**FCC CFR47 PART 15 SUBPART C**

**Bluetooth**

**CERTIFICATION TEST REPORT**

**FOR**

**WCDMA/LTE Watch + Bluetooth/BLE and DTS b/g/n**

**MODEL NUMBER : SM-R775T, SM-R775A**

**FCC ID: A3LSMR775U**

**REPORT NUMBER: 4787852375-E3V2**

**ISSUE DATE: MAR 13, 2017**

*Prepared for*
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ACCREDITED
TL-637

## Revision History

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.

**EUT DESCRIPTION:** WCDMA/LTE Watch + BT/BLE and DTS b/g/n

**MODEL NUMBER:** SM-R775T, SM-R775A

**SERIAL NUMBER:** R3AJ10024TK, R3AJ10024QZ (RADIATED); R3AJ100256E (CONDUCTED)

**DATE TESTED:** FEB 04, 2017 - MAR 07, 2017

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart C | Pass |

UL Korea, 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 UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. 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 UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, 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 IAS, any agency of the Federal Government, or any agency of any government.

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Junwhan Lee
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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. FCC DA 00-705 Filling and measurement guidelines for FHSS systems
4. ANSI C63.10-2013.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 218 Maeyeong-ro |
|---|
| ☒ Chamber 1 |
| ☐ Chamber 2 |

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at http://www.iasonline.org/PDF/TL/TL-637.pdf.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Conducted Disturbance, 0.15 to 30 MHz | 2.32 dB |
| Radiated Disturbance, Below 1GHz | 4.14 dB |
| Radiated Disturbance, Above 1 GHz | 5.97 dB |

Uncertainty figures are valid to a confidence level of 95%.


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# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a WCDMA/LTE Watch + BT/BLE and DTS b/g/n.
This test report addresses the DSS (BT) operational mode.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

| Frequency Range [MHz] | Mode | Power Mode | Output Power [dBm] | Output Power [mW] |
|---|---|---|---|---|
| 2402 - 2480 | Basic GFSK | Average | 13.321 | 21.483 |
| | | Peak | 13.828 | 24.143 |
| | Enhanced Pi/4-DPSK | Average | 8.335 | 6.816 |
| | | Peak | 10.794 | 12.006 |
| | Enhanced 8PSK | Average | 8.401 | 6.920 |
| | | Peak | 11.194 | 13.164 |

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antenna, with a maximum gain of -4.5 dBi

## 5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Note: GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on this mode to showing compliance. For average power data please refer to section 9.5.


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## 5.5. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| Adapter | SAMSUNG | ETA0U60JBE | DG1G826HS/7-E | N/A |
| Data Cable | SAMSUNG | ECB-DU2EBE | N/A | N/A |
| Wireless Charger | SAMSUNG | EP-YO760 | N/A | A3LEPYO760 |

**I/O CABLES**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No** | **Port** | **# of identical ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | DC Power | 1 | Mini-USB | Shielded | 0.8m | N/A |

**TEST SETUP**

The EUT is continuously communicating to the Bluetooth tester during the tests.
Test software in the Hidden menu mode to enable BT communications.


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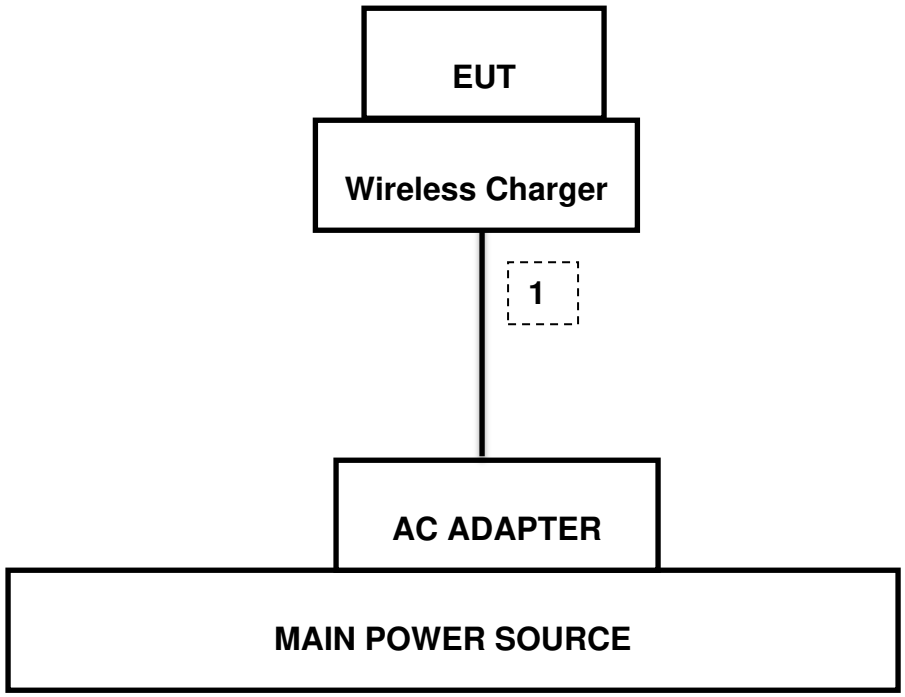
**SETUP DIAGRAM FOR TESTS**





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# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| Test Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **S/N** | **Cal Due** |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK | VULB9163 | 750 | 10-14-18 |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK | VULB9163 | 749 | 04-25-17 |
| Antenna, Horn, 18 GHz | ETS | 3115 | 00167211 | 10-14-18 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168724 | 06-17-17 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168717 | 06-17-17 |
| Antenna, Horn, 40 GHz | ETS | 3116C | 00166155 | 11-30-17 |
| Antenna, Horn, 40 GHz | ETS | 3116C-PA | 00168841 | 12-15-17 |
| Antenna, Loop, 9kHz-30MHz | R&S | HFH2-Z2 | 100418 | 11-25-17 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 341282 | 08-17-17 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 351741 | 08-16-17 |
| Preamplifier | ETS | 3115-PA | 00167475 | 08-17-17 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 1896138 | 08-16-17 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | MY54170614 | 08-17-17 |
| Bluetooth Tester | TESCOM | TC-3000C | 3000C000546 | 08-18-17 |
| Average Power Sensor | Agilent / HP | U2000 | MY54270007 | 08-17-17 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100439 | 08-17-17 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100457 | 08-16-17 |
| EMI Test Receive, 3 GHz | R&S | ESR3 | 101832 | 08-16-17 |
| Low Pass Filter 5GHz | Micro-Tronics | LPS17541 | 009 | 08-17-17 |
| Low Pass Filter 5GHz | Micro-Tronics | LPS17541 | 015 | 08-16-17 |
| High Pass Filter 3GHz | Micro-Tronics | HPM17543 | 010 | 08-17-17 |
| High Pass Filter 3GHz | Micro-Tronics | HPM17543 | 015 | 08-16-17 |
| High Pass Filter 6GHz | Micro-Tronics | HPM17542 | 009 | 08-17-17 |
| High Pass Filter 6GHz | Micro-Tronics | HPM17542 | 016 | 08-16-17 |
| LISN | R&S | ENV-216 | 101836 | 08-16-17 |
| LISN | R&S | ENV-216 | 101837 | 08-16-17 |
| Attenuator | PASTERNACK | PE7087-10 | A009 | 08-16-17 |
| Combiner | WEINSCHEL | 1575 | 2152 | 08-16-17 |
| **UL Software** | | | | |
| **Description** | **Manufacturer** | **Model** | **Version** | |
| Radiated software | UL | UL EMC | Ver 9.5 | |
| AC Line Conducted software | UL | UL EMC | Ver 9.5 | |


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# 7. REFERENCE MEASUREMENT RESULTS

## 7.1. 20 dB AND 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

**RESULTS**

### 7.1.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [KHz] |
|---|---|---|---|
| Low | 2402 | 1.046 | 895.750 |
| Mid | 2441 | 1.046 | 896.050 |
| High | 2480 | 1.046 | 900.440 |
| Worst | | 1.046 | 900.440 |

### 7.1.2. ENHANCED DATA RATE Pi/4-DQPSK MODULATION

| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [MHz] |
|---|---|---|---|
| Low | 2402 | 1.290 | 1.167 |
| Mid | 2441 | 1.350 | 1.166 |
| High | 2480 | 1.350 | 1.166 |
| Worst | | 1.350 | 1.167 |

### 7.1.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [MHz] |
|---|---|---|---|
| Low | 2402 | 1.307 | 1.195 |
| Mid | 2441 | 1.308 | 1.166 |
| High | 2480 | 1.299 | 1.165 |
| Worst | | 1.308 | 1.195 |


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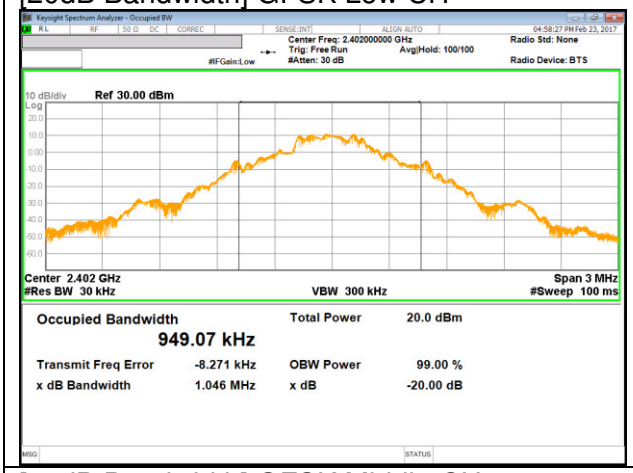
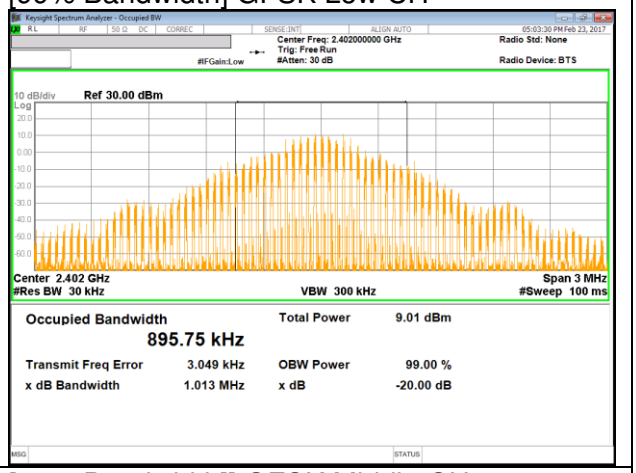
### 7.1.4. 20 dB AND 99% BANDWIDTH PLOTS

**GFSK BANDWIDTH**

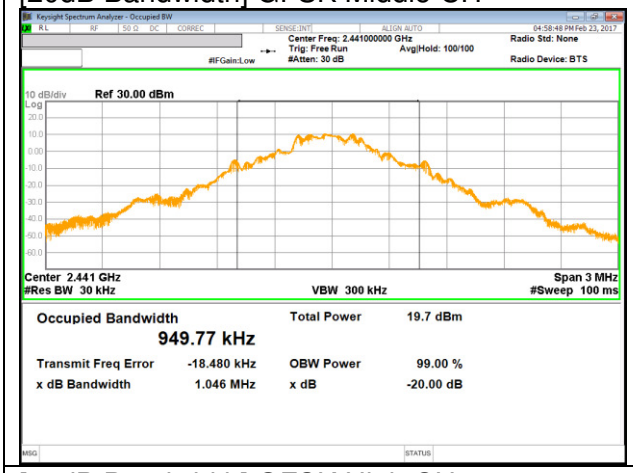
[20dB Bandwidth] GFSK Low CH



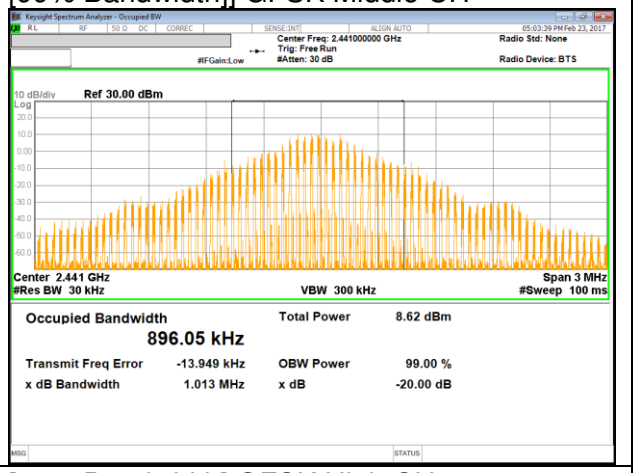

[99% Bandwidth] GFSK Low CH



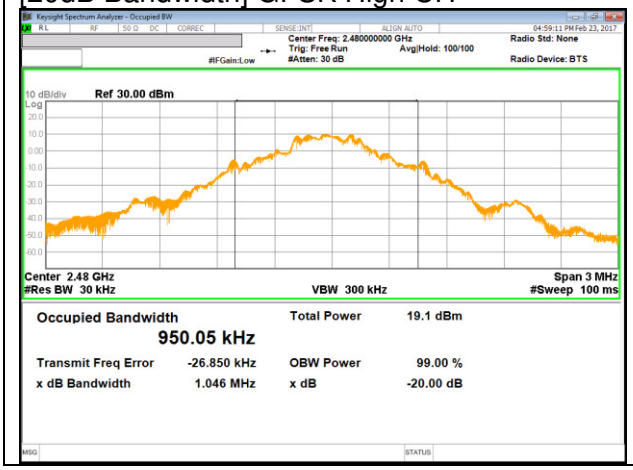

[20dB Bandwidth] GFSK Middle CH



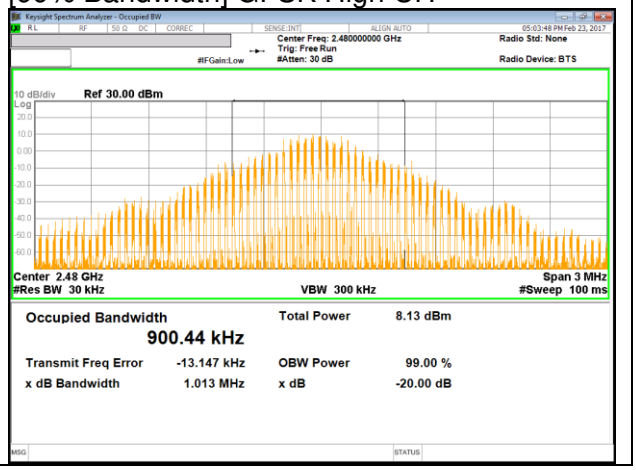

[99% Bandwidth]] GFSK Middle CH




[20dB Bandwidth] GFSK High CH




[99% Bandwidth] GFSK High CH





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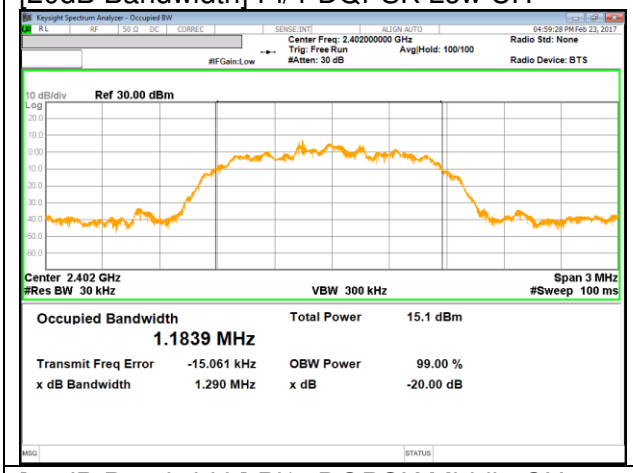
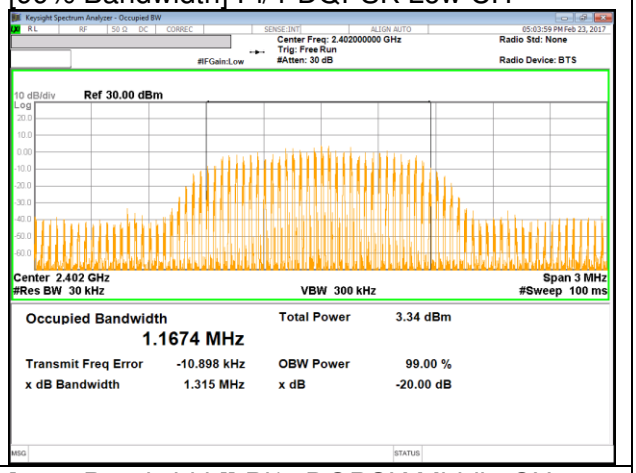
## Pi/4-DQPSK BANDWIDTH

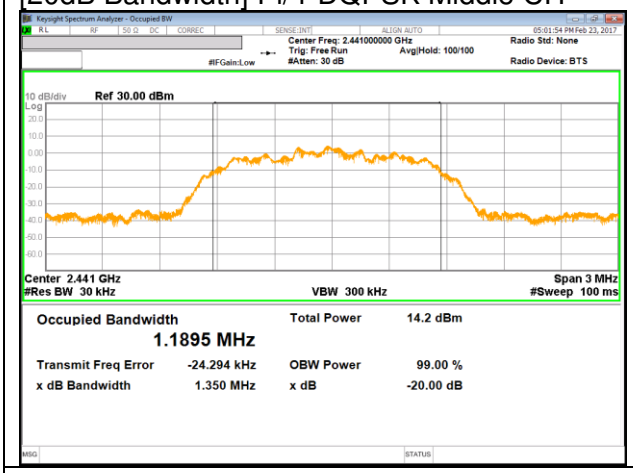
[20dB Bandwidth] Pi/4-DQPSK Low CH



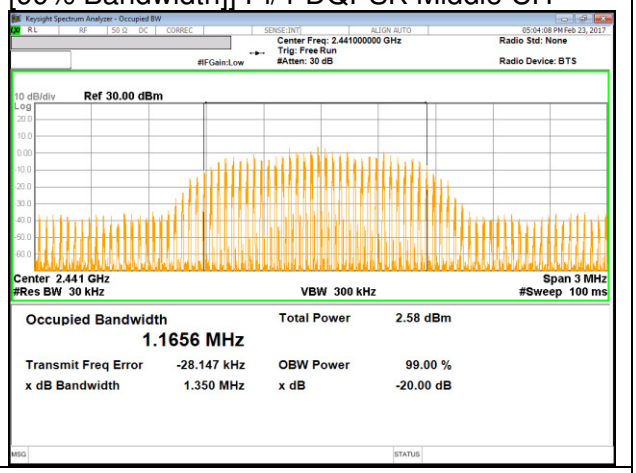

[99% Bandwidth] Pi/4-DQPSK Low CH



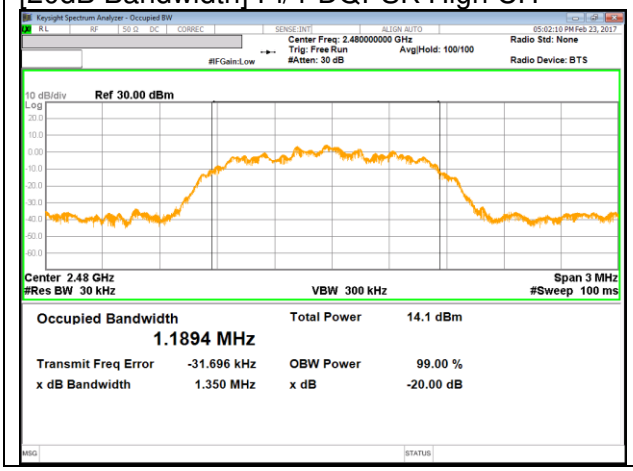

[20dB Bandwidth] Pi/4-DQPSK Middle CH



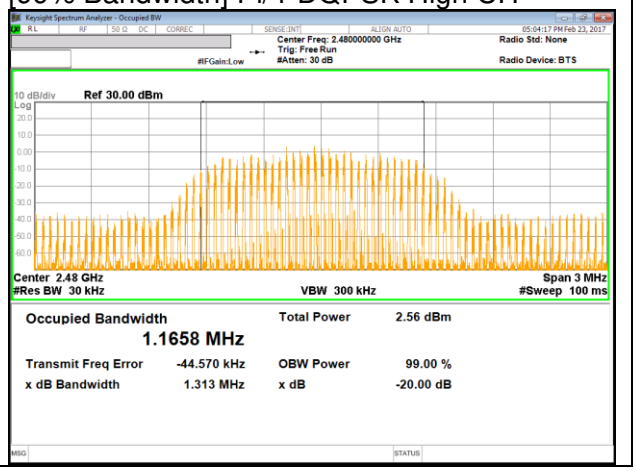

[99% Bandwidth]] Pi/4-DQPSK Middle CH




[20dB Bandwidth] Pi/4-DQPSK High CH




[99% Bandwidth] Pi/4-DQPSK High CH





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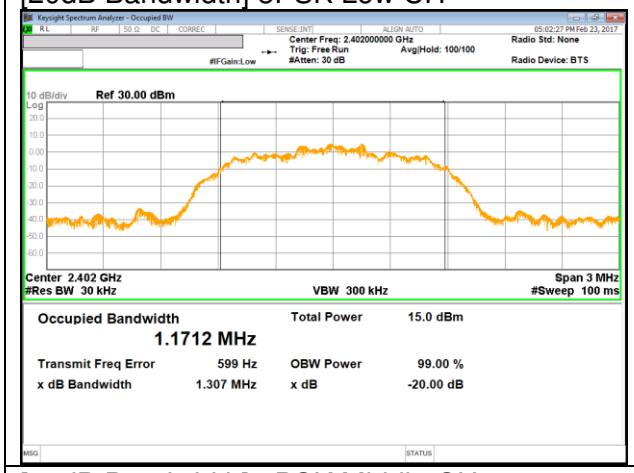
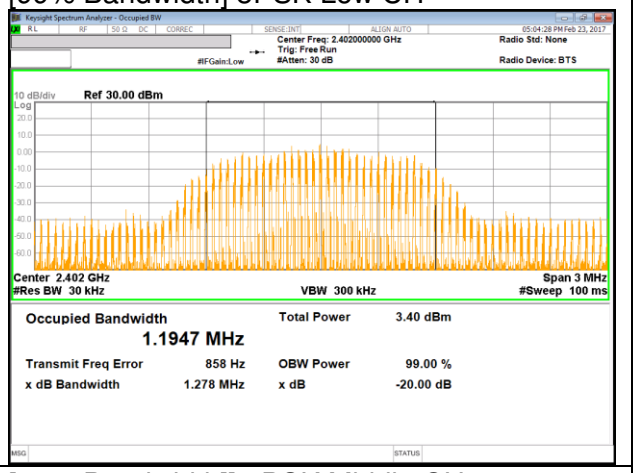
## 8PSK BANDWIDTH

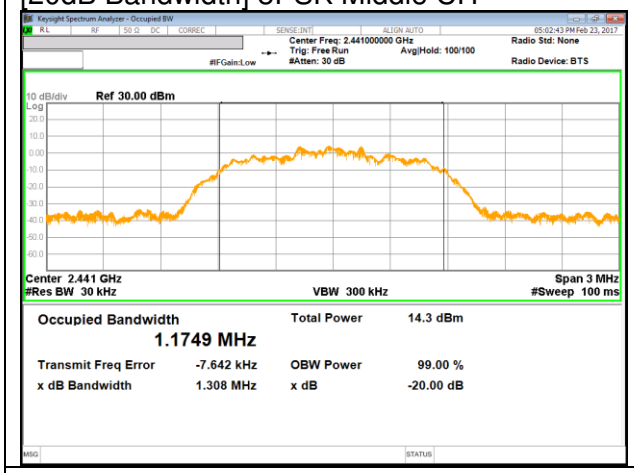
[20dB Bandwidth] 8PSK Low CH



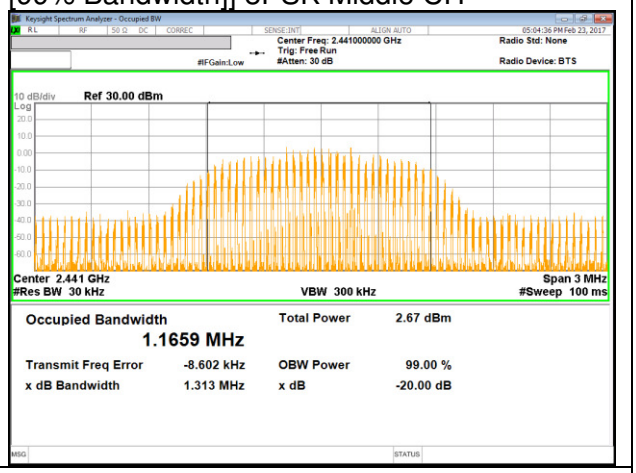

[99% Bandwidth] 8PSK Low CH



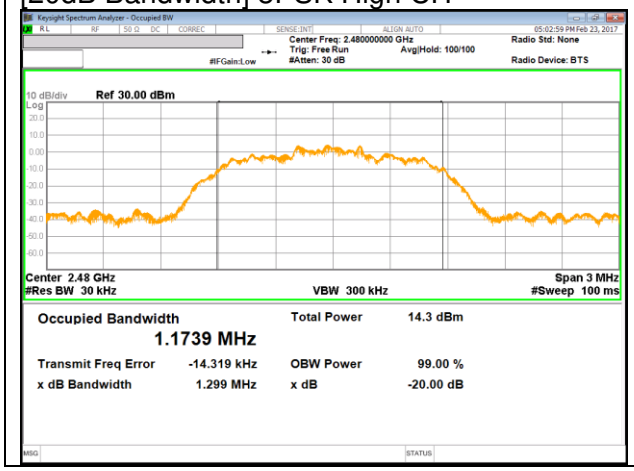

[20dB Bandwidth] 8PSK Middle CH



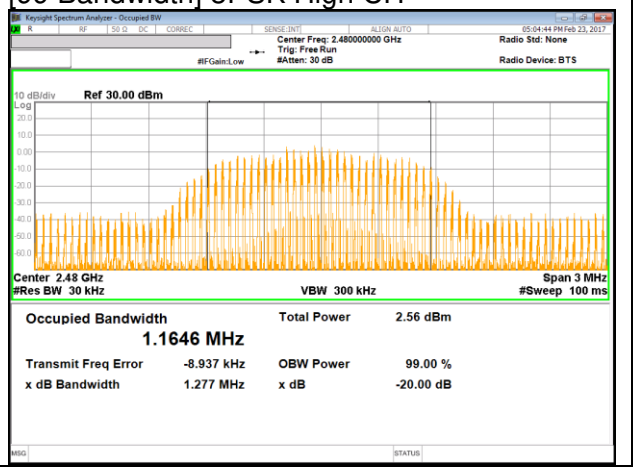

[99% Bandwidth]] 8PSK Middle CH




[20dB Bandwidth] 8PSK High CH




[99 Bandwidth] 8PSK High CH





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# 8. SUMMARY TABLE

| FCC Part Section | Test Description | Test Limit | Test Condition | Test Result | Worst Case |
|---|---|---|---|---|---|
| 2.1051, 15.247 (d) | Band Edge / Conducted Spurious Emission | -20dBc | | Pass | -42.901 dBm |
| 15.247 (b)(1) | TX conducted output power | <21dBm | | Pass | 13.828 dBm (Peak) |
| 15.247 (a)(1) | Hopping frequency separation | > 25KHz | | Pass | 1 MHz |
| 15.247 (a)(1)(iii) | Number of Hopping channels | More than 15 non-overlapping channels | | Pass | 79 |
| 15.247 (a)(1)(iii) | Avg Time of Occupancy | < 0.4sec | | Pass | 0.3744 sec |
| 15.207 (a) | AC Power Line conducted emissions | Section 10 | Power Line conducted | Pass | 45.61 dBuV (Pk) |
| 15.205, 15.209 | Radiated Spurious Emission | < 54dBuV/m | Radiated | Pass | 40.05 dBuV/m (Av) |


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# 9. ANTENNA PORT TEST RESULTS

## 9.1. HOPPING FREQUENCY SEPARATION

**LIMIT**

FCC §15.247 (a) (1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

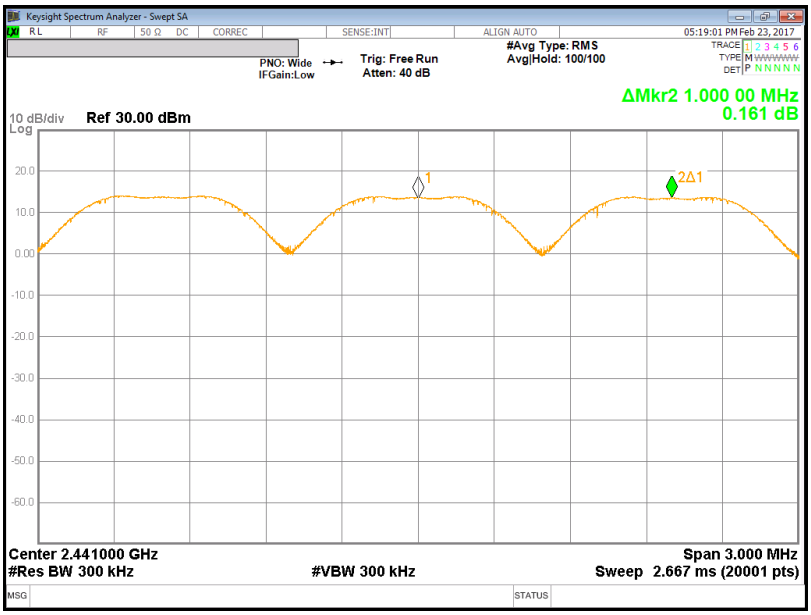
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

**RESULTS**

**HOPPING FREQUENCY SEPARATION PLOT**





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## 9.2. NUMBER OF HOPPING CHANNELS

**LIMIT**

FCC §15.247 (a) (1) (iii)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

**TEST PROCEDURE**

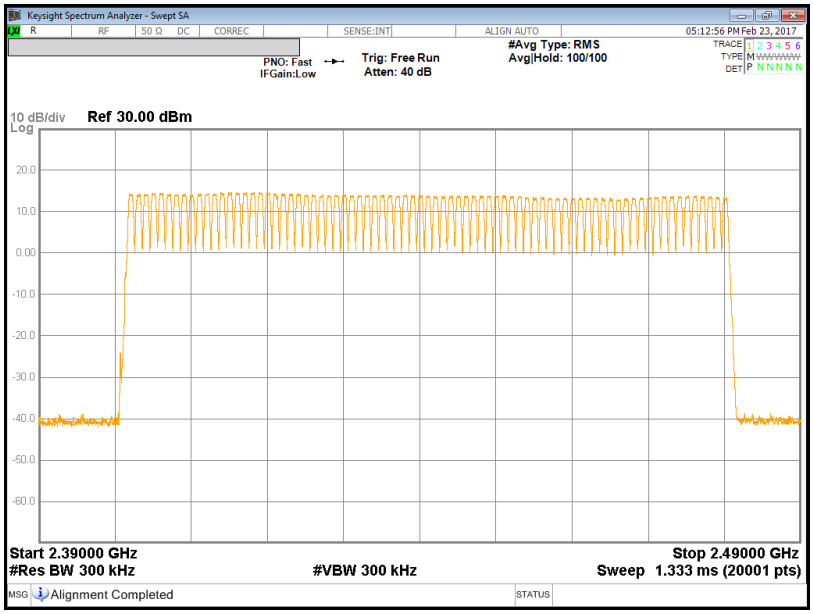
DA 00-705: The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

**RESULTS**

Normal Mode: 79 Channels observed.

**NUMBER OF HOPPING CHANNELS PLOTS**

### NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)





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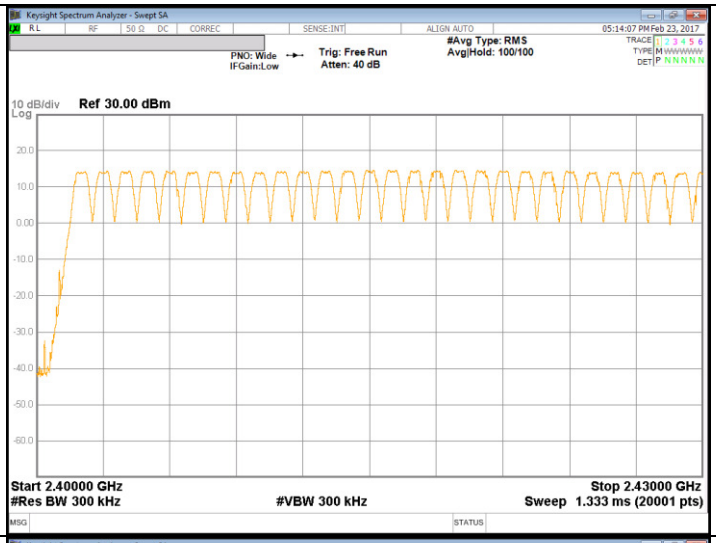
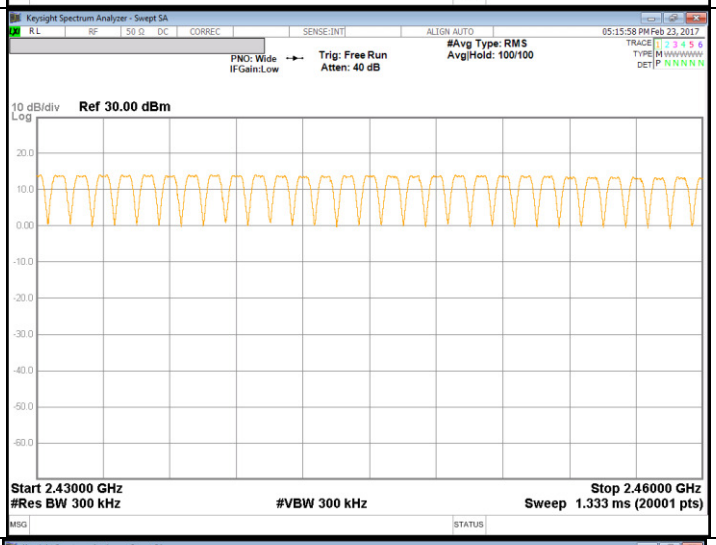
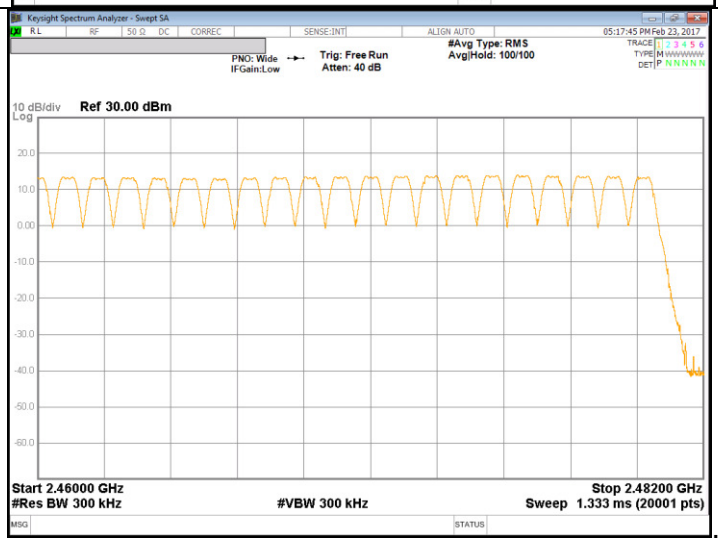
| | | | |
|---|---|---|---|
| 1st SEGMENT<br><br>2400 to 2430 MHz | |  | |
| 2nd SEGMENT<br><br>2430 to 2460 MHz | |  | |
| 3rd SEGMENT<br><br>2460 to 2482 MHz | |  | |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## 9.3. AVERAGE TIME OF OCCUPANCY

**LIMIT**

FCC §15.247 (a) (1) (iii)

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**

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to 10 * (# of pulses in 0.8 s) * pulse width.

**RESULTS**

| DH Packet | Pulse Width [msec] | Number of Pulses in 3.16 seconds | Average Time of Occupancy [sec] | Limit [sec] | Margin [sec] |
|---|---|---|---|---|---|
| GFSK Normal | | | | | |
| DH1 | 0.382 | 32 | 0.122144 | 0.4 | -0.2779 |
| DH3 | 1.636 | 17 | 0.278120 | 0.4 | -0.1219 |
| DH5 | 2.88 | 13 | 0.374400 | 0.4 | -0.0256 |
| | | | | | |
| DH Packet | Pulse Width [msec] | Number of Pulses in 0.8 seconds | Average Time of Occupancy [sec] | Limit [sec] | Margin [sec] |
| GFSK AFH | | | | | |
| DH1 | 0.382 | 8 | 0.030536 | 0.4 | -0.36946 |
| DH3 | 1.636 | 4.25 | 0.069530 | 0.4 | -0.33047 |
| DH5 | 2.88 | 3.25 | 0.093600 | 0.4 | -0.3064 |


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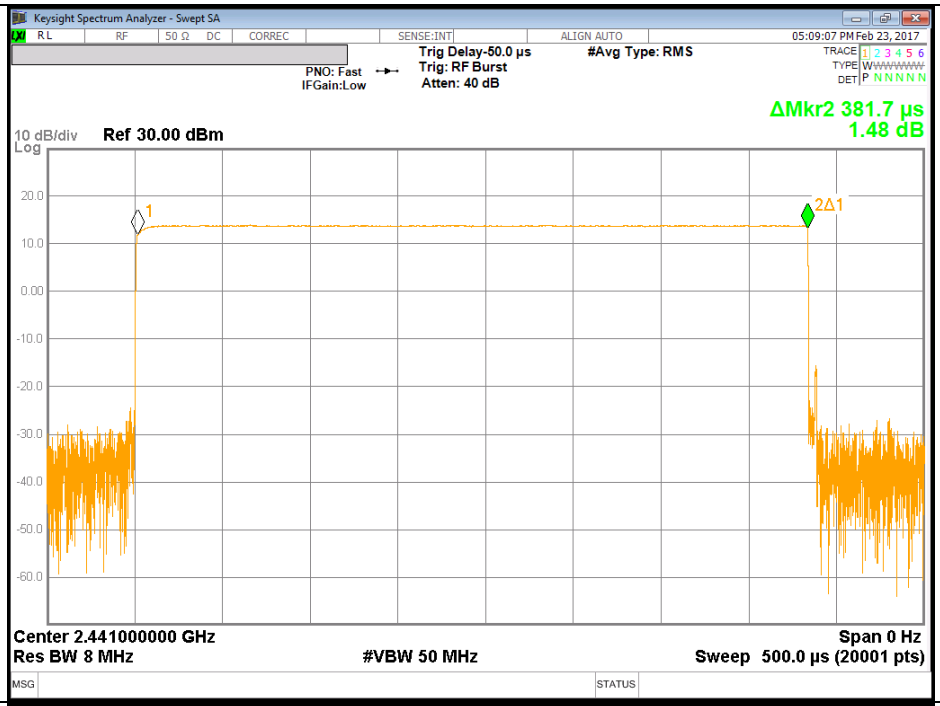
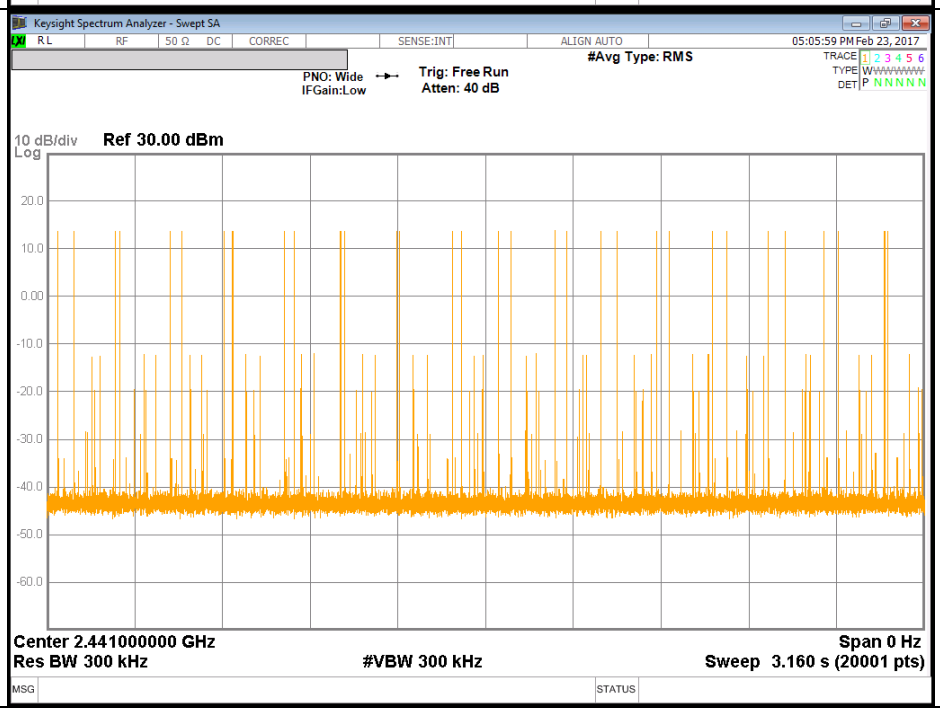
## DH1

| | |
|---|---|
| DH1<br><br>Pulse Width |  |
| DH1<br><br>NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD |  |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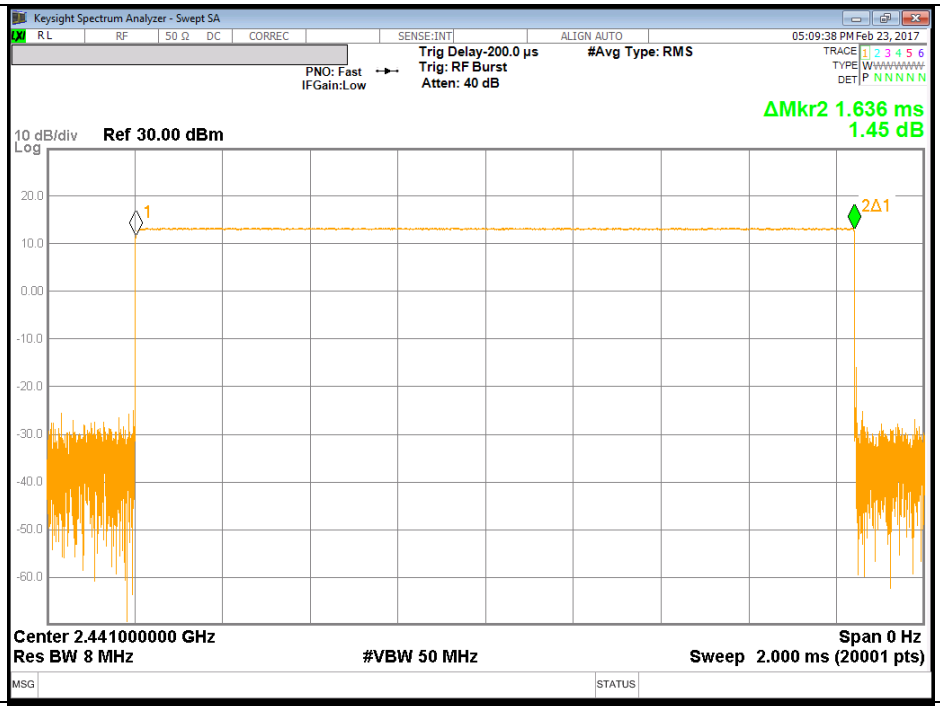
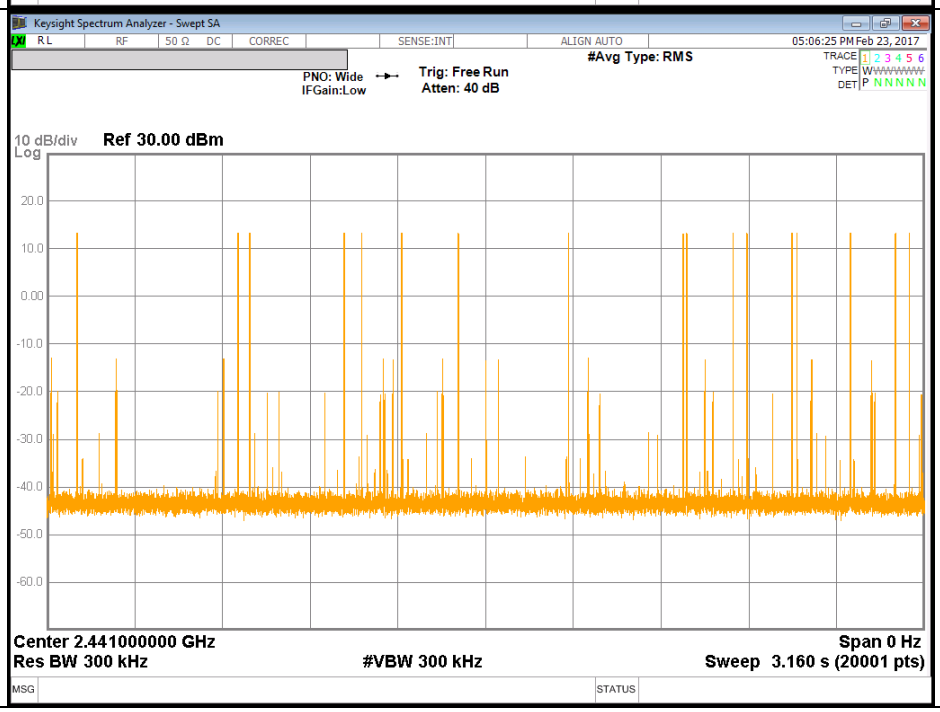
## DH3

| | |
|---|---|
| DH3<br><br>Pulse Width |  |
| DH3<br><br>NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD |  |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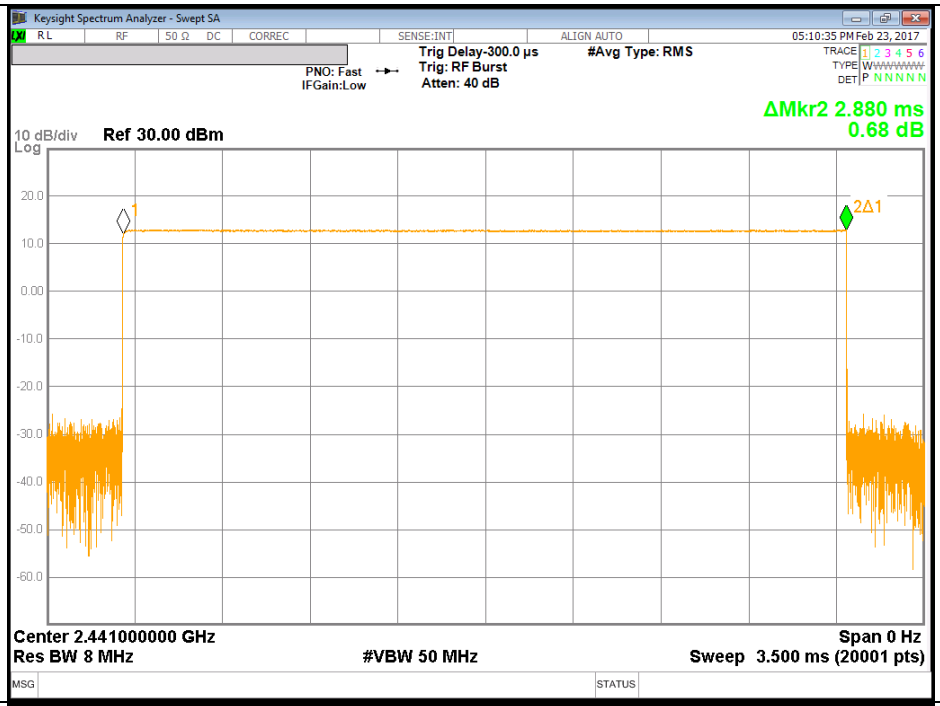
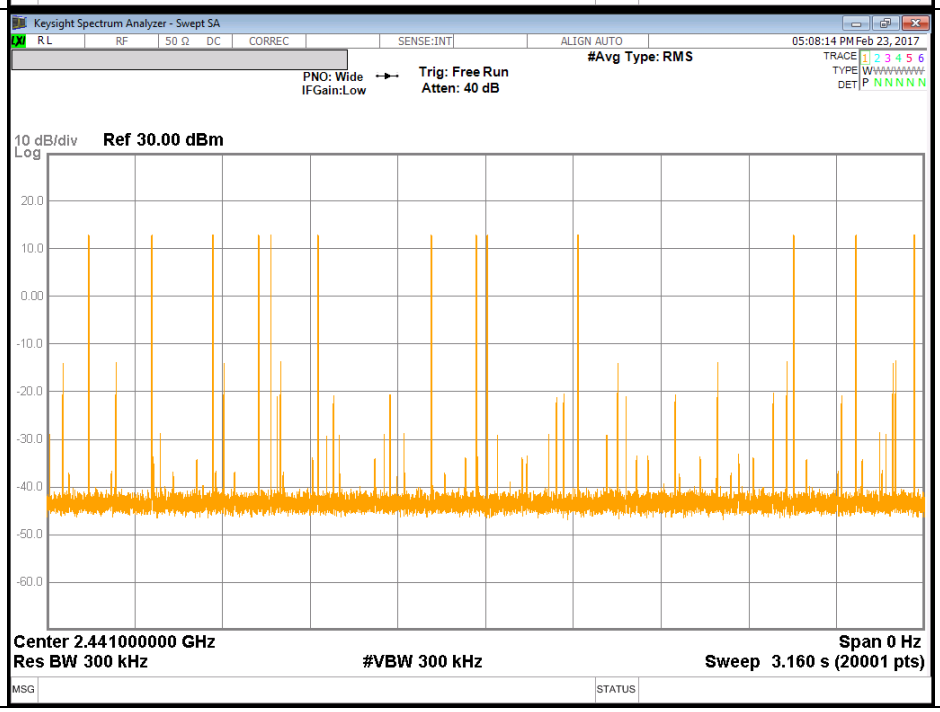
## DH5

| | |
|---|---|
| DH5<br><br>Pulse Width |  |
| DH5<br><br>NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD |  |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## 9.4. OUTPUT POWER

**LIMIT**

§15.247 (b) (1)

The maximum antenna gain is less than 6 dBi, therefore the limit is 21 dBm.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

**RESULTS**

### 9.4.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|
| Low | 2402 | 13.828 | 21 | -7.172 |
| Middle | 2441 | 13.378 | 21 | -7.622 |
| High | 2480 | 13.032 | 21 | -7.968 |
| Worst | | 13.828 | 21 | -7.172 |

### 9.4.2. ENHANCED DATA RATE Pi/4-DPSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|
| Low | 2402 | 10.794 | 21 | -10.206 |
| Middle | 2441 | 9.889 | 21 | -11.111 |
| High | 2480 | 9.753 | 21 | -11.247 |
| Worst | | 10.794 | 21 | -10.206 |

### 9.4.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|
| Low | 2402 | 11.194 | 21 | -9.806 |
| Middle | 2441 | 10.295 | 21 | -10.705 |
| High | 2480 | 10.282 | 21 | -10.718 |
| Worst | | 11.194 | 21 | -9.806 |


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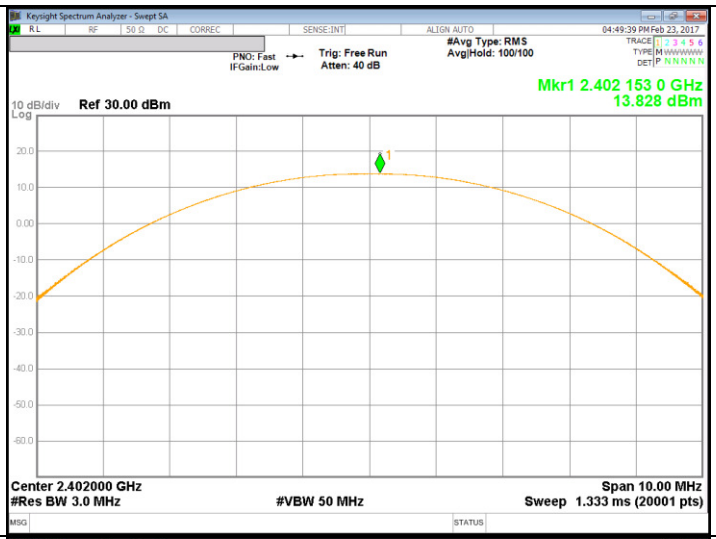
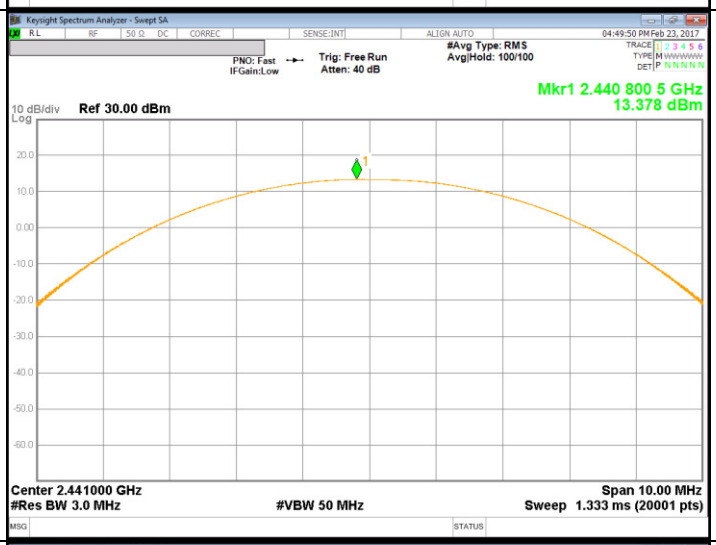
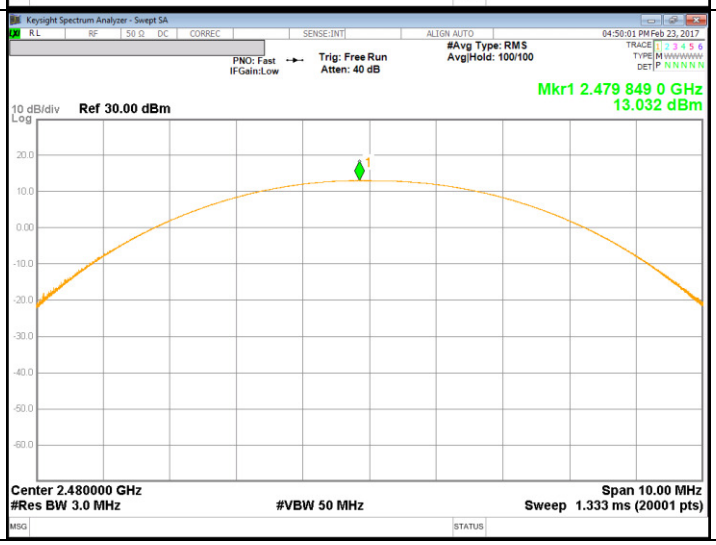
## 9.4.4. OUTPUT POWER PLOTS

**GFSK OUTPUT POWER**

| | | | |
|---|---|---|---|
| GFSK<br><br>Low CH | |  | |
| GFSK<br><br>Middle CH | |  | |
| GFSK<br><br>High CH | |  | |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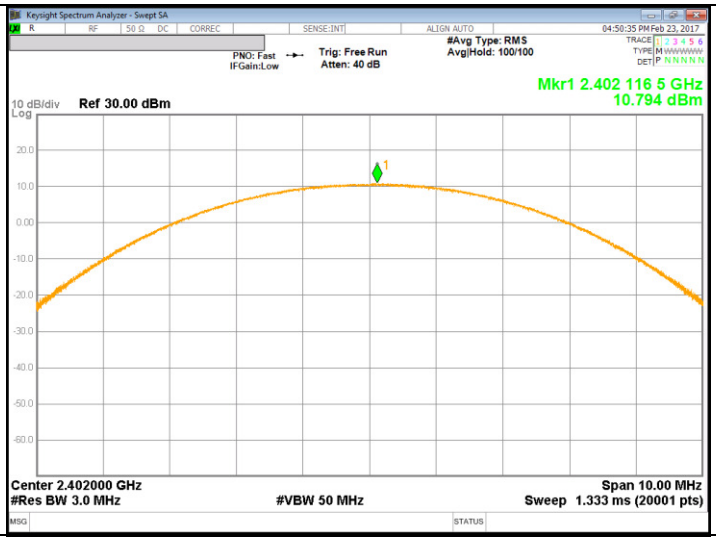
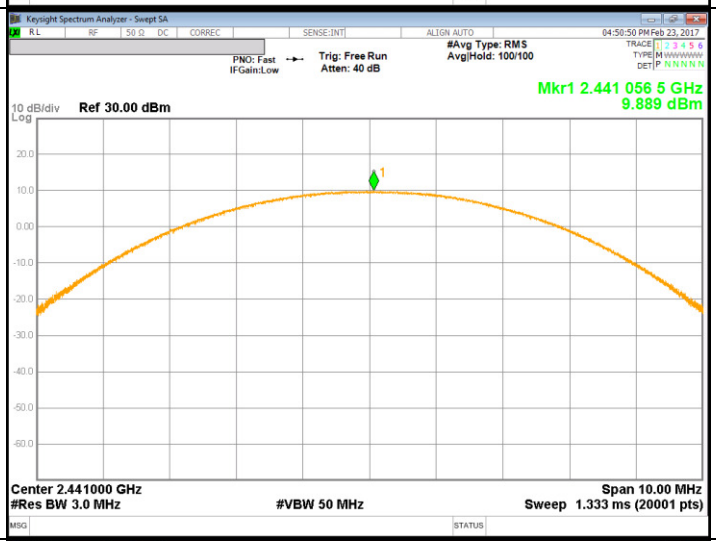
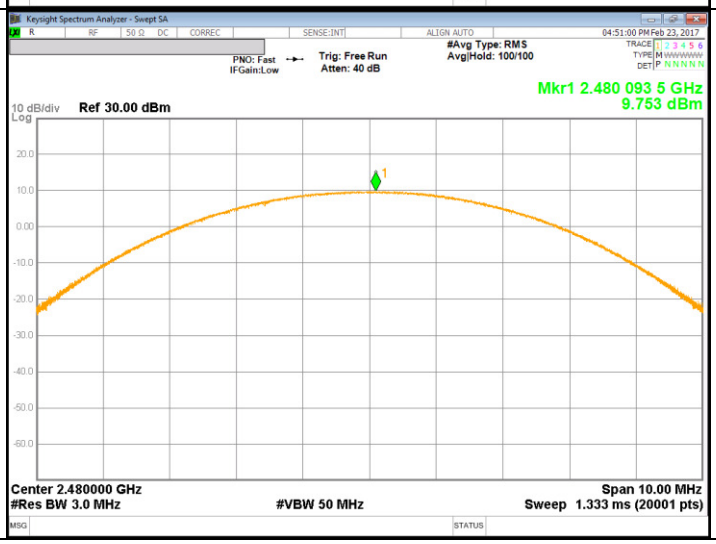
**Pi/4-DPSK OUTPUT POWER**

| | | | |
|---|---|---|---|
| Pi/4-DPSK<br><br>Low CH | |  | |
| Pi/4-DPSK<br><br>Middle CH | |  | |
| Pi/4-DPSK<br><br>High CH | |  | |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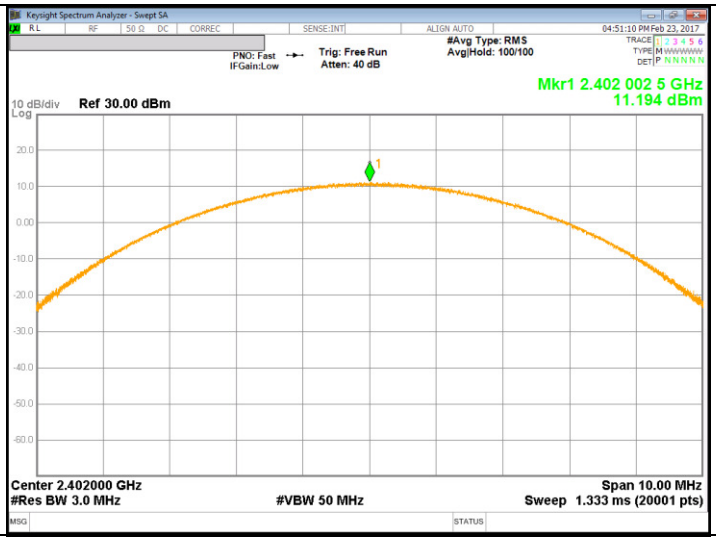
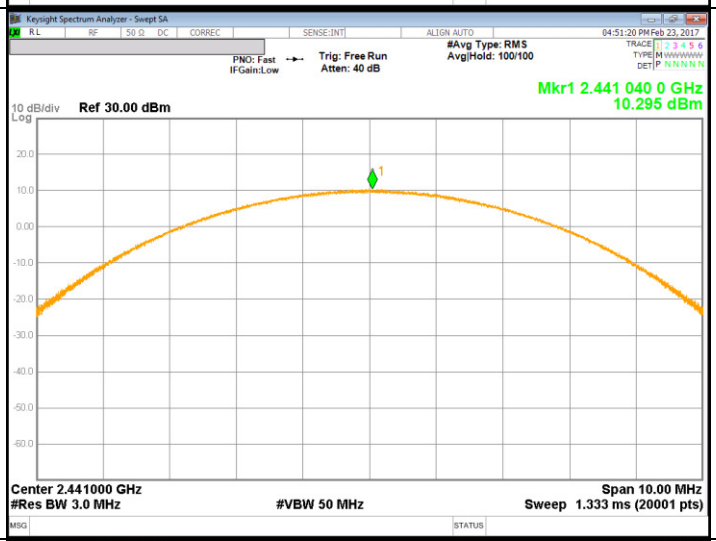
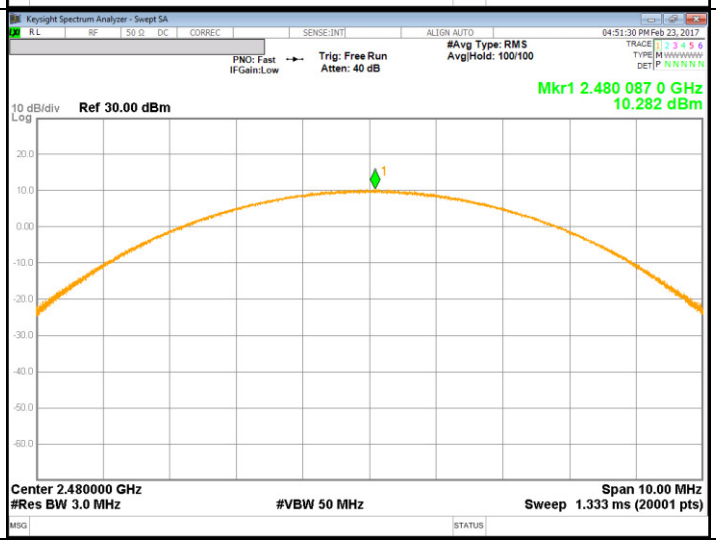
**8PSK OUTPUT POWER**

| | | | |
|---|---|---|---|
| 8PSK<br><br>Low CH | |  | |
| 8PSK<br><br>Middle CH | |  | |
| 8PSK<br><br>High CH | |  | |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## 9.5. AVERAGE POWER

**LIMIT**

None; for reporting purposes only.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a power meter.

**RESULTS**

The cable assembly insertion loss was entered as an offset in the power meter to allow for direct reading of power.

### 9.5.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---|---|---|---|
| Low | 2402 | 13.321 | 21.48 |
| Middle | 2441 | 13.037 | 20.12 |
| High | 2480 | 12.824 | 19.16 |

### 9.5.2. DATA RATE PI/4-DQPSK MODULATION

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---|---|---|---|
| Low | 2402 | 8.335 | 6.82 |
| Middle | 2441 | 7.679 | 5.86 |
| High | 2480 | 7.560 | 5.70 |

### 9.5.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---|---|---|---|
| Low | 2402 | 8.401 | 6.92 |
| Middle | 2441 | 7.698 | 5.89 |
| High | 2480 | 7.600 | 5.75 |


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## 9.6. CONDUCTED SPURIOUS EMISSIONS

**LIMITS**

FCC §15.247 (d)

Limit = -20 dBc

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

**RESULTS**


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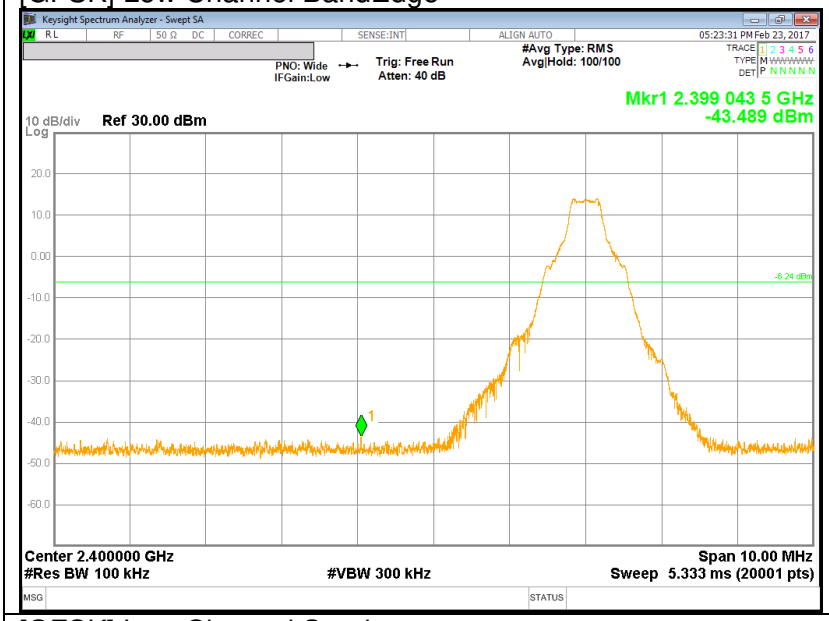
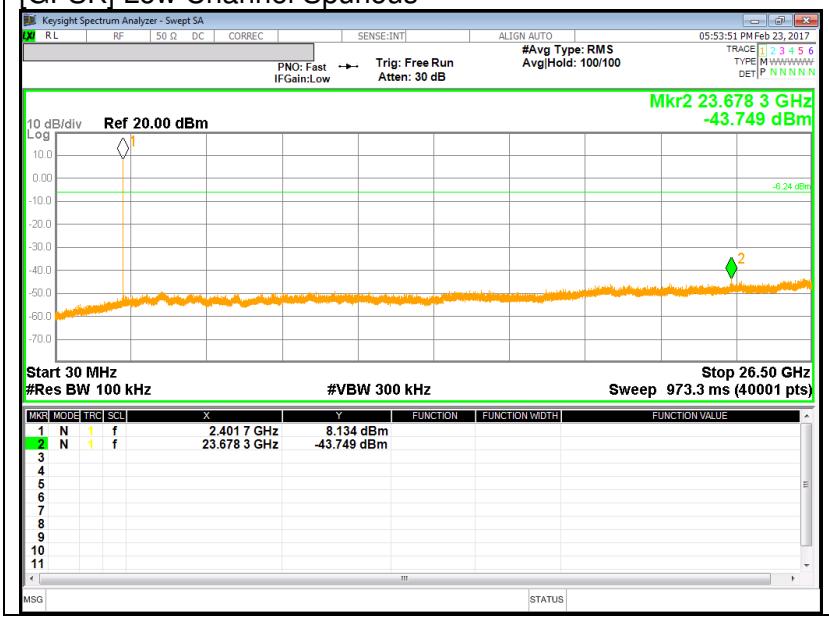
## 9.6.1. BASIC DATA RATE GFSK MODULATION

**GFSK Mode**

[GFSK] Low Channel BandEdge




[GFSK] Low Channel Spurious





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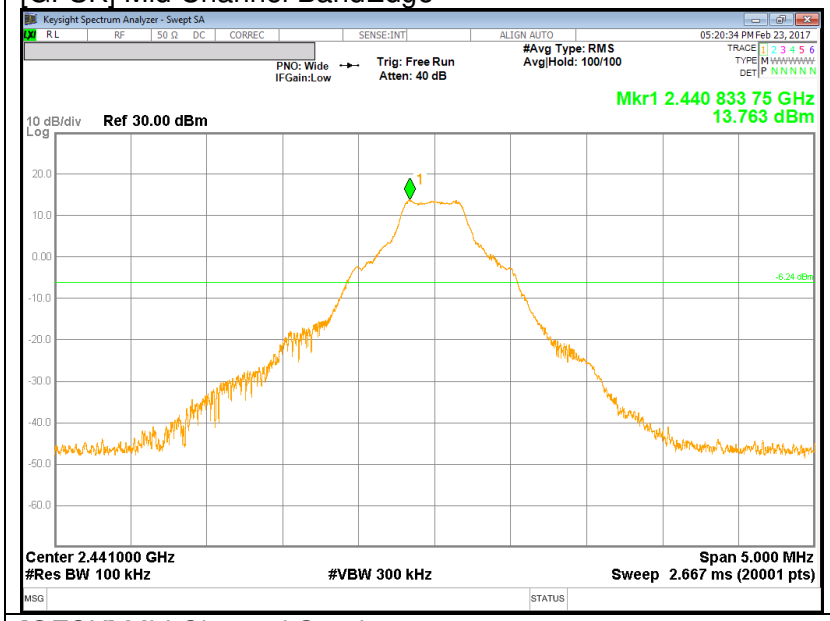
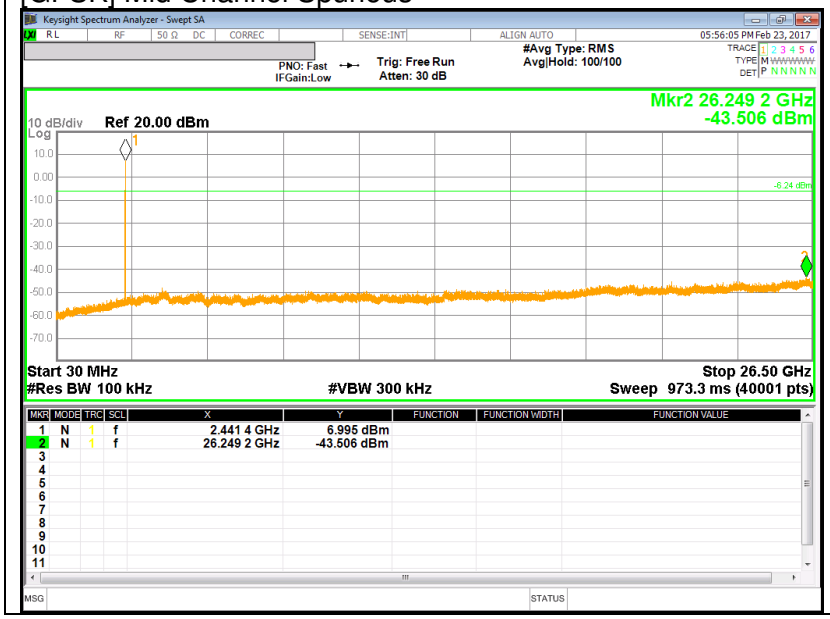
[GFSK] Mid Channel BandEdge




[GFSK] Mid Channel Spurious





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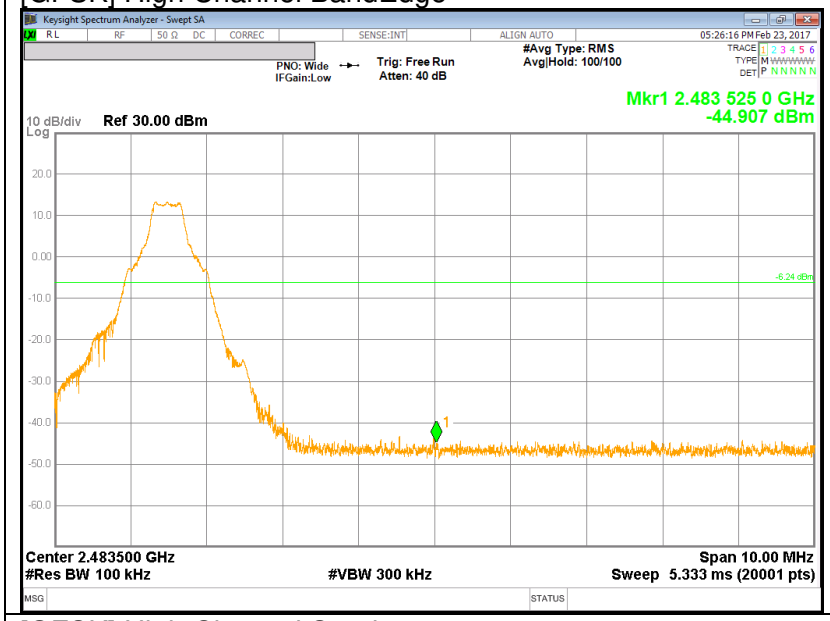
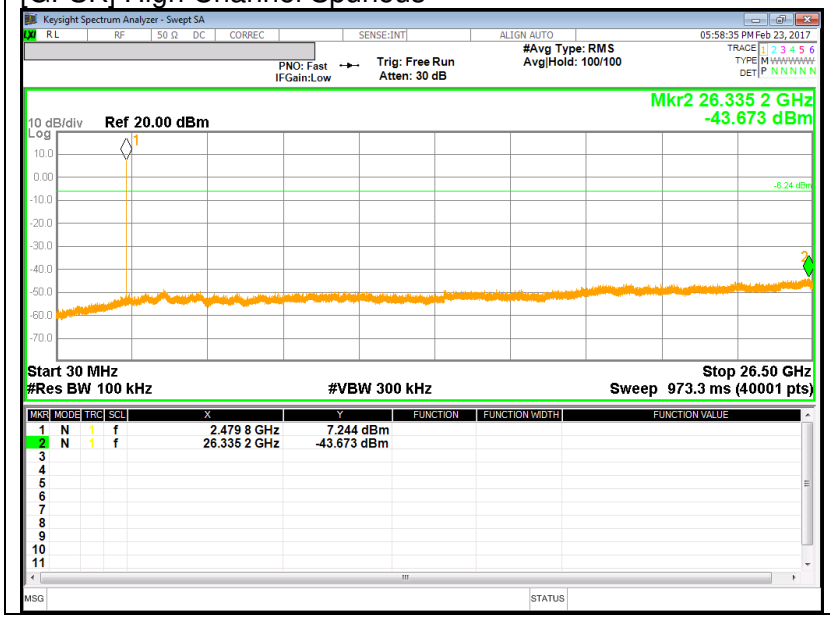
[GFSK] High Channel BandEdge




[GFSK] High Channel Spurious





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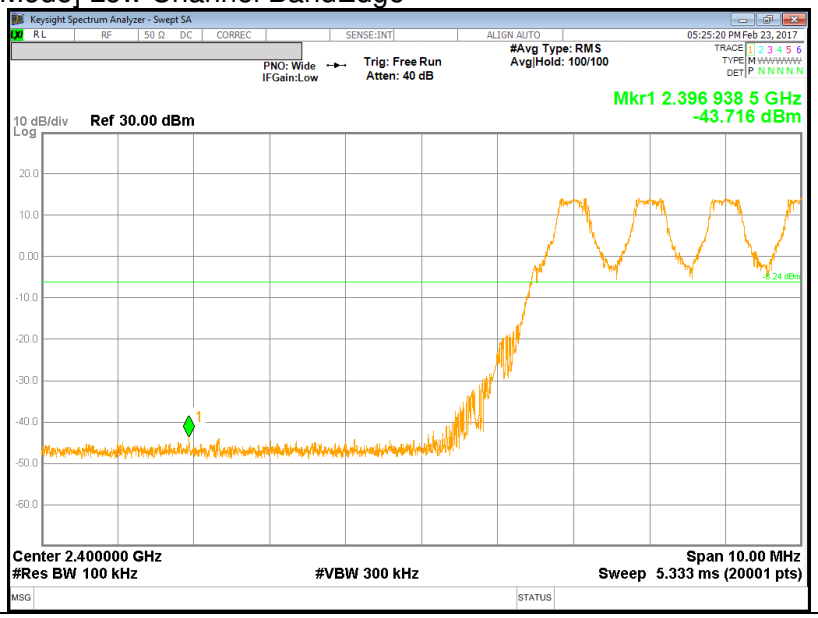
**BandEdge Emission at GFSK Hopping Mode**

[GFSK Hopping Mode] Low Channel BandEdge




[GFSK Hopping Mode] High Channel BandEdge

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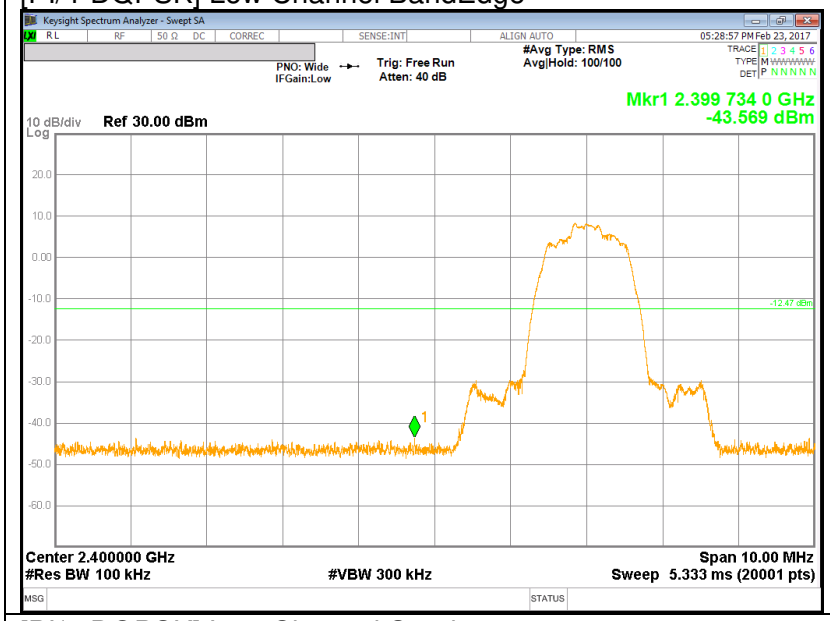
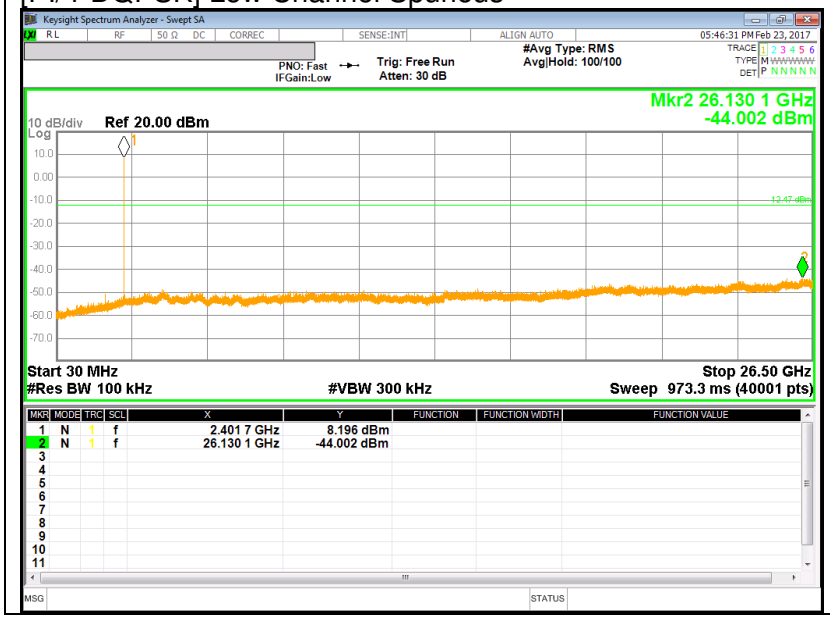
**PI/4-DQPSK Mode**

[PI/4-DQPSK] Low Channel BandEdge




[PI/4-DQPSK] Low Channel Spurious





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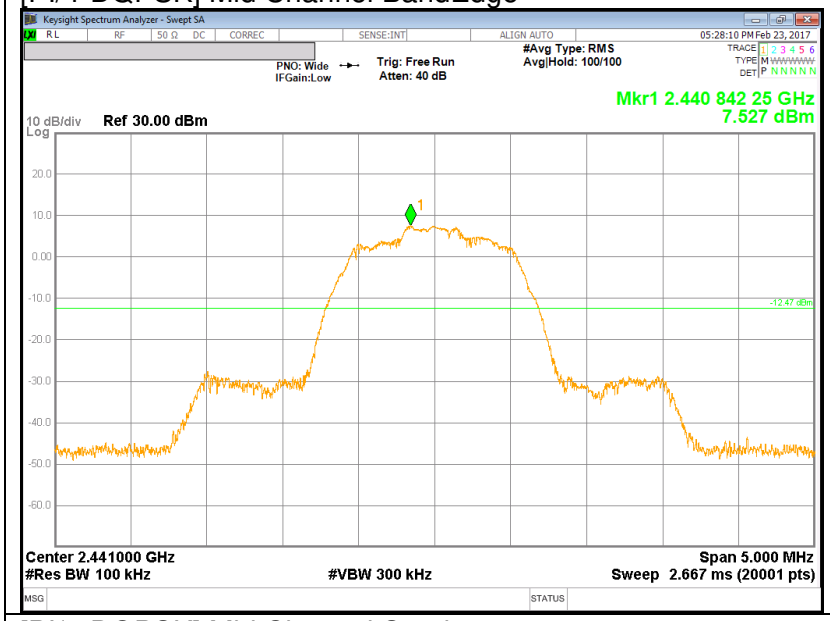
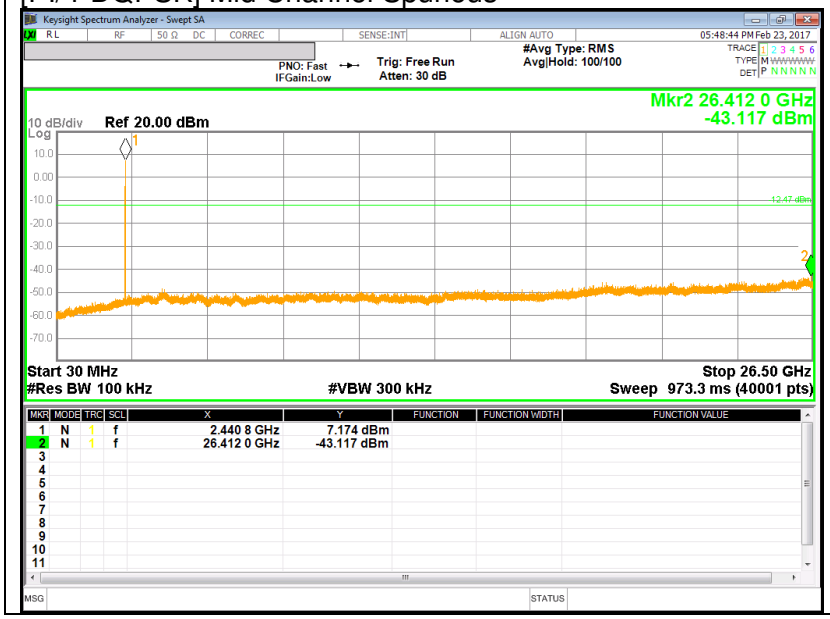
[PI/4-DQPSK] Mid Channel BandEdge




[PI/4-DQPSK] Mid Channel Spurious





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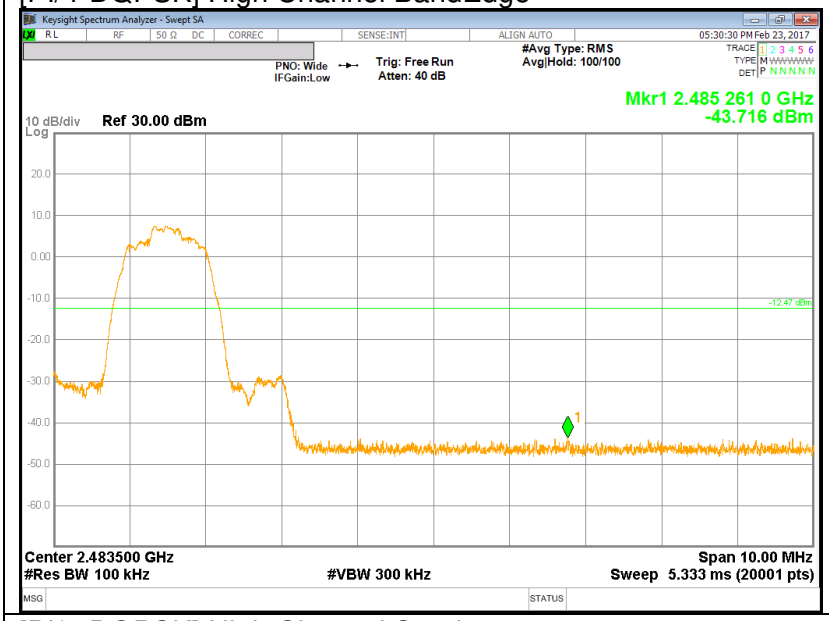
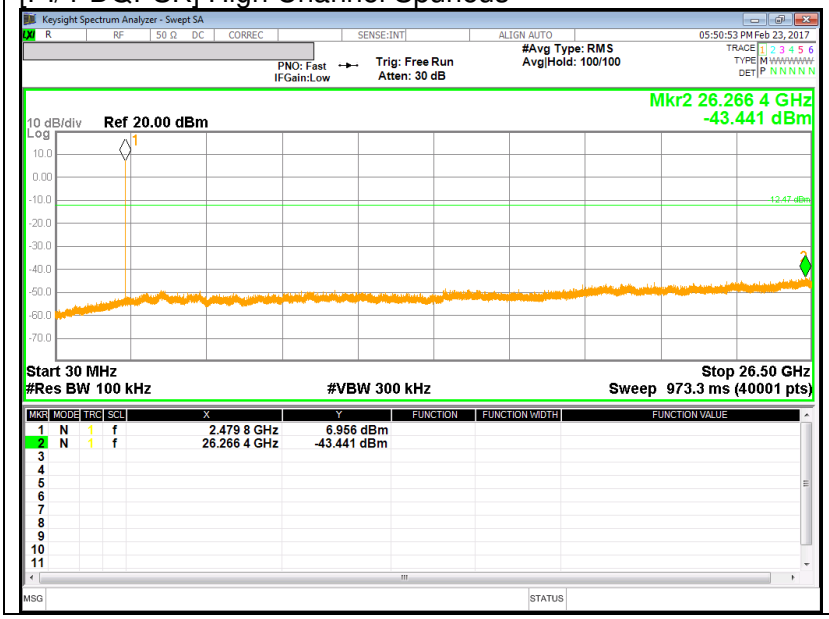
[PI/4-DQPSK] High Channel BandEdge




[PI/4-DQPSK] High Channel Spurious





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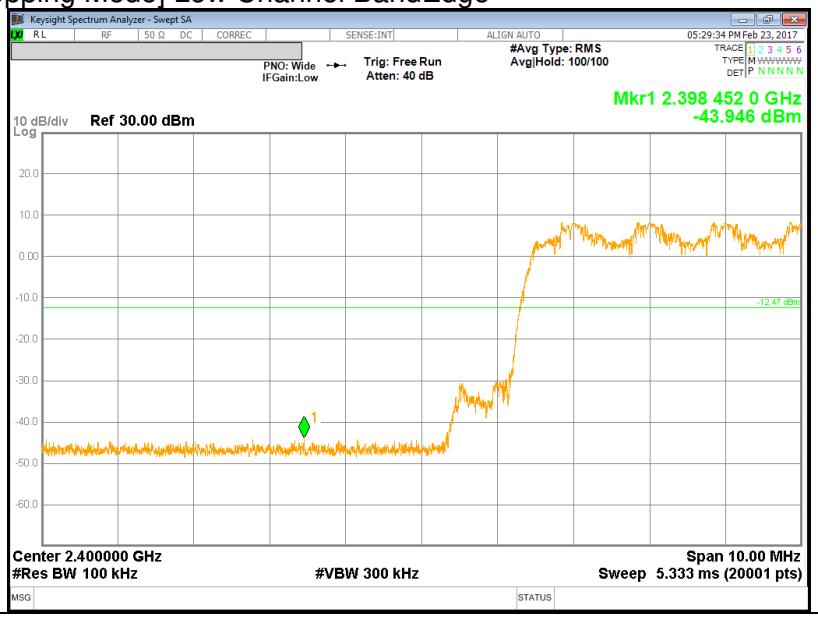
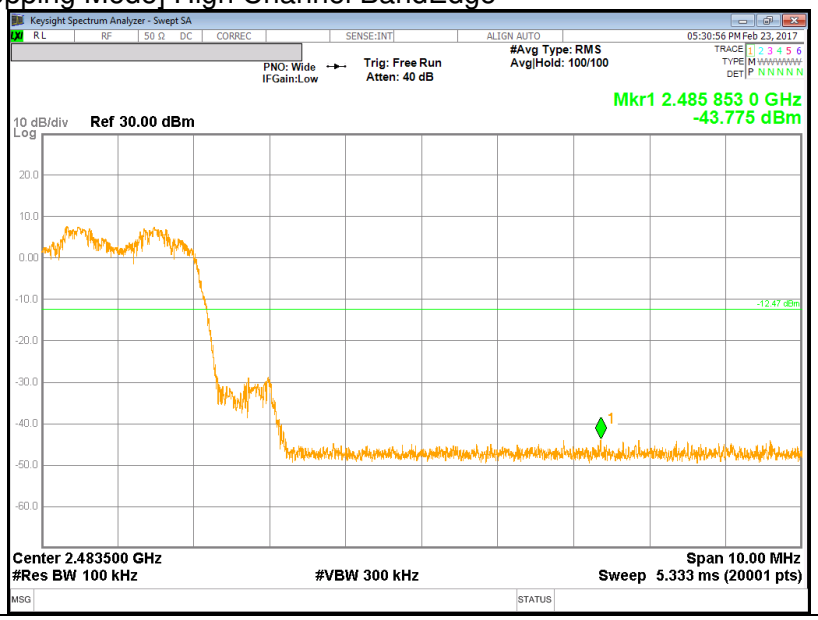
**BandEdge Emission at PI/4-DQPSK Hopping Mode**

[PI/4-DQPSK Hopping Mode] Low Channel BandEdge




[PI/4-DQPSK Hopping Mode] High Channel BandEdge





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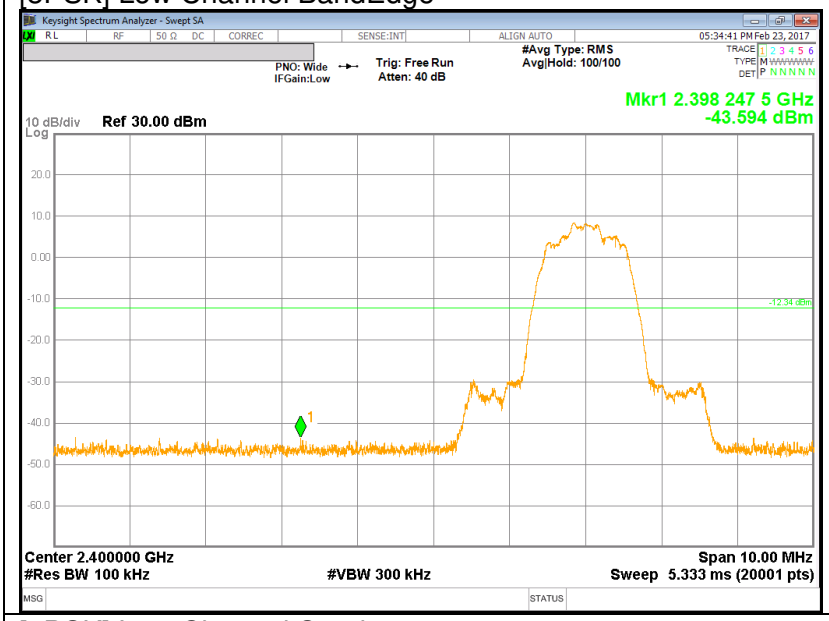
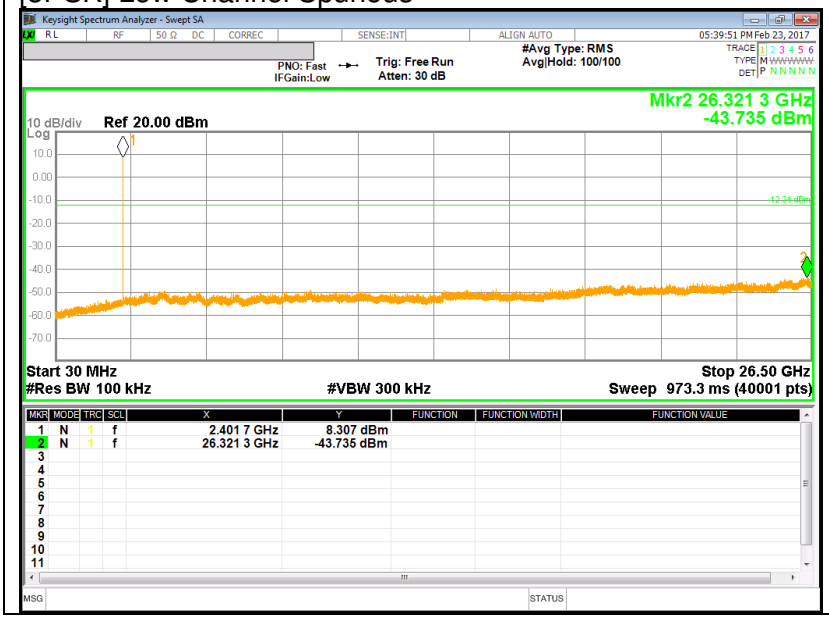
**8PSK Mode**

[8PSK] Low Channel BandEdge




[8PSK] Low Channel Spurious





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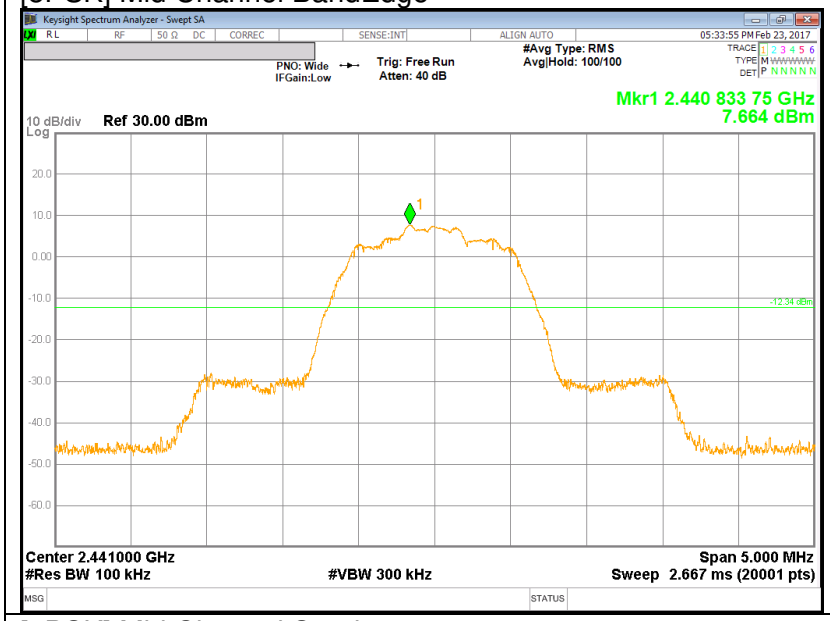
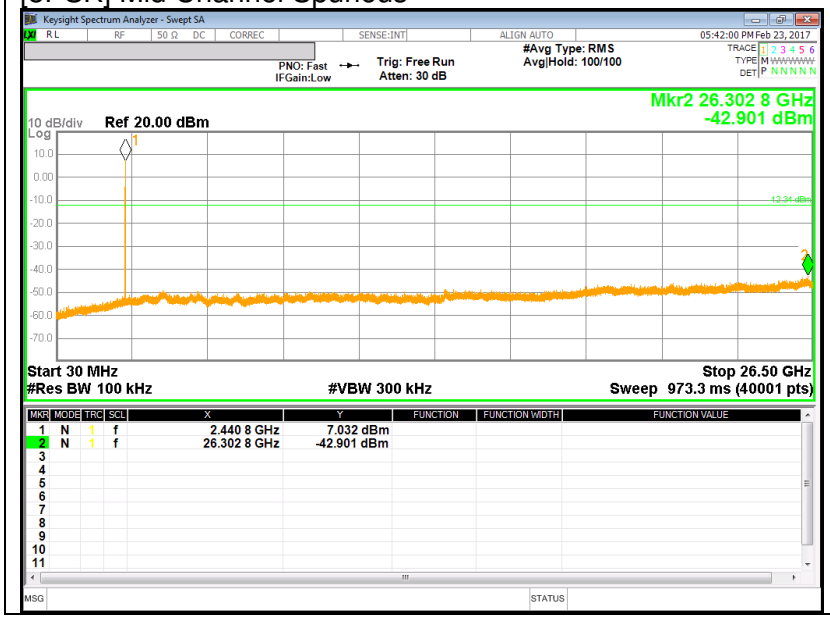
[8PSK] Mid Channel BandEdge




[8PSK] Mid Channel Spurious





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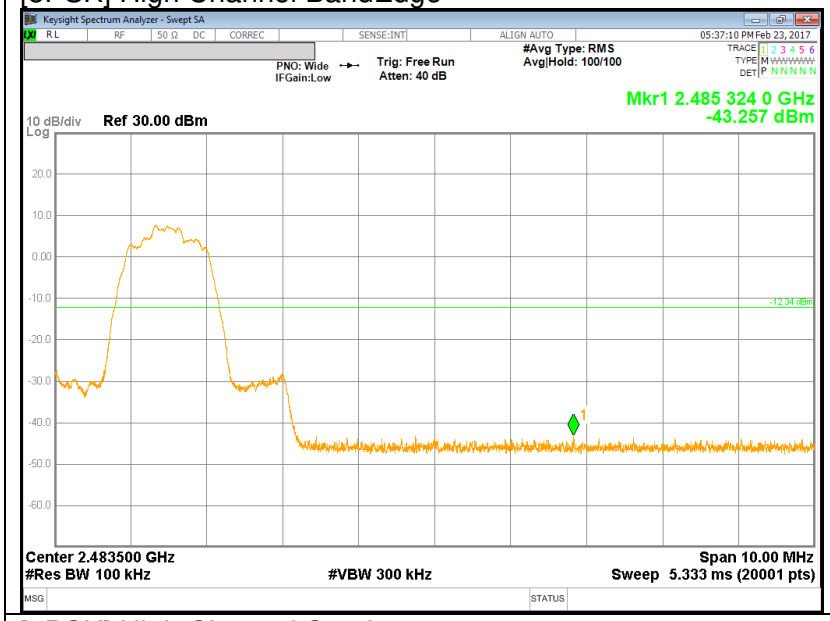
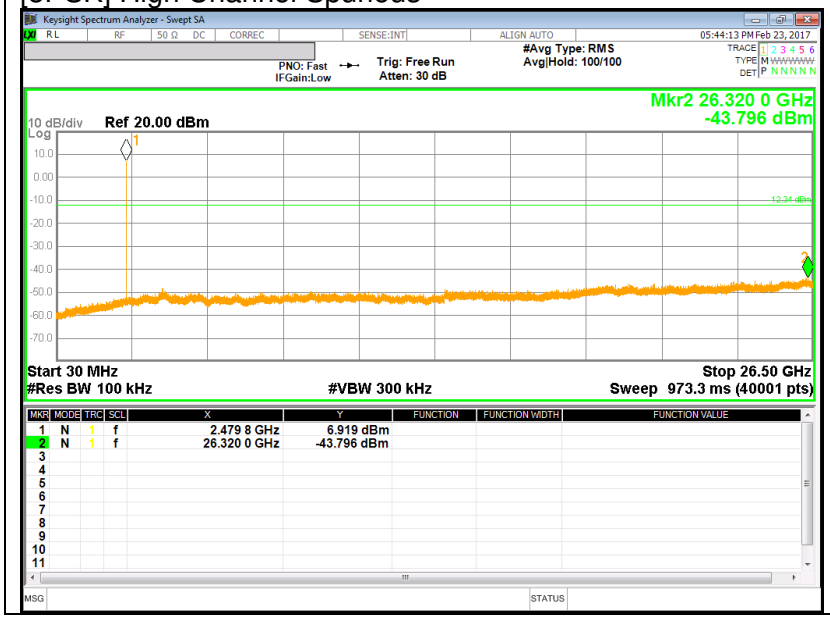
[8PSK] High Channel BandEdge




[8PSK] High Channel Spurious





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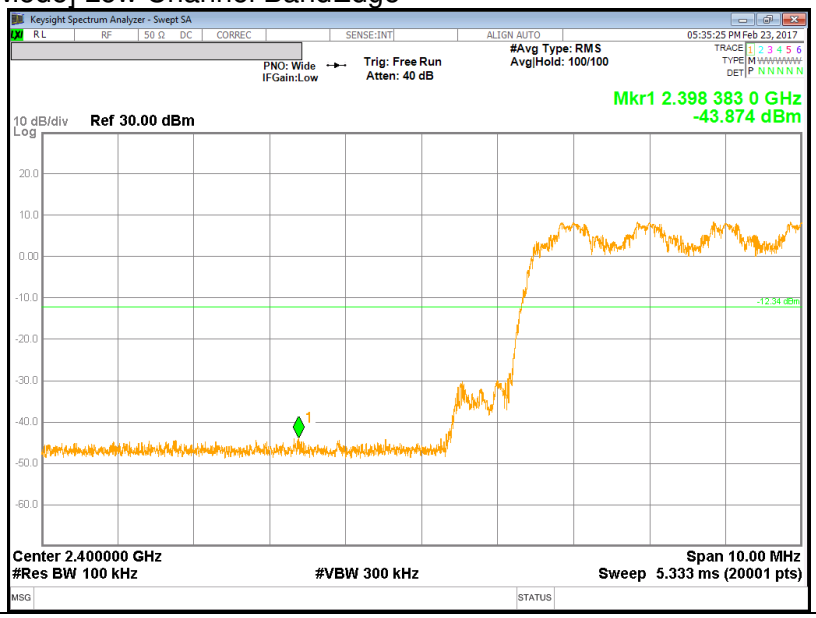
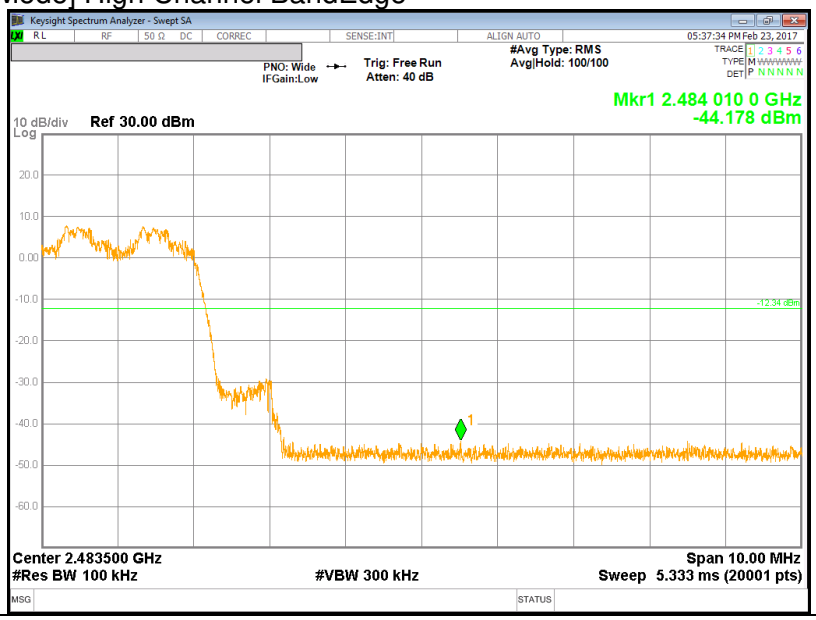
**BandEdge Emission at 8PSK Hopping Mode**

[8PSK Hopping Mode] Low Channel BandEdge




[8PSK Hopping Mode] High Channel BandEdge





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# 10. RADIATED TEST RESULTS

## 10.1. LIMITS AND PROCEDURE

**LIMITS**

FCC §15.205 and §15.209

| Limits for radiated disturbance of an intentional radiator | | |
|---|---|---|
| Frequency range (MHz) | Limits (µV/m) | Measurement Distance (m) |
| 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 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.


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**TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements.(Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.)

For band edge measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 1/T (on time) for average measurement.

GFSK = 1/T = 1 / 0.0029S = 350Hz.

The minimum VBW was 350Hz, but test receiver(ESU40) couldn't set value 350Hz. Due to this reason, testing VBW was set to 500Hz(Worst cases).

The spectrum from 1GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9KHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = 20 log limit (uV/m)


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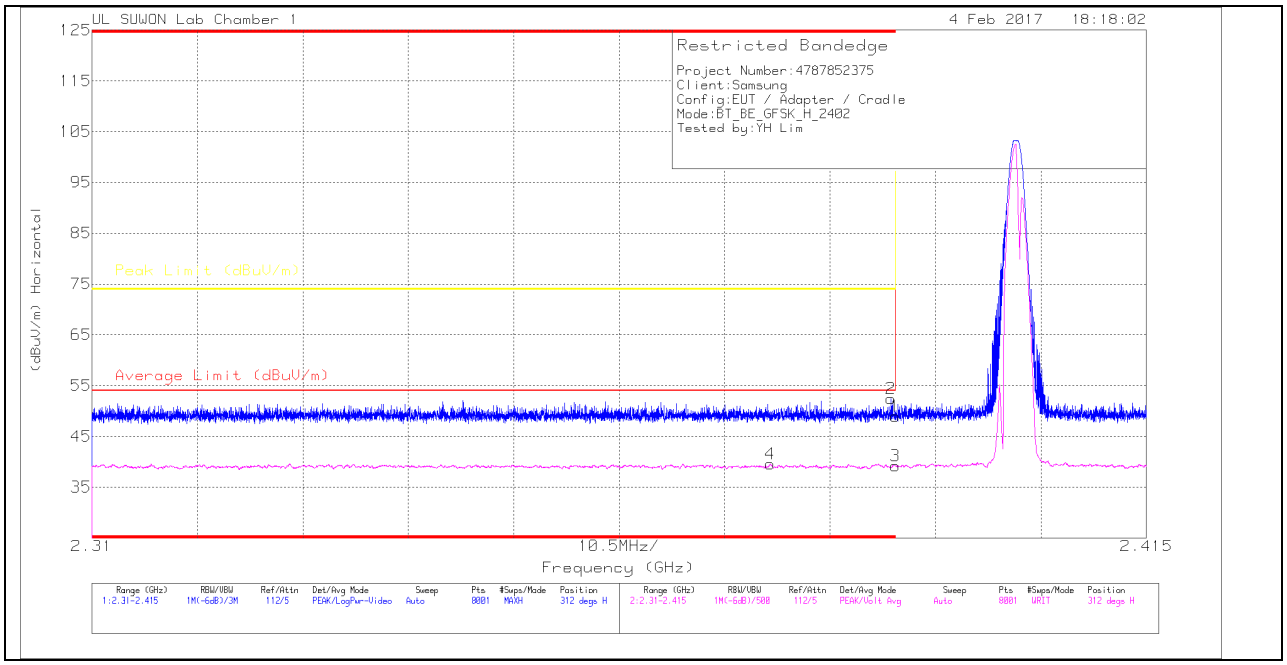
# 10.2. TRANSMITTER ABOVE 1 GHz

## 10.2.1. BASIC DATA RATE GFSK MODULATION

## RESTRICTED BANDEDGE (LOW CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT




### HORIZONTAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.39 | 45.91 | Pk | 31.8 | -28.7 | 49.01 | - | - | 74 | -24.99 | 312 | 101 | H |
| 2 | * 2.39 | 49.31 | Pk | 31.8 | -28.7 | 52.41 | - | - | 74 | -21.59 | 312 | 101 | H |
| 3 | * 2.39 | 36.11 | VA1T | 31.8 | -28.7 | 39.21 | 54 | -14.79 | - | - | 312 | 101 | H |
| 4 | * 2.378 | 36.53 | VA1T | 31.8 | -28.8 | 39.53 | 54 | -14.47 | - | - | 312 | 101 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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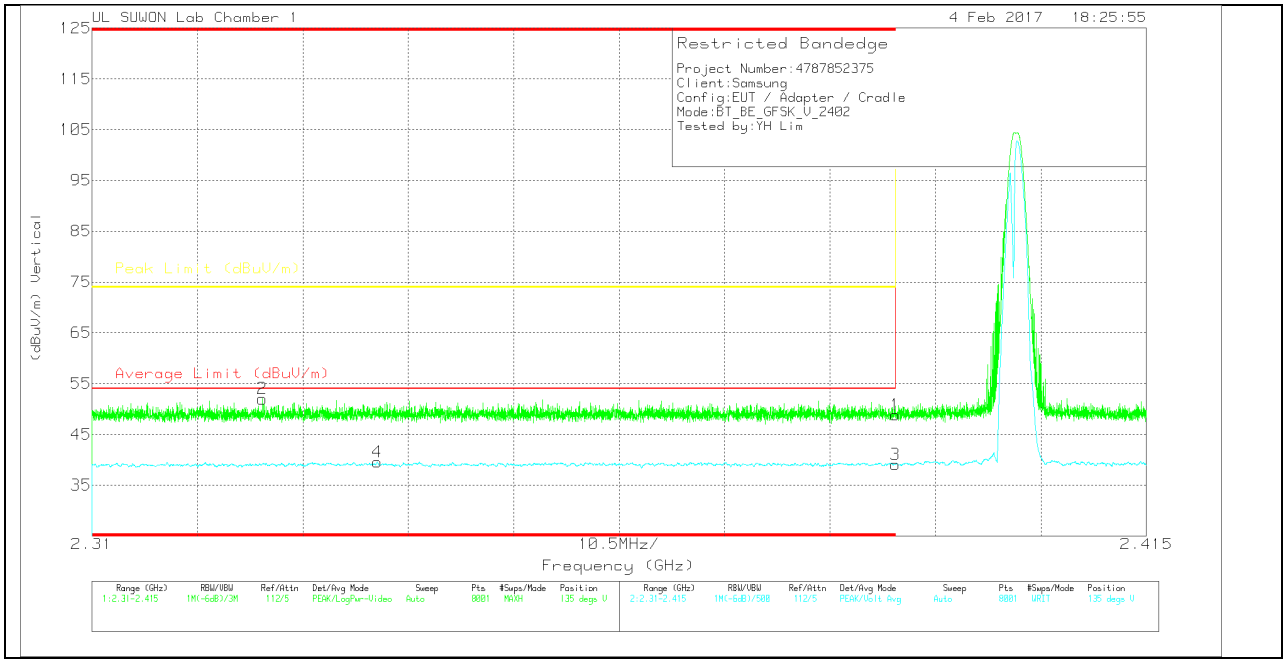
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.39 | 45.79 | Pk | 31.8 | -28.7 | 48.89 | - | - | 74 | -25.11 | 135 | 127 | V |
| 2 | * 2.327 | 49.1 | Pk | 31.7 | -28.8 | 52 | - | - | 74 | -22 | 135 | 127 | V |
| 3 | * 2.39 | 35.95 | VA1T | 31.8 | -28.7 | 39.05 | 54 | -14.95 | - | - | 135 | 127 | V |
| 4 | * 2.338 | 36.54 | VA1T | 31.7 | -28.7 | 39.54 | 54 | -14.46 | - | - | 135 | 127 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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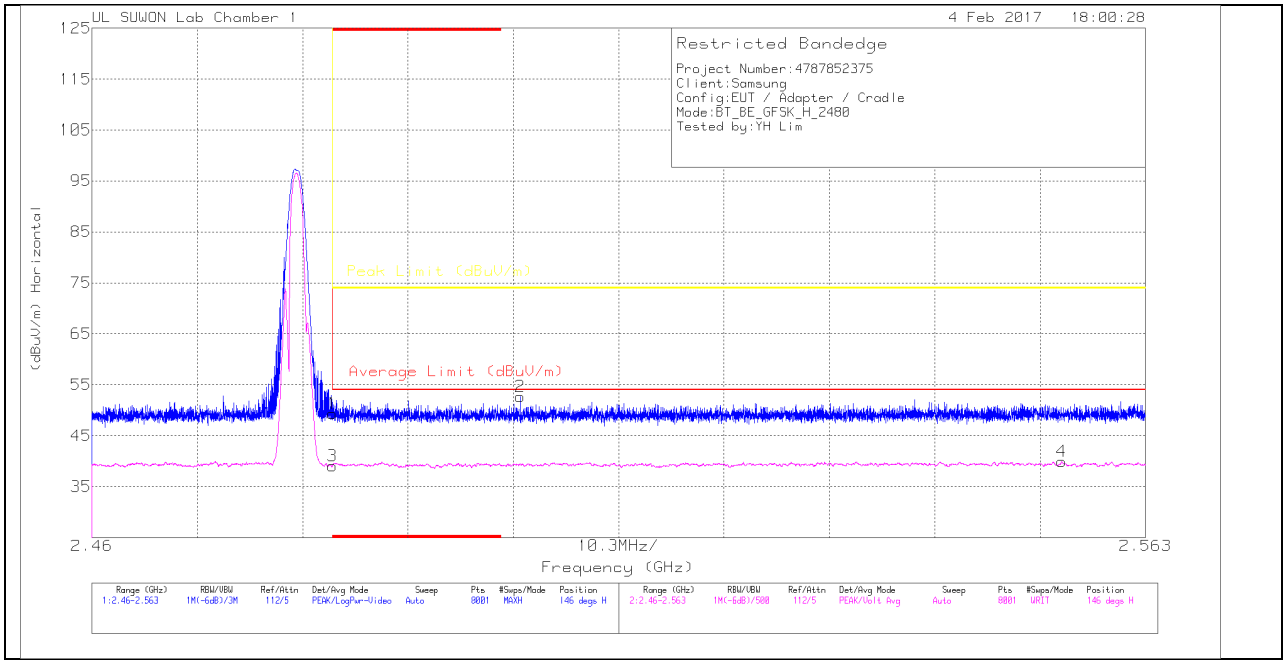
# AUTHORIZED BANDEDGE (HIGH CHANNEL)

## HORIZONTAL PEAK AND AVERAGE PLOT




## HORIZONTAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 46.01 | Pk | 32 | -28.7 | 49.31 | - | - | 74 | -24.69 | 146 | 108 | H |
| 2 | 2.502 | 49.42 | Pk | 32 | -28.7 | 52.72 | - | - | 74 | -21.28 | 146 | 108 | H |
| 3 | * 2.484 | 35.76 | VA1T | 32 | -28.7 | 39.06 | 54 | -14.94 | - | - | 146 | 108 | H |
| 4 | 2.555 | 36.49 | VA1T | 32 | -28.6 | 39.89 | 54 | -14.11 | - | - | 146 | 108 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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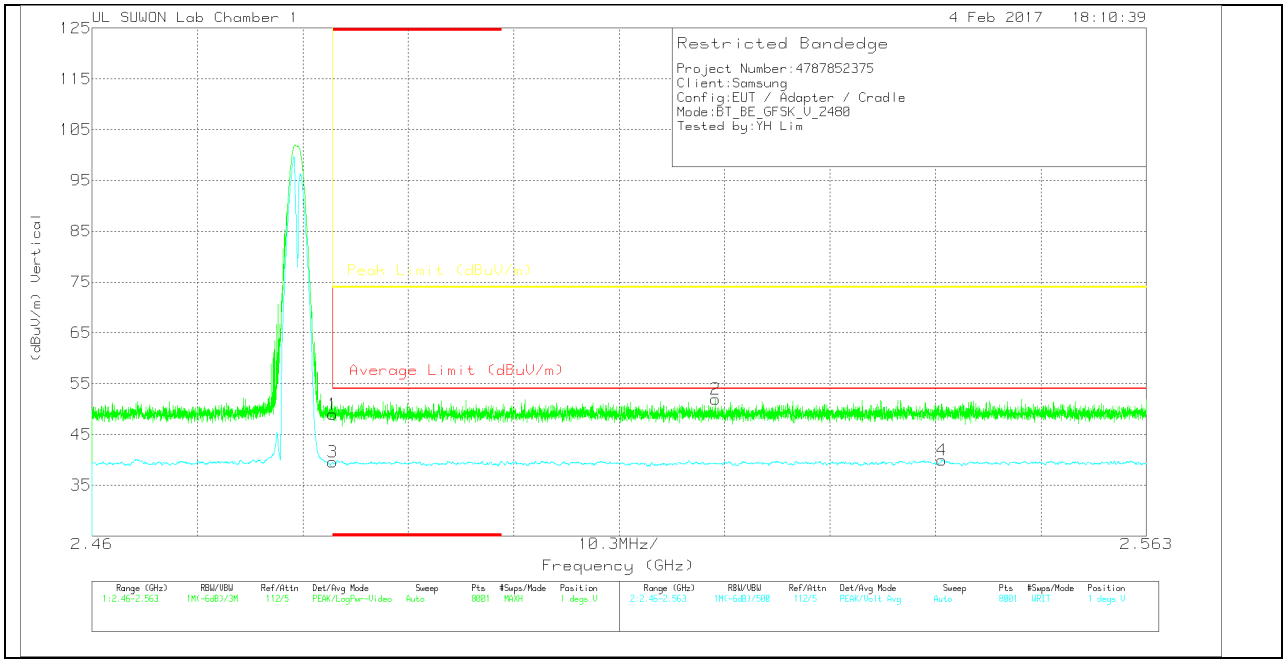
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 45.69 | Pk | 32 | -28.7 | 48.99 | - | - | 74 | -25.01 | 1 | 282 | V |
| 2 | 2.521 | 48.54 | Pk | 32 | -28.6 | 51.94 | - | - | 74 | -22.06 | 1 | 282 | V |
| 3 | * 2.484 | 36.27 | VA1T | 32 | -28.7 | 39.57 | 54 | -14.43 | - | - | 1 | 282 | V |
| 4 | 2.543 | 36.54 | VA1T | 32 | -28.6 | 39.94 | 54 | -14.06 | - | - | 1 | 282 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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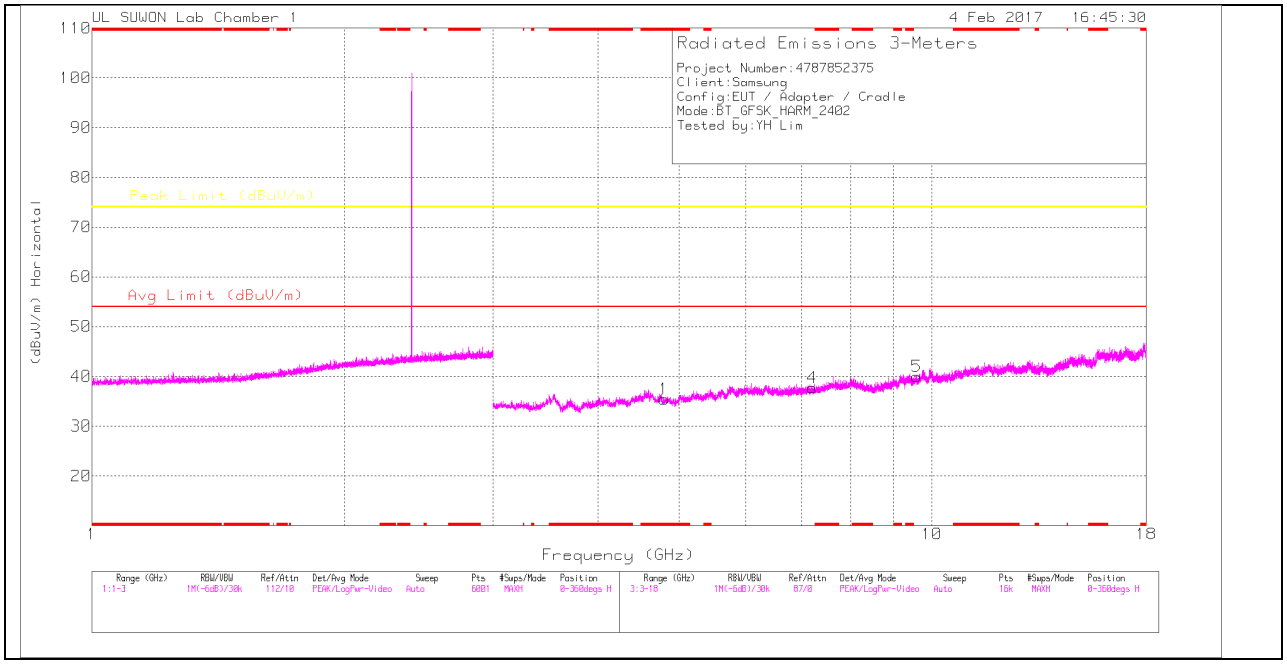
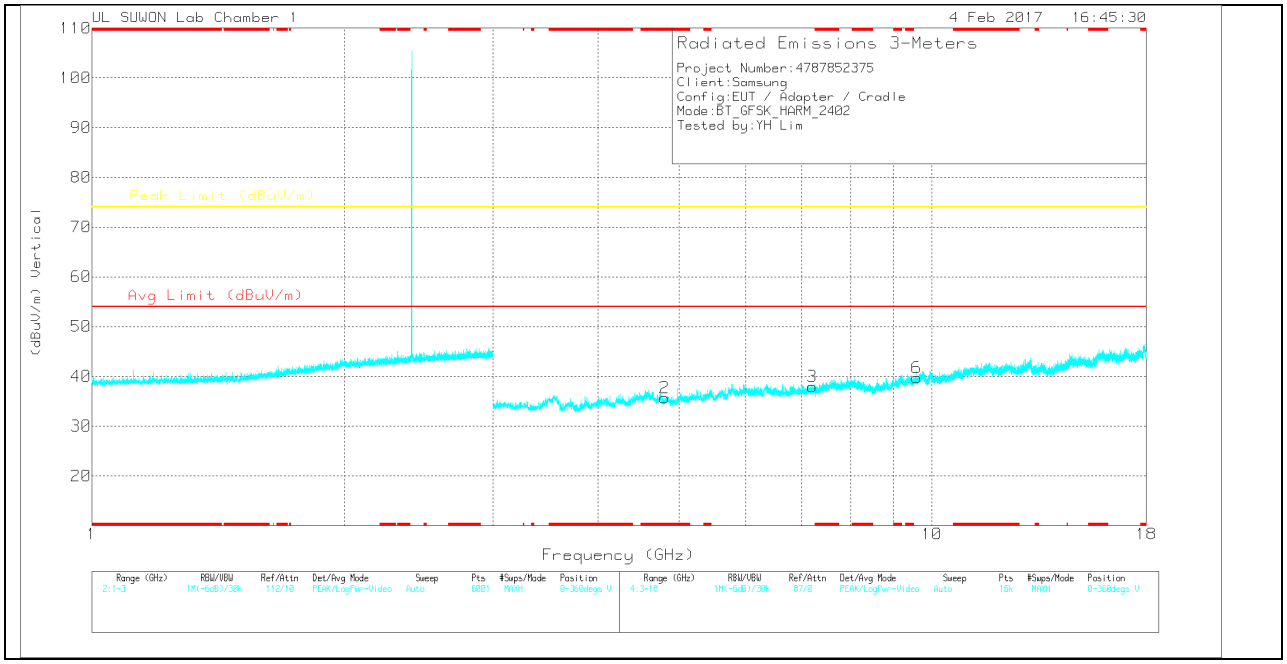
# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL HORIZONTAL




## LOW CHANNEL VERTICAL




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.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**LOW CHANNEL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 3Ghz_HP(dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.801 | 35.49 | Pk | 34 | -34.1 | 35.39 | - | - | 74 | -38.61 | 0-360 | 250 | H |
| 4 | 7.207 | 33.07 | Pk | 35.7 | -31.1 | 37.67 | - | - | 74 | -36.33 | 0-360 | 150 | H |
| 5 | 9.589 | 31.1 | Pk | 37 | -28.1 | 40 | - | - | 74 | -34 | 0-360 | 150 | H |
| 2 | * 4.805 | 35.71 | Pk | 34 | -34 | 35.71 | - | - | 74 | -38.29 | 0-360 | 250 | V |
| 3 | 7.206 | 33.34 | Pk | 35.7 | -31.1 | 37.94 | - | - | 74 | -36.06 | 0-360 | 250 | V |
| 6 | 9.589 | 30.8 | Pk | 37 | -28.1 | 39.7 | - | - | 74 | -34.3 | 0-360 | 150 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limt (54dBuV/m).


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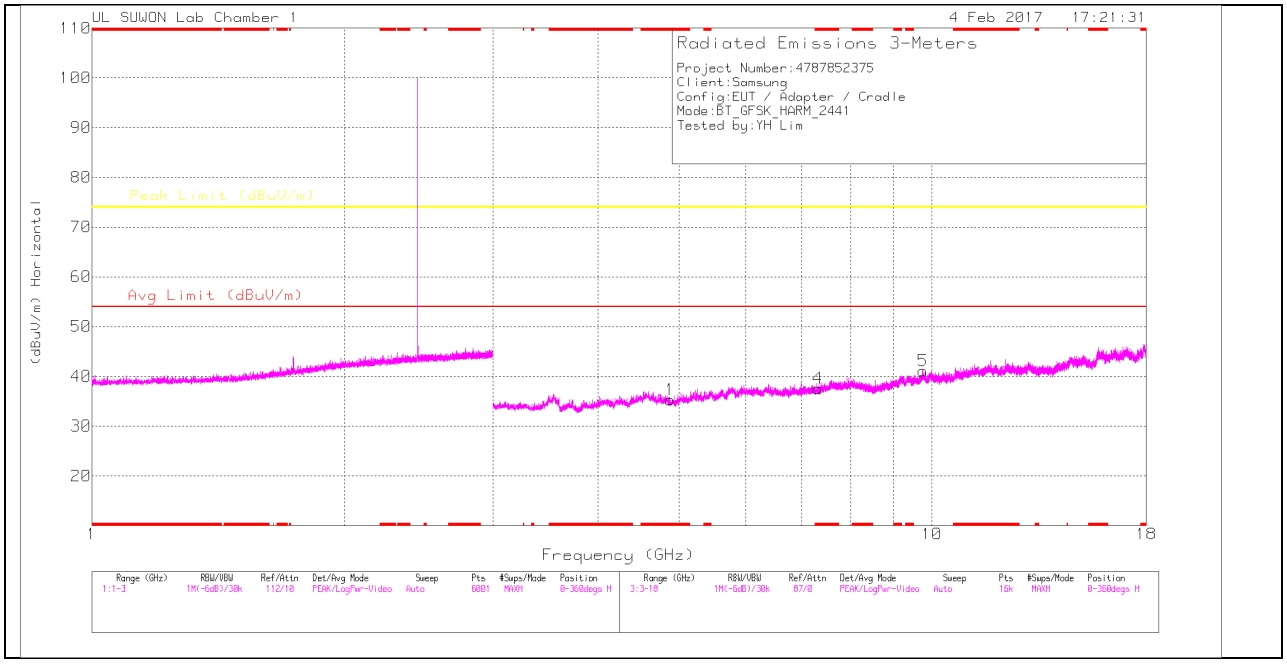
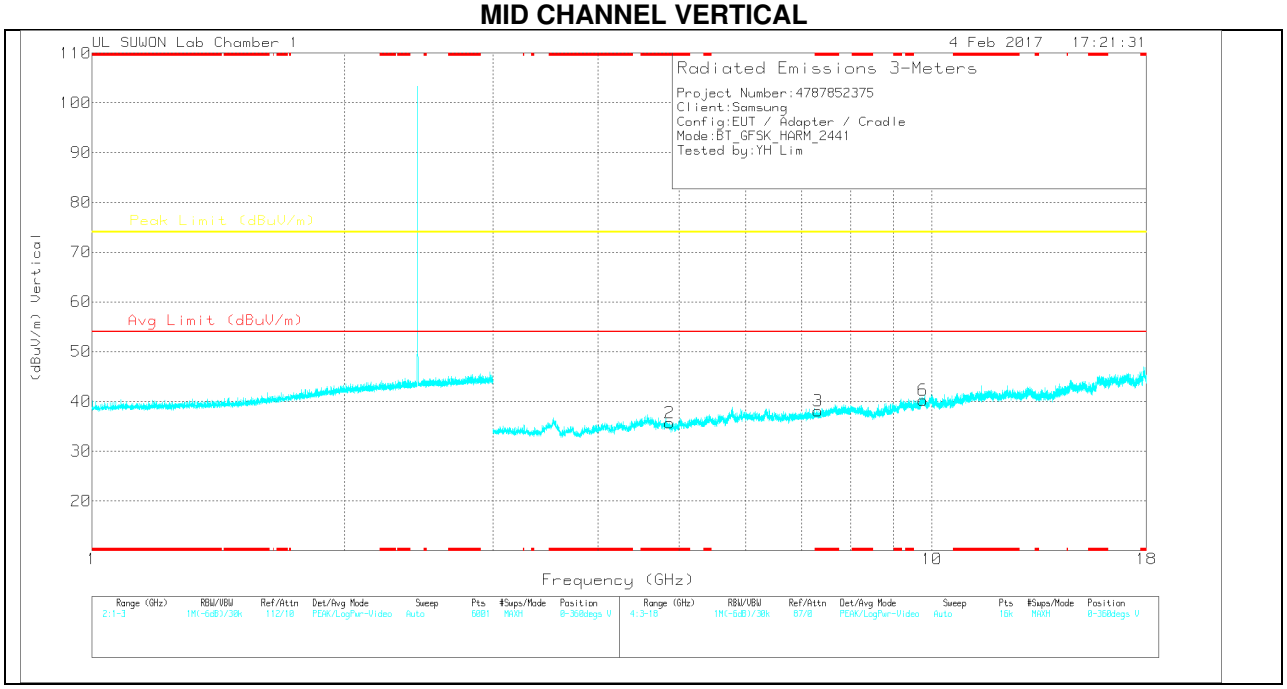
**MID CHANNEL HORIZONTAL**




**MID CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.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**MID CHANNEL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 3Ghz_HP(dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.879 | 35.38 | Pk | 34 | -34.1 | 35.28 | - | - | 74 | -38.72 | 0-360 | 150 | H |
| 4 | * 7.316 | 32.82 | Pk | 35.8 | -31 | 37.62 | - | - | 74 | -36.38 | 0-360 | 150 | H |
| 5 | 9.757 | 31.33 | Pk | 37.2 | -27.4 | 41.13 | - | - | 74 | -32.87 | 0-360 | 250 | H |
| 2 | * 4.875 | 35.93 | Pk | 34 | -34.2 | 35.73 | - | - | 74 | -38.27 | 0-360 | 250 | V |
| 3 | * 7.323 | 33.14 | Pk | 35.8 | -30.9 | 38.04 | - | - | 74 | -35.96 | 0-360 | 150 | V |
| 6 | 9.757 | 30.49 | Pk | 37.2 | -27.4 | 40.29 | - | - | 74 | -33.71 | 0-360 | 250 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limt (54dBuV/m).


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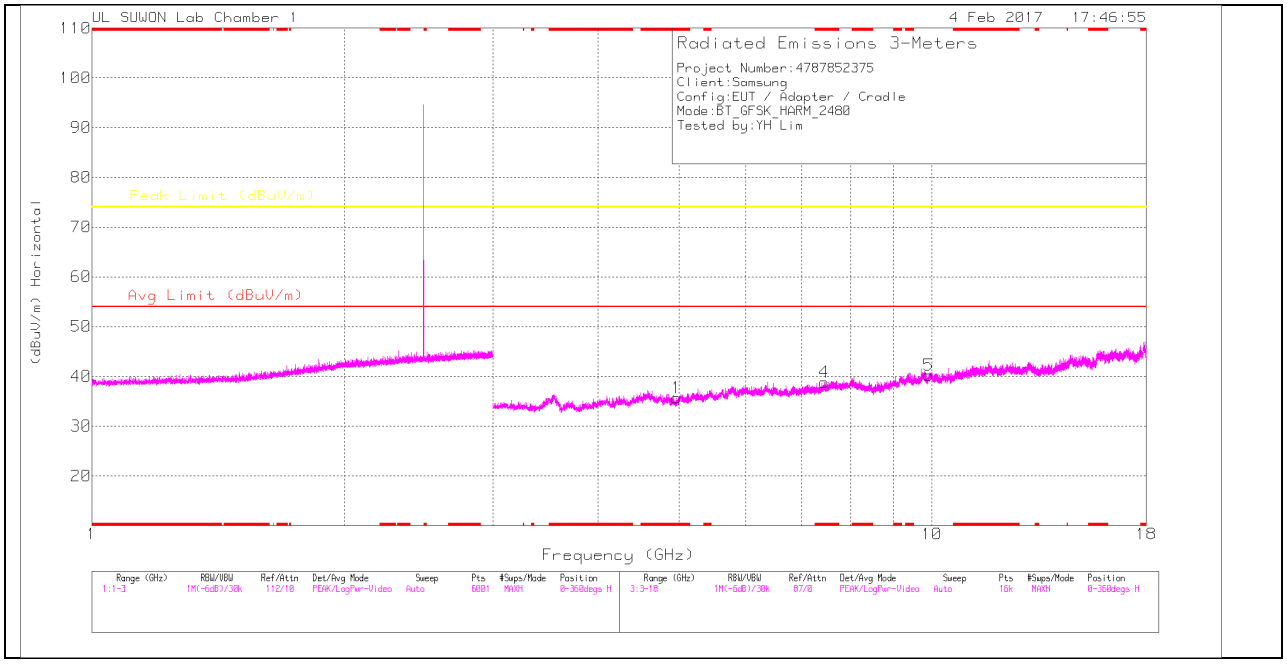
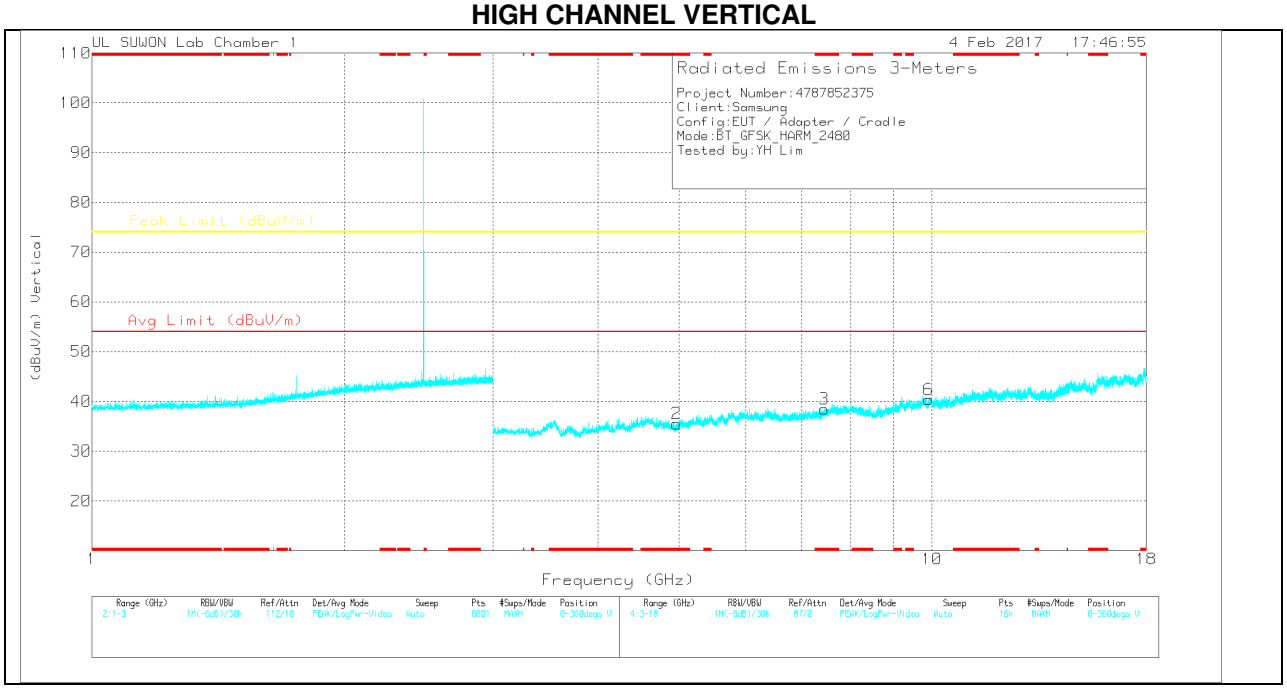
**HIGH CHANNEL HORIZONTAL**




**HIGH CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.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**HIGH CHANNEL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 3Ghz_HP(dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.965 | 35.66 | Pk | 34.1 | -34.1 | 35.66 | - | - | 74 | -38.34 | 0-360 | 150 | H |
| 4 | * 7.444 | 34.01 | Pk | 35.8 | -31 | 38.81 | - | - | 74 | -35.19 | 0-360 | 150 | H |
| 5 | 9.911 | 30.95 | Pk | 37.4 | -28.1 | 40.25 | - | - | 74 | -33.75 | 0-360 | 150 | H |
| 2 | * 4.968 | 35.6 | Pk | 34.1 | -34.2 | 35.5 | - | - | 74 | -38.5 | 0-360 | 250 | V |
| 3 | * 7.447 | 33.62 | Pk | 35.8 | -31 | 38.42 | - | - | 74 | -35.58 | 0-360 | 150 | V |
| 6 | 9.91 | 31.12 | Pk | 37.4 | -28.2 | 40.32 | - | - | 74 | -33.68 | 0-360 | 150 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limt (54dBuV/m).


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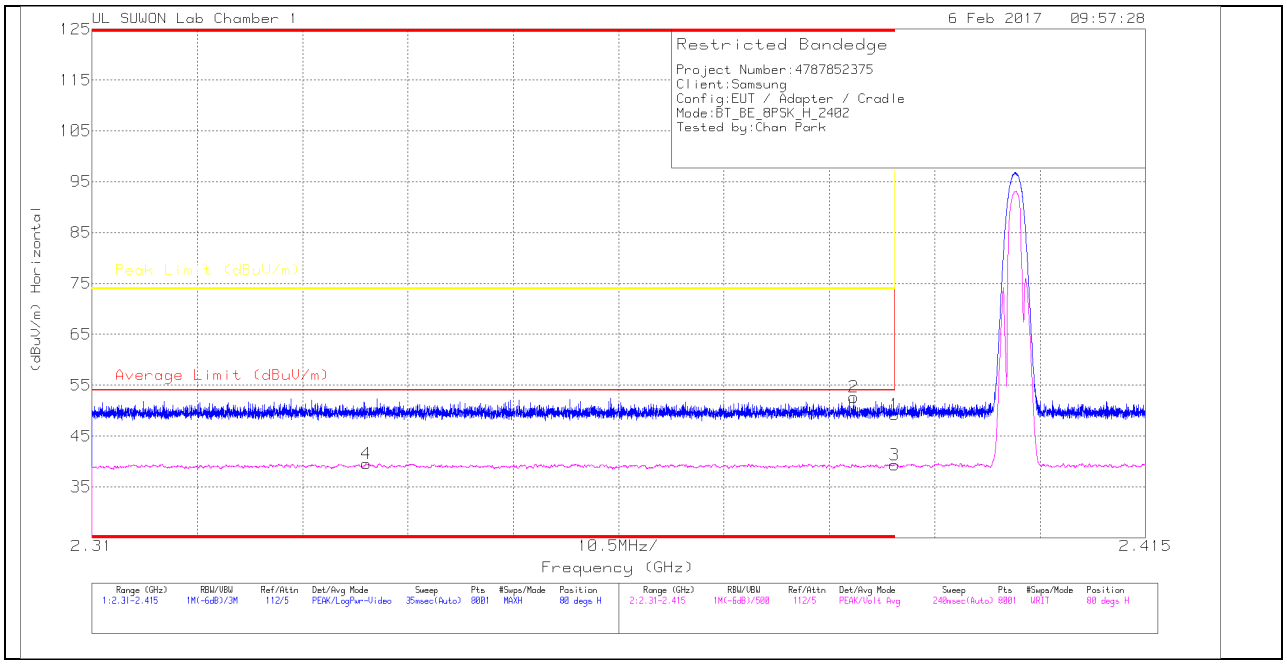
## 10.2.2. ENHANCED DATA RATE 8PSK MODULATION RESTRICTED BANDEDGE (LOW CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT




### HORIZONTAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.39 | 46.06 | Pk | 31.8 | -28.7 | 49.16 | - | - | 74 | -24.84 | 80 | 121 | H |
| 2 | * 2.386 | 49.62 | Pk | 31.8 | -28.8 | 52.62 | - | - | 74 | -21.38 | 80 | 121 | H |
| 3 | * 2.39 | 36.23 | VA1T | 31.8 | -28.7 | 39.33 | 54 | -14.67 | - | - | 80 | 121 | H |
| 4 | * 2.337 | 36.67 | VA1T | 31.7 | -28.8 | 39.57 | 54 | -14.43 | - | - | 80 | 121 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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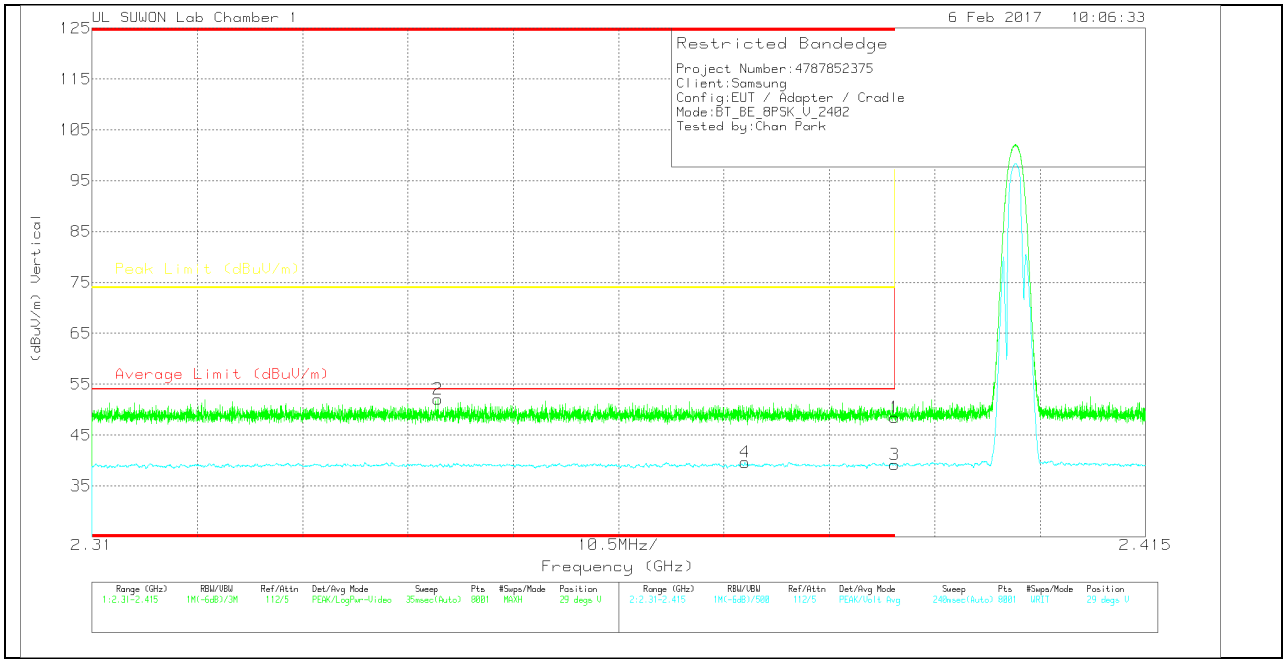
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.39 | 45.36 | Pk | 31.8 | -28.7 | 48.46 | - | - | 74 | -25.54 | 29 | 291 | V |
| 2 | * 2.344 | 49.11 | Pk | 31.7 | -28.8 | 52.01 | - | - | 74 | -21.99 | 29 | 291 | V |
| 3 | * 2.39 | 36.07 | VA1T | 31.8 | -28.7 | 39.17 | 54 | -14.83 | - | - | 29 | 291 | V |
| 4 | * 2.375 | 36.53 | VA1T | 31.8 | -28.7 | 39.63 | 54 | -14.37 | - | - | 29 | 291 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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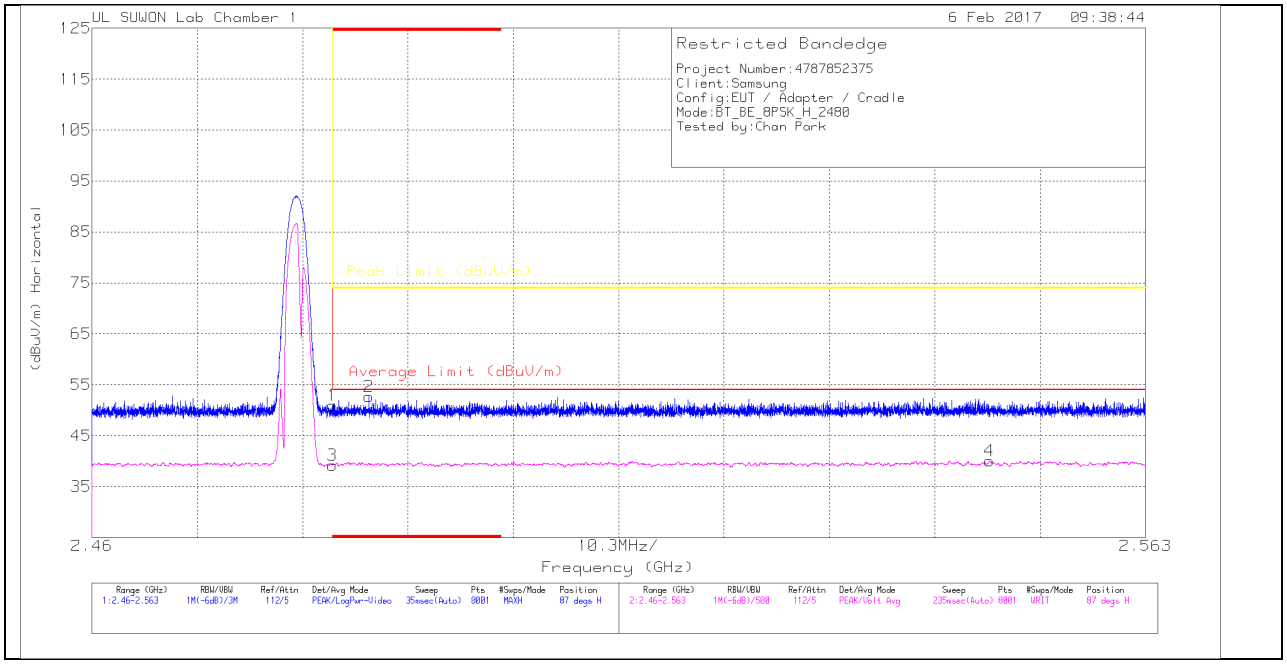
# AUTHORIZED BANDEDGE (HIGH CHANNEL)

## HORIZONTAL PEAK AND AVERAGE PLOT




## HORIZONTAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 47.62 | Pk | 32 | -28.7 | 50.92 | - | - | 74 | -23.08 | 87 | 115 | H |
| 2 | * 2.487 | 49.26 | Pk | 32 | -28.6 | 52.66 | - | - | 74 | -21.34 | 87 | 115 | H |
| 3 | * 2.484 | 35.92 | VA1T | 32 | -28.7 | 39.22 | 54 | -14.78 | - | - | 87 | 115 | H |
| 4 | 2.548 | 36.65 | VA1T | 32 | -28.6 | 40.05 | 54 | -13.95 | - | - | 87 | 115 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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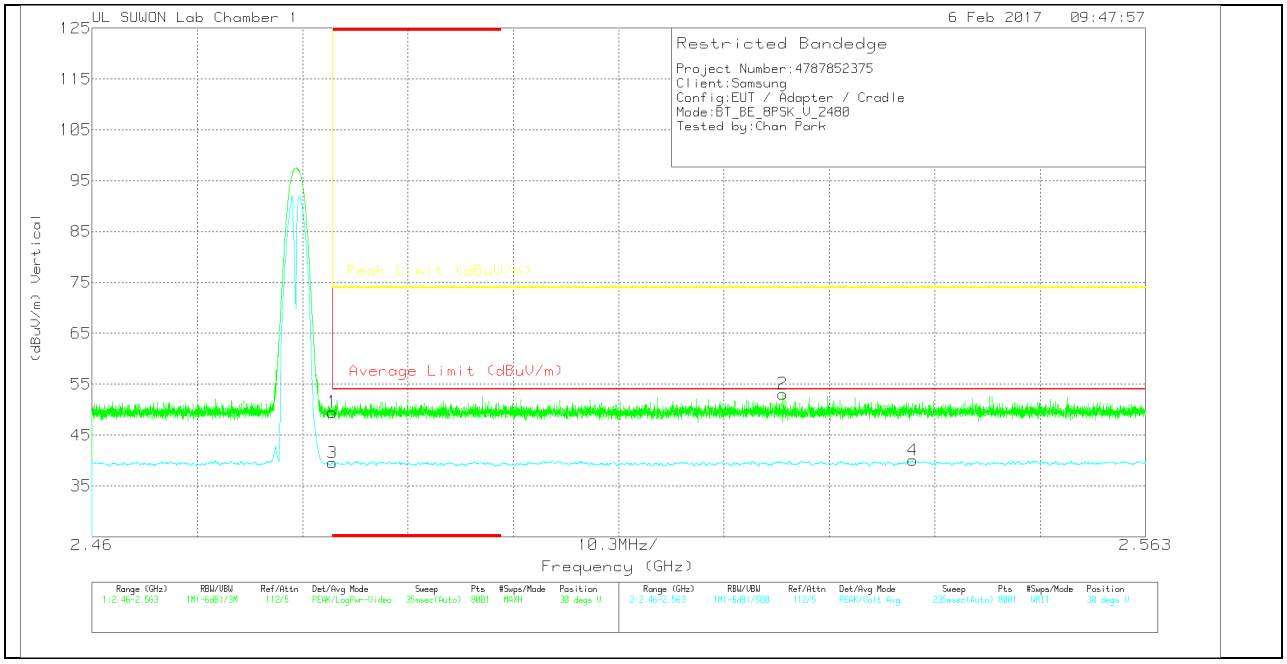
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 10dB_Att(dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 46.22 | Pk | 32 | -28.7 | 49.52 | - | - | 74 | -24.48 | 30 | 362 | V |
| 2 | 2.528 | 49.61 | Pk | 32 | -28.5 | 53.11 | - | - | 74 | -20.89 | 30 | 362 | V |
| 3 | * 2.484 | 36.22 | VA1T | 32 | -28.7 | 39.52 | 54 | -14.48 | - | - | 30 | 362 | V |
| 4 | 2.54 | 36.51 | VA1T | 32 | -28.5 | 40.01 | 54 | -13.99 | - | - | 30 | 362 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration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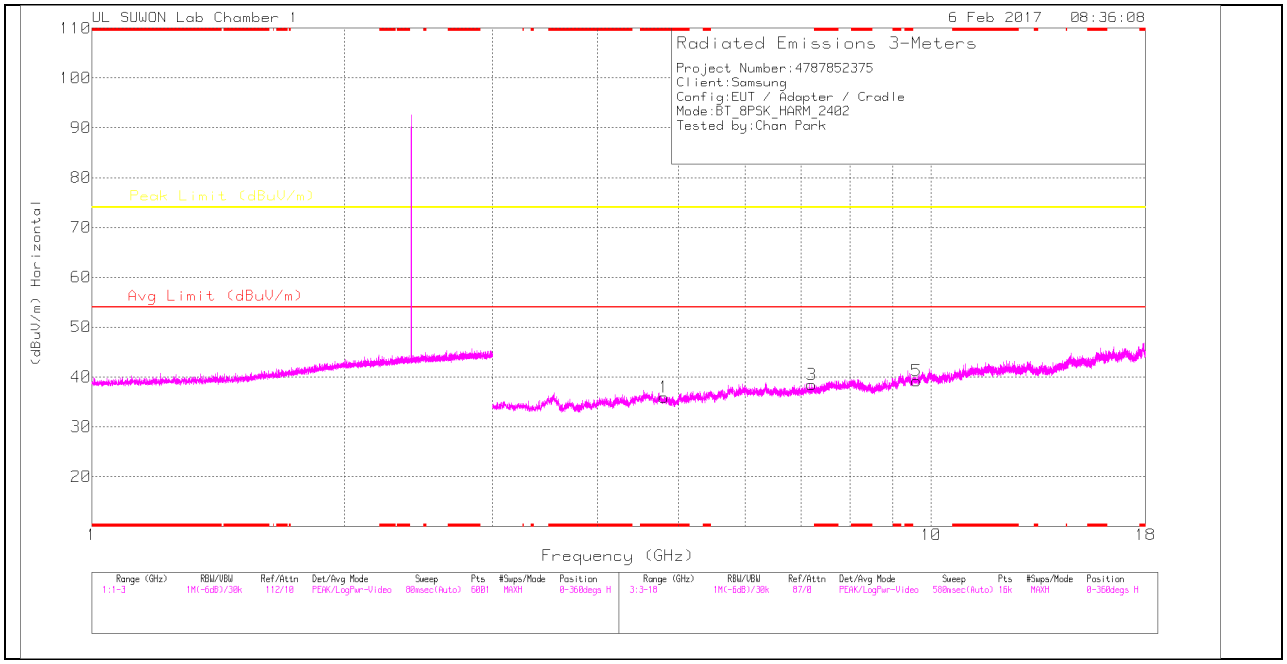
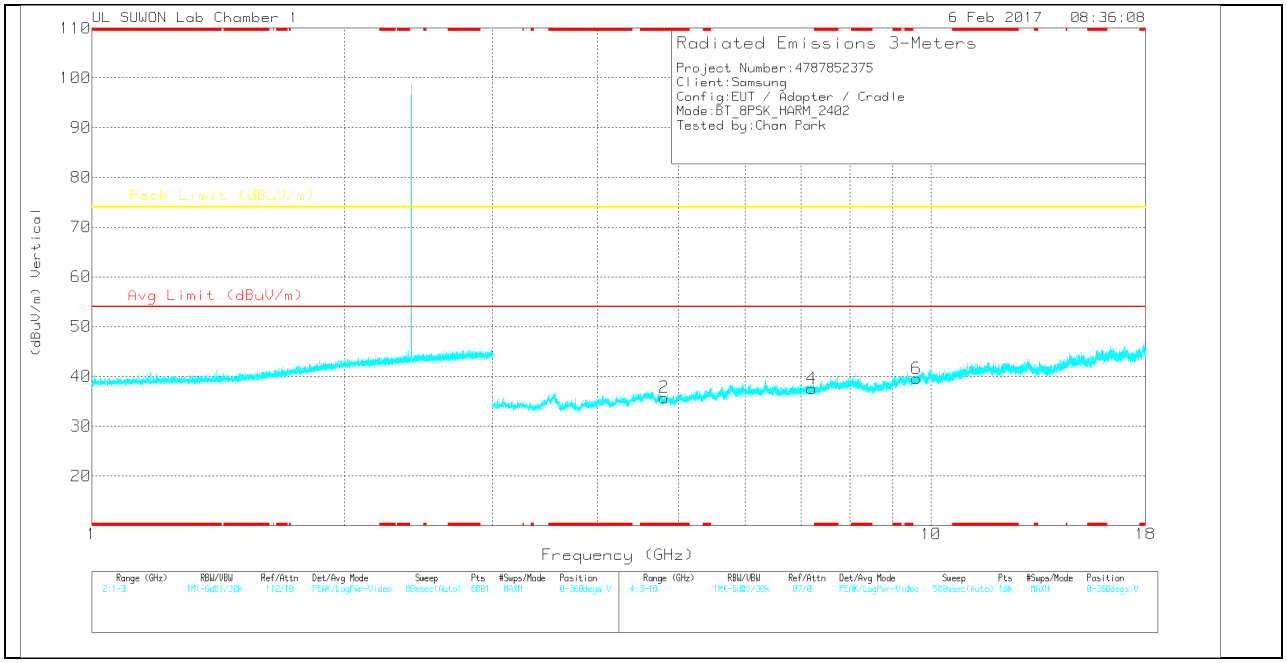
# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL HORIZONTAL




## LOW CHANNEL VERTICAL




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.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**LOW CHANNEL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 3Ghz_HP(dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.805 | 35.96 | Pk | 34 | -34 | 35.96 | - | - | 74 | -38.04 | 0-360 | 150 | H |
| 3 | 7.205 | 33.92 | Pk | 35.7 | -31.1 | 38.52 | - | - | 74 | -35.48 | 0-360 | 150 | H |
| 5 | 9.609 | 30.48 | Pk | 37 | -28.2 | 39.28 | - | - | 74 | -34.72 | 0-360 | 250 | H |
| 2 | * 4.805 | 35.75 | Pk | 34 | -34 | 35.75 | - | - | 74 | -38.25 | 0-360 | 250 | V |
| 4 | 7.204 | 33.11 | Pk | 35.7 | -31.2 | 37.61 | - | - | 74 | -36.39 | 0-360 | 250 | V |
| 6 | 9.609 | 30.78 | Pk | 37 | -28.2 | 39.58 | - | - | 74 | -34.42 | 0-360 | 250 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limt (54dBuV/m).


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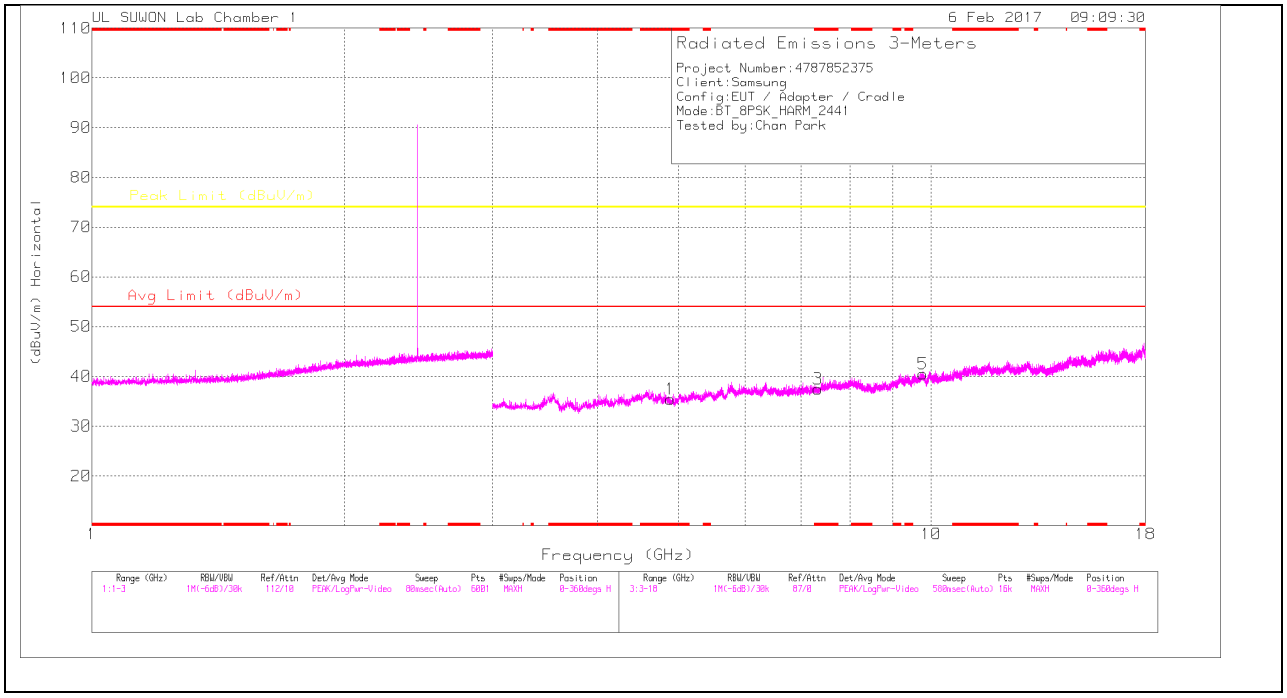
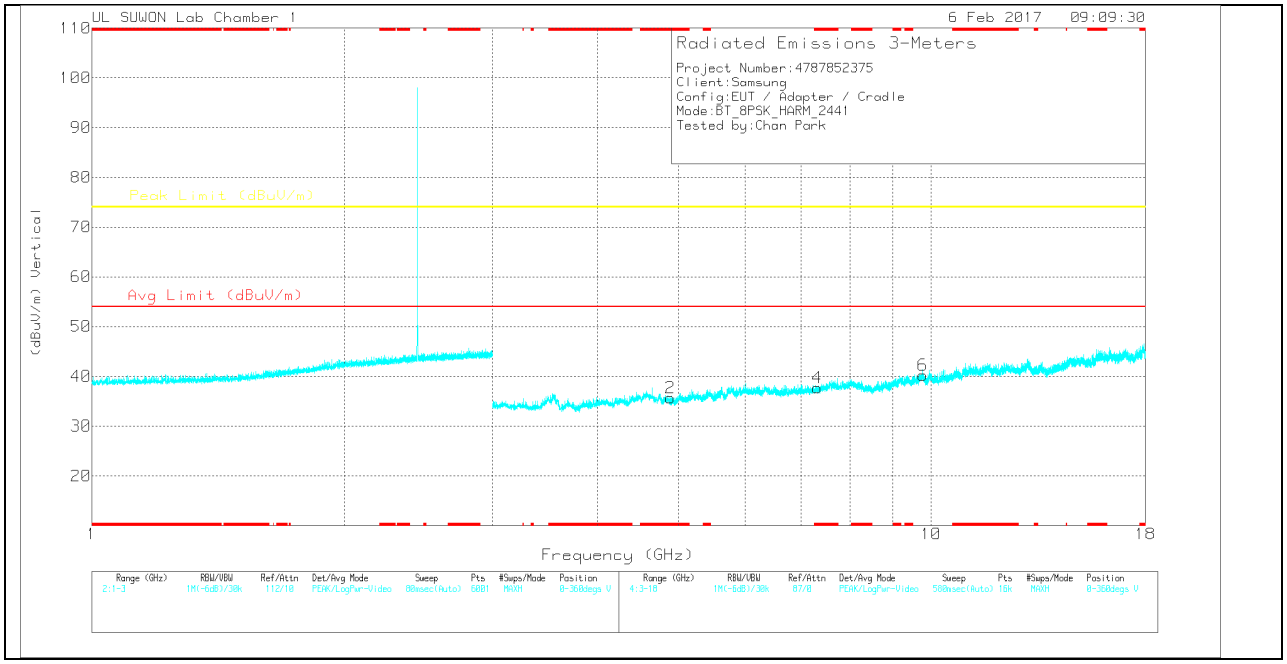
**MID CHANNEL HORIZONTAL**




**MID CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.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**MID CHANNEL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 3Ghz_HP(dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.887 | 35.49 | Pk | 34 | -34.1 | 35.39 | - | - | 74 | -38.61 | 0-360 | 250 | H |
| 3 | * 7.325 | 32.57 | Pk | 35.8 | -30.9 | 37.47 | - | - | 74 | -36.53 | 0-360 | 150 | H |
| 5 | 9.766 | 30.65 | Pk | 37.2 | -27.4 | 40.45 | - | - | 74 | -33.55 | 0-360 | 250 | H |
| 2 | * 4.887 | 35.82 | Pk | 34 | -34.1 | 35.72 | - | - | 74 | -38.28 | 0-360 | 250 | V |
| 4 | * 7.322 | 32.9 | Pk | 35.8 | -31 | 37.7 | - | - | 74 | -36.3 | 0-360 | 250 | V |
| 6 | 9.767 | 30.47 | Pk | 37.2 | -27.4 | 40.27 | - | - | 74 | -33.73 | 0-360 | 150 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limt (54dBuV/m).


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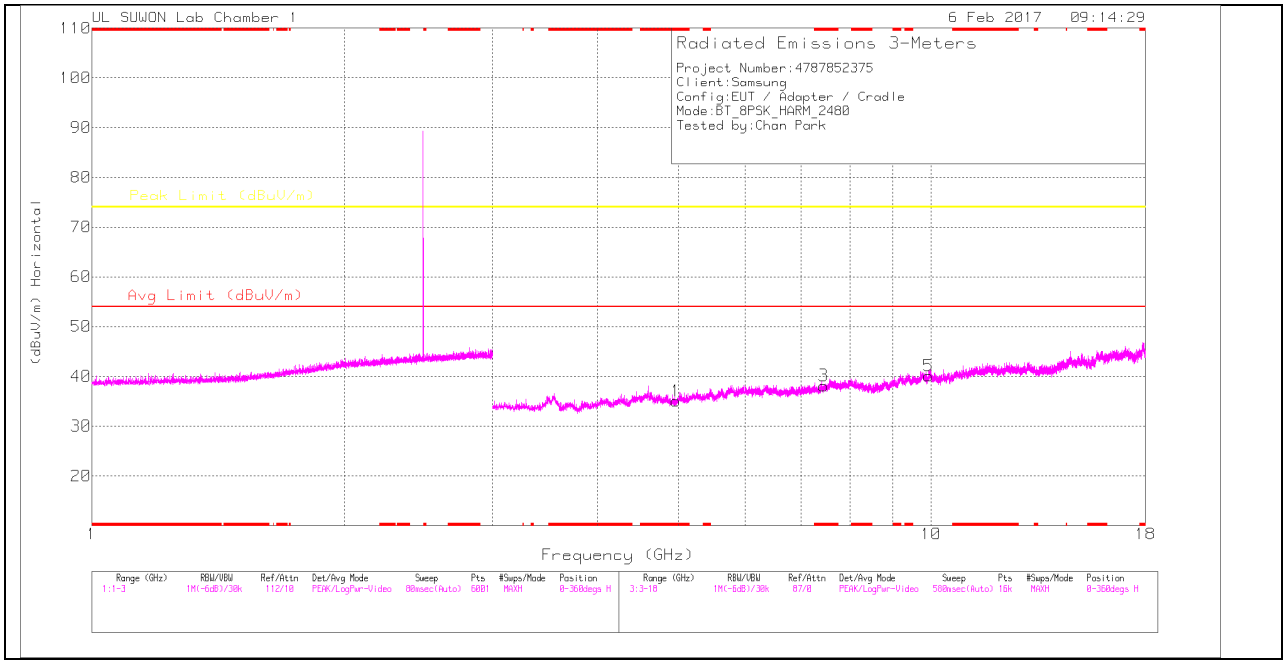
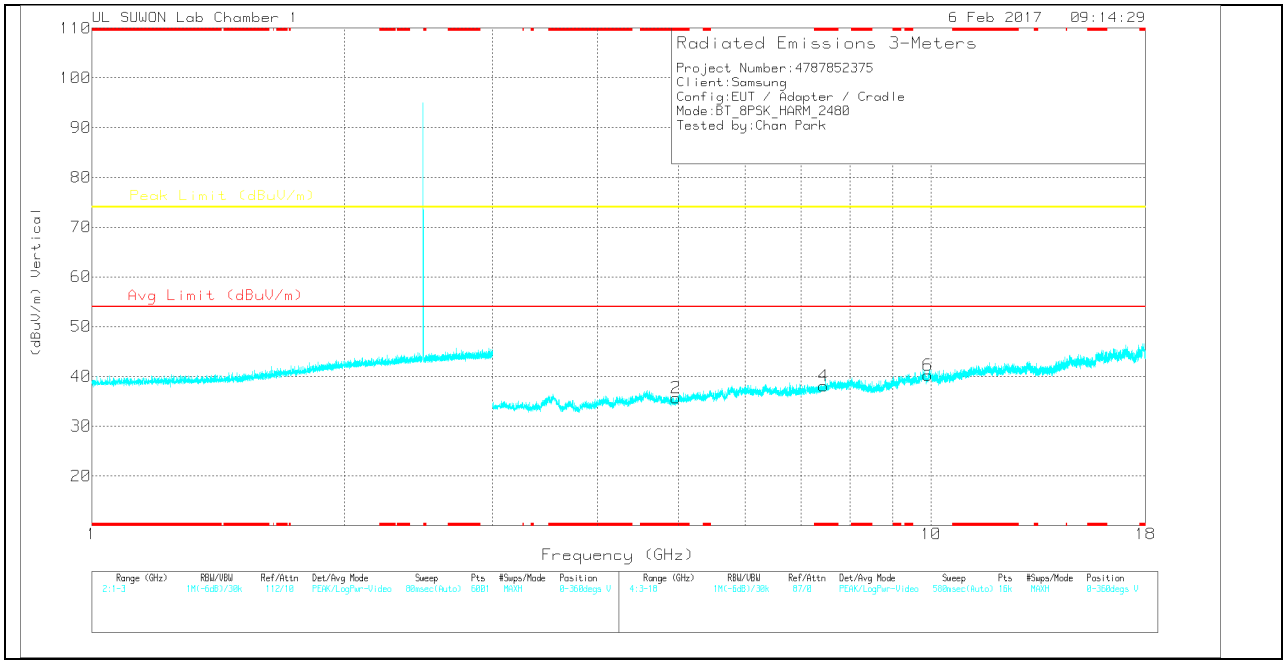
**HIGH CHANNEL HORIZONTAL**




**HIGH CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.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**HIGH CHANNEL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | 3Ghz_HP(dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.962 | 35.18 | Pk | 34 | -34.1 | 35.08 | - | - | 74 | -38.92 | 0-360 | 250 | H |
| 3 | * 7.444 | 33.35 | Pk | 35.8 | -31 | 38.15 | - | - | 74 | -35.85 | 0-360 | 250 | H |
| 5 | 9.921 | 30.56 | Pk | 37.4 | -27.9 | 40.06 | - | - | 74 | -33.94 | 0-360 | 150 | H |
| 2 | * 4.964 | 35.76 | Pk | 34 | -34.1 | 35.66 | - | - | 74 | -38.34 | 0-360 | 150 | V |
| 4 | * 7.44 | 33.4 | Pk | 35.8 | -31.1 | 38.1 | - | - | 74 | -35.9 | 0-360 | 250 | V |
| 6 | 9.916 | 30.79 | Pk | 37.4 | -27.9 | 40.29 | - | - | 74 | -33.71 | 0-360 | 150 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk – Peak detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limt (54dBuV/m).


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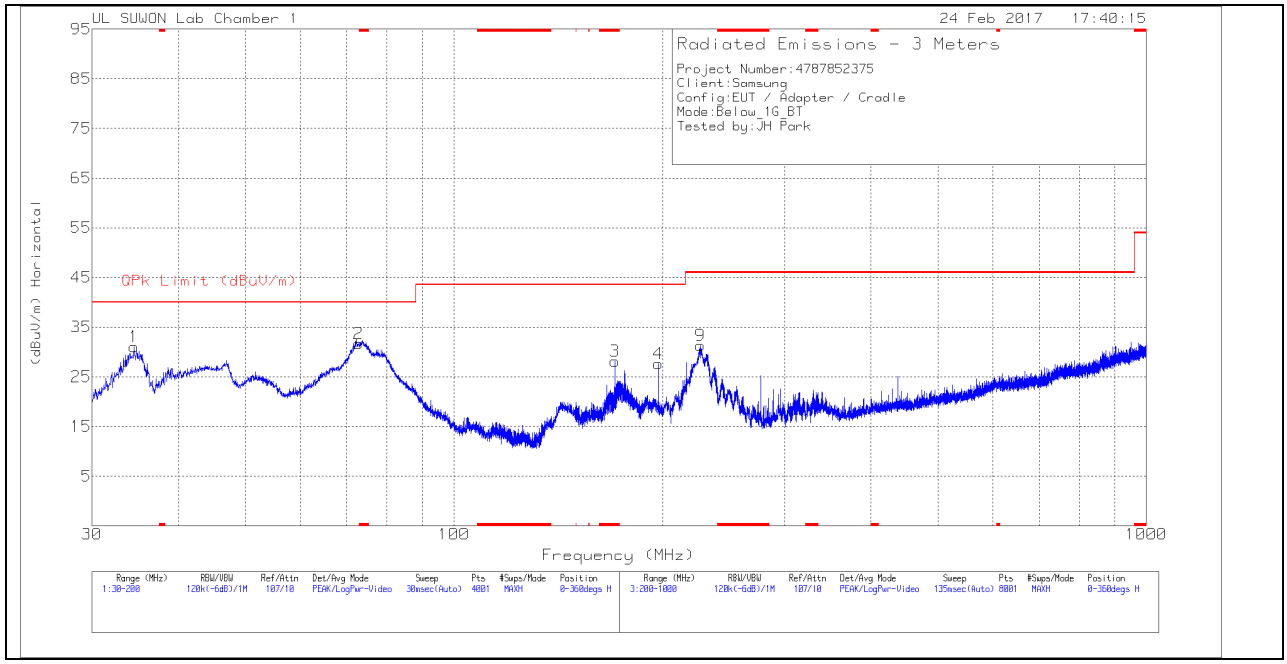
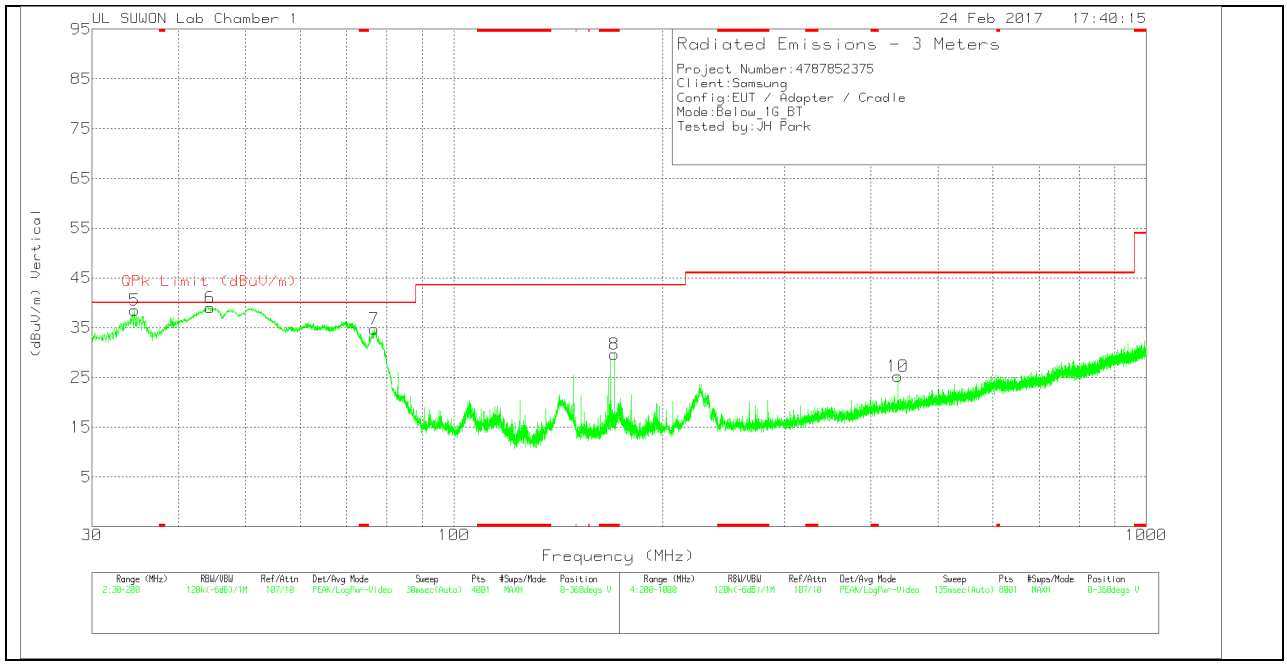
## 10.3. WORST-CASE BELOW 1 GHz

**GFSK SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**

### HORIZONTAL PLOT




### VERTICAL PLOT





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# BELOW 1 GHz TABLE

## Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750(dB) | 30-1000MHz(dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 34.505 | 48.81 | Pk | 10.7 | -28.5 | 31.01 | 40 | -8.99 | 0-360 | 200 | H |
| 2 | 72.84 | 51.34 | Pk | 8.5 | -28.1 | 31.74 | 40 | -8.26 | 0-360 | 300 | H |
| 3 | * 170.8025 | 46.09 | Pk | 8.8 | -26.8 | 28.09 | 43.52 | -15.43 | 0-360 | 200 | H |
| 4 | 197.11 | 43.2 | Pk | 11 | -26.6 | 27.6 | 43.52 | -15.92 | 0-360 | 300 | H |
| 5 | 34.5475 | 56.34 | Pk | 10.7 | -28.5 | 38.54 | 40 | -1.46 | 0-360 | 100 | V |
| 6 | 44.4075 | 53.53 | Pk | 13.5 | -28 | 39.03 | 40 | -.97 | 0-360 | 100 | V |
| 7 | 76.75 | 54.57 | Pk | 7.5 | -27.4 | 34.67 | 40 | -5.33 | 0-360 | 100 | V |
| 8 | * 170.3775 | 47.73 | Pk | 8.8 | -26.9 | 29.63 | 43.52 | -13.89 | 0-360 | 100 | V |
| 9 | 226.8 | 46.31 | Pk | 11.5 | -26.5 | 31.31 | 46.02 | -14.71 | 0-360 | 100 | H |
| 10 | 437.5 | 34.18 | Pk | 15.9 | -24.8 | 25.28 | 46.02 | -20.74 | 0-360 | 100 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

## Radiated Emissions

| Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750(dB) | 30-1000MHz(dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|
| 44.2897 | 50.72 | Qp | 13.4 | -28 | 36.12 | 40 | -3.88 | 147 | 106 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Qp - Quasi-Peak detector


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# 11. AC POWER LINE CONDUCTED EMISSIONS

**LIMITS**

FCC §15.207 (a)

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

**RESULTS**


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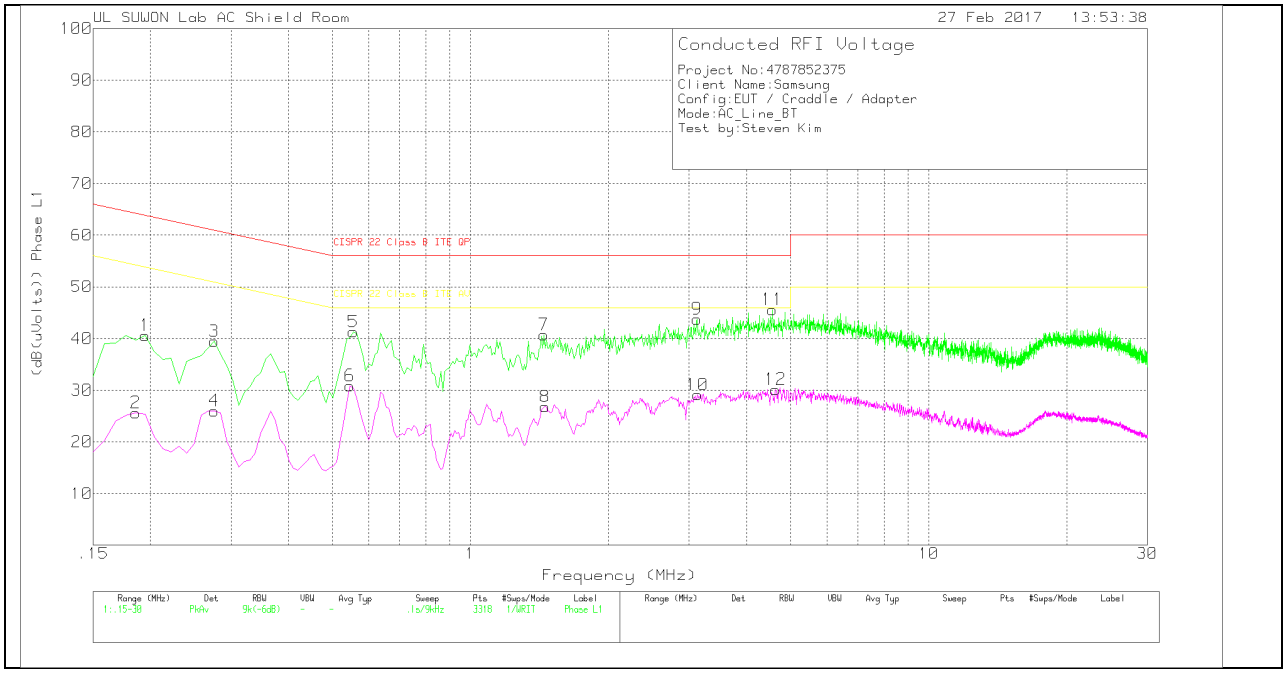
## 6 WORST EMISSIONS

# LINE 1 PLOT





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# LINE 1 RESULTS

## Trace Markers

Phase L1 .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_L1 | CABLELOSS(dB) | Corrected Reading (dB(uVolts)) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .195 | 30.5 | Pk | 9.9 | .2 | 40.6 | 63.82 | -23.22 | - | - |
| 2 | .186 | 15.54 | Av | 9.9 | .2 | 25.64 | - | - | 54.21 | -28.57 |
| 3 | .276 | 29.59 | Pk | 9.7 | .2 | 39.49 | 60.94 | -21.45 | - | - |
| 4 | .276 | 16.12 | Av | 9.7 | .2 | 26.02 | - | - | 50.94 | -24.92 |
| 5 | .555 | 31.19 | Pk | 9.9 | .2 | 41.29 | 56 | -14.71 | - | - |
| 6 | .546 | 20.76 | Av | 9.9 | .2 | 30.86 | - | - | 46 | -15.14 |
| 7 | 1.446 | 30.62 | Pk | 9.8 | .3 | 40.72 | 56 | -15.28 | - | - |
| 8 | 1.455 | 16.7 | Av | 9.8 | .3 | 26.8 | - | - | 46 | -19.2 |
| 9 | 3.12 | 33.67 | Pk | 9.8 | .3 | 43.77 | 56 | -12.23 | - | - |
| 10 | 3.129 | 19.02 | Av | 9.8 | .3 | 29.12 | - | - | 46 | -16.88 |
| 11 | 4.56 | 35.51 | Pk | 9.8 | .3 | 45.61 | 56 | -10.39 | - | - |
| 12 | 4.632 | 20.04 | Av | 9.8 | .3 | 30.14 | - | - | 46 | -15.86 |

Pk - Peak detector

Av - Average detection


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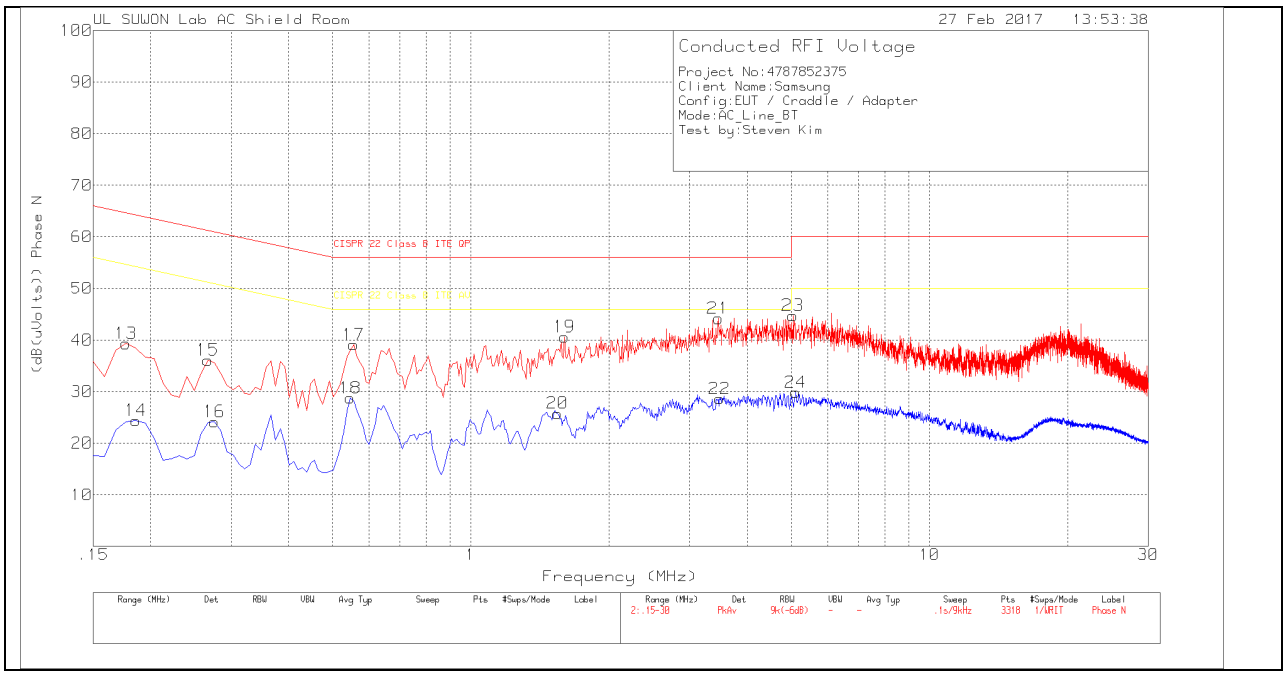
# LINE 2 PLOT





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# LINE 2 RESULTS

Trace Markers

Phase N .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_N | CABLELOSS(dB) | Corrected Reading (dB(uVolts)) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 13 | .177 | 29.12 | Pk | 10 | .2 | 39.32 | 64.63 | -25.31 | - | - |
| 14 | .186 | 14.32 | Av | 9.9 | .2 | 24.42 | - | - | 54.21 | -29.79 |
| 15 | .267 | 26.22 | Pk | 9.7 | .2 | 36.12 | 61.21 | -25.09 | - | - |
| 16 | .276 | 14.27 | Av | 9.7 | .2 | 24.17 | - | - | 50.94 | -26.77 |
| 17 | .555 | 29.01 | Pk | 9.9 | .2 | 39.11 | 56 | -16.89 | - | - |
| 18 | .546 | 18.68 | Av | 9.9 | .2 | 28.78 | - | - | 46 | -17.22 |
| 19 | 1.599 | 30.61 | Pk | 9.7 | .3 | 40.61 | 56 | -15.39 | - | - |
| 20 | 1.545 | 15.79 | Av | 9.7 | .3 | 25.79 | - | - | 46 | -20.21 |
| 21 | 3.462 | 34.09 | Pk | 9.8 | .3 | 44.19 | 56 | -11.81 | - | - |
| 22 | 3.489 | 18.56 | Av | 9.8 | .3 | 28.66 | - | - | 46 | -17.34 |
| 23 | 5.037 | 34.64 | Pk | 9.8 | .3 | 44.74 | 60 | -15.26 | - | - |
| 24 | 5.109 | 19.77 | Av | 9.8 | .3 | 29.87 | - | - | 50 | -20.13 |

Pk - Peak detector

Av - Average detection


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