



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth/BLE and DTS b/g/n

MODEL NUMBER : SM-G600FY

FCC ID: A3LSMG600FY

REPORT NUMBER: 15K21555-E3

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Prepared for

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ACCREDITED

TL-637

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|-------------|-------------------|------------------|-------------------|
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth/BLE and DTS b/g/n
MODEL NUMBER: SM-G600FY
SERIAL NUMBER: R38G80J911J (RADIATED); R38G80J8ZDH (CONDUCTED)
DATE TESTED: AUG 14, 2015 - SEP 03, 2015

| 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.

Approved & Released For
UL Korea, Ltd. By:



CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



SungGil Park
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

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 |
|---|
| <input checked="" type="checkbox"/> Chamber 1 |
| <input checked="" type="checkbox"/> 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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

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%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + Bluetooth/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 | 8.76 | 7.52 |
| | | Peak | 9.43 | 8.76 |
| | Enhanced Pi/4-DPSK | Average | 6.52 | 4.49 |
| | | Peak | 7.51 | 12.52 |
| | Enhanced 8PSK | Average | 6.55 | 4.52 |
| | | Peak | 7.71 | 5.90 |

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 -2.41 dBi.

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.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| Support Equipment List | | | | |
|------------------------|--------------|-------------|---------------|--------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| Charger | SAMSUNG | EP-TA50IWE | DK1G316VS/A-E | N/A |
| Data Cable | SAMSUNG | ECB-DU68WE | N/A | N/A |
| Earphone | SAMSUNG | GH59-11849A | N/A | N/A |

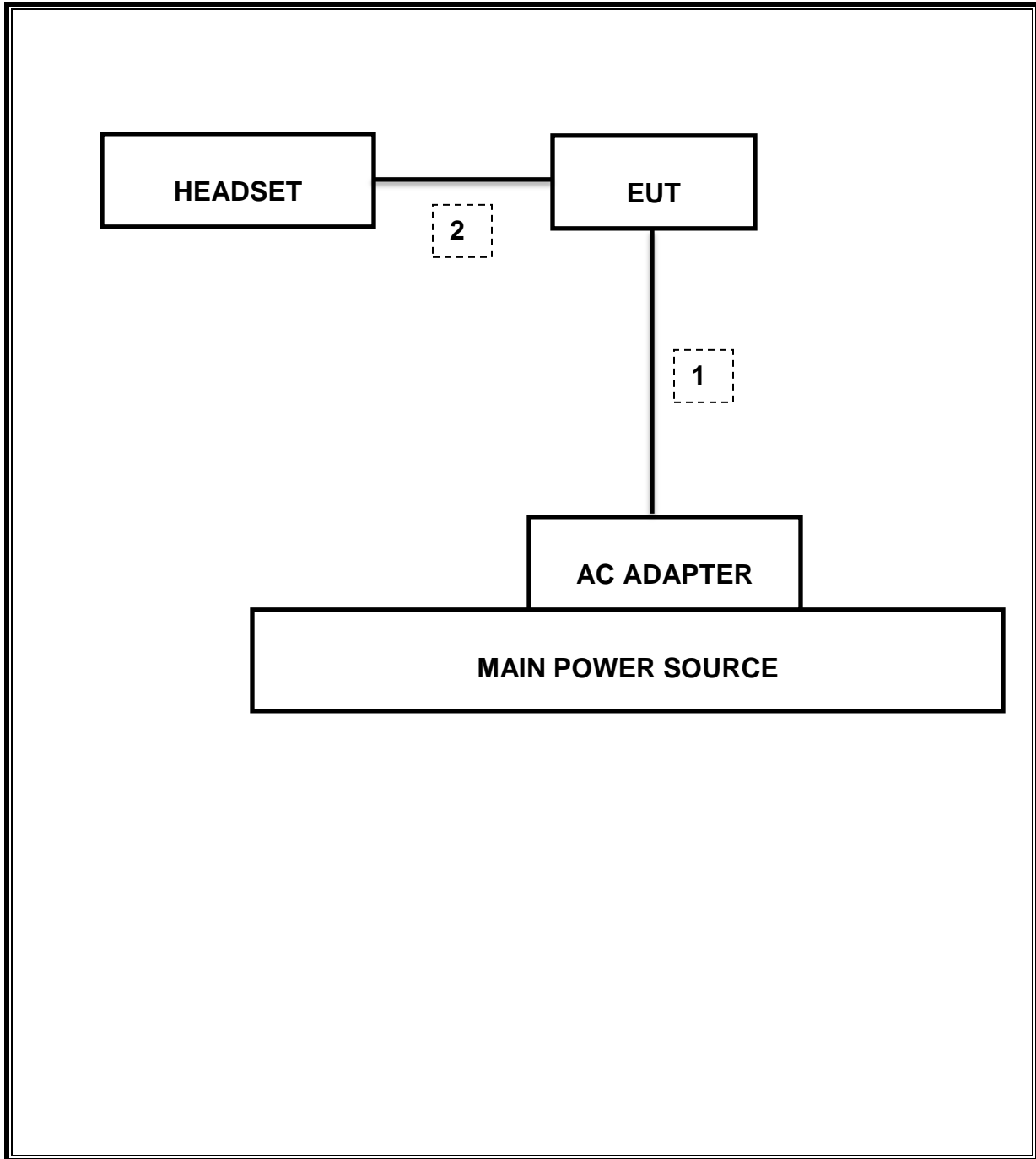
I/O CABLES

| 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.

SETUP DIAGRAM FOR TESTS



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 | WEINSCHL | 1575 | 2153 | 08-20-16 |

7. SUMMARY TABLE

| FCC Part Section | Test Description | Test Limit | Test Condition | Test Result | Worst Case |
|--------------------|---|---------------------------------------|----------------|----------------------|-------------------|
| 2.1049 | Occupied Band width (99%) | N/A | Conducted | Pass | 1.197 MHz |
| 2.1051, 15.247 (d) | Band Edge / Conducted Spurious Emission | -20dBc | | Pass | -38.69 dBm |
| 15.247 (b)(1) | TX conducted output power | <21dBm | | Pass | 9.426 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 | 0.346 sec |
| 15.207 (a) | AC Power Line conducted emissions | Section 10 | | Power Line conducted | Pass |
| 15.205, 15.209 | Radiated Spurious Emission | < 54dBuV/m | Radiated | Pass | 27.43 dBuV/m (AV) |

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 \geq 1% of the 20 dB bandwidth. The VBW is set to \geq 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 | 0.900 | 0.938 |
| Mid | 2441 | 1.007 | 0.936 |
| High | 2480 | 1.010 | 0.908 |
| Worst | | 1.010 | 0.938 |

8.1.2. ENHANCED DATA RATE Pi/4-DQPSK MODULATION

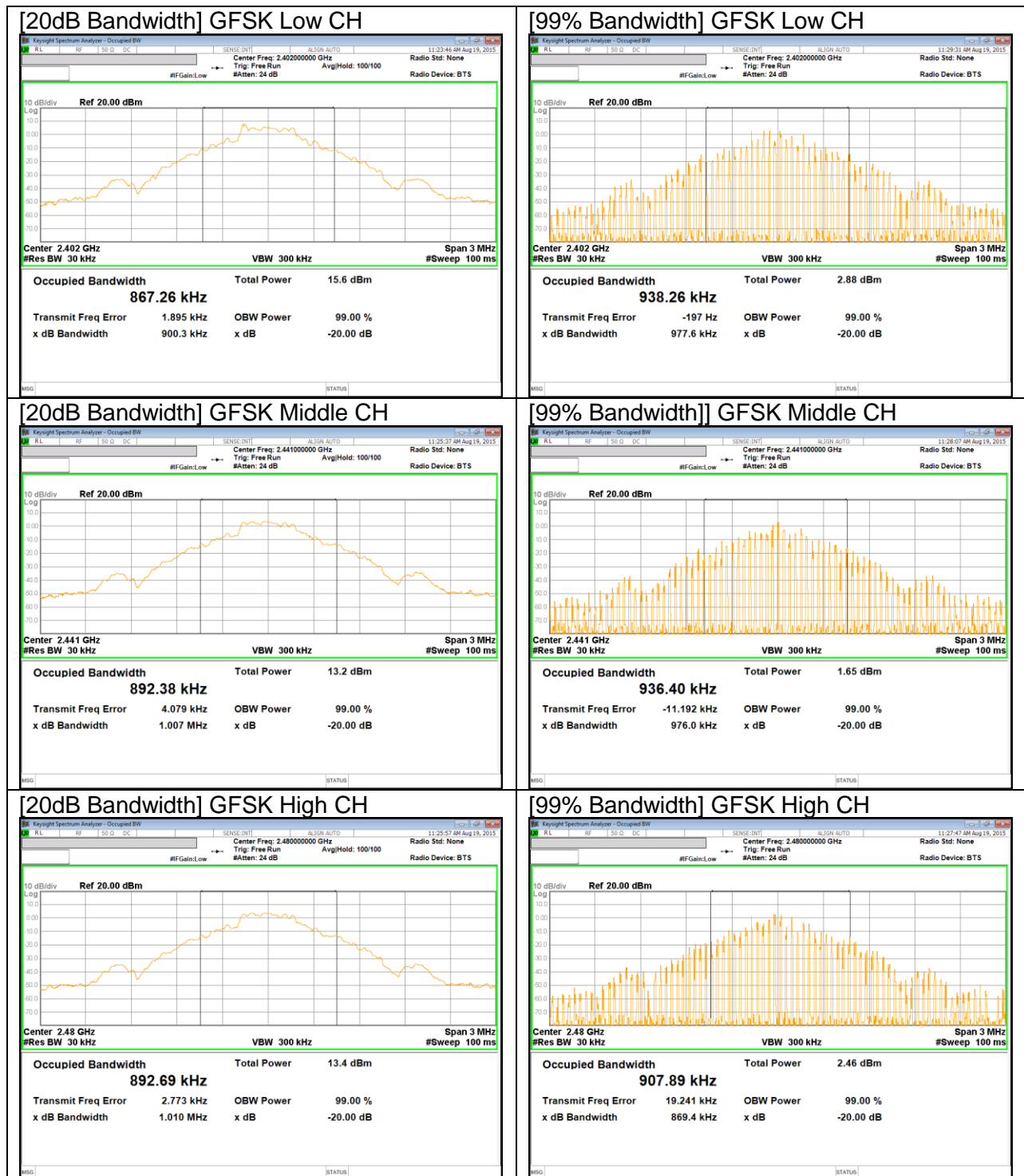
| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|-----------------------|---------------------|
| Low | 2402 | 1.229 | 1.163 |
| Mid | 2441 | 1.221 | 1.197 |
| High | 2480 | 1.310 | 1.167 |
| Worst | | 1.310 | 1.197 |

8.1.3. ENHANCED DATA RATE 8PSK MODULATION

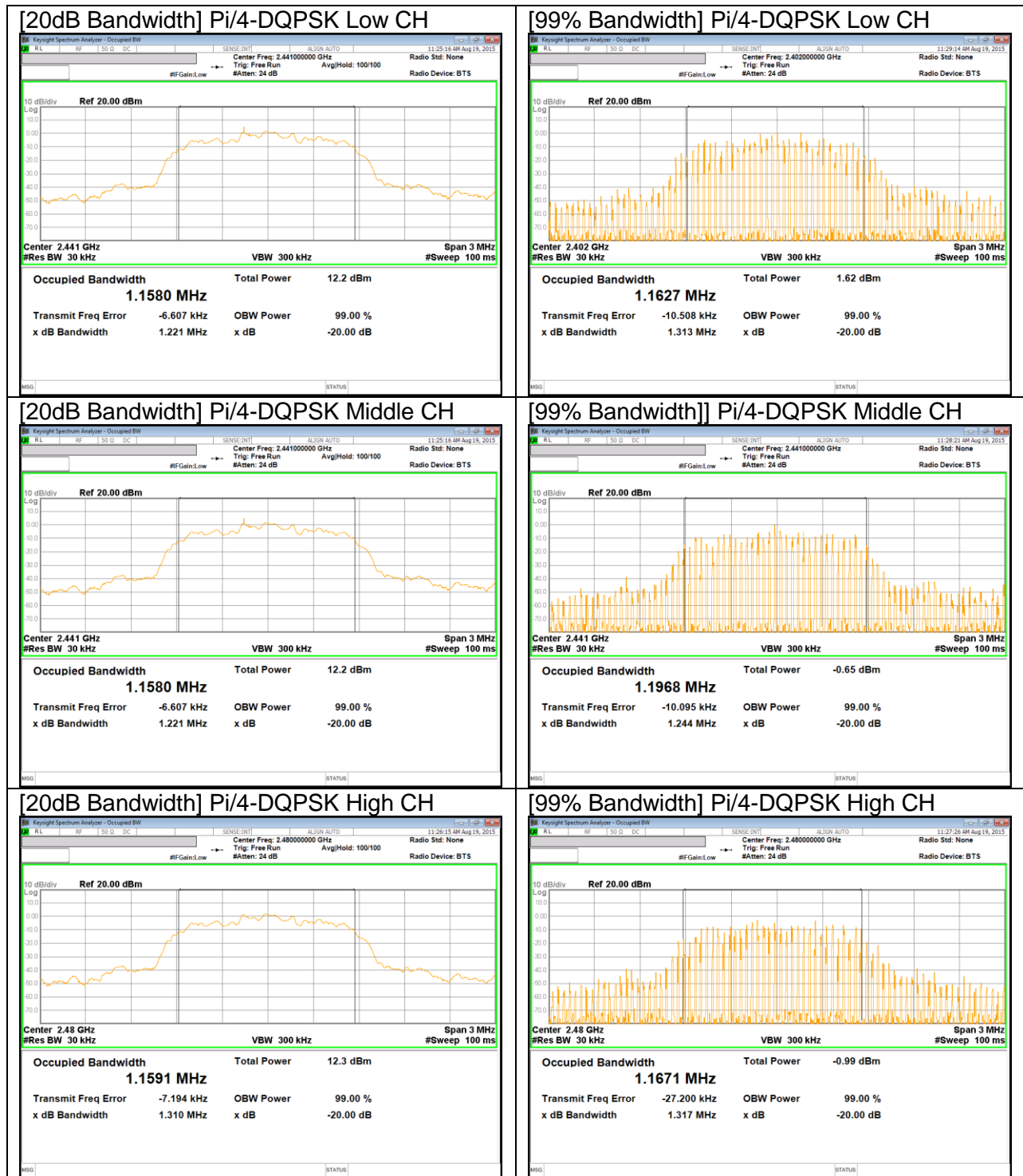
| Channel | Frequency [MHz] | 20 dB Bandwidth [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|-----------------------|---------------------|
| Low | 2402 | 1.264 | 1.166 |
| Mid | 2441 | 1.264 | 1.163 |
| High | 2480 | 1.261 | 1.162 |
| Worst | | 1.264 | 1.166 |

8.1.4. 20 dB AND 99% BANDWIDTH PLOTS

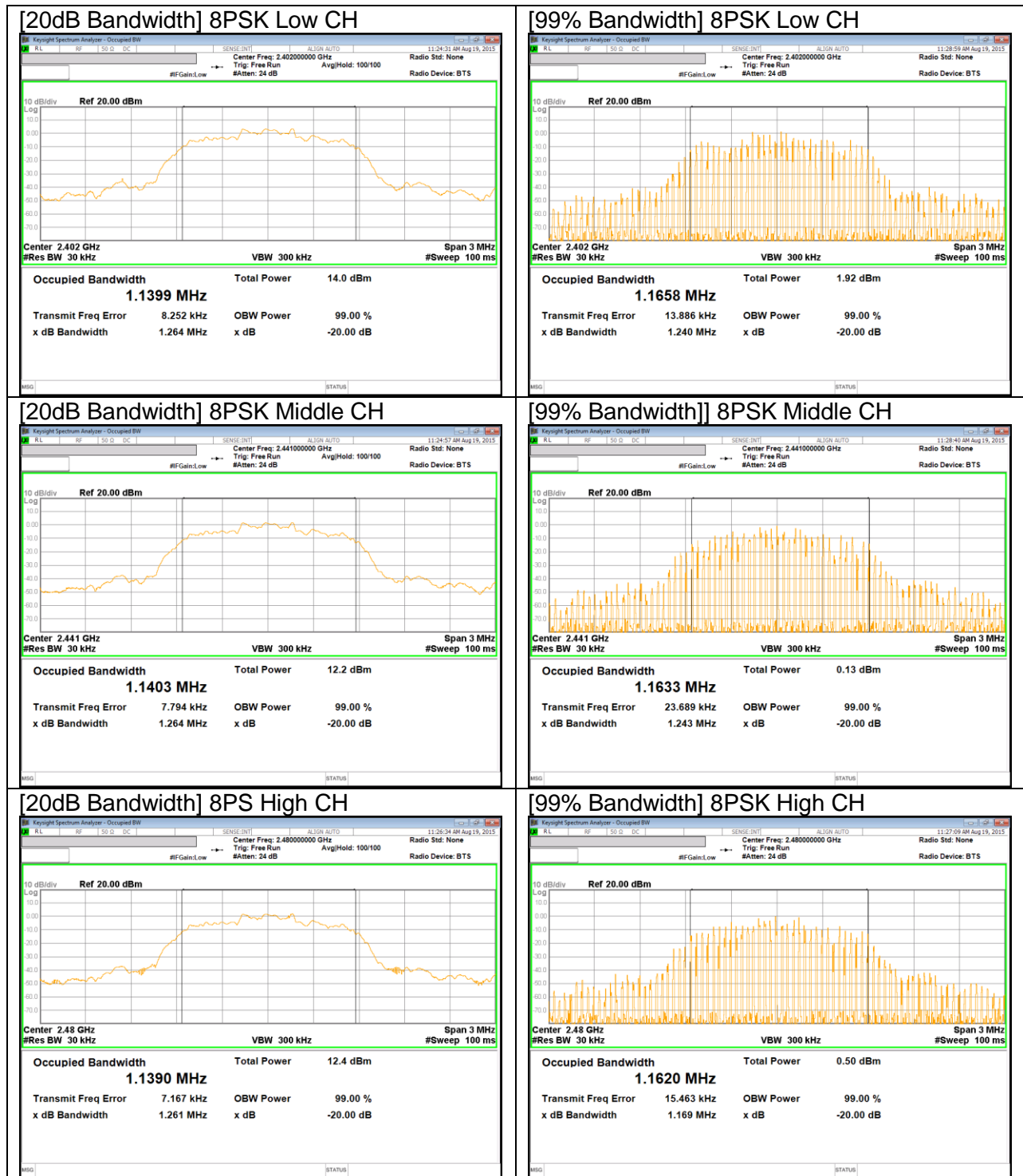
GFSK BANDWIDTH



Pi/4-DQPSK BANDWIDTH



8PSK BANDWIDTH



8.2. 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 hopping 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

8.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

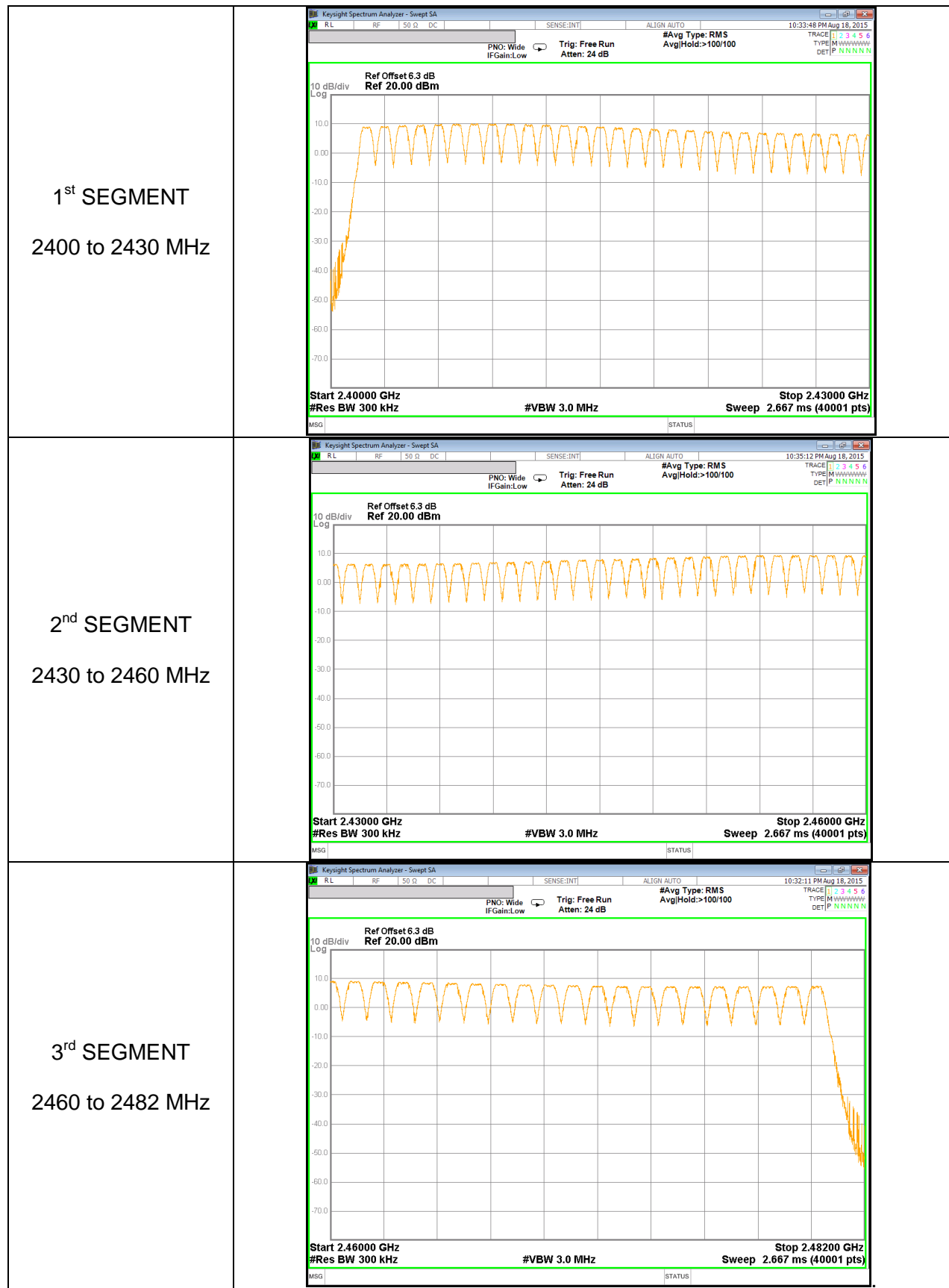
Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

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.



8.4. 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.

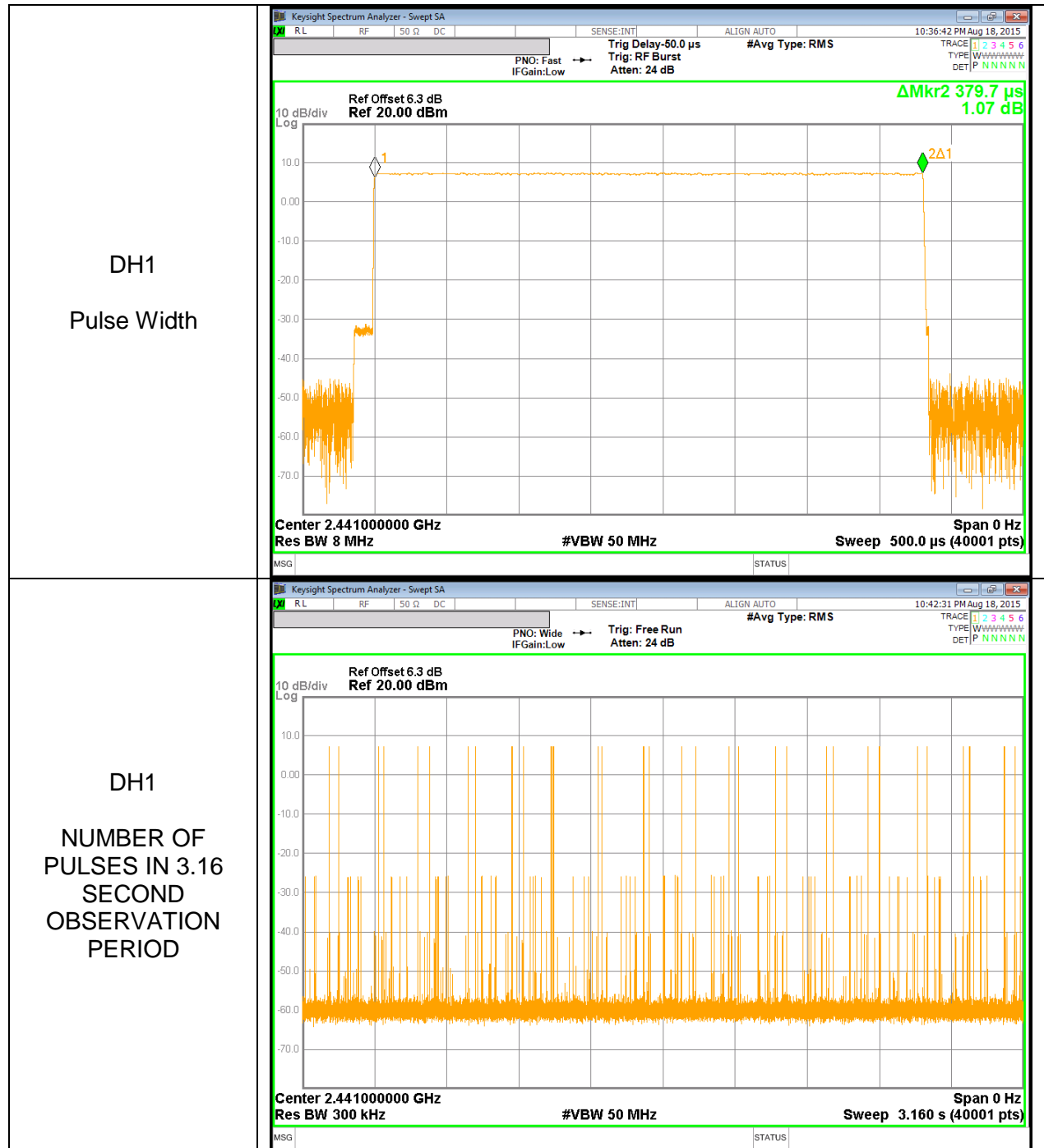
The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$.

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

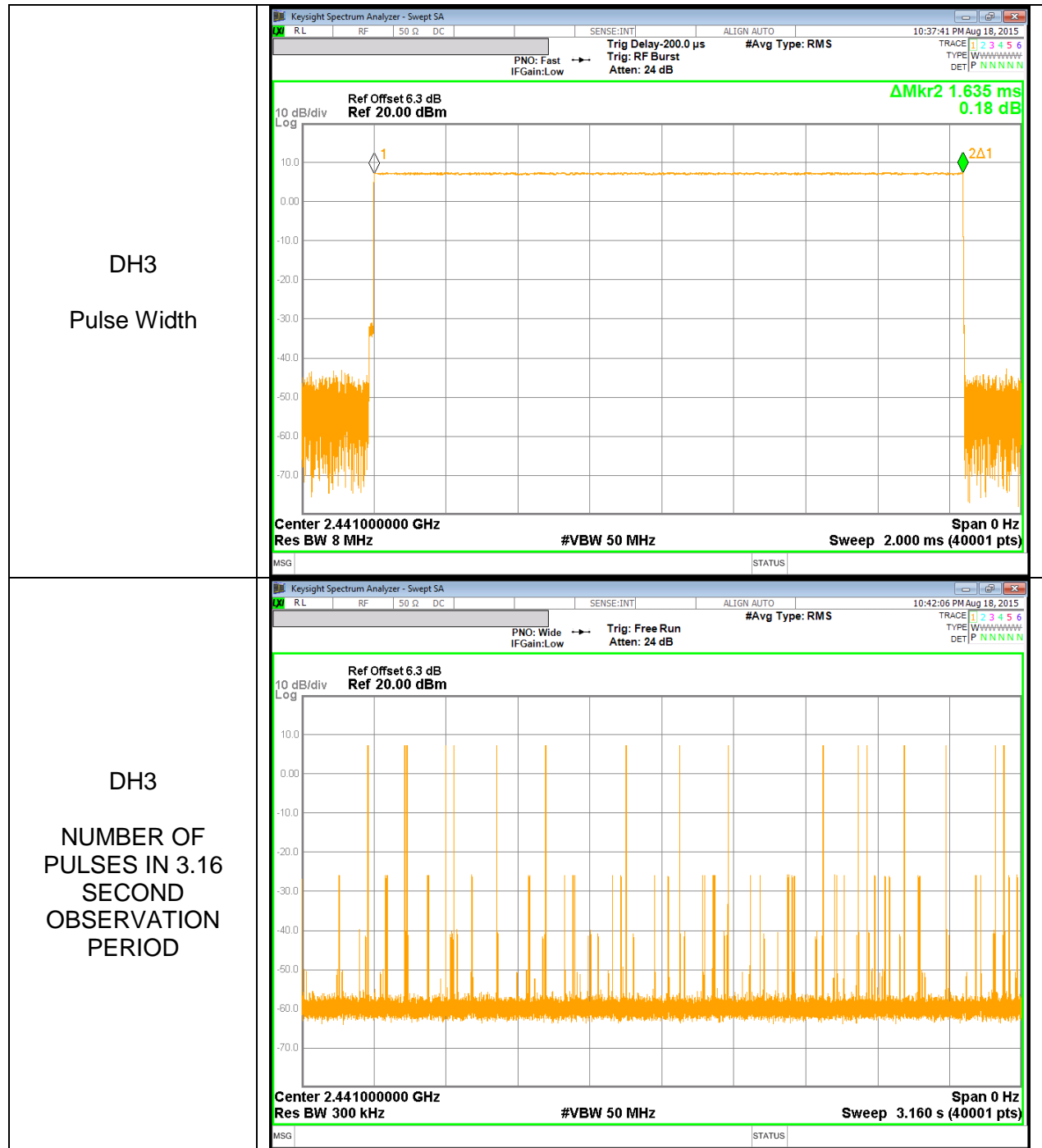
RESULTS

| DH Packet | Pulse Width [msec] | Number of Pulses in 3.16 seconds | Average Time of Occupancy [sec] | Limit [sec] | Margin [sec] |
|-------------|--------------------|----------------------------------|---------------------------------|-------------|--------------|
| GFSK Normal | | | | | |
| DH1 | 0.380 | 32 | 0.121536 | 0.4 | -0.2785 |
| DH3 | 1.635 | 17 | 0.277950 | 0.4 | -0.1221 |
| DH5 | 2.882 | 12 | 0.345840 | 0.4 | -0.0542 |
| GFSK AFH | | | | | |
| DH Packet | Pulse Width [msec] | Number of Pulses in 0.8 seconds | Average Time of Occupancy [sec] | Limit [sec] | Margin [sec] |
| GFSK AFH | | | | | |
| DH1 | 0.380 | 8 | 0.030384 | 0.4 | -0.36962 |
| DH3 | 1.635 | 4.25 | 0.069488 | 0.4 | -0.33051 |
| DH5 | 2.882 | 3 | 0.086460 | 0.4 | -0.31354 |

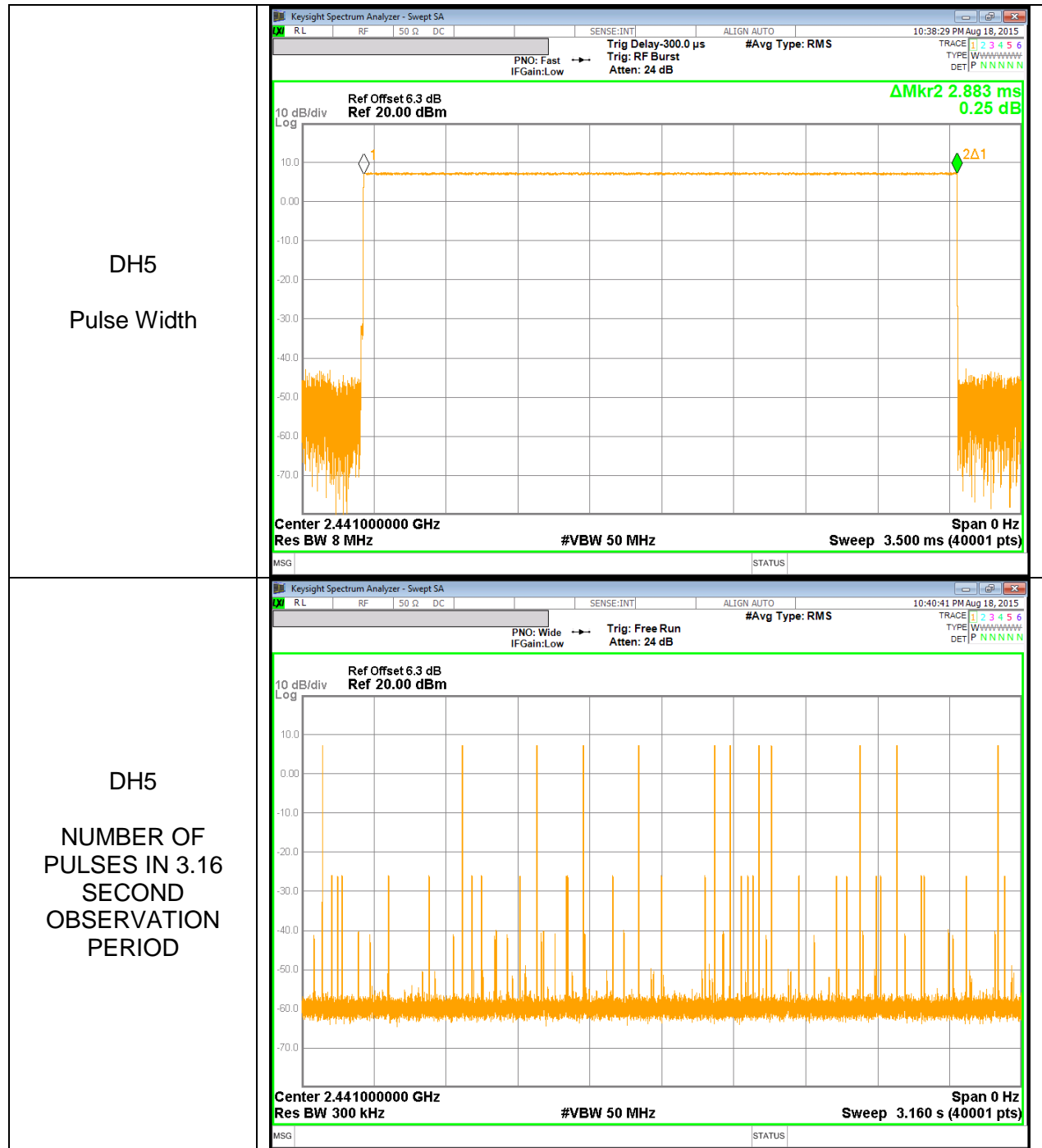
DH1



DH3



DH5



8.5. 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

8.5.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---------|-----------------|--------------------|-------------|-------------|
| Low | 2402 | 9.071 | 21 | -11.929 |
| Middle | 2441 | 9.015 | 21 | -11.985 |
| High | 2480 | 9.426 | 21 | -11.574 |
| Worst | | 9.426 | 21 | -11.574 |

8.5.2. ENHANCED DATA RATE Pi/4-DPSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---------|-----------------|--------------------|-------------|-------------|
| Low | 2402 | 7.143 | 21 | -13.857 |
| Middle | 2441 | 7.094 | 21 | -13.906 |
| High | 2480 | 7.505 | 21 | -13.495 |
| Worst | | 7.505 | 21 | -13.495 |

8.5.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | Output Power [dBm] | Limit [dBm] | Margin [dB] |
|---------|-----------------|--------------------|-------------|-------------|
| Low | 2402 | 7.328 | 21 | -13.672 |
| Middle | 2441 | 7.273 | 21 | -13.727 |
| High | 2480 | 7.705 | 21 | -13.295 |
| Worst | | 7.705 | 21 | -13.295 |

8.5.4. OUTPUT POWER PLOTS

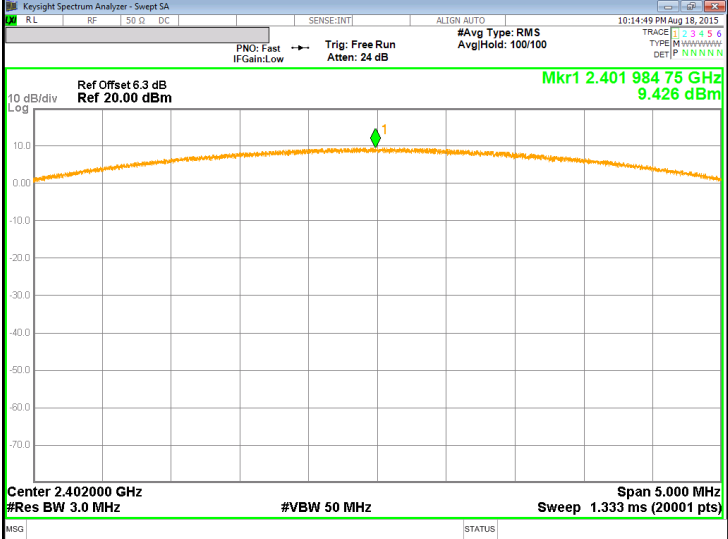
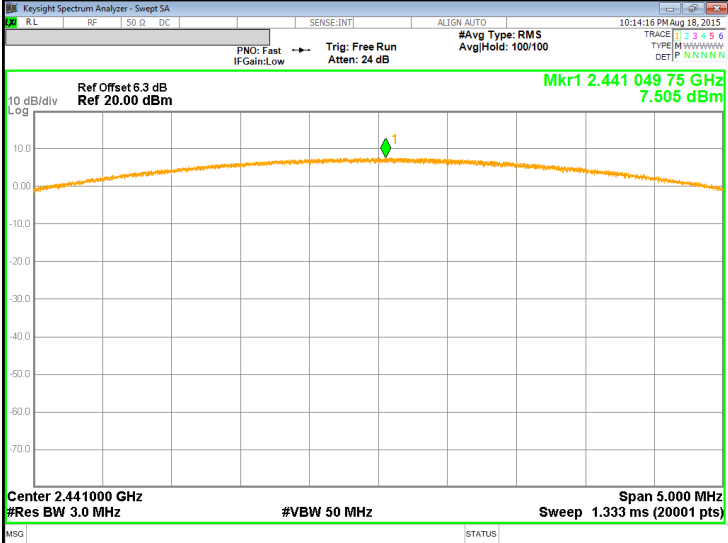
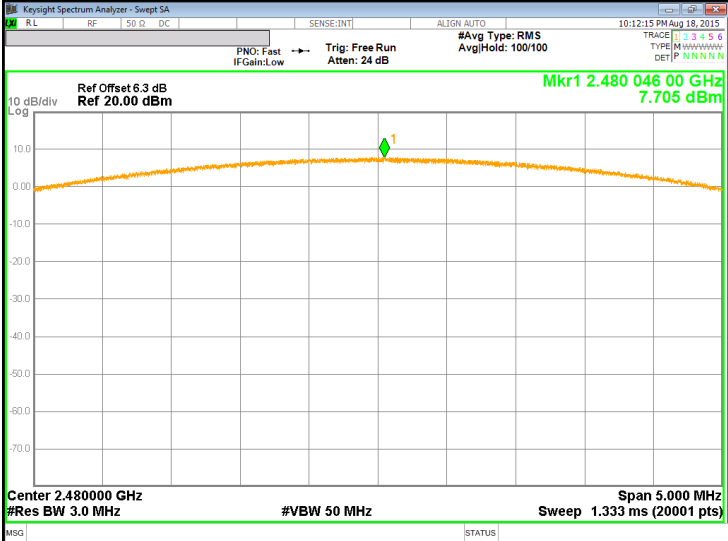
GFSK OUTPUT POWER

| | |
|---------------------------|--|
| <p>GFSK Low CH</p> |  |
| <p>GFSK Middle CH</p> |  |
| <p>GFSK High CH</p> |  |

Pi/4-DPSK OUTPUT POWER



8PSK OUTPUT POWER

| | |
|---------------------------|--|
| <p>8PSK Low CH</p> |  |
| <p>8PSK Middle CH</p> |  |
| <p>8PSK High CH</p> |  |

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 | 8.76 | 7.52 |
| Middle | 2441 | 6.86 | 4.86 |
| High | 2480 | 7.03 | 5.05 |

8.6.2. DATA RATE PI/4-DQPSK MODULATION

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---------|-----------------|----------------|---------------|
| Low | 2402 | 6.52 | 4.49 |
| Middle | 2441 | 4.62 | 2.90 |
| High | 2480 | 4.78 | 3.00 |

8.6.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency [MHz] | AV power [dBm] | AV power [mW] |
|---------|-----------------|----------------|---------------|
| Low | 2402 | 6.55 | 4.52 |
| Middle | 2441 | 4.66 | 2.92 |
| High | 2480 | 4.81 | 3.03 |

8.7. 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.

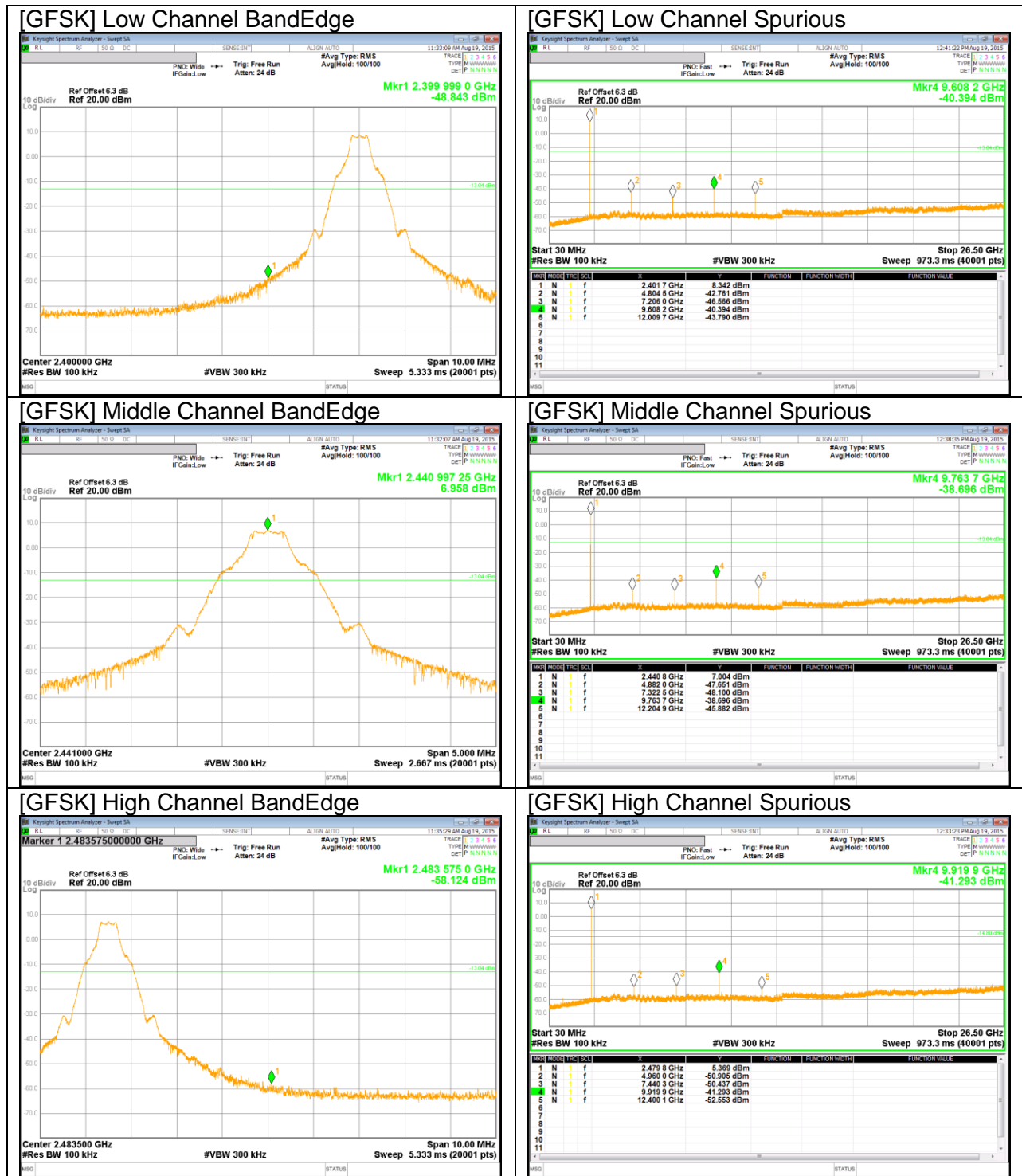
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

RESULTS

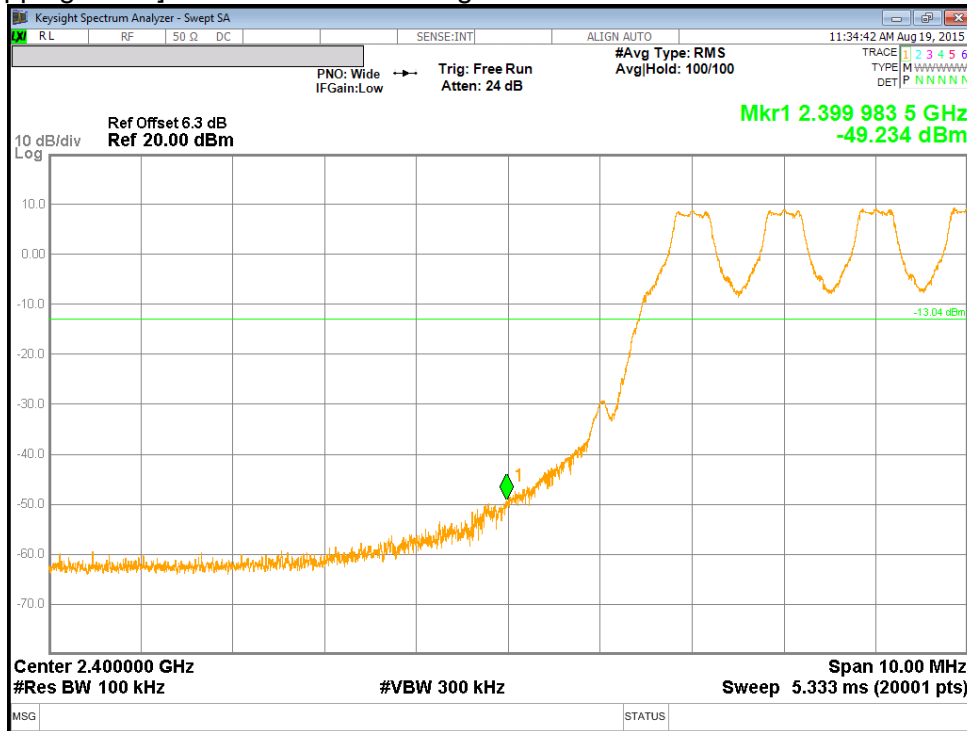
8.7.1. BASIC DATA RATE GFSK MODULATION

GFSK Mode

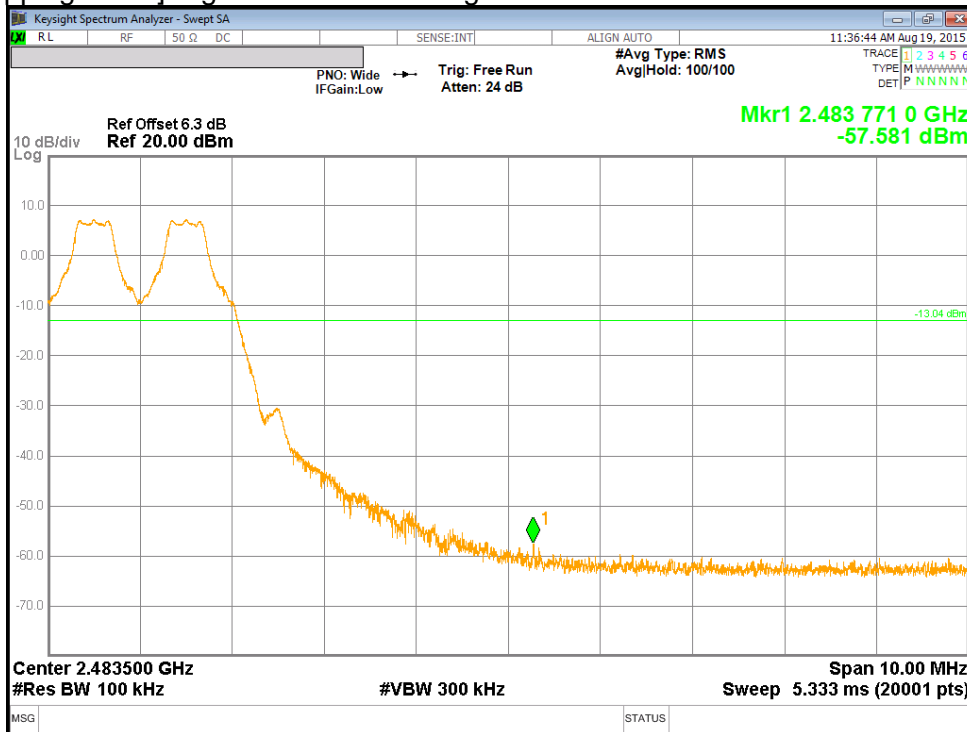


BandEdge Emission at GFSK Hopping Mode

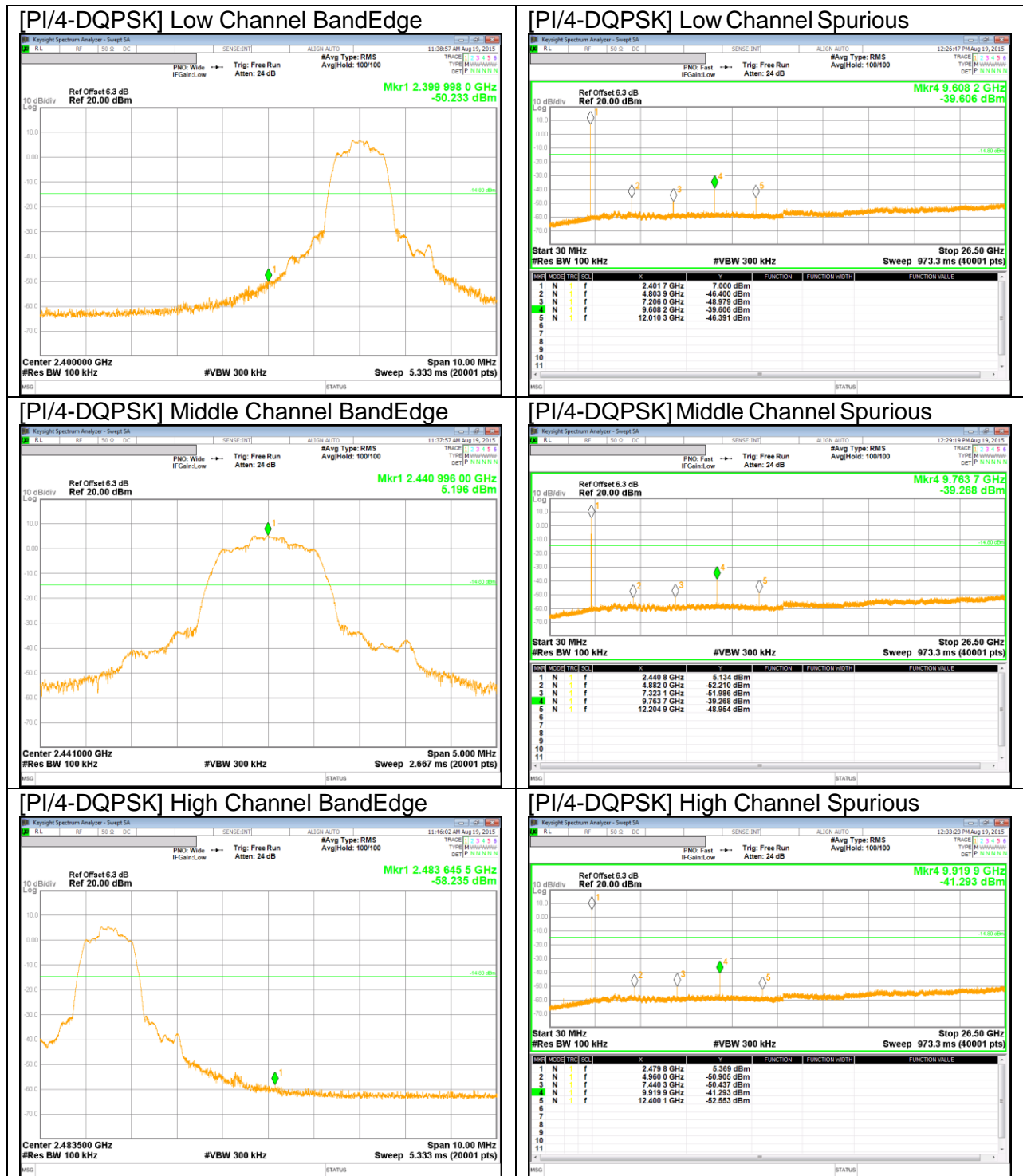
[GFSK Hopping Mode] Low Channel BandEdge



[GFSK Hopping Mode] High Channel BandEdge

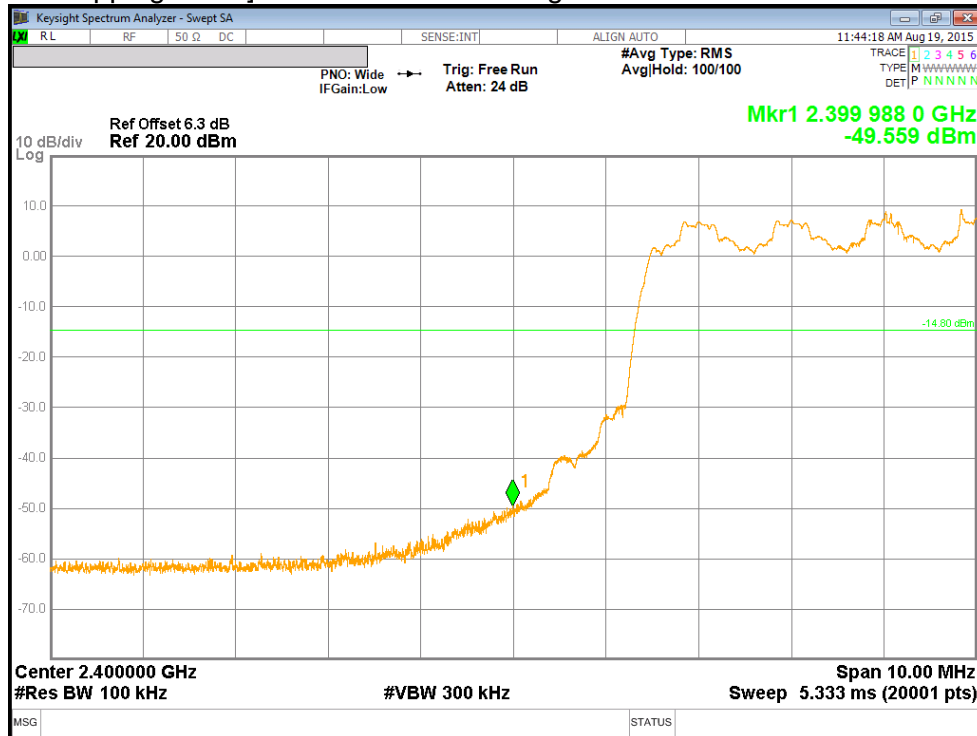


PI/4-DQPSK Mode

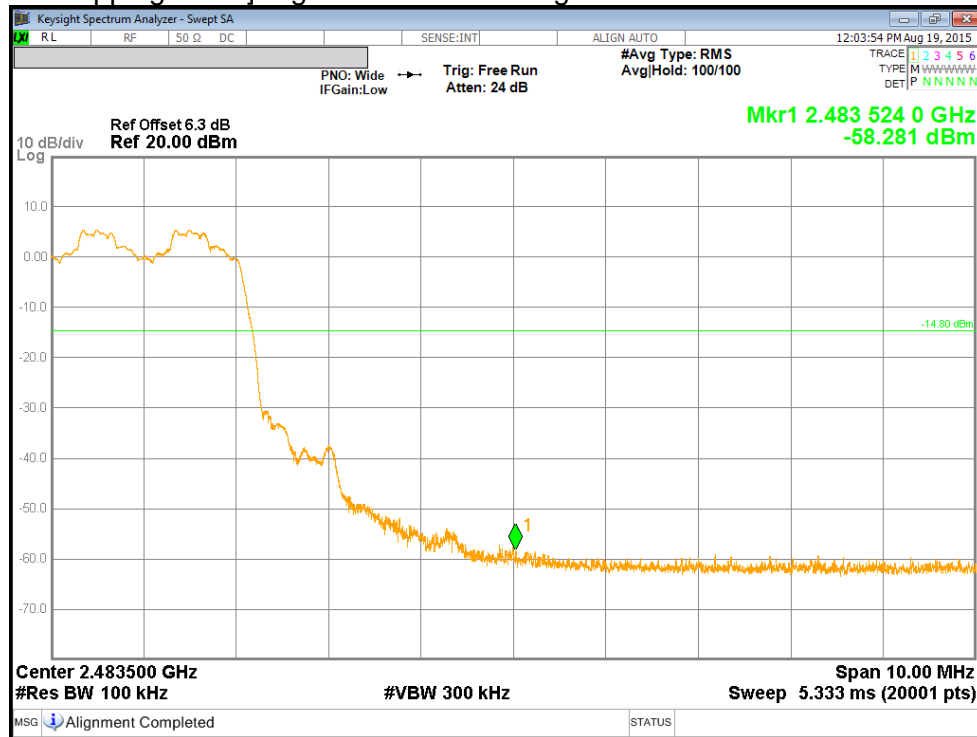


BandEdge Emission at PI/4-DQPSK Hopping Mode

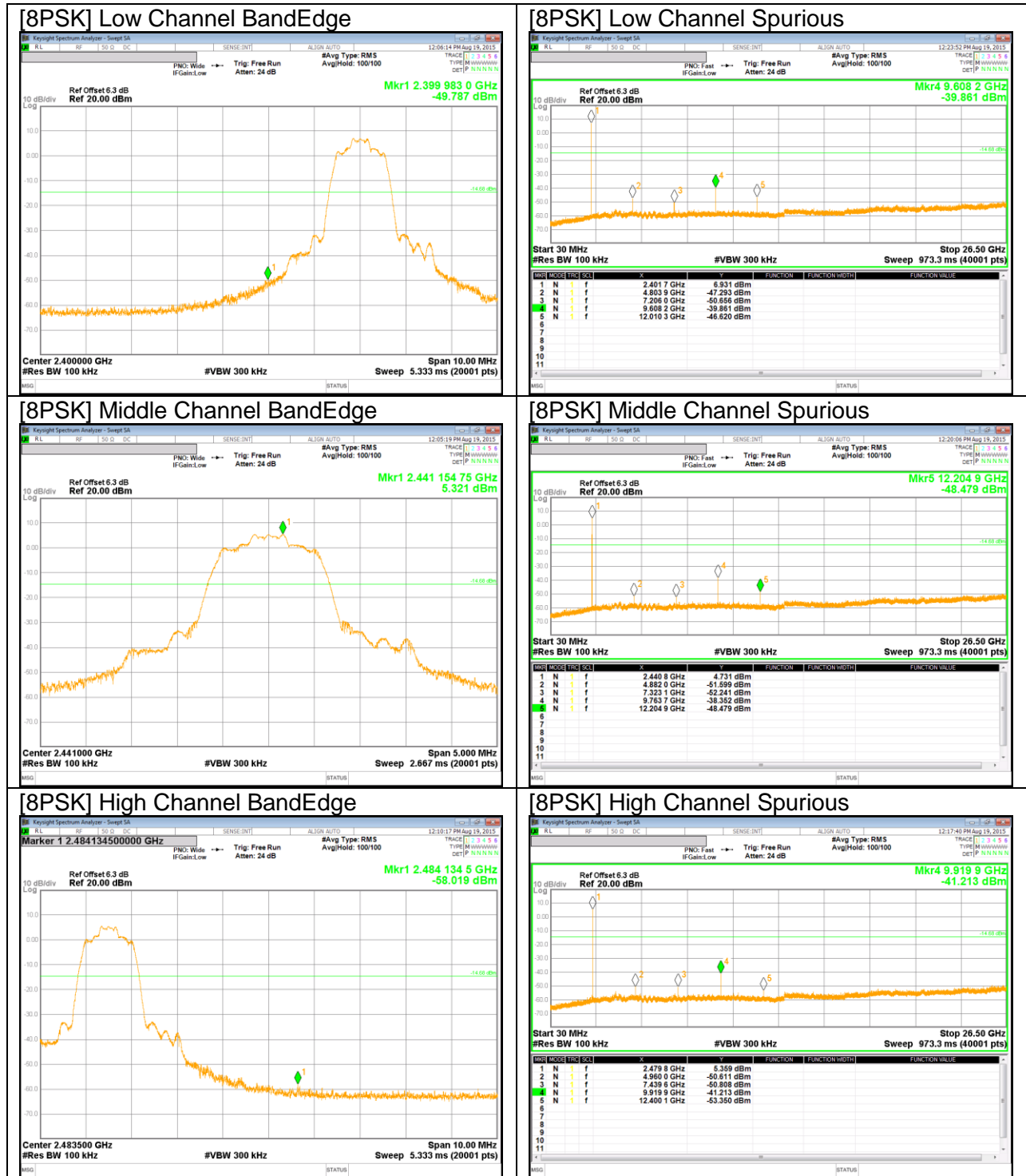
[PI/4-DQPSK Hopping Mode] Low Channel BandEdge



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

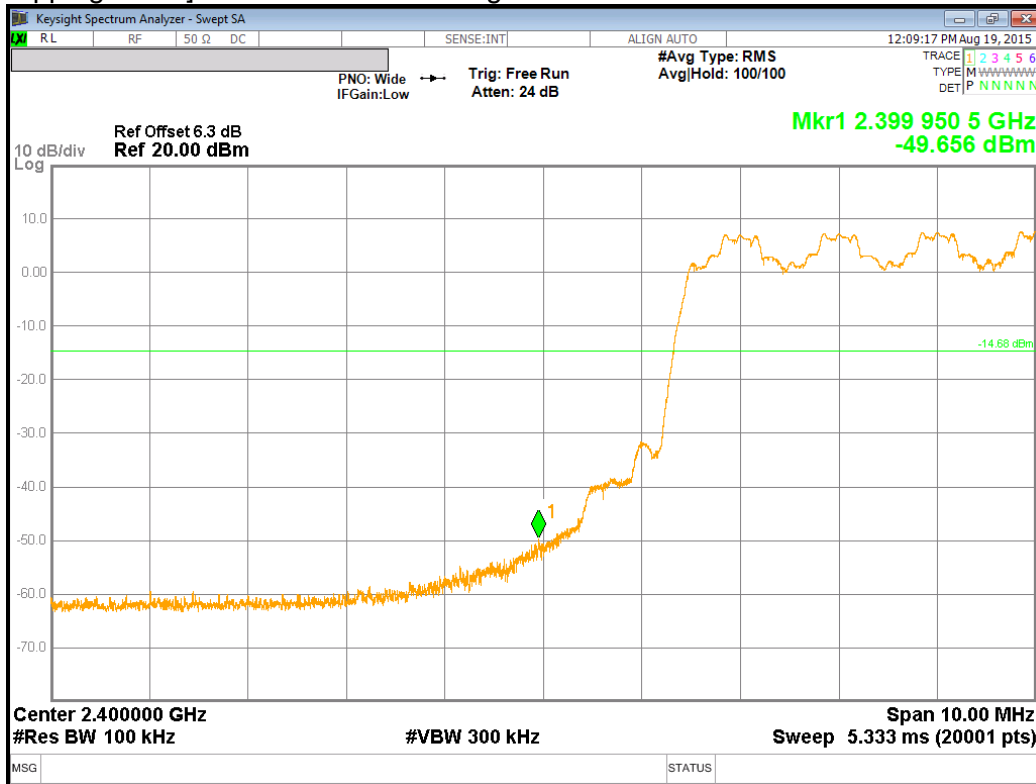


8PSK Mode



BandEdge Emission at 8PSK Hopping Mode

[8PSK Hopping Mode] Low Channel BandEdge



[8PSK Hopping Mode] High Channel BandEdge



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

| 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.

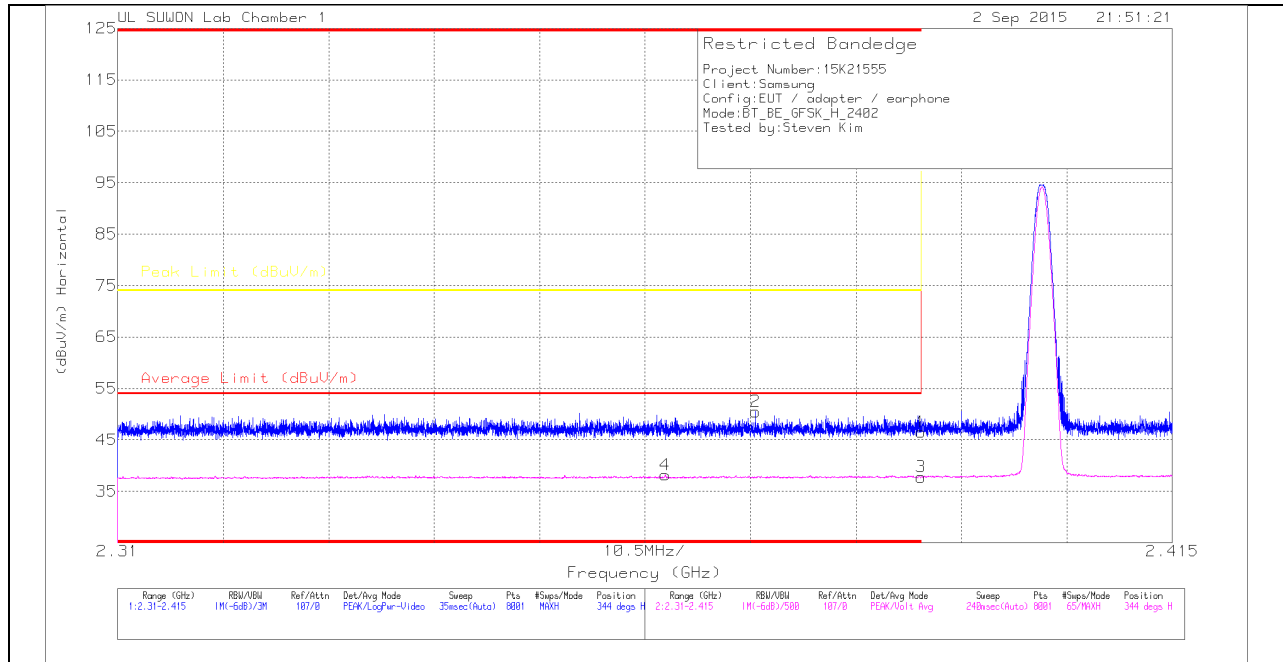
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

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

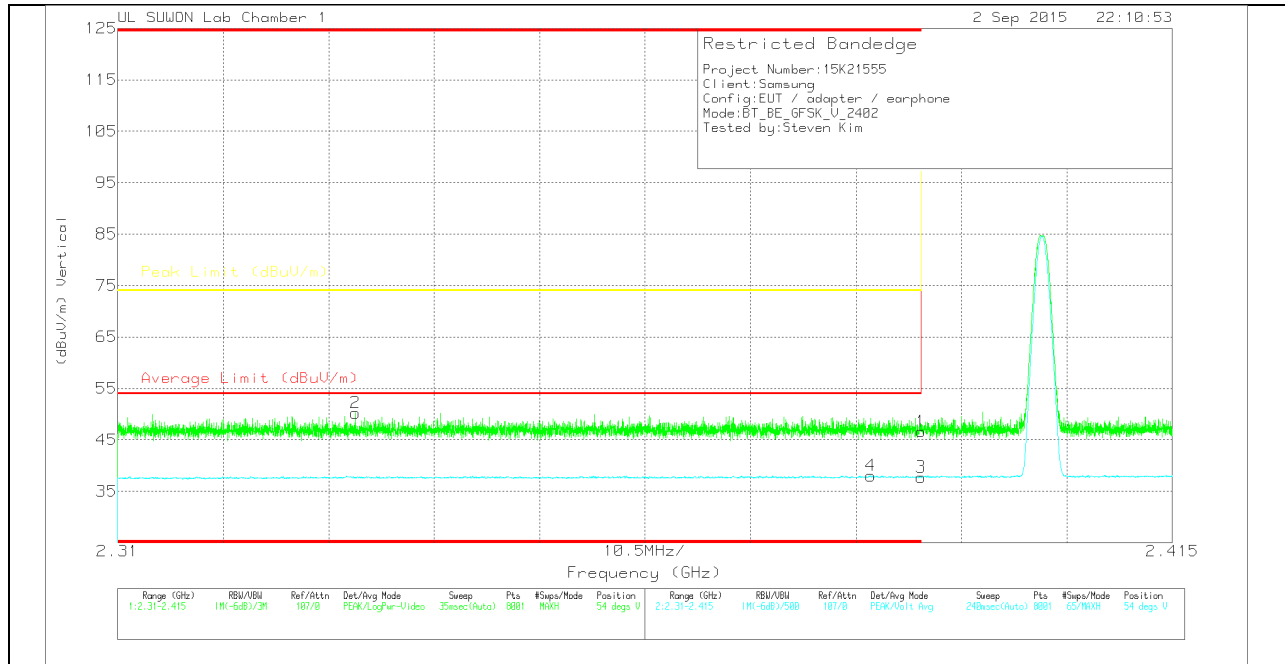
Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717_150 619) | 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 | 37.47 | Pk | 31.8 | -22.8 | 46.47 | - | - | 74 | -27.53 | 344 | 102 | H |
| 2 | * 2.374 | 41.49 | Pk | 31.8 | -22.8 | 50.49 | - | - | 74 | -23.51 | 344 | 102 | H |
| 3 | * 2.39 | 28.78 | V1TV | 31.8 | -22.8 | 37.78 | 54 | -16.22 | - | - | 344 | 102 | H |
| 4 | * 2.365 | 29.17 | V1TV | 31.8 | -22.8 | 38.17 | 54 | -15.83 | - | - | 344 | 102 | H |

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

PK - Peak detector

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

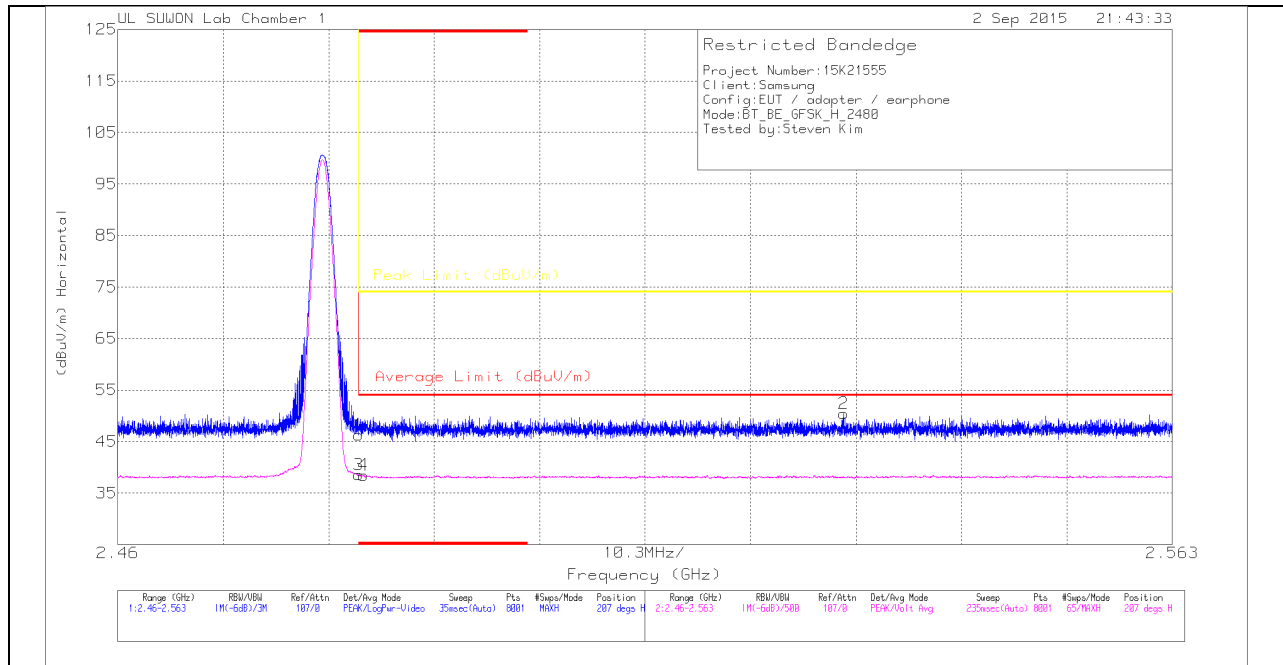
| Marker | Freq (GHz) | Power (dBm) | Detector | Offset (dB) | Bandwidth (MHz) | Position | Range (GHz) | RBW (MHz) | Ref/Att | Det/Avg Mode | Sweep | Pts | #Sweeps/Mode | Position |
|--------|------------|-------------|----------|-------------|-----------------|----------|-------------|-----------|---------|--------------|-------|-----|--------------|----------|
| 1 | * 2.39 | 37.59 | Pk | 31.8 | -22.8 | 46.59 | - | - | 74 | -27.41 | 54 | 317 | V | |
| 2 | * 2.334 | 41.44 | Pk | 31.7 | -22.9 | 50.24 | - | - | 74 | -23.76 | 54 | 317 | V | |
| 3 | * 2.39 | 28.75 | V1TV | 31.8 | -22.8 | 37.75 | 54 | -16.25 | - | - | 54 | 317 | V | |
| 4 | * 2.385 | 29.02 | V1TV | 31.8 | -22.8 | 38.02 | 54 | -15.98 | - | - | 54 | 317 | V | |
| 1 | * 2.39 | 37.59 | Pk | 31.8 | -22.8 | 46.59 | - | - | 74 | -27.41 | 54 | 317 | V | |

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

Pk - Peak detector

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

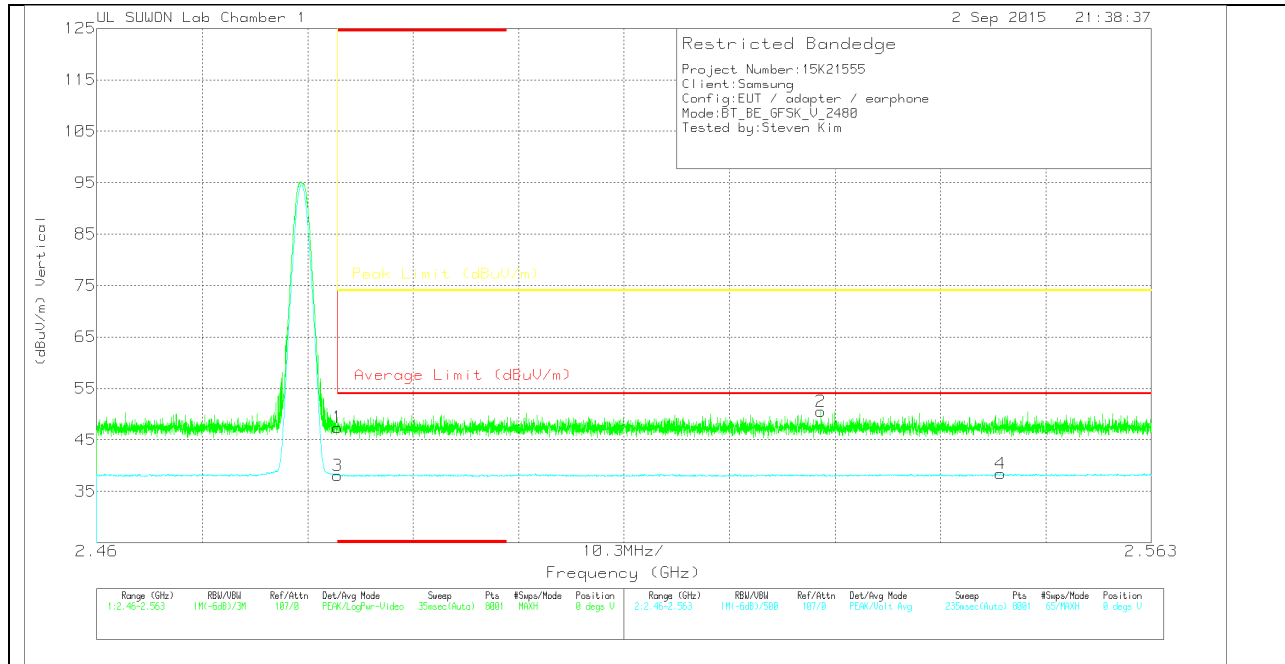
Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | 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 | 36.83 | Pk | 32 | -22.6 | 46.23 | - | - | 74 | -27.77 | 207 | 290 | H |
| 2 | 2.531 | 41.04 | Pk | 32 | -22.6 | 50.44 | - | - | 74 | -23.56 | 207 | 290 | H |
| 3 | * 2.484 | 29.15 | V1TV | 32 | -22.6 | 38.55 | 54 | -15.45 | - | - | 207 | 290 | H |
| 4 | * 2.484 | 29.08 | V1TV | 32 | -22.6 | 38.48 | 54 | -15.52 | - | - | 207 | 290 | H |

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

Pk - Peak detector

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

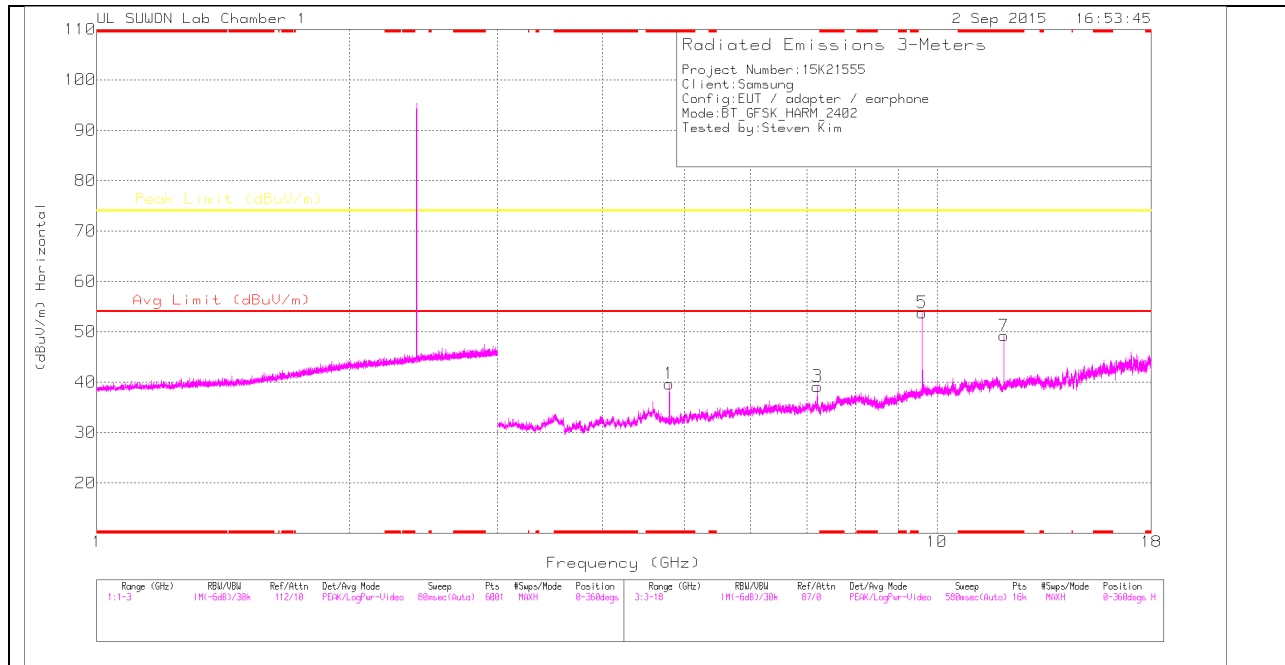
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717_150 619) | Path_2_10 dB | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|-------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1 | * 2.484 | 38 | Pk | 32 | -22.6 | 47.4 | - | - | 74 | -26.6 | 0 | 363 | V |
| 2 | 2.531 | 41.12 | Pk | 32 | -22.6 | 50.52 | - | - | 74 | -23.48 | 0 | 363 | V |
| 3 | * 2.484 | 28.69 | V1TV | 32 | -22.6 | 38.09 | 54 | -15.91 | - | - | 0 | 363 | V |
| 4 | 2.548 | 29.06 | V1TV | 32 | -22.6 | 38.46 | 54 | -15.54 | - | - | 0 | 363 | V |

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

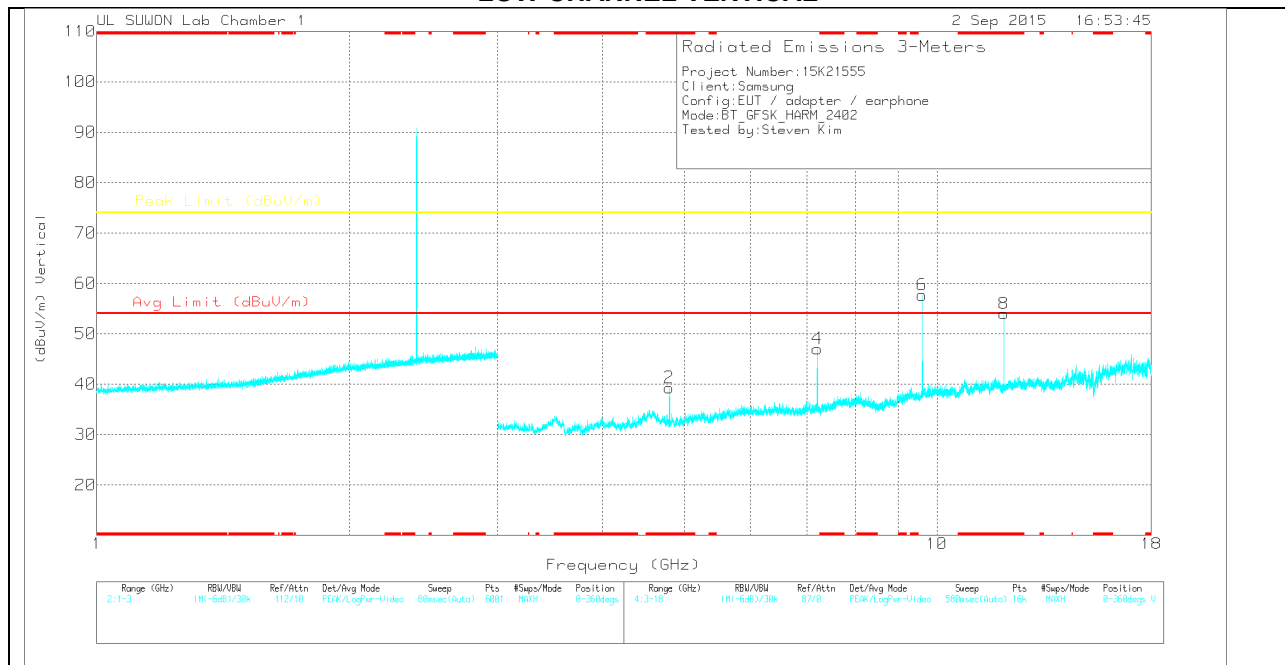
Pk - Peak detector

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.

LOW CHANNEL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168724)_150619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1 | * 4.804 | 35.48 | PK | 34 | -29.8 | 39.68 | - | - | 74 | -34.32 | 0-360 | 100 | H |
| 3 | 7.205 | 28.87 | PK | 35.7 | -25.4 | 39.17 | - | - | 74 | -34.83 | 0-360 | 200 | H |
| 5 | 9.608 | 37.79 | PK | 37 | -21 | 53.79 | - | - | 74 | -20.21 | 0-360 | 200 | H |
| 7 | * 12.01 | 31.03 | PK | 38.9 | -20.7 | 49.23 | - | - | 74 | -24.77 | 0-360 | 200 | H |
| 2 | * 4.804 | 35.09 | PK | 34 | -29.8 | 39.29 | - | - | 74 | -34.71 | 0-360 | 100 | V |
| 4 | 7.206 | 36.74 | PK | 35.7 | -25.4 | 47.04 | - | - | 74 | -26.96 | 0-360 | 100 | V |
| 6 | 9.608 | 41.68 | PK | 37 | -21 | 57.68 | - | - | 74 | -16.32 | 0-360 | 100 | V |
| 8 | * 12.011 | 35.81 | PK | 38.9 | -20.7 | 54.01 | - | - | 74 | -19.99 | 0-360 | 200 | V |

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

PK – Peak detector

Radiated Emissions

| 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 |
|-----------------|----------------------|------|-----------------------|--------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| * 12.01 | 39.05 | PK2 | 38.9 | -20.7 | 57.25 | - | - | 74 | -16.75 | 306 | 338 | H |
| * 12.01 | 34.69 | VA1T | 38.9 | -20.7 | 52.89 | 54 | -1.11 | - | - | 306 | 338 | H |
| 9.608 | 41.6 | PK2 | 37 | -21 | 57.6 | - | - | 74 | -16.4 | 84 | 278 | H |
| 7.206 | 41.36 | PK2 | 35.7 | -25.4 | 51.66 | - | - | 74 | -22.34 | 182 | 389 | H |
| * 4.804 | 43.47 | PK2 | 34 | -29.8 | 47.67 | - | - | 74 | -26.33 | 26 | 100 | H |
| * 4.804 | 36.64 | VA1T | 34 | -29.8 | 40.84 | 54 | -13.16 | - | - | 26 | 100 | H |
| 9.608 | 46.26 | PK2 | 37 | -21 | 62.26 | - | - | 74 | -11.74 | 109 | 389 | V |
| 7.206 | 45.31 | PK2 | 35.7 | -25.4 | 55.61 | - | - | 74 | -18.39 | 153 | 272 | V |
| * 4.804 | 36.81 | VA1T | 34 | -29.8 | 41.01 | 54 | -12.99 | - | - | 250 | 339 | V |
| * 12.01 | 40.03 | PK2 | 38.9 | -20.7 | 58.23 | - | - | 74 | -15.77 | 220 | 191 | V |
| * 12.01 | 35.52 | VA1T | 38.9 | -20.7 | 53.72 | 54 | -.28 | - | - | 220 | 191 | V |

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

PK2 - KDB558074 Method: Maximum Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

* For marker 8, 12.01 GHz, used the following method to do averaging:

DCCF=20* Log(100ms/Ton)

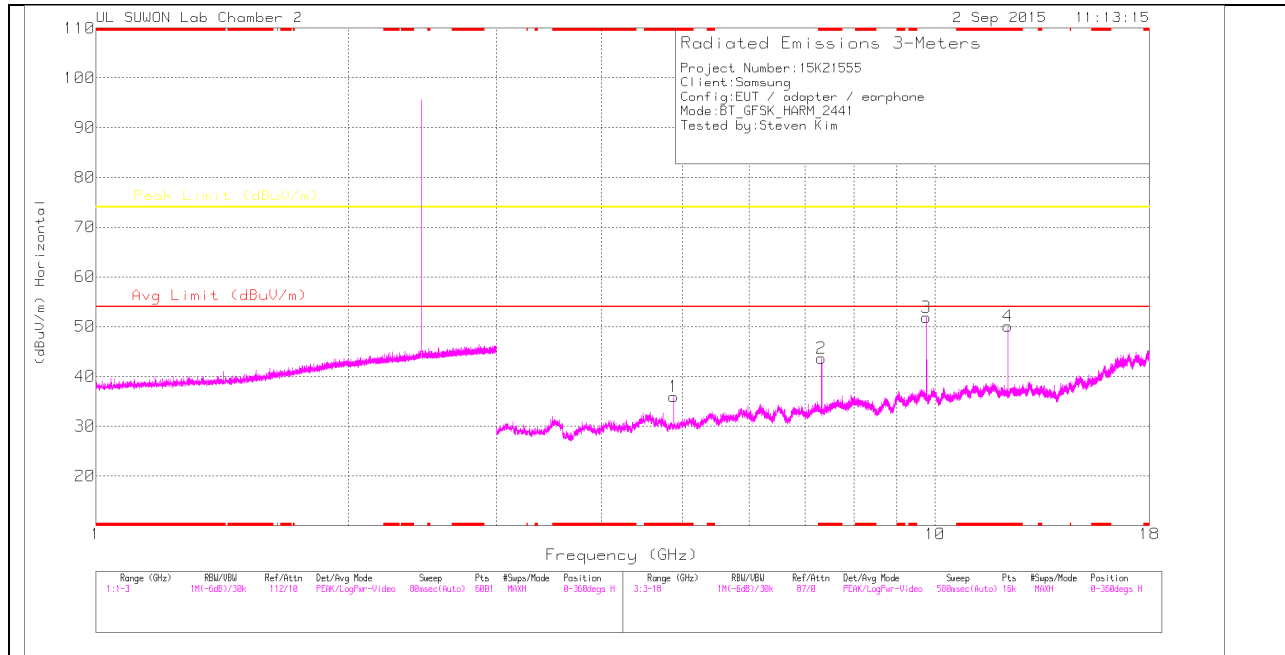
Ton=2.88ms

DCCF=30.8

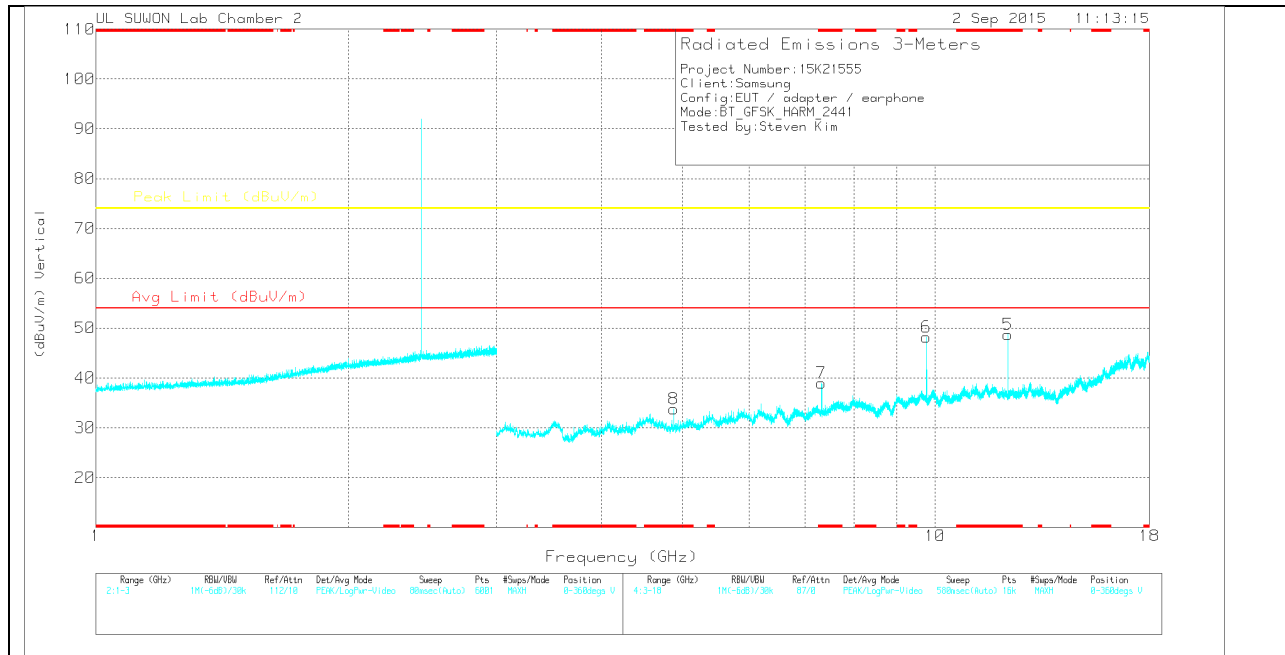
Corrected AV reading = Peak Reading – DCCF

= 58.23 – 30.8 = 27.43 dBuV/m

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.

MID CHANNEL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168724)_150619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1 | * 4.881 | 31.02 | PK | 34 | -29.1 | 35.92 | - | - | 74 | -38.08 | 0-360 | 200 | H |
| 2 | * 7.323 | 33.45 | PK | 35.8 | -25.6 | 43.65 | - | - | 74 | -30.35 | 0-360 | 200 | H |
| 3 | 9.764 | 36.65 | PK | 37.2 | -22 | 51.85 | - | - | 74 | -22.15 | 0-360 | 200 | H |
| 4 | * 12.205 | 32.52 | PK | 38.9 | -21.3 | 50.12 | - | - | 74 | -23.88 | 0-360 | 200 | H |
| 5 | * 12.206 | 31.12 | PK | 38.9 | -21.3 | 48.72 | - | - | 74 | -25.28 | 0-360 | 200 | V |
| 6 | 9.764 | 33 | PK | 37.2 | -22 | 48.2 | - | - | 74 | -25.8 | 0-360 | 200 | V |
| 7 | * 7.323 | 28.81 | PK | 35.8 | -25.6 | 39.01 | - | - | 74 | -34.99 | 0-360 | 100 | V |
| 8 | * 4.881 | 28.93 | PK | 34 | -29.1 | 33.83 | - | - | 74 | -40.17 | 0-360 | 200 | V |

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

PK – Peak detector

Radiated Emissions

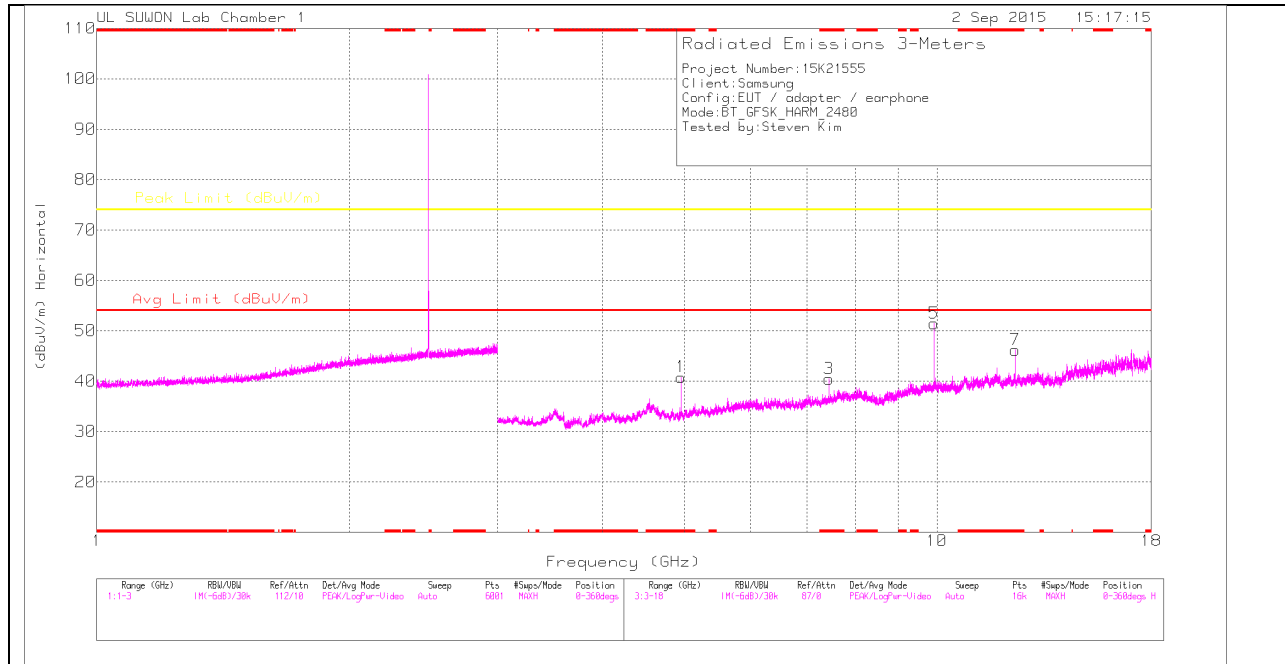
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|-----------------|----------------------|------|-----------------------|--------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| * 4.882 | 38.41 | PK2 | 34 | -29.1 | 43.31 | - | - | 74 | -30.69 | 19 | 299 | H |
| * 4.882 | 26.9 | VA1T | 34 | -29.1 | 31.8 | 54 | -22.2 | - | - | 19 | 299 | H |
| * 4.882 | 39.33 | PK2 | 34 | -29.1 | 44.23 | - | - | 74 | -29.77 | 241 | 332 | V |
| * 4.882 | 30.23 | VA1T | 34 | -29.1 | 35.13 | 54 | -18.87 | - | - | 241 | 332 | V |
| * 7.323 | 40.14 | PK2 | 35.8 | -25.6 | 50.34 | - | - | 74 | -23.66 | 39 | 245 | H |
| * 7.323 | 30.79 | VA1T | 35.8 | -25.6 | 40.99 | 54 | -13.01 | - | - | 39 | 245 | H |
| * 7.323 | 38.95 | PK2 | 35.8 | -25.6 | 49.15 | - | - | 74 | -24.85 | 360 | 324 | V |
| * 7.323 | 28.95 | VA1T | 35.8 | -25.6 | 39.15 | 54 | -14.85 | - | - | 360 | 324 | V |
| 9.764 | 43.4 | PK2 | 37.2 | -22 | 58.6 | - | - | 74 | -15.4 | 79 | 245 | H |
| 9.764 | 39.77 | PK2 | 37.2 | -22 | 54.97 | - | - | 74 | -19.03 | 138 | 207 | V |
| * 12.205 | 37.1 | PK2 | 38.9 | -21.3 | 54.7 | - | - | 74 | -19.3 | 307 | 163 | H |
| * 12.205 | 32.95 | VA1T | 38.9 | -21.3 | 50.55 | 54 | -3.45 | - | - | 307 | 163 | H |
| * 12.205 | 33.77 | PK2 | 38.9 | -21.3 | 51.37 | - | - | 74 | -22.63 | 279 | 233 | V |
| * 12.205 | 27.12 | VA1T | 38.9 | -21.3 | 44.72 | 54 | -9.28 | - | - | 279 | 233 | V |

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

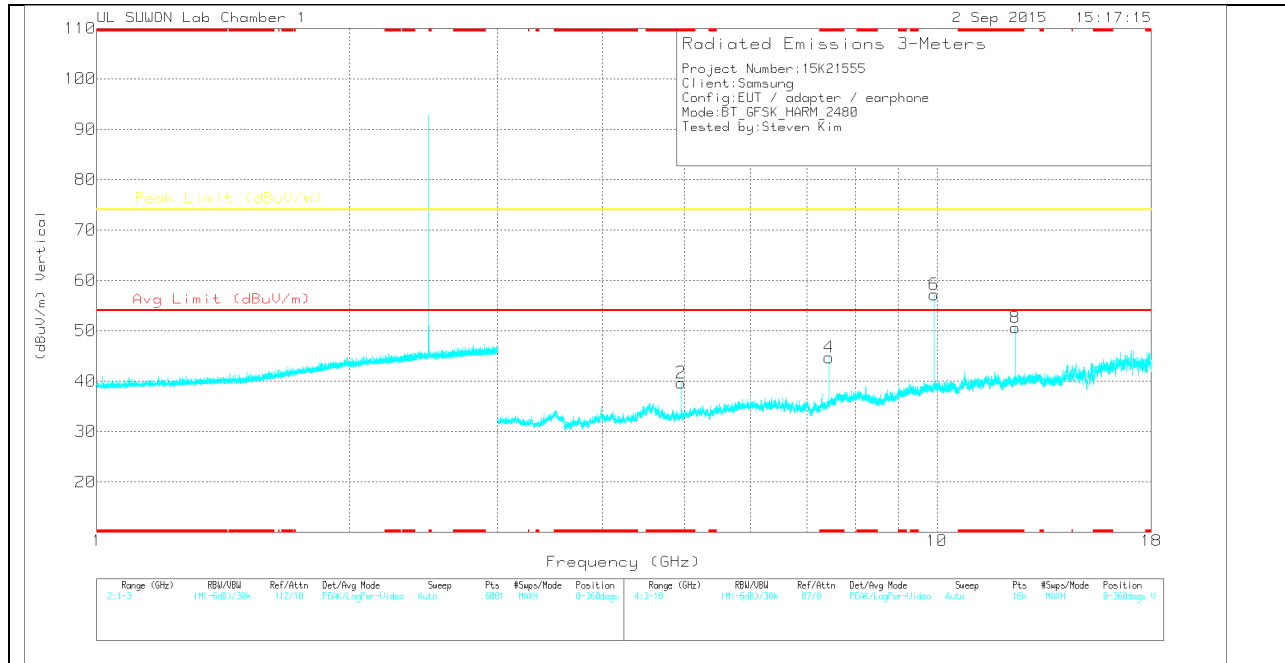
PK2 - KDB558074 Method: Maximum Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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.

HIGH CHANNEL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168724)_150619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1 | * 4.959 | 35.71 | PK | 34 | -28.9 | 40.81 | - | - | 74 | -33.19 | 0-360 | 100 | H |
| 3 | * 7.44 | 29.45 | PK | 35.8 | -24.8 | 40.45 | - | - | 74 | -33.55 | 0-360 | 200 | H |
| 5 | 9.92 | 34.45 | PK | 37.4 | -20.4 | 51.45 | - | - | 74 | -22.55 | 0-360 | 200 | H |
| 7 | * 12.401 | 28.19 | PK | 38.9 | -20.9 | 46.19 | - | - | 74 | -27.81 | 0-360 | 200 | H |
| 2 | * 4.959 | 34.56 | PK | 34 | -28.9 | 39.66 | - | - | 74 | -34.34 | 0-360 | 100 | V |
| 4 | * 7.44 | 33.7 | PK | 35.8 | -24.8 | 44.7 | - | - | 74 | -29.3 | 0-360 | 100 | V |
| 6 | 9.92 | 40.18 | PK | 37.4 | -20.4 | 57.18 | - | - | 74 | -16.82 | 0-360 | 100 | V |
| 8 | * 12.4 | 32.63 | PK | 38.9 | -20.9 | 50.63 | - | - | 74 | -23.37 | 0-360 | 100 | V |

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

PK – Peak detector

Radiated Emissions

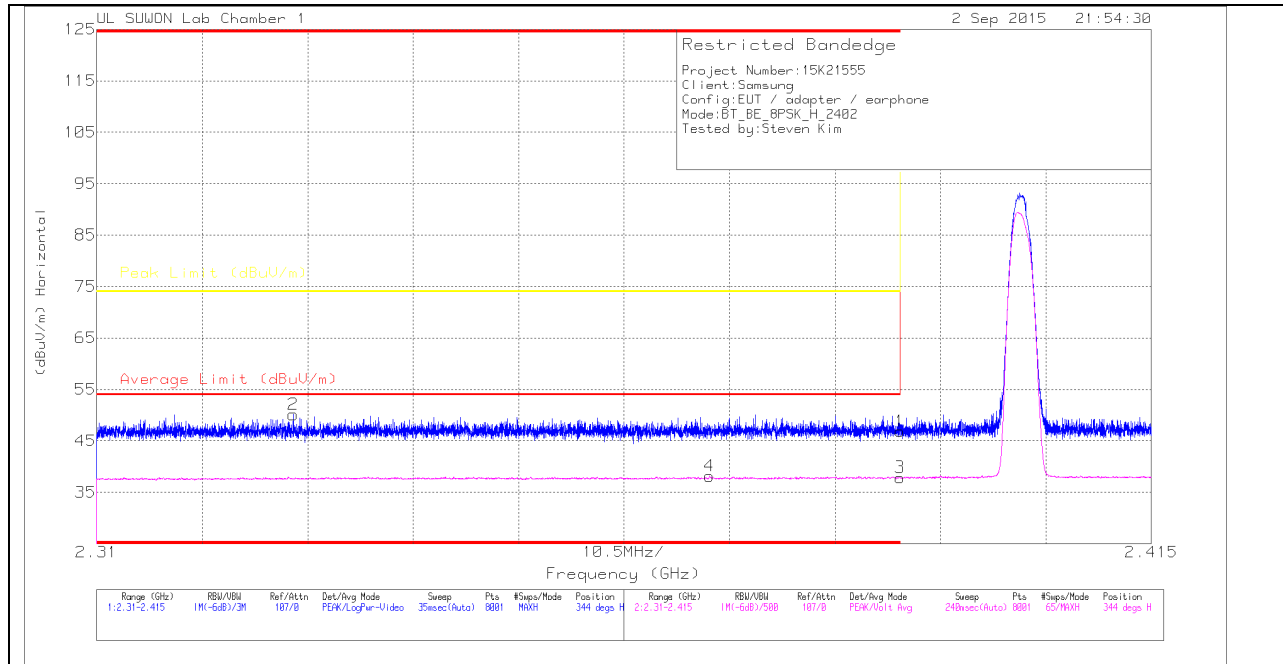
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|-----------------|----------------------|------|-----------------------|--------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| * 4.96 | 42.75 | PK2 | 34 | -28.9 | 47.85 | - | - | 74 | -26.15 | 42 | 265 | H |
| * 4.96 | 34.67 | VA1T | 34 | -28.9 | 39.77 | 54 | -14.23 | - | - | 42 | 265 | H |
| * 7.44 | 38.37 | PK2 | 35.8 | -24.8 | 49.37 | - | - | 74 | -24.63 | 113 | 263 | H |
| * 7.44 | 26.66 | VA1T | 35.8 | -24.8 | 37.66 | 54 | -16.34 | - | - | 113 | 263 | H |
| 9.92 | 38.38 | PK2 | 37.4 | -20.4 | 55.38 | - | - | 74 | -18.62 | 113 | 200 | H |
| * 12.4 | 36.28 | PK2 | 38.9 | -20.9 | 54.28 | - | - | 74 | -19.72 | 298 | 292 | H |
| * 12.4 | 29.15 | VA1T | 38.9 | -20.9 | 47.15 | 54 | -6.85 | - | - | 298 | 292 | H |
| * 4.96 | 42.17 | PK2 | 34 | -28.9 | 47.27 | - | - | 74 | -26.73 | 359 | 289 | V |
| * 4.96 | 33.39 | VA1T | 34 | -28.9 | 38.49 | 54 | -15.51 | - | - | 359 | 289 | V |
| * 7.44 | 39.19 | PK2 | 35.8 | -24.8 | 50.19 | - | - | 74 | -23.81 | 180 | 208 | V |
| * 7.44 | 27.59 | VA1T | 35.8 | -24.8 | 38.59 | 54 | -15.41 | - | - | 180 | 208 | V |
| 9.92 | 42.69 | PK2 | 37.4 | -20.4 | 59.69 | - | - | 74 | -14.31 | 113 | 257 | V |
| * 12.401 | 32.47 | PK2 | 38.9 | -20.9 | 50.47 | - | - | 74 | -23.53 | 232 | 378 | V |
| * 12.401 | 17.83 | VA1T | 38.9 | -20.9 | 35.83 | 54 | -18.17 | - | - | 232 | 378 | V |

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

PK2 - KDB558074 Method: Maximum Peak

VA1T - FHSS: Linear Voltage Average $V_B=1/T_{on}$ where: T_{on} is transmit duration

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



HORIZONTAL DATA

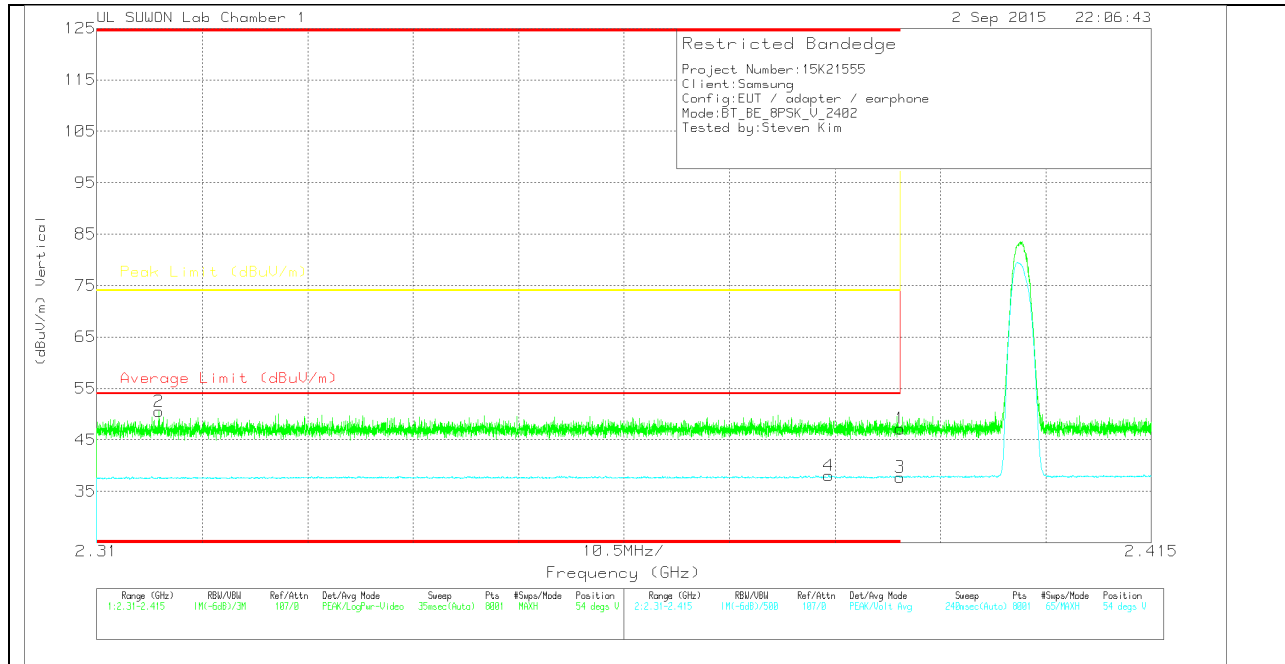
Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8724)_150 619 | 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 | 37.88 | Pk | 31.8 | -22.8 | 46.88 | - | - | 74 | -27.12 | 344 | 102 | H |
| 2 | * 2.33 | 41.32 | Pk | 31.7 | -22.9 | 50.12 | - | - | 74 | -23.88 | 344 | 102 | H |
| 3 | * 2.39 | 28.87 | V1TV | 31.8 | -22.8 | 37.87 | 54 | -16.13 | - | - | 344 | 102 | H |
| 4 | * 2.371 | 29.15 | V1TV | 31.8 | -22.8 | 38.15 | 54 | -15.85 | - | - | 344 | 102 | H |

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

Pk - Peak detector

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

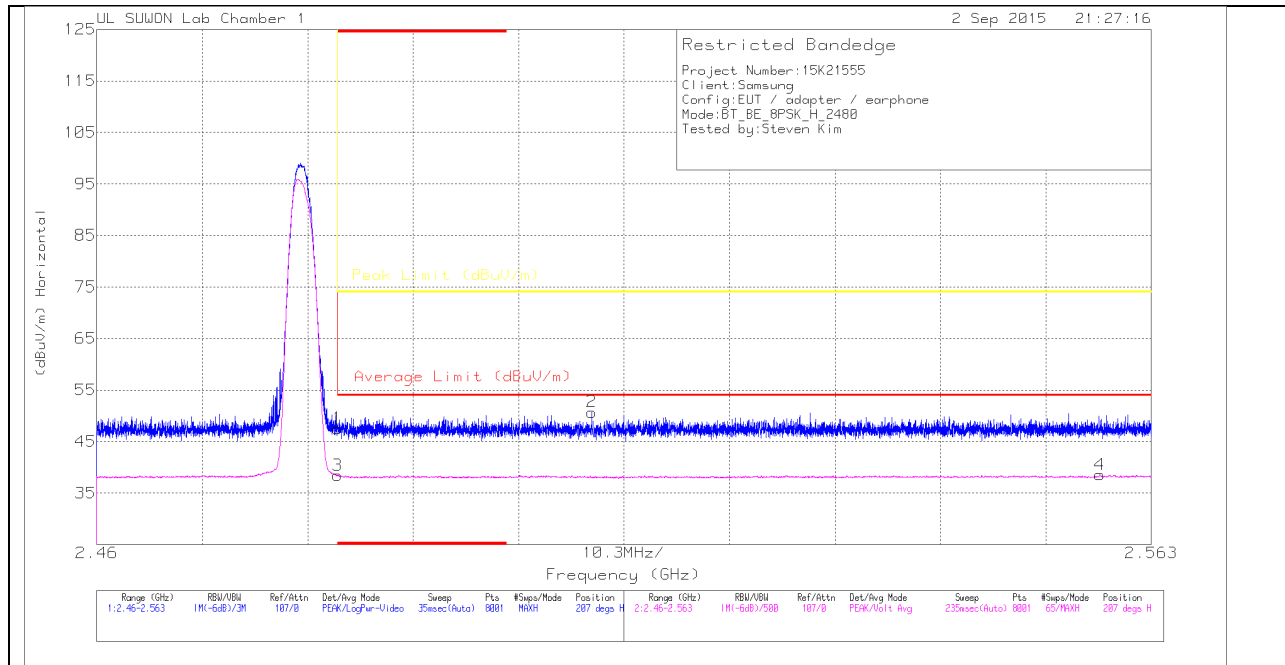
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117/0016 8724_150 619 | Path_2_10 dB | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1 | * 2.39 | 38.18 | Pk | | -22.8 | 47.18 | - | - | 74 | -26.82 | 54 | 317 | V |
| 2 | * 2.316 | 41.7 | Pk | | -22.9 | 50.5 | - | - | 74 | -23.5 | 54 | 317 | V |
| 3 | * 2.39 | 28.75 | V1TV | | -22.8 | 37.75 | 54 | -16.25 | - | - | 54 | 317 | V |
| 4 | * 2.383 | 29.04 | V1TV | | -22.8 | 38.04 | 54 | -15.96 | - | - | 54 | 317 | V |

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

Pk - Peak detector

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

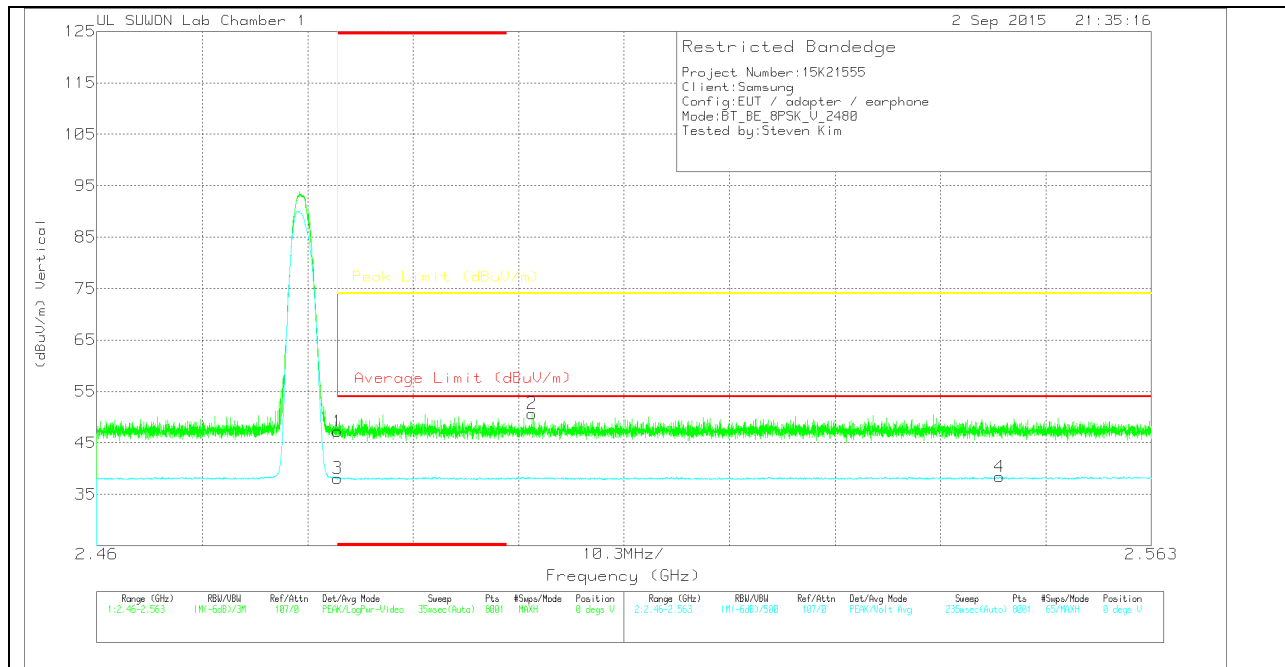
Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8724)_150 619 | 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 | 38.13 | Pk | 32 | -22.6 | 47.53 | - | - | 74 | -26.47 | 207 | 291 | H |
| 2 | 2.508 | 41.32 | Pk | 32 | -22.6 | 50.72 | - | - | 74 | -23.28 | 207 | 291 | H |
| 3 | * 2.484 | 29 | V1TV | 32 | -22.6 | 38.4 | 54 | -15.6 | - | - | 207 | 291 | H |
| 4 | 2.558 | 29.13 | V1TV | 32 | -22.6 | 38.53 | 54 | -15.47 | - | - | 207 | 291 | H |

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

Pk - Peak detector

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

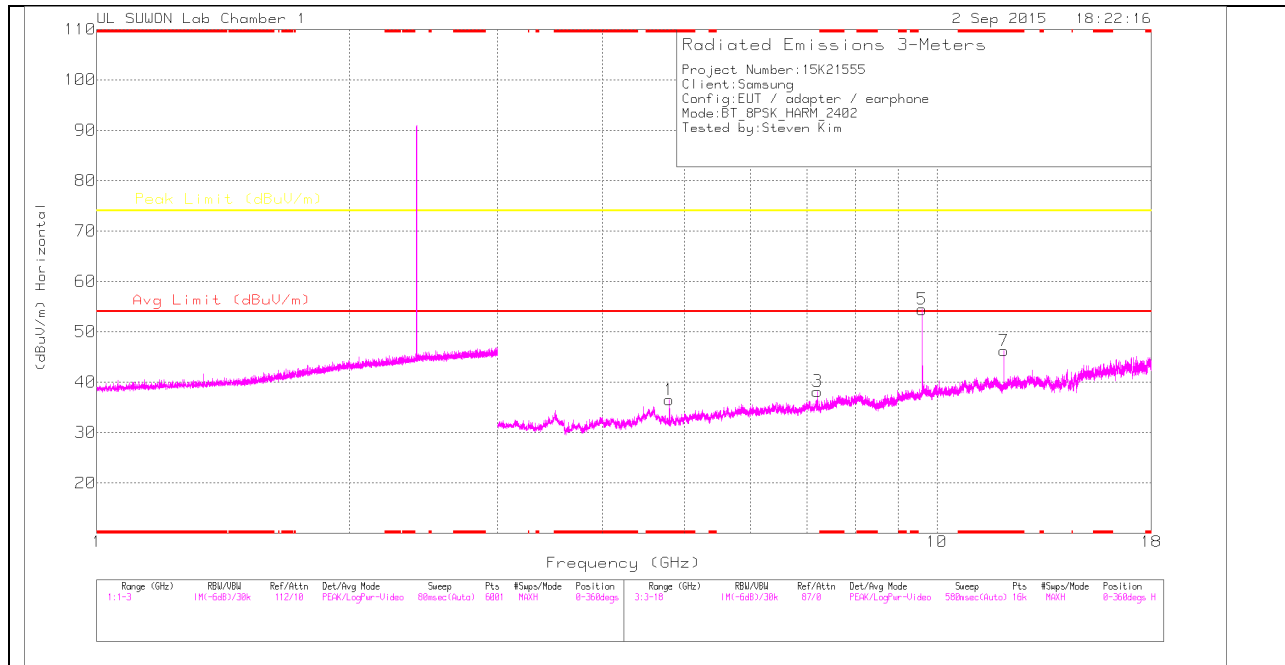
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8724)_150 619 | Path_2_10 dB | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|-------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1 | * 2.484 | 37.8 | Pk | 32 | -22.6 | 47.2 | - | - | 74 | -26.8 | 0 | 363 | V |
| 2 | 2.502 | 41.3 | Pk | 32 | -22.6 | 50.7 | - | - | 74 | -23.3 | 0 | 363 | V |
| 3 | * 2.484 | 28.72 | V1TV | 32 | -22.6 | 38.12 | 54 | -15.88 | - | - | 0 | 363 | V |
| 4 | 2.548 | 29 | V1TV | 32 | -22.6 | 38.4 | 54 | -15.6 | - | - | 0 | 363 | V |

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

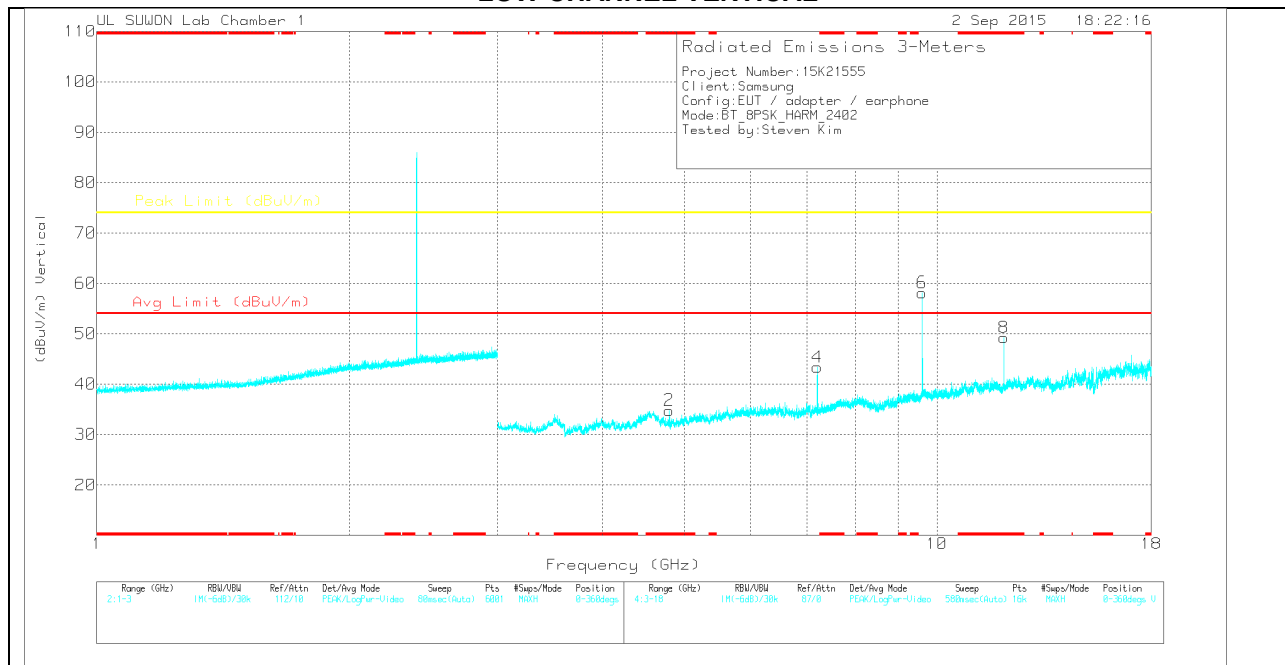
Pk - Peak detector

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.

LOW CHANNEL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168 724)_15061 9 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1 | * 4.804 | 32.28 | PK | 34 | -29.8 | 36.48 | - | - | 74 | -37.52 | 0-360 | 100 | H |
| 3 | 7.206 | 27.88 | PK | 35.7 | -25.4 | 38.18 | - | - | 74 | -35.82 | 0-360 | 200 | H |
| 5 | 9.608 | 38.44 | PK | 37 | -21 | 54.44 | - | - | 74 | -19.56 | 0-360 | 200 | H |
| 7 | * 12.01 | 28.01 | PK | 38.9 | -20.7 | 46.21 | - | - | 74 | -27.79 | 0-360 | 200 | H |
| 2 | * 4.804 | 30.59 | PK | 34 | -29.8 | 34.79 | - | - | 74 | -39.21 | 0-360 | 100 | V |
| 4 | 7.205 | 33.06 | PK | 35.7 | -25.4 | 43.36 | - | - | 74 | -30.64 | 0-360 | 100 | V |
| 6 | 9.608 | 42.14 | PK | 37 | -21 | 58.14 | - | - | 74 | -15.86 | 0-360 | 200 | V |
| 8 | * 12.01 | 31.02 | PK | 38.9 | -20.7 | 49.22 | - | - | 74 | -24.78 | 0-360 | 100 | V |

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

PK – Peak detector

Radiated Emissions

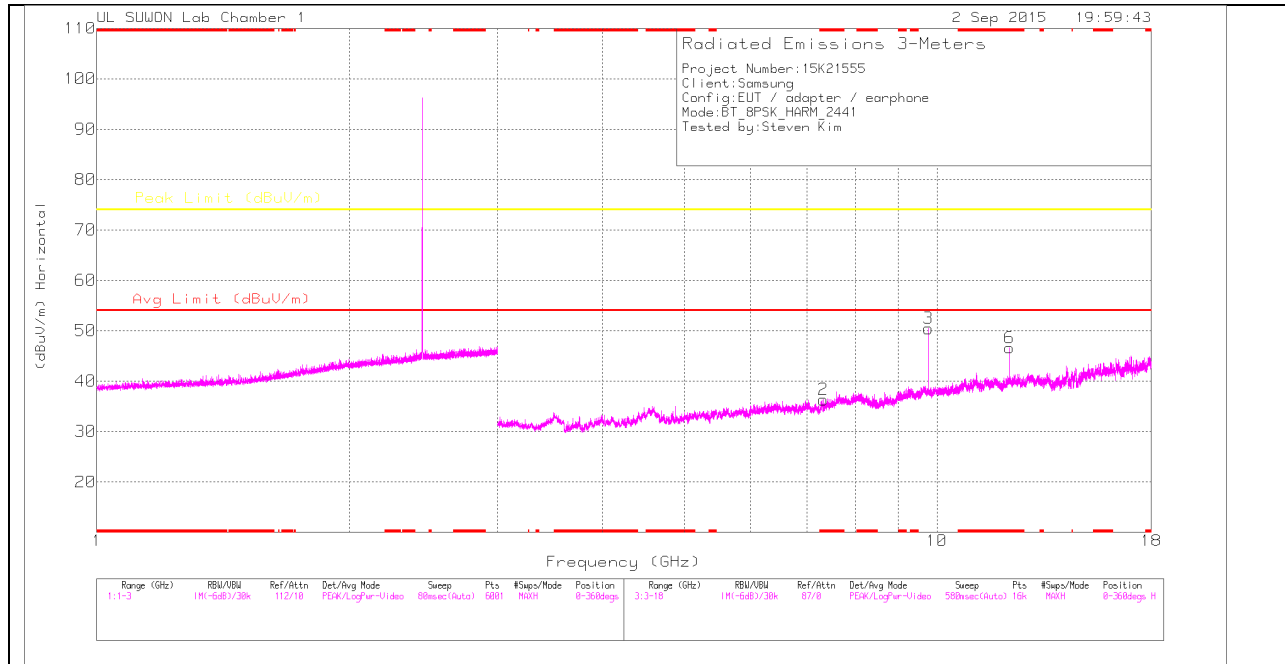
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|-----------------|----------------------|------|-------------------------|--------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| * 4.804 | 41.76 | PK2 | 34 | -29.8 | 45.96 | - | - | 74 | -28.04 | 360 | 100 | H |
| * 4.804 | 29.56 | VA1T | 34 | -29.8 | 33.76 | 54 | -20.24 | - | - | 360 | 100 | H |
| 7.206 | 39.95 | PK2 | 35.7 | -25.4 | 50.25 | - | - | 74 | -23.75 | 133 | 389 | H |
| 9.608 | 43.89 | PK2 | 37 | -21 | 59.89 | - | - | 74 | -14.11 | 78 | 277 | H |
| * 12.01 | 37.06 | PK2 | 38.9 | -20.7 | 55.26 | - | - | 74 | -18.74 | 279 | 271 | H |
| * 12.01 | 28.14 | VA1T | 38.9 | -20.7 | 46.34 | 54 | -7.66 | - | - | 279 | 271 | H |
| * 4.804 | 40.57 | PK2 | 34 | -29.8 | 44.77 | - | - | 74 | -29.23 | 360 | 100 | V |
| * 4.804 | 28.5 | VA1T | 34 | -29.8 | 32.7 | 54 | -21.3 | - | - | 360 | 100 | V |
| 7.206 | 40.77 | PK2 | 35.7 | -25.4 | 51.07 | - | - | 74 | -22.93 | 143 | 232 | V |
| 9.608 | 46.85 | PK2 | 37 | -21 | 62.85 | - | - | 74 | -11.15 | 109 | 368 | V |
| * 12.01 | 39.89 | PK2 | 38.9 | -20.7 | 58.09 | - | - | 74 | -15.91 | 247 | 161 | V |
| * 12.01 | 32.74 | VA1T | 38.9 | -20.7 | 50.94 | 54 | -3.06 | - | - | 247 | 161 | V |

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

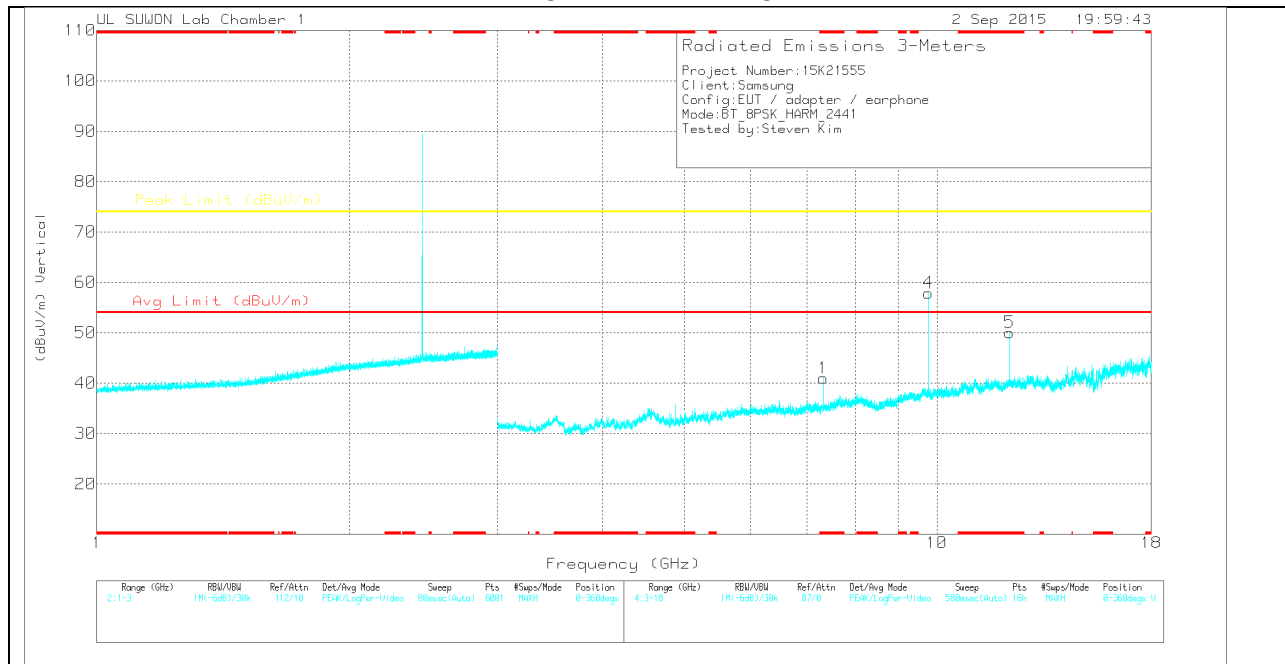
PK2 - KDB558074 Method: Maximum Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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.

MID CHANNEL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168724)_150619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 2 | * 7.323 | 26.13 | PK | 35.8 | -25.6 | 36.33 | - | - | 74 | -37.67 | 0-360 | 200 | H |
| 3 | 9.764 | 35.25 | PK | 37.2 | -22 | 50.45 | - | - | 74 | -23.55 | 0-360 | 200 | H |
| 6 | * 12.205 | 28.98 | PK | 38.9 | -21.3 | 46.58 | - | - | 74 | -27.42 | 0-360 | 200 | H |
| 1 | * 7.323 | 30.78 | PK | 35.8 | -25.6 | 40.98 | - | - | 74 | -33.02 | 0-360 | 100 | V |
| 4 | 9.764 | 42.71 | PK | 37.2 | -22 | 57.91 | - | - | 74 | -16.09 | 0-360 | 100 | V |
| 5 | * 12.205 | 32.44 | PK | 38.9 | -21.3 | 50.04 | - | - | 74 | -23.96 | 0-360 | 100 | V |
| 2 | * 7.323 | 26.13 | PK | 35.8 | -25.6 | 36.33 | - | - | 74 | -37.67 | 0-360 | 200 | H |
| 3 | 9.764 | 35.25 | PK | 37.2 | -22 | 50.45 | - | - | 74 | -23.55 | 0-360 | 200 | H |

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

PK – Peak detector

Radiated Emissions

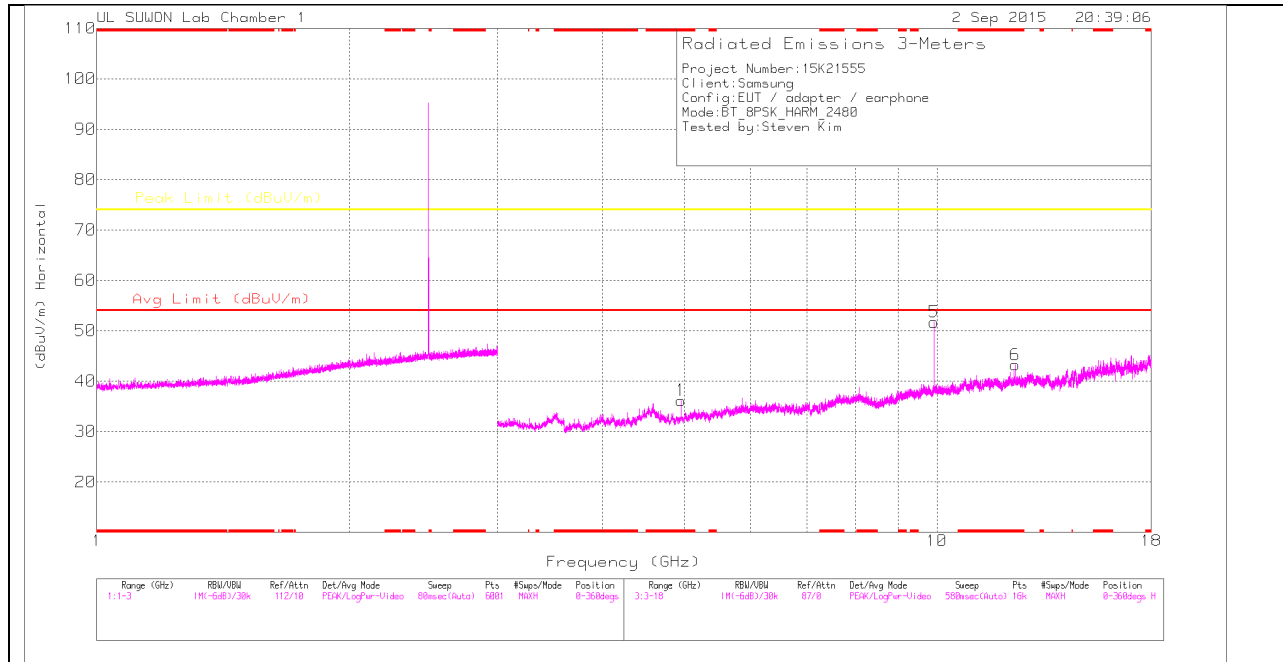
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_3_3G HP | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|-----------------|----------------------|------|-----------------------|--------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 9.764 | 40.9 | PK2 | 37.2 | -22 | 56.1 | - | - | 74 | -17.9 | 53 | 385 | H |
| * 12.205 | 38.11 | PK2 | 38.9 | -21.3 | 55.71 | - | - | 74 | -18.29 | 310 | 313 | H |
| * 12.205 | 29.52 | VA1T | 38.9 | -21.3 | 47.12 | 54 | -6.88 | - | - | 310 | 313 | H |
| * 7.323 | 42.13 | PK2 | 35.8 | -25.6 | 52.33 | - | - | 74 | -21.67 | 143 | 261 | V |
| * 7.323 | 32.72 | VA1T | 35.8 | -25.6 | 42.92 | 54 | -11.08 | - | - | 143 | 261 | V |
| 9.764 | 46.82 | PK2 | 37.2 | -22 | 62.02 | - | - | 74 | -11.98 | 100 | 275 | V |
| * 12.205 | 39.56 | PK2 | 38.9 | -21.3 | 57.16 | - | - | 74 | -16.84 | 232 | 100 | V |
| * 12.205 | 32.45 | VA1T | 38.9 | -21.3 | 50.05 | 54 | -3.95 | - | - | 232 | 100 | V |

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

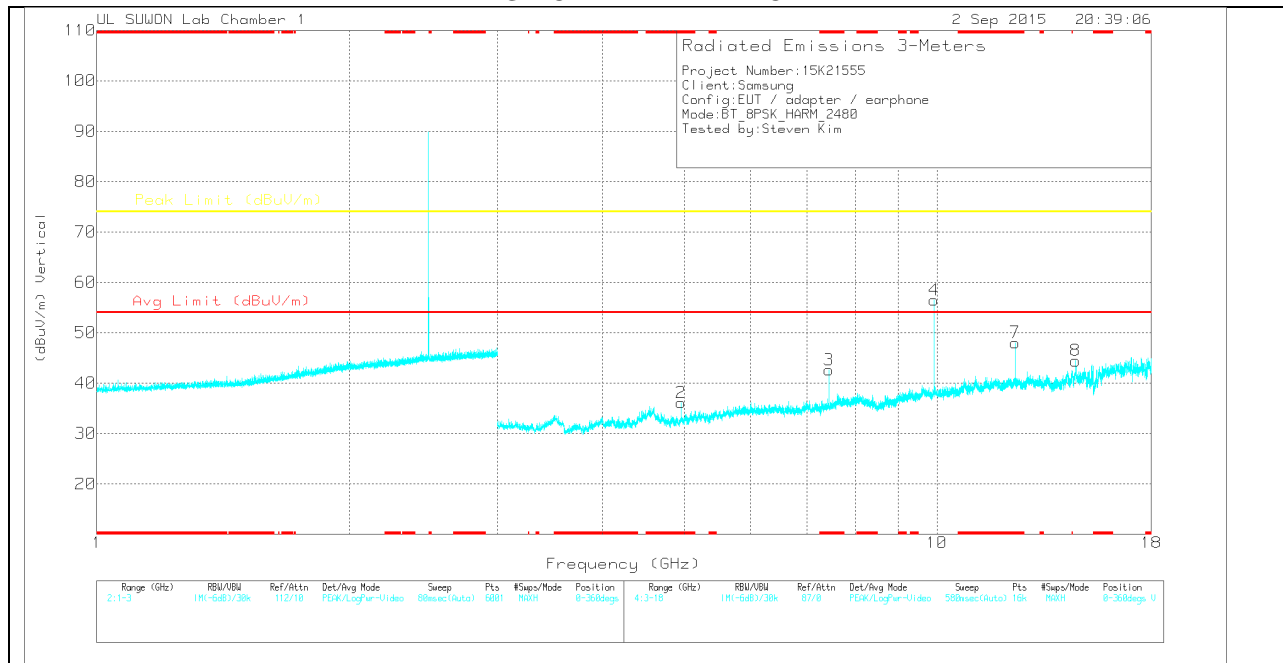
PK2 - KDB558074 Method: Maximum Peak

VA1T - FHSS: Linear Voltage Average $V_B=1/T_{on}$ where: T_{on} is transmit duration

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.

HIGH CHANNEL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168 724)_15061 9 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1 | * 4.959 | 31.08 | PK | 34 | -28.9 | 36.18 | - | - | 74 | -37.82 | 0-360 | 100 | H |
| 5 | 9.92 | 34.7 | PK | 37.4 | -20.4 | 51.7 | - | - | 74 | -22.3 | 0-360 | 200 | H |
| 6 | * 12.4 | 25.23 | PK | 38.9 | -20.9 | 43.23 | - | - | 74 | -30.77 | 0-360 | 200 | H |
| 2 | * 4.96 | 31.02 | PK | 34 | -28.9 | 36.12 | - | - | 74 | -37.88 | 0-360 | 100 | V |
| 3 | * 7.44 | 31.61 | PK | 35.8 | -24.8 | 42.61 | - | - | 74 | -31.39 | 0-360 | 100 | V |
| 4 | 9.92 | 39.47 | PK | 37.4 | -20.4 | 56.47 | - | - | 74 | -17.53 | 0-360 | 100 | V |
| 7 | * 12.4 | 30.02 | PK | 38.9 | -20.9 | 48.02 | - | - | 74 | -25.98 | 0-360 | 100 | V |
| 8 | 14.63 | 25.95 | PK | 39.8 | -21.3 | 44.45 | - | - | 74 | -29.55 | 0-360 | 200 | V |

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

PK – Peak detector

Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | 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 |
|-----------------|----------------------|------|-------------------------|--------------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| * 4.96 | 39.32 | PK2 | 34 | -28.9 | 44.42 | - | - | 74 | -29.58 | 360 | 120 | H |
| * 4.96 | 26.04 | VA1T | 34 | -28.9 | 31.14 | 54 | -22.86 | - | - | 360 | 120 | H |
| 9.92 | 42.53 | PK2 | 37.4 | -20.4 | 59.53 | - | - | 74 | -14.47 | 282 | 400 | H |
| * 12.4 | 33.54 | PK2 | 38.9 | -20.9 | 51.54 | - | - | 74 | -22.46 | 360 | 210 | H |
| * 12.4 | 20.74 | VA1T | 38.9 | -20.9 | 38.74 | 54 | -15.26 | - | - | 360 | 210 | H |
| * 4.96 | 39.92 | PK2 | 34 | -28.9 | 45.02 | - | - | 74 | -28.98 | 360 | 120 | V |
| * 4.96 | 27.47 | VA1T | 34 | -28.9 | 32.57 | 54 | -21.43 | - | - | 360 | 120 | V |
| * 7.44 | 39.79 | PK2 | 35.8 | -24.8 | 50.79 | - | - | 74 | -23.21 | 156 | 239 | V |
| * 7.44 | 29.67 | VA1T | 35.8 | -24.8 | 40.67 | 54 | -13.33 | - | - | 156 | 239 | V |
| 9.92 | 42.87 | PK2 | 37.4 | -20.4 | 59.87 | - | - | 74 | -14.13 | 92 | 218 | V |
| * 12.4 | 36.43 | PK2 | 38.9 | -20.9 | 54.43 | - | - | 74 | -19.57 | 254 | 161 | V |
| * 12.4 | 27.18 | VA1T | 38.9 | -20.9 | 45.18 | 54 | -8.82 | - | - | 254 | 161 | V |
| 14.631 | 34.95 | PK2 | 39.8 | -21.3 | 53.45 | - | - | 74 | -20.55 | 221 | 200 | V |

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

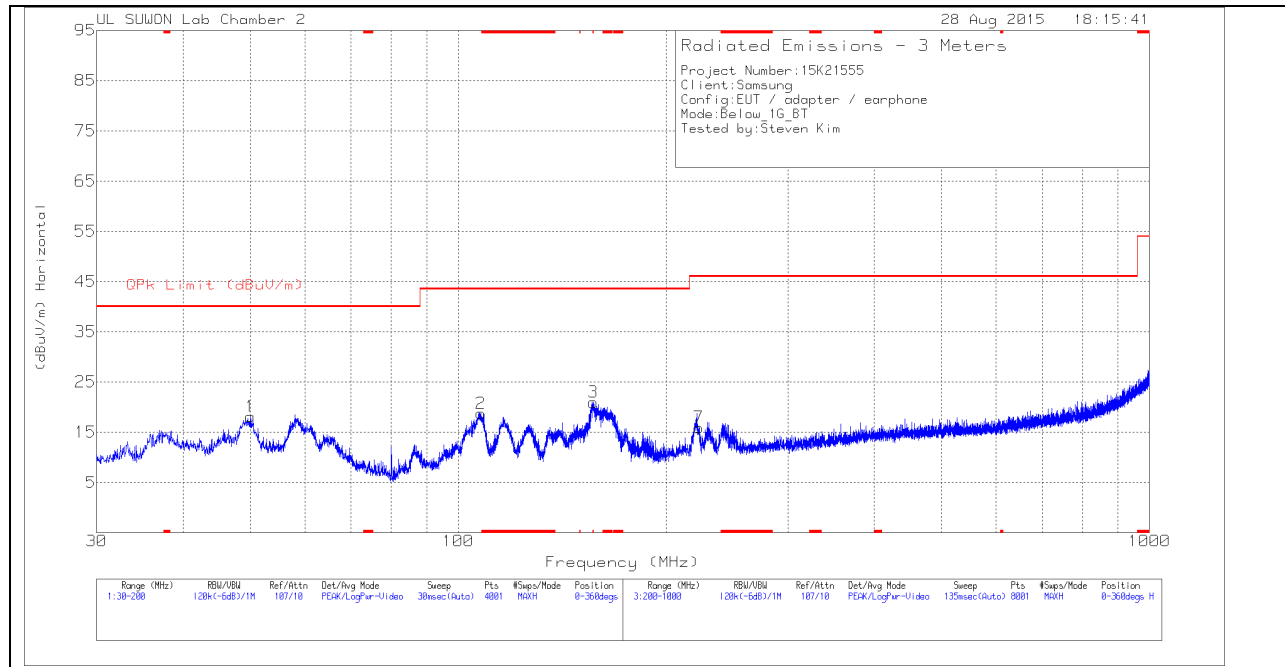
PK2 - KDB558074 Method: Maximum Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

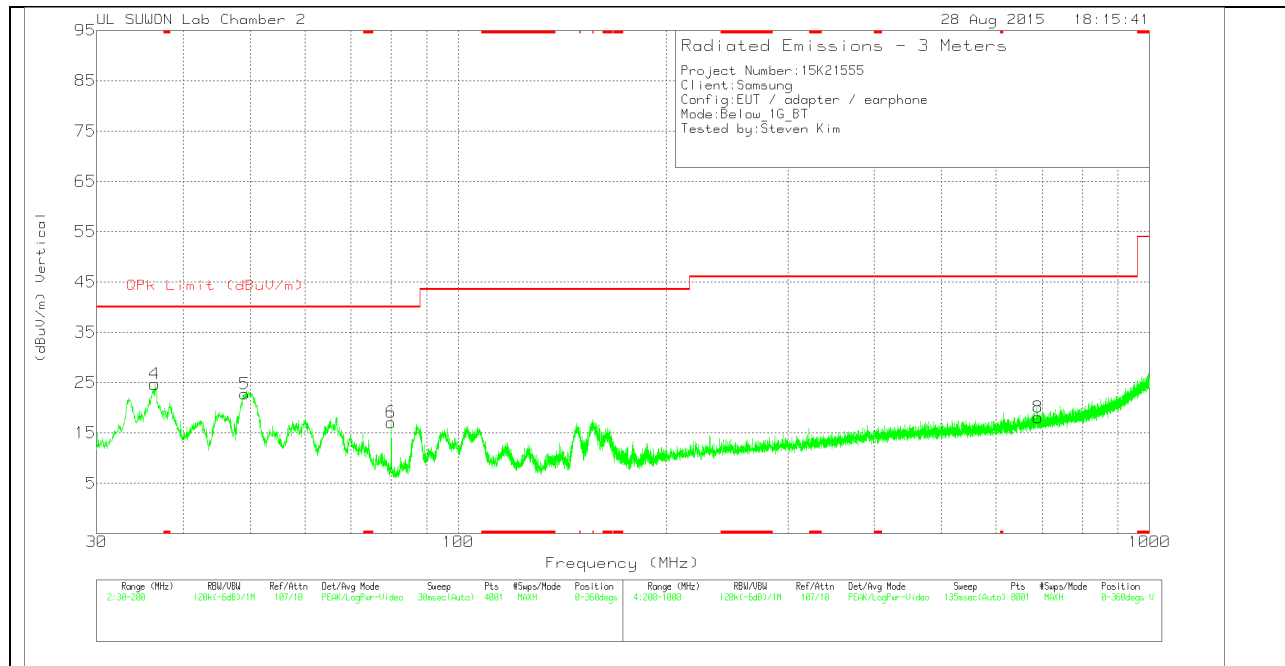
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163-749 | Below_1G | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|----------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1 | 50.06 | 34.71 | Pk | 14.1 | -30.7 | 18.11 | 40 | -21.89 | 0-360 | 400 | H |
| 2 | 107.945 | 38.32 | Pk | 10.9 | -30.5 | 18.72 | 43.52 | -24.8 | 0-360 | 300 | H |
| 3 | * 156.82 | 42.95 | Pk | 8.4 | -30.4 | 20.95 | 43.52 | -22.57 | 0-360 | 200 | H |
| 4 | 36.375 | 44.1 | Pk | 11.3 | -30.7 | 24.7 | 40 | -15.3 | 0-360 | 100 | V |
| 5 | 49.0825 | 39.31 | Pk | 14.1 | -30.7 | 22.71 | 40 | -17.29 | 0-360 | 100 | V |
| 6 | 79.98 | 40.57 | Pk | 7.1 | -30.6 | 17.07 | 40 | -22.93 | 0-360 | 200 | V |
| 7 | 222.8 | 34.23 | Pk | 11.9 | -30.2 | 15.93 | 46.02 | -30.09 | 0-360 | 100 | H |
| 8 | 690.4 | 30.08 | Pk | 17.1 | -29.1 | 18.08 | 46.02 | -27.94 | 0-360 | 300 | V |

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

Pk - Peak detector

10. 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.

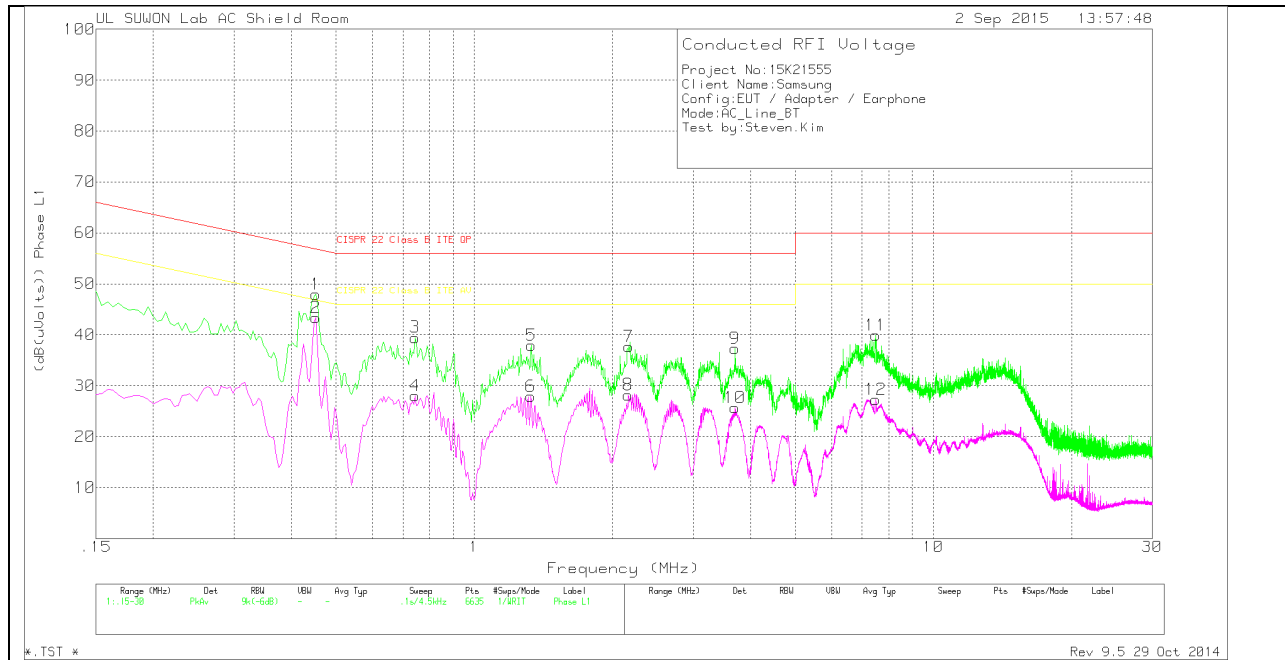
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

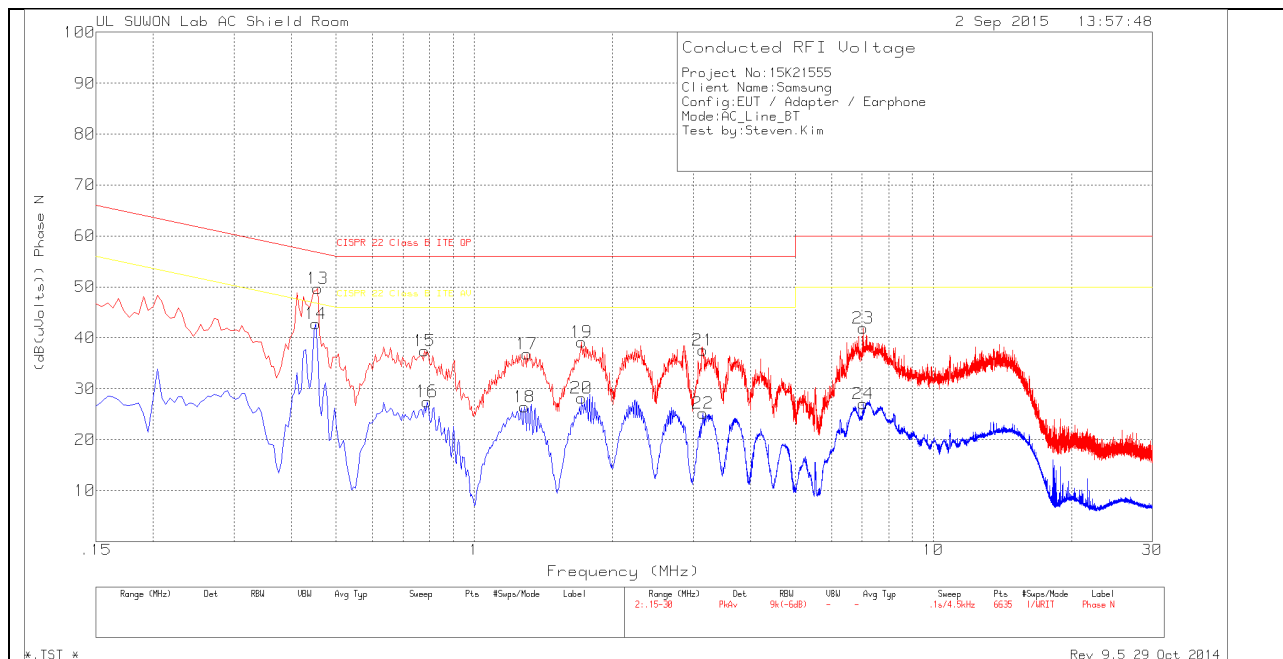
Phase L1 .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_w ith 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 | .4515 | 37.82 | Pk | 10.1 | 0 | 47.92 | 56.85 | -8.93 | - | - |
| 2 | .4515 | 33.33 | Av | 10.1 | 0 | 43.43 | - | - | 46.85 | -3.42 |
| 3 | .744 | 29.49 | Pk | 10 | 0 | 39.49 | 56 | -16.51 | - | - |
| 4 | .744 | 18.01 | Av | 10 | 0 | 28.01 | - | - | 46 | -17.99 |
| 5 | 1.3335 | 28 | Pk | 9.8 | .1 | 37.9 | 56 | -18.1 | - | - |
| 6 | 1.329 | 17.97 | Av | 9.8 | .1 | 27.87 | - | - | 46 | -18.13 |
| 7 | 2.1705 | 27.74 | Pk | 9.8 | .1 | 37.64 | 56 | -18.36 | - | - |
| 8 | 2.166 | 18.33 | Av | 9.8 | .1 | 28.23 | - | - | 46 | -17.77 |
| 9 | 3.7005 | 27.41 | Pk | 9.8 | .1 | 37.31 | 56 | -18.69 | - | - |
| 10 | 3.7005 | 15.85 | Av | 9.8 | .1 | 25.75 | - | - | 46 | -20.25 |
| 11 | 7.4895 | 29.93 | Pk | 9.9 | .1 | 39.93 | 60 | -20.07 | - | - |
| 12 | 7.494 | 17.32 | Av | 9.9 | .1 | 27.32 | - | - | 50 | -22.68 |

Pk - Peak detector

Av - Average detection

LINE 2 PLOT



LINE 2 RESULTS

Phase N .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_w ith 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 | .456 | 39.54 | Pk | 10.1 | 0 | 49.64 | 56.77 | -7.13 | - | - |
| 14 | .4515 | 32.62 | Av | 10.1 | 0 | 42.72 | - | - | 46.85 | -4.13 |
| 15 | .78 | 27.49 | Pk | 10 | 0 | 37.49 | 56 | -18.51 | - | - |
| 16 | .789 | 17.59 | Av | 9.9 | 0 | 27.49 | - | - | 46 | -18.51 |
| 17 | 1.302 | 26.91 | Pk | 9.8 | .1 | 36.81 | 56 | -19.19 | - | - |
| 18 | 1.2885 | 16.54 | Av | 9.8 | .1 | 26.44 | - | - | 46 | -19.56 |
| 19 | 1.7115 | 29.25 | Pk | 9.8 | .1 | 39.15 | 56 | -16.85 | - | - |
| 20 | 1.7115 | 18.29 | Av | 9.8 | .1 | 28.19 | - | - | 46 | -17.81 |
| 21 | 3.147 | 27.65 | Pk | 9.8 | .1 | 37.55 | 56 | -18.45 | - | - |
| 22 | 3.147 | 15.25 | Av | 9.8 | .1 | 25.15 | - | - | 46 | -20.85 |
| 23 | 7.0305 | 31.86 | Pk | 9.9 | .1 | 41.86 | 60 | -18.14 | - | - |
| 24 | 7.0305 | 17.07 | Av | 9.9 | .1 | 27.07 | - | - | 50 | -22.93 |

PK - Peak detector

Av - Average detection