



TEST REPORT

Report Number: 13190901-E4V1

Applicant : APPLE, INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A

Model : A2398

FCC ID : BCG-E3540A

IC : 579C-E3540A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5

Date of Issue:
September 21, 2020

Prepared by:
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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	9/21/2020	Initial Issue	Vien Tran

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: SMARTPHONE

MODEL: A2398

SERIAL NUMBER: Original: C7CD603Z08HK, C7CCT014Q90Y
Spot check: C7CD602408GF, C7CCT03MQ900

DATE TESTED: AUGUST 25 – 27, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:



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Prepared By:



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2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with;

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- FCC KDB 558074 D01 v05r02 15.247 Meas Guidance
- ANSI C63.10-2013
- RSS-GEN Issue 5
- RSS-247 Issue 2

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 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.

47173 Benicia Street	47266 Benicia Street	47658 Kato Road
☐ Chamber A	☐ Chamber D	☐ Chamber I
☐ Chamber B	☒ Chamber E	☐ Chamber J
☐ Chamber C	☐ Chamber F	☐ Chamber K
	☐ Chamber G	☒ Chamber L
	☐ Chamber H	☐ Chamber M

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{LAB}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

6. INTRODUCTION OF TEST DATA REUSE

6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and WPT. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

6.2. INTRODUCTION

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID: BCG-E3539A, IC: 579C-E3539A to cover variant BCG-E3540A, 579C-E3540A. The major difference between the parent/reference model and the variant model is the depopulation in the variant model of the mmWave transmitter. All other circuitry and features are identical. The data reuse test plan was approved via manufacturer KDB inquiry.

6.3. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device model A2398, FCC ID: BCG-E3540A, IC: 579C-E3540A for radiated spurious and radiated band-edge in accordance with the Test Plan that was approved via KDB inquiry.

BCG-E3540A / 579C-E3540A SPOT CHECK RESULTS										
Technology	Mode	Test Item	Channel	Measured	Original model		Spot check model		Delta (dB)	
					A2176		A2398			
					BCG-E3539A 579C-E3539A		BCG-E3540A 579C-E3540A			
				Frequency (MHz)	Peak (dBuV)	Ave (dBuV)	Peak	Ave	Peak	Ave
WiFi (2.4GHz)	Ax 242 Tone	RBE	Low	2390	68.40	50.13	65.92	49.80	-2.48	-0.33
			High	2483.5	69.01	49.17	67.98	50.97	-1.03	1.80
		RSE	Mid	7.31	46.11	34.01	46.02	34.73	-0.09	0.72

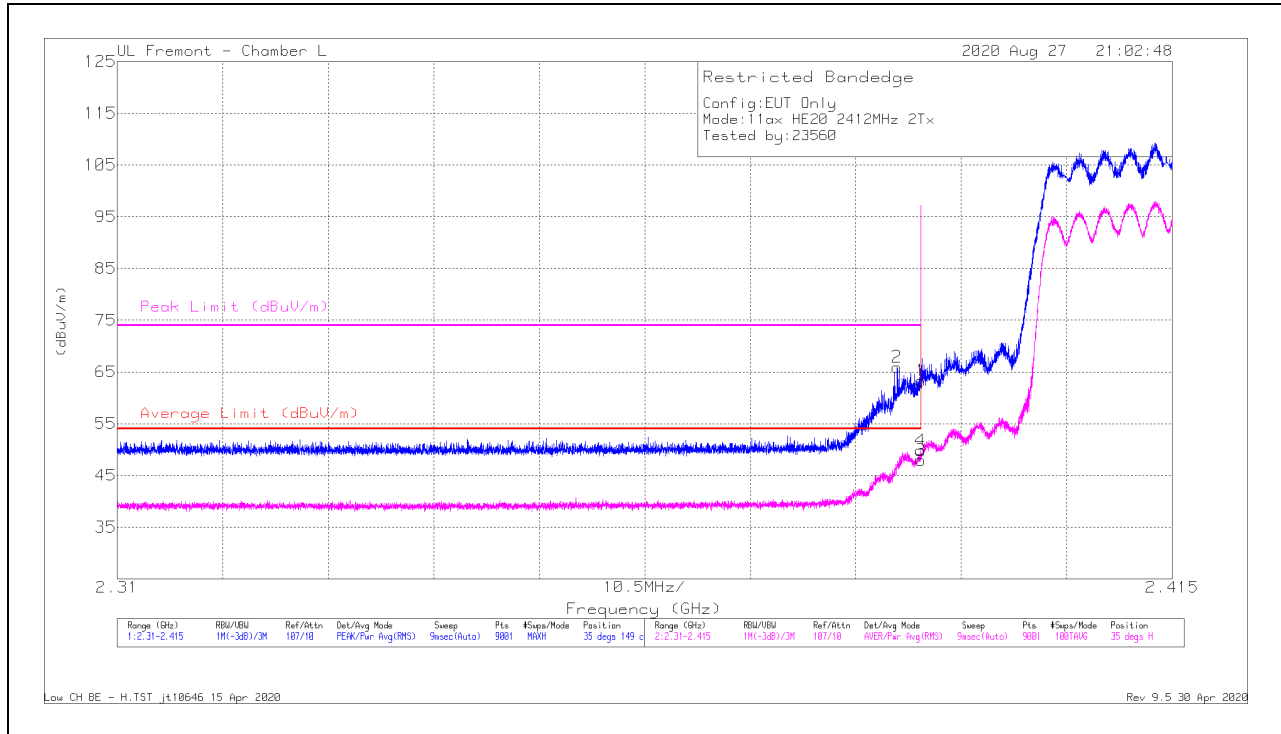
Comparison of the models, upper deviation is within 3dB range and all tests are under FCC Technical Limits. The test report for FCC ID: BCG-E3539A, IC: 579C-E3539A is therefore being used to support the application for certification for FCC ID: BCG-E3540A, IC: 579C-E3540A.

Note: The output powers were verified on model A2398 to match with model A2176 before radiated emissions spot check was performed.

SPOT CHECK DATA

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



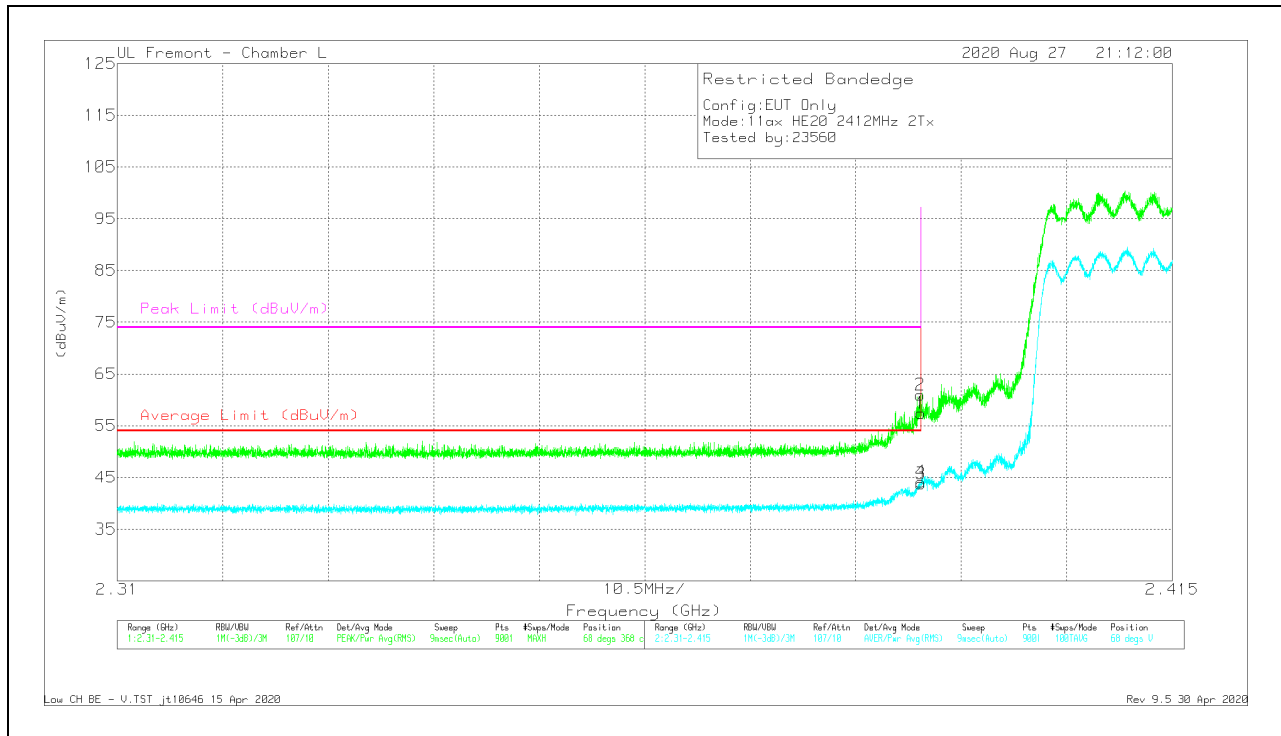
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Filt/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	52.51	Pk	31.9	-21.1	63.31	-	-	74	-10.69	35	149	H
2	* 2.38762	55.22	Pk	31.8	-21.1	65.92	-	-	74	-8.08	35	149	H
3	* 2.38999	37.16	RMS	31.9	-21.1	47.96	54	-6.04	-	-	35	149	H
4	* 2.38994	39	RMS	31.9	-21.1	49.8	54	-4.2	-	-	35	149	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Filtr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	46.6	Pk	31.9	-21.1	57.4	-	-	74	-16.6	68	368	V
2	* 2.38992	50.15	Pk	31.9	-21.1	60.95	-	-	74	-13.05	68	368	V
3	* 2.38999	32.99	RMS	31.9	-21.1	43.79	54	-10.21	-	-	68	368	V
4	* 2.38998	33.32	RMS	31.9	-21.1	44.12	54	-9.88	-	-	68	368	V

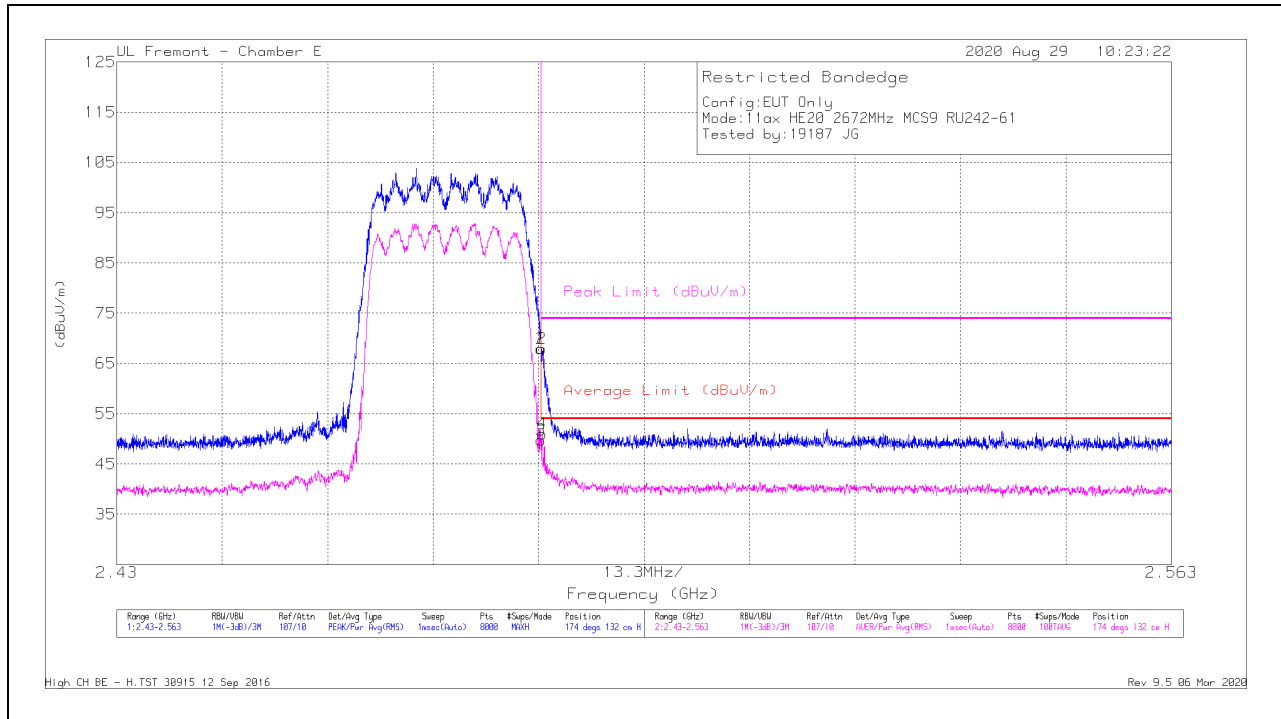
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



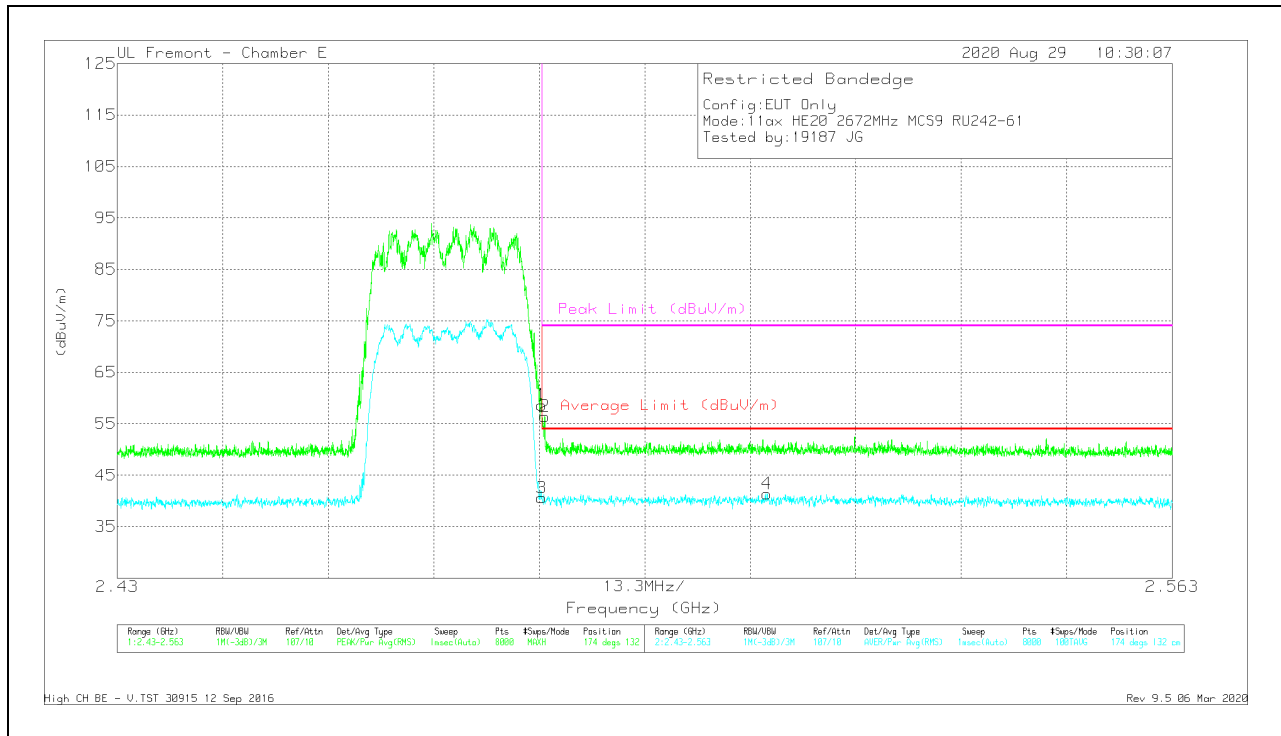
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb1/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	61.64	Pk	32.8	-26.5	67.94	-	-	74	-6.06	174	132	H
2	* 2.48359	61.68	Pk	32.8	-26.5	67.98	-	-	74	-6.02	174	132	H
3	* 2.48351	43.45	RMS	32.8	-26.5	49.75	54	-4.25	-	-	174	132	H
4	* 2.48364	44.67	RMS	32.8	-26.5	50.97	54	-3.03	-	-	174	132	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/CbI/Filt/Pa d (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	52.33	Pk	32.8	-26.5	58.63	-	-	74	-15.37	174	132	V
2	* 2.48389	50.12	Pk	32.8	-26.5	56.42	-	-	74	-17.58	174	132	V
3	* 2.48351	34.32	RMS	32.8	-26.5	40.62	54	-13.38	-	-	174	132	V
4	2.51192	35	RMS	32.9	-26.5	41.4	54	-12.6	-	-	174	132	V

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

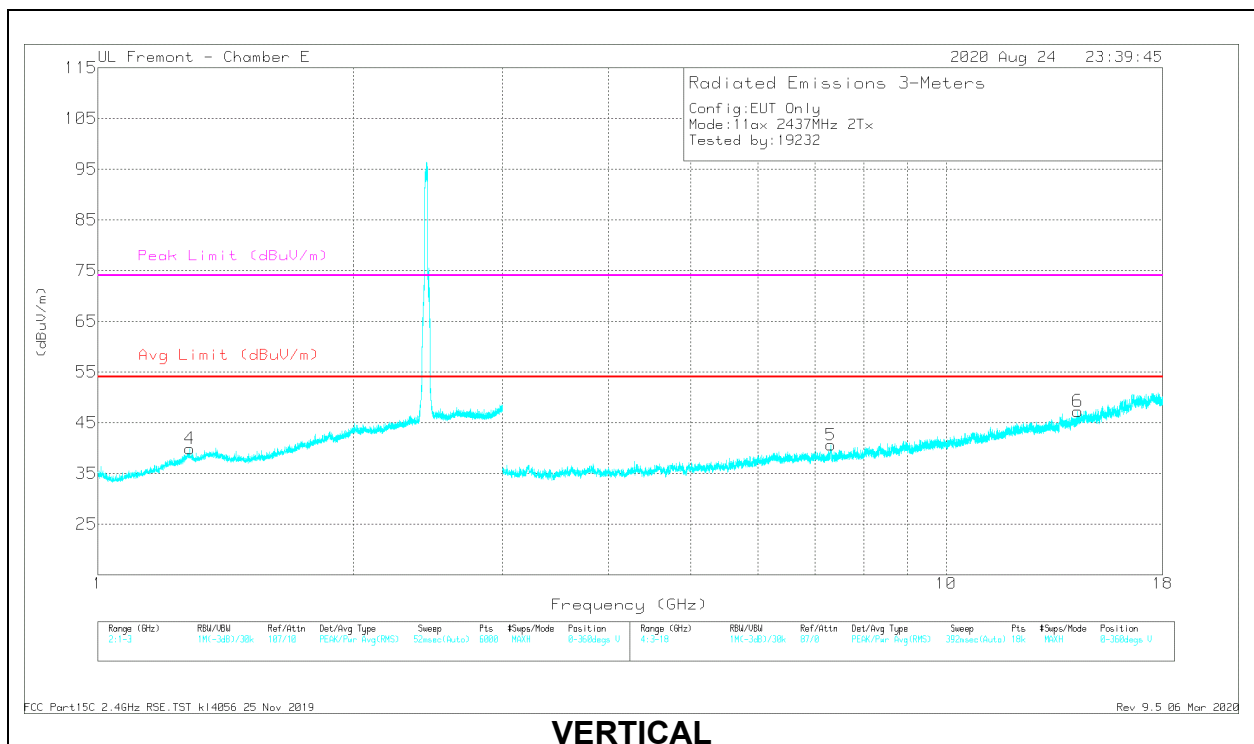
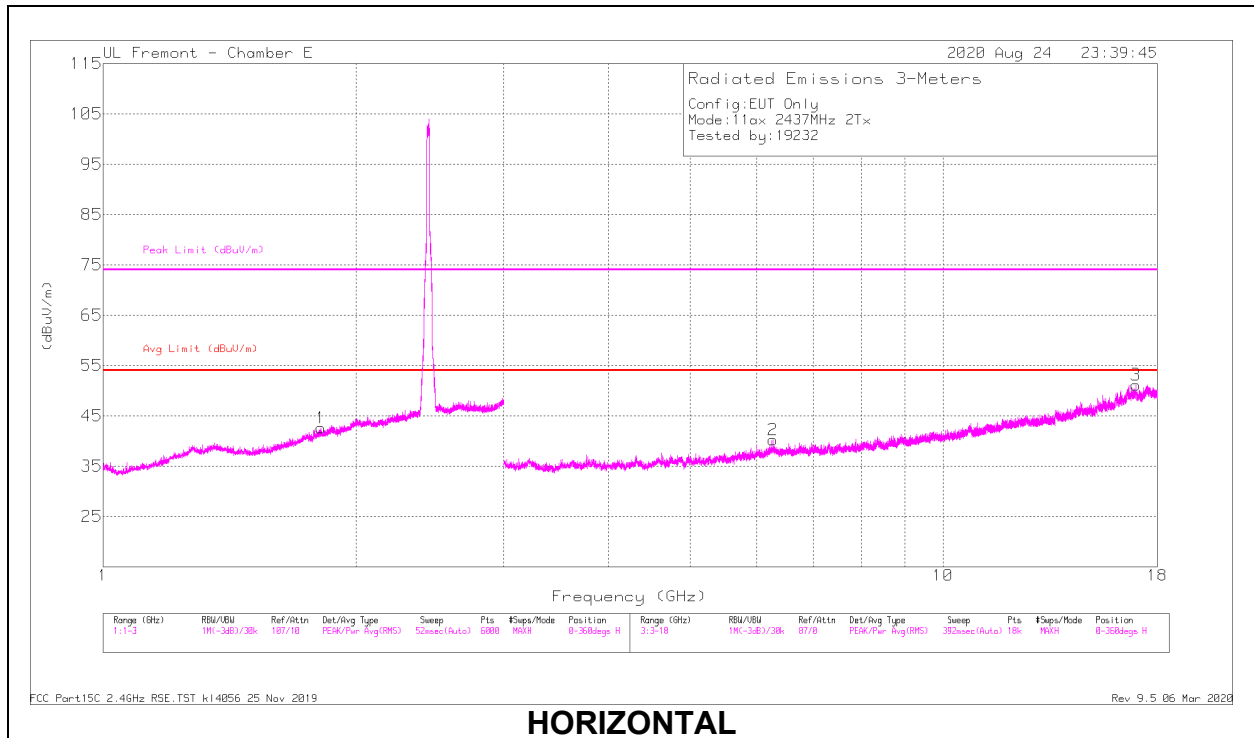
Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

ax mode

MID CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 1.28162	37.79	PK2	29.6	-20.8	46.59	-	-	74	-27.41	365	200	V
	* 1.28239	25.66	MAv1	29.6	-20.8	34.46	54	-19.54	-	-	365	200	V
5	* 7.31514	38.62	PK2	35.5	-28.1	46.02	-	-	74	-27.98	144	101	V
	* 7.31464	27.33	MAv1	35.5	-28.1	34.73	54	-19.27	-	-	144	101	V
1	1.81528	37.12	PK2	30.7	-19.2	48.62	-	-	-	-	222	245	H
2	6.27539	38.98	PK2	35.6	-28.3	46.28	-	-	-	-	124	202	H
6	14.30127	35.58	PK2	39.1	-21.4	53.28	-	-	-	-	278	304	V
3	16.96238	35.19	PK2	41.6	-19.1	57.69	-	-	-	-	264	288	H

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

6.4. REFERENCE DETAIL

Reference application that contains the reused reference data which is attached to this report in Appendix A.

Equipment Class	Reference FCC ID / IC	Reference Report Number	Report Title/Section
DTS	BCG-E3539A 579C-E3539A	13179110-E4	FCC_IC Report DTS / All sections

6.5. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	-2.3	-0.6

6.6. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was WiFi FW Version: 20_10_619_14.

6.7. WORST-CASE CONFIGURATION AND MODE

Radiated band edge and spurious emissions from 1GHz to 18GHz were performed based on the Model A2176 worst case with the EUT set at highest power at Low/Middle/High channels.

802.11ax HE20mode: MCS0, MCS 9

There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The Wi-Fi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

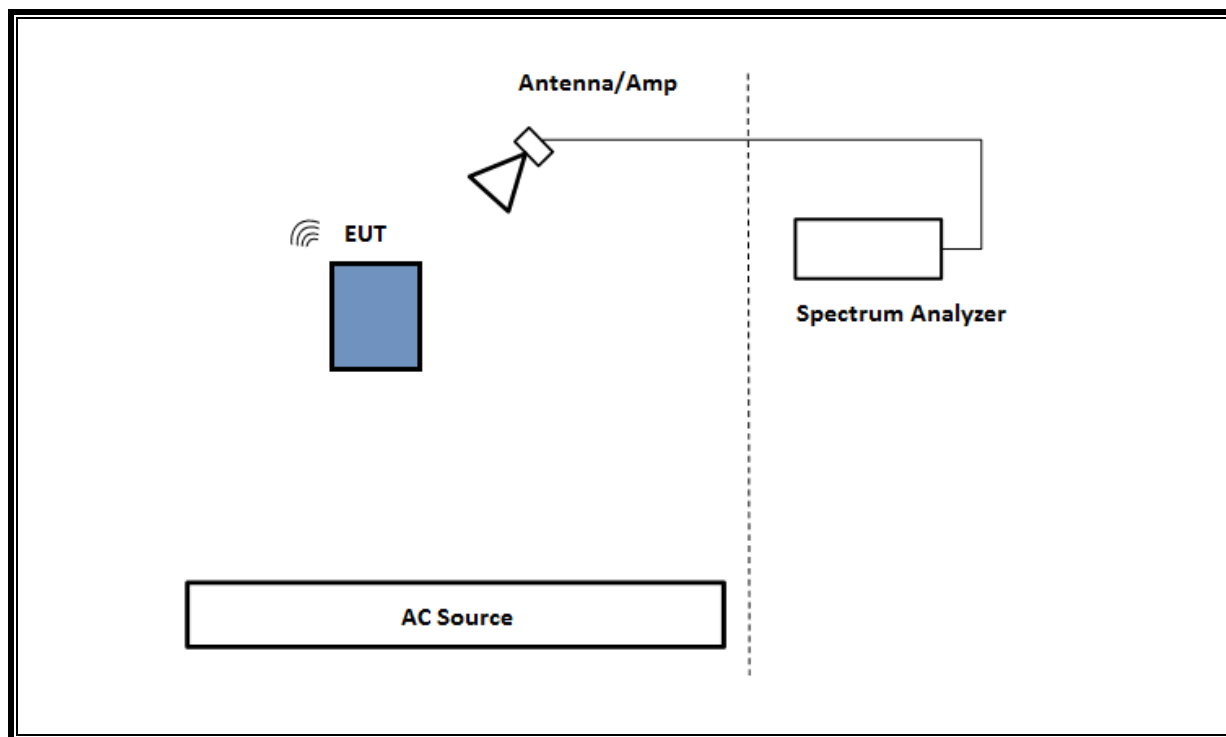
6.8. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Apple	A1398	C02PM012G3QD		DQS-BRCM1069
Laptop AC/DC adapter		Liteon Technology	PA-1450-BA1	B123		N/A
EUT AC/DC adapter		Apple	A1385	D29325SM03XDHLHC9		N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Un-shielded	1	N/A

TEST SETUP

The EUT setup is shown as below. Test software exercised the radio card.

SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



7. MEASUREMENT METHOD

Test Item	Test Method
Output Power	ANSI C63.10 Subclause -11.9.2.3.1 Method AVGPM (Measurement using an RF average-reading power meter)
Radiated emissions non-restricted frequency bands	ANSI C63.10 Subclause -11.11 & Clause 13
Radiated emissions restricted frequency bands	ANSI C63.10 Subclause -11.12.1 & Clause 13
Band-edge	ANSI C63.10 Subclause -11.13.3.2 & Clause 13: Integration method -Peak detection
Band-edge	ANSI C63.10 Subclause -11.13.3.3 & Clause 13: Integration method -Trace averaging with continuous transmission at full power

8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment were utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T1466	01/23/2021	01/23/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T712	03/09/2021	03/09/2020
RF Filter Box, 1-18GHz	UL (IN HOUSE)	N/A	PRE0182865	03/03/2021	03/03/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	02/26/2021	02/26/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	05/26/2021	05/26/2020
RF Filter Box, 1-18GHz	FREMONT	SAC-L1	PRE0180571	04/14/2021	04/14/2020
Power Meter, P-series single channel	Keysight	N1911A	PRE0177682	01/21/2021	01/21/2020
Power Sensor	Keysight	N1921A	T1226	02/13/2021	02/13/2020

UL AUTOMATION SOFTWARE			
Radiated Software	UL	UL EMC	Ver 9.5, Mar 6, 2020

9. SETUP PHOTOS

Please refer to 13179110-EP1V1 for setup photos

END OF TEST REPORT

Appendix A – Reference Test Report

Attached is the test report (13179110-E4) containing the reference data from the parent model as detailed in section 6.4.



TEST REPORT

Report Number: 13179110-E4V2

Applicant : APPLE, INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A

Model : A2176

FCC ID : BCG-E3539A

IC : 579C-E3539A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5

Date of Issue:
October 01, 2020

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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	9/21/2020	Initial Issue	Chin Pang
V2	10/1/2020	Updated per TCB's questions	Vien Tran

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: SMARTPHONE

MODEL: A2176

SERIAL NUMBER: C7CD603Z08HK, C7CCT014Q90Y

DATE TESTED: APRIL 23, 2020- SEPTEMBER 02, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	Complies

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Test Engineer
Consumer Technology Division
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2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
See Comment	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Complies	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Complies	None.
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD	Complies	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Complies	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with;

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- FCC KDB 558074 D01 v05r02 15.247 Meas Guidance
- ANSI C63.10-2013
- RSS-GEN Issue 5
- RSS-247 Issue 2

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 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.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd.
☐ Chamber A (IC:2324B-1)	☐ Chamber D (IC:22541-1)	☒ Chamber I (IC: 2324A-5)
☒ Chamber B (IC:2324B-2)	☒ Chamber E (IC:22541-2)	☒ Chamber J (IC: 2324A-6)
☐ Chamber C (IC:2324B-3)	☐ Chamber F (IC:22541-3)	☐ Chamber K (IC: 2324A-1)
	☐ Chamber G (IC:22541-4)	☒ Chamber L (IC: 2324A-3)
	☒ Chamber H (IC:22541-5)	☐ Chamber M (IC: 2324A-2)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{LAB}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and WPT. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
1Tx			
2412 - 2472	802.11b	22.41	174.18
	802.11g	Covered by 802.11n HT20 1TX	
	802.11n HT20	21.45	139.64
	802.11ax HE20	21.47	140.28

2Tx			
2412-2472	802.11n HT20 CDD	24.23	264.85
	802.11g SDM/STBC	Covered by 802.11n HT20 2TX CDD	
	802.11ax HE20	24.25	266.07

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	-2.3	-0.6

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was FW 20_10_619_14.

6.5. WORST-CASE CONFIGURATION AND MODE

EUT was investigated in three orthogonal orientations X, Y and Z on ANT 4: ANT 3 and 2TX. It was determined that X (Flatbed) orientation was worst-case orientation for ANT 4: and 2TX and Z (portrait) for ANT 3.

Radiated band edge, harmonic, and spurious emissions from 1GHz to 18GHz were performed with the EUT set to transmit at highest power on Low/Middle/High channels.

Radiated emissions below 1GHz, 18-26GHz and power line conducted emissions were performed with the EUT transmits at the channel with the highest output power as worst-case scenario. There were no emissions found below 30MHz within 20dB of the limit.

For radiated harmonics spurious below 1GHz, 1-18GHz L/M/H channels, 18-26GHz, and power line conducted emissions were performed with the EUT set at the 2TX CDD mode among the CDD/SDM modes and 2TX HE mode with power setting equal or higher than SISO modes as worst-case scenario. G mode covered by HT20 mode since it has the same power as HT20.

Below 1GHz tests were performed with EUT connected to AC power adapter as the worst case; and for above 1GHz tests, the worst-case configuration reported was with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop.

The output power and psd for the 802.11 ax mode were investigated between all different tones, and we found that the highest tone had the highest output power and PSD readings, the lowest tone had the highest PSD readings. Therefore, full testing was performed on both the highest and lowest tones.

The PSD were performed as worst case mode.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11n HT20 mode: MCS0, MCS 7
802.11ax HE20mode: MCS0, MCS 9
802.11ax HE20 FULL RU & RU26: MCS09 for Band Edge

There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The Wi-Fi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

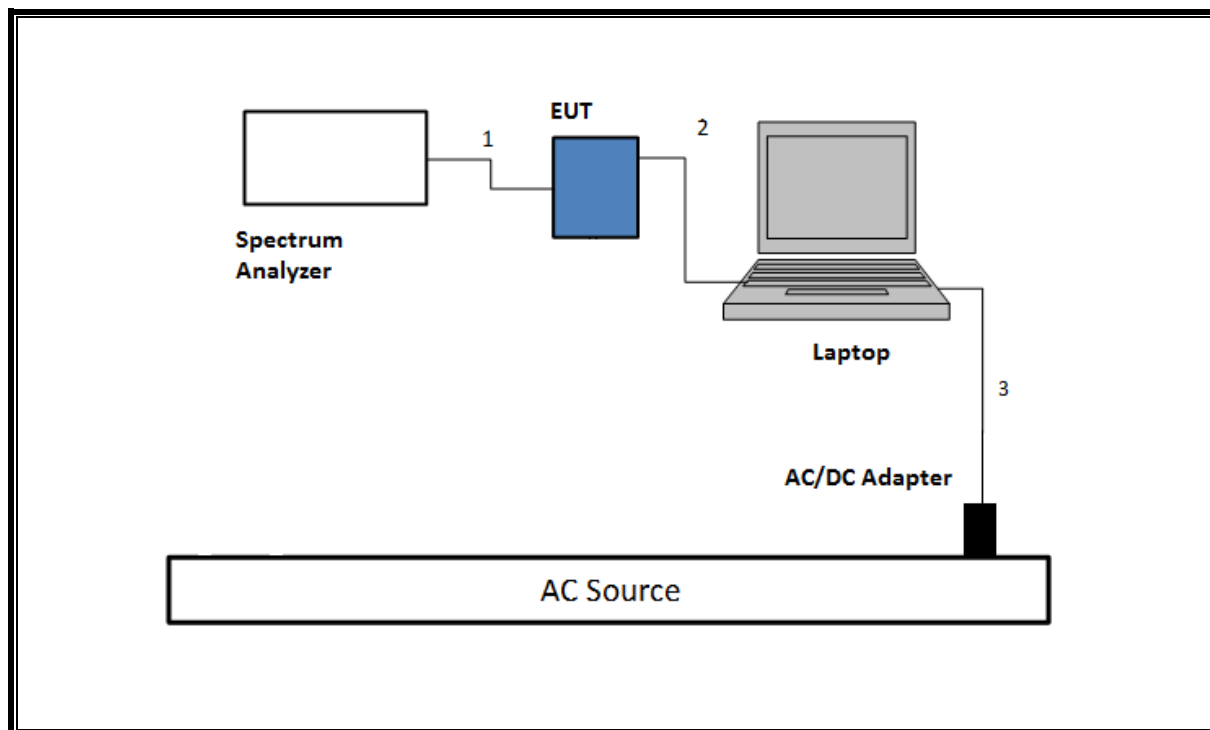
6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Apple	A1502	HRP003436		QDS-BRCM1080
Laptop AC/DC adapter		Liteon Technology	PA-1450-BA1	B123		NA
EUT AC/DC adapter		Apple	A1385	D29325SM03XDHLHC9		NA
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1.0	N/A
3	AC	1	AC	Un-shielded	2	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Un-shielded	1	N/A

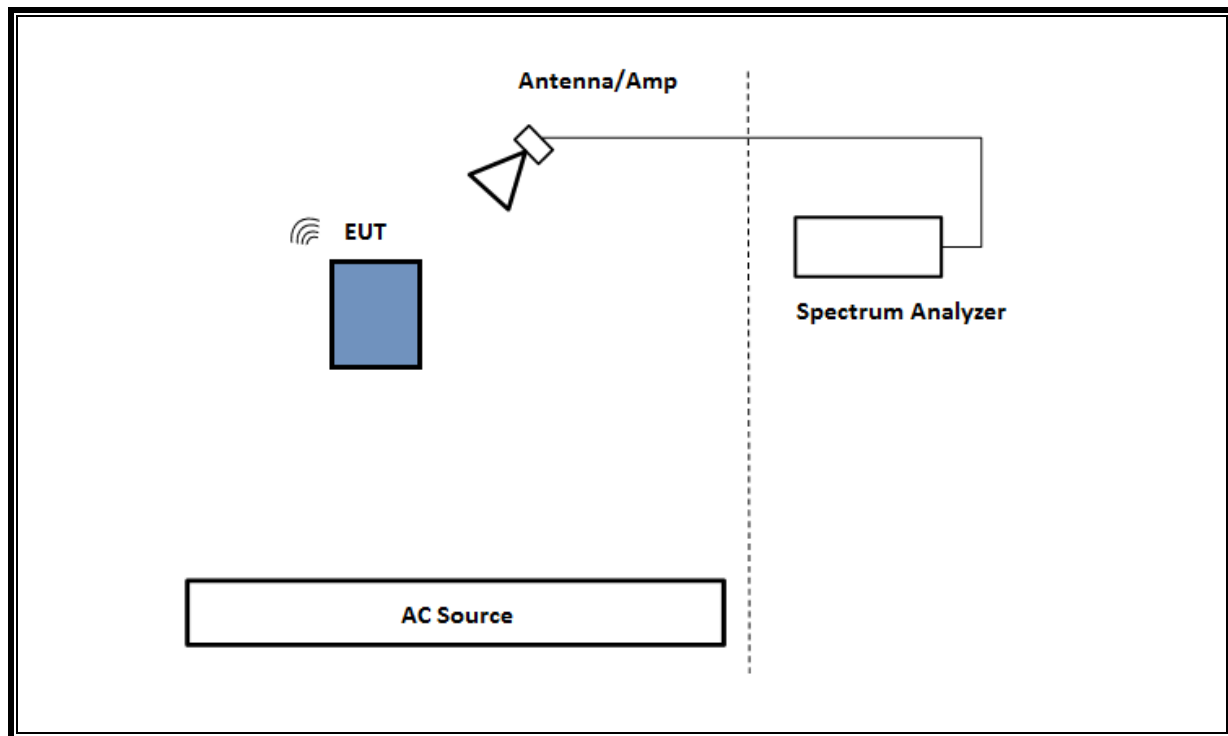
TEST SETUP

The EUT setup is shown as below. Test software exercised the radio card.

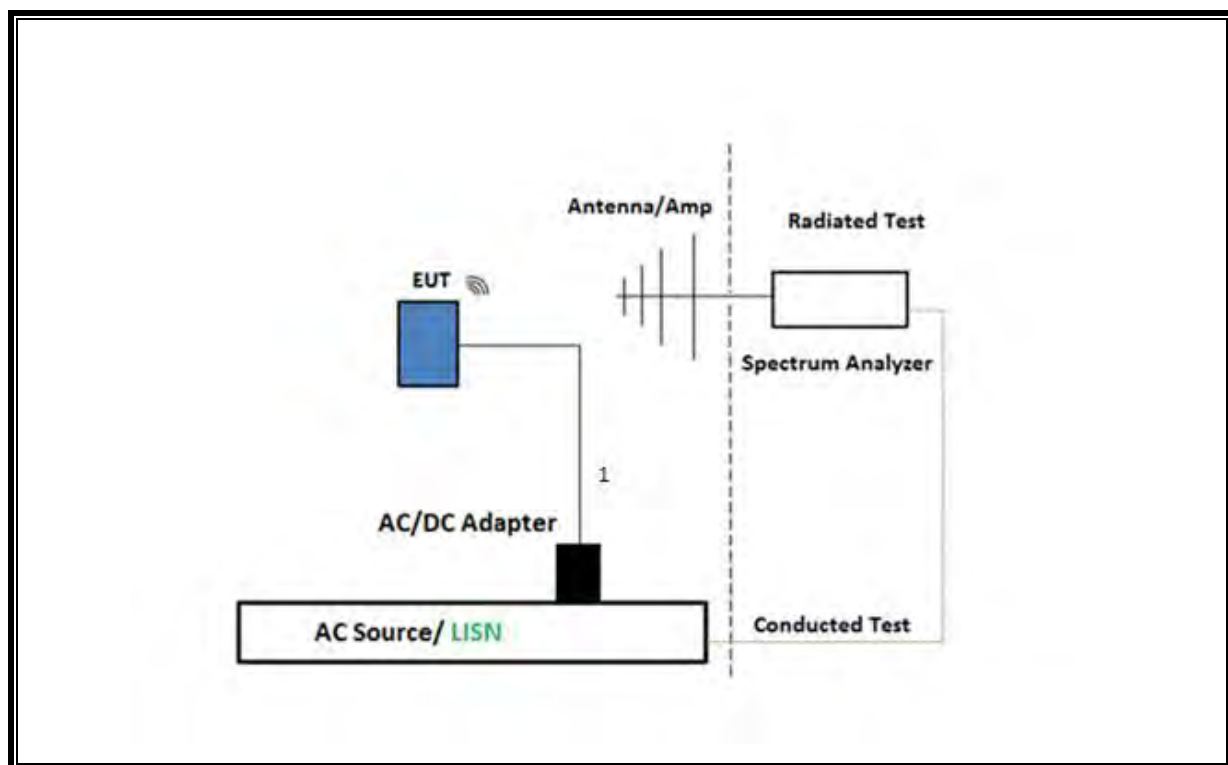
SETUP DIAGRAM FOR CONDUCTED TESTS



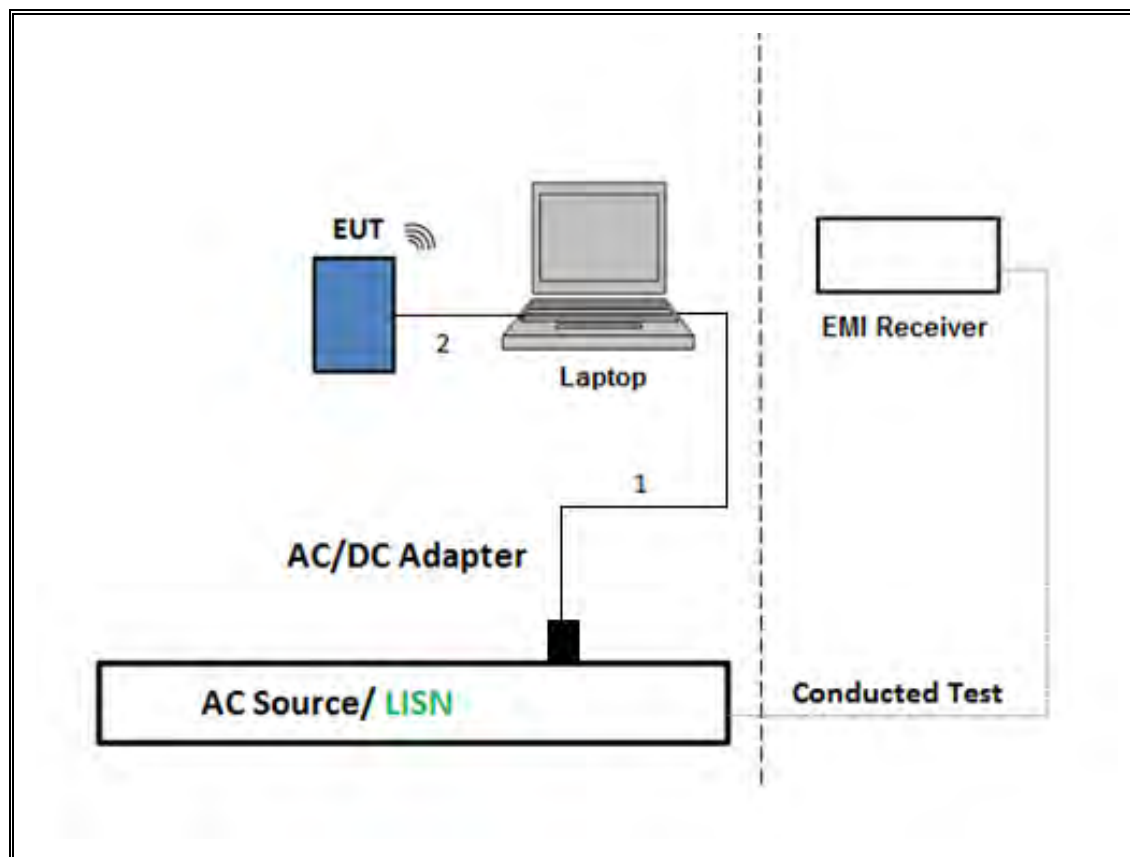
SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



7. MEASUREMENT METHOD

Test Item	Test Method
6 dB BW	ANSI C63.10 Subclause -11.8.1 RBW $\geq$ DTS BW
99% BW	ANSI C63.10-2013, Subclause 6.9.3.
Output Power	ANSI C63.10 Subclause -11.9.2.3.1 Method AVGPM (Measurement using an RF average-reading power meter)
PSD	ANSI C63.10 Subclause -11.10.3 Method AVGPS-1
Radiated emissions non-restricted frequency bands	ANSI C63.10 Subclause -11.11 & Clause 13
Radiated emissions restricted frequency bands	ANSI C63.10 Subclause -11.12.1 & Clause 13
Conducted emissions in restricted frequency bands	ANSI C63.10 Subclause -11.12.2
Band-edge	ANSI C63.10 Subclause -11.13.3.2 & Clause 13: Integration method -Peak detection
Band-edge	ANSI C63.10 Subclause -11.13.3.3 & Clause 13: Integration method -Trace averaging with continuous transmission at full power
Radiated Spurious Emissions Below 30MHz	ANSI C63.10-2013 Subclause 6.4 & Clause 13
AC Power Line Conducted Emissions	ANSI C63.10-2013, Subclause 6.2

8. 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	ID Num	Cal Due	Last Cal
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T712	03/09/2021	03/09/2020
*Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T740	07/31/2020	07/31/2019
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	05/26/2021	05/26/2020
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T931	05/11/2021	05/11/2020
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T344	05/07/2020	05/07/2019
*Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T931	05/11/2020	05/11/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T459	01/23/2021	01/23/2020
Antenna, Double Ridge Guide Horn Antenna	A.H. Systems, Inc.	SAS-571	T963	01/25/2021	01/25/2020
EMI Test Receiver	Rohde & Schwarz	ESW44	Pre0179372	02/25/2021	02/25/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1569	01/30/2021	01/30/2020
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T862	08/20/2020	08/20/2019
*RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	171460	08/24/2020	08/24/2019
EMI Test Receiver	Rohde & Schwarz	ESW44	Pre0179522	02/20/2021	02/20/2020
*EMI Test Receiver	Rohde & Schwarz	ESW44	Pre0179367	05/16/2020	05/16/2019
Antenna Horn, 18 to 26GHz	ARA	SWH-28	T125	04/17/2021	04/17/2020
Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	04/08/2021	04/08/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/23/2021	01/23/2020
*Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunsol Sciences Corp.	JB3	T408	08/23/2020	08/23/2019
*Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	T286	07/31/2020	07/31/2019
Power Sensor	Keysight	N1921A	T1226	02/13/2021	02/13/2020
Power Meter, P-series single channel	Keysight	N1911A	PRE0126090	01/21/2021	01/21/2020
Antenna, Active Loop 9kHz-30MHz	ETS-Lindgren	6502	T1683	04/28/2021	04/28/2020

AC Line Conducted					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	T1436	02/20/2021	02/20/2020
Power Cable, Line Conducted Emissions	UL	PR1	T861	10/27/2020	10/27/2019
LISN for Conducted Emissions CISPR-16	FISCHER CUSTOM COMMUNICATIONS	FCC-LISN-50/250-25-2-01	PRE0186446	01/23/2021	01/23/2020
UL AUTOMATION SOFTWARE					
Radiated Software	UL	UL EMC	Ver 9.5, Mar 6, 2020		
Conducted Software	UL	UL EMC	2020.2.26		
AC Line Conducted Software	UL	UL EMC	Ver 9.5, February 21, 2020		

*Testing is completed before equipment expiration date.

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

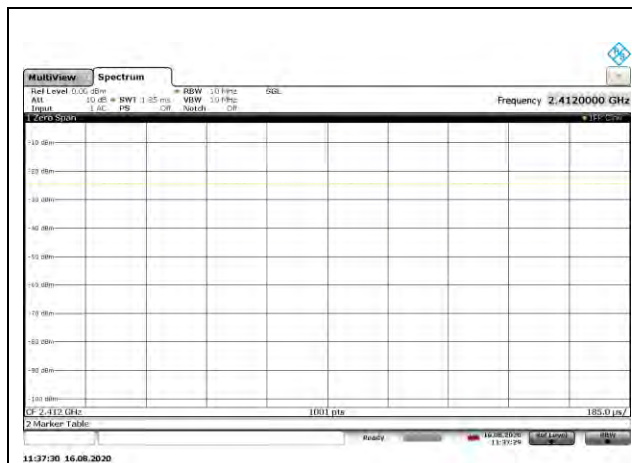
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

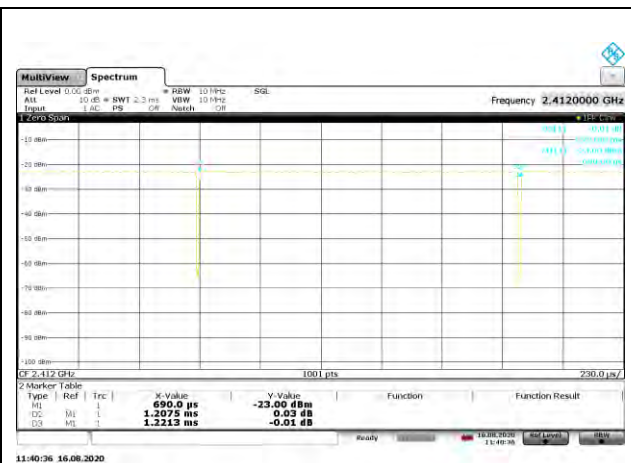
ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11b MCS0	1.850	1.850	1.000	100.00%	0.00	0.010
802.11b MCS11	1.208	1.221	0.989	98.87%	0.00	0.010
802.11n HT20 1Tx MCS0	1.920	1.944	0.988	98.77%	0.00	0.010
802.11n HT20 1Tx MCS7	0.227	0.248	0.915	91.49%	0.39	4.400
802.11n HT20 2Tx MCS0	0.984	1.003	0.981	98.12%	0.00	0.010
802.11n HT20 2Tx MCS7	0.136	0.156	0.871	87.14%	0.60	7.342
802.11ax HE20 1Tx MCS0	1.560	1.584	0.985	98.48%	0.00	0.010
802.11ax HE20 1Tx MCS9	1.560	1.584	0.985	98.48%	0.00	0.010
802.11ax HE20 2Tx MCS0	1.557	1.581	0.985	98.48%	0.00	0.010
802.11ax HE20 2Tx MCS9	1.560	1.581	0.987	98.67%	0.00	0.010

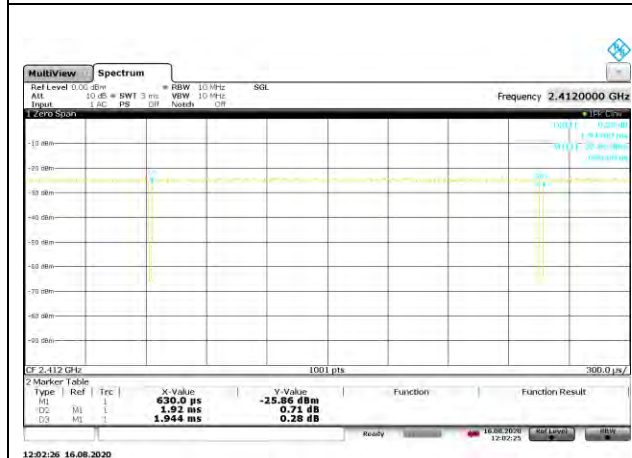
DUTY CYCLE PLOTS



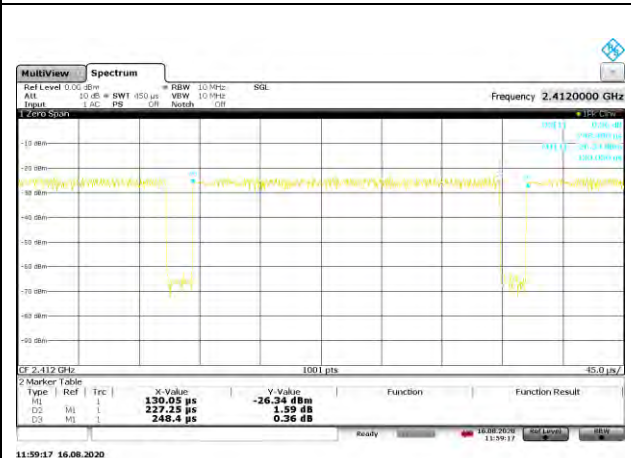
DUTY CYCLE 802.11b MODE MCS0



DUTY CYCLE 802.11b MODE MCS11



DUTY CYCLE 802.11n HT20 1Tx MCS0



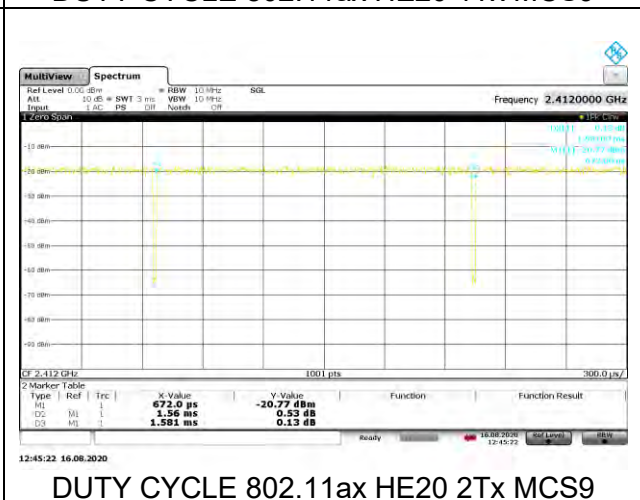
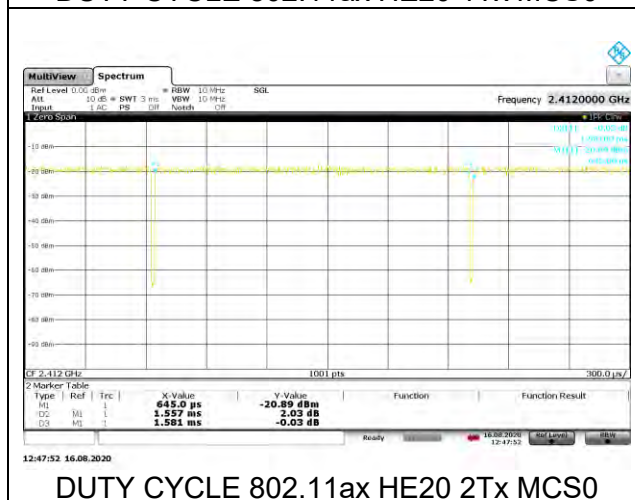
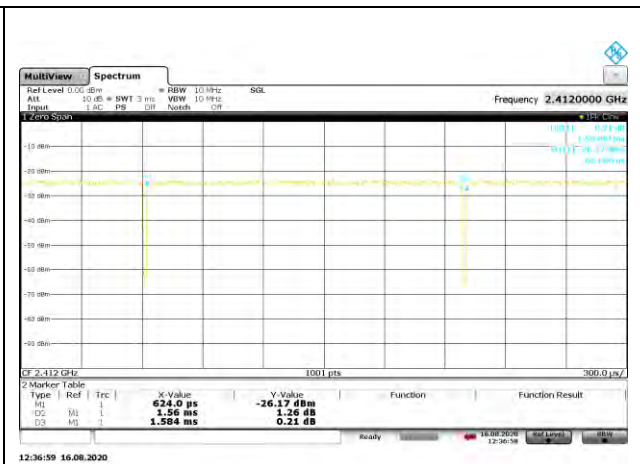
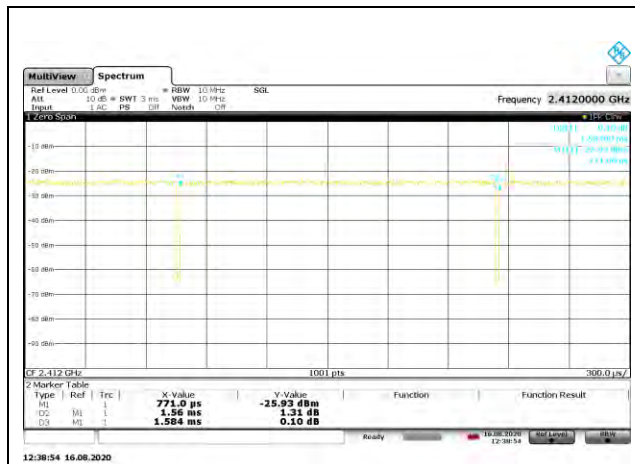
DUTY CYCLE 802.11n HT20 1Tx MCS7



DUTY CYCLE 802.11n HT20 2Tx MCS0



DUTY CYCLE 802.11n HT20 2Tx MCS7



9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

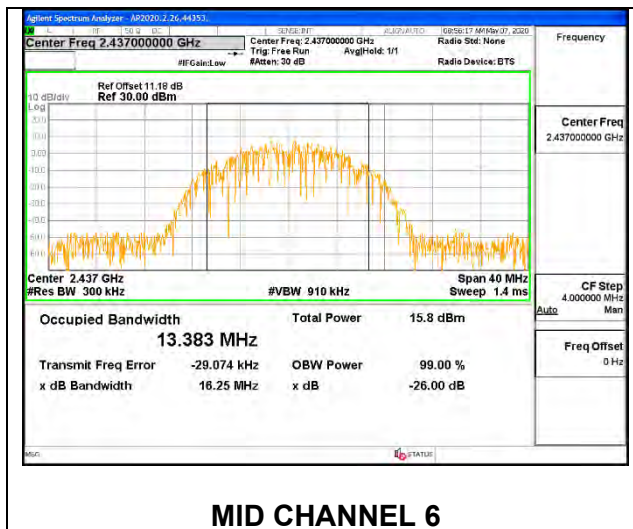
RESULTS

Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

9.2.1. 802.11b MODE 1TX

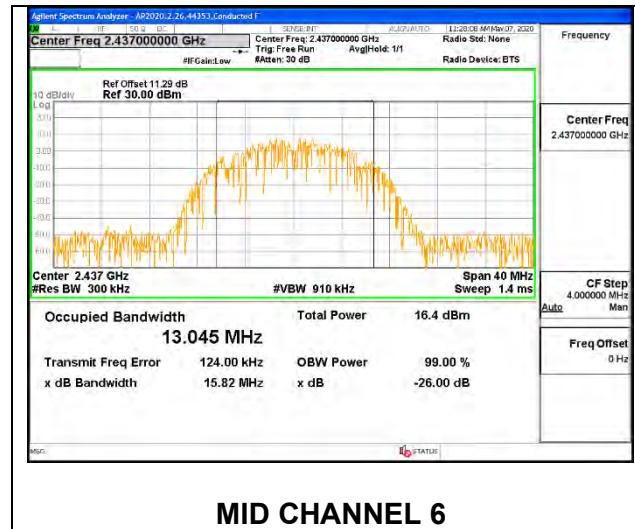
1TX ANT 4 MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	13.228
Mid 6	2437	13.383
High 11	2462	12.929
High 12	2467	13.187
High 13	2472	12.841



1TX ANT 3 MODE

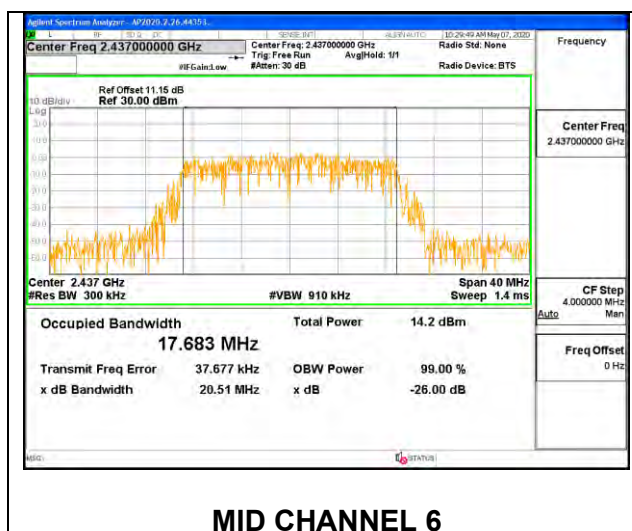
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	13.239
Mid 6	2437	13.045
High 11	2462	13.324
High 12	2467	13.189
High 13	2472	13.298



9.2.2. 802.11n HT20 MODE

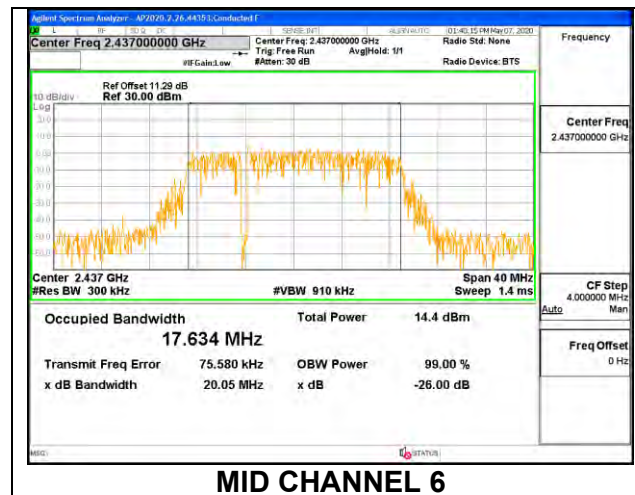
1TX ANT 4 MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.691
Low 2	2417	17.735
Low 3	2422	17.686
Mid 6	2437	17.683
High 9	2452	17.667
High 10	2457	17.632
High 11	2462	17.667
High 12	2467	17.702
High 13	2472	17.537



1TX ANT 3 MODE

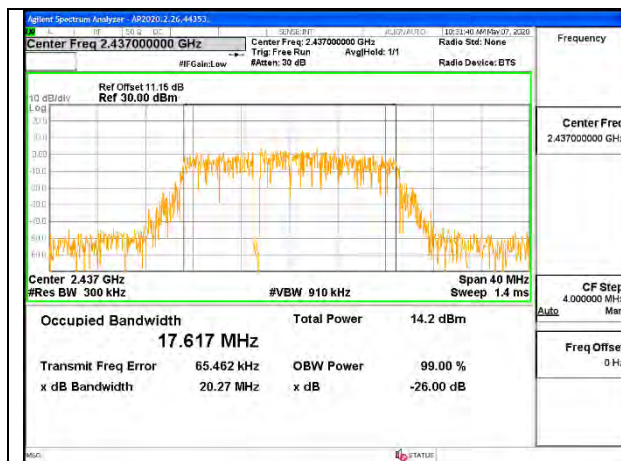
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.733
Low 2	2417	17.668
Low 3	2422	17.755
Mid 6	2437	17.634
High 9	2452	17.701
High 10	2457	17.684
High 11	2462	17.654
High 12	2467	17.729
High 13	2472	17.593



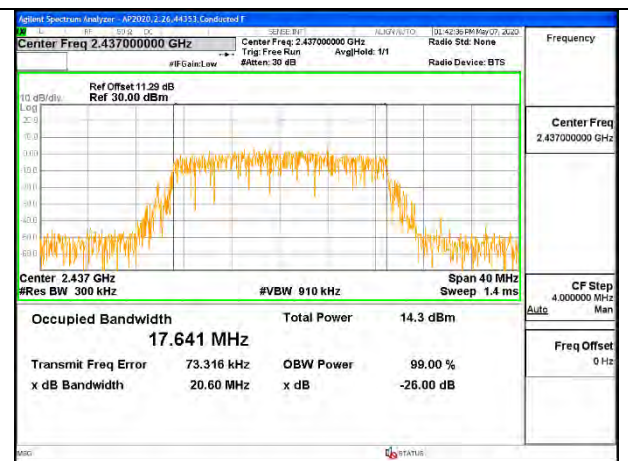
9.2.3. 802.11n HT20 CDD MODE

ANT 4 + ANT 3 2TX MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	17.611	17.739
Low 2	2417	17.696	17.665
Low 3	2422	17.635	17.673
Mid 6	2437	17.617	17.641
High 9	2452	17.642	17.718
High 10	2457	17.730	17.671
High 11	2462	17.716	17.660
High 12	2467	17.728	17.621
High 13	2472	17.638	17.598



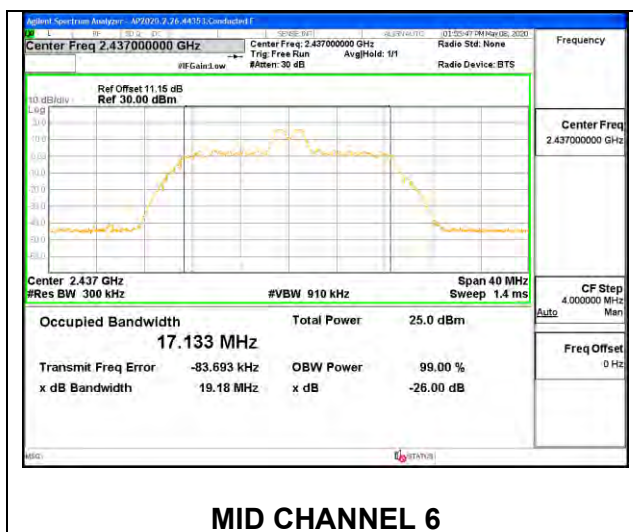
MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

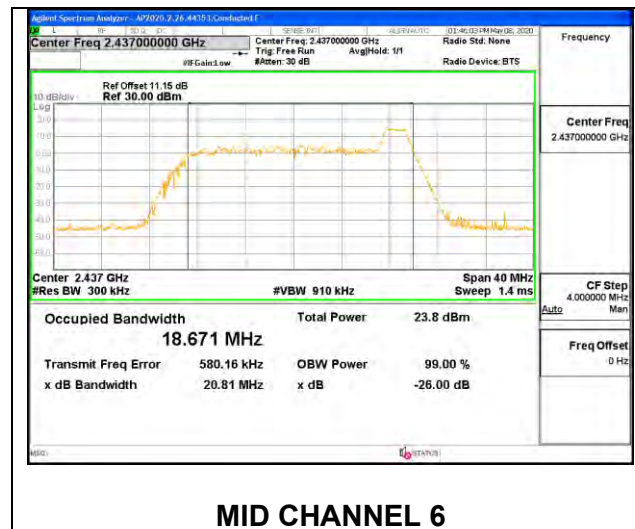
ANT 4 SISO MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.153
Low 2	2417	17.058
Low 3	2422	17.112
Mid 6	2437	17.133
High 9	2452	17.115
High 10	2457	17.098
High 11	2462	16.974
High 12	2467	17.078
High 13	2472	16.738



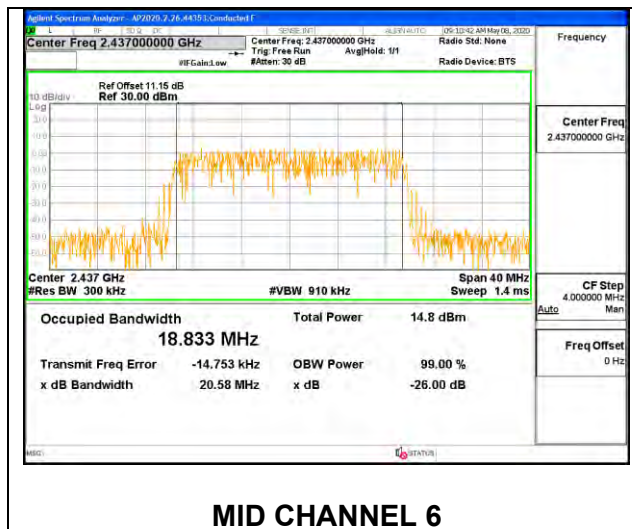
ANT 4 SISO MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.535
Low 2	2417	18.569
Low 3	2422	18.765
Mid 6	2437	18.671
High 9	2452	18.697
High 10	2457	18.863
High 11	2462	18.593
High 12	2467	18.697
High 13	2472	18.729



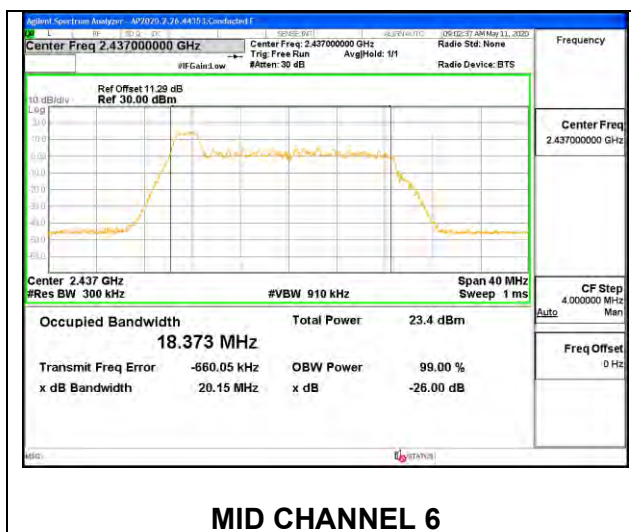
ANT 4 SISO MODE: 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.850
Low 2	2417	18.897
Low 3	2422	19.046
Mid 6	2437	18.833
High 9	2452	18.921
High 10	2457	18.947
High 11	2462	18.940
High 12	2467	18.987
High 13	2472	18.712



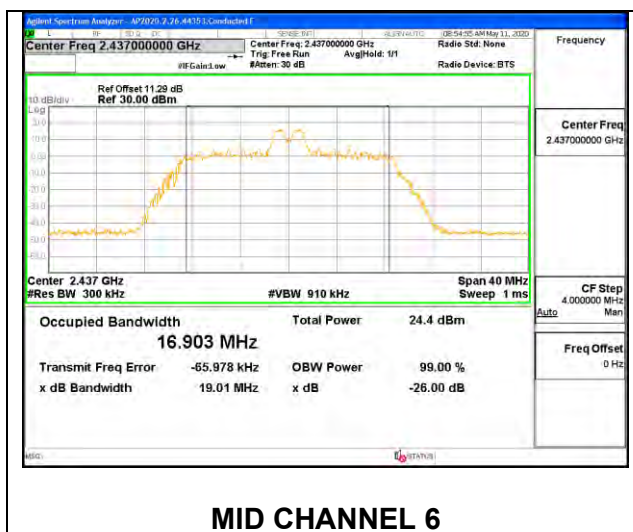
ANT 3 SISO MODE: 26-Tones, RU Index 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.445
Low 2	2417	18.423
Low 3	2422	18.457
Mid 6	2437	18.373
High 9	2452	18.346
High 10	2457	18.447
High 11	2462	18.391
High 12	2467	18.326
High 13	2472	18.140



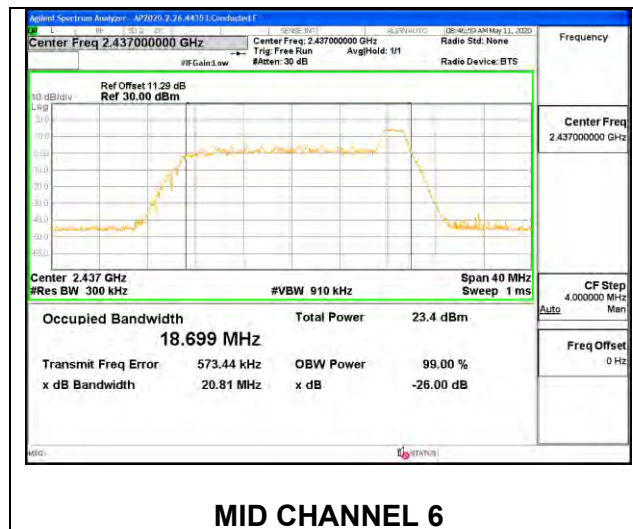
ANT 3 SISO MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.205
Low 2	2417	17.211
Low 3	2422	17.161
Mid 6	2437	16.903
High 9	2452	17.232
High 10	2457	17.186
High 11	2462	17.247
High 12	2467	17.175
High 13	2472	16.843



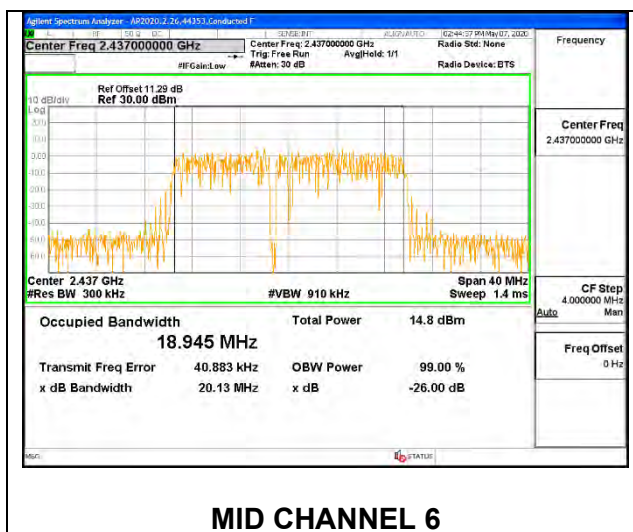
ANT 3 SISO MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.608
Low 2	2417	18.733
Low 3	2422	18.754
Mid 6	2437	18.699
High 9	2452	18.682
High 10	2457	18.865
High 11	2462	18.739
High 12	2467	18.692
High 13	2472	18.851



ANT 3 SISO MODE: 242-Tones, RU Index 61

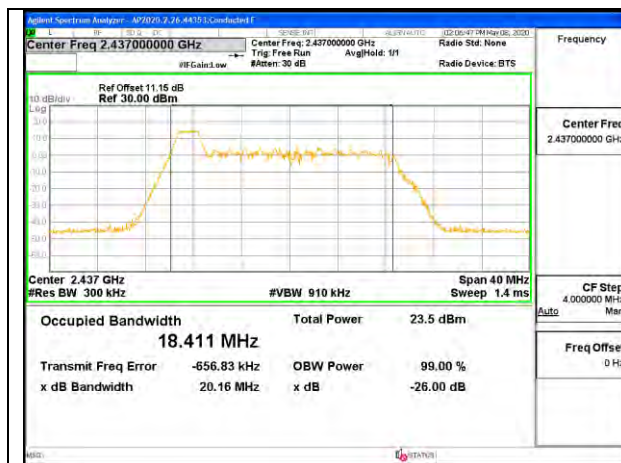
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.893
Low 2	2417	18.887
Low 3	2422	18.908
Mid 6	2437	18.945
High 9	2452	18.886
High 10	2457	18.929
High 11	2462	18.936
High 12	2467	19.040
High 13	2472	18.638



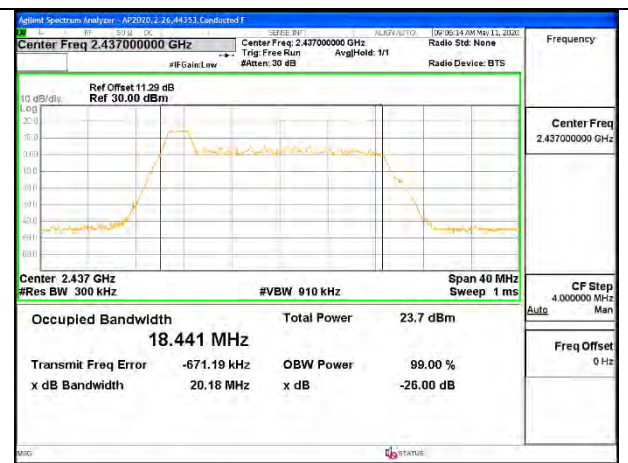
9.2.5. 802.11ax HE20 OFDMA MODE 2TX

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 0

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.489	18.415
Low 2	2417	18.462	18.442
Low 3	2422	18.385	18.431
Mid 6	2437	18.411	18.441
High 9	2452	18.347	18.297
High 10	2457	18.427	18.415
High 11	2462	18.322	18.391
High 12	2467	18.304	18.383
High 13	2472	18.087	18.159



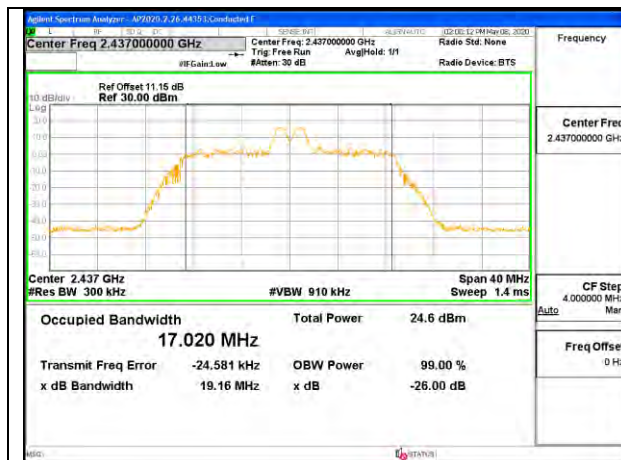
MID CHANNEL 6 ANT 4



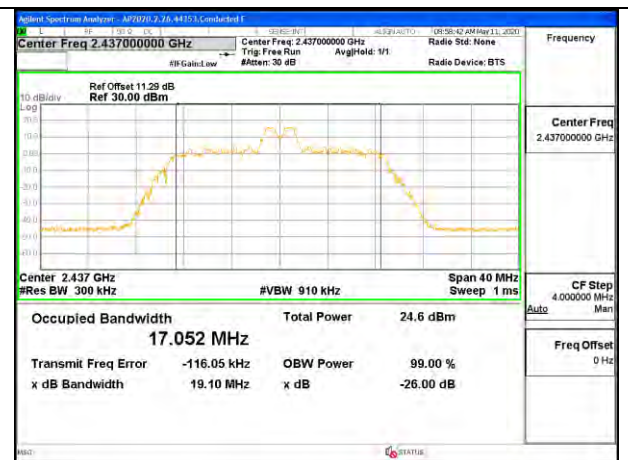
MID CHANNEL 6 ANT 3

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	17.201	17.153
Low 2	2417	17.171	17.108
Low 3	2422	17.007	16.797
Mid 6	2437	17.020	17.052
High 9	2452	17.110	17.261
High 10	2457	17.223	17.125
High 11	2462	17.148	17.102
High 12	2467	17.043	17.181
High 13	2472	16.902	16.942



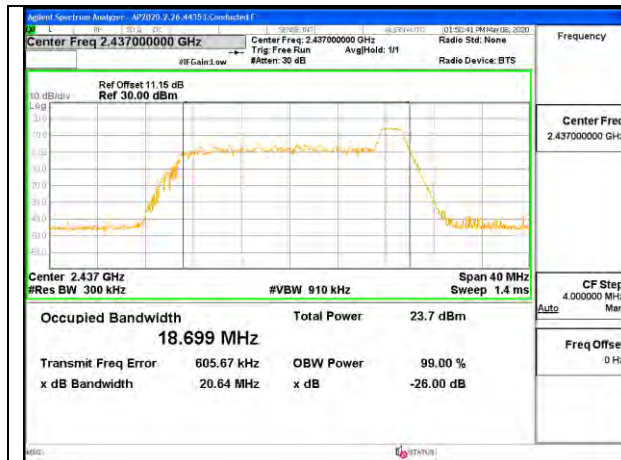
MID CHANNEL 6 ANT 4



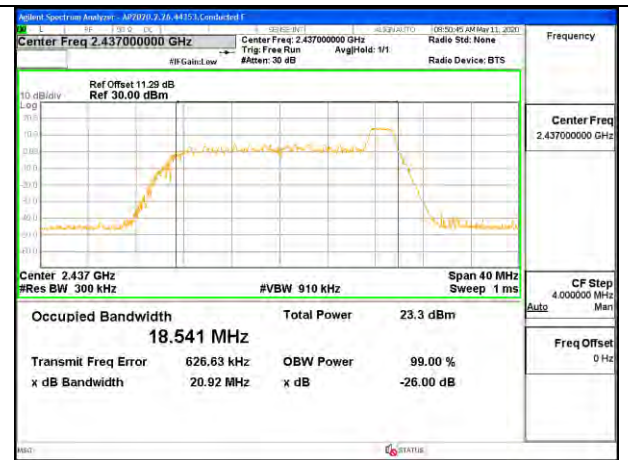
MID CHANNEL 6 ANT 3

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.535	18.800
Low 2	2417	18.590	18.649
Low 3	2422	18.659	18.713
Mid 6	2437	18.699	18.541
High 9	2452	18.676	18.765
High 10	2457	18.747	18.812
High 11	2462	18.668	18.738
High 12	2467	18.615	18.801
High 13	2472	18.842	18.763



MID CHANNEL 6 ANT 4



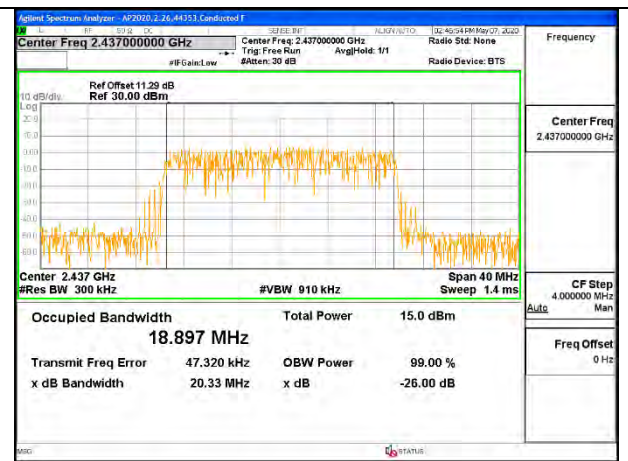
MID CHANNEL 6 ANT 3

ANT 4 + ANT 3 2TX MODE: 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.883	19.021
Low 2	2417	18.937	18.871
Low 3	2422	18.939	19.000
Low 4	2427	18.880	18.910
Mid 6	2437	18.960	18.897
High 8	2447	18.990	18.856
High 9	2452	18.946	18.912
High 10	2457	18.956	18.952
High 11	2462	18.896	19.006
High 12	2467	18.928	19.035
High 13	2472	18.608	18.871



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

9.3. 6dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

RESULTS

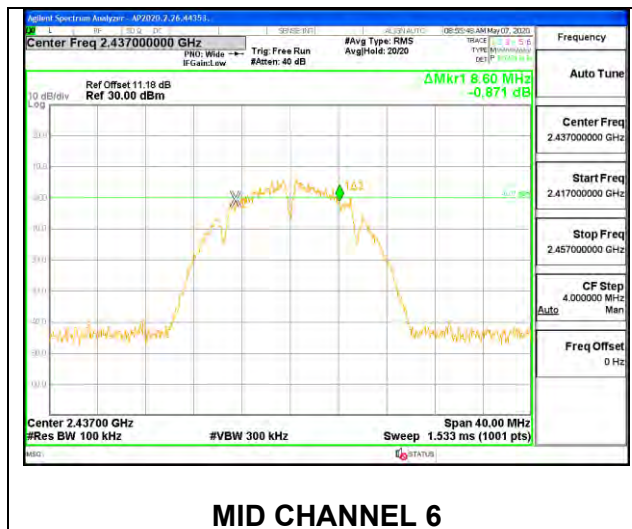
The 6dB bandwidth was measured for the narrowest bandwidth mode, b Mode and ax HE20 Mode 26-Tones as worst case to demonstrate compliance with the minimum required bandwidth of 500 kHz to cover all OFDMA modes.

Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

9.3.1. 802.11b MODE 1TX

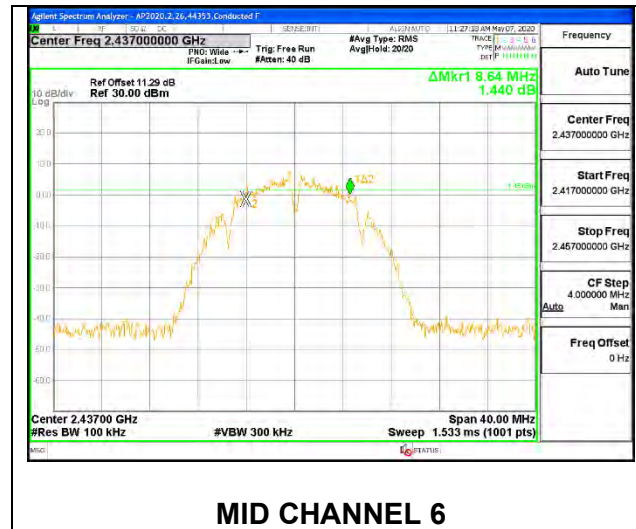
1TX ANT 4 MODE

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	8.12	0.5
Mid 6	2437	8.60	0.5
High 11	2462	8.68	0.5
High 12	2467	7.36	0.5
High 13	2472	7.16	0.5



1TX ANT 3 MODE

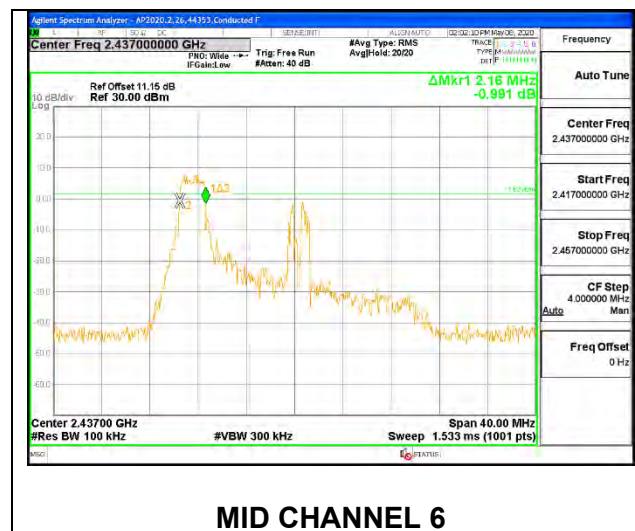
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	7.32	0.5
Mid 6	2437	8.64	0.5
High 11	2462	8.16	0.5
High 12	2467	8.64	0.5
High 13	2472	8.16	0.5



9.3.2. 802.11ax HE20 MODE

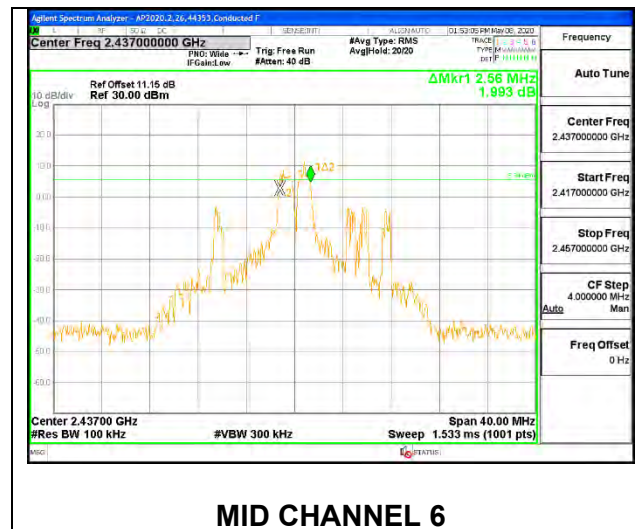
ANT 4 SISO MODE: 26-Tones, RU index 0

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.16	0.5
Low 2	2417	2.12	0.5
Low 3	2422	2.16	0.5
Mid 6	2437	2.16	0.5
High 9	2452	2.04	0.5
High 10	2457	2.12	0.5
High 11	2462	2.16	0.5
High 12	2467	2.16	0.5
High 13	2472	2.16	0.5



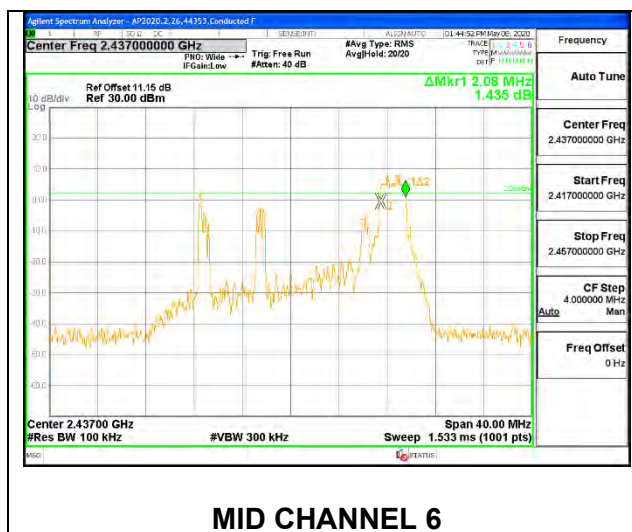
ANT 4 SISO MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.68	0.5
Low 2	2417	2.64	0.5
Low 3	2422	2.64	0.5
Mid 6	2437	2.56	0.5
High 9	2452	2.68	0.5
High 10	2457	2.68	0.5
High 11	2462	2.60	0.5
High 12	2467	2.68	0.5
High 13	2472	2.64	0.5



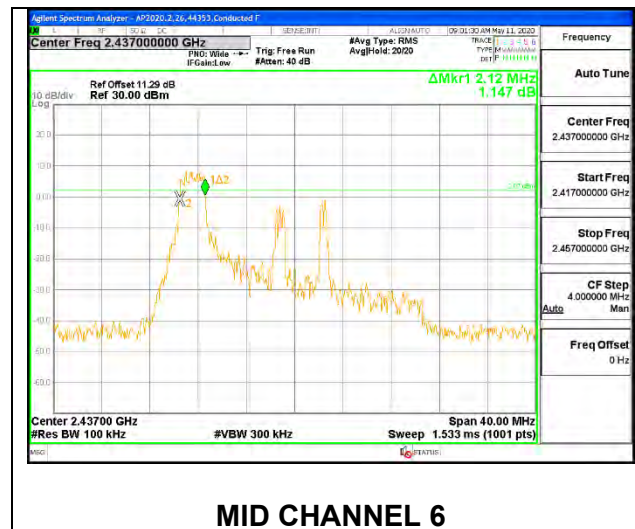
ANT 4 SISO MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.12	0.5
Low 2	2417	2.16	0.5
Low 3	2422	2.04	0.5
Mid 6	2437	2.08	0.5
High 9	2452	2.20	0.5
High 10	2457	2.16	0.5
High 11	2462	2.08	0.5
High 12	2467	2.12	0.5
High 13	2472	2.12	0.5



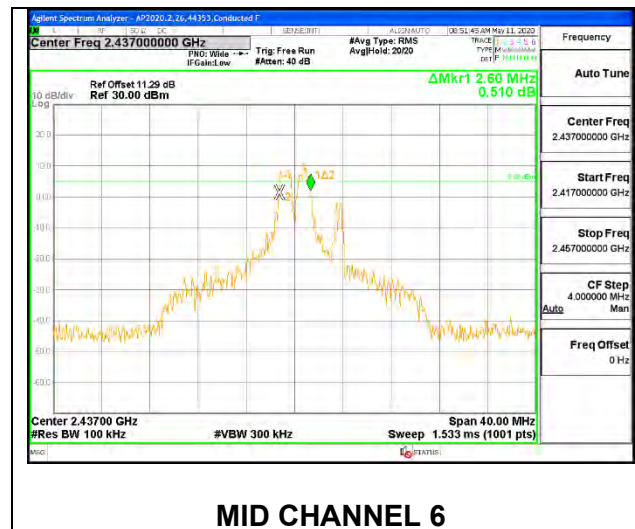
ANT 3 SISO MODE: 26-Tones, RU Index 0

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.12	0.5
Low 2	2417	2.16	0.5
Low 3	2422	2.04	0.5
Mid 6	2437	2.12	0.5
High 9	2452	2.20	0.5
High 10	2457	2.12	0.5
High 11	2462	2.08	0.5
High 12	2467	2.16	0.5
High 13	2472	2.12	0.5



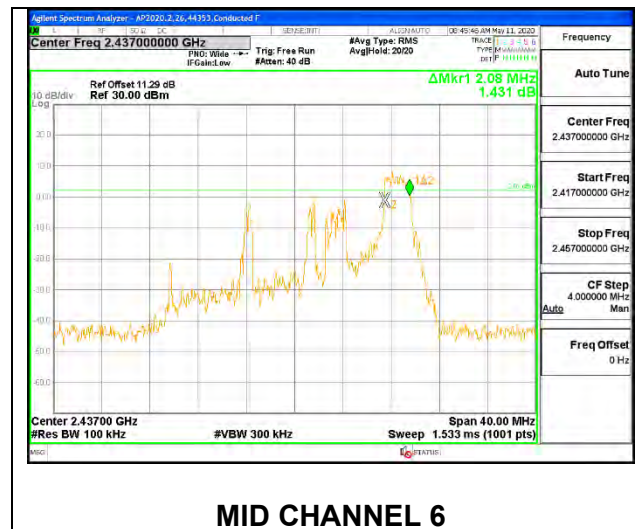
ANT 3 SISO MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.68	0.5
Low 2	2417	2.68	0.5
Low 3	2422	2.76	0.5
Mid 6	2437	2.60	0.5
High 9	2452	2.64	0.5
High 10	2457	2.64	0.5
High 11	2462	2.72	0.5
High 12	2467	2.68	0.5
High 13	2472	2.64	0.5



ANT 3 SISO MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.12	0.5
Low 2	2417	2.12	0.5
Low 3	2422	2.12	0.5
Mid 6	2437	2.08	0.5
High 9	2452	2.12	0.5
High 10	2457	2.16	0.5
High 11	2462	2.20	0.5
High 12	2467	2.16	0.5
High 13	2472	2.12	0.5



9.3.3. 802.11ax HE20 OFDMA MODE 2TX

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 0

Channel	Frequency (MHz)	6dB BW(MHz) ANT 4	6dB BW (MHz) ANT 3	Minimum Limit (MHz)
Low 1	2412	2.16	2.12	0.5
Low 2	2417	2.08	2.04	0.5
Low 3	2422	2.12	2.08	0.5
Mid 6	2437	2.04	2.20	0.5
High 9	2452	2.12	2.12	0.5
High 10	2457	2.12	2.08	0.5
High 11	2462	2.20	2.08	0.5
High 12	2467	2.12	2.16	0.5
High 13	2472	2.12	2.08	0.5



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	6dB BW(MHz) ANT 4	6dB BW (MHz) ANT 3	Minimum Limit (MHz)
Low 1	2412	2.64	2.68	0.5
Low 2	2417	2.68	2.68	0.5
Low 3	2422	2.68	2.72	0.5
Mid 6	2437	2.68	2.72	0.5
High 9	2452	2.76	2.64	0.5
High 10	2457	2.68	2.68	0.5
High 11	2462	2.64	2.60	0.5
High 12	2467	2.64	2.68	0.5
High 13	2472	2.64	2.68	0.5



MID CHANNEL 6 ANT 4



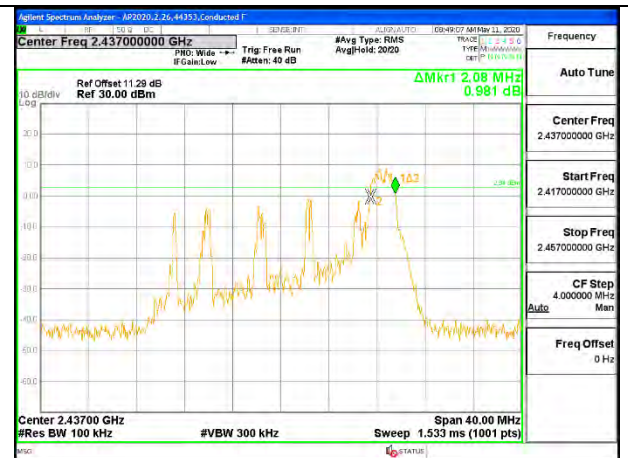
MID CHANNEL 6 ANT 3

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 8

Channel	Frequency (MHz)	6dB BW(MHz) ANT 4	6dB BW (MHz) ANT 3	Minimum Limit (MHz)
Low 1	2412	2.08	2.12	0.5
Low 2	2417	2.12	2.24	0.5
Low 3	2422	2.12	2.04	0.5
Mid 6	2437	2.12	2.08	0.5
High 9	2452	2.08	2.12	0.5
High 10	2457	2.12	2.08	0.5
High 11	2462	2.12	2.16	0.5
High 12	2467	2.12	2.08	0.5
High 13	2472	2.16	2.08	0.5



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Gated average output power was read directly from power meter.

DIRECTIONAL ANTENNA GAIN

For 1 TX:

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

For 2 TX:

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	ANT 4 Antenna Gain (dBi)	ANT 3 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	-2.30	-0.60	-1.37	1.60

RESULTS

9.4.1. 802.11b MODE 1TX

Test Engineer:	44352
Test Date:	8/26/2020

1TX ANT 4 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.30	30.00	30	36	30.00
Mid 6	2437	-2.30	30.00	30	36	30.00
High 11	2462	-2.30	30.00	30	36	30.00
High 12	2467	-2.30	30.00	30	36	30.00
High 13	2472	-2.30	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	20.93	20.93	30.00	-9.07
Mid 6	2437	20.94	20.94	30.00	-9.06
High 11	2462	20.87	20.87	30.00	-9.13
High 12	2467	20.84	20.84	30.00	-9.16
High 13	2472	20.82	20.82	30.00	-9.18

*PSD is tested at higher power.

1TX ANT 3 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.60	30.00	30	36	30.00
Mid 6	2437	-0.60	30.00	30	36	30.00
High 11	2462	-0.60	30.00	30	36	30.00
High 12	2467	-0.60	30.00	30	36	30.00
High 13	2472	-0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	21.91	21.91	30.00	-8.09
Mid 6	2437	22.41	22.41	30.00	-7.59
High 11	2462	21.91	21.91	30.00	-8.09
High 12	2467	21.84	21.84	30.00	-8.16
High 13	2472	20.83	20.83	30.00	-9.17

9.4.2. 802.11n HT20 MODE

Test Engineer:	44352
Test Date:	8/26/2020

1TX ANT 4 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.30	30.00	30	36	30.00
Low 2	2417	-2.30	30.00	30	36	30.00
Low 3	2422	-2.30	30.00	30	36	30.00
Mid 6	2437	-2.30	30.00	30	36	30.00
High 9	2452	-2.30	30.00	30	36	30.00
High 10	2457	-2.30	30.00	30	36	30.00
High 11	2462	-2.30	30.00	30	36	30.00
High 12	2467	-2.30	30.00	30	36	30.00
High 13	2472	-2.30	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.46	17.46	30.00	-12.54
Low 2	2417	19.34	19.34	30.00	-10.66
Low 3	2422	20.88	20.88	30.00	-9.12
Mid 6	2437	20.95	20.95	30.00	-9.05
High 9	2452	20.92	20.92	30.00	-9.08
High 10	2457	19.48	19.48	30.00	-10.52
High 11	2462	17.44	17.44	30.00	-12.56
High 12	2467	15.39	15.39	30.00	-14.61
High 13	2472	15.40	15.40	30.00	-14.60

*PSD is tested at higher power.

1TX ANT 3 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.60	30.00	30	36	30.00
Low 2	2417	-0.60	30.00	30	36	30.00
Low 3	2422	-0.60	30.00	30	36	30.00
Mid 6	2437	-0.60	30.00	30	36	30.00
High 9	2452	-0.60	30.00	30	36	30.00
High 10	2457	-0.60	30.00	30	36	30.00
High 11	2462	-0.60	30.00	30	36	30.00
High 12	2467	-0.60	30.00	30	36	30.00
High 13	2472	-0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.41	17.41	30.00	-12.59
Low 2	2417	19.47	19.47	30.00	-10.53
Low 3	2422	21.40	21.40	30.00	-8.60
Mid 6	2437	21.45	21.45	30.00	-8.55
High 9	2452	20.93	20.93	30.00	-9.07
High 10	2457	19.41	19.41	30.00	-10.59
High 11	2462	17.47	17.47	30.00	-12.53
High 12	2467	15.42	15.42	30.00	-14.58
High 13	2472	15.40	15.40	30.00	-14.60

9.4.3. 802.11n HT20 CDD MODE 2TX

Test Engineer:	44352
Test Date:	8/26/2020

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.37	30.00	36	30.00
Low 2	2417	-1.37	30.00	36	30.00
Low 3	2422	-1.37	30.00	36	30.00
Mid 6	2437	-1.37	30.00	36	30.00
High 9	2452	-1.37	30.00	36	30.00
High 10	2457	-1.37	30.00	36	30.00
High 11	2462	-1.37	30.00	36	30.00
High 12	2467	-1.37	30.00	36	30.00
High 13	2472	-1.37	30.00	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.40	16.46	19.44	30.00	-10.56
Low 2	2417	18.47	18.41	21.45	30.00	-8.55
Low 3	2422	19.82	19.93	22.89	30.00	-7.11
Mid 6	2437	20.94	21.48	24.23	30.00	-5.77
High 9	2452	19.43	19.47	22.46	30.00	-7.54
High 10	2457	18.38	18.43	21.42	30.00	-8.58
High 11	2462	16.46	16.43	19.46	30.00	-10.54
High 12	2467	13.92	13.89	16.92	30.00	-13.08
High 13	2472	13.90	13.88	16.90	30.00	-13.10

*PSD is tested at higher power.

9.4.4. 802.11ax HE20 MODE

Test Engineer:	44352
Test Date:	8/26/2020

1TX ANT 4 MODE: 26-Tones, RU Index 0

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.30	30.00	30	36	30.00
Low 2	2417	-2.30	30.00	30	36	30.00
Low 3	2422	-2.30	30.00	30	36	30.00
Mid 6	2437	-2.30	30.00	30	36	30.00
High 9	2452	-2.30	30.00	30	36	30.00
High 10	2457	-2.30	30.00	30	36	30.00
High 11	2462	-2.30	30.00	30	36	30.00
High 12	2467	-2.30	30.00	30	36	30.00
High 13	2472	-2.30	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.96	15.96	30.00	-14.04
Low 2	2417	17.97	17.97	30.00	-12.03
Low 3	2422	20.80	20.80	30.00	-9.20
Mid 6	2437	20.93	20.93	30.00	-9.07
High 9	2452	20.88	20.88	30.00	-9.12
High 10	2457	17.91	17.91	30.00	-12.09
High 11	2462	15.85	15.85	30.00	-14.15
High 12	2467	13.91	13.91	30.00	-16.09
High 13	2472	0.97	0.97	30.00	-29.03

*PSD is tested at higher power.

1TX ANT 4 MODE: 26-Tones, RU Index 4

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.30	30.00	30	36	30.00
Low 2	2417	-2.30	30.00	30	36	30.00
Low 3	2422	-2.30	30.00	30	36	30.00
Mid 6	2437	-2.30	30.00	30	36	30.00
High 9	2452	-2.30	30.00	30	36	30.00
High 10	2457	-2.30	30.00	30	36	30.00
High 11	2462	-2.30	30.00	30	36	30.00
High 12	2467	-2.30	30.00	30	36	30.00
High 13	2472	-2.30	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.93	15.93	30.00	-14.07
Low 2	2417	17.91	17.91	30.00	-12.09
Low 3	2422	20.82	20.82	30.00	-9.18
Mid 6	2437	20.98	20.98	30.00	-9.02
High 9	2452	20.95	20.95	30.00	-9.05
High 10	2457	17.86	17.86	30.00	-12.14
High 11	2462	15.81	15.81	30.00	-14.19
High 12	2467	13.88	13.88	30.00	-16.12
High 13	2472	0.96	0.96	30.00	-29.04

*PSD is tested at higher power.

1TX ANT 4 MODE: 26-Tones, RU Index 8

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.30	30.00	30	36	30.00
Low 2	2417	-2.30	30.00	30	36	30.00
Low 3	2422	-2.30	30.00	30	36	30.00
Mid 6	2437	-2.30	30.00	30	36	30.00
High 9	2452	-2.30	30.00	30	36	30.00
High 10	2457	-2.30	30.00	30	36	30.00
High 11	2462	-2.30	30.00	30	36	30.00
High 12	2467	-2.30	30.00	30	36	30.00
High 13	2472	-2.30	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.90	15.90	30.00	-14.10
Low 2	2417	17.93	17.93	30.00	-12.07
Low 3	2422	20.85	20.85	30.00	-9.15
Mid 6	2437	20.96	20.96	30.00	-9.04
High 9	2452	20.84	20.84	30.00	-9.16
High 10	2457	17.79	17.79	30.00	-12.21
High 11	2462	15.84	15.84	30.00	-14.16
High 12	2467	13.95	13.95	30.00	-16.05
High 13	2472	0.94	0.94	30.00	-29.06

*PSD is tested at higher power.

1TX ANT 4 MODE: 242-Tones, RU Index 61

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.30	30.00	30	36	30.00
Low 2	2417	-2.30	30.00	30	36	30.00
Low 3	2422	-2.30	30.00	30	36	30.00
Mid 6	2437	-2.30	30.00	30	36	30.00
High 9	2452	-2.30	30.00	30	36	30.00
High 10	2457	-2.30	30.00	30	36	30.00
High 11	2462	-2.30	30.00	30	36	30.00
High 12	2467	-2.30	30.00	30	36	30.00
High 13	2472	-2.30	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.80	15.80	30.00	-14.20
Low 2	2417	17.82	17.82	30.00	-12.18
Low 3	2422	20.77	20.77	30.00	-9.23
Mid 6	2437	20.91	20.91	30.00	-9.09
High 9	2452	20.88	20.88	30.00	-9.12
High 10	2457	17.91	17.91	30.00	-12.09
High 11	2462	15.84	15.84	30.00	-14.16
High 12	2467	13.90	13.90	30.00	-16.10
High 13	2472	9.82	9.82	30.00	-20.18

*PSD is tested at higher power.

1TX ANT 3 MODE: 26-Tones, RU Index 0

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.60	30.00	30	36	30.00
Low 2	2417	-0.60	30.00	30	36	30.00
Low 3	2422	-0.60	30.00	30	36	30.00
Mid 6	2437	-0.60	30.00	30	36	30.00
High 9	2452	-0.60	30.00	30	36	30.00
High 10	2457	-0.60	30.00	30	36	30.00
High 11	2462	-0.60	30.00	30	36	30.00
High 12	2467	-0.60	30.00	30	36	30.00
High 13	2472	-0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.79	15.79	30.00	-14.21
Low 2	2417	17.84	17.84	30.00	-12.16
Low 3	2422	21.44	21.44	30.00	-8.56
Mid 6	2437	21.47	21.47	30.00	-8.53
High 9	2452	21.40	21.40	30.00	-8.60
High 10	2457	17.85	17.85	30.00	-12.15
High 11	2462	15.82	15.82	30.00	-14.18
High 12	2467	13.86	13.86	30.00	-16.14
High 13	2472	0.90	0.90	30.00	-29.10

1TX ANT 3 MODE: 26-Tones, RU Index 4

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.60	30.00	30	36	30.00
Low 2	2417	-0.60	30.00	30	36	30.00
Low 3	2422	-0.60	30.00	30	36	30.00
Mid 6	2437	-0.60	30.00	30	36	30.00
High 9	2452	-0.60	30.00	30	36	30.00
High 10	2457	-0.60	30.00	30	36	30.00
High 11	2462	-0.60	30.00	30	36	30.00
High 12	2467	-0.60	30.00	30	36	30.00
High 13	2472	-0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.71	15.71	30.00	-14.29
Low 2	2417	17.91	17.91	30.00	-12.09
Low 3	2422	21.43	21.43	30.00	-8.57
Mid 6	2437	21.46	21.46	30.00	-8.54
High 9	2452	21.36	21.36	30.00	-8.64
High 10	2457	17.83	17.83	30.00	-12.17
High 11	2462	15.88	15.88	30.00	-14.12
High 12	2467	13.84	13.84	30.00	-16.16
High 13	2472	0.92	0.92	30.00	-29.08

1TX ANT 3 MODE: 26-Tones, RU Index 8

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.60	30.00	30	36	30.00
Low 2	2417	-0.60	30.00	30	36	30.00
Low 3	2422	-0.60	30.00	30	36	30.00
Mid 6	2437	-0.60	30.00	30	36	30.00
High 9	2452	-0.60	30.00	30	36	30.00
High 10	2457	-0.60	30.00	30	36	30.00
High 11	2462	-0.60	30.00	30	36	30.00
High 12	2467	-0.60	30.00	30	36	30.00
High 13	2472	-0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.92	15.92	30.00	-14.08
Low 2	2417	17.86	17.86	30.00	-12.14
Low 3	2422	21.43	21.43	30.00	-8.57
Mid 6	2437	21.47	21.47	30.00	-8.53
High 9	2452	21.38	21.38	30.00	-8.62
High 10	2457	17.85	17.85	30.00	-12.15
High 11	2462	15.97	15.97	30.00	-14.03
High 12	2467	13.81	13.81	30.00	-16.19
High 13	2472	0.91	0.91	30.00	-29.09

1TX ANT 3 MODE: 242-Tones, RU Index 61

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.60	30.00	30	36	30.00
Low 2	2417	-0.60	30.00	30	36	30.00
Low 3	2422	-0.60	30.00	30	36	30.00
Mid 6	2437	-0.60	30.00	30	36	30.00
High 9	2452	-0.60	30.00	30	36	30.00
High 10	2457	-0.60	30.00	30	36	30.00
High 11	2462	-0.60	30.00	30	36	30.00
High 12	2467	-0.60	30.00	30	36	30.00
High 13	2472	-0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.91	15.91	30.00	-14.09
Low 2	2417	17.89	17.89	30.00	-12.11
Low 3	2422	21.41	21.41	30.00	-8.59
Mid 6	2437	21.44	21.44	30.00	-8.56
High 9	2452	21.39	21.39	30.00	-8.61
High 10	2457	17.93	17.93	30.00	-12.07
High 11	2462	15.90	15.90	30.00	-14.10
High 12	2467	13.88	13.88	30.00	-16.12
High 13	2472	9.86	9.86	30.00	-20.14

9.4.5. 802.11ax HE20 OFDMA MODE 2TX

Test Engineer:	44352
Test Date:	8/26/2020

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 0

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.37	30.00	36	30.00
Low 2	2417	-1.37	30.00	36	30.00
Low 3	2422	-1.37	30.00	36	30.00
Mid 6	2437	-1.37	30.00	36	30.00
High 9	2452	-1.37	30.00	36	30.00
High 10	2457	-1.37	30.00	36	30.00
High 11	2462	-1.37	30.00	36	30.00
High 12	2467	-1.37	30.00	36	30.00
High 13	2472	-1.37	30.00	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	14.91	14.83	17.88	30.00	-12.12
Low 2	2417	16.88	16.75	19.83	30.00	-10.17
Low 3	2422	18.91	18.94	21.94	30.00	-8.06
Mid 6	2437	19.94	19.95	22.96	30.00	-7.04
High 9	2452	18.47	18.37	21.43	30.00	-8.57
High 10	2457	16.99	16.83	19.92	30.00	-10.08
High 11	2462	14.83	14.79	17.82	30.00	-12.18
High 12	2467	12.76	12.81	15.80	30.00	-14.20
High 13	2472	-0.12	-0.14	2.88	30.00	-27.12

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 4

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.37	30.00	36	30.00
Low 2	2417	-1.37	30.00	36	30.00
Low 3	2422	-1.37	30.00	36	30.00
Low 4	2427	-1.37	30.00	36	30.00
Mid 6	2437	-1.37	30.00	36	30.00
High 8	2447	-1.37	30.00	36	30.00
High 9	2452	-1.37	30.00	36	30.00
High 10	2457	-1.37	30.00	36	30.00
High 11	2462	-1.37	30.00	36	30.00
High 12	2467	-1.37	30.00	36	30.00
High 13	2472	-1.37	30.00	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	14.83	14.85	17.85	30.00	-12.15
Low 2	2417	16.91	16.83	19.88	30.00	-10.12
Low 3	2422	18.97	18.91	21.95	30.00	-8.05
Low 4	2427	19.82	19.84	22.84	30.00	-7.16
Mid 6	2437	19.99	19.92	22.97	30.00	-7.03
High 8	2447	19.72	19.83	22.79	30.00	-7.21
High 9	2452	18.41	18.45	21.44	30.00	-8.56
High 10	2457	16.83	16.91	19.88	30.00	-10.12
High 11	2462	14.69	14.74	17.73	30.00	-12.27
High 12	2467	12.83	12.89	15.87	30.00	-14.13
High 13	2472	-0.13	-0.10	2.90	30.00	-27.10

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 8

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.37	30.00	36	30.00
Low 2	2417	-1.37	30.00	36	30.00
Low 3	2422	-1.37	30.00	36	30.00
Low 4	2427	-1.37	30.00	36	30.00
Mid 6	2437	-1.37	30.00	36	30.00
High 8	2447	-1.37	30.00	36	30.00
High 9	2452	-1.37	30.00	36	30.00
High 10	2457	-1.37	30.00	36	30.00
High 11	2462	-1.37	30.00	36	30.00
High 12	2467	-1.37	30.00	36	30.00
High 13	2472	-1.37	30.00	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	14.88	14.81	17.86	30.00	-12.14
Low 2	2417	16.87	16.92	19.91	30.00	-10.09
Low 3	2422	18.74	18.89	21.83	30.00	-8.17
Low 4	2427	19.90	19.84	22.88	30.00	-7.12
Mid 6	2437	19.98	19.94	22.97	30.00	-7.03
High 8	2447	19.87	19.79	22.84	30.00	-7.16
High 9	2452	18.35	18.42	21.40	30.00	-8.60
High 10	2457	16.93	16.88	19.92	30.00	-10.08
High 11	2462	14.93	14.89	17.92	30.00	-12.08
High 12	2467	12.85	12.90	15.89	30.00	-14.11
High 13	2472	-0.15	-0.14	2.87	30.00	-27.13

ANT 4 + ANT 3 2TX MODE: 242-Tones, RU Index 61

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.37	30.00	36	30.00
Low 2	2417	-1.37	30.00	36	30.00
Low 3	2422	-1.37	30.00	36	30.00
Low 4	2427	-1.37	30.00	36	30.00
Mid 6	2437	-1.37	30.00	36	30.00
High 8	2447	-1.37	30.00	36	30.00
High 9	2452	-1.37	30.00	36	30.00
High 10	2457	-1.37	30.00	36	30.00
High 11	2462	-1.37	30.00	36	30.00
High 12	2467	-1.37	30.00	36	30.00
High 13	2472	-1.37	30.00	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	14.99	14.93	17.97	30.00	-12.03
Low 2	2417	16.85	16.90	19.89	30.00	-10.11
Low 3	2422	18.89	18.88	21.90	30.00	-8.10
Low 4	2427	20.93	21.43	24.20	30.00	-5.80
Mid 6	2437	20.98	21.48	24.25	30.00	-5.75
High 8	2447	20.92	21.42	24.19	30.00	-5.81
High 9	2452	18.47	18.39	21.44	30.00	-8.56
High 10	2457	16.92	16.98	19.96	30.00	-10.04
High 11	2462	14.90	14.89	17.91	30.00	-12.09
High 12	2467	12.95	12.91	15.94	30.00	-14.06
High 13	2472	8.46	8.44	11.46	30.00	-18.54

9.5. 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.

RESULTS

Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

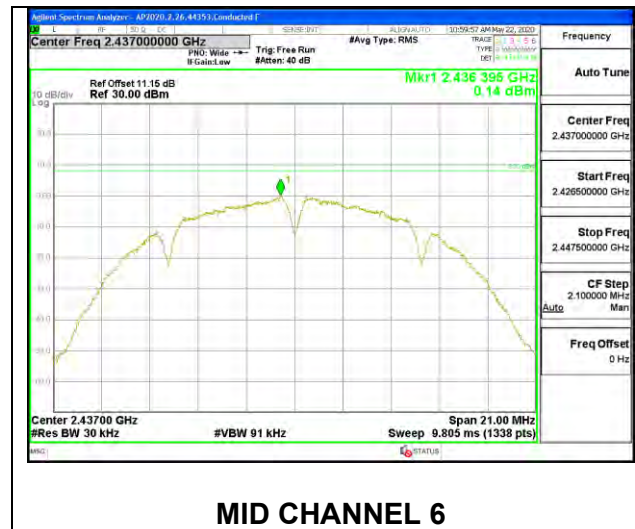
Note: RBW setting is used greater than 3KHz on PSD measurement

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9.5.1. 802.11b MODE 1TX

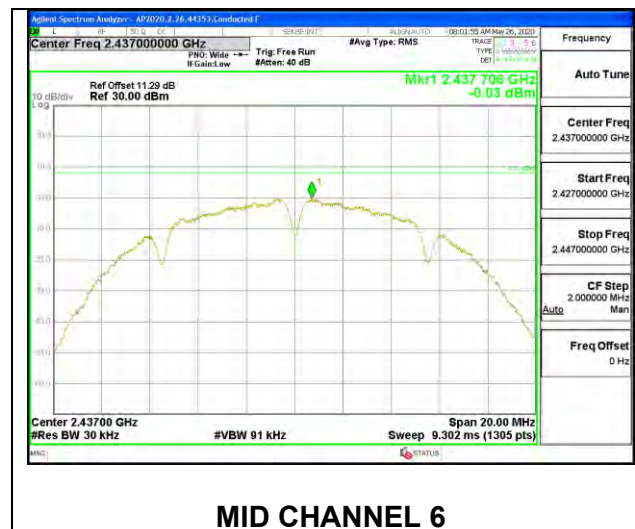
1TX ANT 4 MODE

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.17	-1.17	8.0	-9.2
Mid 6	2437	0.14	0.14	8.0	-7.9
High 11	2462	0.13	0.13	8.0	-7.9
High 12	2467	-1.05	-1.05	8.0	-9.1
High 13	2472	-3.47	-3.47	8.0	-11.5



1TX ANT 3 MODE

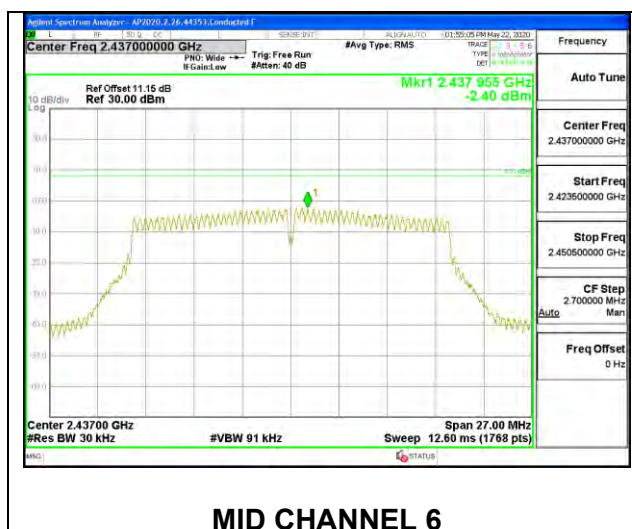
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.05	-1.05	8.0	-9.1
Mid 6	2437	-0.03	-0.03	8.0	-8.0
High 11	2462	-0.12	-0.12	8.0	-8.1
High 12	2467	-0.99	-0.99	8.0	-9.0
High 13	2472	-3.45	-3.45	8.0	-11.5



9.5.2. 802.11n HT20 MODE

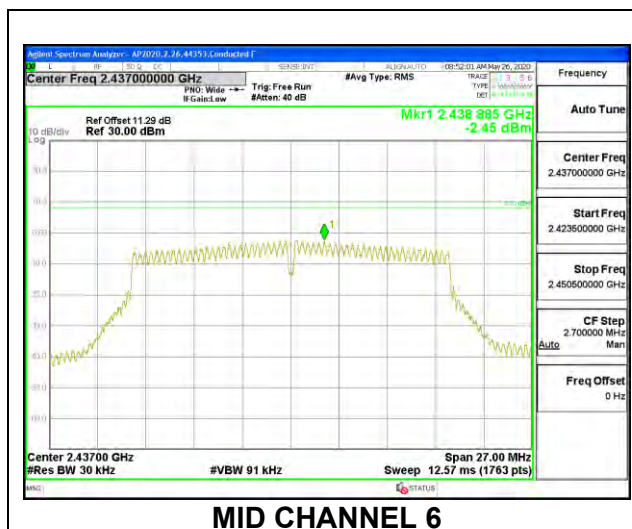
1TX ANT 4 MODE

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.42	-6.42	8.0	-14.4
Low 2	2417	-4.52	-4.52	8.0	-12.5
Low 3	2422	-2.47	-2.47	8.0	-10.5
Mid 6	2437	-2.40	-2.40	8.0	-10.4
High 9	2452	-2.53	-2.53	8.0	-10.5
High 10	2457	-4.46	-4.46	8.0	-12.5
High 11	2462	-6.41	-6.41	8.0	-14.4
High 12	2467	-8.58	-8.58	8.0	-16.6
High 13	2472	-16.38	-16.38	8.0	-24.4



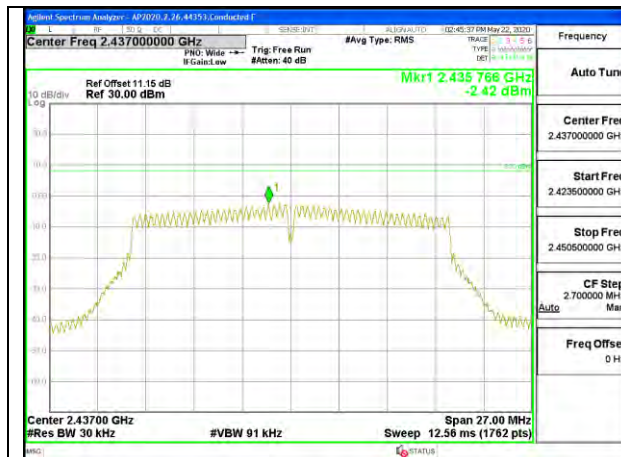
1TX ANT 3 MODE

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.52	-6.52	8.0	-14.5
Low 2	2417	-4.49	-4.49	8.0	-12.5
Low 3	2422	-2.56	-2.56	8.0	-10.6
Mid 6	2437	-2.45	-2.45	8.0	-10.5
High 9	2452	-2.40	-2.40	8.0	-10.4
High 10	2457	-4.46	-4.46	8.0	-12.5
High 11	2462	-6.45	-6.45	8.0	-14.5
High 12	2467	-8.55	-8.55	8.0	-16.6
High 13	2472	-16.56	-16.56	8.0	-24.6

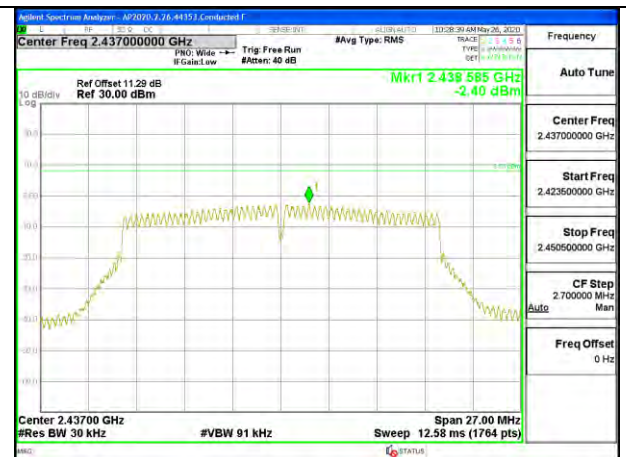


9.5.3. 802.11n HT20 CDD MODE 2TX

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT 4 Meas (dBm)	ANT 3 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-7.52	-7.44	-4.47	8.0	-12.5
Low 2	2417	-5.41	-5.53	-2.46	8.0	-10.5
Low 3	2422	-4.01	-3.93	-0.96	8.0	-9.0
Mid 6	2437	-2.42	-2.40	0.60	8.0	-7.4
High 9	2452	-4.56	-4.54	-1.54	8.0	-9.5
High 10	2457	-5.58	-5.64	-2.60	8.0	-10.6
High 11	2462	-7.50	-7.62	-4.55	8.0	-12.5
High 12	2467	-9.93	-10.05	-6.98	8.0	-15.0
High 13	2472	-18.52	-18.03	-15.26	8.0	-23.3



MID CHANNEL 6 ANT 4

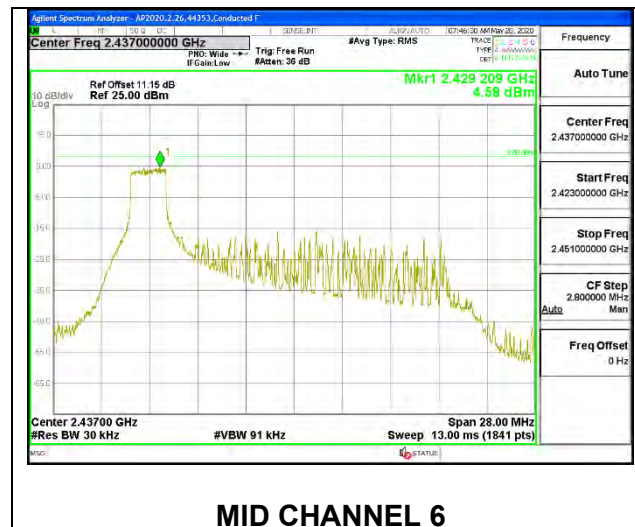


MID CHANNEL 6 ANT 3

9.5.4. 802.11ax HE20 MODE

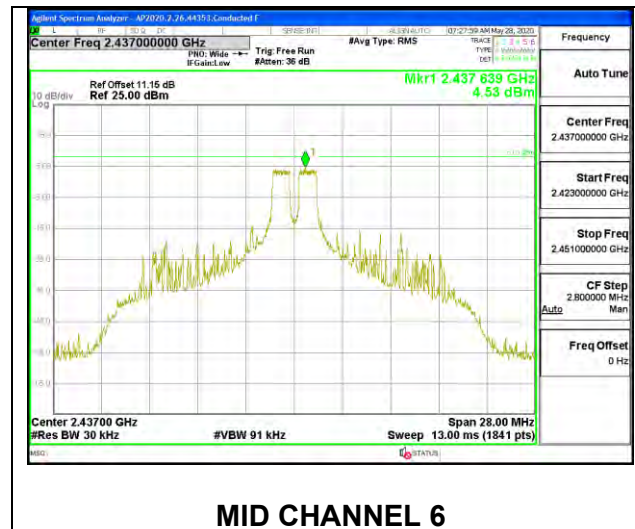
1TX ANT 4 MODE , 26-Tone RU Index 0

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.16	-1.16	8.0	-9.2
Low 2	2417	1.09	1.09	8.0	-6.9
Low 3	2422	4.31	4.31	8.0	-3.7
Mid 6	2437	4.58	4.58	8.0	-3.4
High 9	2452	4.50	4.50	8.0	-3.5
High 10	2457	1.03	1.03	8.0	-7.0
High 11	2462	-0.98	-0.98	8.0	-9.0
High 12	2467	-3.14	-3.14	8.0	-11.1
High 13	2472	-16.64	-16.64	8.0	-24.6



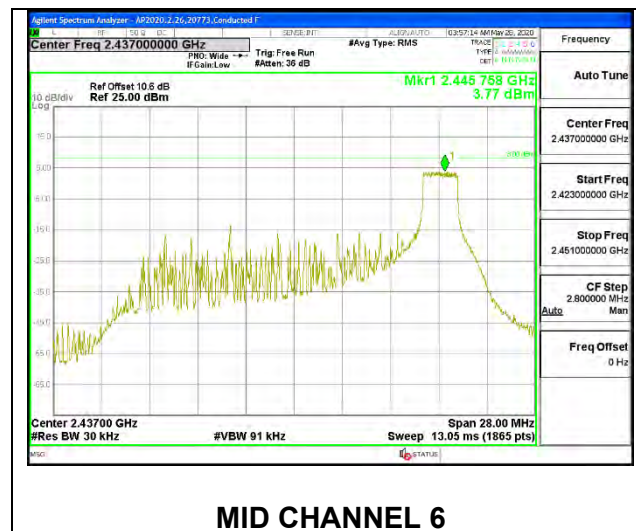
1TX ANT 4 MODE , 26-Tone RU Index 4

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.07	-1.07	8.0	-9.1
Low 2	2417	0.91	0.91	8.0	-7.1
Low 3	2422	4.47	4.47	8.0	-3.5
Mid 6	2437	4.53	4.53	8.0	-3.5
High 9	2452	4.42	4.42	8.0	-3.6
High 10	2457	1.06	1.06	8.0	-6.9
High 11	2462	-0.99	-0.99	8.0	-9.0
High 12	2467	-2.94	-2.94	8.0	-10.9
High 13	2472	-17.12	-17.12	8.0	-25.1



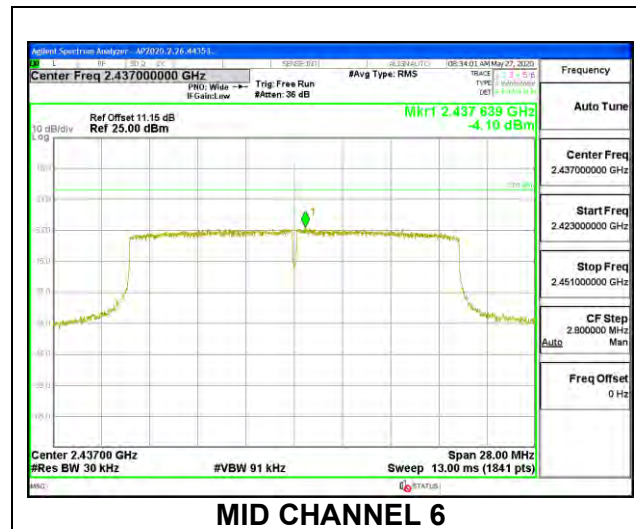
1TX ANT 4 MODE , 26-Tone RU Index 8

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.03	-1.03	8.0	-9.0
Low 2	2417	0.90	0.90	8.0	-7.1
Low 3	2422	4.31	4.31	8.0	-3.7
Mid 6	2437	4.37	4.37	8.0	-3.6
High 9	2452	4.35	4.35	8.0	-3.7
High 10	2457	0.96	0.96	8.0	-7.0
High 11	2462	-0.90	-0.90	8.0	-8.9
High 12	2467	-3.13	-3.13	8.0	-11.1
High 13	2472	-16.61	-16.61	8.0	-24.6



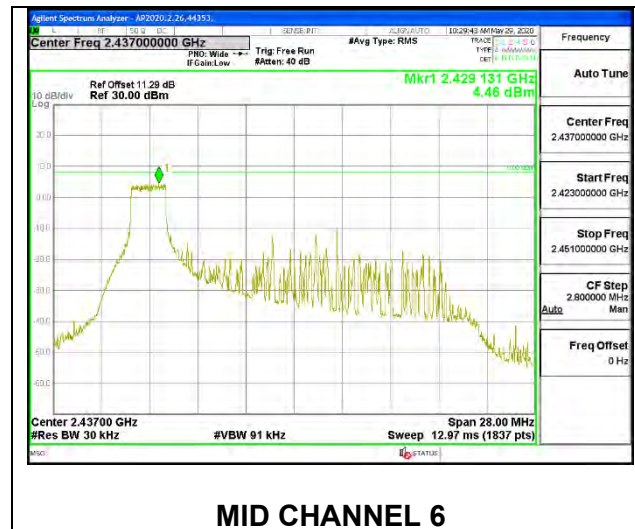
1TX ANT 4 MODE , 242-Tone RU Index 61

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-9.37	-9.37	8.0	-17.4
Low 2	2417	-7.40	-7.40	8.0	-15.4
Low 3	2422	-4.63	-4.63	8.0	-12.6
Mid 6	2437	-4.10	-4.10	8.0	-12.1
High 9	2452	-4.09	-4.09	8.0	-12.1
High 10	2457	-7.55	-7.55	8.0	-15.6
High 11	2462	-9.67	-9.67	8.0	-17.7
High 12	2467	-11.66	-11.66	8.0	-19.7
High 13	2472	-18.48	-18.48	8.0	-26.5



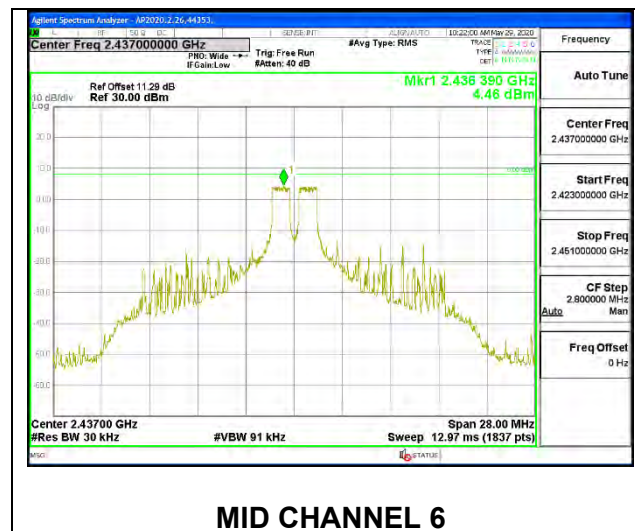
1TX ANT 3 MODE , 26-Tone RU Index 0

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.07	-1.07	8.0	-9.1
Low 2	2417	0.98	0.98	8.0	-7.0
Low 3	2422	4.43	4.43	8.0	-3.6
Mid 6	2437	4.46	4.46	8.0	-3.5
High 9	2452	4.52	4.52	8.0	-3.5
High 10	2457	1.04	1.04	8.0	-7.0
High 11	2462	-1.06	-1.06	8.0	-9.1
High 12	2467	-2.91	-2.91	8.0	-10.9
High 13	2472	-17.24	-17.24	8.0	-25.2



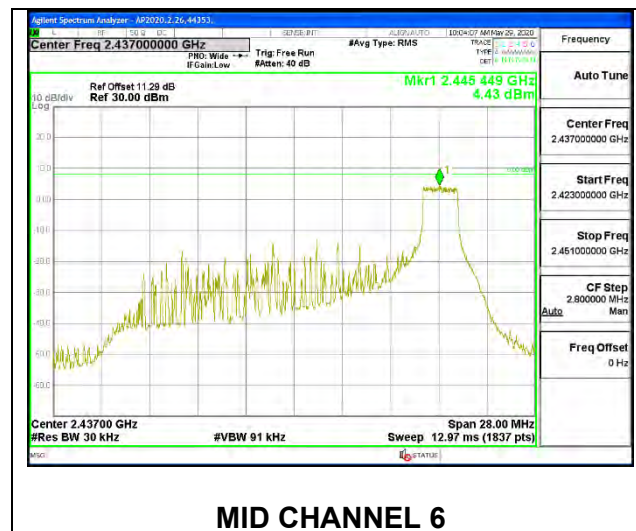
1TX ANT 3 MODE , 26-Tone RU Index 4

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-0.96	-0.96	8.0	-9.0
Low 2	2417	1.06	1.06	8.0	-6.9
Low 3	2422	4.48	4.48	8.0	-3.5
Mid 6	2437	4.46	4.46	8.0	-3.5
High 9	2452	4.39	4.39	8.0	-3.6
High 10	2457	1.03	1.03	8.0	-7.0
High 11	2462	-0.97	-0.97	8.0	-9.0
High 12	2467	-3.09	-3.09	8.0	-11.1
High 13	2472	-16.80	-16.80	8.0	-24.8



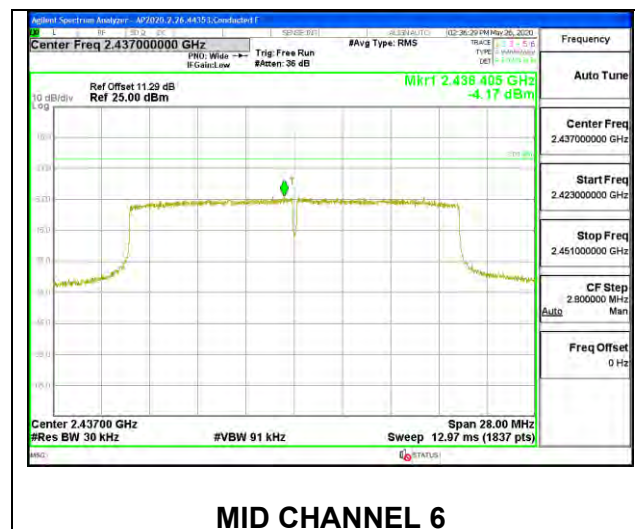
1TX ANT 3 MODE , 26-Tone RU Index 8

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-0.97	-0.97	8.0	-9.0
Low 2	2417	0.97	0.97	8.0	-7.0
Low 3	2422	4.33	4.33	8.0	-3.7
Mid 6	2437	4.43	4.43	8.0	-3.6
High 9	2452	4.31	4.31	8.0	-3.7
High 10	2457	1.09	1.09	8.0	-6.9
High 11	2462	-0.99	-0.99	8.0	-9.0
High 12	2467	-2.91	-2.91	8.0	-10.9
High 13	2472	-16.77	-16.77	8.0	-24.8



1TX ANT 3 MODE , 242-Tone RU Index 61

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-9.45	-9.45	8.0	-17.5
Low 2	2417	-7.64	-7.64	8.0	-15.6
Low 3	2422	-4.61	-4.61	8.0	-12.6
Mid 6	2437	-4.17	-4.17	8.0	-12.2
High 9	2452	-4.04	-4.04	8.0	-12.0
High 10	2457	-7.60	-7.60	8.0	-15.6
High 11	2462	-9.67	-9.67	8.0	-17.7
High 12	2467	-11.56	-11.56	8.0	-19.6
High 13	2472	-18.40	-18.40	8.0	-26.4

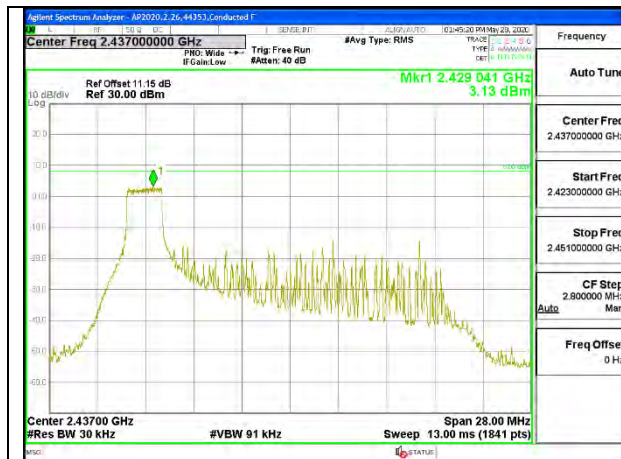


MID CHANNEL 6

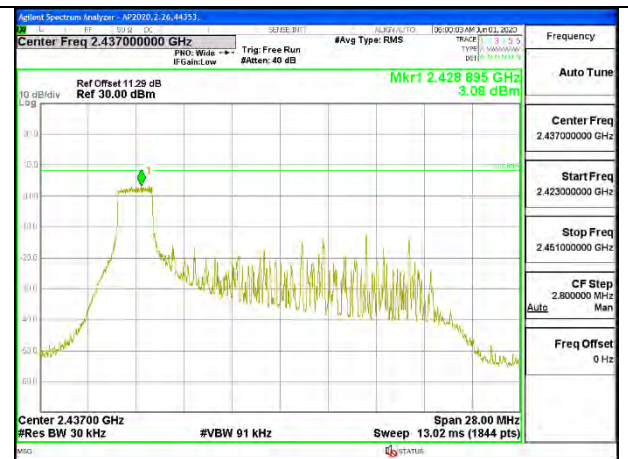
9.5.5. 802.11ax HE20 OFDMA MODE 2TX

ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 0

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT 4 Meas (dBm)	ANT 3 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.99	-2.10	0.97	8.0	-7.0
Low 2	2417	0.02	-0.14	2.95	8.0	-5.0
Low 3	2422	2.12	1.98	5.06	8.0	-2.9
Mid 6	2437	3.13	3.08	6.12	8.0	-1.9
High 9	2452	1.46	1.46	4.47	8.0	-3.5
High 11	2462	-2.15	-2.09	0.89	8.0	-7.1
High 12	2467	-3.99	-4.11	-1.04	8.0	-9.0
High 13	2472	-17.01	-16.85	-13.92	8.0	-21.9



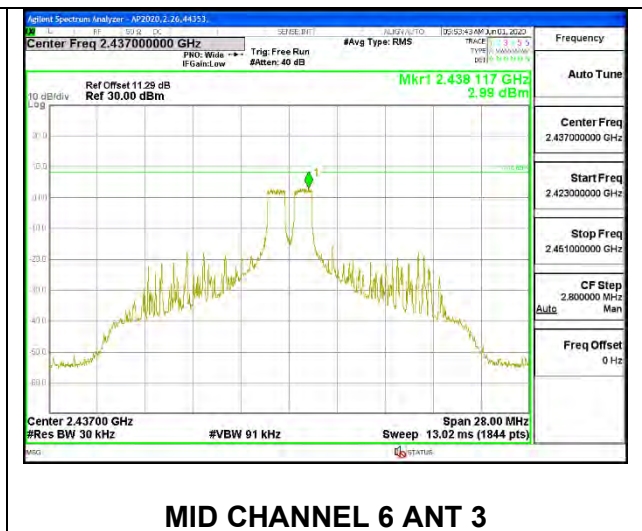
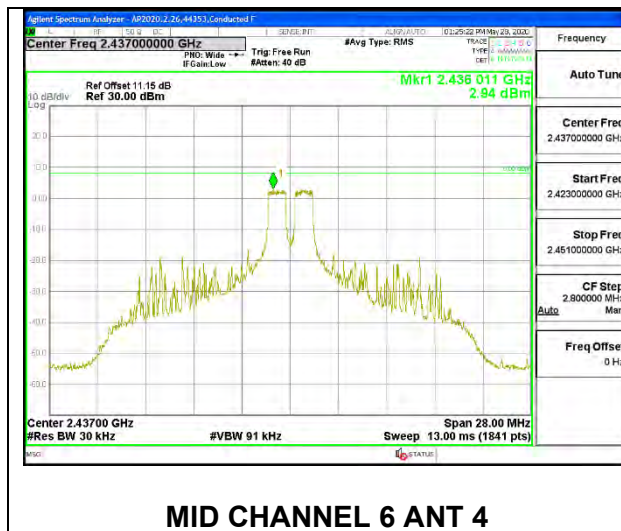
MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

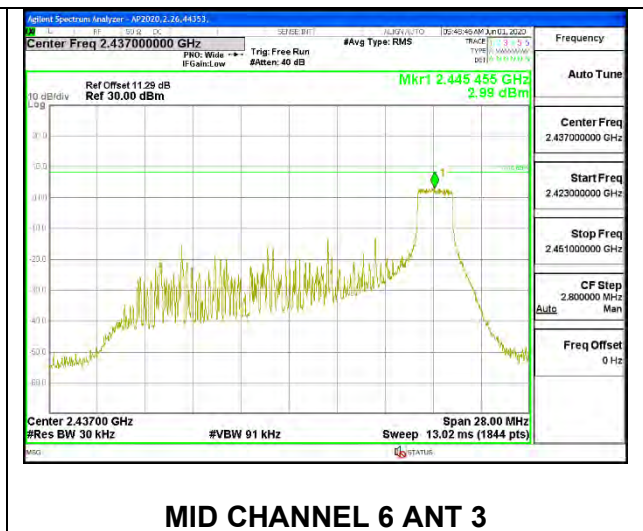
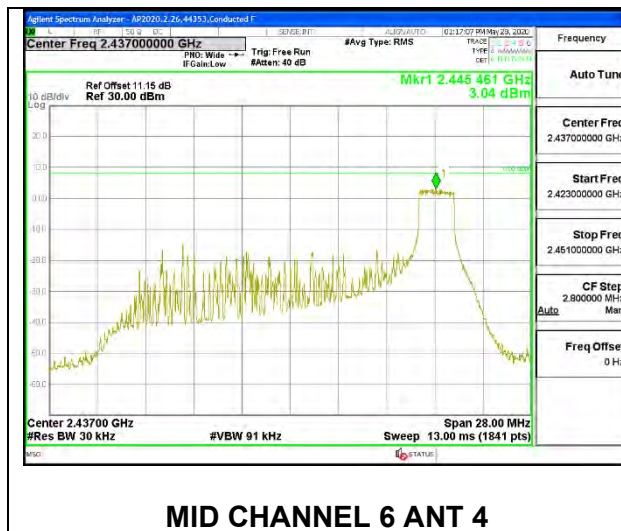
ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 4

Duty Cycle CF (dB)		0.00		Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	ANT 4 Meas (dBm)	ANT 3 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-2.10	-1.98	0.97	8.0	-7.0
Low 2	2417	0.01	-0.02	3.01	8.0	-5.0
Low 3	2422	2.06	2.02	5.05	8.0	-2.9
Mid 6	2437	2.94	2.99	5.98	8.0	-2.0
High 9	2452	1.59	1.55	4.58	8.0	-3.4
High 11	2462	-2.12	-2.09	0.91	8.0	-7.1
High 12	2467	-4.09	-3.94	-1.00	8.0	-9.0
High 13	2472	-17.09	-16.92	-13.99	8.0	-22.0



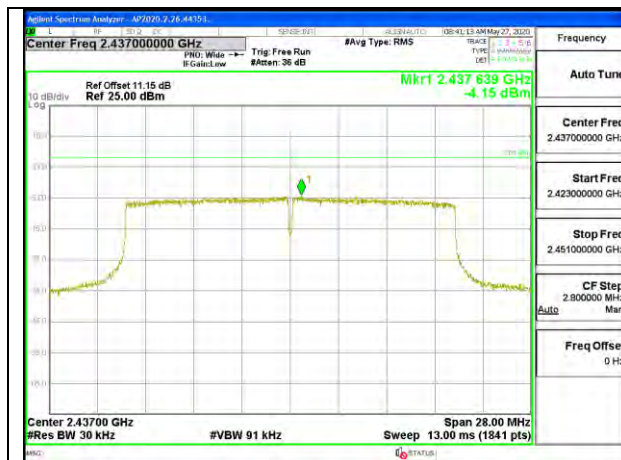
ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 8

Duty Cycle CF (dB)		0.00		Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	ANT 4 Meas (dBm)	ANT 3 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-2.09	-1.94	1.00	8.0	-7.0
Low 2	2417	-0.10	-0.03	2.95	8.0	-5.1
Low 3	2422	1.91	2.06	4.99	8.0	-3.0
Mid 6	2437	3.04	2.99	6.03	8.0	-2.0
High 9	2452	1.47	1.44	4.47	8.0	-3.5
High 11	2462	-2.05	-1.99	0.99	8.0	-7.0
High 12	2467	-4.14	-4.13	-1.12	8.0	-9.1
High 13	2472	-16.77	-16.79	-13.77	8.0	-21.8



ANT 4 + ANT 3 2TX MODE: 242-Tone RU Index 61

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT 4 Meas (dBm)	ANT 3 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-10.54	-10.40	-7.46	8.0	-15.5
Low 2	2417	-8.41	-8.57	-5.48	8.0	-13.5
Low 3	2422	-6.63	-6.53	-3.57	8.0	-11.6
Low 4	2427	-4.17	-3.91	-1.03	8.0	-9.0
Mid 6	2437	-4.15	-4.15	-1.14	8.0	-9.1
High 8	2447	-3.98	-4.19	-1.07	8.0	-9.1
High 9	2452	-7.20	-7.12	-4.15	8.0	-12.1
High 10	2457	-8.57	-8.58	-5.56	8.0	-13.6
High 11	2462	-10.49	-10.35	-7.41	8.0	-15.4
High 12	2467	-12.53	-12.54	-9.52	8.0	-17.5
High 13	2472	-20.57	-20.33	-17.44	8.0	-25.4



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

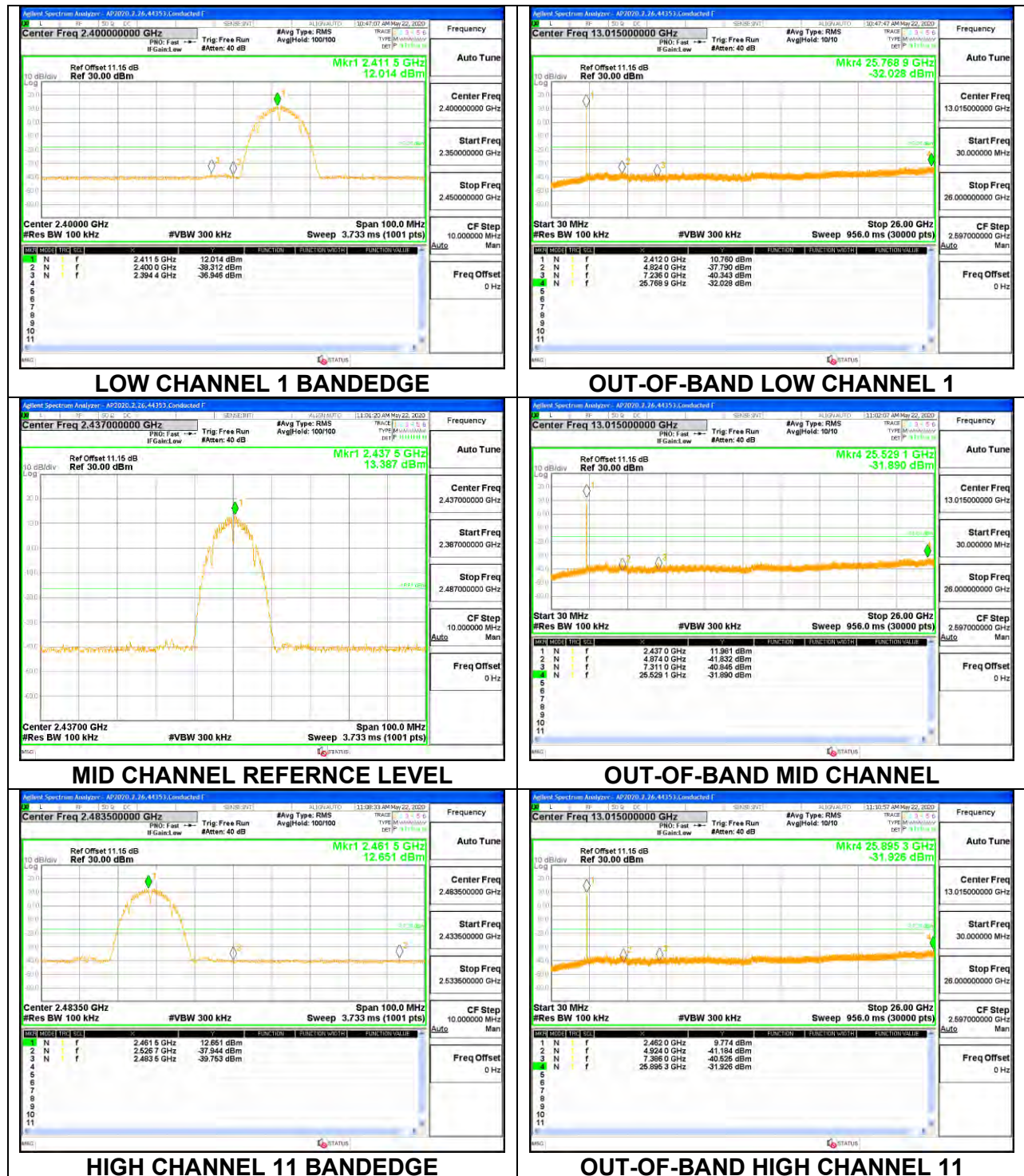
RSS-247 5.5

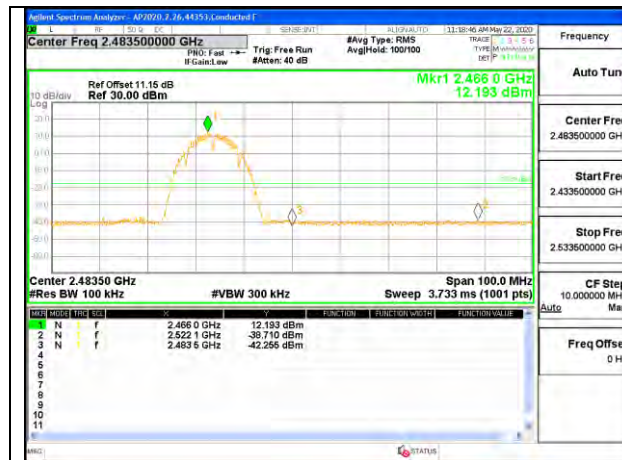
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RESULTS

9.6.1. 802.11b MODE 1TX

1TX ANT 4 MODE





HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12

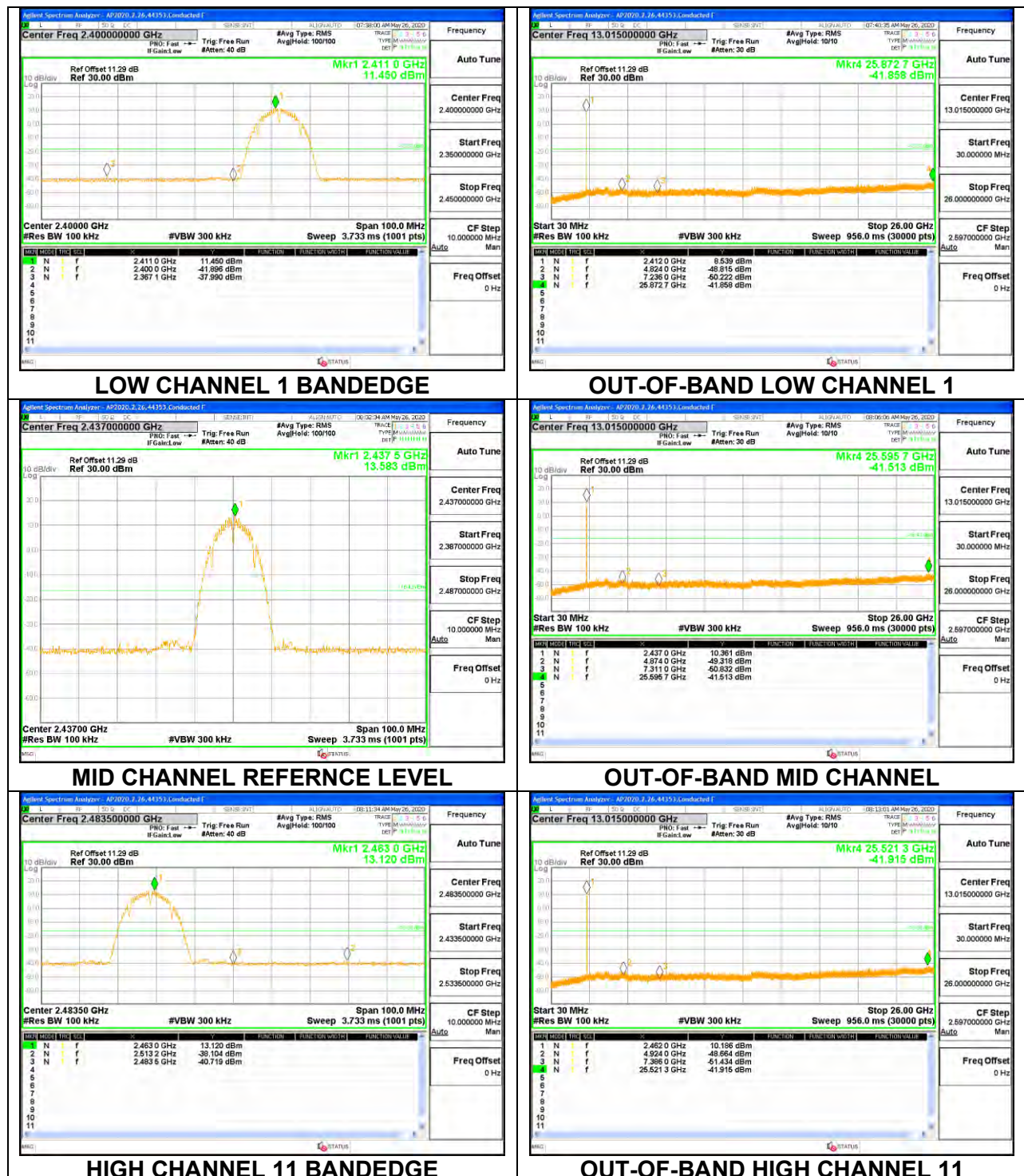


HIGH CHANNEL 13 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 13

1TX ANT 3 MODE





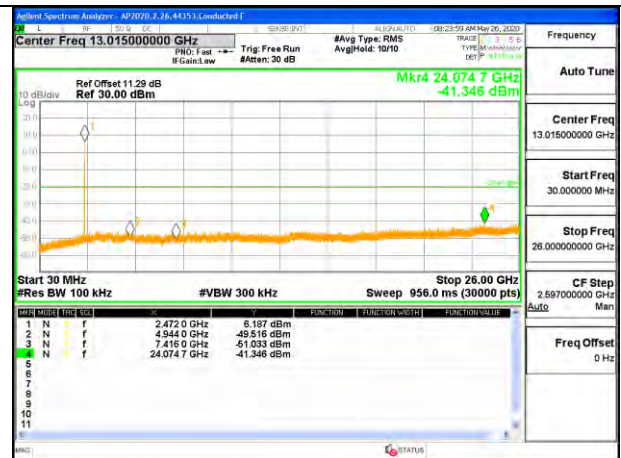
HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



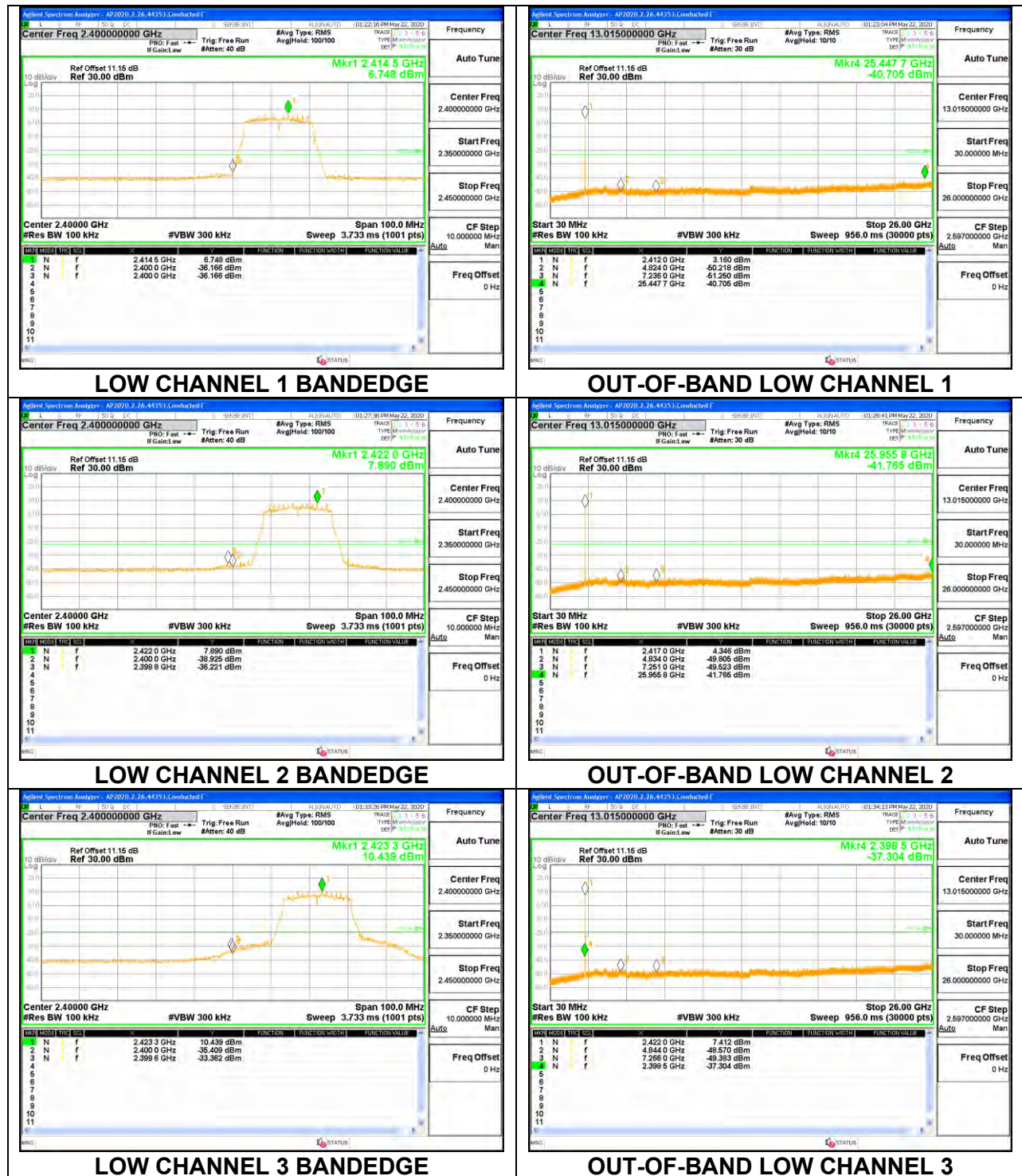
HIGH CHANNEL 13 BANDEDGE

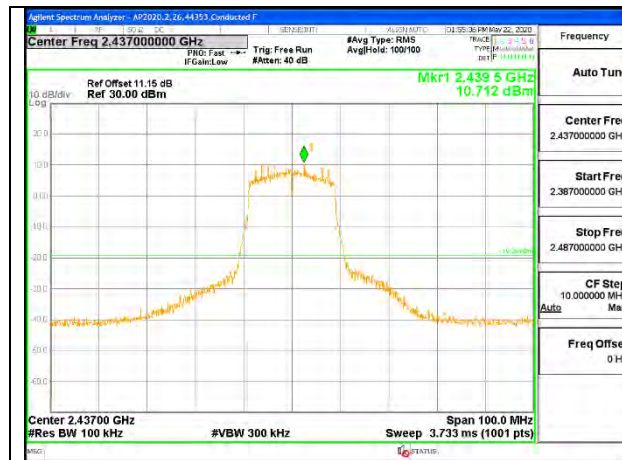


OUT-OF-BAND HIGH CHANNEL 13

9.6.2. 802.11n HT20 MODE

1TX ANT 4 MODE





MID CHANNEL REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL 9 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 9



HIGH CHANNEL 10 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 10



HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12

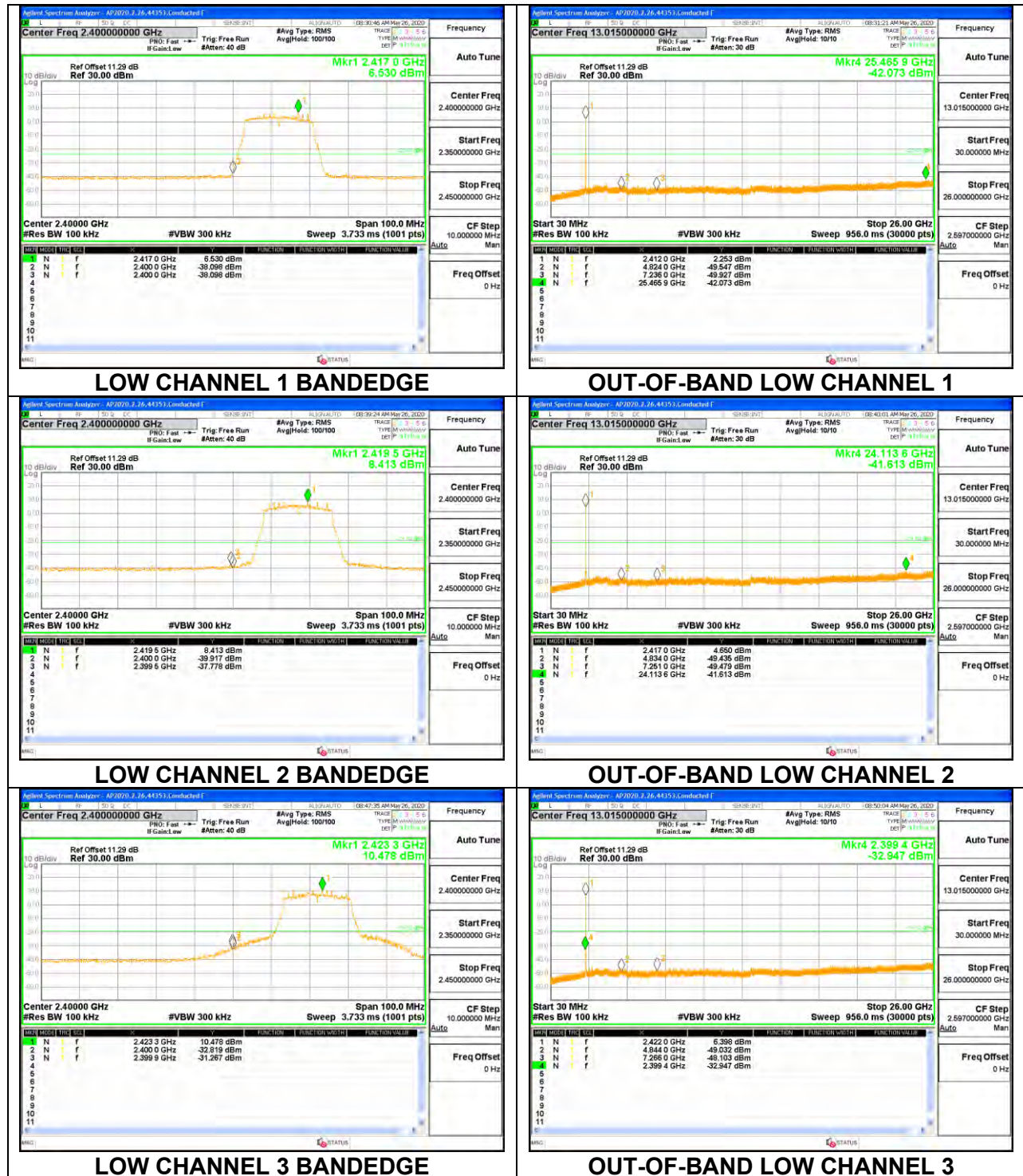


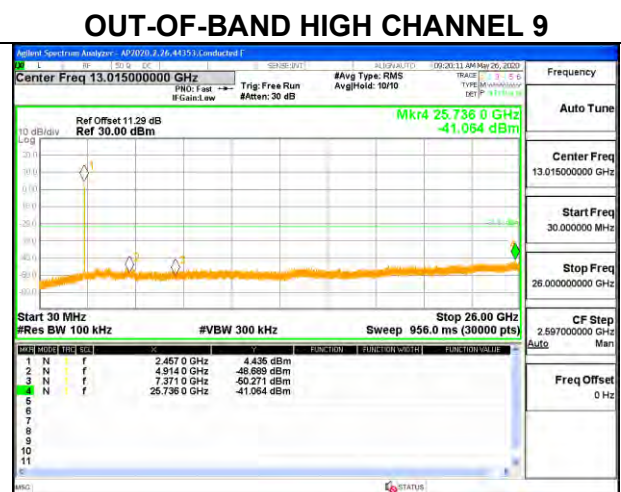
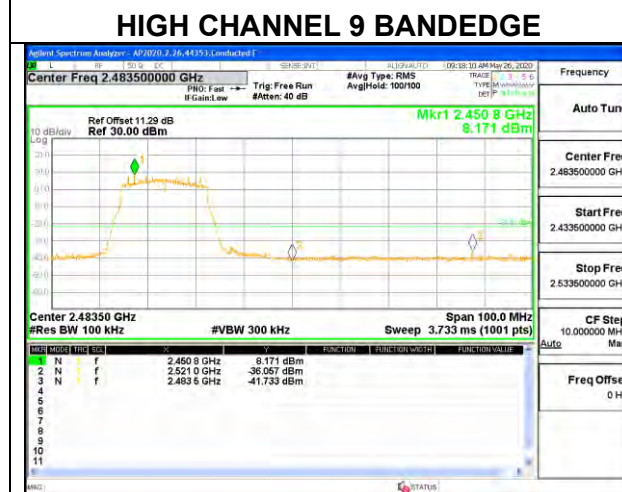
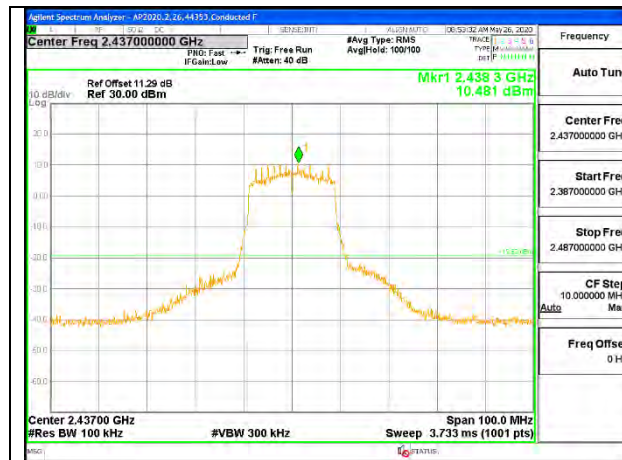
HIGH CHANNEL 13 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 13

1TX ANT 3 MODE







HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



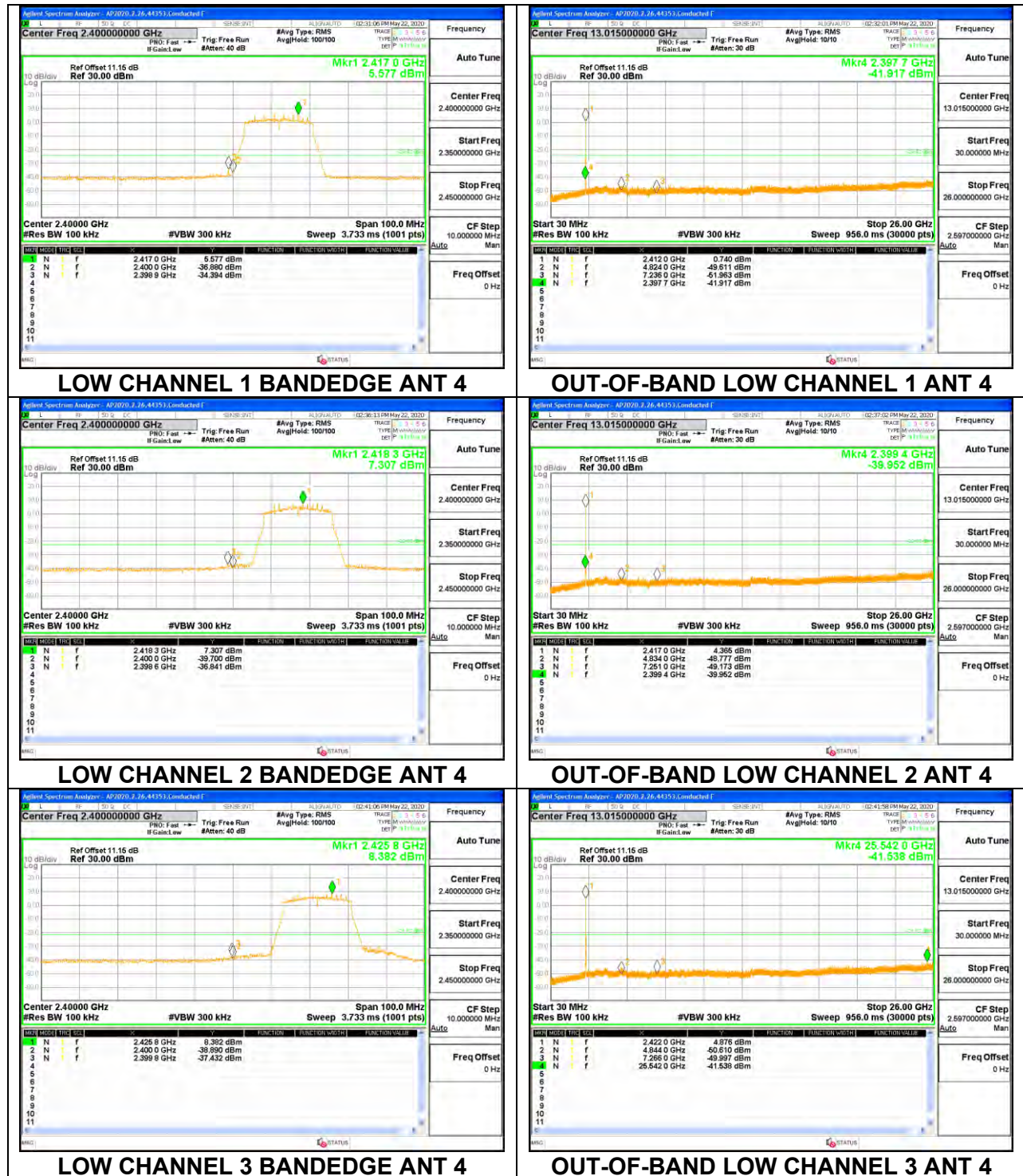
HIGH CHANNEL 13 BANDEDGE

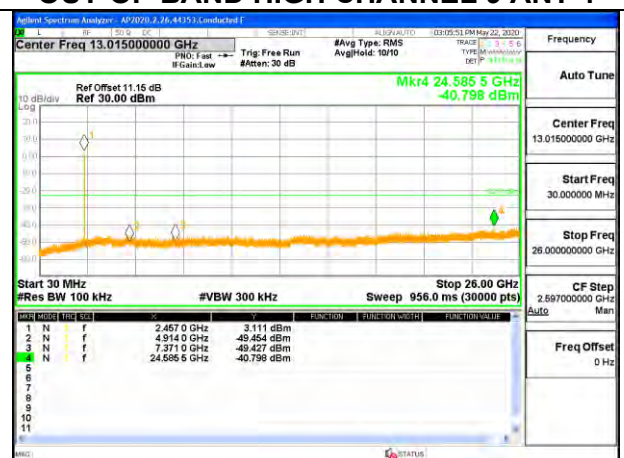
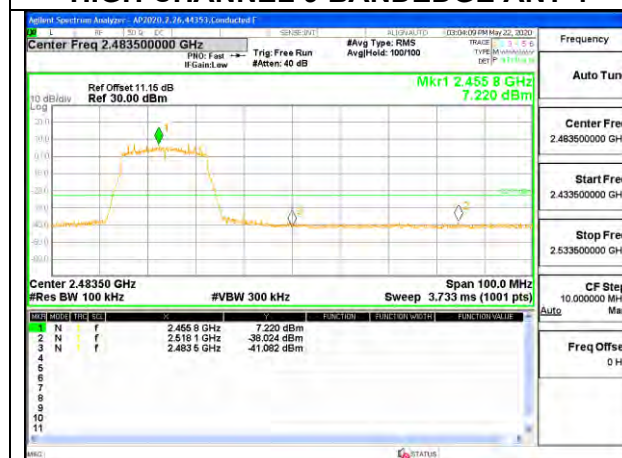
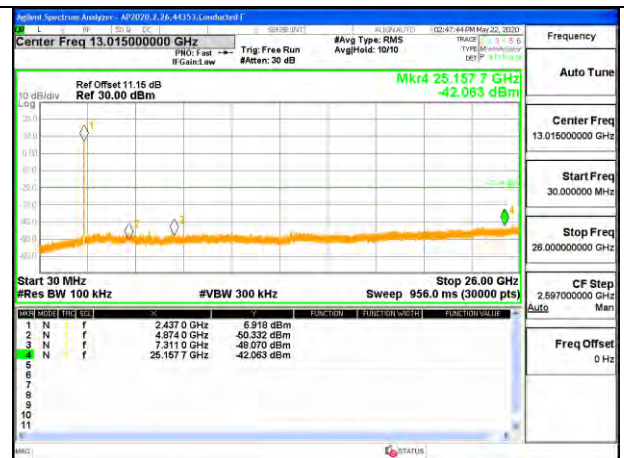
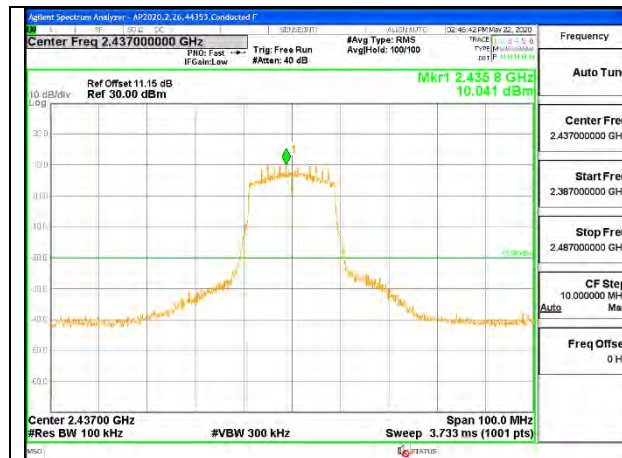


OUT-OF-BAND HIGH CHANNEL 13

9.6.3. 802.11n HT20 MODE 2TX

2TX ANT 4 + ANT 3 CDD MODE







HIGH CHANNEL 11 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 11 ANT 4



HIGH CHANNEL 12 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 12 ANT 4



HIGH CHANNEL 13 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 13 ANT 4



LOW CHANNEL 1 BANDEDGE ANT 3



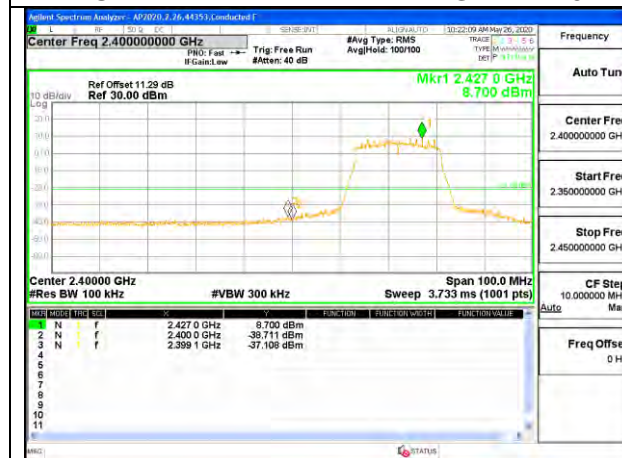
OUT-OF-BAND LOW CHANNEL 1 ANT 3



LOW CHANNEL 2 BANDEDGE ANT 3



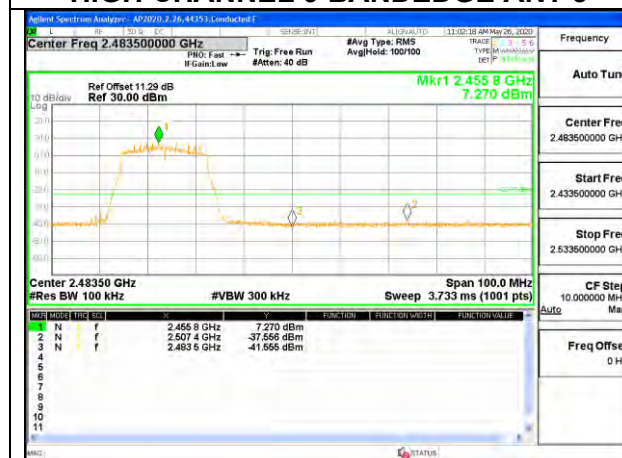
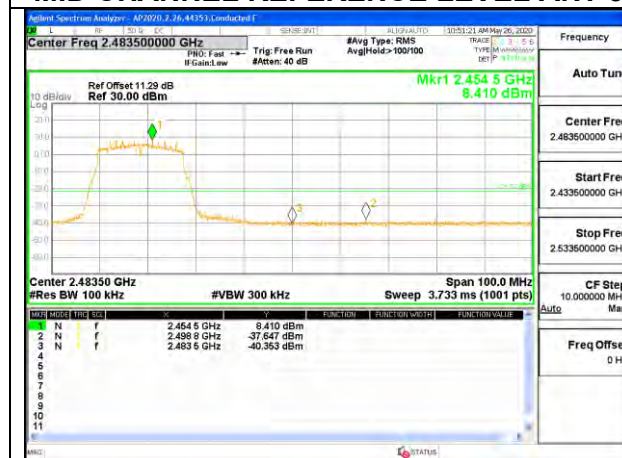
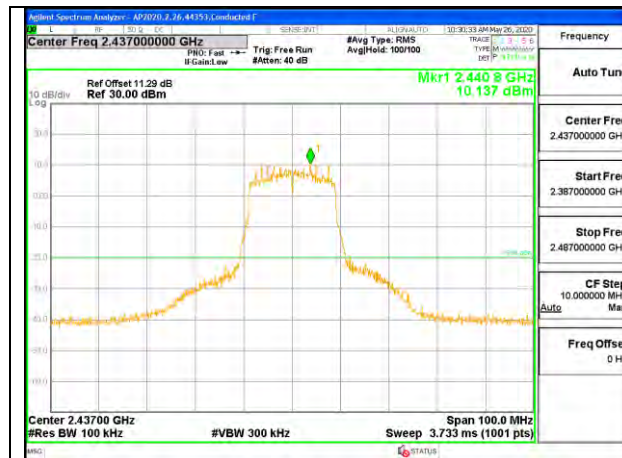
OUT-OF-BAND LOW CHANNEL 2 ANT 3



LOW CHANNEL 3 BANDEDGE ANT 3



OUT-OF-BAND LOW CHANNEL 3 ANT 3





HIGH CHANNEL 11 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 11 ANT 3



HIGH CHANNEL 12 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 12 ANT 3



HIGH CHANNEL 13 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 13 ANT 3