



**FCC CFR47 PART 15 SUBPART C**

**DTS Wireless LAN**

**CERTIFICATION TEST REPORT**

**FOR**

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

**MODEL NUMBER : SM-G6000**

**FCC ID: A3LSMG6000**

**REPORT NUMBER: 15K21563-E1**

**ISSUE DATE: SEP 21, 2015**

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--	09/09/15	Initial issue	SungGil Park
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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-G6000  
**SERIAL NUMBER:** R28G8296GMW (RADIATED); R28G8296F5T (CONDUCTED)  
**DATE TESTED:** AUG 20, 2015 - SEP 09, 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

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

This test report addresses the DTS (WLAN) operational mode.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted output power as follows:

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
2412 - 2462	802.11b	8.93	7.82
	802.11g	8.42	6.95
	802.11n HT20	7.26	5.32

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antennas, with a antenna's 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.

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps

802.11n HT20 mode: MCS0

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	ETA0U83CBC	DW2G201BS/A-E	N/A
Data Cable	SAMSUNG	ECB-DU68WE	N/A	N/A
Earphone	SAMSUNG	GH59-11129M	N/A	N/A

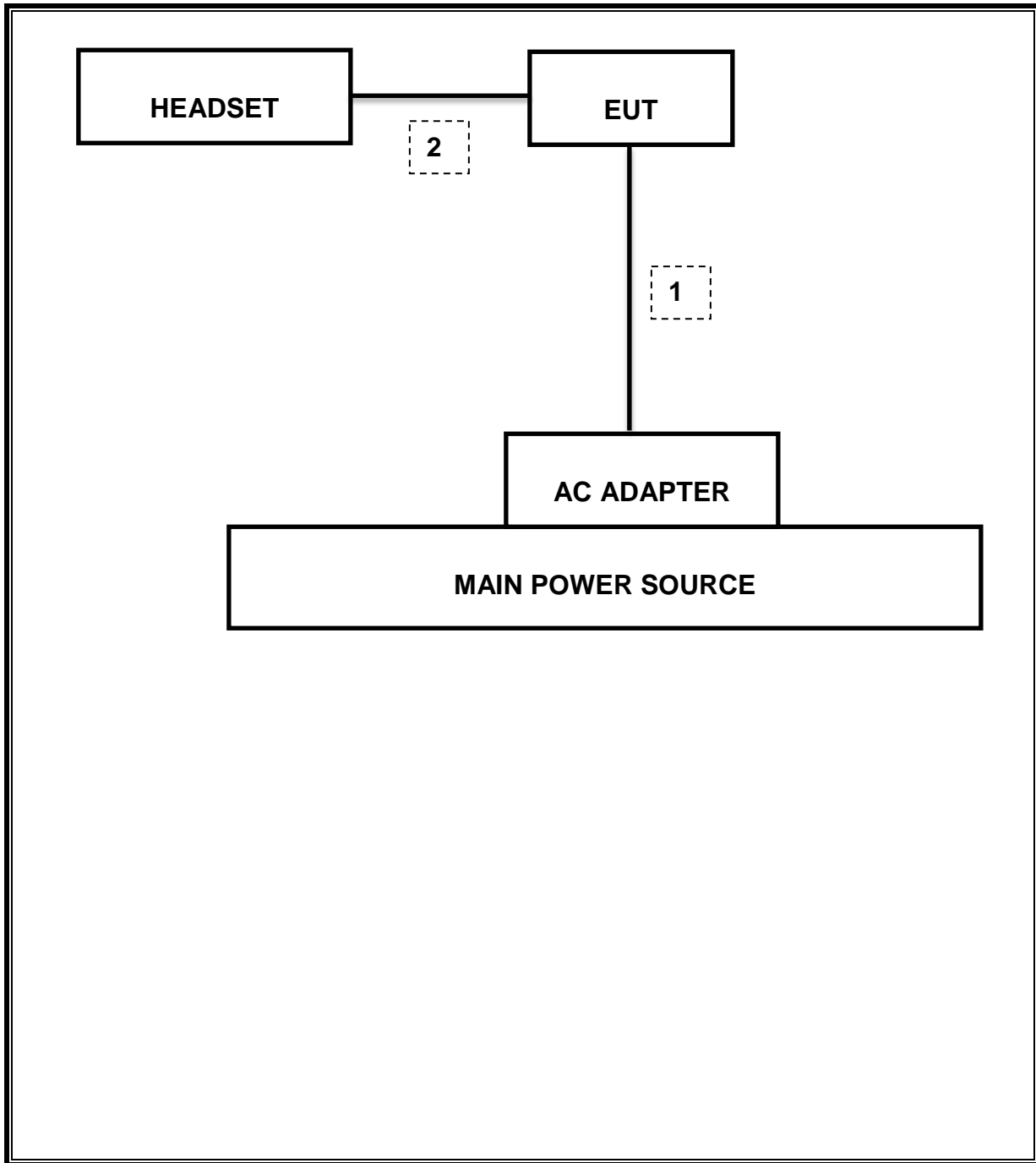
### I/O CABLES

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
1	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

### TEST SETUP

The EUT is a stand-alone unit during the tests. Test software exercised the radio card.

**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

## 7. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r03: Measurement Procedure §9.2.3.1 AVGPM is used for power and §10.2 AVGPSD-2 is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

Band edge emissions within Restricted Bands are measured using RMS with duty cycle factor offset method.

## 8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

### LIMITS

None; for reporting purposes only.

### 8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B [msec]	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
<b>2400MHz Bands</b>						
802.11b	8.415	8.514	0.988	98.8%	0.00	0.010
802.11g	1.396	1.494	0.934	93.4%	0.29	0.716
802.11n HT20	1.296	1.394	0.930	93.0%	0.32	0.772



[802.11b Mode]

[802.11g Mode]

[802.11n Mode]

## 9. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	7.59 MHz
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-34.779 dBm
15.247	TX conducted output power	<30dBm		Pass	8.93 dBm
15.247	PSD	<8dBm		Pass	-21.826 dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	49.44 dBuV (QP)
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	32.7 dBuV/m (QP)

## 10. ANTENNA PORT TEST RESULTS

### 10.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

Reference to KDB 558074 D01 DTS Meas Guidance v03r03: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

#### RESULTS

##### 10.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	8.550	0.5
Mid	2437	8.500	0.5
High	2462	7.587	0.5
Worst		7.587	0.5



##### 10.1.2. 802.11g MODE IN THE 2.4 GHz BAND

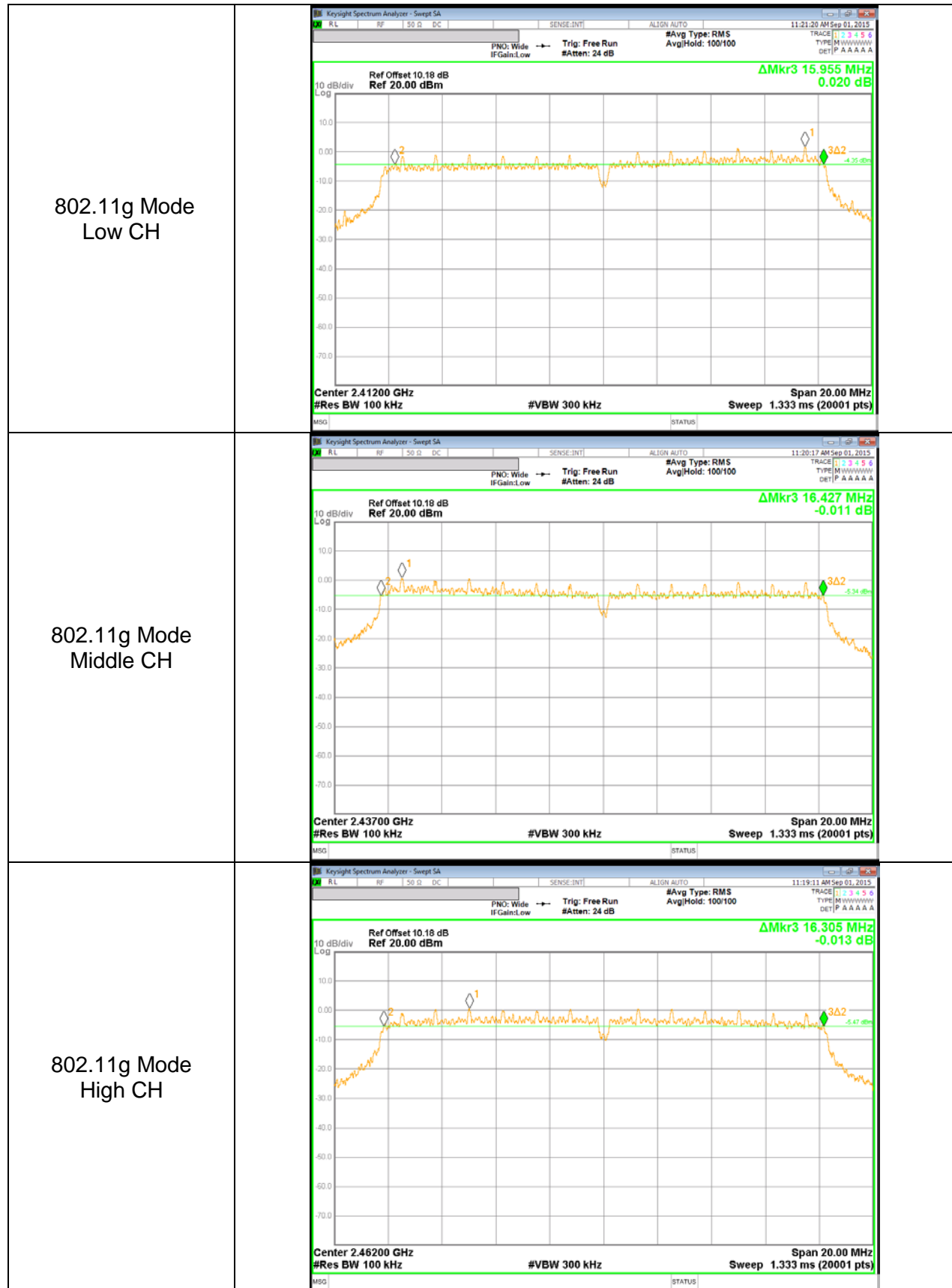
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	15.955	0.5
Mid	2437	16.427	0.5
High	2462	16.305	0.5
Worst		15.955	0.5

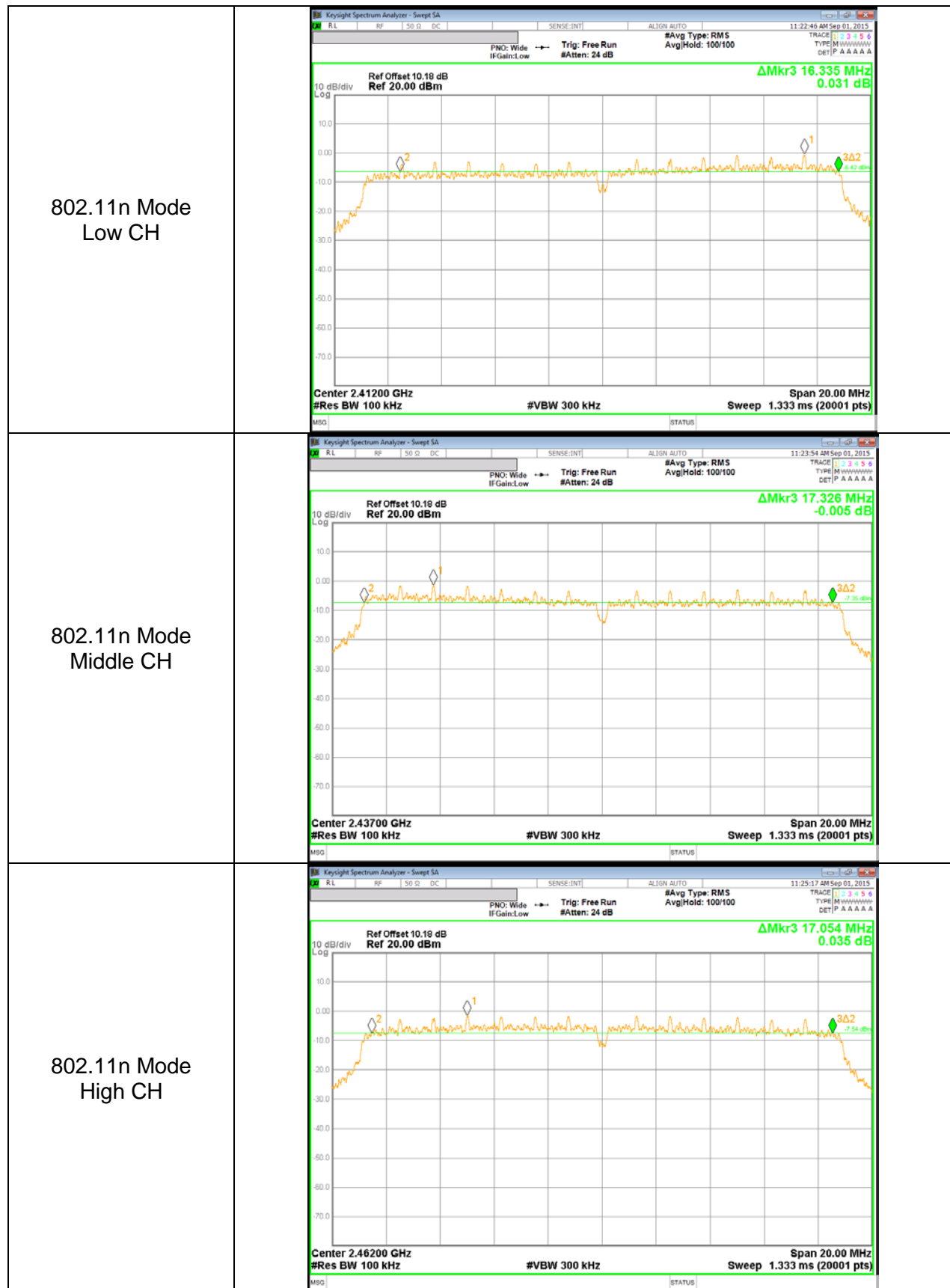
##### 10.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	16.335	0.5
Mid	2437	17.326	0.5
High	2462	17.054	0.5
Worst		16.335	0.5

10.1.4. 6 dB BANDWIDTH PLOTS

<p>802.11b Mode Low CH</p>	
<p>802.11b Mode Middle CH</p>	
<p>802.11b Mode High CH</p>	





## 10.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

### RESULTS

#### 10.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	13.073
Mid	2437	13.071
High	2462	13.022
Worst		13.073

#### 10.2.2. 802.11g MODE IN THE 2.4 GHz BAND

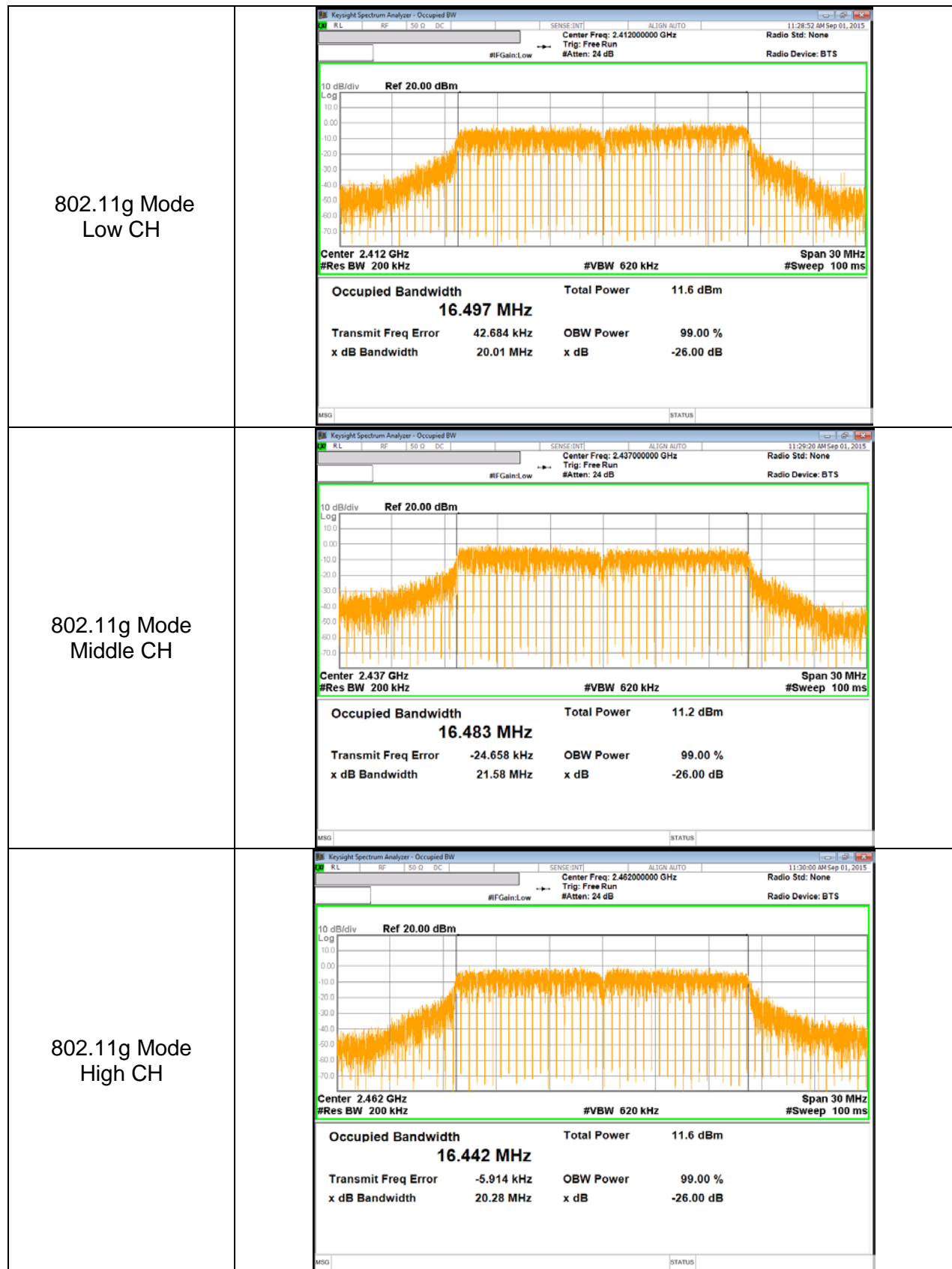
Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	16.497
Mid	2437	16.483
High	2462	16.442
Worst		16.497

#### 10.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	17.719
Mid	2437	17.718
High	2462	17.594
Worst		17.719

**10.2.4. 99% BANDWIDTH PLOTS**

<p>802.11b Mode Low CH</p>	<p>Center Freq: 2.41200000 GHz          #Res BW 150 kHz #VBW 470 kHz Span 30 MHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>14.5 dBm</td> </tr> <tr> <td><b>13.073 MHz</b></td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>212.56 kHz</td> <td></td> <td></td> </tr> <tr> <td>x dB Bandwidth</td> <td>x dB</td> <td>-26.00 dB</td> </tr> <tr> <td>16.18 MHz</td> <td></td> <td></td> </tr> </table>	Occupied Bandwidth	Total Power	14.5 dBm	<b>13.073 MHz</b>			Transmit Freq Error	OBW Power	99.00 %	212.56 kHz			x dB Bandwidth	x dB	-26.00 dB	16.18 MHz		
Occupied Bandwidth	Total Power	14.5 dBm																	
<b>13.073 MHz</b>																			
Transmit Freq Error	OBW Power	99.00 %																	
212.56 kHz																			
x dB Bandwidth	x dB	-26.00 dB																	
16.18 MHz																			
<p>802.11b Mode Middle CH</p>	<p>Center Freq: 2.43700000 GHz          #Res BW 150 kHz #VBW 470 kHz Span 30 MHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>14.1 dBm</td> </tr> <tr> <td><b>13.071 MHz</b></td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-127.12 kHz</td> <td></td> <td></td> </tr> <tr> <td>x dB Bandwidth</td> <td>x dB</td> <td>-26.00 dB</td> </tr> <tr> <td>15.62 MHz</td> <td></td> <td></td> </tr> </table>	Occupied Bandwidth	Total Power	14.1 dBm	<b>13.071 MHz</b>			Transmit Freq Error	OBW Power	99.00 %	-127.12 kHz			x dB Bandwidth	x dB	-26.00 dB	15.62 MHz		
Occupied Bandwidth	Total Power	14.1 dBm																	
<b>13.071 MHz</b>																			
Transmit Freq Error	OBW Power	99.00 %																	
-127.12 kHz																			
x dB Bandwidth	x dB	-26.00 dB																	
15.62 MHz																			
<p>802.11b Mode High CH</p>	<p>Center Freq: 2.46200000 GHz          #Res BW 150 kHz #VBW 470 kHz Span 30 MHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>14.9 dBm</td> </tr> <tr> <td><b>13.022 MHz</b></td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-19.195 kHz</td> <td></td> <td></td> </tr> <tr> <td>x dB Bandwidth</td> <td>x dB</td> <td>-26.00 dB</td> </tr> <tr> <td>16.07 MHz</td> <td></td> <td></td> </tr> </table>	Occupied Bandwidth	Total Power	14.9 dBm	<b>13.022 MHz</b>			Transmit Freq Error	OBW Power	99.00 %	-19.195 kHz			x dB Bandwidth	x dB	-26.00 dB	16.07 MHz		
Occupied Bandwidth	Total Power	14.9 dBm																	
<b>13.022 MHz</b>																			
Transmit Freq Error	OBW Power	99.00 %																	
-19.195 kHz																			
x dB Bandwidth	x dB	-26.00 dB																	
16.07 MHz																			



<p>802.11n Mode Low CH</p>	<p>Center Freq: 2.41200000 GHz          Trig: Free Run          #Atten: 24 dB          Radio Std: None          Radio Device: BTS</p> <p>Center 2.412 GHz          #Res BW 200 kHz          #VBW 620 kHz          Span 30 MHz          #Sweep 100 ms</p> <p><b>Occupied Bandwidth</b> Total Power 9.52 dBm  <b>17.719 MHz</b></p> <p>Transmit Freq Error 38.543 kHz OBW Power 99.00 %          x dB Bandwidth 20.50 MHz x dB -26.00 dB</p>
<p>802.11n Mode Middle CH</p>	<p>Center Freq: 2.43700000 GHz          Trig: Free Run          #Atten: 24 dB          Radio Std: None          Radio Device: BTS</p> <p>Center 2.437 GHz          #Res BW 200 kHz          #VBW 620 kHz          Span 30 MHz          #Sweep 100 ms</p> <p><b>Occupied Bandwidth</b> Total Power 9.12 dBm  <b>17.718 MHz</b></p> <p>Transmit Freq Error -19.437 kHz OBW Power 99.00 %          x dB Bandwidth 20.98 MHz x dB -26.00 dB</p>
<p>802.11n Mode High CH</p>	<p>Center Freq: 2.46200000 GHz          Trig: Free Run          #Atten: 24 dB          Radio Std: None          Radio Device: BTS</p> <p>Center 2.462 GHz          #Res BW 200 kHz          #VBW 620 kHz          Span 30 MHz          #Sweep 100 ms</p> <p><b>Occupied Bandwidth</b> Total Power 9.58 dBm  <b>17.594 MHz</b></p> <p>Transmit Freq Error -26.590 kHz OBW Power 99.00 %          x dB Bandwidth 20.13 MHz x dB -26.00 dB</p>

### 10.3. OUTPUT POWER

#### LIMITS

FCC §15.247

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Duty cycle correction factor is added to the average output power results for duty cycle < 98%.

#### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

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.

#### RESULTS

##### 10.3.1. 802.11b MODE IN THE 2.4 GHZ BAND

###### Limits

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	IC Power Limit [dBm]	IC EIRP Limit [dBm]	Max Power [dBm]
Low	2412	-2.41	30.00	30.00	36.00	30.00
Mid	2437	-2.41	30.00	30.00	36.00	30.00
High	2462	-2.41	30.00	30.00	36.00	30.00

###### Results

Channel	Frequency [MHz]	Primary Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	8.93	8.93	36.00	-27.07
Mid	2437	8.5	8.50	36.00	-27.50
High	2462	8.85	8.85	36.00	-27.15
Worst			8.93	36.00	-27.07

**10.3.2. 802.11g MODE IN THE 2.4 GHz BAND**

**Limits**

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	IC Power Limit [dBm]	IC EIRP Limit [dBm]	Max Power [dBm]
Low	2412	-2.41	30.00	30.00	36.00	30.00
Mid	2437	-2.41	30.00	30.00	36.00	30.00
High	2462	-2.41	30.00	30.00	36.00	30.00

**Results**

Channel	Frequency [MHz]	Primary Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	7.72	7.72	36.00	-28.28
Mid	2437	8.42	8.42	36.00	-27.58
High	2462	8.08	8.08	36.00	-27.92
Worst			8.42	36.00	-27.58

**10.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND**

**Limits**

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	IC Power Limit [dBm]	IC EIRP Limit [dBm]	Max Power [dBm]
Low	2412	-2.41	30.00	30.00	36.00	30.00
Mid	2437	-2.41	30.00	30.00	36.00	30.00
High	2462	-2.41	30.00	30.00	36.00	30.00

**Results**

Channel	Frequency [MHz]	Primary Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	6.68	6.68	36.00	-29.32
Mid	2437	7.26	7.26	36.00	-28.74
High	2462	6.83	6.83	36.00	-29.17
Worst			7.26	36.00	-28.74

## 10.4. PSD

### LIMITS

FCC §15.247

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST PROCEDURE

Power Spectral Density was performed utilizing the “Method AVGPSD-2” under KDB558074 D01 DTS Meas Guidance v03r03

### RESULTS

#### 10.4.1. 802.11b MODE IN THE 2.4 GHz BAND

##### PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-21.919	0.00	-21.92	8.00	-29.92
Mid	2437	-22.373	0.00	-22.37	8.00	-30.37
High	2462	-21.826	0.00	-21.83	8.00	-29.83

#### 10.4.2. 802.11g MODE IN THE 2.4 GHz BAND

##### PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-25.683	0.29	-25.39	8.00	-33.68
Mid	2437	-25.046	0.29	-24.76	8.00	-33.05
High	2462	-26.132	0.29	-25.84	8.00	-34.13

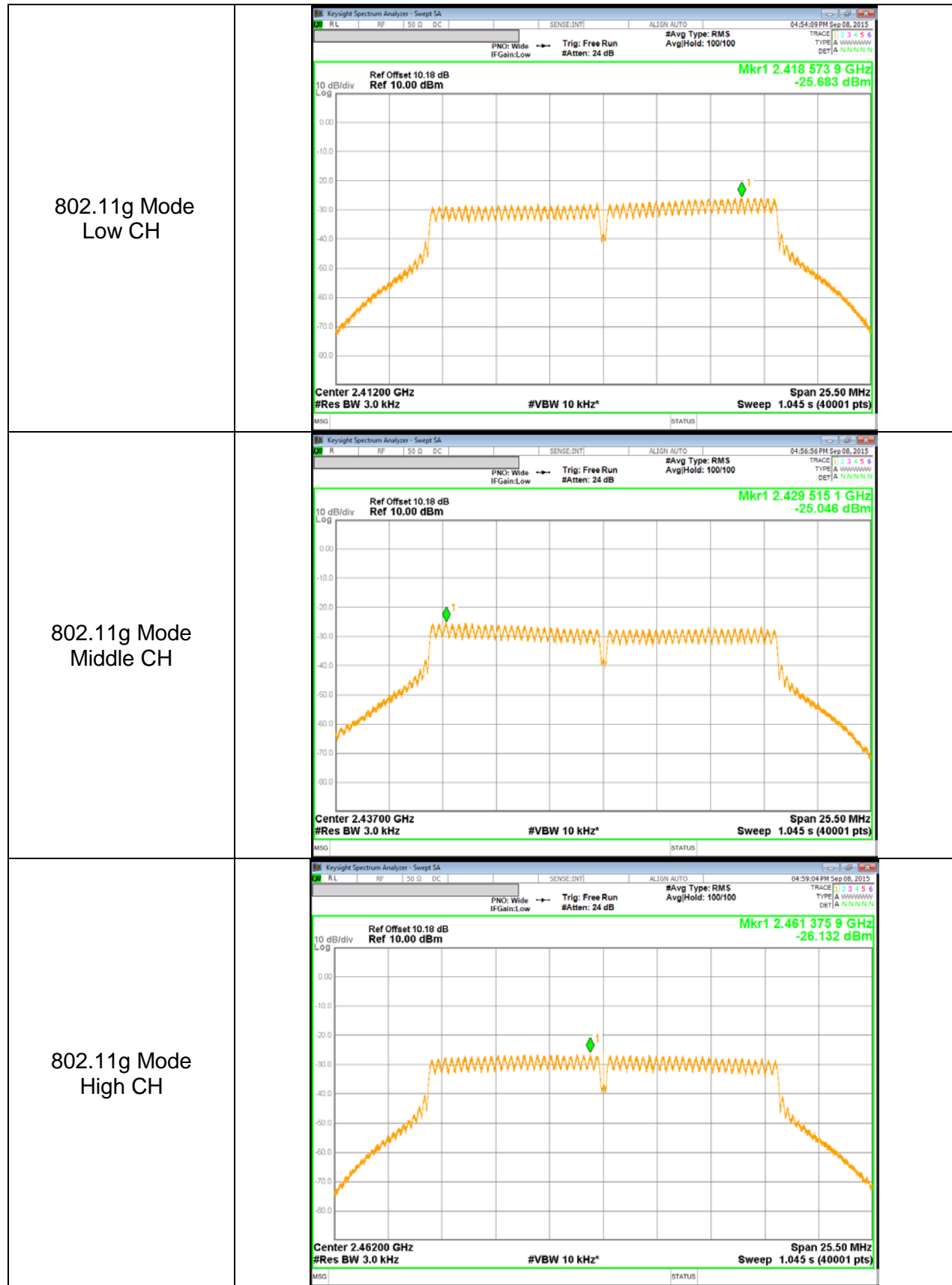
#### 10.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

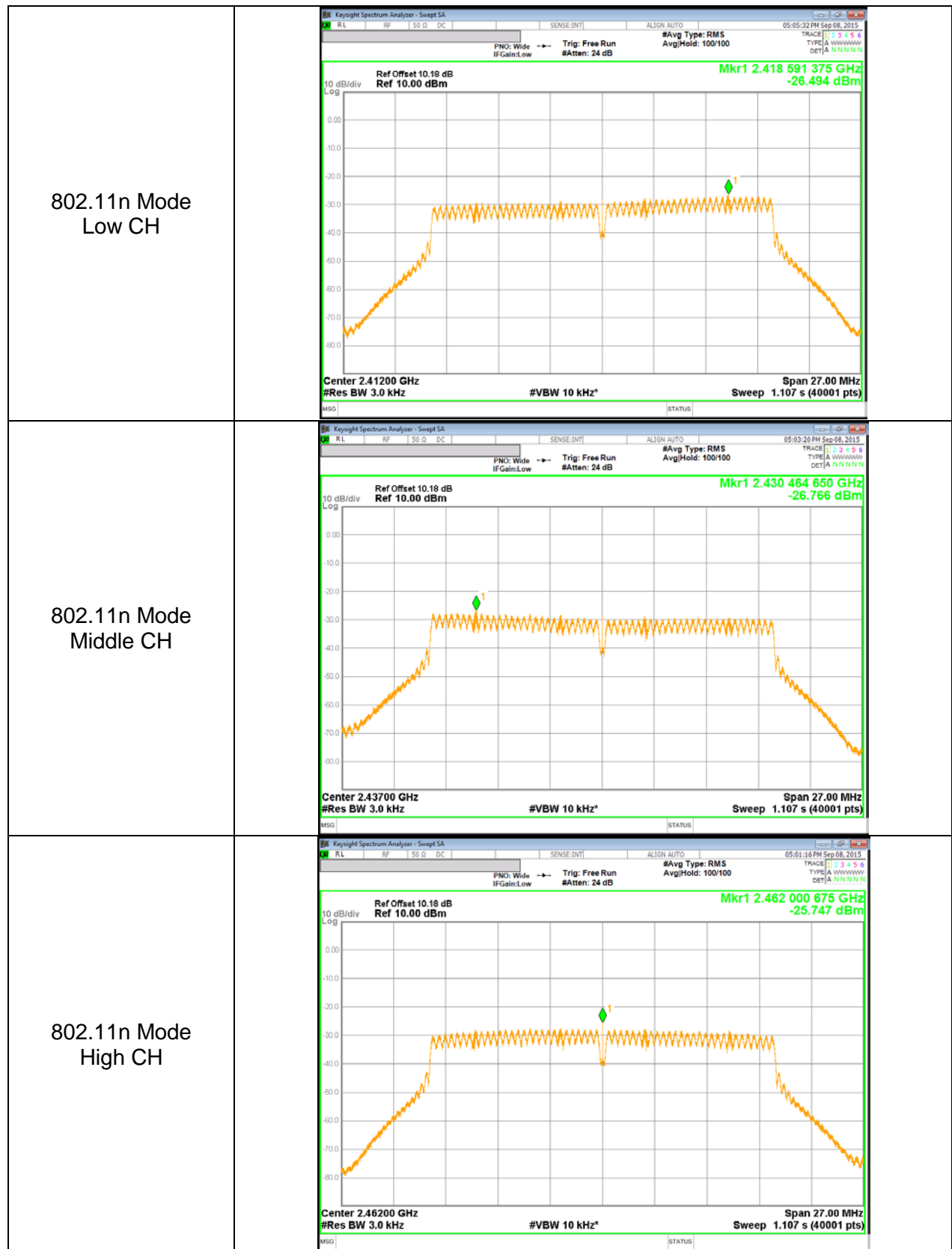
##### PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-26.494	0.32	-26.17	8.00	-34.49
Mid	2437	-26.766	0.32	-26.45	8.00	-34.77
High	2462	-25.747	0.32	-25.43	8.00	-33.75

10.4.4. PSD PLOTS

<p>802.11b Mode Low CH</p>	
<p>802.11b Mode Middle CH</p>	
<p>802.11b Mode High CH</p>	





## 10.5. OUT-OF-BAND EMISSIONS

### LIMITS

FCC §15.247 (d)

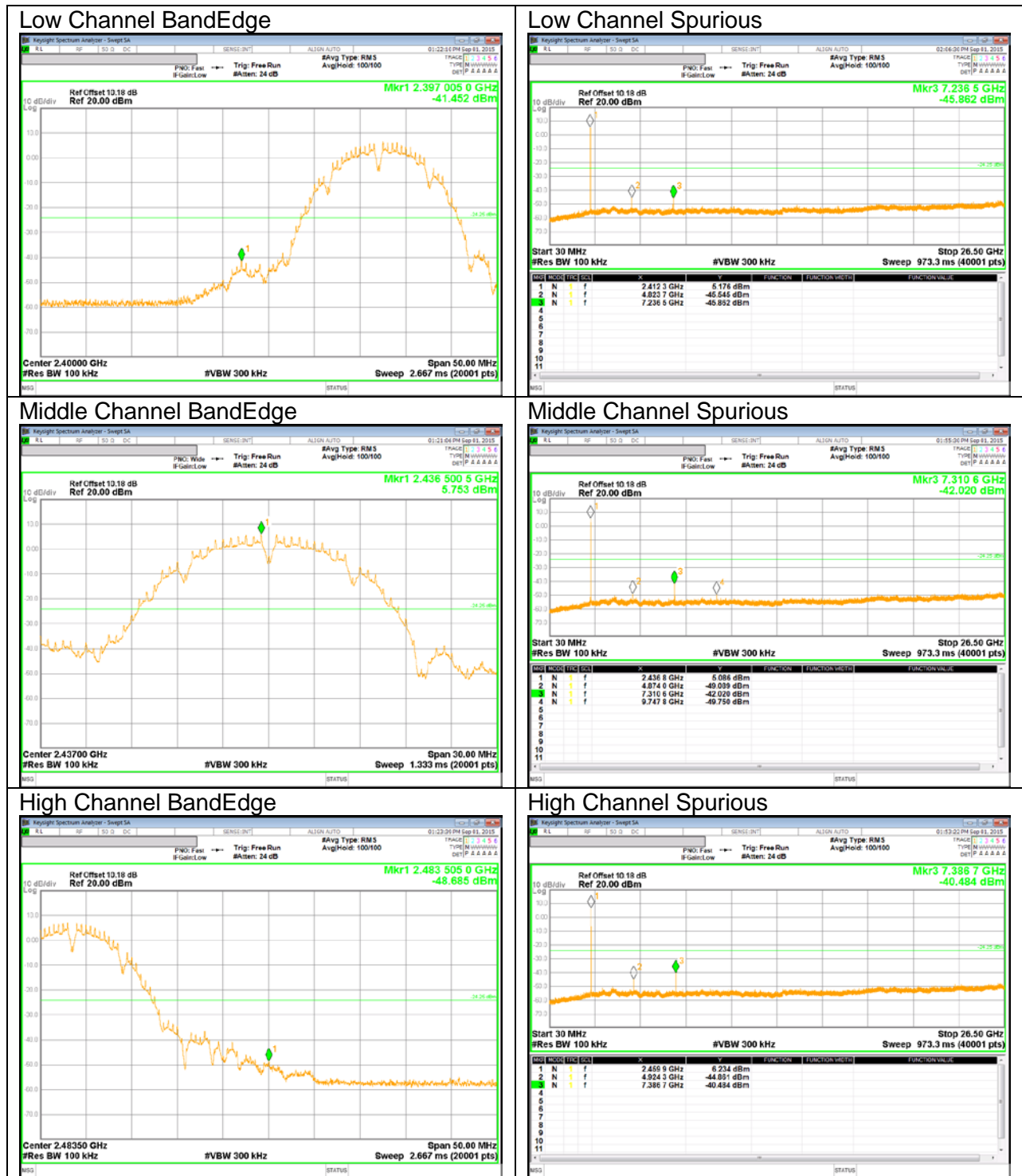
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

**RESULTS**

**10.5.1. 802.11b MODE IN THE 2.4 GHZ BAND**



### 10.5.2. 802.11g MODE IN THE 2.4 GHz BAND



### 10.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND



## 11. RADIATED TEST RESULTS

### 11.1. 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.

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor=  $10\log(1/x)$  For this sample B mode = 0dB (duty cycle >98%); G mode = 0.29dB; N mode = 0.32dB.

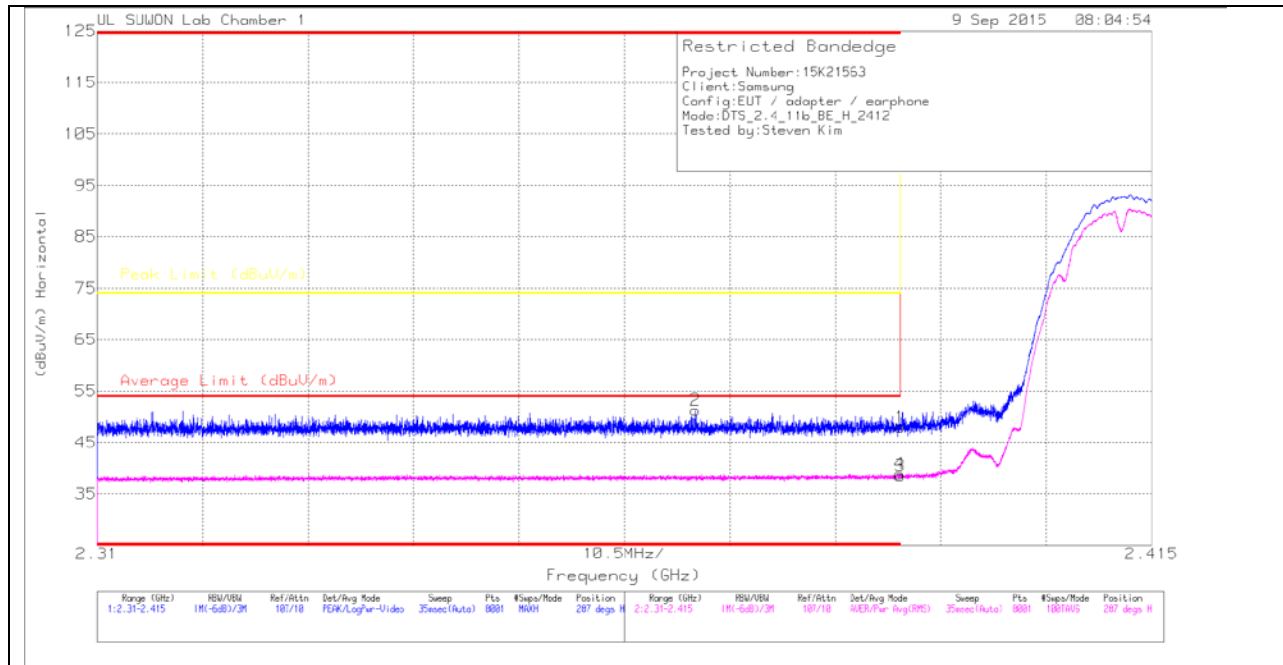
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

## 11.2. TRANSMITTER ABOVE 1 GHz

### 11.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

##### Trace Markers

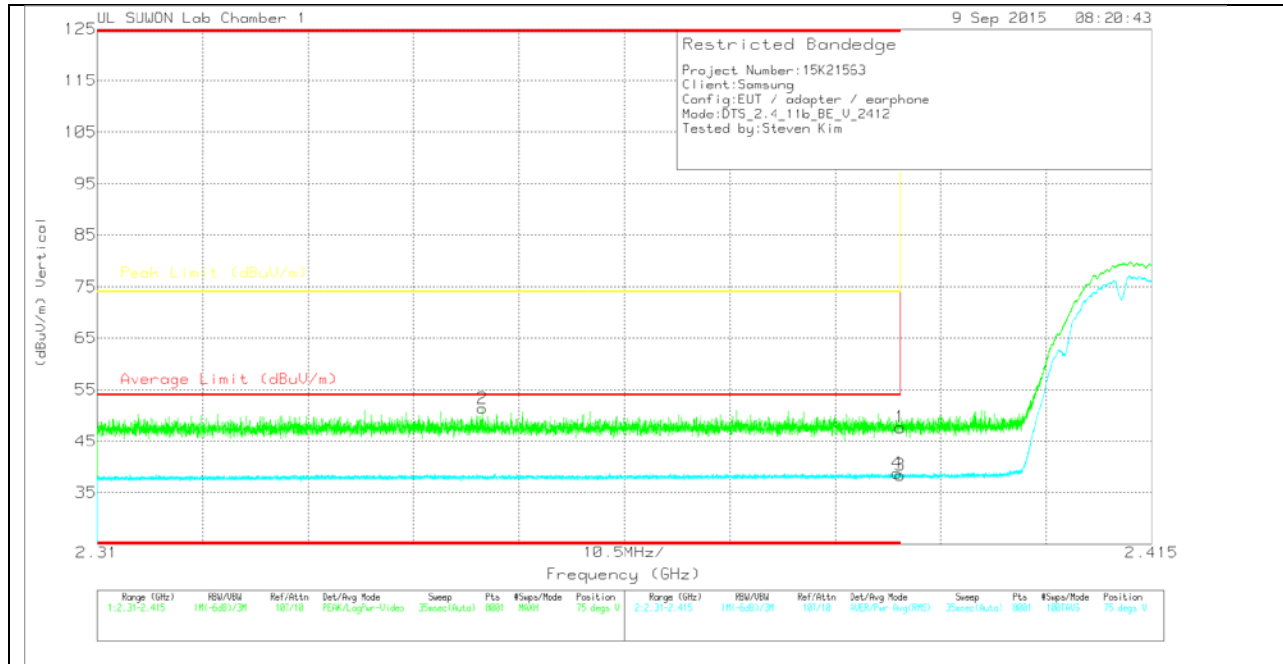
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.94	Pk	31.8	-22.8	0	47.94	-	-	74	-26.06	287	102	H
2	* 2.37	42.3	Pk	31.8	-22.8	0	51.3	-	-	74	-22.7	287	102	H
3	* 2.39	29.56	RMS	31.8	-22.8	0	38.56	54	-15.44	-	-	287	102	H
4	* 2.39	29.95	RMS	31.8	-22.8	0	38.95	54	-15.05	-	-	287	102	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (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	38.68	PK	31.8	-22.8	0	47.68	-	-	74	-26.32	75	102	V
2	* 2.348	42.61	PK	31.7	-22.9	0	51.41	-	-	74	-22.59	75	102	V
3	* 2.39	29.45	RMS	31.8	-22.8	0	38.45	54	-15.55	-	-	75	102	V
4	* 2.39	29.82	RMS	31.8	-22.8	0	38.82	54	-15.18	-	-	75	102	V

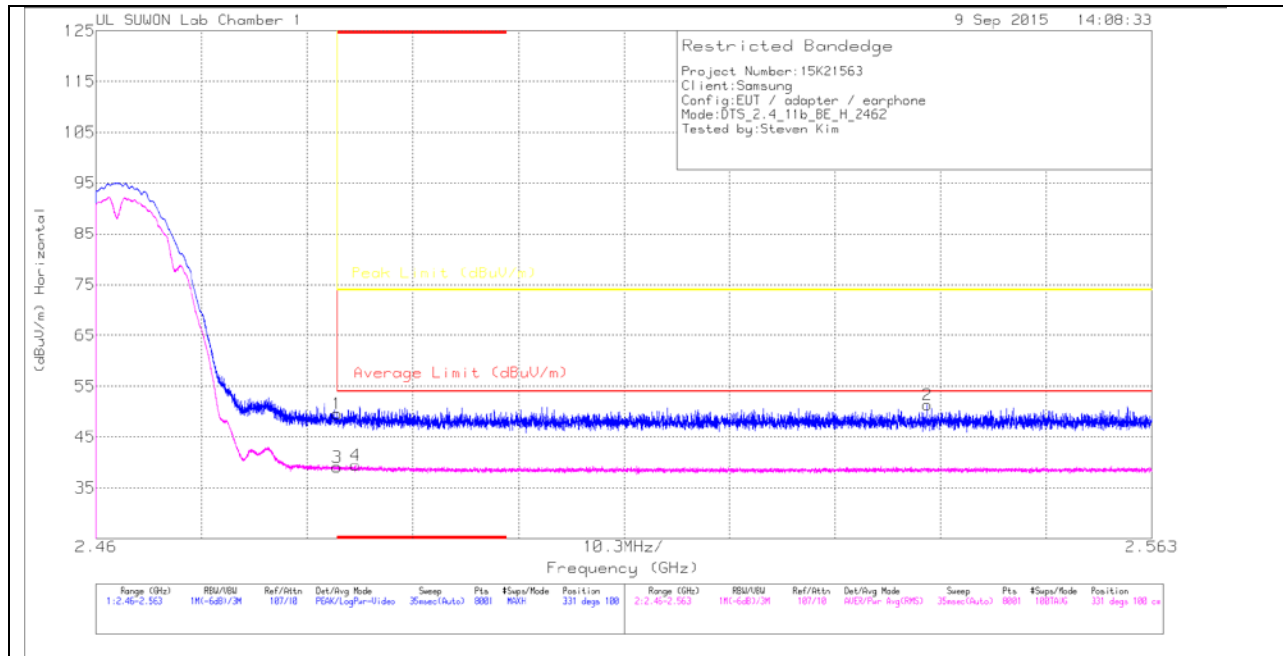
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Trace Markers

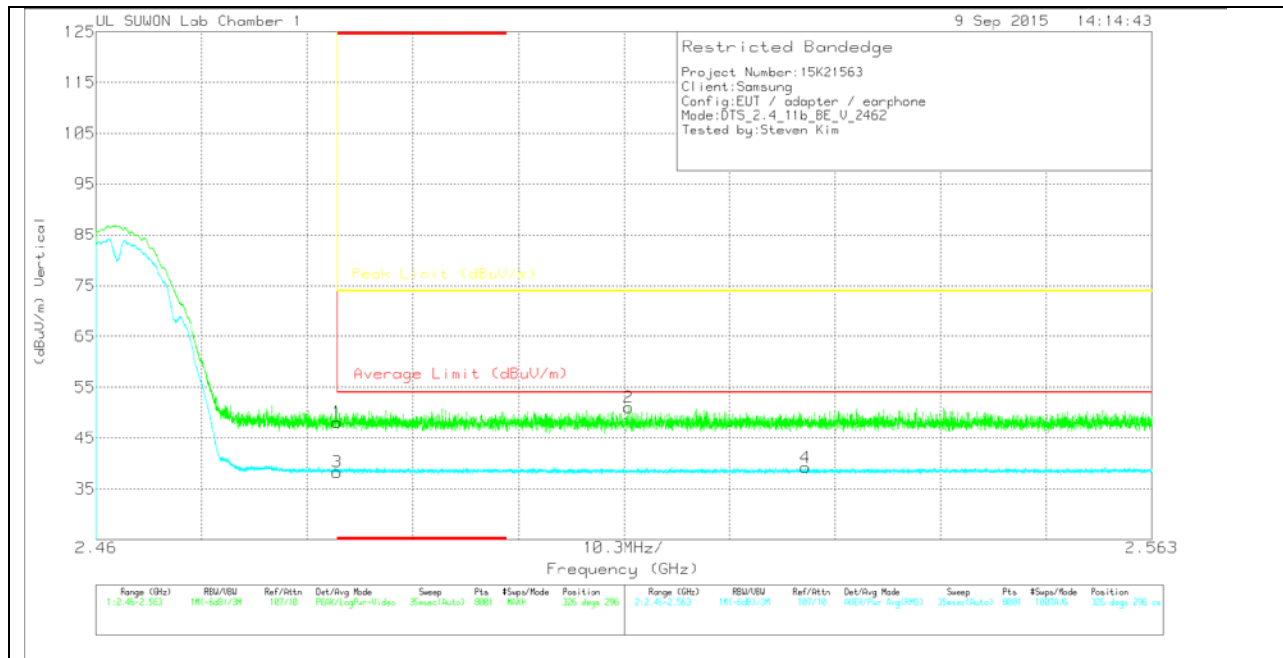
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.24	Pk	32	-22.6	0	49.64	-	-	74	-24.36	331	100	H
2	2.541	41.96	Pk	32	-22.6	0	51.36	-	-	74	-22.64	331	100	H
3	* 2.484	29.63	RMS	32	-22.6	0	39.03	54	-14.97	-	-	331	100	H
4	* 2.485	30	RMS	32	-22.6	0	39.4	54	-14.6	-	-	331	100	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (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	38.75	PK	32	-22.6	0	48.15	-	-	74	-25.85	326	296	V
2	2.512	41.61	PK	32	-22.6	0	51.01	-	-	74	-22.99	326	296	V
3	* 2.484	28.87	RMS	32	-22.6	0	38.27	54	-15.73	-	-	326	296	V
4	2.529	29.83	RMS	32	-22.6	0	39.23	54	-14.77	-	-	326	296	V

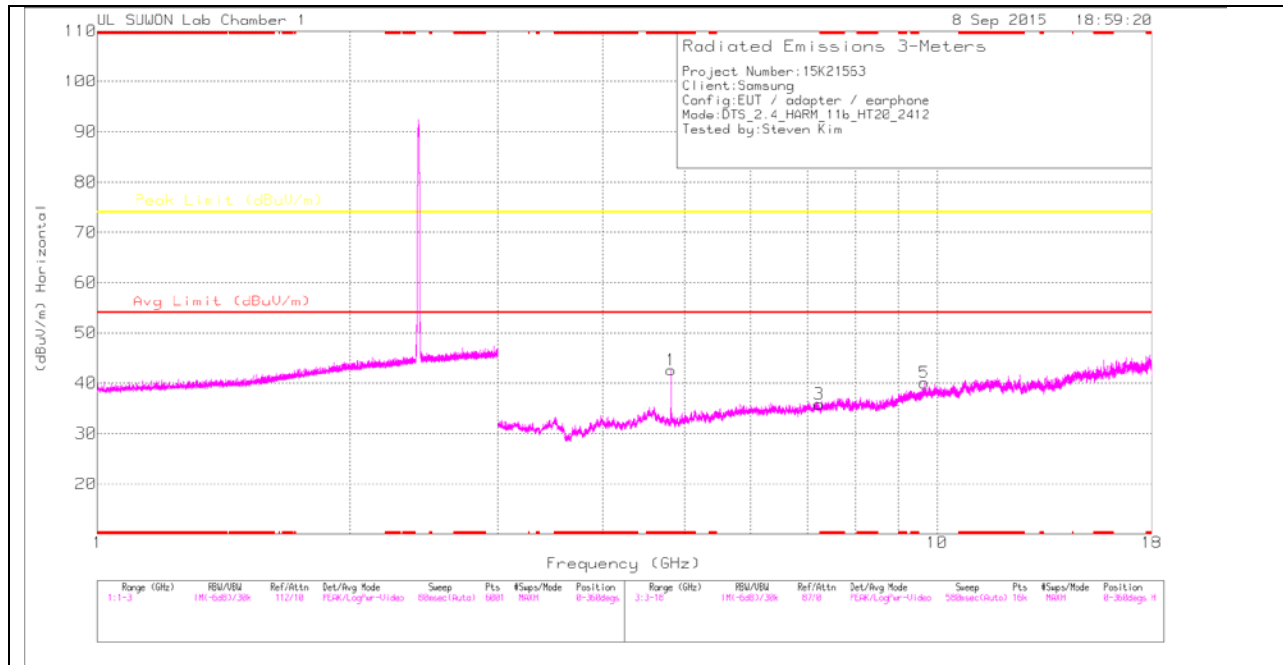
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

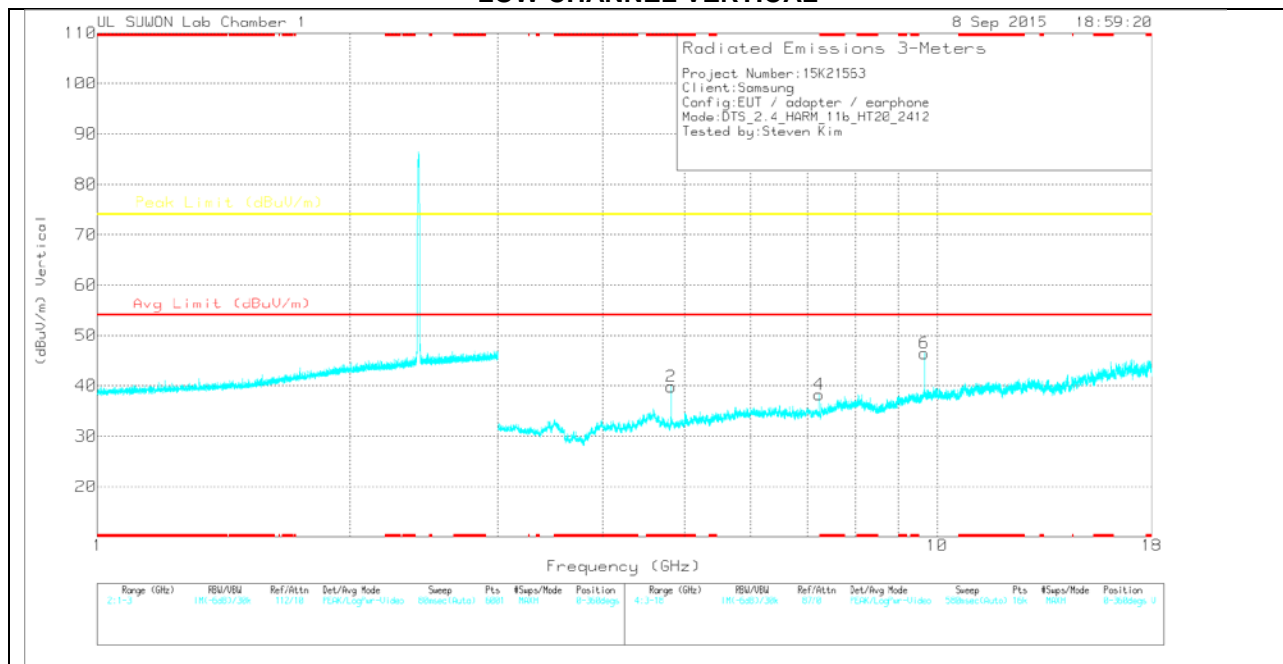
RMS - RMS detection

## 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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.823	38.2	PK	34	-29.6	0	42.6	-	-	74	-31.4	0-360	100	H
3	7.233	25.69	PK	35.7	-25.5	0	35.89	-	-	74	-38.11	0-360	200	H
5	9.648	23.77	PK	37.1	-20.8	0	40.07	-	-	74	-33.93	0-360	200	H
2	* 4.823	35.42	PK	34	-29.6	0	39.82	-	-	74	-34.18	0-360	200	V
4	7.235	28.03	PK	35.7	-25.5	0	38.23	-	-	74	-35.77	0-360	200	V
6	9.648	30.15	PK	37.1	-20.8	0	46.45	-	-	74	-27.55	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

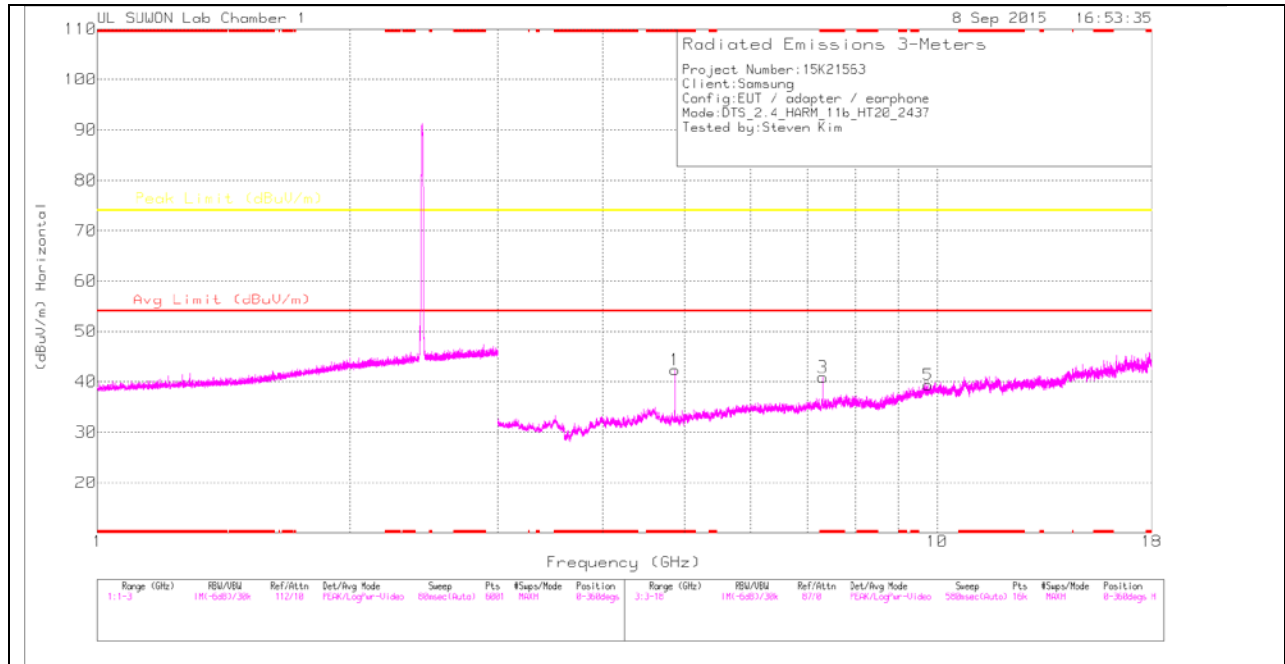
Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.824	44.42	PK2	34	-29.6	0	48.82	-	-	74	-25.18	337	100	H
* 4.824	38.46	MAv1	34	-29.6	0	42.86	54	-11.14	-	-	337	100	H
7.238	38.64	PK2	35.7	-25.5	0	48.84	-	-	74	-25.16	16	296	H
9.648	33.52	PK2	37.1	-20.8	0	49.82	-	-	74	-24.18	175	304	H
* 4.824	42.72	PK2	34	-29.6	0	47.12	-	-	74	-26.88	170	266	V
* 4.824	35.13	MAv1	34	-29.6	0	39.53	54	-14.47	-	-	170	266	V
7.235	39.18	PK2	35.7	-25.5	0	49.38	-	-	74	-24.62	125	304	V
9.648	35.67	PK2	37.1	-20.8	0	51.97	-	-	74	-22.03	230	100	V

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

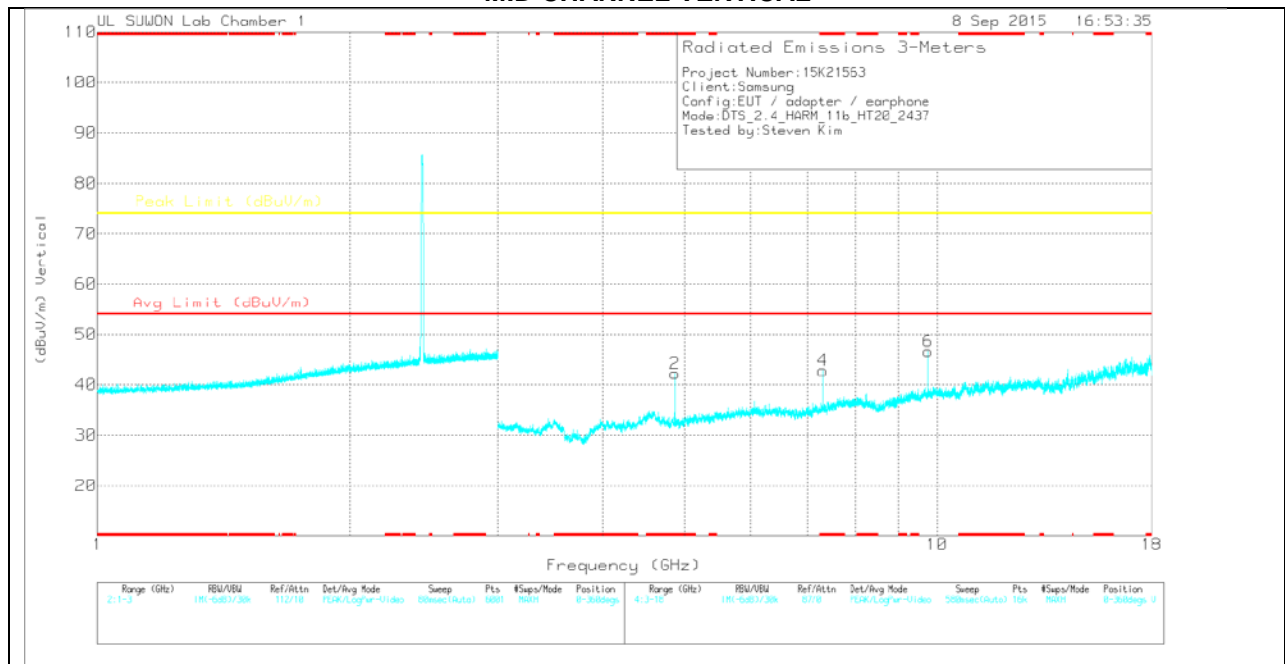
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

**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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.874	37.54	PK	34	-29.2	0	42.34	-	-	74	-31.66	0-360	100	H
3	* 7.31	30.9	PK	35.7	-25.7	0	40.9	-	-	74	-33.1	0-360	200	H
5	9.748	24.09	PK	37.2	-21.9	0	39.39	-	-	74	-34.61	0-360	200	H
2	* 4.874	37.43	PK	34	-29.2	0	42.23	-	-	74	-31.77	0-360	100	V
4	* 7.309	32.82	PK	35.7	-25.7	0	42.82	-	-	74	-31.18	0-360	100	V
6	9.748	31.28	PK	37.2	-21.9	0	46.58	-	-	74	-27.42	0-360	100	V

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

PK – Peak detector

Radiated Emissions

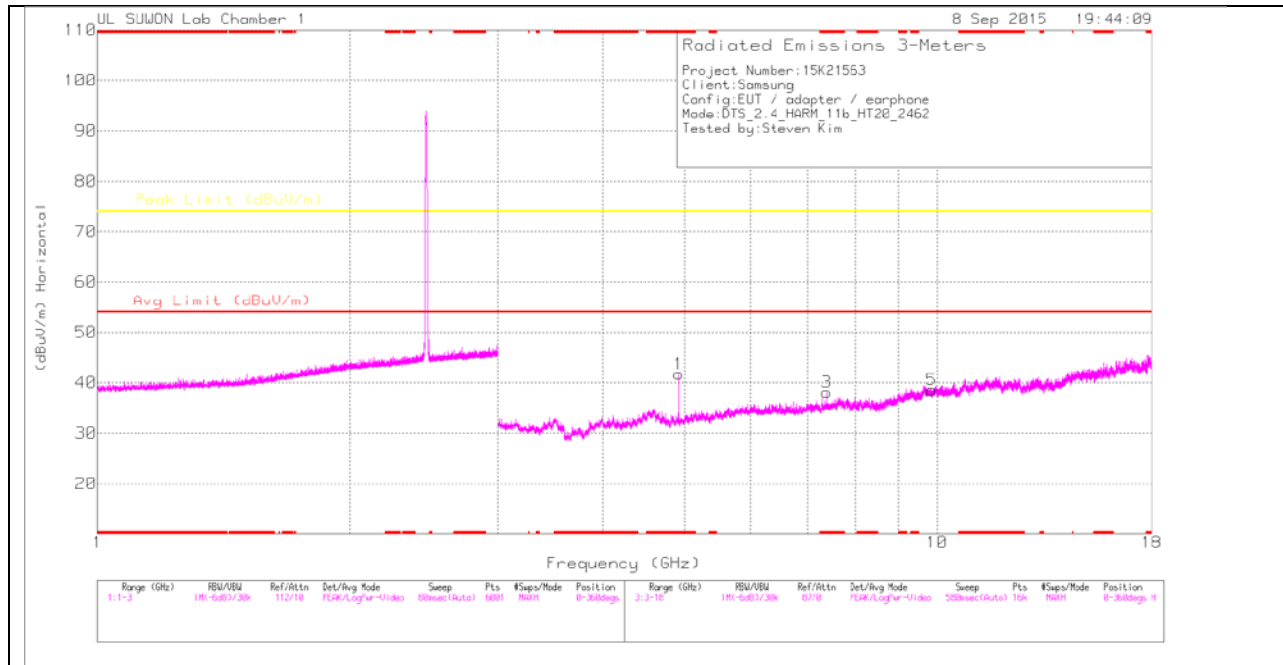
Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.874	44.14	PK2	34	-29.2	0	48.94	-	-	74	-25.06	334	100	H
* 4.874	38.46	MAv1	34	-29.2	0	43.26	54	-10.74	-	-	334	100	H
* 7.31	40.95	PK2	35.7	-25.7	0	50.95	-	-	74	-23.05	26	271	H
* 7.31	32.48	MAv1	35.7	-25.7	0	42.48	54	-11.52	-	-	26	271	H
9.748	34.87	PK2	37.2	-21.9	0	50.17	-	-	74	-23.83	184	281	H
* 4.874	44.12	PK2	34	-29.2	0	48.92	-	-	74	-25.08	166	229	V
* 4.874	38.01	MAv1	34	-29.2	0	42.81	54	-11.19	-	-	166	229	V
* 7.31	43.32	PK2	35.7	-25.7	0	53.32	-	-	74	-20.68	125	318	V
* 7.31	34.44	MAv1	35.7	-25.7	0	44.44	54	-9.56	-	-	125	318	V
9.748	37.43	PK2	37.2	-21.9	0	52.73	-	-	74	-21.27	234	100	V

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

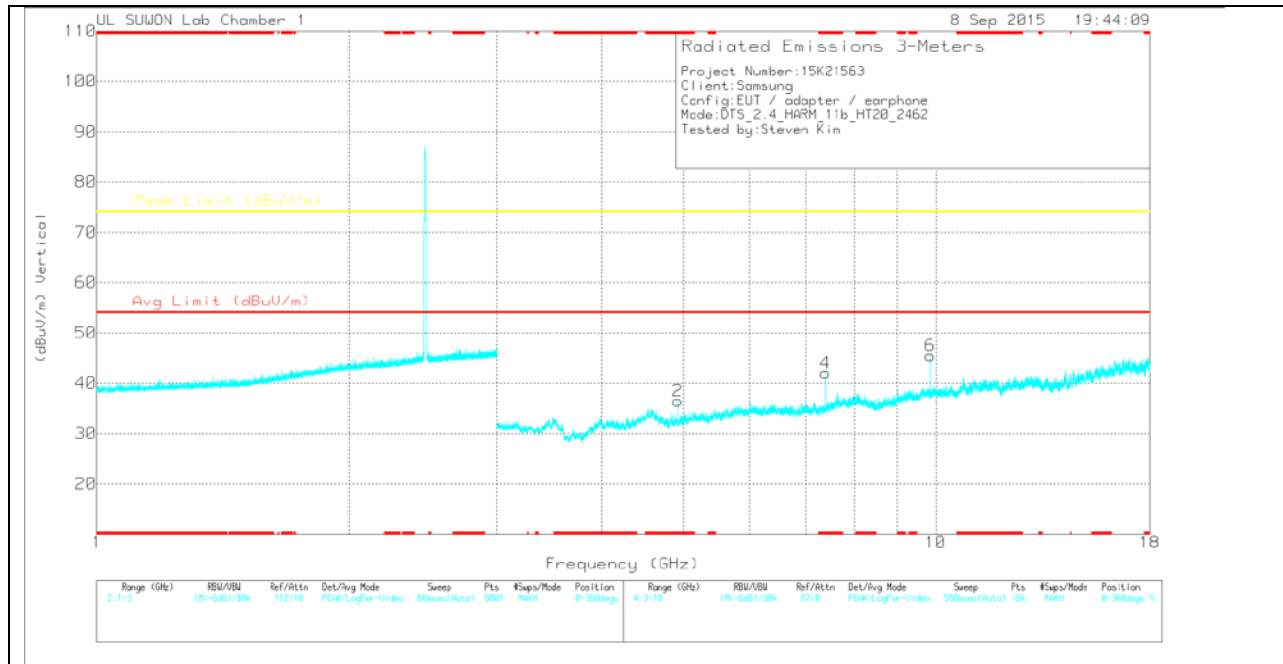
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.924	36.72	PK	34	-29	0	41.72	-	-	74	-32.28	0-360	100	H
3	* 7.387	27.44	PK	35.8	-25.1	0	38.14	-	-	74	-35.86	0-360	200	H
5	9.848	22.88	PK	37.3	-21.6	0	38.58	-	-	74	-35.42	0-360	200	H
2	* 4.924	31.5	PK	34	-29	0	36.5	-	-	74	-37.5	0-360	200	V
4	* 7.386	31.33	PK	35.8	-25.1	0	42.03	-	-	74	-31.97	0-360	200	V
6	9.848	29.8	PK	37.3	-21.6	0	45.5	-	-	74	-28.5	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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.924	43.17	PK2	34	-29	0	48.17	-	-	74	-25.83	337	109	H
* 4.924	36.93	MAv1	34	-29	0	41.93	54	-12.07	-	-	337	109	H
* 7.387	39.18	PK2	35.8	-25.1	0	49.88	-	-	74	-24.12	28	350	H
* 7.387	30.27	MAv1	35.8	-25.1	0	40.97	54	-13.03	-	-	28	350	H
9.848	33.97	PK2	37.3	-21.6	0	49.67	-	-	74	-24.33	181	250	H
* 4.924	41.87	PK2	34	-29	0	46.87	-	-	74	-27.13	288	366	V
* 4.924	32.18	MAv1	34	-29	0	37.18	54	-16.82	-	-	288	366	V
* 7.387	41.27	PK2	35.8	-25.1	0	51.97	-	-	74	-22.03	127	274	V
* 7.387	33.65	MAv1	35.8	-25.1	0	44.35	54	-9.65	-	-	127	274	V
9.848	36.91	PK2	37.3	-21.6	0	52.61	-	-	74	-21.39	235	100	V

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

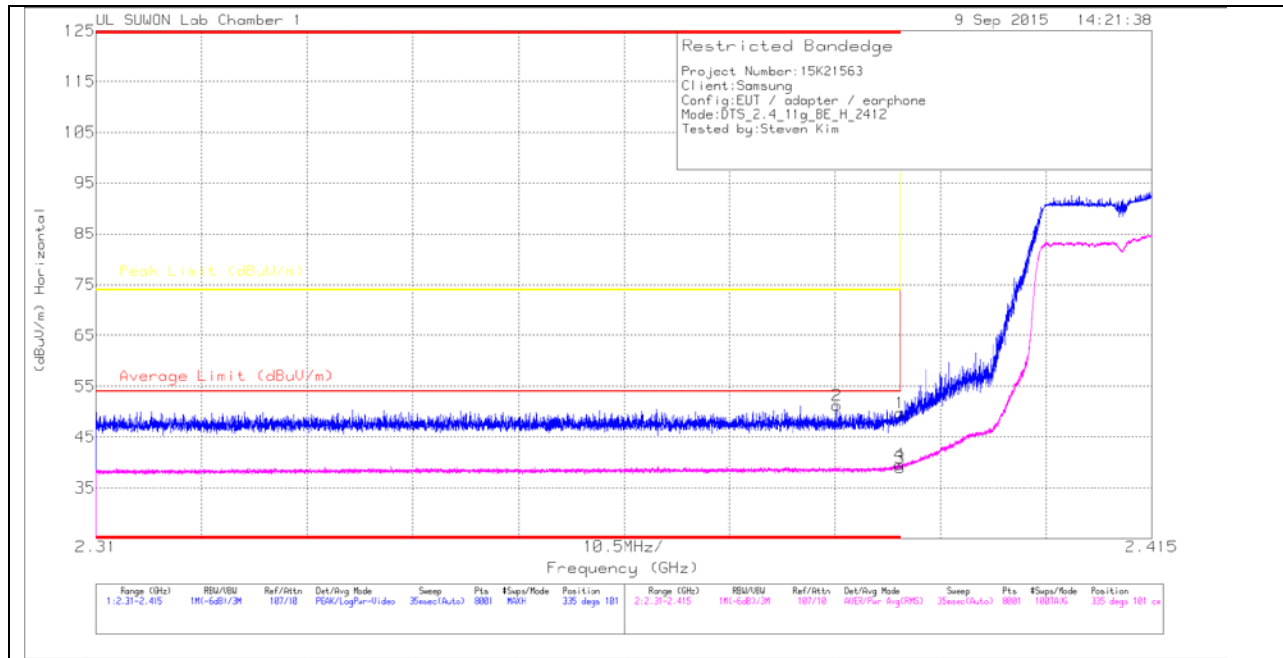
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## 11.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

### RESTRICTED BANDEDGE (LOW CHANNEL)

#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

##### Trace Markers

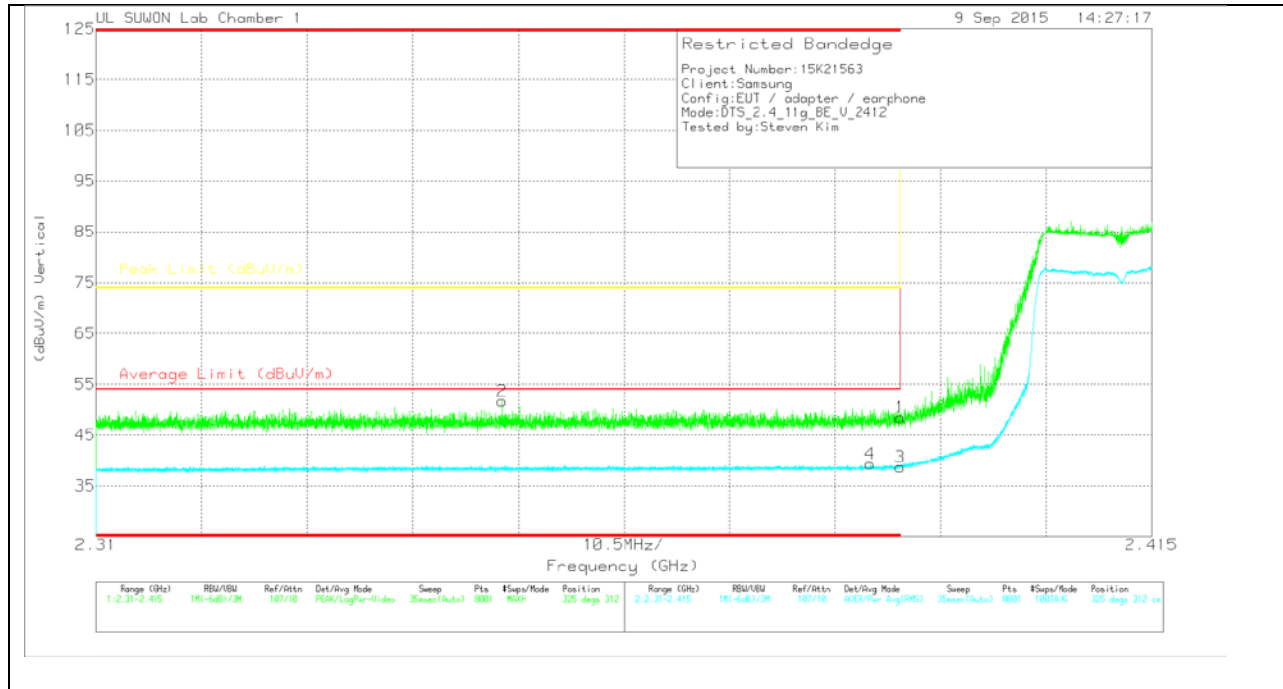
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.67	PK	31.8	-22.8	0	49.67	-	-	74	-24.33	335	101	H
2	* 2.384	42.19	PK	31.8	-22.8	0	51.19	-	-	74	-22.81	335	101	H
3	* 2.39	29.64	RMS	31.8	-22.8	.29	38.93	54	-15.07	-	-	335	101	H
4	* 2.39	30.33	RMS	31.8	-22.8	.29	39.62	54	-14.38	-	-	335	101	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (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	39.42	PK	31.8	-22.8	0	48.42	-	-	74	-25.58	325	312	V
2	* 2.35	42.89	PK	31.7	-22.9	0	51.69	-	-	74	-22.31	325	312	V
3	* 2.39	29.45	RMS	31.8	-22.8	.29	38.74	54	-15.26	-	-	325	312	V
4	* 2.387	30	RMS	31.8	-22.8	.29	39.29	54	-14.71	-	-	325	312	V

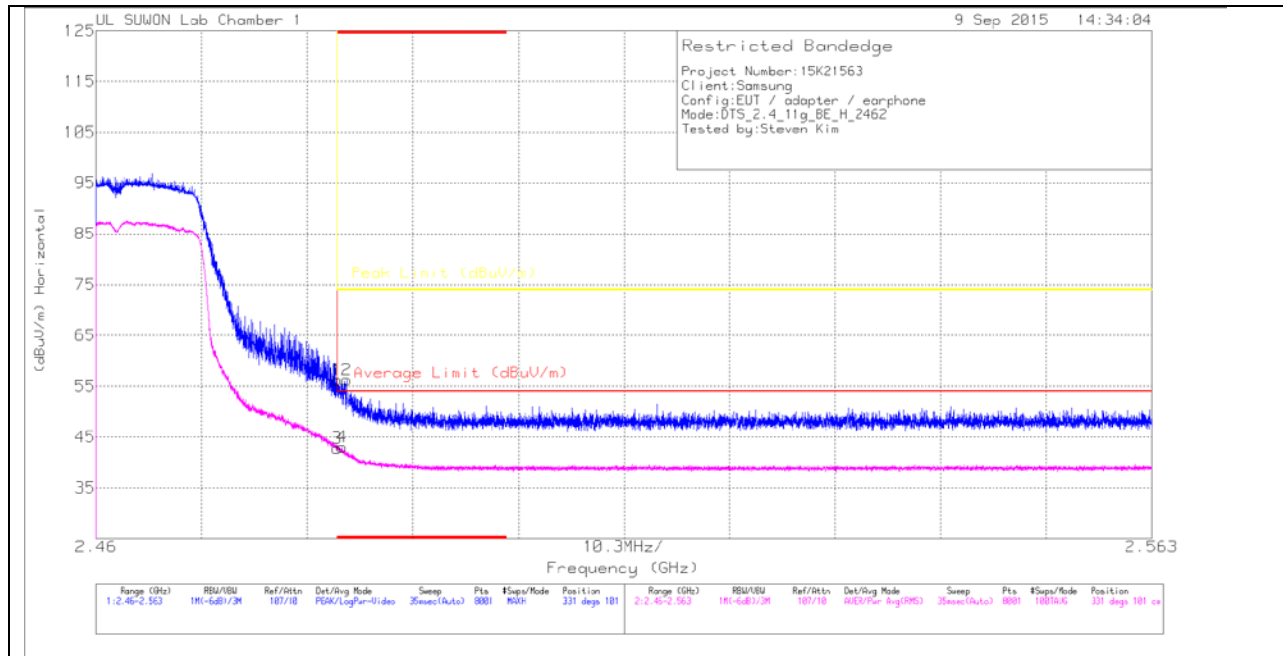
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

### AUTHORIZED BANDEDGE (HIGH CHANNEL)

#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

##### Trace Markers

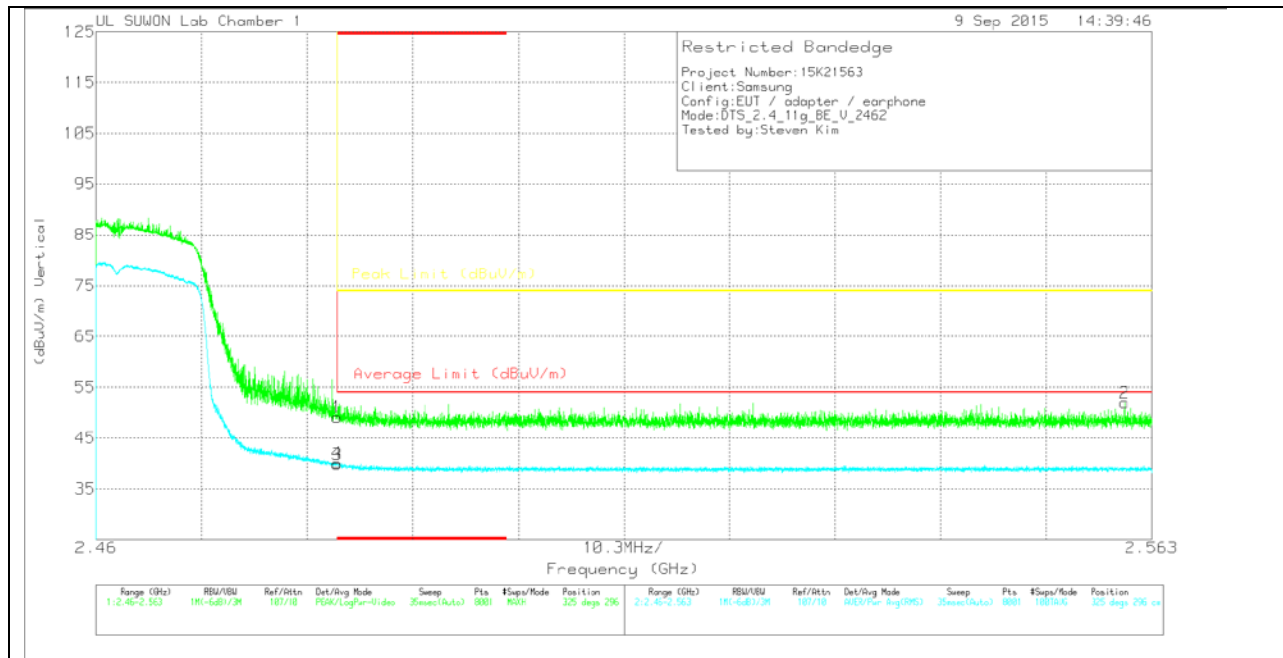
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.83	Pk	32	-22.6	0	56.23	-	-	74	-17.77	331	101	H
2	* 2.484	46.89	Pk	32	-22.6	0	56.29	-	-	74	-17.71	331	101	H
3	* 2.484	33.11	RMS	32	-22.6	.29	42.8	54	-11.2	-	-	331	101	H
4	* 2.484	33.3	RMS	32	-22.6	.29	42.99	54	-11.01	-	-	331	101	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (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	39.7	PK	32	-22.6	0	49.1	-	-	74	-24.9	325	296	V
2	2.56	42.54	PK	32	-22.6	0	51.94	-	-	74	-22.06	325	296	V
3	* 2.484	30.08	RMS	32	-22.6	.29	39.77	54	-14.23	-	-	325	296	V
4	* 2.484	30.35	RMS	32	-22.6	.29	40.04	54	-13.96	-	-	325	296	V

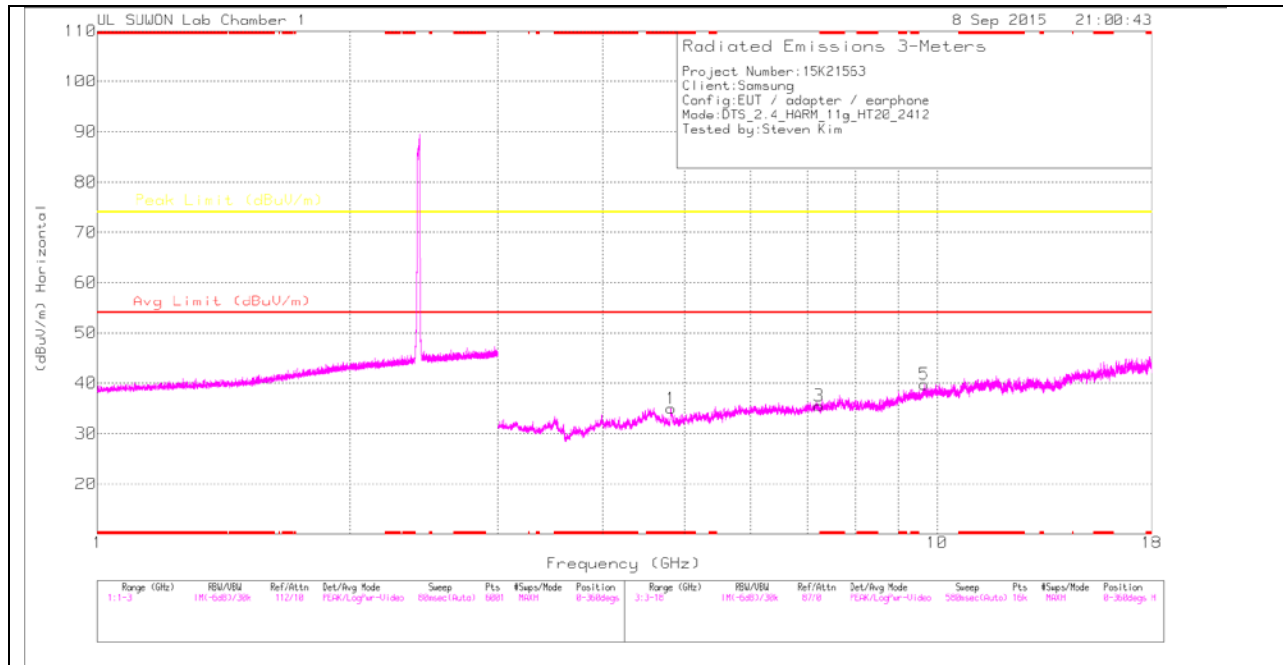
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

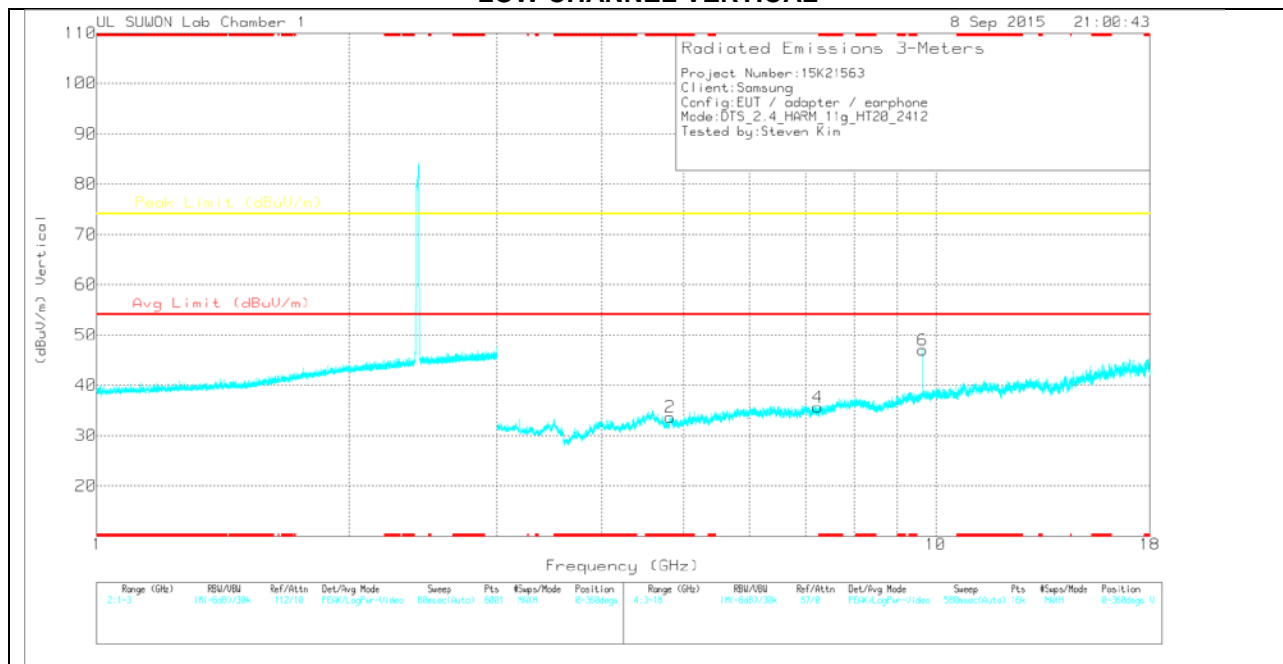
RMS - RMS detection

## 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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.827	30.51	PK	34	-29.5	0	35.01	-	-	74	-38.99	0-360	100	H
3	7.235	25.33	PK	35.7	-25.5	0	35.53	-	-	74	-38.47	0-360	200	H
5	9.647	23.49	PK	37.1	-20.8	0	39.79	-	-	74	-34.21	0-360	200	H
2	* 4.824	29.26	PK	34	-29.6	0	33.66	-	-	74	-40.34	0-360	100	V
4	7.238	25.4	PK	35.7	-25.5	0	35.6	-	-	74	-38.4	0-360	100	V
6	9.648	30.68	PK	37.1	-20.8	0	46.98	-	-	74	-27.02	0-360	100	V

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

PK – Peak detector

Radiated Emissions

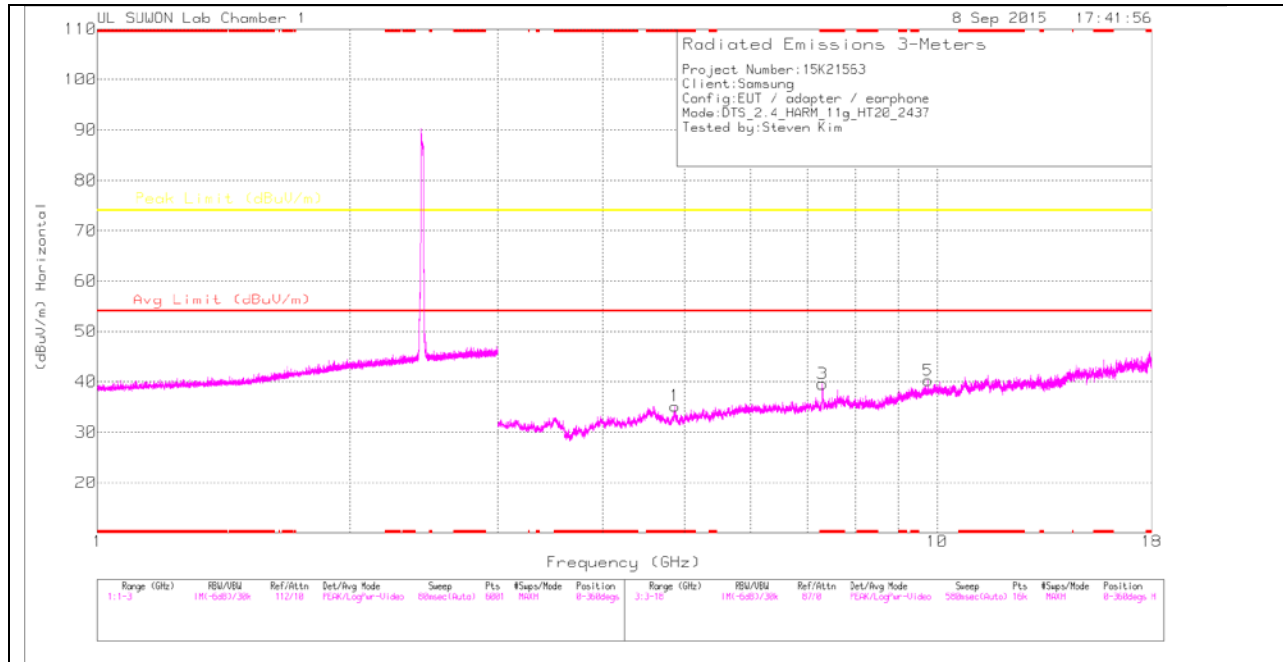
Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.827	43.3	PK2	34	-29.5	0	47.8	-	-	74	-26.2	347	113	H
* 4.826	27.91	MAv1	34	-29.5	.29	32.7	54	-21.3	-	-	347	113	H
9.64	32.94	PK2	37	-20.8	0	49.14	-	-	74	-24.86	272	193	H
9.648	36.86	PK2	37.1	-20.8	0	53.16	-	-	74	-20.84	249	100	V

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

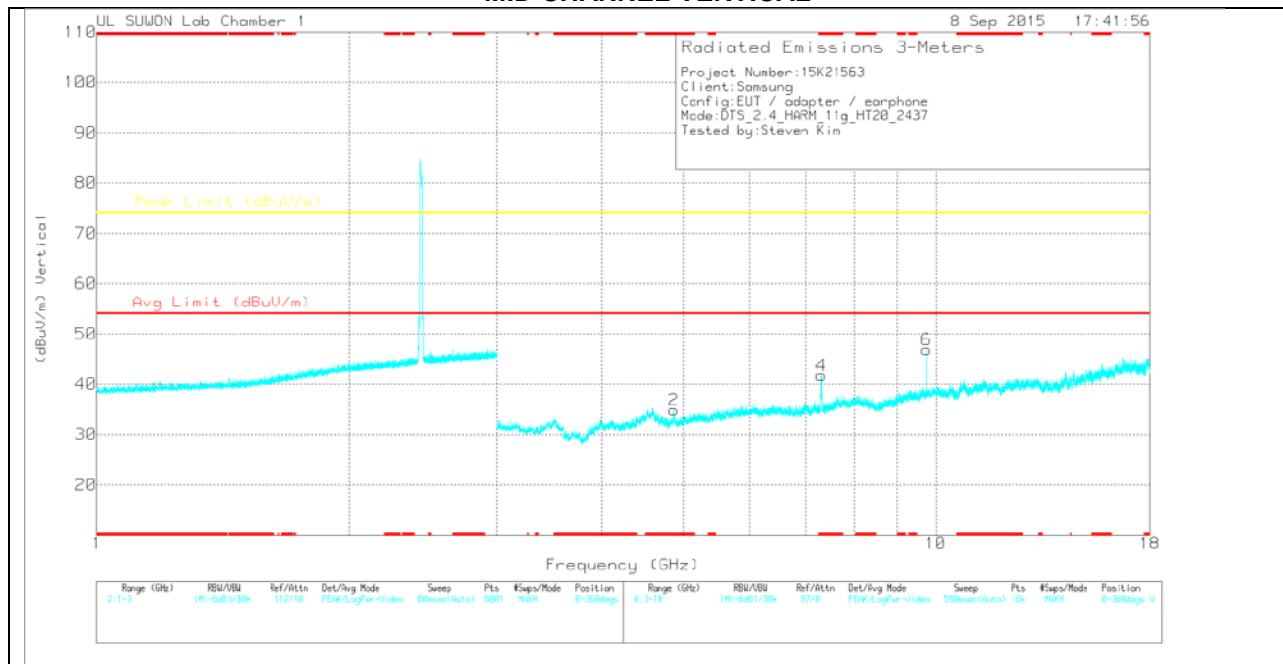
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

**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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.872	30.39	PK	34	-29.2	0	35.19	-	-	74	-38.81	0-360	100	H
3	* 7.305	29.58	PK	35.7	-25.7	0	39.58	-	-	74	-34.42	0-360	200	H
5	9.748	24.91	PK	37.2	-21.9	0	40.21	-	-	74	-33.79	0-360	200	H
2	* 4.876	30.1	PK	34	-29.2	0	34.9	-	-	74	-39.1	0-360	100	V
4	* 7.306	31.75	PK	35.7	-25.7	0	41.75	-	-	74	-32.25	0-360	100	V
6	9.748	31.53	PK	37.2	-21.9	0	46.83	-	-	74	-27.17	0-360	100	V

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

PK – Peak detector

Radiated Emissions

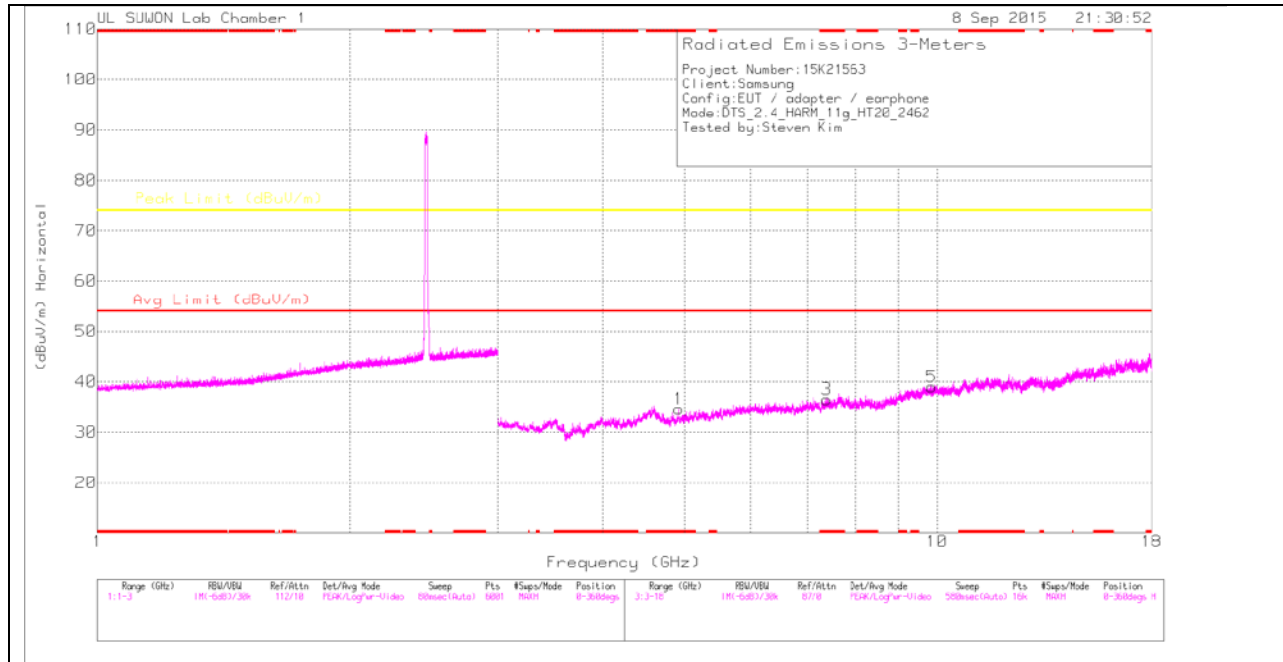
Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.862	42.18	PK2	34	-29.2	0	46.98	-	-	74	-27.02	347	100	H
* 4.874	28.48	MAv1	34	-29.2	.29	33.57	54	-20.43	-	-	347	100	H
* 7.3	49.5	PK2	35.7	-25.7	0	59.5	-	-	74	-14.5	25	360	H
* 7.307	28.9	MAv1	35.7	-25.7	.29	39.19	54	-14.81	-	-	25	360	H
9.748	33.98	PK2	37.2	-21.9	0	49.28	-	-	74	-24.72	108	350	H
* 4.867	41.61	PK2	34	-29.2	0	46.41	-	-	74	-27.59	172	287	V
* 4.873	29.02	MAv1	34	-29.2	.29	34.11	54	-19.89	-	-	172	287	V
* 7.297	52.14	PK2	35.7	-25.7	0	62.14	-	-	74	-11.86	126	299	V
* 7.304	31.4	MAv1	35.7	-25.7	.29	41.69	54	-12.31	-	-	126	299	V
9.748	36.75	PK2	37.2	-21.9	0	52.05	-	-	74	-21.95	238	102	V

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

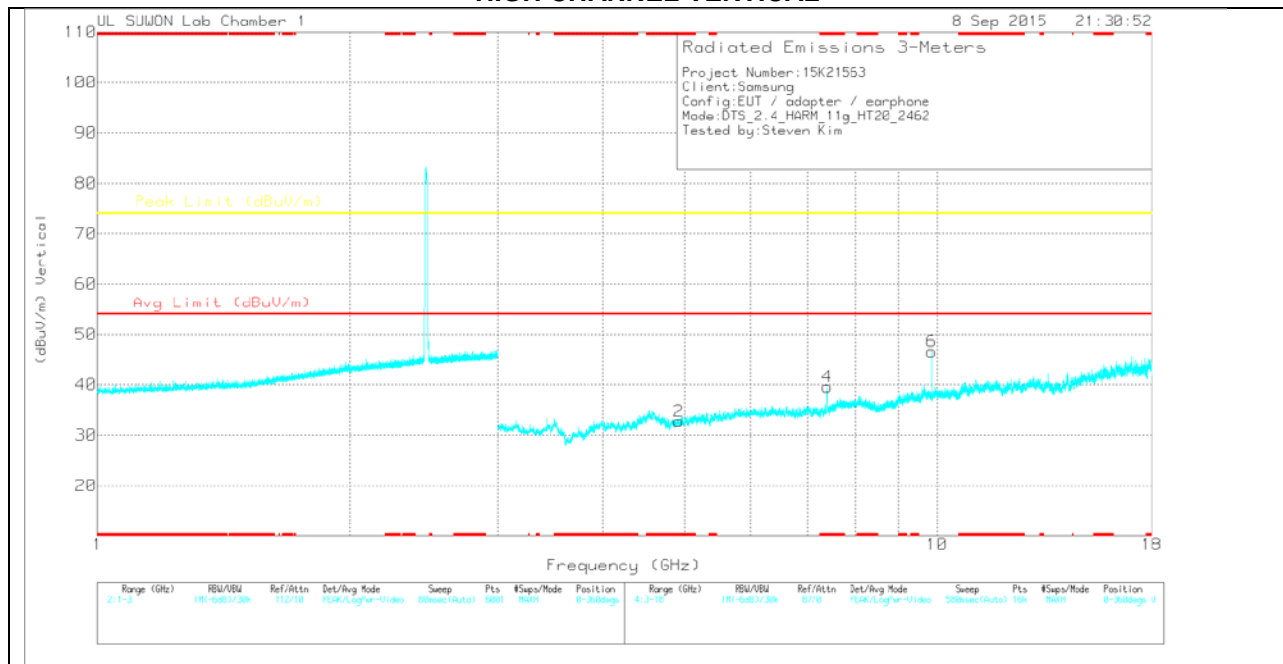
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.924	29.6	PK	34	-29	0	34.6	-	-	74	-39.4	0-360	100	H
3	* 7.384	25.83	PK	35.8	-25.1	0	36.53	-	-	74	-37.47	0-360	200	H
5	9.848	23.32	PK	37.3	-21.6	0	39.02	-	-	74	-34.98	0-360	200	H
2	* 4.929	27.73	PK	34	-29	0	32.73	-	-	74	-41.27	0-360	200	V
4	* 7.397	28.78	PK	35.8	-25	0	39.58	-	-	74	-34.42	0-360	200	V
6	9.848	30.87	PK	37.3	-21.6	0	46.57	-	-	74	-27.43	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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.395	45.85	PK2	35.8	-25	0	56.65	-	-	74	-17.35	128	252	V
* 7.391	28.33	MAv1	35.8	-25.1	.29	39.32	54	-14.68	-	-	128	252	V
9.848	36.31	PK2	37.3	-21.6	0	52.01	-	-	74	-21.99	232	100	V

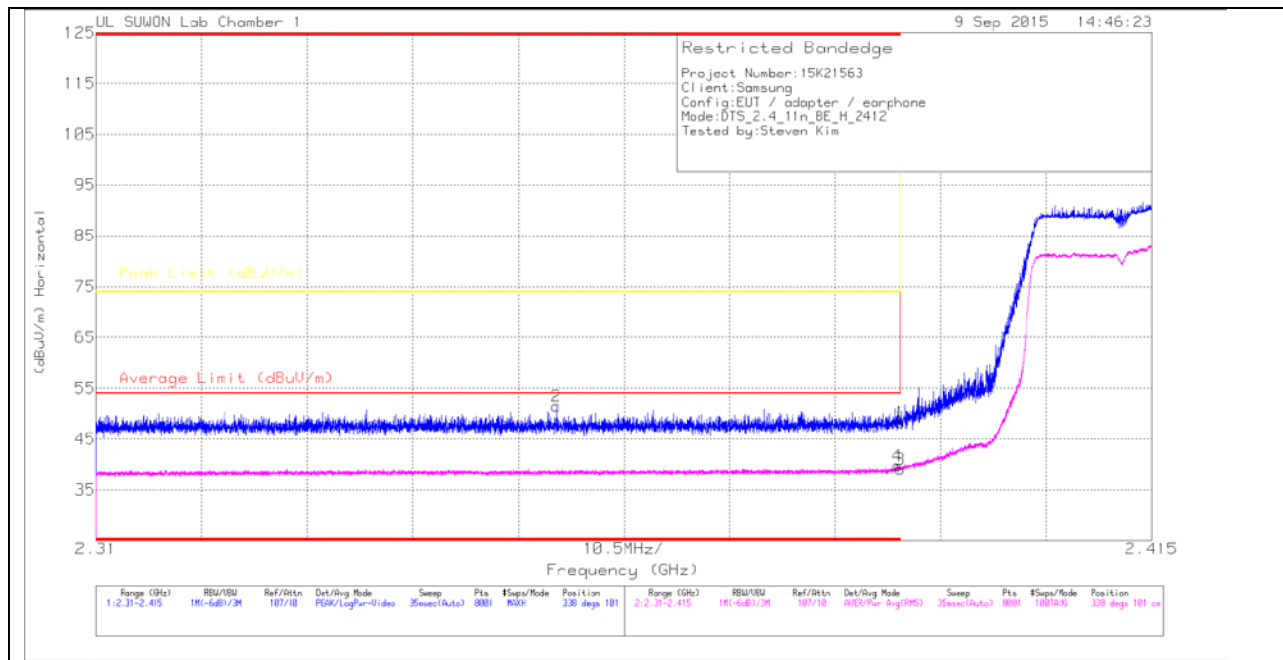
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 11.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

##### Trace Markers

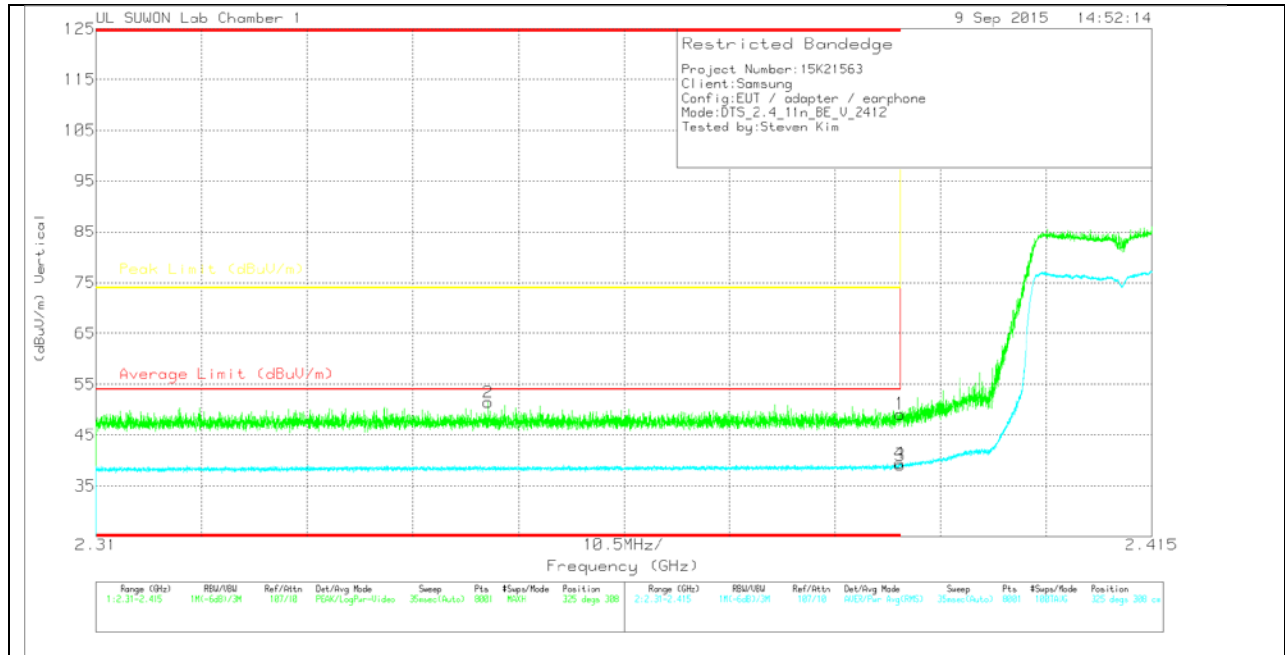
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.24	PK	31.8	-22.8	0	48.24	-	-	74	-25.76	338	101	H
2	* 2.356	42.49	PK	31.7	-22.8	0	51.39	-	-	74	-22.61	338	101	H
3	* 2.39	29.7	RMS	31.8	-22.8	.32	39.02	54	-14.98	-	-	338	101	H
4	* 2.39	30.33	RMS	31.8	-22.8	.32	39.65	54	-14.35	-	-	338	101	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (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	40.15	PK	31.8	-22.8	0	49.15	-	-	74	-24.85	325	308	V
2	* 2.349	42.66	PK	31.7	-22.9	0	51.46	-	-	74	-22.54	325	308	V
3	* 2.39	29.81	RMS	31.8	-22.8	.32	39.13	54	-14.87	-	-	325	308	V
4	* 2.39	30.16	RMS	31.8	-22.8	.32	39.48	54	-14.52	-	-	325	308	V

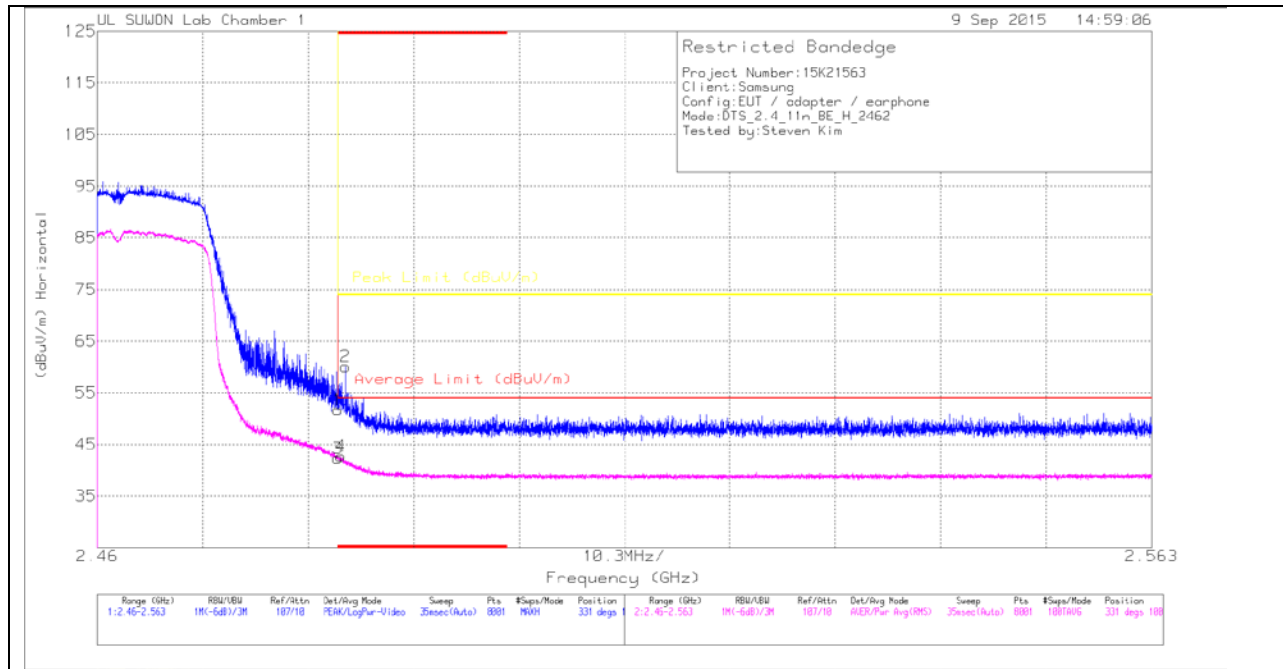
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Trace Markers

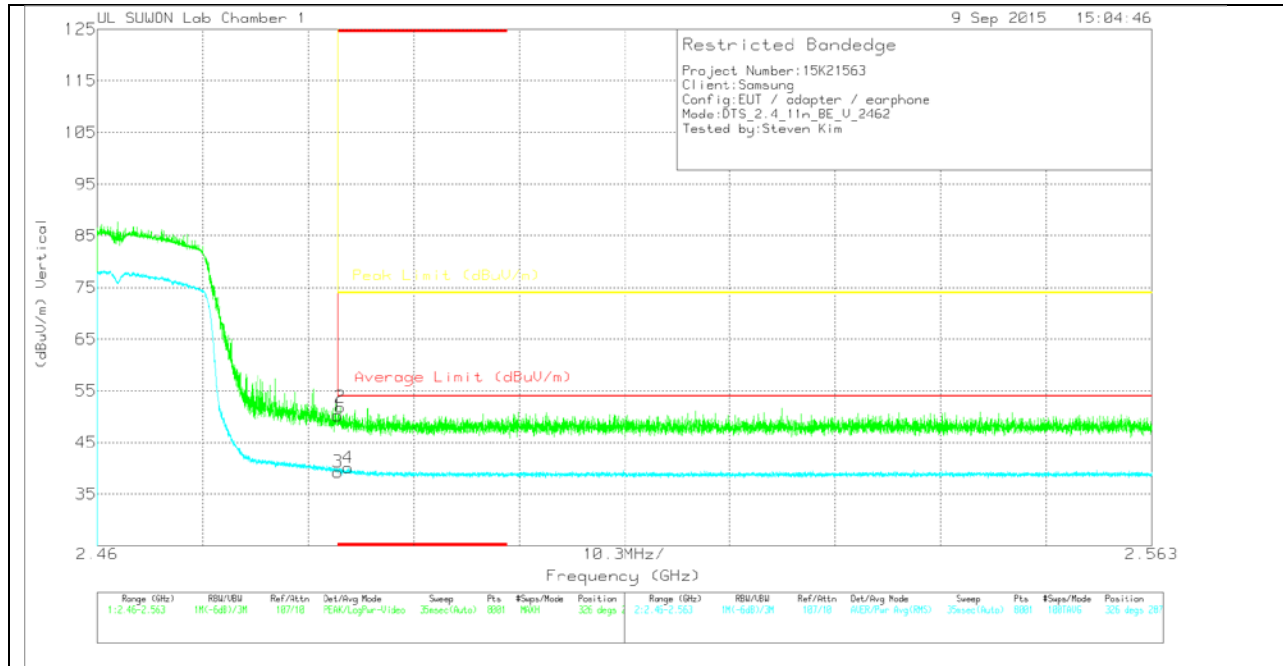
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.28	Pk	32	-22.6	0	51.68	-	-	74	-22.32	331	100	H
2	* 2.484	50.69	Pk	32	-22.6	0	60.09	-	-	74	-13.91	331	100	H
3	* 2.484	32.61	RMS	32	-22.6	.32	42.33	54	-11.67	-	-	331	100	H
4	* 2.484	32.99	RMS	32	-22.6	.32	42.71	54	-11.29	-	-	331	100	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (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	40.8	Pk	32	-22.6	0	50.2	-	-	74	-23.8	326	287	V
2	* 2.484	42.47	Pk	32	-22.6	0	51.87	-	-	74	-22.13	326	287	V
3	* 2.484	29.61	RMS	32	-22.6	.32	39.33	54	-14.67	-	-	326	287	V
4	* 2.484	30.42	RMS	32	-22.6	.32	40.14	54	-13.86	-	-	326	287	V

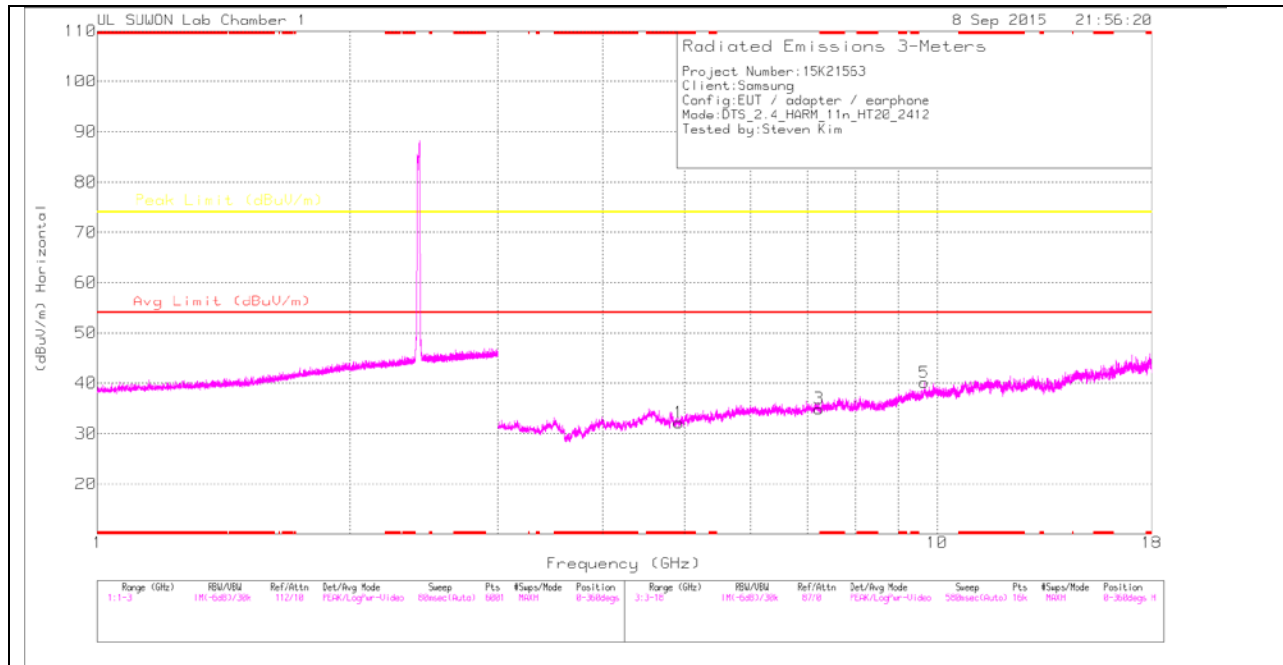
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

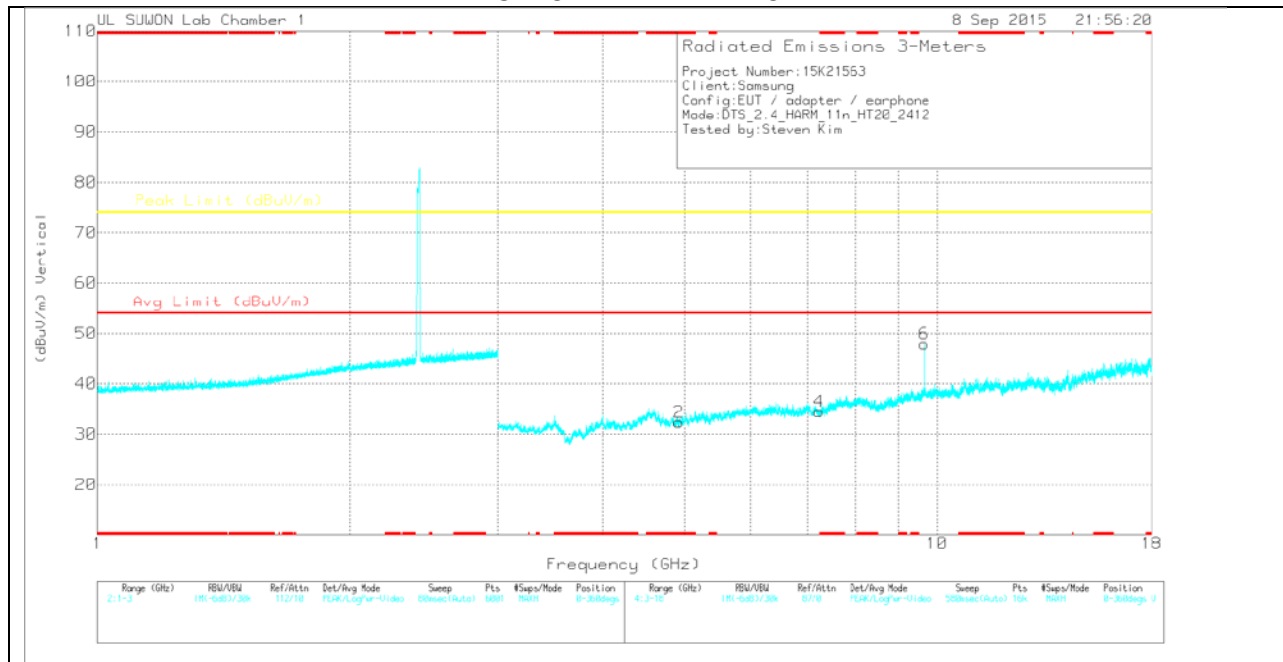
RMS - RMS detection

### 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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.926	27.18	PK	34	-29	0	32.18	-	-	74	-41.82	0-360	200	H
3	7.235	24.74	PK	35.7	-25.5	0	34.94	-	-	74	-39.06	0-360	200	H
5	9.647	23.8	PK	37.1	-20.8	0	40.1	-	-	74	-33.9	0-360	200	H
2	* 4.925	27.35	PK	34	-29	0	32.35	-	-	74	-41.65	0-360	200	V
4	7.237	24.3	PK	35.7	-25.5	0	34.5	-	-	74	-39.5	0-360	200	V
6	9.648	31.61	PK	37.1	-20.8	0	47.91	-	-	74	-26.09	0-360	100	V

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

PK – Peak detector

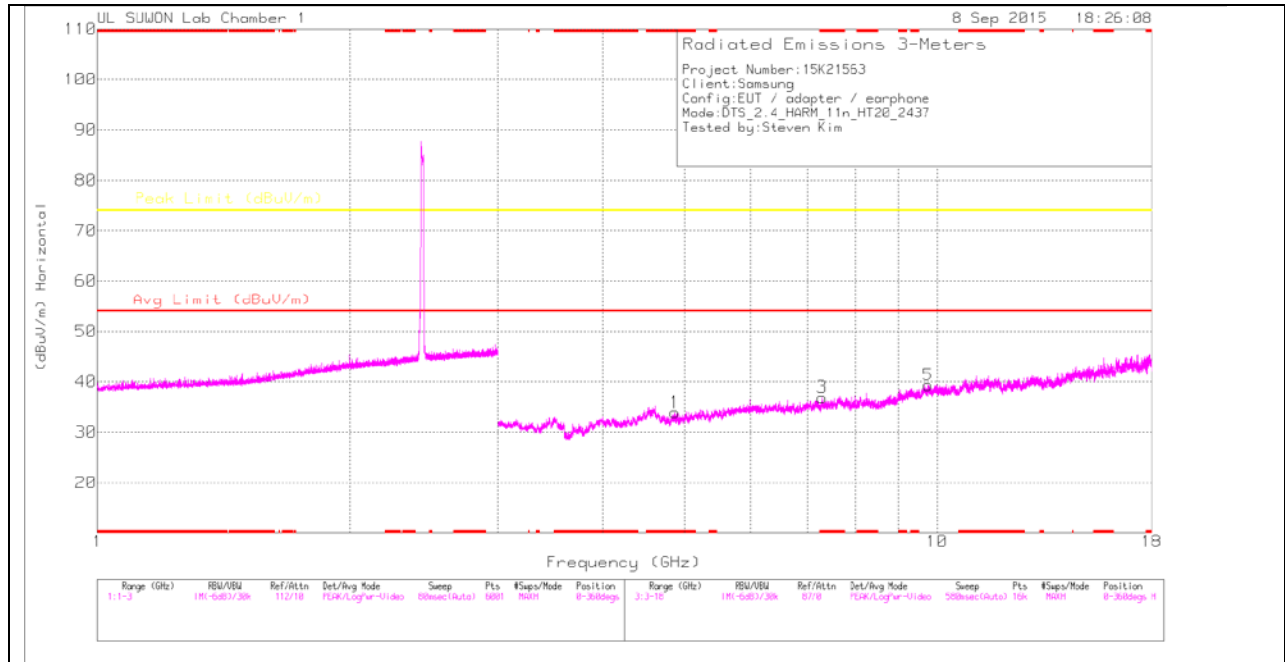
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.648	36.25	PK2	37.1	-20.8	0	52.55	-	-	74	-21.45	218	107	V

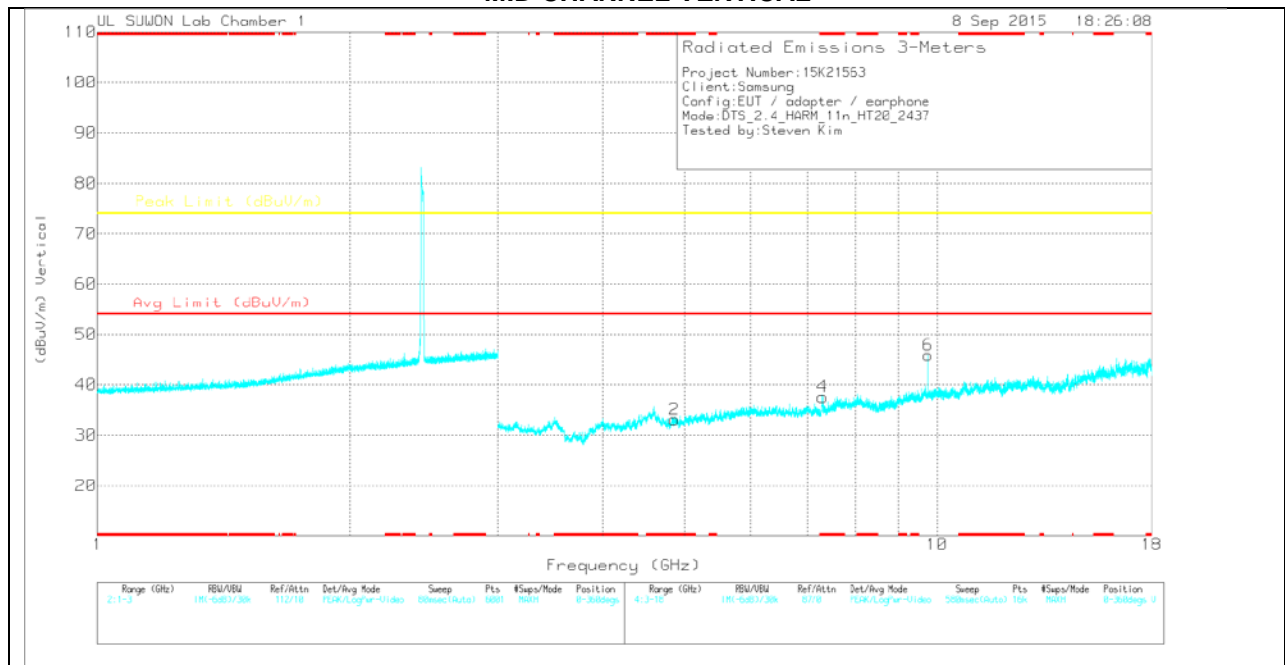
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

**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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.877	29.02	PK	34	-29.1	0	33.92	-	-	74	-40.08	0-360	200	H
3	* 7.302	26.92	PK	35.7	-25.7	0	36.92	-	-	74	-37.08	0-360	200	H
5	9.748	24.03	PK	37.2	-21.9	0	39.33	-	-	74	-34.67	0-360	200	H
2	* 4.87	28.28	PK	34	-29.2	0	33.08	-	-	74	-40.92	0-360	200	V
4	* 7.307	27.58	PK	35.7	-25.7	0	37.58	-	-	74	-36.42	0-360	100	V
6	9.748	30.53	PK	37.2	-21.9	0	45.83	-	-	74	-28.17	0-360	100	V

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

PK – Peak detector

Radiated Emissions

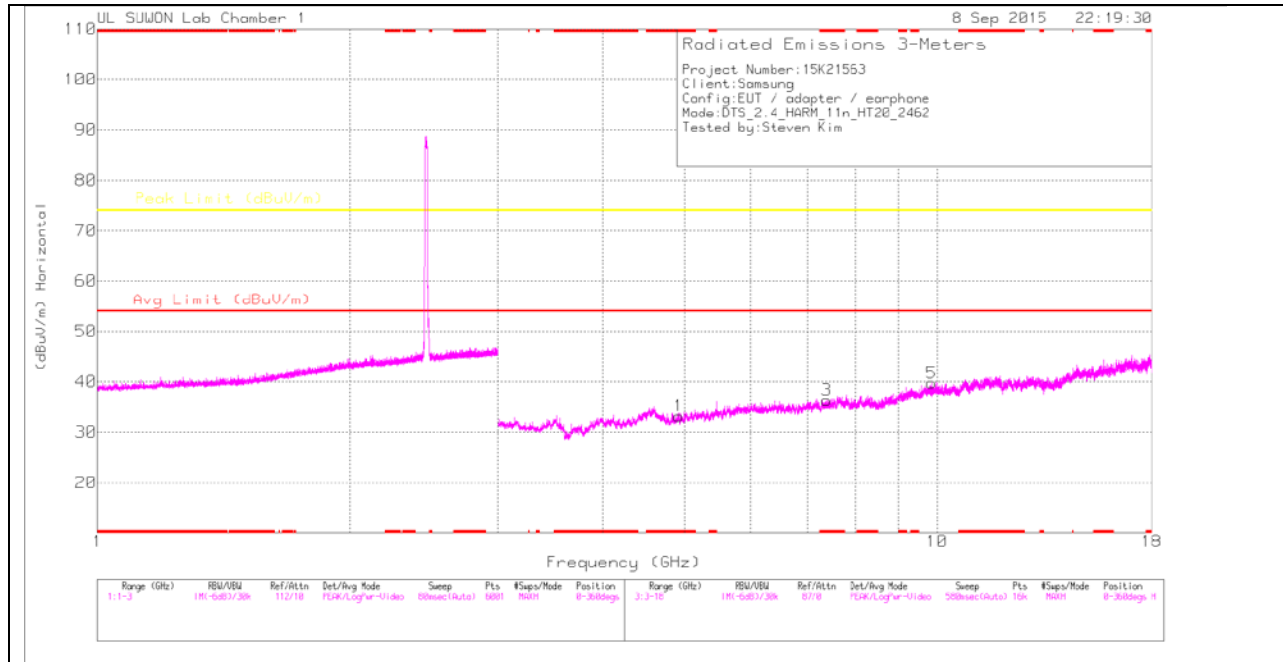
Frequency (GHz)	Meter Reading (dBuV)	Det	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.298	44.69	PK2	35.7	-25.7	0	54.69	-	-	74	-19.31	0	286	H
* 7.305	27.66	MAv1	35.7	-25.7	.32	37.98	54	-16.02	-	-	0	286	H
* 7.304	48.57	PK2	35.7	-25.7	0	58.57	-	-	74	-15.43	126	298	V
* 7.304	29.21	MAv1	35.7	-25.7	.32	39.53	54	-14.47	-	-	126	298	V
9.748	37.65	PK2	37.2	-21.9	0	52.95	-	-	74	-21.05	235	100	V

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

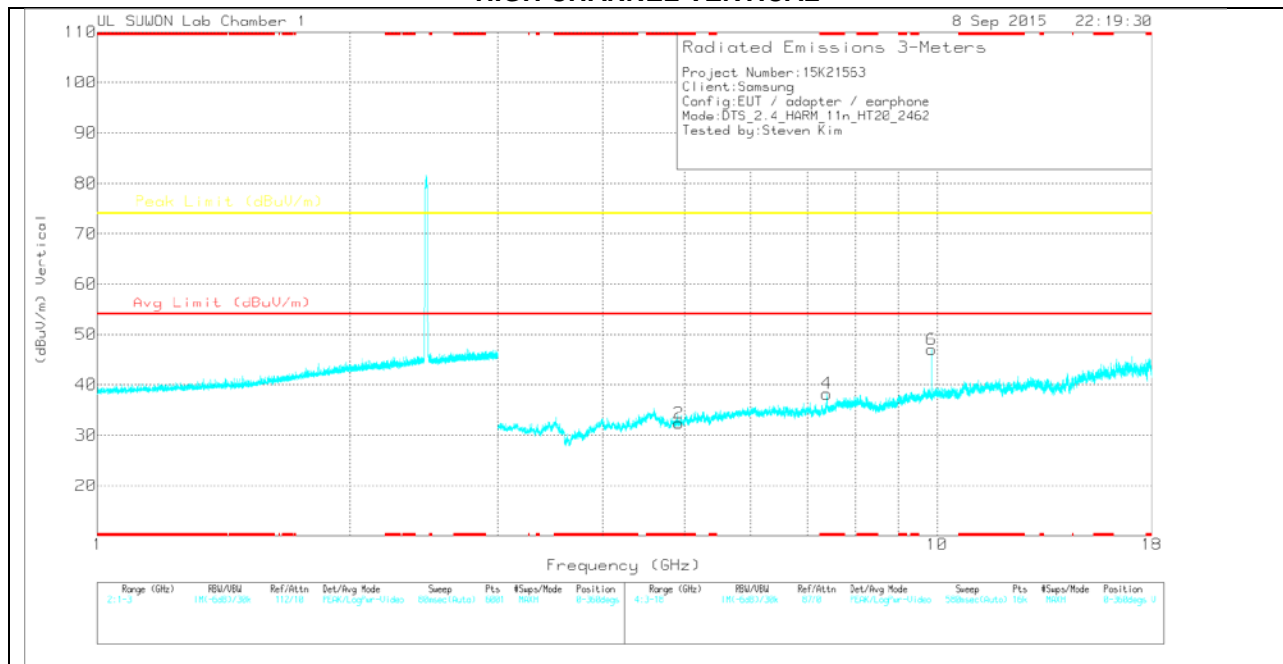
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.924	28.19	PK	34	-29	0	33.19	-	-	74	-40.81	0-360	100	H
3	* 7.393	25.57	PK	35.8	-25	0	36.37	-	-	74	-37.63	0-360	200	H
5	9.848	24.02	PK	37.3	-21.6	0	39.72	-	-	74	-34.28	0-360	200	H
2	* 4.923	27.35	PK	34	-29	0	32.35	-	-	74	-41.65	0-360	100	V
4	* 7.387	27.5	PK	35.8	-25.1	0	38.2	-	-	74	-35.8	0-360	200	V
6	9.848	31.29	PK	37.3	-21.6	0	46.99	-	-	74	-27.01	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	ANT Factor	Path_loss	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.4	44.56	PK2	35.8	-25	0	55.36	-	-	74	-18.64	146	276	V
* 7.393	26.16	MAv1	35.8	-25	.32	37.28	54	-16.72	-	-	146	276	V
9.848	36.61	PK2	37.3	-21.6	0	52.31	-	-	74	-21.69	232	101	V

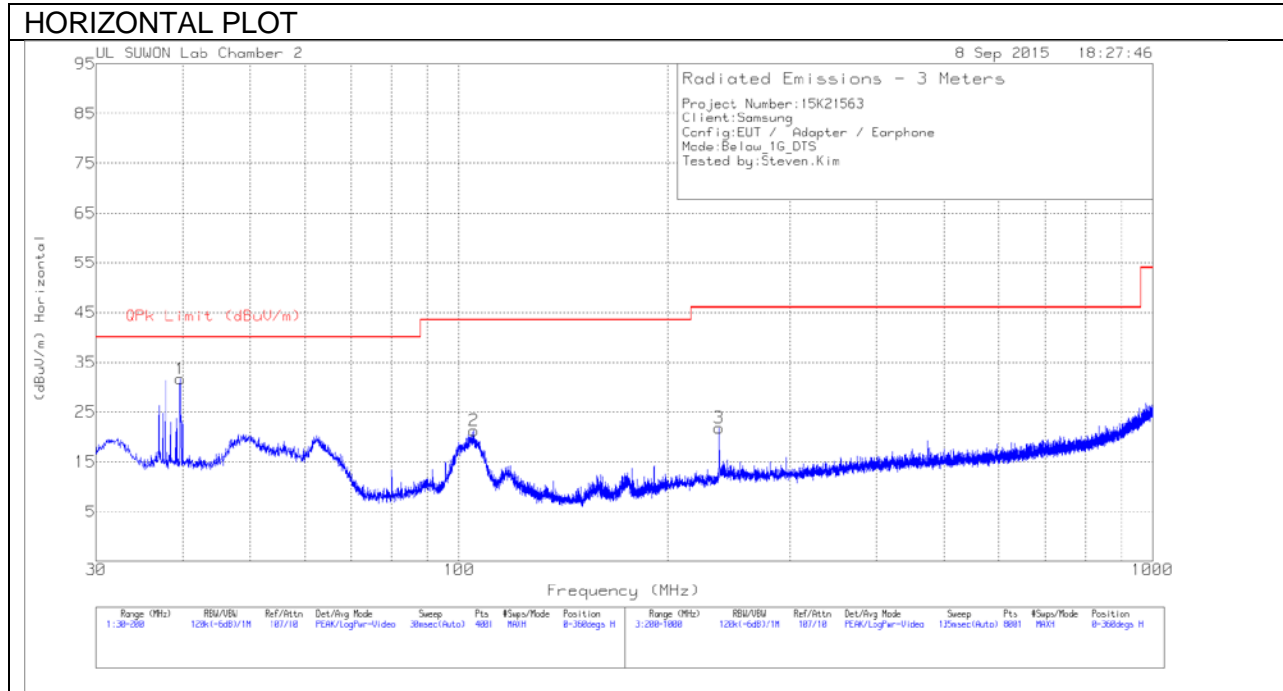
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

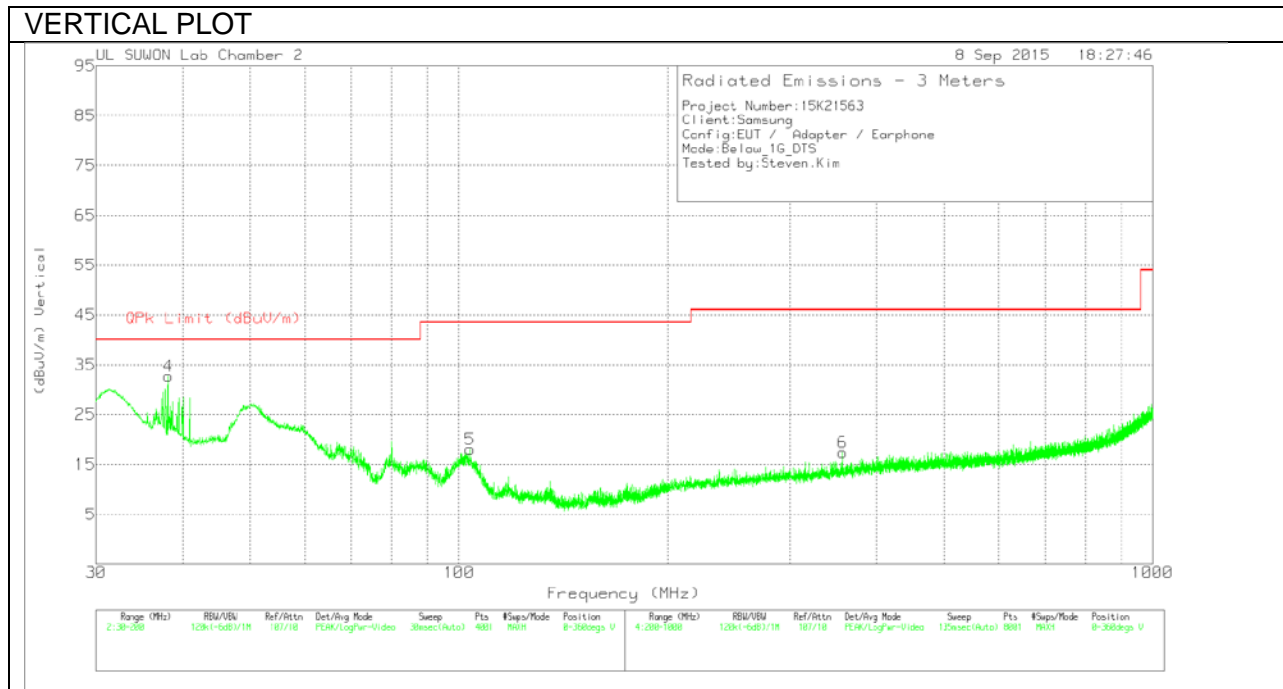
MAv1 - KDB558074 Option 1 Maximum RMS Average

### 11.3. WORST-CASE BELOW 1 GHz

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



#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



**Below 1G Data**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	ANT Factor	Below_1G	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	39.6475	49.87	Pk	12.6	-30.8	31.67	40	-8.33	0-360	300	H
2	105.0975	40.72	Pk	11.2	-30.6	21.32	43.52	-22.2	0-360	300	H
4	38.1175	51.5	Pk	12	-30.8	32.7	40	-7.3	0-360	100	V
5	103.865	37.38	Pk	11.3	-30.6	18.08	43.52	-25.44	0-360	100	V
3	237.1	39.76	Pk	12.2	-30.1	21.86	46.02	-24.16	0-360	100	H
6	357.5	32.65	Pk	14.5	-29.8	17.35	46.02	-28.67	0-360	300	V

Pk - Peak detector

## 12. 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 2009.

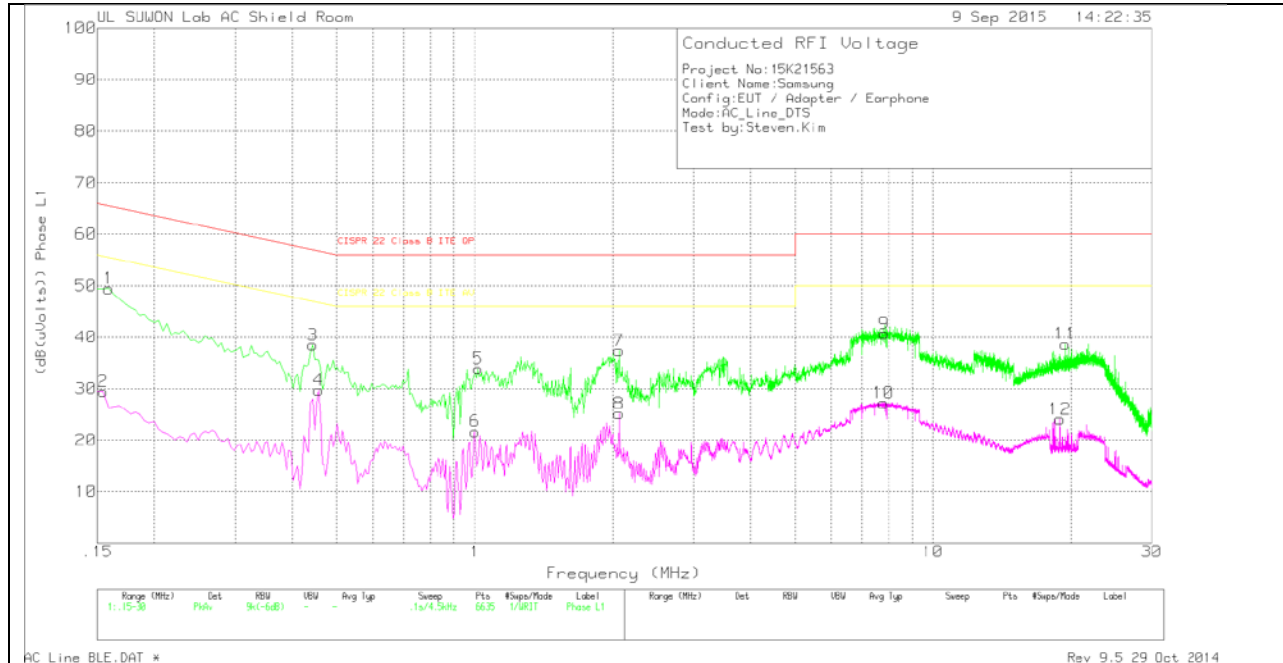
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

**RESULTS**

**6 WORST EMISSIONS**

**LINE 1 PLOT**



**LINE 1 RESULTS**

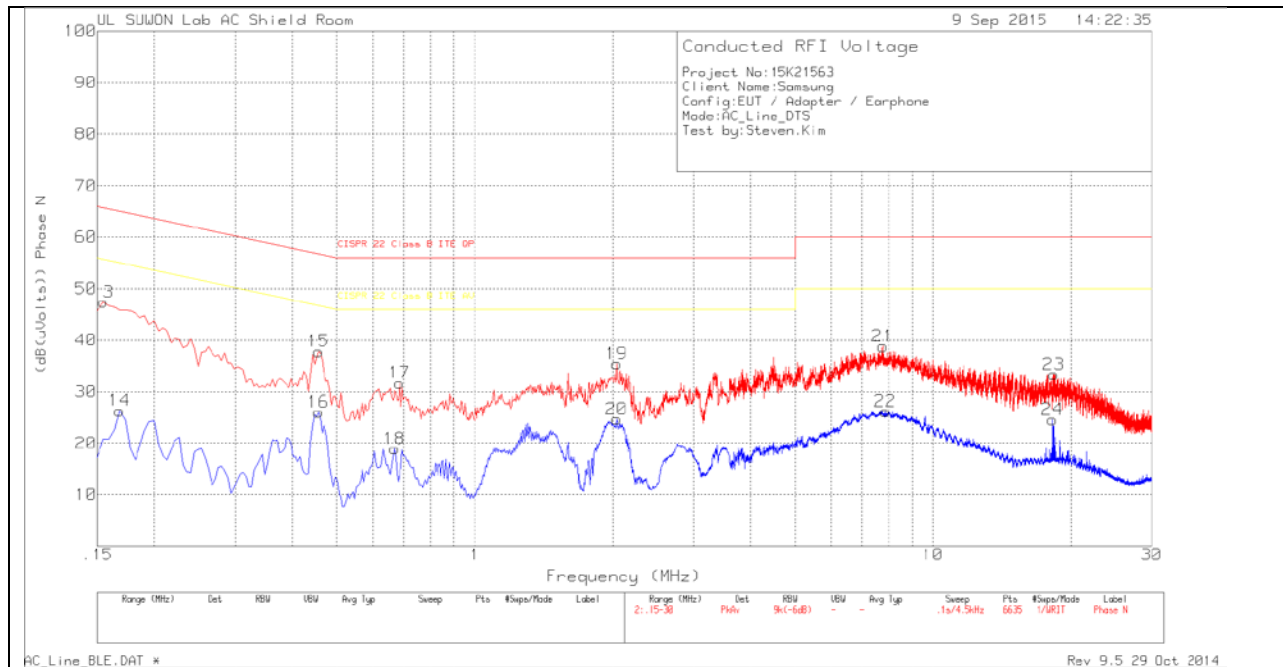
Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBUV)	Det	101837_w ith ex-cord_L1	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.159	39.44	Pk	10	0	49.44	65.52	-16.08	-	-
2	.1545	19.56	Av	9.9	0	29.46	-	-	55.75	-26.29
3	.4425	28.38	Pk	10.1	0	38.48	57.01	-18.53	-	-
4	.456	19.6	Av	10.1	0	29.7	-	-	46.77	-17.07
5	1.0185	23.98	Pk	9.9	0	33.88	56	-22.12	-	-
6	1.0005	11.79	Av	9.9	0	21.69	-	-	46	-24.31
7	2.0625	27.49	Pk	9.8	.1	37.39	56	-18.61	-	-
8	2.0625	15.27	Av	9.8	.1	25.17	-	-	46	-20.83
9	7.809	30.7	Pk	9.9	.1	40.7	60	-19.3	-	-
10	7.8	17.2	Av	9.9	.1	27.2	-	-	50	-22.8
11	19.41	28.07	Pk	10.4	.2	38.67	60	-21.33	-	-
12	18.915	13.53	Av	10.3	.2	24.03	-	-	50	-25.97

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 (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.1545	37.49	Pk	9.9	0	47.39	65.75	-18.36	-	-
14	.168	16.23	Av	10.1	0	26.33	-	-	55.06	-28.73
15	.456	27.72	Pk	10.1	0	37.82	56.77	-18.95	-	-
16	.456	15.95	Av	10.1	0	26.05	-	-	46.77	-20.72
17	.6855	21.71	Pk	10	0	31.71	56	-24.29	-	-
18	.6675	8.91	Av	10	0	18.91	-	-	46	-27.09
19	2.04	25.53	Pk	9.8	.1	35.43	56	-20.57	-	-
20	2.04	14.78	Av	9.8	.1	24.68	-	-	46	-21.32
21	7.7685	28.81	Pk	9.9	.1	38.81	60	-21.19	-	-
22	7.863	16.19	Av	9.9	.1	26.19	-	-	50	-23.81
23	18.3705	22.63	Pk	10.5	.2	33.33	60	-26.67	-	-
24	18.2445	13.91	Av	10.5	.2	24.61	-	-	50	-25.39

Pk - Peak detector

Av - Average detection