CERTIFICATION TEST REPORT

Report Number. : 4790101660-E4V3

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-X906B
FCC ID	:	A3LSMX906B
EUT Description	:	GSM/WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and WPT
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
2021-12-10

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

IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2021-11-24	Initial issue	SunGeun Lee
V2	2021-12-06	Updated to address TCB's question	SunGeun Lee
V3	2021-12-10	Updated to address TCB's question	SunGeun Lee

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UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB
MODEL NUMBER:	SM-X906B
SERIAL NUMBER:	R32RA0033JJ (CONDUCTED); R32R9000KHB, R32RA0034NV (RADIATED);
DATE TESTED:	2021-10-06 ~ 2021-12-06;

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:

Seokhwan Hong
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

SunGeun Lee
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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

28.9 dBuV/m = 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB

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	3.02 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.05 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.78 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.58 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.

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5. EQUIPMENT UNDER TEST

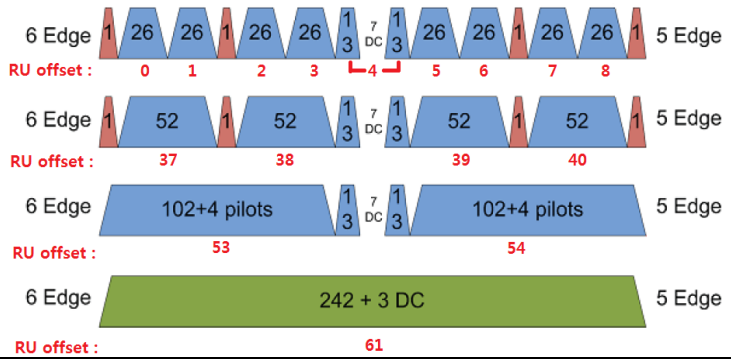
5.1. EUT DESCRIPTION

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

WiFi operating mode

Frequency rage	Mode	ANT 1	ANT 2
2.4GHz (2412 MHz ~ 2472 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



HE20

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.

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5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
2412 - 2472	802.11b MIMO	19.74	94.19
	802.11g MIMO	20.26	106.17
	802.11n(HT20) MIMO	20.15	103.51
	802.11ax(HE20) MIMO	20.25	105.93

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 ~ 2 472	-2.40	-2.10	-0.76

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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi.
Sample calculation for this device with $N_{ANT} = 2$
Directional gain = 10 log[$(10^{-3.5/20} + 10^{-7.1/20})^2 / 2$] = -2.1 dBi

5.4. TESTED CHANNELS LIST

Ch.	Frequency [MHz]	11b [MIMO]	11g [MIMO]	11n(HT20) [MIMO]	11ax(HE20) [MIMO]
1	2 412	O	O	O	O
2	2 417		O	O	O
6	2 437	O	O	O	O
10	2 457		O	O	O
11	2 462	O	O	O	O
12	2 467	O	O	O	O
13	2 472	O	O	O	O

Note: Tested channels are applied to all test items.

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	X	Y

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: Conducted, Radiated

SISO 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	15	15	14	1	2412	20	18	18	17
2	2417		17	17	17	2	2417		20	20	20
6	2437	17	17	17	17	6	2437	20	20	20	20
10	2457		17	17	17	10	2457		20	20	20
11	2462	17	15.5	15.5	14.5	11	2462	20	18.5	18.5	17.5
12	2467	8	8	8	8	12	2467	8	8	8	8
13	2472	-3	-3	-3	-3	13	2472	-3	-3	-3	-3

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. CH 12 & 13 Radiated Band-edge was tested in both SISO and MIMO mode.
Note2. 802.11ax (SU mode)'s CH 2 & 10 target power is same as 802.11n HT20 mode. Therefore, CH 2 & 10 802.11ax SU Mode Radiated Band-Edge test was replaced with 11n mode.
Note3. 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	O
				8	-
	6	2437		0	-
				4	O
				8	-
	11	2462		0	-
				4	O
				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.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37R8YN0CD1RC3	N/A
Data Cable	SAMSUNG	EP-DW767JWE	N/A	N/A

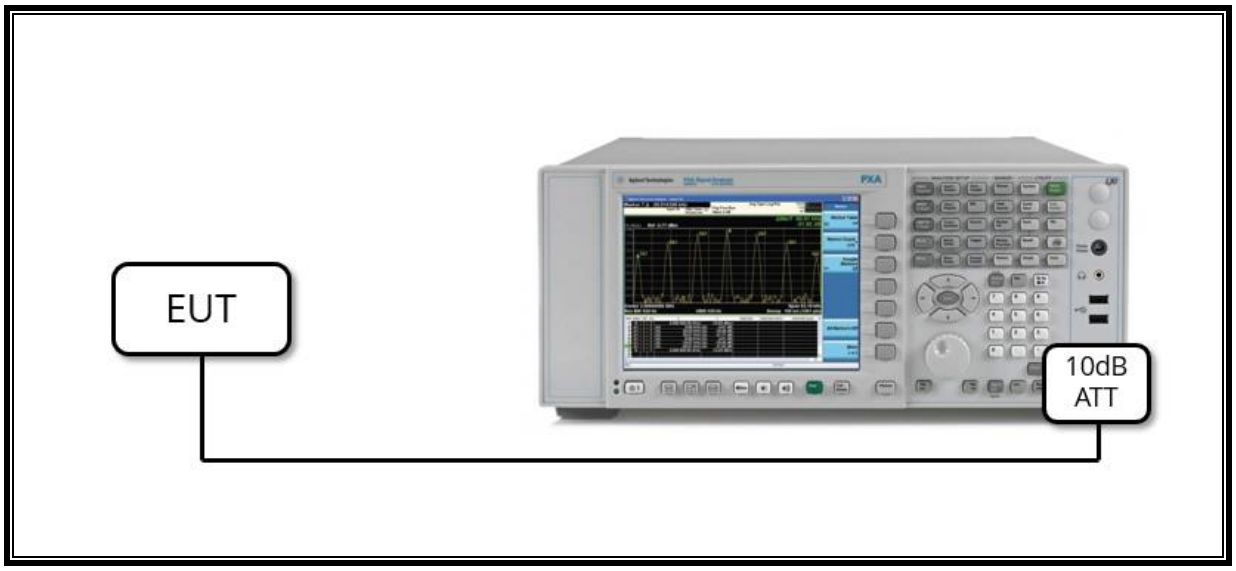
I/O CABLE

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

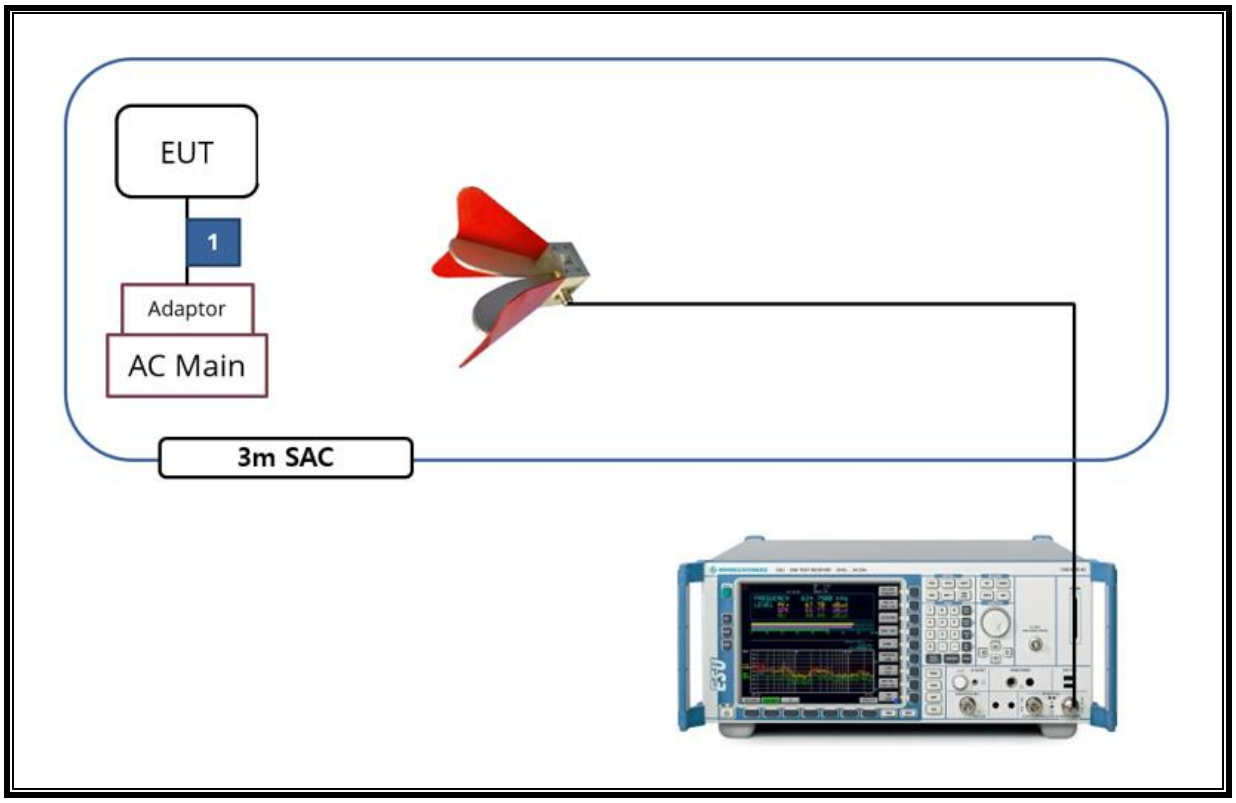
TEST SETUP

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 : 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

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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	2022/08/19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2022/08/13
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2022/08/13
Antenna, Horn, 18 GHz	ETS	3115	00167211	2022/07/27
Antenna, Horn, 18 GHz	ETS	3115	00161451	2022/08/15
Antenna, Horn, 18 GHz	ETS	3117	00168724	2022/07/27
Antenna, Horn, 18 GHz	ETS	3117	00168717	2022/08/15
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2022/08/04
Preamplifier	ETS	3116C-PA	00168841	2022/08/04
Preamplifier, 1000 MHz	Sonoma	310N	341282	2022/08/02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2022/08/02
Preamplifier, 1000 MHz	Sonoma	310N	370599	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029168	2022/08/02
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2022/08/04
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2022/08/04
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2022/01/03
Average Power Sensor	Agilent / HP	U2000	MY54270007	2022/08/04
Average Power Sensor	Agilent / HP	U2000	MY54260010	2022/08/04
Attenuator	PASTERNACK	PE7087-10	A001	2022/08/03
Attenuator	PASTERNACK	PE7087-10	A008	2022/08/03
Attenuator	PASTERNACK	PE7004-10	2	2022/08/02
Attenuator	PASTERNACK	PE7087-10	A009	2022/08/03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2022/08/02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2022/08/02
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	019	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	020	2022/08/02
LISN	R&S	ENV-216	101837	2022/08/05
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	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

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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 SISO & MIMO	16.620	16.730	0.993	99.342	-	0.060
802.11g SISO & MIMO	2.764	2.871	0.963	96.273	0.16	0.362
802.11n(HT20) SISO & MIMO	2.451	2.558	0.958	95.817	0.19	0.408
802.11ax(HE20) SISO SU	5.443	5.461	0.997	99.670	-	0.184
802.11ax(HE20) SISO 26T	5.085	5.109	0.995	99.530	-	0.197
802.11ax(HE20) SISO 52T	5.073	5.097	0.995	99.529	-	0.197
802.11ax(HE20) SISO 106T	4.767	4.790	0.995	99.520	-	0.210
802.11ax(HE20) MIMO SU	5.444	5.460	0.997	99.707	-	0.184
802.11ax(HE20) MIMO 26T	2.596	2.617	0.992	99.198	-	0.385
802.11ax(HE20) MIMO 52T	2.590	2.613	0.991	99.120	-	0.386
802.11ax(HE20) MIMO 106T	2.435	2.458	0.991	99.064	-	0.411

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.

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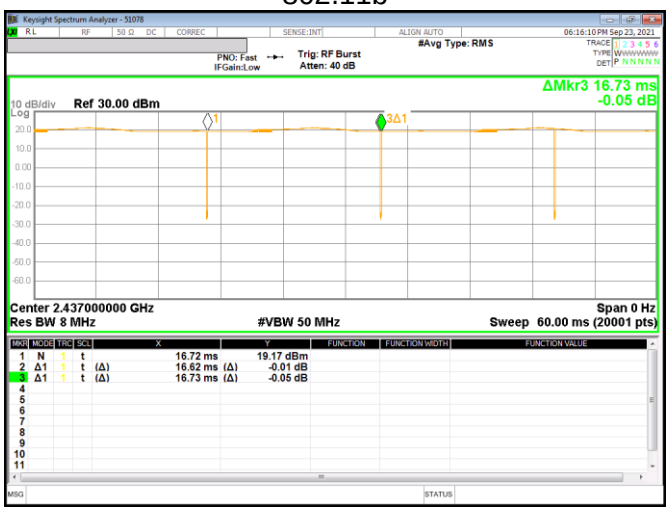
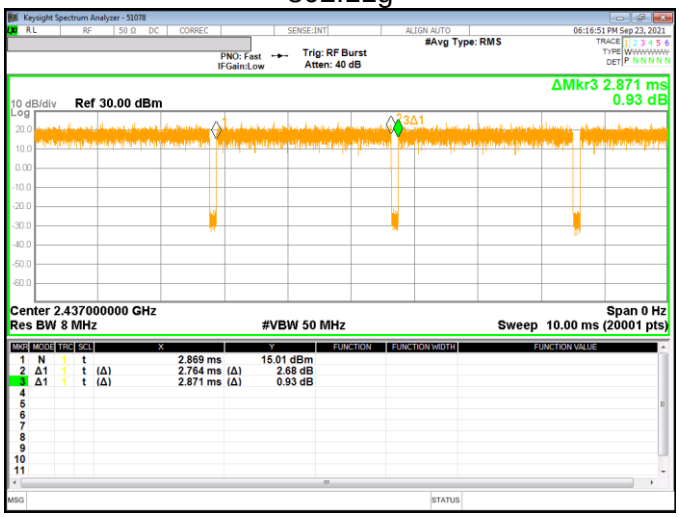
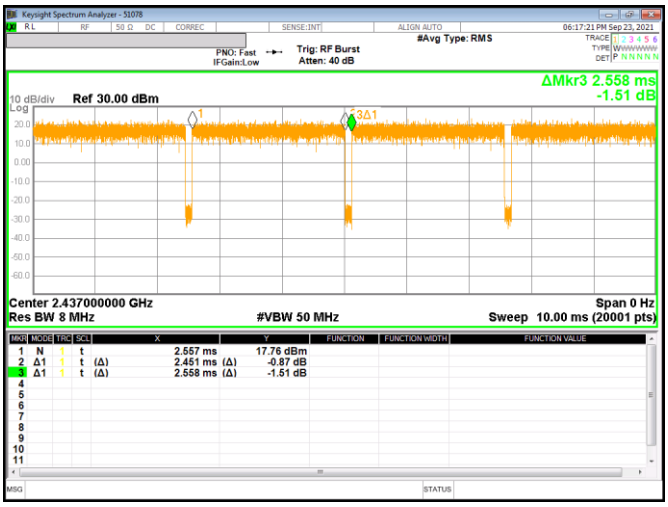
802.11b



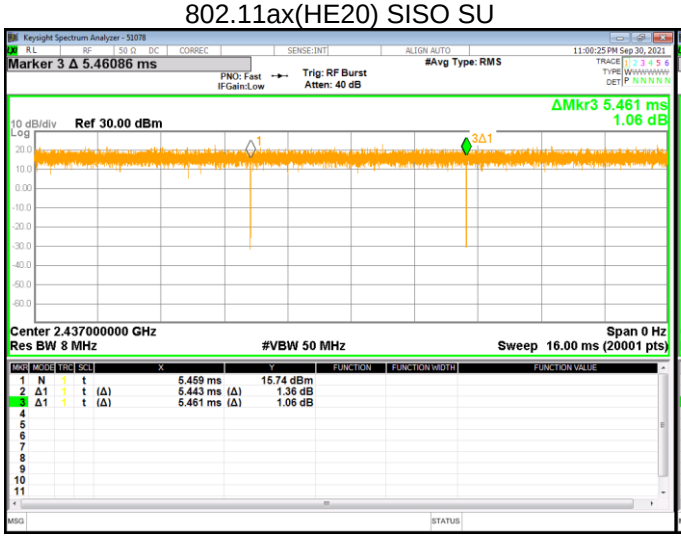
802.11g



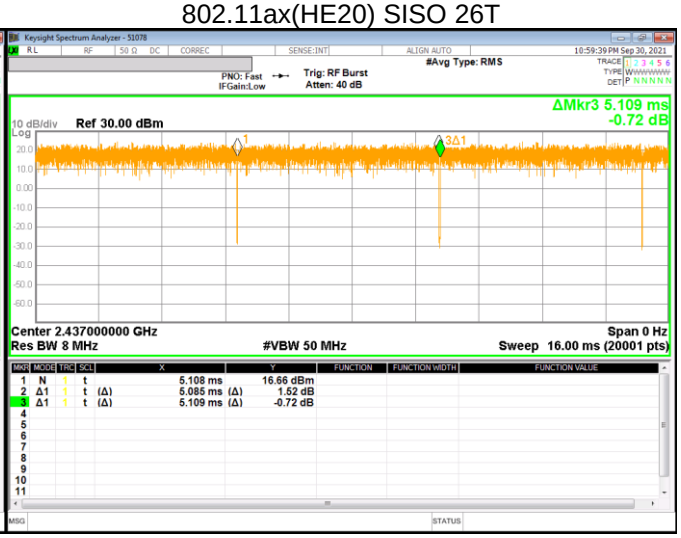
802.11n HT20



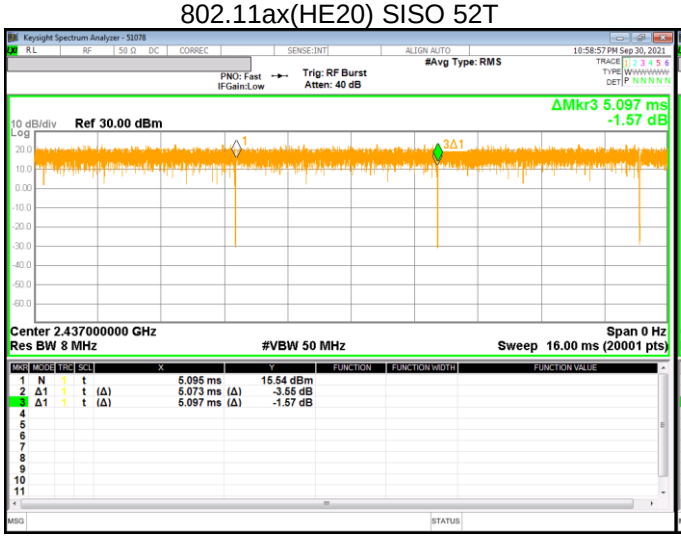
802.11ax(HE20) SISO SU



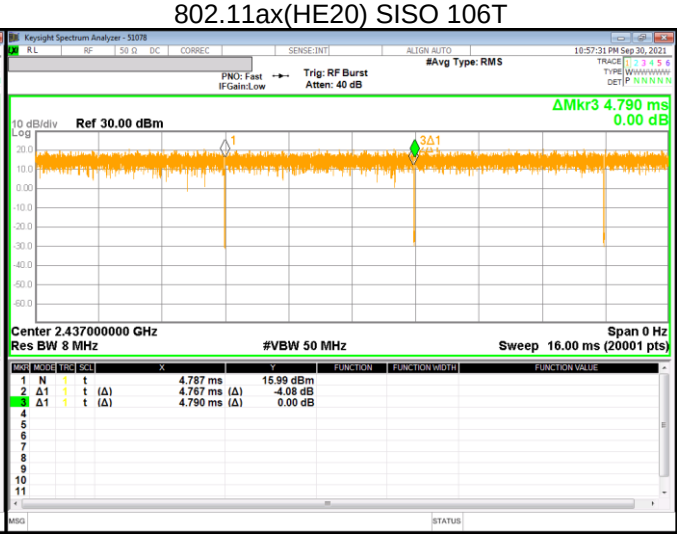
802.11ax(HE20) SISO 26T



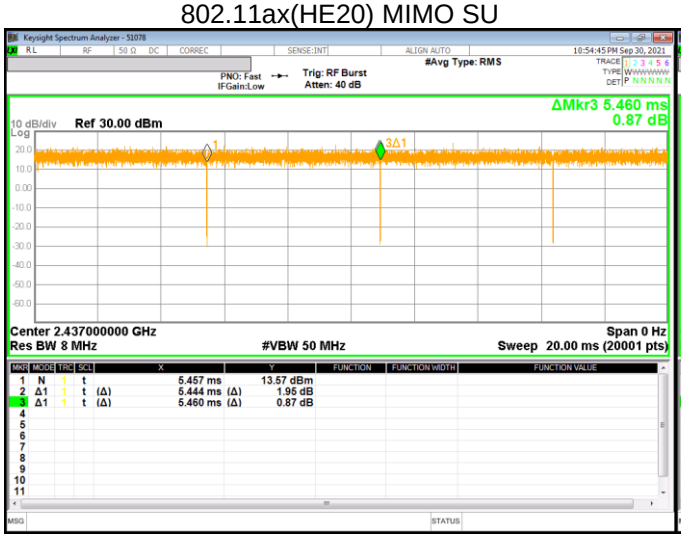
802.11ax(HE20) SISO 52T



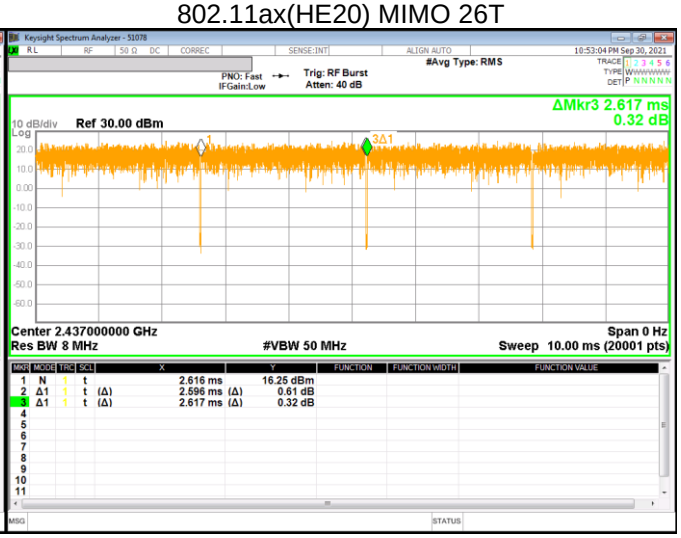
802.11ax(HE20) SISO 106T



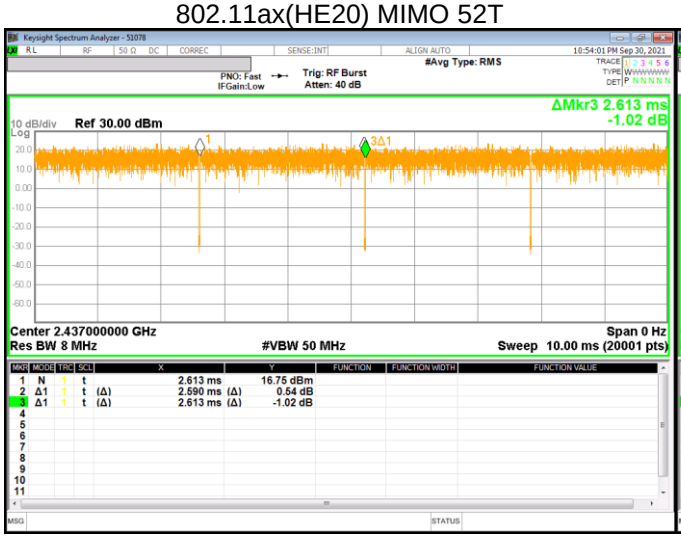
802.11ax(HE20) MIMO SU



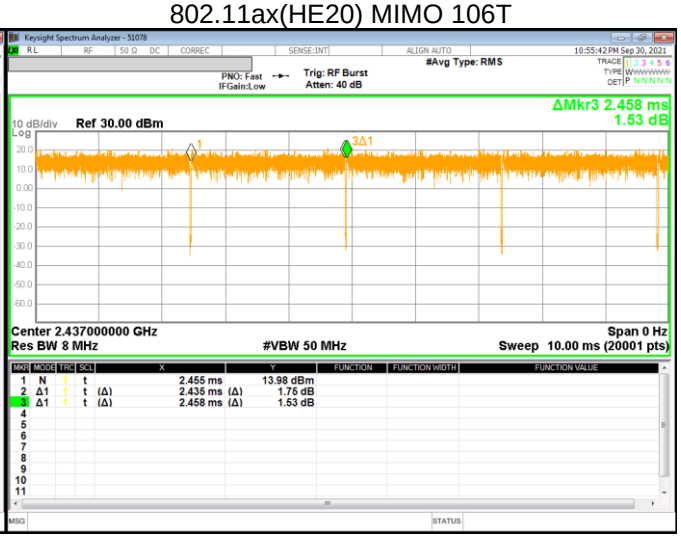
802.11ax(HE20) MIMO 26T



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

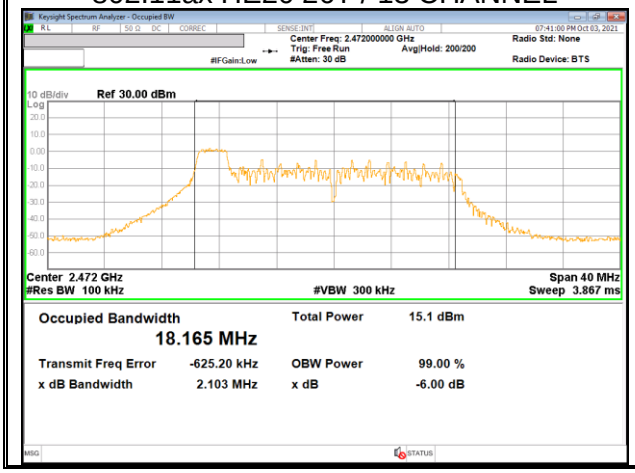
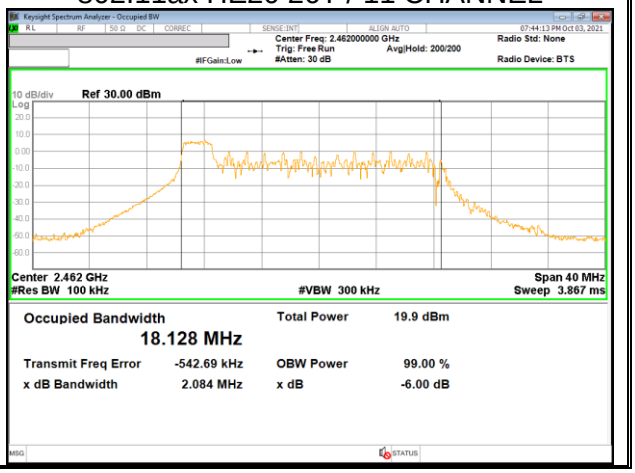
Reference to KDB 558074 D01 15.247 Meas Guidance: The transmitter output is connected to a spectrum analyzer with the RBW set to100 kHz, the VBW >= 3 x RBW, peak detector and max hold.

ANSI C63.10-2013, Section 11.8.1

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS

ANT1	ANT2
802.11ax HE20 26T / 13 CHANNEL	802.11ax HE20 26T / 11 CHANNEL
	

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	7.600	8.049	0.5
6	2 437	7.600	7.614	
11	2 462	8.581	8.058	
12	2 467	**7.115**	**7.589**	
13	2 462	7.605	8.057	
Worst		**7.115**	**7.589**	

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	16.340	16.350	0.5
2	2 417	16.290	**16.310**	
6	2 437	16.350	16.350	
10	2 457	16.080	16.370	
11	2 462	16.350	16.370	
12	2 467	16.340	16.360	
13	2 472	**15.760**	16.360	
Worst		**15.760**	**16.310**	

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	16.310	**15.940**	0.5
2	2 417	16.830	16.110	
6	2 437	16.850	16.850	
10	2 457	17.280	16.010	
11	2 462	16.850	16.580	
12	2 467	16.820	15.980	
13	2 472	**16.100**	16.960	
Worst		**16.100**	**15.940**	

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	17.070	17.030	0.5
2	2 417	17.060	14.510	
6	2 437	2.119	2.099	
10	2 457	2.110	2.108	
11	2 462	2.125	**2.084**	
12	2 467	2.122	2.116	
13	2 472	**2.103**	2.094	
Worst		**2.103**	**2.084**	

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.

ANSI C63.10-2013, Section 11.9.2.3.1 Method AVGPM

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 ~ 2 472	-2.40	-2.10	-0.76

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	16.58	17.50	16.50	16.94	19.74	30.00
	6	2 437	16.98	17.08	16.81	16.42	19.63	
	11	2 462	16.50	16.98	16.38	16.29	19.35	
	12	2 467	7.21	7.72	5.17	5.94	8.58	
	13	2 472	-2.19	-2.79	-5.18	-5.81	-2.47	
Worst Case			**16.98**	**17.50**			**19.74**	
802.11g	1	2 412	14.59	14.77	14.43	15.36	17.93	
	2	2 417	16.68	17.66	16.64	17.72	20.22	
	6	2 437	17.13	16.83	17.07	17.43	20.26	
	10	2 457	16.48	17.37	16.40	17.92	20.24	
	11	2 462	15.22	15.74	15.21	15.83	18.54	
	12	2 467	7.41	7.90	4.68	5.34	8.03	
	13	2 472	-2.75	-3.24	-5.81	-6.27	-3.02	
Worst Case			**17.13**	**17.66**			**20.26**	
802.11n HT20	1	2 412	14.81	15.13	14.24	15.26	17.79	
	2	2 417	16.99	16.91	16.45	17.59	20.07	
	6	2 437	17.48	16.64	16.92	17.34	20.15	
	10	2 457	16.96	17.12	16.41	17.74	20.14	
	11	2 462	15.32	15.53	15.22	15.58	18.41	
	12	2 467	7.27	7.72	4.87	5.52	8.22	
	13	2 472	-2.59	-3.09	-5.64	-6.05	-2.83	
Worst Case			**17.48**	**17.12**			**20.15**	
802.11ax HE20(SU)	1	2 412	13.95	14.19	13.37	14.28	16.86	
	2	2 417	17.29	17.12	16.52	17.71	20.17	
	6	2 437	17.61	16.88	16.99	17.47	20.25	
	10	2 457	16.86	17.37	16.34	17.90	20.20	
	11	2 462	14.36	14.45	14.28	14.49	17.40	
	12	2 467	7.33	7.90	4.80	5.82	8.35	
	13	2 472	-2.97	-3.20	-5.37	-5.65	-2.50	
Worst Case			**17.61**	**17.37**			**20.25**	

- Calculation of Output Power result

Average Power = Meas. Power + Duty Cycle CF / Total Corr'd Power = ANT1's Avearage 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	12.47	12.08	11.52	12.21	14.89	30.00
			4	12.53	12.01	11.46	12.82	15.20	
			8	12.48	12.55	10.73	12.68	14.82	
		52T	37	14.06	13.80	13.64	13.97	16.82	
			38	14.03	13.99	13.43	14.15	16.82	
			40	14.08	14.83	12.98	14.63	16.89	
		106T	53	14.38	13.78	13.35	13.97	16.68	
			54	14.11	13.99	13.11	14.64	16.95	
2	2 417	26T	0	12.03	11.97	11.42	12.07	14.77	
			4	11.75	12.24	11.25	12.35	14.85	
			8	11.78	12.48	11.31	12.54	14.98	
		52T	37	14.24	14.56	14.22	14.70	17.48	
			38	14.45	14.50	13.90	14.64	17.30	
			40	14.50	14.74	13.90	14.99	17.49	
		106T	53	14.50	14.07	13.90	14.45	17.19	
			54	14.64	14.84	13.52	14.94	17.30	
6	2 437	26T	0	12.15	11.89	11.53	11.97	14.77	
			4	12.45	11.91	11.81	11.95	14.89	
			8	12.10	11.71	11.50	11.77	14.65	
		52T	37	14.58	14.46	14.06	14.60	17.35	
			38	14.84	14.56	14.24	14.67	17.47	
			40	14.52	14.24	13.94	14.31	17.14	
		106T	53	14.84	14.66	14.27	14.72	17.51	
			54	14.77	14.43	14.13	14.50	17.33	
10	2 457	26T	0	12.34	11.93	11.53	12.46	15.03	
			4	11.98	12.31	11.19	12.84	15.10	
			8	11.57	12.39	10.79	12.87	14.96	
		52T	37	14.54	14.48	13.91	14.59	17.27	
			38	14.44	14.67	13.76	14.77	17.30	
			40	13.86	14.43	13.28	14.98	17.22	
		106T	53	14.58	14.67	13.93	14.76	17.38	
			54	14.09	14.64	13.49	14.99	17.31	
11	2 462	26T	0	12.66	11.94	12.08	11.99	15.05	
			4	12.29	12.25	11.77	12.32	15.06	
			8	12.12	12.10	11.61	12.12	14.88	
		52T	37	14.66	14.24	14.55	14.36	17.47	
			38	14.59	14.58	14.48	14.65	17.58	
			40	14.22	14.50	14.14	14.60	17.39	
		106T	53	14.76	14.55	14.66	14.60	17.64	
			54	14.40	14.70	14.33	14.81	17.59	
12	2 467	26T	0	7.30	8.25	4.99	5.88	8.47	
			4	7.45	8.09	5.14	5.77	8.48	
			8	7.25	7.49	4.56	5.12	7.86	
		52T	37	7.27	8.19	4.83	5.78	8.34	
			38	7.35	8.21	5.01	5.78	8.42	
			40	7.33	7.53	4.67	5.21	7.96	
		106T	53	7.39	8.33	4.90	5.78	8.37	
			54	7.52	7.83	4.83	5.40	8.13	
13	2 472	26T	0	-2.78	-3.21	-6.24	-6.68	-3.44	
			4	-2.81	-3.36	-6.30	-6.82	-3.54	
			8	-3.84	-2.93	-6.68	-5.93	-3.28	
		52T	37	-2.79	-3.18	-6.16	-6.61	-3.37	
			38	-2.69	-3.17	-6.07	-6.63	-3.33	
			40	-3.54	-2.87	-6.37	-5.86	-3.10	
		106T	53	-2.61	-2.05	-6.00	-6.54	-3.25	
			54	-2.71	-2.55	-5.66	-5.53	-2.58	
Worst Case				**14.84**	**14.84**			**17.64**	

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

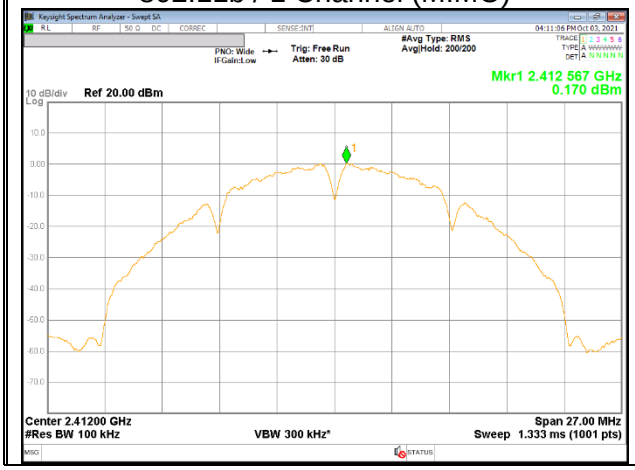
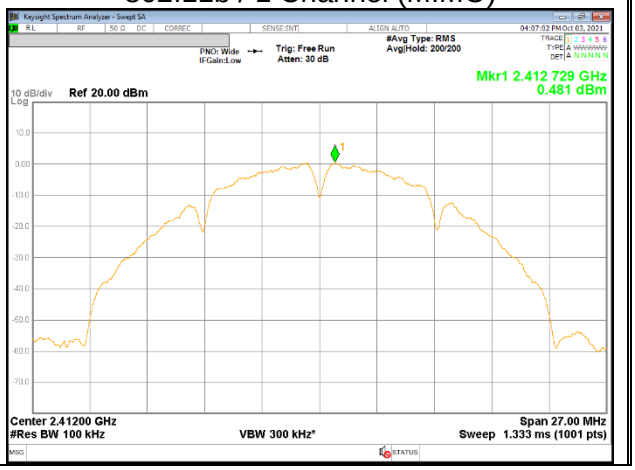
Power Spectral Density was performed utilizing the section8.4 under KDB558074 D01 15.247 Meas Guidance.

ANSI C63.10-2013, Section 11.10.3 & 11.10.5

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS

ANT 1	ANT 2
802.11b / 1 Channel (MIMO)	802.11b / 1 Channel (MIMO)
	

9.4.1. 802.11b/g/n HT20/ax HE20 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	0.170	0.481	-	3.339	8.00Note
	6	2 437	0.049	0.471	-	3.275	
	11	2 462	-0.089	-0.134	-	2.899	

- MIMO Mode

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/100kHz]		DCCF	Total Corr'd PSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
			ANT1	ANT2			
802.11g	2	2 417	-3.094	-2.643	0.16	0.308	8.00 Note
	6	2 437	-2.878	-2.649	0.16	0.408	
	10	2 457	-3.667	-2.055	0.16	0.384	
802.11n HT20	2	2 417	-3.721	-2.983	0.19	-0.136	
	6	2 437	-3.227	-3.094	0.19	0.040	
	10	2 457	-4.203	-2.445	0.19	-0.225	

- SISO Mode (802.11ax HE20)

Channel	Frequency [MHz]	Tones	RU Offset	Meas PPSD [dBm/100kHz]		DCCF	Total Corr'd PSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
				ANT1	ANT2			
2	2 417	26T	0	-1.196	-0.925	-	1.952	8.00 Note
			4	-1.372	-0.894	-	1.884	
			8	-1.308	-1.103	-	1.806	
6	2 437	26T	0	-0.866	-1.007	-	2.074	
			4	-1.056	-1.055	-	1.955	
			8	-1.086	-1.343	-	1.798	
10	2 457	26T	0	-1.367	-0.285	-	2.218	
			4	-1.200	-0.327	-	2.269	
			8	-1.737	-0.328	-	2.035	

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

Note1. RBW 100kHz measurement data is lower than 3kHz limit.
Note2. 12,13ch's PSD test was omitted (Channel 12&13's target is much lower than other channels)

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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.

TEST PROCEDURE

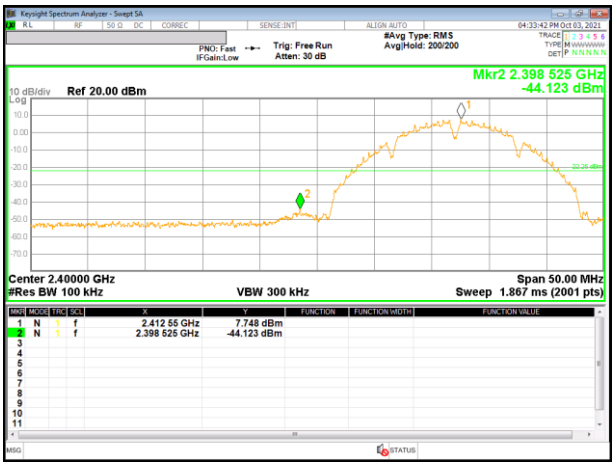
KDB 558074 D01 v05r02, Section 8.5
ANSI C63.10-2013, Section 11.11.3

Note. CH12 & 13 RF conducted emission was done with SISO mode as SISO mode has higher output power than MIMO mode.

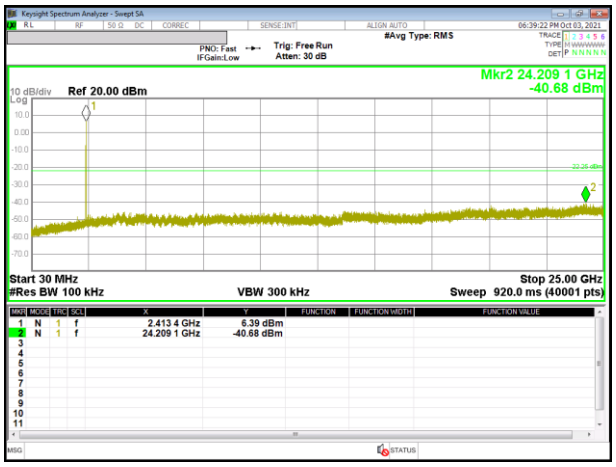
RESULTS

9.5.1. 802.11b MODE

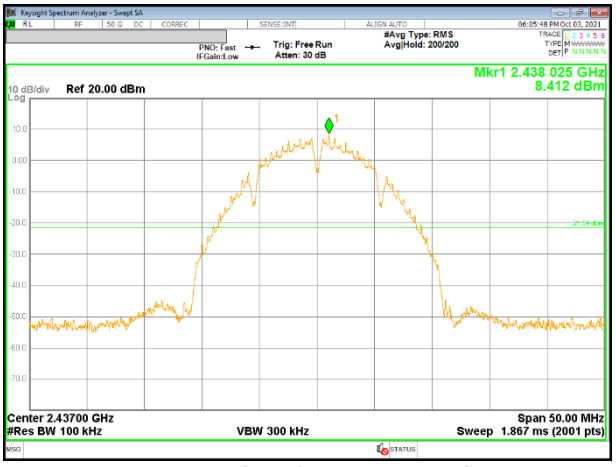
2TX Antenna 1



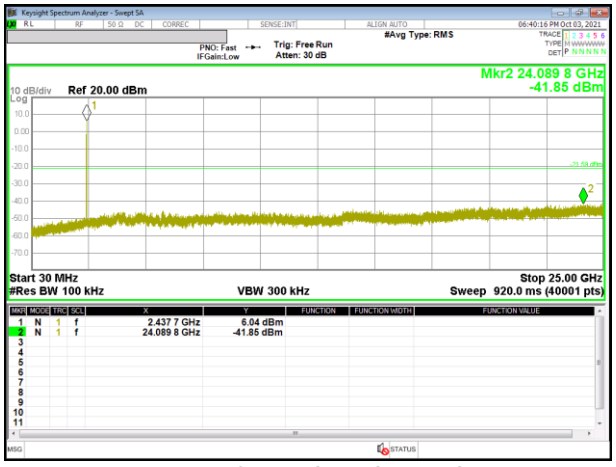
1 Channel Band-edge



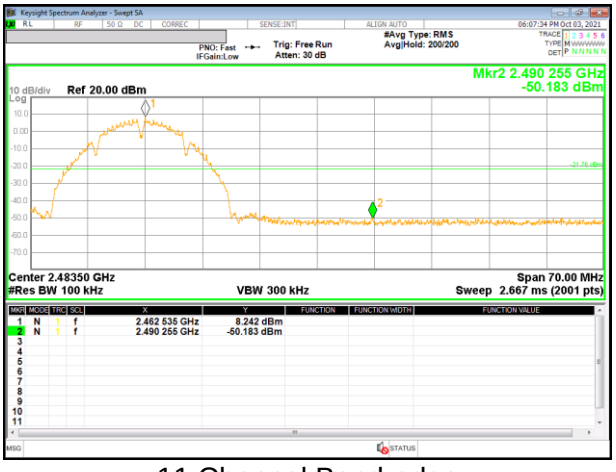
Out-Of-Band 1 Channel



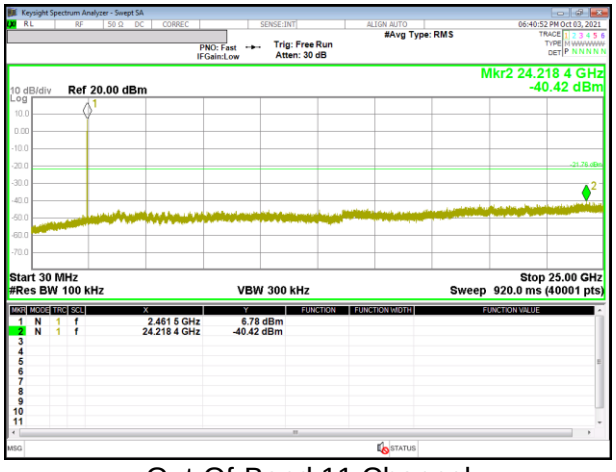
In-Band Reference Level



Out-Of-Band 6 Channel

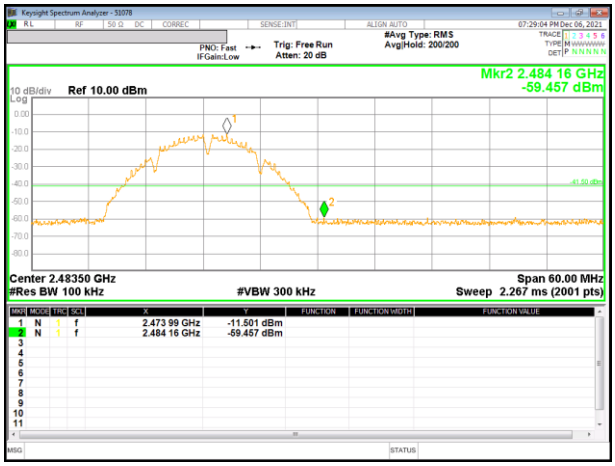


11 Channel Band-edge



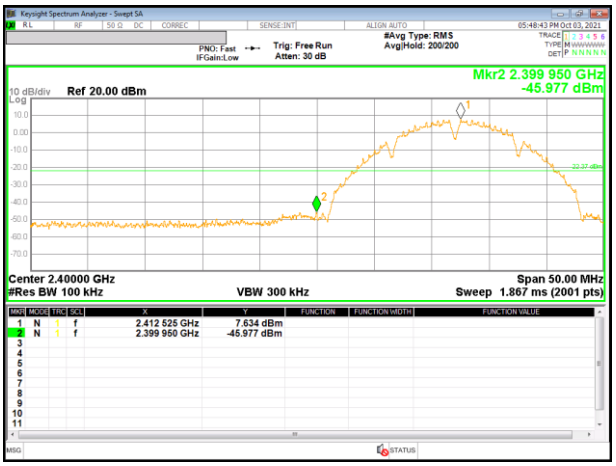
Out-Of-Band 11 Channel

12 Channel Band-edge_SISO

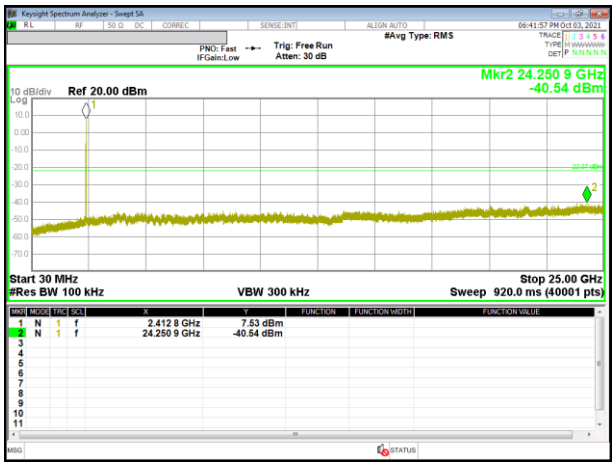


13 Channel Band-edge_SISO

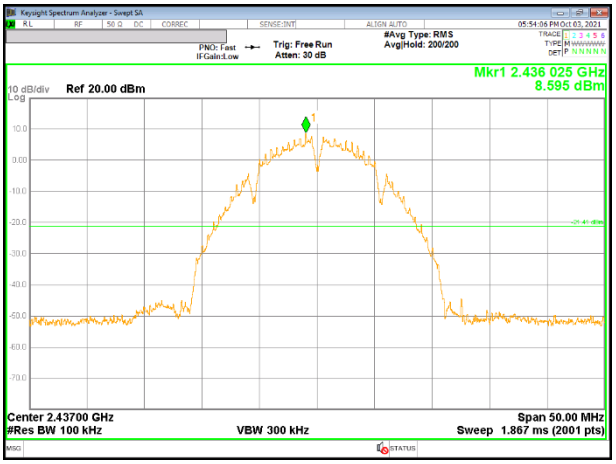
2TX Antenna 2



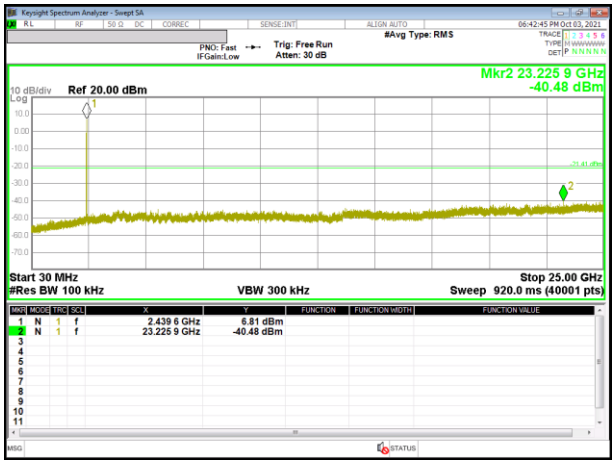
1 Channel Band-edge



Out-Of-Band 1 Channel

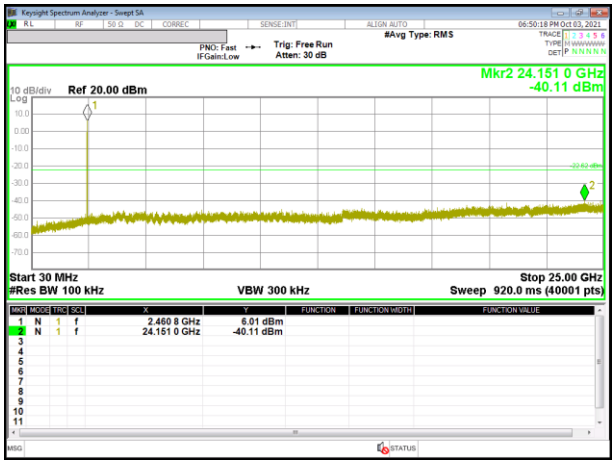


In-Band Reference Level

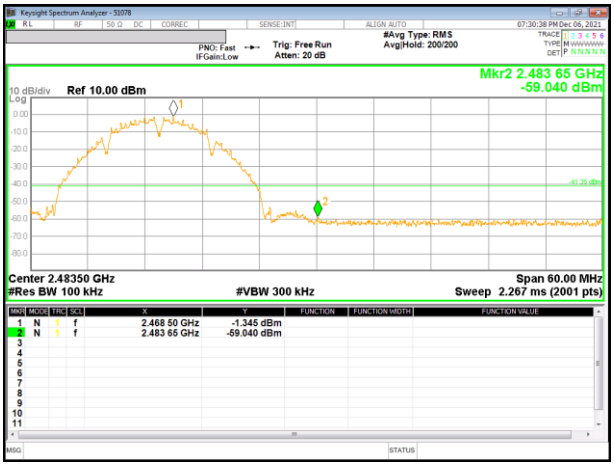


Out-Of-Band 6 Channel

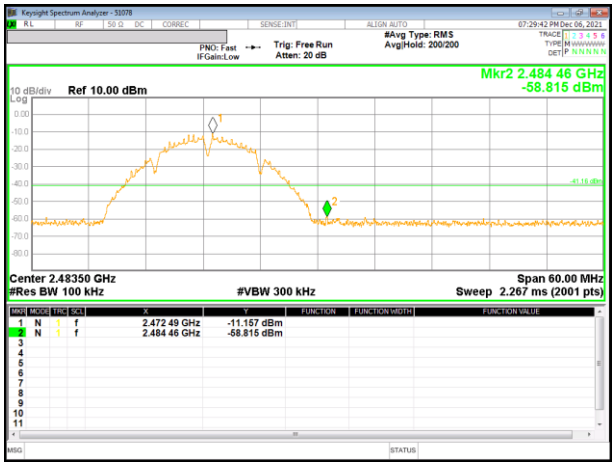
11 Channel Band-edge



Out-Of-Band 11 Channel



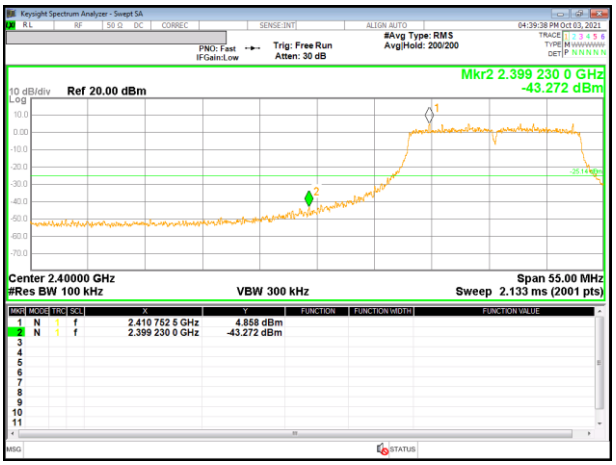
12 Channel Band-edge_SISO



13 Channel Band-edge_SISO

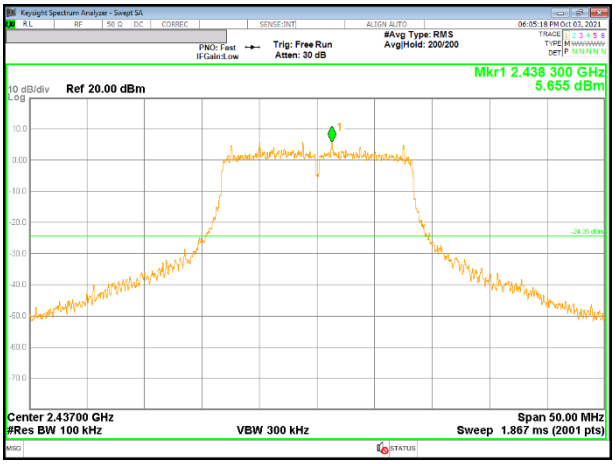
9.5.2. 802.11g MODE

2TX Antenna 1

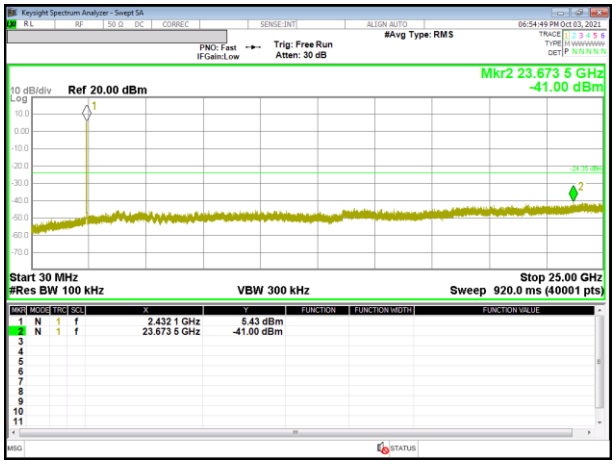


2 Channel Band-edge

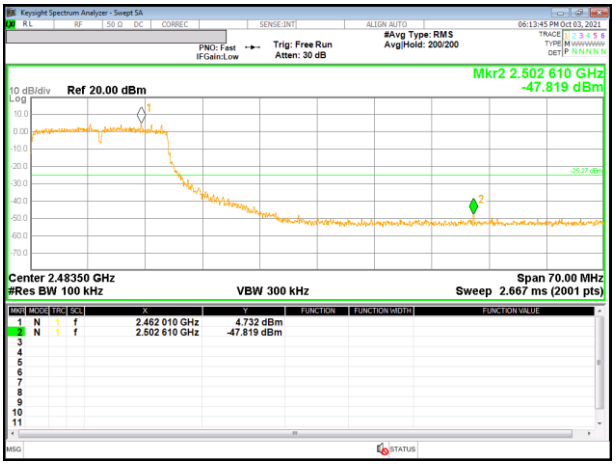
Out-Of-Band 2 Channel



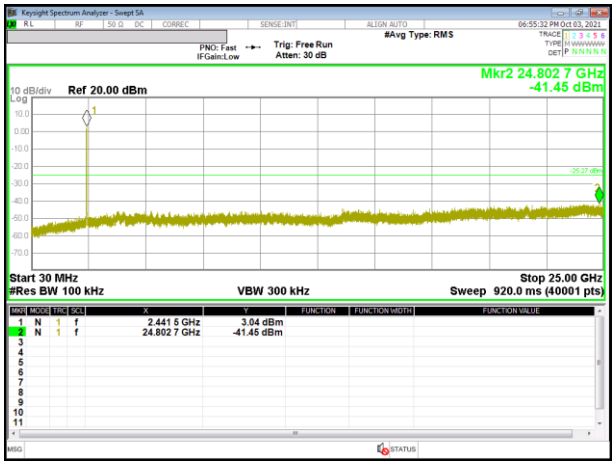
In-Band Reference Level



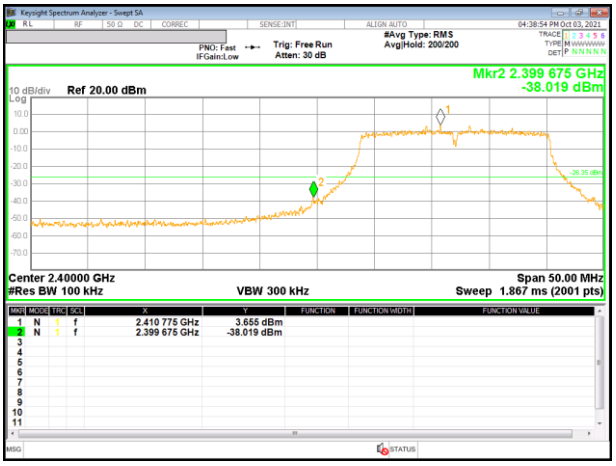
Out-Of-Band 6 Channel



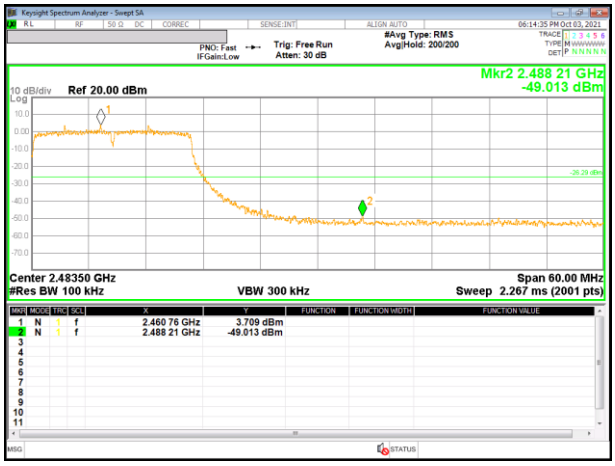
10 Channel Band-edge



Out-Of-Band 10 Channel



1 Channel Band-edge

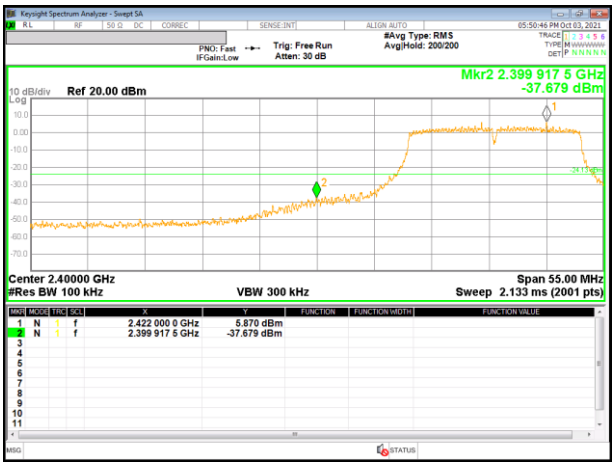


11 Channel Band-edge

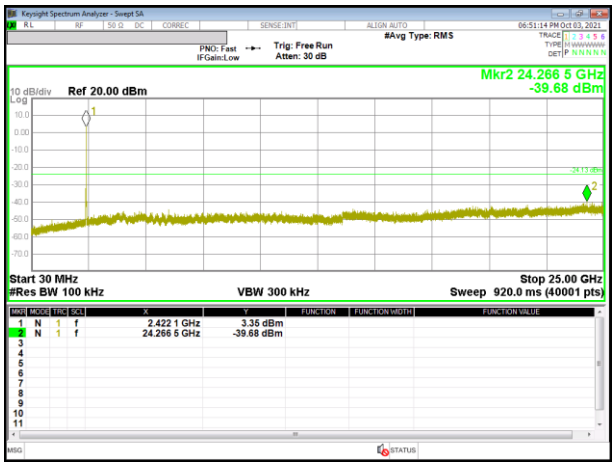
12 Channel Band-edge_SISO

13 Channel Band-edge_SISO

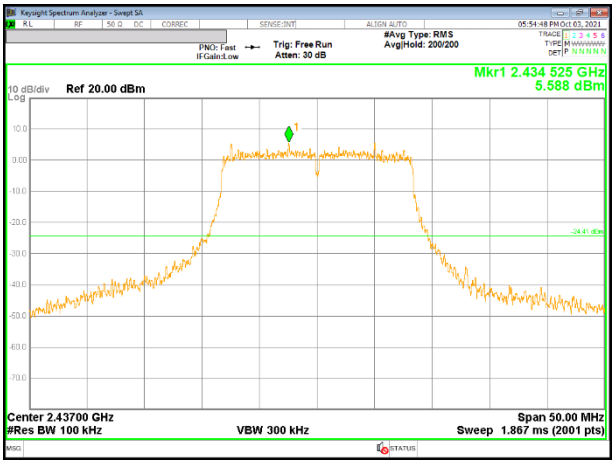
2TX Antenna 2



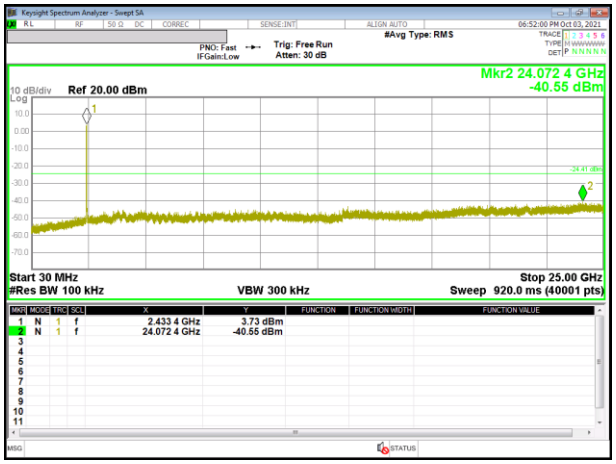
2 Channel Band-edge



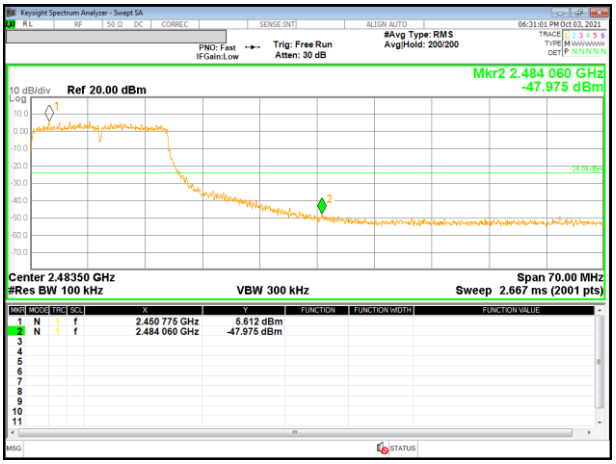
Out-Of-Band 2 Channel



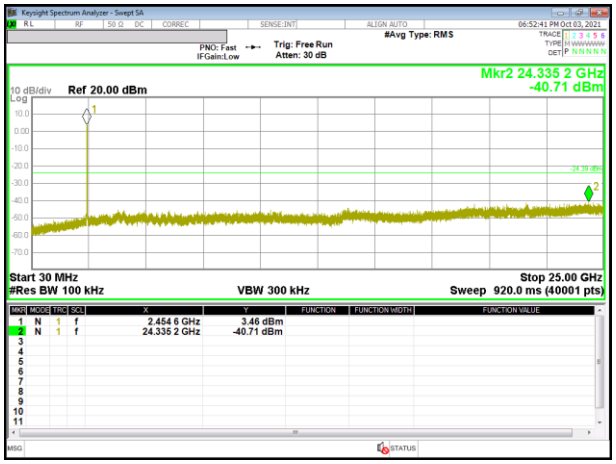
In-Band Reference Level



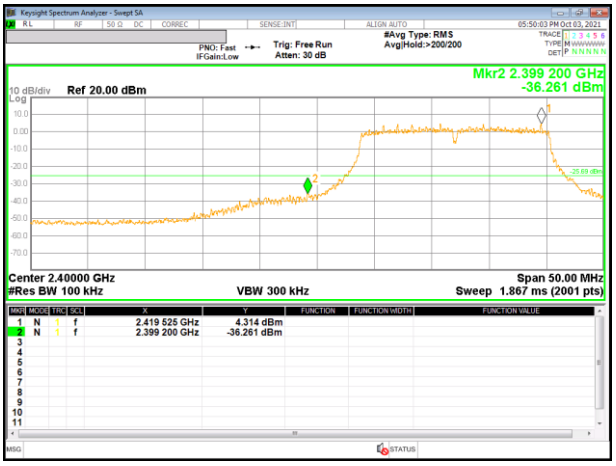
Out-Of-Band 6 Channel



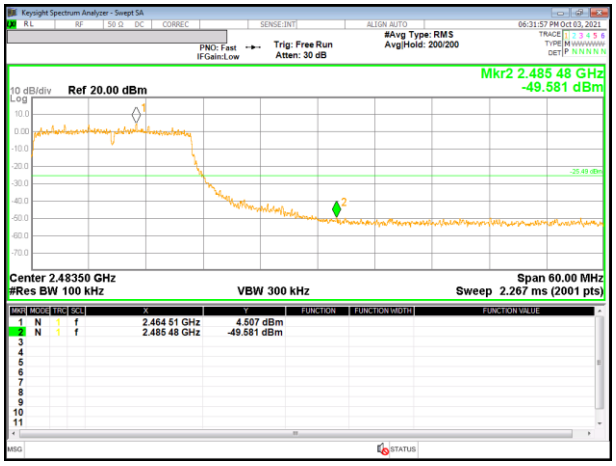
10 Channel Band-edge



Out-Of-Band 10 Channel

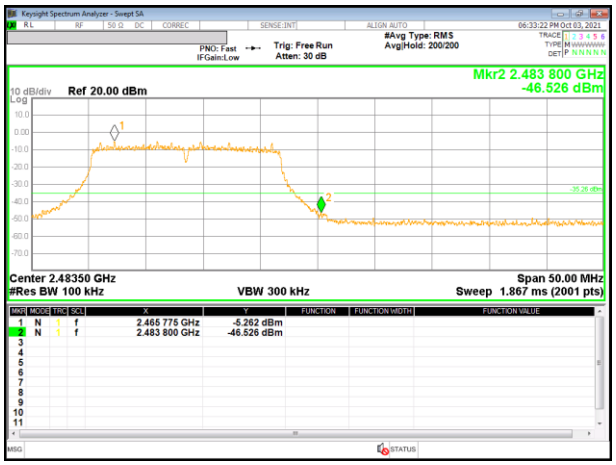


1 Channel Band-edge



11 Channel Band-edge

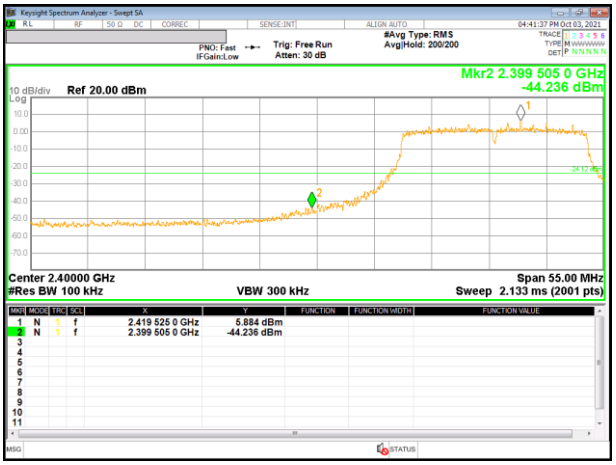
12 Channel Band-edge_SISO



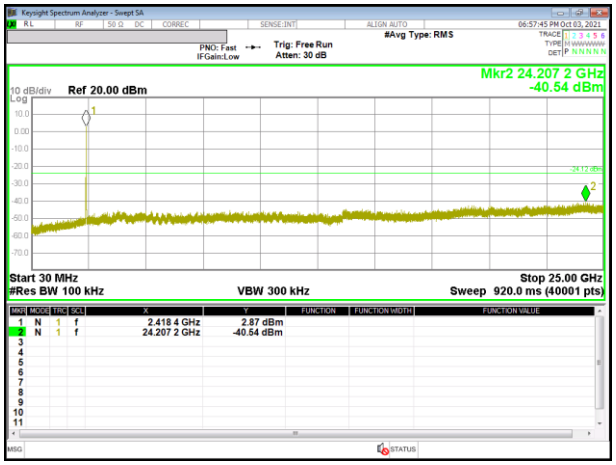
13 Channel Band-edge_SISO

9.5.3. 802.11n HT20 MODE

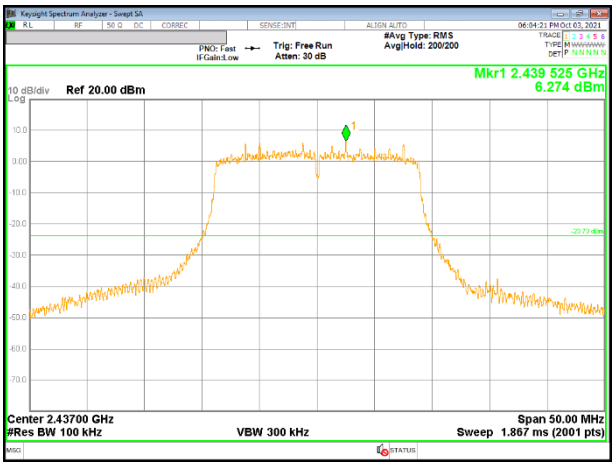
2TX Antenna 1



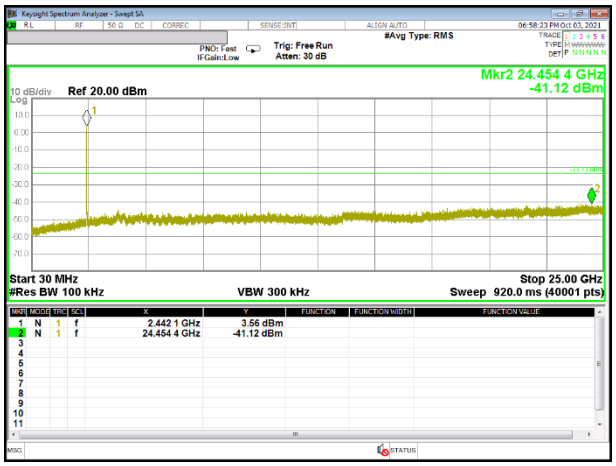
2 Channel Band-edge



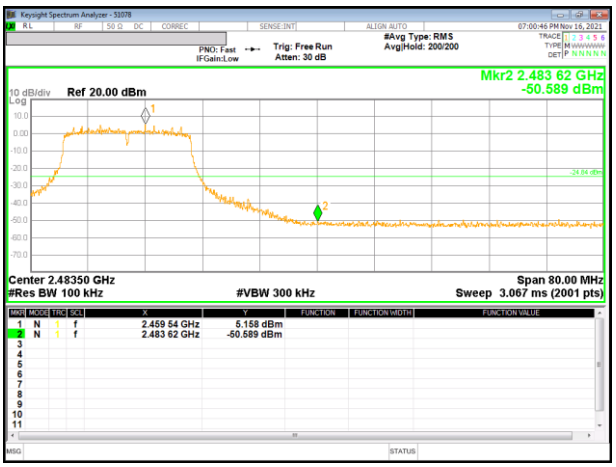
Out-Of-Band 2 Channel



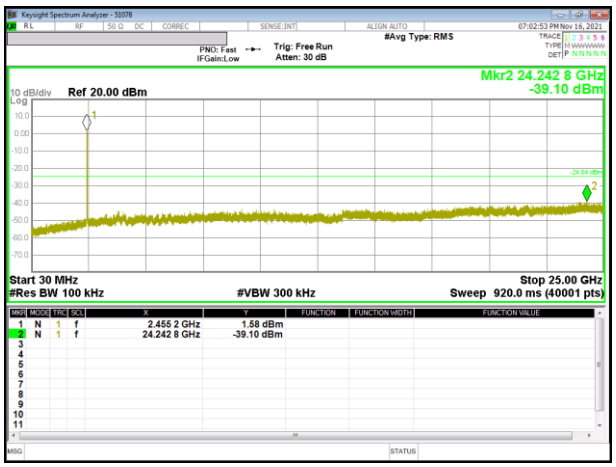
In-Band Reference Level



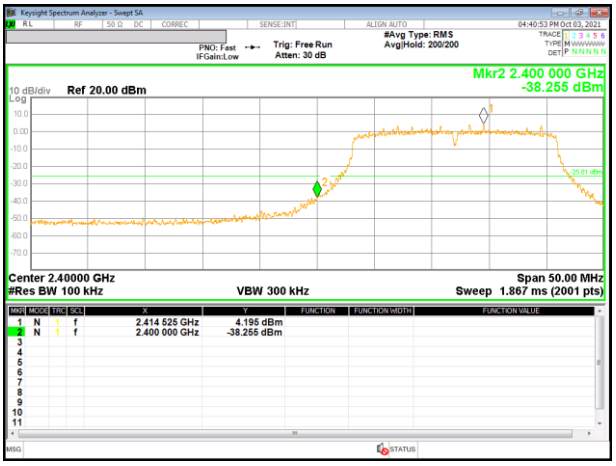
Out-Of-Band 6 Channel



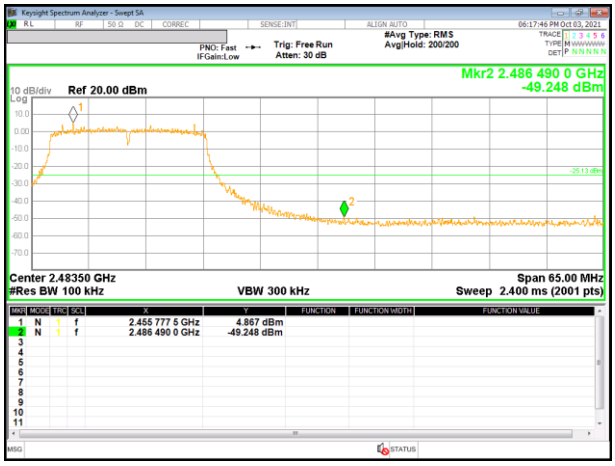
10 Channel Band-edge



Out-Of-Band 10 Channel



1 Channel Band-edge

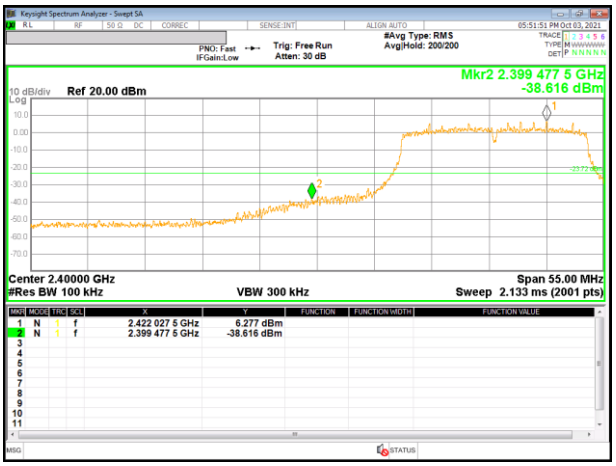


11 Channel Band-edge

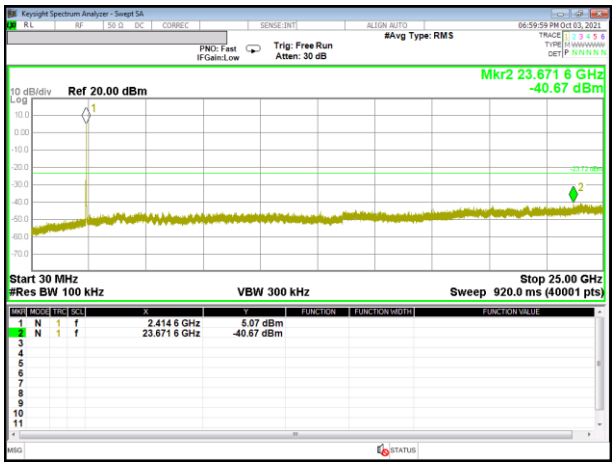
12 Channel Band-edge_SISO

13 Channel Band-edge_SISO

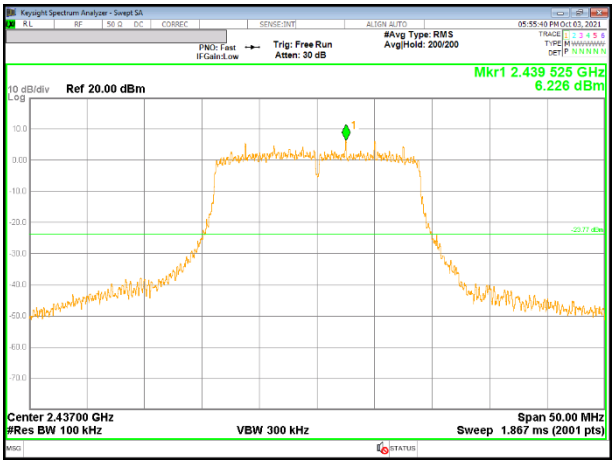
2TX Antenna 2



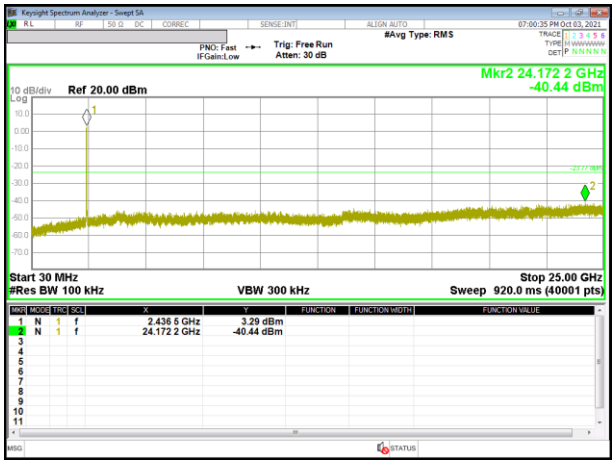
2 Channel Band-edge



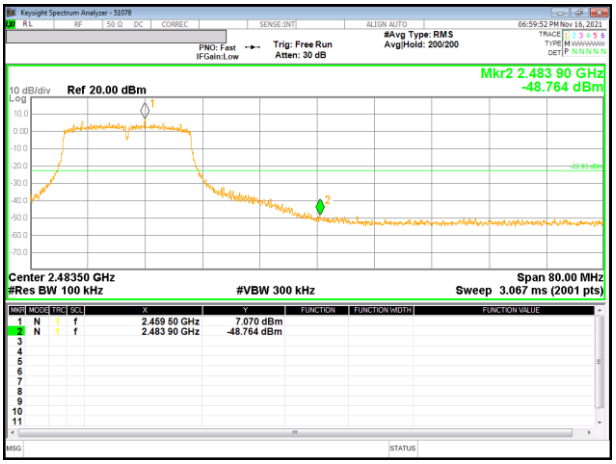
Out-Of-Band 2 Channel



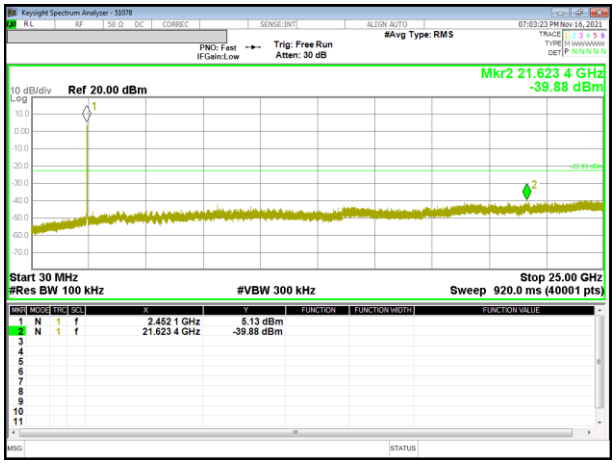
In-Band Reference Level



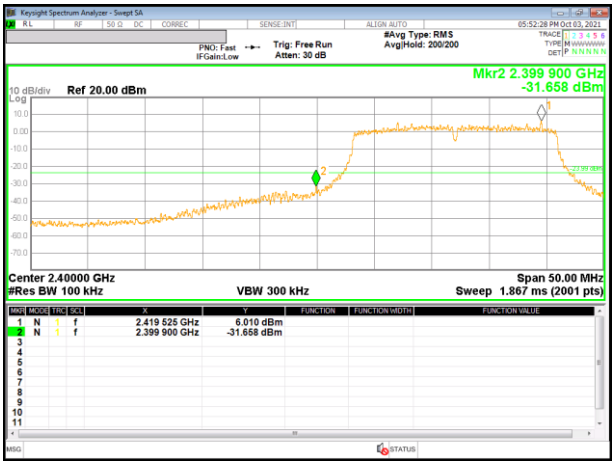
Out-Of-Band 6 Channel



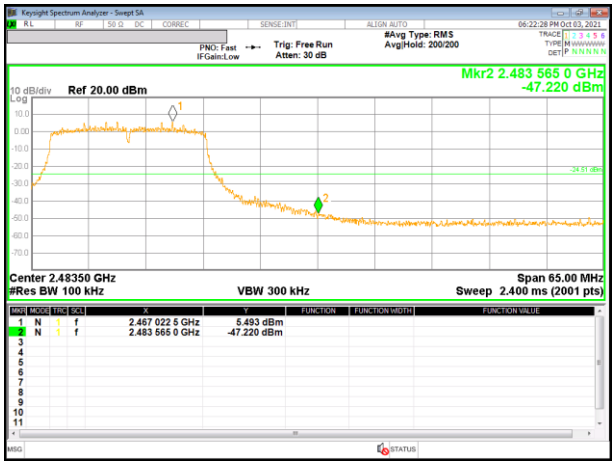
10 Channel Band-edge



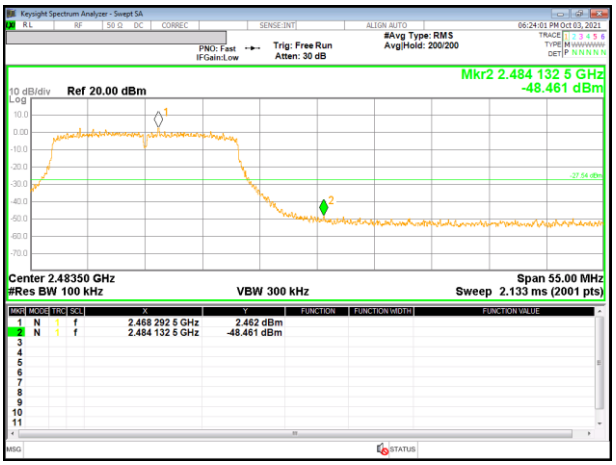
Out-Of-Band 10 Channel



1 Channel Band-edge



11 Channel Band-edge



12 Channel Band-edge_SISO

13 Channel Band-edge_SISO