



TEST REPORT

Applicant Name : Shanghai ABXY Tech Co., Ltd.
Address : 5F, Building 11, No.6055 Jinhai Highway, Fengxian District, Shanghai
Report Number : RA230523-28733E-RF-00C
FCC ID: 2BBMD-ABXYLUTE1

Test Standard (s)

FCC PART 15.407

Sample Description

Product: Handheld Game Console
Tested Model: abxylute_one
Trade Mark: **abxylute**

Date Received: 2023-05-23
Date of Test: 2023-06-02 to 2023-06-12
Report Date: 2023-06-15

Test Result:	PASS*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Roger.Ling

Roger.Ling
EMC Engineer

Approved By:

Candy.Li

Candy Li
EMC Engineer

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

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230523-28733E-RF-00C	Original Report	2023-06-15

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Handheld Game Console		
Tested Model	abxylute_one		
Frequency Range	5G Wi-Fi: 5150-5250 MHz; 5725-5850 MHz		
Maximum Average Conducted Output Power	5150-5250 MHz		
	16.42dBm(802.11a)	15.77dBm(802.11n20)	15.89Bm(802.11n40)
	15.82dBm(802.11ac20)	15.92dBm(802.11ac40)	15.87dBm(802.11ac80)
	5725-5850 MHz		
	18.13dBm(802.11a)	17.63dBm(802.11n20)	17.75dBm(802.11n40)
	17.60dBm(802.11ac20)	17.80dBm(802.11ac40)	17.60dBm(802.11ac80)
Modulation Technique	OFDM		
Antenna Specification*		5150-5250MHz	5725-5850MHz
	ANT 1	1.52dBi	2.31dBi
	ANT 2	1.64dBi	3.56dBi
	Note: provided by the applicant		
Voltage Range	DC 3.87V from battery or DC 5V from USB port		
Sample number	264K-5 (CE&RE), 264K-1 (RF Conducted Test)		
Sample/EUT Status	Good condition		

Objective

This type approval report is in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 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 KDB789033D02 General U-NII Test Procedures New Rules v02r01.

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 output power, conducted		0.71dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.74dB
Emissions, Radiated	30MHz - 1GHz	5.08dB
	1GHz - 18GHz	4.96dB
	18GHz - 26.5GHz	5.16dB
	26.5GHz - 40GHz	4.64dB
Temperature		1°C
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

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 4297.01.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The device supports 5G Wi-Fi 802.11A /n20/n40/ac20/ac40/ac80 modes.

For 5150-5250MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

For 802.11A, 802.11n20/ac20 channel 36, 40, 48 were tested;

For 802.11n40/ac40 channel 38, 46 were tested.

For 802.11ac80 channel 42 were tested.

For 5725-5850MHz Band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
155	5775	165	5825

For 802.11A, 802.11n20/ac20, Channel 149, 157, 165 were tested;

For 802.11n40/ac40, Channel 151, 159 were tested.

For 802.11ac80 channel 155 were tested.

EUT Exercise Software

“adb command*” was used to test and power level as below, which provided by manufacturer.

Frequency Range	Mode	Date rate	Power Level*
5150 - 5250 MHz 5725 - 5850 MHz	802.11a	6Mbps	13
	802.11n20	MCS0	13
	802.11n40	MCS0	13
	802.11ac20	MCS0	13
	802.11ac40	MCS0	13
	802.11ac80	MCS0	13

The worst-case data rates are determined to be as above for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths and modulations.

The device supports SISO/MIMO mode, and the SISO/MIMO mode has same parameter setting, Pretest SISO/MIMO mode, the worst case MIMO mode was recorded in this report.

All the antenna ports have the same power level for MIMO modes.

Duty cycle

Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

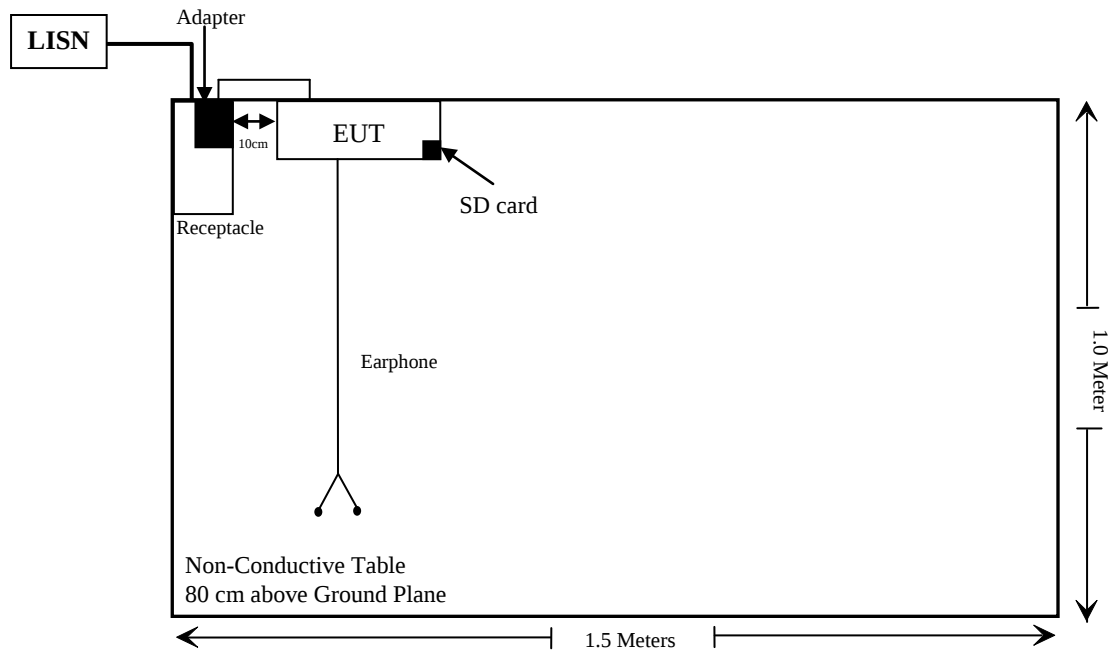
Manufacturer	Description	Model	Serial Number
Hisense	Adapter	E010-1D050200VCU	Unknown
SCI	Earphone	SCRC-130A	Unknown
Kingston	SD card	32GB	Unknown

External I/O Cable

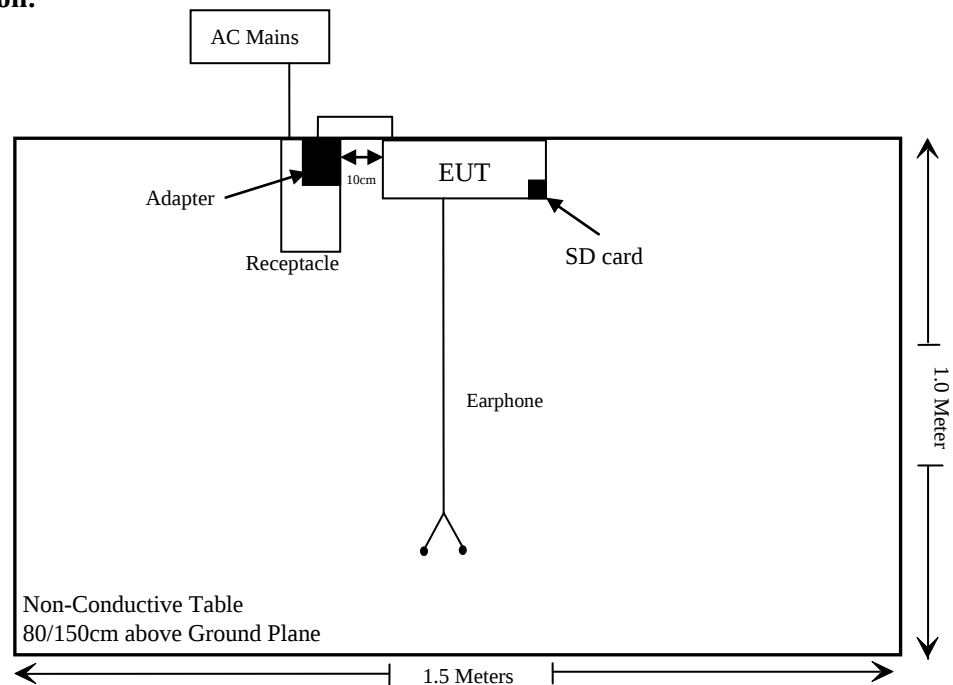
Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	0.8	EUT	Adapter
Un-shielding Detachable Earphone Cable	0.8	EUT	Earphone

Block Diagram of Test Setup

For Conducted Emission:



For Radiated Emission:



Note: the support table edge was flush with the center of turntable.

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 & §2.1093	RF Exposure(SAR)	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(8) & §15.207(a)	Conducted Emissions	Compliant
§15.205 & §15.209 & §15.407(b) (1), (4), (7), (8), (9), (10)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (12), (e)	Bandwidth	Compliant
§15.407(a) (1), (3)	Conducted Transmitter Output Power	Compliant
§15.407 (a) (1), (3)	Power Spectral Density	Compliant
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Not Applicable

Not Applicable: the EUT not operating within frequency range of 5250-5350MHz&5470-5725MHz.

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
R & S	L.I.S.N.	ENV216	101314	2022/11/25	2023/11/24
Anritsu Corp	50Ω 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 191218 (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-184055 36-J0	15964001002	2022/11/08	2023/11/07
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2023/02/14	2026/02/13
Schwarzbeck	Horn Antenna	BBHA9120D	837	2023/02/22	2026/02/21
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2022/12/26	2025/12/25
CD	High PASS Filter	HPM-8.0/18G -60	020	2022/11/25	2023/11/24
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
Radiated Emission Test Software:e3 191218 (V9)					

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2022/11/25	2023/11/24
Rohde & Schwarz	Open Switch and Control Unit	OSP120 + OSP-B157	101244 + 100866	2022/11/25	2023/11/24
Agilent	Power Sensor	U2021XA	MY5425003	2023/02/25	2024/02/24
WEINSCHTEL	10dB Attenuator	5324	AU 3842	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.33	RF-03	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 §1.1307(b)&§2.1093 - RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RA230523-28733E-SA.

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.
- c. 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 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density 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 antennas arrangement for 5G Wi-Fi, which were permanently attached to the EUT, fulfill the requirement of this section. Please refer to the EUT photos.

Frequency Range	5150-5250MHz	5725-5850MHz
ANT 1 Antenna gain	1.52dBi	2.31dBi
ANT 2 Antenna gain	1.64dBi	3.56dBi

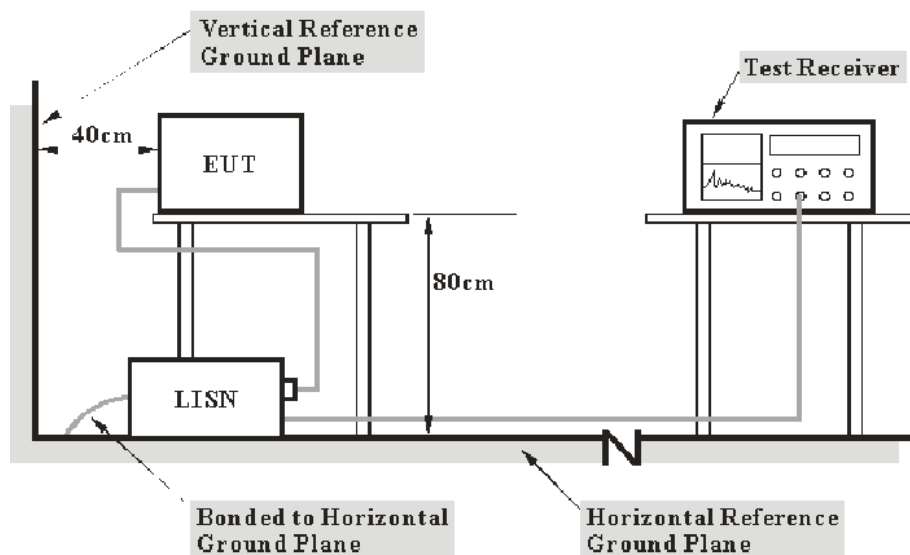
Result: Compliant.

FCC §15.407 (B) (8) §15.207 (A) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (8)

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 adapter was connected to the LISN.

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

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

Factor & Margin Calculation

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

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss}$$

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

$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Read Level} + \text{Factor}\end{aligned}$$

Test Data

Environmental Conditions

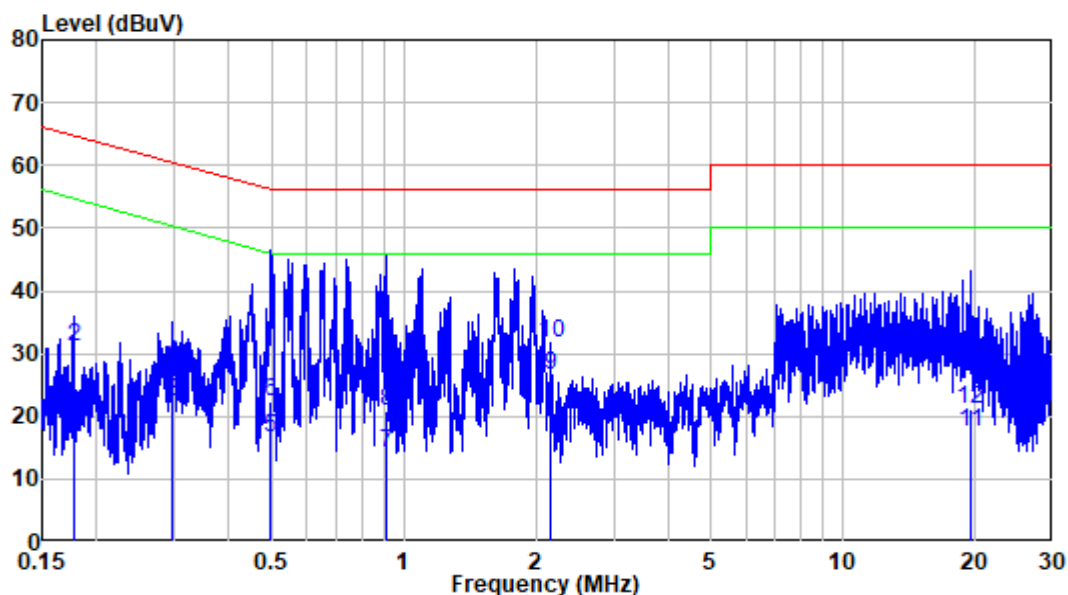
Temperature:	23 °C
Relative Humidity:	48 %
ATM Pressure:	101.1 kPa

The testing was performed by Jerry Wu on 2023-06-12.

EUT operation mode: 5G Wi-Fi Transmitting (worst case for 802.11a, 5180MHz)

Please refer the below plots.

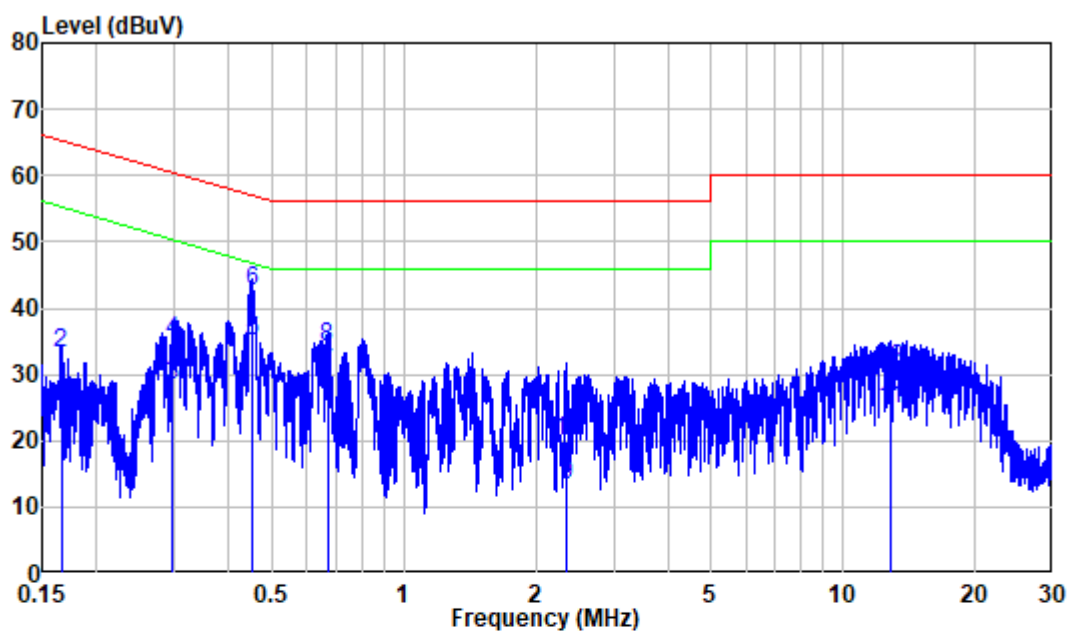
AC 120V/60 Hz, Line



Site : Shielding Room
 Condition: Line
 Job No. : RA230523-28733E-RF
 Mode : 5G WIFI Transmitting
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.177	10.32	9.92	20.24	54.60	-34.36	Average
2	0.177	10.32	20.74	31.06	64.60	-33.54	QP
3	0.297	10.40	11.84	22.24	50.33	-28.09	Average
4	0.297	10.40	17.87	28.27	60.33	-32.06	QP
5	0.497	10.57	5.91	16.48	46.04	-29.56	Average
6	0.497	10.57	11.83	22.40	56.04	-33.64	QP
7	0.912	10.51	3.67	14.18	46.00	-31.82	Average
8	0.912	10.51	10.33	20.84	56.00	-35.16	QP
9	2.157	10.41	16.14	26.55	46.00	-19.45	Average
10	2.157	10.41	21.25	31.66	56.00	-24.34	QP
11	19.416	10.31	7.33	17.64	50.00	-32.36	Average
12	19.416	10.31	10.71	21.02	60.00	-38.98	QP

AC 120V/60 Hz, Neutral



Site : Shielding Room
 Condition: Neutral
 Job No. : RA230523-28733E-RF
 Mode : 5G WIFI Transmitting
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.166	10.28	12.98	23.26	55.17	-31.91	Average
2	0.166	10.28	22.92	33.20	65.17	-31.97	QP
3	0.298	10.35	18.11	28.46	50.30	-21.84	Average
4	0.298	10.35	24.81	35.16	60.30	-25.14	QP
5	0.451	10.45	24.42	34.87	46.86	-11.99	Average
6	0.451	10.45	31.98	42.43	56.86	-14.43	QP
7	0.669	10.47	19.69	30.16	46.00	-15.84	Average
8	0.669	10.47	23.72	34.19	56.00	-21.81	QP
9	2.335	10.51	2.73	13.24	46.00	-32.76	Average
10	2.335	10.51	9.37	19.88	56.00	-36.12	QP
11	12.758	10.39	14.32	24.71	50.00	-25.29	Average
12	12.758	10.39	20.28	30.67	60.00	-29.33	QP

§15.205 & §15.209 & §15.407(B) (1), (4), (7), (8), (9), (10) – UNDESIRABLE EMISSION

Applicable Standard

FCC §15.407 (b) (1), (4), (7), (8), (9), (10); §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b) (7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

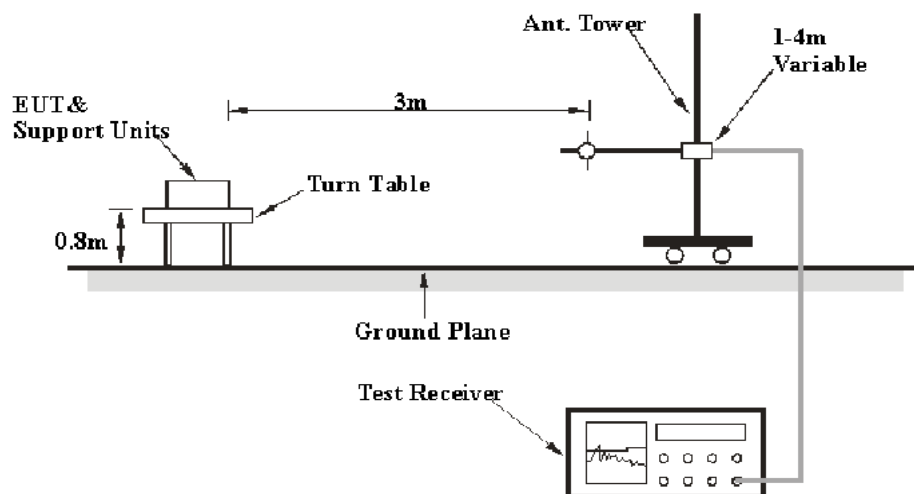
(4) For transmitters operating in the 5.725-5.85 GHz band:

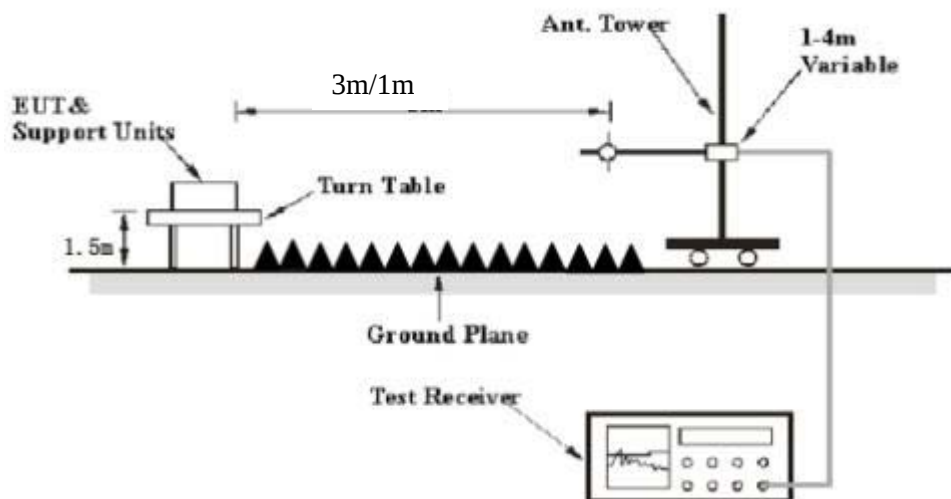
(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

Below 1 GHz:



Above 1 GHz:

Note: 1-18GHz tested @3m, 18-40GHz tested @1m.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 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	1 MHz	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%

If the maximized peak measured value complies with the limit, then it is unnecessary to perform QP/Average measurement.

Test Procedure**Radiated Spurious Emission**

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

According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified, extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\text{SpecLimit}} = E_{\text{Meas}} + 20 \log \left(\frac{d_{\text{Meas}}}{d_{\text{SpecLimit}}} \right)$$

where

$E_{\text{SpecLimit}}$ is the field strength of the emission at the distance specified by the limit, in dB μ V/m
 E_{Meas} is the field strength of the emission at the measurement distance, in dB μ V/m
 d_{Meas} is the measurement distance, in m
 $d_{\text{SpecLimit}}$ is the distance specified by the limit, in m

So the extrapolation factor of 1m is $20 \cdot \log(1/3) = -9.5$ dB, for 18-40GHz range, the limit of 1m distance was added by 9.5dB from limit of 3m to compared with the result measurement at 1m distance.

Factor & Margin Calculation

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

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\begin{aligned} \text{Over Limit/Margin} &= \text{Level} / \text{Corrected Amplitude} - \text{Limit} \\ \text{Level} / \text{Corrected Amplitude} &= \text{Read Level} + \text{Factor} \end{aligned}$$

Test Data

Environmental Conditions

Temperature:	23-24°C
Relative Humidity:	52-58 %
ATM Pressure:	101.0 kPa

The Below 1GHz testing was performed by Jason Liu on 2023-06-12.

The Above 1GHz testing was performed by Jimi Zheng on 2023-06-02.

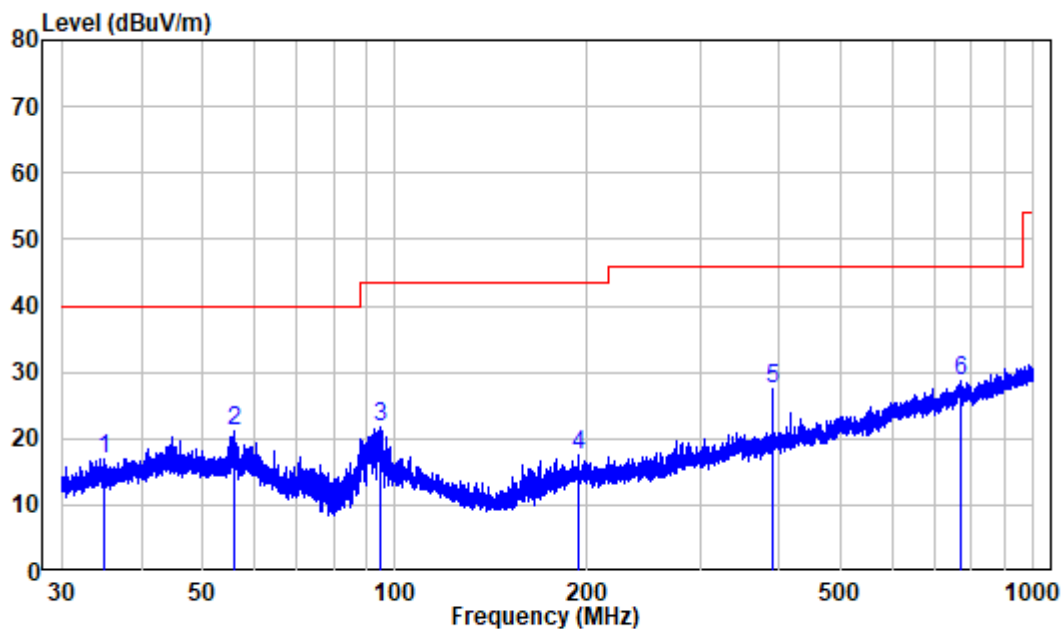
EUT operation mode: 5G WIFI Transmitting

(Pre-scan in the X, Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Test Result: Please refer the below tables and plots.

30 MHz~1 GHz: (worst case for 802.11a, 5180MHz)

Horizontal



Site : chamber

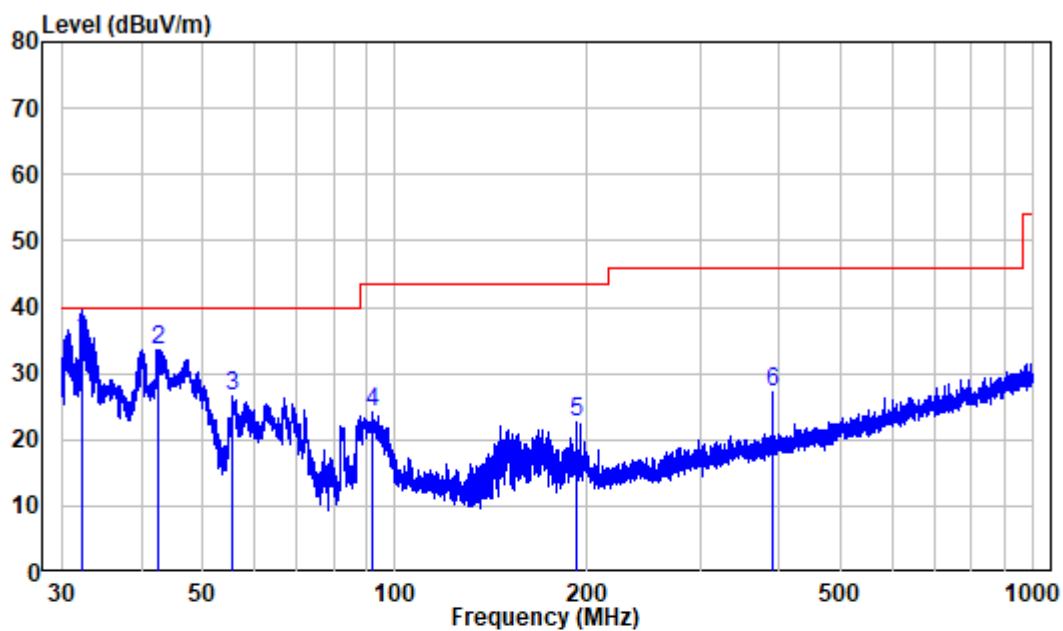
Condition: 3m HORIZONTAL

Job No. : RA230523-28733E-RF

Test Mode: 5G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	34.913	-11.57	28.44	16.87	40.00	-23.13	Peak
2	55.829	-10.21	31.30	21.09	40.00	-18.91	Peak
3	94.636	-12.55	34.17	21.62	43.50	-21.88	Peak
4	193.349	-11.30	28.87	17.57	43.50	-25.93	Peak
5	390.038	-6.89	34.44	27.55	46.00	-18.45	Peak
6	768.075	-0.28	29.04	28.76	46.00	-17.24	Peak

Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : RA230523-28733E-RF

Test Mode: 5G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	32.307	-12.12	47.09	34.97	40.00	-5.03	QP
2	42.469	-10.00	43.66	33.66	40.00	-6.34	Peak
3	55.488	-10.24	36.83	26.59	40.00	-13.41	Peak
4	92.139	-13.26	37.38	24.12	43.50	-19.38	Peak
5	191.913	-11.26	33.79	22.53	43.50	-20.97	Peak
6	390.038	-6.89	34.18	27.29	46.00	-18.71	Peak

1-40GHz:**5150-5250MHz:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11 A, Low Channel									
4500	57.59	PK	6	1.3	H	-6.01	51.58	74	-22.42
4500	56.57	PK	58	2.2	V	-6.01	50.56	74	-23.44
5150	70.11	PK	29	2.1	H	-4.29	65.82	74	-8.18
5150	48.73	AV	29	2.1	H	-4.29	44.44	54	-9.56
5150	66.97	PK	89	2.1	V	-4.29	62.68	74	-11.32
5150	49.18	AV	89	2.1	V	-4.29	44.89	54	-9.11
10360	53.21	PK	112	1.3	H	6.03	59.24	68.2	-8.96
10360	53.91	PK	200	1.9	V	6.03	59.94	68.2	-8.26
802.11 A, Middle Channel									
10400	55.41	PK	120	1.7	H	6.30	61.71	68.2	-6.49
10400	47.55	PK	194	1.9	V	6.30	53.85	68.2	-14.35
802.11 A, High Channel									
5350	54.52	PK	293	1.3	H	-3.15	51.37	74	-22.63
5350	56.32	PK	156	1.3	V	-3.15	53.17	74	-20.83
5460	55.24	PK	280	1.8	H	-2.38	52.86	74	-21.14
5460	56.02	PK	151	1.9	V	-2.38	53.64	74	-20.36
10480	56.13	PK	13	1.2	H	6.00	62.13	68.2	-6.07
10480	56.47	PK	152	1.6	V	6.00	62.47	68.2	-5.73
802.11 N20, Low Channel									
4500	57.17	PK	290	1.5	H	-6.01	51.16	74	-22.84
4500	56.77	PK	234	1.6	V	-6.01	50.76	74	-23.24
5150	74.74	PK	217	2.0	H	-4.29	70.45	74	-3.55
5150	56.78	AV	217	2.0	H	-4.29	52.49	54	-1.51
5150	65.12	PK	286	2.0	V	-4.29	60.83	74	-13.17
5150	50.48	AV	286	2.0	V	-4.29	46.19	54	-7.81
10360	54.67	PK	222	2.0	H	6.03	60.70	68.2	-7.5
10360	54.91	PK	168	1.7	V	6.03	60.94	68.2	-7.26
802.11 N20, Middle Channel									
10400	58.53	PK	255	2.1	H	6.30	64.83	68.2	-3.37
10400	53.65	PK	156	2.1	V	6.30	59.95	68.2	-8.25
802.11 N20, High Channel									
5350	56.42	PK	272	1.3	H	-3.15	53.27	74	-20.73
5350	57.01	PK	101	1.5	V	-3.15	53.86	74	-20.14
5460	56.09	PK	257	1.6	H	-2.38	53.71	74	-20.29
5460	55.44	PK	292	1.7	V	-2.38	53.06	74	-20.94
10480	56.68	PK	308	1.6	H	6.00	62.68	68.2	-5.52
10480	57.83	PK	187	1.1	V	6.00	63.83	68.2	-4.37

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11 N40, Low Channel									
4500	56.26	PK	169	2.1	H	-6.01	50.25	74	-23.75
4500	56.18	PK	272	2.1	V	-6.01	50.17	74	-23.83
5150	75.12	PK	42	1.4	H	-4.29	70.83	74	-3.17
5150	56.78	AV	42	1.4	H	-4.29	52.49	54	-1.51
5150	72.05	PK	237	1.4	V	-4.29	67.76	74	-6.24
5150	56.98	AV	237	1.4	V	-4.29	52.69	54	-1.31
10380	50.99	PK	217	2.0	H	6.17	57.16	68.2	-11.04
10380	51.44	PK	0	1.8	V	6.17	57.61	68.2	-10.59
802.11 N40 High Channel									
5350	57.01	PK	243	1.1	H	-3.15	53.86	74	-20.14
5350	56.44	PK	210	1.7	V	-3.15	53.29	74	-20.71
5460	56.16	PK	67	1.0	H	-2.38	53.78	74	-20.22
5460	56.19	PK	199	1.4	V	-2.38	53.81	74	-20.19
10460	54.73	PK	330	1.1	H	5.91	60.64	68.2	-7.56
10460	53.69	PK	5	1.0	V	5.91	59.60	68.2	-8.6
802.11 AC20, Low Channel									
4500	56.72	PK	33	1.9	H	-6.01	50.71	74	-23.29
4500	55.52	PK	165	1.6	V	-6.01	49.51	74	-24.49
5150	64.27	PK	264	1.3	H	-4.29	59.98	74	-14.02
5150	49.06	AV	264	1.3	H	-4.29	44.77	54	-9.23
5150	68.95	PK	260	1.0	V	-4.29	64.66	74	-9.34
5150	54.68	AV	260	1.0	V	-4.29	50.39	54	-3.61
10360	56.62	PK	241	1.8	H	6.03	62.65	68.2	-5.55
10360	54.02	PK	113	1.1	V	6.03	60.05	68.2	-8.15
802.11 AC20, Middle Channel									
10400	57.29	PK	30	1.4	H	6.30	63.59	68.2	-4.61
10400	56.69	PK	285	1.8	V	6.30	62.99	68.2	-5.21
802.11 AC20, High Channel									
5350	56.28	PK	209	1.6	H	-3.15	53.13	74	-20.87
5350	56.97	PK	289	1.7	V	-3.15	53.82	74	-20.18
5460	56.28	PK	106	1.4	H	-2.38	53.90	74	-20.1
5460	55.60	PK	169	1.9	V	-2.38	53.22	74	-20.78
10480	58.20	PK	294	1.1	H	6.00	64.20	68.2	-4
10480	48.80	PK	301	1.9	V	6.00	54.80	68.2	-13.4

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11 AC40, Low Channel									
4500	55.75	PK	122	1.7	H	-6.01	49.74	74	-24.26
4500	56.11	PK	260	1.0	V	-6.01	50.10	74	-23.9
5150	74.90	PK	328	1.2	H	-4.29	70.61	74	-3.39
5150	57.11	AV	328	1.2	H	-4.29	52.82	54	-1.18
5150	73.48	PK	113	1.1	V	-4.29	69.19	74	-4.81
5150	56.99	AV	113	1.1	V	-4.29	52.70	54	-1.3
10380	54.53	PK	30	1.4	H	6.17	60.70	68.2	-7.5
10380	53.99	PK	285	1.8	V	6.17	60.16	68.2	-8.04
802.11 AC40, High Channel									
5350	62.80	PK	294	1.1	H	-3.15	59.65	74	-14.35
5350	48.51	AV	294	1.1	H	-3.15	45.36	54	-8.64
5350	64.79	PK	209	1.6	V	-3.15	61.64	74	-12.36
5350	49.83	AV	209	1.6	V	-3.15	46.68	54	-7.32
5460	63.91	PK	289	1.7	H	-2.38	61.53	74	-12.47
5460	45.80	AV	289	1.7	H	-2.38	43.42	54	-10.58
5460	63.55	PK	244	2.1	V	-2.38	61.17	74	-12.83
5460	45.11	AV	244	2.1	V	-2.38	42.73	54	-11.27
10460	53.40	PK	169	1.9	H	5.91	59.31	68.2	-8.89
10460	51.17	PK	357	1.8	V	5.91	57.08	68.2	-11.12
802.11 AC80									
4500	57.37	PK	80	1.2	H	-6.01	51.36	74	-22.64
4500	58.04	PK	293	1.3	V	-6.01	52.03	74	-21.97
5150	71.00	PK	279	1.5	H	-4.29	66.71	74	-7.29
5150	55.32	AV	279	1.5	H	-4.29	51.03	54	-2.97
5150	76.26	PK	137	2.2	V	-4.29	71.97	74	-2.03
5150	55.84	AV	137	2.2	V	-4.29	51.55	54	-2.45
5350	62.63	PK	316	1.6	H	-3.15	59.48	74	-14.52
5350	48.34	AV	316	1.6	H	-3.15	45.19	54	-8.81
5350	60.77	PK	49	1.3	V	-3.15	57.62	74	-16.38
5350	48.20	AV	49	1.3	V	-3.15	45.05	54	-8.95
5460	58.19	PK	21	2.2	H	-2.38	55.81	74	-18.19
5460	45.15	AV	21	2.2	H	-2.38	42.77	54	-11.23
5460	57.78	PK	177	1.3	V	-2.38	55.40	74	-18.6
5460	43.90	AV	177	1.3	V	-2.38	41.52	54	-12.48
10420	50.00	PK	132	1.8	H	6.13	56.13	68.2	-12.07
10420	49.55	PK	107	2.1	V	6.13	55.68	68.2	-12.52

5725-5850MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11A Low Channel									
5650	58.80	PK	307	1.7	H	-2.80	56.00	68.2	-12.2
5650	58.29	PK	149	1.2	V	-2.80	55.49	68.2	-12.71
5700	60.43	PK	111	1.2	H	-1.62	58.81	105.2	-46.39
5700	60.69	PK	238	1.3	V	-1.62	59.07	105.2	-46.13
5720	75.27	PK	205	1.6	H	-1.95	73.32	110.8	-37.48
5720	75.84	PK	39	1.3	V	-1.95	73.89	110.8	-36.91
5725	82.58	PK	81	2.1	H	-2.03	80.55	122.2	-41.65
5725	81.63	PK	83	1.7	V	-2.03	79.60	122.2	-42.6
11490	50.11	PK	83	1.7	H	7.99	58.10	74	-15.9
11490	39.69	AV	83	1.7	H	7.99	47.68	54	-6.32
11490	53.03	PK	86	1.7	V	7.99	61.02	74	-12.98
11490	42.05	AV	86	1.7	V	7.99	50.04	54	-3.96
802.11A, Middle Channel									
11570	50.74	PK	259	1.8	H	7.69	58.43	74	-15.57
11570	40.67	AV	259	1.8	H	7.69	48.36	54	-5.64
11570	52.81	PK	278	1.0	V	7.69	60.50	74	-13.5
11570	42.49	AV	278	1.0	V	7.69	50.18	54	-3.82
802.11A, High Channel									
5850	72.33	PK	173	2.0	H	-0.60	71.73	122.2	-50.47
5850	72.29	PK	205	1.7	V	-0.60	71.69	122.2	-50.51
5855	65.41	PK	219	1.5	H	-0.50	64.91	110.8	-45.89
5855	65.53	PK	87	1.2	V	-0.50	65.03	110.8	-45.77
5875	60.48	PK	129	1.8	H	-0.10	60.38	105.2	-44.82
5875	60.18	PK	77	2.1	V	-0.10	60.08	105.2	-45.12
5925	60.90	PK	277	1.6	H	-0.11	60.79	68.2	-7.41
5925	59.08	PK	349	2.0	V	-0.11	58.97	68.2	-9.23
11650	50.05	PK	349	2.0	H	6.82	56.87	74	-17.13
11650	38.62	AV	349	2.0	H	6.82	45.44	54	-8.56
11650	52.04	PK	225	1.4	V	6.82	58.86	74	-15.14
11650	40.71	PK	12	2.1	V	6.82	47.53	54	-6.47
802.11N20, Low Channel									
5650	58.59	PK	328	1.3	H	-2.80	55.79	68.2	-12.41
5650	58.41	PK	216	1.8	V	-2.80	55.61	68.2	-12.59
5700	58.99	PK	18	1.1	H	-1.62	57.37	105.2	-47.83
5700	58.07	PK	247	1.3	V	-1.62	56.45	105.2	-48.75
5720	76.02	PK	234	1.4	H	-1.95	74.07	110.8	-36.73
5720	74.12	PK	206	1.8	V	-1.95	72.17	110.8	-38.63
5725	82.24	PK	246	1.9	H	-2.03	80.21	122.2	-41.99
5725	80.68	PK	187	1.6	V	-2.03	78.65	122.2	-43.55
11490	49.29	PK	216	1.8	H	7.99	57.28	74	-16.72
11490	39.14	AV	216	1.8	H	7.99	47.13	54	-6.87
11490	51.75	PK	42	2.0	V	7.99	59.74	74	-14.26
11490	40.59	AV	42	2.0	V	7.99	48.58	54	-5.42

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11N20, Middle Channel									
11570	47.83	PK	174	1.1	H	7.69	55.52	74	-18.48
11570	37.78	AV	174	1.1	H	7.69	45.47	54	-8.53
11570	46.86	PK	324	1.0	V	7.69	54.55	74	-19.45
11570	37.07	AV	324	1.0	V	7.69	44.76	54	-9.24
802.11N20, High Channel									
5850	74.90	PK	348	1.3	H	-0.60	74.30	122.2	-47.9
5850	75.86	PK	178	1.6	V	-0.60	75.26	122.2	-46.94
5855	67.67	PK	189	2.2	H	-0.50	67.17	110.8	-43.63
5855	69.51	PK	331	1.5	V	-0.50	69.01	110.8	-41.79
5875	59.43	PK	179	2.0	H	-0.10	59.33	105.2	-45.87
5875	59.03	PK	252	1.8	V	-0.10	58.93	105.2	-46.27
5925	59.75	PK	168	1.3	H	-0.11	59.64	68.2	-8.56
5925	58.15	PK	4	1.6	V	-0.11	58.04	68.2	-10.16
11650	47.11	PK	82	1.7	H	6.82	53.93	74	-20.07
11650	50.07	PK	82	1.7	V	6.82	56.89	74	-17.11
11650	38.44	AV	82	1.7	V	6.82	45.26	54	-8.74
802.11N40, Low Channel									
5650	58.83	PK	358	2.0	H	-2.80	56.03	68.2	-12.17
5650	58.72	PK	69	1.0	V	-2.80	55.92	68.2	-12.28
5700	69.04	PK	132	1.6	H	-1.62	67.42	105.2	-37.78
5700	67.73	PK	132	1.7	V	-1.62	66.11	105.2	-39.09
5720	82.30	PK	63	1.5	H	-1.95	80.35	110.8	-30.45
5720	80.98	PK	45	1.9	V	-1.95	79.03	110.8	-31.77
5725	84.36	PK	106	1.9	H	-2.03	82.33	122.2	-39.87
5725	82.53	PK	84	1.2	V	-2.03	80.50	122.2	-41.7
11510	47.76	PK	84	1.2	H	8.05	55.81	74	-18.19
11510	37.99	AV	84	1.2	H	8.05	46.04	54	-7.96
11510	49.75	PK	241	1.2	V	8.05	57.80	74	-16.2
11510	39.36	AV	241	1.2	V	8.05	47.41	54	-6.59
802.11N40, High Channel									
5850	66.24	PK	100	2.1	H	-0.60	65.64	122.2	-56.56
5850	69.84	PK	158	1.6	V	-0.60	69.24	122.2	-52.96
5855	61.94	PK	219	1.2	H	-0.50	61.44	110.8	-49.36
5855	65.35	PK	15	1.3	V	-0.50	64.85	110.8	-45.95
5875	58.70	PK	332	1.5	H	-0.10	58.60	105.2	-46.6
5875	59.48	PK	114	1.8	V	-0.10	59.38	105.2	-45.82
5925	58.63	PK	47	1.4	H	-0.11	58.52	68.2	-9.68
5925	59.16	PK	240	1.1	V	-0.11	59.05	68.2	-9.15
11590	47.06	PK	240	1.1	H	7.60	54.66	74	-19.34
11590	37.17	AV	240	1.1	H	7.60	44.77	54	-9.23
11590	49.07	PK	275	1.3	V	7.60	56.67	74	-17.33
11590	37.76	AV	275	1.3	V	7.60	45.36	54	-8.64

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11AC20, Low Channel									
5650	57.43	PK	358	1.1	H	-2.80	54.63	68.2	-13.57
5650	57.24	PK	276	1.9	V	-2.80	54.44	68.2	-13.76
5700	59.01	PK	77	1.4	H	-1.62	57.39	105.2	-47.81
5700	60.62	PK	56	1.4	V	-1.62	59.00	105.2	-46.2
5720	76.10	PK	348	1.3	H	-1.95	74.15	110.8	-36.65
5720	77.02	PK	92	2.0	V	-1.95	75.07	110.8	-35.73
5725	80.06	PK	288	1.0	H	-2.03	78.03	122.2	-44.17
5725	84.92	PK	18	1.5	V	-2.03	82.89	122.2	-39.31
11490	49.97	PK	18	1.5	H	7.99	57.96	74	-16.04
11490	38.59	AV	18	1.5	H	7.99	46.58	54	-7.42
11490	47.63	PK	139	1.8	V	7.99	55.62	74	-18.38
11490	37.52	AV	139	1.8	V	7.99	45.51	54	-8.49
802.11 AC20, Middle Channel									
11570	47.11	PK	273	1.5	H	7.69	54.80	74	-19.2
11570	36.98	AV	273	1.5	H	7.69	44.67	54	-9.33
11570	48.43	PK	197	1.5	V	7.69	56.12	74	-17.88
11570	38.80	AV	197	1.5	V	7.69	46.49	54	-7.51
802.11 AC20, High Channel									
5850	73.68	PK	291	2.1	H	-0.60	73.08	122.2	-49.12
5850	75.61	PK	120	1.7	V	-0.60	75.01	122.2	-47.19
5855	67.05	PK	148	1.6	H	-0.50	66.55	110.8	-44.25
5855	68.87	PK	286	1.6	V	-0.50	68.37	110.8	-42.43
5875	59.56	PK	90	1.5	H	-0.10	59.46	105.2	-45.74
5875	59.10	PK	35	1.6	V	-0.10	59.00	105.2	-46.2
5925	58.10	PK	130	2.0	H	-0.11	57.99	68.2	-10.21
5925	58.68	PK	6	1.4	V	-0.11	58.57	68.2	-9.63
11650	47.85	PK	6	1.4	H	6.82	54.67	74	-19.33
11650	38.55	AV	6	1.4	H	6.82	45.37	54	-8.63
11650	49.34	PK	160	1.0	V	6.82	56.16	74	-17.84
11650	39.06	AV	160	1.0	V	6.82	45.88	54	-8.12
802.11 AC40, Low Channel									
5650	57.81	PK	27	1.0	H	-2.80	55.01	68.2	-13.19
5650	59.06	PK	18	1.3	V	-2.80	56.26	68.2	-11.94
5700	70.39	PK	192	1.7	H	-1.62	68.77	105.2	-36.43
5700	72.43	PK	106	2.2	V	-1.62	70.81	105.2	-34.39
5720	82.78	PK	122	1.2	H	-1.95	80.83	110.8	-29.97
5720	85.75	PK	325	1.2	V	-1.95	83.80	110.8	-27
5725	84.01	PK	93	1.7	H	-2.03	81.98	122.2	-40.22
5725	87.85	PK	348	1.1	V	-2.03	85.82	122.2	-36.38
11510	47.80	PK	348	1.1	H	8.05	55.85	74	-18.15
11510	37.28	AV	348	1.1	H	8.05	45.33	54	-8.67
11510	48.73	PK	254	1.8	V	8.05	56.78	74	-17.22
11510	38.63	AV	254	1.8	V	8.05	46.68	54	-7.32

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBuV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11 AC40, High Channel									
5850	65.18	PK	265	2.1	H	-0.60	64.58	122.2	-57.62
5850	67.63	PK	355	1.1	V	-0.60	67.03	122.2	-55.17
5855	64.35	PK	119	1.0	H	-0.50	63.85	110.8	-46.95
5855	66.00	PK	272	2.2	V	-0.50	65.50	110.8	-45.3
5875	59.24	PK	80	2.0	H	-0.10	59.14	105.2	-46.06
5875	58.38	PK	220	1.1	V	-0.10	58.28	105.2	-46.92
5925	57.84	PK	153	1.8	H	-0.11	57.73	68.2	-10.47
5925	57.65	PK	111	1.9	V	-0.11	57.54	68.2	-10.66
11590	47.65	PK	111	1.9	H	7.60	55.25	74	-18.75
11590	37.74	AV	111	1.9	H	7.60	45.34	54	-8.66
11590	49.46	PK	25	1.2	V	7.60	57.06	74	-16.94
11590	39.93	AV	25	1.2	V	7.60	47.53	54	-6.47
802.11AC80									
5650	64.51	PK	24	2.2	H	-2.80	61.71	68.2	-6.49
5650	65.38	PK	270	2.2	V	-2.80	62.58	68.2	-5.62
5720	83.90	PK	182	1.1	H	-1.62	82.28	110.8	-28.52
5720	83.14	PK	158	1.1	V	-1.62	81.52	110.8	-29.28
5725	94.91	PK	116	1.6	H	-1.95	92.96	122.2	-29.24
5725	94.19	PK	51	1.6	V	-1.95	92.24	122.2	-29.96
5700	68.67	PK	35	2.2	H	-2.03	66.64	105.2	-38.56
5700	68.21	PK	310	1.7	V	-2.03	66.18	105.2	-39.02
5850	71.79	PK	250	1.7	H	-0.60	71.19	122.2	-51.01
5850	76.28	PK	322	2.1	V	-0.60	75.68	122.2	-46.52
5855	73.67	PK	292	1.8	H	-0.50	73.17	110.8	-37.63
5855	75.75	PK	65	2.0	V	-0.50	75.25	110.8	-35.55
5875	68.35	PK	243	1.4	V	-0.10	68.25	105.2	-36.95
5875	71.18	PK	351	2.0	H	-0.10	71.08	105.2	-34.12
5925	60.01	PK	14	2.0	V	-0.11	59.90	68.2	-8.3
5925	60.13	PK	21	1.6	H	-0.11	60.02	68.2	-8.18
11550	45.87	PK	80	1.2	H	7.77	53.64	74	-20.36
11550	46.19	PK	162	1.5	V	7.77	53.96	74	-20.04

Note:

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

Corrected Amplitude = Corrected Factor + Reading

Margin = Corrected Amplitude – Limit

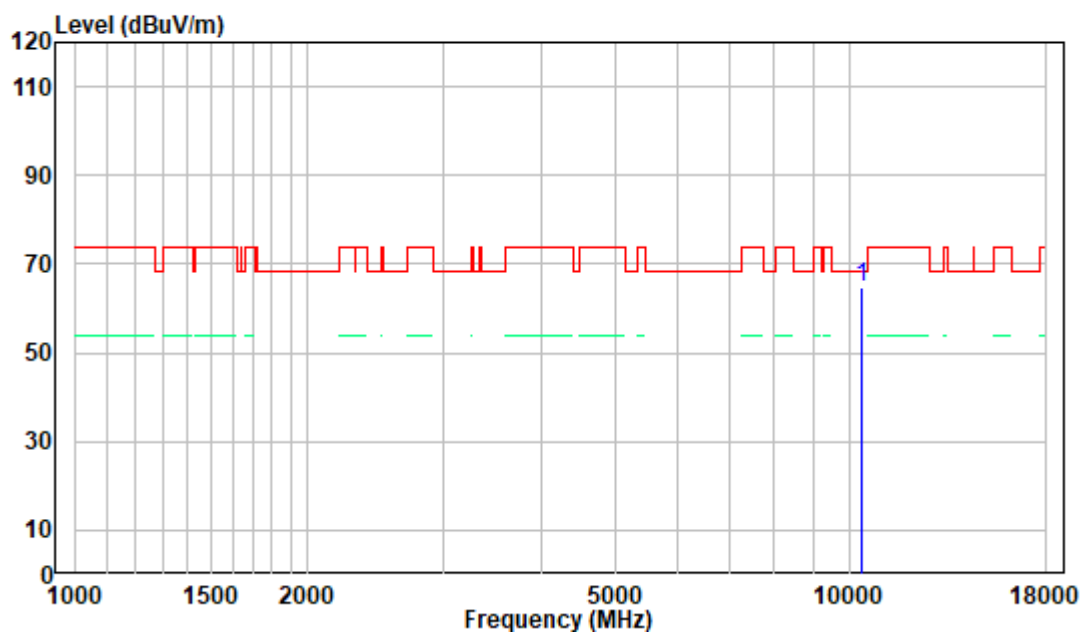
The other spurious emission which is in the noise floor level was not recorded.

When the test result of peak was 20dB below to the limit of peak, which can be compliant to the average limit, just peak value was recorded.

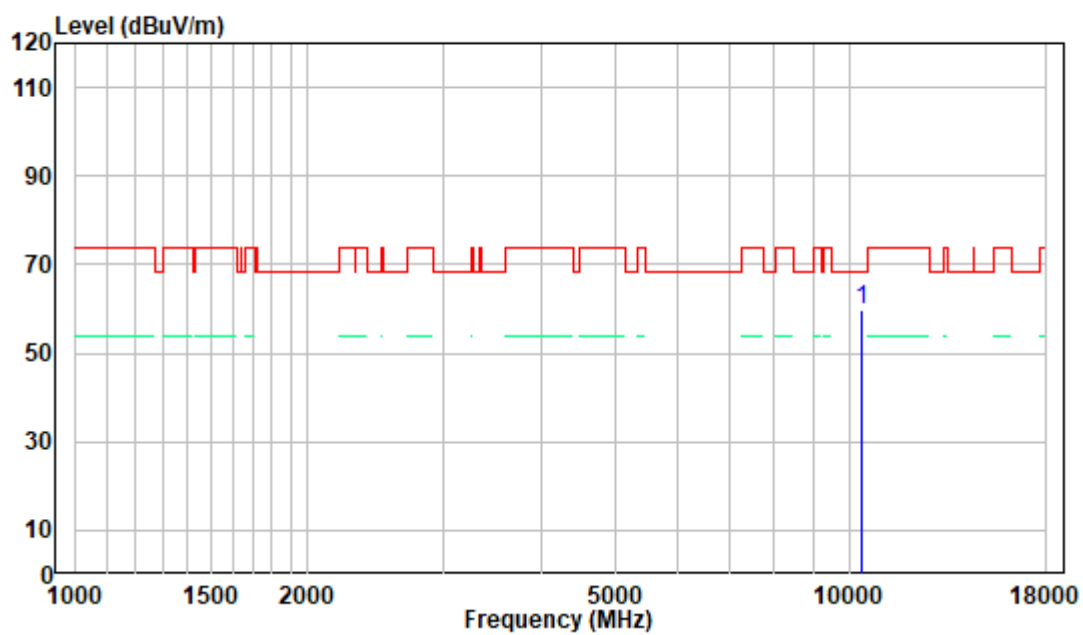
1-18 GHz:

Pre-scan plots:

802.11n20, 5200MHz
Horizontal



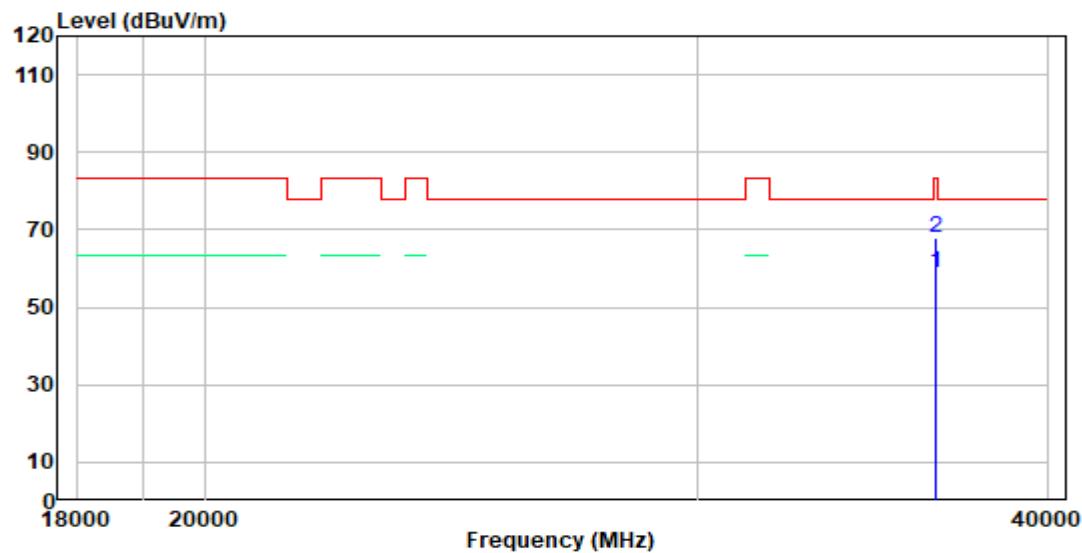
Vertical



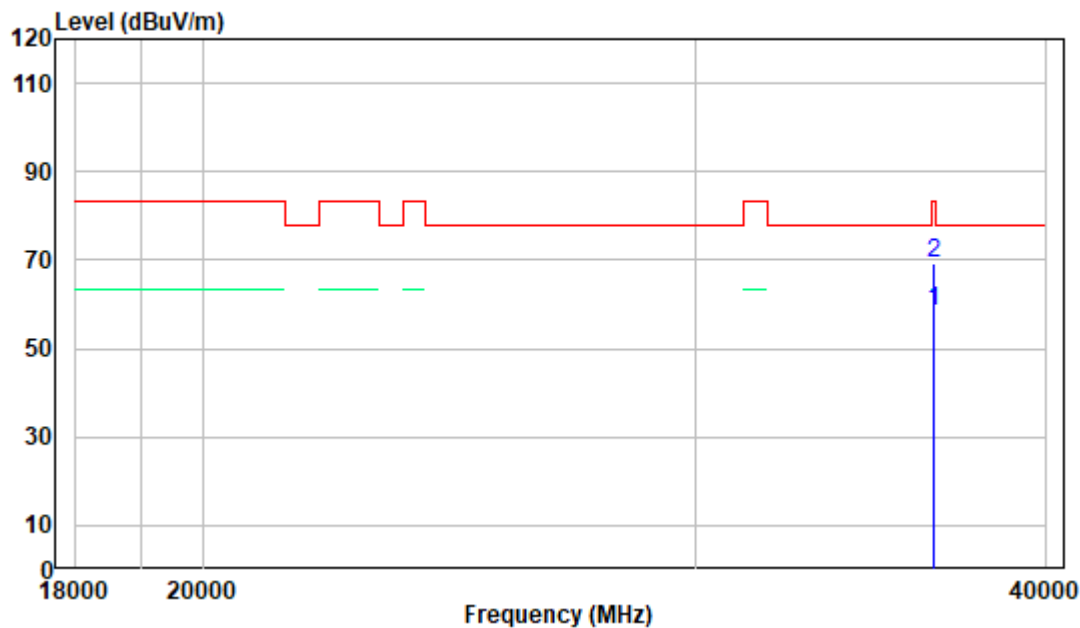
18-40 GHz:

Pre-scan plots:

802.11n20, 5200MHz
Horizontal

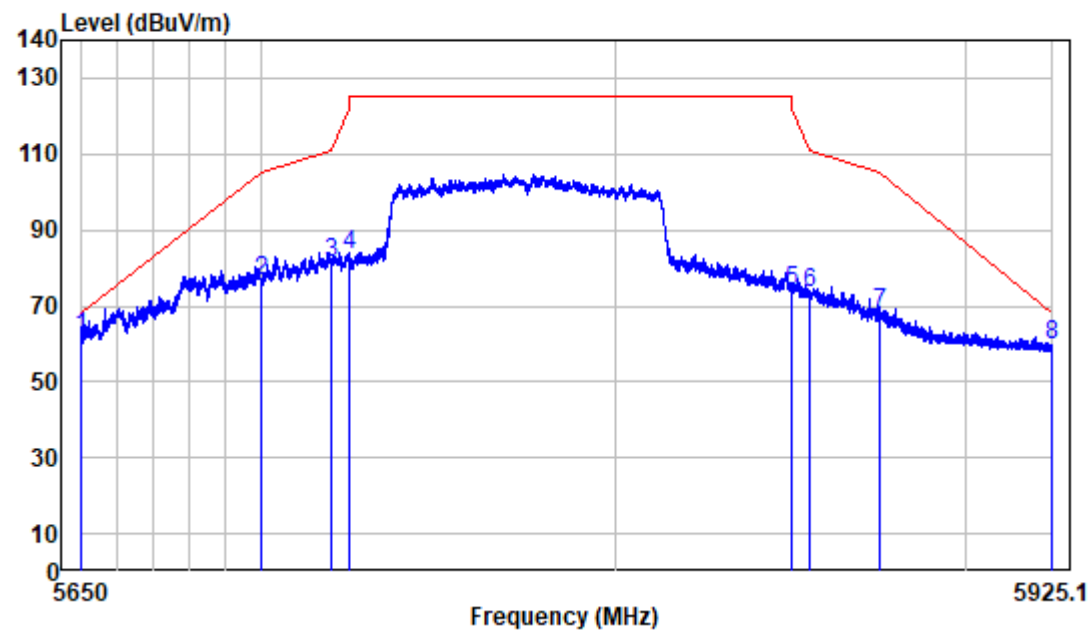


Vertical

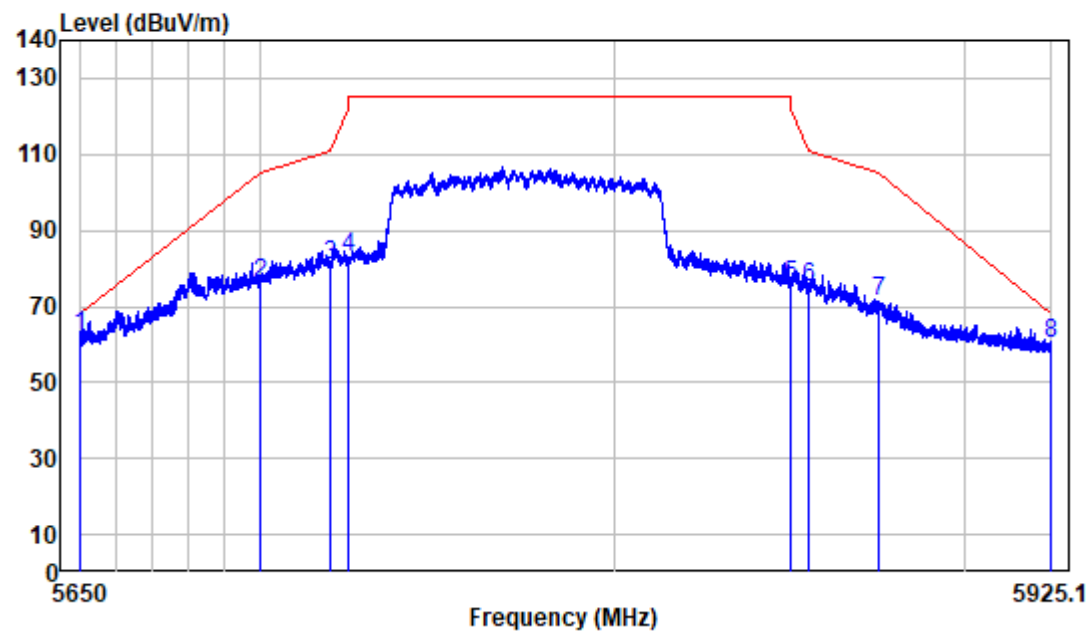


5.8 GHz Band Edge:

Horizontal



Vertical



FCC §15.407(a)(e)-BANDWIDTH

Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

According to KDB789033 D02 section II.C. and section II.D.

1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

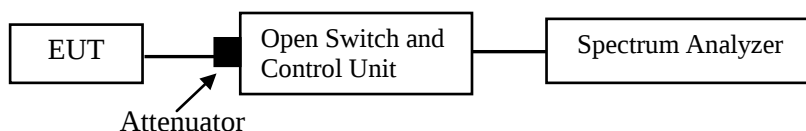
3. 99% Occupied Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is *required* only as a condition for using the optional bandedge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a).

The following procedure shall be used for measuring (99%) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1% to 5% of the OBW
4. Set VBW $\geq 3 \times$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99% power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Note: For devices that use channel aggregation refer to III.A and III.C for determining 99% bandwidth.



Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Liang on 2023-06-03 and 2023-06-06.

EUT operation mode: Transmitting

Test Result: PASS. Please refer to the Appendix.

FCC §15.407(a) (1) (3)-CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

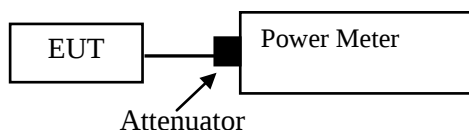
For an indoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

According to KDB789033 D02 section II.E.3.a).

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:	24 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Liang on 2023-06-03 and 2023-06-06.

EUT operation mode: Transmitting

Test Result: PASS. Please refer to the Appendix.

FCC §15.407(a) (1) (3)-POWER SPECTRAL DENSITY

Applicable Standard

For an indoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

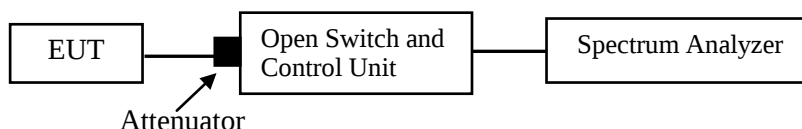
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

According to KDB789033 D02 section II.F.

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- Set $RBW \geq 1/T$, where T is defined in section II.B.1.a).
- Set $VBW \geq 3 RBW$.
- If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log(500 \text{ kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log(1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.



Test Data**Environmental Conditions**

Temperature:	24 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Liang on 2023-06-03 and 2023-06-06.

EUT operation mode: Transmitting

Test Result: PASS. Please refer to the Appendix.

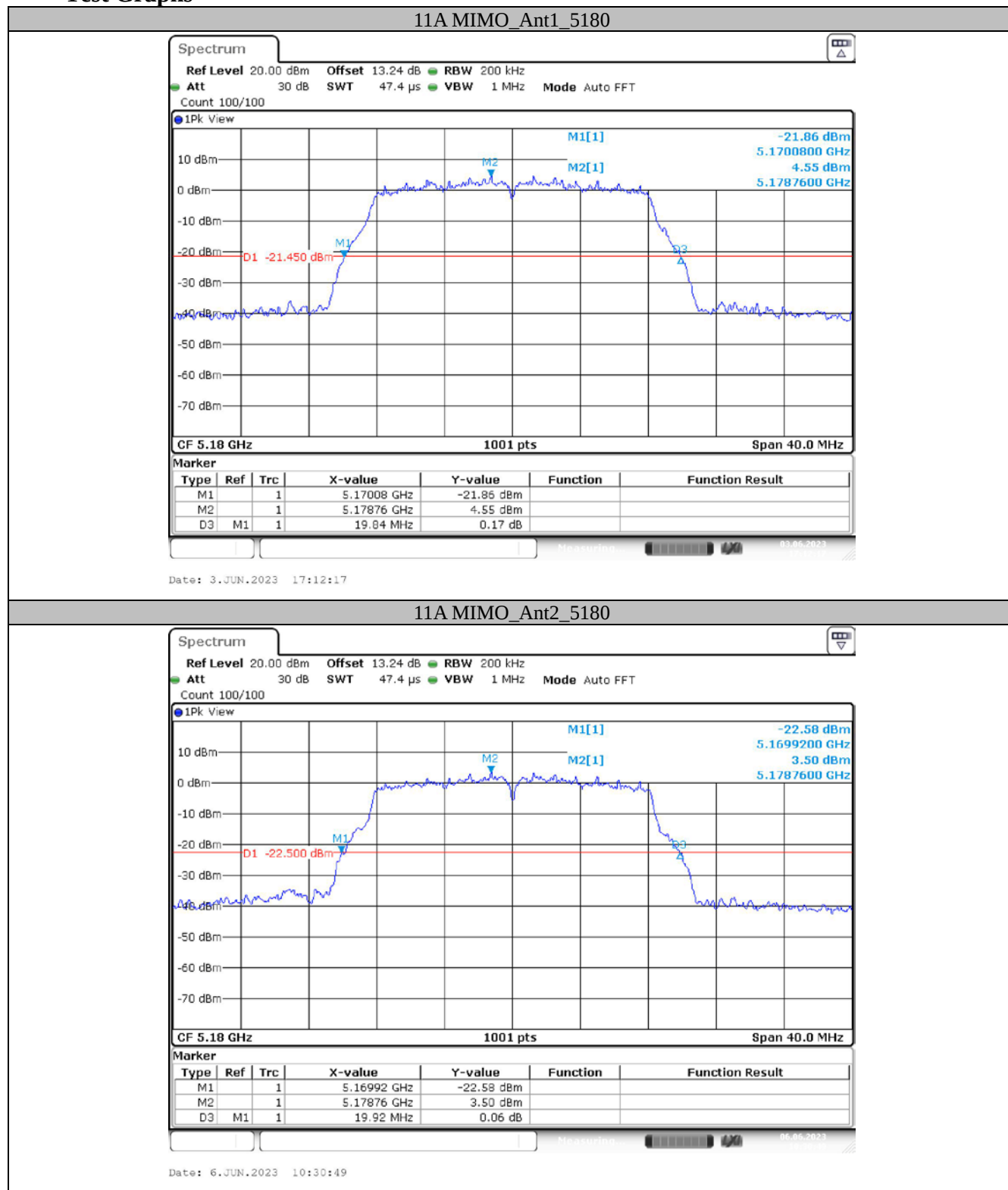
APPENDIX

Appendix A1: Emission Bandwidth

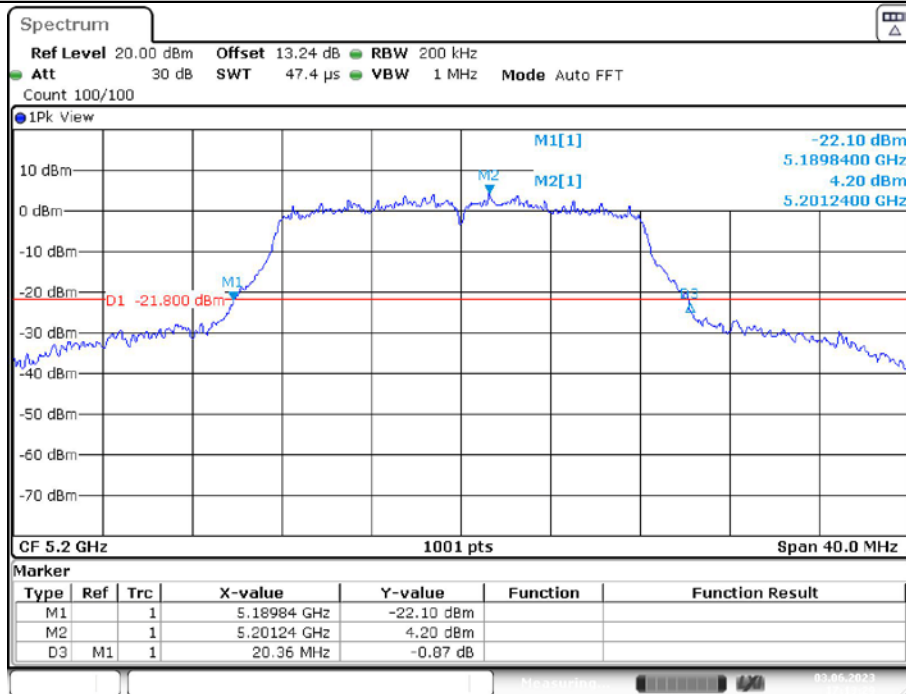
5150-5250 MHz

Test Mode	Channel	Antenna	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A MIMO	5180	Ant1	19.84	5170.08	5189.92	---	PASS
		Ant2	19.92	5169.92	5189.84	---	PASS
	5200	Ant1	20.36	5189.84	5210.20	---	PASS
		Ant2	20.60	5189.76	5210.36	---	PASS
	5240	Ant1	20.32	5229.88	5250.20	---	PASS
		Ant2	20.52	5229.84	5250.36	---	PASS
11N20MIMO	5180	Ant1	20.24	5169.88	5190.12	---	PASS
		Ant2	20.16	5169.84	5190.00	---	PASS
	5200	Ant1	20.16	5189.92	5210.08	---	PASS
		Ant2	20.44	5189.84	5210.28	---	PASS
	5240	Ant1	20.28	5229.92	5250.20	---	PASS
		Ant2	20.52	5229.80	5250.32	---	PASS
11N40MIMO	5190	Ant1	41.04	5169.52	5210.56	---	PASS
		Ant2	40.16	5170.00	5210.16	---	PASS
	5230	Ant1	41.68	5209.36	5251.04	---	PASS
		Ant2	45.92	5206.24	5252.16	---	PASS
11AC20MIMO	5180	Ant1	20.24	5169.88	5190.12	---	PASS
		Ant2	19.96	5170.04	5190.00	---	PASS
	5200	Ant1	20.12	5189.92	5210.04	---	PASS
		Ant2	20.40	5189.84	5210.24	---	PASS
	5240	Ant1	20.12	5229.92	5250.04	---	PASS
		Ant2	20.32	5229.80	5250.12	---	PASS
11AC40MIMO	5190	Ant1	41.2	5170.00	5210.24	---	PASS
		Ant2	40.24	5169.12	5211.28	---	PASS
	5230	Ant1	41.60	5209.36	5250.96	---	PASS
		Ant2	42.64	5209.84	5252.48	---	PASS
11AC80MIMO	5210	Ant1	81.92	5169.20	5251.12	---	PASS
		Ant2	80.8	5169.68	5250.48	---	PASS

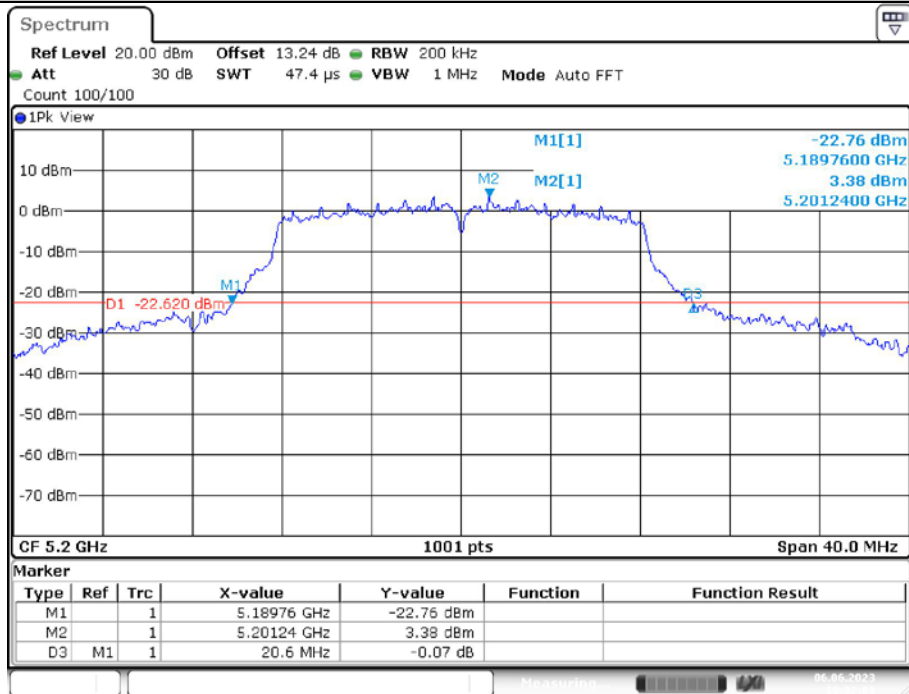
Test Graphs



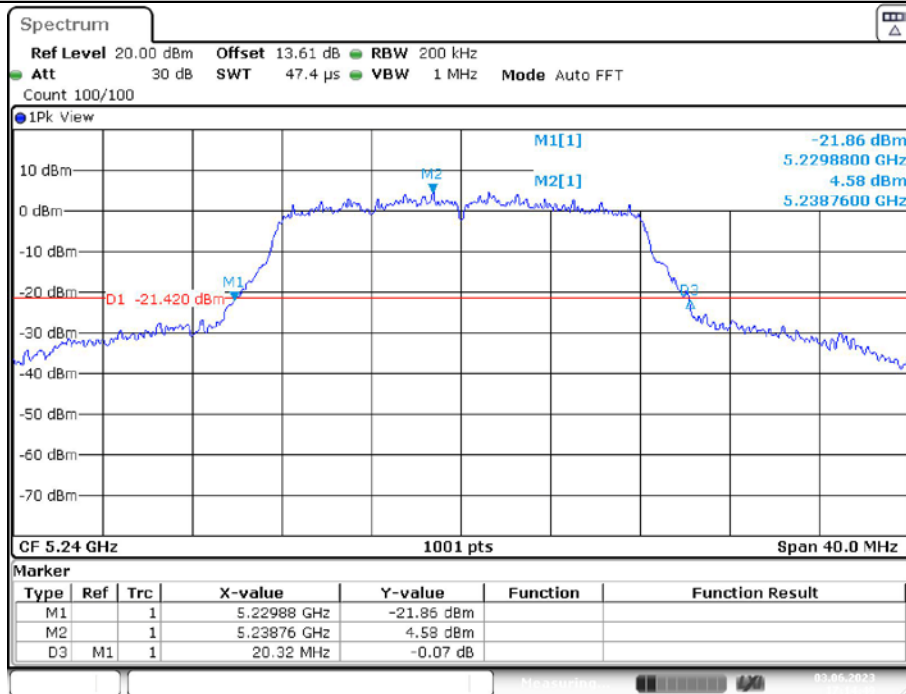
11A MIMO_Ant1_5200



11A MIMO_Ant2_5200

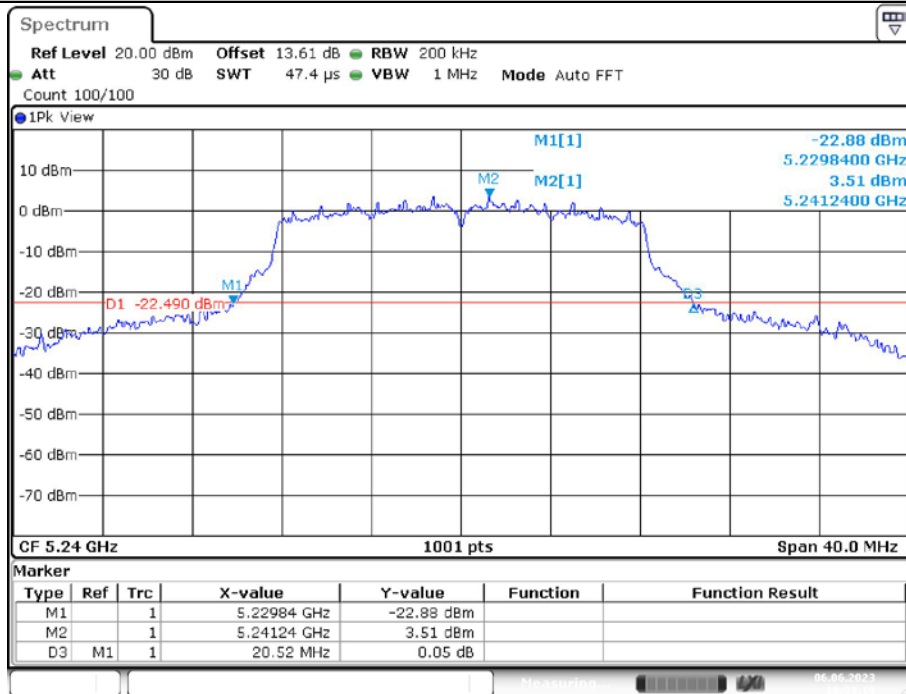


11A MIMO_Ant1_5240



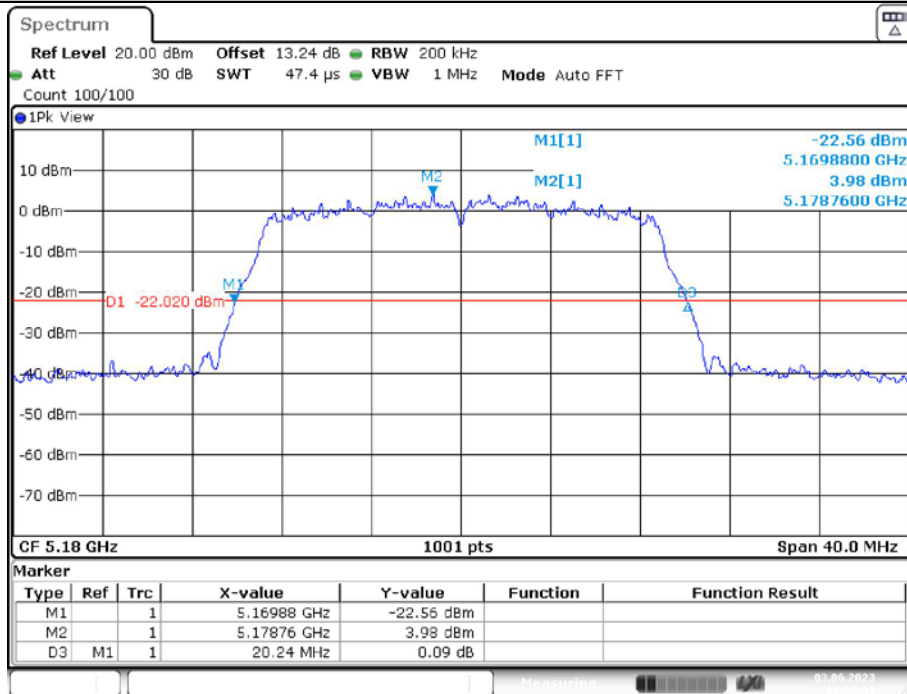
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11A MIMO_Ant2_5240



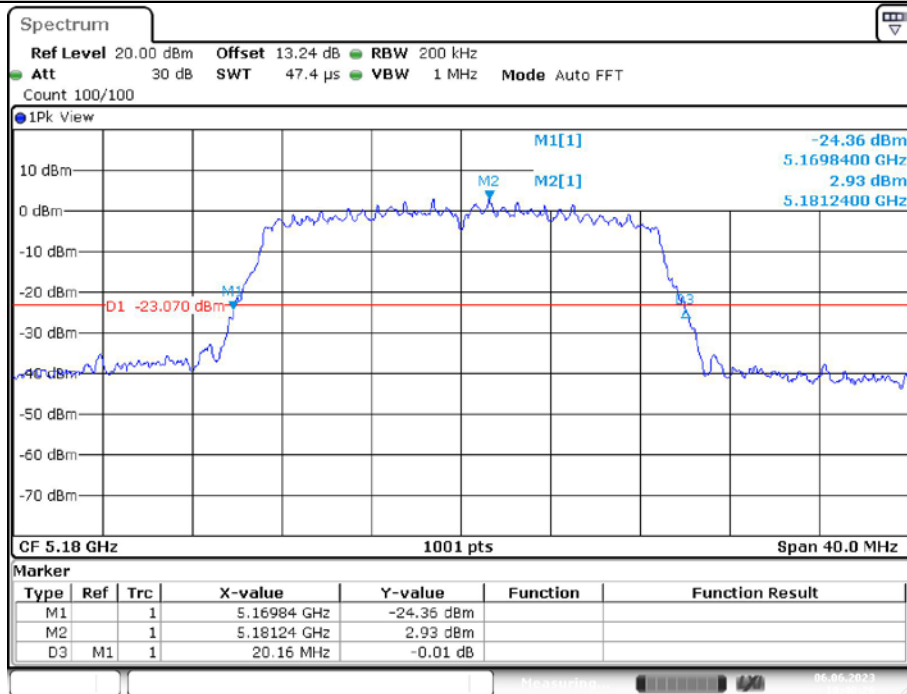
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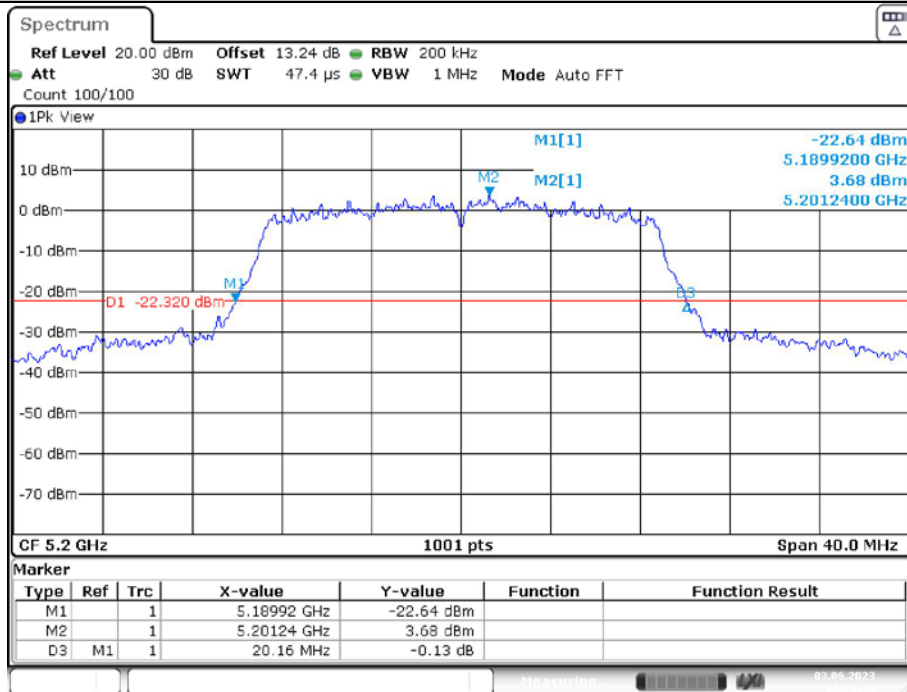
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11N20MIMO_Ant2_5180

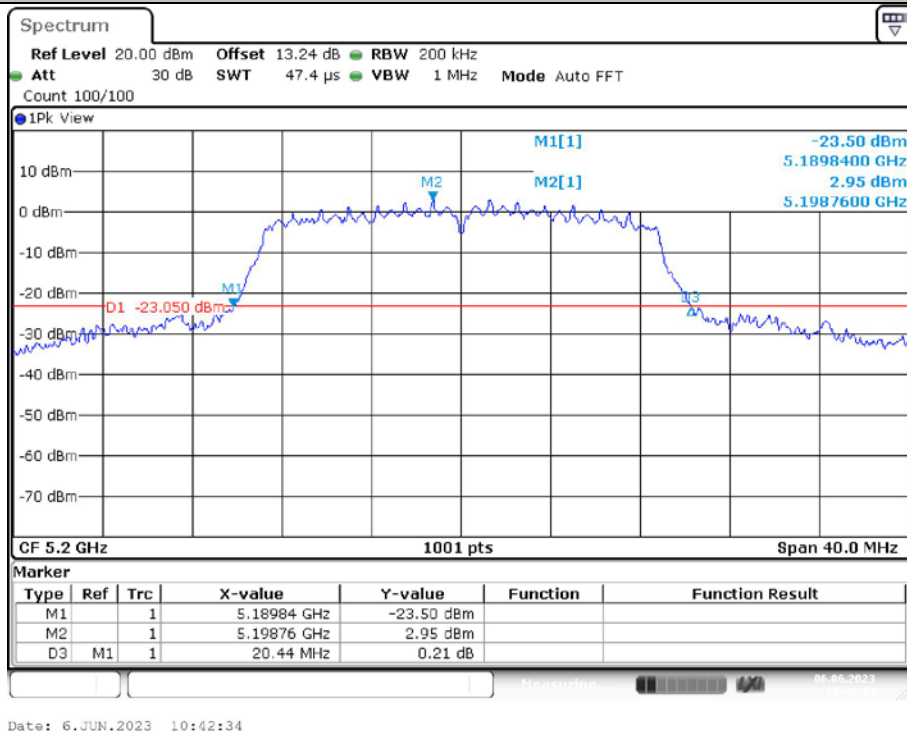


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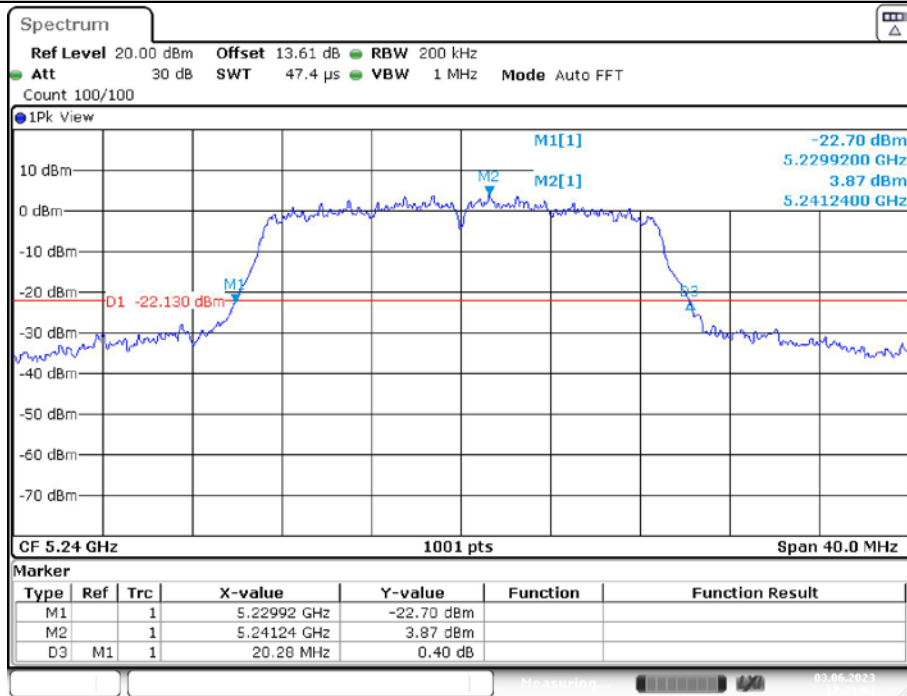
11N20MIMO_Ant1_5200



11N20MIMO_Ant2_5200

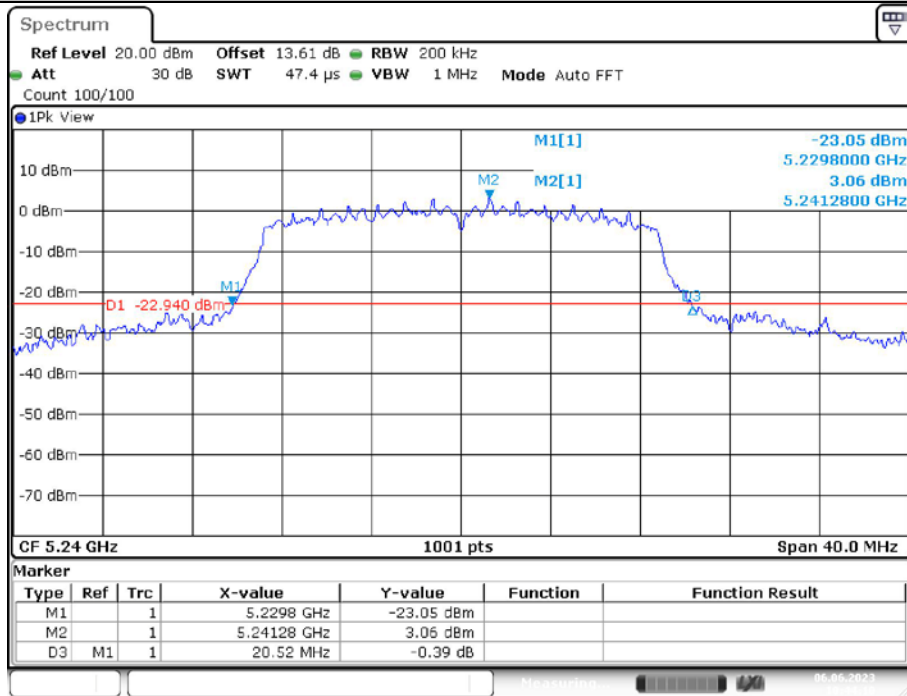


11N20MIMO_Ant1_5240



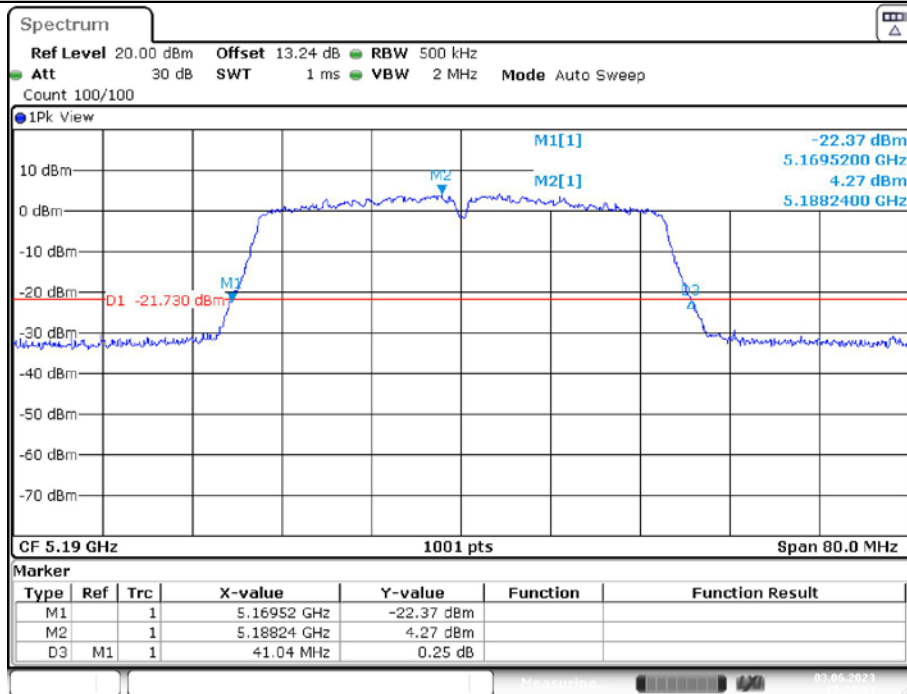
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11N20MIMO_Ant2_5240



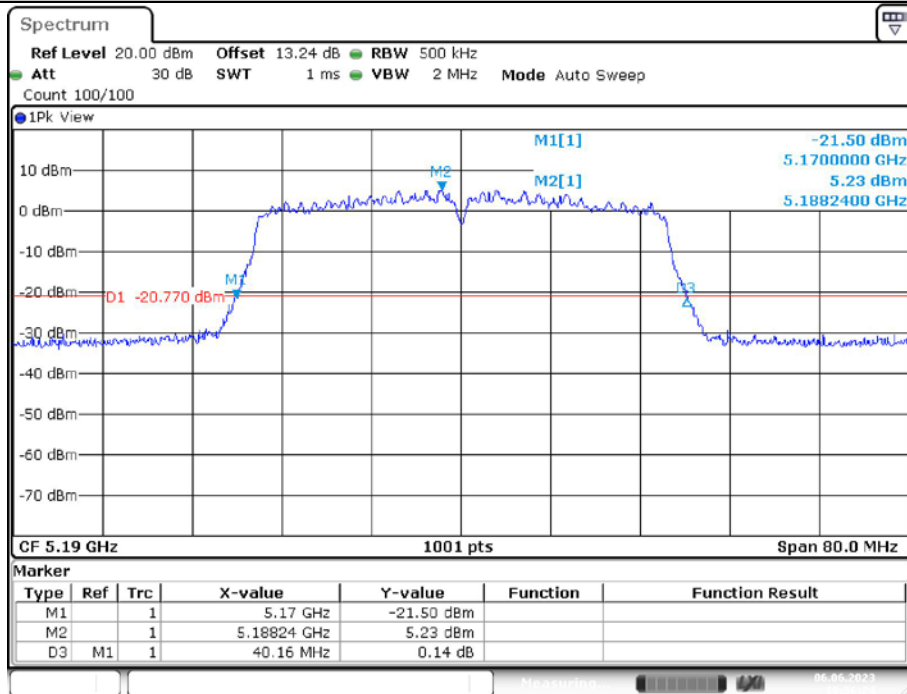
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11N40MIMO_Ant1_5190



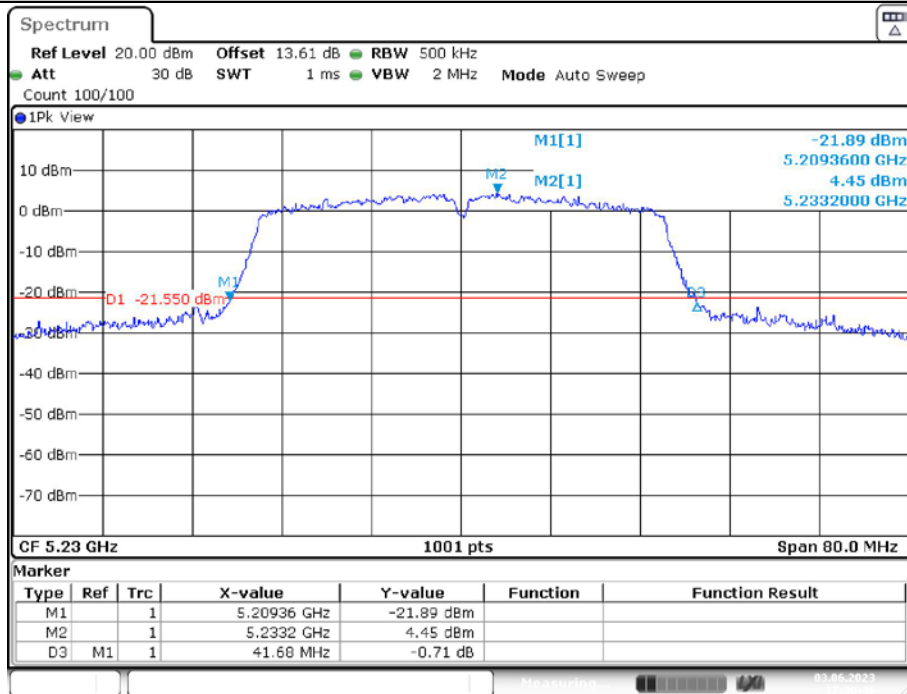
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11N40MIMO_Ant2_5190



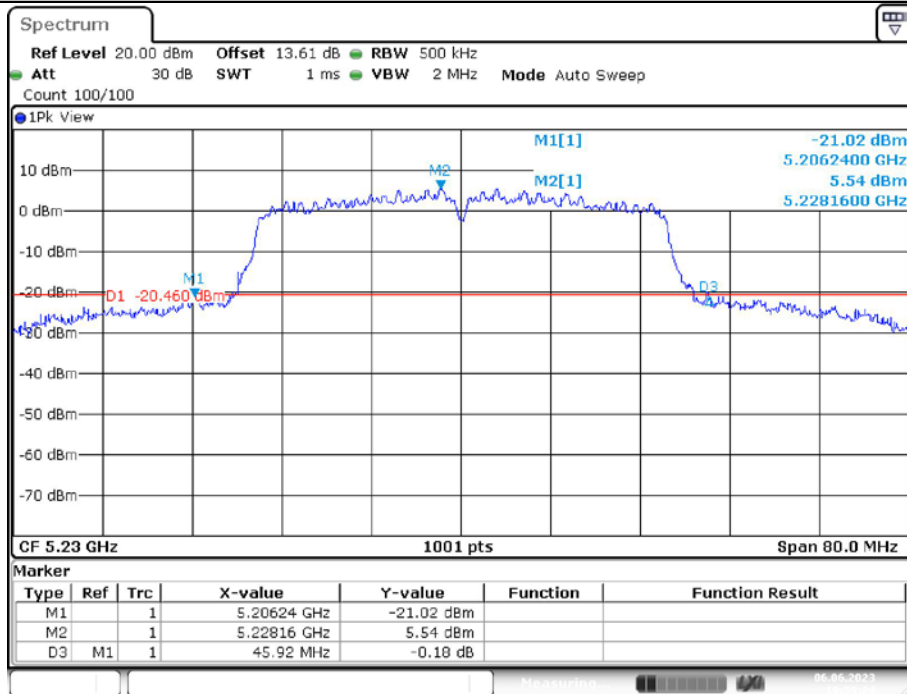
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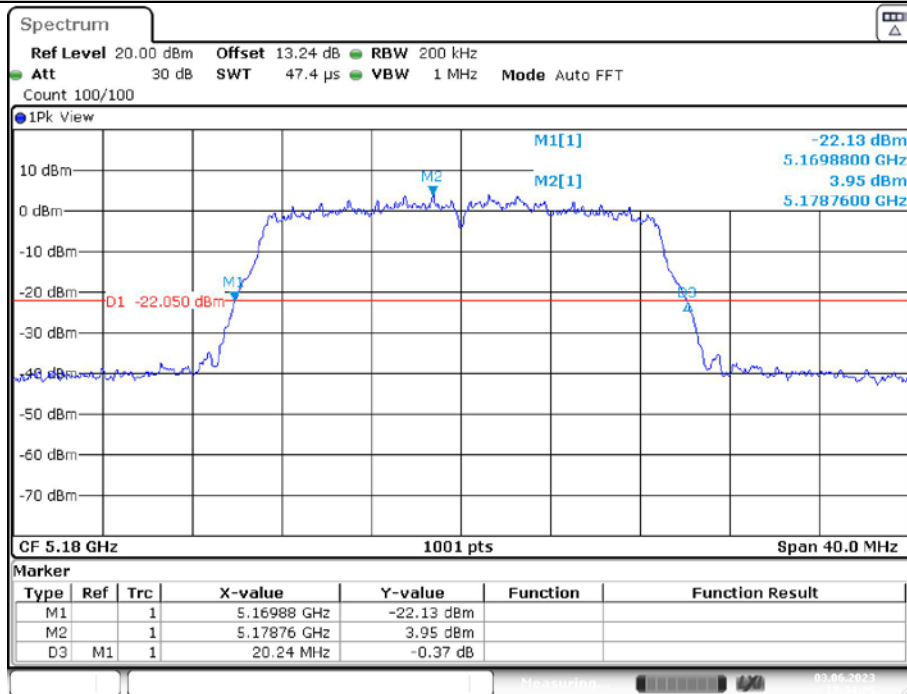
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11N40MIMO_Ant2_5230



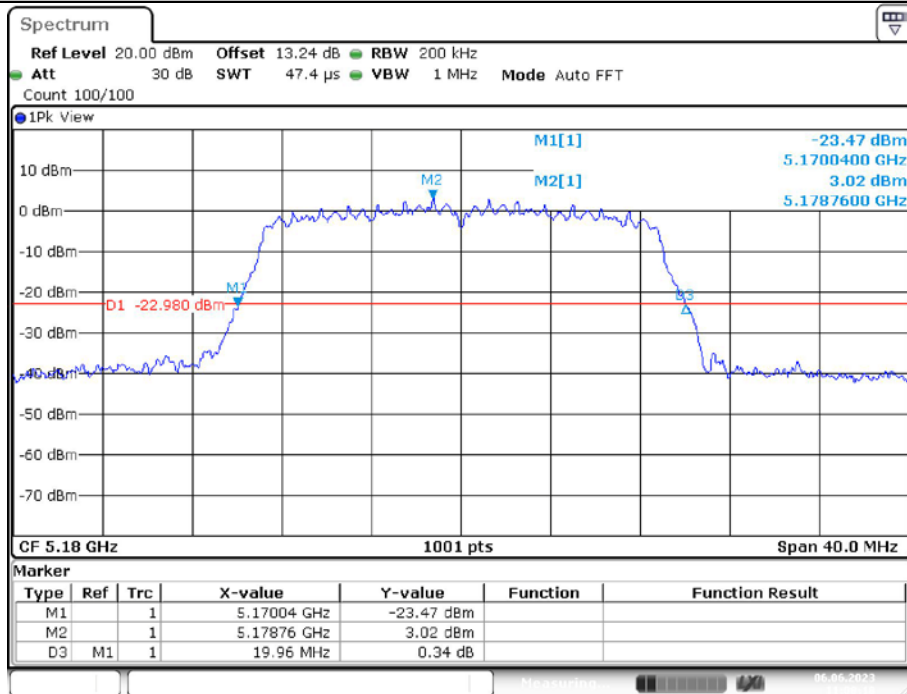
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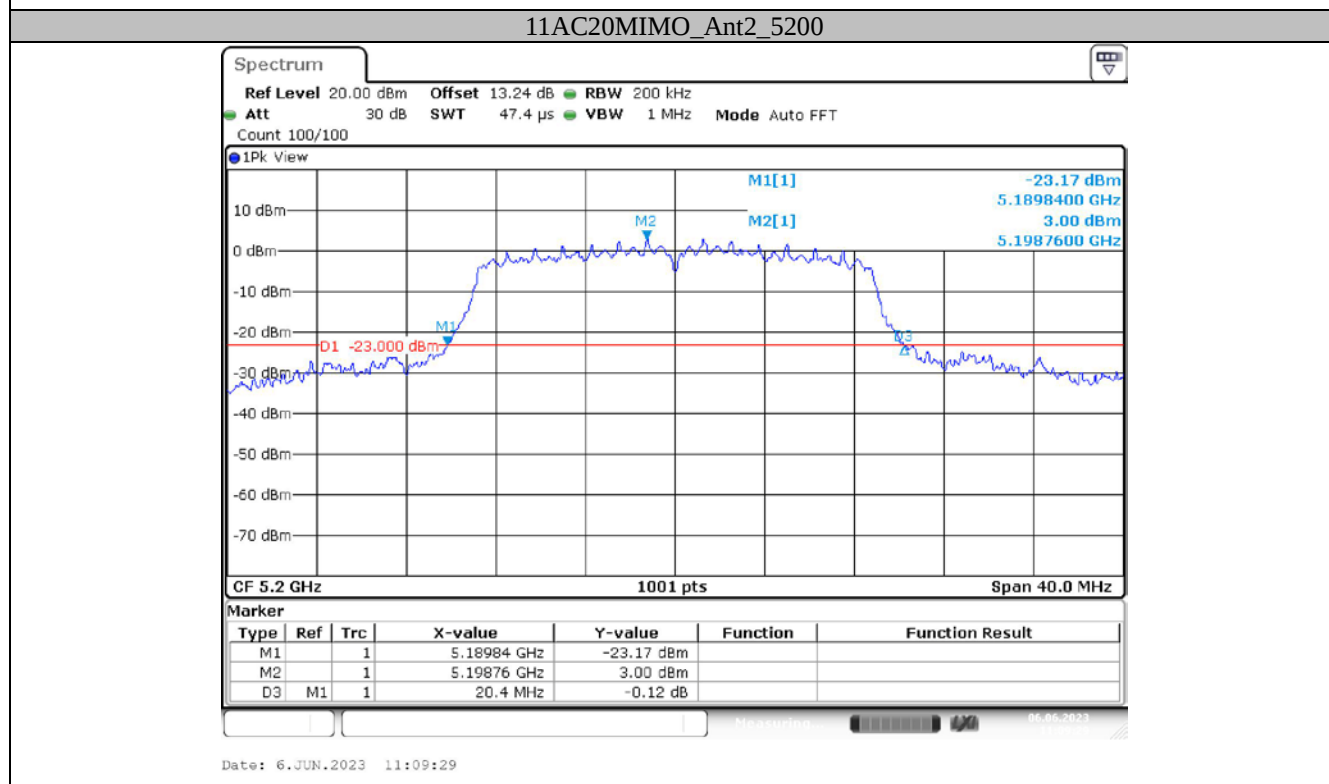
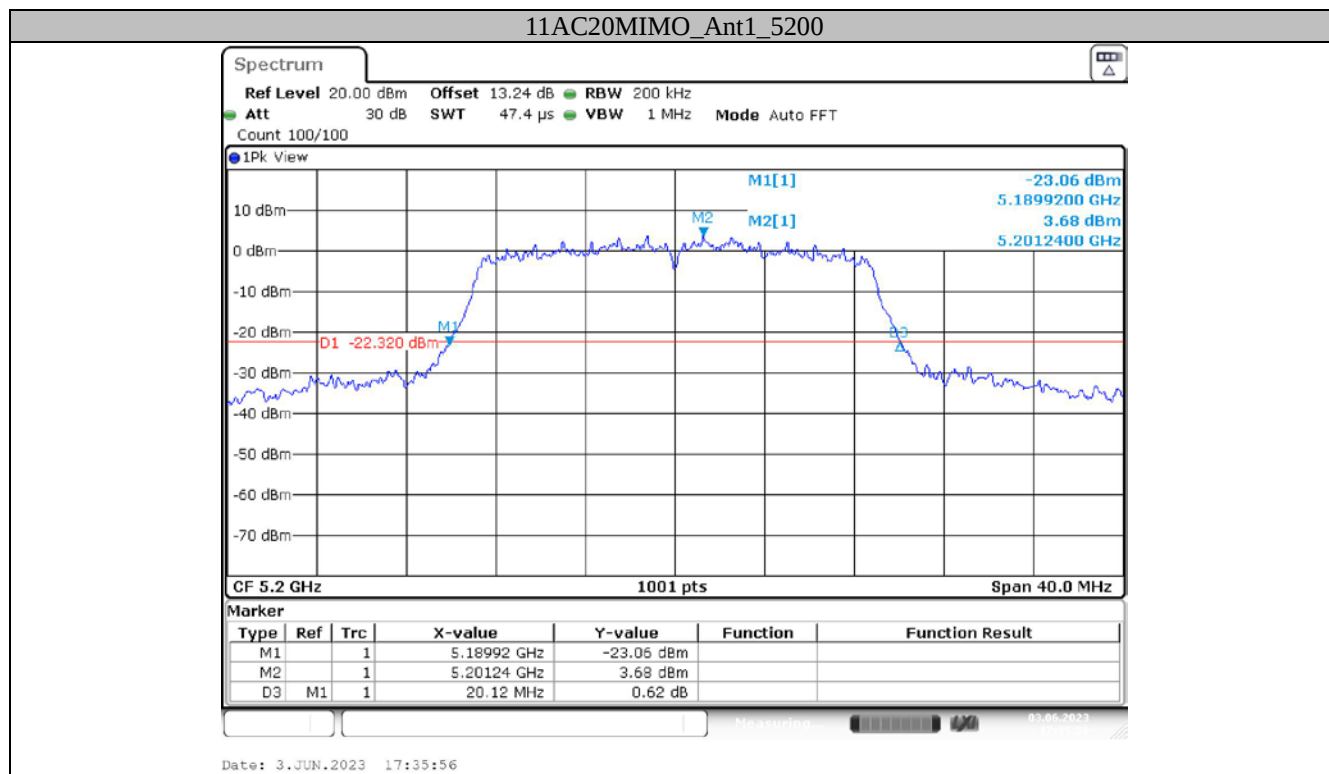


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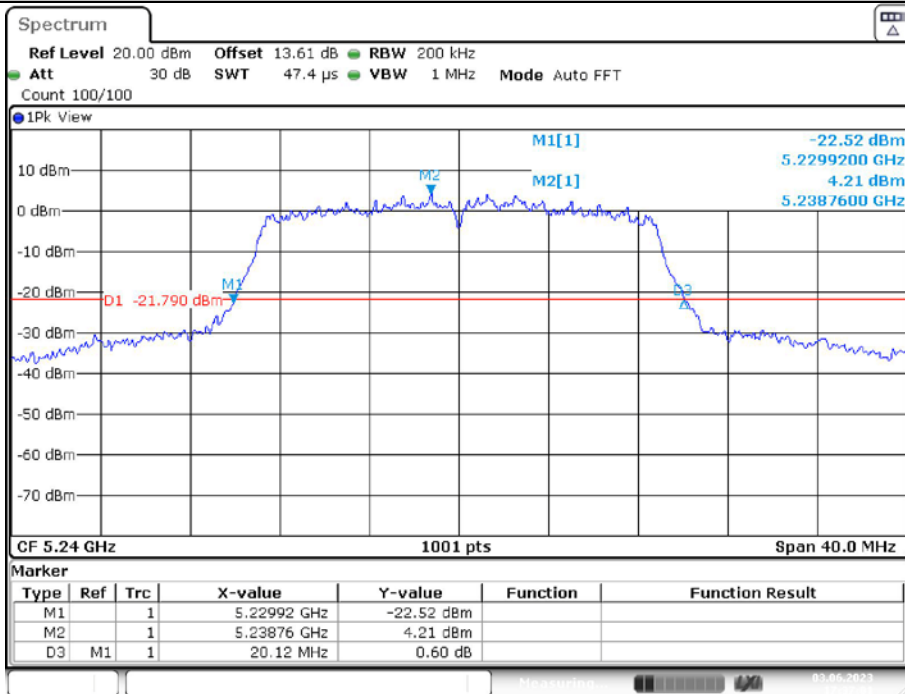
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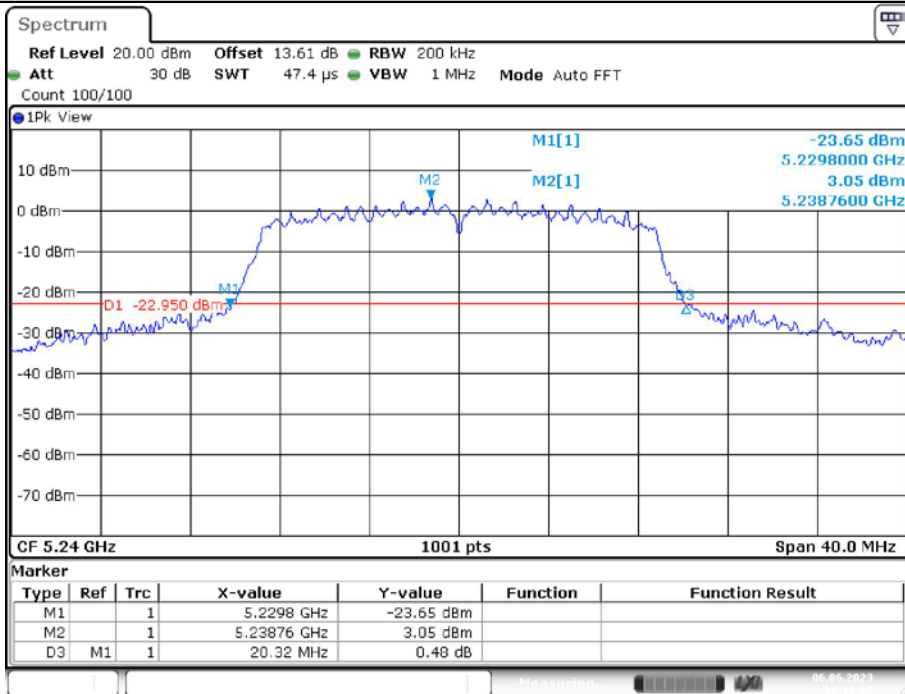


11AC20MIMO_Ant1_5240



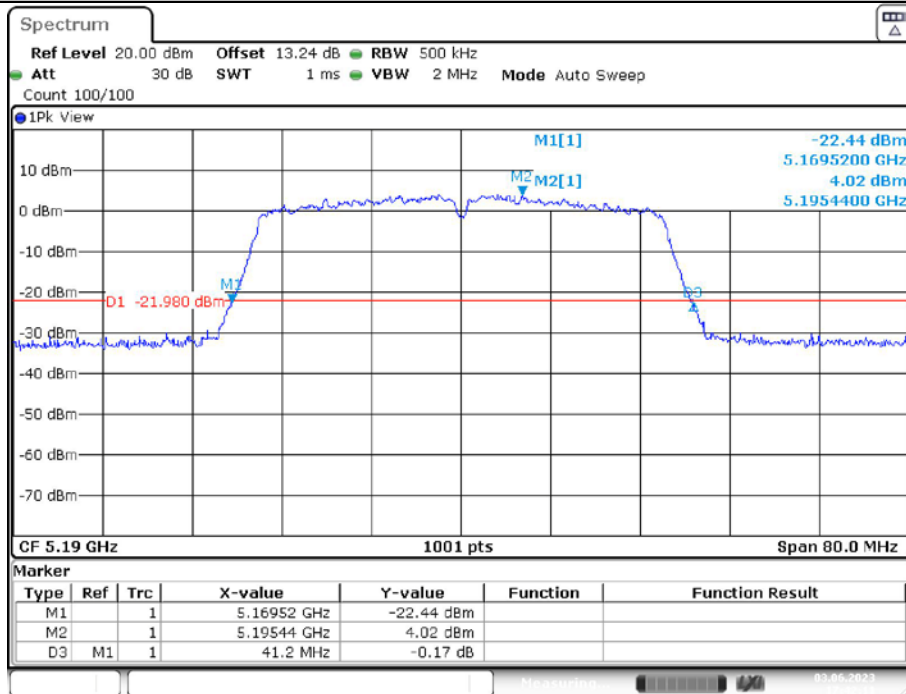
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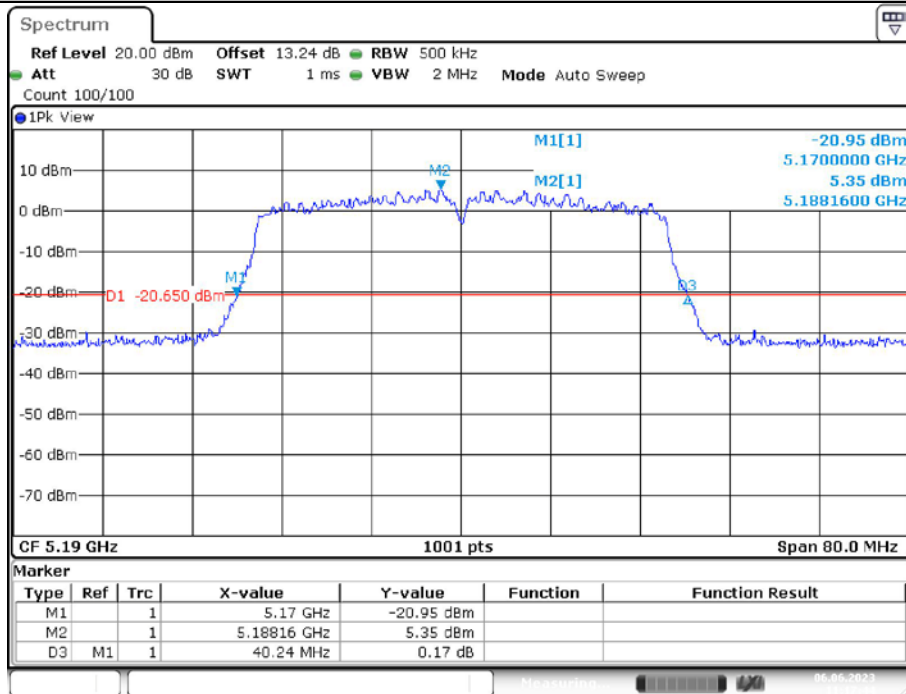


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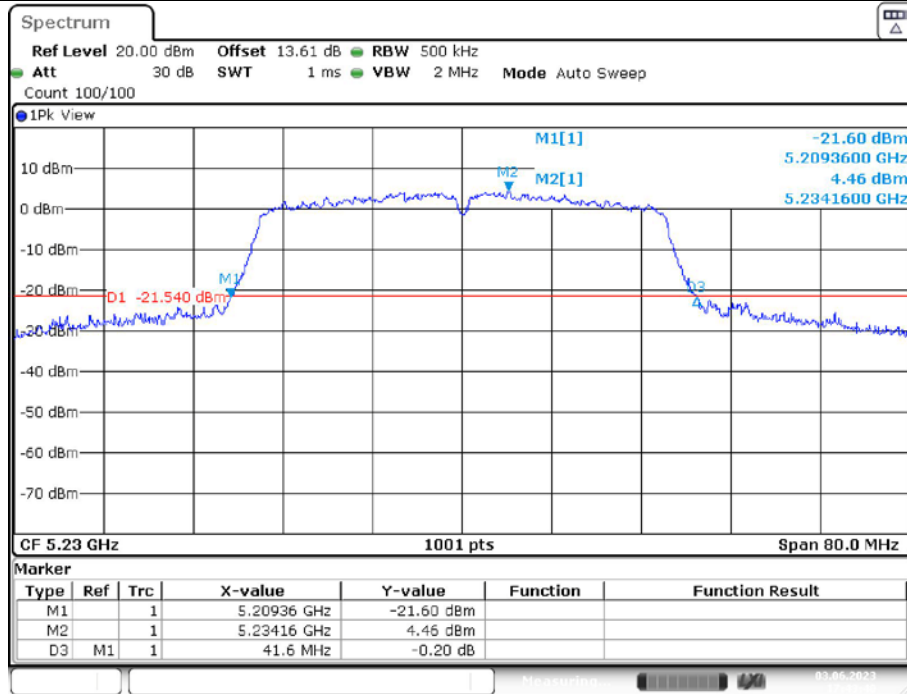
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11AC40MIMO_Ant2_5190

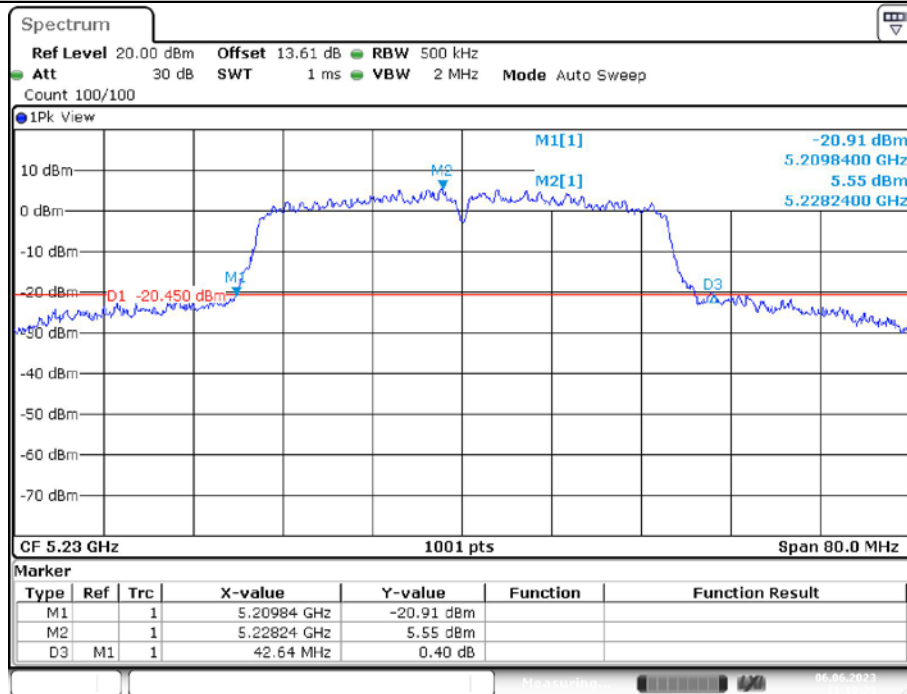


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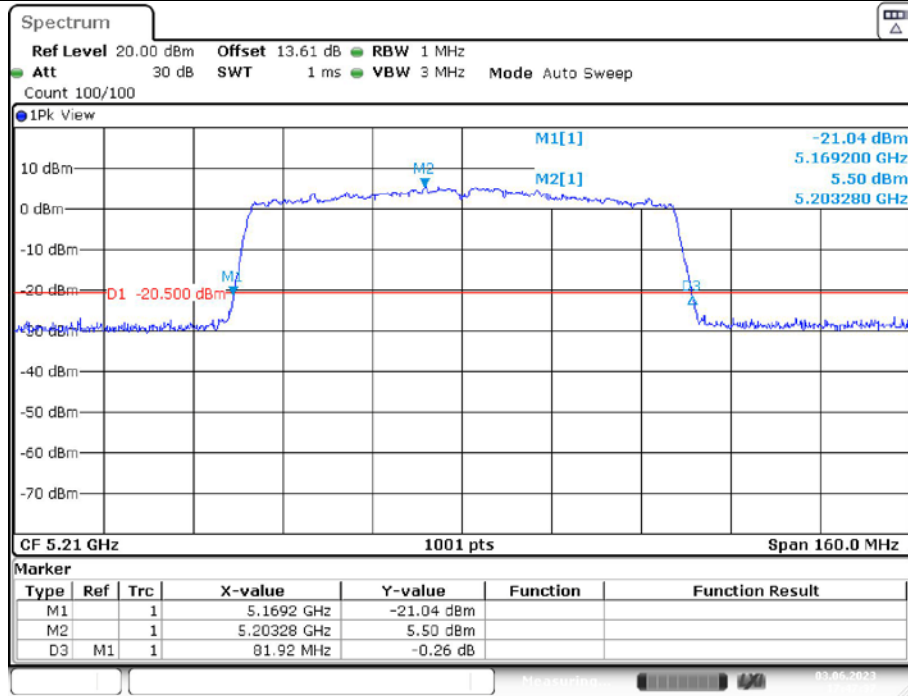
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11AC40MIMO_Ant2_5230



Date: 6.JUN.2023 11:19:23

11AC80MIMO_Ant1_5210



11AC80MIMO_Ant2_5210

