TEST REPORT

Applicant Name :	Xunison Inc
Address :	11720 Amber Park Dr.Suite 160 Atlanta, GA 30009 United States
Report Number :	RA221215-61881E-RF-00B
FCC ID:	2BAT3D50H

Test Standard (s)

FCC PART 15.247

Sample Description

Product Type:	Xunison Hub
Model No.:	D50 Home
Multiple Model(s) No.:	N/A
Trade Mark:	XUNISON
Date Received:	2022/12/15
Report Date:	2023/05/10

Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Nick Fang

EMC Engineer

Approved By:

Candy Li

EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA221215-61881E-RF-00B	Original Report	2023/05/10

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	Wi-Fi: 2412-2462MHz
Maximum Conducted Average Output Power	Wi-Fi: 802.11b: 17.88dBm, 802.11g: 17.62dBm, 802.11n-HT20: 17.51dBm 802.11n-HT40: 17.84dBm, 802.11ax-HEW20: 17.48dBm, 802.11ax-HEW40: 17.46dBm
Modulation Technique	Wi-Fi: DSSS, OFDM, OFDMA
Antenna Specification*	ANT 0: 5.0dBi, ANT 1: 5.0dBi (provided by the applicant)
Beam-forming*	Not support
Voltage Range	DC 12V from adapter
Sample serial number	1ZF5 for Conducted and Radiated Emissions Test 1ZF4 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter 1 Information	Model: AS2406A-1202000DM Input: AC 100-240V, 50/60Hz, 0.8A MAX Output: DC 12.0V, 2.0A, 24.0W
Adapter 2 Information	Model: AS2406A-1202000US Input: AC 100-240V, 50/60Hz, 0.8A MAX Output: DC 12.0V, 2000mA
Adapter 3 Information	Model: RD1202000-C55-154MG Input: AC 100-240V, 50/60Hz, 1.0A MAX Output: DC 12.0V, 2.0A

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082*10^{-7}$
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

Test Site 1:
The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

Test Site 2:
The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For Wi-Fi mode, total 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	/	/
6	2437	/	/
7	2442	/	/

802.11b, 802.11g, 802.11n-HT20, 802.11ax-HEW20 mode was tested with Channel 1, 6 and 11.
802.11n-HT40, 802.11ax-HEW40 mode was tested with Channel 3, 6 and 9.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

"QPST; RU: Hawkeye-OFDMA-ReferenceOnly_LP_forCustomer.exe"* software was used to test and power level as below:

Mode	Data rate	Power Level		
		Low Channel	Middle Channel	High Channel
802.11b	1Mbps	11	11	11
802.11g	6Mbps	11	11	11
802.11n-HT20	MCS0	11	11	11
802.11 n-HT40	MCS0	11	11	11

Test Mode	Data rate	RuSize	RuIndex	Power Level*		
				Low Channel	Middle Channel	High Channel
11AX20	MCS0	26Tone	RU0	4	4	4
		52Tone	RU37	7	7	7
		106Tone	RU53	10	10	10
		242Tone	RU61	11	11	11
11AX40	MCS0	26Tone	RU0	1	1	1
		52Tone	RU37	4	4	4
		106Tone	RU56	7	7	7
		242Tone	RU61	10	10	10
		484Tone	RU65	11	11	11

The software and power level was provided by applicant.

The two antenna port has same power level setting.

EUT support SISO/MIMO for all modes, according to pre-scan, the worst case MIMO was test and recorded in report.

For 802.11AX mode, output power was test in difference RU mode, other items only test the worst case full RU mode.

Duty cycle

Test Result: Compliant. Please refer to the Appendix Wi-Fi.

Support Equipment List and Details

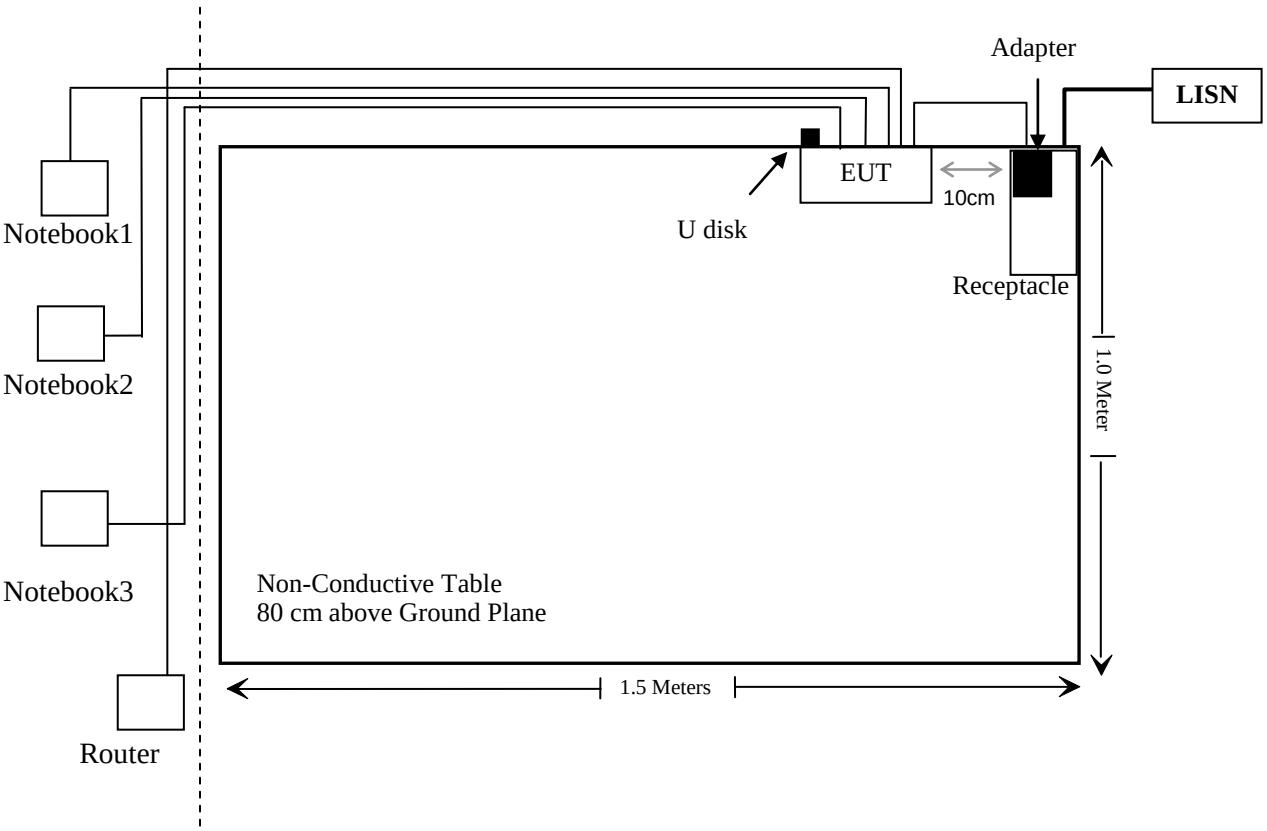
Manufacturer	Description	Model	Serial Number
DELL	Note Book1	Latitude E4710	PC201911252059
DELL	Note Book2	Latitude E4710	PC201911252060
DELL	Note Book3	Latitude E4710	PC201911252061
HUAWEI	Router	WS5100	A4933FEF1D01
Kingston	U-disk	DTKN	100008447371

External I/O Cable

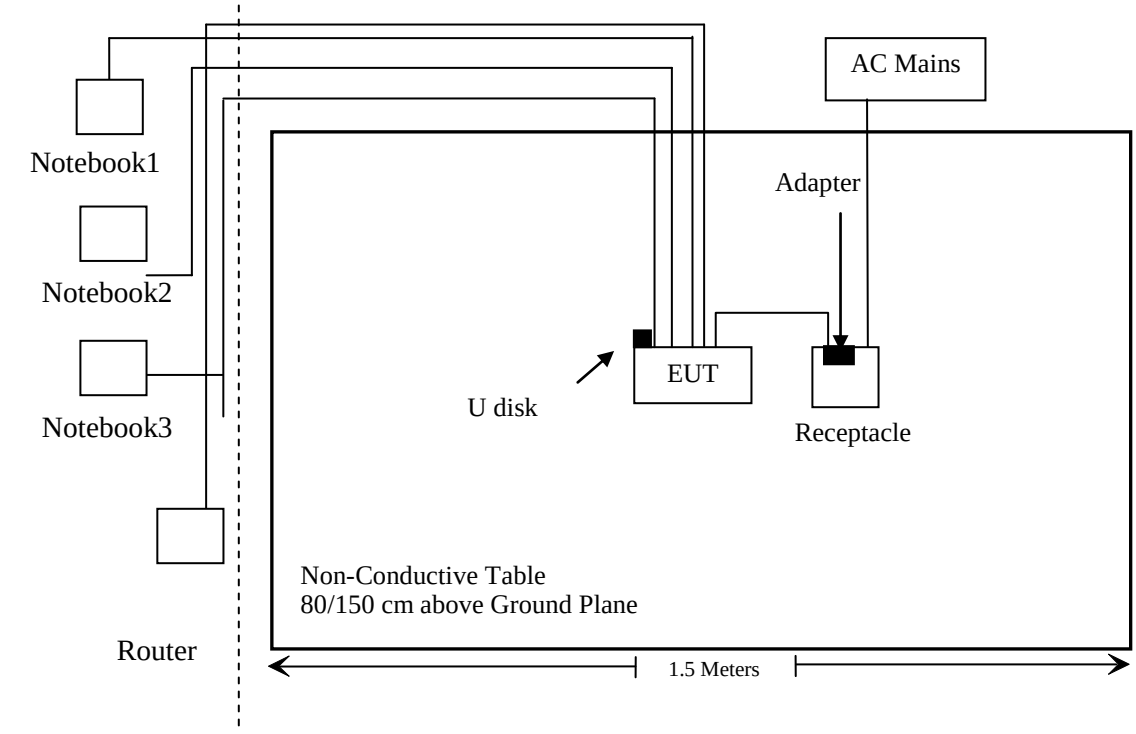
Cable Description	Length (m)	From Port	To
Un-shielded detachable RJ45 cable	8.0	EUT	NoteBook1
Un-shielded detachable RJ45 cable	8.0	EUT	NoteBook2
Un-shielded detachable RJ45 cable	8.0	EUT	NoteBook3
Un-shielded detachable RJ45 cable	8.0	EUT	Router
Unshielded Un-detachable DC cable	1.8	Adapter	EUT

Block Diagram of Test Setup

For conducted emission



For Radiated Emissions:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) & §1.1307 (b) (3) & §2.1091	MPE-BASED EXEMPTION	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth & Occupied Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2022/11/25	2023/11/24
Rohde & Schwarz	L.I.S.N.	ENV216	101314	2022/11/25	2023/11/24
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2022/12/07	2023/12/06
Unknown	RF Coaxial Cable	No.17	N0350	2022/11/25	2023/11/24
Conducted Emission Test Software: e3 19821b (V9)					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2022/11/08	2023/11/07
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2022/11/30	2025/11/29
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2022/12/26	2025/12/25
Radiated Emission Test Software: e3 19821b (V9)					
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.15	N600	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.16	N650	2022/11/25	2023/11/24
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101495	2022/11/25	2023/11/24
Tonscend	RF Control Unit	JS0806-2	19G8060182	2022/10/24	2023/10/23
Agilent	USB wideband power sensor	U2021XA	MY54250003	2022/06/27	2023/06/26
WEINSCHEL	10dB Attenuator	5324	AU 3842	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.31	RF-01	Each time	Each time

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.247 (I) & §1.1307 (B) (3) & §2.1091- MPE-BASED EXEMPTION

Applicable Standard

According to subpart 1.1307 (b) (3) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemptionfrom further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

Ris the minimum separation distance in meters
f = frequency in MHz

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Result

Mode	Frequency (MHz)	Tune up conducted power	Antenna Gain		ERP		Evaluation Distance (m)	ERP Limit (W)
		(dBm)	(dBi)	(dBd)	(dBm)	(W)		
ZigBee	2405-2480	17.0	5	2.85	19.85	0.097	0.2	0.768
2.4G Wi-Fi	2412-2462	18.0	5	2.85	20.85	0.122	0.2	0.768
5G Wi-Fi	5150-5250	19.0	5	2.85	21.85	0.153	0.2	0.768
	5250-5350	21.0	5	2.85	23.85	0.243	0.2	0.768
	5470-5725	21.0	5	2.85	23.85	0.243	0.2	0.768
	5725-5850	20.0	5	2.85	22.85	0.193	0.2	0.768

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. The ZigBee, 2.4G Wi-Fi and 5G Wi-Fi can Simultaneous transmitting
3. 0dBd=2.15dBi

Simultaneous transmitting consideration (worst case):

The ratio=ERP_{Zigbee}/limit+$ERP_{2.4G\ Wi\text{-}Fi}$/limit+$ERP_{5G\ Wi\text{-}Fi}$/limit
=0.097/0.768+0.122 /0.768+0.243/0.768=0.602＜1.0, so simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has two internal antenna arrangement, which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

ANT	Antenna type	Antenna Gain (dBi)	Frequency range (GHz)
0	FPC	5.0	2.4-2.5
1	FPC	5.0	2.4-2.5

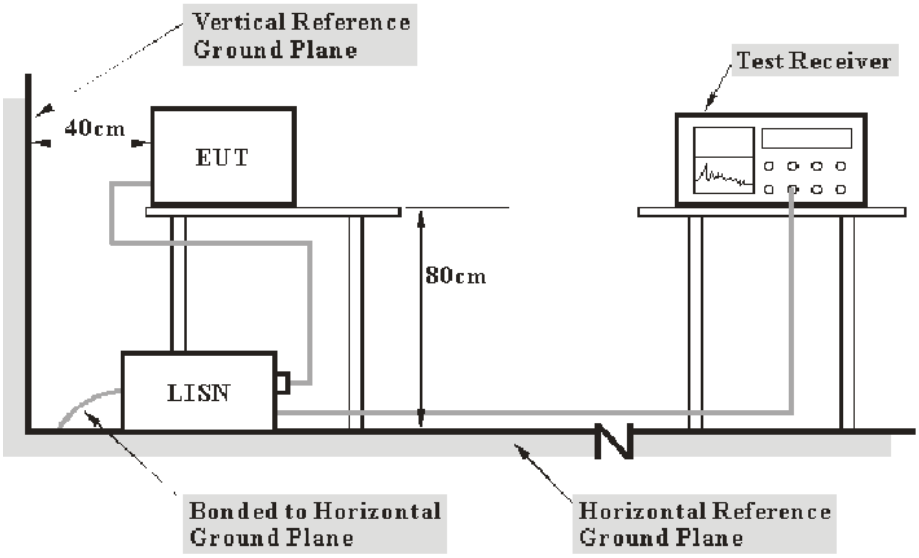
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the device was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Transd Factor & Margin Calculation

The Transd factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Transd Factor = LISN VDF + Cable Loss

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a over limit of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Over Limit = level – Limit
Level= reading level+ Transd Factor

Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

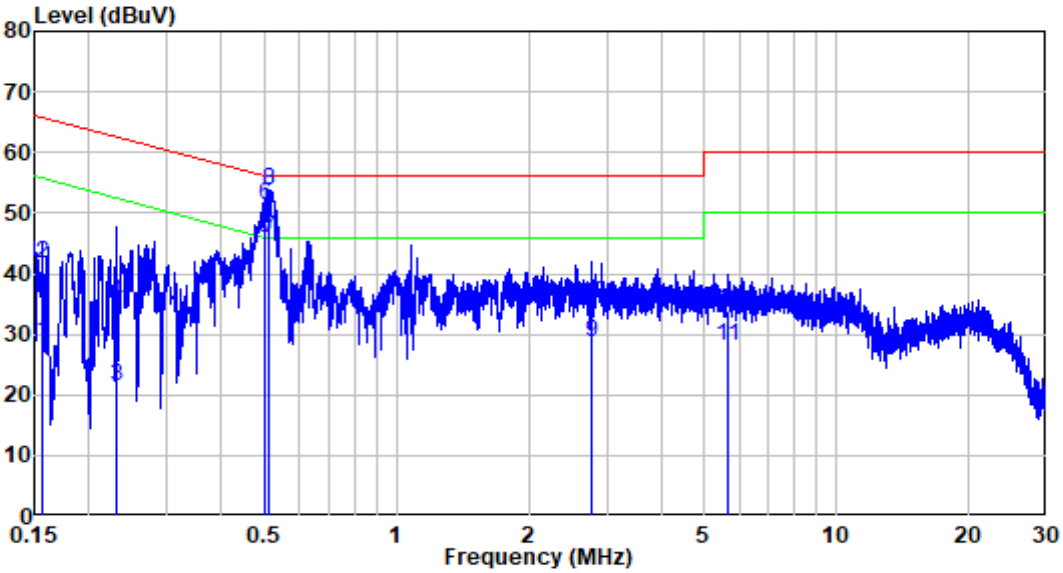
The testing was performed by Lipa Wu on 2023-02-04 and 2023-03-14.

EUT operation mode: Transmitting

Wi-Fi: (Worst case is 802.11b mode, Low Channel)

For Adapter 1

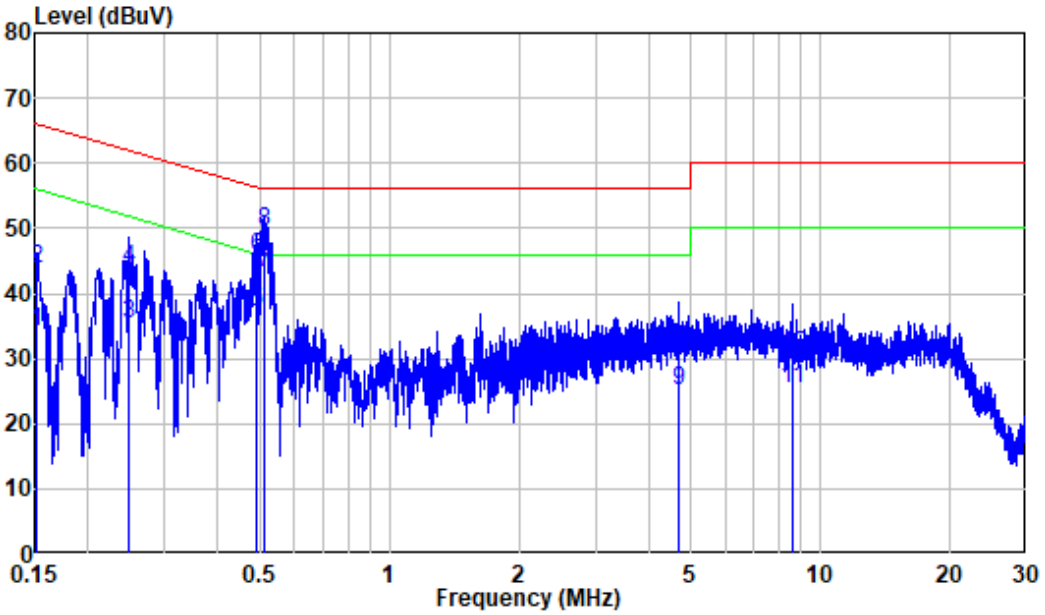
AC 120V/60 Hz, Line



Site : Shielding Room
Condition: Line
Job No. : RA221215-61881E-RF
Mode : 2.4G WIFI&Transmitting
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.157	9.90	18.82	28.72	55.64	-26.92	Average
2	0.157	9.90	31.62	41.52	65.64	-24.12	QP
3	0.231	9.88	11.59	21.47	52.43	-30.96	Average
4	0.231	9.88	25.42	35.30	62.43	-27.13	QP
5	0.499	9.80	36.17	45.97	46.01	-0.04	Average
6	0.499	9.80	41.49	51.29	56.01	-4.72	QP
7	0.510	9.82	35.95	45.77	46.00	-0.23	Average
8	0.510	9.82	43.78	53.60	56.00	-2.40	QP
9	2.783	9.93	18.64	28.57	46.00	-17.43	Average
10	2.783	9.93	24.98	34.91	56.00	-21.09	QP
11	5.664	9.96	18.04	28.00	50.00	-22.00	Average
12	5.664	9.96	23.79	33.75	60.00	-26.25	QP

AC 120V/60 Hz, Neutral

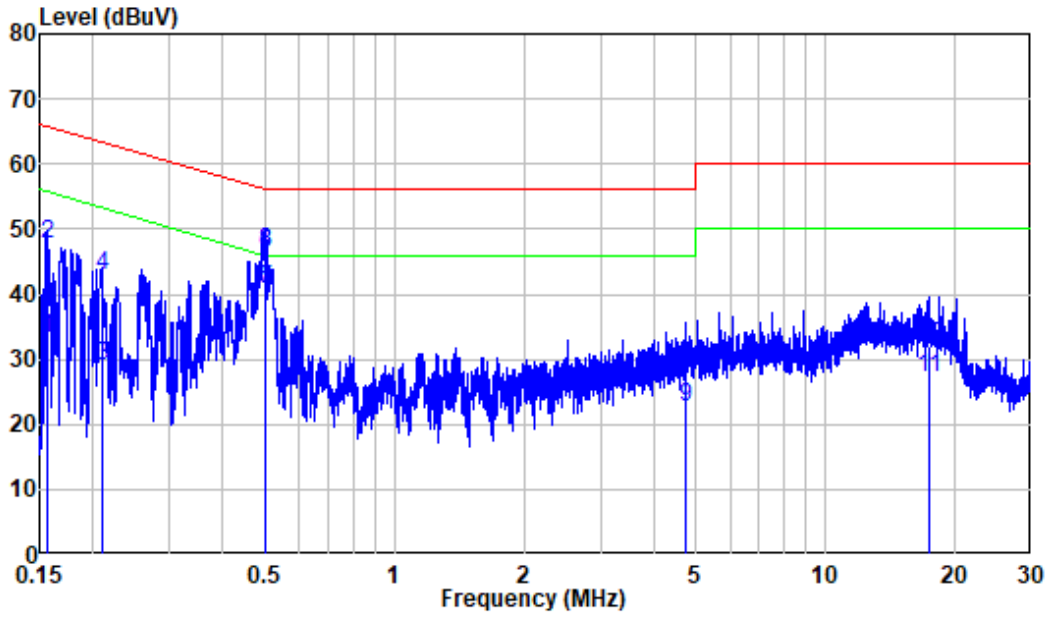


Site : Shielding Room
Condition: Neutral
Job No. : RA221215-61881E-RF
Mode : 2.4G WIFI&Transmitting
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.151	9.80	24.37	34.17	55.94	-21.77	Average
2	0.151	9.80	34.01	43.81	65.94	-22.13	QP
3	0.248	9.82	25.40	35.22	51.84	-16.62	Average
4	0.248	9.82	34.01	43.83	61.84	-18.01	QP
5	0.491	9.90	27.18	37.08	46.15	-9.07	Average
6	0.491	9.90	35.71	45.61	56.15	-10.54	QP
7	0.514	9.90	33.34	43.24	46.00	-2.76	Average
8	0.514	9.90	39.64	49.54	56.00	-6.46	QP
9	4.672	9.91	15.13	25.04	46.00	-20.96	Average
10	4.672	9.91	21.64	31.55	56.00	-24.45	QP
11	8.609	10.03	15.26	25.29	50.00	-24.71	Average
12	8.609	10.03	20.50	30.53	60.00	-29.47	QP

For Adapter 2

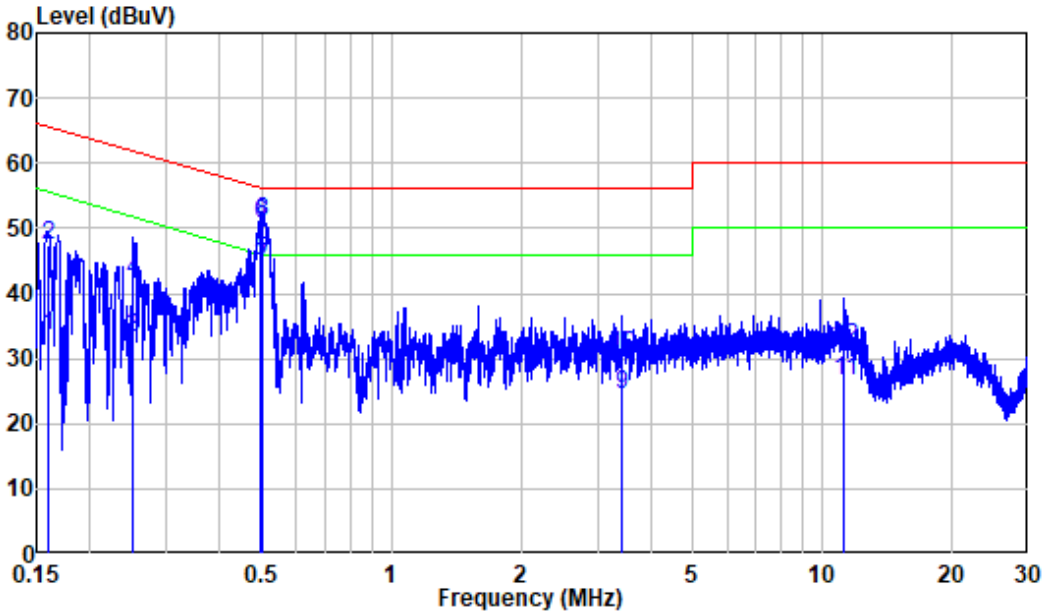
AC 120V/60 Hz, Line



Site : Shielding Room
Condition: Line
Job No. : RA221215-61881E-RF
Mode : 2.4G WIFI (AS2406A-1202000US)
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.156	10.10	23.07	33.17	55.69	-22.52	Average
2	0.156	10.10	37.73	47.83	65.69	-17.86	QP
3	0.210	10.10	18.88	28.98	53.21	-24.23	Average
4	0.210	10.10	32.76	42.86	63.21	-20.35	QP
5	0.499	10.10	30.53	40.63	46.02	-5.39	Average
6	0.499	10.10	36.21	46.31	56.02	-9.71	QP
7	0.500	10.10	30.80	40.90	46.00	-5.10	Average
8	0.500	10.10	36.35	46.45	56.00	-9.55	QP
9	4.728	10.76	11.78	22.54	46.00	-23.46	Average
10	4.728	10.76	17.34	28.10	56.00	-27.90	QP
11	17.302	14.77	12.47	27.24	50.00	-22.76	Average
12	17.302	14.77	17.09	31.86	60.00	-28.14	QP

AC 120V/60 Hz, Neutral

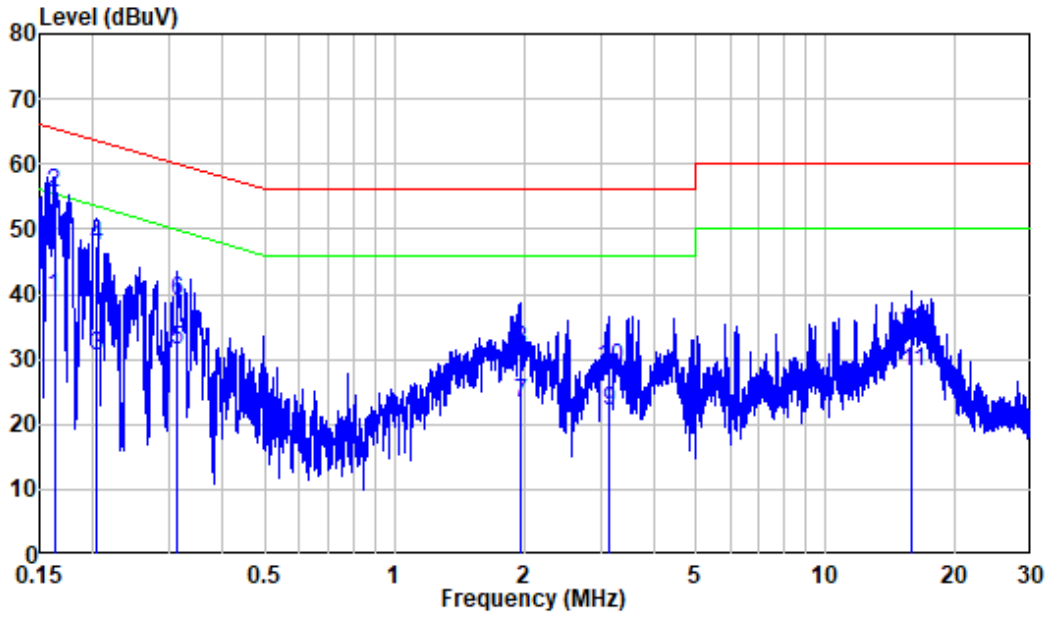


Site : Shielding Room
Condition: Neutral
Job No. : RA221215-61881E-RF
Mode : 2.4G WIFI (AS2406A-1202000US)
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.159	10.30	23.23	33.53	55.50	-21.97	Average
2	0.159	10.30	37.03	47.33	65.50	-18.17	QP
3	0.251	10.32	23.01	33.33	51.74	-18.41	Average
4	0.251	10.32	31.62	41.94	61.74	-19.80	QP
5	0.498	10.40	34.46	44.86	46.03	-1.17	Average
6	0.498	10.40	40.40	50.80	56.03	-5.23	QP
7	0.500	10.40	33.62	44.02	46.00	-1.98	Average
8	0.500	10.40	40.50	50.90	56.00	-5.10	QP
9	3.431	10.26	14.11	24.37	46.00	-21.63	Average
10	3.431	10.26	20.20	30.46	56.00	-25.54	QP
11	11.227	12.78	13.88	26.66	50.00	-23.34	Average
12	11.227	12.78	19.05	31.83	60.00	-28.17	QP

For Adapter 3

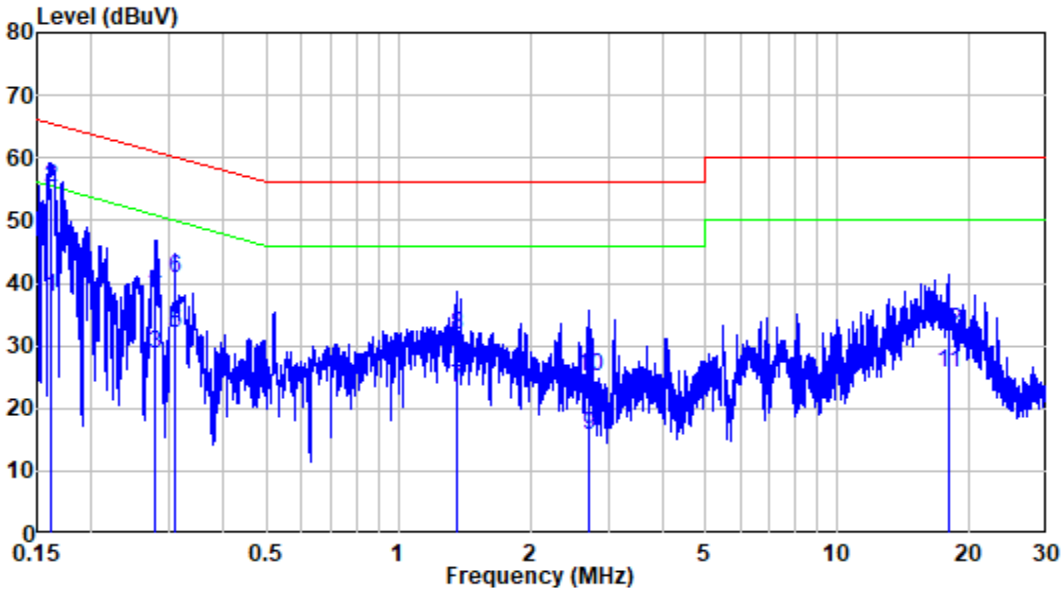
AC 120V/60 Hz, Line



Site : Shielding Room
Condition: Line
Job No. : RA221215-61881E-RF
Mode : 2.4G WIFI (RD1202000-C55-154MG)
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.162	10.10	29.43	39.53	55.35	-15.82	Average
2	0.162	10.10	45.31	55.41	65.35	-9.94	QP
3	0.203	10.10	20.25	30.35	53.50	-23.15	Average
4	0.203	10.10	37.36	47.46	63.50	-16.04	QP
5	0.313	10.10	21.24	31.34	49.89	-18.55	Average
6	0.313	10.10	28.88	38.98	59.89	-20.91	QP
7	1.954	10.32	13.02	23.34	46.00	-22.66	Average
8	1.954	10.32	21.08	31.40	56.00	-24.60	QP
9	3.142	10.46	11.47	21.93	46.00	-24.07	Average
10	3.142	10.46	18.17	28.63	56.00	-27.37	QP
11	15.885	14.46	13.71	28.17	50.00	-21.83	Average
12	15.885	14.46	19.73	34.19	60.00	-25.81	QP

AC 120V/60 Hz, Neutral



Site : Shielding Room
Condition: Neutral
Job No. : RA221215-61881E-RF
Mode : 2.4G WIFI (RD1202000-C55-154MG)
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.161	10.30	27.41	37.71	55.41	-17.70	Average
2	0.161	10.30	44.95	55.25	65.41	-10.16	QP
3	0.280	10.34	18.20	28.54	50.82	-22.28	Average
4	0.280	10.34	28.83	39.17	60.82	-21.65	QP
5	0.310	10.35	21.67	32.02	49.98	-17.96	Average
6	0.310	10.35	30.47	40.82	59.98	-19.16	QP
7	1.355	9.95	13.38	23.33	46.00	-22.67	Average
8	1.355	9.95	21.62	31.57	56.00	-24.43	QP
9	2.716	10.16	5.40	15.56	46.00	-30.44	Average
10	2.716	10.16	15.01	25.17	56.00	-30.83	QP
11	17.849	14.88	10.88	25.76	50.00	-24.24	Average
12	17.849	14.88	17.45	32.33	60.00	-27.67	QP

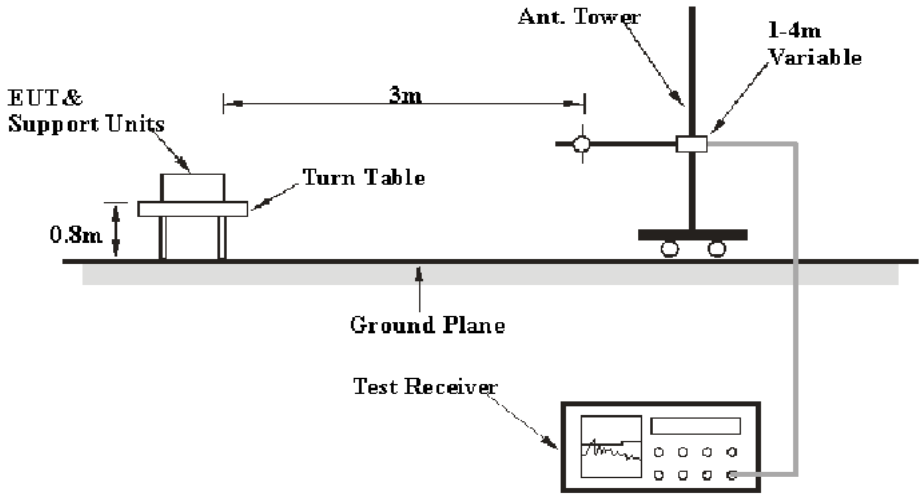
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

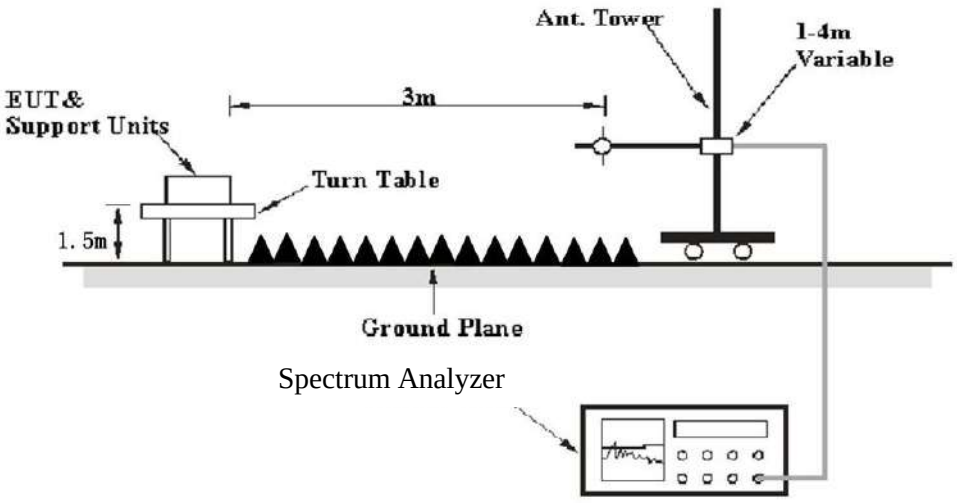
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.247, RSS-247, RSS-Gen limits.

EMI Test Receiver & Spectrum Analyzer Setup

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Average
	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Factor & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Over Limit or Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a over limit/margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin/Over Limit = Corrected Amplitude/Level-Limit
Corrected Amplitude/Level = Reading + Factor

Test Data

Environmental Conditions

Temperature:	24~24.5 ℃
Relative Humidity:	50~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Jimi Zheng on 2023-02-02 and 2023-03-14 for below 1GHz and on 2023-02-14 for above 1GHz.

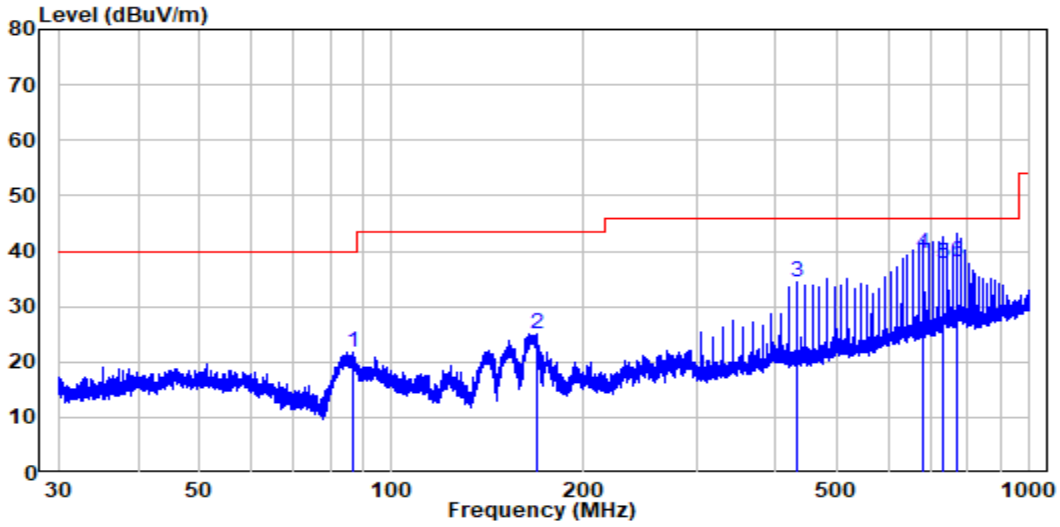
EUT operation mode: Transmitting

30MHz-1GHz: (Worst case is 802.11b mode, low Channel)

Note: When the test result of peak was less than the limit of QP more than 6dB, just peak value were recorded.

For adapter 1

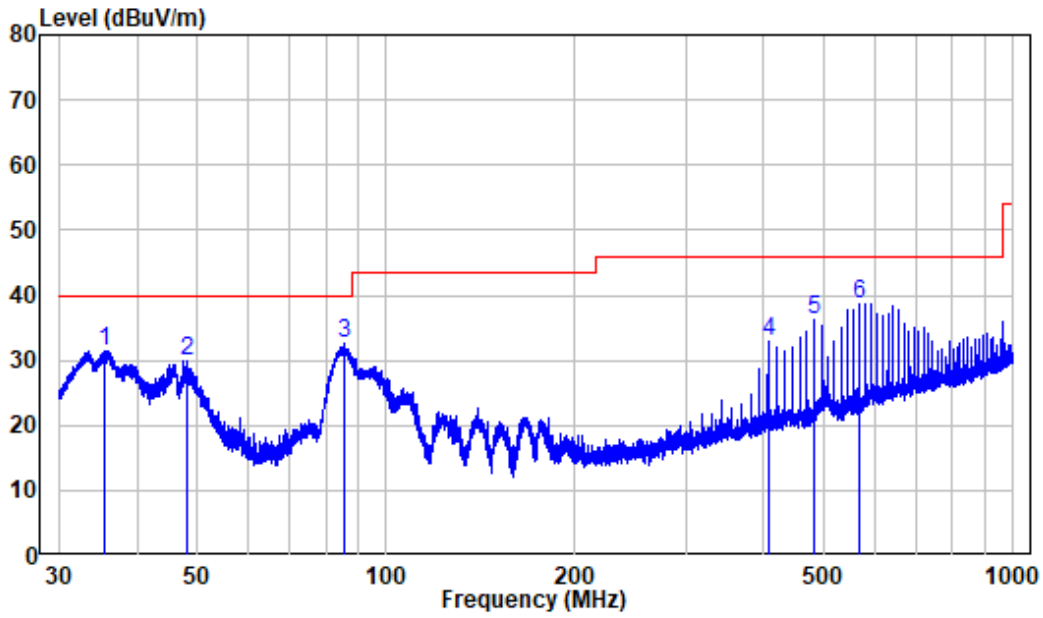
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : RA221215-61881E-RF
Test Mode: 2.4G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	86.845	-14.94	36.77	21.83	40.00	-18.17	Peak
2	168.488	-13.73	38.78	25.05	43.50	-18.45	Peak
3	431.221	-5.76	40.29	34.53	46.00	-11.47	Peak
4	681.452	-1.51	41.11	39.60	46.00	-6.40	QP
5	731.279	-0.85	38.60	37.75	46.00	-8.25	QP
6	769.085	-0.23	38.30	38.07	46.00	-7.93	QP

Vertical

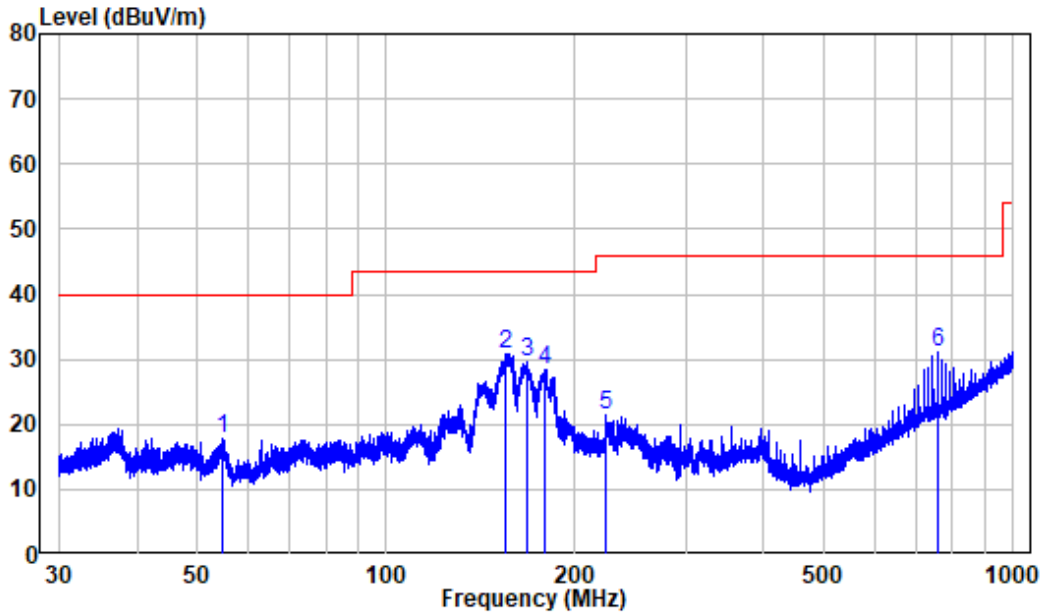


Site : chamber
Condition: 3m VERTICAL
Job No. : RA221215-61881E-RF
Test Mode: 2.4G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	35.530	-11.36	42.87	31.51	40.00	-8.49	Peak
2	48.057	-10.00	39.88	29.88	40.00	-10.12	Peak
3	85.861	-15.27	47.77	32.50	40.00	-7.50	Peak
4	406.266	-6.63	39.50	32.87	46.00	-13.13	Peak
5	481.371	-4.96	41.25	36.29	46.00	-9.71	Peak
6	568.862	-3.86	42.50	38.64	46.00	-7.36	Peak

For adapter 2

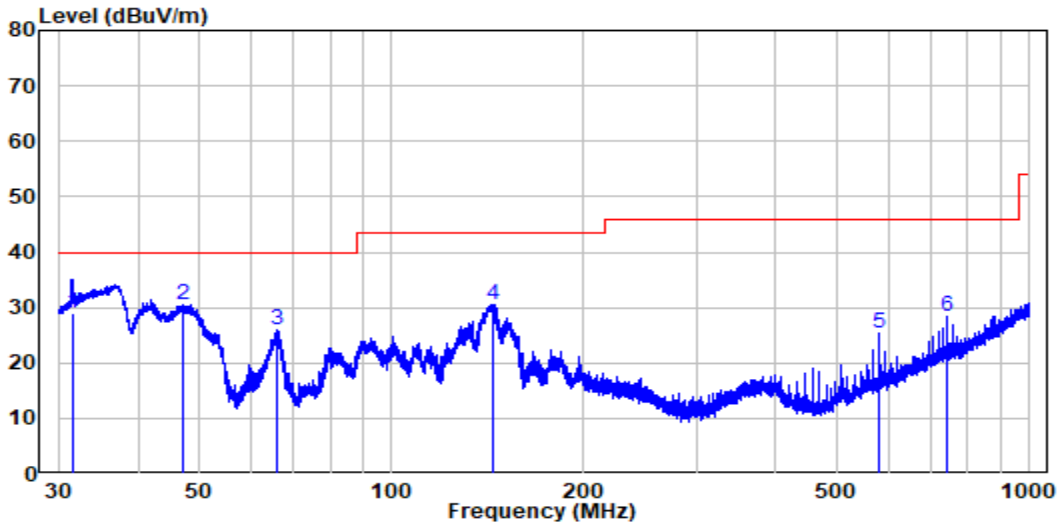
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : RA221215-61881E-RF
Test Mode: 2.4G WIFI
Adapter : AS2406A-1202000US

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	54.571	-14.14	31.94	17.80	40.00	-22.20	Peak
2	155.364	-10.33	41.21	30.88	43.50	-12.62	Peak
3	167.310	-10.29	39.98	29.69	43.50	-13.81	Peak
4	179.229	-10.37	38.78	28.41	43.50	-15.09	Peak
5	224.323	-11.42	32.81	21.39	46.00	-24.61	Peak
6	756.381	-5.42	36.42	31.00	46.00	-15.00	Peak

Vertical

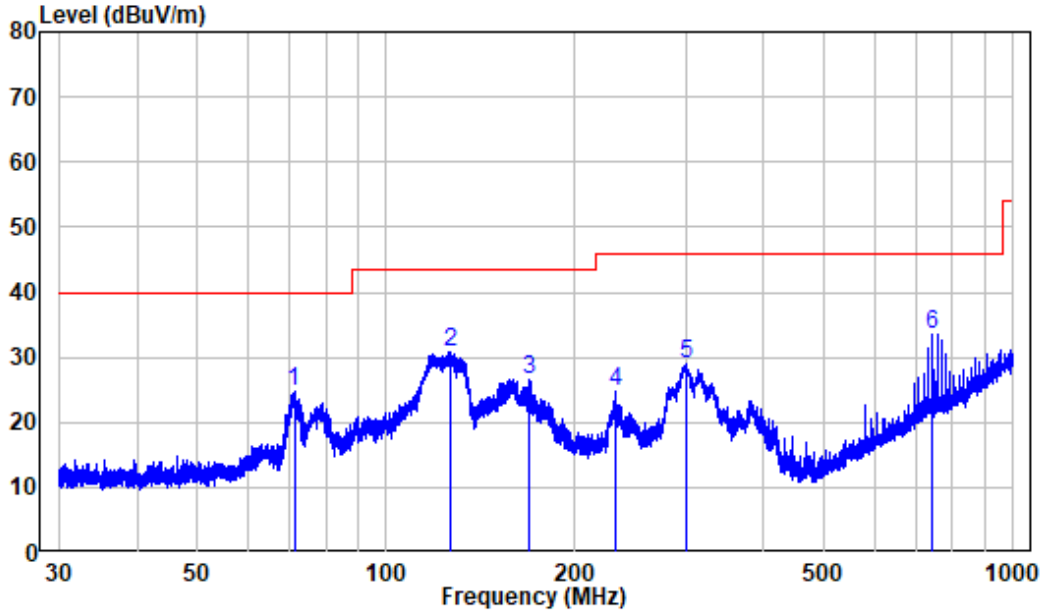


Site : chamber
Condition: 3m VERTICAL
Job No. : RA221215-61881E-RF
Test Mode: 2.4G WIFI
Adapter : AS2406A-1202000US

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	31.523	-14.38	43.50	29.12	40.00	-10.88	QP
2	47.098	-14.30	44.75	30.45	40.00	-9.55	Peak
3	66.266	-13.79	39.86	26.07	40.00	-13.93	Peak
4	144.398	-10.51	41.09	30.58	43.50	-12.92	Peak
5	581.212	-10.79	36.28	25.49	46.00	-20.51	Peak
6	743.887	-5.91	34.17	28.26	46.00	-17.74	Peak

For adapter 3

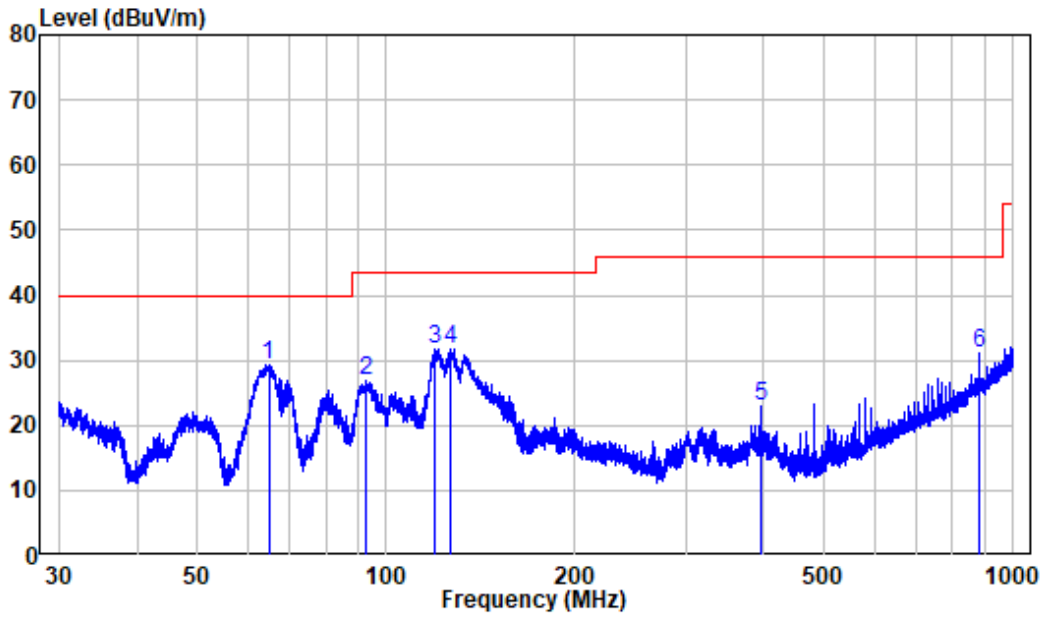
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : RA221215-61881E-RF
Test Mode: 2.4G WIFI
Adapter : RD1202000-C55-154MG

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	71.268	-13.71	38.44	24.73	40.00	-15.27	Peak
2	126.384	-10.76	41.69	30.93	43.50	-12.57	Peak
3	169.005	-10.28	36.89	26.61	43.50	-16.89	Peak
4	231.312	-11.65	36.46	24.81	46.00	-21.19	Peak
5	301.819	-15.53	44.59	29.06	46.00	-16.94	Peak
6	743.887	-5.91	39.48	33.57	46.00	-12.43	Peak

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : RA221215-61881E-RF
Test Mode: 2.4G WIFI
Adapter : RD1202000-C55-154MG

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	64.887	-13.76	43.17	29.41	40.00	-10.59	Peak
2	92.909	-12.30	39.03	26.73	43.50	-16.77	Peak
3	119.593	-11.04	42.60	31.56	43.50	-11.94	Peak
4	126.550	-10.74	42.54	31.80	43.50	-11.70	Peak
5	395.721	-11.87	34.69	22.82	46.00	-23.18	Peak
6	880.249	-1.36	32.42	31.06	46.00	-14.94	Peak

1-25 GHz: worst case MIMO, adapter 1

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11b									
Low Channel(2412MHz)									
2310	61.57	PK	135	2.2	H	-7.24	54.33	74	-19.67
2310	49.25	AV	135	2.2	H	-7.24	42.01	54	-11.99
2310	61.71	PK	316	1.4	V	-7.24	54.47	74	-19.53
2310	49.69	AV	316	1.4	V	-7.24	42.45	54	-11.55
2390	63.24	PK	307	2.2	H	-7.22	56.02	74	-17.98
2390	53.03	AV	307	2.2	H	-7.22	45.81	54	-8.19
2390	63.68	PK	181	1.5	V	-7.22	56.46	74	-17.54
2390	52.55	AV	181	1.5	V	-7.22	45.33	54	-8.67
4824	60.69	PK	344	1.6	H	-3.52	57.17	74	-16.83
4824	53.01	AV	344	1.6	H	-3.52	49.49	54	-4.51
4824	59.20	PK	356	1.6	V	-3.52	55.68	74	-18.32
4824	50.27	AV	356	1.6	V	-3.52	46.75	54	-7.25
Middle Channel(2437MHz)									
4874	62.50	PK	290	1.7	H	-3.42	59.08	74	-14.92
4874	56.41	AV	290	1.7	H	-3.42	52.99	54	-1.01
4874	61.27	PK	157	1.8	V	-3.42	57.85	74	-16.15
4874	53.20	AV	157	1.8	V	-3.42	49.78	54	-4.22
High Channel(2462MHz)									
2483.5	64.94	PK	174	1.9	H	-7.20	57.74	74	-16.26
2483.5	52.49	AV	174	1.9	H	-7.20	45.29	54	-8.71
2483.5	64.15	PK	91	1.3	V	-7.20	56.95	74	-17.05
2483.5	51.32	AV	91	1.3	V	-7.20	44.12	54	-9.88
2500	63.35	PK	173	2.3	H	-7.18	56.17	74	-17.83
2500	49.65	AV	173	2.3	H	-7.18	42.47	54	-11.53
2500	63.16	PK	299	1.8	V	-7.18	55.98	74	-18.02
2500	49.64	AV	299	1.8	V	-7.18	42.46	54	-11.54
4924	62.07	PK	48	2.3	H	-3.16	58.91	74	-15.09
4924	55.47	AV	48	2.3	H	-3.16	52.31	54	-1.69
4924	60.52	PK	358	1.2	V	-3.16	57.36	74	-16.64
4924	53.63	AV	358	1.2	V	-3.16	50.47	54	-3.53

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11g									
Low Channel(2412MHz)									
2310	61.49	PK	7	1	H	-7.24	54.25	74	-19.75
2310	48.83	AV	7	1	H	-7.24	41.59	54	-12.41
2310	61.21	PK	202	1.9	V	-7.24	53.97	74	-20.03
2310	49.14	AV	202	1.9	V	-7.24	41.90	54	-12.10
2390	64.50	PK	286	1.8	H	-7.22	57.28	74	-16.72
2390	51.40	AV	286	1.8	H	-7.22	44.18	54	-9.82
2390	65.49	PK	77	1.9	V	-7.22	58.27	74	-15.73
2390	50.68	AV	77	1.9	V	-7.22	43.46	54	-10.54
4824	58.65	PK	143	1.3	H	-3.52	55.13	74	-18.87
4824	45.59	AV	143	1.3	H	-3.52	42.07	54	-11.93
4824	58.28	PK	171	1.6	V	-3.52	54.76	74	-19.24
4824	45.72	AV	171	1.6	V	-3.52	42.20	54	-11.80
Middle Channel(2437MHz)									
4874	59.32	PK	55	1.1	H	-3.42	55.9	74	-18.10
4874	45.67	AV	55	1.1	H	-3.42	42.25	54	-11.75
4874	58.99	PK	360	2.5	V	-3.42	55.57	74	-18.43
4874	45.79	AV	360	2.5	V	-3.42	42.37	54	-11.63
High Channel(2462MHz)									
2483.5	71.73	PK	169	1.6	H	-7.20	64.53	74	-9.47
2483.5	52.46	AV	169	1.6	H	-7.20	45.26	54	-8.74
2483.5	65.40	PK	122	2	V	-7.20	58.2	74	-15.80
2483.5	51.14	AV	122	2	V	-7.20	43.94	54	-10.06
2500	62.91	PK	277	2.1	H	-7.18	55.73	74	-18.27
2500	49.98	AV	277	2.1	H	-7.18	42.8	54	-11.20
2500	63.59	PK	222	1.4	V	-7.18	56.41	74	-17.59
2500	49.69	AV	222	1.4	V	-7.18	42.51	54	-11.49
4924	62.23	PK	306	2.1	H	-3.16	59.07	74	-14.93
4924	46.49	AV	306	2.1	H	-3.16	43.33	54	-10.67
4924	59.31	PK	74	1.5	V	-3.16	56.15	74	-17.85
4924	45.48	AV	74	1.5	V	-3.16	42.32	54	-11.68

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11n20									
Low Channel(2412MHz)									
2310	60.21	PK	297	1.9	H	-7.24	52.97	74	-21.03
2310	48.01	AV	297	1.9	H	-7.24	40.77	54	-13.23
2310	60.37	PK	47	2.2	V	-7.24	53.13	74	-20.87
2310	47.90	AV	47	2.2	V	-7.24	40.66	54	-13.34
2390	64.16	PK	249	2.2	H	-7.22	56.94	74	-17.06
2390	50.54	AV	249	2.2	H	-7.22	43.32	54	-10.68
2390	63.77	PK	303	1.9	V	-7.22	56.55	74	-17.45
2390	50.94	AV	303	1.9	V	-7.22	43.72	54	-10.28
4824	58.39	PK	249	1.3	H	-3.52	54.87	74	-19.13
4824	45.48	AV	249	1.3	H	-3.52	41.96	54	-12.04
4824	58.44	PK	227	2.4	V	-3.52	54.92	74	-19.08
4824	45.58	AV	227	2.4	V	-3.52	42.06	54	-11.94
Middle Channel(2437MHz)									
4874	60.59	PK	65	1.2	H	-3.42	57.17	74	-16.83
4874	47.63	AV	65	1.2	H	-3.42	44.21	54	-9.79
4874	60.33	PK	139	2.2	V	-3.42	56.91	74	-17.09
4874	46.58	AV	139	2.2	V	-3.42	43.16	54	-10.84
High Channel(2462MHz)									
2483.5	65.60	PK	166	2.1	H	-7.20	58.4	74	-15.60
2483.5	50.87	AV	166	2.1	H	-7.20	43.67	54	-10.33
2483.5	65.41	PK	56	1	V	-7.20	58.21	74	-15.79
2483.5	50.52	AV	56	1	V	-7.20	43.32	54	-10.68
2500	63.59	PK	227	2.4	H	-7.18	56.41	74	-17.59
2500	50.34	AV	227	2.4	H	-7.18	43.16	54	-10.84
2500	63.15	PK	142	1.9	V	-7.18	55.97	74	-18.03
2500	50.15	AV	142	1.9	V	-7.18	42.97	54	-11.03
4924	60.44	PK	265	1.1	H	-3.16	57.28	74	-16.72
4924	47.56	AV	265	1.1	H	-3.16	44.40	54	-9.60
4924	59.48	PK	277	1.9	V	-3.16	56.32	74	-17.68
4924	46.47	AV	277	1.9	V	-3.16	43.31	54	-10.69

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11n40									
Low Channel(2422MHz)									
2310	59.77	PK	141	1.7	H	-7.24	52.53	74	-21.47
2310	47.63	AV	141	1.7	H	-7.24	40.39	54	-13.61
2310	60.32	PK	299	2	V	-7.24	53.08	74	-20.92
2310	48.18	AV	299	2	V	-7.24	40.94	54	-13.06
2390	70.05	PK	273	1.5	H	-7.22	62.83	74	-11.17
2390	53.57	AV	273	1.5	H	-7.22	46.35	54	-7.65
2390	64.58	PK	180	1.4	V	-7.22	57.36	74	-16.64
2390	51.01	AV	180	1.4	V	-7.22	43.79	54	-10.21
4844	57.81	PK	228	1.5	H	-3.54	54.27	74	-19.73
4844	43.69	AV	228	1.5	H	-3.54	40.15	54	-13.85
4844	58.09	PK	9	1.5	V	-3.54	54.55	74	-19.45
4844	43.62	AV	9	1.5	V	-3.54	40.08	54	-13.92
Middle Channel(2437MHz)									
4874	59.21	PK	155	1.1	H	-3.42	55.79	74	-18.21
4874	43.92	AV	155	1.1	H	-3.42	40.5	54	-13.50
4874	57.83	PK	266	2.1	V	-3.42	54.41	74	-19.59
4874	44.13	AV	266	2.1	V	-3.42	40.71	54	-13.29
High Channel(2452MHz)									
2483.5	70.74	PK	346	2.2	H	-7.20	63.54	74	-10.46
2483.5	55.88	AV	346	2.2	H	-7.20	48.68	54	-5.32
2483.5	68.00	PK	262	1.8	V	-7.20	60.8	74	-13.20
2483.5	53.99	AV	262	1.8	V	-7.20	46.79	54	-7.21
2500	62.91	PK	321	1.5	H	-7.18	55.73	74	-18.27
2500	49.86	AV	321	1.5	H	-7.18	42.68	54	-11.32
2500	62.61	PK	143	2.2	V	-7.18	55.43	74	-18.57
2500	49.69	AV	143	2.2	V	-7.18	42.51	54	-11.49
4904	59.01	PK	188	1.9	H	-3.26	55.75	74	-18.25
4904	43.55	AV	188	1.9	H	-3.26	40.29	54	-13.71
4904	57.43	PK	359	2.3	V	-3.26	54.17	74	-19.83
4904	43.77	AV	359	2.3	V	-3.26	40.51	54	-13.49

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11ax20(worst case 242Tone)									
Low Channel(2412MHz)									
2310	60.19	PK	311	2.4	H	-7.24	52.95	74	-21.05
2310	48.43	AV	311	2.4	H	-7.24	41.19	54	-12.81
2310	60.18	PK	287	1	V	-7.24	52.94	74	-21.06
2310	48.19	AV	287	1	V	-7.24	40.95	54	-13.05
2390	63.69	PK	20	2.5	H	-7.22	56.47	74	-17.53
2390	50.68	AV	20	2.5	H	-7.22	43.46	54	-10.54
2390	63.15	PK	175	2.4	V	-7.22	55.93	74	-18.07
2390	50.27	AV	175	2.4	V	-7.22	43.05	54	-10.95
4824	57.55	PK	316	1.8	H	-3.52	54.03	74	-19.97
4824	42.93	AV	316	1.8	H	-3.52	39.41	54	-14.59
4824	57.65	PK	55	1.7	V	-3.52	54.13	74	-19.87
4824	42.68	AV	55	1.7	V	-3.52	39.16	54	-14.84
Middle Channel(2437MHz)									
4874	62.84	PK	348	1.8	H	-3.42	59.42	74	-14.58
4874	43.91	AV	348	1.8	H	-3.42	40.49	54	-13.51
4874	62.69	PK	256	1.3	V	-3.42	59.27	74	-14.73
4874	43.52	AV	256	1.3	V	-3.42	40.1	54	-13.90
High Channel(2462MHz)									
2483.5	65.74	PK	192	1.9	H	-7.20	58.54	74	-15.46
2483.5	51.80	AV	192	1.9	H	-7.20	44.6	54	-9.40
2483.5	65.09	PK	195	1.7	V	-7.20	57.89	74	-16.11
2483.5	52.00	AV	195	1.7	V	-7.20	44.8	54	-9.20
2500	63.13	PK	353	1.6	H	-7.18	55.95	74	-18.05
2500	49.88	AV	353	1.6	H	-7.18	42.7	54	-11.30
2500	62.55	PK	134	2	V	-7.18	55.37	74	-18.63
2500	50.39	AV	134	2	V	-7.18	43.21	54	-10.79
4924	63.45	PK	297	1.6	H	-3.16	60.29	74	-13.71
4924	43.20	AV	297	1.6	H	-3.16	40.04	54	-13.96
4924	59.78	PK	150	1.9	V	-3.16	56.62	74	-17.38
4924	43.84	AV	150	1.9	V	-3.16	40.68	54	-13.32

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11ax40(worst case 484Tone)									
Low Channel(2422MHz)									
2310	60.41	PK	303	2.2	H	-7.24	53.17	74	-20.83
2310	47.97	AV	303	2.2	H	-7.24	40.73	54	-13.27
2310	60.40	PK	273	2.2	V	-7.24	53.16	74	-20.84
2310	48.18	AV	273	2.2	V	-7.24	40.94	54	-13.06
2390	63.58	PK	235	1.4	H	-7.22	56.36	74	-17.64
2390	50.70	AV	235	1.4	H	-7.22	43.48	54	-10.52
2390	63.62	PK	45	1.5	V	-7.22	56.40	74	-17.60
2390	50.07	AV	45	1.5	V	-7.22	42.85	54	-11.15
4844	57.30	PK	306	1.8	H	-3.54	53.76	74	-20.24
4844	43.29	AV	306	1.8	H	-3.54	39.75	54	-14.25
4844	57.06	PK	46	1.3	V	-3.54	53.52	74	-20.48
4844	43.13	AV	46	1.3	V	-3.54	39.59	54	-14.41
Middle Channel(2437MHz)									
4874	59.49	PK	111	1.9	H	-3.42	56.07	74	-17.93
4874	43.31	AV	111	1.9	H	-3.42	39.89	54	-14.11
4874	58.37	PK	226	1.4	V	-3.42	54.95	74	-19.05
4874	42.99	AV	226	1.4	V	-3.42	39.57	54	-14.43
High Channel(2452MHz)									
2483.5	68.21	PK	74	2	H	-7.20	61.01	74	-12.99
2483.5	53.68	AV	74	2	H	-7.20	46.48	54	-7.52
2483.5	66.72	PK	182	1.3	V	-7.20	59.52	74	-14.48
2483.5	52.66	AV	182	1.3	V	-7.20	45.46	54	-8.54
2500	63.42	PK	355	2	H	-7.18	56.24	74	-17.76
2500	50.08	AV	355	2	H	-7.18	42.9	54	-11.10
2500	62.98	PK	205	1.7	V	-7.18	55.8	74	-18.20
2500	50.19	AV	205	1.7	V	-7.18	43.01	54	-10.99
4904	57.53	PK	348	2.3	H	-3.26	54.27	74	-19.73
4904	43.04	AV	348	2.3	H	-3.26	39.78	54	-14.22
4904	57.84	PK	38	1.3	V	-3.26	54.58	74	-19.42
4904	42.84	AV	38	1.3	V	-3.26	39.58	54	-14.42

Note:

Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Absolute Level (Corrected Amplitude） = Factor + Reading

Margin = Absolute Level - Limit

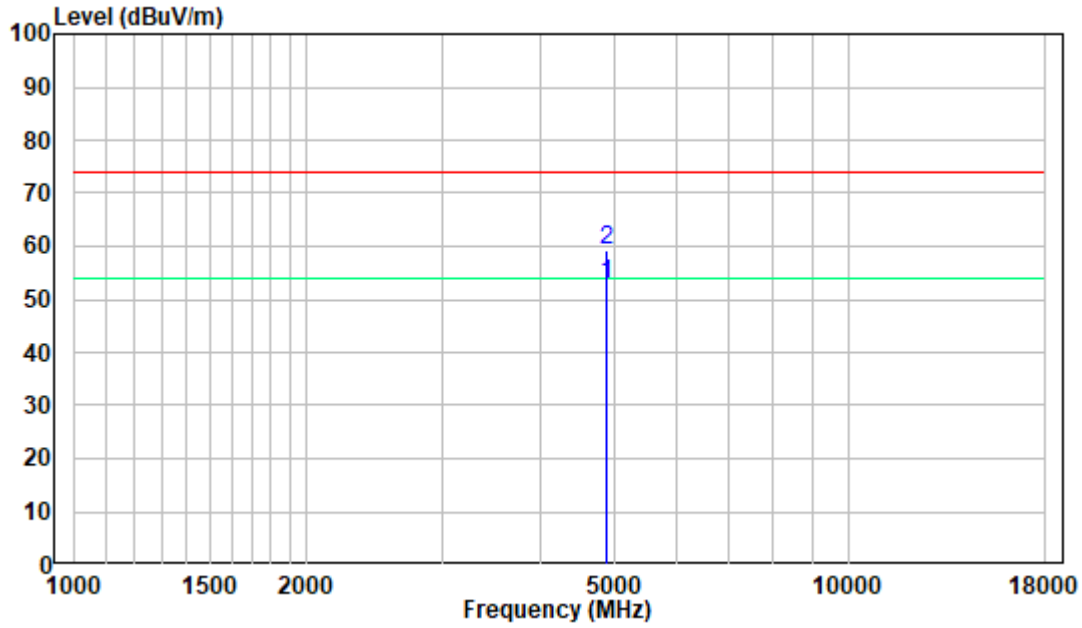
The other spurious emission which is 20dB below to the limit was not recorded.

The test result of peak was less than the limit of average, so just peak values were recorded.

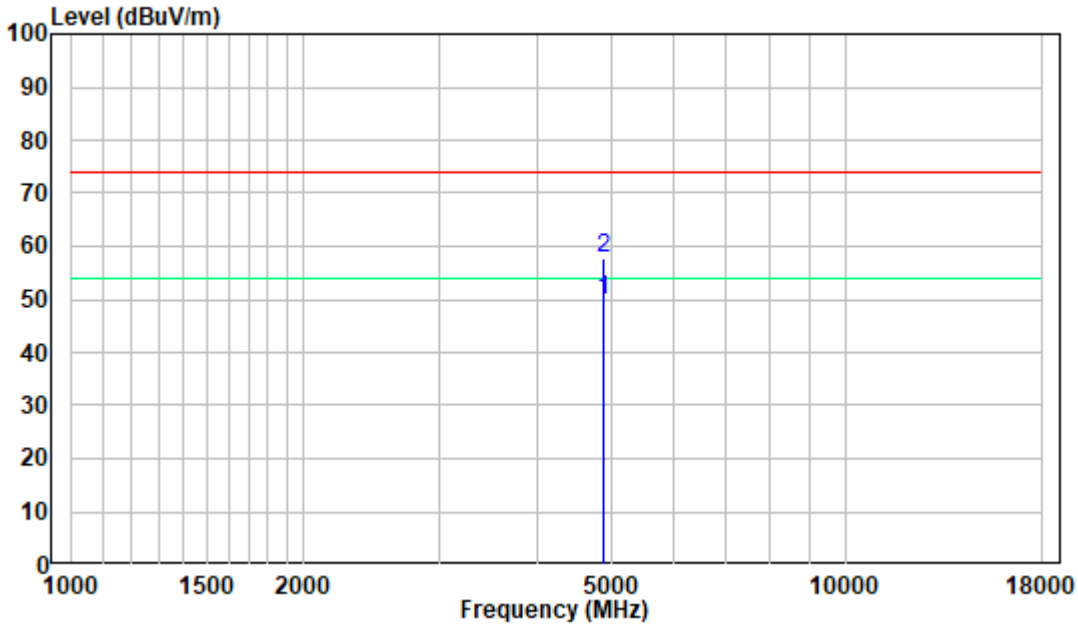
1-18 GHz:

Pre-scan Plots:

802.11 B middle Channel
Horizontal



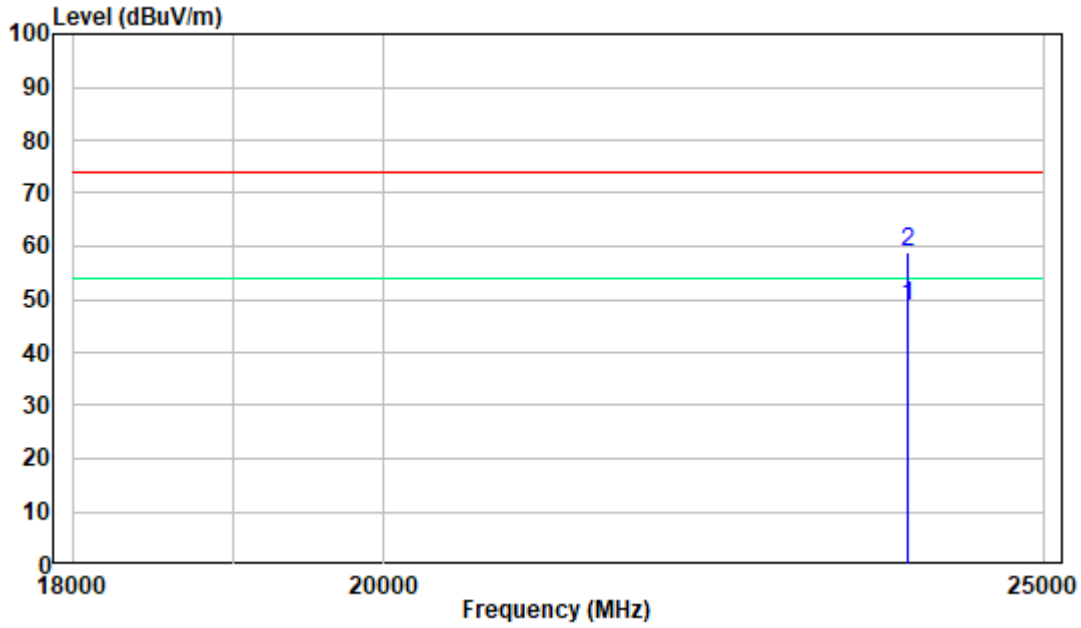
Vertical



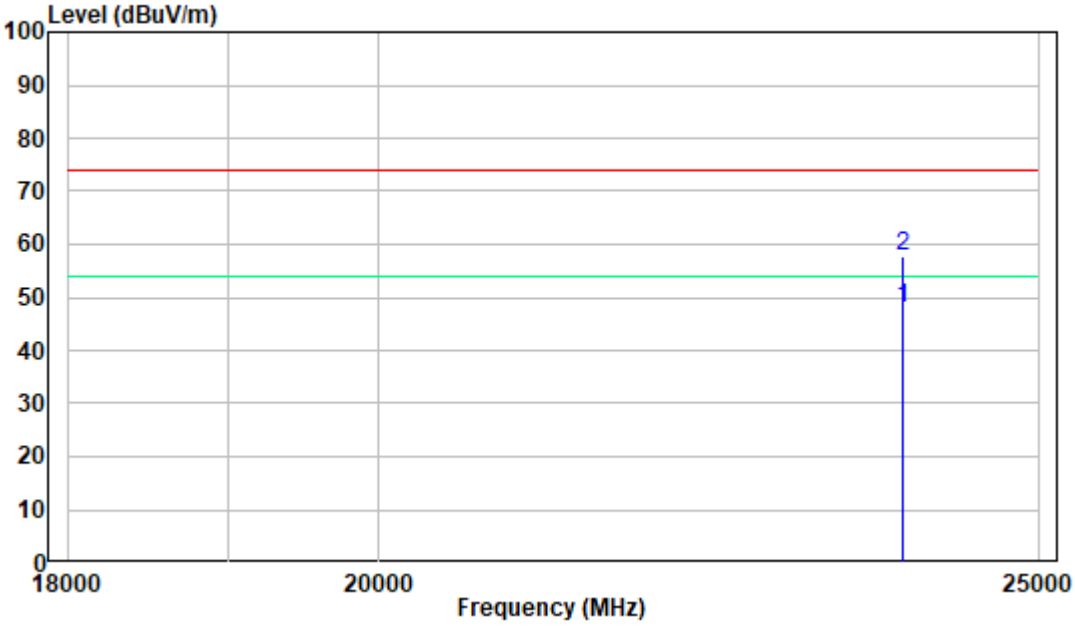
18 -25GHz:

Pre-scan Plots:

802.11 B middle Channel
Horizontal



Vertical



FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH & OCCUPIED BANDWIDTH

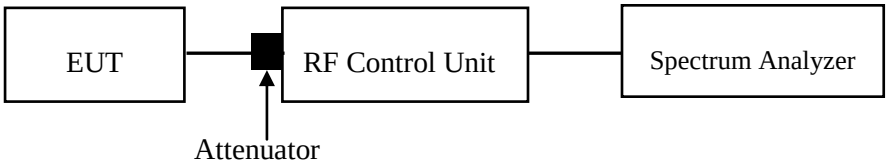
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.8.1 & Clause 6.9.3

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Nick Fang on 2023-02-18.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

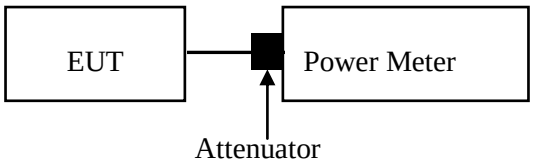
Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.9.2.3.2

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Nick Fang on 2023-02-18.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

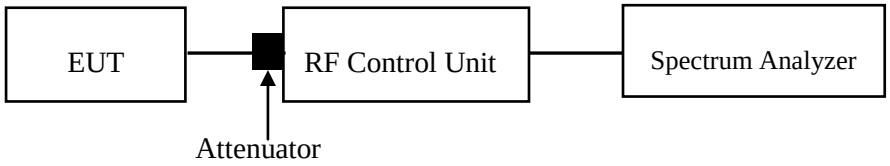
Applicable Standard

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)).

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.11

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Roger Ling on 2023-01-03.

EUT operation mode: Transmitting

Test Result: Compliant.

Conducted Band Edge Result:

Please refer to the Appendix.

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

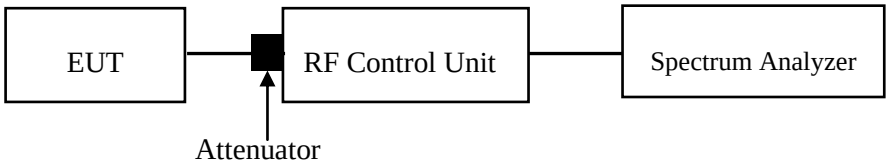
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.10.5

The following procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., D < 98%), when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than ±2%):

a) Measure the duty cycle (D) of the transmitter output signal as described in 11.6.
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥ [3 × RBW].
f) Detector = power averaging (rms) or sample detector (when rms not available).
g) Ensure that the number of measurement points in the sweep ≥ [2 × span / RBW].
h) Sweep time = auto couple.
i) Do not use sweep triggering; allow sweep to "free run."
j) Employ trace averaging (rms) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add [10 log (1 / D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
m) If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Nick Fang on 2023-02-18.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

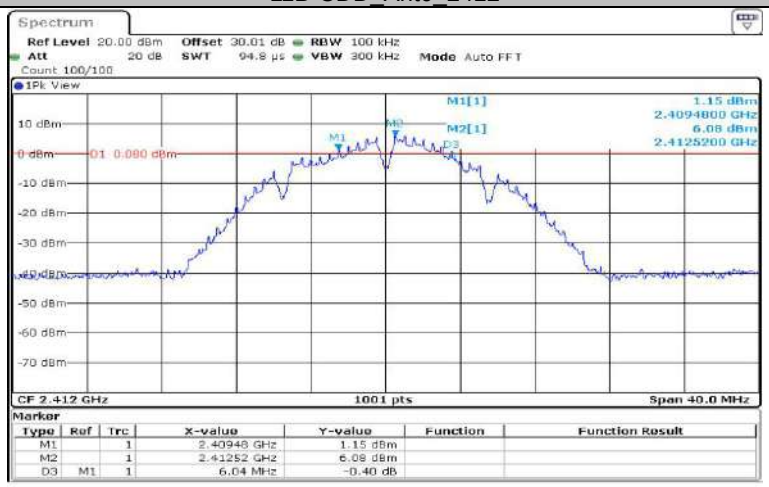
APPENDIX

Appendix A: DTS Bandwidth
Test Result

Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-CDD	Ant0	2412	6.04	2409.48	2415.52	0.5	PASS
	Ant1	2412	6.08	2409.44	2415.52	0.5	PASS
	Ant0	2437	7.32	2433.44	2440.76	0.5	PASS
	Ant1	2437	7.08	2433.48	2440.56	0.5	PASS
	Ant0	2462	6.08	2458.96	2465.04	0.5	PASS
	Ant1	2462	8.08	2457.48	2465.56	0.5	PASS
11G-CDD	Ant0	2412	13.84	2405.72	2419.56	0.5	PASS
	Ant1	2412	15.04	2404.48	2419.52	0.5	PASS
	Ant0	2437	15.08	2429.44	2444.52	0.5	PASS
	Ant1	2437	15.08	2429.44	2444.52	0.5	PASS
	Ant0	2462	15.08	2454.44	2469.52	0.5	PASS
	Ant1	2462	15.12	2454.44	2469.56	0.5	PASS
11N20MIMO	Ant0	2412	15.12	2404.44	2419.56	0.5	PASS
	Ant1	2412	13.84	2405.72	2419.56	0.5	PASS
	Ant0	2437	13.80	2430.72	2444.52	0.5	PASS
	Ant1	2437	14.96	2429.52	2444.48	0.5	PASS
	Ant0	2462	15.28	2453.88	2469.16	0.5	PASS
	Ant1	2462	15.68	2453.84	2469.52	0.5	PASS
11N40MIMO	Ant0	2422	35.12	2404.48	2439.60	0.5	PASS
	Ant1	2422	33.84	2405.76	2439.60	0.5	PASS
	Ant0	2437	32.64	2420.68	2453.32	0.5	PASS
	Ant1	2437	33.76	2420.76	2454.52	0.5	PASS
	Ant0	2452	33.84	2435.76	2469.60	0.5	PASS
	Ant1	2452	33.76	2435.76	2469.52	0.5	PASS
11AX20MIMO	Ant0	2412	11.28	2408.24	2419.52	0.5	PASS
	Ant1	2412	13.80	2405.72	2419.52	0.5	PASS
	Ant0	2437	13.84	2430.72	2444.56	0.5	PASS
	Ant1	2437	15.12	2429.44	2444.56	0.5	PASS
	Ant0	2462	16.92	2453.48	2470.40	0.5	PASS
	Ant1	2462	11.36	2454.44	2465.80	0.5	PASS
11AX40MIMO	Ant0	2422	35.12	2404.48	2439.60	0.5	PASS
	Ant1	2422	35.12	2404.48	2439.60	0.5	PASS
	Ant0	2437	35.12	2419.48	2454.60	0.5	PASS
	Ant1	2437	33.84	2420.76	2454.60	0.5	PASS
	Ant0	2452	28.80	2435.76	2464.56	0.5	PASS
	Ant1	2452	31.28	2435.76	2467.04	0.5	PASS

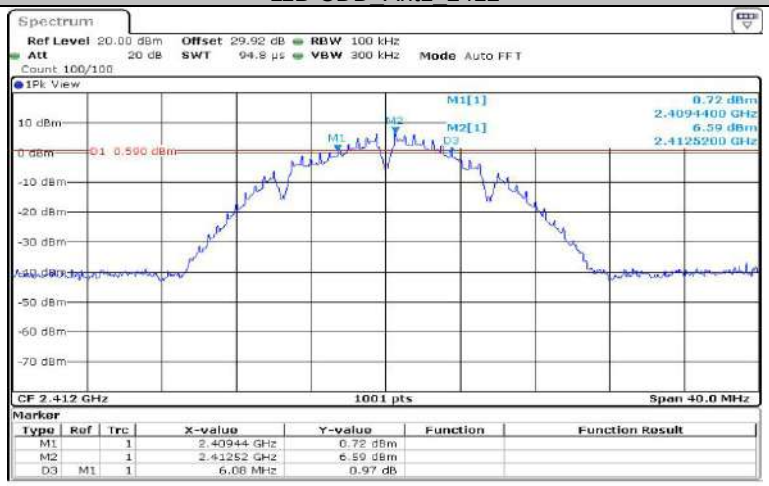
Test Graphs

11B-CDD_Ant0_2412



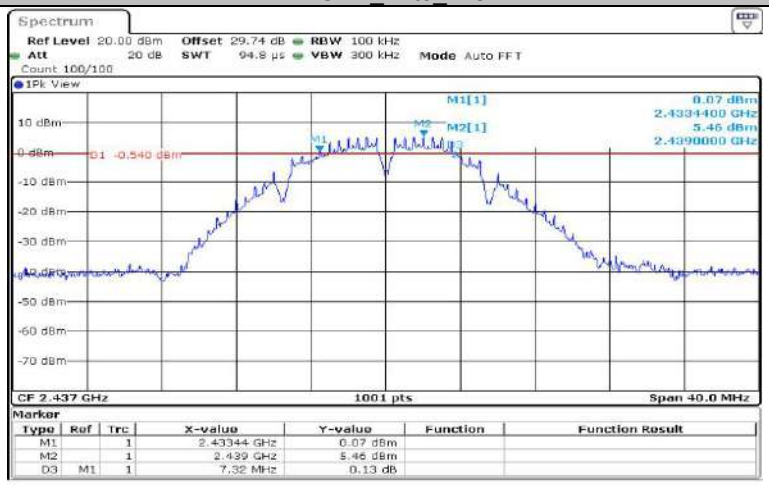
Date: 10.FEB.2023 10:39:20

11B-CDD_Ant1_2412



Date: 10.FEB.2023 10:46:17

11B-CDD_Ant0_2437



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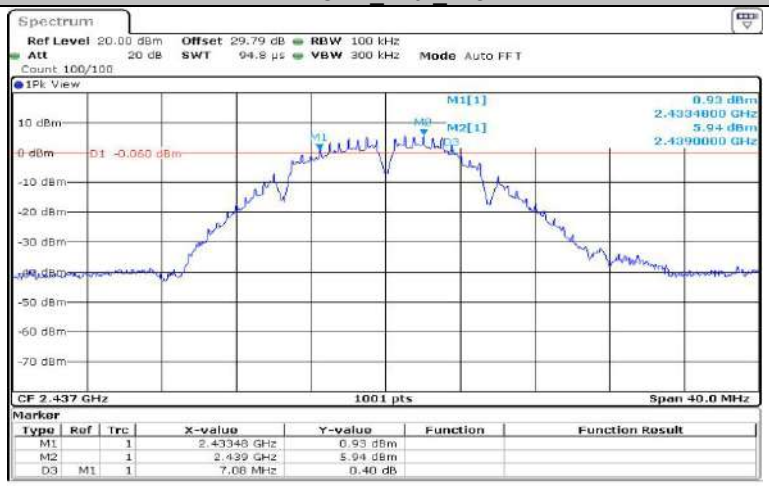
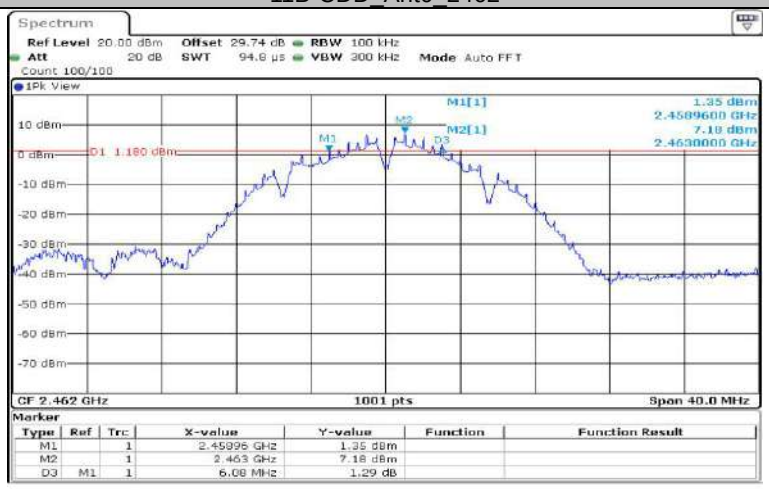
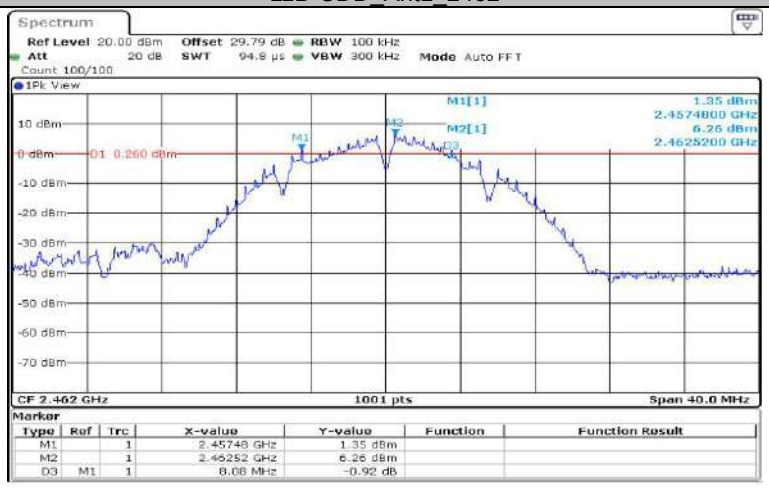
11B-CDD_Ant1_2437



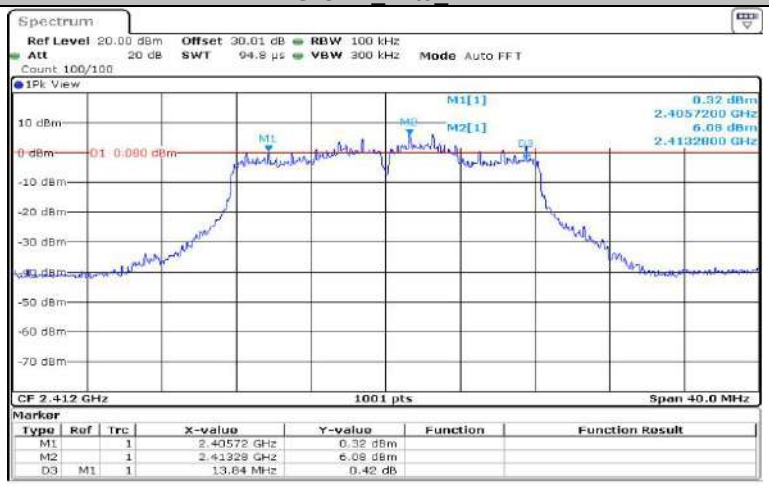
11B-CDD_Ant0_2462



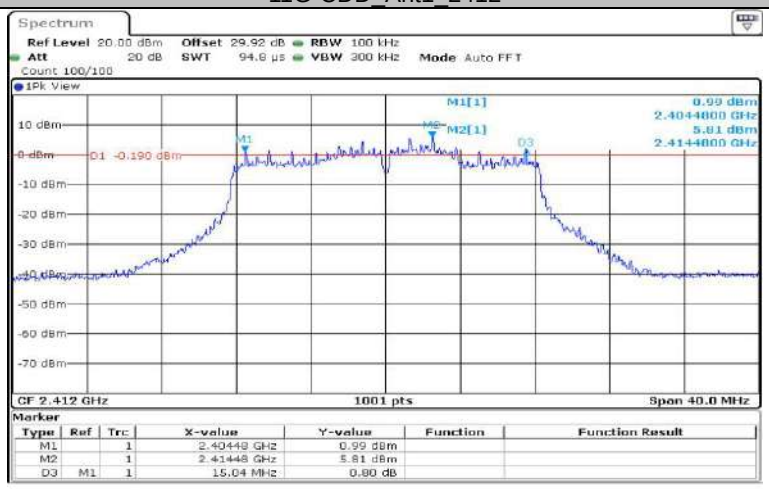
11B-CDD_Ant1_2462



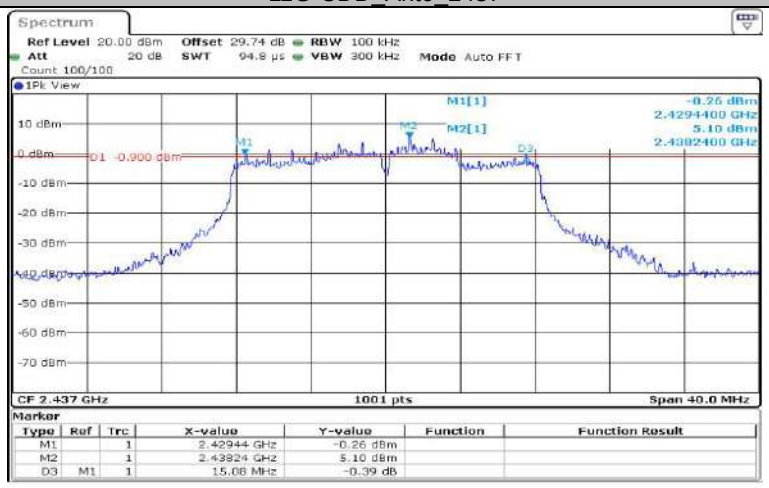
11G-CDD_Ant0_2412



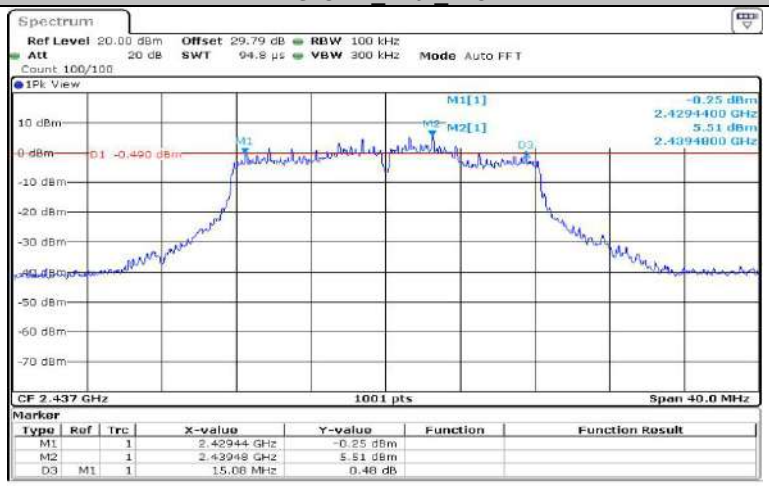
11G-CDD_Ant1_2412



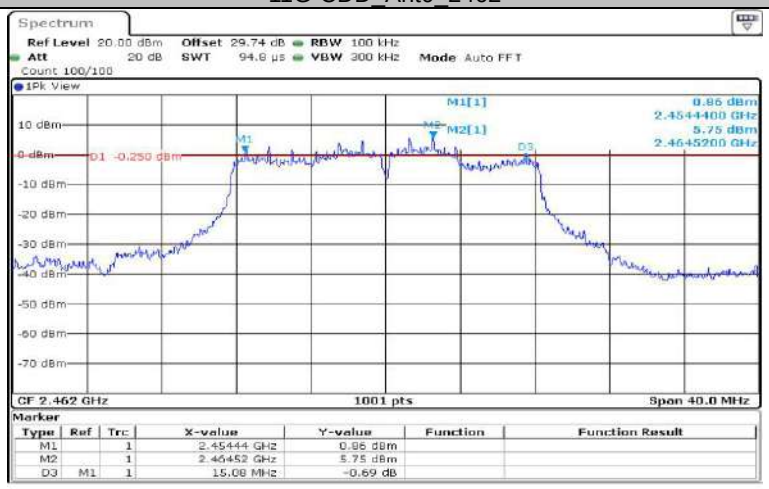
11G-CDD_Ant0_2437



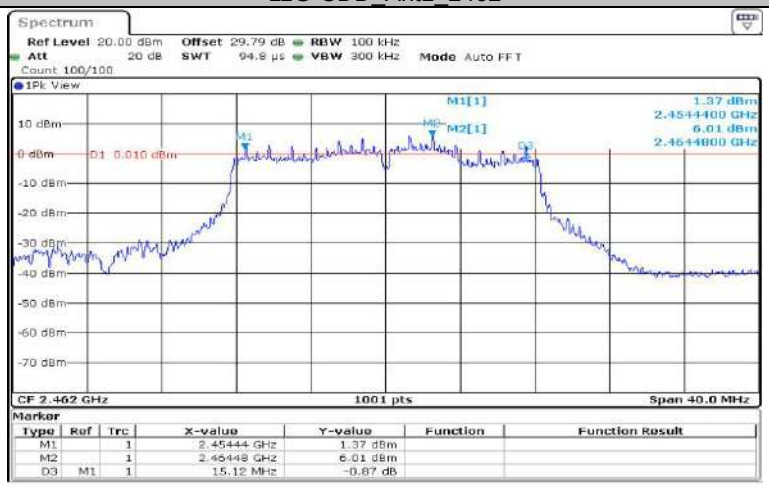
11G-CDD_Ant1_2437



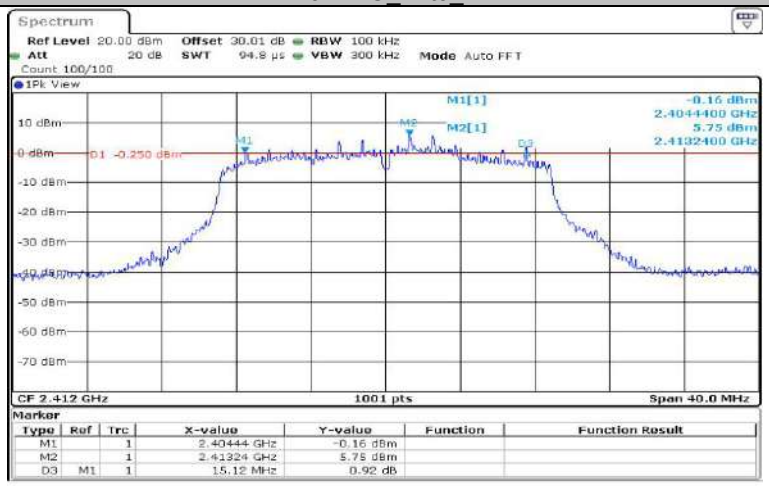
11G-CDD_Ant0_2462



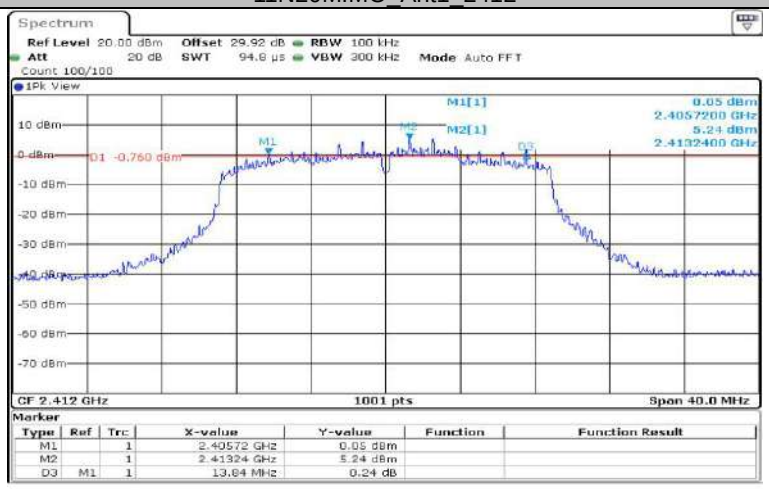
11G-CDD_Ant1_2462



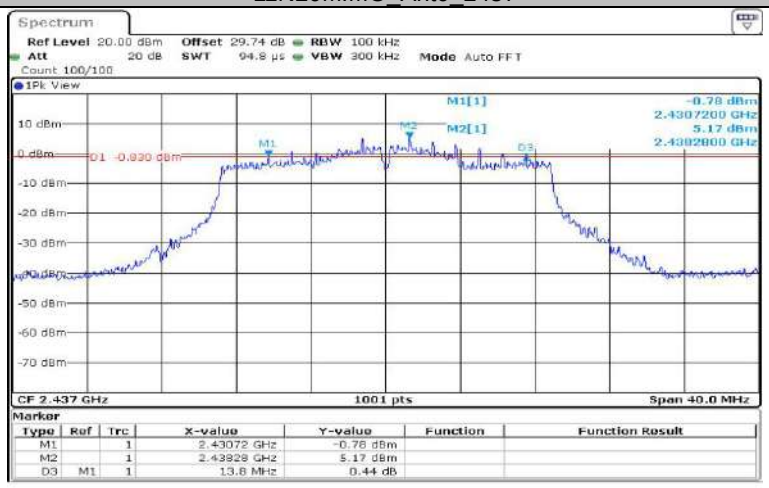
11N20MIMO_Ant0_2412



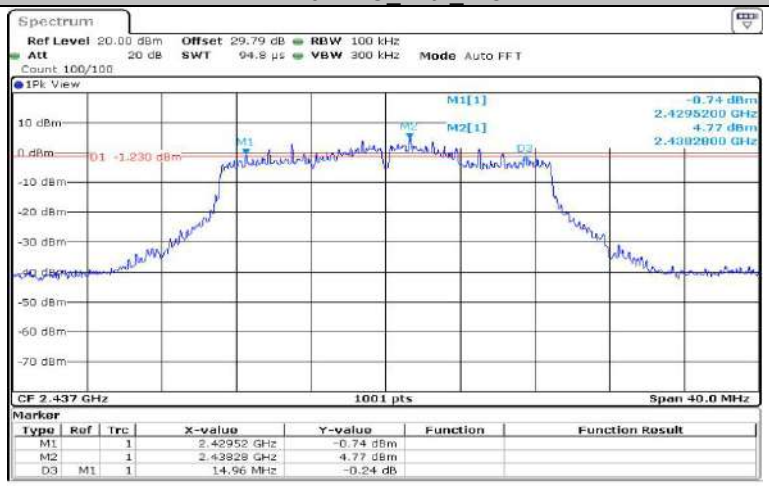
11N20MIMO_Ant1_2412



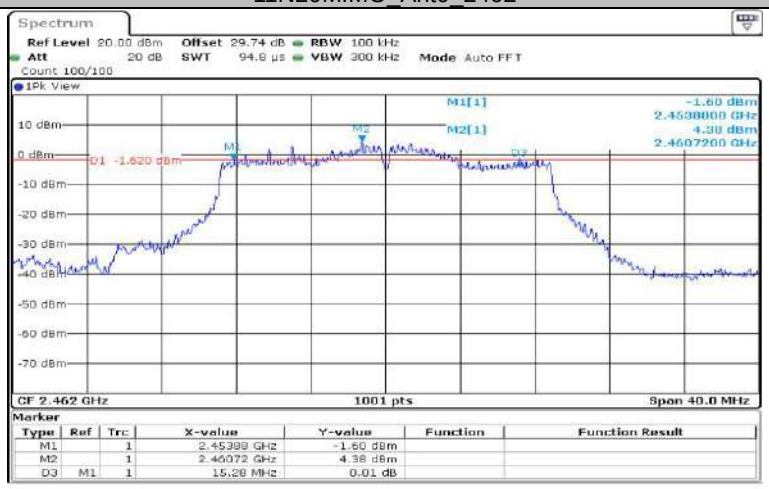
11N20MIMO_Ant0_2437



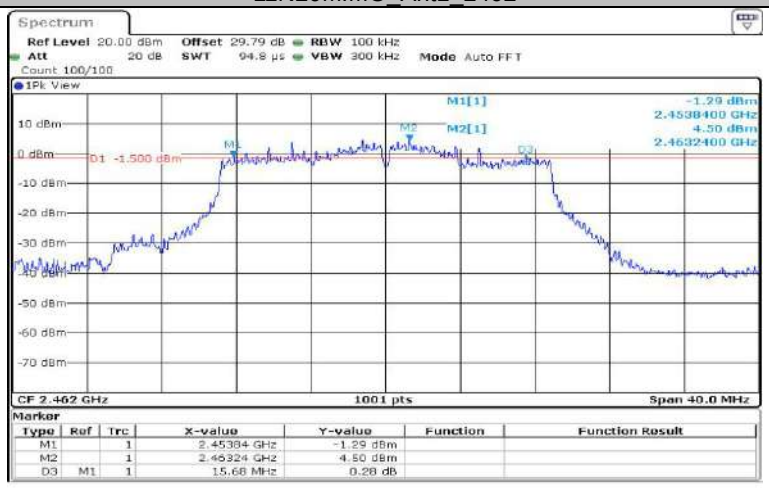
11N20MIMO_Ant1_2437



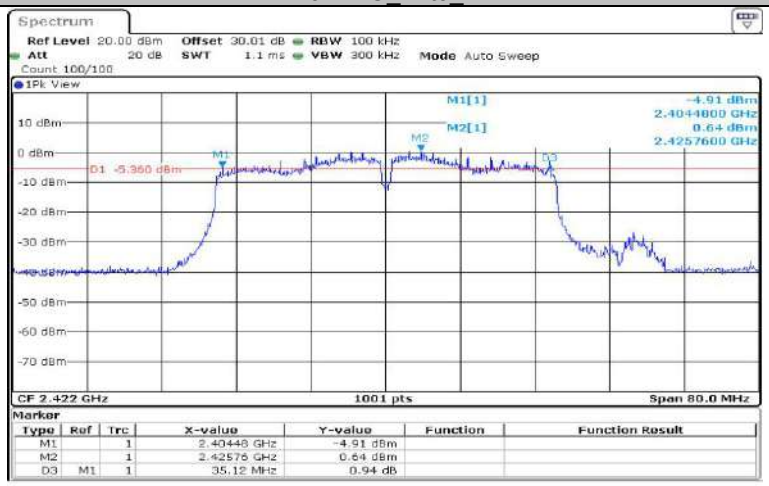
11N20MIMO_Ant0_2462



11N20MIMO_Ant1_2462

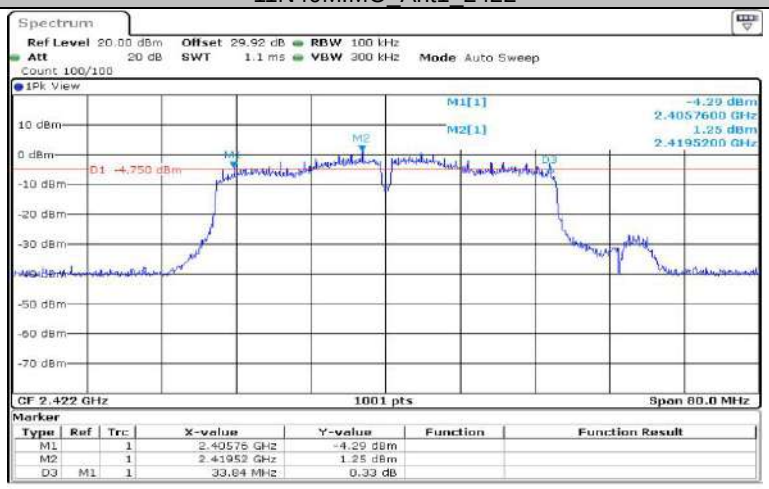


11N40MIMO_Ant0_2422



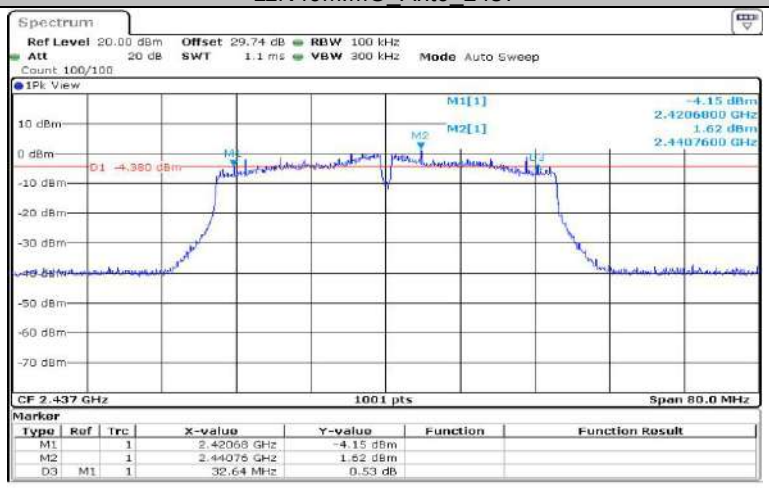
Date: 18.FEB.2023 11:31:05

11N40MIMO_Ant1_2422



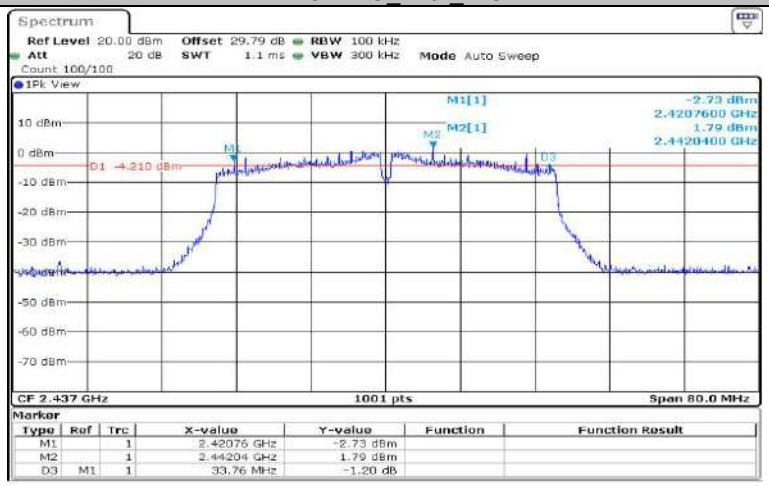
Date: 18.FEB.2023 11:32:14

11N40MIMO_Ant0_2437



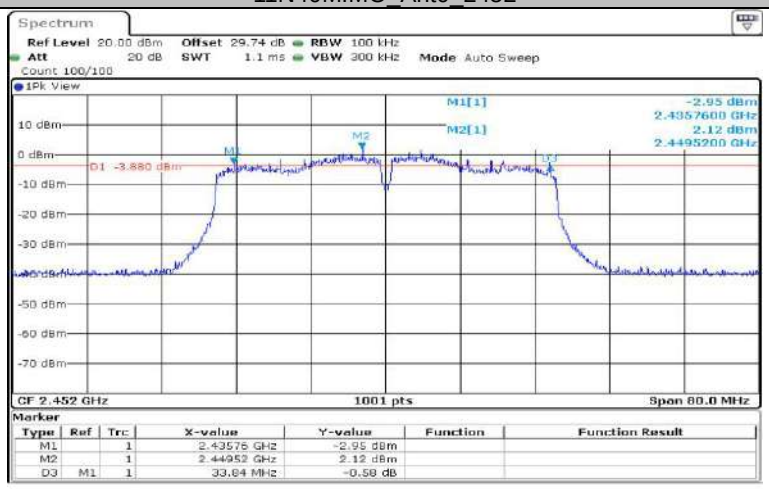
Date: 18.FEB.2023 11:34:45

11N40MIMO_Ant1_2437



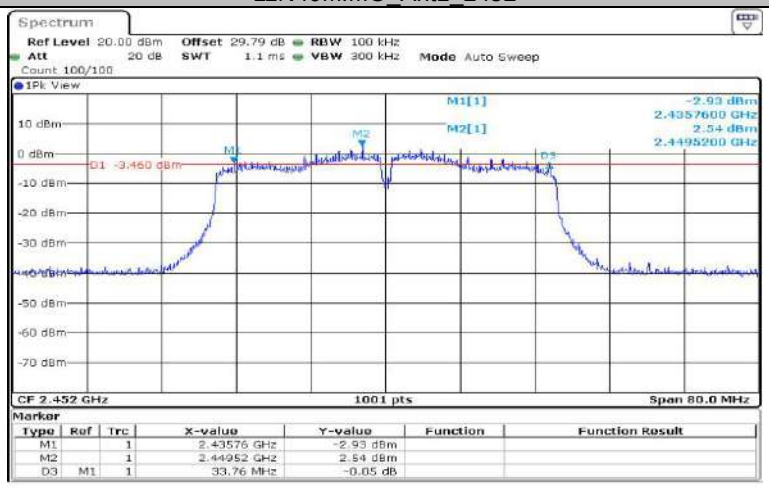
Date: 10.FEB.2023 11:35:38

11N40MIMO_Ant0_2452



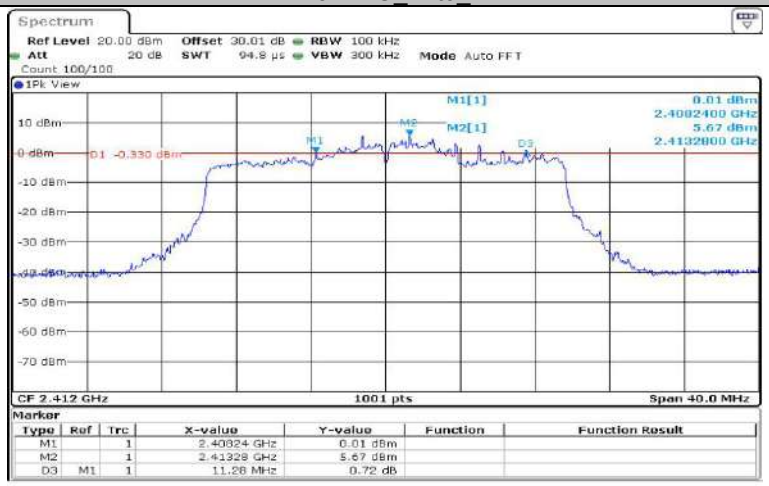
Date: 10.FEB.2023 11:38:01

11N40MIMO_Ant1_2452



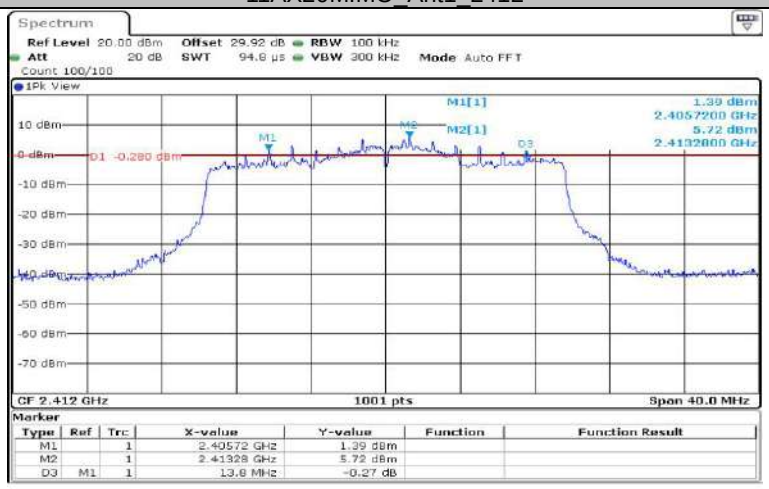
Date: 10.FEB.2023 11:39:08

11AX20MIMO_Ant0_2412



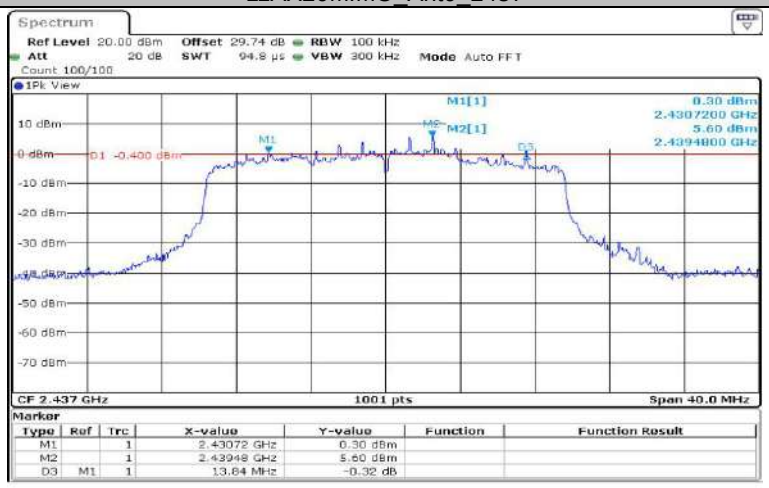
Date: 18.FEB.2023 11:46:07

11AX20MIMO_Ant1_2412



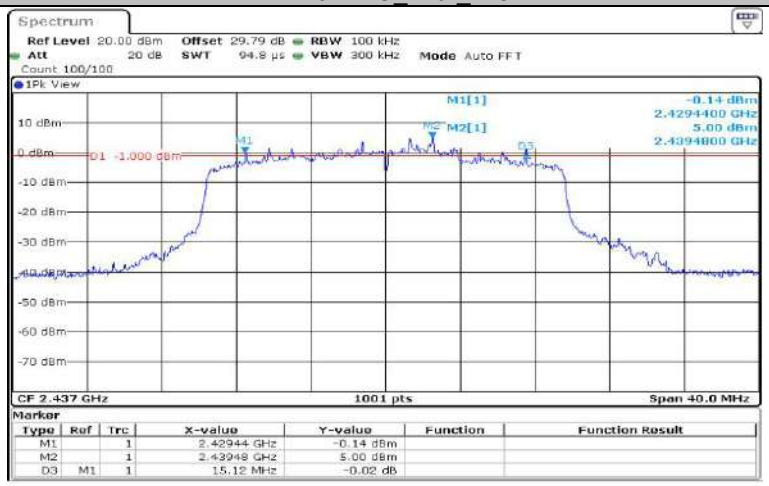
Date: 18.FEB.2023 11:47:14

11AX20MIMO_Ant0_2437

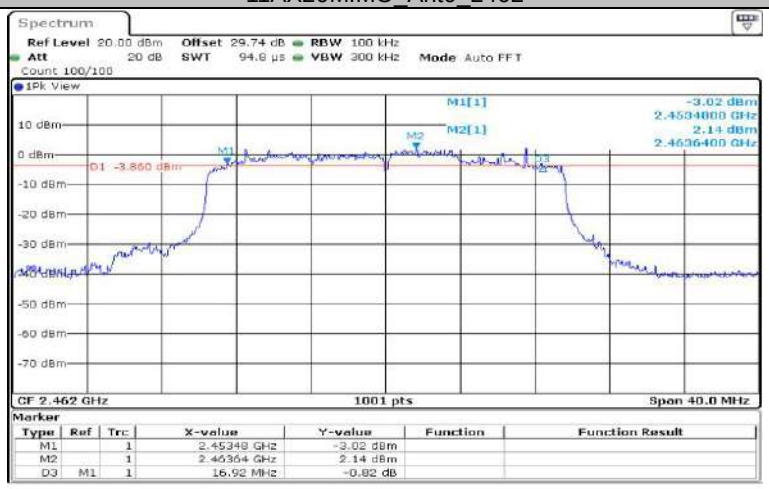


Date: 18.FEB.2023 11:50:57

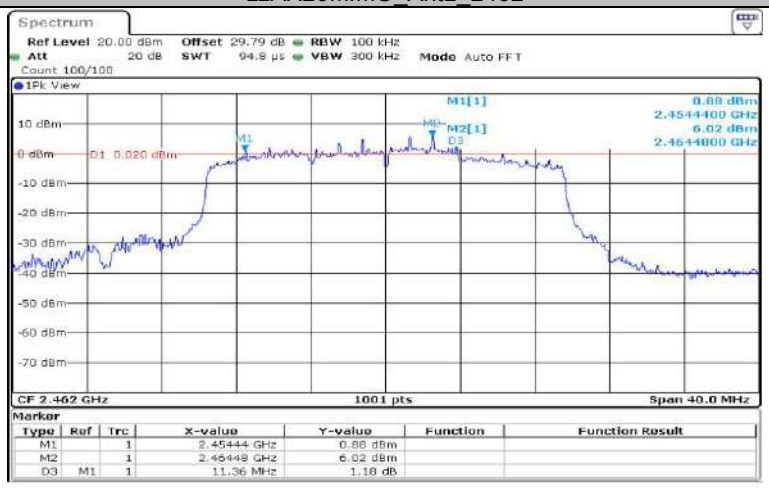
11AX20MIMO_Ant1_2437



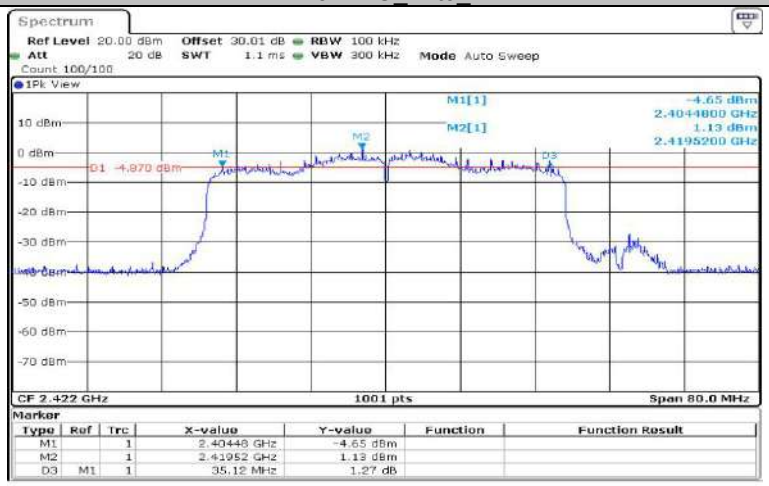
11AX20MIMO_Ant0_2462



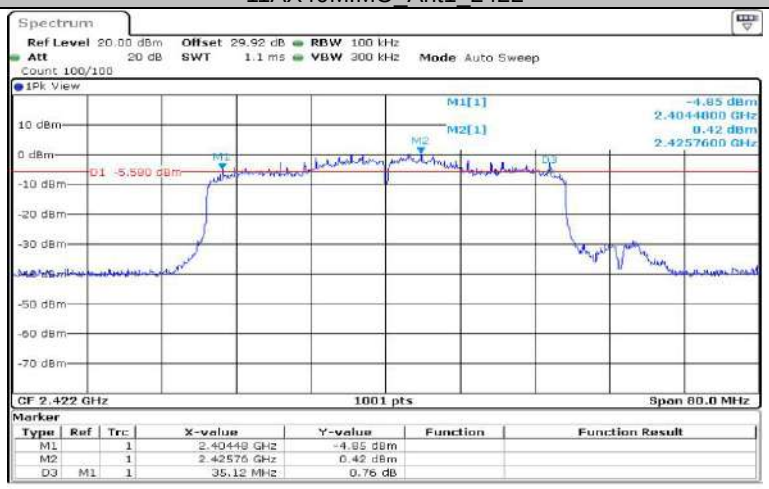
11AX20MIMO_Ant1_2462



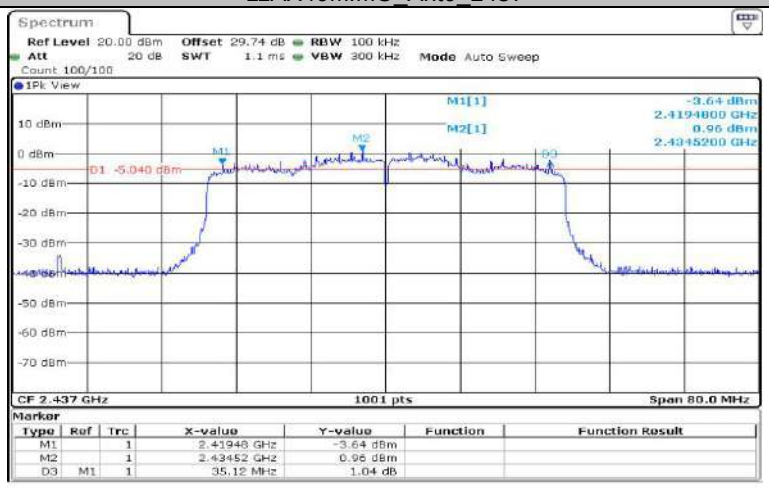
11AX40MIMO_Ant0_2422



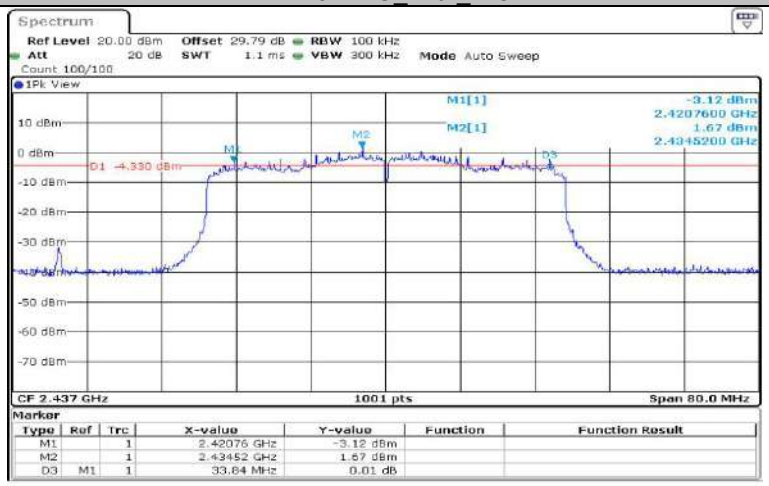
11AX40MIMO_Ant1_2422



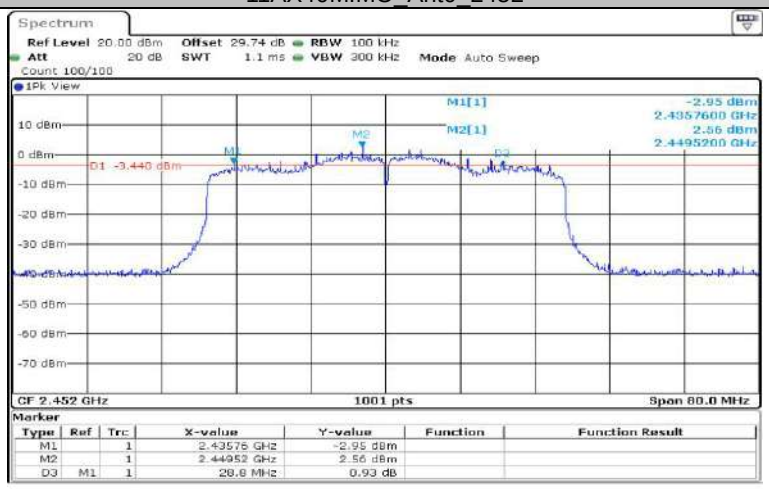
11AX40MIMO_Ant0_2437



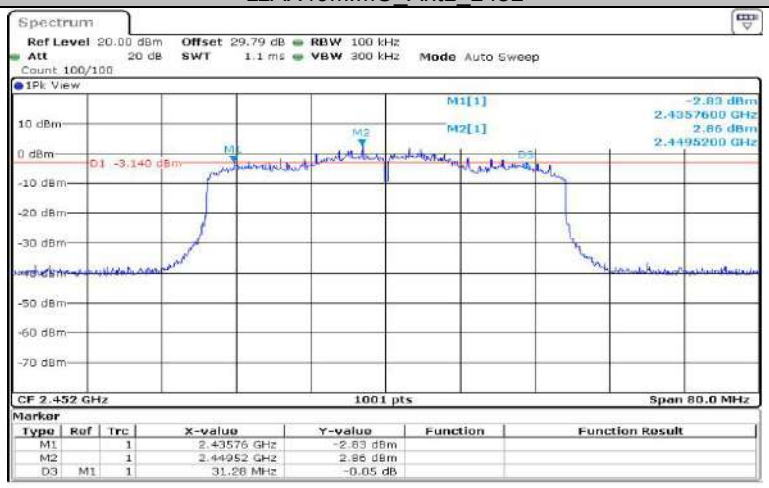
11AX40MIMO_Ant1_2437



11AX40MIMO_Ant0_2452



11AX40MIMO_Ant1_2452

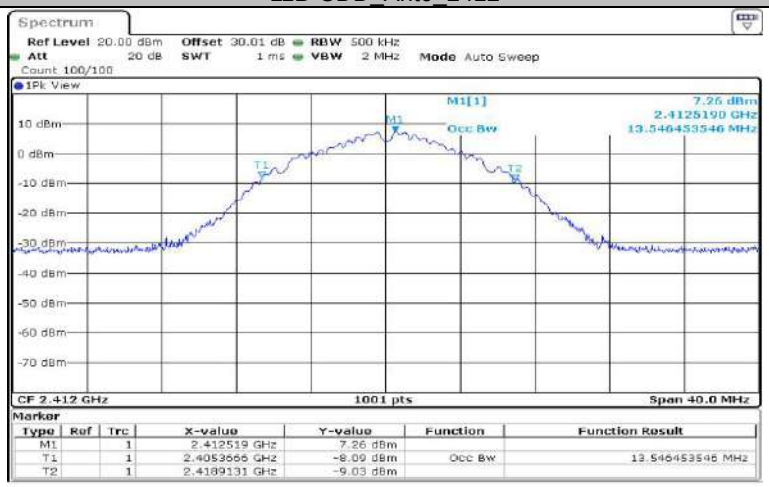


Appendix B: Occupied Channel Bandwidth
Test Result

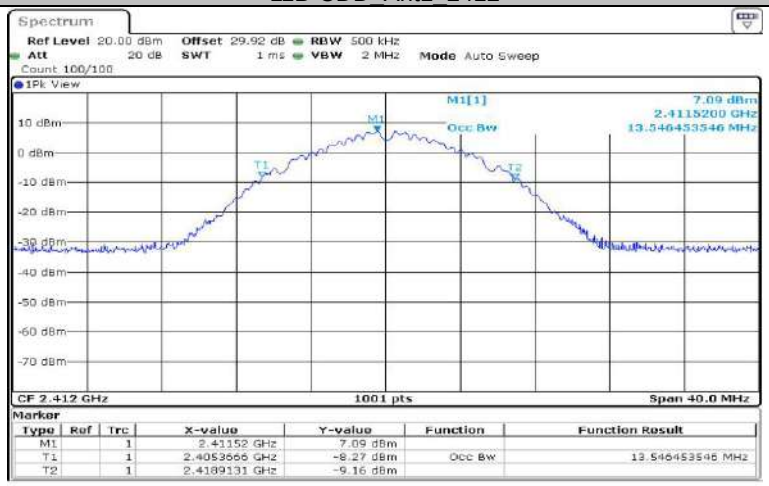
Test Mode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-CDD	Ant0	2412	13.546	2405.367	2418.913	---	---
	Ant1	2412	13.546	2405.367	2418.913	---	---
	Ant0	2437	13.307	2430.407	2443.713	---	---
	Ant1	2437	13.267	2430.447	2443.713	---	---
	Ant0	2462	13.746	2455.087	2468.833	---	---
	Ant1	2462	13.666	2455.127	2468.793	---	---
11G-CDD	Ant0	2412	16.503	2403.808	2420.312	---	---
	Ant1	2412	16.464	2403.848	2420.312	---	---
	Ant0	2437	16.543	2428.768	2445.312	---	---
	Ant1	2437	16.464	2428.808	2445.272	---	---
	Ant0	2462	16.583	2453.728	2470.312	---	---
	Ant1	2462	16.464	2453.768	2470.232	---	---
11N20MIMO	Ant0	2412	17.542	2403.289	2420.831	---	---
	Ant1	2412	17.502	2403.329	2420.831	---	---
	Ant0	2437	17.702	2428.209	2445.911	---	---
	Ant1	2437	17.702	2428.169	2445.871	---	---
	Ant0	2462	17.742	2453.129	2470.871	---	---
	Ant1	2462	17.662	2453.169	2470.831	---	---
11N40MIMO	Ant0	2422	35.884	2404.178	2440.062	---	---
	Ant1	2422	35.804	2404.258	2440.062	---	---
	Ant0	2437	35.964	2419.178	2455.142	---	---
	Ant1	2437	36.044	2419.098	2455.142	---	---
	Ant0	2452	35.884	2434.098	2469.982	---	---
	Ant1	2452	35.804	2434.098	2469.902	---	---
11AX20MIMO	Ant0	2412	18.861	2402.649	2421.510	---	---
	Ant1	2412	18.901	2402.609	2421.510	---	---
	Ant0	2437	18.741	2427.649	2446.391	---	---
	Ant1	2437	18.781	2427.649	2446.431	---	---
	Ant0	2462	18.701	2452.649	2471.351	---	---
	Ant1	2462	18.741	2452.609	2471.351	---	---
11AX40MIMO	Ant0	2422	37.403	2403.379	2440.781	---	---
	Ant1	2422	37.403	2403.538	2440.941	---	---
	Ant0	2437	37.483	2418.299	2455.781	---	---
	Ant1	2437	37.562	2418.299	2455.861	---	---
	Ant0	2452	37.403	2433.299	2470.701	---	---
	Ant1	2452	37.323	2433.379	2470.701	---	---

Test Graphs

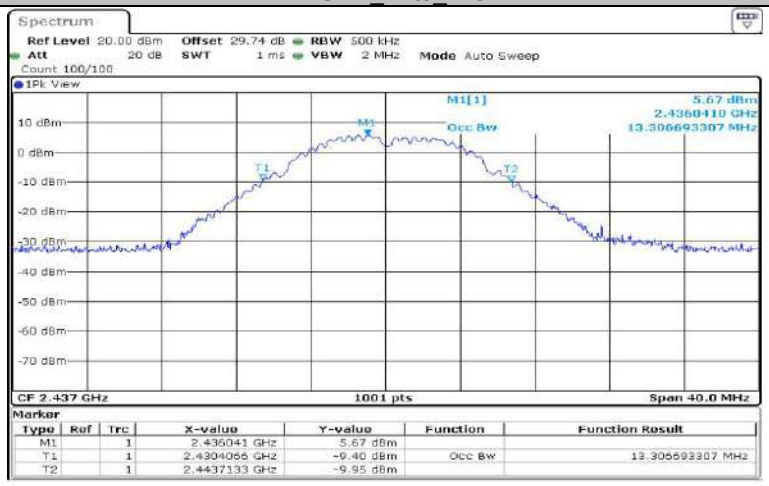
11B-CDD_Ant0_2412



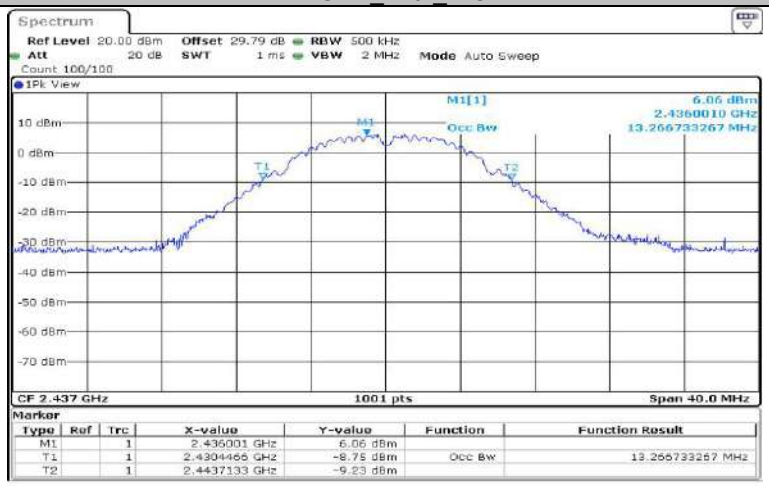
11B-CDD_Ant1_2412



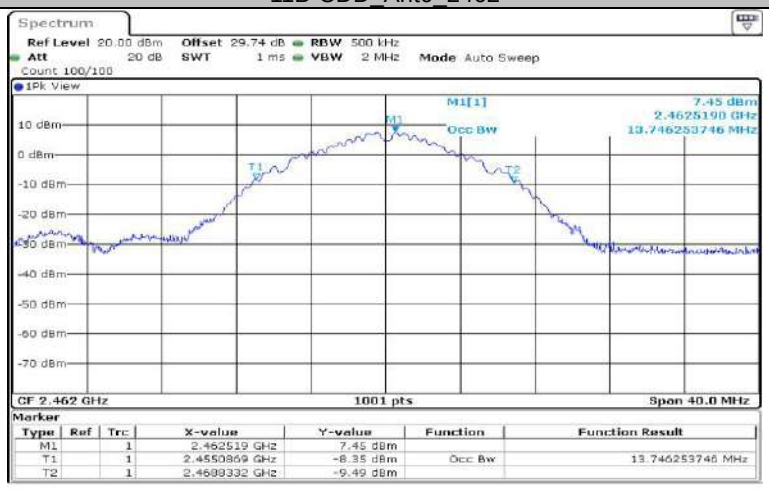
11B-CDD_Ant0_2437



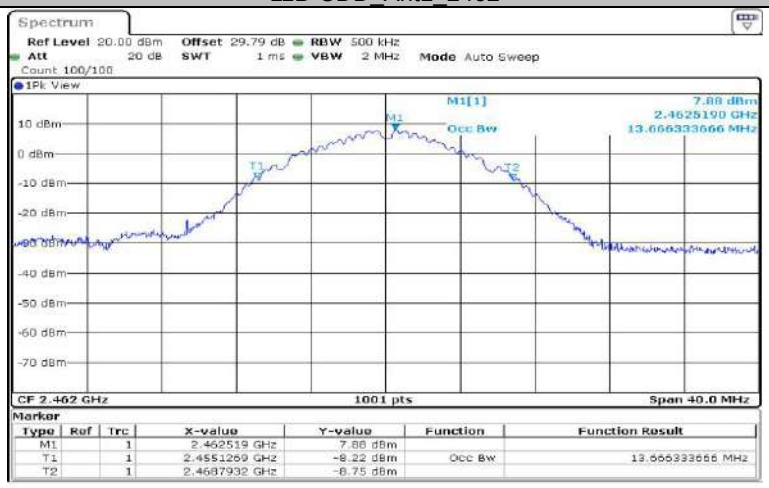
11B-CDD_Ant1_2437



11B-CDD_Ant0_2462



11B-CDD_Ant1_2462



11G-CDD_Ant0_2412

11G-CDD_Ant1_2412

11G-CDD_Ant0_2437

11G-CDD_Ant1_2437

11G-CDD_Ant0_2462

11G-CDD_Ant1_2462

11N20MIMO_Ant0_2412

11N20MIMO_Ant1_2412

11N20MIMO_Ant0_2437

11N20MIMO_Ant1_2437

11N20MIMO_Ant0_2462

11N20MIMO_Ant1_2462

11N40MIMO_Ant0_2422

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11N40MIMO_Ant1_2422

Date: 10.FEB.2023 11:32:25

11N40MIMO_Ant0_2437

Date: 10.FEB.2023 11:34:56

11N40MIMO_Ant1_2437

11N40MIMO_Ant0_2452

11N40MIMO_Ant1_2452

11AX20MIMO_Ant0_2412

11AX20MIMO_Ant1_2412

11AX20MIMO_Ant0_2437

11AX20MIMO_Ant1_2437

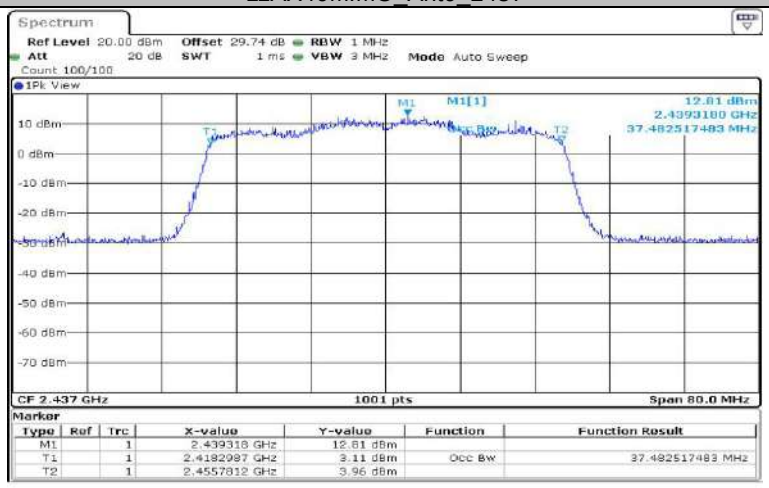
11AX20MIMO_Ant0_2462

11AX20MIMO_Ant1_2462

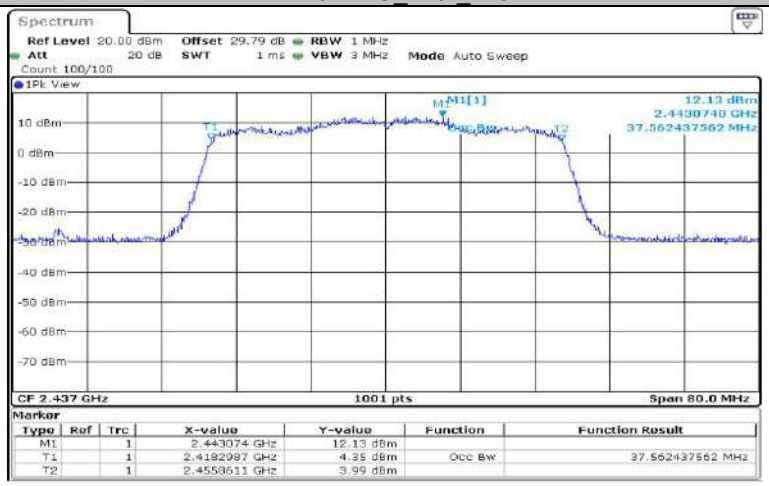
11AX40MIMO_Ant0_2422

11AX40MIMO_Ant1_2422

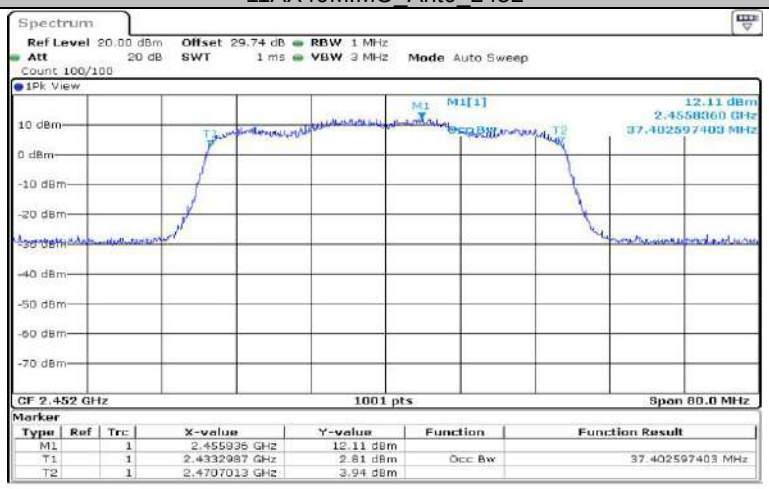
11AX40MIMO_Ant0_2437



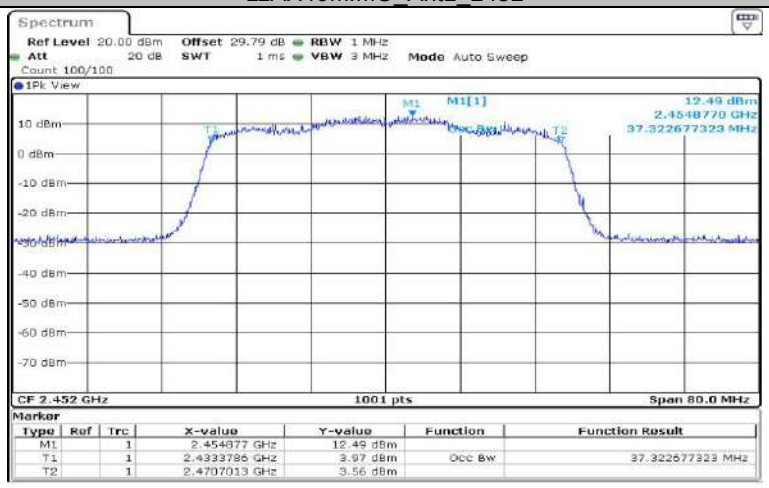
11AX40MIMO_Ant1_2437



11AX40MIMO_Ant0_2452



11AX40MIMO_Ant1_2452



Appendix C: Maximum conducted output power
Test Result

Test Mode	Antenna	Frequency[MHz]	Average Power[dBm]	Conducted Limit[dBm]	Verdict
11B-CDD	Ant0	2412	14.33	≤30.00	PASS
	Ant1	2412	14.34	≤30.00	PASS
	total	2412	17.35	≤30.00	PASS
	Ant0	2437	14.04	≤30.00	PASS
	Ant1	2437	13.54	≤30.00	PASS
	total	2437	16.81	≤30.00	PASS
	Ant0	2462	14.60	≤30.00	PASS
	Ant1	2462	15.12	≤30.00	PASS
	total	2462	17.88	≤30.00	PASS
11G-CDD	Ant0	2412	14.50	≤30.00	PASS
	Ant1	2412	14.30	≤30.00	PASS
	total	2412	17.41	≤30.00	PASS
	Ant0	2437	13.93	≤30.00	PASS
	Ant1	2437	14.22	≤30.00	PASS
	total	2437	17.09	≤30.00	PASS
	Ant0	2462	14.41	≤30.00	PASS
	Ant1	2462	14.80	≤30.00	PASS
	total	2462	17.62	≤30.00	PASS
11N20MIMO	Ant0	2412	13.91	≤30.00	PASS
	Ant1	2412	13.84	≤30.00	PASS
	total	2412	16.89	≤30.00	PASS
	Ant0	2437	13.83	≤30.00	PASS
	Ant1	2437	13.96	≤30.00	PASS
	total	2437	16.91	≤30.00	PASS
	Ant0	2462	14.29	≤30.00	PASS
	Ant1	2462	14.70	≤30.00	PASS
	total	2462	17.51	≤30.00	PASS
11N40MIMO	Ant0	2422	13.93	≤30.00	PASS
	Ant1	2422	13.91	≤30.00	PASS
	total	2422	16.93	≤30.00	PASS
	Ant0	2437	14.27	≤30.00	PASS
	Ant1	2437	14.41	≤30.00	PASS
	total	2437	17.35	≤30.00	PASS
	Ant0	2452	14.70	≤30.00	PASS
	Ant1	2452	14.96	≤30.00	PASS
	total	2452	17.84	≤30.00	PASS
11AX20MIMO_242Tone_RU61	Ant0	2412	14.46	≤30.00	PASS
	Ant1	2412	14.47	≤30.00	PASS
	total	2412	17.48	≤30.00	PASS
	Ant0	2437	13.73	≤30.00	PASS
	Ant1	2437	13.84	≤30.00	PASS
	total	2437	16.80	≤30.00	PASS
	Ant0	2462	13.99	≤30.00	PASS
	Ant1	2462	14.52	≤30.00	PASS
	total	2462	17.27	≤30.00	PASS
11AX40MIMO_484Tone_RU65	Ant0	2422	13.64	≤30.00	PASS
	Ant1	2422	13.52	≤30.00	PASS
	total	2422	16.59	≤30.00	PASS
	Ant0	2437	13.94	≤30.00	PASS
	Ant1	2437	14.13	≤30.00	PASS
	total	2437	17.05	≤30.00	PASS
	Ant0	2452	14.30	≤30.00	PASS
	Ant1	2452	14.59	≤30.00	PASS
	total	2452	17.46	≤30.00	PASS

802.11AX Partial RU:

Test Mode	Antenna	Frequency[MHz]	Ru Size	Ru Index	Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
11AX20MIMO	Ant0	2412	26Tone	RU0	4.72	≤30.00	PASS
			52Tone	RU37	7.83	≤30.00	PASS
			106Tone	RU53	11.28	≤30.00	PASS
	Ant1	2412	26Tone	RU0	4.52	≤30.00	PASS
			52Tone	RU37	7.55	≤30.00	PASS
			106Tone	RU53	10.73	≤30.00	PASS
	total	2412	26Tone	RU0	7.63	≤30.00	PASS
			52Tone	RU37	10.70	≤30.00	PASS
			106Tone	RU53	14.02	≤30.00	PASS
	Ant0	2437	26Tone	RU0	4.4	≤30.00	PASS
			52Tone	RU37	7.36	≤30.00	PASS
			106Tone	RU53	10.79	≤30.00	PASS
	Ant1	2437	26Tone	RU0	4.45	≤30.00	PASS
			52Tone	RU37	7.53	≤30.00	PASS
			106Tone	RU53	10.75	≤30.00	PASS
	total	2437	26Tone	RU0	7.44	≤30.00	PASS
			52Tone	RU37	10.46	≤30.00	PASS
			106Tone	RU53	13.78	≤30.00	PASS
	Ant0	2462	26Tone	RU0	4.21	≤30.00	PASS
			52Tone	RU37	7.07	≤30.00	PASS
			106Tone	RU53	11.19	≤30.00	PASS
	Ant1	2462	26Tone	RU0	4.1	≤30.00	PASS
			52Tone	RU37	7.31	≤30.00	PASS
			106Tone	RU53	11.18	≤30.00	PASS
	total	2462	26Tone	RU0	7.17	≤30.00	PASS
			52Tone	RU37	10.20	≤30.00	PASS
			106Tone	RU53	14.20	≤30.00	PASS
11AX40MIMO	Ant0	2422	26Tone	RU0	1.43	≤30.00	PASS
			52Tone	RU37	4.48	≤30.00	PASS
			106Tone	RU53	7.54	≤30.00	PASS
			242Tone	RU61	10.71	≤30.00	PASS
	Ant1	2422	26Tone	RU0	1.29	≤30.00	PASS
			52Tone	RU37	4.23	≤30.00	PASS
			106Tone	RU53	7.53	≤30.00	PASS
			242Tone	RU61	10.36	≤30.00	PASS
	total	2422	26Tone	RU0	4.37	≤30.00	PASS
			52Tone	RU37	7.37	≤30.00	PASS
			106Tone	RU53	10.55	≤30.00	PASS
			242Tone	RU61	13.55	≤30.00	PASS
	Ant0	2437	26Tone	RU0	1.33	≤30.00	PASS
			52Tone	RU37	4.49	≤30.00	PASS
			106Tone	RU53	7.55	≤30.00	PASS
			242Tone	RU61	10.56	≤30.00	PASS
	Ant1	2437	26Tone	RU0	1.33	≤30.00	PASS
			52Tone	RU37	4.45	≤30.00	PASS
			106Tone	RU53	7.55	≤30.00	PASS
			242Tone	RU61	10.45	≤30.00	PASS
	total	2437	26Tone	RU0	4.34	≤30.00	PASS
			52Tone	RU37	7.48	≤30.00	PASS
			106Tone	RU53	10.56	≤30.00	PASS
			242Tone	RU61	13.52	≤30.00	PASS
	Ant0	2452	26Tone	RU0	1.63	≤30.00	PASS
			52Tone	RU37	4.66	≤30.00	PASS
			106Tone	RU53	7.67	≤30.00	PASS
			242Tone	RU61	10.56	≤30.00	PASS

	Ant1	2452	26Tone	RU0	1.39	≤30.00	PASS
			52Tone	RU37	4.43	≤30.00	PASS
			106Tone	RU53	7.76	≤30.00	PASS
			242Tone	RU61	10.50	≤30.00	PASS
	total	2452	26Tone	RU0	4.52	≤30.00	PASS
			52Tone	RU37	7.56	≤30.00	PASS
			106Tone	RU53	10.73	≤30.00	PASS
			242Tone	RU61	13.54	≤30.00	PASS

Note:
The device employs CDD for MIMO

Directional Gain=G_{ANT} + *Array Gain*

For Output Power measurement on 802.11 devices,
Array Gain=0dB for $N_{ANT} \leq 4$

G_{ANT}=5dBi, N_{ANT}=2

Directional Gain=5dBi<6dBi

Appendix D: Maximum power spectral density

Test Result

Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B-CDD	Ant0	2412	-12.22	≤6.00	PASS
	Ant1	2412	-11.92	≤6.00	PASS
	total	2412	-9.06	≤6.00	PASS
	Ant0	2437	-14.55	≤6.00	PASS
	Ant1	2437	-14.96	≤6.00	PASS
	total	2437	-11.74	≤6.00	PASS
	Ant0	2462	-12.56	≤6.00	PASS
	Ant1	2462	-11.89	≤6.00	PASS
	total	2462	-9.20	≤6.00	PASS
11G-CDD	Ant0	2412	-16.49	≤6.00	PASS
	Ant1	2412	-16.62	≤6.00	PASS
	total	2412	-13.54	≤6.00	PASS
	Ant0	2437	-17.18	≤6.00	PASS
	Ant1	2437	-16.49	≤6.00	PASS
	total	2437	-13.81	≤6.00	PASS
	Ant0	2462	-16.67	≤6.00	PASS
	Ant1	2462	-16.32	≤6.00	PASS
	total	2462	-13.48	≤6.00	PASS
11N20MIMO	Ant0	2412	-19.33	≤6.00	PASS
	Ant1	2412	-19.36	≤6.00	PASS
	total	2412	-16.33	≤6.00	PASS
	Ant0	2437	-18.22	≤6.00	PASS
	Ant1	2437	-17.67	≤6.00	PASS
	total	2437	-14.93	≤6.00	PASS
	Ant0	2462	-17.52	≤6.00	PASS
	Ant1	2462	-17.23	≤6.00	PASS
	total	2462	-14.36	≤6.00	PASS
11N40MIMO	Ant0	2422	-21.78	≤6.00	PASS
	Ant1	2422	-21.53	≤6.00	PASS
	total	2422	-18.64	≤6.00	PASS
	Ant0	2437	-20.19	≤6.00	PASS
	Ant1	2437	-20.57	≤6.00	PASS
	total	2437	-17.37	≤6.00	PASS
	Ant0	2452	-20.56	≤6.00	PASS
	Ant1	2452	-20.5	≤6.00	PASS
	total	2452	-17.52	≤6.00	PASS
11AX20MIMO	Ant0	2412	-18.11	≤6.00	PASS
	Ant1	2412	-18.25	≤6.00	PASS
	total	2412	-15.17	≤6.00	PASS
	Ant0	2437	-20.65	≤6.00	PASS
	Ant1	2437	-20.39	≤6.00	PASS
	total	2437	-17.51	≤6.00	PASS
	Ant0	2462	-20.63	≤6.00	PASS
	Ant1	2462	-19.85	≤6.00	PASS
	total	2462	-17.21	≤6.00	PASS
11AX40MIMO	Ant0	2422	-22.94	≤6.00	PASS
	Ant1	2422	-23.23	≤6.00	PASS
	total	2422	-20.07	≤6.00	PASS
	Ant0	2437	-22.36	≤6.00	PASS
	Ant1	2437	-22.92	≤6.00	PASS
	total	2437	-19.62	≤6.00	PASS
	Ant0	2452	-22.09	≤6.00	PASS
	Ant1	2452	-21.76	≤6.00	PASS
	total	2452	-18.91	≤6.00	PASS

Note:
The unit of result is dBm/10kHz for 802.11N40/AX40 mode.
The duty cycle factor has added into plots.

The device employs CDD for MIMO

Directional Gain=G_{ANT} + *Array Gain*

For PSD measurement,
*Array Gain=10*log*N_{ANT}

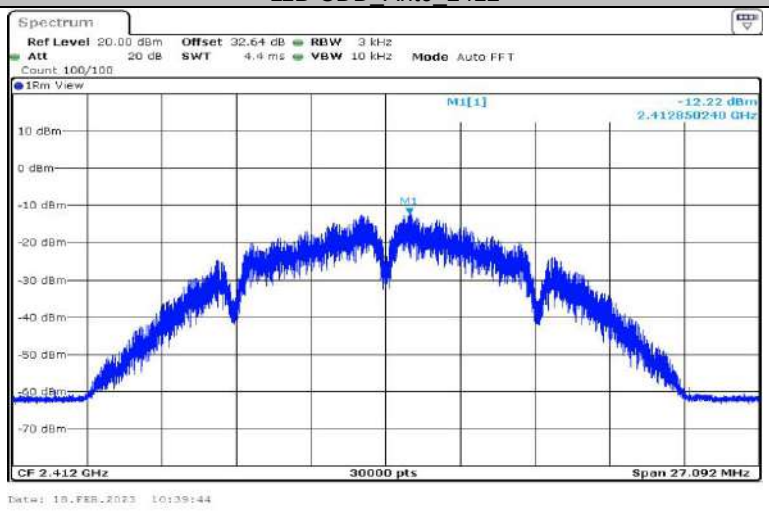
G_{ANT}=5dBi, N_{ANT}=2

Directional Gain=5dBi+10*log2=8>6dBi

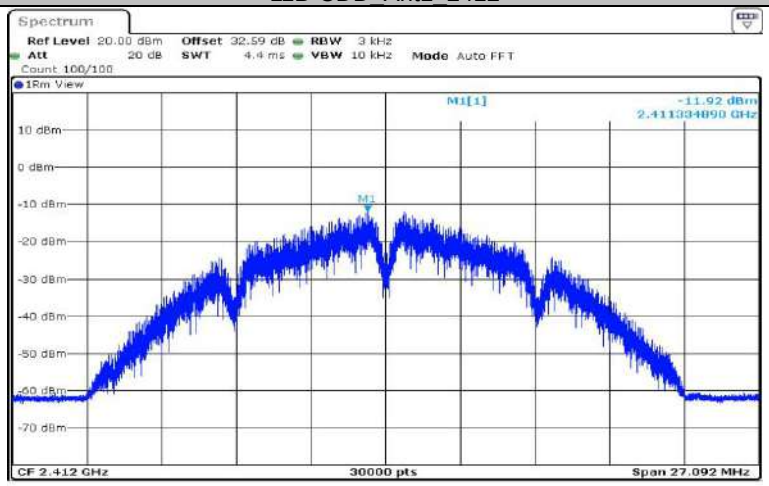
So the limit should reduced 2dB

Test Graphs

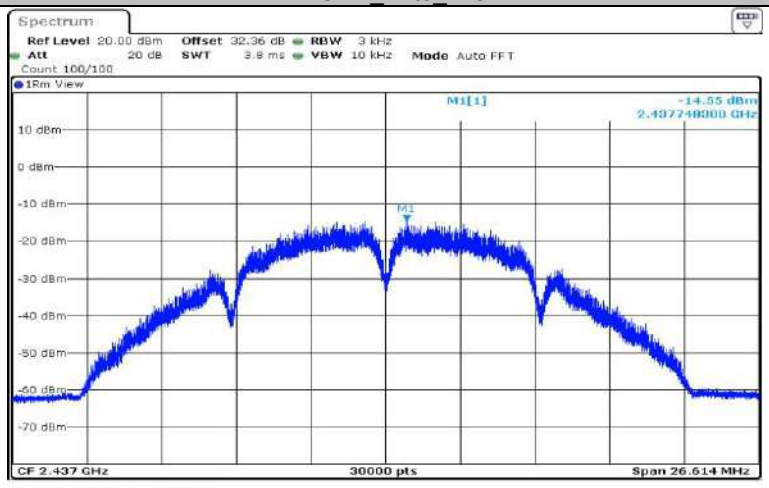
11B-CDD_Ant0_2412



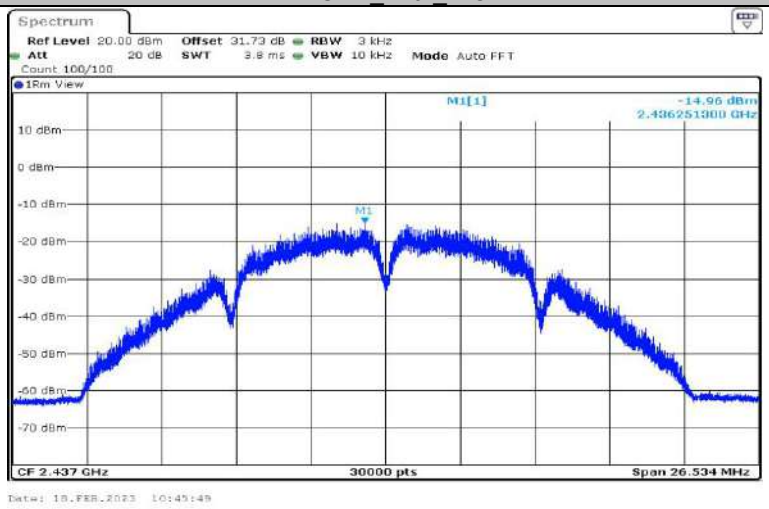
11B-CDD_Ant1_2412



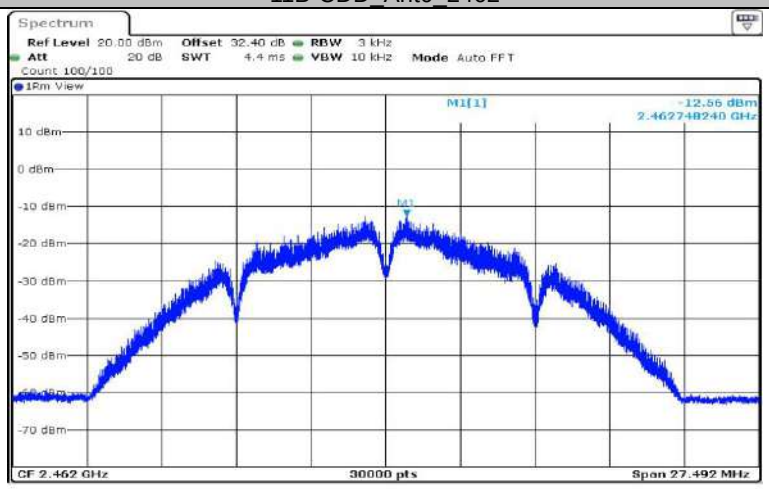
11B-CDD_Ant0_2437



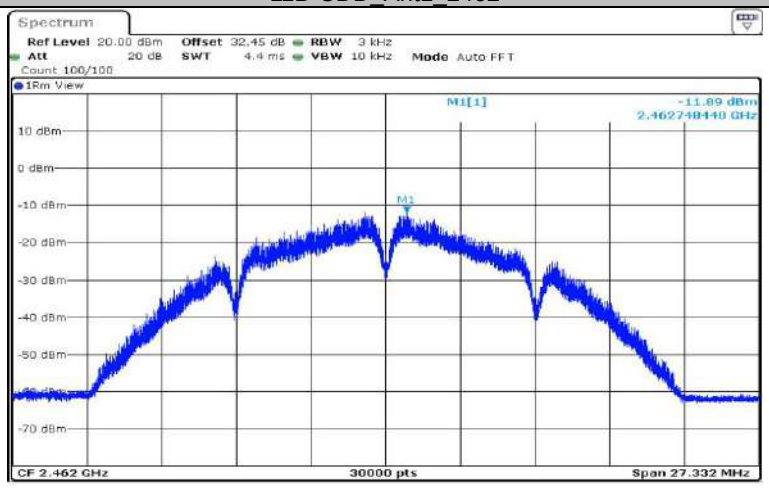
11B-CDD_Ant1_2437



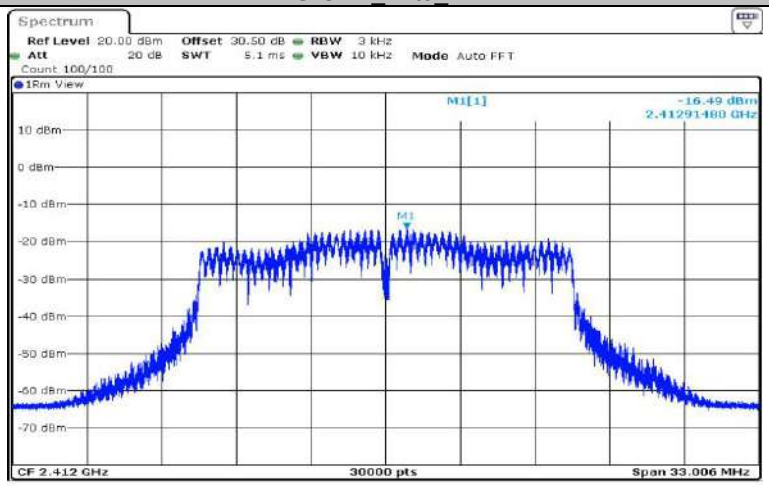
11B-CDD_Ant0_2462



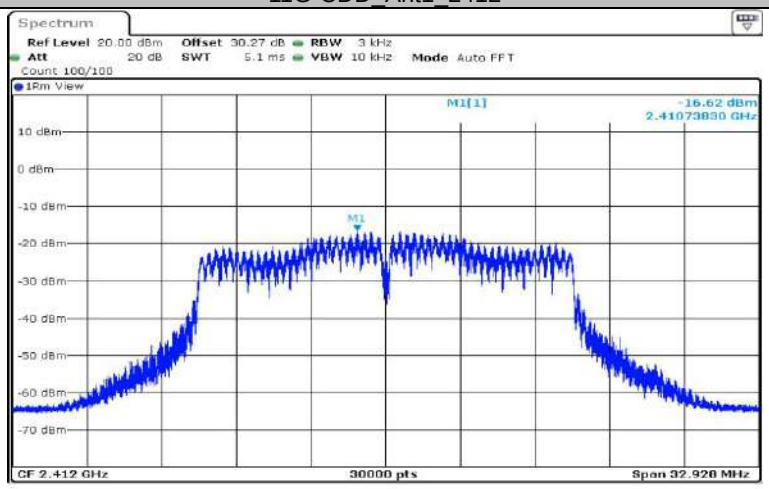
11B-CDD_Ant1_2462



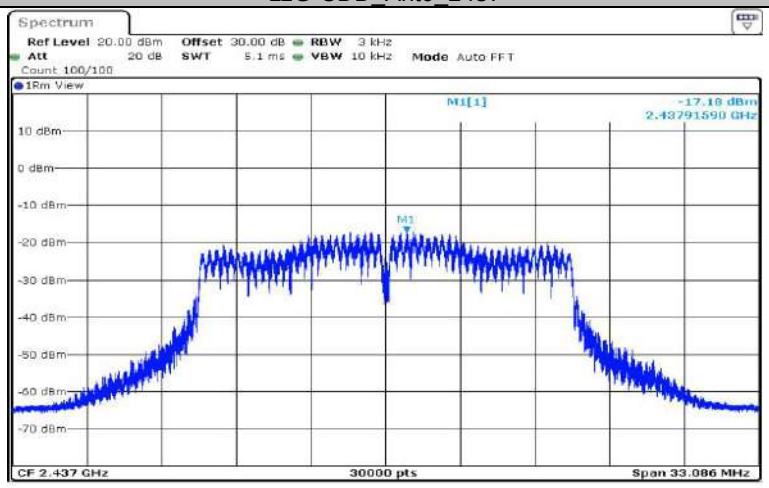
11G-CDD_Ant0_2412



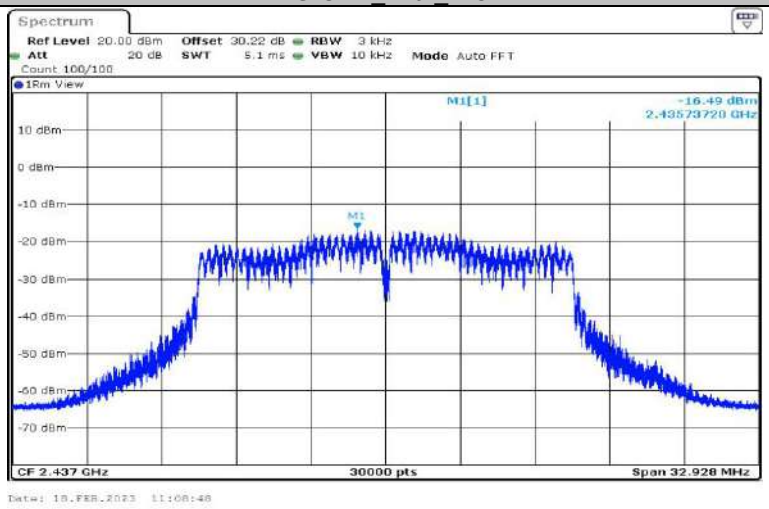
11G-CDD_Ant1_2412



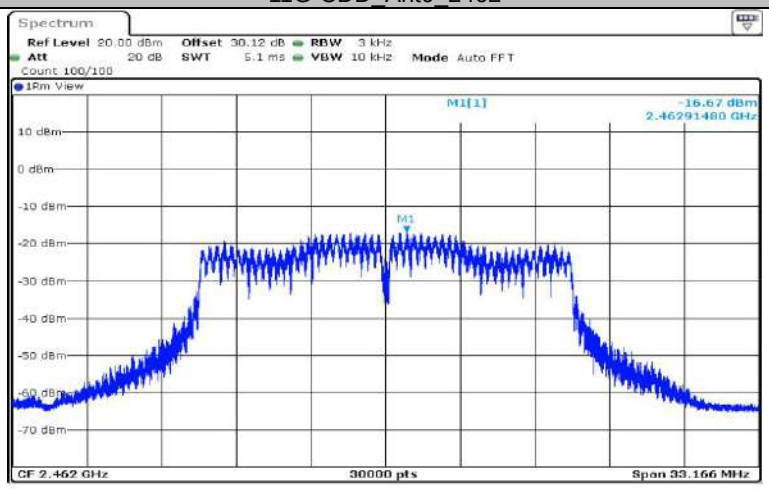
11G-CDD_Ant0_2437



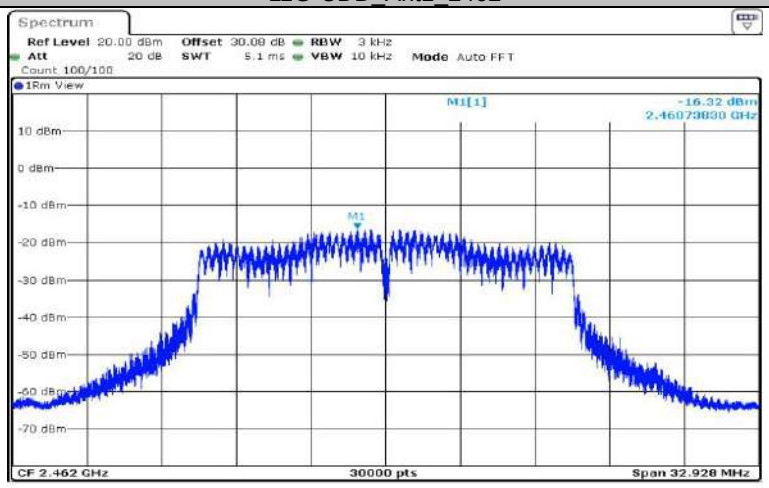
11G-CDD_Ant1_2437



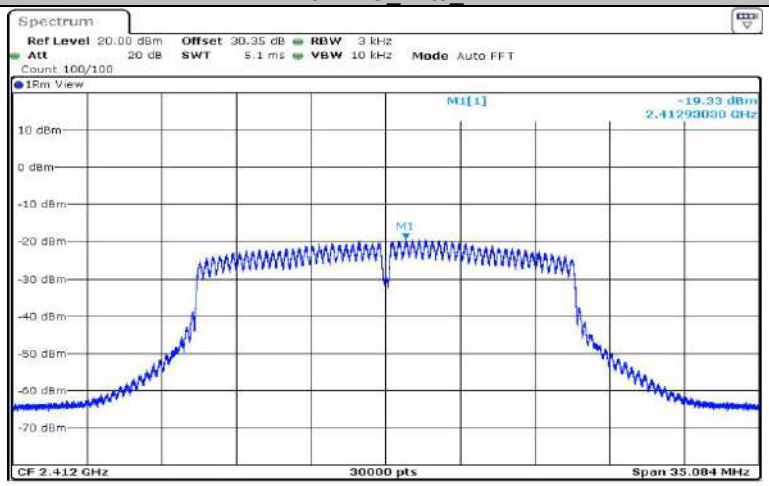
11G-CDD_Ant0_2462



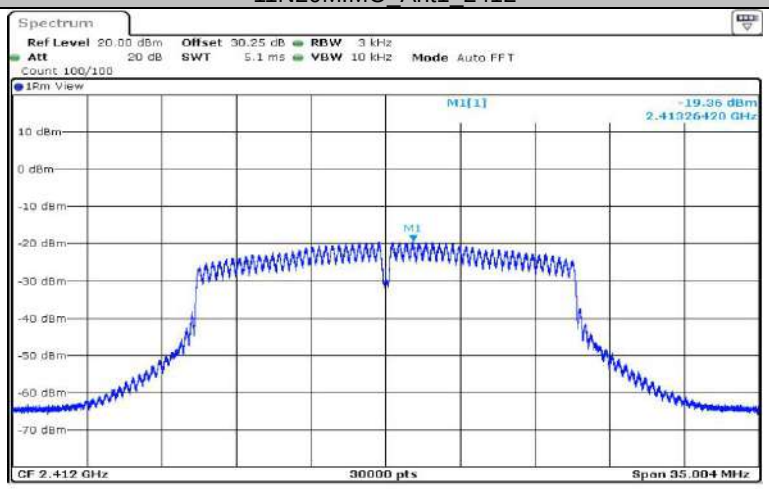
11G-CDD_Ant1_2462



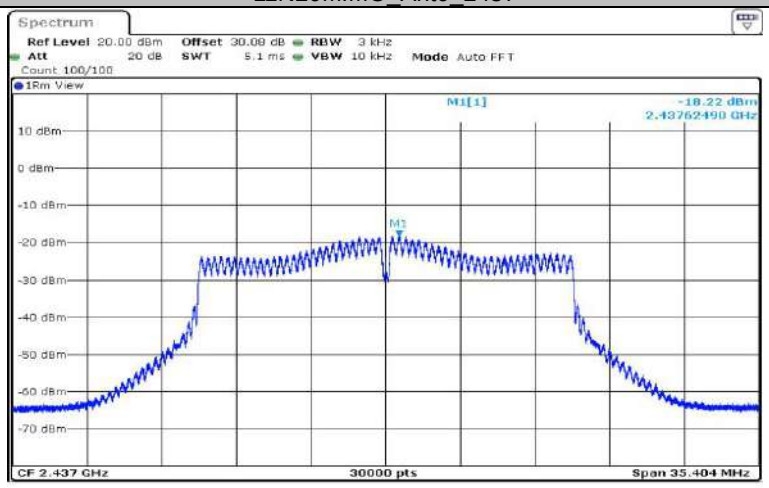
11N20MIMO_Ant0_2412



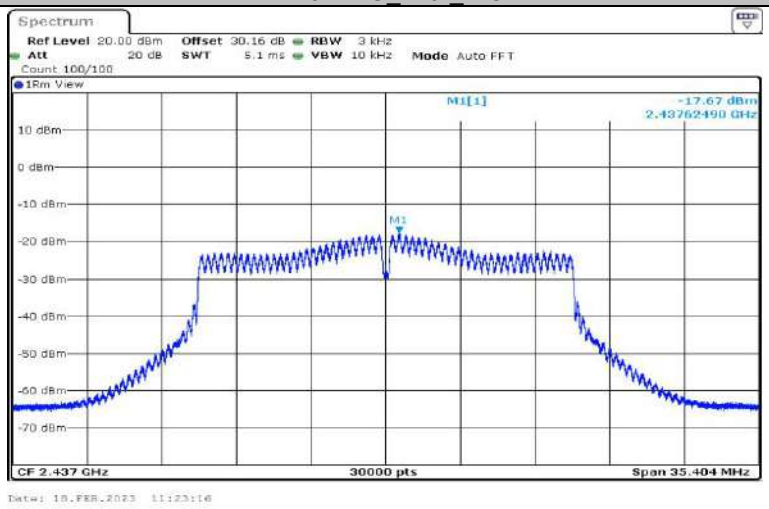
11N20MIMO_Ant1_2412



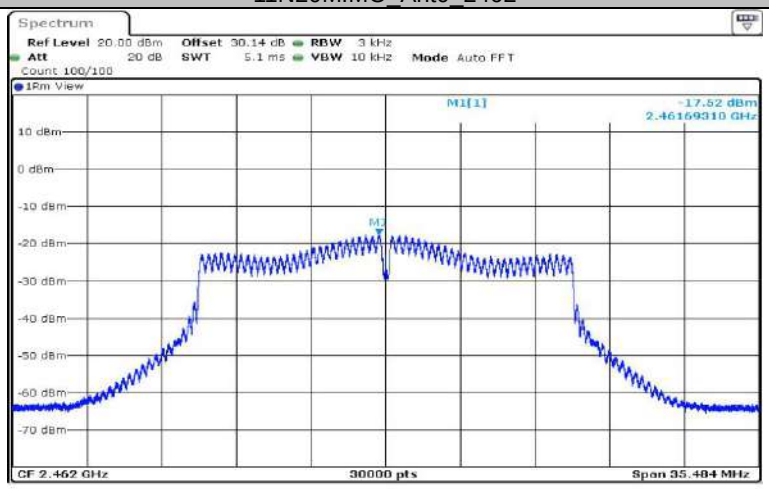
11N20MIMO_Ant0_2437



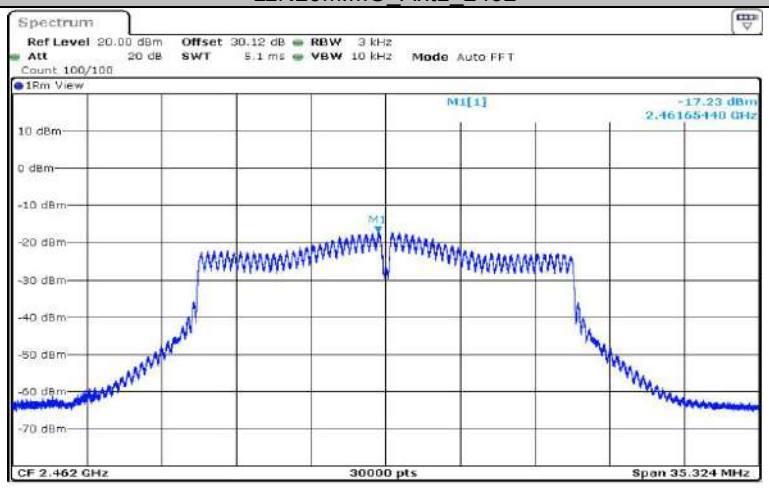
11N20MIMO_Ant1_2437



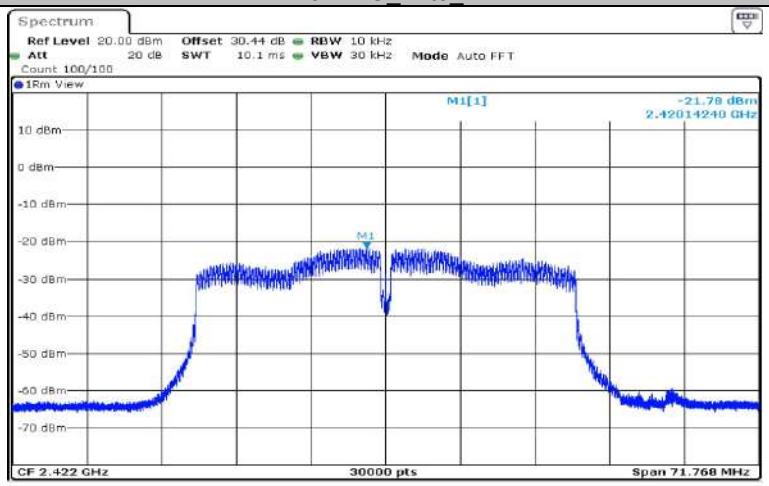
11N20MIMO_Ant0_2462



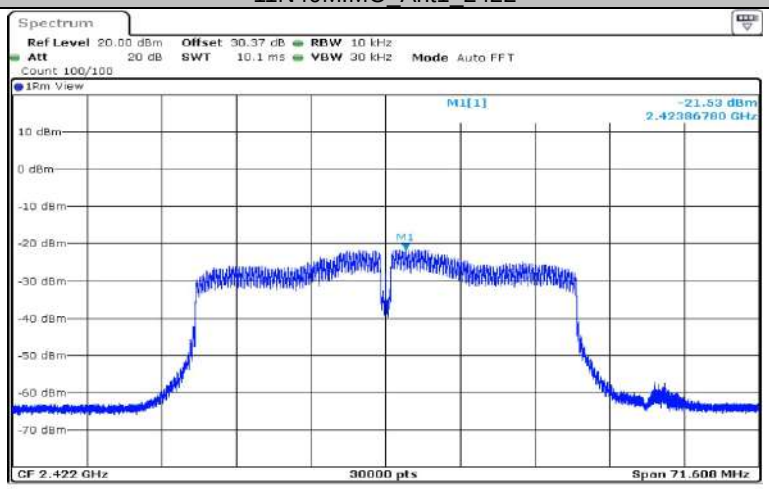
11N20MIMO_Ant1_2462



11N40MIMO_Ant0_2422



11N40MIMO_Ant1_2422



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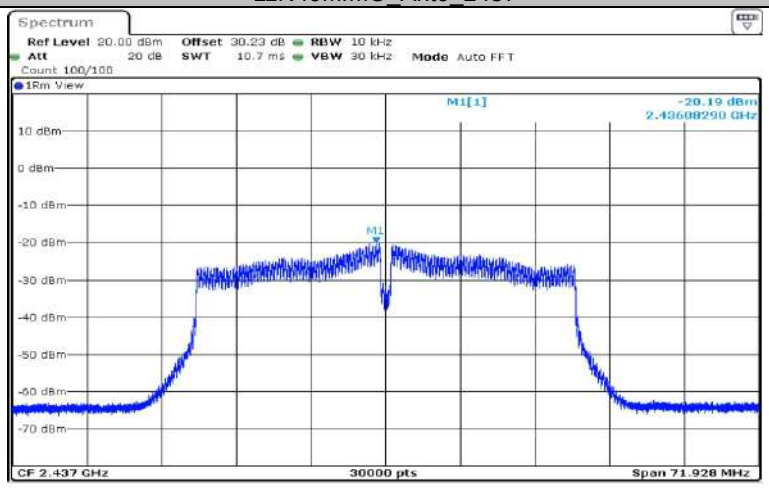
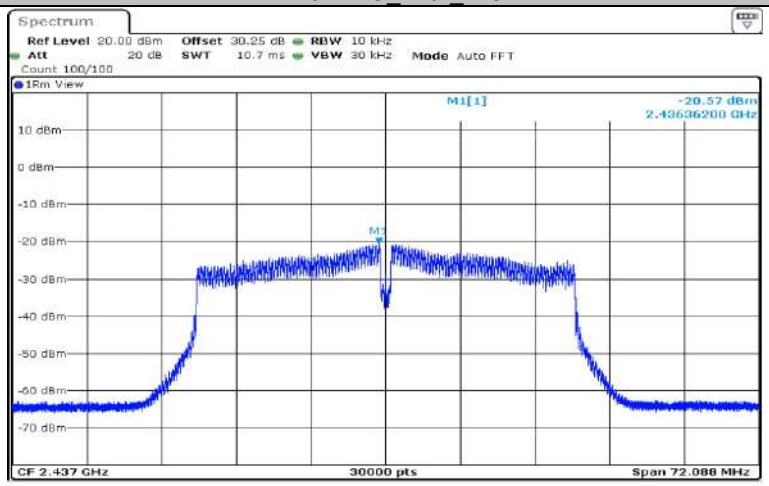
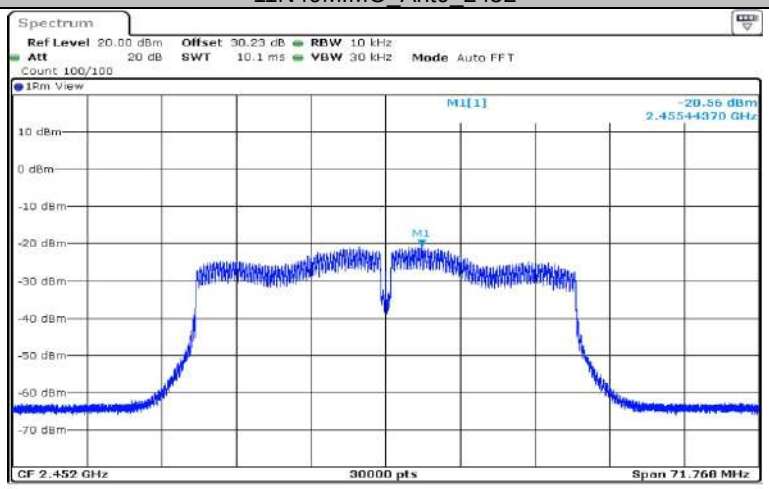


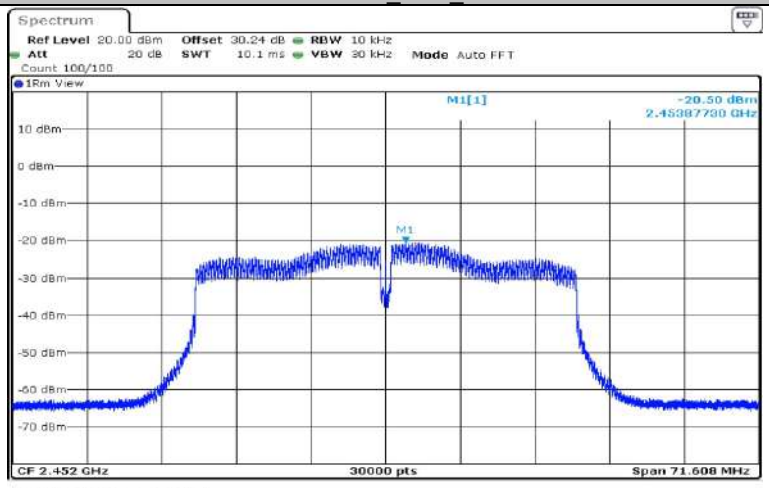
11N40MIMO_Ant1_2437



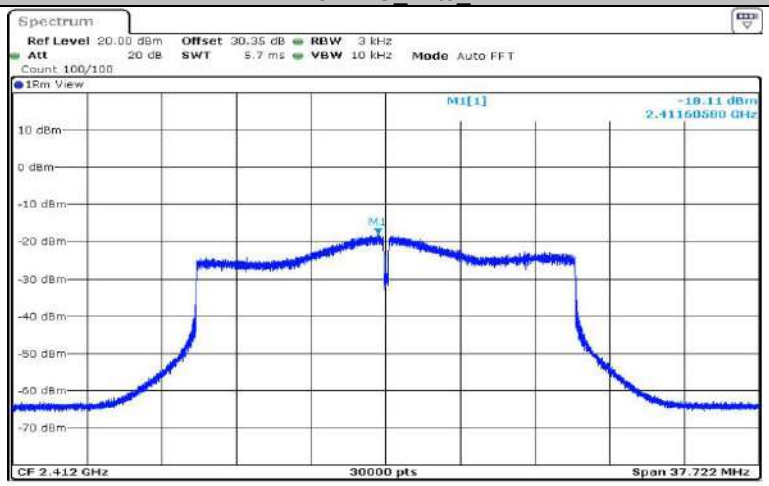
11N40MIMO_Ant0_2452



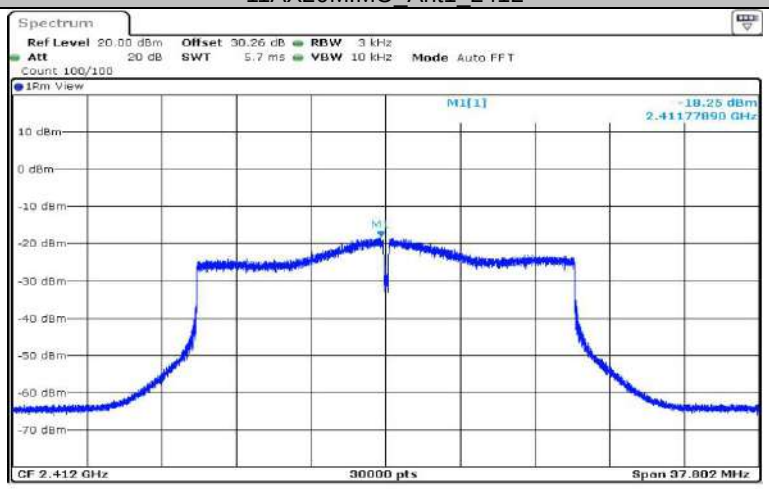
11N40MIMO_Ant1_2452



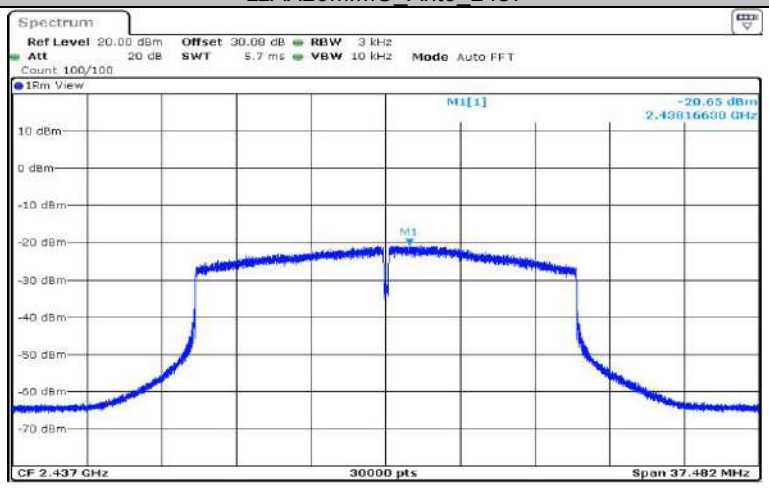
11AX20MIMO_Ant0_2412



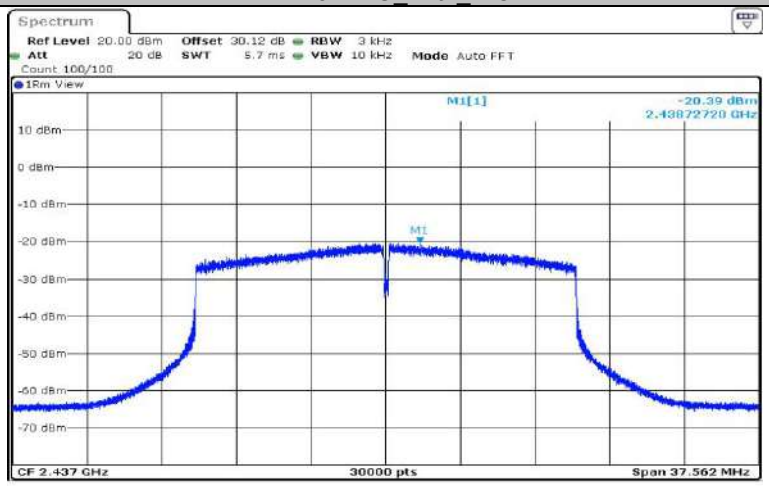
11AX20MIMO_Ant1_2412



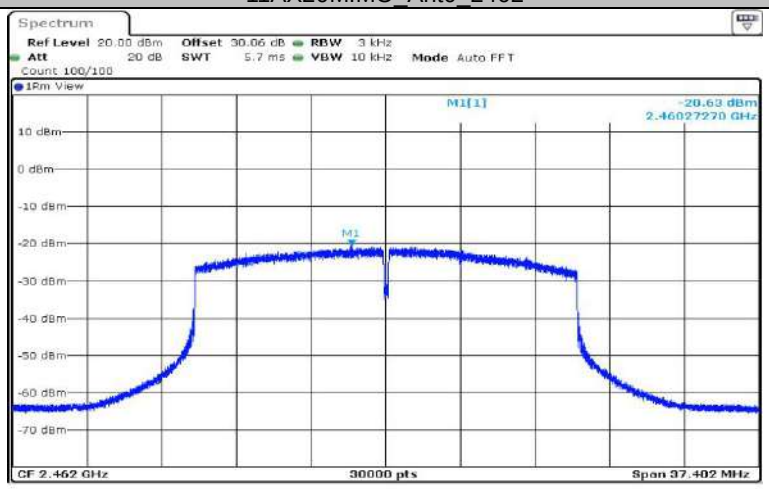
11AX20MIMO_Ant0_2437



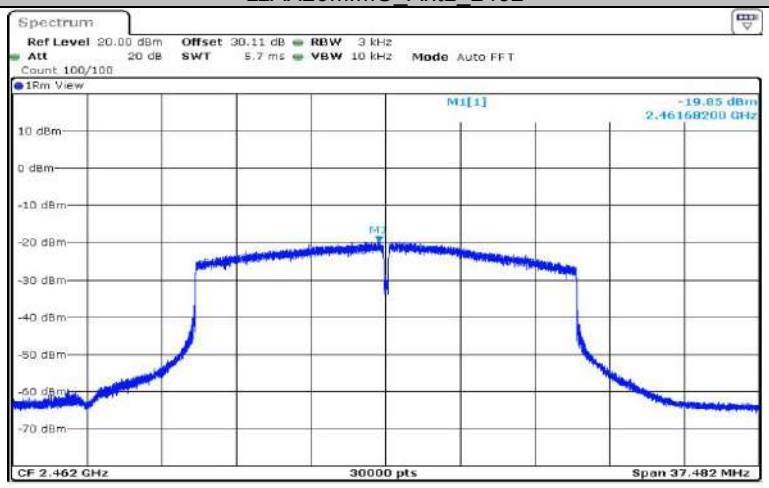
11AX20MIMO_Ant1_2437



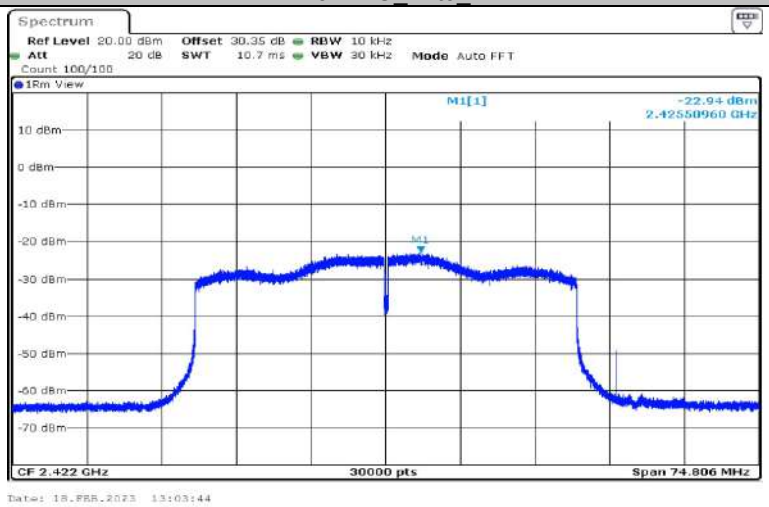
11AX20MIMO_Ant0_2462



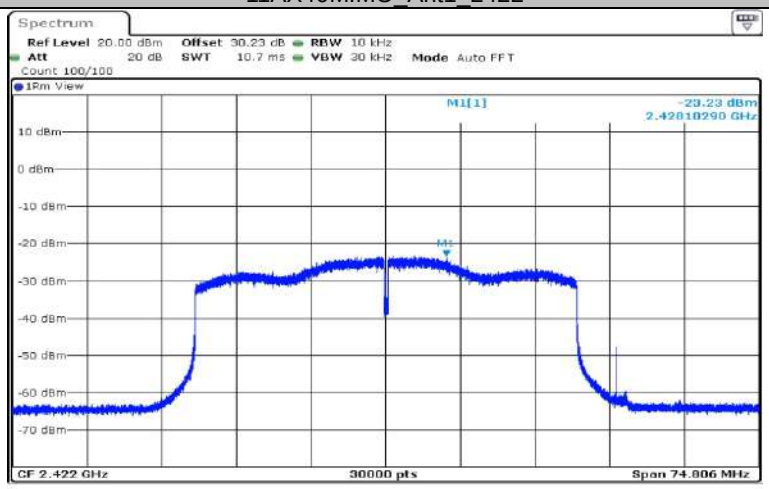
11AX20MIMO_Ant1_2462



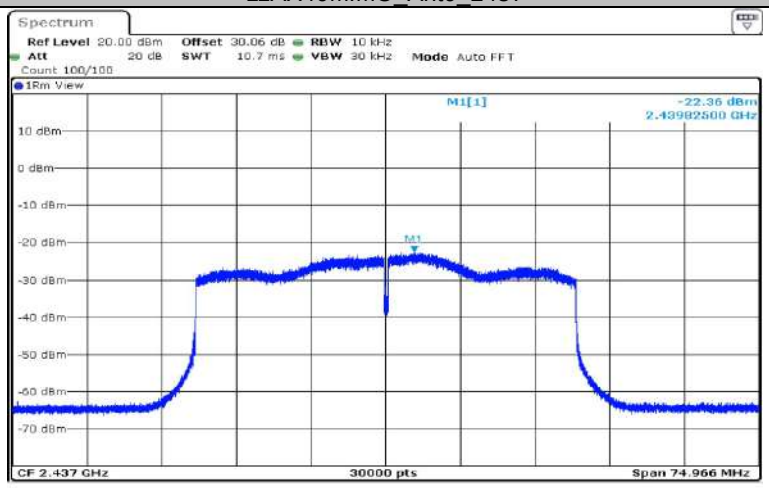
11AX40MIMO_Ant0_2422



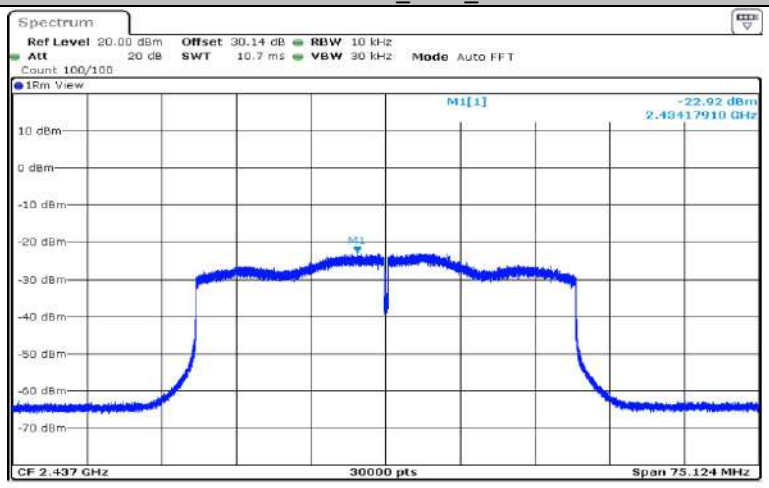
11AX40MIMO_Ant1_2422



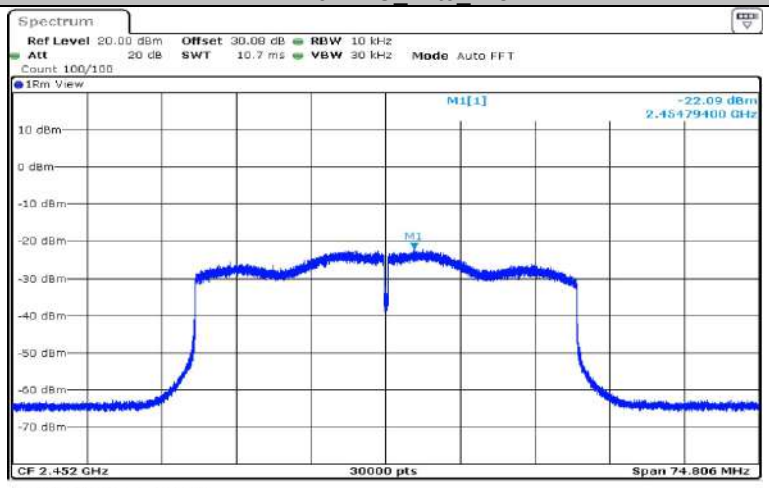
11AX40MIMO_Ant0_2437



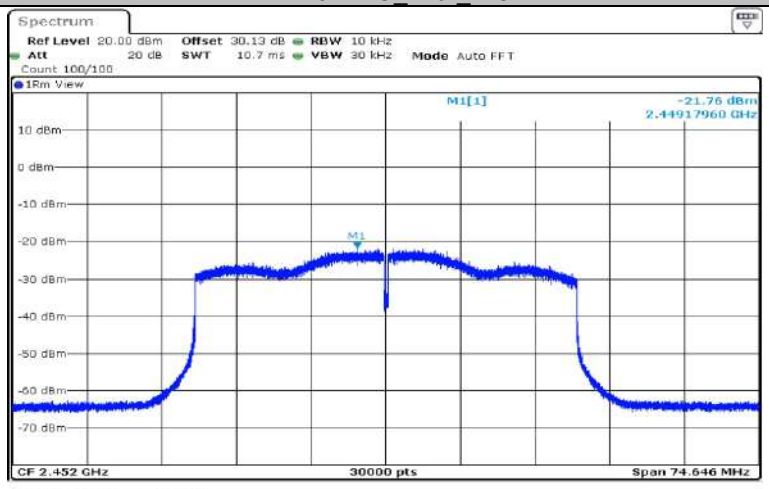
11AX40MIMO_Ant1_2437



11AX40MIMO_Ant0_2452



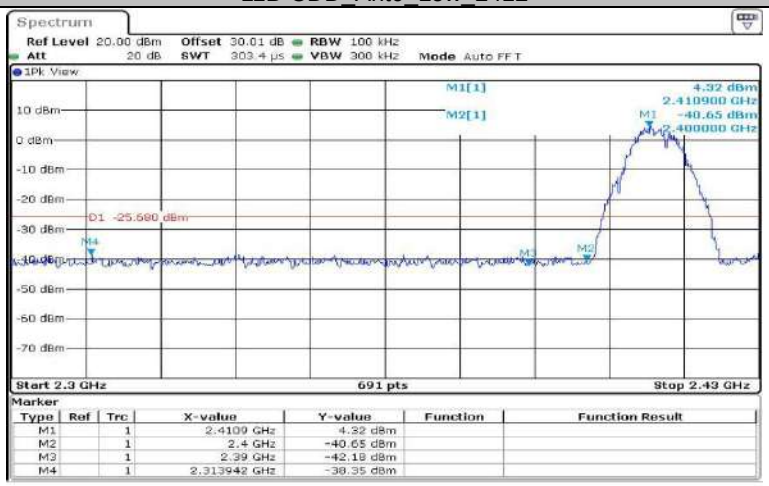
11AX40MIMO_Ant1_2452



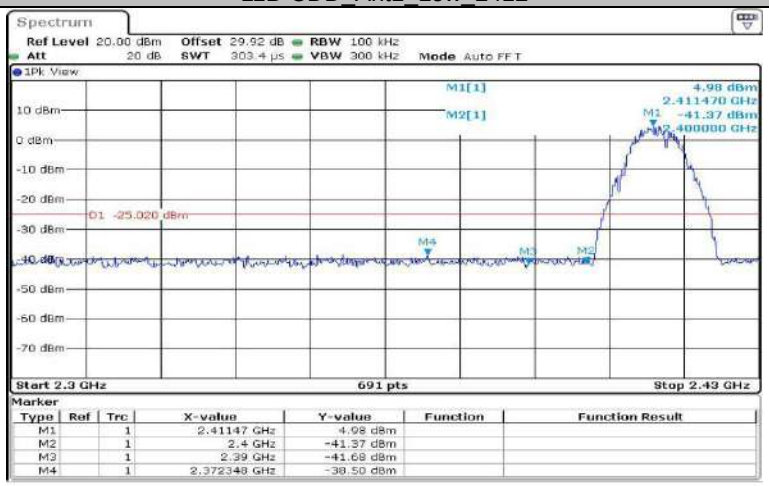
Appendix E: Band edge measurements

Test Graphs

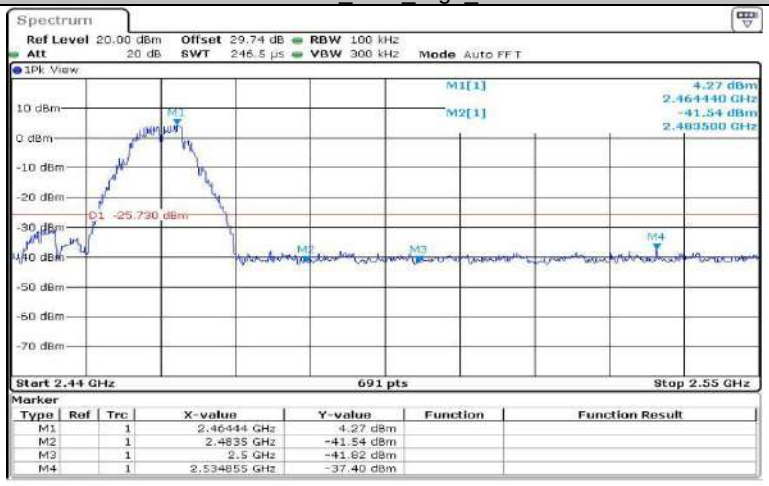
11B-CDD_Ant0_Low_2412



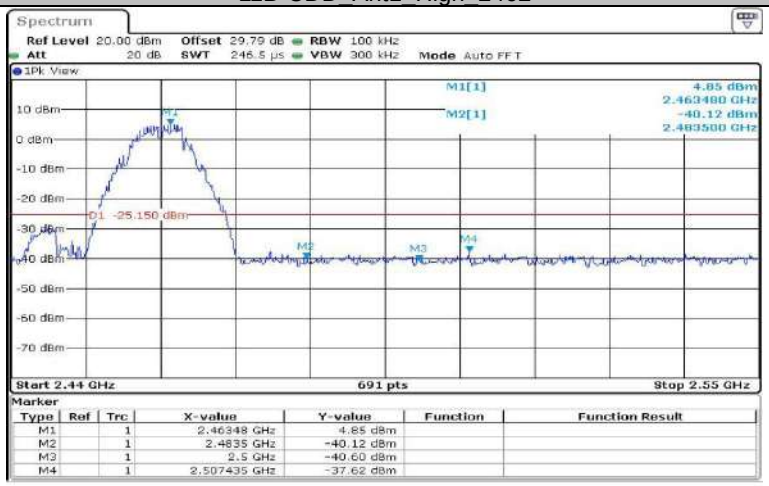
11B-CDD_Ant1_Low_2412



11B-CDD_Ant0_High_2462



11B-CDD_Ant1_High_2462



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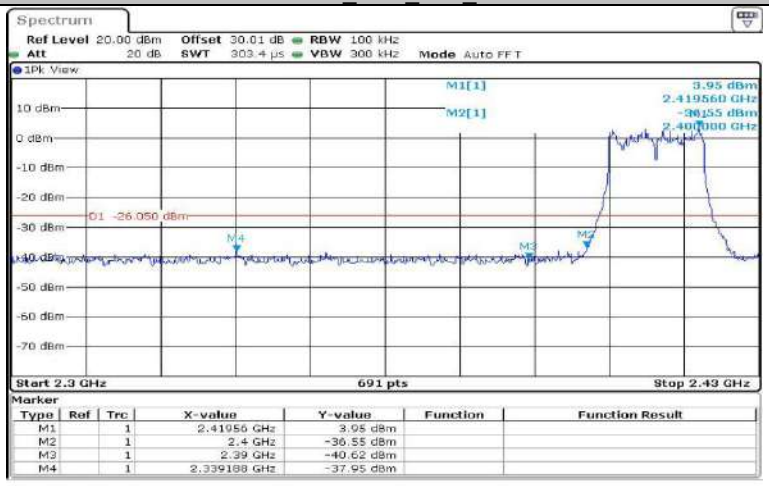

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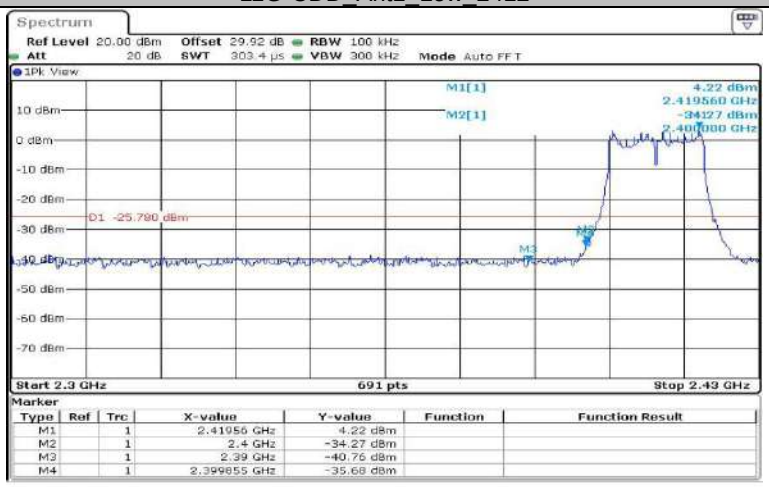

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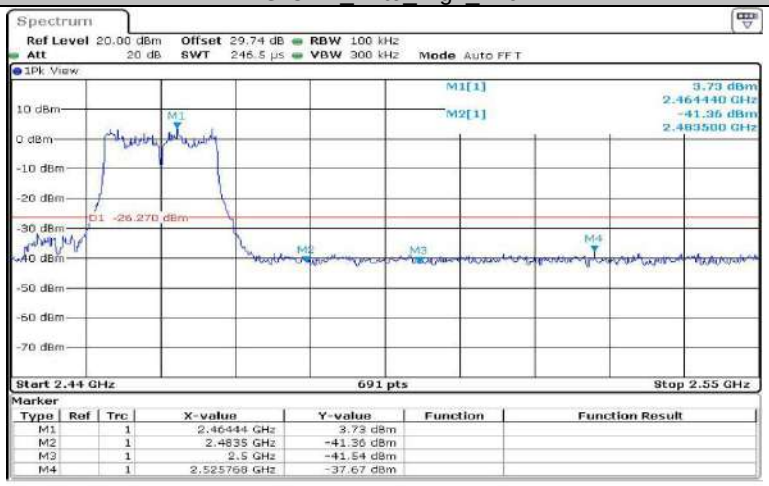

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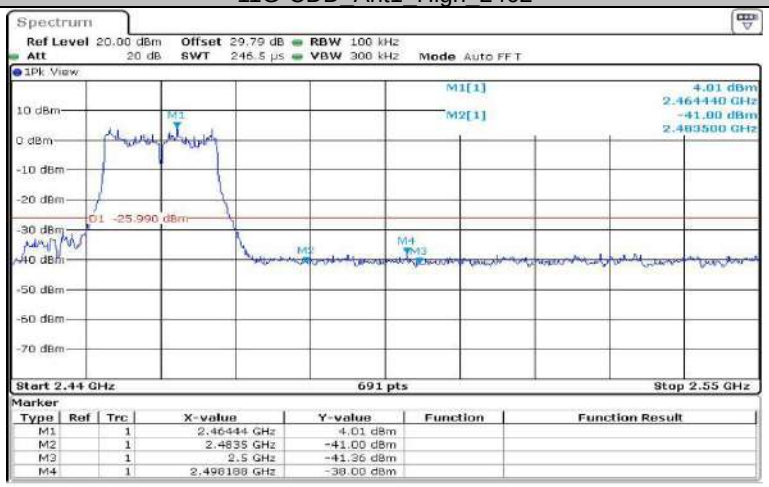
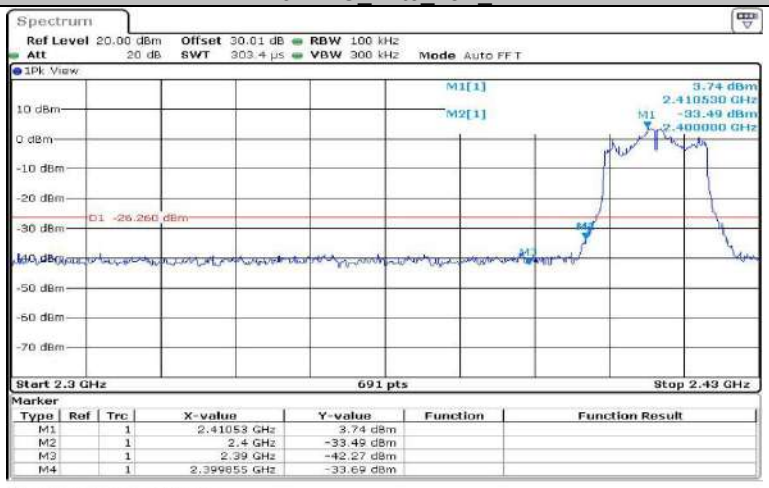


11N20MIMO_Ant0_Low_2412



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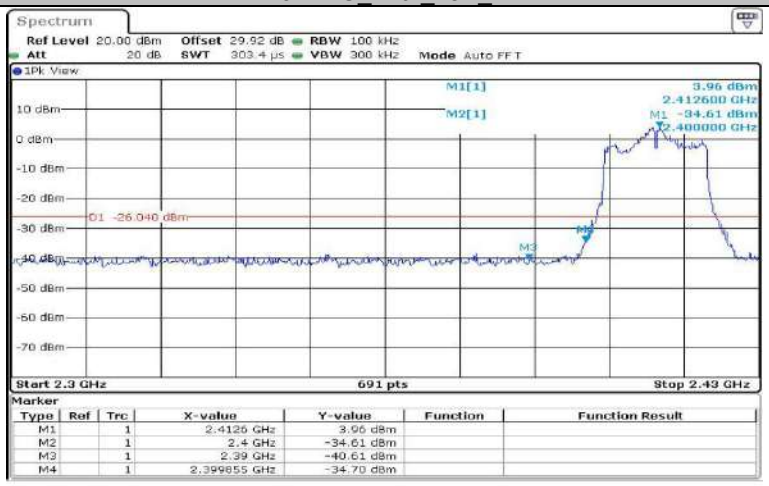

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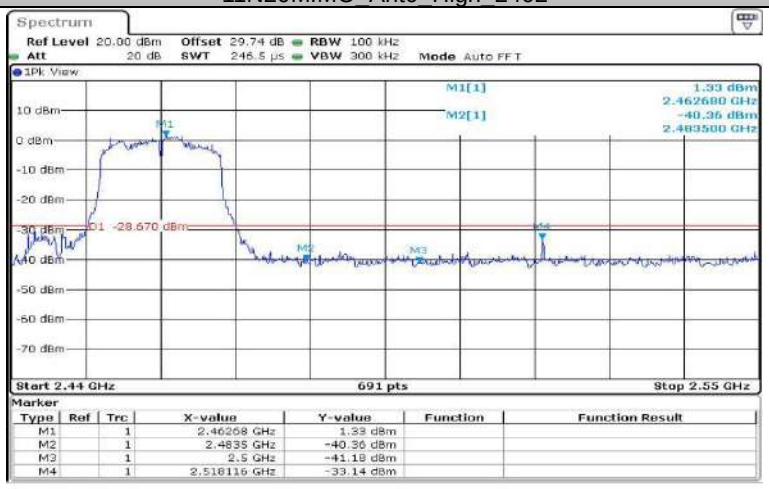

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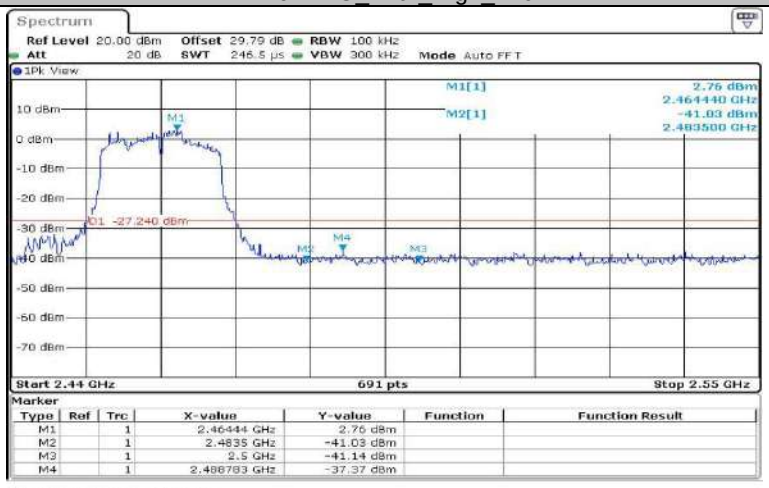
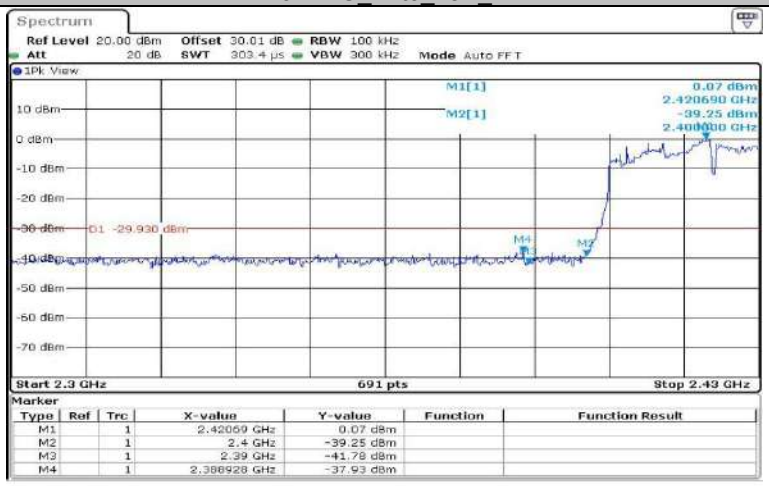


11N40MIMO_Ant0_Low_2422



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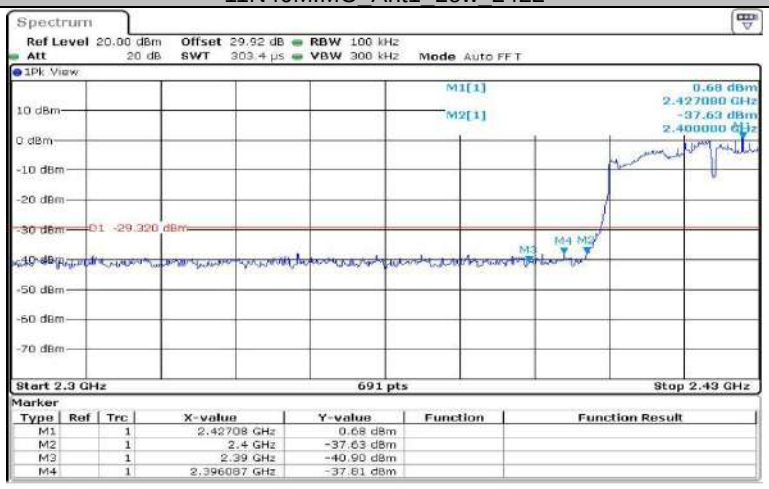

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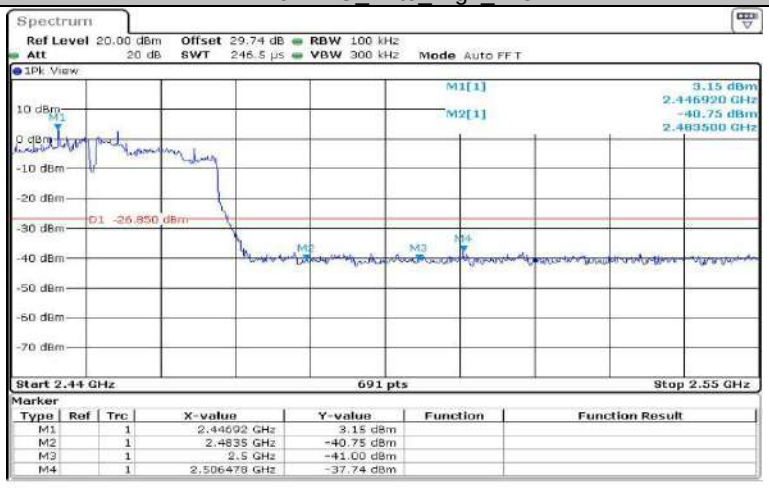

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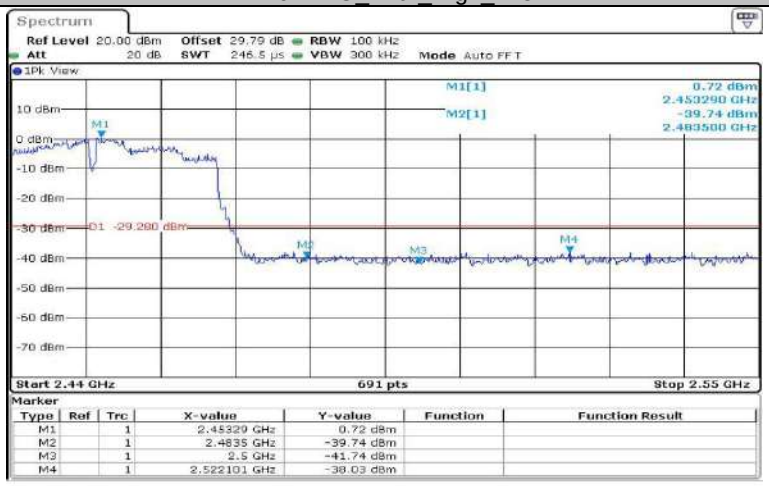

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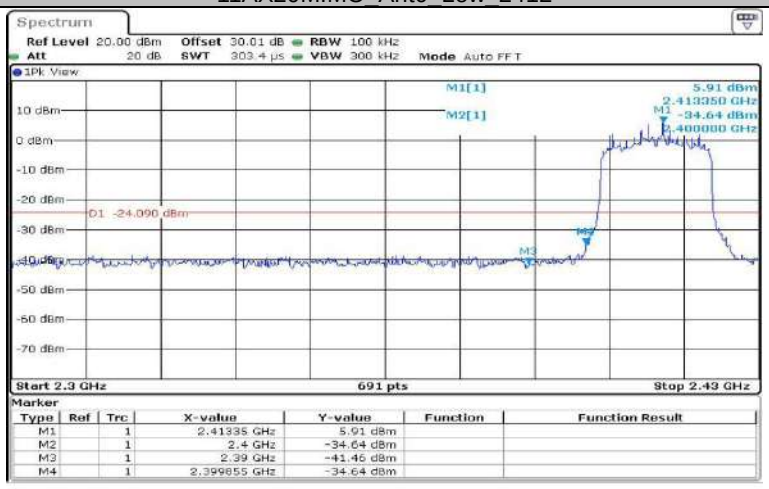

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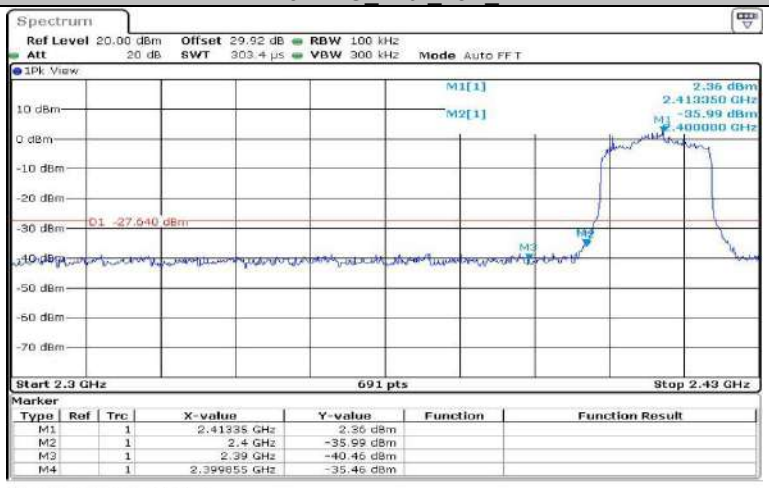

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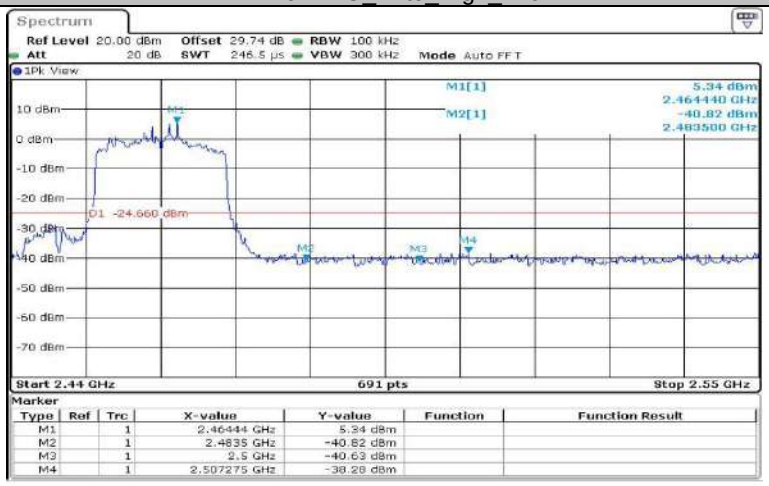

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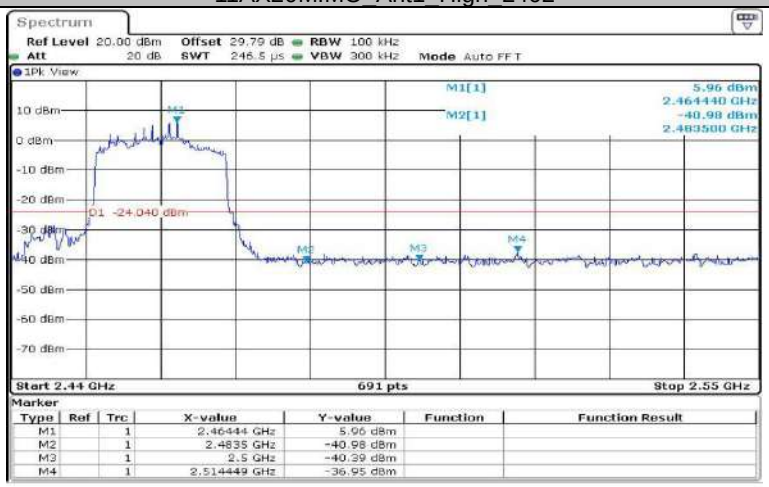

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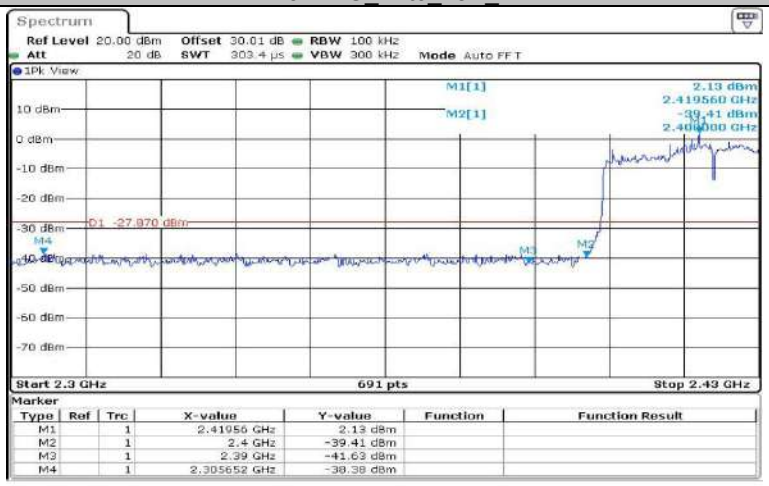

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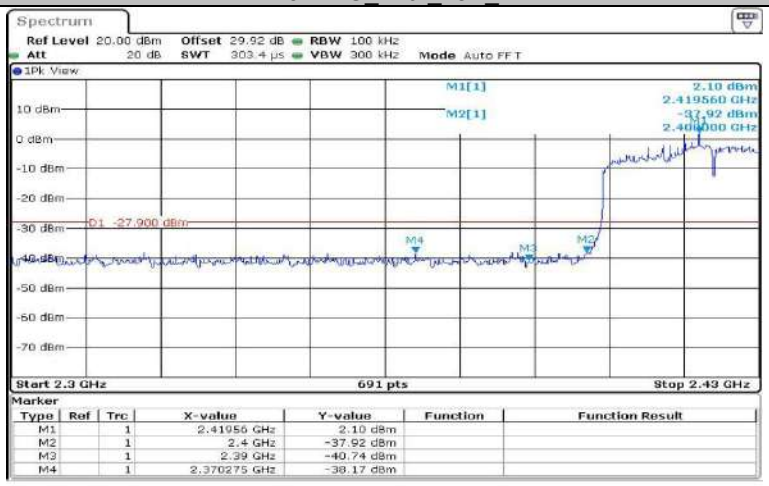

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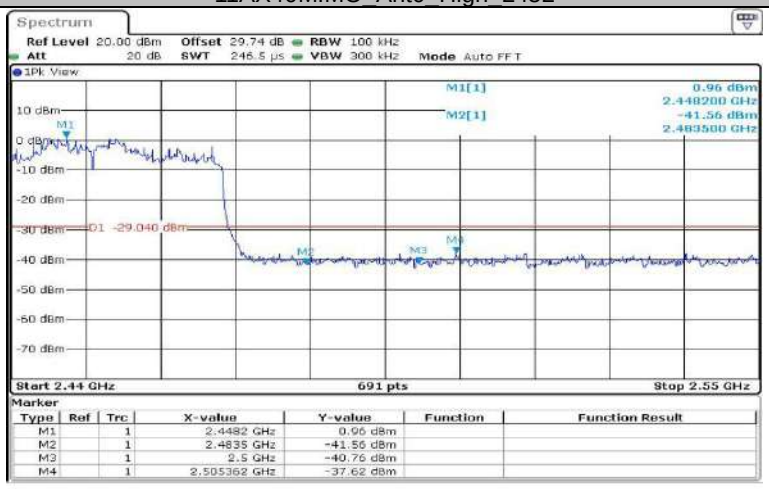

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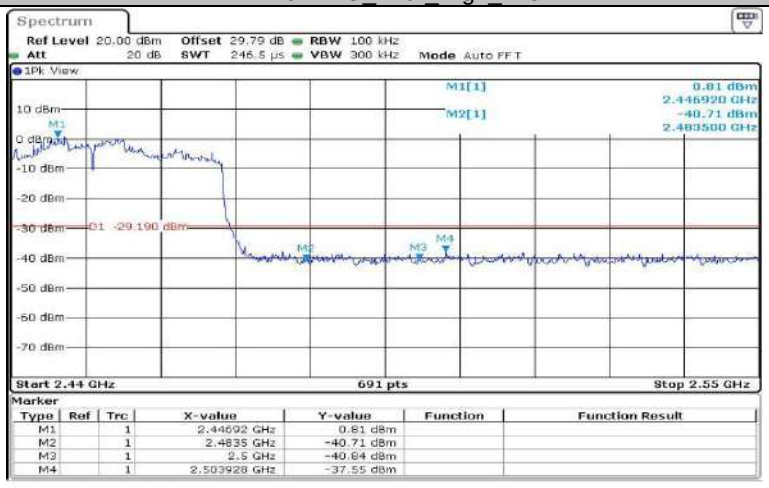
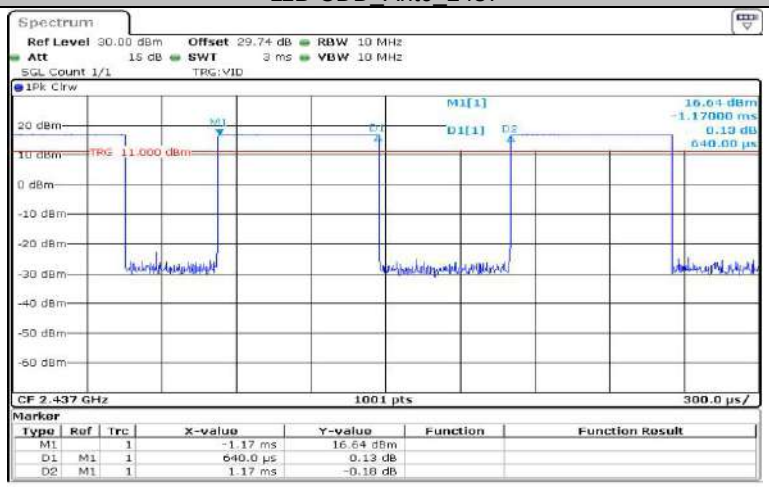


Appendix F: Duty Cycle
Test Result

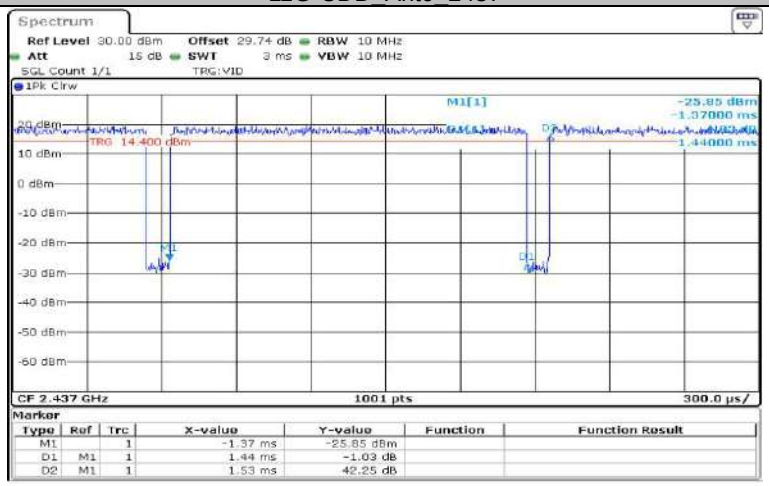
Test Mode	Antenna	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]	1/T [kHz]	VBW [kHz]
11B-CDD	Ant0	2437	0.64	1.17	54.70	2.62	1.56	2.0
11G-CDD	Ant0	2437	1.44	1.53	94.12	0.26	0.69	1.0
11N20MIMO	Ant0	2437	5.43	5.87	92.50	0.34	0.18	0.3
11N40MIMO	Ant0	2437	5.43	6.08	89.31	0.49	0.18	0.3
11AX20MIMO	Ant0	2437	5.45	5.90	92.37	0.34	0.18	0.3
11AX40MIMO	Ant0	2437	5.44	5.85	92.99	0.32	0.18	0.3

Test Graphs

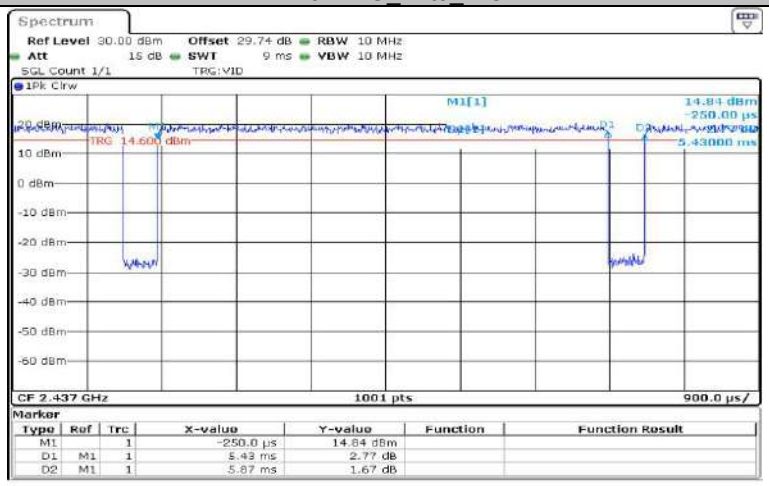
11B-CDD_Ant0_2437



11G-CDD_Ant0_2437



11N20MIMO_Ant0_2437



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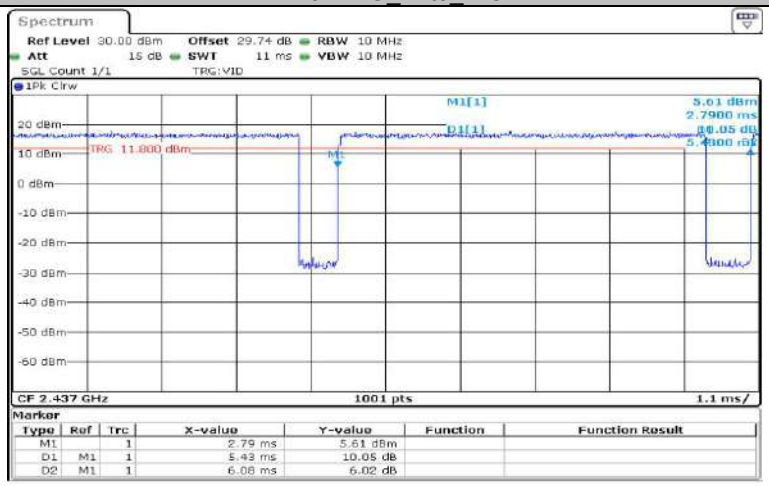

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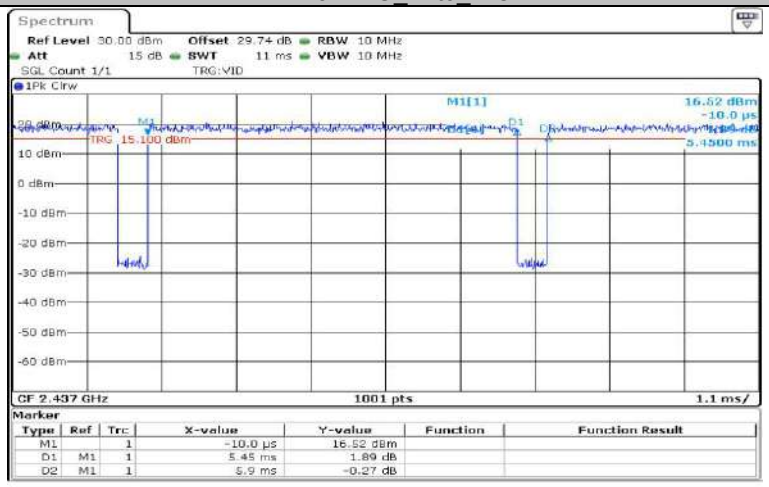

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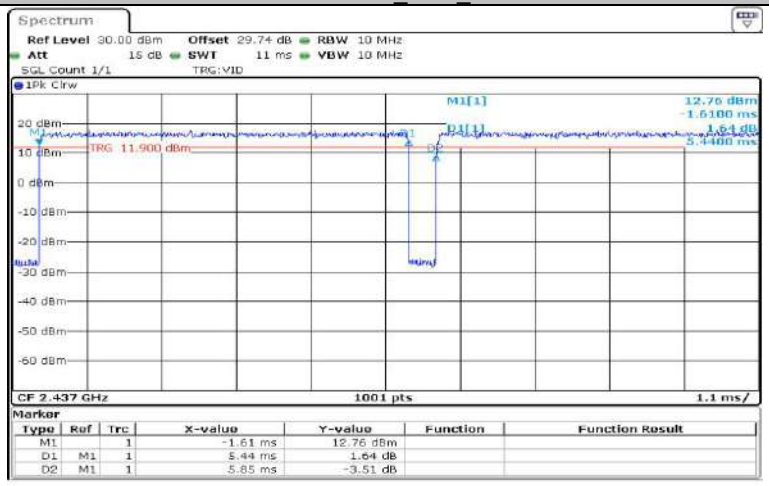

******* END OF REPORT *******