**FCC CFR47 PART 15 SUBPART C**
**INDUSTRY CANADA RSS-247 ISSUE 1**

**Bluetooth**

# CERTIFICATION TEST REPORT

**FOR**

**Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+ Tablet**

**MODEL NUMBER : SM-T670**

**FCC ID: A3LSMT670**
**IC ID: 649E-SMT670**

**REPORT NUMBER: 15K21654-E3**

**ISSUE DATE: SEP 14, 2015**

*Prepared for*
**SAMSUNG ELECTRONICS CO., LTD.**
**129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,**
**GYEONGGI-DO, 16677, KOREA**

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ACCREDITED
TL-637

## Revision History

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# TABLE OF CONTENTS

**1. ATTESTATION OF TEST RESULTS ..... 5**

**2. TEST METHODOLOGY ..... 6**

**3. FACILITIES AND ACCREDITATION ..... 6**

**4. CALIBRATION AND UNCERTAINTY ..... 6**

*4.1. MEASURING INSTRUMENT CALIBRATION ..... 6*

*4.2. SAMPLE CALCULATION ..... 6*

*4.3. MEASUREMENT UNCERTAINTY ..... 6*

**5. EQUIPMENT UNDER TEST ..... 7**

*5.1. DESCRIPTION OF EUT ..... 7*

*5.2. MAXIMUM OUTPUT POWER ..... 7*

*5.3. DESCRIPTION OF AVAILABLE ANTENNAS ..... 7*

*5.4. WORST-CASE CONFIGURATION AND MODE ..... 7*

*5.5. DESCRIPTION OF TEST SETUP ..... 8*

**6. TEST AND MEASUREMENT EQUIPMENT ..... 10**

**7. SUMMARY TABLE ..... 11**

**8. ANTENNA PORT TEST RESULTS ..... 12**

*8.1. 20 dB AND 99% BANDWIDTH ..... 12*

8.1.1. BASIC DATA RATE GFSK MODULATION ..... 12
8.1.2. ENHANCED DATA RATE Pi/4-DQPSK MODULATION ..... 12
8.1.3. ENHANCED DATA RATE 8PSK MODULATION ..... 12
8.1.4. 20 dB AND 99% BANDWIDTH PLOTS ..... 13

*8.2. HOPPING FREQUENCY SEPARATION ..... 16*

*8.3. NUMBER OF HOPPING CHANNELS ..... 18*

*8.4. AVERAGE TIME OF OCCUPANCY ..... 21*

*8.5. OUTPUT POWER ..... 25*

8.5.1. BASIC DATA RATE GFSK MODULATION ..... 25
8.5.2. ENHANCED DATA RATE Pi/4-DPSK MODULATION ..... 25
8.5.3. ENHANCED DATA RATE 8PSK MODULATION ..... 25
8.5.4. OUTPUT POWER PLOTS ..... 26

*8.6. AVERAGE POWER ..... 29*

8.6.1. BASIC DATA RATE GFSK MODULATION ..... 29
8.6.2. DATA RATE PI/4-DQPSK MODULATION ..... 29
8.6.3. ENHANCED DATA RATE 8PSK MODULATION ..... 29

*8.7. CONDUCTED SPURIOUS EMISSIONS ..... 30*

8.7.1. BASIC DATA RATE GFSK MODULATION ..... 31



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**9. RADIATED TEST RESULTS ..... 37**

*9.1. LIMITS AND PROCEDURE ..... 37*

*9.2. TRANSMITTER ABOVE 1 GHz ..... 38*

9.2.1. BASIC DATA RATE GFSK MODULATION ..... 38

9.2.2. ENHANCED DATA RATE 8PSK MODULATION ..... 48

*9.3. WORST-CASE BELOW 1 GHz ..... 58*

**10. AC POWER LINE CONDUCTED EMISSIONS ..... 60**

**11. SETUP PHOTOS ..... 65**



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# 1. ATTESTATION OF TEST RESULTS

| | |
|---|---|
| **COMPANY NAME:** | SAMSUNG ELECTRONICS CO., LTD. |
| **EUT DESCRIPTION:** | Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+ Tablet |
| **MODEL NUMBER:** | SM-T670 |
| **SERIAL NUMBER:** | R32G8008T9F (RADIATED); R32G800900V (CONDUCTED) |
| **DATE TESTED:** | AUG 21, 2015 - SEP 07, 2015 |

**APPLICABLE STANDARDS**

| STANDARD | TEST RESULTS |
|---|---|
| CFR 47 Part 15 Subpart C | Pass |
| INDUSTRY CANADA RSS-247 Issue 1 | Pass |
| INDUSTRY CANADA RSS-GEN Issue 4 | 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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CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.


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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, and KDB 558074 D01 v03r03, ANSI C63.10-2009 for FCC and ANSI C63.10-2013 for IC, RSS-GEN Issue 4, and RSS-247 Issue 1.

**ANSI C63.10-2009 Deviation**
Radiated spurious emission above 1GHz EUT height is 1.5m not 0.8m.

# 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 |

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# 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 Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+ Tablet.
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 | 8.50 | 7.07 |
| | | Peak | 8.56 | 7.18 |
| | Enhanced Pi/4-DPSK | Average | 4.31 | 2.70 |
| | | Peak | 6.57 | 4.54 |
| | Enhanced 8PSK | Average | 4.35 | 2.72 |
| | | Peak | 7.08 | 5.11 |

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 8.6.

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 2.94dBi.

## 5.4. WORST-CASE CONFIGURATION AND MODE

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

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


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## 5.5. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| Charger | SAMSUNG | KSAS0501900200HU | R37G819A01R0KT3 | N/A |
| Data Cable | SAMSUNG | EP-DG925UWE | N/A | N/A |
| Earphone | SAMSUNG | GH59-13967A | N/A | N/A |

**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 |
| 2 | Audio | 1 | Mini-Jack | Unshielded | 1.0m | N/A |

**TEST SETUP**

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


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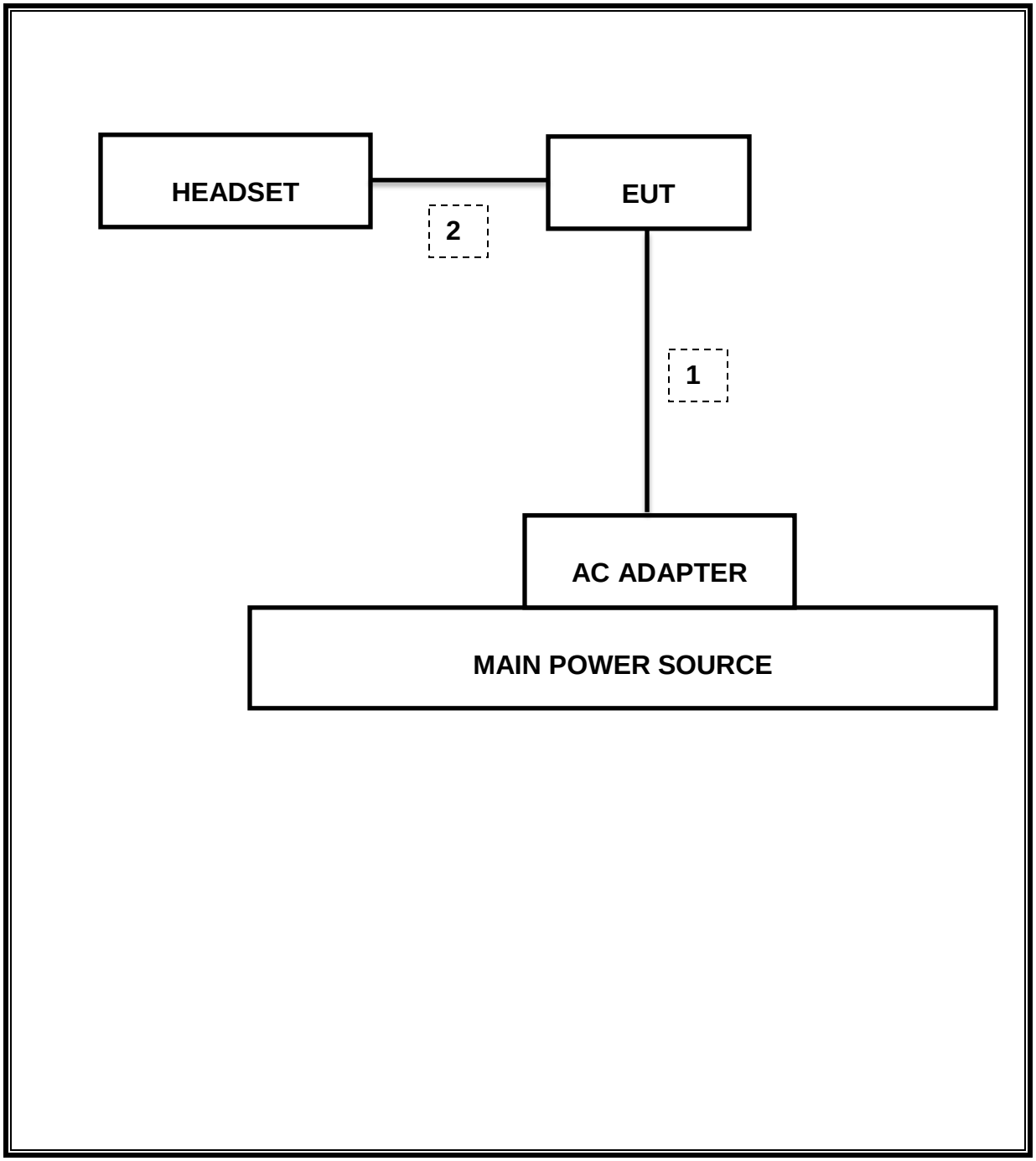
**SETUP DIAGRAM FOR TESTS**





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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 | 11-17-15 |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK | VULB9163 | 749 | 04-25-16 |
| Antenna, Horn, 18 GHz | ETS | 3115 | 00167211 | 09-20-15 |
| Antenna, Horn, 18 GHz | ETS | 3115 | 00161451 | 05-17-16 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168724 | 06-17-16 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168717 | 06-17-16 |
| Antenna, Horn, 40 GHz | ETS | 3116C | 00166255 | 09-23-15 |
| Antenna, Horn, 40 GHz | ETS | 3116C-PA | 00168841 | 09-29-15 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 341282 | 08-18-16 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 351741 | 08-18-16 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 1876511 | 08-18-16 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 1896138 | 08-18-16 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | MY54170614 | 08-19-16 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | MY54490312 | 08-19-16 |
| Bluetooth Tester | TESCOM | TC-3000C | 3000C000546 | 08-18-16 |
| Average Power Sensor | R&S | NRZ-Z91 | 102681 | 08-18-16 |
| Average Power Sensor | Agilent / HP | U2000 | MY54270007 | 08-18-16 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100439 | 08-19-16 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100457 | 08-19-16 |
| EMI Test Receive, 3 GHz | R&S | ESR3 | 101832 | 08-19-16 |
| Attenuator / Switch driver | HP | 11713A | 3748A04272 | N/A |
| Low Pass Filter 3GHz | Micro-Tronics | LPS17541 | 009 | 08-18-16 |
| Low Pass Filter 3GHz | Micro-Tronics | LPS17541 | 015 | 08-18-16 |
| High Pass Filter 5GHz | Micro-Tronics | HPS17542 | 009 | 08-18-16 |
| High Pass Filter 6GHz | Micro-Tronics | HPM17543 | 010 | 08-18-16 |
| High Pass Filter 5GHz | Micro-Tronics | HPS17542 | 016 | 08-18-16 |
| High Pass Filter 6GHz | Micro-Tronics | HPM17543 | 015 | 08-18-16 |
| LISN | R&S | ENV-216 | 101836 | 08-19-16 |
| LISN | R&S | ENV-216 | 101837 | 08-19-16 |
| Combiner | WEINSCHEL | 1575 | 2153 | 08-20-16 |


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# 7. SUMMARY TABLE

| FCC Part Section | RSS Section | Test Description | Test Limit | Test Condition | Test Result | Worst Case |
|---|---|---|---|---|---|---|
| 2.1049 | RSS-GEN 4.6 | Occupied Band width (99%) | N/A | Conducted | Pass | 1.366 MHz |
| 2.1051, 15.247 (d) | RSS-247 5.1(2) | Band Edge / Conducted Spurious Emission | -20dBc | | Pass | -51.036 dBm |
| 15.247 (b)(1) | RSS-247 5.1(2) | TX conducted output power | <21dBm | | Pass | 8.564 dBm (Peak) |
| 15.247 (a)(1) | RSS-247 5.1(2) | Hopping frequency separation | > 25KHz | | Pass | 1 MHz |
| 15.247 (a)(1)(iii) | RSS-247 5.1(4) | Number of Hopping channels | More than 15 non-overlapping channels | | Pass | 79 |
| 15.247 (a)(1)(iii) | RSS-247 5.1(4) | Avg Time of Occupancy | < 0.4sec | | Pass | 0.346 sec |
| 15.207 (a) | RSS-GEN 8.8 | AC Power Line conducted emissions | Section 10 | Power Line conducted | Pass | 52.7 dBuV (QP) |
| 15.205, 15.209 | RSS-GEN Clause 7 & 8.9 | Radiated Spurious Emission | < 54dBuV/m | Radiated | Pass | 34.11 dBuV/m (QP) |


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# 8. ANTENNA PORT TEST RESULTS

## 8.1. 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**

### 8.1.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [MHz] |
|---|---|---|---|
| Low | 2402 | 0.938 | 932.270 |
| Mid | 2441 | 0.937 | 903.120 |
| High | 2480 | 0.937 | 903.060 |
| Worst | | 0.938 | 932.270 |

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

| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [MHz] |
|---|---|---|---|
| Low | 2402 | 1.354 | 1.166 |
| Mid | 2441 | 1.353 | 1.199 |
| High | 2480 | 1.346 | 1.196 |
| Worst | | 1.354 | 1.199 |

### 8.1.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [MHz] |
|---|---|---|---|
| Low | 2402 | 1.352 | 1.195 |
| Mid | 2441 | 1.362 | 1.170 |
| High | 2480 | 1.366 | 1.195 |
| Worst | | 1.366 | 1.195 |


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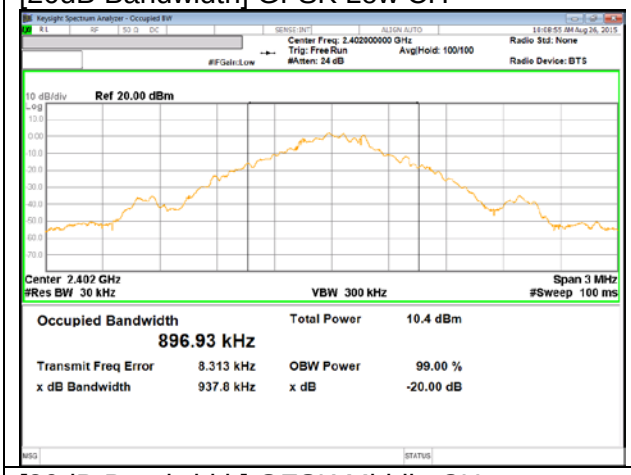
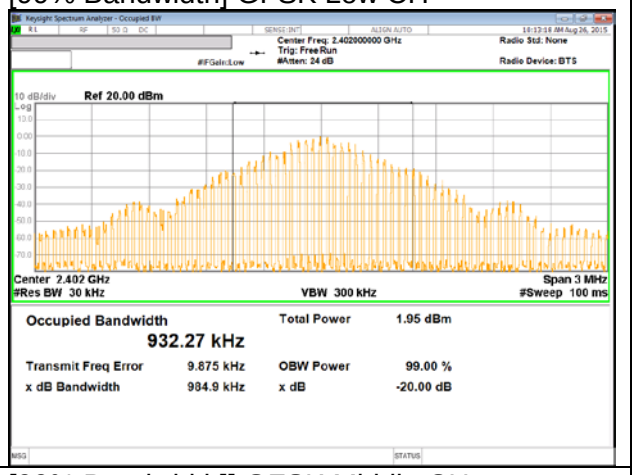
## 8.1.4. 20 dB AND 99% BANDWIDTH PLOTS

**GFSK BANDWIDTH**

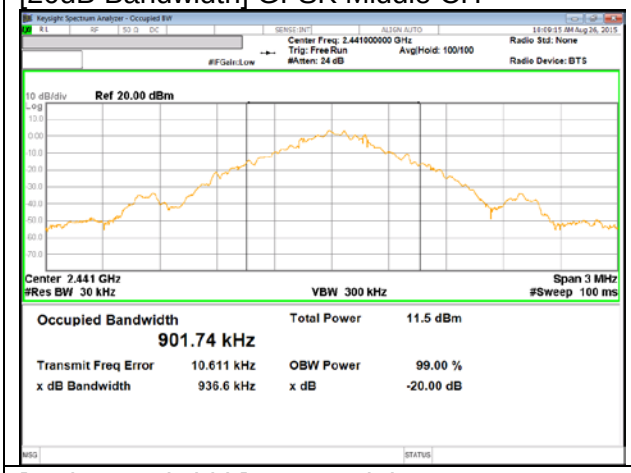
[20dB Bandwidth] GFSK Low CH



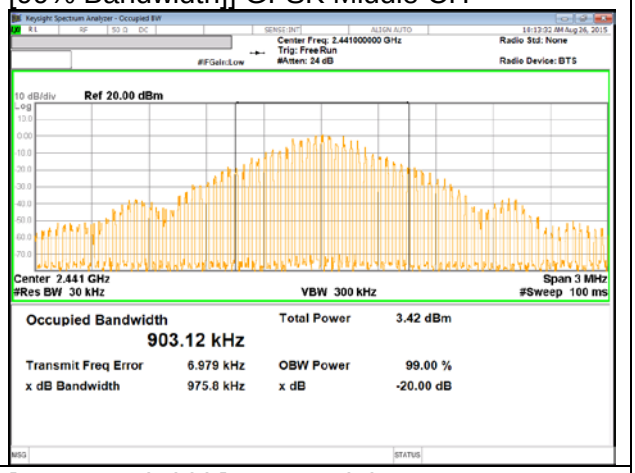

[99% Bandwidth] GFSK Low CH



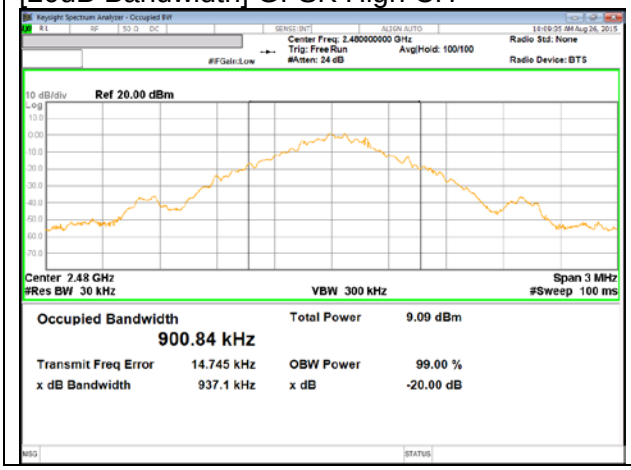

[20dB Bandwidth] GFSK Middle CH



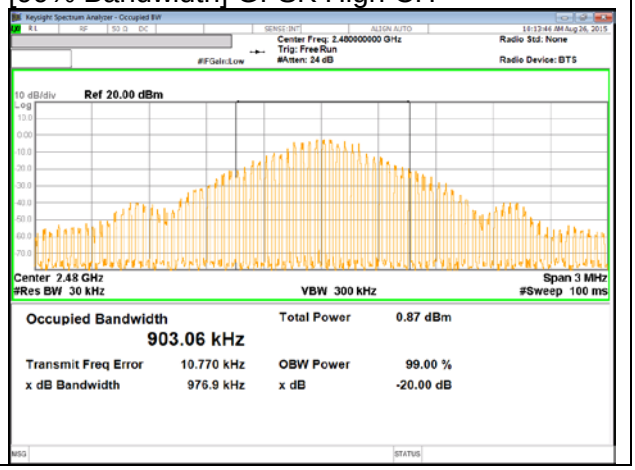

[99% Bandwidth]] GFSK Middle CH




[20dB Bandwidth] GFSK High CH




[99% Bandwidth] GFSK High CH





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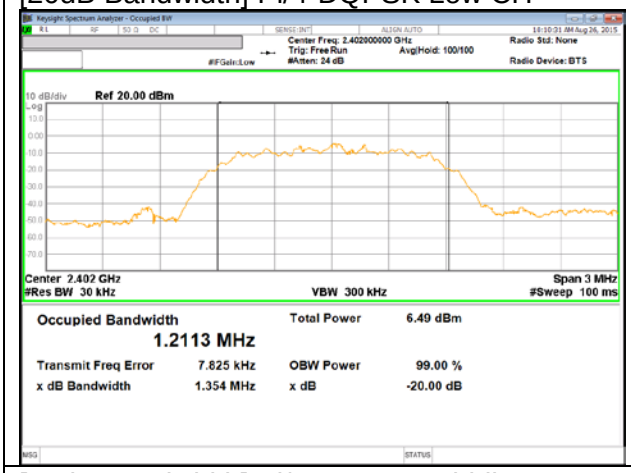
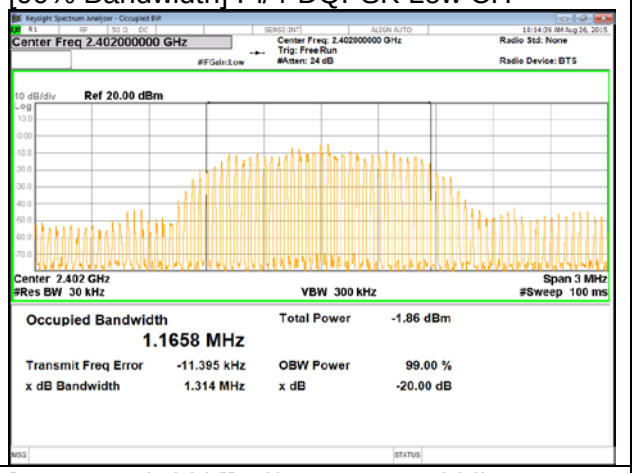
**Pi/4-DQPSK BANDWIDTH**

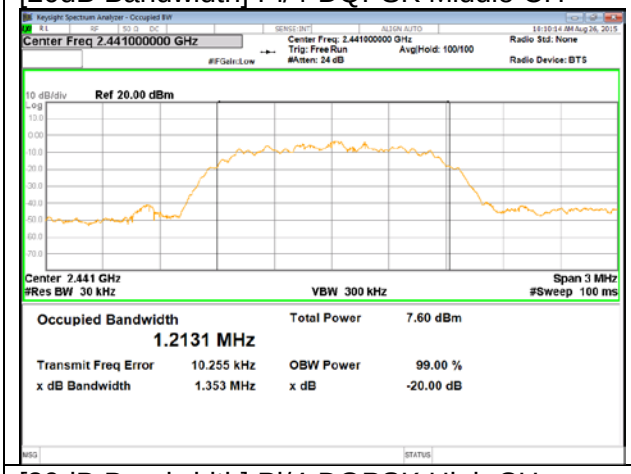
[20dB Bandwidth] Pi/4-DQPSK Low CH



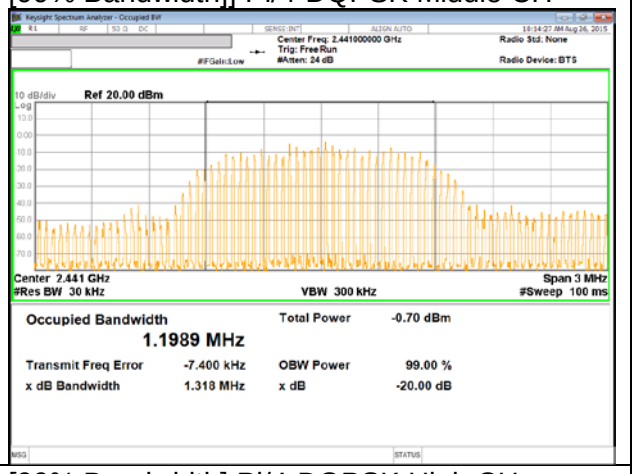

[99% Bandwidth] Pi/4-DQPSK Low CH



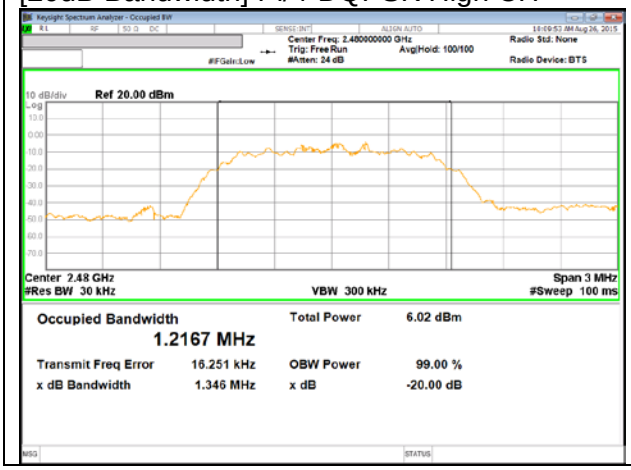

[20dB Bandwidth] Pi/4-DQPSK Middle CH



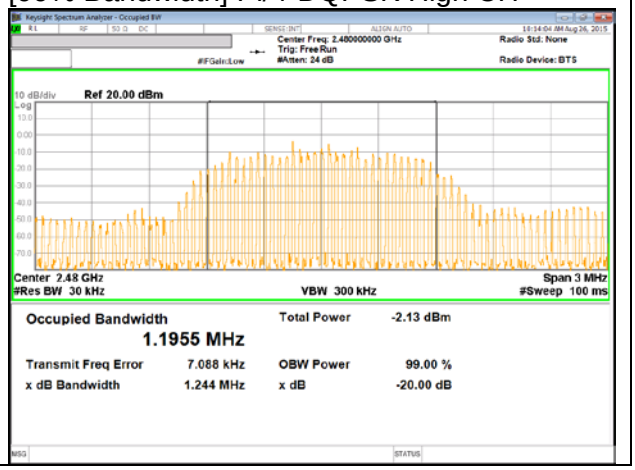

[99% Bandwidth]] Pi/4-DQPSK Middle CH




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




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





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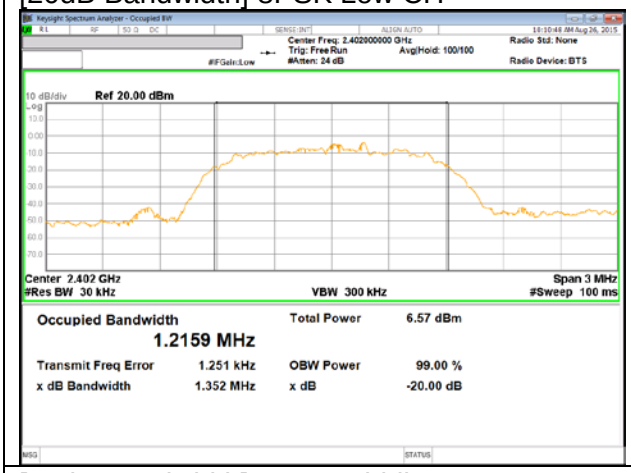
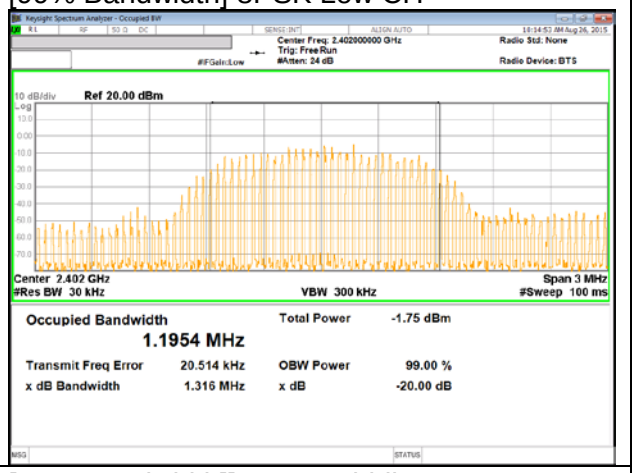
**8PSK BANDWIDTH**

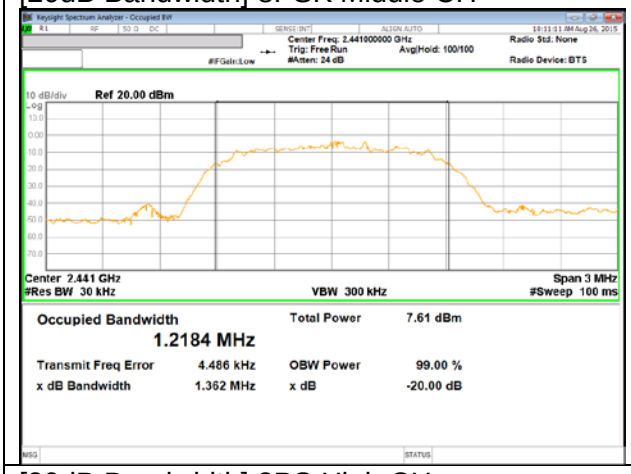
[20dB Bandwidth] 8PSK Low CH



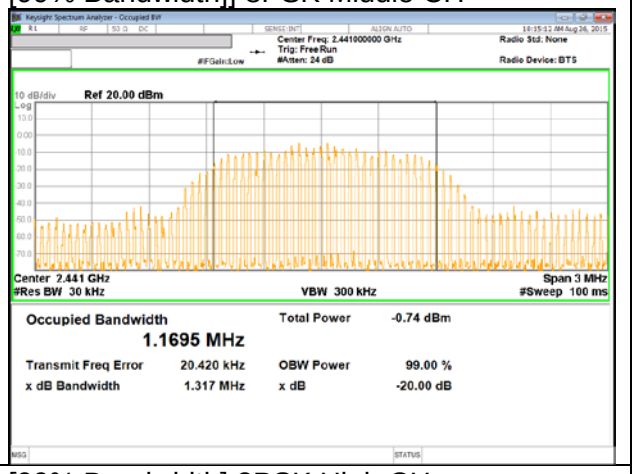

[99% Bandwidth] 8PSK Low CH



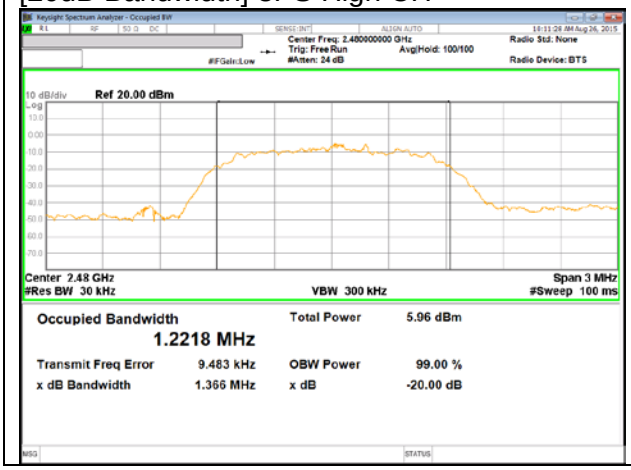

[20dB Bandwidth] 8PSK Middle CH



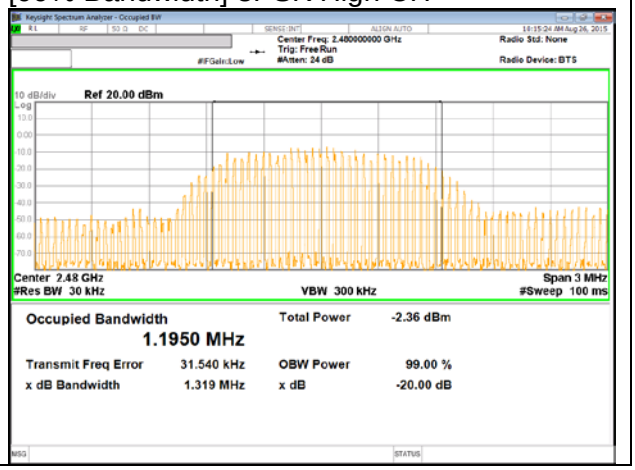

[99% Bandwidth]] 8PSK Middle CH




[20dB Bandwidth] 8PS High CH




[99% Bandwidth] 8PSK High CH





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## 8.2. HOPPING FREQUENCY SEPARATION

**LIMIT**

FCC §15.247 (a) (1)
IC RSS-247 §5.1 (2)

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**


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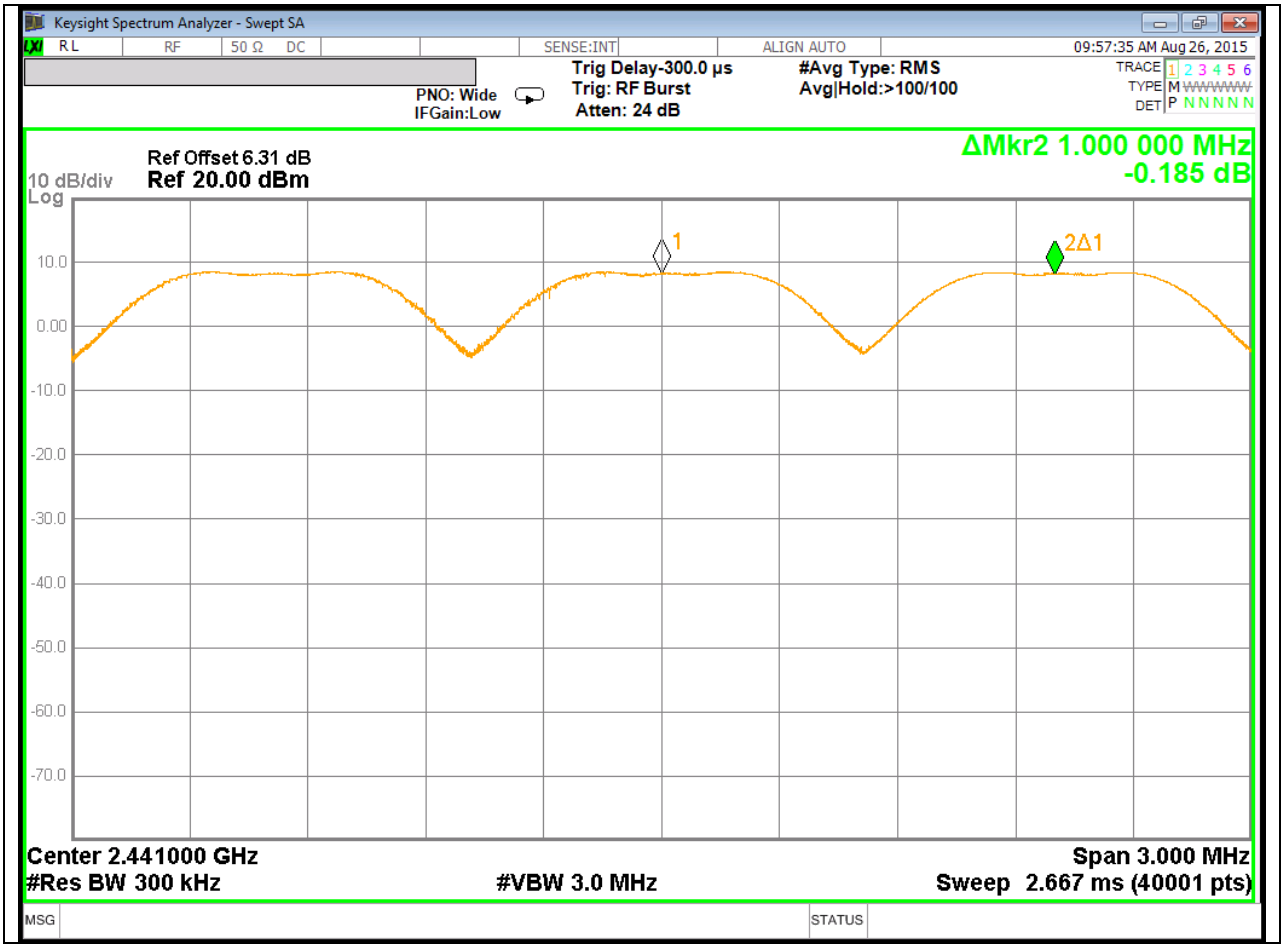
**HOPPING FREQUENCY SEPARATION PLOT**





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## 8.3. NUMBER OF HOPPING CHANNELS

**LIMIT**

FCC §15.247 (a) (1) (iii)
IC RSS-247 §5.1 (4)

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.


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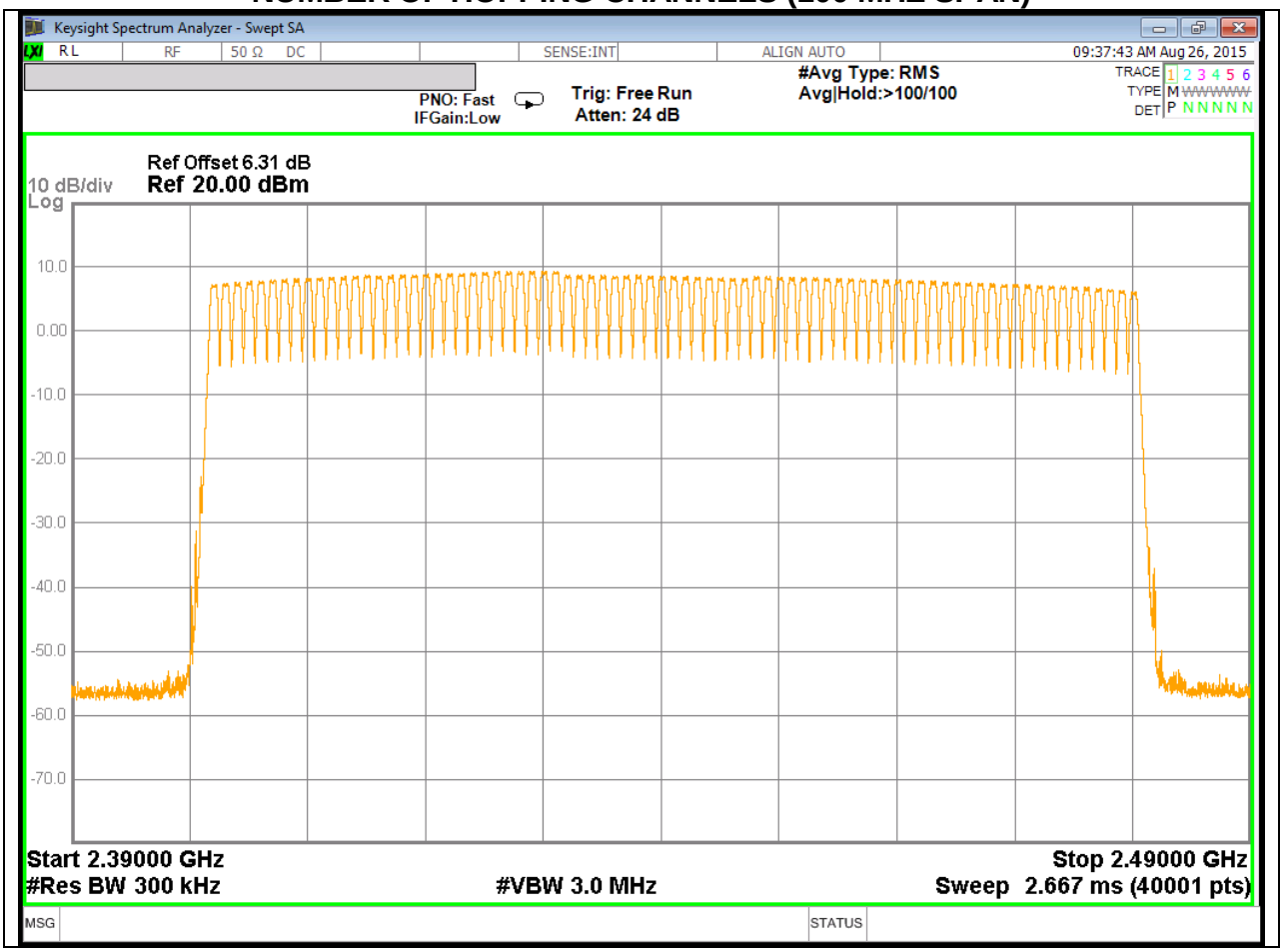
**NUMBER OF HOPPING CHANNELS PLOTS**

## NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)





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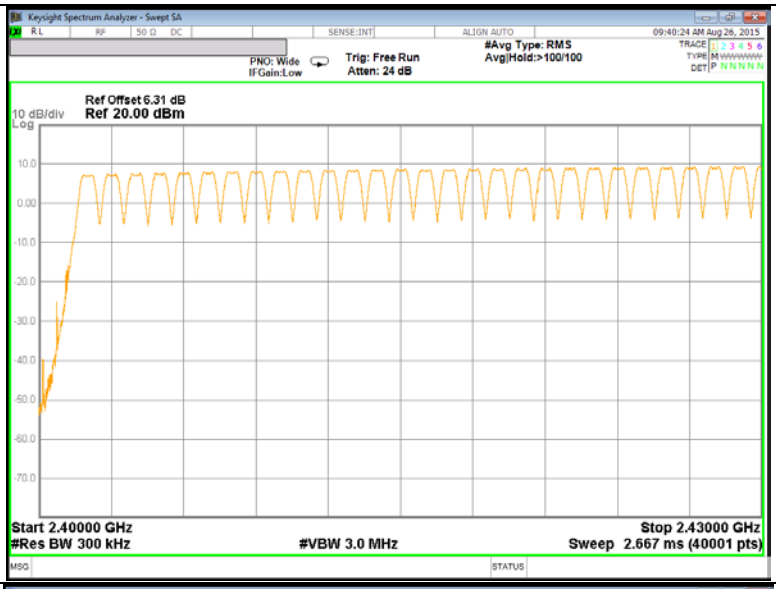
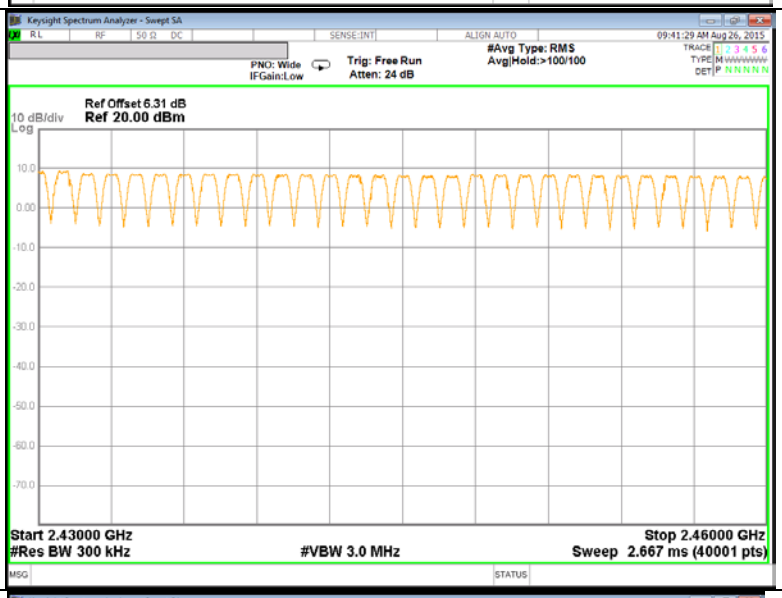
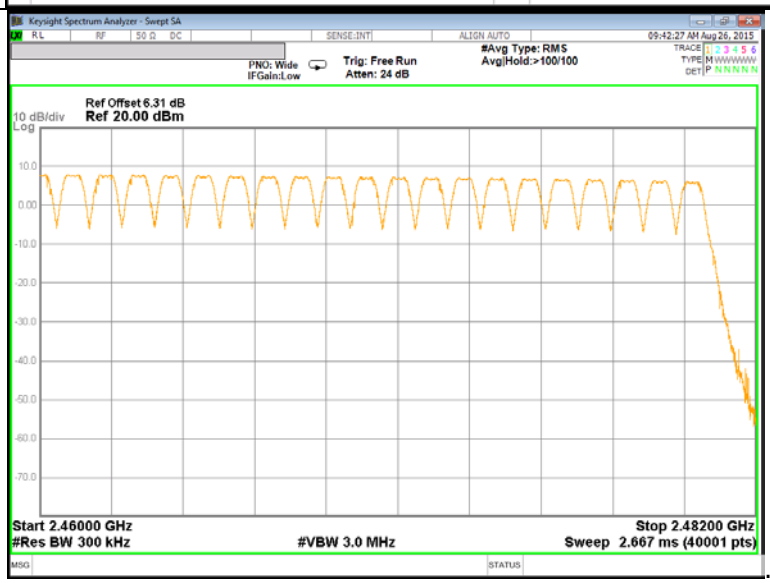
| | |
|---|---|
| 1st SEGMENT<br><br>2400 to 2430 MHz |  |
| 2nd SEGMENT<br><br>2430 to 2460 MHz |  |
| 3rd SEGMENT<br><br>2460 to 2482 MHz |  |



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## 8.4. AVERAGE TIME OF OCCUPANCY

**LIMIT**

FCC §15.247 (a) (1) (iii)
IC RSS-247 §5.1 (4)

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 | 0.122368 | 0.4 | -0.2776 |
| DH3 | 1.638 | 17 | 0.278460 | 0.4 | -0.1215 |
| DH5 | 2.886 | 12 | 0.346320 | 0.4 | -0.0537 |
| | | | | | |
| 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 | 0.030592 | 0.4 | -0.36941 |
| DH3 | 1.638 | 4.25 | 0.069615 | 0.4 | -0.33039 |
| DH5 | 2.886 | 3 | 0.086580 | 0.4 | -0.31342 |


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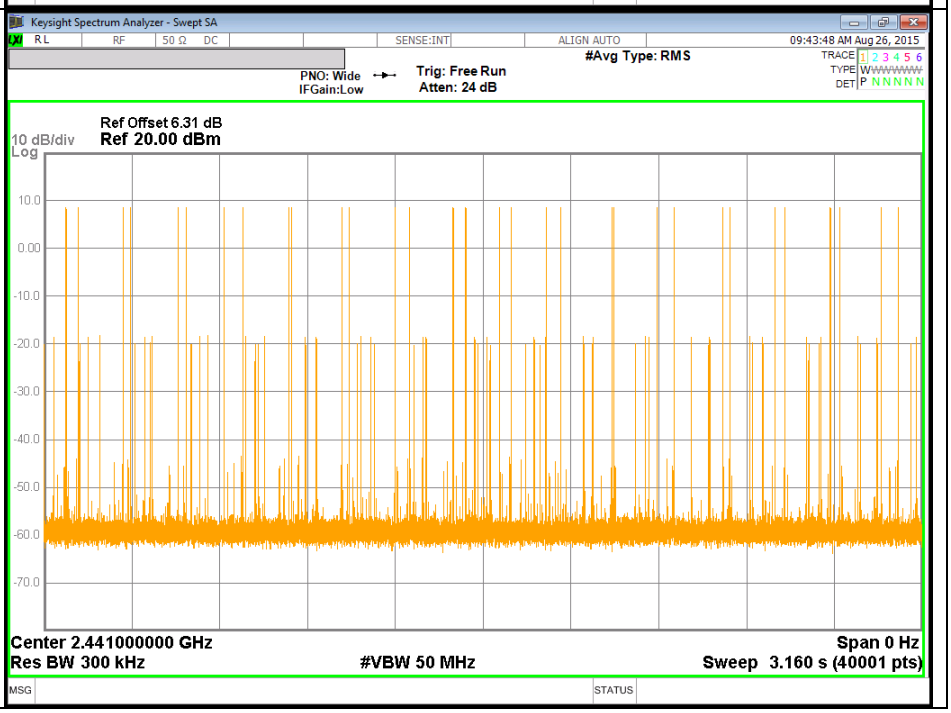
## DH1

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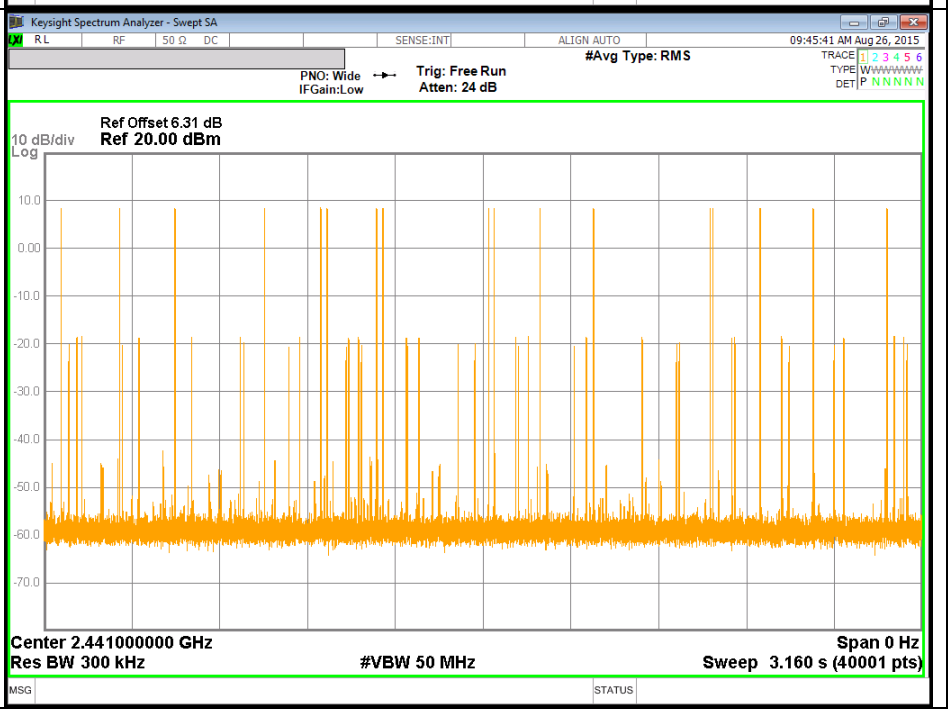
## DH3

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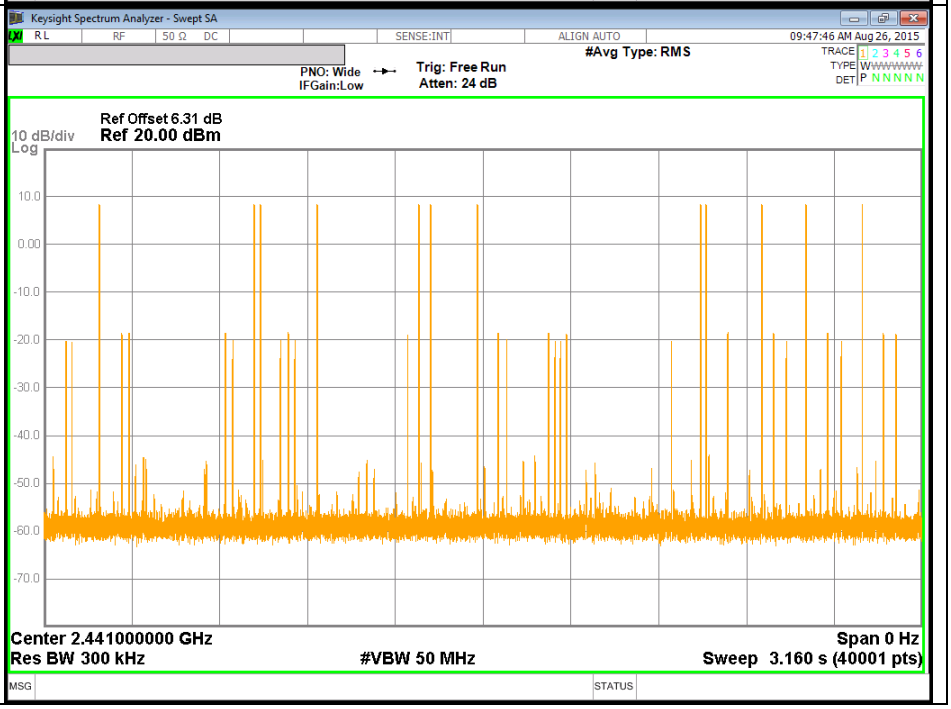
## DH5

| | |
|---|---|
| DH5<br><br>Pulse Width | |
| DH5<br><br>NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD |  |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## 8.5. OUTPUT POWER

**LIMIT**

§15.247 (b) (1)
IC RSS-247 §5.1 (2)

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**

### 8.5.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|
| Low | 2402 | 7.327 | 21 | -13.673 |
| Middle | 2441 | 8.564 | 21 | -12.436 |
| High | 2480 | 6.162 | 21 | -14.838 |
| Worst | | 8.564 | 21 | -12.436 |

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

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|
| Low | 2402 | 5.537 | 21 | -15.463 |
| Middle | 2441 | 6.574 | 21 | -14.426 |
| High | 2480 | 4.810 | 21 | -16.190 |
| Worst | | 6.574 | 21 | -14.426 |

### 8.5.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|
| Low | 2402 | 5.855 | 21 | -15.145 |
| Middle | 2441 | 7.080 | 21 | -13.920 |
| High | 2480 | 5.254 | 21 | -15.746 |
| Worst | | 7.080 | 21 | -13.920 |


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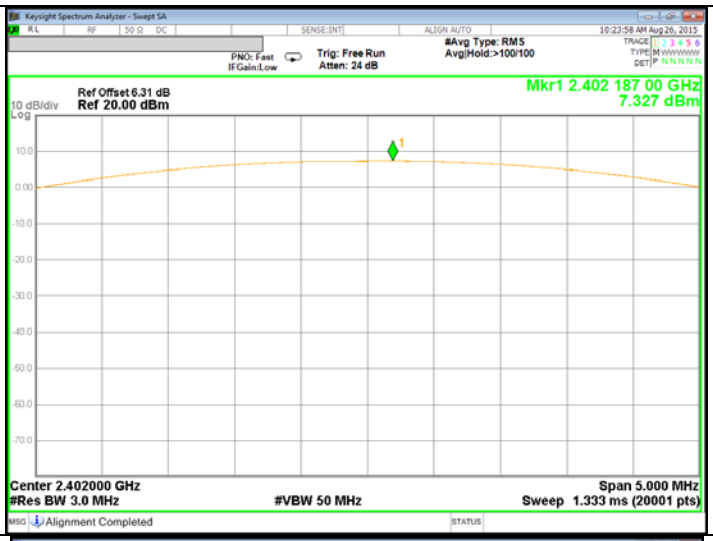
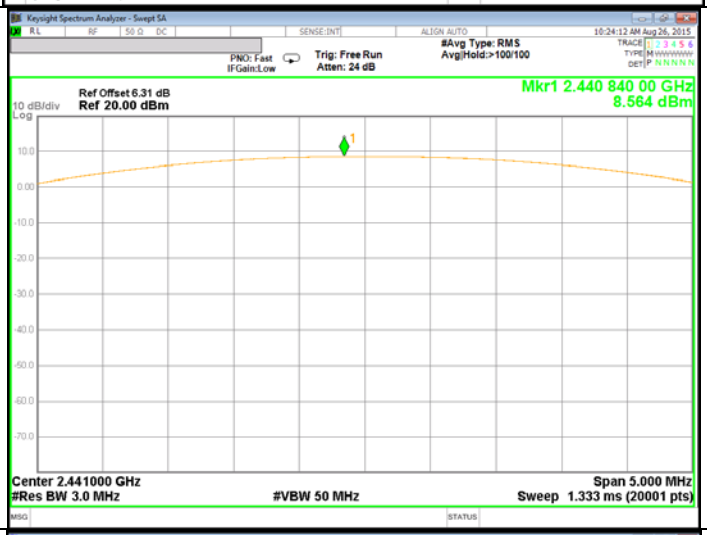
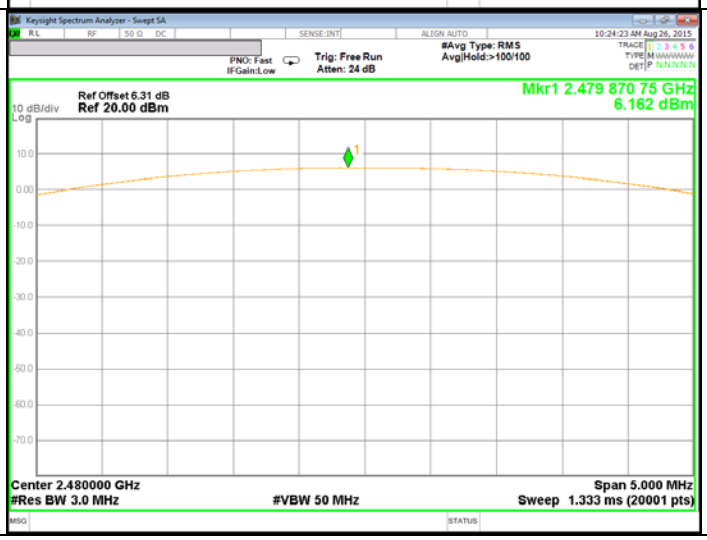
## 8.5.4. OUTPUT POWER PLOTS

**GFSK OUTPUT POWER**

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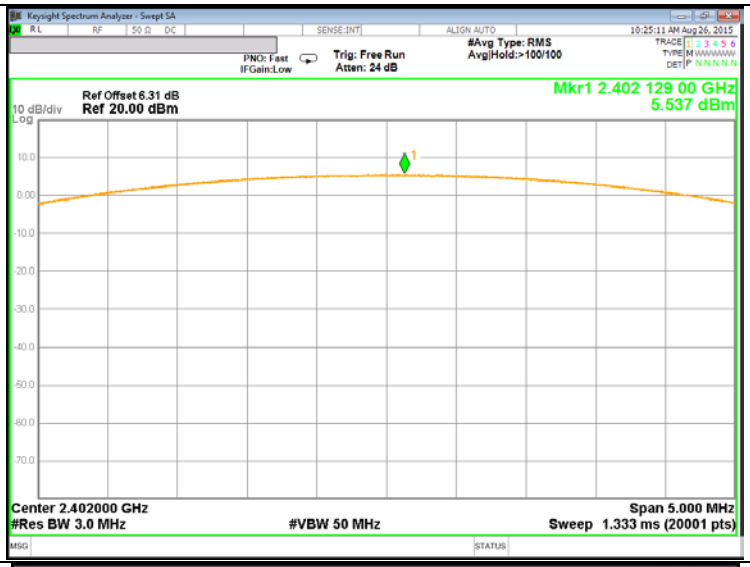
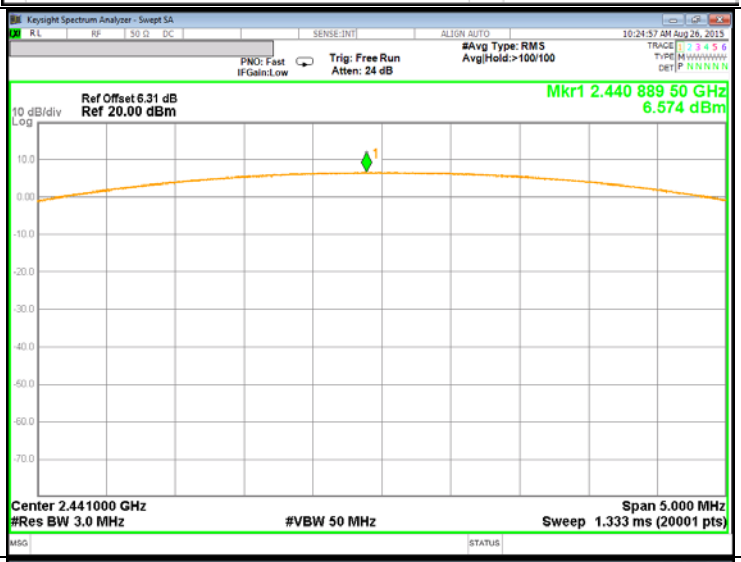
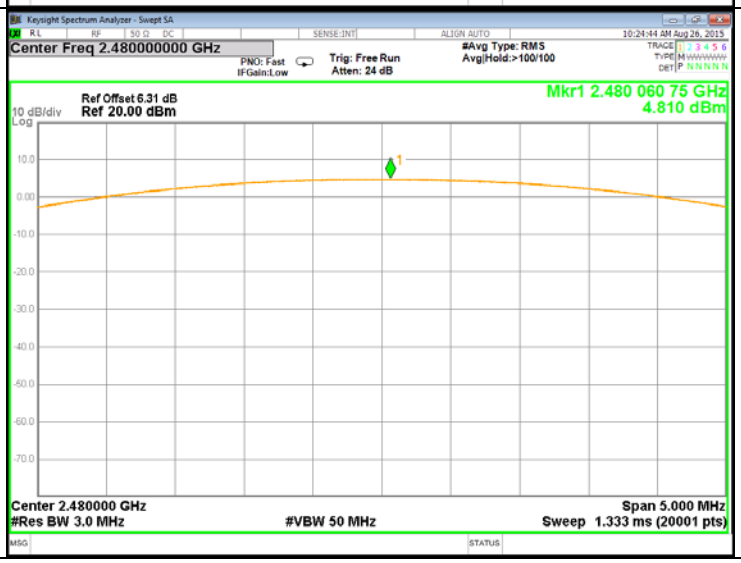
**Pi/4-DPSK OUTPUT POWER**

| | | |
|---|---|---|
| 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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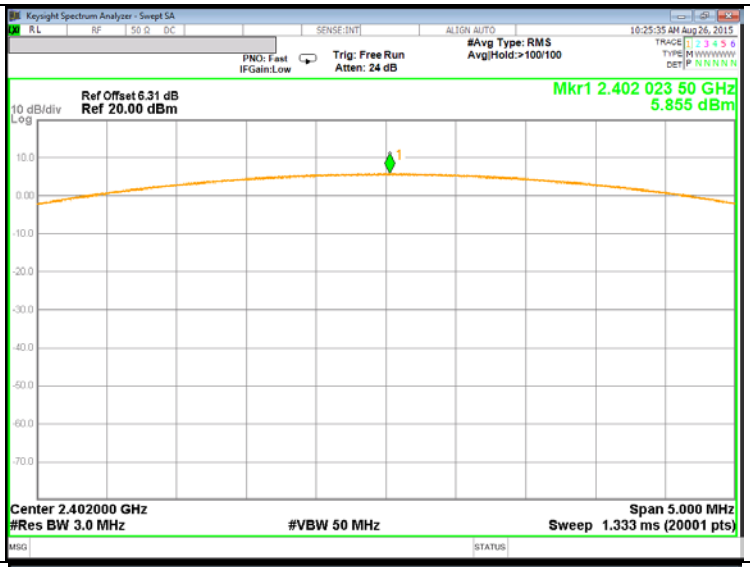
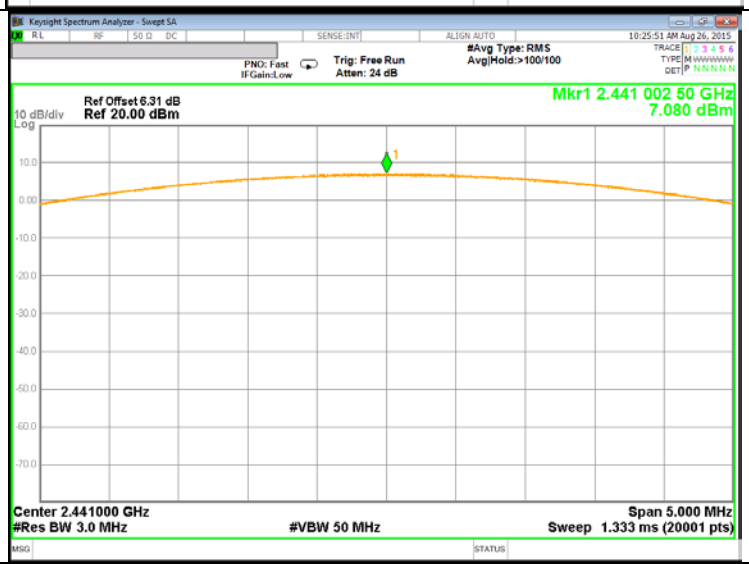
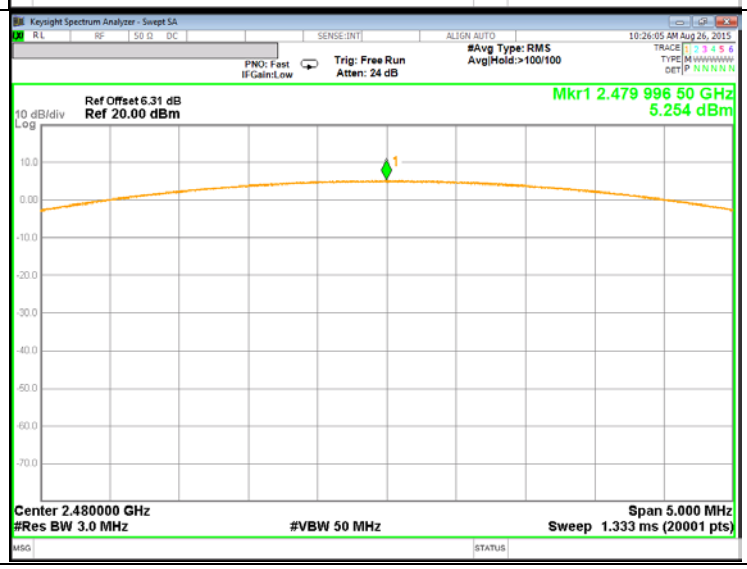
**8PSK OUTPUT POWER**

| | | |
|---|---|---|
| 8PSK<br><br>Low CH | |  |
| 8PSK<br><br>Middle CH | |  |
| 8PSK<br><br>High CH | |  |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## 8.6. 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 of 10.1 dB (including 10 dB pad and 0.1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### 8.6.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---|---|---|---|
| Low | 2402 | 7.23 | 5.28 |
| Middle | 2441 | 8.50 | 7.07 |
| High | 2480 | 6.08 | 4.05 |

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

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---|---|---|---|
| Low | 2402 | 3.12 | 2.05 |
| Middle | 2441 | 4.31 | 2.70 |
| High | 2480 | 2.71 | 1.86 |

### 8.6.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---|---|---|---|
| Low | 2402 | 3.17 | 2.08 |
| Middle | 2441 | 4.35 | 2.72 |
| High | 2480 | 2.74 | 1.88 |


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## 8.7. CONDUCTED SPURIOUS EMISSIONS

**LIMITS**

FCC §15.247 (d)
IC RSS-247 §5.1 (2)

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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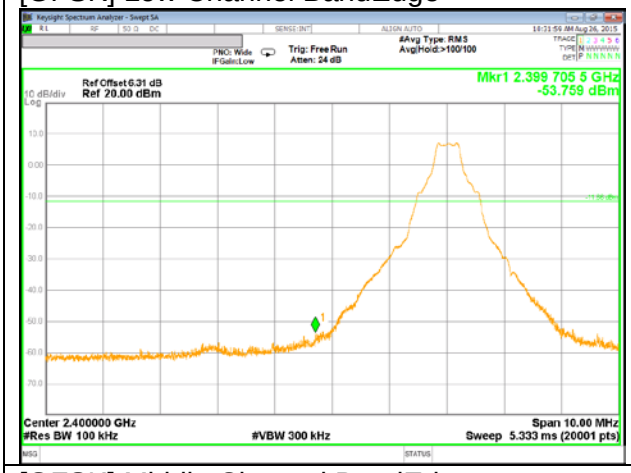
## 8.7.1. BASIC DATA RATE GFSK MODULATION

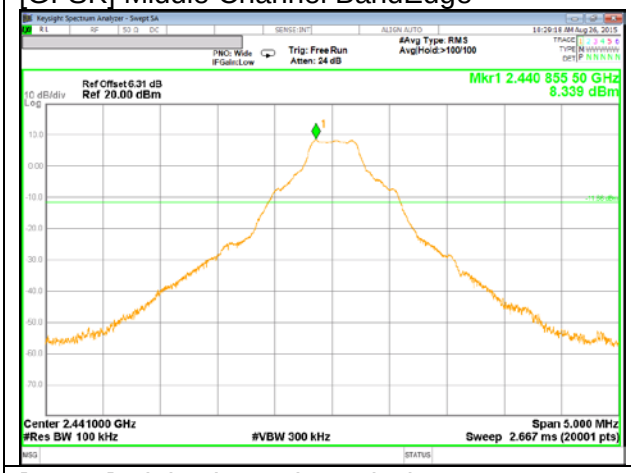
**GFSK Mode**

[GFSK] Low Channel BandEdge



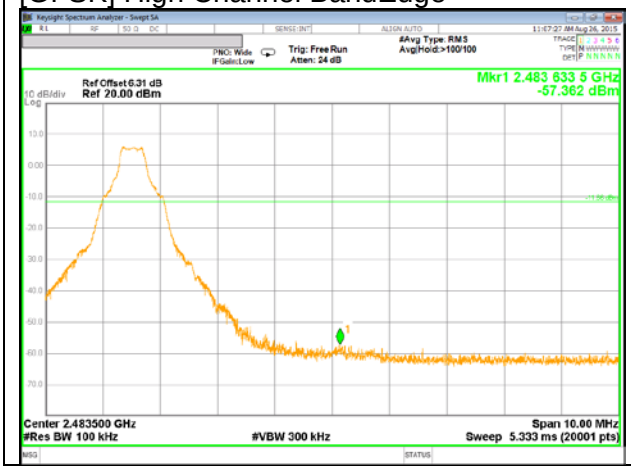

[GFSK] Low Channel Spurious

[GFSK] Middle Channel BandEdge




[GFSK] Middle Channel Spurious

[GFSK] High Channel BandEdge




[GFSK] High Channel Spurious

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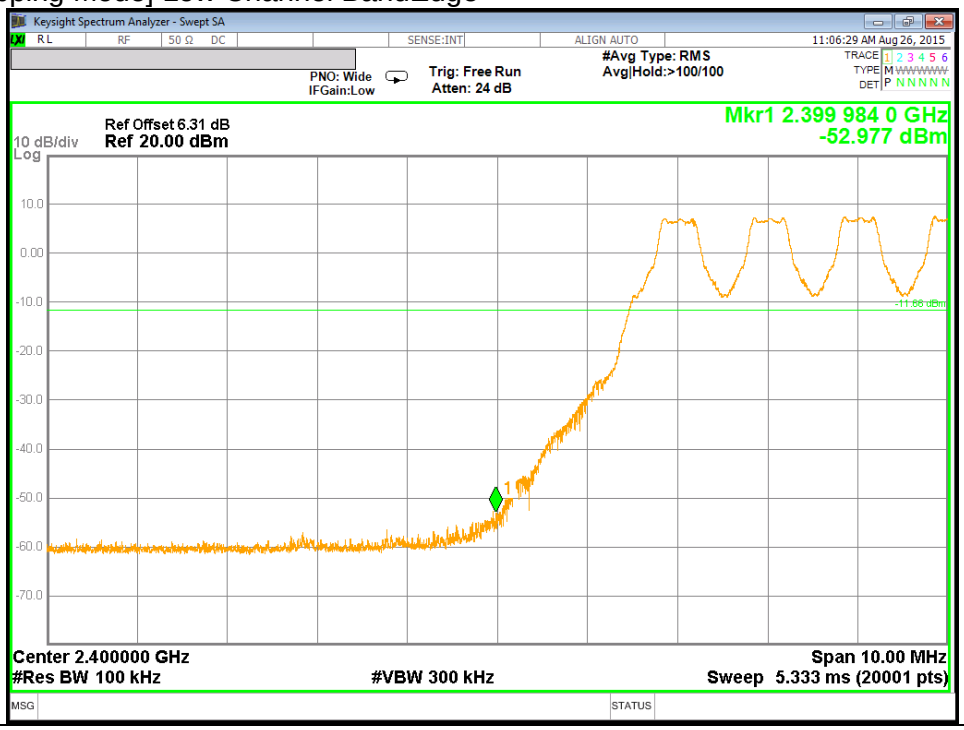
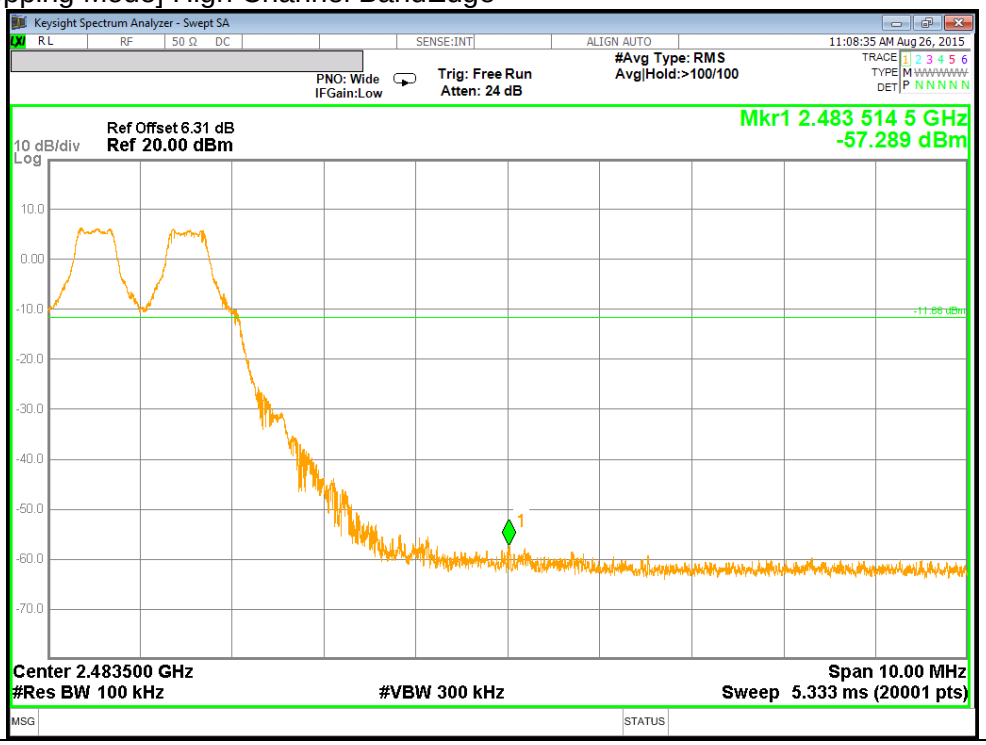
**BandEdge Emission at GFSK Hopping Mode**

[GFSK Hopping Mode] Low Channel BandEdge




[GFSK Hopping Mode] High Channel BandEdge





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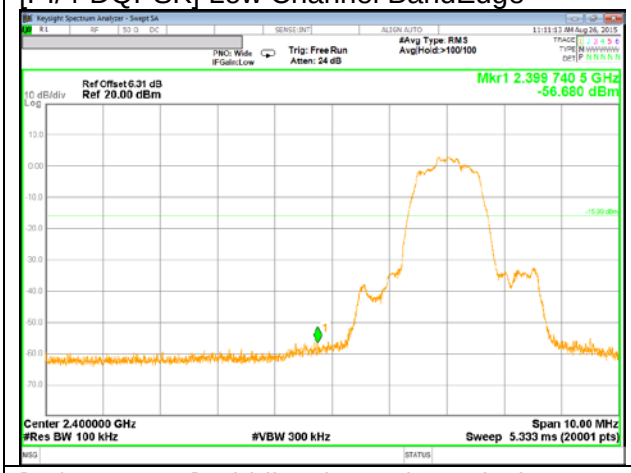
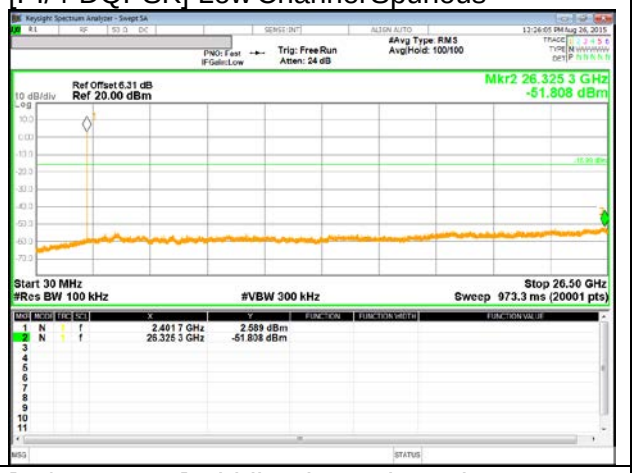
**PI/4-DQPSK Mode**

[PI/4-DQPSK] Low Channel BandEdge

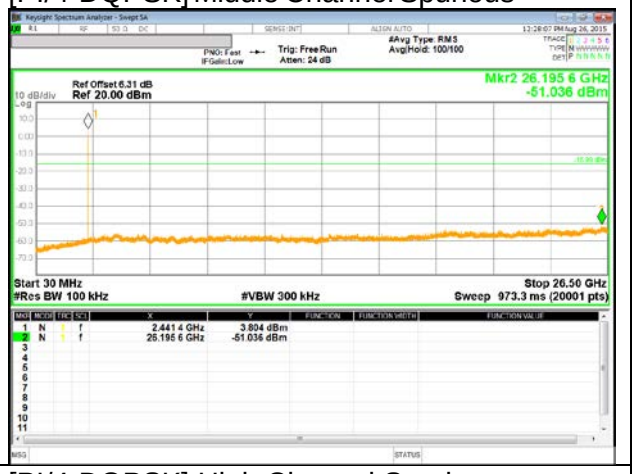



[PI/4-DQPSK] Low Channel Spurious

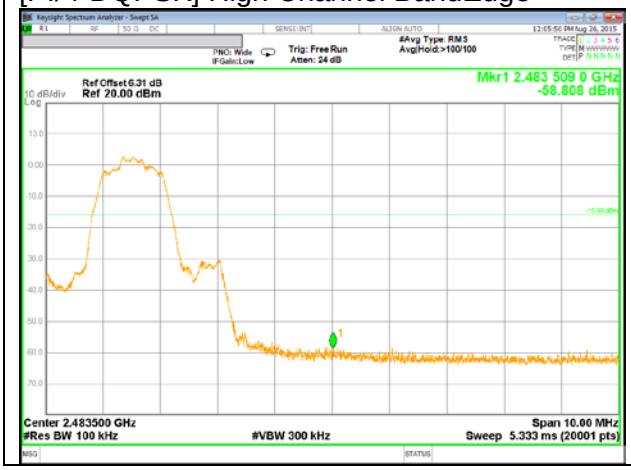



[PI/4-DQPSK] Middle Channel BandEdge

[PI/4-DQPSK] Middle Channel Spurious




[PI/4-DQPSK] High Channel BandEdge




[PI/4-DQPSK] High Channel Spurious

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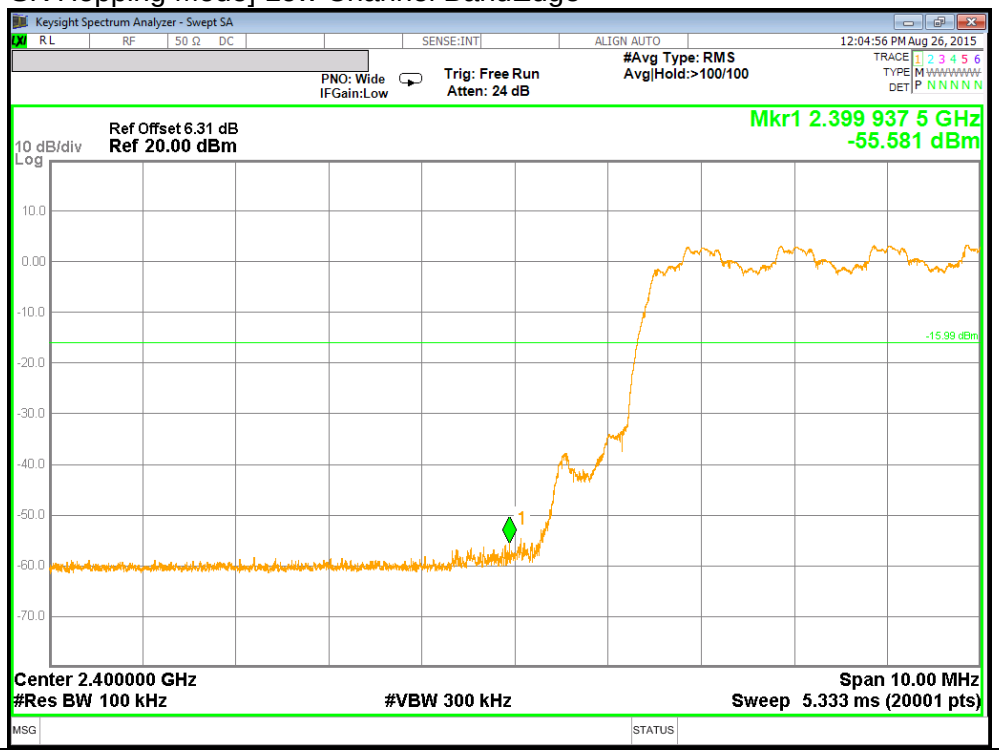
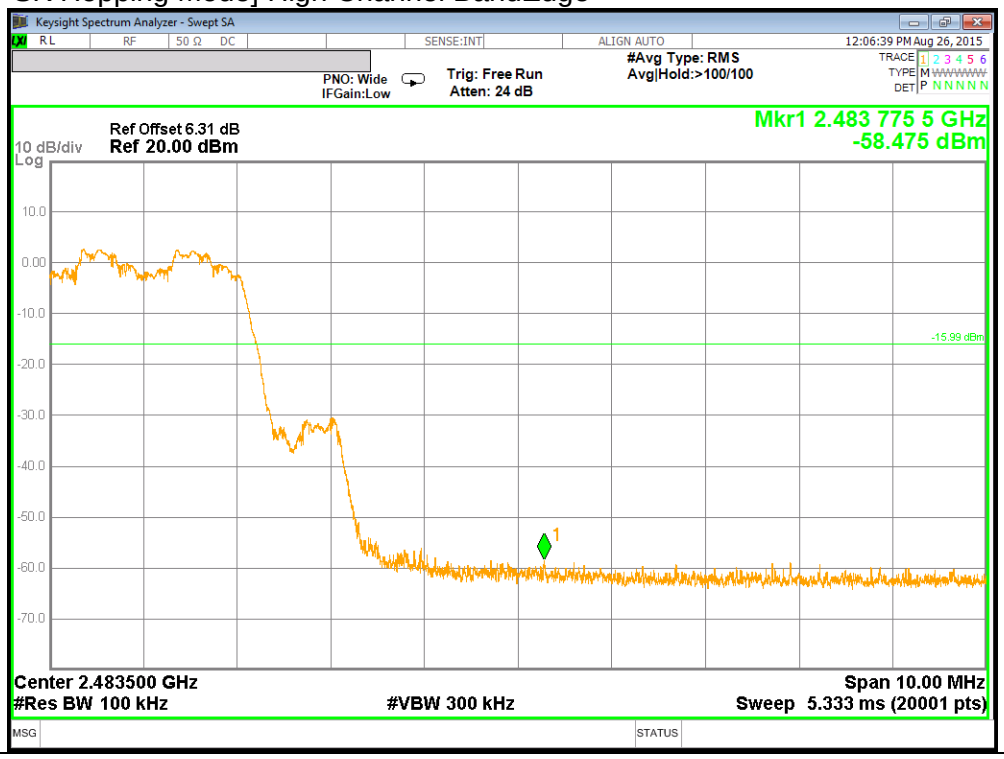
**BandEdge Emission at PI/4-DQPSK Hopping Mode**

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




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





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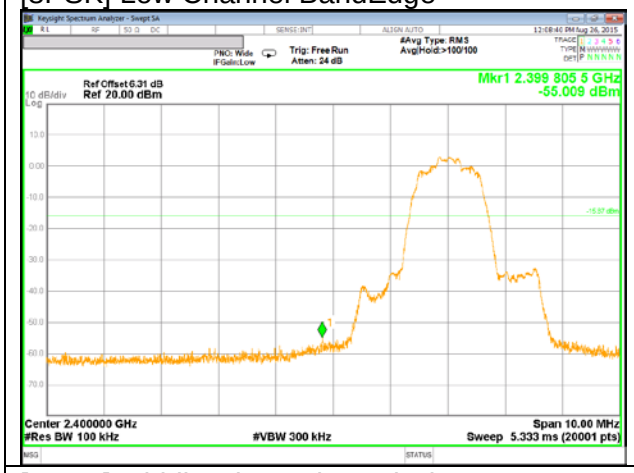
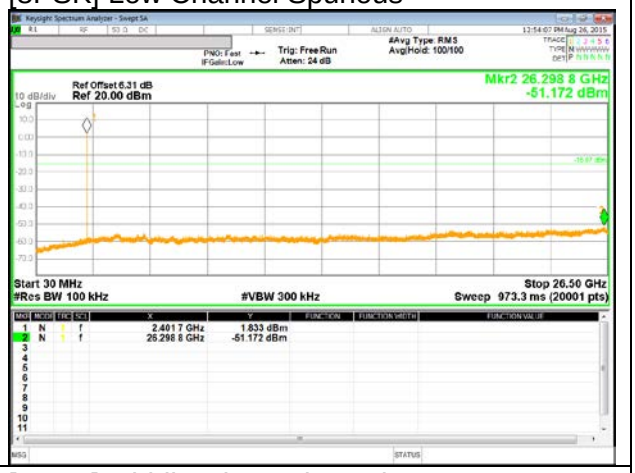
**8PSK Mode**

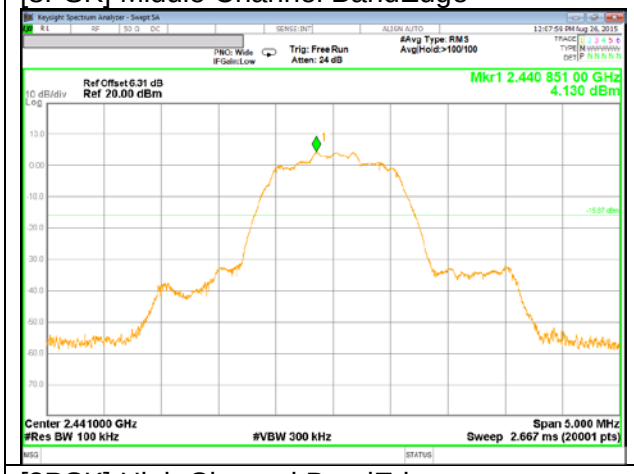
[8PSK] Low Channel BandEdge



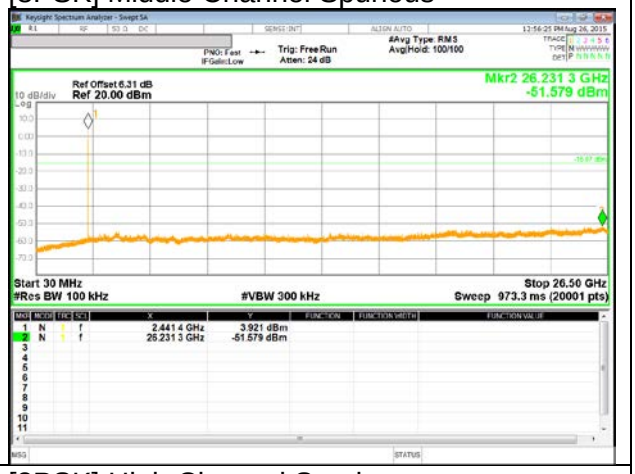

[8PSK] Low Channel Spurious



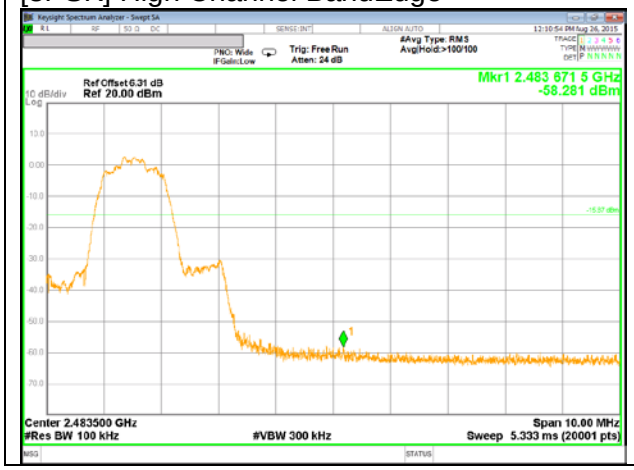

[8PSK] Middle Channel BandEdge



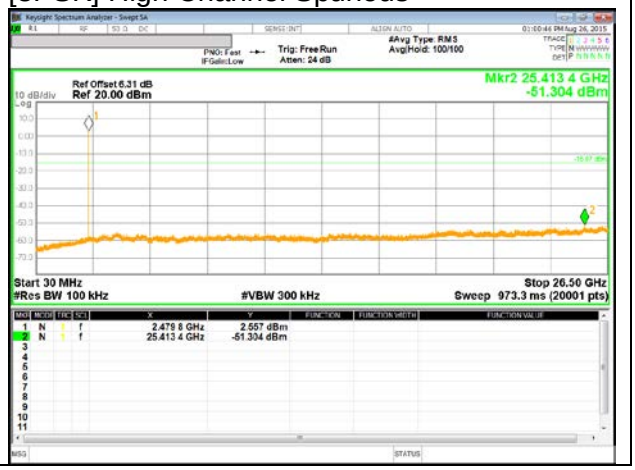

[8PSK] Middle Channel Spurious




[8PSK] High Channel BandEdge




[8PSK] High Channel Spurious





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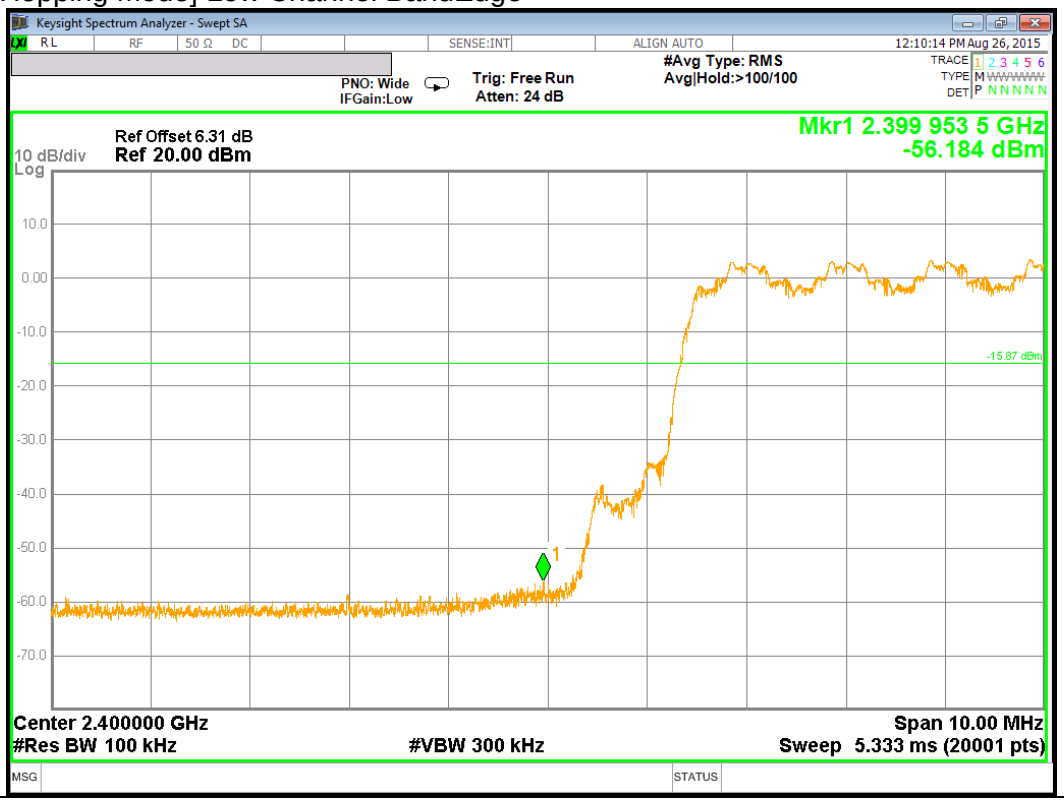
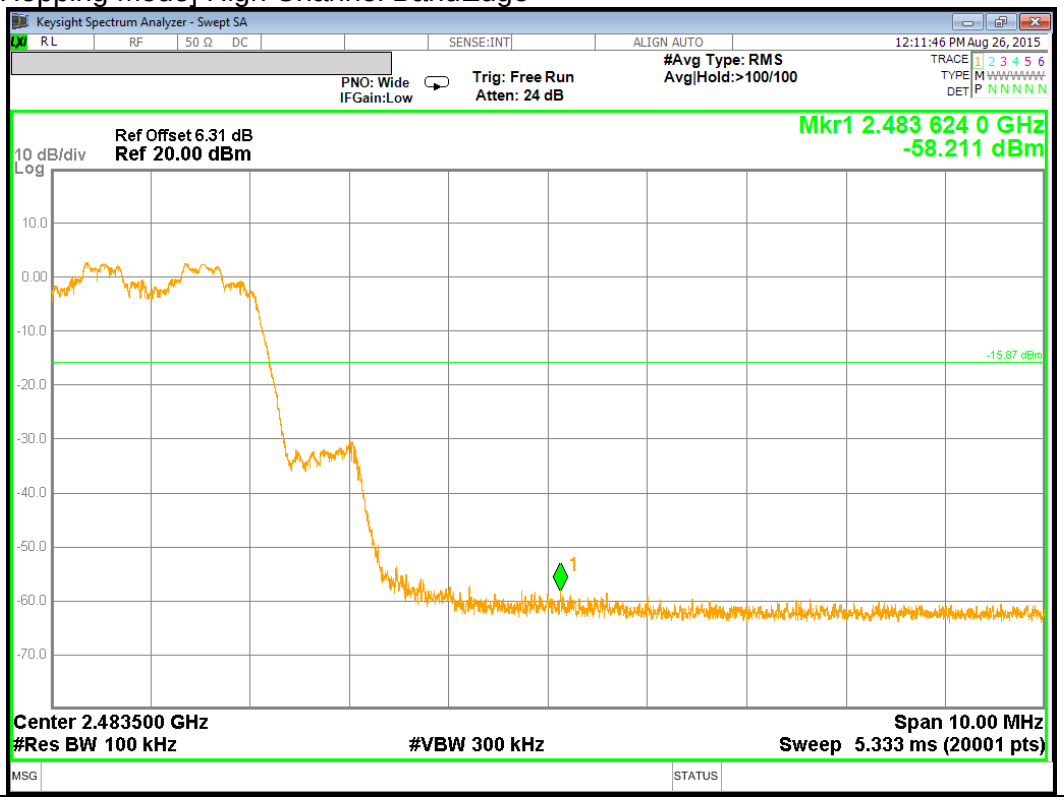
**BandEdge Emission at 8PSK Hopping Mode**

[8PSK Hopping Mode] Low Channel BandEdge




[8PSK Hopping Mode] High Channel BandEdge





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# 9. RADIATED TEST RESULTS

## 9.1. LIMITS AND PROCEDURE

**LIMITS**

FCC §15.205 and §15.209
IC RSS-GEN Clause 8.9 (Transmitter)
IC RSS-GEN Clause 7 (Receiver)

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|---|---|---|
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. 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 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 spectrum from 1GHzHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.


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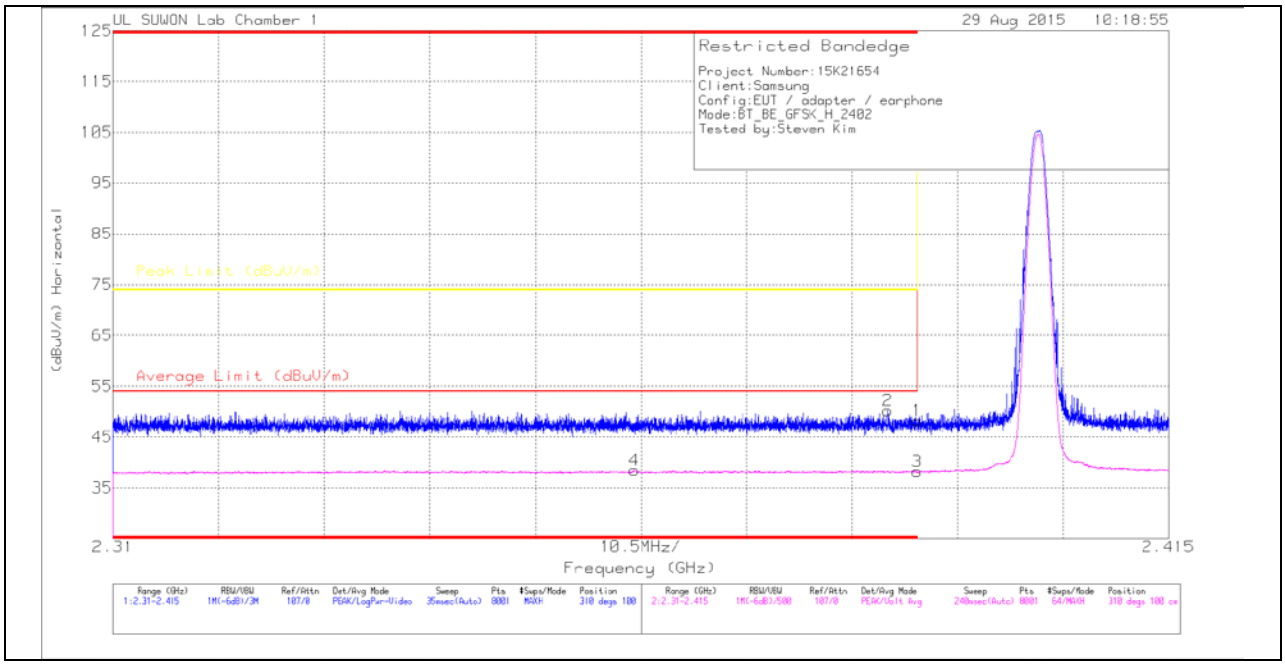
# 9.2. TRANSMITTER ABOVE 1 GHz

## 9.2.1. 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 | Path_2_10 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 | 39.24 | Pk | 31.8 | -22.8 | 48.24 | - | - | 74 | -25.76 | 310 | 100 | H |
| 2 | * 2.387 | 41.2 | Pk | 31.8 | -22.8 | 50.2 | - | - | 74 | -23.8 | 310 | 100 | H |
| 3 | * 2.39 | 29.15 | V1TV | 31.8 | -22.8 | 38.15 | 54 | -15.85 | - | - | 310 | 100 | H |
| 4 | * 2.362 | 29.52 | V1TV | 31.7 | -22.8 | 38.42 | 54 | -15.58 | - | - | 310 | 100 | H |

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

Pk - Peak detector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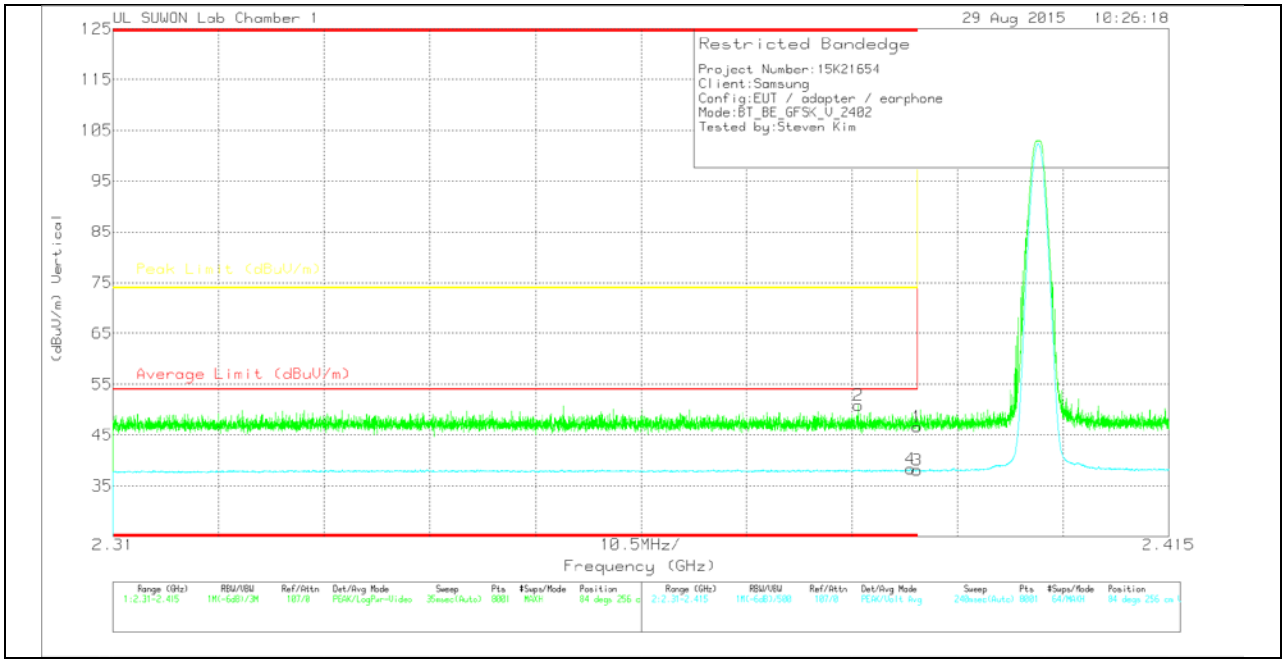
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 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 | 37.65 | Pk | 31.8 | -22.8 | 46.65 | - | - | 74 | -27.35 | 84 | 256 | V |
| 2 | * 2.384 | 41.88 | Pk | 31.8 | -22.8 | 50.88 | - | - | 74 | -23.12 | 84 | 256 | V |
| 3 | * 2.39 | 29.09 | V1TV | 31.8 | -22.8 | 38.09 | 54 | -15.91 | - | - | 84 | 256 | V |
| 4 | * 2.389 | 29.28 | V1TV | 31.8 | -22.8 | 38.28 | 54 | -15.72 | - | - | 84 | 256 | V |

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

Pk - Peak detector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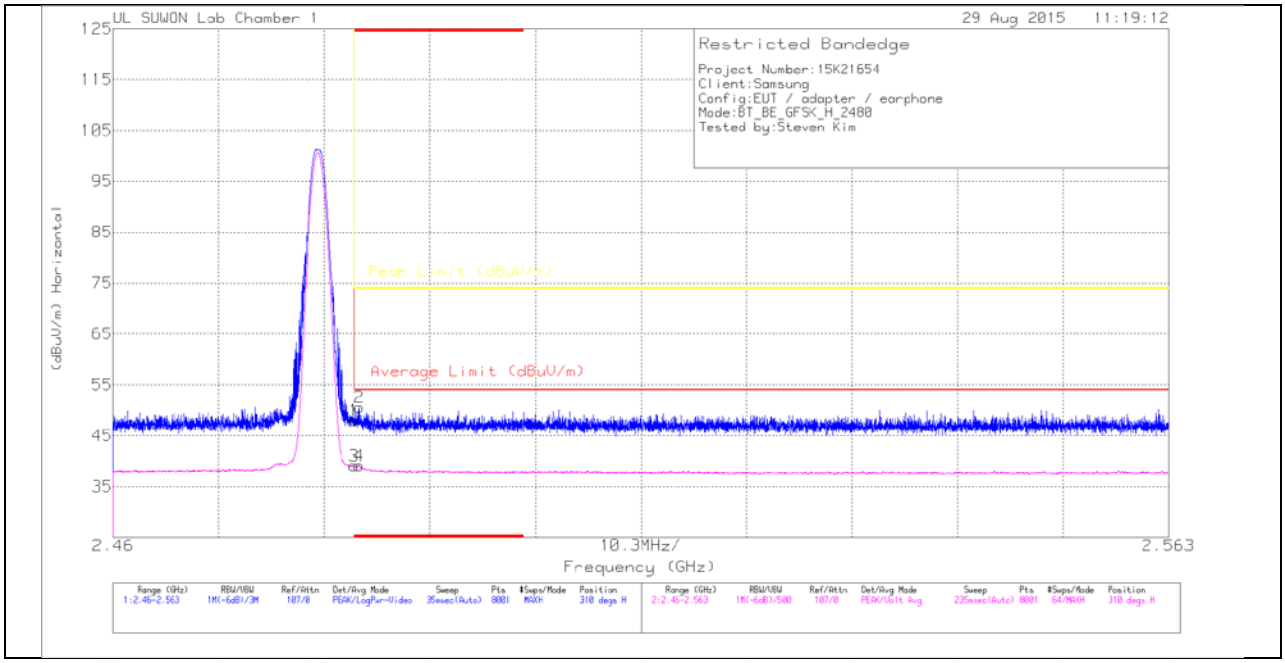
## AUTHORIZED BANDEDGE (HIGH CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT




### HORIZONTAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 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 | 38.57 | Pk | 32 | -22.6 | 47.97 | - | - | 74 | -26.03 | 310 | 100 | H |
| 2 | * 2.484 | 41.2 | Pk | 32 | -22.6 | 50.6 | - | - | 74 | -23.4 | 310 | 100 | H |
| 3 | * 2.484 | 29.63 | V1TV | 32 | -22.6 | 39.03 | 54 | -14.97 | - | - | 310 | 100 | H |
| 4 | * 2.484 | 29.66 | V1TV | 32 | -22.6 | 39.06 | 54 | -14.94 | - | - | 310 | 100 | H |

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

Pk - Peak detector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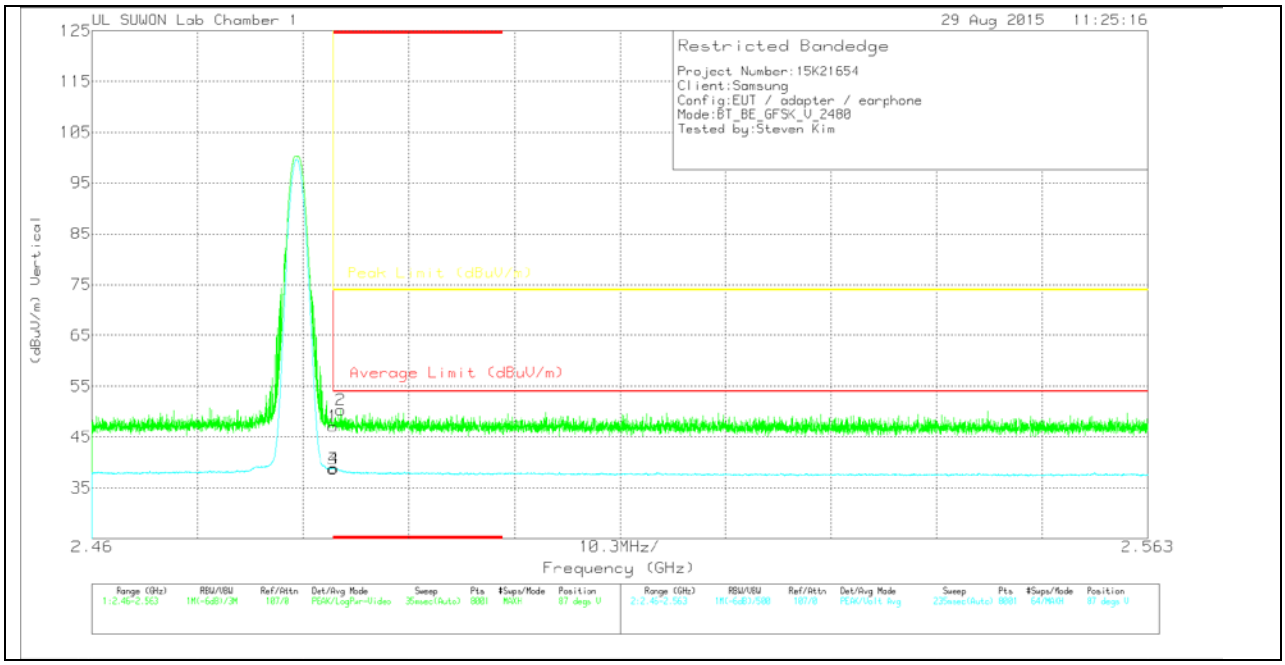
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 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 | 37.66 | Pk | 32 | -22.6 | 47.06 | - | - | 74 | -26.94 | 87 | 196 | V |
| 2 | * 2.484 | 40.97 | Pk | 32 | -22.6 | 50.37 | - | - | 74 | -23.63 | 87 | 196 | V |
| 3 | * 2.484 | 29.35 | V1TV | 32 | -22.6 | 38.75 | 54 | -15.25 | - | - | 87 | 196 | V |
| 4 | * 2.484 | 29.43 | V1TV | 32 | -22.6 | 38.83 | 54 | -15.17 | - | - | 87 | 196 | V |

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

Pk - Peak detector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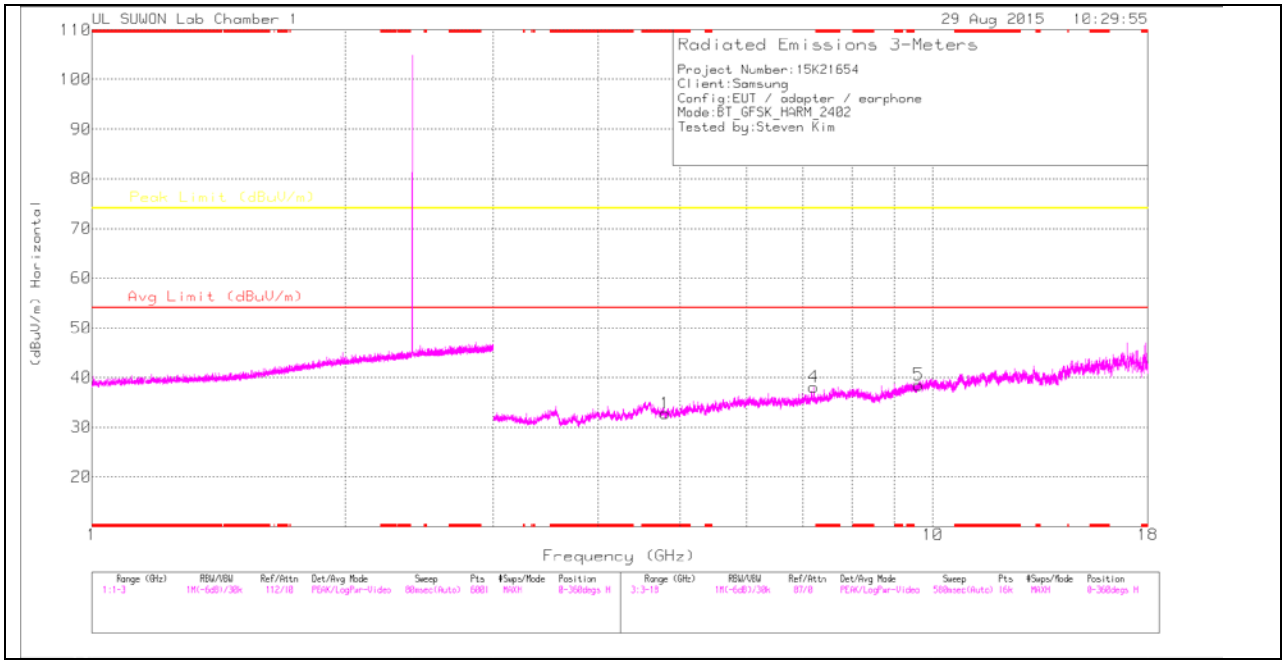
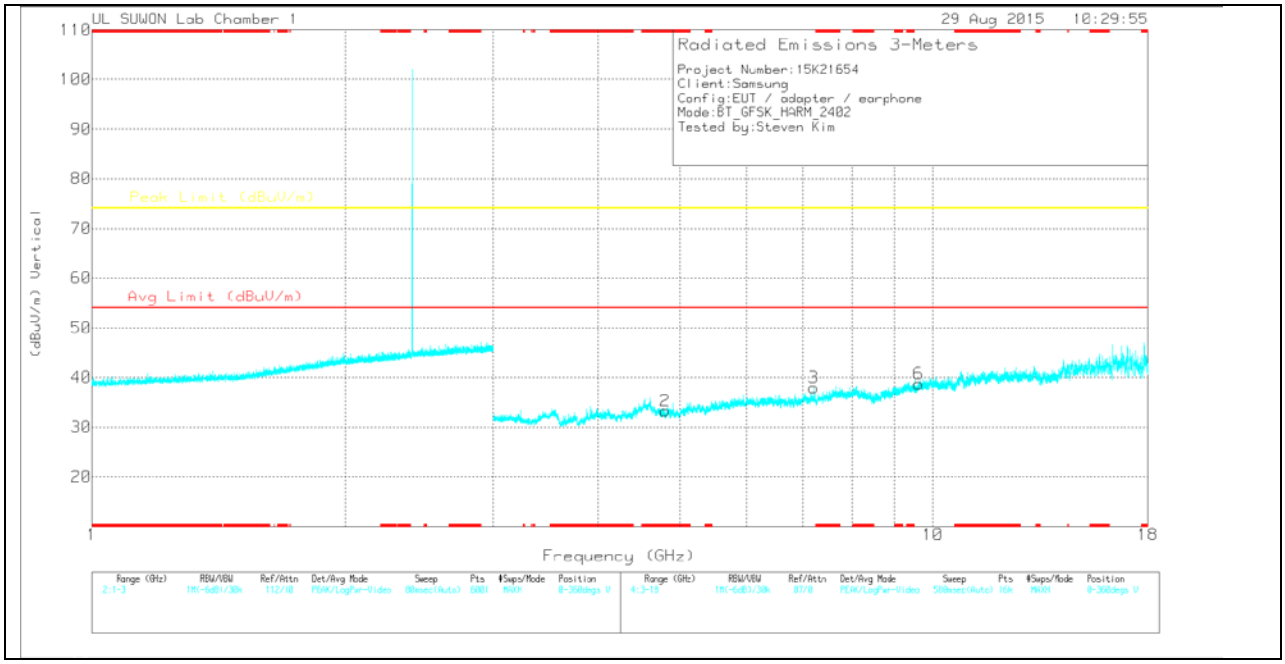
# HARMONICS AND SPURIOUS EMISSIONS

## 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 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.803 | 28.53 | PK | 34 | -29.8 | 32.73 | - | - | 74 | -41.27 | 0-360 | 100 | H |
| 4 | 7.205 | 27.78 | PK | 35.7 | -25.4 | 38.08 | - | - | 74 | -35.92 | 0-360 | 200 | H |
| 5 | 9.608 | 22.53 | PK | 37 | -21 | 38.53 | - | - | 74 | -35.47 | 0-360 | 100 | H |
| 2 | * 4.806 | 29.13 | PK | 34 | -29.8 | 33.33 | - | - | 74 | -40.67 | 0-360 | 200 | V |
| 3 | 7.206 | 27.69 | PK | 35.7 | -25.4 | 37.99 | - | - | 74 | -36.01 | 0-360 | 200 | V |
| 6 | 9.606 | 22.68 | PK | 37 | -21 | 38.68 | - | - | 74 | -35.32 | 0-360 | 100 | 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 limit (54dBuV/m).**


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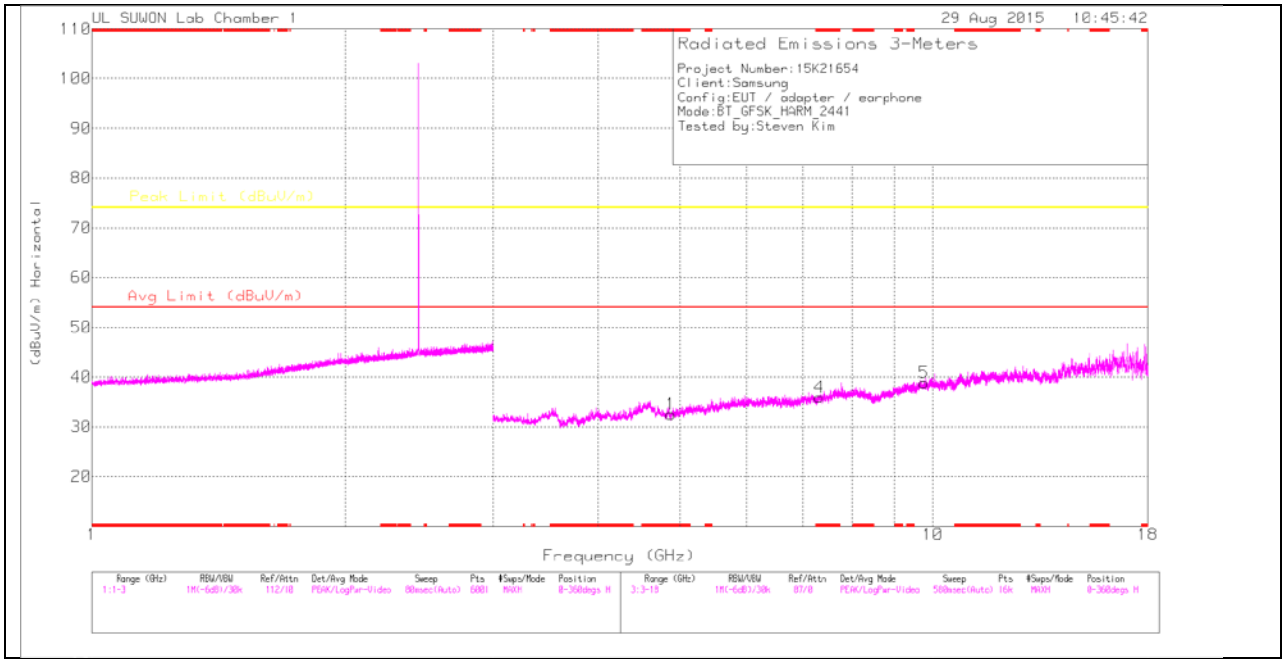
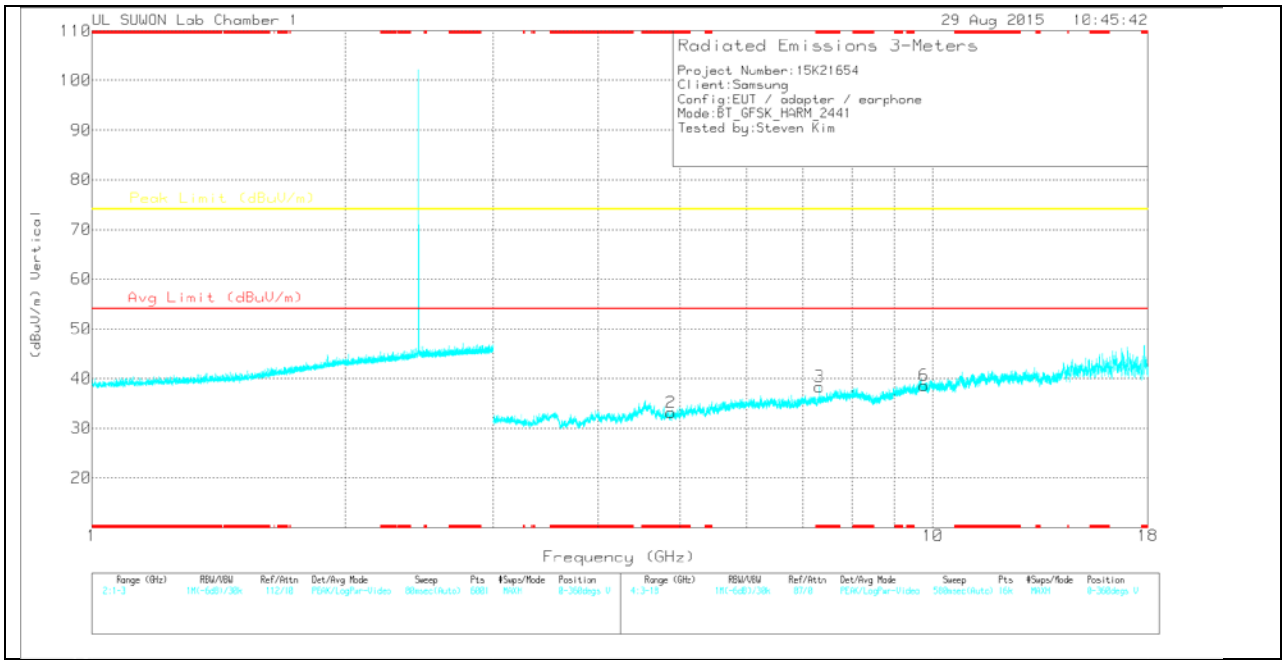
**MID CHANNEL HORIZONTAL**




**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 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.881 | 27.61 | PK | 34 | -29.1 | 32.51 | - | - | 74 | -41.49 | 0-360 | 200 | H |
| 4 | * 7.323 | 25.78 | PK | 35.8 | -25.6 | 35.98 | - | - | 74 | -38.02 | 0-360 | 200 | H |
| 5 | 9.764 | 23.68 | PK | 37.2 | -22 | 38.88 | - | - | 74 | -35.12 | 0-360 | 200 | H |
| 2 | * 4.881 | 28.24 | PK | 34 | -29.1 | 33.14 | - | - | 74 | -40.86 | 0-360 | 100 | V |
| 3 | * 7.323 | 28.11 | PK | 35.8 | -25.6 | 38.31 | - | - | 74 | -35.69 | 0-360 | 100 | V |
| 6 | 9.764 | 23.38 | PK | 37.2 | -22 | 38.58 | - | - | 74 | -35.42 | 0-360 | 200 | 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 limit (54dBuV/m).**


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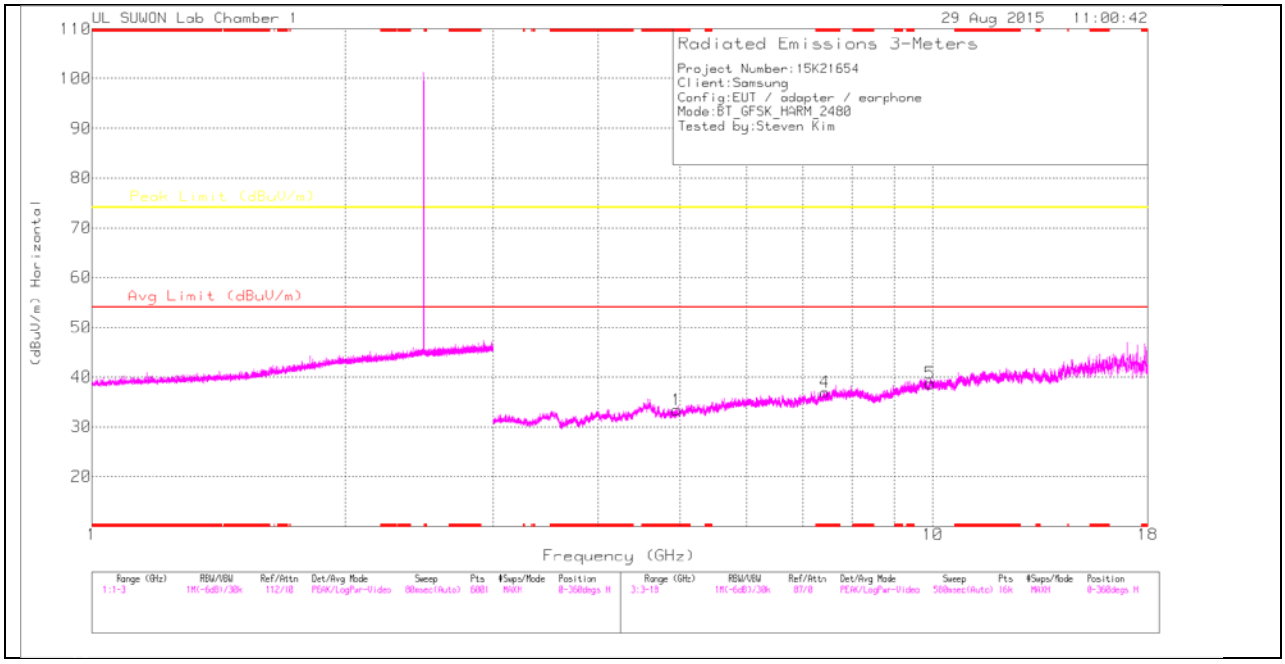
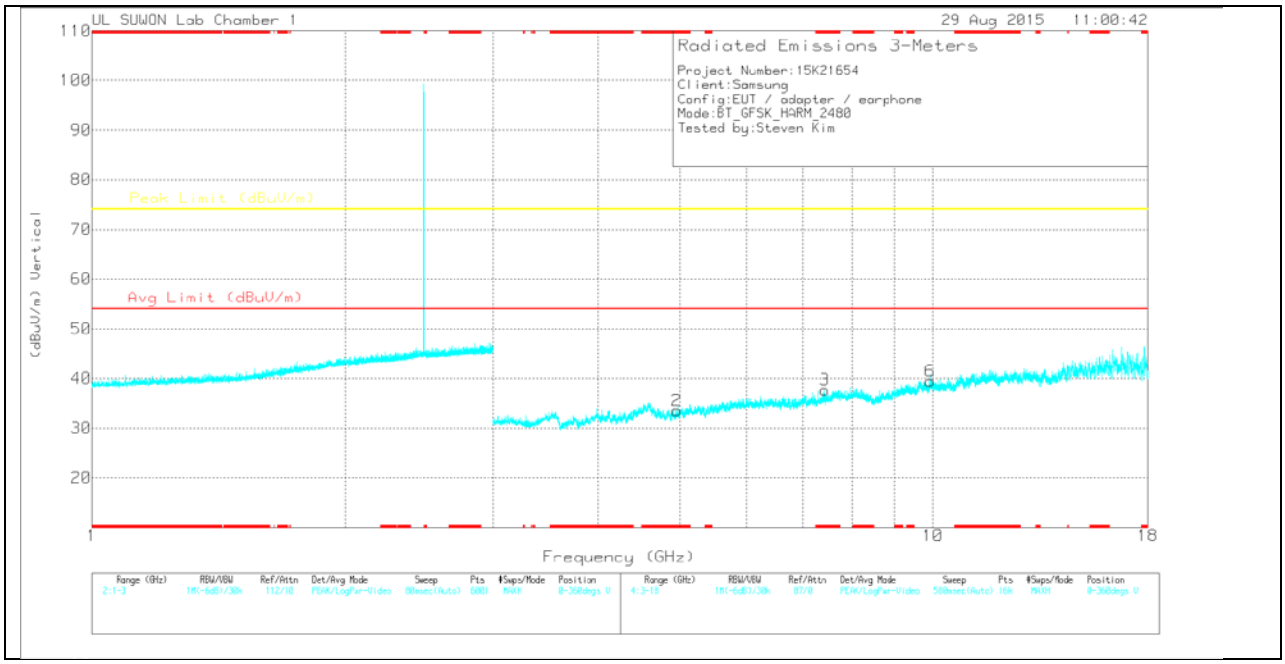
**HIGH CHANNEL HORIZONTAL**




**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 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.958 | 28.36 | PK | 34 | -28.9 | 33.46 | - | - | 74 | -40.54 | 0-360 | 200 | H |
| 4 | * 7.438 | 25.99 | PK | 35.8 | -24.8 | 36.99 | - | - | 74 | -37.01 | 0-360 | 100 | H |
| 5 | 9.918 | 21.69 | PK | 37.4 | -20.4 | 38.69 | - | - | 74 | -35.31 | 0-360 | 100 | H |
| 2 | * 4.959 | 28.43 | PK | 34 | -28.9 | 33.53 | - | - | 74 | -40.47 | 0-360 | 200 | V |
| 3 | * 7.44 | 26.73 | PK | 35.8 | -24.8 | 37.73 | - | - | 74 | -36.27 | 0-360 | 100 | V |
| 6 | 9.922 | 22.44 | PK | 37.4 | -20.4 | 39.44 | - | - | 74 | -34.56 | 0-360 | 100 | 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 limit (54dBuV/m).**


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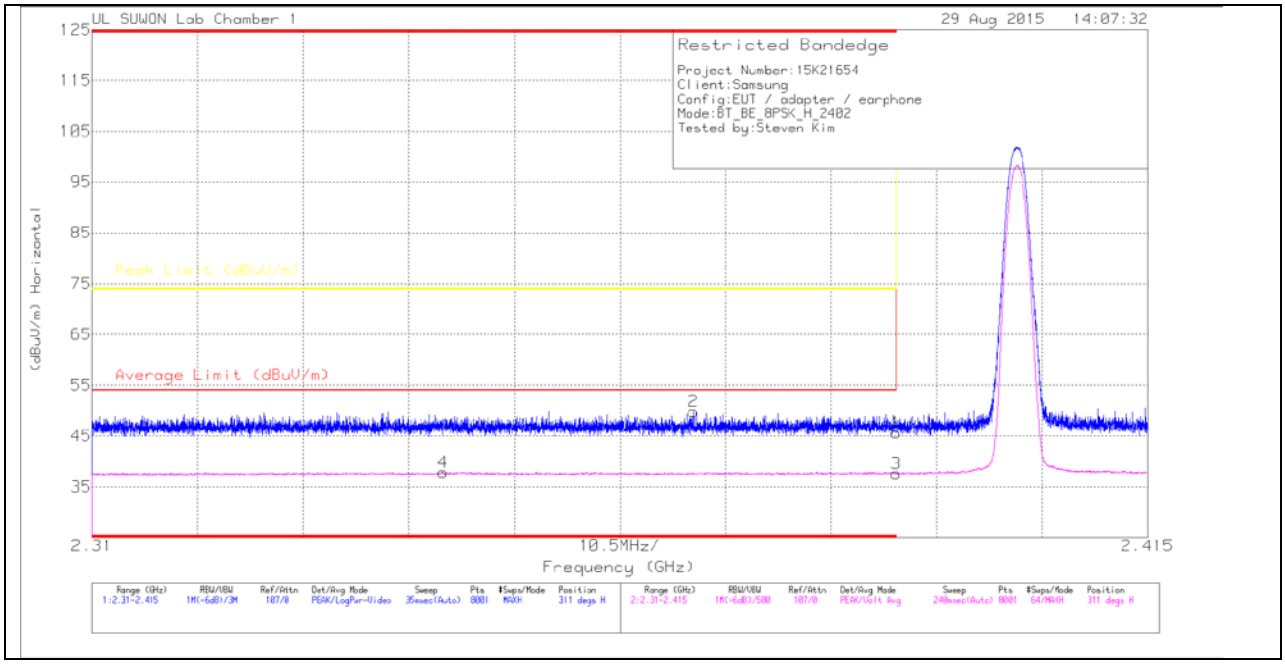
## 9.2.2. ENHANCED DATA RATE 8PSK MODULATION RESTRICTED BANDEDGE (LOW CHANNEL)




**HORIZONTAL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 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 | 36.61 | Pk | 31.8 | -22.8 | 45.61 | - | - | 74 | -28.39 | 311 | 100 | H |
| 2 | * 2.37 | 40.86 | Pk | 31.8 | -22.8 | 49.86 | - | - | 74 | -24.14 | 311 | 100 | H |
| 3 | * 2.39 | 28.56 | V1TV | 31.8 | -22.8 | 37.56 | 54 | -16.44 | - | - | 311 | 100 | H |
| 4 | * 2.345 | 29.03 | V1TV | 31.7 | -22.9 | 37.83 | 54 | -16.17 | - | - | 311 | 100 | H |

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

Pk - Peak detector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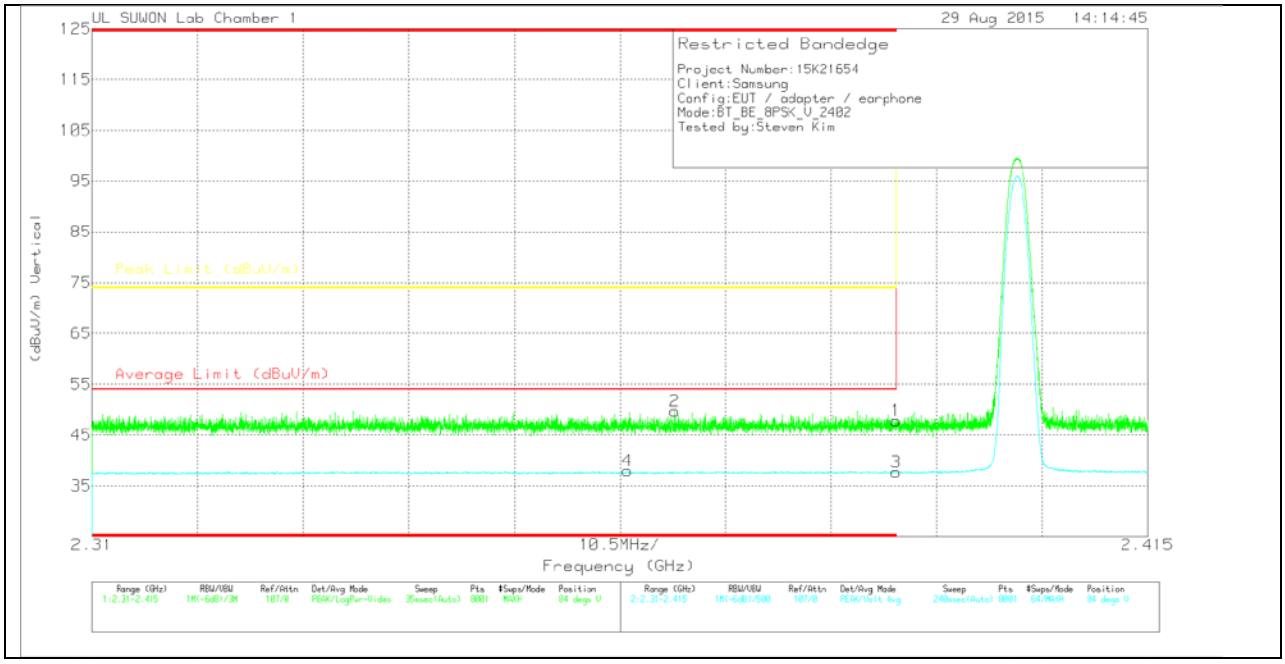
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 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 | 38.8 | Pk | 31.8 | -22.8 | 47.8 | - | - | 74 | -26.2 | 84 | 252 | V |
| 2 | * 2.368 | 40.76 | Pk | 31.8 | -22.8 | 49.76 | - | - | 74 | -24.24 | 84 | 252 | V |
| 3 | * 2.39 | 28.67 | V1TV | 31.8 | -22.8 | 37.67 | 54 | -16.33 | - | - | 84 | 252 | V |
| 4 | * 2.363 | 28.94 | V1TV | 31.8 | -22.8 | 37.94 | 54 | -16.06 | - | - | 84 | 252 | V |

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

Pk - Peak detector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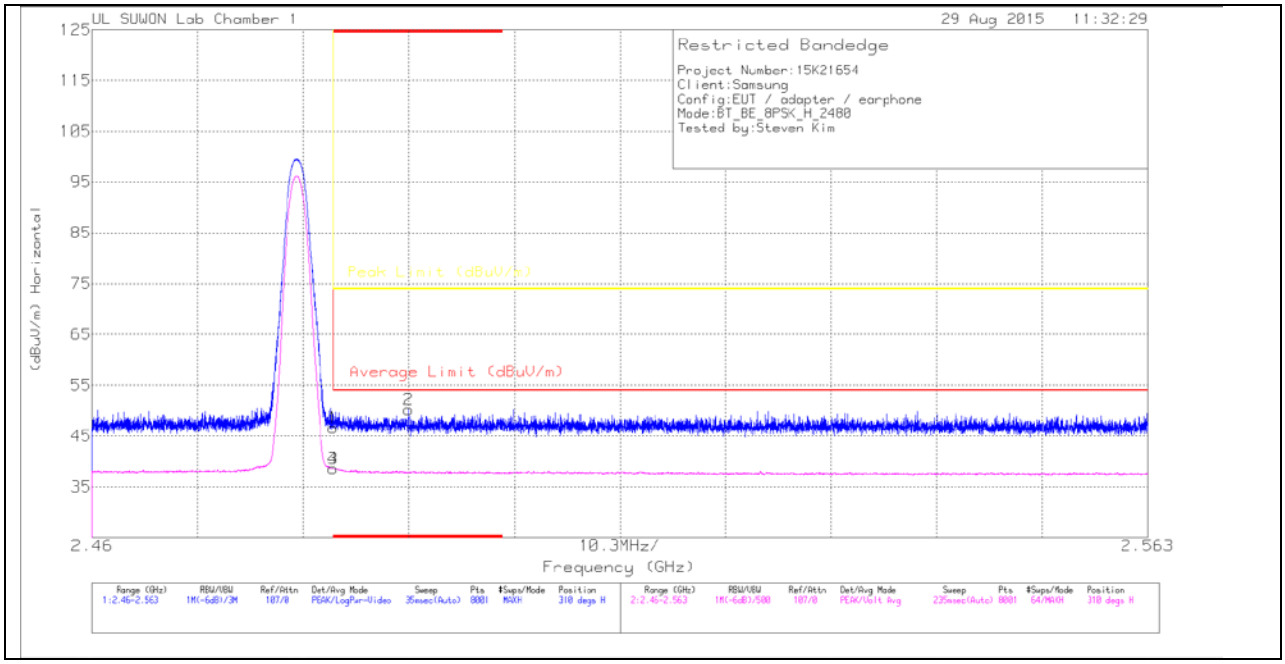
## AUTHORIZED BANDEDGE (HIGH CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT




### HORIZONTAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 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 | 37.25 | Pk | 32 | -22.6 | 46.65 | - | - | 74 | -27.35 | 310 | 102 | H |
| 2 | * 2.491 | 40.83 | Pk | 32 | -22.6 | 50.23 | - | - | 74 | -23.77 | 310 | 102 | H |
| 3 | * 2.484 | 29.17 | V1TV | 32 | -22.6 | 38.57 | 54 | -15.43 | - | - | 310 | 102 | H |
| 4 | * 2.484 | 29.13 | V1TV | 32 | -22.6 | 38.53 | 54 | -15.47 | - | - | 310 | 102 | H |

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

Pk - Peak detector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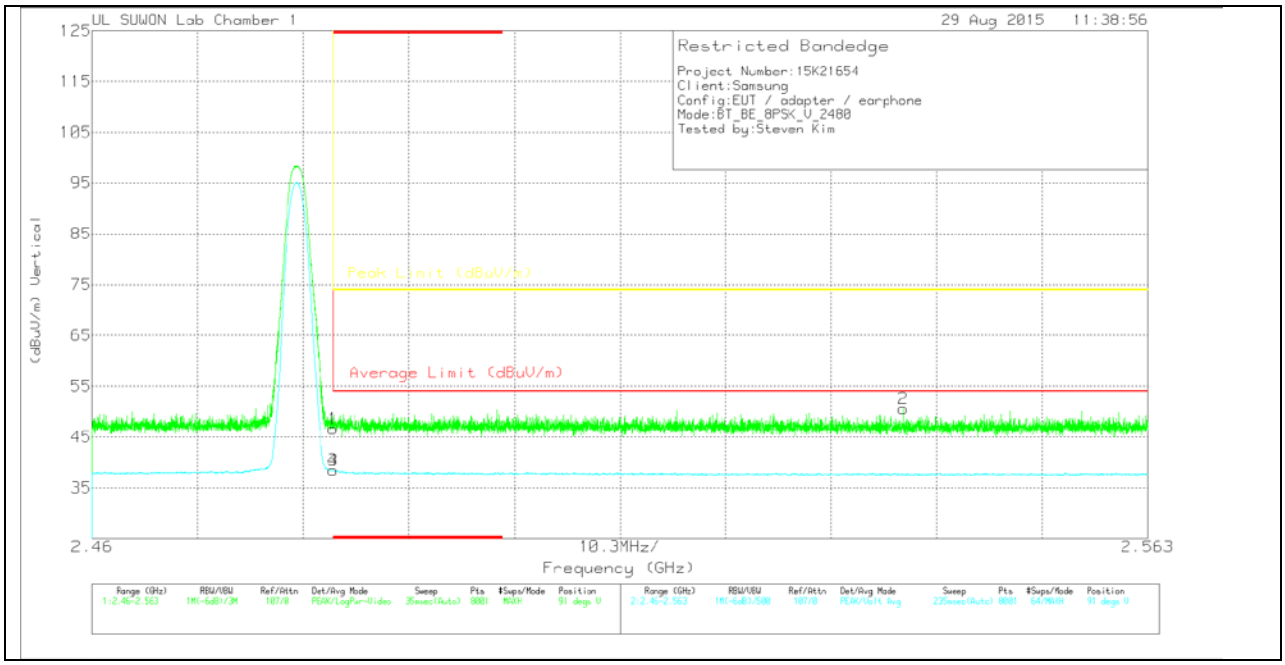
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 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 | 37.21 | Pk | 32 | -22.6 | 46.61 | - | - | 74 | -27.39 | 91 | 196 | V |
| 2 | 2.539 | 41.2 | Pk | 32 | -22.6 | 50.6 | - | - | 74 | -23.4 | 91 | 196 | V |
| 3 | * 2.484 | 29.05 | V1TV | 32 | -22.6 | 38.45 | 54 | -15.55 | - | - | 91 | 196 | V |
| 4 | * 2.484 | 29.04 | V1TV | 32 | -22.6 | 38.44 | 54 | -15.56 | - | - | 91 | 196 | V |

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

Pk - Peak detector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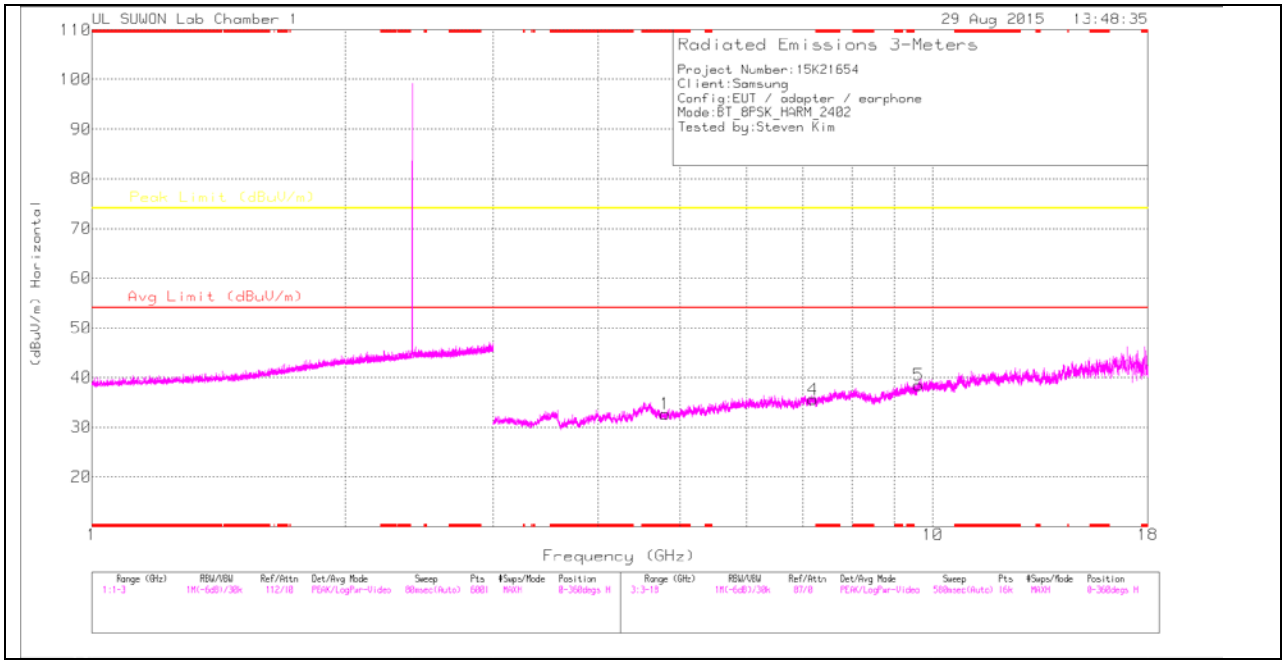
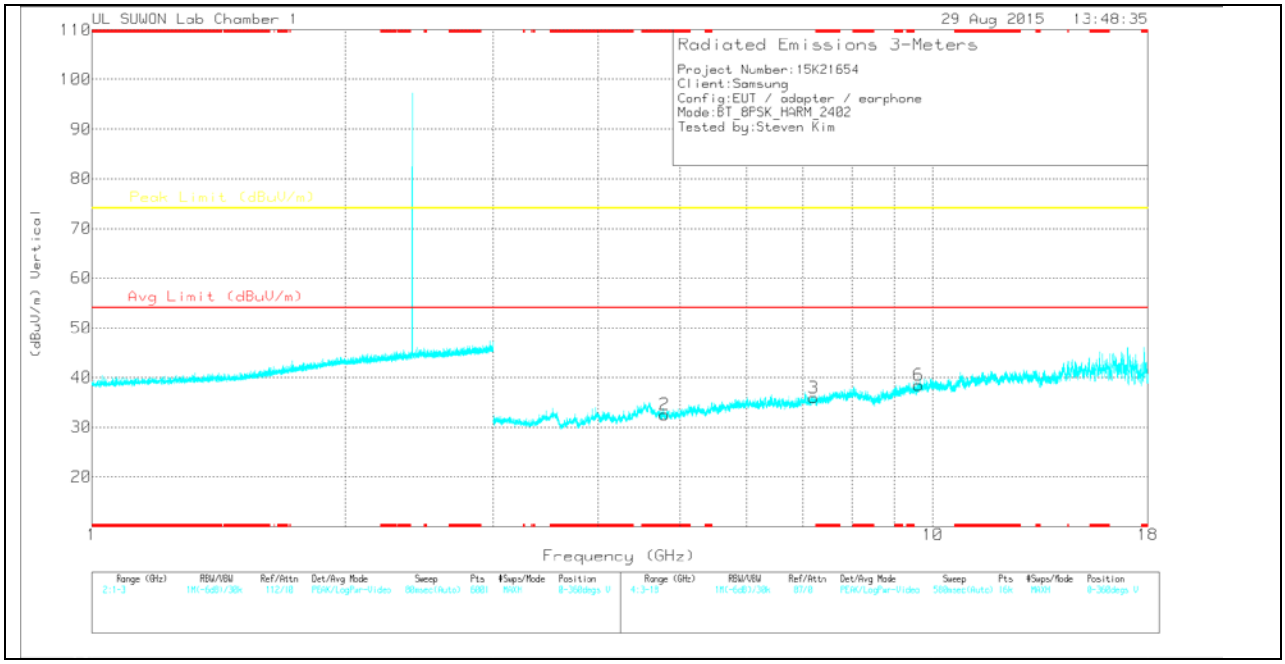
# HARMONICS AND SPURIOUS EMISSIONS

## 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 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.803 | 28.47 | PK | 34 | -29.8 | 32.67 | - | - | 74 | -41.33 | 0-360 | 200 | H |
| 4 | 7.203 | 25.29 | PK | 35.7 | -25.4 | 35.59 | - | - | 74 | -38.41 | 0-360 | 200 | H |
| 5 | 9.61 | 22.46 | PK | 37 | -21 | 38.46 | - | - | 74 | -35.54 | 0-360 | 100 | H |
| 2 | * 4.799 | 28.4 | PK | 34 | -29.9 | 32.5 | - | - | 74 | -41.5 | 0-360 | 100 | V |
| 3 | 7.205 | 25.64 | PK | 35.7 | -25.4 | 35.94 | - | - | 74 | -38.06 | 0-360 | 100 | V |
| 6 | 9.608 | 22.44 | PK | 37 | -21 | 38.44 | - | - | 74 | -35.56 | 0-360 | 100 | 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 limit (54dBuV/m).**


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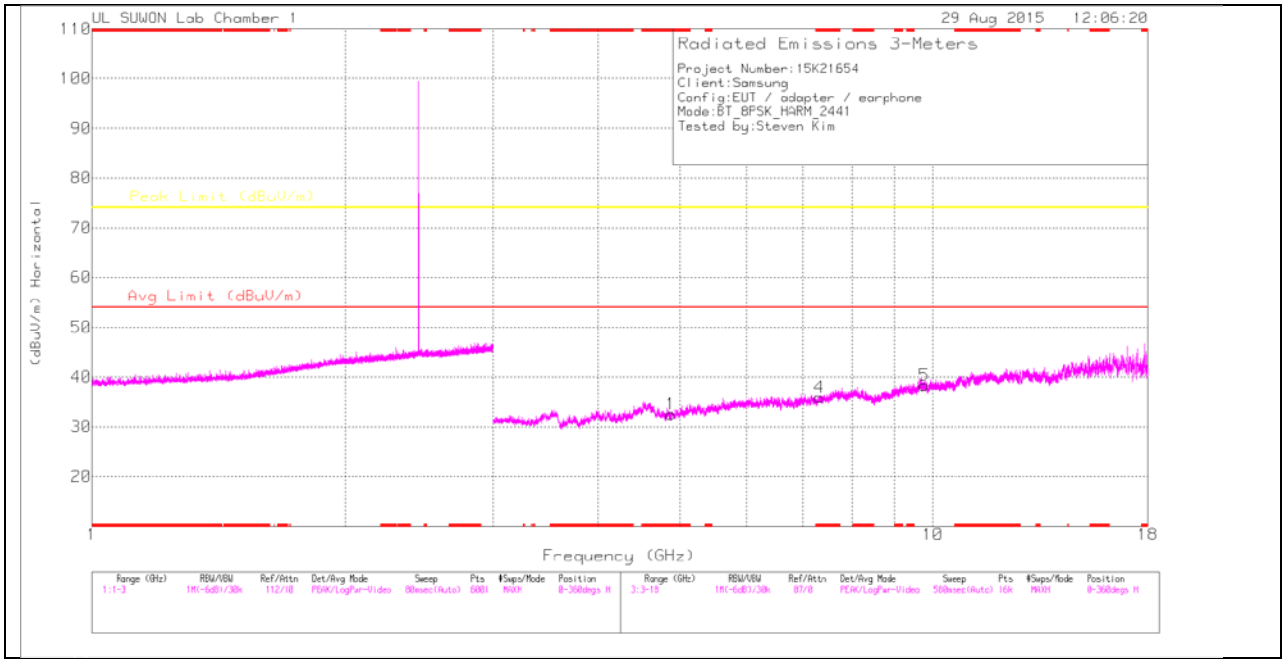
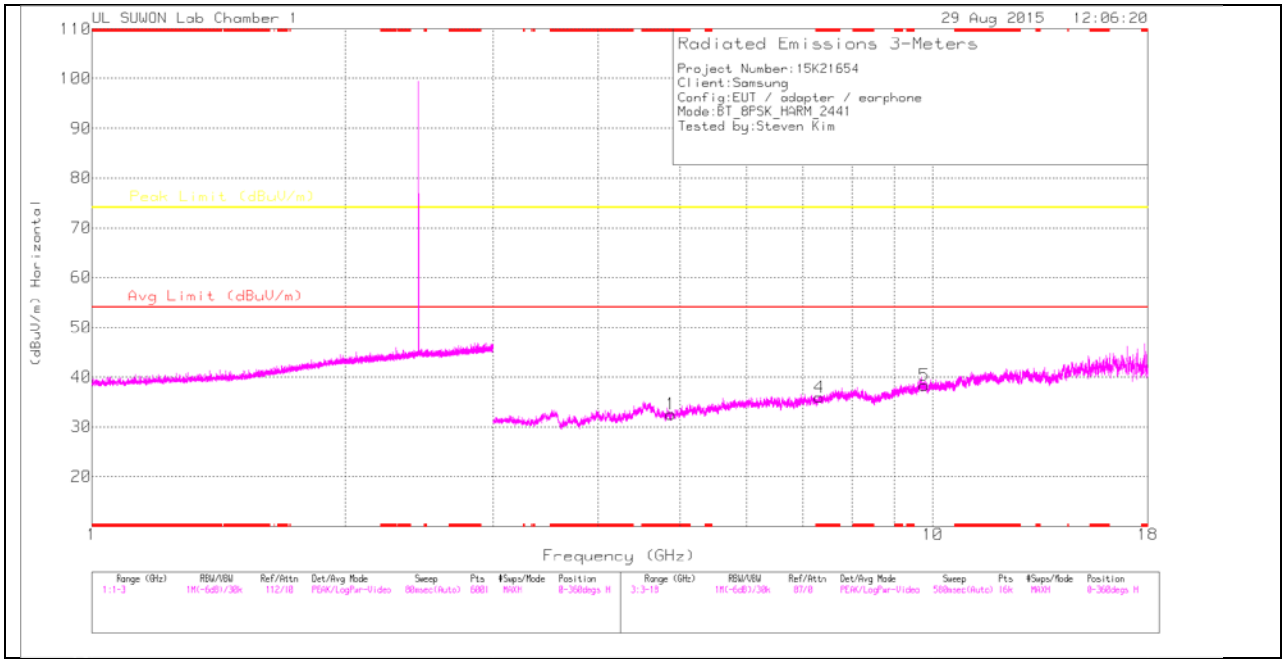
**MID CHANNEL HORIZONTAL**




**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 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.881 | 27.62 | PK | 34 | -29.1 | 32.52 | - | - | 74 | -41.48 | 0-360 | 200 | H |
| 4 | * 7.319 | 25.76 | PK | 35.8 | -25.6 | 35.96 | - | - | 74 | -38.04 | 0-360 | 200 | H |
| 5 | 9.766 | 23.21 | PK | 37.2 | -22.1 | 38.31 | - | - | 74 | -35.69 | 0-360 | 200 | H |
| 2 | * 4.887 | 27.85 | PK | 34 | -29.1 | 32.75 | - | - | 74 | -41.25 | 0-360 | 200 | V |
| 3 | * 7.319 | 26.05 | PK | 35.8 | -25.6 | 36.25 | - | - | 74 | -37.75 | 0-360 | 200 | V |
| 6 | 9.766 | 23.8 | PK | 37.2 | -22.1 | 38.9 | - | - | 74 | -35.1 | 0-360 | 100 | 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 limit (54dBuV/m).**


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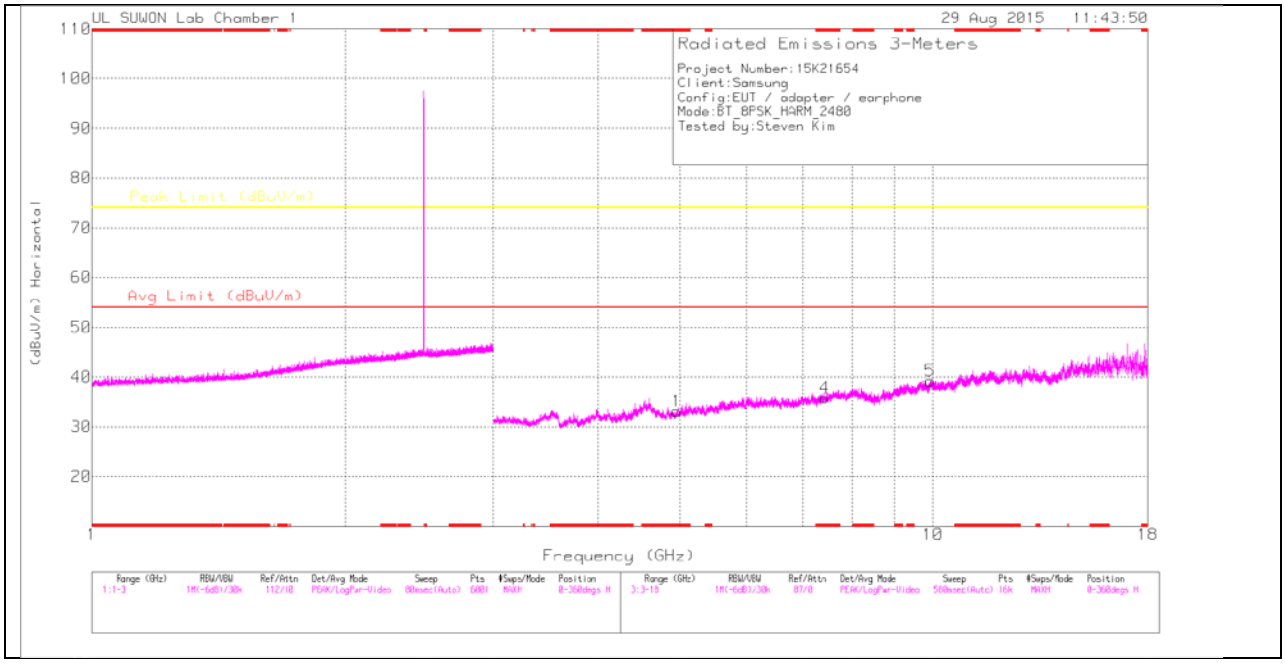
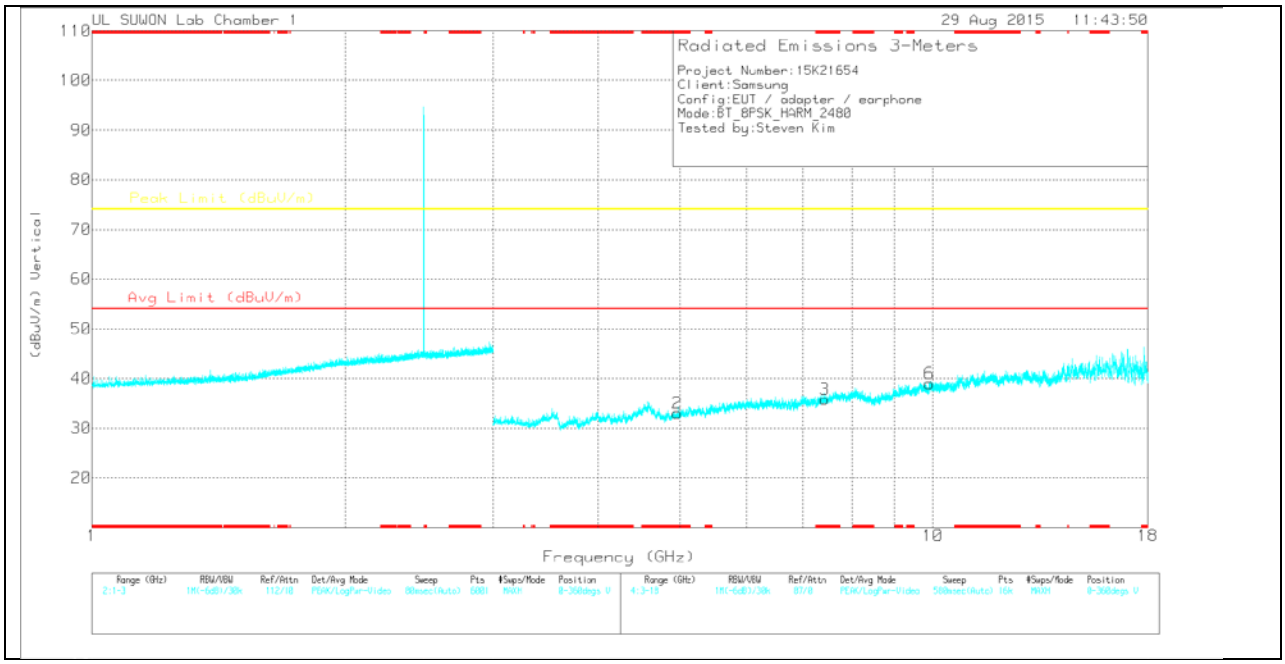
**HIGH CHANNEL HORIZONTAL**




**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 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 4.957 | 28.03 | PK | 34 | -28.9 | 33.13 | - | - | 74 | -40.87 | 0-360 | 100 | H |
| 4 | * 7.442 | 24.8 | PK | 35.8 | -24.8 | 35.8 | - | - | 74 | -38.2 | 0-360 | 200 | H |
| 5 | 9.921 | 22.21 | PK | 37.4 | -20.4 | 39.21 | - | - | 74 | -34.79 | 0-360 | 100 | H |
| 2 | * 4.965 | 27.85 | PK | 34.1 | -28.9 | 33.05 | - | - | 74 | -40.95 | 0-360 | 200 | V |
| 3 | * 7.44 | 24.86 | PK | 35.8 | -24.8 | 35.86 | - | - | 74 | -38.14 | 0-360 | 200 | V |
| 6 | 9.916 | 22.09 | PK | 37.4 | -20.5 | 38.99 | - | - | 74 | -35.01 | 0-360 | 100 | 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 limit (54dBuV/m).**


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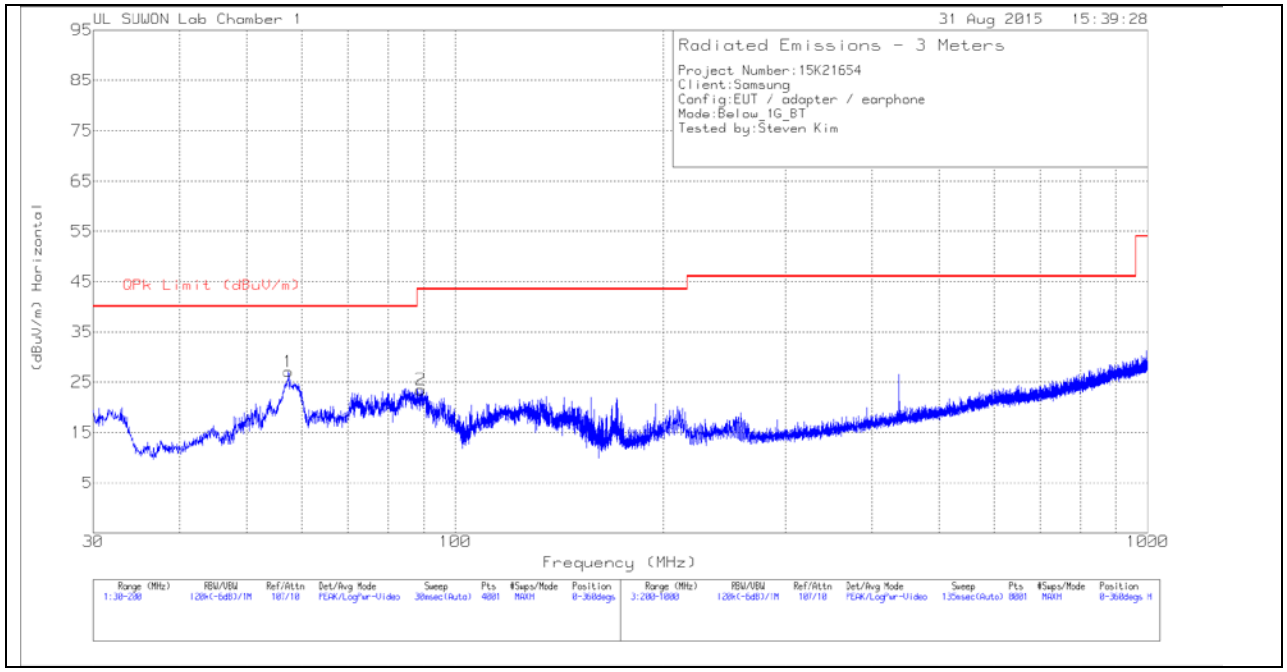
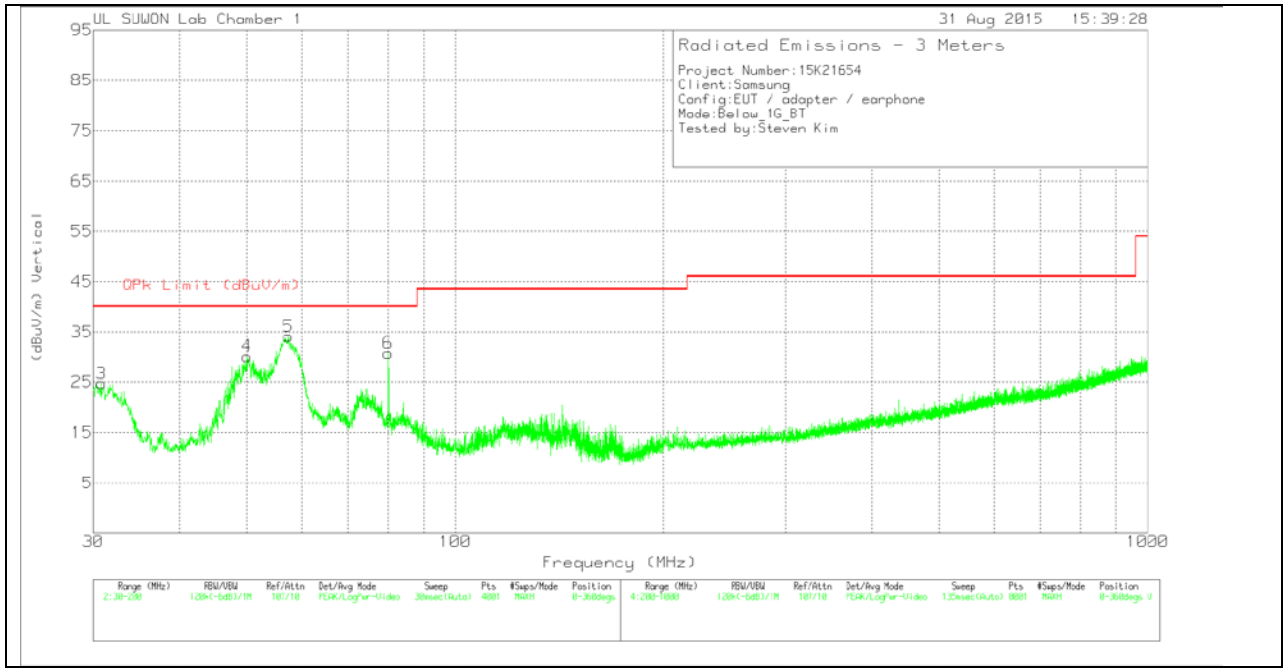
## 9.3. WORST-CASE BELOW 1 GHz

**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 | Bi-Log | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 57.4975 | 44.12 | Pk | 13 | -30 | 27.12 | 40 | -12.88 | 0-360 | 400 | H |
| 2 | 89.16 | 43.63 | Pk | 9.3 | -29.4 | 23.53 | 43.52 | -19.99 | 0-360 | 200 | H |
| 3 | 30.85 | 44.94 | Pk | 10.3 | -30.5 | 24.74 | 40 | -15.26 | 0-360 | 100 | V |
| 4 | 50.06 | 46.35 | Pk | 13.9 | -30.1 | 30.15 | 40 | -9.85 | 0-360 | 100 | V |
| 5 | 57.4975 | 51.11 | Pk | 13 | -30 | 34.11 | 40 | -5.89 | 0-360 | 100 | V |
| 6 | 79.98 | 53.48 | Pk | 6.9 | -29.6 | 30.78 | 40 | -9.22 | 0-360 | 100 | V |

Pk - Peak detector


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# 10. AC POWER LINE CONDUCTED EMISSIONS

**LIMITS**

FCC §15.207 (a)
RSS-Gen §8.8

| 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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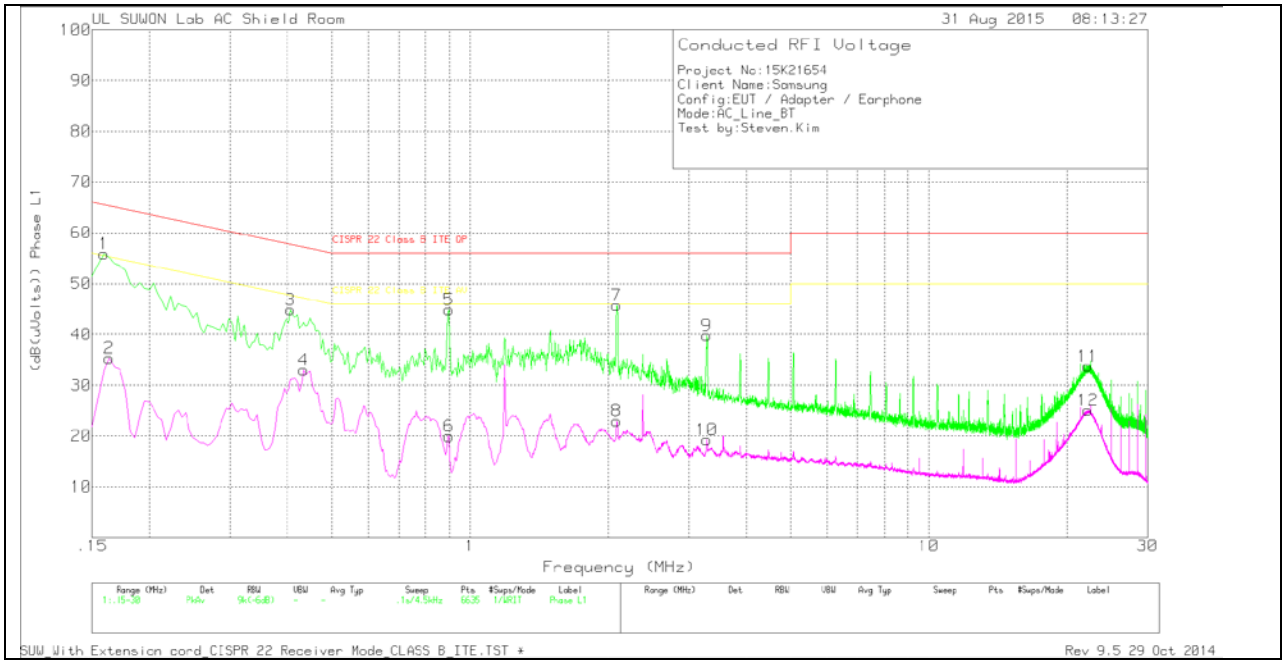
**WORST EMISSIONS**

## LINE 1 PLOT





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# LINE 1 RESULTS

Phase L1 .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_L1 | CE Shield Room | Corrected Reading (dBuV) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .159 | 45.83 | Pk | 10 | 0 | 55.83 | 65.52 | -9.69 | - | - |
| 2 | .1635 | 25.3 | Av | 10.1 | 0 | 35.4 | - | - | 55.28 | -19.88 |
| 3 | .4065 | 34.72 | Pk | 10.1 | 0 | 44.82 | 57.72 | -12.9 | - | - |
| 4 | .4335 | 22.84 | Av | 10.1 | 0 | 32.94 | - | - | 47.19 | -14.25 |
| 5 | .897 | 34.93 | Pk | 9.9 | 0 | 44.83 | 56 | -11.17 | - | - |
| 6 | .897 | 10.05 | Av | 9.9 | 0 | 19.95 | - | - | 46 | -26.05 |
| 7 | 2.085 | 35.81 | Pk | 9.8 | .1 | 45.71 | 56 | -10.29 | - | - |
| 8 | 2.085 | 13.1 | Av | 9.8 | .1 | 23 | - | - | 46 | -23 |
| 9 | 3.282 | 29.91 | Pk | 9.8 | .1 | 39.81 | 56 | -16.19 | - | - |
| 10 | 3.282 | 9.38 | Av | 9.8 | .1 | 19.28 | - | - | 46 | -26.72 |
| 11 | 22.2405 | 23.04 | Pk | 10.5 | .2 | 33.74 | 60 | -26.26 | - | - |
| 12 | 22.2135 | 14.52 | Av | 10.4 | .2 | 25.12 | - | - | 50 | -24.88 |

Pk - Peak detector

Av - Average detection

## Quasi-Peak Emissions

Phase L1 .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_L1 | CE Shield Room | Corrected Reading (dBuV) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .1599 | 42.7 | Qp | 10 | 0 | 52.7 | 65.47 | -12.77 | - | - |
| 2.0895 | 32.15 | Qp | 9.8 | .1 | 42.05 | 56 | -13.95 | - | - |

Qp – Quasi-Peak detector


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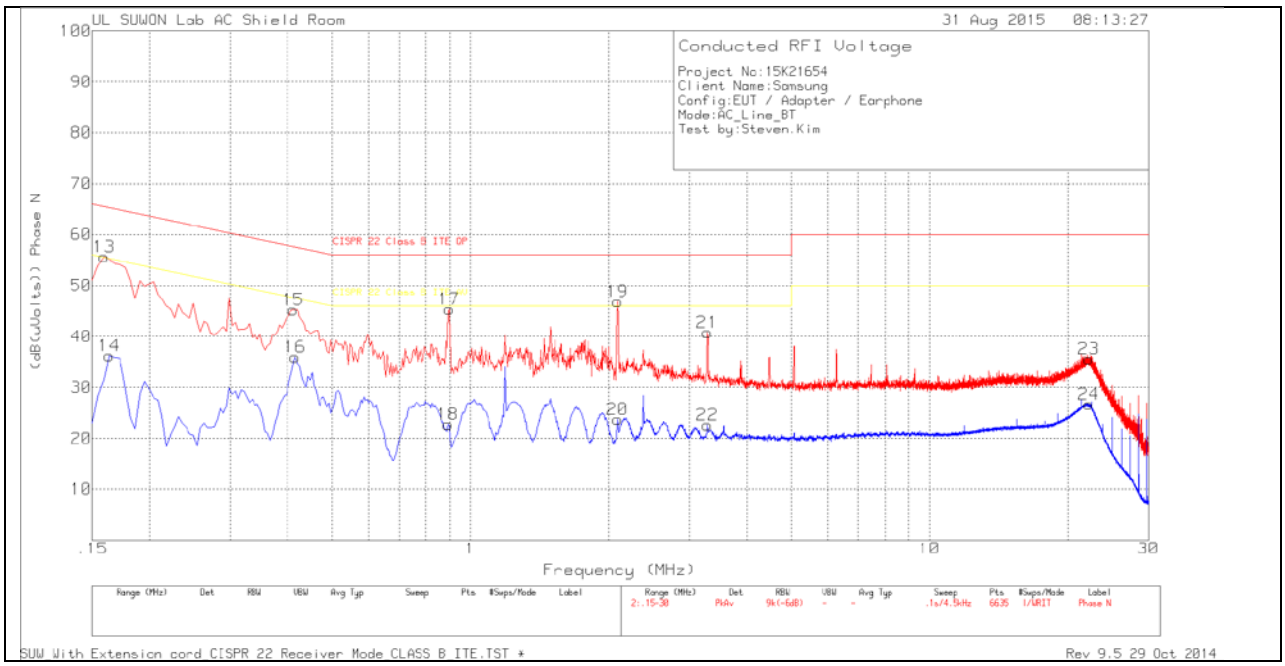
## LINE 2 PLOT





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# LINE 2 RESULTS

Phase N .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_N | CE Shield Room | Corrected Reading (dBuV) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 13 | .159 | 45.65 | Pk | 10 | 0 | 55.65 | 65.52 | -9.87 | - | - |
| 14 | .1635 | 26.16 | Av | 10.1 | 0 | 36.26 | - | - | 55.28 | -19.02 |
| 15 | .411 | 35.19 | Pk | 10.1 | 0 | 45.29 | 57.63 | -12.34 | - | - |
| 16 | .4155 | 25.86 | Av | 10.1 | 0 | 35.96 | - | - | 47.54 | -11.58 |
| 17 | .897 | 35.44 | Pk | 9.9 | 0 | 45.34 | 56 | -10.66 | - | - |
| 18 | .8925 | 12.79 | Av | 9.9 | 0 | 22.69 | - | - | 46 | -23.31 |
| 19 | 2.0895 | 36.98 | Pk | 9.8 | .1 | 46.88 | 56 | -9.12 | - | - |
| 20 | 2.0895 | 13.8 | Av | 9.8 | .1 | 23.7 | - | - | 46 | -22.3 |
| 21 | 3.282 | 30.87 | Pk | 9.8 | .1 | 40.77 | 56 | -15.23 | - | - |
| 22 | 3.282 | 12.71 | Av | 9.8 | .1 | 22.61 | - | - | 46 | -23.39 |
| 23 | 22.227 | 24.66 | Pk | 10.7 | .2 | 35.56 | 60 | -24.44 | - | - |
| 24 | 22.2315 | 15.81 | Av | 10.7 | .2 | 26.71 | - | - | 50 | -23.29 |

Pk - Peak detector

Av - Average detection

## Quasi-Peak Emissions

Phase N .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_N | CE Shield Room | Corrected Reading (dBuV) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .159 | 42.31 | Qp | 10 | 0 | 52.31 | 65.52 | -13.21 | - | - |
| 2.0895 | 32.22 | Qp | 9.8 | .1 | 42.12 | 56 | -13.88 | - | - |

Qp – Quasi-Peak detector


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