TEST REPORT

Report Number: 14040863-E4V4

Applicant	:	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A
Model	:	A2650 (Parent Model, Full Test) A2889, A2890, A2891, A2892 (Variant Models)
FCC ID	:	BCG-E8140A (Parent Model) BCG-E8150A, BCG-E8151A, BCG-E8152A (Variant Models)
IC	:	579C-E8140A (Parent Model) 579C-E8150A, 579C-E8151A, 579C-E8152A (Variant Models)
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
August 09, 2022

Prepared by:
UL LLC
47173 Benicia Street
Fremont, CA 94538 U.S.A.
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ACCREDITED
CERT #0751.05

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	6/22/2022	Initial Issue	Chin Pang
V2	6/28/2022	Address TCB questions on section 9.1, 9.6, 10 and page 300	Chin Pang
V3	7/8/2022	Address 2nd level TCB's question on section 9.4	Chin Pang
V4	8/9/2022	Address Bandedge plots with wrong label	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: A2650 (Parent Model)
A2889, A2890, A2891, A2892 (Variant Models)

BRAND: APPLE

FCC ID: BCG-E8140A (Parent Model)
BCG-E8150A, BCG-E8151A, BCG-E8152A (Variant Models)

IC: 579C-E8140A (Parent Model)
579C-E8150A, 579C-E8151A, 579C-E8152A (Variant Models)

SERIAL NUMBER: R9VD6JPQTY

SAMPLE RECEIPT DATE: JANUARY 14, 2022

DATE TESTED: JANUARY 26- JUNE 21, 2022

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5 + A1 + A2	Complies

UL LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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 A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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Approved & Released For
UL LLC By:

Chin Pang
Senior Lab Engineer
Consumer Technology Division
UL LLC

Prepared By:

Tony Li
Test Engineer
Consumer Technology Division
UL LLC

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2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

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

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
- KDB 662911
- RSS-GEN Issue 5 + A1 + A2
- KDB 414788 D01 Radiated Test Site v01r01
- RSS-247 Issue 2

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

Location	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA	US0104	22541	550739
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA	US0104	2324B	550739

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video),cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and MSS. All models except reference model 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.

Testing was performed on the parent model and is used to support the application for the parent and variants identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC and by ISED-Canada.

The Model and FCC/IC ID covered by this report includes:

Parent Model: A2650, FCC ID: BCG-E8140A, IC: 579C-E8140A

Variant Models: A2889, FCC ID: BCG-E8150A, IC: 579C-E8150A
A2890; FCC ID: BCG-E8151A, IC: 579C-E8151A
A2891 & A2892, FCC ID: BCG-E8152A, IC: 579C-E8152A

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	21.46	139.96
	802.11g	Covered by 802.11n HT20 1TX	
	802.11n HT20	21.48	140.60
	802.11ax HE20	21.47	140.28

2Tx			
2412 - 2472	802.11n HT20 CDD	24.47	279.90
	802.11g SDM/STBC	Covered by 802.11n HT20 2TX CDD	
	802.11ax HE20	24.50	281.84

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6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	-1.8	0.6

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 20_94_1_15.

6.5. WORST-CASE CONFIGURATION AND MODE

EUT was investigated in three orthogonal orientations X (Flatbed), Y (Landscape) and Z (Portrait) 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.

With same power on Full RU and SU higher data rate, investigation were performed on both bandedge to determine the worst case, and SU mode was determined to be the worst case.

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 SU mode had the highest output power and the lowest tone had the highest PSD readings. And after investigation, antenna port conducted tests were performed on both SU and lowest tones; radiated spurious emission and radiated band edge tests were performed on SU and lowest tones.

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. For radiated bandedge, following are the worst-case data rates set for test:

802.11b mode: 1 Mbps
802.11n HT20mode: MCS7
802.11ax HE20mode: MCS9
802.11ax HE20 RU26 and SU, MCS9

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There are three vendors of the Wi-Fi/Bluetooth radio modules: variant 1, 2 and 3. The WiFi/BT 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 three variants to determine the worst case on all conducted power and radiated emissions.

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		**Manufacturer**	**Model**	**Serial Number**		**FCC ID/ DoC**
Laptop		Apple	Macbook Pro	C02VD7SAHV22		BCGA1708
Laptop AC/DC adapter		Liteon Technology	A1424	NSW25679		DoC
EUT AC/DC adapter		Apple	A1720	C3D8417A7R93KVPA8		DoC
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 AND AC LINE CONDUCTED 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	Shielded	1	N/A

TEST SETUP

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

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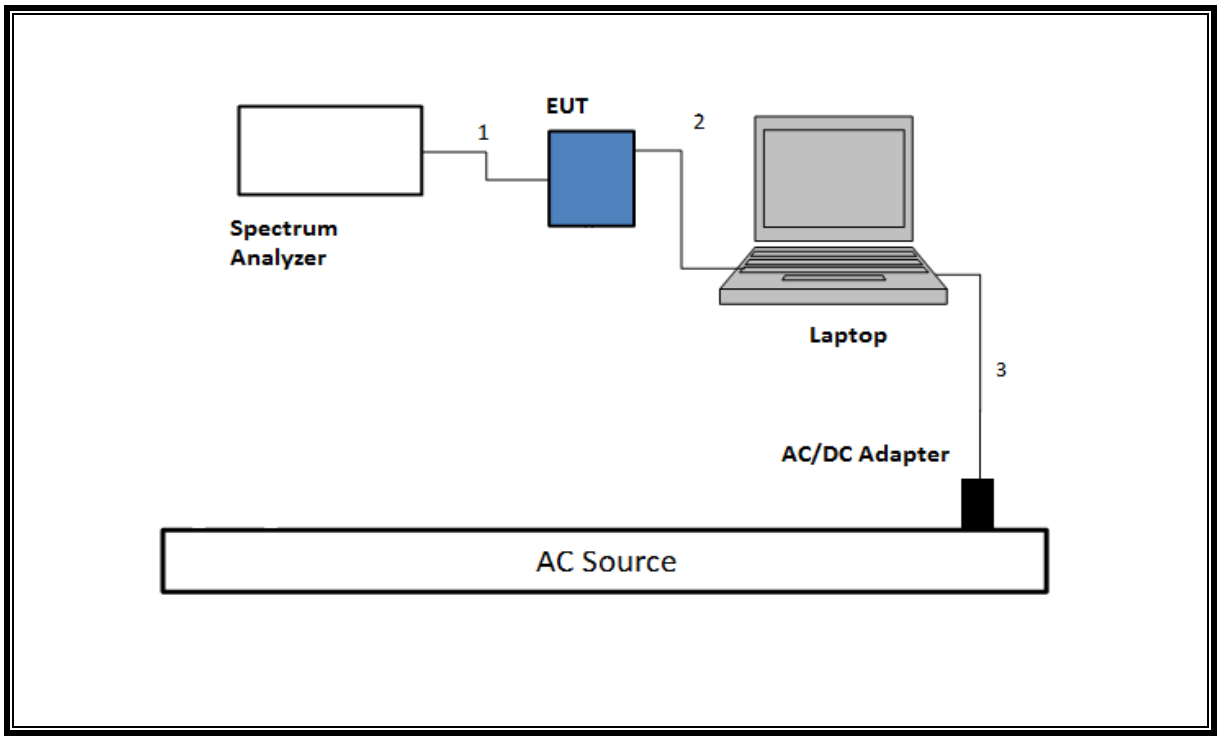
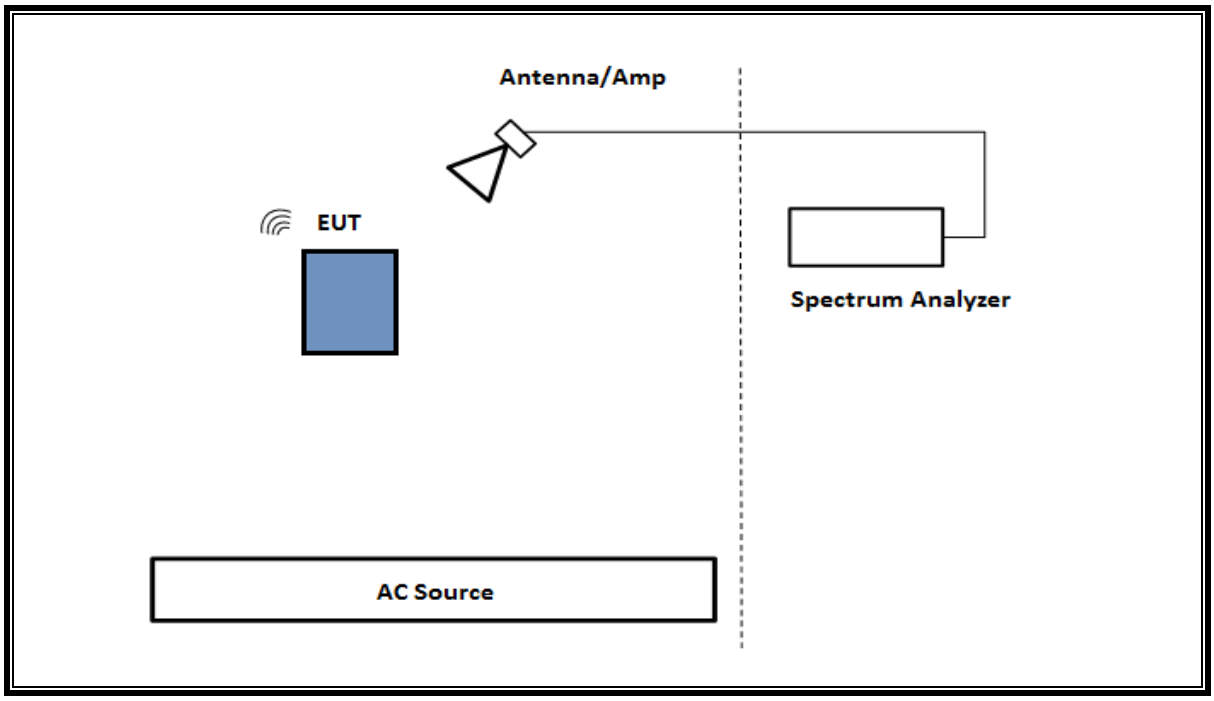
SETUP DIAGRAM FOR CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



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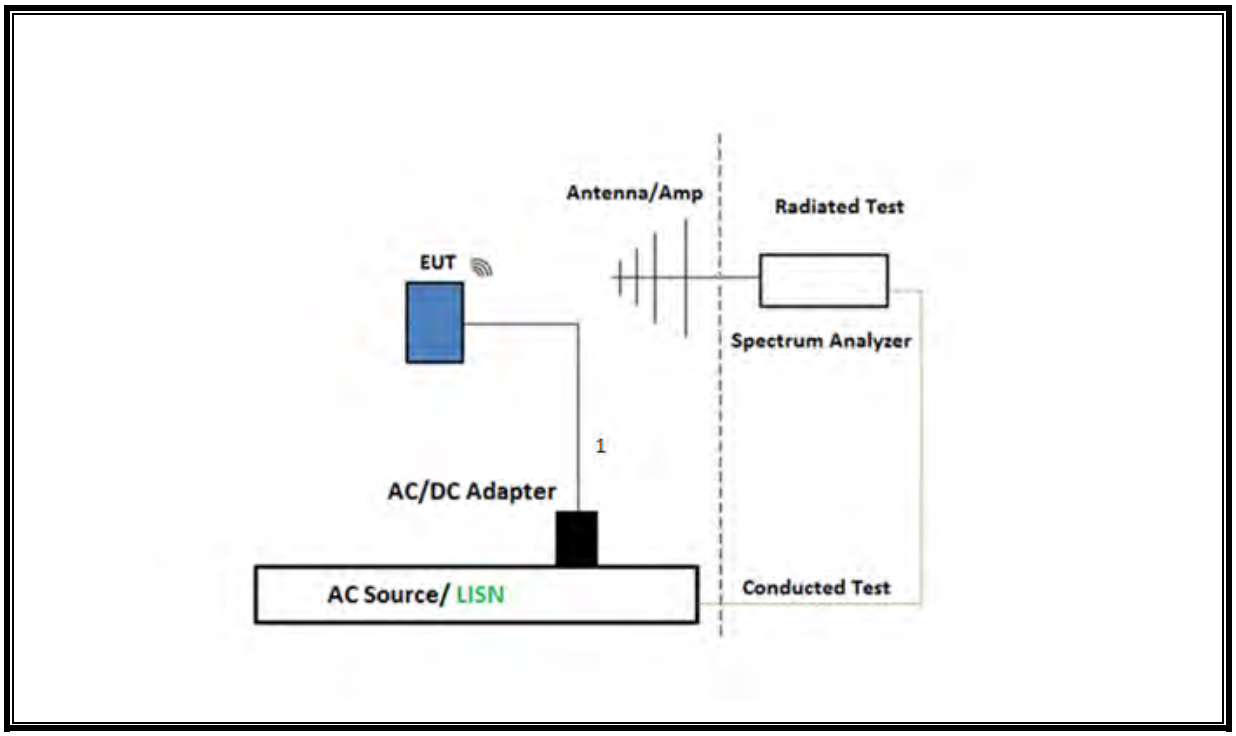
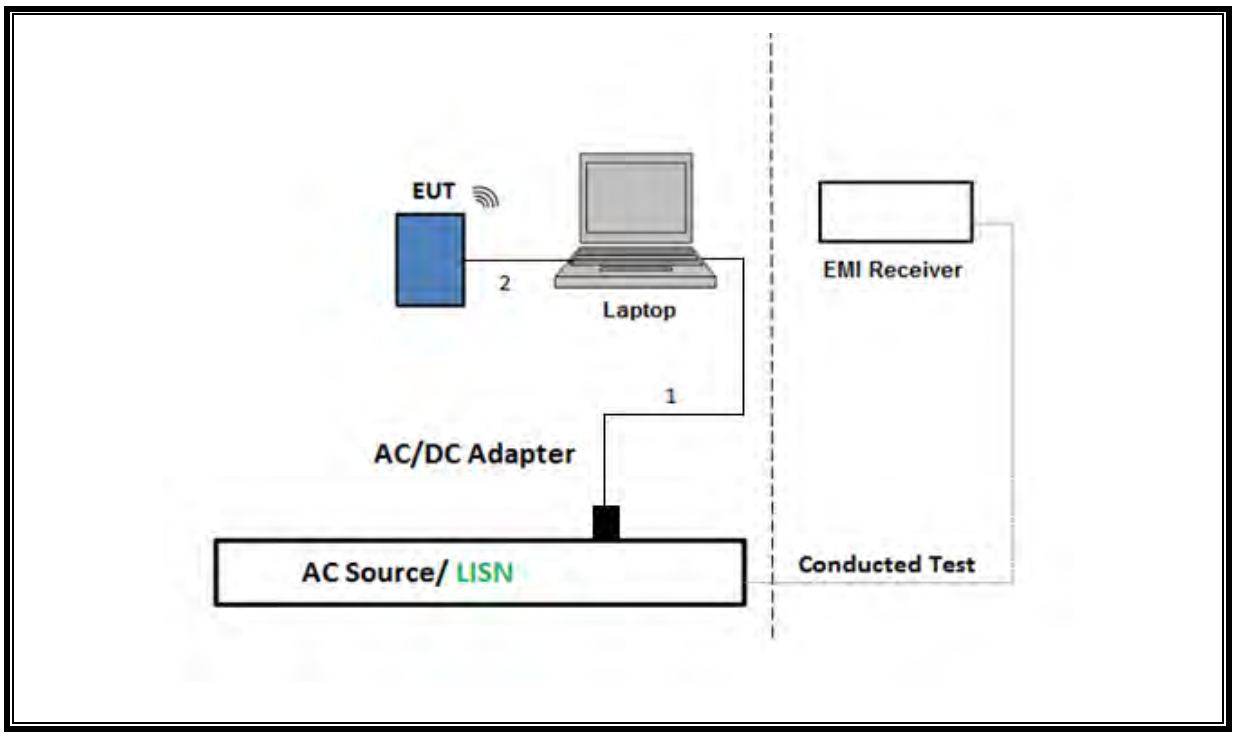
SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



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7. MEASUREMENT METHOD

Test Item	Test Method
6 dB BW	ANSI C63.10 Subclause -11.8.1 RBW ≥ DTS BW
99% BW	ANSI C63.10-2013, Subclause 6.9.3.
Output Power	ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM G (Measurement using an RF average-reading power meter)
PSD	ANSI C63.10 Subclause -11.10.3 Method AVGPSD-1
Radiated emissions non-restricted frequency bands	ANSI C63.10 Subclause -11.11 & Clause 13
Radiated emissions restricted frequency bands	ANSI C63.10 Subclause -11.12.1 & Clause 13
Conducted emissions in restricted frequency bands	ANSI C63.10 Subclause -11.12.2
Band-edge	ANSI C63.10 Subclause -11.13.3.2 & Clause 13: Integration method -Peak detection
Band-edge	ANSI C63.10 Subclause -11.13.3.3 & Clause 13: Integration method -Trace averaging with continuous transmission at full power
Radiated Spurious Emissions Below 30MHz	ANSI C63.10-2013 Subclause 6.4 & Clause 13
AC Power Line Conducted Emissions	ANSI C63.10-2013, Subclause 6.2

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8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
Spectrum Analyzer, PSA, 3Hz to 44GHz	Agilent (Keysight) Technologies	E4446A	81450	02/02/2023	02/02/2022
Power Meter, P-series single channel	Keysight	N1911A	T1271	01/24/2023	01/24/2022
*Power Sensor	Keysight	N1921A	T1228	06/17/2022	06/17/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	81887	03/16/2023	03/16/2022
RF Filter Box	UL-FR1	NA	173233	10/23/2022	10/23/2021
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T120	04/07/2022	04/07/2021
Filter Box 1-18GHz	UL-FR	NA	217063	04/07/2023	04/07/2022
EMI Receiver	Rohde & Schwarz	ESW44	201502	02/22/2023	02/22/2022
Antenna, Horn 1-18GHz	ETS Lindgren	3117	206805	06/22/2022	06/22/2021
RF Filter Box 1-18GHz	UL-FR	NA	171389	11/01/2022	11/01/2021
EMI Test Receiver	Rohde & Schwarz	ESW44	201497	02/18/2023	02/18/2022
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	204044	01/31/2023	01/31/2022
Antenna	ETS-Lindgren	3117	206806	06/22/2022	06/22/2021
RF Filter Box	UL-FR1	NA	173233	10/23/2022	10/23/2021
Amplifier10KHz to 1GHz 32dB	Sonoma	310N	79145	07/21/2022	07/21/2021
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	125179	02/01/2023	02/01/2022
*Antenna Horn 18 to 26.5GHz	ARA	MWH-1826/B	81140	04/22/2022	04/22/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	84796	09/15/2022	09/15/2021
Filter Box 1-18GHz	UL-FR	NA	217063	04/07/2023	04/07/2022
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	200895	10/13/2022	10/13/2021
RF Filter 1-18GHz	UL-FR1	SAC 6 port rf box	203957	02/12/2023	02/12/2022
EMI Receiver	Rohde & Schwarz	ESW44	201498	02/20/2023	02/20/2022
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	41112	09/21/2022	09/21.2021
Filter Box 1-18GHz	UL-FR	NA	217063	04/07/2023	04/07/2022
*Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	04/19/2022	04/19/2021
Antenna, Active Loop 9KHz to 30MHz	EMCO	6502	T35	10/05/2022	10/05/2021
*Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T459	02/11/2022	02/11/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	200785	10/13/2022	10/13/2021
RF Filter Box, 1-18GHz	UL-FR1	NA	207182	02/11/2023	02/11/2022
EMI Receiver	Rohde & Schwarz	ESW44	201499	02/17/2023	02/17/2022

AC Line Conducted					
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	T1436	02/21/2023	02/21/2022
Power Cable, Line Conducted Emissions	UL	PR1	T861	10/27/2022	10/27/2021
LISN for Conducted Emissions CISPR-16	FISCHER CUSTOM COMMUNICATIONS	FCC-LISN-50/250-25-2-01-480V	175765	01/26/2023	01/26/2022
UL AUTOMATION SOFTWARE					
Radiated Software	UL	UL EMC	Ver 9.5, Mar 6, 2020		
Conducted Software	UL	UL EMC	2020.2.26		
AC Line Conducted Software	UL	UL EMC	Ver 9.5, February 21, 2020		

*Testing is completed before equipment expiration date.

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

Test Engineer:	20737
Test Date:	5/2/2022

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	1.210	1.224	0.989	98.86%	0.00	0.010
802.11n HT20 MCS0	1.922	1.946	0.988	98.76%	0.00	0.010
802.11n HT20 MCS7	0.135	0.157	0.8601	86.01%	0.65	7.392
802.11ax HE20 MCS0	3.997	4.044	0.989	98.85%	0.00	0.010
802.11ax HE20 MCS9	0.349	0.395	0.883	88.32%	0.54	2.863
802.11ax HE20 SU MCS0	1.488	1.513	0.983	98.35%	0.00	0.010
802.11ax HE20 SU MCS9	0.167	0.191	0.875	87.55%	0.58	5.995

Note: Duty cycle 2TX is the same as 1TX.

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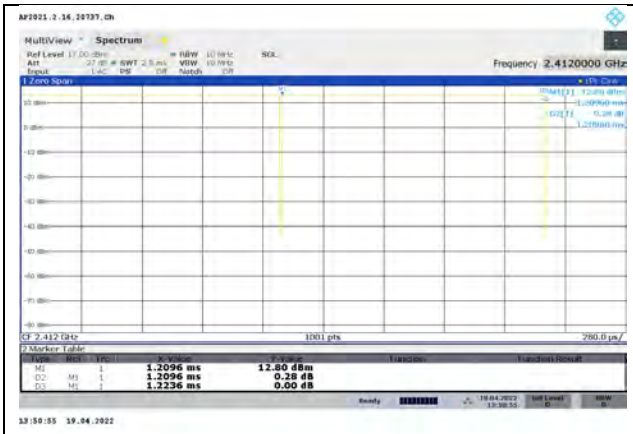
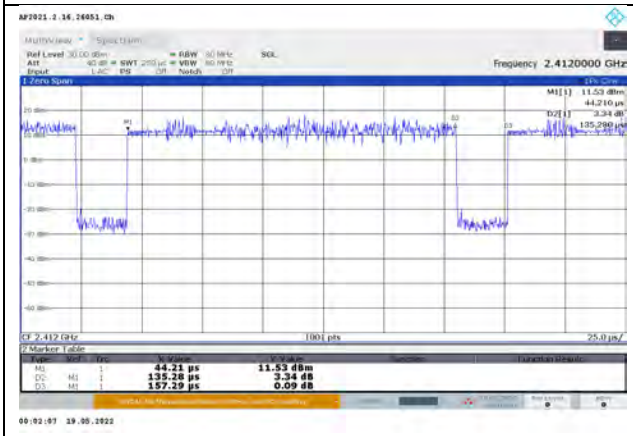
DUTY CYCLE PLOTS

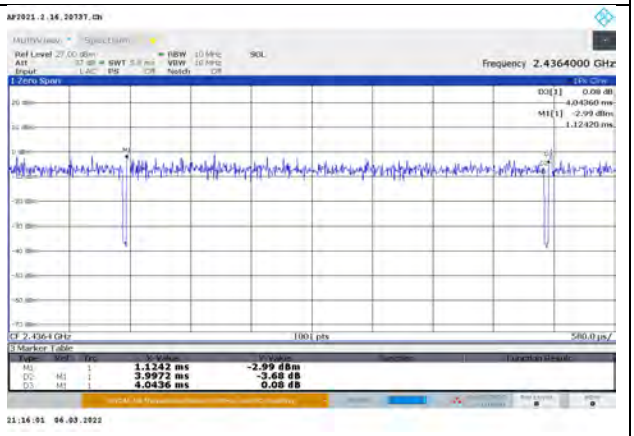


DUTY CYCLE 802.11b MODE

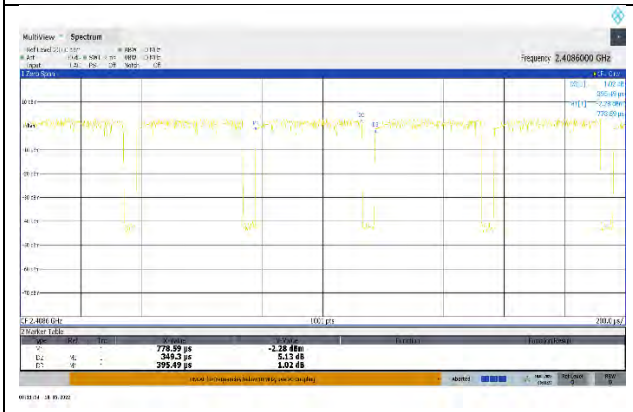
DUTY CYCLE 802.11n HT20 MCS0



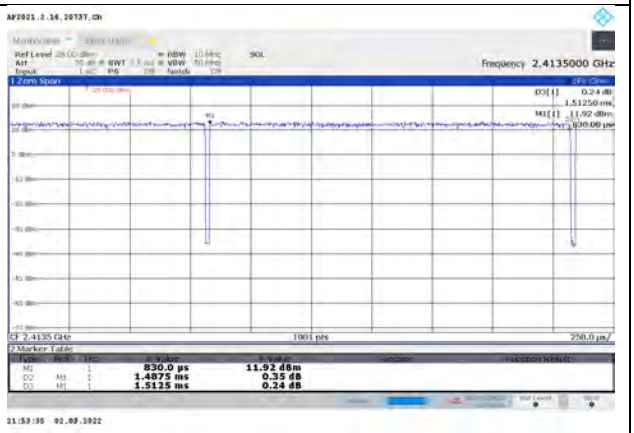
DUTY CYCLE 802.11n HT20 MCS7



DUTY CYCLE 802.11ax HE20 MCS0



DUTY CYCLE 802.11ax HE20 MCS9



DUTY CYCLE 802.11ax HE20 SU MCS0

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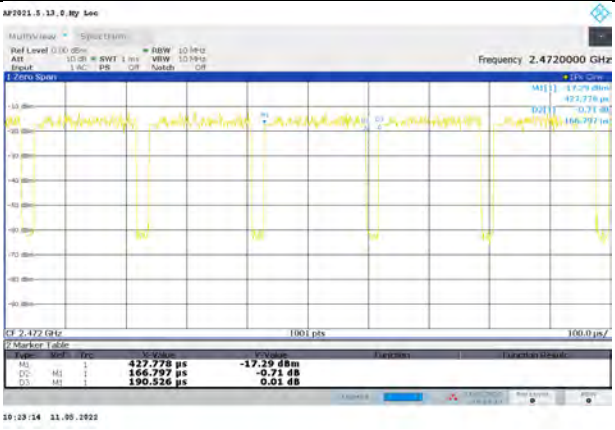

DUTY CYCLE 802.11ax HE20 SU MCS09

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9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

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

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9.2.1. 802.11b MODE 1TX

1TX ANT 4 MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	12.784
Mid 6	2437	12.811
High 11	2462	12.834
High 12	2467	12.886
High 13	2472	12.762

MID CHANNEL 6

1TX ANT 3 MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	12.867
Mid 6	2437	12.825
High 11	2462	12.854
High 12	2467	12.777
High 13	2472	12.752

MID CHANNEL 6

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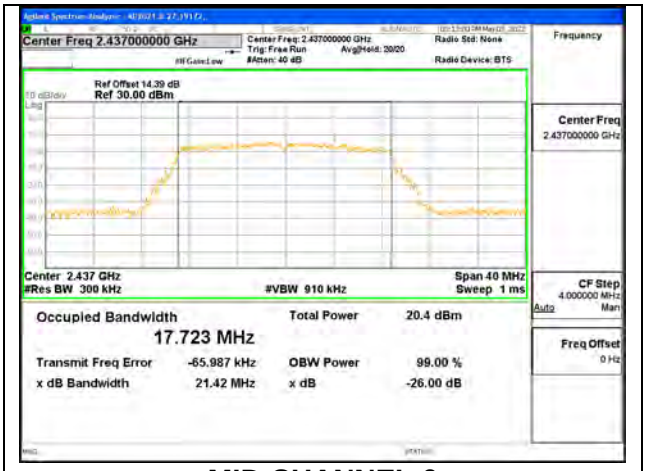
9.2.2. 802.11n HT20 MODE

1TX ANT 4 MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.811
Low 2	2417	17.828
Low 3	2422	17.931
Mid 6	2437	17.723
High 9	2452	17.873
High 10	2457	17.796
High 11	2462	17.835
High 12	2467	17.848
High 13	2472	17.707



MID CHANNEL 6

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1TX ANT 3 MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	17.780
Low 2	2417	17.916
Low 3	2422	17.978
Mid 6	2437	17.740
High 9	2452	17.830
High 10	2457	17.858
High 11	2462	17.817
High 12	2467	17.718
High 13	2472	17.761

MID CHANNEL 6

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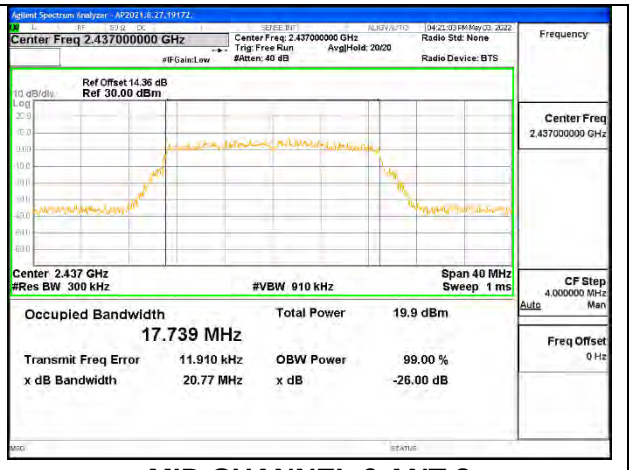
9.2.3. 802.11n HT20 CDD MODE

ANT 4 + ANT 3 2TX MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	17.710	17.733
Low 2	2417	17.873	17.774
Low 3	2422	17.849	17.856
Mid 6	2437	17.752	17.739
High 8	2447	17.884	17.837
High 9	2452	17.896	17.832
High 10	2457	17.845	17.842
High 11	2462	17.771	17.792
High 12	2467	17.752	17.758
High 13	2472	17.677	17.713

MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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9.2.4. 802.11ax HE20 MODE

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

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.458
Mid 6	2437	18.405
High 11	2462	18.369
High 12	2467	18.332
High 13	2472	18.086

MID CHANNEL 6

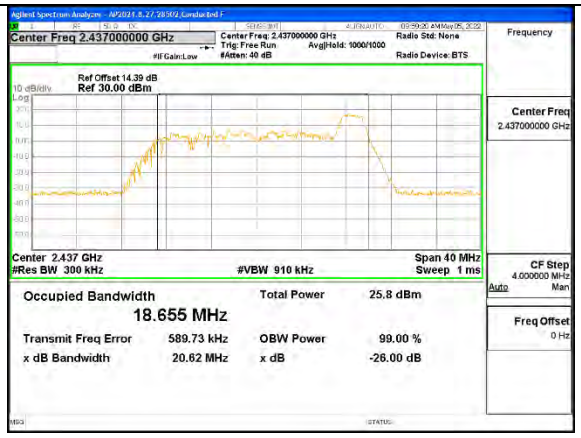
ANT 4 SISO MODE: 26-Tones, RU Index 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	16.992
Mid 6	2437	16.949
High 11	2462	16.910
High 12	2467	17.000
High 13	2472	16.702

MID CHANNEL 6

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

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.527
Mid 6	2437	18.655
High 11	2462	18.669
High 12	2467	18.611
High 13	2472	18.642



MID CHANNEL 6

ANT 4 SISO MODE: SU Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.927
Low 2	2417	18.940
Low 3	2422	19.004
Mid 6	2437	18.903
High 9	2452	18.984
High 10	2457	18.934
High 11	2462	18.907
High 12	2467	18.919
High 13	2472	18.839

MID CHANNEL 6

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

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.412
Mid 6	2437	18.338
High 11	2462	18.372
High 12	2467	18.181
High 13	2472	17.927

MID CHANNEL 6

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

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	16.895
Mid 6	2437	16.777
High 11	2462	16.997
High 12	2467	16.617
High 13	2472	16.724

MID CHANNEL 6

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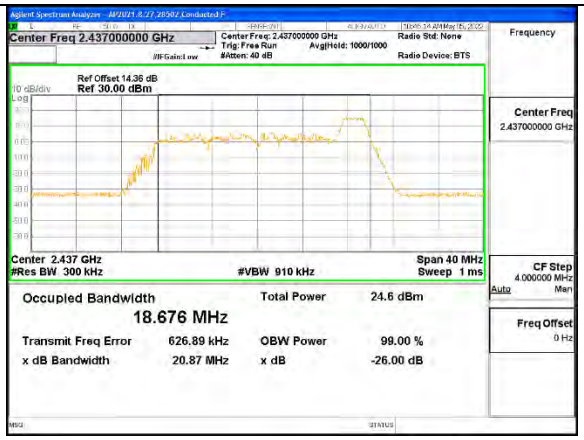
ANT 3 SISO MODE: 26-Tones, RU Index 8

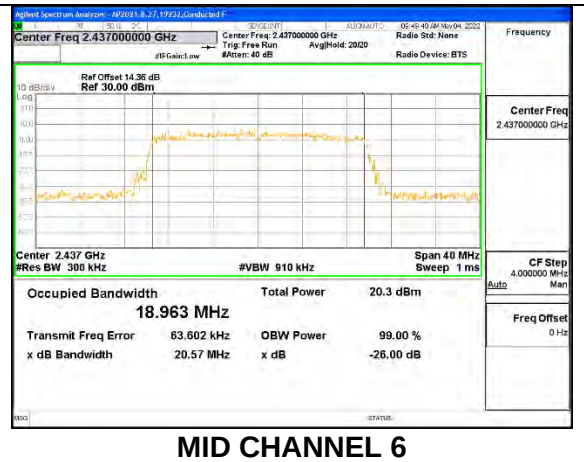
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.549
Mid 6	2437	18.676
High 11	2462	18.650
High 12	2467	18.836
High 13	2472	18.856



MID CHANNEL 6

ANT 3 SISO MODE: SU Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 1	2412	18.911
Low 2	2417	18.936
Low 3	2422	19.009
Mid 6	2437	18.963
High 9	2452	18.978
High 10	2457	18.901
High 11	2462	18.904
High 12	2467	18.815
High 13	2472	18.808



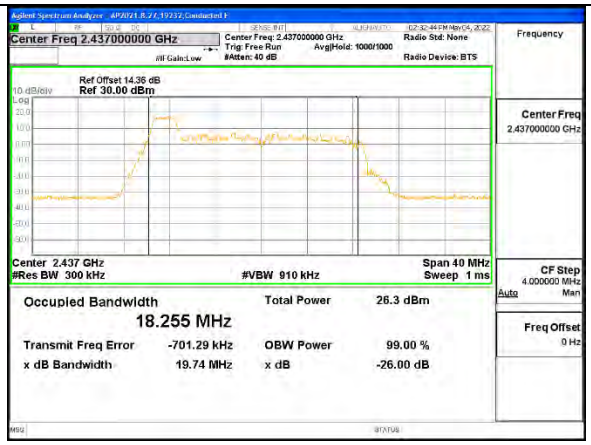
MID CHANNEL 6

9.2.5. 802.11ax HE20 OFDMA MODE 2TX

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

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.479	18.250
Mid 6	2437	18.304	18.255
High 11	2462	18.358	18.318
High 12	2467	18.345	18.046
High 13	2472	18.090	17.784

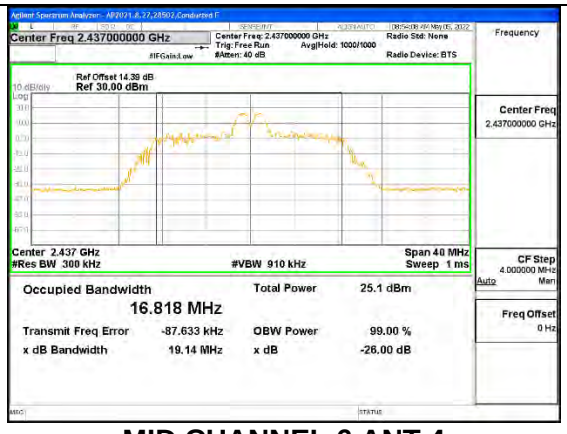
MID CHANNEL 6 ANT 4



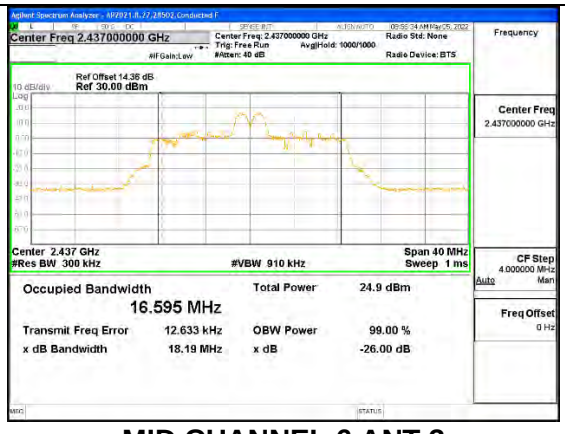
MID CHANNEL 6 ANT 3

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

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	16.846	16.555
Mid 6	2437	16.818	16.595
High 11	2462	16.714	16.534
High 12	2467	16.999	16.436
High 13	2472	16.745	16.355



MID CHANNEL 6 ANT 4

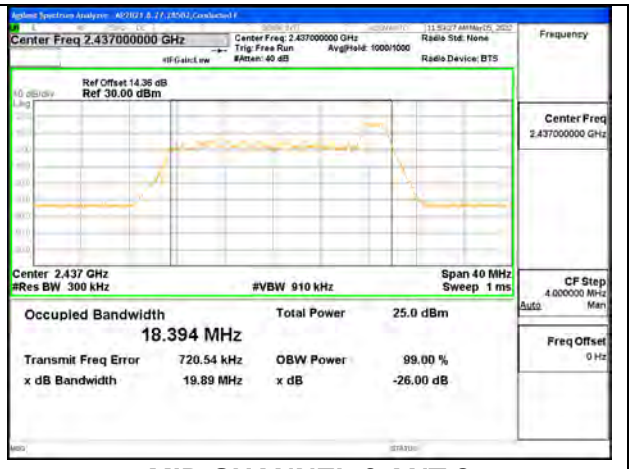


MID CHANNEL 6 ANT 3

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

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	18.384	18.300
Mid 6	2437	18.705	18.394
High 11	2462	18.661	18.443
High 12	2467	18.738	18.381
High 13	2472	18.682	18.213

MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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ANT 4 + ANT 3 2TX MODE: SU Mode

Channel	Frequency (MHz)	99% Bandwidth (MHz) ANT 4	99% Bandwidth (MHz) ANT 3
Low 1	2412	19.043	18.933
Low 2	2417	18.904	18.931
Low 3	2422	19.030	18.995
Low 4	2427	19.028	18.925
Mid 6	2437	18.910	18.955
High 8	2447	18.970	18.962
High 9	2452	18.981	18.956
High 10	2457	18.905	18.926
High 11	2462	18.957	18.947
High 12	2467	18.969	18.914
High 13	2472	18.867	18.915

MID CHANNEL 6 ANT 4

MID CHANNEL 6 ANT 3

9.3. 6dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

RESULTS

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

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

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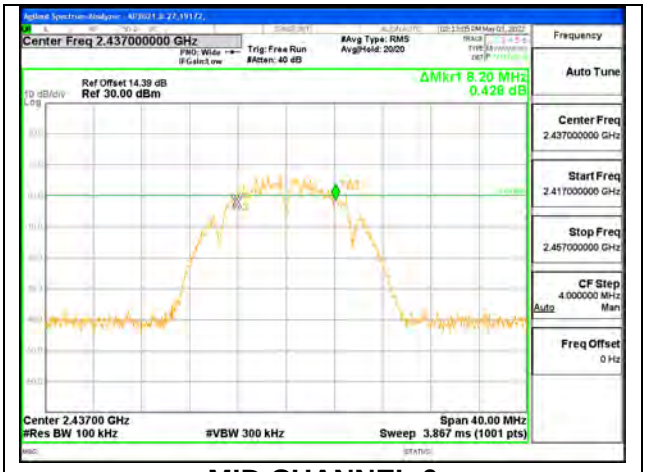
9.3.1. 802.11b MODE 1TX

1TX ANT 4 MODE

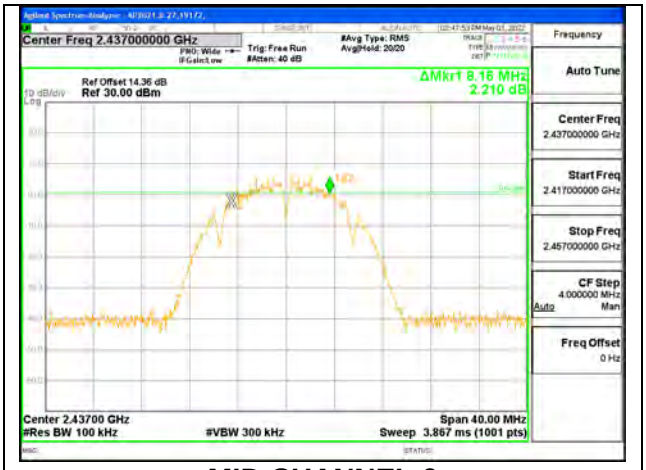
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	8.16	0.5
Low 2	2417	8.24	0.5
Mid 6	2437	8.20	0.5
High 11	2462	8.08	0.5
High 12	2467	8.68	0.5
High 13	2472	8.68	0.5



MID CHANNEL 6

1TX ANT 3 MODE

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	8.20	0.5
Low 2	2417	8.16	0.5
Mid 6	2437	8.16	0.5
High 11	2462	8.00	0.5
High 12	2467	8.16	0.5
High 13	2472	8.16	0.5



MID CHANNEL 6

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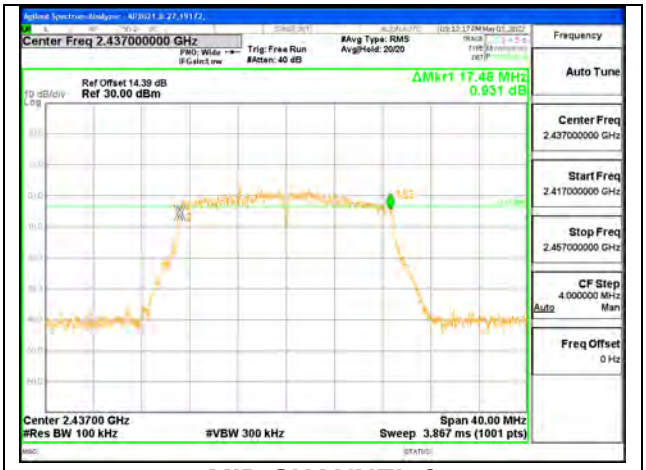
9.3.2. 802.11n HT20 MODE 1TX

ANT 4

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	17.40	0.5
Low 2	2417	17.64	0.5
Low 3	2422	17.24	0.5
Mid 6	2437	17.48	0.5
High 9	2452	17.76	0.5
High 10	2457	17.32	0.5
High 11	2462	17.72	0.5
High 12	2467	17.64	0.5
High 13	2472	17.32	0.5



MID CHANNEL 6

ANT 3

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

MID CHANNEL 6

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9.3.3. 802.11n HT20 CDD MODE 2TX

ANT 4 + ANT 3

Channel	Frequency (MHz)	6 dB BW Antenna 4 (MHz)	6 dB BW Antenna 3 (MHz)	Minimum Limit (MHz)
Low 1	2412	17.24	17.68	0.5
Low 2	2417	17.72	17.00	0.5
Low 3	2422	17.72	17.68	0.5
Mid 6	2437	17.04	17.04	0.5
High 8	2447	17.28	17.04	0.5
High 9	2452	17.32	17.04	0.5
High 10	2457	17.757	17.36	0.5
High 11	2462	17.68	17.24	0.5
High 12	2467	17.44	17.08	0.5
High 13	2472	17.20	17.68	0.5

MID CHANNEL 6 ANT 4

MID CHANNEL 6 ANT 3

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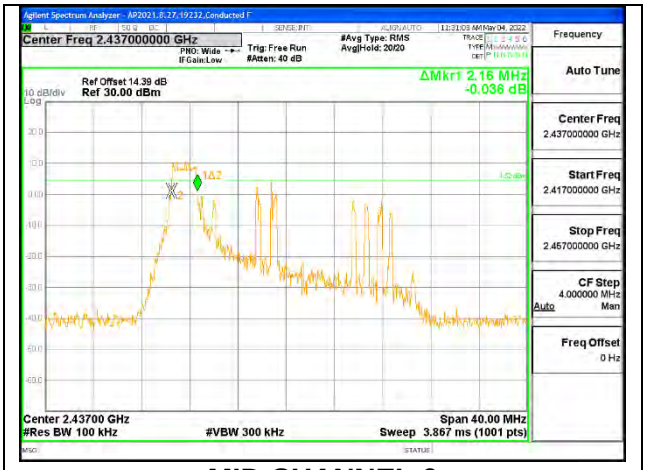
9.3.4. 802.11ax HE20 MODE

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

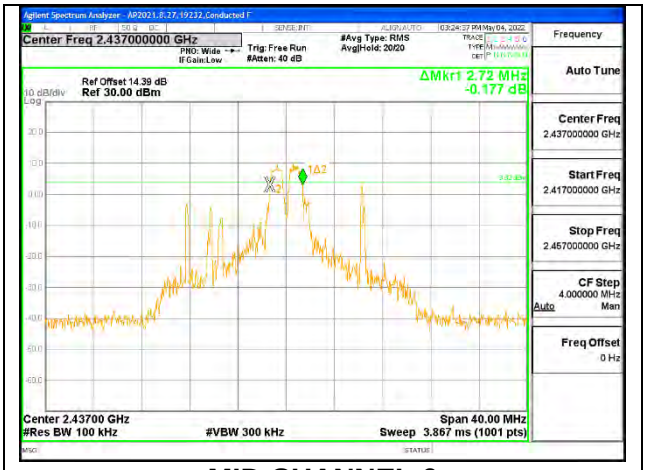
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.08	0.5
Mid 6	2437	2.16	0.5
High 11	2462	2.04	0.5
High 12	2467	2.16	0.5
High 13	2472	2.08	0.5



MID CHANNEL 6

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

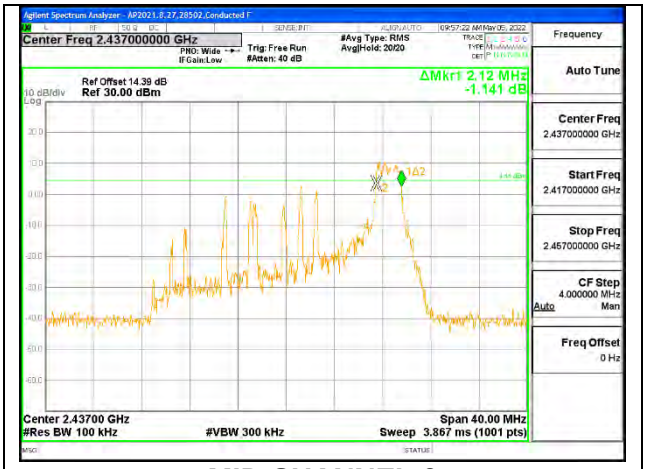
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.68	0.5
Mid 6	2437	2.72	0.5
High 11	2462	2.68	0.5
High 12	2467	2.64	0.5
High 13	2472	2.68	0.5



MID CHANNEL 6

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

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.08	0.5
Mid 6	2437	2.12	0.5
High 11	2462	2.08	0.5
High 12	2467	2.12	0.5
High 13	2472	2.08	0.5



MID CHANNEL 6

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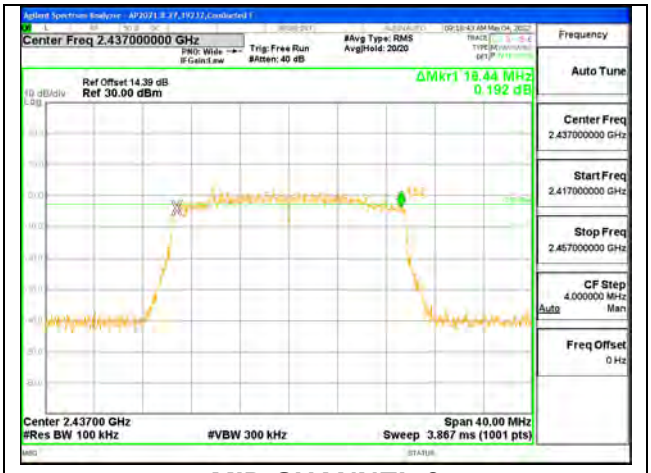
ANT 4 SISO MODE: SU Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	18.68	0.5
Low 2	2417	18.24	0.5
Low 3	2422	18.56	0.5
Mid 6	2437	18.44	0.5
High 9	2452	18.60	0.5
High 10	2457	18.64	0.5
High 11	2462	18.08	0.5
High 12	2467	18.48	0.5
High 13	2472	18.92	0.5



MID CHANNEL 6

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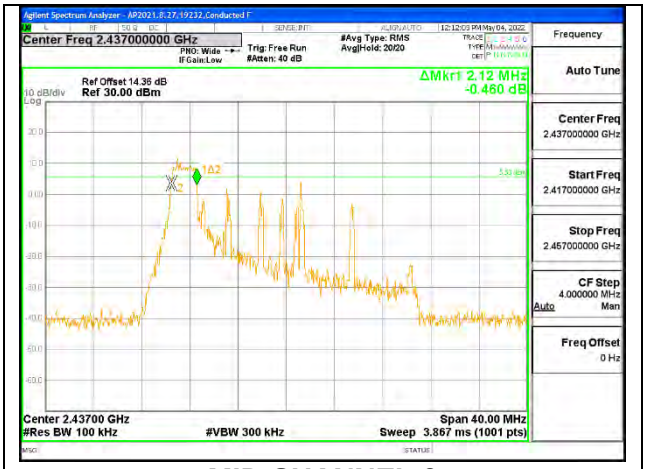
ANT 3 SISO MODE: 26-Tones, RU Index 0

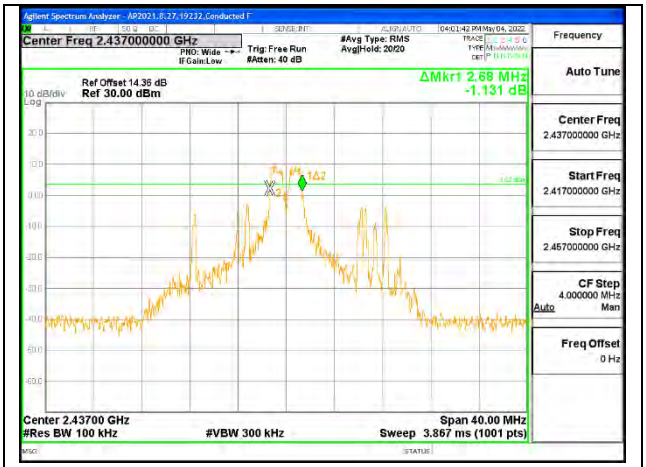
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.16	0.5
Mid 6	2437	2.12	0.5
High 11	2462	2.12	0.5
High 12	2467	2.12	0.5
High 13	2472	2.12	0.5



MID CHANNEL 6

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

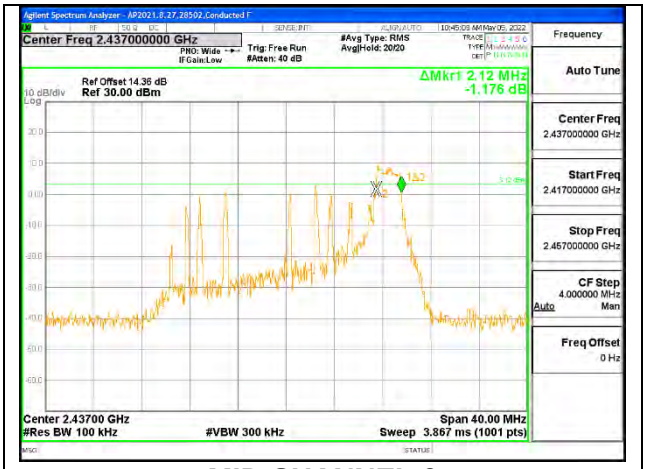
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.56	0.5
Mid 6	2437	2.68	0.5
High 11	2462	2.68	0.5
High 12	2467	2.60	0.5
High 13	2472	2.68	0.5



MID CHANNEL 6

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

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	2.12	0.5
Mid 6	2437	2.12	0.5
High 11	2462	2.12	0.5
High 12	2467	2.12	0.5
High 13	2472	2.08	0.5



MID CHANNEL 6

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ANT 3 SISO MODE: SU Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	18.60	0.5
Low 2	2417	18.60	0.5
Low 3	2422	18.00	0.5
Mid 6	2437	18.44	0.5
High 9	2452	18.20	0.5
High 10	2457	18.80	0.5
High 11	2462	18.72	0.5
High 12	2467	17.00	0.5
High 13	2472	18.32	0.5

MID CHANNEL 6

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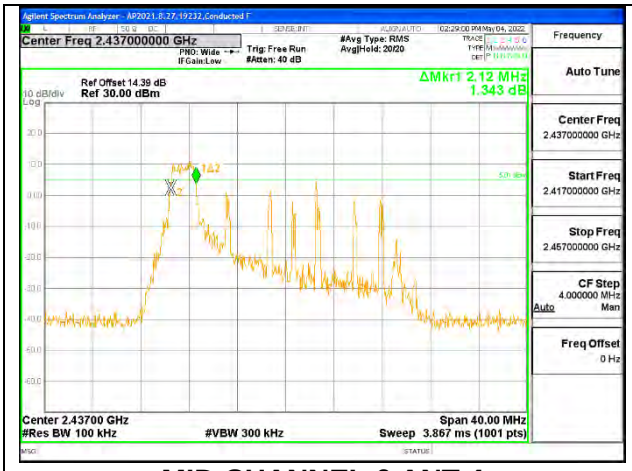
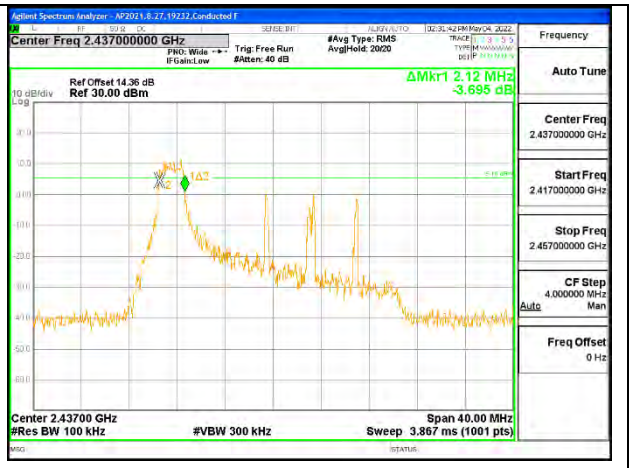
9.3.5. 802.11ax HE20 OFDMA MODE 2TX

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

Channel	Frequency (MHz)	6dB BW(MHz) ANT 4	6dB BW (MHz) ANT 3	Minimum Limit (MHz)
Low 1	2412	2.12	2.08	0.5
Mid 6	2437	2.12	2.12	0.5
High 11	2462	2.08	2.00	0.5
High 12	2467	2.12	2.16	0.5
High 13	2472	2.12	2.12	0.5



MID CHANNEL 6 ANT 4

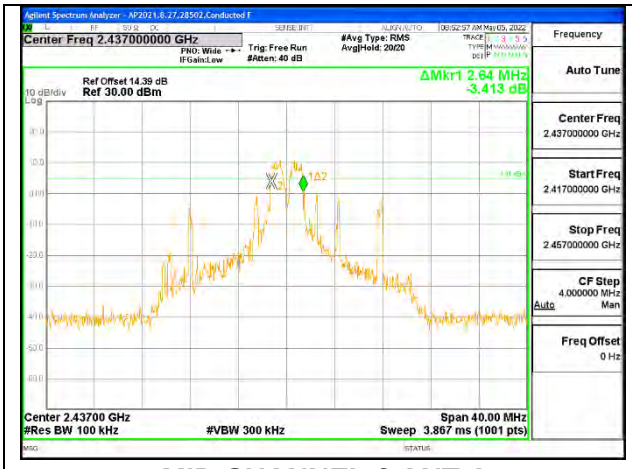


MID CHANNEL 6 ANT 3

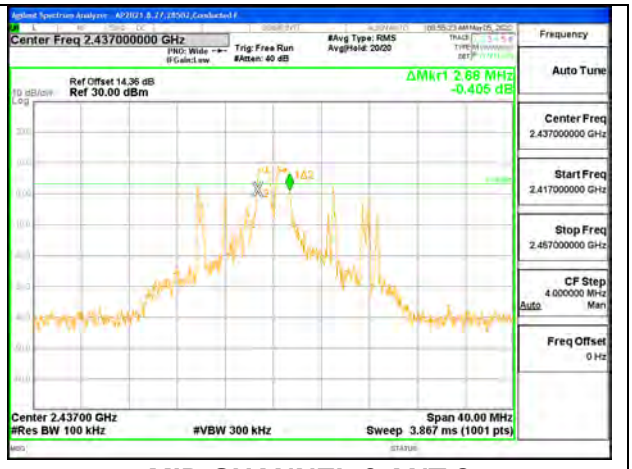
UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

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

Channel	Frequency (MHz)	6dB BW(MHz) ANT 4	6dB BW (MHz) ANT 3	Minimum Limit (MHz)
Low 1	2412	2.64	2.64	0.5
Mid 6	2437	2.64	2.68	0.5
High 11	2462	2.64	2.64	0.5
High 12	2467	2.64	2.68	0.5
High 13	2472	2.68	2.64	0.5



MID CHANNEL 6 ANT 4

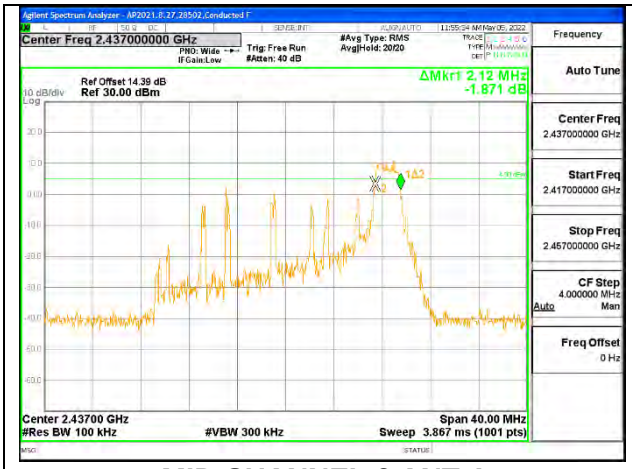


MID CHANNEL 6 ANT 3

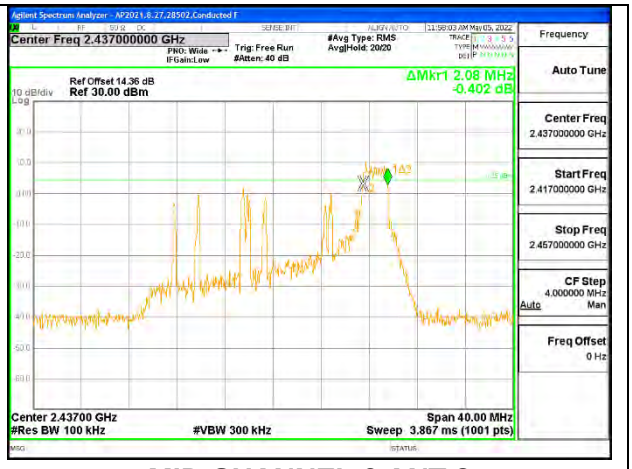
UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

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

Channel	Frequency (MHz)	6dB BW(MHz) ANT 4	6dB BW (MHz) ANT 3	Minimum Limit (MHz)
Low 1	2412	2.12	2.08	0.5
Mid 6	2437	2.12	2.08	0.5
High 11	2462	2.08	2.20	0.5
High 12	2467	1.96	2.16	0.5
High 13	2472	2.08	2.12	0.5



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

UL LLC.
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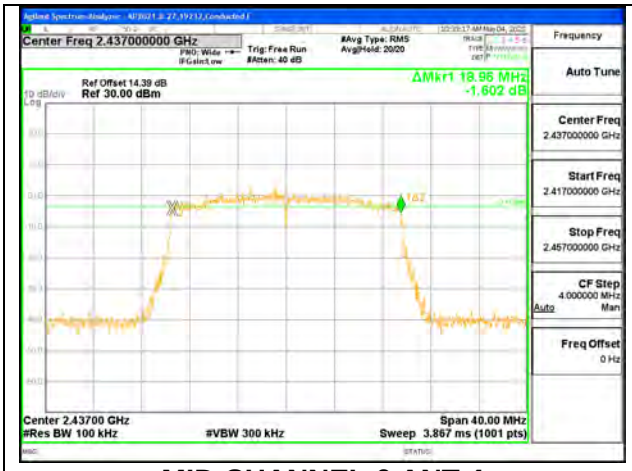
ANT 4 + ANT 3 2TX MODE: SU Mode

Channel	Frequency (MHz)	6 dB BW Antenna 4 (MHz)	6 dB BW Antenna 3 (MHz)	Minimum Limit (MHz)
Low 1	2412	18.36	18.40	0.5
Low 2	2417	18.60	18.52	0.5
Low 3	2422	18.44	18.96	0.5
Low 4	2427	18.08	18.36	0.5
Mid 6	2437	18.96	18.56	0.5
High 8	2447	18.76	19.08	0.5
High 9	2452	18.28	18.76	0.5
High 10	2457	18.68	18.96	0.5
High 11	2462	18.00	18.76	0.5
High 12	2467	18.08	18.80	0.5
High 13	2472	18.24	18.24	0.5



MID CHANNEL 6 ANT 4

MID CHANNEL 6 ANT 3

UL LLC.
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9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

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

TEST PROCEDURE

Measurements perform using a wideband RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter. Gated average output power was read directly from the 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 Gain (dBi)	ANT 3 Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	-1.80	0.60	-0.44	2.49

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DIRECTIONAL GAIN CALCULATION:

ANSI C63.10-2013 section 14.4.3

Uncorrelated directional gain=10*LOG((10^(Ant1/10)+10^(Ant2/10))/2)
Correlated directional Gain=10*LOG(((10^(Ant1/20)+10^(Ant2/20))^2)/2)

Sample Calculation:

Ant1=-1.80, Ant2=0.6

Uncorrelated Antenna gain=10log[(10^(-1.8/10)+10^(0.6/10))/2]=-0.44dBi

Correlated Antenna gain=10log[(10^(-1.8/20)+10^(0.6/20))^2)/2]=2.49

RESULTS

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9.4.1. 802.11b MODE 1TX

Test Engineer:	50820
Test Date:	5/2/2022

1TX ANT 4 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.80	30.00	30	36	30.00
Mid 6	2437	-1.80	30.00	30	36	30.00
High 11	2462	-1.80	30.00	30	36	30.00
High 12	2467	-1.80	30.00	30	36	30.00
High 13	2472	-1.80	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	20.45	20.45	30.00	-9.55
Mid 6	2437	21.45	21.45	30.00	-8.55
High 11	2462	21.32	21.32	30.00	-8.68
High 12	2467	20.38	20.38	30.00	-9.62
High 13	2472	17.80	17.80	30.00	-12.20

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1TX ANT 3 MODE

Limits

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	20.41	20.41	30.00	-9.59
Mid 6	2437	21.46	21.46	30.00	-8.54
High 11	2462	21.35	21.35	30.00	-8.65
High 12	2467	20.42	20.42	30.00	-9.58
High 13	2472	17.80	17.80	30.00	-12.20

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9.4.2. 802.11n HT20 MODE

Test Engineer:	50820
Test Date:	5/2/2022

1TX ANT 4 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.80	30.00	30	36	30.00
Low 2	2417	-1.80	30.00	30	36	30.00
Low 3	2422	-1.80	30.00	30	36	30.00
Mid 6	2437	-1.80	30.00	30	36	30.00
High 9	2452	-1.80	30.00	30	36	30.00
High 10	2457	-1.80	30.00	30	36	30.00
High 11	2462	-1.80	30.00	30	36	30.00
High 12	2467	-1.80	30.00	30	36	30.00
High 13	2472	-1.80	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	17.88	17.88	30.00	-12.12
Low 2	2417	19.42	19.42	30.00	-10.58
Low 3	2422	21.45	21.45	30.00	-8.55
Mid 6	2437	21.45	21.45	30.00	-8.55
High 9	2452	20.98	20.98	30.00	-9.02
High 10	2457	19.45	19.45	30.00	-10.55
High 11	2462	18.44	18.44	30.00	-11.56
High 12	2467	15.87	15.87	30.00	-14.13
High 13	2472	14.40	14.40	30.00	-15.60

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1TX ANT 3 MODE

Limits

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

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.83	17.83	30.00	-12.17
Low 2	2417	19.36	19.36	30.00	-10.64
Low 3	2422	21.48	21.48	30.00	-8.52
Mid 6	2437	21.43	21.43	30.00	-8.57
High 9	2452	20.98	20.98	30.00	-9.02
High 10	2457	19.47	19.47	30.00	-10.53
High 11	2462	18.47	18.47	30.00	-11.53
High 12	2467	15.90	15.90	30.00	-14.10
High 13	2472	14.35	14.35	30.00	-15.65

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9.4.3. 802.11n HT20 CDD MODE 2TX

Test Engineer:	50820
Test Date:	5/2/2022

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.44	30.00	36	30.00
Low 2	2417	-0.44	30.00	36	30.00
Low 3	2422	-0.44	30.00	36	30.00
Mid 6	2437	-0.44	30.00	36	30.00
High 8	2447	-0.44	30.00	36	30.00
High 9	2452	-0.44	30.00	36	30.00
High 10	2457	-0.44	30.00	36	30.00
High 11	2462	-0.44	30.00	36	30.00
High 12	2467	-0.44	30.00	36	30.00
High 13	2472	-0.44	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	17.44	17.43	20.45	30.00	-9.55
Low 2	2417	18.46	18.43	21.46	30.00	-8.54
Low 3	2422	19.94	19.93	22.95	30.00	-7.05
Mid 6	2437	21.45	21.40	24.44	30.00	-5.56
High 8	2447	21.47	21.45	24.47	30.00	-5.53
High 9	2452	19.34	19.38	22.37	30.00	-7.63
High 10	2457	18.45	18.45	21.46	30.00	-8.54
High 11	2462	17.45	17.45	20.46	30.00	-9.54
High 12	2467	14.93	14.95	17.95	30.00	-12.05
High 13	2472	14.11	14.13	17.13	30.00	-12.87

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9.4.4. 802.11ax HE20 MODE

Test Engineer:	50820
Test Date:	5/2/2022

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

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.80	30.00	30	36	30.00
Mid 6	2437	-1.80	30.00	30	36	30.00
High 11	2462	-1.80	30.00	30	36	30.00
High 12	2467	-1.80	30.00	30	36	30.00
High 13	2472	-1.80	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.83	11.83	30.00	-18.17
Mid 6	2437	11.93	11.93	30.00	-18.07
High 11	2462	11.96	11.96	30.00	-18.04
High 12	2467	11.90	11.90	30.00	-18.10
High 13	2472	-0.12	-0.12	30.00	-30.12

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

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.80	30.00	30	36	30.00
Mid 6	2437	-1.80	30.00	30	36	30.00
High 11	2462	-1.80	30.00	30	36	30.00
High 12	2467	-1.80	30.00	30	36	30.00
High 13	2472	-1.80	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.95	11.95	30.00	-18.05
Mid 6	2437	11.92	11.92	30.00	-18.08
High 11	2462	11.85	11.85	30.00	-18.15
High 12	2467	11.95	11.95	30.00	-18.05
High 13	2472	-0.15	-0.15	30.00	-30.15

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

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.80	30.00	30	36	30.00
Mid 6	2437	-1.80	30.00	30	36	30.00
High 11	2462	-1.80	30.00	30	36	30.00
High 12	2467	-1.80	30.00	30	36	30.00
High 13	2472	-1.80	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.92	11.92	30.00	-18.08
Mid 6	2437	11.90	11.90	30.00	-18.10
High 11	2462	11.82	11.82	30.00	-18.18
High 12	2467	11.94	11.94	30.00	-18.06
High 13	2472	-0.11	-0.11	30.00	-30.11

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1TX ANT 4 MODE: SU Mode

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-1.80	30.00	30	36	30.00
Low 2	2417	-1.80	30.00	30	36	30.00
Low 3	2422	-1.80	30.00	30	36	30.00
Mid 6	2437	-1.80	30.00	30	36	30.00
High 9	2452	-1.80	30.00	30	36	30.00
High 10	2457	-1.80	30.00	30	36	30.00
High 11	2462	-1.80	30.00	30	36	30.00
High 12	2467	-1.80	30.00	30	36	30.00
High 13	2472	-1.80	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.98	16.98	30.00	-13.02
Low 2	2417	17.94	17.94	30.00	-12.06
Low 3	2422	21.43	21.43	30.00	-8.57
Mid 6	2437	21.32	21.32	30.00	-8.68
High 9	2452	21.47	21.47	30.00	-8.53
High 10	2457	17.92	17.92	30.00	-12.08
High 11	2462	16.90	16.90	30.00	-13.10
High 12	2467	14.94	14.94	30.00	-15.06
High 13	2472	9.90	9.90	30.00	-20.10

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

Limits

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.85	11.85	30.00	-18.15
Mid 6	2437	11.92	11.92	30.00	-18.08
High 11	2462	11.98	11.98	30.00	-18.02
High 12	2467	11.93	11.93	30.00	-18.07
High 13	2472	-0.18	-0.18	30.00	-30.18

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

Limits

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.93	11.93	30.00	-18.07
Mid 6	2437	11.93	11.93	30.00	-18.07
High 11	2462	11.90	11.90	30.00	-18.10
High 12	2467	11.95	11.95	30.00	-18.05
High 13	2472	-0.22	-0.22	30.00	-30.22

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

Limits

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.95	11.95	30.00	-18.05
Mid 6	2437	11.98	11.98	30.00	-18.02
High 11	2462	11.88	11.88	30.00	-18.12
High 12	2467	11.93	11.93	30.00	-18.07
High 13	2472	-0.21	-0.21	30.00	-30.21

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1TX ANT 3 MODE: SU Mode

Limits

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

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	16.97	16.97	30.00	-13.03
Low 2	2417	17.92	17.92	30.00	-12.08
Low 3	2422	21.46	21.46	30.00	-8.54
Mid 6	2437	21.39	21.39	30.00	-8.61
High 9	2452	21.44	21.44	30.00	-8.56
High 10	2457	17.83	17.83	30.00	-12.17
High 11	2462	16.80	16.80	30.00	-13.20
High 12	2467	14.95	14.95	30.00	-15.05
High 13	2472	9.89	9.89	30.00	-20.11

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9.4.5. 802.11ax HE20 OFDMA MODE 2TX

Test Engineer:	50820
Test Date:	5/2/2022

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

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.44	30.00	36	30.00
Mid 6	2437	-0.44	30.00	36	30.00
High 11	2462	-0.44	30.00	36	30.00
High 12	2467	-0.44	30.00	36	30.00
High 13	2472	-0.44	30.00	36	30.00

Results

Channel	Frequency (MHz)	ANT4 Meas Power (dBm)	ANT3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.85	11.87	14.87	30.00	-15.13
Mid 6	2437	11.92	11.94	14.94	30.00	-15.06
High 11	2462	11.95	11.94	14.96	30.00	-15.04
High 12	2467	11.83	11.95	14.90	30.00	-15.10
High 13	2472	-0.23	-0.21	2.79	30.00	-27.21

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

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.44	30.00	36	30.00
Mid 6	2437	-0.44	30.00	36	30.00
High 11	2462	-0.44	30.00	36	30.00
High 12	2467	-0.44	30.00	36	30.00
High 13	2472	-0.44	30.00	36	30.00

Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.96	11.92	14.95	30.00	-15.05
Mid 6	2437	11.94	11.95	14.96	30.00	-15.04
High 11	2462	11.85	11.90	14.89	30.00	-15.11
High 12	2467	11.91	11.96	14.95	30.00	-15.05
High 13	2472	-0.15	-0.16	2.86	30.00	-27.14

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

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.44	30.00	36	30.00
Mid 6	2437	-0.44	30.00	36	30.00
High 11	2462	-0.44	30.00	36	30.00
High 12	2467	-0.44	30.00	36	30.00
High 13	2472	-0.44	30.00	36	30.00

Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	11.96	11.92	14.95	30.00	-15.05
Mid 6	2437	11.93	11.94	14.95	30.00	-15.05
High 11	2462	11.90	11.90	14.91	30.00	-15.09
High 12	2467	11.94	11.90	14.93	30.00	-15.07
High 13	2472	-0.17	-0.12	2.87	30.00	-27.13

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ANT 4 + ANT 3 2TX MODE: SU Mode

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-0.44	30.00	36	30.00
Low 2	2417	-0.44	30.00	36	30.00
Low 3	2422	-0.44	30.00	36	30.00
Low 4	2427	-0.44	30.00	36	30.00
Mid 6	2437	-0.44	30.00	36	30.00
High 8	2447	-0.44	30.00	36	30.00
High 9	2452	-0.44	30.00	36	30.00
High 10	2457	-0.44	30.00	36	30.00
High 11	2462	-0.44	30.00	36	30.00
High 12	2467	-0.44	30.00	36	30.00
High 13	2472	-0.44	30.00	36	30.00

Results

Channel	Frequency (MHz)	ANT 4 Meas Power (dBm)	ANT 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	15.90	15.90	18.91	30.00	-11.09
Low 2	2417	16.91	16.89	19.91	30.00	-10.09
Low 3	2422	18.90	18.88	21.90	30.00	-8.10
Low 4	2427	21.40	21.43	24.43	30.00	-5.57
Mid 6	2437	21.40	21.44	24.43	30.00	-5.57
High 8	2447	21.50	21.47	24.50	30.00	-5.50
High 9	2452	18.46	18.50	21.49	30.00	-8.51
High 10	2457	16.90	16.87	19.90	30.00	-10.10
High 11	2462	15.91	15.95	18.94	30.00	-11.06
High 12	2467	13.91	13.92	16.93	30.00	-13.07
High 13	2472	8.85	8.90	11.89	30.00	-18.11

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9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

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

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

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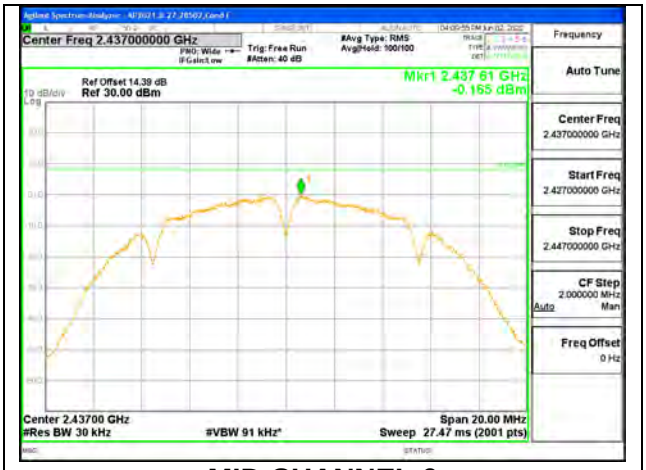
9.5.1. 802.11b MODE 1TX

1TX ANT 4 MODE

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.037	-1.037	8.0	-9.0
Mid 6	2437	-0.165	-0.165	8.0	-8.2
High 11	2462	0.020	0.020	8.0	-8.0
High 12	2467	-0.833	-0.833	8.0	-8.8
High 13	2472	-3.737	-3.737	8.0	-11.7



MID CHANNEL 6

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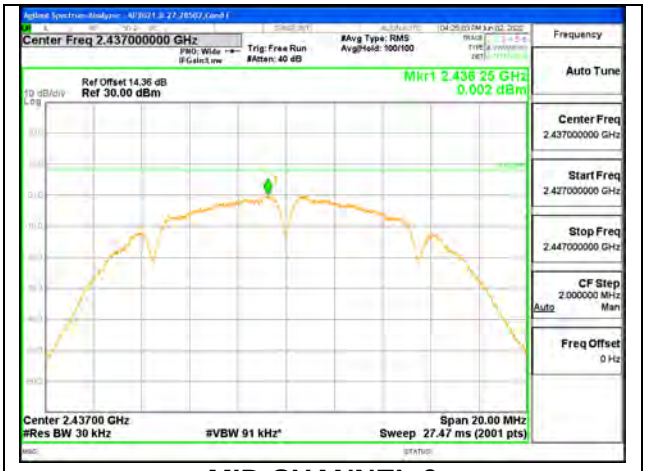
1TX ANT 3 MODE

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	-0.927	-0.927	8.0	-8.9
Mid 6	2437	0.002	0.002	8.0	-8.0
High 11	2462	0.153	0.153	8.0	-7.8
High 12	2467	-1.109	-1.109	8.0	-9.1
High 13	2472	-3.248	-3.248	8.0	-11.2



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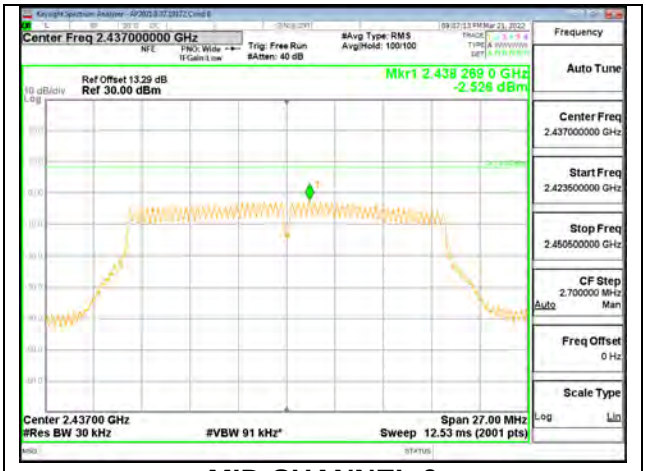
9.5.2. 802.11n HT20 MODE

1TX ANT 4 MODE

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.345	-6.345	8.0	-14.3
Low 2	2417	-4.469	-4.469	8.0	-12.5
Low 3	2422	-2.513	-2.513	8.0	-10.5
Mid 6	2437	-2.526	-2.526	8.0	-10.5
High 9	2452	-3.088	-3.088	8.0	-11.1
High 10	2457	-4.411	-4.411	8.0	-12.4
High 11	2462	-5.385	-5.385	8.0	-13.4
High 12	2467	-8.185	-8.185	8.0	-16.2
High 13	2472	-9.064	-9.064	8.0	-17.1



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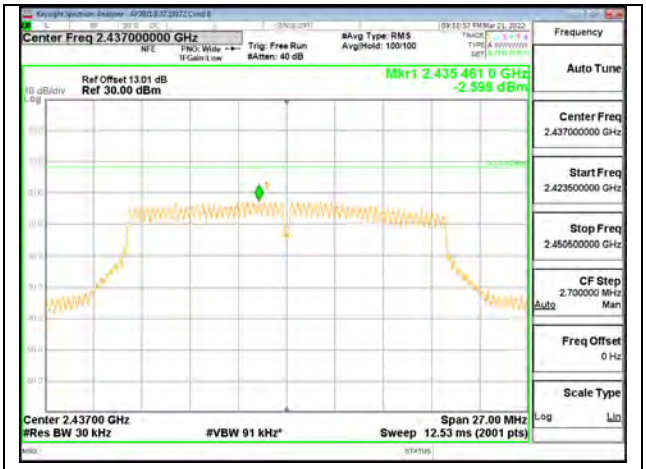
1TX ANT 3 MODE

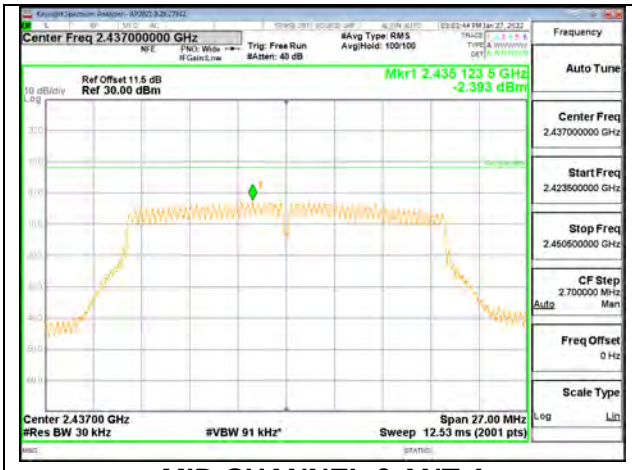
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.350	-6.350	8.0	-14.4
Low 2	2417	-4.408	-4.408	8.0	-12.4
Low 3	2422	-2.568	-2.568	8.0	-10.6
Mid 6	2437	-2.598	-2.598	8.0	-10.6
High 9	2452	-3.002	-3.002	8.0	-11.0
High 10	2457	-4.454	-4.454	8.0	-12.5
High 11	2462	-5.314	-5.314	8.0	-13.3
High 12	2467	-8.207	-8.207	8.0	-16.2
High 13	2472	-9.071	-9.071	8.0	-17.1



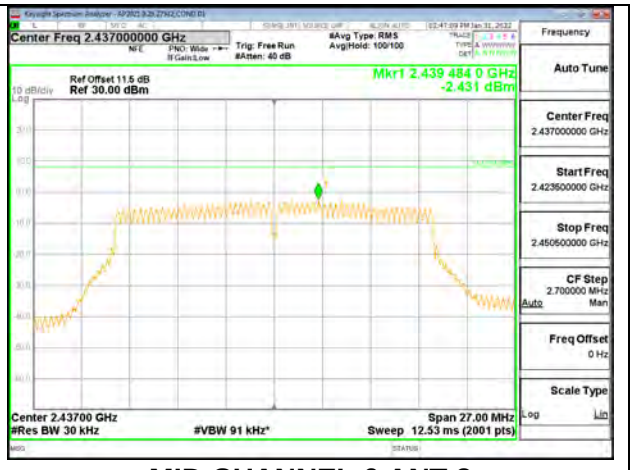
MID CHANNEL 6

9.5.3. 802.11n HT20 CDD MODE 2TX

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT 4 Meas (dBm/ 3kHz)	ANT 3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-7.021	-6.265	-3.616	8.0	-11.6
Low 2	2417	-5.525	-5.162	-2.329	8.0	-10.3
Low 3	2422	-4.020	-3.500	-0.742	8.0	-8.7
Mid 6	2437	-2.393	-2.431	0.598	8.0	-7.4
High 9	2452	-4.289	-4.015	-1.140	8.0	-9.1
High 10	2457	-5.319	-5.307	-2.303	8.0	-10.3
High 11	2462	-6.201	-6.135	-3.158	8.0	-11.2
High 12	2467	-8.678	-8.810	-5.733	8.0	-13.7
High 13	2472	-8.832	-9.092	-5.950	8.0	-13.9



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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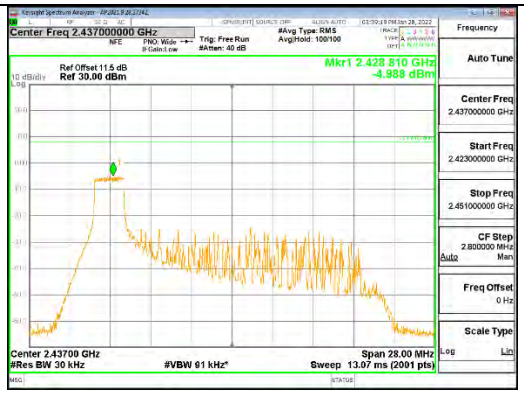
9.5.4. 802.11ax HE20 MODE

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

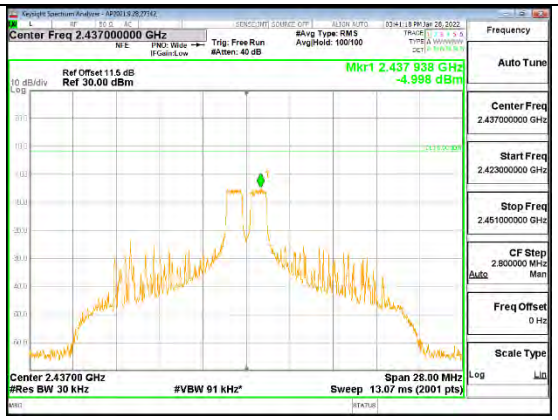
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-4.964	-4.964	8.0	-13.0
Mid 6	2437	-4.988	-4.988	8.0	-13.0
High 11	2462	-5.149	-5.149	8.0	-13.1
High 12	2467	-5.033	-5.033	8.0	-13.0
High 13	2472	-17.108	-17.108	8.0	-25.1



MID CHANNEL 6

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

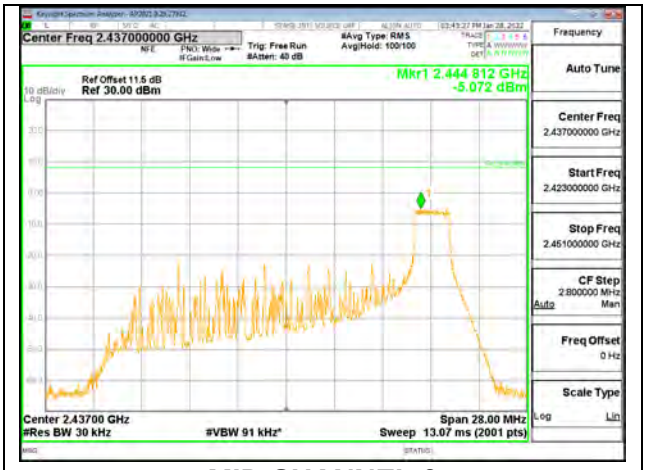
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-4.971	-4.971	8.0	-13.0
Mid 6	2437	-4.998	-4.998	8.0	-13.0
High 11	2462	-5.073	-5.073	8.0	-13.1
High 12	2467	-4.817	-4.817	8.0	-12.8
High 13	2472	-17.178	-17.178	8.0	-25.2



MID CHANNEL 6

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

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-4.908	-4.908	8.0	-12.9
Mid 6	2437	-5.072	-5.072	8.0	-13.1
High 11	2462	-5.012	-5.012	8.0	-13.0
High 12	2467	-4.983	-4.983	8.0	-13.0
High 13	2472	-16.513	-16.513	8.0	-24.5



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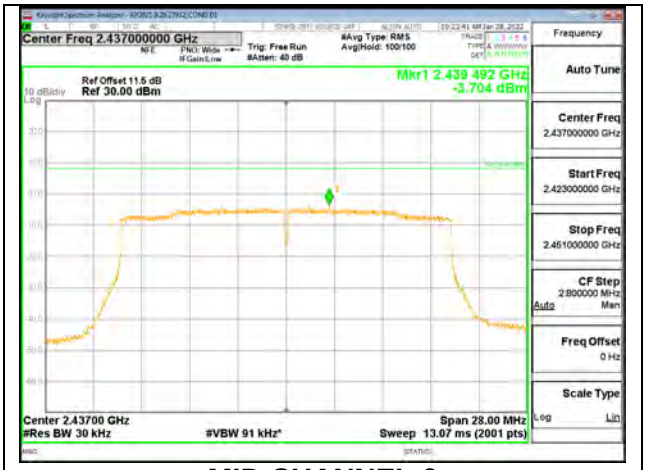
1TX ANT 4 MODE , SU Mode

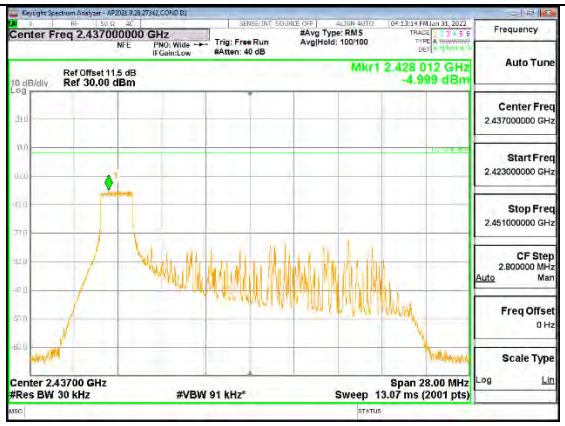
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.374	-8.374	8.0	-16.4
Low 2	2417	-7.225	-7.225	8.0	-15.2
Low 3	2422	-3.824	-3.824	8.0	-11.8
Mid 6	2437	-3.704	-3.704	8.0	-11.7
High 9	2452	-3.870	-3.870	8.0	-11.9
High 10	2457	-7.581	-7.581	8.0	-15.6
High 11	2462	-8.206	-8.206	8.0	-16.2
High 12	2467	-10.324	-10.324	8.0	-18.3
High 13	2472	-15.659	-15.659	8.0	-23.7



MID CHANNEL 6

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

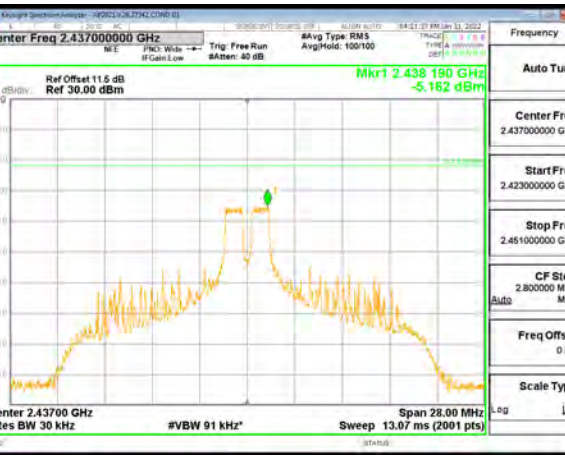
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-4.785	-4.785	8.0	-12.8
Mid 6	2437	-4.999	-4.999	8.0	-13.0
High 11	2462	-5.085	-5.085	8.0	-13.1
High 12	2467	-4.927	-4.927	8.0	-12.9
High 13	2472	-17.106	-17.106	8.0	-25.1



MID CHANNEL 6

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

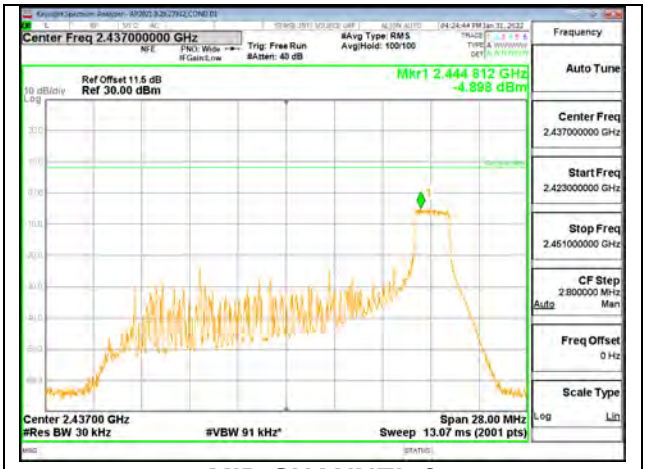
Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-5.105	-5.105	8.0	-13.1
Mid 6	2437	-5.162	-5.162	8.0	-13.2
High 11	2462	-5.137	-5.137	8.0	-13.1
High 12	2467	-5.159	-5.159	8.0	-13.2
High 13	2472	-16.457	-16.457	8.0	-24.5



MID CHANNEL 6

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

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
Channel	Frequency (MHz)	Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-5.165	-5.165	8.0	-13.2
Mid 6	2437	-4.898	-4.898	8.0	-12.9
High 11	2462	-5.227	-5.227	8.0	-13.2
High 12	2467	-5.014	-5.014	8.0	-13.0
High 13	2472	-17.760	-17.760	8.0	-25.8



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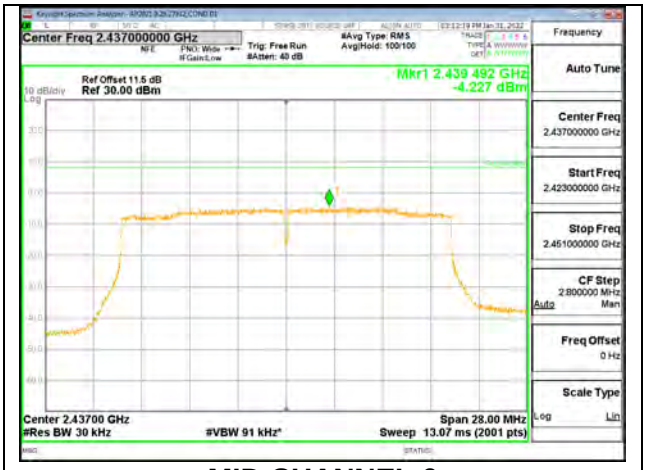
1TX ANT 3 MODE , SU Mode

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	-8.211	-8.211	8.0	-16.2
Low 2	2417	-7.167	-7.167	8.0	-15.2
Low 3	2422	-3.884	-3.884	8.0	-11.9
Mid 6	2437	-4.227	-4.227	8.0	-12.2
High 9	2452	-4.359	-4.359	8.0	-12.4
High 10	2457	-7.533	-7.533	8.0	-15.5
High 11	2462	-7.968	-7.968	8.0	-16.0
High 12	2467	-10.546	-10.546	8.0	-18.5
High 13	2472	-15.320	-15.320	8.0	-23.3



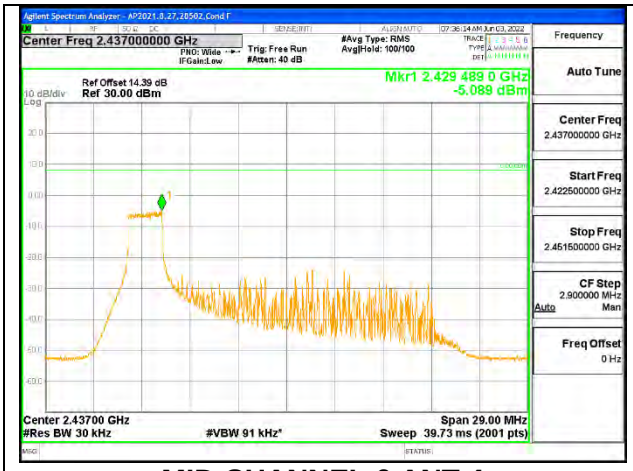
MID CHANNEL 6

UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

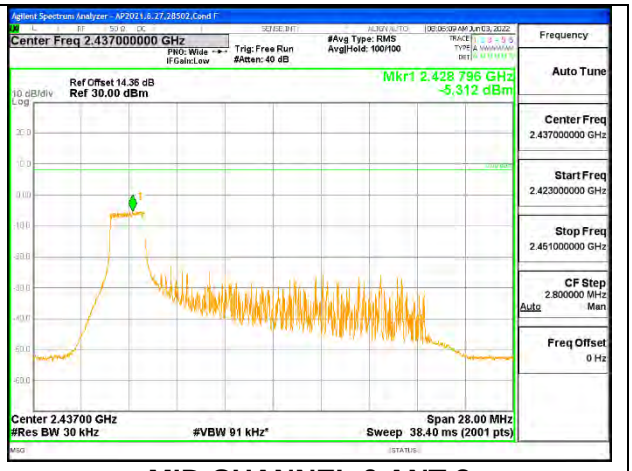
9.5.5. 802.11ax HE20 OFDMA MODE 2TX

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

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT4 Meas (dBm/ 3kHz)	ANT3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-5.098	-4.976	-2.026	8.0	-10.0
Mid 6	2437	-5.089	-5.312	-2.189	8.0	-10.2
High 11	2462	-4.931	-5.400	-2.149	8.0	-10.1
High 12	2467	-5.209	-5.347	-2.267	8.0	-10.3
High 13	2472	-16.527	-16.371	-13.438	8.0	-21.4



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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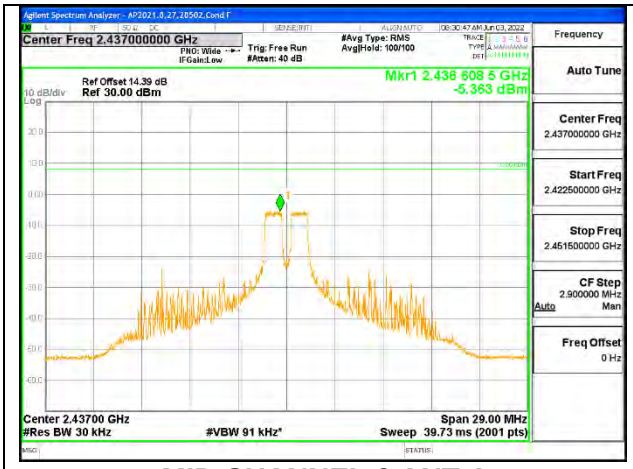
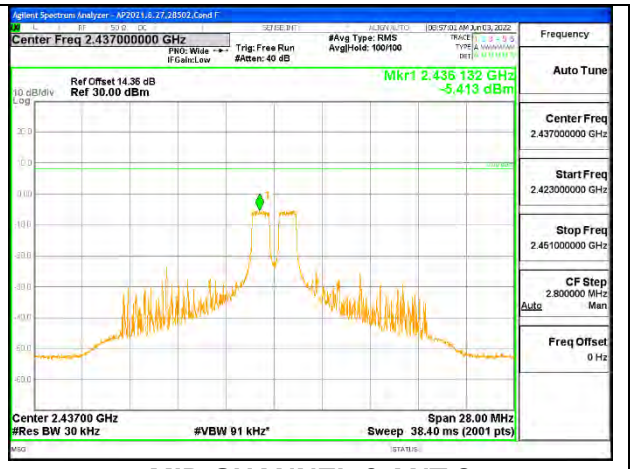
ANT 4 + ANT 3 2TX MODE: 26-Tones, RU Index 4

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT4 Meas (dBm/ 3kHz)	ANT3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-5.527	-4.767	-2.120	8.0	-10.1
Mid 6	2437	-5.363	-5.413	-2.378	8.0	-10.4
High 11	2462	-5.015	-5.037	-2.016	8.0	-10.0
High 12	2467	-5.523	-4.916	-2.199	8.0	-10.2
High 13	2472	-17.483	-16.535	-13.973	8.0	-22.0



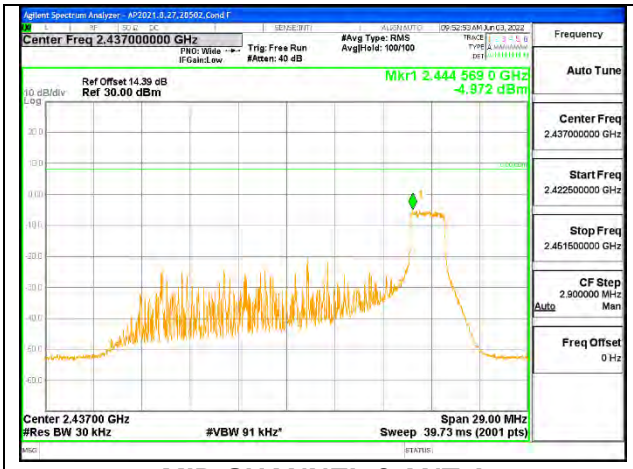
MID CHANNEL 6 ANT 4



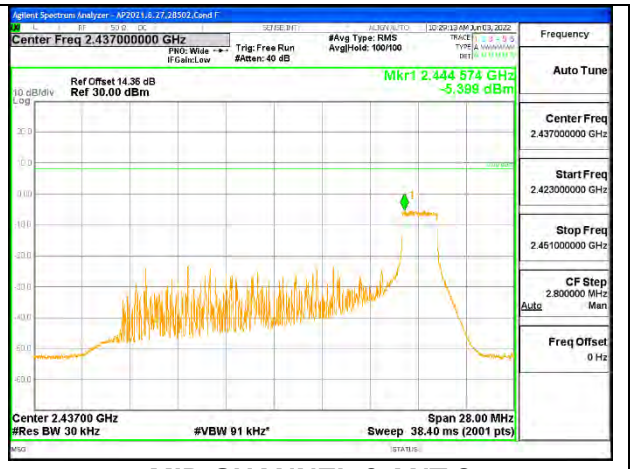
MID CHANNEL 6 ANT 3

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

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD			
Channel	Frequency (MHz)	ANT4 Meas (dBm/ 3kHz)	ANT3 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-4.885	-4.822	-1.843	8.0	-9.8
Mid 6	2437	-4.972	-5.399	-2.170	8.0	-10.2
High 11	2462	-5.362	-5.113	-2.225	8.0	-10.2
High 12	2467	-4.899	-5.117	-1.996	8.0	-10.0
High 13	2472	-16.680	-17.288	-13.963	8.0	-22.0



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

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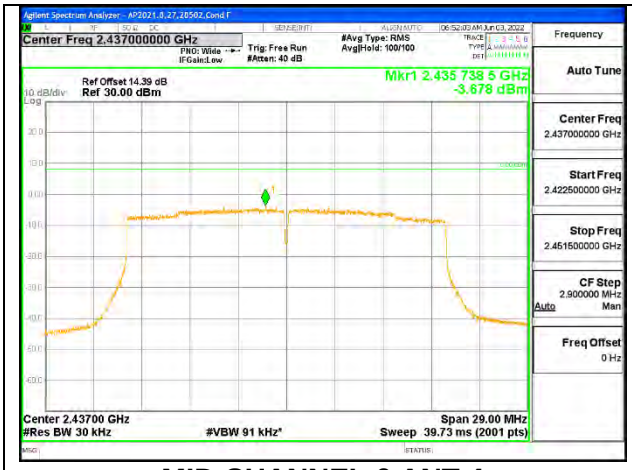
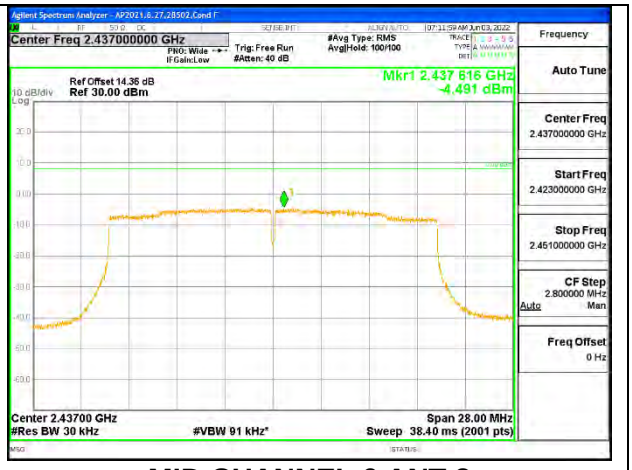
ANT 4 + ANT 3 2TX MODE: SU Mode

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	-10.124	-9.948	-7.025	8.0	-15.0
Low 2	2417	-8.126	-8.054	-5.080	8.0	-13.1
Low 3	2422	-6.587	-6.305	-3.433	8.0	-11.4
Low 4	2427	-4.065	-4.174	-1.109	8.0	-9.1
Mid 6	2437	-3.678	-4.491	-1.055	8.0	-9.1
High 8	2447	-4.093	-4.100	-1.086	8.0	-9.1
High 9	2452	-7.168	-7.124	-4.136	8.0	-12.1
High 10	2457	-8.649	-8.340	-5.481	8.0	-13.5
High 11	2462	-9.994	-10.054	-7.014	8.0	-15.0
High 12	2467	-11.929	-11.497	-8.697	8.0	-16.7
High 13	2472	-16.980	-16.685	-13.820	8.0	-21.8



MID CHANNEL 6 ANT 4



MID CHANNEL 6 ANT 3

UL LLC.
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9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 5.5

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

RESULTS

UL LLC.
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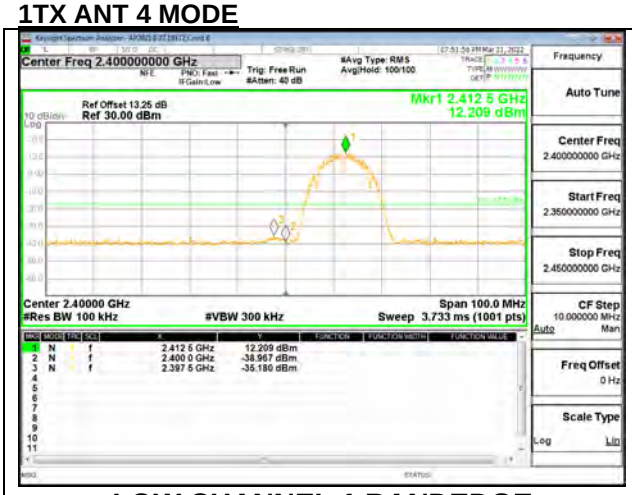
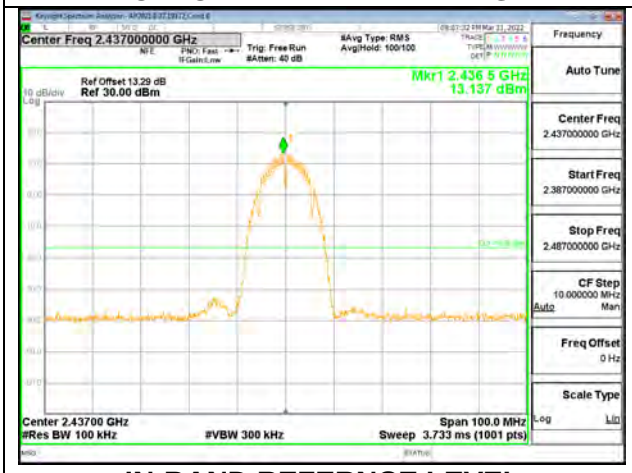
9.6.1. 802.11b MODE 1TX

1TX ANT 4 MODE

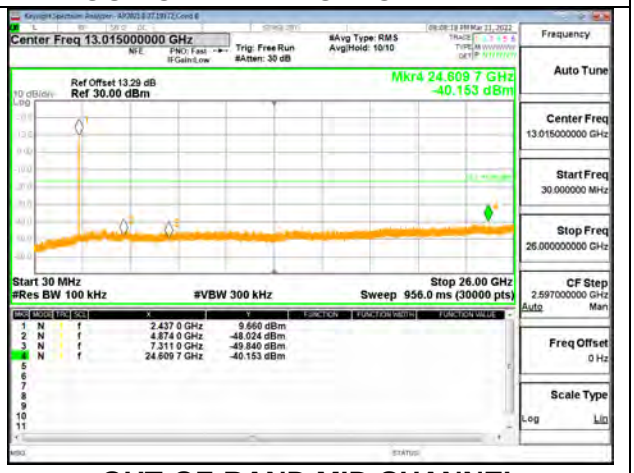


LOW CHANNEL 1 BANDEDGE

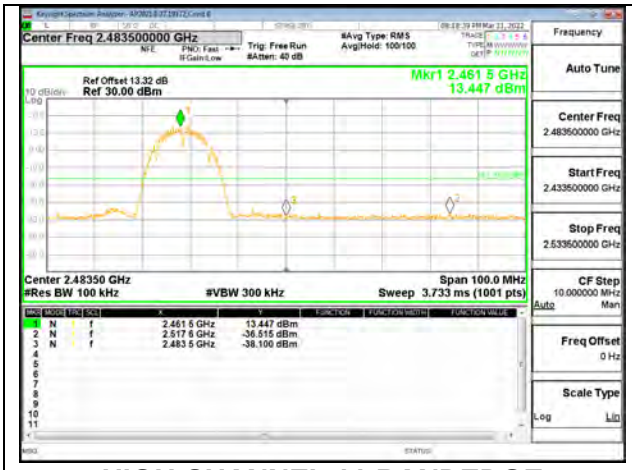
OUT-OF-BAND LOW CHANNEL 1



IN-BAND REFERNCE LEVEL

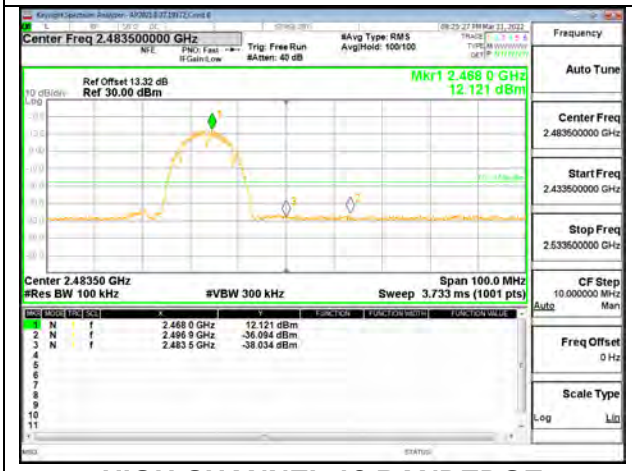


OUT-OF-BAND MID CHANNEL



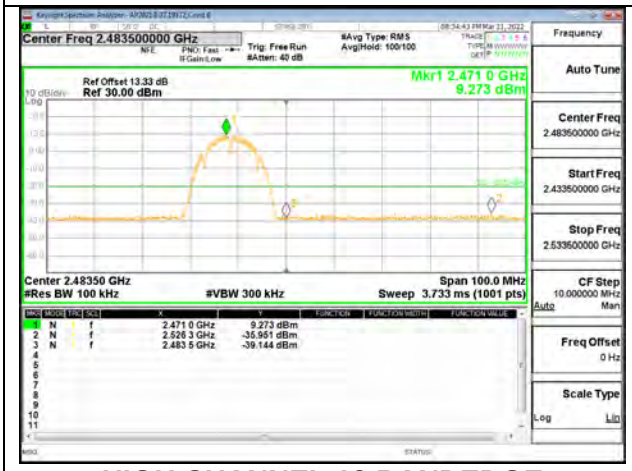
HIGH CHANNEL 11 BANDEDGE

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

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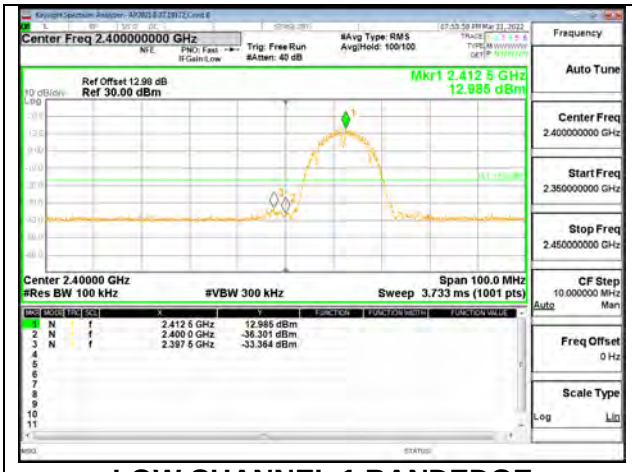
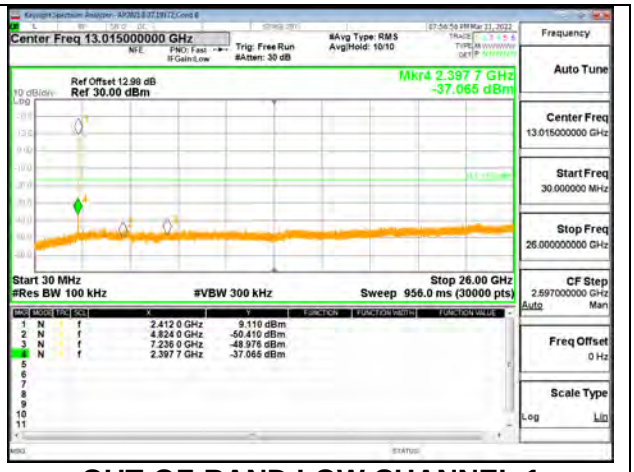
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

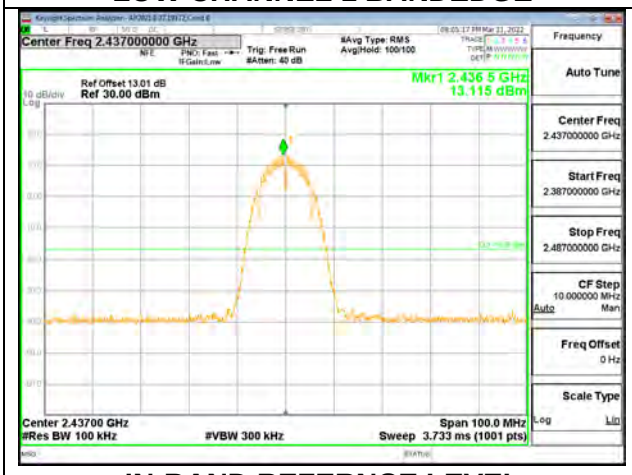
1TX ANT 3 MODE



LOW CHANNEL 1 BANDEDGE



OUT-OF-BAND LOW CHANNEL 1



IN-BAND REFERNCE LEVEL

OUT-OF-BAND MID CHANNEL

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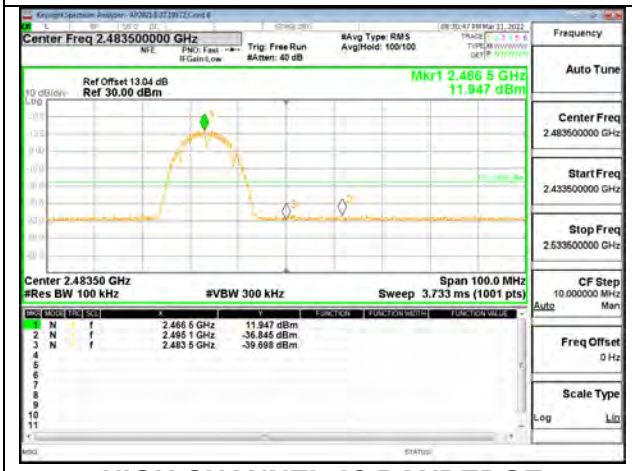
HIGH CHANNEL 11 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 12

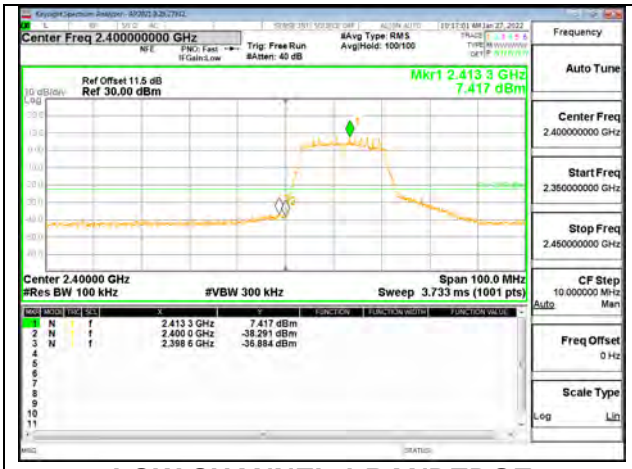
HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

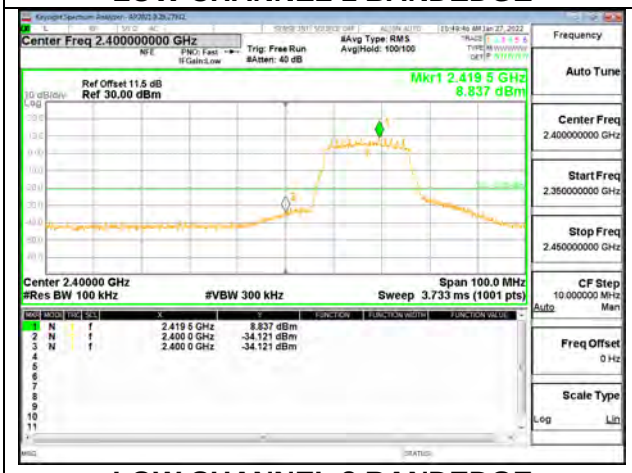
9.6.2. 802.11n HT20 SISO MODE

1TX ANT 4 MODE



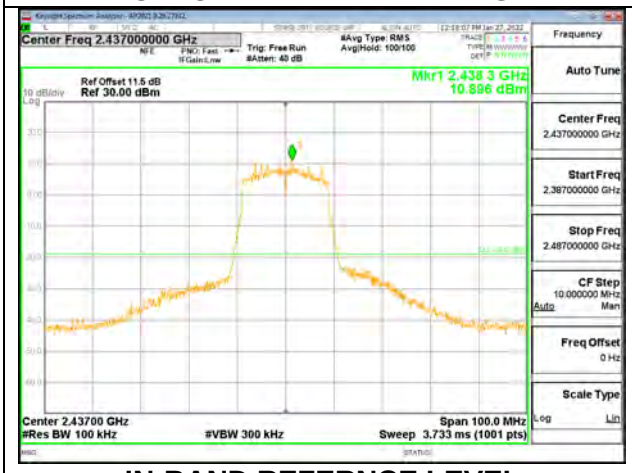
LOW CHANNEL 1 BANDEDGE

OUT-OF-BAND LOW CHANNEL 1



LOW CHANNEL 2 BANDEDGE

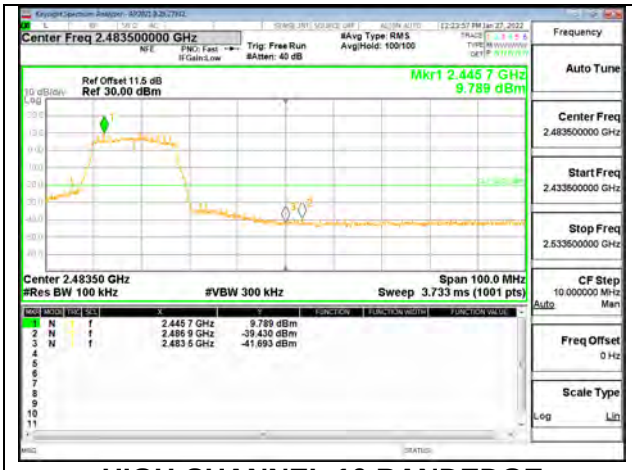
OUT-OF-BAND LOW CHANNEL 2



IN-BAND REFERNCE LEVEL

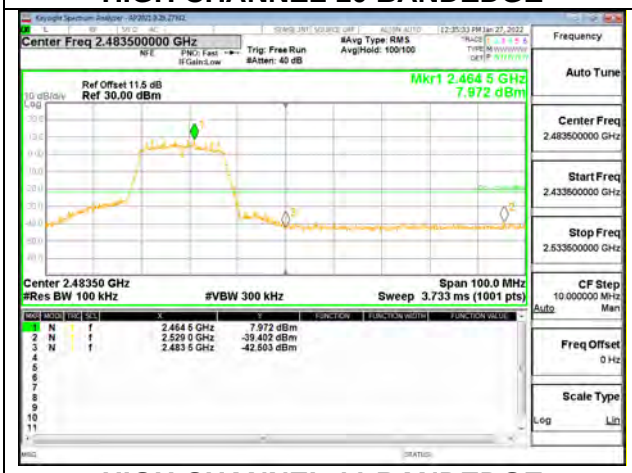
OUT-OF-BAND MID CHANNEL

UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

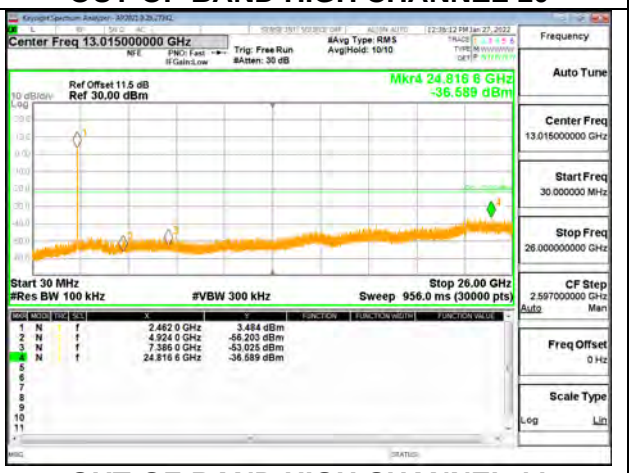


HIGH CHANNEL 10 BANDEDGE

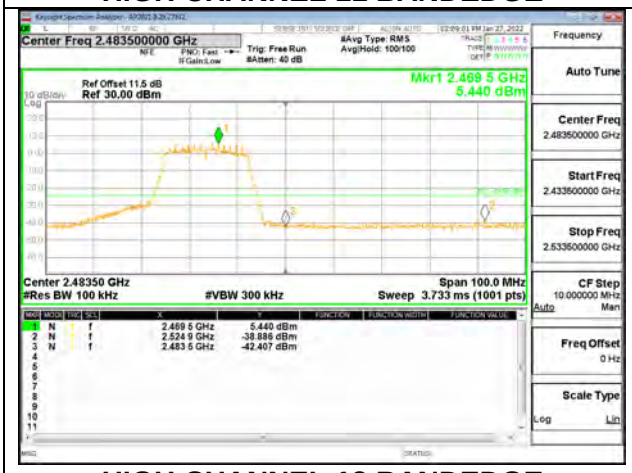
OUT-OF-BAND HIGH CHANNEL 10



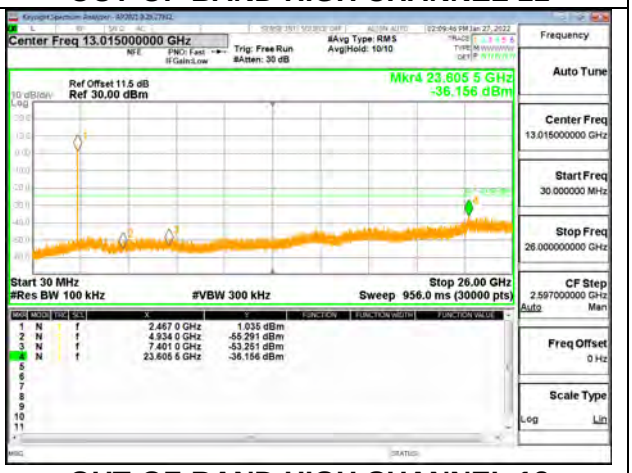
HIGH CHANNEL 11 BANDEDGE



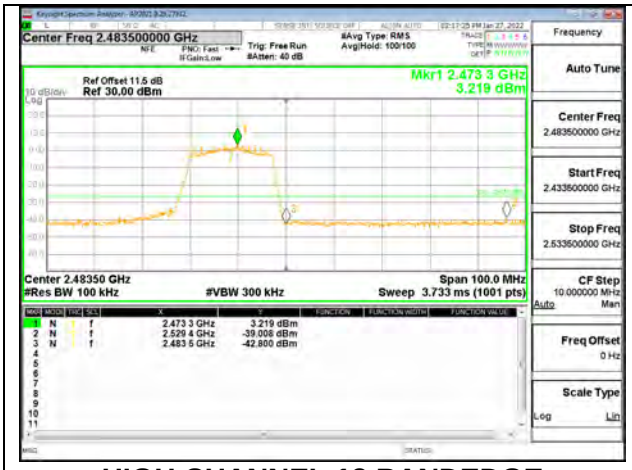
OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12

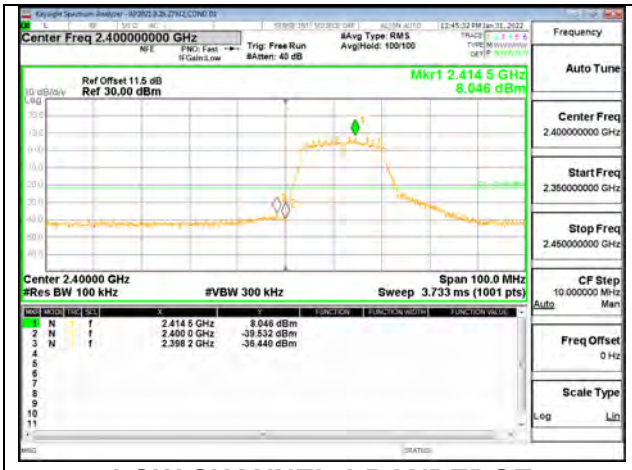


HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

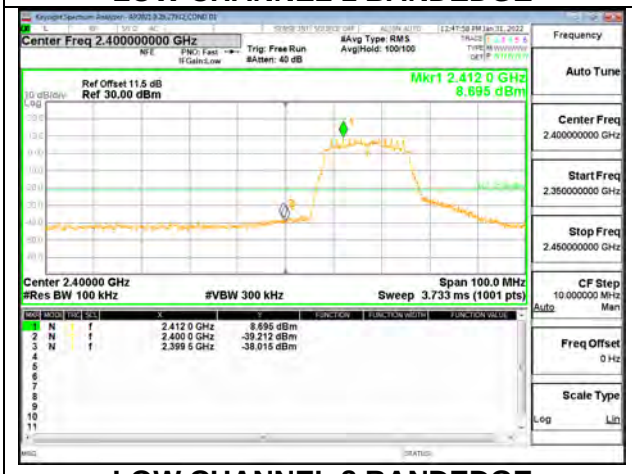
UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

1TX ANT 3 MODE



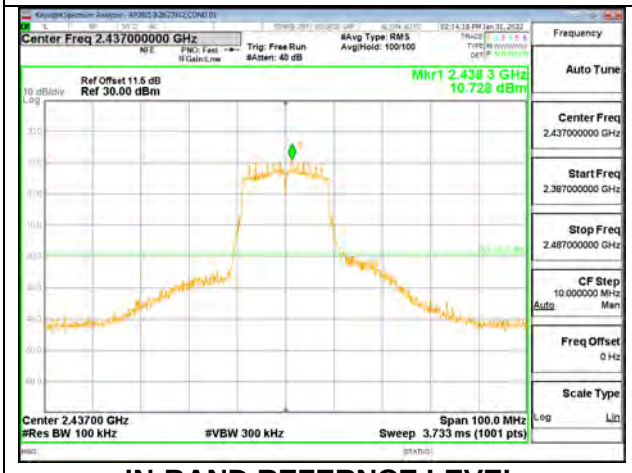
LOW CHANNEL 1 BANDEDGE

OUT-OF-BAND LOW CHANNEL 1

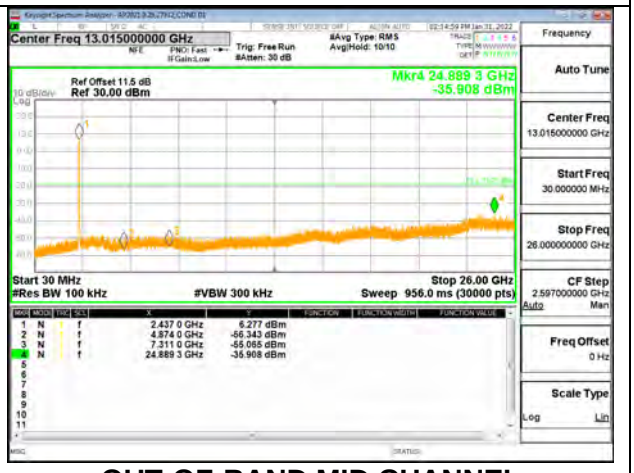


LOW CHANNEL 2 BANDEDGE

OUT-OF-BAND LOW CHANNEL 2

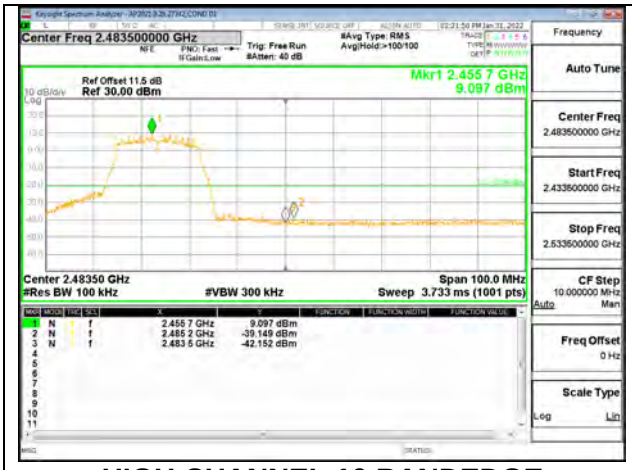


IN-BAND REFERNCE LEVEL



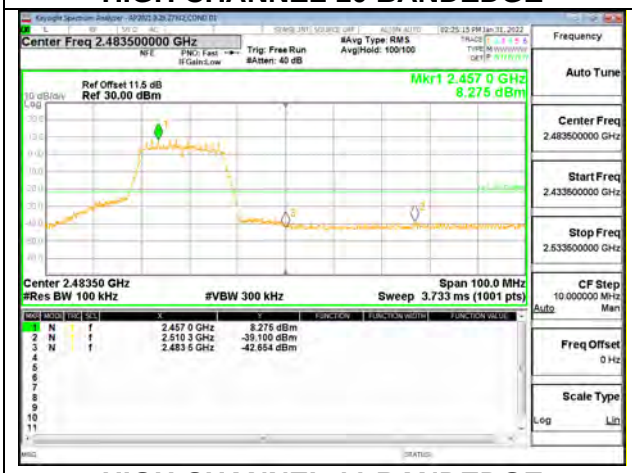
OUT-OF-BAND MID CHANNEL

UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888



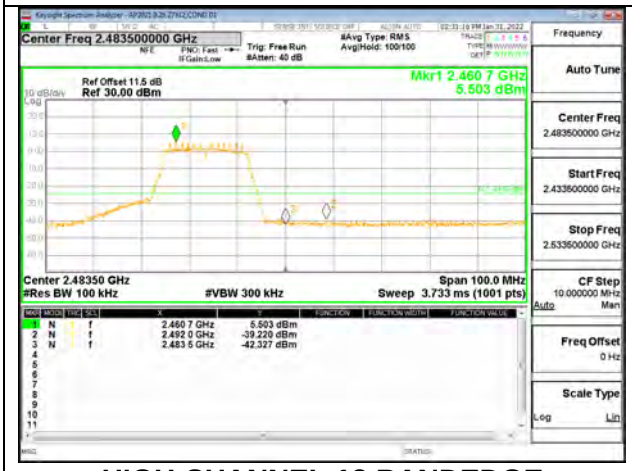
HIGH CHANNEL 10 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 10

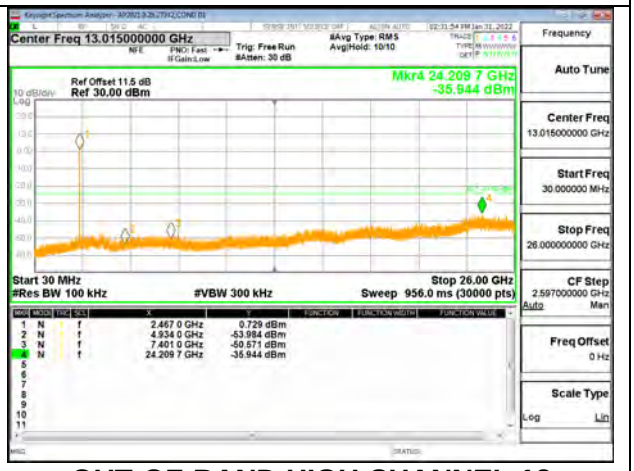


HIGH CHANNEL 11 BANDEDGE

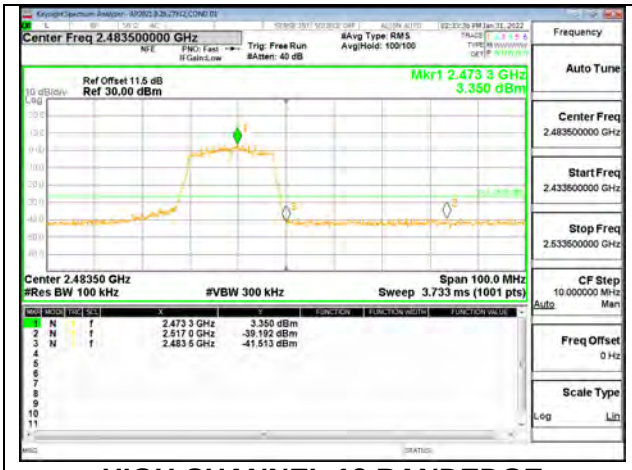
OUT-OF-BAND HIGH CHANNEL 11



HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



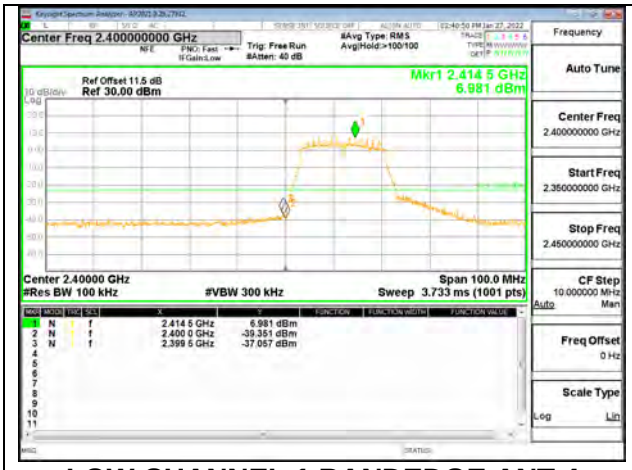
HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

UL LLC.
47173 Benicia Street, Fremont, CA 94538; USA. TEL:(510) 319-4000 FAX:(510) 661-0888

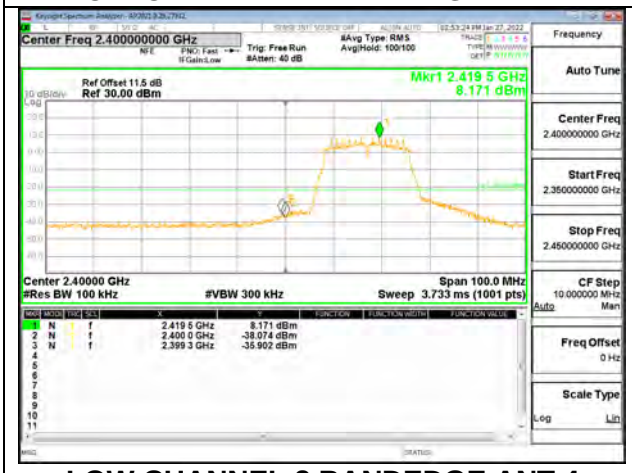
9.6.3. 802.11n HT20 MODE 2TX

2TX ANT 4 + ANT 3 CDD MODE

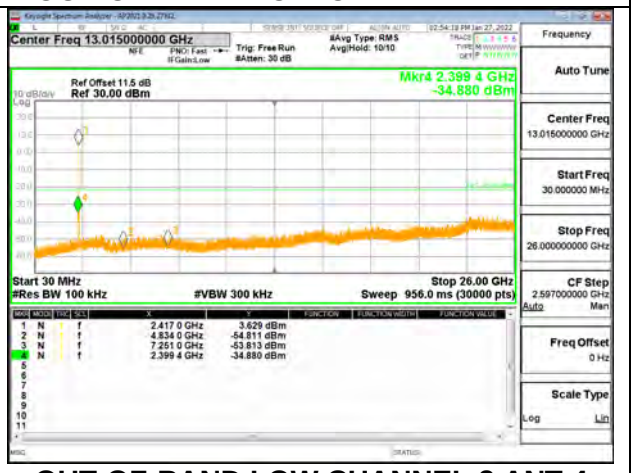


LOW CHANNEL 1 BANDEDGE ANT 4

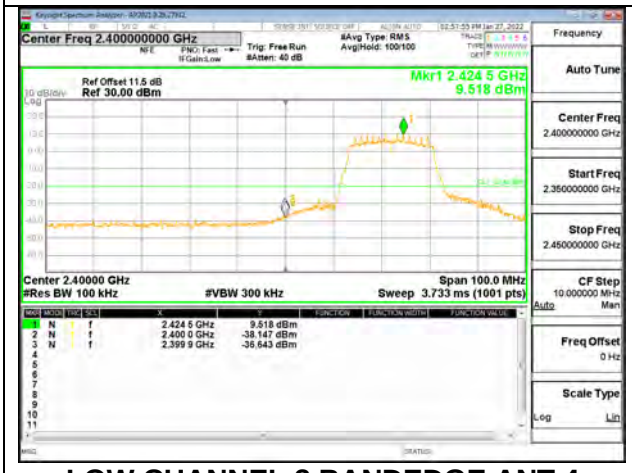
OUT-OF-BAND LOW CHANNEL 1 ANT 4



LOW CHANNEL 2 BANDEDGE ANT 4

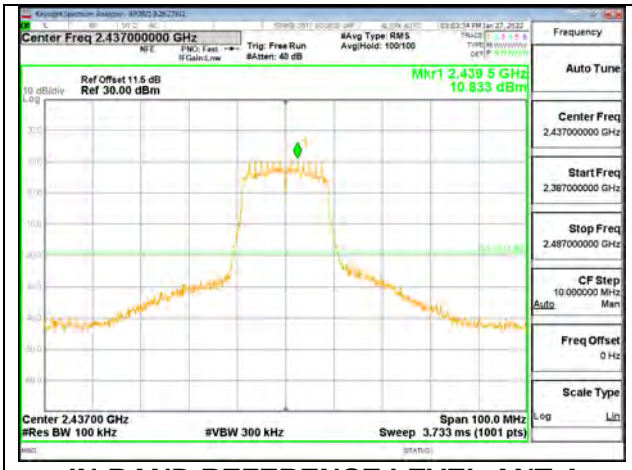


OUT-OF-BAND LOW CHANNEL 2 ANT 4



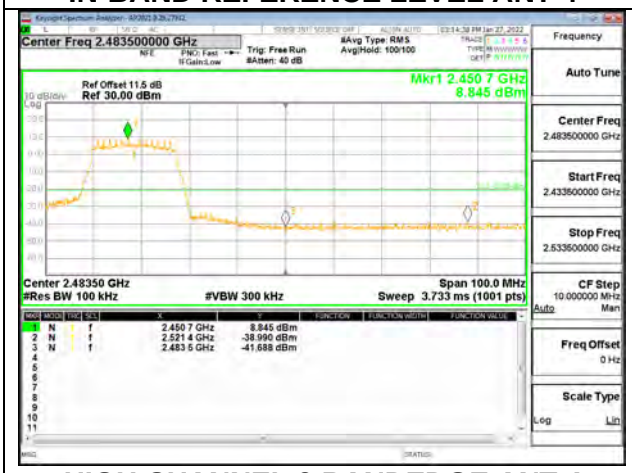
LOW CHANNEL 3 BANDEDGE ANT 4

OUT-OF-BAND LOW CHANNEL 3 ANT 4



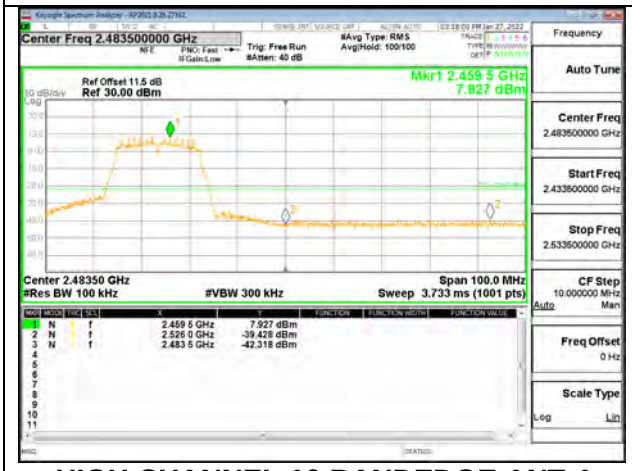
IN-BAND REFERENCE LEVEL ANT 4

OUT-OF-BAND MID CHANNEL ANT 4

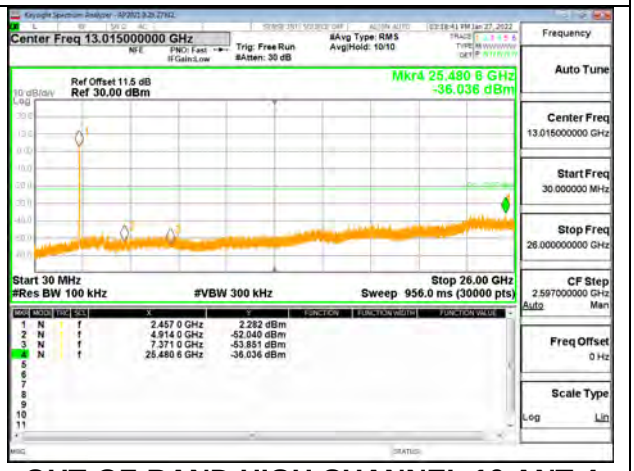


HIGH CHANNEL 9 BANDEDGE ANT 4

OUT-OF-BAND HIGH CHANNEL 9 ANT 4



HIGH CHANNEL 10 BANDEDGE ANT 4



OUT-OF-BAND HIGH CHANNEL 10 ANT 4

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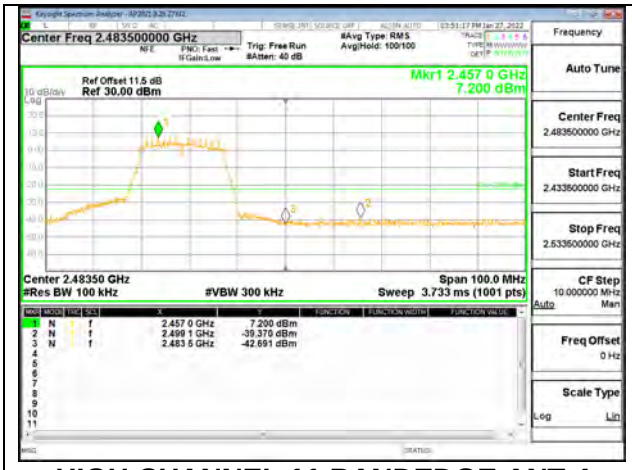
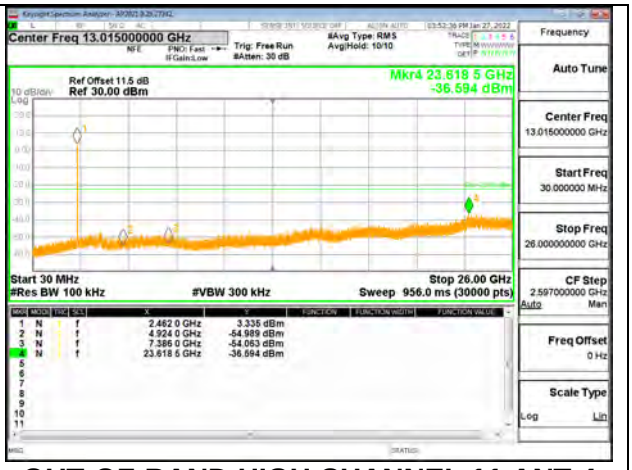
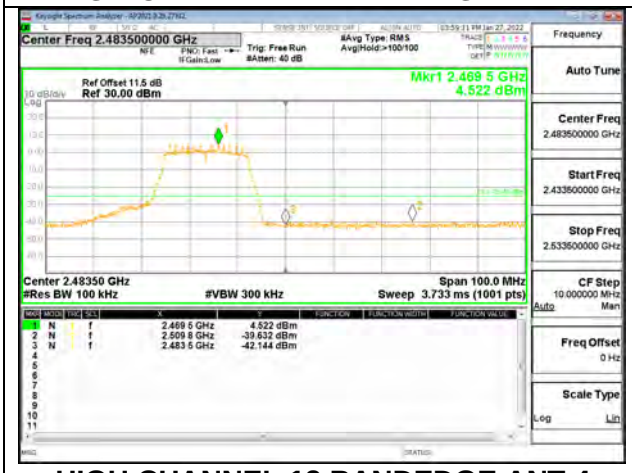


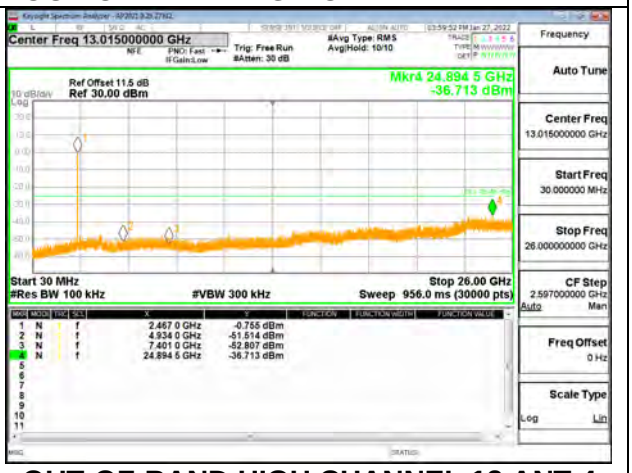
HIGH CHANNEL 11 BANDEDGE ANT 4



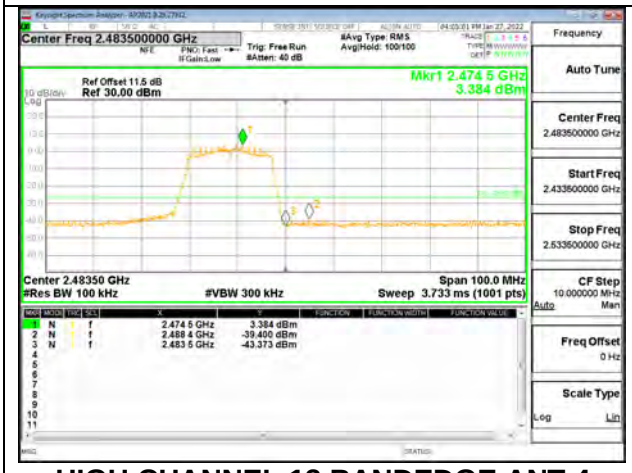
OUT-OF-BAND HIGH CHANNEL 11 ANT 4



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

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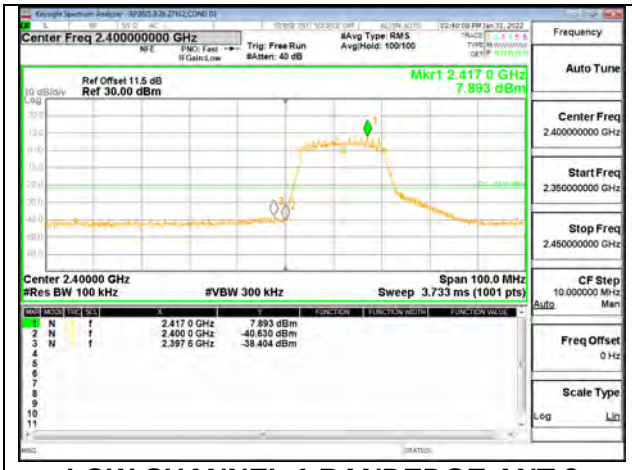
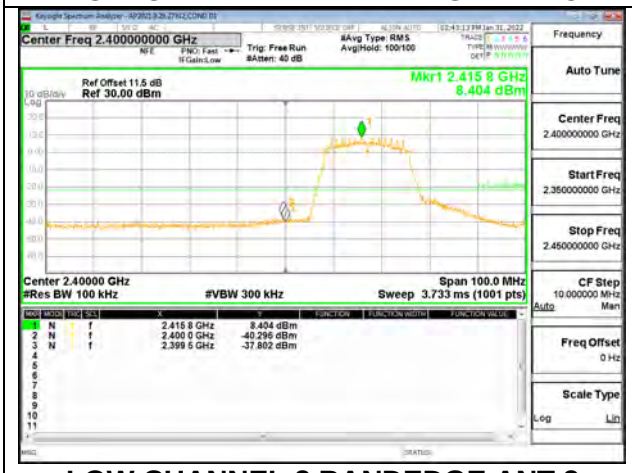
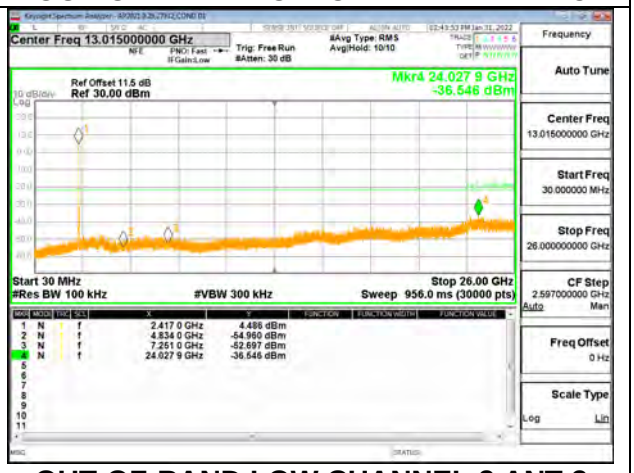


LOW CHANNEL 1 BANDEDGE ANT 3

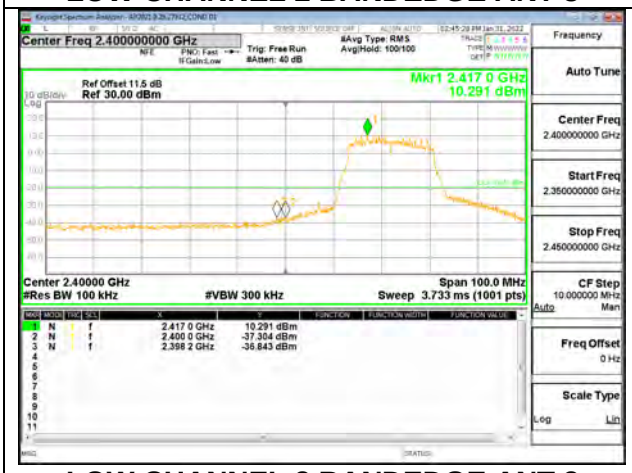
OUT-OF-BAND LOW CHANNEL 1 ANT 3



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

UL LLC.
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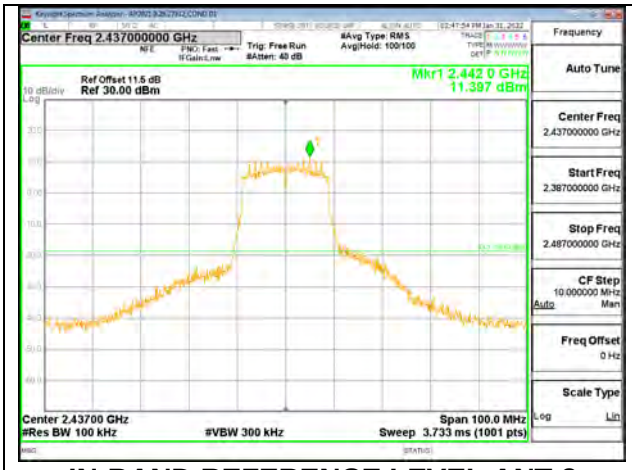
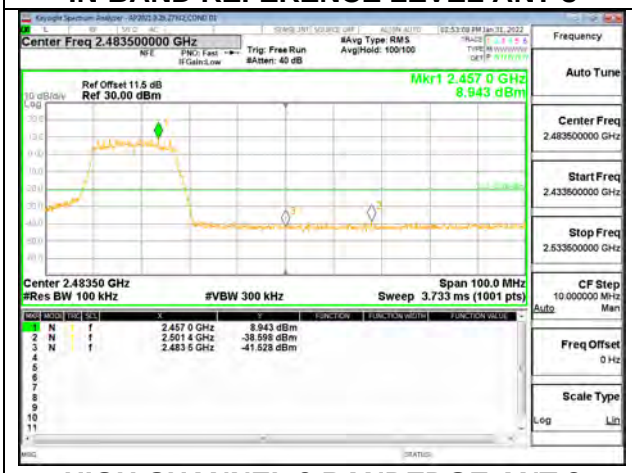


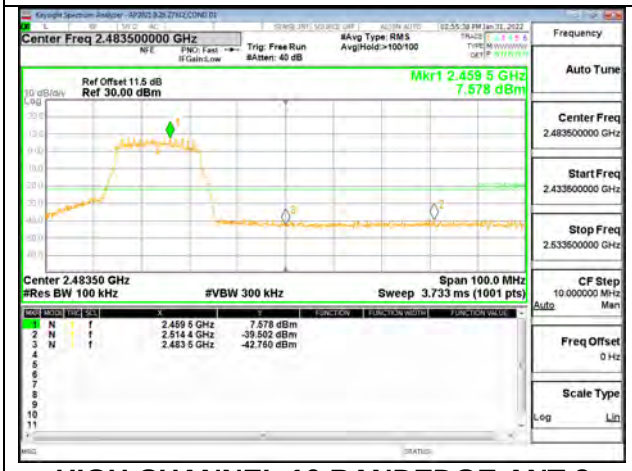
IN-BAND REFERENCE LEVEL ANT 3

OUT-OF-BAND MID CHANNEL ANT 3

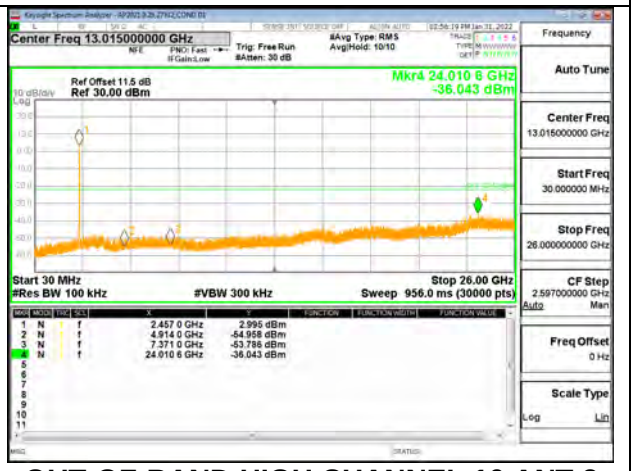


HIGH CHANNEL 9 BANDEDGE ANT 3

OUT-OF-BAND HIGH CHANNEL 9 ANT 3



HIGH CHANNEL 10 BANDEDGE ANT 3



OUT-OF-BAND HIGH CHANNEL 10 ANT 3

UL LLC.
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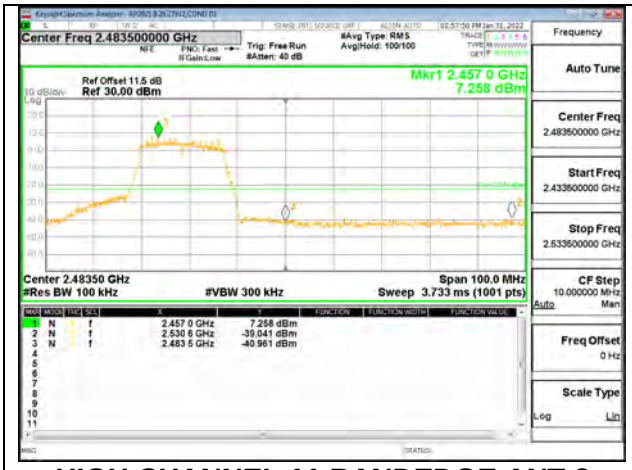
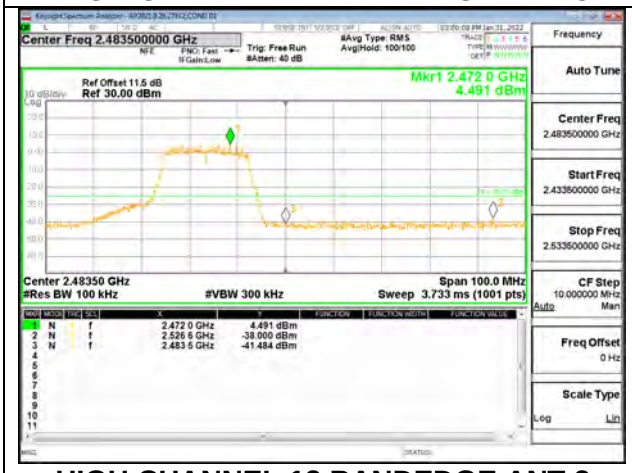
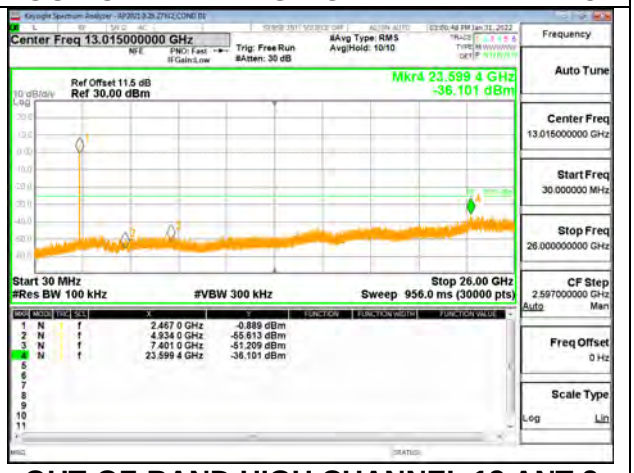


HIGH CHANNEL 11 BANDEDGE ANT 3

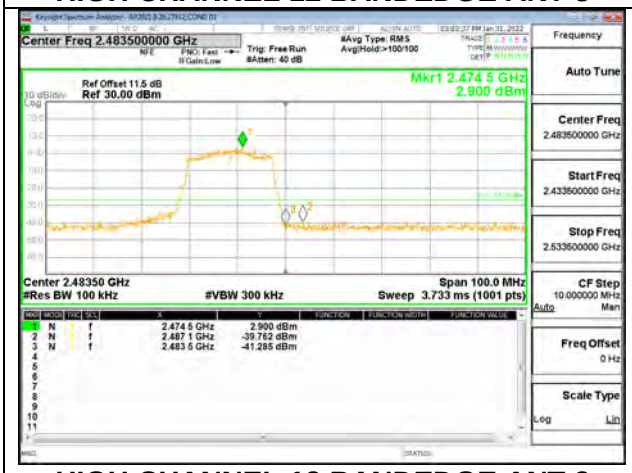
OUT-OF-BAND HIGH CHANNEL 11 ANT 3



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

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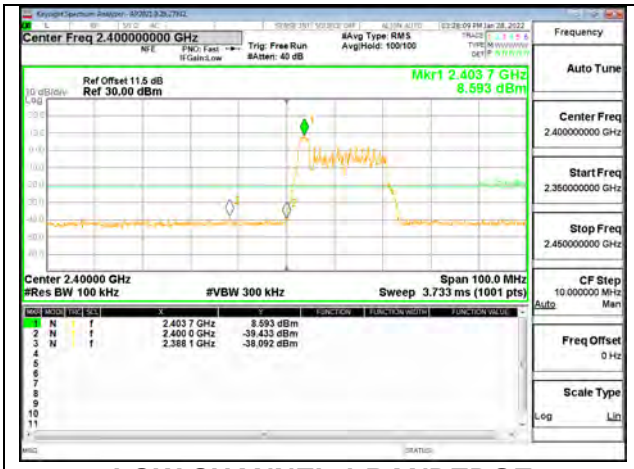
9.6.4. 802.11ax HE20 MODE

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



LOW CHANNEL 1 BANDEDGE

OUT-OF-BAND LOW CHANNEL 1

IN-BAND REFERNCE LEVEL

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL 11 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 11

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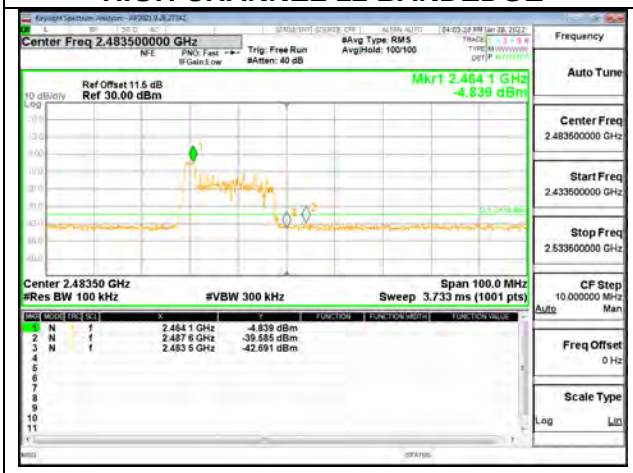
HIGH CHANNEL 12 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 12



HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

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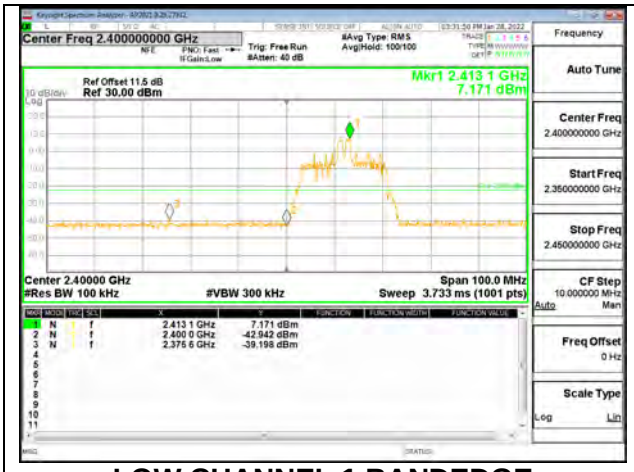
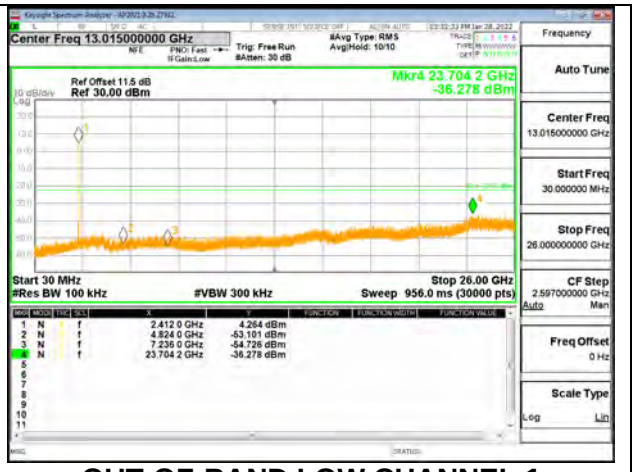
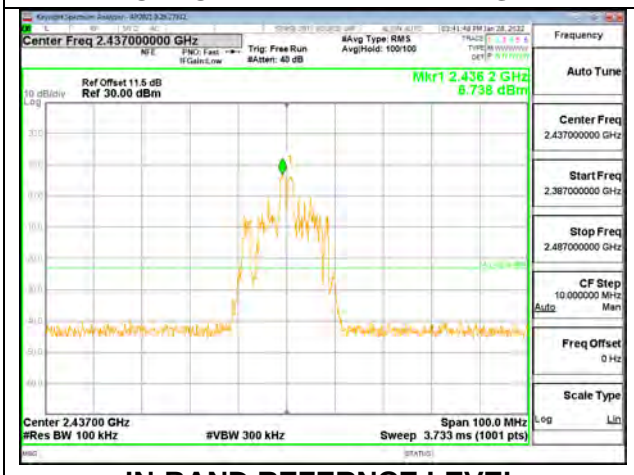
1TX ANT 4 MODE, 26-Tone RU Index 4



LOW CHANNEL 1 BANDEDGE

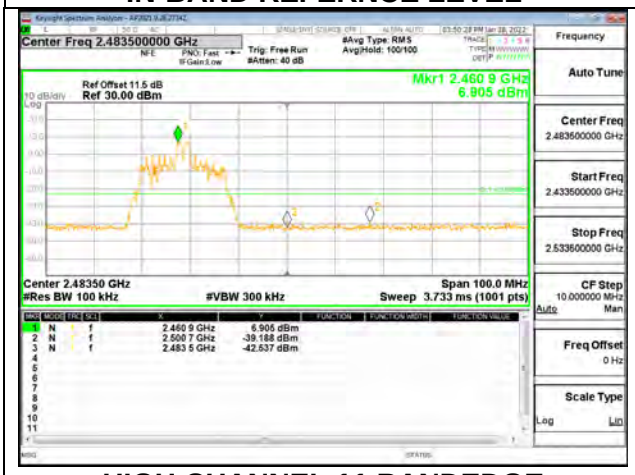


OUT-OF-BAND LOW CHANNEL 1

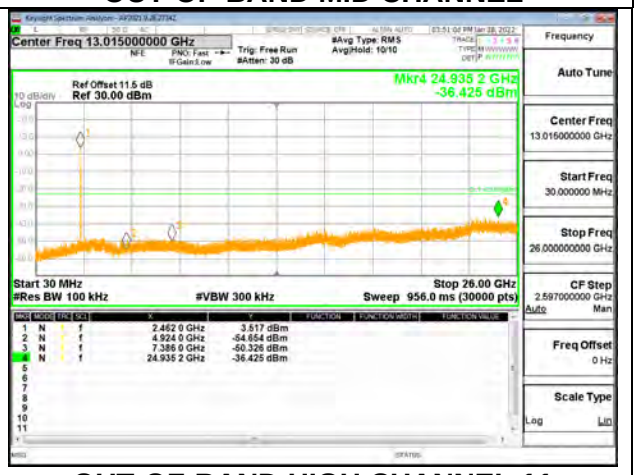


IN-BAND REFERNCE LEVEL

OUT-OF-BAND MID CHANNEL

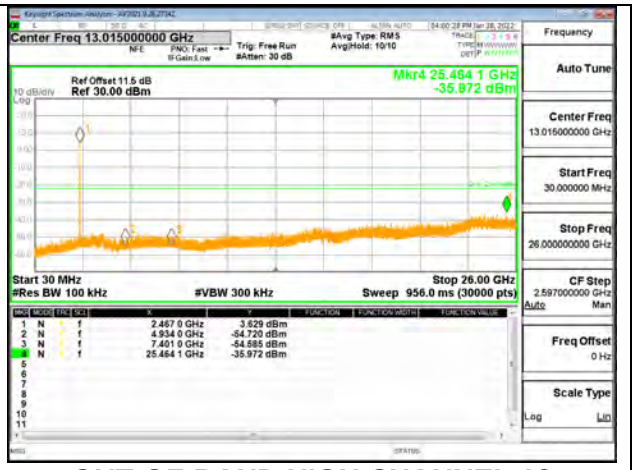


HIGH CHANNEL 11 BANDEDGE

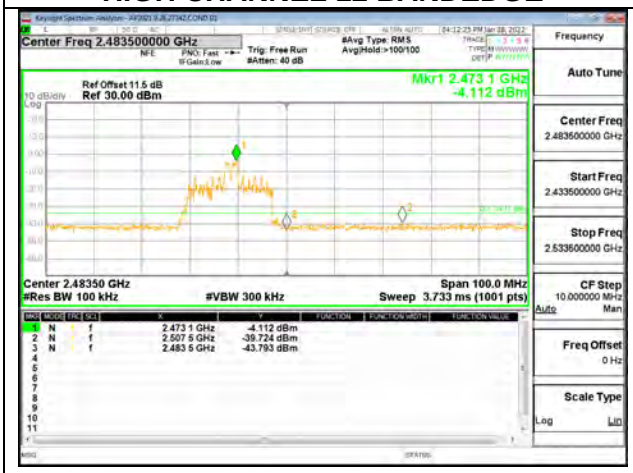


OUT-OF-BAND HIGH CHANNEL 11

HIGH CHANNEL 12 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 12



HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

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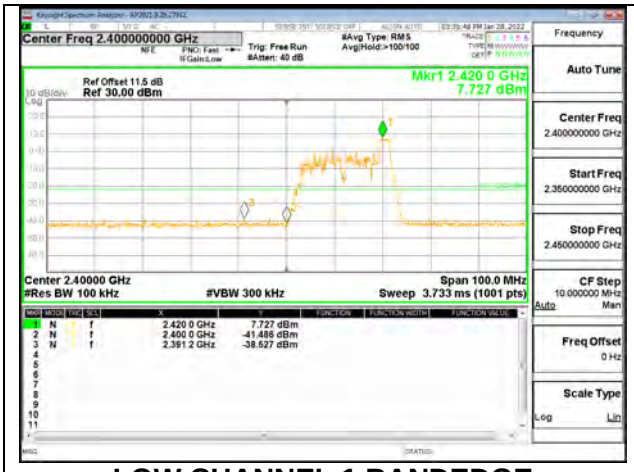
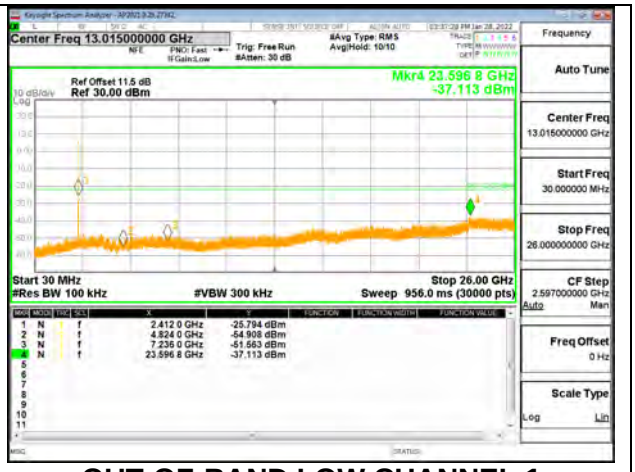
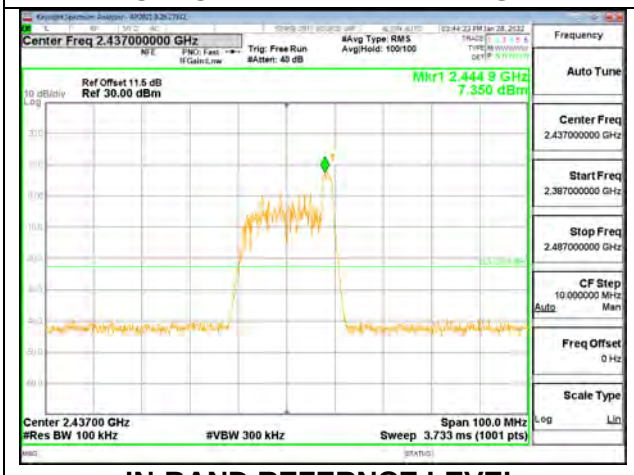
1TX ANT 4 MODE, 26-Tone RU Index 8



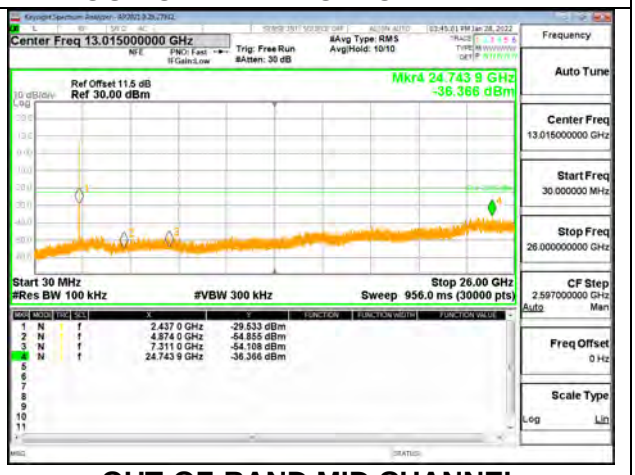
LOW CHANNEL 1 BANDEDGE



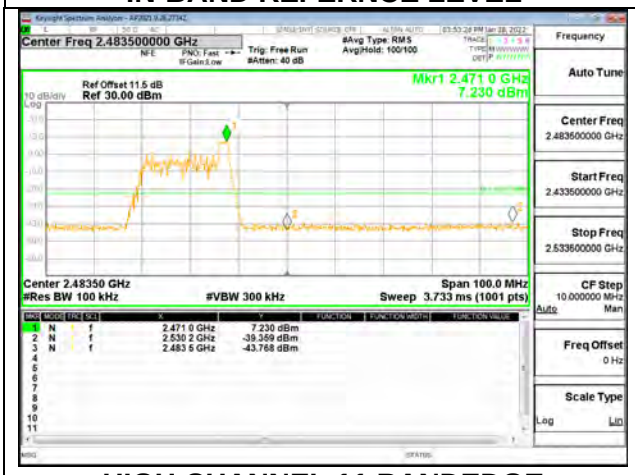
OUT-OF-BAND LOW CHANNEL 1



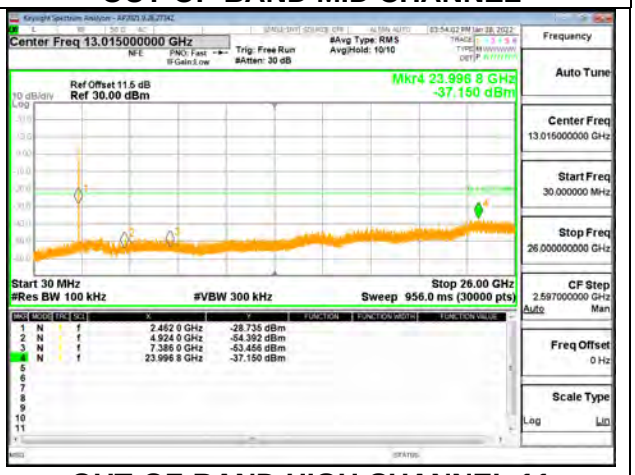
IN-BAND REFERNCE LEVEL



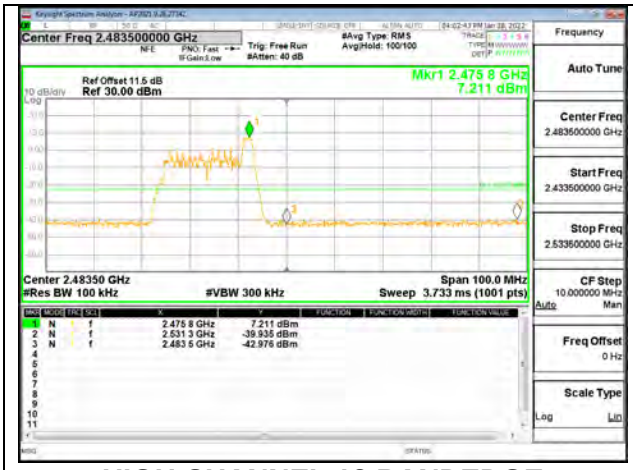
OUT-OF-BAND MID CHANNEL



HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11



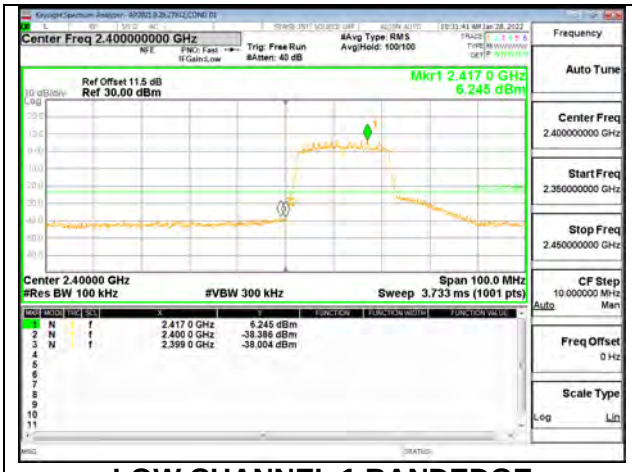
HIGH CHANNEL 12 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 12

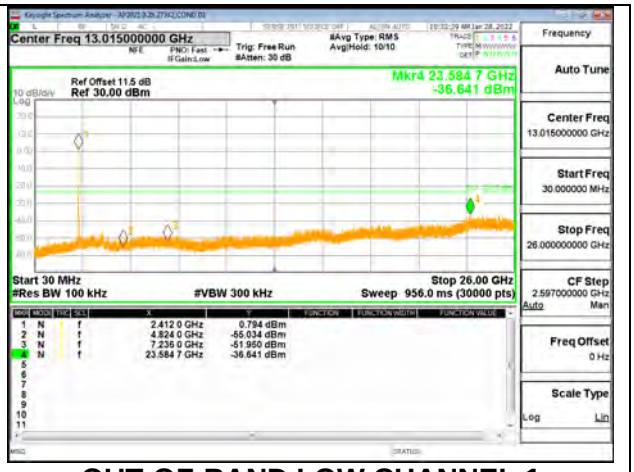
HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

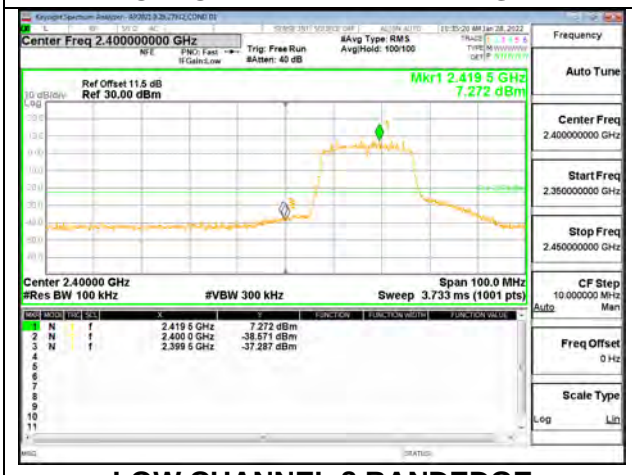
1TX ANT 4 MODE, SU Mode



LOW CHANNEL 1 BANDEDGE

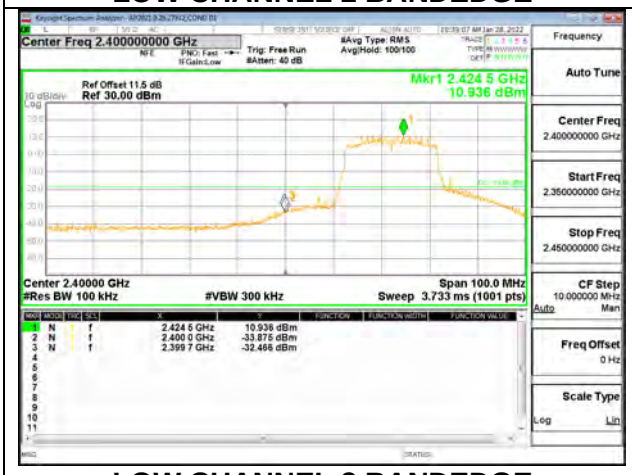


OUT-OF-BAND LOW CHANNEL 1

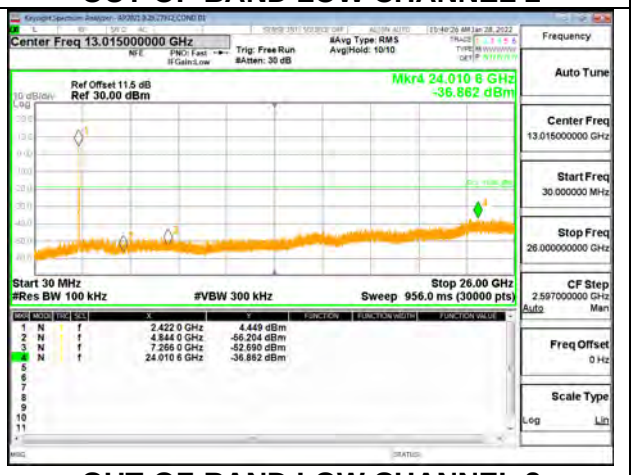


LOW CHANNEL 2 BANDEDGE

OUT-OF-BAND LOW CHANNEL 2



LOW CHANNEL 3 BANDEDGE



OUT-OF-BAND LOW CHANNEL 3

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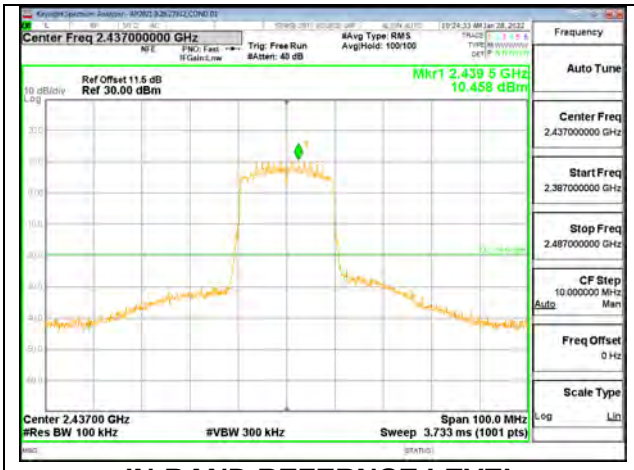
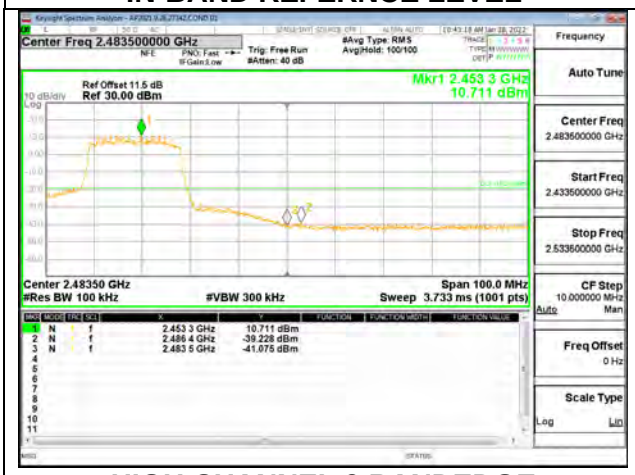
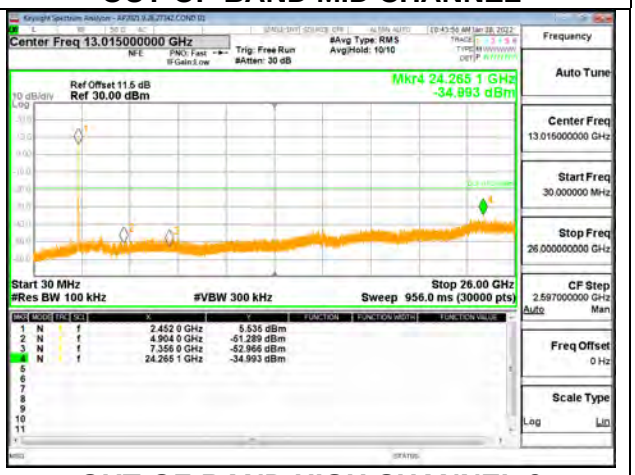


IN-BAND REFERNCE LEVEL

OUT-OF-BAND MID CHANNEL



HIGH CHANNEL 9 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 9

HIGH CHANNEL 10 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 10

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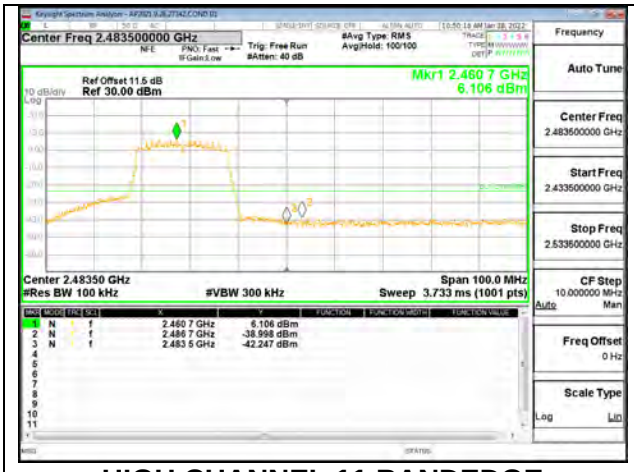
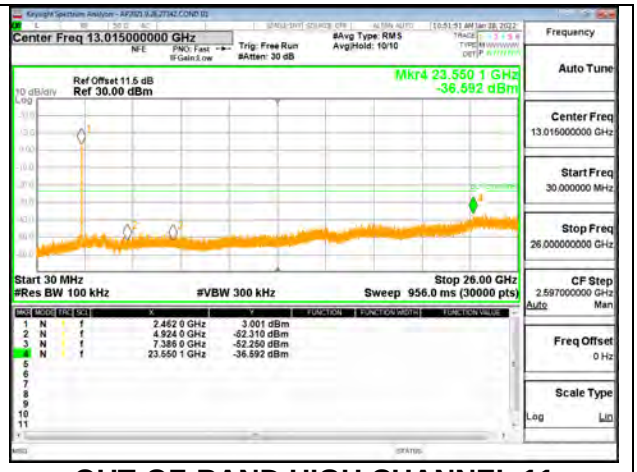


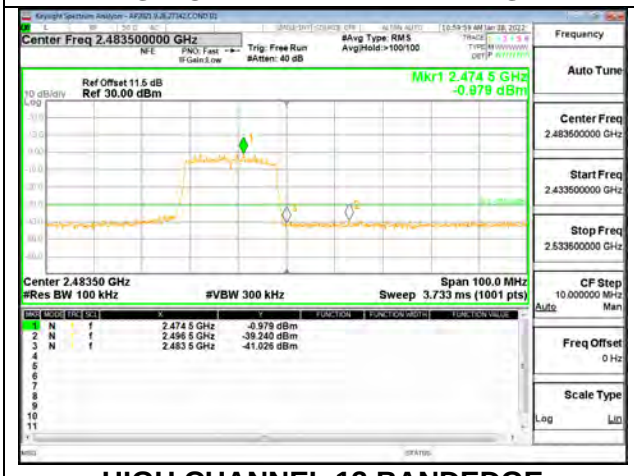
HIGH CHANNEL 11 BANDEDGE



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

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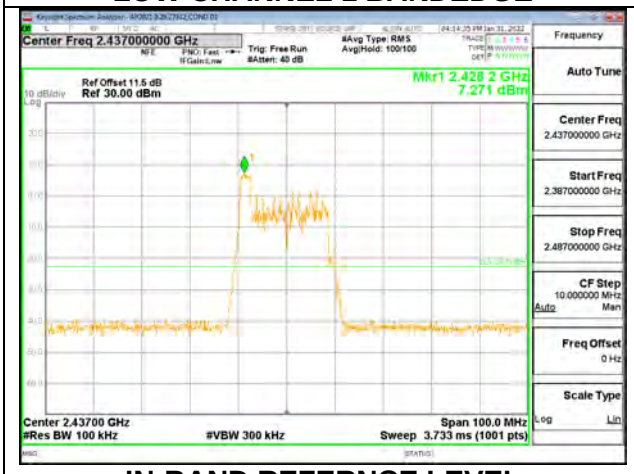
1TX ANT 3 MODE, 26-Tone RU Index 0

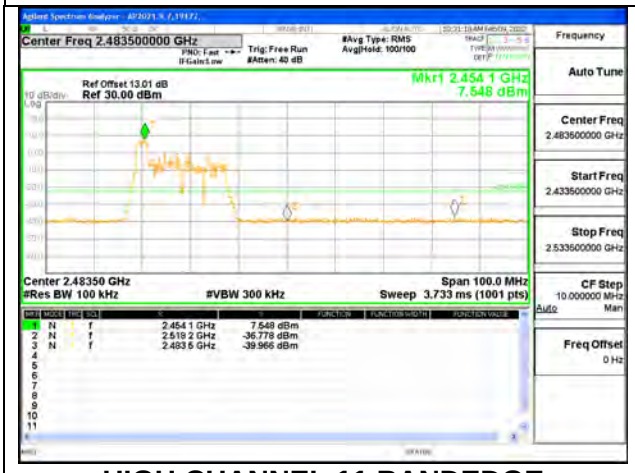
LOW CHANNEL 1 BANDEDGE

OUT-OF-BAND LOW CHANNEL 1



IN-BAND REFERNCE LEVEL

OUT-OF-BAND MID CHANNEL



HIGH CHANNEL 11 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 11

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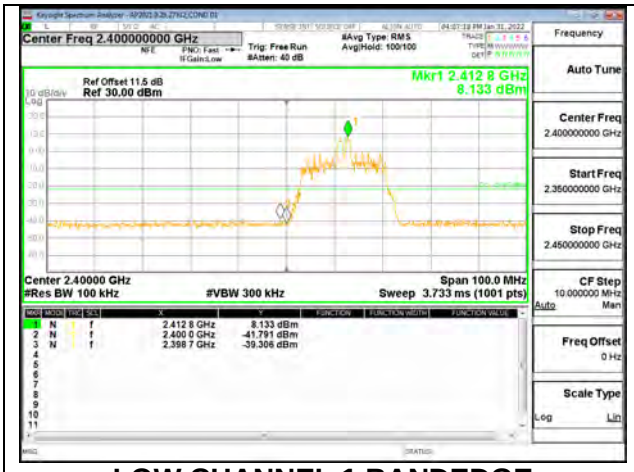
HIGH CHANNEL 12 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 12

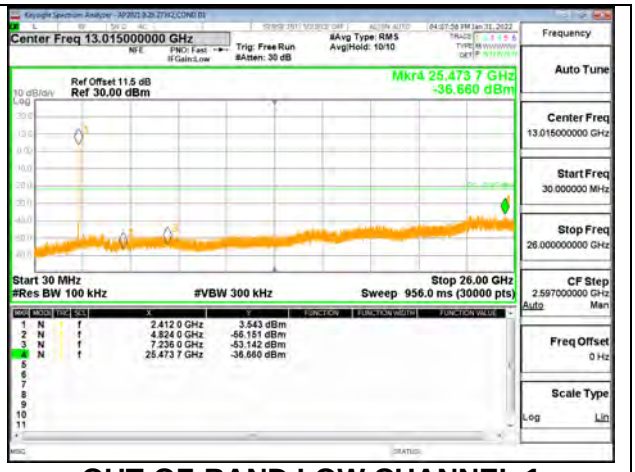
HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

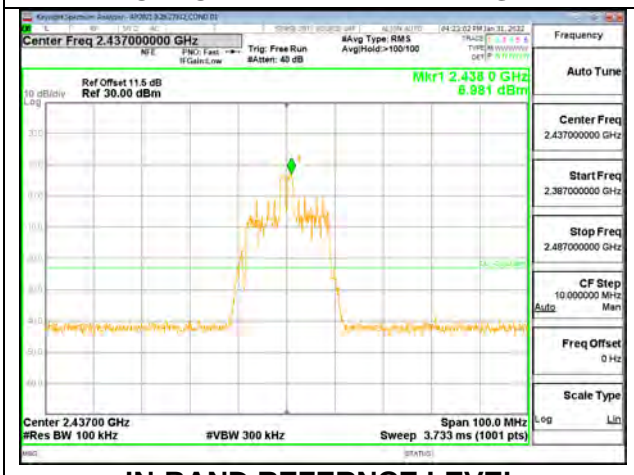
1TX ANT 3 MODE, 26-Tone RU Index 4



LOW CHANNEL 1 BANDEDGE



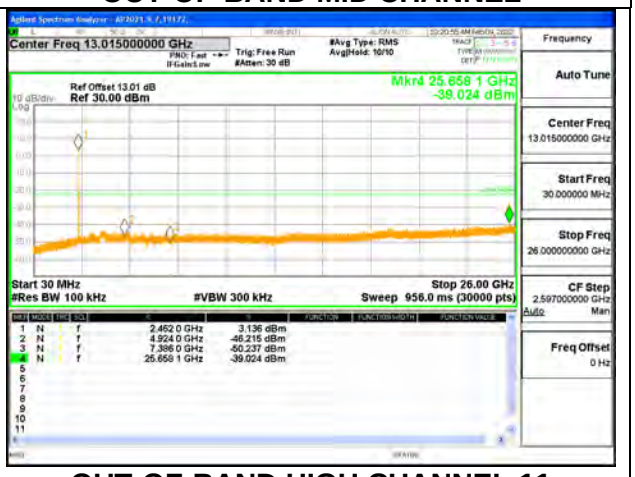
OUT-OF-BAND LOW CHANNEL 1



IN-BAND REFERNCE LEVEL

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11

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HIGH CHANNEL 12 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 12

HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

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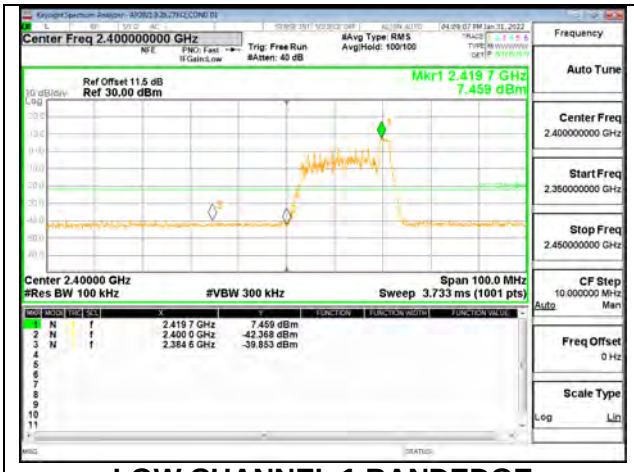
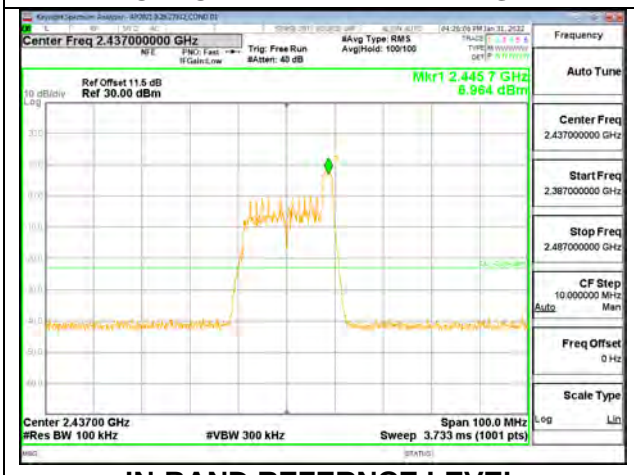
1TX ANT 3 MODE, 26-Tone RU Index 8

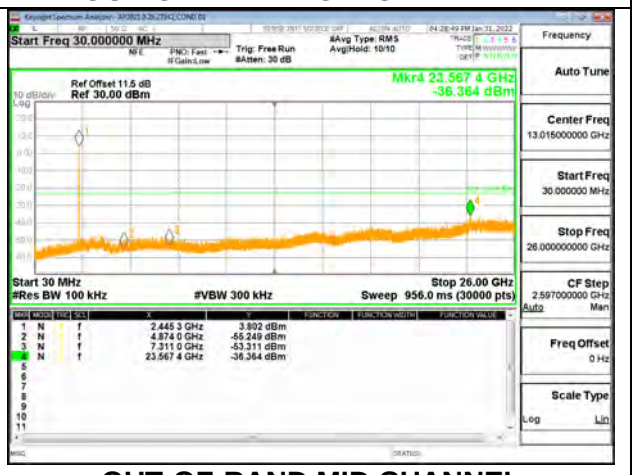


LOW CHANNEL 1 BANDEDGE

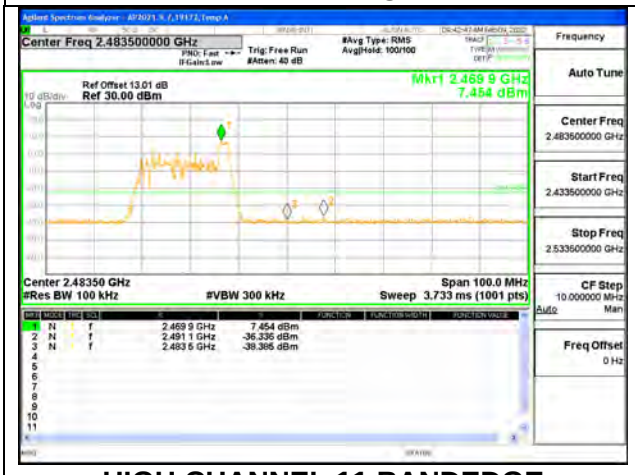
OUT-OF-BAND LOW CHANNEL 1



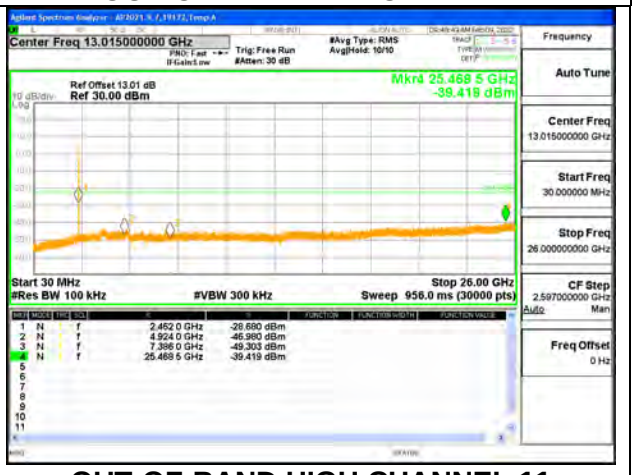
IN-BAND REFERNCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL 11 BANDEDGE



OUT-OF-BAND HIGH CHANNEL 11

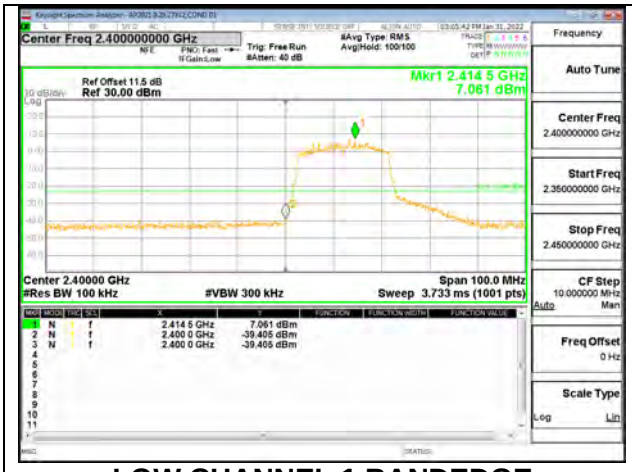
HIGH CHANNEL 12 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 12

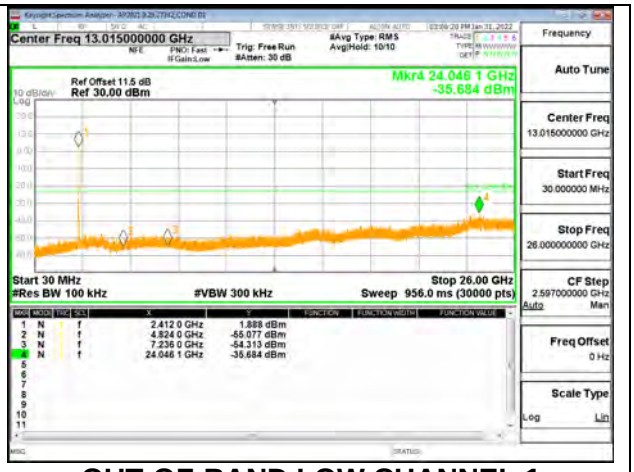
HIGH CHANNEL 13 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 13

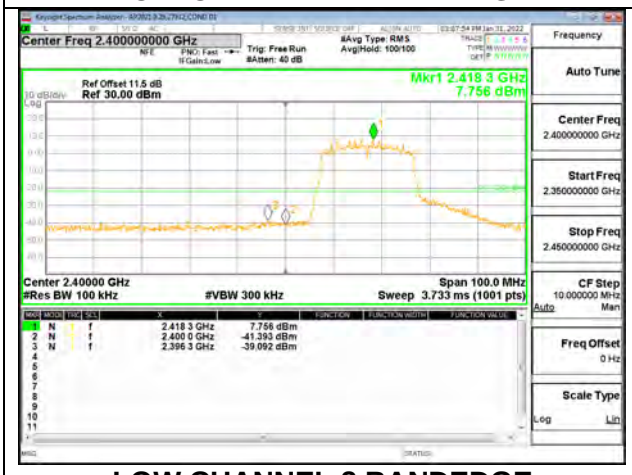
1TX ANT 3 MODE, SU Mode



LOW CHANNEL 1 BANDEDGE

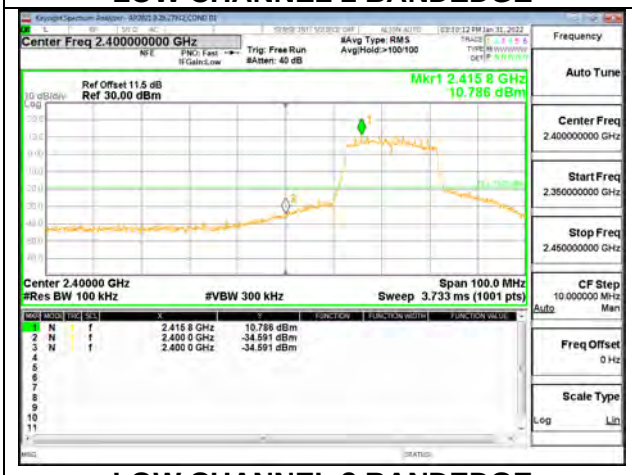


OUT-OF-BAND LOW CHANNEL 1



LOW CHANNEL 2 BANDEDGE

OUT-OF-BAND LOW CHANNEL 2



LOW CHANNEL 3 BANDEDGE

OUT-OF-BAND LOW CHANNEL 3

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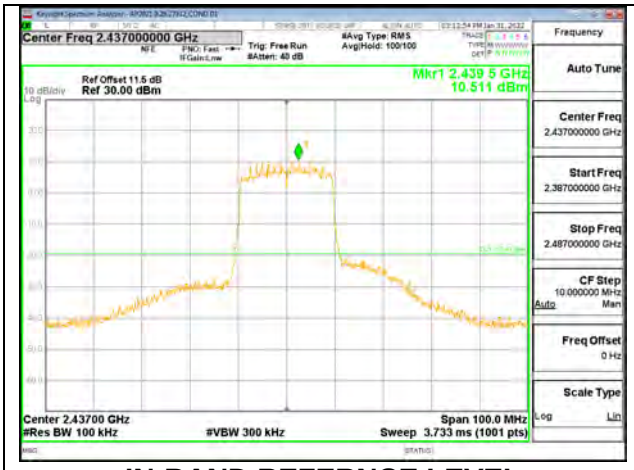

IN-BAND REFERNCE LEVEL

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL 9 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 9

HIGH CHANNEL 10 BANDEDGE

OUT-OF-BAND HIGH CHANNEL 10

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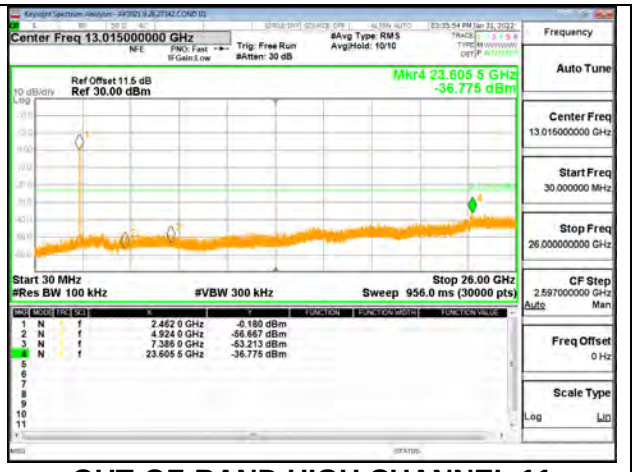
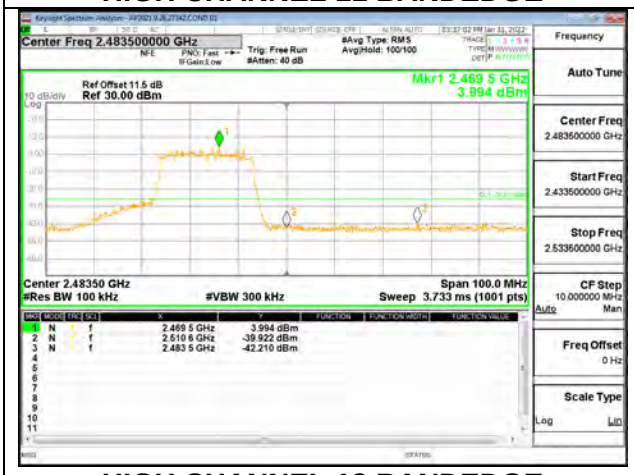
HIGH CHANNEL 11 BANDEDGE



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

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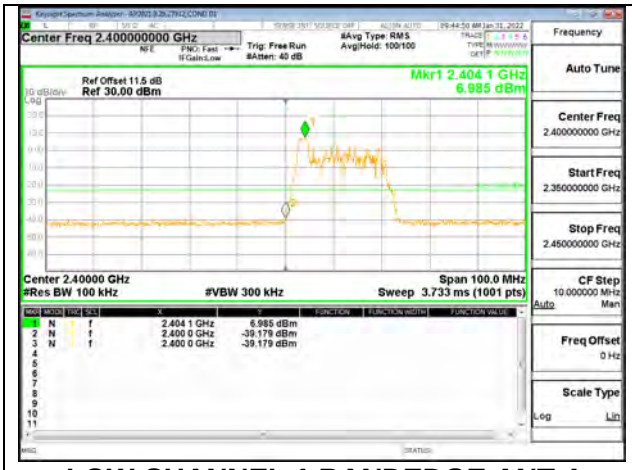
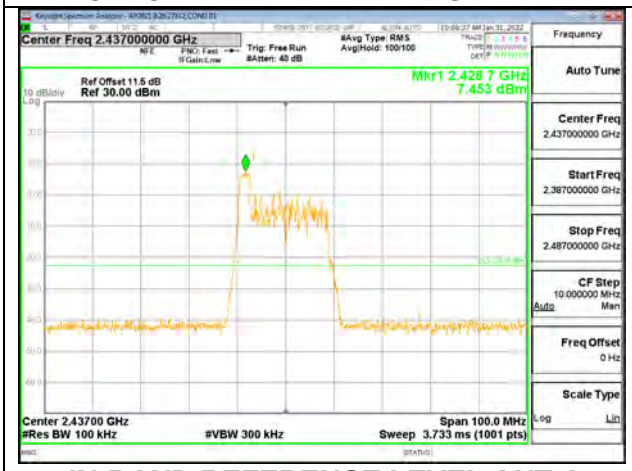
9.6.5. 802.11ax HE20 OFDMA MODE 2TX

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



LOW CHANNEL 1 BANDEDGE ANT 4

OUT-OF-BAND LOW CHANNEL 1 ANT 4



IN-BAND REFERENCE LEVEL ANT 4

OUT-OF-BAND MID CHANNEL ANT 4

HIGH CHANNEL 11 BANDEDGE ANT 4

OUT-OF-BAND HIGH CHANNEL 11 ANT 4

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