FCC CFR47 PART 15 SUBPART C

DTS Wireless LAN

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER : SM-J3109

FCC ID: A3LSMJ3109

REPORT NUMBER: 15K21842-E1

ISSUE DATE: OCT 20, 2015

Prepared for
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129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
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ACCREDITED
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/20/15	Initial issue	Junwhan Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + Bluetooth/BLE, DTS b/g/n and NFC
MODEL NUMBER:	SM-J3109
SERIAL NUMBER:	R28G944MERY, R28G91J6LEV (RADIATED); R28G84SHPPN (CONDUCTED)
DATE TESTED:	SEP 25, 2015 - OCT 20, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass

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

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

Approved & Released For
UL Korea, Ltd. By:

CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☐ 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + Bluetooth/BLE, DTS b/g/n and NFC.
This test report addresses the DTS (WLAN) operational mode.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
2412 - 2462	802.11b	15.27	33.65
	802.11g	13.29	21.33
	802.11n HT20	11.56	14.32

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antennas, with a antenna's maximum gain of -5.39 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

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	ETA0U83CBC	DK1F702HS/A	N/A
Data Cable	SAMSUNG	ECB-DU68WC	N/A	N/A
Earphone	SAMSUNG	EHS61ASFWE	N/A	N/A

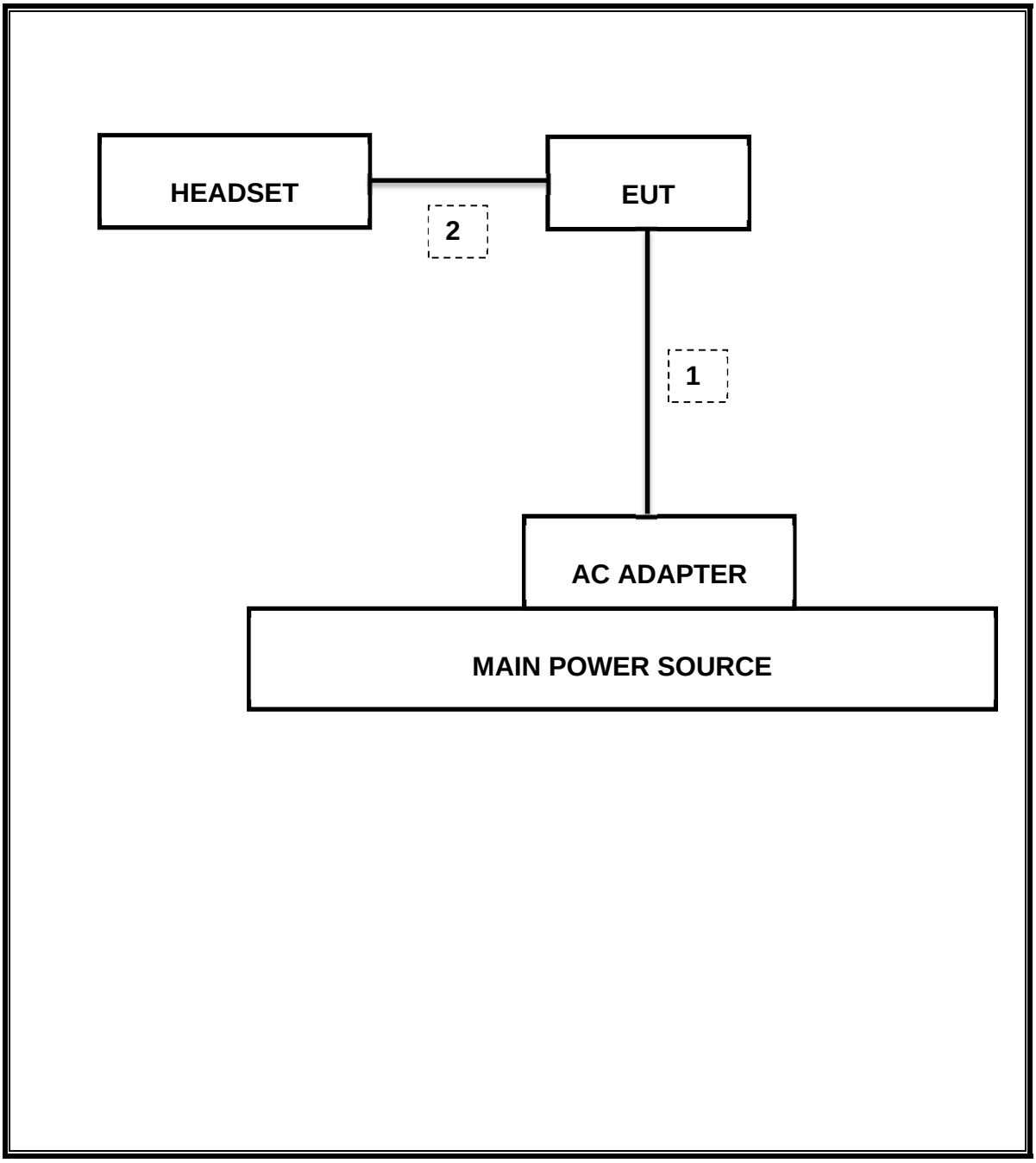
I/O CABLES

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

7. MEASUREMENT METHODS

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

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

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

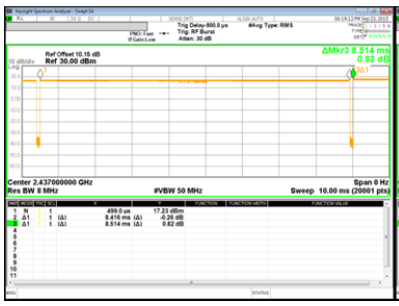
8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B [msec]	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
2400MHz Bands						
802.11b	8.416	8.514	0.988	98.8%	0.00	0.010
802.11g	1.396	1.494	0.934	93.4%	0.29	0.716
802.11n HT20	1.295	1.394	0.929	92.9%	0.32	0.772



[802.11b Mode]

[802.11g Mode]

[802.11n Mode]

9. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	8.537 MHz
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-30dBc		Pass	-33.355 dBm
15.247	TX conducted output power	<30dBm		Pass	15.36 dBm
15.247	PSD	<8dBm		Pass	-16.227 dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	47.31 dBuV (QP)
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	46.68 dBuV/m (AV)

10. ANTENNA PORT TEST RESULTS

10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

Reference to KDB 558074 D01 DTS Meas Guidance v03r03: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

10.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	8.537	0.5
Mid	2437	9.029	0.5
High	2462	8.539	0.5
Worst		8.537	0.5

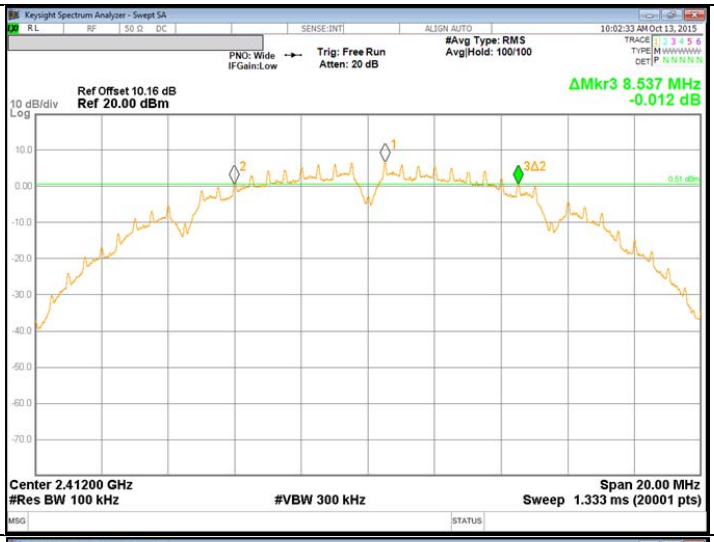
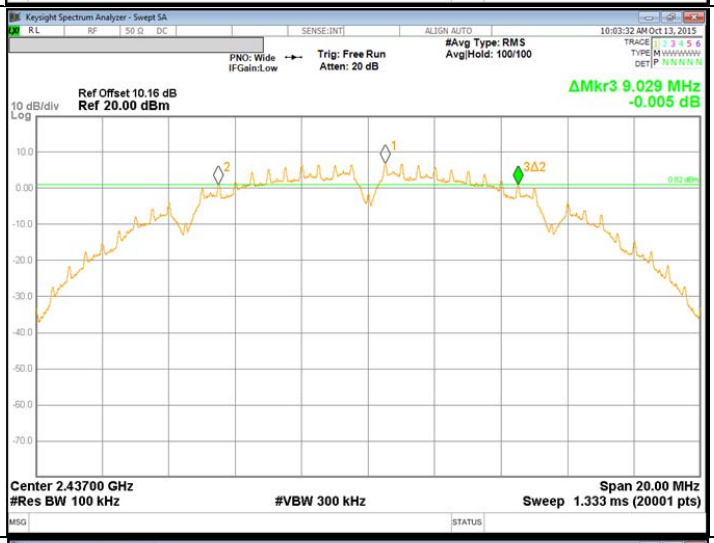
10.1.2. 802.11g MODE IN THE 2.4 GHz BAND

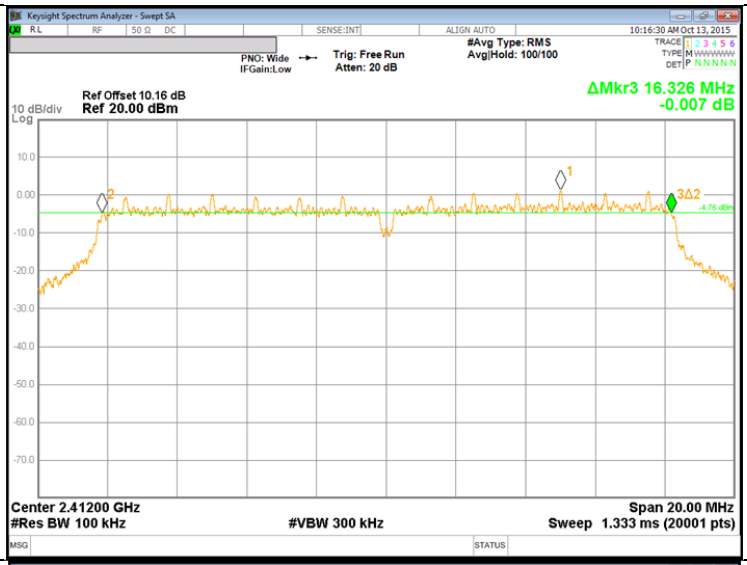
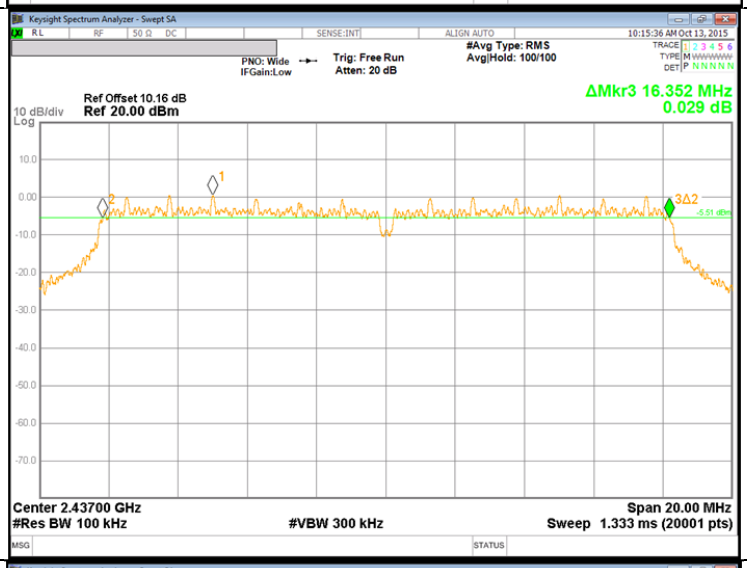
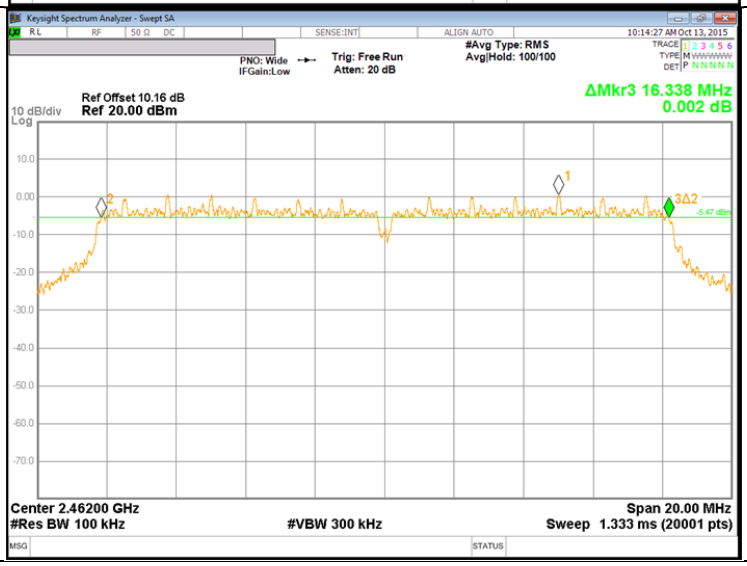
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	16.326	0.5
Mid	2437	16.352	0.5
High	2462	16.338	0.5
Worst		16.326	0.5

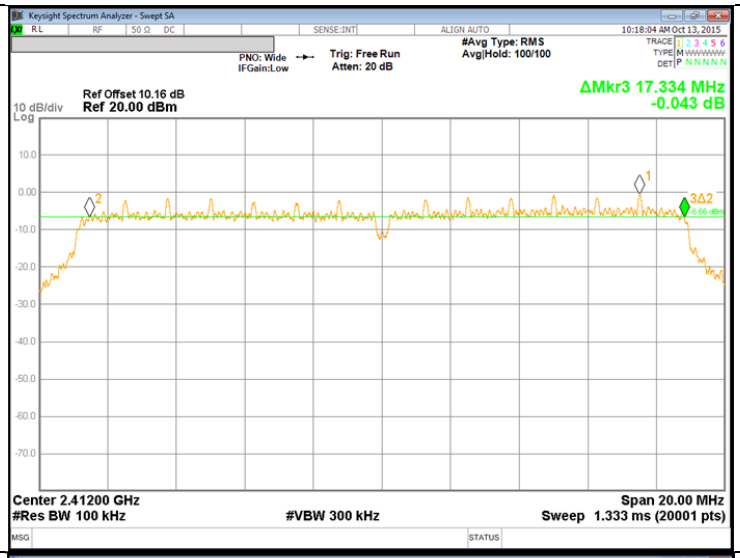
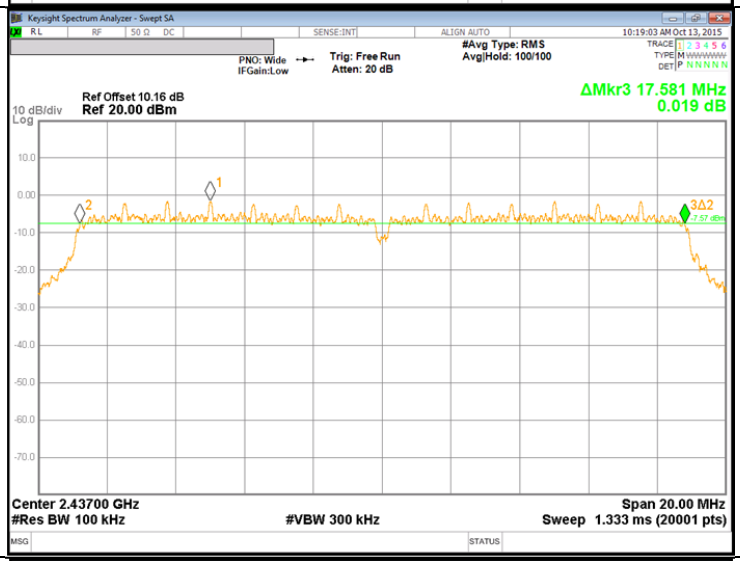
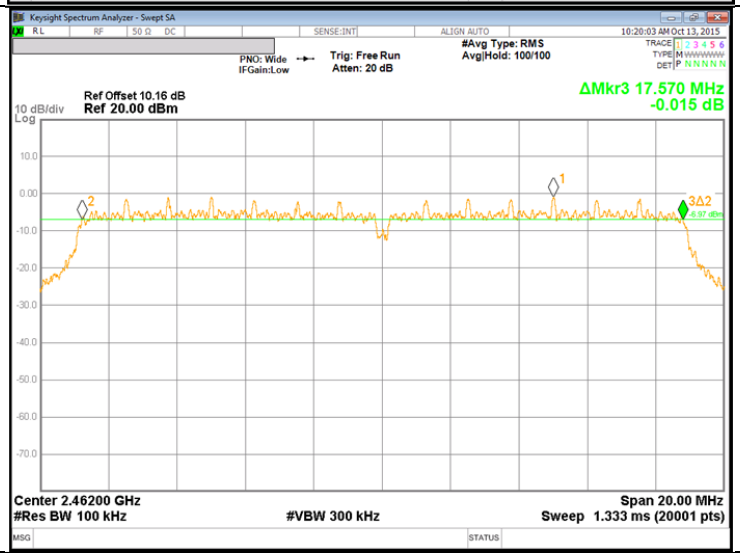
10.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	17.334	0.5
Mid	2437	17.581	0.5
High	2462	17.570	0.5
Worst		17.334	0.5

10.1.4. 6 dB BANDWIDTH PLOTS

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

802.11g Mode Low CH	
802.11g Mode Middle CH	
802.11g Mode High CH	

802.11n Mode Low CH	
802.11n Mode Middle CH	
802.11n 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	13.285
Mid	2437	13.425
High	2462	13.520
Worst		13.520

10.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	16.533
Mid	2437	16.501
High	2462	16.500
Worst		16.533

10.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2412	17.707
Mid	2437	17.662
High	2462	17.678
Worst		17.707

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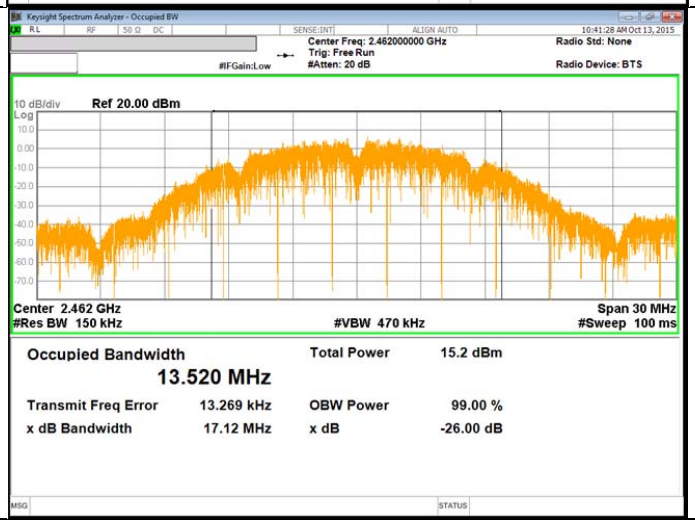
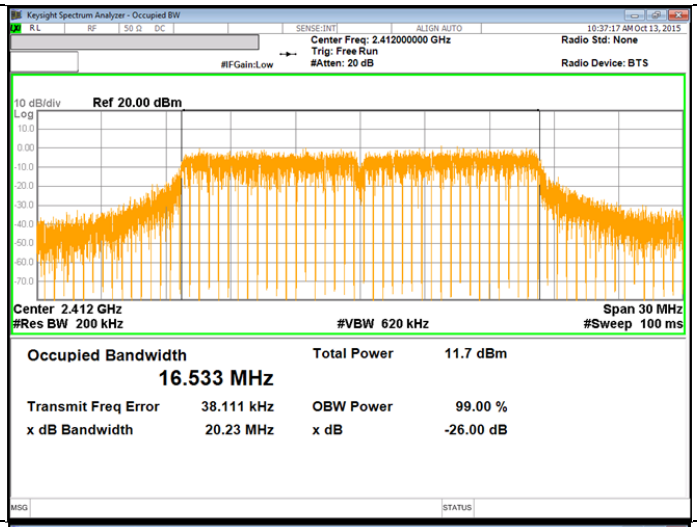
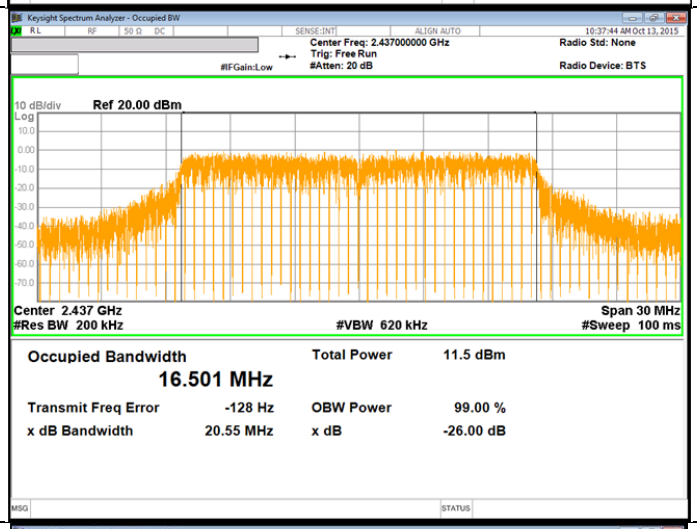
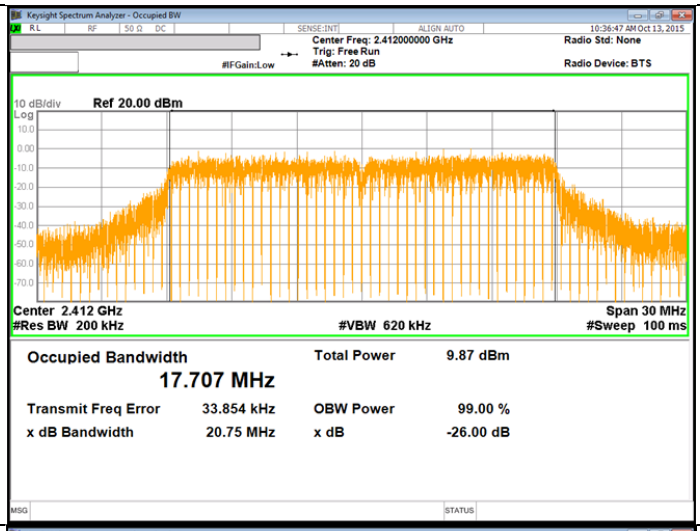
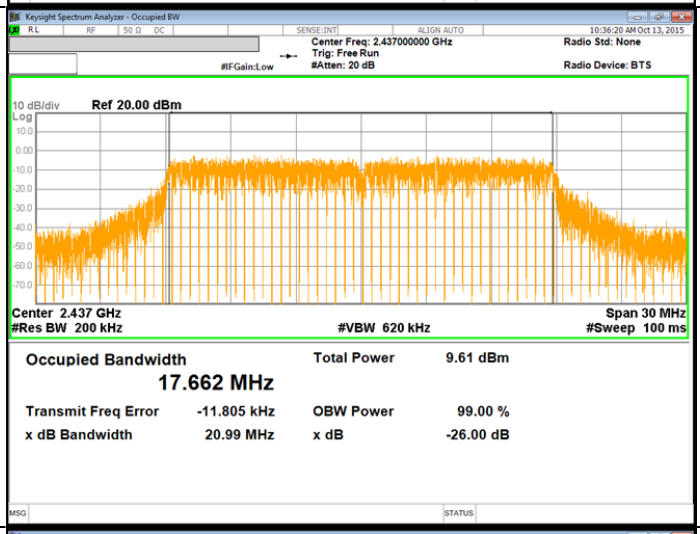
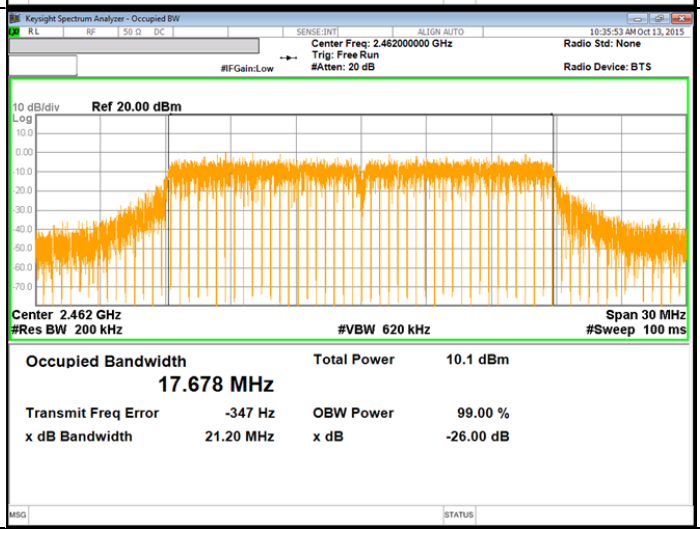
10.2.4. 99% BANDWIDTH PLOTS

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

802.11g Mode Low CH		
802.11g Mode Middle CH		
802.11g Mode High CH		

802.11n Mode Low CH			
802.11n Mode Middle CH			
802.11n Mode High CH			

10.3. OUTPUT POWER

LIMITS

FCC §15.247

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

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	-5.39	30.00	30.00	36.00	30.00
Mid	2437	-5.39	30.00	30.00	36.00	30.00
High	2462	-5.39	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	14.64	14.64	36.00	-21.36
Mid	2437	15.34	15.34	36.00	-20.66
High	2462	15.36	15.36	36.00	-20.64
Worst			15.36	36.00	-20.64

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	-5.39	30.00	30.00	36.00	30.00
Mid	2437	-5.39	30.00	30.00	36.00	30.00
High	2462	-5.39	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	12.18	12.18	36.00	-23.82
Mid	2437	11.87	11.87	36.00	-24.13
High	2462	11.88	11.88	36.00	-24.12
Worst			12.18	36.00	-23.82

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	-5.39	30.00	30.00	36.00	30.00
Mid	2437	-5.39	30.00	30.00	36.00	30.00
High	2462	-5.39	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	10.15	10.15	36.00	-25.85
Mid	2437	9.84	9.84	36.00	-26.16
High	2462	10.40	10.40	36.00	-25.60
Worst			10.40	36.00	-25.60

10.4. PSD

LIMITS

FCC §15.247

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

TEST PROCEDURE

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

RESULTS

10.4.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-17.029	0.00	-17.029	8.00	-25.029
Mid	2437	-16.227	0.00	-16.227	8.00	-24.227
High	2462	-16.265	0.00	-16.265	8.00	-24.265

10.4.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

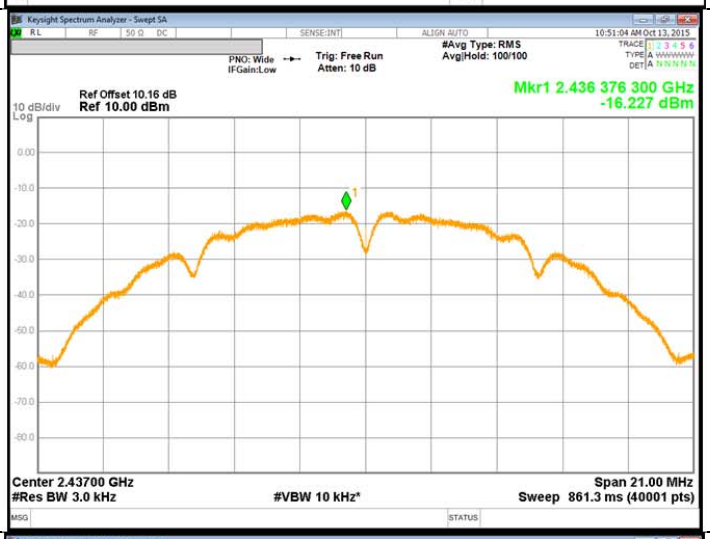
Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-21.852	0.29	-21.562	8.00	-29.562
Mid	2437	-22.456	0.29	-22.166	8.00	-30.166
High	2462	-22.273	0.29	-21.983	8.00	-29.983

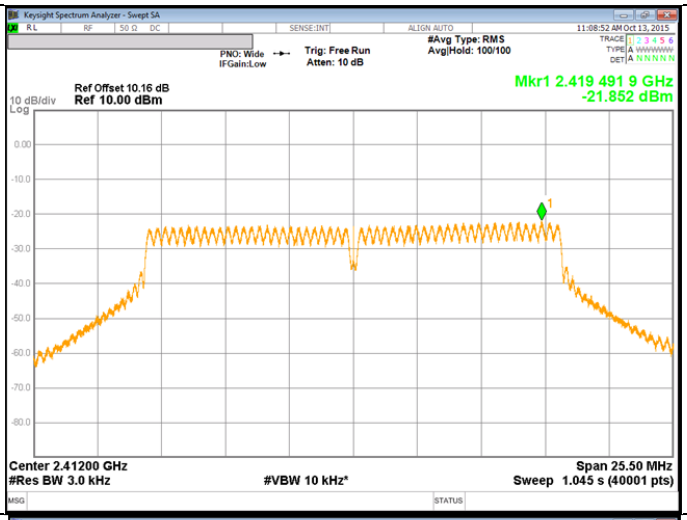
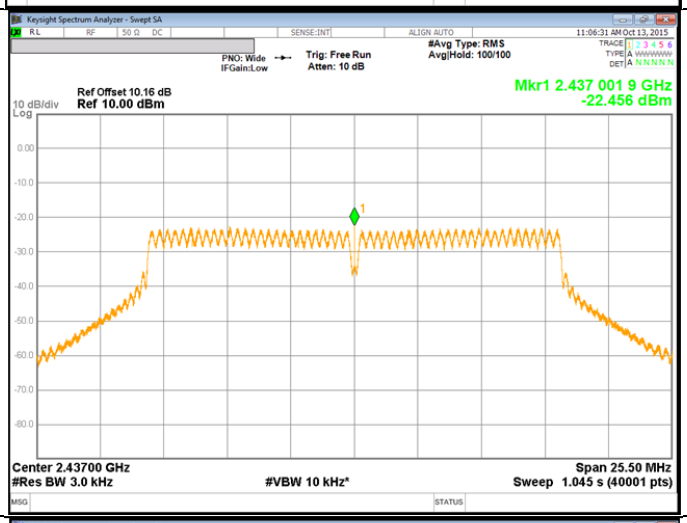
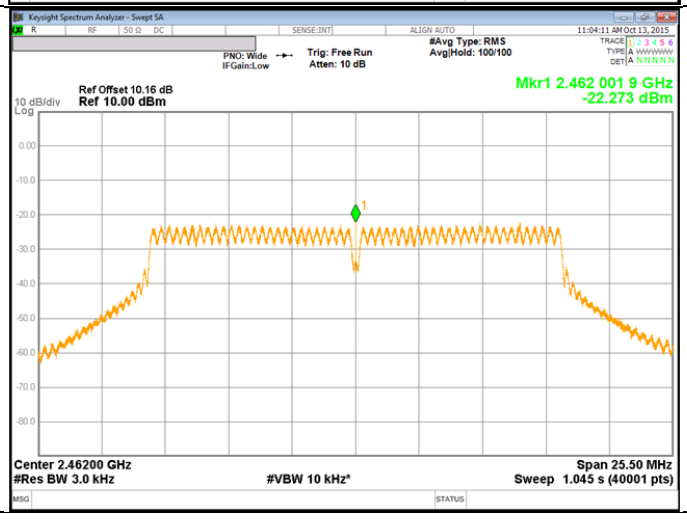
10.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

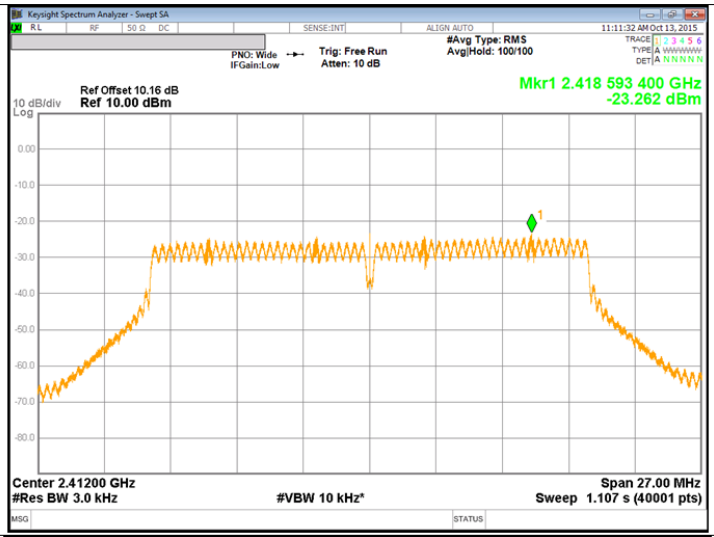
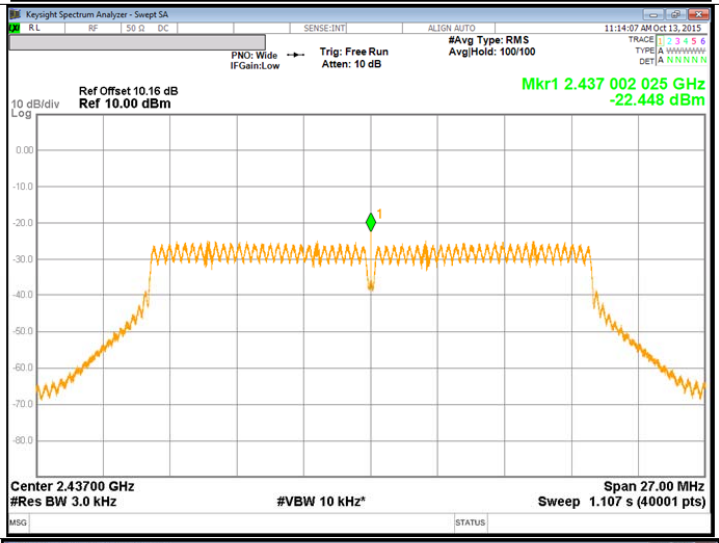
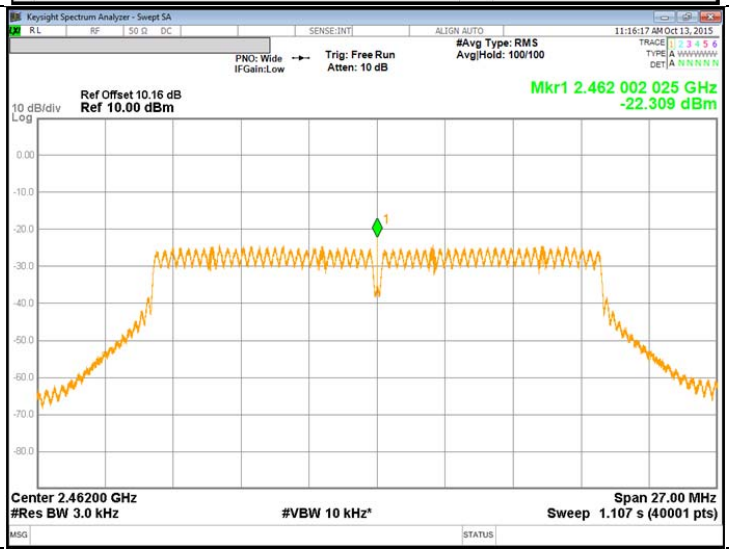
PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-23.262	0.32	-22.942	8.00	-30.942
Mid	2437	-22.448	0.32	-22.128	8.00	-30.128
High	2462	-22.309	0.32	-21.989	8.00	-29.989

10.4.4. PSD PLOTS

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

802.11g Mode Low CH		
802.11g Mode Middle CH		
802.11g Mode High CH		

802.11n Mode Low CH	
802.11n Mode Middle CH	
802.11n Mode High CH	

10.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

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

TEST PROCEDURE

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

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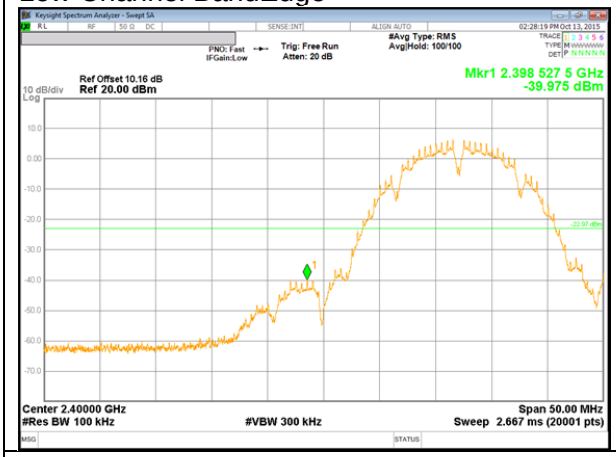
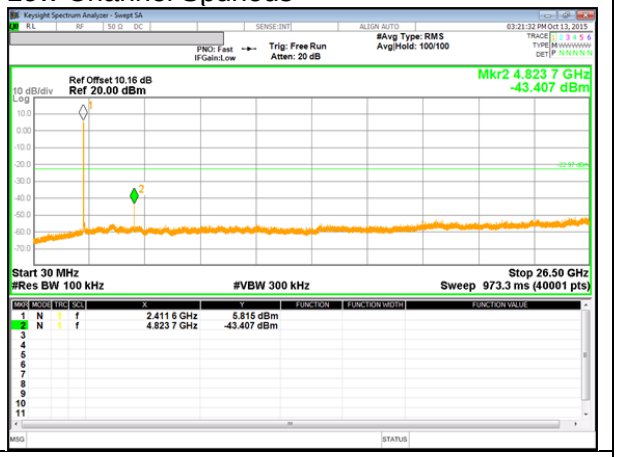
RESULTS

10.5.1. 802.11b MODE IN THE 2.4 GHz BAND

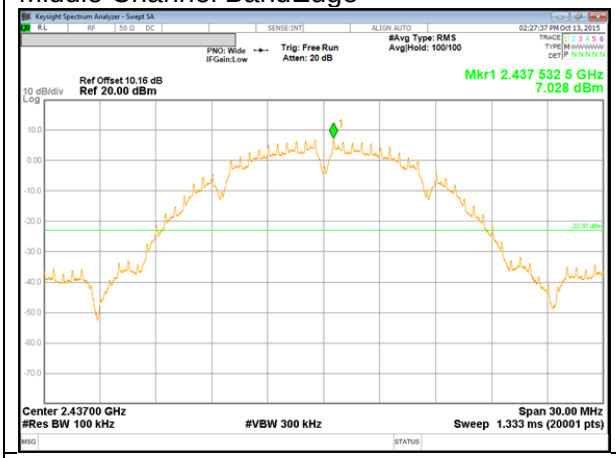
Low Channel BandEdge



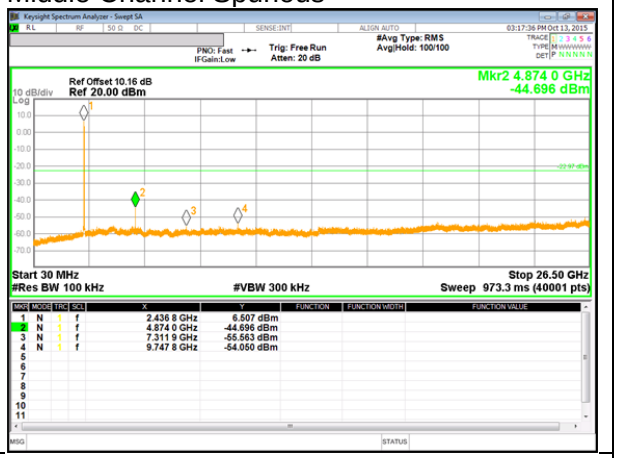
Low Channel Spurious



Middle Channel BandEdge

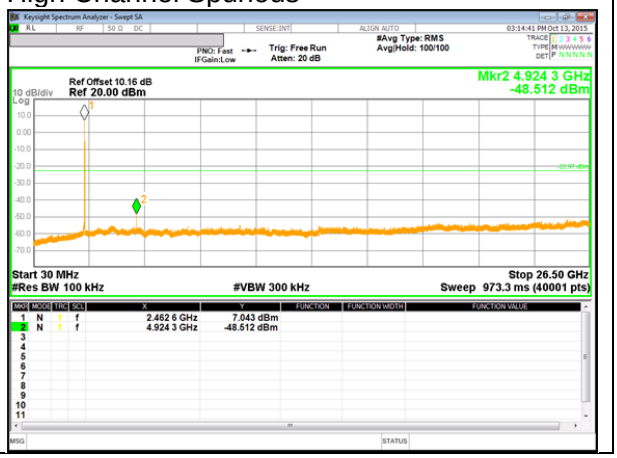


Middle Channel Spurious



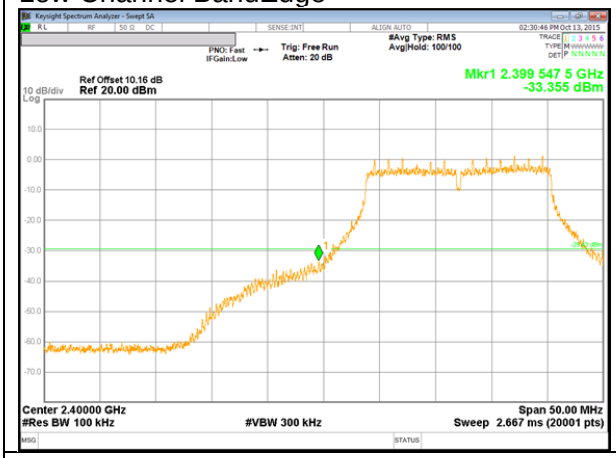
High Channel BandEdge

High Channel Spurious

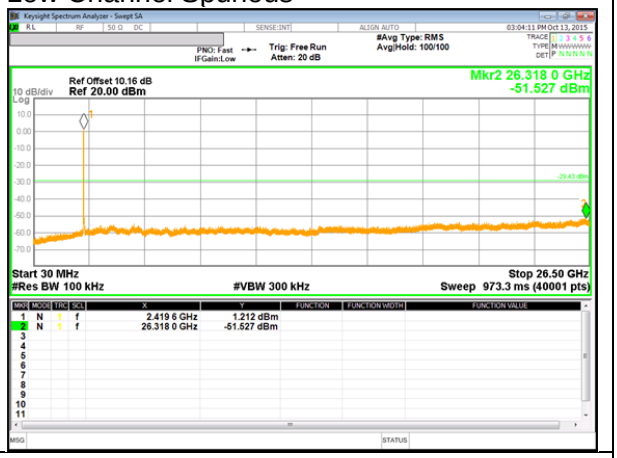


10.5.2. 802.11g MODE IN THE 2.4 GHz BAND

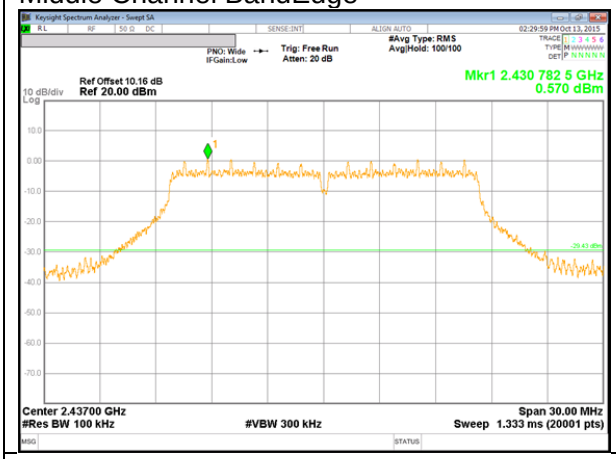
Low Channel BandEdge



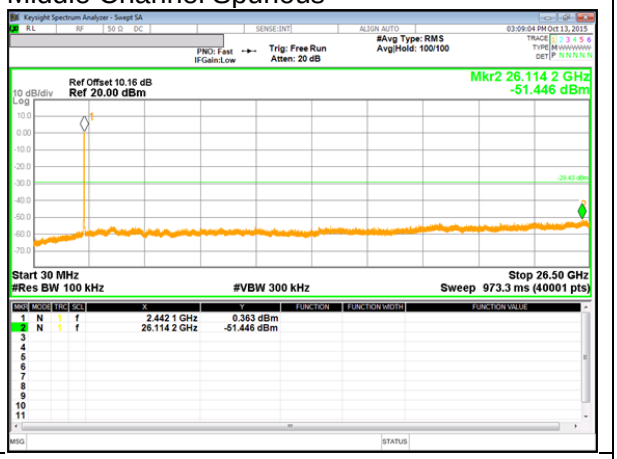
Low Channel Spurious



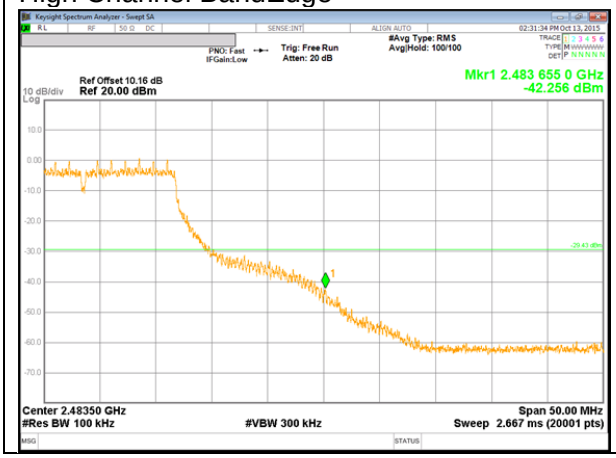
Middle Channel BandEdge



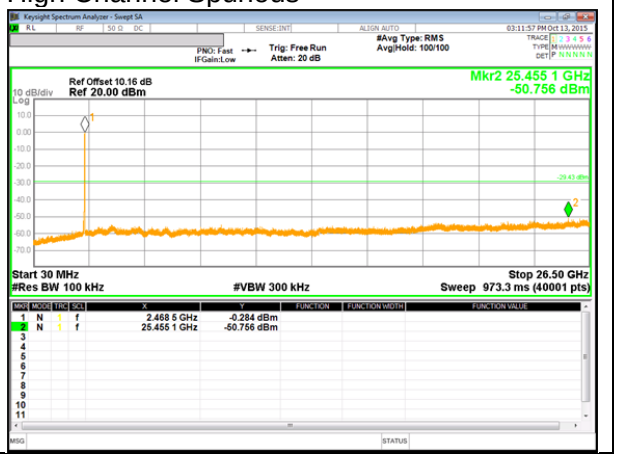
Middle Channel Spurious



High Channel BandEdge



High Channel Spurious



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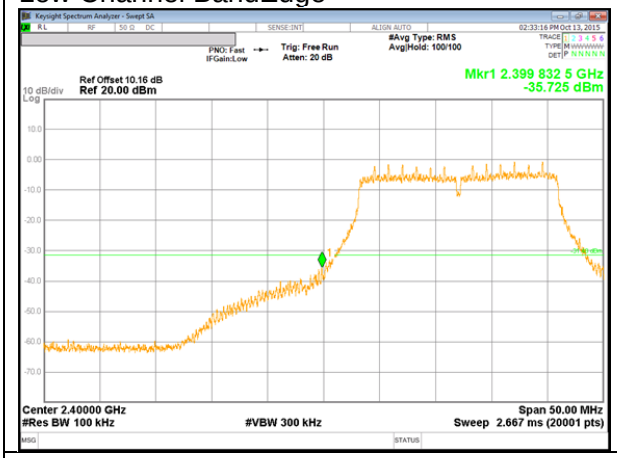
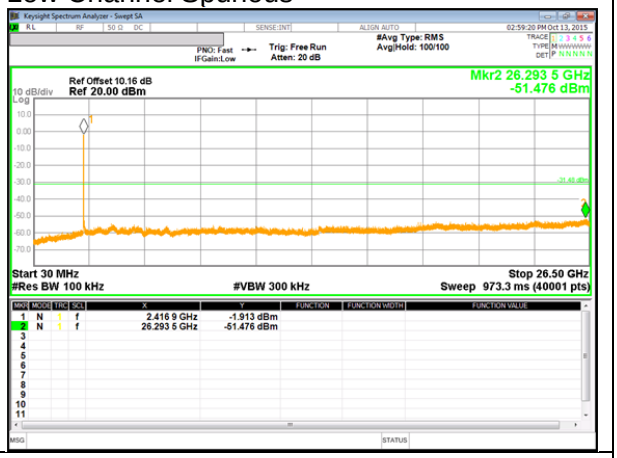
10.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

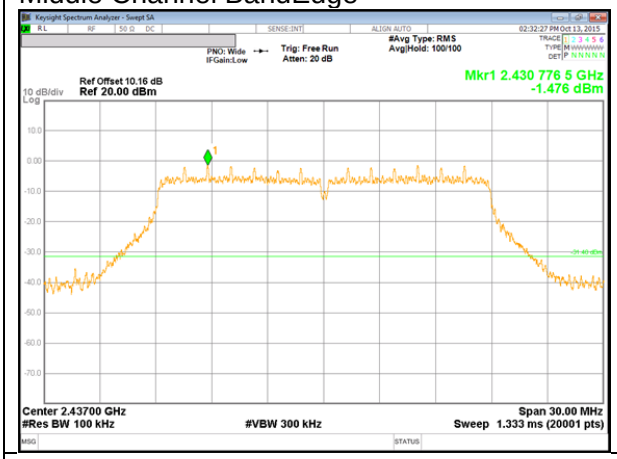
Low Channel BandEdge



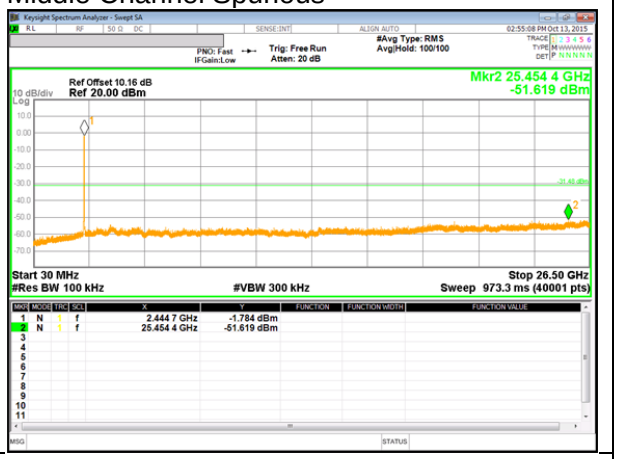
Low Channel Spurious



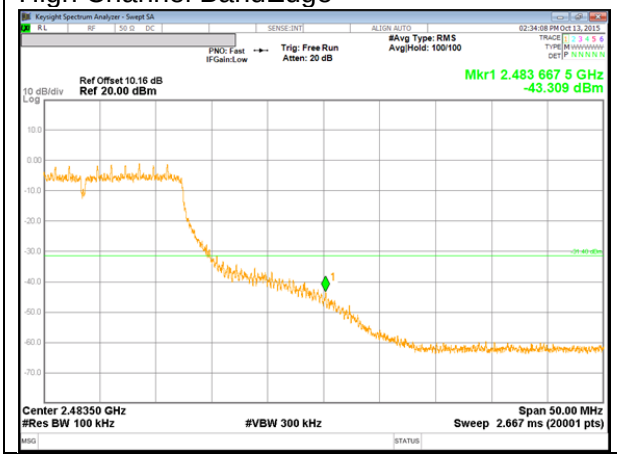
Middle Channel BandEdge



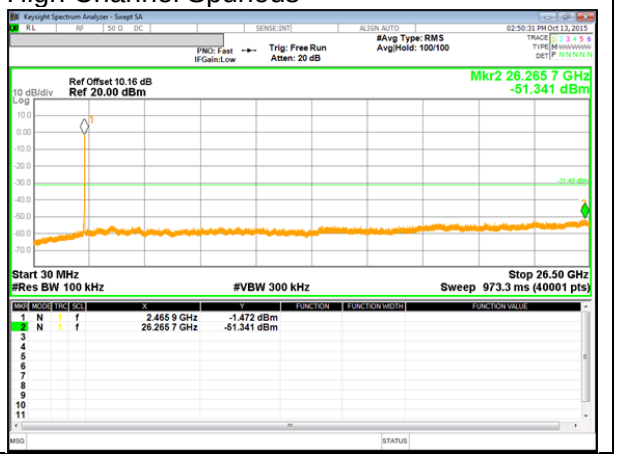
Middle Channel Spurious



High Channel BandEdge



High Channel Spurious



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11. RADIATED TEST RESULTS

11.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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

TEST PROCEDURE

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

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= 10log (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.

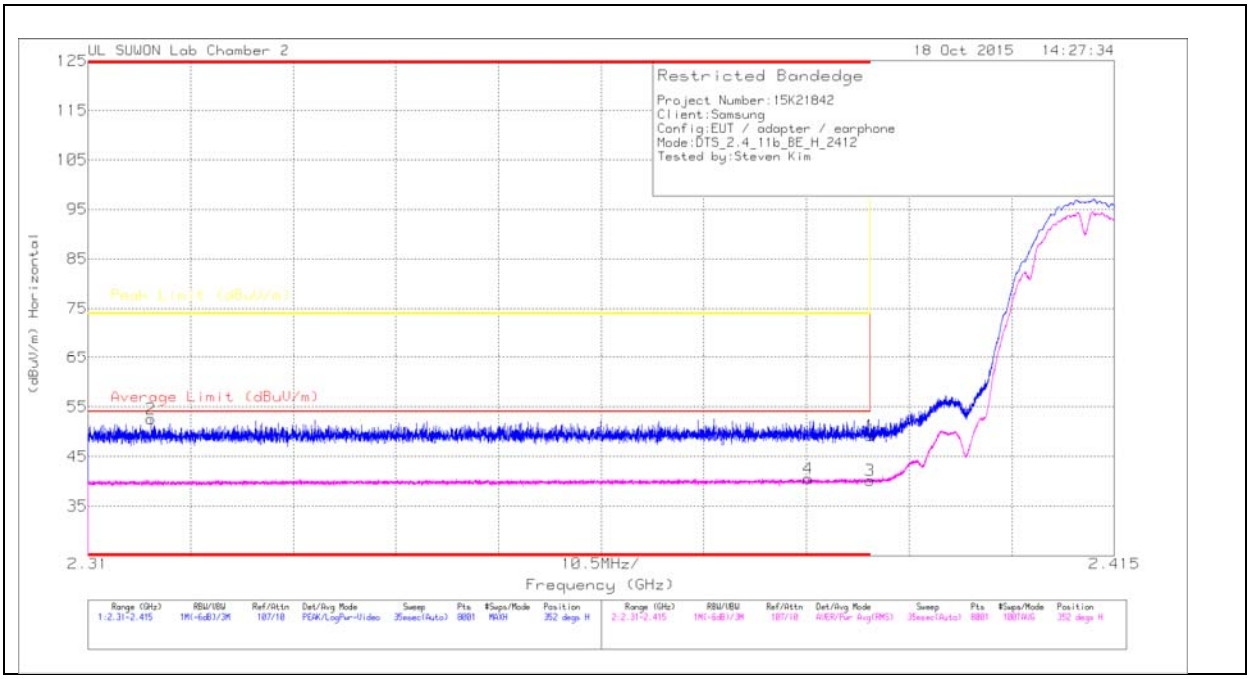
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

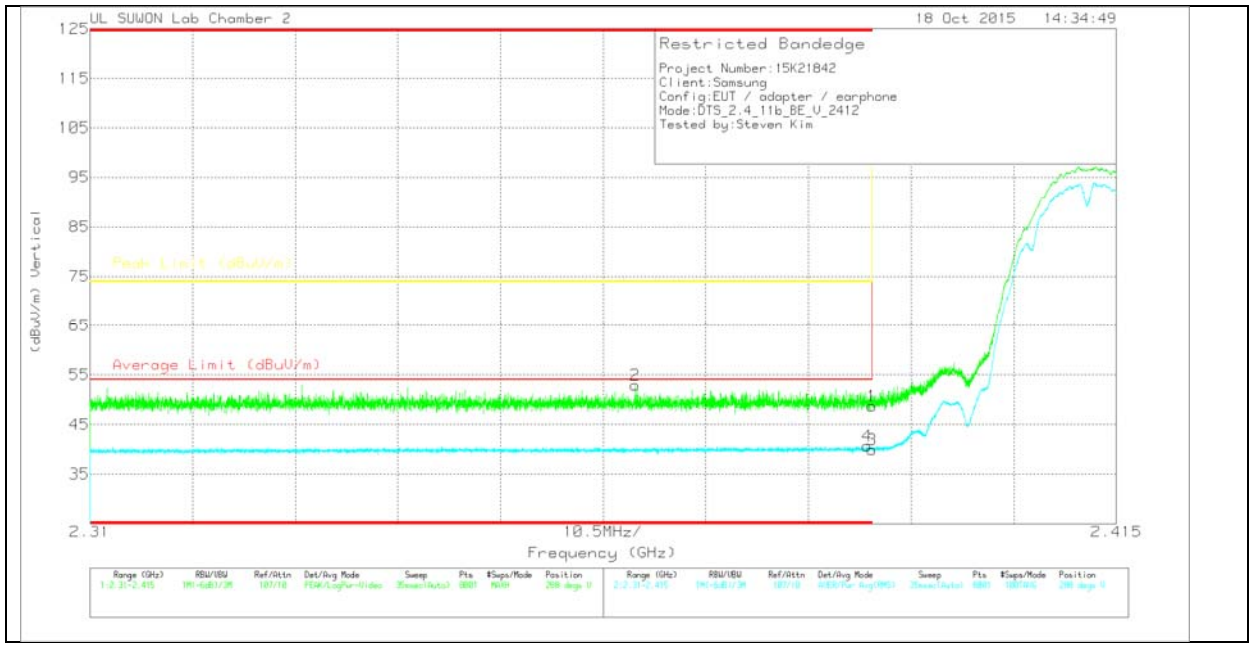
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.03	Pk	31.7	-19.5	0	49.23	-	-	74	-24.77	352	147	H
2	* 2.316	40.7	Pk	31.6	-19.7	0	52.6	-	-	74	-21.4	352	147	H
3	* 2.39	28.02	RMS	31.7	-19.5	0	40.22	54	-13.78	-	-	352	147	H
4	* 2.384	28.38	RMS	31.7	-19.5	0	40.58	54	-13.42	-	-	352	147	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(00168724)_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	36.55	Pk	31.7	-19.5	0	48.75	-	-	74	-25.25	288	277	V
2	* 2.366	40.82	Pk	31.7	-19.6	0	52.92	-	-	74	-21.08	288	277	V
3	* 2.39	27.75	RMS	31.7	-19.5	0	39.95	54	-14.05	-	-	288	277	V
4	* 2.389	28.48	RMS	31.7	-19.5	0	40.68	54	-13.32	-	-	288	277	V

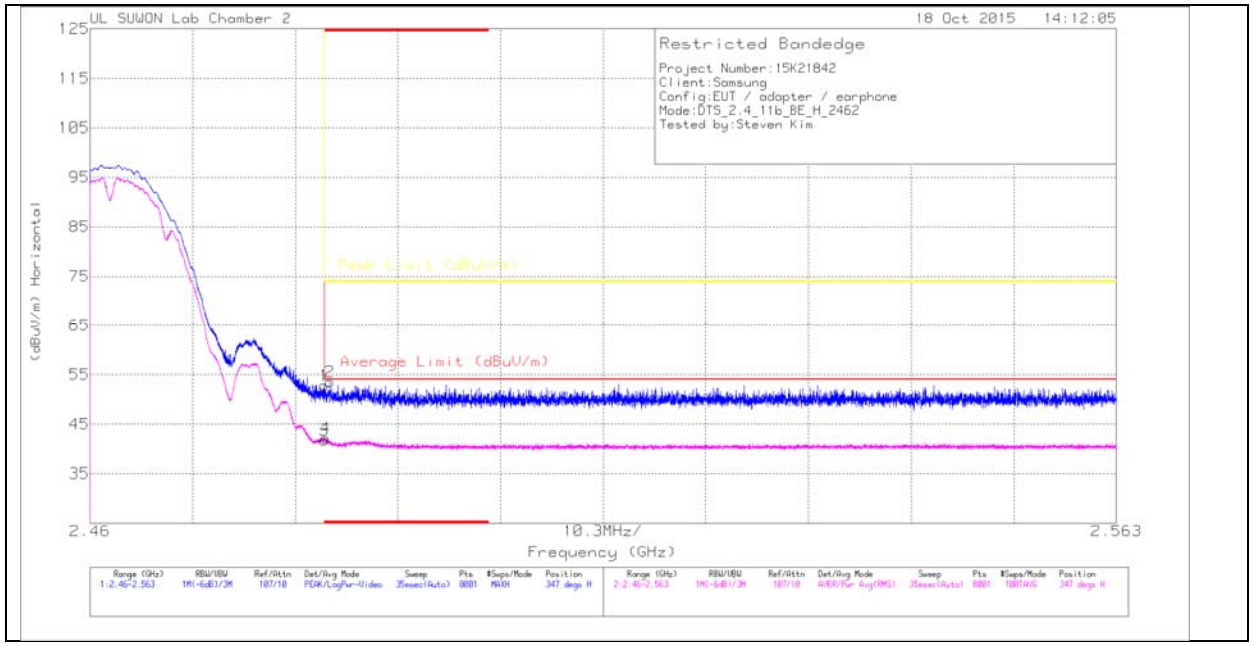
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

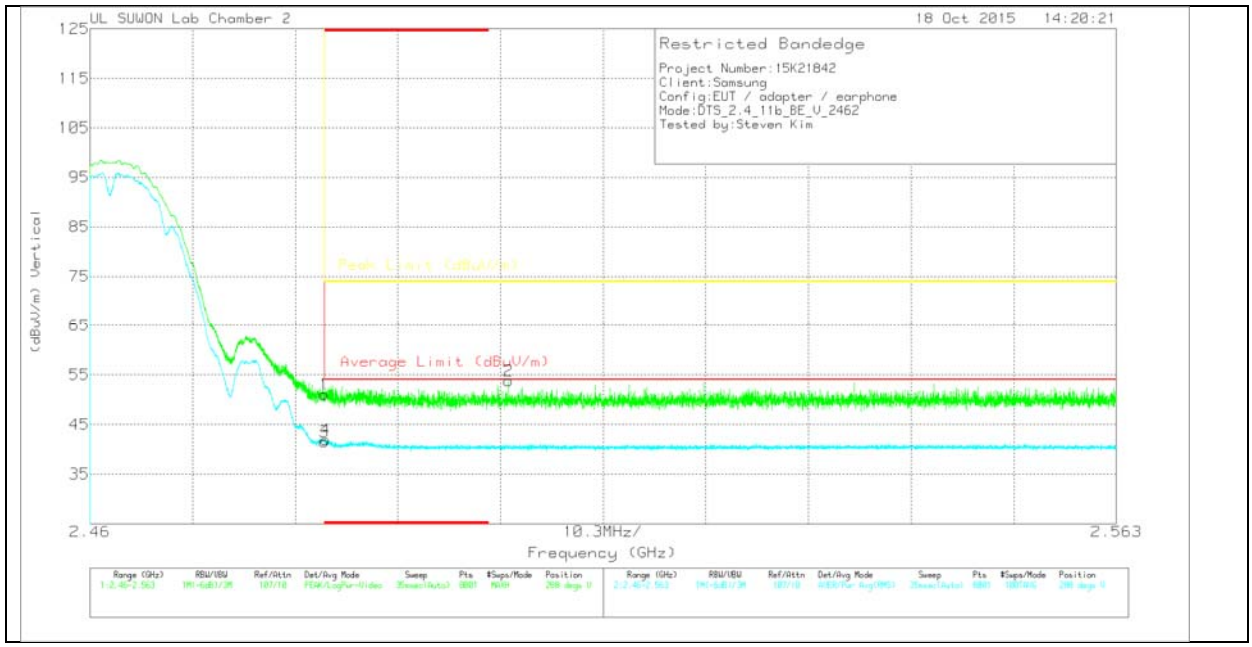
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.36	Pk	31.8	-19.4	0	52.76	-	-	74	-21.24	347	283	H
2	* 2.484	41.1	Pk	31.8	-19.4	0	53.5	-	-	74	-20.5	347	283	H
3	* 2.484	29.4	RMS	31.8	-19.4	0	41.8	54	-12.2	-	-	347	283	H
4	* 2.484	29.8	RMS	31.8	-19.4	0	42.2	54	-11.8	-	-	347	283	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(00168724)_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	38.69	Pk	31.8	-19.4	0	51.09	-	-	74	-22.91	288	264	V
2	2.502	41.24	Pk	31.9	-19.3	0	53.84	-	-	74	-20.16	288	264	V
3	* 2.484	29.18	RMS	31.8	-19.4	0	41.58	54	-12.42	-	-	288	264	V
4	* 2.484	29.51	RMS	31.8	-19.4	0	41.91	54	-12.09	-	-	288	264	V

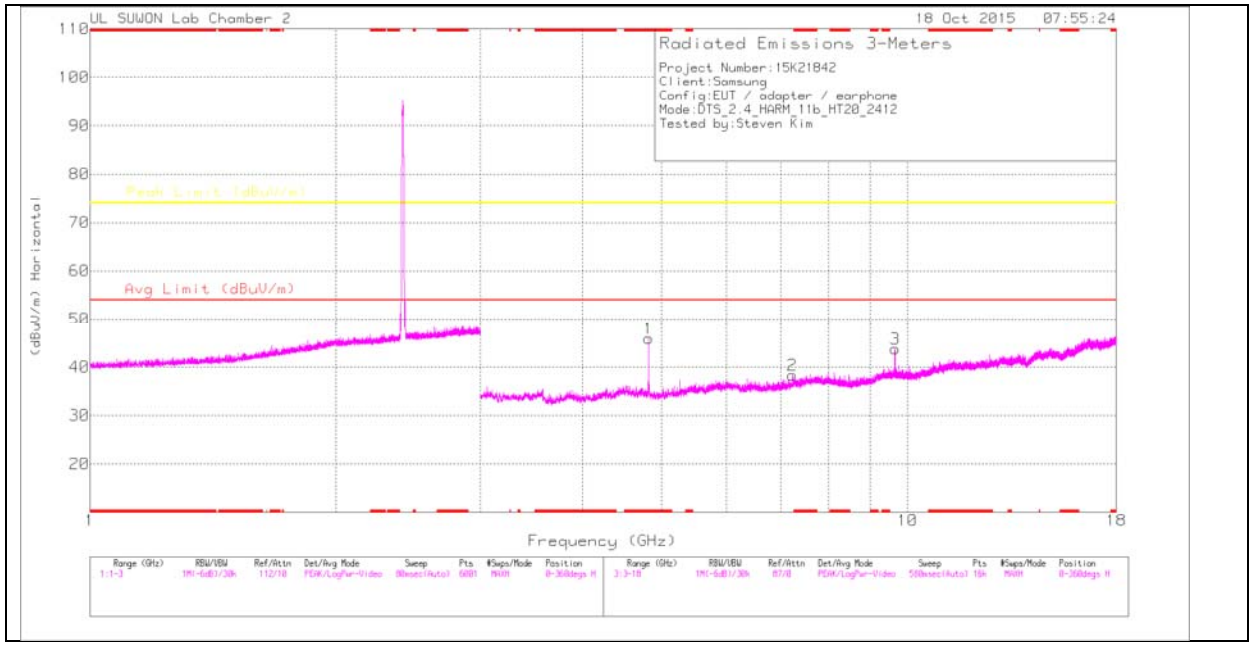
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

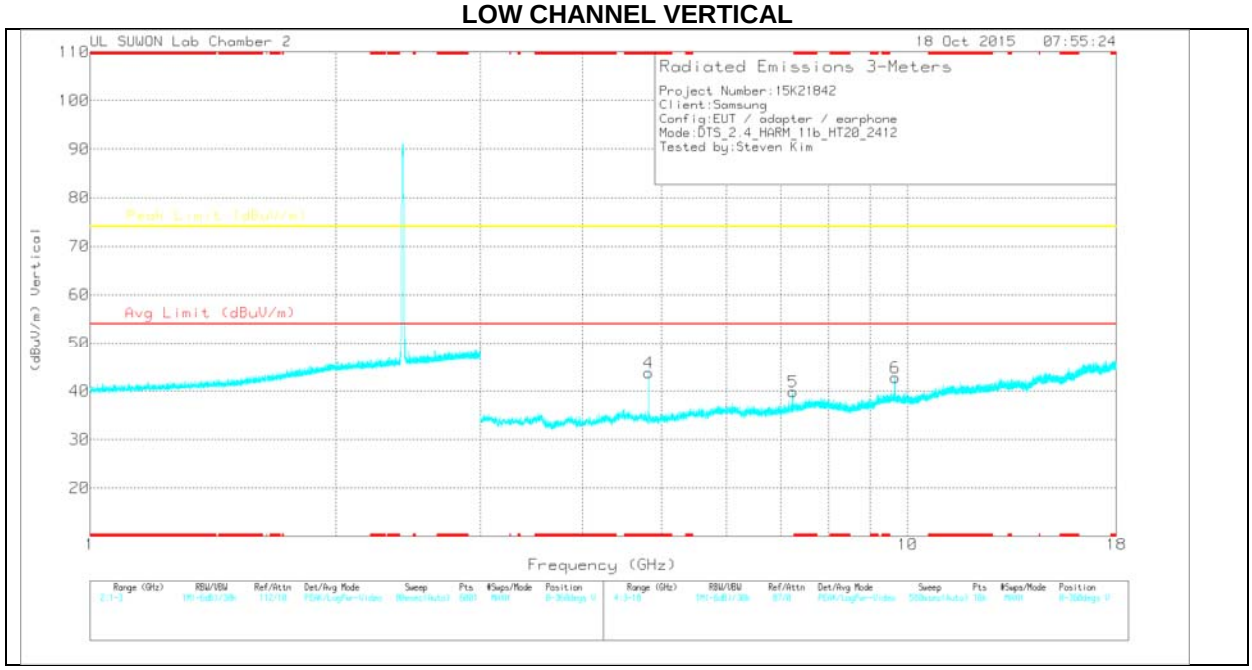
RMS - RMS detection

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	* 4.823	37.3	PK	33.9	-25.3	0	45.9	-	-	74	-28.1	0-360	200	H
2	7.234	25.54	PK	35.8	-23	0	38.34	-	-	74	-35.66	0-360	200	H
3	9.648	25.88	PK	36.9	-19	0	43.78	-	-	74	-30.22	0-360	200	H
4	* 4.823	35.21	PK	33.9	-25.3	0	43.81	-	-	74	-30.19	0-360	100	V
5	7.237	27.07	PK	35.8	-23	0	39.87	-	-	74	-34.13	0-360	200	V
6	9.648	24.86	PK	36.9	-19	0	42.76	-	-	74	-31.24	0-360	200	V

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

PK – Peak Detector

Radiated Emissions

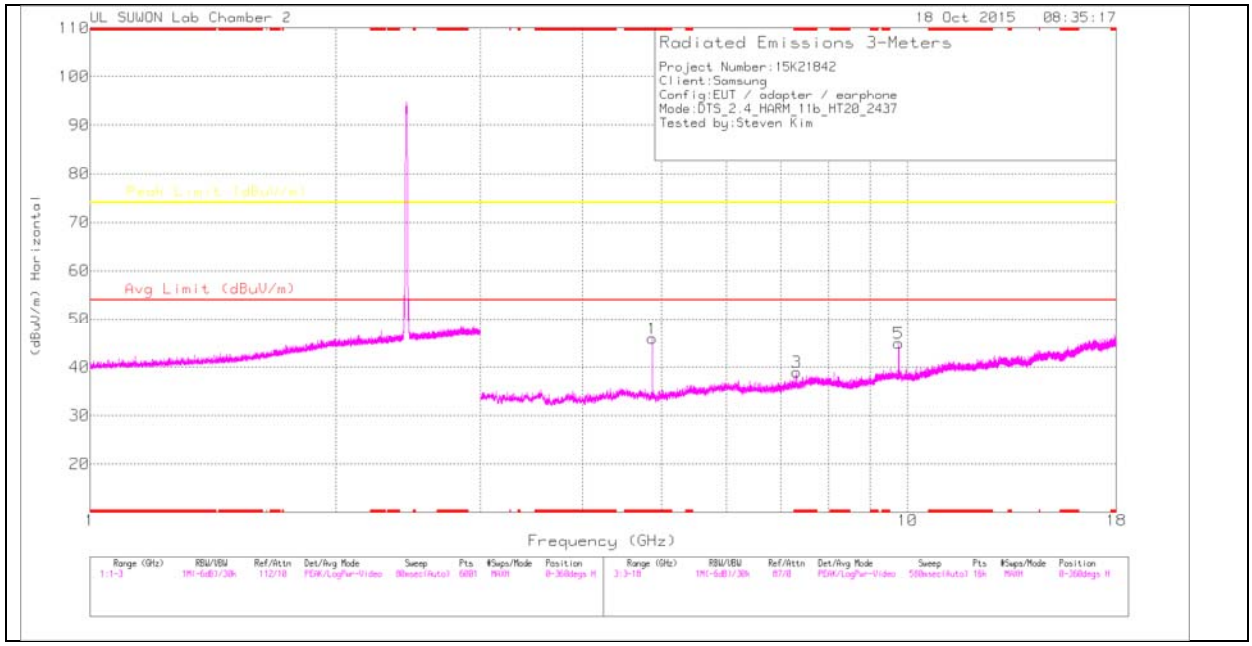
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.824	43.19	PK2	33.9	-25.3	0	51.79	-	-	74	-22.21	332	314	H
* 4.824	38.08	MAv1	33.9	-25.3	0	46.68	54	-7.32	-	-	332	314	H
* 4.824	42.7	PK2	33.9	-25.3	0	51.3	-	-	74	-22.7	269	267	V
* 4.824	38.01	MAv1	33.9	-25.3	0	46.61	54	-7.39	-	-	269	267	V
7.236	36.89	PK2	35.8	-23	0	49.69	-	-	74	-24.31	58	356	H
7.235	36.37	PK2	35.8	-23	0	49.17	-	-	74	-24.83	348	102	V
9.648	33.94	PK2	36.9	-19	0	51.84	-	-	74	-22.16	183	118	H
9.648	33.08	PK2	36.9	-19	0	50.98	-	-	74	-23.02	176	348	V

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

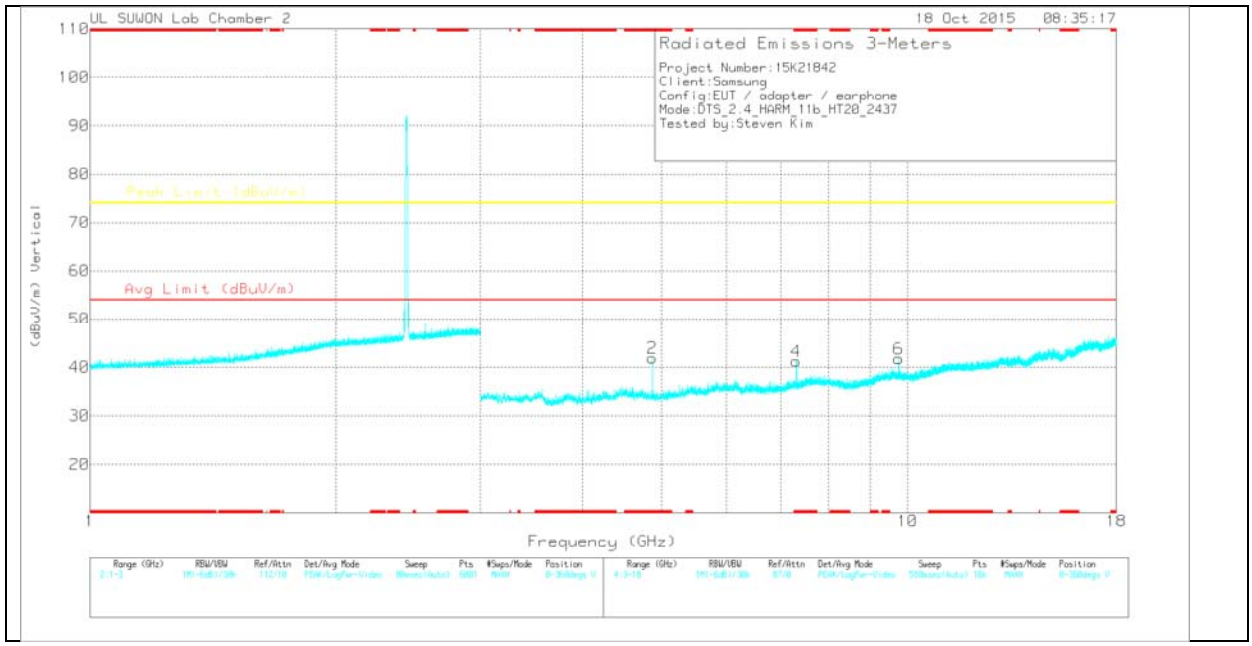
PK2 - KDB558074 Method: Maximum Peak

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(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	* 4.874	37.22	PK	33.9	-25.2	0	45.92	-	-	74	-28.08	0-360	200	H
3	* 7.311	25.68	PK	35.9	-22.6	0	38.98	-	-	74	-35.02	0-360	200	H
5	9.748	27.19	PK	37	-19.3	0	44.89	-	-	74	-29.11	0-360	200	H
2	* 4.874	33.24	PK	33.9	-25.2	0	41.94	-	-	74	-32.06	0-360	100	V
4	* 7.309	27.98	PK	35.9	-22.6	0	41.28	-	-	74	-32.72	0-360	200	V
6	9.748	24.11	PK	37	-19.3	0	41.81	-	-	74	-32.19	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

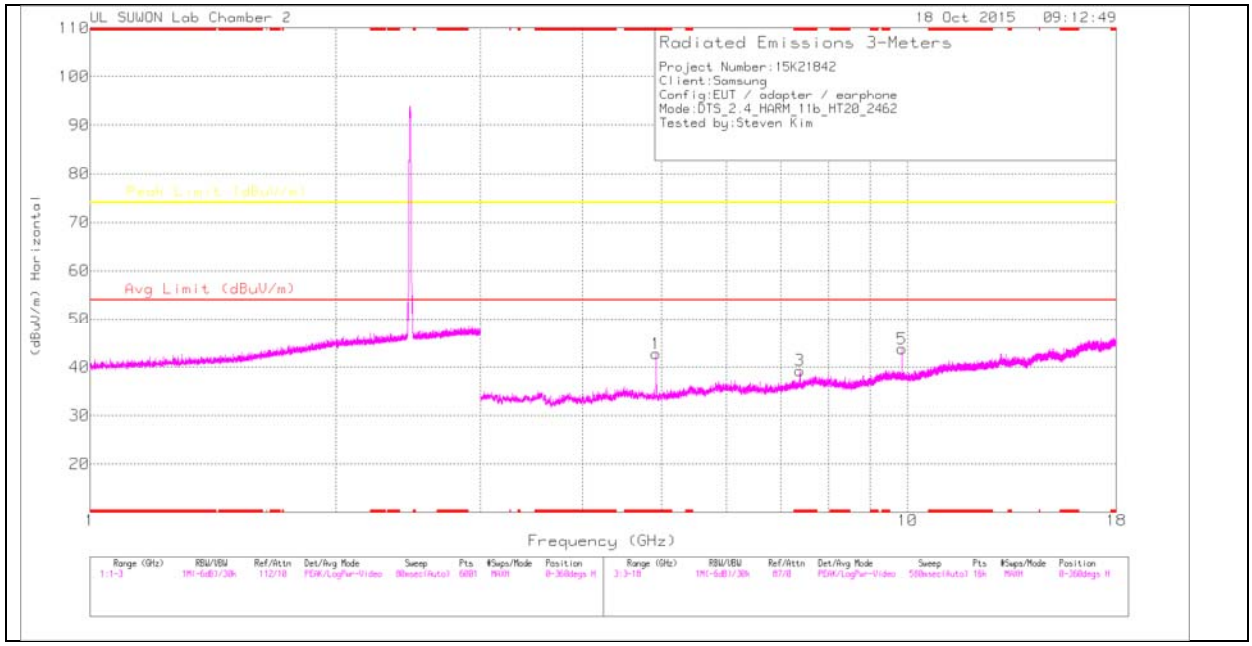
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.874	40.37	PK2	33.9	-25.2	0	49.07	-	-	74	-24.93	358	100	H
* 4.874	33.79	MAv1	33.9	-25.2	0	42.49	54	-11.51	-	-	358	100	H
* 4.874	40.49	PK2	33.9	-25.2	0	49.19	-	-	74	-24.81	263	361	V
* 4.874	34.01	MAv1	33.9	-25.2	0	42.71	54	-11.29	-	-	263	361	V
* 7.312	36.64	PK2	35.9	-22.6	0	49.94	-	-	74	-24.06	48	338	H
* 7.31	24.53	MAv1	35.9	-22.6	0	37.83	54	-16.17	-	-	48	338	H
* 7.31	37.69	PK2	35.9	-22.6	0	50.99	-	-	74	-23.01	1	263	V
* 7.31	27.58	MAv1	35.9	-22.6	0	40.88	54	-13.12	-	-	1	263	V
9.748	33.54	PK2	37	-19.3	0	51.24	-	-	74	-22.76	176	344	H
9.748	32.62	PK2	37	-19.3	0	50.32	-	-	74	-23.68	197	325	V

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

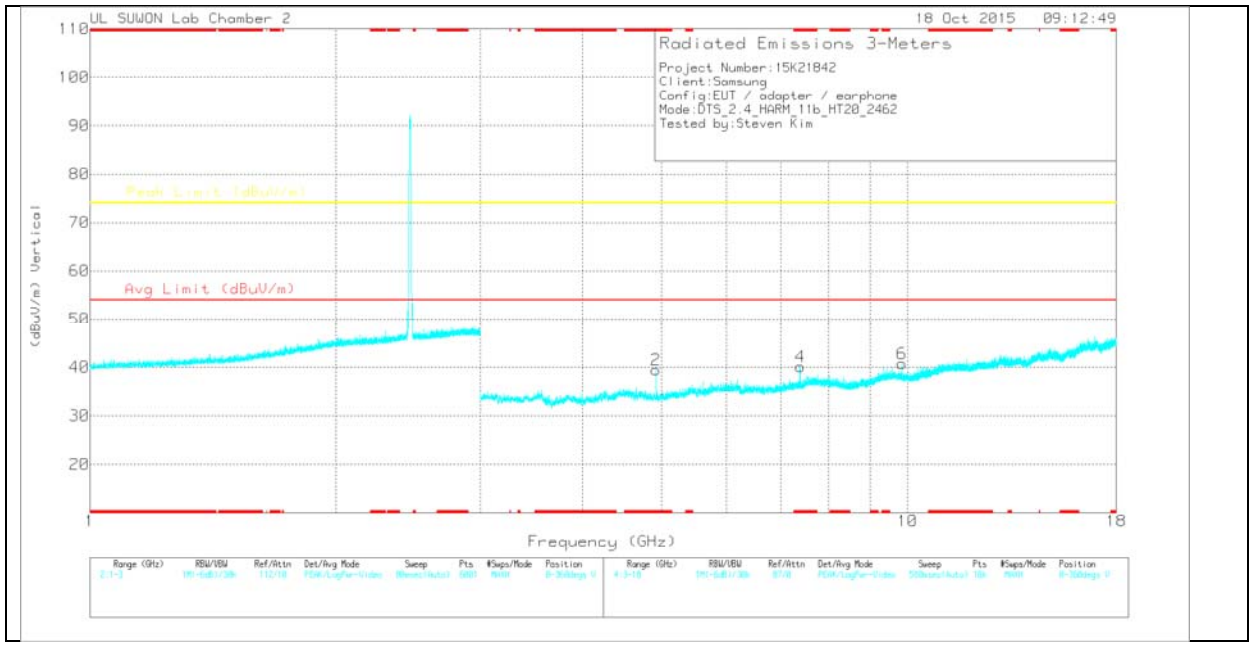
PK2 - KDB558074 Method: Maximum Peak

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	* 4.924	34.02	PK	33.9	-25.1	0	42.82	-	-	74	-31.18	0-360	200	H
3	* 7.385	25.59	PK	35.9	-22.2	0	39.29	-	-	74	-34.71	0-360	200	H
5	9.848	25.84	PK	37.1	-19.2	0	43.74	-	-	74	-30.26	0-360	200	H
2	* 4.924	30.63	PK	33.9	-25.1	0	39.43	-	-	74	-34.57	0-360	100	V
4	* 7.387	26.46	PK	35.9	-22.2	0	40.16	-	-	74	-33.84	0-360	100	V
6	9.848	22.83	PK	37.1	-19.2	0	40.73	-	-	74	-33.27	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(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
* 4.924	40.66	PK2	33.9	-25.1	0	49.46	-	-	74	-24.54	355	303	H
* 4.924	35	MAv1	33.9	-25.1	0	43.8	54	-10.2	-	-	355	303	H
* 4.924	39.65	PK2	33.9	-25.1	0	48.45	-	-	74	-25.55	256	283	V
* 4.924	31.69	MAv1	33.9	-25.1	0	40.49	54	-13.51	-	-	256	283	V
* 7.389	35.17	PK2	35.9	-22.2	0	48.87	-	-	74	-25.13	167	247	H
* 7.388	22.42	MAv1	35.9	-22.2	0	36.12	54	-17.88	-	-	167	247	H
* 7.387	36.49	PK2	35.9	-22.2	0	50.19	-	-	74	-23.81	9	259	V
* 7.387	26.53	MAv1	35.9	-22.2	0	40.23	54	-13.77	-	-	9	259	V
9.848	34.16	PK2	37.1	-19.2	0	52.06	-	-	74	-21.94	175	157	H
9.848	32.75	PK2	37.1	-19.2	0	50.65	-	-	74	-23.35	150	105	V

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

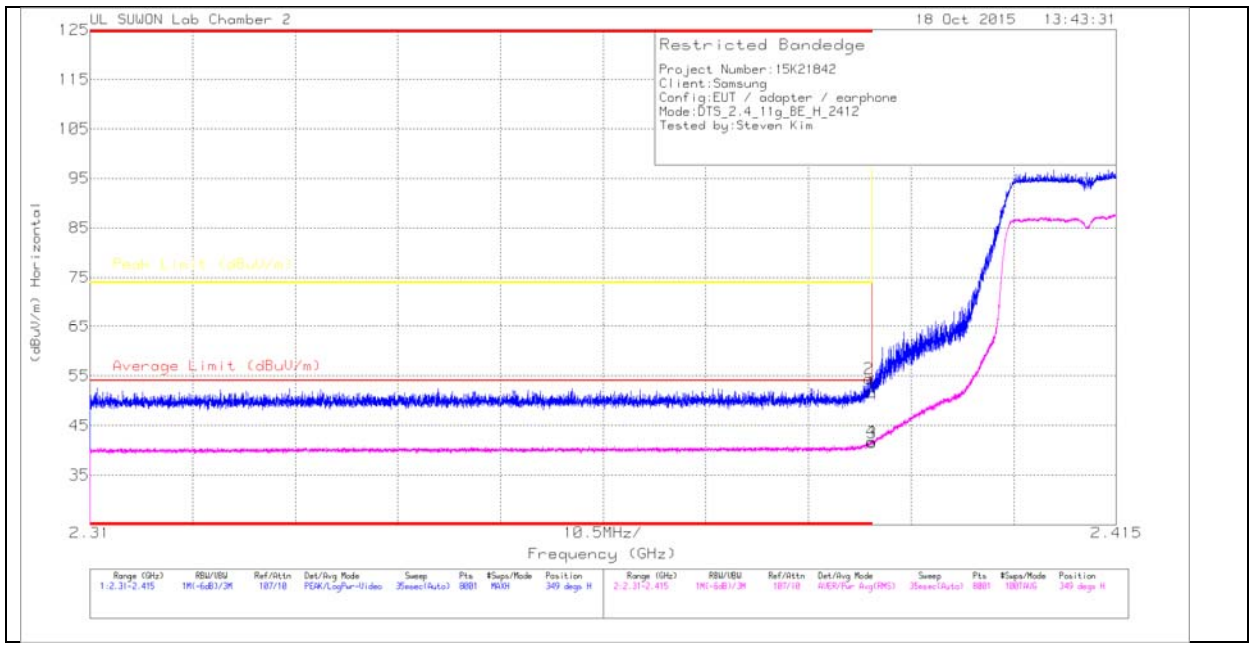
PK2 - KDB558074 Method: Maximum Peak

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

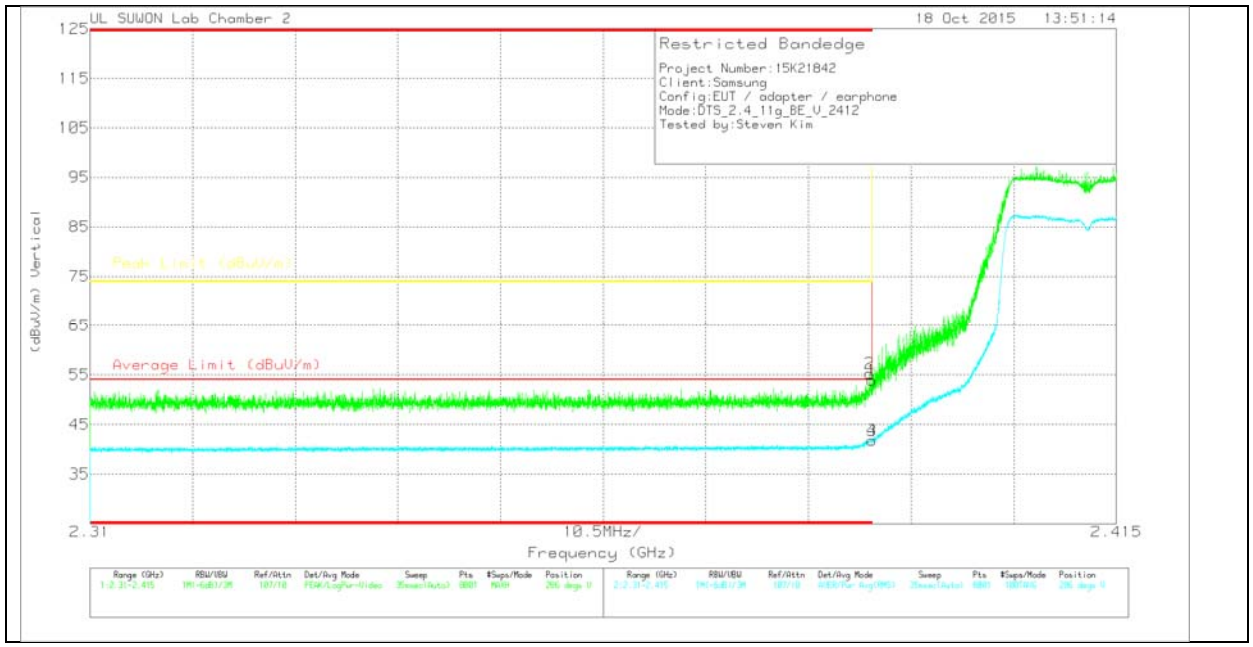
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.47	Pk	31.7	-19.5	0	51.67	-	-	74	-22.33	349	244	H
2	* 2.39	42.16	Pk	31.7	-19.5	0	54.36	-	-	74	-19.64	349	244	H
3	* 2.39	29.04	RMS	31.7	-19.5	.29	41.53	54	-12.47	-	-	349	244	H
4	* 2.39	29.35	RMS	31.7	-19.5	.29	41.84	54	-12.16	-	-	349	244	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(00168724)_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	41.75	Pk	31.7	-19.5	0	53.95	-	-	74	-20.05	286	281	V
2	* 2.39	43.12	Pk	31.7	-19.5	0	55.32	-	-	74	-18.68	286	281	V
3	* 2.39	29.35	RMS	31.7	-19.5	.29	41.84	54	-12.16	-	-	286	281	V
4	* 2.39	29.36	RMS	31.7	-19.5	.29	41.85	54	-12.15	-	-	286	281	V

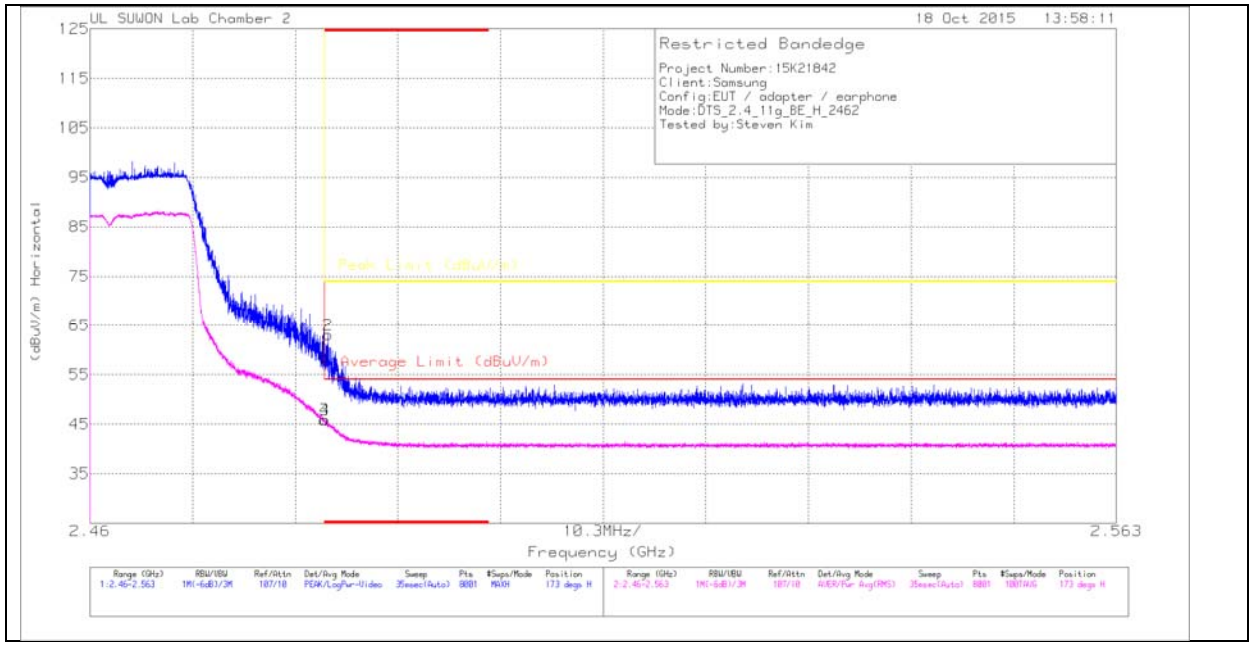
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

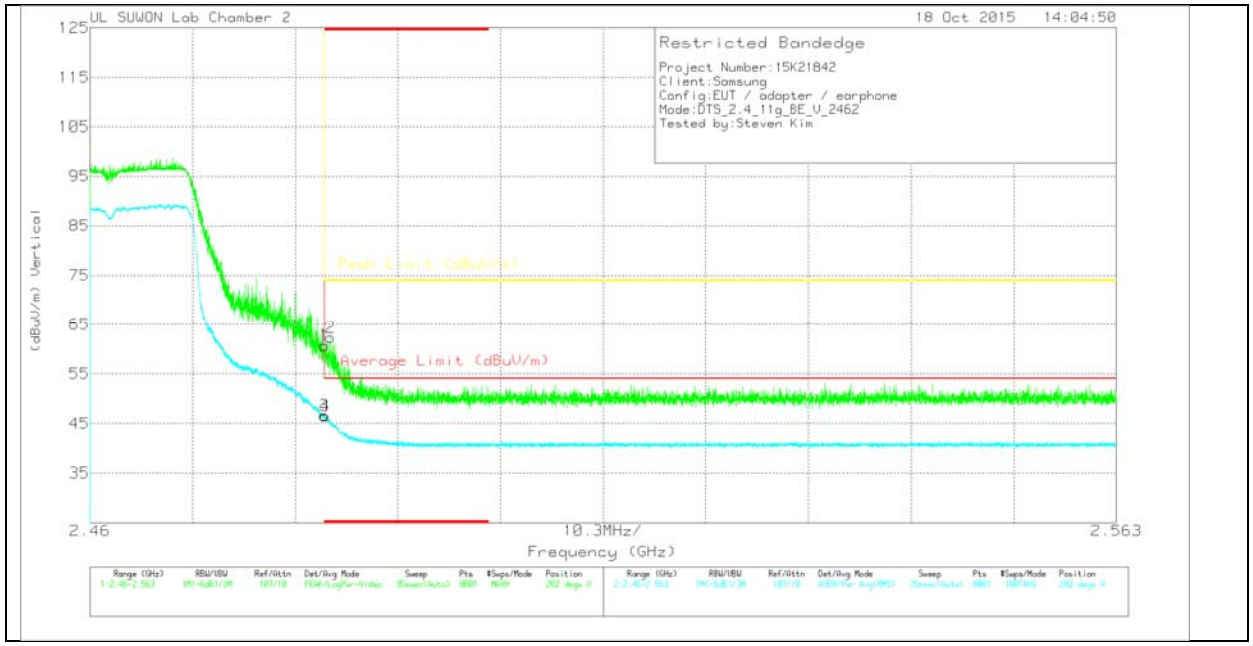
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.06	Pk	31.8	-19.4	0	58.46	-	-	74	-15.54	173	286	H
2	* 2.484	50.64	Pk	31.8	-19.4	0	63.04	-	-	74	-10.96	173	286	H
3	* 2.484	33.15	RMS	31.8	-19.4	.29	45.84	54	-8.16	-	-	173	286	H
4	* 2.484	33.13	RMS	31.8	-19.4	.29	45.82	54	-8.18	-	-	173	286	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(00168724)_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	48.3	Pk	31.8	-19.4	0	60.7	-	-	74	-13.3	282	264	V
2	* 2.484	49.97	Pk	31.8	-19.4	0	62.37	-	-	74	-11.63	282	264	V
3	* 2.484	33.97	RMS	31.8	-19.4	.29	46.66	54	-7.34	-	-	282	264	V
4	* 2.484	33.76	RMS	31.8	-19.4	.29	46.45	54	-7.55	-	-	282	264	V

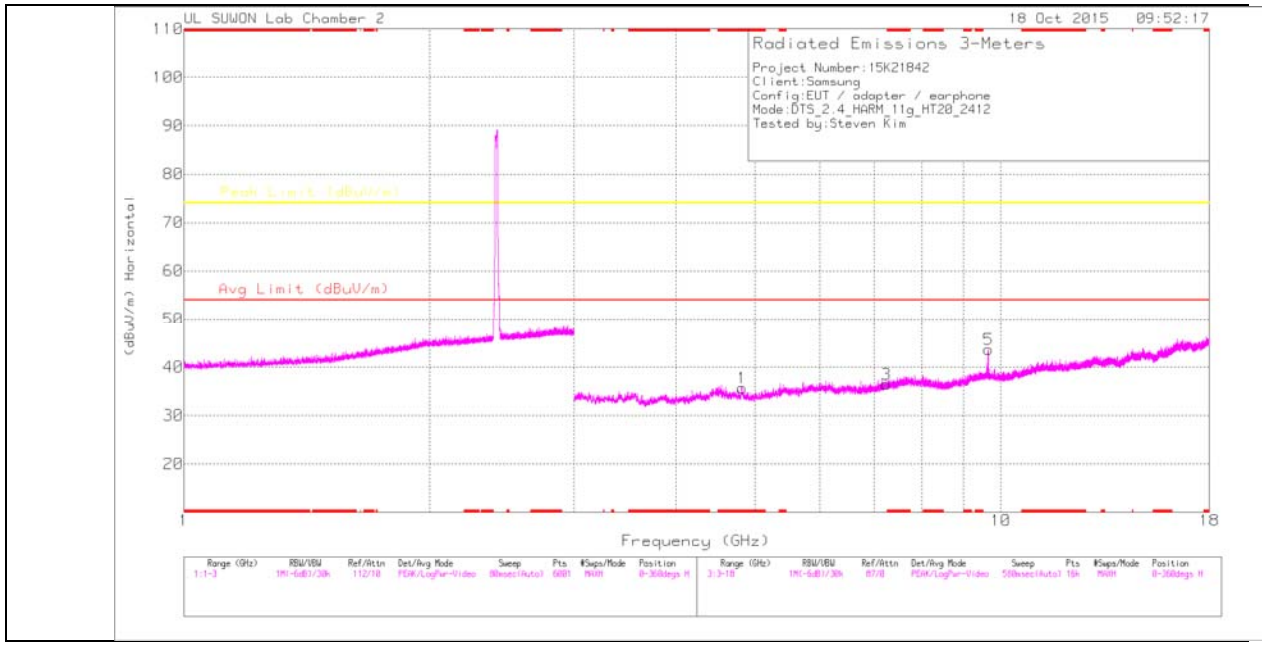
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

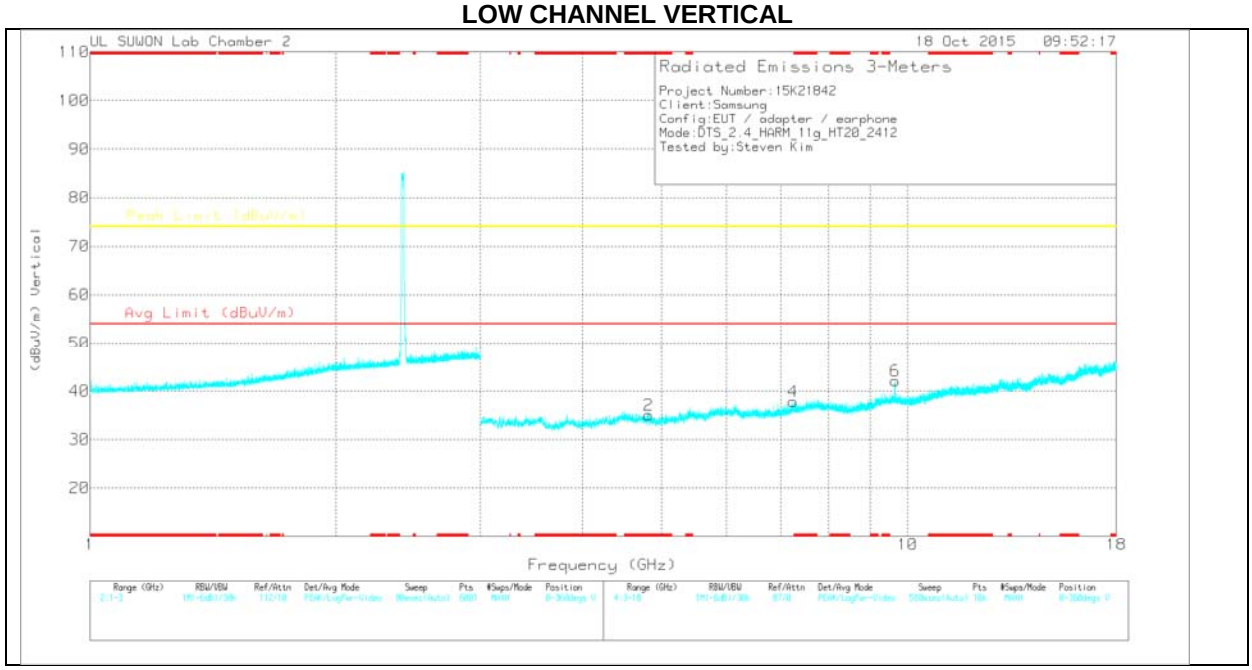
RMS - RMS detection

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	* 4.822	27.11	PK	33.9	-25.3	0	35.71	-	-	74	-38.29	0-360	100	H
3	7.238	23.69	PK	35.8	-23	0	36.49	-	-	74	-37.51	0-360	100	H
5	9.648	25.8	PK	36.9	-19	0	43.7	-	-	74	-30.3	0-360	100	H
2	* 4.822	26.51	PK	33.9	-25.3	0	35.11	-	-	74	-38.89	0-360	100	V
4	7.236	25.09	PK	35.8	-23	0	37.89	-	-	74	-36.11	0-360	200	V
6	9.648	24.26	PK	36.9	-19	0	42.16	-	-	74	-31.84	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(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
9.648	33.86	PK2	36.9	-19	0	51.76	-	-	74	-22.24	182	103	H
9.648	33.61	PK2	36.9	-19	0	51.51	-	-	74	-22.49	166	286	V

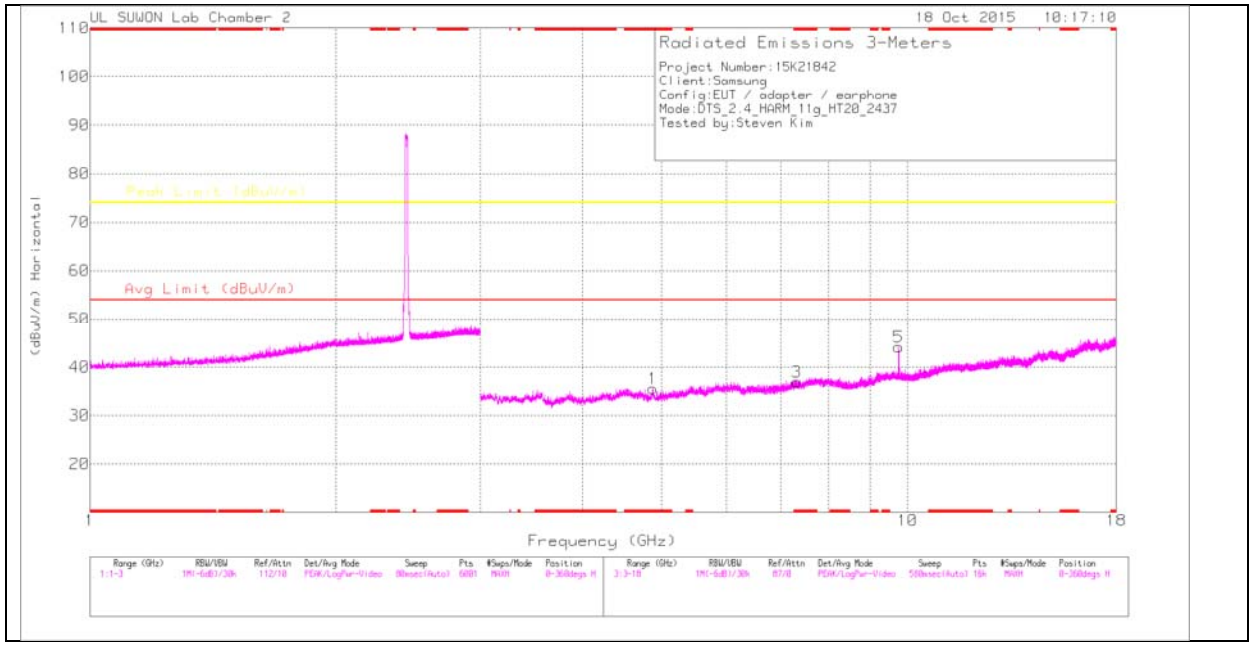
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

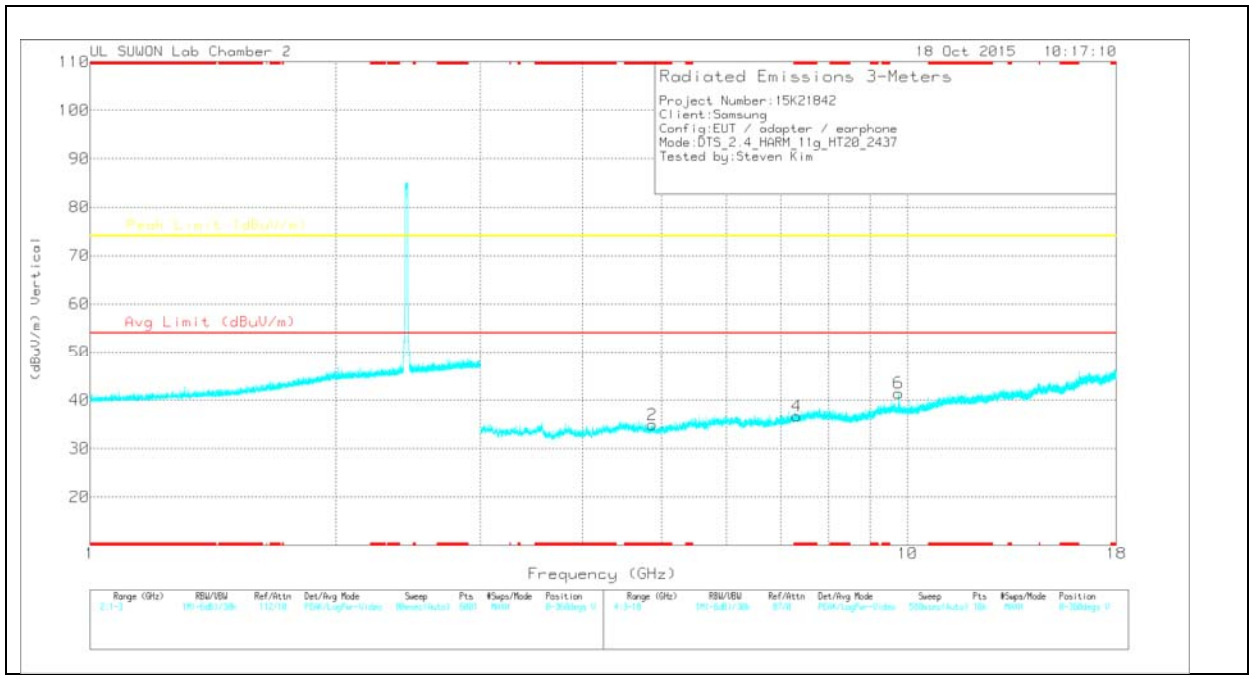
NOTE : Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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	* 4.879	26.89	PK	33.9	-25.2	0	35.59	-	-	74	-38.41	0-360	100	H
3	* 7.317	23.61	PK	35.9	-22.6	0	36.91	-	-	74	-37.09	0-360	200	H
5	9.748	26.49	PK	37	-19.3	0	44.19	-	-	74	-29.81	0-360	200	H
2	* 4.868	26.23	PK	33.9	-25.2	0	34.93	-	-	74	-39.07	0-360	200	V
4	* 7.312	23.37	PK	35.9	-22.6	0	36.67	-	-	74	-37.33	0-360	200	V
6	9.748	23.74	PK	37	-19.3	0	41.44	-	-	74	-32.56	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

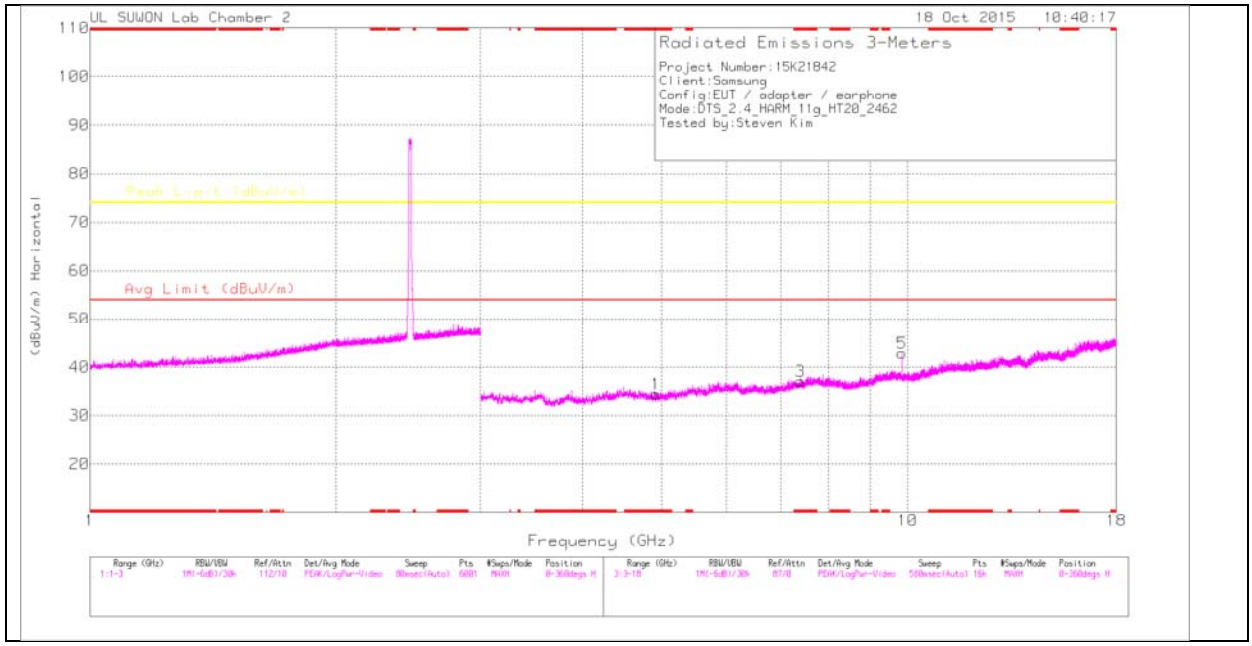
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.748	33.91	PK2	37	-19.3	0	51.61	-	-	74	-22.39	181	119	H
9.748	32.78	PK2	37	-19.3	0	50.48	-	-	74	-23.52	160	293	V

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

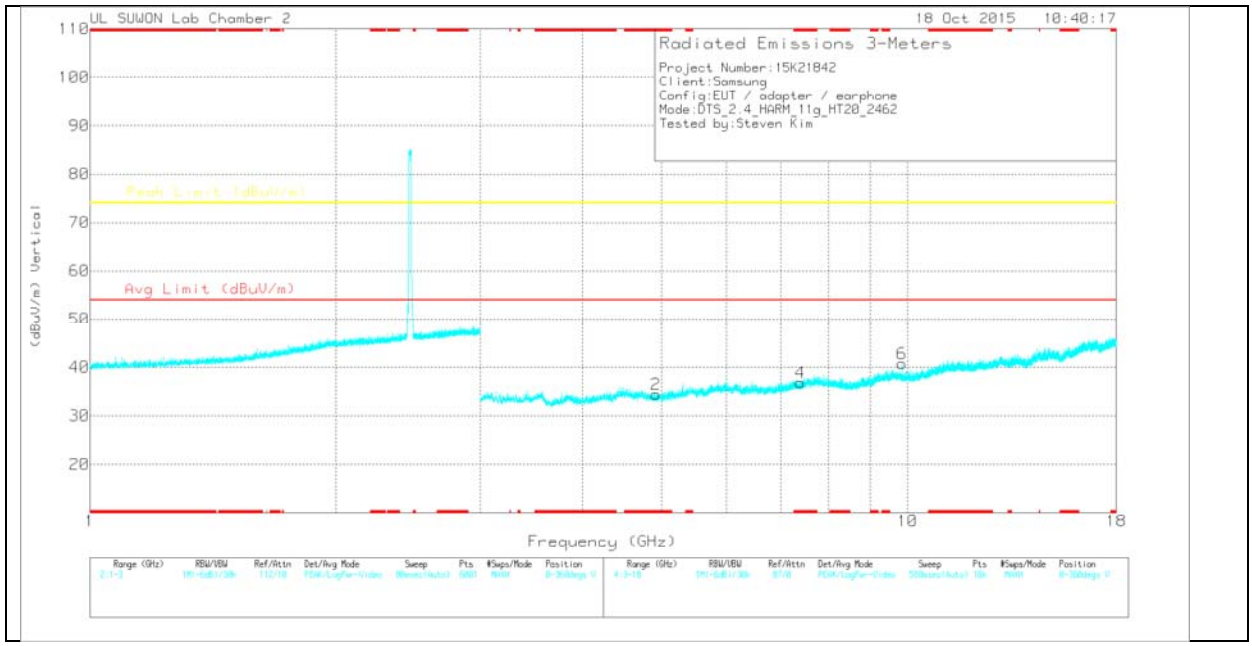
PK2 - KDB558074 Method: Maximum Peak

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

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	* 4.922	25.6	PK	33.9	-25.1	0	34.4	-	-	74	-39.6	0-360	200	H
3	* 7.392	23.28	PK	35.9	-22.1	0	37.08	-	-	74	-36.92	0-360	200	H
5	9.848	24.94	PK	37.1	-19.2	0	42.84	-	-	74	-31.16	0-360	200	H
2	* 4.926	25.64	PK	33.9	-25.1	0	34.44	-	-	74	-39.56	0-360	200	V
4	* 7.391	23.18	PK	35.9	-22.2	0	36.88	-	-	74	-37.12	0-360	200	V
6	9.848	22.83	PK	37.1	-19.2	0	40.73	-	-	74	-33.27	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(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
9.848	33.3	PK2	37.1	-19.2	0	51.2	-	-	74	-22.8	175	145	H
9.848	32.37	PK2	37.1	-19.2	0	50.27	-	-	74	-23.73	150	102	V

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

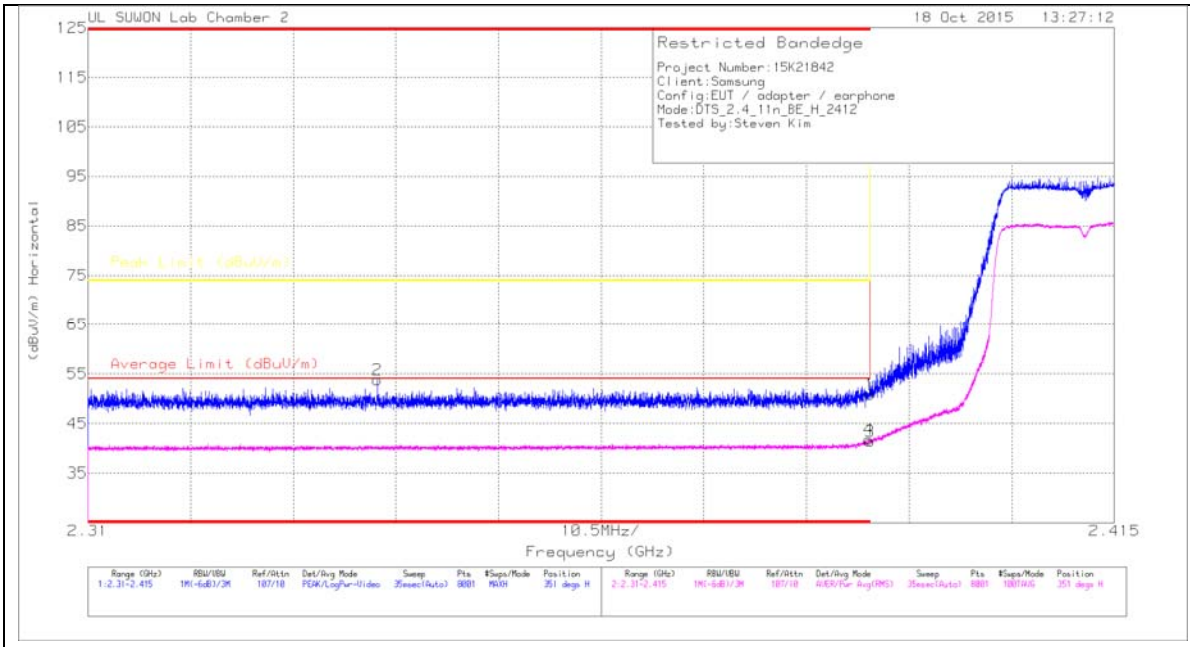
PK2 - KDB558074 Method: Maximum Peak

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

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

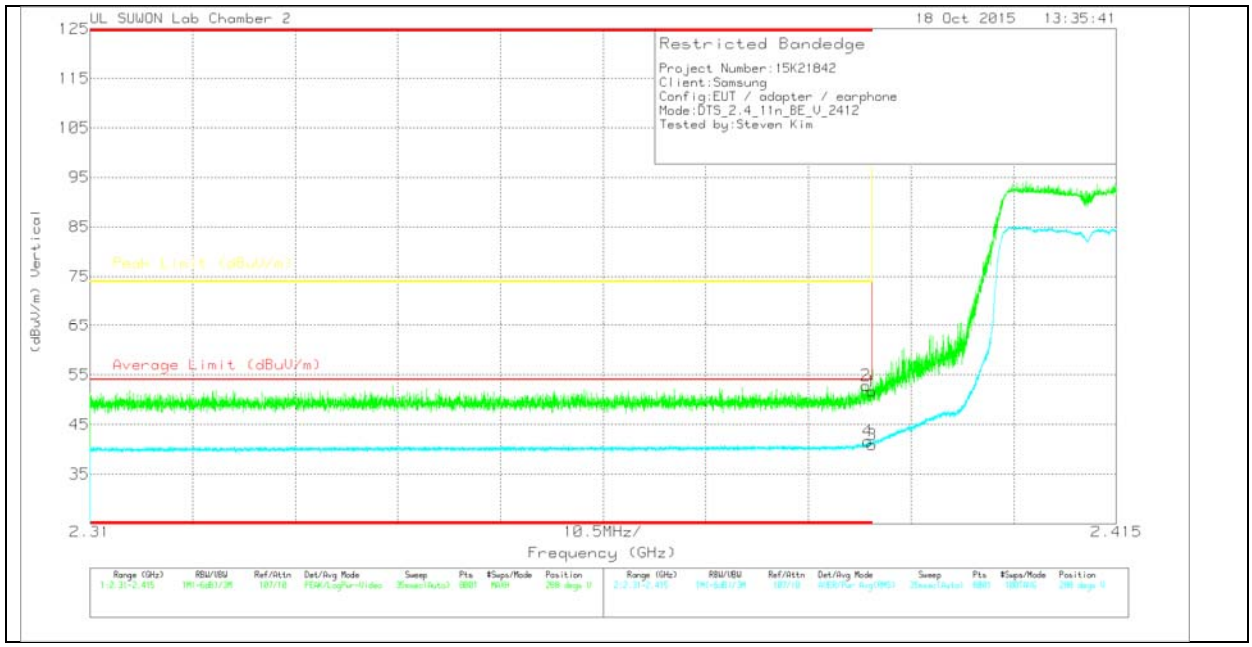
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.62	Pk	31.7	-19.5	0	50.82	-	-	74	-23.18	351	147	H
2	* 2.34	41.75	Pk	31.6	-19.6	0	53.75	-	-	74	-20.25	351	147	H
3	* 2.39	28.94	RMS	31.7	-19.5	.32	41.46	54	-12.54	-	-	351	147	H
4	* 2.39	29.23	RMS	31.7	-19.5	.32	41.75	54	-12.25	-	-	351	147	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(00168724)_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	39.54	Pk	31.7	-19.5	0	51.74	-	-	74	-22.26	288	280	V
2	* 2.389	40.66	Pk	31.7	-19.5	0	52.86	-	-	74	-21.14	288	280	V
3	* 2.39	28.4	RMS	31.7	-19.5	.32	40.92	54	-13.08	-	-	288	280	V
4	* 2.39	29.09	RMS	31.7	-19.5	.32	41.61	54	-12.39	-	-	288	280	V

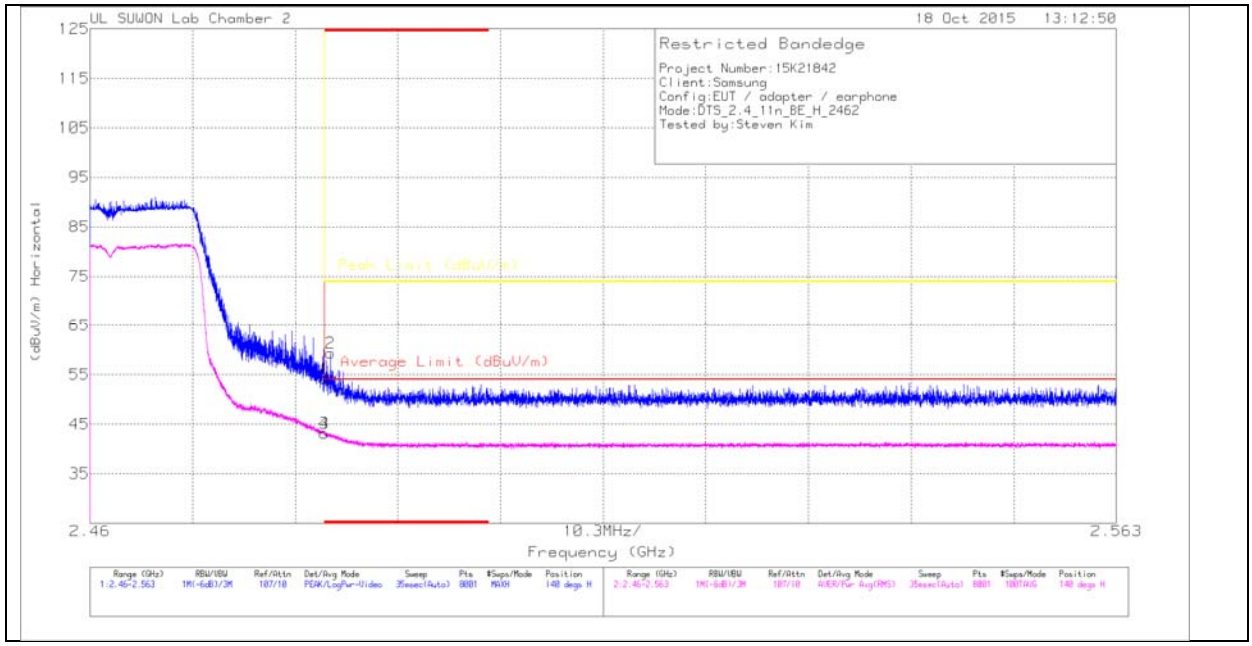
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

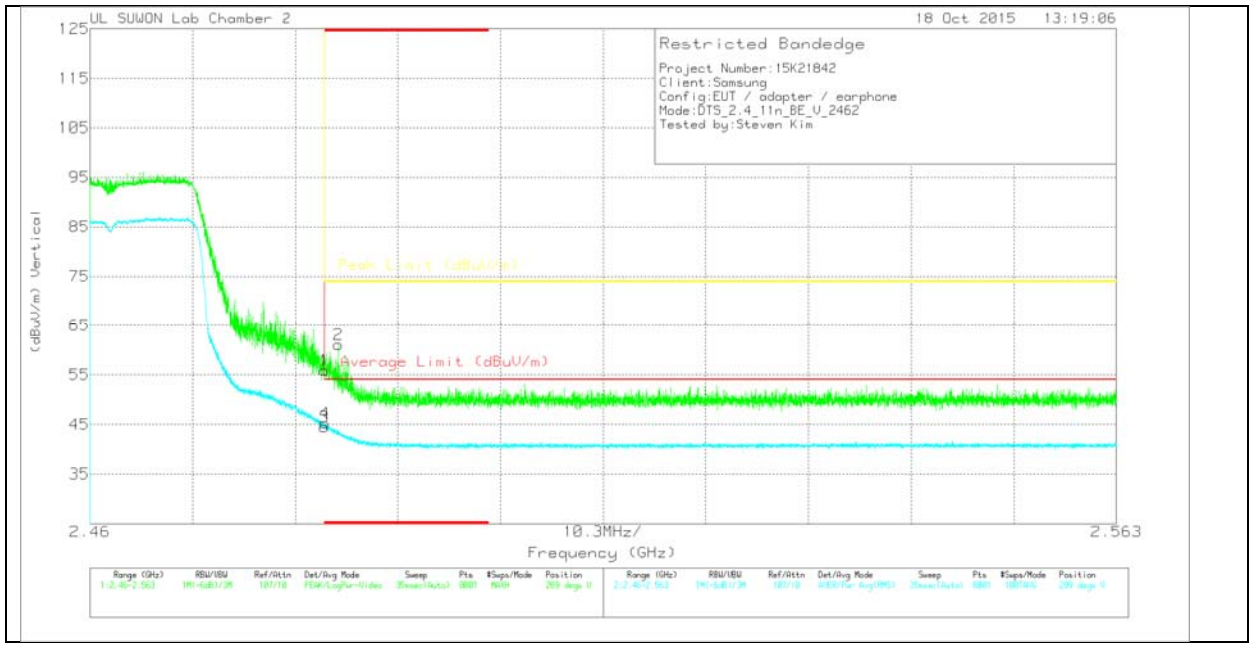
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.72	Pk	31.8	-19.4	0	54.12	-	-	74	-19.88	140	138	H
2	* 2.484	46.94	Pk	31.8	-19.4	0	59.34	-	-	74	-14.66	140	138	H
3	* 2.484	30.39	RMS	31.8	-19.4	.32	43.11	54	-10.89	-	-	140	138	H
4	* 2.484	30.45	RMS	31.8	-19.4	.32	43.17	54	-10.83	-	-	140	138	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(00168724)_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	43.46	Pk	31.8	-19.4	0	55.86	-	-	74	-18.14	289	261	V
2	* 2.485	48.65	Pk	31.8	-19.4	0	61.05	-	-	74	-12.95	289	261	V
3	* 2.484	31.85	RMS	31.8	-19.4	.32	44.57	54	-9.43	-	-	289	261	V
4	* 2.484	32.51	RMS	31.8	-19.4	.32	45.23	54	-8.77	-	-	289	261	V

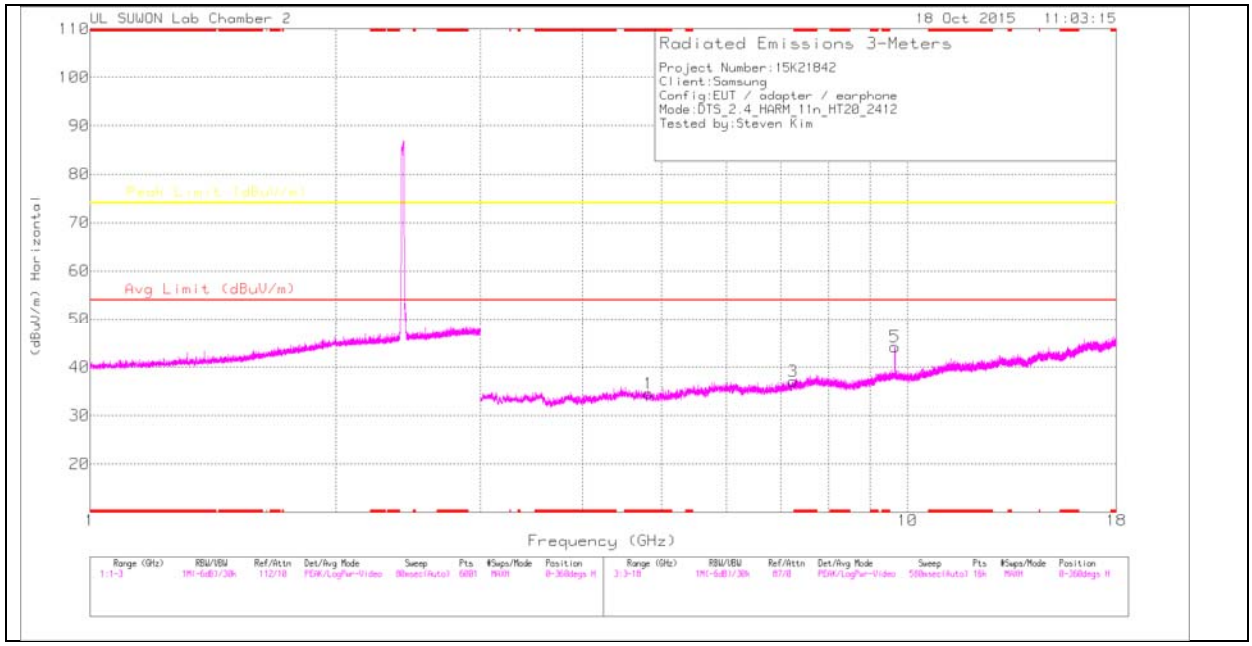
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

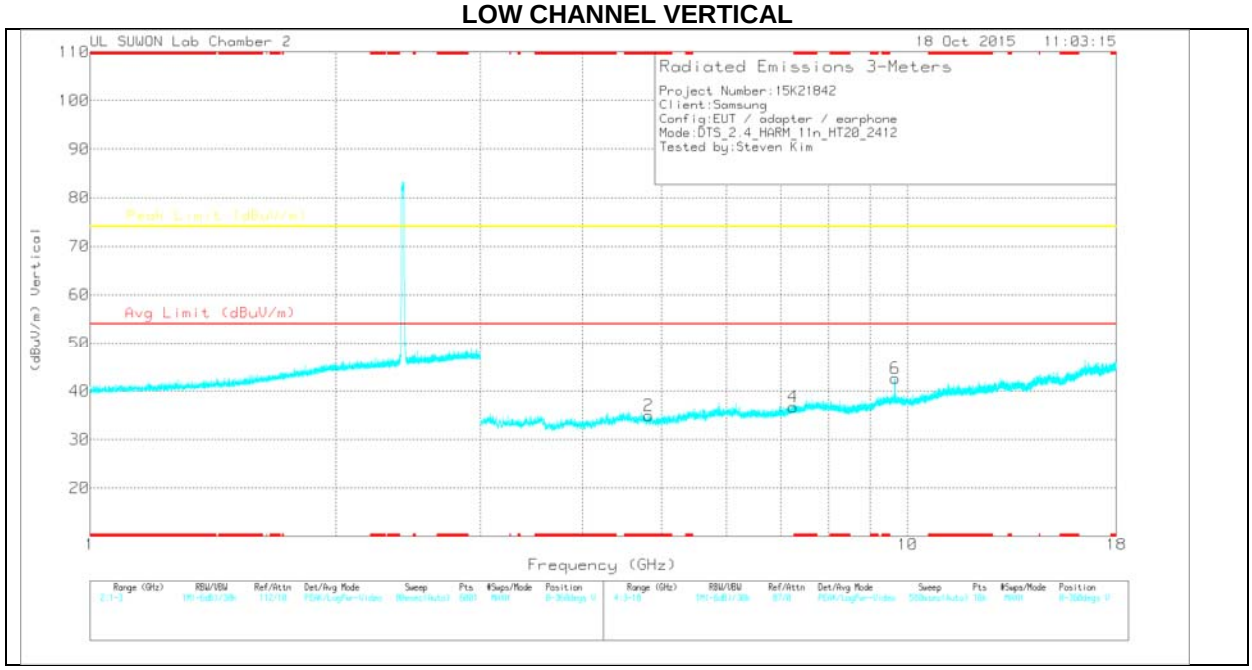
RMS - RMS detection

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	* 4.825	25.9	PK	33.9	-25.3	0	34.5	-	-	74	-39.5	0-360	200	H
3	7.238	24.29	PK	35.8	-23	0	37.09	-	-	74	-36.91	0-360	100	H
5	9.647	26.32	PK	36.9	-19	0	44.22	-	-	74	-29.78	0-360	200	H
2	* 4.821	26.39	PK	33.9	-25.3	0	34.99	-	-	74	-39.01	0-360	100	V
4	7.237	23.96	PK	35.8	-23	0	36.76	-	-	74	-37.24	0-360	200	V
6	9.648	24.8	PK	36.9	-19	0	42.7	-	-	74	-31.3	0-360	200	V

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

PK – Peak Detector

Radiated Emissions

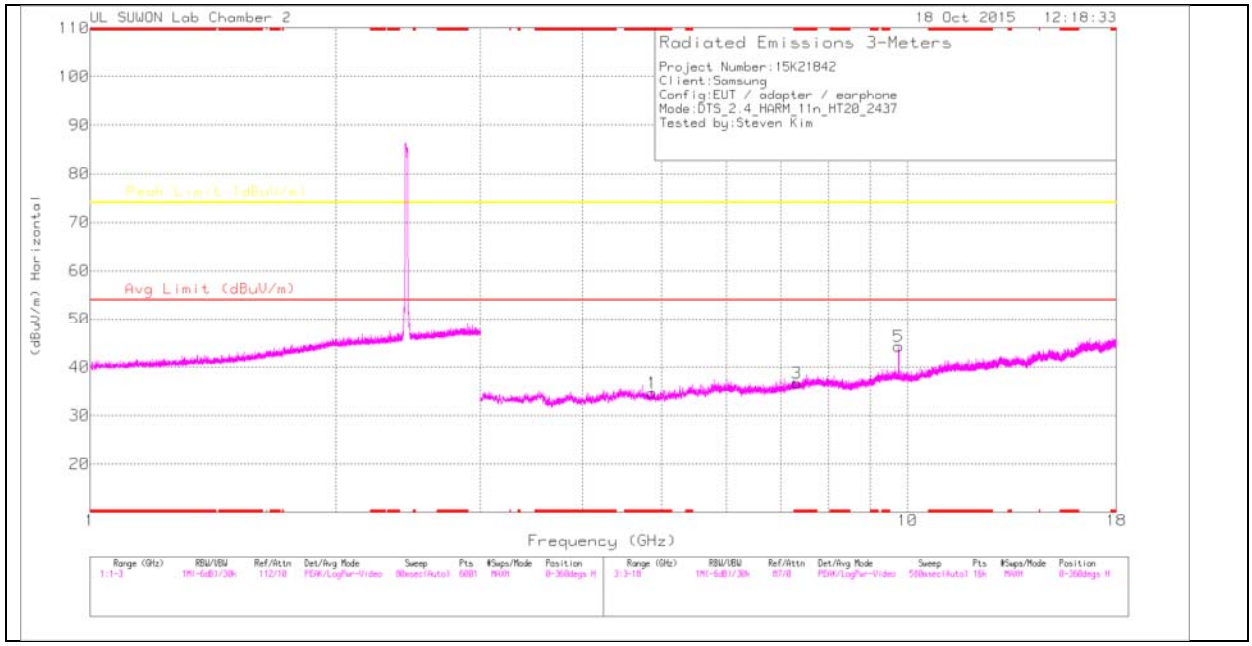
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00168724)_150619	Path_3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.648	32.83	PK2	36.9	-19	0	50.73	-	-	74	-23.27	177	177	H
9.648	32.42	PK2	36.9	-19	0	50.32	-	-	74	-23.68	316	110	V

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

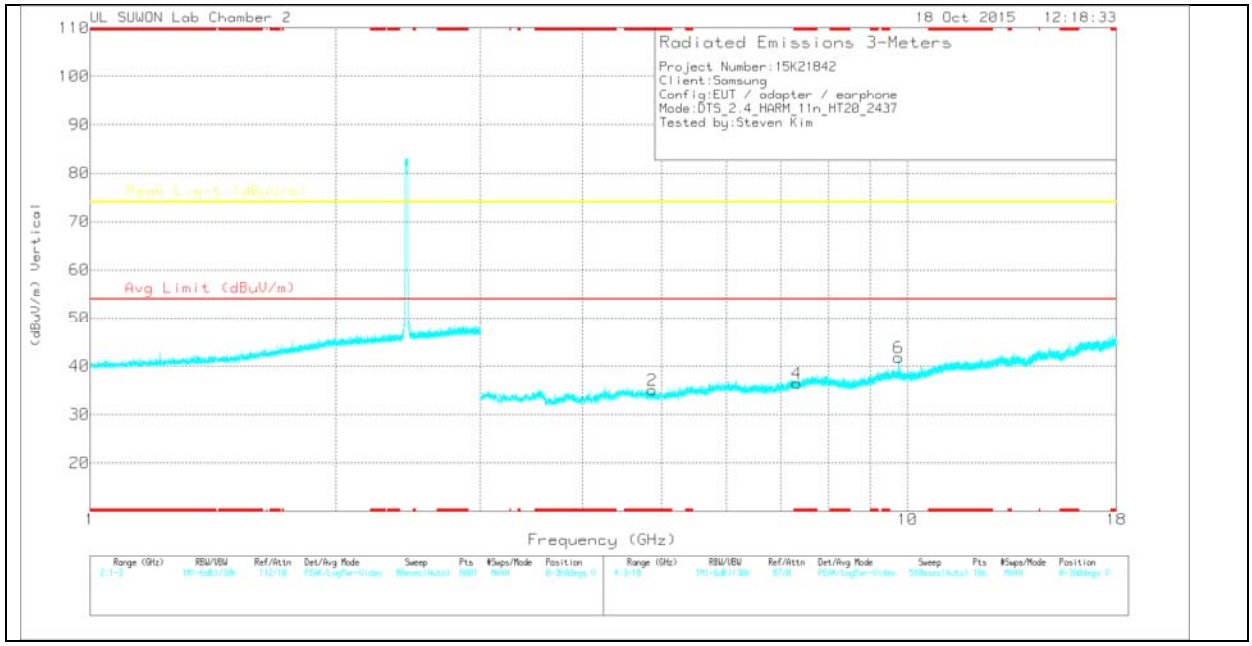
PK2 - KDB558074 Method: Maximum Peak

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	* 4.871	25.96	PK	33.9	-25.2	0	34.66	-	-	74	-39.34	0-360	100	H
3	* 7.317	23.35	PK	35.9	-22.6	0	36.65	-	-	74	-37.35	0-360	200	H
5	9.748	26.59	PK	37	-19.3	0	44.29	-	-	74	-29.71	0-360	200	H
2	* 4.869	26.37	PK	33.9	-25.2	0	35.07	-	-	74	-38.93	0-360	100	V
4	* 7.315	23.15	PK	35.9	-22.6	0	36.45	-	-	74	-37.55	0-360	200	V
6	9.748	24.09	PK	37	-19.3	0	41.79	-	-	74	-32.21	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(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
9.748	33.31	PK2	37	-19.3	0	51.01	-	-	74	-22.99	188	164	H
9.748	34.1	PK2	37	-19.3	0	51.8	-	-	74	-22.2	160	296	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).

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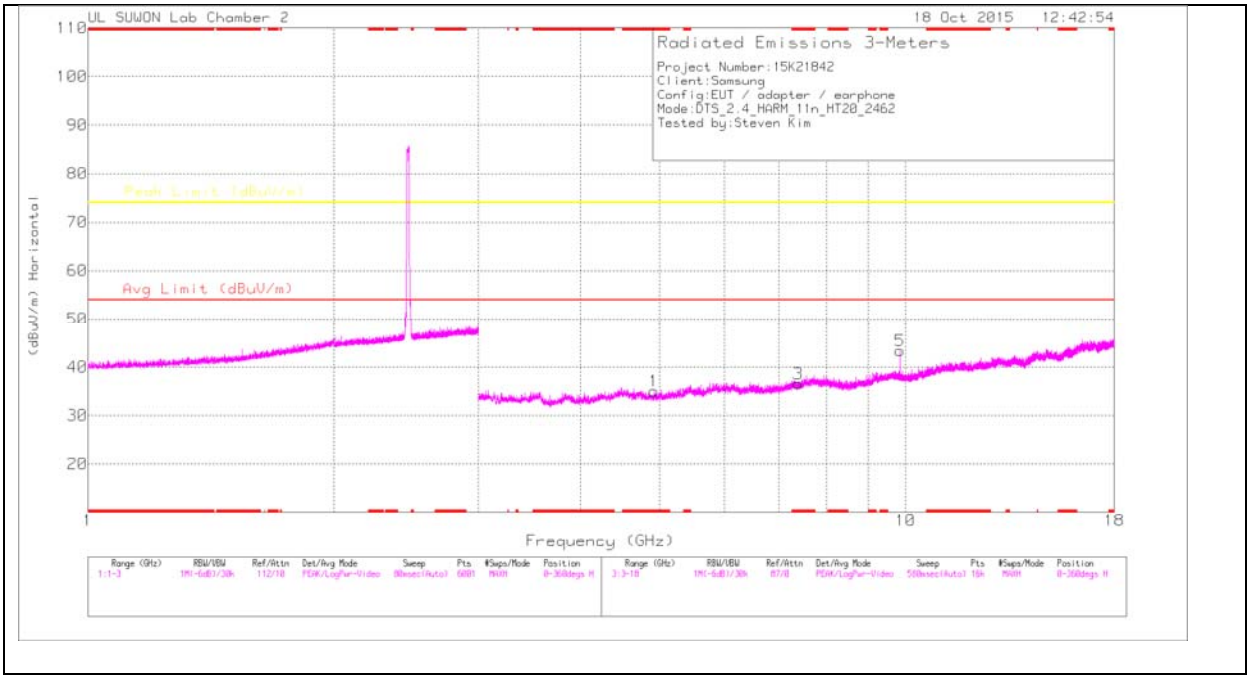
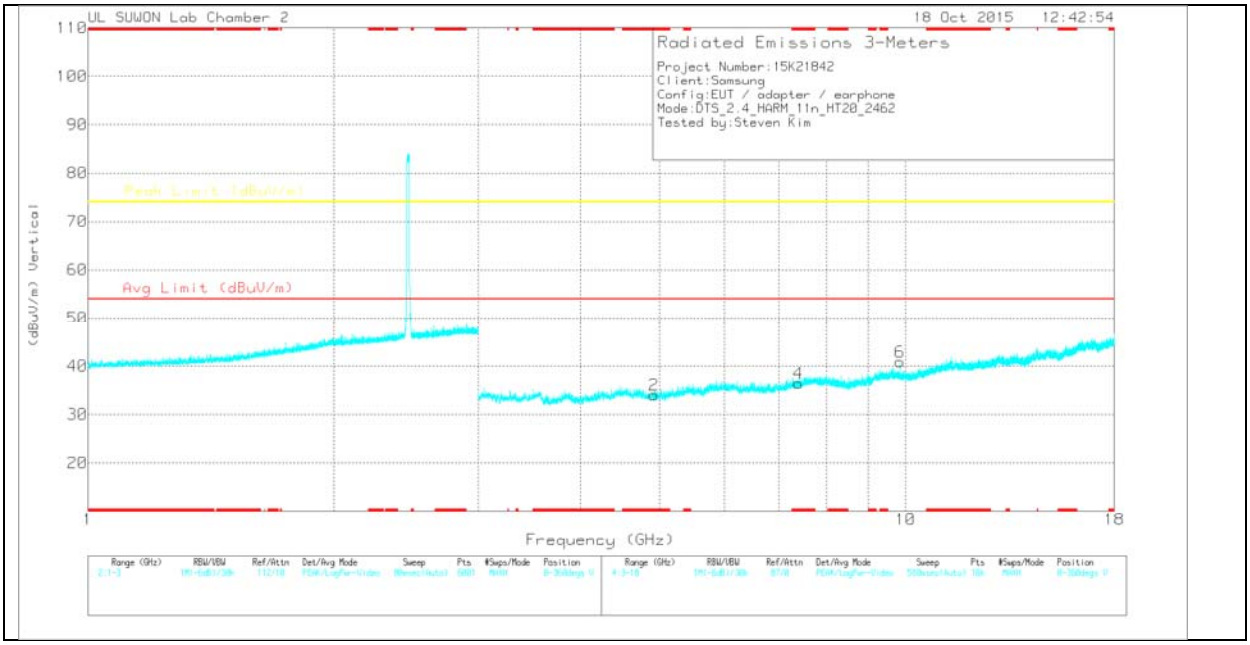
HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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	* 4.926	26.27	PK	33.9	-25.1	0	35.07	-	-	74	-38.93	0-360	100	H
3	* 7.386	22.92	PK	35.9	-22.2	0	36.62	-	-	74	-37.38	0-360	100	H
5	9.848	25.46	PK	37.1	-19.2	0	43.36	-	-	74	-30.64	0-360	200	H
2	* 4.924	25.21	PK	33.9	-25.1	0	34.01	-	-	74	-39.99	0-360	100	V
4	* 7.388	22.72	PK	35.9	-22.2	0	36.42	-	-	74	-37.58	0-360	200	V
6	9.848	22.99	PK	37.1	-19.2	0	40.89	-	-	74	-33.11	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
9.848	34.01	PK2	37.1	-19.2	0	51.91	-	-	74	-22.09	175	149	H
9.848	32.85	PK2	37.1	-19.2	0	50.75	-	-	74	-23.25	156	173	V

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

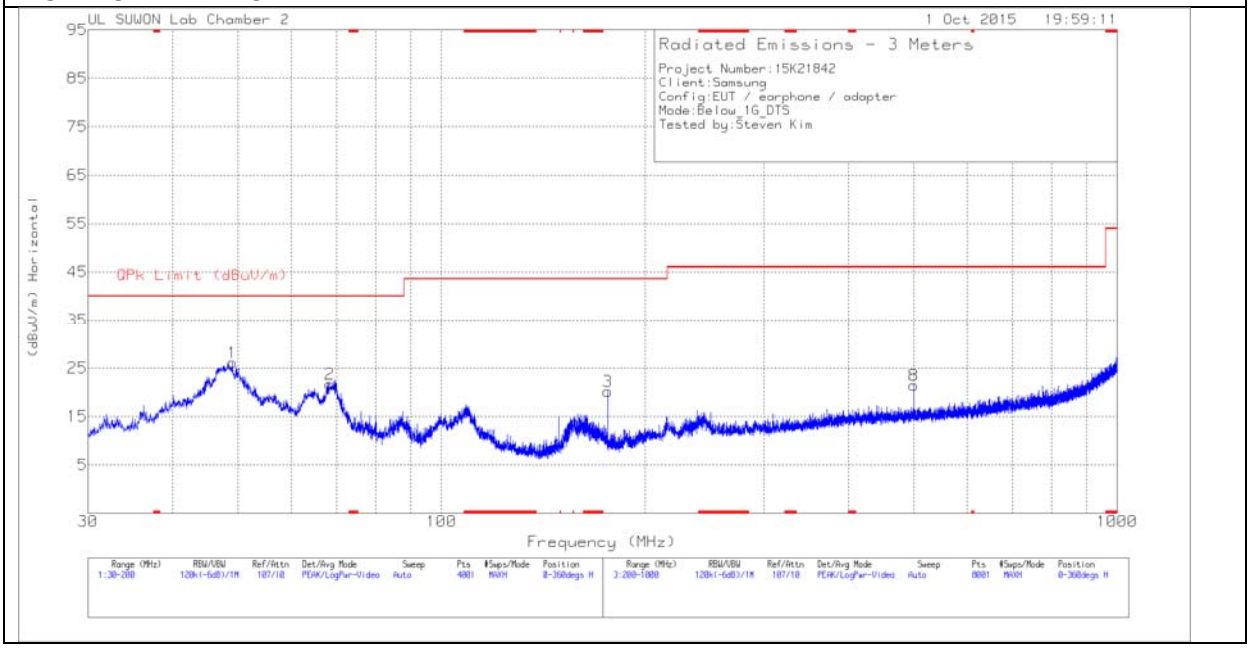
PK2 - KDB558074 Method: Maximum Peak

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

11.3. WORST-CASE BELOW 1 GHz

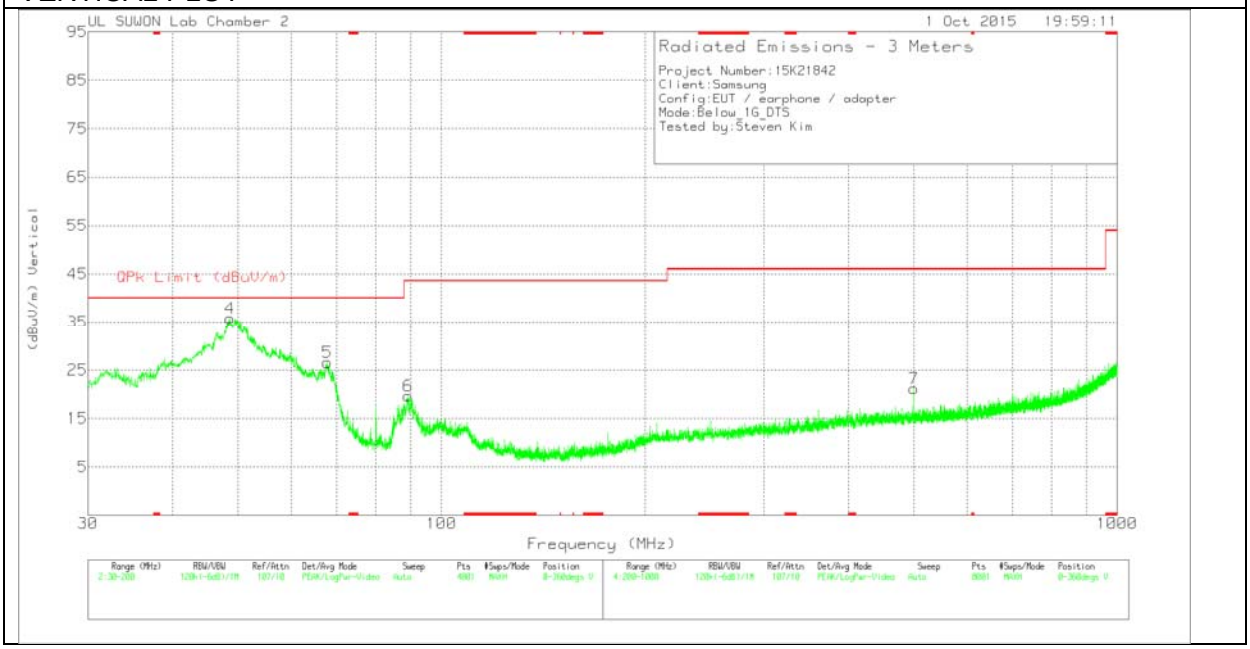
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



Below 1G Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163-749	Below_1G	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	49.04	42.68	Pk	14.1	-30.7	26.08	40	-13.92	0-360	400	H
2	68.42	42.21	Pk	10.1	-30.6	21.71	40	-18.29	0-360	100	H
3	176.285	41.29	Pk	9.3	-30.4	20.19	43.52	-23.33	0-360	200	H
4	48.615	52.65	Pk	14	-30.8	35.85	40	-4.15	0-360	100	V
5	67.7825	46.87	Pk	10.3	-30.6	26.57	40	-13.43	0-360	200	V
6	89.2025	40.82	Pk	9.4	-30.6	19.62	43.52	-23.9	0-360	100	V
8	500.4	35.11	Pk	15.8	-29.5	21.41	46.02	-24.61	0-360	200	H
7	500.4	34.89	Pk	15.8	-29.5	21.19	46.02	-24.83	0-360	100	V

Pk - Peak detector

Radiated Emissions

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
48.4373	47.28	Qp	14	-30.8	30.48	40	-9.52	166	122	V

Qp - Quasi-Peak detector

12. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

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

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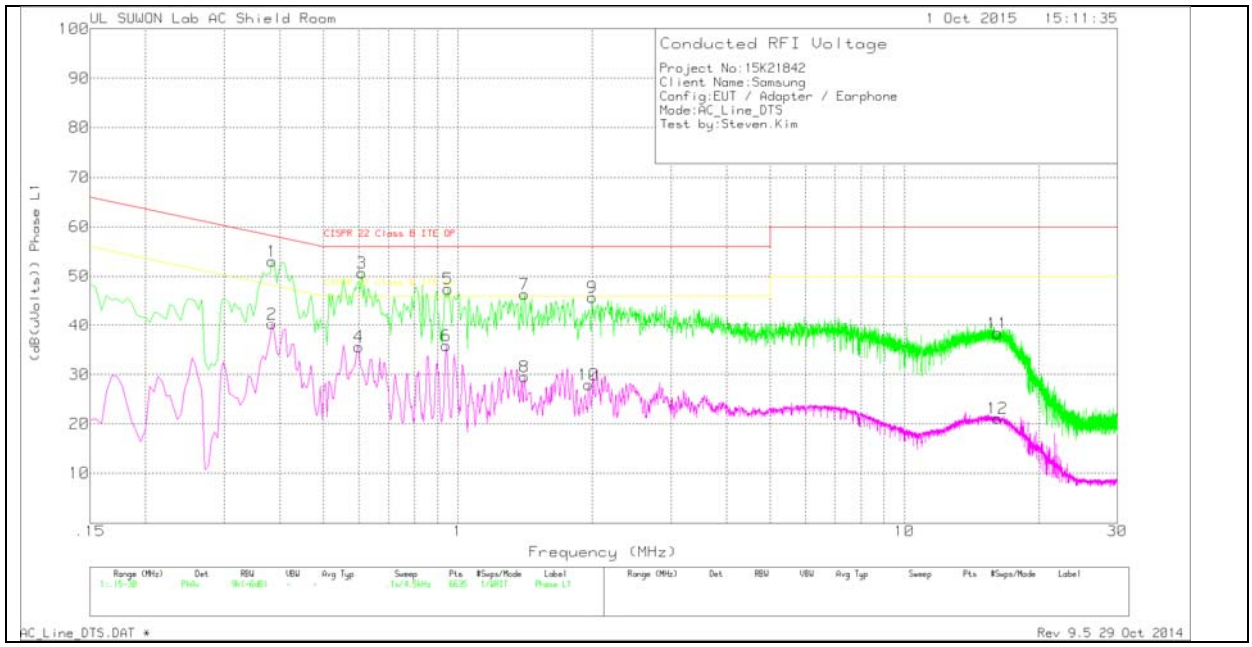
RESULTS

WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_with ex-cord_L1	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.384	42.97	Pk	10.1	0	53.07	58.19	-5.12	-	-
2	.384	30.18	Av	10.1	0	40.28	-	-	48.19	-7.91
3	.609	40.56	Pk	10.1	0	50.66	56	-5.34	-	-
4	.6	25.55	Av	10.1	0	35.65	-	-	46	-10.35
5	.951	37.51	Pk	9.9	0	47.41	56	-8.59	-	-
6	.942	25.92	Av	9.9	0	35.82	-	-	46	-10.18
7	1.41	36.43	Pk	9.8	.1	46.33	56	-9.67	-	-
8	1.41	19.64	Av	9.8	.1	29.54	-	-	46	-16.46
9	1.9995	35.82	Pk	9.8	.1	45.72	56	-10.28	-	-
10	1.9635	18.01	Av	9.8	.1	27.91	-	-	46	-18.09
11	16.179	27.98	Pk	10.2	.2	38.38	60	-21.62	-	-
12	16.152	10.72	Av	10.2	.2	21.12	-	-	50	-28.88

Pk - Peak detector

Av - Average detection

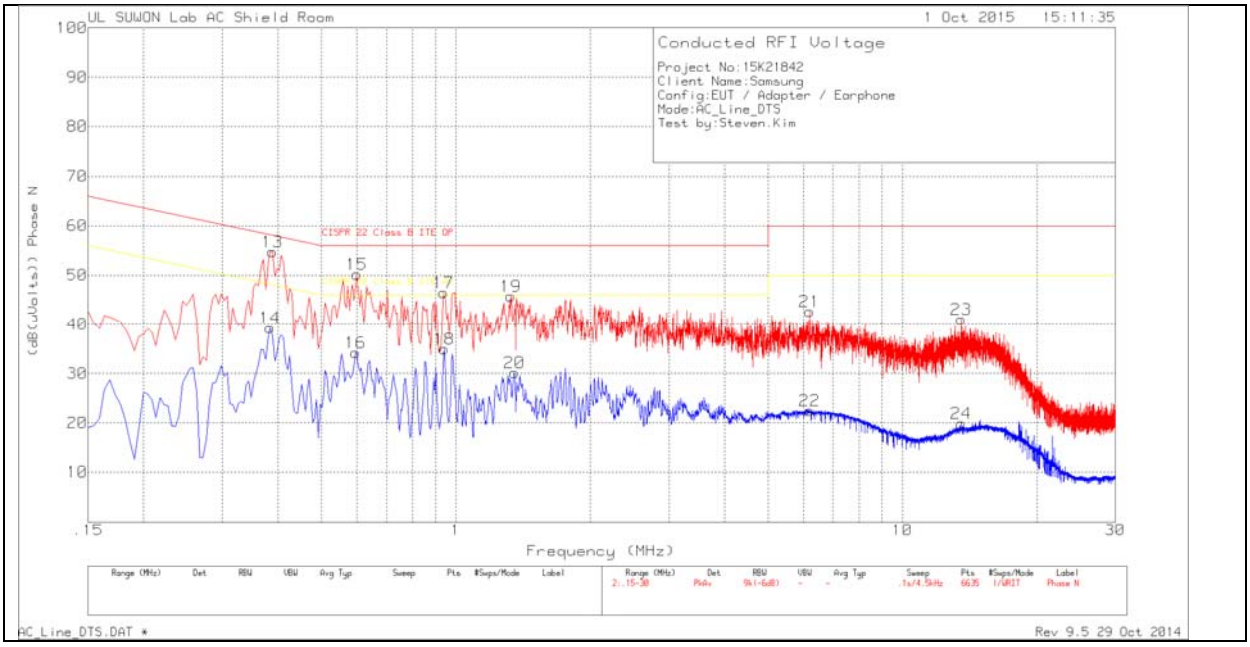
Quasi-Peak Emissions

Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_with ex-cord_L1	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
.3867	37.21	Qp	10.1	0	47.31	58.13	-10.82	-	-
.6054	27.11	Qp	10.1	0	37.21	56	-18.79	-	-
.9474	23.42	Qp	9.9	0	33.32	56	-22.68	-	-

Qp - Quasi-Peak detector

LINE 2 PLOT



LINE 2 RESULTS

Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_with ex-cord_N	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.3885	44.7	Pk	10.1	0	54.8	58.1	-3.3	-	-
14	.384	29.26	Av	10.1	0	39.36	-	-	48.19	-8.83
15	.6	40.11	Pk	10.1	0	50.21	56	-5.79	-	-
16	.5955	24.18	Av	10.1	0	34.28	-	-	46	-11.72
17	.9375	36.62	Pk	9.9	0	46.52	56	-9.48	-	-
18	.942	25.03	Av	9.9	0	34.93	-	-	46	-11.07
19	1.329	35.79	Pk	9.8	.1	45.69	56	-10.31	-	-
20	1.3515	20.26	Av	9.8	.1	30.16	-	-	46	-15.84
21	6.1935	32.79	Pk	9.8	.1	42.69	60	-17.31	-	-
22	6.2025	12.6	Av	9.8	.1	22.5	-	-	50	-27.5
23	13.5555	30.65	Pk	10.2	.2	41.05	60	-18.95	-	-
24	13.5645	9.54	Av	10.2	.2	19.94	-	-	50	-30.06

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_with ex-cord_N	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
.3858	34.17	Qp	10.1	0	44.27	58.15	-13.88	-	-
.5991	26.24	Qp	10.1	0	36.34	56	-19.66	-	-
.9402	21.29	Qp	9.9	0	31.19	56	-24.81	-	-

Qp - Quasi-Peak detector