



FCC CFR47 PART 15 SUBPART C

DTS Wireless LAN

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC

MODEL NUMBER : SM-C701F/DS

FCC ID: A3LSMC701F

REPORT NUMBER: 4787871150-E1V2

ISSUE DATE: 3/20/2017

Prepared for
SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Prepared by
UL Korea, Ltd. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433



Revision History

Rev.	Issue Date	Revisions	Revised By
V1	03/10/17	Initial issue	Junwhan Lee
V2	03/20/17	Revised section 5.3, 9.2	Junwhan Lee

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION.....	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION	6
4.2. SAMPLE CALCULATION.....	6
4.3. MEASUREMENT UNCERTAINTY	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT.....	8
5.2. MAXIMUM OUTPUT POWER.....	8
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	8
5.4. WORST-CASE CONFIGURATION AND MODE.....	8
5.5. DESCRIPTION OF TEST SETUP	9
6. TEST AND MEASUREMENT EQUIPMENT	11
7. REFERENCE MEASUREMENT RESULTS.....	12
7.1. ON TIME AND DUTY CYCLE RESULTS.....	12
7.2. Verification of geo-location functioning for Wi-Fi Ch. 12& 13	14
7.2.1. Setup Configuration.....	14
7.2.2. Test Results	14
8. SUMMARY TABLE	15
9. ANTENNA PORT TEST RESULTS	16
9.1. 6 dB BANDWIDTH	16
9.1.1. 802.11b MODE IN THE 2.4 GHz BAND.....	16
9.1.2. 802.11g MODE IN THE 2.4 GHz BAND.....	16
9.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND	16
9.1.4. 6 dB BANDWIDTH PLOTS	17
9.2. OUTPUT POWER	20
9.2.1. 802.11b MODE IN THE 2.4 GHz BAND.....	21
9.2.2. 802.11g MODE IN THE 2.4 GHz BAND.....	22
9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND	23
9.3. PSD	24
9.3.1. 802.11b MODE IN THE 2.4 GHz BAND.....	25
9.3.2. 802.11g MODE IN THE 2.4 GHz BAND.....	25
9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND	25
9.3.4. PSD PLOTS	26

9.4.	OUT-OF-BAND EMISSIONS.....	29
9.4.1.	802.11b MODE IN THE 2.4 GHz BAND.....	30
9.4.2.	802.11g MODE IN THE 2.4 GHz BAND.....	33
9.4.3.	802.11n HT20 MODE IN THE 2.4 GHz BAND.....	36
10.	RADIATED TEST RESULTS.....	39
10.1.	LIMITS AND PROCEDURE.....	39
10.2.	TRANSMITTER ABOVE 1 GHz.....	41
10.2.1.	TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND.....	41
10.2.2.	TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND.....	51
10.2.3.	TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND.....	61
10.3.	WORST-CASE BELOW 1 GHz.....	71
11.	AC POWER LINE CONDUCTED EMISSIONS	73
12.	SETUP PHOTOS.....	78

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC

MODEL NUMBER: SM-C701F/DS

SERIAL NUMBER: R38J10TDQ3N, R38J10TDT3R (RADIATED);
R38J10TDQ7J (CONDUCTED)

DATE TESTED: FEB 24, 2017 - MAR 09, 2017

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:



SungGil Park
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 following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 DTS Meas Guidance v03r05.
4. KDB 594280 D01 Software configuration control v02r01.
5. ANSI C63.10-2013.

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
2412 - 2462	802.11b	16.48	44.46
	802.11g	11.66	14.66
	802.11n HT20	11.68	14.72

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antennas, with a antenna's maximum gain of -0.3 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

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	EP-TA20IWE	R37H7JNHYW1SE3	N/A
Data Cable	SAMSUNG	EP-DN930CWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

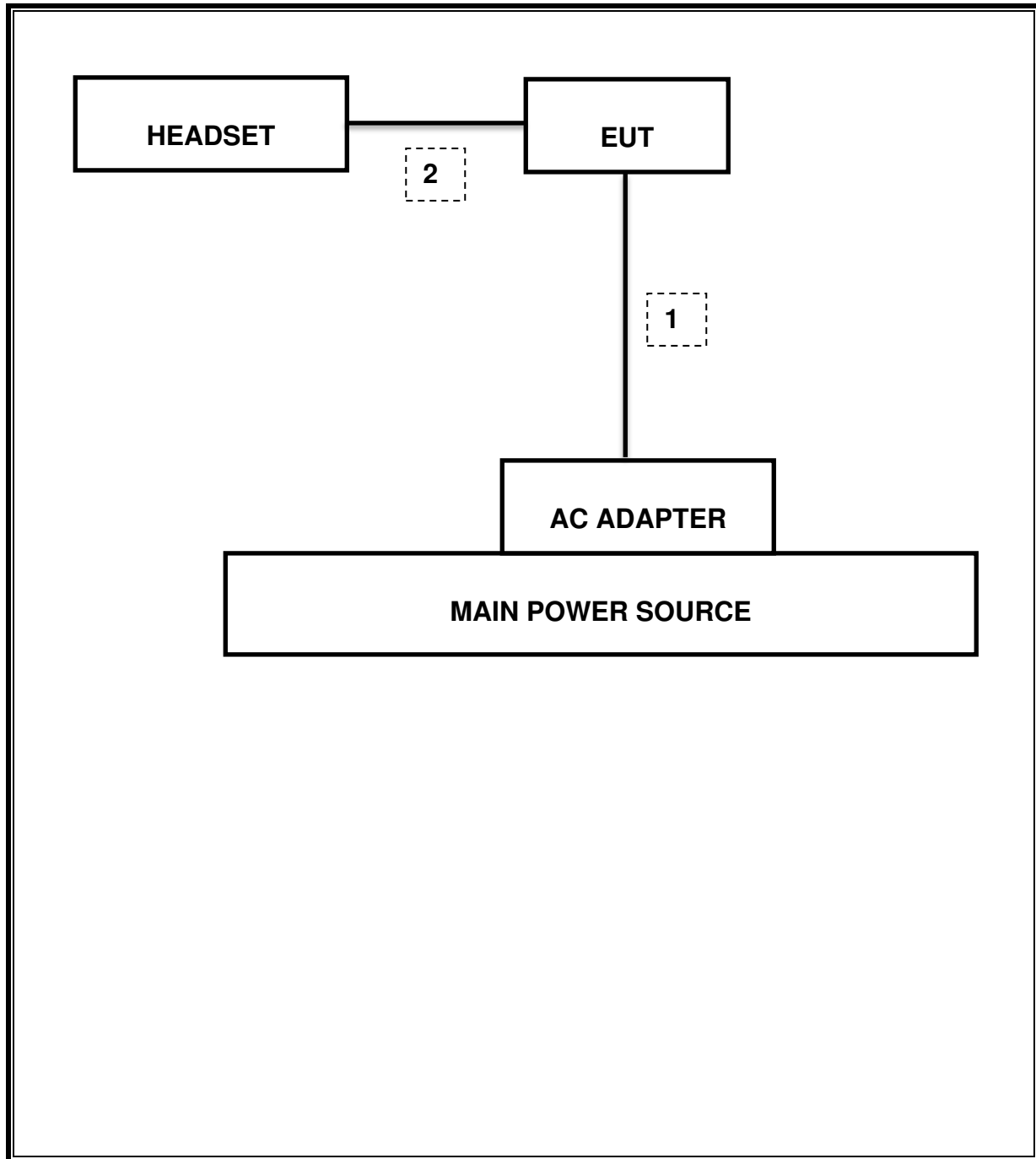
I/O CABLES

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	1.0m	N/A
2	Audio	2	Mini-Jack	Unshielded	1.0m	N/A

TEST SETUP

The EUT is a stand-alone unit during the tests.
Test software in hidden menu exercised the EUT to enable DTS mode.

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	10-14-18
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	04-25-17
Antenna, Horn, 18 GHz	ETS	3115	00167211	10-14-18
Antenna, Horn, 18 GHz	ETS	3117	00168724	06-17-17
Antenna, Horn, 18 GHz	ETS	3117	00168717	06-17-17
Antenna, Horn, 40 GHz	ETS	3116C	00166155	11-30-17
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	12-15-17
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-17-17
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-16-17
Preamplifier	ETS	3115-PA	00167475	08-17-17
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-16-17
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-17-17
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	11-25-17
Average Power Sensor	R&S	NRP-Z91	102681	08-16-17
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-17-17
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-17-17
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-16-17
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-16-17
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-17-17
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-16-17
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-17-17
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-16-17
High Pass Filter 6GHz	Micro-Tronics	HPM17542	009	08-17-17
High Pass Filter 6GHz	Micro-Tronics	HPM17542	016	08-16-17
LISN	R&S	ENV-216	101836	08-16-17
LISN	R&S	ENV-216	101837	08-16-17
Attenuator	PASTERNAK	PE7087-10	A007	08-17-17
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

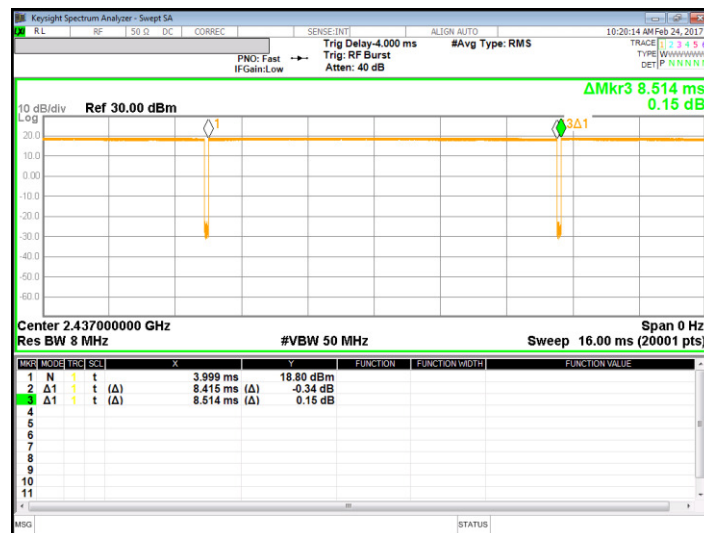
7. REFERENCE MEASUREMENT RESULTS

7.1. ON TIME AND DUTY CYCLE RESULTS

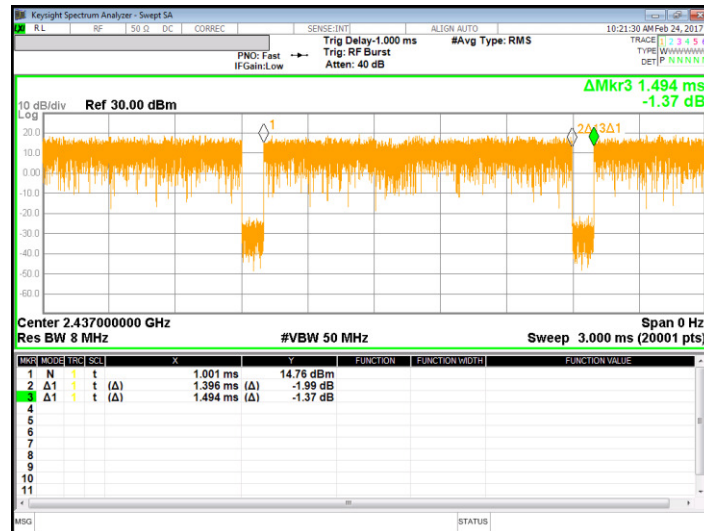
LIMITS

None; for reporting purposes only.

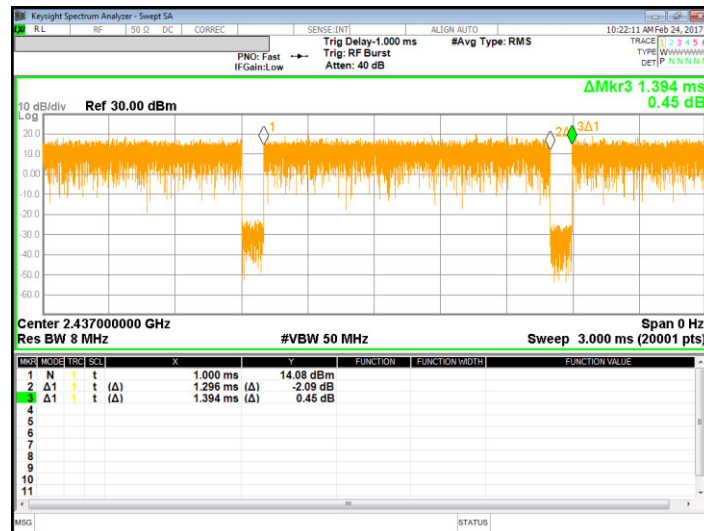
Mode	ON Time B [msec]	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
2400MHz Bands						
802.11b	8.415	8.514	0.988	98.8%	0.00	0.010
802.11g	1.396	1.494	0.934	93.4%	0.29	0.716
802.11n HT20	1.296	1.394	0.930	93.0%	0.32	0.772



[802.11b]



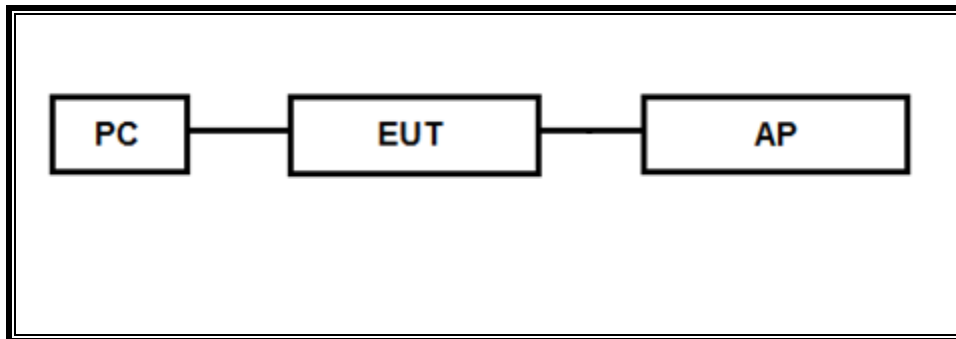
[802.11g]



[802.11n]

7.2. Verification of geo-location functioning for Wi-Fi Ch. 12& 13

7.2.1. Setup Configuration



7.2.2. Test Results

MCC	US	Non-US (KR)	Airplane
Country	United States	Korea	Default mode (US)
Channel 1	Connected	Connected	Connected
Channel 2	Connected	Connected	Connected
Channel 3	Connected	Connected	Connected
Channel 4	Connected	Connected	Connected
Channel 5	Connected	Connected	Connected
Channel 6	Connected	Connected	Connected
Channel 7	Connected	Connected	Connected
Channel 8	Connected	Connected	Connected
Channel 9	Connected	Connected	Connected
Channel 10	Connected	Connected	Connected
Channel 11	Connected	Connected	Connected
Channel 12	Not Connected	Connected	Not Connected
Channel 13	Not Connected	Connected	Not Connected

Note : Test scripts used are fully described in the operational description

8. 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	8.030 MHz
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-30dBc		Pass	-30.246 dBm
15.247	TX conducted output power	<30dBm		Pass	16.48 dBm
15.247	PSD	<8dBm		Pass	-15.114 dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	48.7 dBuV (Pk)
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	51.01 dBuV/m (Av)

9. ANTENNA PORT TEST RESULTS

9.1. 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 v03r05: 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

9.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	8.048	0.5
Mid	2437	8.053	0.5
High	2462	8.030	0.5
Worst		8.030	0.5

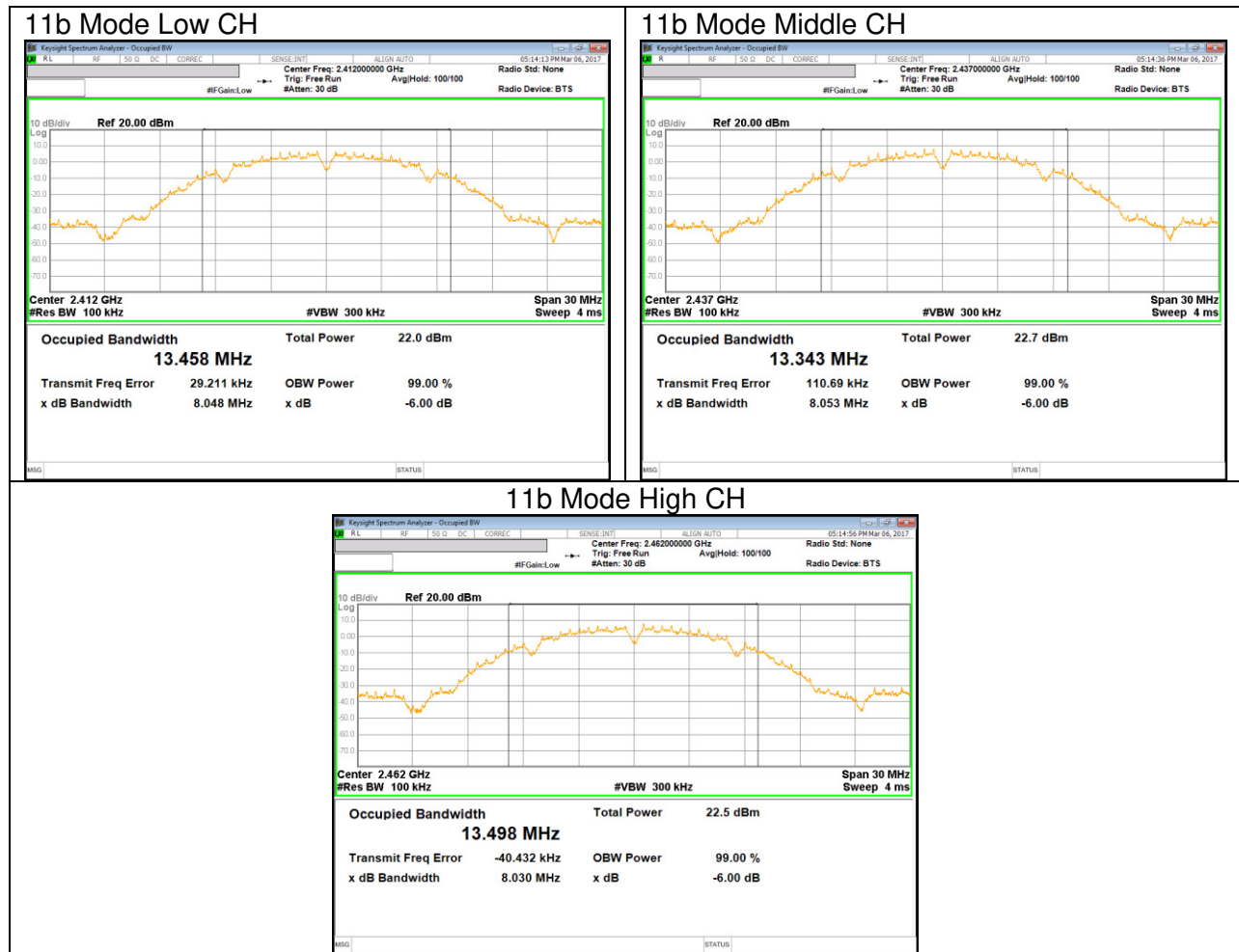
9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	16.350	0.5
Mid	2437	16.330	0.5
High	2462	16.330	0.5
Worst		16.330	0.5

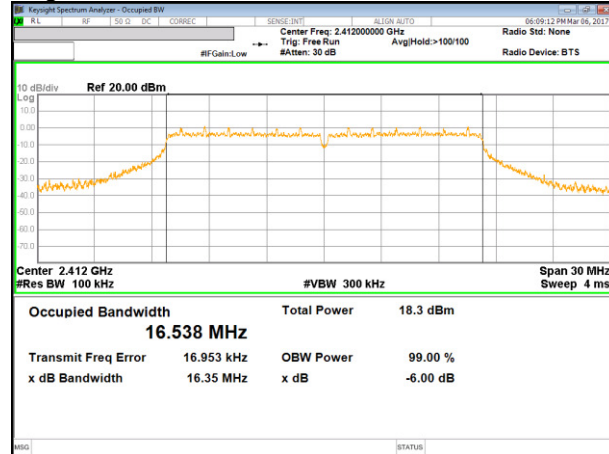
9.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	17.570	0.5
Mid	2437	17.560	0.5
High	2462	17.550	0.5
Worst		17.550	0.5

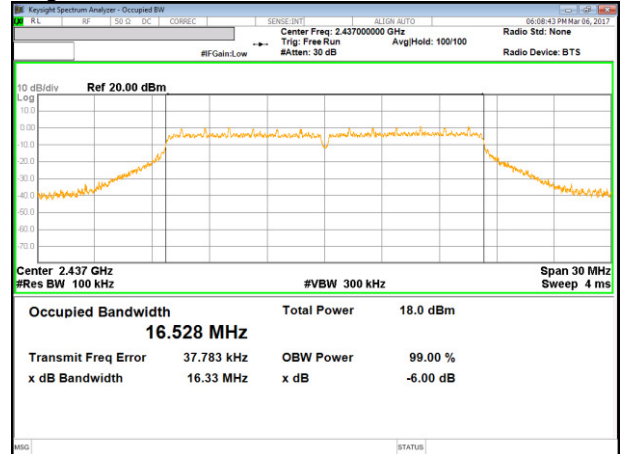
9.1.4. 6 dB BANDWIDTH PLOTS



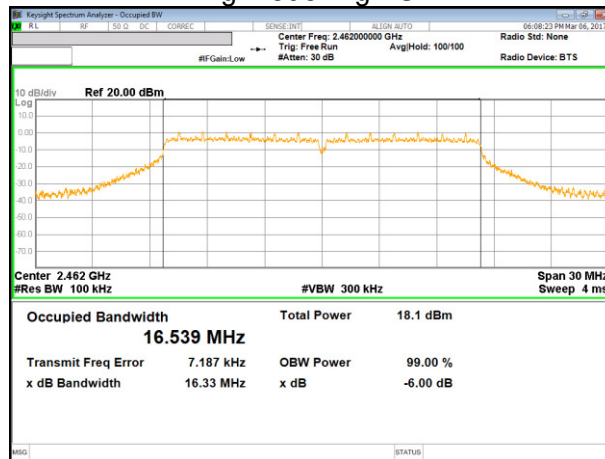
11g Mode Low CH



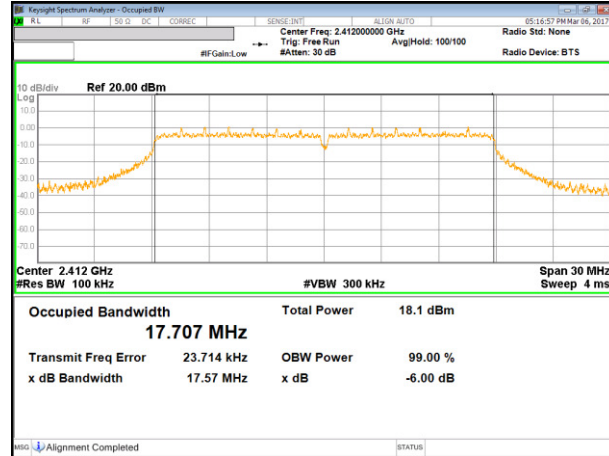
11g Mode Middle CH



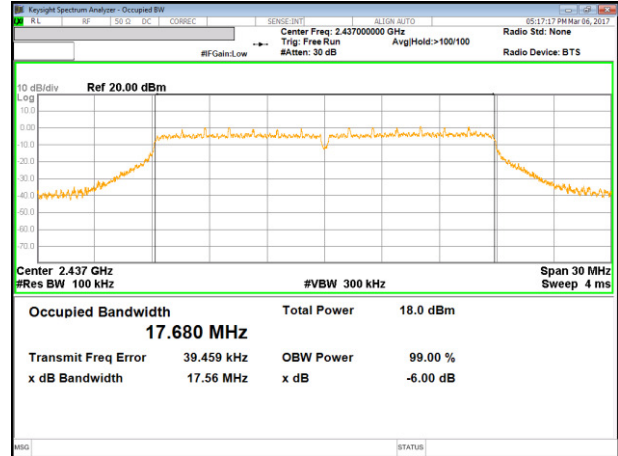
11g Mode High CH



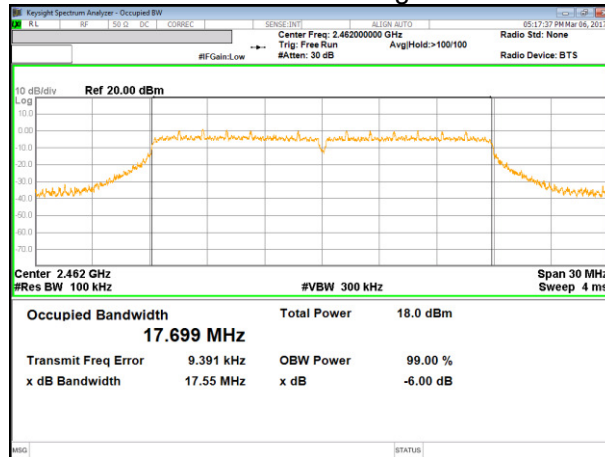
11n HT20 Mode Low CH



11n HT20 Mode Middle CH



11n HT20 Mode High CH



9.2. 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 was entered as an offset in the power meter to allow for direct reading of power.

Output power measurement was performed utilizing the “§9.2.3.1 AVGPM” under KDB558074 D01 DTS Meas Guidance v03r05.

Duty cycle correction factor is already added to the average output power results for duty cycle factor < 98%. (802.11g, 802.11n mode)

RESULTS

9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	Max Power [dBm]
Low	2412	-0.30	30.00	30.00
Mid	2437	-0.30	30.00	30.00
High	2462	-0.30	30.00	30.00

Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	15.77	15.77	30.00	-14.23
Mid	2437	16.48	16.48	30.00	-13.52
High	2462	16.36	16.36	30.00	-13.64
Worst			16.48	30.00	-13.52

9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	Max Power [dBm]
Low	2412	-0.30	30.00	30.00
Mid	2437	-0.30	30.00	30.00
High	2462	-0.30	30.00	30.00

Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	11.66	11.66	30.00	-18.34
Mid	2437	11.58	11.58	30.00	-18.42
High	2462	11.65	11.65	30.00	-18.35
Worst			11.66	30.00	-18.34

9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	Max Power [dBm]
Low	2412	-0.30	30.00	30.00
Mid	2437	-0.30	30.00	30.00
High	2462	-0.30	30.00	30.00

Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	11.68	11.68	30.00	-18.32
Mid	2437	11.56	11.56	30.00	-18.44
High	2462	11.58	11.58	30.00	-18.42
Worst			11.68	30.00	-18.32

9.3. 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 §10.3 AVGPDS-1 (802.11 b mode) and §10.5 AVGPDS-2(802.11 g/n mode)” under KDB558074 D01 DTS Meas Guidance v03r05.

RESULTS

9.3.1. 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	-15.835	0.00	-15.835	8.00	-23.835
Mid	2437	-15.114	0.00	-15.114	8.00	-23.114
High	2462	-15.295	0.00	-15.295	8.00	-23.295

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

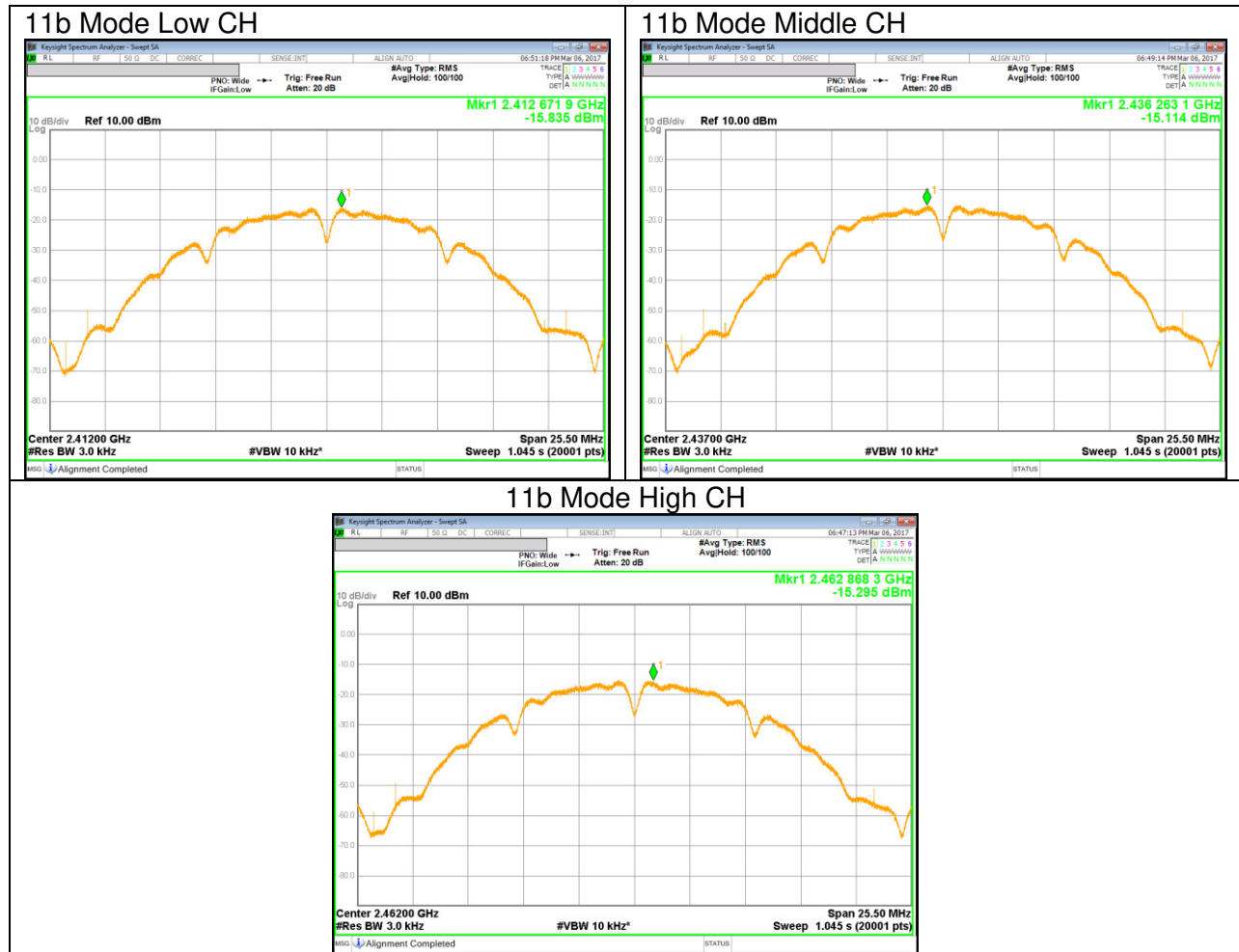
Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-22.497	0.29	-22.207	8.00	-30.497
Mid	2437	-22.316	0.29	-22.026	8.00	-30.316
High	2462	-22.430	0.29	-22.140	8.00	-30.430

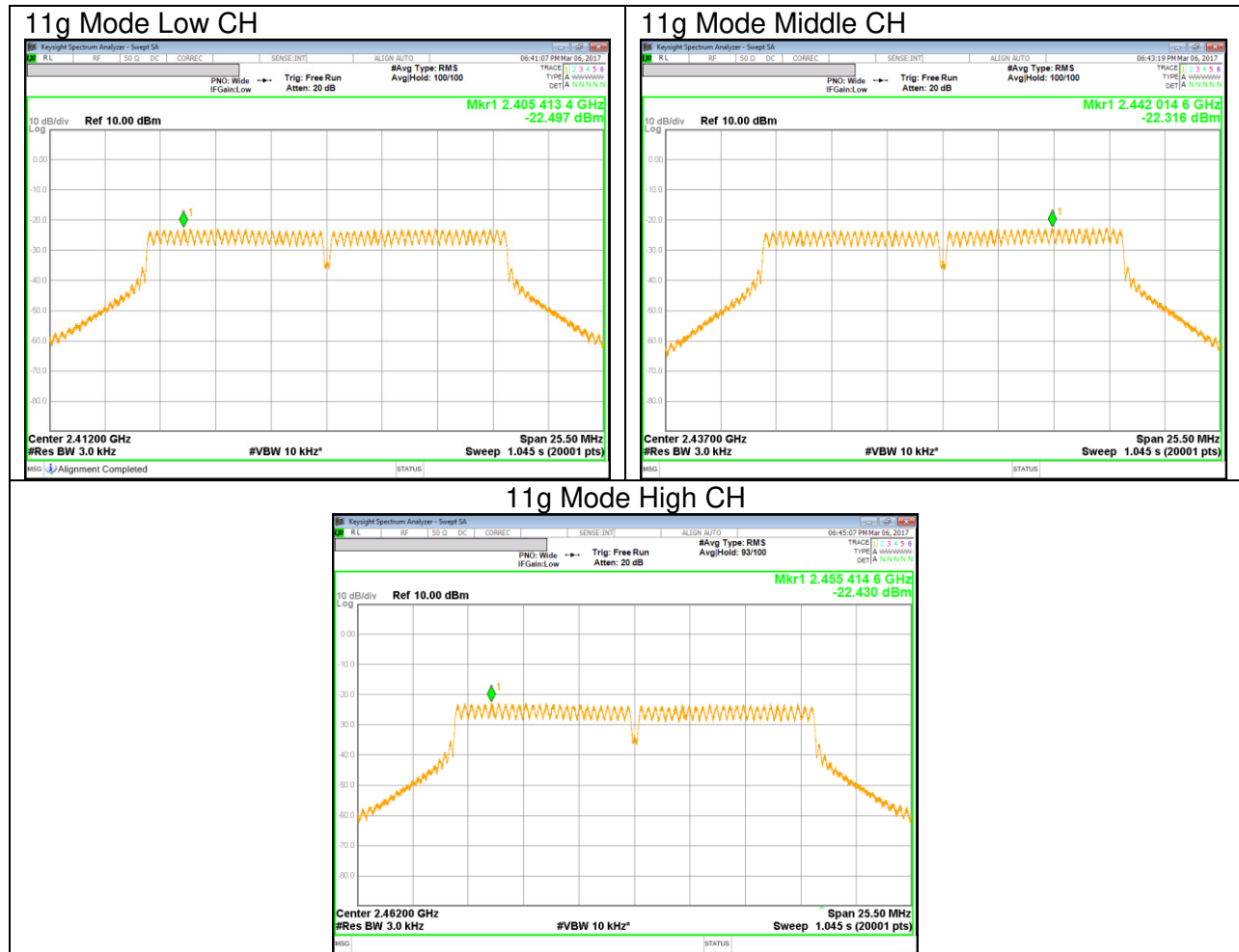
9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2412	-22.514	0.32	-22.194	8.00	-30.514
Mid	2437	-22.502	0.32	-22.182	8.00	-30.502
High	2462	-22.660	0.32	-22.340	8.00	-30.660

9.3.4. PSD PLOTS

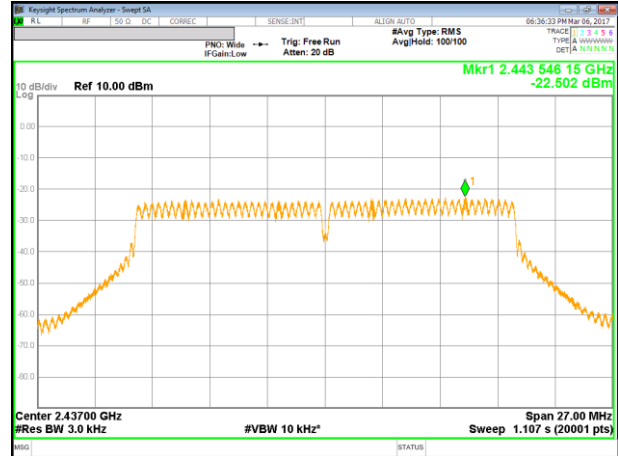




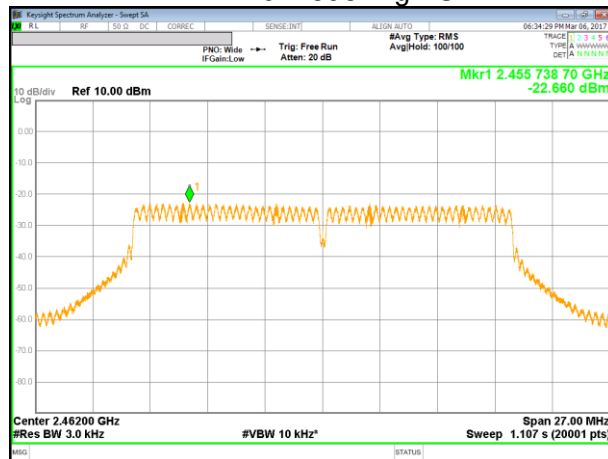
11n HT20 Mode Low CH



11n HT20 Mode Middle CH



11n HT20 Mode High CH



9.4. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

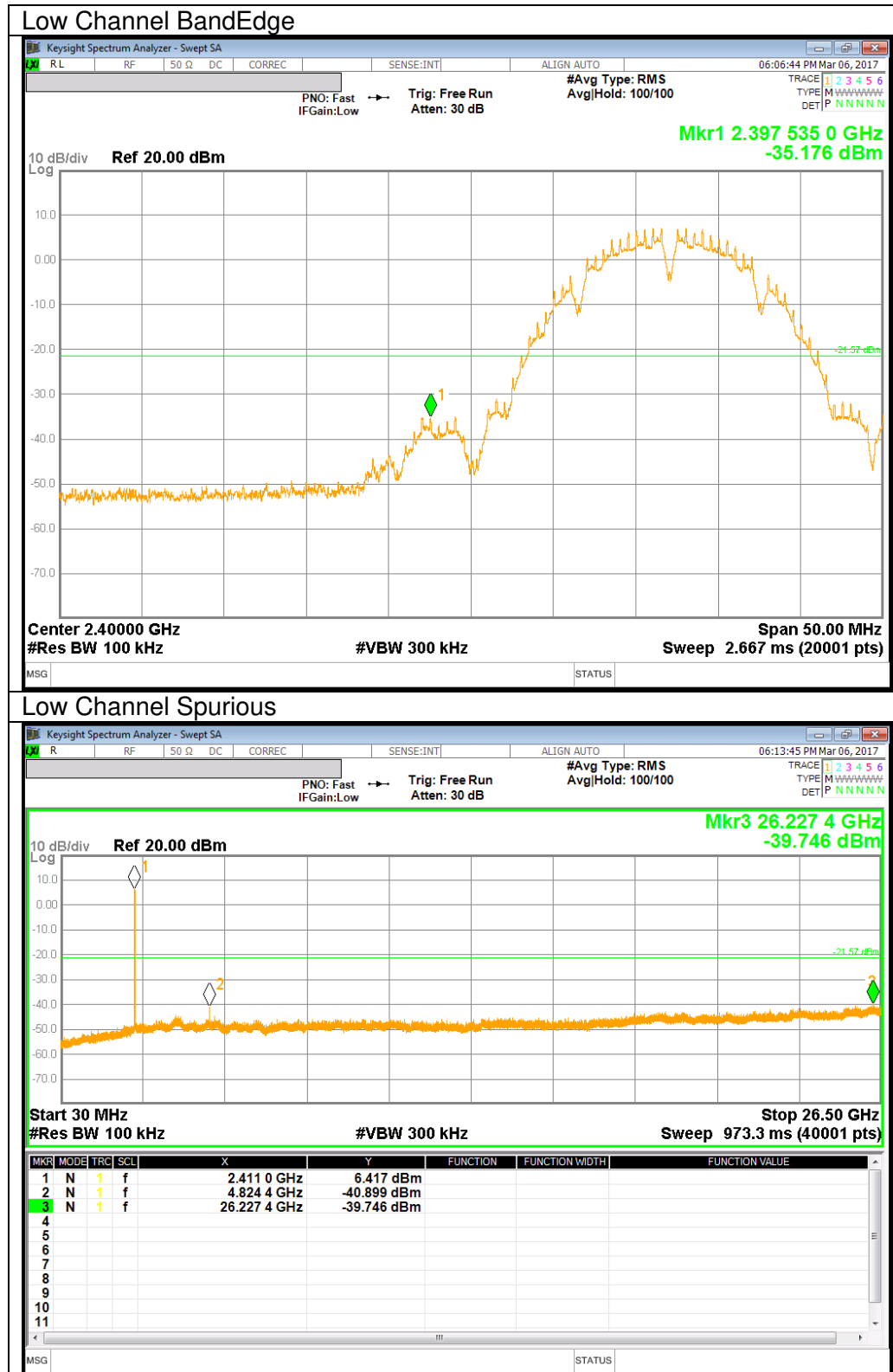
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

TEST PROCEDURE

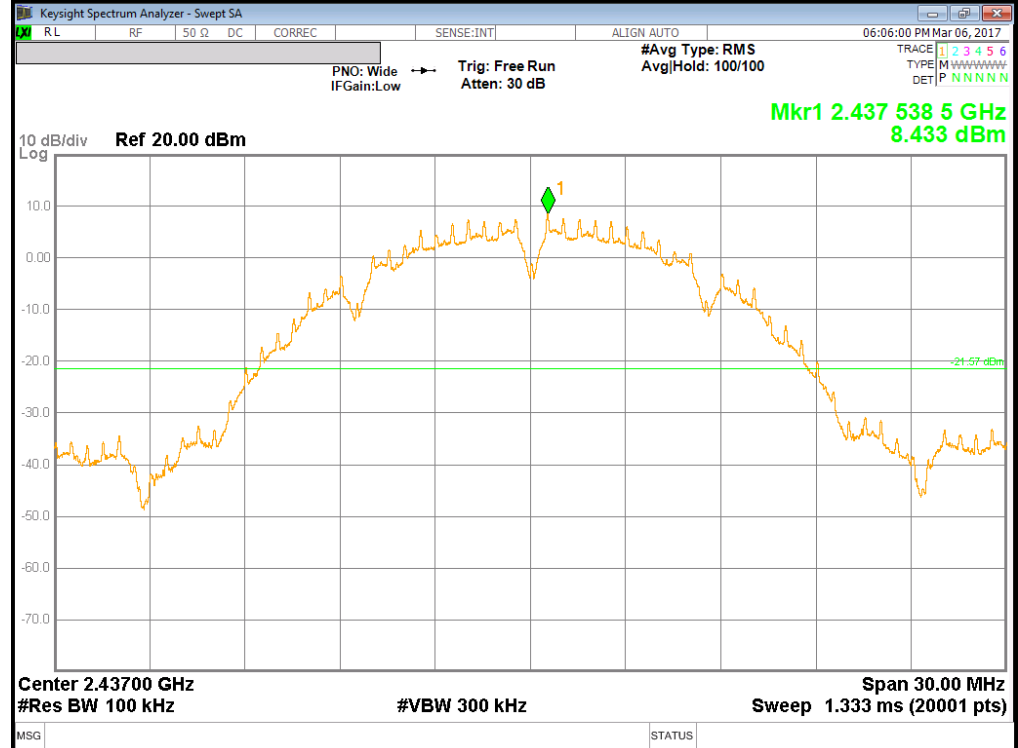
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

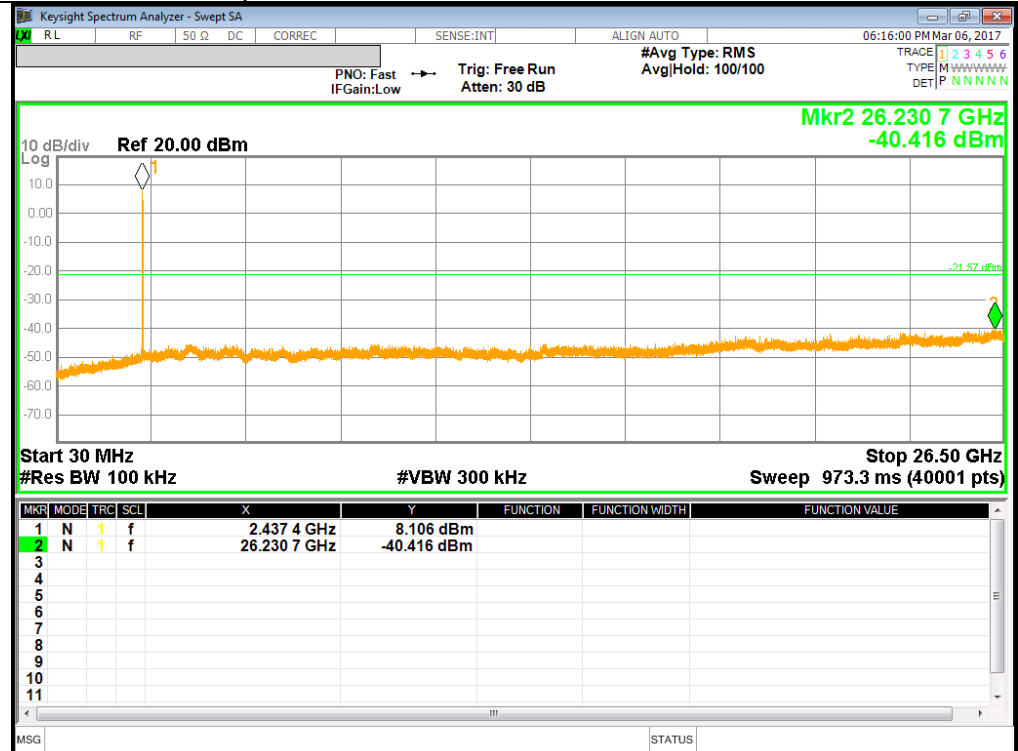
9.4.1. 802.11b MODE IN THE 2.4 GHz BAND



Middle Channel BandEdge

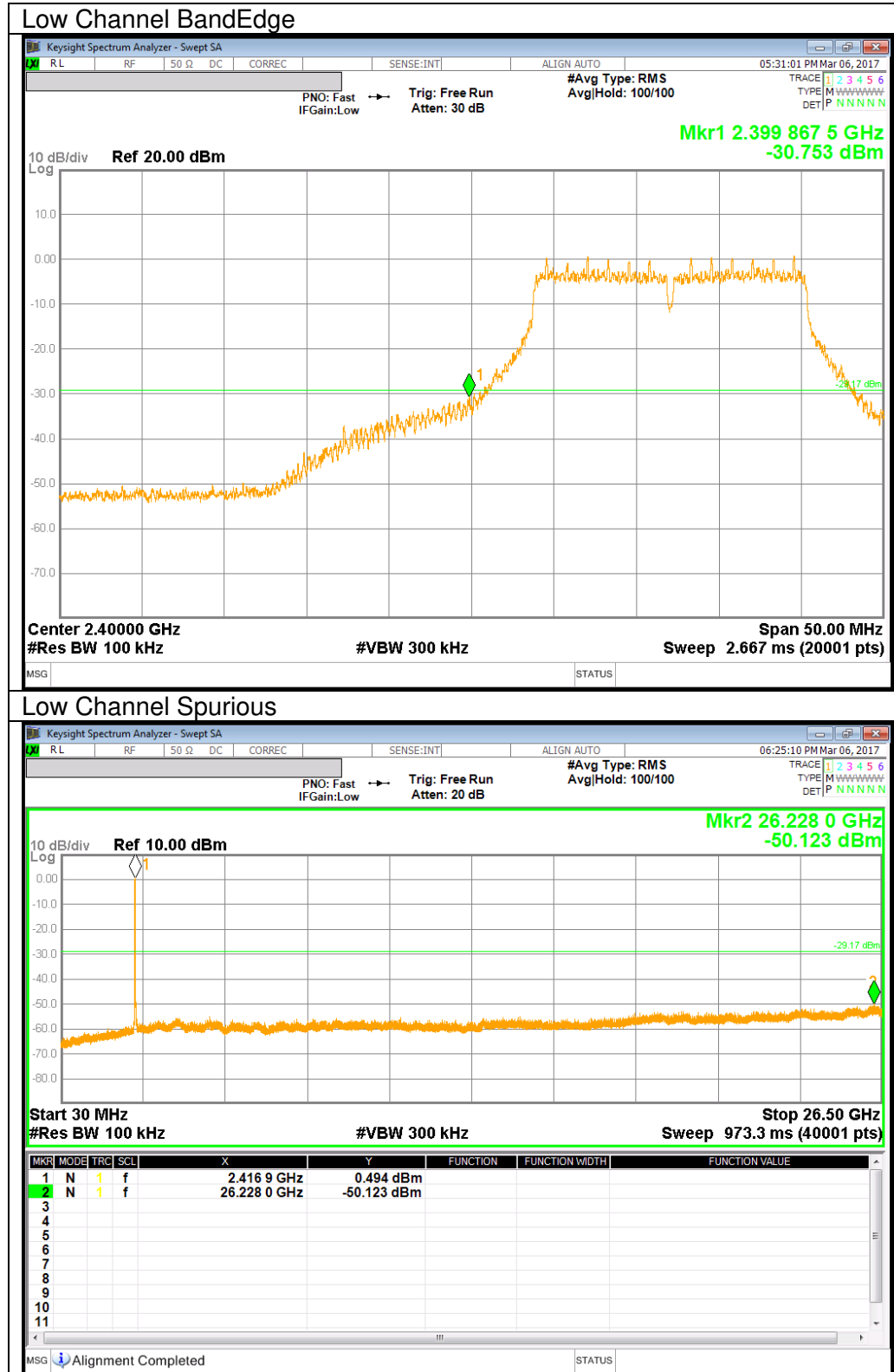


Middle Channel Spurious

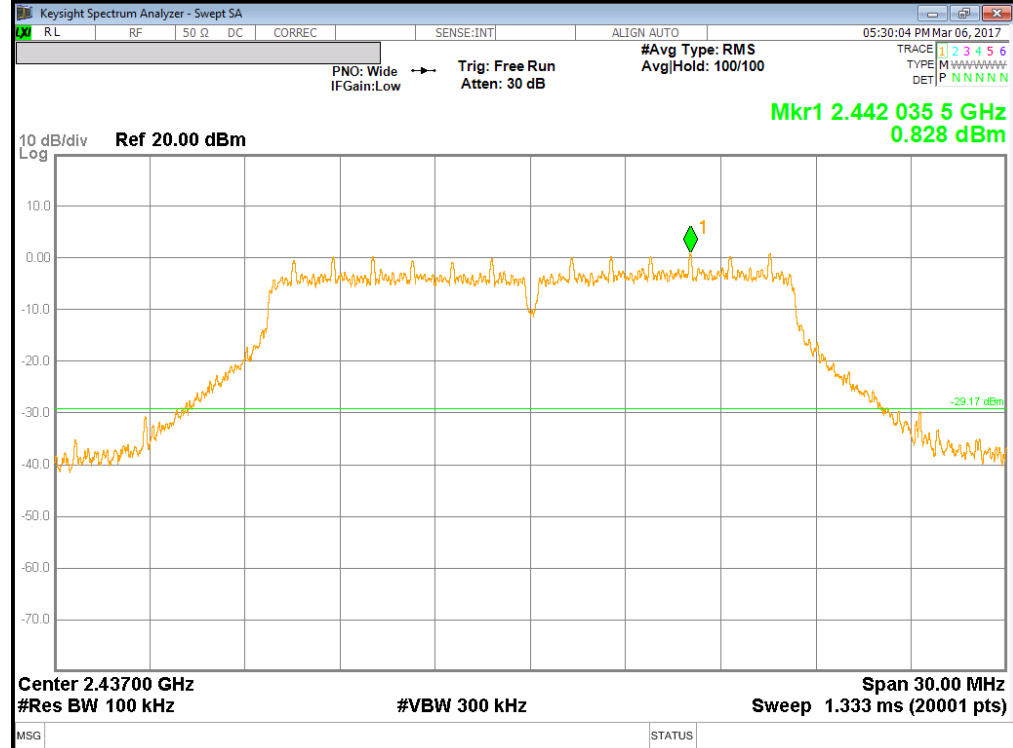




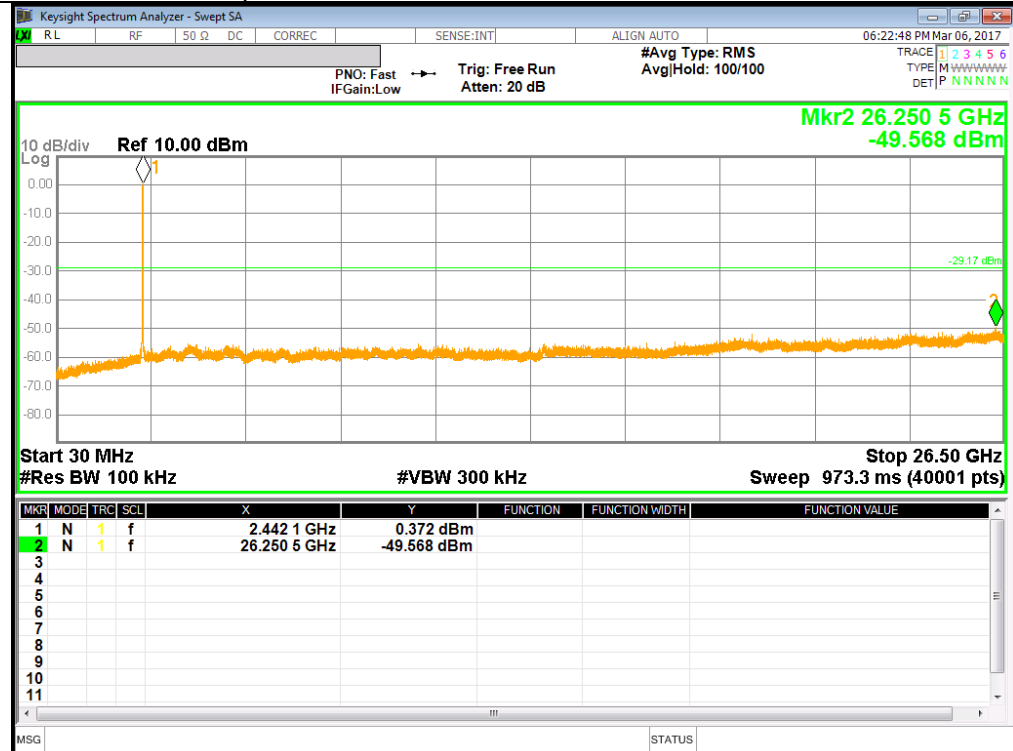
9.4.2. 802.11g MODE IN THE 2.4 GHz BAND

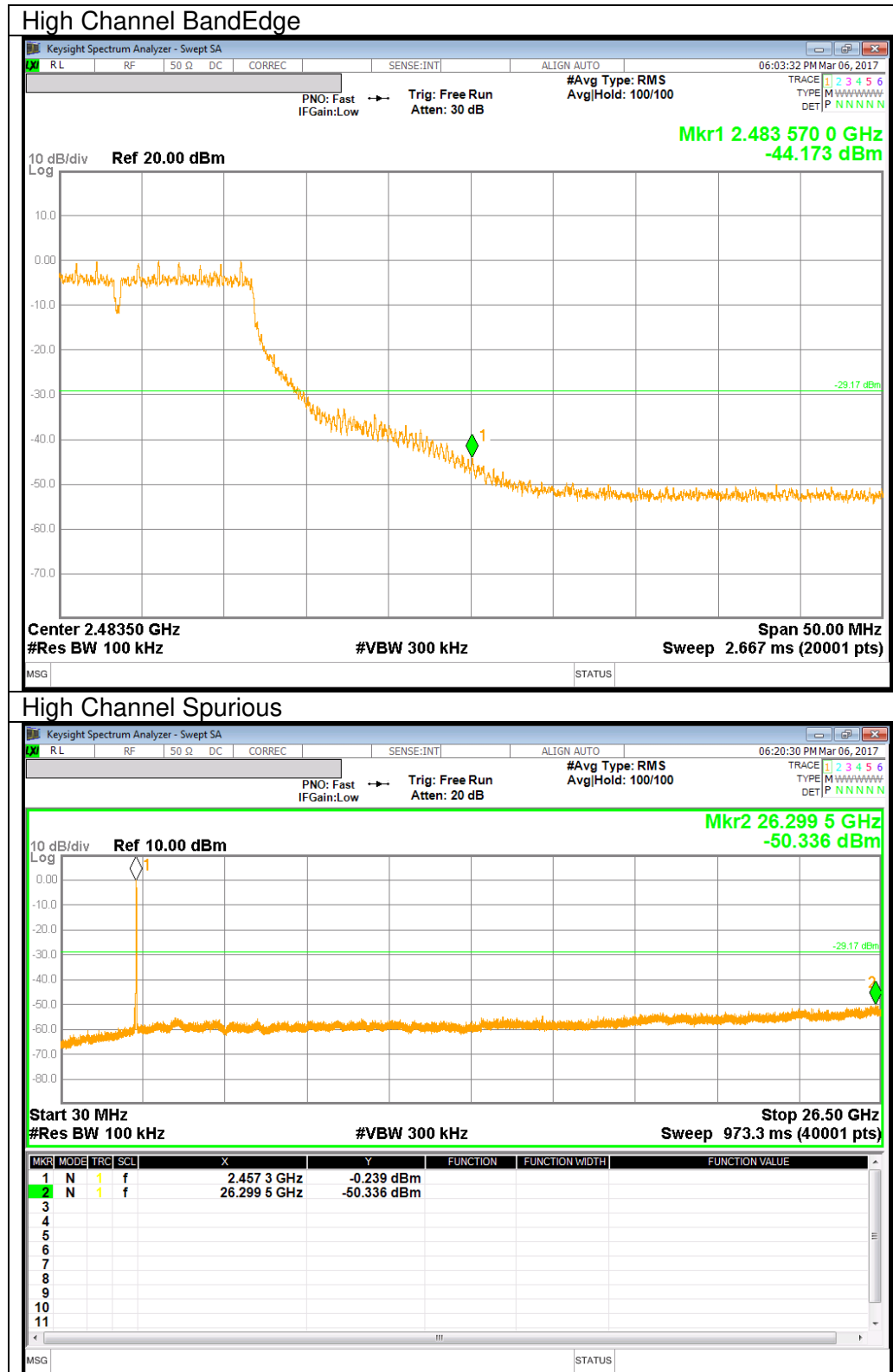


Middle Channel BandEdge

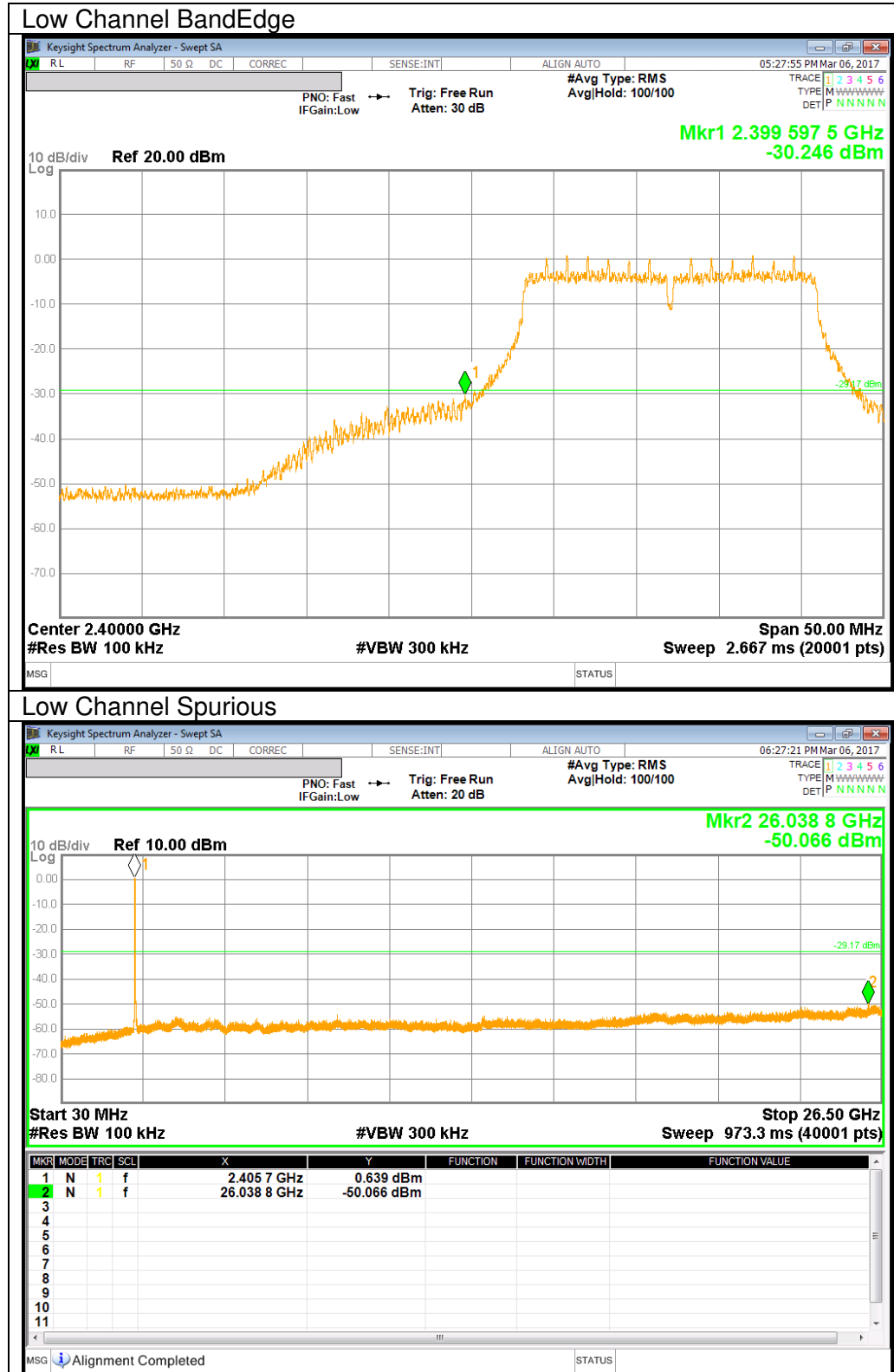


Middle Channel Spurious

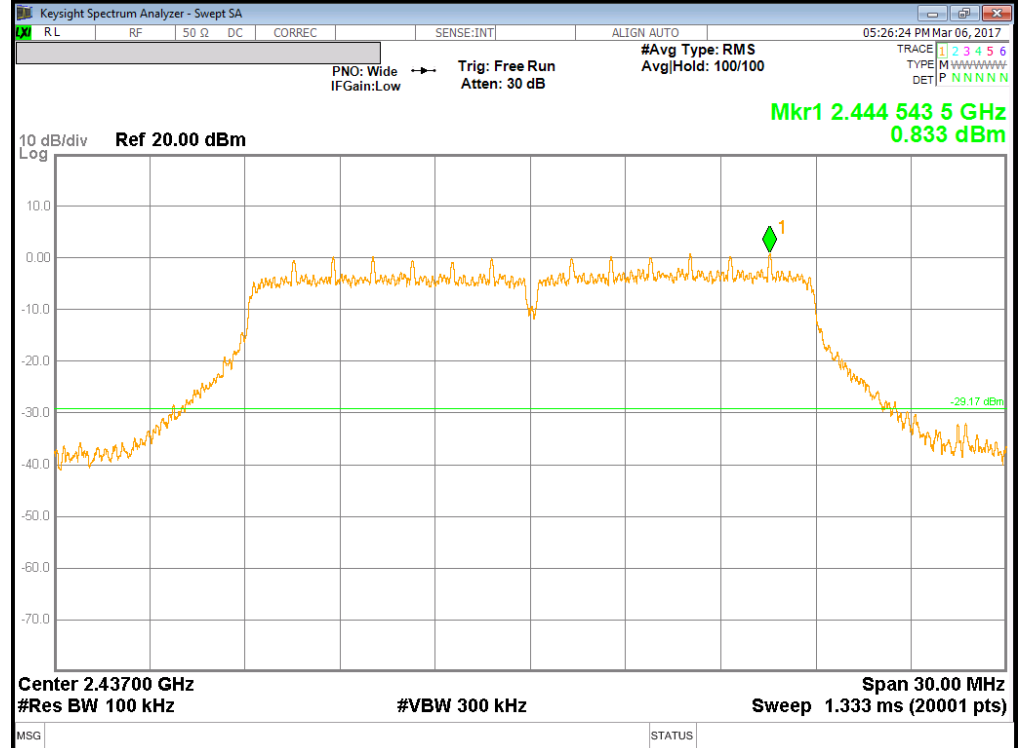




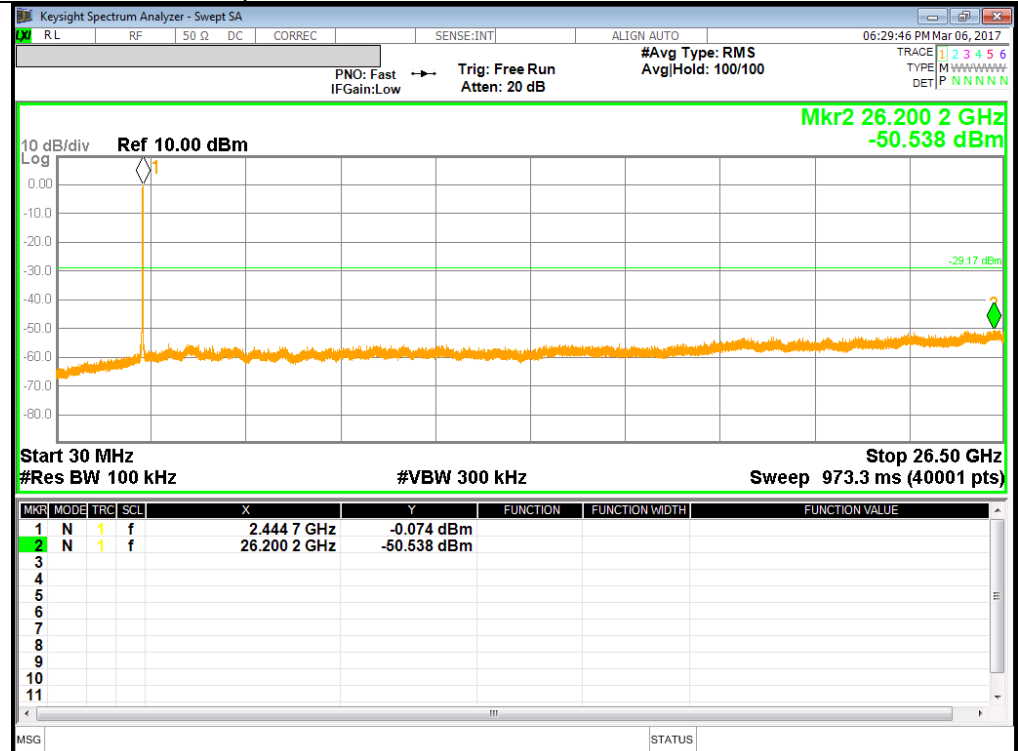
9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

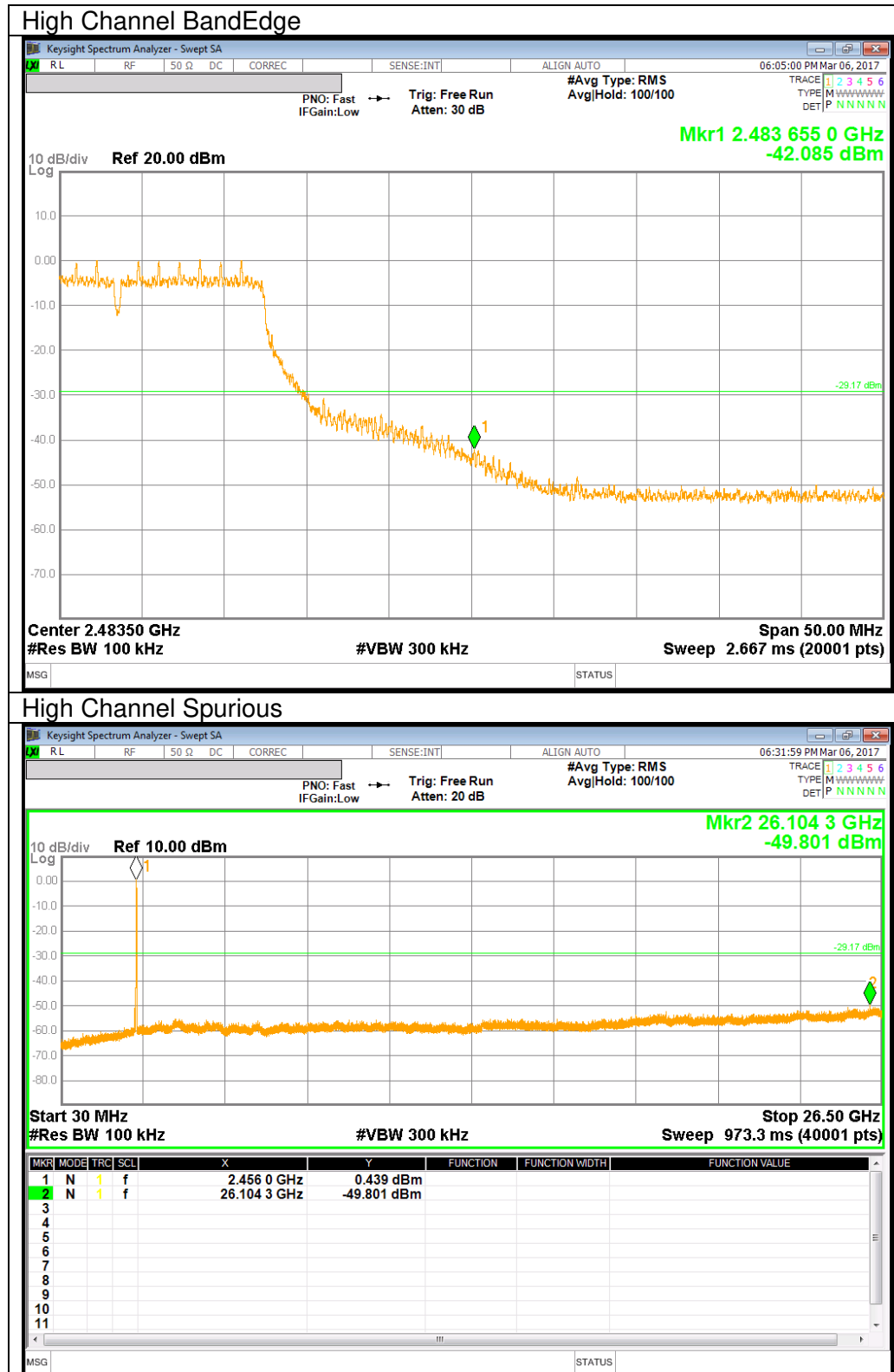


Middle Channel BandEdge



Middle Channel Spurious





10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

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

For 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. (Restricted bandedge, Final detection of spurious harmonic emissions)
Duty cycle factor= $10\log(1/x)$ For this sample B mode = 0dB (duty cycle >98%); G mode = 0.29dB; N mode = 0.32dB.

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

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.

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.

Note : Emission was pre-scanned from 9KHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = $20 \log \text{limit (uV/m)}$

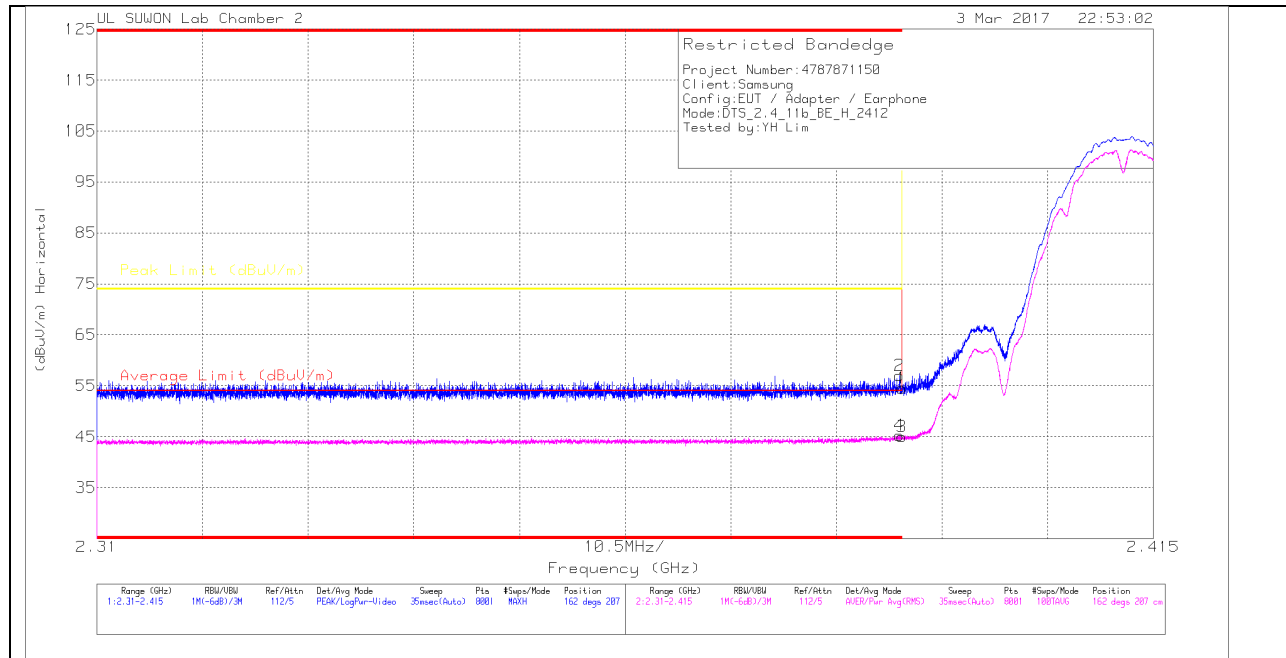
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 937606.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 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

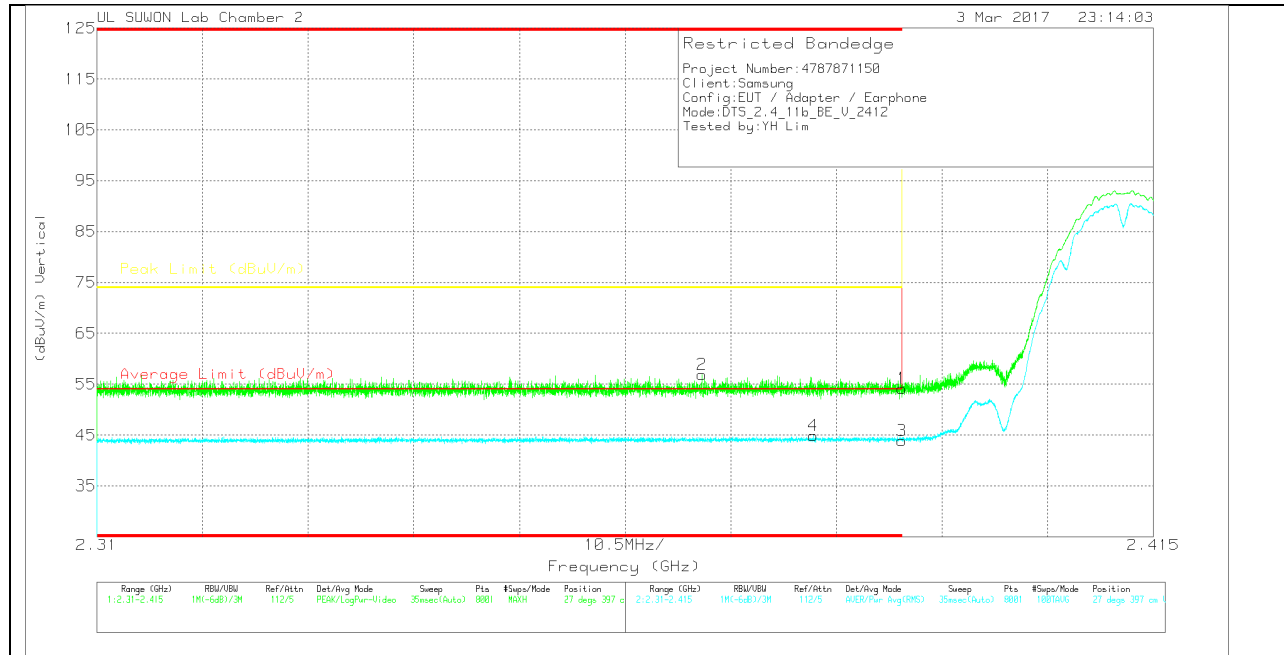
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	10dB[dB]	DC Corr [dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.99	PK	31.7	-18.2	0	54.49	-	-	74	-19.51	162	207	H
2	* 2.39	43.54	PK	31.7	-18.2	0	57.04	-	-	74	-16.96	162	207	H
3	* 2.39	31.53	RMS	31.7	-18.2	0	45.03	54	-8.97	-	-	162	207	H
4	* 2.39	31.75	RMS	31.7	-18.2	0	45.25	54	-8.75	-	-	162	207	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	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.69	Pk	31.7	-18.2	0	54.19	-	-	74	-19.81	27	397	V
2	* 2.37	43.51	Pk	31.7	-18.3	0	56.91	-	-	74	-17.09	27	397	V
3	* 2.39	30.36	RMS	31.7	-18.2	0	43.86	54	-10.14	-	-	27	397	V
4	* 2.381	31.46	RMS	31.7	-18.3	0	44.86	54	-9.14	-	-	27	397	V

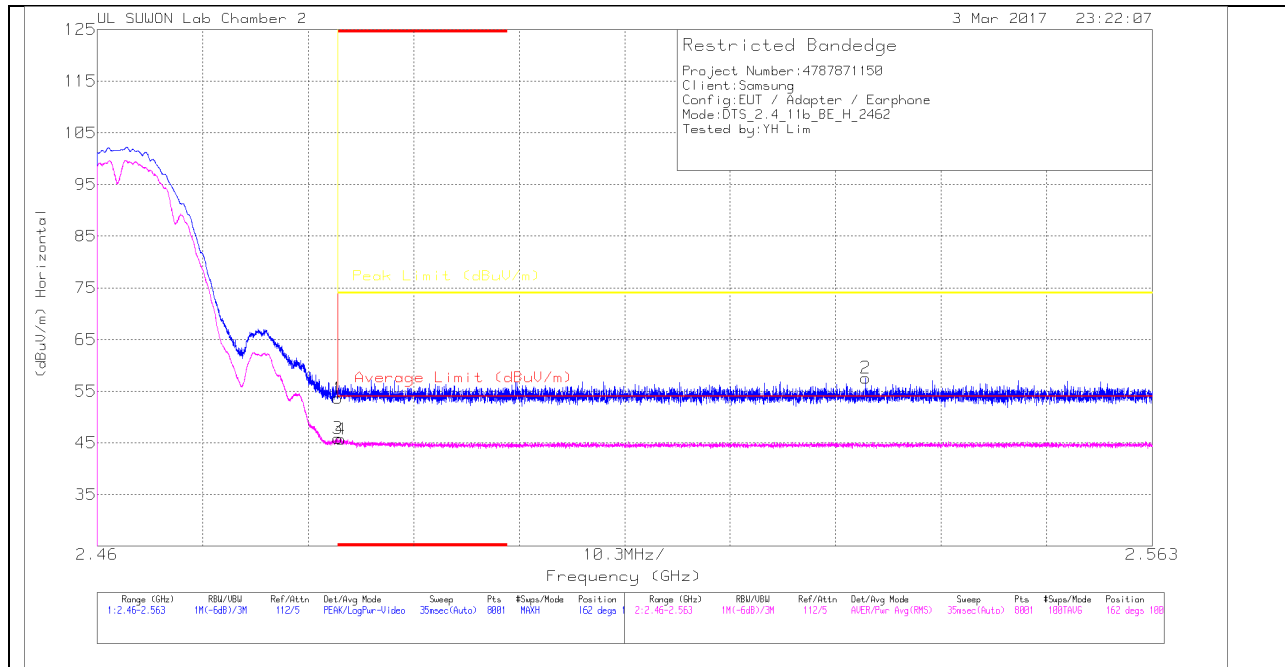
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

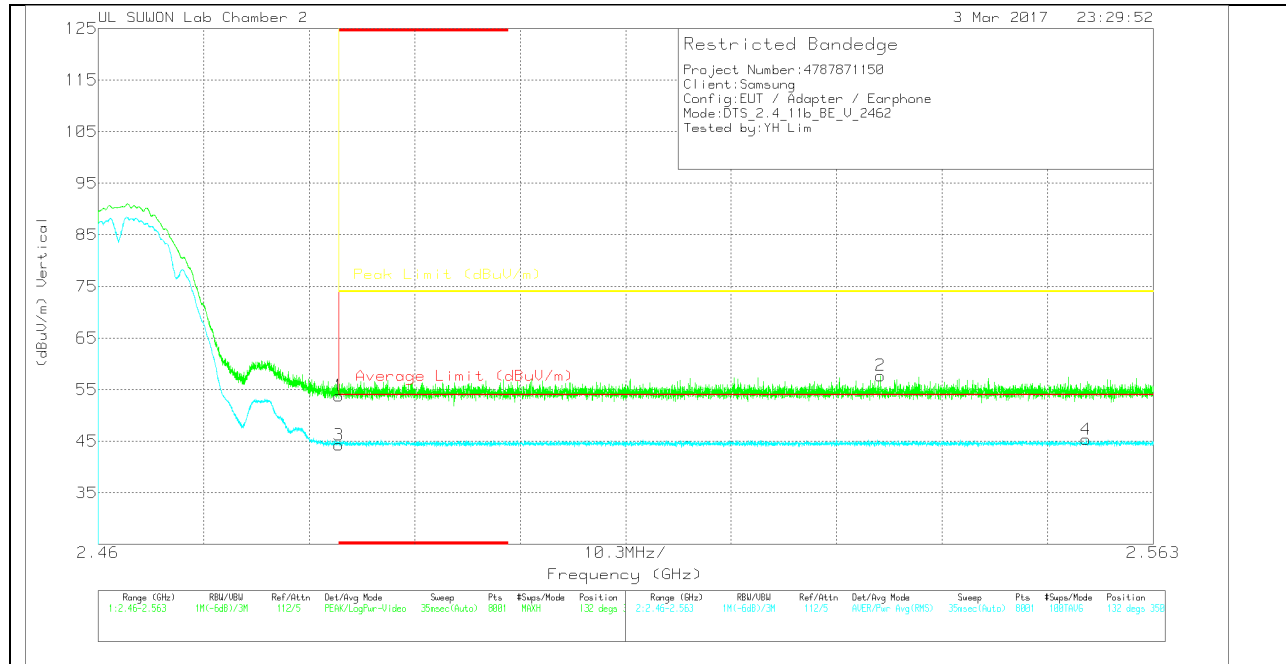
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.84	Pk	31.8	-18	0	53.64	-	-	74	-20.36	162	100	H
2	2.535	43.66	Pk	31.9	-18	0	57.56	-	-	74	-16.44	162	100	H
3	* 2.484	32.09	RMS	31.8	-18	0	45.89	54	-8.11	-	-	162	100	H
4	* 2.484	31.94	RMS	31.8	-18	0	45.74	54	-8.26	-	-	162	100	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	10dB(dB)	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	40.03	Pk	31.8	-18	0	53.83	-	-	74	-20.17	132	350	V
2	2.536	43.82	Pk	31.9	-18	0	57.72	-	-	74	-16.28	132	350	V
3	* 2.484	30.48	RMS	31.8	-18	0	44.28	54	-9.72	-	-	132	350	V
4	2.556	31.44	RMS	31.9	-18	0	45.34	54	-8.66	-	-	132	350	V

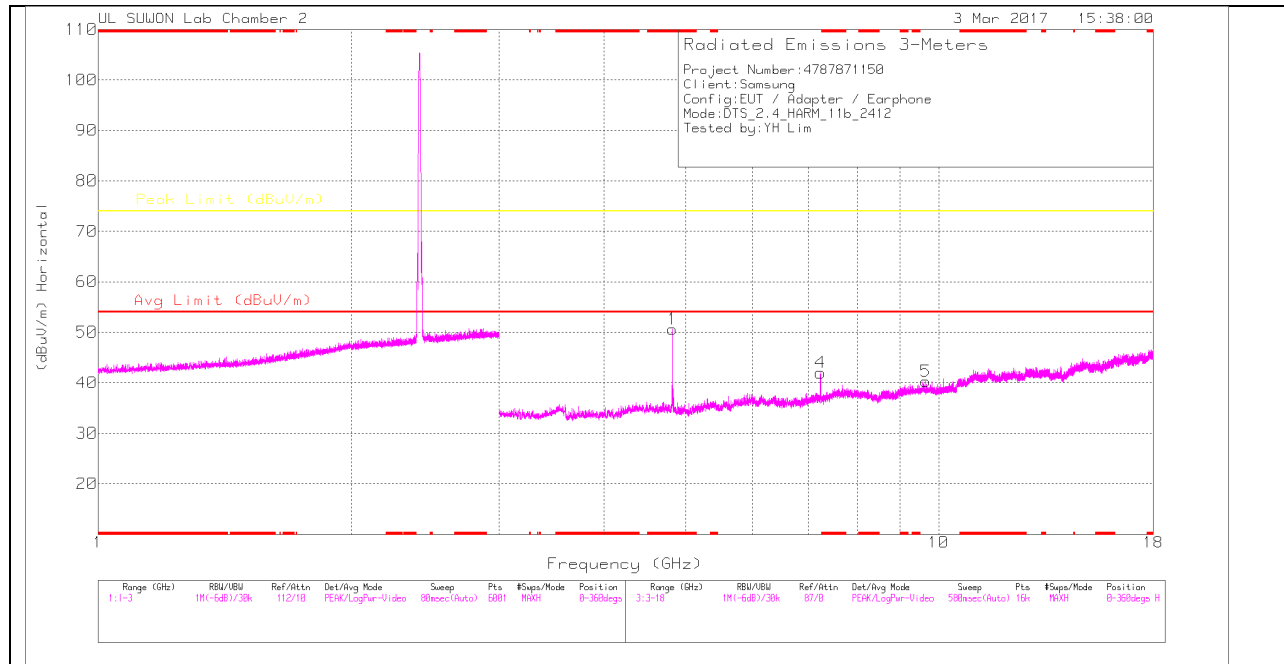
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

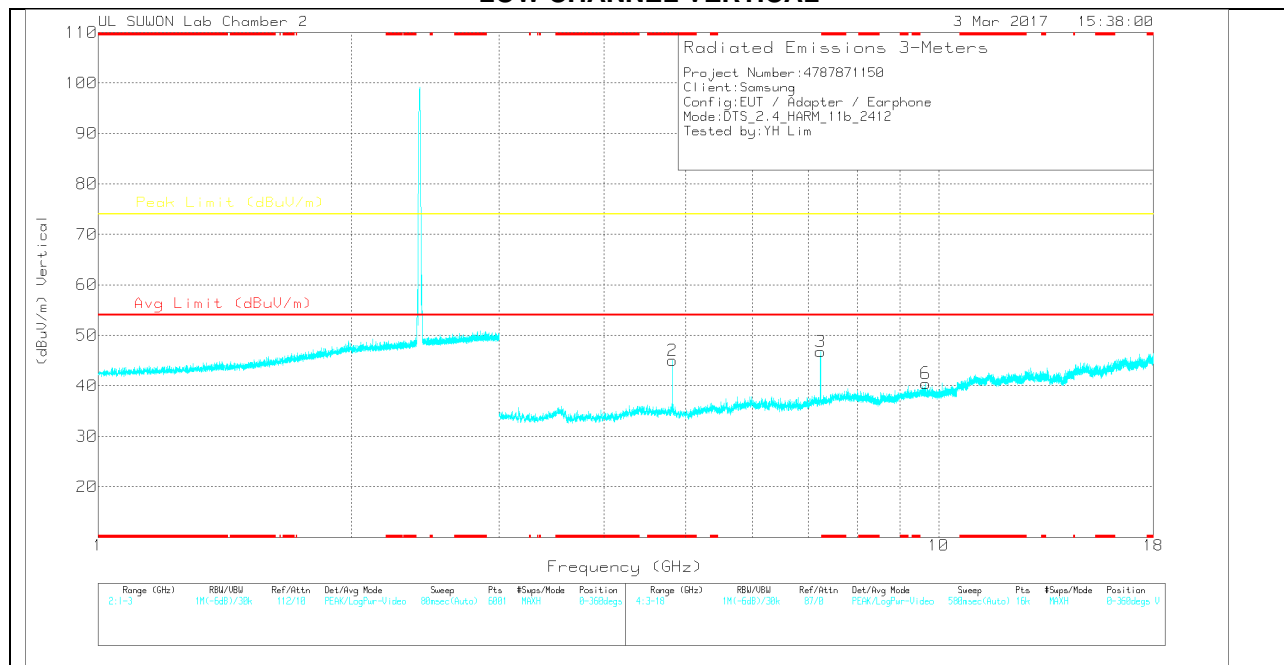
RMS - RMS detection

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 24)_150619	3GHz_HP[dB]	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	41.04	PK	33.9	-24.3	0	50.64	-	-	74	-23.36	0-360	150	H
4	7.234	28.09	PK	35.8	-21.9	0	41.99	-	-	74	-32.01	0-360	250	H
5	9.649	21.69	PK	36.9	-18.3	0	40.29	-	-	74	-33.71	0-360	150	H
2	* 4.823	35.41	PK	33.9	-24.3	0	45.01	-	-	74	-28.99	0-360	250	V
3	7.235	32.86	PK	35.8	-21.9	0	46.76	-	-	74	-27.24	0-360	250	V
6	9.648	21.84	PK	36.9	-18.3	0	40.44	-	-	74	-33.56	0-360	150	V

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

PK – Peak detector

Radiated Emissions

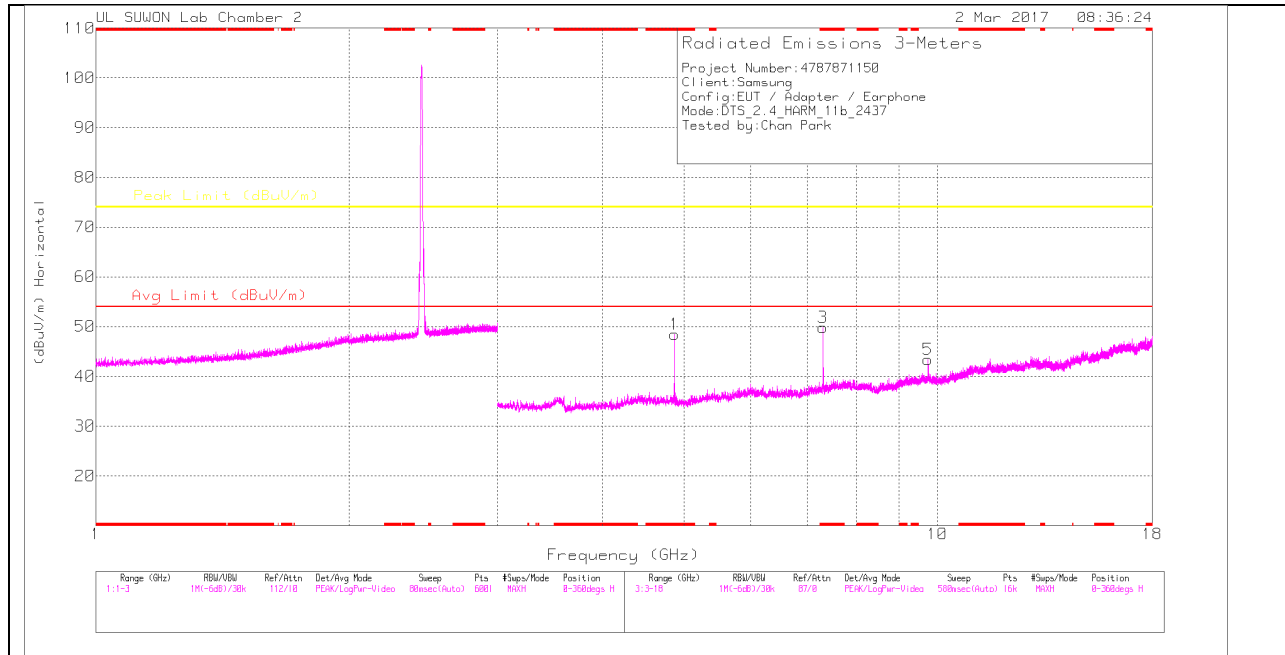
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.824	44.66	PK2	33.9	-24.3	0	54.26	-	-	74	-19.74	164	151	H
* 4.824	41.41	MAV1	33.9	-24.3	0	51.01	54	-2.99	-	-	164	151	H
7.237	42.32	PK2	35.8	-22	0	56.12	-	-	74	-17.88	186	242	V
7.238	39.38	PK2	35.8	-22	0	53.18	-	-	74	-20.82	123	312	H
* 4.824	40.13	PK2	33.9	-24.3	0	49.73	-	-	74	-24.27	153	292	V
* 4.824	34.2	MAV1	33.9	-24.3	0	43.8	54	-10.2	-	-	153	292	V

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

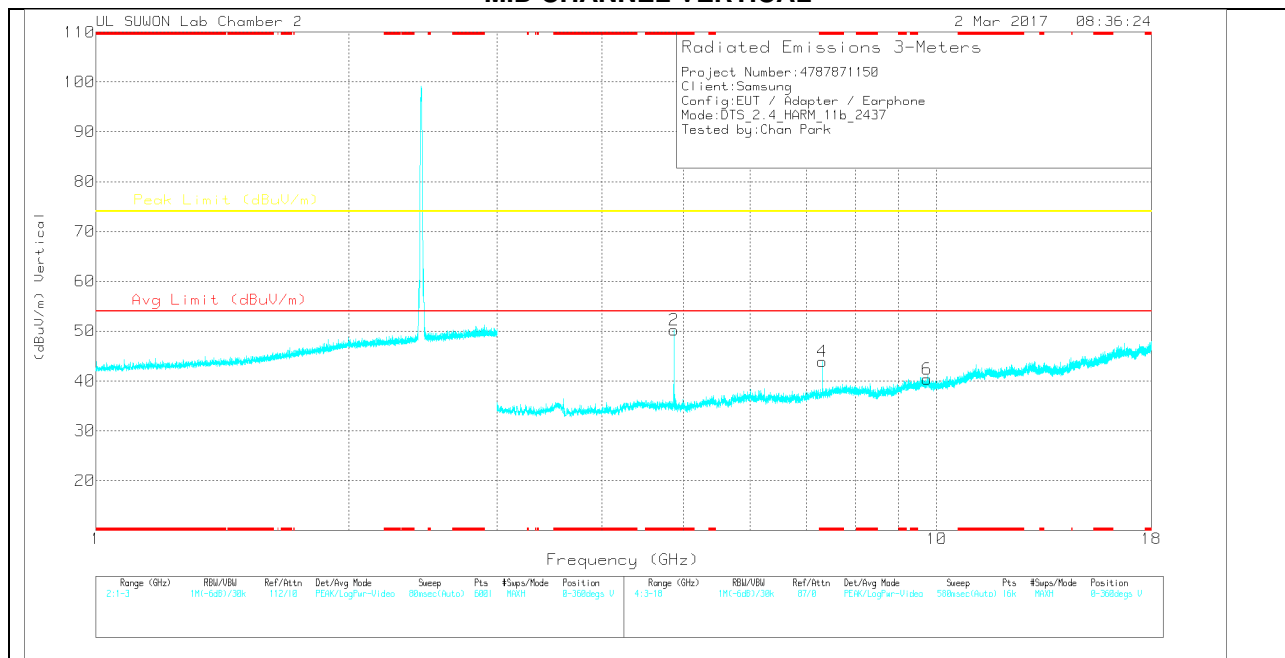
PK2 - KDB558074 Method: Maximum Peak

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 24)_150619	3GHz_HP[dB]	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	39.1	PK	33.9	-24.5	0	48.5	-	-	74	-25.5	0-360	150	H
3	* 7.311	35.99	PK	35.9	-22	0	49.89	-	-	74	-24.11	0-360	250	H
5	9.748	24.49	PK	37	-18.1	0	43.39	-	-	74	-30.61	0-360	150	H
2	* 4.874	40.84	PK	33.9	-24.5	0	50.24	-	-	74	-23.76	0-360	150	V
4	* 7.312	29.98	PK	35.9	-22	0	43.88	-	-	74	-30.12	0-360	250	V
6	9.748	21.52	PK	37	-18.1	0	40.42	-	-	74	-33.58	0-360	150	V

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

PK – Peak detector

Radiated Emissions

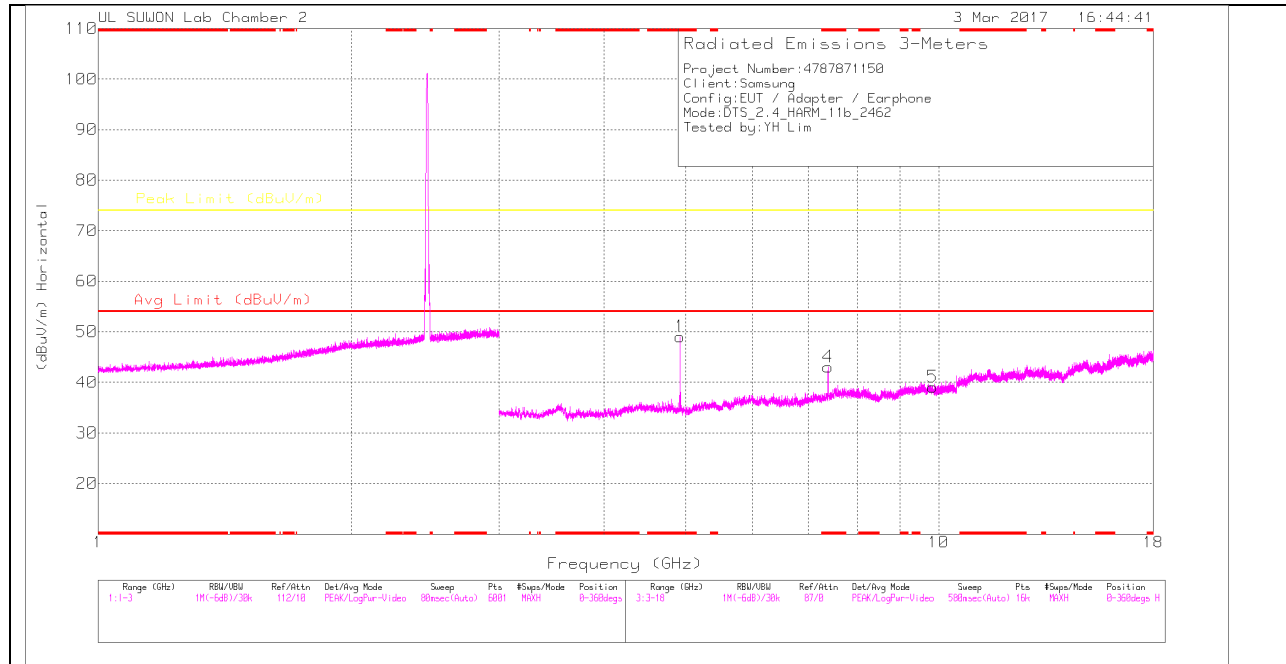
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.874	42.94	PK2	33.9	-24.5	0	52.34	-	-	74	-21.66	154	175	H
* 4.874	38.46	MAV1	33.9	-24.5	0	47.86	54	-6.14	-	-	154	175	H
* 7.312	39.57	PK2	35.9	-22	0	53.47	-	-	74	-20.53	73	166	H
* 7.312	30.72	MAV1	35.9	-22	0	44.62	54	-9.38	-	-	73	166	H
9.748	32.46	PK2	37	-18.1	0	51.36	-	-	74	-22.64	208	193	H
* 4.874	45.3	PK2	33.9	-24.5	0	54.7	-	-	74	-19.3	104	112	V
* 4.874	41.43	MAV1	33.9	-24.5	0	50.83	54	-3.17	-	-	104	112	V
* 7.308	36.75	PK2	35.9	-22	0	50.65	-	-	74	-23.35	214	172	V
* 7.312	25.98	MAV1	35.9	-22	0	39.88	54	-14.12	-	-	214	172	V

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

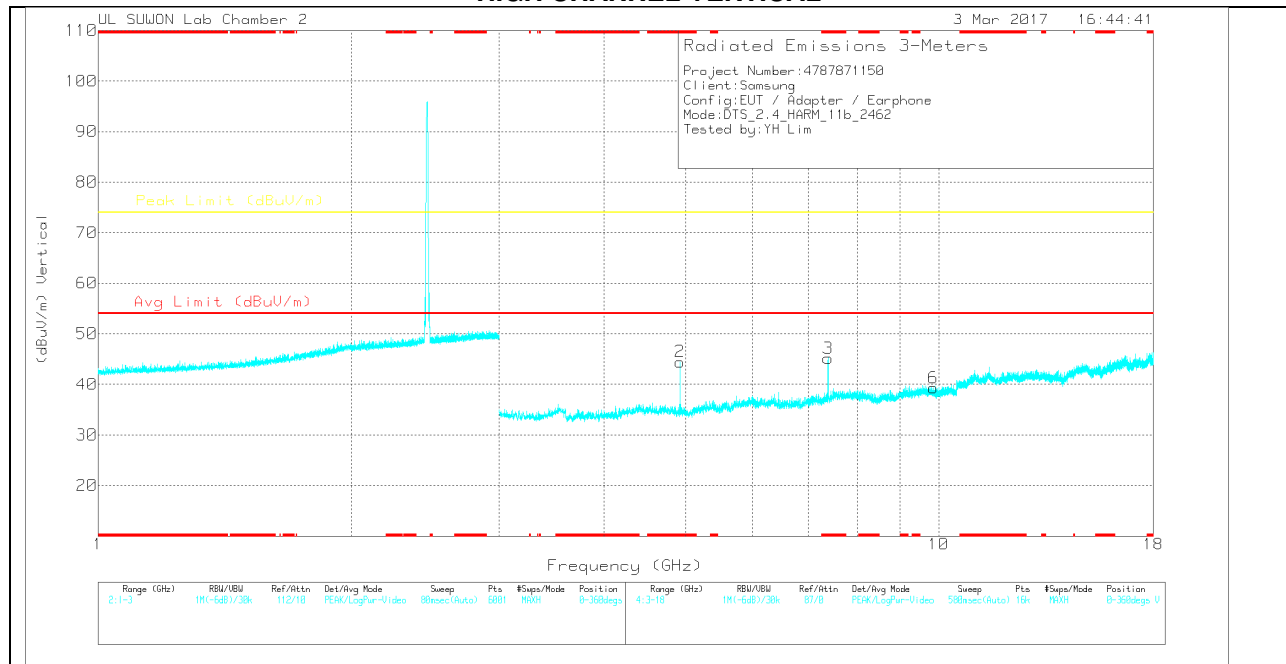
PK2 - KDB558074 Method: Maximum Peak

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 24)_150619	3GHz_HP[dB]	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	39.87	PK	33.9	-24.7	0	49.07	-	-	74	-24.93	0-360	150	H
4	* 7.386	28.55	PK	35.9	-21.4	0	43.05	-	-	74	-30.95	0-360	250	H
5	9.836	19.89	PK	37.1	-17.9	0	39.09	-	-	74	-34.91	0-360	250	H
2	* 4.924	35.26	PK	33.9	-24.7	0	44.46	-	-	74	-29.54	0-360	250	V
3	* 7.386	30.62	PK	35.9	-21.4	0	45.12	-	-	74	-28.88	0-360	250	V
6	9.848	20.07	PK	37.1	-17.9	0	39.27	-	-	74	-34.73	0-360	250	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	3GHz_HP[dB]	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	44.13	PK2	33.9	-24.7	0	53.33	-	-	74	-20.67	150	133	H
* 4.924	40.6	MAv1	33.9	-24.7	0	49.8	54	-4.2	-	-	150	133	H
* 4.924	39.56	PK2	33.9	-24.7	0	48.76	-	-	74	-25.24	150	252	V
* 4.924	32.93	MAv1	33.9	-24.7	0	42.13	54	-11.87	-	-	150	252	V
* 7.388	39.56	PK2	35.9	-21.4	0	54.06	-	-	74	-19.94	189	233	V
* 7.385	31.52	MAv1	35.9	-21.4	0	46.02	54	-7.98	-	-	189	233	V
* 7.387	37.96	PK2	35.9	-21.4	0	52.46	-	-	74	-21.54	132	347	H
* 7.387	28.75	MAv1	35.9	-21.4	0	43.25	54	-10.75	-	-	132	347	H

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

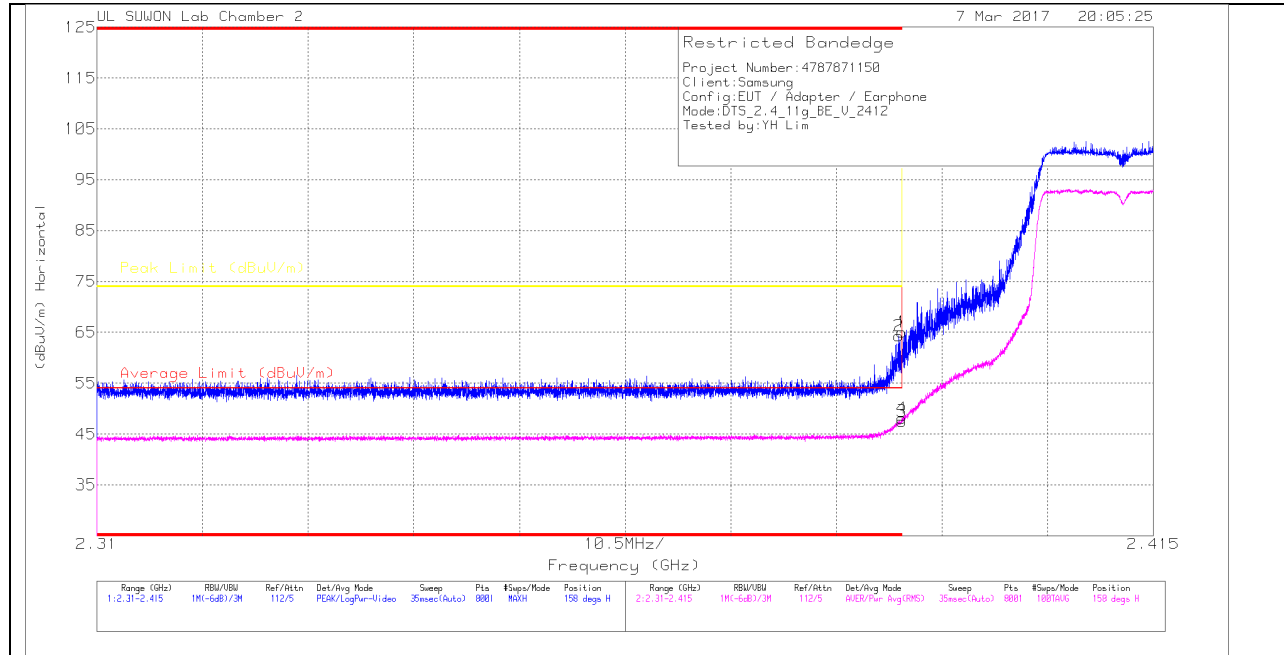
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

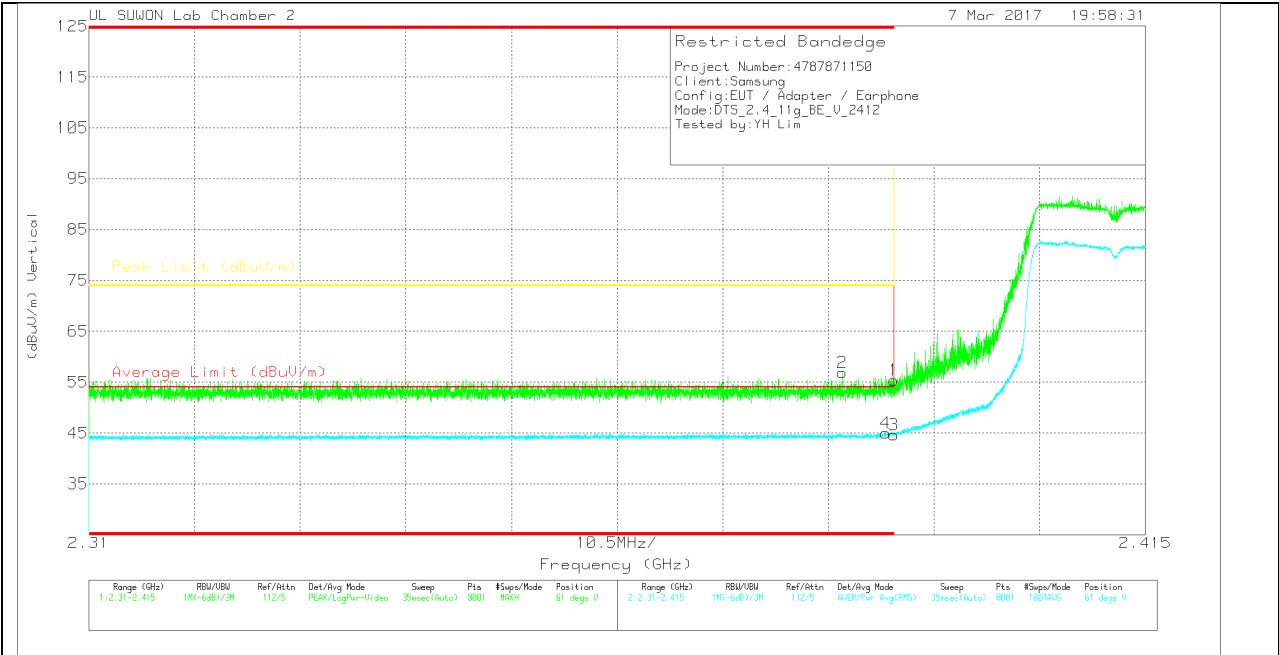
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	10dB[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	51.52	Pk	31.7	-18.2	0	65.02	-	-	74	-8.98	158	118	H
2	* 2.39	50.86	Pk	31.7	-18.2	0	64.36	-	-	74	-9.64	158	118	H
3	* 2.39	33.75	RMS	31.7	-18.2	.29	47.54	54	-6.46	-	-	158	118	H
4	* 2.39	34.34	RMS	31.7	-18.2	.29	48.13	54	-5.87	-	-	158	118	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	10dB(dB)	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	41.88	Pk	31.7	-18.2	0	55.38	-	-	74	-18.62	61	324	V
2	* 2.385	43.42	Pk	31.7	-18.2	0	56.92	-	-	74	-17.08	61	324	V
3	* 2.39	31.16	RMS	31.7	-18.2	.29	44.95	54	-9.05	-	-	61	324	V
4	* 2.389	31.53	RMS	31.7	-18.2	.29	45.32	54	-8.68	-	-	61	324	V

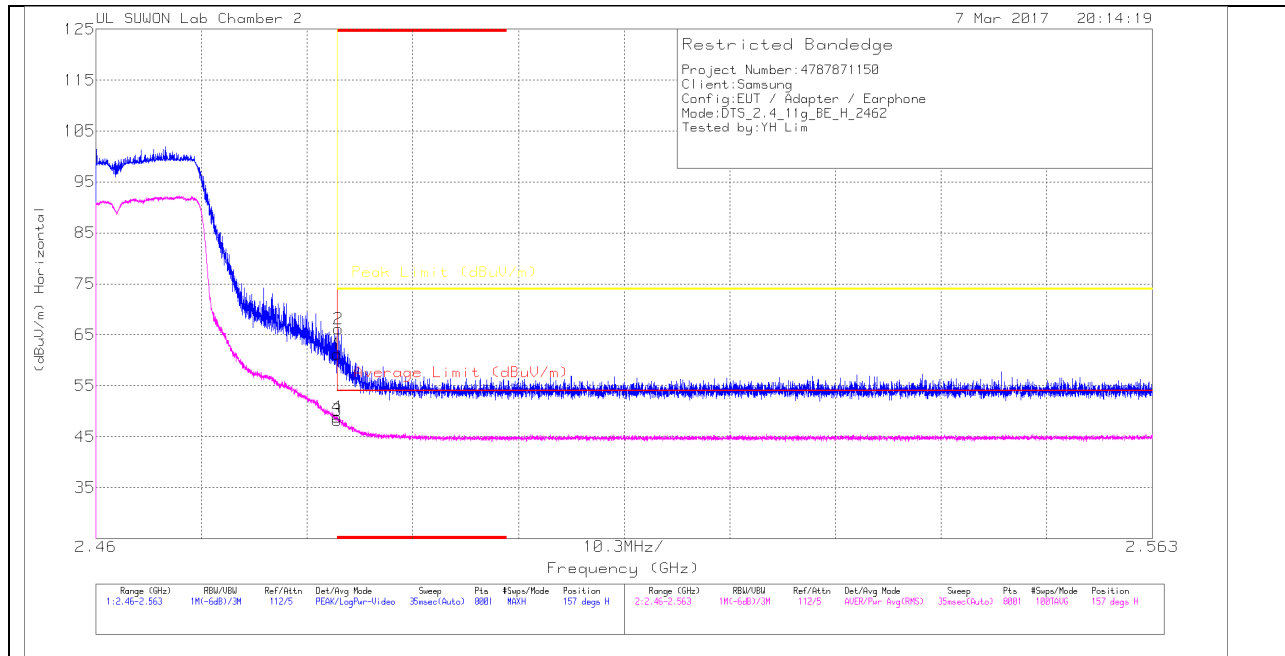
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

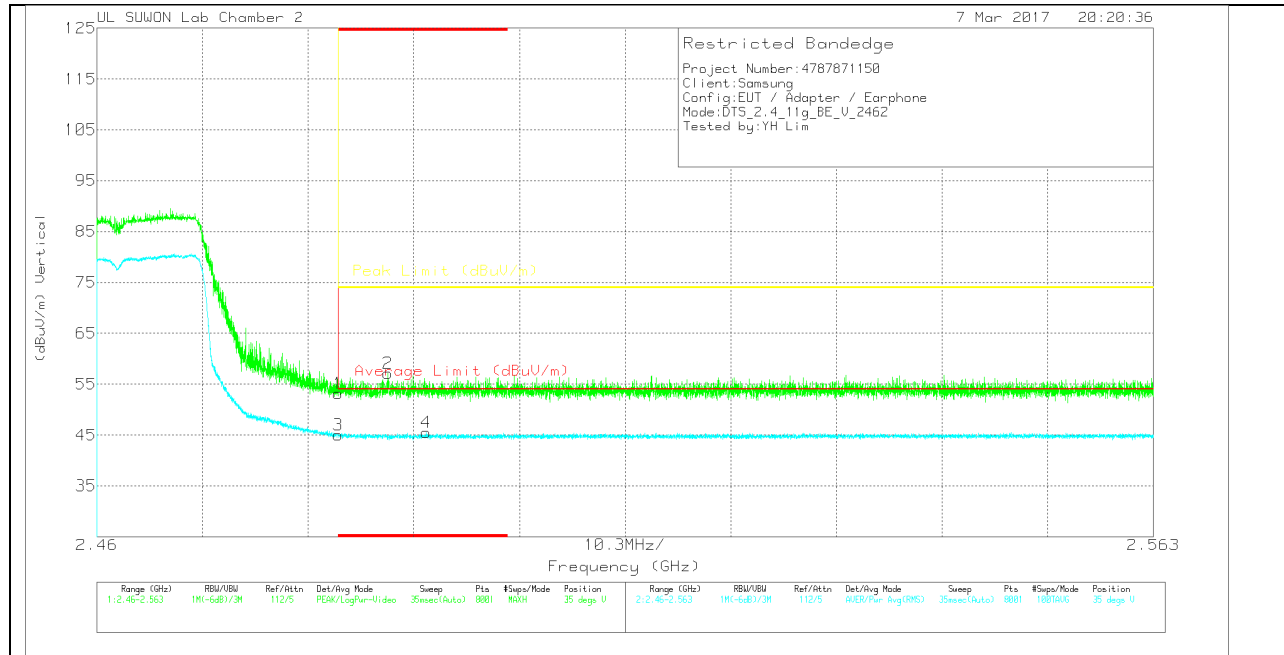
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117/001687 24_150619	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	47.39	Pk	31.8	-18	0	61.19	-	-	74	-12.81	157	137	H
2	* 2.484	52.34	Pk	31.8	-18	0	66.14	-	-	74	-7.86	157	137	H
3	* 2.484	34.16	RMS	31.8	-18	.29	48.25	54	-5.75	-	-	157	137	H
4	* 2.484	34.75	RMS	31.8	-18	.29	48.84	54	-5.16	-	-	157	137	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	10dB(dB)	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	39.41	Pk	31.8	-18	0	53.21	-	-	74	-20.79	35	400	V
2	* 2.488	43.3	Pk	31.8	-18	0	57.1	-	-	74	-16.9	35	400	V
3	* 2.484	30.87	RMS	31.8	-18	.29	44.96	54	-9.04	-	-	35	400	V
4	* 2.492	31.39	RMS	31.8	-18	.29	45.48	54	-8.52	-	-	35	400	V

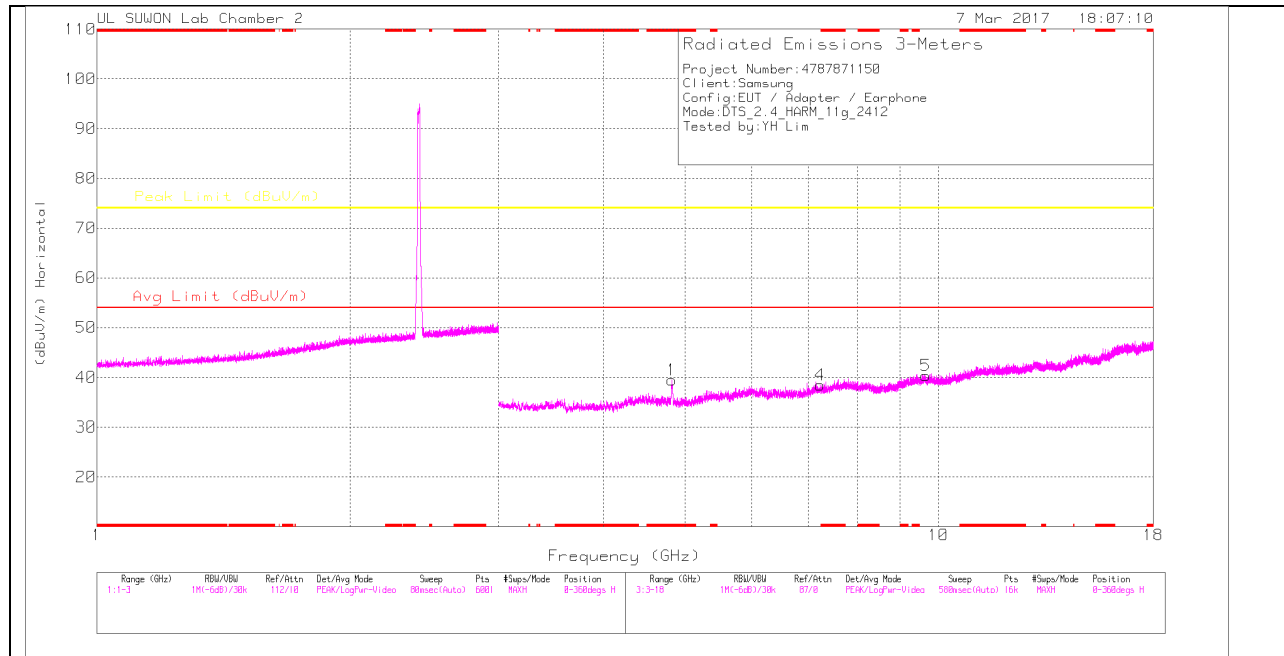
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

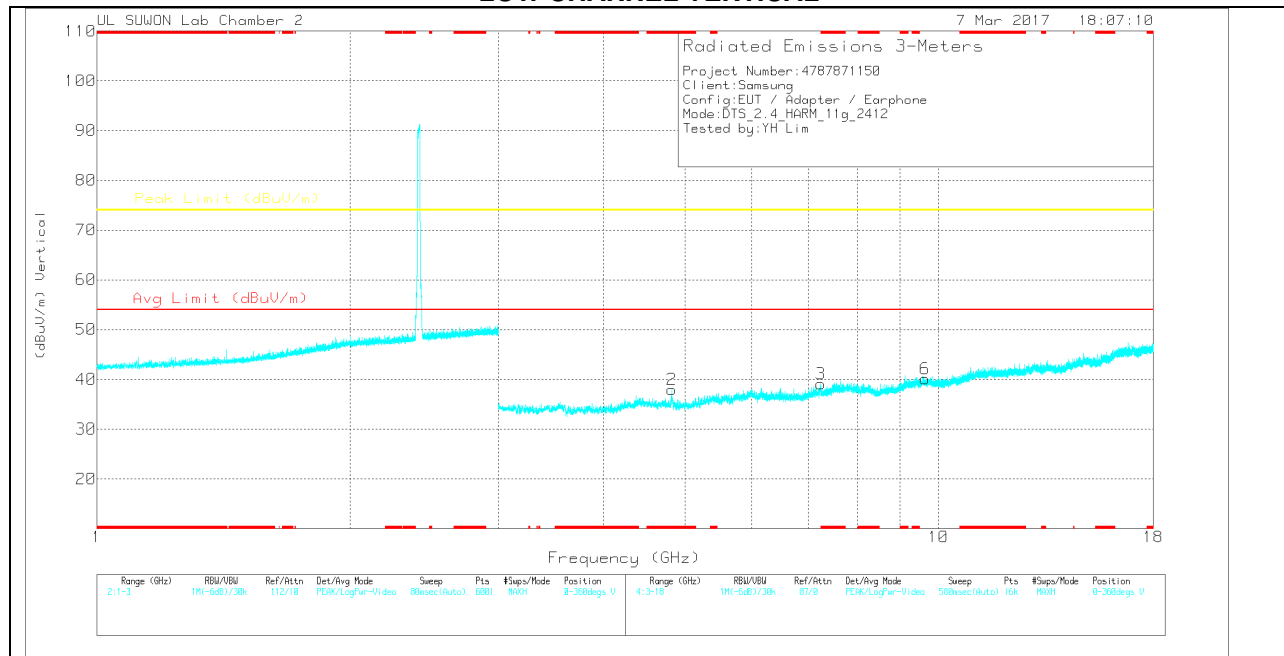
RMS - RMS detection

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 24_150619]	3GHz_HP[dB]	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	29.84	PK	33.9	-24.3	0	39.44	-	-	74	-34.56	0-360	150	H
4	7.232	24.57	PK	35.8	-21.9	0	38.47	-	-	74	-35.53	0-360	250	H
5	9.652	21.75	PK	36.9	-18.3	0	40.35	-	-	74	-33.65	0-360	150	H
2	* 4.82	28.39	PK	33.9	-24.3	0	37.99	-	-	74	-36.01	0-360	250	V
3	7.242	25.33	PK	35.8	-22	0	39.13	-	-	74	-34.87	0-360	250	V
6	9.639	21.52	PK	36.9	-18.3	0	40.12	-	-	74	-33.88	0-360	150	V

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

PK – Peak detector

Radiated Emissions

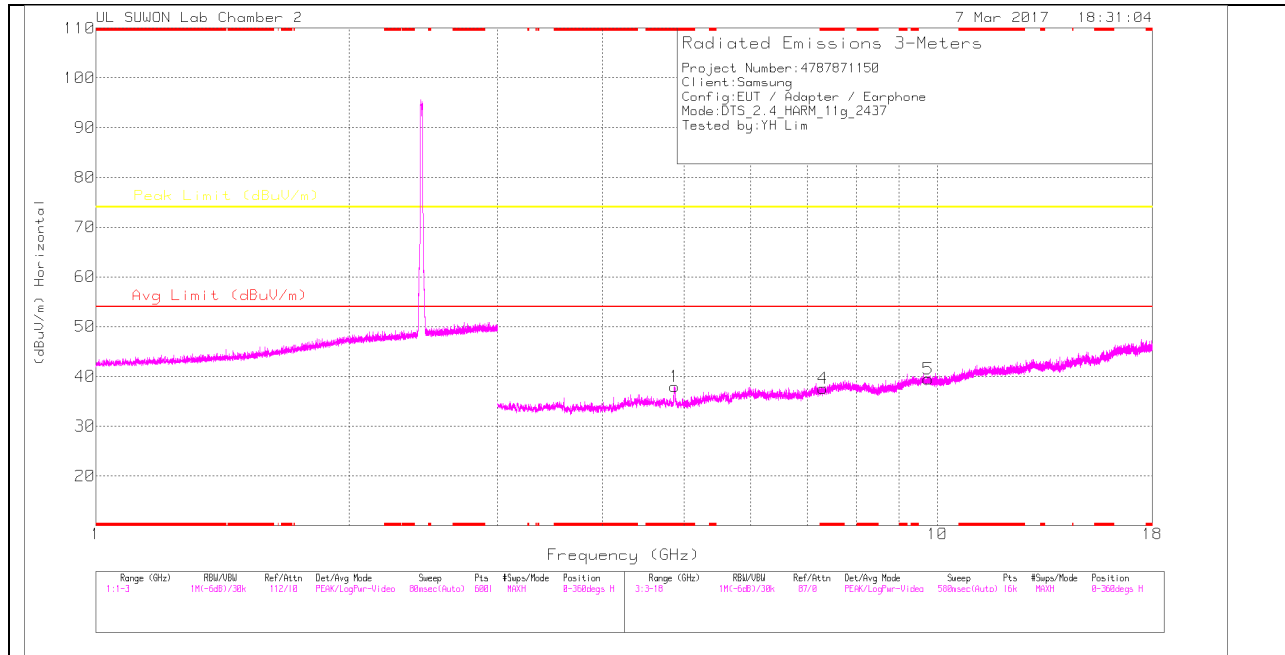
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[0016 8724_150 619]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.826	40.98	PK2	33.9	-24.3	0	50.58	-	-	74	-23.42	158	122	H
* 4.823	29.08	MAv1	33.9	-24.3	.29	38.97	54	-15.03	-	-	158	122	H
* 4.822	37.89	PK2	33.9	-24.3	0	47.49	-	-	74	-26.51	100	322	V
* 4.823	24.98	MAv1	33.9	-24.3	.29	34.87	54	-19.13	-	-	100	322	V

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

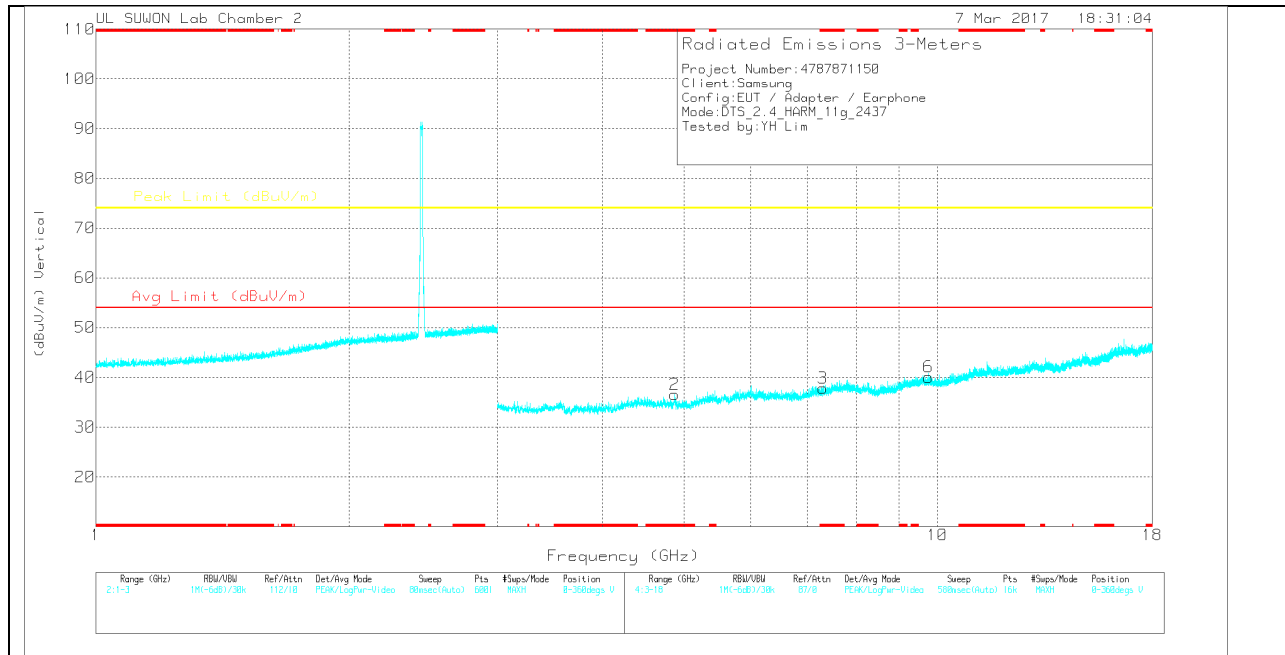
PK2 - KDB558074 Method: Maximum Peak

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 24)_150619	3GHz_HP[dB]	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	28.61	PK	33.9	-24.5	0	38.01	-	-	74	-35.99	0-360	150	H
4	* 7.304	23.69	PK	35.9	-22	0	37.59	-	-	74	-36.41	0-360	250	H
5	9.749	20.53	PK	37	-18.1	0	39.43	-	-	74	-34.57	0-360	250	H
2	* 4.87	27.17	PK	33.9	-24.5	0	36.57	-	-	74	-37.43	0-360	250	V
3	* 7.306	23.91	PK	35.9	-22	0	37.81	-	-	74	-36.19	0-360	150	V
6	9.752	21.15	PK	37	-18.1	0	40.05	-	-	74	-33.95	0-360	250	V

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

PK – Peak detector

Radiated Emissions

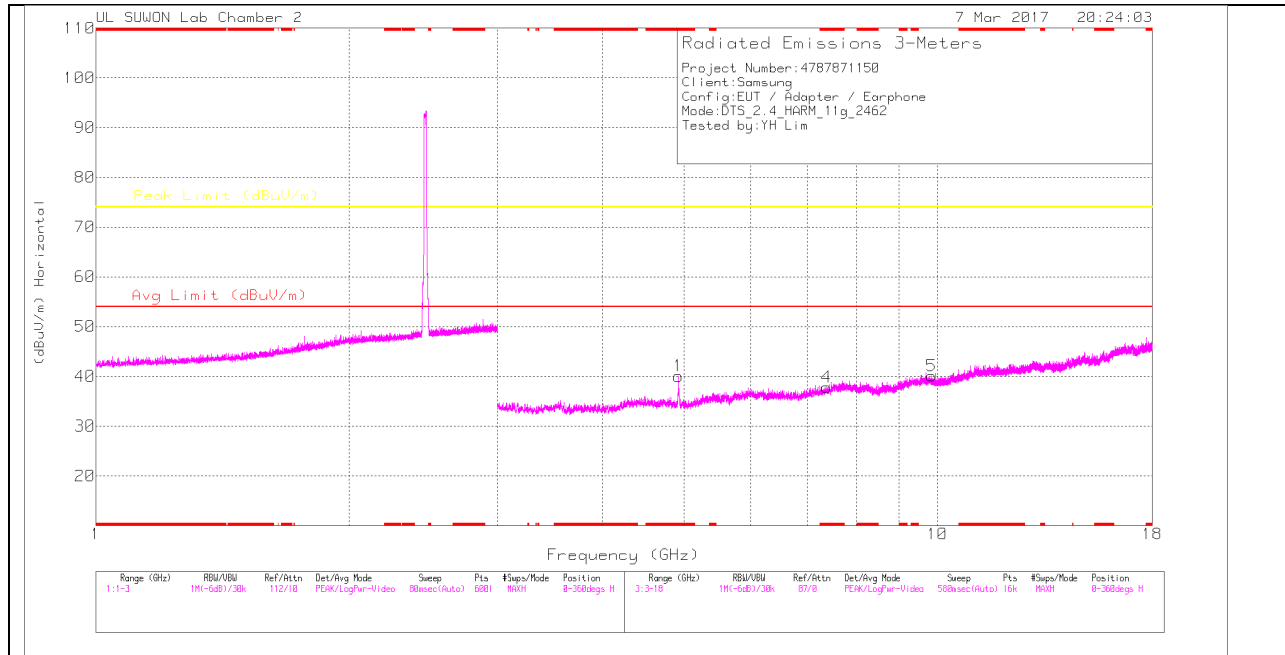
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.874	41.09	PK2	33.9	-24.5	0	50.49	-	-	74	-23.51	158	126	H
* 4.873	28.15	MAv1	33.9	-24.5	.29	37.84	54	-16.16	-	-	158	126	H
* 4.87	38.36	PK2	33.9	-24.5	0	47.76	-	-	74	-26.24	194	234	V
* 4.873	25.61	MAv1	33.9	-24.5	.29	35.3	54	-18.7	-	-	194	234	V

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

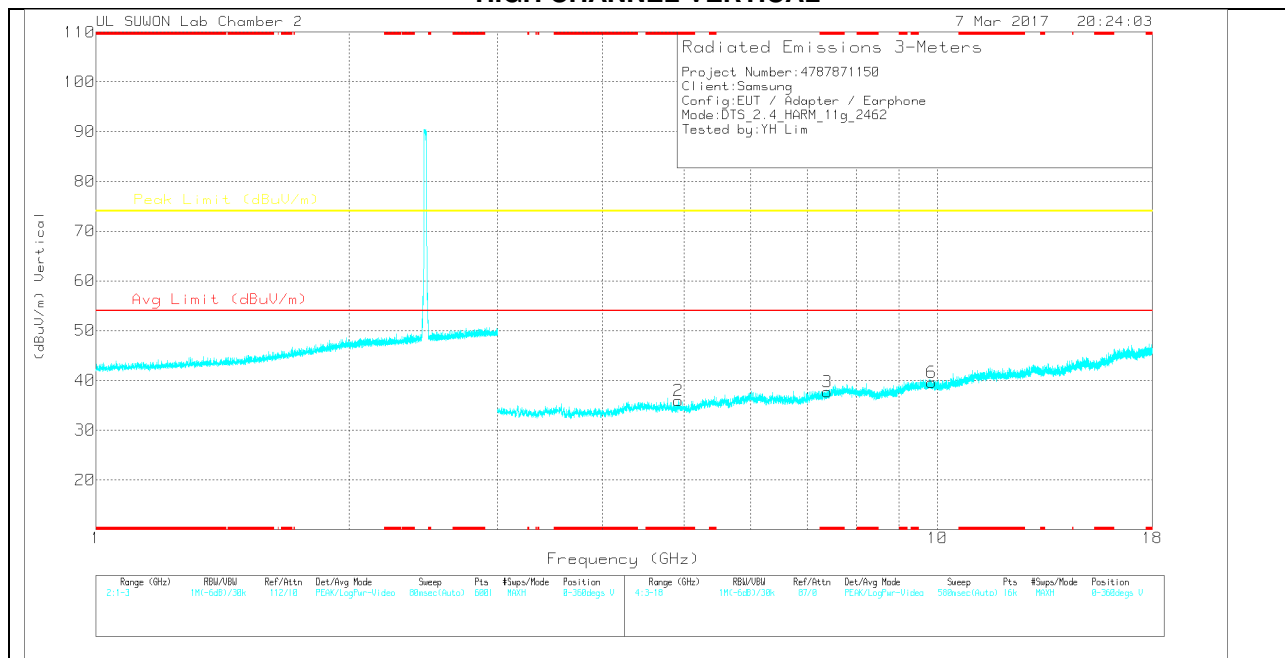
PK2 - KDB558074 Method: Maximum Peak

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 24_150619)	3GHz_HP[dB]	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	30.85	PK	33.9	-24.7	0	40.05	-	-	74	-33.95	0-360	250	H
4	* 7.39	23.22	PK	35.9	-21.3	0	37.82	-	-	74	-36.18	0-360	250	H
5	9.841	20.93	PK	37.1	-17.9	0	40.13	-	-	74	-33.87	0-360	150	H
2	* 4.919	26.7	PK	33.9	-24.7	0	35.9	-	-	74	-38.1	0-360	250	V
3	* 7.393	23.13	PK	35.9	-21.3	0	37.73	-	-	74	-36.27	0-360	150	V
6	9.84	20.46	PK	37.1	-17.9	0	39.66	-	-	74	-34.34	0-360	250	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	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.922	42.68	PK2	33.9	-24.7	0	51.88	-	-	74	-22.12	157	125	H
* 4.924	28.72	MAv1	33.9	-24.7	.29	38.21	54	-15.79	-	-	157	125	H
* 4.926	38.07	PK2	33.9	-24.7	0	47.27	-	-	74	-26.73	156	338	V
* 4.924	25.74	MAv1	33.9	-24.7	.29	35.23	54	-18.77	-	-	156	338	V

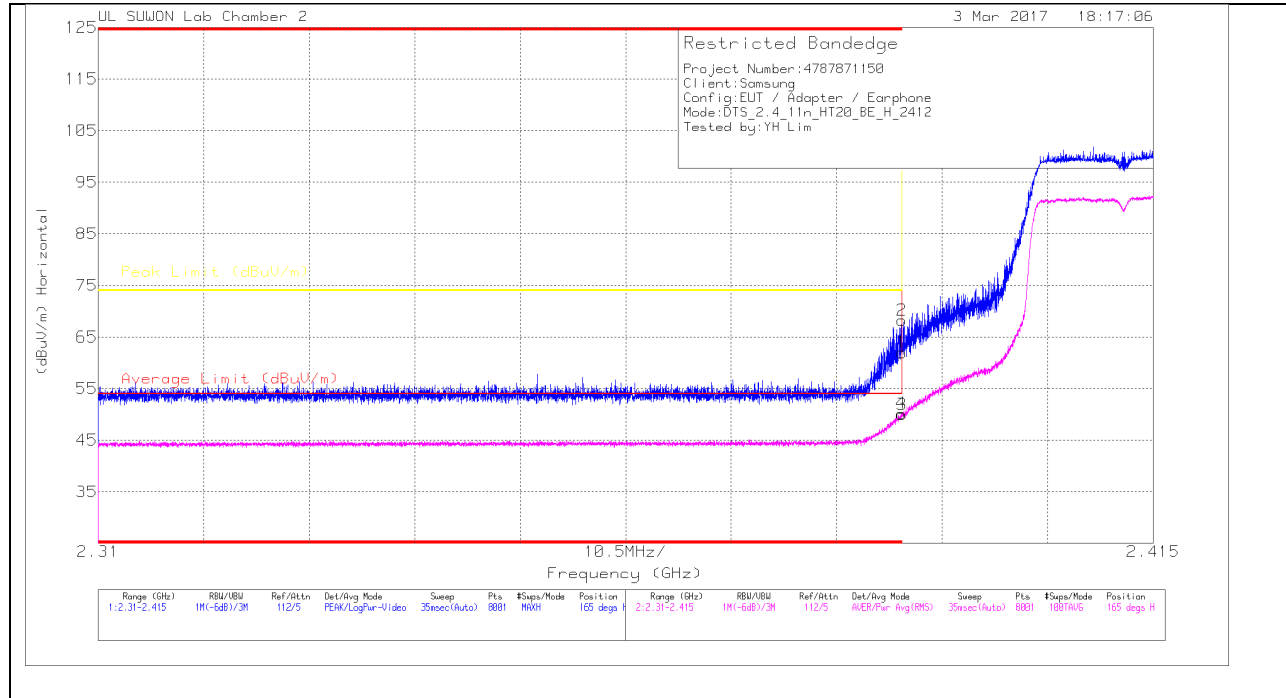
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

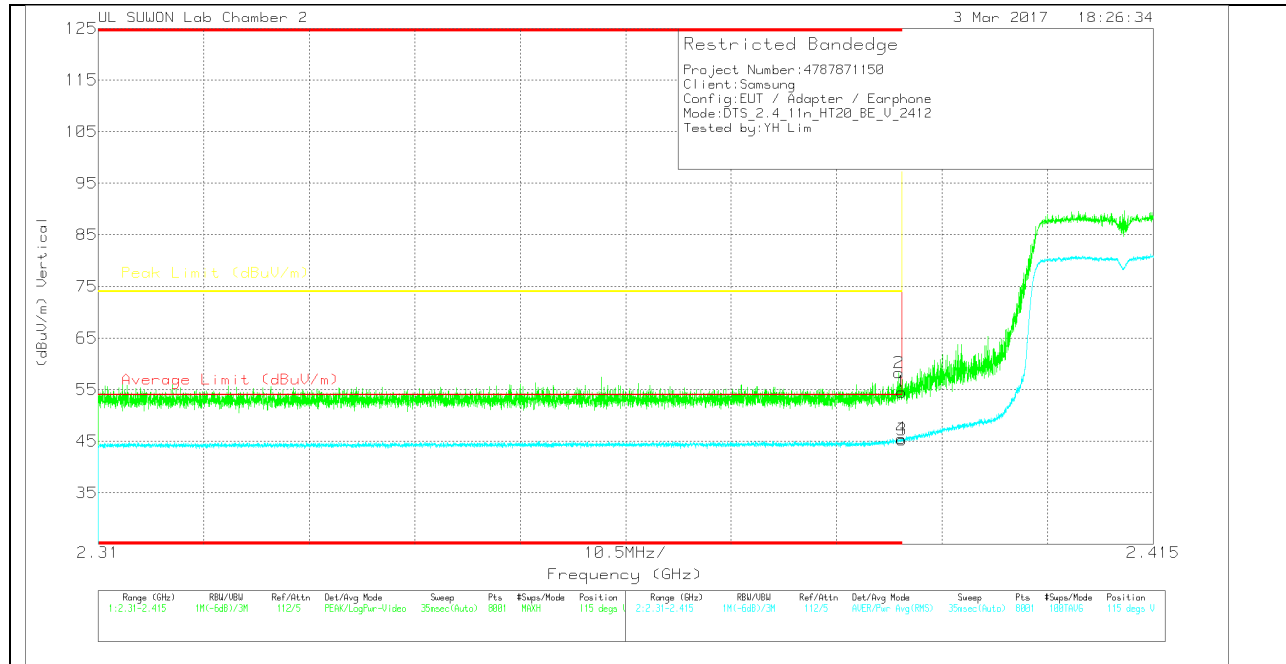
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	48.5	Pk	31.7	-18.2	0	62	-	-	74	-12	165	205	H
2	* 2.39	54.76	Pk	31.7	-18.2	0	68.26	-	-	74	-5.74	165	205	H
3	* 2.39	36.18	RMS	31.7	-18.2	.32	50	54	-4	-	-	165	205	H
4	* 2.39	36.35	RMS	31.7	-18.2	.32	50.17	54	-3.83	-	-	165	205	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	10dB[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.39	41.06	Pk	31.7	-18.2	0	54.56	-	-	74	-19.44	115	154	V
2	* 2.39	44.75	Pk	31.7	-18.2	0	58.25	-	-	74	-15.75	115	154	V
3	* 2.39	31.47	RMS	31.7	-18.2	.32	45.29	54	-8.71	-	-	115	154	V
4	* 2.39	31.71	RMS	31.7	-18.2	.32	45.53	54	-8.47	-	-	115	154	V

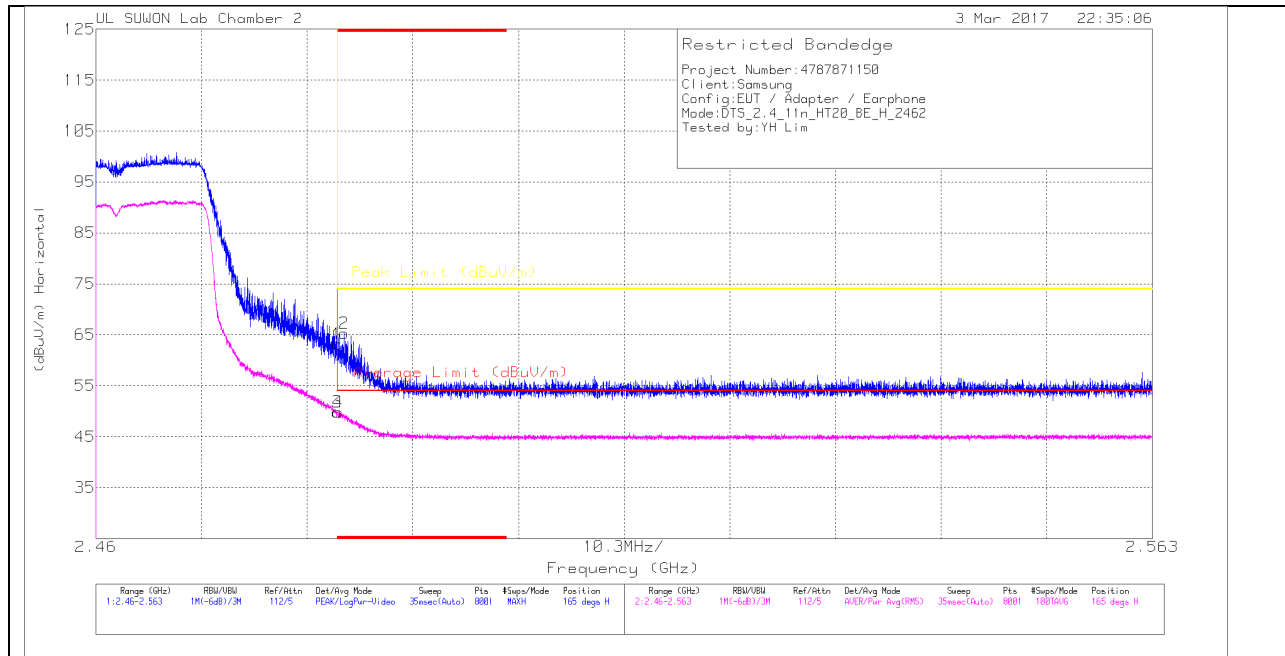
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

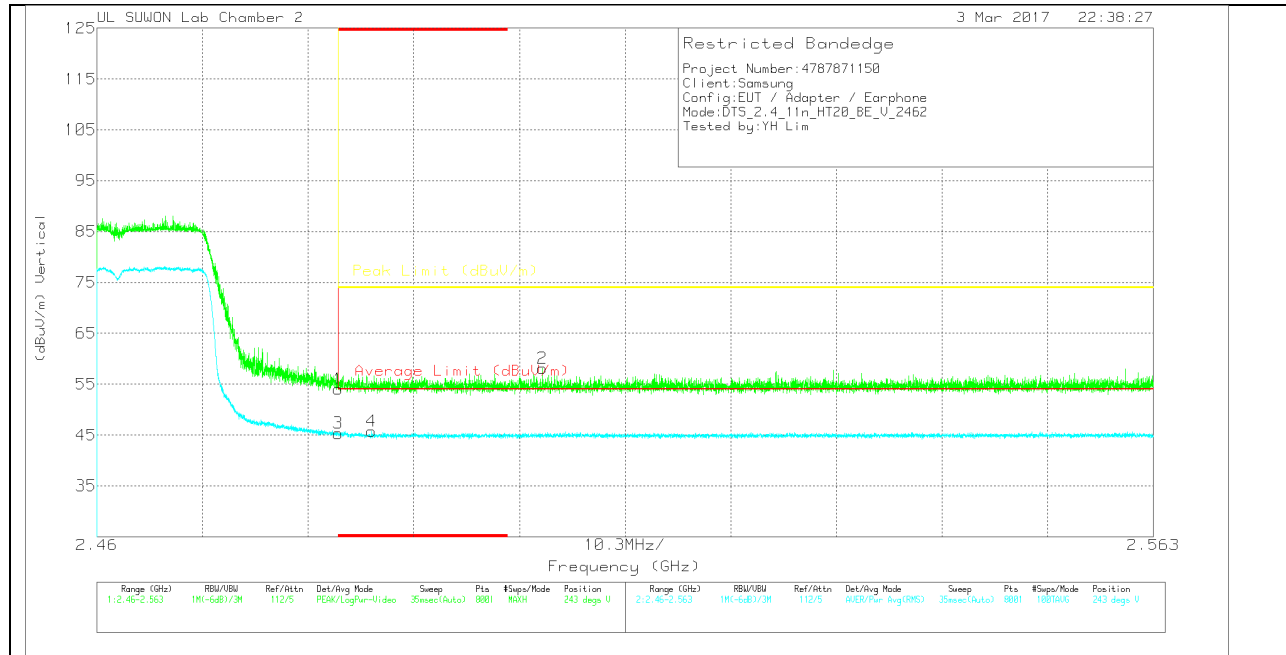
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(001687 24)_150619	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	49.37	Pk	31.8	-18	0	63.17	-	-	74	-10.83	165	146	H
2	* 2.484	51.44	Pk	31.8	-18	0	65.24	-	-	74	-8.76	165	146	H
3	* 2.484	35.68	RMS	31.8	-18	.32	49.8	54	-4.2	-	-	165	146	H
4	* 2.484	35.69	RMS	31.8	-18	.32	49.81	54	-4.19	-	-	165	146	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	10dB(dB)	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	40.28	Pk	31.8	-18	0	54.08	-	-	74	-19.92	243	150	V
2	2.503	44.2	Pk	31.9	-18	0	58.1	-	-	74	-15.9	243	150	V
3	* 2.484	31.2	RMS	31.8	-18	.32	45.32	54	-8.68	-	-	243	150	V
4	* 2.487	31.64	RMS	31.8	-18	.32	45.76	54	-8.24	-	-	243	150	V

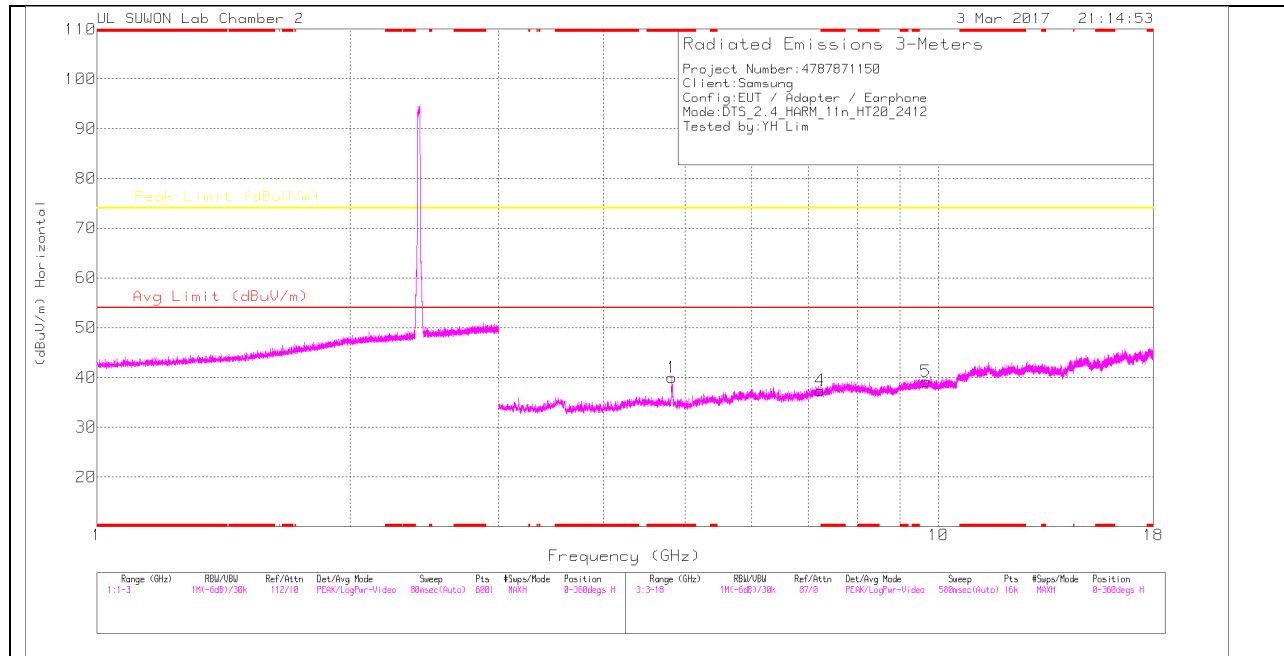
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

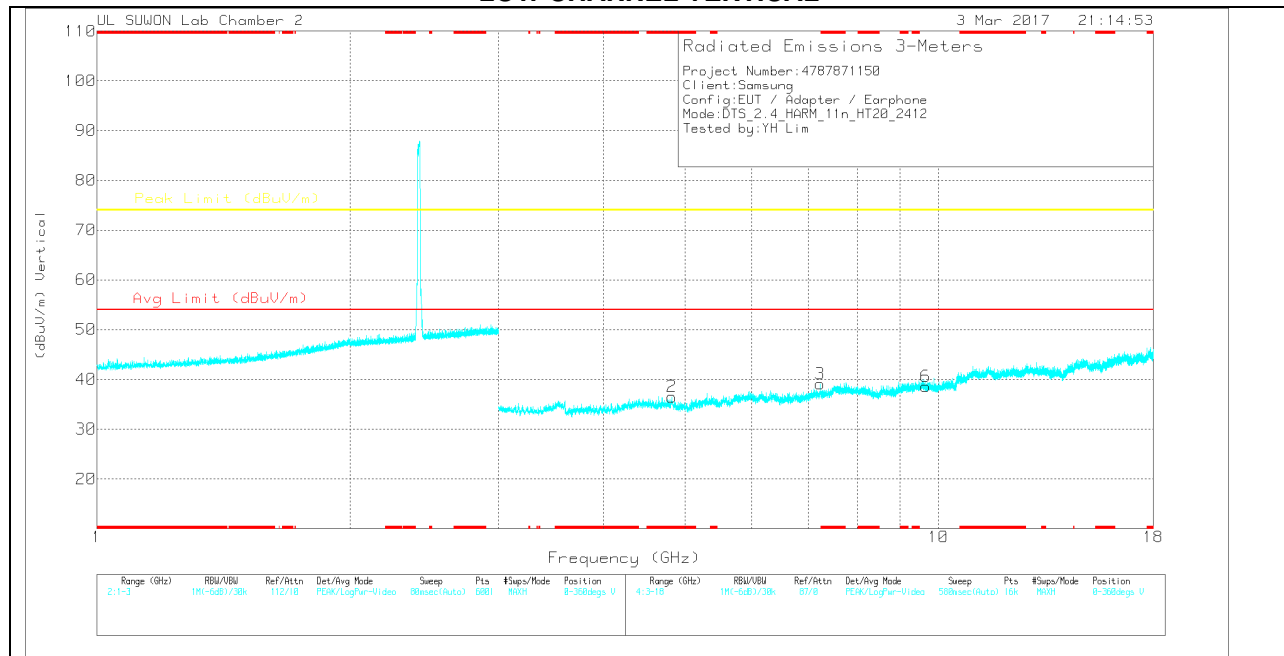
RMS - RMS detection

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 24)_150619	3GHz_HP[dB]	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	30.36	PK	33.9	-24.3	0	39.96	-	-	74	-34.04	0-360	150	H
4	7.233	23.49	PK	35.8	-21.9	0	37.39	-	-	74	-36.61	0-360	250	H
5	9.65	20.66	PK	36.9	-18.3	0	39.26	-	-	74	-34.74	0-360	250	H
2	* 4.823	26.91	PK	33.9	-24.3	0	36.51	-	-	74	-37.49	0-360	250	V
3	7.232	25.22	PK	35.8	-21.9	0	39.12	-	-	74	-34.88	0-360	250	V
6	9.655	20.05	PK	36.9	-18.3	0	38.65	-	-	74	-35.35	0-360	250	V

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

PK – Peak detector

Radiated Emissions

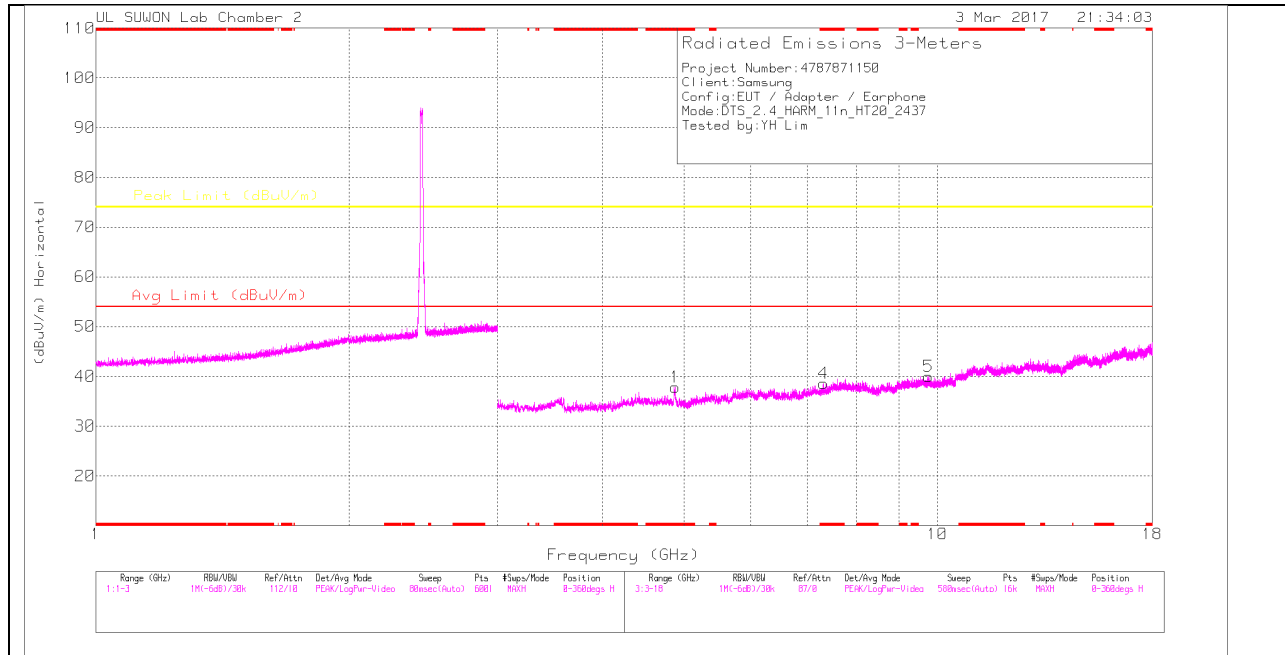
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.823	40.83	PK2	33.9	-24.3	0	50.43	-	-	74	-23.57	160	150	H
* 4.824	28	MAV1	33.9	-24.3	.32	37.92	54	-16.08	-	-	160	150	H
* 4.823	37.44	PK2	33.9	-24.3	0	47.04	-	-	74	-26.96	101	149	V
* 4.824	24.52	MAV1	33.9	-24.3	.32	34.44	54	-19.56	-	-	101	149	V

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

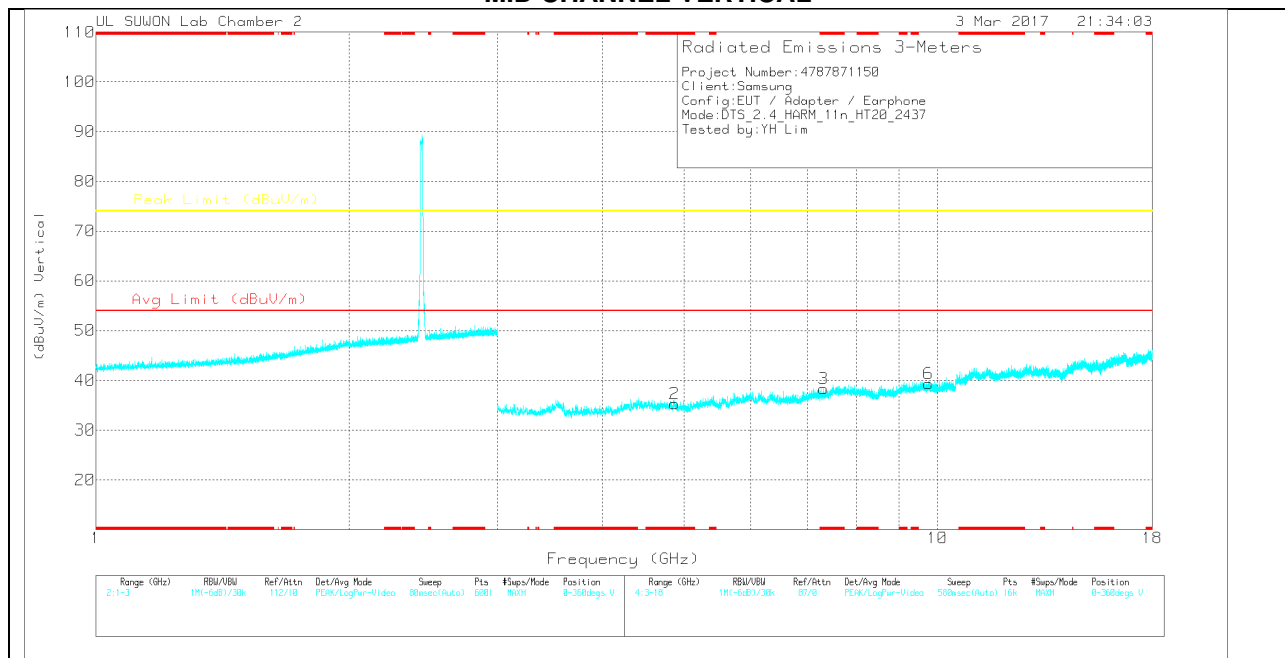
PK2 - KDB558074 Method: Maximum Peak

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 24)_150619	3GHz_HP[dB]	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	* 4.878	28.48	PK	33.9	-24.5	0	37.88	-	-	74	-36.12	0-360	150	H
4	* 7.317	24.74	PK	35.9	-22	0	38.64	-	-	74	-35.36	0-360	150	H
5	9.753	21.03	PK	37	-18.1	0	39.93	-	-	74	-34.07	0-360	150	H
2	* 4.874	25.94	PK	33.9	-24.5	0	35.34	-	-	74	-38.66	0-360	250	V
3	* 7.317	24.49	PK	35.9	-22	0	38.39	-	-	74	-35.61	0-360	250	V
6	9.758	20.31	PK	37	-18	0	39.31	-	-	74	-34.69	0-360	250	V

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

PK – Peak detector

Radiated Emissions

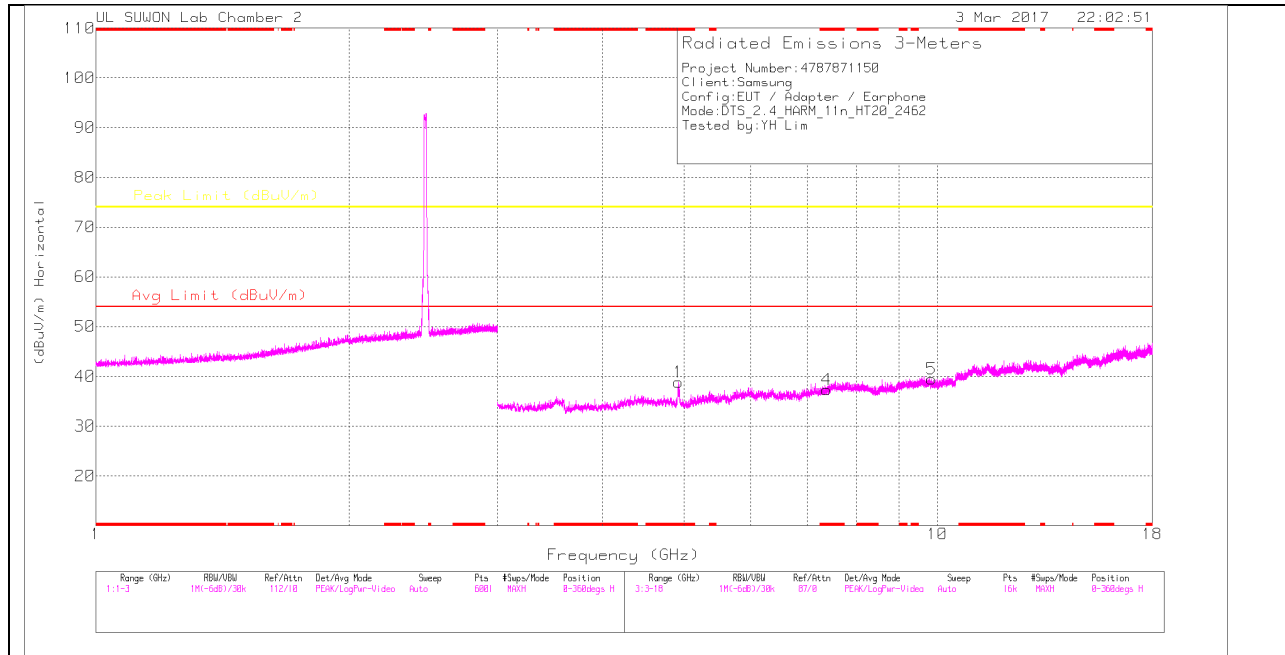
Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8724)_150 619	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.871	40.37	PK2	33.9	-24.5	0	49.77	-	-	74	-24.23	150	123	H
* 4.873	28.69	MAv1	33.9	-24.5	.32	38.41	54	-15.59	-	-	150	123	H
* 4.876	39.42	PK2	33.9	-24.5	0	48.82	-	-	74	-25.18	196	304	V
* 4.873	26.91	MAv1	33.9	-24.5	.32	36.63	54	-17.37	-	-	196	304	V

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

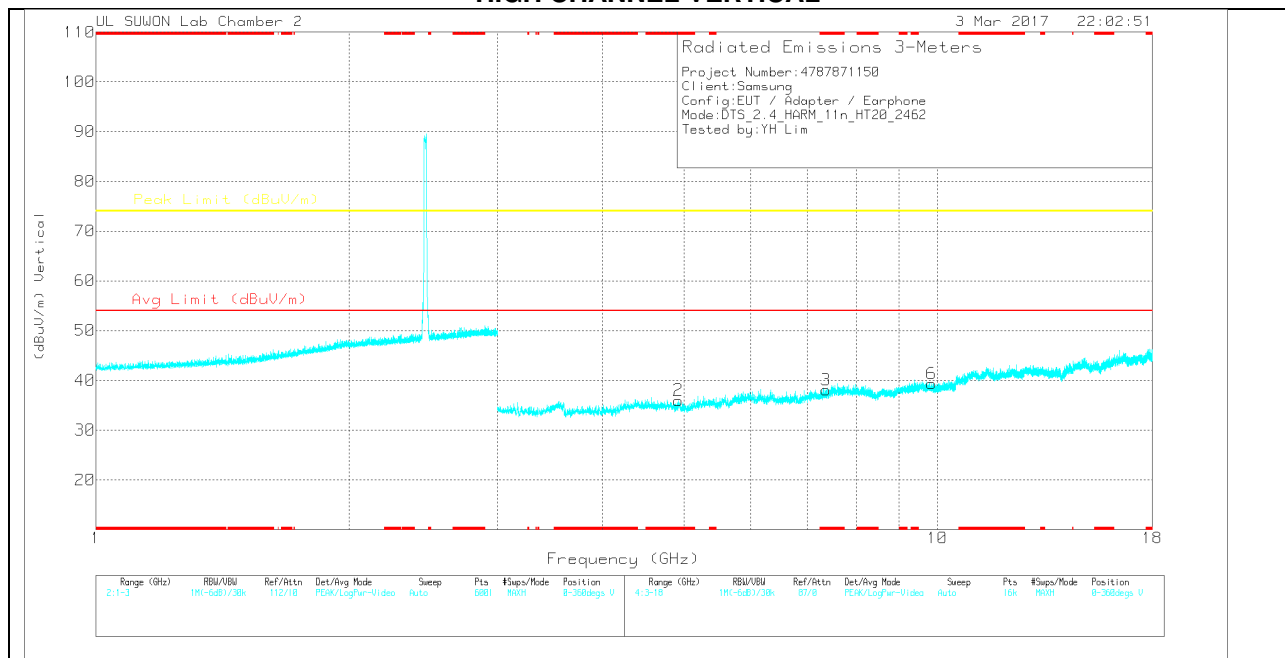
PK2 - KDB558074 Method: Maximum Peak

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 24)_150619	3GHz_HP[dB]	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	* 4.925	29.62	PK	33.9	-24.7	0	38.82	-	-	74	-35.18	0-360	150	H
4	* 7.381	22.98	PK	35.9	-21.5	0	37.38	-	-	74	-36.62	0-360	150	H
5	9.844	20.23	PK	37.1	-17.9	0	39.43	-	-	74	-34.57	0-360	150	H
2	* 4.925	26.8	PK	33.9	-24.7	0	36	-	-	74	-38	0-360	250	V
3	* 7.371	23.81	PK	35.9	-21.6	0	38.11	-	-	74	-35.89	0-360	250	V
6	9.848	20.11	PK	37.1	-17.9	0	39.31	-	-	74	-34.69	0-360	250	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	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.927	41.48	PK2	33.9	-24.7	0	50.68	-	-	74	-23.32	151	120	H
* 4.924	29.36	MAv1	33.9	-24.7	.32	38.88	54	-15.12	-	-	151	120	H
* 4.928	37.54	PK2	33.9	-24.7	0	46.74	-	-	74	-27.26	155	253	V
* 4.925	26.44	MAv1	33.9	-24.7	.32	35.96	54	-18.04	-	-	155	253	V

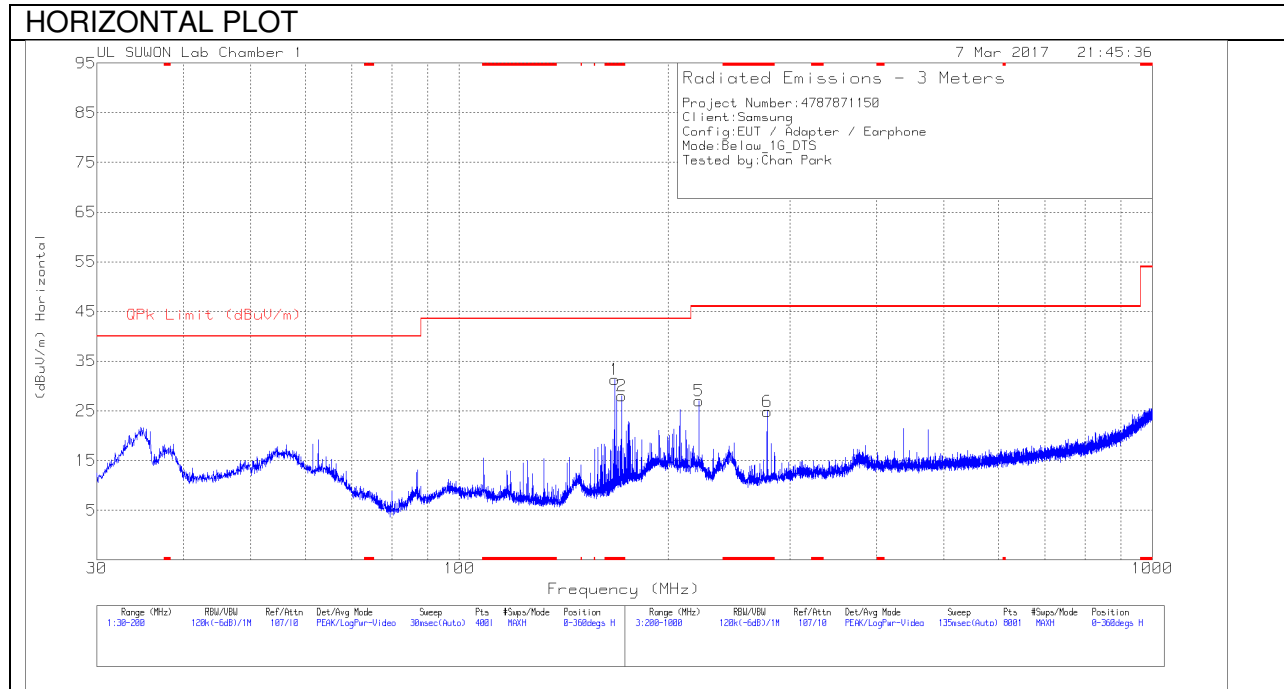
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

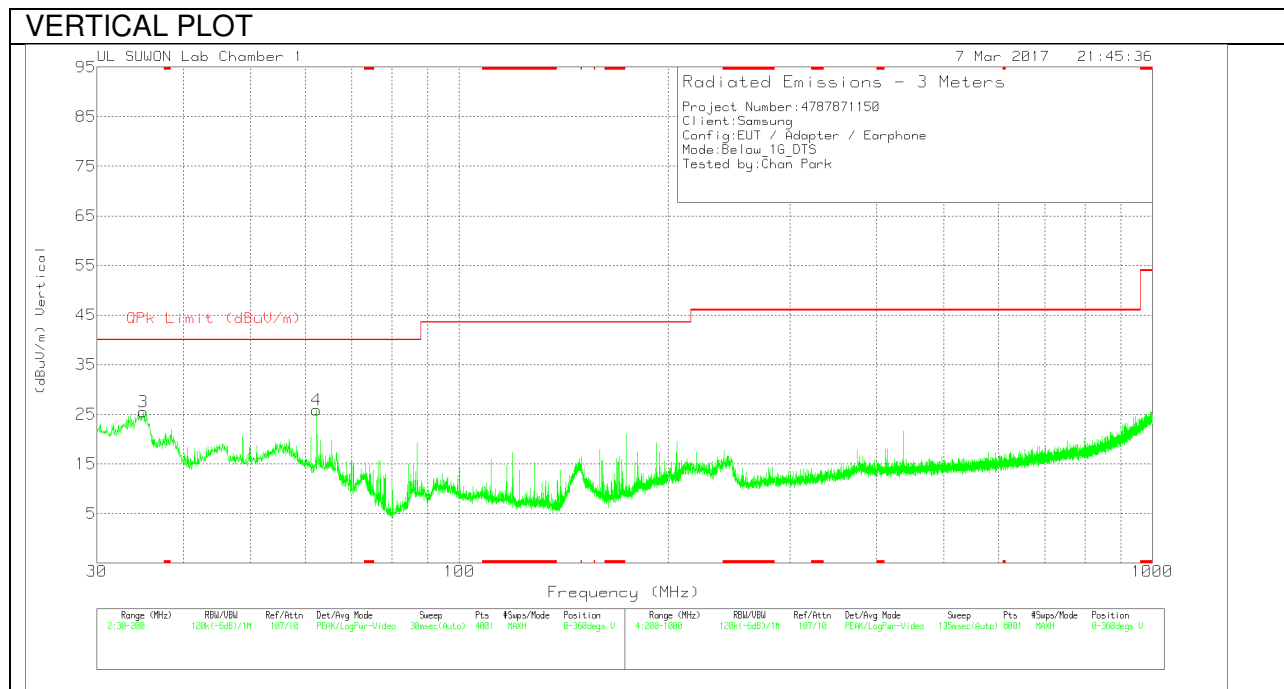
MAv1 - KDB558074 Option 1 Maximum RMS Average

10.3. 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

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163-749	30-1000MHz[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 167.7425	53.11	Pk	8.9	-30.7	31.31	43.52	-12.21	0-360	300	H
2	* 171.3975	49.56	Pk	9.1	-30.6	28.06	43.52	-15.46	0-360	200	H
3	35.015	46.27	Pk	10.8	-31.6	25.47	40	-14.53	0-360	100	V
4	62.3	45.12	Pk	12.1	-31.3	25.92	40	-14.08	0-360	100	V
5	221.6	45.58	Pk	11.8	-30.4	26.98	46.02	-19.04	0-360	200	H
6	* 278.1	42.02	Pk	13	-30.2	24.82	46.02	-21.2	0-360	100	H

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

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

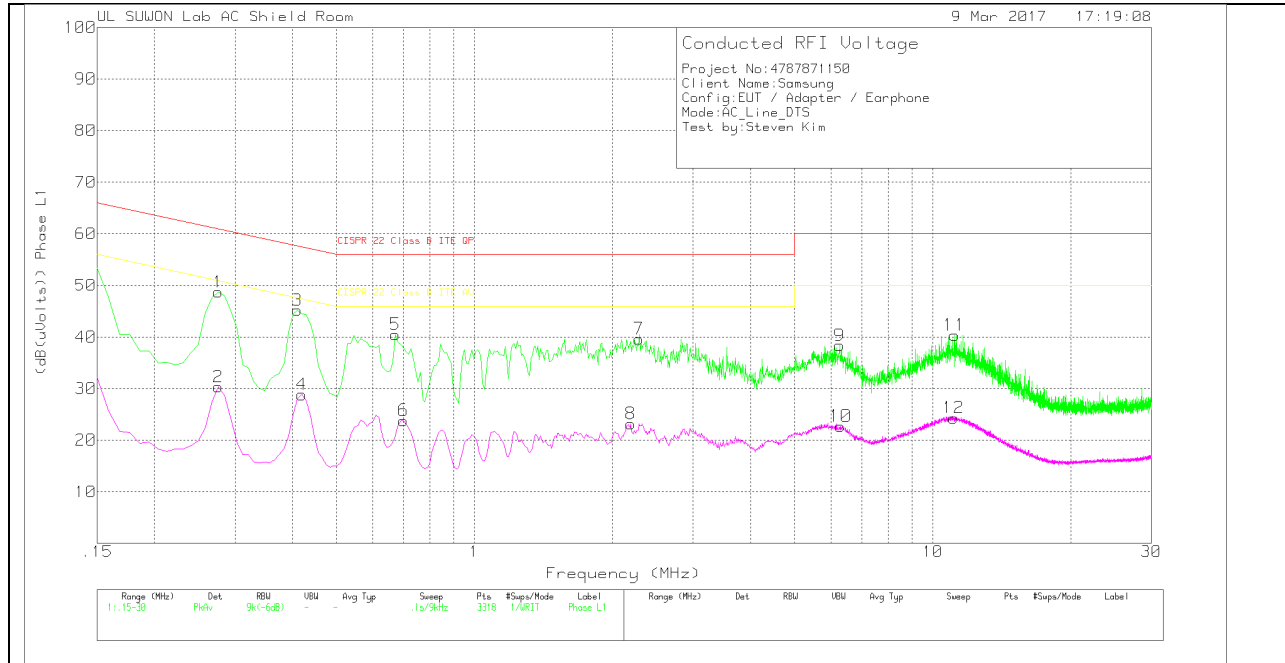
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

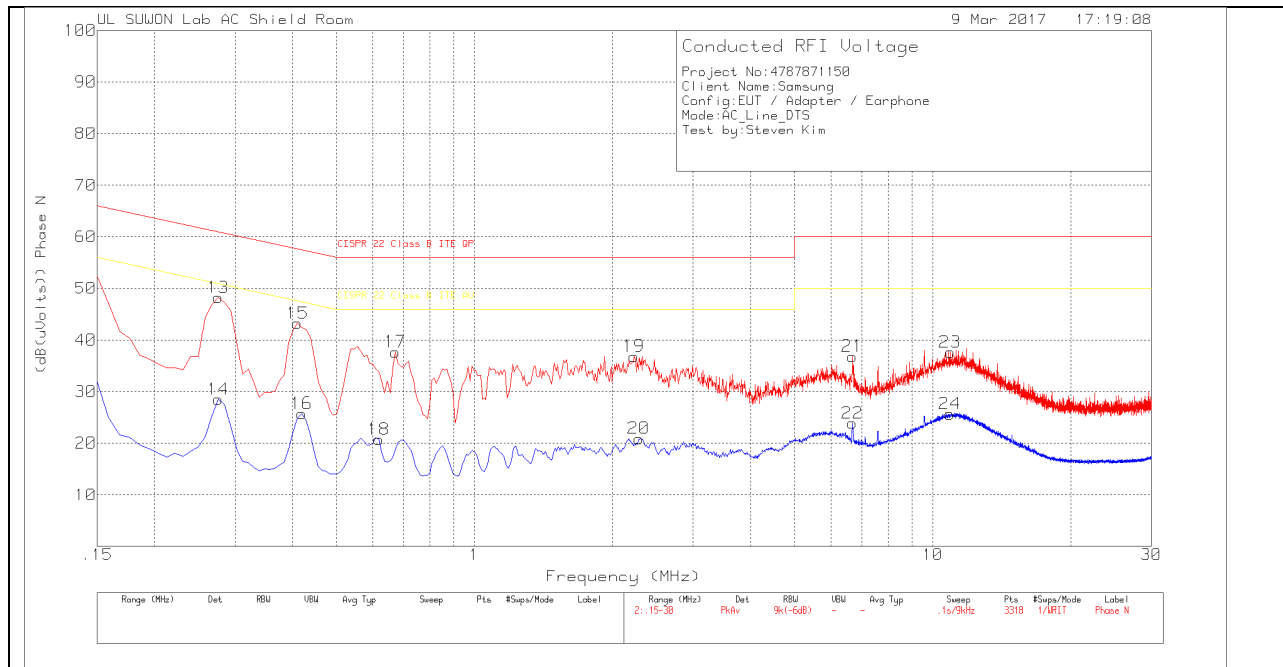
Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith ex- cord_L1	CABLELOS S(dB)	Corrected Reading (dB(uVolts)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.276	38.8	Pk	9.7	.2	48.7	60.94	-12.24	-	-
2	.276	20.45	Av	9.7	.2	30.35	-	-	50.94	-20.59
3	.411	35.09	Pk	9.9	.2	45.19	57.63	-12.44	-	-
4	.42	18.75	Av	9.9	.2	28.85	-	-	47.45	-18.6
5	.672	30.37	Pk	9.9	.2	40.47	56	-15.53	-	-
6	.699	13.72	Av	9.9	.2	23.82	-	-	46	-22.18
7	2.283	29.63	Pk	9.7	.3	39.63	56	-16.37	-	-
8	2.193	13.2	Av	9.7	.3	23.2	-	-	46	-22.8
9	6.261	28.29	Pk	9.8	.3	38.39	60	-21.61	-	-
10	6.297	12.61	Av	9.8	.3	22.71	-	-	50	-27.29
11	11.157	30.07	Pk	10	.3	40.37	60	-19.63	-	-
12	11.094	14.02	Av	10	.3	24.32	-	-	50	-25.68

Pk - Peak detector

Av – Average detection

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	CABLELOS S(dB)	Corrected Reading (dB(uVolts)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.276	38.34	Pk	9.7	.2	48.24	60.94	-12.7	-	-
14	.276	18.6	Av	9.7	.2	28.5	-	-	50.94	-22.44
15	.411	33.12	Pk	9.9	.2	43.22	57.63	-14.41	-	-
16	.42	15.64	Av	9.9	.2	25.74	-	-	47.45	-21.71
17	.672	27.59	Pk	9.9	.2	37.69	56	-18.31	-	-
18	.618	10.65	Av	9.9	.2	20.75	-	-	46	-25.25
19	2.229	26.85	Pk	9.7	.3	36.85	56	-19.15	-	-
20	2.283	10.91	Av	9.7	.3	20.91	-	-	46	-25.09
21	6.684	26.63	Pk	9.9	.3	36.83	60	-23.17	-	-
22	6.684	13.69	Av	9.9	.3	23.89	-	-	50	-26.11
23	10.914	27.21	Pk	10.1	.3	37.61	60	-22.39	-	-
24	10.905	15.27	Av	10.1	.3	25.67	-	-	50	-24.33

Pk - Peak detector

Av - Average detection