TEST REPORT

Report Number: 13336566-E4V1

Applicant	:	APPLE INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A
Model	:	A2406
FCC ID	:	BCG-E3546A
IC	:	579C-E3546A
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:
UL Verification Services Inc.
47173 Benicia Street
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NVLAP TESTING ilac-MRA
NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	9/21/2020	Initial Issue	Chin Pang

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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: A2406

SERIAL NUMBER: (Original): G6TCP01UQ5R9, G6TCM020Q5T6
(Spot Check): G6TCN00GQ5W0, G6TCN00KQ5W0

DATE TESTED: FEBRUARY 11, 2020 – AUGUST 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:

Chin Pang
Senior Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:

Jingang Li
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

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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 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: 2324A.

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

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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%.

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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-E3545A, IC: 579C-E3545A to cover variant model BCG-E3546A, 579C-E3546A. 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 A2406, FCC ID: BCG-E3546A, IC: 579C-E3546A for radiated spurious and radiated band-edge in accordance with the Test Plan that was approved via KDB inquiry.

BCG-E3546A, 579C-E3546A SPOT CHECK RESULTS										
Technology	Mode	Test Item	Channel	Measured	Original model		Spot check model		Delta (dB)	
					BCG-E3545A 579C-E3545A		BCG-E3546A 579C-E3546A			
					A2341		A2406			
				Frequency (MHz)	Peak	Ave	Peak	Ave	Peak	Ave
WiFi (2.4GHz)	Ax 242 Tone	RBE	Low	2390.0z	66.42	50.55	68.73	48.87	2.31	-1.68
			High	2483.5	68.55	48.81	68.99	45.48	0.55	-3.33
		RSE,	Mid	12143.8	61.16	44.8	NF	NF	-	-

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-E3545A, IC: 579C-E3545A is therefore being used to support the application for certification for FCC ID: BCG-E3546A & IC: 579C-E3546A.

Note: NF—Noise Floor.

Note: The output powers were verified on model A2406 to match with model A2341 before radiated emissions spot check was performed.

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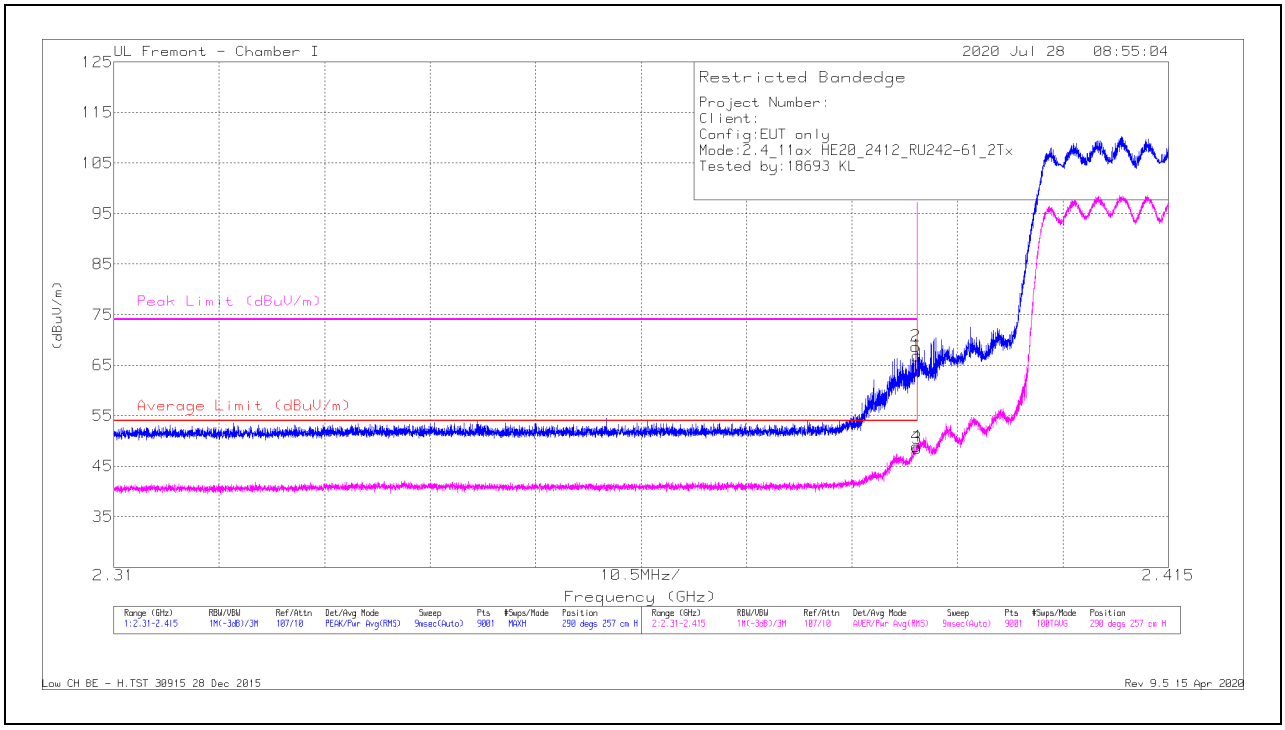
SPOT CHECK DATA

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	52.27	Pk	31.9	-17.3	0	66.87	-	-	74	-7.13	290	257	H
2	* 2.38983	54.13	Pk	31.9	-17.3	0	68.73	-	-	74	-5.27	290	257	H
3	* 2.38999	33.91	RMS	31.9	-17.3	0	48.51	54	-5.49	-	-	290	257	H
4	* 2.38991	34.27	RMS	31.9	-17.3	0	48.87	54	-5.13	-	-	290	257	H

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

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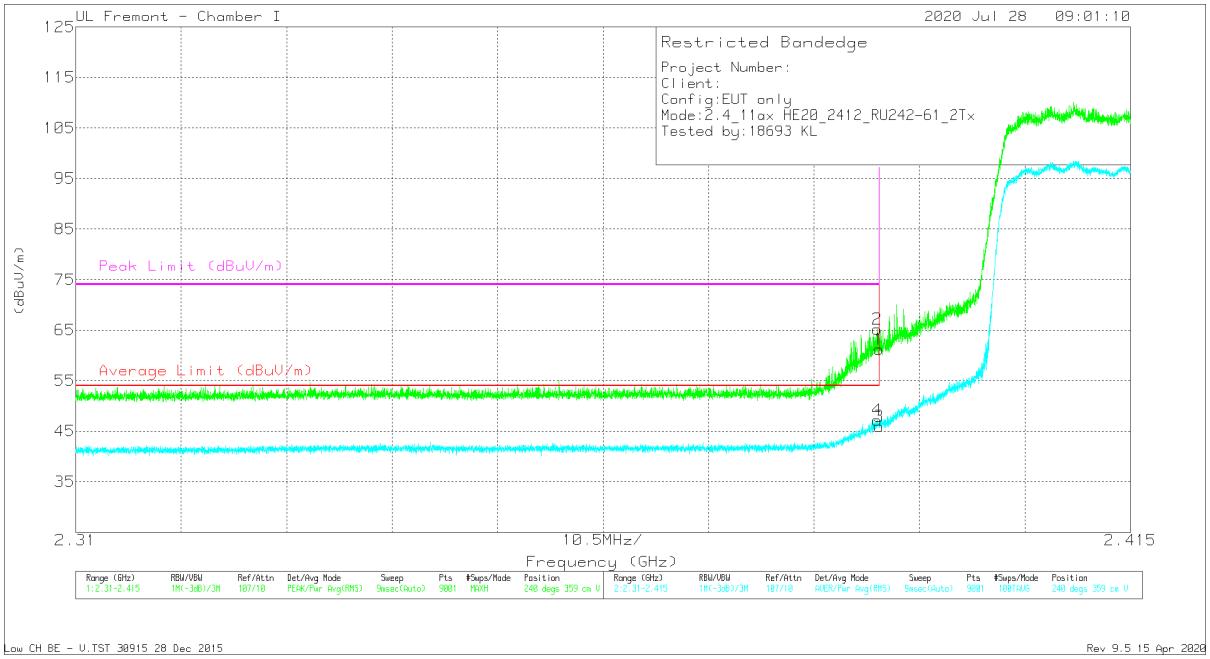
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	46.57	Pk	31.9	-17.3	0	61.17	-	-	74	-12.83	240	359	V
2	* 2.38981	50.61	Pk	31.9	-17.3	0	65.21	-	-	74	-8.79	240	359	V
3	* 2.38999	31.32	RMS	31.9	-17.3	0	45.92	54	-8.08	-	-	240	359	V
4	* 2.38979	32.55	RMS	31.9	-17.3	0	47.15	54	-6.85	-	-	240	359	V

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

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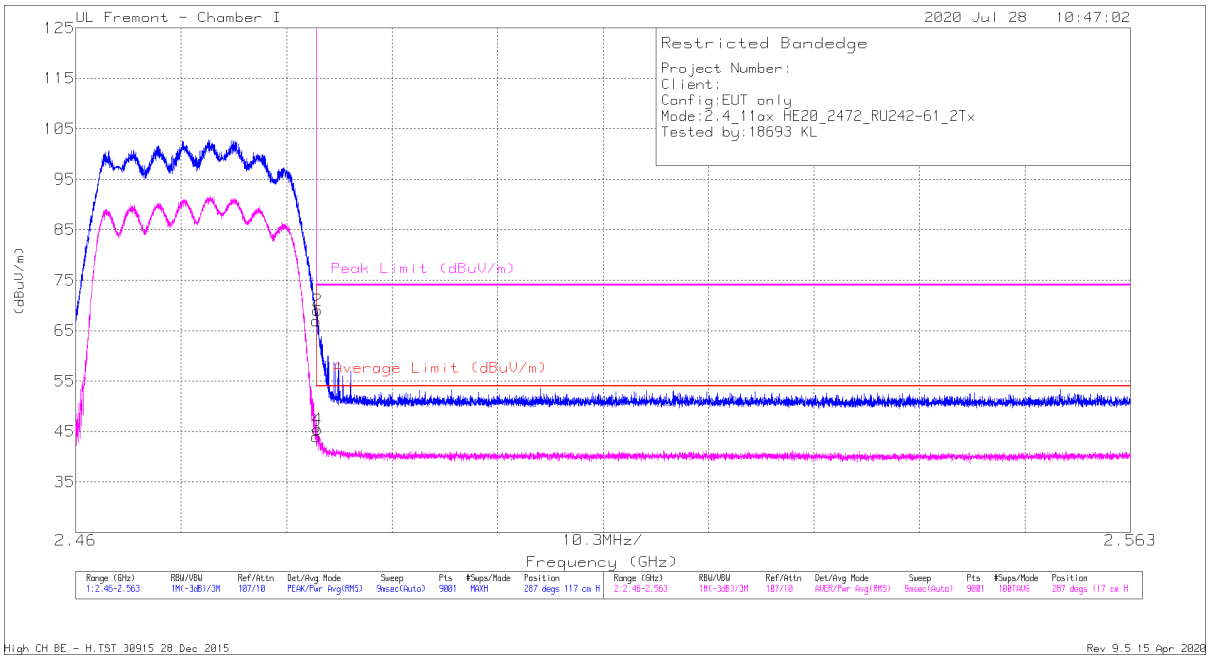
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	52.2	Pk	32.4	-17.7	0	66.9	-	-	74	-7.1	287	117	H
2	* 2.4836	54.29	Pk	32.4	-17.7	0	68.99	-	-	74	-5.01	287	117	H
3	* 2.48351	29.28	RMS	32.4	-17.7	0	43.98	54	-10.02	-	-	287	117	H
4	* 2.48364	30.78	RMS	32.4	-17.7	0	45.48	54	-8.52	-	-	287	117	H

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

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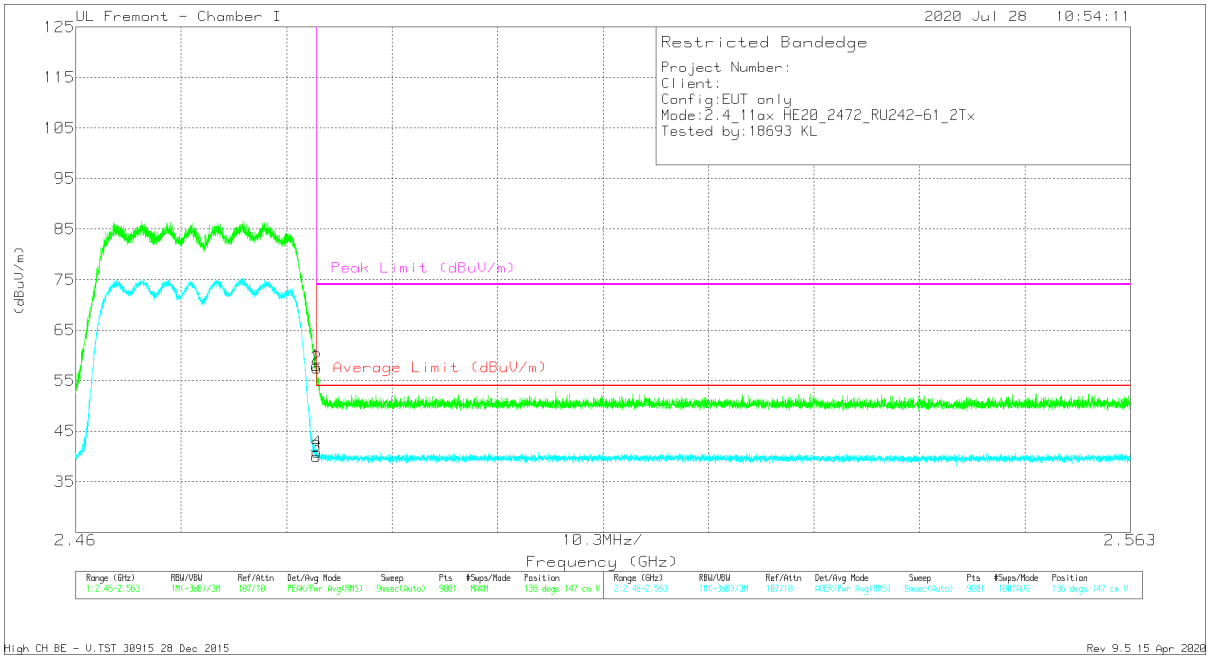
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/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	43.3	Pk	32.4	-17.7	58	-	-	74	-16	136	147	V
2	* 2.48356	42.77	Pk	32.4	-17.7	57.47	-	-	74	-16.53	136	147	V
3	* 2.48351	25.32	RMS	32.4	-17.7	40.02	54	-13.98	-	-	136	147	V
4	* 2.48353	26.16	RMS	32.4	-17.7	40.86	54	-13.14	-	-	136	147	V

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

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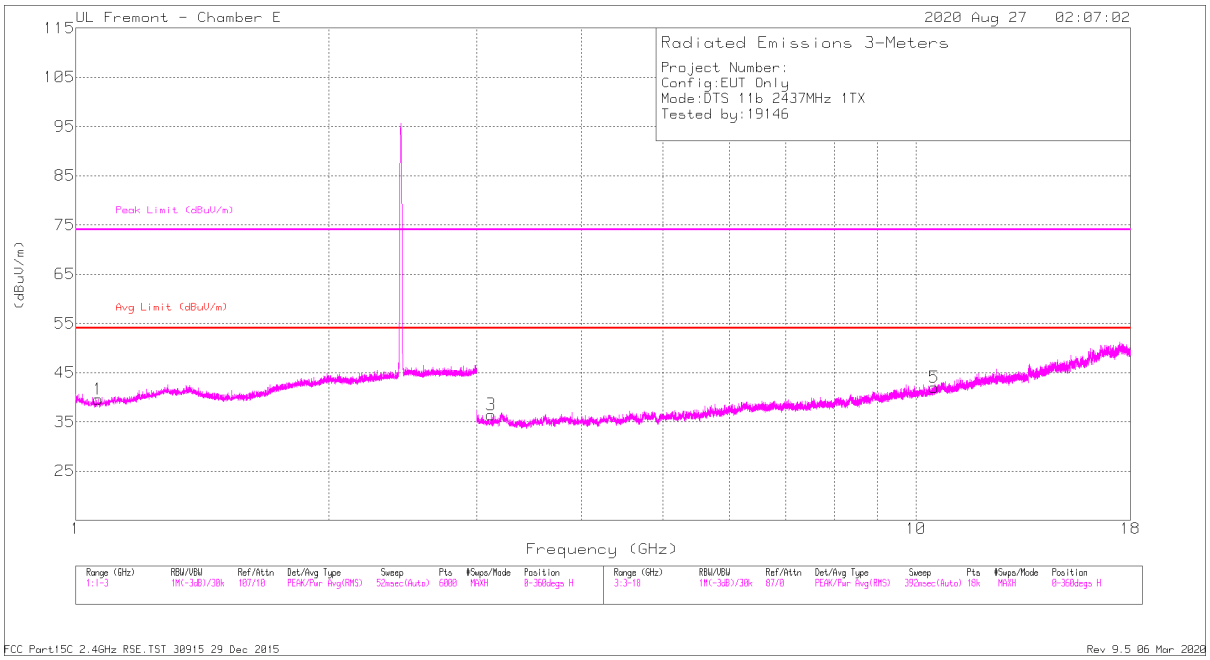
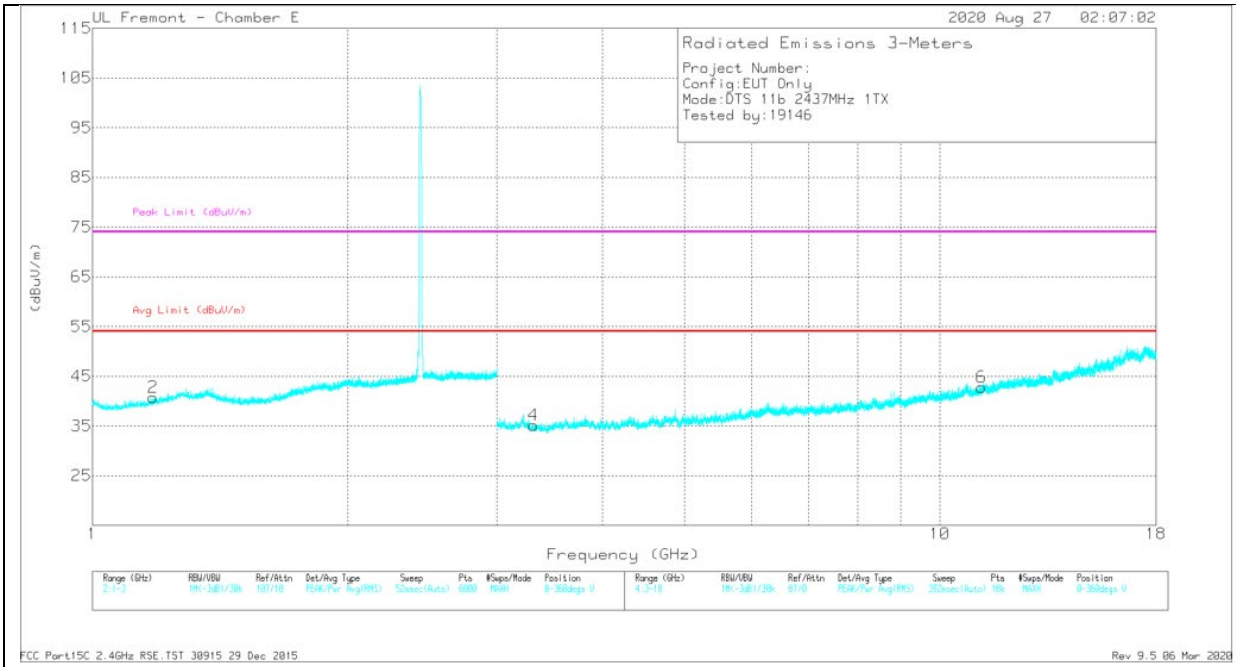
HARMONICS AND SPURIOUS EMISSIONS

11b Mode

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.06498	45.15	PK2	27.1	-25.9	46.35	-	-	74	-27.65	321	361	H
	* 1.06487	33.23	MAv1	27.1	-25.9	34.43	54	-19.57	-	-	321	361	H
3	3.12275	44.75	PK2	33	-34.8	42.95	-	-	-	-	181	297	H
5	10.5089	37.51	PK2	37.6	-25.4	49.71	-	-	-	-	340	122	H
2	* 1.17796	45.27	PK2	28.1	-26.2	47.17	-	-	74	-26.83	323	363	V
	* 1.17764	33.42	MAv1	28.1	-26.2	35.32	54	-18.68	-	-	323	363	V
4	* 11.19808	35.71	PK2	37.7	-24.2	49.21	-	-	74	-24.79	242	201	V
	* 11.19714	24.48	MAv1	37.7	-24.2	37.98	54	-16.02	-	-	242	201	V
6	3.315	44.21	PK2	32.8	-34.5	42.51	-	-	-	-	125	317	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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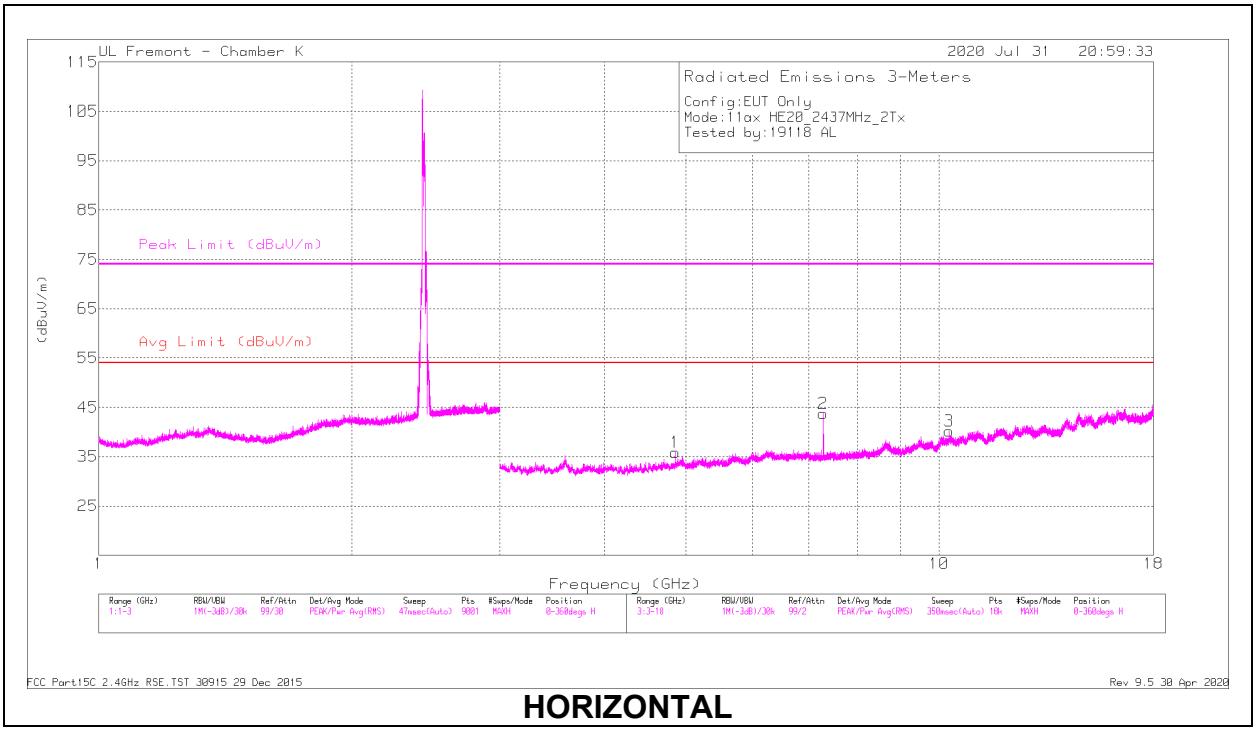
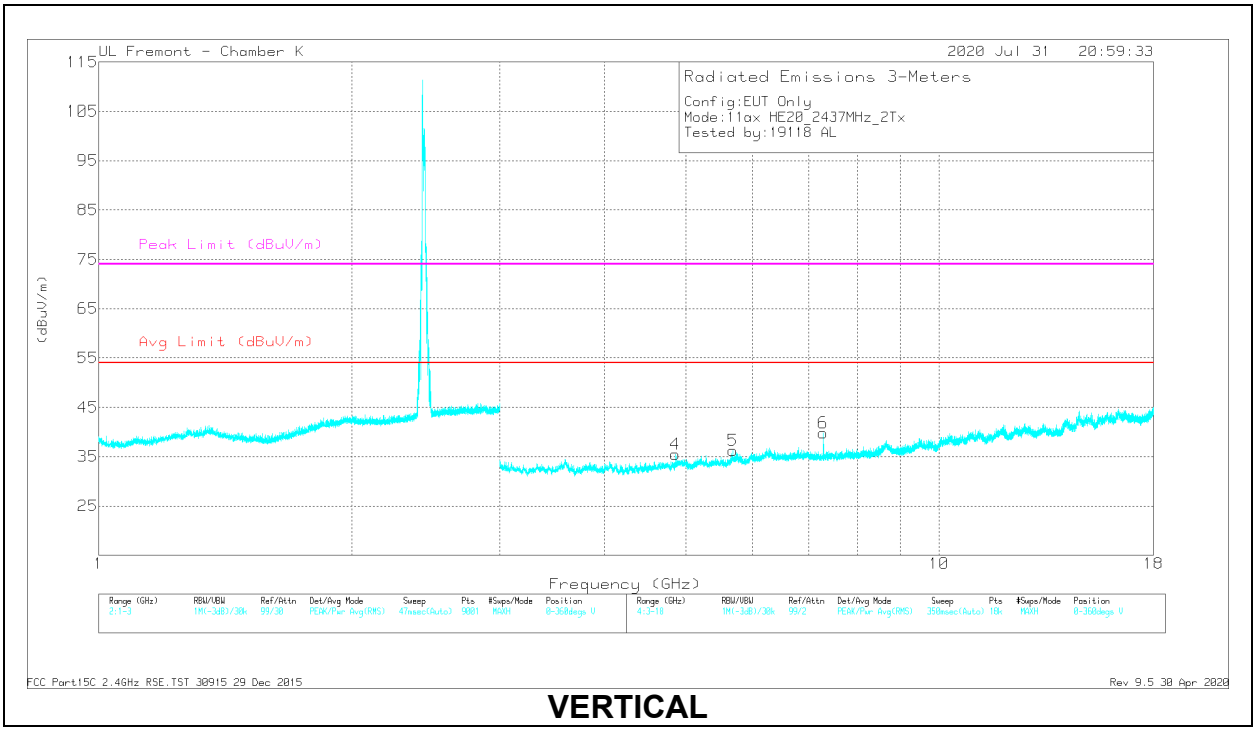
11ax MODE

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.85728	51.72	PK2	34.2	-40.7	45.22	-	-	74	-28.78	232	129	H
	* 4.85706	41.26	MAv1	34.2	-40.7	34.76	54	-19.24	-	-	232	129	H
2	* 7.28427	59.91	PK2	35.6	-38.4	57.11	-	-	74	-16.89	7	126	H
	* 7.28493	46.83	MAv1	35.6	-38.4	44.03	54	-9.97	-	-	7	126	H
3	10.28997	45.61	PK2	37.5	-36.7	46.41	-	-	-	-	126	139	H
4	* 4.85732	50.66	PK2	34.2	-40.7	44.16	-	-	74	-29.84	264	227	V
	* 4.85693	40.56	MAv1	34.2	-40.7	34.06	54	-19.94	-	-	264	227	V
5	5.68854	48.64	PK2	34.8	-39.6	43.84	-	-	-	-	261	340	V
6	* 7.28361	55.6	PK2	35.6	-38.4	52.8	-	-	74	-21.2	279	113	V
	* 7.28514	43.33	MAv1	35.6	-38.4	40.53	54	-13.47	-	-	279	113	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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6.4. REFERENCE DETAIL

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

Equipment Class	Reference FCC ID & IC	Reference Report	Report Title/Section
DTS	BCG-E3545A 579C-E3545A	13259315-E4	FCC IC_DTS Report / All sections

6.5. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	-1.9	0.4

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 A2341 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.

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6.8. DESCRIPTION OF TEST SETUP

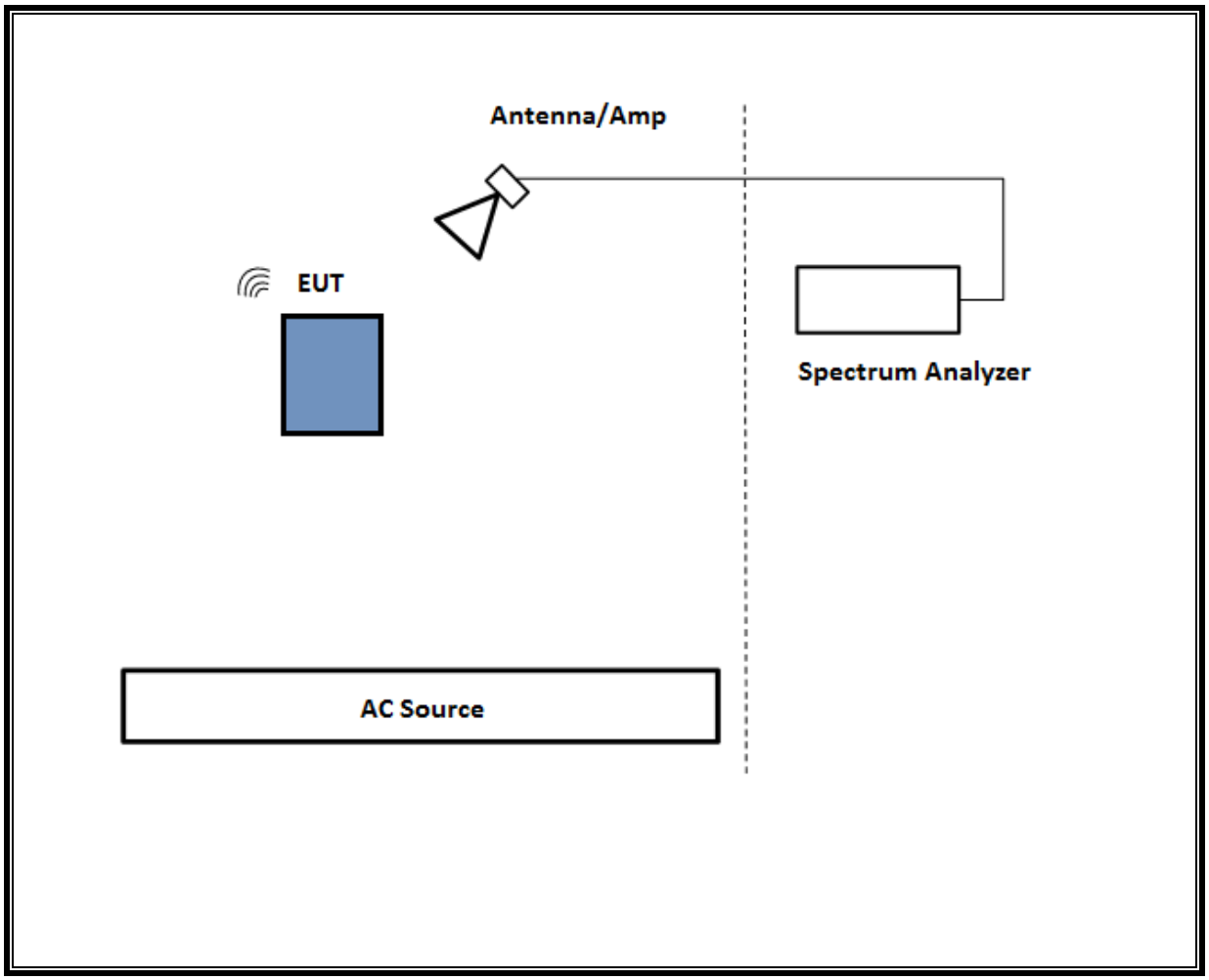
SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
Laptop	Apple	A1502	HRP003436	QDS-BRCM1080
Laptop AC/DC adapter	Liteon Technology	PA-1450-BA1	B123	NA
EUT AC/DC adapter	Apple	A1385	D29325SM03XDHLHC9	NA

I/O CABLES (RF 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 is connected to a test laptop during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



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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**
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T346	07/20/2021	07/20/2020
RF Filter Box, 1-18GHz	UL (IN HOUSE)	NA	PRE0180997	05/06/2021	05/06/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179522	02/20/2021	02/20/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T712	03/09/2021	03/10/2020
RF Filter Box	UL (IN HOUSE)	NA	PRE0182865	03/03/2021	03/03/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T1466	01/23/2021	01/23/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	PRE0100034	11/1/2020	11/01/2019
RF Filter Box, 8 port, 1-18GHz	UL (IN HOUSE)	SAC 8 port rf box 1	PRE0210426	05/04/2021	05/04/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179376	04/03/2021	04/03/2020
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 13259315-EP1 for setup photos

END OF TEST REPORT

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Appendix A – Reference Test Report

Attached is the test report (13259315-E4) containing the reference data from the parent model as detailed in section 6.4.

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TEST REPORT

Report Number: 13259315-E4V3

Applicant	:	APPLE INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A
Model	:	A2341
FCC ID	:	BCG-E3545A
IC	:	579C-E3545A
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:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
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NVLAP TESTING

NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	8/26/2020	Initial Issue	Chin Pang
V2	9/18/2020	Address TCB's Questions	Chin Pang
V3	9/21/2020	Address TCB's Questions	Chin Pang

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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: A2341

SERIAL NUMBER: G6TCQ02MQ5WF, G6TCJ05DQ5RR

DATE TESTED: FEBRUARY 11, 2020 – AUGUST 20, 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:

Chin Pang
Senior engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:

Francisco Guarnero
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

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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.
-	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.

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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: 2324A.
UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

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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%.

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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	22.19	165.58
	802.11g	Covered by 802.11n HT20 1TX	
	802.11n HT20	21.27	133.97
	802.11ax HE20	21.41	138.36

2Tx			
2412-2472	802.11n HT20 CDD	24.27	267.30
	802.11g SDM/STBC	Covered by 802.11n HT20 2TX CDD	
	802.11ax HE20	24.30	269.15

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	-1.9	0.4

6.4. SOFTWARE AND FIRMWARE

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

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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 both ANT 4 and 2TX. And the Z (Portrait) orientation 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. Radiated Bandedge was performed on highest data rate on both 802.11n and 802.11 ax.

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. There were no emissions found below 30MHz within 20dB of the limit.

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 HT20mode: MCS0, MCS 7
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.

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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 is connected to a test laptop during the tests. Test software exercised the radio card.

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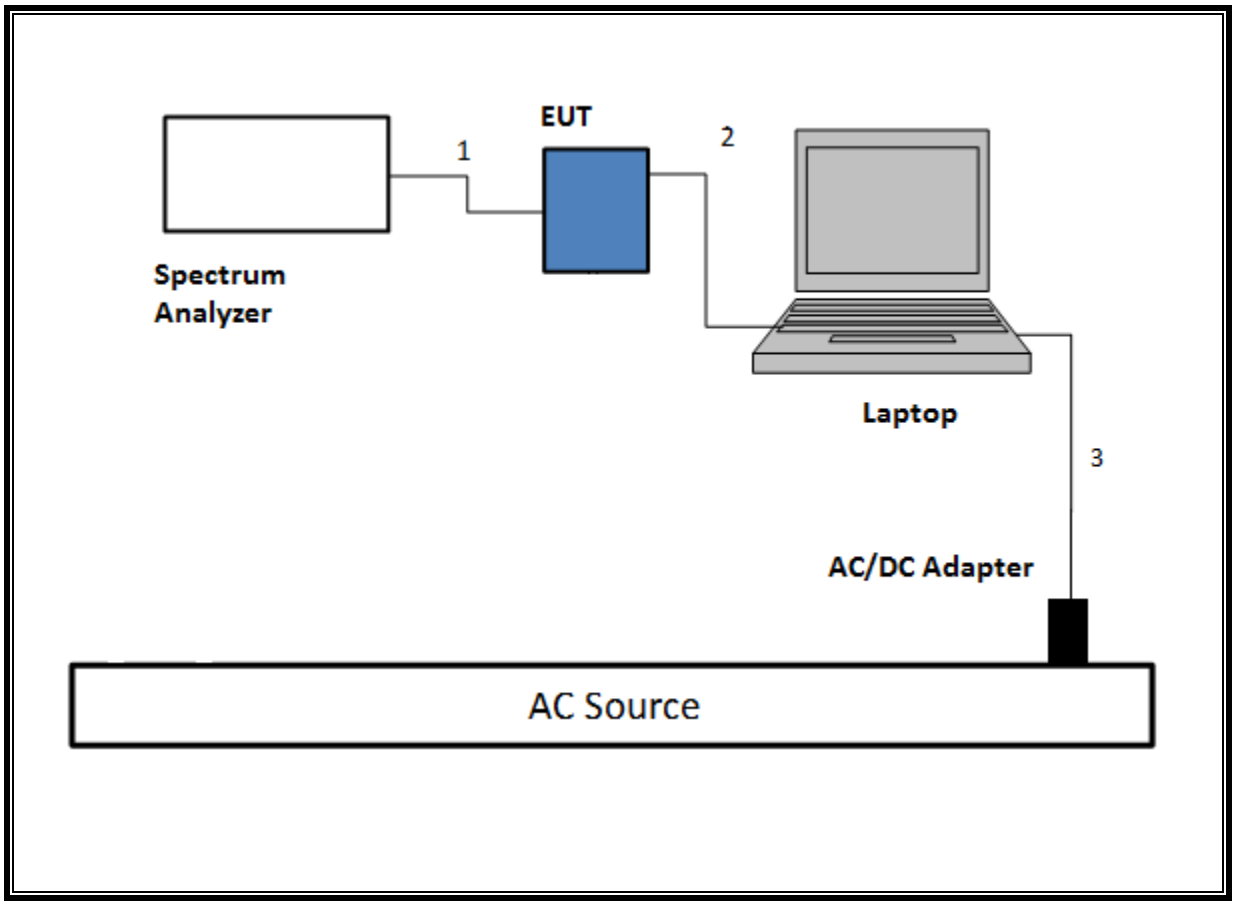
SETUP DIAGRAM FOR CONDUCTED TESTS



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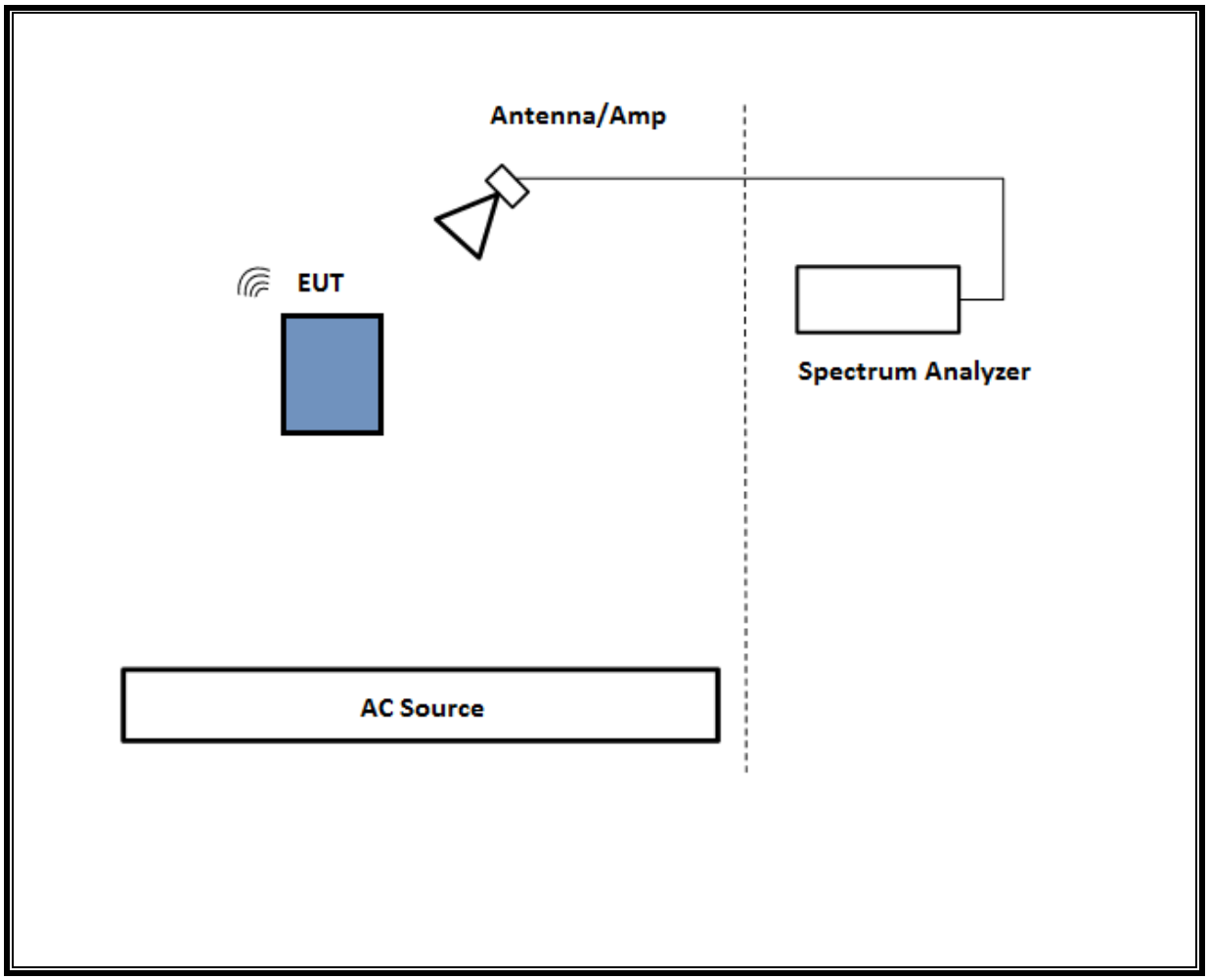
SETUP DIAGRAM FOR RADIATED TESTS Above 1GHz



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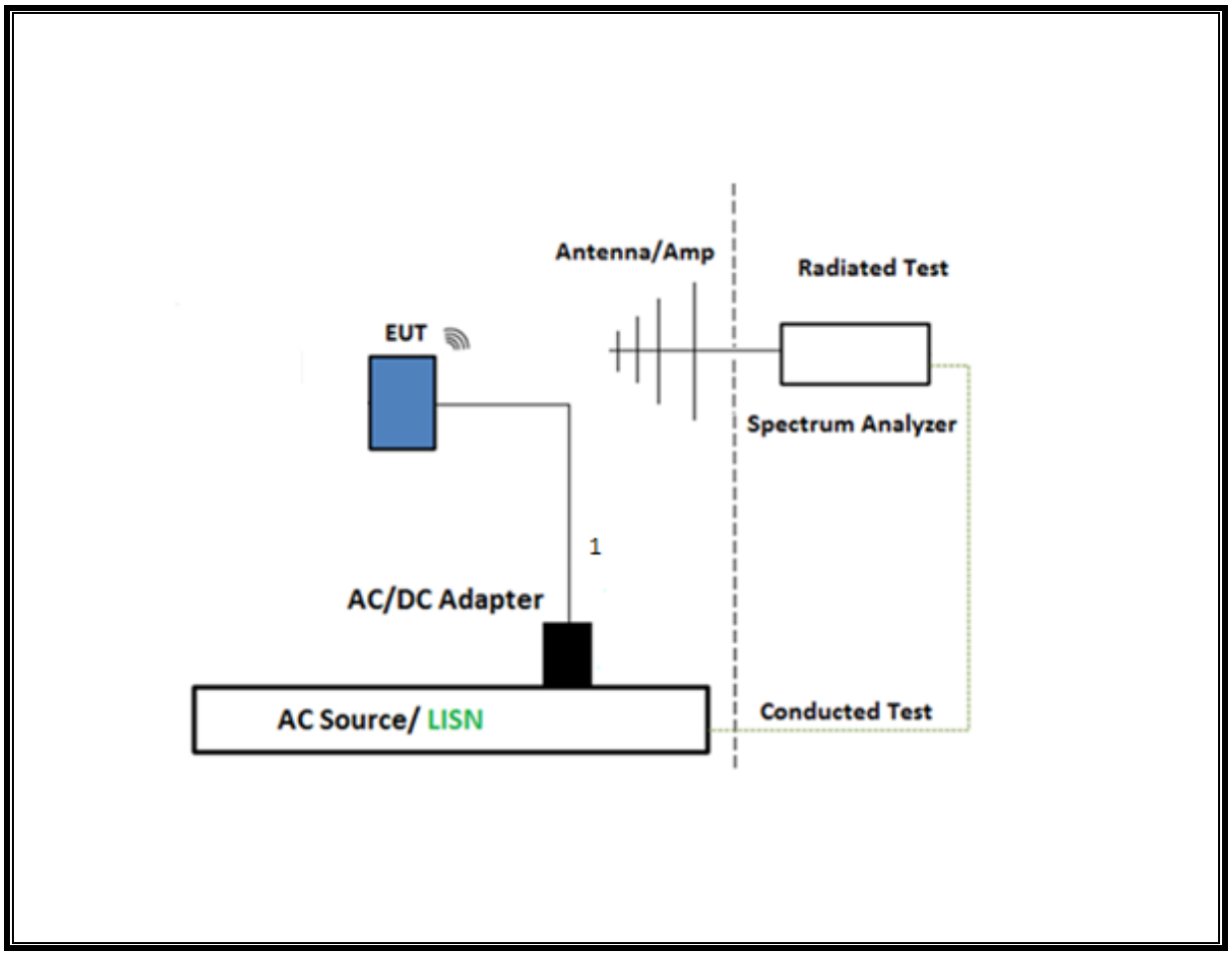
SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



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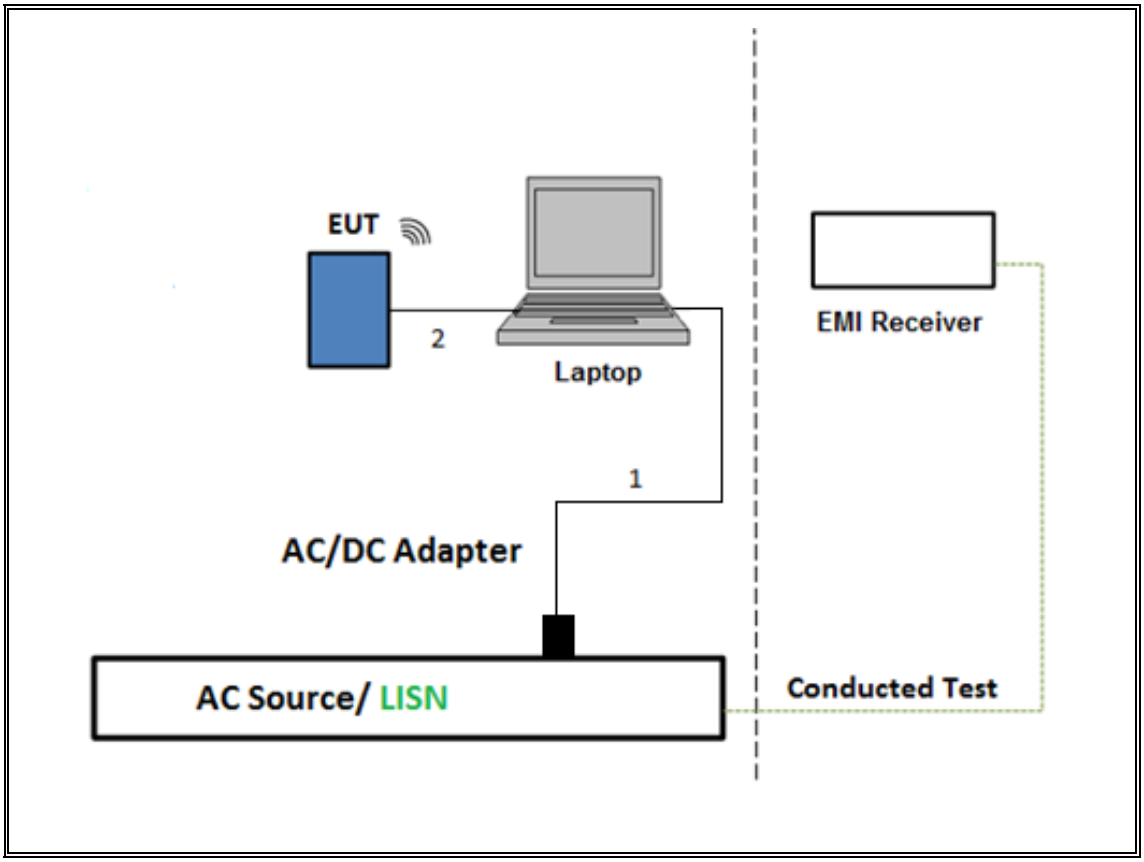
TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



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7. MEASUREMENT METHOD

Test Item	Test Method
6 dB BW	ANSI C63.10 Subclause -11.8.1 RBW ≥ 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 AVGPSD-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

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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	T120	04/19/2021	04/19/2020
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T491	06/12/2021	06/12/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T342	01/23/2021	01/23/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T345	05/19/2021	05/19/2020
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T1165	05/18/2021	05/18/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T346	07/20/2021	07/20/2020
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T931	05/11/2021	05/11/2020
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T1466	01/23/2021	01/23/2020
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, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T757	10/01/2020	10/01/2019
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T136	07/02/2020	07/02/2019
Amplifier, 1 to 18GHz, 35dB	Amplical	AFS42-00101800-25-S-42	T1568	04/14/2021	04/14/2020
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T345	04/20/2020	04/20/2019
*Amplifier, 1 to 18GHz	Amplical	AMP0.1G18-47-20	172121	07/15/2020	07/15/2019
Antenna, Double Ridge Guide Horn Antenna	A.H. Systems, Inc.	SAS-571	T963	01/25/2021	01/25/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1569	01/30/2021	01/30/2020
Antenna, Broadband Hybrid, 30MHz to 3000MHz	Sun AR rf motion	JB3	Pre0181575	09/05/2020	09/05/2019
*Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	Pre0180089	07/06/2020	07/06/2019
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	T459	01/23/2021	01/23/2020
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
Antenna, Active Loop 9KHz to 30MHz	EMCO	6502	T1683	04/28/2021	04/28/2020

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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.

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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	15.000	15.000	1.000	100.00%	0.00	0.010
802.11n HT20, MCS 0	1.920	1.940	0.990	98.97%	0.00	0.010
802.11n 1TX, MCS 7	0.1356	0.1560	0.869	86.92%	0.61	7.375
802.11n 2TX, MCS 7	0.1360	0.1560	0.872	87.18%	0.60	7.353
802.11ax HE20 26T	3.980	4.020	0.990	99.00%	0.00	0.010

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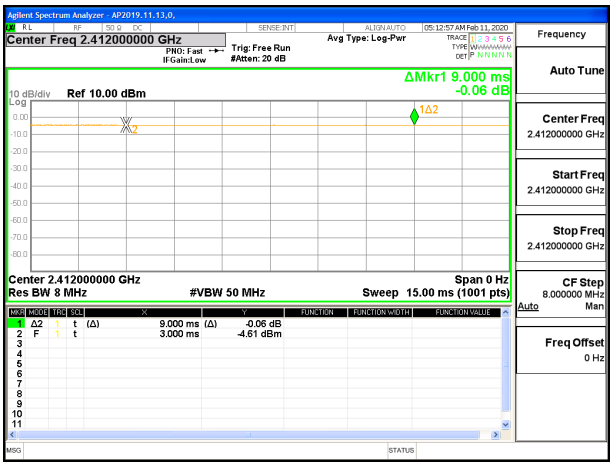
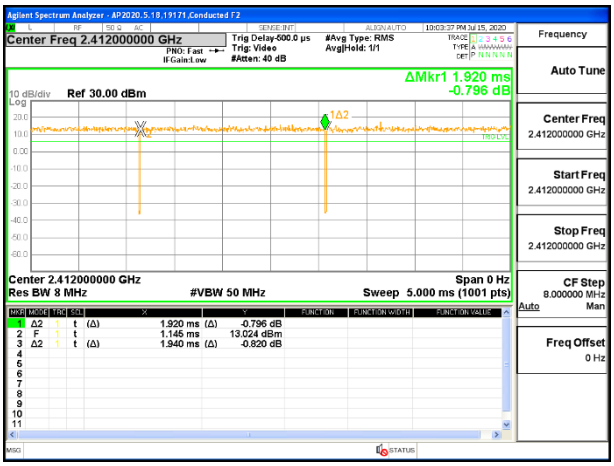
DUTY CYCLE PLOTS



DUTY CYCLE 802.11b MODE

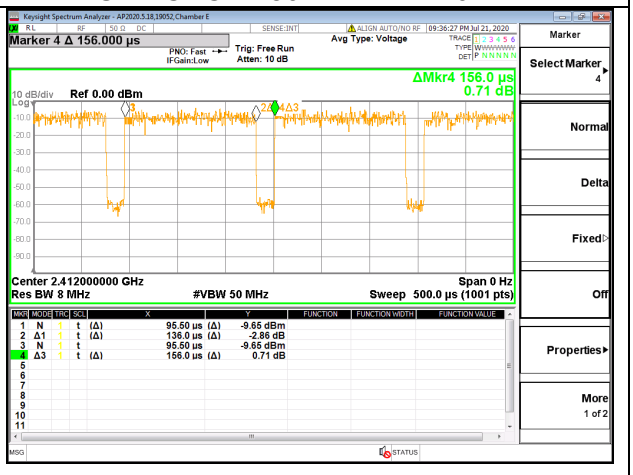


DUTY CYCLE 802.11n HT20, MCS 0

DUTY CYCLE 802.11ax HE20 26T

DUTY CYCLE 802.11ax HE20 242T

DUTY CYCLE 802.11n 1TX MCS 7



DUTY CYCLE 802.11n 2TX, MCS 7

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9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

ID:	44353	Date:	2/19/2020

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

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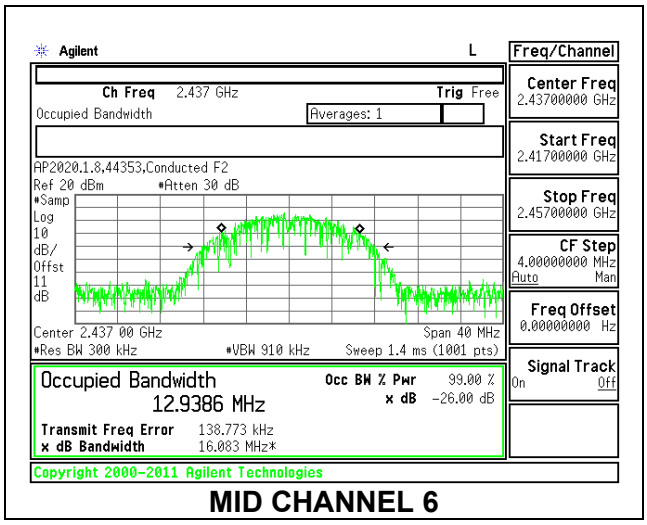
9.2.1. 802.11b MODE 1TX

ANT 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	13.1890
Mid 6	2437	12.9390
High 11	2462	13.1040
High 12	2467	13.1920
High 13	2472	13.0310



MID CHANNEL 6

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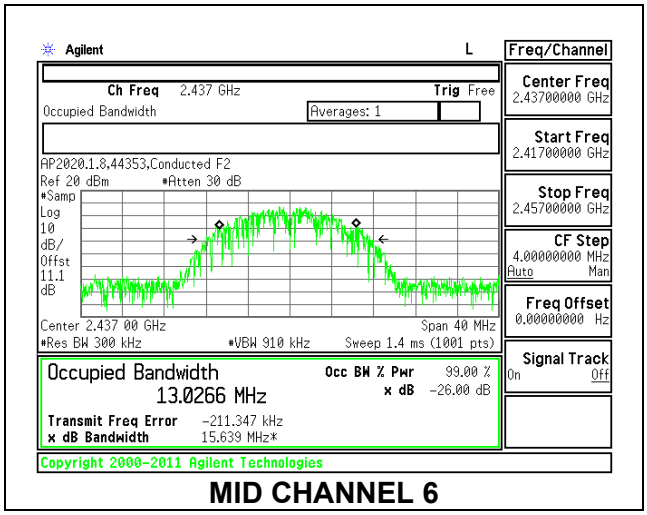
ANT 3

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	12.8800
Mid 6	2437	13.0270
High 11	2462	12.8070
High 12	2467	12.6560
High 13	2472	12.7050



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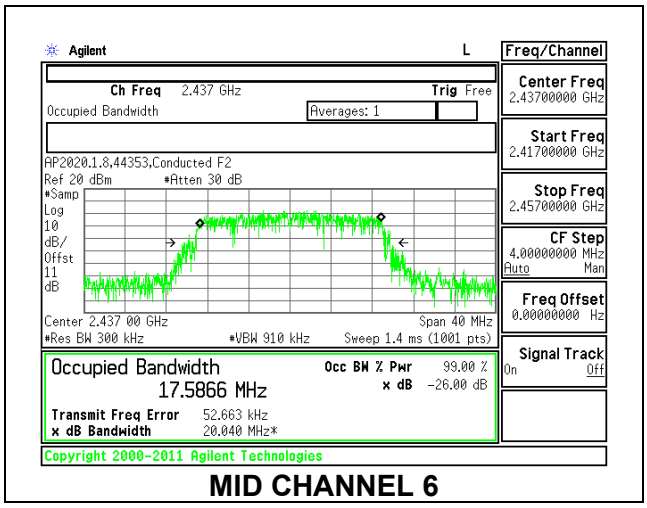
9.2.2. 802.11n HT20 MODE 1TX

ANT 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.6737
Low 2	2417	17.7306
Low 3	2422	17.7125
Mid 6	2437	17.5866
High 9	2452	17.6598
High 10	2457	17.6975
High 11	2462	17.6755
High 12	2467	17.6064
High 13	2472	17.6824



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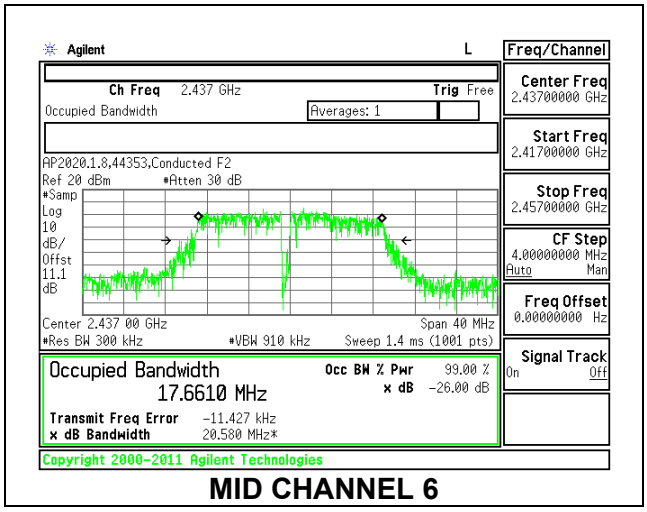
ANT 3

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.6692
Low 2	2417	17.6086
Low 3	2422	17.6829
Mid 6	2437	17.6610
High 9	2452	17.6950
High 10	2457	17.7061
High 11	2462	17.6768
High 12	2467	17.6572
High 13	2472	17.4556



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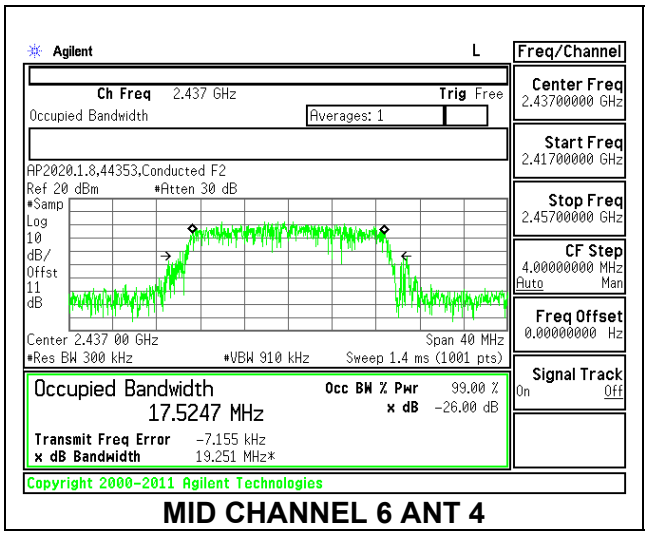
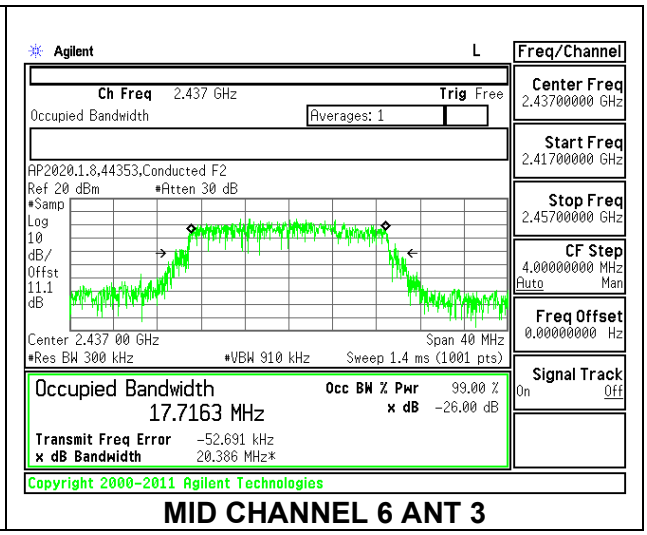
9.2.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3

Channel	Frequency (MHz)	99% Bandwidth ANT 4 (MHz)	99% Bandwidth ANT 3 (MHz)
Low 1	2412	17.6210	17.7103
Low 2	2417	17.7430	17.6375
Low 3	2422	17.6049	17.6353
Mid 6	2437	17.5247	17.7163
High 9	2452	17.6563	17.7431
High 10	2457	17.6750	17.7063
High 11	2462	17.7646	17.6316
High 12	2467	17.7562	17.5464
High 13	2472	17.5317	17.4494



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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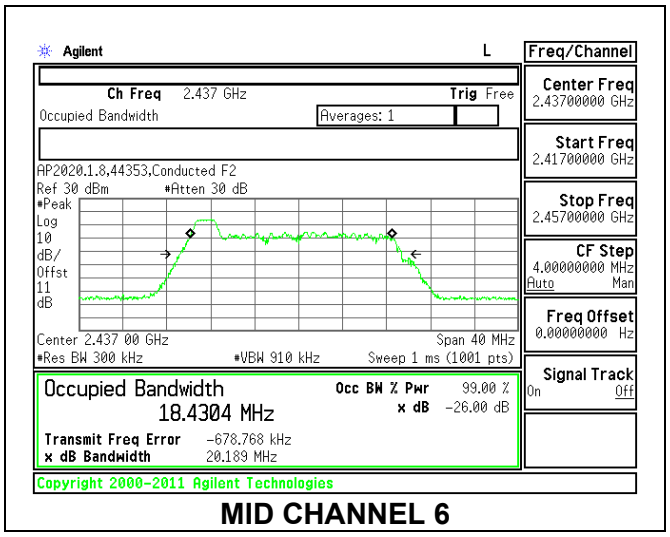
9.2.4. 802.11ax HE20 OFDMA MODE 1TX

ANT 4: 26-Tones, RU Index 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.1709
Low 2	2417	18.2884
Low 3	2422	18.5082
Mid 6	2437	18.4304
High 9	2452	18.1280
High 10	2457	18.1086
High 11	2462	18.3937
High 12	2467	18.4624
High 13	2472	18.1371



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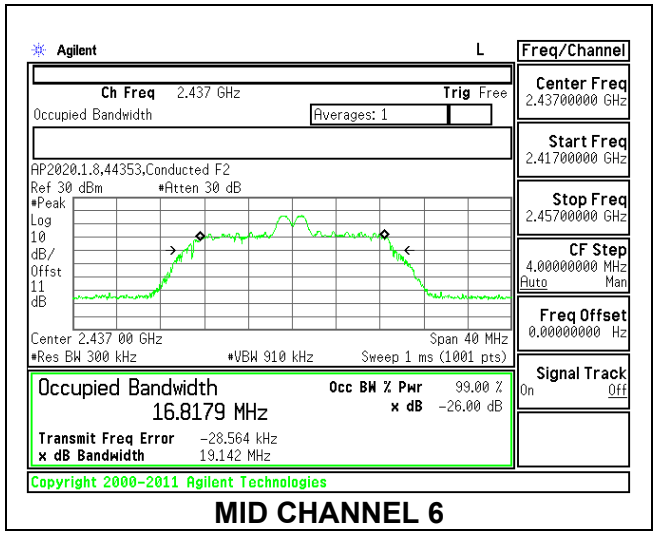
ANT 4: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.0154
Low 2	2417	17.1426
Low 3	2422	17.2098
Mid 6	2437	16.8179
High 9	2452	17.1219
High 10	2457	17.0004
High 11	2462	17.2338
High 12	2467	17.1278
High 13	2472	16.8136



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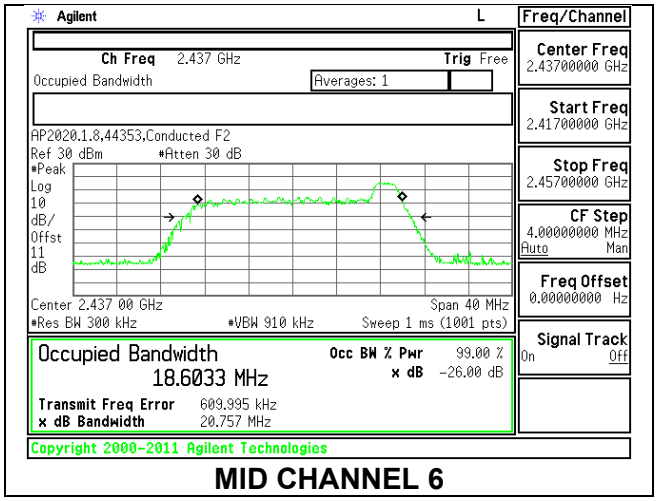
ANT 4: 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.6244
Low 2	2417	18.6304
Low 3	2422	18.5730
Mid 6	2437	18.6033
High 9	2452	18.7999
High 10	2457	19.0093
High 11	2462	18.9318
High 12	2467	18.5427
High 13	2472	18.5745



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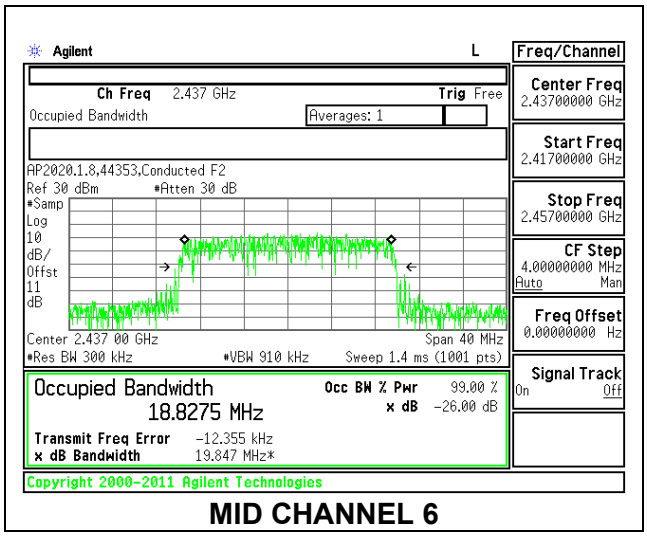
ANT 4: 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.8377
Low 2	2417	18.9296
Low 3	2422	18.9290
Mid 6	2437	18.8275
High 9	2452	18.9330
High 10	2457	18.7773
High 11	2462	18.8918
High 12	2467	19.0240
High 13	2472	18.8533



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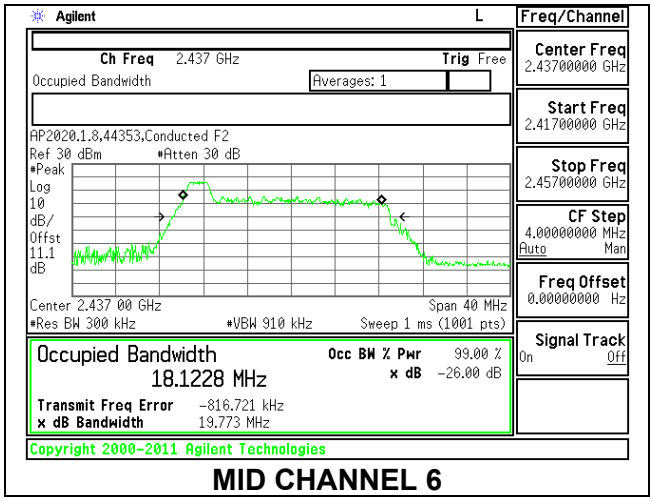
ANT 3: 26-Tones, RU Index 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.5690
Low 2	2417	18.4022
Low 3	2422	18.5041
Mid 6	2437	18.1228
High 9	2452	18.4858
High 10	2457	18.5032
High 11	2462	18.4594
High 12	2467	18.3267
High 13	2472	17.8236



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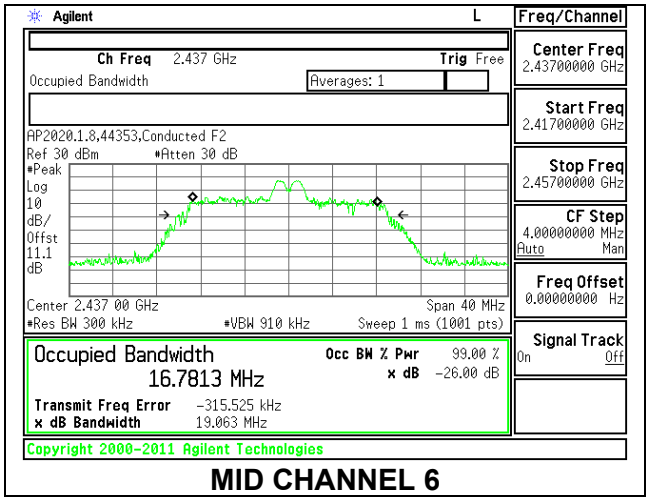
ANT 3: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.0934
Low 2	2417	16.9579
Low 3	2422	17.0945
Mid 6	2437	16.7813
High 9	2452	16.9391
High 10	2457	17.0716
High 11	2462	16.8265
High 12	2467	16.4989
High 13	2472	16.5230



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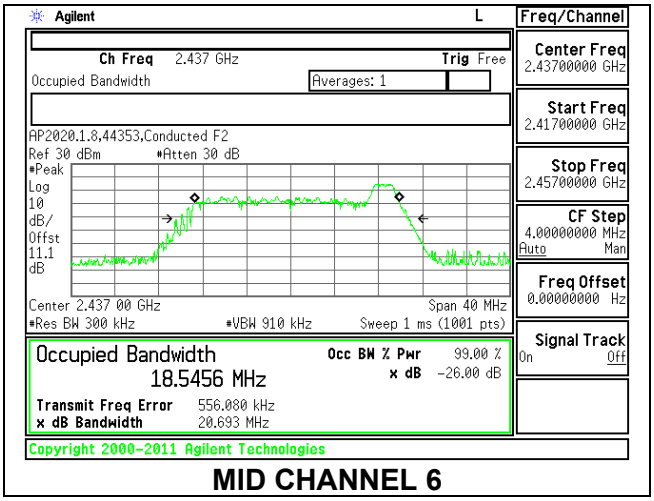
ANT 3: 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.3649
Low 2	2417	18.4899
Low 3	2422	18.6164
Mid 6	2437	18.5456
High 9	2452	18.6952
High 10	2457	18.2593
High 11	2462	18.3498
High 12	2467	18.6029
High 13	2472	18.5044



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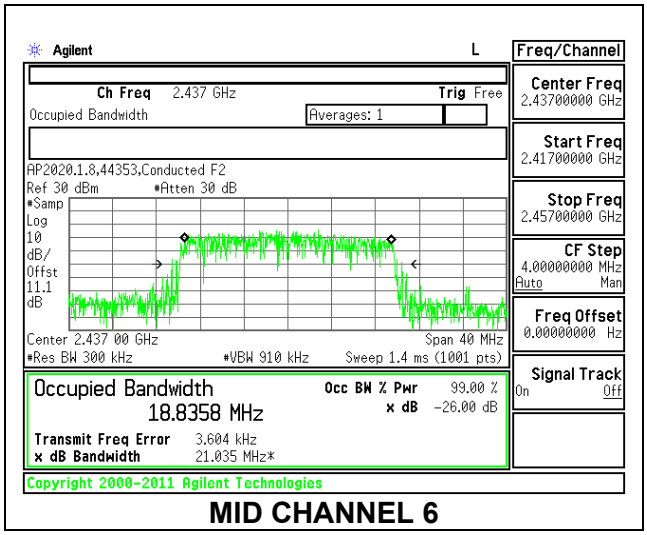
ANT 3: 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.8828
Low 2	2417	18.9003
Low 3	2422	18.9237
Mid 6	2437	18.8358
High 9	2452	18.8894
High 10	2457	18.9495
High 11	2462	18.9561
High 12	2467	18.8997
High 13	2472	18.6542



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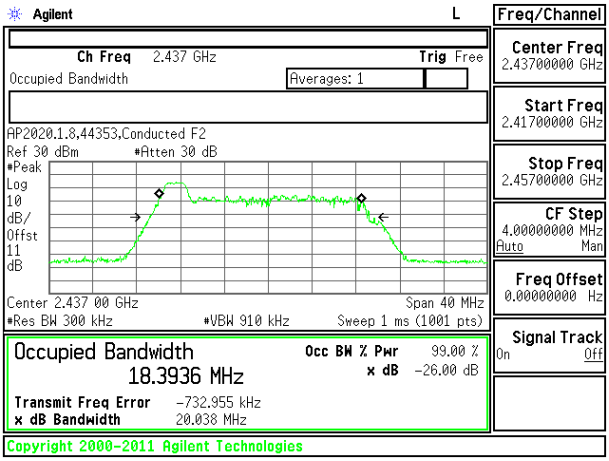
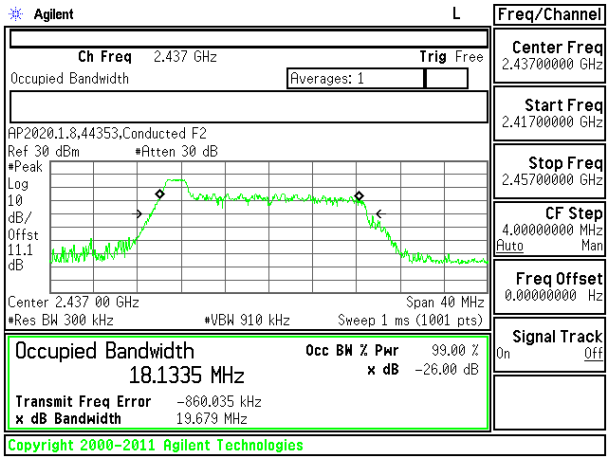
9.2.5. 802.11ax HE20 OFDMA MODE 2TX

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

Channel	Frequency (MHz)	99% Bandwidth ANT 4 (MHz)	99% Bandwidth ANT 3 (MHz)
Low 1	2412	18.2764	18.5907
Low 2	2417	18.2921	18.4682
Low 3	2422	18.4319	18.4313
Mid 6	2437	18.3936	18.1335
High 9	2452	18.0737	18.4588
High 10	2457	18.2699	18.4973
High 11	2462	18.2485	18.3426
High 12	2467	18.5395	18.2836
High 13	2472	18.2471	17.9579



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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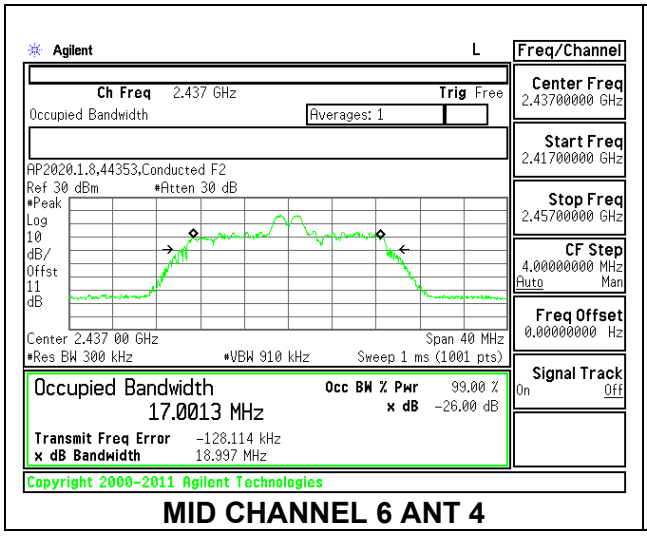
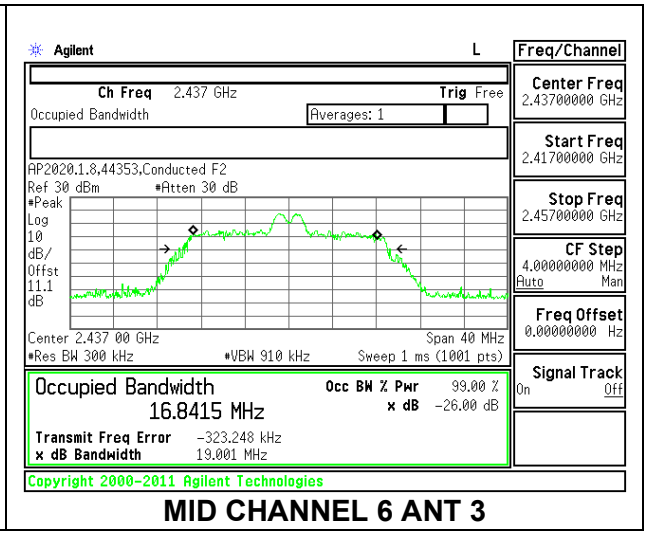
ANT 4 + ANT 3: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth ANT 4 (MHz)	99% Bandwidth ANT 3 (MHz)
Low 1	2412	17.0952	17.0790
Low 2	2417	17.0483	16.6885
Low 3	2422	17.2974	17.0305
Mid 6	2437	17.0013	16.8415
High 9	2452	16.9100	17.0958
High 10	2457	17.0188	17.1956
High 11	2462	17.1815	17.0436
High 12	2467	17.1438	16.7415
High 13	2472	16.9114	16.4835



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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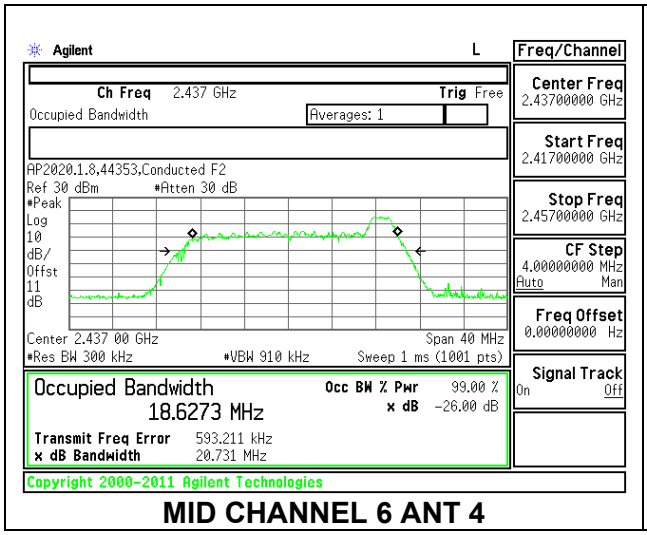
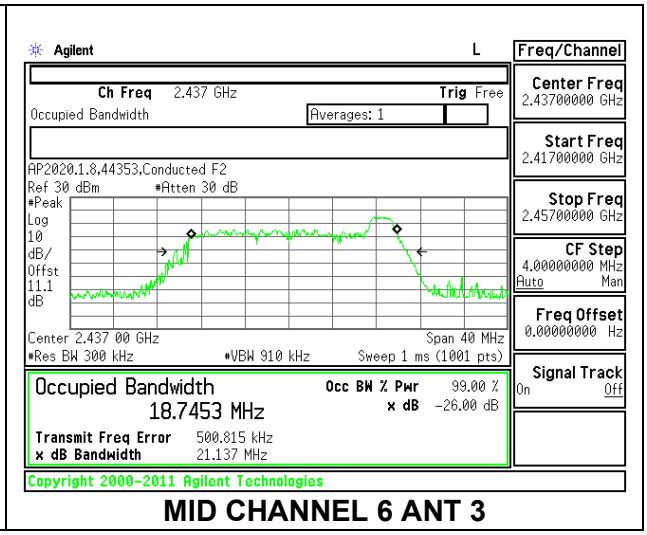
ANT 4 + ANT 3: 26-Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth ANT 4 (MHz)	99% Bandwidth ANT 3 (MHz)
Low 1	2412	18.6612	18.4340
Low 2	2417	18.9475	18.4908
Low 3	2422	18.5620	18.6156
Mid 6	2437	18.6273	18.7453
High 9	2452	18.8762	18.6338
High 10	2457	18.9075	18.4295
High 11	2462	18.7165	18.4923
High 12	2467	18.6776	18.5053
High 13	2472	18.7305	18.5556



MID CHANNEL 6 ANT 4



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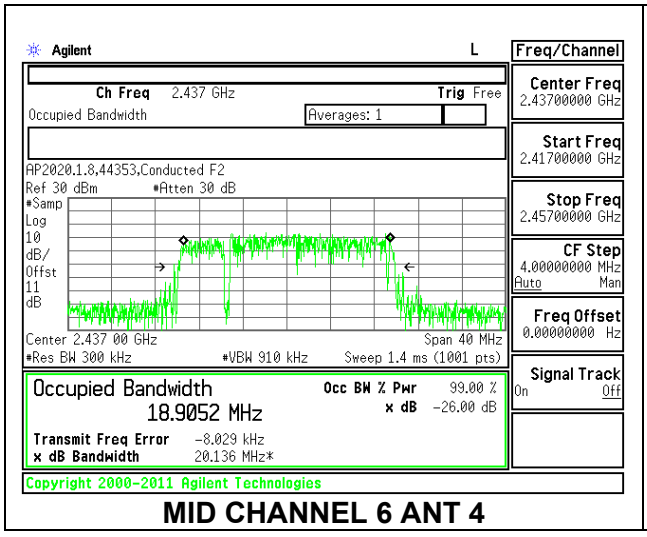
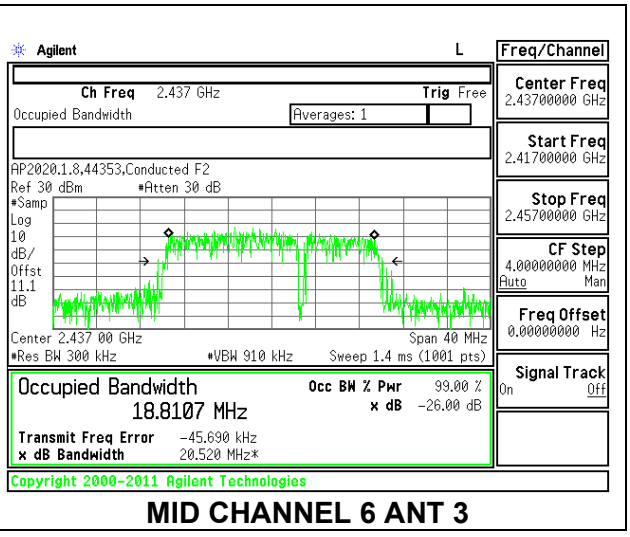
ANT 4 + ANT 3 2TX MODE: 242-Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth ANT 4 (MHz)	99% Bandwidth ANT 3 (MHz)
Low 1	2412	18.8382	18.7317
Low 2	2417	18.9662	18.8435
Low 3	2422	19.0121	18.9163
Low 4	2427	18.8900	18.9171
Mid 6	2437	18.9052	18.8107
High 8	2447	18.8705	18.9979
High 9	2452	18.8336	18.9835
High 10	2457	18.9559	18.9377
High 11	2462	18.9648	18.8745
High 12	2467	18.8422	18.7453
High 13	2472	18.7913	18.7526



MID CHANNEL 6 ANT 4



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9.3. 6 dB 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.

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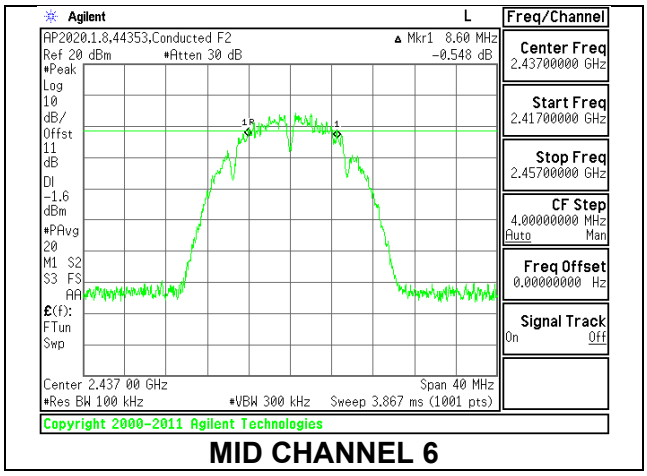
9.3.1. 802.11b MODE 1TX

ANT 4

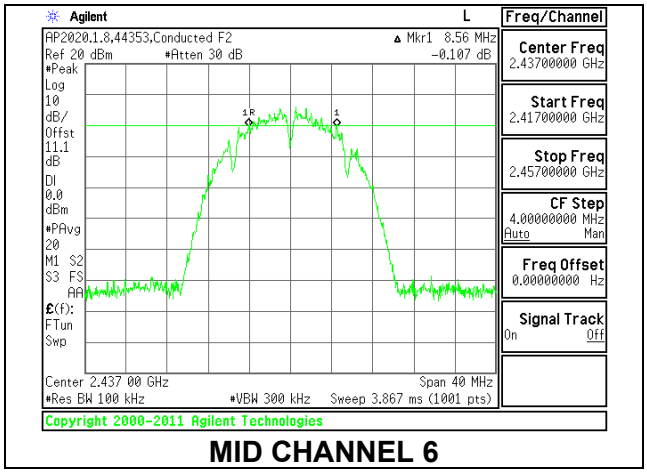
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	8.2000	0.5
Mid 6	2437	8.6000	0.5
High 11	2462	8.4000	0.5
High 12	2467	8.2000	0.5
High 13	2472	8.8000	0.5



MID CHANNEL 6

ANT 3

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	8.6800	0.5
Mid 6	2437	8.5600	0.5
High 11	2462	8.0800	0.5
High 12	2467	8.1600	0.5
High 13	2472	8.6000	0.5



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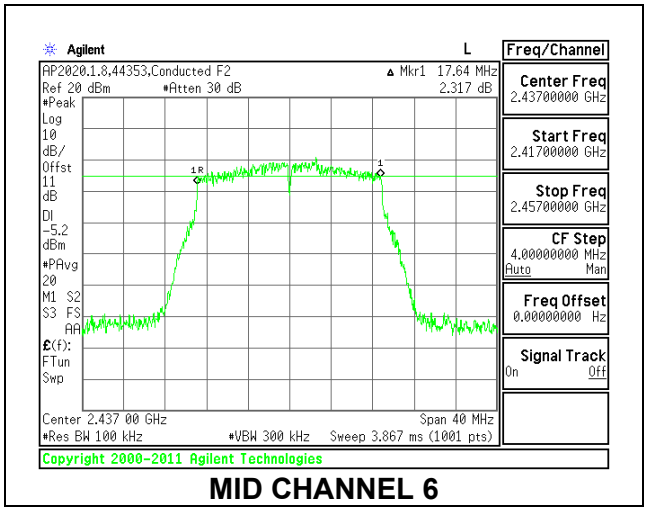
9.3.2. 802.11n HT20 MODE 1TX

ANT 4

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	17.7600	0.5
Low 2	2417	17.6400	0.5
Low 3	2422	16.8800	0.5
Mid 6	2437	17.6400	0.5
High 9	2452	17.7200	0.5
High 10	2457	17.2800	0.5
High 11	2462	17.7600	0.5
High 12	2467	17.4000	0.5
High 13	2472	17.2000	0.5



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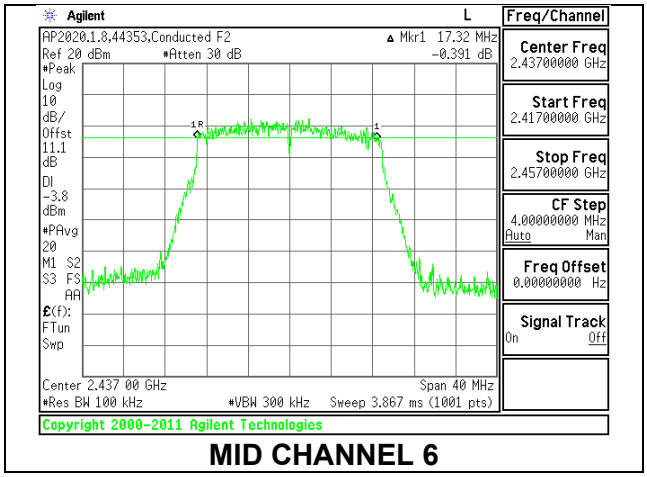
ANT 3

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	17.7600	0.5
Low 2	2417	17.6800	0.5
Low 3	2422	17.6800	0.5
Mid 6	2437	17.3200	0.5
High 9	2452	16.8000	0.5
High 10	2457	17.7600	0.5
High 11	2462	17.7200	0.5
High 12	2467	17.6000	0.5
High 13	2472	17.3200	0.5



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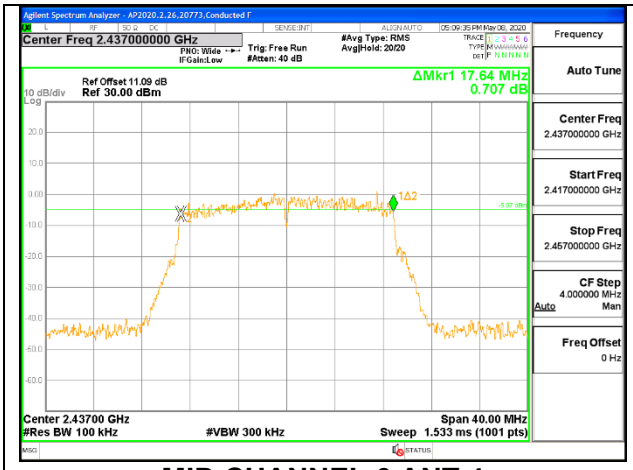
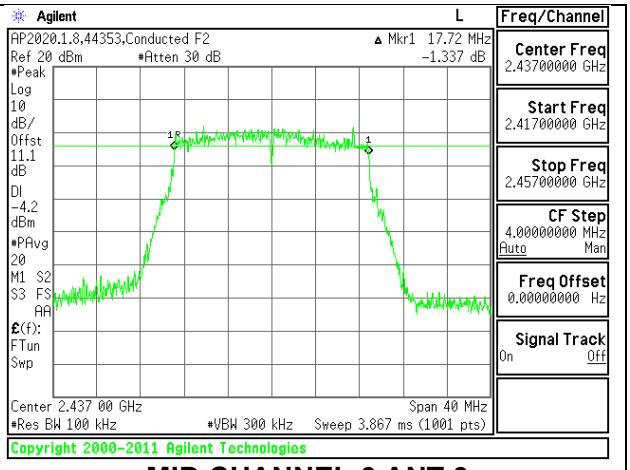
9.3.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3

Channel	Frequency (MHz)	6 dB Bandwidth ANT 4 (MHz)	6 dB Bandwidth ANT 3 (MHz)	Minimum Limit (MHz)
Low 1	2412	17.72	17.64	0.5
Low 2	2417	17.68	17.44	0.5
Low 3	2422	17.64	17.64	0.5
Mid 6	2437	17.64	17.72	0.5
High 9	2452	17.76	17.68	0.5
High 10	2457	17.72	17.00	0.5
High 11	2462	17.24	17.60	0.5
High 12	2467	17.64	17.64	0.5
High 13	2472	17.28	17.04	0.5



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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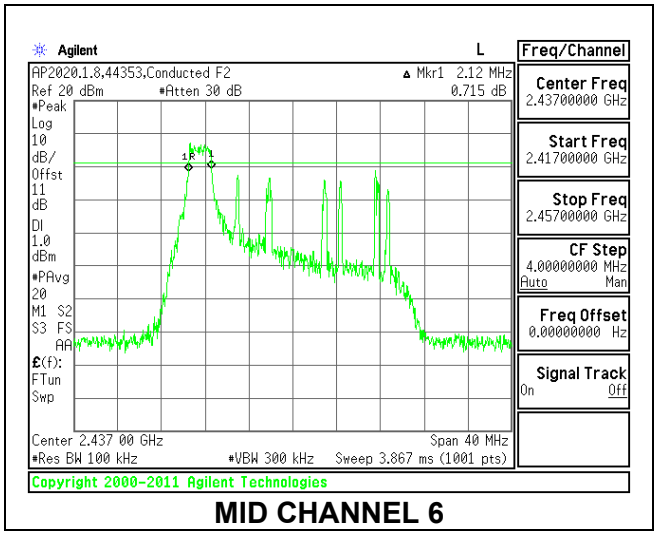
9.3.4. 802.11ax HE20 OFDMA MODE 1TX

ANT 4: 26-Tones, RU Index 0

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.12	0.5
Low 2	2417	2.12	0.5
Low 3	2422	2.04	0.5
Mid 6	2437	2.12	0.5
High 9	2452	2.08	0.5
High 10	2457	2.08	0.5
High 11	2462	2.16	0.5
High 12	2467	2.00	0.5
High 13	2472	2.04	0.5



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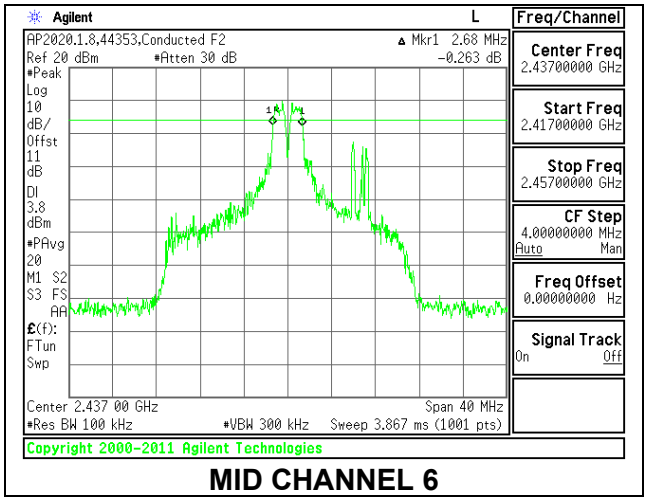
ANT 4: 26-Tones, RU Index 4

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	2.68	0.5
Mid 6	2437	2.68	0.5
High 9	2452	2.72	0.5
High 10	2457	2.64	0.5
High 11	2462	2.68	0.5
High 12	2467	2.64	0.5
High 13	2472	2.64	0.5



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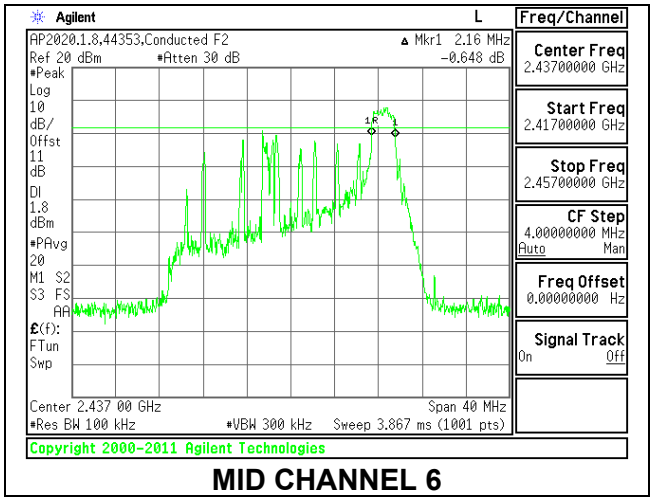
ANT 4: 26-Tones, RU Index 8

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



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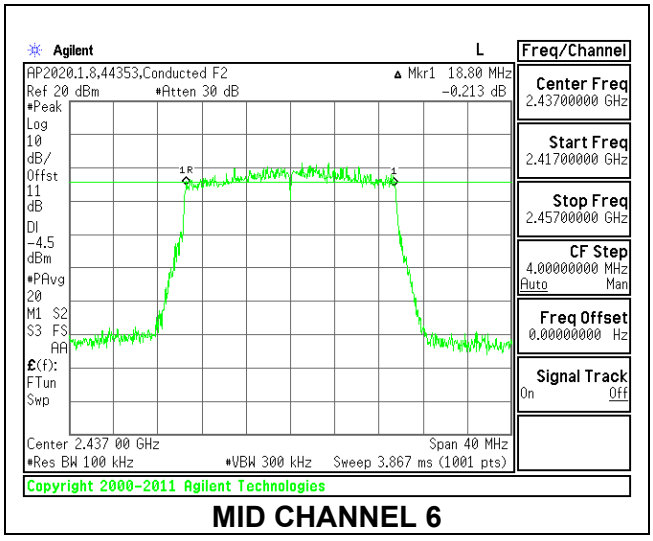
ANT 4: 242-Tones, RU Index 61

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	18.88	0.5
Low 2	2417	19.00	0.5
Low 3	2422	18.96	0.5
Mid 6	2437	18.80	0.5
High 9	2452	18.60	0.5
High 10	2457	19.08	0.5
High 11	2462	19.08	0.5
High 12	2467	19.00	0.5
High 13	2472	18.72	0.5



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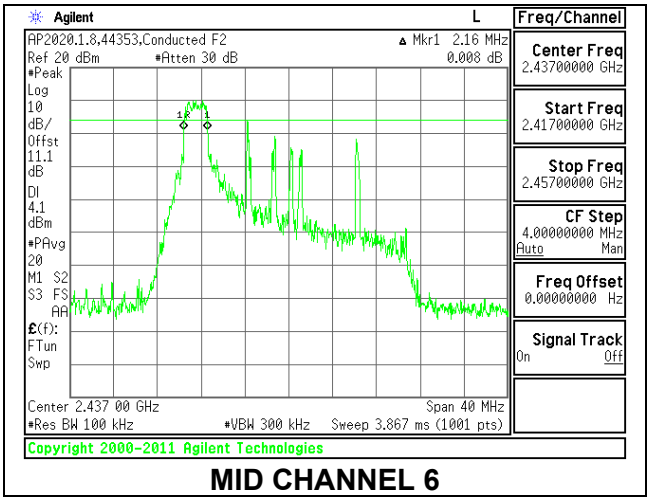
ANT 3: 26-Tones, RU Index 0

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.08	0.5
Low 2	2417	2.12	0.5
Low 3	2422	2.12	0.5
Mid 6	2437	2.16	0.5
High 9	2452	2.08	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	2.08	0.5



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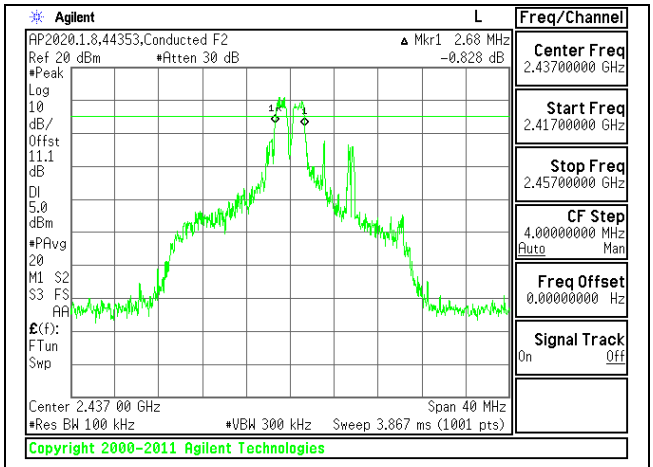
ANT 3: 26-Tones, RU Index 4

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



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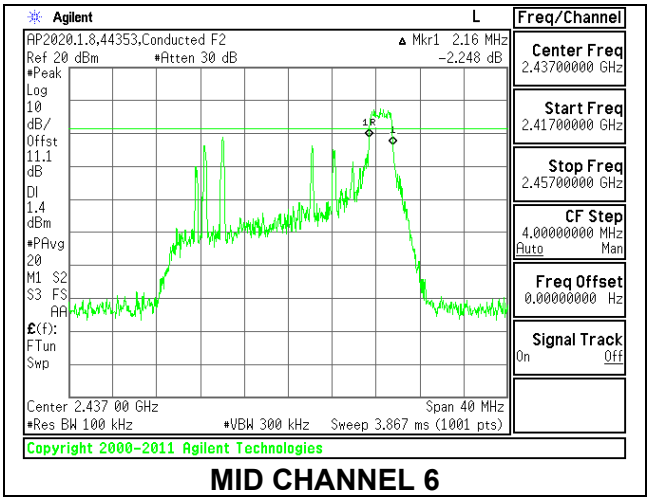
ANT 3: 26-Tones, RU Index 8

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.16	0.5
Low 2	2417	2.08	0.5
Low 3	2422	2.12	0.5
Mid 6	2437	2.16	0.5
High 9	2452	2.08	0.5
High 10	2457	2.16	0.5
High 11	2462	2.00	0.5
High 12	2467	2.08	0.5
High 13	2472	2.12	0.5



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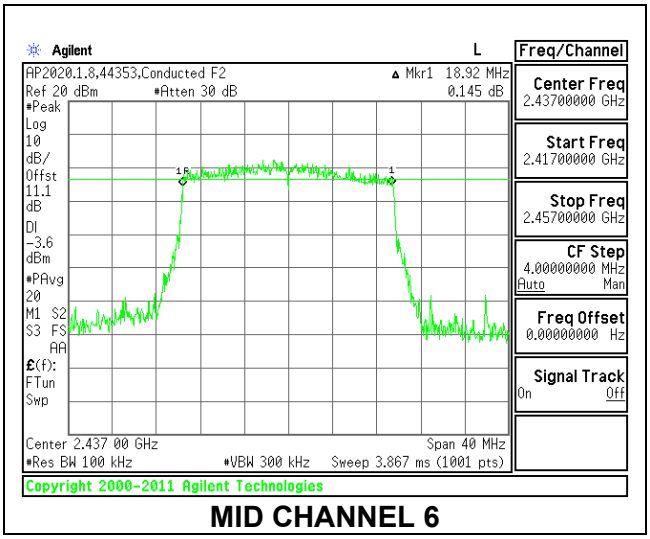
ANT 3: 242-Tones, RU Index 61

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	18.20	0.5
Low 2	2417	18.96	0.5
Low 3	2422	18.72	0.5
Mid 6	2437	18.92	0.5
High 9	2452	18.92	0.5
High 10	2457	18.80	0.5
High 11	2462	18.60	0.5
High 12	2467	18.04	0.5
High 13	2472	17.60	0.5



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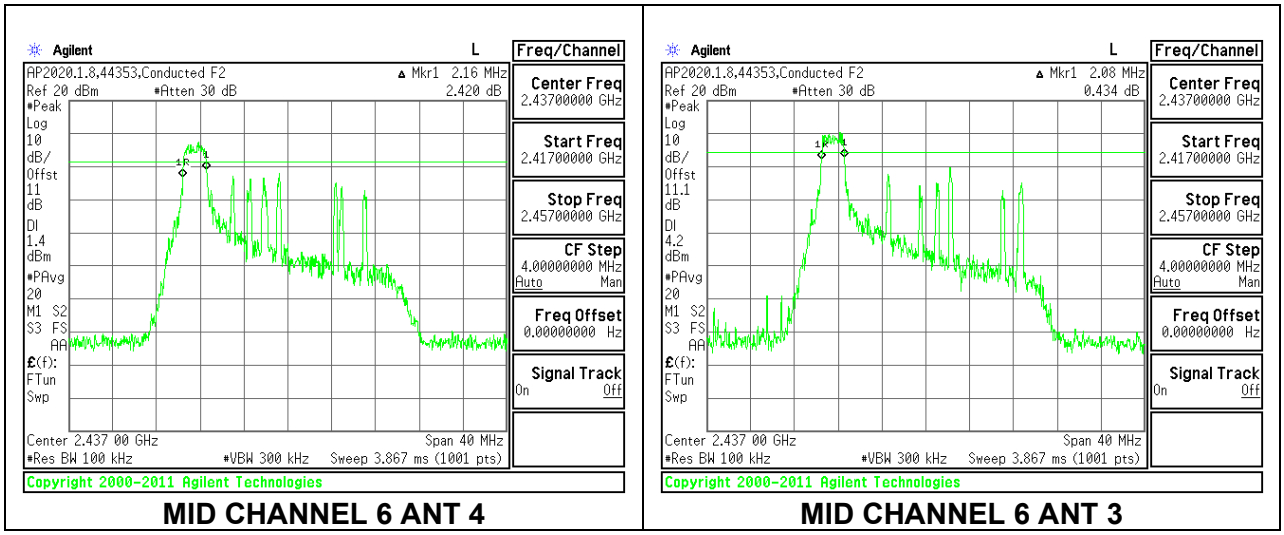
9.3.5. 802.11ax HE20 OFDMA MODE 2TX

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

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



MID CHANNEL 6 ANT 4 **MID CHANNEL 6 ANT 3**

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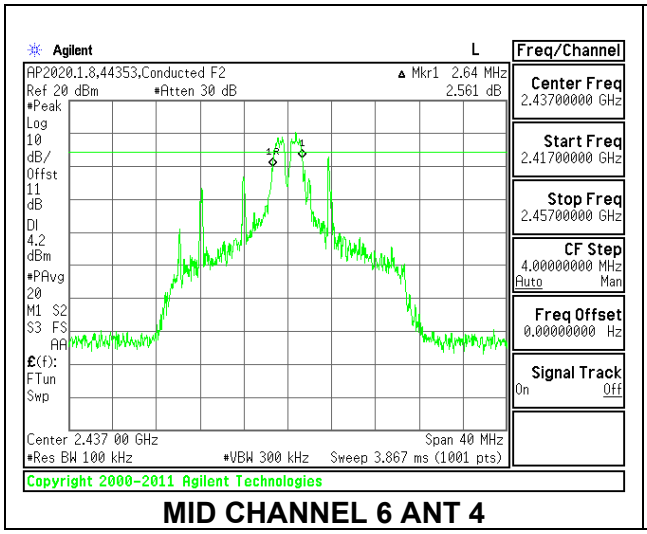
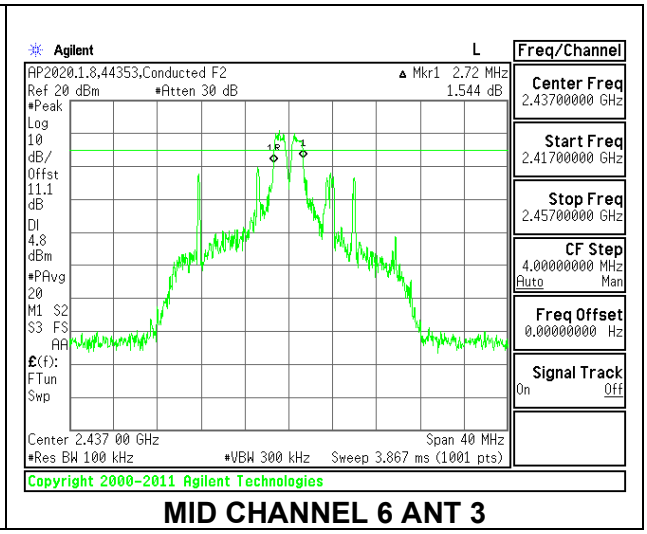
ANT 4 + ANT 3: 26-Tones, RU Index 4

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



MID CHANNEL 6 ANT 4



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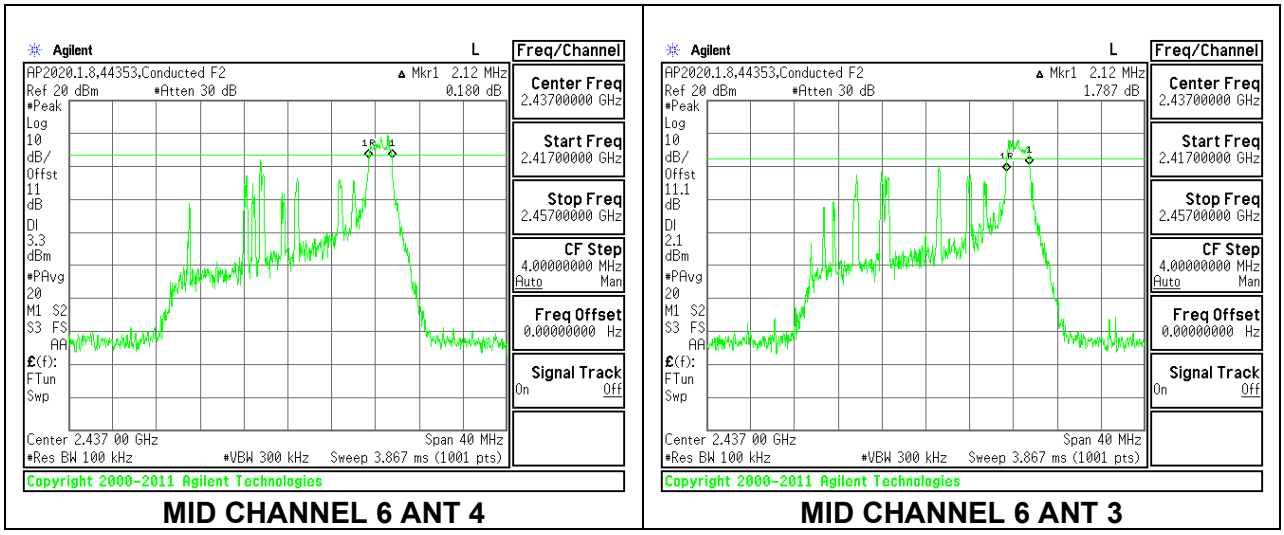
ANT 4 + ANT 3: 26-Tones, RU Index 8

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



MID CHANNEL 6 ANT 4 **MID CHANNEL 6 ANT 3**

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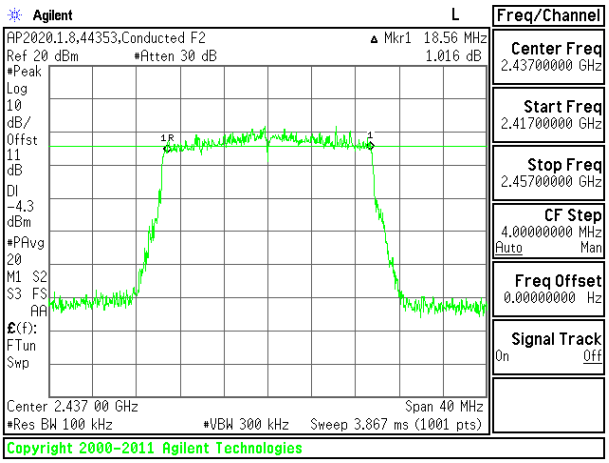
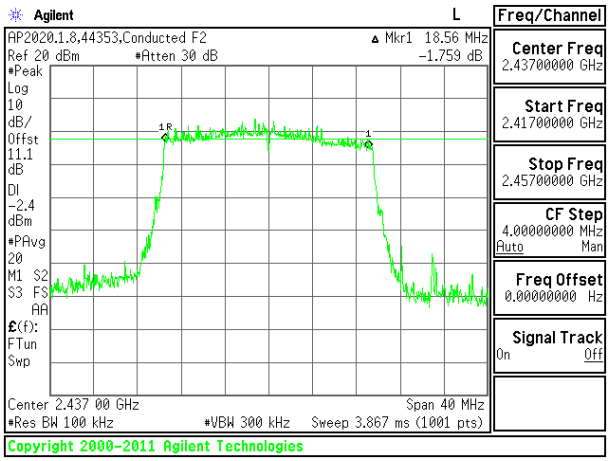
ANT 4 + ANT 3: 242-Tones, RU Index 61

Channel	Frequency (MHz)	6dB Bandwidth ANT 4 (MHz)	6dB Bandwidth ANT 3 (MHz)	Minimum Limit (MHz)
Low 1	2412	18.16	18.56	0.5
Low 2	2417	19.08	18.56	0.5
Low 3	2422	18.92	17.60	0.5
Low 4	2427	18.96	17.92	0.5
Mid 6	2437	18.56	18.56	0.5
High 8	2447	18.80	18.76	0.5
High 9	2452	18.96	18.40	0.5
High 10	2457	19.00	18.80	0.5
High 11	2462	19.08	18.92	0.5
High 12	2467	18.92	19.00	0.5
High 13	2472	18.48	17.00	0.5



MID CHANNEL 6 ANT 4



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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 transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

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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	-1.90	0.40	-0.60	2.34

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RESULTS

9.4.1. 802.11b MODE 1TX

ANT 4

Test Engineer:	20773
Test Date:	08/06/2020

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	-1.90	30.00	30	36	30.00
Mid 6	2437	-1.90	30.00	30	36	30.00
High 11	2462	-1.90	30.00	30	36	30.00
High 12	2467	-1.90	30.00	30	36	30.00
High 13	2472	-1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	21.21	21.21	30.00	-8.79
Mid 6	2437	21.19	21.19	30.00	-8.81
High 11	2462	21.09	21.09	30.00	-8.91
High 12	2467	21.15	21.15	30.00	-8.85
High 13	2472	21.24	21.24	30.00	-8.76

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ANT 3

Test Engineer:	20773
Test Date:	08/06/2020

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	0.40	30.00	30	36	30.00
Mid 6	2437	0.40	30.00	30	36	30.00
High 11	2462	0.40	30.00	30	36	30.00
High 12	2467	0.40	30.00	30	36	30.00
High 13	2472	0.40	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	21.30	21.30	30.00	-8.70
Mid 6	2437	22.19	22.19	30.00	-7.81
High 11	2462	21.79	21.79	30.00	-8.21
High 12	2467	21.81	21.81	30.00	-8.19
High 13	2472	21.22	21.22	30.00	-8.78

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9.4.2. 802.11n HT20 MODE 1TX

ANT 4

Test Engineer:	20773
Test Date:	08/06/2020

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	-1.90	30.00	30	36	30.00
Low 2	2417	-1.90	30.00	30	36	30.00
Low 3	2422	-1.90	30.00	30	36	30.00
Mid 6	2437	-1.90	30.00	30	36	30.00
High 9	2452	-1.90	30.00	30	36	30.00
High 10	2457	-1.90	30.00	30	36	30.00
High 11	2462	-1.90	30.00	30	36	30.00
High 12	2467	-1.90	30.00	30	36	30.00
High 13	2472	-1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.32	17.32	30.00	-12.68
Low 2	2417	19.32	19.32	30.00	-10.68
Low 3	2422	21.10	21.10	30.00	-8.90
Mid 6	2437	21.19	21.19	30.00	-8.81
High 9	2452	20.79	20.79	30.00	-9.21
High 10	2457	19.24	19.24	30.00	-10.76
High 11	2462	17.12	17.12	30.00	-12.88
High 12	2467	15.17	15.17	30.00	-14.83
High 13	2472	15.21	15.21	30.00	-14.79

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ANT 3

Test Engineer:	20773
Test Date:	08/06/2020

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	0.40	30.00	30	36	30.00
Low 2	2417	0.40	30.00	30	36	30.00
Low 3	2422	0.40	30.00	30	36	30.00
Mid 6	2437	0.40	30.00	30	36	30.00
High 9	2452	0.40	30.00	30	36	30.00
High 10	2457	0.40	30.00	30	36	30.00
High 11	2462	0.40	30.00	30	36	30.00
High 12	2467	0.40	30.00	30	36	30.00
High 13	2472	0.40	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.16	17.16	30.00	-12.84
Low 2	2417	19.22	19.22	30.00	-10.78
Low 3	2422	21.27	21.27	30.00	-8.73
Mid 6	2437	21.21	21.21	30.00	-8.79
High 9	2452	20.86	20.86	30.00	-9.14
High 10	2457	19.13	19.13	30.00	-10.87
High 11	2462	17.18	17.18	30.00	-12.82
High 12	2467	15.13	15.13	30.00	-14.87
High 13	2472	15.33	15.33	30.00	-14.67

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9.4.3. 802.11n HT20 CDD MODE 2TX

ANT 4+ ANT 3

Test Engineer:	20773
Test Date:	08/06/2020

Limits

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

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	16.13	16.15	19.15	30.00	-10.85
Low 2	2417	18.23	18.11	21.18	30.00	-8.82
Low 3	2422	19.85	19.88	22.88	30.00	-7.12
Mid 6	2437	21.22	21.29	24.27	30.00	-5.73
High 9	2452	19.40	19.39	22.41	30.00	-7.59
High 10	2457	18.21	18.12	21.18	30.00	-8.82
High 11	2462	16.12	16.18	19.16	30.00	-10.84
High 12	2467	13.59	13.58	16.60	30.00	-13.40
High 13	2472	14.09	14.11	17.11	30.00	-12.89

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9.4.4. 802.11ax HE20 OFDMA MODE 1TX

ANT 4: 26-Tones, RU Index 0

Test Engineer:	20773
Test Date:	08/06/2020

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	-1.90	30.00	30	36	30.00
Low 2	2417	-1.90	30.00	30	36	30.00
Low 3	2422	-1.90	30.00	30	36	30.00
Mid 6	2437	-1.90	30.00	30	36	30.00
High 9	2452	-1.90	30.00	30	36	30.00
High 10	2457	-1.90	30.00	30	36	30.00
High 11	2462	-1.90	30.00	30	36	30.00
High 12	2467	-1.90	30.00	30	36	30.00
High 13	2472	-1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.65	15.65	30.00	-14.35
Low 2	2417	17.63	17.63	30.00	-12.37
Low 3	2422	21.19	21.19	30.00	-8.81
Mid 6	2437	21.22	21.22	30.00	-8.78
High 9	2452	21.20	21.20	30.00	-8.80
High 10	2457	17.62	17.62	30.00	-12.38
High 11	2462	15.59	15.59	30.00	-14.41
High 12	2467	13.56	13.56	30.00	-16.44
High 13	2472	-0.03	-0.03	30.00	-30.03

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ANT 4: 26-Tones, RU Index 4

Test Engineer:	20773
Test Date:	08/06/2020

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	-1.90	30.00	30	36	30.00
Low 2	2417	-1.90	30.00	30	36	30.00
Low 3	2422	-1.90	30.00	30	36	30.00
Mid 6	2437	-1.90	30.00	30	36	30.00
High 9	2452	-1.90	30.00	30	36	30.00
High 10	2457	-1.90	30.00	30	36	30.00
High 11	2462	-1.90	30.00	30	36	30.00
High 12	2467	-1.90	30.00	30	36	30.00
High 13	2472	-1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.65	15.65	30.00	-14.35
Low 2	2417	17.67	17.67	30.00	-12.33
Low 3	2422	21.23	21.23	30.00	-8.77
Mid 6	2437	21.23	21.23	30.00	-8.77
High 9	2452	21.21	21.21	30.00	-8.79
High 10	2457	17.70	17.70	30.00	-12.30
High 11	2462	15.64	15.64	30.00	-14.36
High 12	2467	13.61	13.61	30.00	-16.39
High 13	2472	-0.01	-0.01	30.00	-30.01

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ANT 4: 26-Tones, RU Index 8

Test Engineer:	20773
Test Date:	08/06/2020

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	-1.90	30.00	30	36	30.00
Low 2	2417	-1.90	30.00	30	36	30.00
Low 3	2422	-1.90	30.00	30	36	30.00
Mid 6	2437	-1.90	30.00	30	36	30.00
High 9	2452	-1.90	30.00	30	36	30.00
High 10	2457	-1.90	30.00	30	36	30.00
High 11	2462	-1.90	30.00	30	36	30.00
High 12	2467	-1.90	30.00	30	36	30.00
High 13	2472	-1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.59	15.59	30.00	-14.41
Low 2	2417	17.62	17.62	30.00	-12.38
Low 3	2422	21.18	21.18	30.00	-8.82
Mid 6	2437	21.24	21.24	30.00	-8.76
High 9	2452	21.20	21.20	30.00	-8.80
High 10	2457	17.63	17.63	30.00	-12.37
High 11	2462	15.60	15.60	30.00	-14.40
High 12	2467	13.56	13.56	30.00	-16.44
High 13	2472	-0.05	-0.05	30.00	-30.05

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ANT 4: 242-Tones, RU Index 61

Test Engineer:	20773
Test Date:	08/06/2020

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	-1.90	30.00	30	36	30.00
Low 2	2417	-1.90	30.00	30	36	30.00
Low 3	2422	-1.90	30.00	30	36	30.00
Mid 6	2437	-1.90	30.00	30	36	30.00
High 9	2452	-1.90	30.00	30	36	30.00
High 10	2457	-1.90	30.00	30	36	30.00
High 11	2462	-1.90	30.00	30	36	30.00
High 12	2467	-1.90	30.00	30	36	30.00
High 13	2472	-1.90	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.65	15.65	30.00	-14.35
Low 2	2417	17.67	17.67	30.00	-12.33
Low 3	2422	21.19	21.19	30.00	-8.81
Mid 6	2437	21.22	21.22	30.00	-8.78
High 9	2452	21.19	21.19	30.00	-8.81
High 10	2457	17.67	17.67	30.00	-12.33
High 11	2462	15.64	15.64	30.00	-14.36
High 12	2467	13.61	13.61	30.00	-16.39
High 13	2472	10.57	10.57	30.00	-19.43

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ANT 3: 26-Tones, RU Index 0

Test Engineer:	20773
Test Date:	08/06/2020

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	0.40	30.00	30	36	30.00
Low 2	2417	0.40	30.00	30	36	30.00
Low 3	2422	0.40	30.00	30	36	30.00
Mid 6	2437	0.40	30.00	30	36	30.00
High 9	2452	0.40	30.00	30	36	30.00
High 10	2457	0.40	30.00	30	36	30.00
High 11	2462	0.40	30.00	30	36	30.00
High 12	2467	0.40	30.00	30	36	30.00
High 13	2472	0.40	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.60	15.60	30.00	-14.40
Low 2	2417	17.60	17.60	30.00	-12.40
Low 3	2422	21.29	21.29	30.00	-8.71
Mid 6	2437	21.30	21.30	30.00	-8.70
High 9	2452	21.35	21.35	30.00	-8.65
High 10	2457	17.63	17.63	30.00	-12.37
High 11	2462	15.59	15.59	30.00	-14.41
High 12	2467	13.56	13.56	30.00	-16.44
High 13	2472	-0.10	-0.10	30.00	-30.10

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ANT 3: 26-Tones, RU Index 4

Test Engineer:	20773
Test Date:	08/06/2020

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	0.40	30.00	30	36	30.00
Low 2	2417	0.40	30.00	30	36	30.00
Low 3	2422	0.40	30.00	30	36	30.00
Mid 6	2437	0.40	30.00	30	36	30.00
High 9	2452	0.40	30.00	30	36	30.00
High 10	2457	0.40	30.00	30	36	30.00
High 11	2462	0.40	30.00	30	36	30.00
High 12	2467	0.40	30.00	30	36	30.00
High 13	2472	0.40	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.59	15.59	30.00	-14.41
Low 2	2417	17.65	17.65	30.00	-12.35
Low 3	2422	21.40	21.40	30.00	-8.60
Mid 6	2437	21.38	21.38	30.00	-8.62
High 9	2452	21.29	21.29	30.00	-8.71
High 10	2457	17.68	17.68	30.00	-12.32
High 11	2462	15.62	15.62	30.00	-14.38
High 12	2467	13.55	13.55	30.00	-16.45
High 13	2472	0.00	0.00	30.00	-30.00

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ANT 3: 26-Tones, RU Index 8

Test Engineer:	20773
Test Date:	08/06/2020

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	0.40	30.00	30	36	30.00
Low 2	2417	0.40	30.00	30	36	30.00
Low 3	2422	0.40	30.00	30	36	30.00
Mid 6	2437	0.40	30.00	30	36	30.00
High 9	2452	0.40	30.00	30	36	30.00
High 10	2457	0.40	30.00	30	36	30.00
High 11	2462	0.40	30.00	30	36	30.00
High 12	2467	0.40	30.00	30	36	30.00
High 13	2472	0.40	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.59	15.59	30.00	-14.41
Low 2	2417	17.64	17.64	30.00	-12.36
Low 3	2422	21.34	21.34	30.00	-8.66
Mid 6	2437	21.41	21.41	30.00	-8.59
High 9	2452	21.38	21.38	30.00	-8.62
High 10	2457	17.70	17.70	30.00	-12.30
High 11	2462	15.61	15.61	30.00	-14.39
High 12	2467	13.60	13.60	30.00	-16.40
High 13	2472	-0.08	-0.08	30.00	-30.08

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ANT 3: 242-Tones, RU Index 61

Test Engineer:	20773
Test Date:	08/06/2020

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	0.40	30.00	30	36	30.00
Low 2	2417	0.40	30.00	30	36	30.00
Low 3	2422	0.40	30.00	30	36	30.00
Mid 6	2437	0.40	30.00	30	36	30.00
High 9	2452	0.40	30.00	30	36	30.00
High 10	2457	0.40	30.00	30	36	30.00
High 11	2462	0.40	30.00	30	36	30.00
High 12	2467	0.40	30.00	30	36	30.00
High 13	2472	0.40	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.58	15.58	30.00	-14.42
Low 2	2417	17.59	17.59	30.00	-12.41
Low 3	2422	21.28	21.28	30.00	-8.72
Mid 6	2437	21.33	21.33	30.00	-8.67
High 9	2452	21.37	21.37	30.00	-8.63
High 10	2457	17.61	17.61	30.00	-12.39
High 11	2462	15.56	15.56	30.00	-14.44
High 12	2467	13.58	13.58	30.00	-16.42
High 13	2472	10.53	10.53	30.00	-19.47

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9.4.5. 802.11ax HE20 OFDMA MODE 2TX

Test Engineer:	20773
Test Date:	08/06/2020

ANT 4 + ANT 3: 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	-0.60	30.00	36	30.00
Low 2	2417	-0.60	30.00	36	30.00
Low 3	2422	-0.60	30.00	36	30.00
Mid 6	2437	-0.60	30.00	36	30.00
High 9	2452	-0.60	30.00	36	30.00
High 10	2457	-0.60	30.00	36	30.00
High 11	2462	-0.60	30.00	36	30.00
High 12	2467	-0.60	30.00	36	30.00
High 13	2472	-0.60	30.00	36	30.00

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	14.63	14.61	17.63	30.00	-12.37
Low 2	2417	16.57	16.54	19.57	30.00	-10.43
Low 3	2422	18.65	18.62	21.65	30.00	-8.35
Mid 6	2437	19.71	19.70	22.72	30.00	-7.28
High 9	2452	18.41	18.42	21.43	30.00	-8.57
High 10	2457	16.58	16.57	19.59	30.00	-10.41
High 11	2462	14.61	14.61	17.62	30.00	-12.38
High 12	2467	12.59	12.61	15.61	30.00	-14.39
High 13	2472	-0.21	-0.14	2.84	30.00	-27.16

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ANT 4 + ANT 3: 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	-0.60	30.00	36	30.00
Low 2	2417	-0.60	30.00	36	30.00
Low 3	2422	-0.60	30.00	36	30.00
Mid 6	2437	-0.60	30.00	36	30.00
High 9	2452	-0.60	30.00	36	30.00
High 10	2457	-0.60	30.00	36	30.00
High 11	2462	-0.60	30.00	36	30.00
High 12	2467	-0.60	30.00	36	30.00
High 13	2472	-0.60	30.00	36	30.00

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	14.62	14.64	17.64	30.00	-12.36
Low 2	2417	16.60	16.63	19.63	30.00	-10.37
Low 3	2422	18.68	18.70	21.70	30.00	-8.30
Mid 6	2437	19.70	19.70	22.71	30.00	-7.29
High 9	2452	18.33	18.42	21.39	30.00	-8.61
High 10	2457	16.58	16.68	19.64	30.00	-10.36
High 11	2462	14.67	14.65	17.67	30.00	-12.33
High 12	2467	12.59	12.57	15.59	30.00	-14.41
High 13	2472	-0.02	-0.10	2.95	30.00	-27.05

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ANT 4 + ANT 3: 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	-0.60	30.00	36	30.00
Low 2	2417	-0.60	30.00	36	30.00
Low 3	2422	-0.60	30.00	36	30.00
Mid 6	2437	-0.60	30.00	36	30.00
High 9	2452	-0.60	30.00	36	30.00
High 10	2457	-0.60	30.00	36	30.00
High 11	2462	-0.60	30.00	36	30.00
High 12	2467	-0.60	30.00	36	30.00
High 13	2472	-0.60	30.00	36	30.00

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	14.64	14.69	17.68	30.00	-12.32
Low 2	2417	16.58	16.61	19.61	30.00	-10.39
Low 3	2422	18.69	18.68	21.70	30.00	-8.30
Mid 6	2437	19.64	19.66	22.66	30.00	-7.34
High 9	2452	18.37	18.31	21.35	30.00	-8.65
High 10	2457	16.58	16.60	19.60	30.00	-10.40
High 11	2462	14.65	14.67	17.67	30.00	-12.33
High 12	2467	12.62	12.65	15.65	30.00	-14.35
High 13	2472	-0.01	-0.23	2.89	30.00	-27.11

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ANT 4 + ANT 3: 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	-0.60	30.00	36	30.00
Low 2	2417	-0.60	30.00	36	30.00
Low 3	2422	-0.60	30.00	36	30.00
Low 4	2427	-0.60	30.00	36	30.00
Mid 6	2437	-0.60	30.00	36	30.00
High 8	2447	-0.60	30.00	36	30.00
High 9	2452	-0.60	30.00	36	30.00
High 10	2457	-0.60	30.00	36	30.00
High 11	2462	-0.60	30.00	36	30.00
High 12	2467	-0.60	30.00	36	30.00
High 13	2472	-0.60	30.00	36	30.00

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	14.58	14.61	17.61	30.00	-12.39
Low 2	2417	16.63	16.68	19.67	30.00	-10.33
Low 3	2422	18.68	18.67	21.69	30.00	-8.31
Low 4	2427	21.22	21.29	24.27	30.00	-5.73
Mid 6	2437	21.19	21.30	24.26	30.00	-5.74
High 8	2447	21.18	21.39	24.30	30.00	-5.70
High 9	2452	18.31	18.27	21.30	30.00	-8.70
High 10	2457	16.64	16.67	19.67	30.00	-10.33
High 11	2462	14.60	14.61	17.62	30.00	-12.38
High 12	2467	12.61	12.66	15.65	30.00	-14.35
High 13	2472	8.34	8.22	11.29	30.00	-18.71

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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.

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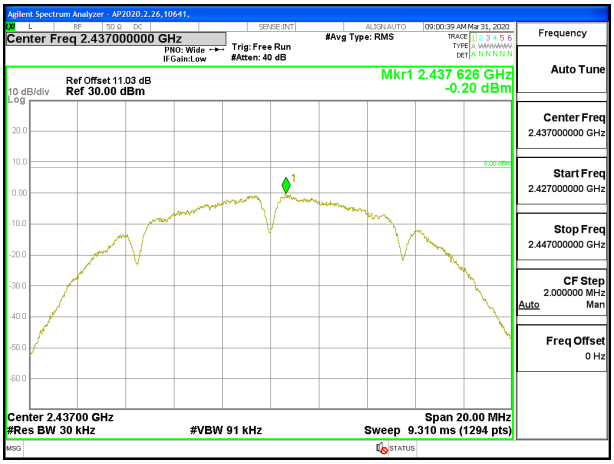
9.5.1. 802.11b MODE 1TX

ANT 4

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

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.23	-1.23	8.0	-9.23
Mid 6	2437	-0.20	-0.20	8.0	-8.20
High 11	2462	-0.41	-0.41	8.0	-8.41
High 12	2467	-0.76	-0.76	8.0	-8.76
High 13	2472	-0.44	-0.44	8.0	-8.44



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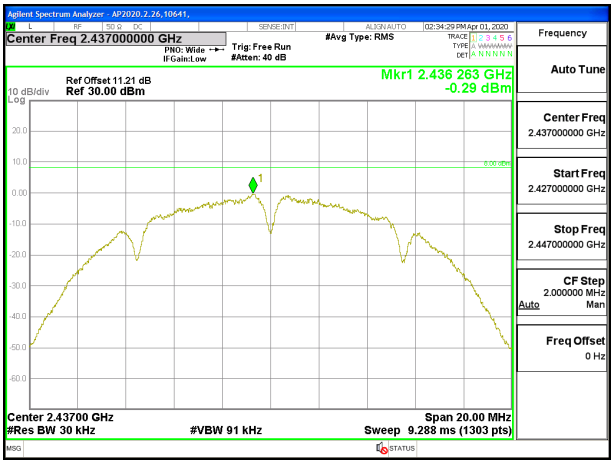
ANT 3

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

PSD Results

Channel	Frequency (MHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.18	-1.18	8.0	-9.18
Mid 6	2437	-0.29	-0.29	8.0	-8.29
High 11	2462	-0.38	-0.38	8.0	-8.38
High 12	2467	-0.49	-0.49	8.0	-8.49
High 13	2472	-0.51	-0.51	8.0	-8.51



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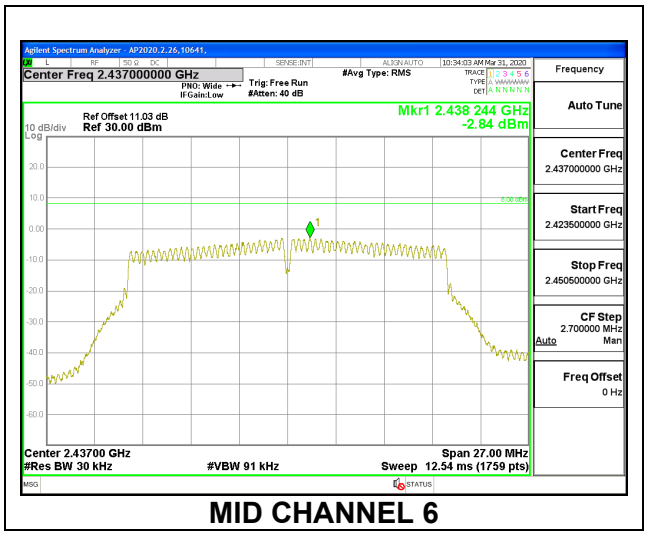
9.5.2. 802.11n HT20 MODE 1TX

ANT 4

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

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-7.04	-7.04	8.0	-15.04
Low 2	2417	-4.61	-4.61	8.0	-12.61
Low 3	2422	-2.81	-2.81	8.0	-10.81
Mid 6	2437	-2.85	-2.85	8.0	-10.85
High 9	2452	-2.31	-2.31	8.0	-10.31
High 10	2457	-4.48	-4.48	8.0	-12.48
High 11	2462	-6.74	-6.74	8.0	-14.74
High 12	2467	-8.87	-8.87	8.0	-16.87
High 13	2472	-9.26	-9.26	8.0	-17.26



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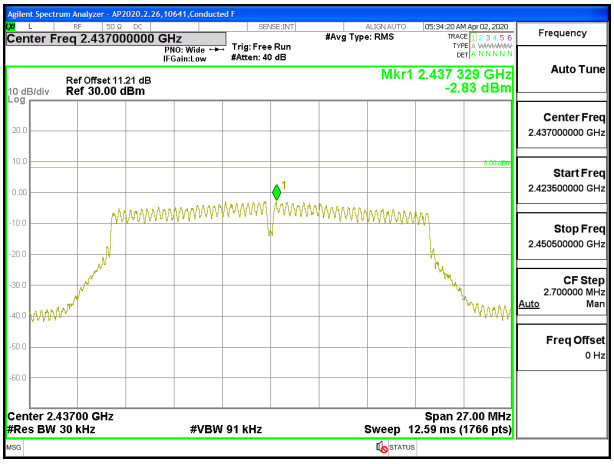
ANT 3

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

PSD Results

Channel	Frequency (MHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-7.27	-7.27	8.0	-15.27
Low 2	2417	-4.61	-4.61	8.0	-12.61
Low 3	2422	-2.34	-2.34	8.0	-10.34
Mid 6	2437	-2.83	-2.83	8.0	-10.83
High 9	2452	-2.85	-2.85	8.0	-10.85
High 10	2457	-3.93	-3.93	8.0	-11.93
High 11	2462	-6.49	-6.49	8.0	-14.49
High 12	2467	-8.81	-8.81	8.0	-16.81
High 13	2472	-9.06	-9.06	8.0	-17.06



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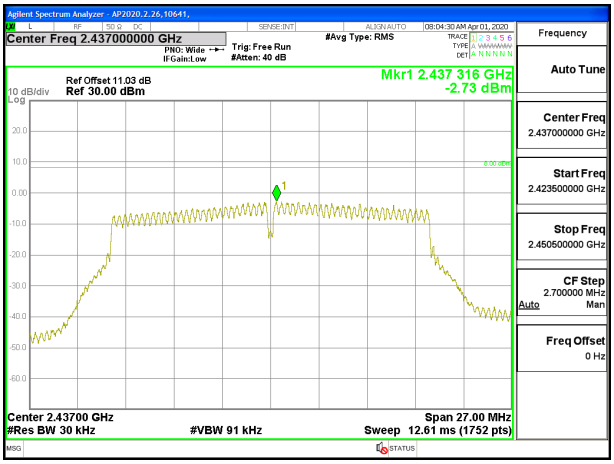
9.5.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3

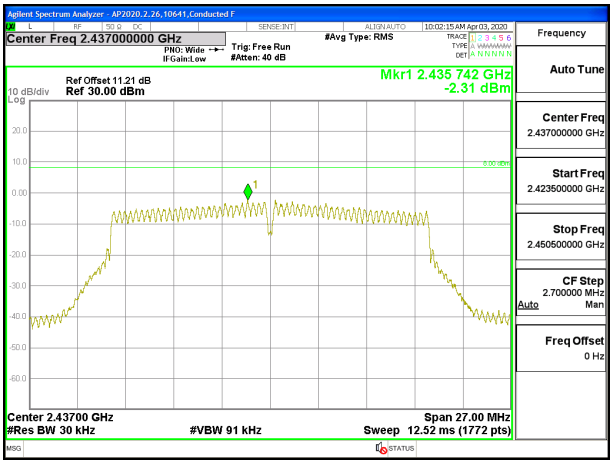
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.31	-8.12	-5.20	8.0	-13.20
Low 2	2417	-5.75	-5.23	-2.47	8.0	-10.47
Low 3	2422	-4.05	-3.71	-0.87	8.0	-8.87
Mid 6	2437	-2.74	-2.31	0.50	8.0	-7.50
High 9	2452	-4.65	-4.81	-1.72	8.0	-9.72
High 10	2457	-5.29	-5.44	-2.35	8.0	-10.35
High 11	2462	-8.62	-7.88	-5.22	8.0	-13.22
High 12	2467	-10.60	-10.14	-7.36	8.0	-15.36
High 13	2472	-10.38	-10.21	-7.28	8.0	-15.28



MID CHANNEL 6 ANT 4



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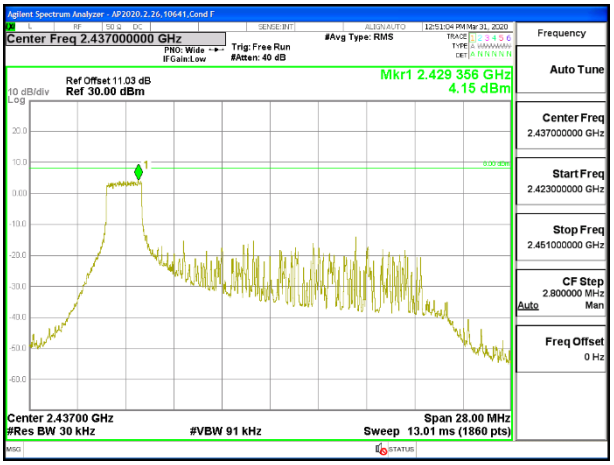
9.5.4. 802.11ax HE20 OFDMA MODE 1TX

ANT 4: 26-Tones, RU Index 0

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

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	1.07	1.07	8.0	-6.93
Low 2	2417	0.87	0.87	8.0	-7.13
Low 3	2422	3.55	3.55	8.0	-4.45
Mid 6	2437	4.15	4.15	8.0	-3.85
High 9	2452	3.61	3.61	8.0	-4.39
High 10	2457	0.85	0.85	8.0	-7.15
High 11	2462	-1.18	-1.18	8.0	-9.18
High 12	2467	-3.02	-3.02	8.0	-11.02
High 13	2472	-17.60	-17.60	8.0	-25.60



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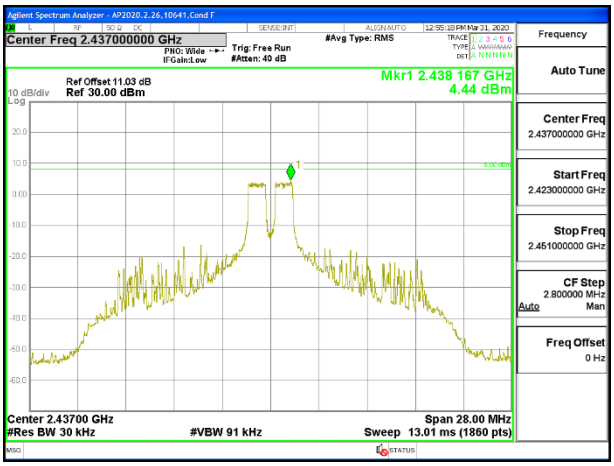
ANT 4: 26-Tones, RU Index 4

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

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.44	-1.44	8.0	-9.44
Low 2	2417	-0.78	-0.78	8.0	-8.78
Low 3	2422	3.84	3.84	8.0	-4.16
Mid 6	2437	4.44	4.44	8.0	-3.56
High 9	2452	3.48	3.48	8.0	-4.52
High 10	2457	0.90	0.90	8.0	-7.10
High 11	2462	-1.63	-1.63	8.0	-9.63
High 12	2467	-3.32	-3.32	8.0	-11.32
High 13	2472	-17.55	-17.55	8.0	-25.55



HIGH CHANNEL 13

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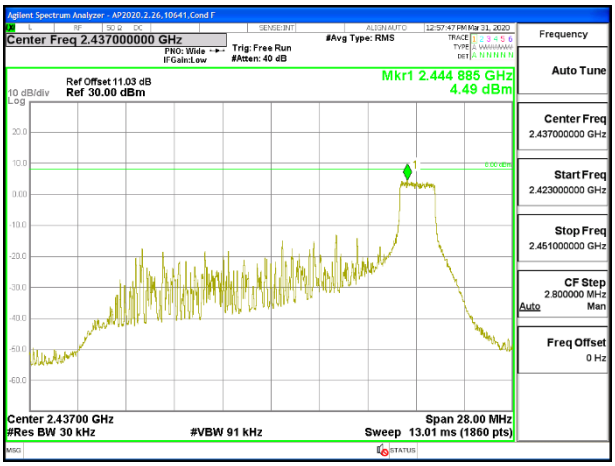
ANT 4: 26-Tones, RU Index 8

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

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.40	-1.40	8.0	-9.40
Low 2	2417	0.73	0.73	8.0	-7.27
Low 3	2422	3.82	3.82	8.0	-4.18
Mid 6	2437	4.49	4.49	8.0	-3.51
High 9	2452	3.86	3.86	8.0	-4.14
High 10	2457	0.72	0.72	8.0	-7.28
High 11	2462	-1.36	-1.36	8.0	-9.36
High 12	2467	-3.31	-3.31	8.0	-11.31
High 13	2472	-16.97	-16.97	8.0	-24.97



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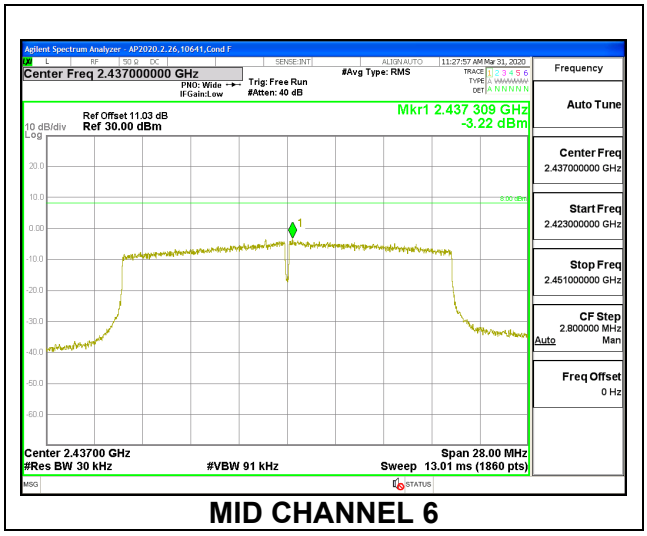
1TX ANT 4 MODE , 242-Tone RU Index 61

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

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.74	-8.74	8.0	-16.74
Low 2	2417	-7.28	-7.28	8.0	-15.28
Low 3	2422	-4.33	-4.33	8.0	-12.33
Mid 6	2437	-3.22	-3.22	8.0	-11.22
High 9	2452	-4.05	-4.05	8.0	-12.05
High 10	2457	-7.05	-7.05	8.0	-15.05
High 11	2462	-9.71	-9.71	8.0	-17.71
High 12	2467	-11.39	-11.39	8.0	-19.39
High 13	2472	-18.64	-18.64	8.0	-26.64



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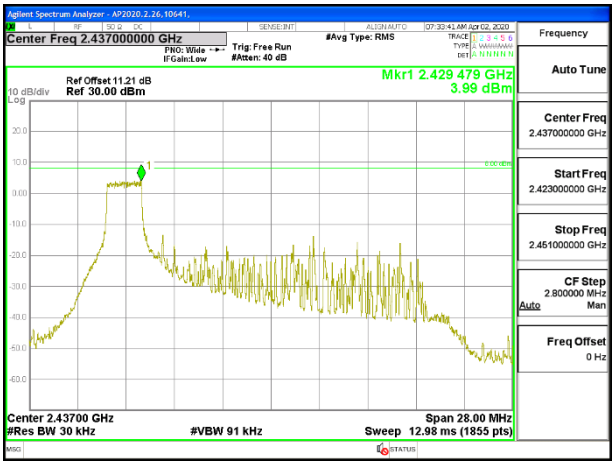
ANT 3: 26-Tones, RU Index 0

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

PSD Results

Channel	Frequency (MHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-0.93	-0.93	8.0	-8.93
Low 2	2417	0.83	0.83	8.0	-7.17
Low 3	2422	3.71	3.71	8.0	-4.29
Mid 6	2437	3.99	3.99	8.0	-4.01
High 9	2452	3.60	3.60	8.0	-4.40
High 10	2457	1.06	1.06	8.0	-6.94
High 11	2462	-1.10	-1.10	8.0	-9.10
High 12	2467	-3.24	-3.24	8.0	-11.24
High 13	2472	-15.57	-15.57	8.0	-23.57



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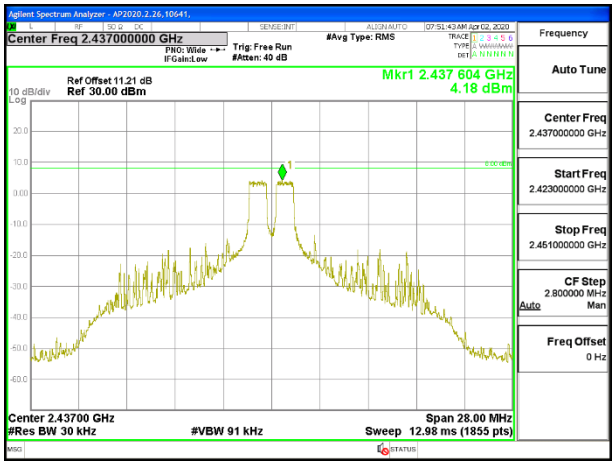
ANT 3: 26-Tones, RU Index 4

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

PSD Results

Channel	Frequency (MHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.29	-1.29	8.0	-9.29
Low 2	2417	0.65	0.65	8.0	-7.35
Low 3	2422	3.45	3.45	8.0	-4.55
Mid 6	2437	4.18	4.18	8.0	-3.82
High 9	2452	3.67	3.67	8.0	-4.33
High 10	2457	0.89	0.89	8.0	-7.11
High 11	2462	-1.20	-1.20	8.0	-9.20
High 12	2467	-2.97	-2.97	8.0	-10.97
High 13	2472	-14.84	-14.84	8.0	-22.84



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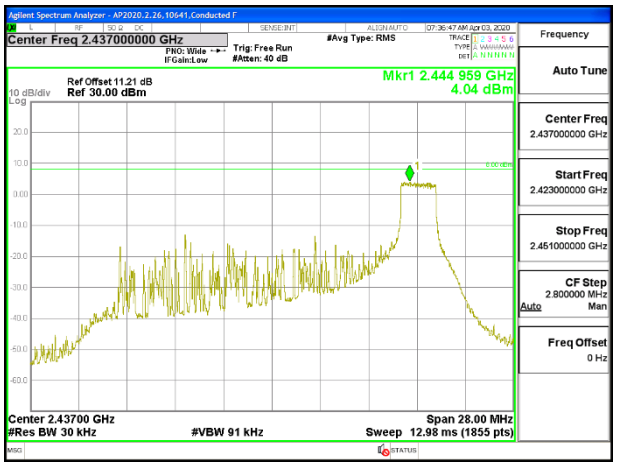
ANT 3: 26-Tones, RU Index 8

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

PSD Results

Channel	Frequency (MHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.65	-1.65	8.0	-9.65
Low 2	2417	-0.75	-0.75	8.0	-8.75
Low 3	2422	3.85	3.85	8.0	-4.15
Mid 6	2437	4.04	4.04	8.0	-3.96
High 9	2452	3.58	3.58	8.0	-4.42
High 10	2457	0.71	0.71	8.0	-7.29
High 11	2462	-1.34	-1.34	8.0	-9.34
High 12	2467	-3.37	-3.37	8.0	-11.37
High 13	2472	-16.65	-16.65	8.0	-24.65



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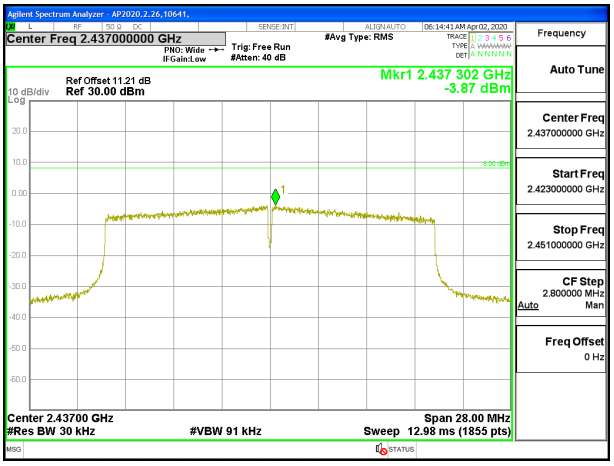
1TX ANT 3 MODE , 242-Tone RU Index 61

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

PSD Results

Channel	Frequency (MHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.68	-8.68	8.0	-16.68
Low 2	2417	-7.04	-7.04	8.0	-15.04
Low 3	2422	-4.18	-4.18	8.0	-12.18
Mid 6	2437	-3.87	-3.87	8.0	-11.87
High 9	2452	-4.34	-4.34	8.0	-12.34
High 10	2457	-7.10	-7.10	8.0	-15.10
High 11	2462	-8.96	-8.96	8.0	-16.96
High 12	2467	-11.01	-11.01	8.0	-19.01
High 13	2472	-18.29	-18.29	8.0	-26.29



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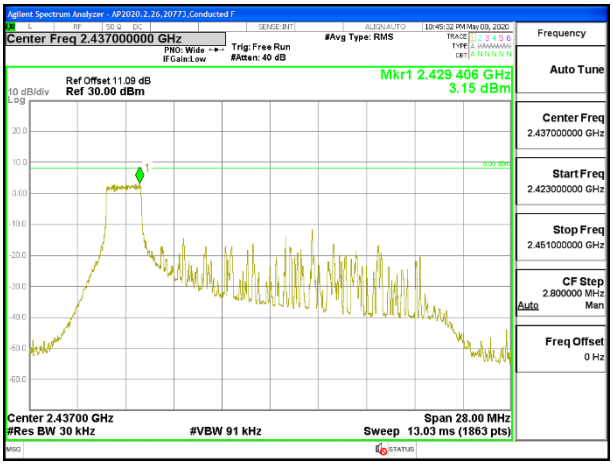
9.5.5. 802.11ax HE20 OFDMA MODE 2TX

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

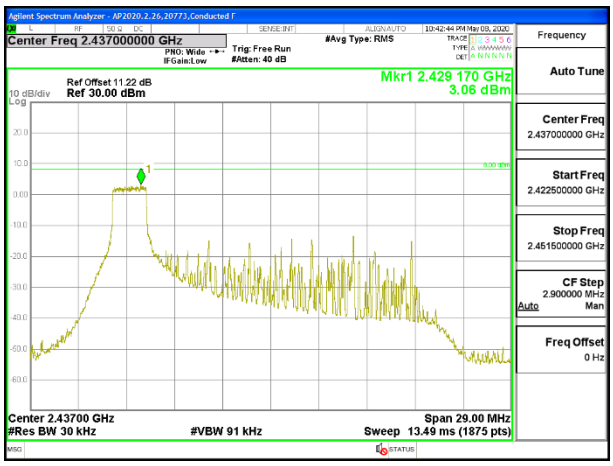
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-2.18	-2.22	0.81	8.0	-7.19
Low 2	2417	-0.28	-0.41	2.67	8.0	-5.33
Low 3	2422	2.47	2.12	5.31	8.0	-2.69
Mid 6	2437	3.15	3.06	6.12	8.0	-1.88
High 9	2452	1.31	1.11	4.22	8.0	-3.78
High 10	2457	-0.23	-0.33	2.73	8.0	-5.27
High 11	2462	-2.31	-2.31	0.70	8.0	-7.30
High 12	2467	-4.50	-4.26	-1.37	8.0	-9.37
High 13	2472	-17.00	-17.13	-14.05	8.0	-22.05



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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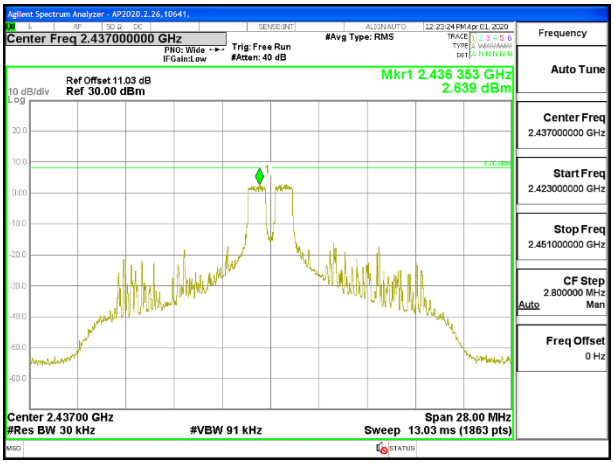
ANT 4 + ANT 3: 26-Tones, RU Index 4

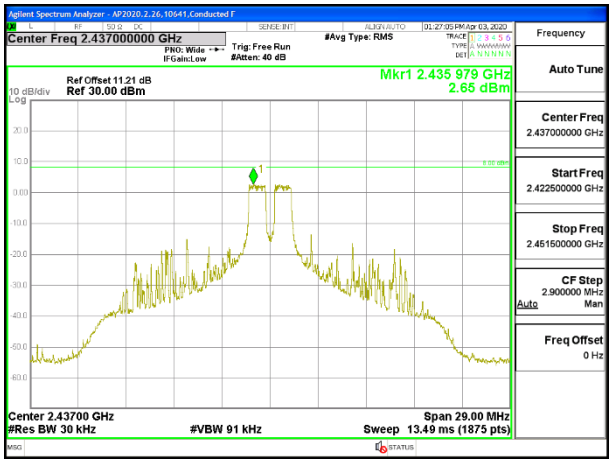
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-2.55	-2.44	0.52	8.0	-7.48
Low 2	2417	-0.21	-0.18	2.82	8.0	-5.18
Low 3	2422	1.57	1.64	4.62	8.0	-3.38
Mid 6	2437	2.64	2.65	5.65	8.0	-2.35
High 9	2452	0.73	0.91	3.83	8.0	-4.17
High 10	2457	-0.44	-0.14	2.72	8.0	-5.28
High 11	2462	-2.13	-2.26	0.82	8.0	-7.18
High 12	2467	-4.44	-4.48	-1.45	8.0	-9.45
High 13	2472	-17.43	-17.01	-14.20	8.0	-22.20



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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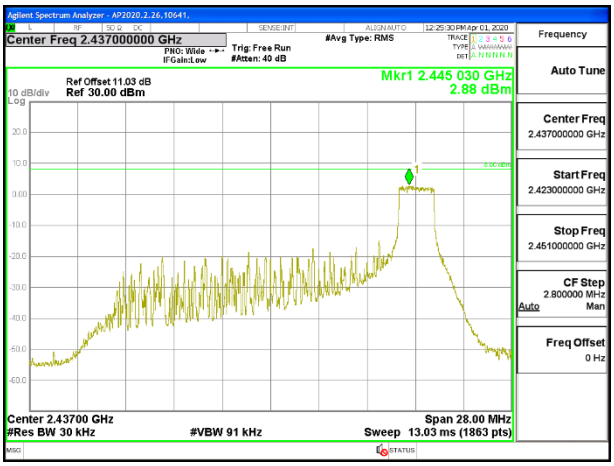
ANT 4 + ANT 3: 26-Tones, RU Index 8

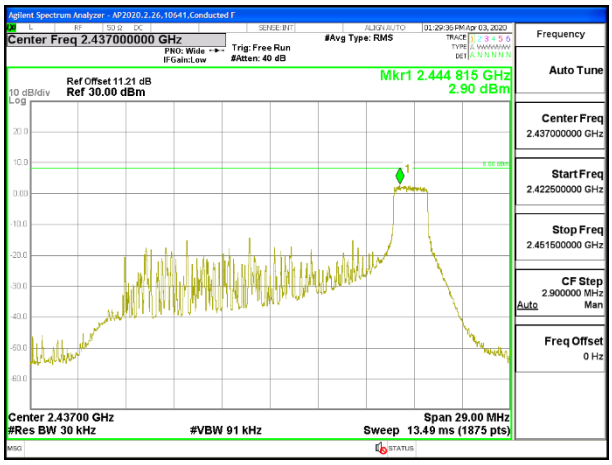
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-2.47	-2.28	0.64	8.0	-7.36
Low 2	2417	-0.28	0.08	2.91	8.0	-5.09
Low 3	2422	1.94	1.92	4.94	8.0	-3.06
Mid 6	2437	2.88	2.90	5.90	8.0	-2.10
High 9	2452	1.20	1.27	4.25	8.0	-3.75
High 10	2457	-0.18	0.07	2.96	8.0	-5.04
High 11	2462	-2.40	-2.33	0.65	8.0	-7.35
High 12	2467	-3.85	-3.73	-0.78	8.0	-8.78
High 13	2472	-17.07	-17.21	-14.13	8.0	-22.13



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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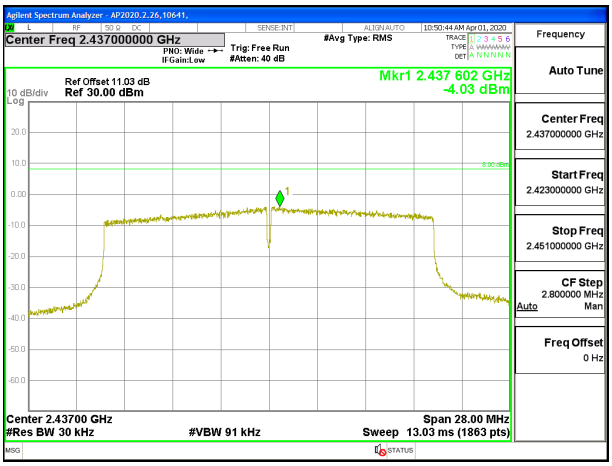
ANT 4 + ANT 3 2TX MODE: 242-Tone RU Index 61

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

PSD Results

Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-9.83	-9.14	-6.46	8.0	-14.46
Low 2	2417	-8.30	-8.17	-5.22	8.0	-13.22
Low 3	2422	-6.25	-5.92	-3.07	8.0	-11.07
Low 4	2427	-4.17	-3.84	-0.99	8.0	-8.99
Mid 6	2437	-4.03	-3.69	-0.85	8.0	-8.85
High 8	2442	-3.64	-3.98	-0.80	8.0	-8.80
High 9	2447	-6.58	-6.41	-3.48	8.0	-11.48
High 10	2457	-8.20	-8.35	-5.26	8.0	-13.26
High 11	2462	-10.44	-10.17	-7.29	8.0	-15.29
High 12	2467	-12.67	-12.21	-9.42	8.0	-17.42
High 13	2472	-20.80	-20.53	-17.65	8.0	-25.65



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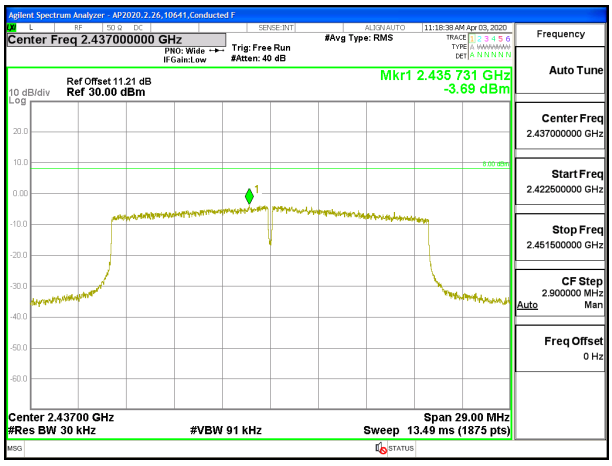

MID CHANNEL 6 ANT 3

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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)).

Attenuated by 30dB since average power was measured

RESULTS

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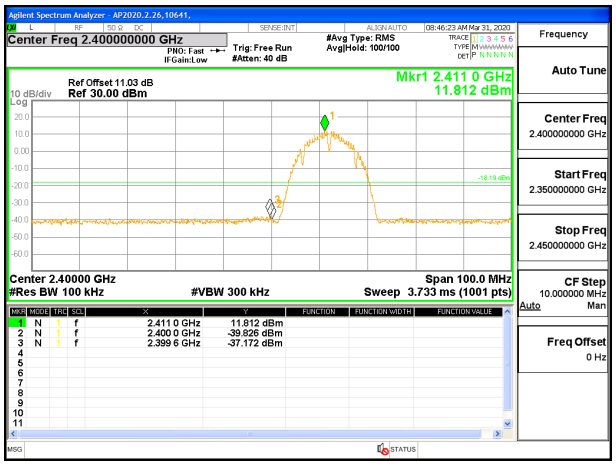
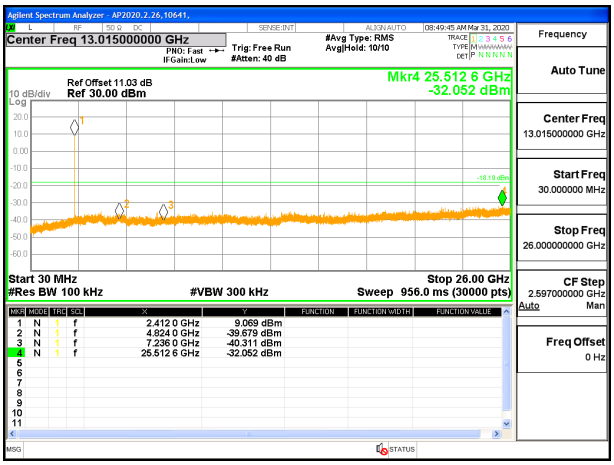
9.6.1. 802.11b MODE 1TX

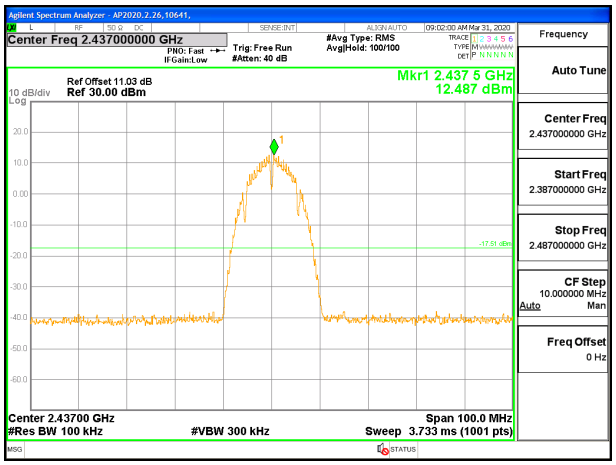
ANT 4



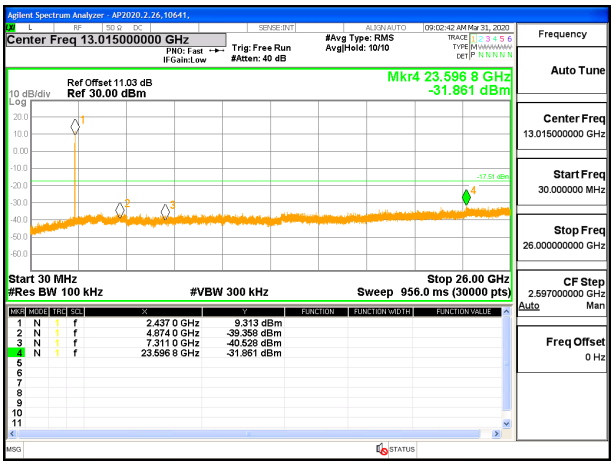
LOW CHANNEL 1 BANDEDGE



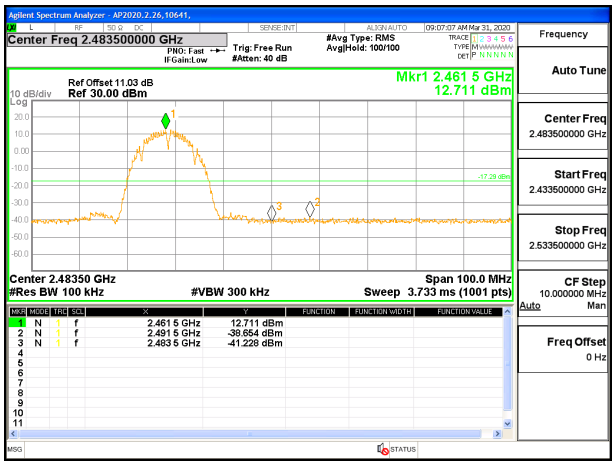
OUT-OF-BAND LOW CHANNEL 1



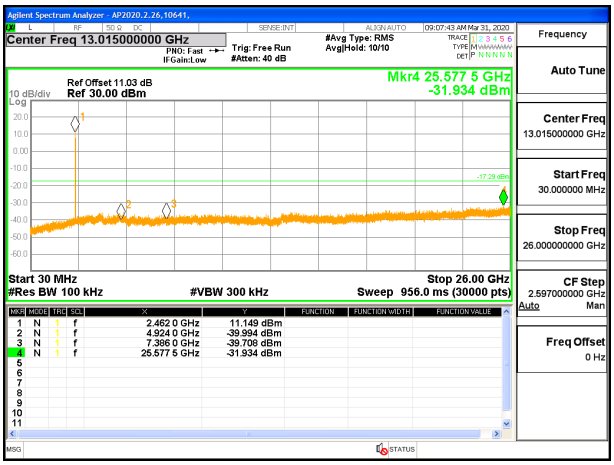
MID CHANNEL REFERNCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11

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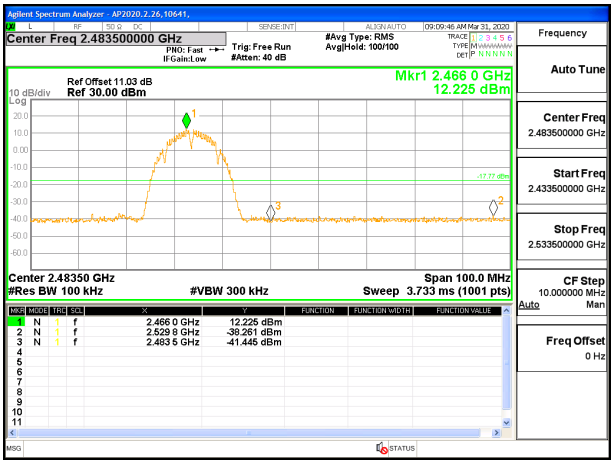
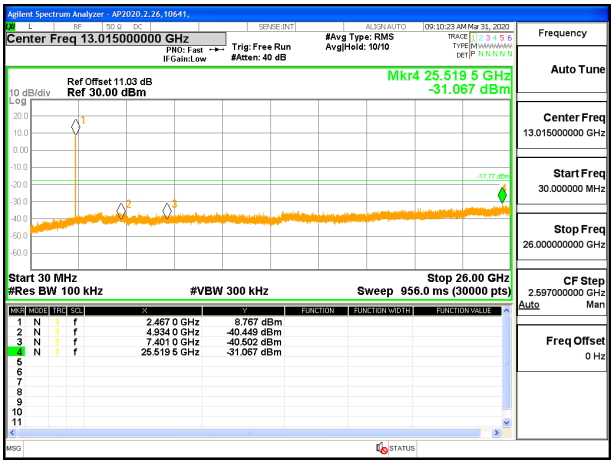
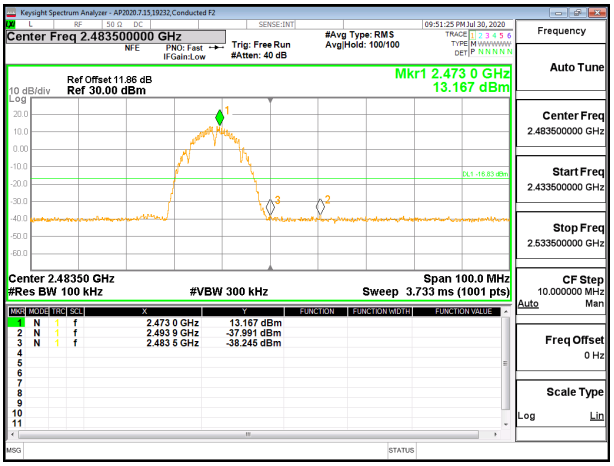


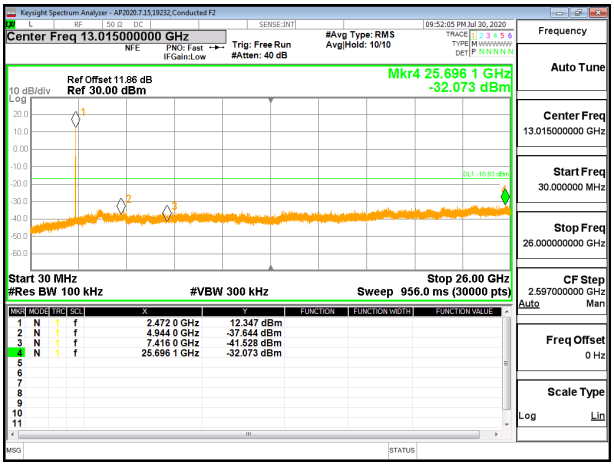
HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



HIGH CHANNEL 13 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 13

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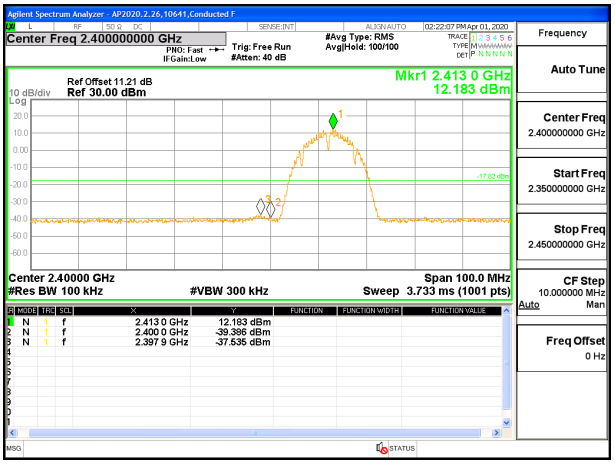
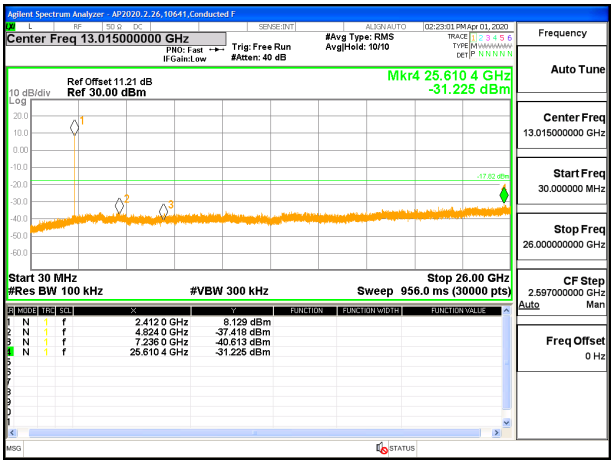
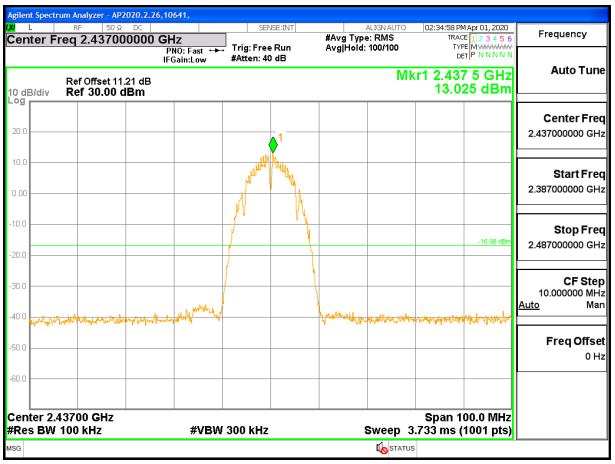
ANT 3



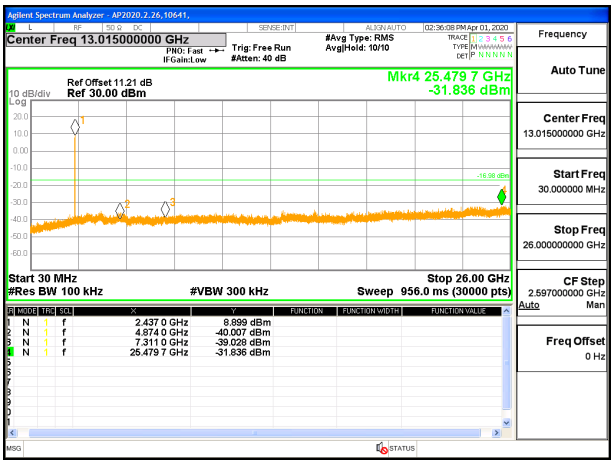
LOW CHANNEL 1 BANDEDGE



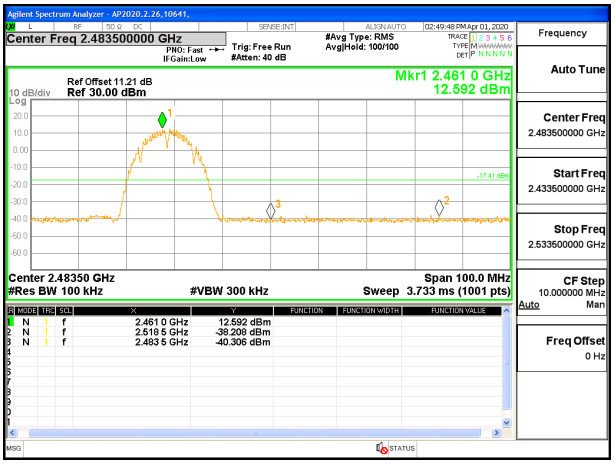
OUT-OF-BAND LOW CHANNEL 1



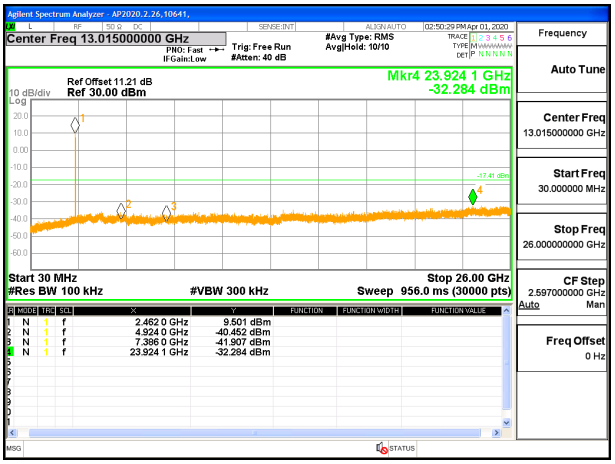
MID CHANNEL REFERNCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11

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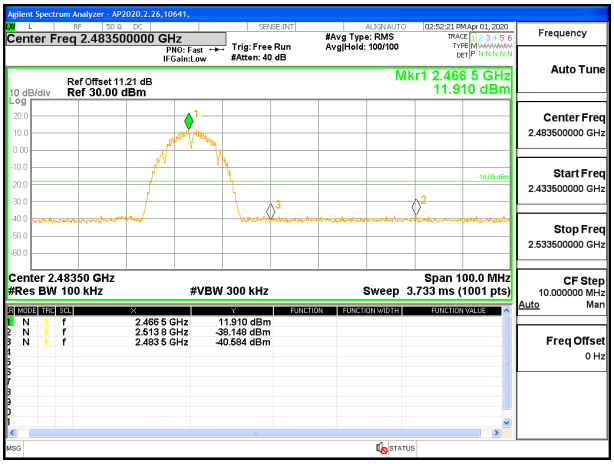
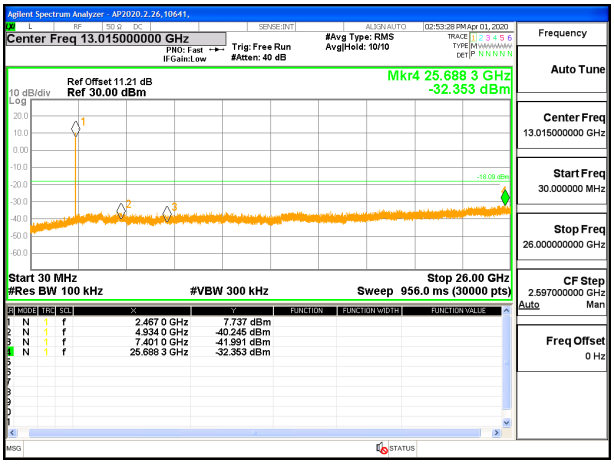
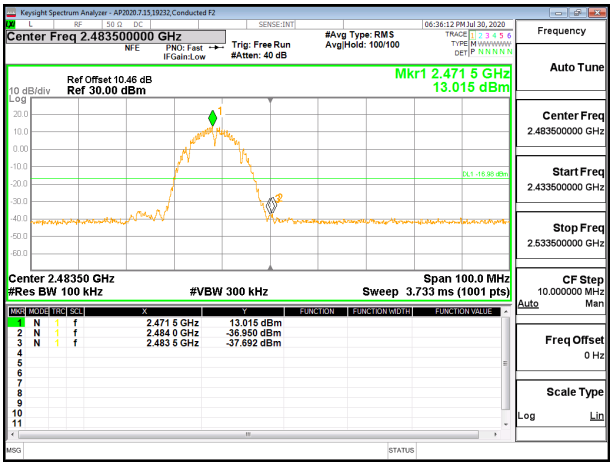


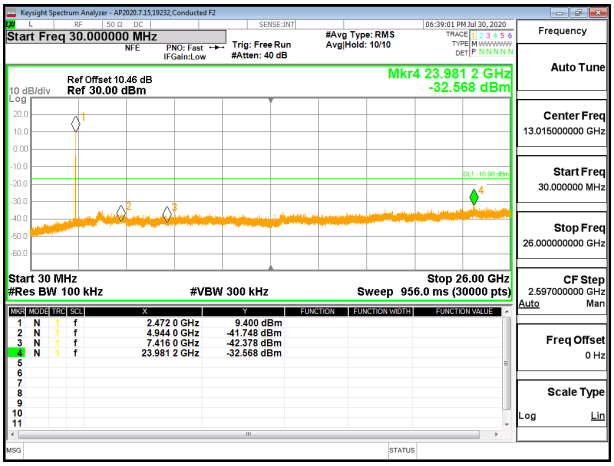
HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



HIGH CHANNEL 13 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 13

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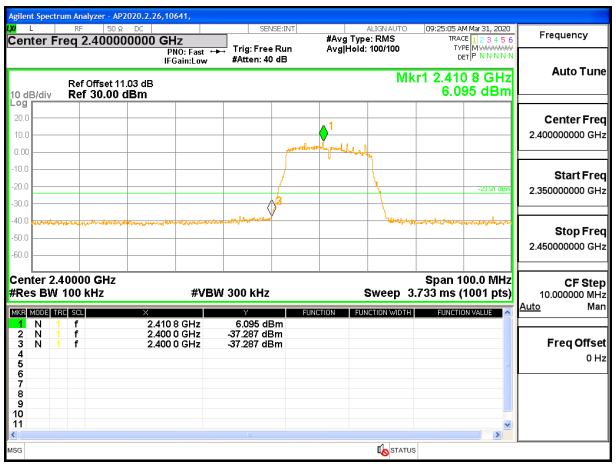
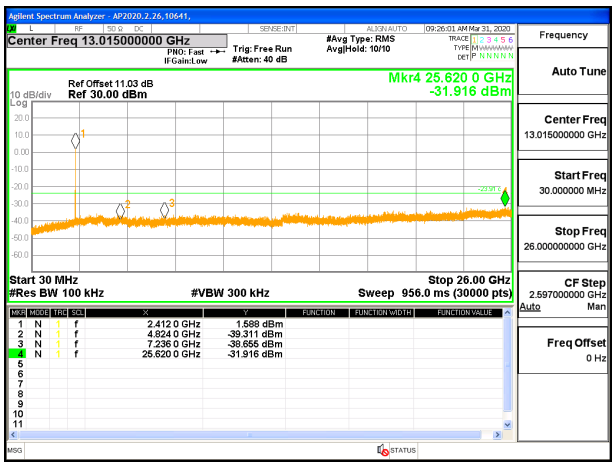
9.6.2. 802.11n HT20 MODE 1TX

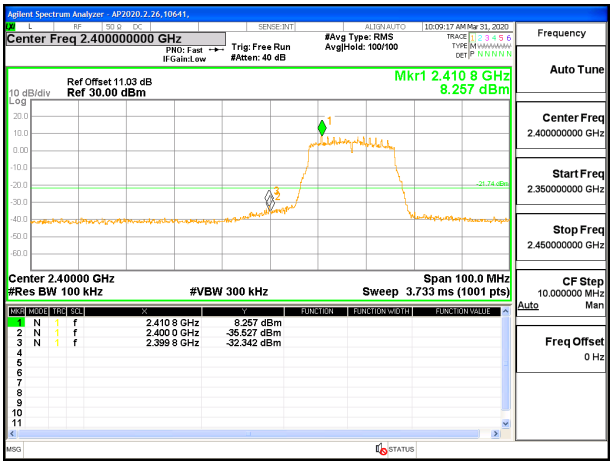
ANT 4



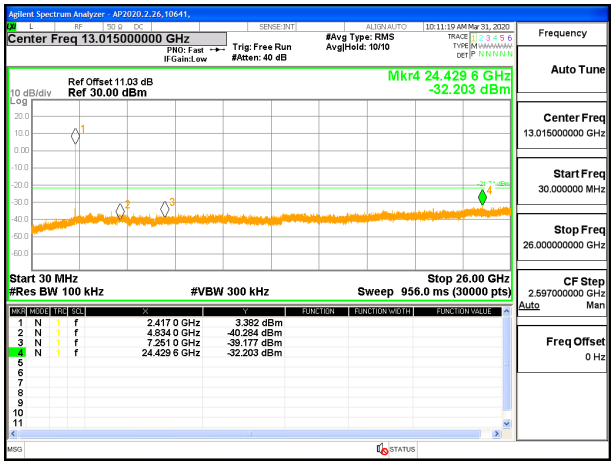
LOW CHANNEL 1 BANDEDGE



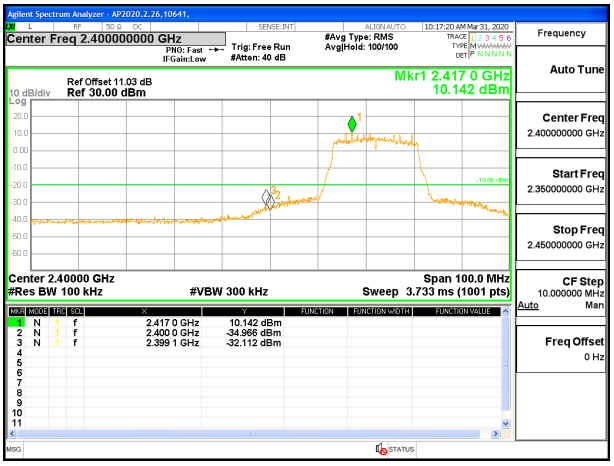
OUT-OF-BAND LOW CHANNEL 1



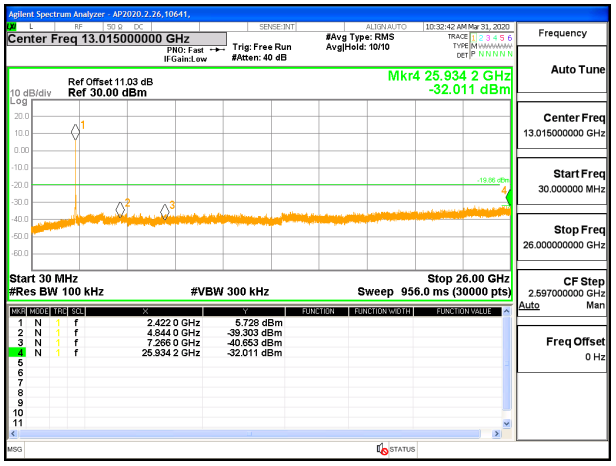
LOW CHANNEL 2 BANDEDGE



OUT-OF-BAND LOW CHANNEL 2



LOW CHANNEL 3 BANDEDGE



OUT-OF-BAND LOW CHANNEL 3

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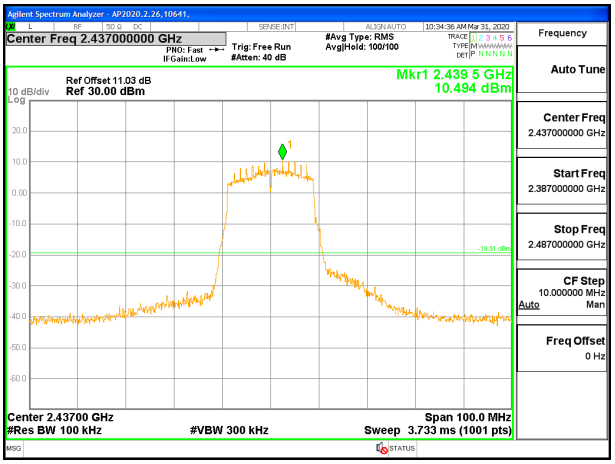
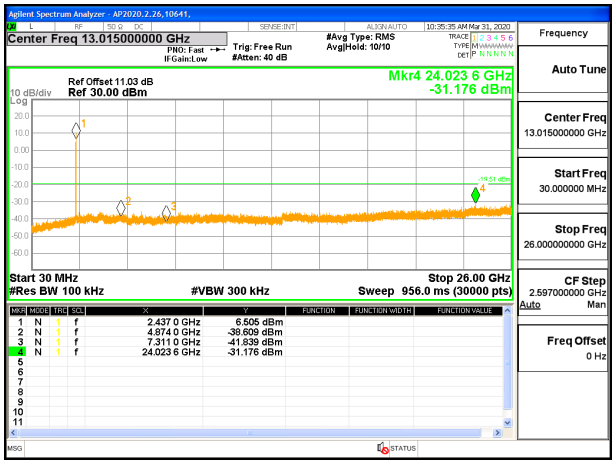
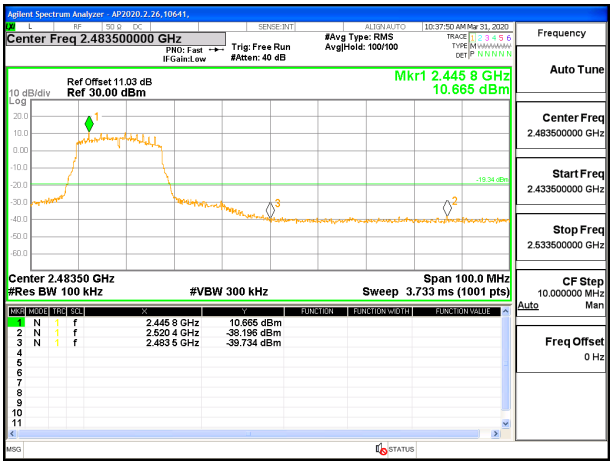


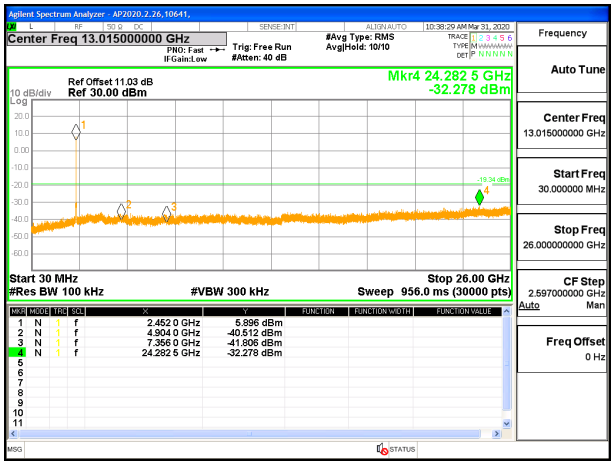
MID CHANNEL REFERNCE LEVEL



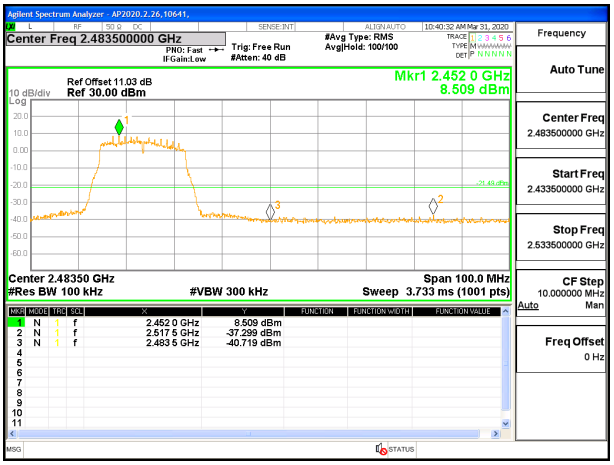
OUT-OF-BAND MID CHANNEL



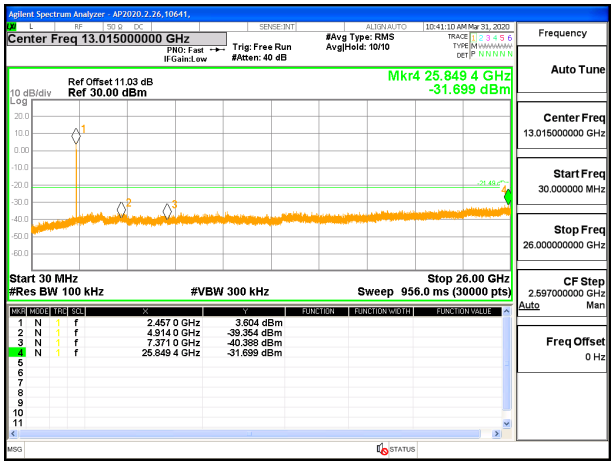
HIGH CHANNEL 9 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 9



HIGH CHANNEL 10 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 10

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