



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

DTS Wireless LAN

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER : SM-T670

FCC ID: A3LSMT670

IC ID: 649E-SMT670

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Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	09/08/15	Initial issue	Junwhan Lee
--	09/14/15	Revised test plot of page 15	Junwhan Lee
--	09/15/15	Added Section 10.3	Junwhan Lee

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1. ATTESTATION OF TEST RESULTS

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

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

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

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

Approved & Released For
UL Korea, Ltd. By:



CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Junwhan Lee
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, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1
☒ Chamber 2

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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, DTS/UNII a/b/g/n/ac and ANT+ Tablet.

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	Average Power [dBm]	Average Power [mW]	Output Power [dBm] (Peak)	Output Power [mW] (Peak)
2412 - 2462	802.11b	16.32	42.85	19.27	84.53
	802.11g	14.26	26.67	22.29	169.43
	802.11n HT20	13.02	20.04	21.19	131.52

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antennas, with a antenna's maximum gain of 2.94 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	KSAS0501900200HU	R37G819A01R0KT3	N/A
Data Cable	SAMSUNG	EP-DG925UWE	N/A	N/A
Earphone	SAMSUNG	GH59-13967A	N/A	N/A

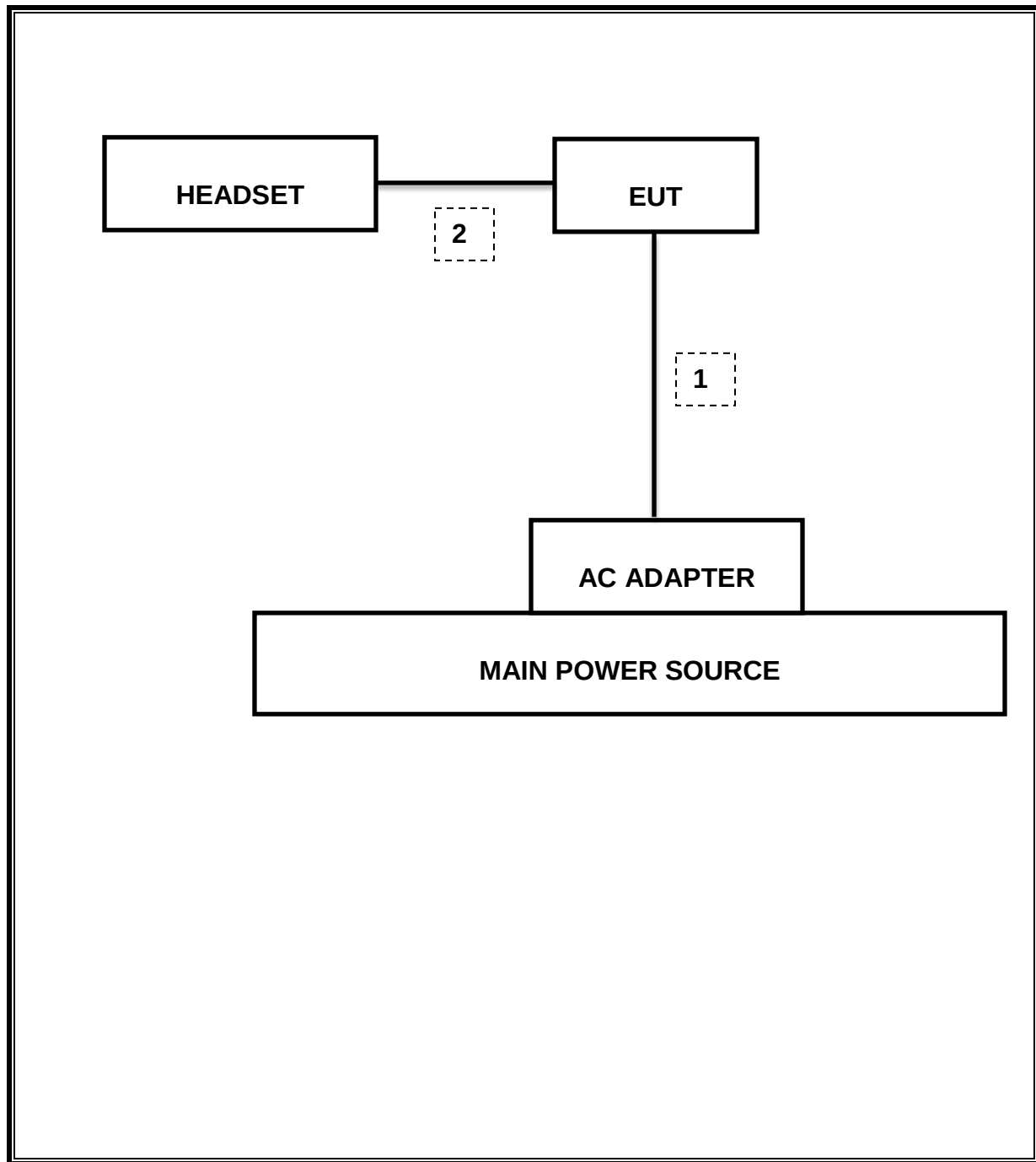
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

TEST SETUP

The EUT is 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 §9.1.1 is used for peak power and §9.2.3.1 AVGPM is used for average power and §10.2 AVGPS-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.

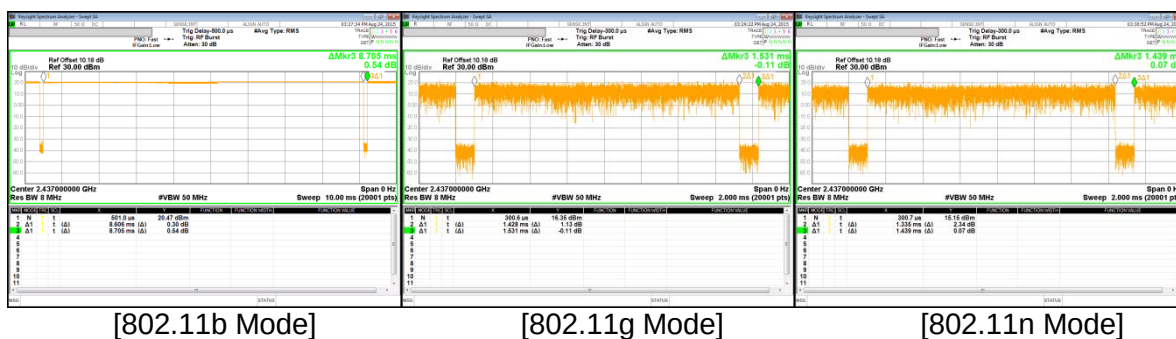
8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

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]
2400MHz Bands						
802.11b	8.606	8.705	0.989	98.9%	0.00	0.010
802.11g	1.428	1.531	0.933	93.3%	0.30	0.700
802.11n HT20	1.335	1.439	0.928	92.8%	0.33	0.749



9. SUMMARY TABLE

FCC Part Section	IC Section	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	9.037 MHz
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-35.806 dBm
15.247	RSS-247 5.4(4)	TX conducted output power	<30dBm		Pass	22.29 dBm
15.247	RSS-247 5.2(2)	PSD	<8dBm		Pass	-13.97 dBm
15.207 (a)	RSS-GEN Clause 8.8	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	48.66 dBuV (QP)
15.205, 15.209	RSS-GEN Clause 7 & 8.9	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	48.54 dBuV/m (AV)

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	9.037	0.5
Mid	2437	9.052	0.5
High	2462	9.046	0.5
Worst		9.037	0.5

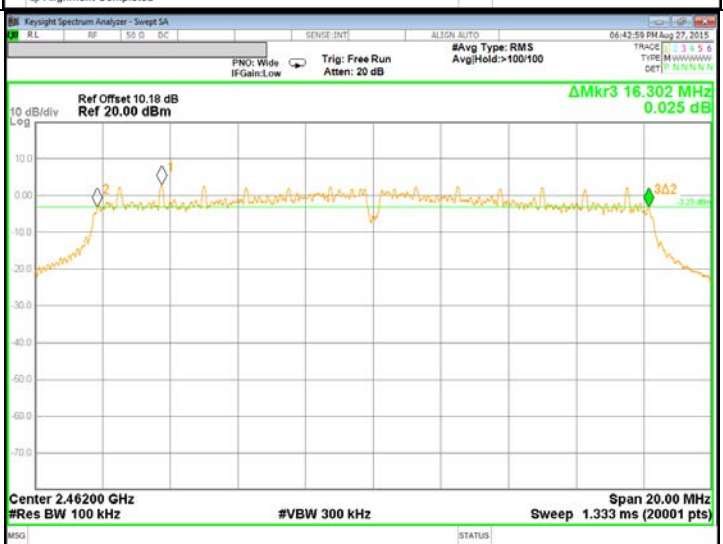
10.1.2. 802.11g MODE IN THE 2.4 GHz BAND

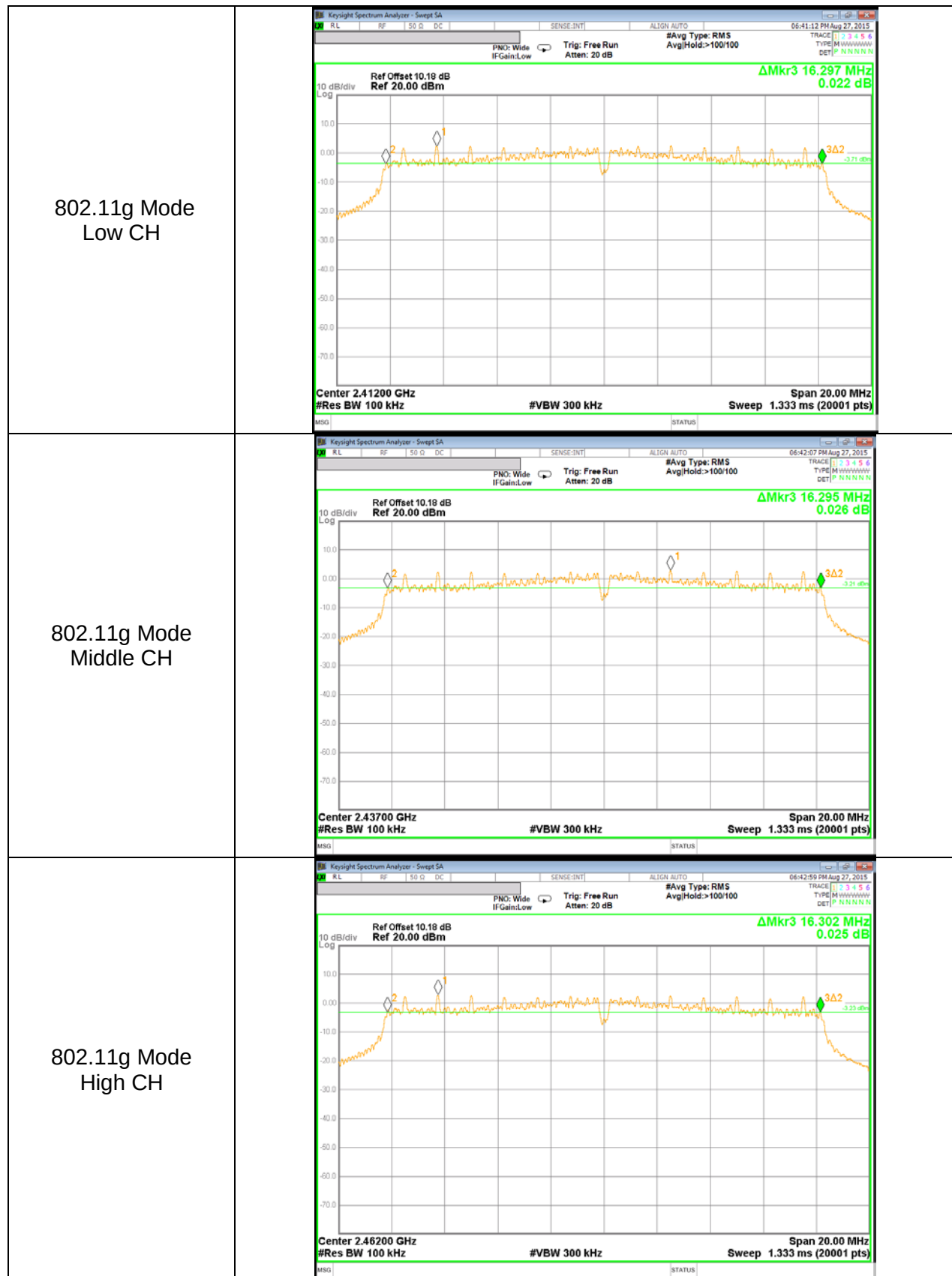
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	16.297	0.5
Mid	2437	16.295	0.5
High	2462	16.302	0.5
Worst		16.295	0.5

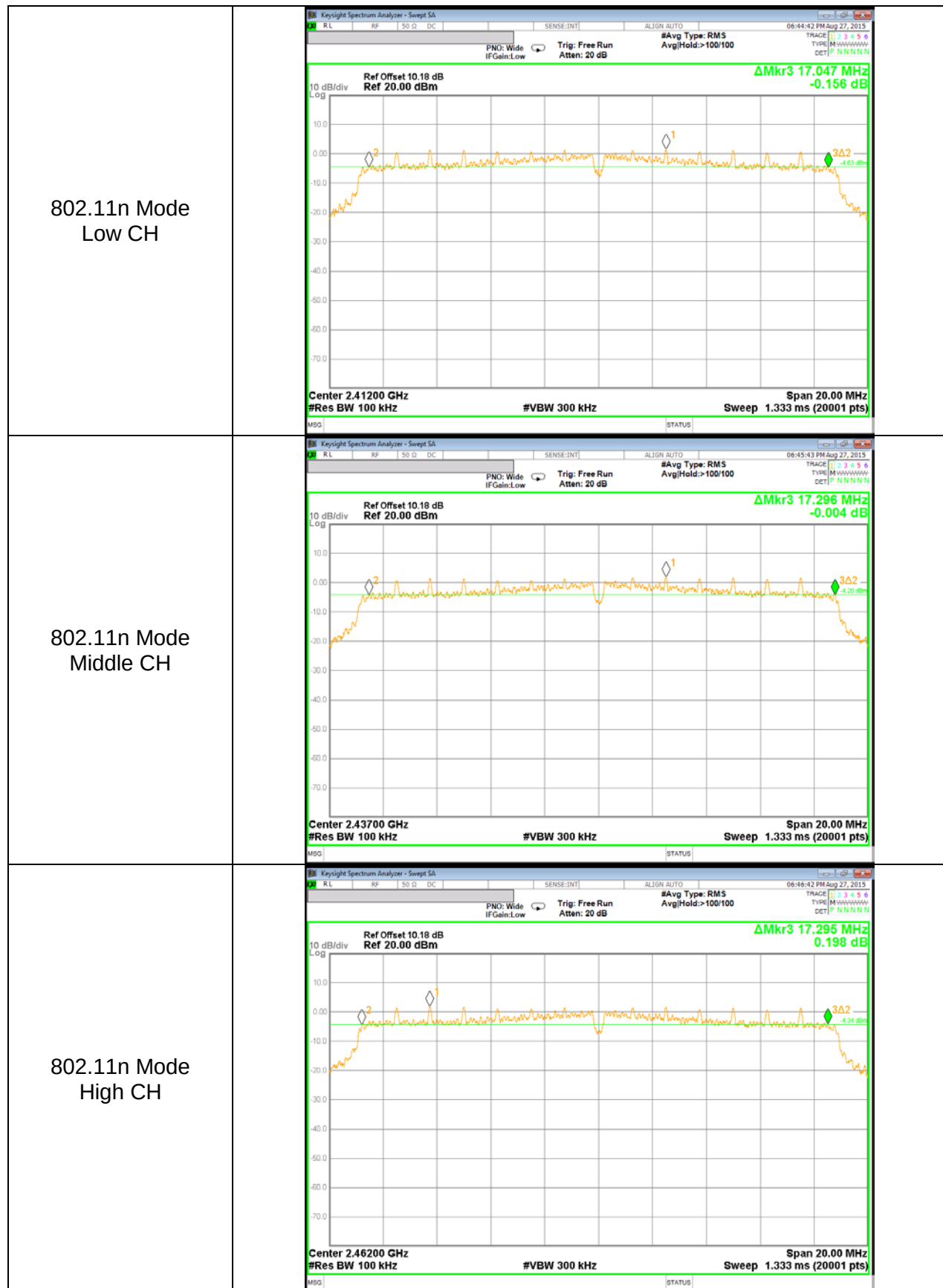
10.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	17.047	0.5
Mid	2437	17.296	0.5
High	2462	17.295	0.5
Worst		17.047	0.5

10.1.4. 6 dB BANDWIDTH PLOTS

802.11b Mode Low CH	
802.11b Mode Middle CH	
802.11b Mode High CH	





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	11.947
Mid	2437	12.041
High	2462	12.084
Worst		12.084

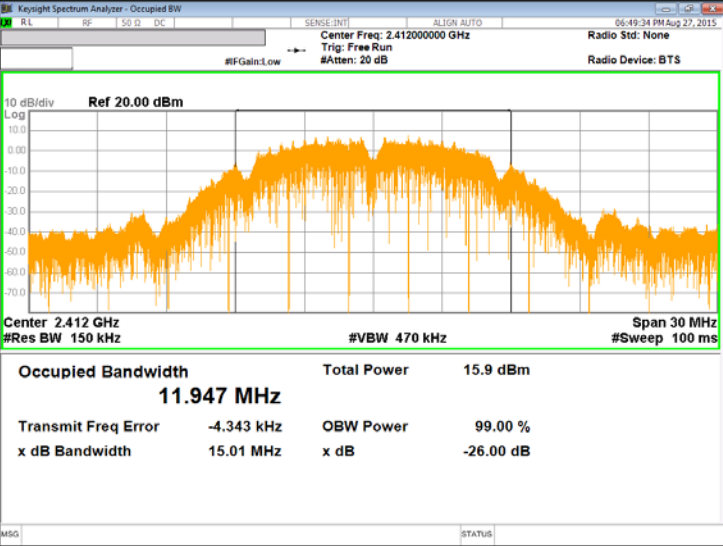
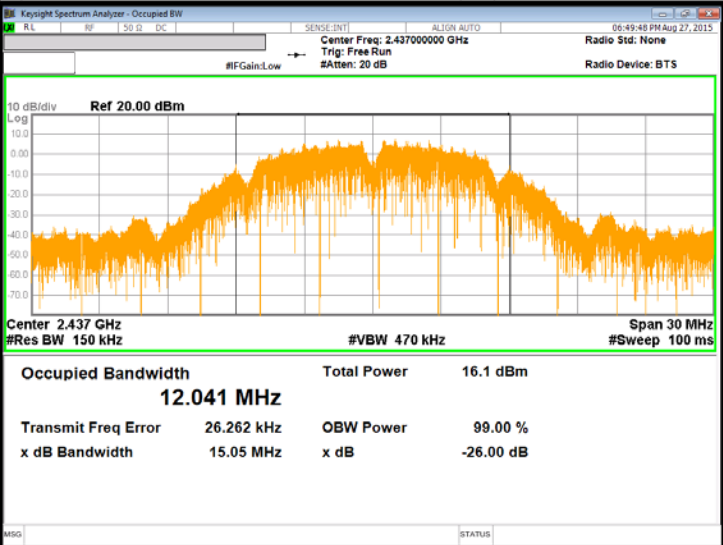
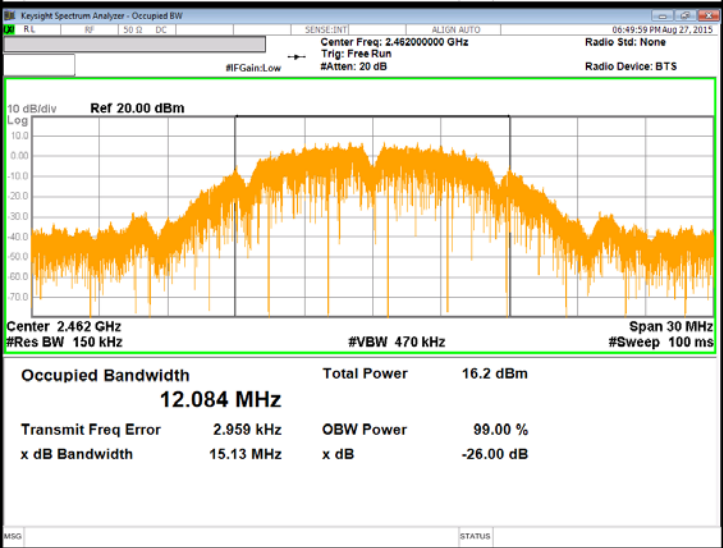
10.2.2. 802.11g MODE IN THE 2.4 GHz BAND

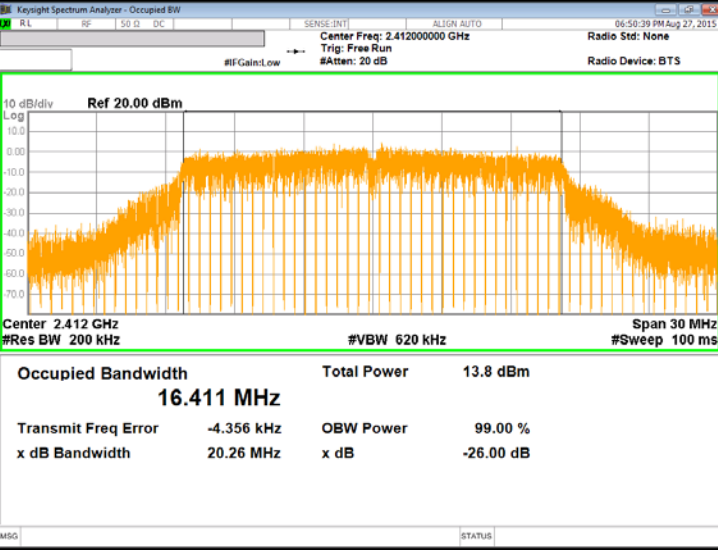
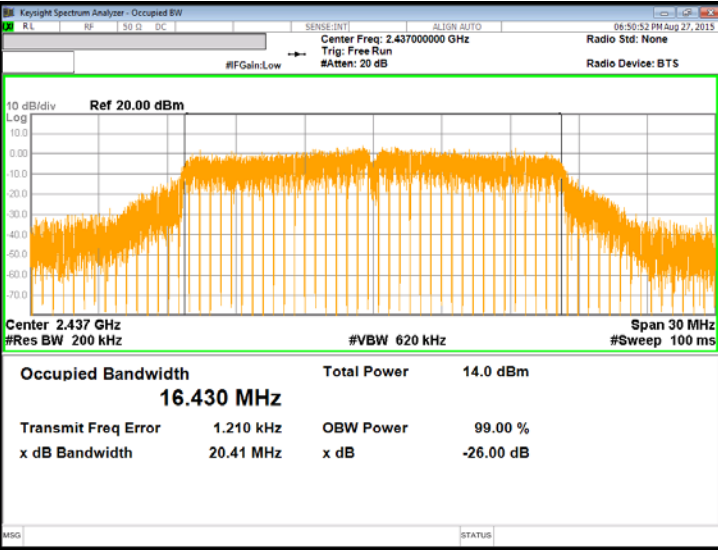
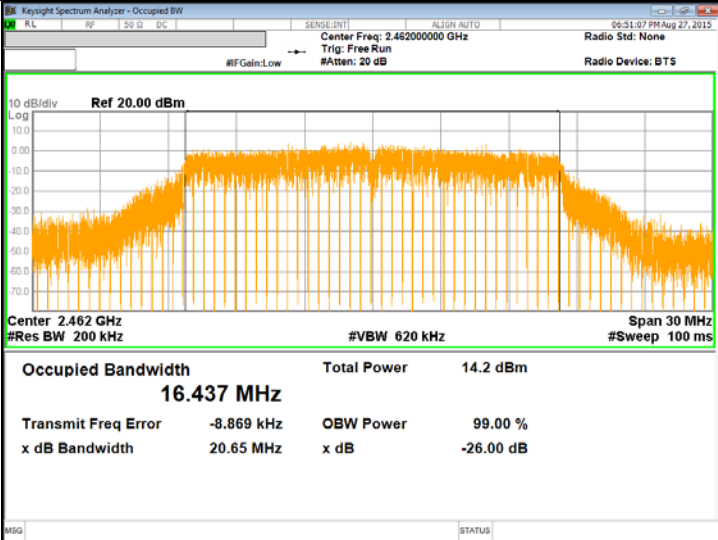
Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	16.411
Mid	2437	16.430
High	2462	16.437
Worst		16.437

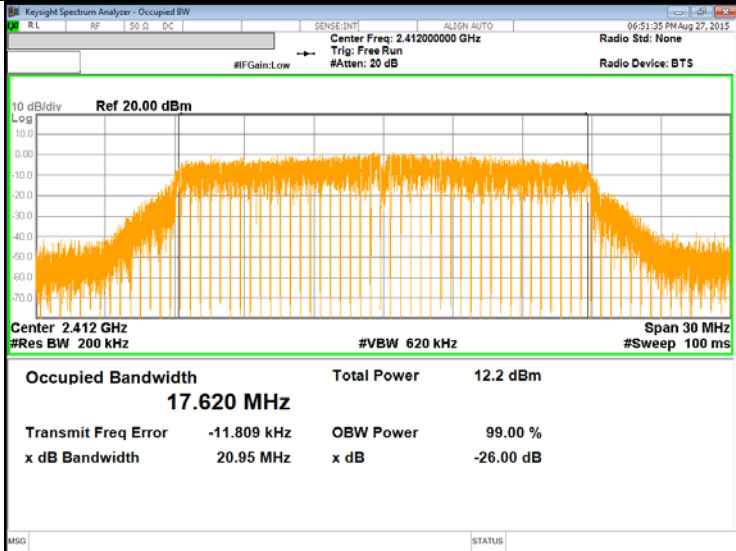
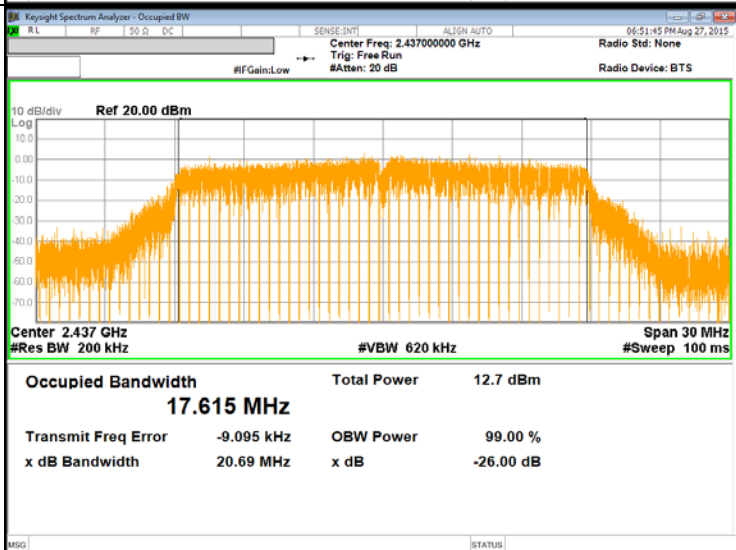
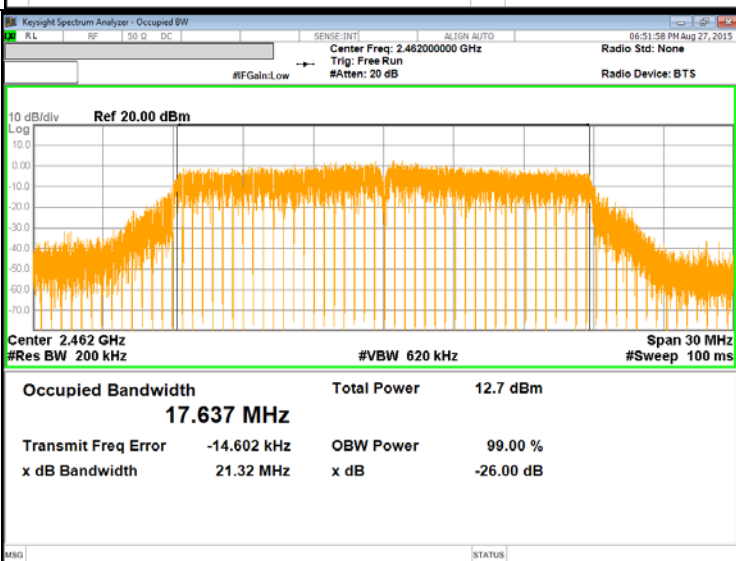
10.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	17.620
Mid	2437	17.615
High	2462	17.637
Worst		17.637

10.2.4. 99% BANDWIDTH PLOTS

802.11b Mode Low CH	 KeySight Spectrum Analyzer - Occupied BW Center Freq: 2.412000000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.412 GHz #Res BW 150 kHz #VBW 470 kHz Span 30 MHz #Sweep 100 ms Occupied Bandwidth 11.947 MHz Total Power 15.9 dBm Transmit Freq Error -4.343 kHz OBW Power 99.00 % x dB Bandwidth 15.01 MHz x dB -26.00 dB
802.11b Mode Middle CH	 KeySight Spectrum Analyzer - Occupied BW Center Freq: 2.437000000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.437 GHz #Res BW 150 kHz #VBW 470 kHz Span 30 MHz #Sweep 100 ms Occupied Bandwidth 12.041 MHz Total Power 16.1 dBm Transmit Freq Error 26.262 kHz OBW Power 99.00 % x dB Bandwidth 15.05 MHz x dB -26.00 dB
802.11b Mode High CH	 KeySight Spectrum Analyzer - Occupied BW Center Freq: 2.462000000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.462 GHz #Res BW 150 kHz #VBW 470 kHz Span 30 MHz #Sweep 100 ms Occupied Bandwidth 12.084 MHz Total Power 16.2 dBm Transmit Freq Error 2.959 kHz OBW Power 99.00 % x dB Bandwidth 15.13 MHz x dB -26.00 dB

802.11g Mode Low CH	 KeySight Spectrum Analyzer - Occupied BW Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.412 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms Occupied Bandwidth 16.411 MHz Total Power 13.8 dBm Transmit Freq Error -4.356 kHz OBW Power 99.00 % x dB Bandwidth 20.26 MHz x dB -26.00 dB
802.11g Mode Middle CH	 KeySight Spectrum Analyzer - Occupied BW Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.437 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms Occupied Bandwidth 16.430 MHz Total Power 14.0 dBm Transmit Freq Error 1.210 kHz OBW Power 99.00 % x dB Bandwidth 20.41 MHz x dB -26.00 dB
802.11g Mode High CH	 KeySight Spectrum Analyzer - Occupied BW Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.462 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms Occupied Bandwidth 16.437 MHz Total Power 14.2 dBm Transmit Freq Error -8.869 kHz OBW Power 99.00 % x dB Bandwidth 20.65 MHz x dB -26.00 dB

802.11n Mode Low CH	 Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.412 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms <table><tr><td>Occupied Bandwidth</td><td>Total Power</td><td>12.2 dBm</td></tr><tr><td>17.620 MHz</td><td></td><td></td></tr><tr><td>Transmit Freq Error</td><td>-11.809 kHz</td><td>OBW Power</td></tr><tr><td>x dB Bandwidth</td><td>20.95 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	12.2 dBm	17.620 MHz			Transmit Freq Error	-11.809 kHz	OBW Power	x dB Bandwidth	20.95 MHz	x dB			99.00 %			-26.00 dB
Occupied Bandwidth	Total Power	12.2 dBm																	
17.620 MHz																			
Transmit Freq Error	-11.809 kHz	OBW Power																	
x dB Bandwidth	20.95 MHz	x dB																	
		99.00 %																	
		-26.00 dB																	
802.11n Mode Middle CH	 Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.437 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms <table><tr><td>Occupied Bandwidth</td><td>Total Power</td><td>12.7 dBm</td></tr><tr><td>17.615 MHz</td><td></td><td></td></tr><tr><td>Transmit Freq Error</td><td>-9.095 kHz</td><td>OBW Power</td></tr><tr><td>x dB Bandwidth</td><td>20.69 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	12.7 dBm	17.615 MHz			Transmit Freq Error	-9.095 kHz	OBW Power	x dB Bandwidth	20.69 MHz	x dB			99.00 %			-26.00 dB
Occupied Bandwidth	Total Power	12.7 dBm																	
17.615 MHz																			
Transmit Freq Error	-9.095 kHz	OBW Power																	
x dB Bandwidth	20.69 MHz	x dB																	
		99.00 %																	
		-26.00 dB																	
802.11n Mode High CH	 Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB Radio Std: None Radio Device: BTS Ref 20.00 dBm Center 2.462 GHz #Res BW 200 kHz #VBW 620 kHz Span 30 MHz #Sweep 100 ms <table><tr><td>Occupied Bandwidth</td><td>Total Power</td><td>12.7 dBm</td></tr><tr><td>17.637 MHz</td><td></td><td></td></tr><tr><td>Transmit Freq Error</td><td>-14.602 kHz</td><td>OBW Power</td></tr><tr><td>x dB Bandwidth</td><td>21.32 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	12.7 dBm	17.637 MHz			Transmit Freq Error	-14.602 kHz	OBW Power	x dB Bandwidth	21.32 MHz	x dB			99.00 %			-26.00 dB
Occupied Bandwidth	Total Power	12.7 dBm																	
17.637 MHz																			
Transmit Freq Error	-14.602 kHz	OBW Power																	
x dB Bandwidth	21.32 MHz	x dB																	
		99.00 %																	
		-26.00 dB																	

10.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

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

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	16.08
Mid	2437	16.14
High	2462	16.32
Worst		16.32

10.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	13.83
Mid	2437	14.18
High	2462	14.26
Worst		14.26

10.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	12.52
Mid	2437	12.77
High	2462	13.02
Worst		13.02

10.4. OUTPUT POWER(Peak)

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.

RESULTS

10.4.1. 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	2.94	30.00	30.00	36.00	30.00
Mid	2437	2.94	30.00	30.00	36.00	30.00
High	2462	2.94	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	18.62	18.62	36.00	-17.38
Mid	2437	19.27	19.27	36.00	-16.73
High	2462	18.39	18.39	36.00	-17.61
Worst			19.27	36.00	-16.73

10.4.2. 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	2.94	30.00	30.00	36.00	30.00
Mid	2437	2.94	30.00	30.00	36.00	30.00
High	2462	2.94	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	21.55	21.55	36.00	-14.45
Mid	2437	22.29	22.29	36.00	-13.71
High	2462	21.57	21.57	36.00	-14.43
Worst			22.29	36.00	-13.71

10.4.3. 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	2.94	30.00	30.00	36.00	30.00
Mid	2437	2.94	30.00	30.00	36.00	30.00
High	2462	2.94	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	20.72	20.72	36.00	-15.28
Mid	2437	21.19	21.19	36.00	-14.81
High	2462	20.55	20.55	36.00	-15.45
Worst			21.19	36.00	-14.81

10.5. 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 AVGPS-2” under KDB558074 D01 DTS Meas Guidance v03r03

RESULTS

10.5.1. 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	-15.582	0.00	-15.58	8.00	-23.58
Mid	2437	-15.34	0.00	-15.34	8.00	-23.34
High	2462	-15.497	0.00	-15.50	8.00	-23.50

10.5.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

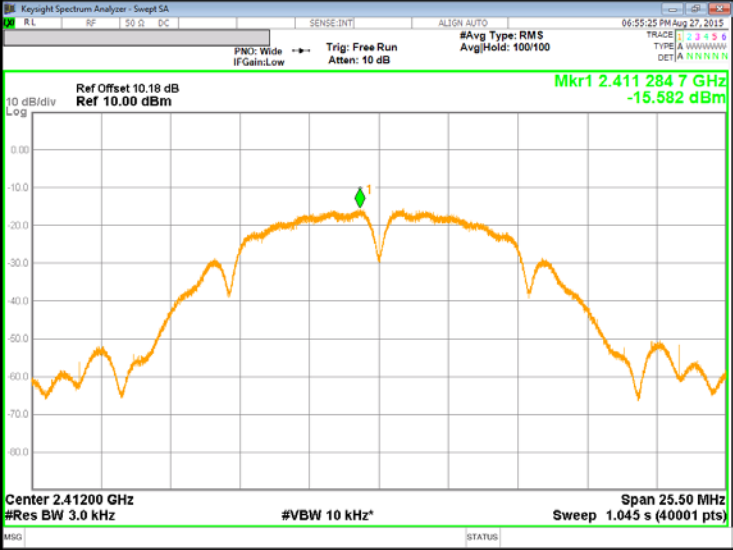
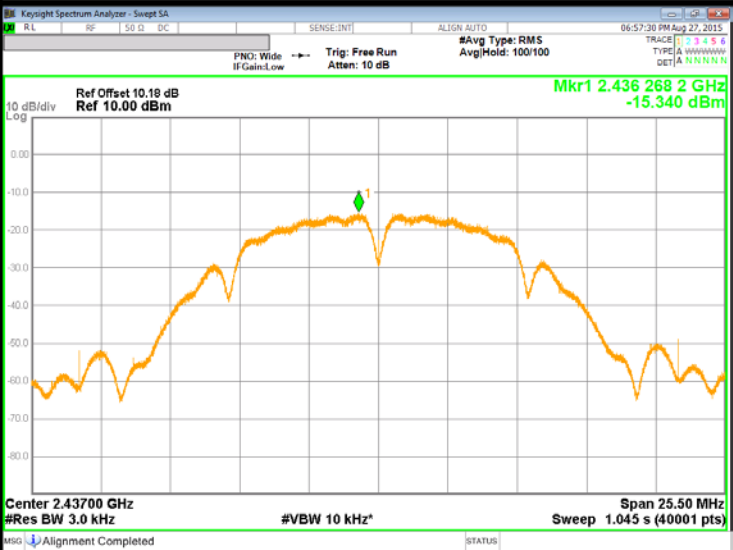
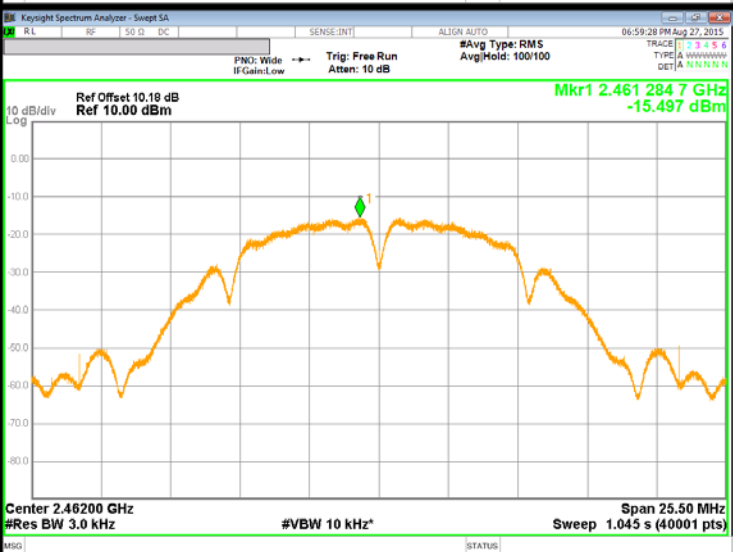
Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-14.673	0.30	-14.37	8.00	-22.67
Mid	2437	-14.607	0.30	-14.31	8.00	-22.61
High	2462	-14.269	0.30	-13.97	8.00	-22.27

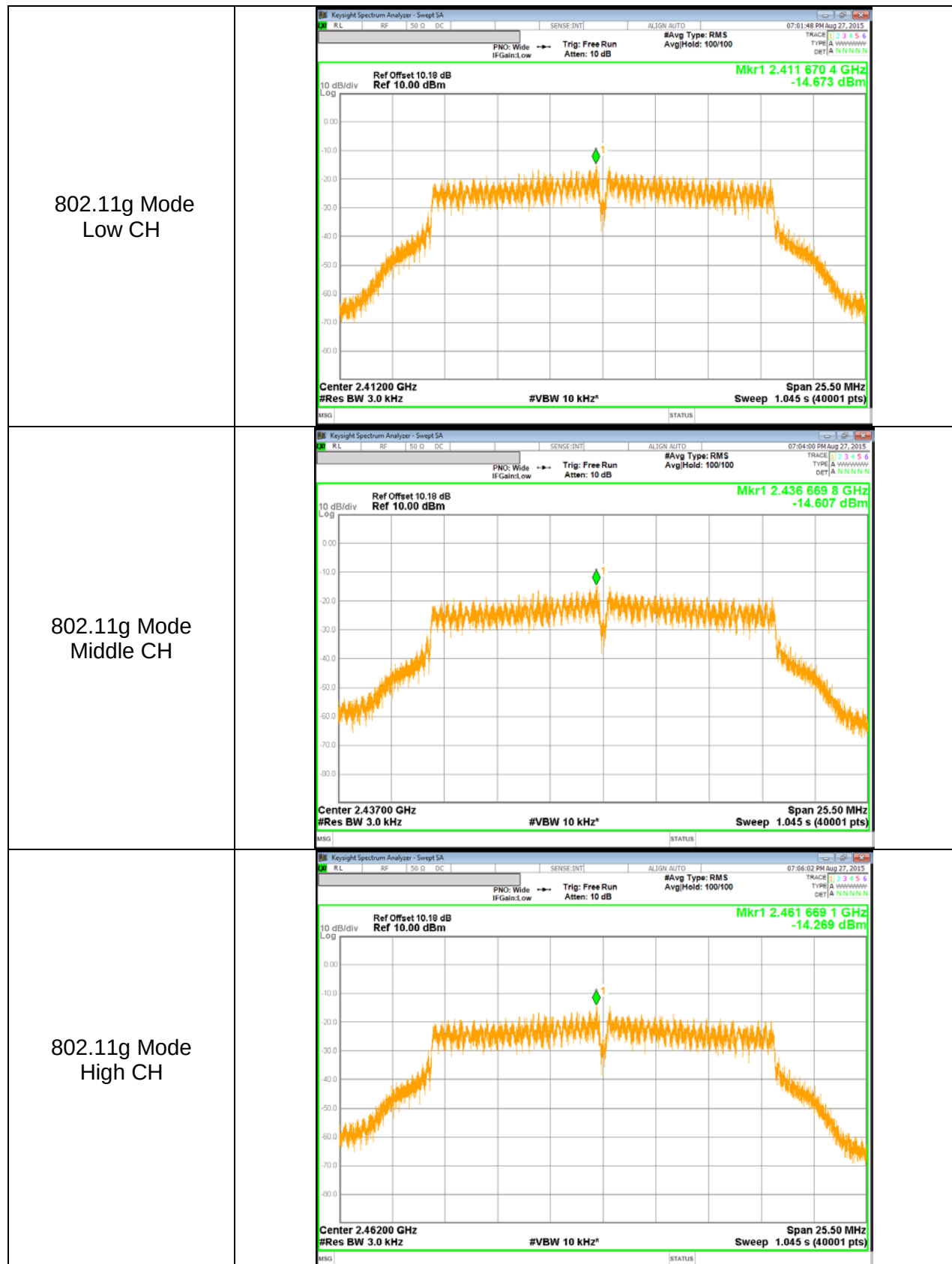
10.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

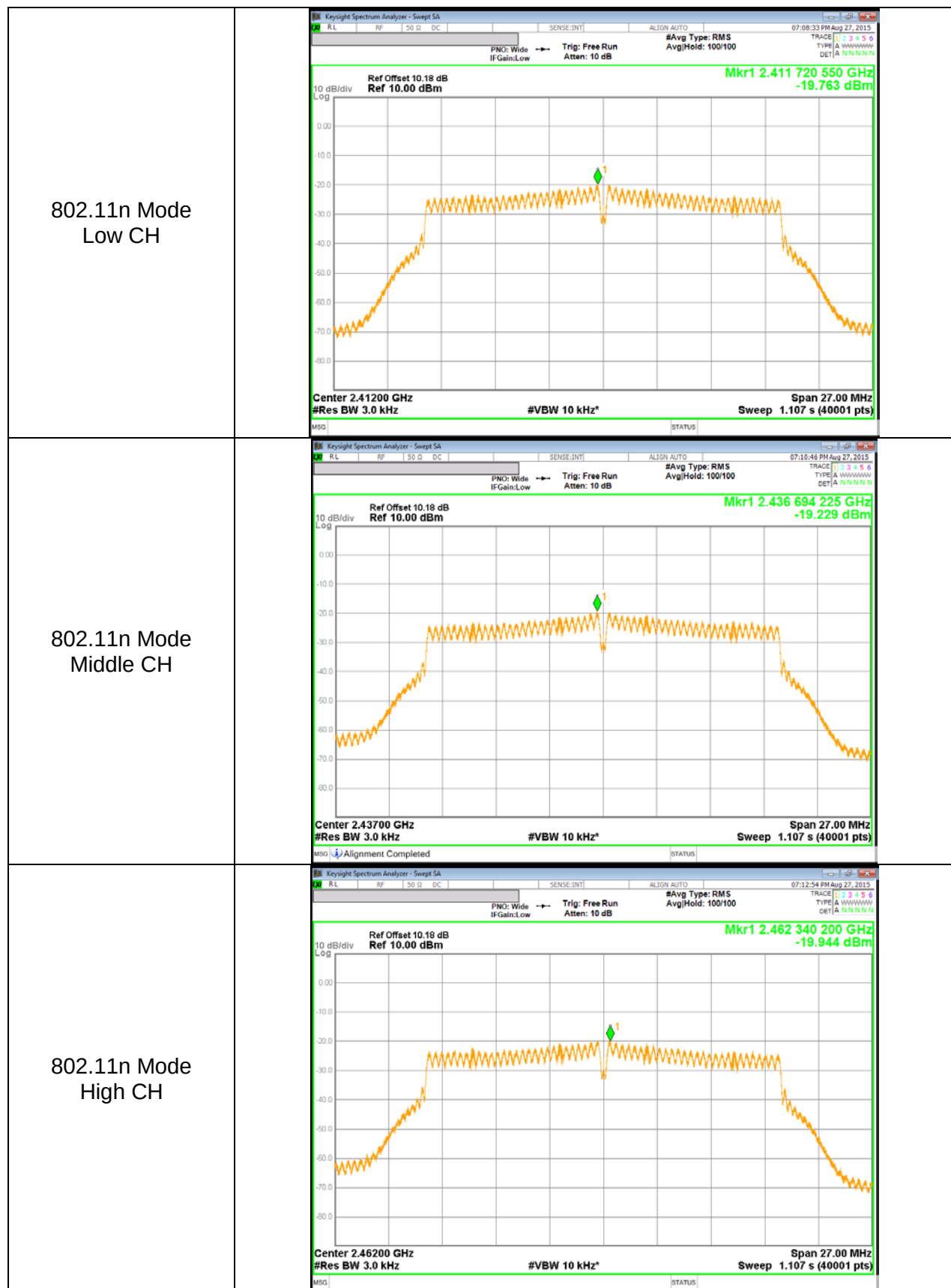
PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-19.763	0.33	-19.43	8.00	-27.76
Mid	2437	-19.229	0.33	-18.90	8.00	-27.23
High	2462	-19.944	0.33	-19.61	8.00	-27.94

10.5.4. PSD PLOTS

802.11b Mode Low CH	
802.11b Mode Middle CH	
802.11b Mode High CH	





10.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)
IC RSS-247 §5.5

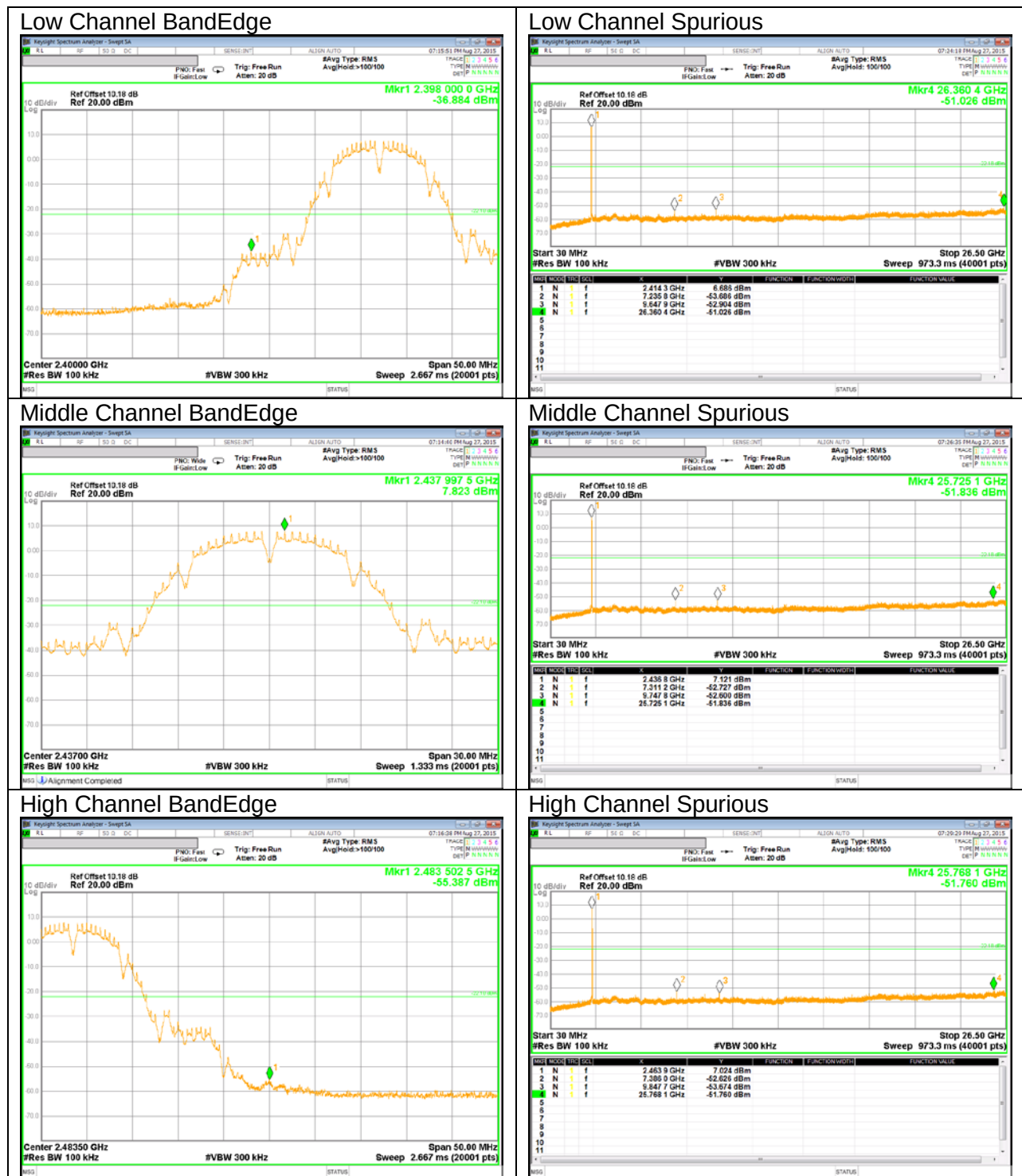
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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

10.6.1. 802.11b MODE IN THE 2.4 GHZ BAND



10.6.2. 802.11g MODE IN THE 2.4 GHZ BAND



10.6.3. 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.

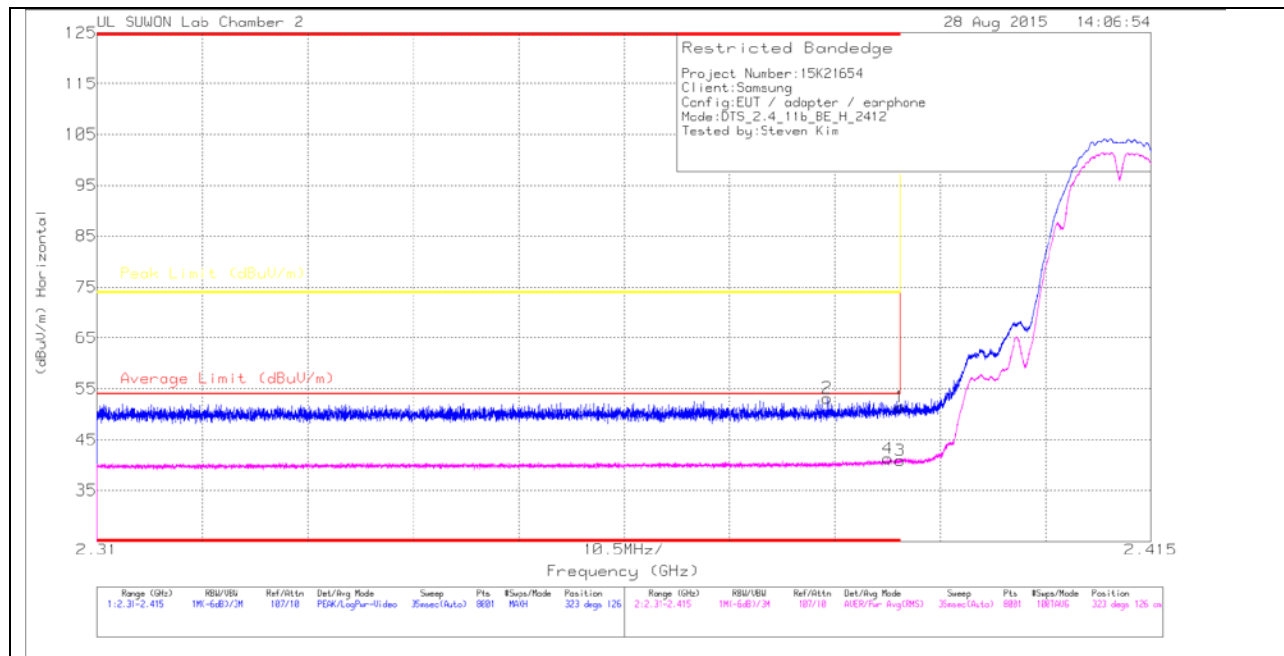
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

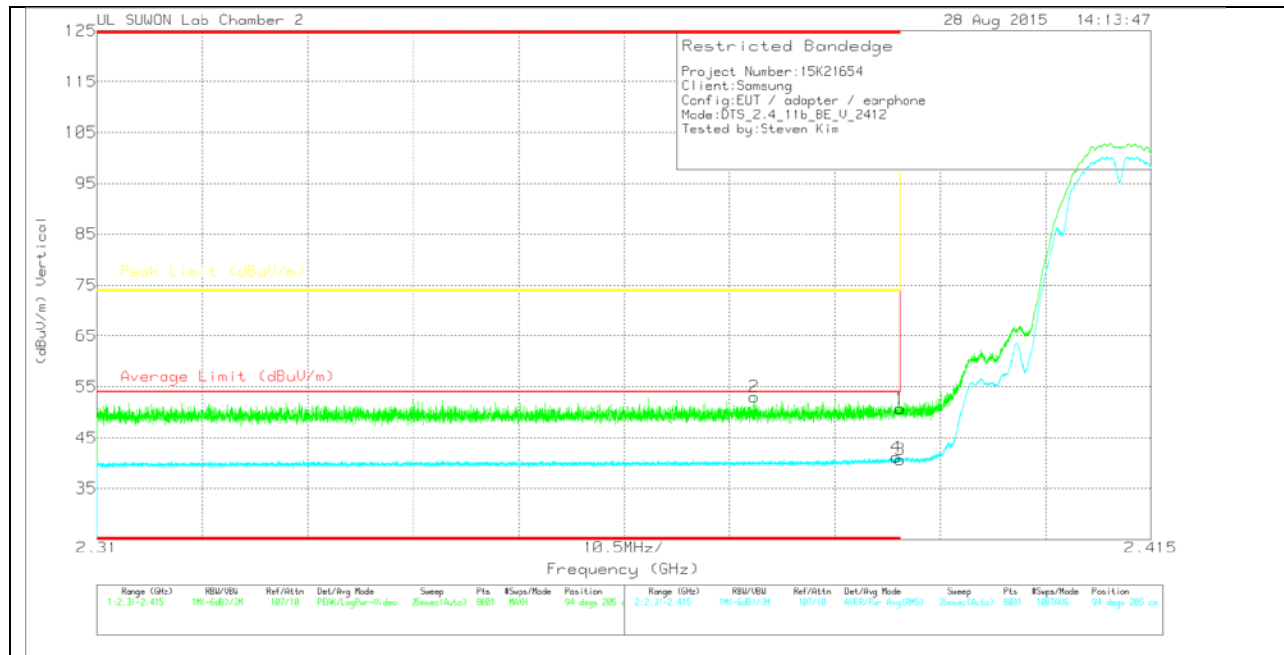
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.23	PK	31.7	-19.5	0	51.43	-	-	74	-22.57	323	126	H
2	* 2.383	40.97	PK	31.7	-19.5	0	53.17	-	-	74	-20.83	323	126	H
3	* 2.39	28.71	RMS	31.7	-19.5	0	40.91	54	-13.09	-	-	323	126	H
4	* 2.389	29.06	RMS	31.7	-19.5	0	41.26	54	-12.74	-	-	323	126	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	38.55	Pk	31.7	-19.5	0	50.75	-	-	74	-23.25	94	205	V
2	* 2.375	40.94	Pk	31.7	-19.6	0	53.04	-	-	74	-20.96	94	205	V
3	* 2.39	28.45	RMS	31.7	-19.5	0	40.65	54	-13.35	-	-	94	205	V
4	* 2.39	28.92	RMS	31.7	-19.5	0	41.12	54	-12.88	-	-	94	205	V

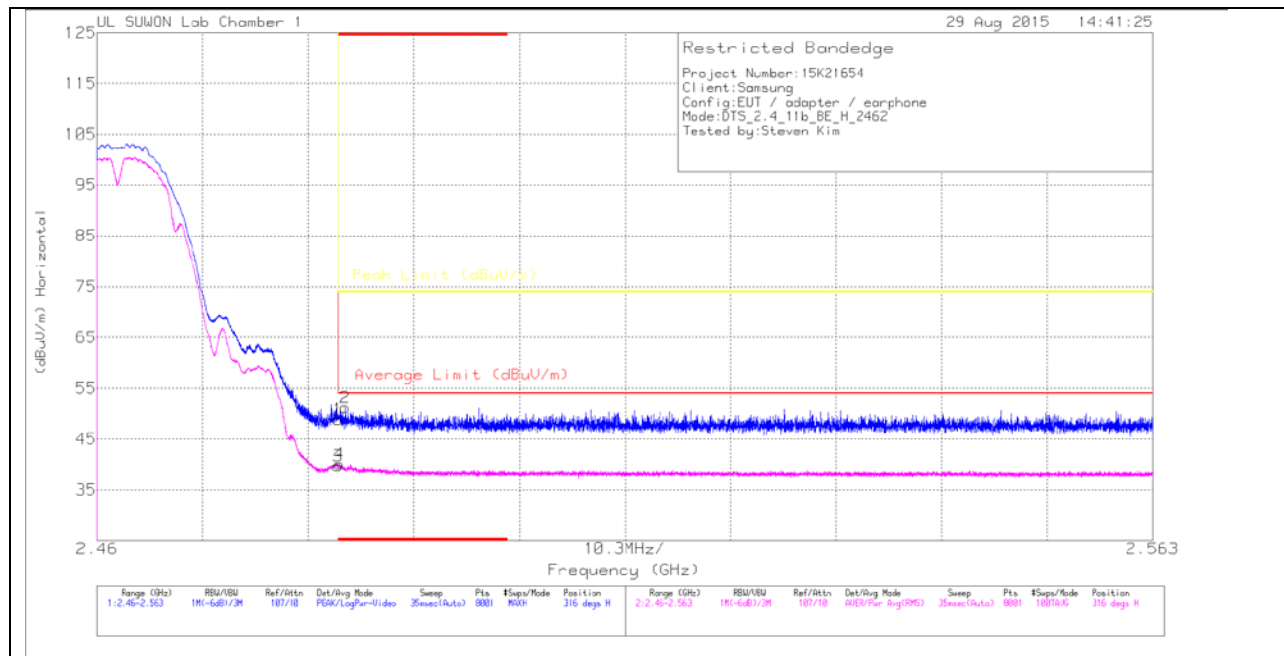
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

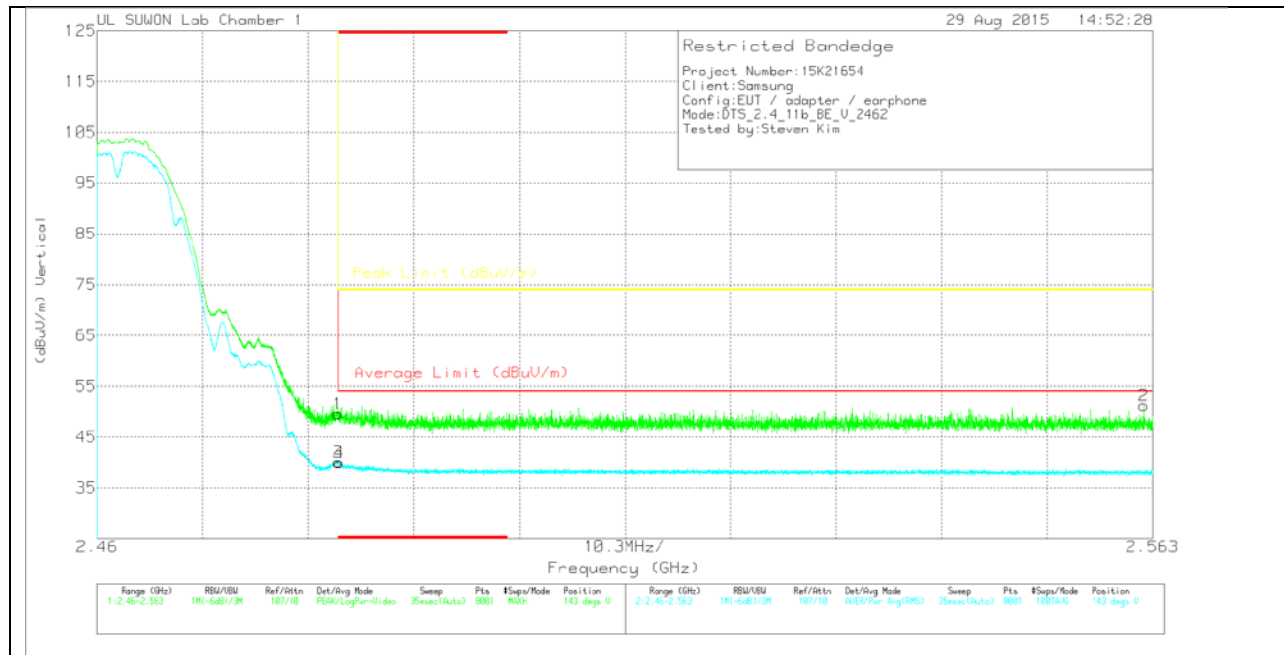
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117/00168 717/15061 9	Path_2_10d B	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.48	Pk	32	-22.6	0	48.88	-	-	74	-25.12	316	269	H
2	* 2.484	41.75	Pk	32	-22.6	0	51.15	-	-	74	-22.85	316	269	H
3	* 2.484	30.31	RMS	32	-22.6	0	39.71	54	-14.29	-	-	316	269	H
4	* 2.484	30.7	RMS	32	-22.6	0	40.1	54	-13.9	-	-	316	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(00168 717)_15061 9	Path_2_10d B	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	40.2	Pk	32	-22.6	0	49.6	-	-	74	-24.4	143	349	V
2	2.562	41.8	Pk	32	-22.6	0	51.2	-	-	74	-22.8	143	349	V
3	* 2.484	30.7	RMS	32	-22.6	0	40.1	54	-13.9	-	-	143	349	V
4	* 2.484	30.54	RMS	32	-22.6	0	39.94	54	-14.06	-	-	143	349	V

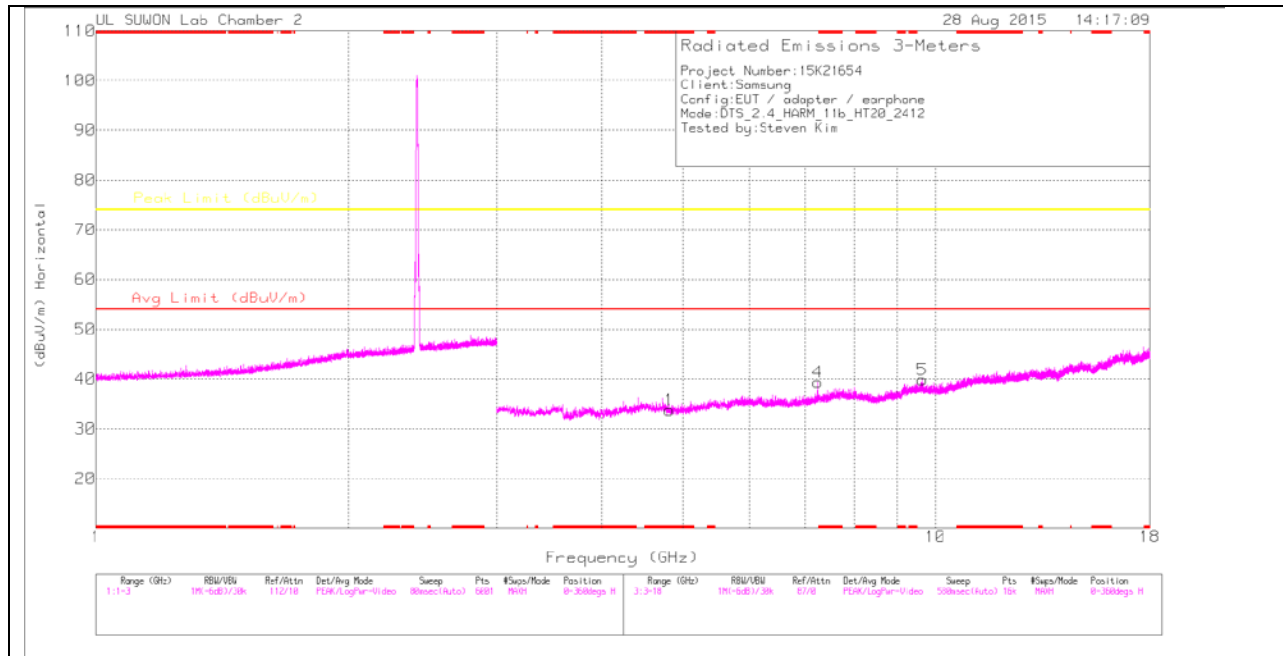
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

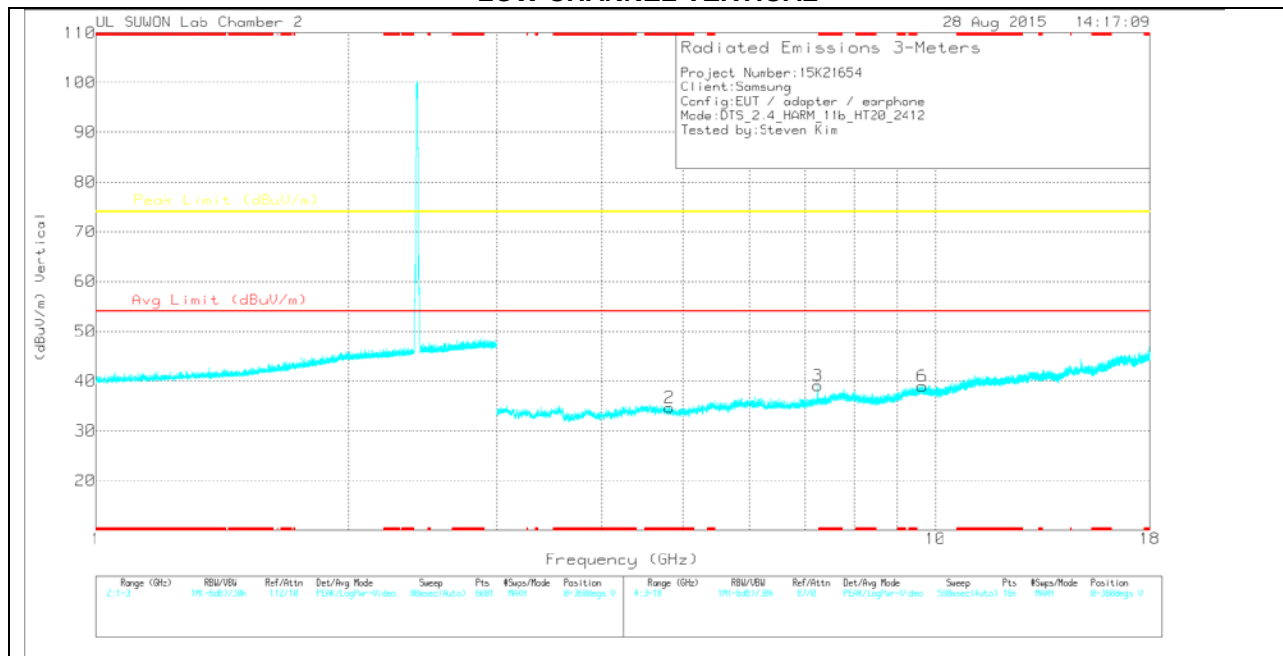
RMS - RMS detection

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	* 4.823	25.13	PK	33.9	-25.3	0	33.73	-	-	74	-40.27	0-360	200	H
4	7.235	26.56	PK	35.8	-23	0	39.36	-	-	74	-34.64	0-360	200	H
5	9.647	21.97	PK	36.9	-19	0	39.87	-	-	74	-34.13	0-360	200	H
2	* 4.821	26.03	PK	33.9	-25.3	0	34.63	-	-	74	-39.37	0-360	100	V
3	7.235	26.26	PK	35.8	-23	0	39.06	-	-	74	-34.94	0-360	200	V
6	9.647	21.11	PK	36.9	-19	0	39.01	-	-	74	-34.99	0-360	100	V

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

PK – Peak detector

Radiated Emissions

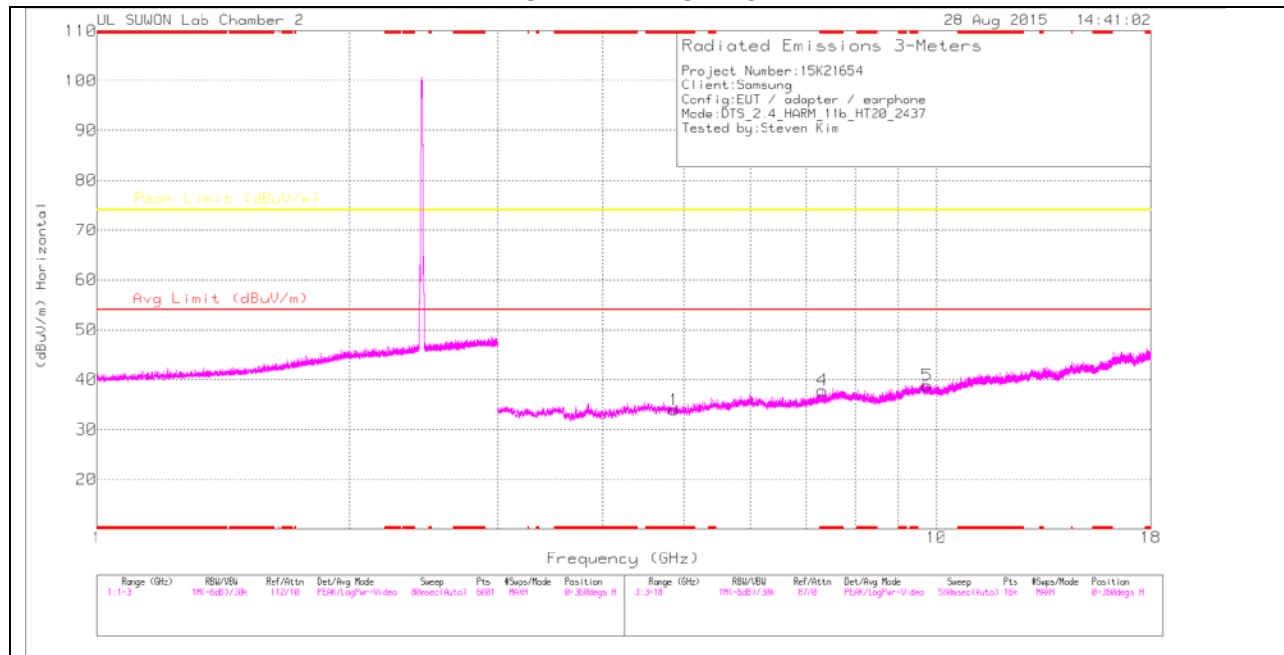
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.236	36.47	PK2	35.8	-23	0	49.27	-	-	74	-24.73	314	336	H
7.236	23.64	MAv1	35.8	-23	0	36.44	-	-	-	-	314	336	H
7.234	35.95	PK2	35.8	-23	0	48.75	-	-	74	-25.25	93	247	V
7.236	24.54	MAv1	35.8	-23	0	37.34	-	-	-	-	93	247	V

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

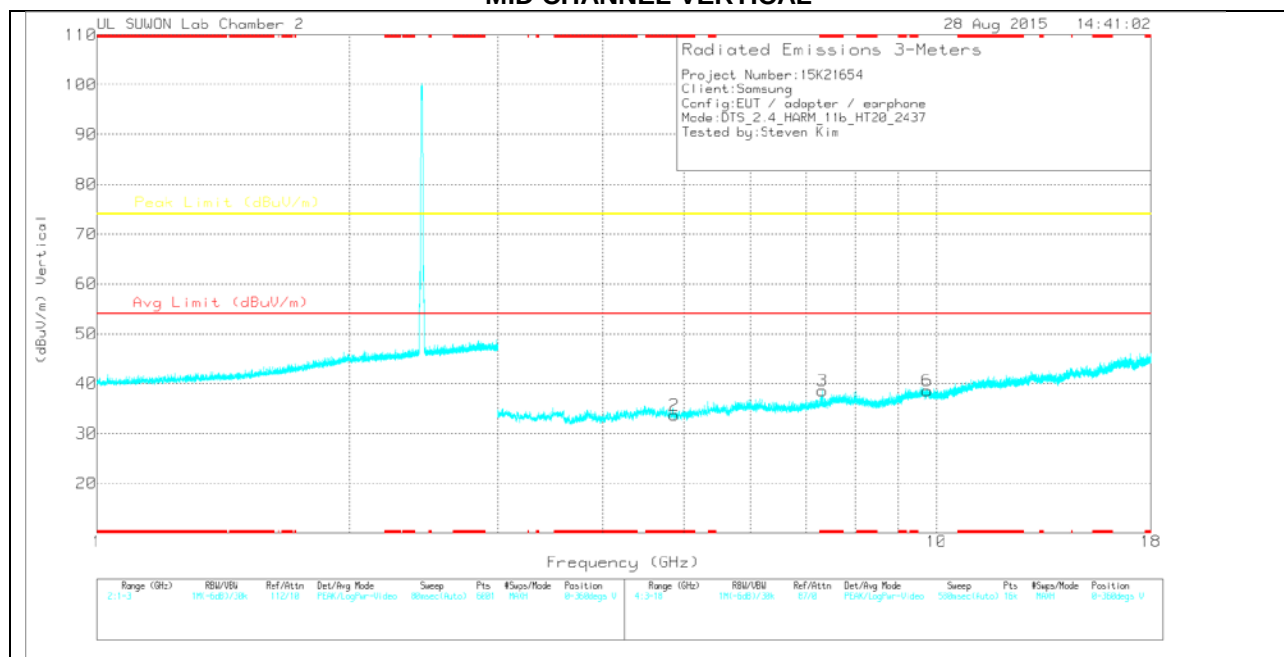
PK2 - KDB558074 Method: Maximum Peak

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

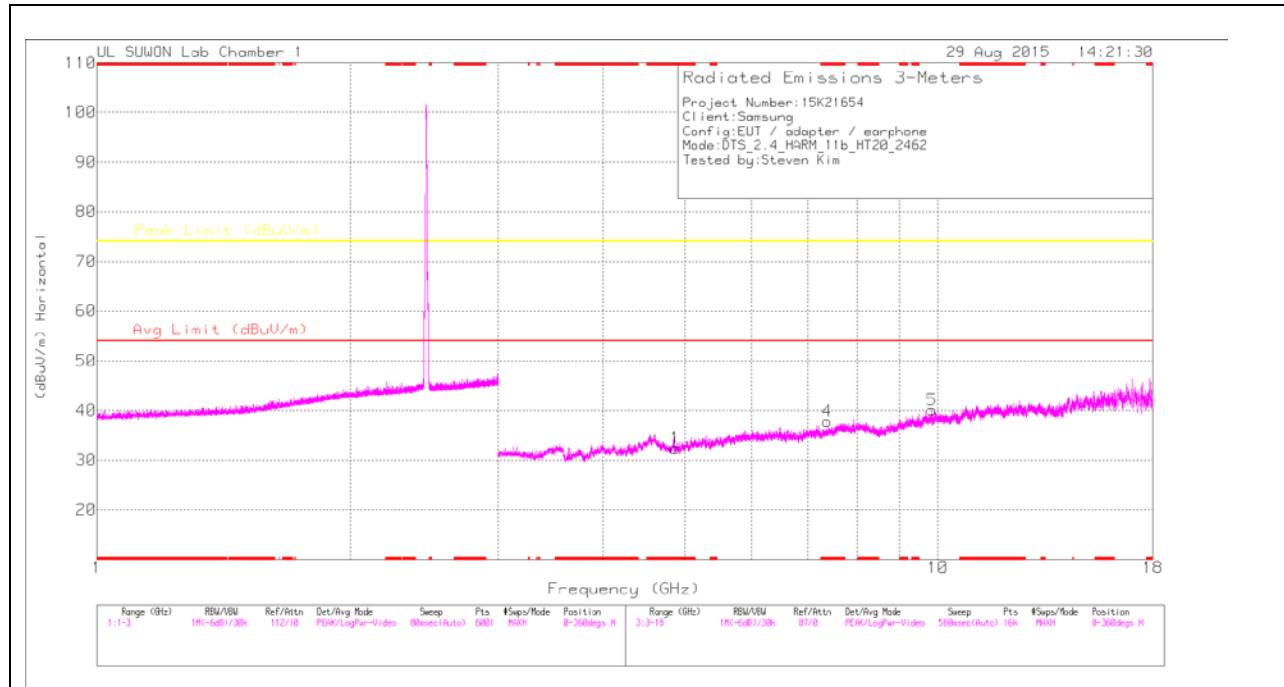
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016872 4)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.872	25.23	PK	33.9	-25.2	0	33.93	-	-	74	-40.07	0-360	200	H
4	* 7.31	24.54	PK	35.9	-22.6	0	37.84	-	-	74	-36.16	0-360	200	H
5	9.748	21.13	PK	37	-19.3	0	38.83	-	-	74	-35.17	0-360	200	H
2	* 4.87	24.99	PK	33.9	-25.2	0	33.69	-	-	74	-40.31	0-360	200	V
3	* 7.31	25.29	PK	35.9	-22.6	0	38.59	-	-	74	-35.41	0-360	200	V
6	9.748	20.86	PK	37	-19.3	0	38.56	-	-	74	-35.44	0-360	200	V

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

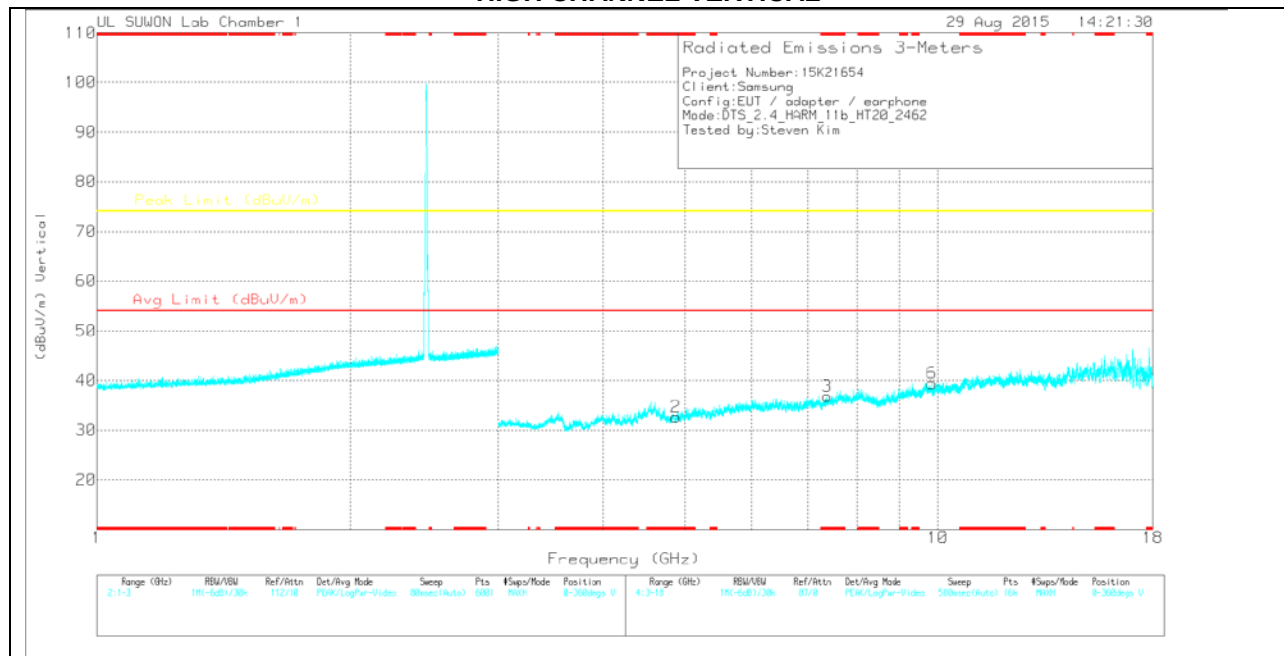
PK – Peak detector

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[001687 17]_150619	Path_3_3GHP	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	* 4.875	27.57	PK	34	-29.2	0	32.37	-	-	74	-41.63	0-360	100	H
4	* 7.386	27.12	PK	35.8	-25.1	0	37.82	-	-	74	-36.18	0-360	200	H
5	9.848	24.43	PK	37.3	-21.6	0	40.13	-	-	74	-33.87	0-360	200	H
2	* 4.878	27.77	PK	34	-29.1	0	32.67	-	-	74	-41.33	0-360	100	V
3	* 7.386	26.12	PK	35.8	-25.1	0	36.82	-	-	74	-37.18	0-360	200	V
6	9.848	23.72	PK	37.3	-21.6	0	39.42	-	-	74	-34.58	0-360	100	V

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

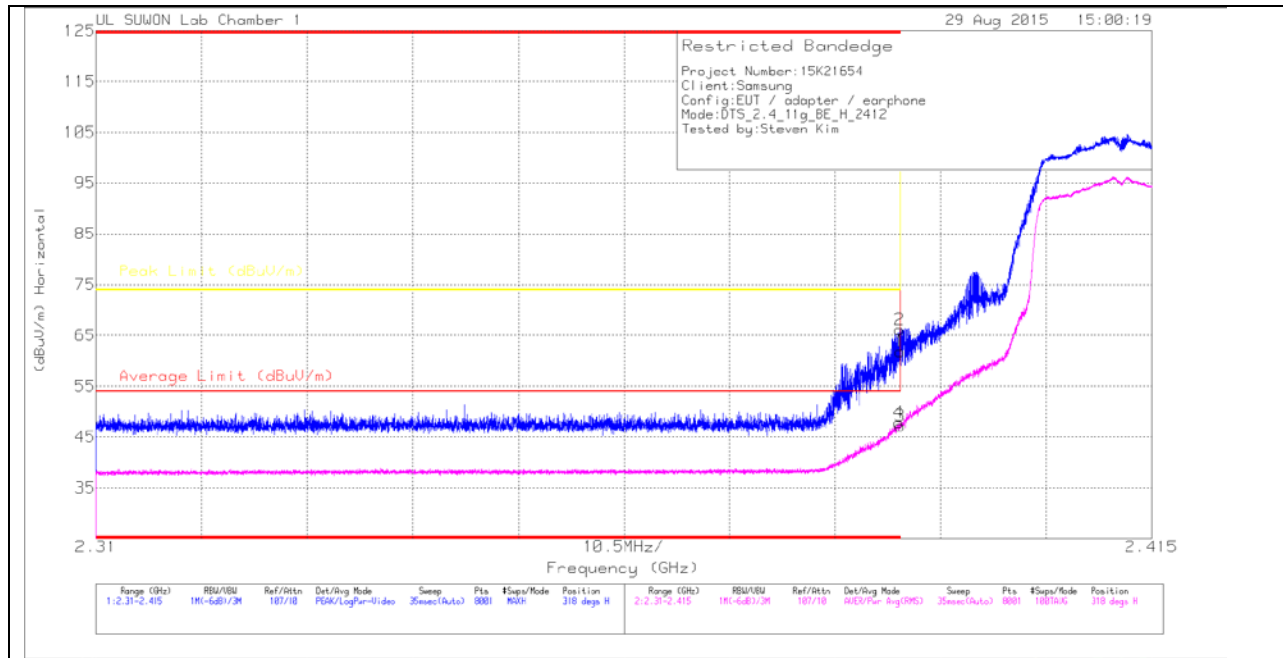
PK – Peak detector

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

11.2.2. 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

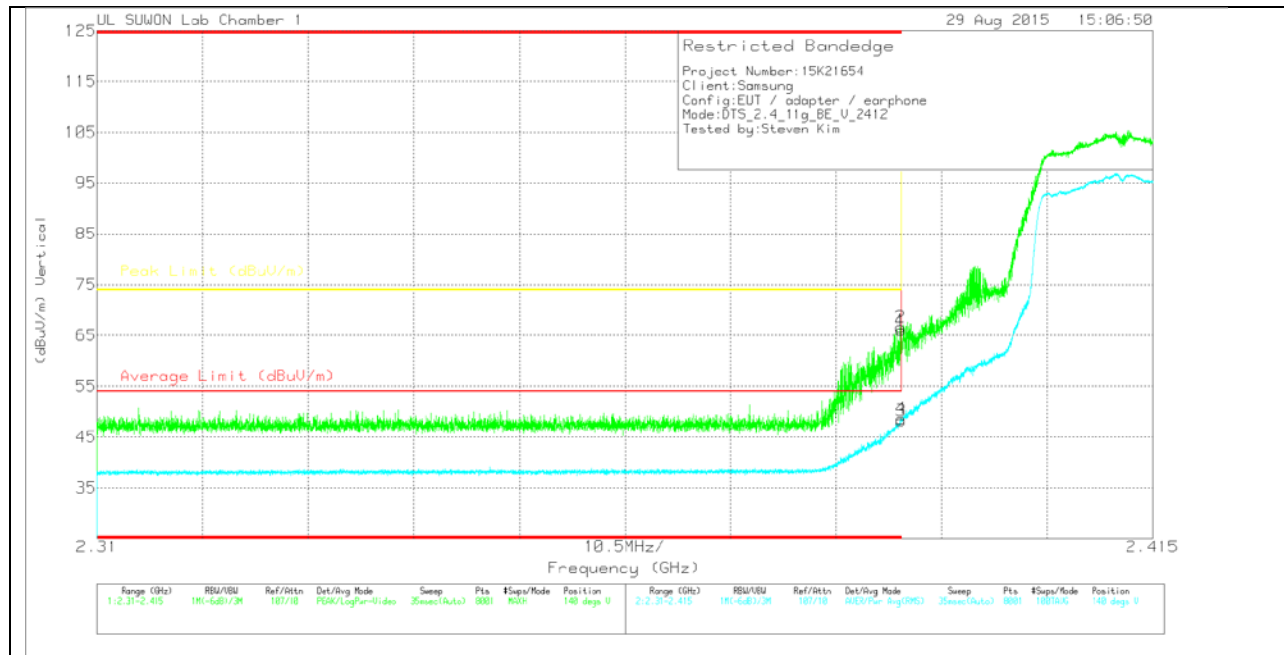
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_2_10d B	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	52.83	Pk			0	61.83	-	-	74	-12.17	318	100	H
2	* 2.39	57.21	Pk			0	66.21	-	-	74	-7.79	318	100	H
3	* 2.39	37.89	RMS			.3	47.19	54	-6.81	-	-	318	100	H
4	* 2.39	38.57	RMS			.3	47.87	54	-6.13	-	-	318	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_10d B	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	57.05	Pk	31.8	-22.8	0	66.05	-	-	74	-7.95	140	297	V
2	* 2.39	57.67	Pk	31.8	-22.8	0	66.67	-	-	74	-7.33	140	297	V
3	* 2.39	38.88	RMS	31.8	-22.8	.3	48.18	54	-5.82	-	-	140	297	V
4	* 2.39	39.24	RMS	31.8	-22.8	.3	48.54	54	-5.46	-	-	140	297	V

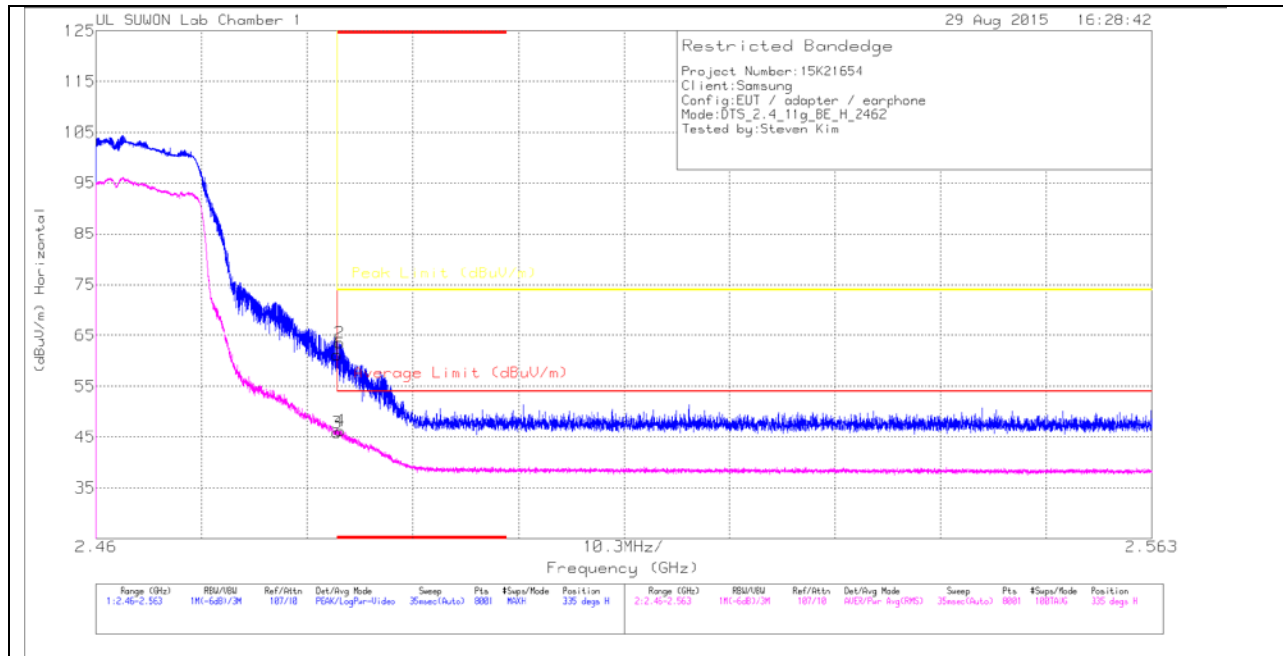
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

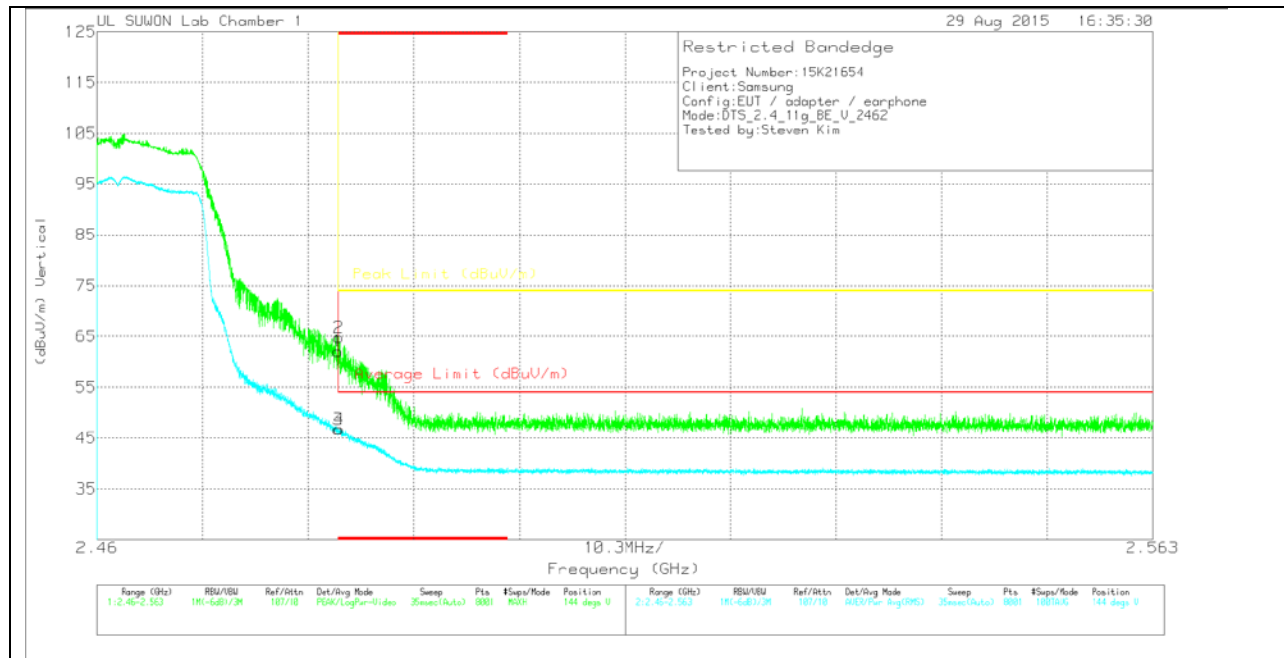
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_2_10d B	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	51.85	Pk	32	-22.6	0	61.25	-	-	74	-12.75	335	280	H
2	* 2.484	54.19	Pk	32	-22.6	0	63.59	-	-	74	-10.41	335	280	H
3	* 2.484	36.21	RMS	32	-22.6	.3	45.91	54	-8.09	-	-	335	280	H
4	* 2.484	36.6	RMS	32	-22.6	.3	46.3	54	-7.7	-	-	335	280	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_10d B	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	52.66	Pk	32	-22.6	0	62.06	-	-	74	-11.94	144	343	V
2	* 2.484	55.43	Pk	32	-22.6	0	64.83	-	-	74	-9.17	144	343	V
3	* 2.484	37.02	RMS	32	-22.6	.3	46.72	54	-7.28	-	-	144	343	V
4	* 2.484	37.09	RMS	32	-22.6	.3	46.79	54	-7.21	-	-	144	343	V

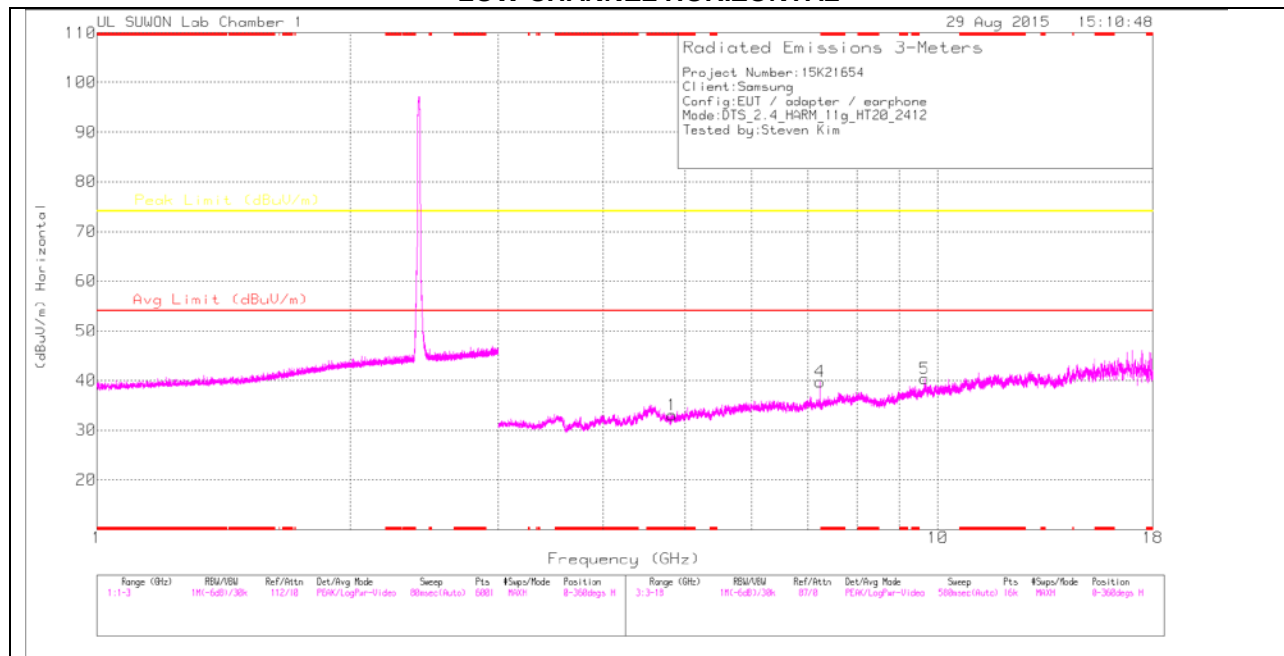
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

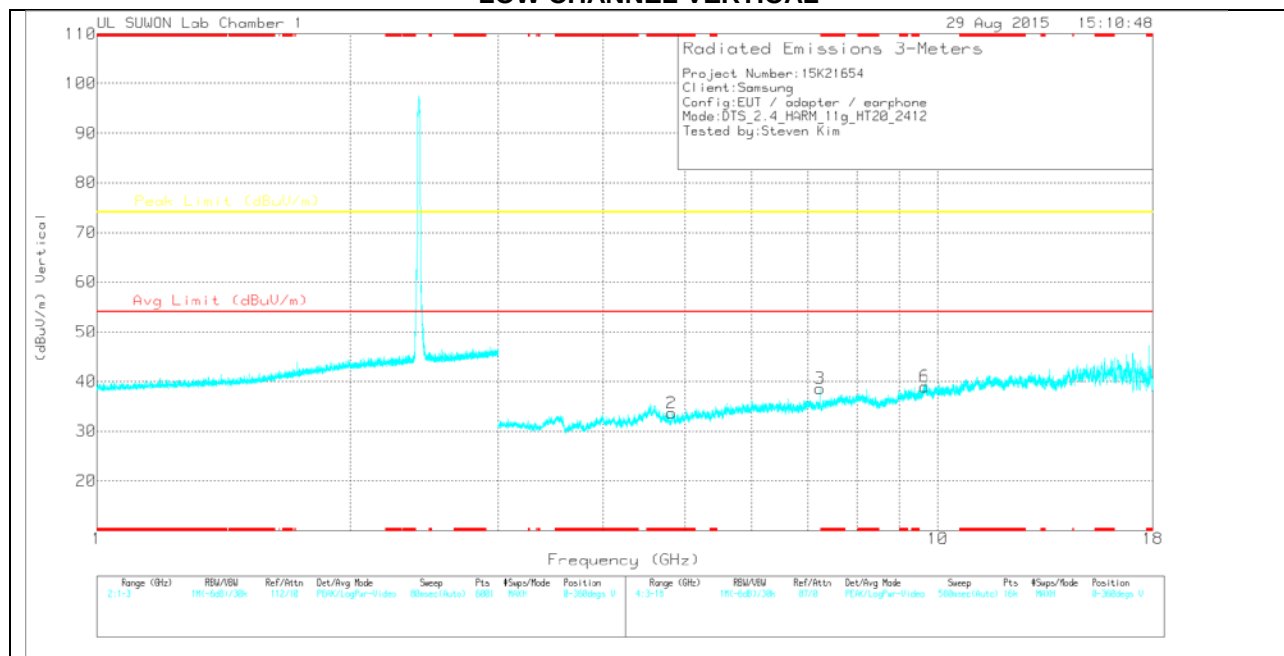
RMS - RMS detection

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(001687 17)_150619	Path_3_3GHP	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	* 4.826	28.48	PK	34	-29.5	0	32.98	-	-	74	-41.02	0-360	200	H
4	7.235	29.59	PK	35.7	-25.5	0	39.79	-	-	74	-34.21	0-360	200	H
5	9.647	24.01	PK	37.1	-20.8	0	40.31	-	-	74	-33.69	0-360	200	H
2	* 4.823	29.32	PK	34	-29.6	0	33.72	-	-	74	-40.28	0-360	200	V
3	7.235	28.35	PK	35.7	-25.5	0	38.55	-	-	74	-35.45	0-360	100	V
6	9.647	22.73	PK	37.1	-20.8	0	39.03	-	-	74	-34.97	0-360	100	V

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

PK – Peak detector

Radiated Emissions

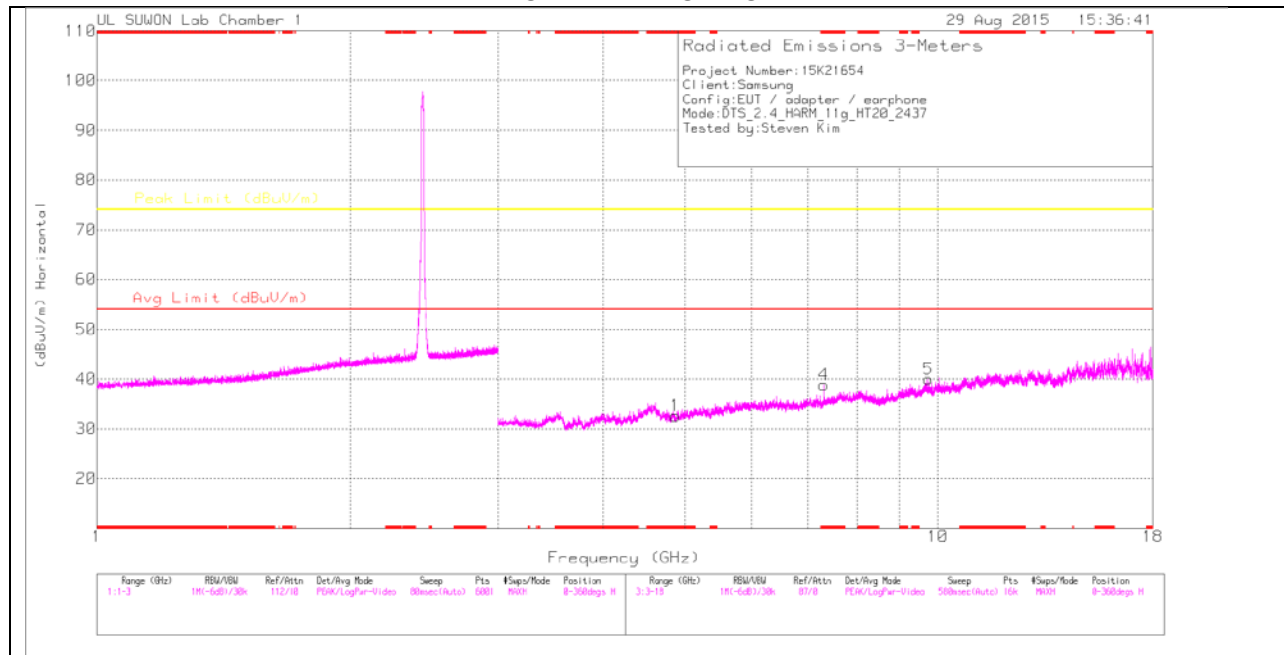
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.236	37.03	PK2	35.7	-25.5	0	47.23	-	-	74	-26.77	175	157	H
7.236	25.84	MAv1	35.7	-25.5	.3	36.34	-	-	-	-	175	157	H
7.236	38.29	PK2	35.7	-25.5	0	48.49	-	-	74	-25.51	63	201	V
7.236	28.75	MAv1	35.7	-25.5	.3	39.25	-	-	-	-	63	201	V

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

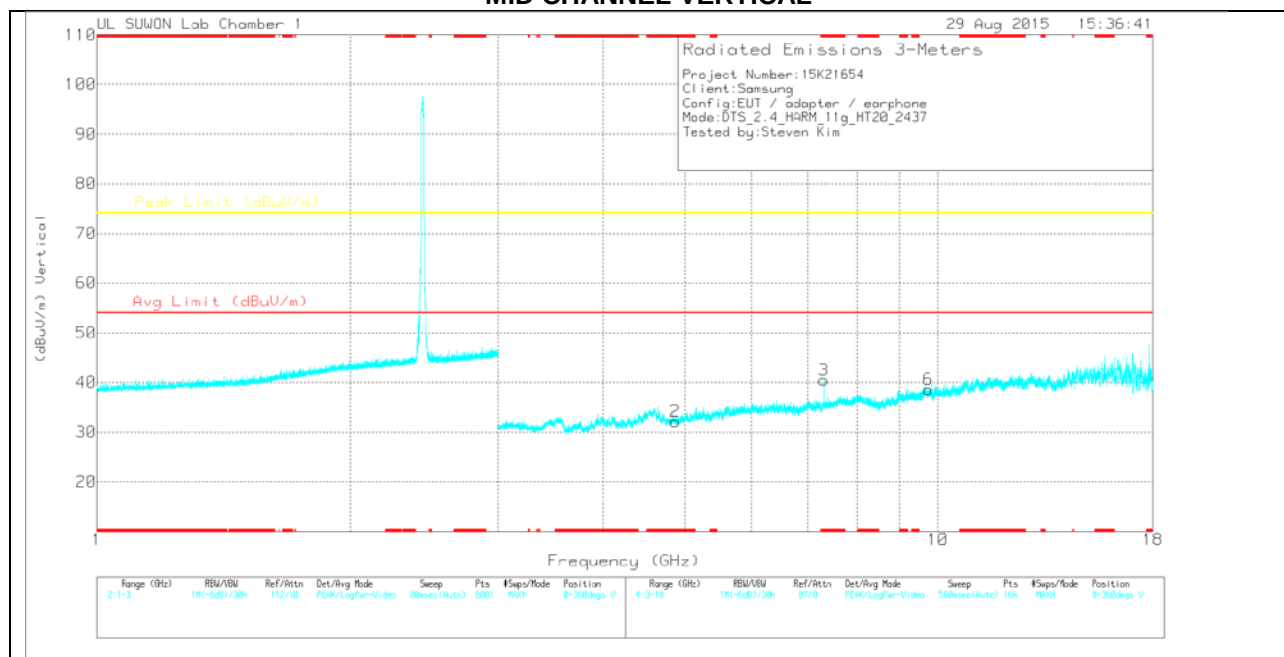
PK2 - KDB558074 Method: Maximum Peak

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	3117(001687 17)_150619	Path_3_3GHP	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	27.79	PK	34	-29.2	0	32.59	-	-	74	-41.41	0-360	200	H
4	* 7.311	28.85	PK	35.7	-25.7	0	38.85	-	-	74	-35.15	0-360	200	H
5	9.748	24.64	PK	37.2	-21.9	0	39.94	-	-	74	-34.06	0-360	200	H
2	* 4.871	27.39	PK	34	-29.2	0	32.19	-	-	74	-41.81	0-360	100	V
3	* 7.31	30.49	PK	35.7	-25.7	0	40.49	-	-	74	-33.51	0-360	200	V
6	9.748	23.31	PK	37.2	-21.9	0	38.61	-	-	74	-35.39	0-360	200	V

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

PK – Peak detector

Radiated Emissions

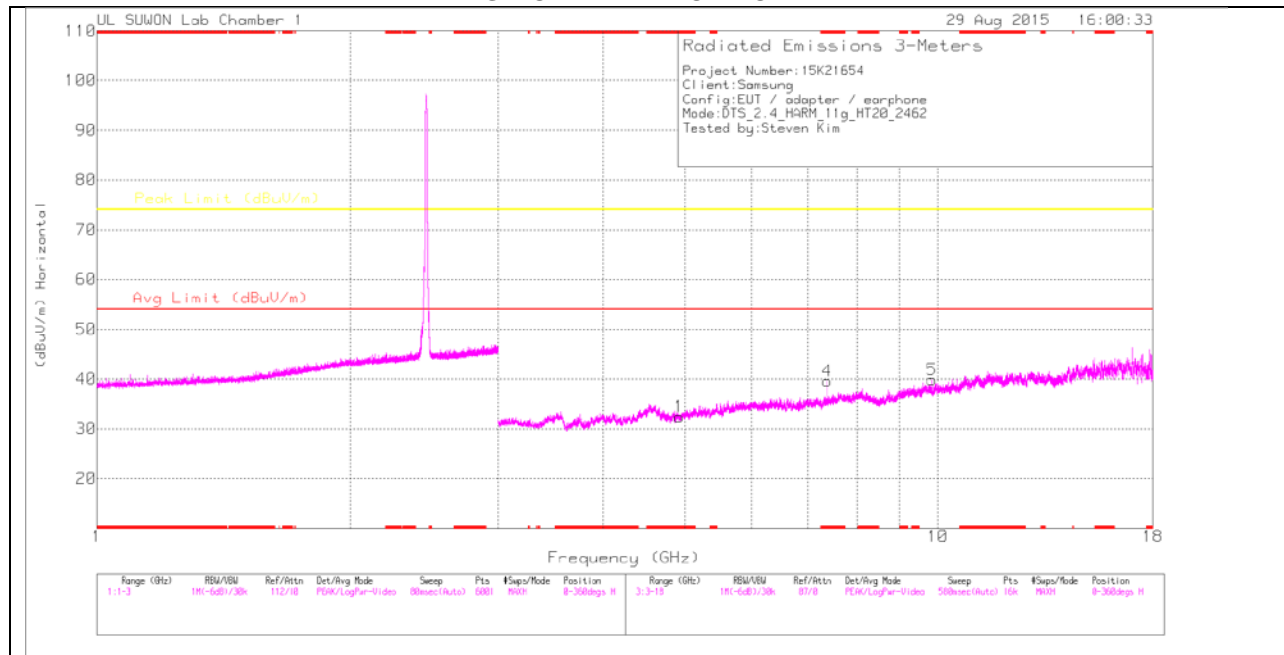
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001 68717)_1 50619	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.305	37.11	PK2	35.7	-25.7	0	47.11	-	-	74	-26.89	209	190	H
* 7.311	25.01	MAv1	35.7	-25.7	.3	35.31	54	-18.69	-	-	209	190	H
* 7.311	37.01	PK2	35.7	-25.7	0	47.01	-	-	74	-26.99	187	112	V
* 7.311	24.73	MAv1	35.7	-25.7	.3	35.03	54	-18.97	-	-	187	112	V

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

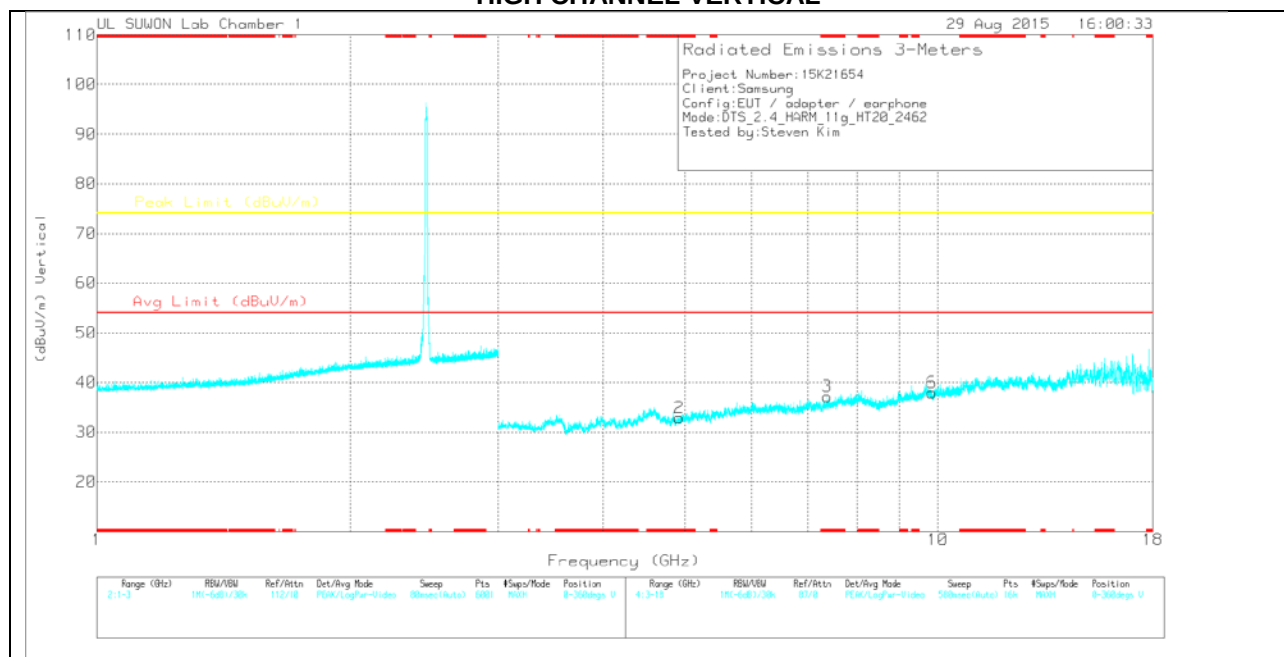
PK2 - KDB558074 Method: Maximum Peak

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(001687 17)_150619	Path_3_3GHP	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	27.34	PK	34	-29	0	32.34	-	-	74	-41.66	0-360	200	H
4	* 7.385	28.87	PK	35.8	-25.1	0	39.57	-	-	74	-34.43	0-360	200	H
5	9.848	24.11	PK	37.3	-21.6	0	39.81	-	-	74	-34.19	0-360	200	H
2	* 4.925	27.94	PK	34	-29	0	32.94	-	-	74	-41.06	0-360	200	V
3	* 7.385	26.55	PK	35.8	-25.1	0	37.25	-	-	74	-36.75	0-360	200	V
6	9.848	22.21	PK	37.3	-21.6	0	37.91	-	-	74	-36.09	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(001 68717)_1 50619	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.376	36.2	PK2	35.8	-25.2	0	46.8	-	-	74	-27.2	166	213	H
* 7.386	22.74	MAV1	35.8	-25.1	.3	33.74	54	-20.26	-	-	166	213	H
* 7.386	36.48	PK2	35.8	-25.1	0	47.18	-	-	74	-26.82	72	296	V
* 7.386	24.88	MAV1	35.8	-25.1	.3	35.88	54	-18.12	-	-	72	296	V

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

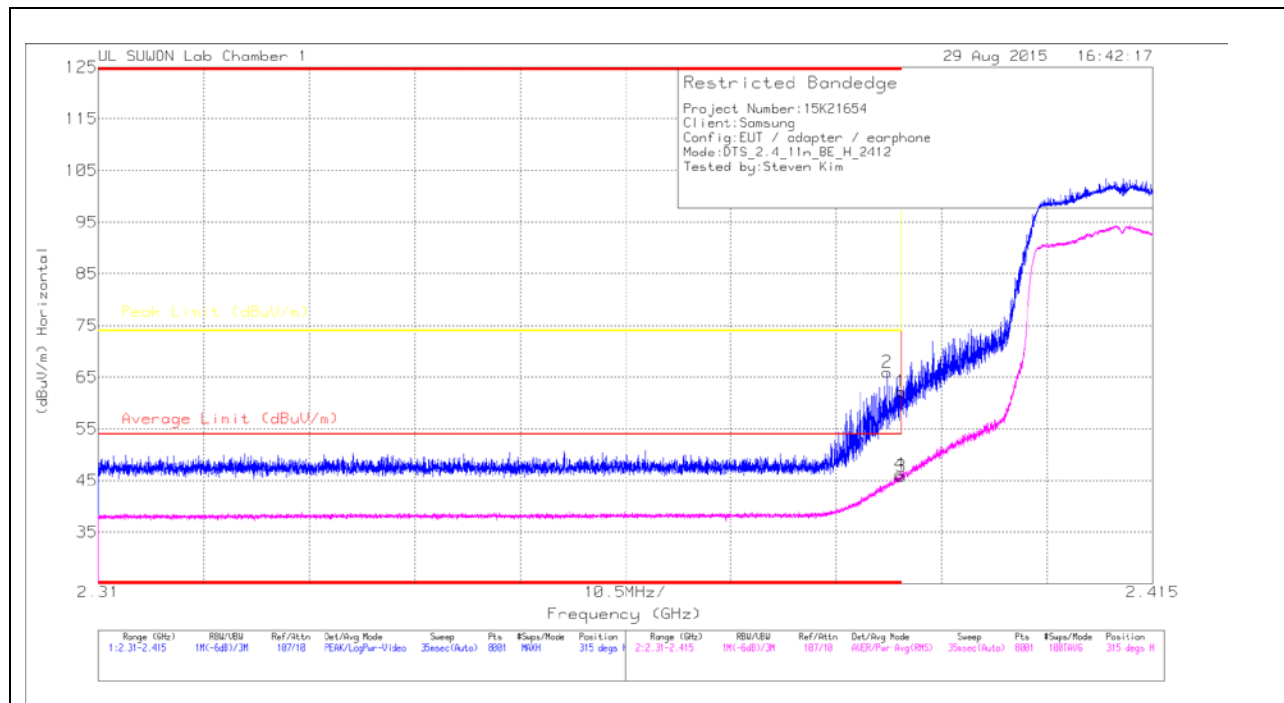
PK2 - KDB558074 Method: Maximum Peak

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

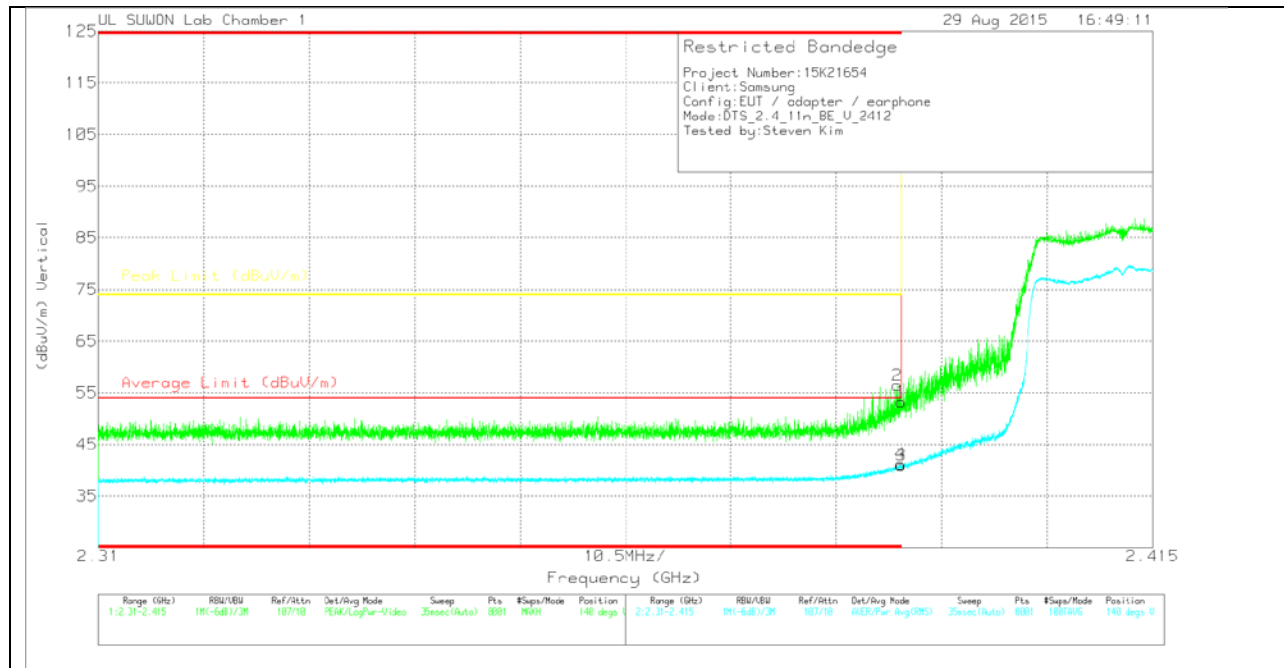
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 17)_150619	Path_2_10d B	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	53.23	Pk	31.8	-22.8	0	62.23	-	-	74	-11.77	315	100	H
2	* 2.389	56.98	Pk	31.8	-22.8	0	65.98	-	-	74	-8.02	315	100	H
3	* 2.39	36.54	RMS	31.8	-22.8	.33	45.87	54	-8.13	-	-	315	100	H
4	* 2.39	36.87	RMS	31.8	-22.8	.33	46.2	54	-7.8	-	-	315	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	3117/00168 717_15061 9	Path_2_10d B	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	44.28	Pk	31.8	-22.8	0	53.28	-	-	74	-20.72	140	327	V
2	* 2.39	47.46	Pk	31.8	-22.8	0	56.46	-	-	74	-17.54	140	327	V
3	* 2.39	31.64	RMS	31.8	-22.8	.33	40.97	54	-13.03	-	-	140	327	V
4	* 2.39	31.85	RMS	31.8	-22.8	.33	41.18	54	-12.82	-	-	140	327	V

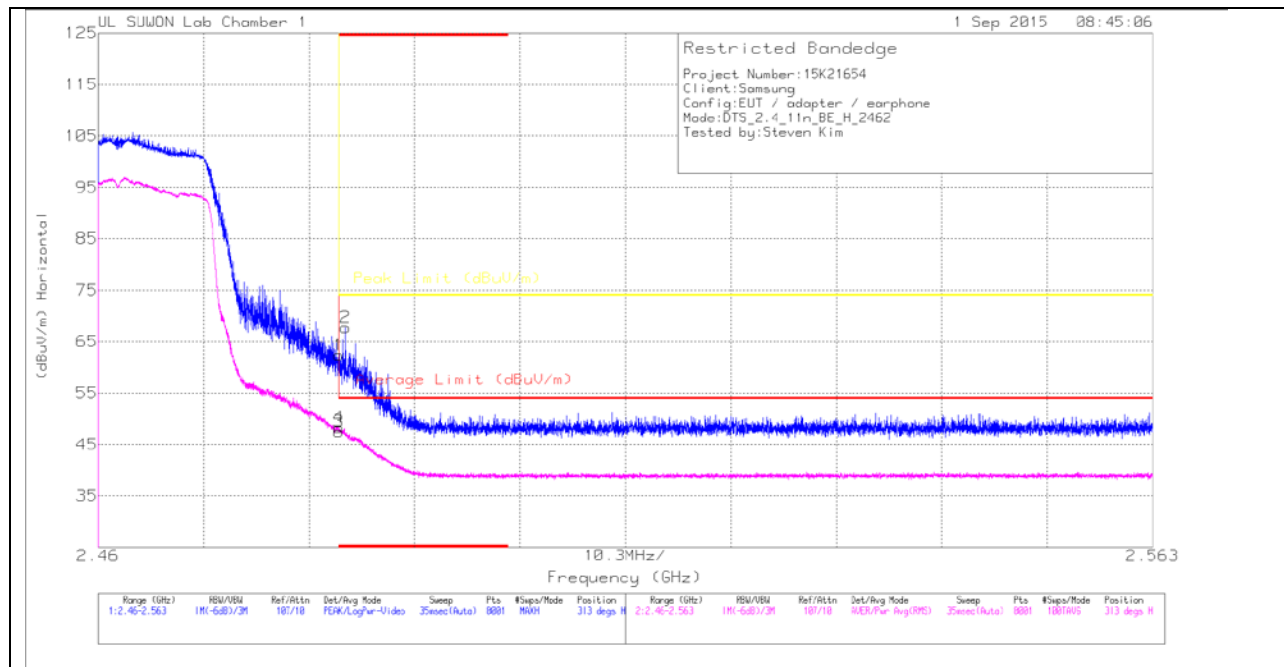
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

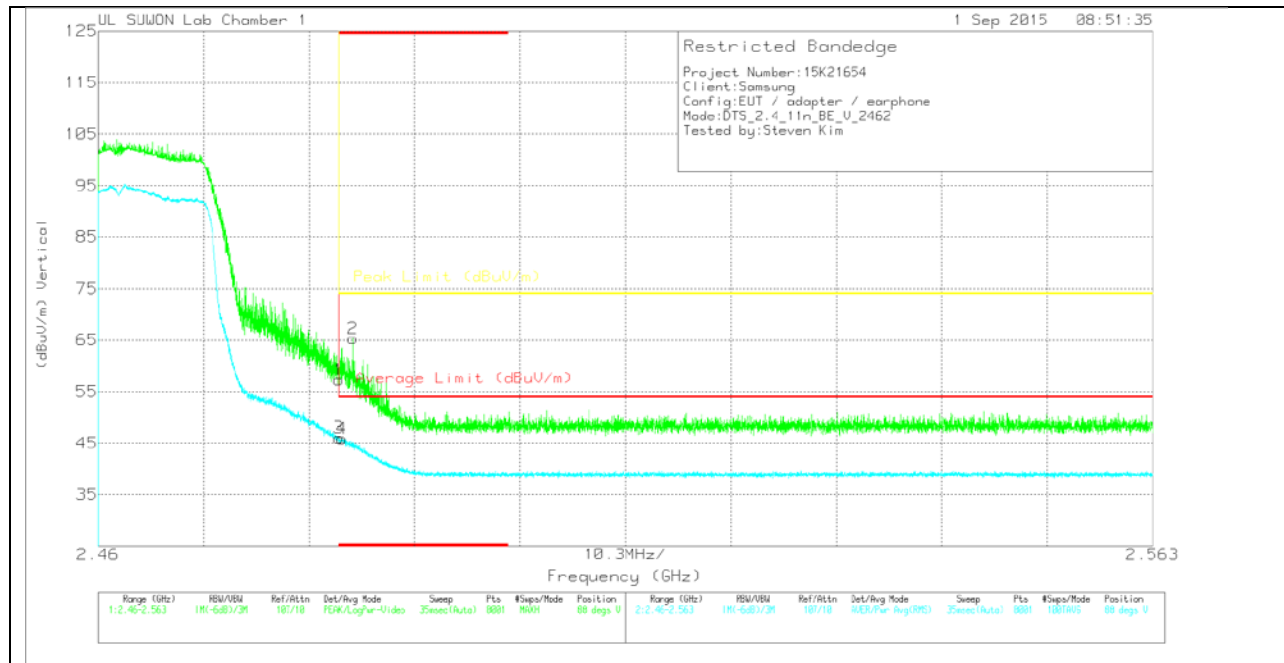
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117/001687 171_150619	Path_2_10d B	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	52.97	Pk	32	-22.6	0	62.37	-	-	74	-11.63	313	100	H
2	* 2.484	58.39	Pk	32	-22.6	0	67.79	-	-	74	-6.21	313	100	H
3	* 2.484	37.78	RMS	32	-22.6	.33	47.51	54	-6.49	-	-	313	100	H
4	* 2.484	38.58	RMS	32	-22.6	.33	48.31	54	-5.69	-	-	313	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 171_150619	Path_2_10d B	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	47.83	Pk	32	-22.6	0	57.23	-	-	74	-16.77	88	242	V
2	* 2.485	55.93	Pk	32	-22.6	0	65.33	-	-	74	-8.67	88	242	V
3	* 2.484	36.31	RMS	32	-22.6	.33	46.04	54	-7.96	-	-	88	242	V
4	* 2.484	36.14	RMS	32	-22.6	.33	45.87	54	-8.13	-	-	88	242	V

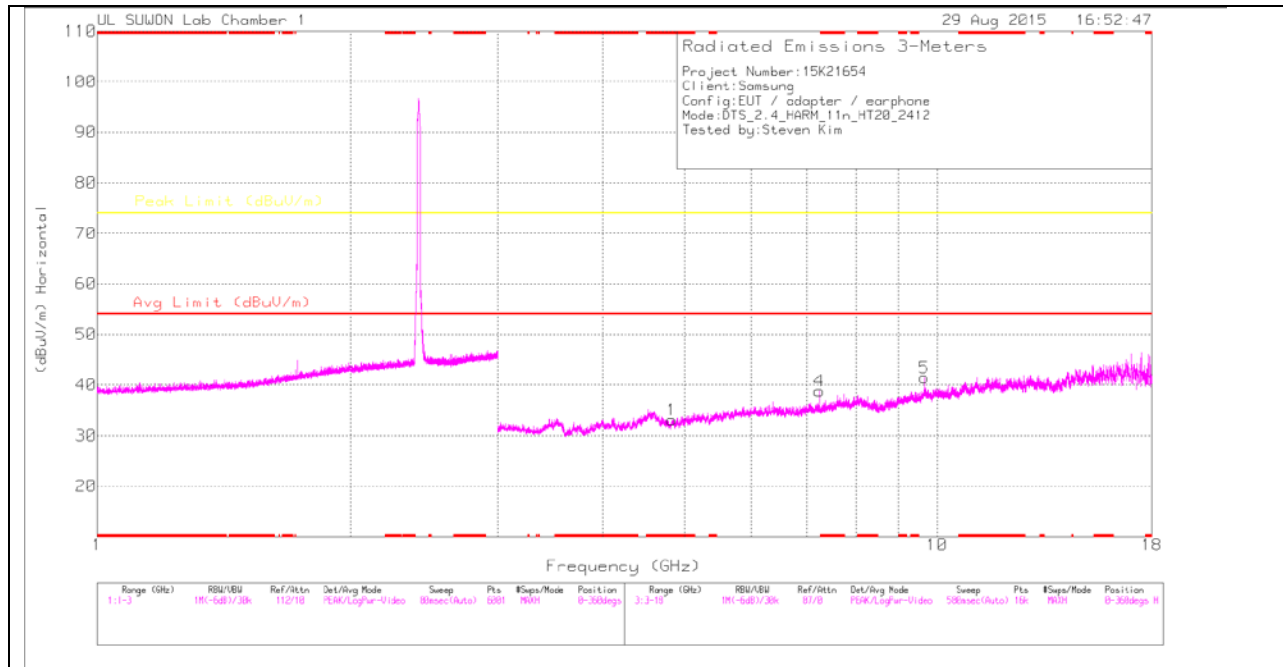
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

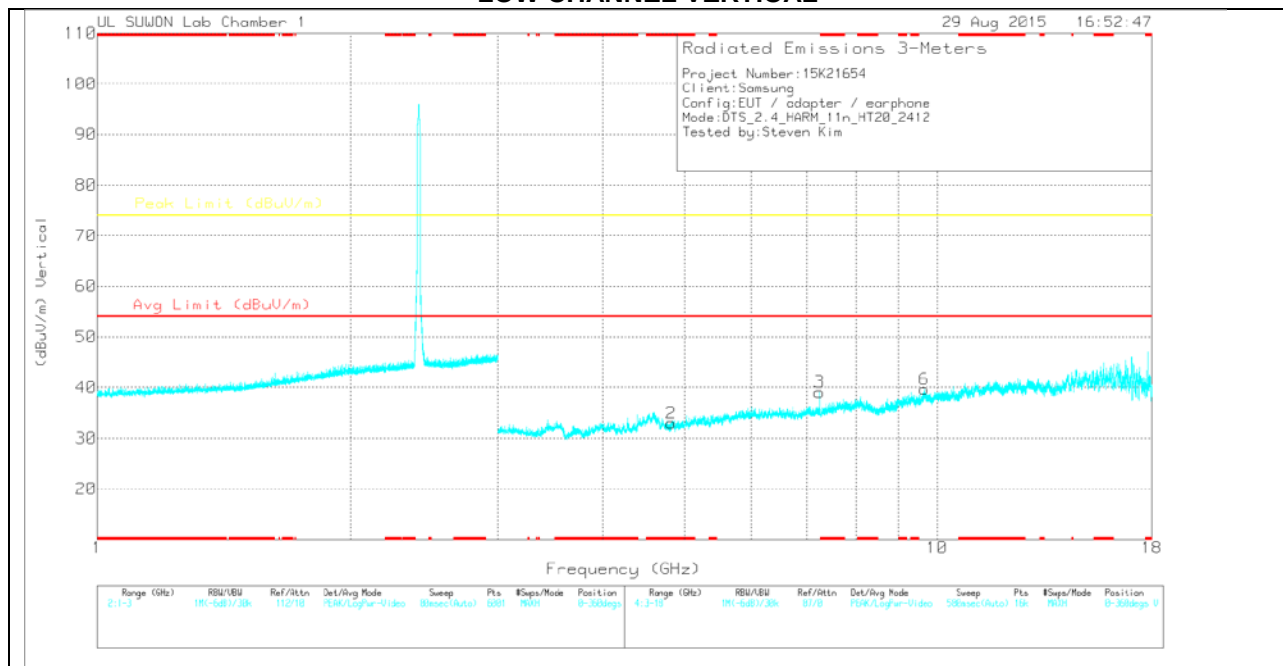
RMS - RMS detection

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(001687 17)_150619	Path_3_3GHP	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	* 4.829	28.58	PK	34	-29.5	0	33.08	-	-	74	-40.92	0-360	100	H
4	7.235	28.61	PK	35.7	-25.5	0	38.81	-	-	74	-35.19	0-360	200	H
5	9.648	25.08	PK	37.1	-20.8	0	41.38	-	-	74	-32.62	0-360	200	H
2	* 4.826	28.43	PK	34	-29.5	0	32.93	-	-	74	-41.07	0-360	100	V
3	7.235	28.89	PK	35.7	-25.5	0	39.09	-	-	74	-34.91	0-360	200	V
6	9.647	23.34	PK	37.1	-20.8	0	39.64	-	-	74	-34.36	0-360	200	V

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

PK – Peak detector

Radiated Emissions

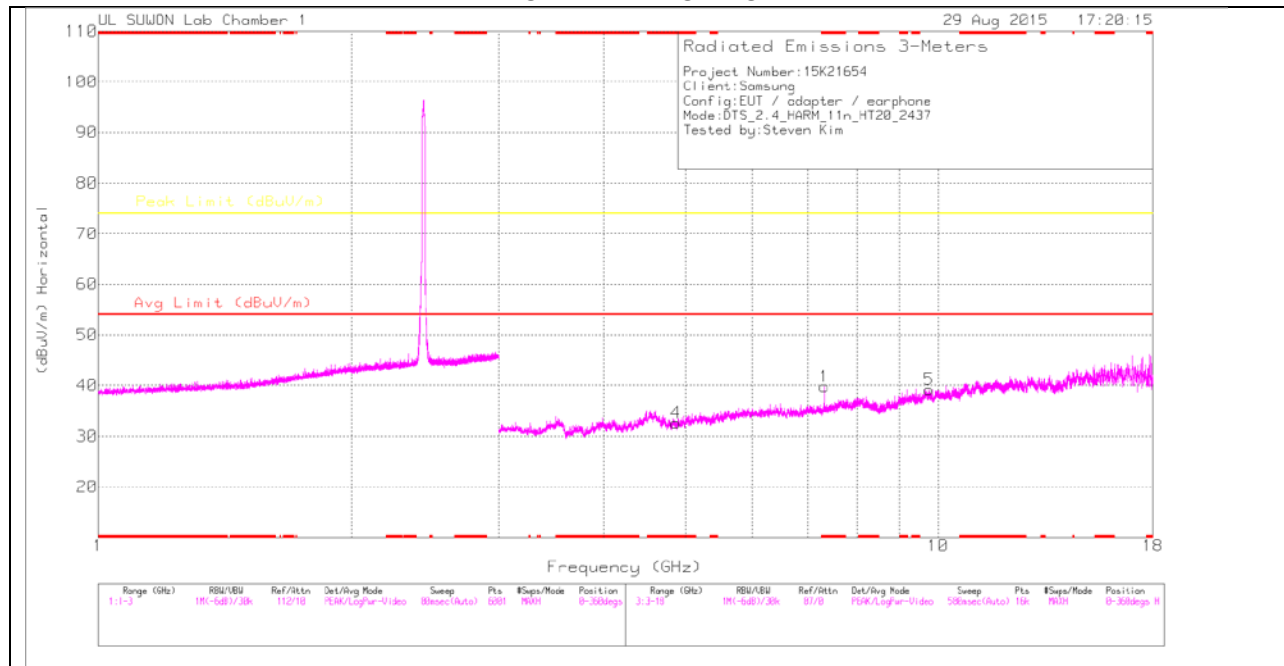
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.235	36.19	PK2	35.7	-25.5	0	46.39	-	-	74	-27.61	122	328	H
7.236	24.49	MAv1	35.7	-25.5	.33	35.02	-	-	-	-	122	328	H
7.236	38.67	PK2	35.7	-25.5	0	48.87	-	-	74	-25.13	53	209	V
7.236	25.96	MAv1	35.7	-25.5	.33	36.49	-	-	-	-	53	209	V
9.648	33.69	PK2	37.1	-20.8	0	49.99	-	-	74	-24.01	23	206	V
9.648	22.6	MAv1	37.1	-20.8	.33	39.23	-	-	-	-	23	206	V

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

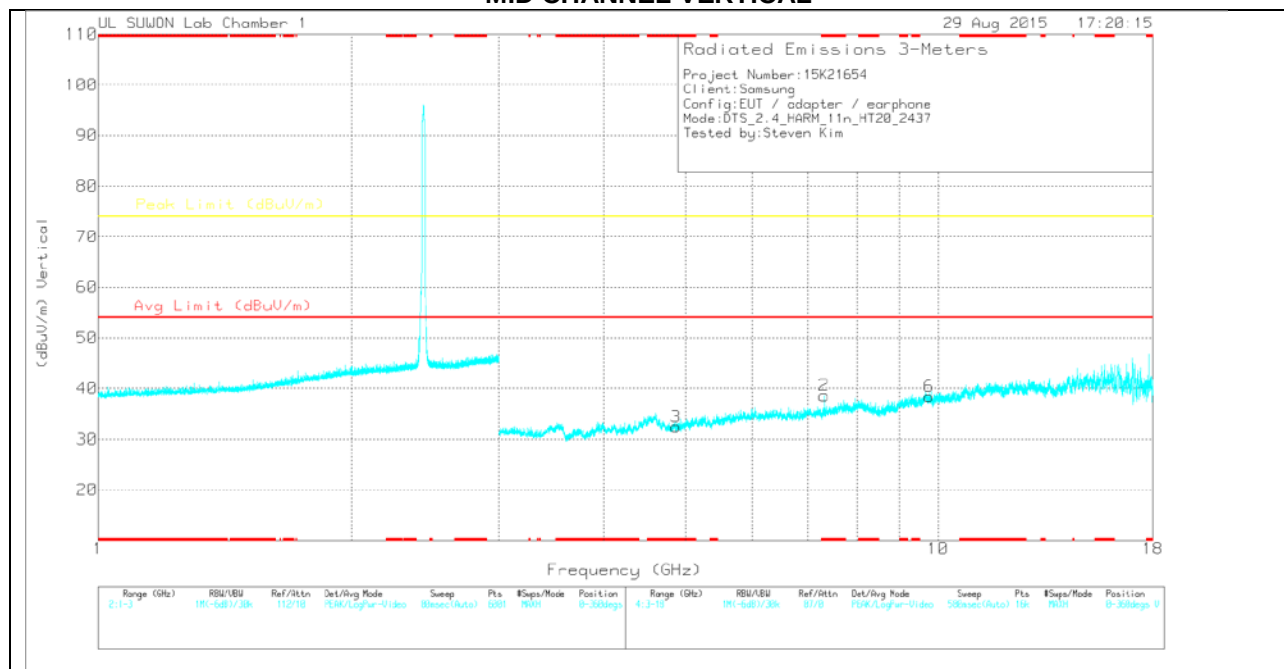
PK2 - KDB558074 Method: Maximum Peak

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	3117(001687 17_150619	Path_3_3GHP	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	* 7.311	29.77	PK	35.7	-25.7	0	39.77	-	-	74	-34.23	0-360	200	H
4	* 4.875	27.81	PK	34	-29.2	0	32.61	-	-	74	-41.39	0-360	100	H
5	9.748	23.89	PK	37.2	-21.9	0	39.19	-	-	74	-34.81	0-360	200	H
2	* 7.31	28.62	PK	35.7	-25.7	0	38.62	-	-	74	-35.38	0-360	200	V
3	* 4.876	27.64	PK	34	-29.2	0	32.44	-	-	74	-41.56	0-360	200	V
6	9.748	23.12	PK	37.2	-21.9	0	38.42	-	-	74	-35.58	0-360	200	V

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

PK – Peak detector

Radiated Emissions

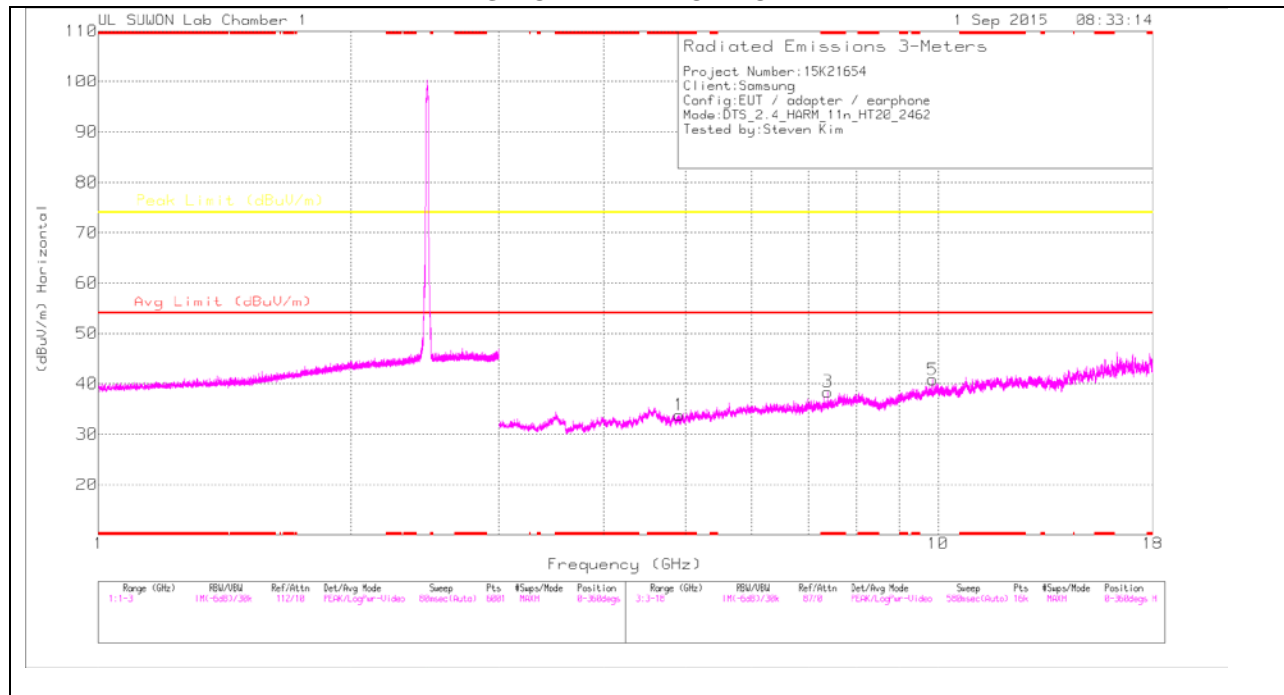
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001 68717)_1 50619	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.314	37	PK2	35.8	-25.7	0	47.1	-	-	74	-26.9	205	193	H
* 7.311	24.8	MAv1	35.7	-25.7	.33	35.13	54	-18.87	-	-	205	193	H
* 7.311	37.93	PK2	35.7	-25.7	0	47.93	-	-	74	-26.07	184	112	V
* 7.311	25.42	MAv1	35.7	-25.7	.33	35.75	54	-18.25	-	-	184	112	V

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

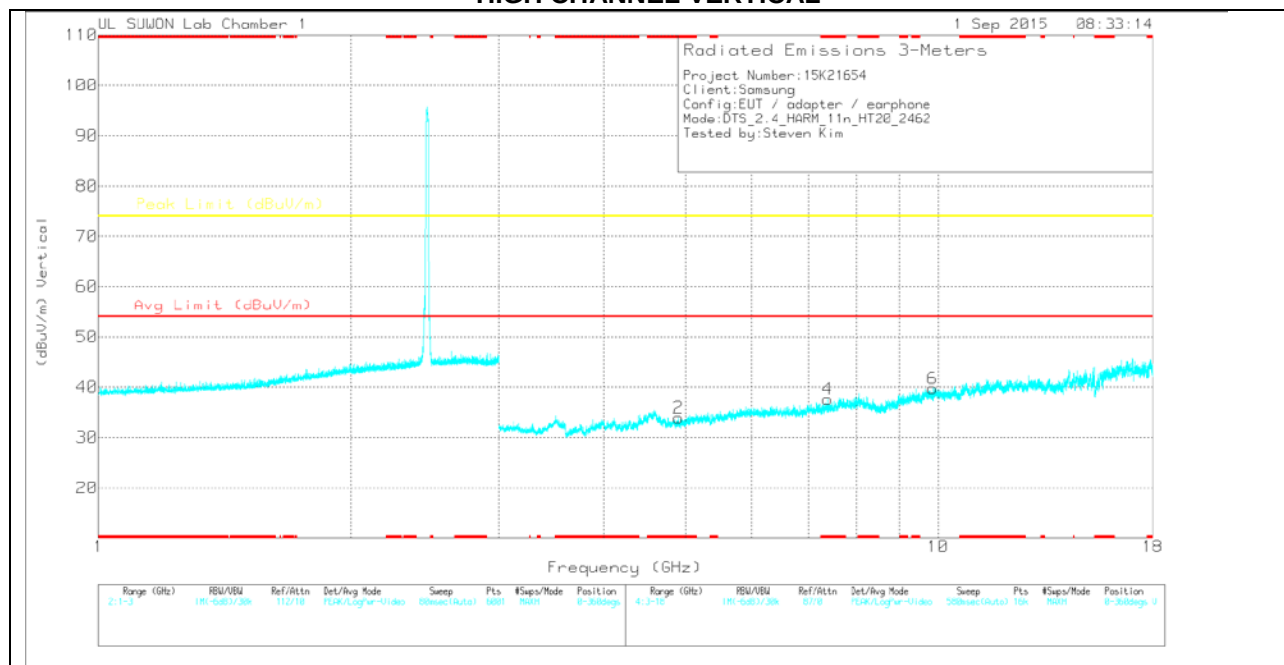
PK2 - KDB558074 Method: Maximum Peak

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(001687 17)_150619	Path_3_3GHP	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	* 4.915	28.91	PK	34	-29.1	0	33.81	-	-	74	-40.19	0-360	100	H
3	* 7.385	27.72	PK	35.8	-25.1	0	38.42	-	-	74	-35.58	0-360	200	H
5	9.848	25.13	PK	37.3	-21.6	0	40.83	-	-	74	-33.17	0-360	200	H
2	* 4.91	29.03	PK	34	-29.1	0	33.93	-	-	74	-40.07	0-360	200	V
4	* 7.386	26.93	PK	35.8	-25.1	0	37.63	-	-	74	-36.37	0-360	200	V
6	9.848	24.02	PK	37.3	-21.6	0	39.72	-	-	74	-34.28	0-360	100	V

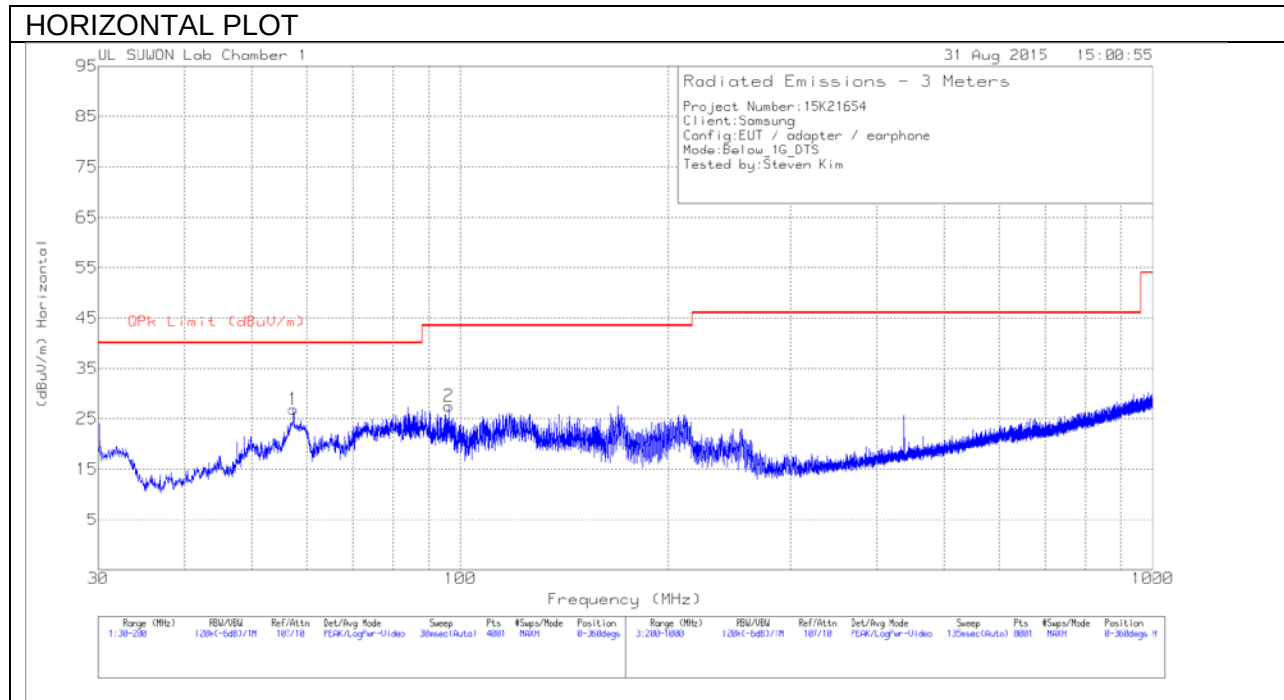
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

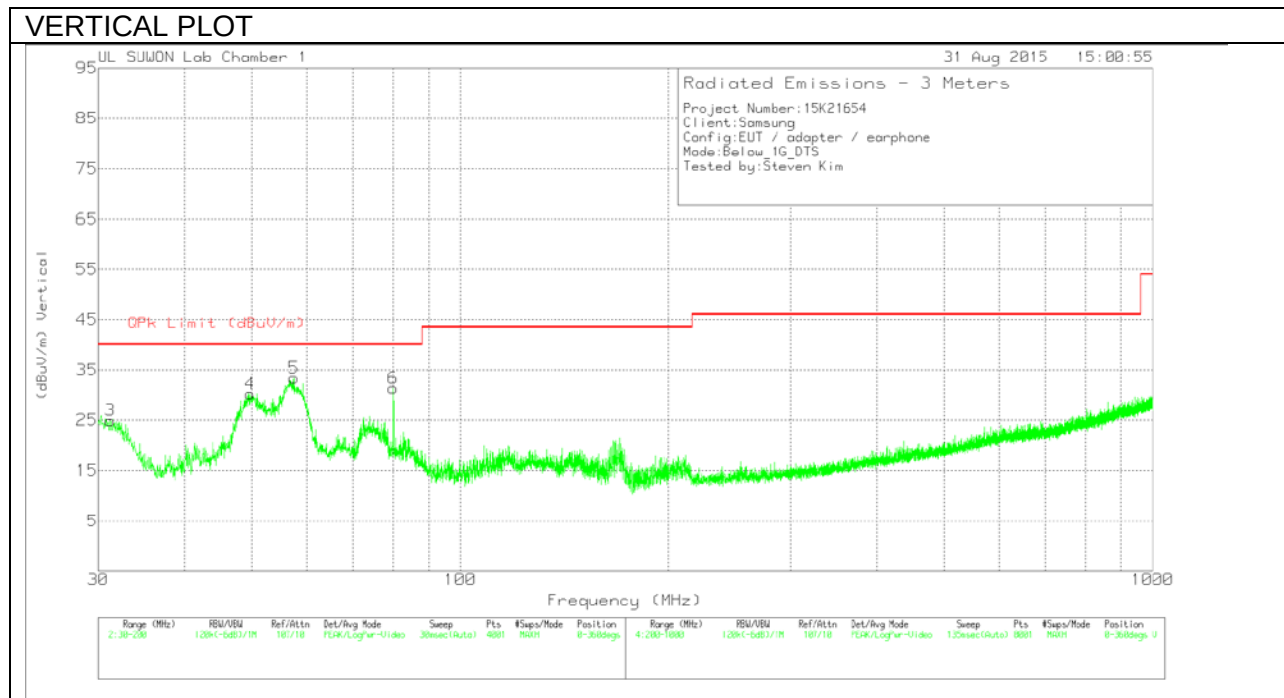
Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

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	VULB9163-750	Bi-Log	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	57.4975	43.92	Pk	13	-30	26.92	40	-13.08	0-360	400	H
2	96.3425	46.05	Pk	10.8	-29.3	27.55	43.52	-15.97	0-360	300	H
3	31.2325	45.13	Pk	10.3	-30.5	24.93	40	-15.07	0-360	100	V
4	49.72	46.65	Pk	13.8	-30.2	30.25	40	-9.75	0-360	100	V
5	57.54	50.5	Pk	12.9	-30	33.4	40	-6.6	0-360	100	V
6	79.98	54.09	Pk	6.9	-29.6	31.39	40	-8.61	0-360	100	V

Pk - Peak detector

12. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
IC RSS-GEN Clause 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.

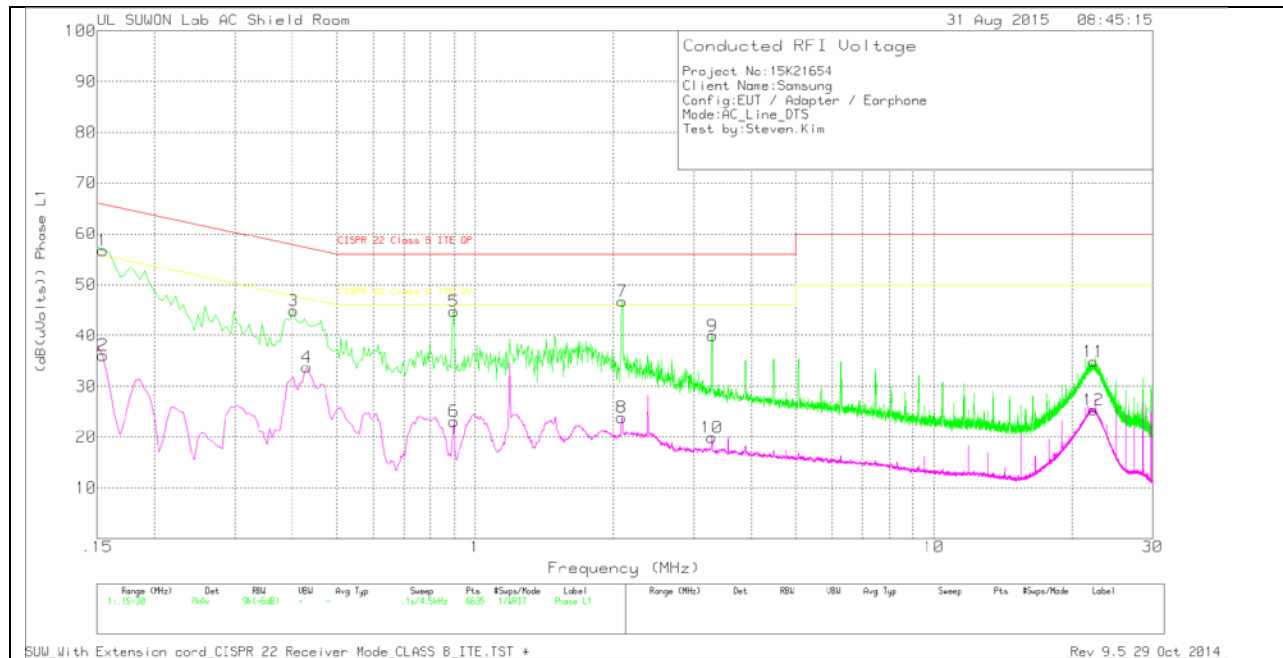
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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	.1545	46.84	Pk	9.9	0	56.74	65.75	-9.01	-	-
2	.1545	26.22	Av	9.9	0	36.12	-	-	55.75	-19.63
3	.402	34.74	Pk	10.1	0	44.84	57.81	-12.97	-	-
4	.429	23.61	Av	10.1	0	33.71	-	-	47.27	-13.56
5	.897	34.89	Pk	9.9	0	44.79	56	-11.21	-	-
6	.897	13.2	Av	9.9	0	23.1	-	-	46	-22.9
7	2.0895	36.77	Pk	9.8	.1	46.67	56	-9.33	-	-
8	2.085	13.98	Av	9.8	.1	23.88	-	-	46	-22.12
9	3.2865	30.02	Pk	9.8	.1	39.92	56	-16.08	-	-
10	3.282	10.01	Av	9.8	.1	19.91	-	-	46	-26.09
11	22.272	24.11	Pk	10.5	.2	34.81	60	-25.19	-	-
12	22.29	14.66	Av	10.5	.2	25.36	-	-	50	-24.64

Pk - Peak detector

Av - Average detection

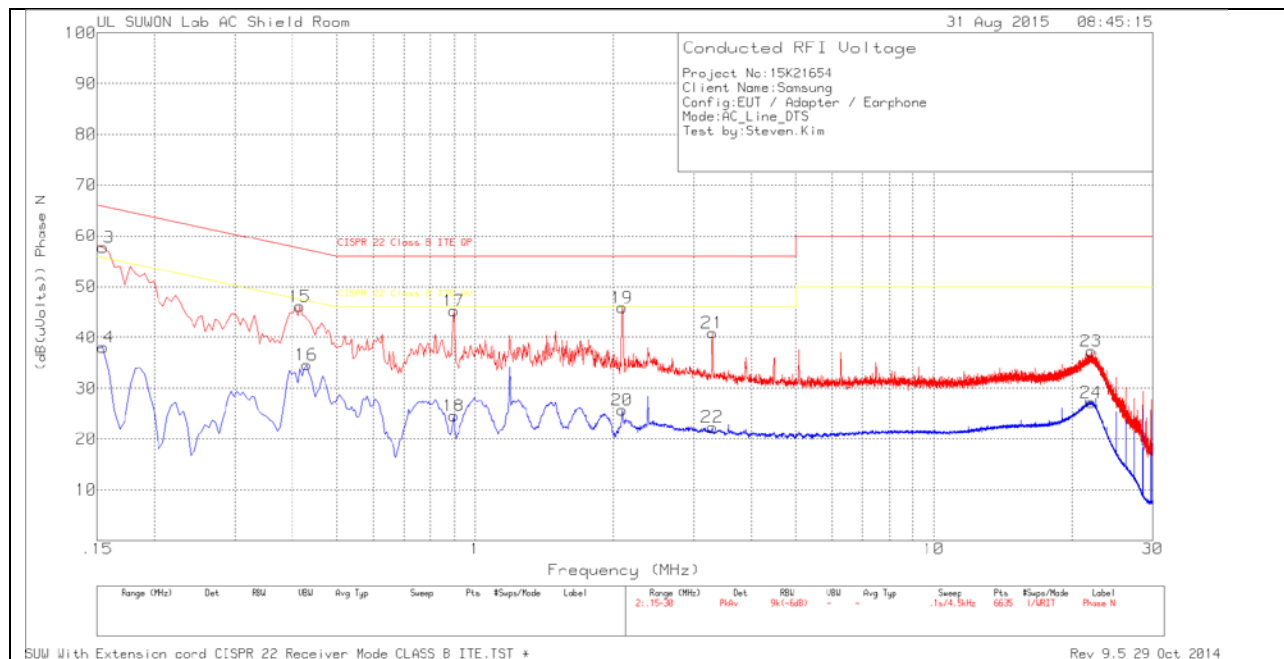
Quasi-Peak Emissions

Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_wit h 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)
.1509	44.65	Qp	9.8	0	54.45	65.95	-11.5	-	-
2.0931	31.9	Qp	9.8	.1	41.8	56	-14.2	-	-

QP – Quasi-Peak detector

LINE 2 PLOT



LINE 2 RESULTS

Trace Markers

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	.1545	47.85	Pk	9.9	0	57.75	65.75	-8	-	-
14	.1545	28.11	Av	9.9	0	38.01	-	-	55.75	-17.74
15	.4155	36.02	Pk	10.1	0	46.12	57.54	-11.42	-	-
16	.429	24.53	Av	10.1	0	34.63	-	-	47.27	-12.64
17	.897	35.32	Pk	9.9	0	45.22	56	-10.78	-	-
18	.897	14.69	Av	9.9	0	24.59	-	-	46	-21.41
19	2.0895	35.98	Pk	9.8	.1	45.88	56	-10.12	-	-
20	2.0895	15.82	Av	9.8	.1	25.72	-	-	46	-20.28
21	3.2865	31.05	Pk	9.8	.1	40.95	56	-15.05	-	-
22	3.2865	12.49	Av	9.8	.1	22.39	-	-	46	-23.61
23	22.0065	26.4	Pk	10.7	.2	37.3	60	-22.7	-	-
24	22.011	16.28	Av	10.7	.2	27.18	-	-	50	-22.82

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_wit h 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)
.1518	44.98	Qp	9.8	0	54.78	65.9	-11.12	-	-
2.0931	38.76	Qp	9.8	.1	48.66	56	-7.34	-	-

Qp - Quasi-Peak detector