CERTIFICATION TEST REPORT

Report Number. : 4789754174-E3V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SCG09, SC-51B
FCC ID	:	A3LSMG991JPN
EUT Description	:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax WPT and NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
February 17, 2021

Prepared by:
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Testing Laboratory

TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	02/08/21	Initial issue	Hyunsik Yun
V2	02/17/21	Updated to address TCB's question	Hyunsik Yun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, WPT and NFC
MODEL NUMBER:	SCG09, SC-51B
SERIAL NUMBER:	R3CNA0ASK5X, R3CNA0ASKBD (CONDUCTED); R3CNC0391GW, R3CNC038Z3E (RADIATED);
DATE TESTED:	DEC 04, 2020 – FEB 03, 2021;

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

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:

Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Hyunsik Yun
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 DTS Meas Guidance v05r02.
4. KDB 662911 D01 Multiple Transmitter Output v02r01
5. ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

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

218 Maeyeong-ro
☒ Chamber 1
☒ Chamber 2
☐ Chamber 3

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

4.4. DECISION RULE

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

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

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

This report covers the Samsung models SCG09 and SC-51B.
SCG09 and SC-51B have the same hardware. Supported band and protocol are different depending on software settings.

WiFi operating mode

Frequency rage	Mode	ANT 1	ANT 2
2.4GHz (2412 MHz ~ 2472 MHz)	802.11b SISO	TX/RX	TX/RX
	802.11g MIMO	TX/RX	
	802.11n(HT20) MIMO	TX/RX	
	802.11ax(HE20) MIMO	TX/RX	

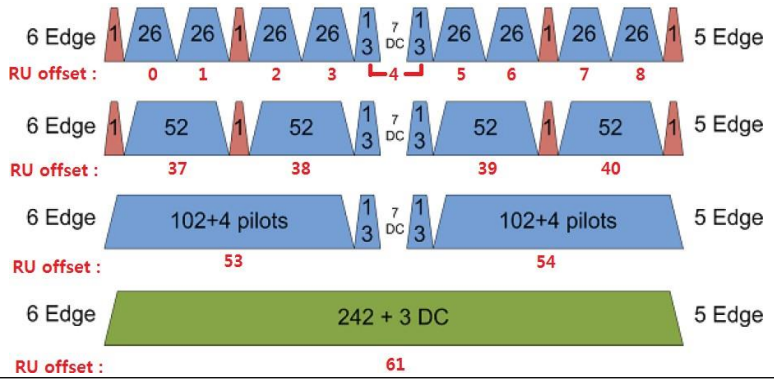
Note.

Simultaneous TX Condition

Simultaneous Tx Condition - RSDB

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

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]	
		ANT1	ANT2	ANT1	ANT2
2412 - 2472	802.11b SISO	17.17	17.03	52.12	50.47
	802.11g MIMO	18.71		74.30	
	802.11n(HT20) MIMO	18.68		73.79	
	802.11ax(HE20) MIMO	18.28		67.30	

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

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

The radio utilizes an internal antennas, with Antenna 1's maximum gain of -6.83 dBi and Antenna 2's maximum gain of -6.86 dBi
"Sub3 st" and "Sub 5" as indicated in antenna specification are written as ANT1 and ANT2 in this report.

5.4. TESTED CHANNELS LIST

Ch.	Frequency [MHz]	11b [SISO]	11g [MIMO]	11n(HT20) [MIMO]	11ax(HE20) [MIMO]
1	2 412	O	O	O	O
6	2 437	O	O	O	O
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

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 condition

ANT1	ANT2	MIMO
Axis	Axis	Axis
X	Y	Y

All axis were investigated to determine the worst case scenario and the table reflects the configurations used for final testing.

Based on the baseline scan, the worst-case data rates were:
802.11b mode: 1 Mbps 1TX
802.11g mode: 6 Mbps 2TX
802.11n HT20 mode: MCS0 2TX
802.11ax HE20 mode: MCS0 2TX

802.11b mode: only supports SISO mode
802.11g & n HT20 & ax HE20 mode: only supports MIMO mode.

Worst-case selection criteria for 802.11ax test items :
For the 6dB Bandwidth, it was tested at the RU allocation with lowest tones number for each bandwidth.

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

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

SISO Target[dBm]						MIMO Target[dBm]				
Ch.	Freq.	802.11b	802.11g	802.11n HT20	802.11ax HE20(SU)	Ch.	Freq.	802.11g	802.11n HT20	802.11ax HE20(SU)
1	2412	**17**	Not Supported			1	2412	**18**	**18**	**18**
2	2417					2	2417			
3	2422					3	2422			
4	2427					4	2427			
5	2432					5	2432			
6	2437	**17**				6	2437	**18**	**18**	**18**
7	2442					7	2442			
8	2447					8	2447			
9	2452					9	2452			
10	2457					10	2457	**18**	**18**	**18**
11	2462	**17**				11	2462	16	16	16
12	2467	10				12	2467	13	13	13
13	2472	4				13	2472	7	7	7

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

MIMO Worst RU offset[dBm]				
Ch.	Freq.	Tone	RU offset	Test Case
1	2412	26 T	0	-
			4	**O**
			8	-
6	2437		0	-
			4	-
			8	**O**
10	2457		0	-
			4	**O**
			8	-

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

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	N/A	N/A
Data Cable	SAMSUNG	EP-DN980BBE	N/A	N/A

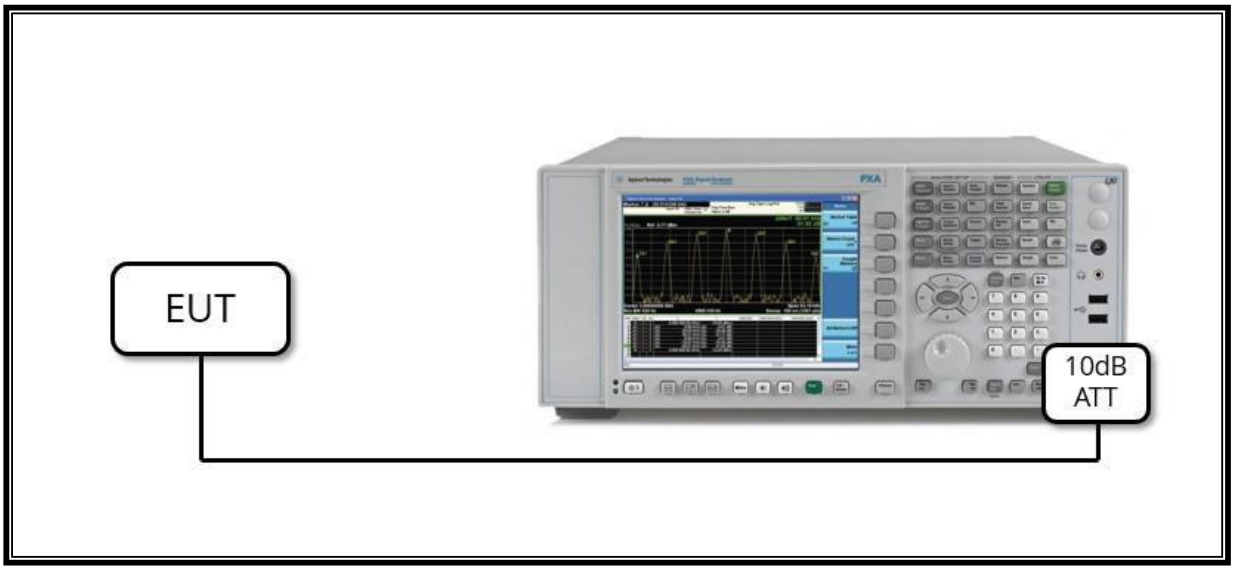
I/O CABLE

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

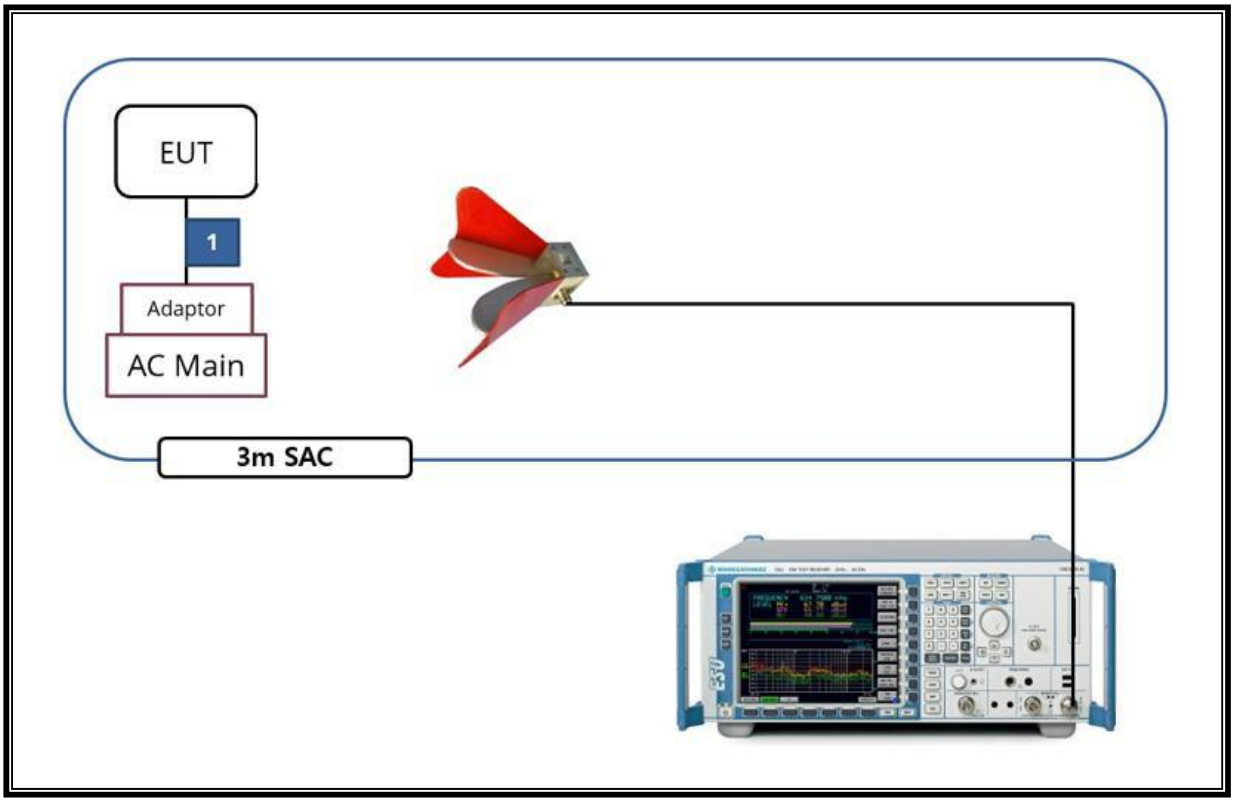
TEST SETUP

The EUT is a stand-alone unit during the tests.
Test software in hidden menu exercised the EUT to enable DTS mode.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. MEASUREMENT METHOD

6 dB BW : KDB 558074 D01 v05r02, Section 8.2

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.2.3.

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

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

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

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

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

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

8. SUMMARY TABLE

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

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]	1/T Minimum VBW[kHz]
802.11b	8.605	8.703	0.989	98.87	-	0.12
802.11g MIMO	4.062	4.163	0.976	97.57	0.11	0.25
802.11n(HT20) MIMO	3.767	3.868	0.974	97.39	0.11	0.27
802.11ax(HE20) MIMO SU	4.267	4.369	0.977	97.67	0.10	0.23
802.11ax(HE20) MIMO 26T	5.222	5.324	0.981	98.08	-	0.19
802.11ax(HE20) MIMO 52T	5.102	5.205	0.980	98.02	-	0.20
802.11ax(HE20) MIMO 106T	4.754	4.855	0.979	97.92	0.09	0.21

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

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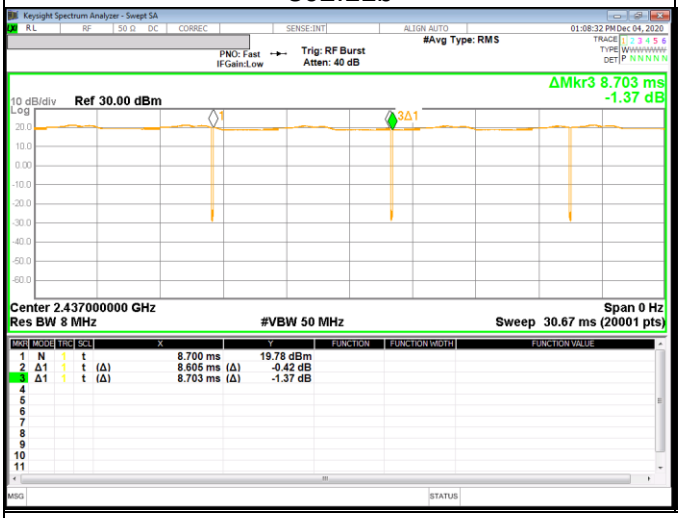
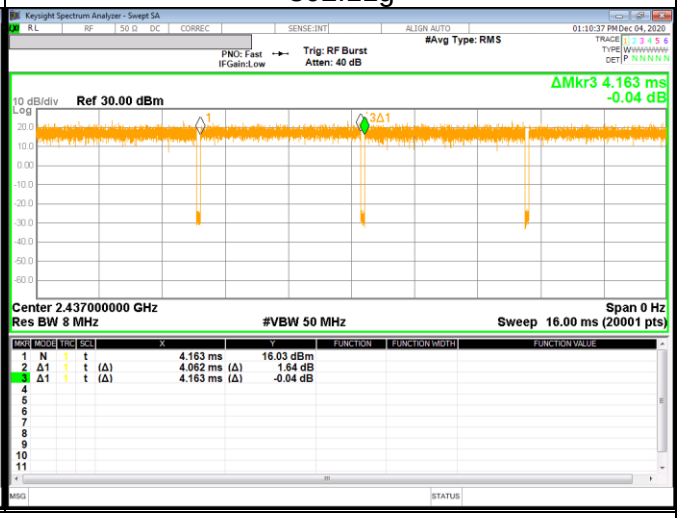
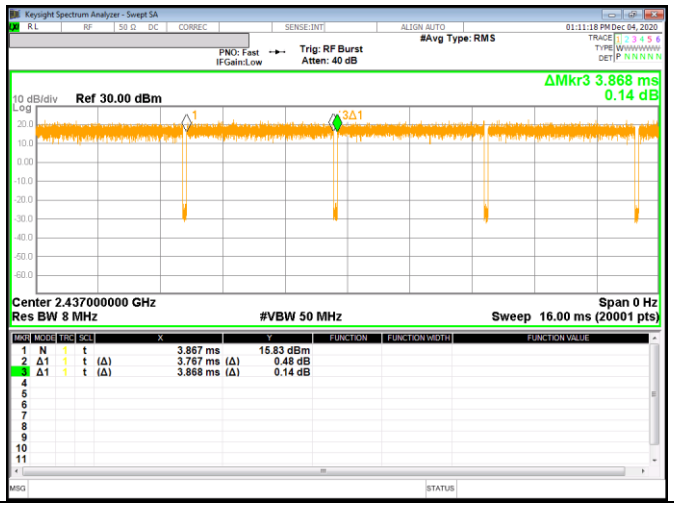
802.11b



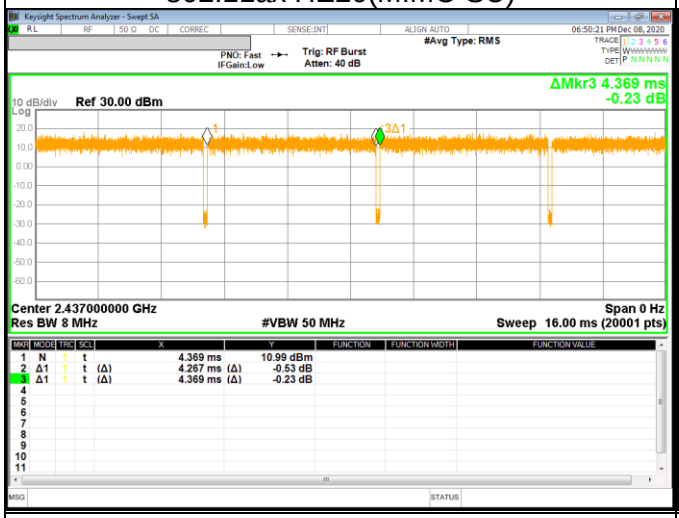
802.11g



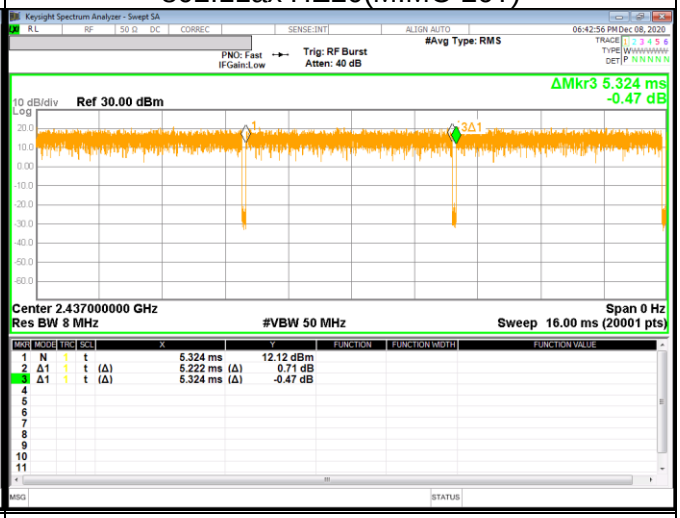
802.11n HT20



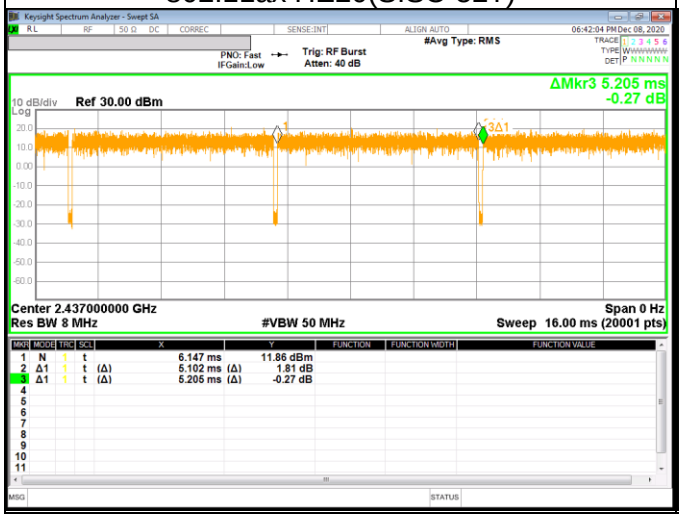
802.11ax HE20(MIMO SU)



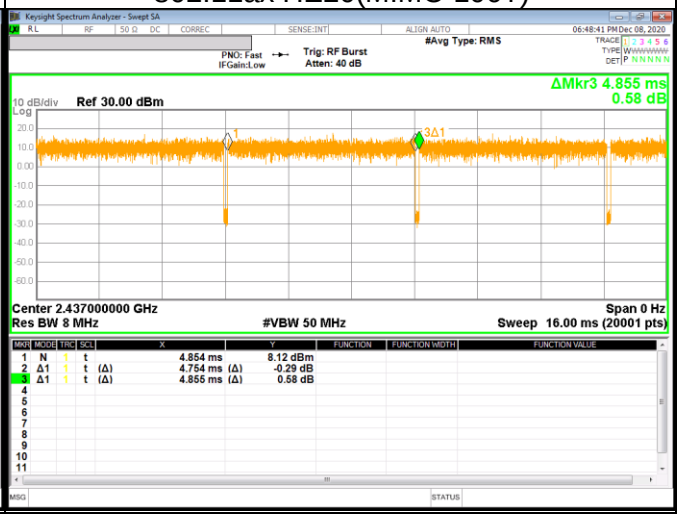
802.11ax HE20(MIMO 26T)



802.11ax HE20(SISO 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.

RESULTS

- Please refer to the next page

9.2.1. 802.11b SISO MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		ANT 1	ANT 2	
1	2 412	7.553	7.560	0.5
6	2 437	7.483	7.548	
11	2 462	7.523	7.531	
12	2 467	7.544	7.562	
13	2 472	7.502	7.050	
Worst		**7.483**	**7.050**	

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	16.320	16.390	0.5
6	2 437	16.410	16.310	
10	2 457	16.310	16.340	
11	2 462	16.400	16.350	
12	2 467	16.350	16.350	
13	2 472	16.340	16.330	
Worst		**16.310**	**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	17.610	17.590	0.5
6	2 437	17.200	17.570	
10	2 457	17.190	17.600	
11	2 462	17.320	17.680	
12	2 467	17.750	17.590	
13	2 472	17.580	17.590	
Worst		**17.190**	**17.570**	

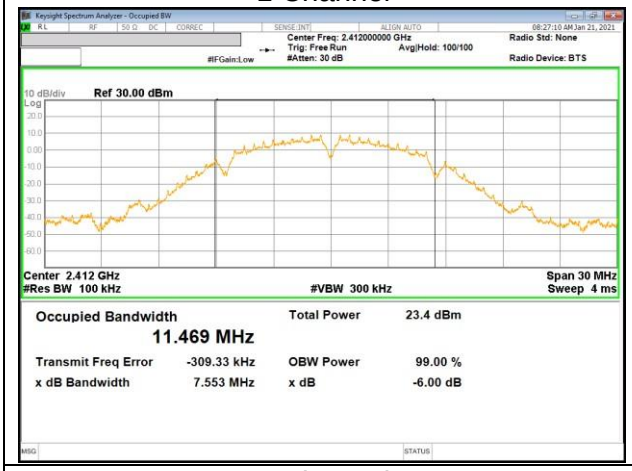
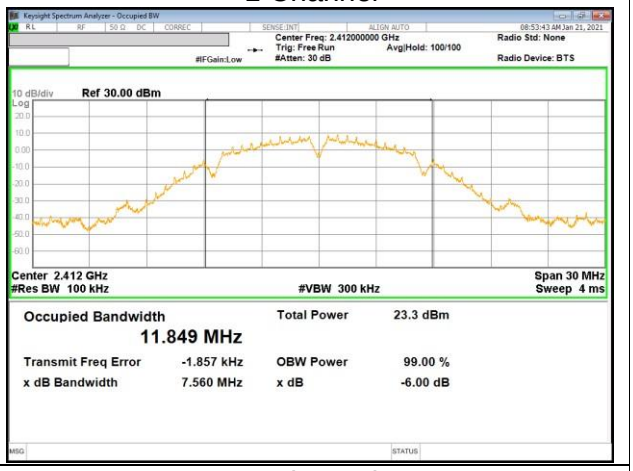
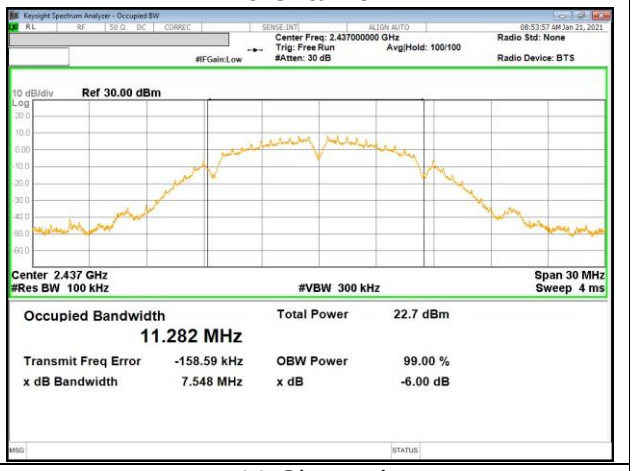
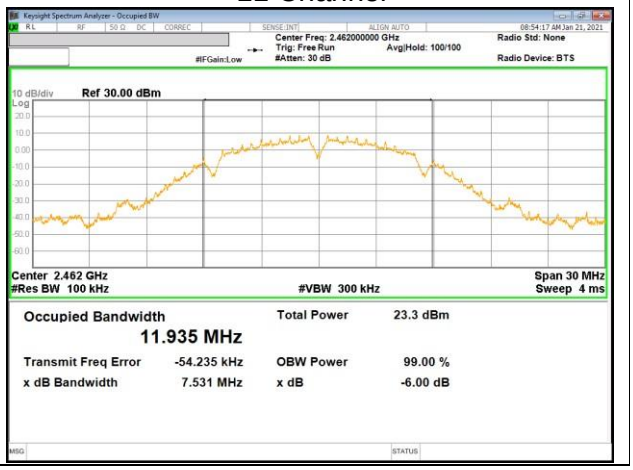
9.2.4. 802.11ax HE20 MIMO MODE IN THE 2.4 GHz BAND

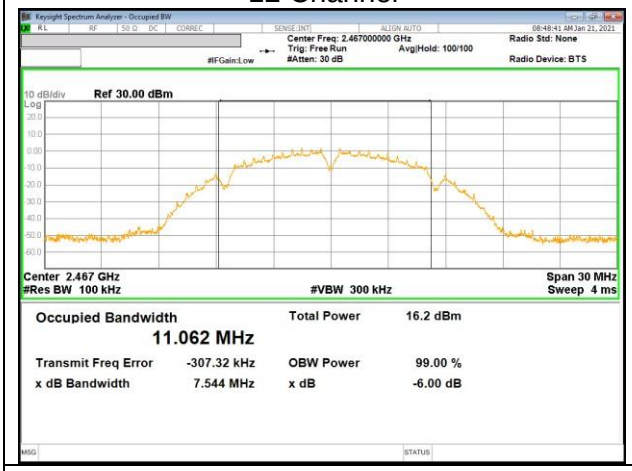
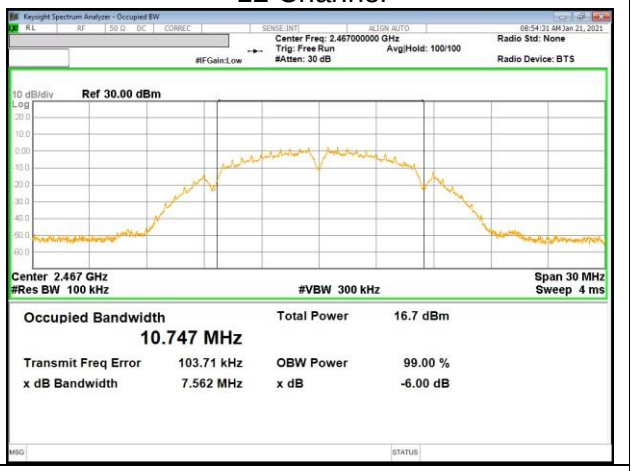
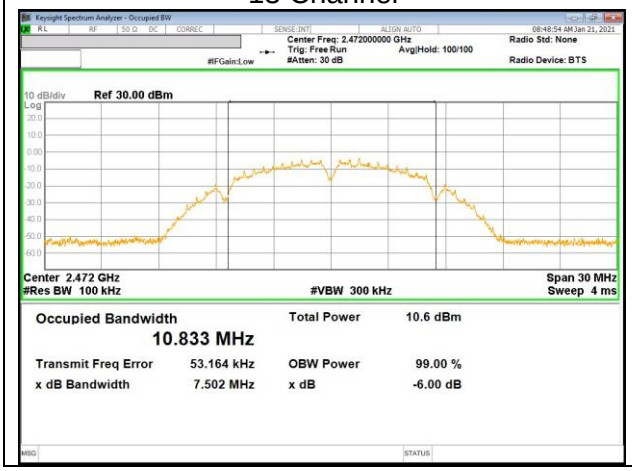
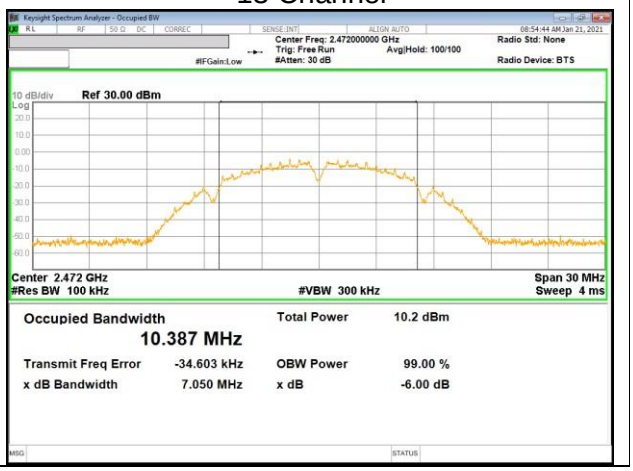
Channel	Frequency [MHz]	Tones	RU offset	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
				ANT 1	ANT 2	
1	2 412	26T	0	2.002	2.034	0.5
6	2 437			1.998	1.963	
10	2 457			2.025	2.009	
11	2 462			1.998	2.074	
12	2 467			2.045	2.051	
13	2 472			1.983	1.990	
Worst				**1.983**	**1.963**	

Note. 11ax mode was tested at the RU allocation with lowest tones(lowest bandwidth) number for each bandwidth.

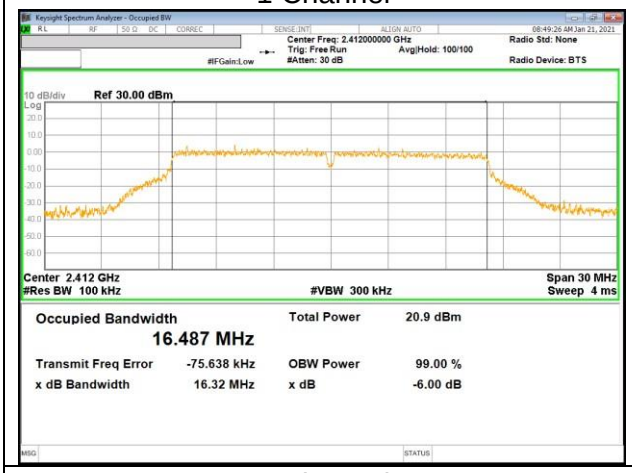
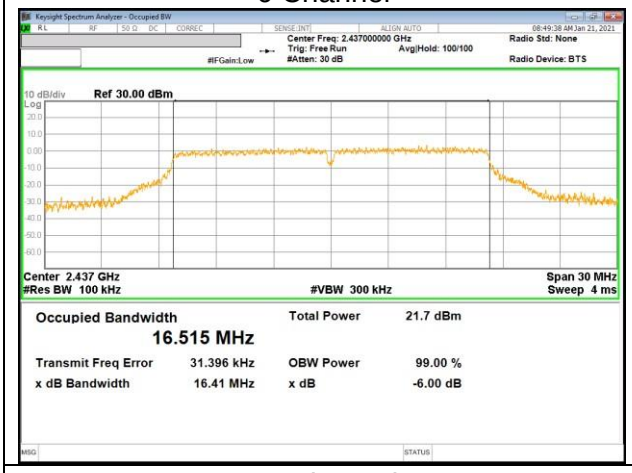
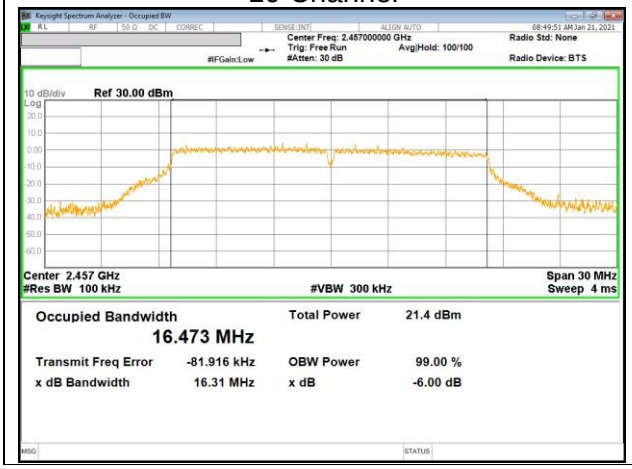
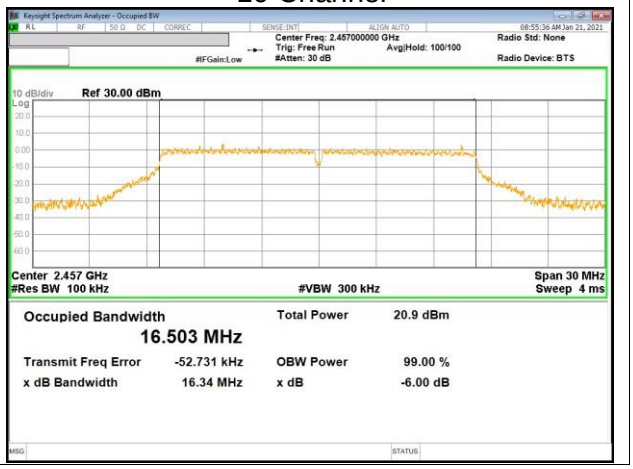
9.2.5. 6 dB BANDWIDTH TEST PLOTS

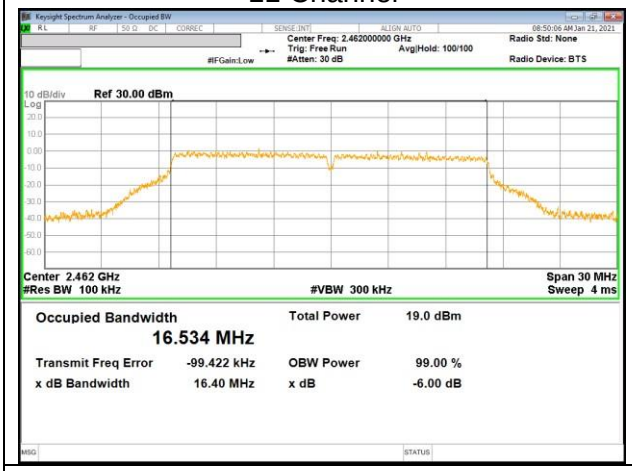
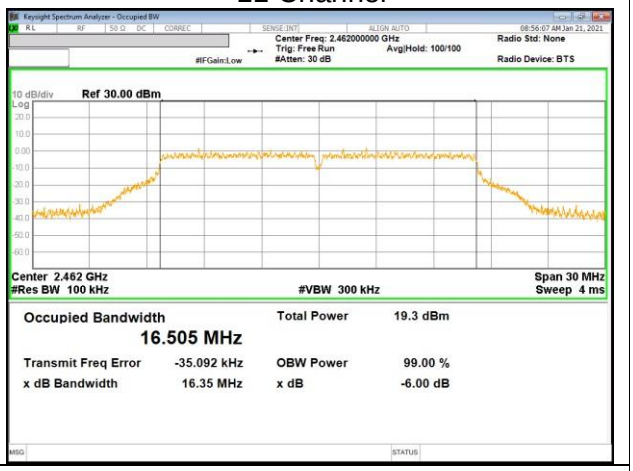
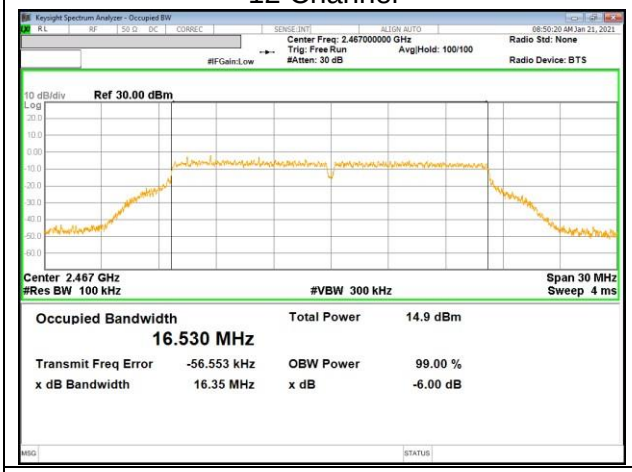
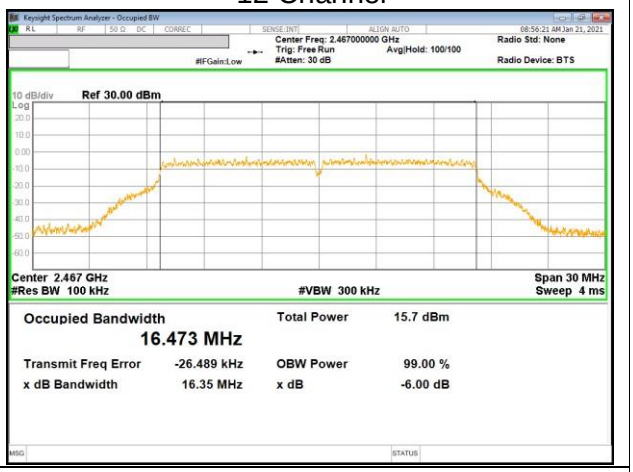
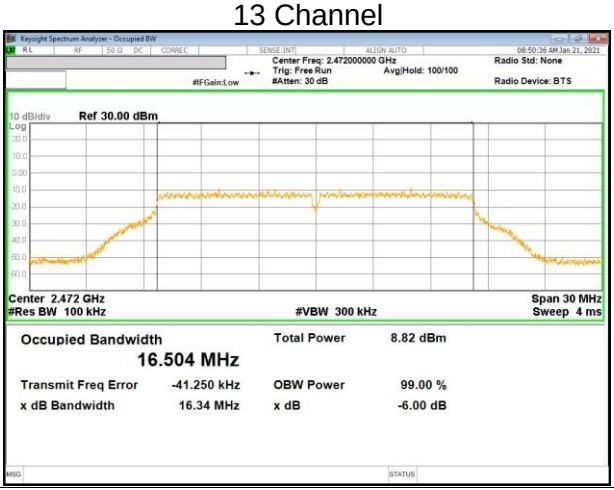
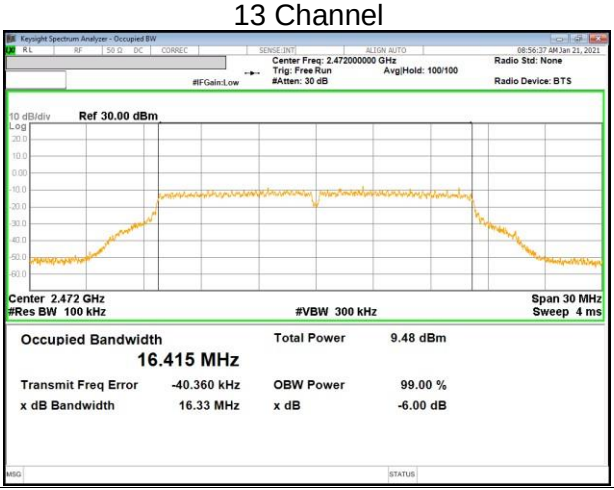
DTS 2.4 GHz IEEE 802.11b mode

ANT 1	ANT 2
1 Channel	1 Channel
	
6 Channel	6 Channel
	
11 Channel	11 Channel
	

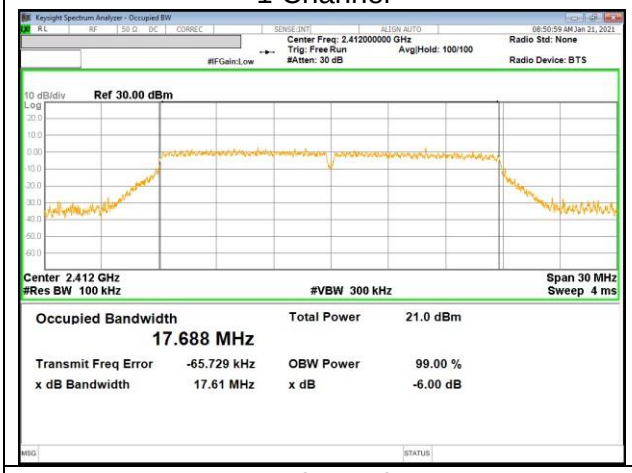
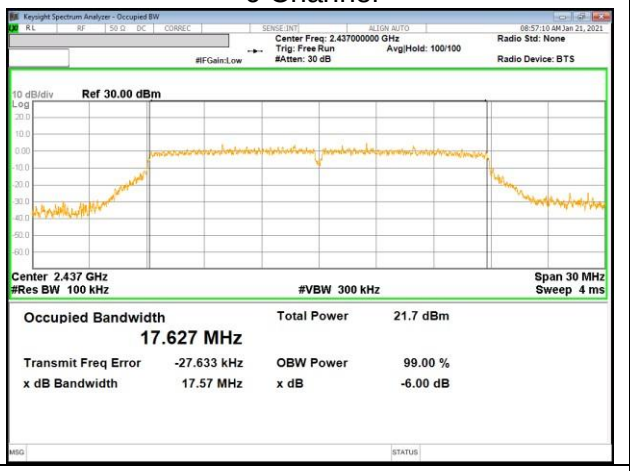
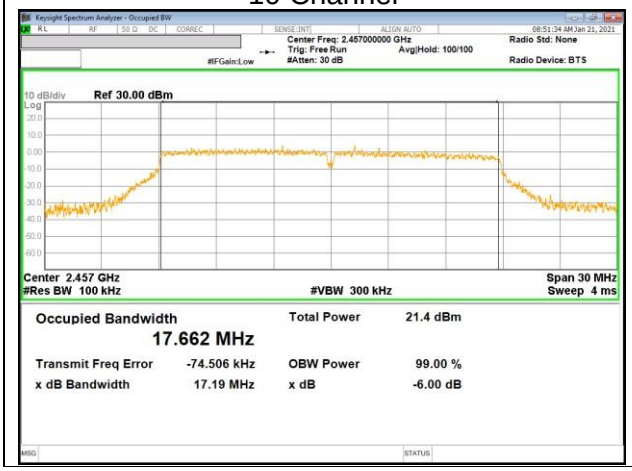
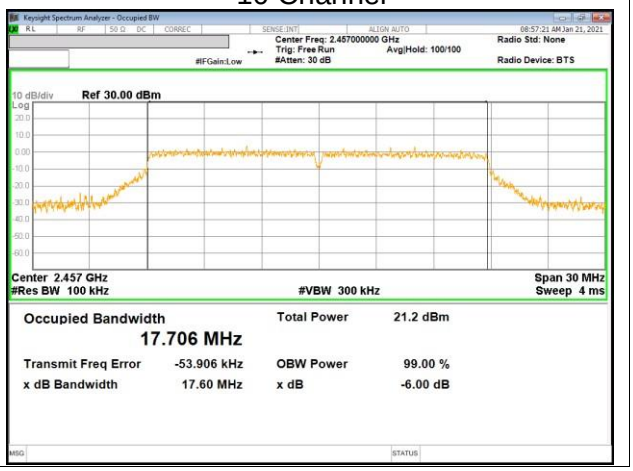
ANT 1	ANT 2
12 Channel	12 Channel
	
13 Channel	13 Channel
	

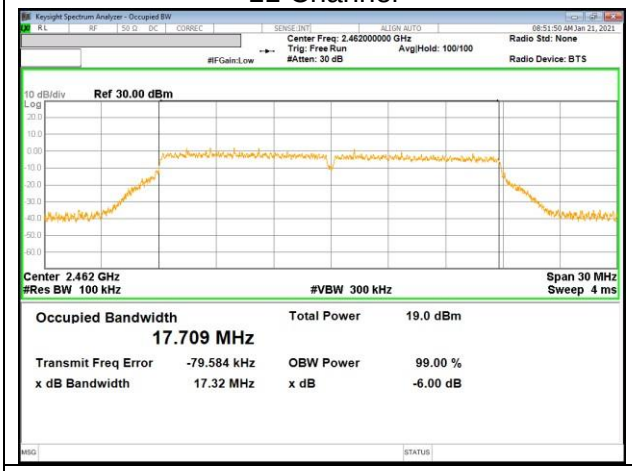
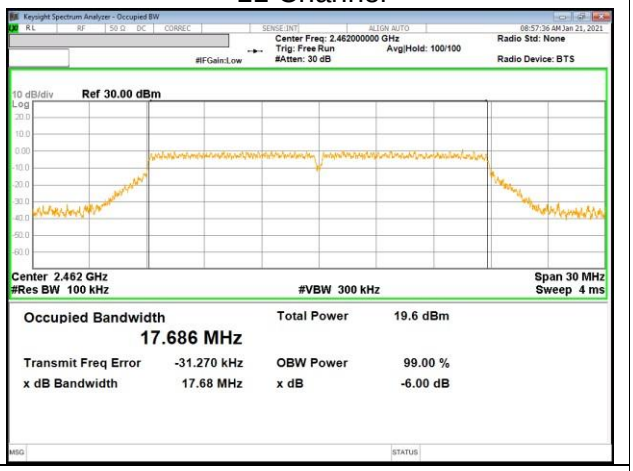
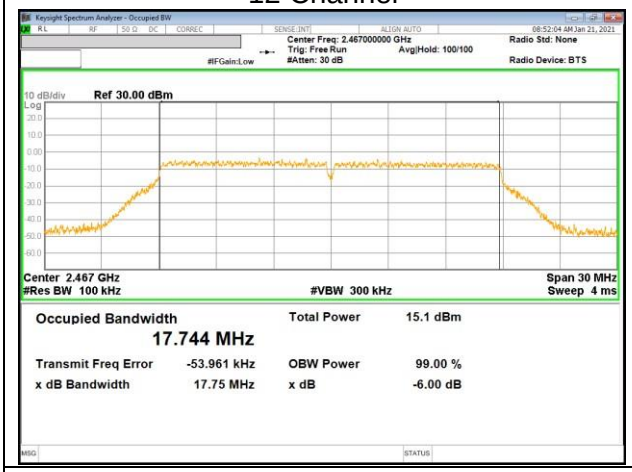
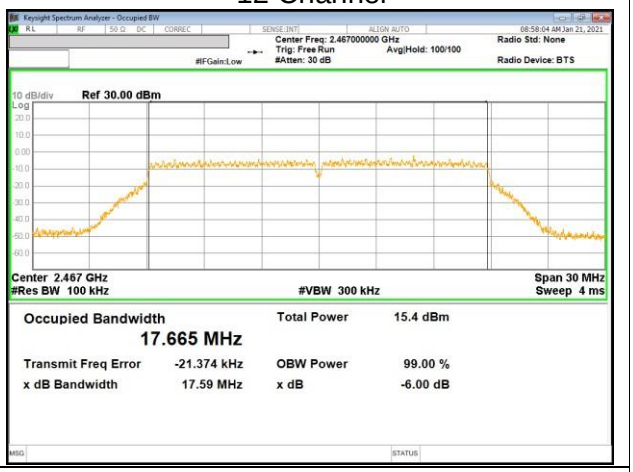
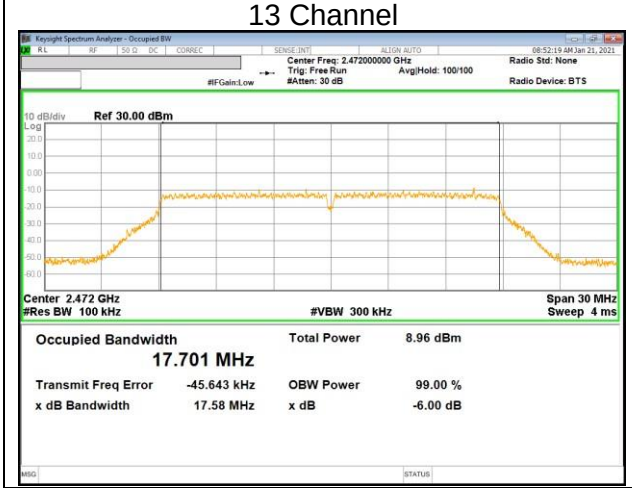
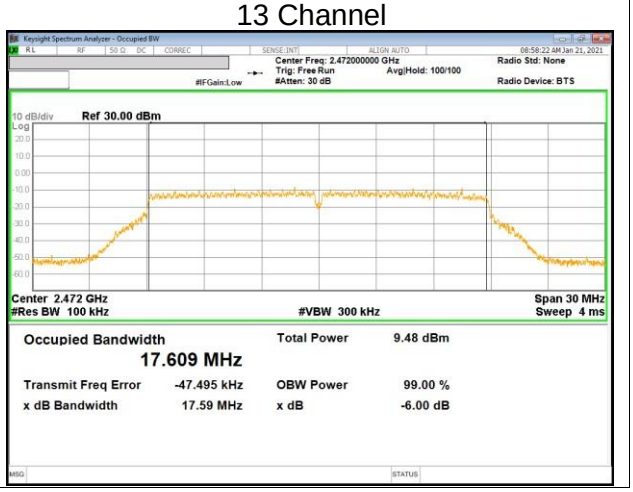
DTS 2.4 GHz IEEE 802.11g mode

ANT 1	ANT 2
1 Channel	1 Channel
	
6 Channel	6 Channel
	
10 Channel	10 Channel
	

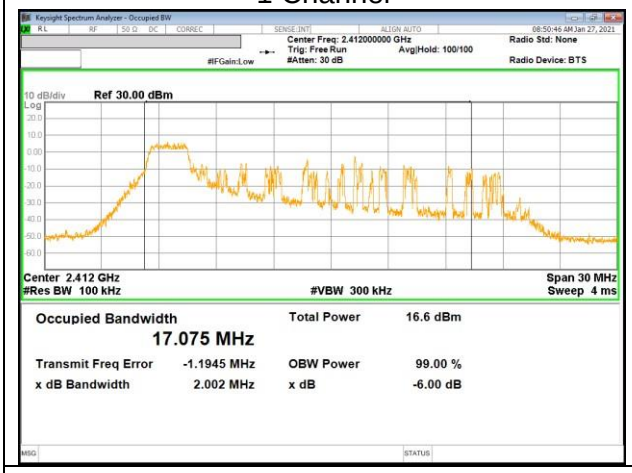
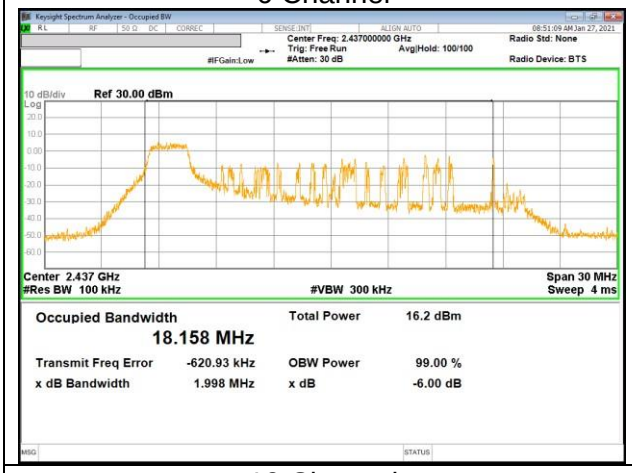
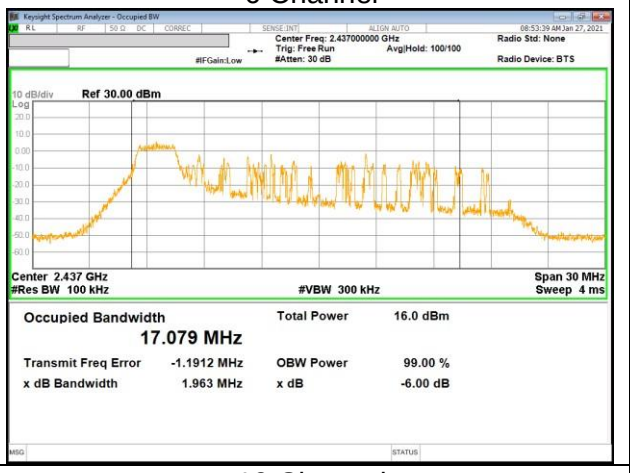
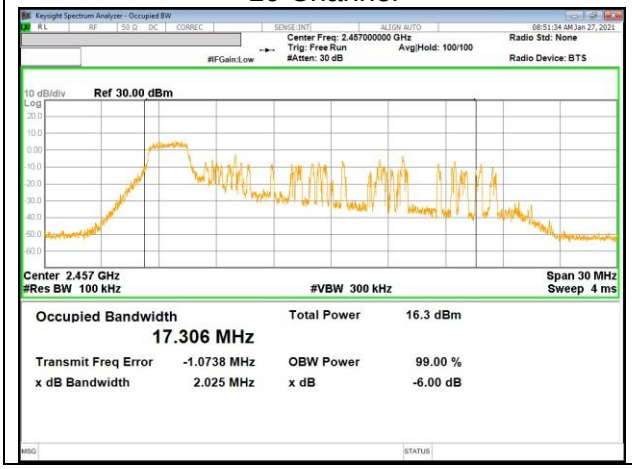
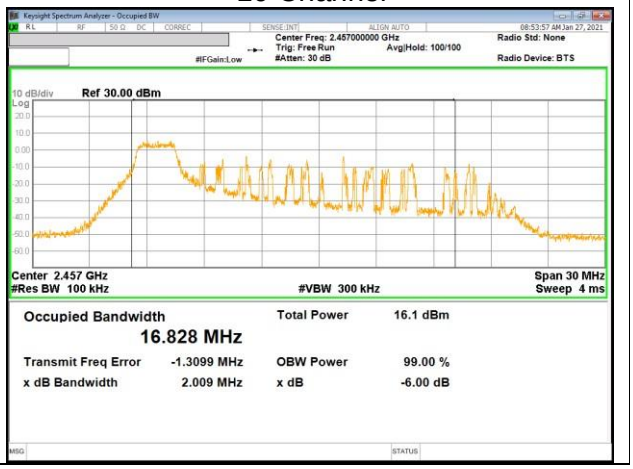
ANT 1	ANT 2
11 Channel	11 Channel
	
12 Channel	12 Channel
	
13 Channel	13 Channel
	

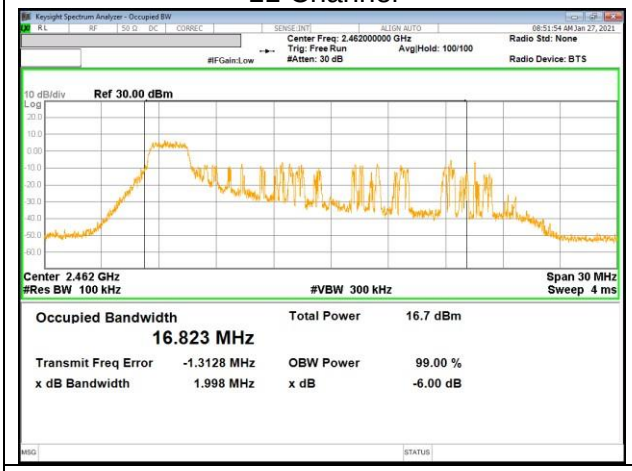
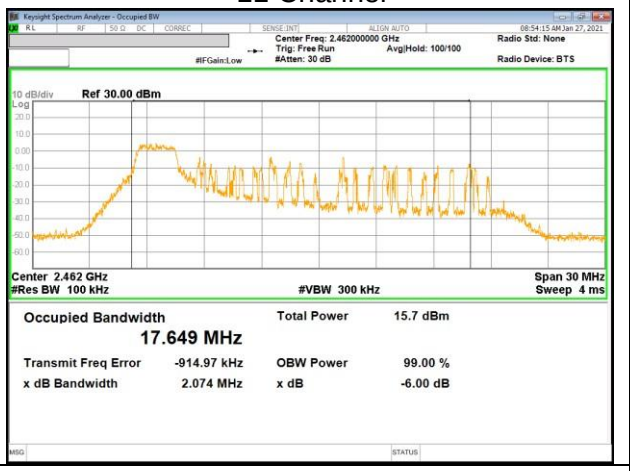
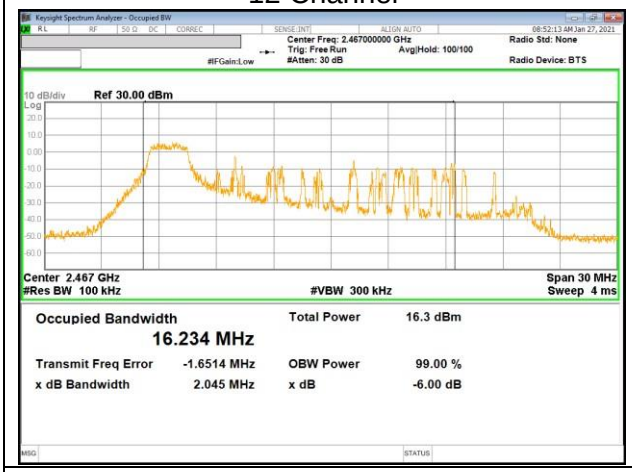
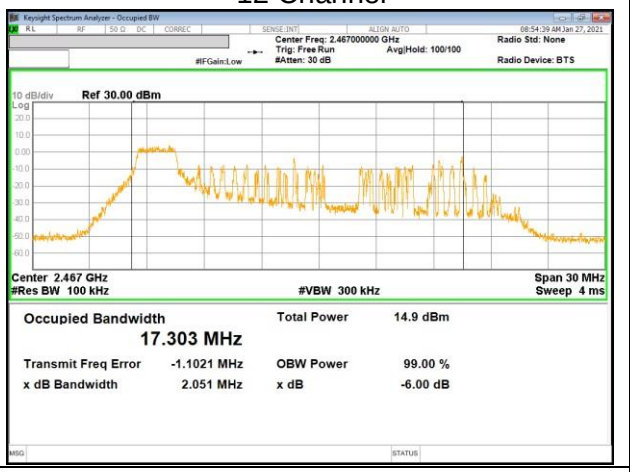
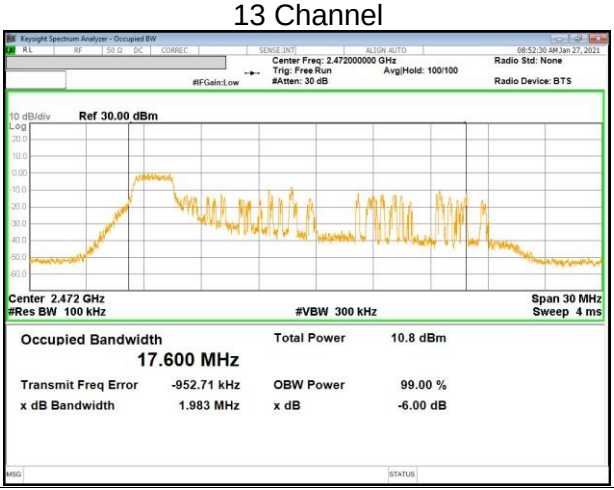
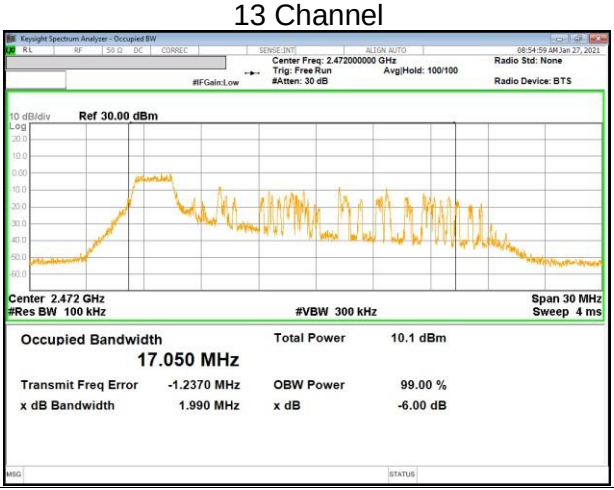
DTS 2.4 GHz IEEE 802.11n HT20 mode

ANT 1	ANT 2
1 Channel	1 Channel
	
6 Channel	6 Channel
	
10 Channel	10 Channel
	

ANT 1	ANT 2
11 Channel	11 Channel
	
12 Channel	12 Channel
	
13 Channel	13 Channel
	

DTS 2.4 GHz IEEE 802.11ax HE20(26T) mode

ANT 1	ANT 2
1 Channel	1 Channel
	
6 Channel	6 Channel
	
10 Channel	10 Channel
	

ANT 1	ANT 2
11 Channel	11 Channel
	
12 Channel	12 Channel
	
13 Channel	13 Channel
	

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 – 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	-6.83	-6.86	-3.83

9.3.1. TEST RESULTS

Included in Calculations of Corr'd Power			
Duty Cycle CF	802.11b SISO	-	dB
	802.11g MIMO	0.11	dB
	802.11n HT20 MIMO	0.11	dB
	802.11ax HE20(SU) MIMO	0.10	dB

Calculation of Output Power result
→ Average Power = Meas. Power + Duty Cycle CF / → Total Corr'd Power = ANT1's Avearage Power + ANT2's Average Power

- SISO Mode

Mode	Channel	Frequency [MHz]	Average Power [dBm]		Power Limit [dBm]
			ANT1	ANT2	
802.11b	1	2 412	17.17	17.01	30.00
	6	2 437	16.94	16.93	
	11	2 462	16.82	17.03	
	12	2 467	9.86	10.35	
	13	2 472	4.32	4.26	
Worst Case			17.17	17.03	

- MIMO Mode

Mode	Channel	Frequency [MHz]	Average Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
			ANT1	ANT2		
802.11g	1	2 412	15.25	15.91	18.60	30.00
	6	2 437	15.56	15.84	18.71	
	10	2 457	15.75	15.46	18.62	
	11	2 462	13.54	13.52	16.54	
	12	2 467	9.80	10.31	13.07	
	13	2 472	3.49	3.94	6.73	
Worst Case					**18.71**	
802.11n HT20	1	2 412	15.15	15.81	18.50	30.00
	6	2 437	15.33	15.80	18.58	
	10	2 457	15.87	15.46	18.68	
	11	2 462	13.52	13.51	16.53	
	12	2 467	9.13	9.51	12.33	
	13	2 472	3.45	4.11	6.80	
Worst Case					**18.68**	
802.11ax HE20(SU)	1	2 412	14.70	15.21	17.97	30.00
	6	2 437	15.44	15.09	18.28	
	10	2 457	14.88	14.86	17.88	
	11	2 462	12.84	12.90	15.88	
	12	2 467	9.45	9.63	12.55	
	13	2 472	3.56	4.10	6.85	
Worst Case					**18.28**	

9.3.2. RU mode TEST RESULTS

Included in Calculations of Corr'd Power			
Duty Cycle CF	802.11ax HE20 26T MIMO	-	dB
	802.11ax HE20 52T MIMO	-	dB
	802.11ax HE20 106T MIMO	0.09	dB

Calculation of Output Power result
→ Average Power = Meas. Power + Duty Cycle CF / → Total Corr'd Power = ANT1's Avearage Power + ANT2's Average Power

- MIMO Mode

Channel	Frequency [MHz]	Tones	RU Offset	Average Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
1	2 412	26T	0	10.44	10.03	13.25	30.00
			4	10.43	10.69	13.57	
			8	8.60	10.08	12.41	
		52T	37	10.88	9.84	13.40	
			38	11.17	11.61	14.41	
			40	10.04	11.52	13.85	
		106T	53	11.86	11.22	14.56	
			54	10.54	11.75	14.20	
6	2 437	26T	0	9.87	9.99	12.94	30.00
			4	10.05	10.32	13.20	
			8	10.98	9.26	13.21	
		52T	37	11.13	10.30	13.75	
			38	11.24	11.61	14.44	
			40	11.75	9.90	13.93	
		106T	53	12.68	11.11	14.98	
			54	12.23	11.07	14.70	
10	2 457	26T	0	10.01	10.13	13.08	30.00
			4	10.66	9.55	13.15	
			8	9.02	10.06	12.58	
		52T	37	11.24	10.77	14.02	
			38	11.52	11.42	14.48	
			40	10.25	9.85	13.06	
		106T	53	12.24	11.75	15.01	
			54	12.29	12.25	15.28	
11	2 462	26T	0	10.66	9.45	13.11	30.00
			4	10.37	10.17	13.28	
			8	9.57	10.55	13.10	
		52T	37	11.87	10.04	14.06	
			38	11.55	11.24	14.41	
			40	9.95	10.91	13.47	
		106T	53	12.18	11.32	14.78	
			54	11.94	12.97	15.50	
12	2 467	26T	0	9.78	9.01	12.42	30.00
			4	10.08	9.83	12.97	
			8	9.98	10.62	13.32	
		52T	37	9.91	8.56	12.30	
			38	10.79	10.95	13.88	
			40	9.46	9.69	12.59	
		106T	53	9.87	9.43	12.67	
			54	8.91	9.82	12.40	
13	2 472	26T	0	4.31	4.13	7.23	30.00
			4	4.26	4.68	7.49	
			8	3.84	4.03	6.95	
		52T	37	4.22	3.67	6.96	
			38	3.22	4.40	6.86	
			40	3.18	3.65	6.43	
		106T	53	3.59	3.95	6.78	
			54	3.51	4.10	6.83	

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.

RESULTS

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

Included in Calculations of Corr'd Power			
Duty Cycle CF	802.11b SISO	-	dB
	802.11g MIMO	0.11	dB
	802.11n HT20 MIMO	0.11	dB

Calculation of Output PSD result
1. 1TX : Corr'd PSD = Meas PSD + Duty Cycle CF
2. 2TX : Total PSD = ANT1 Meas PSD + ANT2 Meas PSD + Duty Cycle CF

- SISO Mode

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/3kHz]		Total Corr'd PSD [dBm/3kHz]		PSD Limit [dBm/3kHz]
			ANT1	ANT2	ANT1	ANT2	
802.11b	1	2 412	1.35	1.12	1.35	1.12	8.00
	6	2 437	1.44	0.59	1.44	0.59	
	11	2 462	1.11	1.01	1.11	1.01	
	12	2 467	-6.28	-5.49	-6.28	-5.49	
	13	2 472	-11.68	-11.80	-11.68	-11.80	

- MIMO Mode

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/3kHz]		Total Corr'd PSD [dBm/3kHz]	PSD Limit [dBm/3kHz]
			ANT1	ANT2		
802.11g	1	2 412	-3.80	-3.84	-0.70	8.00
	6	2 437	-3.10	-3.19	-0.02	
	10	2 457	-3.52	-3.75	-0.51	
	11	2 462	-5.63	-5.82	-2.60	
	12	2 467	-10.27	-9.45	-6.72	
	13	2 472	-16.30	-15.33	-12.67	
802.11n HT20	1	2 412	-4.46	-4.01	-1.11	8.00
	6	2 437	-3.28	-3.71	-0.37	
	10	2 457	-3.12	-4.68	-0.71	
	11	2 462	-5.70	-6.08	-2.77	
	12	2 467	-10.50	-10.48	-7.37	
	13	2 472	-16.68	-15.23	-12.77	

9.4.2. 802.11ax HE20 MODE TEST RESULTS

Included in Calculations of Corr'd Power			
Duty Cycle CF	802.11ax HE20(26T) MIMO	-	dB
	802.11ax HE20(SU) MIMO	0.10	dB

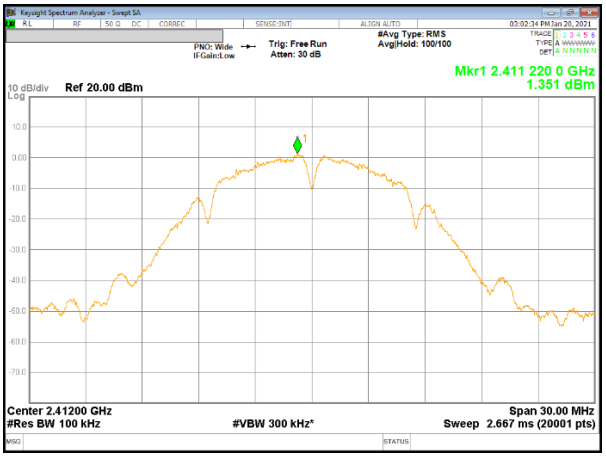
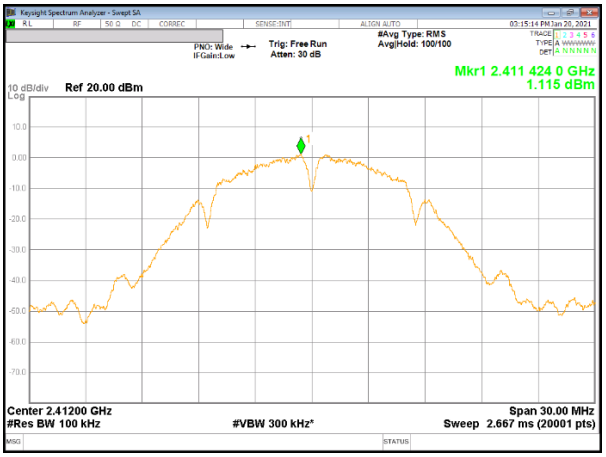
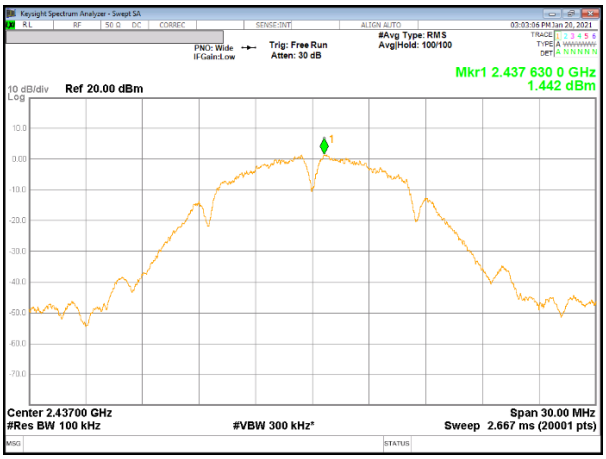
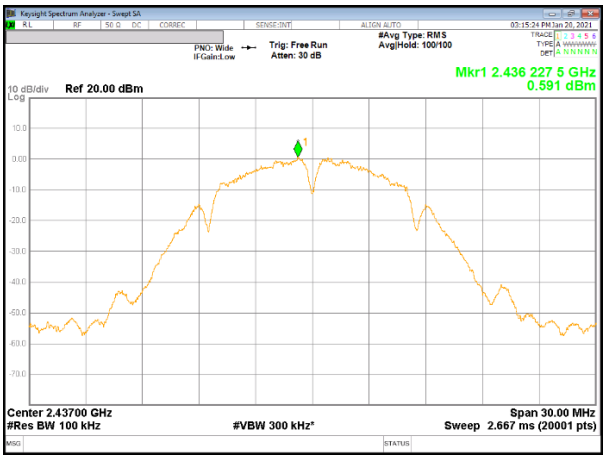
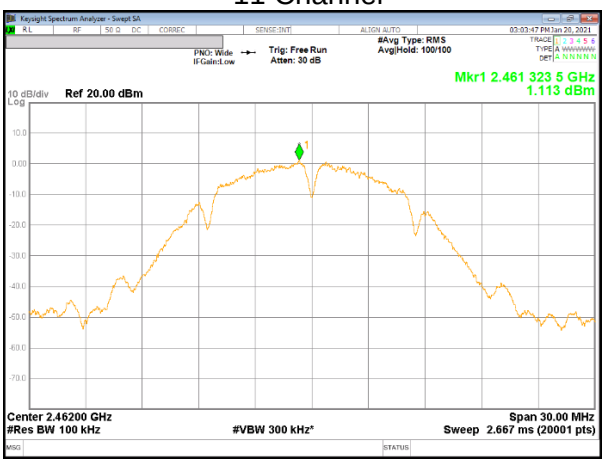
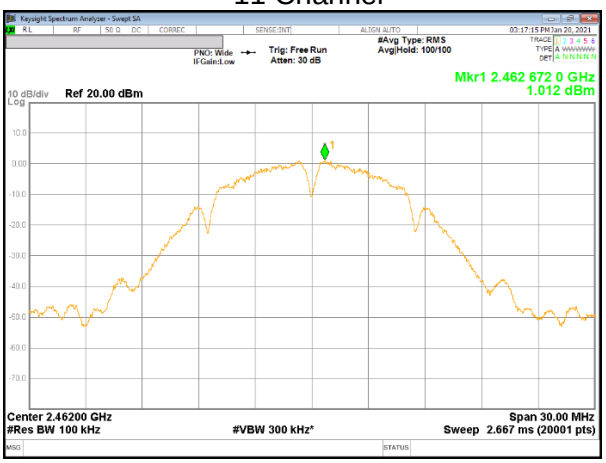
Calculation of Output PSD result
2TX : Total PSD = ANT1 Meas PSD + ANT2 Meas PSD + Duty Cycle CF

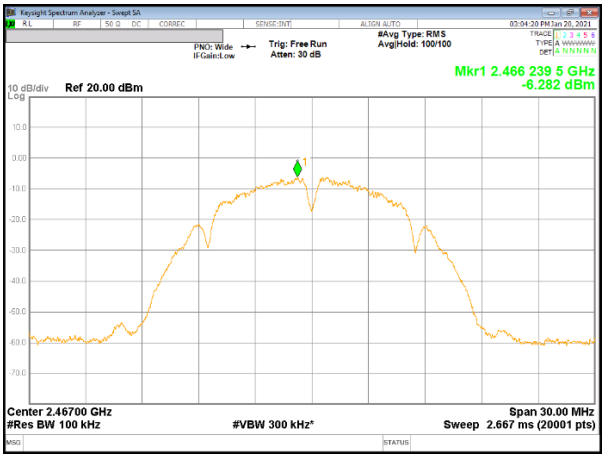
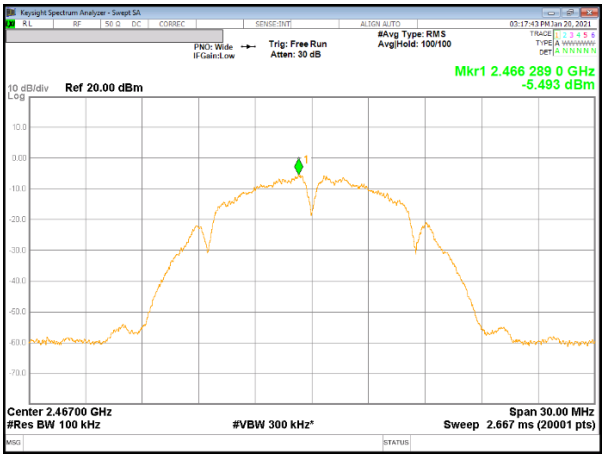
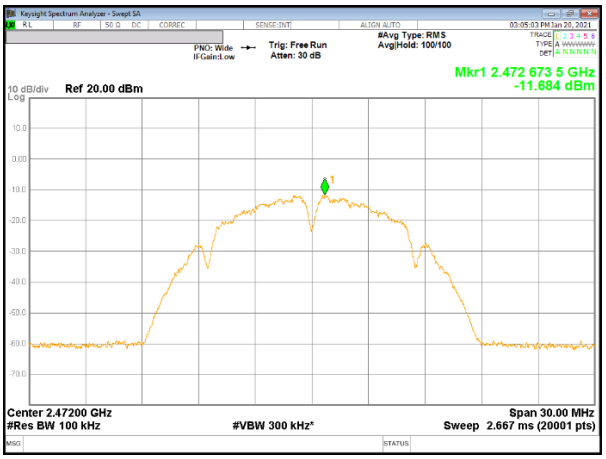
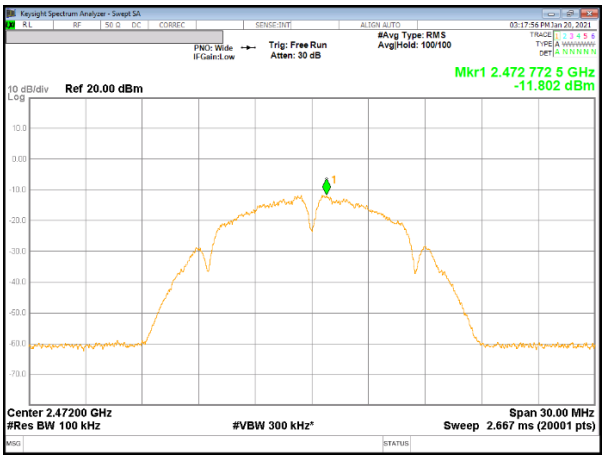
Channel	Frequency [MHz]	Tones	RU Offset	Meas PPSD [dBm/100kHz]		Total Corr'd PPSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
				ANT1	ANT2		
1	2 412	26T	0	-0.72	-2.13	1.74	8.00
			4	-1.07	-1.52	1.82	
			8	-3.75	-1.45	0.66	
		SU	-	-6.34	-5.95	-3.03	
6	2 437	26T	0	-2.39	-2.13	0.85	8.00
			4	-1.56	-1.99	1.34	
			8	-0.61	-3.25	1.38	
		SU	-	-5.43	-5.70	-2.45	
10	2457	26T	0	-1.45	-2.21	1.30	8.00
			4	-2.17	-3.32	0.40	
			8	-2.54	-1.88	0.91	
		SU	-	-5.60	-6.42	-2.88	
11	2 462	26T	0	-1.98	-2.42	0.92	8.00
			4	-1.04	-2.27	1.50	
			8	-2.75	-0.89	1.39	
		SU	-	-7.30	-8.29	-4.66	
12	2 467	26T	0	-2.38	-3.90	0.04	8.00
			4	-1.91	-1.90	1.21	
			8	-2.18	-1.75	1.15	
		SU	-	-11.56	-11.56	-8.45	
13	2 472	26T	0	-8.15	-8.19	-5.06	8.00
			4	-8.11	-8.02	-4.95	
			8	-8.27	-8.55	-5.30	
		SU	-	-17.37	-17.08	-14.11	

Note. RBW 100kHz measurement data is lower than 8dBm/3kHz limit.

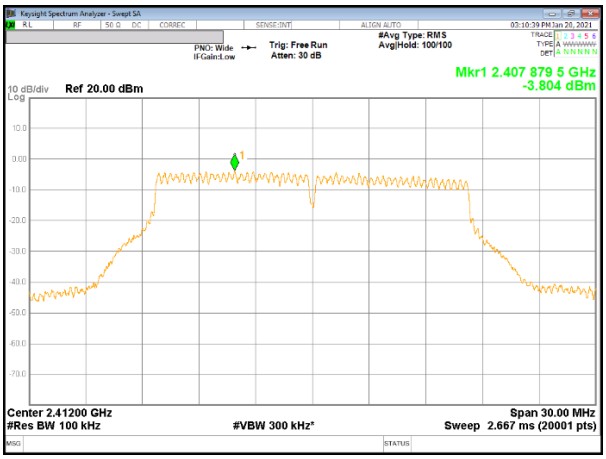
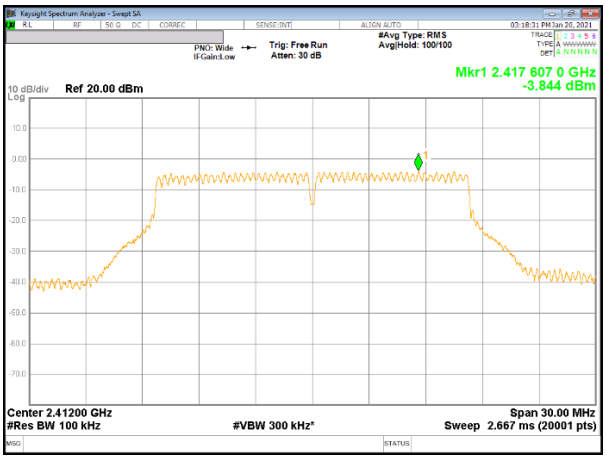
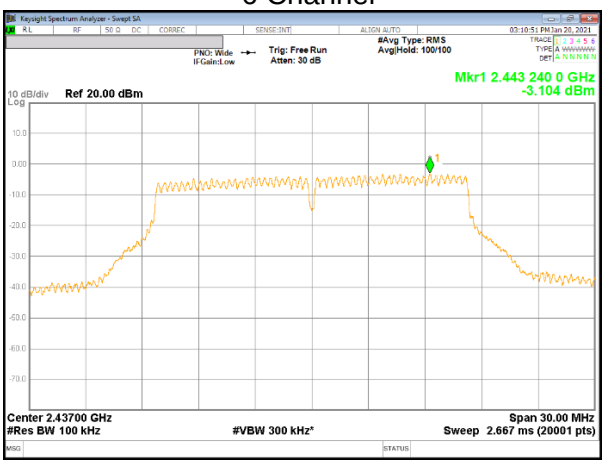
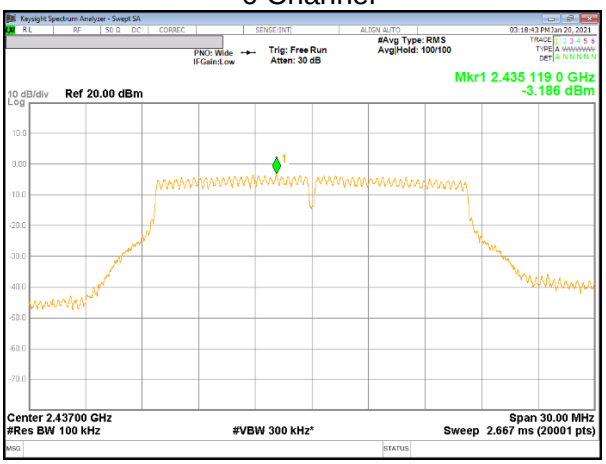
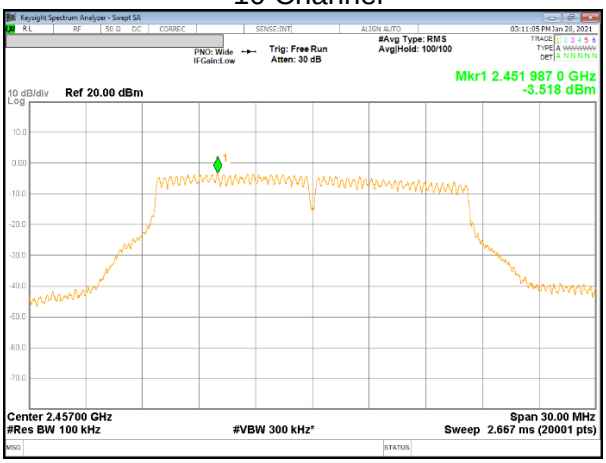
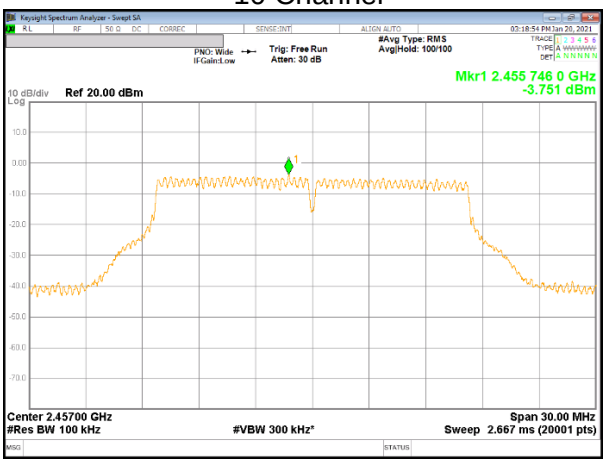
9.4.3. PSD TEST PLOTS

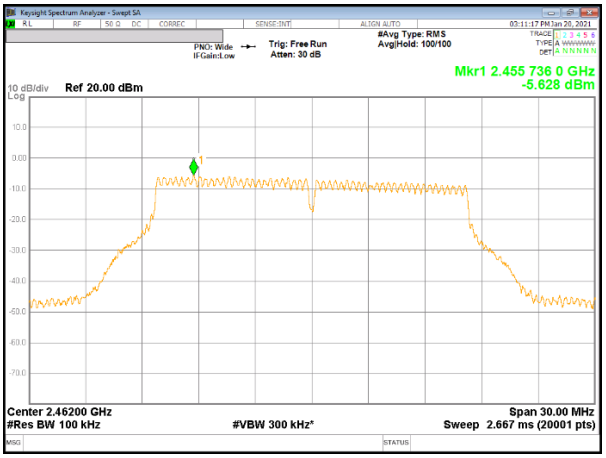
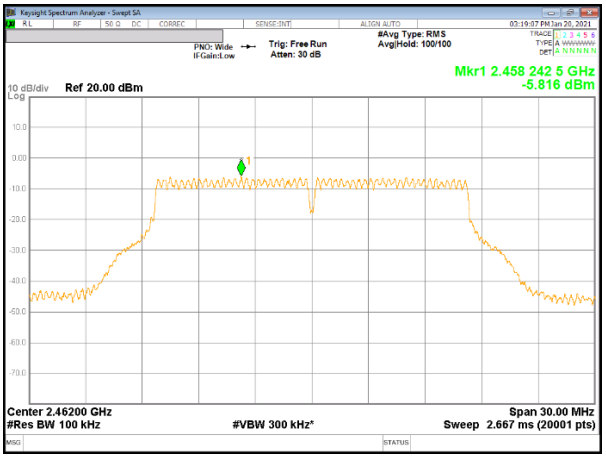
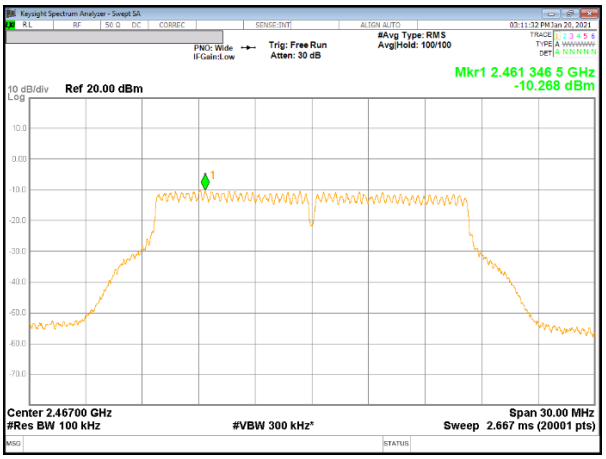
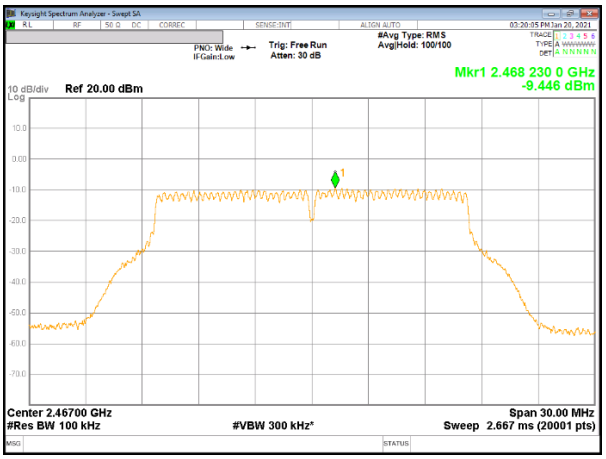
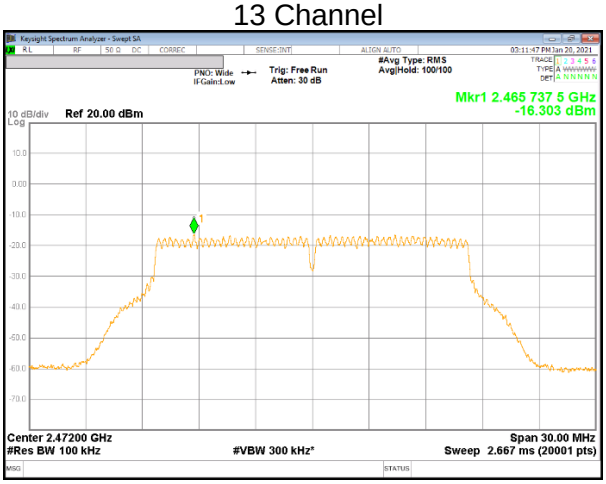
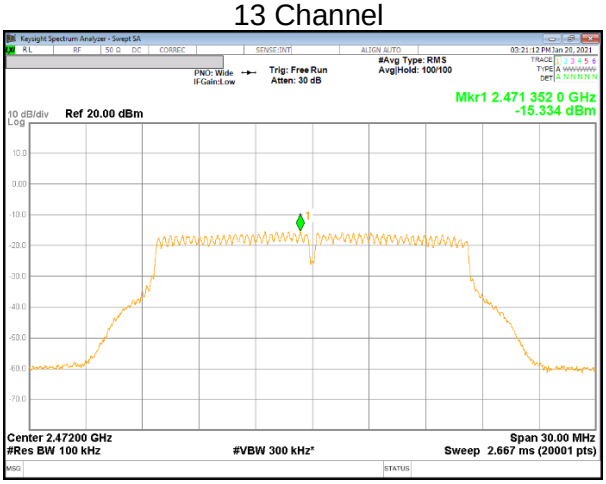
DTS 2.4 GHz IEEE 802.11b mode

ANT 1	ANT 2
1 Channel	1 Channel
	
6 Channel	6 Channel
	
11 Channel	11 Channel
	

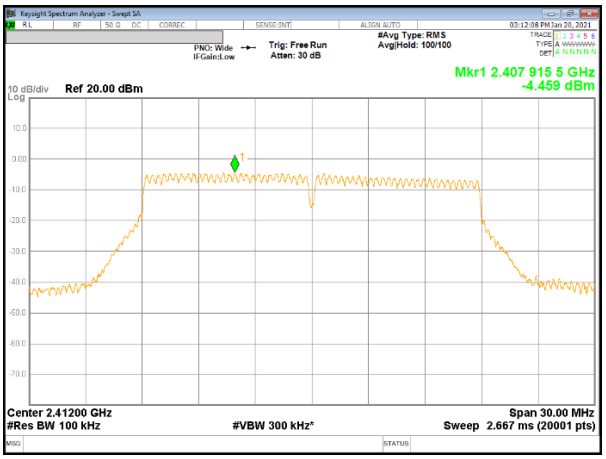
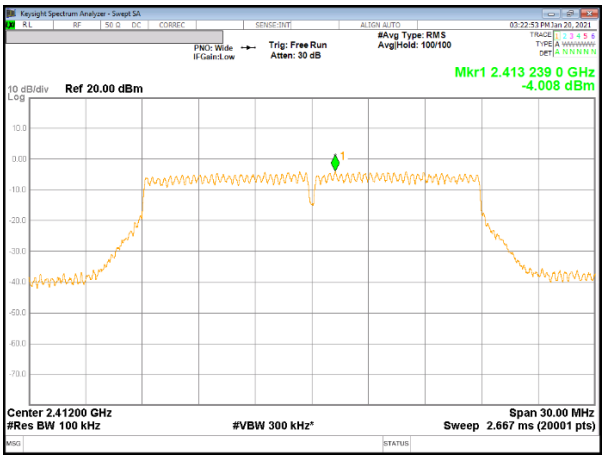
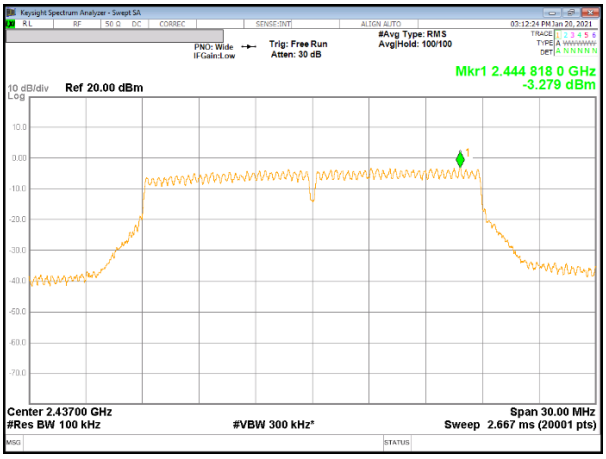
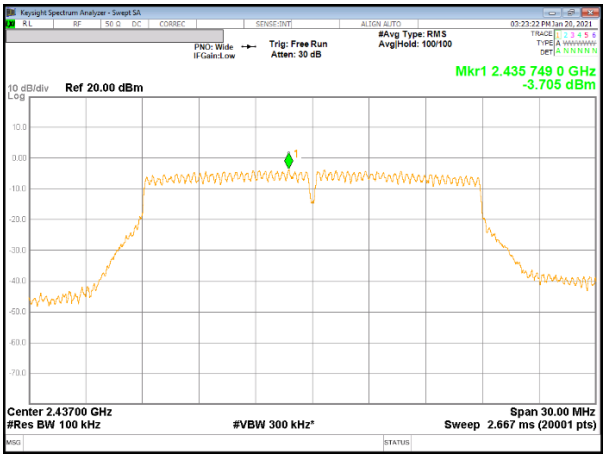
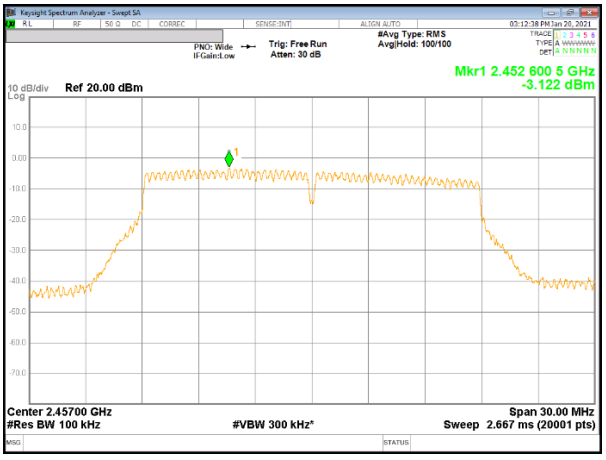
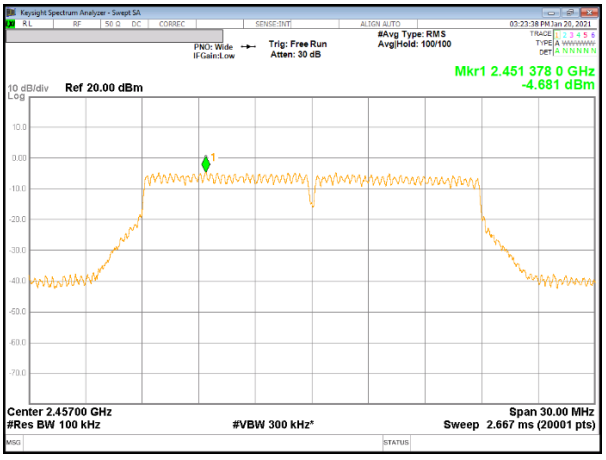
ANT 1	ANT 2
12 Channel	12 Channel
	
13 Channel	13 Channel
	

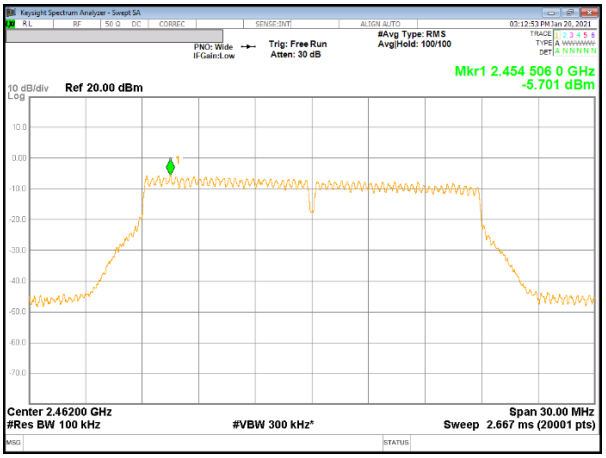
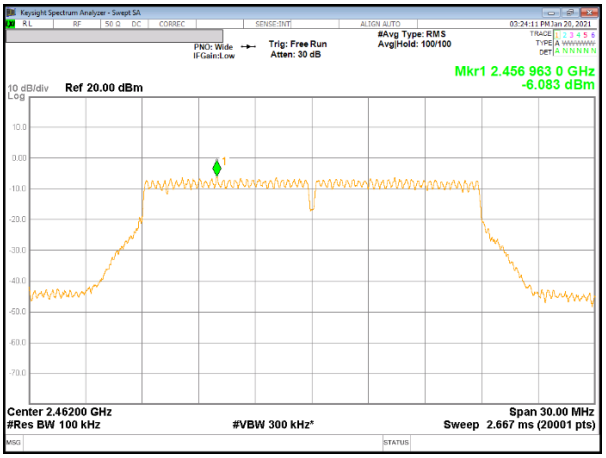
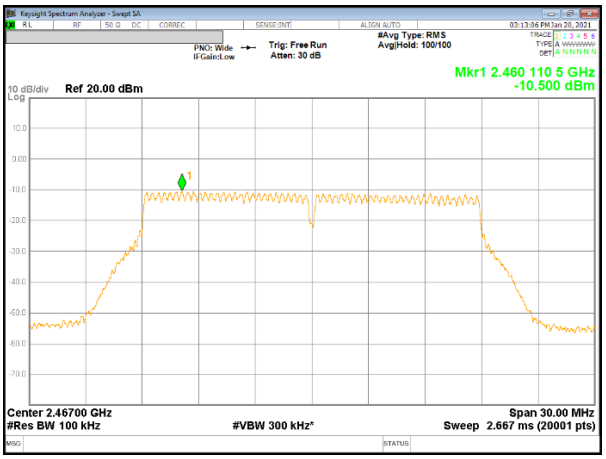
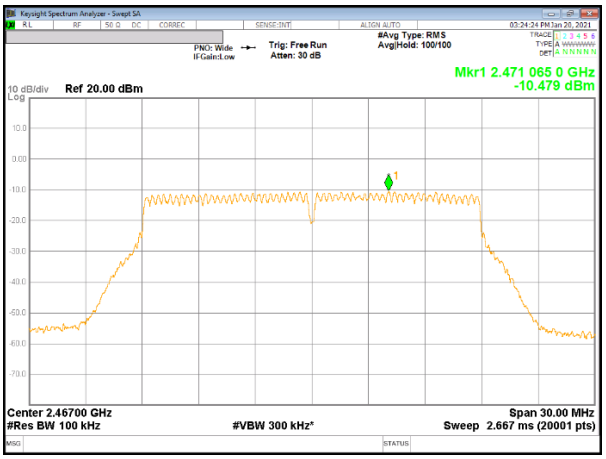
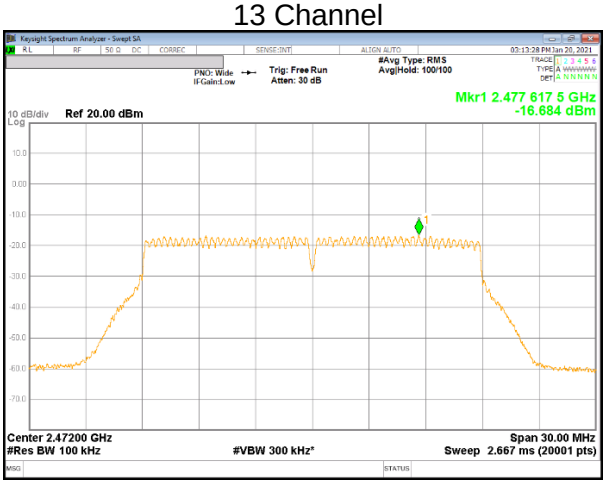
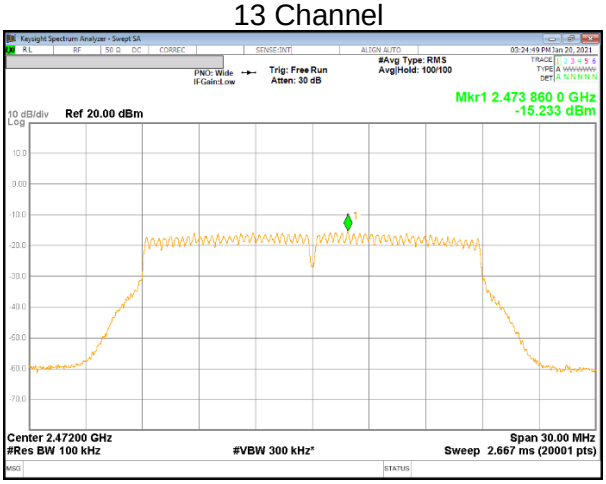
DTS 2.4 GHz IEEE 802.11g mode

ANT 1	ANT 2
1 Channel	1 Channel
	
6 Channel	6 Channel
	
10 Channel	10 Channel
	

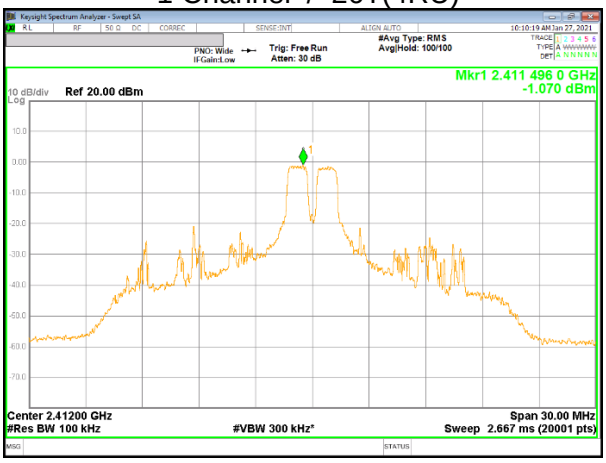
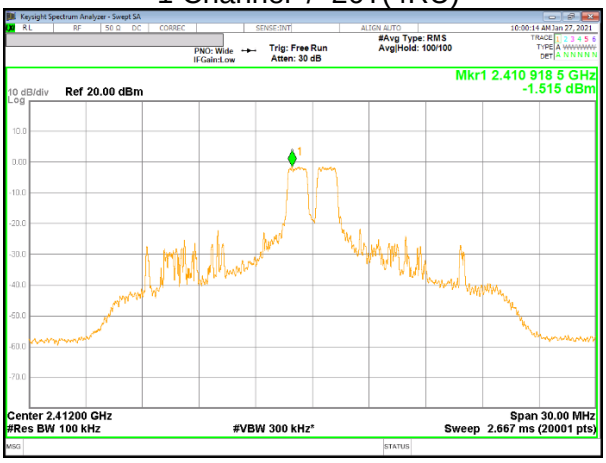
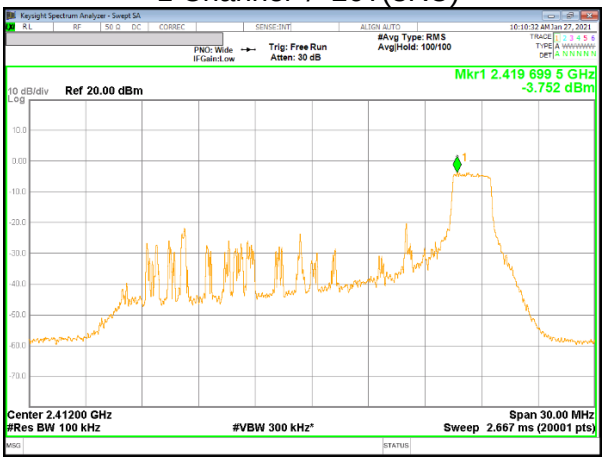
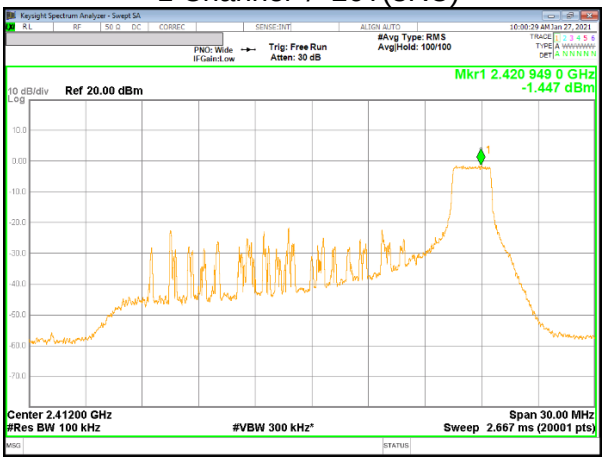
ANT 1	ANT 2
11 Channel	11 Channel
	
12 Channel	12 Channel
	
13 Channel	13 Channel
	

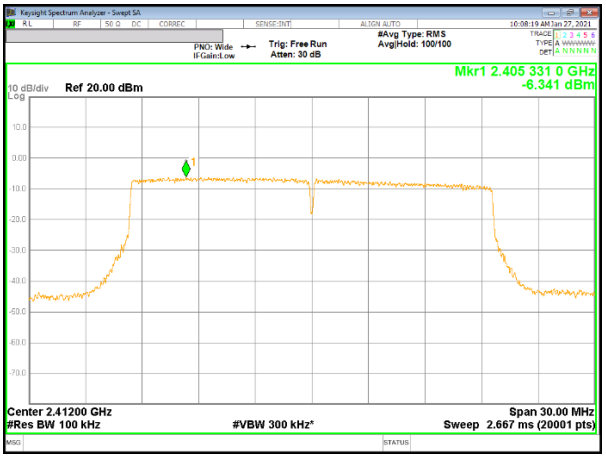
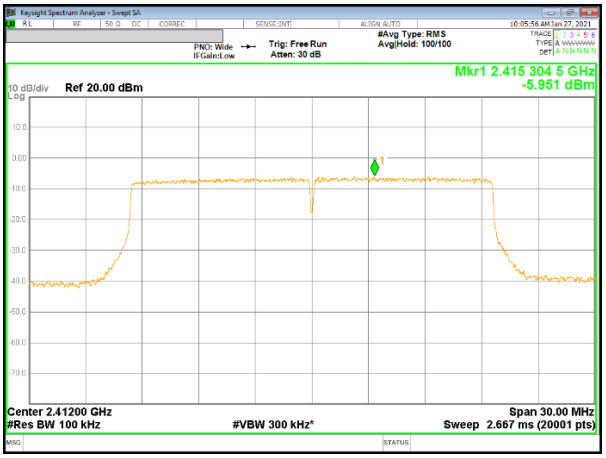
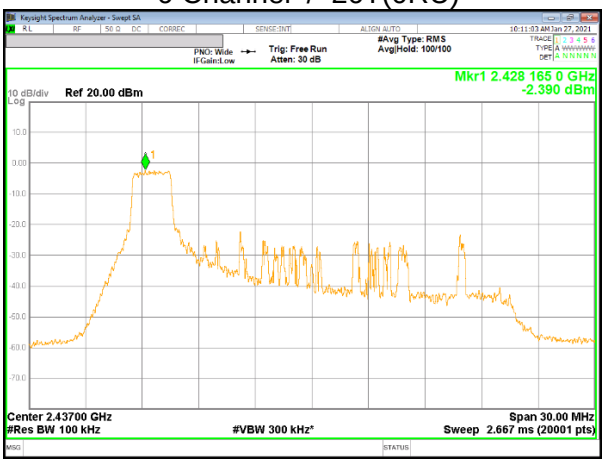
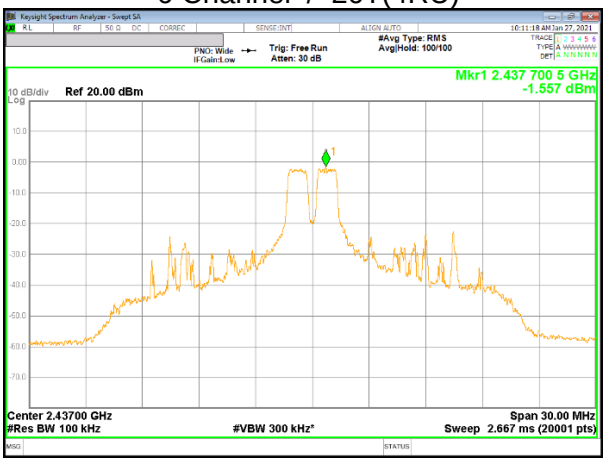
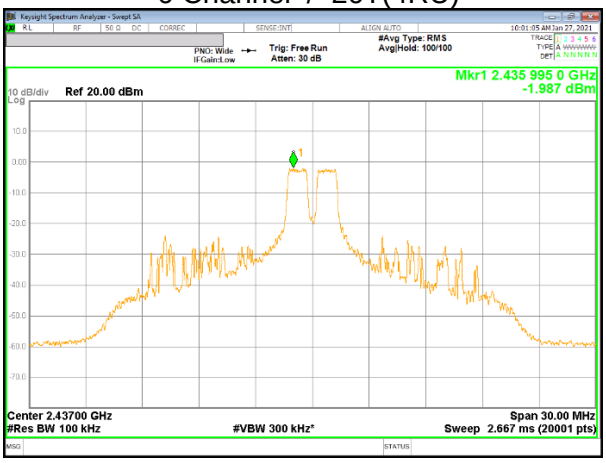
DTS 2.4 GHz IEEE 802.11n HT20 mode

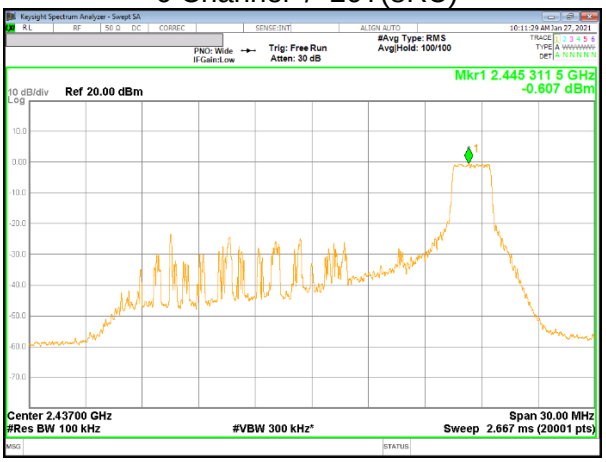
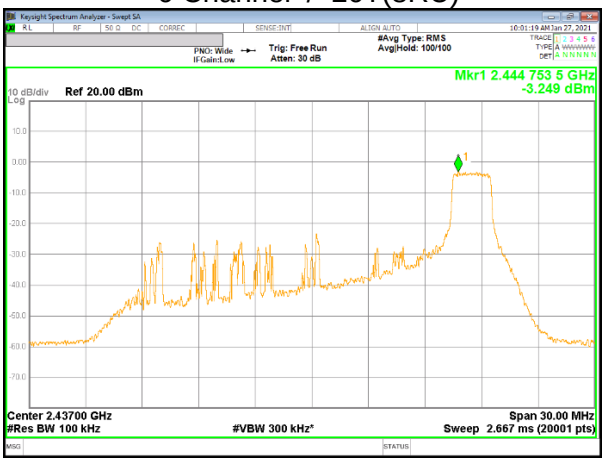
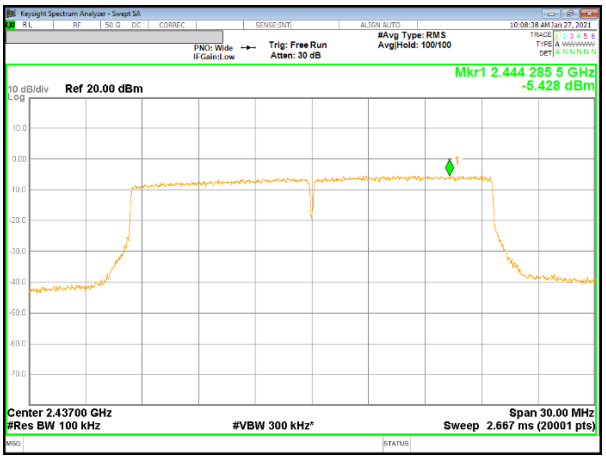
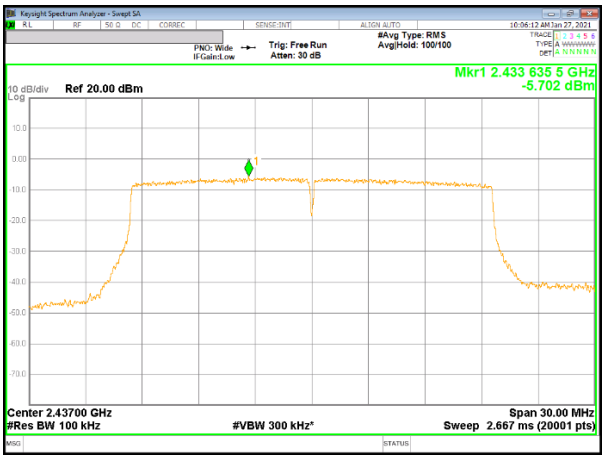
ANT 1	ANT 2
1 Channel	1 Channel
	
6 Channel	6 Channel
	
10 Channel	10 Channel
	

ANT 1	ANT 2
11 Channel	11 Channel
	
12 Channel	12 Channel
	
13 Channel	13 Channel
	

DTS 2.4 GHz IEEE 802.11ax HE20 mode

ANT 1	ANT 2
1 Channel / 26T(0RU)	1 Channel / 26T(0RU)
	
1 Channel / 26T(4RU)	1 Channel / 26T(4RU)
	
1 Channel / 26T(8RU)	1 Channel / 26T(8RU)
	

ANT 1	ANT 2
1 Channel / SU	1 Channel / SU
	
6 Channel / 26T(0RU)	6 Channel / 26T(0RU)
	
6 Channel / 26T(4RU)	6 Channel / 26T(4RU)
	

ANT 1	ANT 2
6 Channel / 26T(8RU)	6 Channel / 26T(8RU)
	
6 Channel / SU	6 Channel / SU
	
10 Channel / 26T(0RU)	10 Channel / 26T(0RU)