



# CERTIFICATION TEST REPORT

**Report Number. :** 4790632108-E3V2

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

**Model :** SM-A546U, SM-A546U1, SM-S546VL

**FCC ID :** A3LSMA546U

**EUT Description :** GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax  
and NFC

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

**Date Of Issue:**

2023-01-27

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ACCREDITED™

Testing Laboratory

TL-637

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2023-01-20	Initial issue	Minju Cha
V2	2023-01-27	Updated to address TCB's question	Minju Cha

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.

**EUT DESCRIPTION:** GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax and NFC

**MODEL NUMBER:** SM-A546U, SM-A546U1, SM-S546VL

**SERIAL NUMBER:** R3CTA0AXZDA (CONDUCTED, Original);  
R3CTA0AXPBY (RADIATED, Original);  
R3CTB0F5WGD, R3CTB0F5QVZ (RADIATED, Spot-check);

**DATE TESTED:** 2022-11-25 ~ 2023-01-17(Original);  
2023-01-09 ~ 2023-01-17(Spot-check);

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.

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Tested By:



Minju Cha  
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UL Korea, Ltd.

### 1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMA546V 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 A3LSMA546U model shares the same enclosure and circuit board as A3LSMA546V. 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 A3LSMA546V remains representative of A3LSMA546U. The test data of A3LSMA546V being submitted for this application to cover WLAN features.

### 1.3. SPOT CHECK VERIFICATION DATA

(Worst case of the radiated band-edge and radiated spurious emissions)

Band	Test Item	Mode	Frequency	Test Limit	Original model		Spot check model		Deviation	Remark
					SM-A546V Results		SM-A546U Results			
					FCC ID : A3LSMA546V		FCC ID : A3LSMA546U			
DTS WLAN (2.4GHz)	BANDEDGE	802.11b MIMO	2462 MHz	54 dBuV/m	45.36 dBuV/m	46.73 dBuV/m	1.37 dB			
	RSE	802.11b MIMO	4874 MHz	54 dBuV/m	43.34 dBuV/m	42.17 dBuV/m	-1.17 dB			
	BANDEDGE	802.11g MIMO	2462 MHz	54 dBuV/m	50.26 dBuV/m	51.88 dBuV/m	1.62 dB			
	RSE	802.11g MIMO	4874 MHz	54 dBuV/m	40.92 dBuV/m	35.18 dBuV/m	-5.74 dB			
	BANDEDGE	802.11n HT20 MIMO	2462 MHz	54 dBuV/m	51.56 dBuV/m	51.74 dBuV/m	0.18 dB			
	RSE	802.11n HT20 MIMO	4874 MHz	54 dBuV/m	40.48 dBuV/m	35.33 dBuV/m	-5.15 dB			
	BANDEDGE	802.11ax HE20 SU MIMO	2457 MHz	54 dBuV/m	49.19 dBuV/m	47.24 dBuV/m	-1.95 dB			
	RSE	802.11ax HE20 26T(RU4) MIMO	2437_4th	74 dBuV/m	49.26 dBuV/m	47.75 dBuV/m	-1.51 dB			

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

### 1.4. REFERENCE DETAIL

Reference application that contains the reused reference data in the individual test reports:

Equipment Class	Reference FCC ID (Parent)	Application Type	Reference Test report number	Exhibit Type	Variant Test Report Number	Data Re-used
PCE	A3LSMA546V	Original Grant	4790632299-E2 (WWAN)	Test Report	4790632108-E2 (WWAN)	Partial
DTS	A3LSMA546V	Original Grant	4790632299-E3 (802.11b/g/n/ax)	Test Report	4790632108-E3 (802.11b/g/n/ax)	All
			4790632299-E4 (Bluetooth LE)	Test Report	4790632108-E4 (Bluetooth LE)	All
DSS	A3LSMA546V	Original Grant	4790632299-E5 (Bluetooth)	Test Report	4790632108-E5 (Bluetooth)	All
NII	A3LSMA546V	Original Grant	4790632299-E6 (802.11a/n/ac/ax)	Test Report	4790632108-E6 (802.11a/n/ac/ax)	All
DXX	A3LSMA546V	Original Grant	4790632299-E7 (NFC)	Test Report	4790632108-E7 (NFC)	All
CBE	A3LSMA546V	Original Grant	4790632299-E8 (CBRS)	Test Report	4790632108-E8 (CBRS)	All

## 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. KDB 484596 D01 Referencing Test Data v01
6. 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(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	Chamber 5(3m Full-anechoic chamber)

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:

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

$$\begin{aligned} \text{AC Corrected Reading (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Extension Cord Loss} \\ &\text{(dB)} + \text{Cable Loss (dB)} \\ 44.72 \text{ dBuV} &= 34.72 \text{ dBuV} + 9.9 \text{ dB} + 0.1 \text{ dB} \end{aligned}$$

### 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	2.80 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.92 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.06 dB
Radiated Disturbance, Above 18 GHz	6.02 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 115:2021.



## 5. EQUIPMENT UNDER TEST

### 5.1. EUT DESCRIPTION

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

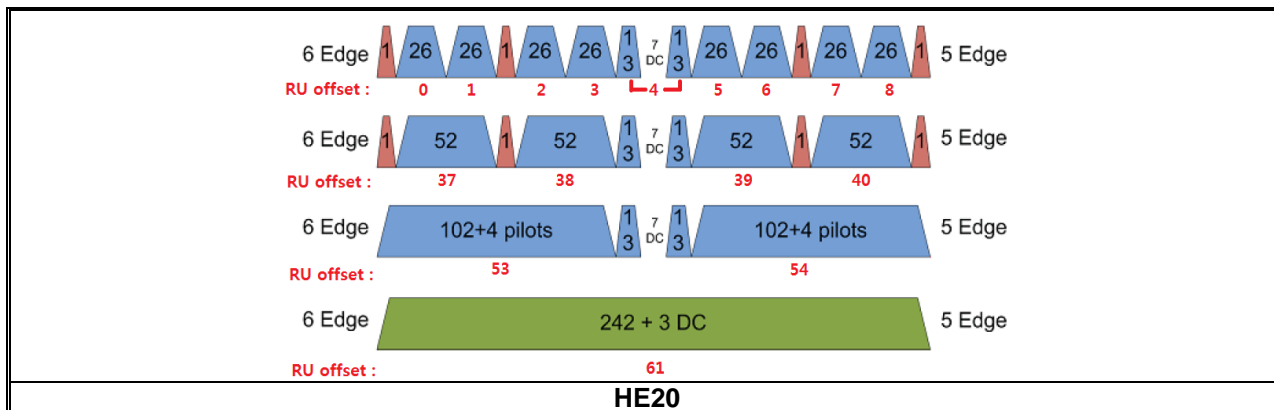
Representative model	Difference	Derivative model	
		SM-A546U1	SM-S546VL
SM-A546U	Hardware	Same as SM-A546U	Same as SM-A546U
	Software	Same as SM-A546U	Different from SM-A546U (Exclude some of the main band)

Thus, SM-A546U was set for final test.

### WiFi operating mode

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

### 802.11ax RU allocations



### Test RU offset for tones

Mode	Tones number in RU	RU offset
HE20		0
	26T	4
		8
		37
	52T	38
		40
	106T	53
54		
242T / SU <small>Note 1</small>	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 MIMO	21.71		148.25	
	802.11g MIMO	19.08		80.91	
	802.11n(HT20) MIMO	18.96		78.70	
	802.11ax(HE20) MIMO	18.73		74.64	

### 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.

Bands [MHz]	ANT 1 [dBi]	ANT 2 [dBi]	Correlated Directional Gain [dBi]
2 412 ~ 2 462	-1.95	-2.47	0.80

Directional gain for the MIMO operations is determined using KDB 662911 D01 Multiple Transmitter Output section F (2)(d)(1) for *Unequal antenna gains, with equal transmit powers*. The gain is calculated using the formula for correlated transmissions across the two transmit antennas. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$  dBi.

Sample calculation for this device with  $N_{ANT} = 2$   
 Directional gain =  $10 \log[(10^{0.40/20} + 10^{0.30/20})^2 / 2] = 3.36$  dBi

“SUB5\_Wi-Fi 1” and “SUB2\_Wi-Fi 2” as indicated in antenna specification are written as ANT 1 and ANT 2 in this report.

### 5.4. TESTED CHANNELS LIST

Ch.	Frequency [MHz]	11b		11g		11n(HT20)		11ax(HE20)	
		SISO	MIMO	SISO	MIMO	SISO	MIMO	SISO	MIMO
1	2 412		○		○		○		○
2	2 417		○		○		○		○
6	2 437		○		○		○		○
10	2 457		○		○		○		○
11	2 462		○		○		○		○

### 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.

Worst case of antenna axis:

ANT1	ANT2	MIMO
X	Z	X

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

- 802.11b mode: 1 Mbps 2TX
- 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 ANT1 / ANT2 Target[dBm]						MIMO Target[dBm]					
Ch.	Freq.	802.11b	802.11g	802.11n HT20	802.11ax HE20	Ch.	Freq.	802.11b	802.11g	802.11n HT20	802.11ax HE20
1	2412	17	14	14	14	1	2412	20	17	17	17
2	2417	18	15.5	15.5	15.5	2	2417	21	18.5	18.5	18.5
6	2437	18	15.5	15.5	15.5	6	2437	21	18.5	18.5	18.5
10	2457	18	15.5	15.5	15.5	10	2457	21	18.5	18.5	18.5
11	2462	17	14	14	14	11	2462	20	17	17	17

	Radiated Band-Edge, Conducted Band-Edge
	Radiated Band-Edge, Radiated Spurious Emission, Conducted Band-Edge, Conducted Spurious Emission, PSD
	Radiated Spurious Emission, Conducted Spurious Emission, PSD

Note1. In 802.11ax (RU mode), conducted & radiated spurious test was performed on the lower tone(26T) with high density.

**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	○
				8	-
	6	2437		0	-
				4	○
				8	-
	11	2462		0	-
				4	○
				8	-

Note1. In 802.11ax HE20(RU) mode, the test case according to RU offset was selected from the offset with worst average power.

Note2. Radiated Band-Edge: investigated additional test with other lower RU tones. SU Mode (Worst case) is reported.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37T7WW84Y9SEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02116A	N/A

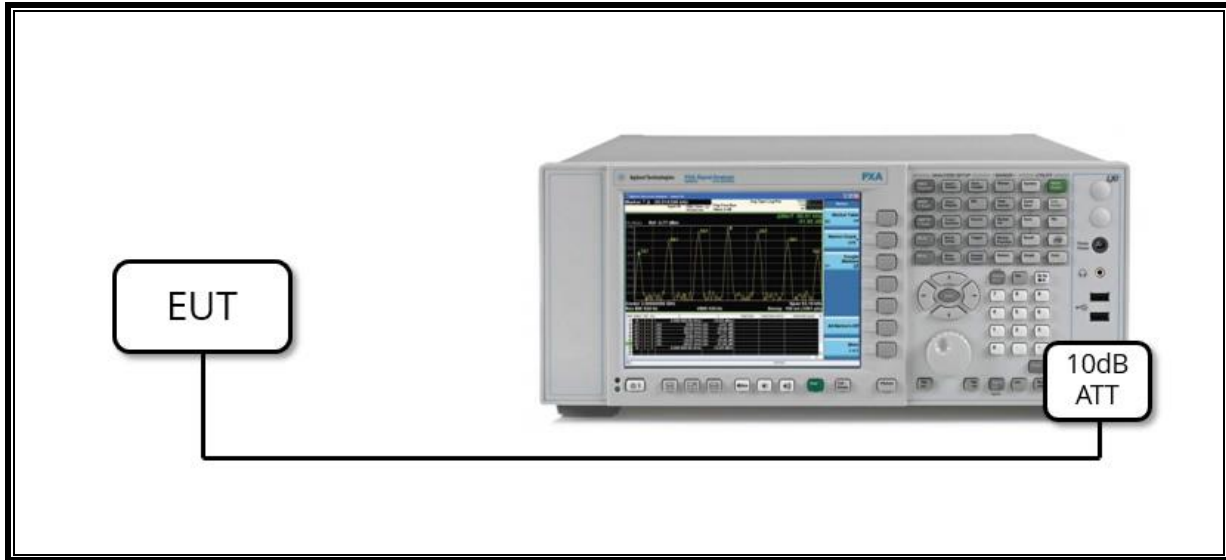
### I/O CABLE

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

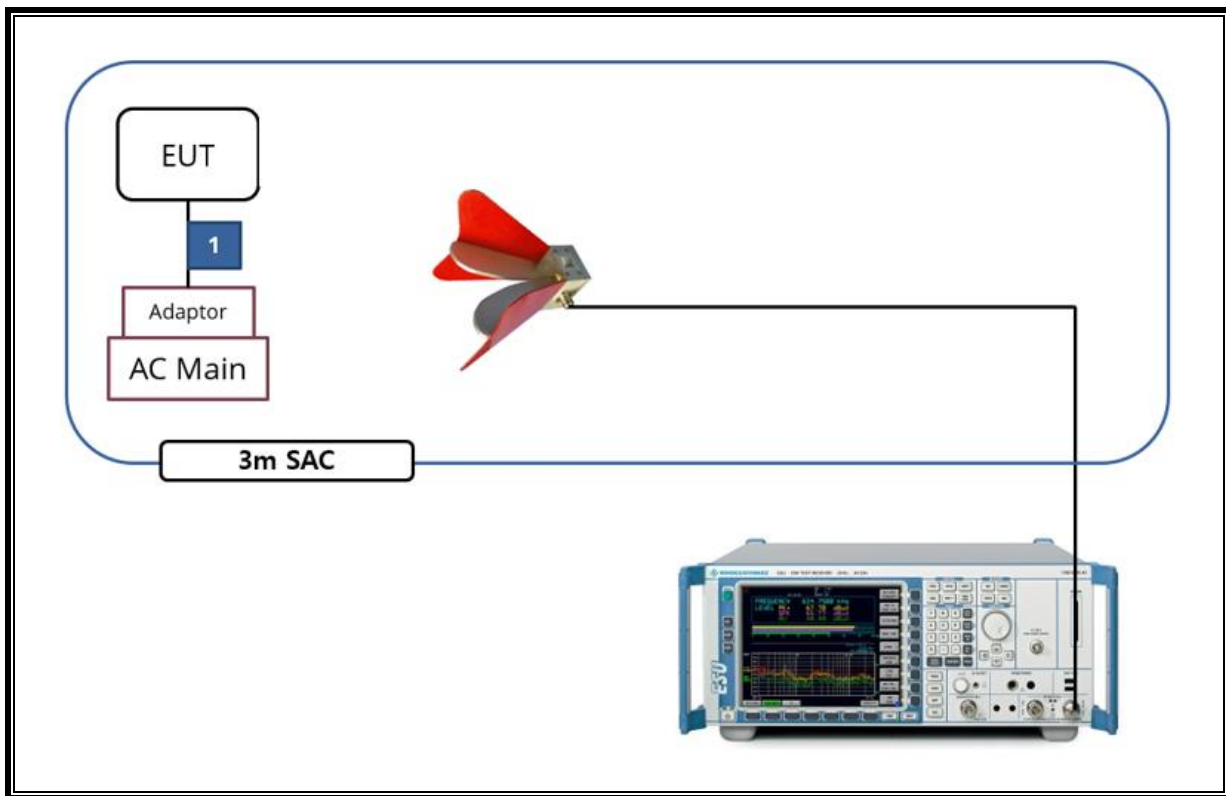
### TEST SETUP

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)**



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## 6. MEASUREMENT METHOD

6 dB BW : ANSI C63.10-2013, Section 11.8.2 Option 2

OUTPUT POWER : ANSI C63.10-2013, Section 11.9.2.3.1 Method AVGPM

POWER SPECTRAL DENSITY : ANSI C63.10-2013, Section 11.10.3 & 11.10.5 Method AVGPSD-1 and Method AVGPSD-2

Out-of-band Emissions (Conducted) : ANSI C63.10-2013, Section 11.11 Emissions in nonrestricted frequency bands

Out-of-band Emissions in Non-restricted Bands: ANSI C63.10-2013, Section 11.11 Emissions in nonrestricted frequency bands

Out-of-band Emissions in Restricted Bands : ANSI C63.10-2013, Section 11.12 Emissions in restricted frequency bands

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	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2024-08-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	2024-08-04
Antenna, Horn, 18 GHz	ETS	3115	00161451	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00168724	2024-08-04
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preamplifier	ETS	3116C-PA	00168841	2023-08-04
Preamplifier, 1000 MHz	Sonoma	310N	341282	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2023-08-01
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2023-08-01
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2023-08-03
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2023-08-01
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2023-01-18
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2023-01-19
Average Power Sensor	Agilent / HP	U2000A	MY54270007	2023-08-03
Average Power Sensor	Agilent / HP	U2000A	MY54260010	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A001	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A008	2023-08-03
Attenuator	PASTERNAK	PE7004-10	2	2023-08-01
Attenuator	PASTERNAK	PE7087-10	A009	2023-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2023-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2023-07-29
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2023-08-01
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2023-08-02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2023-08-01
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2023-08-01
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2023-08-02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2023-08-01
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2023-08-02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	2023-08-01
LISN	R&S	ENV-216	101837	2023-08-04
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2023-10-06
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	Complies
2.1051, 15.247(d)	Band Edge / Conducted Spurious Emission	-30 dBc		Complies
15.247 (b)(3)	TX conducted output power	< 30 dBm		Complies
15.247(e)	PSD	< 8 dBm/3kHz		Complies
15.207(a)	AC Power Line conducted emissions	Section 11	Power Line conducted	Complies
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	Complies

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

**LIMITS**

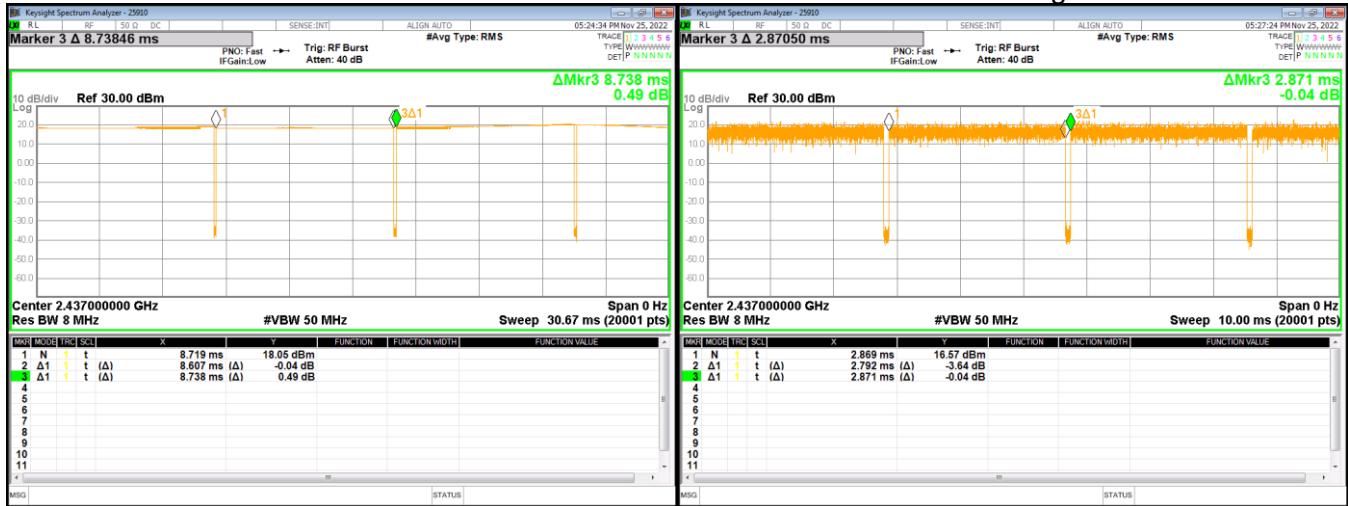
None; for reporting purposes only.

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 MIMO	8.607	8.738	0.985	98.501	-	0.12
802.11g MIMO	2.792	2.871	0.972	97.248	0.12	0.36
802.11n(HT20) MIMO	5.132	5.231	0.981	98.107	-	0.19
802.11ax(HE20) MIMO SU	4.196	4.275	0.982	98.152	-	0.24
802.11ax(HE20) MIMO 26T	5.547	5.620	0.987	98.701	-	0.18
802.11ax(HE20) MIMO 52T	2.903	2.983	0.973	97.318	0.12	0.34
802.11ax(HE20) MIMO 106T	1.400	1.479	0.947	94.659	0.24	0.71

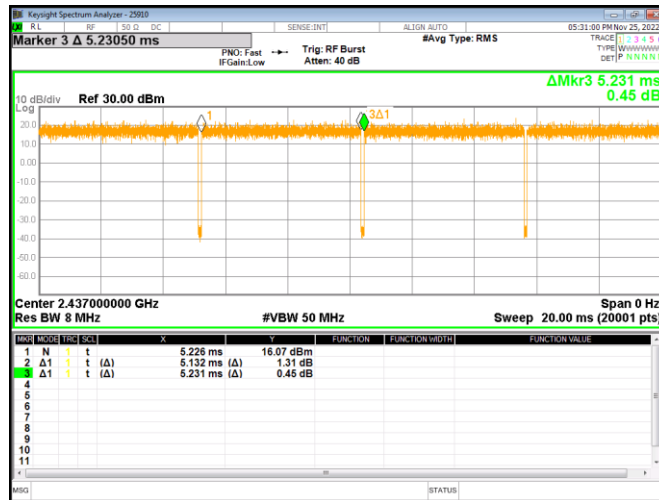
Note. According to ANSI C63.10 Section 11.6, do not apply the Duty Cycle Correction Factor judging that a duty cycle of greater than or equal to 98% is continuous signal.

802.11b

802.11g

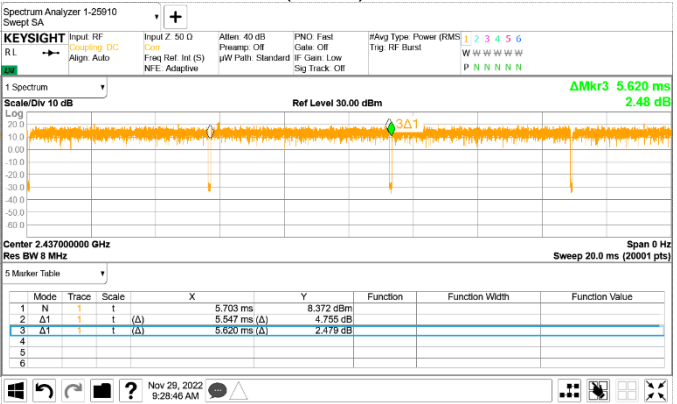


802.11n HT20



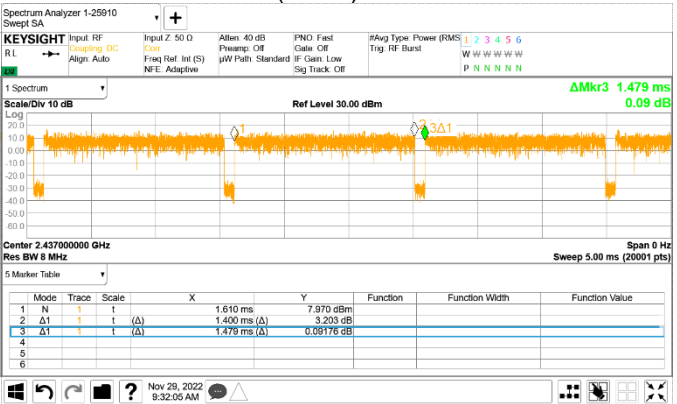
802.11ax(HE20) MIMO SU

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.

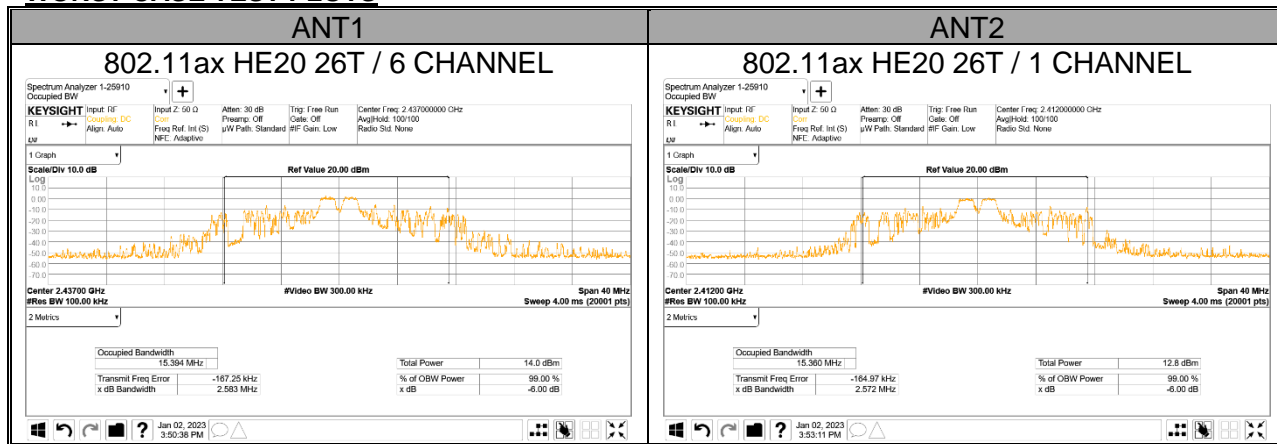
### TEST PROCEDURE

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	<b>7.083</b>	8.041	0.5
2	2 417	8.028	8.071	
6	2 437	8.087	8.029	
10	2 457	7.564	<b>7.575</b>	
11	2 462	8.053	7.590	
Worst		<b>7.083</b>	<b>7.575</b>	

**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	16.300	15.060	0.5
2	2 417	15.410	16.340	
6	2 437	15.550	15.690	
10	2 457	<b>14.660</b>	15.260	
11	2 462	15.060	<b>15.050</b>	
Worst		<b>14.660</b>	<b>15.050</b>	

**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	15.490	17.570	0.5
2	2 417	16.320	16.970	
6	2 437	17.580	16.330	
10	2 457	16.050	<b>16.290</b>	
11	2 462	<b>14.780</b>	16.350	
Worst		<b>14.780</b>	<b>16.290</b>	

**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	2.592	<b>2.572</b>	0.5
6	2 437	<b>2.583</b>	2.643	
11	2 462	2.590	2.600	
Worst		<b>2.583</b>	<b>2.572</b>	

### 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	-1.95	-2.47	0.80

Note. Since the correlated directional gain does not exceed 6dBi, it is not mentioned further below.

**9.3.1. TEST RESULTS**

**- 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	17.07	17.56	17.09	17.45	20.28	30.00
	2	2 417	18.43	18.59	18.61	18.78	21.71	
	6	2 437	18.75	18.29	18.29	18.51	21.41	
	10	2 457	18.25	18.30	18.10	18.29	21.21	
	11	2 462	16.94	17.12	16.72	17.26	20.01	
Worst Case			<b>18.75</b>	<b>18.59</b>			<b>21.71</b>	
802.11g	1	2 412	14.44	14.78	14.55	14.97	17.78	
	2	2 417	16.20	15.85	16.17	15.96	19.08	
	6	2 437	15.79	15.61	16.01	15.66	18.85	
	10	2 457	15.48	15.59	15.65	15.45	18.56	
	11	2 462	13.94	14.43	14.24	14.31	17.29	
Worst Case			<b>16.20</b>	<b>15.85</b>			<b>19.08</b>	
802.11n HT20	1	2 412	14.25	14.62	14.32	14.91	17.64	
	2	2 417	16.09	15.69	16.04	15.86	18.96	
	6	2 437	15.64	15.42	15.84	15.56	18.71	
	10	2 457	15.39	15.45	15.56	15.60	18.59	
	11	2 462	13.95	14.28	14.10	14.43	17.28	
Worst Case			<b>16.09</b>	<b>15.69</b>			<b>18.96</b>	
802.11ax HE20(SU)	1	2 412	13.92	14.74	13.97	14.44	17.22	
	2	2 417	16.08	15.70	15.68	15.75	18.73	
	6	2 437	15.58	15.49	15.40	15.34	18.38	
	10	2 457	15.28	15.51	15.08	15.37	18.24	
	11	2 462	13.90	14.34	13.61	14.15	16.90	
Worst Case			<b>16.08</b>	<b>15.70</b>			<b>18.73</b>	

- Calculation of Output Power result

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



- 802.11ax (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	4.73	4.64	4.63	4.39	7.52	30.00
			4	8.54	9.09	8.19	8.74	11.48	
			8	5.62	6.33	5.59	6.04	8.83	
		52T	37	5.72	5.69	5.54	5.47	8.52	
			38	8.23	8.70	7.91	8.49	11.22	
			40	6.45	7.04	6.31	6.73	9.54	
		106T	53	6.92	7.22	6.54	6.97	9.77	
			54	7.41	7.92	7.10	7.46	10.29	
6	2 437	26T	0	5.77	5.40	5.45	5.30	8.39	
			4	9.54	9.43	9.25	9.32	12.30	
			8	6.48	6.26	6.12	6.22	9.18	
		52T	37	7.18	6.72	6.98	6.79	9.90	
			38	9.71	9.47	9.58	9.51	12.56	
			40	7.77	7.48	7.58	7.51	10.56	
		106T	53	8.46	8.14	8.26	8.16	11.22	
			54	8.86	8.65	8.66	8.63	11.66	
11	2 462	26T	0	4.60	5.40	4.18	4.71	7.46	
			4	8.55	9.40	8.14	8.47	11.32	
			8	5.15	4.60	4.62	4.57	7.61	
		52T	37	5.57	5.66	5.38	5.74	8.57	
			38	8.12	8.33	7.75	7.97	10.87	
			40	6.04	6.07	5.69	5.70	8.71	
		106T	53	6.88	7.23	6.75	6.99	9.88	
			54	7.17	7.33	6.85	7.01	9.94	
<b>Worst Case</b>				<b>9.71</b>	<b>9.47</b>			<b>12.56</b>	

### 9.4. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247 (e)

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.

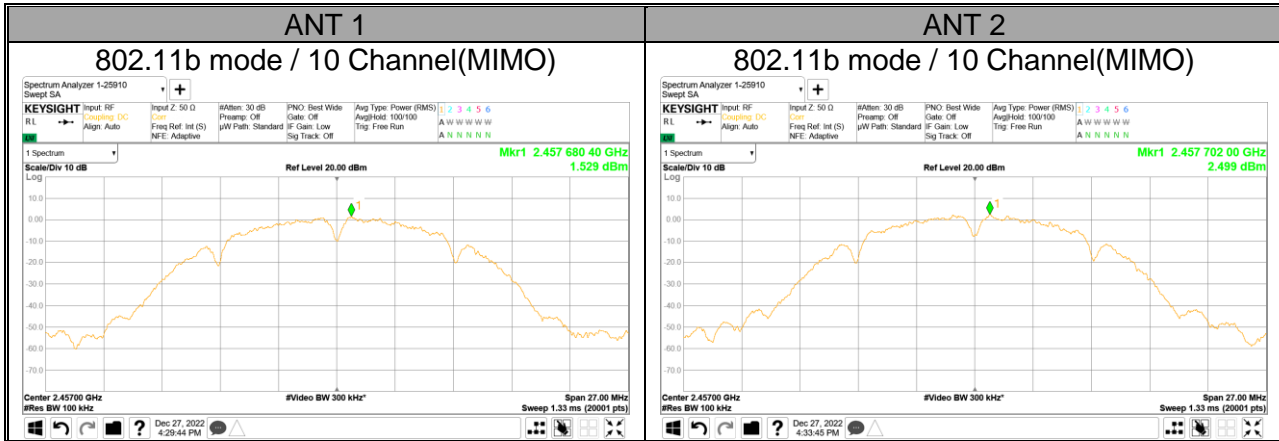
#### TEST PROCEDURE

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

**- MIMO Mode**

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/100kHz]		DCCF	Total Corr'd PSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
			ANT1	ANT2			
802.11b	1	2 412	-1.84	-0.82	0.00	1.71	8.00 <sup>Note</sup>
	2	2 417	1.22	-2.55	0.00	2.74	
	6	2 437	1.81	1.30	0.00	4.57	
	10	2 457	<b>1.53</b>	<b>2.50</b>	<b>0.00</b>	<b>5.05</b>	
	11	2 462	-1.11	-0.76	0.00	2.08	
802.11g	1	2 412	-6.46	-5.28	0.12	-2.70	
	2	2 417	-3.33	-2.64	0.12	0.16	
	6	2 437	-3.66	-3.36	0.12	-0.37	
	10	2 457	-3.84	-3.65	0.12	-0.61	
	11	2 462	-7.13	-6.34	0.12	-3.59	
802.11n HT20	1	2 412	-6.54	-5.02	0.00	-2.70	
	2	2 417	-3.43	-2.79	0.00	-0.09	
	6	2 437	-3.97	-3.34	0.00	-0.63	
	10	2 457	-3.89	-3.34	0.00	-0.60	
	11	2 462	-7.57	-5.79	0.00	-3.58	

**- MIMO Mode(802.11ax HE20)**

Channel	Frequency [MHz]	Tones	RU Offset	Meas PPSD [dBm/100kHz]		DCCF	Total Corr'd PPSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
				ANT1	ANT2			
1	2 412	26T	0	-6.67	-6.86	0.00	-3.75	8.00 <sup>Note</sup>
			4	-3.44	-3.09	0.00	-0.25	
			8	-5.64	-5.43	0.00	-2.52	
6	2 437	26T	0	-4.62	-6.58	0.00	-2.48	
			4	<b>-2.22</b>	<b>-3.17</b>	<b>0.00</b>	<b>0.35</b>	
			8	-4.73	-5.65	0.00	-2.16	
11	2 462	26T	0	-6.32	-6.74	0.00	-3.52	
			4	-3.23	-3.24	0.00	-0.22	
			8	-6.15	-6.51	0.00	-3.32	

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

## 9.5. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

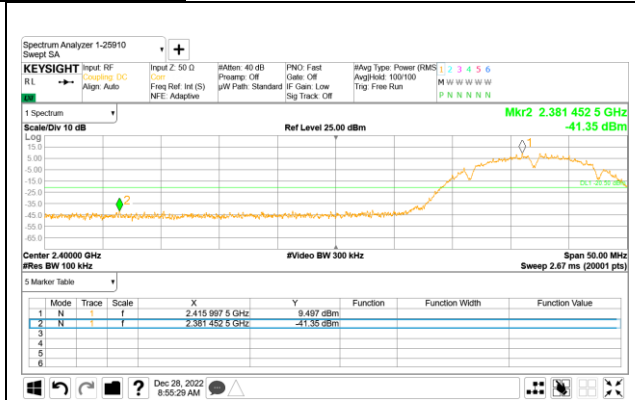
FCC §15.247 (d)

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

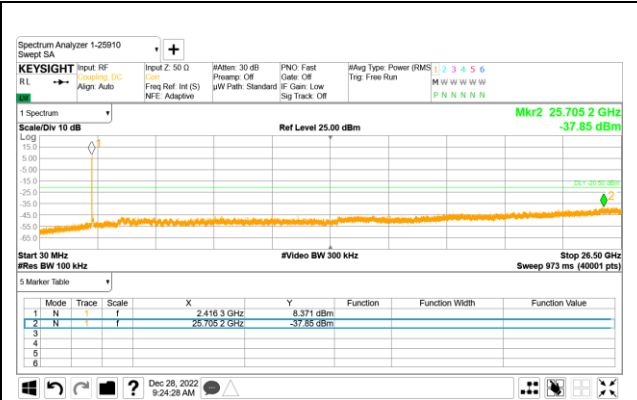
### RESULTS

9.5.1. 802.11b MODE

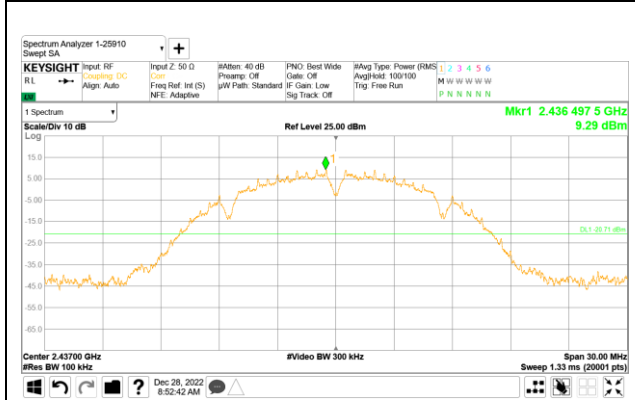
2TX Antenna 1



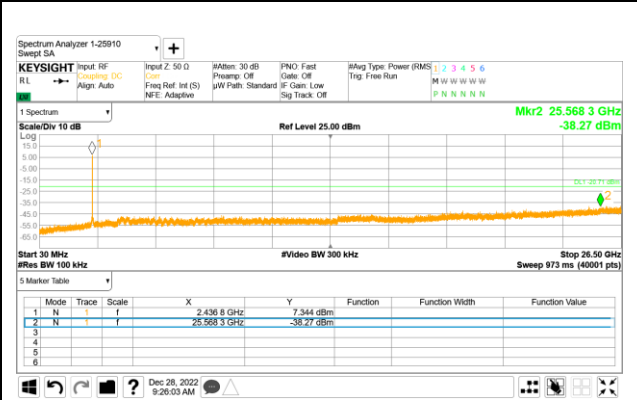
2 Channel Band-edge



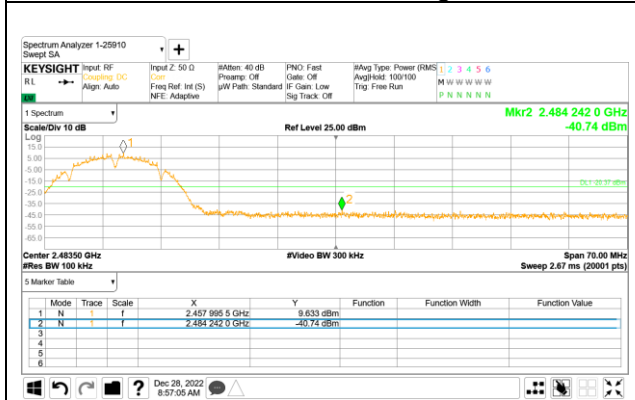
Out-Of-Band 2 Channel



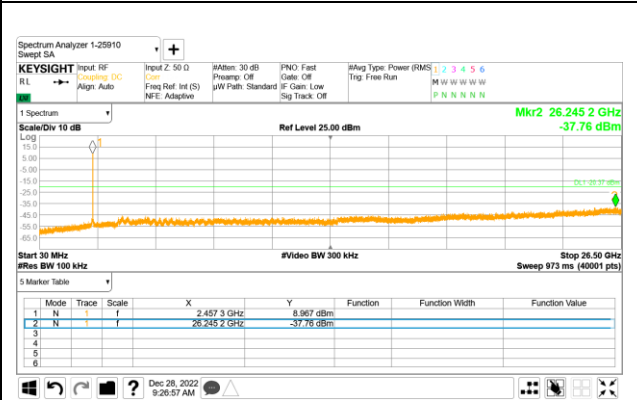
6 Channel Band-edge



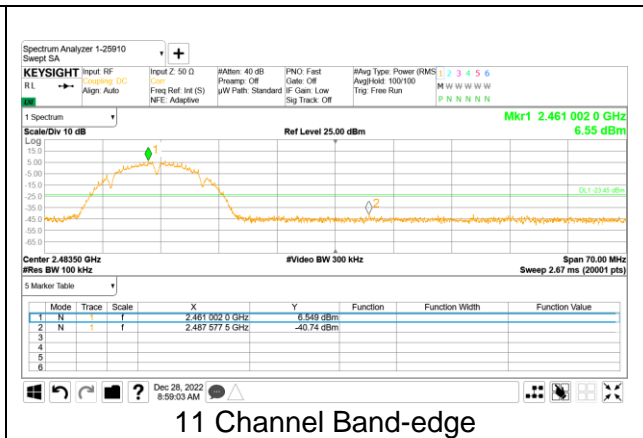
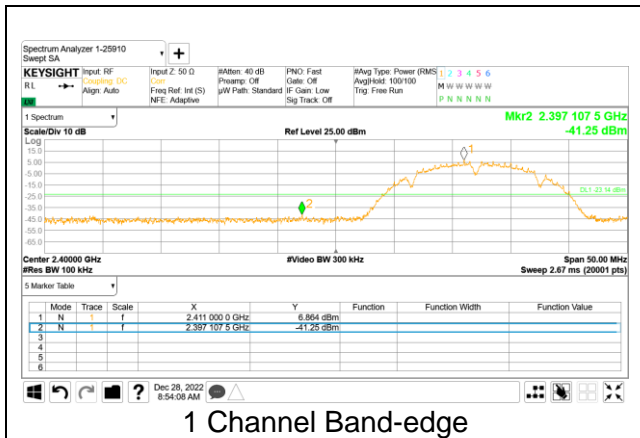
Out-Of-Band 6 Channel



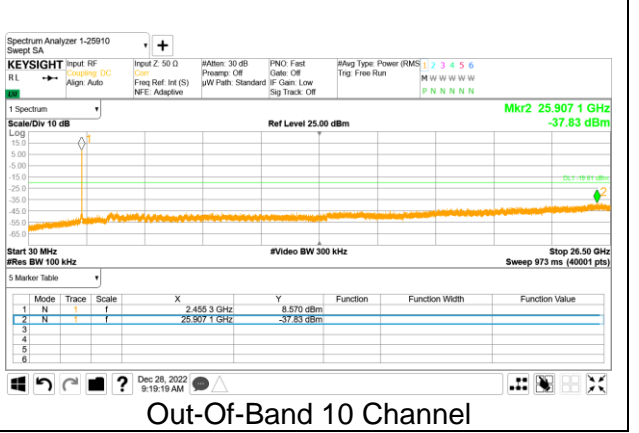
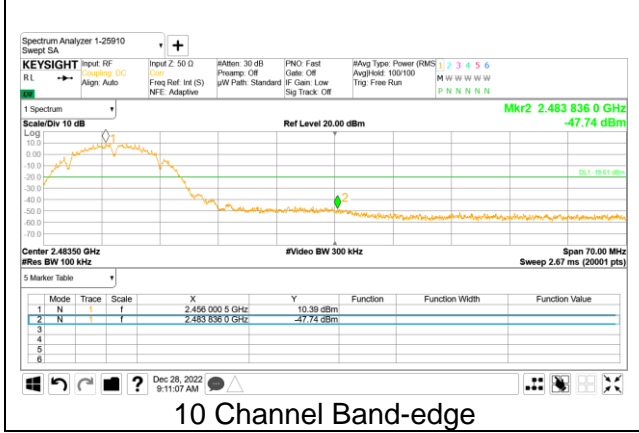
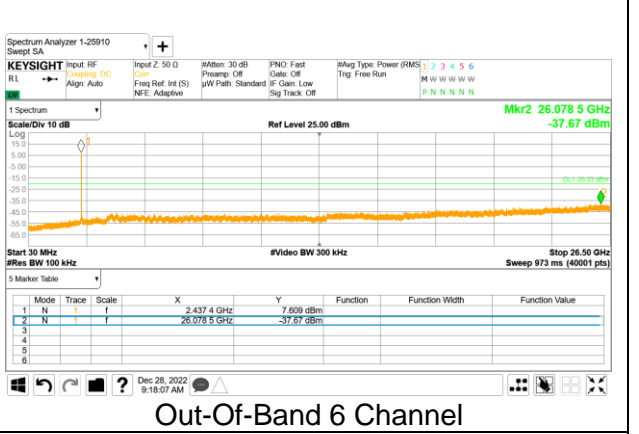
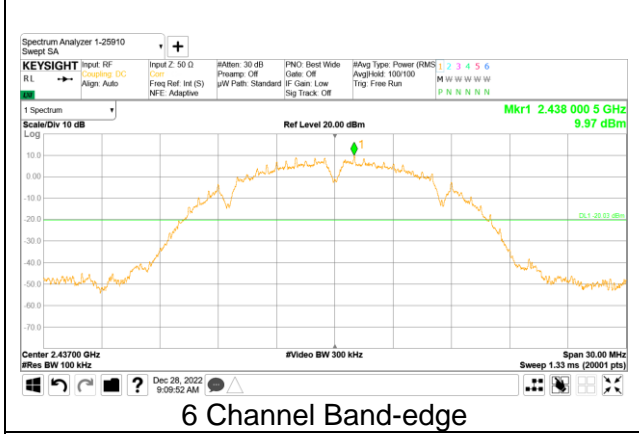
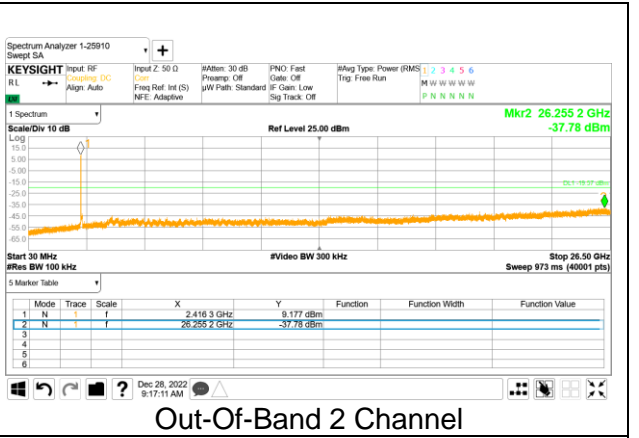
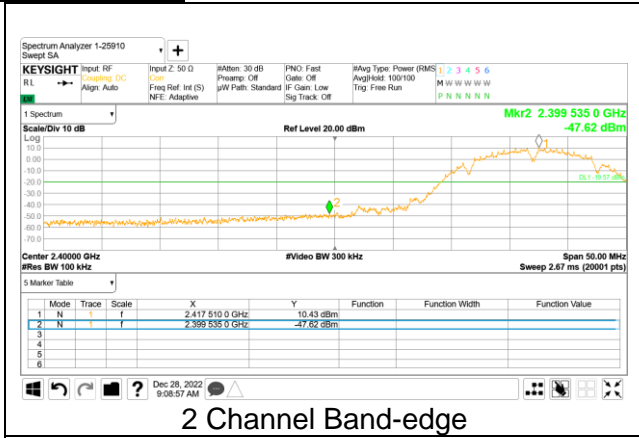
10 Channel Band-edge

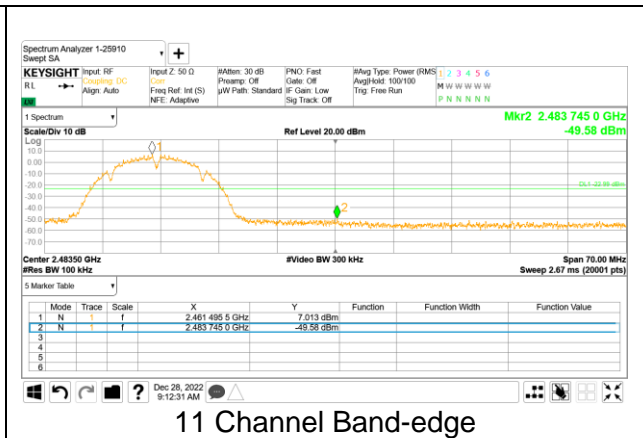
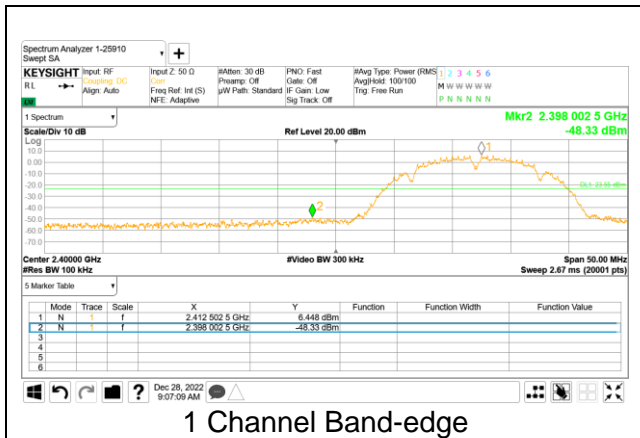


Out-Of-Band 10 Channel



**2TX Antenna 2**

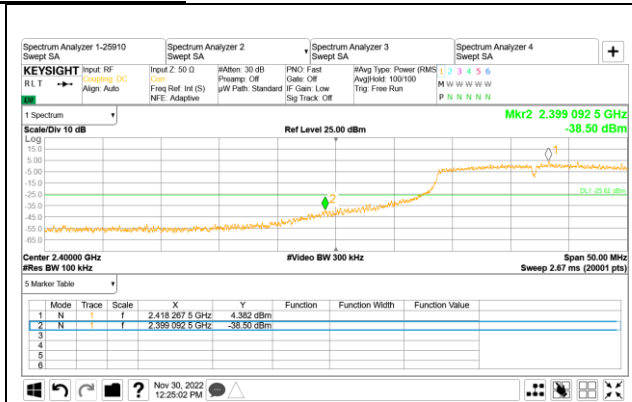






### 9.5.2. 802.11g MODE

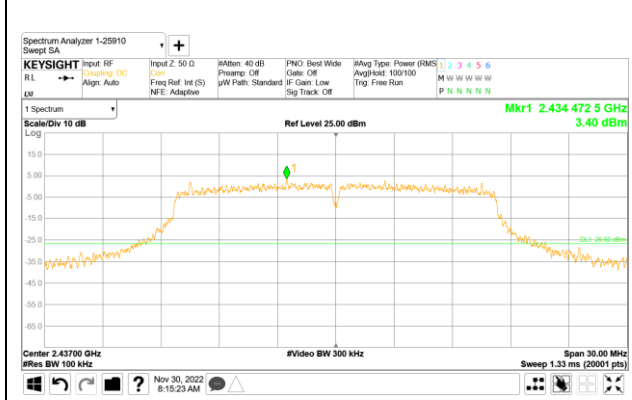
#### 2TX Antenna 1



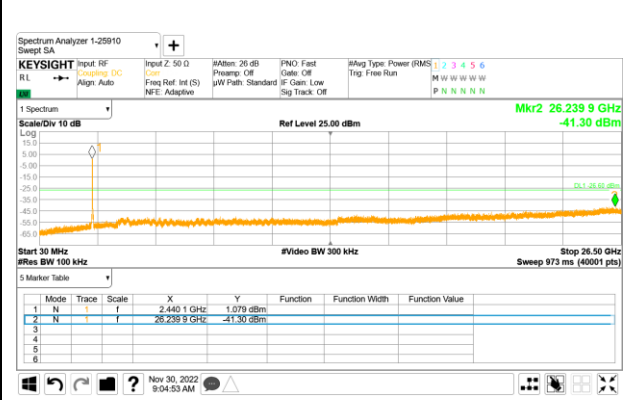
2 Channel Band-edge



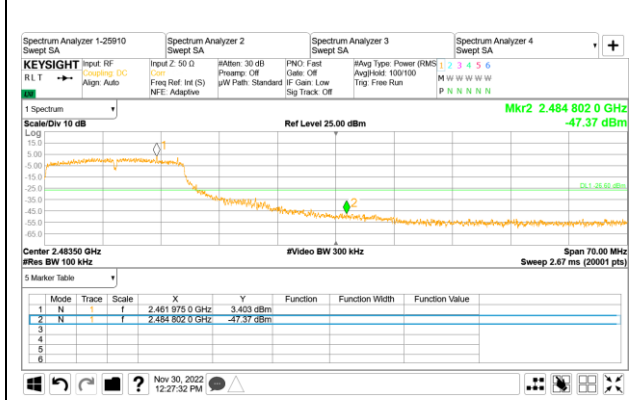
Out-Of-Band 2 Channel



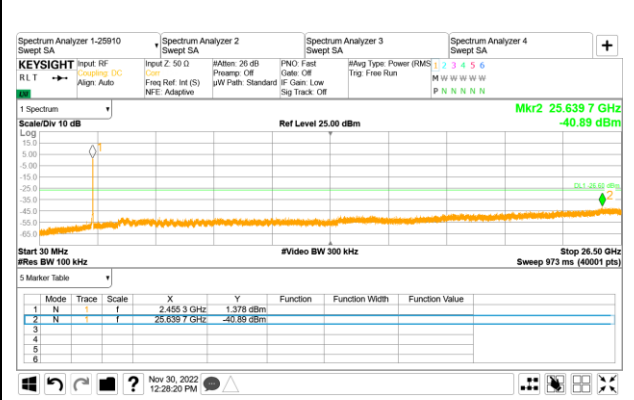
6 Channel Band-edge



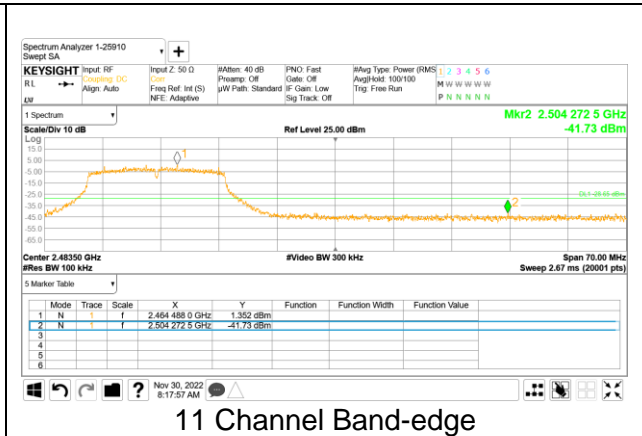
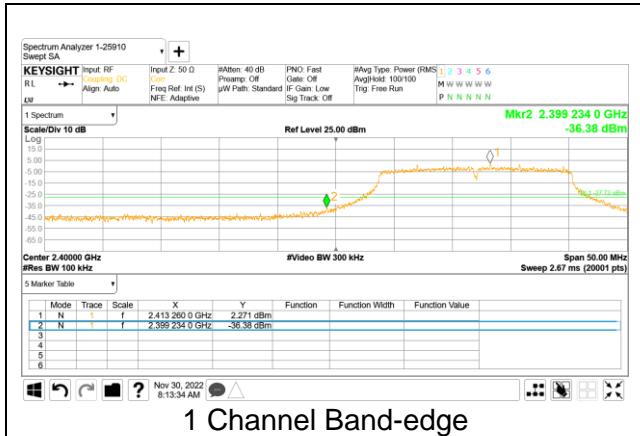
Out-Of-Band 6 Channel



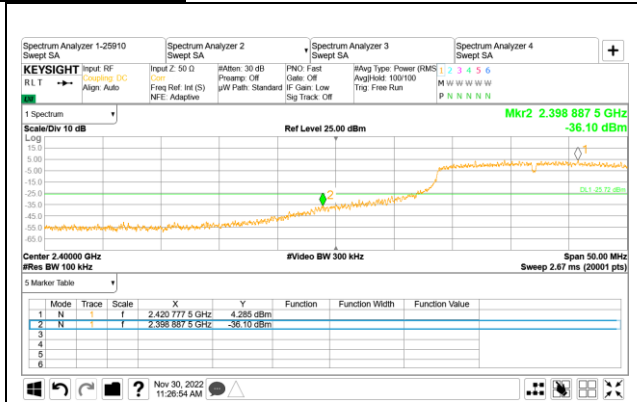
10 Channel Band-edge



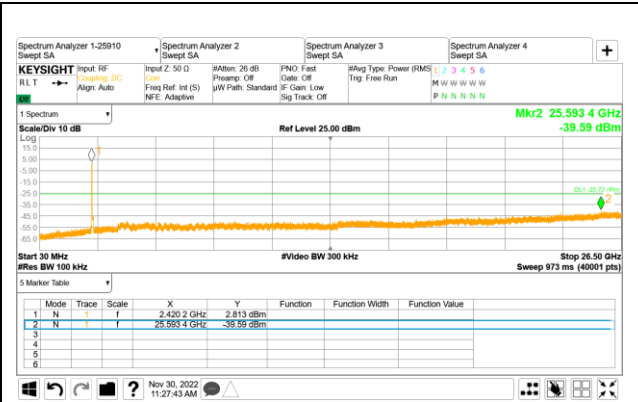
Out-Of-Band 10 Channel



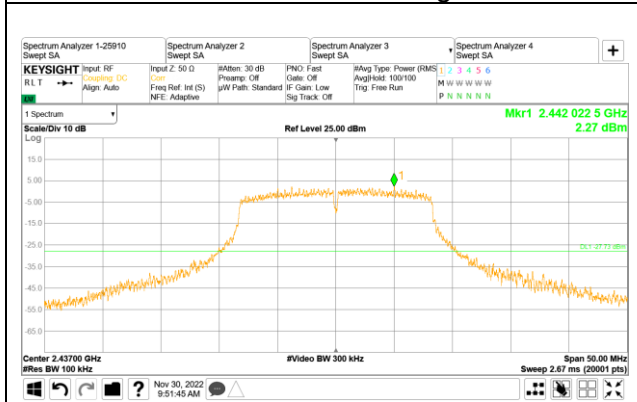
**2TX Antenna 2**



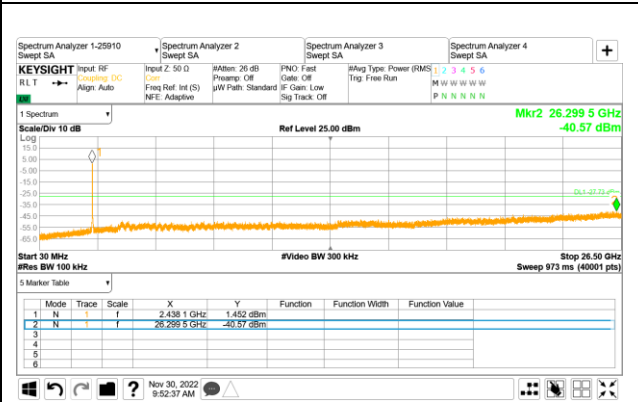
2 Channel Band-edge



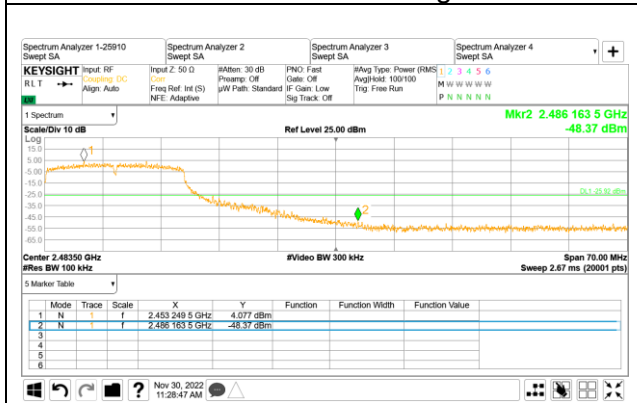
Out-Of-Band 2 Channel



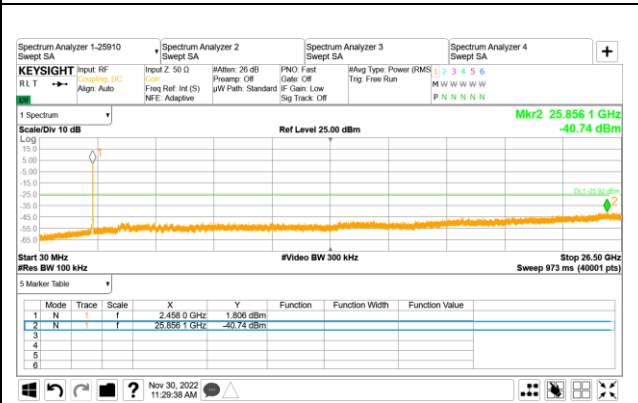
6 Channel Band-edge



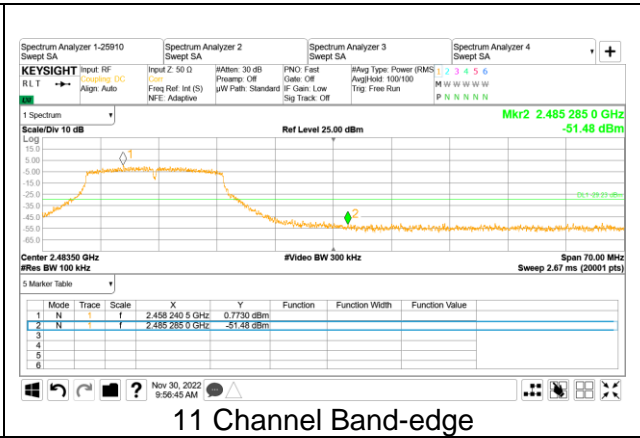
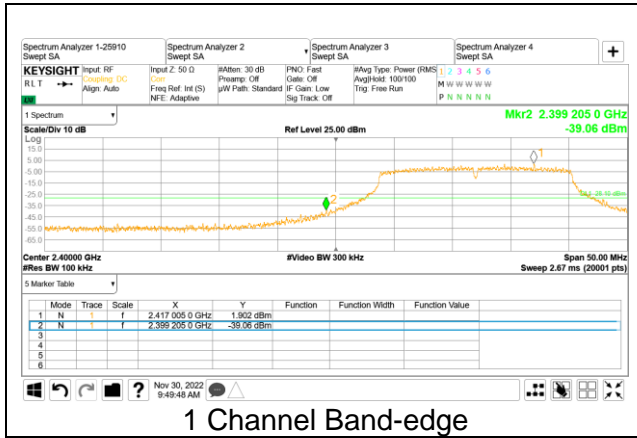
Out-Of-Band 6 Channel



10 Channel Band-edge

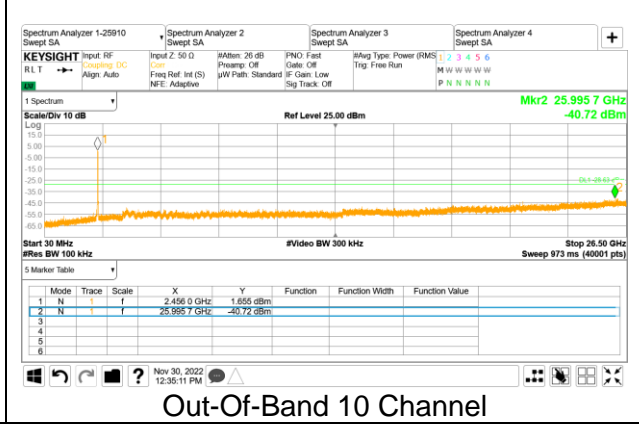
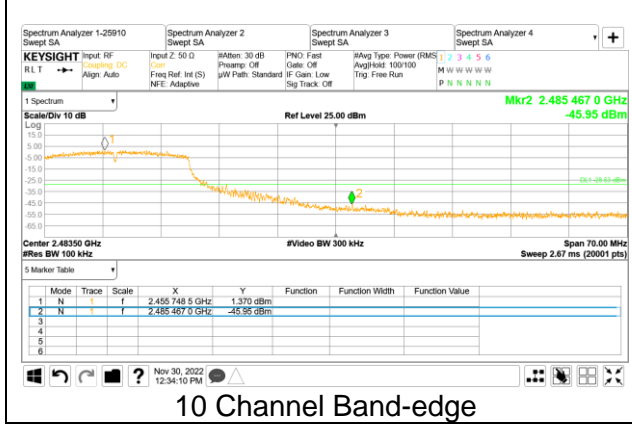
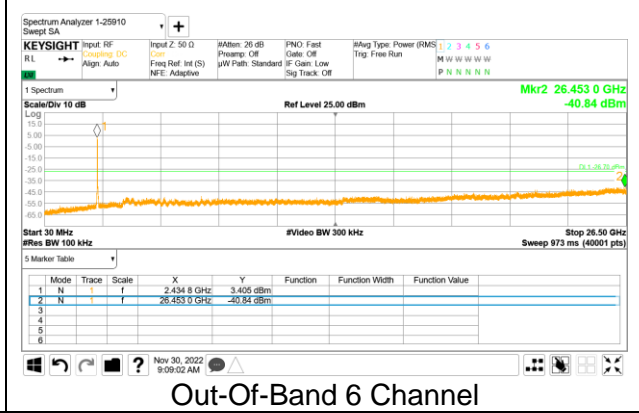
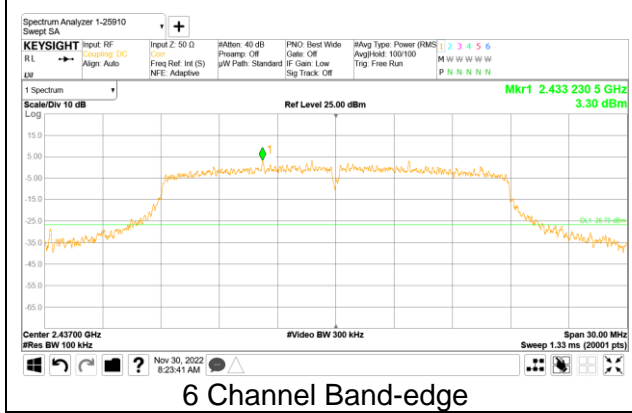
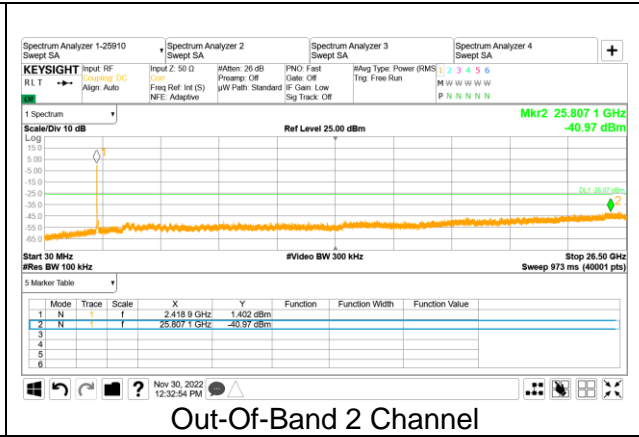
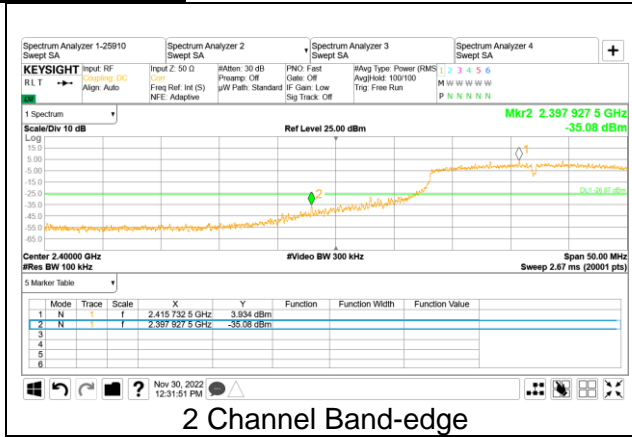


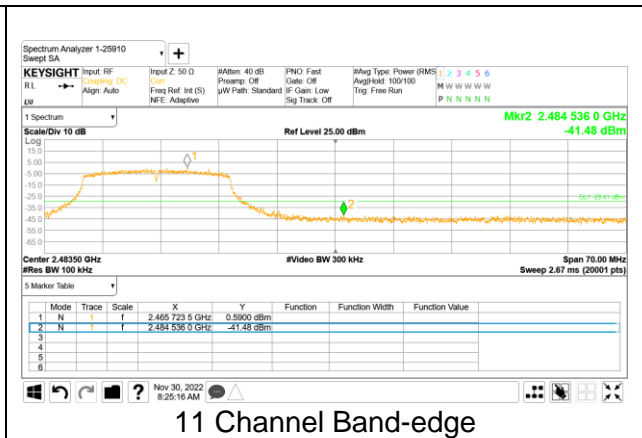
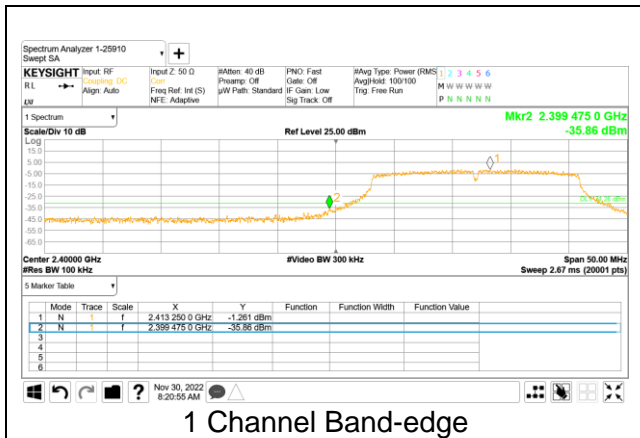
Out-Of-Band 10 Channel



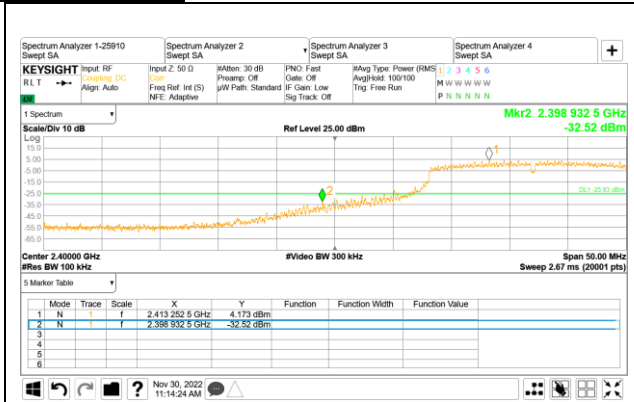
### 9.5.3. 802.11n HT20 MODE

#### 2TX Antenna 1

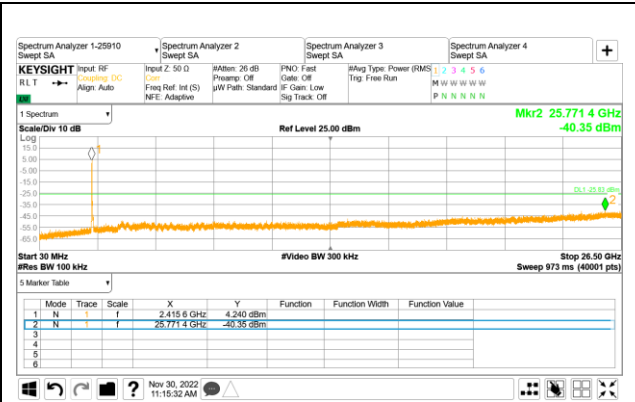




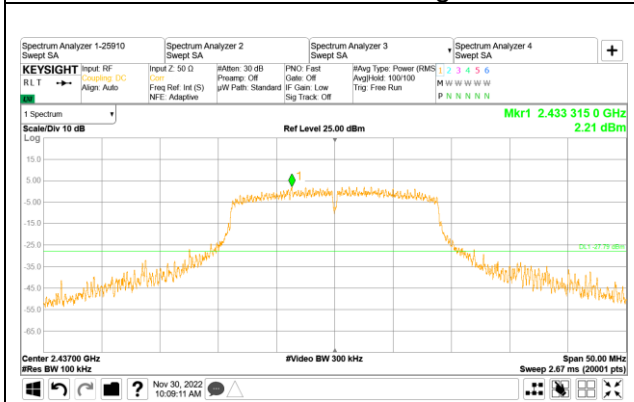
**2TX Antenna 2**



2 Channel Band-edge



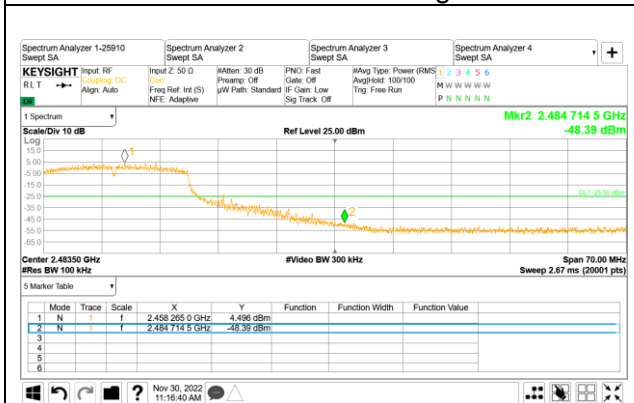
Out-Of-Band 2 Channel



6 Channel Band-edge



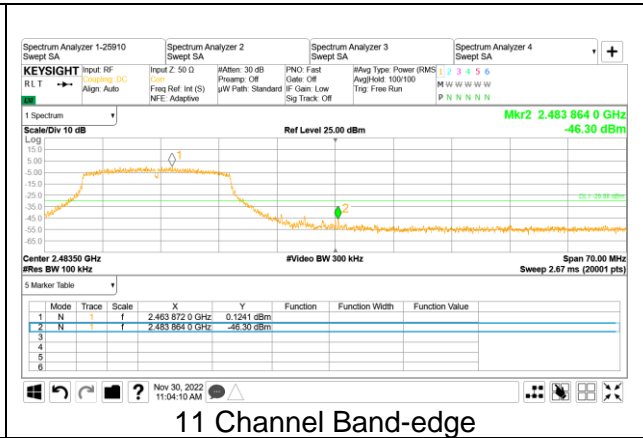
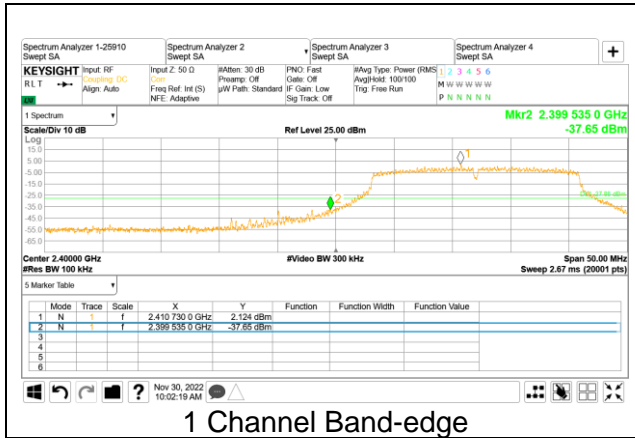
Out-Of-Band 6 Channel



10 Channel Band-edge



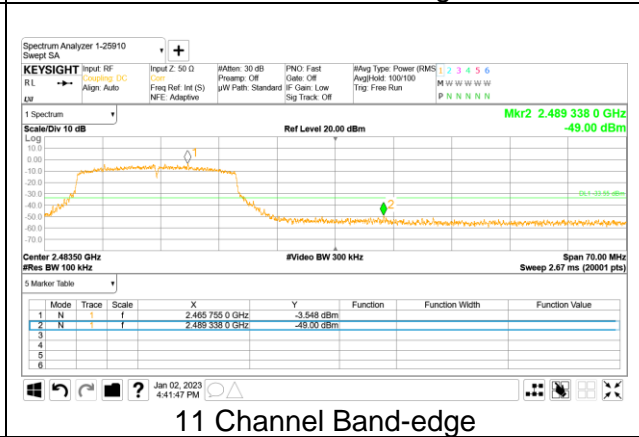
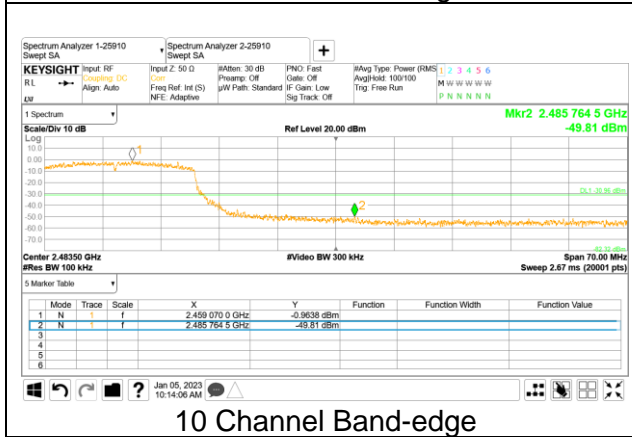
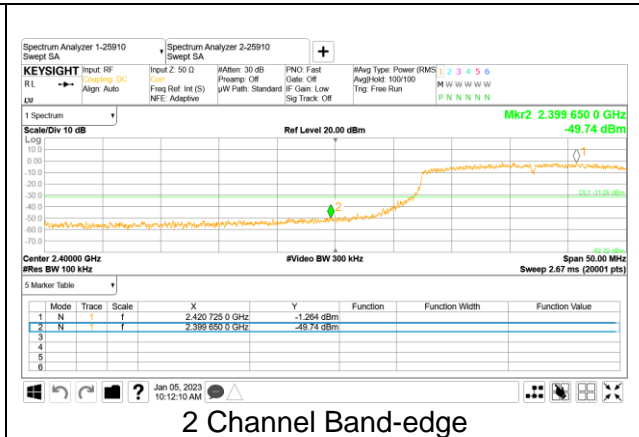
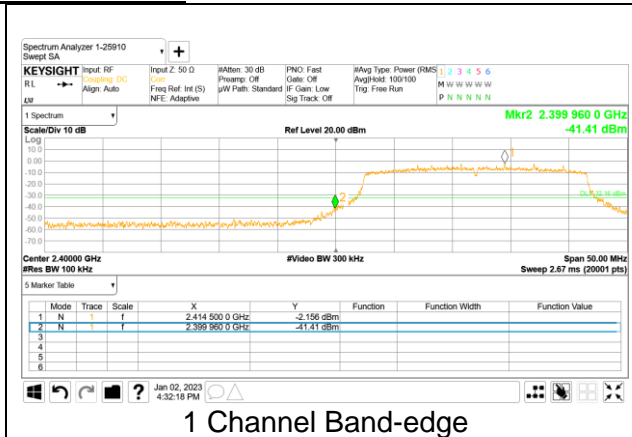
Out-Of-Band 10 Channel



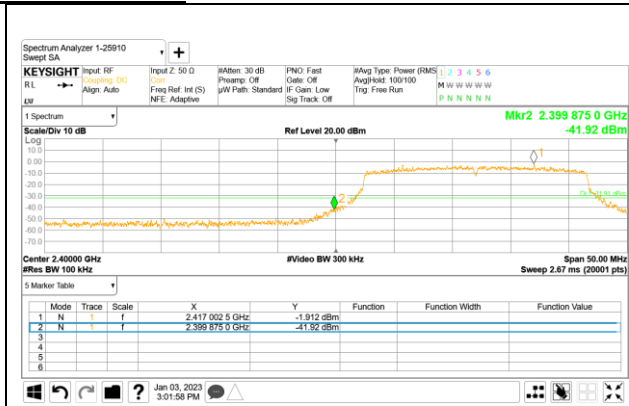


### 9.5.4. 802.11ax HE20(SU) MODE

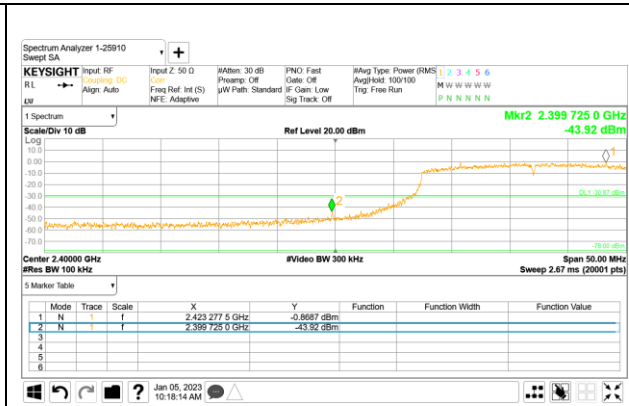
#### 2TX Antenna 1



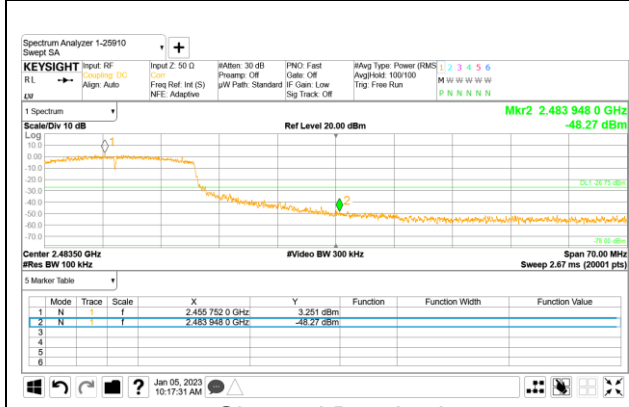
2TX Antenna 2



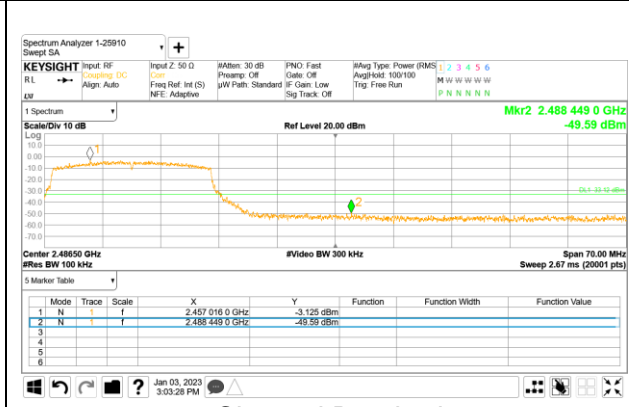
1 Channel Band-edge



2 Channel Band-edge



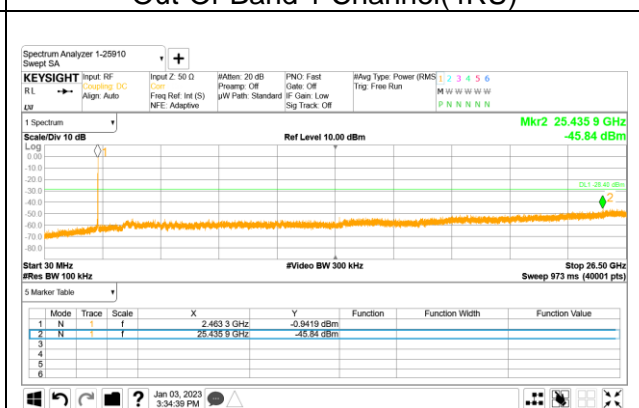
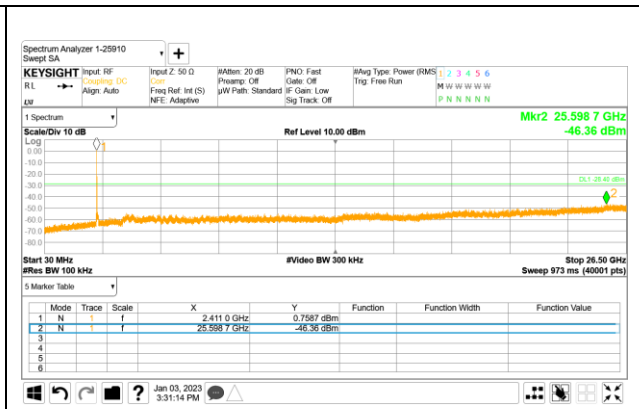
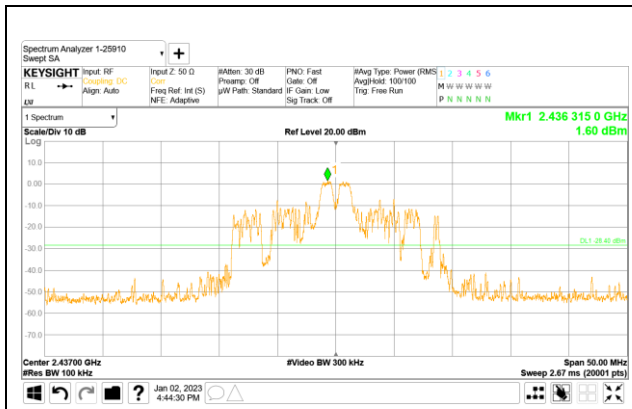
10 Channel Band-edge



11 Channel Band-edge

### 9.5.5. 802.11ax HE20(RU) MODE

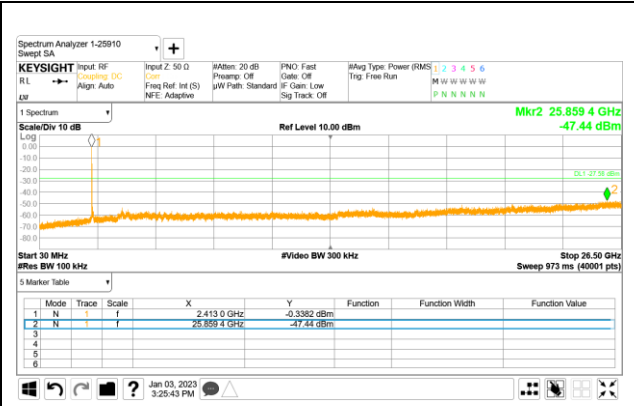
#### 2TX Antenna 1 MODE



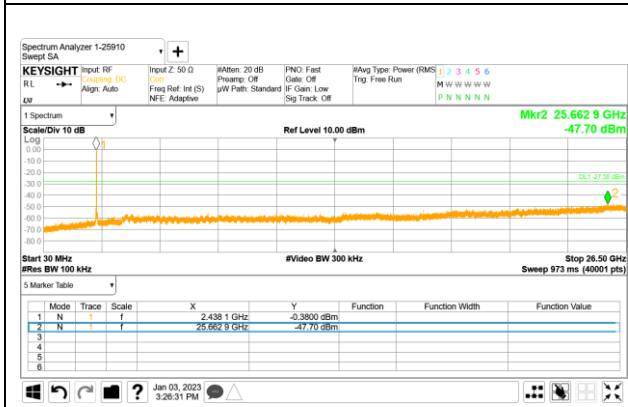
**2TX Antenna 2 MODE**



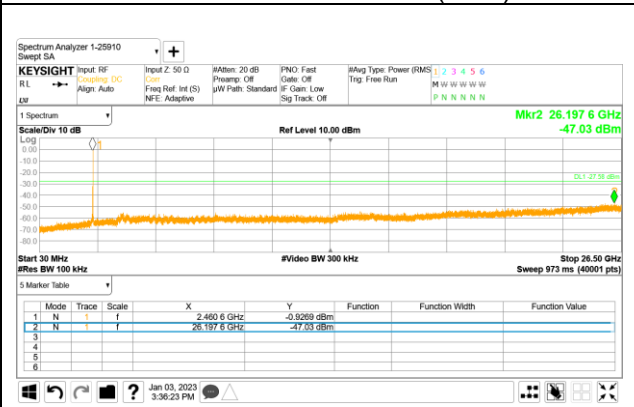
In-Band Reference Level



Out-Of-Band 1 Channel(4RU)



Out-Of-Band 6 Channel(4RU)



Out-Of-Band 11 Channel(4RU)

## 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 MIMO mode = 0 dB (duty cycle > 98%);  
802.11g MIMO mode = 0.12 dB (97.25%);  
802.11n(HT20) MIMO mode = 0 dB (duty cycle > 98%);  
802.11ax(HE20) MIMO SU mode = 0 dB (duty cycle > 98%);  
802.11ax(HE20) MIMO 26 Tone 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.

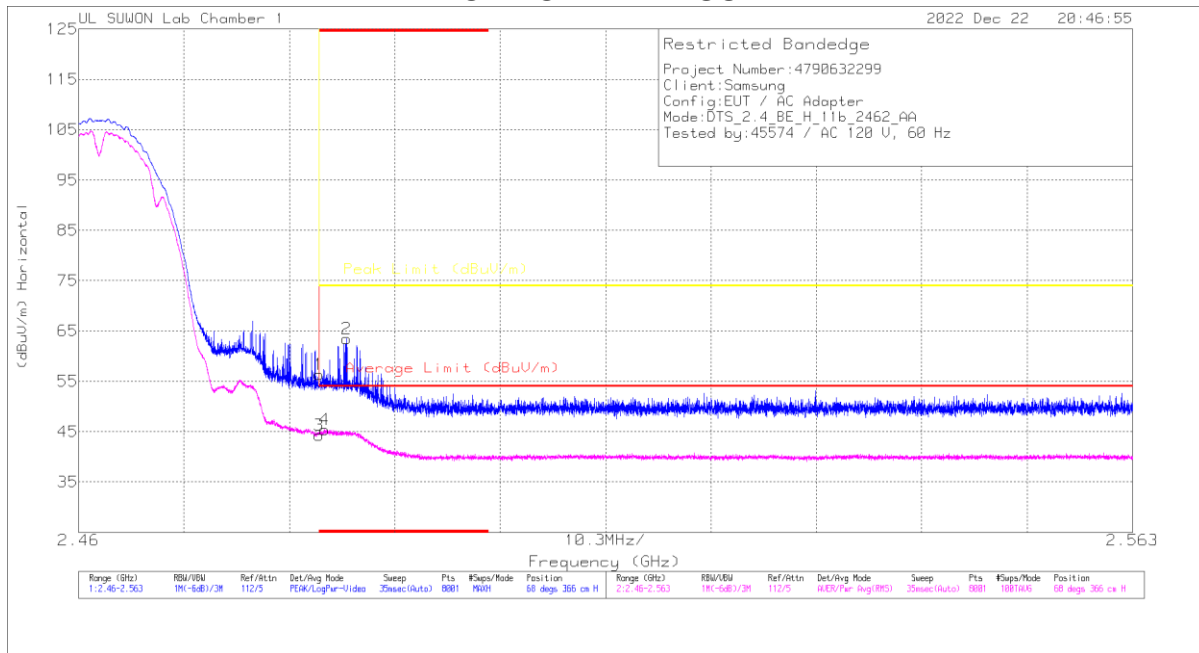
## 10.1. TRANSMITTER ABOVE 1 GHz

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

#### 2TX Antenna 1 + Antenna 2

#### BANDEDGE(WORST CASE: 11 CHANNEL)

#### HORIZONTAL RESULT



#### Trace Markers

Marker	Frequency (GHz)	Marker 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	* 2.48351	52.5	PK	32.2	-28.3	0	56.4	-	-	74	-17.6	68	366	H
2	* 2.4862	59.54	PK	32.2	-28.3	0	63.44	-	-	74	-10.56	68	366	H
3	* 2.48351	40.39	RMS	32.2	-28.3	0	44.29	54	-9.71	-	-	68	366	H
4	* 2.48405	41.46	RMS	32.2	-28.3	0	45.36	54	-8.64	-	-	68	366	H

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

**BANDEDGE TEST DATA**

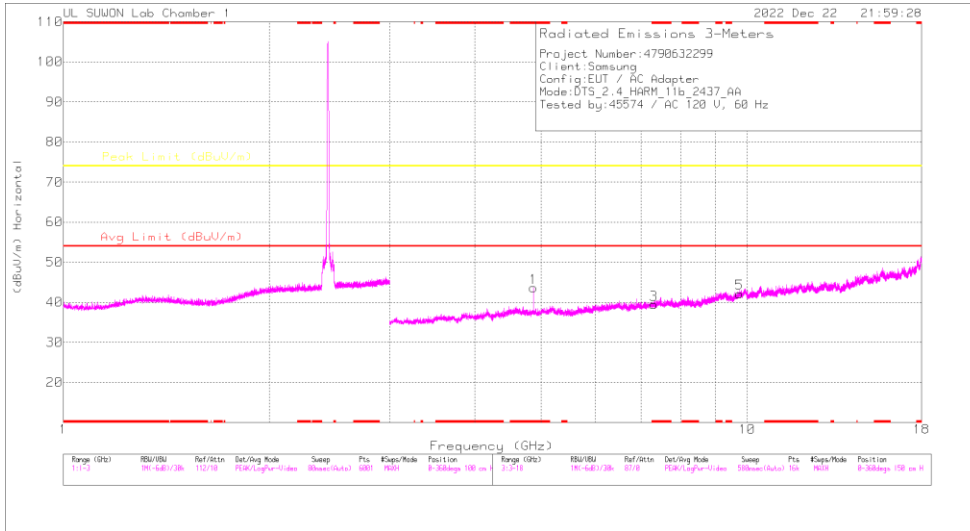
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result dBuV/m	AV Limit dBuV/m	AV Margin [dB]	PK Limit dBuV/m	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	MIMO	* 2.39	49.65	Pk	31.90	-28.40	0.00	53.15	-	-	74.00	-20.85	56	128	H
		* 2.38976	55.06	Pk	31.90	-28.40	0.00	58.56	-	-	74.00	-15.44	56	128	H
		2.39	39.74	RMS	31.90	-28.40	0.00	43.24	54.00	-10.76	-	-	56	128	H
		* 2.38981	39.78	RMS	31.90	-28.40	0.00	43.28	54.00	-10.72	-	-	56	128	H
		* 2.39	45.86	Pk	31.90	-28.40	0.00	49.36	-	-	74.00	-24.64	149	361	V
		* 2.37489	49.28	Pk	31.90	-28.50	0.00	52.68	-	-	74.00	-21.32	149	361	V
		* 2.39	37.08	RMS	31.90	-28.40	0.00	40.58	54.00	-13.42	-	-	149	361	V
		* 2.38888	37.48	RMS	31.90	-28.50	0.00	40.88	54.00	-13.12	-	-	149	361	V
2417	MIMO	* 2.39	47.74	Pk	31.90	-28.40	0.00	51.24	-	-	74.00	-22.76	45	215	H
		* 2.3895	50.13	Pk	31.90	-28.40	0.00	53.63	-	-	74.00	-20.37	45	215	H
		* 2.39	38.67	RMS	31.90	-28.40	0.00	42.17	54.00	-11.83	-	-	45	215	H
		* 2.38996	39.20	RMS	31.90	-28.40	0.00	42.70	54.00	-11.30	-	-	45	215	H
		* 2.39	45.53	Pk	31.90	-28.40	0.00	49.03	-	-	74.00	-24.97	148	363	V
		* 2.34397	48.79	Pk	31.80	-28.40	0.00	52.19	-	-	74.00	-21.81	148	363	V
		* 2.39	36.94	RMS	31.90	-28.40	0.00	40.44	54.00	-13.56	-	-	148	363	V
		* 2.38855	37.47	RMS	31.90	-28.50	0.00	40.87	54.00	-13.13	-	-	148	363	V
2457	MIMO	* 2.48351	48.15	Pk	32.20	-28.30	0.00	52.05	-	-	74.00	-21.95	26	137	H
		* 2.48587	54.88	Pk	32.20	-28.30	0.00	58.78	-	-	74.00	-15.22	26	137	H
		* 2.48351	38.72	RMS	32.20	-28.30	0.00	42.62	54.00	-11.38	-	-	26	137	H
		* 2.4839	39.59	RMS	32.20	-28.30	0.00	43.49	54.00	-10.51	-	-	26	137	H
		* 2.48351	47.15	Pk	32.20	-28.30	0.00	51.05	-	-	74.00	-22.95	129	382	V
		* 2.48471	50.15	Pk	32.20	-28.30	0.00	54.05	-	-	74.00	-19.95	129	382	V
		* 2.48351	37.02	RMS	32.20	-28.30	0.00	40.92	54.00	-13.08	-	-	129	382	V
		* 2.48359	37.52	RMS	32.20	-28.30	0.00	41.42	54.00	-12.58	-	-	129	382	V
2462	MIMO	* 2.48351	52.50	Pk	32.20	-28.30	0.00	56.40	-	-	74.00	-17.60	68	366	H
		* 2.4862	59.54	Pk	32.20	-28.30	0.00	63.44	-	-	74.00	-10.56	68	366	H
		* 2.48351	40.39	RMS	32.20	-28.30	0.00	44.29	54.00	-9.71	-	-	68	366	H
		* 2.48405	41.46	RMS	32.20	-28.30	0.00	45.36	54.00	-8.64	-	-	68	366	H
		* 2.48351	48.38	Pk	32.20	-28.30	0.00	52.28	-	-	74.00	-21.72	139	376	V
		* 2.48636	53.72	Pk	32.20	-28.30	0.00	57.62	-	-	74.00	-16.38	139	376	V
		* 2.48351	38.14	RMS	32.20	-28.30	0.00	42.04	54.00	-11.96	-	-	139	376	V
		* 2.48384	38.49	RMS	32.20	-28.30	0.00	42.39	54.00	-11.61	-	-	139	376	V

Note1. Pk - Peak detector, RMS - RMS detector  
 Note2. \* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

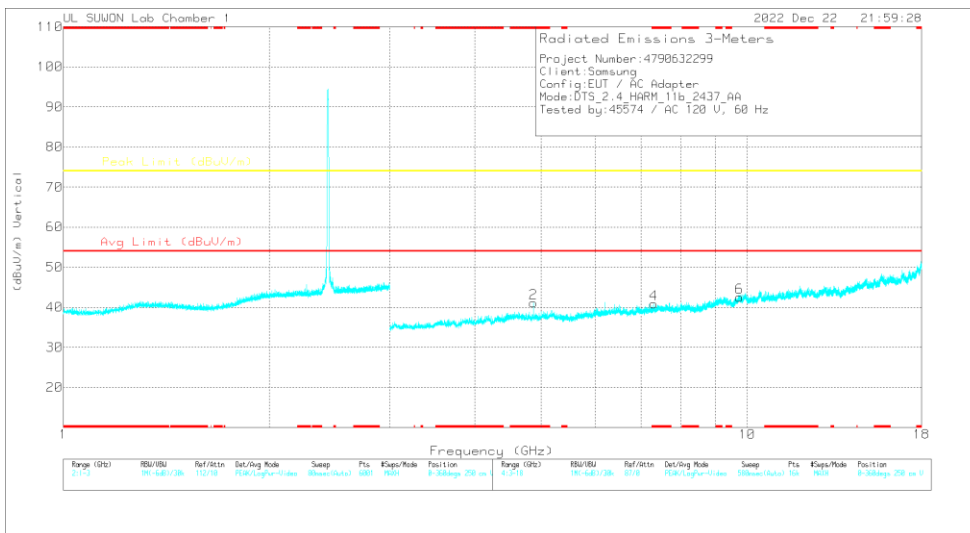


**HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 6 CHANNEL)**

**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_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
* 4.874	48.67	PK2	34.2	-33	0	49.87	-	-	74	-24.13	147	151	H
* 4.87394	42.14	MAV1	34.2	-33	0	43.34	54	-10.66	-	-	147	151	H
* 4.87401	46.74	PK2	34.2	-33	0	47.94	-	-	74	-26.06	295	102	V
* 4.87401	37.52	MAV1	34.2	-33	0	38.72	54	-15.28	-	-	295	102	V
* 7.31061	43.41	PK2	35.7	-30.2	0	48.91	-	-	74	-25.09	0	100	H
9.74328	40.42	PK2	37.3	-26.9	0	50.82	-	-	74	-23.18	0	100	H
* 7.31135	43.85	PK2	35.7	-30.2	0	49.35	-	-	74	-24.65	0	100	V
9.75036	40.5	PK2	37.3	-26.7	0	51.1	-	-	74	-22.9	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
2417	MIMO	* 4.83383	49.03	PK-U	34.20	-33.30	0.00	49.93	-	-	74.00	-24.07	151	100	H
		* 4.83397	42.39	ADR	34.20	-33.30	0.00	43.29	54.00	-10.71	-	-	151	100	H
		* 4.83412	47.64	PK-U	34.20	-33.30	0.00	48.54	-	-	74.00	-25.46	302	101	V
		* 4.83398	39.78	ADR	34.20	-33.30	0.00	40.68	54.00	-13.32	-	-	302	101	V
		* 7.26717	43.79	PK-U	35.70	-30.10	0.00	49.39	-	-	74.00	-24.61	58	115	H
		7.250	31.64	ADR	35.70	-30.20	0.00	37.14	-	-	-	-	58	115	H
		* 7.25107	43.58	PK-U	35.70	-30.20	0.00	49.08	-	-	74.00	-24.92	8	111	V
		* 7.25242	32.43	ADR	35.70	-30.20	0.00	37.93	54.00	-16.07	-	-	8	111	V
		9.676	40.58	PK-U	37.20	-27.10	0.00	50.68	-	-	74.00	-23.32	163	101	H
		9.668	41.51	PK-U	37.20	-26.90	0.00	51.81	-	-	74.00	-22.19	20	102	V
2437	MIMO	* 4.874	48.67	PK2	34.20	-33.00	0.00	49.87	-	-	74.00	-24.13	147	151	H
		* 4.87394	42.14	MAv1	34.20	-33.00	0.00	43.34	54.00	-10.66	-	-	147	151	H
		* 4.87401	46.74	PK2	34.20	-33.00	0.00	47.94	-	-	74.00	-26.06	295	102	V
		* 4.87401	37.52	MAv1	34.20	-33.00	0.00	38.72	54.00	-15.28	-	-	295	102	V
		* 7.31061	43.41	PK2	35.70	-30.20	0.00	48.91	-	-	74.00	-25.09	0	100	H
		9.743	40.42	PK2	37.30	-26.90	0.00	50.82	-	-	74.00	-23.18	0	100	H
		* 7.31135	43.85	PK2	35.70	-30.20	0.00	49.35	-	-	74.00	-24.65	0	100	V
		9.750	40.50	PK2	37.30	-26.70	0.00	51.10	-	-	74.00	-22.90	0	100	V
2457	MIMO	* 4.91425	48.40	PK-U	34.20	-33.00	0.00	49.60	-	-	74.00	-24.40	154	129	H
		* 4.91397	40.68	ADR	34.20	-33.00	0.00	41.88	54.00	-12.12	-	-	154	129	H
		* 4.91395	46.72	PK-U	34.20	-33.00	0.00	47.92	-	-	74.00	-26.08	293	111	V
		* 4.91401	36.81	ADR	34.20	-33.00	0.00	38.01	54.00	-15.99	-	-	293	111	V
		* 7.36797	43.67	PK-U	35.70	-30.00	0.00	49.37	-	-	74.00	-24.63	72	111	H
		* 7.36965	32.03	ADR	35.70	-30.10	0.00	37.63	54.00	-16.37	-	-	72	111	H
		* 7.37477	43.47	PK-U	35.70	-30.00	0.00	49.17	-	-	74.00	-24.83	3	108	V
		* 7.36973	32.37	ADR	35.70	-30.10	0.00	37.97	54.00	-16.03	-	-	3	108	V
		9.824	40.93	PK-U	37.50	-26.80	0.00	51.63	-	-	74.00	-22.37	318	101	H
		9.828	41.04	PK-U	37.50	-26.90	0.00	51.64	-	-	74.00	-22.36	16	111	V

Note1. PK2 - KDB558074 Method: Maximum Peak / MAv1 - KDB558074 Option 1 Maximum RMS Average

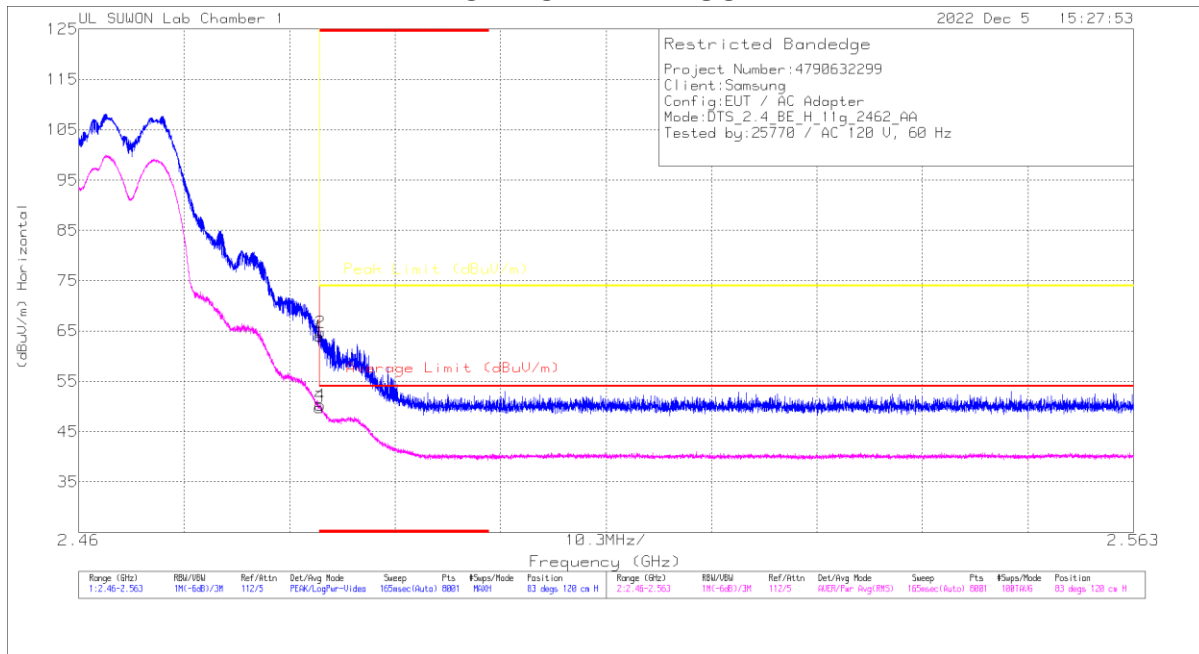
Note2. \* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

#### 2TX Antenna 1 + Antenna 2

#### BANDEDGE (WORST CASE: 11 CHANNEL)

#### HORIZONTAL RESULT



#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT(dB)	DC Cor (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	60.09	Pk	32.2	-28.3	0	63.99	-	-	74	-10.01	83	120	H
2	* 2.48364	60.86	Pk	32.2	-28.3	0	64.76	-	-	74	-9.24	83	120	H
3	* 2.48351	45.79	RMS	32.2	-28.3	.12	49.81	54	-4.19	-	-	83	120	H
4	* 2.48359	46.24	RMS	32.2	-28.3	.12	50.26	54	-3.74	-	-	83	120	H

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