



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

Wireless LAN

CERTIFICATION TEST REPORT

FOR

Bluetooth/BLE, DTS b/g/n WATCH

MODEL NUMBER : SM-R720

FCC ID: A3LSMR720

IC ID: 649E-SMR720

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Revision History

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: Bluetooth/BLE and DTS b/g/n WATCH
MODEL NUMBER: SM-R720
SERIAL NUMBER: 11075, 11085 (RADIATED); CF50031AE534941 (CONDUCTED)
DATE TESTED: AUG 07, 2015 - AUG 25, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 1	Pass
INDUSTRY CANADA RSS-GEN Issue 4	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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

Approved & Released For
UL Korea, Ltd. By:



CY Choi
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Tested By:



SungGil Park
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

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

ANSI C63.10-2009 Deviation

Radiated spurious emission above 1GHz EUT height is 1.5m not 0.8m.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, 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 Bluetooth/BLE and DTS b/g/n WATCH.

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

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
2412 - 2462	802.11b	17.01	50.23
	802.11g	14.25	26.61
	802.11n HT20	13.15	20.65

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antennas, with a antenna's maximum gain of -5.78 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 Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z 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
Adapter	SAMSUNG	ETA0U60JBE	DK1G725HS/7-E	N/A
Wireless Charger	SAMSUNG	EP-OR720	N/A	N/A
Data Cable	SAMSUNG	ECB-DU6ABE	N/A	N/A

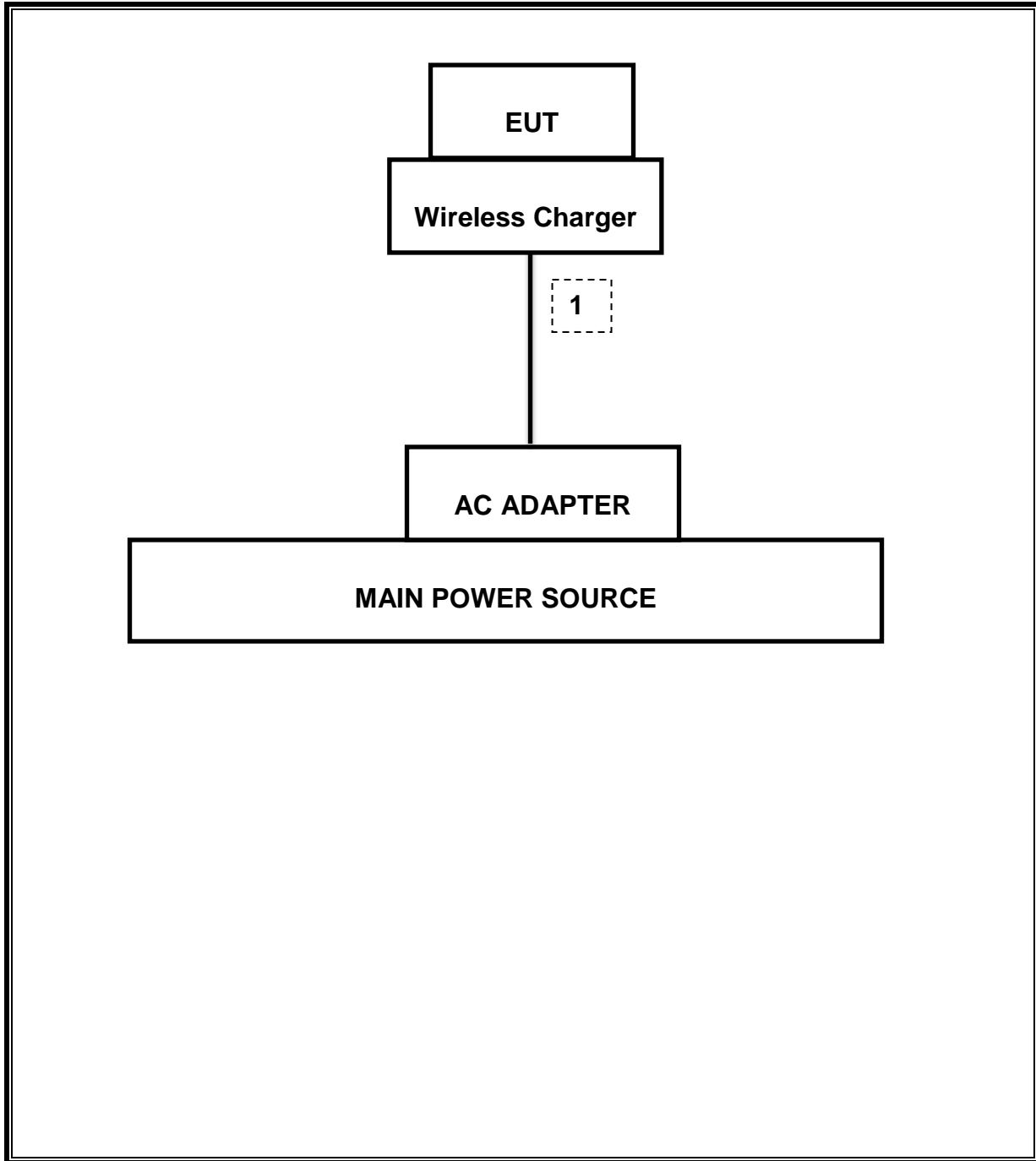
I/O CABLES

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

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 AVGPS-1 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]
2400MHz Bands						
802.11b	8.604	8.704	0.989	98.9%	0.00	0.010
802.11g	1.428	1.528	0.935	93.5%	0.29	0.700
802.11n HT20	1.335	1.436	0.930	93.0%	0.32	0.749



[802.11b Mode]

[802.11g Mode]

[802.11n Mode]

9. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-247 5.2.1	Occupied Band width (6dB)	>500KHz	Conducted	Pass	9.516 MHz
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-29.797 dBm
15.247	RSS-247 5.4.4	TX conducted output power	<30dBm		Pass	17.01 dBm
15.247	RSS-247 5.2.2	PSD	<8dBm		Pass	-14.84 dBm
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	37.85 dBuV (QP)
15.205, 15.209	RSS-GEN 8.9/7	Radiated Spurious Emission	< 40dBuV/m	Radiated	Pass	33.13 dBuV/m (Pk)

10. ANTENNA PORT TEST RESULTS

10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)
 IC RSS-247 5.2.1

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	10.026	0.5
Mid	2437	9.538	0.5
High	2462	9.516	0.5
Worst		9.516	0.5

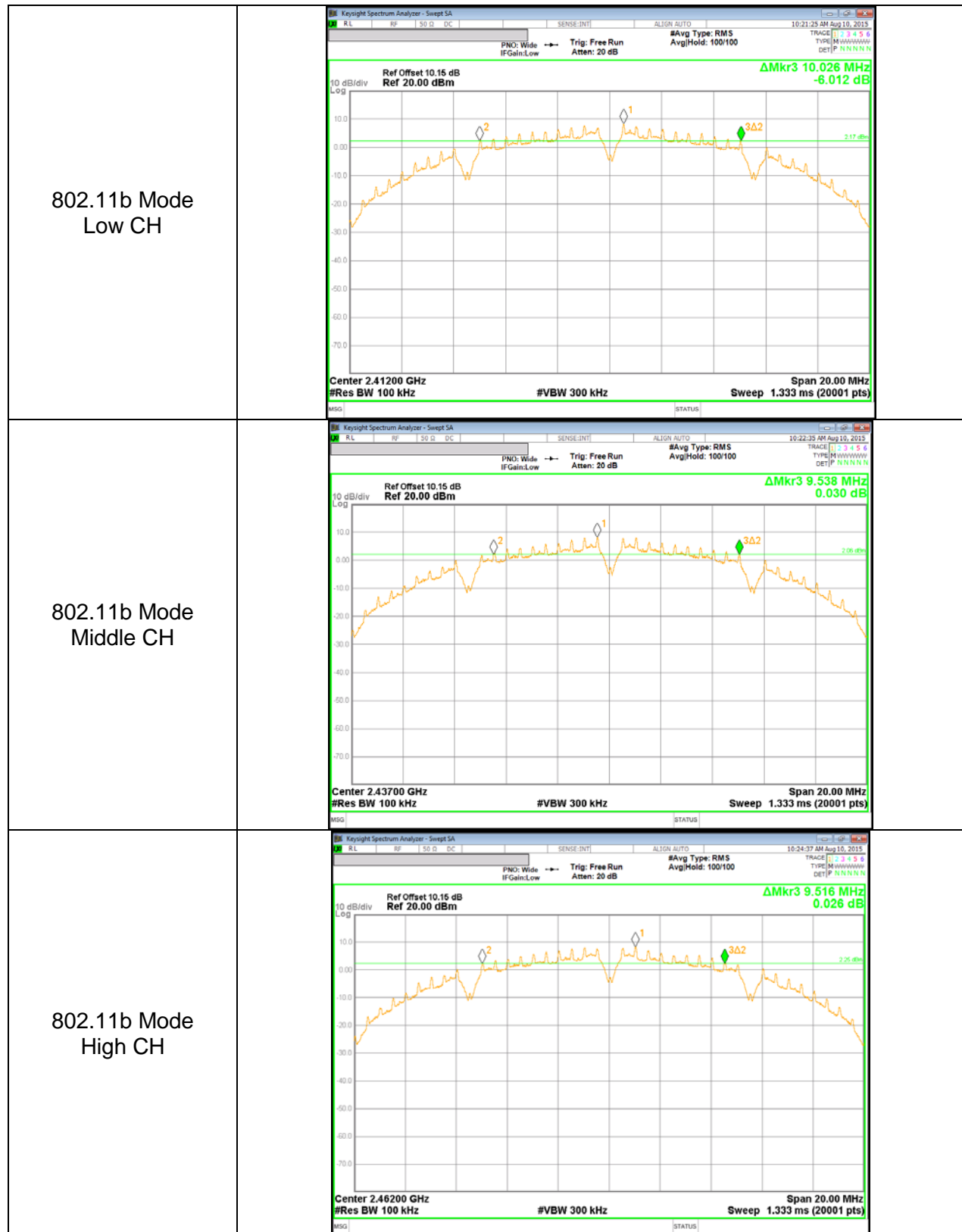
10.1.2. 802.11g MODE IN THE 2.4 GHz BAND

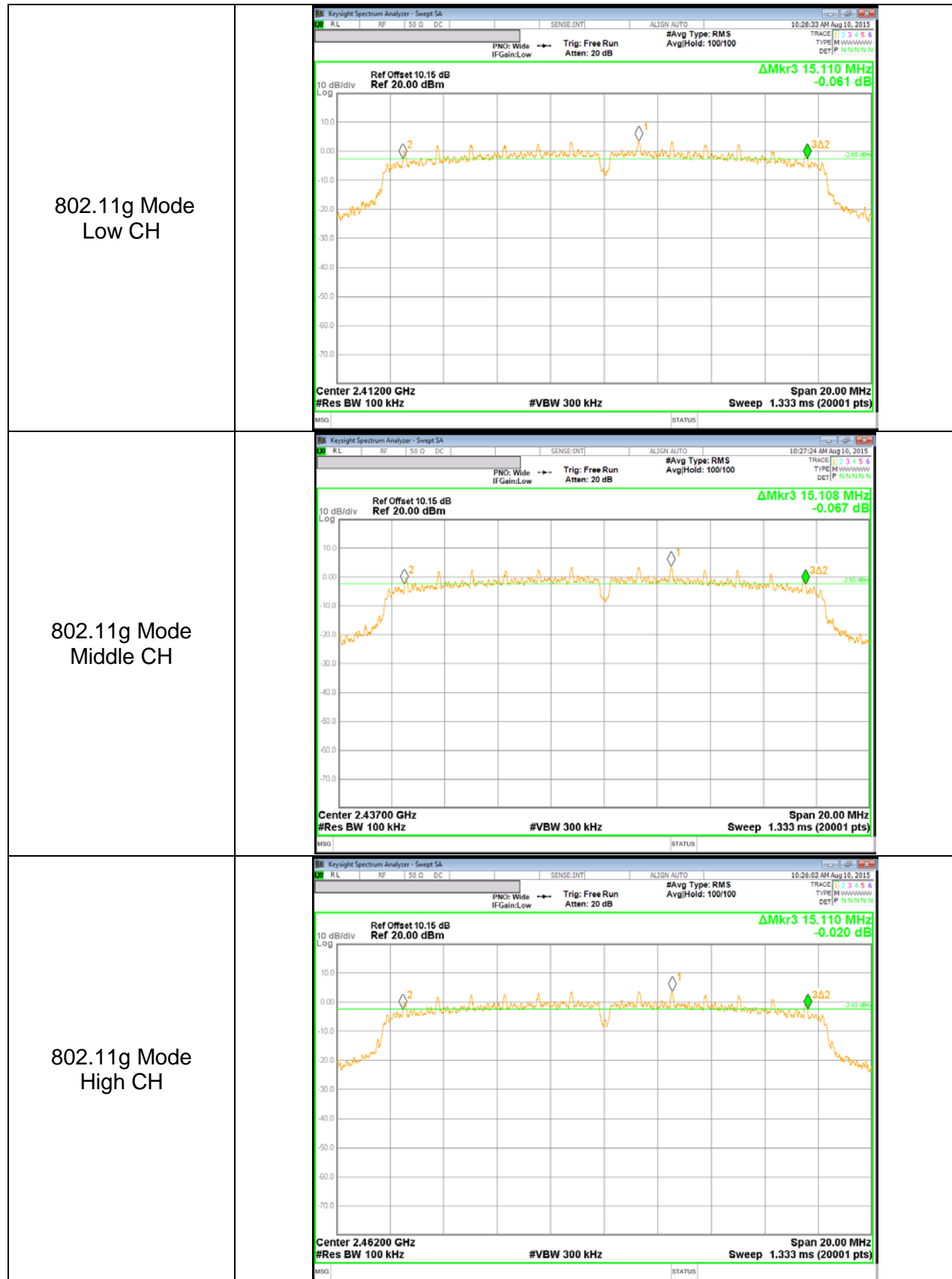
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	15.110	0.5
Mid	2437	15.108	0.5
High	2462	15.110	0.5
Worst		15.108	0.5

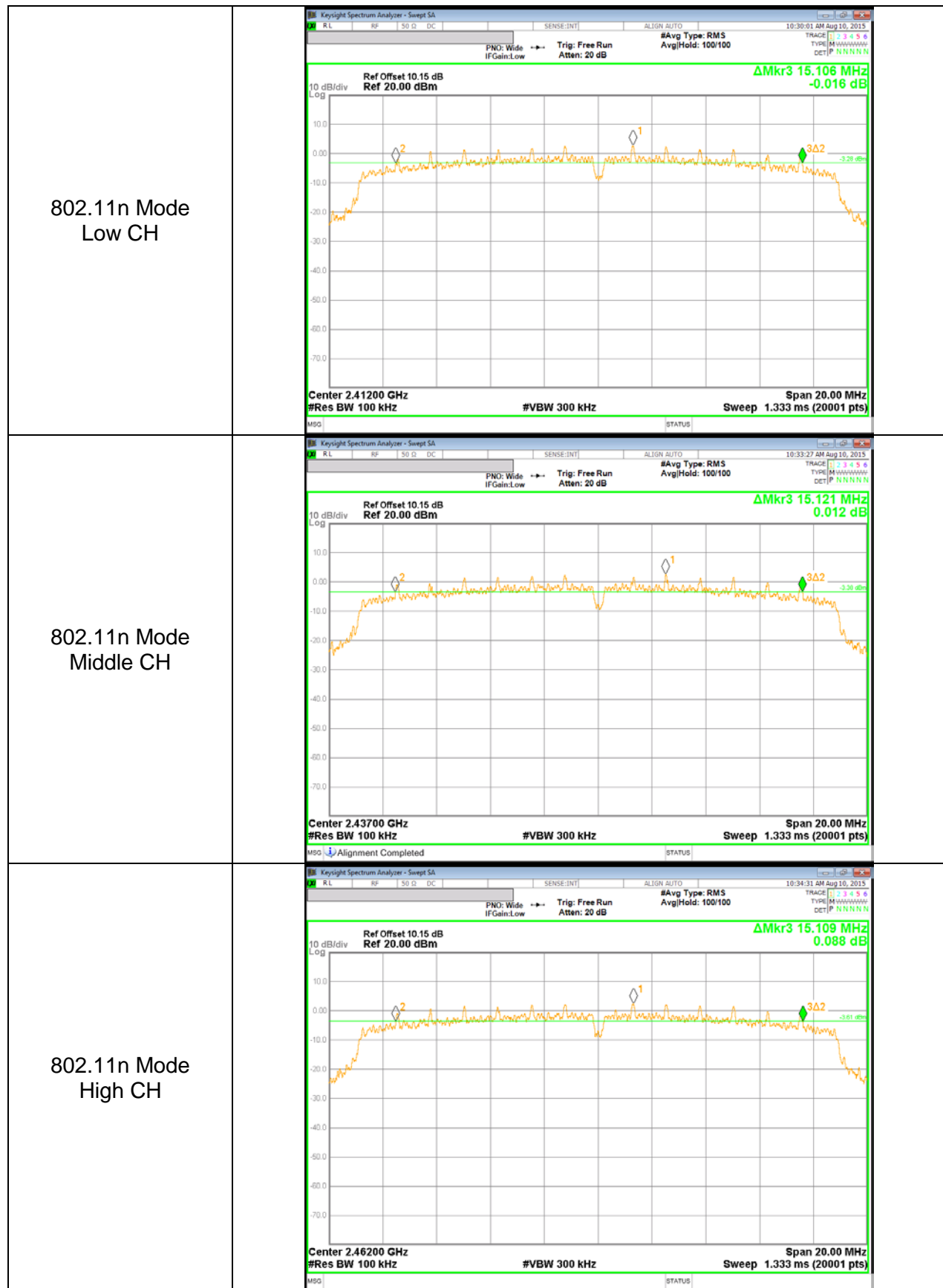
10.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	15.106	0.5
Mid	2437	15.121	0.5
High	2462	15.109	0.5
Worst		15.106	0.5

10.1.4. 6 dB BANDWIDTH PLOTS







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	15.149
Mid	2437	15.046
High	2462	15.083
Worst		15.149

10.2.2. 802.11g MODE IN THE 2.4 GHz BAND

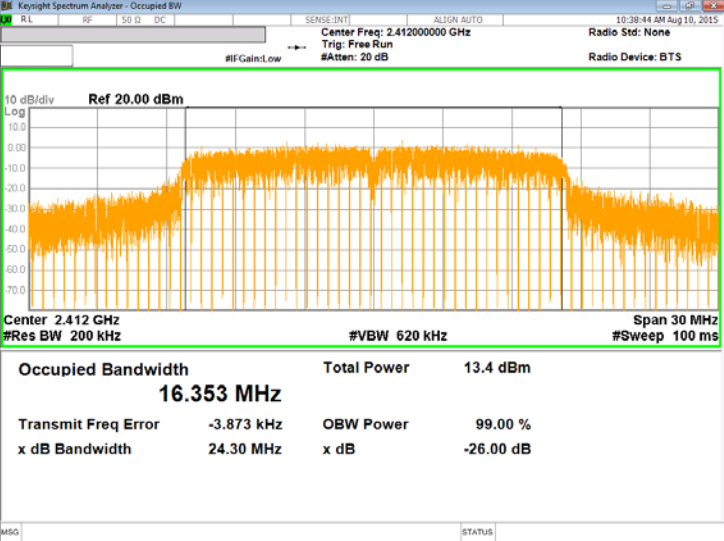
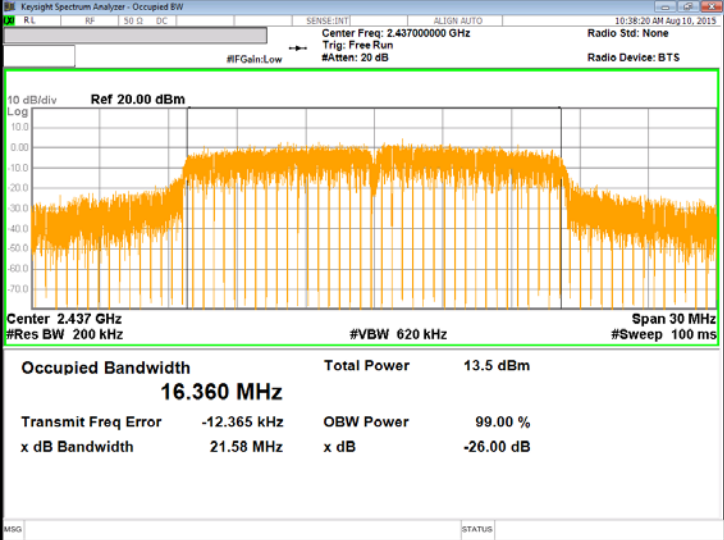
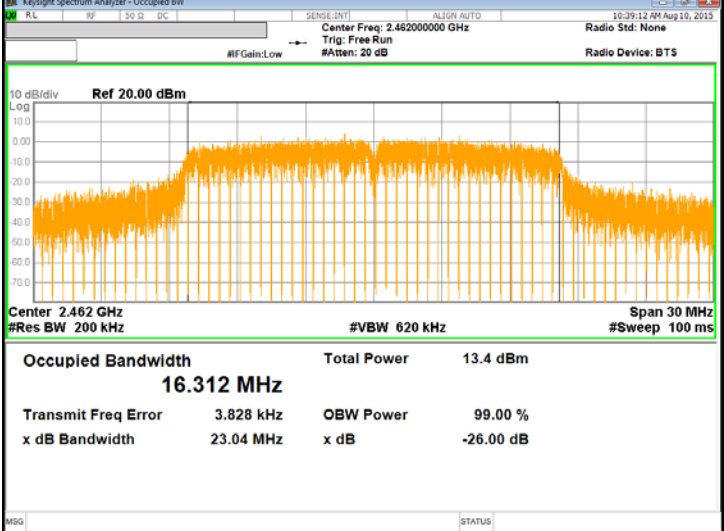
Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	16.353
Mid	2437	16.360
High	2462	16.312
Worst		16.360

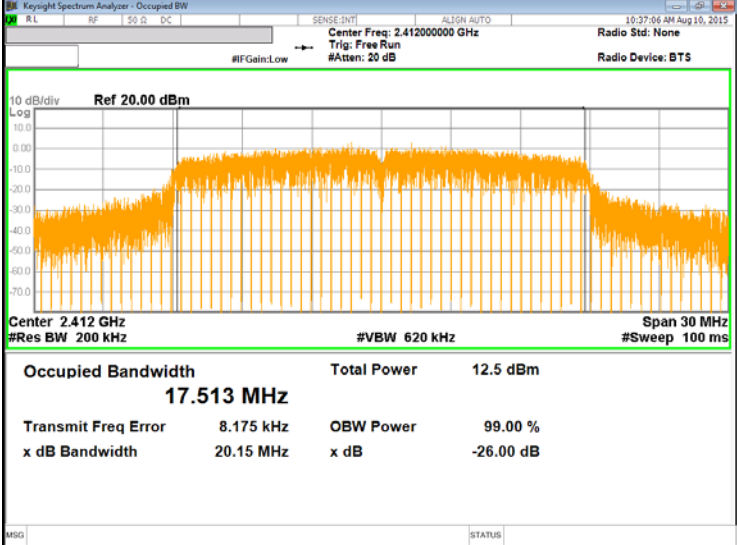
10.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	17.513
Mid	2437	17.517
High	2462	17.461
Worst		17.517

10.2.4. 99% BANDWIDTH PLOTS

<p>802.11b Mode Low CH</p>	<p>Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS</p> <p>Ref 20.00 dBm</p> <p>Center 2.412 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>16.5 dBm</td> </tr> <tr> <td>15.149 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>34.073 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>18.66 MHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>99.00 %</td> </tr> <tr> <td></td> <td></td> <td>-26.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	16.5 dBm	15.149 MHz			Transmit Freq Error	34.073 kHz	OBW Power	x dB Bandwidth	18.66 MHz	x dB			99.00 %			-26.00 dB
Occupied Bandwidth	Total Power	16.5 dBm																	
15.149 MHz																			
Transmit Freq Error	34.073 kHz	OBW Power																	
x dB Bandwidth	18.66 MHz	x dB																	
		99.00 %																	
		-26.00 dB																	
<p>802.11b Mode Middle CH</p>	<p>Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS</p> <p>Ref 20.00 dBm</p> <p>Center 2.437 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>16.6 dBm</td> </tr> <tr> <td>15.046 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>11.861 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>19.02 MHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>99.00 %</td> </tr> <tr> <td></td> <td></td> <td>-26.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	16.6 dBm	15.046 MHz			Transmit Freq Error	11.861 kHz	OBW Power	x dB Bandwidth	19.02 MHz	x dB			99.00 %			-26.00 dB
Occupied Bandwidth	Total Power	16.6 dBm																	
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Transmit Freq Error	11.861 kHz	OBW Power																	
x dB Bandwidth	19.02 MHz	x dB																	
		99.00 %																	
		-26.00 dB																	
<p>802.11b Mode High CH</p>	<p>Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS</p> <p>Ref 20.00 dBm</p> <p>Center 2.462 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>16.7 dBm</td> </tr> <tr> <td>15.083 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>560 Hz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>18.71 MHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>99.00 %</td> </tr> <tr> <td></td> <td></td> <td>-26.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	16.7 dBm	15.083 MHz			Transmit Freq Error	560 Hz	OBW Power	x dB Bandwidth	18.71 MHz	x dB			99.00 %			-26.00 dB
Occupied Bandwidth	Total Power	16.7 dBm																	
15.083 MHz																			
Transmit Freq Error	560 Hz	OBW Power																	
x dB Bandwidth	18.71 MHz	x dB																	
		99.00 %																	
		-26.00 dB																	

<p>802.11g Mode Low CH</p>	 <p>Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.412 GHz Span 30 MHz #Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>13.4 dBm</td> </tr> <tr> <td>16.353 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>-3.873 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>24.30 MHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>-26.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	13.4 dBm	16.353 MHz			Transmit Freq Error	-3.873 kHz	OBW Power	x dB Bandwidth	24.30 MHz	x dB			-26.00 dB
Occupied Bandwidth	Total Power	13.4 dBm														
16.353 MHz																
Transmit Freq Error	-3.873 kHz	OBW Power														
x dB Bandwidth	24.30 MHz	x dB														
		-26.00 dB														
<p>802.11g Mode Middle CH</p>	 <p>Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.437 GHz Span 30 MHz #Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>13.5 dBm</td> </tr> <tr> <td>16.360 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>-12.365 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>21.58 MHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>-26.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	13.5 dBm	16.360 MHz			Transmit Freq Error	-12.365 kHz	OBW Power	x dB Bandwidth	21.58 MHz	x dB			-26.00 dB
Occupied Bandwidth	Total Power	13.5 dBm														
16.360 MHz																
Transmit Freq Error	-12.365 kHz	OBW Power														
x dB Bandwidth	21.58 MHz	x dB														
		-26.00 dB														
<p>802.11g Mode High CH</p>	 <p>Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.462 GHz Span 30 MHz #Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>13.4 dBm</td> </tr> <tr> <td>16.312 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>3.828 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>23.04 MHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>-26.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	13.4 dBm	16.312 MHz			Transmit Freq Error	3.828 kHz	OBW Power	x dB Bandwidth	23.04 MHz	x dB			-26.00 dB
Occupied Bandwidth	Total Power	13.4 dBm														
16.312 MHz																
Transmit Freq Error	3.828 kHz	OBW Power														
x dB Bandwidth	23.04 MHz	x dB														
		-26.00 dB														

<p>802.11n Mode Low CH</p>	 <p>Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>Ref 20.00 dBm</p> <p>Center 2.412 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>12.5 dBm</td> </tr> <tr> <td>17.513 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>8.175 kHz</td> <td>x dB</td> <td>-26.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>20.15 MHz</td> <td></td> <td></td> </tr> </table>	Occupied Bandwidth	Total Power	12.5 dBm	17.513 MHz			Transmit Freq Error	OBW Power	99.00 %	8.175 kHz	x dB	-26.00 dB	x dB Bandwidth			20.15 MHz		
Occupied Bandwidth	Total Power	12.5 dBm																	
17.513 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
8.175 kHz	x dB	-26.00 dB																	
x dB Bandwidth																			
20.15 MHz																			
<p>802.11n Mode Middle CH</p>	 <p>Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>Ref 20.00 dBm</p> <p>Center 2.437 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>12.5 dBm</td> </tr> <tr> <td>17.517 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-6.657 kHz</td> <td>x dB</td> <td>-26.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>21.82 MHz</td> <td></td> <td></td> </tr> </table>	Occupied Bandwidth	Total Power	12.5 dBm	17.517 MHz			Transmit Freq Error	OBW Power	99.00 %	-6.657 kHz	x dB	-26.00 dB	x dB Bandwidth			21.82 MHz		
Occupied Bandwidth	Total Power	12.5 dBm																	
17.517 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
-6.657 kHz	x dB	-26.00 dB																	
x dB Bandwidth																			
21.82 MHz																			
<p>802.11n Mode High CH</p>	 <p>Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS</p> <p>Ref 20.00 dBm</p> <p>Center 2.462 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>12.4 dBm</td> </tr> <tr> <td>17.461 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>6.010 kHz</td> <td>x dB</td> <td>-26.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>23.79 MHz</td> <td></td> <td></td> </tr> </table>	Occupied Bandwidth	Total Power	12.4 dBm	17.461 MHz			Transmit Freq Error	OBW Power	99.00 %	6.010 kHz	x dB	-26.00 dB	x dB Bandwidth			23.79 MHz		
Occupied Bandwidth	Total Power	12.4 dBm																	
17.461 MHz																			
Transmit Freq Error	OBW Power	99.00 %																	
6.010 kHz	x dB	-26.00 dB																	
x dB Bandwidth																			
23.79 MHz																			

10.3. OUTPUT POWER

LIMITS

FCC §15.247
 IC RSS-247 5.4.4

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.

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	-5.78	30.00	30.00	36.00	30.00
Mid	2437	-5.78	30.00	30.00	36.00	30.00
High	2462	-5.78	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	16.98	16.98	36.00	-19.02
Mid	2437	17.01	17.01	36.00	-18.99
High	2462	16.98	16.98	36.00	-19.02
Worst			17.01	36.00	-18.99

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	-5.78	30.00	30.00	36.00	30.00
Mid	2437	-5.78	30.00	30.00	36.00	30.00
High	2462	-5.78	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	14.25	14.25	36.00	-21.75
Mid	2437	14.21	14.21	36.00	-21.79
High	2462	14.10	14.10	36.00	-21.90
Worst			14.25	36.00	-21.75

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	-5.78	30.00	30.00	36.00	30.00
Mid	2437	-5.78	30.00	30.00	36.00	30.00
High	2462	-5.78	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	13.14	13.14	36.00	-22.86
Mid	2437	13.15	13.15	36.00	-22.85
High	2462	12.99	12.99	36.00	-23.01
Worst			13.15	36.00	-22.85

10.4. PSD

LIMITS

FCC §15.247
 IC RSS-247 5.2.2

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-1" 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	-14.842	0.00	-14.84	8.00	-22.84
Mid	2437	-15.044	0.00	-15.04	8.00	-23.04
High	2462	-15.073	0.00	-15.07	8.00	-23.07

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	-19.525	0.29	-19.24	8.00	-27.53
Mid	2437	-19.716	0.29	-19.43	8.00	-27.72
High	2462	-19.536	0.29	-19.25	8.00	-27.54

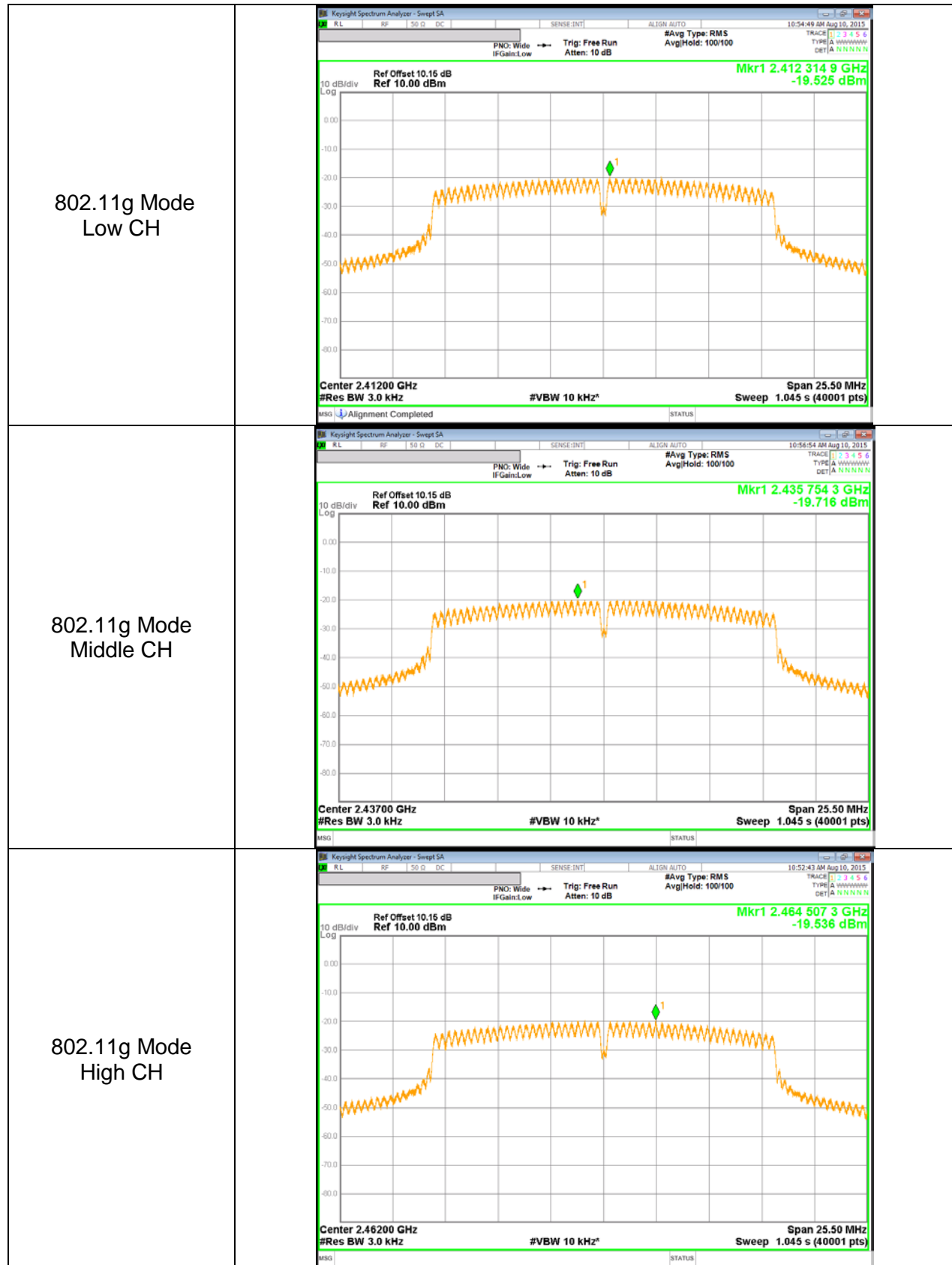
10.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

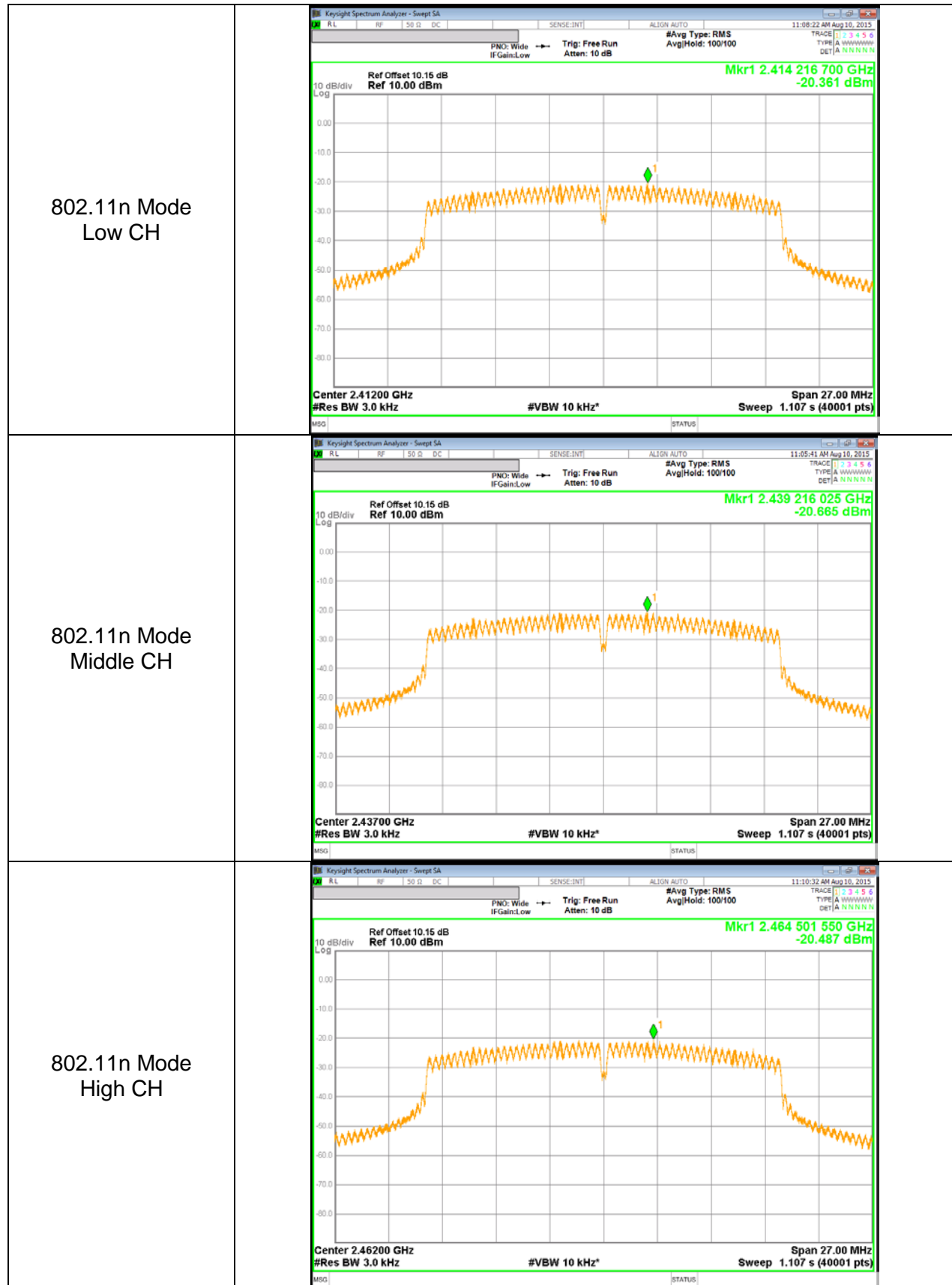
PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-20.361	0.32	-20.04	8.00	-28.36
Mid	2437	-20.665	0.32	-20.35	8.00	-28.67
High	2462	-20.487	0.32	-20.17	8.00	-28.49

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)
IC RSS-247 5.5

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

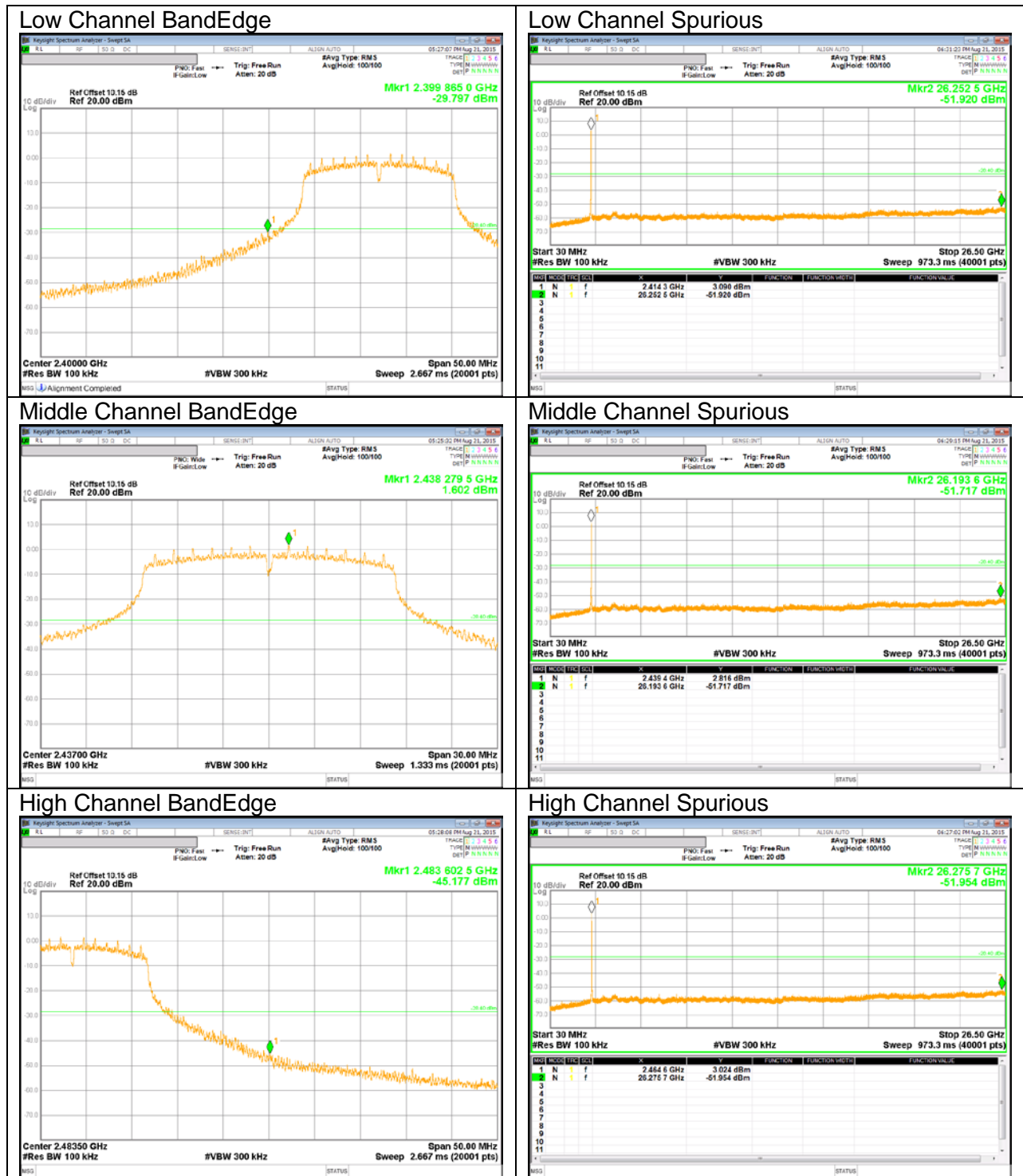
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

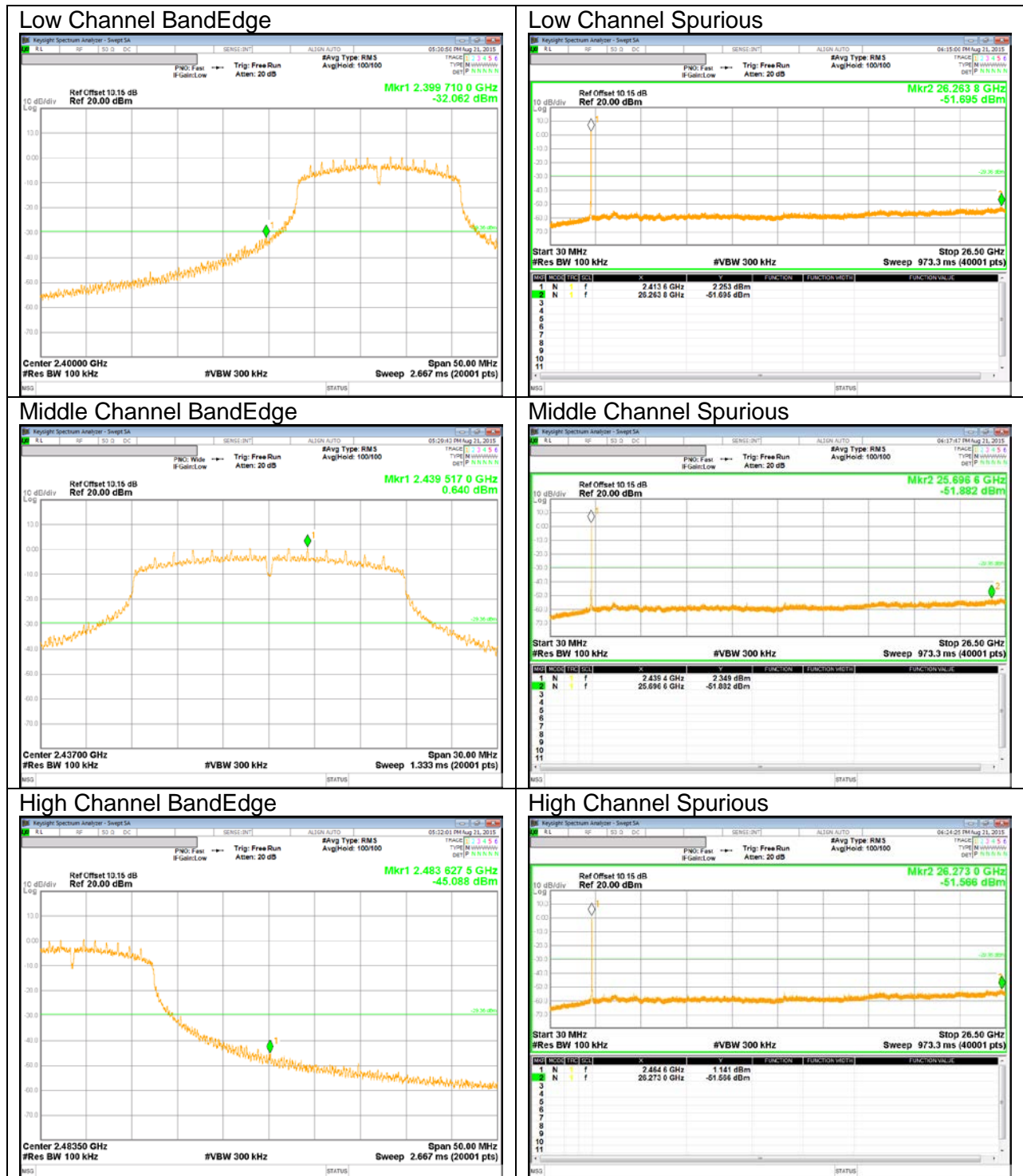
10.5.1. 802.11b MODE IN THE 2.4 GHz BAND



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
IC RSS-GEN Clause 8.9 (Transmitter)
IC RSS-GEN Clause 7 (Receiver)

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

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.

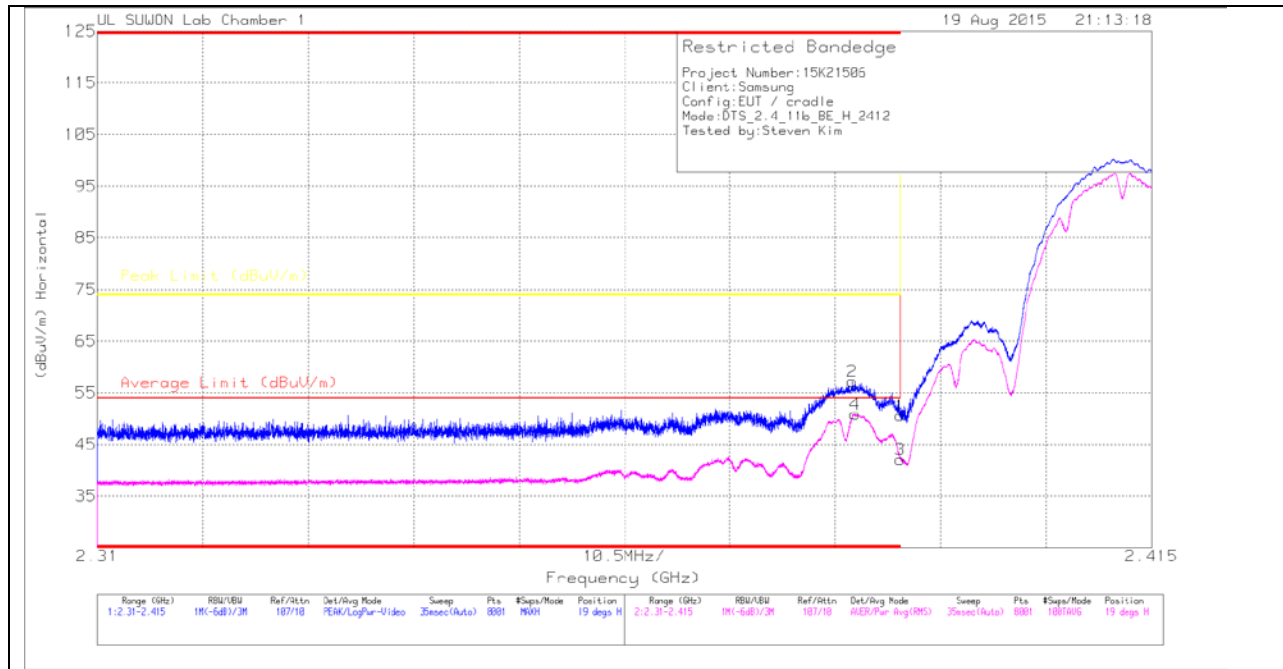
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

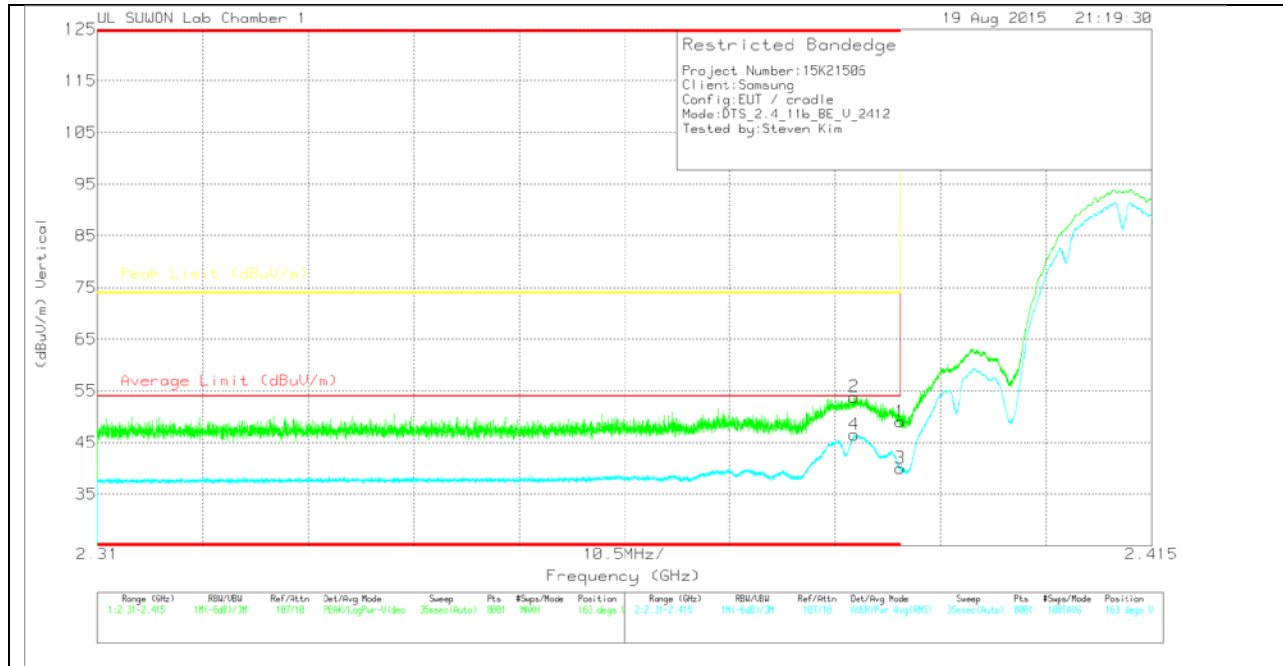
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.59	PK	31.8	-22.8	0	50.59	-	-	74	-23.41	19	100	H
2	* 2.385	48.18	PK	31.8	-22.8	0	57.18	-	-	74	-16.82	19	100	H
3	* 2.39	33.05	RMS	31.8	-22.8	0	42.05	54	-11.95	-	-	19	100	H
4	* 2.385	41.82	RMS	31.8	-22.8	0	50.82	54	-3.18	-	-	19	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	3117(001687 17_150619)	Path_2_10dB	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	40.05	PK	31.8	-22.8	0	49.05	-	-	74	-24.95	163	100	V
2	* 2.385	44.85	PK	31.8	-22.8	0	53.85	-	-	74	-20.15	163	100	V
3	* 2.39	31.04	RMS	31.8	-22.8	0	40.04	54	-13.96	-	-	163	100	V
4	* 2.385	37.55	RMS	31.8	-22.8	0	46.55	54	-7.45	-	-	163	100	V

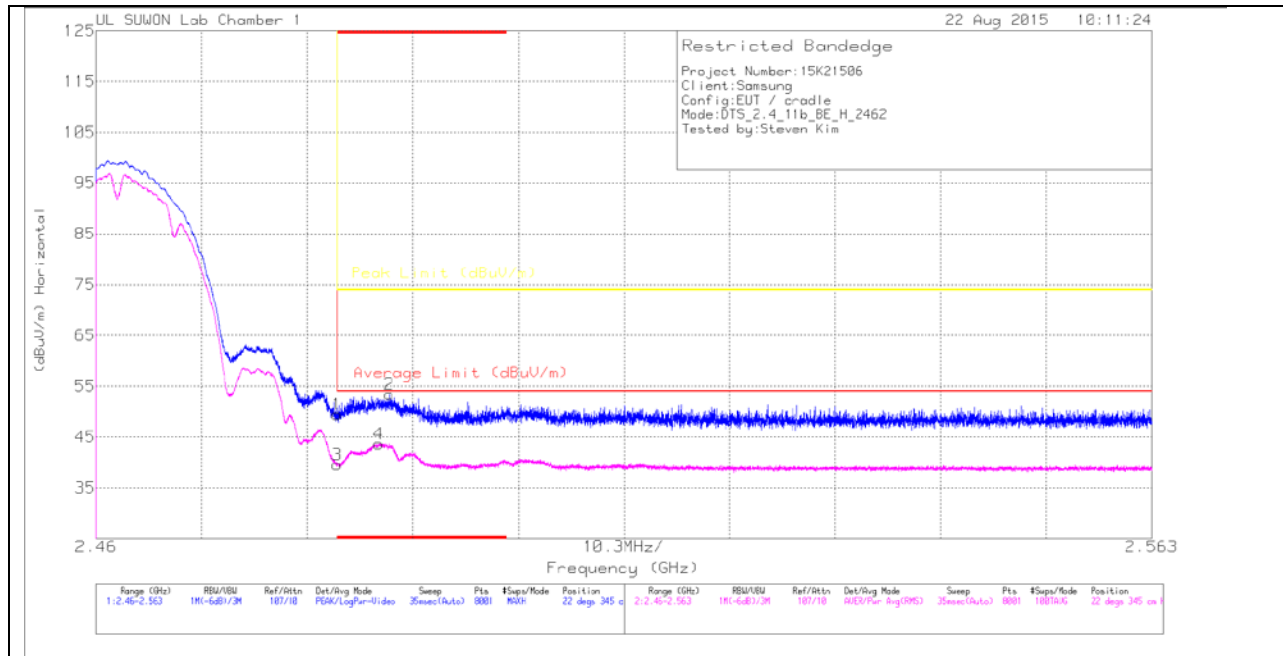
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

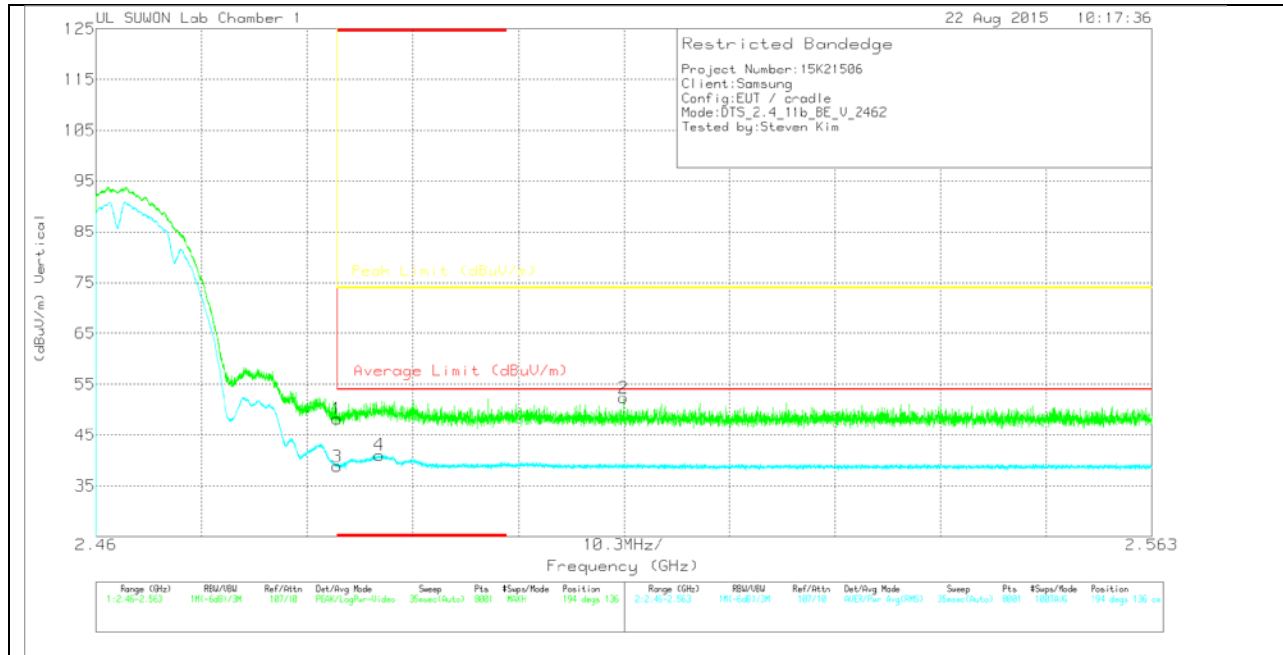
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24_150619)	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.07	PK	32	-22.6	0	49.47	-	-	74	-24.53	22	345	H
2	* 2.489	44.01	PK	32	-22.6	0	53.41	-	-	74	-20.59	22	345	H
3	* 2.484	30.21	RMS	32	-22.6	0	39.61	54	-14.39	-	-	22	345	H
4	* 2.488	34.22	RMS	32	-22.6	0	43.62	54	-10.38	-	-	22	345	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	3117(001687 24)_150619	Path_2_10dB	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	38.82	Pk	32	-22.6	0	48.22	-	-	74	-25.78	194	136	V
2	2.511	42.95	Pk	32	-22.6	0	52.35	-	-	74	-21.65	194	136	V
3	* 2.484	29.43	RMS	32	-22.6	0	38.83	54	-15.17	-	-	194	136	V
4	* 2.488	31.71	RMS	32	-22.6	0	41.11	54	-12.89	-	-	194	136	V

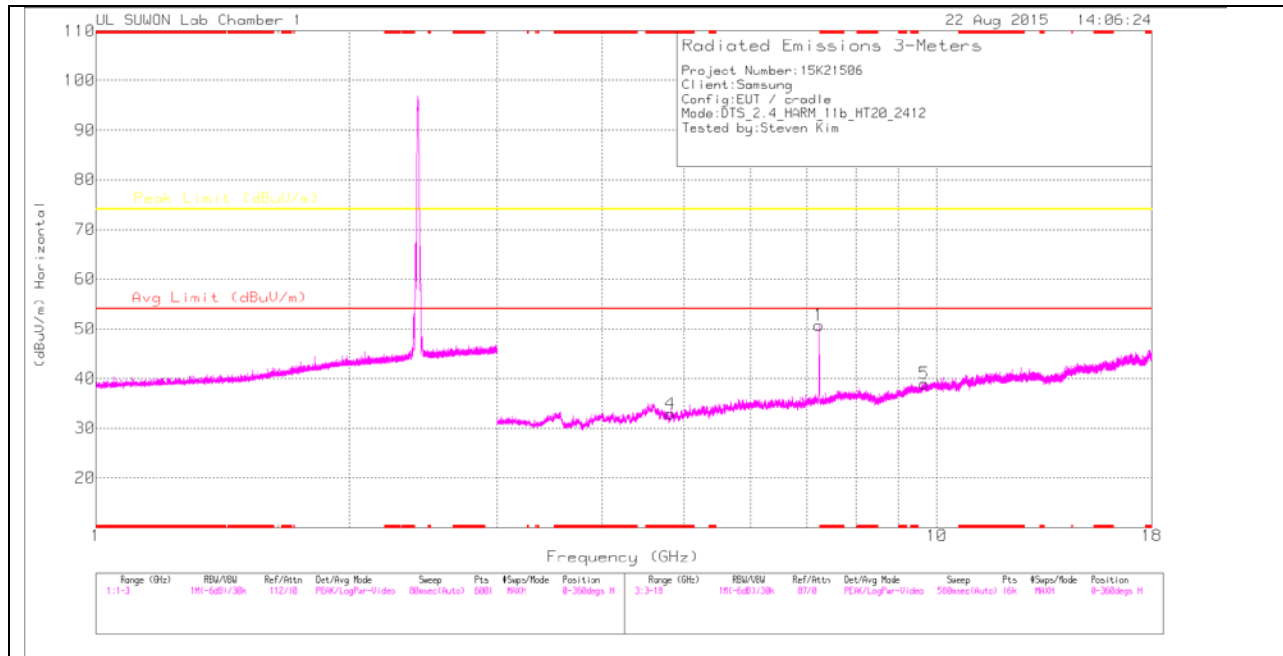
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

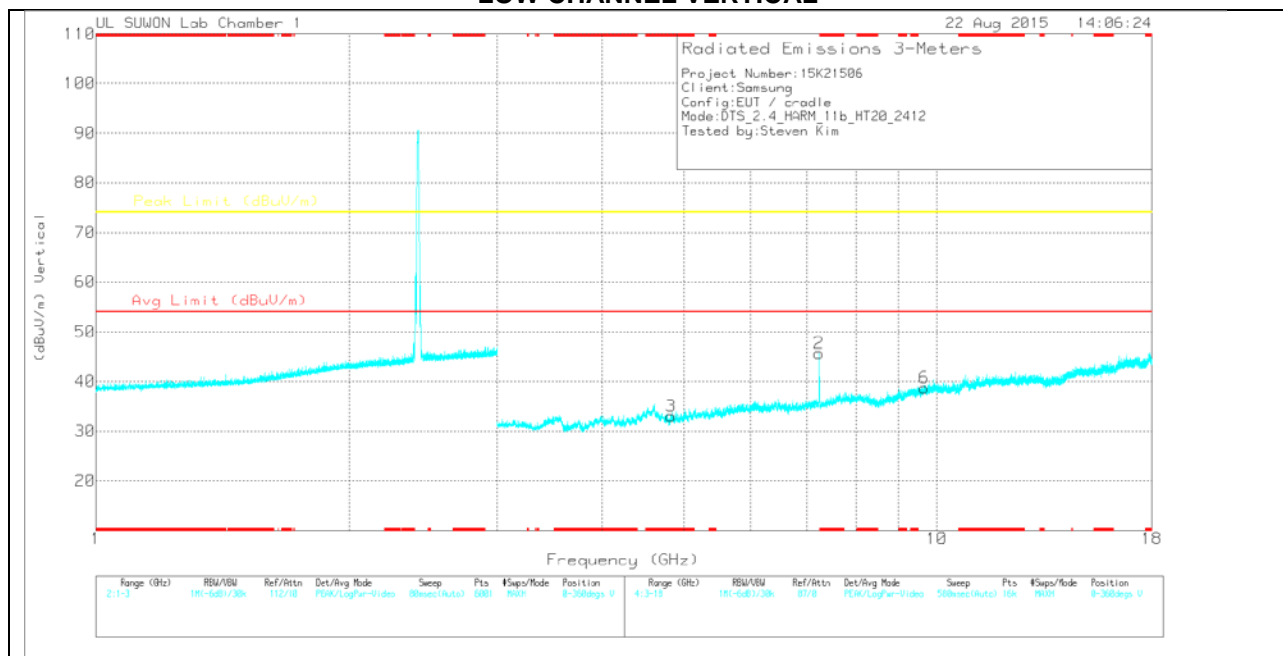
RMS - RMS detection

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	3117(00168724)_150619	Path_3	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	7.235	40.52	PK	35.7	-25.5	0	50.72	-	-	74	-23.28	0-360	200	H
4	* 4.824	28.54	PK	34	-29.6	0	32.94	-	-	74	-41.06	0-360	100	H
5	9.65	22.68	PK	37.1	-20.8	0	38.98	-	-	74	-35.02	0-360	200	H
2	7.233	35.52	PK	35.7	-25.5	0	45.72	-	-	74	-28.28	0-360	200	V
3	* 4.826	28.5	PK	34	-29.5	0	33	-	-	74	-41	0-360	200	V
6	9.649	22.44	PK	37.1	-20.8	0	38.74	-	-	74	-35.26	0-360	100	V

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

PK – Peak detector

Radiated Emissions

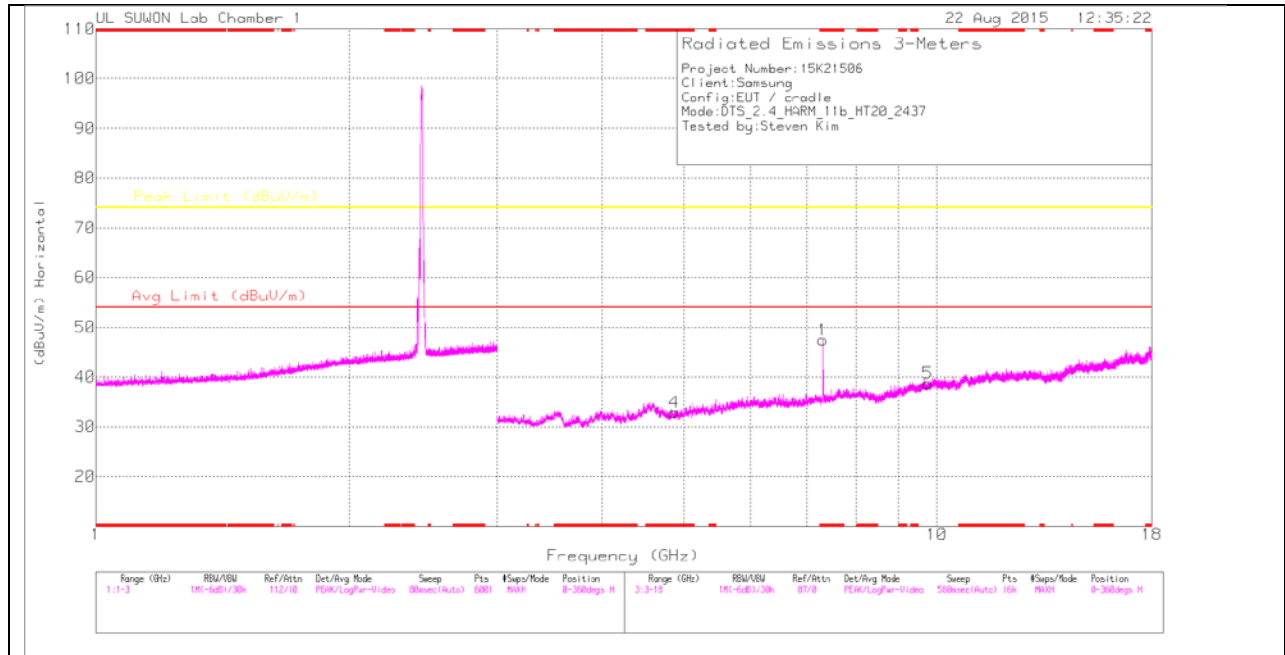
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.237	43.86	PK2	35.7	-25.5	0	54.06	-	-	74	-19.94	160	180	H
7.235	40.47	PK2	35.7	-25.5	0	50.67	-	-	74	-23.33	32	246	V

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

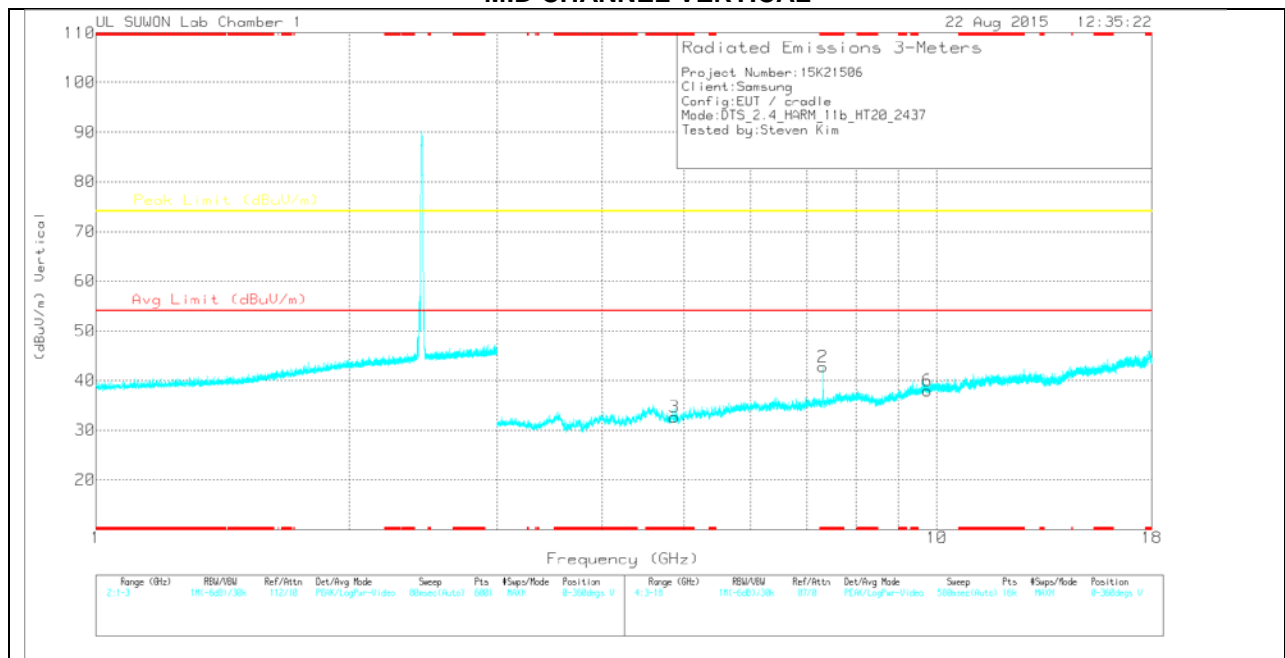
PK2 - KDB558074 Method: Maximum Peak

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/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	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	* 7.31	37.39	PK	35.7	-25.7	0	47.39	-	-	74	-26.61	0-360	200	H
4	* 4.872	28.06	PK	34	-29.2	0	32.86	-	-	74	-41.14	0-360	100	H
5	9.749	23.37	PK	37.2	-21.9	0	38.67	-	-	74	-35.33	0-360	200	H
2	* 7.31	32.82	PK	35.7	-25.7	0	42.82	-	-	74	-31.18	0-360	200	V
3	* 4.873	27.89	PK	34	-29.2	0	32.69	-	-	74	-41.31	0-360	100	V
6	9.748	22.67	PK	37.2	-21.9	0	37.97	-	-	74	-36.03	0-360	100	V

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

PK – Peak detector

Radiated Emissions

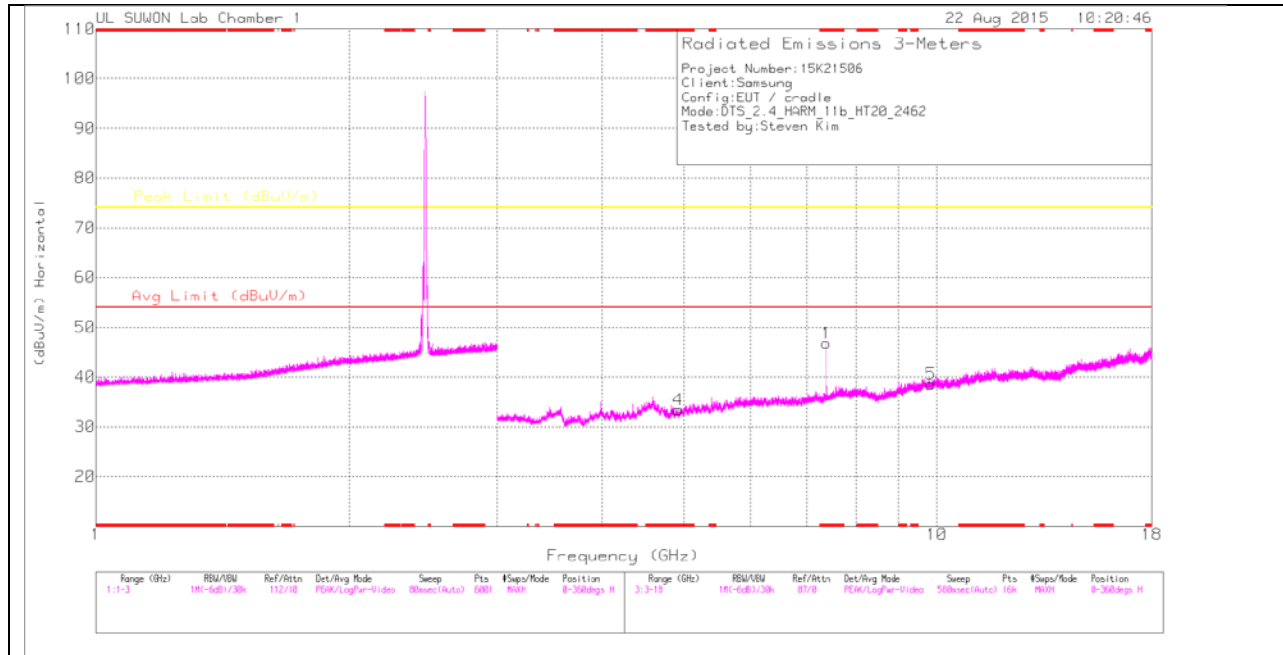
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.312	46.89	PK2	35.7	-25.7	0	56.89	-	-	74	-17.11	160	171	H
* 7.312	39.67	MAv1	35.7	-25.7	0	49.67	54	-4.33	-	-	160	171	H
* 7.312	43.33	PK2	35.7	-25.7	0	53.33	-	-	74	-20.67	9	197	V
* 7.312	35.72	MAv1	35.7	-25.7	0	45.72	54	-8.28	-	-	9	197	V

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

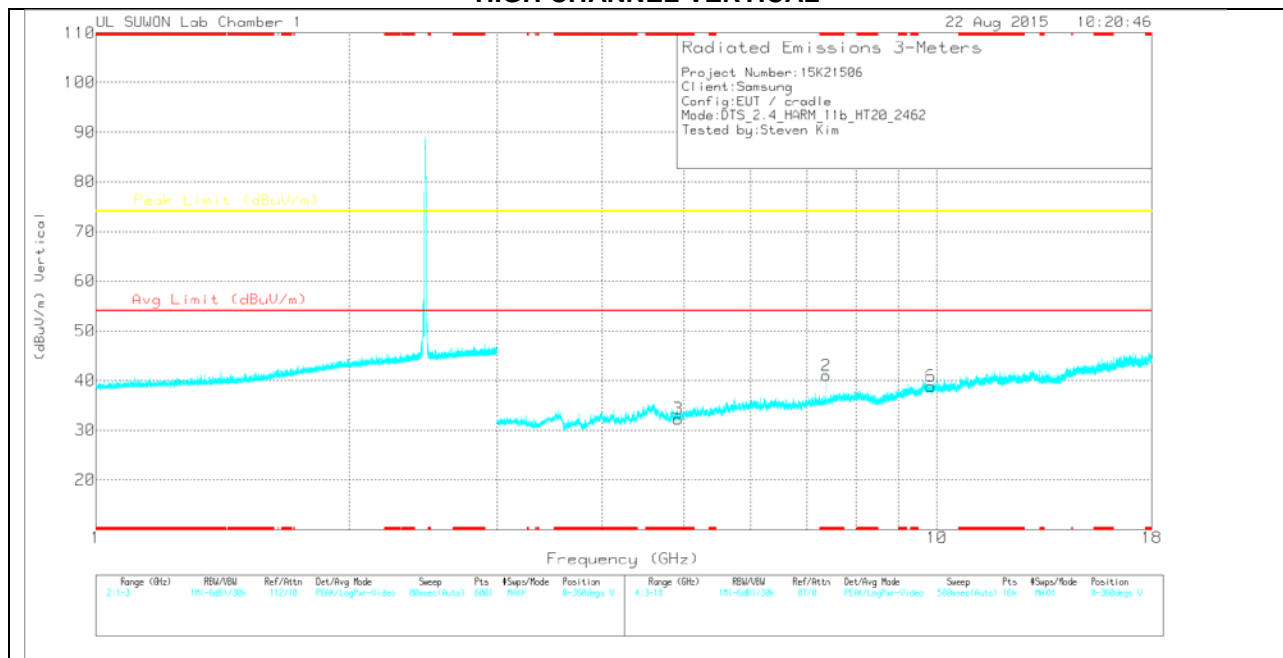
PK2 - KDB558074 Method: Maximum Peak

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	3117(00168724)_150619	Path_3	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	* 7.387	36.17	PK	35.8	-25.1	0	46.87	-	-	74	-27.13	0-360	200	H
4	* 4.924	28.39	PK	34	-29	0	33.39	-	-	74	-40.61	0-360	100	H
5	9.846	22.91	PK	37.3	-21.6	0	38.61	-	-	74	-35.39	0-360	200	H
2	* 7.385	30.33	PK	35.8	-25.1	0	41.03	-	-	74	-32.97	0-360	200	V
3	* 4.925	27.23	PK	34	-29	0	32.23	-	-	74	-41.77	0-360	200	V
6	9.846	23.17	PK	37.3	-21.6	0	38.87	-	-	74	-35.13	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(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.387	44.16	PK2	35.8	-25.1	0	54.86	-	-	74	-19.14	172	200	H
* 7.387	37.47	MAv1	35.8	-25.1	0	48.17	54	-5.83	-	-	172	200	H
* 7.384	38.27	PK2	35.8	-25.1	0	48.97	-	-	74	-25.03	238	145	V
* 7.385	27.19	MAv1	35.8	-25.1	0	37.89	54	-16.11	-	-	238	145	V

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

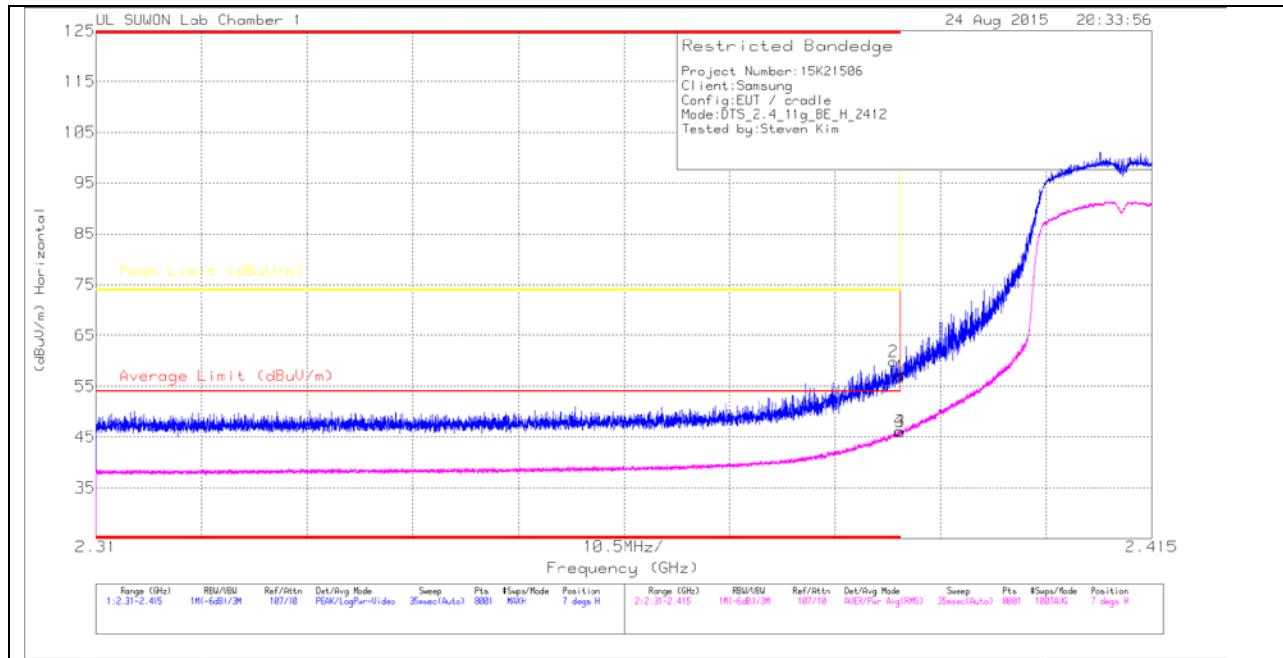
PK2 - KDB558074 Method: Maximum Peak

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

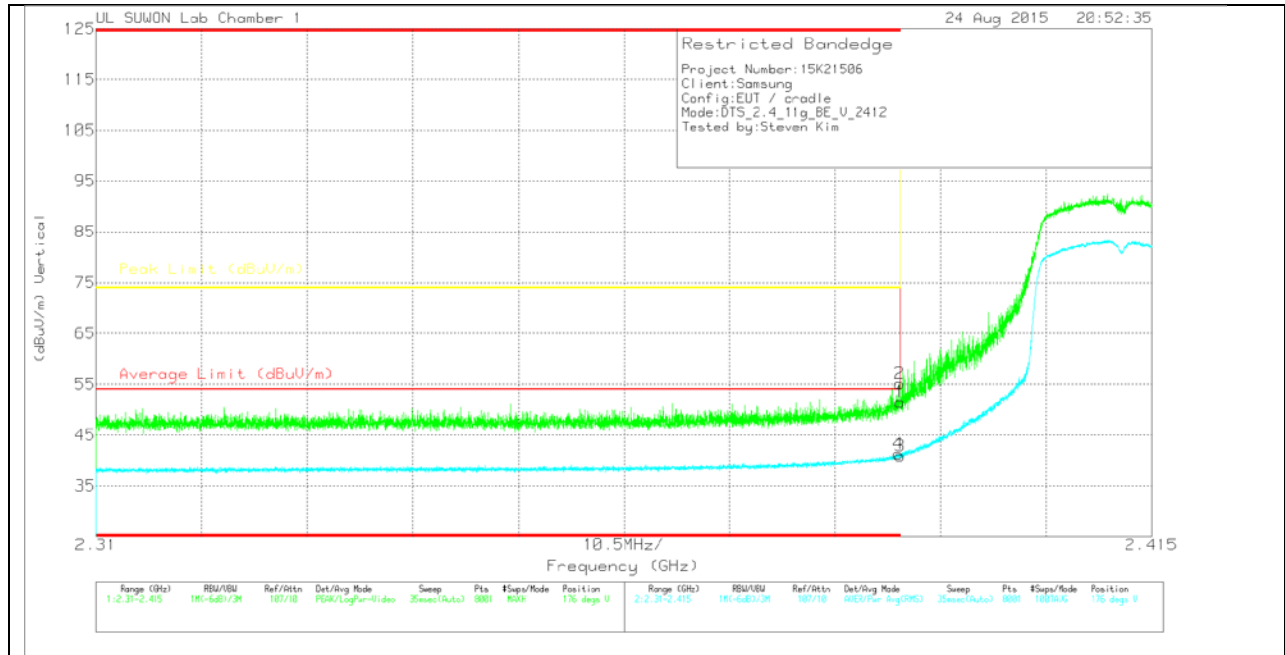
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24_150619)	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	48.01	PK	31.8	-22.8	0	57.01	-	-	74	-16.99	7	100	H
2	* 2.389	50.85	PK	31.8	-22.8	0	59.85	-	-	74	-14.15	7	100	H
3	* 2.39	36.77	RMS	31.8	-22.8	.29	46.06	54	-7.94	-	-	7	100	H
4	* 2.39	36.97	RMS	31.8	-22.8	.29	46.26	54	-7.74	-	-	7	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	3117(001687 24)_150619	Path_2_10dB	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	42.5	PK	31.8	-22.8	0	51.5	-	-	74	-22.5	176	135	V
2	* 2.39	46.11	PK	31.8	-22.8	0	55.11	-	-	74	-18.89	176	135	V
3	* 2.39	31.6	RMS	31.8	-22.8	.29	40.89	54	-13.11	-	-	176	135	V
4	* 2.39	31.98	RMS	31.8	-22.8	.29	41.27	54	-12.73	-	-	176	135	V

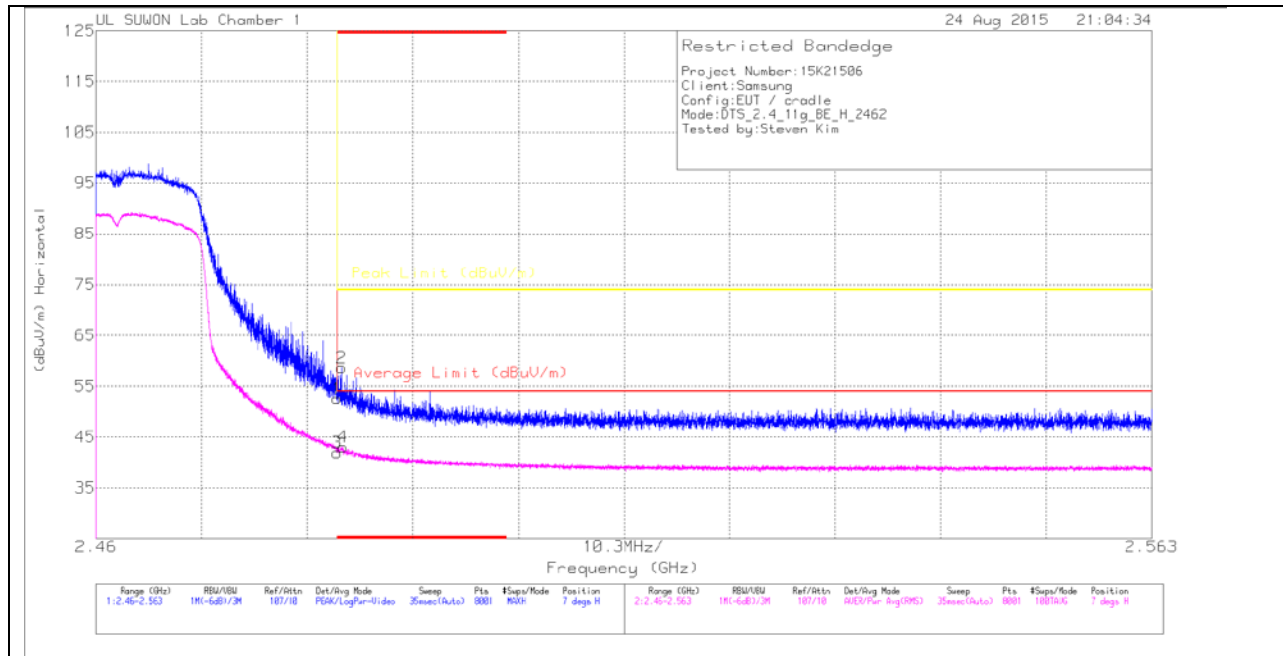
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

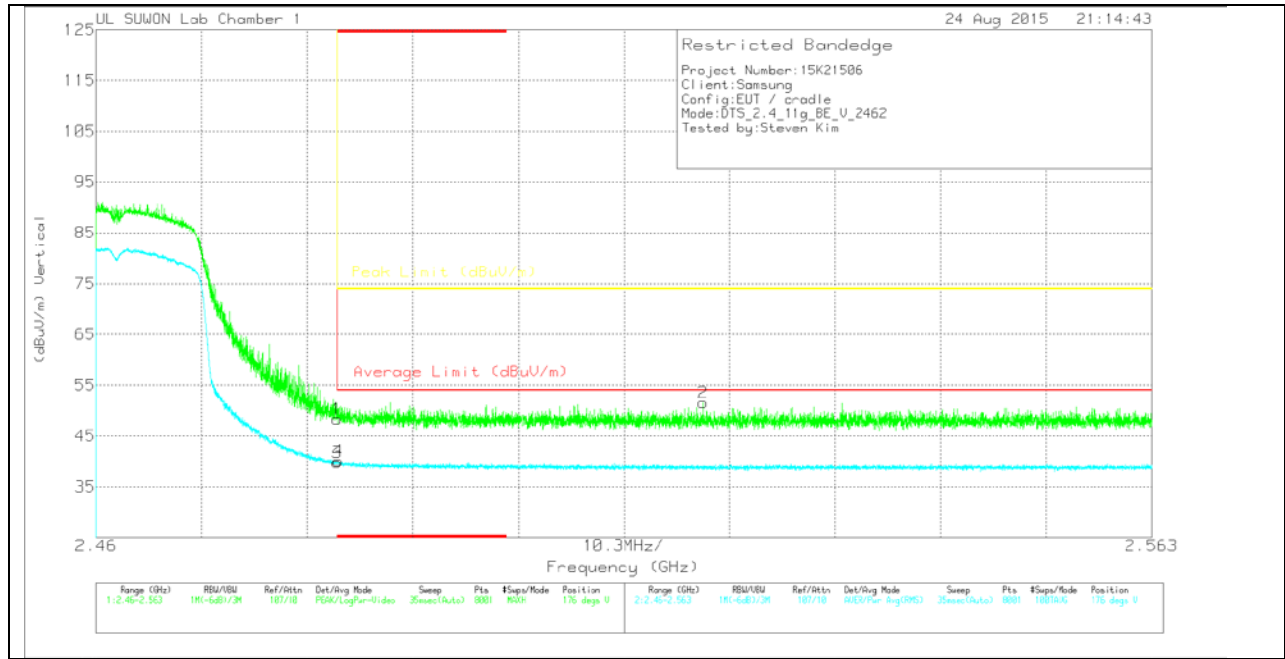
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	43.18	Pk	32	-22.6	0	52.58	-	-	74	-21.42	7	269	H
2	* 2.484	49.23	Pk	32	-22.6	0	58.63	-	-	74	-15.37	7	269	H
3	* 2.484	32.27	RMS	32	-22.6	.29	41.96	54	-12.04	-	-	7	269	H
4	* 2.484	33.3	RMS	32	-22.6	.29	42.99	54	-11.01	-	-	7	269	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	3117(001687 24)_150619	Path_2_10dB	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	38.99	Pk	32	-22.6	0	48.39	-	-	74	-25.61	176	138	V
2	2.519	42.2	PK	32	-22.6	0	51.6	-	-	74	-22.4	176	138	V
3	* 2.484	30.13	RMS	32	-22.6	.29	39.82	54	-14.18	-	-	176	138	V
4	* 2.484	30.33	RMS	32	-22.6	.29	40.02	54	-13.98	-	-	176	138	V

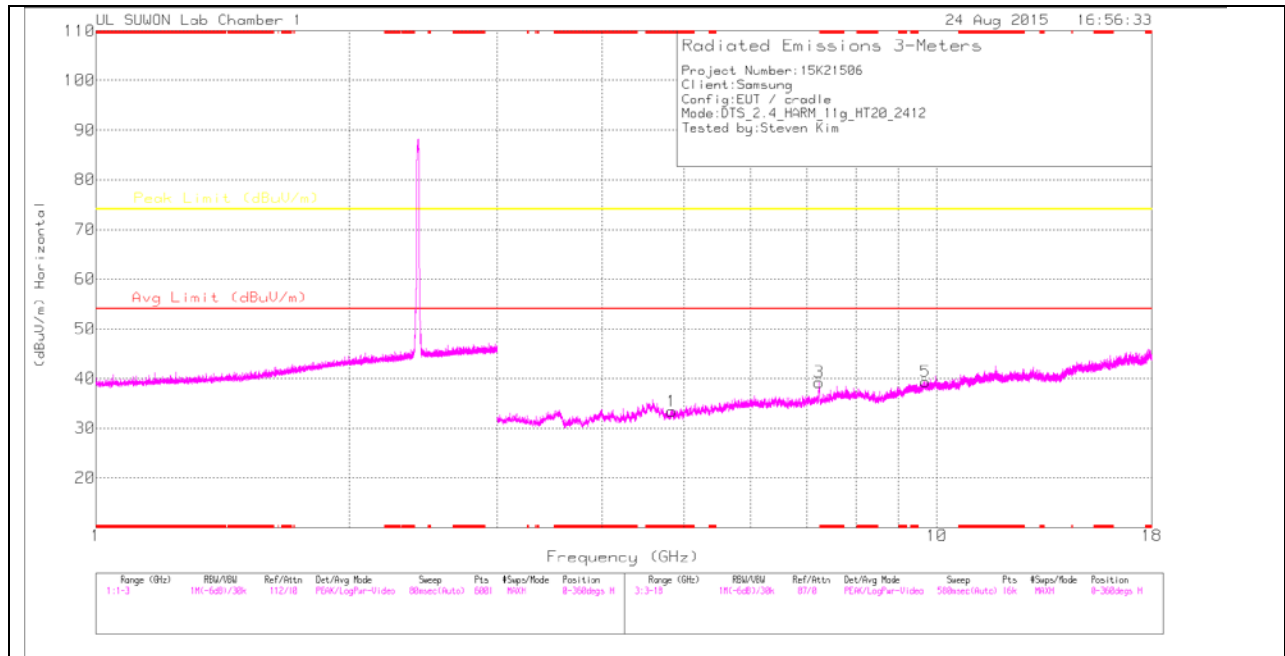
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

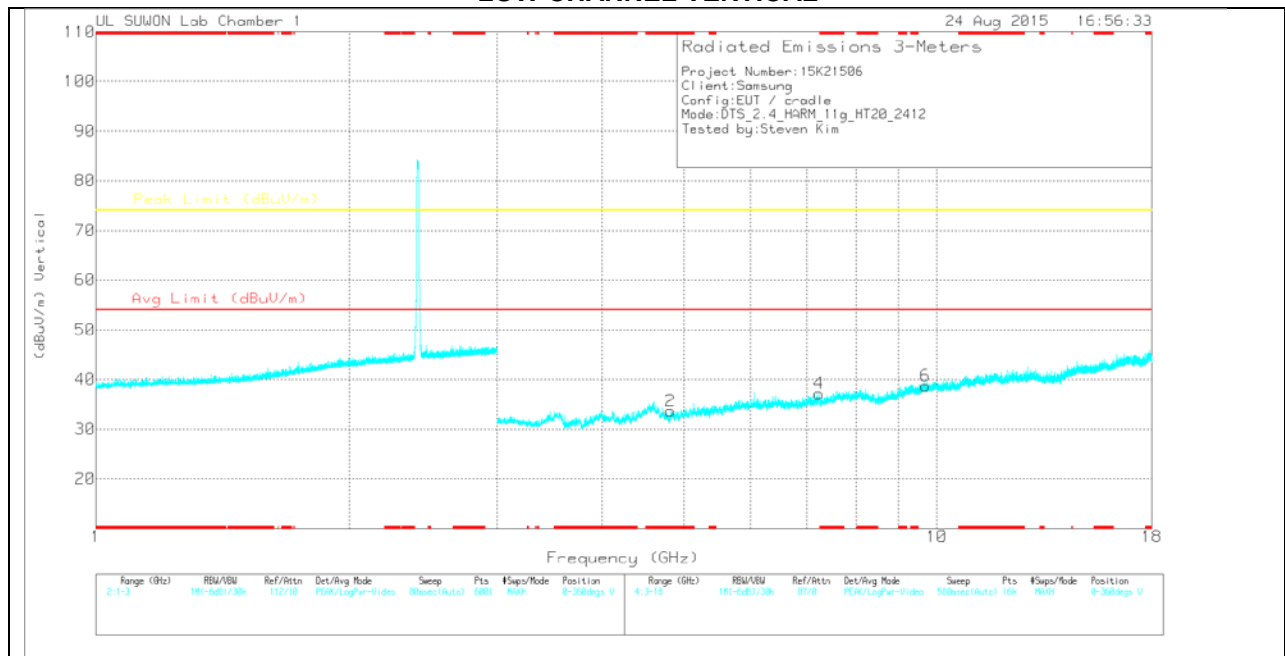
RMS - RMS detection

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	3117(0016872 4)_150619	Path_3	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	* 4.836	28.82	PK	34	-29.4	0	33.42	-	-	74	-40.58	0-360	100	H
3	7.233	29.08	PK	35.7	-25.5	0	39.28	-	-	74	-34.72	0-360	200	H
5	9.694	23.33	PK	37.1	-21.1	0	39.33	-	-	74	-34.67	0-360	100	H
2	* 4.825	29.21	PK	34	-29.5	0	33.71	-	-	74	-40.29	0-360	200	V
4	7.234	27.05	PK	35.7	-25.5	0	37.25	-	-	74	-36.75	0-360	200	V
6	9.687	22.72	PK	37.1	-21.1	0	38.72	-	-	74	-35.28	0-360	200	V

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

PK – Peak detector

Radiated Emissions

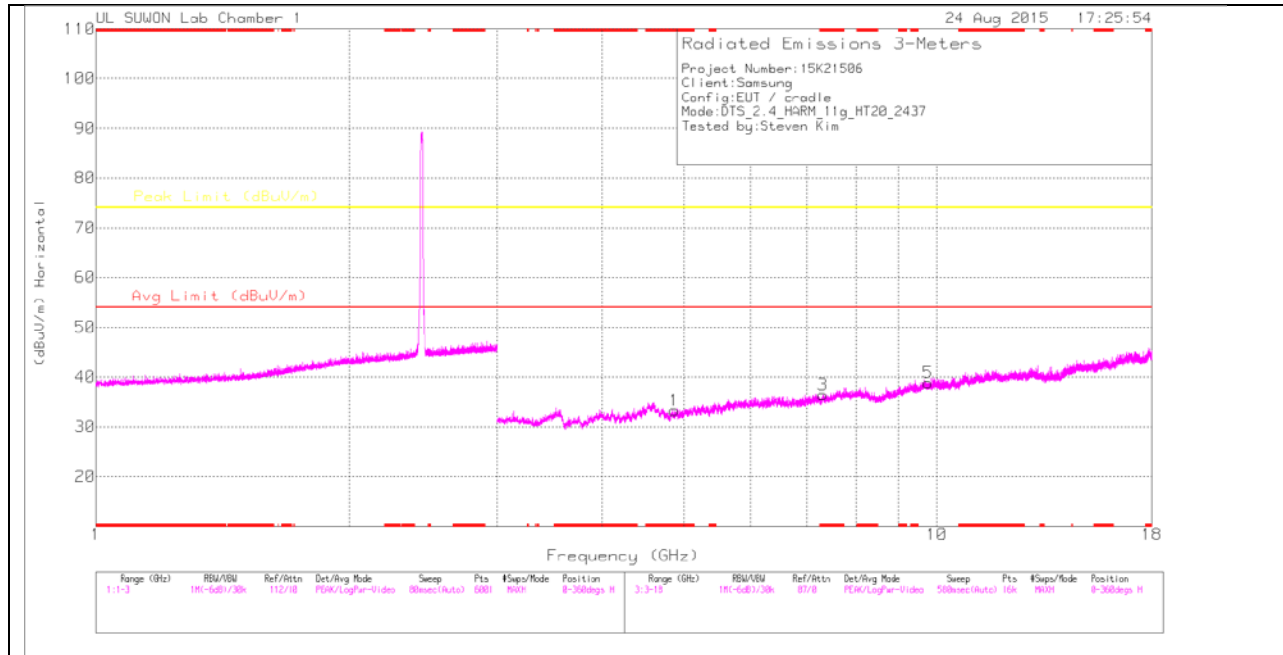
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.233	42.12	PK2	35.7	-25.5	0	52.32	-	-	74	-21.68	134	173	H

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

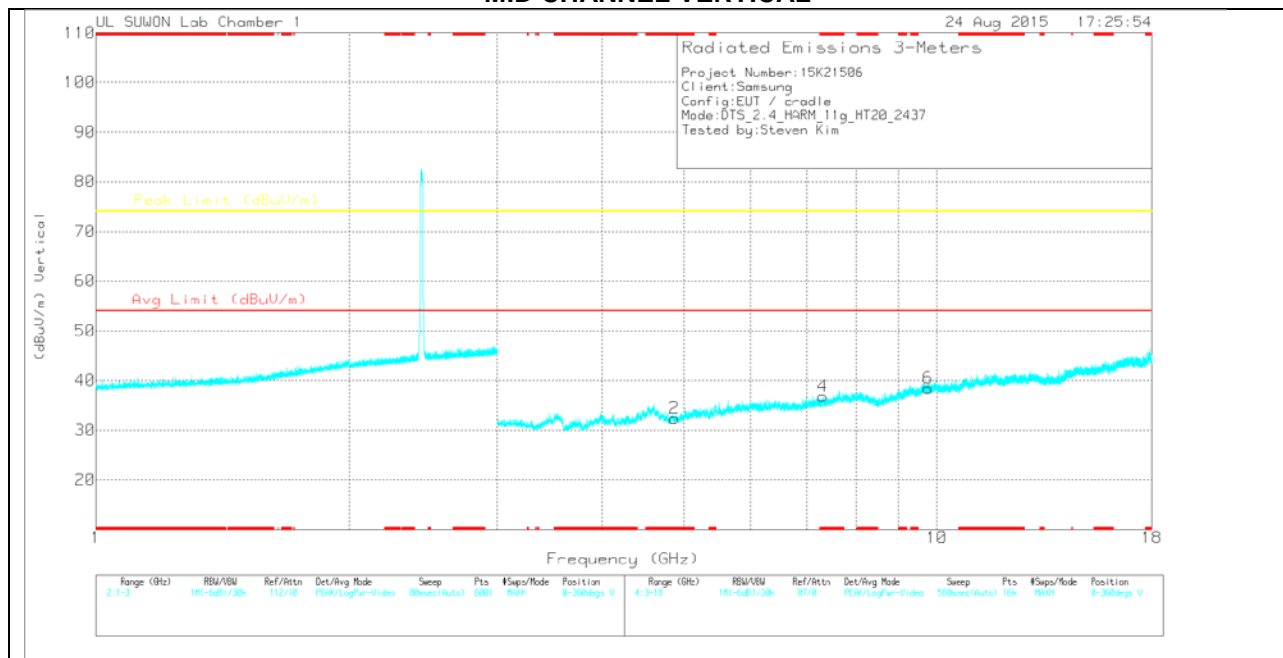
PK2 - KDB558074 Method: Maximum Peak

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

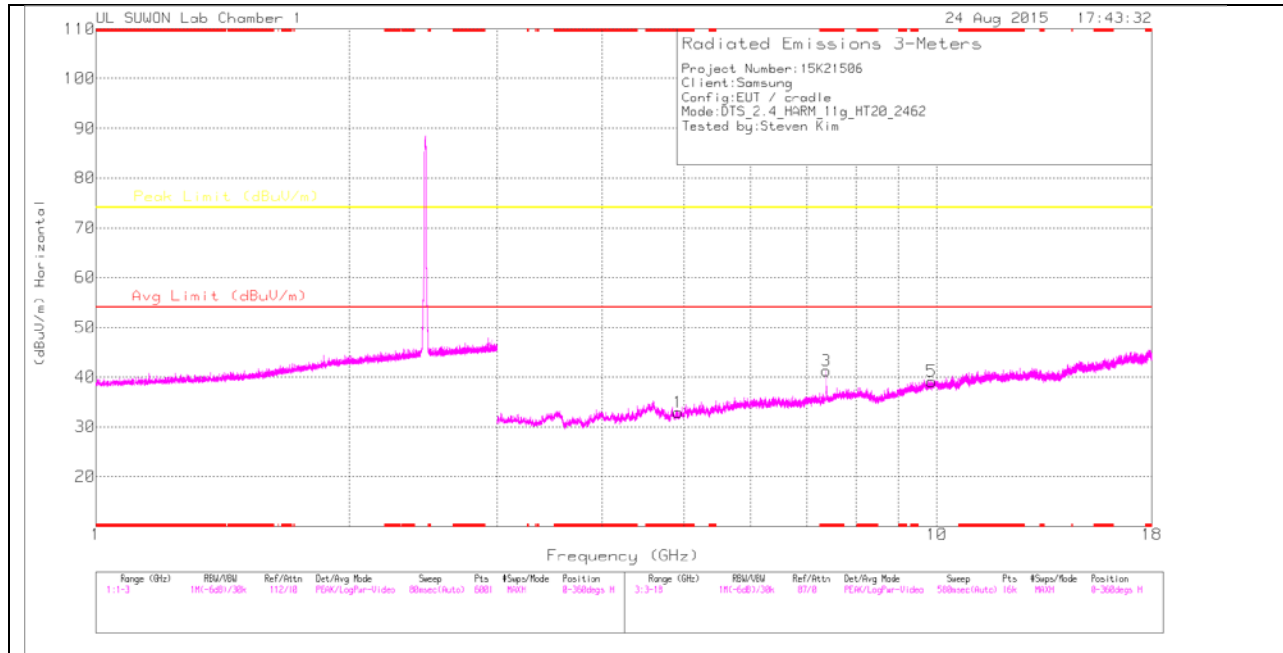
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016872 4)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.872	28.43	PK	34	-29.2	0	33.23	-	-	74	-40.77	0-360	200	H
3	* 7.311	26.5	PK	35.7	-25.7	0	36.5	-	-	74	-37.5	0-360	200	H
5	9.754	23.68	PK	37.2	-22	0	38.88	-	-	74	-35.12	0-360	100	H
2	* 4.869	27.55	PK	34	-29.2	0	32.35	-	-	74	-41.65	0-360	200	V
4	* 7.31	26.79	PK	35.7	-25.7	0	36.79	-	-	74	-37.21	0-360	200	V
6	9.753	23.23	PK	37.2	-22	0	38.43	-	-	74	-35.57	0-360	200	V

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

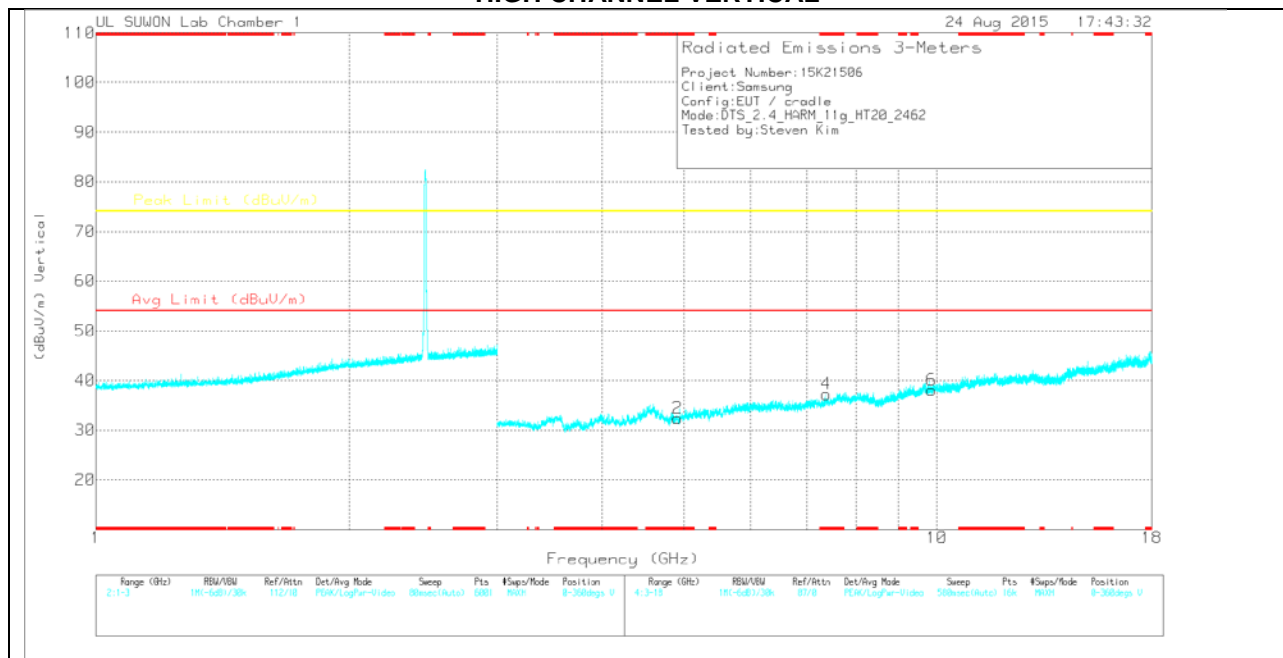
PK – Peak detector

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

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	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	* 4.919	28.01	PK	34	-29.1	0	32.91	-	-	74	-41.09	0-360	200	H
3	* 7.39	30.55	PK	35.8	-25.1	0	41.25	-	-	74	-32.75	0-360	200	H
5	9.862	23.2	PK	37.3	-21.4	0	39.1	-	-	74	-34.9	0-360	200	H
2	* 4.914	27.48	PK	34	-29.1	0	32.38	-	-	74	-41.62	0-360	200	V
4	* 7.389	26.57	PK	35.8	-25.1	0	37.27	-	-	74	-36.73	0-360	100	V
6	9.861	22.22	PK	37.3	-21.4	0	38.12	-	-	74	-35.88	0-360	100	V

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

PK – Peak detector

Radiated Emissions

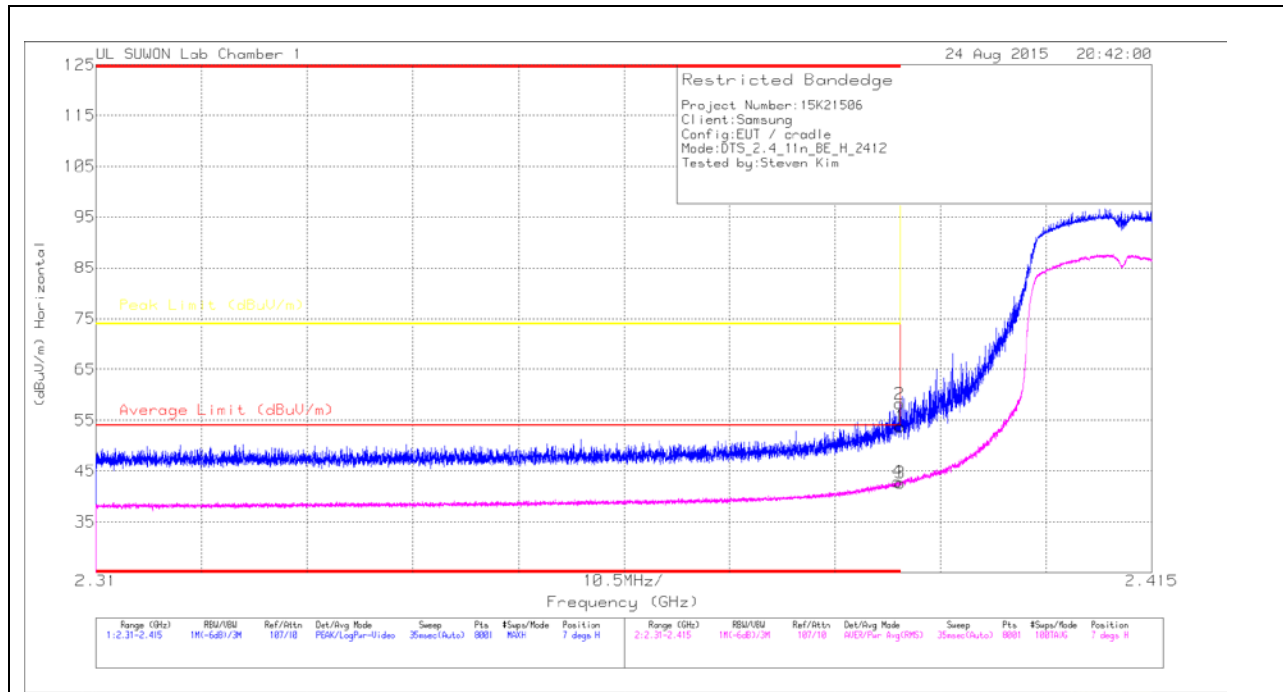
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.382	40.32	PK2	35.8	-25.1	0	51.02	-	-	74	-22.98	176	171	H
* 7.386	26.36	MAV1	35.8	-25.1	.29	37.35	54	-16.65	-	-	176	171	H
* 7.382	39.84	PK2	35.8	-25.1	0	50.54	-	-	74	-23.46	16	192	V
* 7.386	23.74	MAV1	35.8	-25.1	.29	34.73	54	-19.27	-	-	16	192	V

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

PK2 - KDB558074 Method: Maximum Peak

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

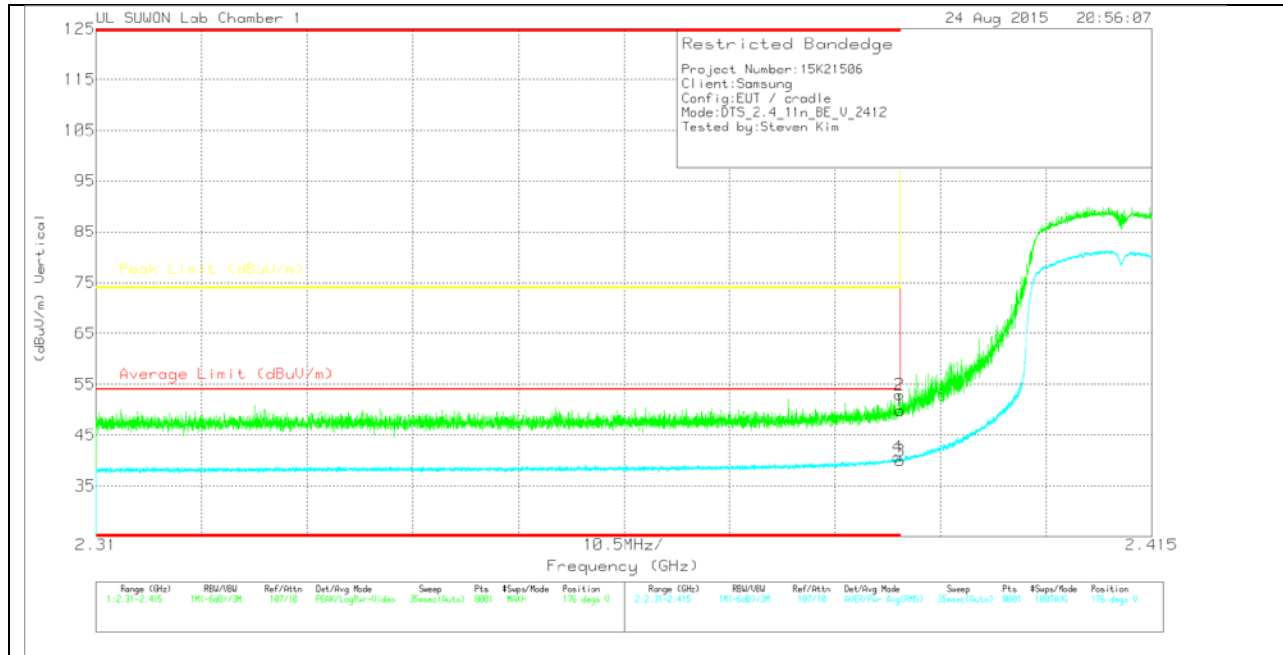
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.8	Pk	31.8	-22.8	0	53.8	-	-	74	-20.2	7	100	H
2	* 2.39	49.21	Pk	31.8	-22.8	0	58.21	-	-	74	-15.79	7	100	H
3	* 2.39	33.38	RMS	31.8	-22.8	.32	42.7	54	-11.3	-	-	7	100	H
4	* 2.39	33.62	RMS	31.8	-22.8	.32	42.94	54	-11.06	-	-	7	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	3117(001687 24)_150619	Path_2_10dB	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	40.88	PK	31.8	-22.8	0	49.88	-	-	74	-24.12	176	135	V
2	* 2.39	43.9	PK	31.8	-22.8	0	52.9	-	-	74	-21.1	176	135	V
3	* 2.39	30.66	RMS	31.8	-22.8	.32	39.98	54	-14.02	-	-	176	135	V
4	* 2.39	31.41	RMS	31.8	-22.8	.32	40.73	54	-13.27	-	-	176	135	V

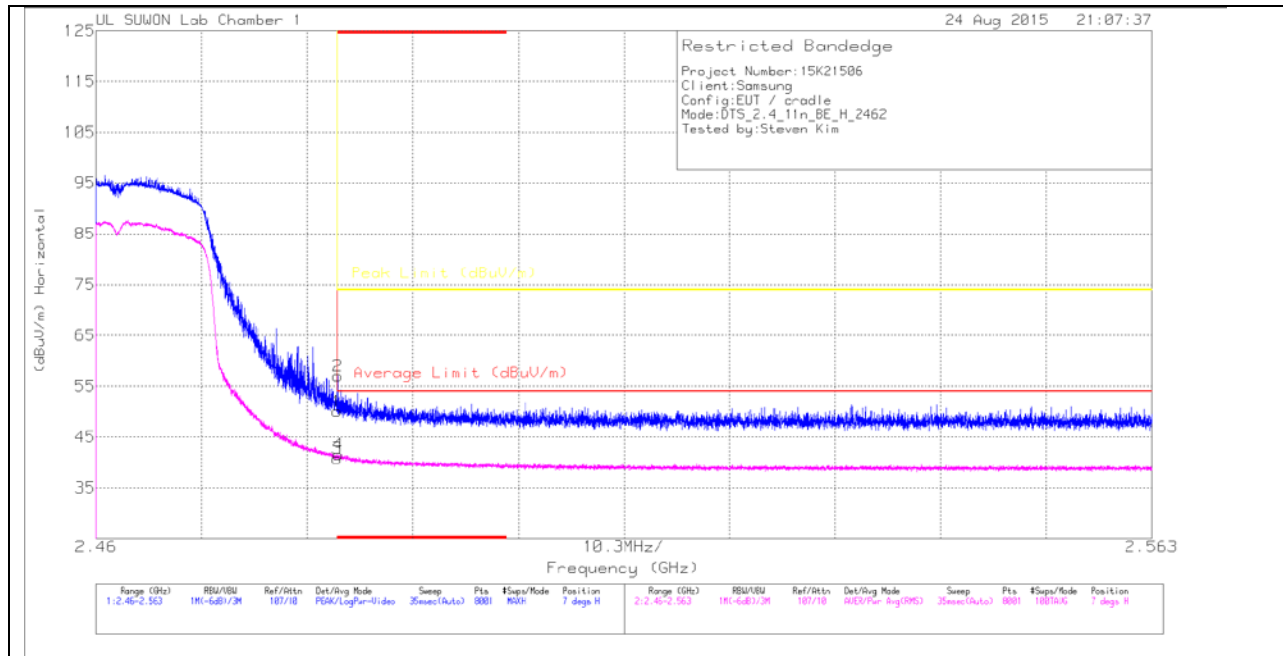
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

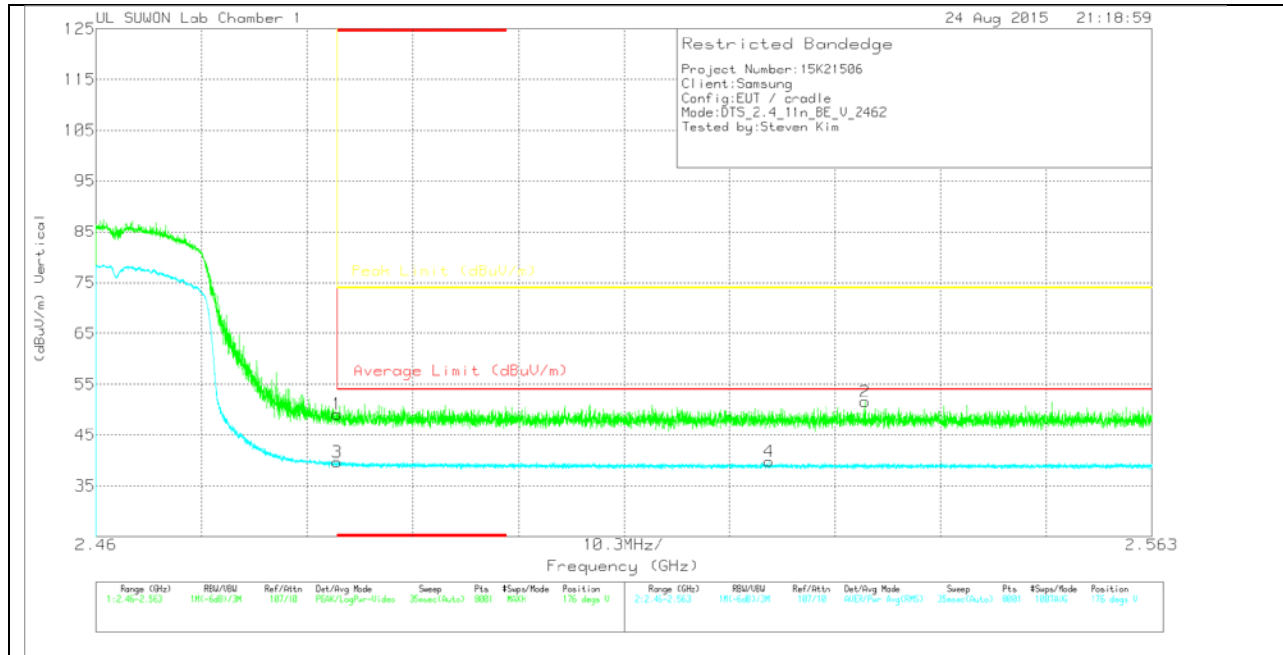
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.63	Pk	32	-22.6	0	50.03	-	-	74	-23.97	7	269	H
2	* 2.484	47.58	Pk	32	-22.6	0	56.98	-	-	74	-17.02	7	269	H
3	* 2.484	31.1	RMS	32	-22.6	.32	40.82	54	-13.18	-	-	7	269	H
4	* 2.484	31.8	RMS	32	-22.6	.32	41.52	54	-12.48	-	-	7	269	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	3117(001687 24)_150619	Path_2_10dB	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	39.71	PK	32	-22.6	0	49.11	-	-	74	-24.89	176	138	V
2	2.535	42.12	PK	32	-22.6	0	51.52	-	-	74	-22.48	176	138	V
3	* 2.484	29.93	RMS	32	-22.6	.32	39.65	54	-14.35	-	-	176	138	V
4	2.526	30.07	RMS	32	-22.6	.32	39.79	54	-14.21	-	-	176	138	V

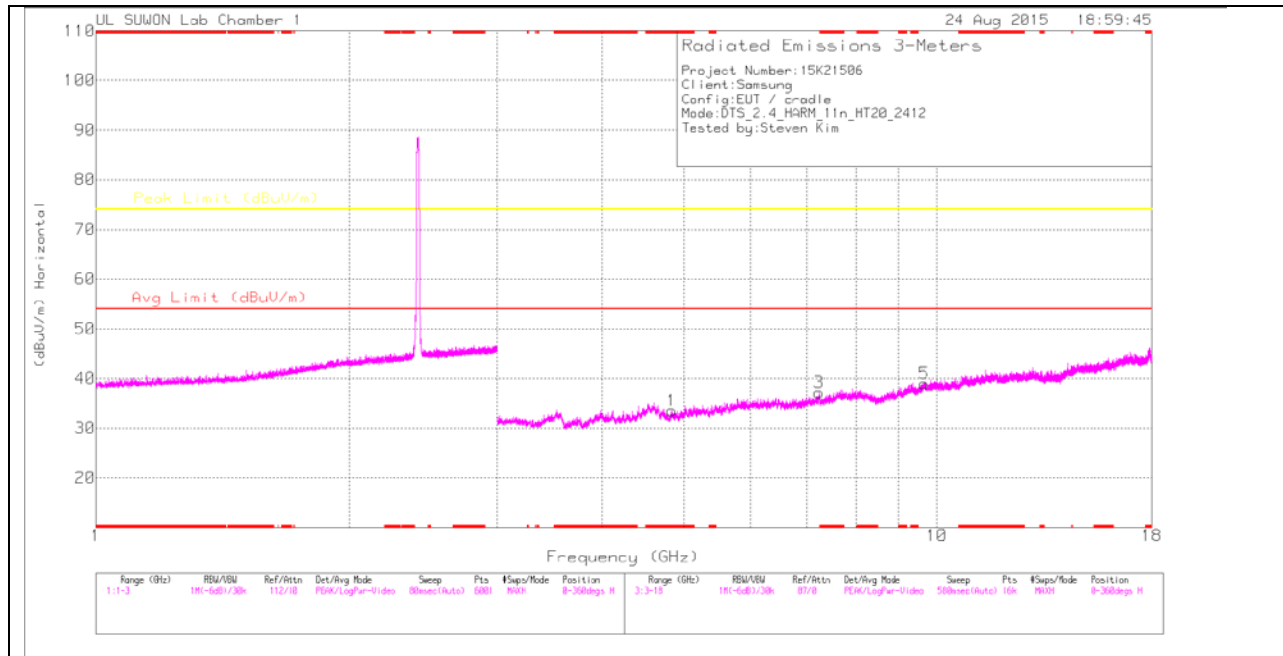
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

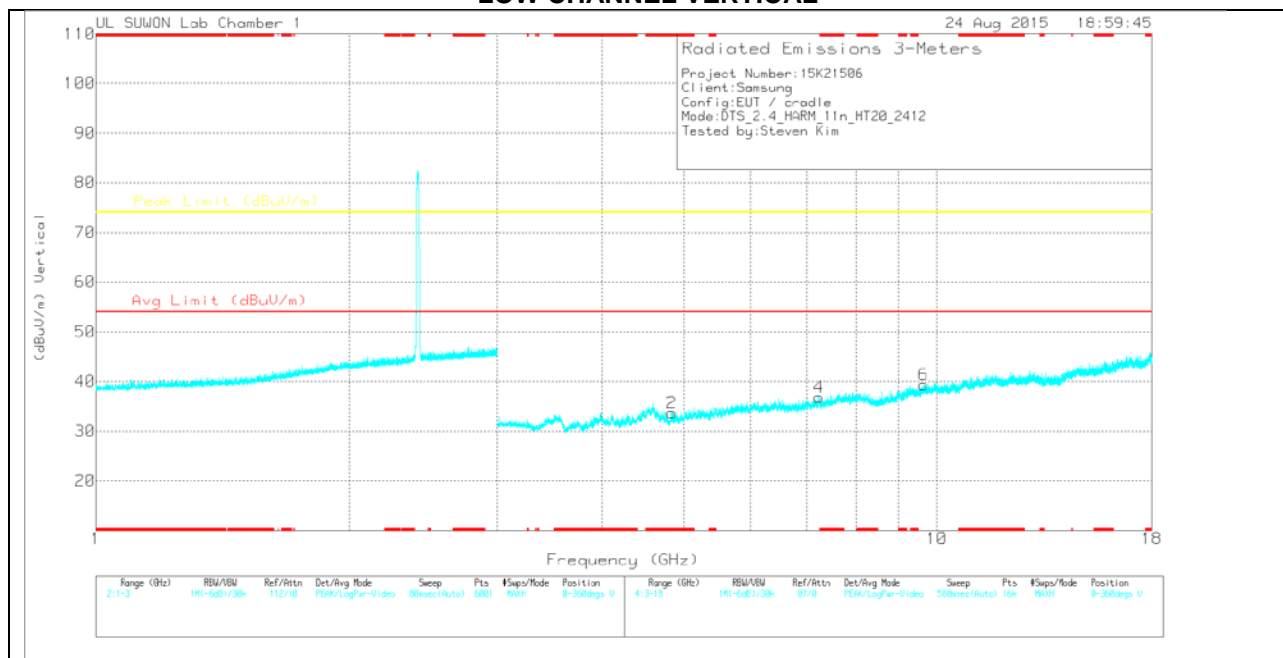
RMS - RMS detection

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

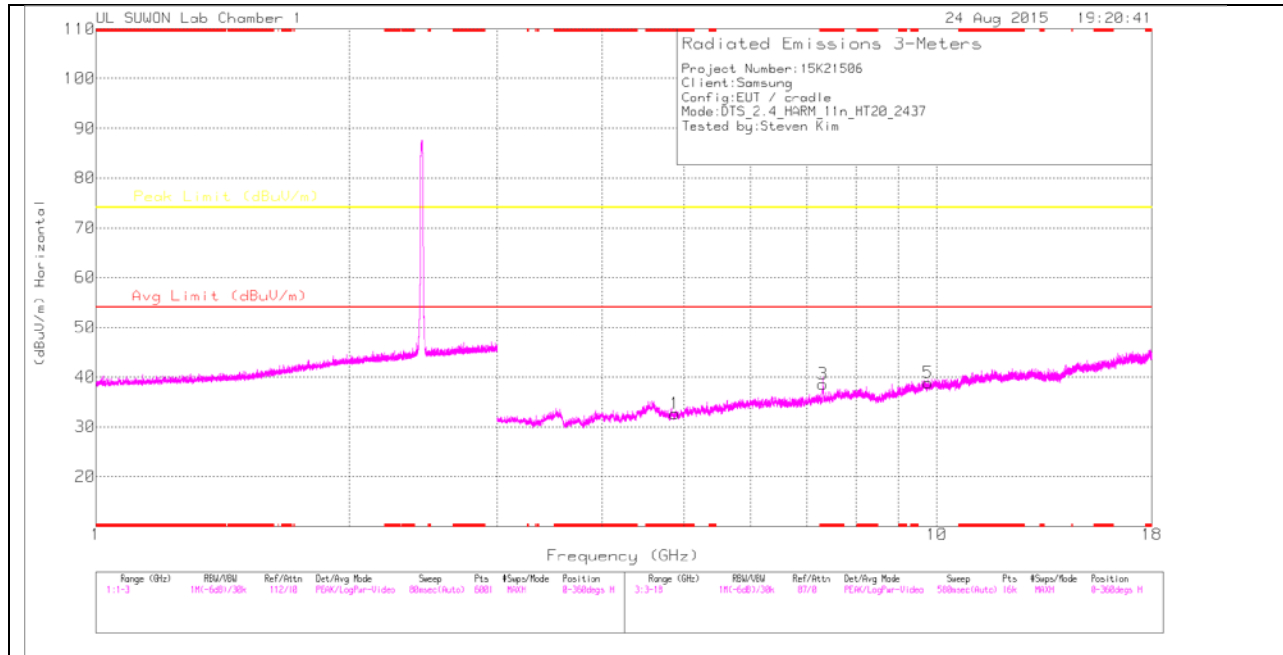
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016872 4)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.835	28.91	PK	34	-29.4	0	33.51	-	-	74	-40.49	0-360	200	H
3	7.235	26.97	PK	35.7	-25.5	0	37.17	-	-	74	-36.83	0-360	200	H
5	9.65	22.64	PK	37.1	-20.8	0	38.94	-	-	74	-35.06	0-360	100	H
2	* 4.836	29.06	PK	34	-29.4	0	33.66	-	-	74	-40.34	0-360	100	V
4	7.237	26.62	PK	35.7	-25.5	0	36.82	-	-	74	-37.18	0-360	200	V
6	9.647	23.1	PK	37.1	-20.8	0	39.4	-	-	74	-34.6	0-360	200	V

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

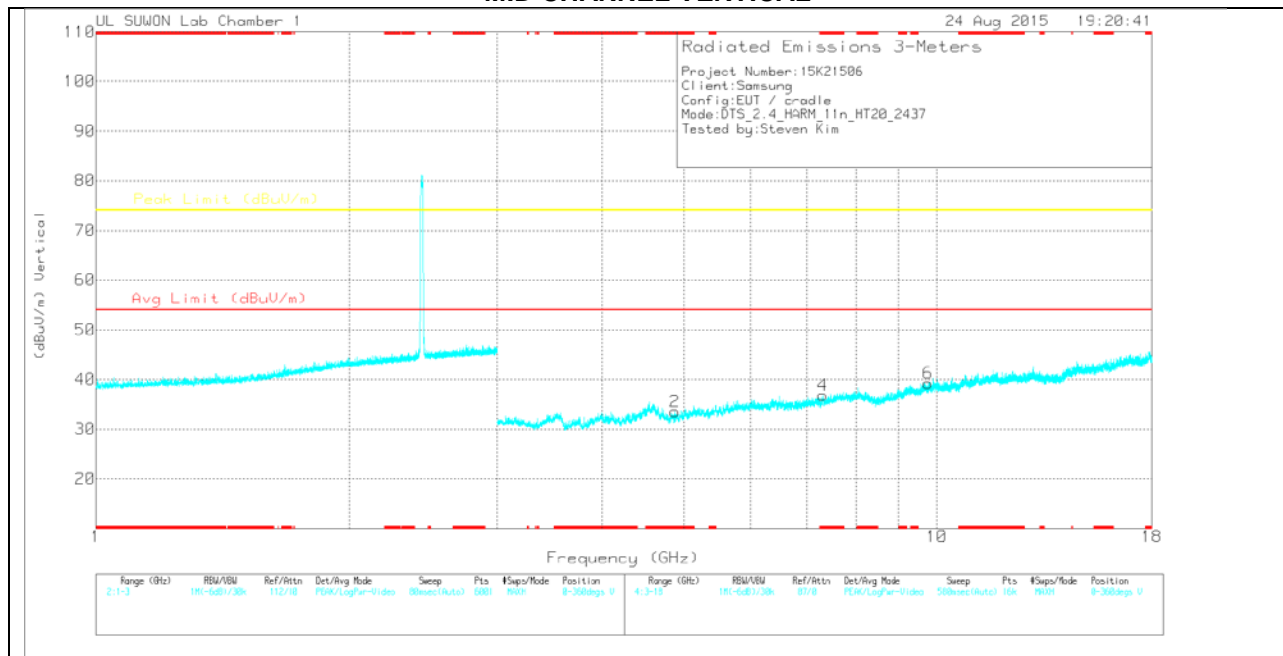
PK – Peak detector

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

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(0016872 4)_150619	Path_3	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	* 4.88	27.72	PK	34	-29.1	0	32.62	-	-	74	-41.38	0-360	100	H
3	* 7.31	28.62	PK	35.7	-25.7	0	38.62	-	-	74	-35.38	0-360	200	H
5	9.757	23.61	PK	37.2	-22	0	38.81	-	-	74	-35.19	0-360	200	H
2	* 4.876	28.69	PK	34	-29.2	0	33.49	-	-	74	-40.51	0-360	100	V
4	* 7.308	26.8	PK	35.7	-25.7	0	36.8	-	-	74	-37.2	0-360	200	V
6	9.758	23.98	PK	37.2	-22	0	39.18	-	-	74	-34.82	0-360	200	V

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

PK – Peak detector

Radiated Emissions

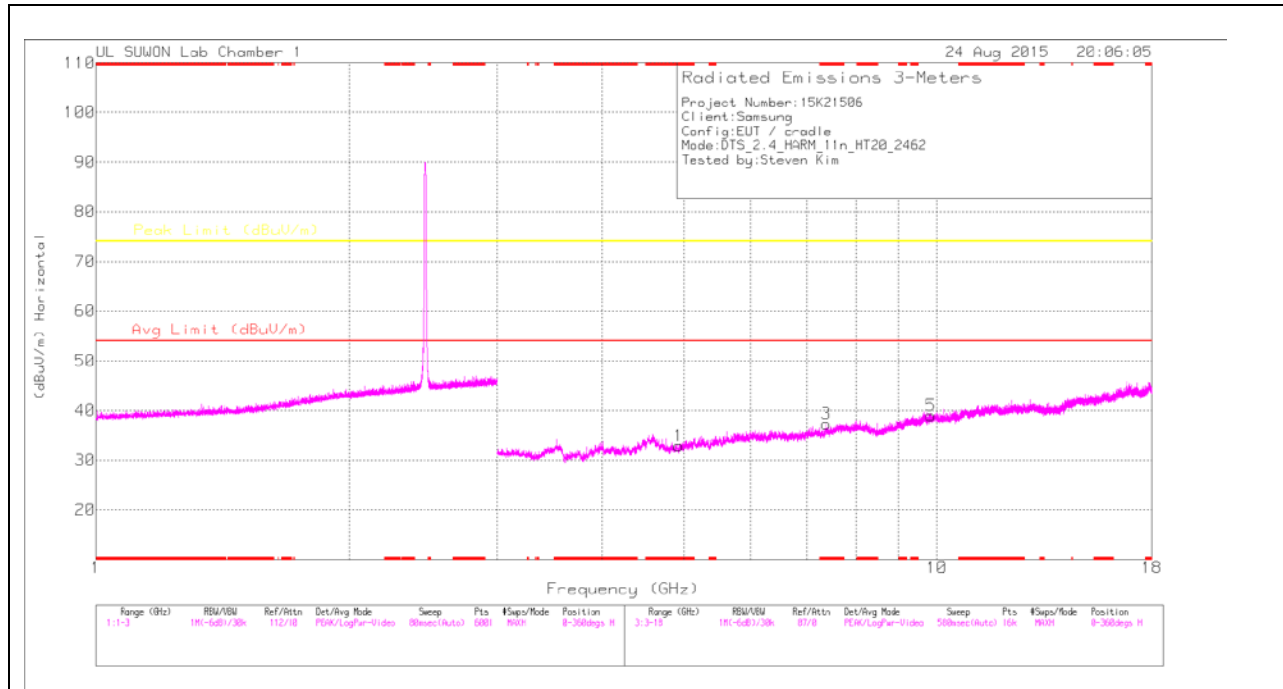
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.311	37.96	PK2	35.7	-25.7	0	47.96	-	-	74	-26.04	250	163	H
* 7.311	24.75	MAv1	35.7	-25.7	.32	35.07	54	-18.93	-	-	250	163	H

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

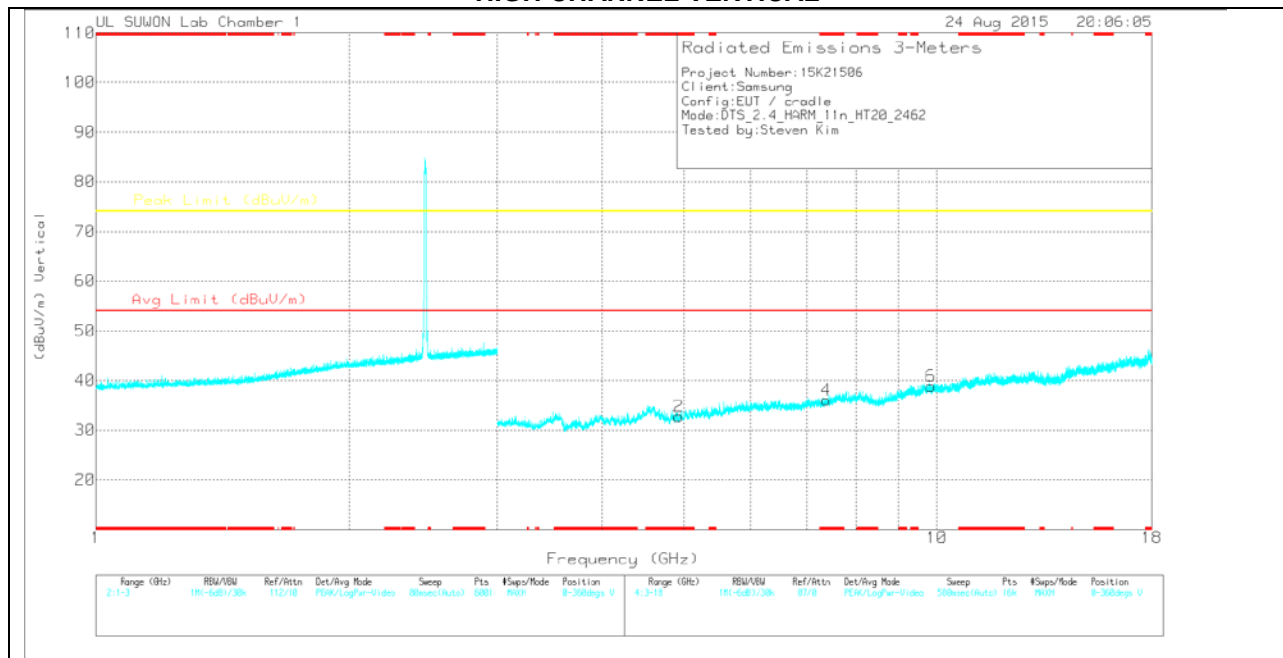
PK2 - KDB558074 Method: Maximum Peak

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	3117(0016872 4)_150619	Path_3	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	* 4.934	27.92	PK	34	-29	0	32.92	-	-	74	-41.08	0-360	100	H
3	* 7.386	26.65	PK	35.8	-25.1	0	37.35	-	-	74	-36.65	0-360	200	H
5	9.849	23.27	PK	37.3	-21.6	0	38.97	-	-	74	-35.03	0-360	100	H
2	* 4.931	27.73	PK	34	-29	0	32.73	-	-	74	-41.27	0-360	100	V
4	* 7.385	25.33	PK	35.8	-25.1	0	36.03	-	-	74	-37.97	0-360	100	V
6	9.846	23.09	PK	37.3	-21.6	0	38.79	-	-	74	-35.21	0-360	100	V

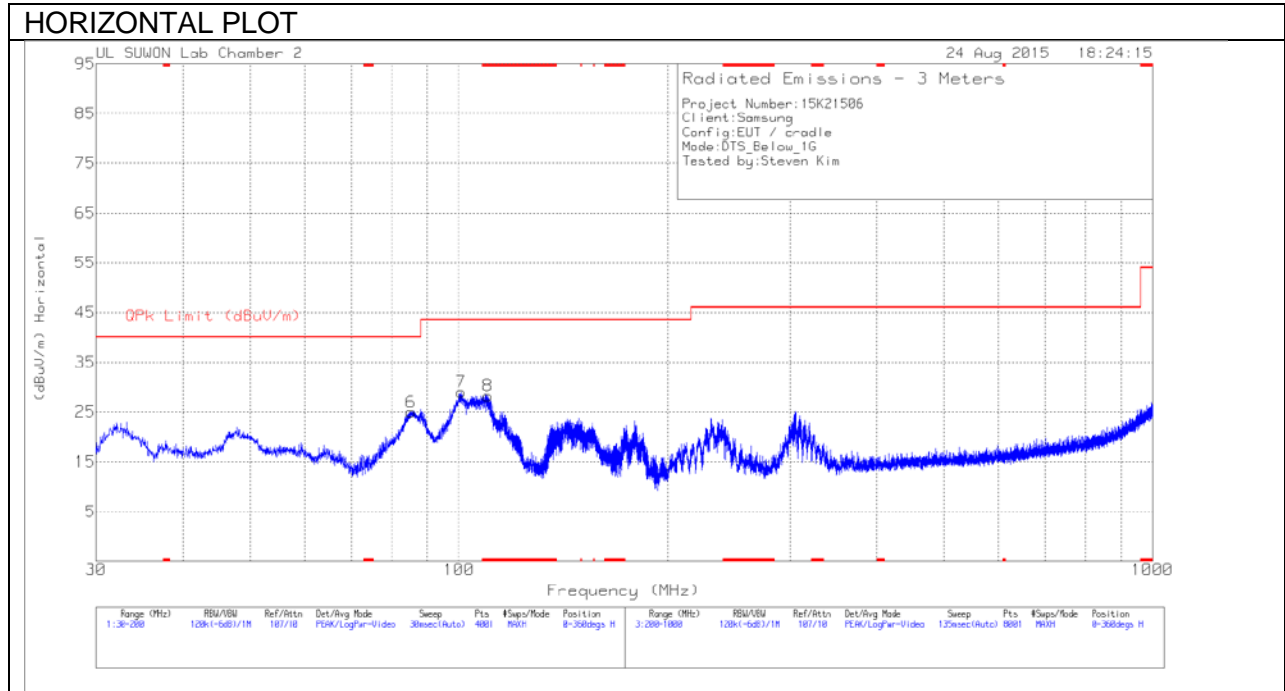
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak detector

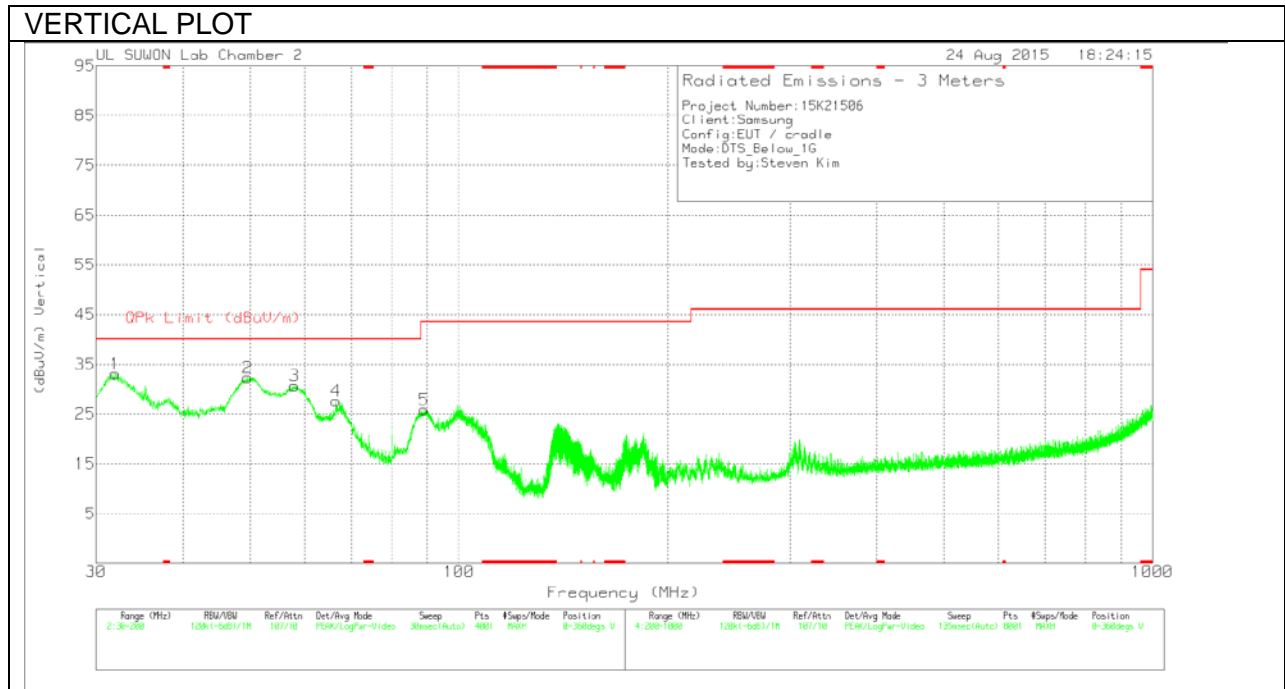
Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

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	VULB9163-749	Below_1G	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	85.2075	47.2	Pk	8.4	-30.6	25	40	-15	0-360	200	H
7	100.7625	47.98	Pk	11.5	-30.5	28.98	43.52	-14.54	0-360	300	H
8	* 109.9	47.93	Pk	10.8	-30.5	28.23	43.52	-15.29	0-360	300	H
1	31.955	53.53	Pk	10.4	-30.8	33.13	40	-6.87	0-360	100	V
2	49.55	48.92	Pk	14.1	-30.7	32.32	40	-7.68	0-360	100	V
3	57.9225	48.33	Pk	13.1	-30.7	30.73	40	-9.27	0-360	100	V
4	66.55	47.64	Pk	10.7	-30.7	27.64	40	-12.36	0-360	100	V
5	89.1175	47.08	Pk	9.4	-30.6	25.88	43.52	-17.64	0-360	100	V

Pk - Peak detector

12. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
RSS-Gen 8.8

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

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10 2009.

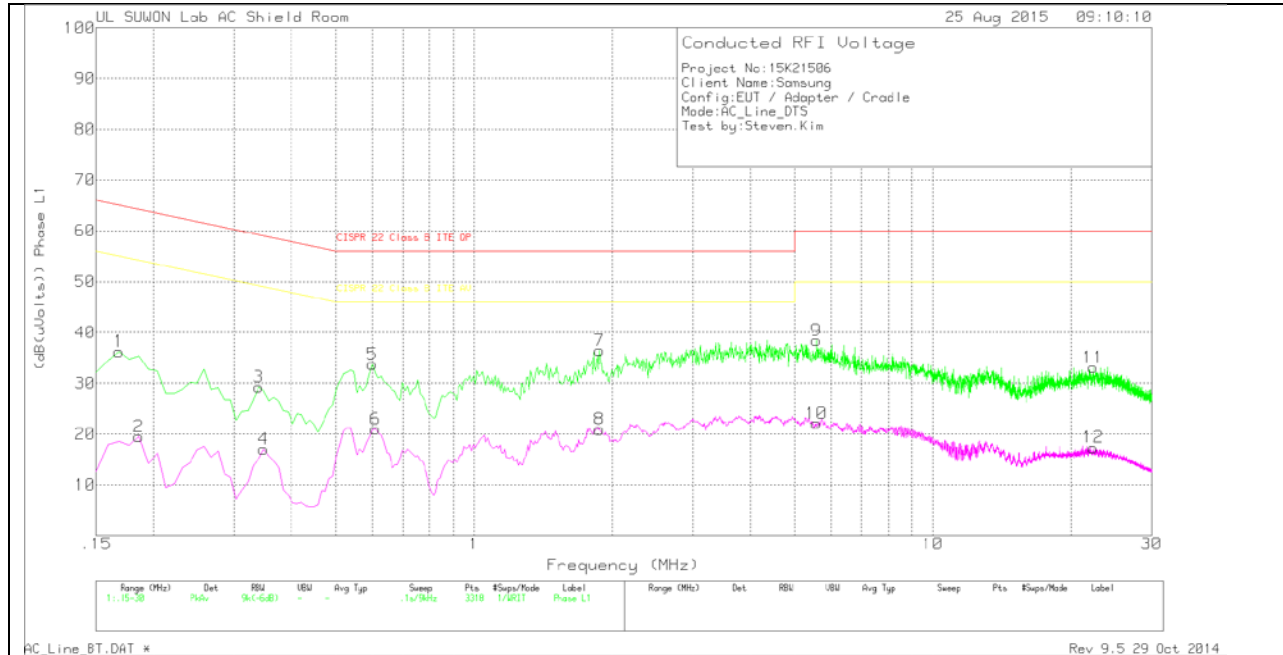
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

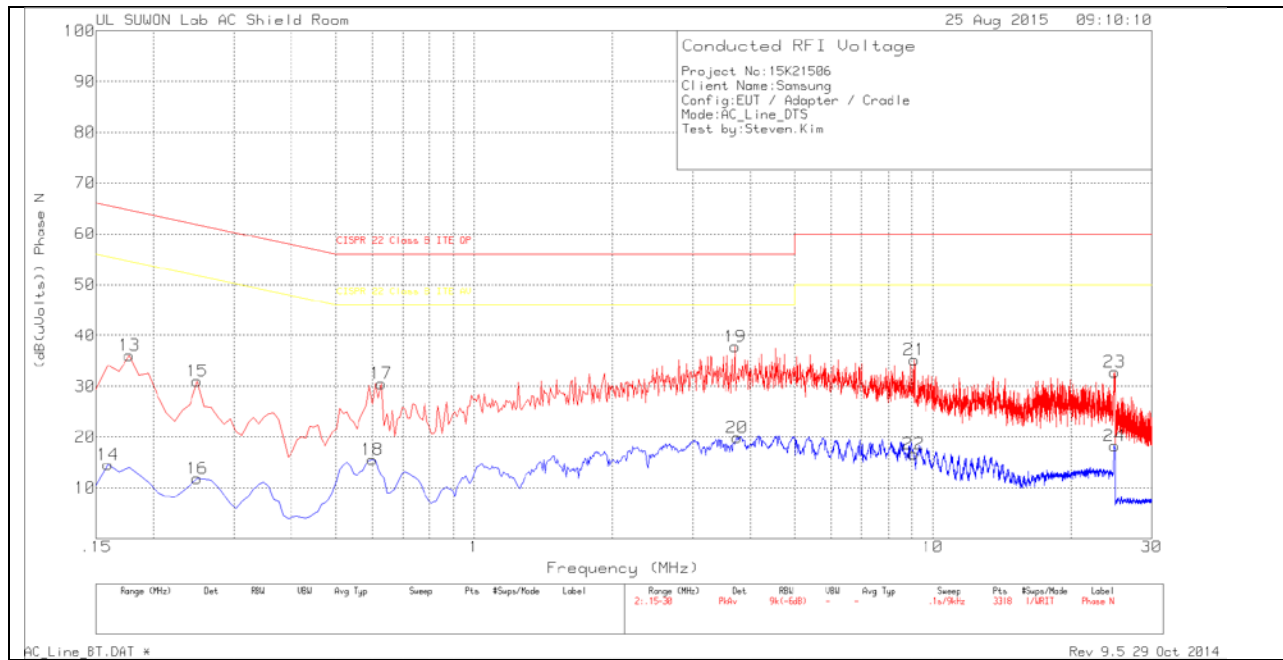
Phase L1 .15 - 30MHz

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	.168	26.07	Pk	10.2	0	36.27	65.06	-28.79	-	-
2	.186	9.44	Av	10.1	0	19.54	-	-	54.21	-34.67
3	.339	19.33	Pk	10	0	29.33	59.23	-29.9	-	-
4	.348	7.05	Av	10	0	17.05	-	-	49.01	-31.96
5	.6	23.64	Pk	10.1	0	33.74	56	-22.26	-	-
6	.609	10.93	Av	10.1	0	21.03	-	-	46	-24.97
7	1.878	26.54	Pk	9.8	.1	36.44	56	-19.56	-	-
8	1.878	11.04	Av	9.8	.1	20.94	-	-	46	-25.06
9	5.577	28.59	Pk	9.8	.1	38.49	60	-21.51	-	-
10	5.568	12.2	Av	9.8	.1	22.1	-	-	50	-27.9
11	22.362	22.4	Pk	10.5	.2	33.1	60	-26.9	-	-
12	22.398	6.65	Av	10.5	.2	17.35	-	-	50	-32.65

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	.177	25.96	Pk	10.1	0	36.06	64.63	-28.57	-	-
14	.159	4.61	Av	10	0	14.61	-	-	55.52	-40.91
15	.249	21.3	Pk	9.7	0	31	61.79	-30.79	-	-
16	.249	2.2	Av	9.7	0	11.9	-	-	51.79	-39.89
17	.627	20.51	Pk	10	0	30.51	56	-25.49	-	-
18	.6	5.46	Av	10.1	0	15.56	-	-	46	-30.44
19	3.705	27.95	Pk	9.8	.1	37.85	56	-18.15	-	-
20	3.75	10	Av	9.8	.1	19.9	-	-	46	-26.1
21	9.123	25.04	Pk	10	.2	35.24	60	-24.76	-	-
22	9.069	6.43	Av	10	.2	16.63	-	-	50	-33.37
23	24.927	21.81	Pk	10.7	.3	32.81	60	-27.19	-	-
24	24.9	7.23	Av	10.7	.3	18.23	-	-	50	-31.77

Pk - Peak detector

Av - Average detection