



Test report No. : 4790592589-US-R0-V0  
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Issued date : 2022/11/7  
FCC ID : 2AYYS-AW720H

# **RADIO TEST REPORT**

**Product** : Gaming Headset

**Model Name** : AW720H

**FCC ID** : 2AYYS-AW720H

**Test Regulation** : FCC 47 CFR Part 15 Subpart C (Section 15.247)

**Received Date** : 2022/10/4

**Test Date** : 2022/10/12 ~ 2022/11/2

**Issued Date** : 2022/11/7

**Applicant** : Luxshare Precision Industry Co., Ltd.  
2nd floor,A building,Sanyo New Industrial Area,West of  
Maoyi,Shajing Street,Ban'an District,Shenzhen  
City,Guangdong Province,China

**Issued By** : Underwriters Laboratories Taiwan Co., Ltd.  
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,  
Zhudong Township, Hsinchu County, Taiwan



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Doc No: 17-EM-F0876 / 6.0



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## REVISION HISTORY

**Original Test Report No.: 4790592589-US-R0-V0**

[illegible]

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## 1. Attestation of Test Results

**APPLICANT:** Luxshare Precision Industry Co., Ltd.  
2nd floor,A building,Sanyo New Industrial Area,West of  
Maoyi,Shajing Street,Ban'an District,Shenzhen City,Guangdong  
Province,China.

**MANUFACTURER:** Luxshare Precision Industry Co., Ltd.  
2nd floor,A building,Sanyo New Industrial Area,West of  
Maoyi,Shajing Street,Ban'an District,Shenzhen City,Guangdong  
Province,China

**EUT DESCRIPTION:** Gaming Headset

**BRAND:** ALIENWARE

**MODEL:** AW720H

**SAMPLE STAGE:** Engineering Verification Test sample

**DATE of TESTED:** 2022/10/12 ~ 2022/11/2

| APPLICABLE STANDARDS                          |              |
|-----------------------------------------------|--------------|
| STANDARD                                      | Test Results |
| FCC 47 CFR PART 15 Subpart C (Section 15.247) | PASS         |

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Cindy Hsin  
Project Handler

Date : 2022/11/7

Approved and Authorized By:

Eric Lee  
Senior Laboratory Engineer

Date : 2022/11/7

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## 2. Summary of Test Results

| Summary of Test Results        |                                                                                                                  |        |
|--------------------------------|------------------------------------------------------------------------------------------------------------------|--------|
| FCC Clause                     | Test Items                                                                                                       | Result |
| 15.247(a)(1) (iii)             | Number of Hopping Frequency Used                                                                                 | PASS   |
| 15.247(a)(1) (iii)             | Dwell Time on Each Channel                                                                                       | PASS   |
| 15.247(a)(1)                   | 1. Hopping Channel Separation<br>2. Spectrum Bandwidth of a Frequency<br>Hopping Sequence Spread Spectrum System | PASS   |
| 15.247(b)                      | Conducted Output Power                                                                                           | PASS   |
| 15.247(d)                      | Antenna Port Emission                                                                                            | PASS   |
| 15.205 / 15.209 /<br>15.247(d) | Radiated Emissions and<br>Band Edge Measurement                                                                  | PASS   |
| 15.207                         | AC Power Conducted Emission                                                                                      | PASS   |
| 15.203                         | Antenna Requirement                                                                                              | PASS   |

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### 3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB558074 D01 Meas Guidance v05r02, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013.

### 4. Facilities and Accreditation

|                                  |                                                                                                       |
|----------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Test Location</b>             | Underwriters Laboratories Taiwan Co., Ltd.                                                            |
| <b>Address</b>                   | Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan |
| <b>Accreditation Certificate</b> | Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.                |

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## 5. Measurement Uncertainty

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k=2$ .

| Measurement                                    | Frequency      | Uncertainty  |
|------------------------------------------------|----------------|--------------|
| Conducted disturbance at mains terminals ports | 150kHz ~ 30MHz | $\pm 2.9$ dB |
| RF Conducted                                   | 9 kHz - 40GHz  | $\pm 2.4$ dB |
| Radiated disturbance below 30MHz               | 9 kHz - 30 MHz | $\pm 1.9$ dB |
| Radiated disturbance below 1 GHz               | 30MHz ~ 1GHz   | $\pm 5.8$ dB |
| Radiated disturbance above 1 GHz               | 1GHz ~ 40GHz   | $\pm 4.8$ dB |

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## 6. Equipment under Test

### 6.1. Description of EUT

|                             |                                                   |
|-----------------------------|---------------------------------------------------|
| <b>Product</b>              | Gaming Headset                                    |
| <b>Brand Name</b>           | ALIENWARE                                         |
| <b>Model Name</b>           | AW720H                                            |
| <b>Operating Frequency</b>  | 2402MHz ~ 2480MHz                                 |
| <b>Modulation</b>           | GFSK, $\pi/4$ -DQPSK and 8DPSK                    |
| <b>Transfer Rate</b>        | Up to 3 Mbps                                      |
| <b>Number of Channel</b>    | 79                                                |
| <b>Maximum Output Power</b> | 8.67 dBm                                          |
| <b>Normal Voltage</b>       | 5Vdc from host<br>3.7Vdc from battery             |
| <b>Sample ID</b>            | Conducted Test: 5415496<br>Radiated Test: 5418498 |

Note:

1. The EUT contains following accessory devices:

| <b>Product</b> | <b>Brand</b> | <b>Model</b> | <b>Description</b> |
|----------------|--------------|--------------|--------------------|
| Charging cable | Luxshare     | LX001        | Length: 1.5 m      |
| Inline cable   | Luxshare     | LX001        | Length: 1.5 m      |
| USB-C Adapter  | Luxshare     | LX001        | N/A                |

2. The EUT could be supplied with rechargeable battery as the following table:

| <b>Brand Name</b>     | <b>Model</b> | <b>Description</b> |
|-----------------------|--------------|--------------------|
| Hangzhou Future Power | FT573439P    | 3.7 Vdc, 750 mAh   |

3. The EUT may have a lot of colors for marketing requirement.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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## 6.2. Channel List

79 channels are provided for BT-EDR mode:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (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            | -       | -               |

## 6.3. Test Condition

| Test Item                          | Test Site No. | Environmental Condition | Input Power    | Test Date                 | Tested by |
|------------------------------------|---------------|-------------------------|----------------|---------------------------|-----------|
| Antenna Port Conducted Measurement | SR4           | 23~25°C/<br>60~63%RH    | 5Vdc from host | 2022/10/17~<br>2022/10/17 | Jubo Shen |
| Radiated Spurious Emission         | 966-2         | 23~25°C/<br>61~64%RH    | 5Vdc from host | 2022/10/12~<br>2022/11/02 | Jubo Shen |
| AC power Line Conducted Emission   | SR1           | 23~25°C/<br>62~63%RH    | 5Vdc from host | 2022/10/19~<br>2022/11/02 | Jubo Shen |

FCC Test Firm Registration Number: 498077

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#### 6.4. Description of Available Antennas

| Ant. No. | Transmitter Circuit | Brand Name | Model Name  | Ant. Type | Maximum Gain (dBi) |
|----------|---------------------|------------|-------------|-----------|--------------------|
| 1        | Chain (0)           | Luxshare   | Headset_PCB | PIFA      | -1.8               |

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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## 6.5. Test Mode Applicability and Tested Channel Detail

- The EUT has been evaluated for power supply as: 5Vdc from host(Latitude E5470), 5Vdc from Adapter(TC P900-US) and 3.7Vdc from Battery(FT573439P). Among them, 5Vdc from host(Latitude E5470) with the worst case. The final measurement is carried out in this power supply, and the test result is recorded in the report.
- The EUT in the charge mode (the Latitude E5470 is charge to DUT), was evaluate radiated emission below 1GHz and AC power line conducted emission.
- The fundamental of the EUT was investigated in three orthogonal axes X-Y/Y-Z/X-Z, it was determined that Y-Z plane was worst-case. Therefore, all final radiated testing was performed with the EUT in Y-Z plane.
- The Packet Type for DH1, DH3, and DH5 have all been pre-tested, the fundamental worst case of the Packet Type was found in the DH5. Therefore, only DH5 Packet Type is recorded in the report. (Except Dwell Time).
- The modulation and bandwidth are similar for  $\pi/4$ -DQPSK mode and 8DPSK mode, therefore investigated 8DPSK mode to representative mode in test report.
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Since the DUT is a Bluetooth device, the AFH mode and non-AFH mode follow the Bluetooth timing protocol, and the same timing level has the same time interval, but the non-AFH mode has worse results, therefore only the test data of this type were recorded in this report.

| Test Item                             | Modulation Type    | Available Channel | Test Channel | Packet Type       |
|---------------------------------------|--------------------|-------------------|--------------|-------------------|
| Radiated Emissions<br>(Above 1GHz)    | GFSK               | 0 to 78           | 0,39,78      | DH5               |
|                                       | 8DPSK              | 0 to 78           | 0,39,78      | 3DH5              |
| Radiated Emissions<br>(Below 1GHz)    | GFSK               | 0 to 78           | 0            | DH5               |
| AC Power Line Conducted<br>Emission   | GFSK               | 0 to 78           | 0            | DH5               |
| Antenna Port Conducted<br>Measurement | GFSK               | 0 to 78           | 0,39,78      | DH1*,DH3*,DH5     |
|                                       | 8DPSK              | 0 to 78           | 0,39,78      | 3DH1*,3DH3*, 3DH5 |
| Test Item                             | Test Configuration |                   |              |                   |
| Radiated Emissions<br>(Below 1GHz)    | Charging Mode      |                   |              |                   |
| AC Power Line Conducted<br>Emission   | Charging Mode      |                   |              |                   |

\* Only for Dwell Time on Each Channel test

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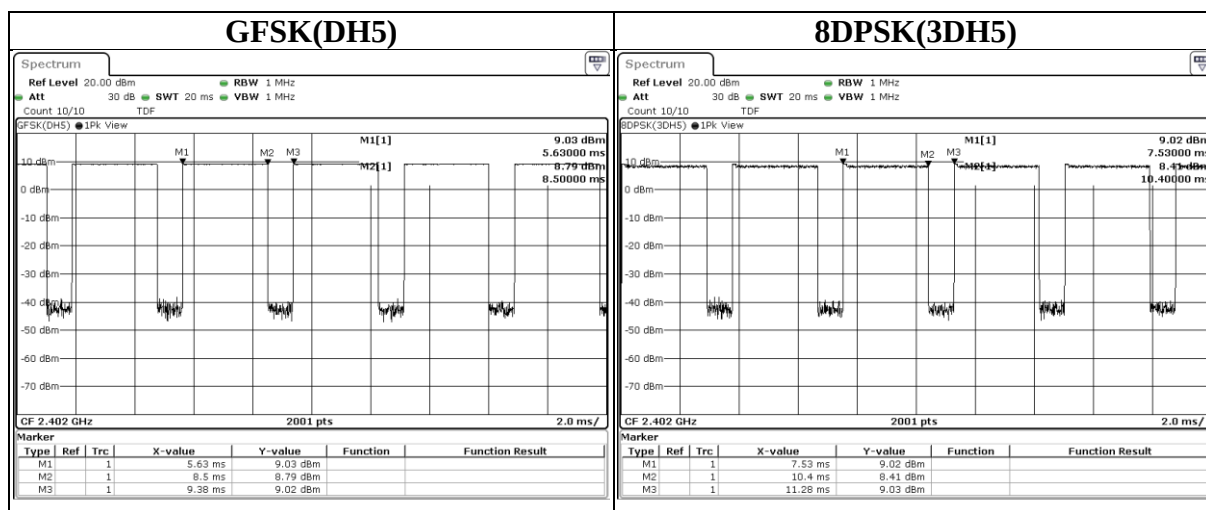
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## 6.6. Duty cycle

| Mode        | On Time (ms) | On+Off Time (ms) | Duty Cycle | Duty Factor (dB) | VBW Set (above 1GHz) |
|-------------|--------------|------------------|------------|------------------|----------------------|
| GFSK(DH5)   | 2.870        | 3.750            | 0.7653     | 1.16             | 510Hz                |
| 8DPSK(3DH5) | 2.870        | 3.750            | 0.7653     | 1.16             | 510Hz                |





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## 7. Test Equipment

| Test Equipment List                          |                    |                         |                     |            |              |
|----------------------------------------------|--------------------|-------------------------|---------------------|------------|--------------|
| Equipment                                    | Manufacturer       | Model No.               | Serial No.          | Cal. Date  | Expired date |
| Radiated Spurious Emission                   |                    |                         |                     |            |              |
| Spectrum Analyzer                            | Keysight           | N9010A                  | MY56070827          | 2021/11/9  | 2022/11/8    |
| EMI Test Receiver                            | Rohde & Schwarz    | ESR7                    | 101754              | 2021/12/10 | 2022/12/9    |
| Loop Antenna                                 | ETS lindgren       | 6502                    | 00213440            | 2021/12/23 | 2022/12/22   |
| Trilog-Broadband Antenna with 5dB Attenuator | Schwarzbeck & EMCI | VULB 9168 & N-6-05      | 774 & AT-N0538      | 2022/2/8   | 2023/2/7     |
| Horn Antenna (1-18 GHz)                      | Schwarzbeck        | BBHA 9120 D             | 01690               | 2021/12/13 | 2022/12/12   |
| Horn Antenna (18-40 GHz)                     | Schwarzbeck        | BBHA 9170               | 781                 | 2021/12/17 | 2022/12/16   |
| Preamplifier (30-1000 MHz)                   | EMCI               | EMC330E                 | 980405              | 2022/6/7   | 2023/6/6     |
| Preamplifier (1-18 GHz)                      | EMCI               | EMC051835BE             | 980406              | 2022/2/16  | 2023/2/15    |
| Preamplifier (18-40GHz)                      | EMCI               | EMC184040SEE            | 980426              | 2022/5/17  | 2023/5/16    |
| Cables                                       | Hanyitek           | K1K50-UP0264-K1K50-2500 | 170214-4 & 170425-2 | 2021/12/3  | 2022/12/2    |
| Cables                                       | Hanyitek           | K1K50-UP0264-K1K50-2500 | 170214-1 & 170214-2 | 2021/12/3  | 2022/12/2    |

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| Test Equipment List                |                 |           |                          |            |              |
|------------------------------------|-----------------|-----------|--------------------------|------------|--------------|
| Equipment                          | Manufacturer    | Model No. | Serial No.               | Cal. Date  | Expired date |
| Antenna Port Conducted Measurement |                 |           |                          |            |              |
| Spectrum Analyzer                  | Rohde & Schwarz | FSV40     | 101490                   | 2022/9/12  | 2023/9/11    |
| Pulse Power Sensor                 | Anritsu         | MA2411B   | 1531202                  | 2021/12/22 | 2022/12/21   |
| Power Meter                        | Anritsu         | ML2495A   | 1645002                  | 2021/12/22 | 2022/12/21   |
| AC power Line Conducted Emission   |                 |           |                          |            |              |
| EMI Test Receiver                  | Rohde & Schwarz | ESR7      | 101753                   | 2021/11/15 | 2022/11/14   |
| Two-Line V-Network                 | Rohde & Schwarz | ENV216    | 102136                   | 2022/8/29  | 2023/8/28    |
| Impuls-Begrenzer Pulse Limiter     | Rohde & Schwarz | ESH3-Z2   | 102219-Qt                | 2022/8/30  | 2023/8/29    |
| Cables                             | TITAN           | CFD200    | T0732ACFD20<br>020A300-2 | 2022/4/9   | 2023/4/8     |

| UL Software                      |                        |               |
|----------------------------------|------------------------|---------------|
| Description                      | Name                   | Version       |
| Radiated measurement             | e3                     | 6.191211 (V6) |
| Conducted measurement            | RF-Conducted-FCC 15247 | ver 1.0       |
| AC power Line Conducted Emission | EZ EMC                 | UL-3A1.2      |

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## 8. Description of Test Setup

### Support Equipment

| ID | Equipment | Brand Name            | Model Name     | S/N     | Remark            |
|----|-----------|-----------------------|----------------|---------|-------------------|
| A  | Laptop    | DELL                  | Latitude E5470 | 5M2MWF2 | Provide by lab    |
| B  | Battery   | Hangzhou Future Power | FT573439P      | -       | Provide by client |

### I/O Cables

| ID | Equipment    | Brand Name | Model Name | Length (m) | Remark            |
|----|--------------|------------|------------|------------|-------------------|
| 1  | Type C Cable | Luxshare   | LX001      | 1.5        | Provide by client |

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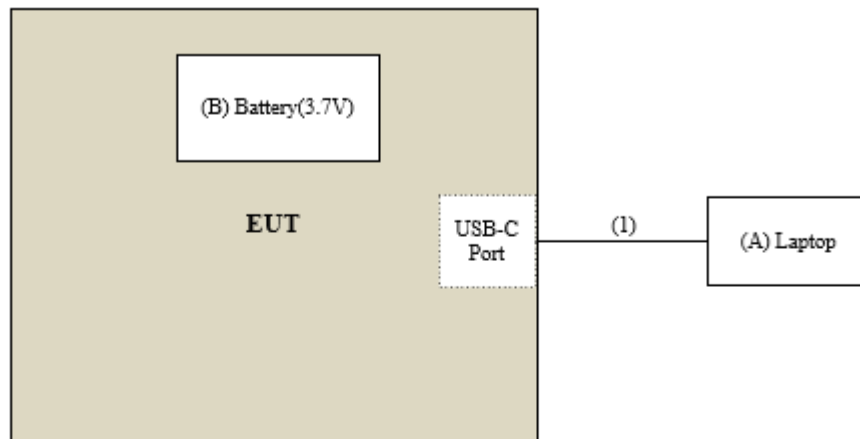
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### Test Setup

Controlled using a bespoke application (AB1565\_AB1568\_Tool\_v2.10.4) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

### Setup Diagram for Test



-----  
**Under Table**

-----  
**Remote Site**

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## 9. Test Results

### 9.1. Channel Bandwidth

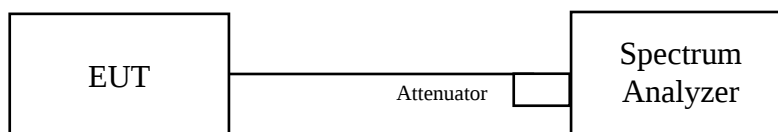
#### Requirements

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.

#### Test 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.

#### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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### Test Data

| Mode        | CH | Freq<br>(MHz) | 20dB BW<br>(MHz) | Limit<br>(MHz) | Result |
|-------------|----|---------------|------------------|----------------|--------|
| GFSK(DH5)   | 0  | 2402          | 0.957            | N/A            | Pass   |
| GFSK(DH5)   | 39 | 2441          | 0.973            | N/A            | Pass   |
| GFSK(DH5)   | 78 | 2480          | 0.962            | N/A            | Pass   |
| 8DPSK(3DH5) | 0  | 2402          | 1.281            | N/A            | Pass   |
| 8DPSK(3DH5) | 39 | 2441          | 1.284            | N/A            | Pass   |
| 8DPSK(3DH5) | 78 | 2480          | 1.284            | N/A            | Pass   |

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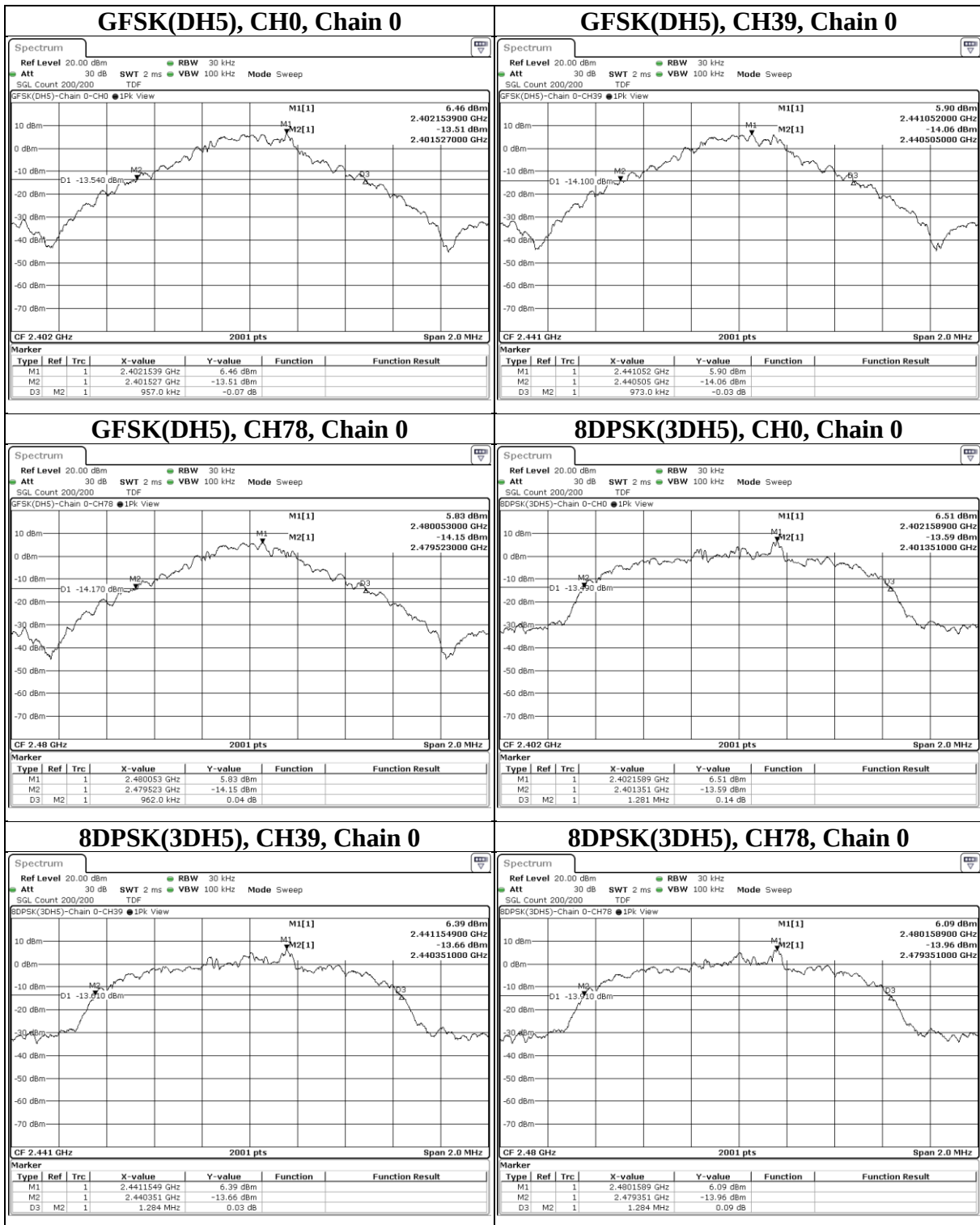
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## 9.2. Conducted Output Power

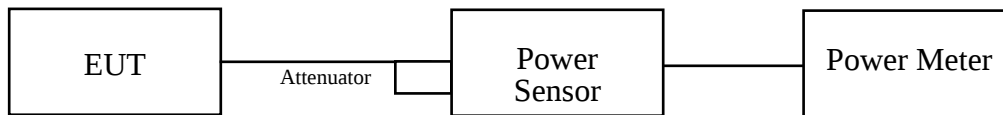
### Requirements

The Maximum Output Power Measurement is 125mW.

### Test Procedure

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. Record the power level.

### Test Setup



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

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## Test Data

### Peak Power

#### BT GFSK

| Channel | Frequency (MHz) | Peak Power (mW) | Peak Power (dBm) | Limit (dBm) | Pass/Fail |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 0       | 2402            | 7.362           | 8.67             | 20.97       | PASS      |
| 39      | 2441            | 7.112           | 8.52             | 20.97       | PASS      |
| 78      | 2480            | 6.714           | 8.27             | 20.97       | PASS      |

#### BT 8DPSK

| Channel | Frequency (MHz) | Peak Power (mW) | Peak Power (dBm) | Limit (dBm) | Pass/Fail |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 0       | 2402            | 7.345           | 8.66             | 20.97       | PASS      |
| 39      | 2441            | 7.129           | 8.53             | 20.97       | PASS      |
| 78      | 2480            | 6.792           | 8.32             | 20.97       | PASS      |

### Average Power (Reference Only)

#### BT GFSK

| Channel | Frequency (MHz) | Average Power (mW) | Average Power (dBm) |
|---------|-----------------|--------------------|---------------------|
| 0       | 2402            | 7.178              | 8.56                |
| 39      | 2441            | 6.95               | 8.42                |
| 78      | 2480            | 6.577              | 8.18                |

#### BT 8DPSK

| Channel | Frequency (MHz) | Average Power (mW) | Average Power (dBm) |
|---------|-----------------|--------------------|---------------------|
| 0       | 2402            | 7.194              | 8.57                |
| 39      | 2441            | 6.761              | 8.30                |
| 78      | 2480            | 6.592              | 8.19                |

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### 9.3. Hopping Channel Separation

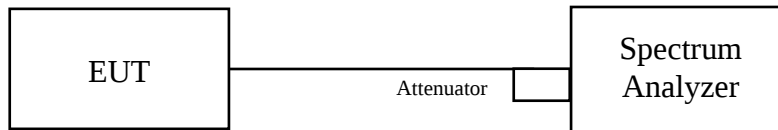
#### Requirements

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

#### Test 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.

#### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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### **Test Data**

| Mode        | CH | Freq<br>(MHz) | Channel<br>Separation<br>(MHz) | > Limit<br>(MHz) |
|-------------|----|---------------|--------------------------------|------------------|
| GFSK(DH5)   | 0  | 2402          | 0.867                          | 0.638            |
| GFSK(DH5)   | 39 | 2441          | 1.044                          | 0.649            |
| GFSK(DH5)   | 78 | 2480          | 0.943                          | 0.641            |
| 8DPSK(3DH5) | 0  | 2402          | 1.219                          | 0.943            |
| 8DPSK(3DH5) | 39 | 2441          | 1.235                          | 0.856            |
| 8DPSK(3DH5) | 78 | 2480          | 1.162                          | 0.856            |

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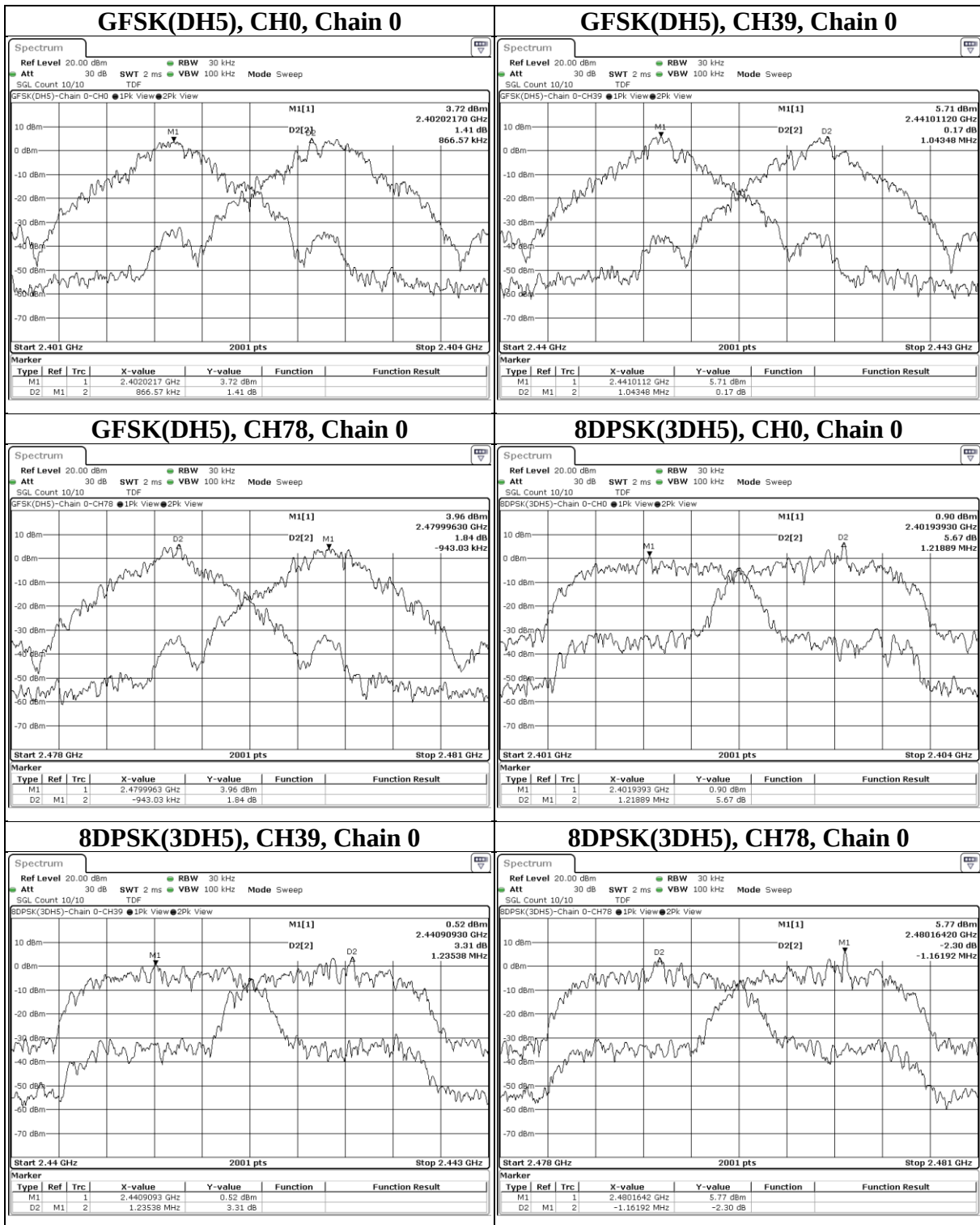
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## 9.4. Number of Hopping Frequency Used

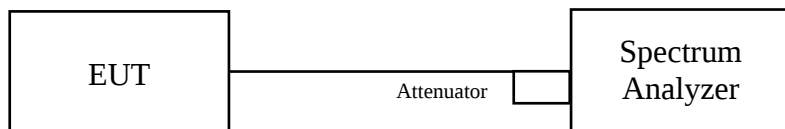
### Requirements

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

### Test 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 complete.

### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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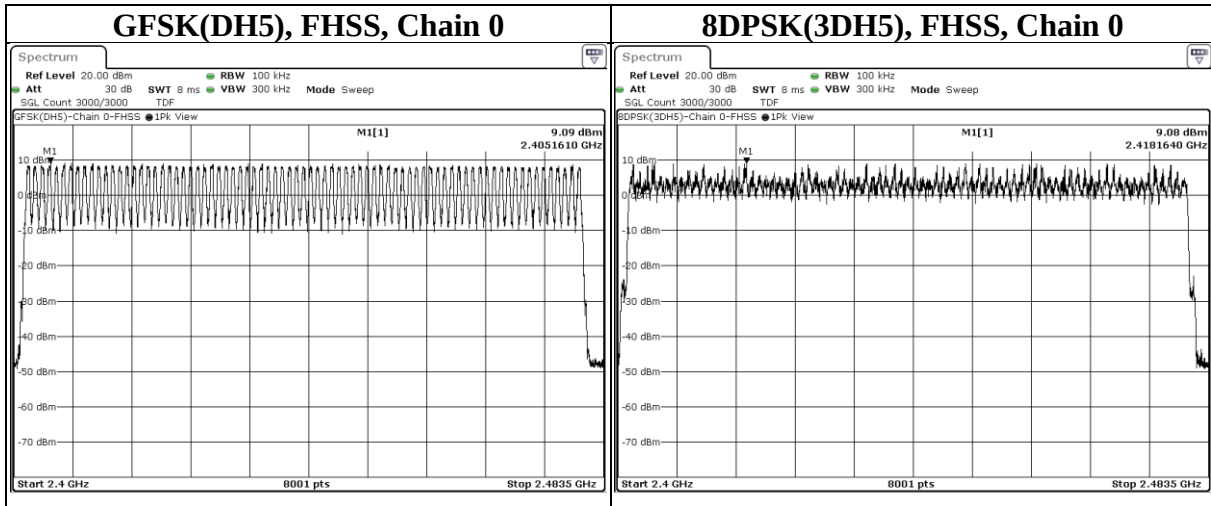
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## Test Data

There are 79 hopping frequencies in the hopping mode. On the plots, it shows that the hopping frequencies are equally spaced.



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## 9.5. Dwell Time on Each Channel

### Requirements

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.

### Test 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.
- Measure the maximum time duration of one single pulse.

A Period Time = (channel number)\*0.4

For normal mode:

DH1 Time Slot: Reading \* (1600/2)\*31.6/(channel number)

DH3 Time Slot: Reading \* (1600/4)\*31.6/(channel number)

DH5 Time Slot: Reading \* (1600/6)\*31.6/(channel number)

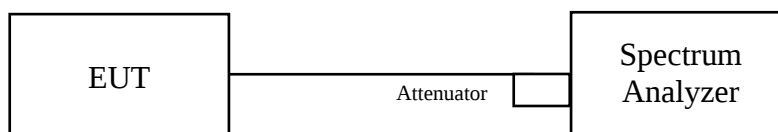
For AFH mode:

DH1 Time Slot: Reading \* (800/2)\*31.6/(channel number)

DH3 Time Slot: Reading \* (800/4)\*31.6/(channel number)

DH5 Time Slot: Reading \* (800/6)\*31.6/(channel number)

### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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### Test Data

| Mode        | Freq<br>(MHz) | Length of<br>transmission<br>time<br>(ms) | Dwell Time<br>(ms) | Limit<br>(ms) | Result |
|-------------|---------------|-------------------------------------------|--------------------|---------------|--------|
| GFSK(DH1)   | 2441          | 0.360                                     | 115.200            | 400           | PASS   |
| GFSK(DH3)   | 2441          | 1.625                                     | 260.000            | 400           | PASS   |
| GFSK(DH5)   | 2441          | 2.870                                     | 306.133            | 400           | PASS   |
| 8DPSK(3DH1) | 2441          | 0.380                                     | 121.600            | 400           | PASS   |
| 8DPSK(3DH3) | 2441          | 1.625                                     | 260.000            | 400           | PASS   |
| 8DPSK(3DH5) | 2441          | 2.875                                     | 306.667            | 400           | PASS   |

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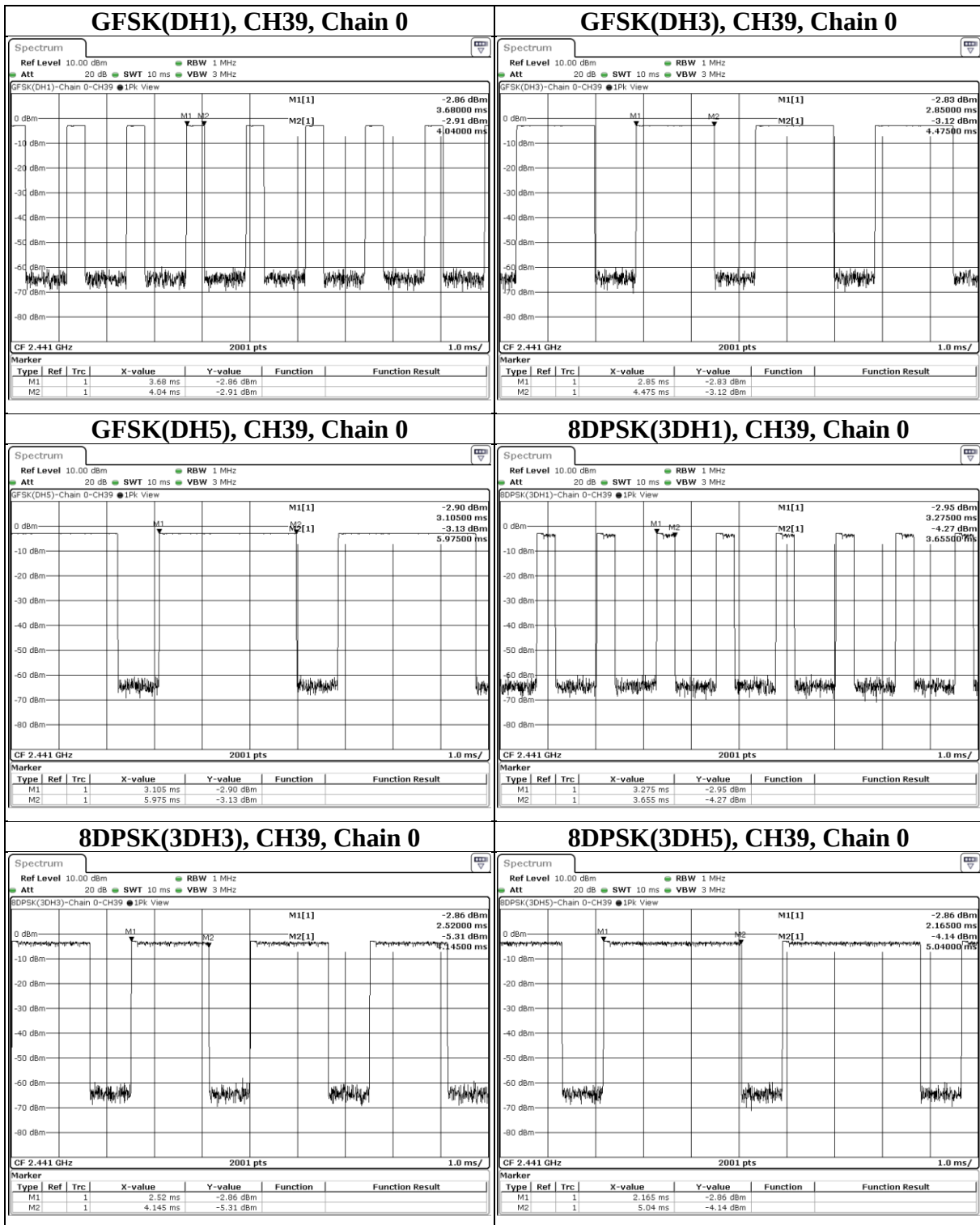
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## 9.6. Conducted Out of Band Emission

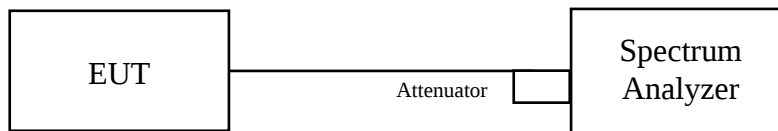
### Requirements

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b) (3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209 (a) is not required.

### Test procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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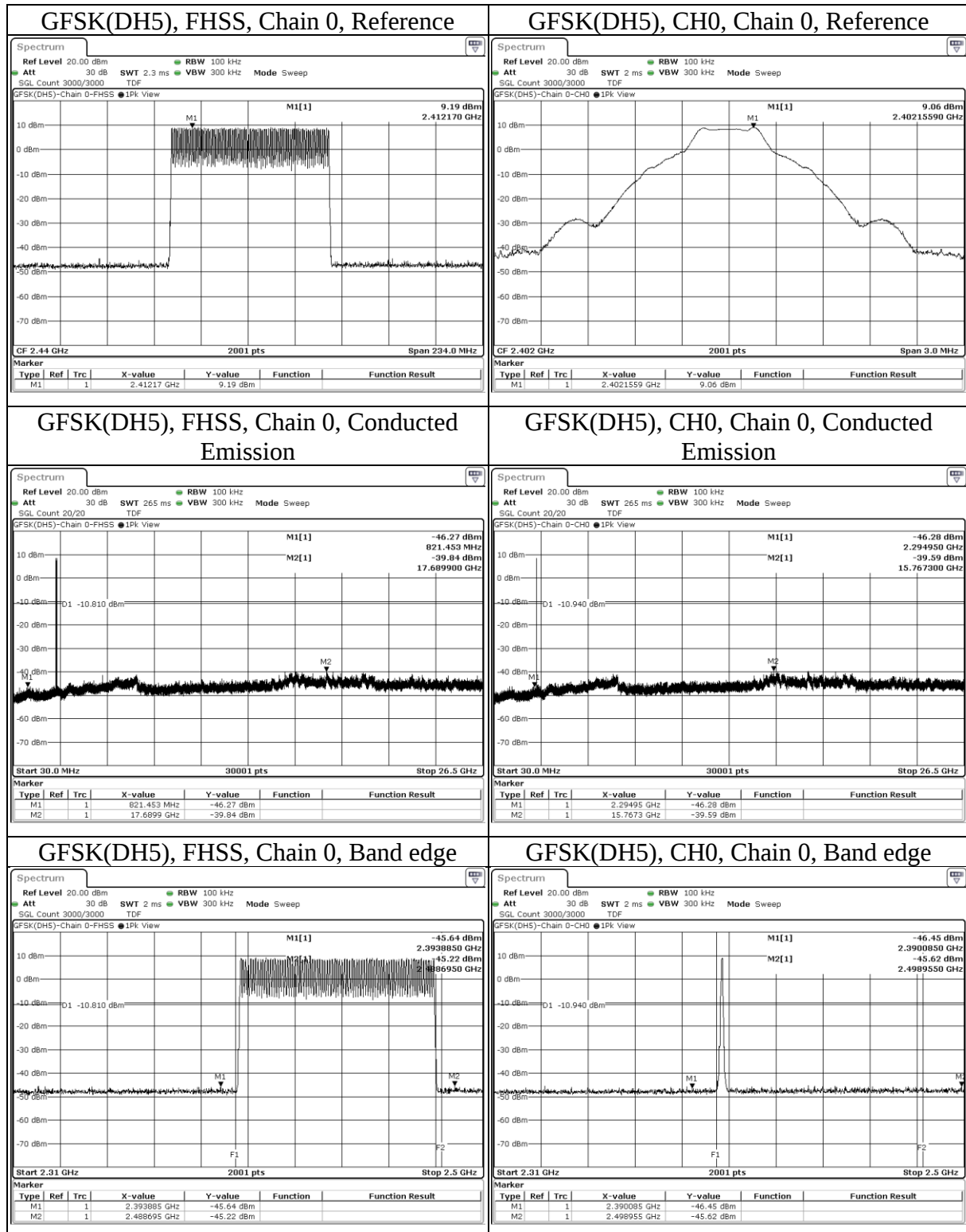
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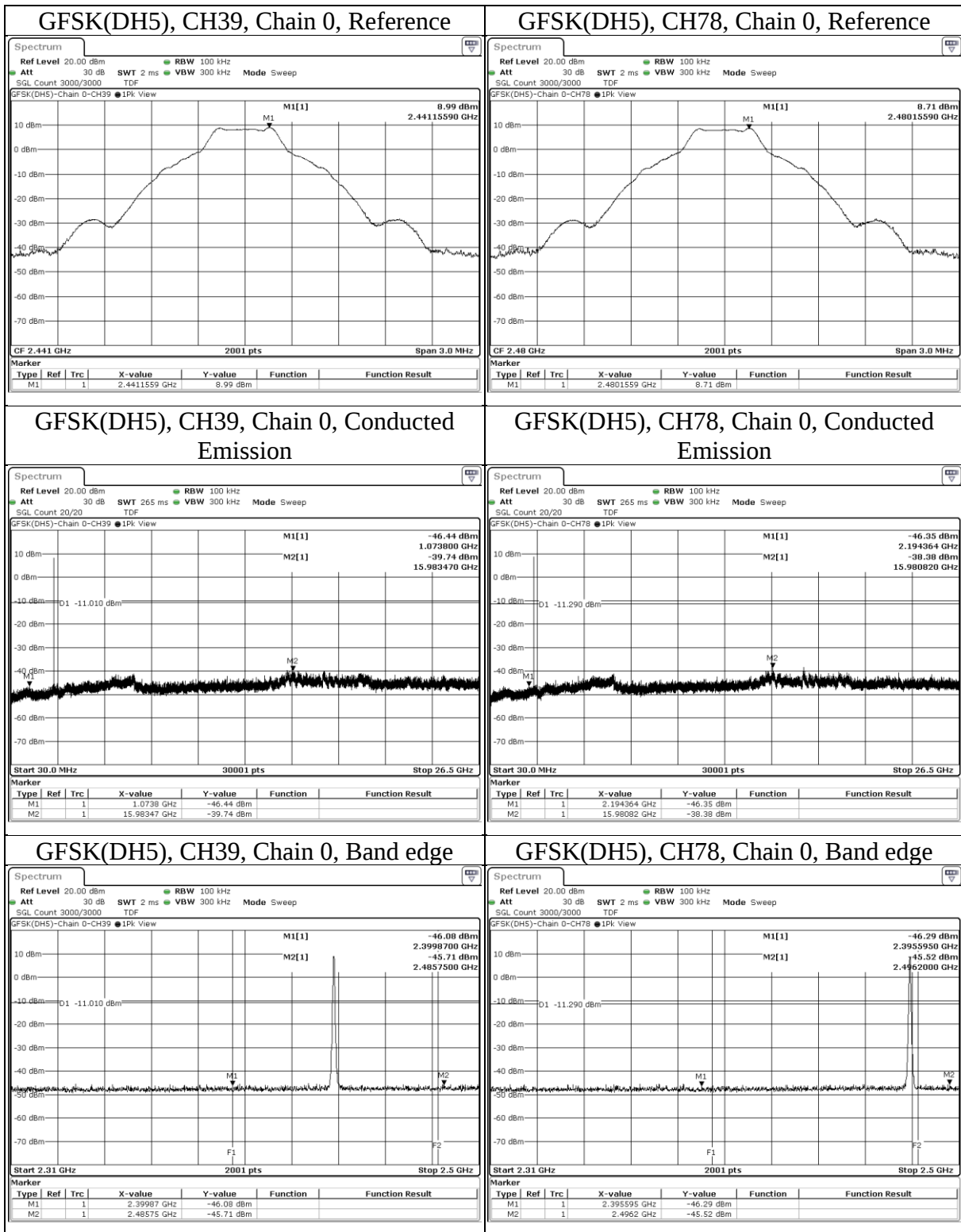


## Test Data





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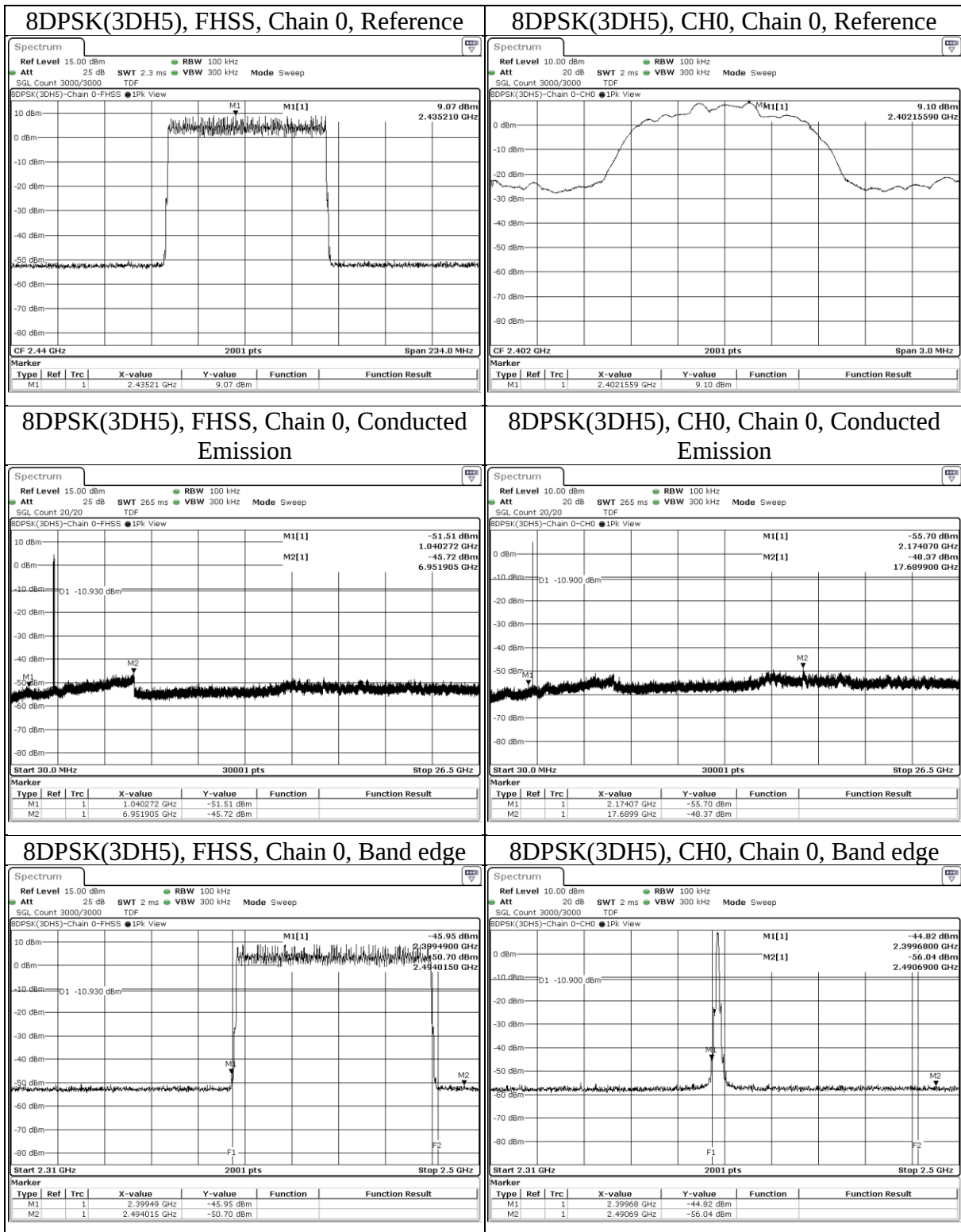
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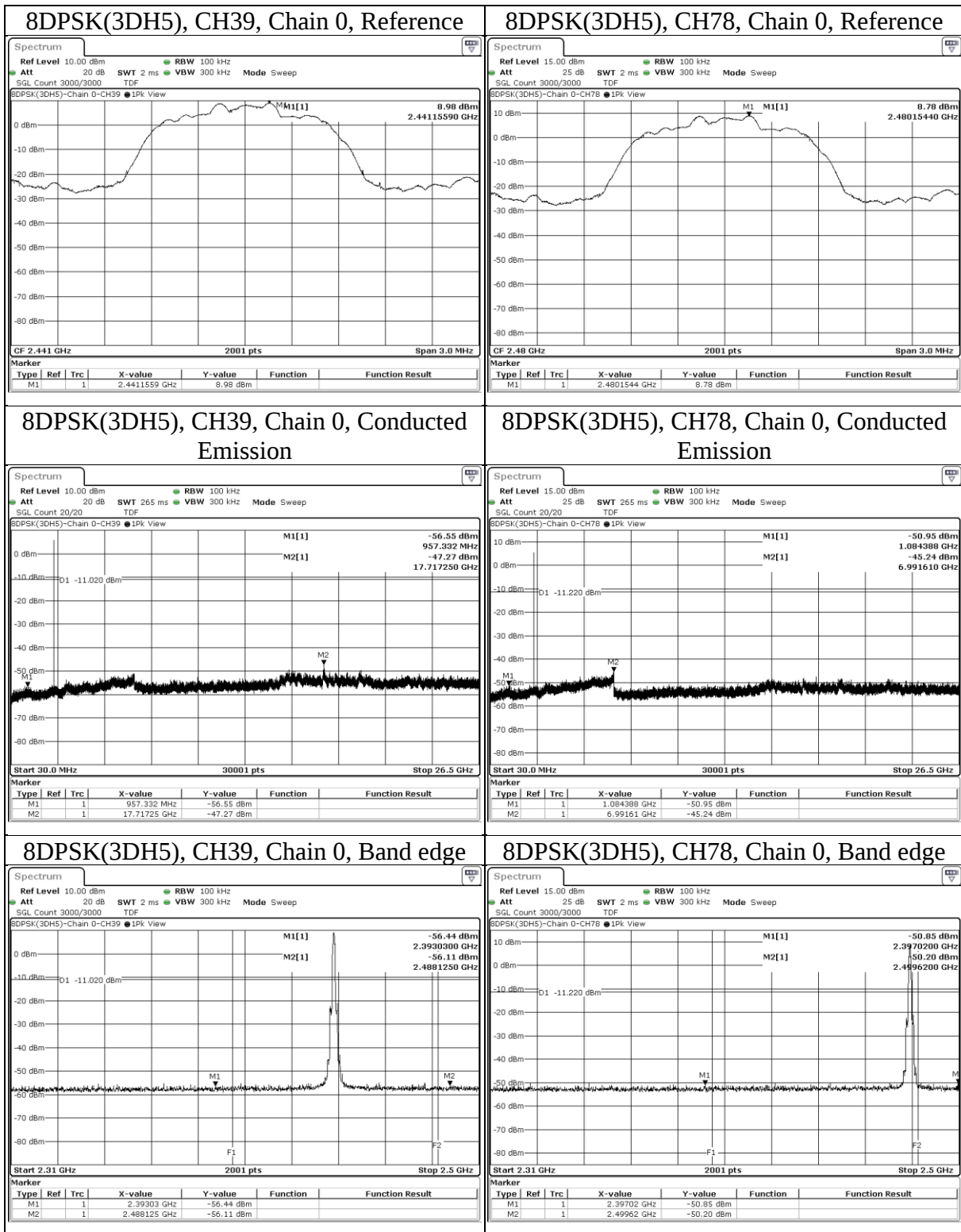
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## 9.7. Radiated Spurious Emission

### Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| Frequency (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.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. 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.

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## **Test Procedures**

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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.
- d. 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.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

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Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.

| Configuration | Average |                                      |
|---------------|---------|--------------------------------------|
|               | RBW     | VBW                                  |
| Bluetooth     | 1MHz    | Refer to section 6.6 for duty cycle. |

4. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
5. Test data of Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
6. Test data of Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
7. Test data of Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
8. Test data of Notation "@" = Fundamental Frequency
9. Test data of Notation "\*" = The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.

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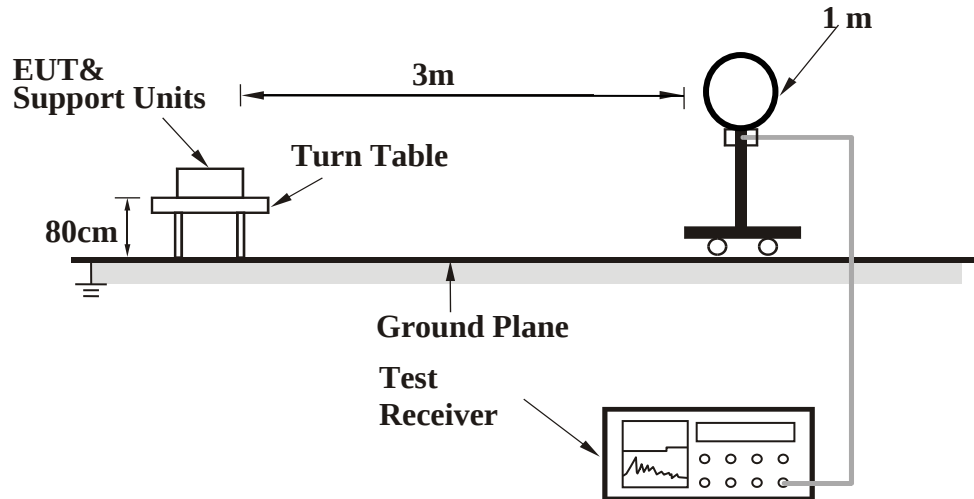
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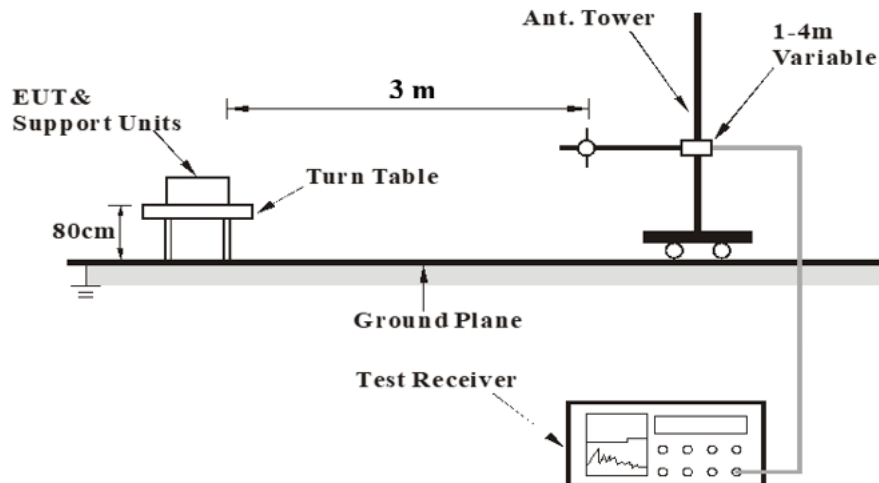


## Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



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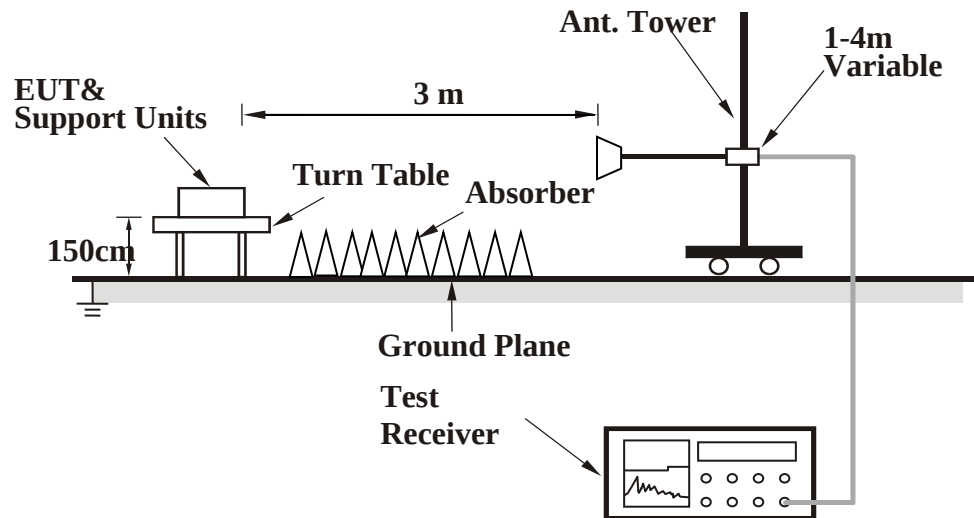
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<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

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## Test Data

### Above 1 GHz

|      |      |         |   |
|------|------|---------|---|
| Mode | GFSK | Channel | 0 |
|------|------|---------|---|

| Polarization | Notation | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|--------------|----------|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| Horizontal   |          | 2387.52            | 41.4              | 5.82              | 47.22              | 74                | -26.78         | PK     |
|              |          | 2389.42            | 29.36             | 5.82              | 35.18              | 54                | -18.82         | AVG    |
|              | @        | 2402               | 101.06            | 5.8               | 106.86             | N/A               | N/A            | PK     |
|              | @        | 2402               | 100.81            | 5.8               | 106.61             | N/A               | N/A            | AVG    |
|              | *        | 4804               | 39.27             | 2.33              | 41.6               | 74                | -32.4          | PK     |
| Vertical     |          | 2336.98            | 41.07             | 5.89              | 46.96              | 74                | -27.04         | PK     |
|              |          | 2361.87            | 28.82             | 5.88              | 34.7               | 54                | -19.3          | AVG    |
|              | @        | 2402               | 86.82             | 5.8               | 92.62              | N/A               | N/A            | PK     |
|              | @        | 2402               | 86.57             | 5.8               | 92.37              | N/A               | N/A            | AVG    |
|              | *        | 4804               | 35.56             | 2.33              | 37.89              | 74                | -36.11         | PK     |

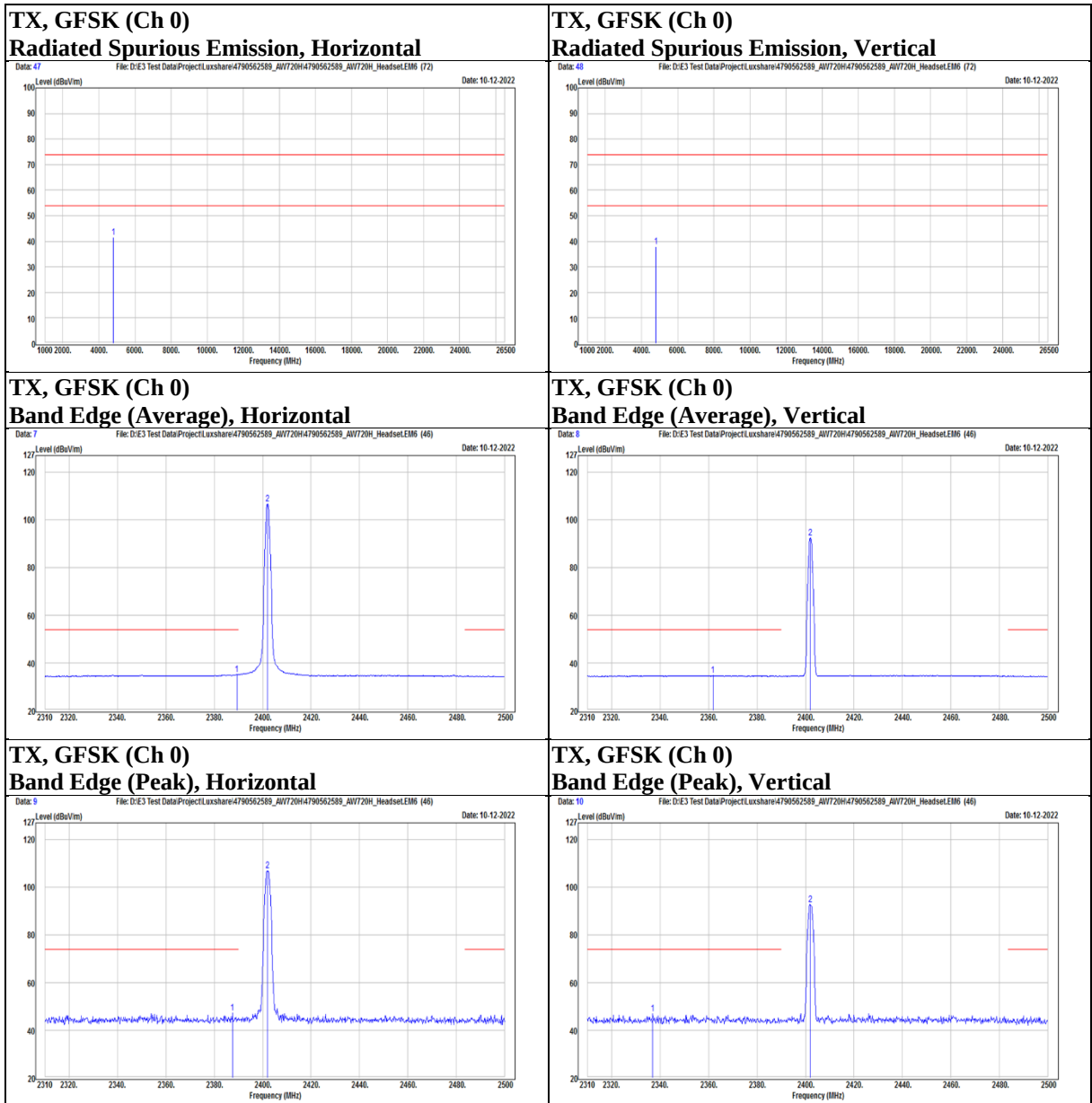
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|      |      |         |    |
|------|------|---------|----|
| Mode | GFSK | Channel | 39 |
|------|------|---------|----|

| Polarization | Notation | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|--------------|----------|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| Horizontal   |          | 2363.01            | 41.18             | 5.88              | 47.06              | 74                | -26.94         | PK     |
|              |          | 2377.07            | 29.26             | 5.84              | 35.1               | 54                | -18.9          | AVG    |
|              | @        | 2441               | 99.48             | 5.94              | 105.42             | N/A               | N/A            | PK     |
|              | @        | 2441               | 99.21             | 5.94              | 105.15             | N/A               | N/A            | AVG    |
|              |          | 2496.77            | 28.97             | 5.57              | 34.54              | 54                | -19.46         | AVG    |
|              |          | 2497.91            | 40.19             | 5.57              | 45.76              | 74                | -28.24         | PK     |
|              | *        | 4882               | 39.47             | 2.41              | 41.88              | 74                | -32.12         | PK     |
|              |          | 2338.12            | 41.45             | 5.89              | 47.34              | 74                | -26.66         | PK     |
| Vertical     |          | 2343.25            | 28.81             | 5.9               | 34.71              | 54                | -19.29         | AVG    |
|              | @        | 2441               | 88.29             | 5.94              | 94.23              | N/A               | N/A            | PK     |
|              | @        | 2441               | 88.13             | 5.94              | 94.07              | N/A               | N/A            | AVG    |
|              |          | 2487.08            | 28.83             | 5.66              | 34.49              | 54                | -19.51         | AVG    |
|              |          | 2488.79            | 41.83             | 5.64              | 47.47              | 74                | -26.53         | PK     |
|              | *        | 4882               | 36.23             | 2.41              | 38.64              | 74                | -35.36         | PK     |
|              |          |                    |                   |                   |                    |                   |                |        |
|              |          |                    |                   |                   |                    |                   |                |        |

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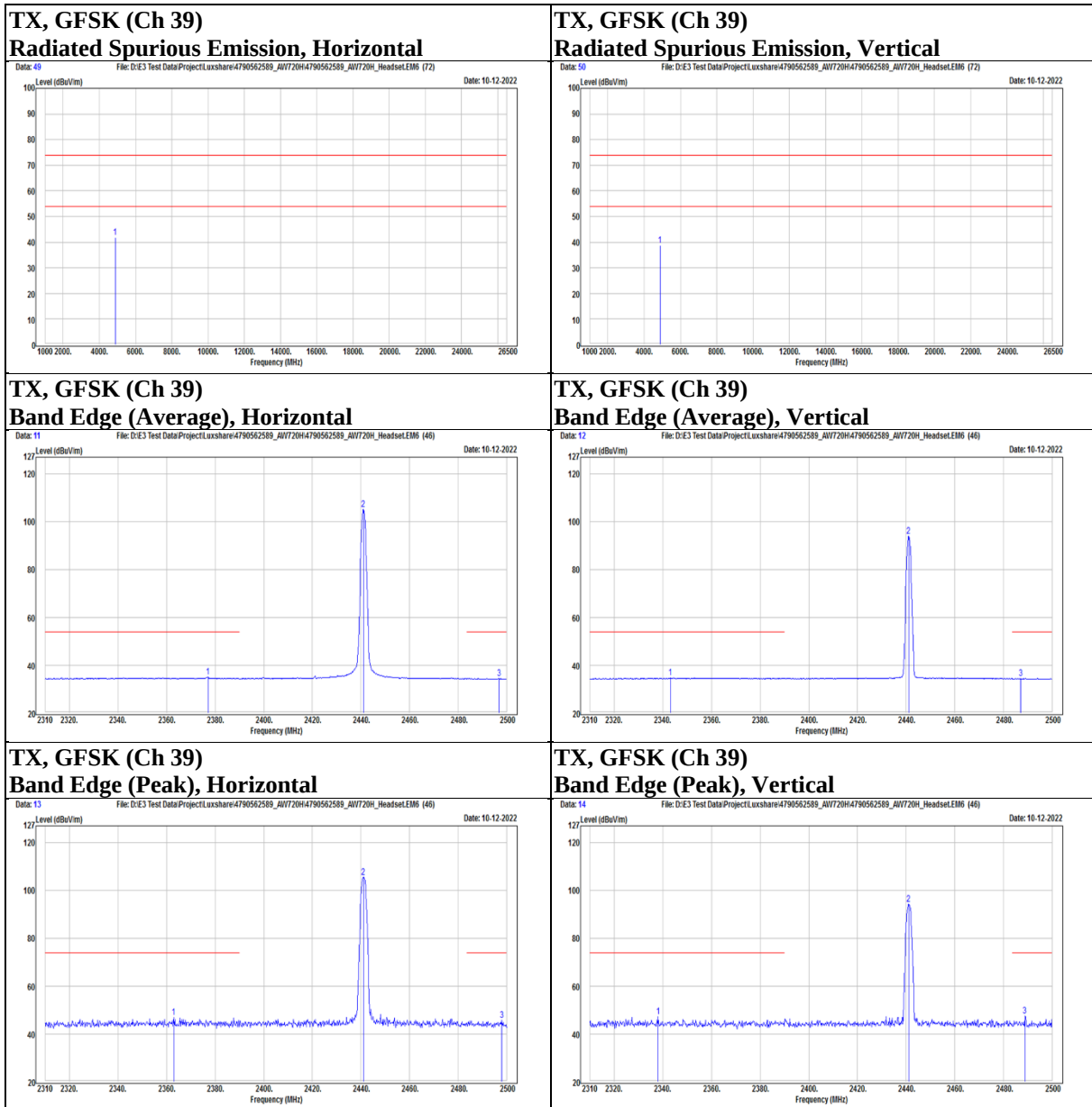
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|      |      |         |    |
|------|------|---------|----|
| Mode | GFSK | Channel | 78 |
|------|------|---------|----|

| Polarization | Notation | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|--------------|----------|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| Horizontal   | @        | 2480               | 96.57             | 5.72              | 102.29             | N/A               | N/A            | PK     |
|              | @        | 2480               | 96.31             | 5.72              | 102.03             | N/A               | N/A            | AVG    |
|              |          | 2483.66            | 30.69             | 5.68              | 36.37              | 54                | -17.63         | AVG    |
|              |          | 2486.89            | 40.31             | 5.66              | 45.97              | 74                | -28.03         | PK     |
|              | *        | 4960               | 38.93             | 2.43              | 41.36              | 74                | -32.64         | PK     |
| Vertical     | @        | 2480               | 89.34             | 5.72              | 95.06              | N/A               | N/A            | PK     |
|              | @        | 2480               | 89.12             | 5.72              | 94.84              | N/A               | N/A            | AVG    |
|              |          | 2483.66            | 29.23             | 5.68              | 34.91              | 54                | -19.09         | AVG    |
|              |          | 2494.49            | 41.1              | 5.6               | 46.7               | 74                | -27.3          | PK     |
|              | *        | 4960               | 39.13             | 2.43              | 41.56              | 74                | -32.44         | PK     |

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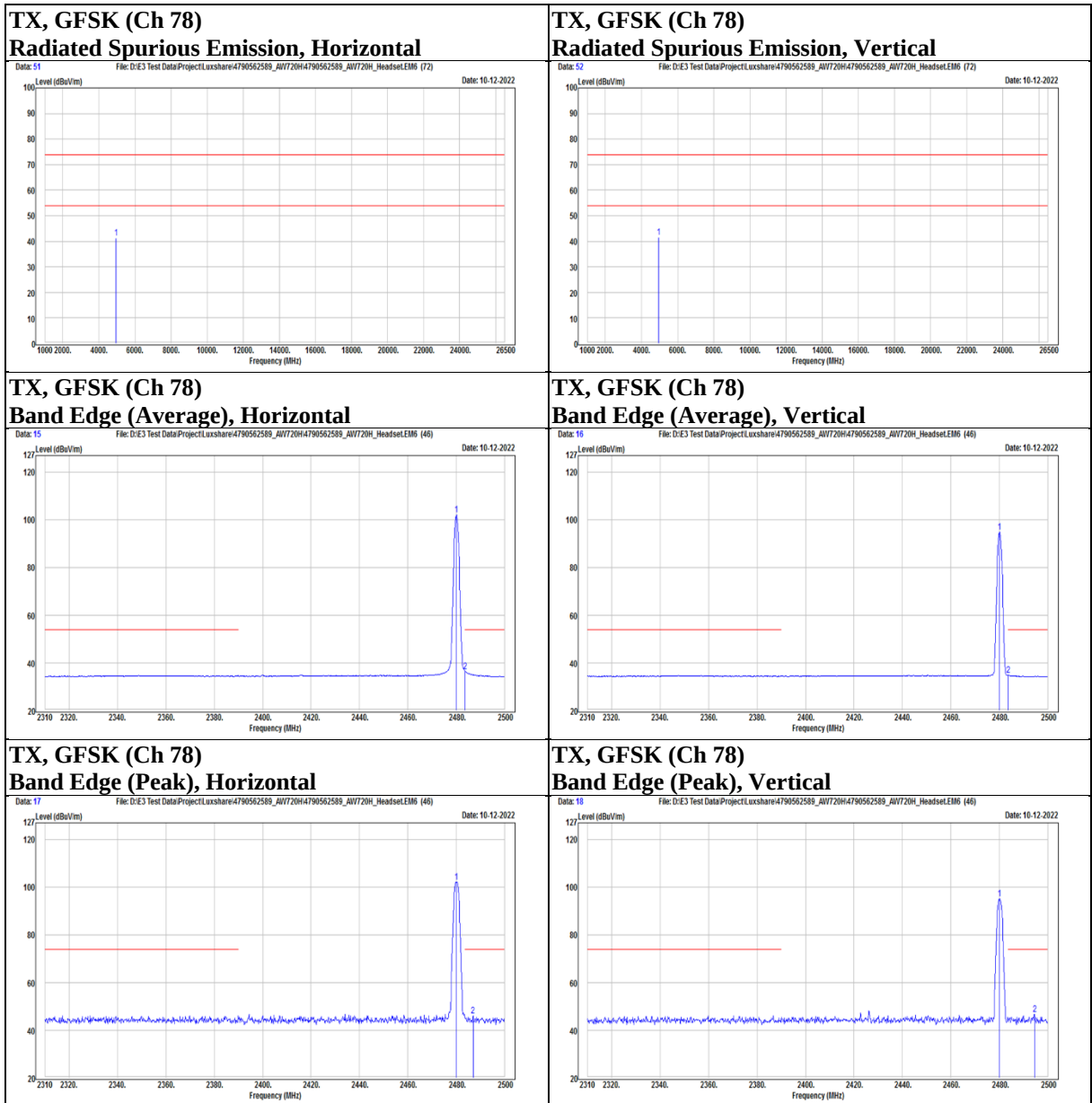
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|      |       |         |   |
|------|-------|---------|---|
| Mode | 8DPSK | Channel | 0 |
|------|-------|---------|---|

| Polarization | Notation | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|--------------|----------|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| Horizontal   |          | 2384.48            | 41.27             | 5.83              | 47.1               | 74                | -26.9          | PK     |
|              |          | 2389.99            | 29.64             | 5.82              | 35.46              | 54                | -18.54         | AVG    |
|              | @        | 2402               | 100.35            | 5.8               | 106.15             | N/A               | N/A            | PK     |
|              | @        | 2402               | 97.81             | 5.8               | 103.61             | N/A               | N/A            | AVG    |
|              | *        | 4804               | 37.41             | 2.33              | 39.74              | 74                | -34.26         | PK     |
| Vertical     |          | 2353.13            | 28.85             | 5.9               | 34.75              | 54                | -19.25         | AVG    |
|              |          | 2370.42            | 40.49             | 5.86              | 46.35              | 74                | -27.65         | PK     |
|              | @        | 2402               | 85.91             | 5.8               | 91.71              | N/A               | N/A            | PK     |
|              | @        | 2402               | 83.49             | 5.8               | 89.29              | N/A               | N/A            | AVG    |
|              | *        | 4804               | 35.97             | 2.33              | 38.3               | 74                | -35.7          | PK     |

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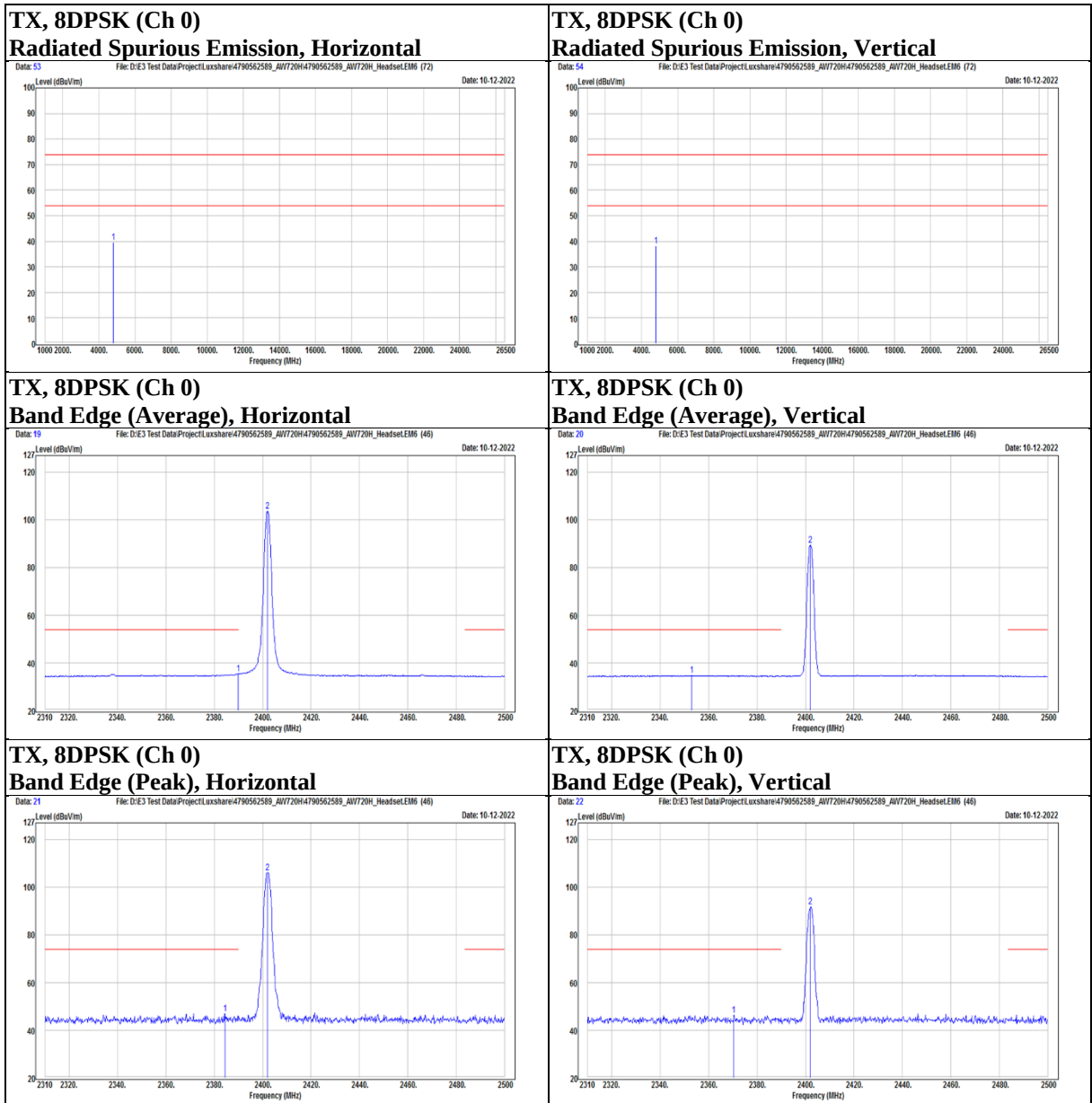
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|      |       |         |    |
|------|-------|---------|----|
| Mode | 8DPSK | Channel | 39 |
|------|-------|---------|----|

| Polarization | Notation | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|--------------|----------|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| Horizontal   |          | 2377.26            | 29.82             | 5.84              | 35.66              | 54                | -18.34         | AVG    |
|              |          | 2385.81            | 40.63             | 5.83              | 46.46              | 74                | -27.54         | PK     |
|              | @        | 2441               | 99.34             | 5.94              | 105.28             | N/A               | N/A            | PK     |
|              | @        | 2441               | 96.34             | 5.94              | 102.28             | N/A               | N/A            | AVG    |
|              |          | 2484.04            | 28.85             | 5.68              | 34.53              | 54                | -19.47         | AVG    |
|              |          | 2488.22            | 41.22             | 5.65              | 46.87              | 74                | -27.13         | PK     |
|              | *        | 4882               | 41.1              | 2.41              | 43.51              | 74                | -30.49         | PK     |
|              |          |                    |                   |                   |                    |                   |                |        |
| Vertical     |          | 2340.02            | 40.69             | 5.9               | 46.59              | 74                | -27.41         | PK     |
|              |          | 2346.67            | 28.88             | 5.9               | 34.78              | 54                | -19.22         | AVG    |
|              | @        | 2441               | 87.88             | 5.94              | 93.82              | N/A               | N/A            | PK     |
|              | @        | 2441               | 85.05             | 5.94              | 90.99              | N/A               | N/A            | AVG    |
|              |          | 2486.7             | 40.37             | 5.66              | 46.03              | 74                | -27.97         | PK     |
|              |          | 2494.3             | 29                | 5.6               | 34.6               | 54                | -19.4          | AVG    |
|              | *        | 4882               | 36.72             | 2.41              | 39.13              | 74                | -34.87         | PK     |
|              |          |                    |                   |                   |                    |                   |                |        |

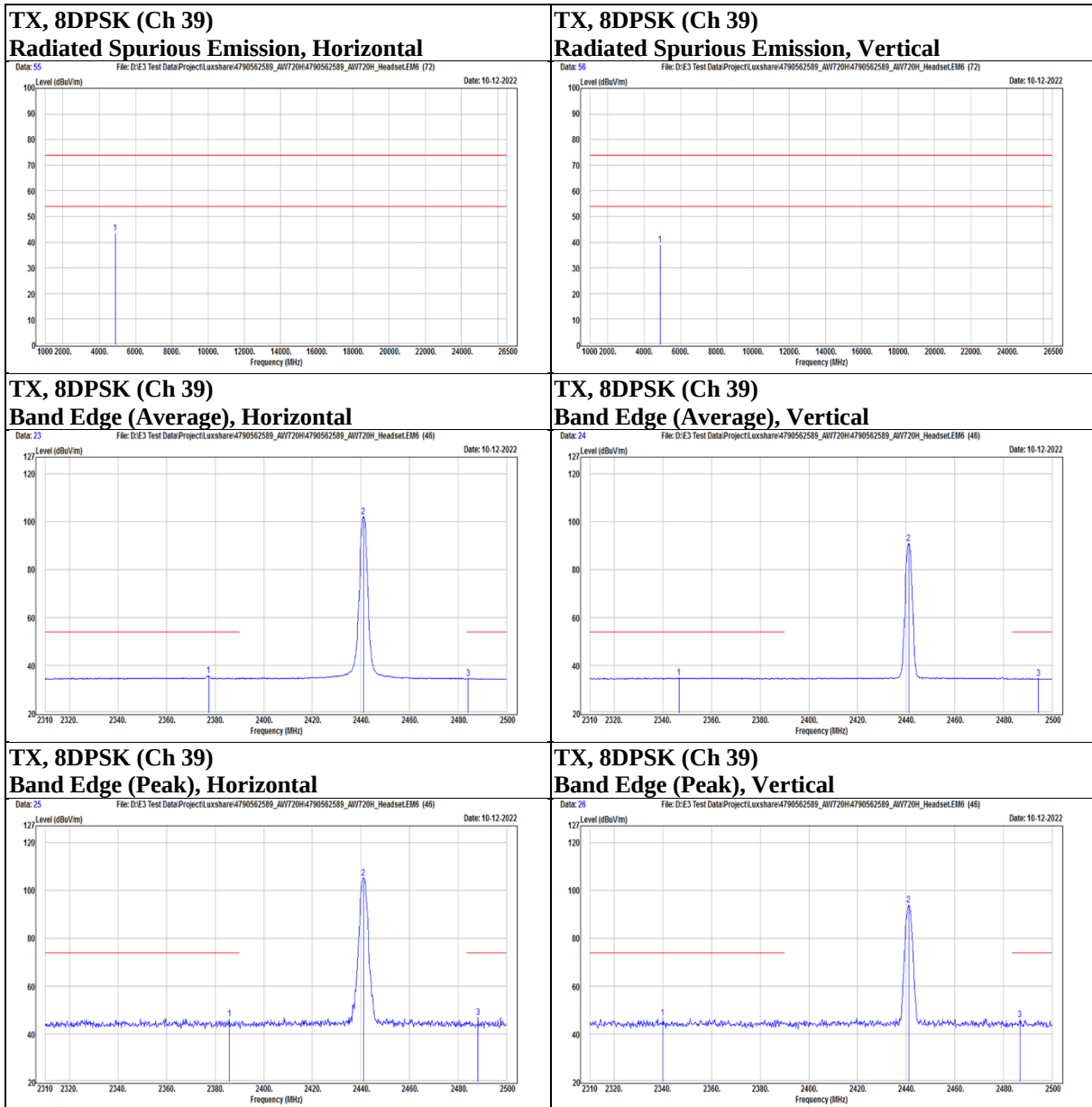
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|      |       |         |    |
|------|-------|---------|----|
| Mode | 8DPSK | Channel | 78 |
|------|-------|---------|----|

| Polarization | Notation | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|--------------|----------|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| Horizontal   | @        | 2480               | 96.19             | 5.72              | 101.91             | N/A               | N/A            | PK     |
|              | @        | 2480               | 93.5              | 5.72              | 99.22              | N/A               | N/A            | AVG    |
|              |          | 2483.66            | 44.69             | 5.68              | 50.37              | 74                | -23.63         | PK     |
|              |          | 2483.66            | 32.43             | 5.68              | 38.11              | 54                | -15.89         | AVG    |
|              | *        | 4960               | 37.08             | 2.43              | 39.51              | 74                | -34.49         | PK     |
| Vertical     | @        | 2480               | 88.99             | 5.72              | 94.71              | N/A               | N/A            | PK     |
|              | @        | 2480               | 86.08             | 5.72              | 91.8               | N/A               | N/A            | AVG    |
|              |          | 2483.66            | 29.63             | 5.68              | 35.31              | 54                | -18.69         | AVG    |
|              |          | 2486.32            | 40.49             | 5.67              | 46.16              | 74                | -27.84         | PK     |
|              | *        | 4960               | 35.97             | 2.43              | 38.4               | 74                | -35.6          | PK     |

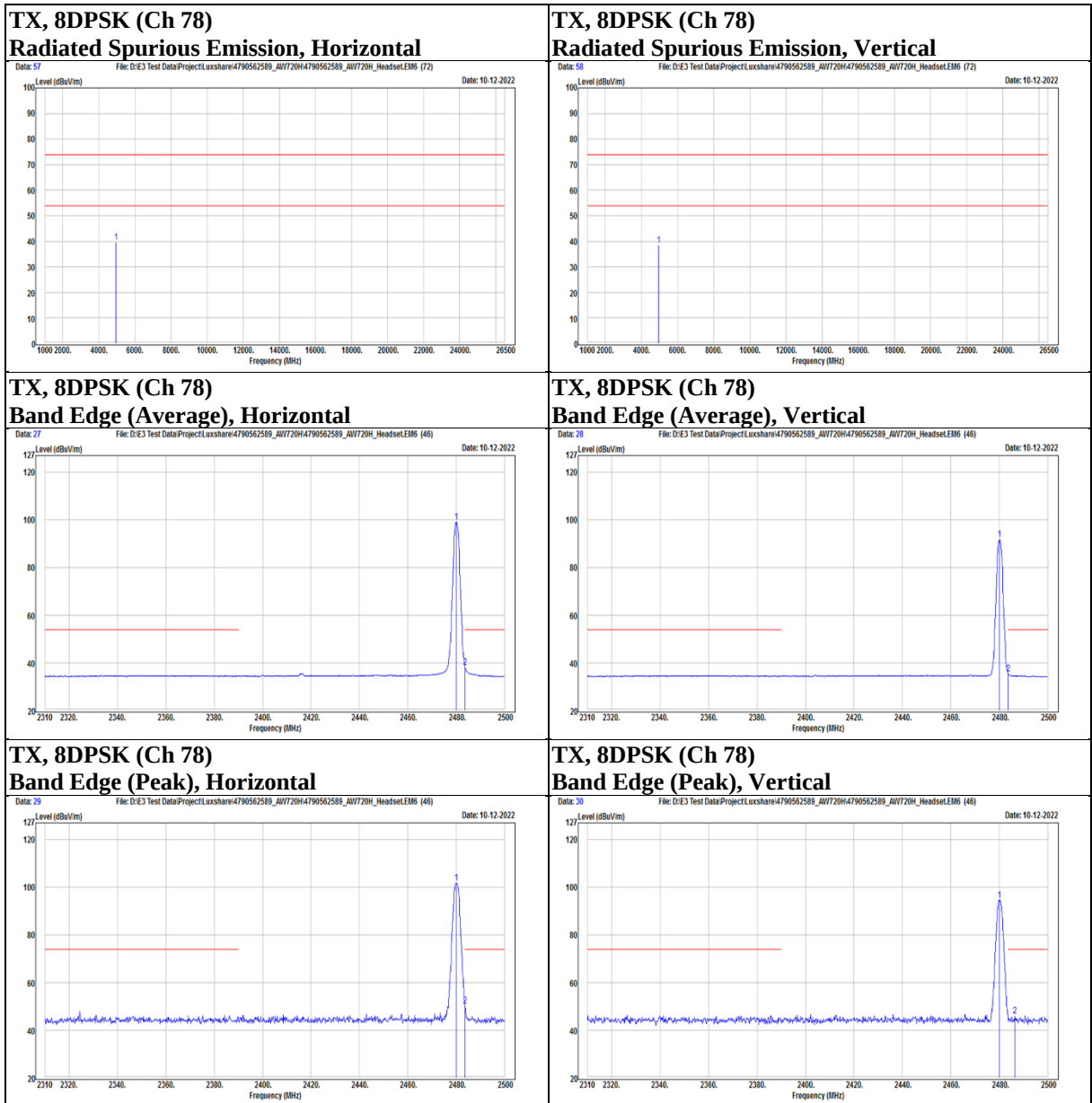
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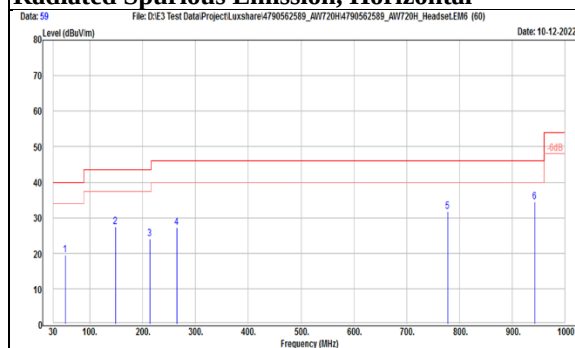
### Below 1 GHz

| Mode | GFSK | Channel | 0 |
|------|------|---------|---|
|------|------|---------|---|

| Polarization | Notation | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|--------------|----------|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| Horizontal   |          | 53.28              | 31.35             | -11.78            | 19.57              | 40                | -20.43         | PK     |
|              |          | 148.34             | 39.38             | -11.98            | 27.4               | 43.5              | -16.1          | PK     |
|              |          | 213.33             | 38.42             | -14.32            | 24.1               | 43.5              | -19.4          | PK     |
|              |          | 264.74             | 39.07             | -11.82            | 27.25              | 46                | -18.75         | PK     |
|              |          | 777.87             | 31.56             | 0.11              | 31.67              | 46                | -14.33         | PK     |
|              |          | 942.77             | 31.43             | 2.95              | 34.38              | 46                | -11.62         | PK     |
| Vertical     |          | 45.52              | 40.8              | -12               | 28.8               | 40                | -11.2          | PK     |
|              |          | 83.35              | 47.7              | -17.32            | 30.38              | 40                | -9.62          | PK     |
|              |          | 148.34             | 36.17             | -11.98            | 24.19              | 43.5              | -19.31         | PK     |
|              |          | 341.37             | 31.93             | -9.62             | 22.31              | 46                | -23.69         | PK     |
|              |          | 510.15             | 40.64             | -5.31             | 35.33              | 46                | -10.67         | PK     |
|              |          | 955.38             | 31.96             | 3.28              | 35.24              | 46                | -10.76         | PK     |

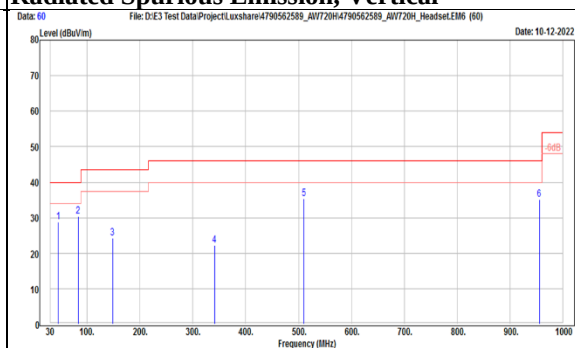
### TX, GFSK (Ch 0)

#### Radiated Spurious Emission, Horizontal



### TX, GFSK (Ch 0)

#### Radiated Spurious Emission, Vertical



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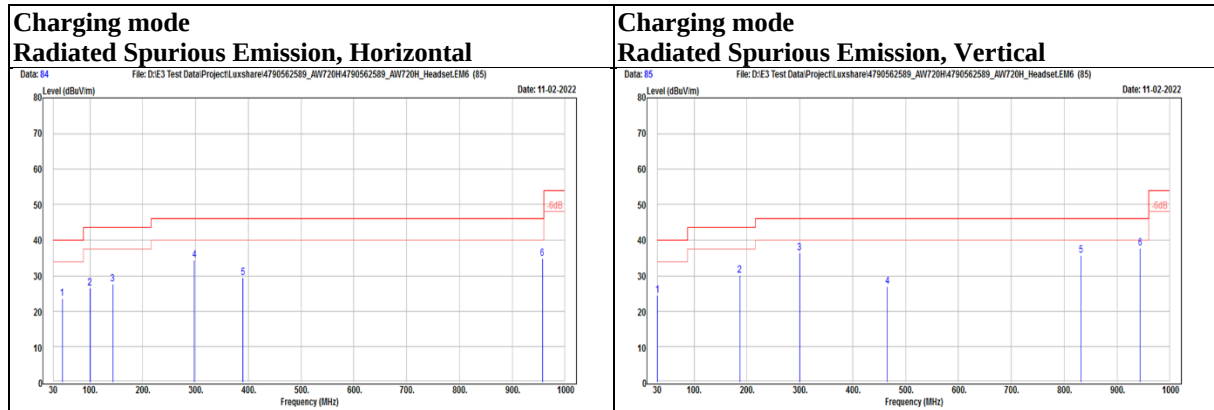
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## Charging mode

### Below 1 GHz

| Mode | Charging mode | Channel | N/A |
|------|---------------|---------|-----|
|------|---------------|---------|-----|

| Polarization | Notation @ | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|--------------|------------|-----------------|----------------|----------------|-----------------|----------------|-------------|--------|
| Horizontal   |            | 47.46           | 35.43          | -11.91         | 23.52           | 40             | -16.48      | PK     |
|              |            | 99.84           | 42.78          | -16.37         | 26.41           | 43.5           | -17.09      | PK     |
|              |            | 143.49          | 39.68          | -12.09         | 27.59           | 43.5           | -15.91      | PK     |
|              |            | 297.72          | 45.28          | -10.86         | 34.42           | 46             | -11.58      | PK     |
|              |            | 389.87          | 37.65          | -8.23          | 29.42           | 46             | -16.58      | PK     |
|              |            | 957.32          | 31.52          | 3.24           | 34.76           | 46             | -11.24      | PK     |
| Vertical     |            | 30.97           | 37.29          | -12.9          | 24.39           | 40             | -15.61      | PK     |
|              |            | 186.17          | 43.51          | -13.45         | 30.06           | 43.5           | -13.44      | PK     |
|              |            | 299.66          | 47.18          | -10.81         | 36.37           | 46             | -9.63       | PK     |
|              |            | 465.53          | 32.92          | -5.96          | 26.96           | 46             | -19.04      | PK     |
|              |            | 832.19          | 34.93          | 0.91           | 35.84           | 46             | -10.16      | PK     |
|              |            | 943.74          | 34.82          | 2.94           | 37.76           | 46             | -8.24       | PK     |



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#### 9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

#### **KDB 414788 D01 OATS and Chamber Correlation Justification**

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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## 9.8. AC Power Line Conducted Emission

### Requirements

| Frequency (MHz) | Conducted limit (dBμV) |         |
|-----------------|------------------------|---------|
|                 | Quasi-peak             | Average |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |
| 0.50 - 5.0      | 56                     | 46      |
| 5.0 - 30        | 60                     | 50      |

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.
2. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
3. Test data of Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB).
4. Test data of Margin(dB) = Result value (dBuV) - Limit value (dBuV).
5. Test data of Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).

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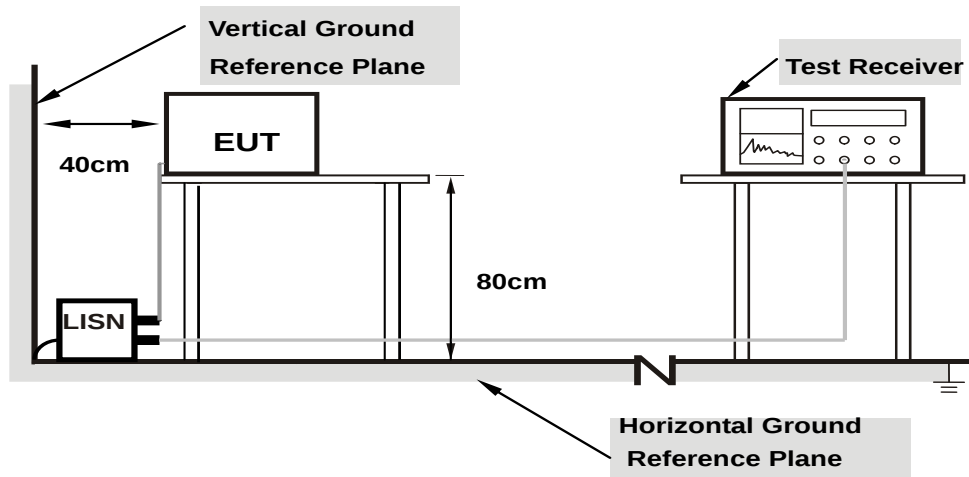
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## Test Setup



**Note: 1.Support units were connected to second LISN.**

For the actual test configuration, please refer to the Setup Configurations.

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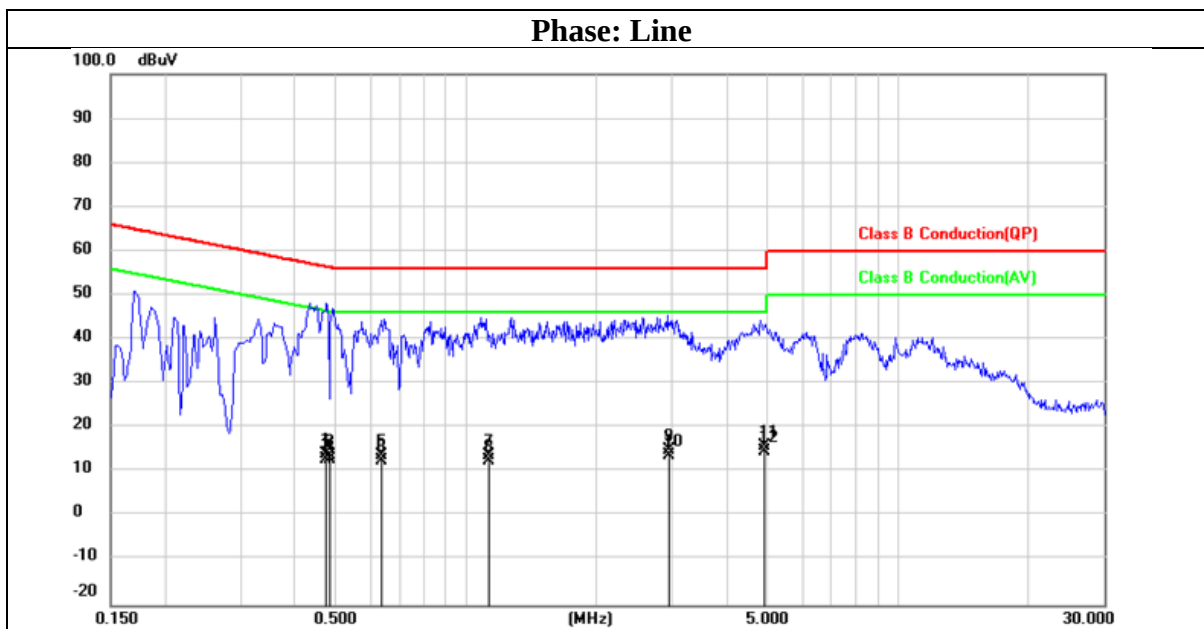
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## Test Data

|      |            |         |   |
|------|------------|---------|---|
| Mode | DH5_TX2402 | Channel | 0 |
|------|------------|---------|---|



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB) | Result<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1   | 0.4748             | -5.51             | 19.54           | 14.03            | 56.43           | -42.40         | QP     |
| 2   | 0.4748             | -6.69             | 19.54           | 12.85            | 46.43           | -33.58         | AVG    |
| 3   | 0.4853             | -5.69             | 19.54           | 13.85            | 56.25           | -42.40         | QP     |
| 4   | 0.4853             | -6.75             | 19.54           | 12.79            | 46.25           | -33.46         | AVG    |
| 5   | 0.6340             | -5.78             | 19.54           | 13.76            | 56.00           | -42.24         | QP     |
| 6   | 0.6340             | -6.85             | 19.54           | 12.69            | 46.00           | -33.31         | AVG    |
| 7   | 1.1199             | -5.68             | 19.56           | 13.88            | 56.00           | -42.12         | QP     |
| 8   | 1.1199             | -6.88             | 19.56           | 12.68            | 46.00           | -33.32         | AVG    |
| 9   | 2.9353             | -4.71             | 19.59           | 14.88            | 56.00           | -41.12         | QP     |
| 10  | 2.9353             | -5.88             | 19.59           | 13.71            | 46.00           | -32.29         | AVG    |
| 11  | 4.8953             | -3.82             | 19.65           | 15.83            | 56.00           | -40.17         | QP     |
| 12  | 4.8953             | -4.88             | 19.65           | 14.77            | 46.00           | -31.23         | AVG    |

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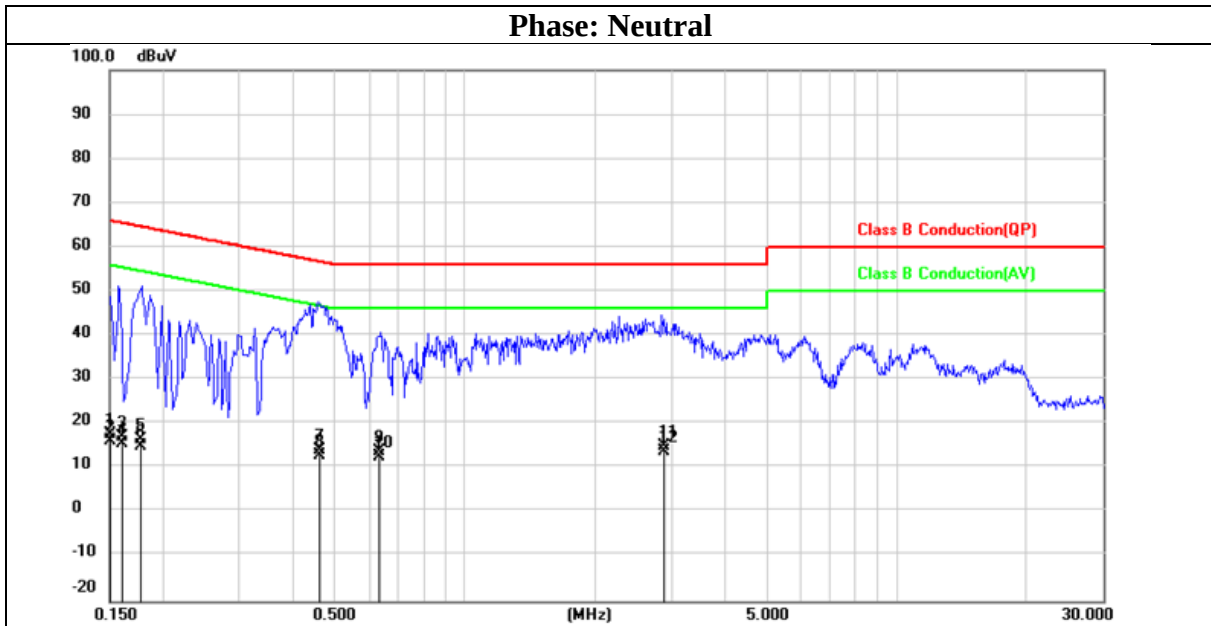
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|      |            |         |   |
|------|------------|---------|---|
| Mode | DH5_TX2402 | Channel | 0 |
|------|------------|---------|---|



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB) | Result<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1   | 0.1512             | -1.87             | 19.54           | 17.67            | 65.93           | -48.26         | QP     |
| 2   | 0.1512             | -3.25             | 19.54           | 16.29            | 55.93           | -39.64         | AVG    |
| 3   | 0.1607             | -2.42             | 19.54           | 17.12            | 65.43           | -48.31         | QP     |
| 4   | 0.1607             | -4.13             | 19.54           | 15.41            | 55.43           | -40.02         | AVG    |
| 5   | 0.1762             | -3.17             | 19.54           | 16.37            | 64.66           | -48.29         | QP     |
| 6   | 0.1762             | -4.62             | 19.54           | 14.92            | 54.66           | -39.74         | AVG    |
| 7   | 0.4591             | -5.49             | 19.55           | 14.06            | 56.71           | -42.65         | QP     |
| 8   | 0.4591             | -6.68             | 19.55           | 12.87            | 46.71           | -33.84         | AVG    |
| 9   | 0.6312             | -5.80             | 19.55           | 13.75            | 56.00           | -42.25         | QP     |
| 10  | 0.6312             | -6.85             | 19.55           | 12.70            | 46.00           | -33.30         | AVG    |
| 11  | 2.8856             | -4.73             | 19.60           | 14.87            | 56.00           | -41.13         | QP     |
| 12  | 2.8856             | -5.93             | 19.60           | 13.67            | 46.00           | -32.33         | AVG    |

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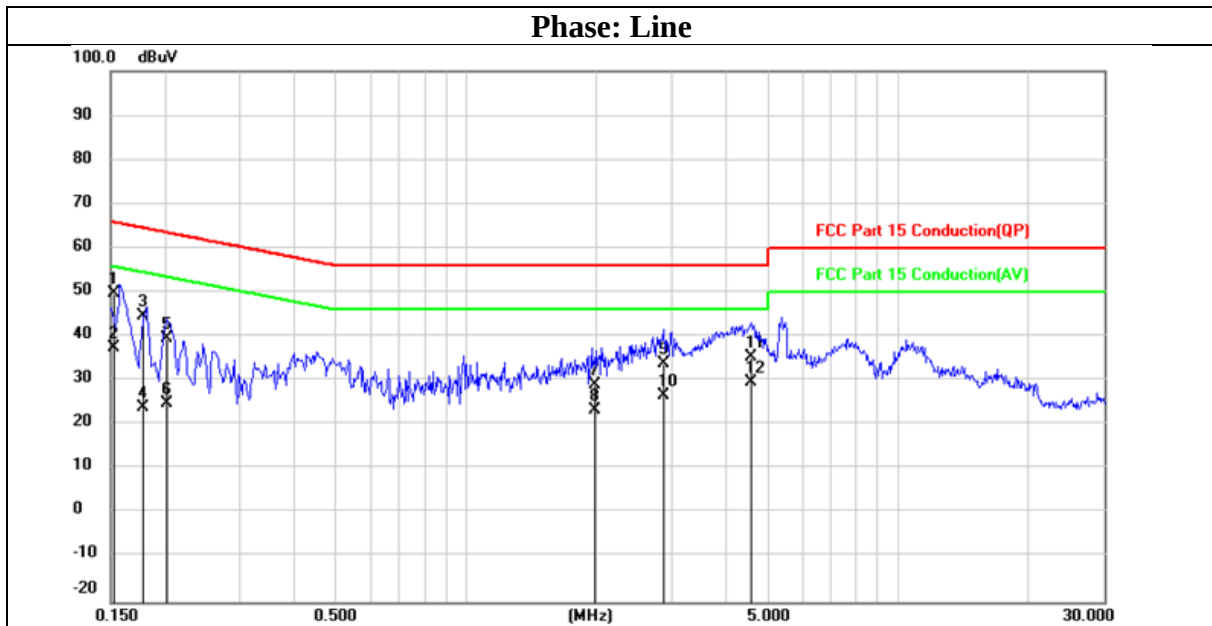
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|      |               |         |     |
|------|---------------|---------|-----|
| Mode | Charging mode | Channel | N/A |
|------|---------------|---------|-----|



| No. | Frequency | Reading | Correct | Result | Limit  | Margin | Remark |
|-----|-----------|---------|---------|--------|--------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB)    | (dBuV) | (dBuV) | (dB)   |        |
| 1   | 0.1537    | 30.24   | 19.53   | 49.77  | 65.80  | -16.03 | QP     |
| 2   | 0.1537    | 17.81   | 19.53   | 37.34  | 55.80  | -18.46 | AVG    |
| 3   | 0.1770    | 25.12   | 19.53   | 44.65  | 64.63  | -19.98 | QP     |
| 4   | 0.1770    | 4.56    | 19.53   | 24.09  | 54.63  | -30.54 | AVG    |
| 5   | 0.2016    | 20.05   | 19.53   | 39.58  | 63.54  | -23.96 | QP     |
| 6   | 0.2016    | 5.29    | 19.53   | 24.82  | 53.54  | -28.72 | AVG    |
| 7   | 1.9977    | 9.56    | 19.57   | 29.13  | 56.00  | -26.87 | QP     |
| 8   | 1.9977    | 3.78    | 19.57   | 23.35  | 46.00  | -22.65 | AVG    |
| 9   | 2.8656    | 14.24   | 19.58   | 33.82  | 56.00  | -22.18 | QP     |
| 10  | 2.8656    | 7.08    | 19.58   | 26.66  | 46.00  | -19.34 | AVG    |
| 11  | 4.5653    | 15.60   | 19.62   | 35.22  | 56.00  | -20.78 | QP     |
| 12  | 4.5653    | 9.96    | 19.62   | 29.58  | 46.00  | -16.42 | AVG    |

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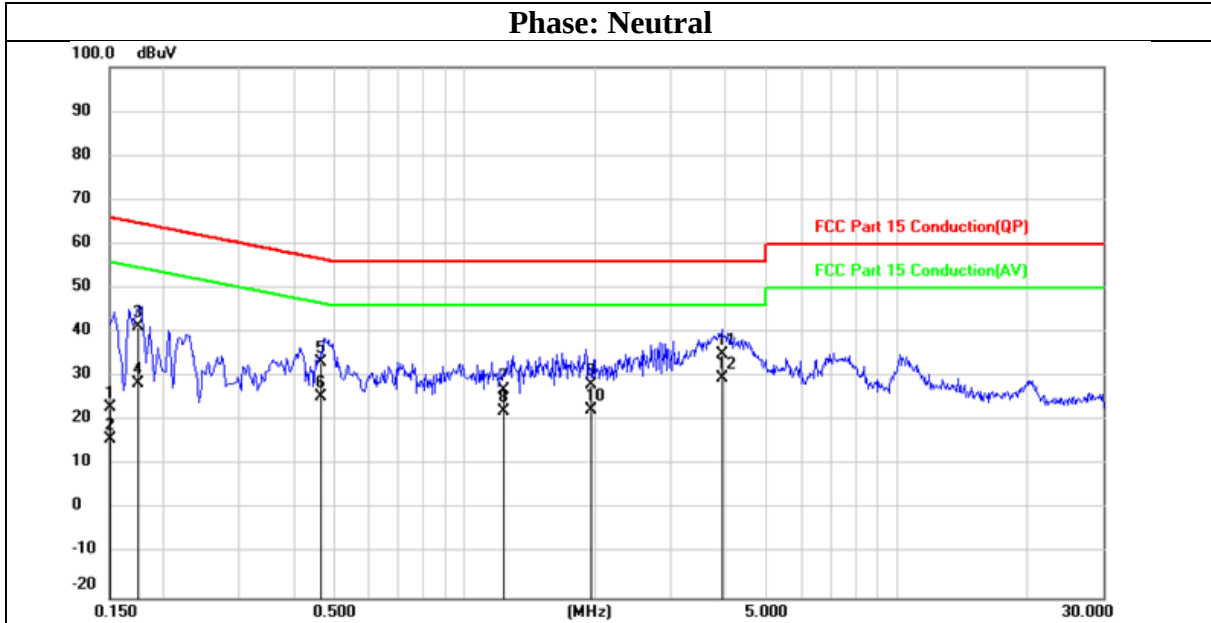
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|      |               |         |     |
|------|---------------|---------|-----|
| Mode | Charging mode | Channel | N/A |
|------|---------------|---------|-----|



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB) | Result<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1   | 0.1494             | 3.59              | 19.53           | 23.12            | 66.03           | -42.91         | QP     |
| 2   | 0.1494             | -3.76             | 19.53           | 15.77            | 56.03           | -40.26         | AVG    |
| 3   | 0.1736             | 21.85             | 19.53           | 41.38            | 64.79           | -23.41         | QP     |
| 4   | 0.1736             | 9.03              | 19.53           | 28.56            | 54.79           | -26.23         | AVG    |
| 5   | 0.4654             | 13.62             | 19.53           | 33.15            | 56.60           | -23.45         | QP     |
| 6   | 0.4654             | 5.89              | 19.53           | 25.42            | 46.60           | -21.18         | AVG    |
| 7   | 1.2354             | 7.50              | 19.54           | 27.04            | 56.00           | -28.96         | QP     |
| 8   | 1.2354             | 2.67              | 19.54           | 22.21            | 46.00           | -23.79         | AVG    |
| 9   | 1.9595             | 8.45              | 19.56           | 28.01            | 56.00           | -27.99         | QP     |
| 10  | 1.9595             | 2.89              | 19.56           | 22.45            | 46.00           | -23.55         | AVG    |
| 11  | 3.9399             | 15.54             | 19.62           | 35.16            | 56.00           | -20.84         | QP     |
| 12  | 3.9399             | 10.07             | 19.62           | 29.69            | 46.00           | -16.31         | AVG    |

**END OF REPORT**

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