



TEST REPORT

Report Number: 13389132-E4V1

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

Model : A2411, A2412, A2413

FCC ID : BCG-E3550A

IC : 579C-E3550A

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
FAX: (510) 661-0888

REPORT REVISION HISTORY

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

REPORT REVISION HISTORY	2
1. ATTESTATION OF TEST RESULTS	4
2. TEST RESULTS SUMMARY	5
3. TEST METHODOLOGY	5
4. FACILITIES AND ACCREDITATION	5
5. DECISION RULES AND MEASUREMENT UNCERTAINTY	6
5.1. METROLOGICAL TRACEABILITY	6
5.2. DECISION RULES	6
5.3. MEASUREMENT UNCERTAINTY	6
6. INTRODUCTION OF TEST DATA REUSE	7
6.1. EUT DESCRIPTION	7
6.2. INTRODUCTION	7
6.3. DIFFERENCE IN MODEL NUMBER	7
6.4. SPOT CHECK VERIFICATION RESULTS SUMMARY	7
6.5. REFERENCE DETAIL	14
6.6. DESCRIPTION OF AVAILABLE ANTENNAS	14
6.7. SOFTWARE AND FIRMWARE	14
6.8. WORST-CASE CONFIGURATION AND MODE	14
6.9. DESCRIPTION OF TEST SETUP	15
7. MEASUREMENT METHOD	16
8. TEST AND MEASUREMENT EQUIPMENT	16
9. SETUP PHOTOS	16
Appendix A – Reference Test Report	17

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Smartphone

MODEL: A2411, A2412, A2413

SERIAL NUMBER: (Original): G6TCQ01TQ897, G6TCQ02KQ897
(Spot Check): G6TD401R06R1, G6TD401N06R1

DATE TESTED: AUGUST 24 – 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:



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

2. TEST RESULTS SUMMARY

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

3. TEST METHODOLOGY

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

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

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

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

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

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

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

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

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

6. INTRODUCTION OF TEST DATA REUSE

6.1. EUT DESCRIPTION

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

6.2. INTRODUCTION

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID BCG-E3548A, IC: 579C-E3548A to cover variant model BCG-E3550A, 579C-E3550A. 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. DIFFERENCE IN MODEL NUMBER

Models A2411, A2412, and A2413 are electrically identical and the model numbers are allocated for marketing and logistic purposes only. Model A2411 was used for the spot check testing described in this report.

6.4. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device model A2411, FCC ID: BCG-E3550A, IC: 579C-E3550A for radiated spurious and radiated band-edge in accordance with the Test Plan that was approved via KDB inquiry.

BCG-E3550A SPOT CHECK RESULTS										
Technology	Mode	Test Item	Channel	Measured	Original model		Spot check model		Delta (dB)	
					A2342		A2411, A2412, A2413			
					BCG-E3548A 579C-E3548A		BCG-E3550A 579C-E3550A			
				Frequency (GHz)	Peak (dBuV)	Ave (dBuV)	Peak	Ave	Peak	Ave
WiFi (2.4GHz)	Ax HE 20	RBE	Low	2.400 GHz	69.33	50.07	68.23	49.18	1.10	0.89
			High	2.4835 GHz	69.08	47.97	68.69	45.58	0.39	2.39
			Mid	2.89565 GHz	53.38	41.62	52.69	40.54	0.69	1.08

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-E3548A, IC: 579C-E3548A is therefore being used to support the application for certification for FCC ID: BCG-E3550A, IC: 579C-E3550A.

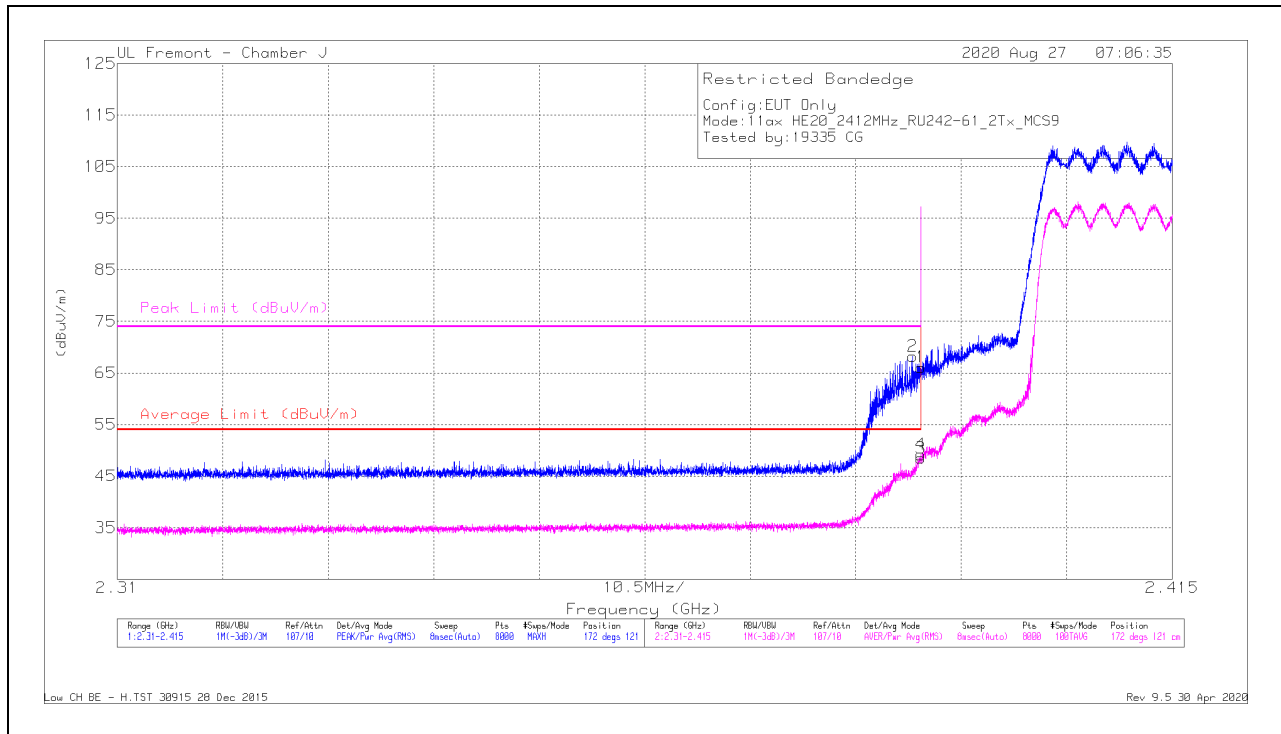
Note: The output powers were verified on model A2411 to match with model A2342 before radiated emissions spot check was performed.

SPOT CHECK DATA

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

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



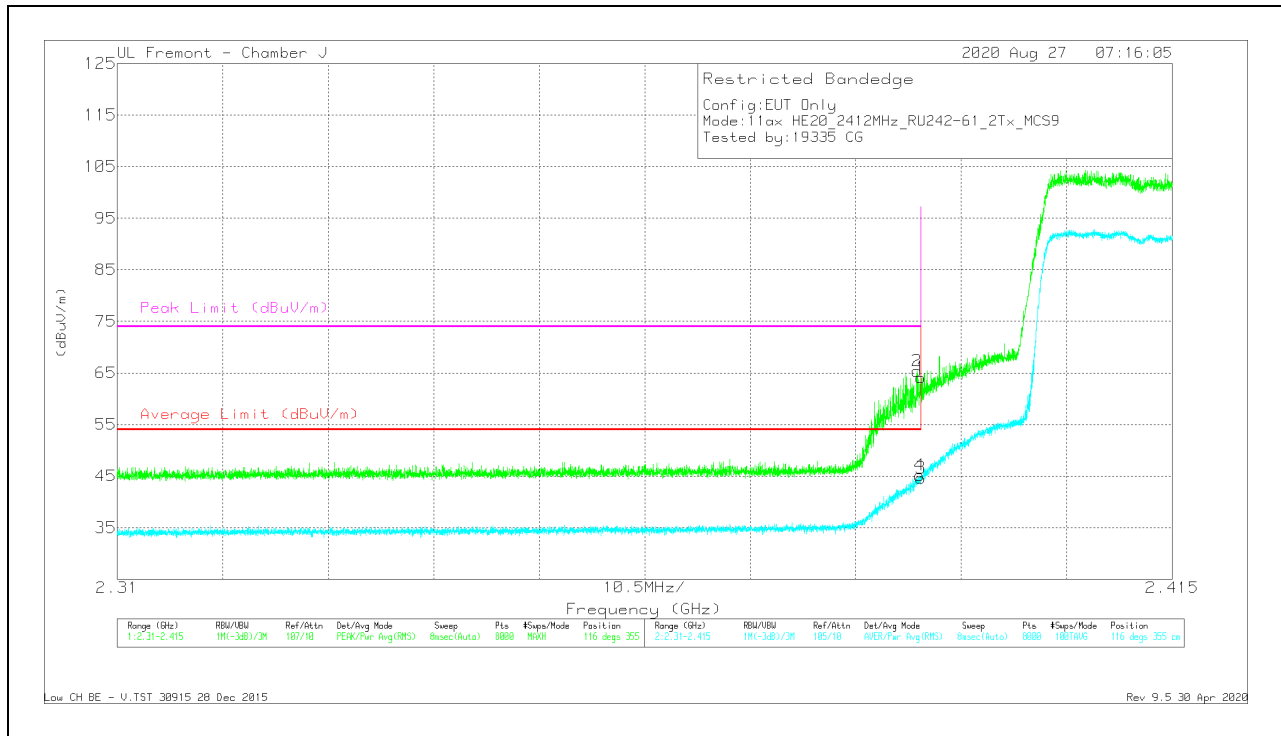
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T963 (dB/m)	Amp/Cbl/Fitr/Pat d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	51.29	Pk	29	-14.2	66.09	-	-	74	-7.91	172	121	H
2	* 2.38917	53.43	Pk	29	-14.2	68.23	-	-	74	-5.77	172	121	H
3	* 2.39	33.69	RMS	29	-14.2	48.49	54	-5.51	-	-	172	121	H
4	* 2.38997	34.38	RMS	29	-14.2	49.18	54	-4.82	-	-	172	121	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT

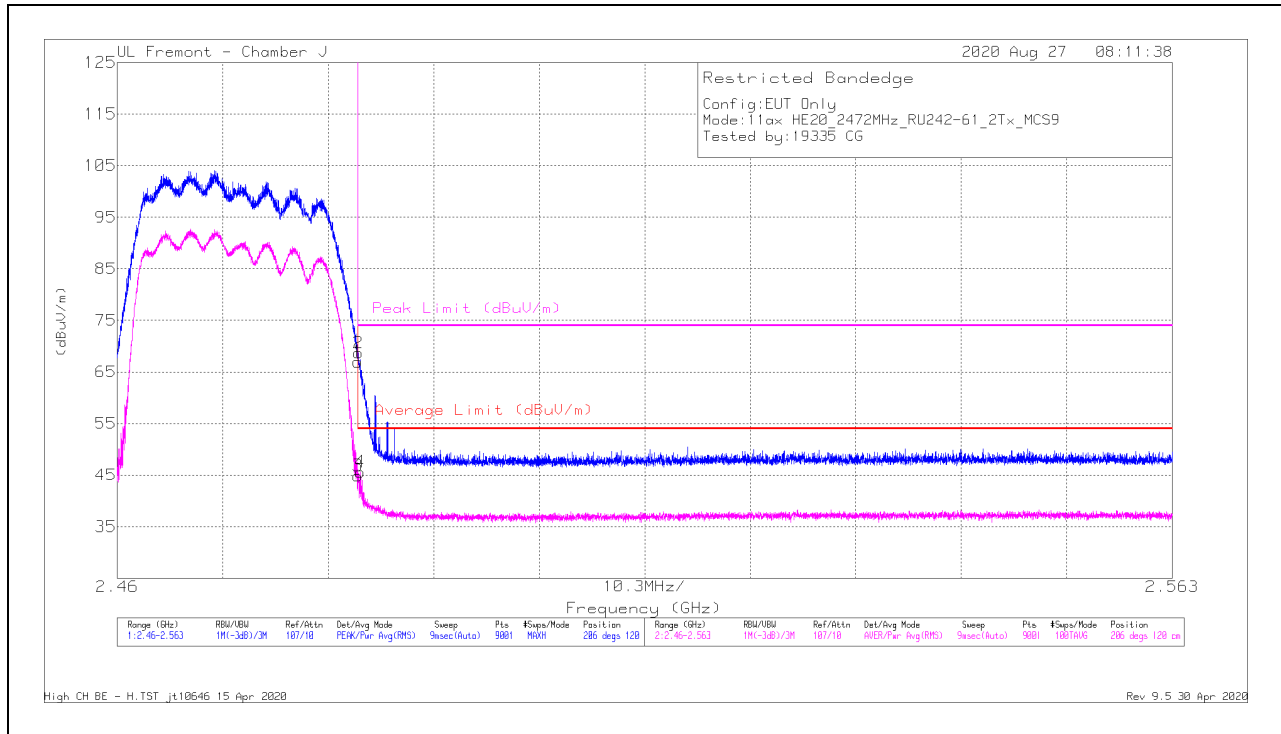


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T963 (dB/m)	Amp/Cbll/Filtr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	49.29	Pk	29	-14.2	64.09	-	-	74	-9.91	116	355	V
2	* 2.38959	50.59	Pk	29	-14.2	65.39	-	-	74	-8.61	116	355	V
3	* 2.39	29.83	RMS	29	-14.2	44.63	54	-9.37	-	-	116	355	V
4	* 2.38985	30.35	RMS	29	-14.2	45.15	54	-8.85	-	-	116	355	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



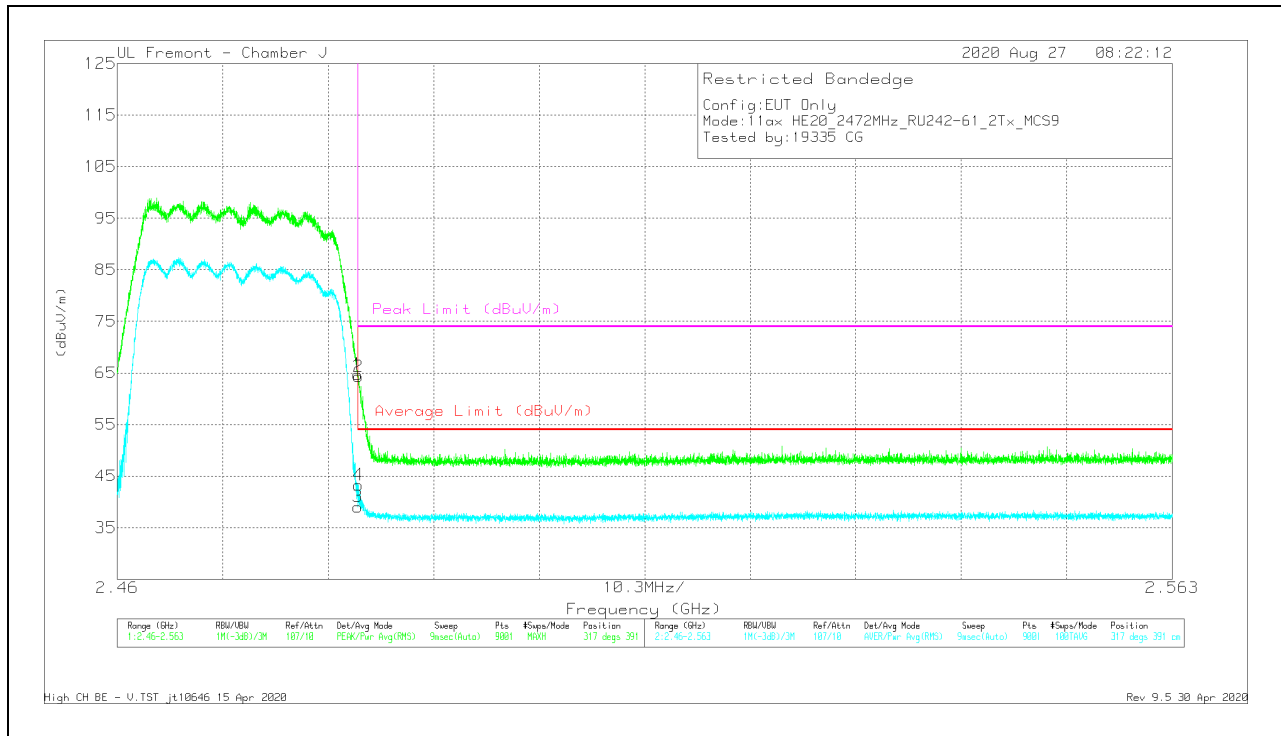
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T963 (dB/m)	Amp/Cbl/Fitr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	62.67	Pk	29.5	-25.2	66.97	-	-	74	-7.03	206	120	H
2	* 2.48354	64.39	Pk	29.5	-25.2	68.69	-	-	74	-5.31	206	120	H
3	* 2.48351	40.58	RMS	29.5	-25.2	44.88	54	-9.12	-	-	206	120	H
4	* 2.48371	41.28	RMS	29.5	-25.2	45.58	54	-8.42	-	-	206	120	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T963 (dB/m)	Amp/Cbl/Filt/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	60.44	Pk	29.5	-25.2	64.74	-	-	74	-9.26	317	391	V
2	* 2.48354	60.01	Pk	29.5	-25.2	64.31	-	-	74	-9.69	317	391	V
3	* 2.48351	34.75	RMS	29.5	-25.2	39.05	54	-14.95	-	-	317	391	V
4	* 2.48354	38.97	RMS	29.5	-25.2	43.27	54	-10.73	-	-	317	391	V

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

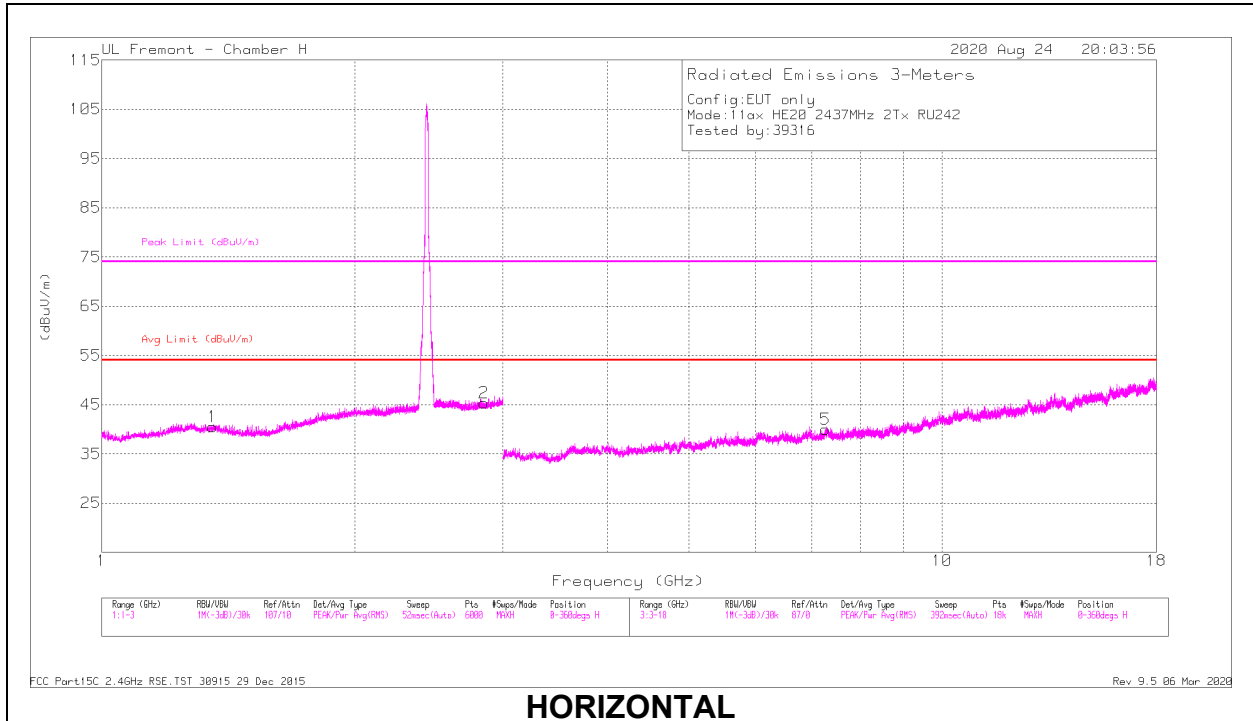
Pk - Peak detector

RMS - RMS detection

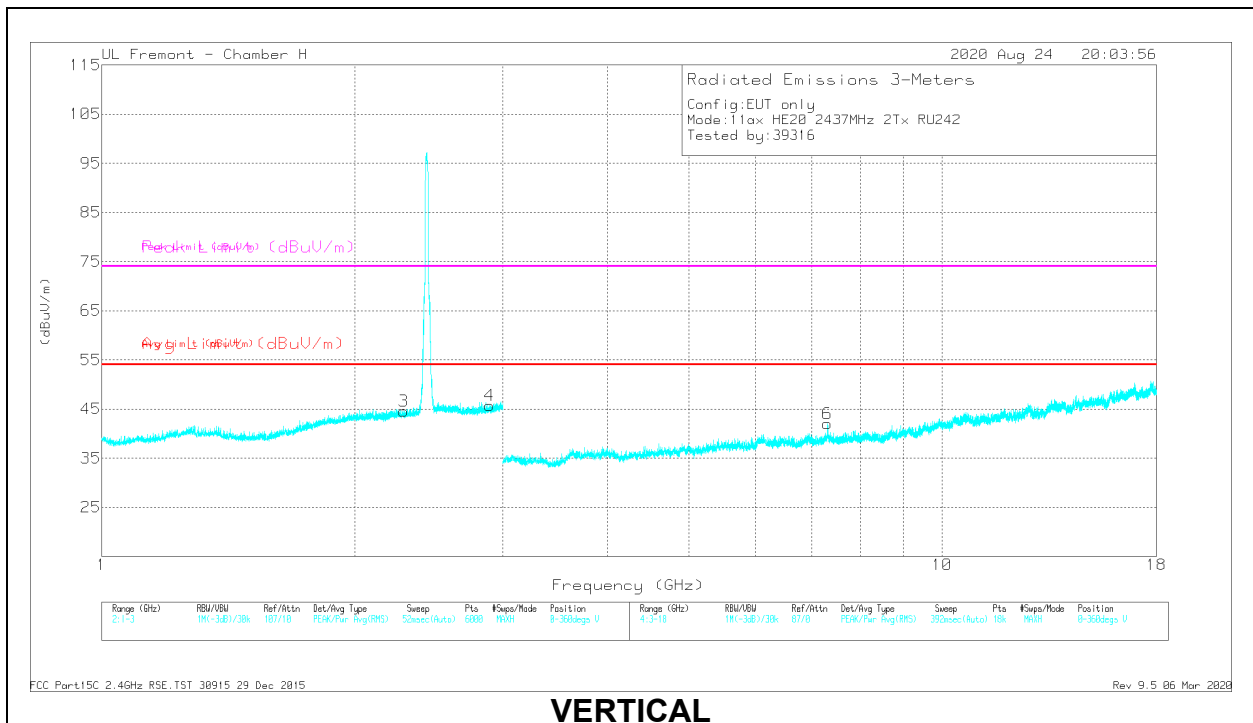
HARMONICS AND SPURIOUS EMISSIONS

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

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/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	* 1.35299	44.75	PK2	29	-25.5	48.25	-	-	74	-25.75	36	157	H
	* 1.35214	33.02	MAv1	29	-25.5	36.52	54	-17.48	-	-	36	157	H
2	* 2.8521	44.12	PK2	32.4	-23.4	53.12	-	-	74	-20.88	82	211	H
	* 2.84924	32.45	MAv1	32.3	-23.4	41.35	54	-12.65	-	-	82	211	H
3	* 2.28639	44.24	PK2	31.9	-24.1	52.04	-	-	74	-21.96	133	239	V
	* 2.28529	32.7	MAv1	31.9	-24.1	40.5	54	-13.5	-	-	133	239	V
4	* 2.89665	44.08	PK2	32.6	-23.3	53.38	-	-	74	-20.62	239	203	V
	* 2.89565	32.32	MAv1	32.6	-23.3	41.62	54	-12.38	-	-	239	203	V
5	* 7.26713	37.5	PK2	36	-27.5	46	-	-	74	-28	184	321	H
	* 7.26461	26.42	MAv1	36	-27.6	34.82	54	-19.18	-	-	184	321	H
6	* 7.31046	43.84	PK2	36	-27	52.84	-	-	74	-21.16	113	102	V
	* 7.31268	30.03	MAv1	36	-27	39.03	54	-14.97	-	-	113	102	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

6.5. 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-E3548A 579C-E3548A	13335182-E4	FCC IC_DTS Report / All sections

6.6. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	.03	-1.7

6.7. SOFTWARE AND FIRMWARE

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

6.8. WORST-CASE CONFIGURATION AND MODE

Radiated band edge and spurious emissions from 1GHz to 18GHz were performed based on the Model A2342 worst case with the EUT set at highest power at Low/Middle/High channels.

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

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

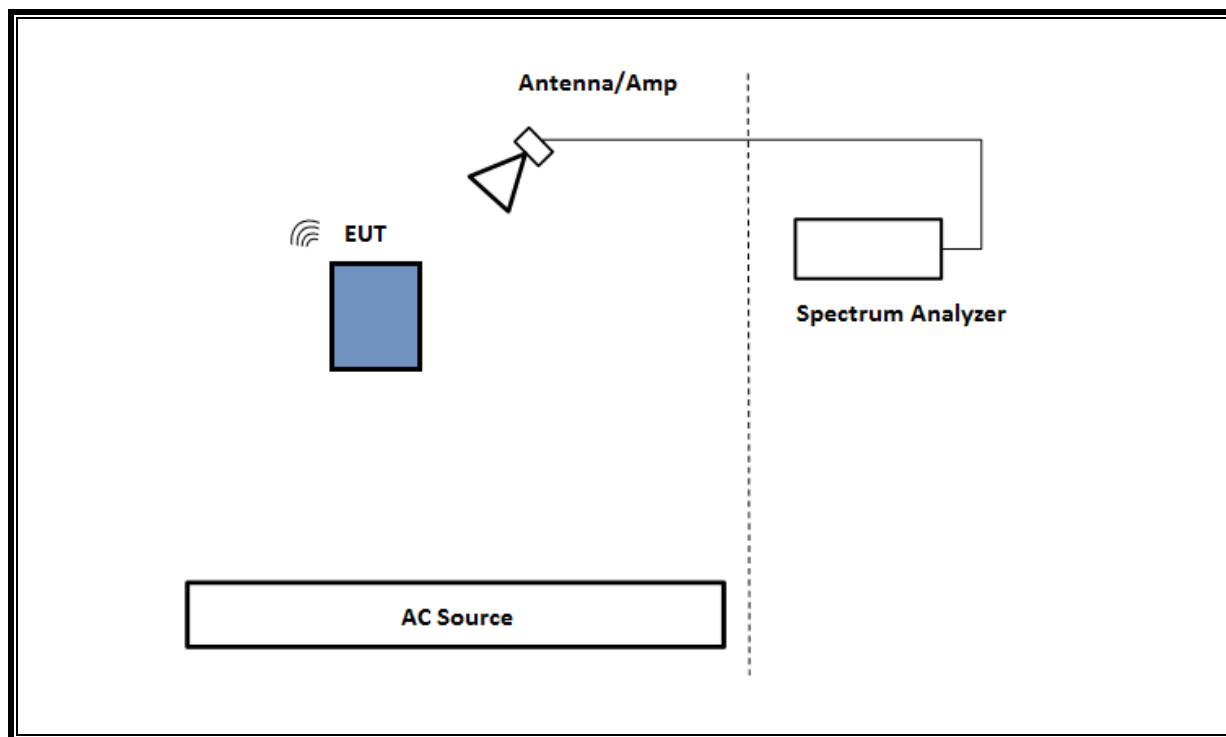
6.9. DESCRIPTION OF TEST SETUP

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

TEST SETUP

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

SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



7. MEASUREMENT METHOD

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

8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Antenna, Double Ridge Guide Horn Antenna 700MHz to 18GHz	A.H. Systems, Inc.	SAS-571	T963	1/25/2021	1/25/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1571	8/20/2021	8/20/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179372	2/22/2021	2/25/2020
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T1683	4/28/2021	4/28/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	11/01/2020	11/01/2019
Amplifier, 1 - 18GHz	MITEQ	AFS42-00101800-25-S-42	T1567	1/24/2021	1/24/2020
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

*Testing was completed before equipment expiration date.

9. SETUP PHOTOS

Please refer to 13335182-EP1V1 for setup photos

END OF TEST REPORT

Appendix A – Reference Test Report

Attached is the test report (13335182-E4) containing the reference data from the parent model as detailed in section 6.5.



TEST REPORT

Report Number: 13335182-E4V3

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

Model : A2342

FCC ID : BCG-E3548A

IC : 579C-E3548A

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 30, 2020

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888



NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	9/21/2020	Initial Issue	Chin Pang
V2	9/29/2020	Updated TCB's questions	Vien Tran
V3	9/30/2020	Updated Section 9.6 per TCB Question	Chris Lam

REPORT REVISION HISTORY	2
1. ATTESTATION OF TEST RESULTS	5
2. TEST RESULTS SUMMARY	6
3. TEST METHODOLOGY	6
4. FACILITIES AND ACCREDITATION	6
5. DECISION RULES AND MEASUREMENT UNCERTAINTY	7
5.1. METROLOGICAL TRACEABILITY	7
5.2. DECISION RULES	7
5.3. MEASUREMENT UNCERTAINTY	7
6. EQUIPMENT UNDER TEST	8
6.1. EUT DESCRIPTION	8
6.2. MAXIMUM OUTPUT POWER	8
6.3. DESCRIPTION OF AVAILABLE ANTENNAS	8
6.4. SOFTWARE AND FIRMWARE	8
6.5. WORST-CASE CONFIGURATION AND MODE	9
6.6. DESCRIPTION OF TEST SETUP	10
7. MEASUREMENT METHOD	13
8. TEST AND MEASUREMENT EQUIPMENT	14
9. ANTENNA PORT TEST RESULTS	15
9.1. ON TIME AND DUTY CYCLE	15
9.2. 99% BANDWIDTH	18
9.2.1. 802.11b MODE 1TX	19
9.2.2. 802.11n HT20 MODE 1TX	21
9.2.3. 802.11n HT20 CDD MODE 2TX	23
9.2.4. 802.11ax HE20 MODE 1TX	24
9.2.5. 802.11ax HE20 OFDMA MODE 2TX	32
9.3. 6dB BANDWIDTH	36
9.3.1. 802.11b MODE 1TX	37
9.3.2. 802.11ax HE20 MODE 1TX	39
9.3.3. 802.11ax HE20 OFDMA MODE 2TX	45
9.4. OUTPUT POWER	48
9.4.1. 802.11b MODE 1TX	49
9.4.2. 802.11n HT20 MODE 1TX	51
9.4.3. 802.11n HT20 CDD MODE 2TX	53
9.4.4. 802.11ax HE20 MODE 1TX	54
9.4.5. 802.11ax HE20 OFDMA MODE 2TX	62
9.5. POWER SPECTRAL DENSITY	66

9.5.1.	802.11b MODE 1TX.....	67
9.5.2.	802.11n HT20 MODE 1TX.....	69
9.5.3.	802.11n HT20 CDD MODE 2TX	71
9.5.4.	802.11ax HE20 MODE 1TX.....	72
9.5.5.	802.11ax HE20 OFDMA MODE 2TX	80
9.6.	CONDUCTED SPURIOUS EMISSIONS.....	84
9.6.1.	802.11b MODE 1TX.....	85
9.6.2.	802.11n HT20 MODE 1TX.....	89
9.6.3.	802.11n HT20 CDD MODE 2TX	95
9.6.4.	802.11ax HE20 MODE 1TX.....	101
9.6.5.	802.11ax HE20 OFDMA MODE 2TX	125
10.	RADIATED TEST RESULTS.....	152
10.1.	TRANSMITTER ABOVE 1 GHz.....	154
10.1.1.	TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND	154
10.1.2.	TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND.....	182
10.1.3.	TX ABOVE 1 GHz 802.11ax HE20 MODE IN THE 2.4 GHz BAND.....	228
10.1.4.	TX ABOVE 1 GHz 802.11ax HE20 OFDMA MODE IN THE 2.4 GHz BAND	292
10.2.	WORST CASE BELOW 1 GHz	338
10.3.	WORST CASE 18-26 GHz	340
11.	AC POWER LINE CONDUCTED EMISSIONS	342
11.1.	AC POWER LINE with Laptop.....	343
11.2.	AC POWER LINE with AC/DC Adapter	345
12.	SETUP PHOTOS.....	347

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: SMARTPHONE

MODEL: A2342

SERIAL NUMBER: G6TCQ01TQ897, G6TCV00BQ88T

DATE TESTED: MARCH 25, 2020 – SEPTEMBER 30, 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:



Chris Xiong
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

2. TEST RESULTS SUMMARY

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

3. TEST METHODOLOGY

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

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

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

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

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

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

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

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

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

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

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
1Tx			
2412 - 2472	802.11b	20.25	105.93
	802.11g	Covered by 802.11n HT20 1TX	
	802.11n HT20	21.23	132.74
	802.11ax HE20	21.24	133.05

2Tx			
2412 - 2472	802.11n HT20 CDD	23.76	237.68
	802.11g SDM/STBC	Covered by 802.11n HT20 2TX CDD	
	802.11ax HE20	23.75	237.14

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	0.3	-1.7

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was FW 20_10_619_14.

6.5. WORST-CASE CONFIGURATION AND MODE

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

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

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

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

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

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

The PSD were performed as worst case mode.

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

802.11b mode: 1 Mbps
802.11n HT20mode: MCS0, MCS 7
802.11ax HE20mode: MCS0, MCS 9
802.11ax HE20 FULL RU & RU26: MCS9 for Band Edge

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

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

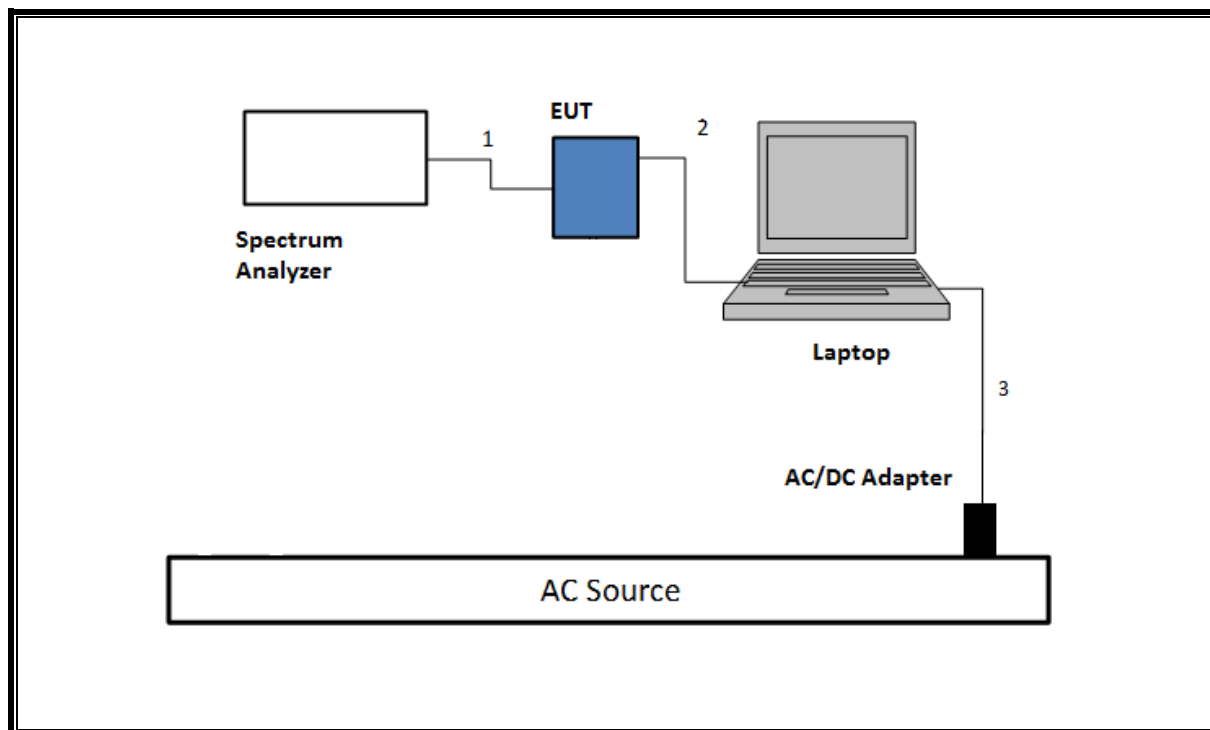
6.6. DESCRIPTION OF TEST SETUP

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

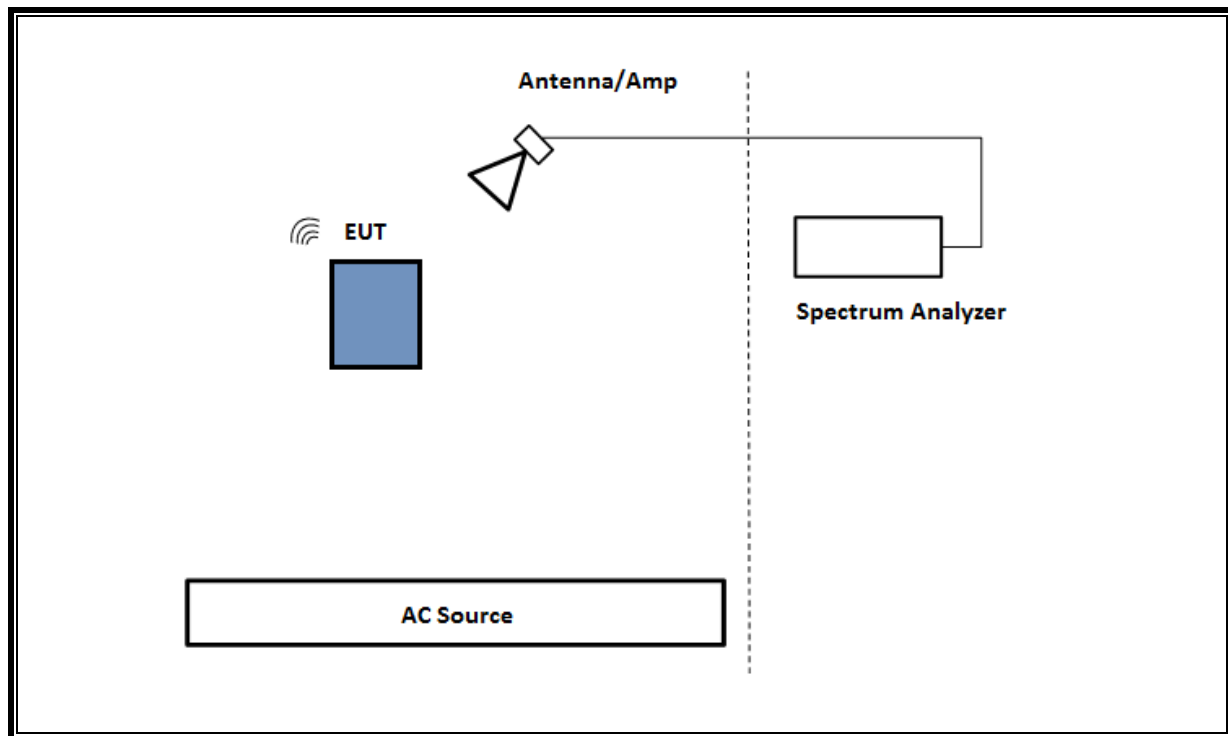
TEST SETUP

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

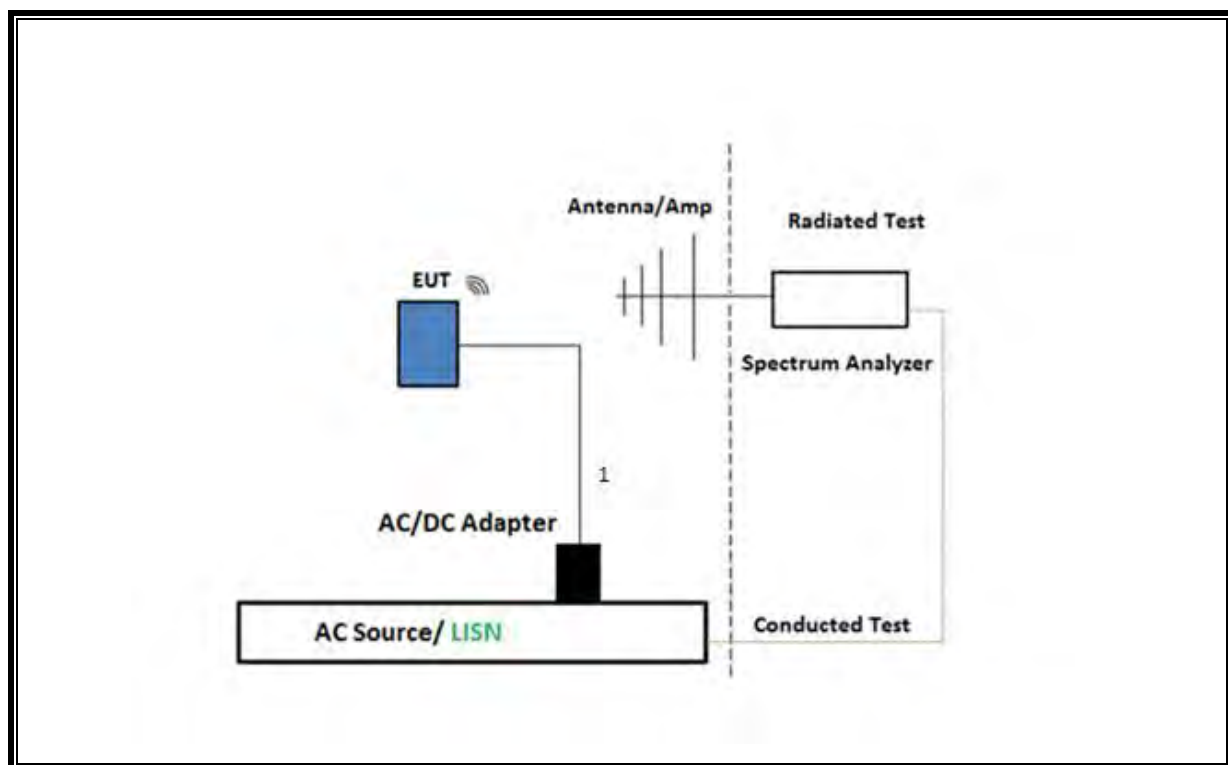
SETUP DIAGRAM FOR CONDUCTED TESTS



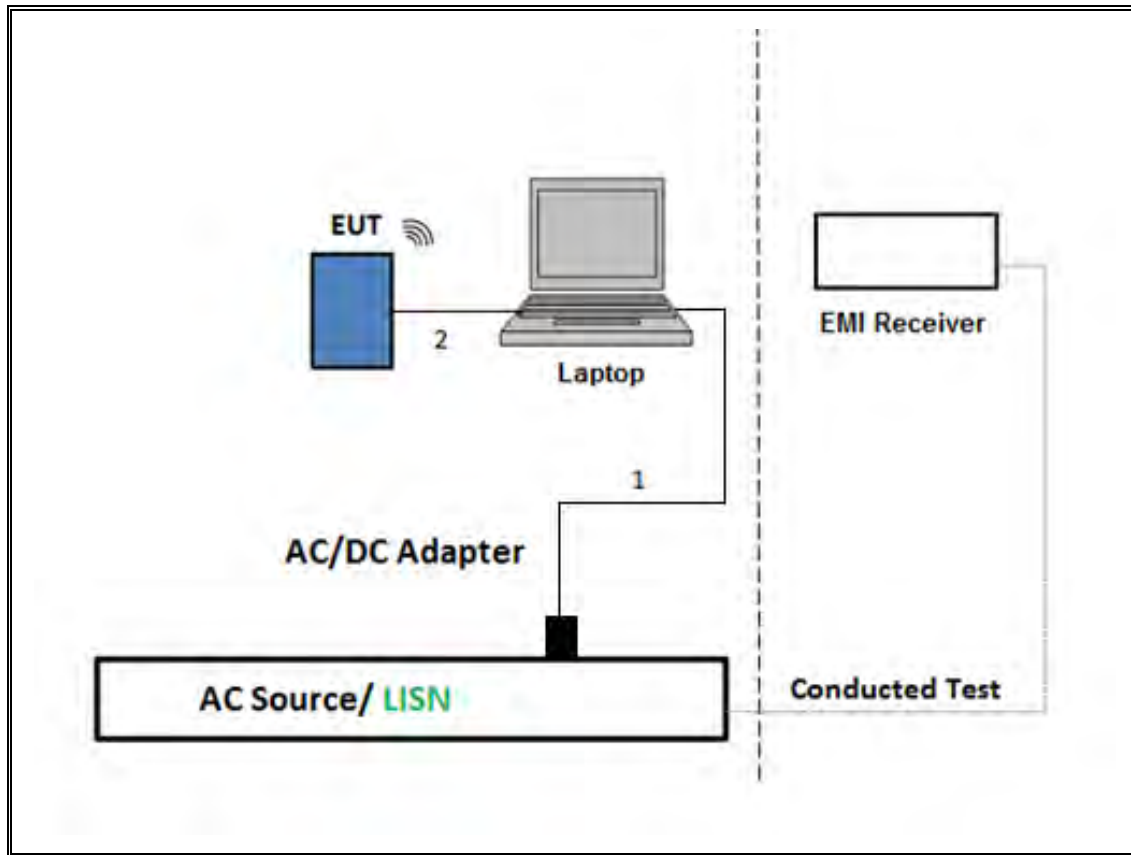
SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



7. MEASUREMENT METHOD

Test Item	Test Method
6 dB BW	ANSI C63.10 Subclause -11.8.1 RBW $\geq$ DTS BW
99% BW	ANSI C63.10-2013, Subclause 6.9.3.
Output Power	ANSI C63.10 Subclause -11.9.2.3.1 Method AVGPM (Measurement using an RF average-reading power meter)
PSD	ANSI C63.10 Subclause -11.10.3 Method 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

8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T1466	01/23/2021	01/23/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T712	03/09/2021	03/10/2020
RF Filter Box, 1-18GHz	UL (IN HOUSE)	N/A	PRE0182865	03/03/2021	03/03/2020
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	T122	04/15/2021	04/15/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A-544	T1210	01/21/2021	01/21/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179522	02/20/2021	02/20/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	11/01/2020	11/01/2019
Amplifier, 1 to 18GHz, 35dB	Amplical	AFS42-00101800-25-S-42	T1567	01/24/2021	01/24/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T346	07/20/2021	07/20/2020
RF Filter Box, 1-18GHz	UL (IN HOUSE)	N/A	PRE0180997	05/06/2021	05/06/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179372	02/25/2021	02/25/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T963	01/25/2021	01/25/2020
RF Filter Box, 1-18GHz	UL (IN HOUSE)	N/A	PRE0181597	08/20/2021	08/20/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	02/26/2021	02/26/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	05/26/2021	05/26/2020
RF Filter Box, 1-18GHz	FREMONT	SAC-L1	PRE0180571	04/14/2021	04/14/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T339	01/21/2021	01/21/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T908	05/05/2021	05/05/2020
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1269	01/21/2021	01/21/2020
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T1225	02/13/2021	02/13/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T340	01/22/2021	01/22/2020
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T1683	04/28/2021	04/28/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T905	01/24/2021	01/24/2020
ANTENNA, HORN 18-26GHz	ARA	SWH-28	T125	04/17/2021	04/17/2020

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

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

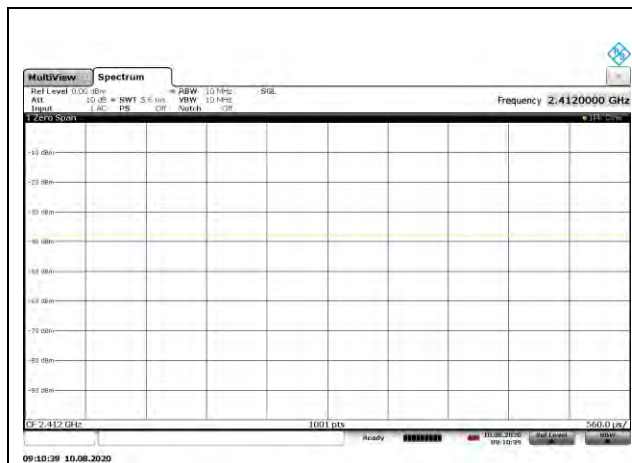
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

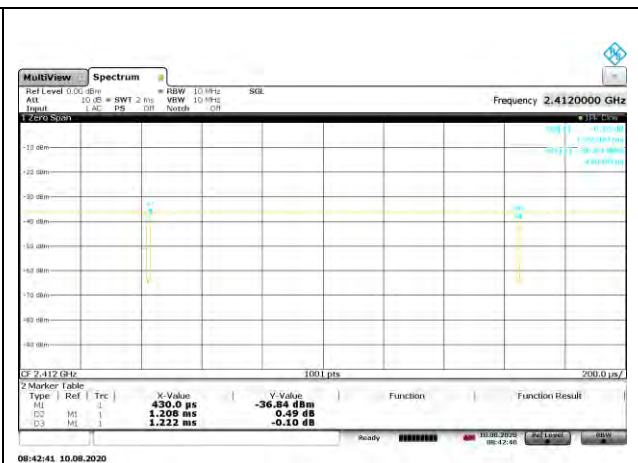
ON TIME AND DUTY CYCLE RESULTS

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 1Mbps	1.000	1.000	1.000	100.00	0.00	0.010
802.11b 11Mbps	1.208	1.222	0.989	98.85	0.00	0.010
802.11n HT20 MCS0	1.920	1.943	0.988	98.84%	0.00	0.010
802.11n HT20 MCS7	0.228	0.248	0.919	91.94%	0.36	4.388
802.11n HT20 2TX MCS0	0.983	1.004	0.979	97.93%	0.09	1.018
802.11n HT20 2TX MCS7	0.136	0.156	0.869	86.86%	0.61	7.380
802.11ax HE20 26T MCS0	3.980	4.020	0.990	99.00%	0.00	0.010
802.11ax HE20 26T MCS9	3.997	4.044	0.998	98.84	0.00	0.01
802.11ax HE20 242T MCS0	1.560	1.585	0.984	98.42%	0.00	0.010
802.11ax HE20 242T MCS9	1.559	1.582	0.986	98.58%	0.00	0.010

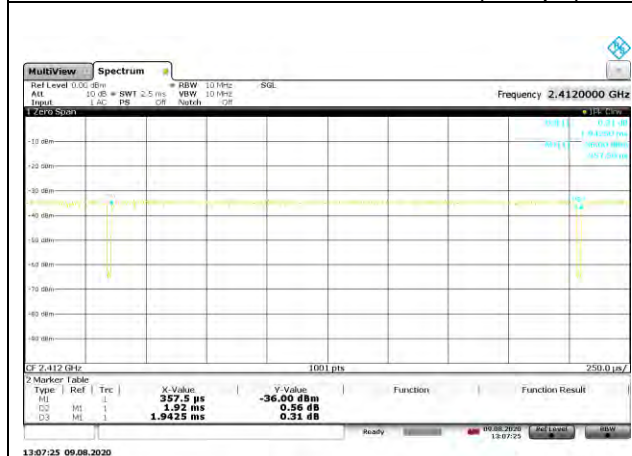
DUTY CYCLE PLOTS



DUTY CYCLE 802.11b MODE (1Mbps)



DUTY CYCLE 802.11b MODE (11Mbps)



DUTY CYCLE 802.HT20 (MCS0)



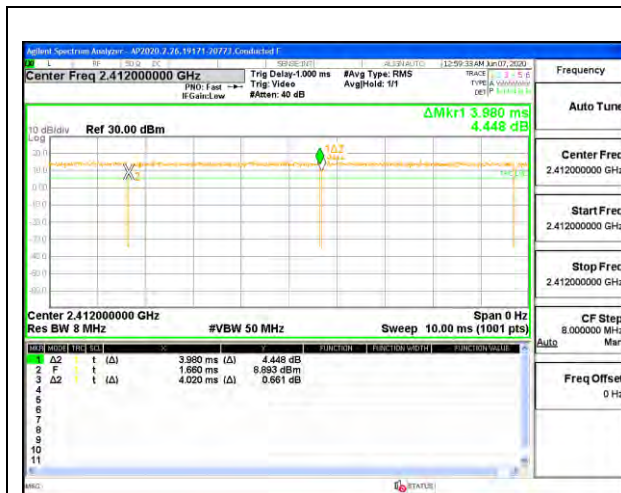
DUTY CYCLE 802.HT20 (MCS7)



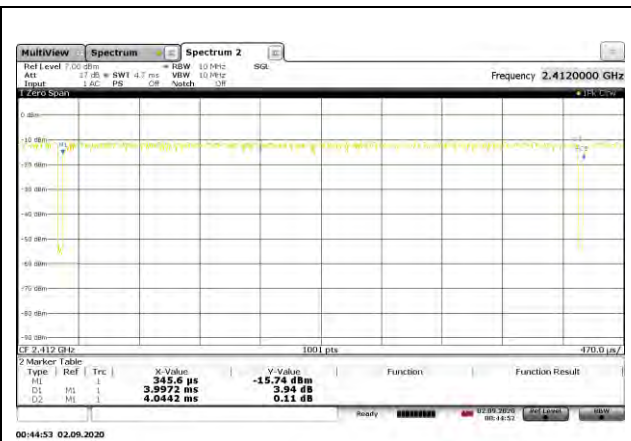
DUTY CYCLE 802.TT20 2TX (MCS0)



DUTY CYCLE 802.HT20 2TX (MCS7)



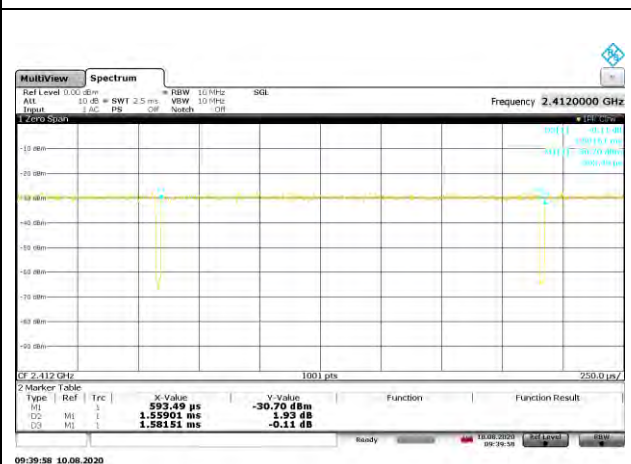
DUTY CYCLE 802.HE20 26T (MCS0)



DUTY CYCLE 802.HE20 26T (MCS9)



DUTY CYCLE 802.HE20 242T (MCS0)



DUTY CYCLE 802.HE20 242T (MCS9)

9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

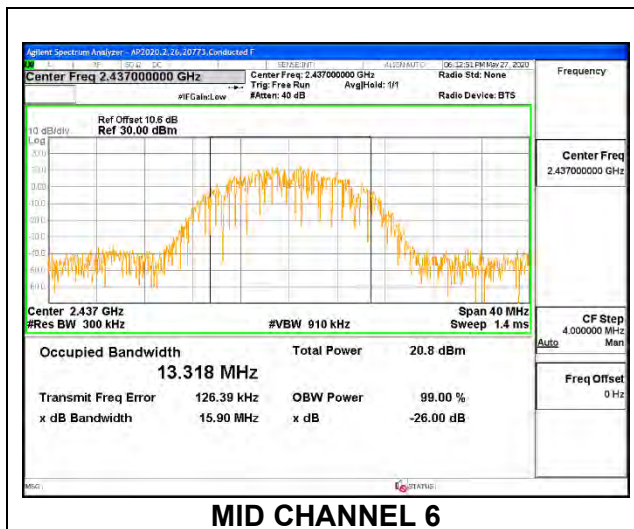
RESULTS

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

9.2.1. 802.11b MODE 1TX

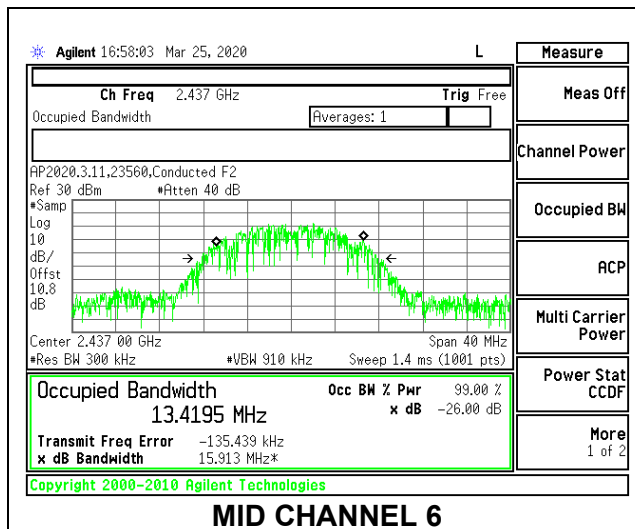
ANT 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	12.7340
Mid 6	2437	13.3180
High 11	2462	13.2446
High 12	2467	13.2040
High 13	2472	13.2520



ANT 3

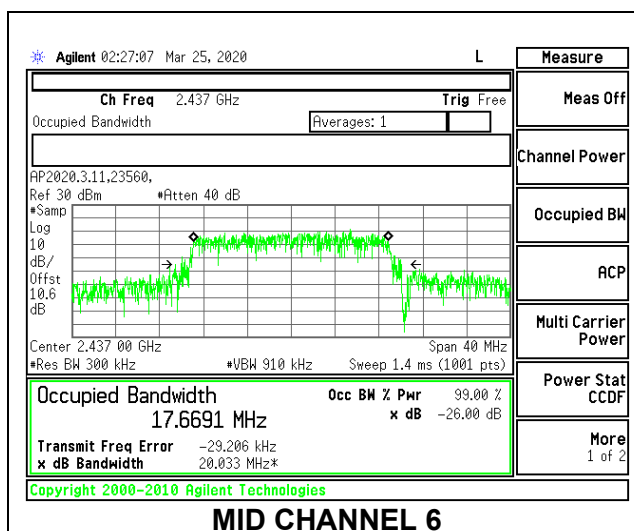
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	12.8920
Mid 6	2437	13.4195
High 11	2462	12.8424
High 12	2467	13.0280
High 13	2472	13.1020



9.2.2. 802.11n HT20 MODE 1TX

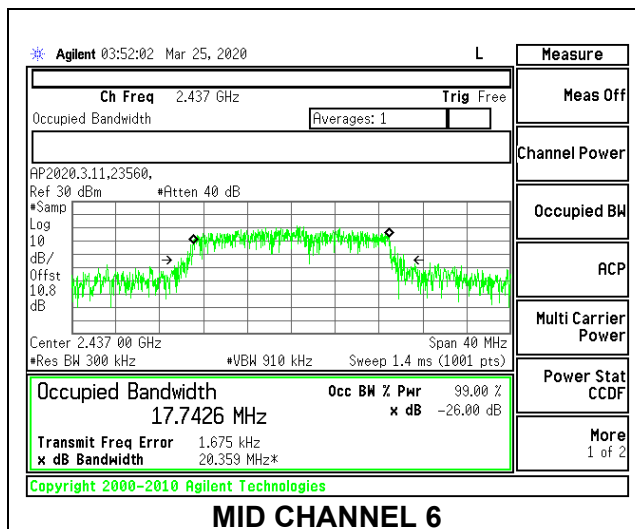
ANT 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.6767
Low 2	2417	17.7207
Mid 6	2437	17.6691
High 10	2457	17.6423
High 11	2462	17.6209
High 12	2467	17.6801
High 13	2472	17.5141



ANT 3

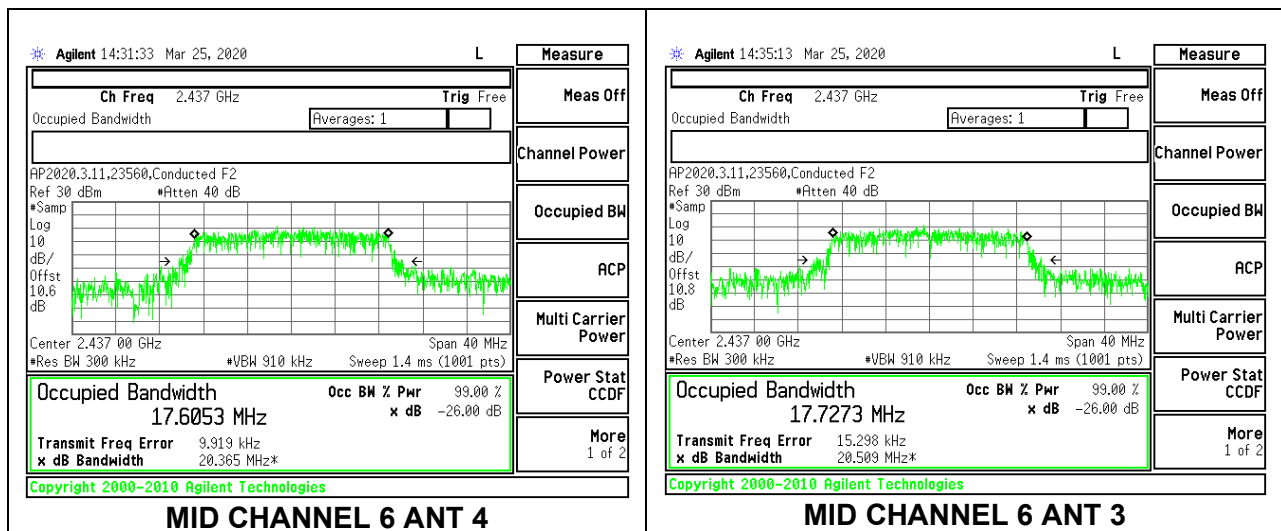
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.5921
Low 2	2417	17.7430
Mid 6	2437	17.7426
High 10	2457	17.6505
High 11	2462	17.6200
High 12	2467	17.7012
High 13	2472	17.8400



9.2.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3

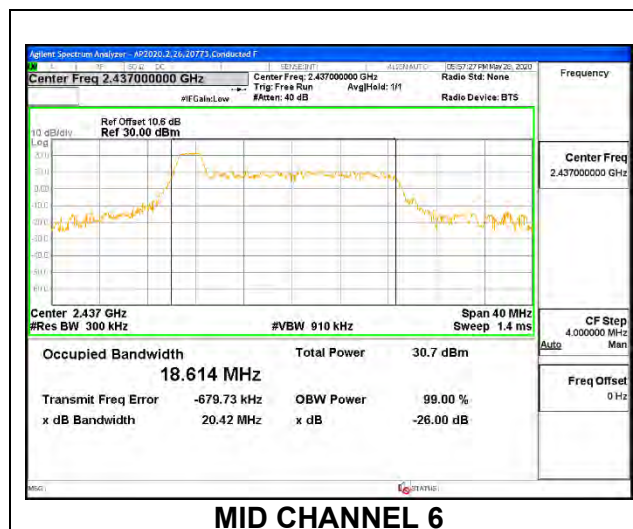
Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	17.6096	17.5936
Low 2	2417	17.6717	17.6692
Low 3	2422	17.6314	17.7369
Mid 6	2437	17.6053	17.7273
High 9	2452	17.6849	17.6219
High 10	2457	17.6972	17.5533
High 11	2462	17.6945	17.5338
High 12	2467	17.6832	17.6297
High 13	2472	17.5849	17.5979



9.2.4. 802.11ax HE20 MODE 1TX

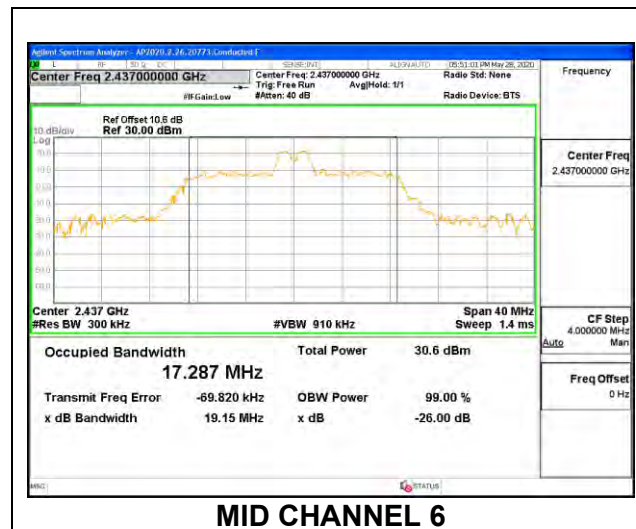
ANT 4: 26 -Tones, RU index 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.460
Low 2	2417	18.422
Low 3	2422	18.425
Mid 6	2437	18.614
High 9	2452	18.443
High 10	2457	18.179
High 11	2462	18.196
High 12	2467	18.233
High 13	2472	18.072



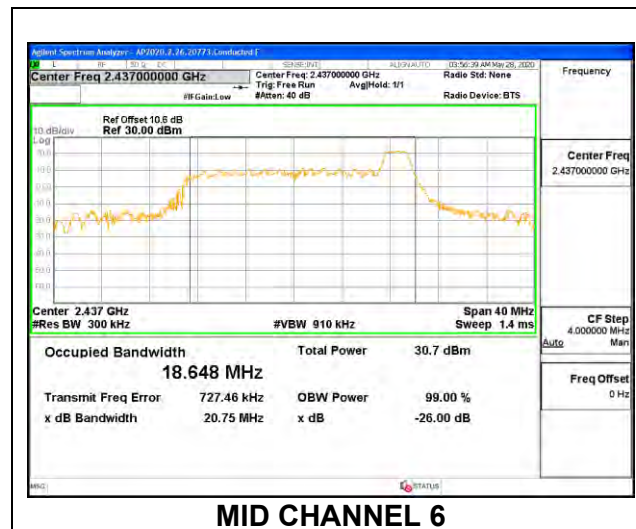
ANT 4: 26 -Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.101
Low 2	2417	17.209
Low 3	2422	17.142
Mid 6	2437	17.287
High 9	2452	17.073
High 10	2457	17.085
High 11	2462	17.212
High 12	2467	17.247
High 13	2472	17.088



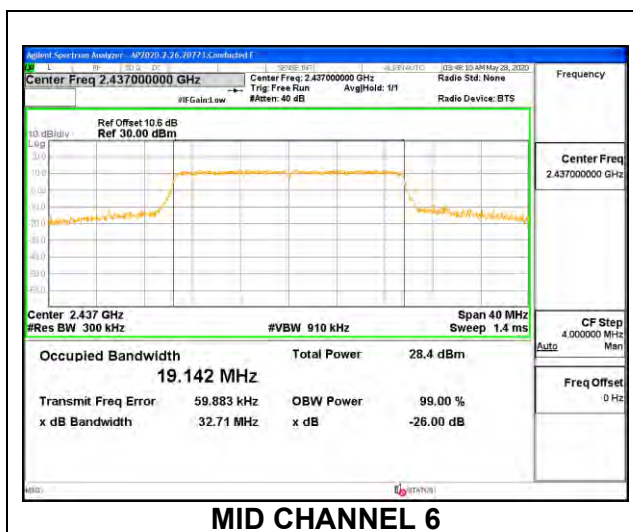
ANT 4: 26 -Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.638
Low 2	2417	18.766
Low 3	2422	18.690
Mid 6	2437	18.648
High 9	2452	18.575
High 10	2457	18.916
High 11	2462	18.875
High 12	2467	19.046
High 13	2472	18.960



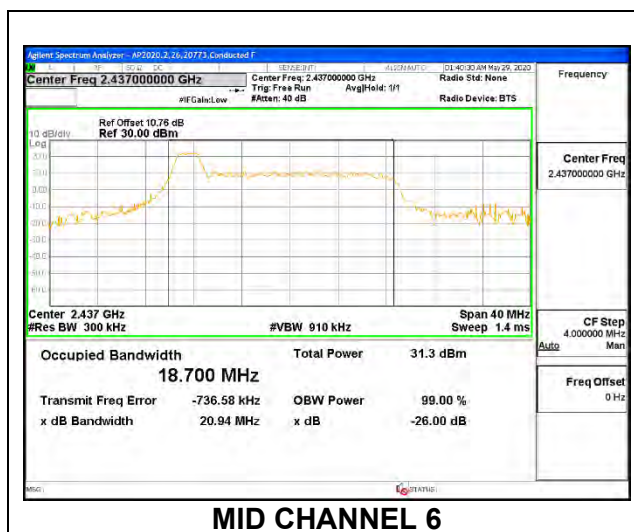
ANT 4: 242 -Tones, RU Index 61

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.947
Low 2	2417	18.989
Low 3	2422	19.057
Mid 6	2437	19.142
High 9	2452	19.013
High 10	2457	18.976
High 11	2462	19.005
High 12	2467	19.071
High 13	2472	18.924



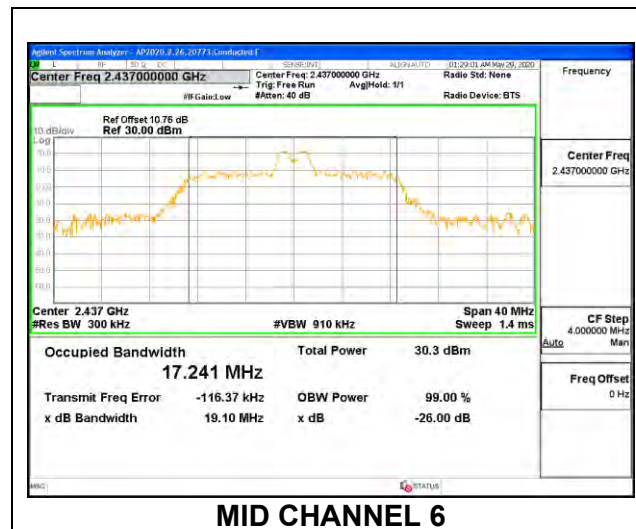
ANT 3: 26 -Tones, RU Index 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.459
Low 2	2417	18.402
Low 3	2422	18.503
Mid 6	2437	18.700
High 9	2452	18.370
High 10	2457	18.124
High 11	2462	18.319
High 12	2467	18.175
High 13	2472	18.214



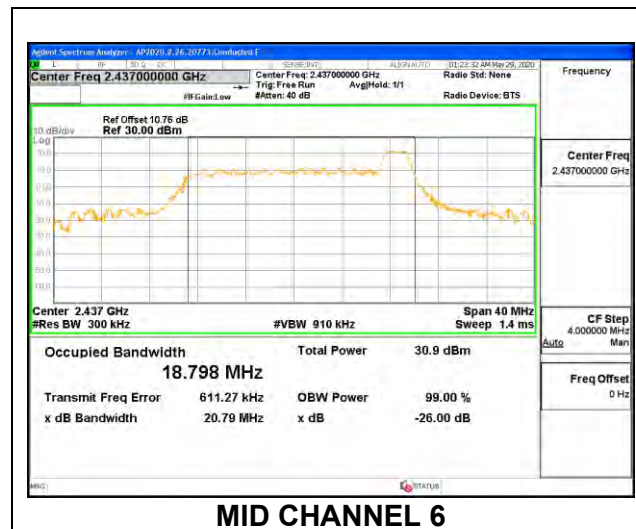
ANT 3: 26 -Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.016
Low 2	2417	17.106
Low 3	2422	17.274
Mid 6	2437	17.241
High 9	2452	17.010
High 10	2457	17.092
High 11	2462	17.077
High 12	2467	17.251
High 13	2472	17.138



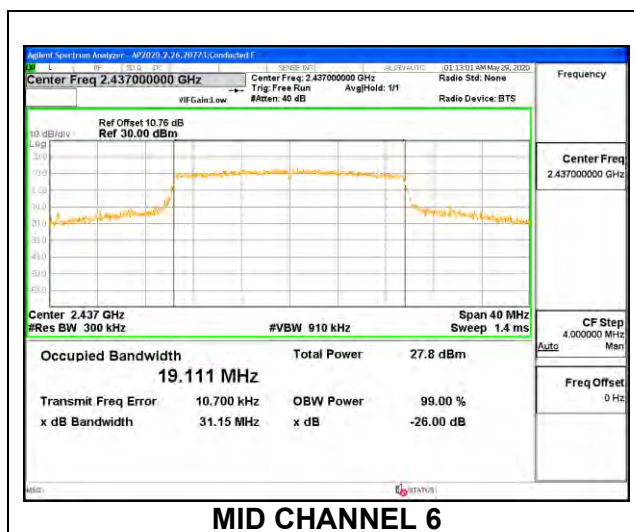
ANT 3: 26 -Tones, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.551
Low 2	2417	18.604
Low 3	2422	18.648
Mid 6	2437	18.798
High 9	2452	18.654
High 10	2457	18.548
High 11	2462	18.834
High 12	2467	19.020
High 13	2472	18.855



ANT 3: 242 -Tones, RU Index 61

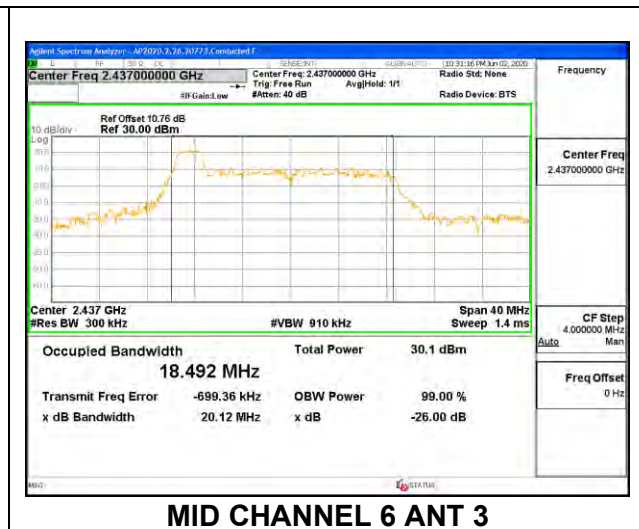
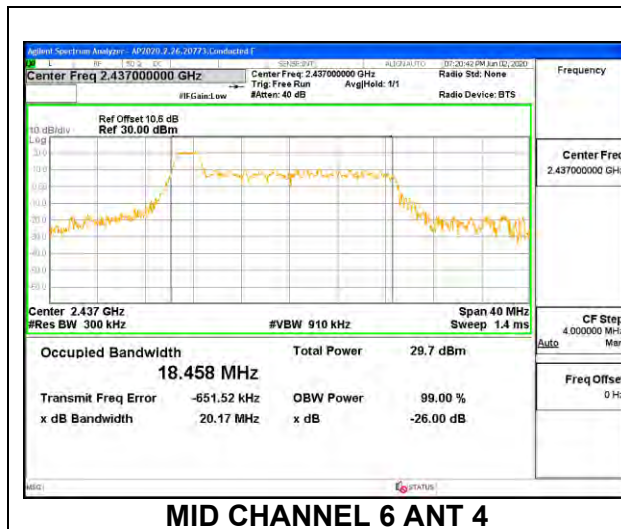
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.864
Low 2	2417	18.883
Low 3	2422	19.008
Mid 6	2437	19.111
High 9	2452	18.976
High 10	2457	18.917
High 11	2462	18.919
High 12	2467	18.921
High 13	2472	18.933



9.2.5. 802.11ax HE20 OFDMA MODE 2TX

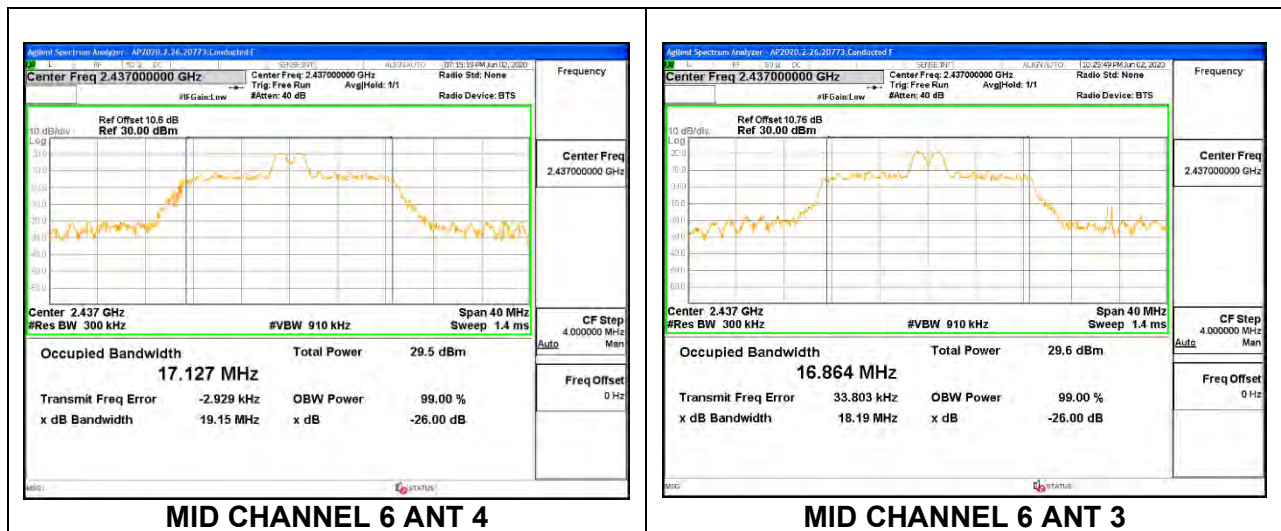
ANT 4 + ANT 3: 26-Tone, RU Index 0

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.451	18.346
Low 2	2417	18.429	18.340
Low 3	2422	18.448	18.289
Mid 6	2437	18.458	18.492
High 9	2452	18.444	18.389
High 10	2457	18.243	18.308
High 11	2462	18.012	18.151
High 12	2467	18.278	18.146
High 13	2472	18.149	18.205



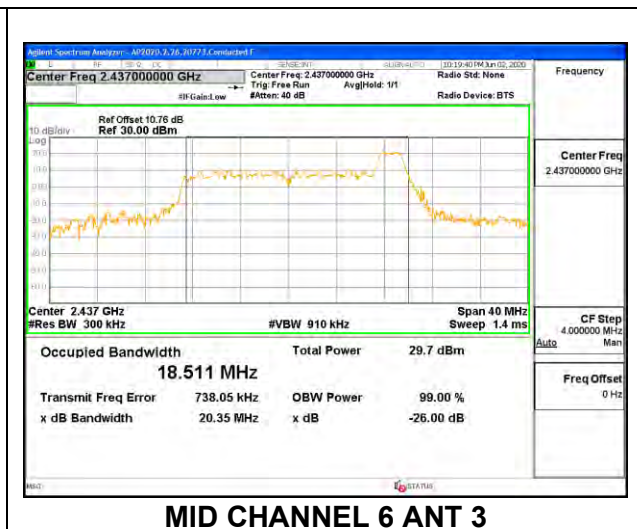
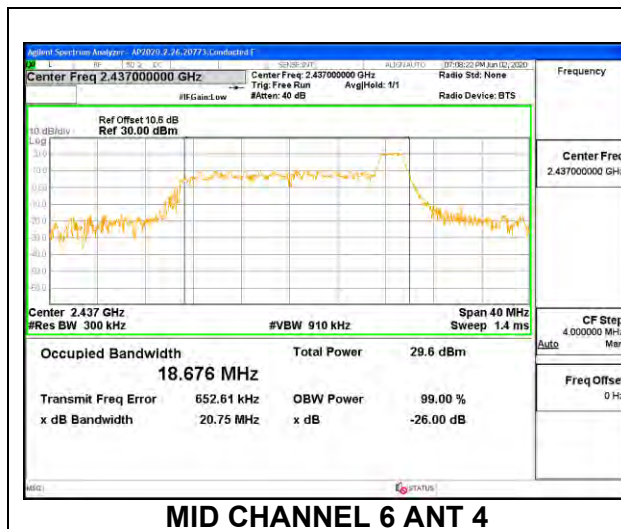
ANT 4 + ANT 3: 26-Tone, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	17.042	16.564
Low 2	2417	17.111	16.651
Low 3	2422	17.228	16.803
Mid 6	2437	17.127	16.864
High 9	2452	17.078	16.852
High 10	2457	17.040	16.669
High 11	2462	17.009	16.620
High 12	2467	17.143	16.645
High 13	2472	17.047	16.798



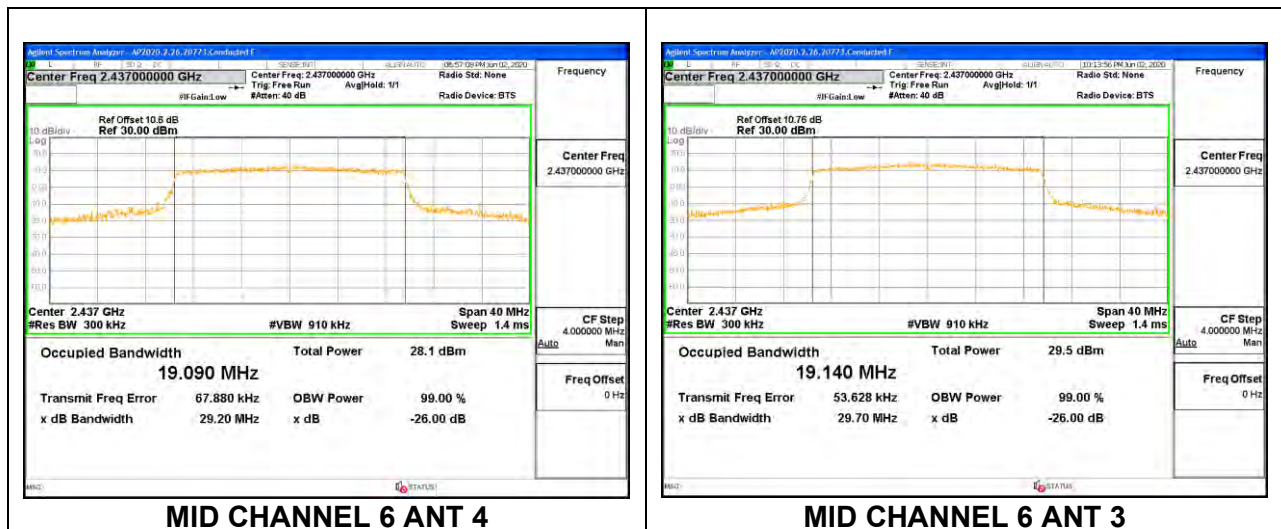
ANT 4 + ANT 3: 26-Tone, RU Index 8

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.593	18.303
Low 2	2417	18.744	18.385
Low 3	2422	18.694	18.521
Mid 6	2437	18.676	18.511
High 9	2452	18.647	18.397
High 10	2457	18.755	18.416
High 11	2462	18.767	18.445
High 12	2467	18.797	18.505
High 13	2472	18.766	18.533



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

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.888	18.860
Low 2	2417	18.950	18.903
Low 3	2422	18.956	18.957
Low 4	2427	19.090	19.052
Mid 6	2437	19.090	19.140
High 9	2452	18.941	18.985
High 10	2457	18.892	18.933
High 11	2462	18.924	18.915
High 12	2467	18.987	18.900
High 13	2472	18.869	18.913



9.3. 6dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

RESULTS

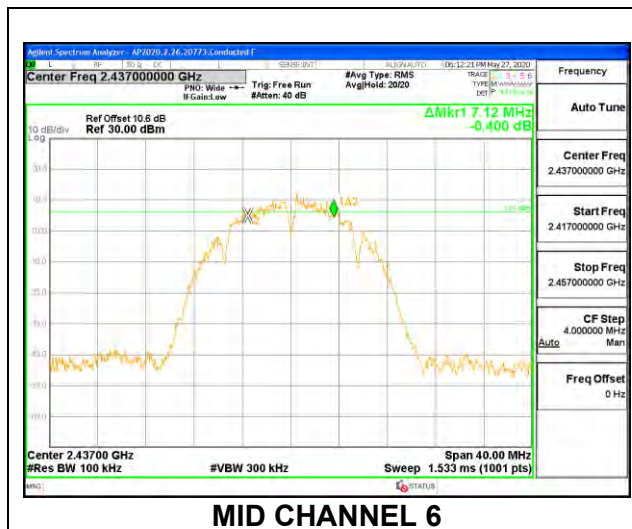
The 6dB bandwidth was measured for the narrowest bandwidth mode, b Mode and ax HE20 Mode 26-Tone as worst case to demonstrate compliance with the minimum required bandwidth of 500 kHz to cover all OFDMA modes.

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

9.3.1. 802.11b MODE 1TX

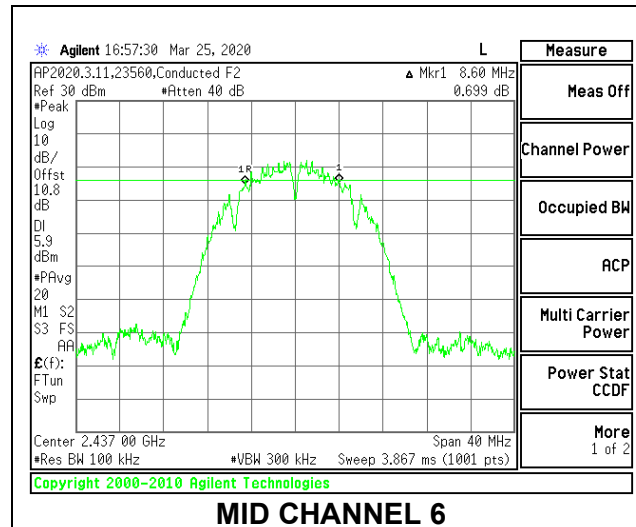
ANT 4

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	8.60	0.5
Mid 6	2437	7.12	0.5
High 11	2462	8.68	0.5
High 12	2467	8.56	0.5
High 13	2472	6.76	0.5



ANT 3

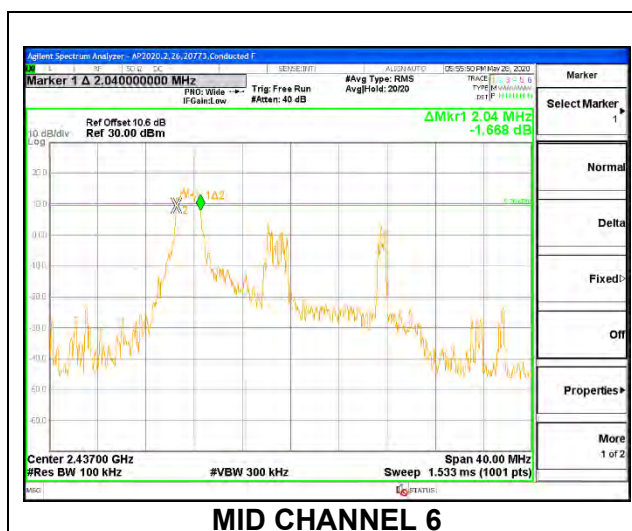
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	7.72	0.5
Mid 6	2437	8.60	0.5
High 11	2462	8.12	0.5
High 12	2467	7.72	0.5
High 13	2472	7.28	0.5



9.3.2. 802.11ax HE20 MODE 1TX

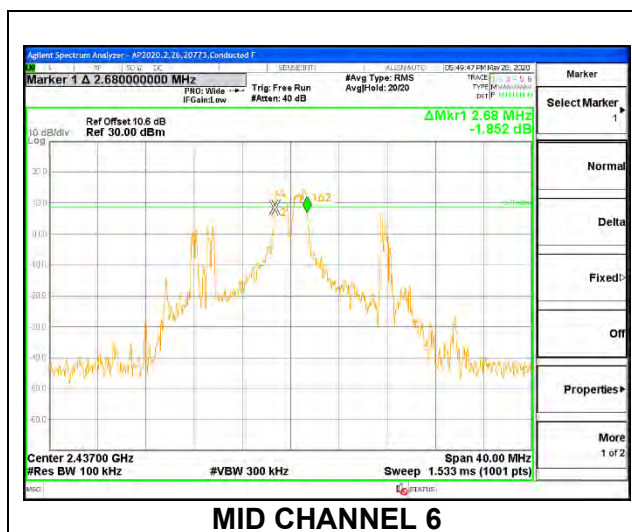
ANT 4: 26 -Tones, RU index 0

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



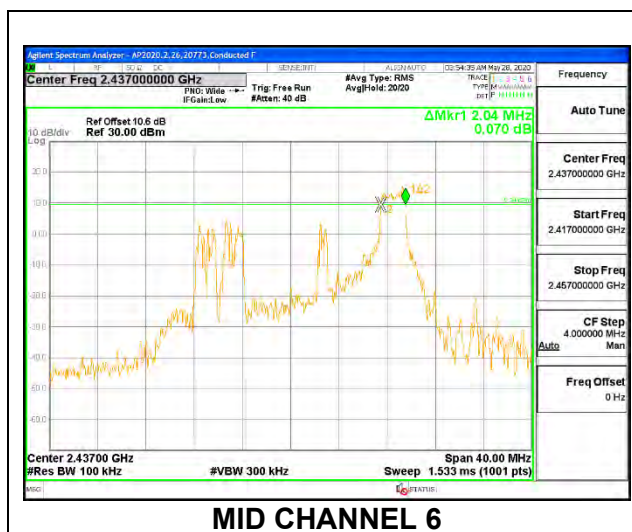
ANT 4: 26 -Tones, RU Index 4

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



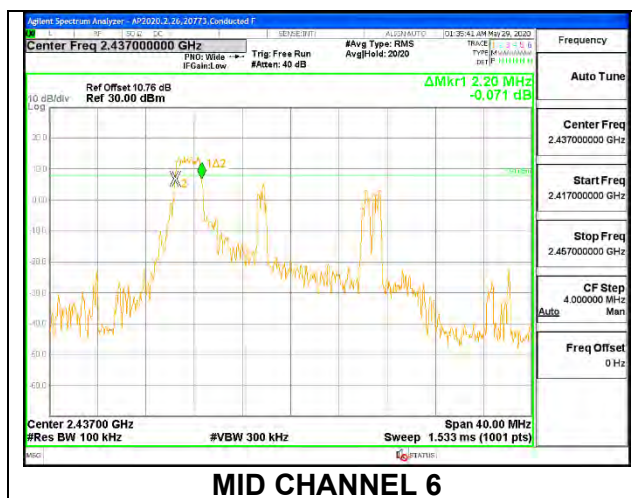
ANT 4: 26 -Tones, RU Index 8

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



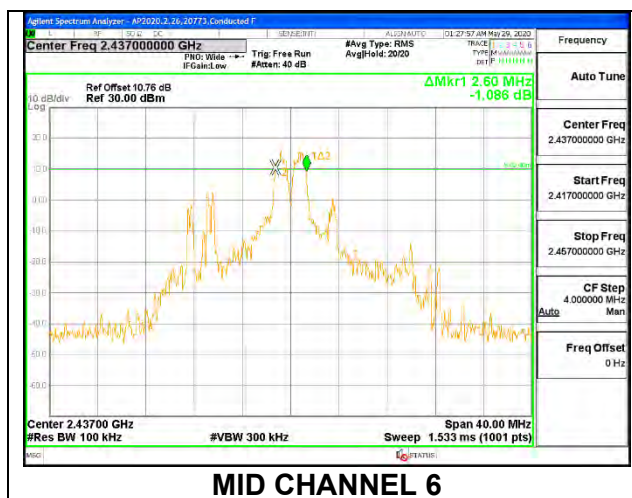
ANT 3: 26 -Tones, RU Index 0

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.04	0.5
Low 2	2417	2.16	0.5
Low 3	2422	2.12	0.5
Mid 6	2437	2.20	0.5
High 9	2452	2.12	0.5
High 10	2457	2.16	0.5
High 11	2462	2.08	0.5
High 12	2467	2.00	0.5
High 13	2472	1.96	0.5



ANT 3: 26 -Tones, RU Index 4

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



ANT 3: 26 -Tones, RU Index 8

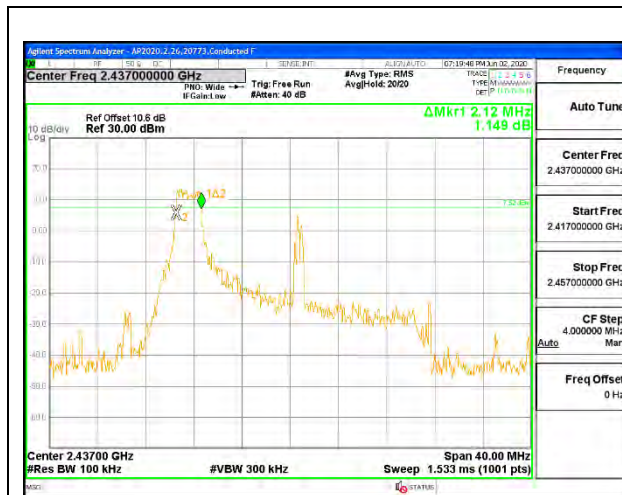
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.08	0.5
Low 2	2417	2.08	0.5
Low 3	2422	2.08	0.5
Mid 6	2437	2.16	0.5
High 9	2452	2.16	0.5
High 10	2457	2.16	0.5
High 11	2462	2.04	0.5
High 12	2467	2.08	0.5
High 13	2472	2.04	0.5



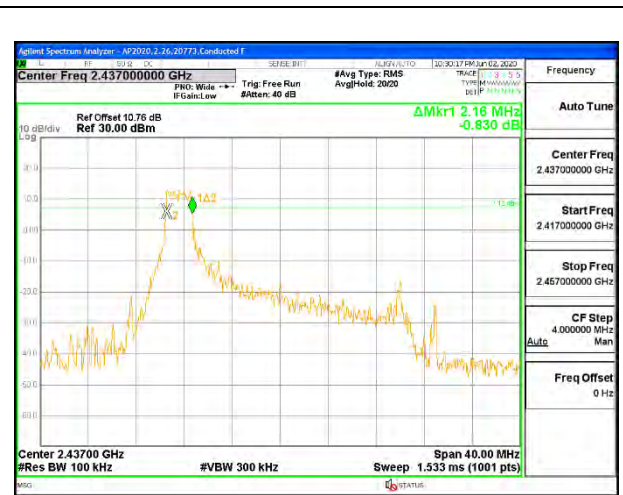
9.3.3. 802.11ax HE20 OFDMA MODE 2TX

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

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



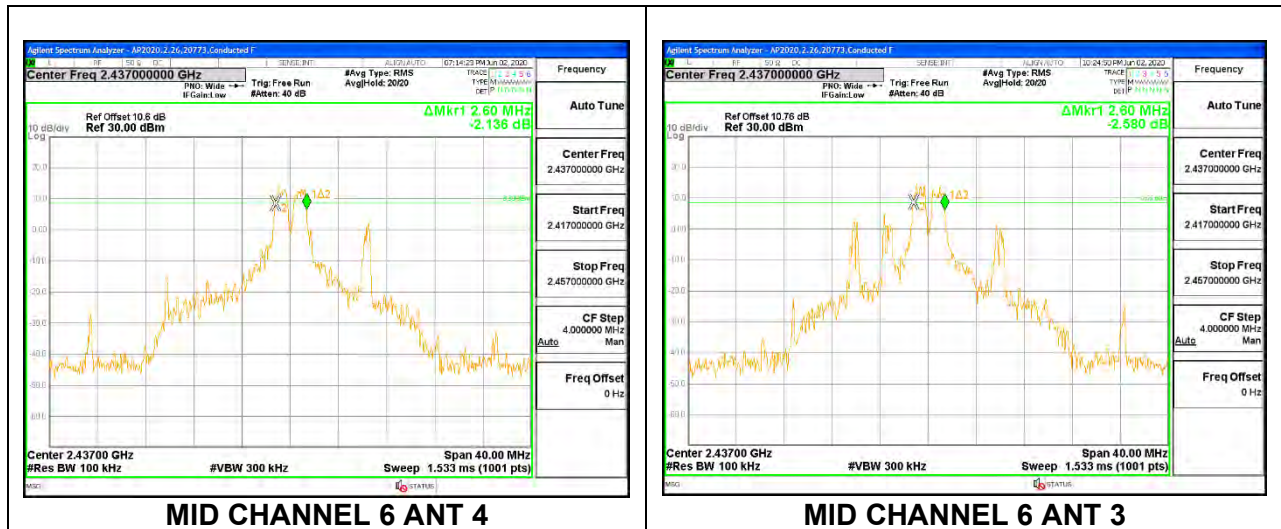
MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

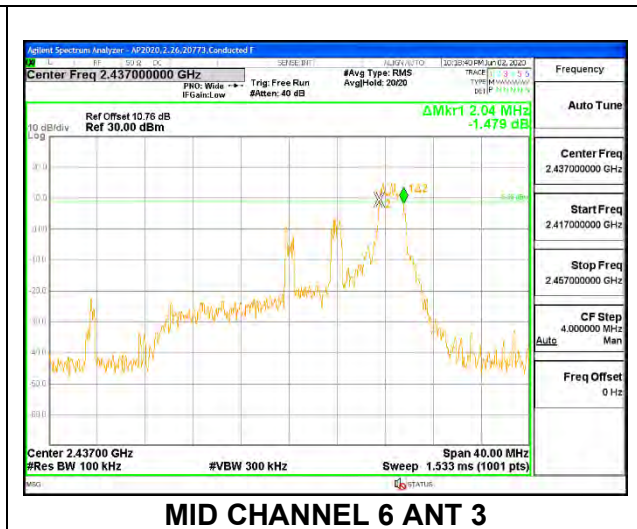
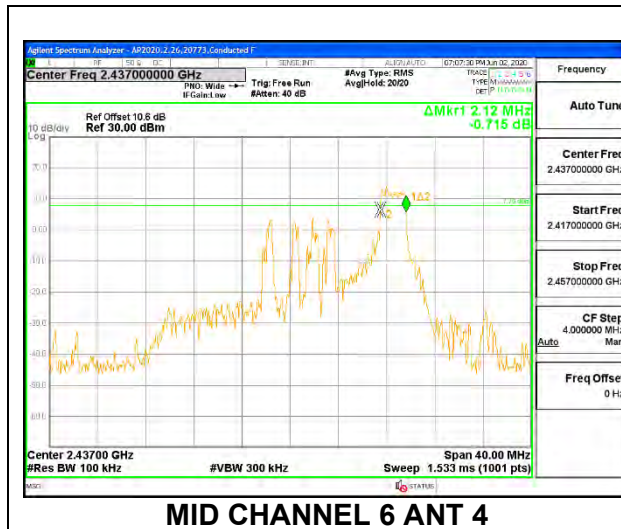
ANT 4 + ANT 3: 26-Tone, RU Index 4

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



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

Channel	Frequency (MHz)	6dB BW(MHz) ANT 4	6dB BW (MHz) ANT 3	Minimum Limit (MHz)
Low 1	2412	2.08	2.12	0.5
Low 2	2417	2.08	2.04	0.5
Low 3	2422	2.16	2.08	0.5
Mid 6	2437	2.12	2.04	0.5
High 9	2452	2.12	2.08	0.5
High 10	2457	2.00	2.08	0.5
High 11	2462	2.12	2.12	0.5
High 12	2467	2.08	2.08	0.5
High 13	2472	2.04	2.12	0.5



9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

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

TEST PROCEDURE

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

DIRECTIONAL ANTENNA GAIN

For 1 TX:

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

For 2 TX:

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

Band (GHz)	ANT 4 Antenna Gain (dBi)	ANT 3 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	0.30	-1.70	-0.59	2.37

RESULTS

9.4.1. 802.11b MODE 1TX

Test Engineer:	12981
Test Date:	8/27/2020

ANT 4

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.30	30.00	30	36	30.00
Mid 6	2437	0.30	30.00	30	36	30.00
High 11	2462	0.30	30.00	30	36	30.00
High 12	2467	0.30	30.00	30	36	30.00
High 13	2472	0.30	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	20.19	20.19	30.00	-9.81
Mid 6	2437	20.25	20.25	30.00	-9.75
High 11	2462	20.23	20.23	30.00	-9.77
High 12	2467	20.20	20.20	30.00	-9.80
High 13	2472	20.21	20.21	30.00	-9.79

NOTE: Ch 1/11/13 PSD tested at higher power

ANT 3

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	-1.70	30.00	30	36	30.00
Mid 6	2437	-1.70	30.00	30	36	30.00
High 11	2462	-1.70	30.00	30	36	30.00
High 12	2467	-1.70	30.00	30	36	30.00
High 13	2472	-1.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	21.14	21.14	30.00	-8.86
Mid 6	2437	21.24	21.24	30.00	-8.76
High 11	2462	21.17	21.17	30.00	-8.83
High 12	2467	21.21	21.21	30.00	-8.79
High 13	2472	21.23	21.23	30.00	-8.77

9.4.2. 802.11n HT20 MODE 1TX

Test Engineer:	12492
Test Date:	8/28/2020

ANT 4

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.30	30.00	30	36	30.00
Low 2	2417	0.30	30.00	30	36	30.00
Mid 6	2437	0.30	30.00	30	36	30.00
High 10	2457	0.30	30.00	30	36	30.00
High 11	2462	0.30	30.00	30	36	30.00
High 12	2467	0.30	30.00	30	36	30.00
High 13	2472	0.30	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.18	16.18	30.00	-13.82
Low 2	2417	19.23	19.23	30.00	-10.77
Mid 6	2437	20.17	20.17	30.00	-9.83
High 10	2457	19.20	19.20	30.00	-10.80
High 11	2462	17.18	17.18	30.00	-12.82
High 12	2467	15.21	15.21	30.00	-14.79
High 13	2472	14.67	14.67	30.00	-15.33

NOTE: Ch 1/6 PSD tested at higher power

ANT 3

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	-1.70	30.00	30	36	30.00
Low 2	2417	-1.70	30.00	30	36	30.00
Mid 6	2437	-1.70	30.00	30	36	30.00
High 10	2457	-1.70	30.00	30	36	30.00
High 11	2462	-1.70	30.00	30	36	30.00
High 12	2467	-1.70	30.00	30	36	30.00
High 13	2472	-1.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.17	16.17	30.00	-13.83
Low 2	2417	19.24	19.24	30.00	-10.76
Mid 6	2437	21.23	21.23	30.00	-8.77
High 10	2457	19.20	19.20	30.00	-10.80
High 11	2462	17.21	17.21	30.00	-12.79
High 12	2467	15.18	15.18	30.00	-14.82
High 13	2472	14.74	14.74	30.00	-15.26

9.4.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3

Test Engineer:	12492
Test Date:	8/28/2020

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.59	30.00	36	30.00
Low 2	2417	-0.59	30.00	36	30.00
Low 3	2422	-0.59	30.00	36	30.00
Mid 6	2437	-0.59	30.00	36	30.00
High 9	2452	-0.59	30.00	36	30.00
High 10	2457	-0.59	30.00	36	30.00
High 11	2462	-0.59	30.00	36	30.00
High 12	2467	-0.59	30.00	36	30.00
High 13	2472	-0.59	30.00	36	30.00

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

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	15.74	15.73	18.75	30.00	-11.25
Low 2	2417	18.23	18.22	21.24	30.00	-8.76
Low 3	2422	19.74	19.70	22.73	30.00	-7.27
Mid 6	2437	20.20	21.23	23.76	30.00	-6.24
High 9	2452	19.18	19.24	22.22	30.00	-7.78
High 10	2457	18.19	18.21	21.21	30.00	-8.79
High 11	2462	16.21	16.20	19.22	30.00	-10.78
High 12	2467	13.70	13.69	16.71	30.00	-13.29
High 13	2472	14.23	14.20	17.23	30.00	-12.77

NOTE: ANT 4 Ch 1/6 PSD and ANT 3 Ch1 tested at higher power

9.4.4. 802.11ax HE20 MODE 1TX

Test Engineer:	12492
Test Date:	8/28/2020

ANT 4: 26-Tone, RU Index 0

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.30	30.00	30	36	30.00
Low 2	2417	0.30	30.00	30	36	30.00
Low 3	2422	0.30	30.00	30	36	30.00
Mid 6	2437	0.30	30.00	30	36	30.00
High 9	2452	0.30	30.00	30	36	30.00
High 10	2457	0.30	30.00	30	36	30.00
High 11	2462	0.30	30.00	30	36	30.00
High 12	2467	0.30	30.00	30	36	30.00
High 13	2472	0.30	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.72	15.72	30.00	-14.28
Low 2	2417	17.75	17.75	30.00	-12.25
Low 3	2422	19.68	19.68	30.00	-10.32
Mid 6	2437	20.19	20.19	30.00	-9.81
High 9	2452	19.70	19.70	30.00	-10.30
High 10	2457	17.73	17.73	30.00	-12.27
High 11	2462	15.72	15.72	30.00	-14.28
High 12	2467	13.65	13.65	30.00	-16.35
High 13	2472	0.74	0.74	30.00	-29.26

NOTE: Ch 6/13 PSD tested at higher power

ANT 4: 26-Tone, RU Index 4

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.30	30.00	30	36	30.00
Low 2	2417	0.30	30.00	30	36	30.00
Low 3	2422	0.30	30.00	30	36	30.00
Mid 6	2437	0.30	30.00	30	36	30.00
High 9	2452	0.30	30.00	30	36	30.00
High 10	2457	0.30	30.00	30	36	30.00
High 11	2462	0.30	30.00	30	36	30.00
High 12	2467	0.30	30.00	30	36	30.00
High 13	2472	0.30	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.74	15.74	30.00	-14.26
Low 2	2417	17.74	17.74	30.00	-12.26
Low 3	2422	19.69	19.69	30.00	-10.31
Mid 6	2437	20.22	20.22	30.00	-9.78
High 9	2452	19.72	19.72	30.00	-10.28
High 10	2457	17.70	17.70	30.00	-12.30
High 11	2462	15.73	15.73	30.00	-14.27
High 12	2467	13.70	13.70	30.00	-16.30
High 13	2472	0.75	0.75	30.00	-29.25

NOTE: Ch 6/13 PSD tested at higher power

ANT 4: 26-Tone, RU Index 8

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.30	30.00	30	36	30.00
Low 2	2417	0.30	30.00	30	36	30.00
Low 3	2422	0.30	30.00	30	36	30.00
Mid 6	2437	0.30	30.00	30	36	30.00
High 9	2452	0.30	30.00	30	36	30.00
High 10	2457	0.30	30.00	30	36	30.00
High 11	2462	0.30	30.00	30	36	30.00
High 12	2467	0.30	30.00	30	36	30.00
High 13	2472	0.30	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.69	15.69	30.00	-14.31
Low 2	2417	17.68	17.68	30.00	-12.32
Low 3	2422	19.71	19.71	30.00	-10.29
Mid 6	2437	20.25	20.25	30.00	-9.75
High 9	2452	19.70	19.70	30.00	-10.30
High 10	2457	17.73	17.73	30.00	-12.27
High 11	2462	15.68	15.68	30.00	-14.32
High 12	2467	13.74	13.74	30.00	-16.26
High 13	2472	0.72	0.72	30.00	-29.28

NOTE: Ch 6/13 PSD tested at higher power

ANT 4: 242-Tone, RU Index 61

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.30	30.00	30	36	30.00
Low 2	2417	0.30	30.00	30	36	30.00
Low 3	2422	0.30	30.00	30	36	30.00
Mid 6	2437	0.30	30.00	30	36	30.00
High 9	2452	0.30	30.00	30	36	30.00
High 10	2457	0.30	30.00	30	36	30.00
High 11	2462	0.30	30.00	30	36	30.00
High 12	2467	0.30	30.00	30	36	30.00
High 13	2472	0.30	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.72	15.72	30.00	-14.28
Low 2	2417	17.74	17.74	30.00	-12.26
Low 3	2422	19.70	19.70	30.00	-10.30
Mid 6	2437	20.23	20.23	30.00	-9.77
High 9	2452	19.68	19.68	30.00	-10.32
High 10	2457	17.66	17.66	30.00	-12.34
High 11	2462	15.74	15.74	30.00	-14.26
High 12	2467	13.68	13.68	30.00	-16.32
High 13	2472	9.70	9.70	30.00	-20.30

NOTE: Ch 6 PSD tested at higher power

ANT 3: 26-Tone, RU Index 0

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.70	30.00	30	36	30.00
Low 2	2417	-1.70	30.00	30	36	30.00
Low 3	2422	-1.70	30.00	30	36	30.00
Mid 6	2437	-1.70	30.00	30	36	30.00
High 9	2452	-1.70	30.00	30	36	30.00
High 10	2457	-1.70	30.00	30	36	30.00
High 11	2462	-1.70	30.00	30	36	30.00
High 12	2467	-1.70	30.00	30	36	30.00
High 13	2472	-1.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.75	15.75	30.00	-14.25
Low 2	2417	17.70	17.70	30.00	-12.30
Low 3	2422	19.72	19.72	30.00	-10.28
Mid 6	2437	21.23	21.23	30.00	-8.77
High 9	2452	19.75	19.75	30.00	-10.25
High 10	2457	17.69	17.69	30.00	-12.31
High 11	2462	15.73	15.73	30.00	-14.27
High 12	2467	13.68	13.68	30.00	-16.32
High 13	2472	0.71	0.71	30.00	-29.29

NOTE: Ch 13 PSD tested at higher power

ANT 3: 26-Tone, RU Index 4

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.70	30.00	30	36	30.00
Low 2	2417	-1.70	30.00	30	36	30.00
Low 3	2422	-1.70	30.00	30	36	30.00
Mid 6	2437	-1.70	30.00	30	36	30.00
High 9	2452	-1.70	30.00	30	36	30.00
High 10	2457	-1.70	30.00	30	36	30.00
High 11	2462	-1.70	30.00	30	36	30.00
High 12	2467	-1.70	30.00	30	36	30.00
High 13	2472	-1.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.70	15.70	30.00	-14.30
Low 2	2417	17.69	17.69	30.00	-12.31
Low 3	2422	19.73	19.73	30.00	-10.27
Mid 6	2437	21.24	21.24	30.00	-8.76
High 9	2452	19.71	19.71	30.00	-10.29
High 10	2457	17.73	17.73	30.00	-12.27
High 11	2462	15.69	15.69	30.00	-14.31
High 12	2467	13.71	13.71	30.00	-16.29
High 13	2472	0.69	0.69	30.00	-29.31

NOTE: Ch 13 PSD tested at higher power

ANT 3: 26-Tone, RU Index 8

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.70	30.00	30	36	30.00
Low 2	2417	-1.70	30.00	30	36	30.00
Low 3	2422	-1.70	30.00	30	36	30.00
Mid 6	2437	-1.70	30.00	30	36	30.00
High 9	2452	-1.70	30.00	30	36	30.00
High 10	2457	-1.70	30.00	30	36	30.00
High 11	2462	-1.70	30.00	30	36	30.00
High 12	2467	-1.70	30.00	30	36	30.00
High 13	2472	-1.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.75	15.75	30.00	-14.25
Low 2	2417	17.69	17.69	30.00	-12.31
Low 3	2422	19.70	19.70	30.00	-10.30
Mid 6	2437	21.20	21.20	30.00	-8.80
High 9	2452	19.70	19.70	30.00	-10.30
High 10	2457	17.66	17.66	30.00	-12.34
High 11	2462	15.67	15.67	30.00	-14.33
High 12	2467	13.70	13.70	30.00	-16.30
High 13	2472	0.71	0.71	30.00	-29.29

NOTE: Ch 13 PSD tested at higher power

ANT 3: 242-Tone, RU Index 61

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.70	30.00	30	36	30.00
Low 2	2417	-1.70	30.00	30	36	30.00
Low 3	2422	-1.70	30.00	30	36	30.00
Mid 6	2437	-1.70	30.00	30	36	30.00
High 9	2452	-1.70	30.00	30	36	30.00
High 10	2457	-1.70	30.00	30	36	30.00
High 11	2462	-1.70	30.00	30	36	30.00
High 12	2467	-1.70	30.00	30	36	30.00
High 13	2472	-1.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.71	15.71	30.00	-14.29
Low 2	2417	17.73	17.73	30.00	-12.27
Low 3	2422	19.69	19.69	30.00	-10.31
Mid 6	2437	21.19	21.19	30.00	-8.81
High 9	2452	19.70	19.70	30.00	-10.30
High 10	2457	17.68	17.68	30.00	-12.32
High 11	2462	15.73	15.73	30.00	-14.27
High 12	2467	13.69	13.69	30.00	-16.31
High 13	2472	9.71	9.71	30.00	-20.29

9.4.5. 802.11ax HE20 OFDMA MODE 2TX

Test Engineer:	12492
Test Date:	8/29/2020

ANT 4 + ANT 3: 26-Tone, 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	-0.59	30.00	36	30.00
Low 2	2417	-0.59	30.00	36	30.00
Low 3	2422	-0.59	30.00	36	30.00
Mid 6	2437	-0.59	30.00	36	30.00
High 9	2452	-0.59	30.00	36	30.00
High 10	2457	-0.59	30.00	36	30.00
High 11	2462	-0.59	30.00	36	30.00
High 12	2467	-0.59	30.00	36	30.00
High 13	2472	-0.59	30.00	36	30.00

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

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	14.74	14.66	17.71	30.00	-12.29
Low 2	2417	16.75	16.69	19.73	30.00	-10.27
Low 3	2422	18.74	18.72	21.74	30.00	-8.26
Mid 6	2437	19.71	19.66	22.70	30.00	-7.30
High 9	2452	18.23	18.25	21.25	30.00	-8.75
High 10	2457	16.73	16.70	19.73	30.00	-10.27
High 11	2462	14.72	14.67	17.71	30.00	-12.29
High 12	2467	12.23	12.20	15.23	30.00	-14.77
High 13	2472	-0.24	-0.26	2.76	30.00	-27.24

NOTE: ANT 4 Ch 4/6/12 and ANT 3 Ch 12 PSD tested at higher power

ANT 4 + ANT 3: 26-Tone, 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	-0.59	30.00	36	30.00
Low 2	2417	-0.59	30.00	36	30.00
Low 3	2422	-0.59	30.00	36	30.00
Mid 6	2437	-0.59	30.00	36	30.00
High 9	2452	-0.59	30.00	36	30.00
High 10	2457	-0.59	30.00	36	30.00
High 11	2462	-0.59	30.00	36	30.00
High 12	2467	-0.59	30.00	36	30.00
High 13	2472	-0.59	30.00	36	30.00

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

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	14.71	14.67	17.70	30.00	-12.30
Low 2	2417	16.72	16.70	19.72	30.00	-10.28
Low 3	2422	18.74	18.73	21.75	30.00	-8.25
Mid 6	2437	19.71	19.69	22.71	30.00	-7.29
High 9	2452	18.20	18.16	21.19	30.00	-8.81
High 10	2457	16.69	16.71	19.71	30.00	-10.29
High 11	2462	14.68	14.70	17.70	30.00	-12.30
High 12	2467	12.21	12.17	15.20	30.00	-14.80
High 13	2472	-0.27	-0.29	2.73	30.00	-27.27

NOTE: ANT 4 Ch 4/6/12 and ANT 3 Ch 12 PSD tested at higher power

ANT 4 + ANT 3: 26-Tone, 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	-0.59	30.00	36	30.00
Low 2	2417	-0.59	30.00	36	30.00
Low 3	2422	-0.59	30.00	36	30.00
Mid 6	2437	-0.59	30.00	36	30.00
High 9	2452	-0.59	30.00	36	30.00
High 10	2457	-0.59	30.00	36	30.00
High 11	2462	-0.59	30.00	36	30.00
High 12	2467	-0.59	30.00	36	30.00
High 13	2472	-0.59	30.00	36	30.00

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

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	14.71	14.68	17.71	30.00	-12.29
Low 2	2417	16.72	16.71	19.73	30.00	-10.27
Low 3	2422	18.64	18.74	21.70	30.00	-8.30
Mid 6	2437	19.70	19.67	22.70	30.00	-7.30
High 9	2452	18.22	18.17	21.21	30.00	-8.79
High 10	2457	16.70	16.72	19.72	30.00	-10.28
High 11	2462	14.69	14.70	17.71	30.00	-12.29
High 12	2467	12.23	12.21	15.23	30.00	-14.77
High 13	2472	-0.28	-0.30	2.72	30.00	-27.28

NOTE: ANT 4 Ch 4/6/12 and ANT 3 Ch 12 PSD tested at higher power

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

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.59	30.00	36	30.00
Low 2	2417	-0.59	30.00	36	30.00
Low 3	2422	-0.59	30.00	36	30.00
Low 4	2427	-0.59	30.00	36	30.00
Mid 6	2437	-0.59	30.00	36	30.00
High 9	2452	-0.59	30.00	36	30.00
High 10	2457	-0.59	30.00	36	30.00
High 11	2462	-0.59	30.00	36	30.00
High 12	2467	-0.59	30.00	36	30.00
High 13	2472	-0.59	30.00	36	30.00

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

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	14.66	14.65	17.67	30.00	-12.33
Low 2	2417	16.75	16.68	19.73	30.00	-10.27
Low 3	2422	18.74	18.72	21.74	30.00	-8.26
Low 4	2427	20.18	21.23	23.75	30.00	-6.25
Mid 6	2437	20.22	21.17	23.73	30.00	-6.27
High 9	2452	18.25	18.22	21.25	30.00	-8.75
High 10	2457	16.74	16.70	19.73	30.00	-10.27
High 11	2462	14.71	14.69	17.71	30.00	-12.29
High 12	2467	12.21	12.23	15.23	30.00	-14.77
High 13	2472	8.70	8.66	11.69	30.00	-18.31

NOTE: ANT 4 Ch 1/6 and ANT 3 Ch 1 PSD tested at higher power

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.

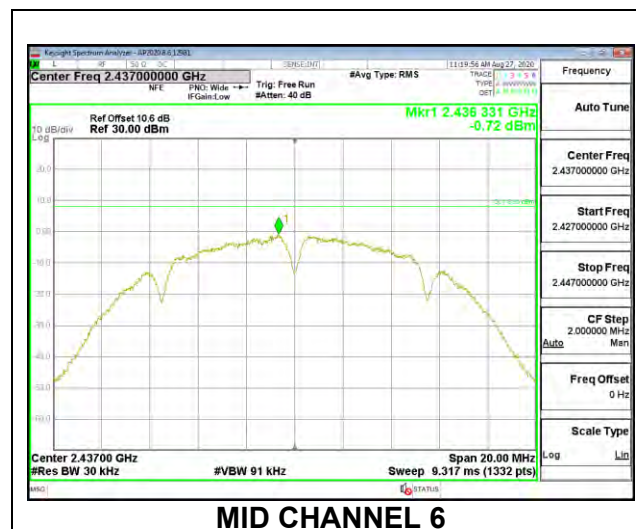
RESULTS

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

9.5.1. 802.11b MODE 1TX

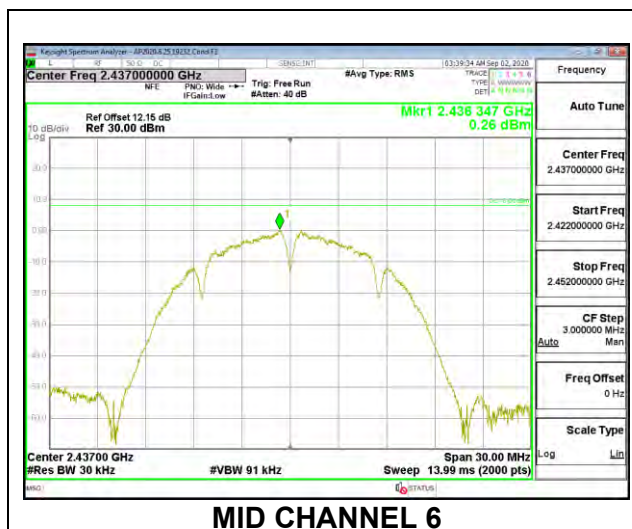
ANT 4

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.25	-1.25	8.0	-9.3
Mid 6	2437	-0.72	-0.72	8.0	-8.7
High 11	2462	-0.76	-0.76	8.0	-8.8
High 12	2467	-1.22	-1.22	8.0	-9.2
High 13	2472	-0.75	-0.75	8.0	-8.8



ANT 3

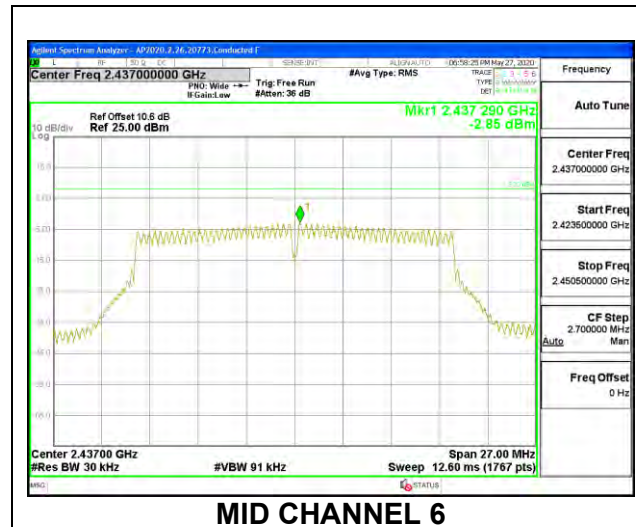
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	0.10	0.10	8.0	-7.9
Mid 6	2437	0.26	0.26	8.0	-7.7
High 11	2462	-0.28	-0.28	8.0	-8.3
High 12	2467	0.03	0.03	8.0	-8.0
High 13	2472	0.27	0.27	8.0	-7.7



9.5.2. 802.11n HT20 MODE 1TX

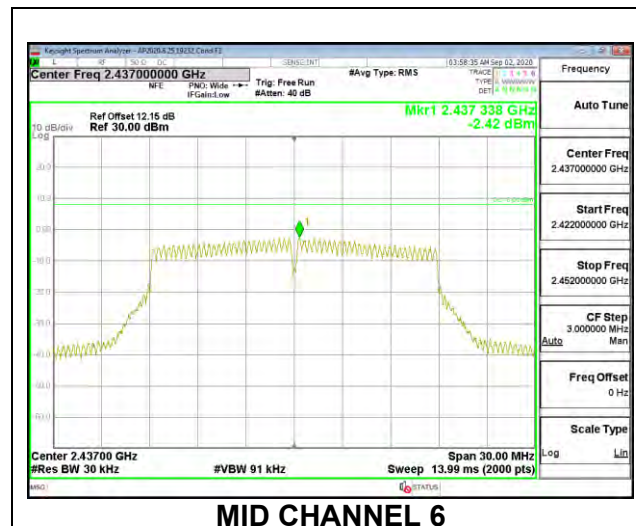
ANT 4

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.20	-6.20	8.0	-14.2
Low 2	2417	-4.18	-4.18	8.0	-12.2
Mid 6	2437	-2.85	-2.85	8.0	-10.9
High 10	2457	-4.21	-4.21	8.0	-12.2
High 11	2462	-6.26	-6.26	8.0	-14.3
High 12	2467	-8.87	-8.87	8.0	-16.9
High 13	2472	-9.08	-9.08	8.0	-17.1



ANT 3

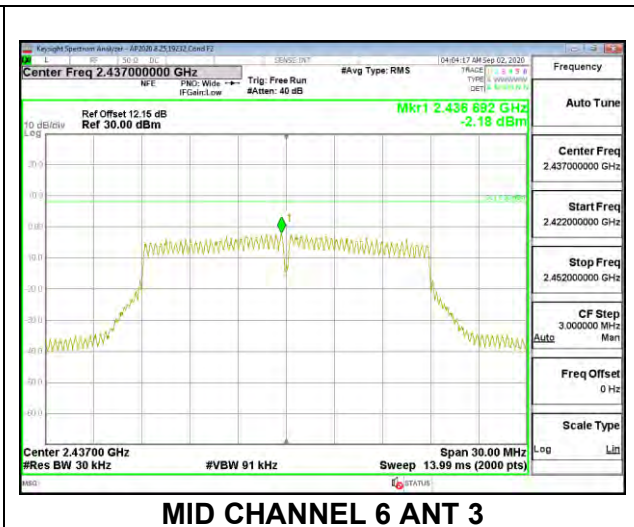
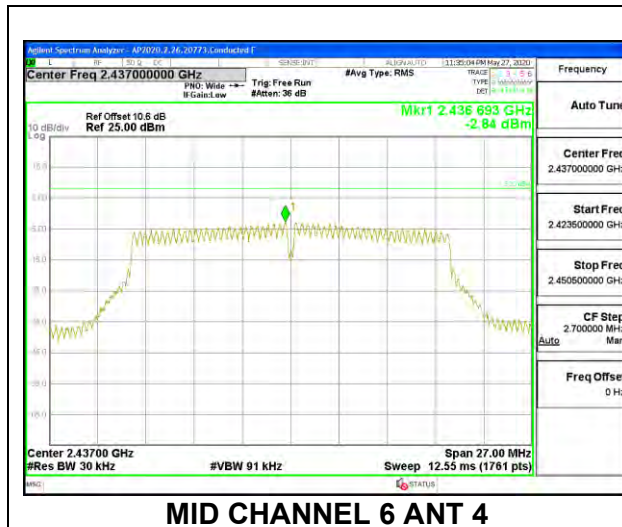
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.39	-6.39	8.0	-14.4
Low 2	2417	-4.22	-4.22	8.0	-12.2
Low 3	2422	-3.11	-3.11	8.0	-11.1
Mid 6	2437	-2.42	-2.42	8.0	-10.4
High 9	2452	-2.91	-2.91	8.0	-10.9
High 10	2457	-4.31	-4.31	8.0	-12.3
High 11	2462	-6.19	-6.19	8.0	-14.2
High 12	2467	-8.20	-8.20	8.0	-16.2
High 13	2472	-8.88	-8.88	8.0	-16.9



9.5.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3

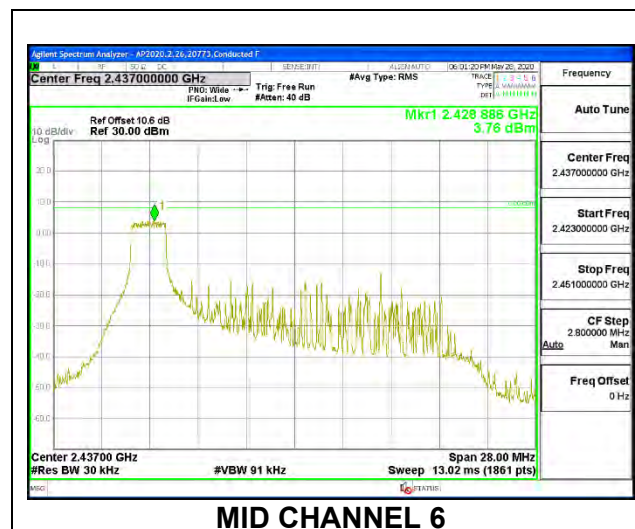
Duty Cycle CF (dB)		0.09	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-7.70	-7.57	-4.53	8.0	-12.5
Low 2	2417	-5.29	-5.32	-2.20	8.0	-10.2
Low 3	2422	-3.95	-3.97	-0.86	8.0	-8.9
Mid 6	2437	-2.84	-2.18	0.60	8.0	-7.4
High 9	2452	-4.13	-4.34	-1.13	8.0	-9.1
High 10	2457	-5.28	-5.12	-2.10	8.0	-10.1
High 11	2462	-7.56	-7.47	-4.41	8.0	-12.4
High 12	2467	-10.11	-9.92	-6.91	8.0	-14.9
High 13	2472	-8.83	-9.85	-6.21	8.0	-14.2



9.5.4. 802.11ax HE20 MODE 1TX

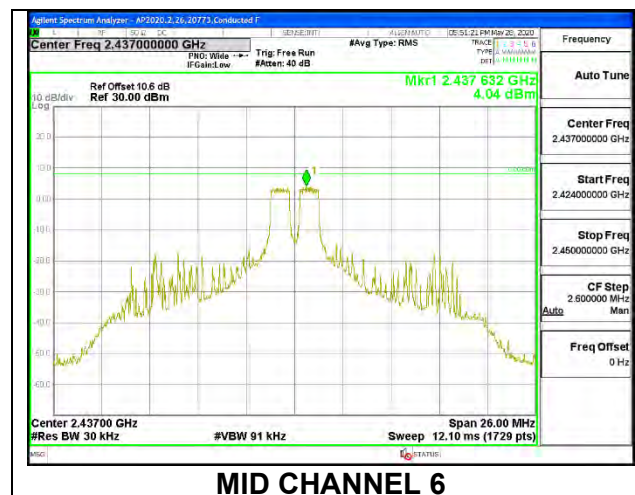
ANT 4: 26-Tone RU, Index 0

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.09	-1.09	8.0	-9.1
Low 2	2417	0.91	0.91	8.0	-7.1
Low 3	2422	3.61	3.61	8.0	-4.4
Mid 6	2437	3.76	3.76	8.0	-4.2
High 9	2452	3.95	3.95	8.0	-4.1
High 10	2457	0.94	0.94	8.0	-7.1
High 11	2462	-0.77	-0.77	8.0	-8.8
High 12	2467	-3.09	-3.09	8.0	-11.1
High 13	2472	-9.51	-9.51	8.0	-17.5



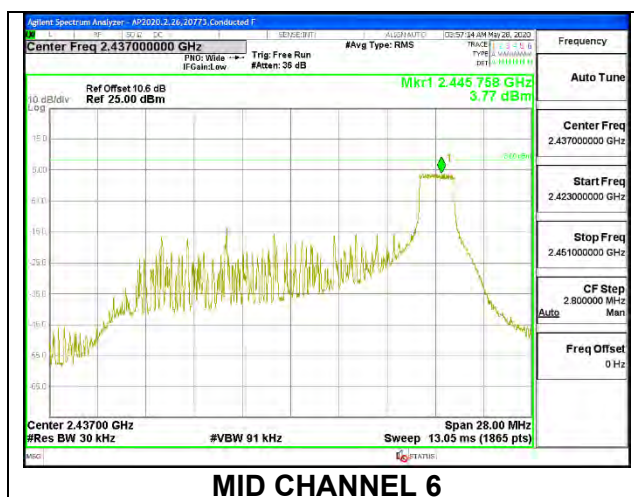
ANT 4: 26-Tone RU Index 4

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-0.97	-0.97	8.0	-9.0
Low 2	2417	0.67	0.67	8.0	-7.3
Low 3	2422	3.70	3.70	8.0	-4.3
Mid 6	2437	4.04	4.04	8.0	-4.0
High 9	2452	3.72	3.72	8.0	-4.3
High 10	2457	0.97	0.97	8.0	-7.0
High 11	2462	-1.38	-1.38	8.0	-9.4
High 12	2467	-3.15	-3.15	8.0	-11.2
High 13	2472	-9.74	-9.74	8.0	-17.7



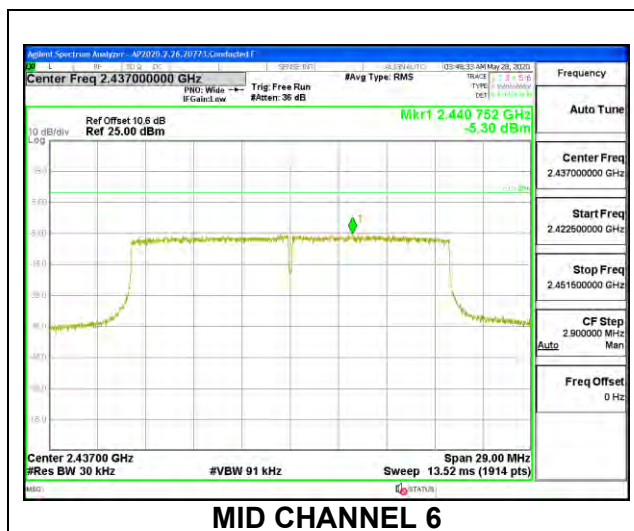
ANT 4: 26-Tone RU Index 8

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.01	-1.01	8.0	-9.0
Low 2	2417	1.19	1.19	8.0	-6.8
Low 3	2422	4.04	4.04	8.0	-4.0
Mid 6	2437	3.77	3.77	8.0	-4.2
High 9	2452	4.18	4.18	8.0	-3.8
High 10	2457	1.08	1.08	8.0	-6.9
High 11	2462	-1.00	-1.00	8.0	-9.0
High 12	2467	-3.06	-3.06	8.0	-11.1
High 13	2472	-6.51	-6.51	8.0	-14.5



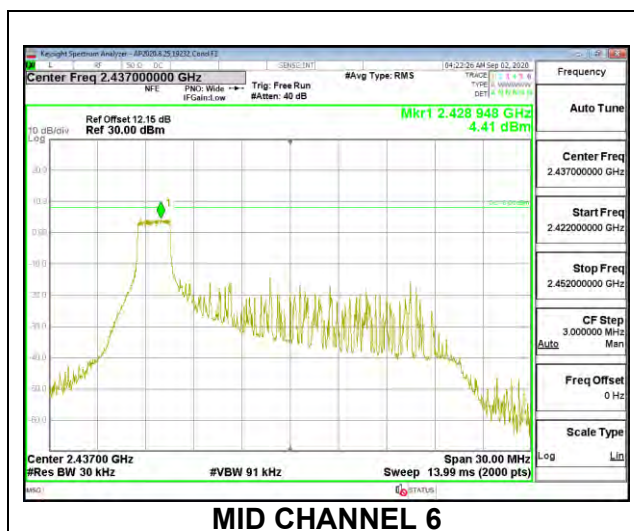
ANT 4: 242-Tone RU Index 61

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-9.05	-9.05	8.0	-17.1
Low 2	2417	-7.79	-7.79	8.0	-15.8
Low 3	2422	-5.86	-5.86	8.0	-13.9
Mid 6	2437	-5.30	-5.30	8.0	-13.3
High 9	2452	-4.82	-4.82	8.0	-12.8
High 10	2457	-7.92	-7.92	8.0	-15.9
High 11	2462	-9.58	-9.58	8.0	-17.6
High 12	2467	-11.49	-11.49	8.0	-19.5
High 13	2472	-15.03	-15.03	8.0	-23.0



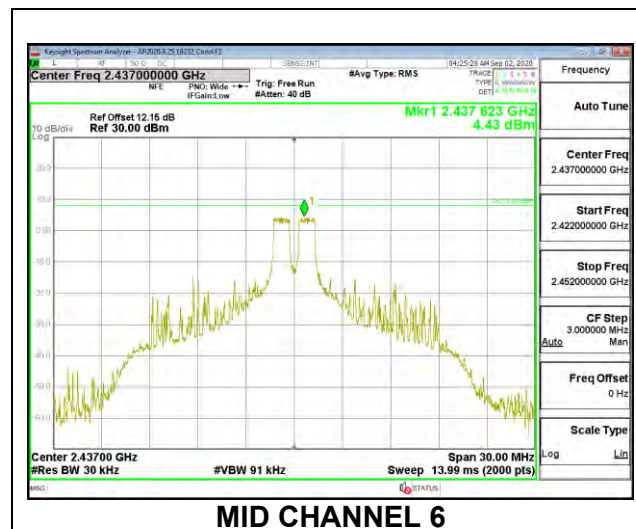
ANT 3: 26-Tone RU, Index 0

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.14	-1.14	8.0	-9.1
Low 2	2417	0.95	0.95	8.0	-7.1
Low 3	2422	3.28	3.28	8.0	-4.7
Mid 6	2437	4.41	4.41	8.0	-3.6
High 9	2452	4.54	4.54	8.0	-3.5
High 10	2457	1.15	1.15	8.0	-6.9
High 11	2462	-1.12	-1.12	8.0	-9.1
High 12	2467	-3.14	-3.14	8.0	-11.1
High 13	2472	-9.67	-9.67	8.0	-17.7



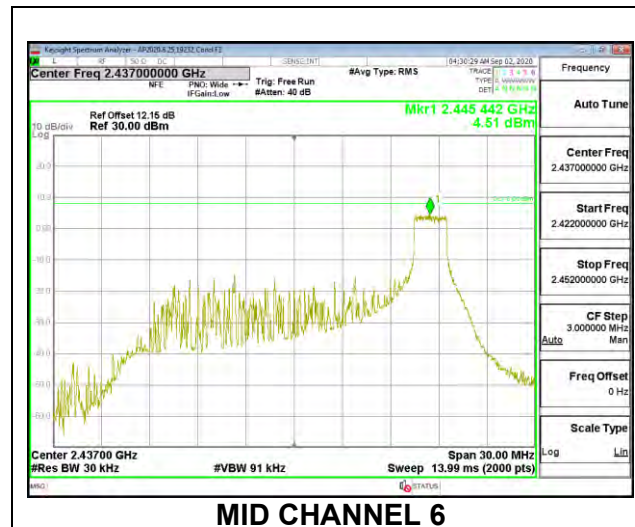
ANT 3: 26-Tone RU Index 4

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.06	-1.06	8.0	-9.1
Low 2	2417	0.86	0.86	8.0	-7.1
Low 3	2422	2.67	2.67	8.0	-5.3
Mid 6	2437	4.43	4.43	8.0	-3.6
High 9	2452	2.88	2.88	8.0	-5.1
High 10	2457	1.02	1.02	8.0	-7.0
High 11	2462	-1.45	-1.45	8.0	-9.5
High 12	2467	-3.10	-3.10	8.0	-11.1
High 13	2472	-9.60	-9.60	8.0	-17.6



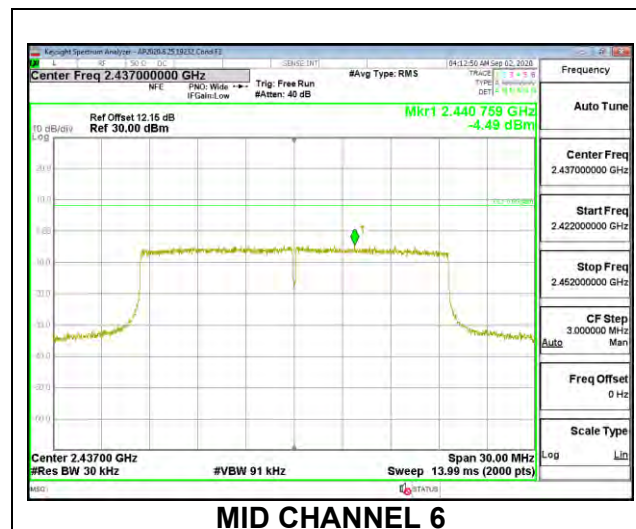
ANT 3: 26-Tone RU Index 8

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.11	-1.11	8.0	-9.1
Low 2	2417	0.87	0.87	8.0	-7.1
Low 3	2422	2.81	2.81	8.0	-5.2
Mid 6	2437	4.51	4.51	8.0	-3.5
High 9	2452	2.92	2.92	8.0	-5.1
High 10	2457	1.05	1.05	8.0	-7.0
High 11	2462	-1.15	-1.15	8.0	-9.2
High 12	2467	-2.97	-2.97	8.0	-11.0
High 13	2472	-9.24	-9.24	8.0	-17.2



ANT 3: 242-Tone RU Index 61

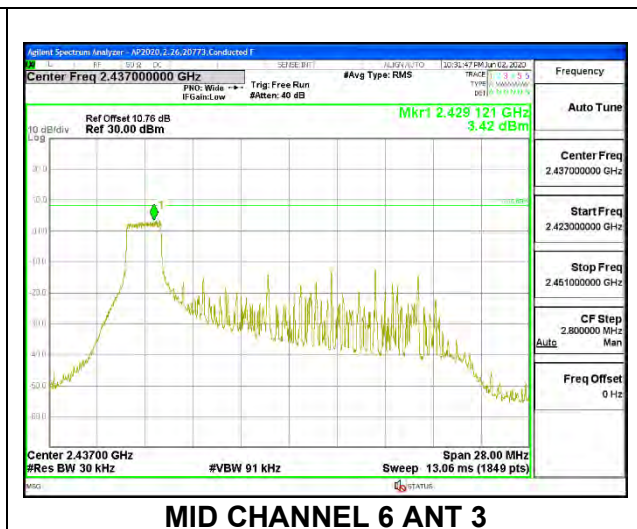
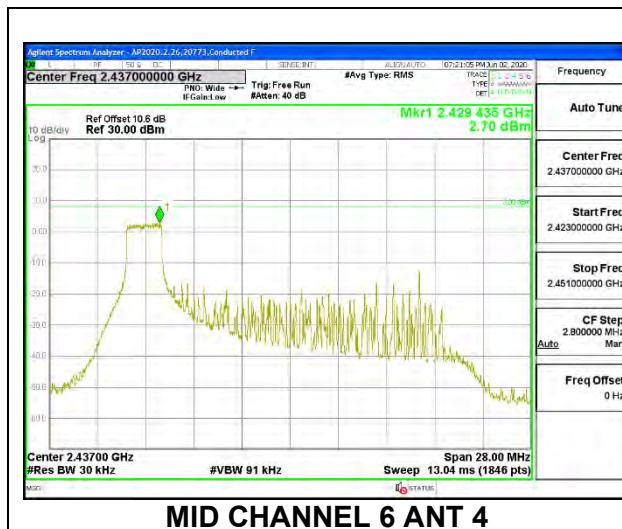
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.60	-8.60	8.0	-16.6
Low 2	2417	-7.15	-7.15	8.0	-15.2
Low 3	2422	-4.86	-4.86	8.0	-12.9
Mid 6	2437	-4.49	-4.49	8.0	-12.5
High 9	2452	-4.28	-4.28	8.0	-12.3
High 10	2457	-6.82	-6.82	8.0	-14.8
High 11	2462	-8.88	-8.88	8.0	-16.9
High 12	2467	-11.06	-11.06	8.0	-19.1
High 13	2472	-15.13	-15.13	8.0	-23.1



9.5.5. 802.11ax HE20 OFDMA MODE 2TX

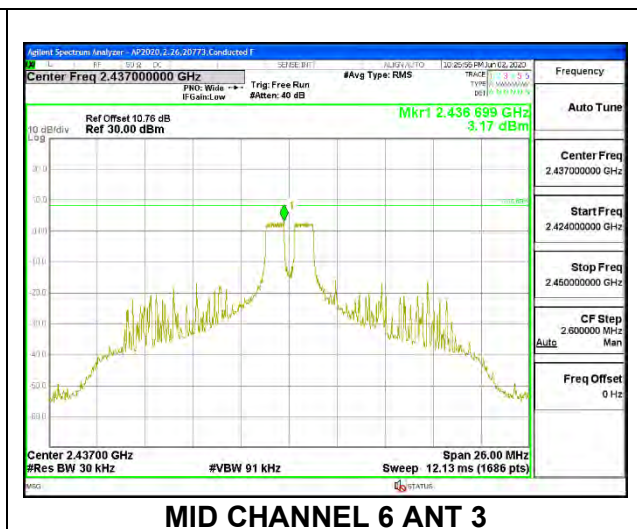
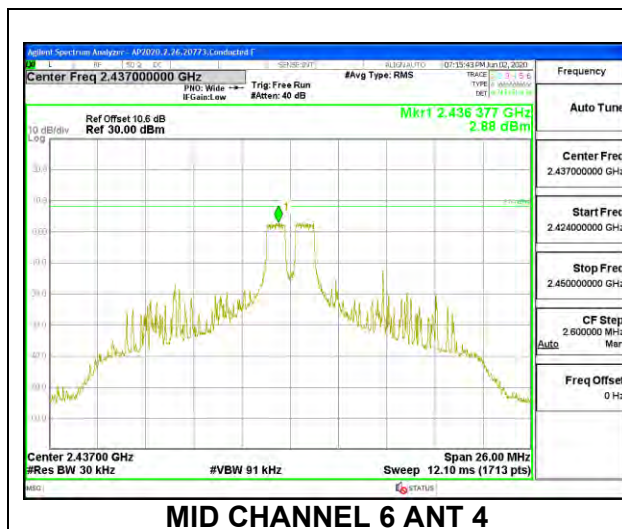
ANT 4 + ANT 3: 26-Tone, RU Index 0

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
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	-1.69	-1.92	1.21	8.0	-6.8
Low 2	2417	-0.04	0.02	3.00	8.0	-5.0
Low 3	2422	1.85	1.83	4.85	8.0	-3.1
Mid 6	2437	2.70	3.42	6.09	8.0	-1.9
High 9	2452	1.96	1.81	4.90	8.0	-3.1
High 10	2457	-0.30	-0.28	2.72	8.0	-5.3
High 11	2462	-2.31	-2.22	0.75	8.0	-7.3
High 12	2467	-4.73	-4.56	-1.63	8.0	-9.6
High 13	2472	-9.51	-9.37	-6.43	8.0	-14.4



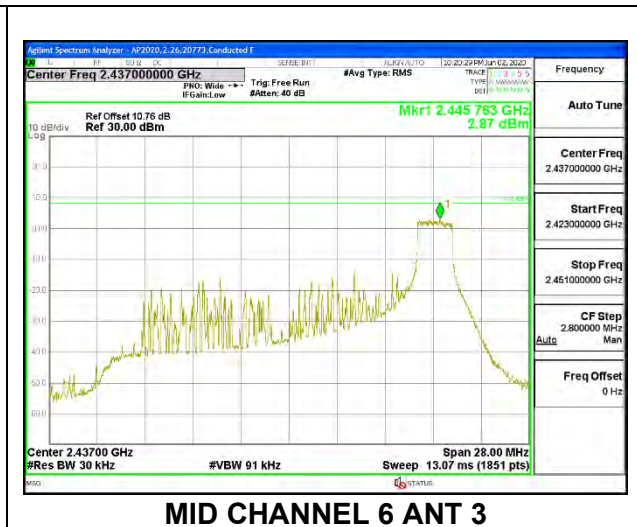
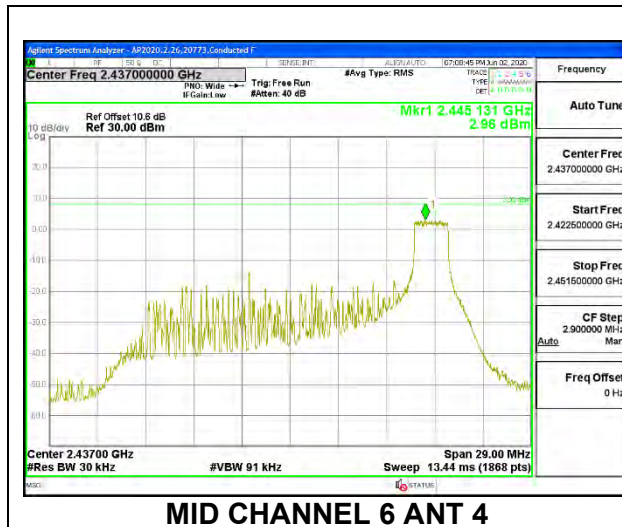
ANT 4 + ANT 3: 26-Tone, RU Index 4

Duty Cycle CF (dB)		Included in Calculations of Corr'd PSD				
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	-1.93	-1.83	1.13	8.0	-6.9
Low 2	2417	-0.15	-0.16	2.86	8.0	-5.1
Low 3	2422	1.71	1.75	4.74	8.0	-3.3
Mid 6	2437	2.88	3.17	6.04	8.0	-2.0
High 9	2452	1.20	1.83	4.54	8.0	-3.5
High 10	2457	-0.03	-0.49	2.76	8.0	-5.2
High 11	2462	-2.17	-2.02	0.92	8.0	-7.1
High 12	2467	-4.62	-4.65	-1.62	8.0	-9.6
High 13	2472	-9.13	-9.69	-6.39	8.0	-14.4



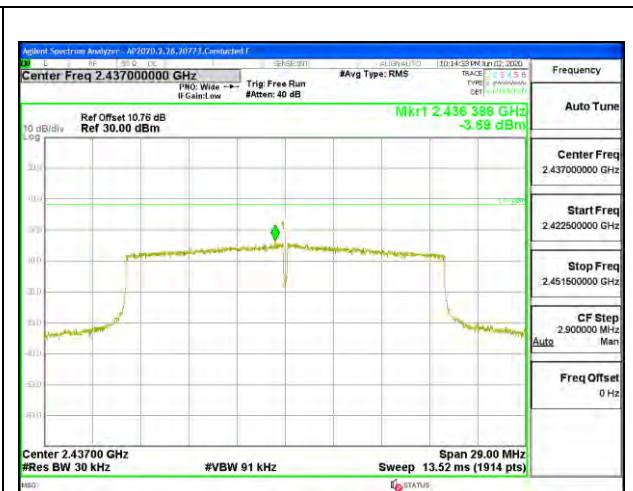
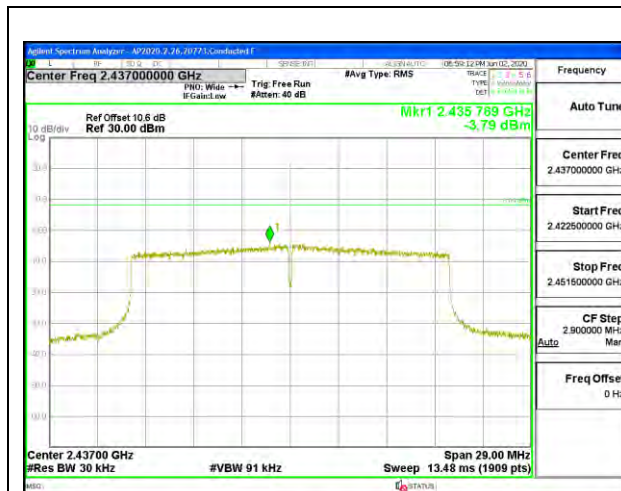
ANT 4 + ANT 3: 26-Tone, RU Index 8

Duty Cycle CF (dB)		Included in Calculations of Corr'd PSD				
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	-1.97	-1.81	1.12	8.0	-6.9
Low 2	2417	0.02	-0.12	2.96	8.0	-5.0
Low 3	2422	1.74	1.75	4.76	8.0	-3.2
Mid 6	2437	2.96	2.87	5.93	8.0	-2.1
High 9	2452	1.29	1.24	4.28	8.0	-3.7
High 10	2457	-0.25	0.15	2.96	8.0	-5.0
High 11	2462	-2.04	-2.09	0.95	8.0	-7.1
High 12	2467	-4.44	-4.62	-1.52	8.0	-9.5
High 13	2472	-9.38	-9.50	-6.43	8.0	-14.4



ANT 4 + ANT 3: 242-Tone RU Index 61

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-10.01	-9.94	-6.96	8.0	-15.0
Low 2	2417	-7.77	-8.12	-4.93	8.0	-12.9
Low 3	2422	-6.18	-5.90	-3.03	8.0	-11.0
Low 4	2427	-5.87	-4.43	-2.08	8.0	-10.1
Mid 6	2437	-3.79	-3.69	-0.73	8.0	-8.7
High 9	2452	-6.41	-6.40	-3.39	8.0	-11.4
High 10	2457	-7.77	-7.67	-4.71	8.0	-12.7
High 11	2462	-9.66	-9.55	-6.59	8.0	-14.6
High 12	2467	-12.82	-12.30	-9.54	8.0	-17.5
High 13	2472	-16.44	-16.72	-13.57	8.0	-21.6



9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

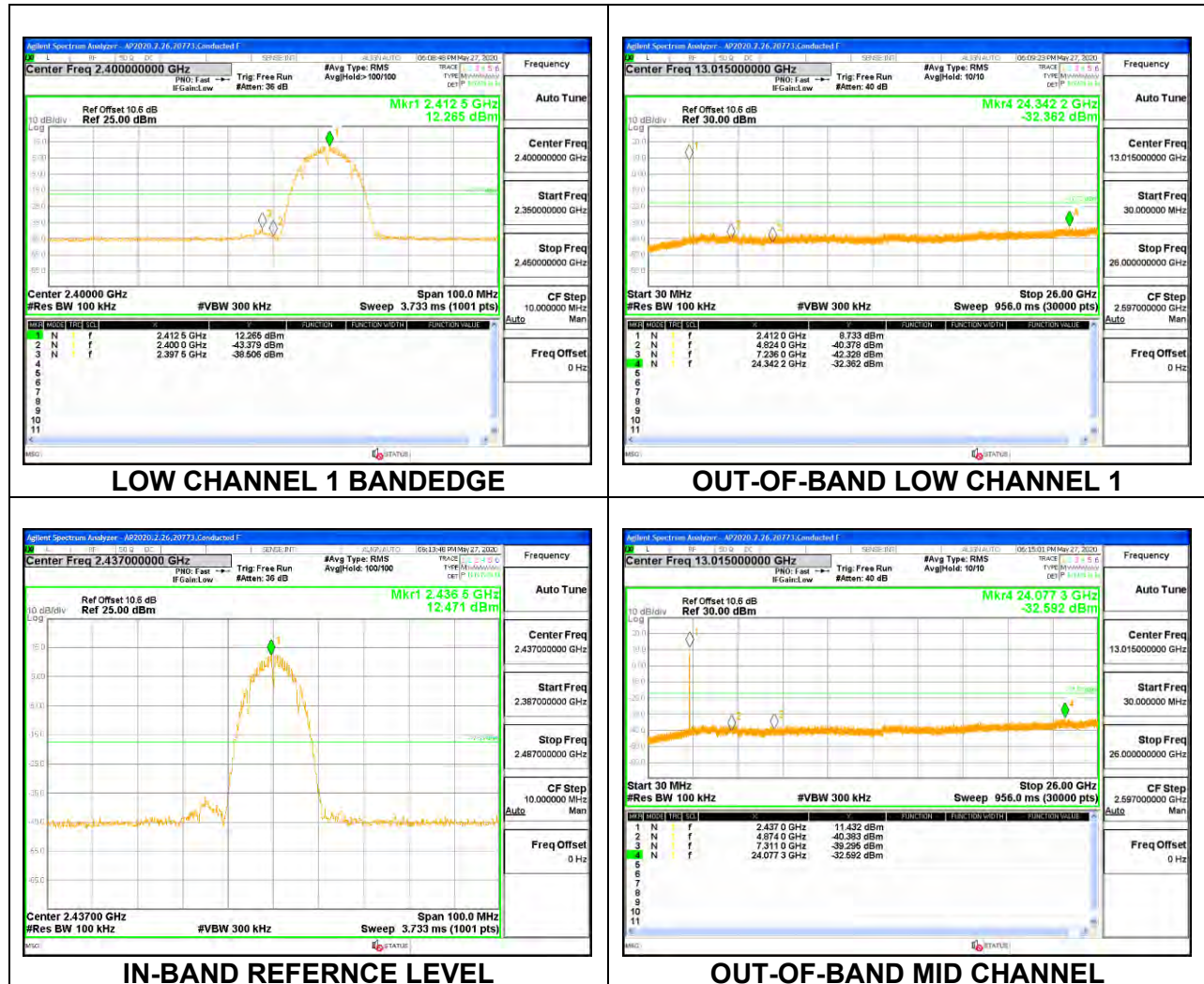
RSS-247 5.5

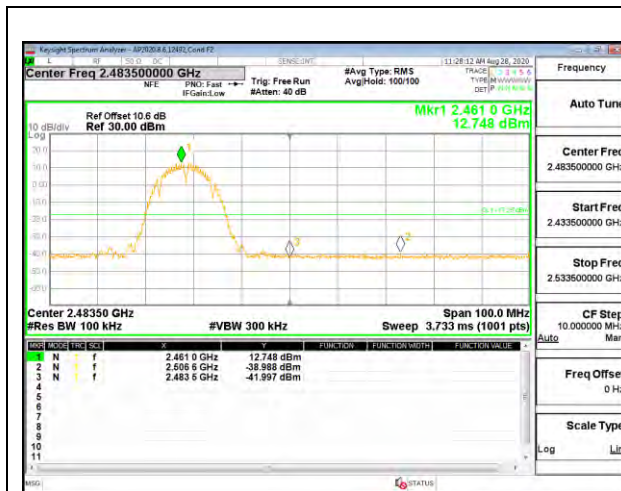
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

RESULTS

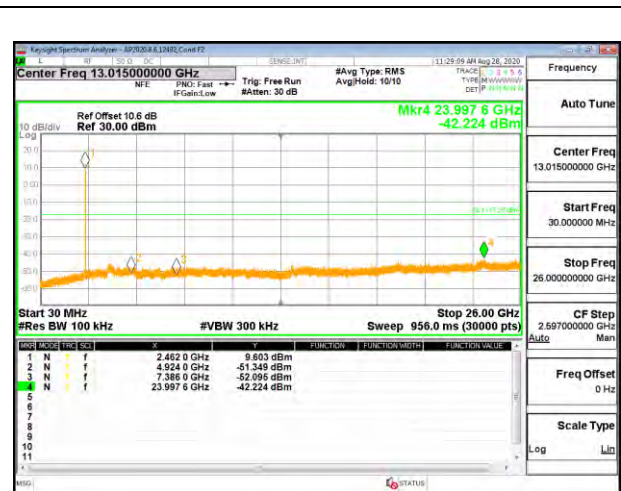
9.6.1. 802.11b MODE 1TX

ANT 4

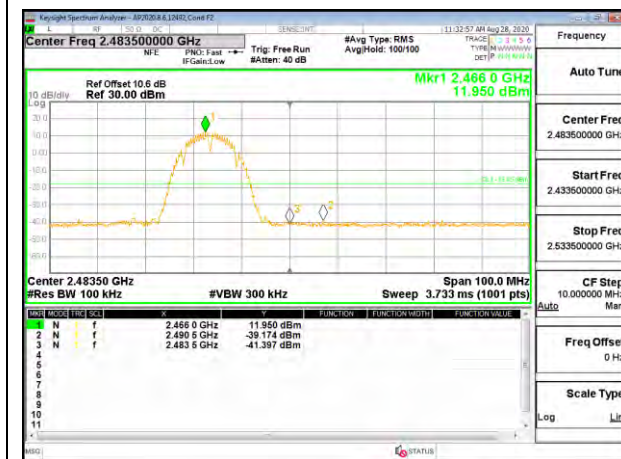




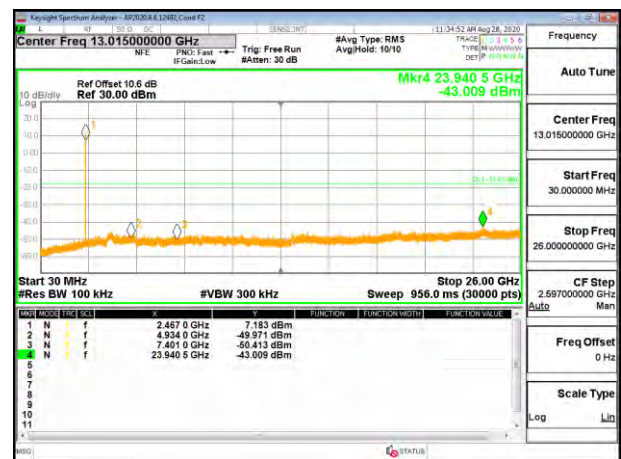
HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12

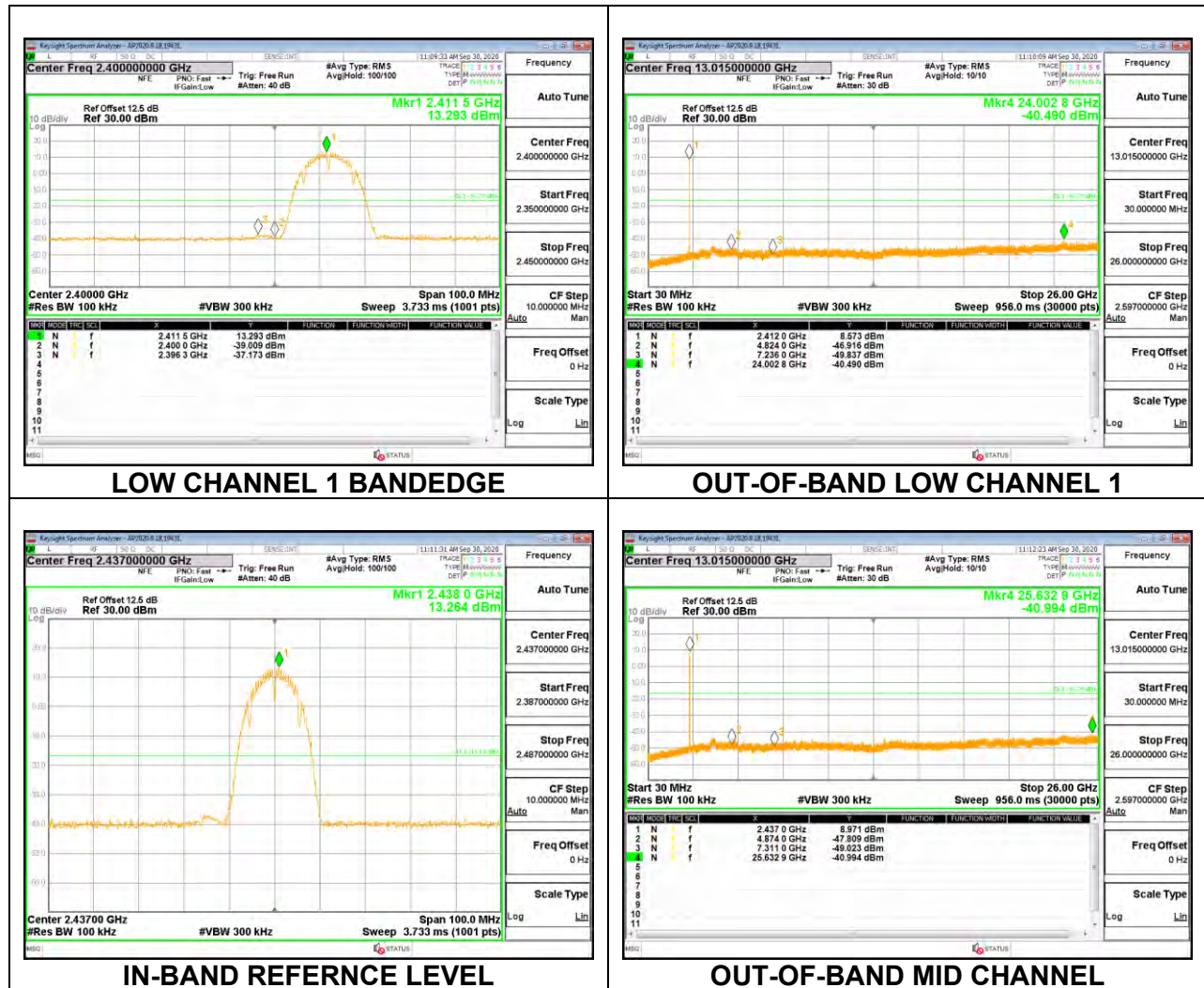


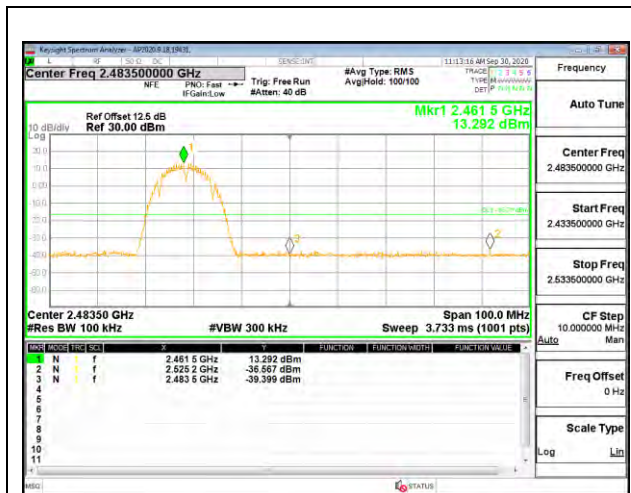
HIGH CHANNEL 13 BANDEDGE



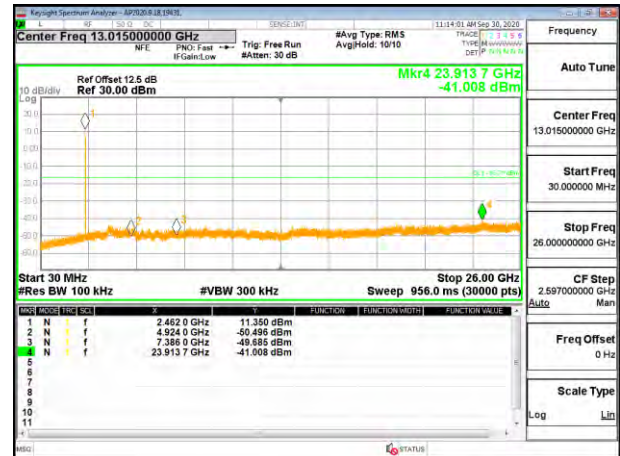
OUT-OF-BAND HIGH CHANNEL 13

ANT 3

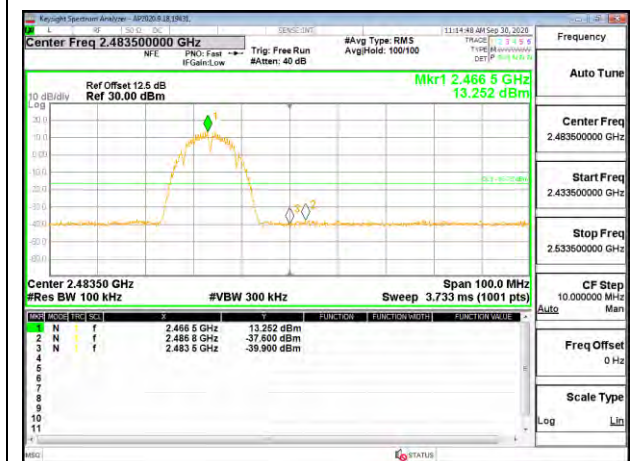




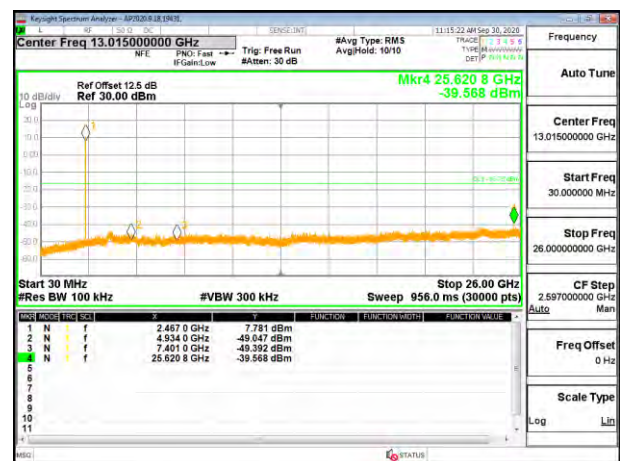
HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



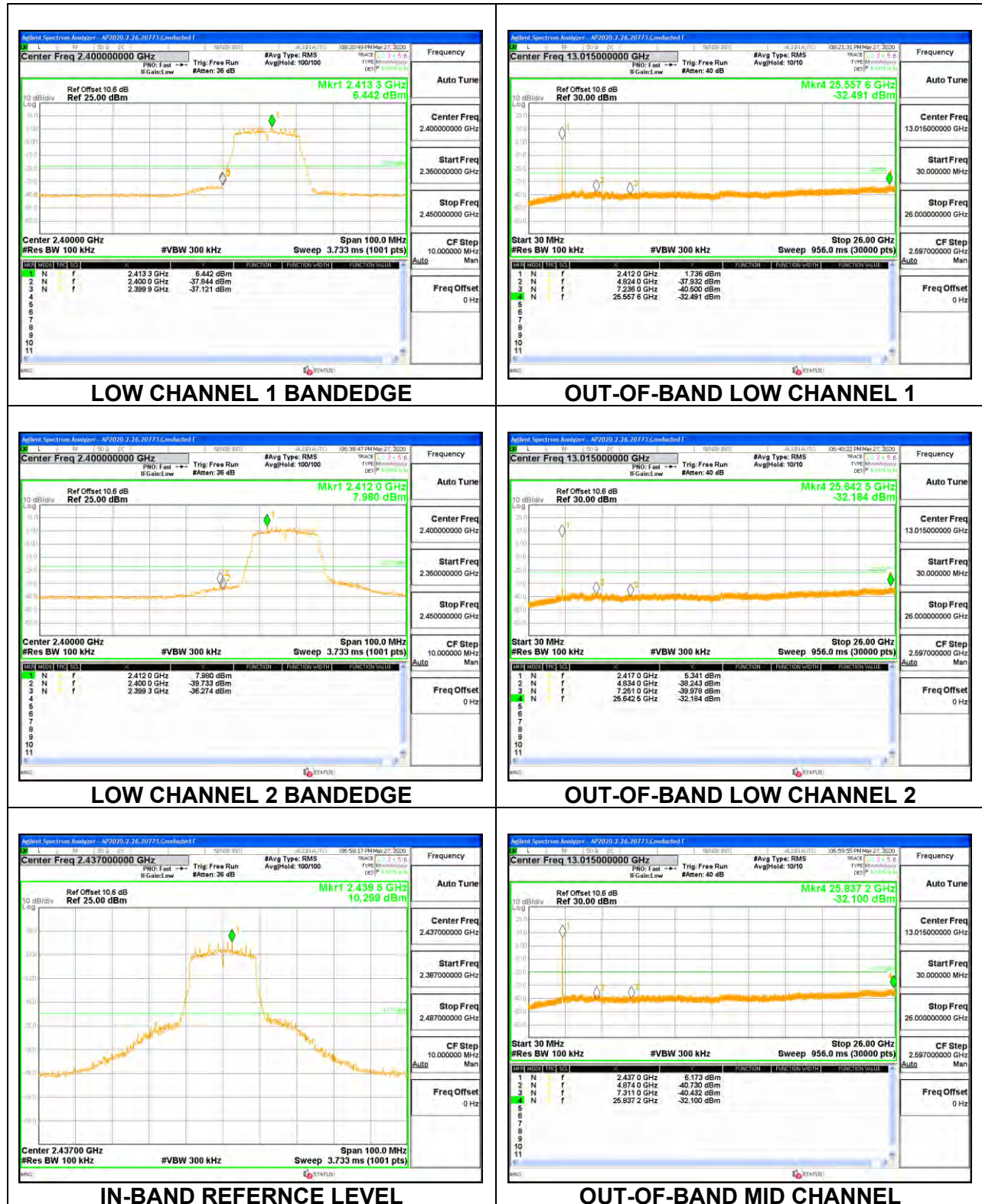
HIGH CHANNEL 13 BANDEDGE

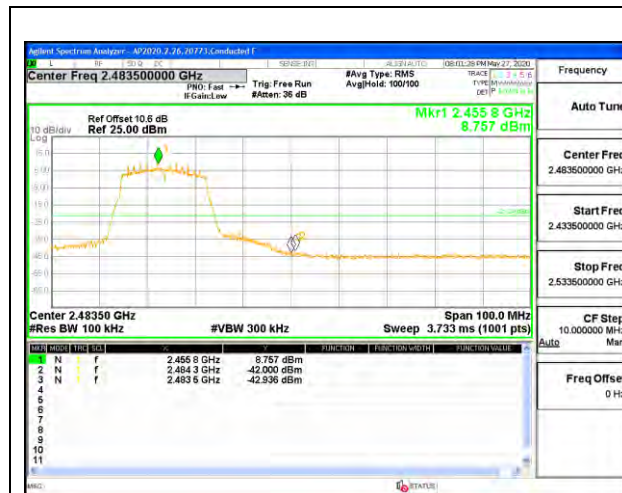


OUT-OF-BAND HIGH CHANNEL 13

9.6.2. 802.11n HT20 MODE 1TX

ANT 4





HIGH CHANNEL 10 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 10



HIGH CHANNEL 11 BANDEDGE



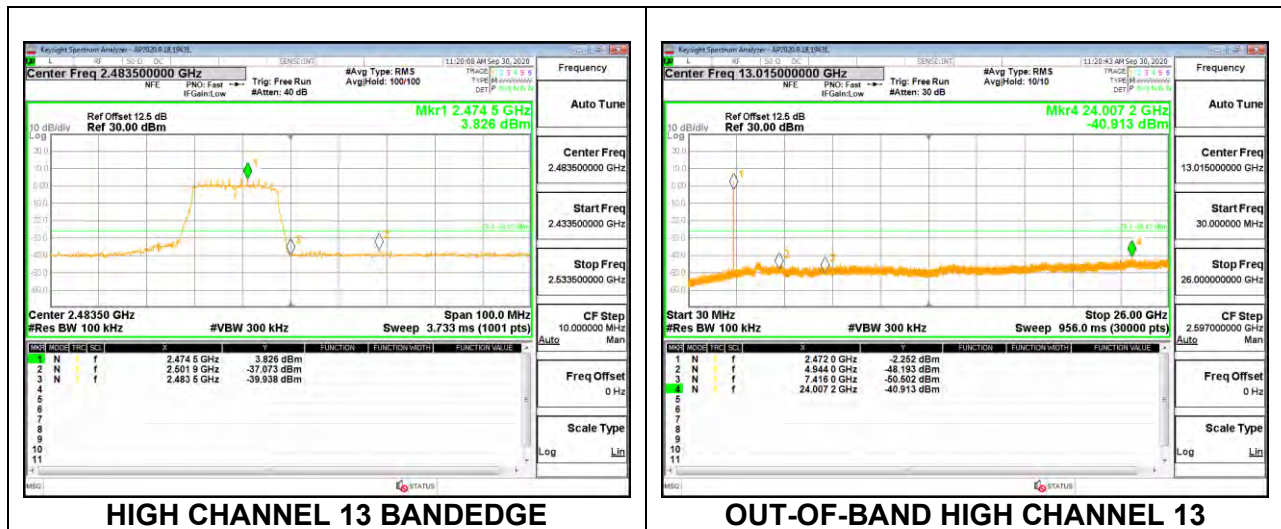
OUT-OF-BAND HIGH CHANNEL 11



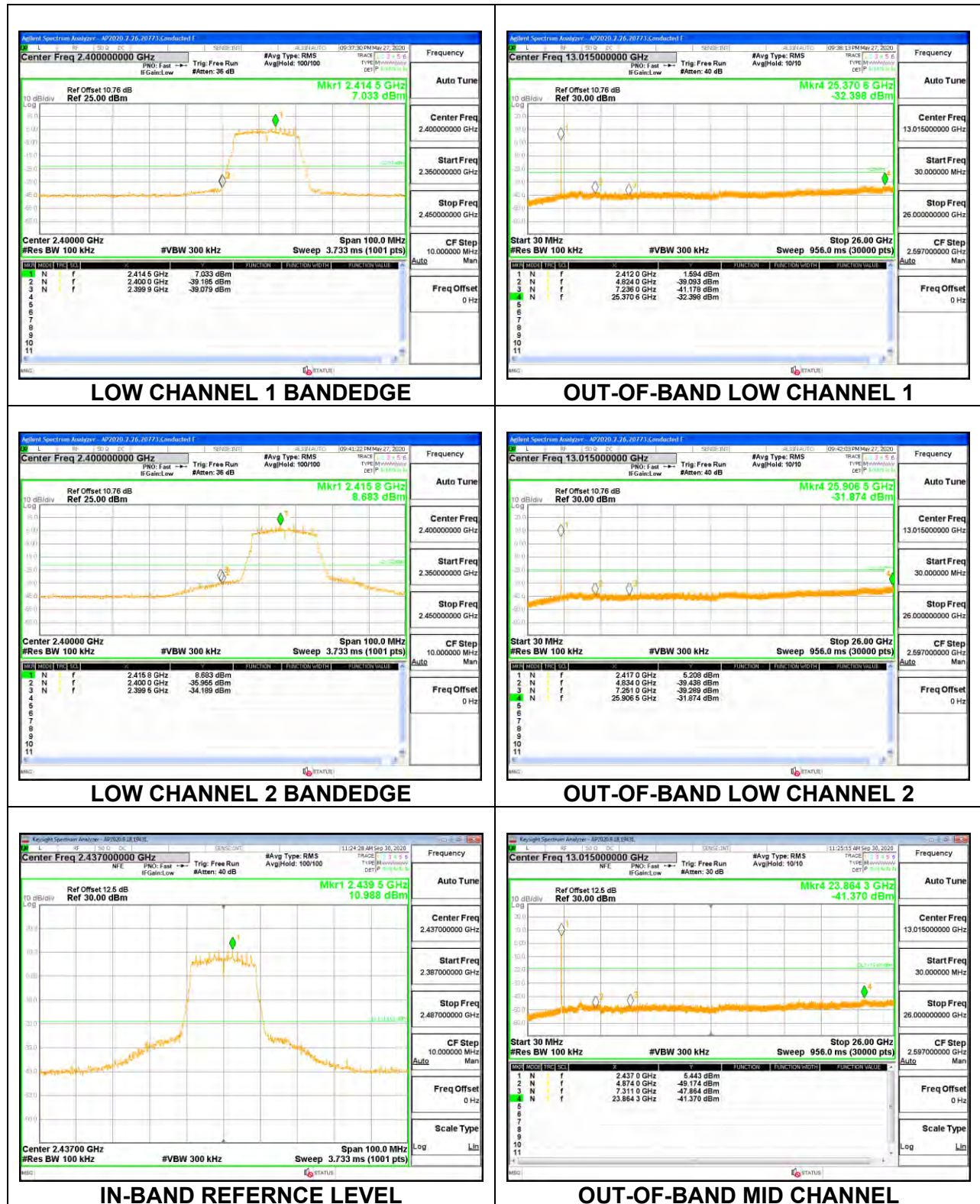
HIGH CHANNEL 12 BANDEDGE

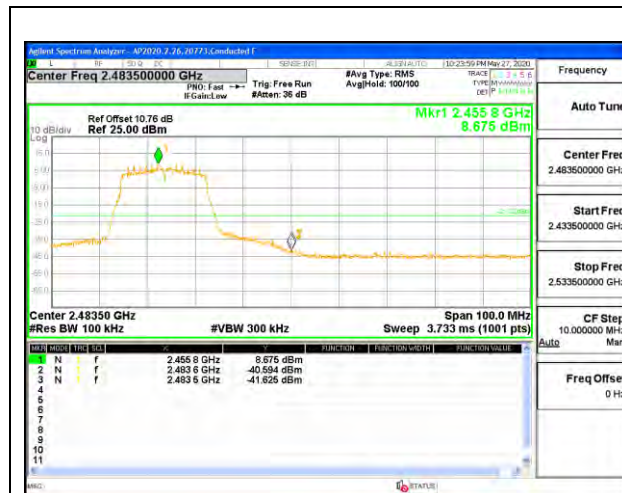


OUT-OF-BAND HIGH CHANNEL 12



ANT 3





HIGH CHANNEL 10 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 10



HIGH CHANNEL 11 BANDEDGE



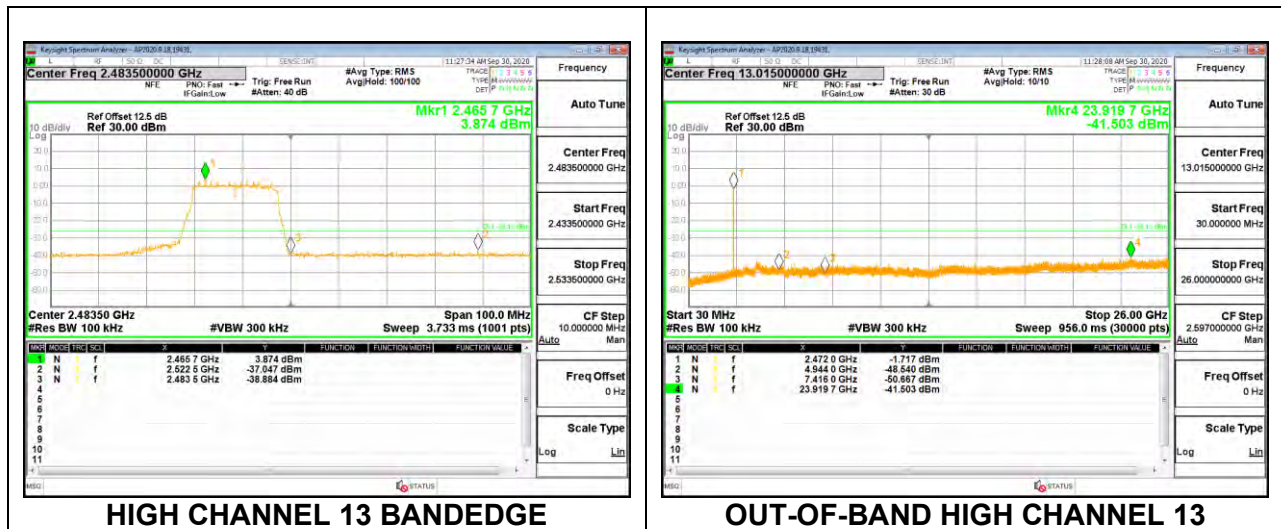
OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE

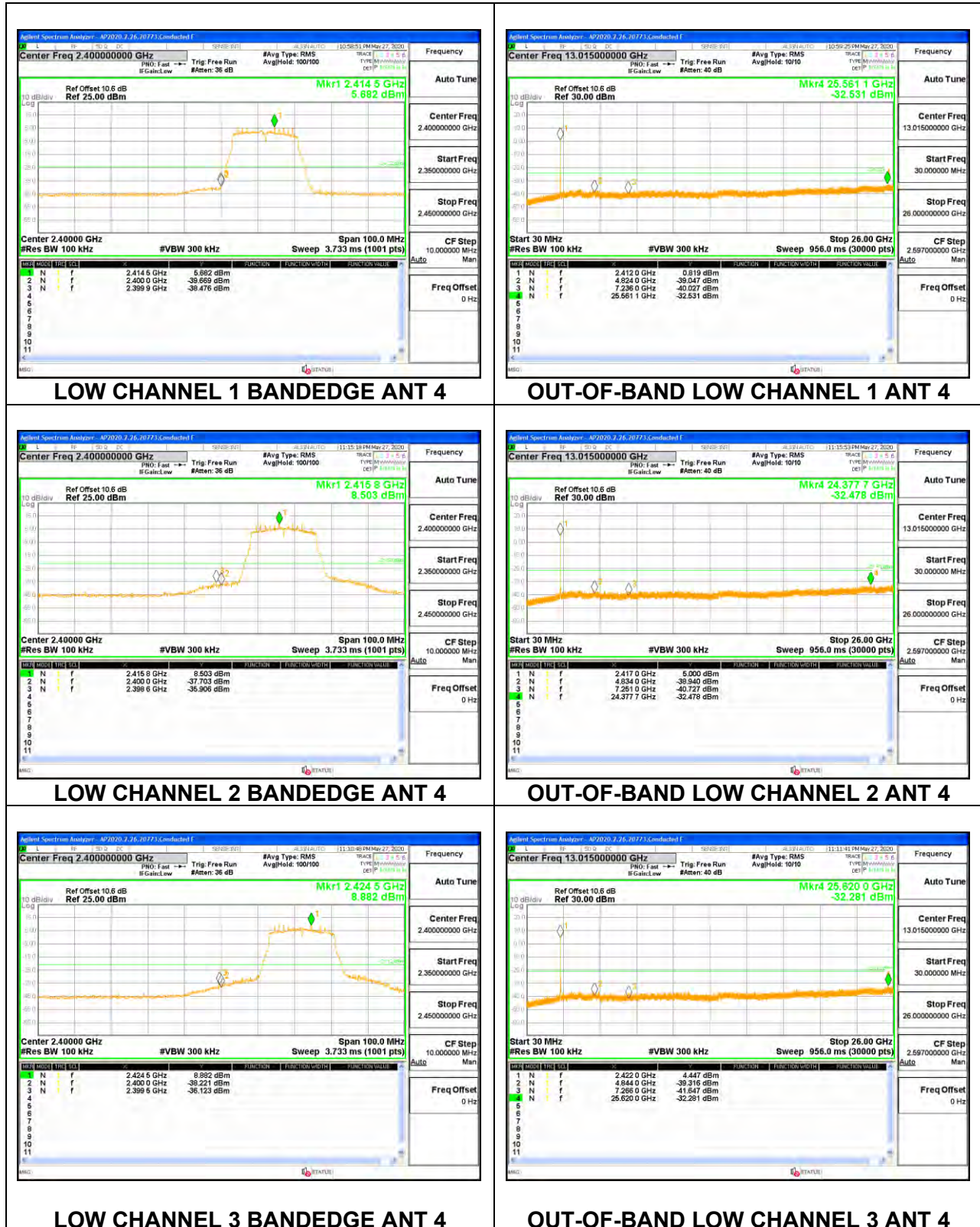


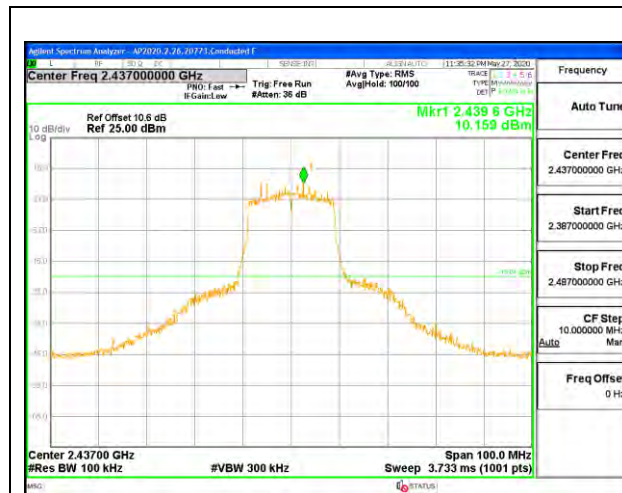
OUT-OF-BAND HIGH CHANNEL 12



9.6.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3





IN-BAND REFERENCE LEVEL ANT 4



OUT-OF-BAND MID CHANNEL ANT 4



HIGH CHANNEL 9 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 9 ANT 4



HIGH CHANNEL 10 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 10 ANT 4



HIGH CHANNEL 11 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 11 ANT 4



HIGH CHANNEL 12 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 12 ANT 4



HIGH CHANNEL 13 BANDEDGE ANT 4



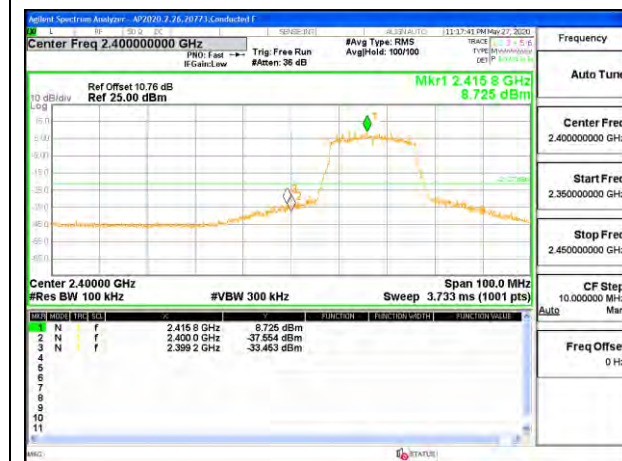
OUT-OF-BAND HIGH CHANNEL 13 ANT 4



LOW CHANNEL 1 BANDEDGE ANT 3



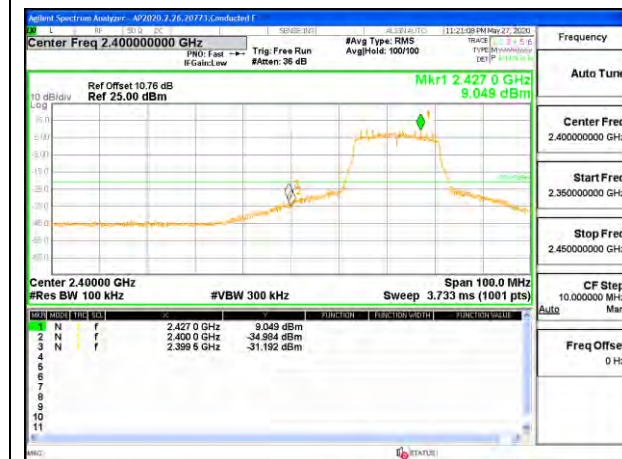
OUT-OF-BAND LOW CHANNEL 1 ANT 3



LOW CHANNEL 2 BANDEDGE ANT 3



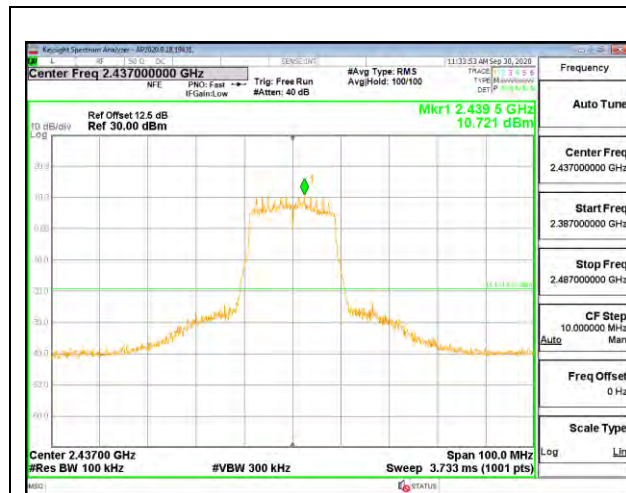
OUT-OF-BAND LOW CHANNEL 2 ANT 3



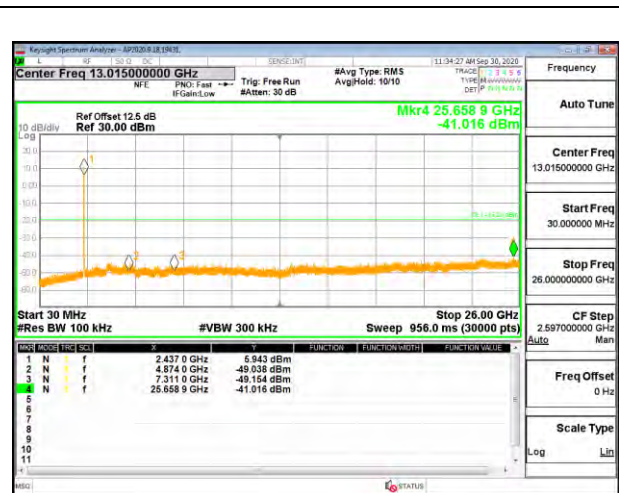
LOW CHANNEL 3 BANDEDGE ANT 3



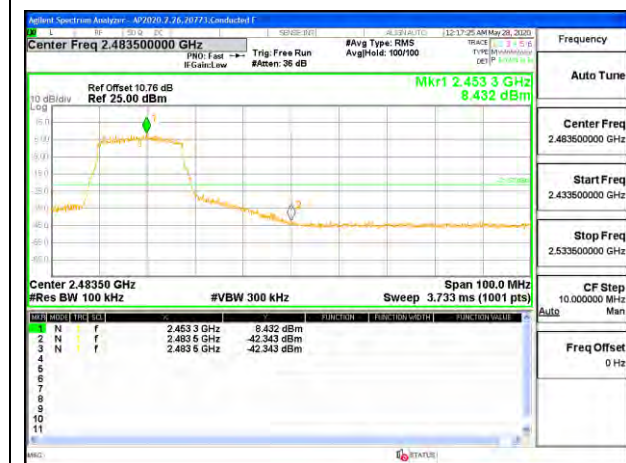
OUT-OF-BAND LOW CHANNEL 3 ANT 3



IN-BAND REFERENCE LEVEL ANT 3



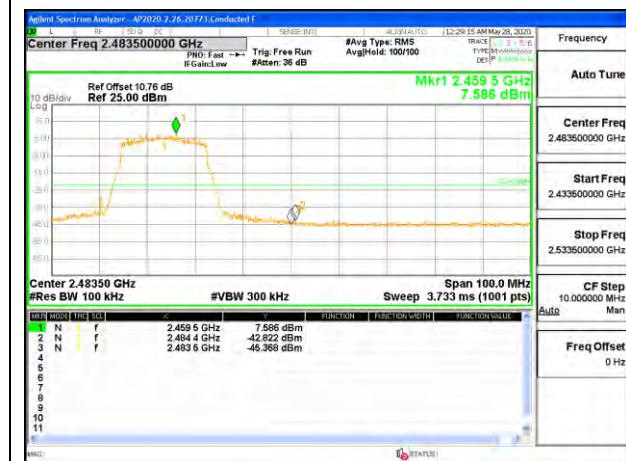
OUT-OF-BAND MID CHANNEL ANT 3



HIGH CHANNEL 9 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 9 ANT 3



HIGH CHANNEL 10 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 10 ANT 3



HIGH CHANNEL 11 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 11 ANT 3



HIGH CHANNEL 12 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 12 ANT 3



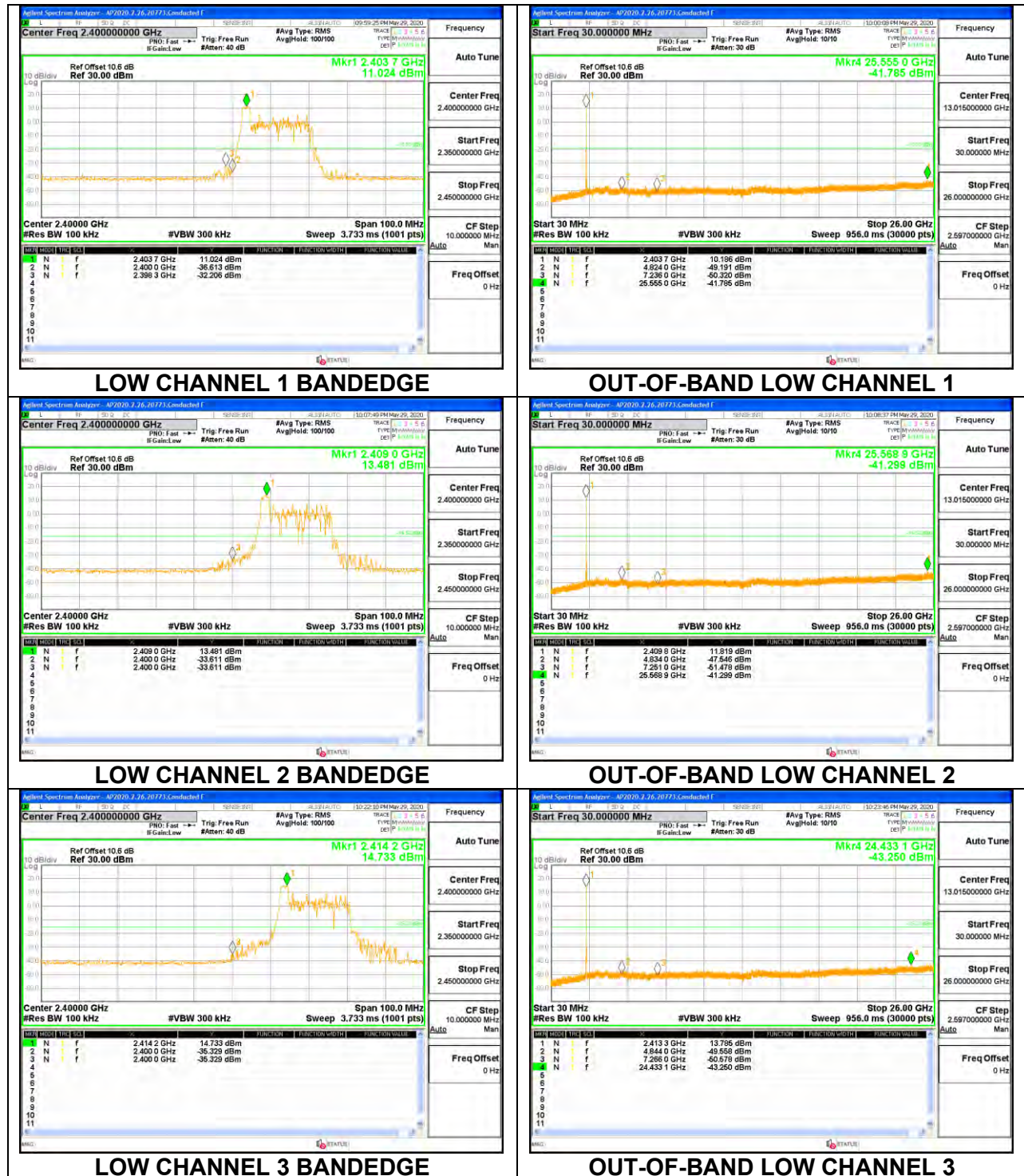
HIGH CHANNEL 13 BANDEDGE ANT 3

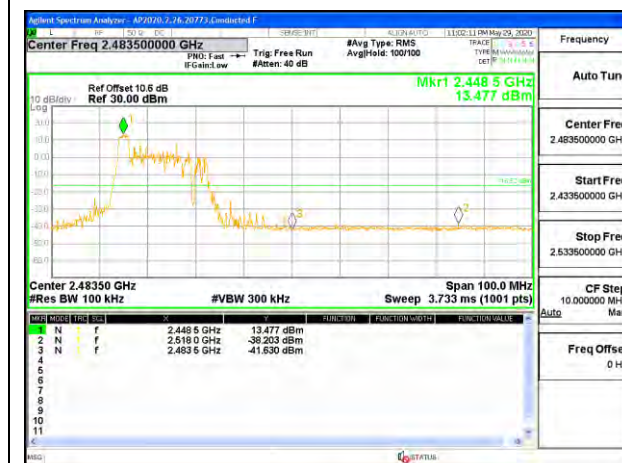
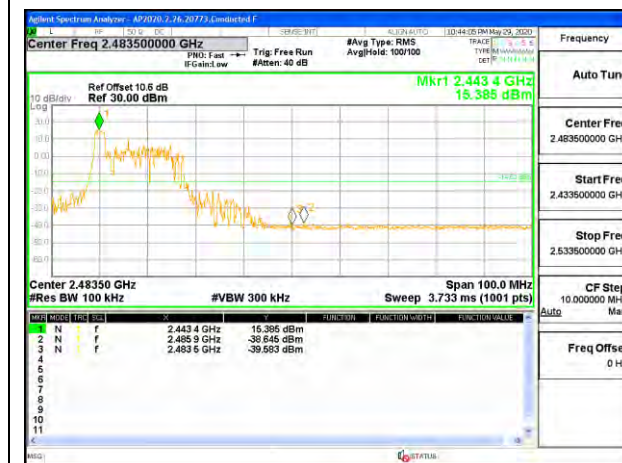
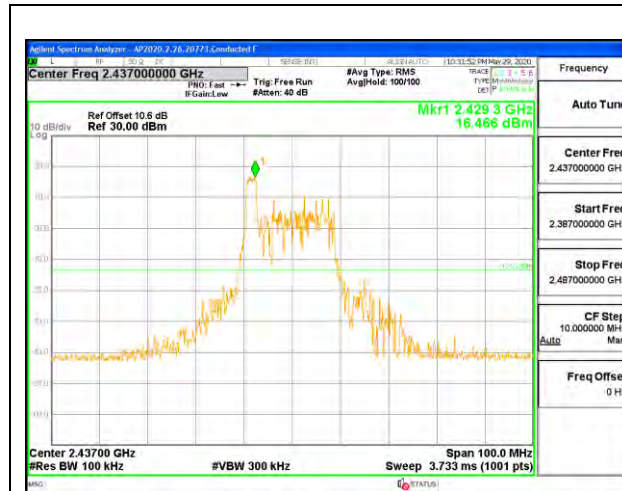


OUT-OF-BAND HIGH CHANNEL 13 ANT 3

9.6.4. 802.11ax HE20 MODE 1TX

ANT 4: 26-Tone RU, Index 0







HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



HIGH CHANNEL 13 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 13

ANT 4: 26-Tone RU, Index 4

