



CERTIFICATION TEST REPORT

Report Number: 13131736-E5V3 & E6V3

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

Model : A2402

FCC ID : BCG-E3543A
IC : 579C-E3543A

EUT Description : SMARTPHONE

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

Date of Issue:
September 17, 2020

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	8/27/2020	Initial Issue	Chin Pang
V2	9/15/2020	Updated per TCB's comments	Vien Tran
V3	9/17/2020	Updated per TCB's comments	Vien Tran

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: SMARTPHONE

MODEL: A2402

SERIAL NUMBER: (Original): G6TZX04APT5N, G6TCQ01XQ5HX
(Spot Check): G6TC402JPT45, G6TC4026PT2L

DATE TESTED: APRIL 01, 2020 – JULY 29, 2020

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

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

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

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:



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Senior Engineer
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UL Verification Services Inc.

Prepared By:



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

2. 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 662911 D01 v02r01, FCC KDB 789033 D02 v02r01, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2

3. 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 (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☐ Chamber I (ISED:2324A-5)
☐ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)	☐ Chamber J (ISED:2324A-6)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)	☒ Chamber K (ISED:2324A-1)
	☐ Chamber G (ISED:22541-4)	☒ Chamber L (ISED:2324A-3)
	☒ Chamber H (ISED:22541-5)	

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

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

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

4.2. 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.)

4.3. 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%.

5. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209 -Restricted bands

FCC §15.407(b)(1-3) -Un-Restricted bands

RSS 247 Issue 2 Sections

6.2.1.2 (for 5150-5250 MHz band)

6.2.2.2 (for 5250-5350 MHz band)

6.2.3.2 (for 5470-5600 MHz and 5650-5725 MHz bands)

6.2.4.2 (for 5725-5850 MHz band)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

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-E3542A and IC: 579C-E3542A to cover variant FCC ID: BCG-E3543A and IC: 579C-E3543A. 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 A2402, FCC ID: BCG-E3543A and IC: 579C-E3543A for radiated fundamental and spurious in accordance with the Test Plan that was approved via KDB inquiry.

BCG-E3543A SPOT CHECK RESULTS										
Technology	Mode	Test Item	Channel	Measured	Original model		Spot check model		Delta (dB)	
					A2172		A2402			
				Frequency (GHz)	Peak (dBuV)	Ave (dBuV)	Peak	Ave	Peak	Ave
WiFi (5GHz)	ax, HE20 5.2 & 5.3GHz	RBE	Low, 36	5150	62.66	50.96	66.62	50.66	3.96	-0.3
			High, 64	5351	64.84	50.67	66.14	50.83	1.3	0.16
	ax, HE20 5.6GHz	RBE	Low, 100	5451	58.32	48.56	63.57	45.65	5.25	2.91
	ax, HE20 5.8GHz	RBE	High, 165	5850	-36.86 (EIRP)		-37.08 (EIRP)		-0.22	
	ax, HE20 5.3/5.6/5.8GHz	RSE	Mid, 60	15.902	54.86	43.76	54.1	42.85	0.76	-0.91
			Mid, 116	12.015	50.28	40.28	49.91	39.04	-0.37	-1.24
			Mid, 157	12.178	50.32	39.37	48.66	38.44	-1.66	-0.93

Comparison of the models, upper deviation is within 3dB for the worst case measurements relative to the limit (note some peak values are more than 3dB higher but the corresponding average value, which has less margin relative to the average limit for emissions, is within 3dB of the reference model) and all measurements are under FCC/IC Technical Limits.

Note: The output powers were verified on model A2402 to match with model A2172 before radiated emissions spot check was performed.

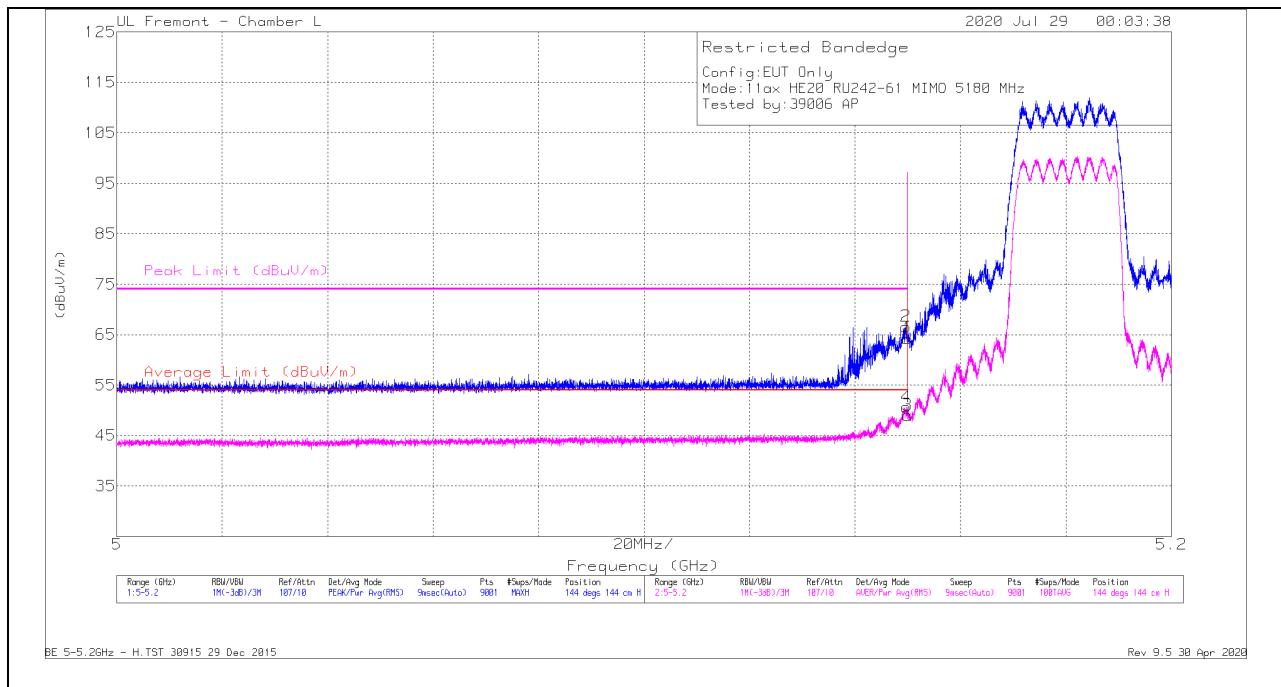
SPOT CHECK DATA

6.3.1. TX ABOVE 1 GHz 802.11ax HE20 MODE IN THE 5.2 GHz BAND

5.2GHz Band, Ax, HE 20 RU 61, 242 Tone

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



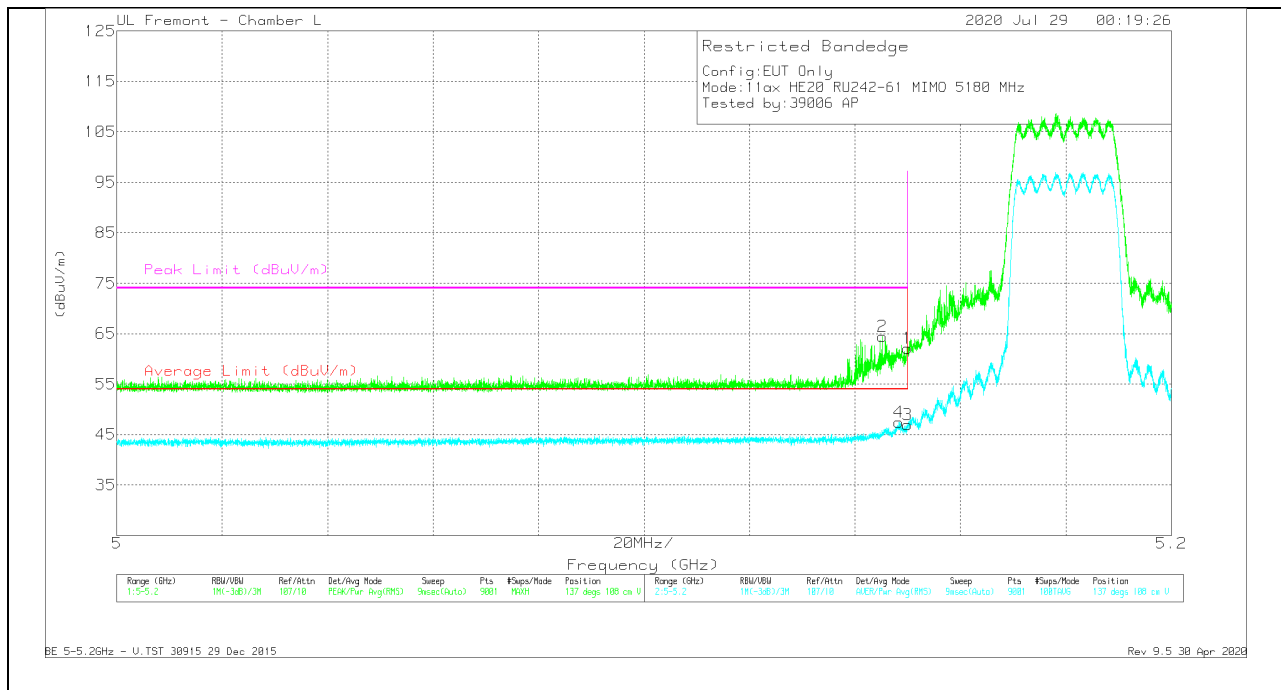
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Fitr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.15	47.46	Pk	34.3	-17.5	64.26	-	-	74	-9.74	144	144	H
2	* 5.14967	49.82	Pk	34.3	-17.5	66.62	-	-	74	-7.38	144	144	H
3	* 5.15	32.19	RMS	34.3	-17.5	48.99	54	-5.01	-	-	144	144	H
4	* 5.14978	33.86	RMS	34.3	-17.5	50.66	54	-3.34	-	-	144	144	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



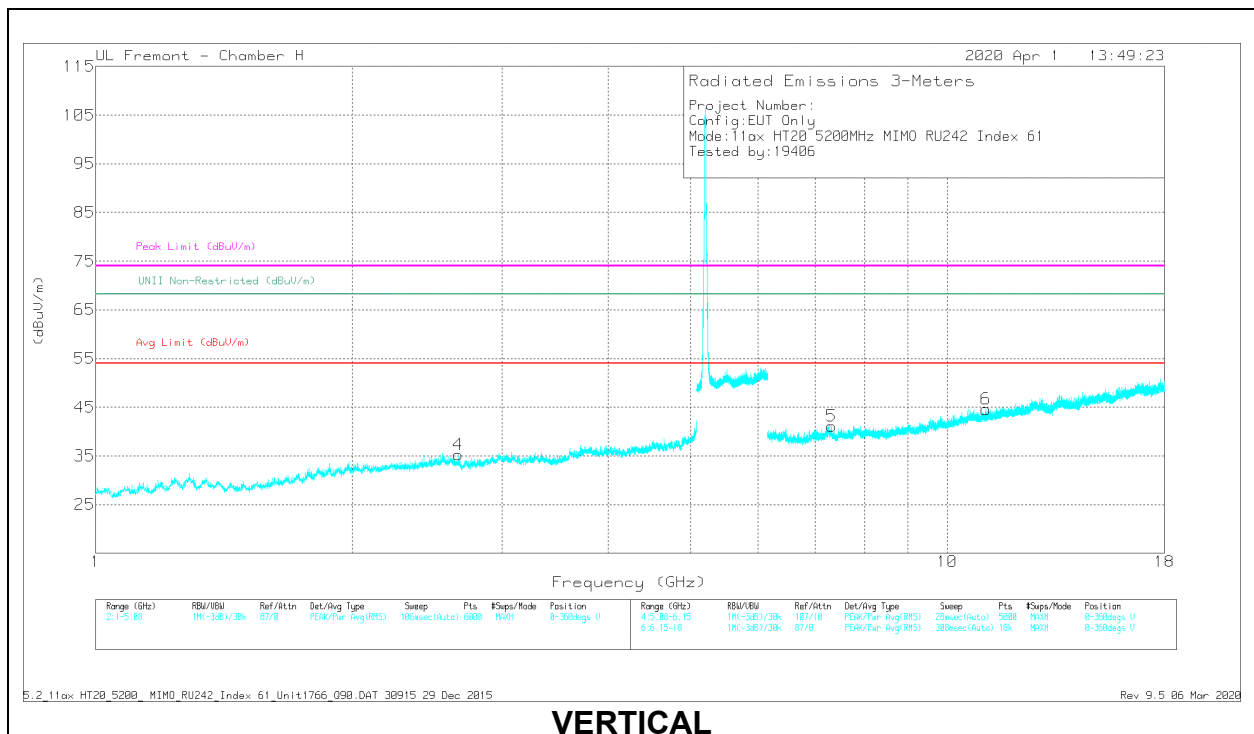
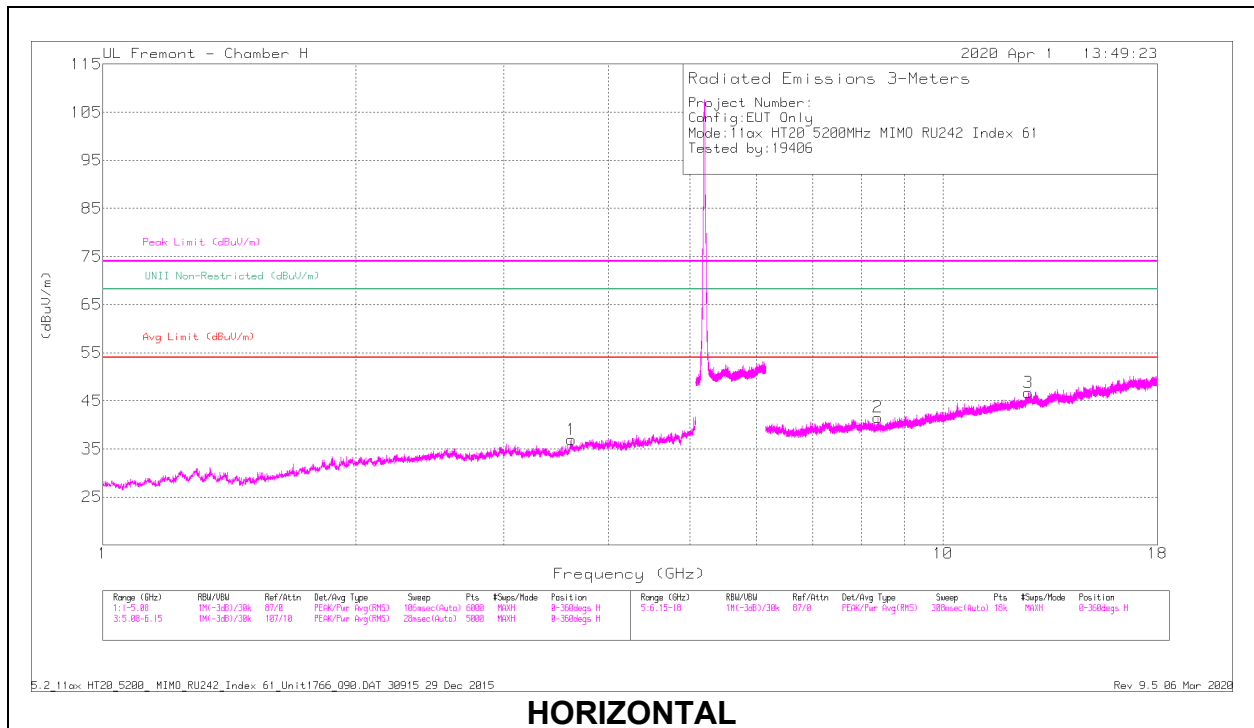
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Fitr/Par d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.15	45.29	Pk	34.3	-17.5	62.09	-	-	74	-11.91	137	108	V
2	* 5.14518	47.67	Pk	34.3	-17.5	64.47	-	-	74	-9.53	137	108	V
3	* 5.15	30.13	RMS	34.3	-17.5	46.93	54	-7.07	-	-	137	108	V
4	* 5.14833	30.61	RMS	34.3	-17.5	47.41	54	-6.59	-	-	137	108	V

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

HARMONICS AND SPURIOUS EMISSIONS

2TX Antenna 5 + Antenna 6 OFDMA MODE

MID CHANNEL RESULTS



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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.61291	42.61	PK-U	33.1	-32.4	43.31	-	-	74	-30.69	-	-	306	219	H
	* 3.61118	31.62	ADR	33.1	-32.4	32.32	54	-21.68	-	-	-	-	306	219	H
2	* 8.36621	38.42	PK-U	36	-26.9	47.52	-	-	74	-26.48	-	-	204	148	H
	* 8.36623	27.13	ADR	36	-26.9	36.23	54	-17.77	-	-	-	-	204	148	H
3	* 12.63732	36.59	PK-U	39.7	-23.4	52.89	-	-	74	-21.11	-	-	290	279	H
	* 2.66536	42.28	PK-U	32.1	-32.8	41.58	-	-	74	-32.42	-	-	290	135	V
4	* 2.66863	30.79	ADR	32.1	-32.8	30.09	54	-23.91	-	-	-	-	290	135	V
	* 12.63731	26.02	ADR	39.7	-23.4	42.32	54	-11.68	-	-	-	-	290	279	H
5	* 7.31539	38.83	PK-U	36	-27.4	47.43	-	-	74	-26.57	-	-	107	190	V
	* 7.3164	27.82	ADR	36	-27.4	36.42	54	-17.58	-	-	-	-	107	190	V
6	* 11.11188	36.71	PK-U	37.8	-24.1	50.41	-	-	74	-23.59	-	-	68	358	V
	* 11.11336	25.79	ADR	37.8	-24	39.59	54	-14.41	-	-	-	-	68	358	V

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

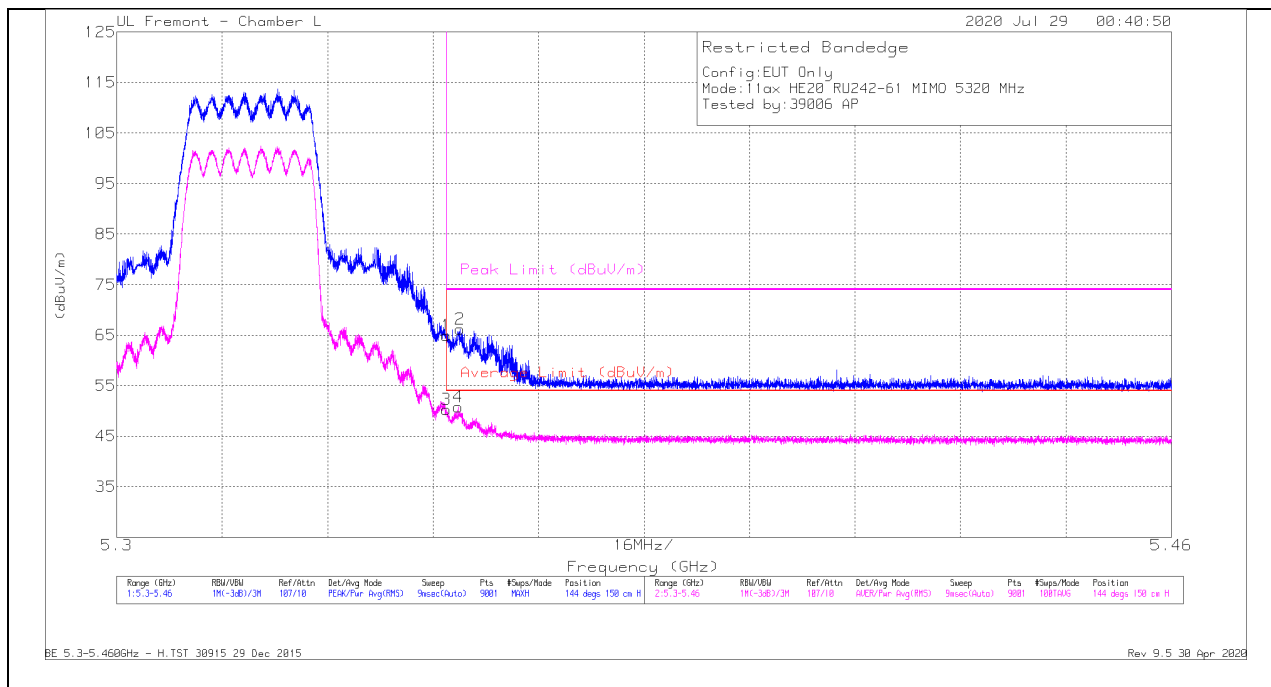
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

6.3.2. TX ABOVE 1 GHz 802.11ax HE20 MODE IN THE 5.3 GHz BAND

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



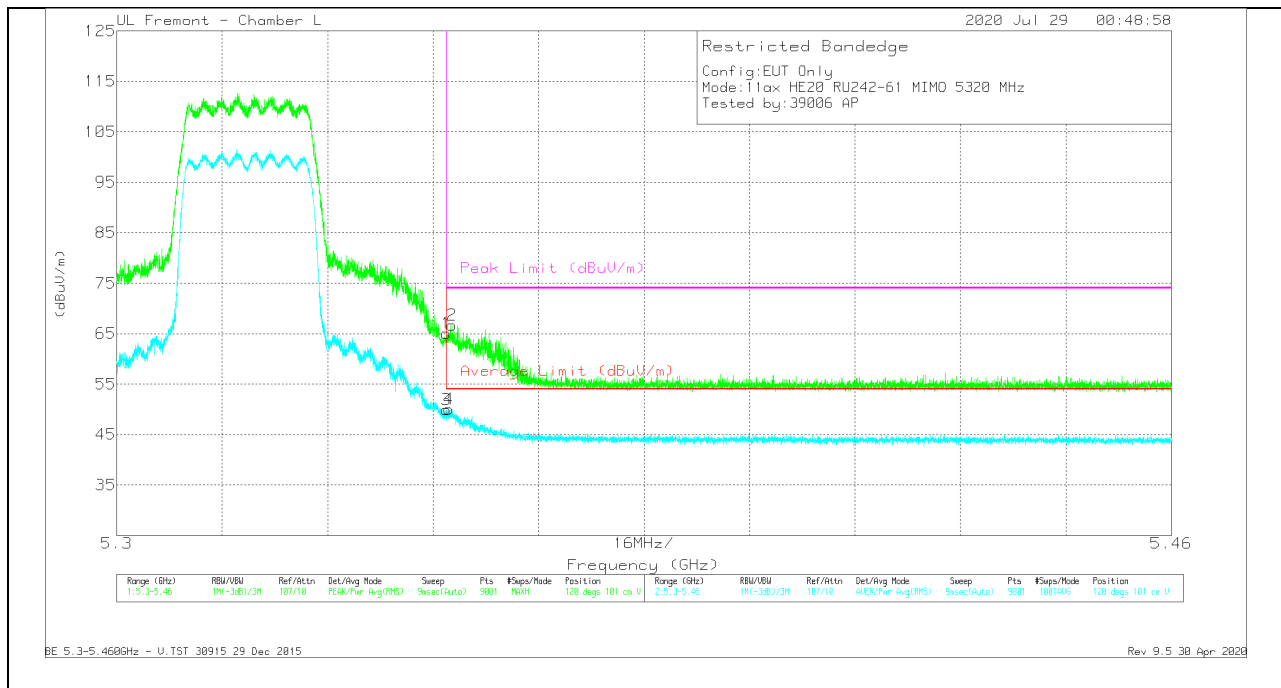
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dBm)	Amp/Cb1Ftr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.35001	47.49	Pk	34.5	-17.1	64.89	-	-	74	-9.11	144	150	H
2	* 5.35205	48.74	Pk	34.5	-17.1	66.14	-	-	74	-7.86	144	150	H
3	* 5.35001	32.92	RMS	34.5	-17.1	50.32	54	-3.68	-	-	144	150	H
4	* 5.35182	33.43	RMS	34.5	-17.1	50.83	54	-3.17	-	-	144	150	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



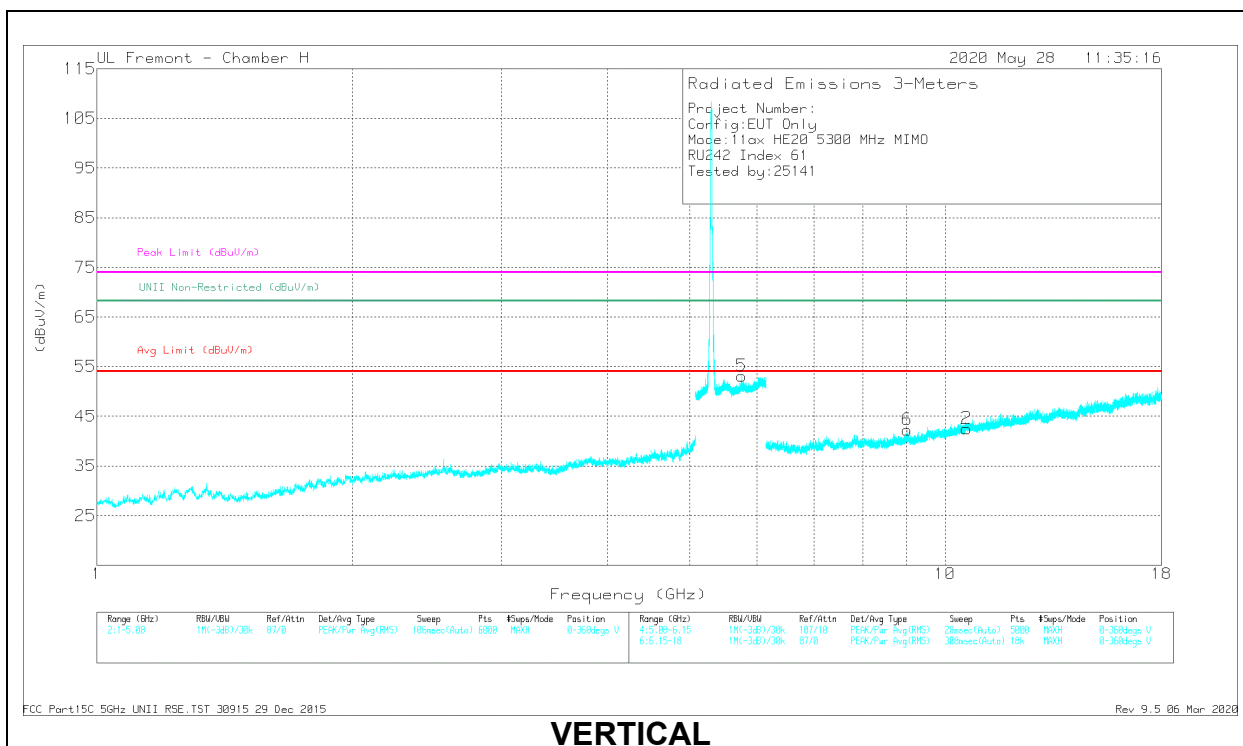
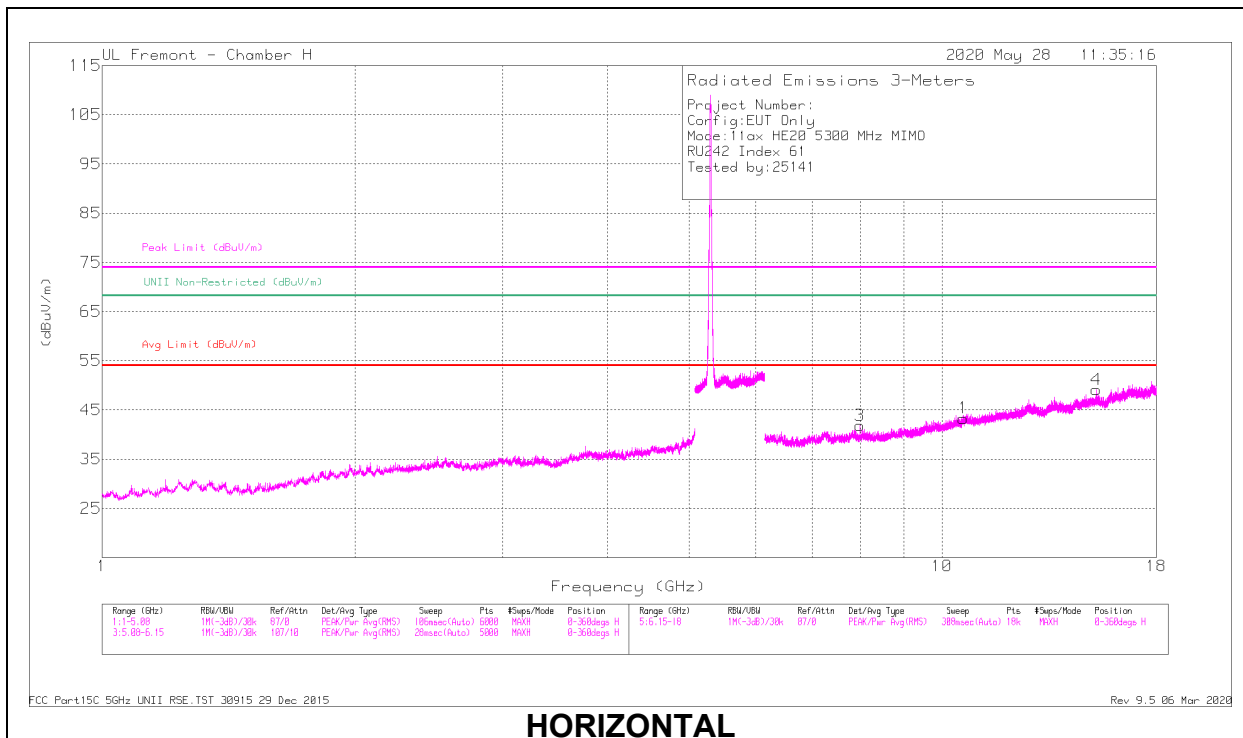
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Fitr/Par d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.35001	47.62	Pk	34.5	-17.1	65.02	-	-	74	-8.98	120	101	V
2	* 5.35085	49.27	Pk	34.5	-17.1	66.67	-	-	74	-7.33	120	101	V
3	* 5.35001	32.57	RMS	34.5	-17.1	49.97	54	-4.03	-	-	120	101	V
4	* 5.35042	32.63	RMS	34.5	-17.1	50.03	54	-3.97	-	-	120	101	V

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

HARMONICS AND SPURIOUS EMISSIONS

2TX Antenna 5 + Antenna 6 OFDMA MODE

MID CHANNEL RESULTS



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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 10.60392	37.73	PK-U	37.6	-24.4	50.93	-	-	74	-23.07	-	-	301	226	H
1	* 10.60098	26.01	ADR	37.6	-24.3	39.31	54	-14.69	-	-	-	-	301	226	H
2	* 10.60097	37.58	PK-U	37.6	-24.3	50.88	-	-	74	-23.12	-	-	172	384	V
2	* 10.60392	25.64	ADR	37.6	-24.4	38.84	54	-15.16	-	-	-	-	172	384	V
3	7.98814	26.53	ADR	36.1	-27.1	35.53	-	-	-	-	-	-	263	190	H
3	7.98896	38.23	PK-U	36.2	-27.1	47.33	-	-	-	-	68.2	-20.87	263	190	H
4	15.26667	25.15	ADR	40.9	-23.2	42.85	-	-	-	-	-	-	268	112	H
4	15.2685	36.4	PK-U	40.9	-23.2	54.1	-	-	-	-	68.2	-14.1	268	112	H
5	5.75771	33.13	ADR	35	-20.9	47.23	-	-	-	-	-	-	87	292	V
5	5.73844	45.01	PK-U	35	-20.9	59.11	-	-	-	-	68.2	-9.09	87	292	V
6	* 9.02722	37.06	PK-U	36.2	-25.2	48.06	-	-	74	-25.94	-	-	73	148	V
6	* 9.03016	25.52	ADR	36.2	-25.3	36.42	54	-17.58	-	-	-	-	73	148	V

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

PK-U - U-NII: Maximum Peak

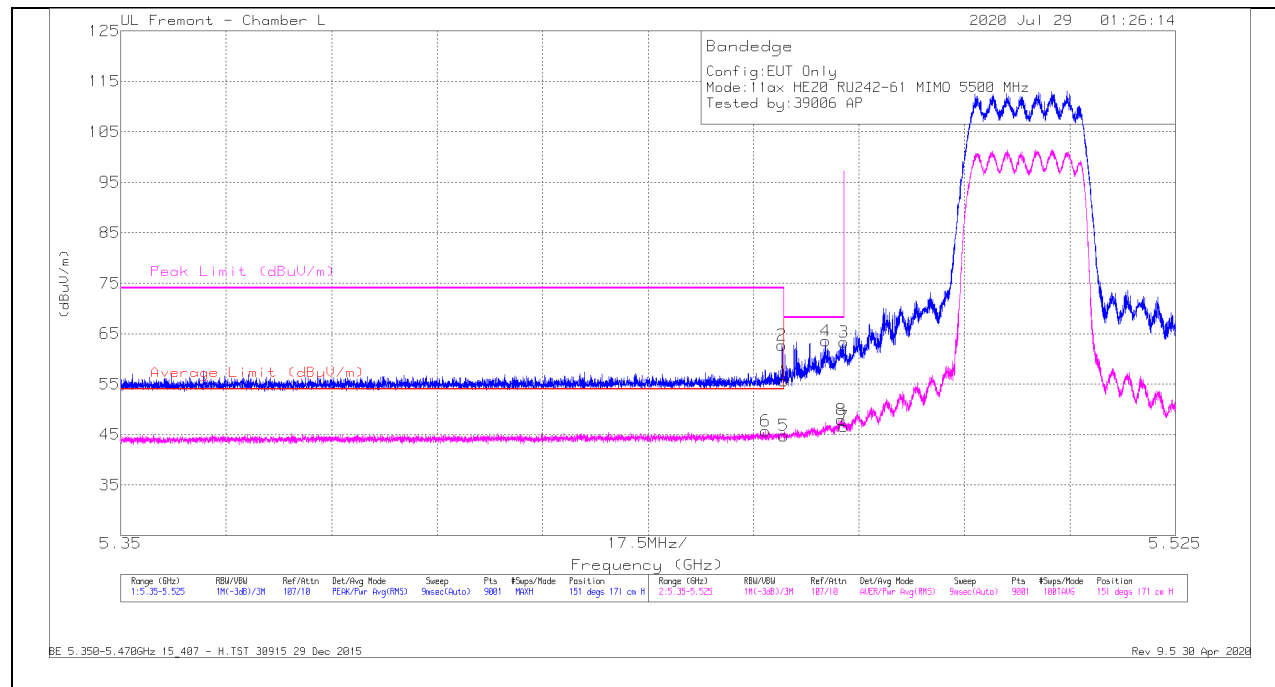
ADR - U-NII AD primary method, RMS average

6.3.3. TX ABOVE 1 GHz 802.11ax HE20 MODE IN THE 5.6 GHz BAND

5.6GHz Band, Ax, HE 20 242 Tone

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (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 (Degr)	Height (cm)	Polarity
1	* 5.45999	37.98	Pk	34.6	-16.9	55.68	-	-	74	-18.32	151	171	H
2	* 5.45974	45.04	Pk	34.6	-16.9	62.74	-	-	74	-11.26	151	171	H
3	5.46999	45.6	Pk	34.6	-16.9	63.3	-	-	68.2	-4.9	151	171	H
4	5.46699	45.87	Pk	34.6	-16.9	63.57	-	-	68.2	-4.63	151	171	H
5	* 5.45999	27.07	RMS	34.6	-16.9	44.77	54	-9.23	-	-	151	171	H
6	* 5.45696	27.85	RMS	34.7	-16.9	45.65	54	-8.35	-	-	151	171	H
7	5.46999	28.82	RMS	34.6	-16.9	46.52	-	-	-	-	151	171	H
8	5.46956	30.27	RMS	34.6	-16.9	47.97	-	-	-	-	151	171	H

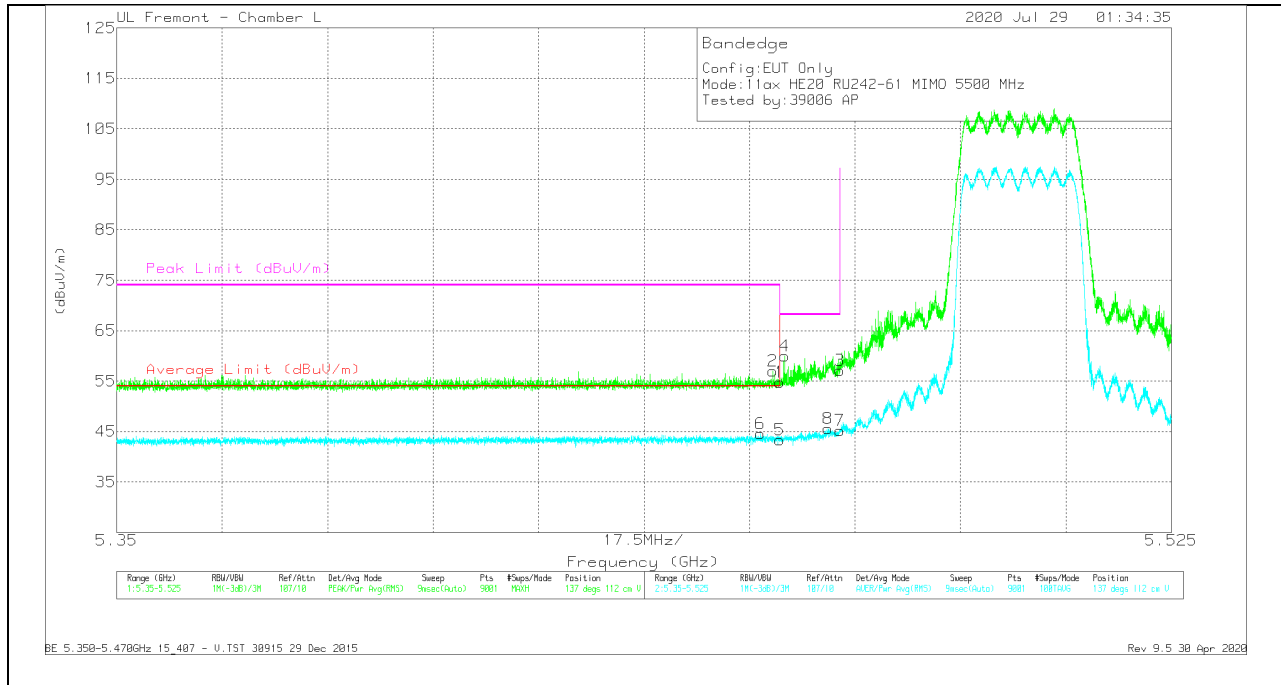
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (LOW CHANNEL)

VERTICAL RESULT



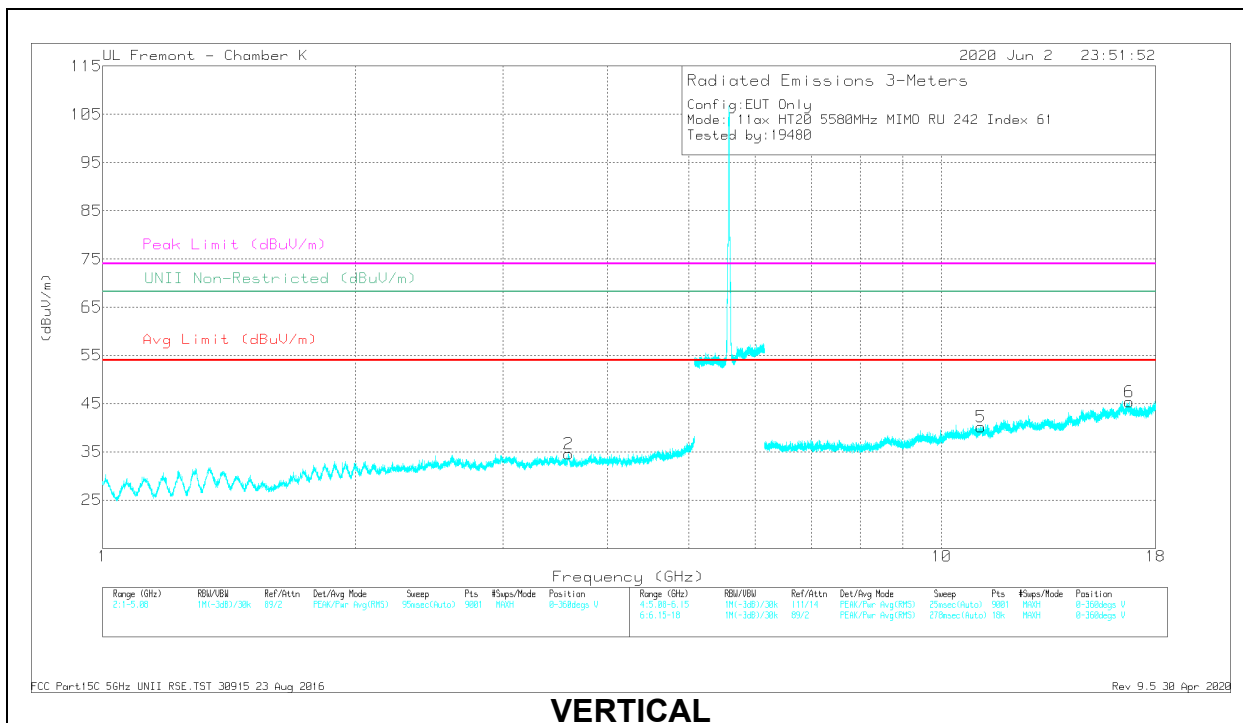
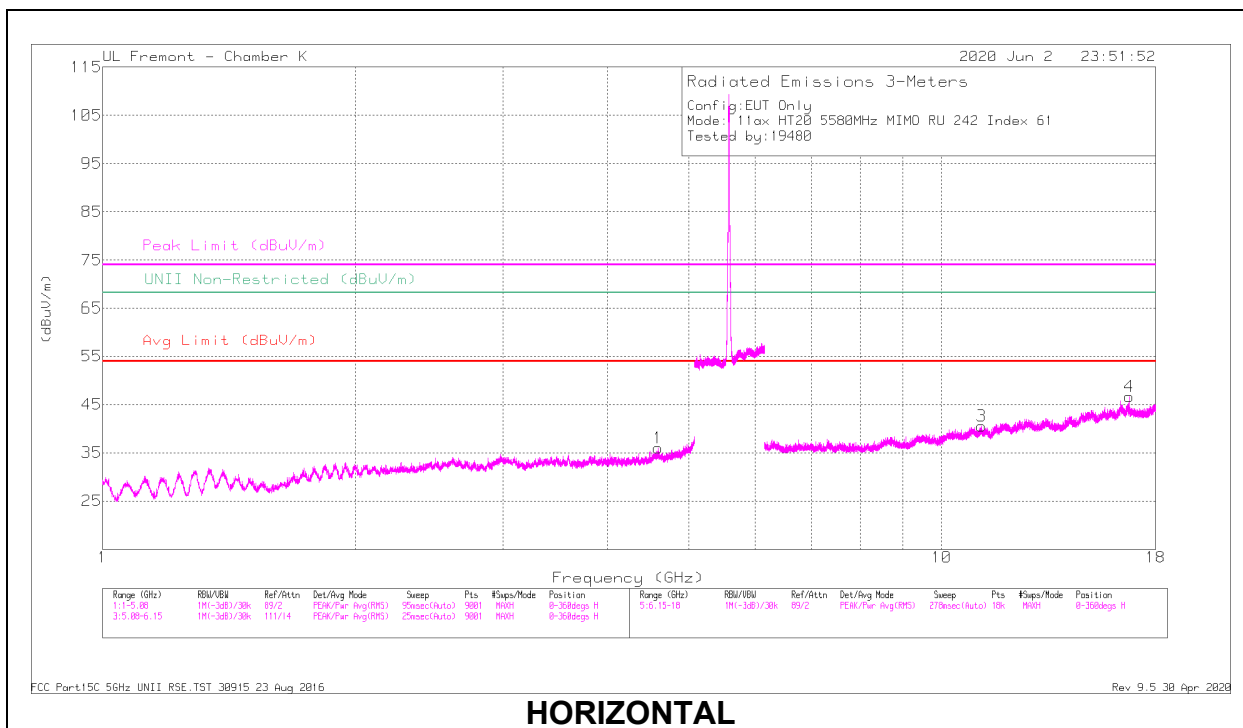
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Fitr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.45999	37.1	Pk	34.6	-16.9	54.8	-	-	74	-19.2	137	112	V
2	* 5.45889	39.3	Pk	34.6	-16.9	57	-	-	74	-17	137	112	V
3	5.46999	39.4	Pk	34.6	-16.9	57.1	-	-	68.2	-11.1	137	112	V
4	5.46081	42.25	Pk	34.6	-16.9	59.95	-	-	68.2	-8.25	137	112	V
5	* 5.45999	25.6	RMS	34.6	-16.9	43.3	54	-10.7	-	-	137	112	V
6	* 5.45675	26.75	RMS	34.7	-16.9	44.55	54	-9.45	-	-	137	112	V
7	5.46999	27.47	RMS	34.6	-16.9	45.17	-	-	-	-	137	112	V
8	5.46799	27.84	RMS	34.6	-16.9	45.54	-	-	-	-	137	112	V

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

HARMONICS AND SPURIOUS EMISSIONS

2TX Antenna 5 + Antenna 6 OFDMA MODE

MID CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.59886	49.99	PK-U	34	-41.2	42.79	-	-	74	-31.21	-	-	126	139	H
1	* 4.59748	40.45	ADR	34	-41.2	33.25	54	-20.75	-	-	-	-	126	139	H
2	* 3.59505	52.36	PK-U	33.9	-42	44.28	-	-	74	-29.72	-	-	13	183	V
2	* 3.59357	40.05	ADR	34	-42	32.05	54	-21.95	-	-	-	-	13	183	V
3	* 11.15136	48.71	PK-U	38	-36.8	49.91	-	-	74	-24.09	-	-	357	302	H
3	* 11.16068	37.74	ADR	38	-36.7	39.04	54	-14.96	-	-	-	-	357	302	H
4	16.74264	49.9	PK-U	41	-33.6	57.3	-	-	-	-	68.2	-10.9	15	98	H
4	16.74242	38.03	ADR	41	-33.6	45.43	-	-	-	-	-	-	15	98	H
5	* 11.15947	48.77	PK-U	38	-36.7	50.07	-	-	74	-23.93	-	-	314	191	V
5	* 11.15407	37.09	ADR	38	-36.8	38.29	54	-15.71	-	-	-	-	314	191	V
6	16.73993	48.2	PK-U	41	-33.6	55.6	-	-	-	-	68.2	-12.6	326	97	V
6	16.73976	36.43	ADR	41	-33.6	43.83	-	-	-	-	-	-	326	97	V

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

PK-U - U-NII: Maximum Peak

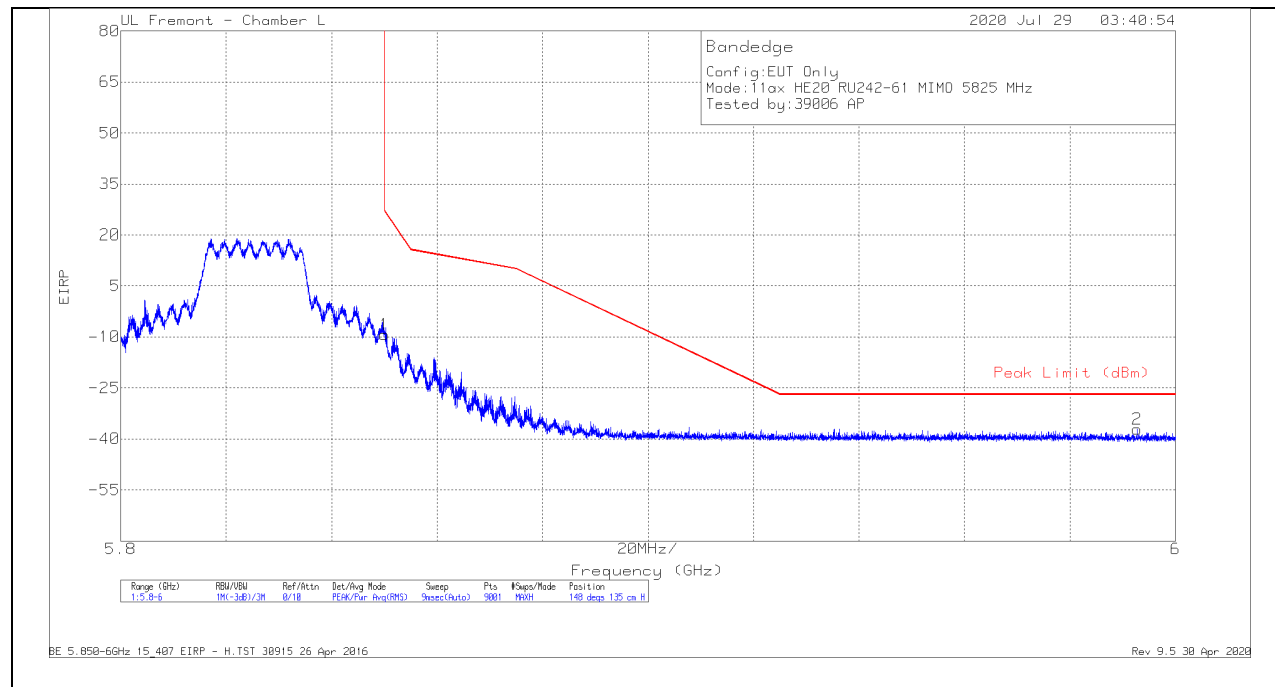
ADR - U-NII AD primary method, RMS average

6.3.4. TX ABOVE 1 GHz 802.11ax HE20 MODE IN THE 5.8 GHz BAND

5.8GHz Band, Ax, HE 20 242 Tone

BANDEDGE (HIGH CHANNEL)

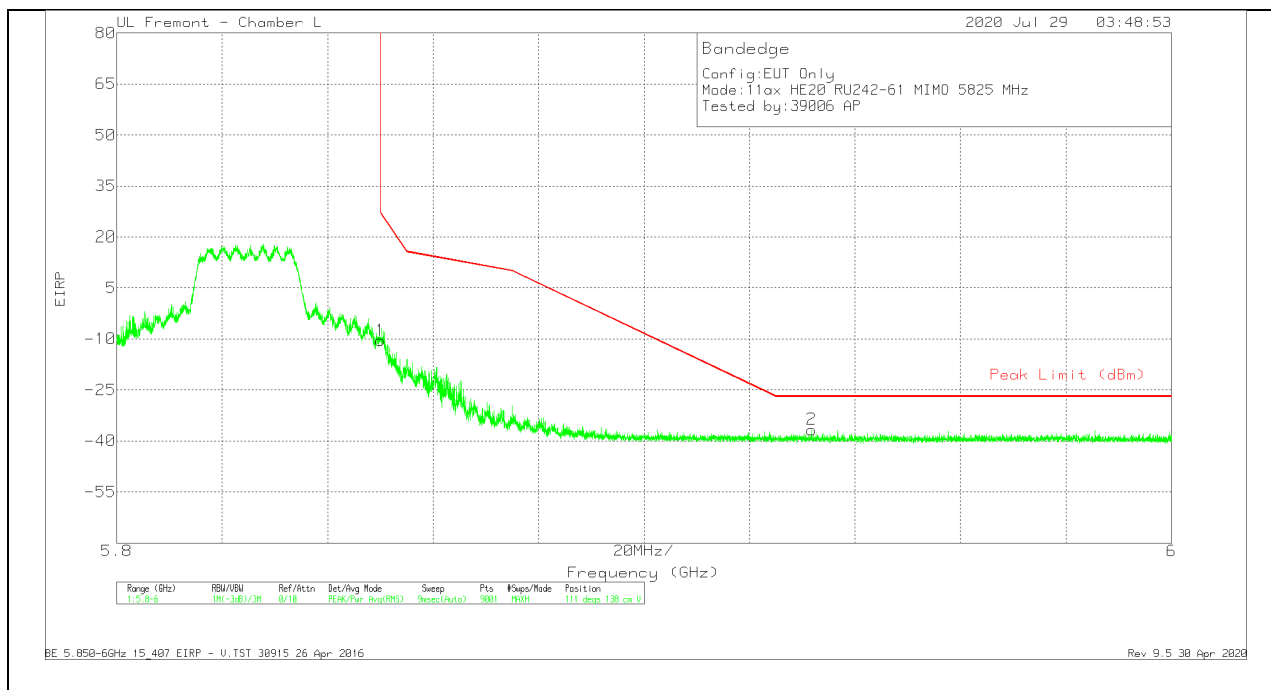
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF 344 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85002	-39.42	Pk	35	-16.7	11.8	-9.32	26.95	-36.27	148	135	H
2	5.99273	-68.18	Pk	35.3	-16	11.8	-37.08	-27	-10.08	148	135	H

Pk - Peak detector

VERTICAL RESULT



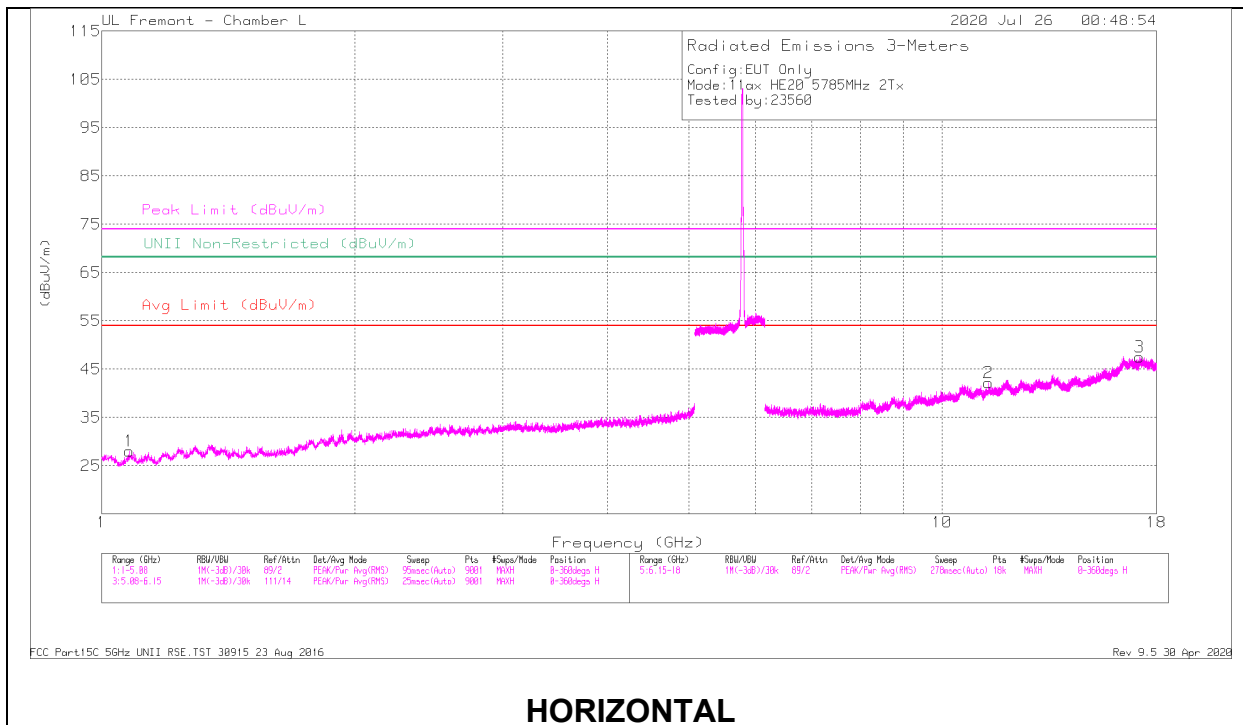
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF 344 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85002	-40.44	Pk	35	-16.7	11.8	-10.34	26.95	-37.29	111	138	V
2	5.93173	-67.35	Pk	35.2	-16.3	11.8	-36.65	-27	-9.65	111	138	V

Pk - Peak detector

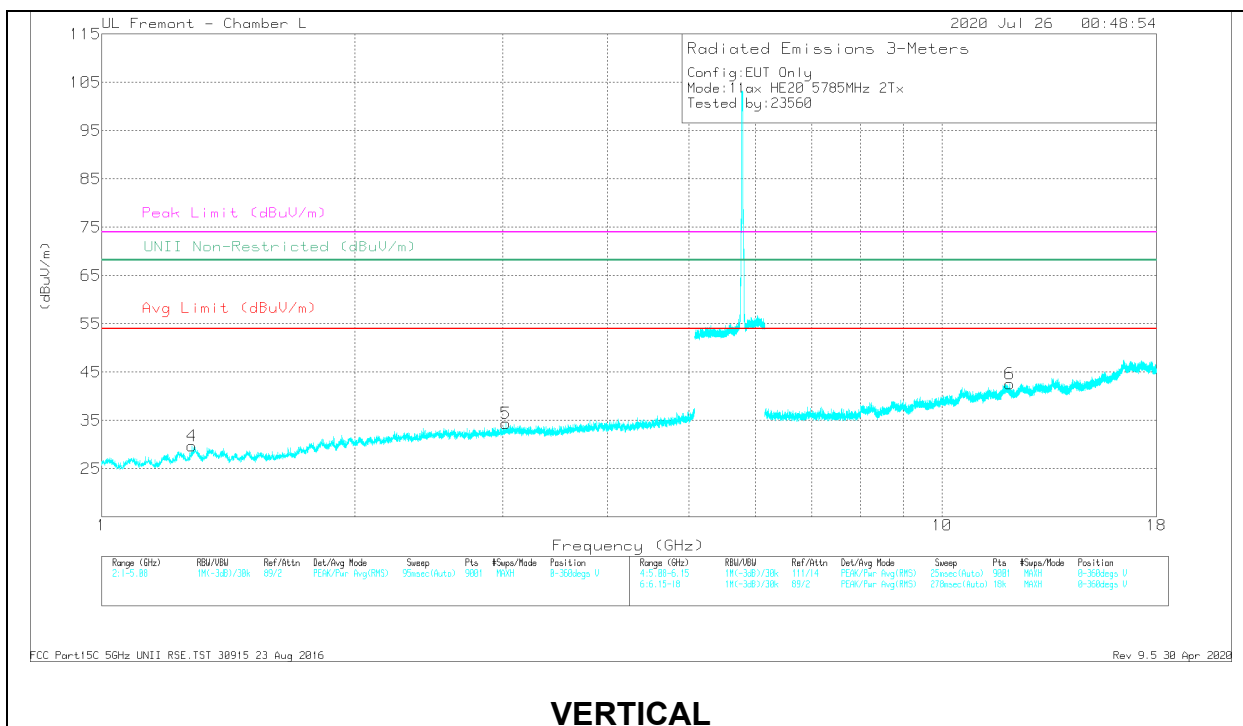
HARMONICS AND SPURIOUS EMISSIONS

2TX Antenna 5 + Antenna 6 OFDMA MODE

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 344 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.07894	41.83	PK-U	27.3	-34	35.13	-	-	74	-38.67	-	-	103	156	H
	* 1.07872	32.09	ADR	27.3	-34	25.39	54	-28.61	-	-	-	-	103	156	H
4	* 1.27982	40.71	PK-U	28.9	-33.1	36.51	-	-	74	-37.49	-	-	173	108	V
	* 1.27846	30.86	ADR	29	-33.2	26.66	54	-27.34	-	-	-	-	173	108	V
5	3.03021	38.23	PK-U	32.8	-29.4	41.63	-	-	-	-	68.2	-26.57	199	215	V
2	* 11.35255	29.47	PK-U	38	-19.6	47.87	-	-	74	-26.13	-	-	330	154	H
	* 11.34902	19.02	ADR	38	-19.7	37.32	54	-16.68	-	-	-	-	330	154	H
3	17.18711	50.06	PK-U	41.7	-17.3	54.48	-	-	-	-	68.2	-13.72	280	186	H
6	* 12.03844	29.86	PK-U	38.8	-20	43.66	-	-	74	-25.34	-	-	318	254	V
	* 12.04202	19.74	ADR	38.7	-20	38.44	54	-15.56	-	-	-	-	318	254	V

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

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

6.4. REFERENCE DETAIL

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

Equipment Class	Reference FCC ID & IC	Reference Report	Report Title/Section
NII	BCG-E3542A 579C-E3542A	13179116-E5 (FCC) 13179116-E6 (IC) 13179116-E5 & E6	FCC IC_UNII Report / All sections

*-E5 report is conducted measurements for FCC, -E6 is conducted for Canada, -E5 & E6 contains radiated emissions data.

6.5. DESCRIPTION OF TEST SETUP

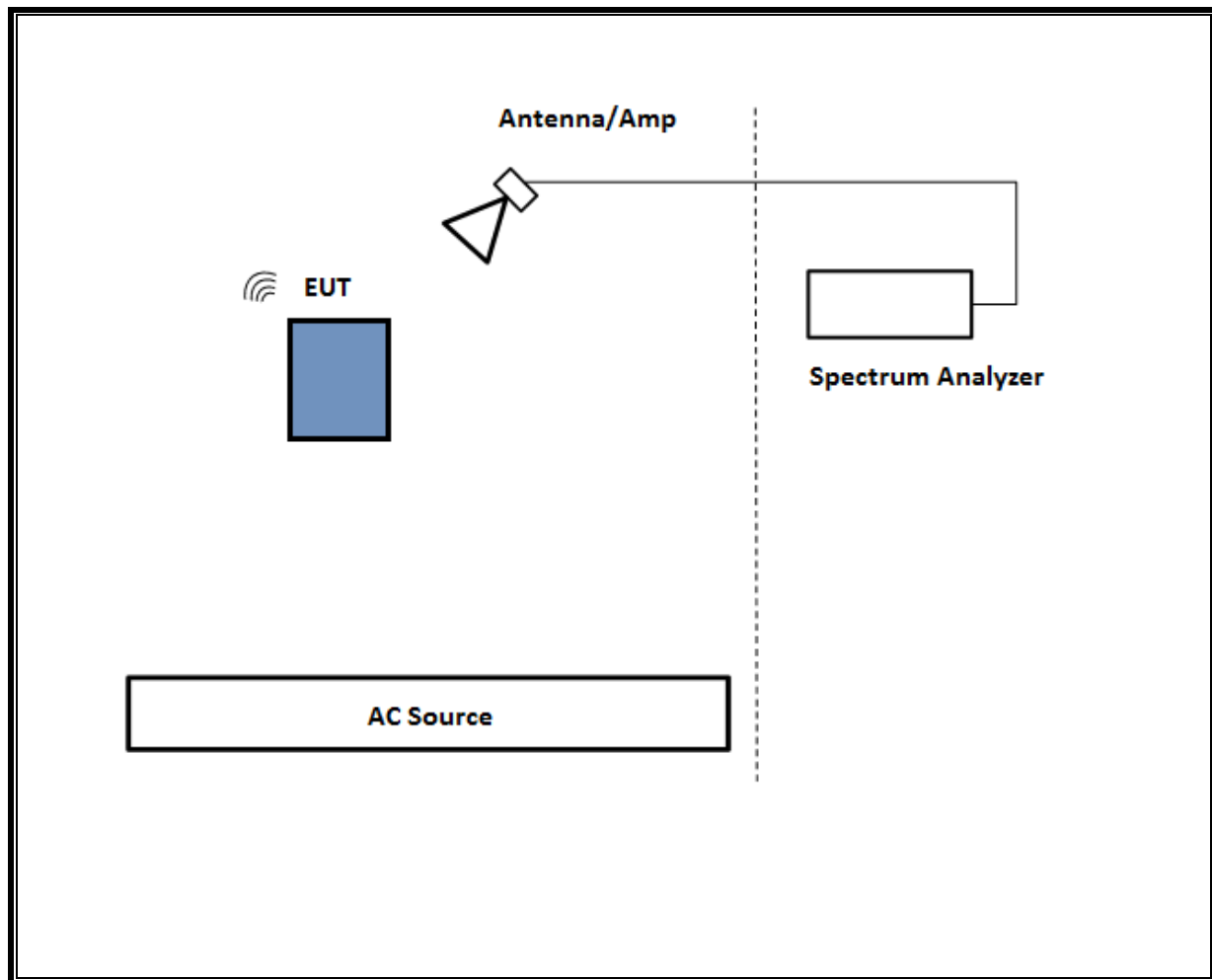
SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Apple	A1989	C02YL3ZMJHC8	BCGA1989
Laptop 61W USBC-C AC/DC adapter	Liteon Technology	A1718	C4N711404U3GN8RAW	NA
EUT AC Adapter	Apple	A2305	D292365CDYADHLHC3	NA

I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
NA						

SETUP DIAGRAM FOR RADIATED TESTS Above 1GHz



6.6. WORST-CASE CONFIGURATION AND MODE

For radiated harmonics spurious 1-18GHz L/M/H channels were performed with the EUT set at the 2TX CDD mode based on model A2172 with power setting equal or higher than SISO modes as worst-case scenario.

Investigated worst-case data rates as listed below were:

802.11ax HE20, MCS 0, MCS11

7. MEASUREMENT METHOD

Test Item	Test Method
Unwanted emissions in restricted bands:	KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.
Unwanted emissions in non-restricted bands	KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.
Band-edge	ANSI C63.10-2013, Section 6.10.

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 Due
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	05/26/2021	05/26/2020
Amplifier, 1 to 18GHz, 35dB	Amplical	AFS42-00101800-25-S-42	T1568	04/14/2021	04/14/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0180917	02/26/2021	02/26/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	11/01/2020	11/01/2019
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1569	01/30/2021	01/30/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A-544	T1210	01/21/2021	01/21/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	11/01/2020	11/01/2019
EMI Test Receiver	Rohde & Schwarz	ESW44	Pre0179372	02/25/2021	02/25/2020
Amplifier, 1 to 18GHz, 35dB	Amplical	AFS42-00101800-25-S-42	T1567	01/24/2021	01/24/2020
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	Rev 9.5, 30 Apr, 2020

9. SETUP PHOTOS

Please refer to 13179116-EP1 for setup photos

Appendix A - Conducted Data for FCC Part 15 E

Attached is the test report (13179116-E5) containing the reference data form the parent model as detailed in section 6.4. This data will only be included in the report submitted for FCC filing



TEST REPORT

Report Number: 13179116-E5V2

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

Model : A2172

FCC ID : BCG-E3542A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
September 08, 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	8/26/2020	Initial issue	Chin Pang
V2	9/8/2020	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: A2172

SERIAL NUMBER: G6TZX04APT5N, G6TCQ01XQ5HX

DATE TESTED: FEBUARY 19, 2020 – AUGUST 21, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	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:



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

2. 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 662911 D01 v02r01, FCC KDB 789033 D02 v02r01, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2

3. 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 (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☐ Chamber I (ISED:2324A-5)
☐ Chamber B (ISED:2324B-2)	☒ Chamber E (ISED:22541-2)	☒ Chamber J (ISED:2324A-6)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)	☐ Chamber K (ISED:2324A-1)
	☐ Chamber G (ISED:22541-4)	☒ Chamber L (ISED:2324A-3)
	☒ Chamber H (ISED:22541-5)	

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

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

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

4.2. 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.)

4.3. 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%.

5. EQUIPMENT UNDER TEST

5.1. 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.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.2 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 1TX			
5180-5240	802.11a	Covered by 802.11n HT20 1TX	
5180-5240	802.11n HT20	19.85	96.61
5190-5230	802.11n HT40	20.65	116.14
5180-5240	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5190-5230	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5210	802.11ac VHT80	16.45	44.16
5180-5240	802.11ax HE20, 242-Tones	19.82	95.94
5180-5240	802.11ax HE20, 26-Tones	11.96	15.70
5190-5230	802.11ax HE40, 484-Tones	20.74	118.58
5190-5230	802.11ax HE40, 26-Tones	11.89	15.45
5210	802.11ax HE80, 996 Tones	15.60	36.31
5210	802.11ax HE80, 26 Tones	11.95	15.67
5.2 GHz band, 2TX			
5180-5240	802.11n HT20 CDD	19.72	93.76
5180-5240	802.11n HT20 SDM/STBC	Covered by 802.11n HT20 2TX CDD	
5190-5230	802.11n HT40 CDD	22.09	161.81
5190-5230	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5180-5240	802.11ac VHT20 SDM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5190-5230	802.11ac VHT40 SDM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5210	802.11ac VHT80 CDD	18.36	68.55
5210	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5180-5240	802.11ax HE20 OFDMA, 242-Tones	19.90	97.72
5180-5240	802.11ax HE20 OFDMA, 26-Tones	11.77	15.03
5190-5230	802.11ax HE40 OFDMA, 484-Tones	22.25	167.88
5190-5230	802.11ax HE40 OFDMA, 26-Tones	11.76	15.00
5210	802.11ax HE80 OFDMA, 996-Tones	15.96	39.45
5210	802.11ax HE80 OFDMA, 26-Tones	21.73	148.94

5.3 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 1TX			
5260 - 5320	802.11a	Covered by 802.11n HT20 1TX	
5260 - 5320	802.11n HT20	19.95	98.86
5270 - 5310	802.11n HT40	20.54	113.24
5260 - 5320	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5270 - 5310	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5290	802.11ac VHT80	16.48	44.46
5260 - 5320	802.11ax HE20, 242-Tones	19.96	99.08
5260 - 5320	802.11ax HE20, 26-Tones	11.98	15.78
5270 - 5310	802.11ax HE40, 484-Tones	20.78	119.67
5270 - 5310	802.11ax HE40, 26-Tones	11.81	15.17
5290	802.11ax HE80, 996-Tones	15.96	39.45
5290	802.11ax HE80, 26-Tones	11.94	15.63
5.3 GHz band, 2TX			
5260 - 5320	802.11n HT20 CDD	19.95	98.86
5260 - 5320	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5270 - 5310	802.11n HT40 CDD	21.98	157.76
5270 - 5310	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5260 - 5320	802.11ac VHT20 SDM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5270 - 5310	802.11ac VHT40 SDM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5290	802.11ac VHT80 CDD	18.26	66.99
5290	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5260 - 5320	802.11ax HE20 OFDMA, 242-Tones	19.84	96.38
5260 - 5320	802.11ax HE20 OFDMA, 26-Tones	11.94	15.63
5270 - 5310	802.11ax HE40 OFDMA, 484-Tones	21.84	152.76
5270 - 5310	802.11ax HE40 OFDMA, 26-Tones	11.90	15.49
5290	802.11ax HE80 OFDMA, 996-Tones	17.86	61.09
5290	802.11ax HE80 OFDMA, 26-Tones	11.95	15.67

5.6 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6 GHz band, 1TX			
5500-5720	802.11a	Covered by 802.11n HT20 1TX	
5500-5720	802.11n HT20	19.96	99.08
5510-5710	802.11n HT40	20.88	122.46
5500-5720	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5510-5710	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5530-5690	802.11ac VHT80	21.54	142.56
5500-5720	802.11ax HE20, 242-Tones	19.99	99.77
5500-5720	802.11ax HE20, 26-Tones	11.98	15.78
5510-5710	802.11ax HE40, 484-Tones	20.98	125.31
5510-5710	802.11ax HE40, 26-Tones	11.96	15.70
5530-5690	802.11ax HE80, 996-Tones	21.45	139.64
5530-5690	802.11ax HE80, 26-Tones	11.96	15.70
5.6 GHz band, 2TX			
5500-5720	802.11n HT20 CDD	19.68	92.90
5500-5720	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5510-5710	802.11n HT40 CDD	21.57	143.55
5510-5710	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5500-5720	802.11ac VHT20 SDM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5510-5710	802.11ac VHT40 SDM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5530-5690	802.11ac VHT80 CDD	21.73	148.94
5530-5690	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5500-5720	802.11ax HE20 OFDMA, 242-Tones	19.74	94.19
5500-5720	802.11ax HE20 OFDMA, 26-Tones	11.94	15.63
5510-5710	802.11ax HE40 OFDMA, 484-Tones	21.58	143.88
5510-5710	802.11ax HE40 OFDMA, 26-Tones	11.95	15.67
5530-5690	802.11ax HE80 OFDMA, 996-Tones	21.59	144.21
5530-5690	802.11ax HE80 OFDMA, 26-Tones	11.96	15.70

5.8 GHz BAND (FCC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 1TX			
5745-5825	802.11a	Covered by 802.11n HT20 1TX	
5745-5825	802.11n HT20	21.43	139.00
5755-5795	802.11n HT40	20.94	124.17
5745-5825	802.11ac VHT20	Covered by 802.11n HT20 1TX	
5755-5795	802.11ac VHT40	Covered by 802.11n HT40 1TX	
5775	802.11ac VHT80	20.42	110.15
5745-5825	802.11ax HE20, 242-Tones	21.46	139.96
5745-5825	802.11ax HE20, 26-Tones	21.47	140.28
5755-5795	802.11ax HE40, 484-Tones	20.93	123.88
5755-5795	802.11ax HE40, 26-Tones	20.94	124.17
5775	802.11ax HE80, 996-Tones	20.44	110.66
5775	802.11ax HE80, 26-Tones	21.47	140.28
5.8 GHz band, 2TX			
5745-5825	802.11n HT20 CDD	23.06	202.30
5745-5825	802.11n HT20 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5755-5795	802.11n HT40 CDD	22.69	185.78
5755-5795	802.11n HT40 SDM/STBC	Covered by 802.11n HT40 2TX CDD	
5745-5825	802.11ac VHT20 STM/STBC/CDD	Covered by 802.11n HT20 2TX CDD	
5755-5795	802.11ac VHT40 STM/STBC/CDD	Covered by 802.11n HT40 2TX CDD	
5775	802.11ac VHT80 CDD	22.03	159.59
5775	802.11ac VHT80 SDM/STBC	Covered by 802.11ac VHT80 2TX CDD	
5745-5825	802.11ax HE20 OFDMA, 242-Tones	23.04	201.37
5745-5825	802.11ax HE20 OFDMA, 26-Tones	23.08	203.24
5755-5795	802.11ax HE40 OFDMA, 484-Tones	22.65	184.08
5755-5795	802.11ax HE40 OFDMA, 26-Tones	22.71	186.64
5775	802.11ax HE80 OFDMA, 996-Tones	22.07	161.06
5775	802.11ax HE80 OFDMA, 26-Tones	22.08	161.44

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range	ANT 6 (Core 0)	ANT 5 (Core 1)
5180 - 5240	0.9	-4.3
5260 – 5320	1.8	-3.0
5500 - 5720	2.2	-1.4
5745 - 5825	-1.1	-2.9

5.4. SOFTWARE AND FIRMWARE

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

5.5. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z on Ant 6 (Core 0) and Ant 5 (Core 1). It was determined that X (Flatbed) orientation was the worst-case orientation for Ant 6; and Y (Landscape) orientation was the worst case for Ant 5 and Y (Landscape) for 2TX.

For radiated harmonics spurious below 1GHz, 1-18GHz L/M/H channels, 18-40GHz, and power line conducted emissions were performed with the EUT set at the 2TX CDD mode among the CDD/SDM modes with power setting equal or higher than SISO modes as worst-case scenario.

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

Below 1GHz tests were performed with EUT connected to AC power adapter as the worst case; and for above 1GHz, the worst-case configuration reported was tested 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 lowest tone had the highest PSD readings. Therefore, full testing was performed on both the highest and lowest tones.

For simultaneous transmission with the Bluetooth was investigated, no noticeable emission was found.

Investigated worst-case data rates as listed below were:

802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ac VHT80 mode: MCS0
802.11ax HE20/HE40/HE80 FULL RU & RU26

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Apple	A1989	C02YL3ZMJHC8	BCGA1989
Laptop 61W USBC-C AC/DC adapter	Liteon Technology	A1718	C4N711404U3GN8RAW	NA
EUT AC Adapter	Apple	A2305	D292365CDYADHLHC3	NA

I/O CABLES

I/O Cable List						
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	N/A
3	AC	1	AC	Un-shielded	2	N/A

I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
NA						

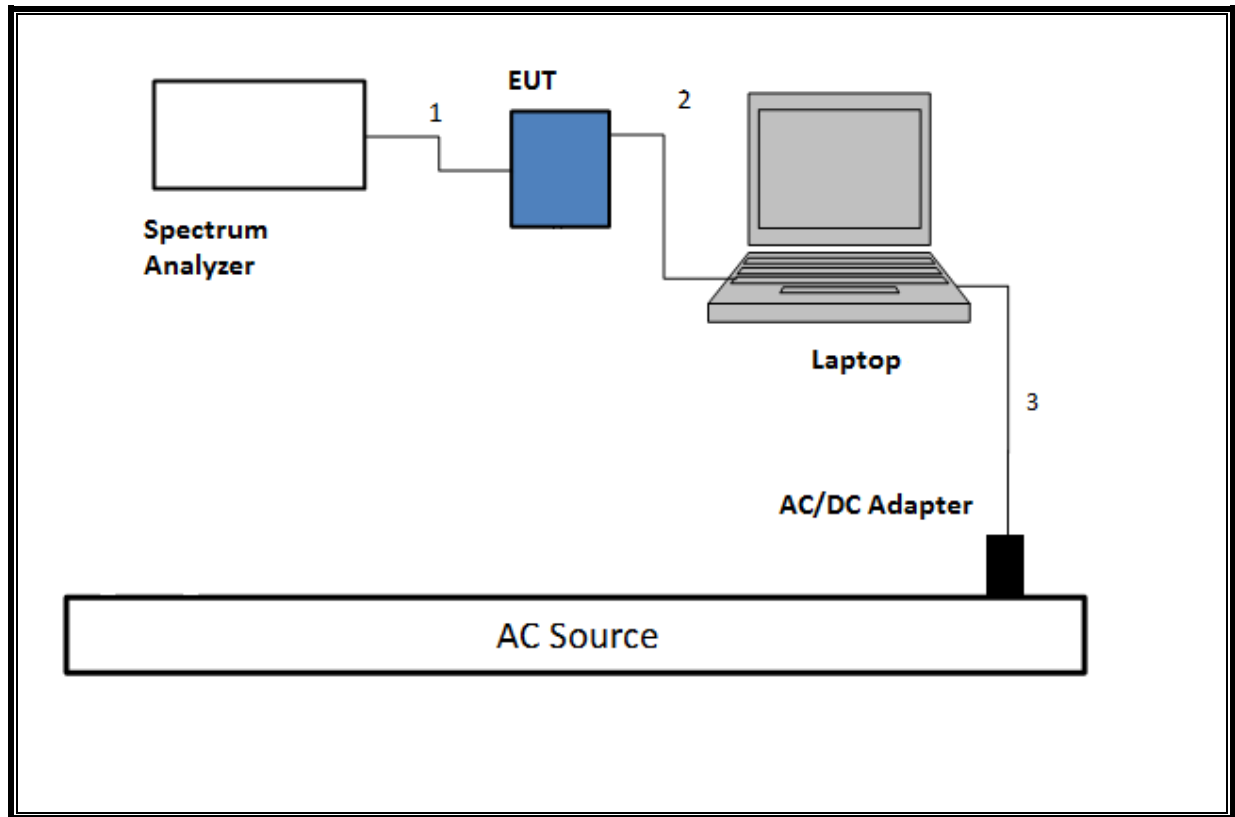
I/O CABLES (BELOW 1GHz AND AC POWER LINE TEST WITH ADAPTER AND LAPTOP)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Shielded	1	N/A

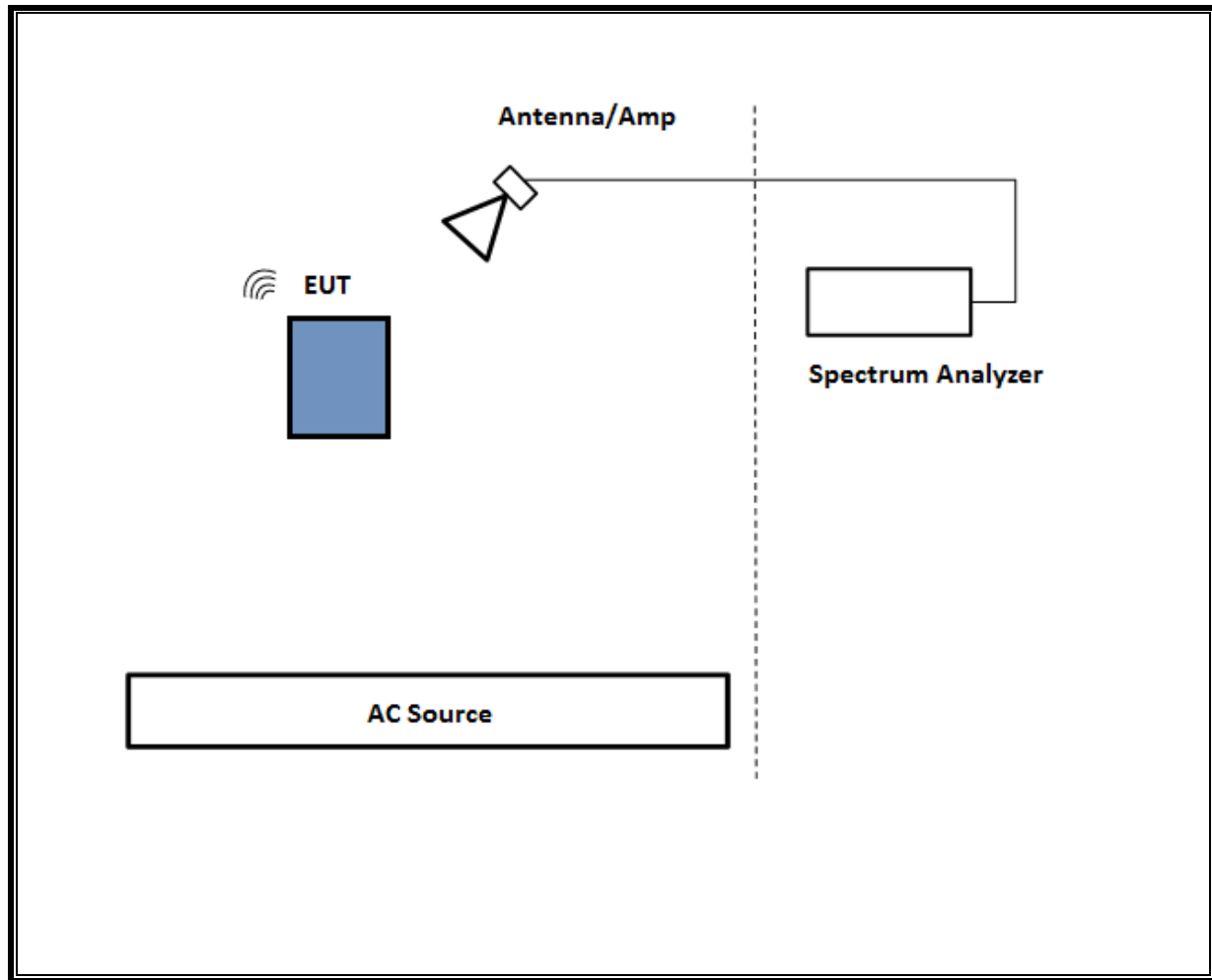
TEST SETUP - CONDUCTED TESTS

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

SETUP DIAGRAM

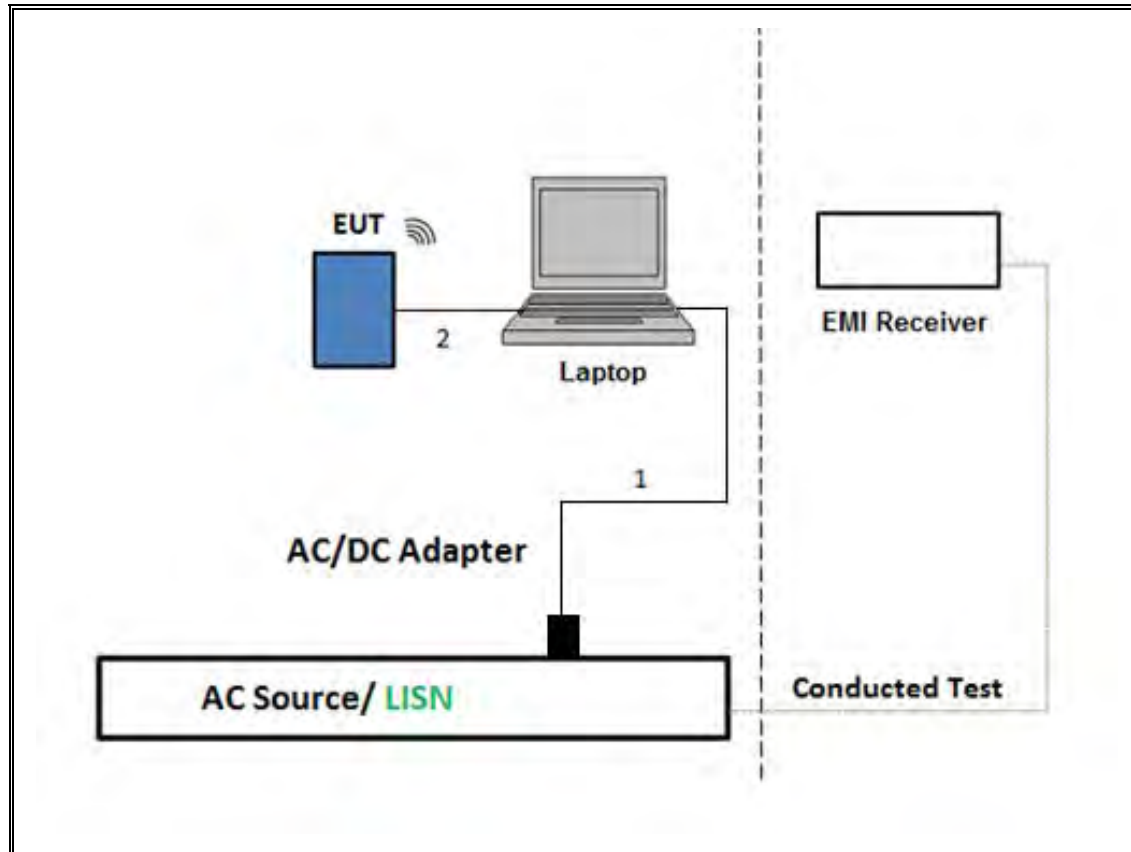


SETUP DIAGRAM FOR RADIATED TESTS Above 1GHz



The diagram illustrates an EMC test setup. On the left, an **AC Source/ LISN** (green text) is connected to an **AC/DC Adapter**, which is then connected to the **EUT** (blue box). A vertical dashed line separates the **Conducted Test** region from the **Radiated Test** region. In the **Conducted Test** region, the **EUT** is connected to the **AC/DC Adapter**. In the **Radiated Test** region, the **EUT** is connected to an **Antenna/Amp**, which is then connected to a **Spectrum Analyzer**. The **Spectrum Analyzer** is also connected to the **AC/DC Adapter** via a green line. The **EUT** is labeled with a small antenna symbol and the number **1**.

TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



6. MEASUREMENT METHOD

Test Item	Test Method
On Time and Duty Cycle:	KDB 789033 D02 v02r01, Section B.
6 dB Emission BW:	KDB 789033 D02 v02r01, Section C.2
26 dB Emission BW	KDB 789033 D02 v02r01, Section C.1
99% Occupied BW	KDB 789033 D02 v02r01, Section D.
Conducted Output Power	KDB 789033 D02 v02r01, Section E.3.b (Method PM-G) and KDB 789033 D02 v02r01, Section E.2.b (Method SA-1), Section E.2.d (Method SA-2)
Power Spectral Density	KDB 789033 D02 v02r01, Section F
Unwanted emissions in restricted bands:	KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.
Unwanted emissions in non- restricted bands	KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.
Band-edge	ANSI C63.10-2013, Section 6.2.
AC Power Line Conducted Emissions	<u>ANSI C63.10-2013 Section 6.4</u>

7. 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
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T712	3/9/2021
Amplifier, 1 to 18GHz, 35dB	Miteq	AFS42-00101800-25-S-42	138301	3/3/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	1/23/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	11/1/2020
Amplifier, 1 to 18GHz, 35dB	Miteq	AFS42-00101800-25-S-42	T1567	1/24/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1210	1/21/2021
Antenna, Horn 1-18GHz	A.H Systems Inc.	SAS-571	T963	1/25/2021
Amplifier, 1 to 18GHz, 35dB	Miteq	AFS42-00101800-25-S-42	T1567	01/24/2021
EMI Test Receiver	Rohde & Schwarz	ESW44	PRE0179372	2/25/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	5/26/2021
Amplifier, 1 to 18GHz, 35dB	Miteq	AFS42-00101800-25-S-42	T1568	4/14/2021
EMI Test Receiver	Rohde & Schwarz	ESW44	PRE0179367	2/26/2021
Antenna, Broadband Hybrid, 30MHz to 3000MHz	Sunol Sciences Corp.	JB3	PRE0184052	11/12/2020
Amplifier, 100KHz to 1GHz, 32dB	Keysight Technologies	8447D	T15	10/26/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T907	1/22/2021
EMI Test Receiver	Rohde & Schwarz	ESW44	PRE0179522	2/20/2021
Antenna Horn, 18 to 26GHz	ARA	SWH-28	T125	4/17/2021
Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	4/8/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T905	1/24/2021
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T339	1/21/2021
Power Meter, P-series single channel	Keysight	N1911A	PRE0177682	01/21/2021
Power Sensor	Keysight	N1921A	T1226	02/13/2021
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T757	10/01/2020

*Testing is completed before equipment expiration date.

AC Line Conducted				
Description	Manufacturer	Model	ID Num	Cal Due
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	T1436	02/20/2021
Power Cable, Line Conducted Emissions	UL	PG1	T861	10/27/2020
LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	T1310	01/23/2021
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Rev 9.5, 30 Apr, 2020	
Conducted Software	UL	UL EMC	AP2020.8.6	
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 21 Feb 2020	

8. ANTENNA PORT TEST RESULTS

8.1. 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)
5GHz Band						
802.11n HT20 1Tx MCS0	1.930	1.950	0.990	98.97%	0.00	0.010
802.11n HT20 1Tx MCS7	0.231	0.251	0.920	92.04%	0.36	4.325
802.11n HT20 CDD MCS0	1.930	1.960	0.985	98.47%	0.00	0.010
802.11n HT20 CDD MCS7	0.232	0.252	0.921	92.06%	0.36	4.310
802.11n HT40 1Tx MCS0	0.951	0.972	0.978	97.84%	0.09	1.052
802.11n HT40 1Tx MCS7	0.132	0.152	0.868	86.80%	0.61	7.605
802.11n HT40 CDD MCS0	0.951	0.972	0.978	97.84%	0.09	1.052
802.11n HT40 CDD MCS7	0.132	0.152	0.868	86.80%	0.61	7.605
802.11ac VHT80 1Tx MCS0	0.458	0.478	0.958	95.82%	0.19	2.182
802.11ac VHT80 1Tx MCS9	0.071	0.091	0.783	78.29%	1.06	14.006
802.11ac VHT80 CDD MCS0	0.460	0.480	0.959	95.85%	0.18	2.174
802.11ac VHT80 CDD MCS9	0.071	0.092	0.776	77.60%	1.10	14.085
802.11ax HE20 1Tx, MCS0	1.560	1.580	0.987	98.73%	0.00	0.010
802.11ax HE20 1Tx, MCS11	1.560	1.580	0.987	98.73%	0.00	0.010
802.11ax HE20 OFDMA, MCS0	1.560	1.580	0.987	98.73%	0.00	0.010
802.11ax HE20 OFDMA, MCS11	1.560	1.580	0.987	98.73%	0.00	0.010
802.11ax HE40 1Tx, MCS0	1.545	1.565	0.987	98.72%	0.00	0.010
802.11ax HE40 1Tx, MCS11	1.545	1.565	0.987	98.72%	0.00	0.010
802.11ax HE40 OFDMA, MCS0	1.545	1.565	0.987	98.72%	0.00	0.010
802.11ax HE40 OFDMA, MCS11	1.540	1.565	0.984	98.40%	0.00	0.010
802.11ax HE80 1Tx, MCS0	1.470	1.495	0.983	98.33%	0.00	0.010
802.11ax HE80 1Tx, MCS11	1.475	1.495	0.987	98.66%	0.00	0.010
802.11ax HE80 OFDMA, MCS0	1.475	1.495	0.987	98.66%	0.00	0.010
802.11ax HE80 OFDMA, MCS11	1.475	1.495	0.987	98.66%	0.00	0.010

DUTY CYCLE PLOTS



DUTY CYCLE 802.11n HT20 1TX MODE MCS0



DUTY CYCLE 802.11n HT20 1TX MODE MCS7



DUTY CYCLE 802.11n HT20 CDD MODE MCS0



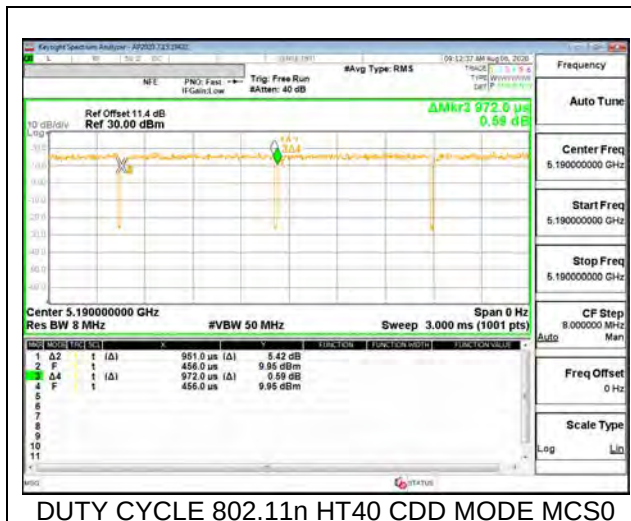
DUTY CYCLE 802.11n HT20 CDD MODE MCS7



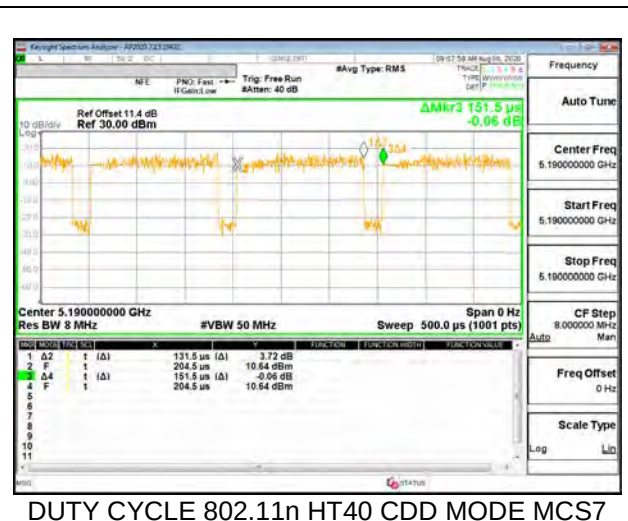
DUTY CYCLE 802.11n HT40 1TX MODE MCS0



DUTY CYCLE 802.11n HT40 1TX MODE MCS7



DUTY CYCLE 802.11n HT40 CDD MODE MCS0



DUTY CYCLE 802.11n HT40 CDD MODE MCS7



DUTY CYCLE 802.11ac VHT80 1TX MODE MCS0



DUTY CYCLE 802.11ac VHT80 1TX MODE MCS9



DUTY CYCLE 802.11ac VHT80 CDD MODE
MCS0



DUTY CYCLE 802.11ac VHT80 CDD MODE
MCS9



802.11ax HE20 1Tx, MCS0



802.11ax HE20 1Tx, MCS11



802.11ax HE20 OFDMA, MCS0



802.11ax HE20 OFDMA, MCS11



802.11ax HE40 1Tx, MCS0



802.11ax HE40 1Tx, MCS11



802.11ax HE40 OFDMA, MCS0



802.11ax HE40 OFDMA, MCS11



802.11ax HE80 1Tx, MCS0



802.11ax HE80 1Tx, MCS11



802.11ax HE80 OFDMA, MCS0



802.11ax HE80 OFDMA, MCS11

8.2. 26 dB & 99% BANDWIDTH

LIMITS

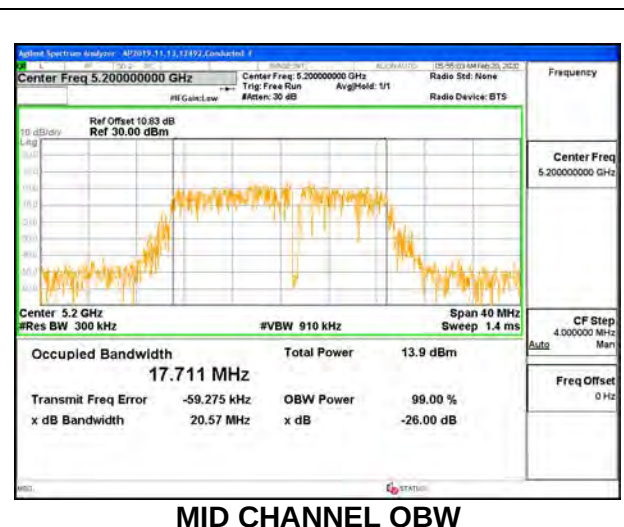
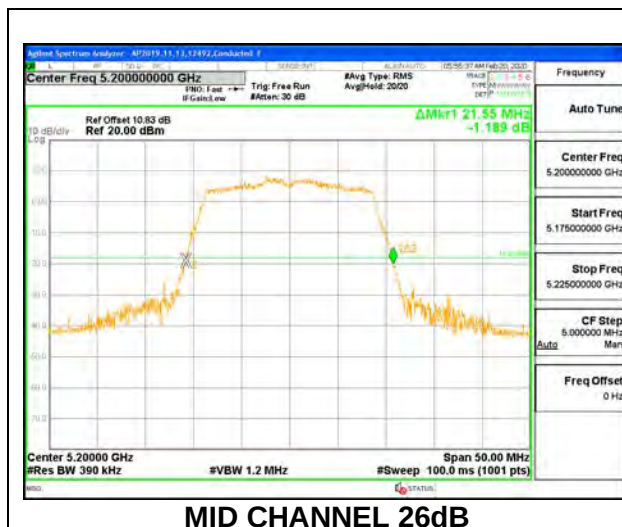
None; for reporting purposes only.

RESULTS

8.2.1. 802.11n HT20 MODE IN THE 5.2 GHz BAND

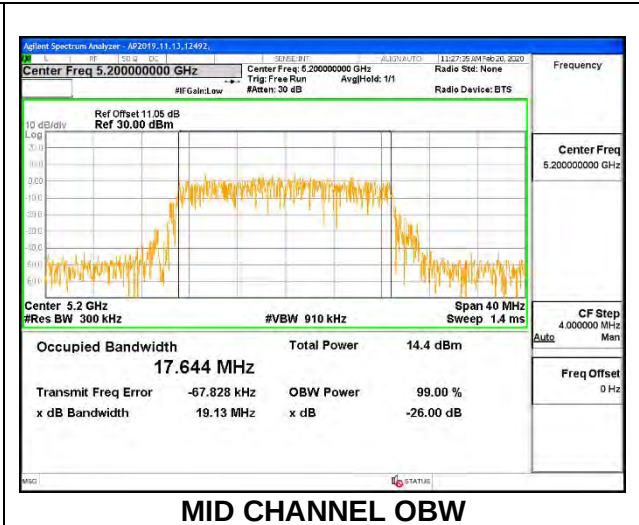
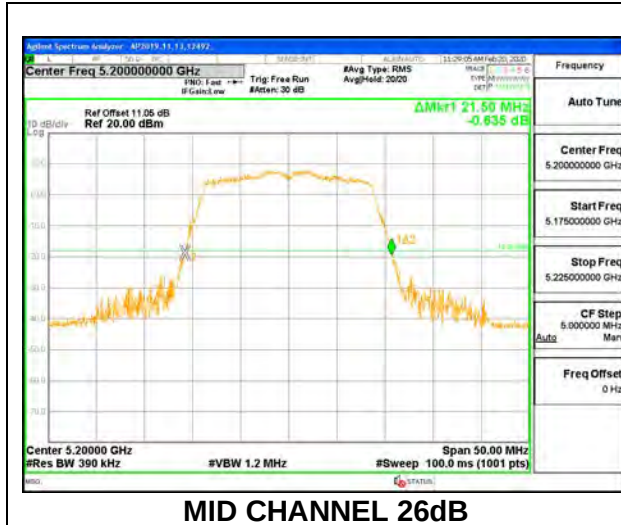
1TX ANT 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	21.60	17.6680
Mid	5200	21.55	17.7110
High	5240	21.40	17.7190



1TX ANT 5 MODE

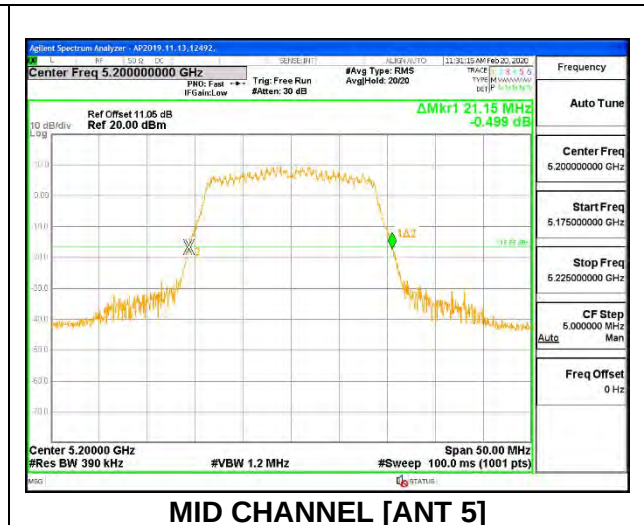
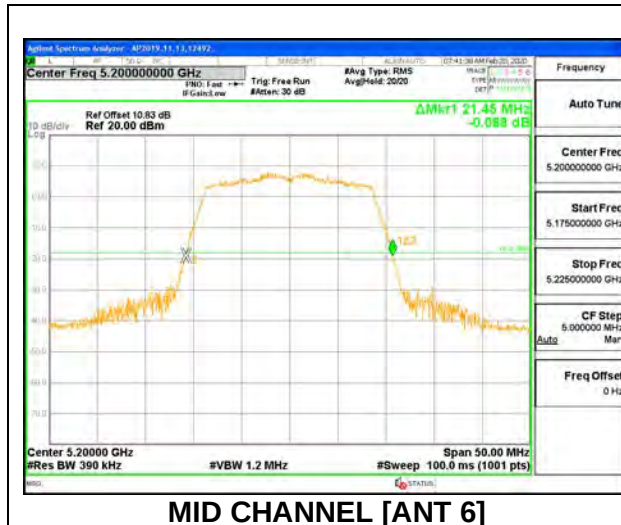
Channel	Frequency	26dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	21.60	17.7330
Mid	5200	21.50	17.6440
High	5240	21.50	17.6290



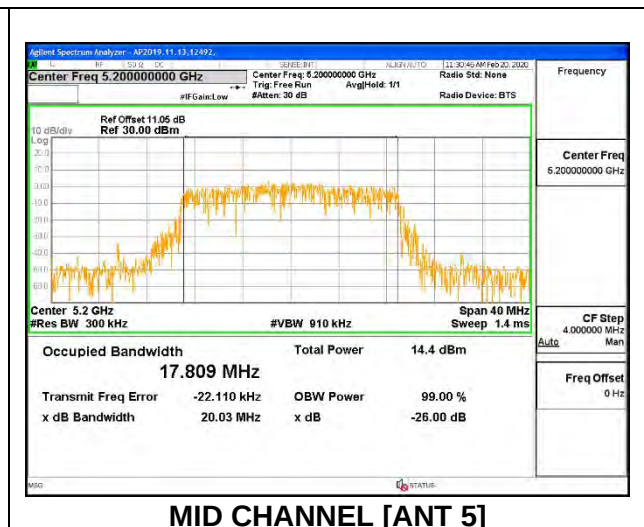
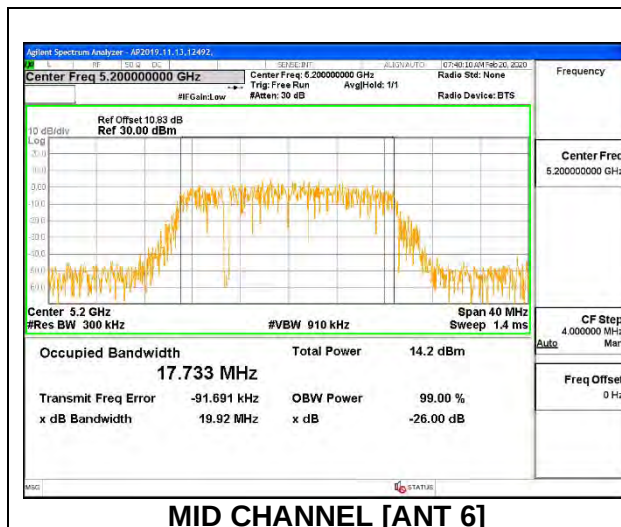
2TX ANT 6 + ANT 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	21.55	21.05	17.6920	17.6470
Mid	5200	21.45	21.15	17.7330	17.8090
High	5240	21.55	21.15	17.6290	17.6300

MID CHANNEL 26dB



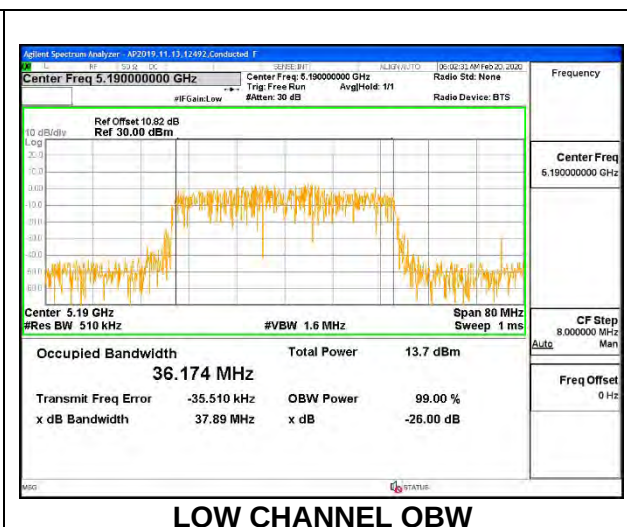
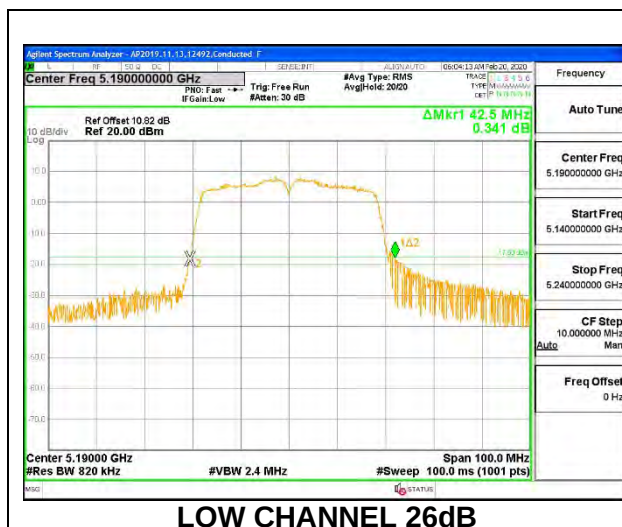
MID CHANNEL OBW



8.2.2. 802.11n HT40 MODE IN THE 5.2 GHz BAND

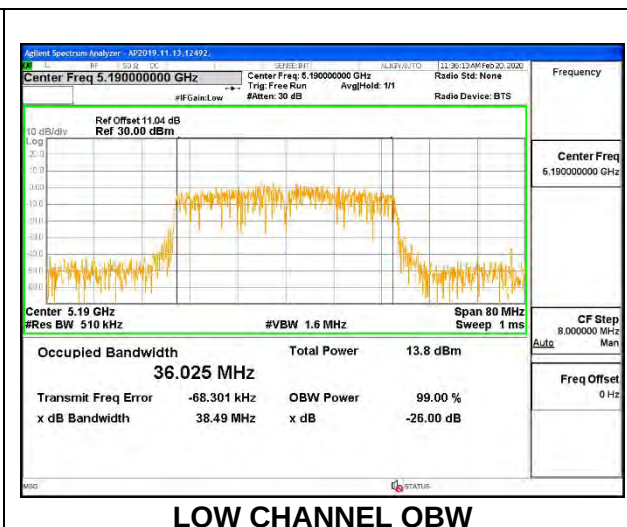
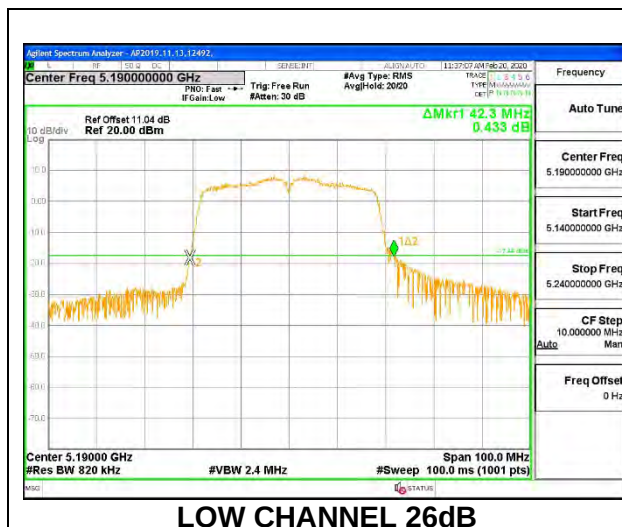
1TX ANT 6 MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	42.50	36.1740
High	5230	43.90	36.0100



1TX ANT 5 MODE

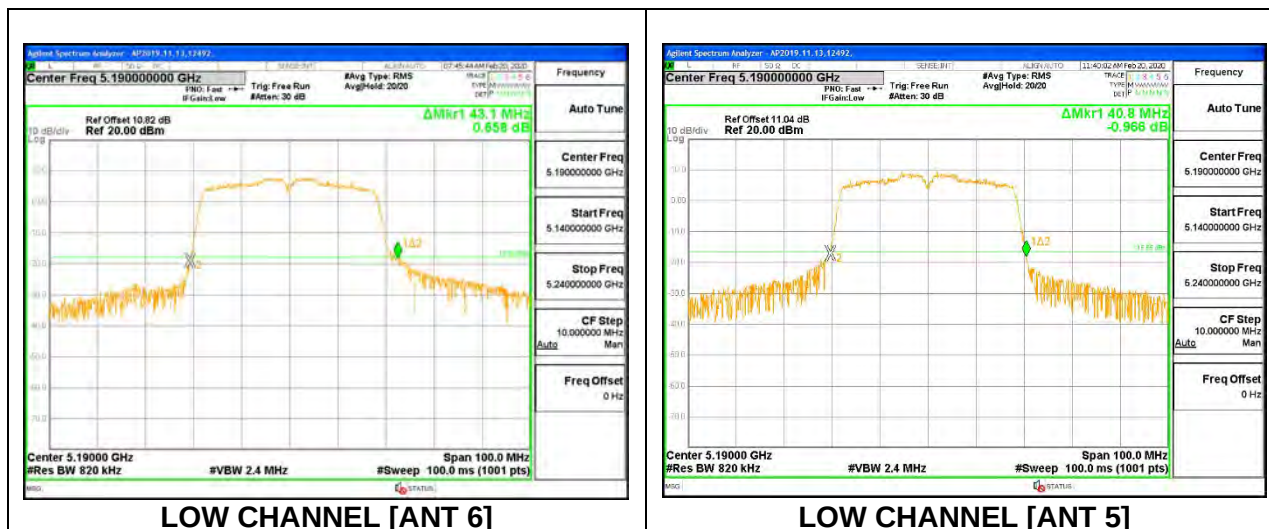
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	42.30	36.0250
High	5230	42.90	36.1460



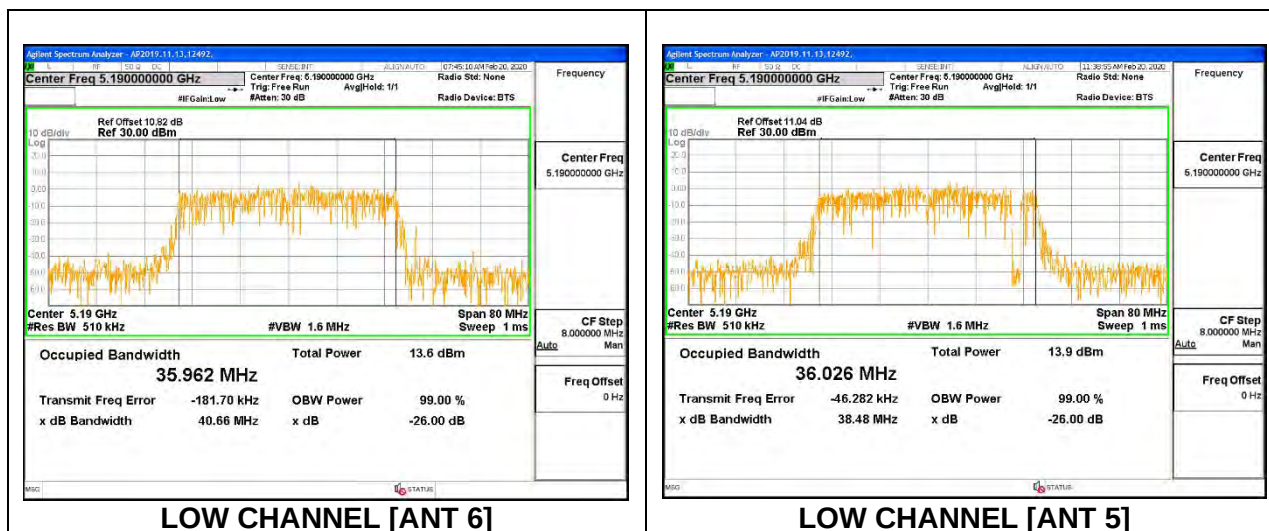
2TX ANT 6 + ANT 5 CDD MODE

Channel	Frequency (MHz)	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	43.10	40.80	35.962	36.026
High	5230	43.00	40.70	36.175	36.113

LOW CHANNEL 26dB



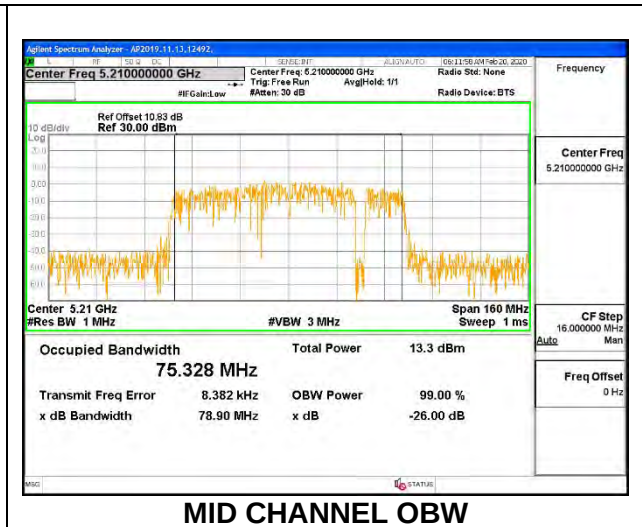
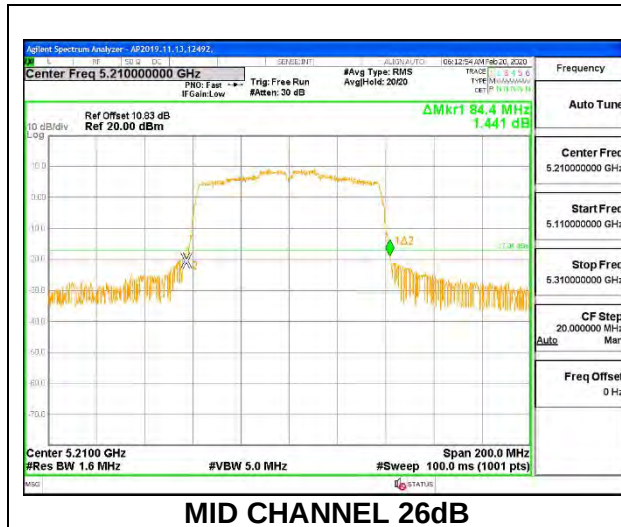
LOW CHANNEL OBW



8.2.3. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

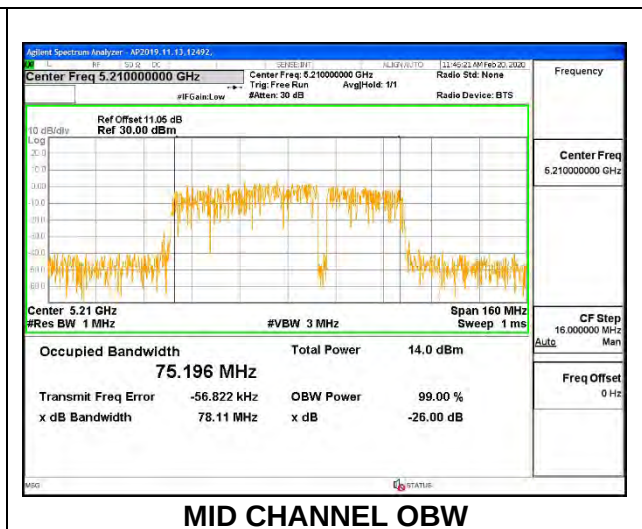
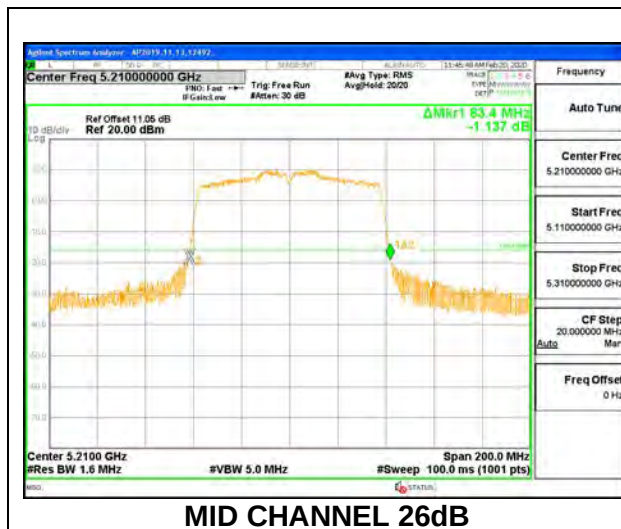
1TX ANT 6 MODE

Channel	Frequency	26dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Mid	5210	84.40	75.3280



1TX ANT 5 MODE

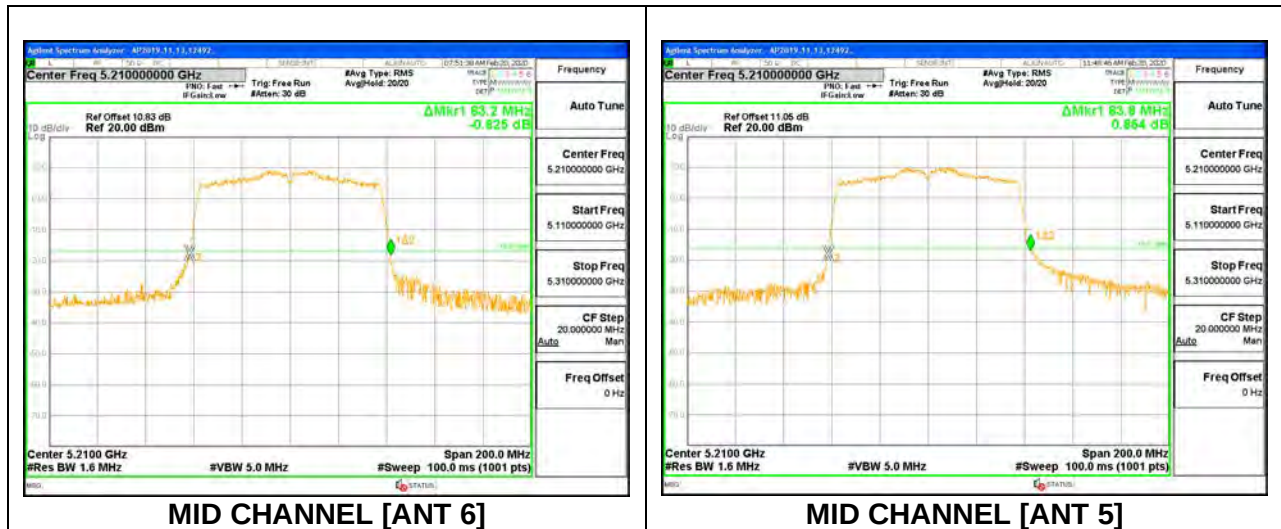
Channel	Frequency	26dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Mid	5210	83.40	75.1960



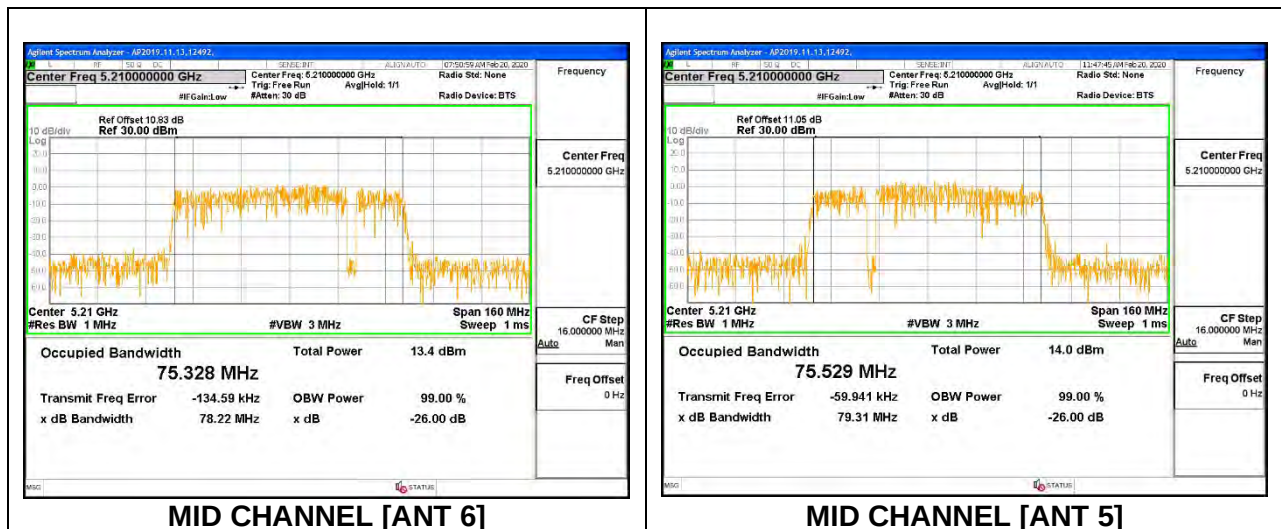
2TX ANT 6 + ANT 5 CDD MODE

Channel	Frequency	26dB Bandwidth Antenna 6 (MHz)	26dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Mid	5210	83.20	83.80	75.3280	75.5290

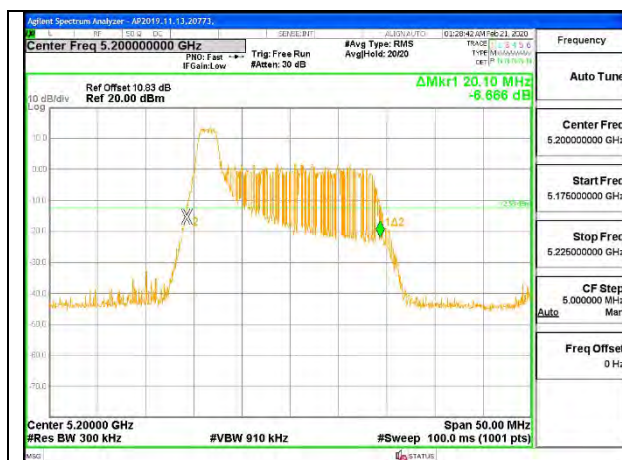
MID CHANNEL 26dB



MID CHANNEL OBW



Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.30	18.3950
Mid	5200	20.10	18.2590
High	5240	20.25	18.2790



MID CHANNEL 26dB

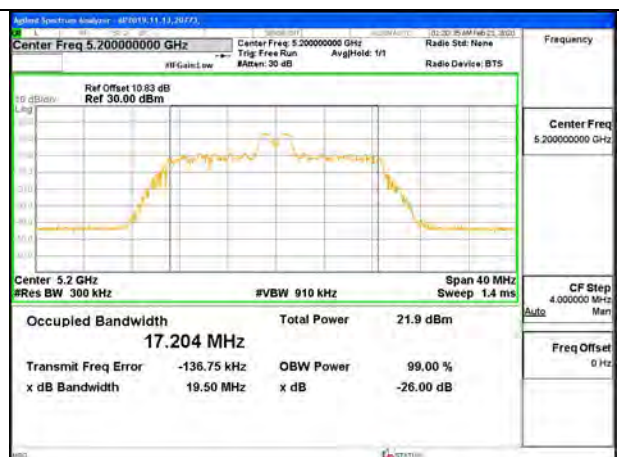


MID CHANNEL OBW

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.30	17.2420
Mid	5200	19.45	17.2040
High	5240	19.35	17.1800



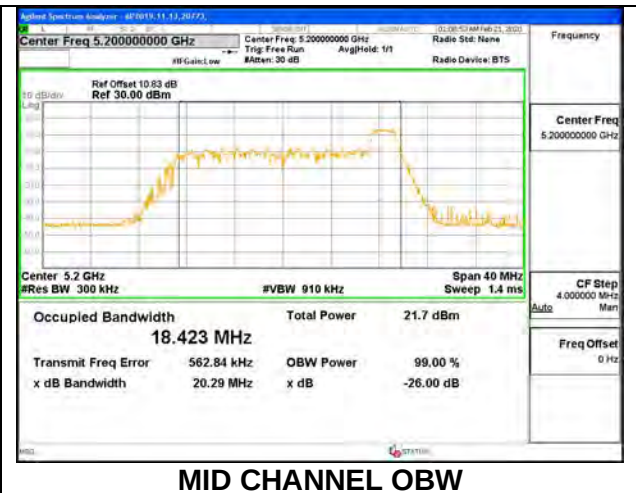
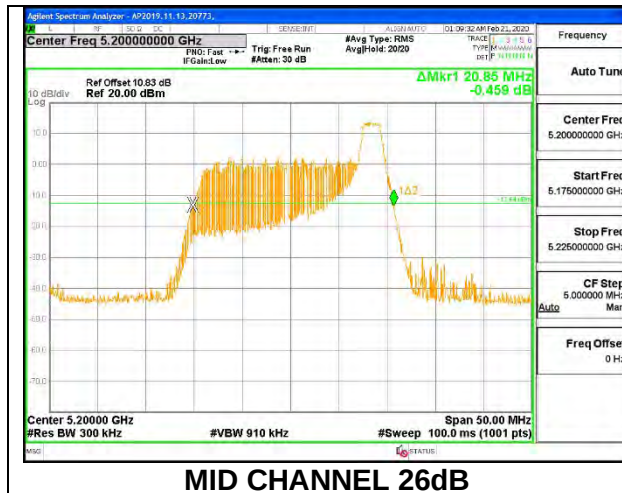
MID CHANNEL 26dB



MID CHANNEL OBW

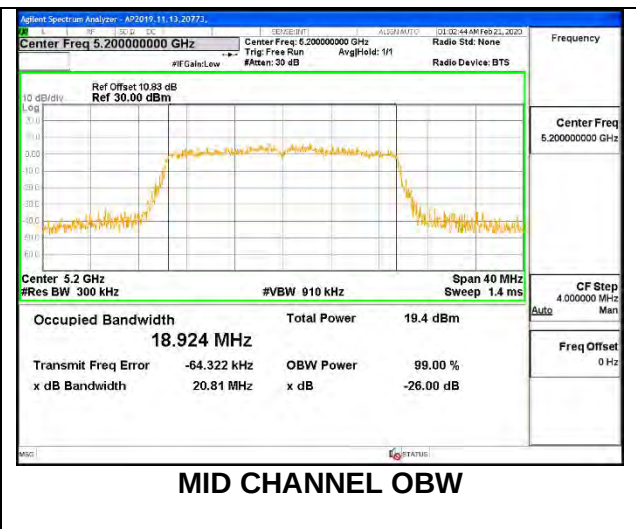
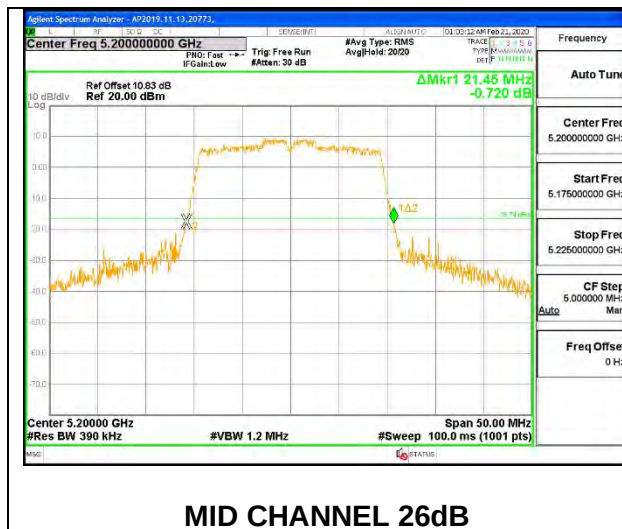
1TX ANT 6 MODE: 26 Tones, RU Index 4

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	20.55	18.5410
Mid	5200	20.85	18.4230
High	5240	20.80	18.5560



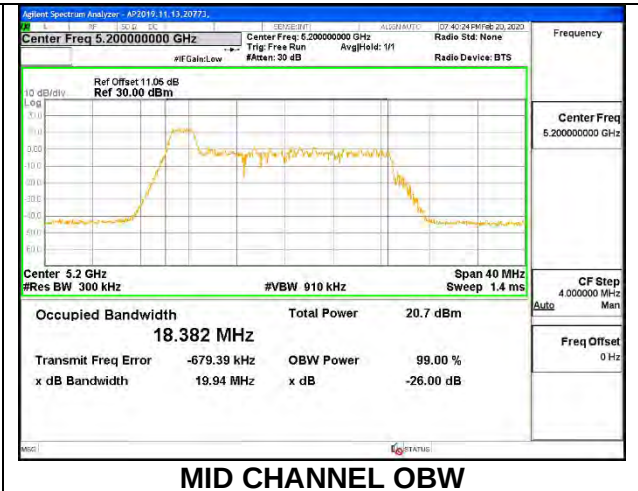
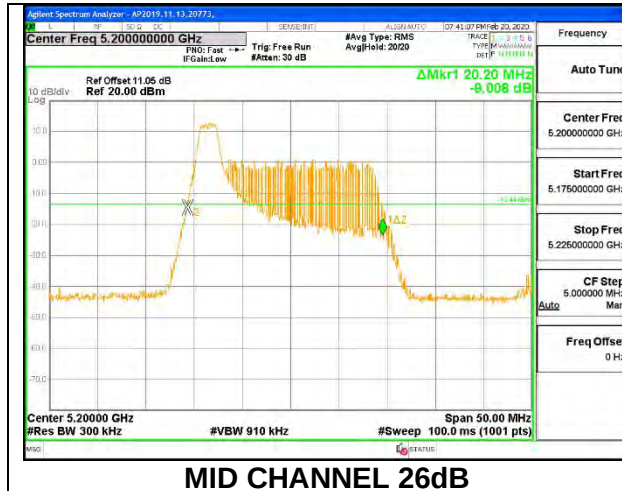
1TX ANT 6 MODE: 242 Tones, RU Index 61

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	21.45	18.8360
Mid	5200	21.45	18.9240
High	5240	21.45	18.8200



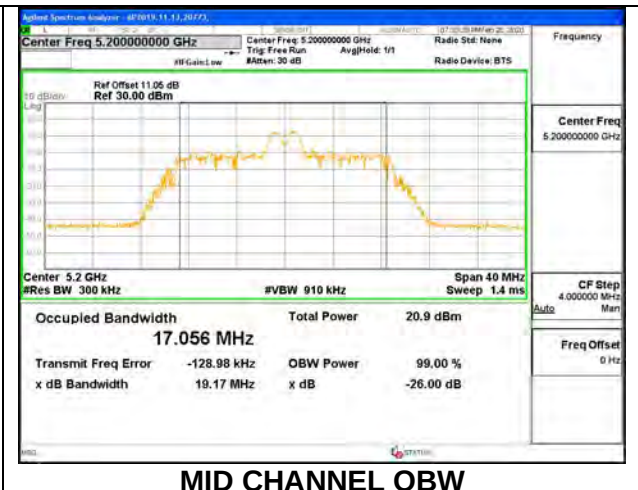
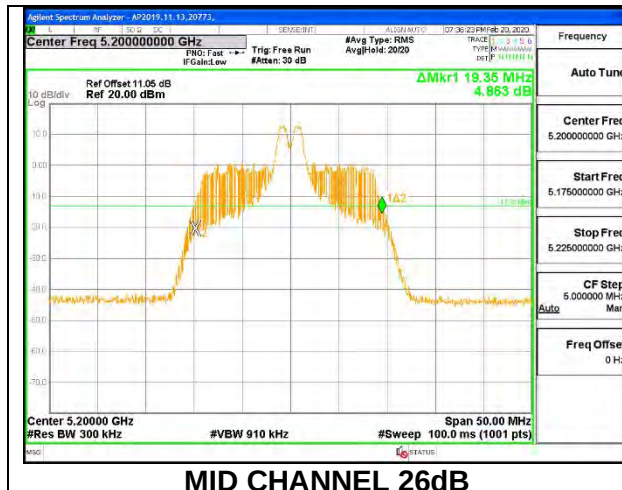
1TX ANT 5 MODE: 26 Tones, RU Index 0

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	20.10	18.3730
Mid	5200	20.20	18.3820
High	5240	20.15	18.2860



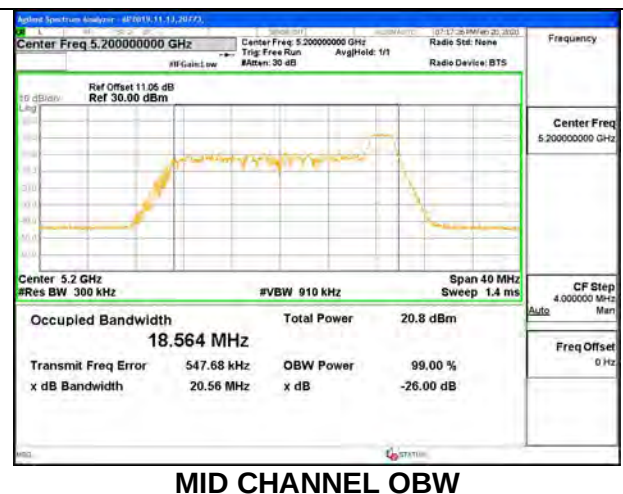
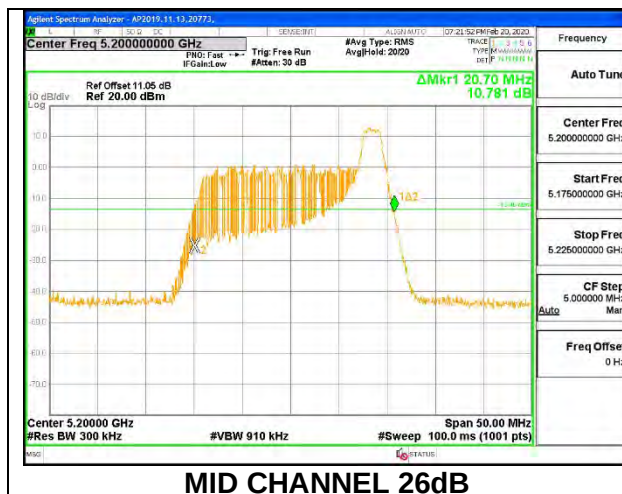
1TX ANT 5 MODE: 26 Tones, RU Index 4

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	19.40	17.1940
Mid	5200	19.35	17.0560
High	5240	19.25	17.1620



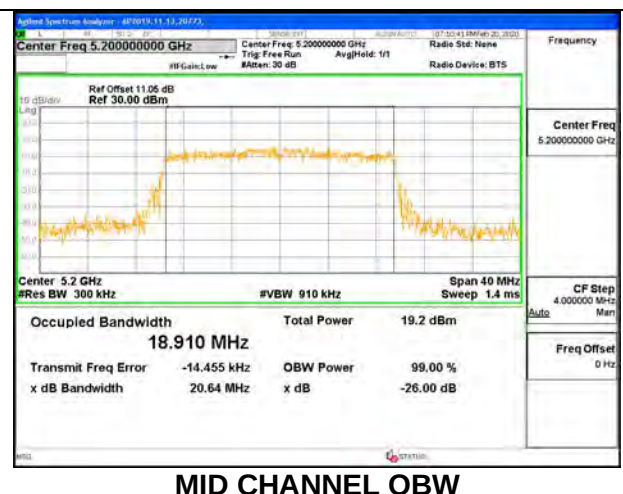
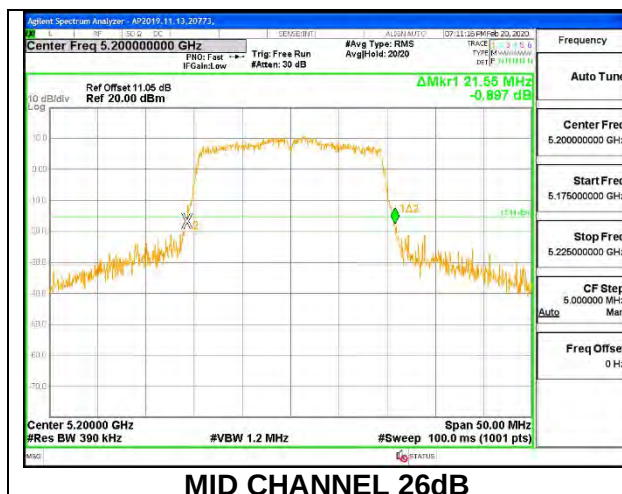
1TX ANT 5 MODE: 26 Tones, RU Index 4

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	20.65	18.5100
Mid	5200	20.70	18.5640
High	5240	20.55	18.2140



1TX ANT 5 MODE: 242 Tones, RU Index 61

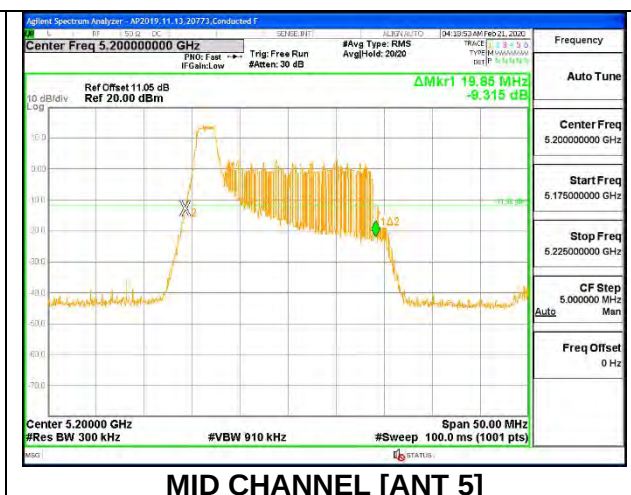
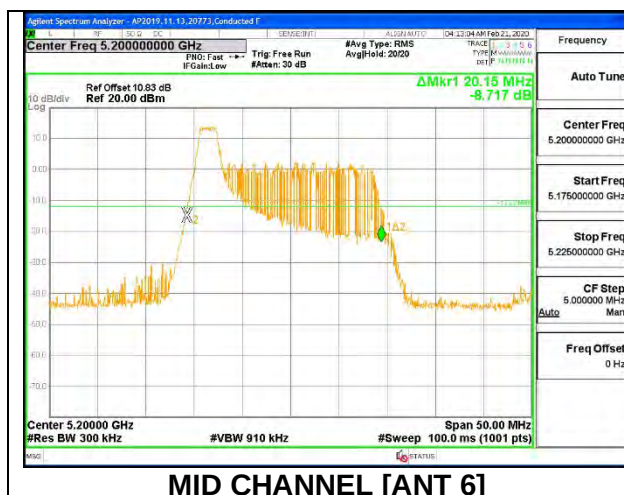
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	21.45	18.7880
Mid	5200	21.55	18.9100
High	5240	21.35	19.0250



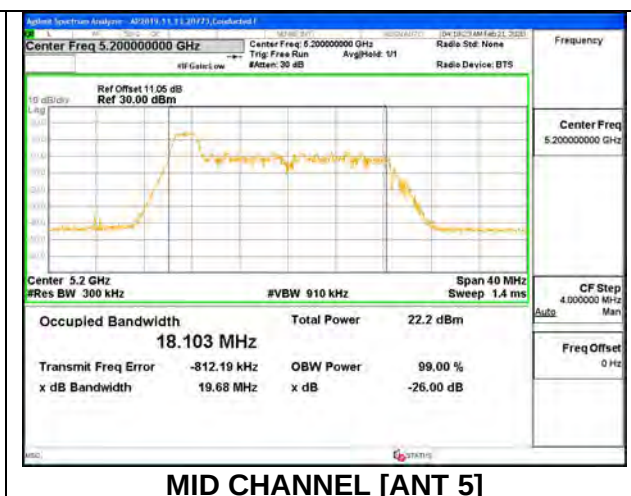
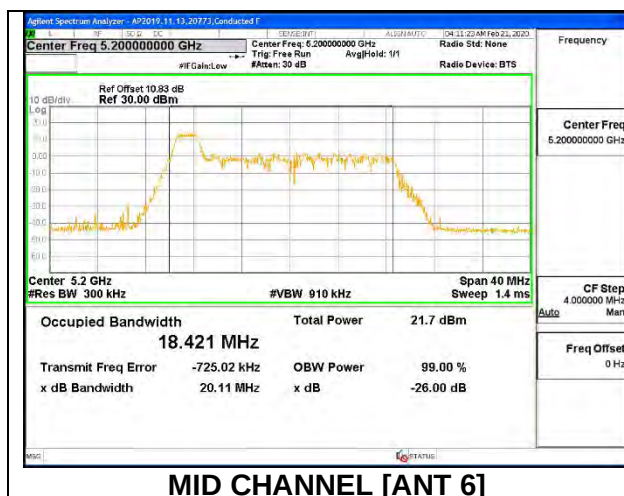
2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 0

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	20.05	19.85	18.2260	18.2970
Mid	5200	20.15	19.85	18.4210	18.1030
High	5240	20.20	20.10	18.3730	18.3230

MID CHANNEL 26dB



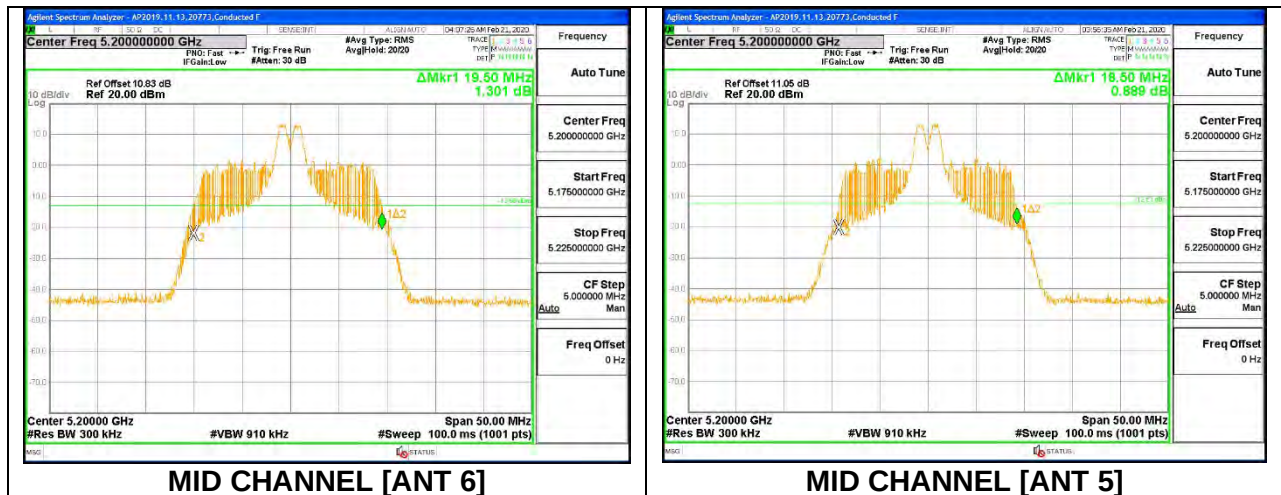
MID CHANNEL OBW



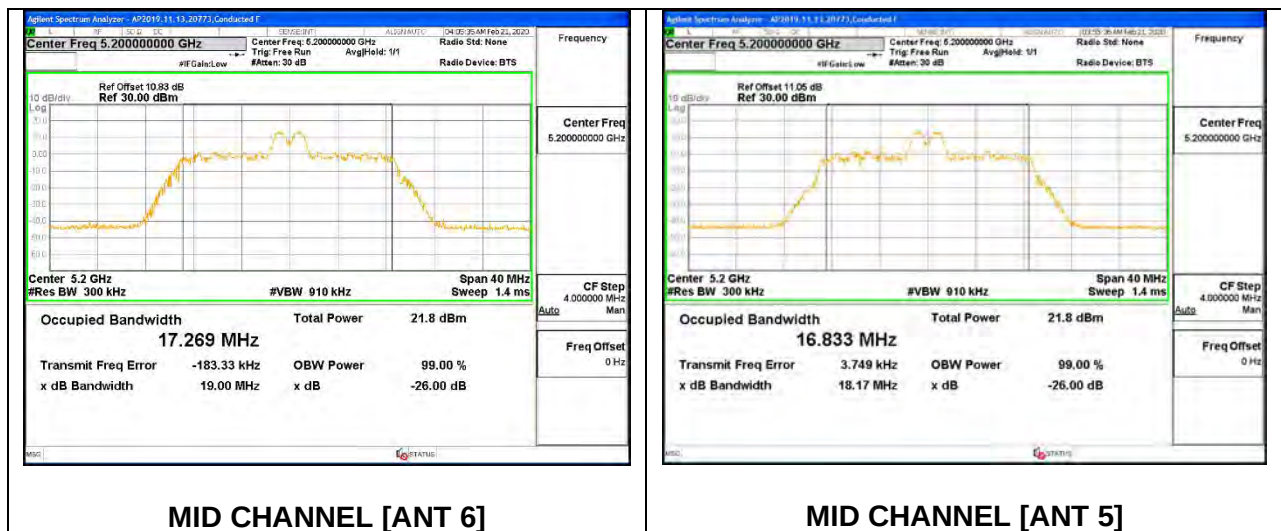
2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 4

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	19.30	18.45	17.0290	17.0130
Mid	5200	19.50	18.50	17.2690	16.8330
High	5240	19.40	18.30	17.2310	17.0140

MID CHANNEL 26dB



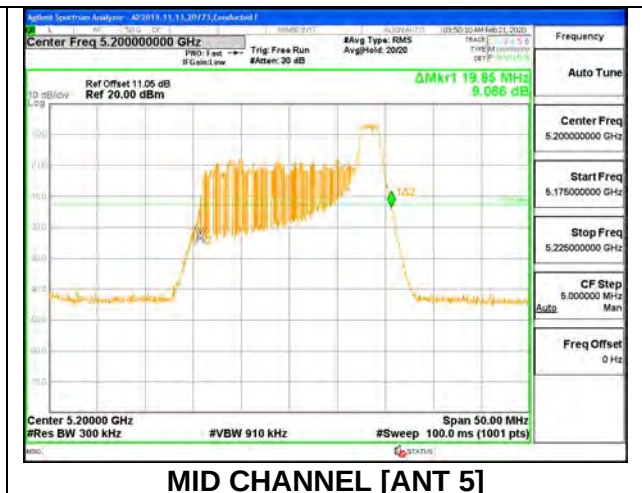
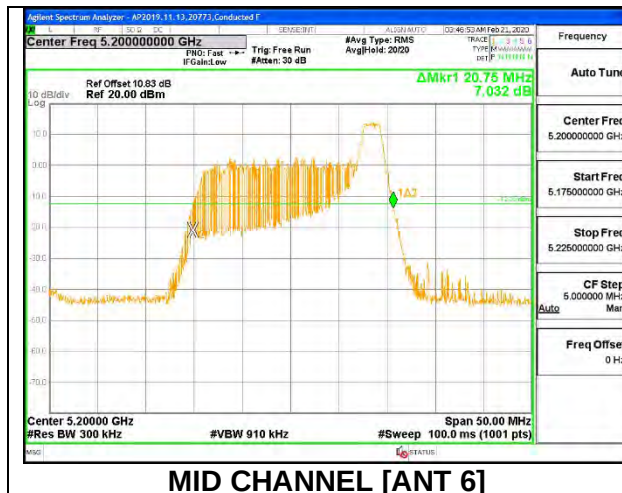
MID CHANNEL OBW



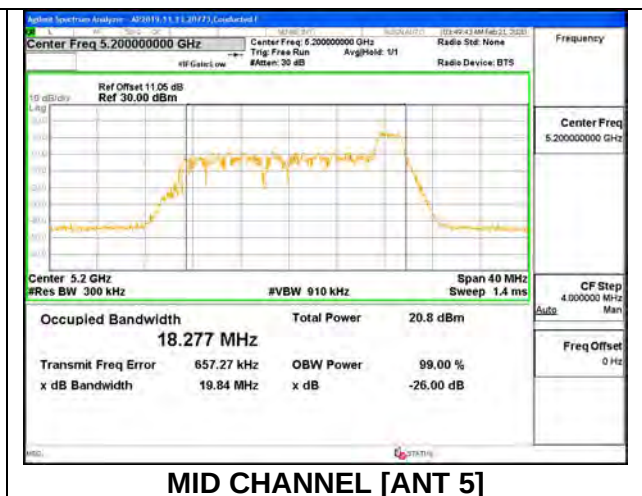
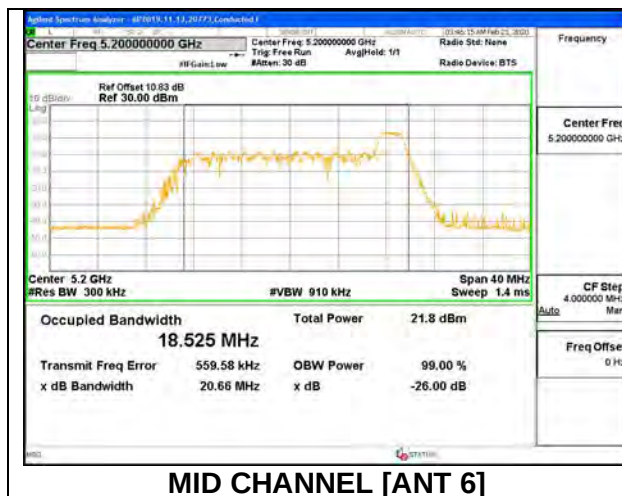
2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 8

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	20.55	19.95	18.3970	18.2690
Mid	5200	20.75	19.85	18.5250	18.2770
High	5240	20.50	19.85	18.4830	18.1530

MID CHANNEL 26dB



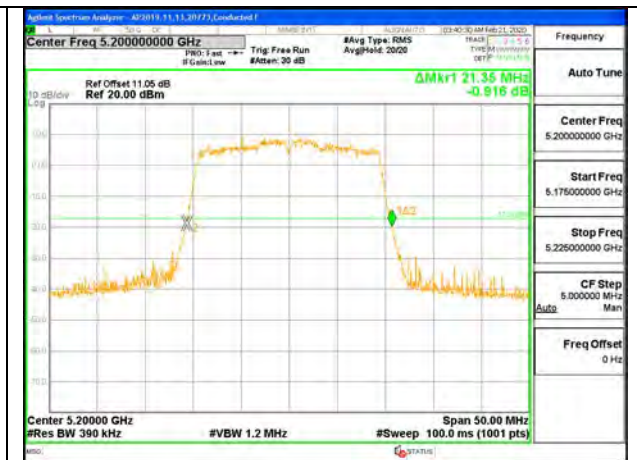
MID CHANNEL OBW



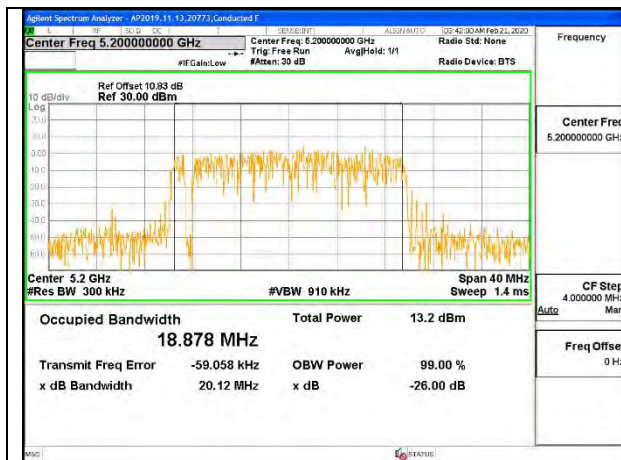
2TX ANT 6 + ANT 5 OFDMA MODE: 242 Tones, RU Index 61

Channel	Frequency (MHz)	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5180	21.40	21.40	18.9400	18.9080
Mid	5200	21.45	21.35	18.8780	19.0070
High	5240	21.45	21.00	18.8590	18.9110

MID CHANNEL 26dB



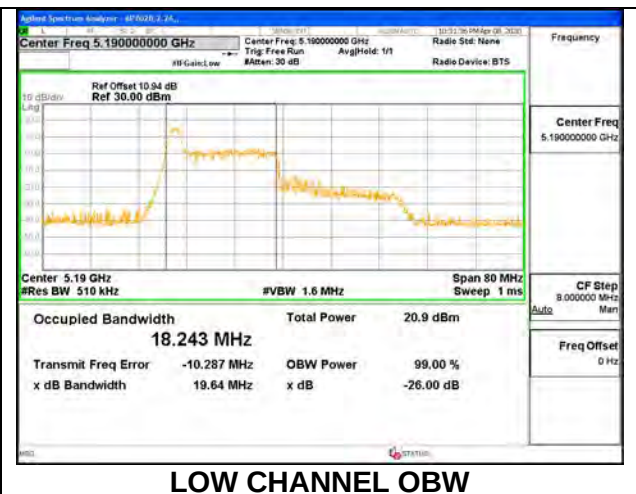
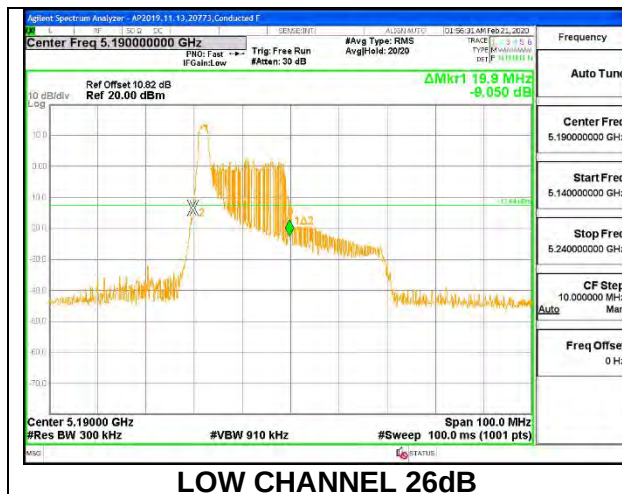
MID CHANNEL OBW



8.2.5. 802.11ax HE40 MODE IN THE 5.2 GHz BAND

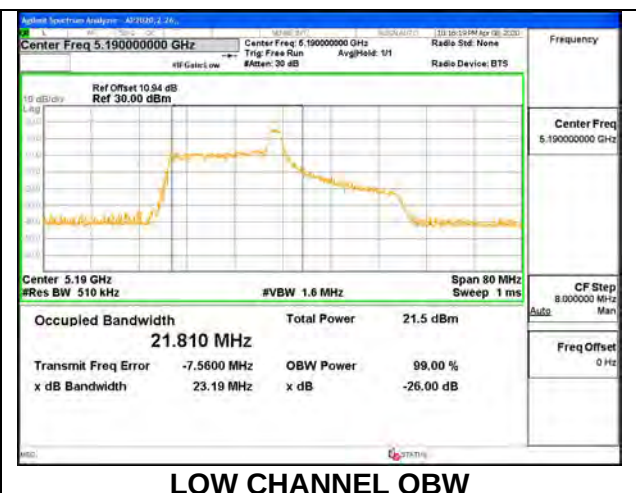
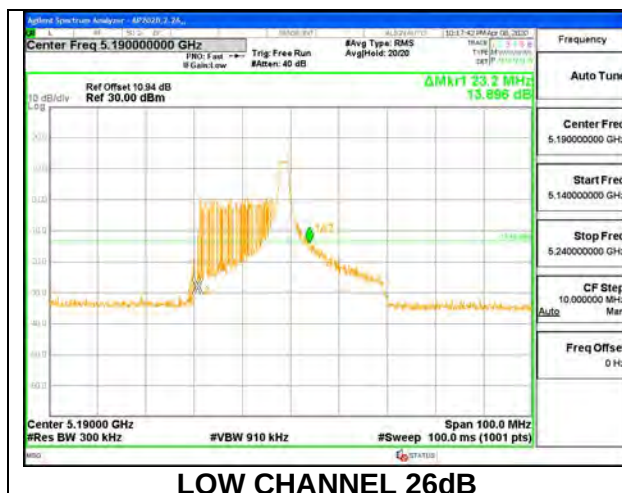
1TX ANT 6 MODE: 26 Tones, RU Index 0

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	19.90	18.2430
High	5230	19.90	18.1520



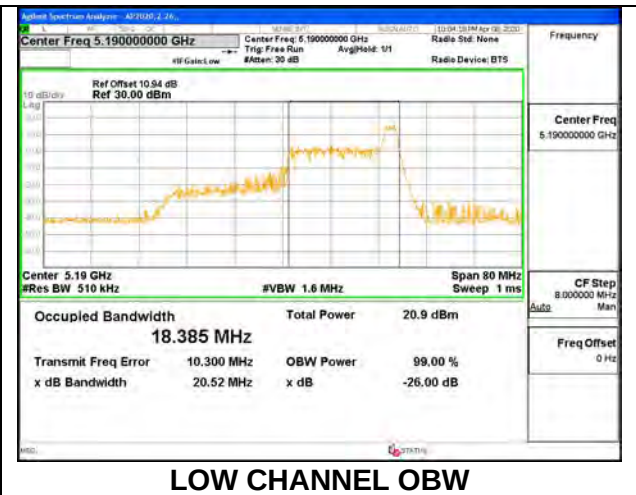
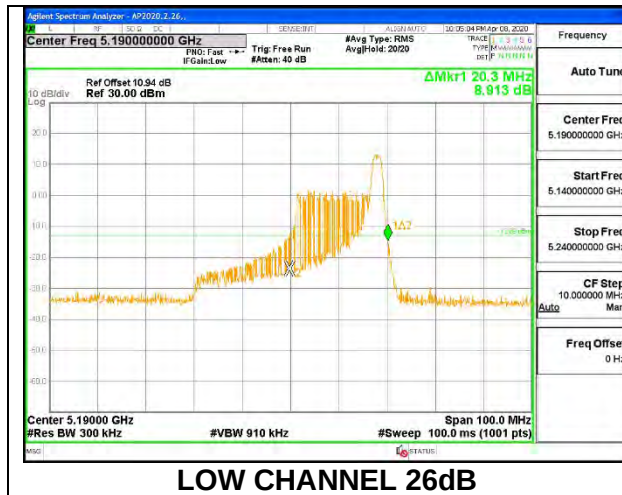
1TX ANT 6 MODE: 26 Tones, RU Index 8

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	23.20	21.8100
High	5230	22.70	21.2610



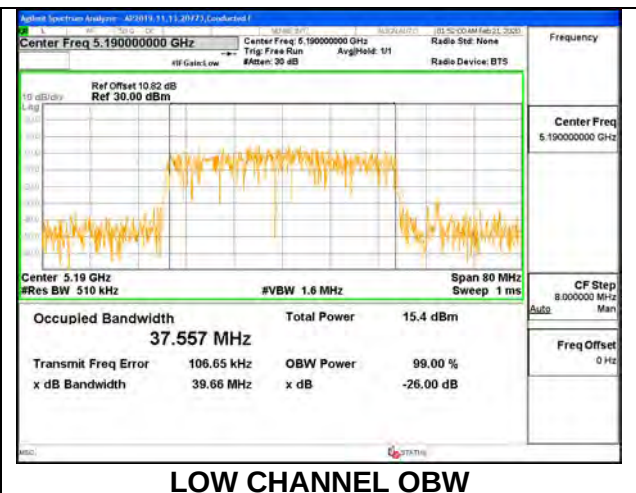
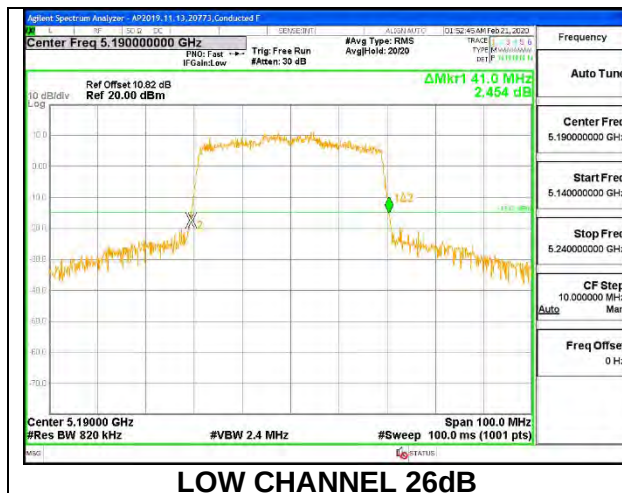
1TX ANT 6 MODE: 26 Tones, RU Index 17

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	20.30	18.3850
High	5230	20.20	18.4540



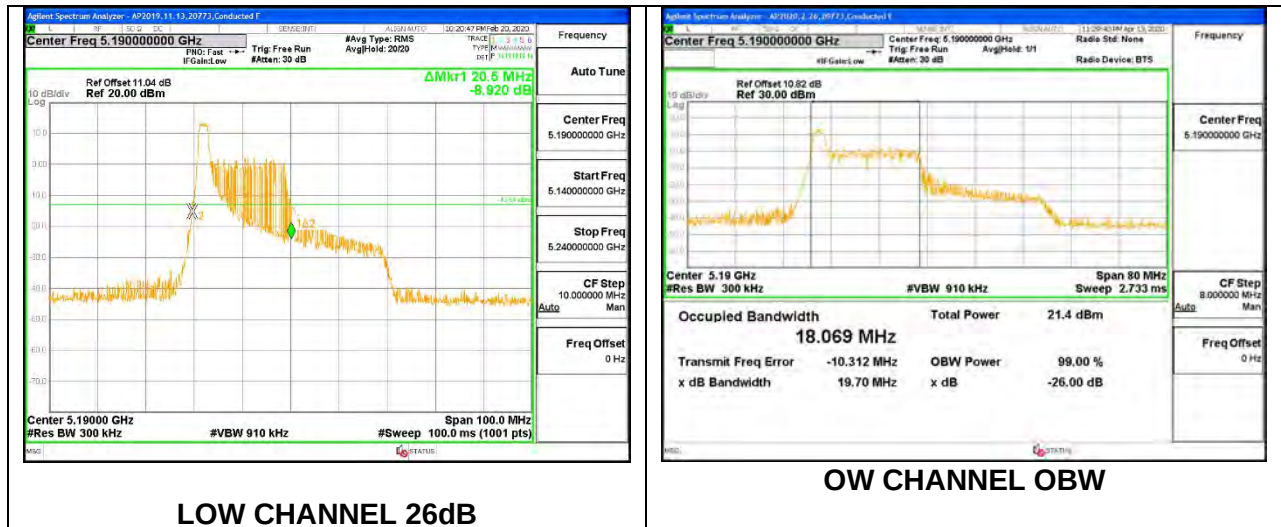
1TX ANT 6 MODE: 484 Tones, RU Index 65

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	41.00	37.5570
High	5230	41.10	37.5430



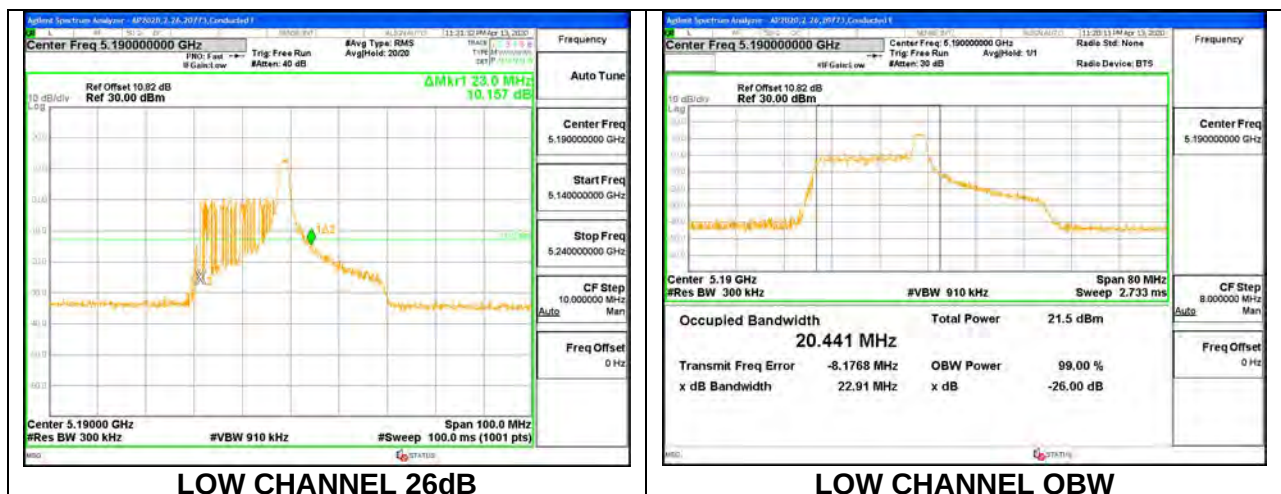
1TX ANT 5 MODE: 26 Tones, RU Index 0

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	20.50	18.0690
High	5230	20.10	18.0380



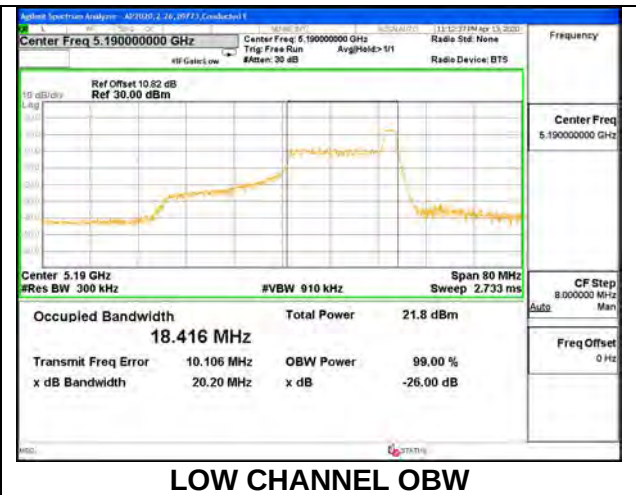
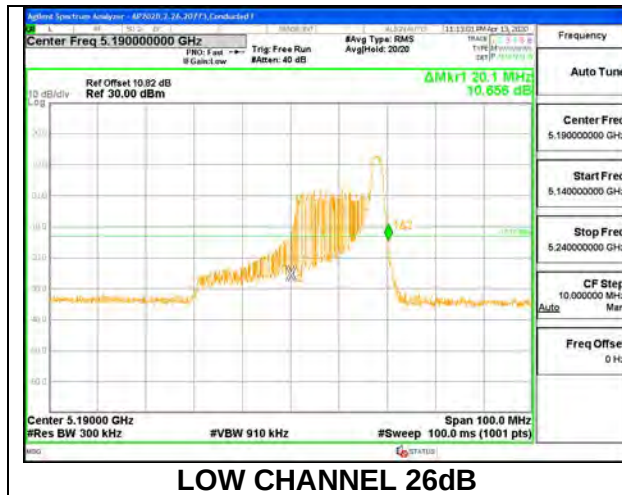
1TX ANT 5 MODE: 26 Tones, RU Index 4

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	23.00	20.4410
High	5230	22.90	20.6790



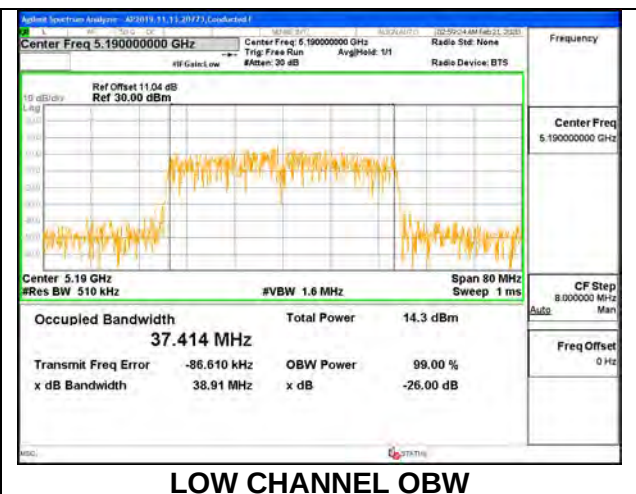
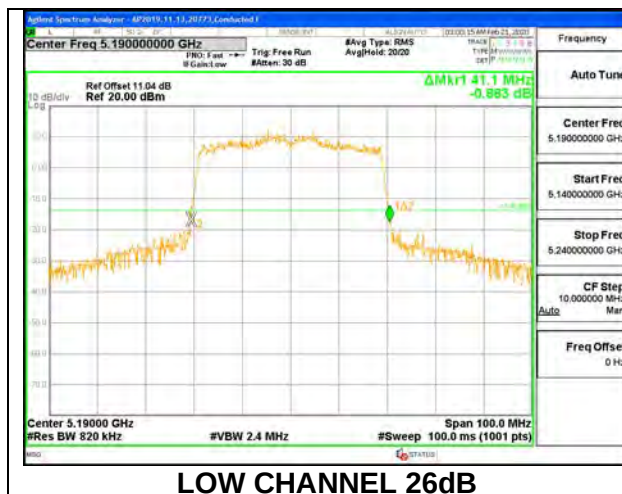
1TX ANT 5 MODE: 26 Tones, RU Index 17

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	20.10	18.4160
High	5230	20.30	18.0470



1TX ANT 5 MODE: 484 Tones, RU Index 65

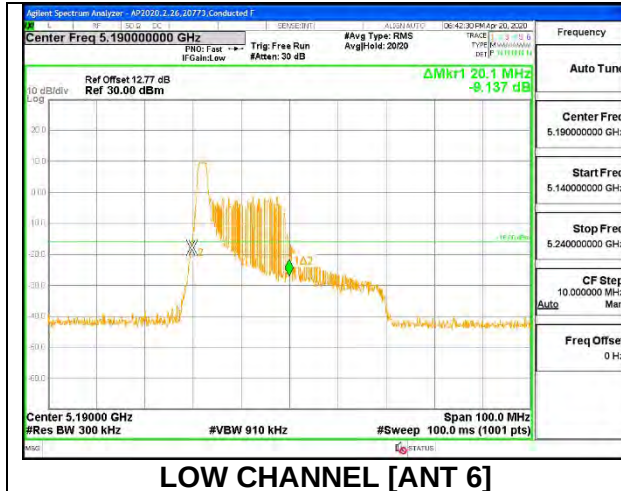
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	41.10	37.4140
High	5230	40.90	37.4530



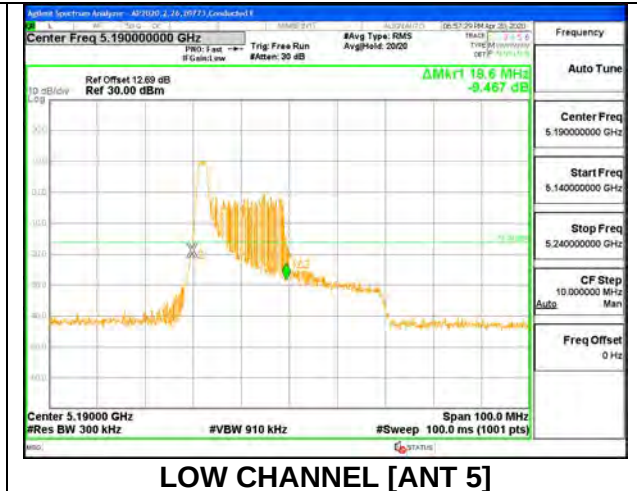
2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 0

Channel	Frequency	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	20.10	19.60	18.1190	18.2160
High	5230	20.20	19.80	18.1080	18.1870

LOW CHANNEL 26dB

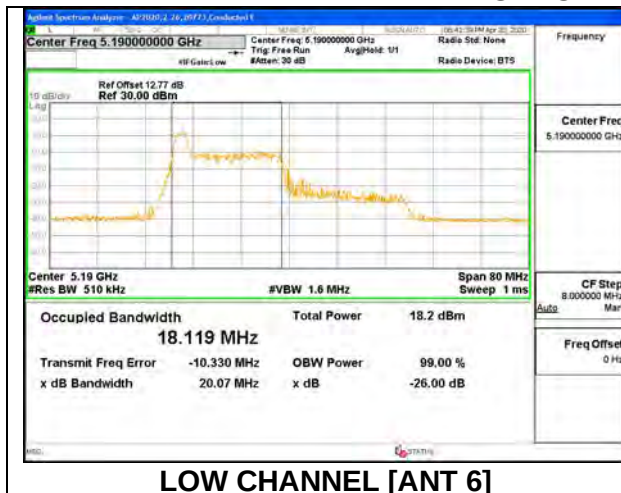


LOW CHANNEL [ANT 6]

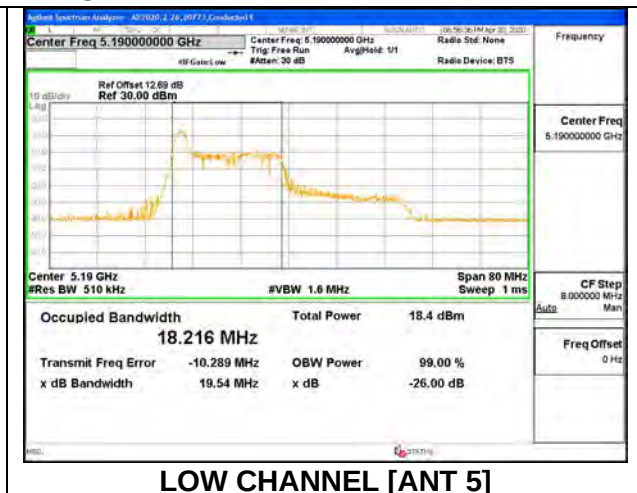


LOW CHANNEL [ANT 5]

LOW CHANNEL OBW



LOW CHANNEL [ANT 6]

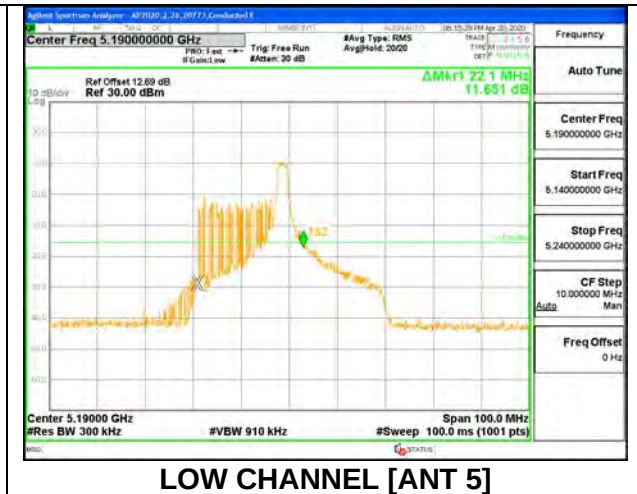
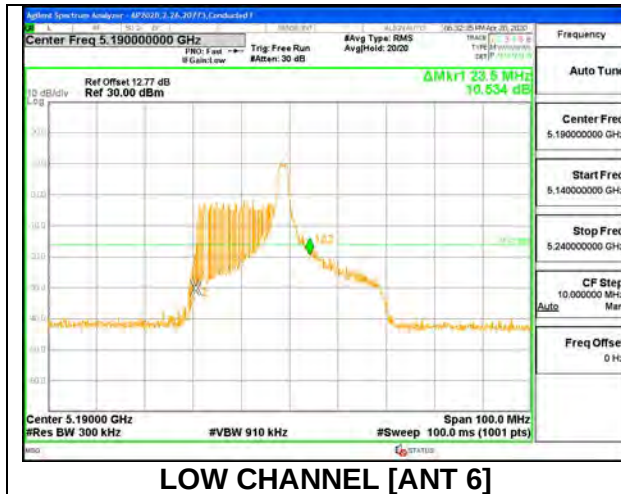


LOW CHANNEL [ANT 5]

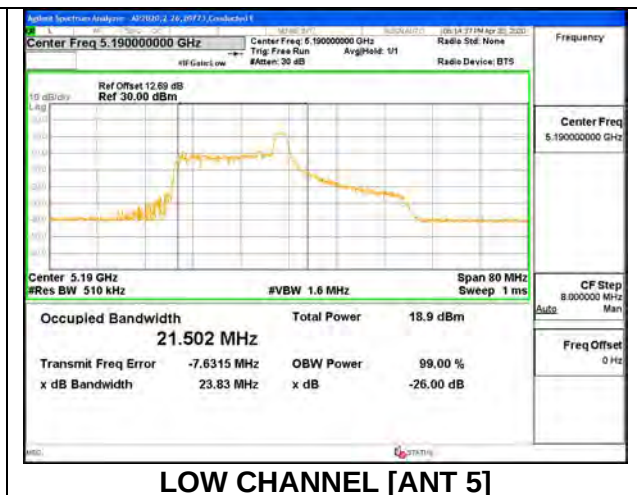
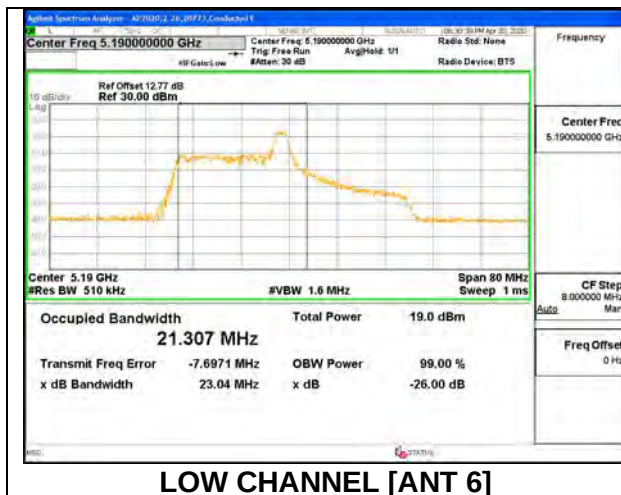
2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 8

Channel	Frequency	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	23.50	22.10	21.3070	21.5020
High	5230	22.60	22.50	21.9990	21.8550

LOW CHANNEL 26dB



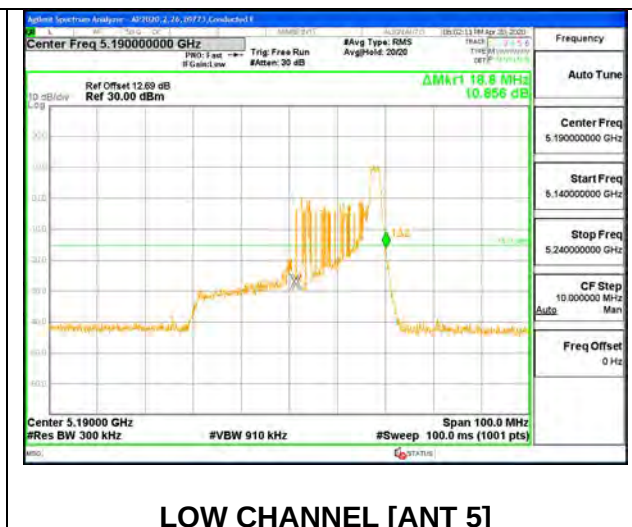
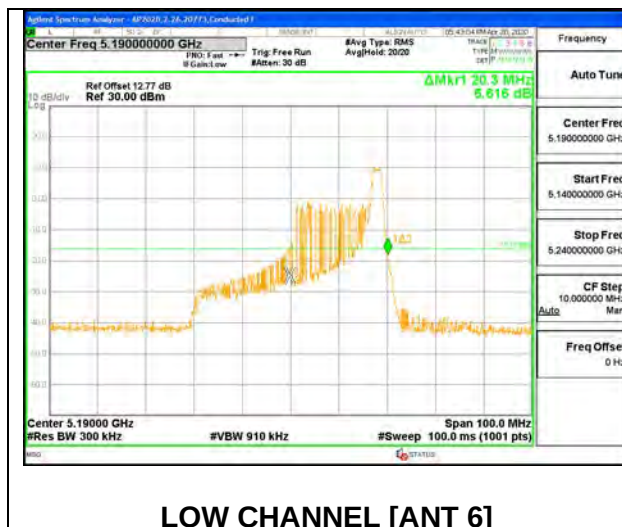
LOW CHANNEL OBW



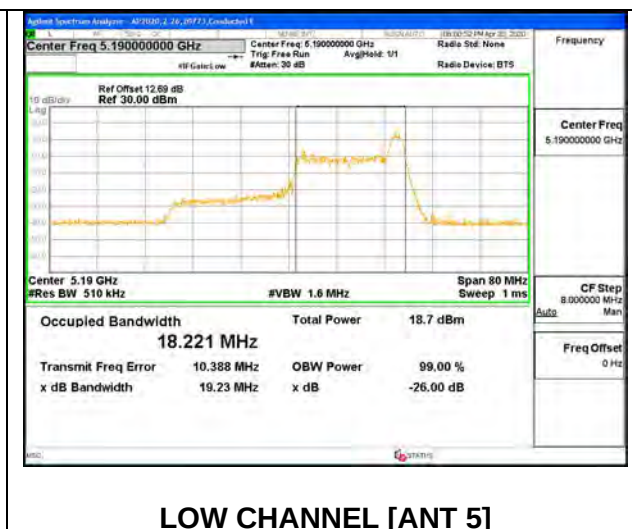
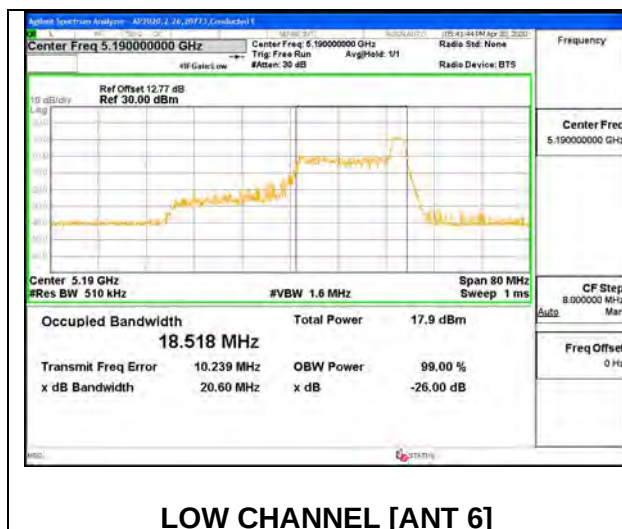
2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 17

Channel	Frequency	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	20.30	18.80	18.5180	18.2210
High	5230	20.00	19.20	18.3800	18.3010

LOW CHANNEL 26dB



LOW CHANNEL OBW



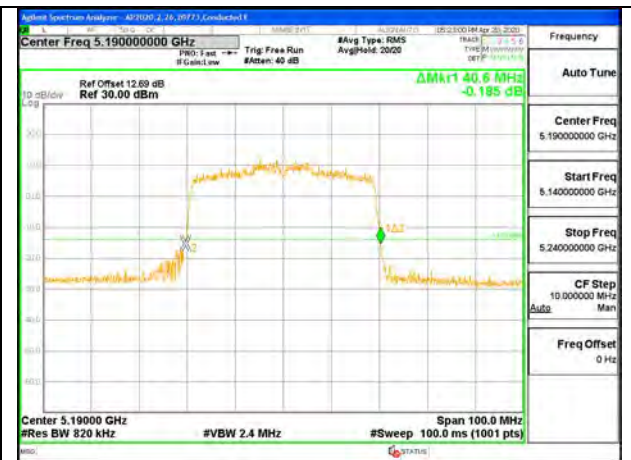
2TX ANT 6 + ANT 5 OFDMA MODE: 242 Tones, RU Index 65

Channel	Frequency	26 dB Bandwidth Antenna 6 (MHz)	26 dB Bandwidth Antenna 5 (MHz)	99% Bandwidth Antenna 6 (MHz)	99% Bandwidth Antenna 5 (MHz)
Low	5190	41.00	40.60	37.3360	37.6680
High	5230	41.00	40.80	37.7100	37.6350

LOW CHANNEL 26dB



LOW CHANNEL [ANT 6]



LOW CHANNEL [ANT 5]

LOW CHANNEL OBW



LOW CHANNEL [ANT 6]

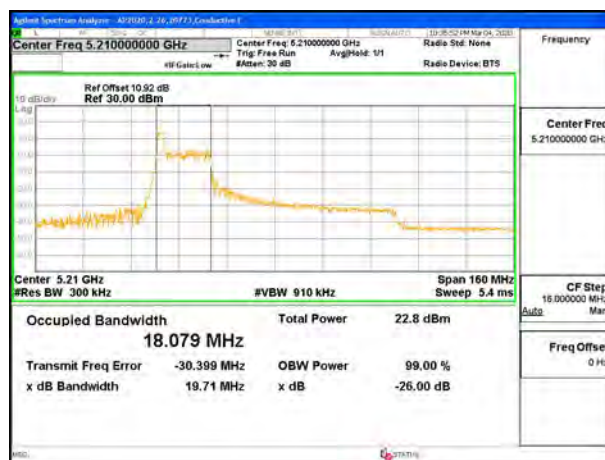
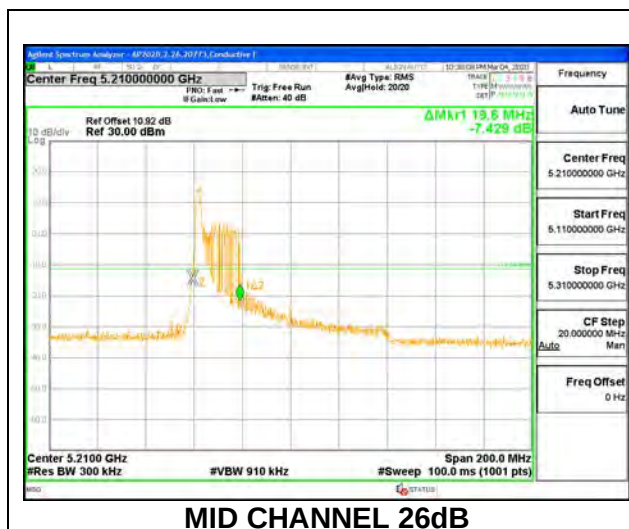


LOW CHANNEL [ANT 5]

8.2.6. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

1TX ANT 6 MODE: 26 Tones, RU Index 0

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Mid	5210	19.60	18.0790



1TX ANT 6 MODE: 26 Tones, RU Index 18

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Mid	5210	40.00	36.6750

