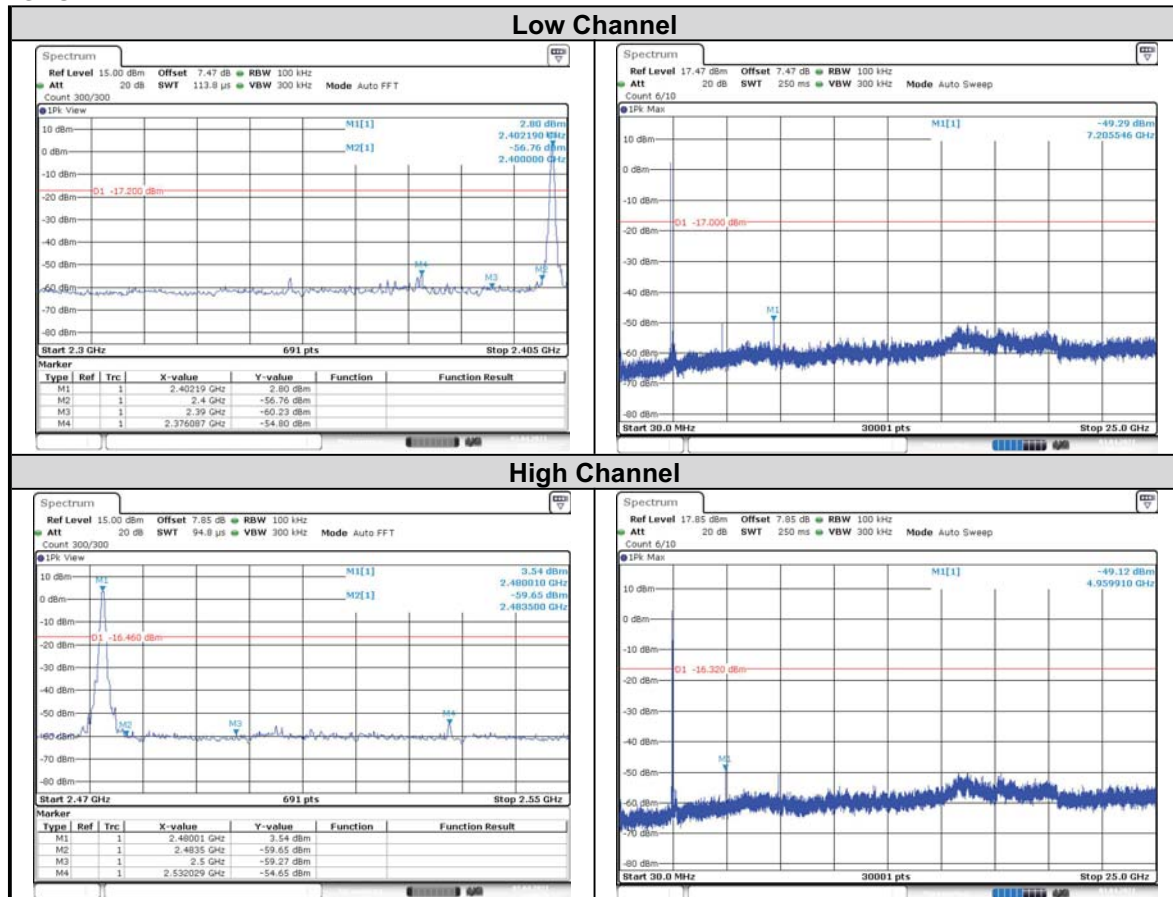


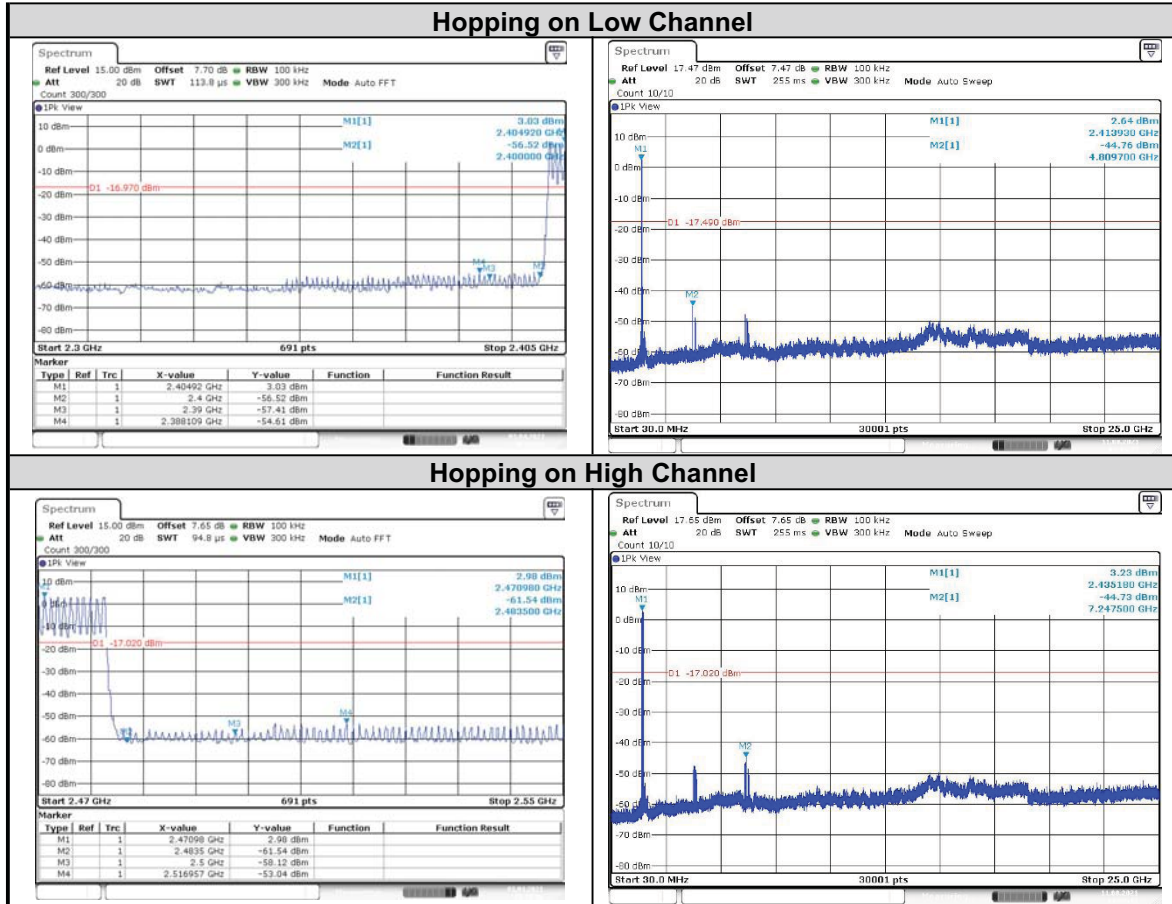


## 3.8.4 Test result

The spectrum plots are attached on the following images.

### GFSK

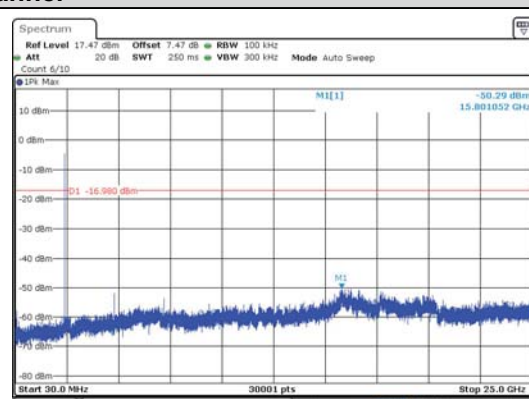
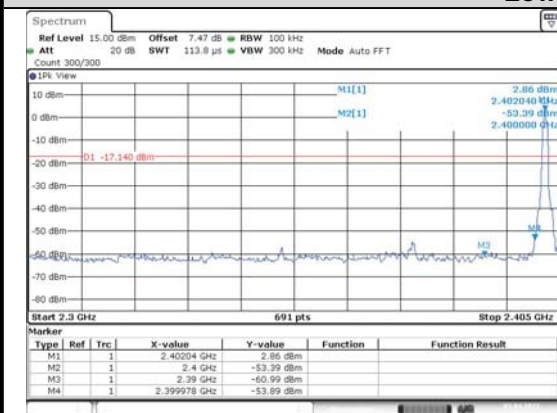




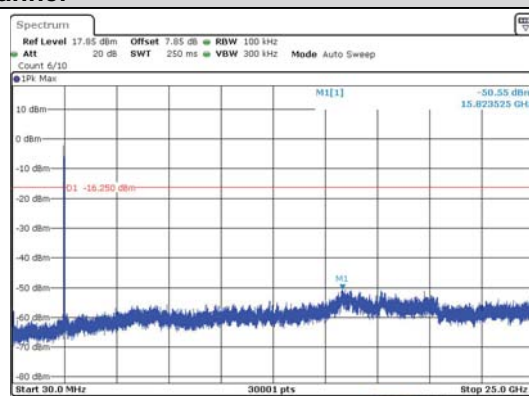
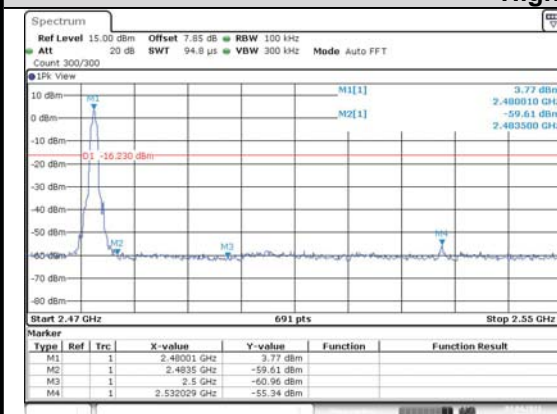


## 8DPSK

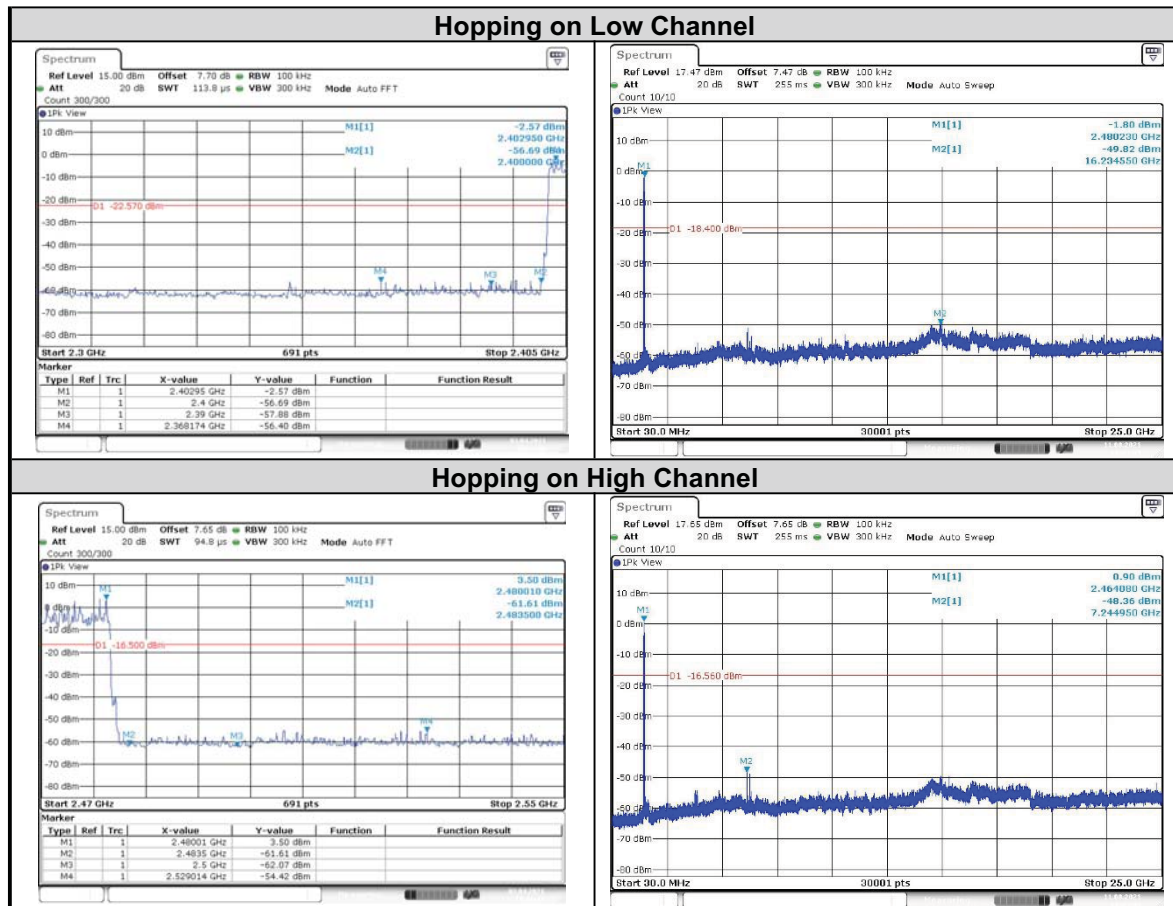
### Low Channel



### High Channel









## 4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Photos).



## 5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).



## Appendix A

### RADIATED SPURIOUS EMISSION AND BANDEDGE MEASUREMENT TEST RESULT

ABOVE 1GHz DATA:

BT\_GFSK

| Test Mode       |                 | DH5             |             |                | Channel           |             | CH0                       |            |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|------------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |            |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity   | Remark |
| 1               | 1901.6902       | 45.34           | 8.23        | 74.00          | 28.66             | 100         | 340                       | Horizontal | PK     |
| 2               | 1901.6902       | 37.78           | 8.23        | 54.00          | 16.22             | 100         | 285                       | Horizontal | AV     |
| 3               | 2390.0000       | 45.77           | 10.16       | 54.00          | 8.23              | 200         | 275                       | Horizontal | AV     |
| 4               | 2390.0000       | 56.17           | 10.16       | 74.00          | 17.83             | 200         | 166                       | Horizontal | PK     |
| 5               | *2401.8239      | 99.53           | 10.21       |                |                   | 200         | 224                       | Horizontal | PK     |
| 6               | *2401.9973      | 99.03           | 10.21       |                |                   | 200         | 224                       | Horizontal | AV     |
| 7               | 5955.1155       | 58.06           | 20.99       | 74.00          | 15.94             | 200         | 312                       | Horizontal | PK     |
| 8               | 6033.0033       | 50.46           | 21.61       | 54.00          | 3.54              | 200         | 209                       | Horizontal | AV     |
| 9               | 17039.3339      | 49.03           | 26.03       | 74.00          | 24.97             | 100         | 82                        | Horizontal | PK     |
| 10              | 17384.5185      | 42.15           | 26.13       | 54.00          | 11.85             | 100         | 253                       | Horizontal | AV     |

#### REMARKS:

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.



| Test Mode       |                 | DH5             |             | Channel           |             | CH0                       |               |          |        |
|-----------------|-----------------|-----------------|-------------|-------------------|-------------|---------------------------|---------------|----------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             | Detector Function |             | Peak (PK)<br>Average (AV) |               |          |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m)    | Margin (dB) | Height (cm)               | Azimuth (deg) | Polarity | Remark |
| 1               | 1898.2898       | 45.05           | 8.19        | 74.00             | 28.95       | 100                       | 353           | Vertical | PK     |
| 2               | 2002.5003       | 38.75           | 9.01        | 54.00             | 15.25       | 100                       | 306           | Vertical | AV     |
| 3               | 2390.0000       | 56.17           | 10.16       | 74.00             | 17.83       | 100                       | 102           | Vertical | PK     |
| 4               | 2390.0000       | 46.00           | 10.16       | 54.00             | 8.00        | 100                       | 153           | Vertical | AV     |
| 5               | *2401.9973      | 96.04           | 10.21       |                   |             | 200                       | 234           | Vertical | AV     |
| 6               | *2402.1707      | 96.53           | 10.21       |                   |             | 200                       | 234           | Vertical | PK     |
| 7               | 5334.6535       | 56.66           | 19.69       | 74.00             | 17.34       | 100                       | 32            | Vertical | PK     |
| 8               | 5435.6436       | 49.53           | 20.16       | 54.00             | 4.47        | 100                       | 250           | Vertical | AV     |
| 9               | 8819.2619       | 43.40           | 13.59       | 74.00             | 30.60       | 200                       | 320           | Vertical | PK     |
| 10              | 8846.1746       | 36.62           | 13.22       | 54.00             | 17.38       | 200                       | 158           | Vertical | AV     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.



|                 |                 |                 |             |                |                   |             |                           |            |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|------------|--------|
| Test Mode       |                 | DH5             |             |                | Channel           |             | CH39                      |            |        |
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |            |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity   | Remark |
| 1               | 2039.5040       | 45.83           | 8.91        | 74.00          | 28.17             | 100         | 49                        | Horizontal | PK     |
| 2               | 2092.3092       | 39.12           | 8.75        | 54.00          | 14.88             | 100         | 148                       | Horizontal | AV     |
| 3               | 6033.9934       | 58.05           | 21.61       | 74.00          | 15.95             | 200         | 106                       | Horizontal | PK     |
| 4               | 6256.4356       | 50.93           | 22.24       | 54.00          | 3.07              | 200         | 72                        | Horizontal | AV     |
| 5               | 12493.4293      | 45.49           | 17.80       | 74.00          | 28.51             | 100         | 300                       | Horizontal | PK     |
| 6               | 12610.4410      | 38.14           | 17.74       | 54.00          | 15.86             | 100         | 326                       | Horizontal | AV     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.



|                 |                 |                 |             |                   |             |                           |               |          |        |
|-----------------|-----------------|-----------------|-------------|-------------------|-------------|---------------------------|---------------|----------|--------|
| Test Mode       |                 | DH5             |             | Channel           |             | CH39                      |               |          |        |
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             | Detector Function |             | Peak (PK)<br>Average (AV) |               |          |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m)    | Margin (dB) | Height (cm)               | Azimuth (deg) | Polarity | Remark |
| 1               | 1910.0910       | 45.59           | 8.26        | 74.00             | 28.41       | 100                       | 216           | Vertical | PK     |
| 2               | 1990.4991       | 38.15           | 8.91        | 54.00             | 15.85       | 100                       | 71            | Vertical | AV     |
| 3               | 6210.5611       | 58.73           | 21.76       | 74.00             | 15.27       | 100                       | 3             | Vertical | PK     |
| 4               | 6255.7756       | 50.41           | 22.24       | 54.00             | 3.59        | 100                       | 117           | Vertical | AV     |
| 5               | 12488.7489      | 37.87           | 17.80       | 54.00             | 16.13       | 200                       | 154           | Vertical | AV     |
| 6               | 12839.7840      | 45.31           | 17.76       | 74.00             | 28.69       | 200                       | 181           | Vertical | PK     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.



| Test Mode       |                 | DH5             |             |                | Channel           |             | CH78                      |            |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|------------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |            |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity   | Remark |
| 1               | 2038.1038       | 45.89           | 8.91        | 74.00          | 28.11             | 100         | 256                       | Horizontal | PK     |
| 2               | 2172.5173       | 38.50           | 9.20        | 54.00          | 15.50             | 100         | 342                       | Horizontal | AV     |
| 3               | 2480.0133       | 103.41          | 10.89       |                |                   | 200         | 237                       | Horizontal | PK     |
| 4               | 2480.0734       | 103.91          | 10.89       |                |                   | 200         | 237                       | Horizontal | AV     |
| 5               | 2483.5000       | 52.53           | 10.88       | 74.00          | 21.47             | 200         | 261                       | Horizontal | PK     |
| 6               | 2483.5000       | 41.90           | 10.88       | 54.00          | 12.10             | 200         | 115                       | Horizontal | AV     |
| 7               | 5392.0792       | 49.42           | 20.23       | 54.00          | 4.58              | 100         | 256                       | Horizontal | AV     |
| 8               | 5409.2409       | 56.34           | 20.26       | 74.00          | 17.66             | 100         | 97                        | Horizontal | PK     |
| 9               | 8801.7102       | 43.62           | 13.72       | 74.00          | 30.38             | 300         | 249                       | Horizontal | PK     |
| 10              | 8812.2412       | 36.70           | 13.67       | 54.00          | 17.30             | 300         | 224                       | Horizontal | AV     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.





| Test Mode       |                 | DH5             |             |                | Channel           |             | CH78                      |          |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|----------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |          |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity | Remark |
| 1               | 2038.3038       | 46.06           | 8.91        | 74.00          | 27.94             | 100         | 289                       | Vertical | PK     |
| 2               | 2087.9088       | 38.91           | 8.76        | 54.00          | 15.09             | 100         | 359                       | Vertical | AV     |
| 3               | *2479.9933      | 97.80           | 10.89       |                |                   | 100         | 235                       | Vertical | AV     |
| 4               | *2480.1934      | 98.40           | 10.89       |                |                   | 100         | 228                       | Vertical | PK     |
| 5               | 2483.5000       | 51.64           | 10.88       | 74.00          | 22.36             | 200         | 111                       | Vertical | PK     |
| 6               | 2483.5000       | 41.53           | 10.88       | 54.00          | 12.47             | 200         | 330                       | Vertical | AV     |
| 7               | 5394.0594       | 56.57           | 20.25       | 74.00          | 17.43             | 100         | 45                        | Vertical | PK     |
| 8               | 5422.7723       | 49.52           | 20.21       | 54.00          | 4.48              | 100         | 266                       | Vertical | AV     |
| 9               | 12542.5743      | 38.22           | 17.69       | 54.00          | 15.78             | 200         | 357                       | Vertical | AV     |
| 10              | 12658.4158      | 45.28           | 17.63       | 74.00          | 28.72             | 200         | 101                       | Vertical | PK     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.



## BT\_8DPSK

| Test Mode       |                 | 3DH5            |             |                | Channel           |             | CH0                       |            |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|------------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |            |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity   | Remark |
| 1               | 2038.5039       | 45.70           | 8.91        | 74.00          | 28.30             | 100         | 23                        | Horizontal | PK     |
| 2               | 2091.7092       | 38.72           | 8.75        | 54.00          | 15.28             | 100         | 282                       | Horizontal | AV     |
| 3               | 2390.0000       | 45.61           | 10.16       | 54.00          | 8.39              | 200         | 212                       | Horizontal | AV     |
| 4               | 2390.0000       | 56.23           | 10.16       | 74.00          | 17.77             | 200         | 104                       | Horizontal | PK     |
| 5               | *2402.0407      | 98.67           | 10.21       |                |                   | 200         | 173                       | Horizontal | AV     |
| 6               | *2402.2574      | 98.54           | 10.21       |                |                   | 200         | 220                       | Horizontal | PK     |
| 7               | 5418.1518       | 57.27           | 20.22       | 74.00          | 16.73             | 200         | 1                         | Horizontal | PK     |
| 8               | 5420.7921       | 49.74           | 20.21       | 54.00          | 4.26              | 200         | 12                        | Horizontal | AV     |
| 9               | 8761.9262       | 36.44           | 13.34       | 54.00          | 17.56             | 200         | 308                       | Horizontal | AV     |
| 10              | 8766.6067       | 43.50           | 13.39       | 74.00          | 30.50             | 200         | 181                       | Horizontal | PK     |

### REMARKS:

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.



| Test Mode       |                 | 3DH5            |             |                | Channel           |             | CH0                       |          |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|----------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |          |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity | Remark |
| 1               | 2044.5045       | 46.09           | 8.90        | 74.00          | 27.91             | 100         | 164                       | Vertical | PK     |
| 2               | 2083.9084       | 38.84           | 8.77        | 54.00          | 15.16             | 100         | 137                       | Vertical | AV     |
| 3               | 2390.0000       | 45.70           | 10.16       | 54.00          | 8.30              | 200         | 19                        | Vertical | AV     |
| 4               | 2390.0000       | 55.36           | 10.16       | 74.00          | 18.64             | 200         | 188                       | Vertical | PK     |
| 5               | *2401.8239      | 95.14           | 10.21       |                |                   | 200         | 228                       | Vertical | AV     |
| 6               | *2401.8239      | 96.55           | 10.21       |                |                   | 200         | 228                       | Vertical | PK     |
| 7               | 5372.9373       | 49.20           | 20.08       | 54.00          | 4.80              | 100         | 162                       | Vertical | AV     |
| 8               | 5403.6304       | 56.60           | 20.28       | 74.00          | 17.40             | 100         | 328                       | Vertical | PK     |
| 9               | 12640.8641      | 38.44           | 17.65       | 54.00          | 15.56             | 200         | 39                        | Vertical | AV     |
| 10              | 12649.0549      | 45.83           | 17.67       | 74.00          | 28.17             | 200         | 327                       | Vertical | PK     |

## REMARKS:

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.



|                 |                 |                 |             |                |                   |             |                           |            |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|------------|--------|
| Test Mode       |                 | 3DH5            |             |                | Channel           |             | CH39                      |            |        |
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |            |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity   | Remark |
| 1               | 1999.5000       | 38.98           | 9.01        | 54.00          | 15.02             | 100         | 218                       | Horizontal | AV     |
| 2               | 2035.5036       | 45.77           | 8.92        | 74.00          | 28.23             | 100         | 85                        | Horizontal | PK     |
| 3               | 5387.1287       | 56.81           | 20.19       | 74.00          | 17.19             | 200         | 142                       | Horizontal | PK     |
| 4               | 5393.7294       | 49.20           | 20.25       | 54.00          | 4.80              | 200         | 308                       | Horizontal | AV     |
| 5               | 12172.8173      | 37.95           | 16.90       | 54.00          | 16.05             | 100         | 12                        | Horizontal | AV     |
| 6               | 12563.6364      | 45.69           | 17.73       | 74.00          | 28.31             | 100         | 38                        | Horizontal | PK     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.



|                 |                 |                 |             |                |                   |             |                           |          |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|----------|--------|
| Test Mode       |                 | 3DH5            |             |                | Channel           |             | CH39                      |          |        |
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |          |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity | Remark |
| 1               | 2128.1128       | 47.03           | 9.01        | 74.00          | 26.97             | 100         | 359                       | Vertical | PK     |
| 2               | 2178.3178       | 38.94           | 9.19        | 54.00          | 15.06             | 100         | 236                       | Vertical | AV     |
| 3               | 5363.3663       | 49.38           | 20.00       | 54.00          | 4.62              | 200         | 98                        | Vertical | AV     |
| 4               | 5421.4521       | 56.81           | 20.21       | 74.00          | 17.19             | 200         | 152                       | Vertical | PK     |
| 5               | 12604.5905      | 38.52           | 17.71       | 54.00          | 15.48             | 100         | 8                         | Vertical | AV     |
| 6               | 13062.1062      | 46.28           | 17.87       | 74.00          | 27.72             | 100         | 61                        | Vertical | PK     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.



| Test Mode       |                 | 3DH5            |             |                | Channel           |             | CH78                      |            |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|------------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |            |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity   | Remark |
| 1               | 2087.1087       | 46.28           | 8.76        | 74.00          | 27.72             | 100         | 103                       | Horizontal | PK     |
| 2               | 2126.3126       | 38.85           | 8.99        | 54.00          | 15.15             | 100         | 203                       | Horizontal | AV     |
| 3               | 2479.7733       | 103.88          | 10.89       |                |                   | 200         | 162                       | Horizontal | PK     |
| 4               | *2480.1334      | 102.69          | 10.89       |                |                   | 200         | 254                       | Horizontal | AV     |
| 5               | *2483.5000      | 52.75           | 10.88       | 74.00          | 21.25             | 100         | 233                       | Horizontal | PK     |
| 6               | 2483.5000       | 42.15           | 10.88       | 54.00          | 11.85             | 100         | 222                       | Horizontal | AV     |
| 7               | 5395.3795       | 56.79           | 20.26       | 74.00          | 17.21             | 200         | 262                       | Horizontal | PK     |
| 8               | 5409.9010       | 49.23           | 20.26       | 54.00          | 4.77              | 200         | 104                       | Horizontal | AV     |
| 9               | 12268.7669      | 37.97           | 16.85       | 54.00          | 16.03             | 200         | 181                       | Horizontal | AV     |
| 10              | 12652.5653      | 45.13           | 17.66       | 74.00          | 28.87             | 200         | 208                       | Horizontal | PK     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.



| Test Mode       |                 | 3DH5            |             |                | Channel           |             | CH78                      |          |        |
|-----------------|-----------------|-----------------|-------------|----------------|-------------------|-------------|---------------------------|----------|--------|
| Frequency Range |                 | 1GHz ~ 26.5GHz  |             |                | Detector Function |             | Peak (PK)<br>Average (AV) |          |        |
| NO.             | Frequency (MHz) | Result (dBuV/m) | Factor [dB] | Limit (dBuV/m) | Margin (dB)       | Height (cm) | Azimuth (deg)             | Polarity | Remark |
| 1               | 2133.5134       | 46.02           | 9.06        | 74.00          | 27.98             | 100         | 143                       | Vertical | PK     |
| 2               | 2268.1268       | 39.01           | 9.68        | 54.00          | 14.99             | 100         | 97                        | Vertical | AV     |
| 1               | 2480.0133       | 98.53           | 10.89       |                |                   | 200         | 227                       | Vertical | PK     |
| 2               | 2480.0333       | 97.30           | 10.89       |                |                   | 200         | 227                       | Vertical | AV     |
| 3               | *2483.5000      | 52.31           | 10.88       | 74.00          | 21.69             | 200         | 13                        | Vertical | PK     |
| 4               | *2483.5000      | 41.60           | 10.88       | 54.00          | 12.40             | 200         | 347                       | Vertical | AV     |
| 3               | 5874.2574       | 57.75           | 20.39       | 74.00          | 16.25             | 200         | 102                       | Vertical | PK     |
| 4               | 6157.0957       | 50.66           | 21.51       | 54.00          | 3.34              | 200         | 181                       | Vertical | AV     |
| 5               | 16974.9775      | 48.74           | 25.99       | 74.00          | 25.26             | 100         | 72                        | Vertical | PK     |
| 6               | 17712.1512      | 42.23           | 27.59       | 54.00          | 11.77             | 100         | 52                        | Vertical | AV     |

**REMARKS:**

1. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
2. The emission levels of other frequencies were greater than 20dB margin.
3. Margin value = Result – Limit value.
4. " \* ": Fundamental frequency.



## Appendix B

| Test Equipment                  | Type/Mode     | SERIAL NO.   | Equipment No. | Manufacturer | Cal. Due   | Used                                |
|---------------------------------|---------------|--------------|---------------|--------------|------------|-------------------------------------|
| <b>Conducted emission</b>       |               |              |               |              |            |                                     |
| EMI Test Receiver               | ESCI          | 100857       | WKNB-0081     | R&S          | 2021-12-08 | <input checked="" type="checkbox"/> |
| EMI Test Receiver               | ESR3          | 102394       | VG DY-0705    | R&S          | 2022-03-05 | <input type="checkbox"/>            |
| LISN                            | NSLK 8127     | 8127644      | VG DY-0150    | SCHWARZBECK  | 2021-09-04 | <input type="checkbox"/>            |
| LISN                            | NSLK 8128     | 8128-316     | VG DY-0149    | SCHWARZBECK  | 2021-09-04 | <input checked="" type="checkbox"/> |
| DC LISN                         | PVDC8301-017  | PVDC8301#17  | VG DY-0692    | SCHWARZBECK  | 2022-06-07 | <input type="checkbox"/>            |
| LISN                            | NSLK 8129     | 8129-268     | EM-000388     | SCHWARZBECK  | 2022-03-05 | <input type="checkbox"/>            |
| Plus Limiter (#1)               | VTSD 9561 F-N | 00515        | VG DY-0808    | SCHWARZBECK  | 2022-03-05 | <input checked="" type="checkbox"/> |
| Plus Limiter (#2)               | VTSD 9561     | 9561-F017    | VG DY-0152    | SCHWARZBECK  | 2021-10-09 | <input type="checkbox"/>            |
| Impedance Stabilization Network | ISN T800      | 27095        | WKNE-0195     | TESEQ        | 2021-09-04 | <input type="checkbox"/>            |
| Impedance Stabilization Network | NTFM8158      | 8158-0092    | VG DY-0356    | SCHWARZBECK  | 2022-06-07 | <input type="checkbox"/>            |
| Impedance Stabilization Network | NTFM8131      | #184         | EM-000498     | SCHWARZBECK  | 2022-06-05 | <input type="checkbox"/>            |
| Voltage Probe                   | TK9420        | 9420-499     | VG DY-0128    | SCHWARZBECK  | 2022-03-05 | <input type="checkbox"/>            |
| Power Divider                   | 4901.17.B     | 22643830     | DB-0016       | HUBER+SUHNER | 2021-11-08 | <input type="checkbox"/>            |
| Video Signal Generator          | GV-798+       | 151064920001 | VGDS-0215     | PROMAX       | 2022-06-07 | <input type="checkbox"/>            |
| Audio Signal Generator          | GAG-810       | EK871591     | EM-000309     | GW           | 2021-12-11 | <input type="checkbox"/>            |
| Shielding Room(#1)              | GP1A          | 002          | WKNF-0001     | LEINING      | 2024-08-08 | <input checked="" type="checkbox"/> |
| Shielding Room(#2)              | GP1A          | /            | WKNF-0006     | LEINING      | 2024-08-08 | <input type="checkbox"/>            |

| Test Equipment                         | Type/Mode            | SERIAL NO.  | Equipment No. | Manufacturer | Cal. Due   | Used                                |
|----------------------------------------|----------------------|-------------|---------------|--------------|------------|-------------------------------------|
| <b>Radiated Spurious Emission Test</b> |                      |             |               |              |            |                                     |
| 3m Semi-Anechoic Chamber               | FACT-4               | ST08035     | WKNA-0024     | ETS          | 2024-12-12 | <input checked="" type="checkbox"/> |
| Spectrum Analyzer                      | N9010B               | MY57470323  | DZ-000174     | KEYSIGHT     | 2022-03-05 | <input checked="" type="checkbox"/> |
| EMI Test Receiver                      | N9038A-508           | MY532290079 | EM-000397     | Agilent      | 2022-03-05 | <input checked="" type="checkbox"/> |
| Broadband Antenna                      | VULB 9163            | 9163-530    | EM-000342     | SCHWARZBECK  | 2022-06-30 | <input checked="" type="checkbox"/> |
| Waveguide Horn Antenna                 | HF906                | 360306/008  | WKNA-0024-8   | R&S          | 2021-09-04 | <input checked="" type="checkbox"/> |
| Waveguide Horn Antenna                 | BBHA9170             | 00949       | EM-000383     | SCHWARZBECK  | 2021-12-16 | <input checked="" type="checkbox"/> |
| Preamplifier                           | BBV 9721             | 9721-050    | VGDS-0667-1   | SCHWARZBECK  | 2022-07-20 | <input checked="" type="checkbox"/> |
| Bandstop Filters                       | SW-BSF-2400-100-7-A1 | /           | EM-000495     | /            | 2022-07-20 | <input checked="" type="checkbox"/> |

| Test Equipment                     | Type/Mode | SERIAL NO.      | Equipment No. | Manufacturer | Cal. Due   | Used                                |
|------------------------------------|-----------|-----------------|---------------|--------------|------------|-------------------------------------|
| <b>Antenna Port Conducted Test</b> |           |                 |               |              |            |                                     |
| Communication Shielded Room 2      | 4m*3m*3m  | CRTDSWKSR 44301 | /             | CRT          | 2023-04-05 | <input checked="" type="checkbox"/> |





| Test Equipment                | Type/Mode | SERIAL NO. | Equipment No. | Manufacturer | Cal. Due   | Used                                |
|-------------------------------|-----------|------------|---------------|--------------|------------|-------------------------------------|
| Spectrum Analyzer             | FSV40     | 101580     | DZ-000238-3   | R&S          | 2022-06-30 | <input checked="" type="checkbox"/> |
| Comprehensive Test Instrument | CMW270    | 100304     | DZ-000240-1   | R&S          | 2021-12-08 | <input checked="" type="checkbox"/> |
| Analog Signal Generator       | SMB100A   | 181858     | DZ-000238-2   | R&S          | 2022-06-30 | <input checked="" type="checkbox"/> |
| Vector Signal Generator       | SGT100A   | 111661     | DZ-000238-1   | R&S          | 2022-06-30 | <input checked="" type="checkbox"/> |
| RF Radio Frequency Switch     | JS0806-2  | 19H9080187 | DZ-000241     | Tonscend     | 2022-06-30 | <input checked="" type="checkbox"/> |
| Programmable DC Power Supply  | E3644A    | MY58036222 | DZ-000178     | KEYSIGHT     | 2022-04-22 | <input checked="" type="checkbox"/> |



### Important

- (1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.
- (2) The test report is invalid if altered.
- (3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.
- (4) Objections to the test report must be submitted to the laboratory within 15 days.
- (5) Generally, commission test is responsible for the tested samples only.

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