



CERTIFICATION TEST REPORT

Report Number. : 4789893923-E6V1

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

Model : NP545XLA, NP545XLA-KA1TT, NP545XLA-KA1VZ

FCC ID : A3LNP545XLA

EUT Description : WCDMA/LTE/5G NR Laptop + BT/BLE, DTS/UNII a/b/g/n/ac/ax

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

Date Of Issue:

2021-06-14

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	2021-06-14	Initial issue	Hyunsik Yun

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	7
4.1. MEASURING INSTRUMENT CALIBRATION	7
4.2. SAMPLE CALCULATION	7
4.3. MEASUREMENT UNCERTAINTY	7
4.4. DECISION RULE	7
5. EQUIPMENT UNDER TEST	8
5.1. EUT DESCRIPTION	8
5.2. MAXIMUM OUTPUT POWER	10
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	10
5.4. TESTED CHANNELS LIST	10
5.5. WORST-CASE CONFIGURATION AND MODE	11
5.6. DESCRIPTION OF TEST SETUP	13
6. MEASUREMENT METHOD	15
7. TEST AND MEASUREMENT EQUIPMENT	16
8. SUMMARY TABLE	17
9. ANTENNA PORT TEST RESULTS	18
9.1. ON TIME AND DUTY CYCLE	18
9.2. 6 dB BANDWIDTH	21
9.2.1. 802.11b SISO MODE IN THE 2.4 GHz BAND	22
9.2.2. 802.11g MIMO MODE IN THE 2.4 GHz BAND	22
9.2.3. 802.11n HT20 MIMO MODE IN THE 2.4 GHz BAND	22
9.2.4. 802.11ax HE20(26T) MIMO MODE IN THE 2.4 GHz BAND	22
9.3. OUTPUT POWER	23
9.3.1. TEST RESULTS	24
9.4. POWER SPECTRAL DENSITY	26
9.4.1. 802.11b/g/n HT20 MODE TEST RESULTS	27
9.5. CONDUCTED SPURIOUS EMISSIONS	28
9.5.1. 802.11b MODE	29
9.5.2. 802.11g MODE	31
9.5.3. 802.11n HT20 MODE	33
9.5.4. 802.11ax HE20(SU) MODE	35

9.5.5.	802.11ax HE20(RU) MODE	37
10.	RADIATED TEST RESULTS.....	39
10.1.	TRANSMITTER ABOVE 1 GHz.....	41
10.1.1.	TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND	41
10.1.2.	TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND	47
10.1.3.	TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND.....	50
10.1.4.	TX ABOVE 1 GHz 802.11ax HE20 MODE IN THE 2.4 GHz BAND.....	53
10.2.	WORST CASE BELOW 1 GHz.....	56
11.	AC POWER LINE CONDUCTED EMISSIONS.....	57
11.1.1.	AC Power Line.....	58

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: WCDMA/LTE/5G NR Laptop + BT/BLE, DTS/UNII a/b/g/n/ac/ax

MODEL NUMBER: NP545XLA, NP545XLA-KA1TT, NP545XLA-KA1VZ

SERIAL NUMBER: FLKR01R2S00430 (CONDUCTED);
FLKJ930R400094X (RADIATED);

DATE TESTED: 2021-04-20 ~ 2021-06-14;

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
UL Korea, Ltd. By:



Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Hyunsik Yun
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. KDB 662911 D01 Multiple Transmitter Output v02r01
5. ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

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

218 Maeyeong-ro	
☒	Chamber 1
☒	Chamber 2
☒	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:

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

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 2, Clause 4.4.3 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a WCDMA/LTE/5G NR Laptop + BT/BLE, DTS/UNII a/b/g/n/ac/ax.
This test report addresses the DTS (WLAN) operational mode.

This report covers the Samsung models NP545XLA, NP545XLA-KA1TT and NP545XLA-KA1VZ. These models are identical in hardware except below.

NP545XLA-KA1TT: eSIM IC unmounted on PCB.

NP545XLA-KA1VZ: There is no difference in hardware(Supported RF band is different).

With some pre-scan, model NP545XLA was set for final test.

WiFi operating mode

Frequency rage	Mode	ANT 1	ANT 2
2.4GHz (2412 MHz ~ 2462 MHz)	802.11b SISO	TX/RX	TX/RX
	802.11g MIMO	TX/RX	
	802.11n(HT20) MIMO	TX/RX	
	802.11ax(HE20) MIMO	TX/RX	

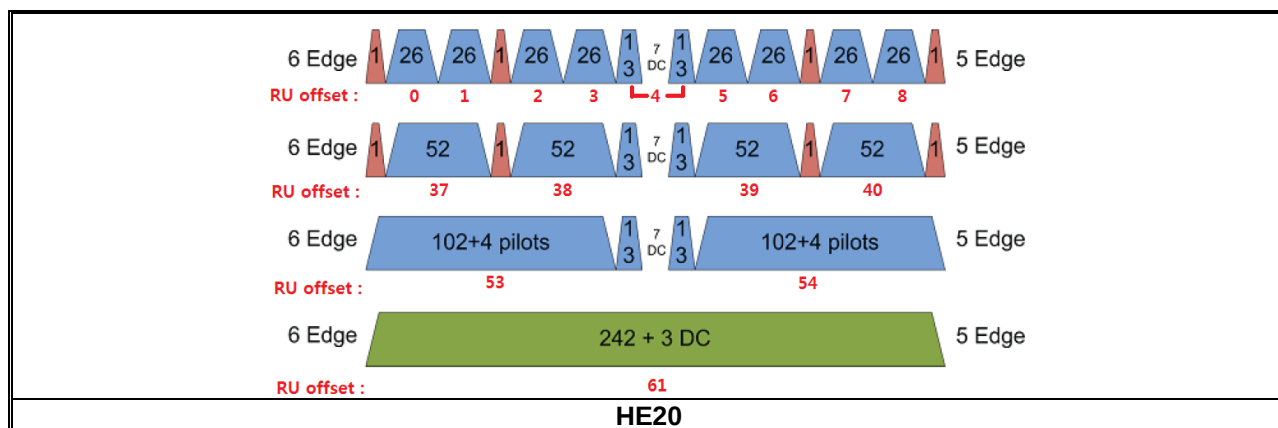
Simultaneous TX Condition

Simultaneous Tx Condition - RSDB

Mode	# of TX	5GHz WLAN		2.4GHz WLAN		Test Case
		ANT1	ANT2	ANT1	ANT2	
2.4GHz + 5GHz RSDB MIMO	4	O	O	O	O	O

Note. Please refer to the report "4789893923-E9 FCC Report UNII(a,n,ac,ax) WLAN"

802.11ax RU allocations



Test RU offset for tones

Mode	Tones number in RU	RU offset
HE20	26T	0
		4
		8
	52T	37
		38
		40
	106T	53
		54
	242T / SU ^{Note 1}	61 / -

Note. Full RU(Resource Unit) 242T mode and SU(Single Unit) mode have no difference in physical waveform. This report has been reported the SU mode with highest output power in MIMO.

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]	
		ANT1	ANT2	ANT1	ANT2
2412 - 2462	802.11b SISO	16.94	16.98	49.43	49.89
	802.11g MIMO	17.95		62.37	
	802.11n(HT20) MIMO	18.68		73.79	
	802.11ax(HE20) MIMO	17.74		59.43	

5.3. 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 ANT 1's maximum gain of 1.61 dBi and ANT 2's maximum gain of 4.25 dBi

"Ant1" and "Ant2" as indicated in antenna specification are written as ANT1 and ANT2 in this report.

5.4. TESTED CHANNELS LIST

Ch.	Frequency [MHz]	11b [SISO]	11g [MIMO]	11n(HT20) [MIMO]	11ax(HE20) [MIMO]
1	2 412	O	O	O	O
6	2 437	O	O	O	O
11	2 462	O	O	O	O
12	2 467	Not supported			
13	2 472				

5.5. 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.

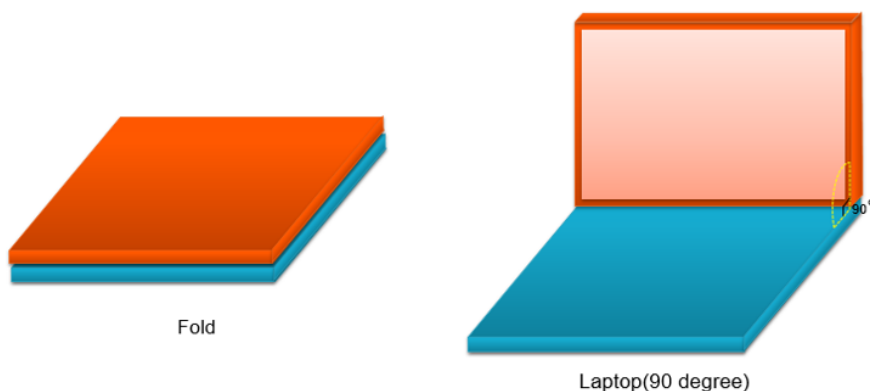
i. Worst Axis Condition

The fundamental and radiated spurious emission were investigated in three orthogonal orientations X and Y, it was determined that below orientation was worst-case orientation for each antenna.

Antenna	Worst Case	
	X	Y
ANT1	-	Laptop
ANT2	Laptop	-
ANT ALL	Laptop	-

ii. Foldable Condition

The Fundamental of the EUT was investigated in four foldable conditions. [Fold, Laptop(90degree)].



Based on the baseline scan, the worst-case data rates were:

802.11b mode: 1 Mbps 1TX

802.11g mode: 6 Mbps 2TX

802.11n HT20 mode: MCS0 2TX

802.11ax HE20 mode: MCS0 2TX

Worst-case selection criteria for 802.11ax test items :

For the 6dB Bandwidth, it was tested at the RU allocation with lowest tones number for each bandwidth.

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

Test case configuration for 802.11b, g, n HT20, ax HE20(SU) modes :

SISO Target[dBm]						MIMO Target[dBm]				
Ch.	Freq.	802.11b	802.11g	802.11n HT20	802.11ax HE20(SU)	Ch.	Freq.	802.11g	802.11n HT20	802.11ax HE20(SU)
1	2412	16	15	15	14	1	2412	18	18	17
6	2437	16	15	15	14	6	2437	18	18	17
11	2462	16	15	15	14	11	2462	18	18	17
12	2467	Disable				12	2467	Disable		
13	2472					13	2472			

	Band-Edge & Spurious Emission
	Spot-check

Note1. Since the power density is lower than that of the 11g or 11n mode, 11ax SU mode's spurious test was omitted.
Note2. Since the target power of 11ax su mode was lower than 11g or 11n, only spot-check was performed for radiated band-edge test.

Test case configuration for 802.11ax HE20(RU) modes :

MIMO Worst RU offset[dBm]					
Mode	Ch.	Freq.	Tone	RU offset	Test Case
802.11ax RU mode	1	2412	26 T	0	-
				4	O
				8	-
	6	2437		0	O
				4	-
				8	-
	11	2462		0	-
				4	-
				8	O

Note. In 802.11ax HE20(RU) mode, the test case according to RU offset was selected from the offset with worst average power.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37R32A00XADK3	N/A
Data Cable	SAMSUNG	EP-DW767JWE	N/A	N/A

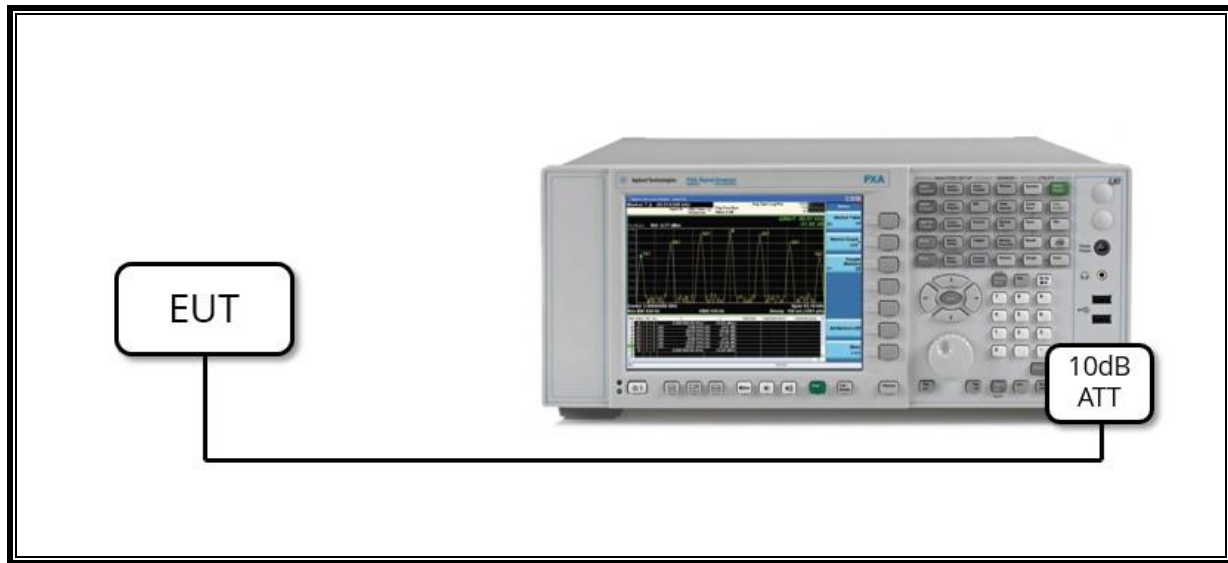
I/O CABLE

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

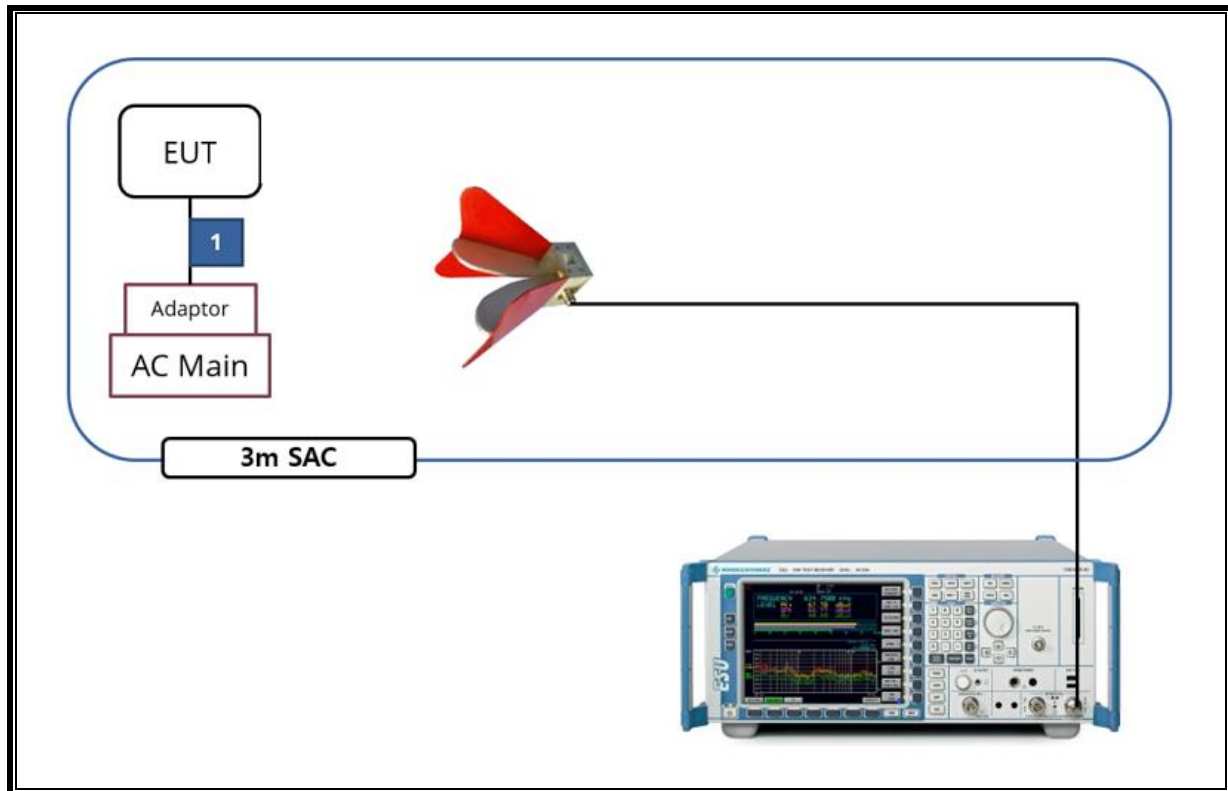
TEST SETUP

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

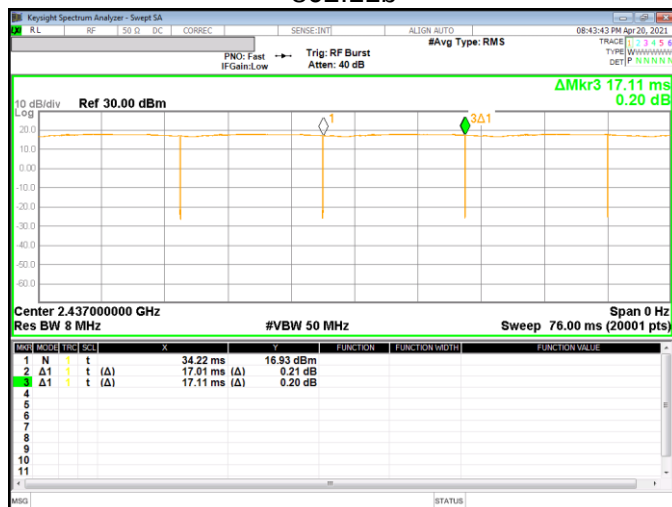
LIMITS

None; for reporting purposes only.

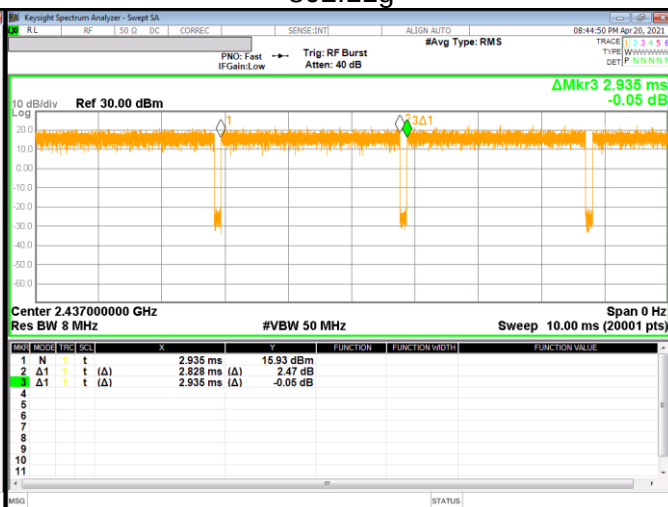
Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]	1/T Minimum VBW[kHz]
802.11b	17.010	17.110	0.994	99.416	-	0.12
802.11g MIMO	2.828	2.935	0.964	96.354	0.16	0.36
802.11n(HT20) MIMO	2.512	2.620	0.959	95.878	0.18	0.38
802.11ax(HE20) MIMO SU	4.503	4.610	0.977	97.679	0.10	0.22
802.11ax(HE20) MIMO 26T	5.079	5.194	0.978	97.786	0.10	0.20
802.11ax(HE20) MIMO 52T	5.074	5.182	0.979	97.916	0.09	0.20
802.11ax(HE20) MIMO 106T	4.767	4.874	0.978	97.805	0.10	0.21

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.

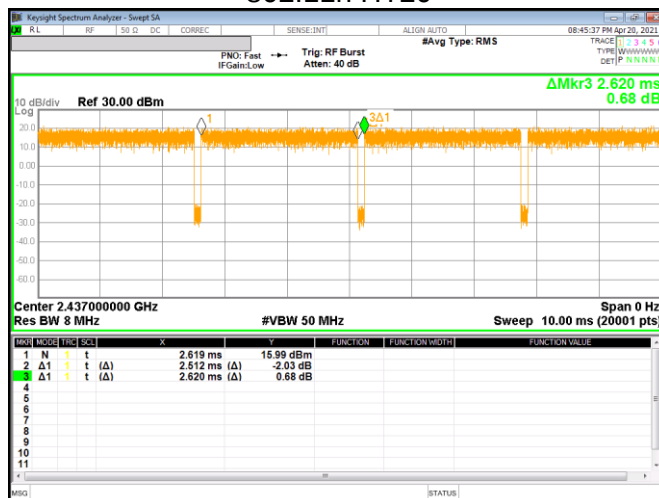
802.11b



802.11g

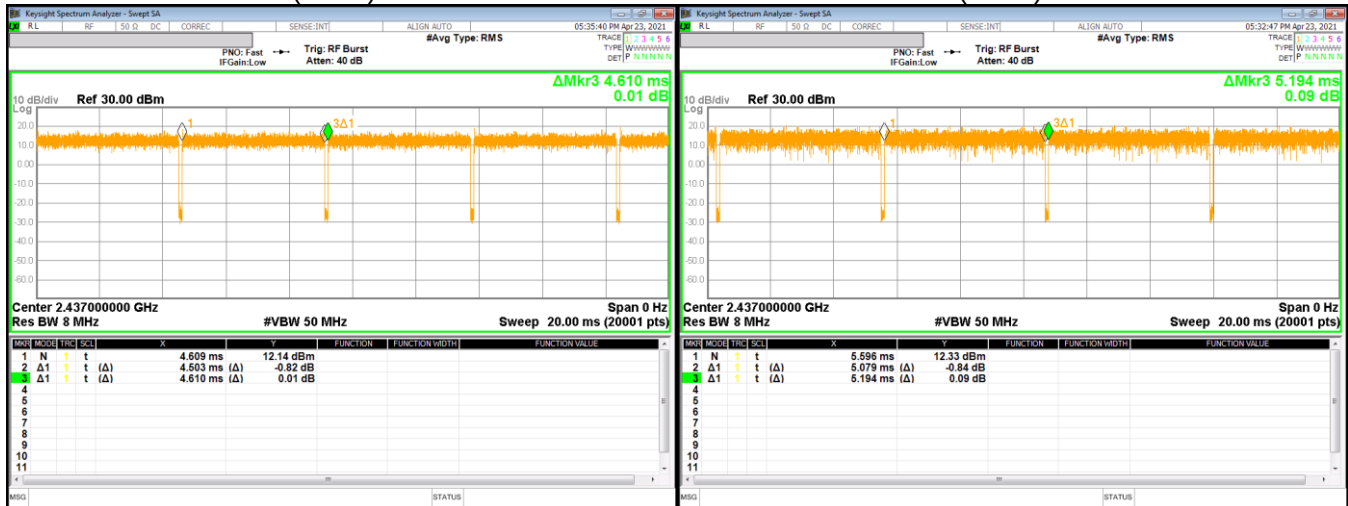


802.11n HT20



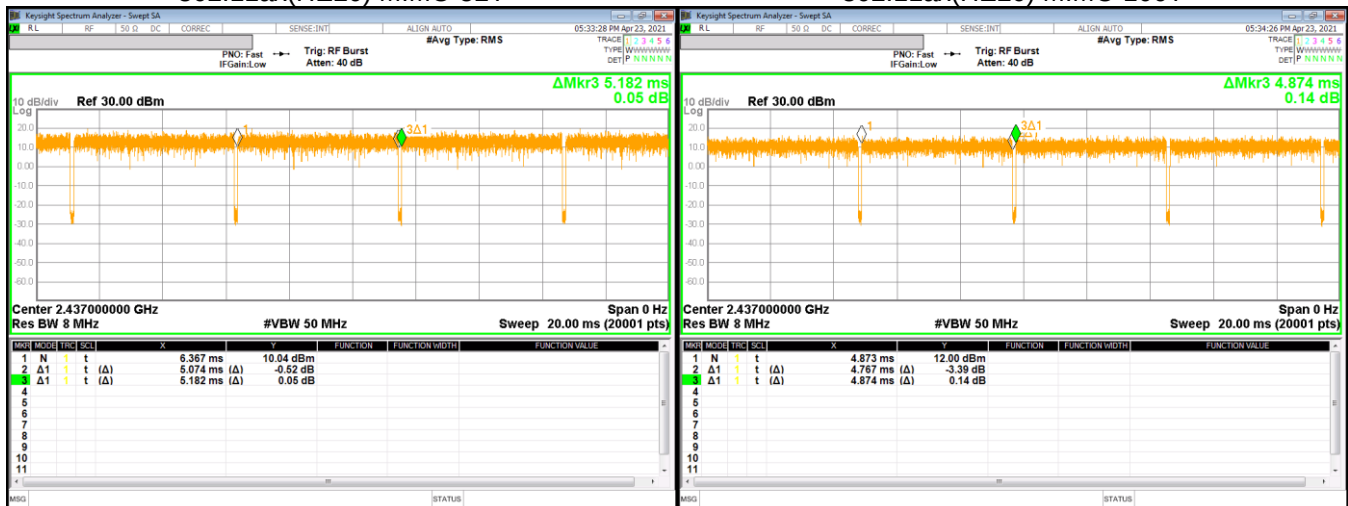
802.11ax(HE20) MIMO SU

802.11ax(HE20) MIMO 26T



802.11ax(HE20) MIMO 52T

802.11ax(HE20) MIMO 106T



9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

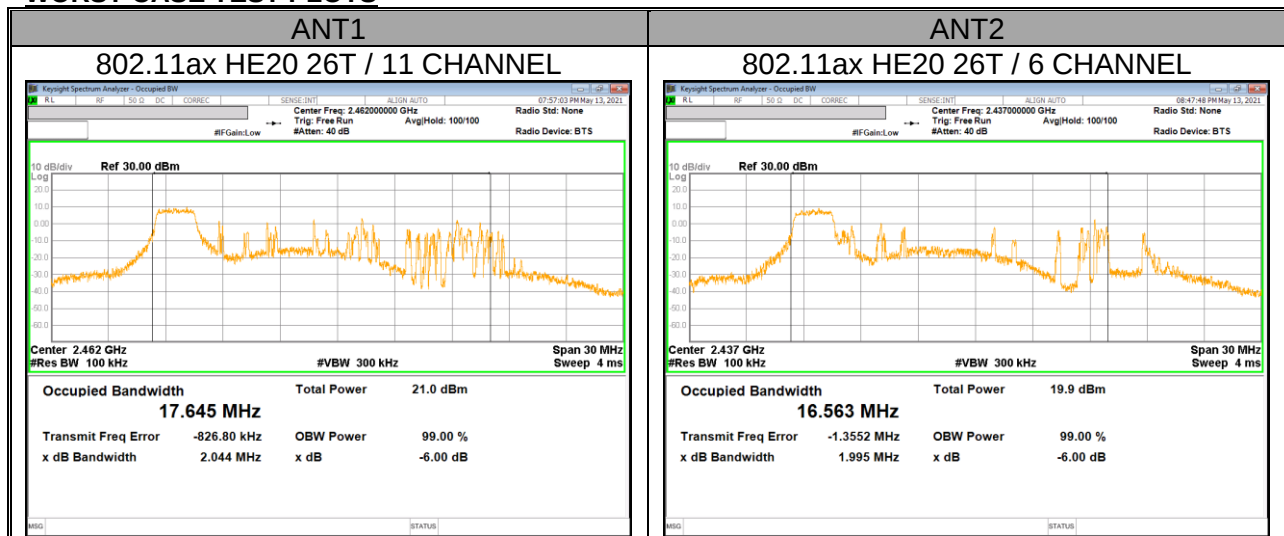
TEST PROCEDURE

Reference to KDB 558074 D01 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

WORST CASE TEST PLOTS



9.2.1. 802.11b SISO MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		ANT 1	ANT 2	
1	2 412	13.030	13.570	0.5
6	2 437	13.090	13.080	
11	2 462	11.570	13.020	
Worst		11.570	13.020	

9.2.2. 802.11g MIMO MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		ANT 1	ANT 2	
1	2 412	16.280	15.670	0.5
6	2 437	16.290	16.300	
11	2 462	14.660	15.070	
Worst		14.660	15.070	

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

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		ANT 1	ANT 2	
1	2 412	16.520	16.210	0.5
6	2 437	16.150	15.670	
11	2 462	15.940	15.690	
Worst		15.940	15.670	

9.2.4. 802.11ax HE20(26T) MIMO MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		ANT 1	ANT 2	
1	2 412	2.054	14.470	0.5
6	2 437	3.257	1.995	
11	2 462	2.044	2.016	
Worst		2.044	1.995	

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

Measurements perform using a wideband RF frame average power sensor.

The cable assembly insertion loss and duty cycle correction factor was entered as an offset in the power sensor 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.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is unequal among the chains.
The directional gain is:

Bands [MHz]	ANT 1 [dBi]	ANT 2 [dBi]	Correlated Directional Gain [dBi]
2 412 ~ 2 462	1.61	4.25	6.04

Note. Excessive(0.04dB) directional gain hardly affects the result value, so compensation or limit correction is excluded.

9.3.1. TEST RESULTS

Included in Calculations of Corr'd Power			
Duty Cycle CF	802.11b SISO	-	dB
	802.11g MIMO	0.16	dB
	802.11n HT20 MIMO	0.18	dB
	802.11ax(HE20) MIMO SU	0.10	dB
	802.11ax(HE20) MIMO 26T	0.10	dB
	802.11ax(HE20) MIMO 52T	0.09	dB
	802.11ax(HE20) MIMO 106T	0.10	dB

Calculation of Output Power result

Average Power = Meas. Power + Duty Cycle CF / Total Corr'd Power = ANT1's Average Power + ANT2's Average Power

- 802.11b,g,n,ax(SU) mode

Mode	Channel	Frequency [MHz]	SISO Average Power [dBm]		MIMO Average Power [dBm]			Power Limit [dBm]
			ANT1	ANT2	ANT1	ANT2	Total Corr'd Power [dBm]	
802.11b	1	2 412	16.80	16.98	Not Supported			30.00
	6	2 437	15.92	16.89				
	11	2 462	16.94	16.78				
Worst Case			16.94	16.98				
802.11g	1	2 412	14.90	14.75	14.65	14.74	17.71	
	6	2 437	15.06	14.90	15.01	14.86	17.95	
	11	2 462	14.90	14.89	14.89	14.59	17.75	
Worst Case			15.06	14.90			17.95	
802.11n HT20	1	2 412	15.63	15.51	15.56	15.52	18.55	
	6	2 437	15.82	15.59	15.80	15.54	18.68	
	11	2 462	15.77	15.55	15.72	15.50	18.62	
Worst Case			15.82	15.59			18.68	
802.11ax HE20(SU)	1	2 412	14.78	14.84	14.70	14.75	17.74	
	6	2 437	14.25	14.96	14.14	13.81	16.99	
	11	2 462	14.95	14.54	14.81	14.42	17.63	
Worst Case			14.95	14.96			17.74	

- 802.11ax (RU) mode

Channel	Frequency [MHz]	Tones	RU Offset	SISO Average Power [dBm]		MIMO Average Power [dBm]			Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	Total Corr'd Power [dBm]	
1	2 412	26T	0	14.45	14.03	14.41	13.89	17.17	30.00
			4	14.54	14.48	14.43	14.43	17.44	
			8	14.21	14.98	14.09	14.89	17.52	
		52T	37	14.47	14.11	14.48	14.03	17.27	
			38	14.61	14.32	14.58	14.29	17.45	
			40	14.31	14.95	14.20	14.95	17.60	
		106T	53	14.64	14.30	14.60	14.23	17.43	
			54	14.50	14.95	14.34	14.89	17.63	
6	2 437	26T	0	14.83	14.22	14.72	14.10	17.43	
			4	14.78	14.65	14.74	14.52	17.64	
			8	14.06	14.70	14.98	14.46	17.74	
		52T	37	14.84	14.28	14.76	14.18	17.49	
			38	14.86	14.61	14.79	14.50	17.66	
			40	14.10	14.74	14.99	14.56	17.79	
		106T	53	14.95	14.53	14.84	14.45	17.66	
			54	14.13	14.86	14.98	14.69	17.85	
11	2 462	26T	0	14.02	14.18	13.99	14.05	17.03	
			4	14.80	14.08	14.66	13.97	17.34	
			8	14.55	14.37	14.41	14.33	17.38	
		52T	37	14.08	14.10	14.05	13.97	17.02	
			38	14.08	14.65	14.00	13.49	16.76	
			40	14.80	14.45	14.65	14.46	17.57	
		106T	53	14.16	14.98	14.10	13.80	16.96	
			54	14.23	14.75	14.07	13.61	16.86	
Worst Case				14.95	14.98		17.85		

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.

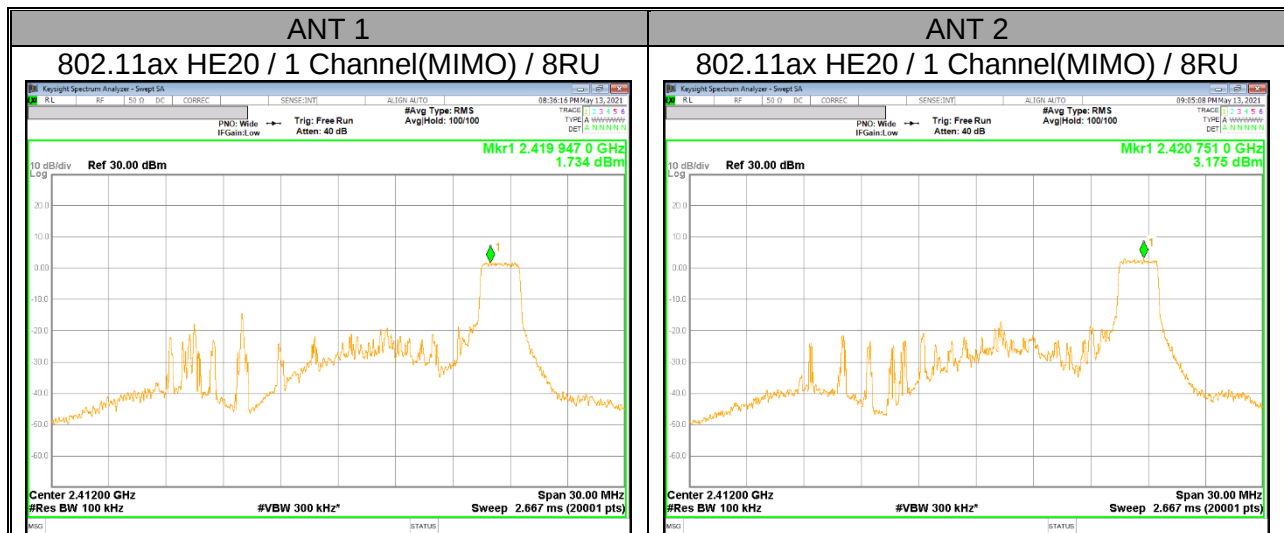
TEST PROCEDURE

Power Spectral Density was performed utilizing the section 8.4 under KDB558074 D01 15.247 Meas Guidance.

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS



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

Included in Calculations of Corr'd Power			
Duty Cycle CF	802.11b SISO	-	dB
	802.11g MIMO	0.16	dB
	802.11n HT20 MIMO	0.18	dB
	802.11ax(HE20) MIMO SU	0.10	dB
	802.11ax(HE20) MIMO 26T	0.10	dB
	802.11ax(HE20) MIMO 52T	0.09	dB
	802.11ax(HE20) MIMO 106T	0.10	dB

Calculation of Output PSD result

- 1TX : Corr'd PSD = Meas PSD + Duty Cycle CF
- 2TX : Total PSD = ANT1 Meas PSD + ANT2 Meas PSD + Duty Cycle CF

- SISO Mode

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/100kHz]		Total Corr'd PSD [dBm/100kHz]		PSD Limit [dBm/3kHz]
			ANT1	ANT2	ANT1	ANT2	
802.11b	1	2 412	-2.148	-2.289	-2.148	-2.289	8.00 ^{Note}
	6	2 437	-1.932	-2.644	-1.932	-2.644	
	11	2 462	-1.670	-2.822	-1.670	-2.822	

- MIMO Mode

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/100kHz]		Total Corr'd PSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
			ANT1	ANT2		
802.11g	1	2 412	-4.980	-4.881	-1.760	8.00 ^{Note}
	6	2 437	-4.862	-5.285	-1.898	
	11	2 462	-5.110	-5.246	-2.007	
802.11n HT20	1	2 412	-4.748	-4.633	-1.500	
	6	2 437	-4.276	-4.675	-1.281	
	11	2 462	-4.161	-4.360	-1.069	

- MIMO Mode(802.11ax HE20)

Channel	Frequency [MHz]	Tones	RU Offset	Meas PPSP [dBm/100kHz]		Total Corr'd PPSP [dBm/100kHz]	PSD Limit [dBm/3kHz]
				ANT1	ANT2		
1	2 412	26T	0	2.012	1.636	4.938	8.00 ^{Note}
			4	2.152	2.080	5.216	
			8	1.734	3.175	5.624	
		SU	-	-7.729	-7.330	-4.415	
6	2 437	26T	0	2.587	2.052	5.438	
			4	2.412	2.166	5.391	
			8	1.560	2.188	4.996	
		SU	-	-8.380	-8.320	-5.240	
11	2 462	26T	0	1.690	1.496	4.704	
			4	2.195	1.628	5.021	
			8	1.988	2.130	5.170	
		SU	-	-7.448	-7.689	-4.457	

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

9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

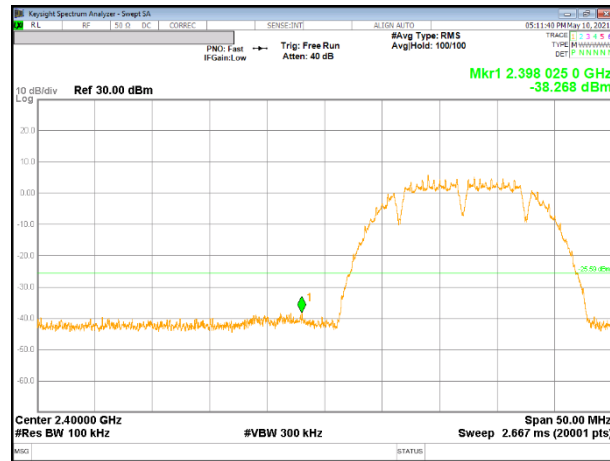
FCC §15.247 (d)

RSS-247 5.5

Output power was measured based on the use of average measurement, therefore the required attenuation is 30 dB.

RESULTS

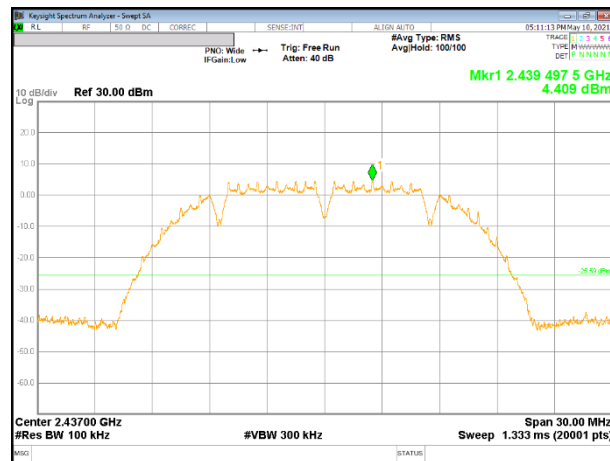
1TX Antenna 2



1 Channel Band-edge



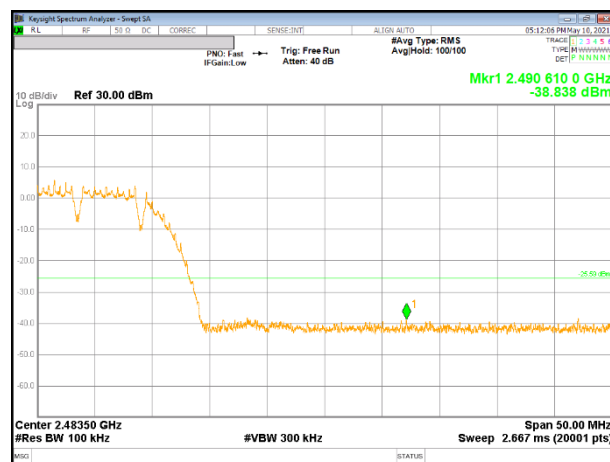
Out-Of-Band 1 Channel



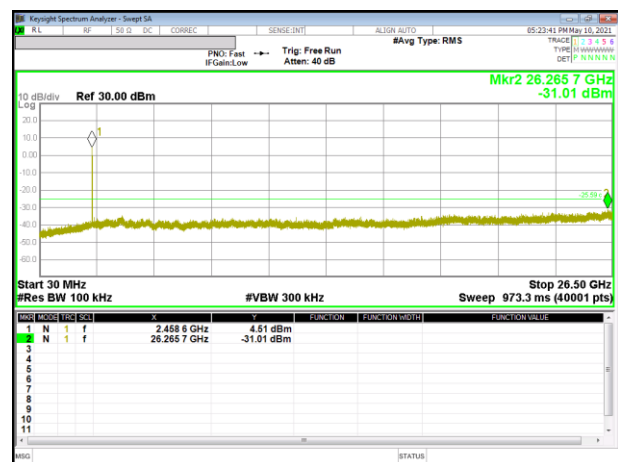
In-Band Reference Level



Out-Of-Band 6 Channel



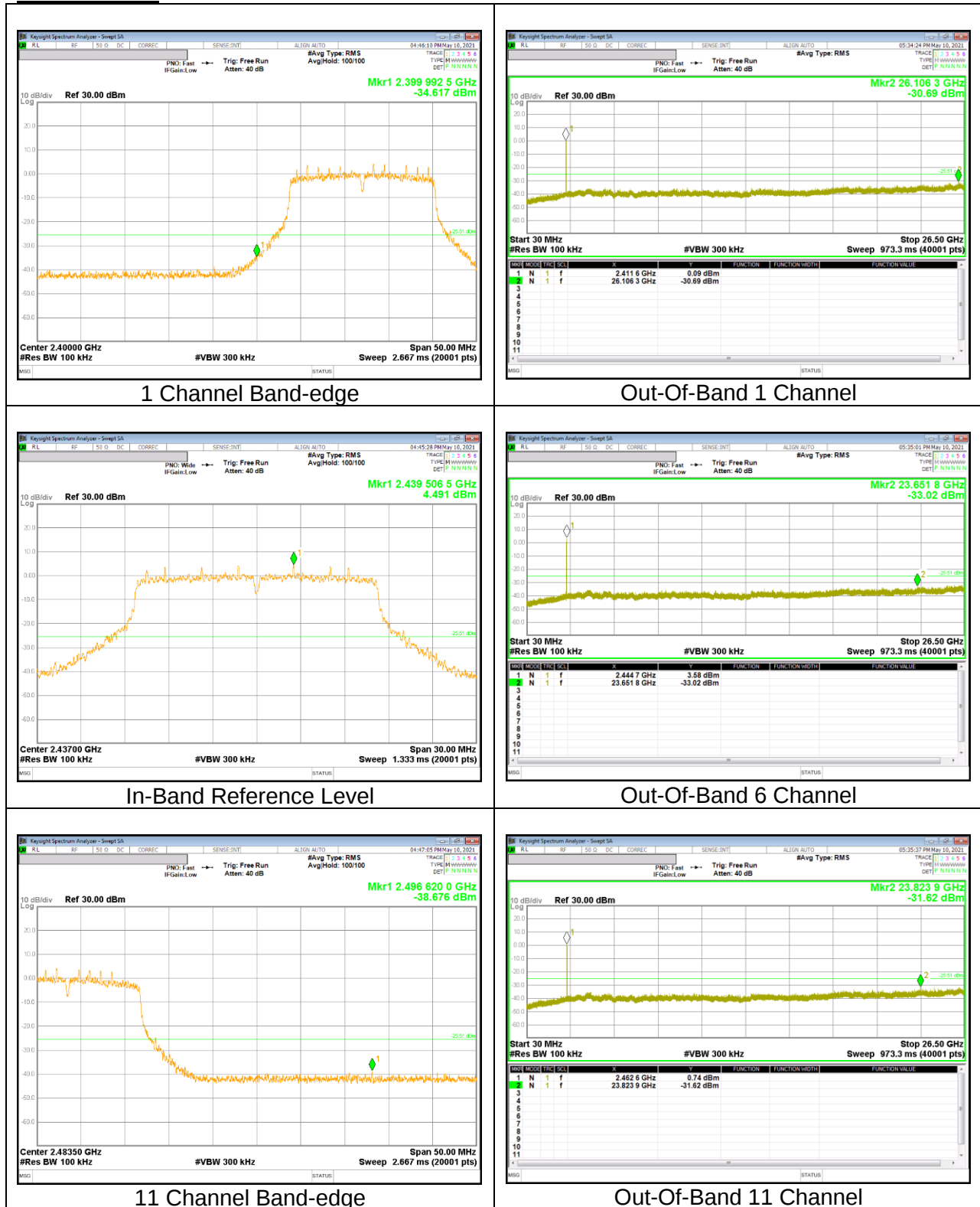
11 Channel Band-edge



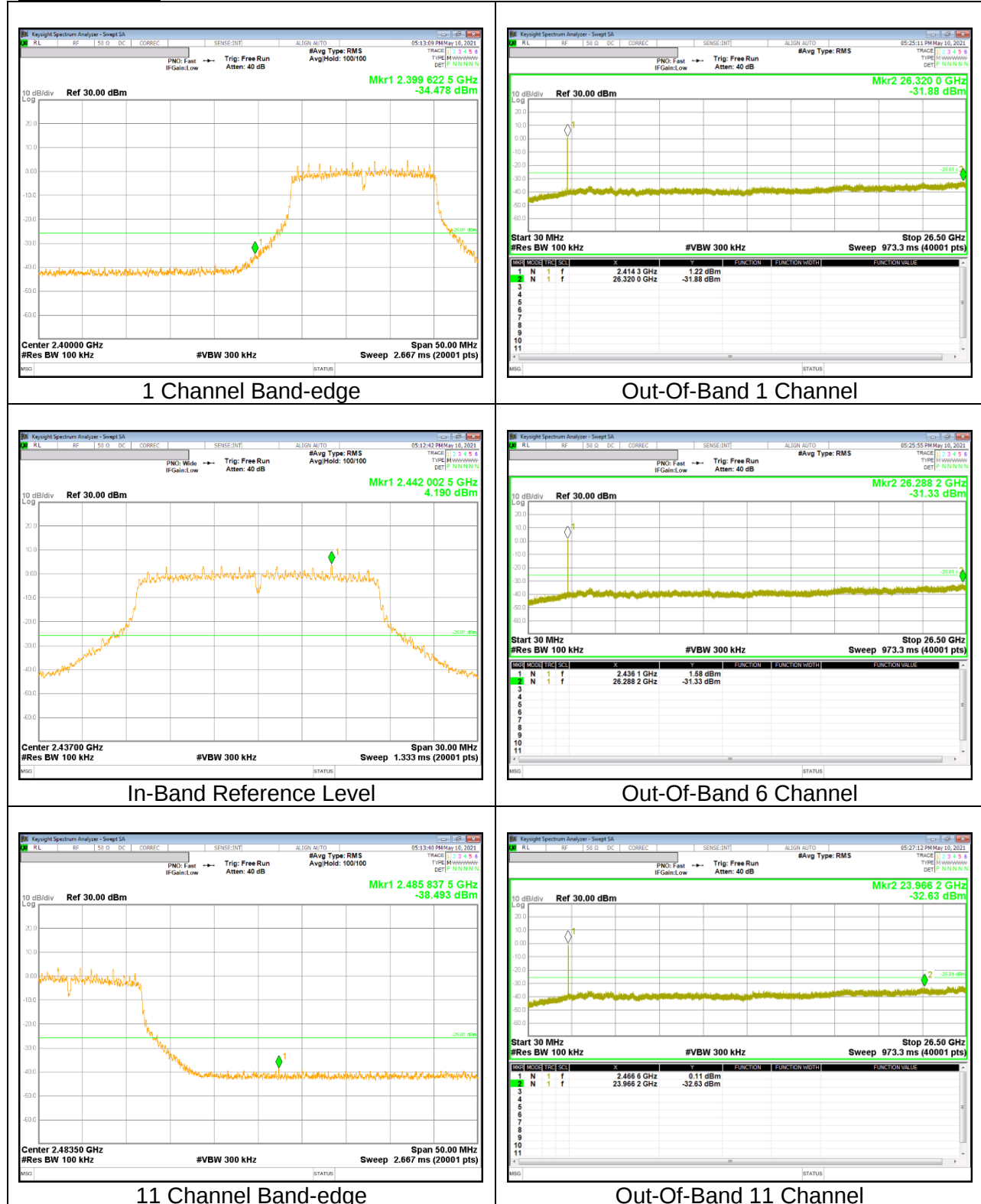
Out-Of-Band 11 Channel

9.5.2. 802.11g MODE

2TX Antenna 1

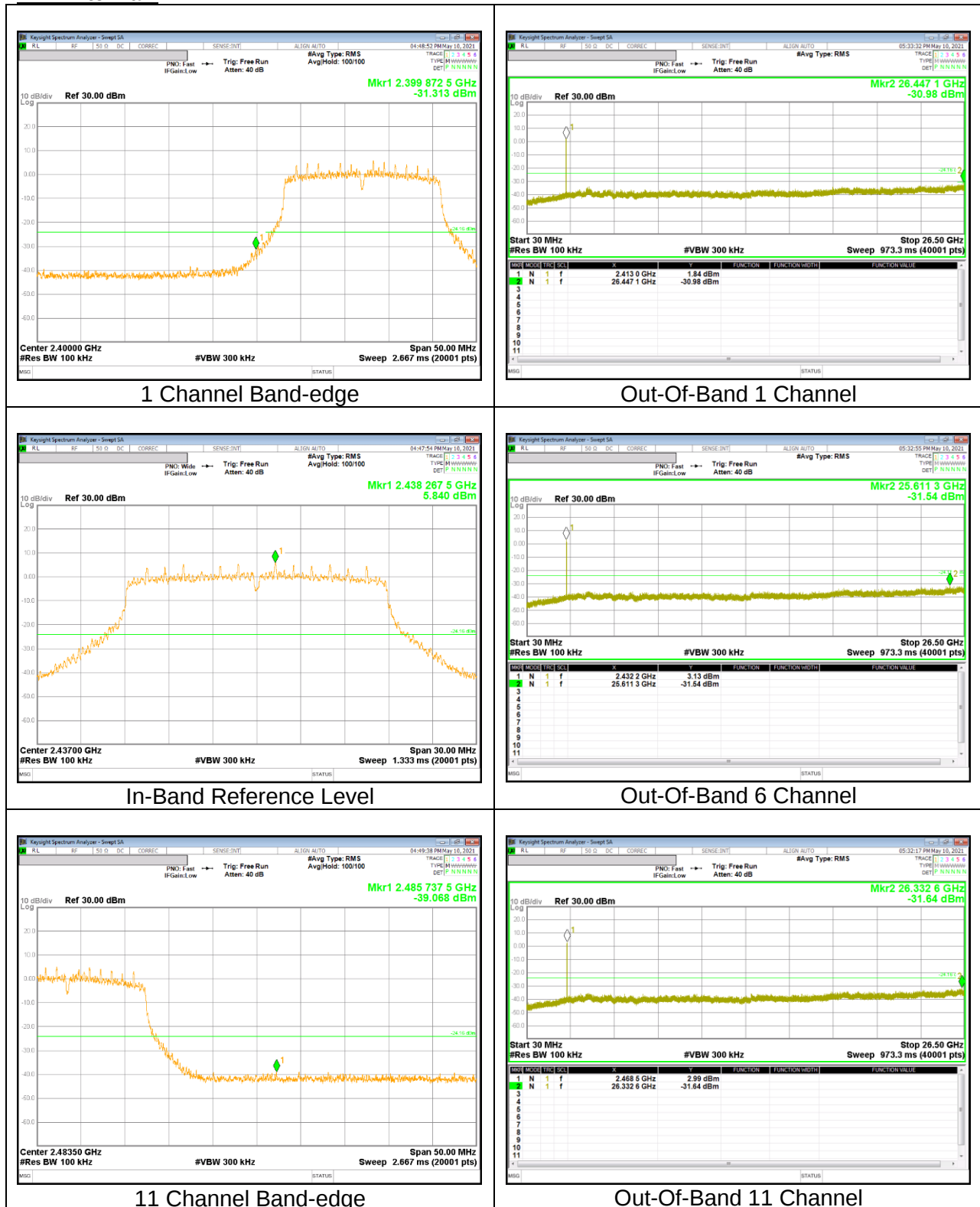


2TX Antenna 2

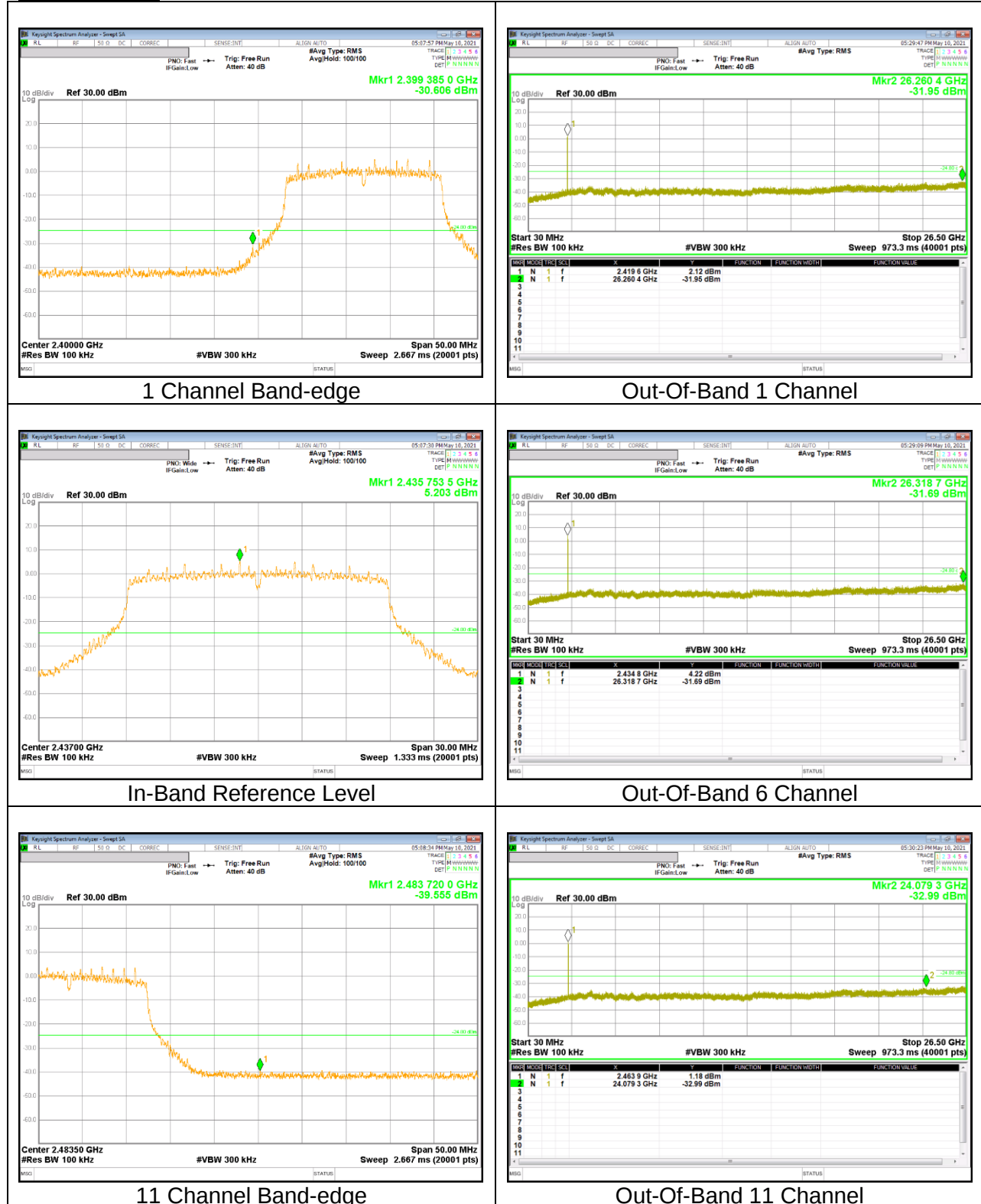


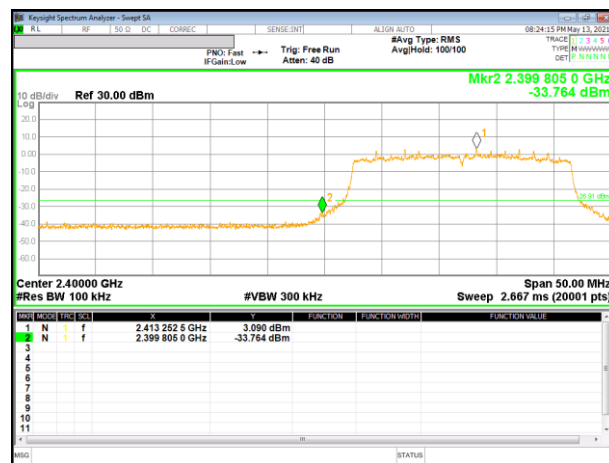
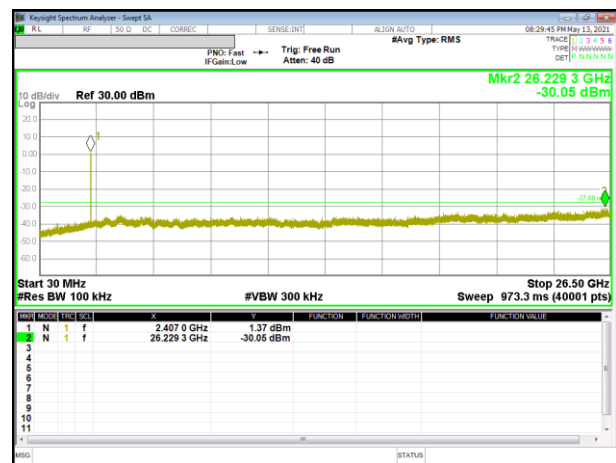
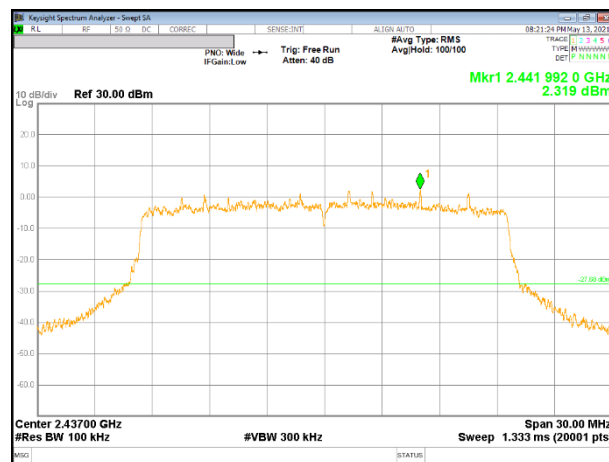
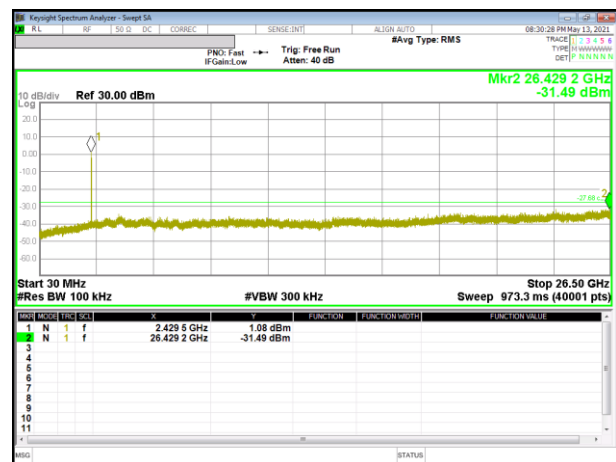
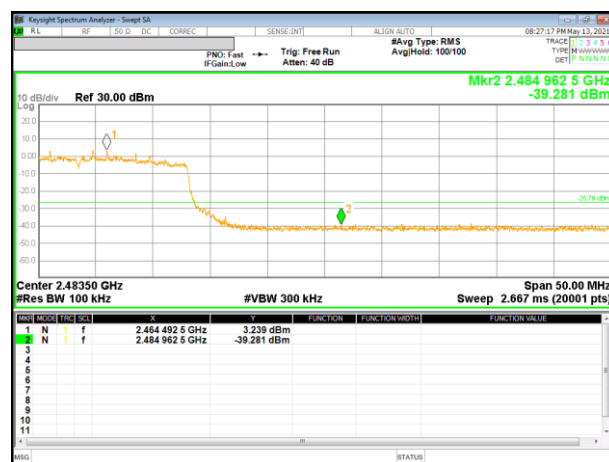
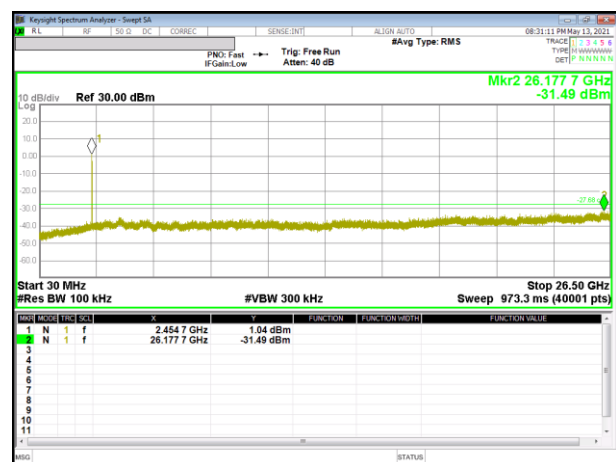
9.5.3. 802.11n HT20 MODE

2TX Antenna 1

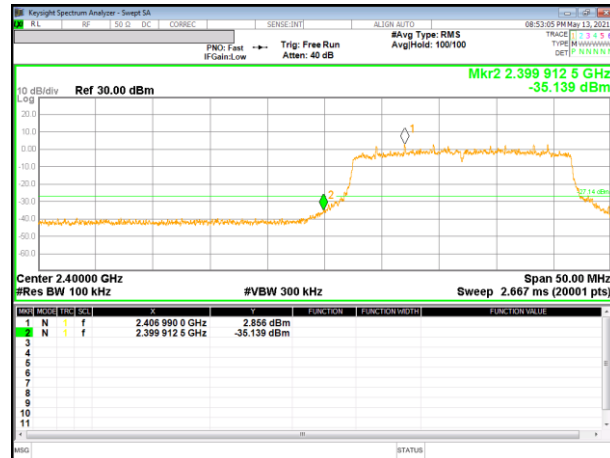


2TX Antenna 2

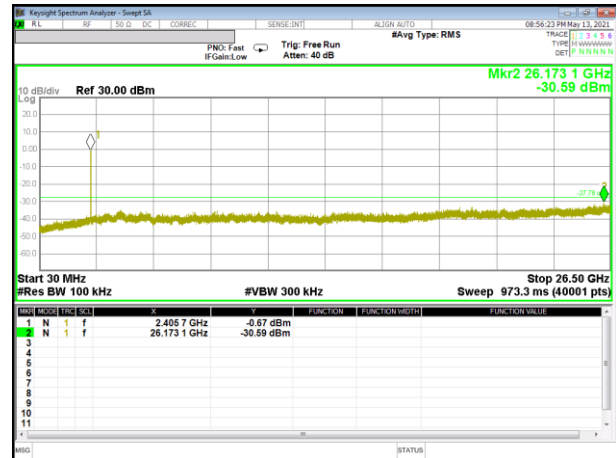


9.5.4. 802.11ax HE20(SU) MODE**2TX Antenna 1****1 Channel Band-edge****Out-Of-Band 1 Channel****In-Band Reference Level****Out-Of-Band 6 Channel****11 Channel Band-edge****Out-Of-Band 11 Channel**

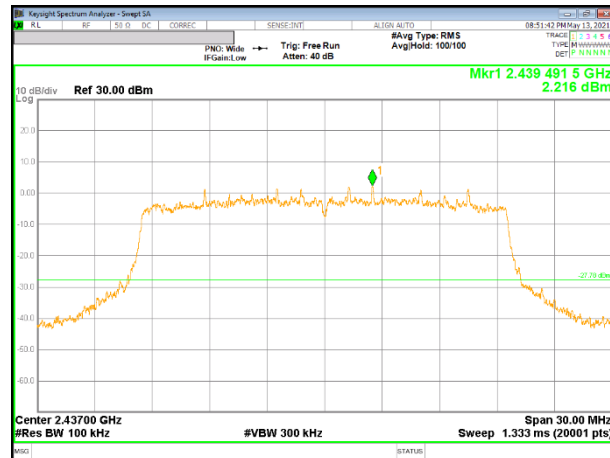
2TX Antenna 2



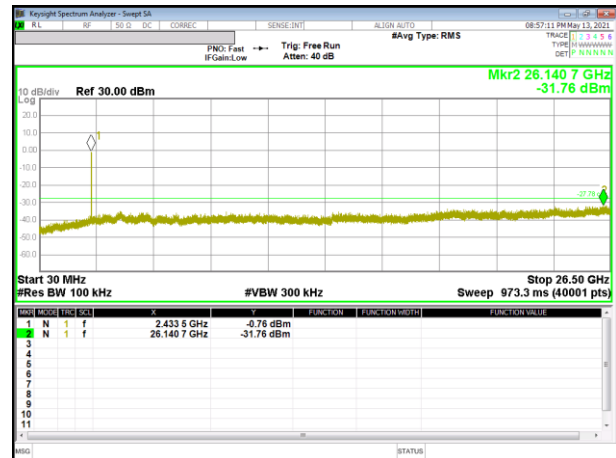
1 Channel Band-edge



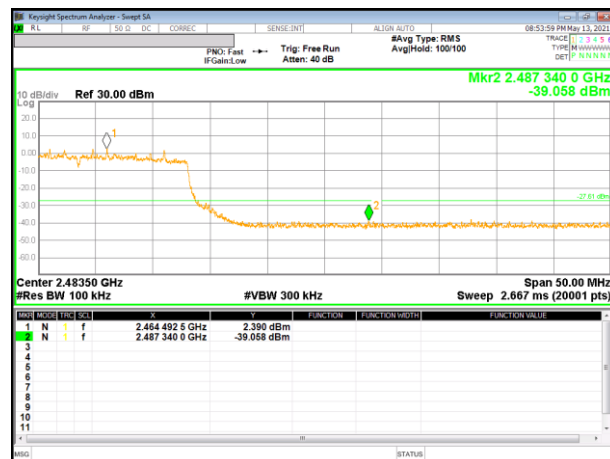
Out-Of-Band 1 Channel



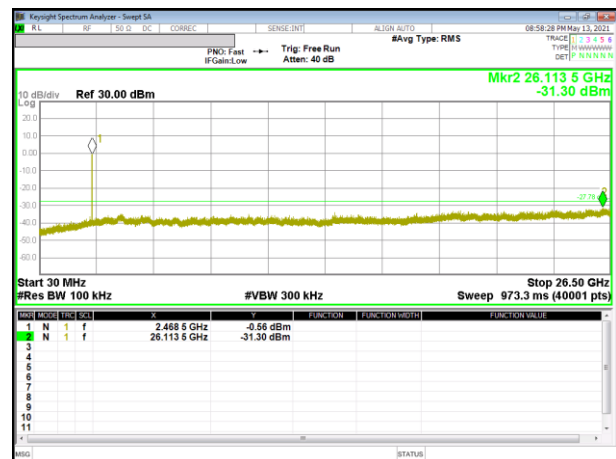
In-Band Reference Level



Out-Of-Band 6 Channel



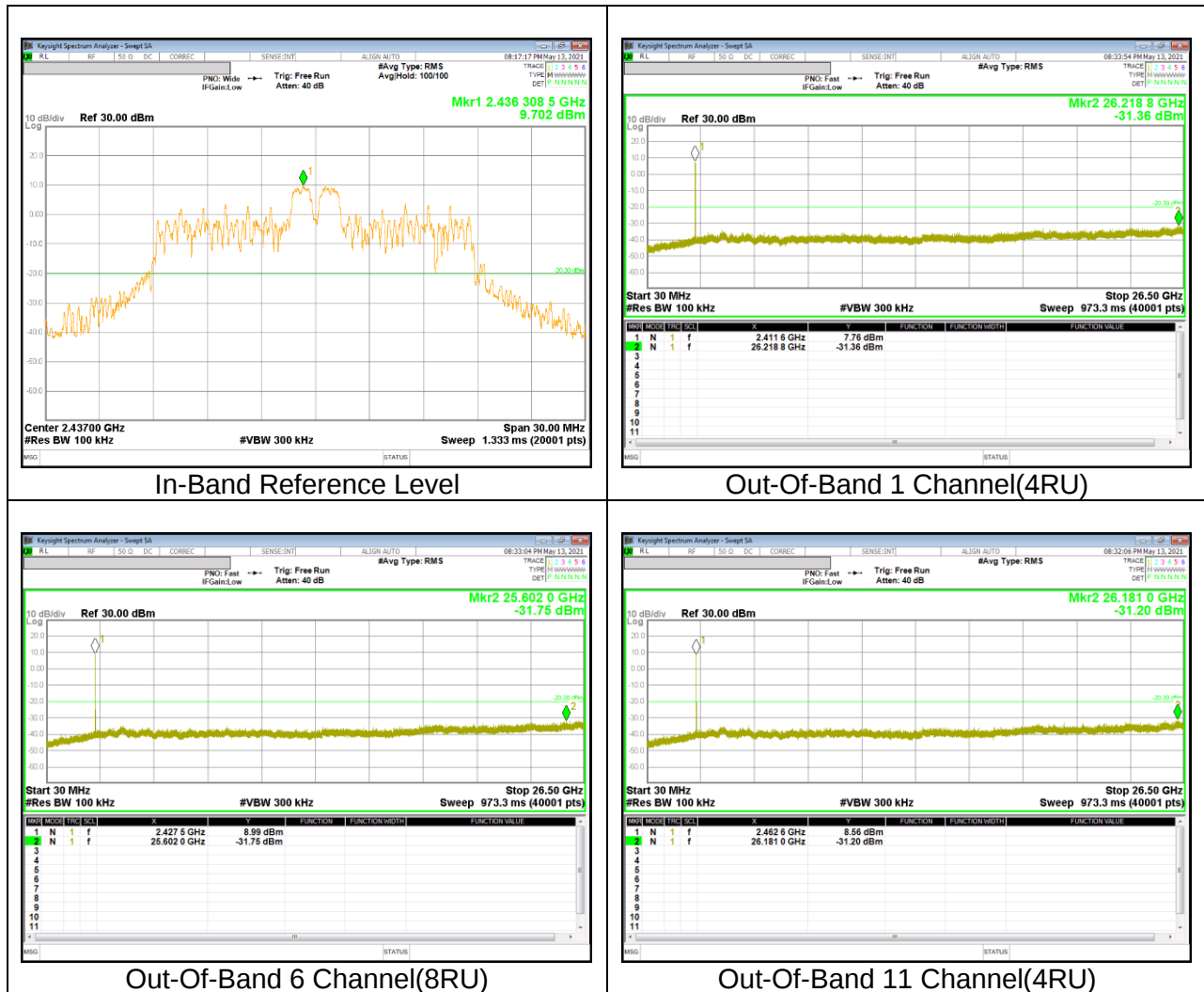
11 Channel Band-edge



Out-Of-Band 11 Channel

9.5.5. 802.11ax HE20(RU) MODE

2TX Antenna 1 MODE



2TX Antenna 2 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 MIMO mode = 0.16 dB (96.35%);
802.11n(HT20) MIMO mode = 0.18 dB (95.88%);
802.11ax(HE20) MIMO SU mode = 0.10 dB (97.68%);
802.11ax(HE20) MIMO 26 Tone mode = 0.10 dB (97.79%).

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.

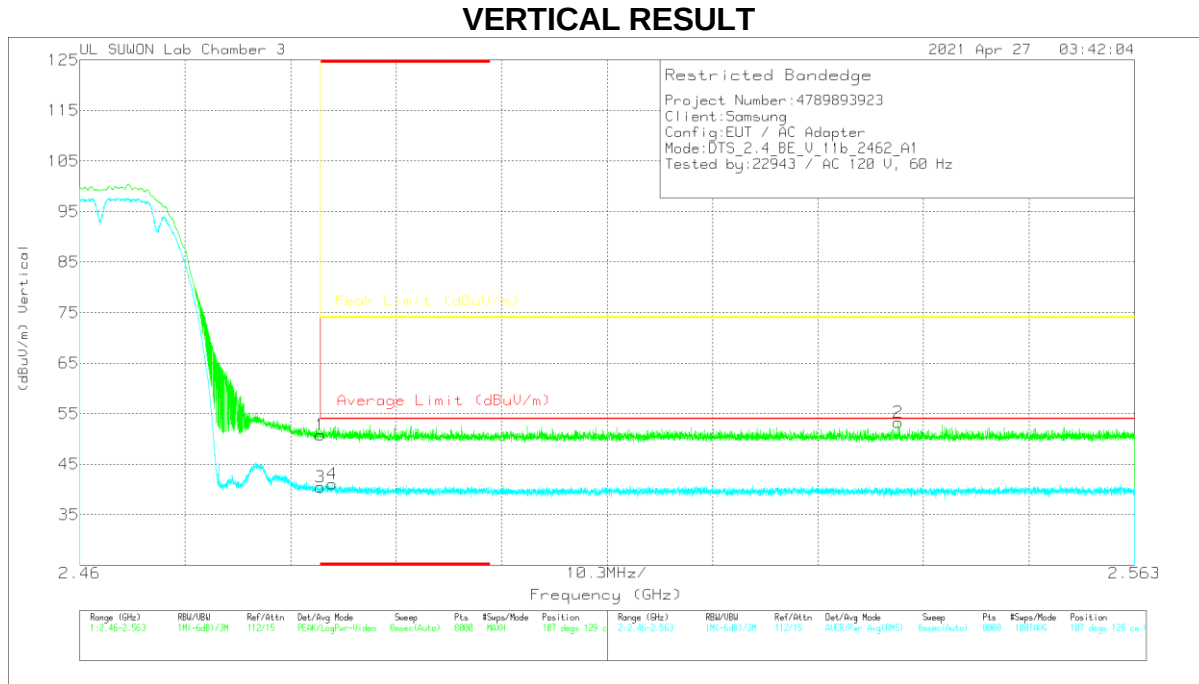
Note : Emission was pre-scanned from 9 kHz to 30 MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

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(ANT1 WORST CASE: 11 CHANNEL)



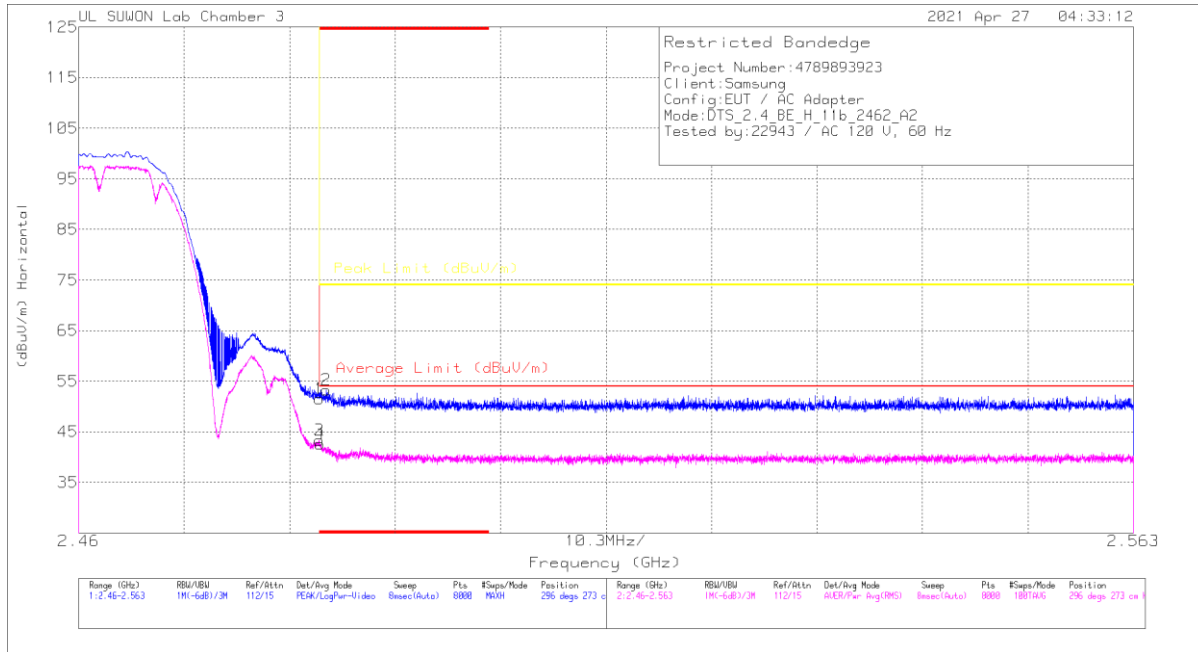
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	* 2.4835	42.89	Pk	32.9	-25	0	50.79	-	-	74	-23.21	107	129	V
2	2.53994	45.33	Pk	32.9	-25	0	53.23	-	-	74	-20.77	107	129	V
3	* 2.4835	32.56	RMS	32.9	-25	0	40.46	54	-13.54	-	-	107	129	V
4	* 2.48466	33.22	RMS	32.9	-25	0	41.12	54	-12.88	-	-	107	129	V

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

BANDEDGE(ANT2 WORST CASE: 11 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	10dB_ATT[0dB]	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	43.64	PK		-25	0	51.54	-	-	74	-22.46	296	273	H
2	* 2.4842	45.42	PK		-25	0	53.32	-	-	74	-20.68	296	273	H
3	* 2.4835	35.39	RMS		-25	0	43.29	54	-10.71	-	-	296	273	H
4	* 2.48355	34.74	RMS		-25	0	42.64	54	-11.36	-	-	296	273	H

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

BANDEDGE TEST DATA

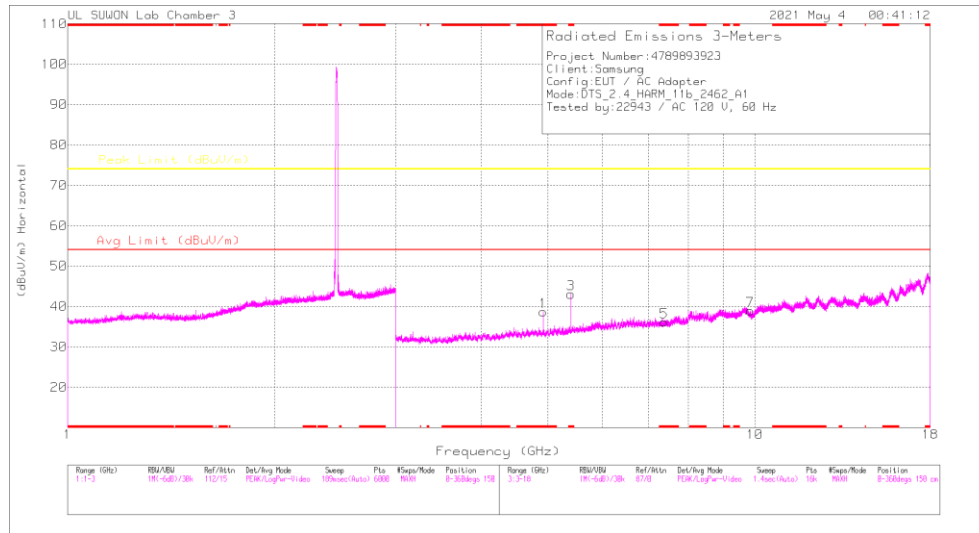
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	ANT1	* 2.39	42.39	Pk	32.80	-25.20	0.00	49.99	-	-	74.00	-24.01	296	104	H
		* 2.3778	44.39	Pk	32.70	-25.20	0.00	51.89	-	-	74.00	-22.11	296	104	H
		* 2.39	31.03	RMS	32.80	-25.20	0.00	38.63	54.00	-15.37	-	-	296	104	H
		* 2.35862	33.12	RMS	32.60	-25.10	0.00	40.62	54.00	-13.38	-	-	296	104	H
		* 2.39	41.46	Pk	32.80	-25.20	0.00	49.06	-	-	74.00	-24.94	154	100	V
		* 2.37525	44.73	Pk	32.70	-25.20	0.00	52.23	-	-	74.00	-21.77	154	100	V
		* 2.39	32.06	RMS	32.80	-25.20	0.00	39.66	54.00	-14.34	-	-	154	100	V
		* 2.36906	33.10	RMS	32.70	-25.10	0.00	40.70	54.00	-13.30	-	-	154	100	V
		* 2.4835	43.54	Pk	32.90	-25.00	0.00	51.44	-	-	74.00	-22.56	39	173	H
		* 2.554	44.96	Pk	32.90	-25.00	0.00	52.86	-	-	74.00	-21.14	39	173	H
2462	ANT1	* 2.4835	33.14	RMS	32.90	-25.00	0.00	41.04	54.00	-12.96	-	-	39	173	H
		* 2.522	33.02	RMS	32.90	-25.00	0.00	40.92	54.00	-13.08	-	-	39	173	H
		* 2.4835	42.89	Pk	32.90	-25.00	0.00	50.79	-	-	74.00	-23.21	107	129	V
		* 2.540	45.33	Pk	32.90	-25.00	0.00	53.23	-	-	74.00	-20.77	107	129	V
		* 2.4835	32.56	RMS	32.90	-25.00	0.00	40.46	54.00	-13.54	-	-	107	129	V
		* 2.48466	33.22	RMS	32.90	-25.00	0.00	41.12	54.00	-12.88	-	-	107	129	V

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	ANT2	* 2.39	43.06	Pk	32.80	-25.20	0.00	50.66	-	-	74.00	-23.34	294	277	H
		* 2.3671	45.76	Pk	32.70	-25.20	0.00	53.26	-	-	74.00	-20.74	294	277	H
		* 2.39	32.46	RMS	32.80	-25.20	0.00	40.06	54.00	-13.94	-	-	294	277	H
		* 2.38628	34.44	RMS	32.70	-25.10	0.00	42.04	54.00	-11.96	-	-	294	277	H
		* 2.39	43.35	Pk	32.80	-25.20	0.00	50.95	-	-	74.00	-23.05	289	115	V
		* 2.38585	45.73	Pk	32.70	-25.10	0.00	53.33	-	-	74.00	-20.67	289	115	V
		* 2.39	32.04	RMS	32.80	-25.20	0.00	39.64	54.00	-14.36	-	-	289	115	V
		* 2.38703	33.89	RMS	32.70	-25.20	0.00	41.39	54.00	-12.61	-	-	289	115	V
		* 2.4835	43.64	Pk	32.90	-25.00	0.00	51.54	-	-	74.00	-22.46	296	273	H
		* 2.4842	45.42	Pk	32.90	-25.00	0.00	53.32	-	-	74.00	-20.68	296	273	H
2462	ANT2	* 2.4835	35.39	RMS	32.90	-25.00	0.00	43.29	54.00	-10.71	-	-	296	273	H
		* 2.48355	34.74	RMS	32.90	-25.00	0.00	42.64	54.00	-11.36	-	-	296	273	H
		* 2.4835	43.50	Pk	32.90	-25.00	0.00	51.40	-	-	74.00	-22.60	84	106	V
		* 2.534	44.81	Pk	32.90	-24.90	0.00	52.81	-	-	74.00	-21.19	84	106	V
		* 2.4835	33.59	RMS	32.90	-25.00	0.00	41.49	54.00	-12.51	-	-	84	106	V
		* 2.48375	34.01	RMS	32.90	-25.00	0.00	41.91	54.00	-12.09	-	-	84	106	V

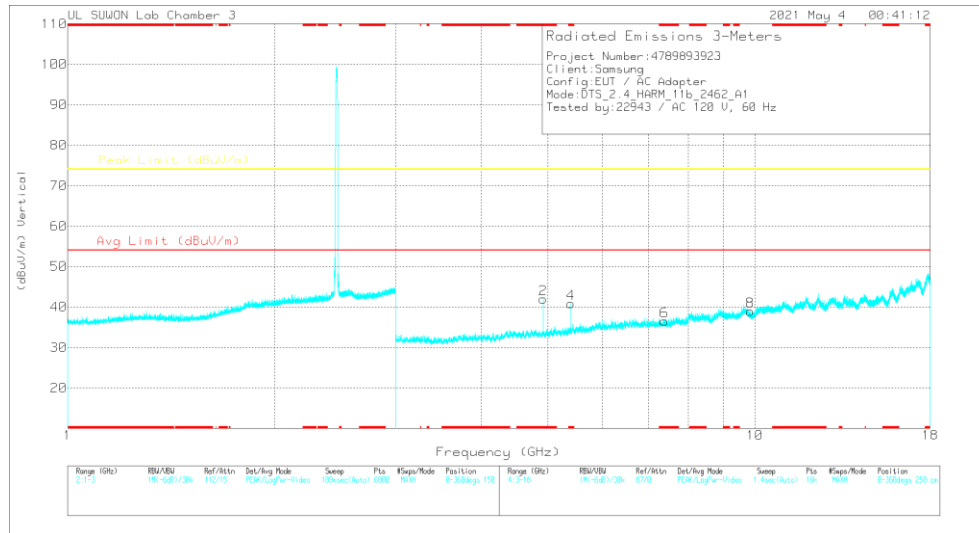
Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(ANT1 WORST CASE: 11 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

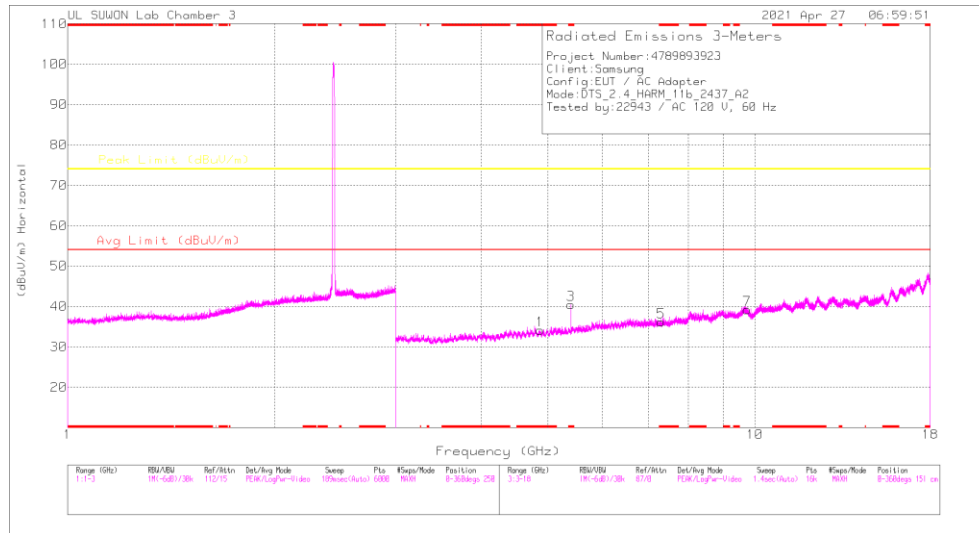
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0021895 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.92394	41.15	PK2	34.7	-30.9	0	44.95	-	-	74	-29.05	295	308	H
* 4.92404	32.33	MAV1	34.7	-30.9	0	36.13	54	-17.87	-	-	295	308	H
* 4.92392	43.89	PK2	34.7	-30.9	0	47.69	-	-	74	-26.31	166	264	V
* 4.92388	38.24	MAV1	34.7	-30.9	0	42.04	54	-11.96	-	-	166	264	V
* 5.40016	41.2	PK2	35.2	-29.1	0	47.3	-	-	74	-26.7	360	100	H
* 5.40002	38.46	PK2	35.2	-29.1	0	44.56	-	-	74	-29.44	360	100	V
* 7.38497	34.88	PK2	36	-24.5	0	46.38	-	-	74	-27.62	360	100	H
* 7.38844	34.76	PK2	36	-24.5	0	46.26	-	-	74	-27.74	360	100	V
9.85027	31.63	PK2	37.7	-21.3	0	48.03	-	-	74	-25.97	360	100	H
9.84901	31.33	PK2	37.7	-21.3	0	47.73	-	-	74	-26.27	360	100	V

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

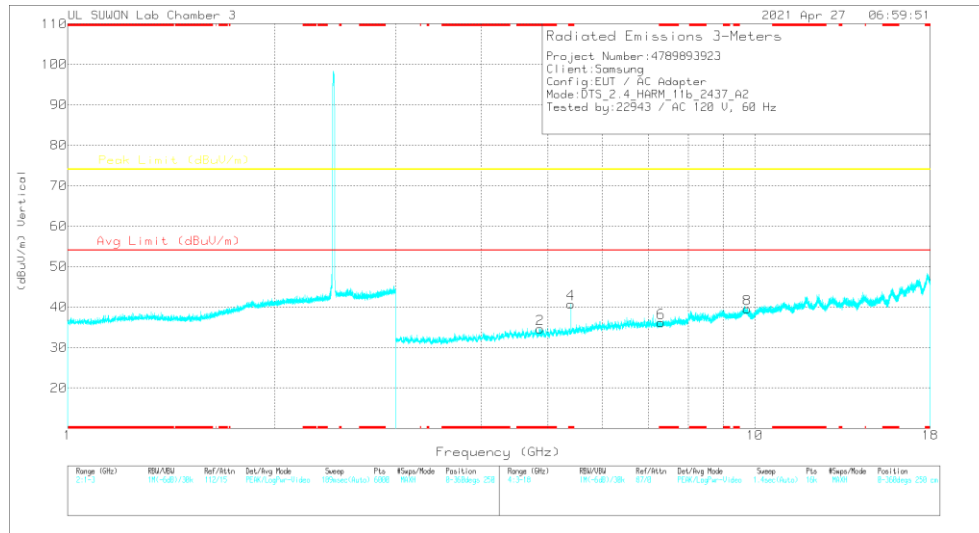
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS(ANT2 WORST CASE: 6 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_0021895 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
* 4.87394	40.16	PK2	34.6	-30.8	0	43.96	-	-	74	-30.04	203	101	H
* 4.87384	30.46	MAV1	34.6	-30.8	0	34.26	54	-19.74	-	-	203	101	H
* 4.87368	40.36	PK2	34.6	-30.8	0	44.16	-	-	74	-29.84	309	101	V
* 4.87406	31.19	MAV1	34.6	-30.8	0	34.99	54	-19.01	-	-	309	101	V
* 5.40007	40.87	PK2	35.2	-29.1	0	46.97	-	-	74	-27.03	86	137	H
* 5.40013	33.48	MAV1	35.2	-29.1	0	39.58	54	-14.42	-	-	86	137	H
* 5.40013	41.43	PK2	35.2	-29.1	0	47.53	-	-	74	-26.47	14	100	V
* 5.40011	34.7	MAV1	35.2	-29.1	0	40.8	54	-13.2	-	-	14	100	V
* 7.31497	35.51	PK2	36	-25	0	46.51	-	-	74	-27.49	0	100	H
* 7.30662	35.05	PK2	36	-25.3	0	45.75	-	-	74	-28.25	0	100	V
9.74543	32.28	PK2	37.5	-21.2	0	48.58	-	-	74	-25.42	0	100	H
9.75011	32.42	PK2	37.5	-21.2	0	48.72	-	-	74	-25.28	0	100	V

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

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	ANT1	* 4.82396	40.39	PK2	34.60	-30.30	0.00	44.69	-	-	74.00	-29.31	248	316	H
		* 4.82408	31.49	MAV1	34.60	-30.30	0.00	35.79	54.00	-18.21	-	-	248	316	H
		* 4.82404	40.97	PK2	34.60	-30.30	0.00	45.27	-	-	74.00	-28.73	166	232	V
		* 4.8239	33.45	MAV1	34.60	-30.30	0.00	37.75	54.00	-16.25	-	-	166	232	V
		* 5.40033	40.62	PK2	35.20	-29.10	0.00	46.72	-	-	74.00	-27.28	360	100	H
		* 5.40015	38.30	PK2	35.20	-29.10	0.00	44.40	-	-	74.00	-29.60	360	100	V
		7.245	35.25	PK2	36.00	-25.50	0.00	45.75	-	-	74.00	-28.25	360	100	H
		7.237	35.78	PK2	36.00	-25.60	0.00	46.18	-	-	74.00	-27.82	360	100	V
		9.645	33.20	PK2	37.40	-21.40	0.00	49.20	-	-	74.00	-24.80	360	100	H
		9.645	32.90	PK2	37.40	-21.40	0.00	48.90	-	-	74.00	-25.10	360	100	V
2437	ANT1	* 4.87398	42.09	PK2	34.60	-30.80	0.00	45.89	-	-	74.00	-28.11	182	247	H
		* 4.87404	34.80	MAV1	34.60	-30.80	0.00	38.60	54.00	-15.40	-	-	182	247	H
		* 4.874	43.06	PK2	34.60	-30.80	0.00	46.86	-	-	74.00	-27.14	167	269	V
		* 4.87396	37.33	MAV1	34.60	-30.80	0.00	41.13	54.00	-12.87	-	-	167	269	V
		* 5.40003	41.85	PK2	35.20	-29.10	0.00	47.95	-	-	74.00	-26.05	0	100	H
		* 5.40016	38.10	PK2	35.20	-29.10	0.00	44.20	-	-	74.00	-29.80	0	100	V
		* 7.31155	35.38	PK2	36.00	-25.10	0.00	46.28	-	-	74.00	-27.72	0	100	H
		* 7.31158	35.41	PK2	36.00	-25.10	0.00	46.31	-	-	74.00	-27.69	0	100	V
		9.748	31.92	PK2	37.50	-21.10	0.00	48.32	-	-	74.00	-25.68	0	100	H
		9.745	32.37	PK2	37.50	-21.20	0.00	48.67	-	-	74.00	-25.33	0	100	V
2462	ANT1	* 4.92394	41.15	PK2	34.70	-30.90	0.00	44.95	-	-	74.00	-29.05	295	308	H
		* 4.92404	32.33	MAV1	34.70	-30.90	0.00	36.13	54.00	-17.87	-	-	295	308	H
		* 4.92392	43.89	PK2	34.70	-30.90	0.00	47.69	-	-	74.00	-26.31	166	264	V
		* 4.92388	38.24	MAV1	34.70	-30.90	0.00	42.04	54.00	-11.96	-	-	166	264	V
		* 5.40016	41.20	PK2	35.20	-29.10	0.00	47.30	-	-	74.00	-26.70	360	100	H
		* 5.40002	38.46	PK2	35.20	-29.10	0.00	44.56	-	-	74.00	-29.44	360	100	V
		* 7.38497	34.88	PK2	36.00	-24.50	0.00	46.38	-	-	74.00	-27.62	360	100	H
		* 7.38844	34.76	PK2	36.00	-24.50	0.00	46.26	-	-	74.00	-27.74	360	100	V
		9.850	31.63	PK2	37.70	-21.30	0.00	48.03	-	-	74.00	-25.97	360	100	H
		9.849	31.33	PK2	37.70	-21.30	0.00	47.73	-	-	74.00	-26.27	360	100	V

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	ANT2	* 4.82105	38.95	PK2	34.60	-30.30	0.00	43.25	-	-	74.00	-30.75	0	100	H
		* 4.82173	39.33	PK2	34.60	-30.30	0.00	43.63	-	-	74.00	-30.37	0	100	V
		* 5.40031	38.47	PK2	35.20	-29.10	0.00	44.57	-	-	74.00	-29.43	0	100	H
		* 5.40024	40.95	PK2	35.20	-29.10	0.00	47.05	-	-	74.00	-26.95	0	100	V
		7.236	35.51	PK2	36.00	-25.60	0.00	45.91	-	-	74.00	-28.09	0	100	H
		7.238	35.91	PK2	36.00	-25.60	0.00	46.31	-	-	74.00	-27.69	0	100	V
		9.647	33.32	PK2	37.40	-21.40	0.00	49.32	-	-	74.00	-24.68	0	100	H
		9.649	32.78	PK2	37.40	-21.30	0.00	48.88	-	-	74.00	-25.12	0	100	V
		* 4.87394	40.16	PK2	34.60	-30.80	0.00	43.96	-	-	74.00	-30.04	203	101	H
		* 4.87384	30.46	MAV1	34.60	-30.80	0.00	34.26	54.00	-19.74	-	-	203	101	H
2437	ANT2	* 4.87368	40.36	PK2	34.60	-30.80	0.00	44.16	-	-	74.00	-29.84	309	101	V
		* 4.87406	31.19	MAV1	34.60	-30.80	0.00	34.99	54.00	-19.01	-	-	309	101	V
		* 5.40007	40.87	PK2	35.20	-29.10	0.00	46.97	-	-	74.00	-27.03	86	137	H
		* 5.40013	33.48	MAV1	35.20	-29.10	0.00	39.58	54.00	-14.42	-	-	86	137	H
		* 5.40013	41.43	PK2	35.20	-29.10	0.00	47.53	-	-	74.00	-26.47	14	100	V
		* 5.40011	34.70	MAV1	35.20	-29.10	0.00	40.80	54.00	-13.20	-	-	14	100	V
		* 7.31497	35.51	PK2	36.00	-25.00	0.00	46.51	-	-	74.00	-27.49	0	100	H
		* 7.30662	35.05	PK2	36.00	-25.30	0.00	45.75	-	-	74.00	-28.25	0	100	V
		9.745	32.28	PK2	37.50	-21.20	0.00	48.58	-	-	74.00	-25.42	0	100	H
		9.750	32.42	PK2	37.50	-21.20	0.00	48.72	-	-	74.00	-25.28	0	100	V
2462	ANT2	* 4.92716	40.19	PK2	34.70	-30.90	0.00	43.99	-	-	74.00	-30.01	205	100	H
		* 4.92406	29.96	MAV1	34.70	-30.90	0.00	33.76	54.00	-20.24	-	-	205	100	H
		* 4.924	40.82	PK2	34.70	-30.90	0.00	44.62	-	-	74.00	-29.38	307	100	V
		* 4.92394	31.93	MAV1	34.70	-30.90	0.00	35.73	54.00	-18.27	-	-	307	100	V
		* 5.40047	38.09	PK2	35.20	-29.10	0.00	44.19	-	-	74.00	-29.81	360	100	H
		* 5.40023	41.32	PK2	35.20	-29.10	0.00	47.42	-	-	74.00	-26.58	360	100	V
		* 7.38126	34.50	PK2	36.00	-24.50	0.00	46.00	-	-	74.00	-28.00	360	100	H
		* 7.38817	34.55	PK2	36.00	-24.50	0.00	46.05	-	-	74.00	-27.95	360	100	V
		9.849	31.40	PK2	37.70	-21.30	0.00	47.80	-	-	74.00	-26.20	360	100	H
		9.844	31.70	PK2	37.70	-21.30	0.00	48.10	-	-	74.00	-25.90	360	100	V

Note1. PK2 - KDB558074 Method: Maximum Peak / MAV1 - KDB558074 Option 1 Maximum RMS Average

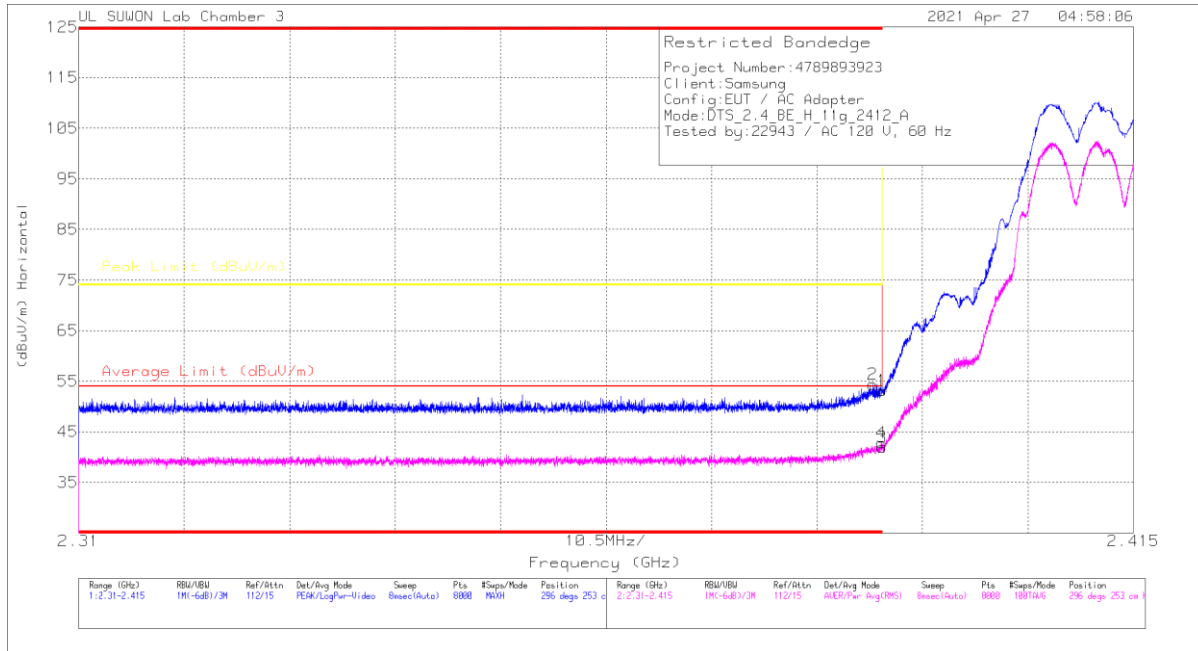
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

2TX Antenna 1 + Antenna 2

BANDEDGE (WORST CASE: 1 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	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	45.55	Pk	32.8	-25.2	0	53.15	-	-	74	-20.85	296	253	H
2	* 2.38905	46.69	Pk	32.8	-25.1	0	54.39	-	-	74	-19.61	296	253	H
3	* 2.39	34.2	RMS	32.8	-25.2	.16	41.96	54	-12.04	-	-	296	253	H
4	* 2.38989	35.11	RMS	32.8	-25.2	.16	42.87	54	-11.13	-	-	296	253	H

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

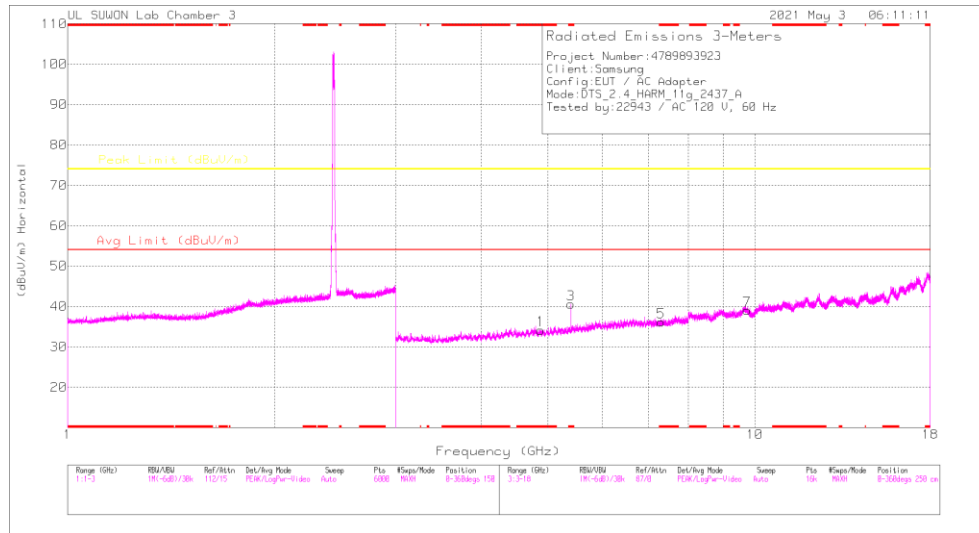
BANDEDGE TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	MIMO	* 2.39	45.55	Pk	32.80	-25.20	0.00	53.15	-	-	74.00	-20.85	296	253	H
		* 2.38905	46.69	Pk	32.80	-25.10	0.00	54.39	-	-	74.00	-19.61	296	253	H
		* 2.39	34.20	RMS	32.80	-25.20	0.16	41.96	54.00	-12.04	-	-	296	253	H
		* 2.38989	35.11	RMS	32.80	-25.20	0.16	42.87	54.00	-11.13	-	-	296	253	H
		* 2.39	43.50	Pk	32.80	-25.20	0.00	51.10	-	-	74.00	-22.90	290	100	V
		* 2.38997	45.60	Pk	32.80	-25.20	0.00	53.20	-	-	74.00	-20.80	290	100	V
		* 2.39	33.18	RMS	32.80	-25.20	0.16	40.94	54.00	-13.06	-	-	290	100	V
		* 2.38992	33.69	RMS	32.80	-25.20	0.16	41.45	54.00	-12.55	-	-	290	100	V
2462	MIMO	* 2.4835	43.53	Pk	32.90	-25.00	0.00	51.43	-	-	74.00	-22.57	84	156	H
		* 2.48373	45.70	Pk	32.90	-25.00	0.00	53.60	-	-	74.00	-20.40	84	156	H
		* 2.4835	32.89	RMS	32.90	-25.00	0.16	40.95	54.00	-13.05	-	-	84	156	H
		* 2.48373	33.73	RMS	32.90	-25.00	0.16	41.79	54.00	-12.21	-	-	84	156	H
		* 2.4835	43.29	Pk	32.90	-25.00	0.00	51.19	-	-	74.00	-22.81	284	100	V
		* 2.506	44.92	Pk	32.90	-25.10	0.00	52.72	-	-	74.00	-21.28	284	100	V
		* 2.4835	32.77	RMS	32.90	-25.00	0.16	40.83	54.00	-13.17	-	-	284	100	V
		* 2.48385	33.59	RMS	32.90	-25.00	0.16	41.65	54.00	-12.35	-	-	284	100	V

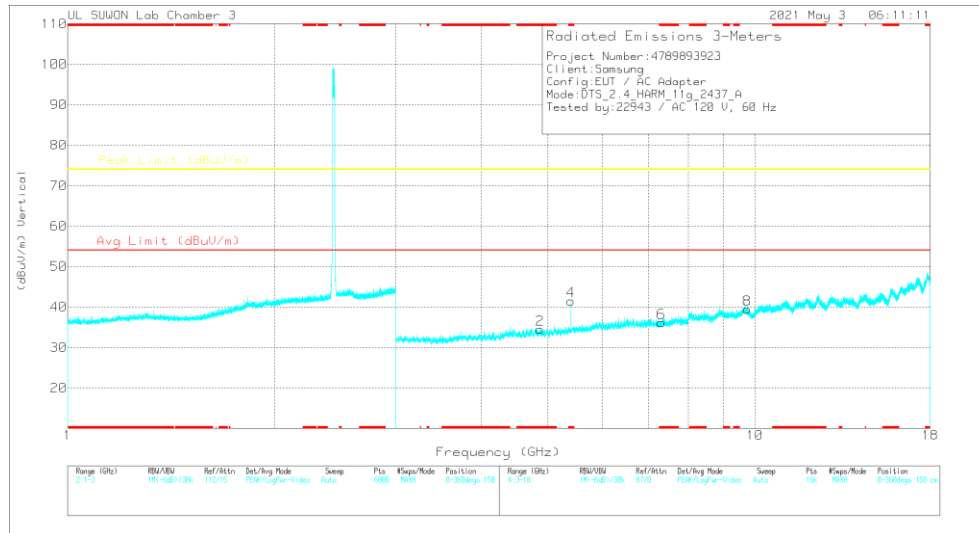
Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS (WORST CASE: 6 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_00218957	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
* 4.87269	40.45	PK2	34.6	-30.8	0	44.25	-	-	74	-29.75	360	100	H
* 4.8688	40.22	PK2	34.6	-30.7	0	44.12	-	-	74	-29.88	360	100	V
* 5.39306	38.65	PK2	35.2	-29.2	0	44.65	-	-	74	-29.35	360	100	H
* 5.40016	41.12	PK2	35.2	-29.1	0	47.22	-	-	74	-26.78	360	100	V
* 7.30462	35.12	PK2	36	-25.2	0	45.92	-	-	74	-28.08	360	100	H
* 7.30765	35.32	PK2	36	-25.2	0	46.12	-	-	74	-27.88	360	100	V
9.74172	32.88	PK2	37.5	-21.2	0	49.18	-	-	74	-24.82	360	100	H
9.75172	32.54	PK2	37.5	-21.2	0	48.84	-	-	74	-25.16	360	100	V

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

PK2 - KDB558074 Method: Maximum Peak