



FCC CFR47 PART 15 SUBPART C

DTS Wireless LAN

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER : SM-J810Y/DS, SM-J810Y

FCC ID: A3LSMJ810Y

REPORT NUMBER: 4788468750-E1V2

ISSUE DATE: MAY 25, 2018

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

Prepared by
UL Korea, Ltd.
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

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



ACCREDITED*

Testing
Laboratory

TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	05/17/2018	Initial issue	Hoonpyo Lee
V2	05/25/2018	Updated to address TCB's question	Hoonpyo Lee

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	8
4. CALIBRATION AND UNCERTAINTY	8
4.1. MEASURING INSTRUMENT CALIBRATION.....	8
4.2. SAMPLE CALCULATION.....	8
4.3. MEASUREMENT UNCERTAINTY	8
5. EQUIPMENT UNDER TEST	9
5.1. DESCRIPTION OF EUT.....	9
5.2. MAXIMUM OUTPUT POWER.....	9
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	9
5.4. WORST-CASE CONFIGURATION AND MODE	9
5.5. DESCRIPTION OF TEST SETUP.....	10
6. TEST AND MEASUREMENT EQUIPMENT	12
7. REFERENCE MEASUREMENT RESULTS.....	13
7.1. ON TIME AND DUTY CYCLE RESULTS.....	13
8. MEASUREMENT METHODS	14
9. SUMMARY TABLE	15
10. ANTENNA PORT TEST RESULTS	16
10.1. 6 dB BANDWIDTH.....	16
10.1.1. 802.11b MODE IN THE 2.4 GHz BAND.....	17
10.1.1.1. 802.11g MODE IN THE 2.4 GHz BAND	17
10.1.2. 802.11n HT20 MODE IN THE 2.4 GHz BAND	17
10.1.3. 6 dB BANDWIDTH PLOTS.....	18
10.2. OUTPUT POWER.....	21
10.2.1. 802.11b MODE IN THE 2.4 GHz BAND.....	22
10.2.2. 802.11g MODE IN THE 2.4 GHz BAND.....	23
10.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND	24
10.3. PSD	25
10.3.1. 802.11b MODE IN THE 2.4 GHz BAND.....	26
10.3.2. 802.11g MODE IN THE 2.4 GHz BAND.....	26
10.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND	26
10.3.4. PSD PLOTS	27
10.4. OUT-OF-BAND EMISSIONS	30

10.4.1.	802.11b MODE IN THE 2.4 GHz BAND.....	31
10.4.2.	802.11g MODE IN THE 2.4 GHz BAND.....	34
10.4.3.	802.11n HT20 MODE IN THE 2.4 GHz BAND.....	37
11.	RADIATED TEST RESULTS	40
11.1.	LIMITS AND PROCEDURE	40
11.2.	TRANSMITTER ABOVE 1 GHz	42
11.2.1.	TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND	42
11.2.2.	TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND	52
11.2.3.	TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND	62
11.3.	WORST-CASE BELOW 1 GHz.....	72
12.	AC POWER LINE CONDUCTED EMISSIONS	74
13.	SETUP PHOTOS	79

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

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

MODEL NUMBER: SM-J810Y/DS, SM-J810Y

SERIAL NUMBER: R38K30RGB8V (RADIATED, Original);
R38K30RGGYN (CONDUCTED, Original);
R38K409R32M (RADIATED, Spot check)

DATE TESTED: APR 30, 2018 - MAY 09, 2018 (Original);
MAY 11, 2018 - MAY 17, 2018 (Spot check)

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:



Hoonpyo Lee
Suwon Lab Engineer
UL Korea, Ltd.

1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMJ810F DTS WLAN(FCC CFR 47 Part 15C). And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The FCC ID: A3LSMJ810Y shares the same enclosure and circuit board as FCC ID: A3LSMJ810F. The WLAN antennas and surrounding circuitry and layout are identical between these two units.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMJ810F remains representative of FCC ID: A3LSMJ810Y. The test data of FCC ID: A3LSMJ810F being submitted for this application to cover WLAN features.

1.3. SPOT CHECK VERIFICATION DATA

Band	Test Item	Mode	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
					SM-J810F/DS Results	SM-J810Y/DS Results		
					FCC ID : A3LSMJ810F	FCC ID : A3LSMJ810Y		
DTS WLAN (2.4GHz)	Band Edge	802.11b	2412 MHz	54 dBuV/m	43.02 dBuV/m	42.49 dBuV/m	-0.53 dB	
	RSE	802.11b	2462 MHz	54 dBuV/m	46.08 dBuV/m	37.35 dBuV/m	-8.73 dB	3th Harmonic
	Band Edge	802.11g	2412 MHz	54 dBuV/m	50.97 dBuV/m	48.62 dBuV/m	-2.35 dB	
	RSE	802.11g	2462 MHz	54 dBuV/m	41.79 dBuV/m	37.22 dBuV/m	-4.57 dB	3th Harmonic
	Band Edge	802.11n	2412 MHz	54 dBuV/m	50.48 dBuV/m	51.20 dBuV/m	0.72 dB	
	RSE	802.11n	2437 MHz	54 dBuV/m	44.26 dBuV/m	37.33 dBuV/m	-6.93 dB	3th Harmonic

Comparison of two models, higher deviation is within 3dB range and all test results are under FCC Technical Limits.

1.4. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID	Type Grant/Permissive Change	Reference Application	Folder Test/RF Exposure	Report Title / Section
DTS	A3LSMJ810F	Grant	4788458975-E1V3	Test	FCC Report DTS WLAN / All sections
			4788458975-E2V2	Test	FCC Report BLE All sections
DSS	A3LSMJ810F	Grant	4788458975-E3V2	Test	FCC Report BT / All sections
DXX	A3LSMJ810F	Grant	4788458975-E4V2	Test	FCC Report ANT+ / All sections
PCE	A3LSMJ810F	Grant	4788458975-E5V2	Test	FCC Report WWAN / All sections

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 v04.
4. 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
☒	Chamber 3

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	3.86 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 , ANT+ and DTS b/g/n
This test report addresses the DTS (WLAN) operational mode.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
2412 - 2472	802.11b	15.32	34.04
	802.11g	12.68	18.54
	802.11n HT20	12.69	18.58

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antennas, with a antenna's maximum gain of 1.1 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

Note : All radiated and power line conducted tests were performed connected with earphone and charger for evaluation of worst case mode.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA50EWE	1565617	N/A
Data Cable	SAMSUNG	ECB-DU68WE	N/A	N/A
Earphone	SAMSUNG	EHS61ASFWE	N/A	N/A

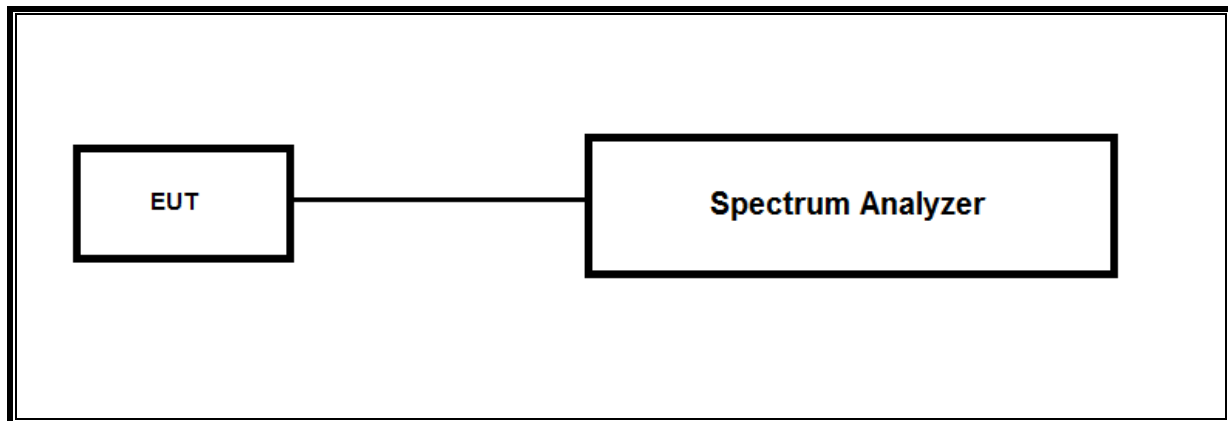
I/O CABLES

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	1.2m	N/A
2	Audio	2	Mini-Jack	Unshielded	1.2m	N/A

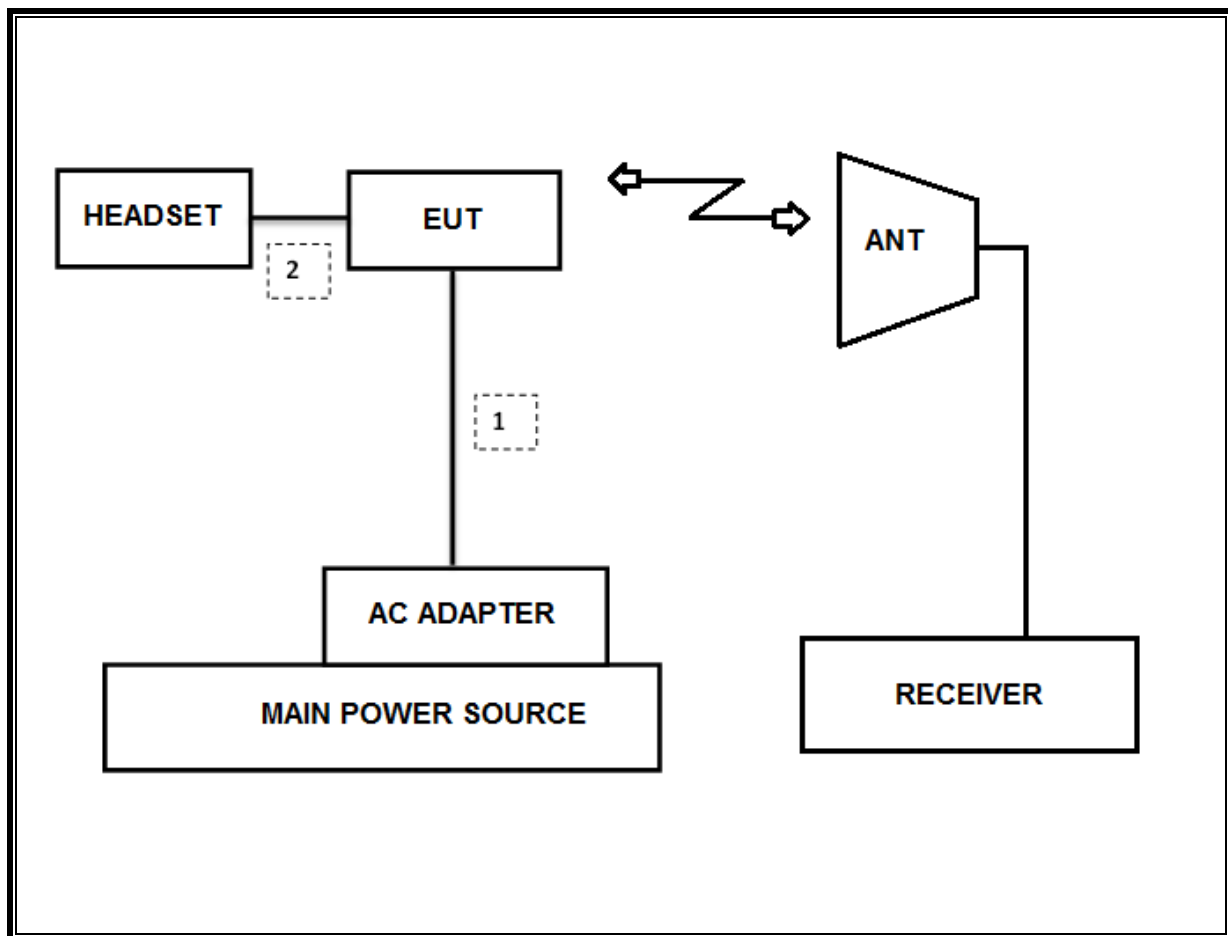
TEST SETUP

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 (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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	08-31-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	09-14-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-31-19
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-26-19
Antenna, Horn, 18 GHz	ETS	3115	00167211	10-14-18
Antenna, Horn, 18 GHz	ETS	3115	00161451	03-10-19
Antenna, Horn, 18 GHz	ETS	3117	00168724	05-31-19
Antenna, Horn, 18 GHz	ETS	3117	00168717	05-31-19
Antenna, Horn, 18 GHz	ETS	3117	00205959	11-29-18
Antenna, Horn, 40 GHz	ETS	3116C	00166155	12-04-19
Antenna, Horn, 40 GHz	ETS	3116C	00168645	12-04-19
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	11-13-19
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-09-18
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-07-18
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-10-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-08-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-08-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-11-18
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-08-18
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-08-18
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-08-18
Attenuator	PASTERNAK	PE7087-10	A001	08-08-18
Attenuator	PASTERNAK	PE7087-10	A008	08-08-18
Attenuator	PASTERNAK	PE7087-10	2	08-10-18
Attenuator	PASTERNAK	PE7087-10	A009	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-08-18
EMI Test Receive, 44 GHz	R&S	ESW44	101590	08-09-18
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-07-18
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-08-18
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-08-18
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-11-18
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-08-18
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-08-18
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-11-18
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-08-18
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-08-18
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-11-18
LISN	R&S	ENV-216	101837	08-09-18
UL Software				
Description	Manufacturer	Model	Version	
Radiated 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	32.95	33.05	0.997	99.7%	0.00	0.010
802.11g	5.483	5.582	0.982	98.2%	0.00	0.010
802.11n HT20	5.067	5.165	0.981	98.1%	0.00	0.010



8. MEASUREMENT METHODS

6 dB BW : KDB 558074 D01 v04, Section 8.2.

OUTPUT POWER : KDB 558074 D01 v04, Section 9.2.3.1.

POWER SPECTRAL DENSITY : KDB 558074 D01 v04, Section 10.3./10.5.

Out-of-band EMISSIONS (Conducted) : KDB 558074 D01 v04, Section 11.1, 11.2.

Out-of-band EMISSIONS IN NON-RESTRICTED BANDS: KDB 558074 D01 v04, Section 11.0.

Out-of-band EMISSIONS IN RESTRICTED BANDS : KDB 558074 D01 v04, Section 12.1.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.

9. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	Occupied Band width (6dB)	>500KHz	Conducted	Pass
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-30dBc		Pass
15.247 (b)(3)	TX conducted output power	<30dBm		Pass
15.247 (e)	PSD	<8dBm		Pass
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass

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 v04: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

RESULTS

10.1.1.802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	8.541	0.5
Mid	2437	8.543	0.5
High	2462	8.552	0.5
Worst		8.541	0.5

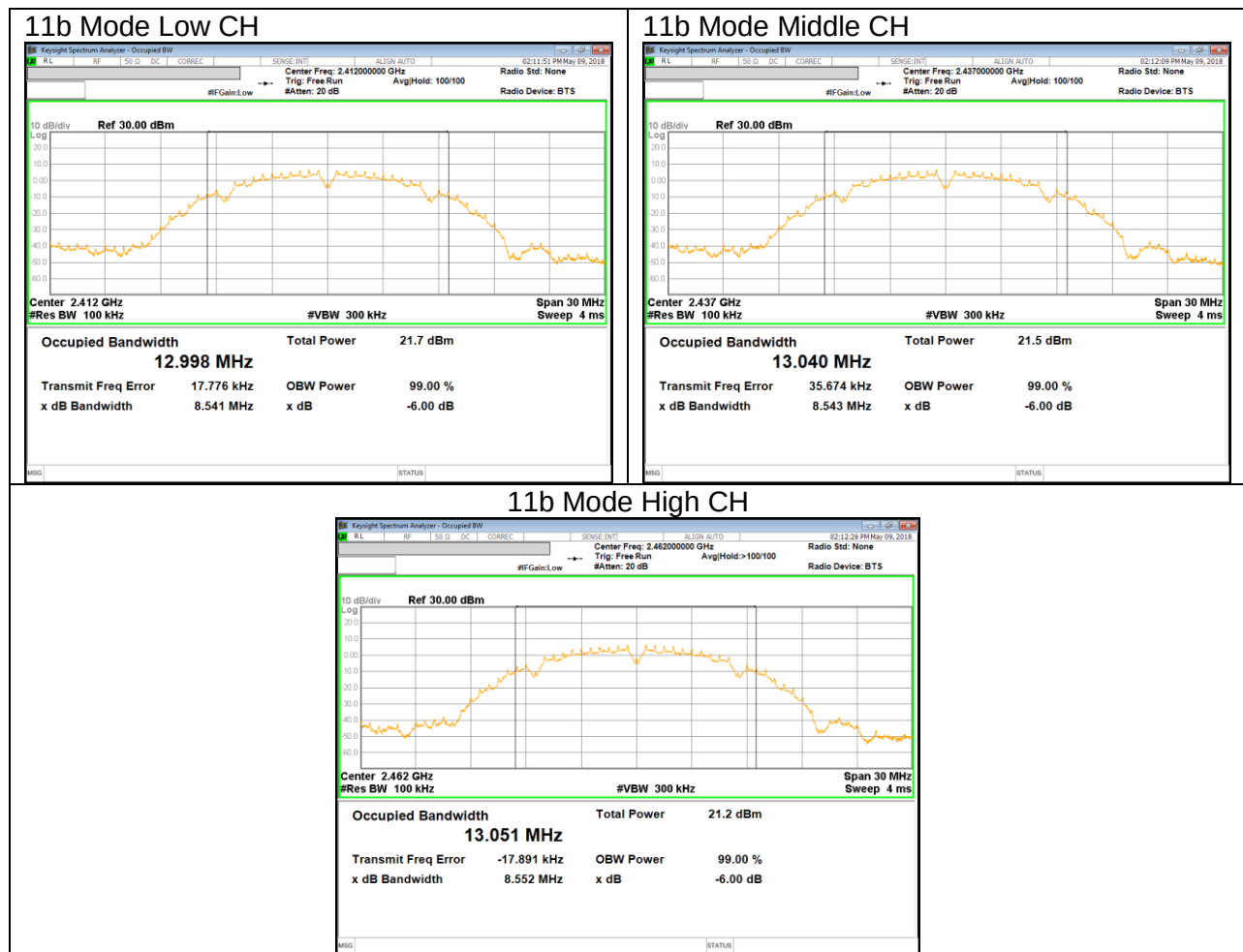
10.1.1.1. 802.11g MODE IN THE 2.4 GHz BAND

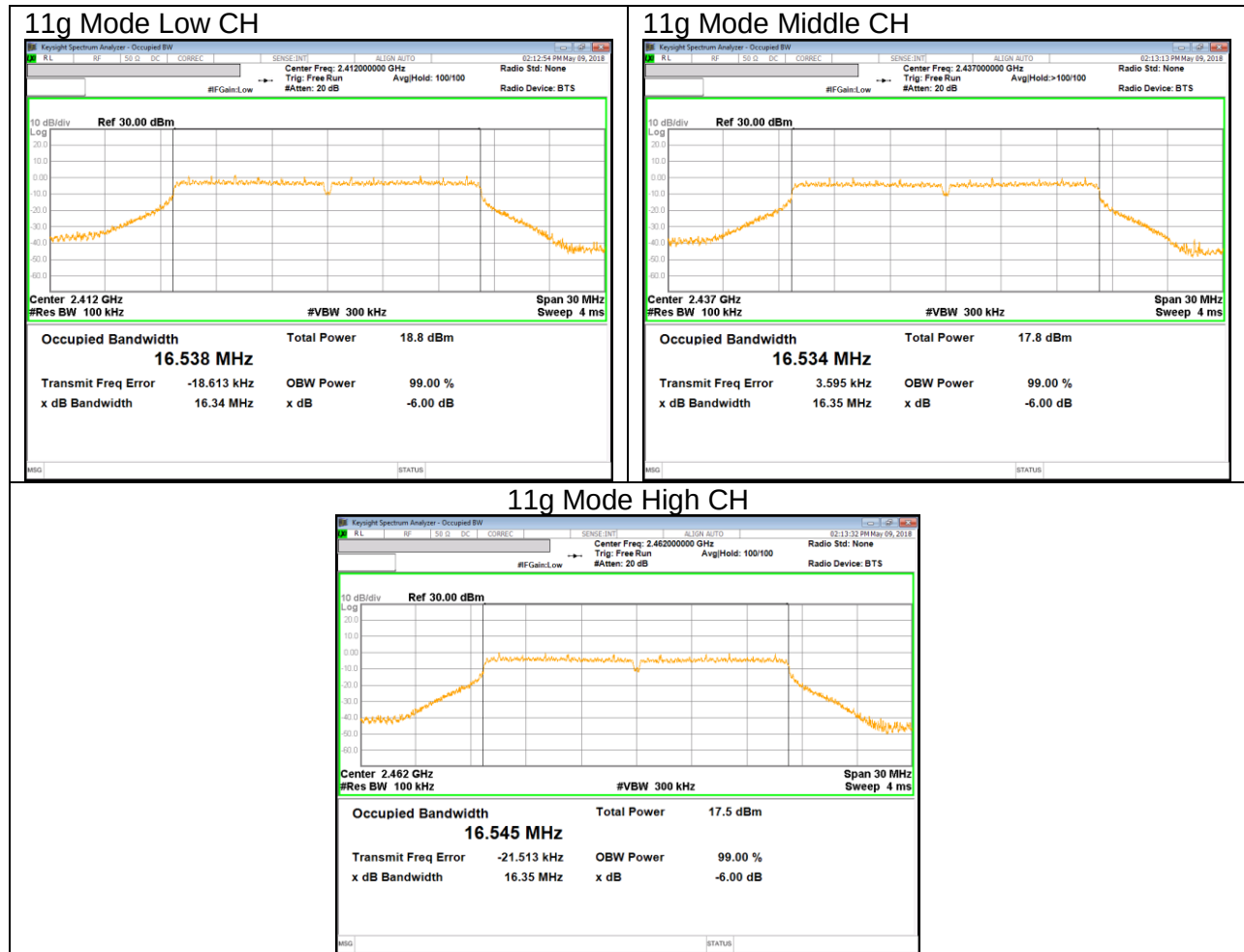
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	16.340	0.5
Mid	2437	16.350	0.5
High	2462	16.350	0.5
Worst		16.340	0.5

10.1.2.802.11n HT20 MODE IN THE 2.4 GHz BAND

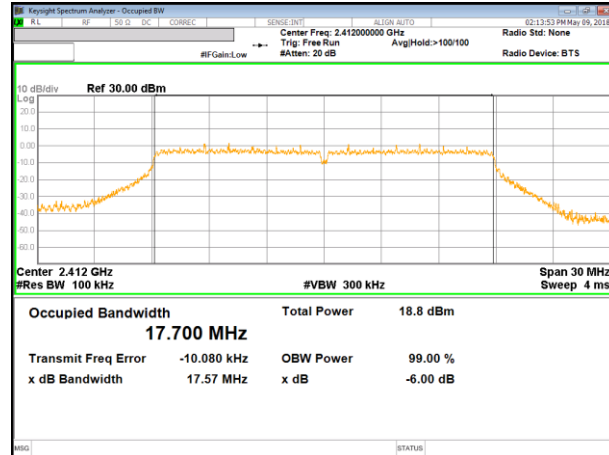
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Low	2412	17.570	0.5
Mid	2437	17.560	0.5
High	2462	17.570	0.5
Worst		16.930	0.5

10.1.3.6 dB BANDWIDTH PLOTS

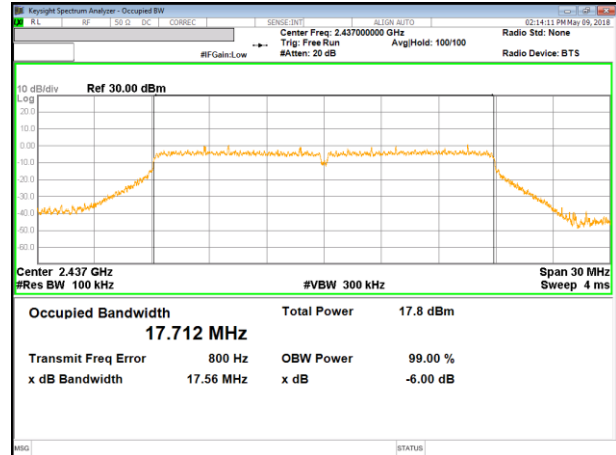




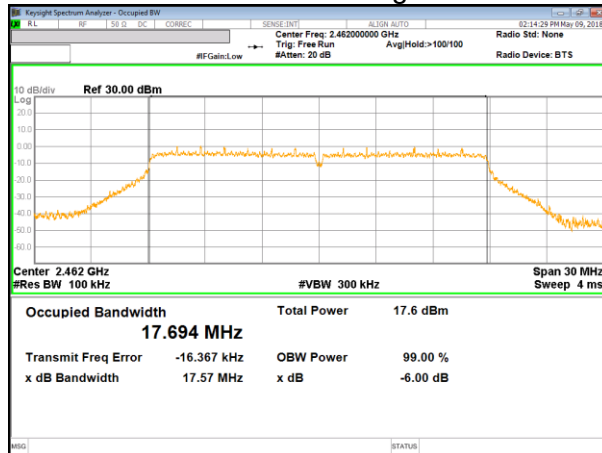
11n HT20 Mode Low CH



11n HT20 Middle CH



11n HT20 Mode High CH



10.2. 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 v04.

Duty cycle correction factor is not added to the average output power results for duty cycle factor > 98%.

RESULTS

10.2.1.802.11b MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	Max Power [dBm]
Low	2412	1.10	30.00	30.00
Mid	2437	1.10	30.00	30.00
High	2462	1.10	30.00	30.00

Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	15.30	15.30	30.00	-14.70
Mid	2437	15.32	15.32	30.00	-14.68
High	2462	15.23	15.23	30.00	-14.77
Worst			15.32	30.00	-14.68

10.2.2.802.11g MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	FCC Power Limit [dBm]	Max Power [dBm]
Low	2412	1.10	30.00	30.00
Mid	2437	1.10	30.00	30.00
High	2462	1.10	30.00	30.00

Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	12.68	12.68	30.00	-17.32
Mid	2437	12.27	12.27	30.00	-17.73
High	2462	12.01	12.01	30.00	-17.99
Worst			12.68	30.00	-17.32

10.2.3.802.11n 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	1.10	30.00	30.00
Mid	2437	1.10	30.00	30.00
High	2462	1.10	30.00	30.00

Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Power [dBm]	Power Limit [dBm]	Margin [dB]
Low	2412	12.69	12.69	30.00	-17.31
Mid	2437	12.28	12.28	30.00	-17.72
High	2462	12.04	12.04	30.00	-17.96
Worst			12.69	30.00	-17.31

10.3. 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 AVGPS-1" under KDB558074 D01 DTS Meas Guidance v04.

RESULTS

10.3.1.802.11b MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2412	-16.078	0.00	-16.078	8.00	-24.078
Mid	2437	-15.952	0.00	-15.952	8.00	-23.952
High	2462	-16.659	0.00	-16.659	8.00	-24.659

10.3.2.802.11g MODE IN THE 2.4 GHz BAND

PSD Results

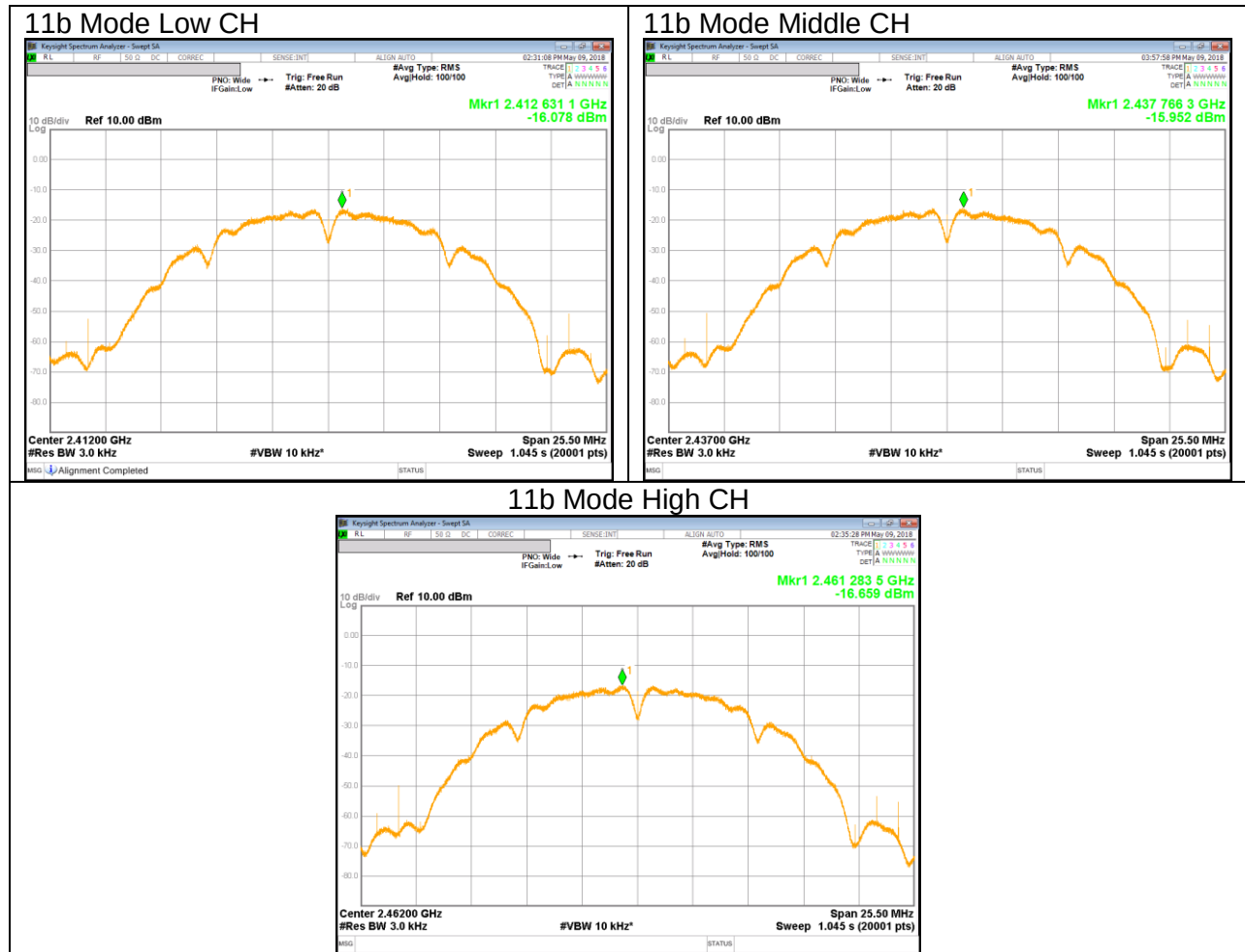
Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2412	-19.984	0.00	-19.984	8.00	-27.984
Mid	2437	-20.331	0.00	-20.331	8.00	-28.331
High	2462	-20.562	0.00	-20.562	8.00	-28.562

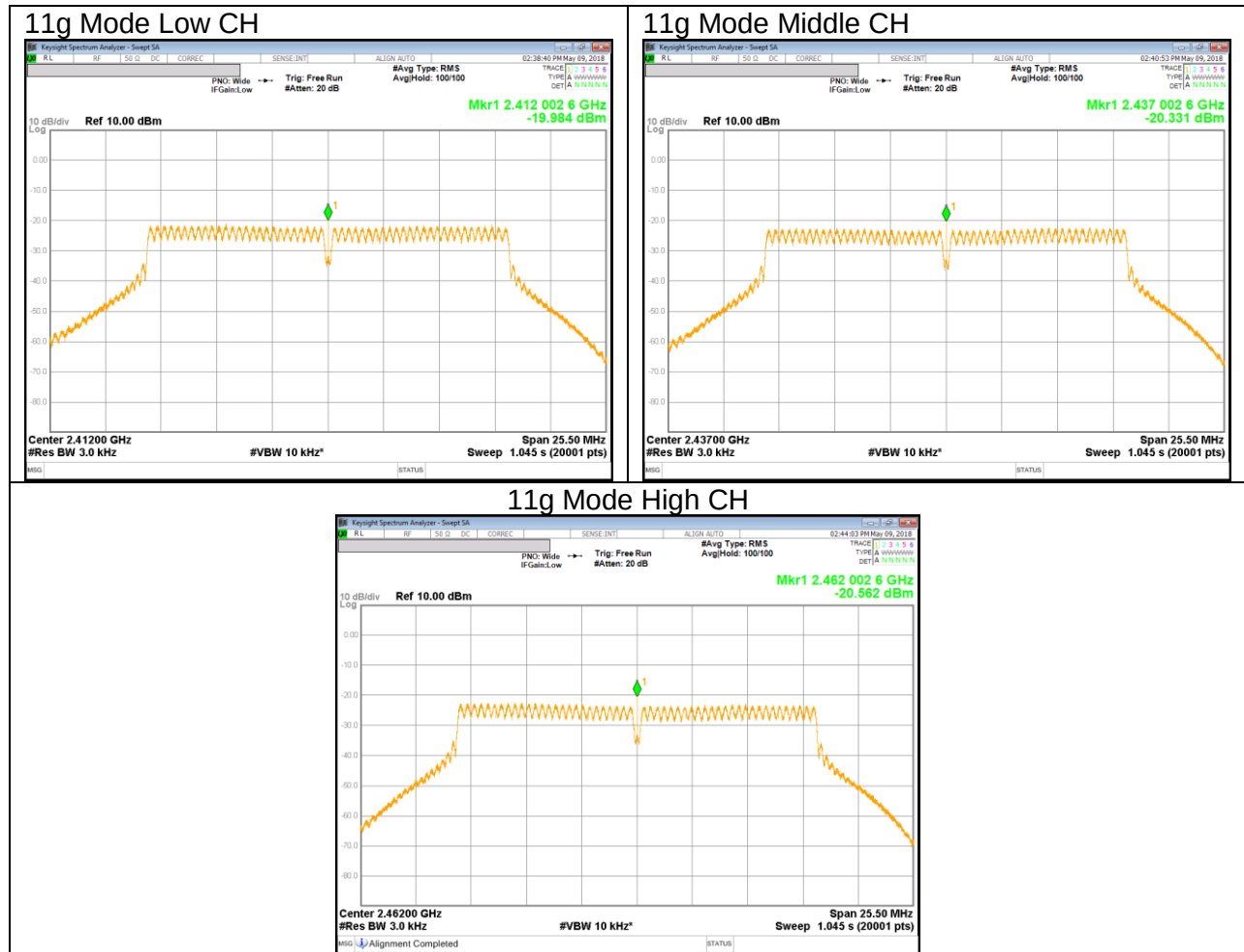
10.3.3.802.11n HT20 MODE IN THE 2.4 GHz BAND

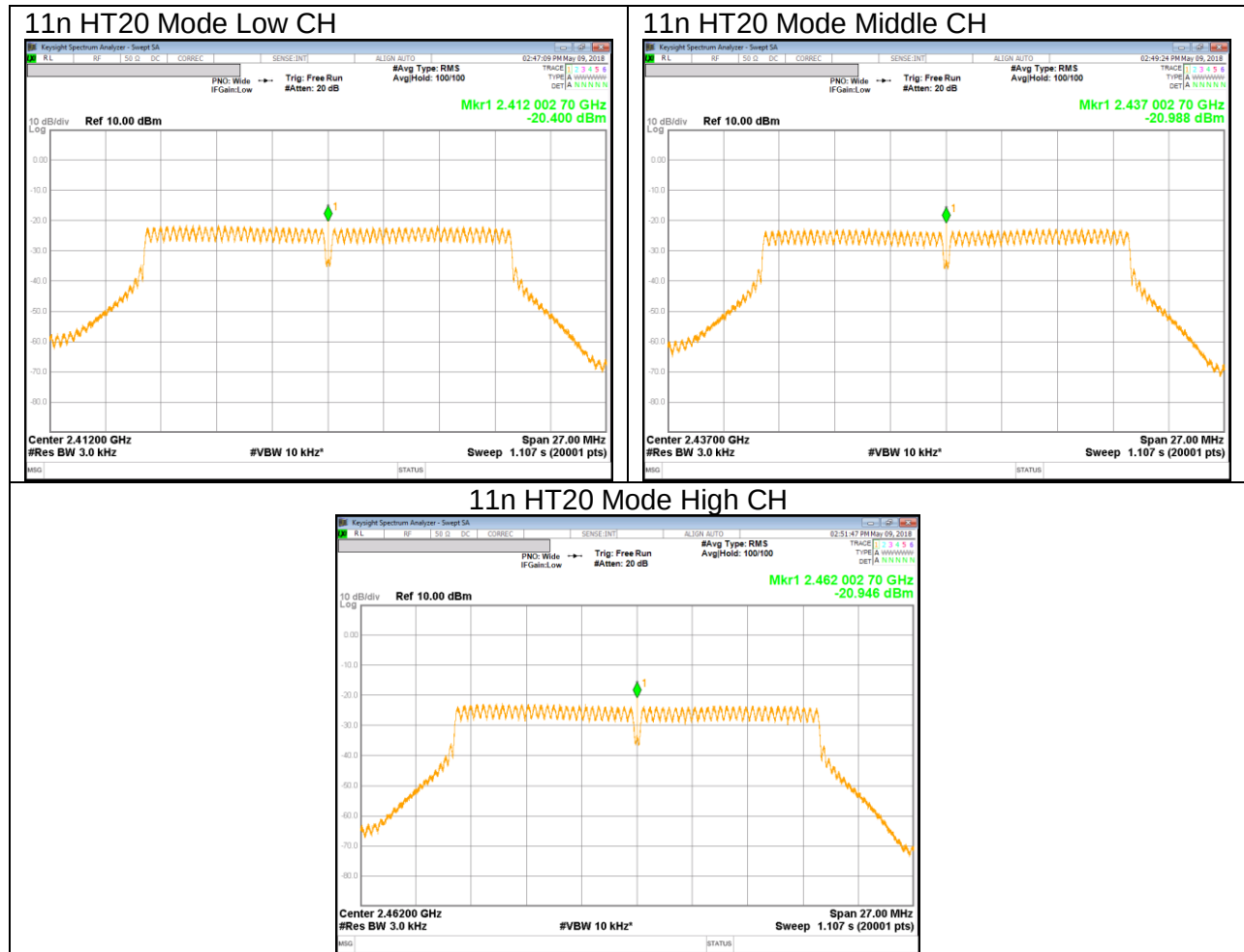
PSD Results

Channel	Frequency [MHz]	PSD Meas [dBm]	Duty Factor [dB]	Final PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2412	-20.400	0.00	-20.400	8.00	-28.400
Middle	2437	-20.988	0.00	-20.988	8.00	-28.988
High	2462	-20.946	0.00	-20.946	8.00	-28.946

10.3.4.PSD PLOTS







10.4. 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

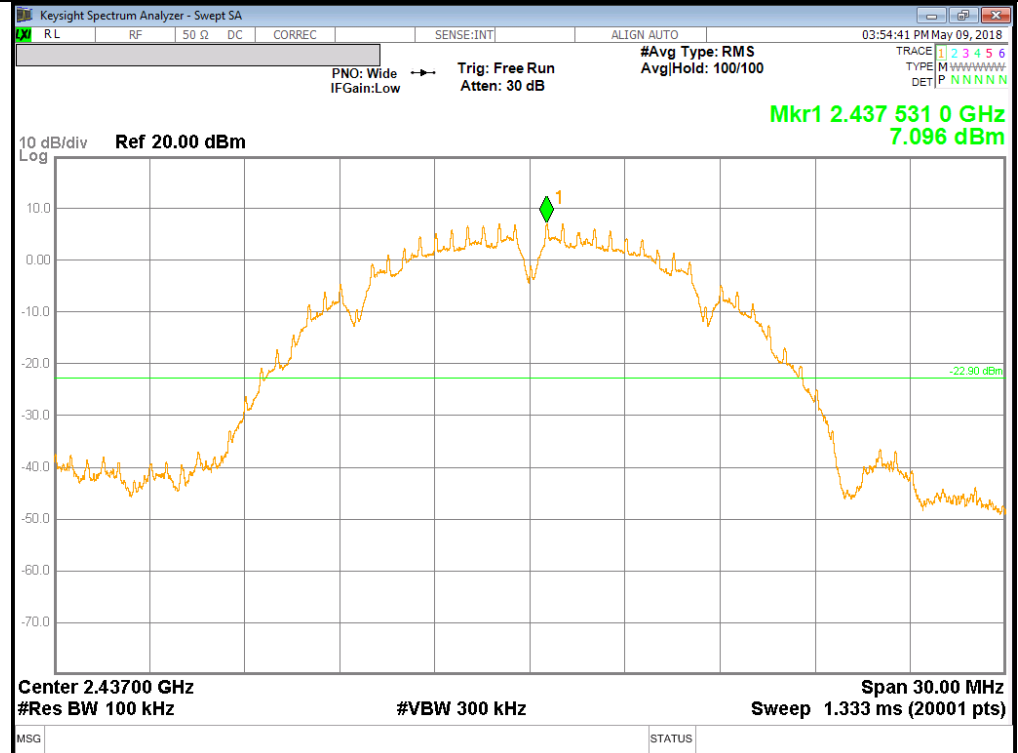
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

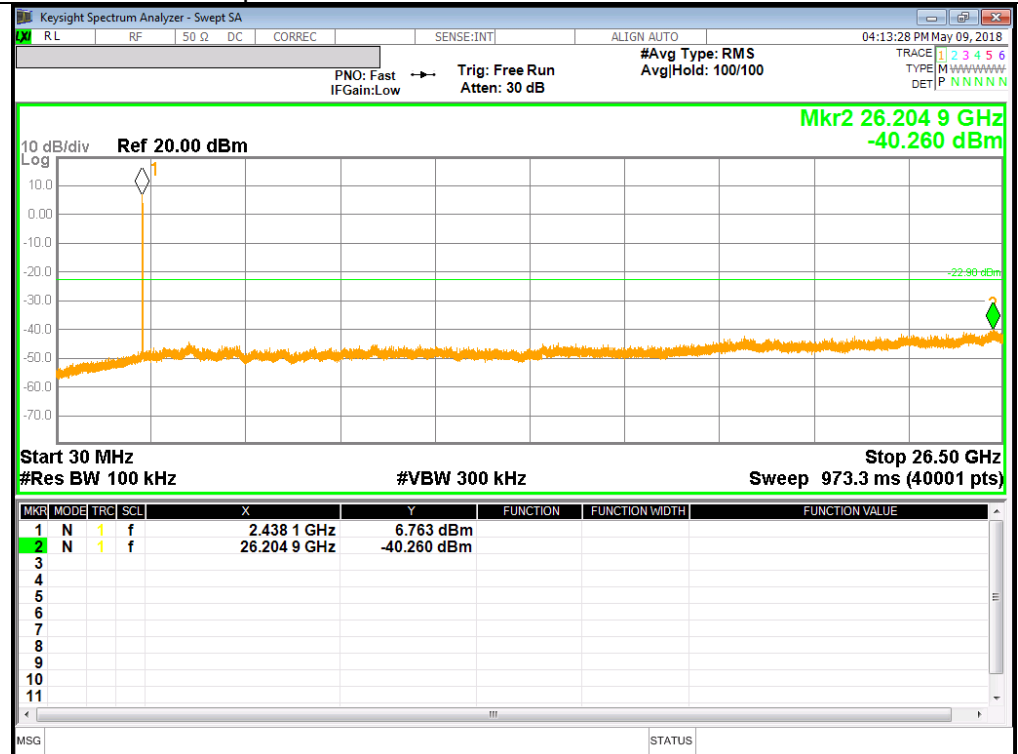
10.4.1.802.11b MODE IN THE 2.4 GHz BAND



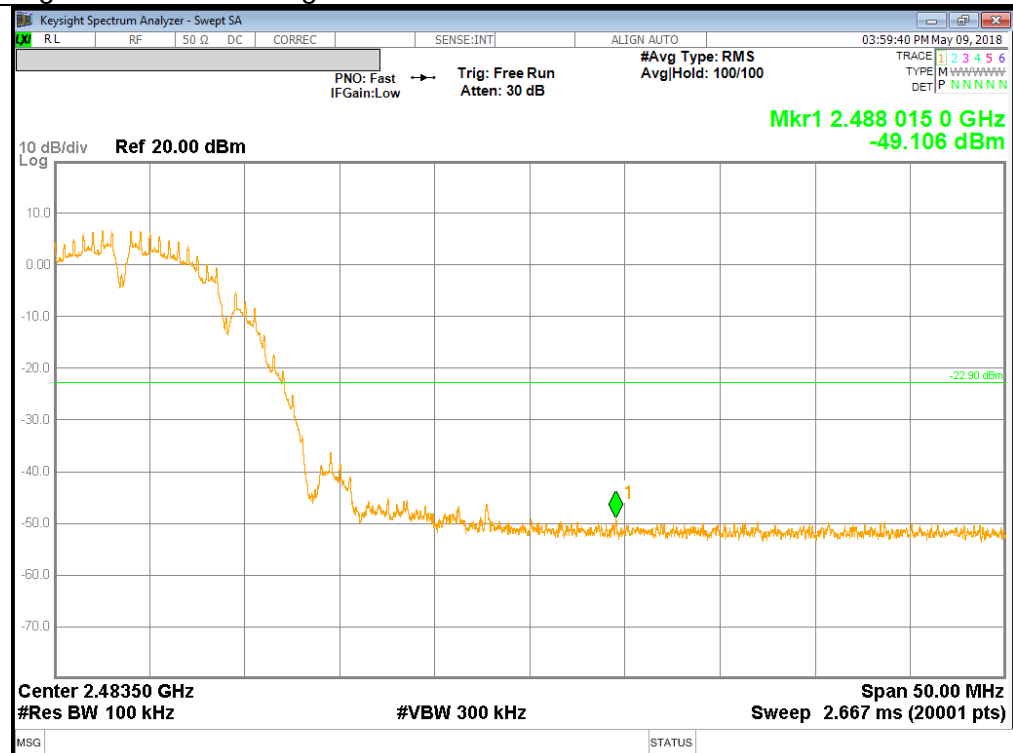
Middle Channel BandEdge



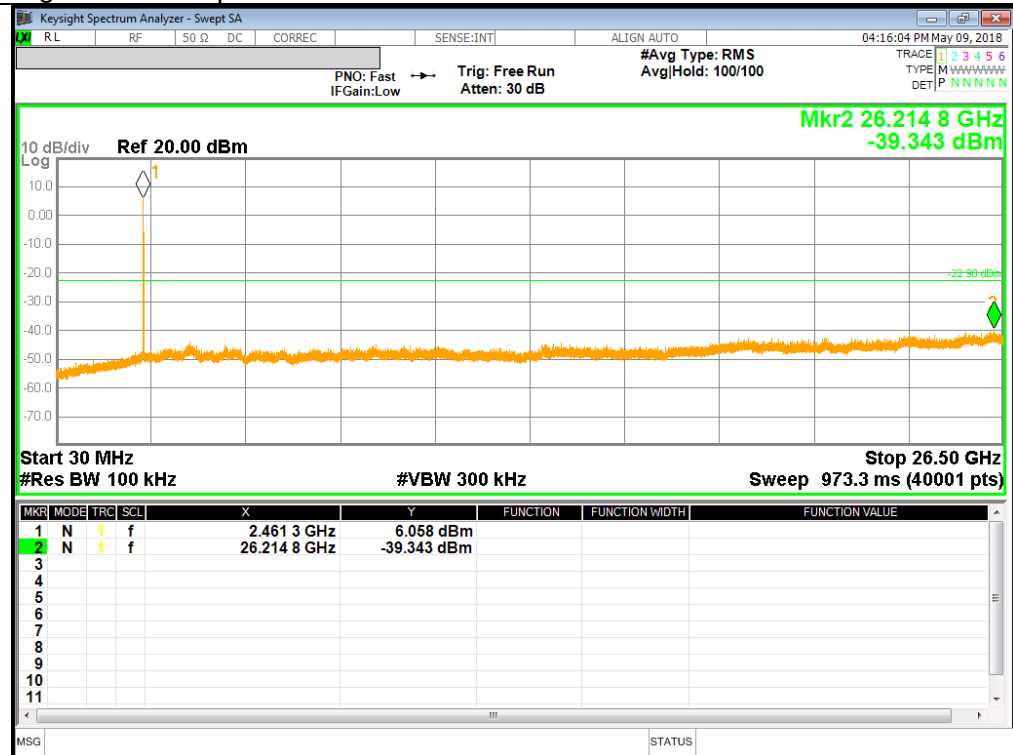
Middle Channel Spurious



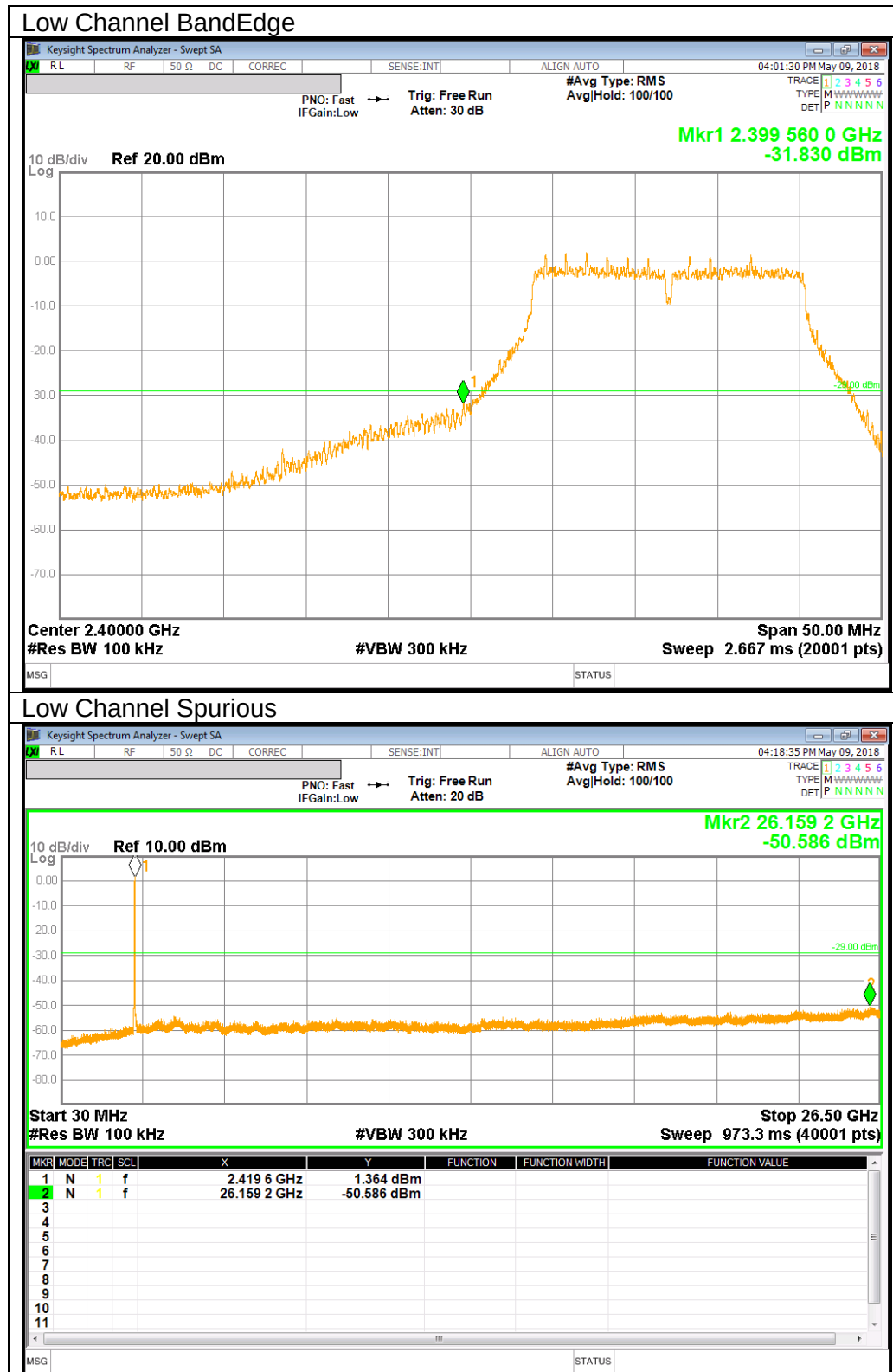
High Channel BandEdge



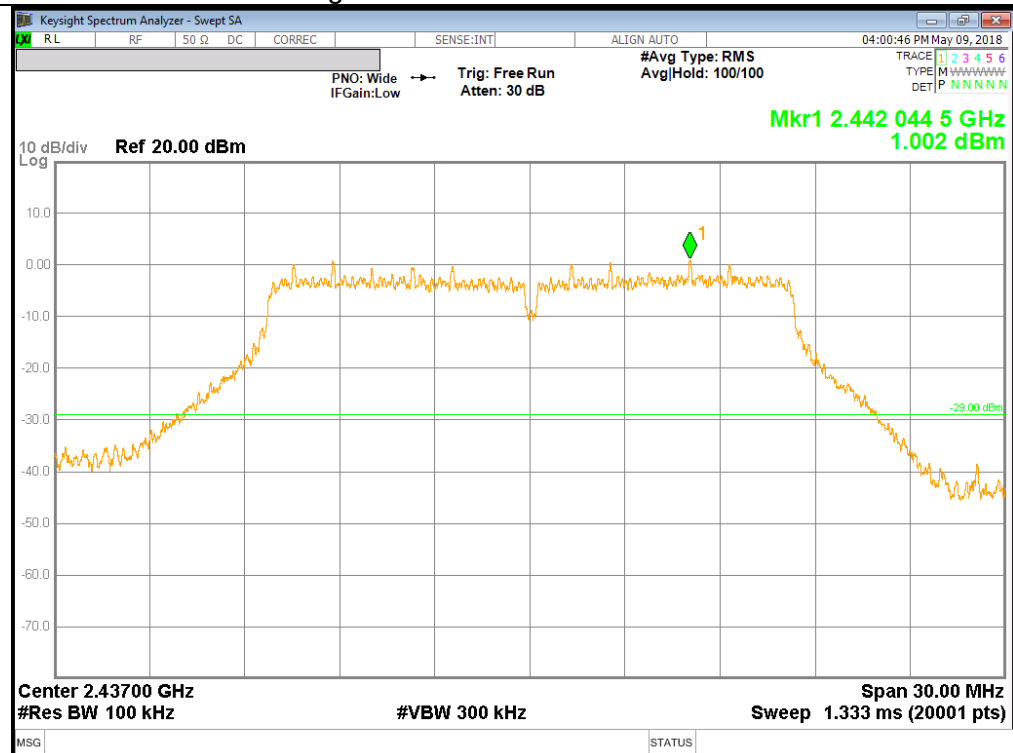
High Channel Spurious



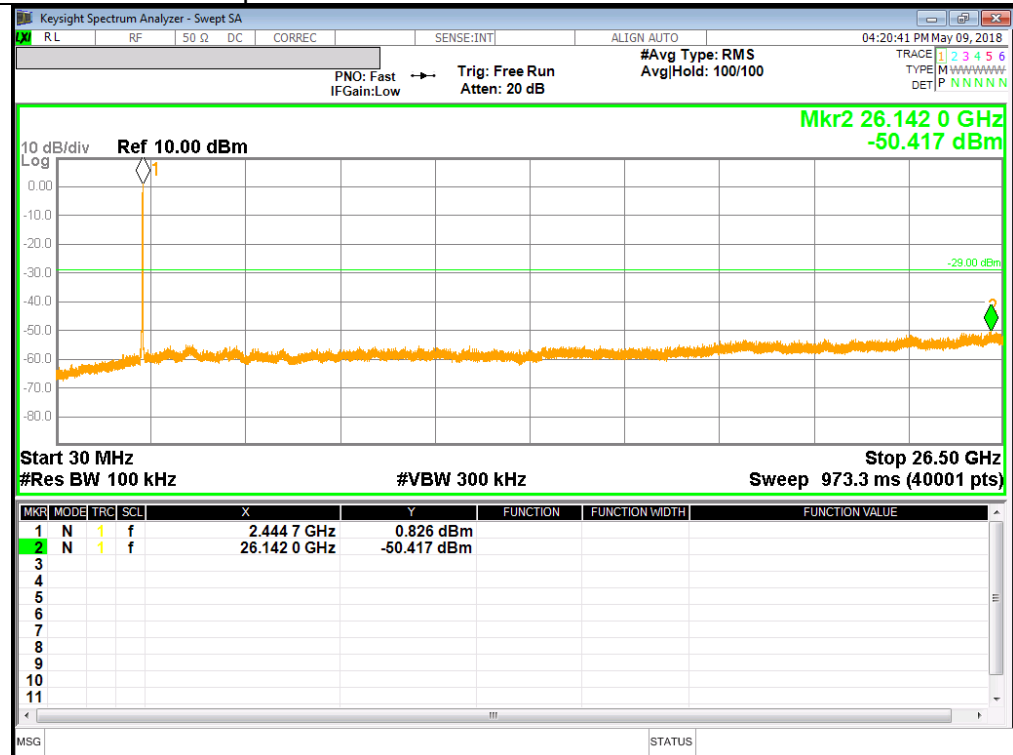
10.4.2.802.11g MODE IN THE 2.4 GHz BAND



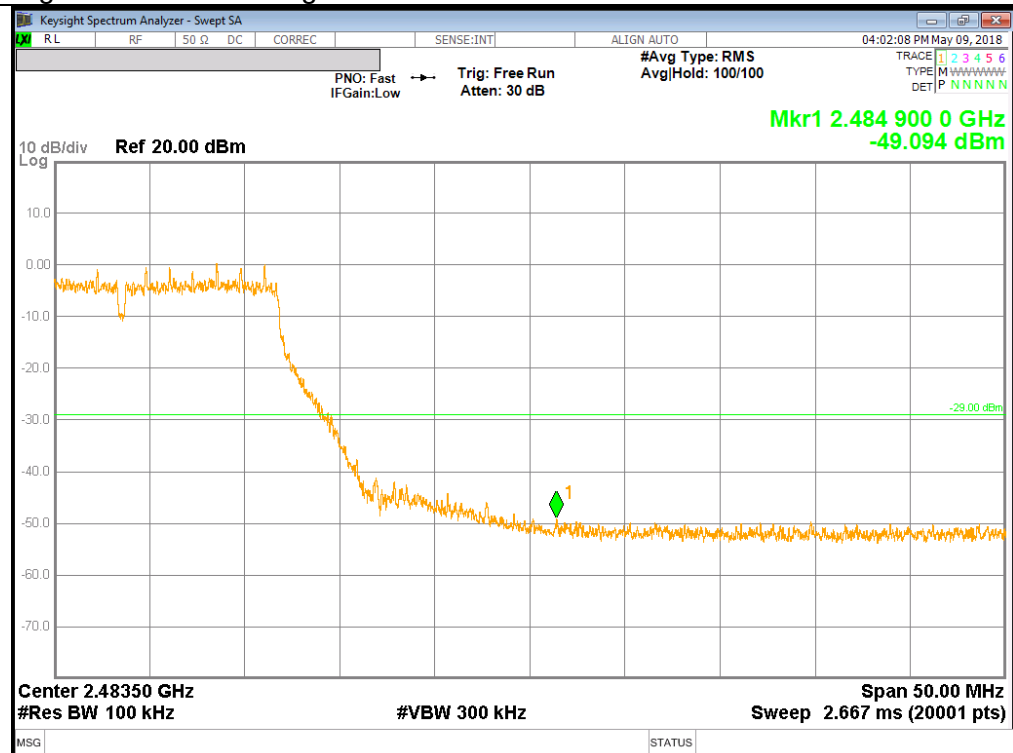
Middle Channel BandEdge



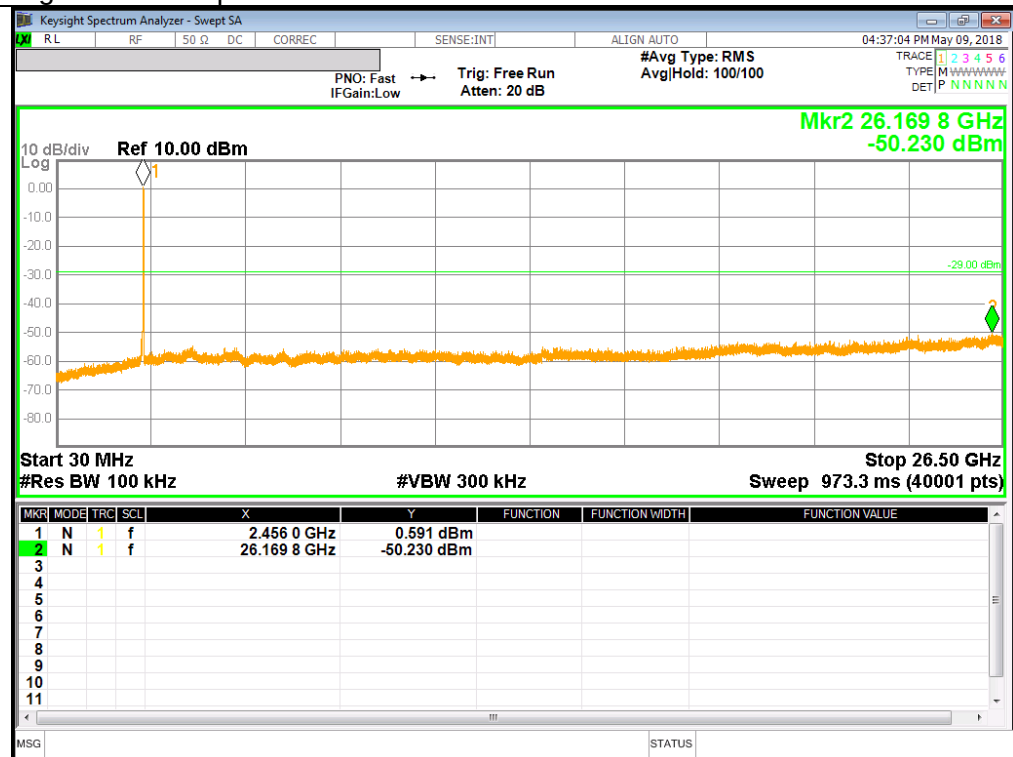
Middle Channel Spurious



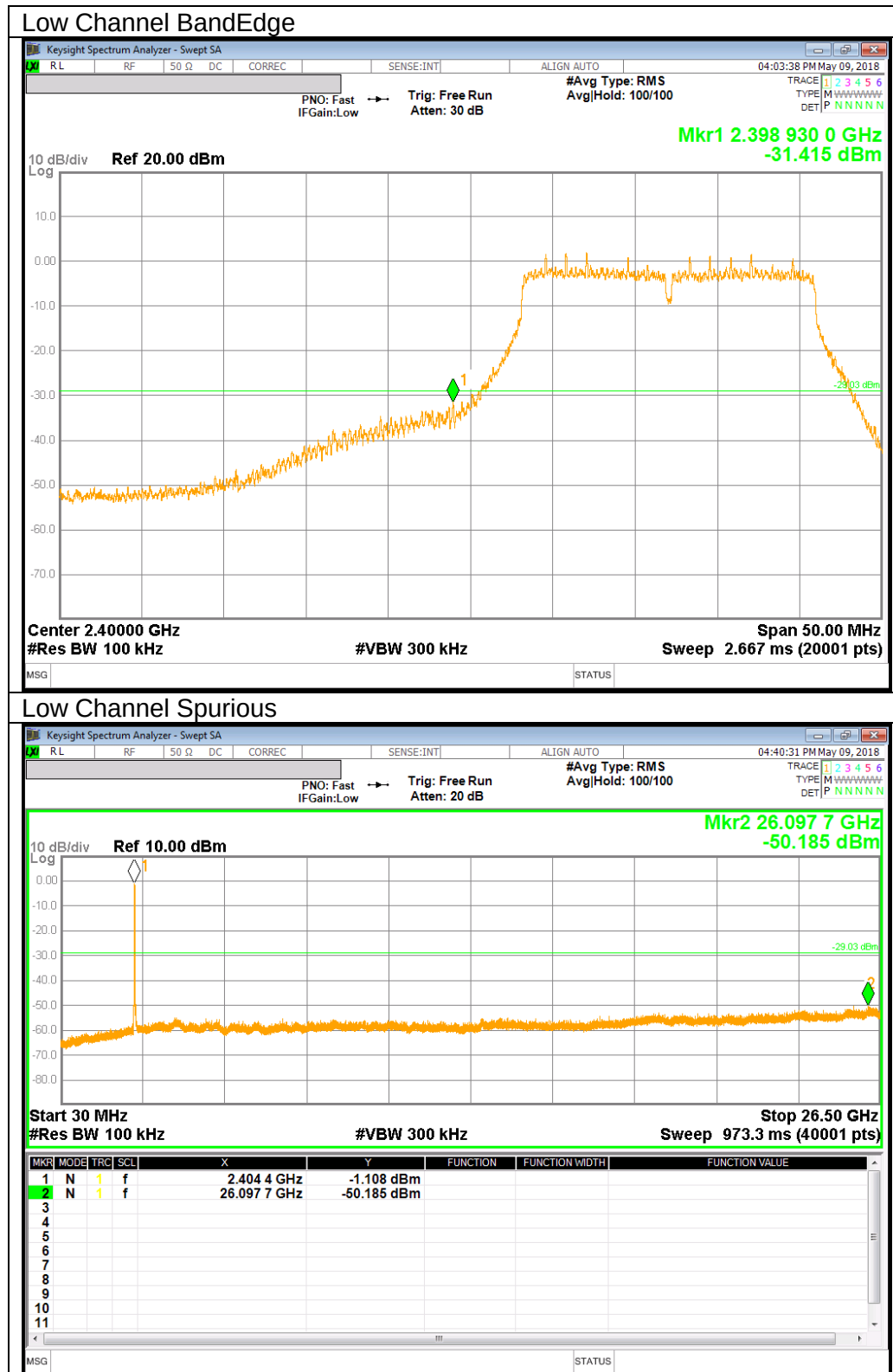
High Channel BandEdge



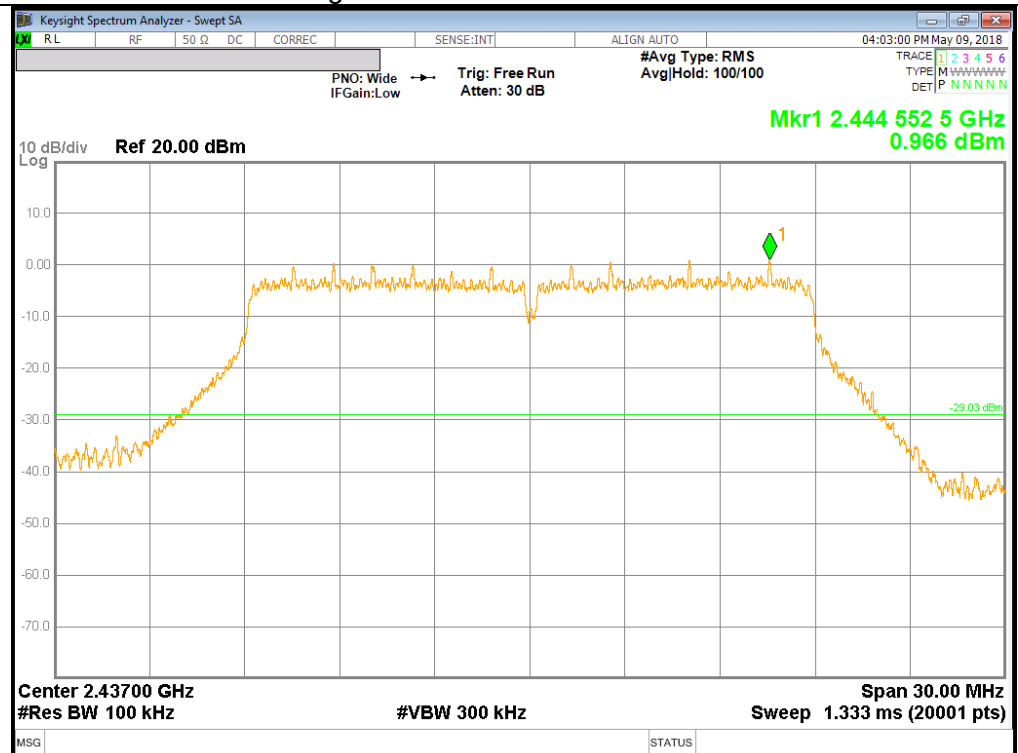
High Channel Spurious



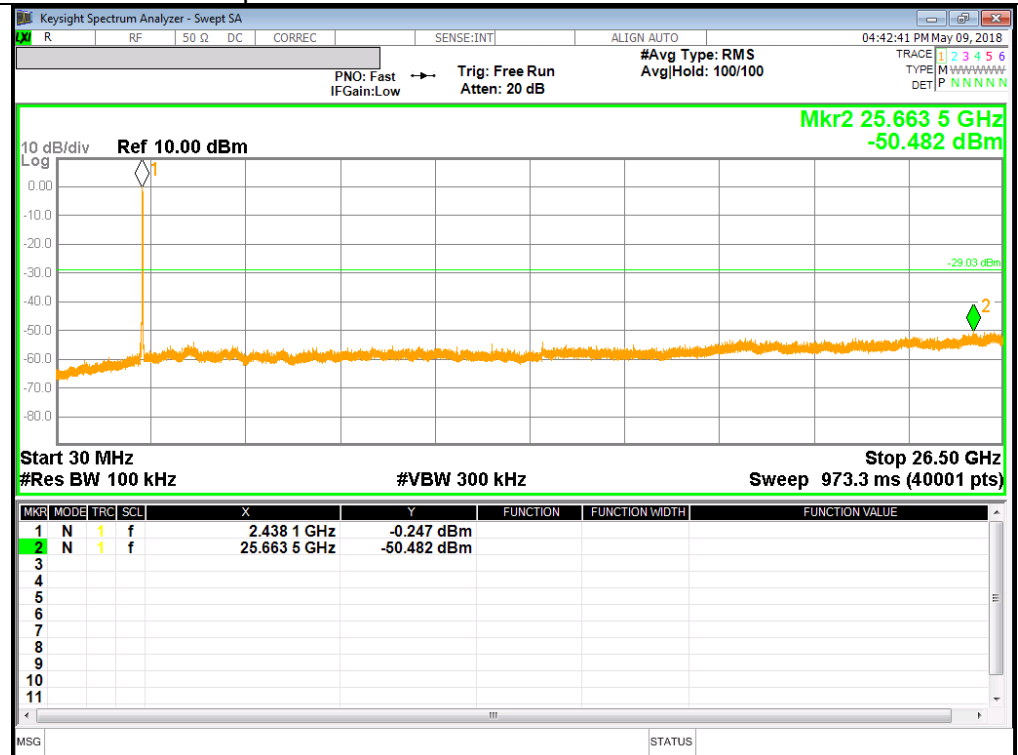
10.4.3.802.11n HT20 MODE IN THE 2.4 GHz BAND



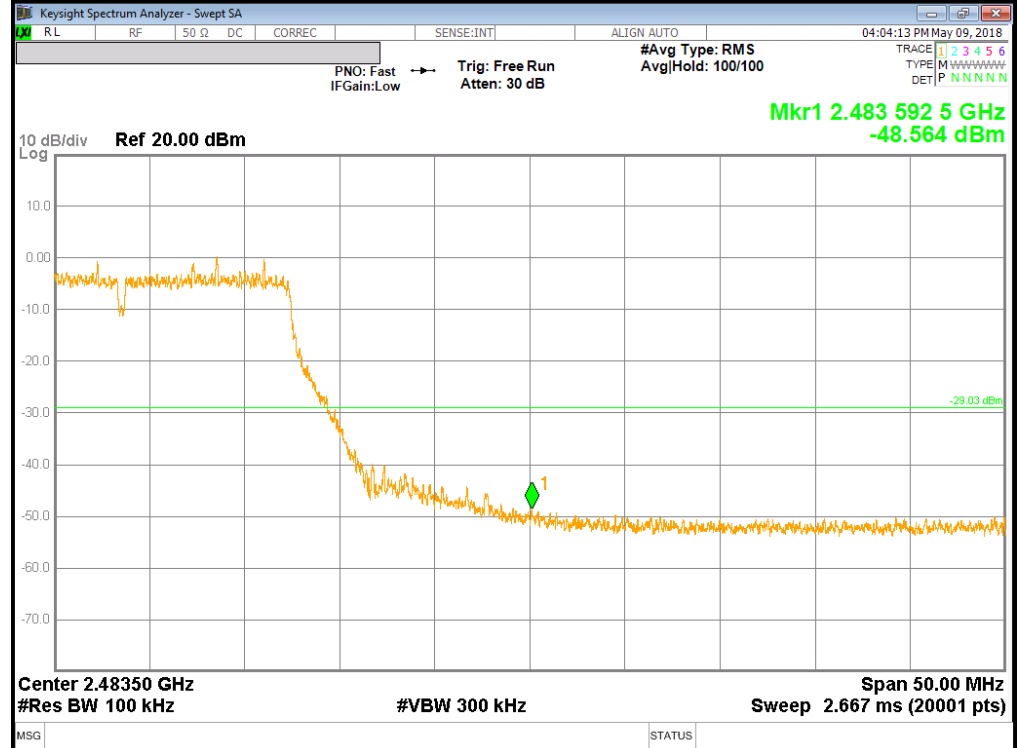
Middle Channel BandEdge



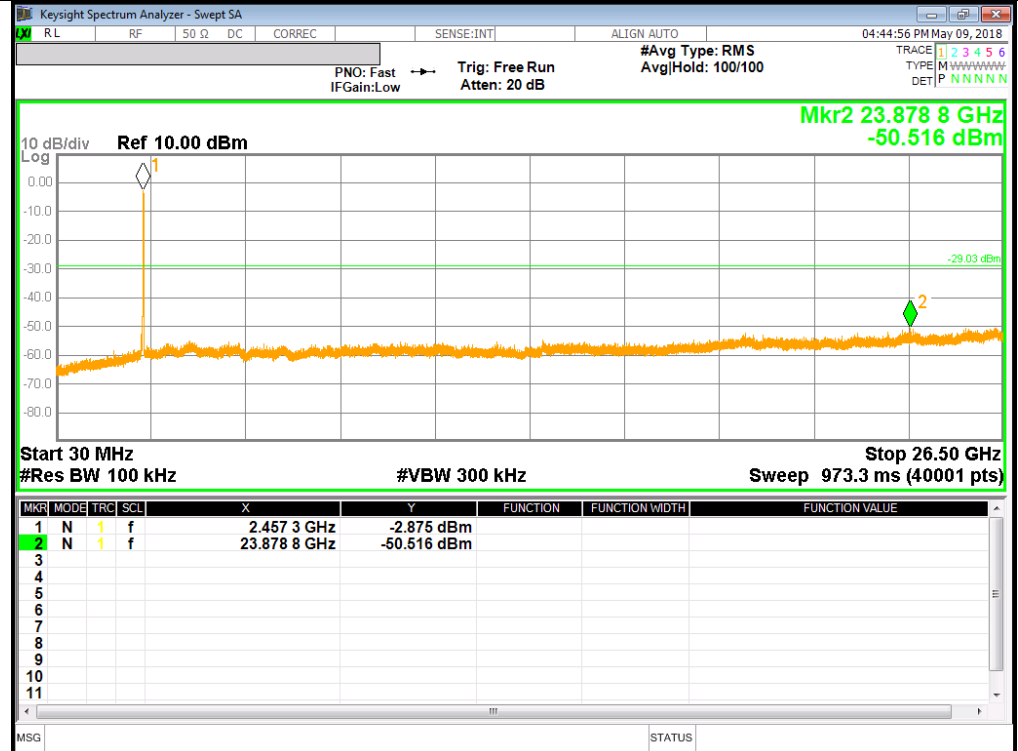
Middle Channel Spurious



High Channel BandEdge



High Channel Spurious



11. RADIATED TEST RESULTS

11.1. 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 all mode = 0dB (duty cycle >98%);

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.

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.

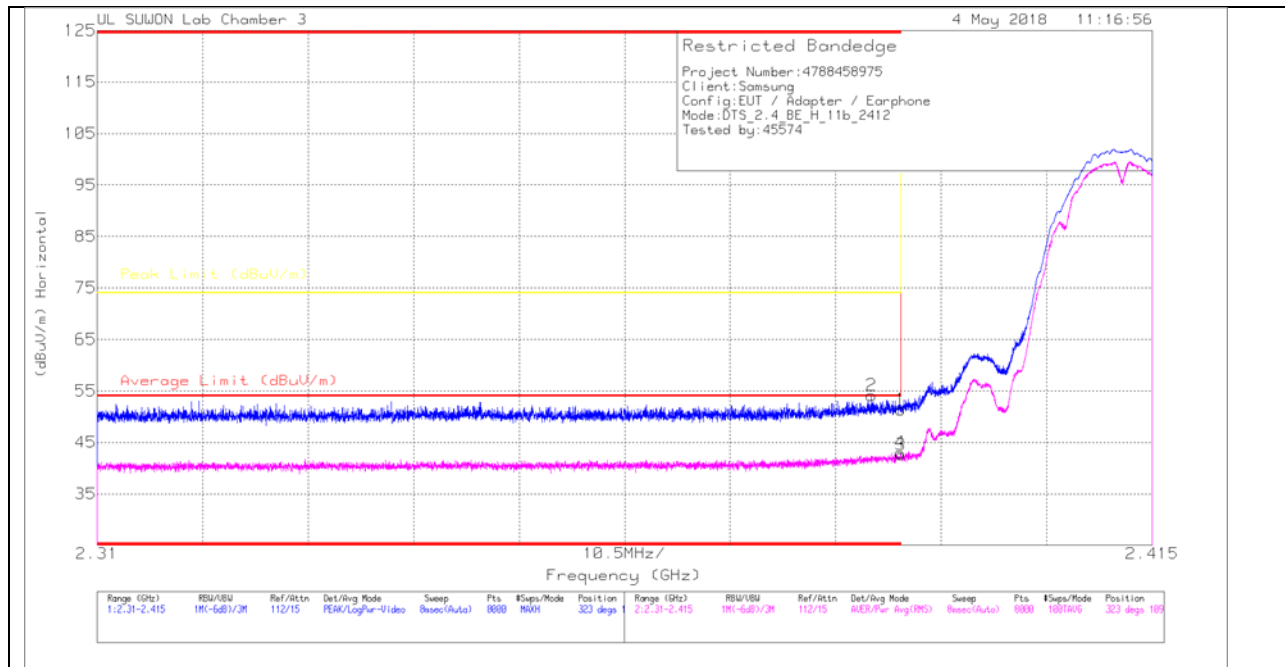
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

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

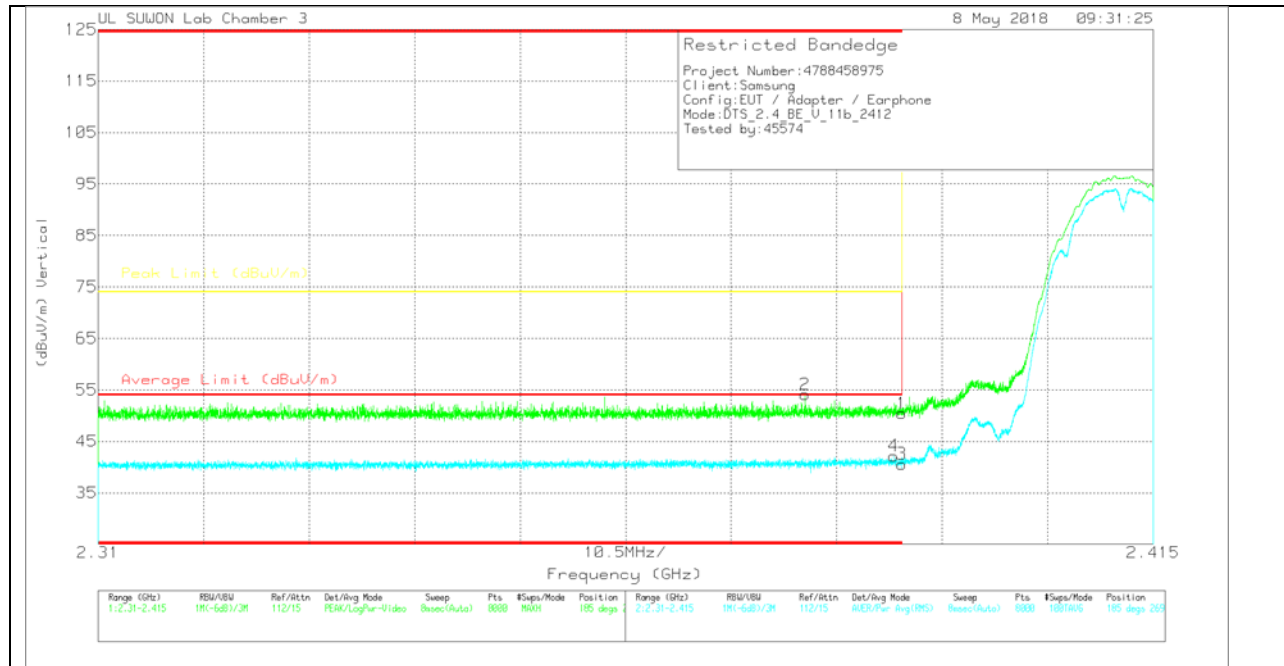
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00205959)	10dB_ATT(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.39	42.89	Pk	31.8	-23.3	0	51.39	-	-	74	-22.61	323	109	H
2	* 2.387	45.63	Pk	31.8	-23.3	0	54.13	-	-	74	-19.87	323	109	H
3	* 2.39	34.1	RMS	31.8	-23.3	0	42.6	54	-11.4	-	-	323	109	H
4	* 2.39	34.52	RMS	31.8	-23.3	0	43.02	54	-10.98	-	-	323	109	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

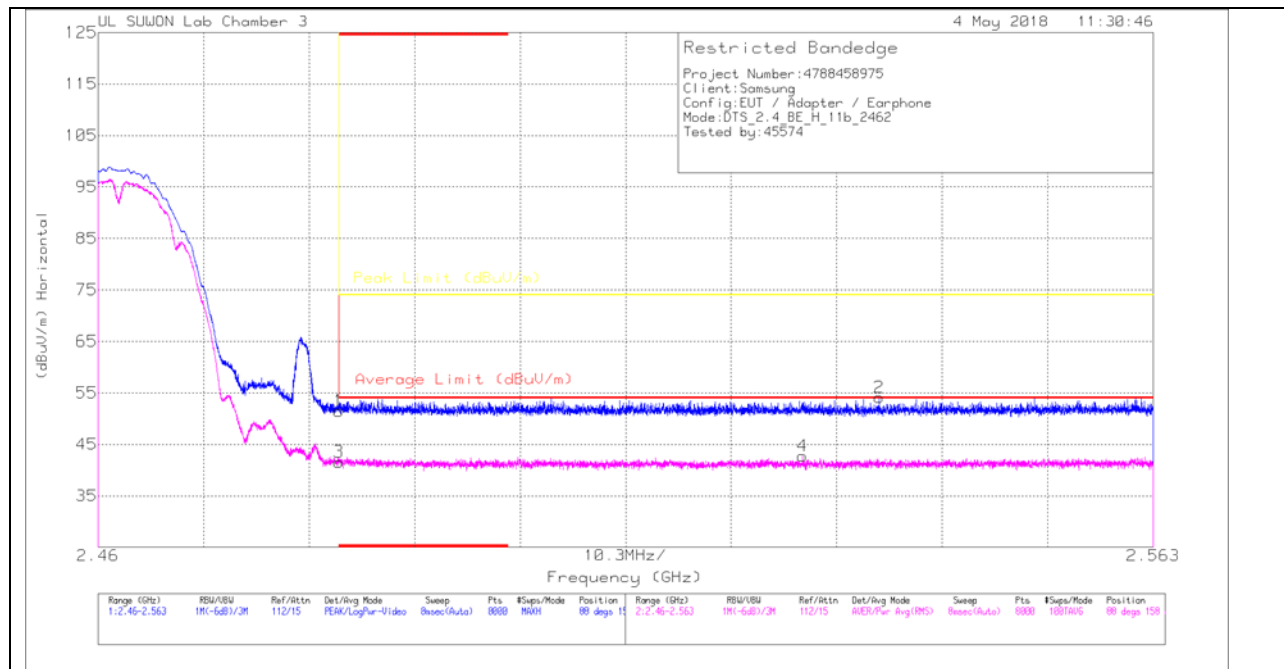
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0020599)	10dB_ATT(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	41.94	Pk	31.8	-23.3	0	50.44	-	-	74	-23.56	185	269	V
2	* 2.38	45.51	Pk	31.8	-23.2	0	54.11	-	-	74	-19.89	185	269	V
3	* 2.39	32.09	RMS	31.8	-23.3	0	40.59	54	-13.41	-	-	185	269	V
4	* 2.389	33.66	RMS	31.8	-23.3	0	42.16	54	-11.84	-	-	185	269	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)**HORIZONTAL PEAK AND AVERAGE PLOT****HORIZONTAL DATA****Trace Markers**

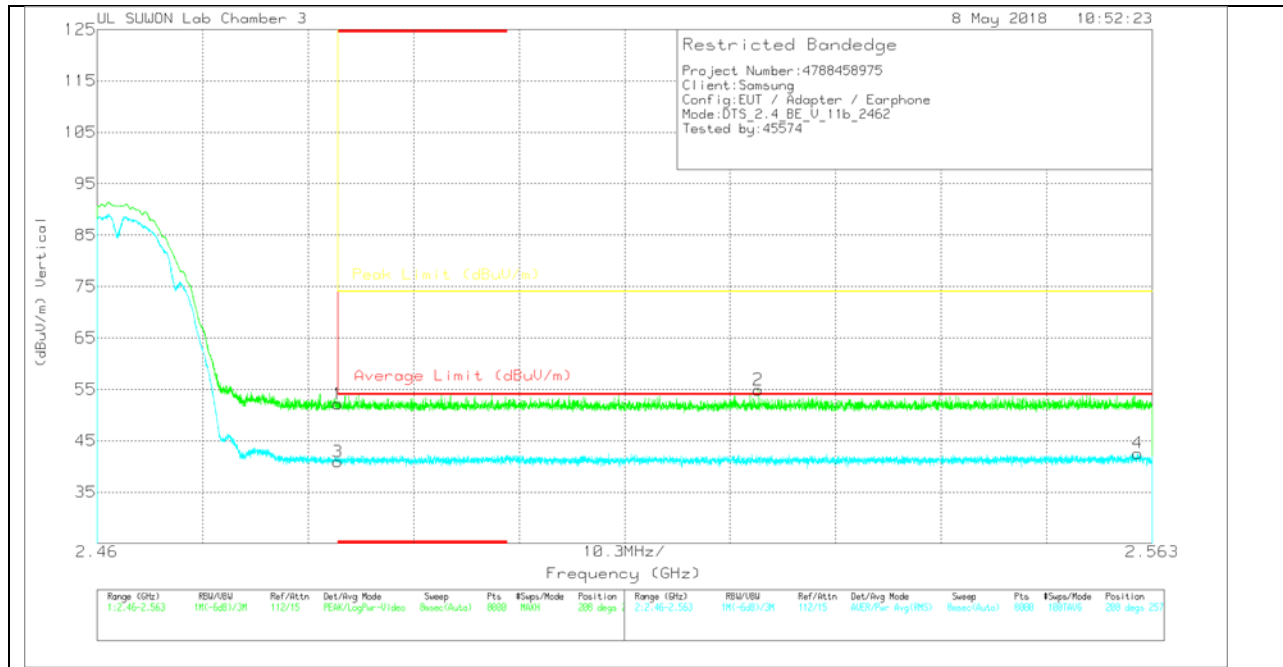
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00205959)	10dB_ATT(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Pk Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.484	42.4	Pk	32.1	-23	0	51.5	-	-	74	-22.5	88	158	H
2	2.536	44.98	Pk	32.1	-23	0	54.08	-	-	74	-19.92	88	158	H
3	* 2.484	32.47	RMS	32.1	-23	0	41.57	54	-12.43	-	-	88	158	H
4	2.529	33.65	RMS	32.1	-23	0	42.75	54	-11.25	-	-	88	158	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-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[00020959]	10dB_ATT[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	* 2.484	43.05	Pk	32.1	-23	0	52.15	-	-	74	-21.85	208	257	V
2	2.525	45.77	Pk	32.1	-23	0	54.87	-	-	74	-19.13	208	257	V
3	* 2.484	31.8	RMS	32.1	-23	0	40.9	54	-13.1	-	-	208	257	V
4	2.562	33.37	RMS	32.1	-22.9	0	42.57	54	-11.43	-	-	208	257	V

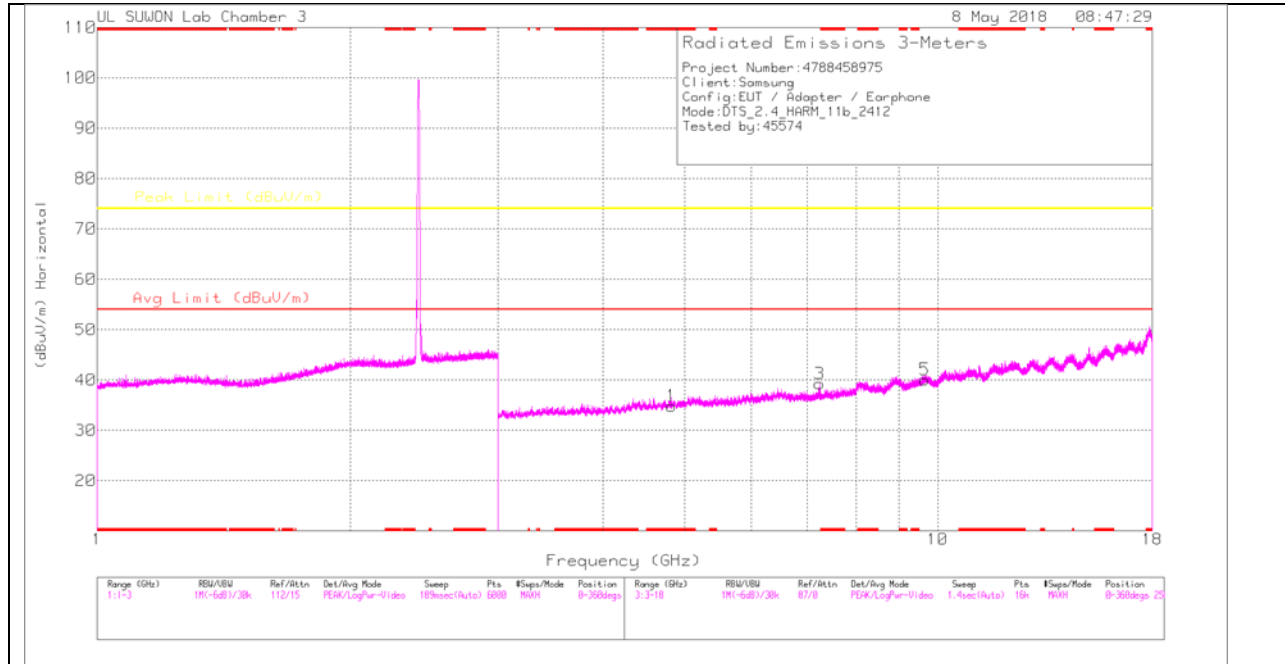
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

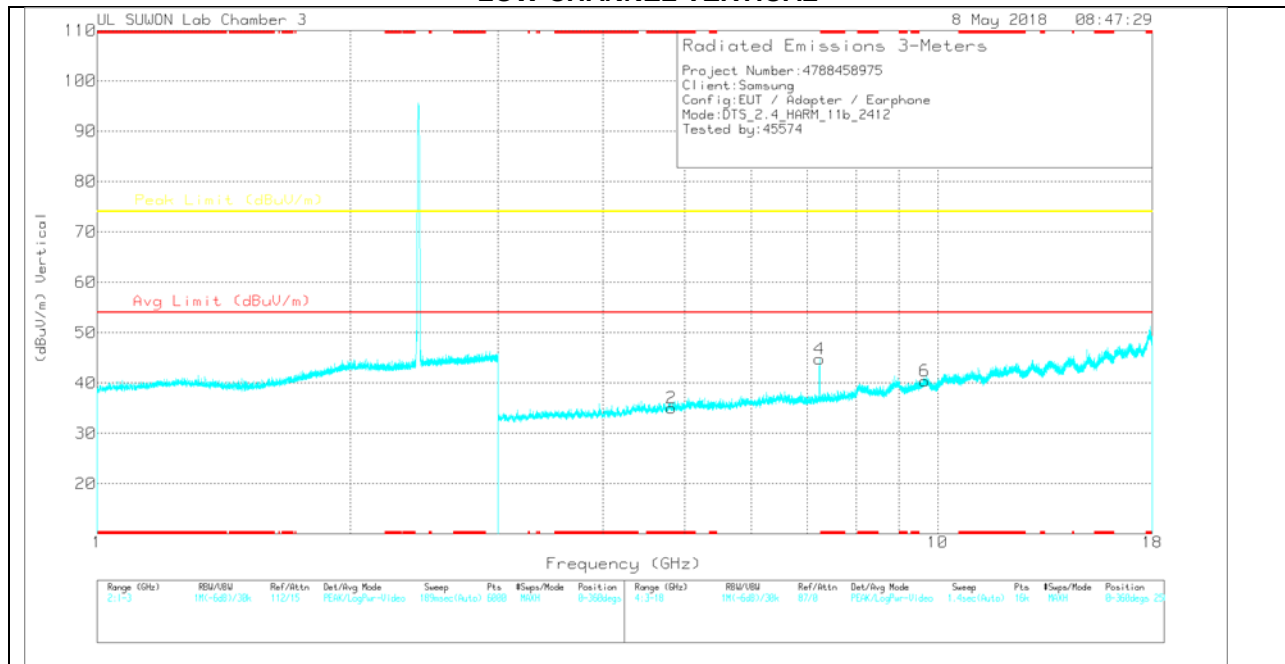
RMS - RMS detection

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[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 4.824	29.23	PK	34	-28.4	0	34.83	-	-	74	-39.17	0-360	150	H
3	7.235	27.56	PK	35.6	-23.9	0	39.26	-	-	74	-34.74	0-360	150	H
5	9.648	23.06	PK	36.7	-19.7	0	40.06	-	-	74	-33.94	0-360	250	H
2	* 4.824	29.42	PK	34	-28.4	0	35.02	-	-	74	-38.98	0-360	250	V
4	7.235	33.05	PK	35.6	-23.9	0	44.75	-	-	74	-29.25	0-360	250	V
6	9.648	23.39	PK	36.7	-19.7	0	40.39	-	-	74	-33.61	0-360	250	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

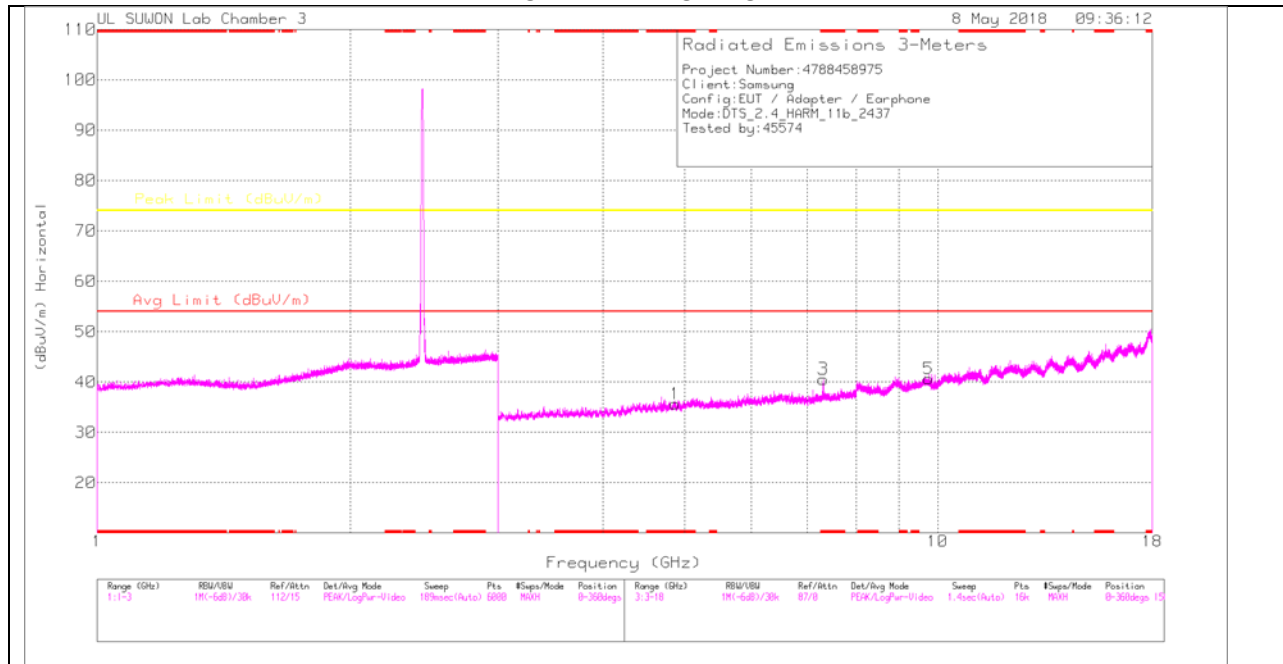
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
7.235	40.47	PK2	35.6	-23.9	0	52.17	-	-	74	-21.83	130	283	V
7.236	37.72	PK2	35.6	-23.9	0	49.42	-	-	74	-24.58	339	101	H

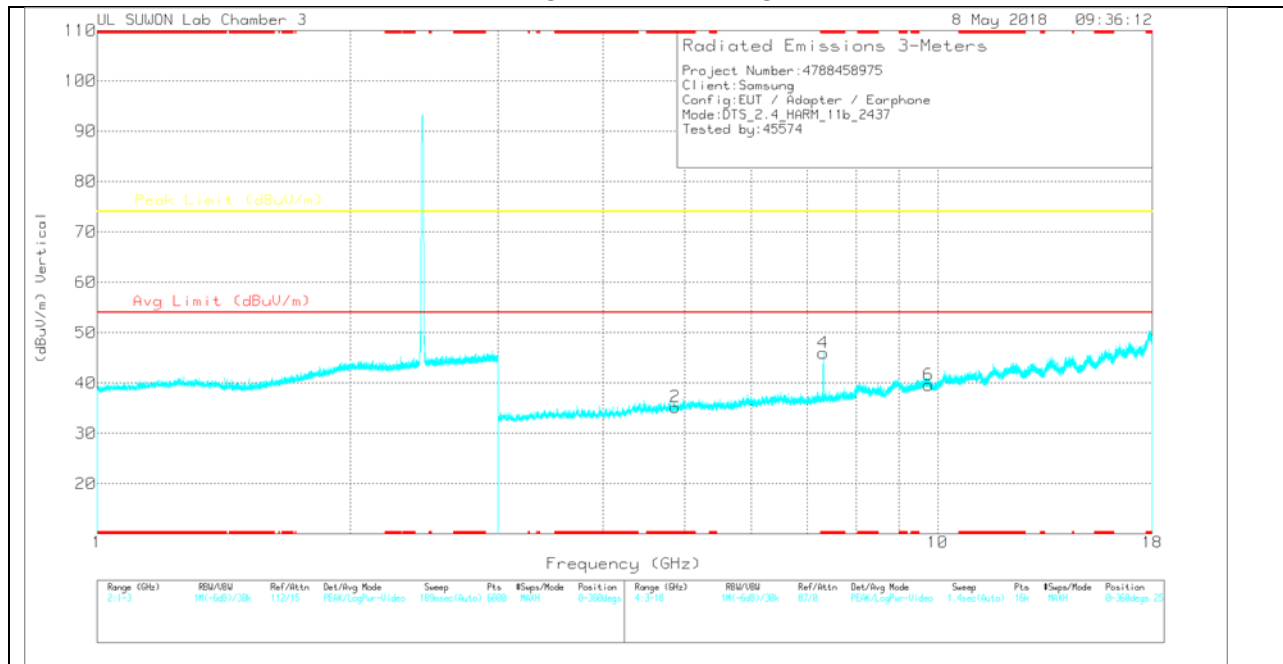
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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[00205959]	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	30.52	PK	34	-28.9	0	35.62	-	-	74	-38.38	0-360	250	H
3	* 7.309	28.58	PK	35.6	-23.6	0	40.58	-	-	74	-33.42	0-360	150	H
5	9.749	23.36	PK	36.9	-19.6	0	40.66	-	-	74	-33.34	0-360	150	H
2	* 4.874	30.12	PK	34	-28.9	0	35.22	-	-	74	-38.78	0-360	150	V
4	* 7.31	33.87	PK	35.6	-23.5	0	45.97	-	-	74	-28.03	0-360	251	V
6	9.749	22.3	PK	36.9	-19.6	0	39.6	-	-	74	-34.4	0-360	150	V

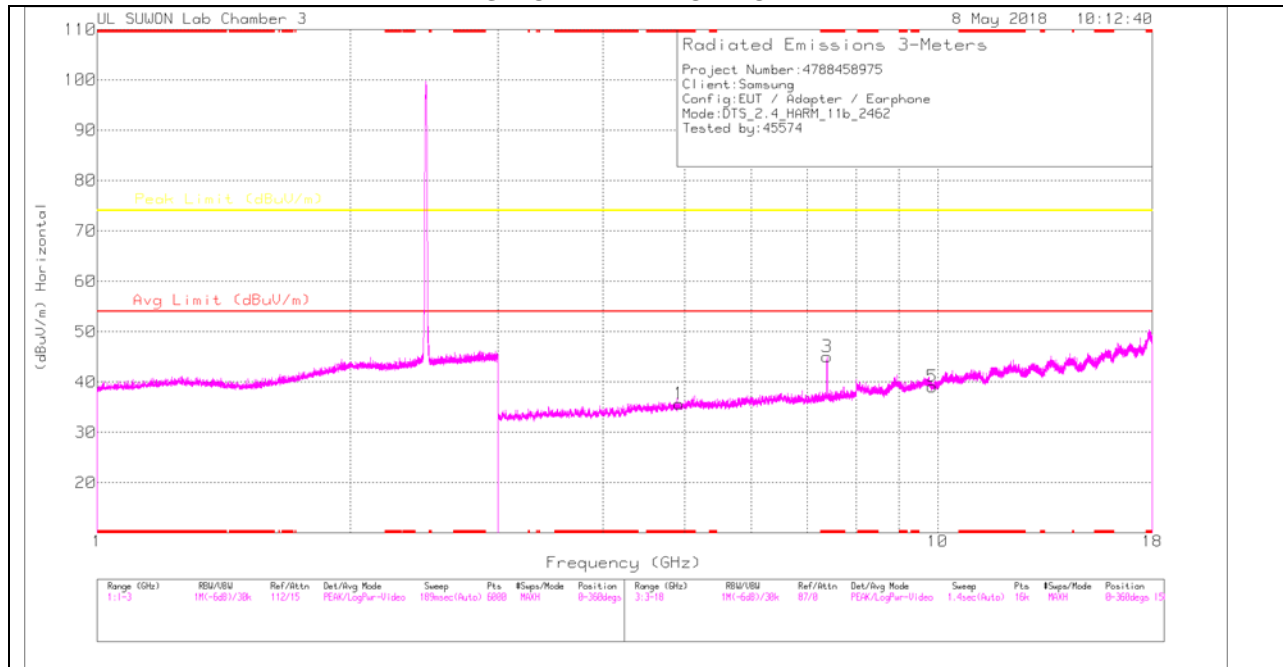
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

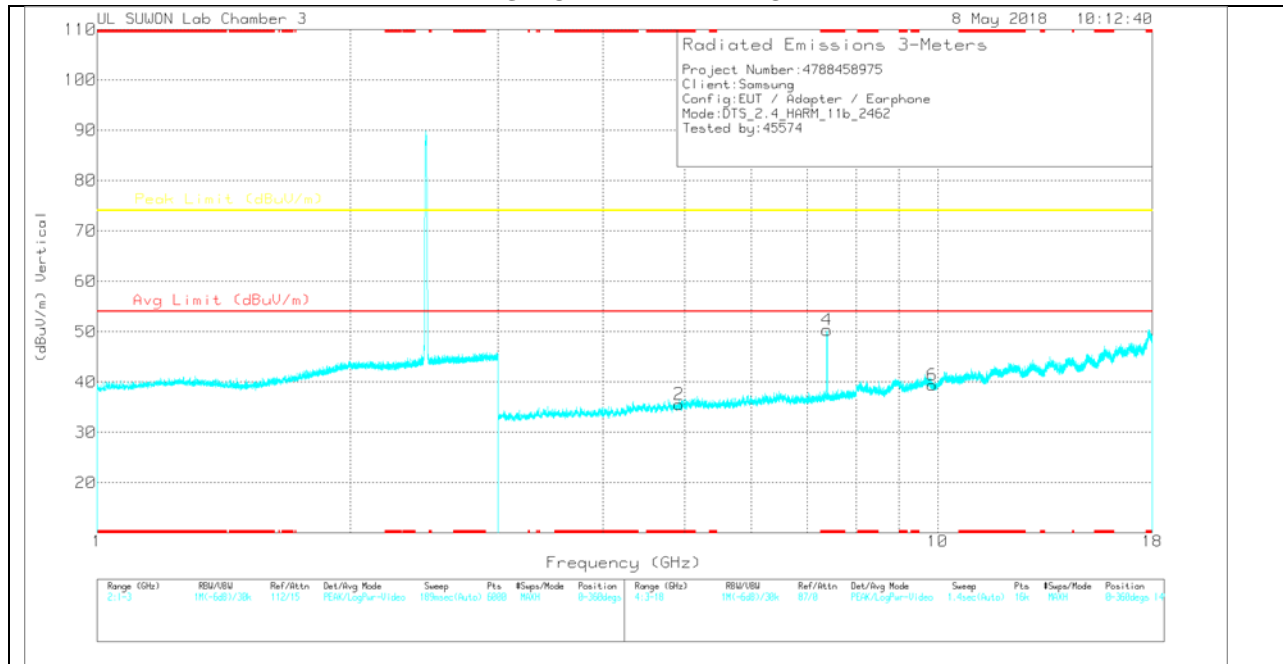
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.312	41.39	PK2	35.6	-23.5	0	53.49	-	-	74	-20.51	116	336	V
* 7.31	33.98	MAv1	35.6	-23.5	0	46.08	54	-7.92	-	-	116	336	V
* 7.311	37.85	PK2	35.6	-23.5	0	49.95	-	-	74	-24.05	3	140	H
* 7.31	28.01	MAv1	35.6	-23.5	0	40.11	54	-13.89	-	-	3	140	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-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[00205959]	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	30.58	PK	34	-28.9	0	35.68	-	-	74	-38.32	0-360	150	H
3	* 7.385	32.45	PK	35.6	-23	0	45.05	-	-	74	-28.95	0-360	150	H
5	9.849	21.81	PK	37	-19.7	0	39.11	-	-	74	-34.89	0-360	250	H
2	* 4.924	30.46	PK	34	-28.9	0	35.56	-	-	74	-38.44	0-360	149	V
4	* 7.385	37.74	PK	35.6	-23	0	50.34	-	-	74	-23.66	0-360	251	V
6	9.849	22.09	PK	37	-19.7	0	39.39	-	-	74	-34.61	0-360	149	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

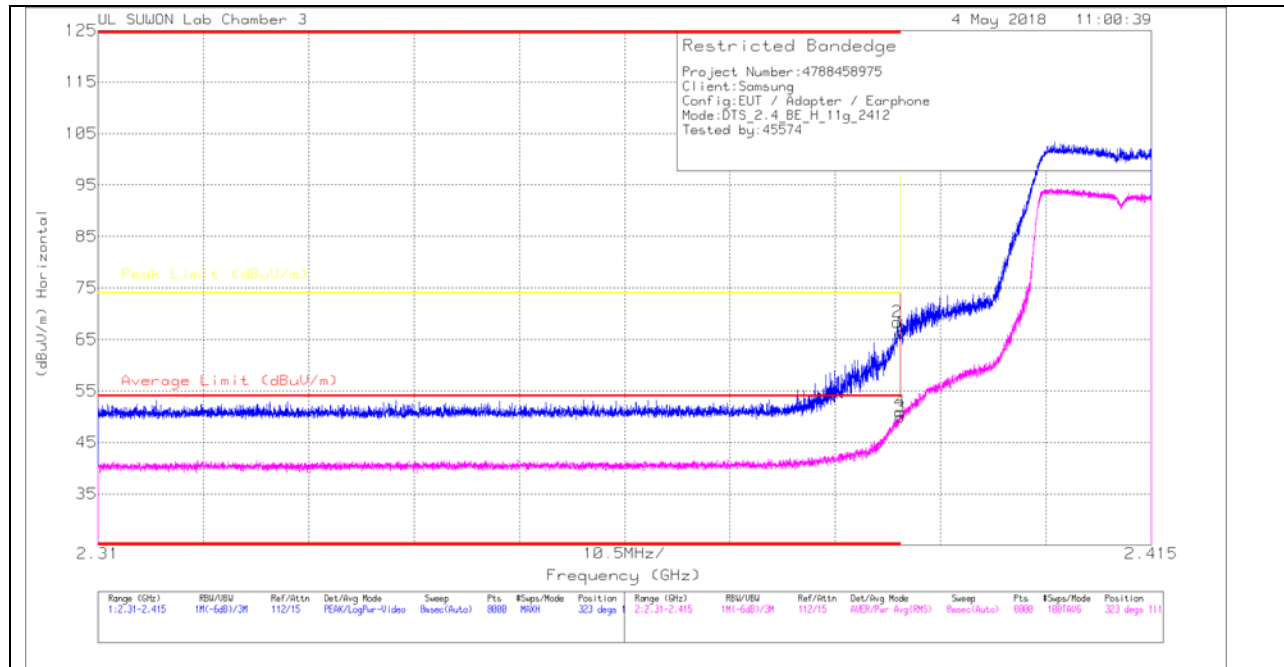
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.385	39.65	PK2	35.6	-23	0	52.25	-	-	74	-21.75	356	101	H
* 7.385	32.9	MAv1	35.6	-23	0	45.5	54	-8.5	-	-	356	101	H
* 7.385	43.37	PK2	35.6	-23	0	55.97	-	-	74	-18.03	123	328	V
* 7.385	38.26	MAv1	35.6	-23	0	50.86	54	-3.14	-	-	123	328	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-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

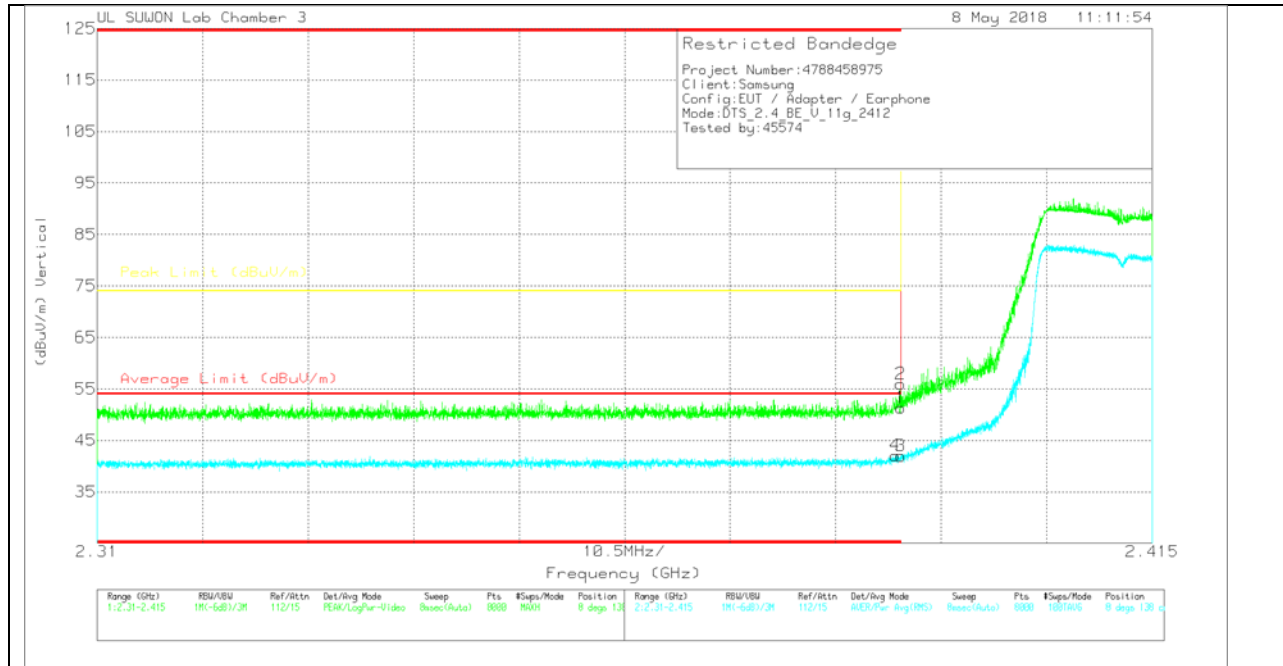
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00205959)	10dB_ATT(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	57.79	Pk	31.8	-23.3	0	66.29	-	-	74	-7.71	323	111	H
2	* 2.39	59.86	Pk	31.8	-23.3	0	68.36	-	-	74	-5.64	323	111	H
3	* 2.39	41.47	RMS	31.8	-23.3	0	49.97	54	-4.03	-	-	323	111	H
4	* 2.39	42.47	RMS	31.8	-23.3	0	50.97	54	-3.03	-	-	323	111	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-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(00205959)	10dB_ATT(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	42.84	Pk	31.8	-23.3	0	51.34	-	-	74	-22.66	8	138	V
2	* 2.39	47.46	Pk	31.8	-23.3	0	55.96	-	-	74	-18.04	8	138	V
3	* 2.39	33.48	RMS	31.8	-23.3	0	41.98	54	-12.02	-	-	8	138	V
4	* 2.389	33.56	RMS	31.8	-23.3	0	42.06	54	-11.94	-	-	8	138	V

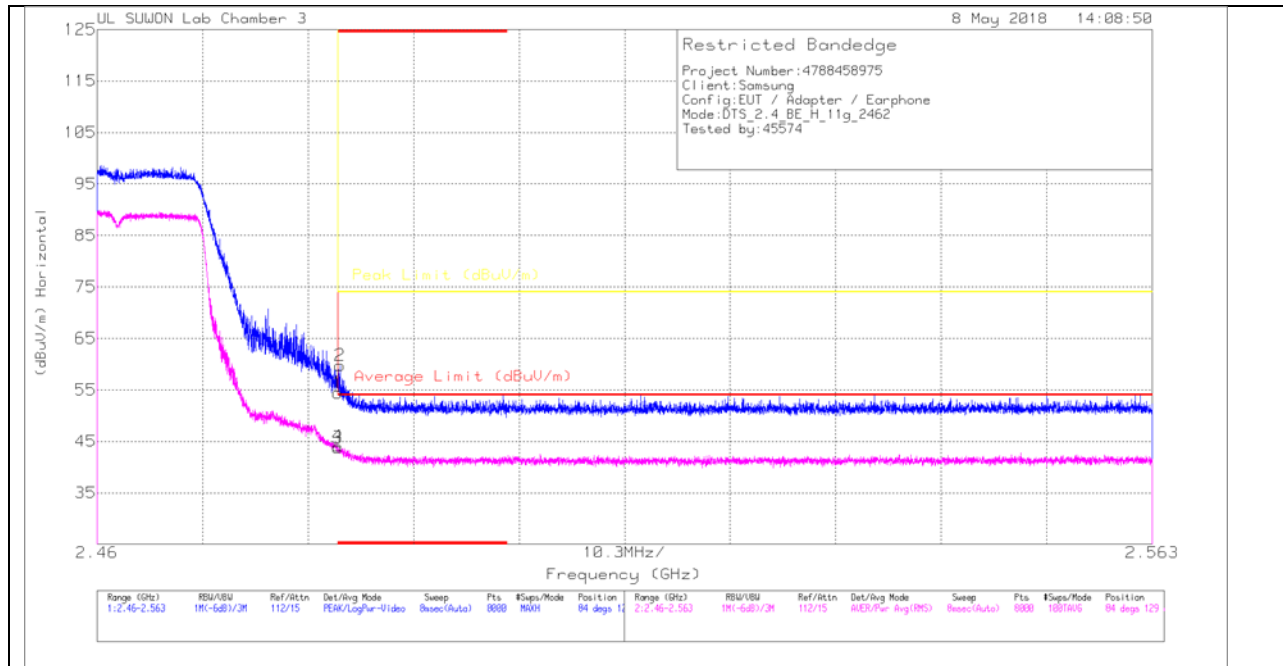
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

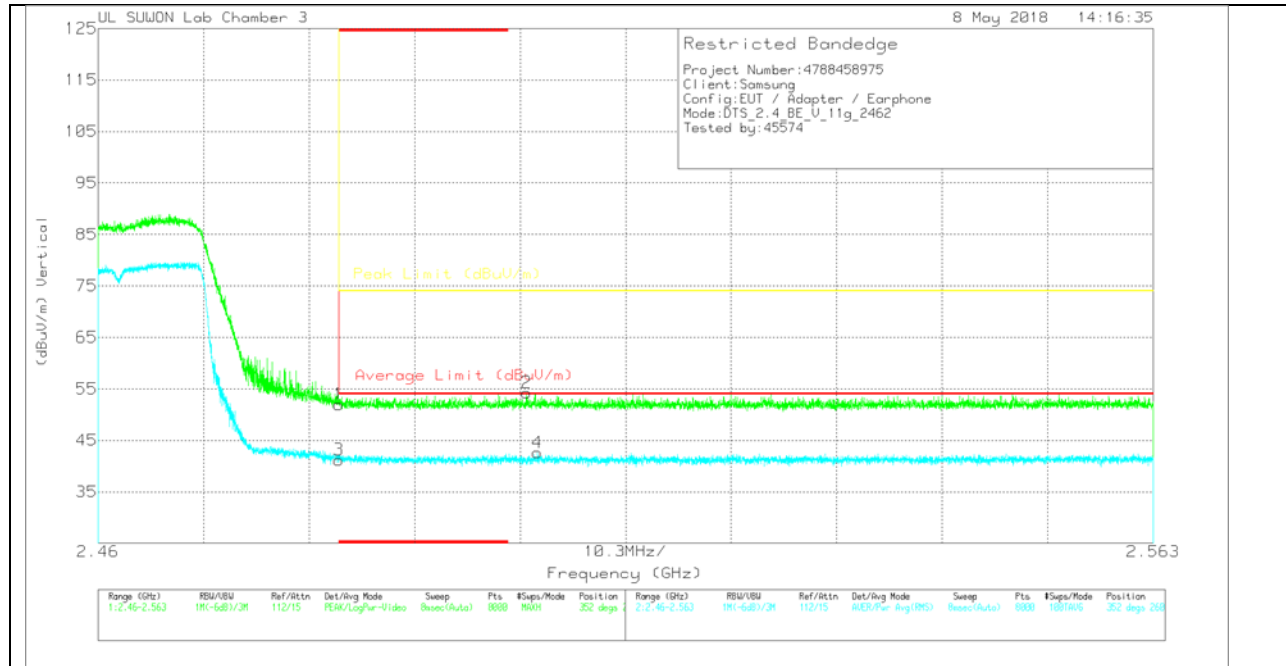
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00205999)	10dB_ATT(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Pk Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.484	45.34	Pk	32.1	-23	0	54.44	-	-	74	-19.56	84	129	H
2	* 2.484	50.65	Pk	32.1	-23	0	59.75	-	-	74	-14.25	84	129	H
3	* 2.484	34.65	RMS	32.1	-23	0	43.75	54	-10.25	-	-	84	129	H
4	* 2.484	35	RMS	32.1	-23	0	44.1	54	-9.9	-	-	84	129	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-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(00205959)	10dB_ATT(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	* 2.484	42.87	Pk	32.1	-23	0	51.97	-	-	74	-22.03	352	260	V
2	2.502	45.25	Pk	32.1	-23.1	0	54.25	-	-	74	-19.75	352	260	V
3	* 2.484	32.1	RMS	32.1	-23	0	41.2	54	-12.8	-	-	352	260	V
4	2.503	33.53	RMS	32.1	-23	0	42.63	54	-11.37	-	-	352	260	V

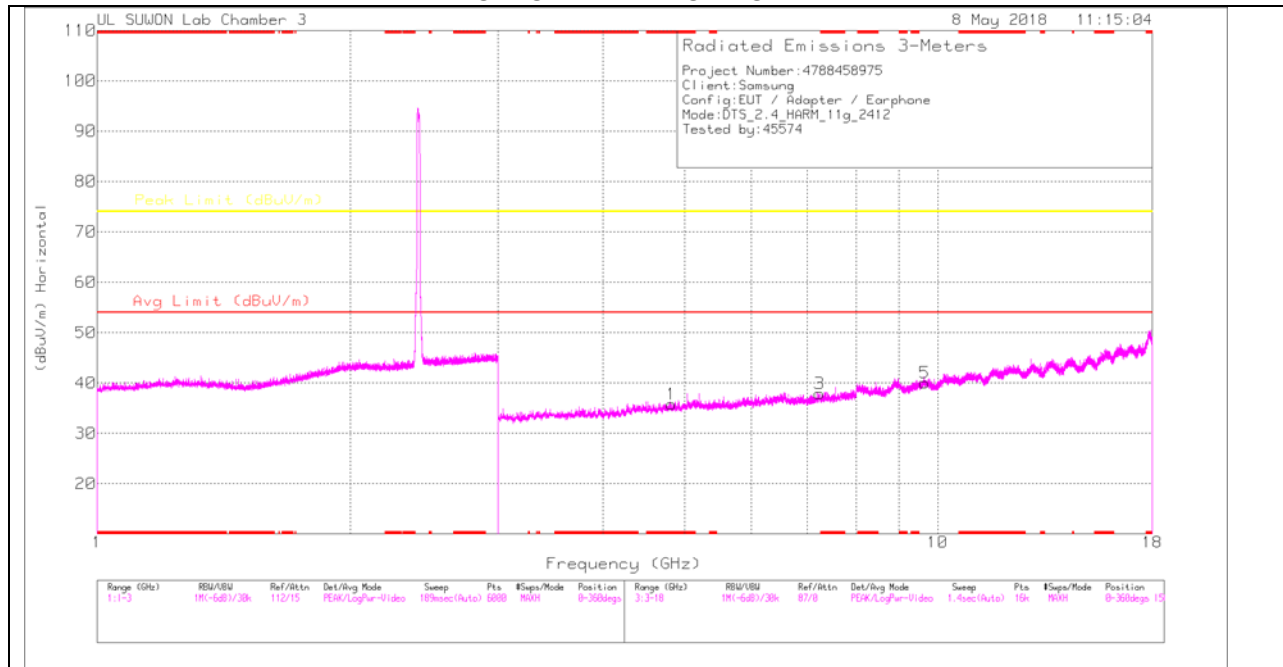
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

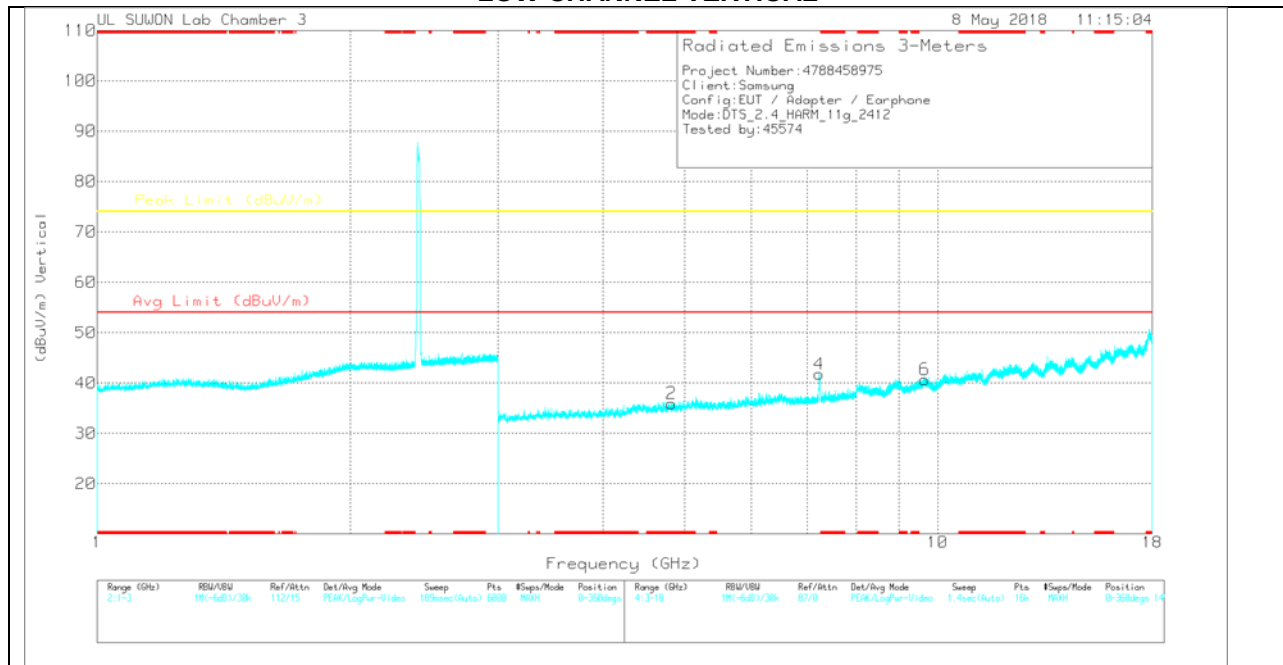
RMS - RMS detection

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[00205959]	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	30.19	PK	34	-28.4	0	35.79	-	-	74	-38.21	0-360	150	H
3	7.234	26.18	PK	35.6	-23.9	0	37.88	-	-	74	-36.12	0-360	150	H
5	9.648	23.04	PK	36.7	-19.7	0	40.04	-	-	74	-33.96	0-360	150	H
2	* 4.825	30.33	PK	34	-28.4	0	35.93	-	-	74	-38.07	0-360	250	V
4	7.229	30.08	PK	35.6	-23.9	0	41.78	-	-	74	-32.22	0-360	250	V
6	9.648	23.69	PK	36.7	-19.7	0	40.69	-	-	74	-33.31	0-360	149	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK – Peak Detector

Radiated Emissions

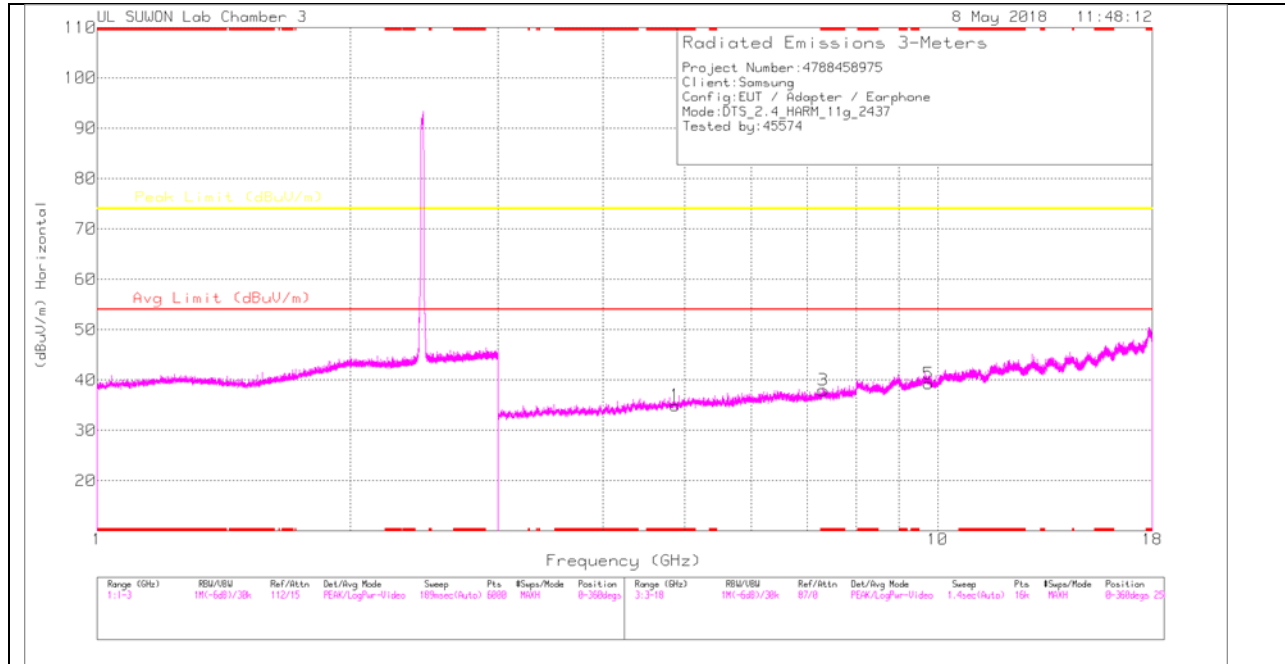
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.231	48.74	PK2	35.6	-23.9	0	60.44	-	-	74	-13.56	123	340	V
7.235	40.29	PK2	35.6	-23.9	0	51.99	-	-	74	-22.01	6	104	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

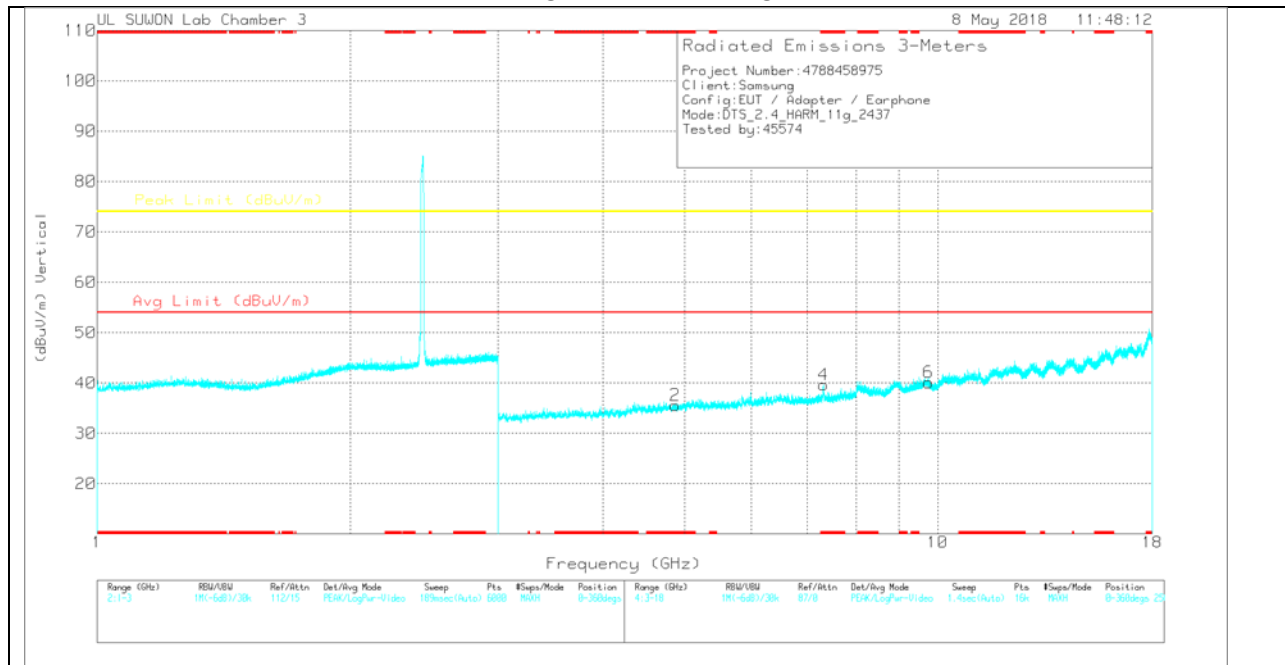
PK2 - KDB558074 Method: Maximum Peak

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[00205959]	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	29.85	PK	34	-28.9	0	34.95	-	-	74	-39.05	0-360	250	H
3	* 7.308	25.98	PK	35.6	-23.6	0	37.98	-	-	74	-36.02	0-360	150	H
5	9.749	21.99	PK	36.9	-19.6	0	39.29	-	-	74	-34.71	0-360	250	H
2	* 4.874	30.45	PK	34	-28.9	0	35.55	-	-	74	-38.45	0-360	250	V
4	* 7.313	27.55	PK	35.6	-23.5	0	39.65	-	-	74	-34.35	0-360	149	V
6	9.749	22.81	PK	36.9	-19.6	0	40.11	-	-	74	-33.89	0-360	149	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK – Peak Detector

Radiated Emissions

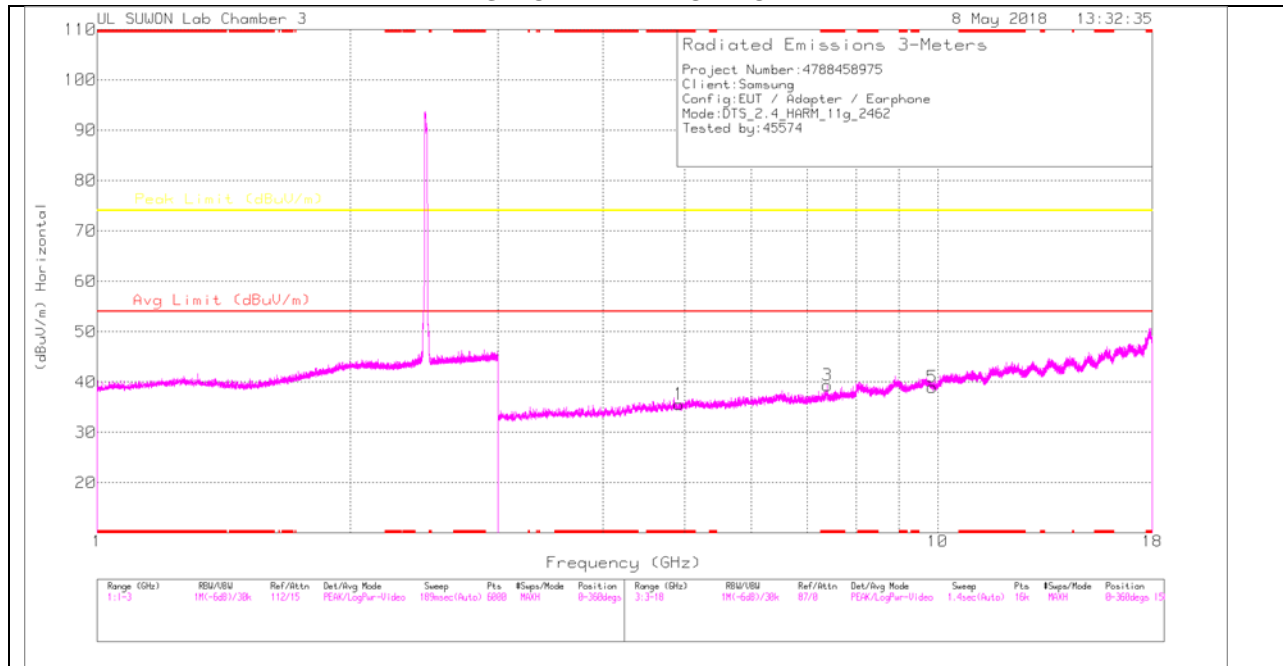
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.312	45.28	PK2	35.6	-23.5	0	57.38	-	-	74	-16.62	117	325	V
* 7.309	28.11	MAv1	35.6	-23.6	0	40.11	54	-13.89	-	-	117	325	V
* 7.314	39.48	PK2	35.6	-23.5	0	51.58	-	-	74	-22.42	349	100	H
* 7.309	25.15	MAv1	35.6	-23.6	0	37.15	54	-16.85	-	-	349	100	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

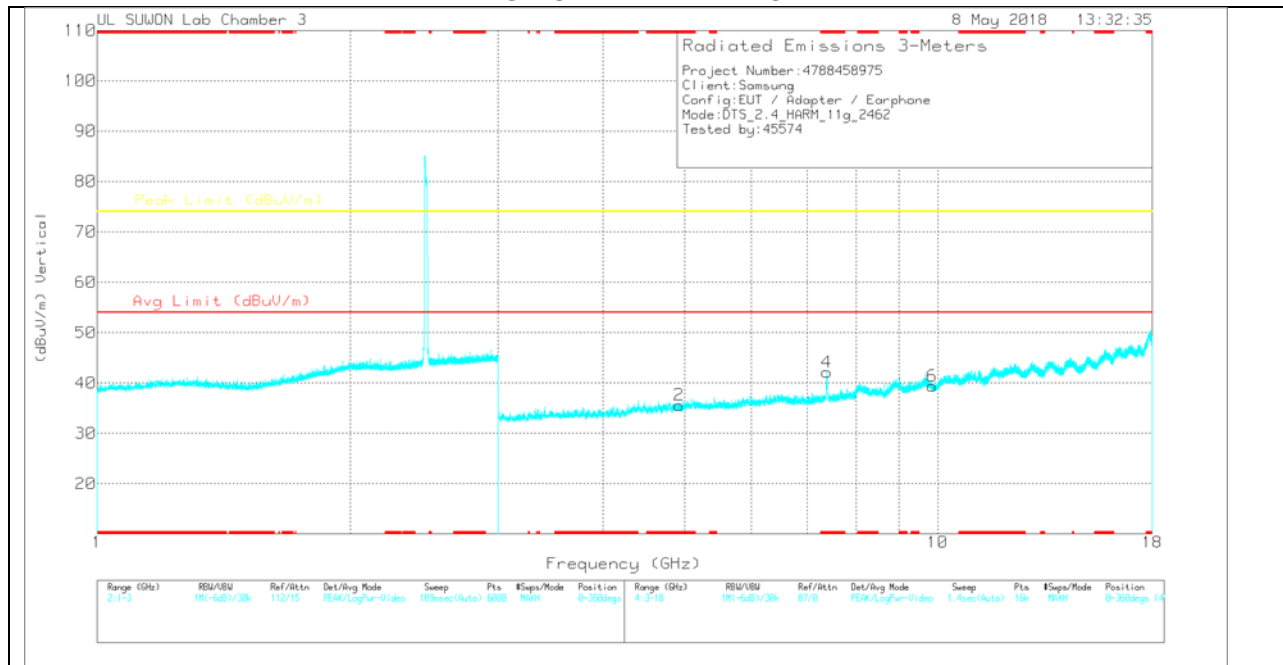
PK2 - KDB558074 Method: Maximum Peak

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[00205959]	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	* 4.923	30.48	PK	34	-28.9	0	35.58	-	-	74	-38.42	0-360	150	H
3	* 7.388	26.76	PK	35.6	-23	0	39.36	-	-	74	-34.64	0-360	150	H
5	9.849	21.67	PK	37	-19.7	0	38.97	-	-	74	-35.03	0-360	150	H
2	* 4.924	30.49	PK	34	-28.9	0	35.59	-	-	74	-38.41	0-360	149	V
4	* 7.384	29.55	PK	35.6	-23	0	42.15	-	-	74	-31.85	0-360	250	V
6	9.849	22.11	PK	37	-19.7	0	39.41	-	-	74	-34.59	0-360	149	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

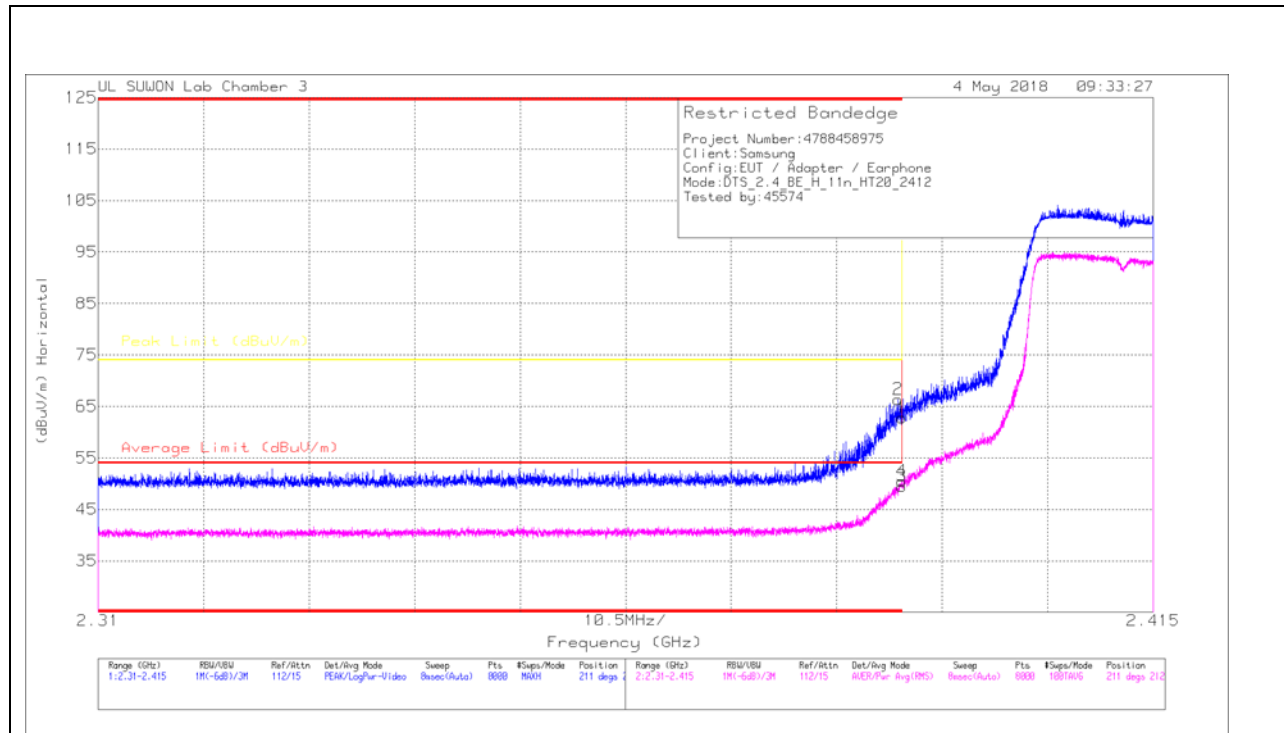
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.378	46.02	PK2	35.6	-23	0	58.62	-	-	74	-15.38	121	327	V
* 7.382	29.29	MAv1	35.6	-23.1	0	41.79	54	-12.21	-	-	121	327	V
* 7.374	40.93	PK2	35.6	-23.1	0	53.43	-	-	74	-20.57	360	152	H
* 7.38	25.56	MAv1	35.6	-23	0	38.16	54	-15.84	-	-	360	152	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

11.2.3.TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

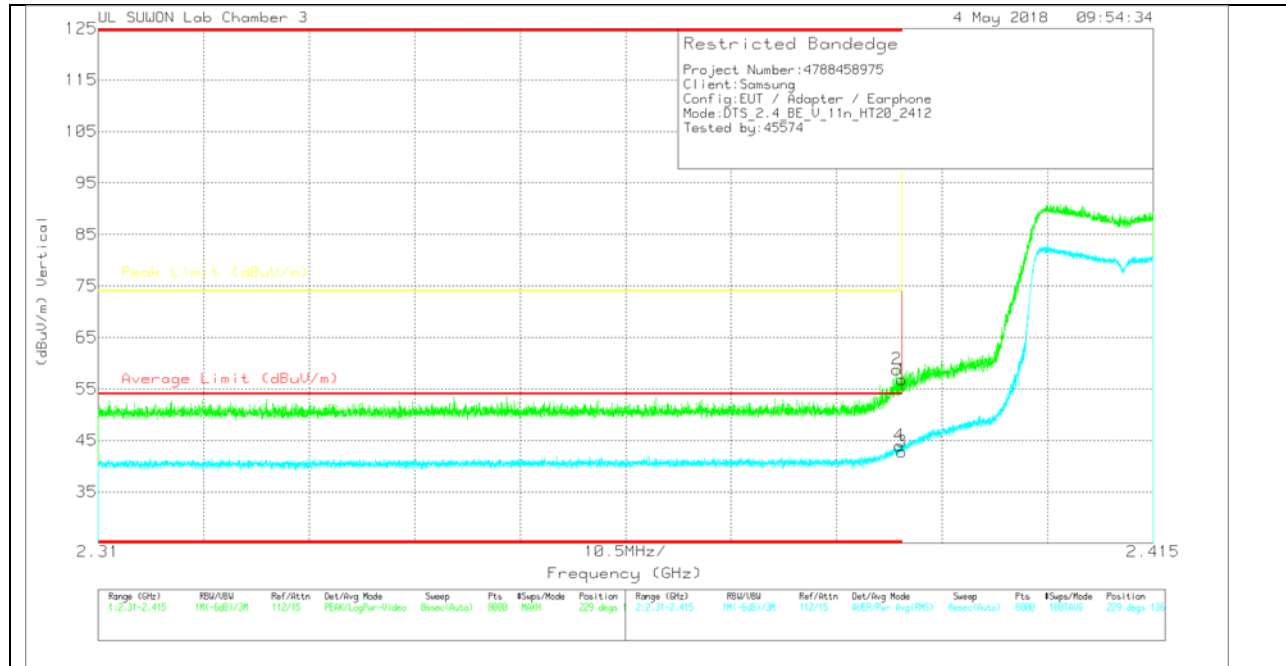
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00205959)	10dB_ATT(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.39	54.28	Pk	31.8	-23.3	0	62.78	-	-	74	-11.22	211	212	H
2	* 2.39	57.88	Pk	31.8	-23.3	0	66.38	-	-	74	-7.62	211	212	H
3	* 2.39	41.03	RMS	31.8	-23.3	0	49.53	54	-4.47	-	-	211	212	H
4	* 2.39	41.98	RMS	31.8	-23.3	0	50.48	54	-3.52	-	-	211	212	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-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(00205959)	10dB_ATT(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	48.31	Pk	31.8	-23.3	0	56.81	-	-	74	-17.19	229	136	V
2	* 2.389	50.32	Pk	31.8	-23.3	0	58.82	-	-	74	-15.18	229	136	V
3	* 2.39	34.32	RMS	31.8	-23.3	0	42.82	54	-11.18	-	-	229	136	V
4	* 2.39	35.49	RMS	31.8	-23.3	0	43.99	54	-10.01	-	-	229	136	V

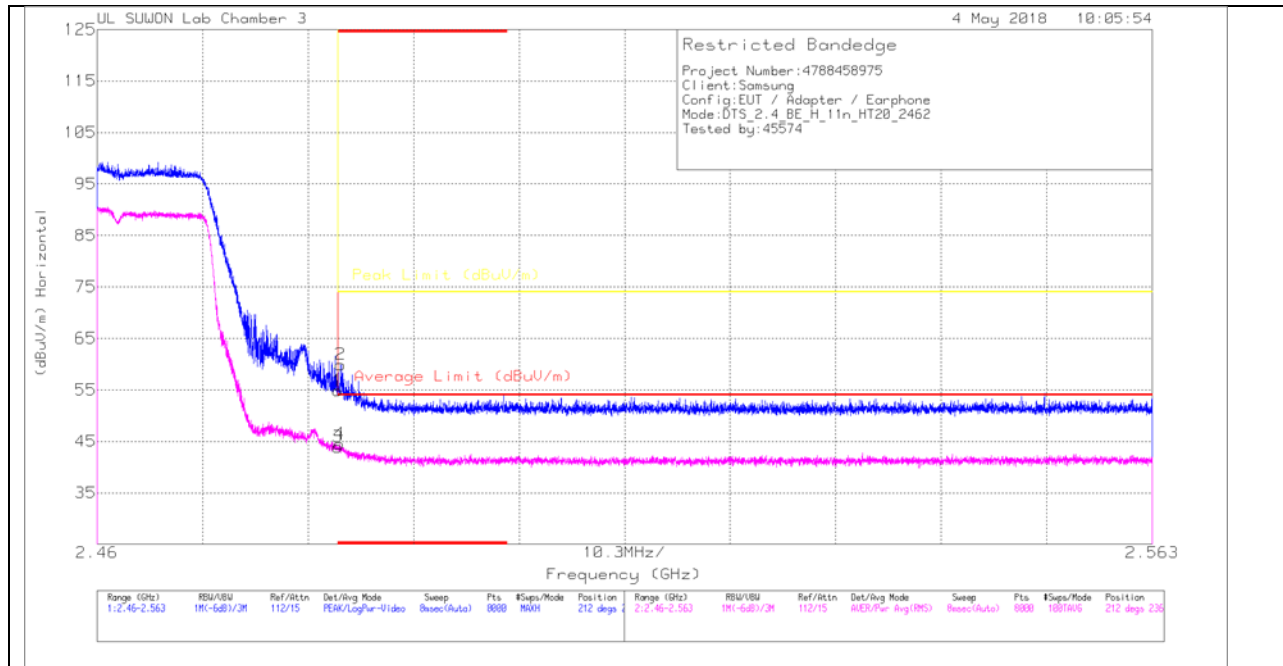
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

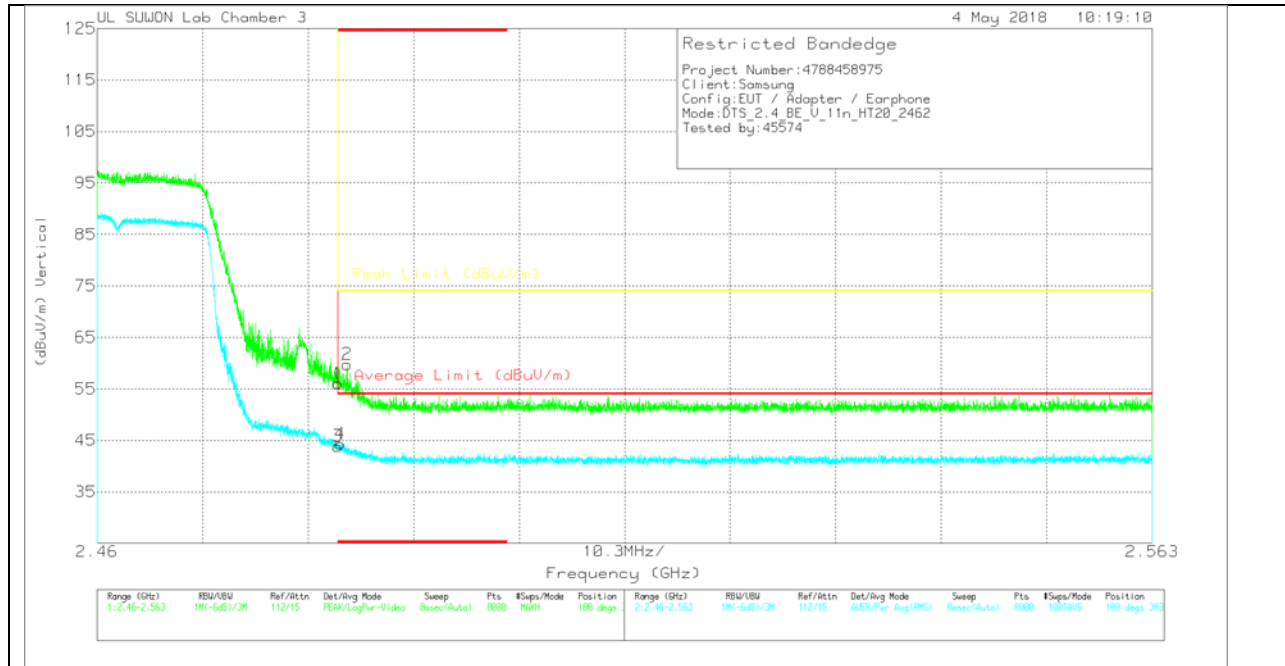
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(00205999)	10dB_ATT(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Altitude (Degs)	Height (cm)	Polarity
1	* 2.484	45.76	Pk	32.1	-23	0	54.86	-	-	74	-19.14	212	236	H
2	* 2.484	50.91	Pk	32.1	-23.1	0	59.91	-	-	74	-14.09	212	236	H
3	* 2.484	34.83	RMS	32.1	-23	0	43.93	54	-10.07	-	-	212	236	H
4	* 2.484	35.39	RMS	32.1	-23	0	44.49	54	-9.51	-	-	212	236	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-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(00205959)	10dB_ATT(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	* 2.484	46.94	Pk	32.1	-23	0	56.04	-	-	74	-17.96	188	383	V
2	* 2.484	50.78	Pk	32.1	-23.1	0	59.78	-	-	74	-14.22	188	383	V
3	* 2.484	34.78	RMS	32.1	-23	0	43.88	54	-10.12	-	-	188	383	V
4	* 2.484	35.35	RMS	32.1	-23.1	0	44.35	54	-9.65	-	-	188	383	V

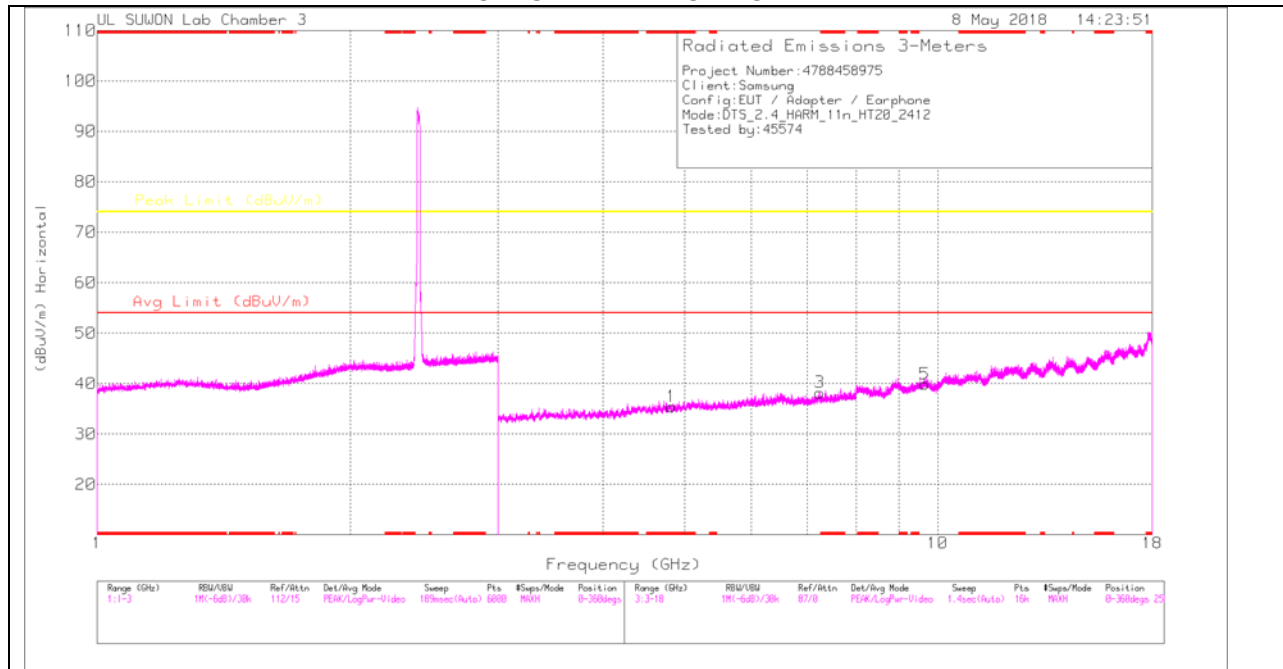
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

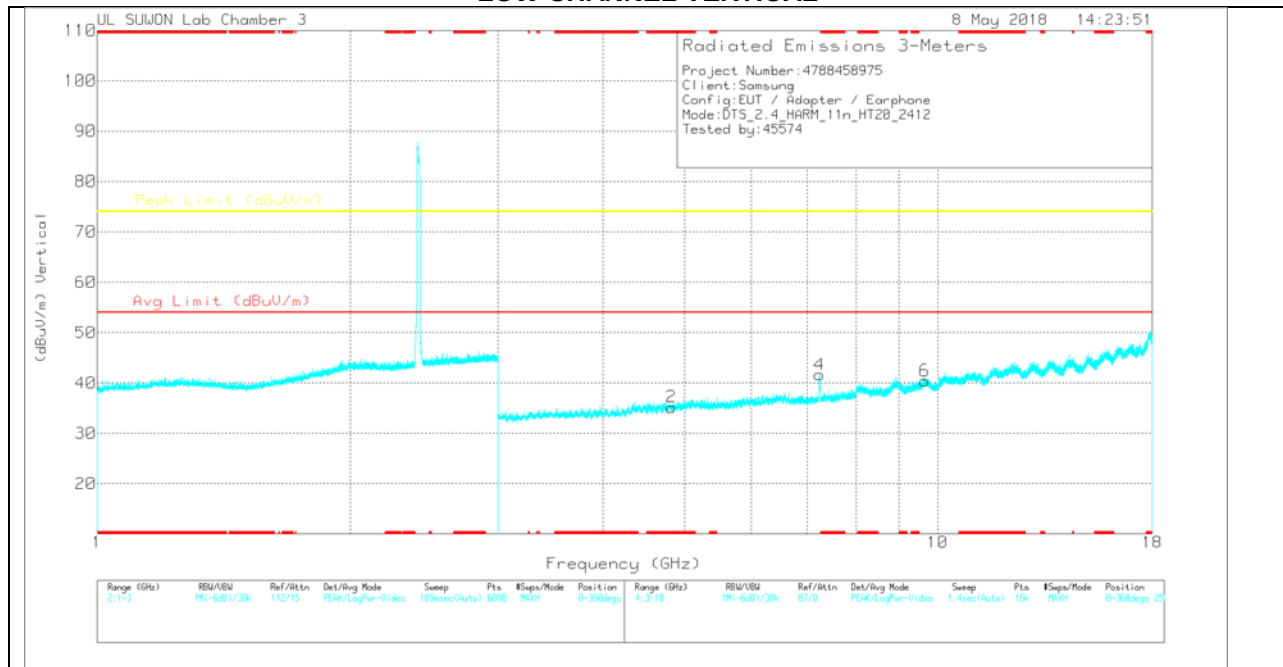
RMS - RMS detection

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[00205959]	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	* 4.826	29.72	PK	34	-28.3	0	35.42	-	-	74	-38.58	0-360	150	H
3	7.238	26.52	PK	35.6	-23.9	0	38.22	-	-	74	-35.78	0-360	150	H
5	9.648	22.9	PK	36.7	-19.7	0	39.9	-	-	74	-34.1	0-360	150	H
2	* 4.824	29.51	PK	34	-28.3	0	35.21	-	-	74	-38.79	0-360	150	V
4	7.235	29.95	PK	35.6	-23.9	0	41.65	-	-	74	-32.35	0-360	250	V
6	9.648	23.42	PK	36.7	-19.7	0	40.42	-	-	74	-33.58	0-360	150	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

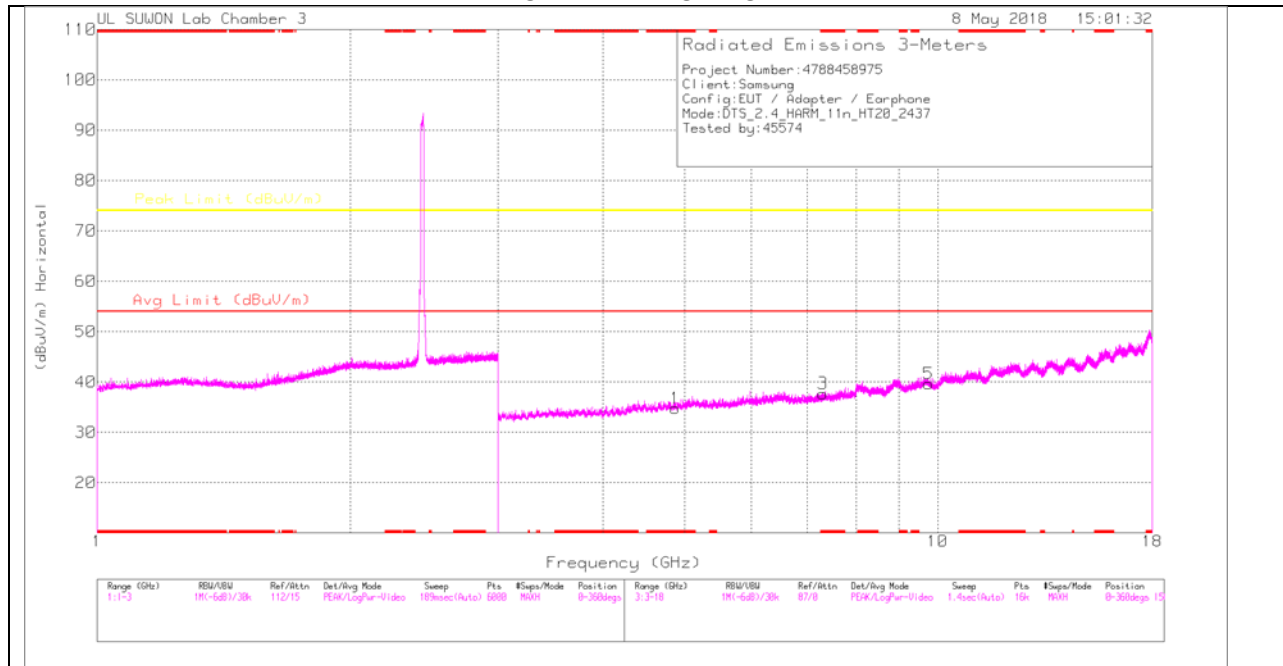
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	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
7.227	47.79	PK2	35.6	-23.9	0	59.49	-	-	74	-14.51	118	338	V
7.227	40.67	PK2	35.6	-23.9	0	52.37	-	-	74	-21.63	349	100	H

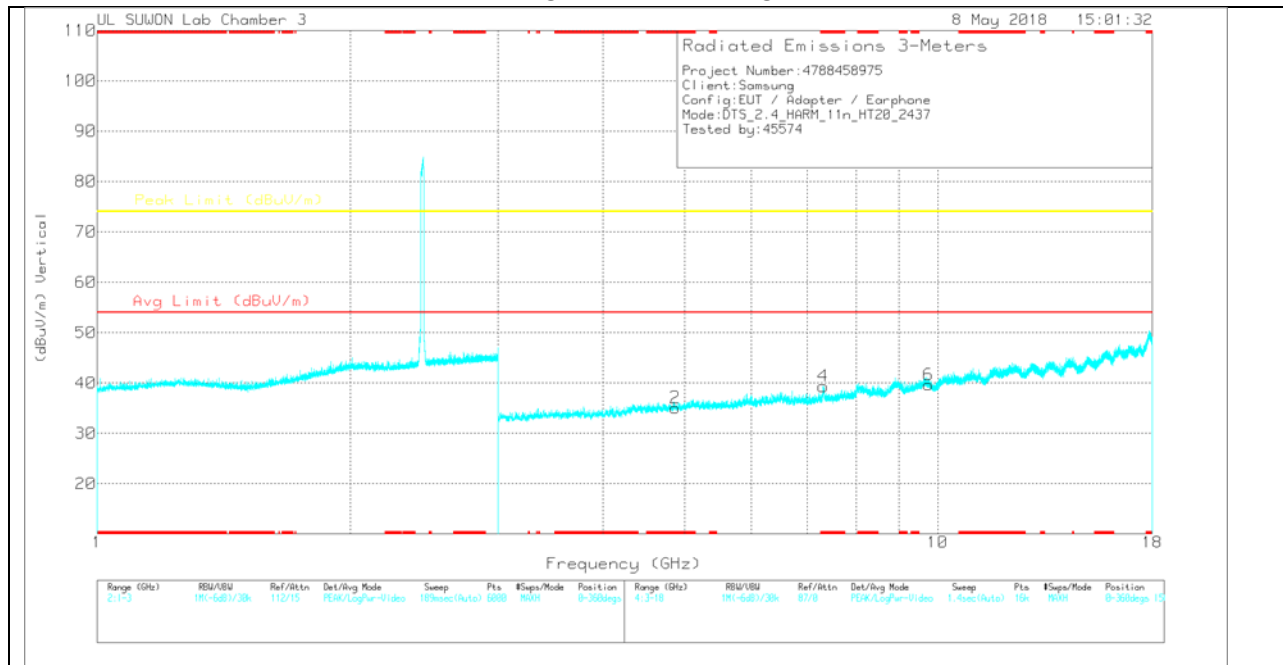
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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[00205959]	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	29.65	PK	34	-28.9	0	34.75	-	-	74	-39.25	0-360	150	H
3	* 7.305	25.69	PK	35.6	-23.6	0	37.69	-	-	74	-36.31	0-360	150	H
5	9.749	22.34	PK	36.9	-19.6	0	39.64	-	-	74	-34.36	0-360	250	H
2	* 4.874	29.95	PK	34	-28.9	0	35.05	-	-	74	-38.95	0-360	250	V
4	* 7.309	27.36	PK	35.6	-23.6	0	39.36	-	-	74	-34.64	0-360	250	V
6	9.749	22.32	PK	36.9	-19.6	0	39.62	-	-	74	-34.38	0-360	250	V

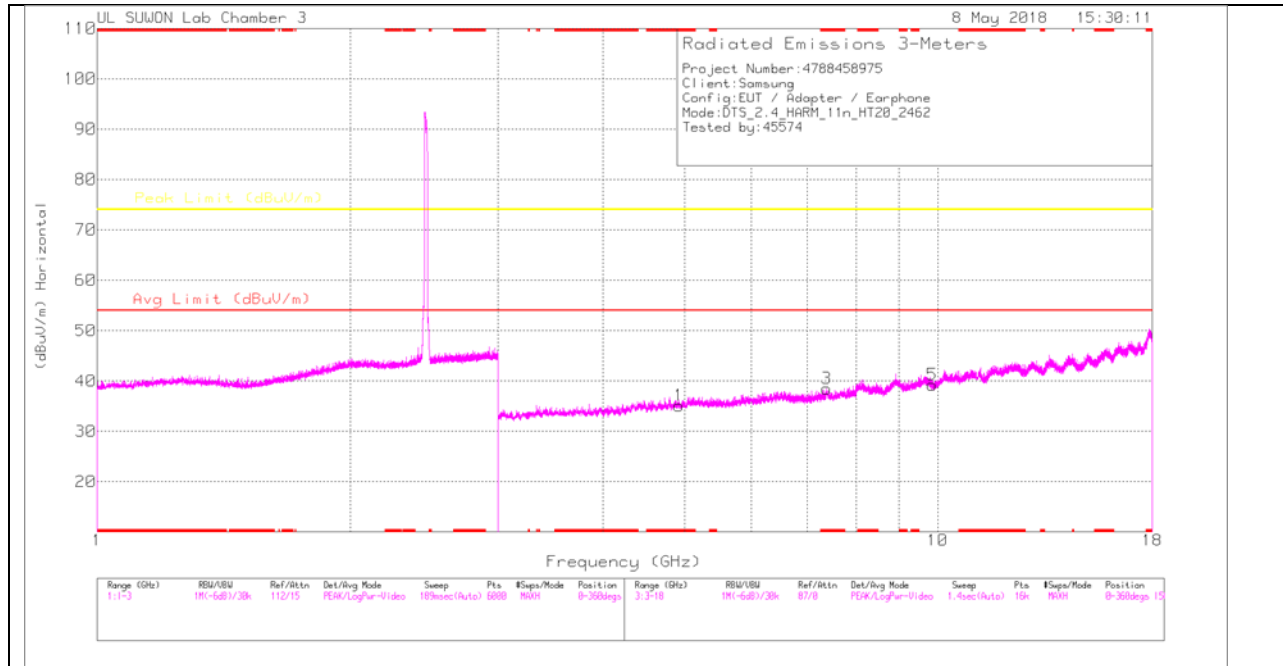
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

Radiated Emissions

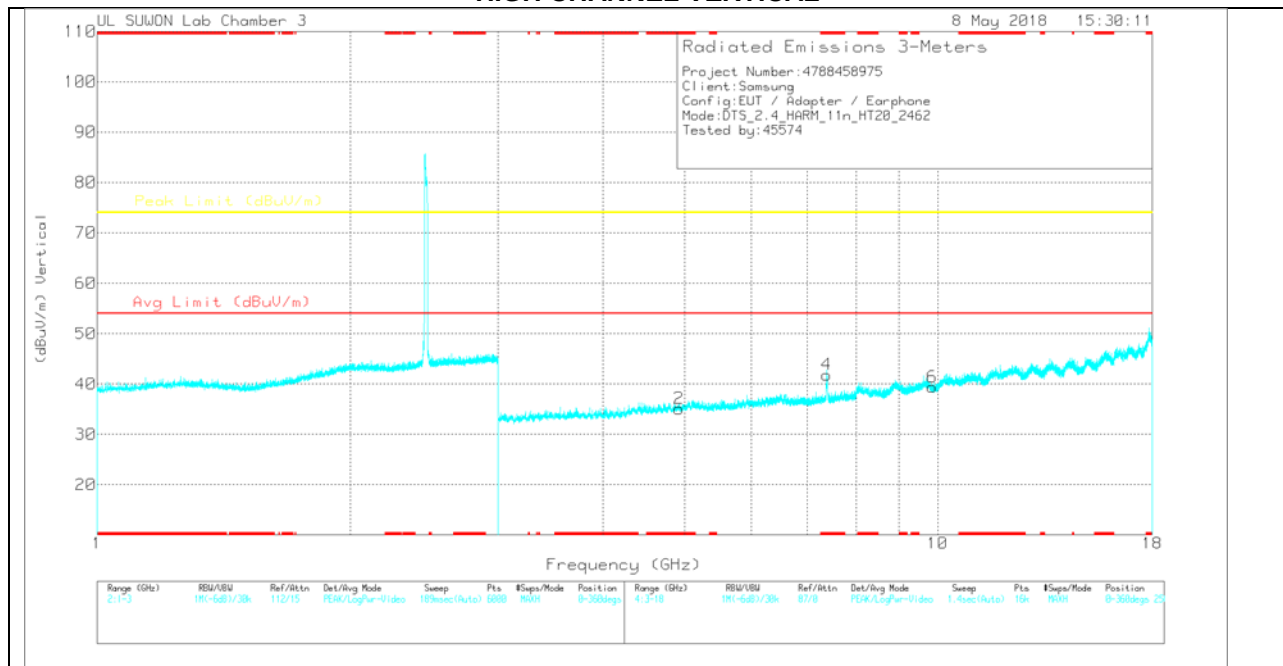
Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.327	45.82	PK2	35.6	-23.3	0	58.12	-	-	74	-15.88	117	322	V
* 7.317	27.41	MAv1	35.6	-23.4	0	39.61	54	-14.39	-	-	117	322	V
* 7.319	43.41	PK2	35.6	-23.5	0	55.51	-	-	74	-18.49	65	326	H
* 7.319	32.16	MAv1	35.6	-23.5	0	44.26	54	-9.74	-	-	65	326	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-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[00205959]	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	30.01	PK	34	-28.9	0	35.11	-	-	74	-38.89	0-360	150	H
3	* 7.382	25.98	PK	35.6	-23.1	0	38.48	-	-	74	-35.52	0-360	250	H
5	9.848	21.94	PK	37	-19.7	0	39.24	-	-	74	-34.76	0-360	150	H
2	* 4.925	30	PK	34	-28.9	0	35.1	-	-	74	-38.9	0-360	250	V
4	* 7.377	29.34	PK	35.6	-23.1	0	41.84	-	-	74	-32.16	0-360	250	V
6	9.848	22.07	PK	37	-19.7	0	39.37	-	-	74	-34.63	0-360	149	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK – Peak Detector

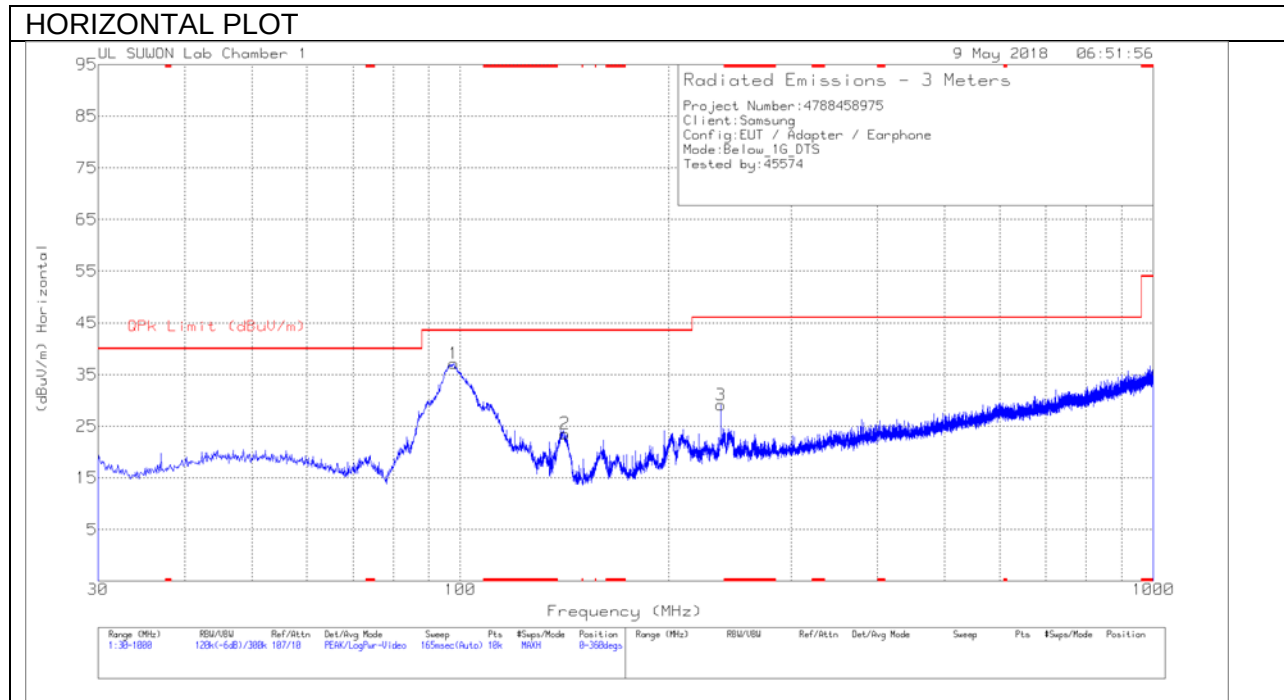
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117[00205959]	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
* 7.388	45.78	PK2	35.6	-23	0	58.38	-	-	74	-15.62	120	327	V
* 7.381	29.32	MAv1	35.6	-23	0	41.92	54	-12.08	-	-	120	327	V
* 7.388	40.77	PK2	35.6	-23	0	53.37	-	-	74	-20.63	357	114	H
* 7.383	25.92	MAv1	35.6	-23	0	38.52	54	-15.48	-	-	357	114	H

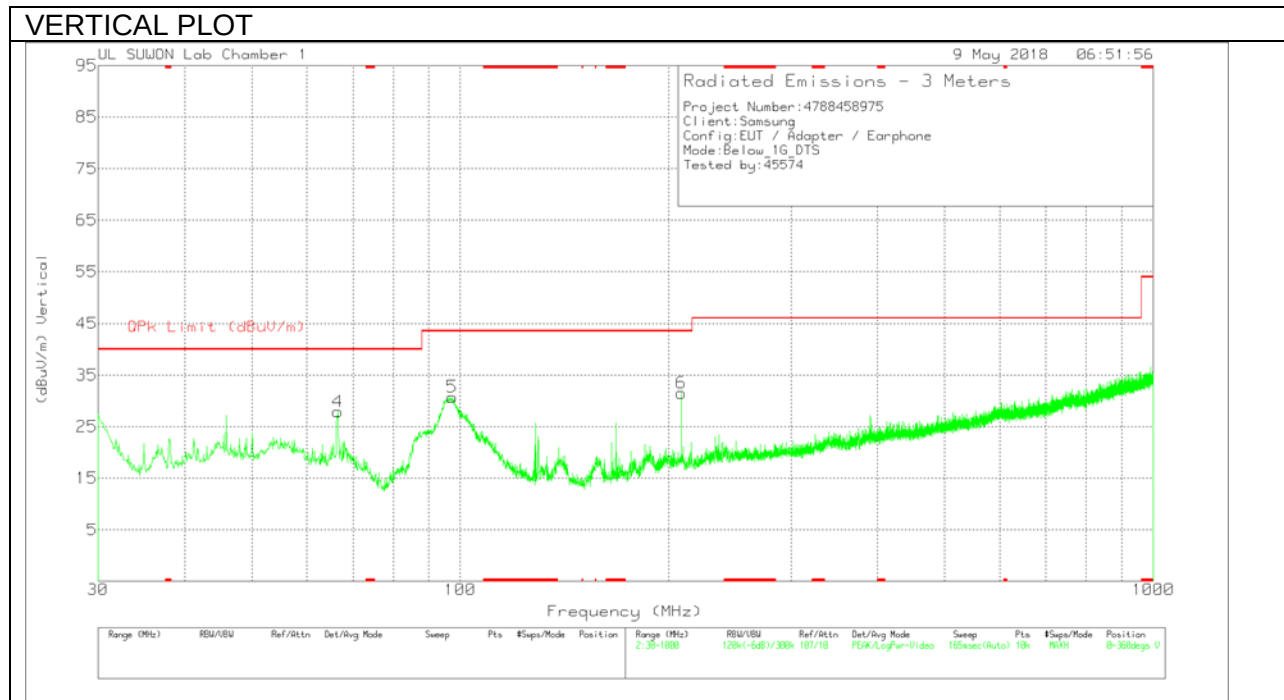
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

11.3. WORST-CASE BELOW 1 GHz

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



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



Below 1G Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	750_20170831	30-1000MHz[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	97.8515	48.56	Pk	17.1	-28.5	37.16	43.52	-6.36	0-360	300	H
2	141.647	37.75	Pk	13.7	-27.9	23.55	43.52	-19.97	0-360	200	H
3	237.677	38.73	Pk	17.9	-27.5	29.13	46.02	-16.89	0-360	100	H
4	66.569	40.4	Pk	16.4	-28.9	27.9	40	-12.1	0-360	100	V
5	97.318	42.24	Pk	17	-28.5	30.74	43.52	-12.78	0-360	300	V
6	208.286	42.41	Pk	16.7	-27.6	31.51	43.52	-12.01	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	750_20170831	30-1000MHz[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
96.833	47.94	Qp	17	-28.5	36.44	43.52	-7.08	177	308	H
97.318	41.26	Qp	17	-28.5	29.76	43.52	-13.76	117	295	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Qp - Quasi-Peak detector

12. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
IC RSS-GEN Clause 8.8

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

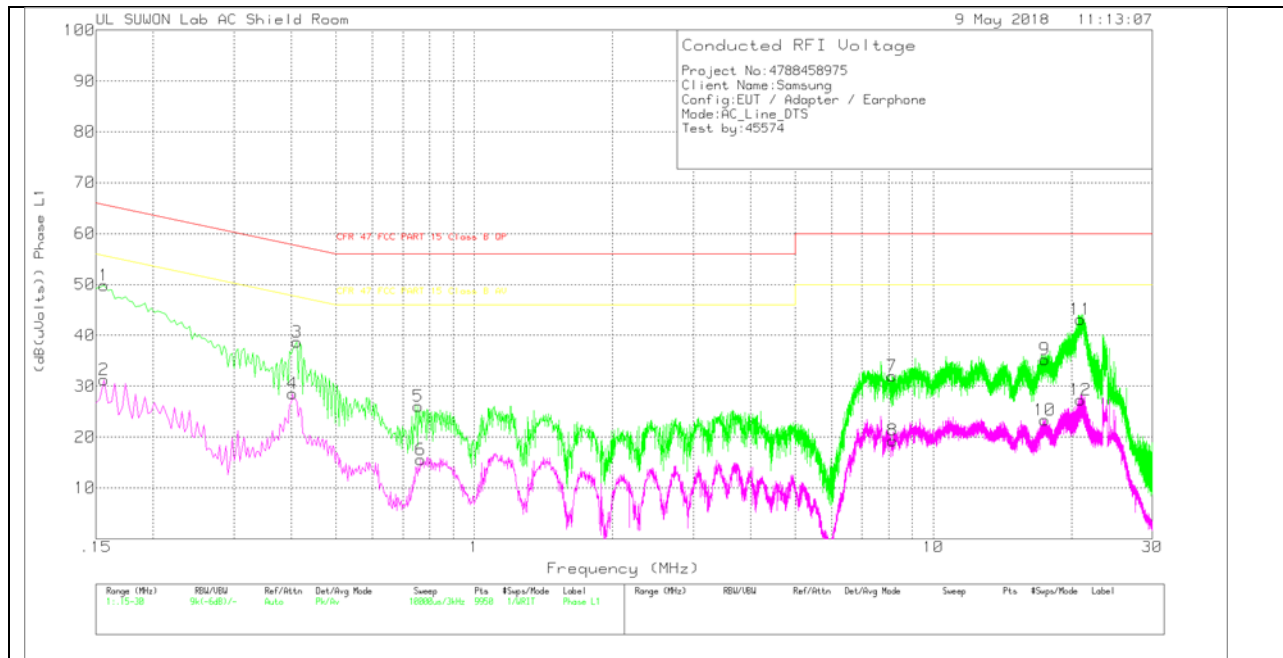
^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

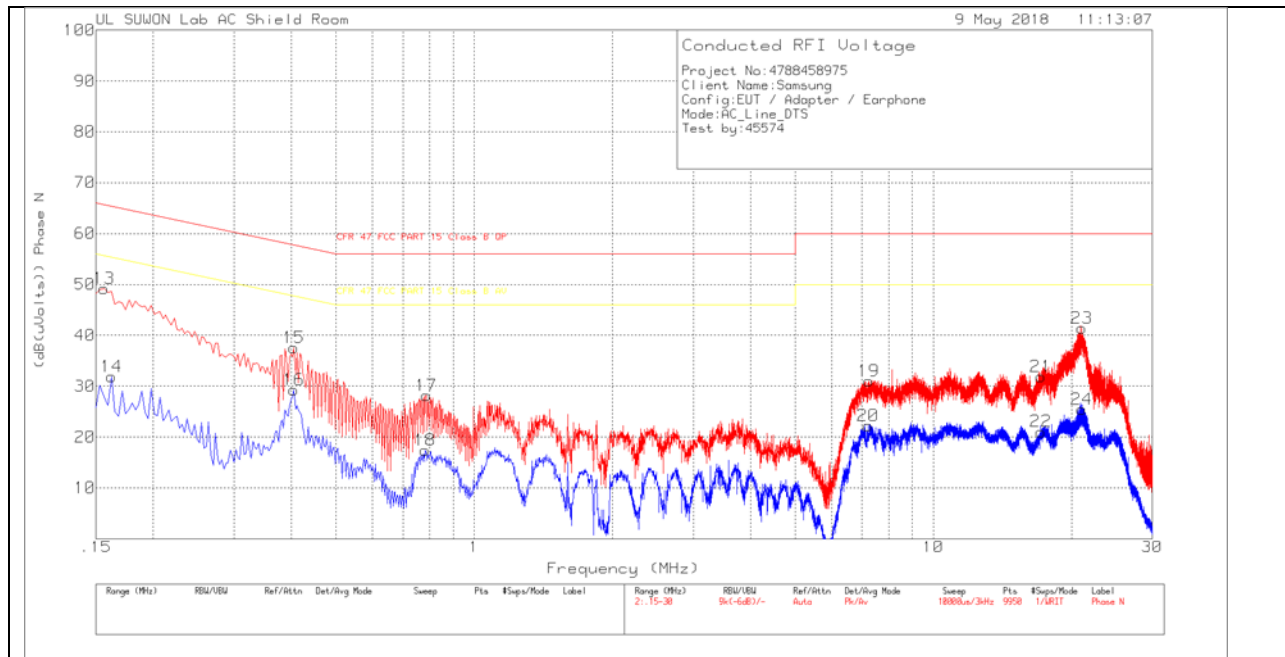
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_L1_wit h extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.156	39.76	Pk	10	.1	49.86	65.67	-15.81	-	-
2	.156	21.17	Av	10	.1	31.27	-	-	55.67	-24.4
3	.411	28.67	Pk	9.8	.2	38.67	57.63	-18.96	-	-
4	.402	18.53	Av	9.8	.2	28.53	-	-	47.81	-19.28
5	.756	16.17	Pk	9.7	.2	26.07	56	-29.93	-	-
6	.765	5.64	Av	9.7	.2	15.54	-	-	46	-30.46
7	8.142	21.98	Pk	9.7	.3	31.98	60	-28.02	-	-
8	8.163	9.33	Av	9.7	.3	19.33	-	-	50	-30.67
9	17.505	24.88	Pk	10	.4	35.28	60	-24.72	-	-
10	17.508	12.9	Av	10	.4	23.3	-	-	50	-26.7
11	20.922	32.65	Pk	10.1	.4	43.15	60	-16.85	-	-
12	20.943	16.75	Av	10.1	.4	27.25	-	-	50	-22.75

Pk - Peak detector

Av - Average detection

LINE 2 PLOT



LINE 2 RESULTS

Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_N_with extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.156	39.13	Pk	10	.1	49.23	65.67	-16.44	-	-
14	.162	21.74	Av	10	.1	31.84	-	-	55.36	-23.52
15	.405	27.62	Pk	9.8	.2	37.62	57.75	-20.13	-	-
16	.405	19.28	Av	9.8	.2	29.28	-	-	47.75	-18.47
17	.786	18.28	Pk	9.7	.2	28.18	56	-27.82	-	-
18	.783	7.55	Av	9.7	.2	17.45	-	-	46	-28.55
19	7.236	20.93	Pk	9.8	.3	31.03	60	-28.97	-	-
20	7.224	12.14	Av	9.8	.3	22.24	-	-	50	-27.76
21	17.154	21.45	Pk	10	.4	31.85	60	-28.15	-	-
22	17.172	10.66	Av	10	.4	21.06	-	-	50	-28.94
23	21.066	30.96	Pk	10.1	.4	41.46	60	-18.54	-	-
24	21.054	14.9	Av	10.1	.4	25.4	-	-	50	-24.6

Pk - Peak detector

Av - Average detection