



CERTIFICATION TEST REPORT

Report Number. : 4789793179-E3V2

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

Model : SM-A125U, SM-S127DL, SM-A125U1/DS

FCC ID : A3LSMA125U

EUT Description : GSM/CDMA/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac
and NFC

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

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ACCREDITED

Testing Laboratory

TL-637

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	03/05/21	Initial issue	Hyunsik Yun
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

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

MODEL NUMBER: SM-A125U, SM-S127DL, SM-A125U1/DS

SERIAL NUMBER: R38R100SMVZ (CONDUCTED);
R37R100SNBW, R38R100SPAF (RADIATED);

DATE TESTED: FEB 10, 2021 – MAR 05, 2021;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies

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
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Tested By:



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Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 DTS Meas Guidance v05r02.
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	
<input checked="" type="checkbox"/>	Chamber 1
<input checked="" type="checkbox"/>	Chamber 2
<input checked="" type="checkbox"/>	Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.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:

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

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	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

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

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

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

This report covers the Samsung models SM-A125U, SM-A125U1/DS and SM-S127DL. These models are identical in hardware except SM-A125U1/DS has dual SIM tray and SM-S127DL is not supported CDMA.

With some pre-scan, model SM-A125U was set for final test.

WiFi operating mode

Frequency range	Mode	ANT 1
2.4GHz (2412 MHz ~ 2462 MHz)	802.11b SISO	TX/RX
	802.11g SISO	TX/RX
	802.11n(HT20) SISO	TX/RX

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 SISO	22.66	184.50
	802.11g MIMO	20.42	110.15
	802.11n(HT20) MIMO	20.27	106.41

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.
 Therefore this E.U.T Complies with the requirement of §15.203.**

The radio utilizes an internal antennas, with maximum gain of -4.26 dBi.

5.3. TESTED CHANNELS LIST

Ch.	Frequency [MHz]	11b [SISO]	11g [SISO]	11n(HT20) [SISO]
1	2 412	O	O	O
2	2 417	O	O	O
6	2 437	O	O	O
10	2 457	-	O	O
11	2 462	O	O	O
12	2 467	Blocked		
13	2 472			

Note. 12,13 channels was blocked.

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 1TX
 802.11g mode: 6 Mbps 1TX
 802.11n HT20 mode: MCS0 1TX

Note : All radiated and power line conducted tests were performed attached with travel adapter and earphone for the worst case condition mode.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA200	R37NBH409C3SE3	N/A
Data Cable	SAMSUNG	EP-DR140AWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

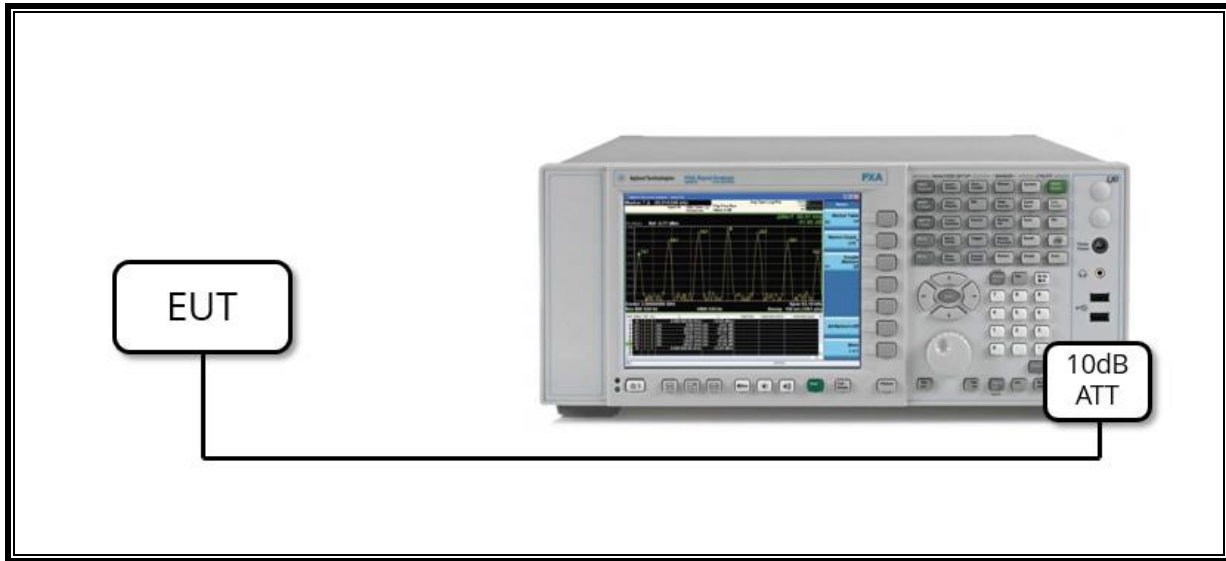
I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0 m	N/A
2	Audio	2	AUX	Unshielded	1.1 m	N/A

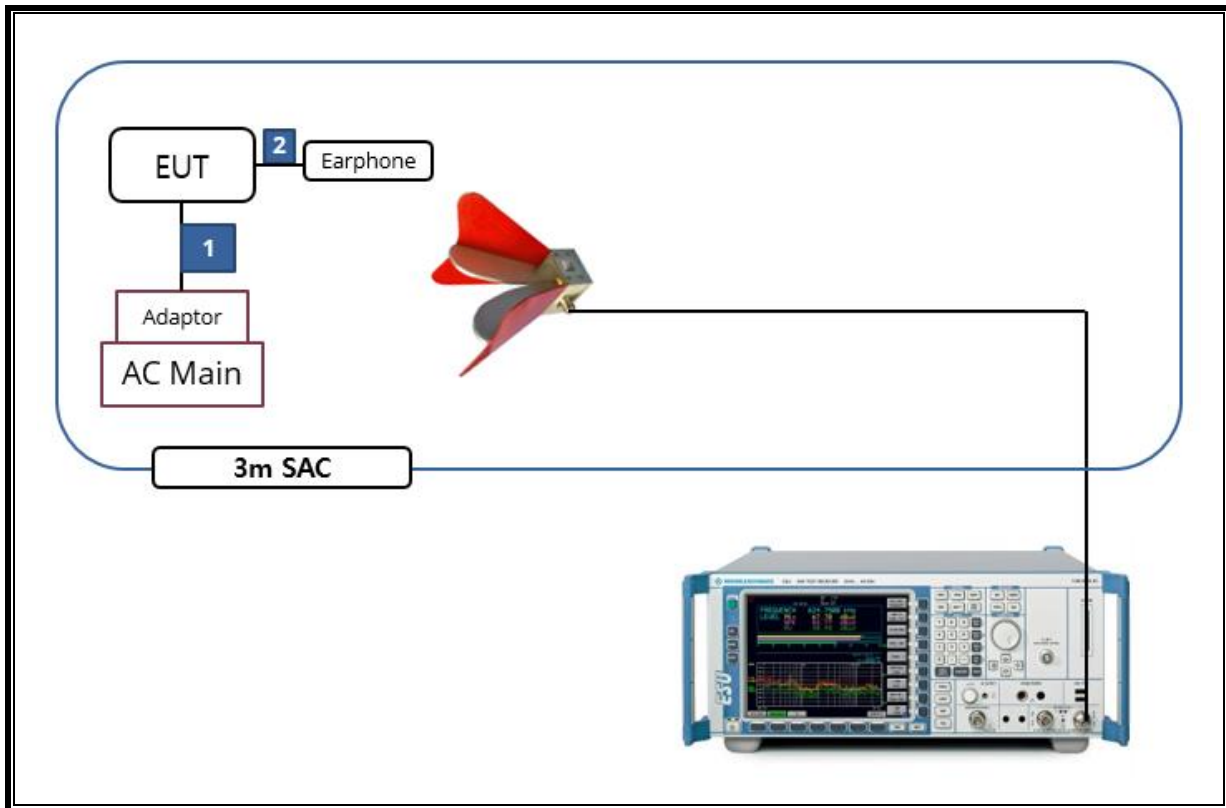
TEST SETUP

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. MEASUREMENT METHOD

6 dB BW : KDB 558074 D01 v05r02, Section 8.2

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.2.3.

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band EMISSIONS (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band EMISSIONS IN NON-RESTRICTED BANDS: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band EMISSIONS IN RESTRICTED BANDS KDB 558074 D01 v05r02, Section 8.6.

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

7. 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	08-19-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	07-27-22
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-15-22
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-04-22
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preamplifier	ETS	3116C-PA	00168841	08-06-21
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-06-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-04-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-05-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-05-21
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	08-06-21
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-05-21
Attenuator	PASTERNAK	PE7087-10	A001	08-03-21
Attenuator	PASTERNAK	PE7087-10	A008	08-03-21
Attenuator	PASTERNAK	PE7004-10	2	08-04-21
Attenuator	PASTERNAK	PE7087-10	A009	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-03-21
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-04-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-04-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-04-21
LISN	R&S	ENV-216	101837	08-06-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

8. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	Occupied Bandwidth(6dB)	> 500kHz	Conducted	PASS
2.1051, 15.247(d)	Band Edge / Conducted Spurious Emission	-30 dBc		PASS
15.247 (b)(3)	TX conducted output power	< 30 dBm		PASS
15.247(e)	PSD	< 8 dBm/3kHz		PASS
15.207(a)	AC Power Line conducted emissions	Section 11	Power Line conducted	PASS
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	PASS

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]	1/T Minimum VBW[kHz]
802.11b	16.580	16.610	0.998	99.819	-	0.06
802.11g MIMO	2.756	2.801	0.984	98.393	-	0.36
802.11n(HT20) MIMO	2.560	2.604	0.983	98.310	-	0.39

Note. According to ANSI C63.10 Section 11.6, do not apply the Duty Cycle Correction Factor judging that a duty cycle of greater than or equal to 98% is continuous signal.



9.2. 6 dB & 99% 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 15.247 Meas Guidance: The transmitter output is connected to a spectrum analyzer with the RBW set to 100 kHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

RESULTS

- Please refer to the next page

9.2.1. 802.11b SISO MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	99% Bandwidth [MHz]	Minimum Limit [MHz]
1	2 412	8.517	12.486	0.5
2	2 417	7.103	12.510	
6	2 437	7.539	12.552	
11	2 462	7.076	12.657	

9.2.2. 802.11g SISO MODE IN THE 2.4 GHz BAND

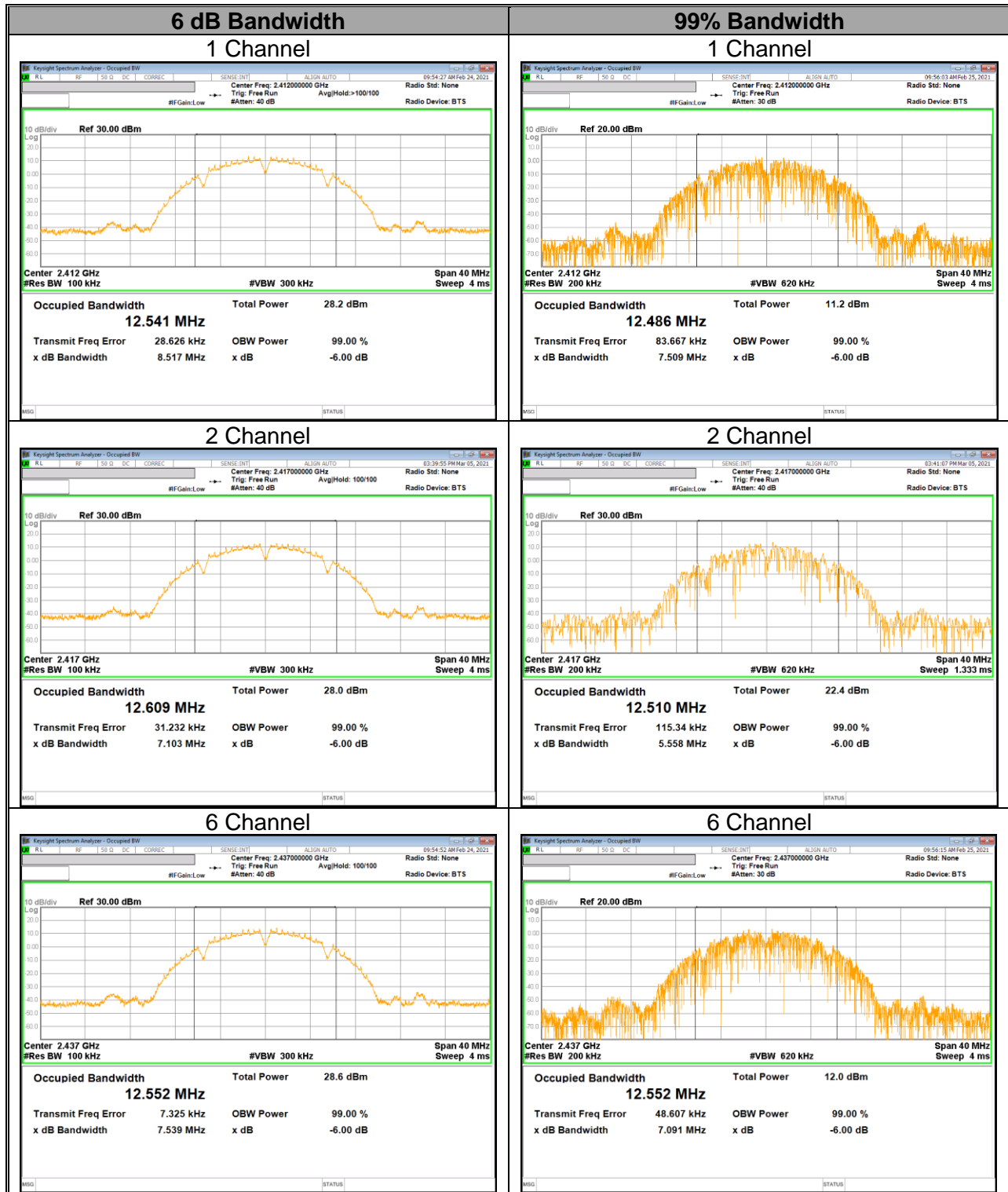
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	99% Bandwidth [MHz]	Minimum Limit [MHz]
1	2 412	15.94	16.33	0.5
2	2 417	15.36	16.37	
6	2 437	16.32	16.34	
10	2 457	14.38	16.42	
11	2 462	15.05	16.34	

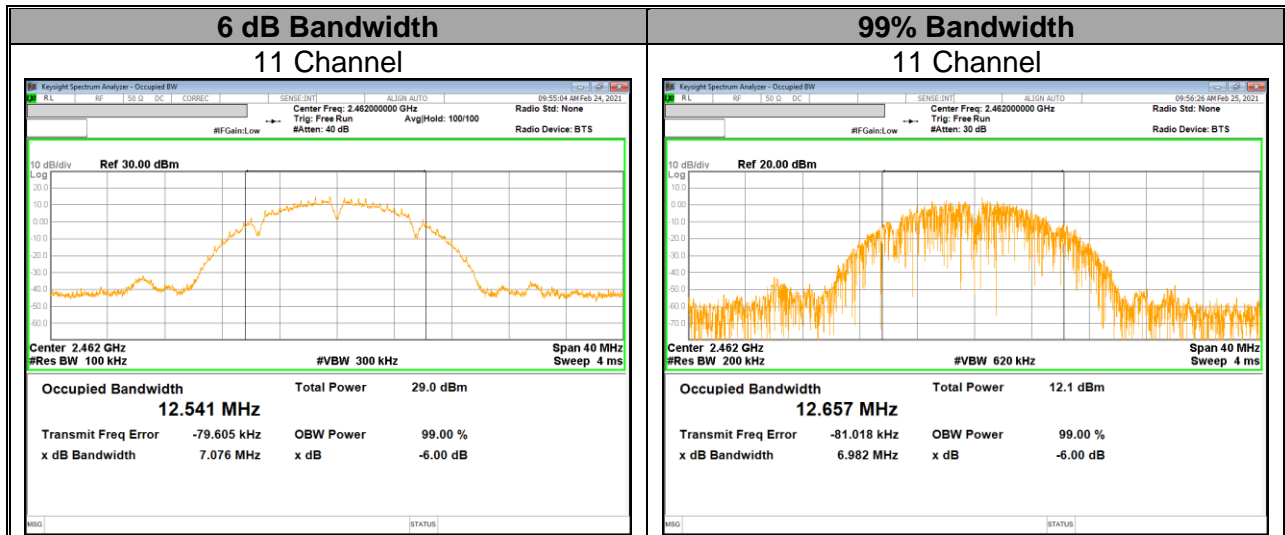
9.2.3. 802.11n HT20 SISO MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	99% Bandwidth [MHz]	Minimum Limit [MHz]
1	2 412	15.89	17.61	0.5
2	2 417	14.90	17.59	
6	2 437	16.54	17.52	
10	2 457	14.15	17.57	
11	2 462	15.91	17.61	

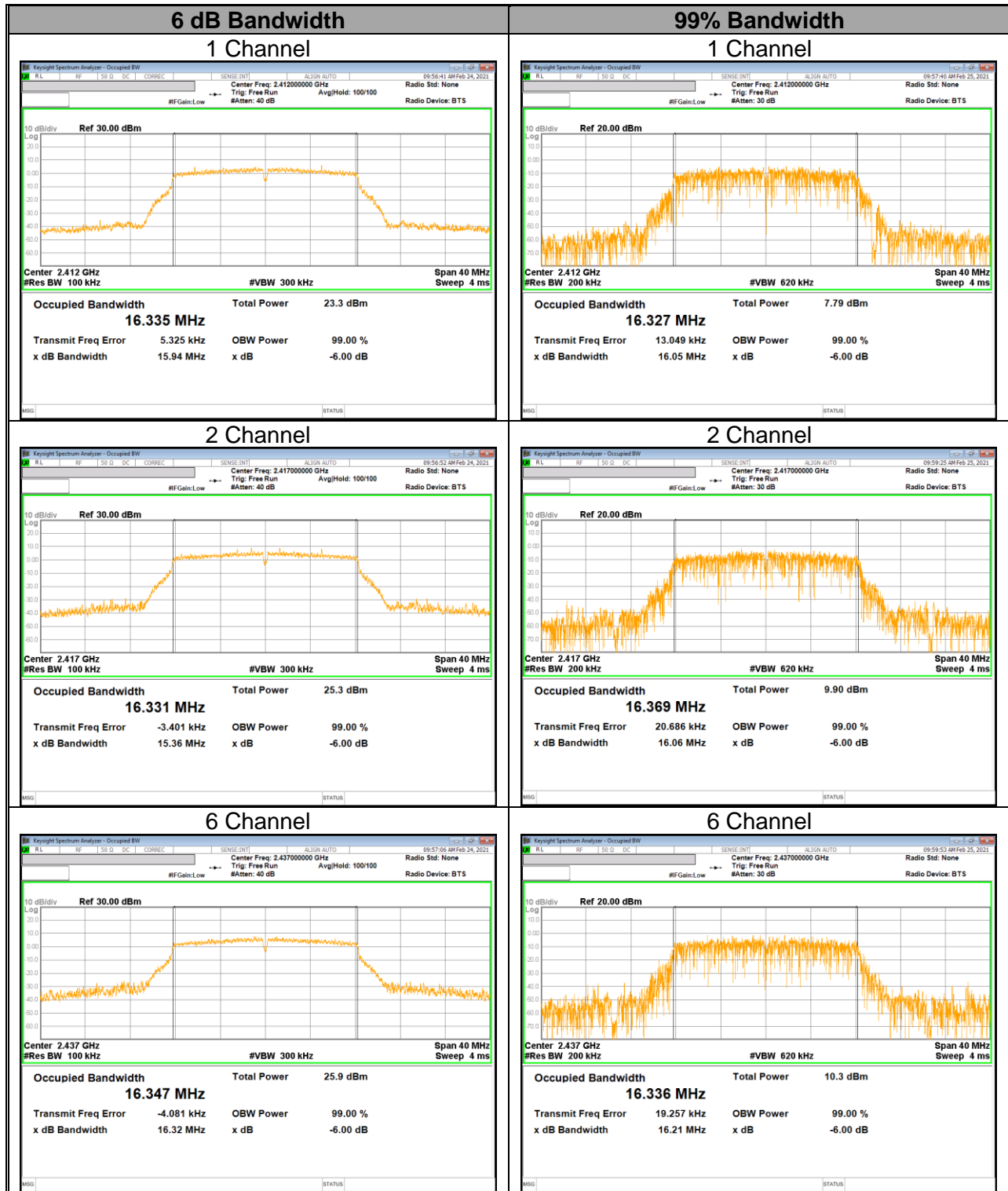
9.2.4. 6 dB & 99% BANDWIDTH TEST PLOTS

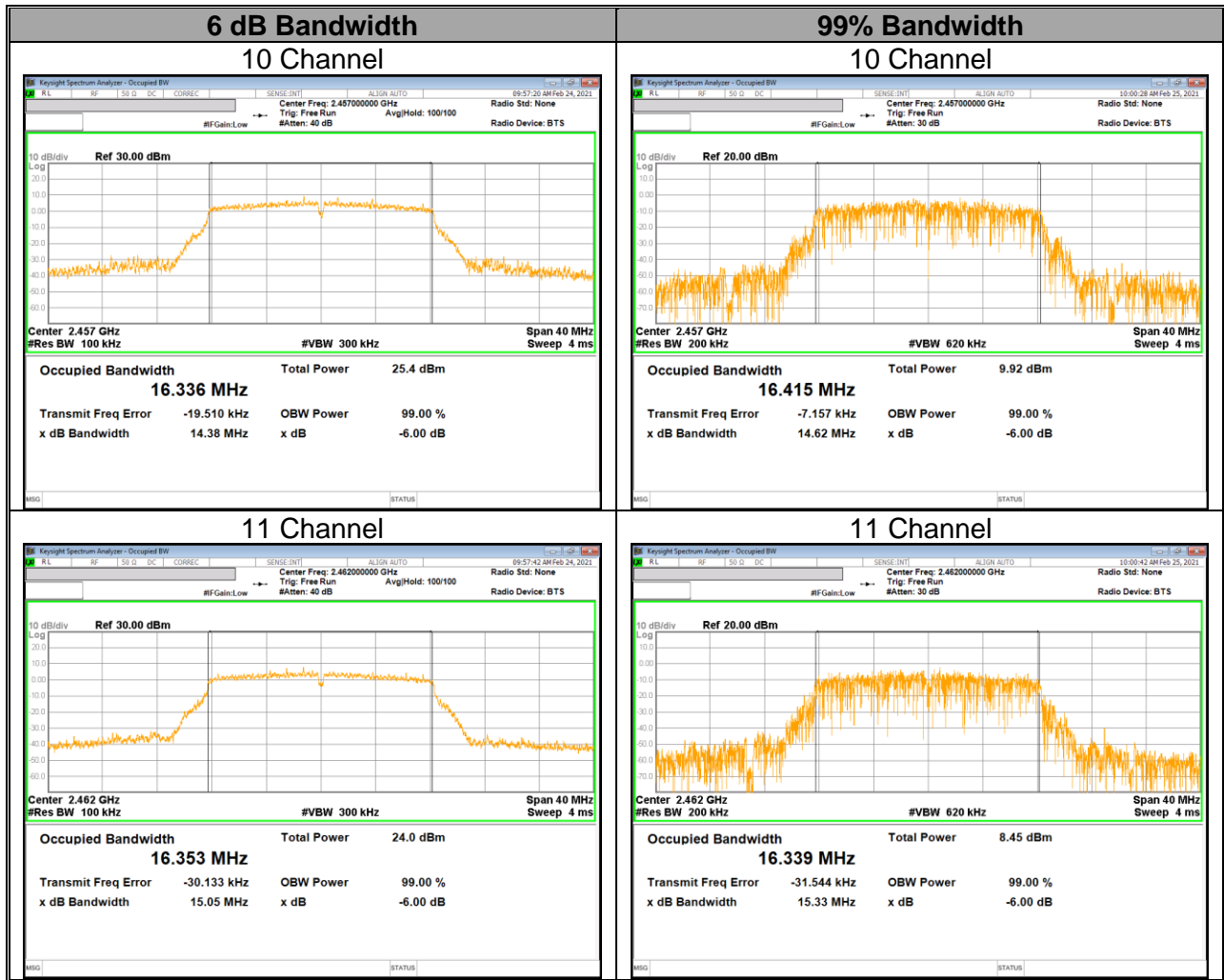
DTS 2.4 GHz IEEE 802.11b mode



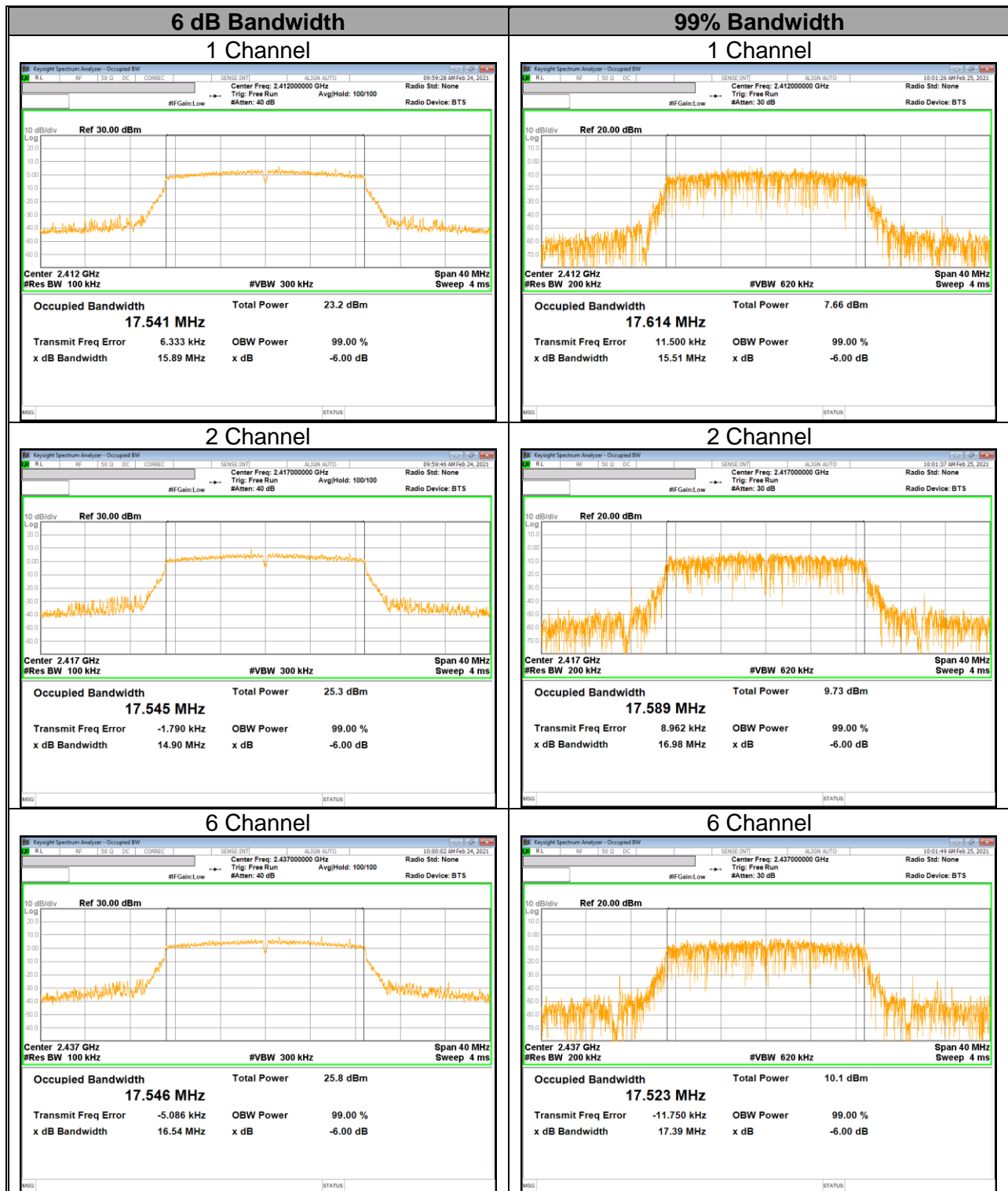


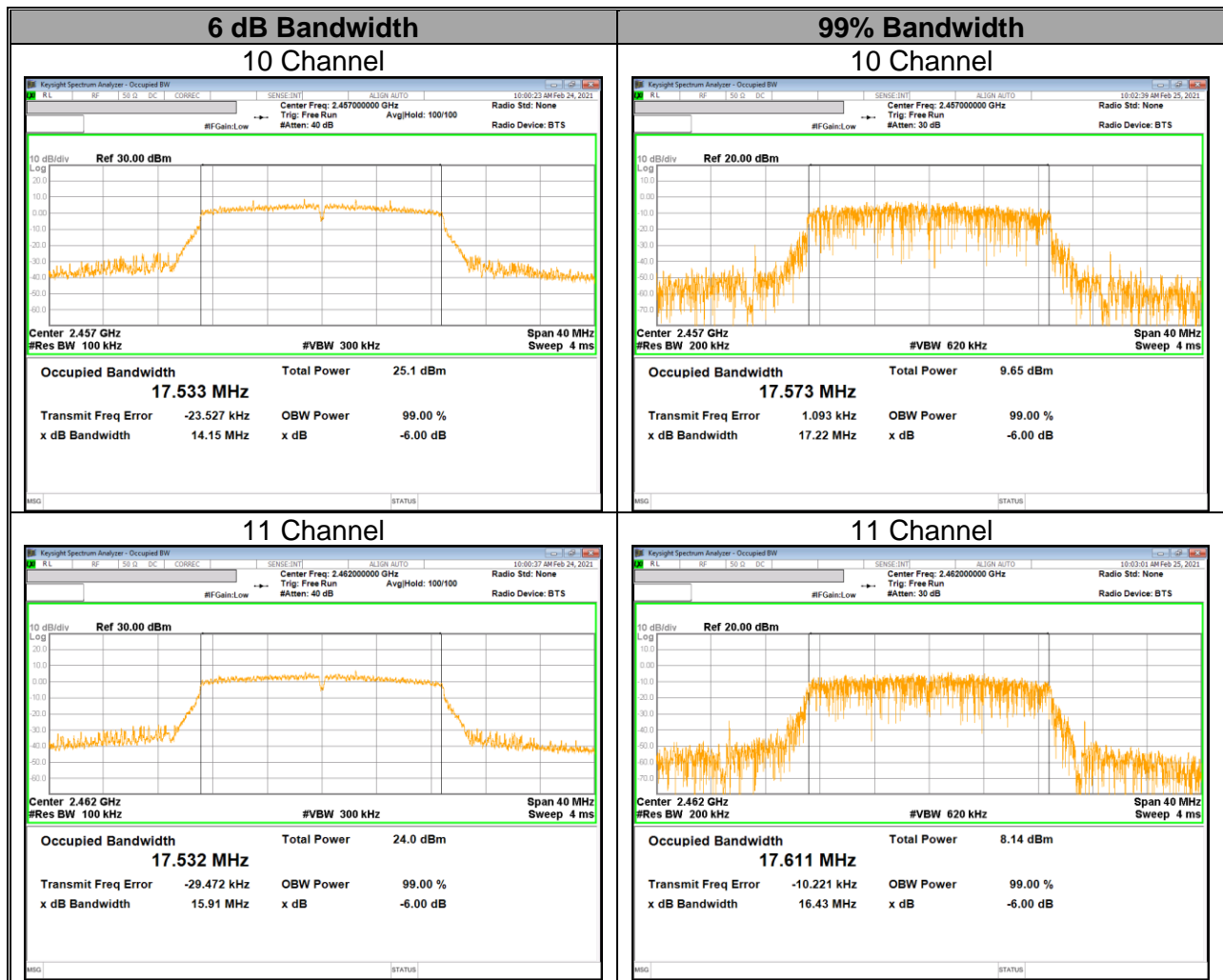
DTS 2.4 GHz IEEE 802.11g mode





DTS 2.4 GHz IEEE 802.11n HT20 mode





9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

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.

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 8.3.2.3 under KDB558074 D01 15.247 Meas Guidance.

9.3.1. TEST RESULTS

- SISO Mode

Mode	Channel	Frequency [MHz]	Average Power [dBm]	Power Limit [dBm]
802.11b	1	2 412	21.84	30.00
	2	2 417	22.16	
	6	2 437	22.53	
	11	2 462	22.66	
	Max. average power :		22.66	
802.11g	1	2 412	17.66	
	2	2 417	19.86	
	6	2 437	20.42	
	10	2 457	19.60	
	11	2 462	18.60	
	Max. average power :		20.42	
802.11n HT20	1	2 412	17.52	
	2	2 417	19.73	
	6	2 437	20.27	
	10	2 457	19.45	
	11	2 462	18.45	
	Max. average power :		20.27	

Calculation of Output Power result

→ Average Power = Meas. Power + Duty Cycle CF

9.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

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 section 11.10 under ANSI C63.10 Meas Guidance.

ANSI C63.10 [11.10.3. Method AVGPSD-1]

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set VBW $\geq [3 \times \text{RBW}]$.
- e) Detector = power averaging (rms) or sample detector (when rms not available).
- f) Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
- g) Sweep time = auto couple.
- h) Employ trace averaging (rms) mode over a minimum of 100 traces.
- i) Use the peak marker function to determine the maximum amplitude level.
- j) If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

RESULTS

9.4.1. 802.11b/g/n HT20 MODE TEST RESULTS

Included in Calculations of Corr'd Power			
Duty Cycle CF	802.11b SISO	0.00	dB
	802.11g SISO	0.00	dB
	802.11n HT20 SISO	0.00	dB

Calculation of Output PSD result

SISO Mode : Corr'd PSD = Meas PSD + Duty Cycle CF

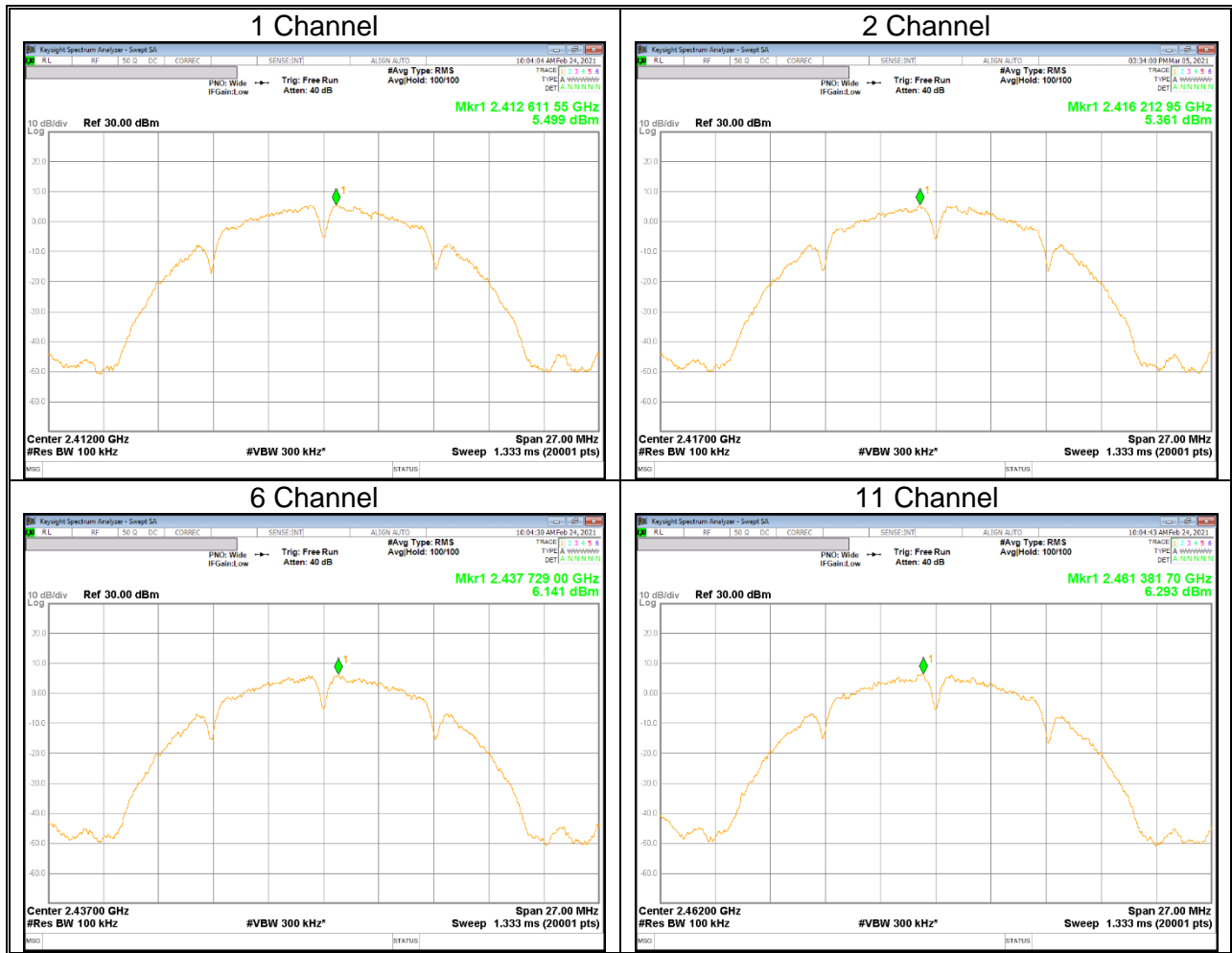
- SISO Mode

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/100kHz]	Corr'd PSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
802.11b	1	2 412	5.499	5.499	8.00 (Note.)
	2	2 417	5.361	5.361	
	6	2 437	6.141	6.141	
	11	2 462	6.293	6.293	
802.11g	1	2 412	-1.166	-1.166	
	2	2 417	1.245	1.245	
	6	2 437	1.505	1.505	
	10	2 457	0.837	0.837	
	11	2 462	-0.380	-0.380	
802.11n HT20	1	2 412	-1.198	-1.198	
	2	2 417	0.622	0.622	
	6	2 437	1.061	1.061	
	10	2 457	0.465	0.465	
	11	2 462	-0.708	-0.708	

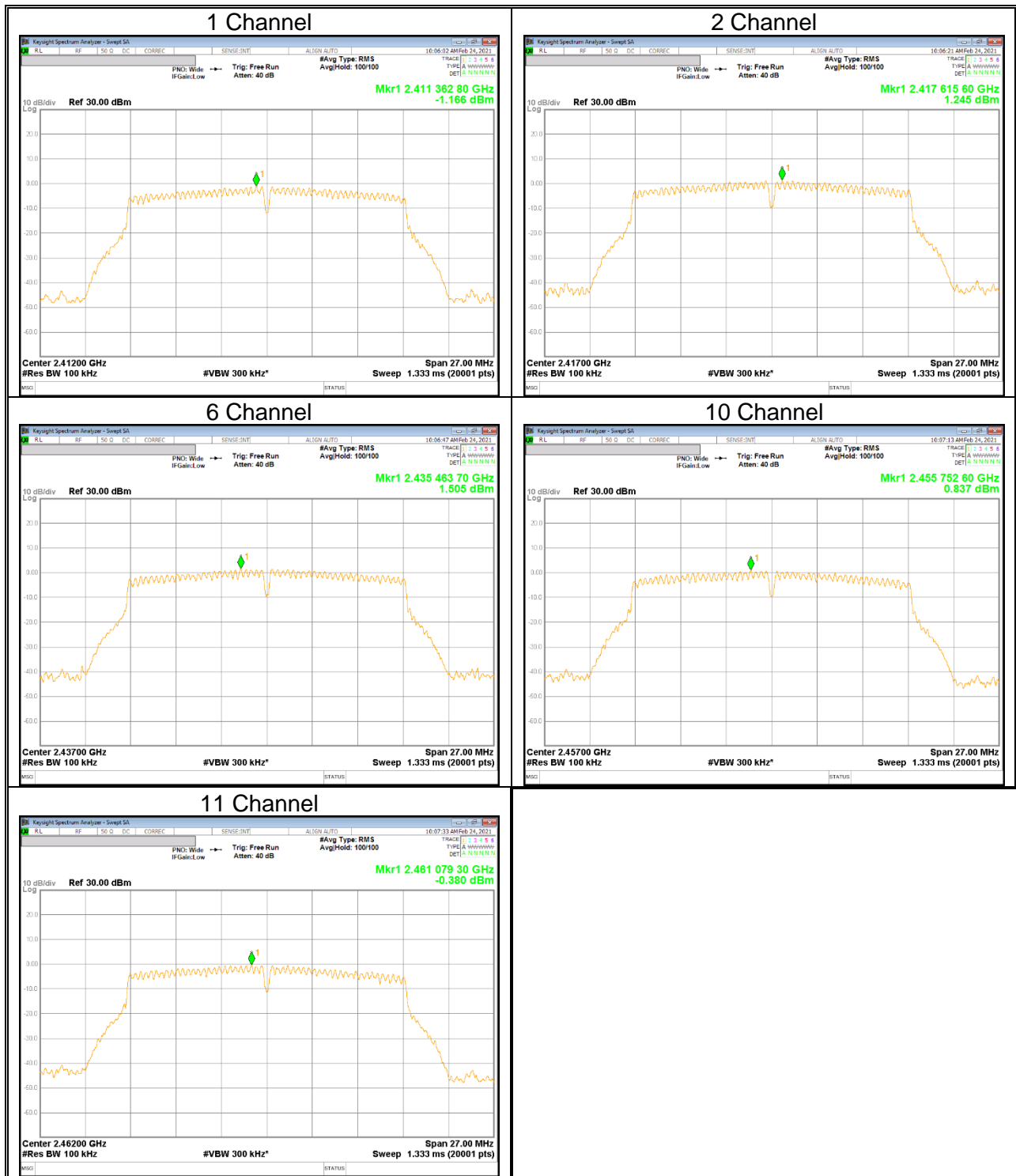
Note. RBW 100 kHz measurement data is lower than 3 kHz limit.

9.4.2. PSD TEST PLOTS

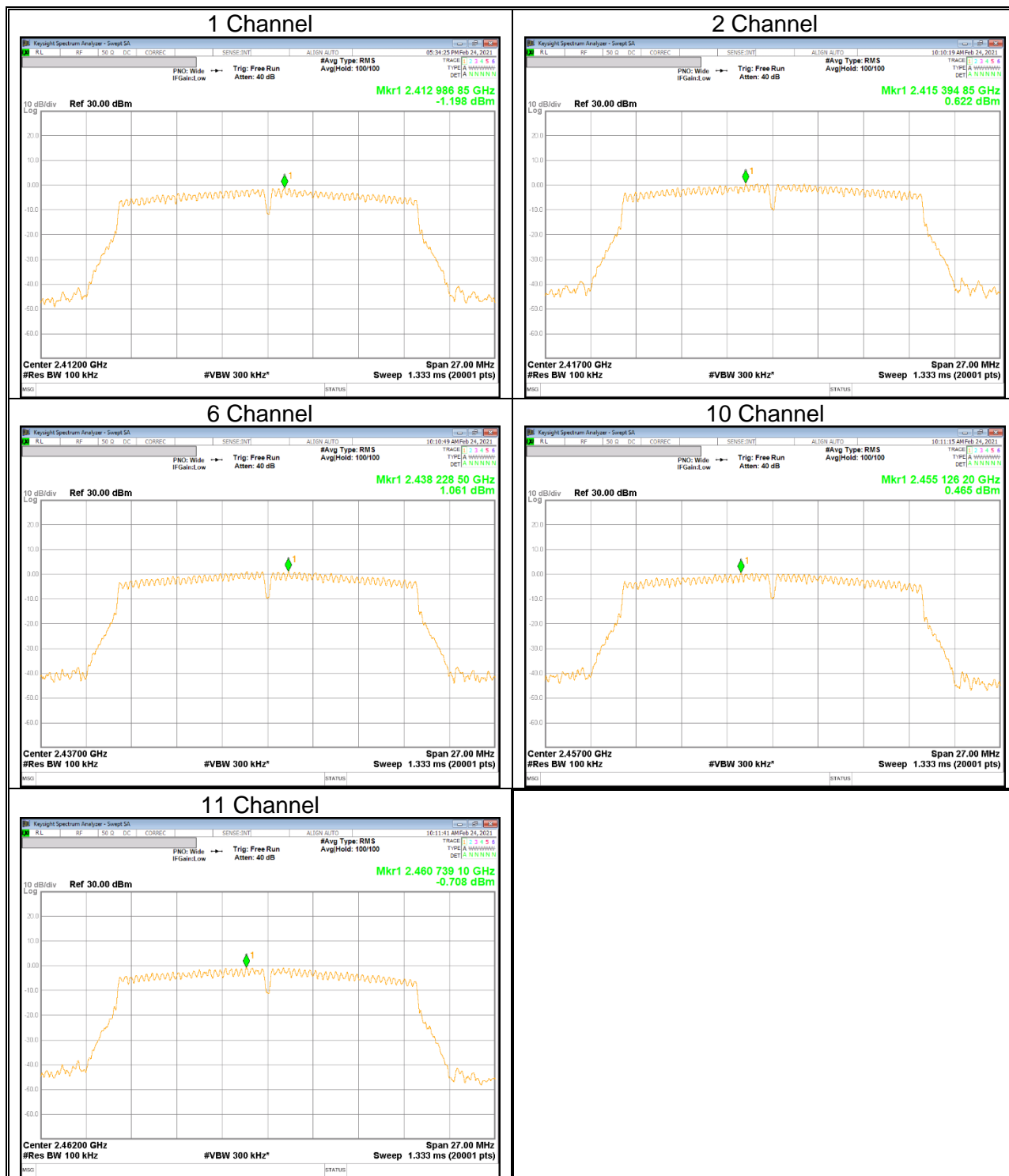
DTS 2.4 GHz IEEE 802.11b mode



DTS 2.4 GHz IEEE 802.11g mode



DTS 2.4 GHz IEEE 802.11n HT20 mode



9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

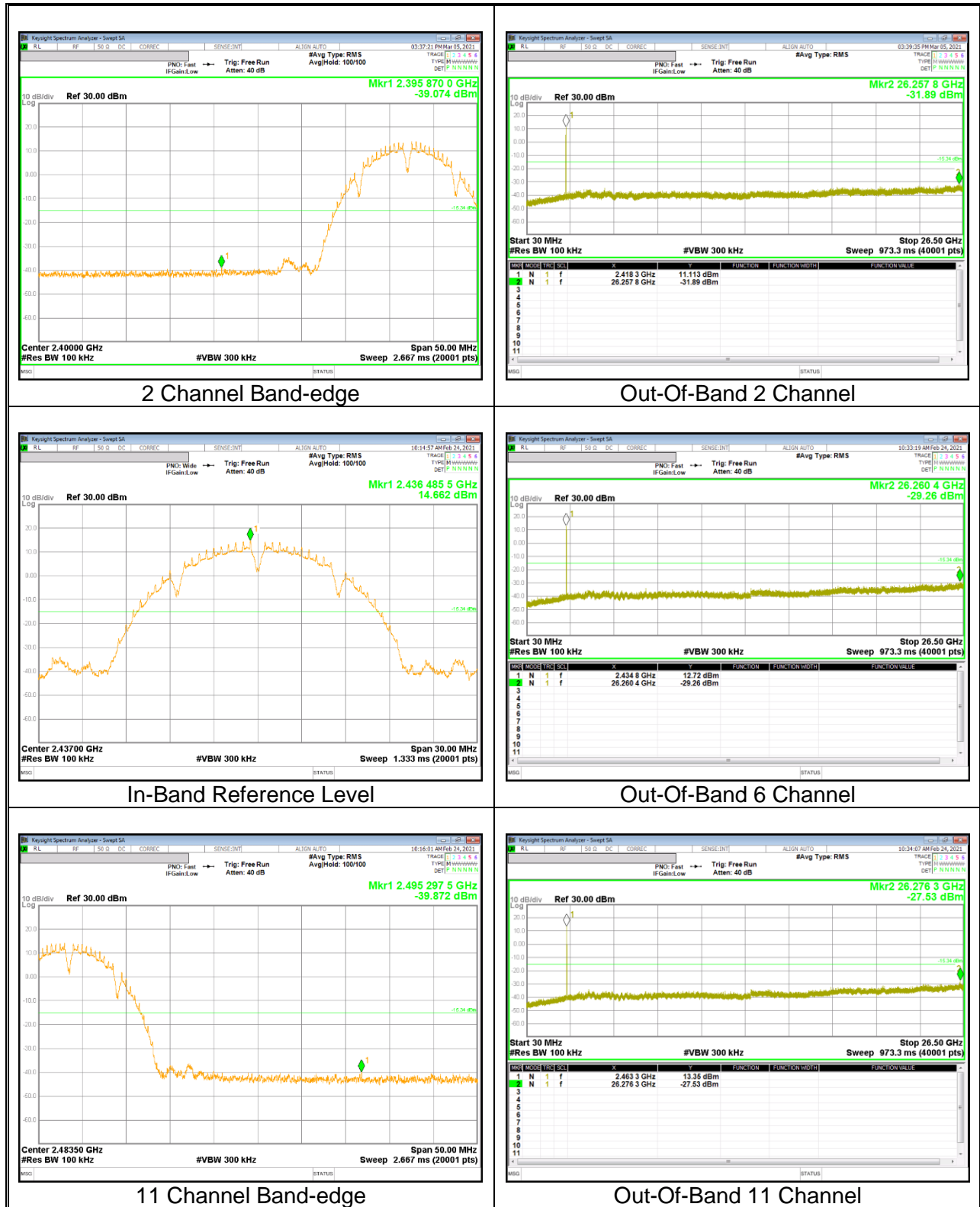
FCC §15.247 (d)

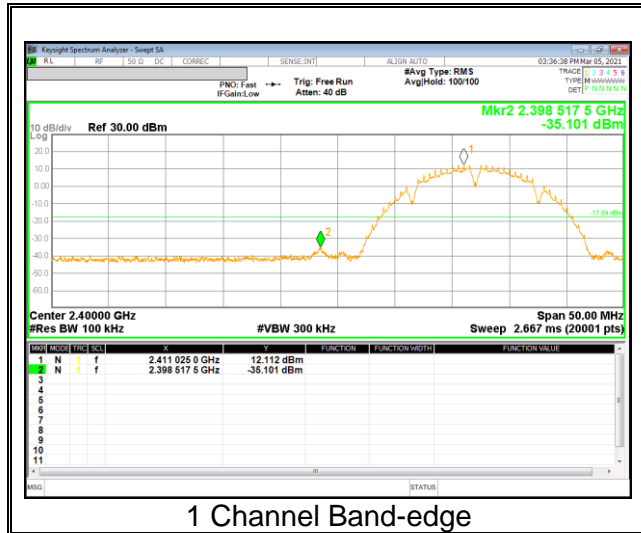
RSS-247 5.5

Output power was measured based on the use of average measurement.
Therefore, spurious emissions are required to be 30 dBc.

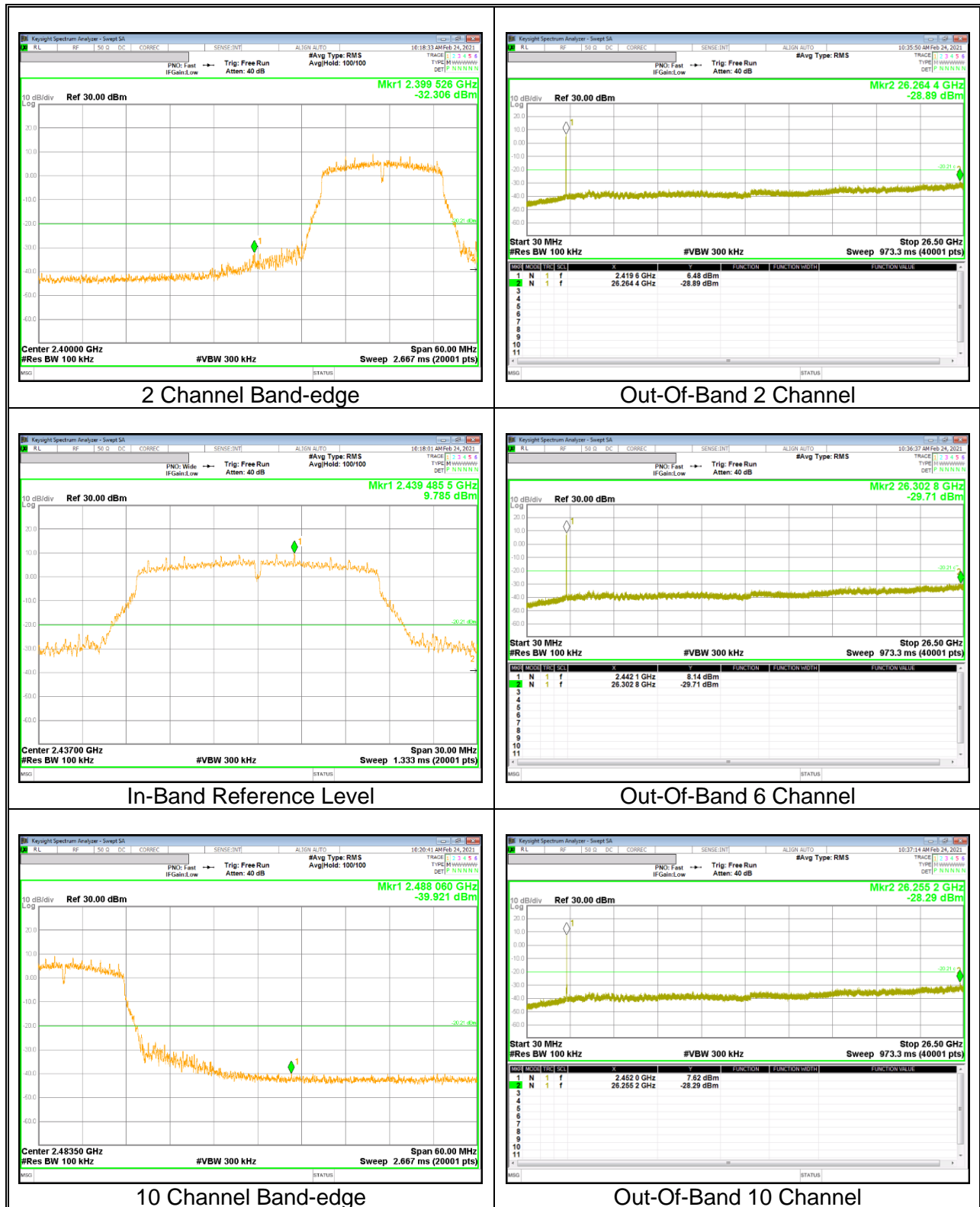
RESULTS

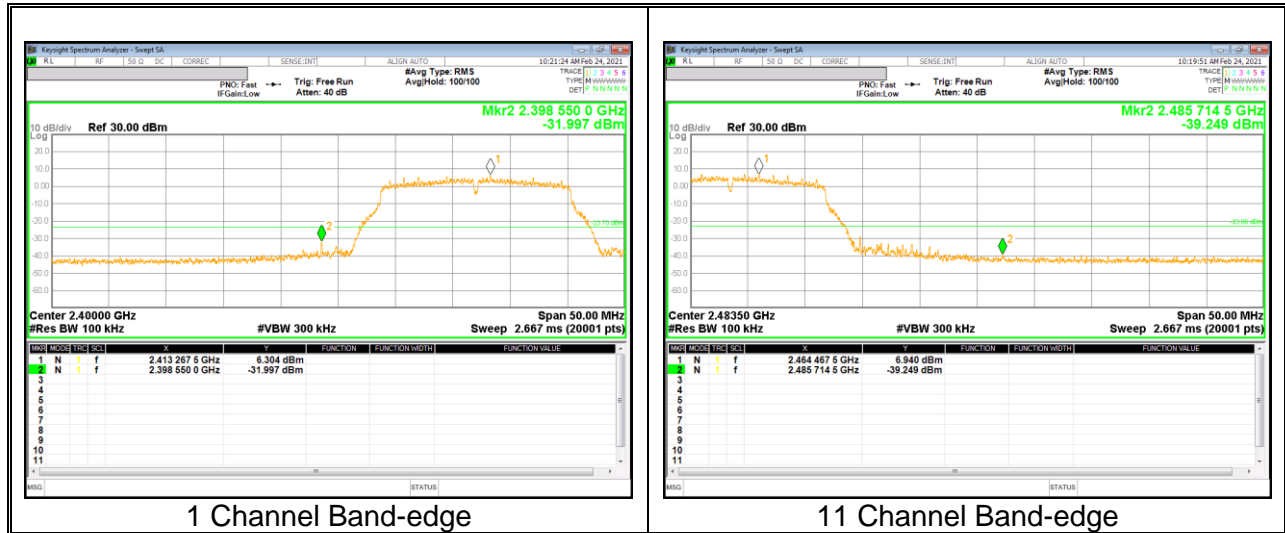
9.5.1. 802.11b MODE



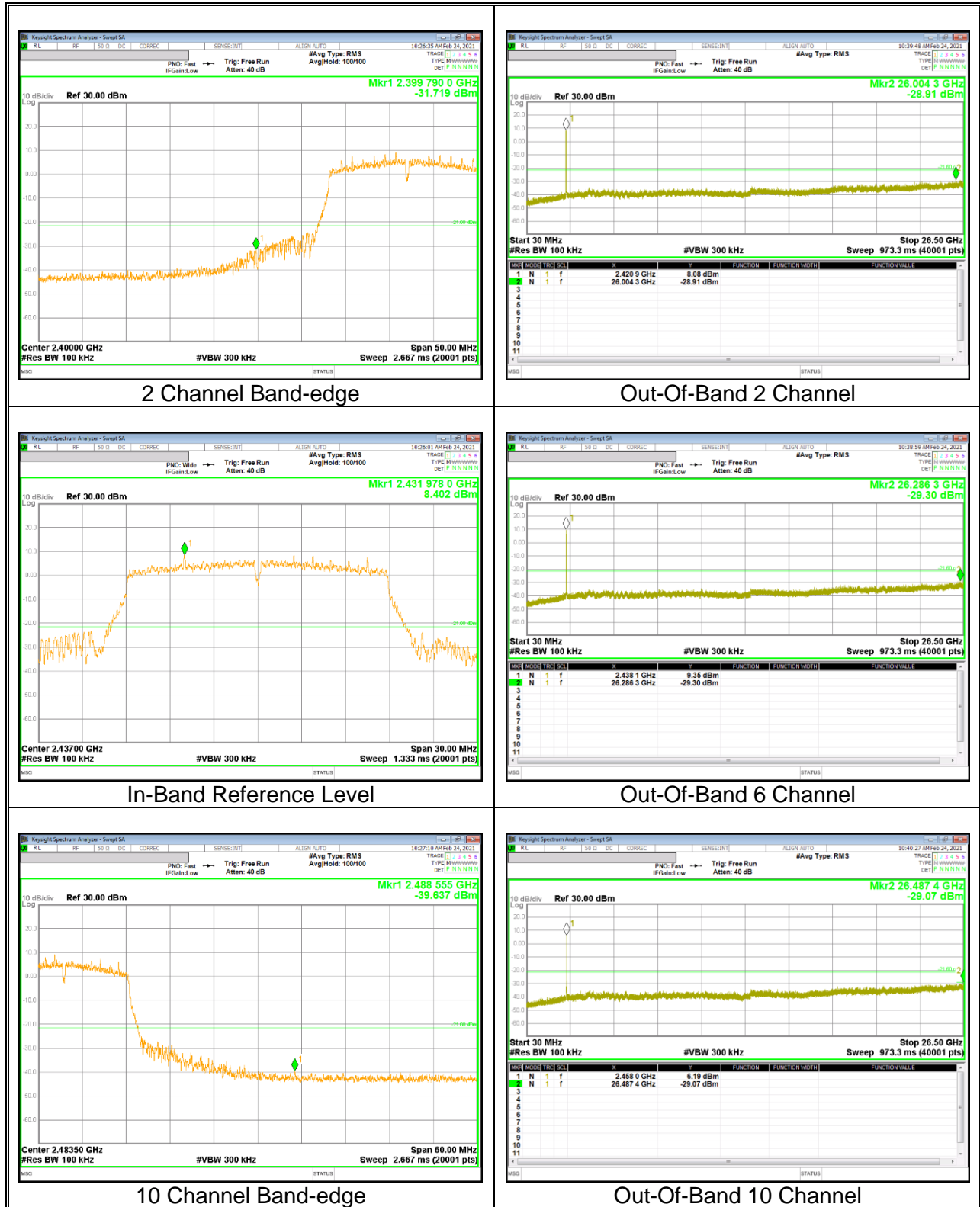


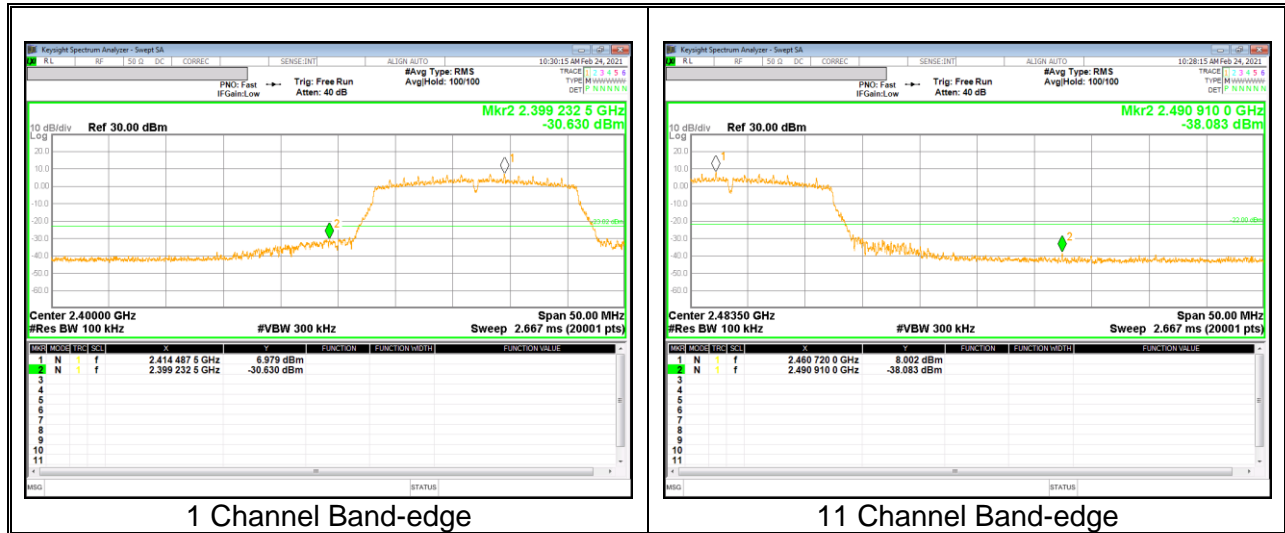
9.5.2. 802.11g MODE





9.5.3. 802.11n HT20 MODE





10. RADIATED TEST RESULTS

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.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	162.0125 ~	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	167.17	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	167.72 ~ 173.2	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	240 ~ 285	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	322 ~ 335.4	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	399.90 ~ 410	3345.8 ~ 3358		
		608 ~ 614	3600 ~ 4400		
		960 ~ 1240			

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1 GHz and 150 cm for above 1 GHz. 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:

802.11b SISO mode = 0 dB (duty cycle > 98%);
802.11g SISO mode = 0 dB (duty cycle > 98%);
802.11n(HT20) SISO mode = 0 dB (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 9 kHz to 30 MHz; 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.

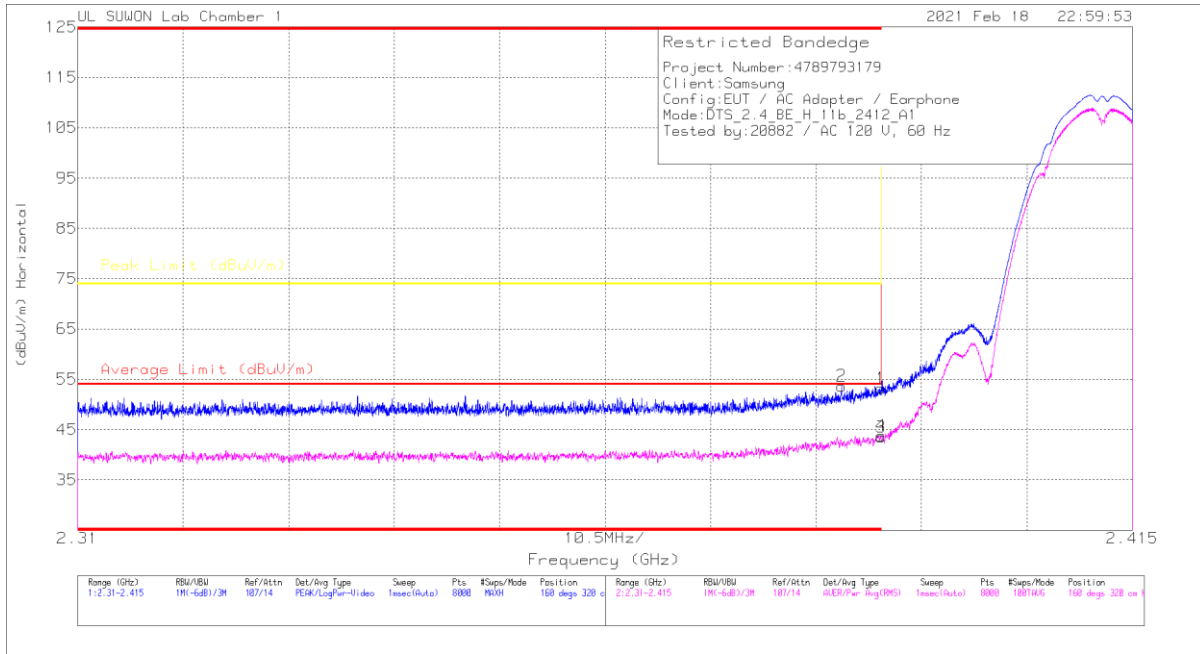
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Trace Markers

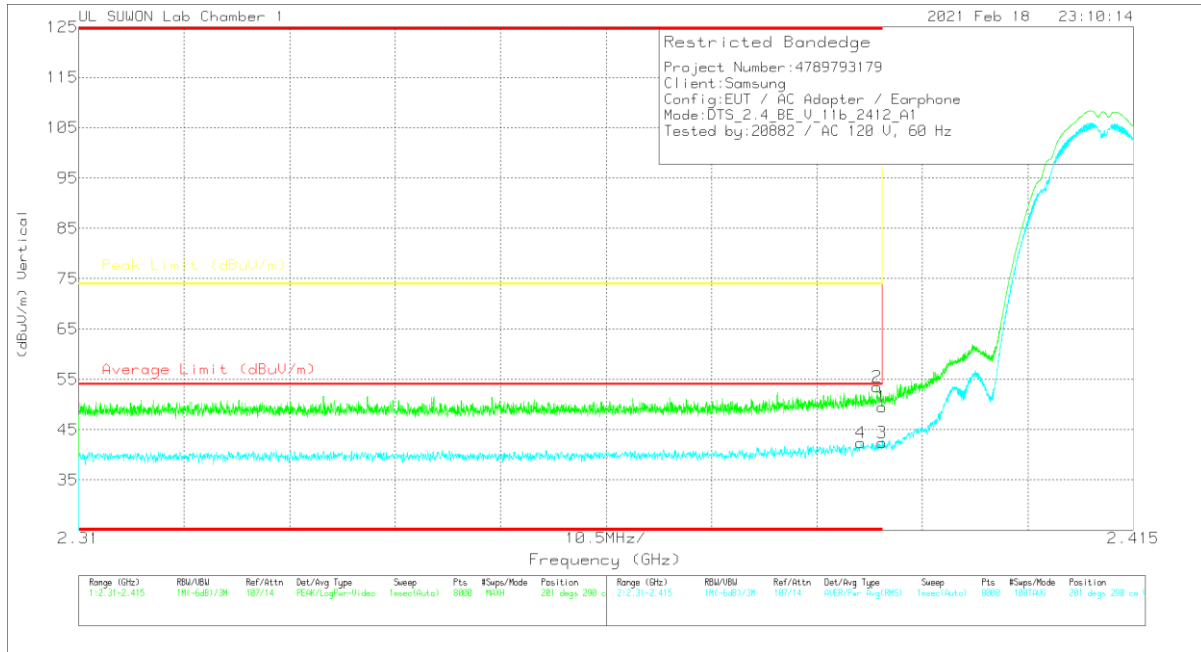
Marker	Frequency (GHz)	Meter Reading (dBu/m)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBu/m)	Average Limit (dBu/m)	Margin (dB)	Peak Limit (dBu/m)	PK Margin (dB)	Acimuth (Degs)	Height (cm)	Polarity
1	* 2.39	47.01	Pk	31.8	-25.6	0	53.21	-	-	74	-20.79	160	320	H
2	* 2.38603	47.48	Pk	31.8	-25.6	0	53.68	-	-	74	-20.32	160	320	H
3	* 2.39	37.33	RMS	31.8	-25.6	0	43.53	54	-10.47	-	-	160	320	H
4	* 2.38997	37.63	RMS	31.8	-25.6	0	43.83	54	-10.17	-	-	160	320	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



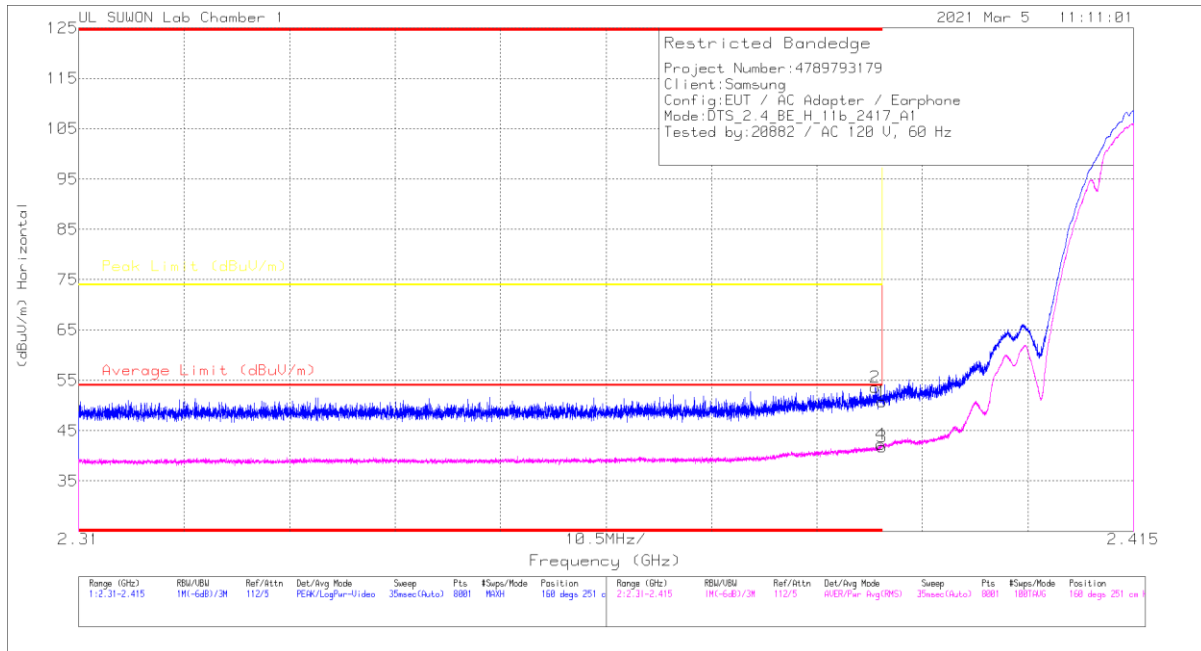
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	43.3	Pk	31.8	-25.6	0	49.5	-	-	74	-24.5	201	290	V
2	* 2.38948	47.19	Pk	31.8	-25.5	0	53.49	-	-	74	-20.51	201	290	V
3	* 2.39	36.19	RMS	31.8	-25.6	0	42.39	54	-11.61	-	-	201	290	V
4	* 2.38787	36.14	RMS	31.8	-25.5	0	42.44	54	-11.56	-	-	201	290	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

BANDEDGE (LOW CHANNEL, CH 2)

HORIZONTAL RESULT



Trace Markers

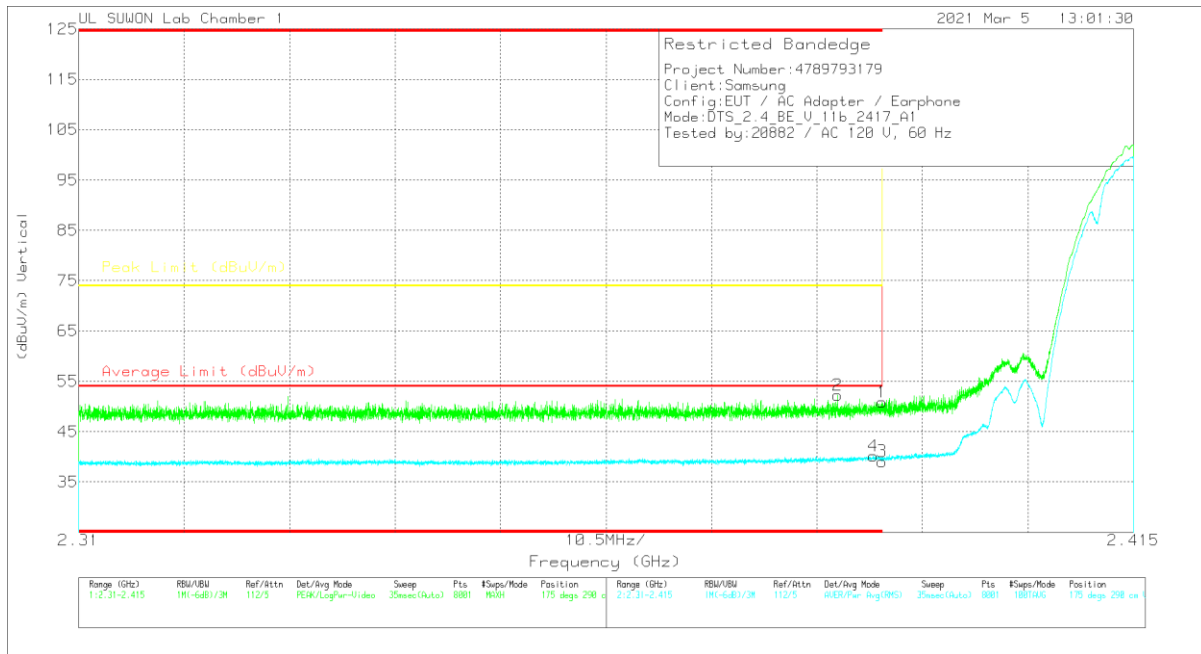
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.52	Pk	31.8	-25.6	50.72	-	-	74	-23.28	160	251	H
2	* 2.38929	47.33	PK	31.8	-25.5	53.63	-	-	74	-20.37	160	251	H
3	* 2.39	35.59	RMS	31.8	-25.6	41.79	54	-12.21	-	-	160	251	H
4	* 2.38983	36.09	RMS	31.8	-25.6	42.29	54	-11.71	-	-	160	251	H

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

PK - Peak detector

RMS - RMS detection

VERTICAL RESULT



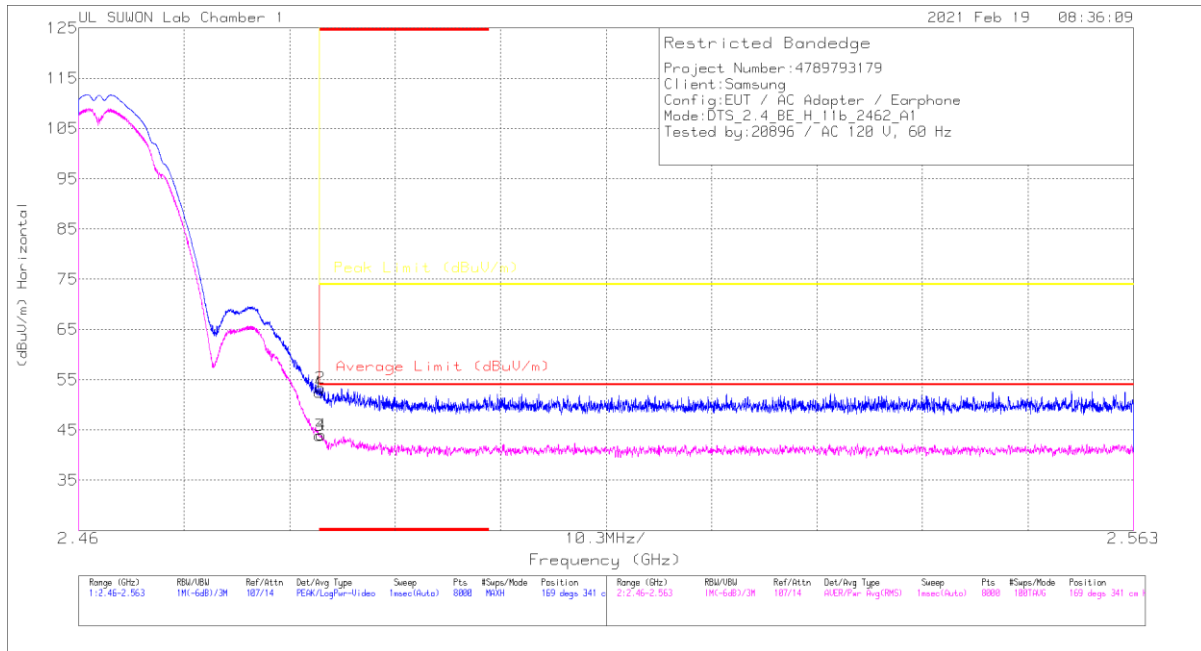
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	44.7	Pk	31.8	-25.6	0	50.9	-	-	74	-23.1	175	290	V
2	* 2.38553	46.08	Pk	31.8	-25.6	0	52.28	-	-	74	-21.72	175	290	V
3	* 2.39	32.9	RMS	31.8	-25.6	0	39.1	54	-14.9	-	-	175	290	V
4	* 2.38908	33.86	RMS	31.8	-25.5	0	40.16	54	-13.84	-	-	175	290	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Trace Markers

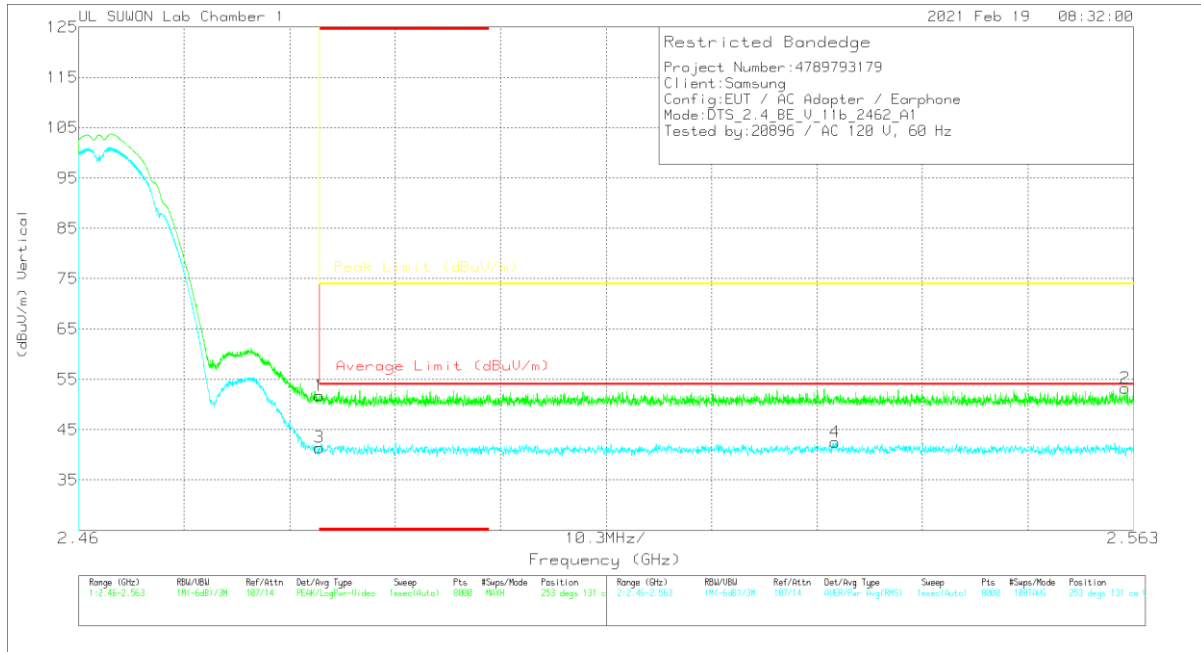
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	45.78	Pk	32	-25.3	52.48	-	-	74	-21.52	169	341	H
2	* 2.48359	46.71	Pk	32	-25.3	53.41	-	-	74	-20.59	169	341	H
3	* 2.4835	37.16	RMS	32	-25.3	43.86	54	-10.14	-	-	169	341	H
4	* 2.48367	37.31	RMS	32	-25.3	44.01	54	-9.99	-	-	169	341	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT

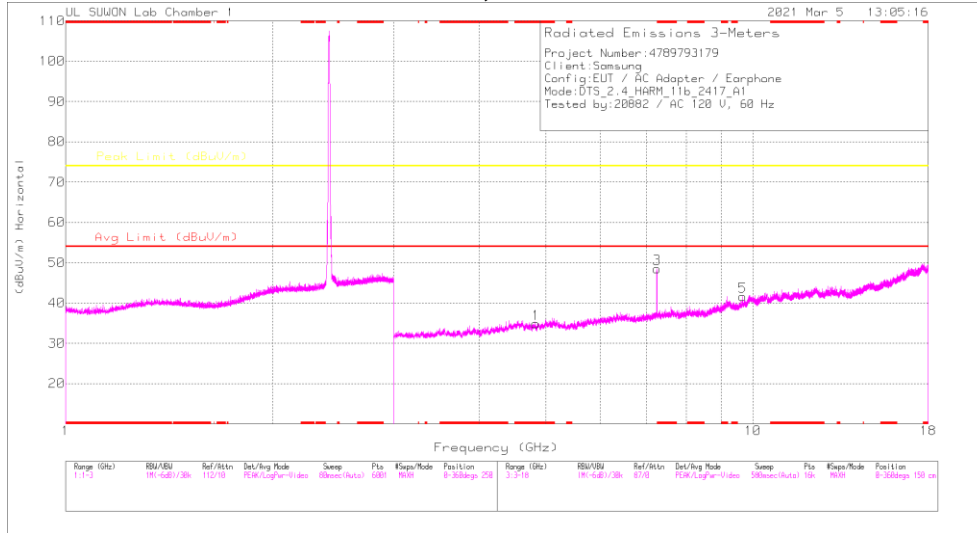


Trace Markers

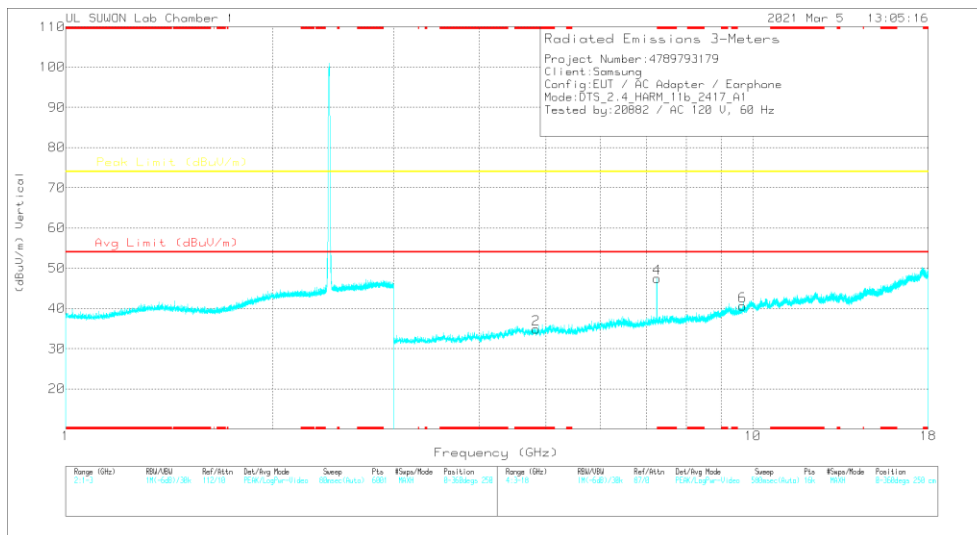
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	45.01	PK	32	-25.3	0	51.71	-	-	74	-22.29	253	131	V
2	2.56219	46.28	PK	32.1	-25.1	0	53.28	-	-	74	-20.72	253	131	V
3	* 2.4835	34.77	RMS	32	-25.3	0	41.47	54	-12.53	-	-	253	131	V
4	2.53388	35.61	RMS	32	-25.1	0	42.51	54	-11.49	-	-	253	131	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL, CH 2 RESULTS



HORIZONTAL



VERTICAL

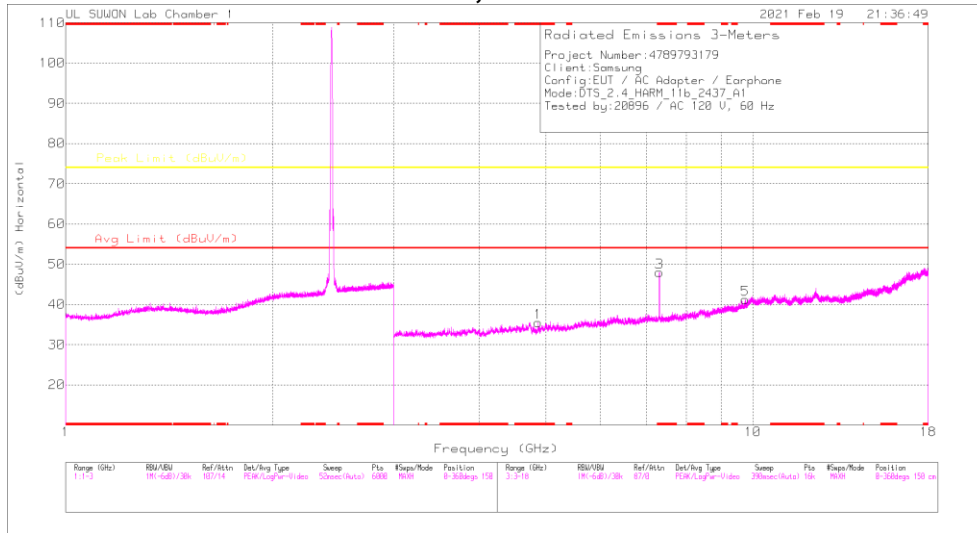
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

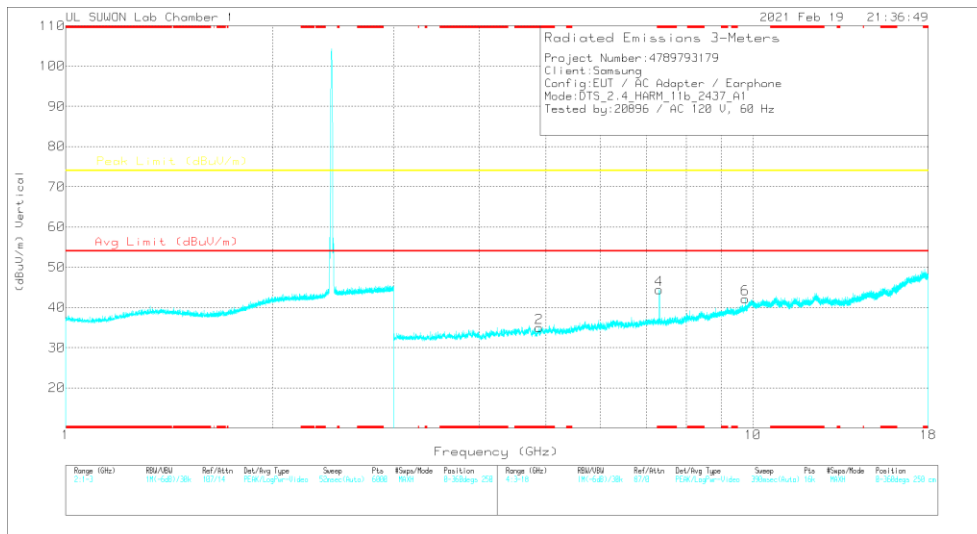
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.83395	41.44	PK2	34.1	-31.3	0	44.24	-	-	74	-29.76	15	121	H
* 4.83391	31.79	MAV1	34.1	-31.3	0	34.59	54	-19.41	-	-	15	121	H
* 4.83384	42.06	PK2	34.1	-31.3	0	44.86	-	-	74	-29.14	303	100	V
* 4.83401	30.38	MAV1	34.1	-31.3	0	33.18	54	-20.82	-	-	303	100	V
* 7.252	44.06	PK2	35.8	-27.6	0	52.26	-	-	74	-21.74	317	100	H
* 7.2515	40	MAV1	35.8	-27.6	0	48.2	54	-5.8	-	-	317	100	H
7.25	44.5	PK2	35.8	-27.6	0	52.7	-	-	74	-21.3	43	100	V
* 7.2515	39.96	MAV1	35.8	-27.6	0	48.16	54	-5.84	-	-	43	100	V
9.6669	34.37	PK2	37.3	-23.2	0	48.47	-	-	74	-25.53	360	100	H
9.66801	35.33	PK2	37.3	-23.3	0	49.33	-	-	74	-24.67	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAV1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

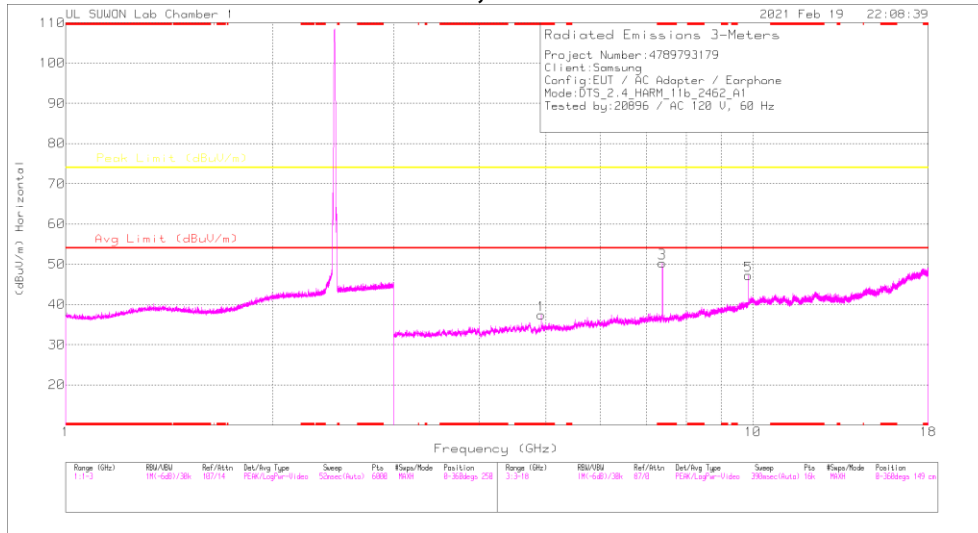
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

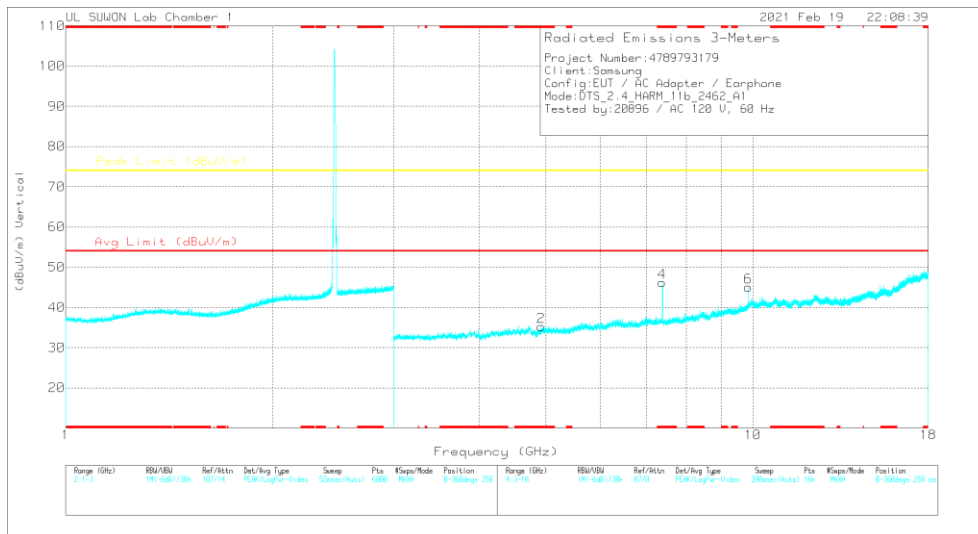
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8741	40.87	PK2	34.1	-31.3	0	43.67	-	-	74	-30.33	360	100	H
* 4.87248	39.96	PK2	34.1	-31.3	0	42.76	-	-	74	-31.24	360	100	V
* 7.31197	45.65	PK2	35.8	-27.4	0	54.05	-	-	74	-19.95	331	100	H
* 7.31193	39.96	MAv1	35.8	-27.4	0	48.36	54	-5.64	-	-	331	100	H
* 7.30973	43.49	PK2	35.8	-27.4	0	51.89	-	-	74	-22.11	315	105	V
* 7.30989	36.66	MAv1	35.8	-27.4	0	45.06	54	-8.94	-	-	315	105	V
9.74823	36	PK2	37.4	-23.7	0	49.7	-	-	74	-24.3	360	100	H
9.74793	36.49	PK2	37.4	-23.7	0	50.19	-	-	74	-23.81	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 MAv1- KDB558074 Option1 Maximum Peak
 PK2 - KDB558074 Method: Maximum Peak

HIGH CHANNEL, CH 11 RESULTS



HORIZONTAL



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.

RADIATED EMISSIONS

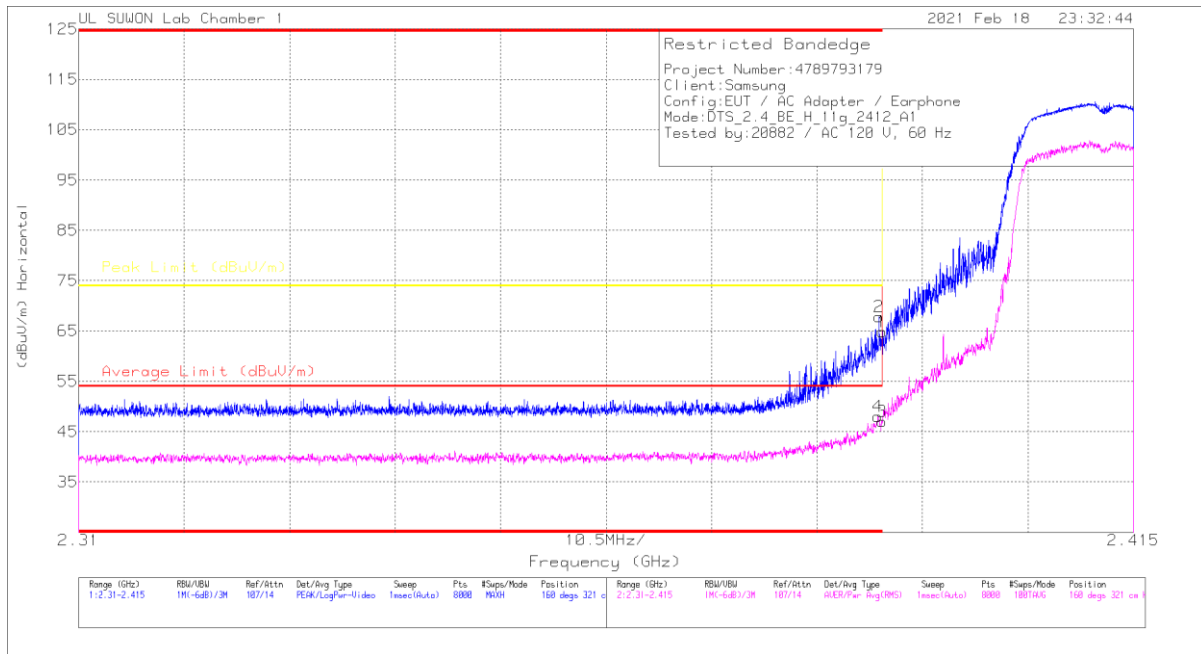
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.92349	42.5	PK2	34.1	-31.4	0	45.2	-	-	74	-28.8	26	102	H
* 4.92407	34.23	MAV1	34.1	-31.5	0	36.83	54	-17.17	-	-	26	102	H
* 4.92383	41.23	PK2	34.1	-31.4	0	43.93	-	-	74	-30.07	280	100	V
* 4.92405	31.52	MAV1	34.1	-31.5	0	34.12	54	-19.88	-	-	280	100	V
* 7.38498	46.82	PK2	35.8	-27	0	55.62	-	-	74	-18.38	350	101	H
* 7.38504	41.59	MAV1	35.8	-27	0	50.39	54	-3.61	-	-	350	101	H
* 7.38494	43.79	PK2	35.8	-27	0	52.59	-	-	74	-21.41	96	108	V
* 7.38498	37.89	MAV1	35.8	-27	0	46.69	54	-7.31	-	-	96	108	V
9.84815	39.14	PK2	37.6	-23	0	53.74	-	-	74	-20.26	287	112	H
9.84827	38.81	PK2	37.6	-23	0	53.41	-	-	74	-20.59	269	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 MAV1- KDB558074 Option1 Maximum Peak
 PK2 - KDB558074 Method: Maximum Peak

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

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT

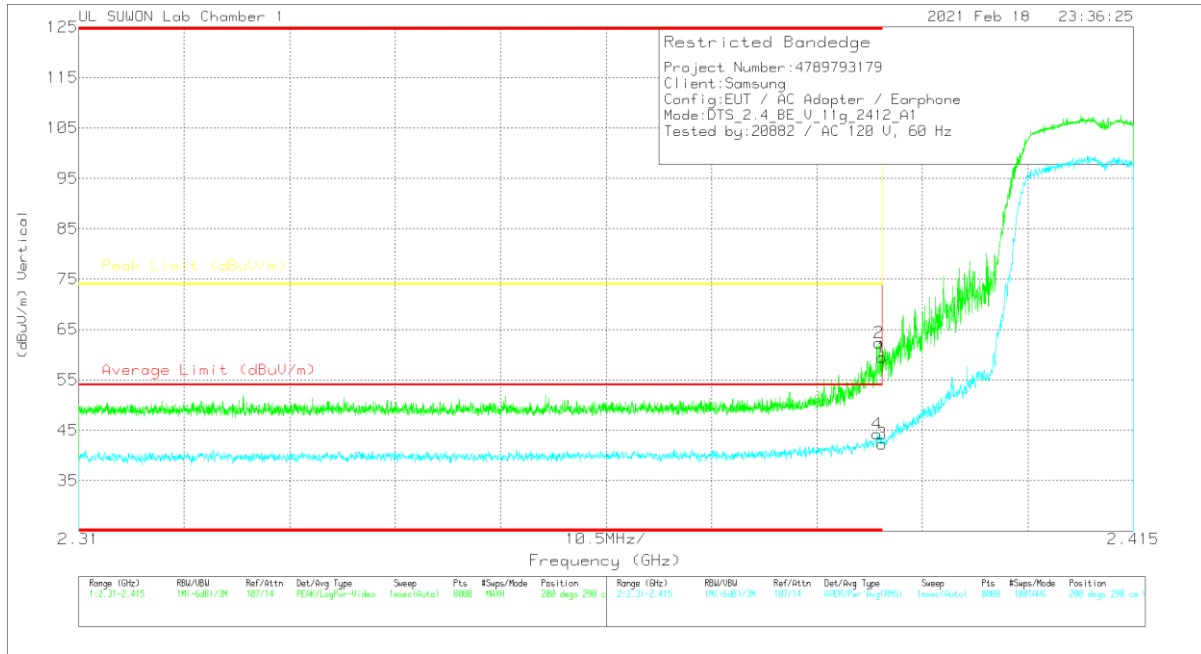


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	58.61	Pk	31.8	-25.6	0	64.81	-	-	74	-9.19	160	321	H
2	* 2.38967	61.61	Pk	31.8	-25.6	0	67.81	-	-	74	-6.19	160	321	H
3	* 2.39	40.82	RMS	31.8	-25.6	0	47.02	54	-6.98	-	-	160	321	H
4	* 2.38956	41.72	RMS	31.8	-25.5	0	48.02	54	-5.98	-	-	160	321	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	53.29	Pk	31.8	-25.6	0	59.49	-	-	74	-14.51	200	290	V
2	* 2.38967	56.1	Pk	31.8	-25.6	0	62.3	-	-	74	-11.7	200	290	V
3	* 2.39	36.14	RMS	31.8	-25.6	0	42.34	54	-11.66	-	-	200	290	V
4	* 2.3895	37.99	RMS	31.8	-25.5	0	44.29	54	-9.71	-	-	200	290	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection