FCC PART 15.407

TEST REPORT

For

Seeed Technology Co., Ltd

9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, China

FCC ID: Z4T-RETERMINAL

Report Type:	Product Type:
Original Report	reTerminal with Raspberry Pi Compute Module CM4X

Report Number:	SZNS210706-27597E-00C
Report Date:	2021-08-23
Reviewed By:	Candy Li RF Engineer
Prepared By:	Shenzhen Accurate Technology Co., Ltd. 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396 Http://www.atc-lab.com

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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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	reTerminal with Raspberry Pi Compute Module CM4X
Trademark	Seeed Studio
Tested Model	reTerminal - CM4X
Frequency Range	5G Wi-Fi: 5150-5250 MHz; 5725-5850 MHz
Maximum Average Conducted Output Power	5G Wi-Fi: 5150-5250 MHz 4.62dBm (802.11a), 4.62dBm(802.11n20), 4.09dBm(802.11n40), 4.05dBm (802.11ac80) 5725-5850 MHz: 4.19dBm (802.11a), 4.05dBm(802.11n20), 2.91dBm(802.11n40), 2.49dBm (802.11ac80)
Modulation Technique	OFDM
Antenna Specification	Ant 0 FPC Antenna: -0.69dBi(5.2G), 1.56dBi(5.8G) Ant 1 PCB Antenna: 2.3dBi(5.2G&5.8G) Ant 2 External Antenna: 2dBi(5.2G&5.8G) (provided by the applicant)
Voltage Range	DC 5V from adapter.
Date of Test	2021-08-05 to 2021-08-10
Sample serial number	SZNS210706-27597E-RF-S1
Received date	2021-07-06
Sample/EUT Status	Good condition

Note: This product has three types of configuration about antenna for different customer market, and End User can change the configuration files to select antenna used via Windows System, which will not change RF parameter and always only one antenna was used.

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		0.73dB
Unwanted Emission, conducted		1.6dB
Emissions, Radiated	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

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.

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.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A-2.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device only supports 5G Wi-Fi 802.11a/n20/n40/ac80 modes, which was declared by manufacturer.

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 channel 36, 40, 48 were tested;
For 802.11n40 channel 38, 46 were tested.
For 802.11ac80 channel 42 was 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 channel 149, 157, 165 were tested; For 802.11n40, channel 151, 159 were tested.
For 802.11ac80, channel 155 were tested.

EUT Exercise Software

"Windows PowerShell" software was used to test, which provided by manufacturer and power level as below:

Mode	Data Rate (Mbps)	Power Level*
802.11 a	6	30
802.11 n20/n40/ac80	MCS0	30

Duty cycle

5150-5250 MHz:

TestMode	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	5180	2.05	2.07	99.03
	5200	2.05	2.07	99.03
	5240	2.05	2.07	99.03
11N20SISO	5180	1.91	1.93	98.96
	5200	1.91	1.93	98.96
	5240	1.91	1.93	98.96
11N40SISO	5190	0.94	0.96	97.92
	5230	0.94	0.96	97.92
11AC80SISO	5210	0.46	0.48	95.83

5725-5850 MHz:

TestMode	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	5745	2.05	2.07	99.03
	5785	2.05	2.07	99.03
	5825	2.05	2.07	99.03
11N20SISO	5745	1.91	1.93	98.96
	5785	1.91	1.93	98.96
	5825	1.91	1.93	98.96
11N40SISO	5755	0.94	0.96	97.92
	5795	0.94	0.96	97.92
11AC80SISO	5775	0.46	0.48	95.83

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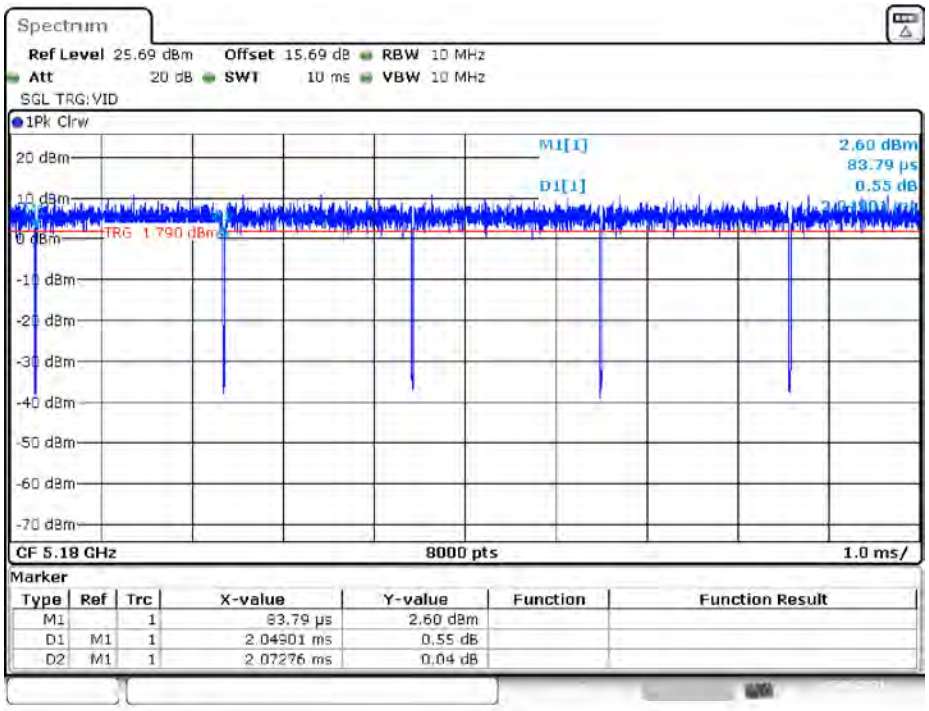

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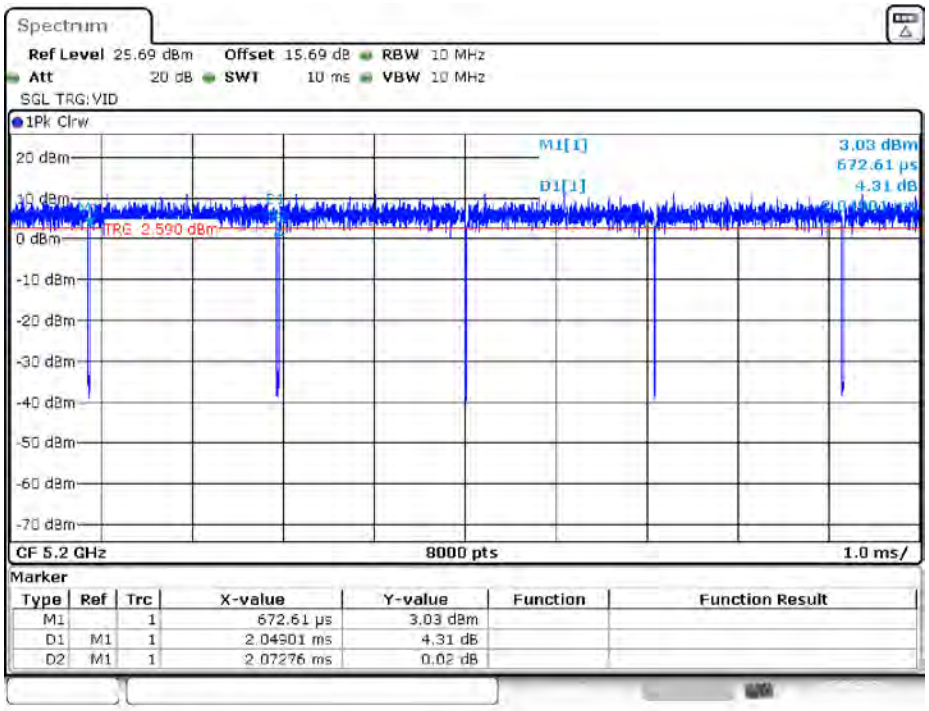

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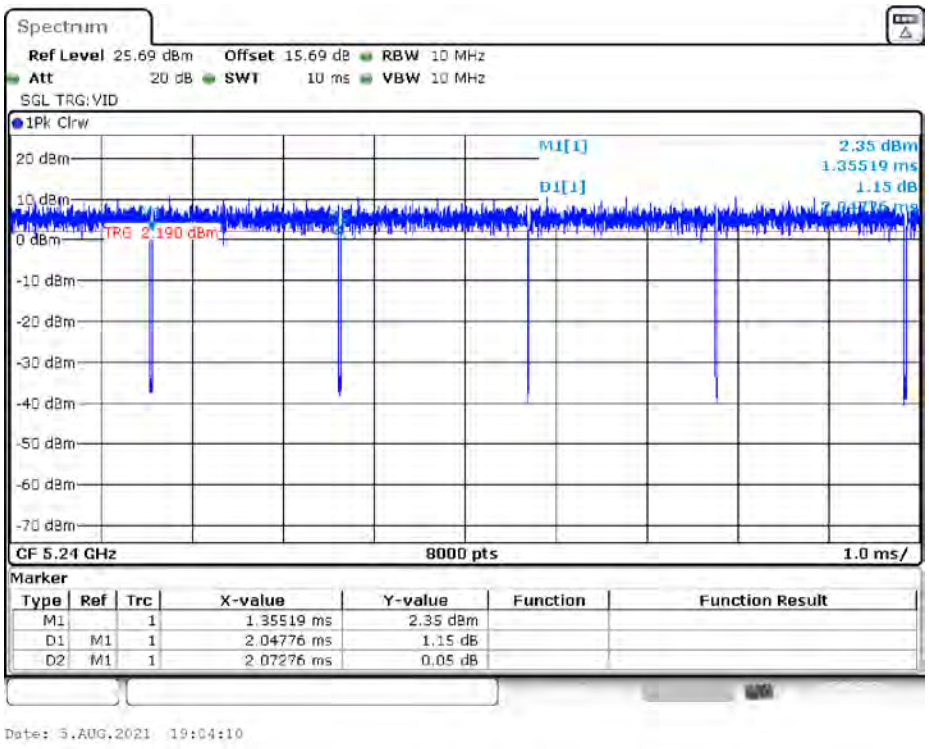

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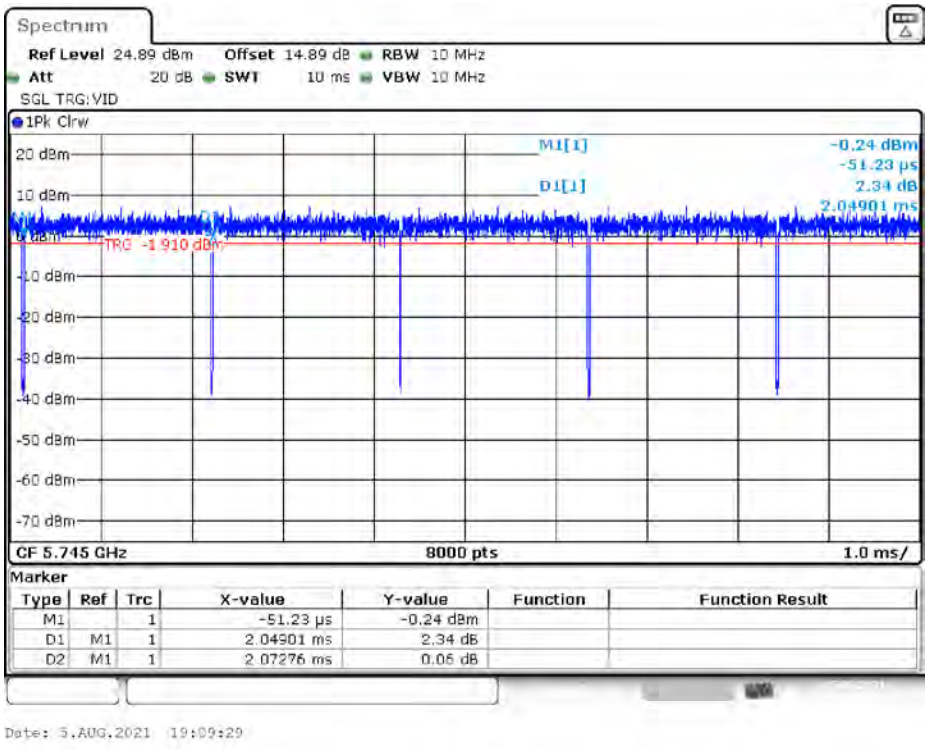

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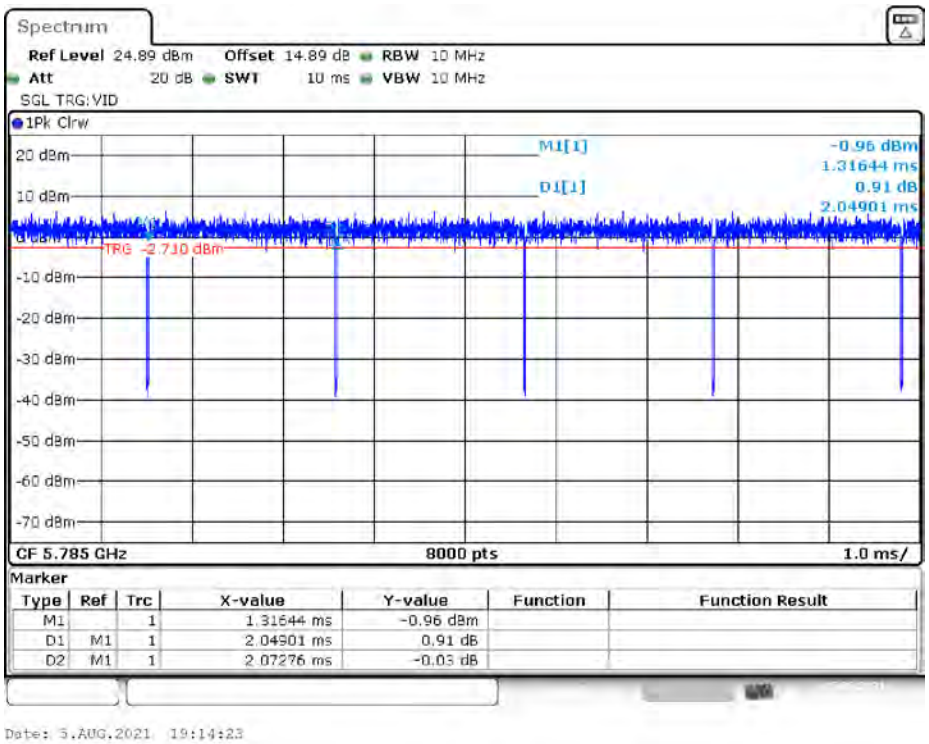

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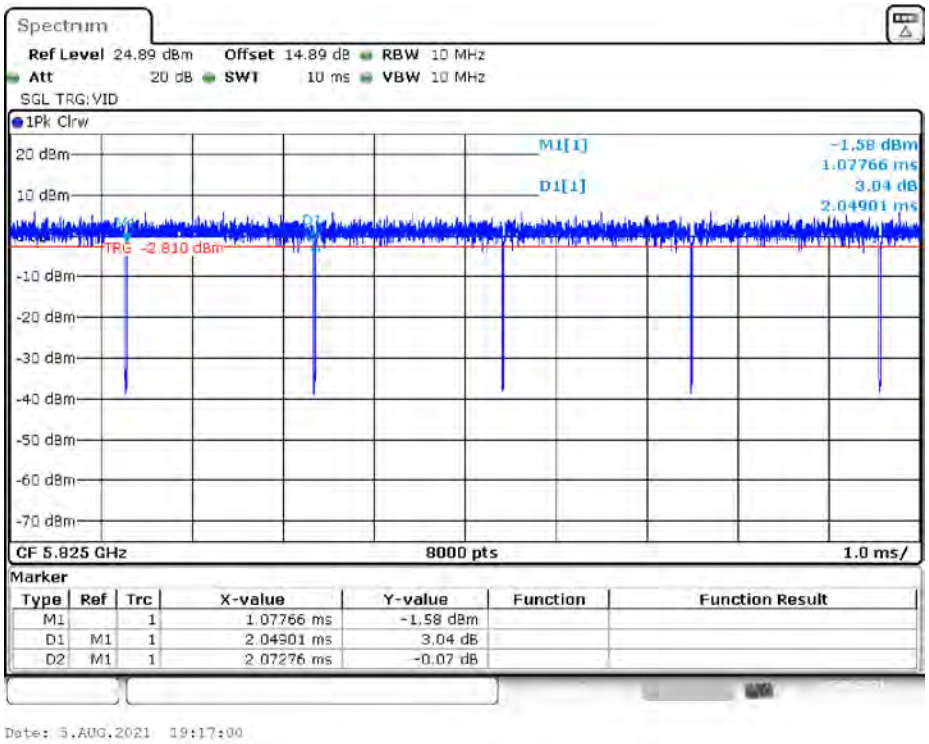

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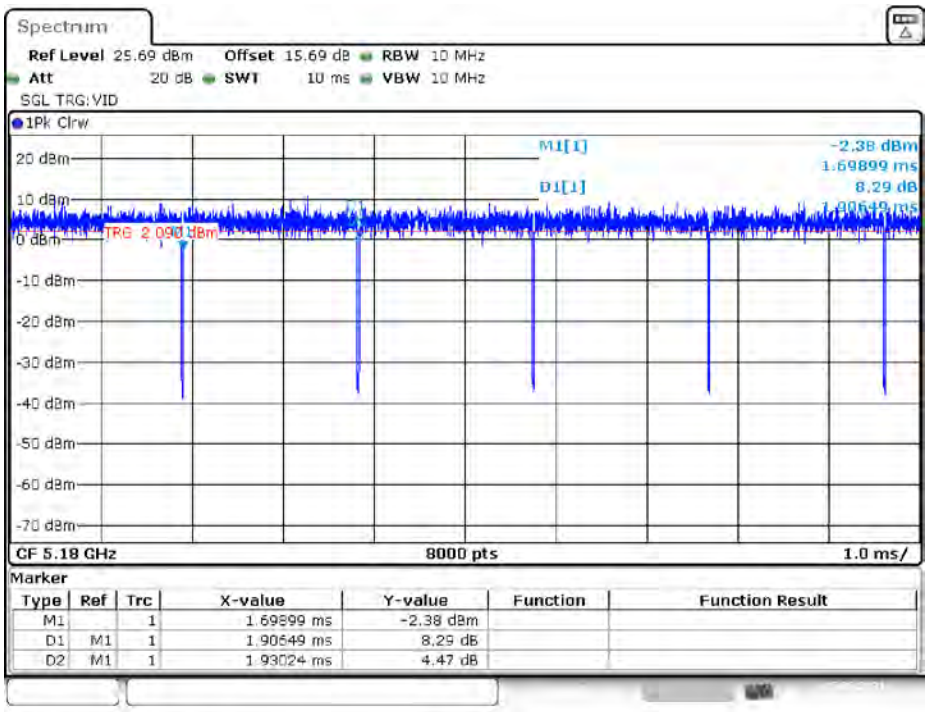

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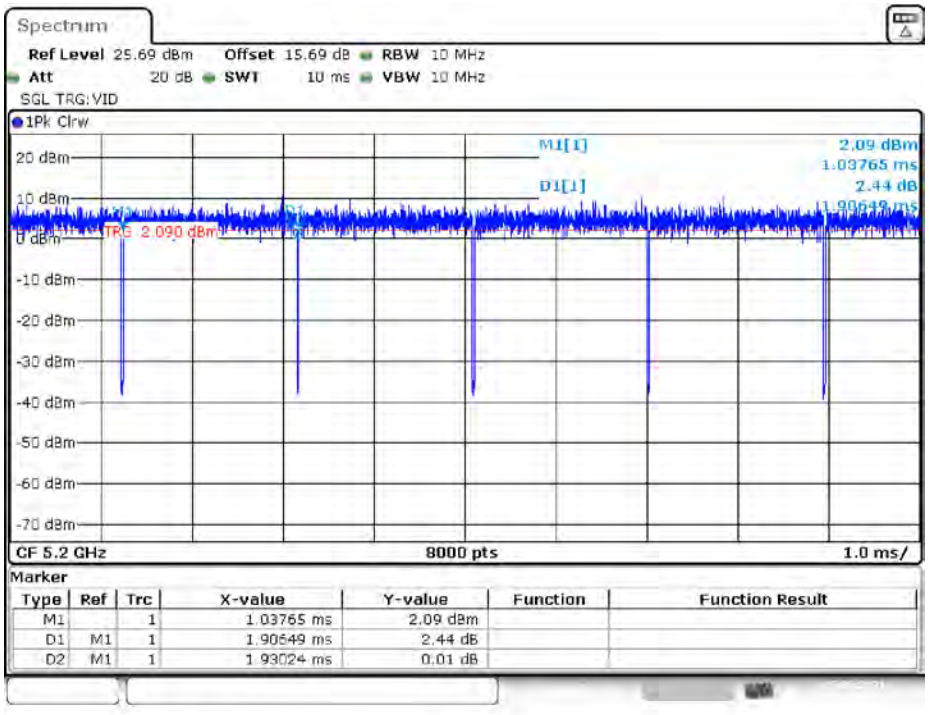

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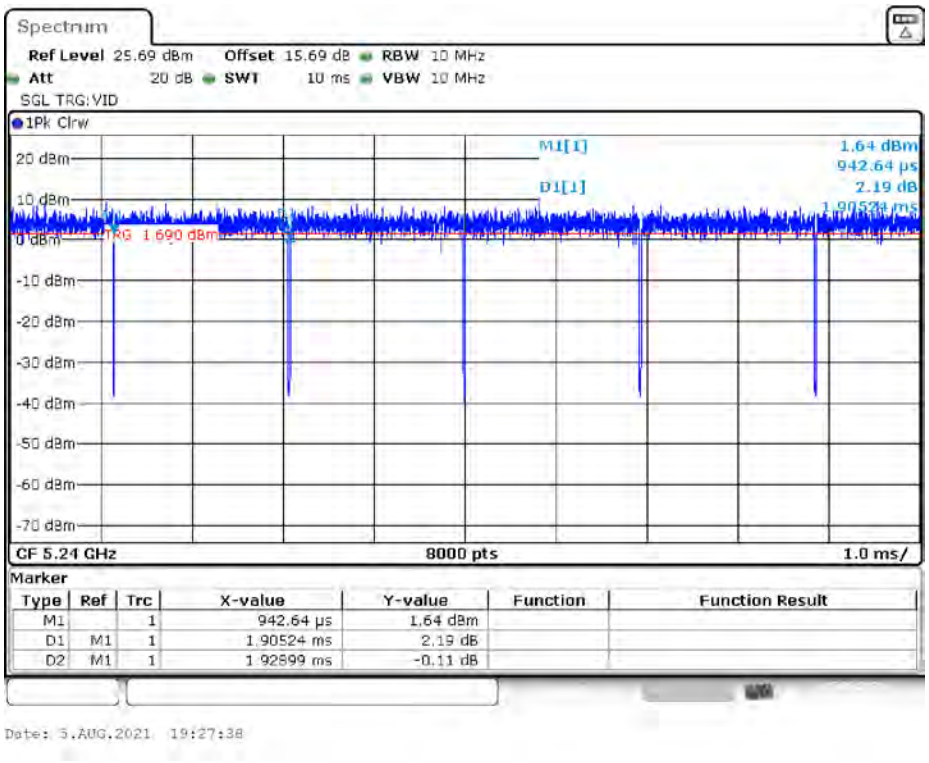

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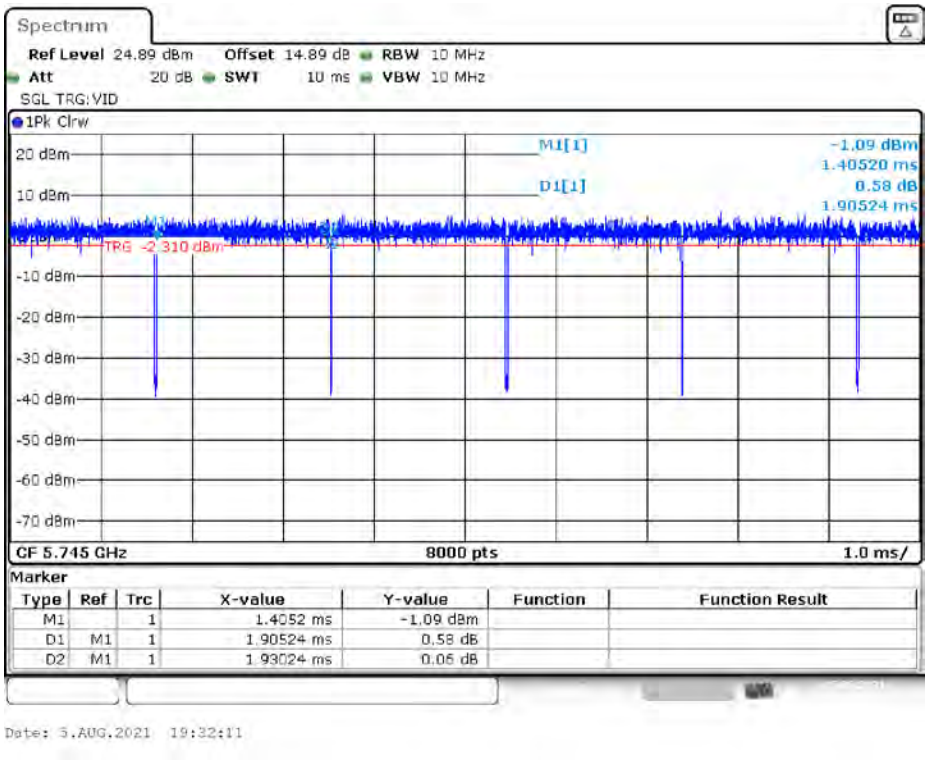

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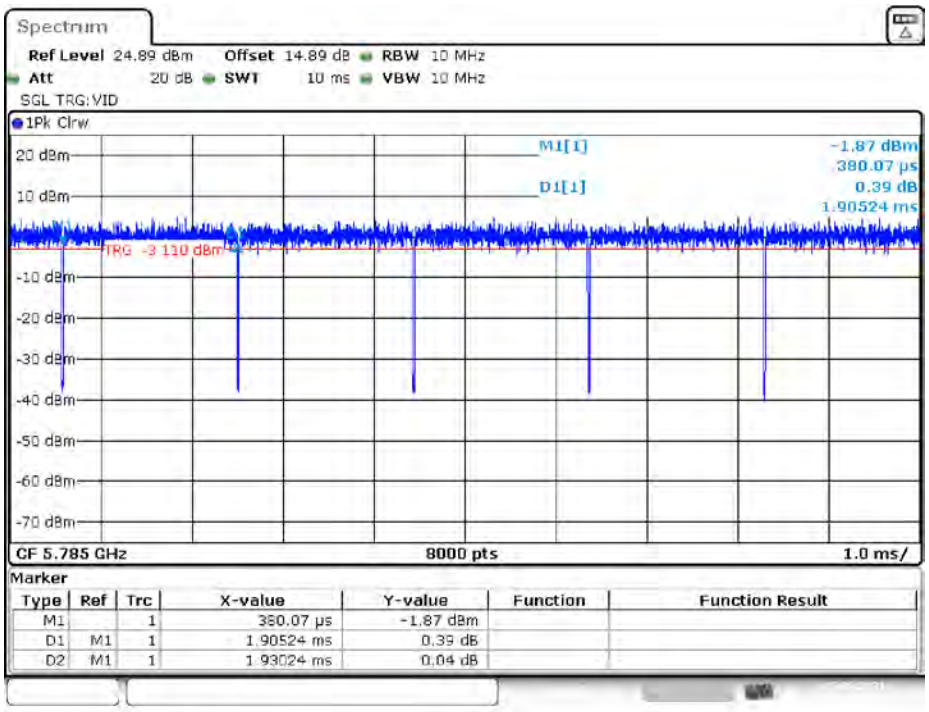

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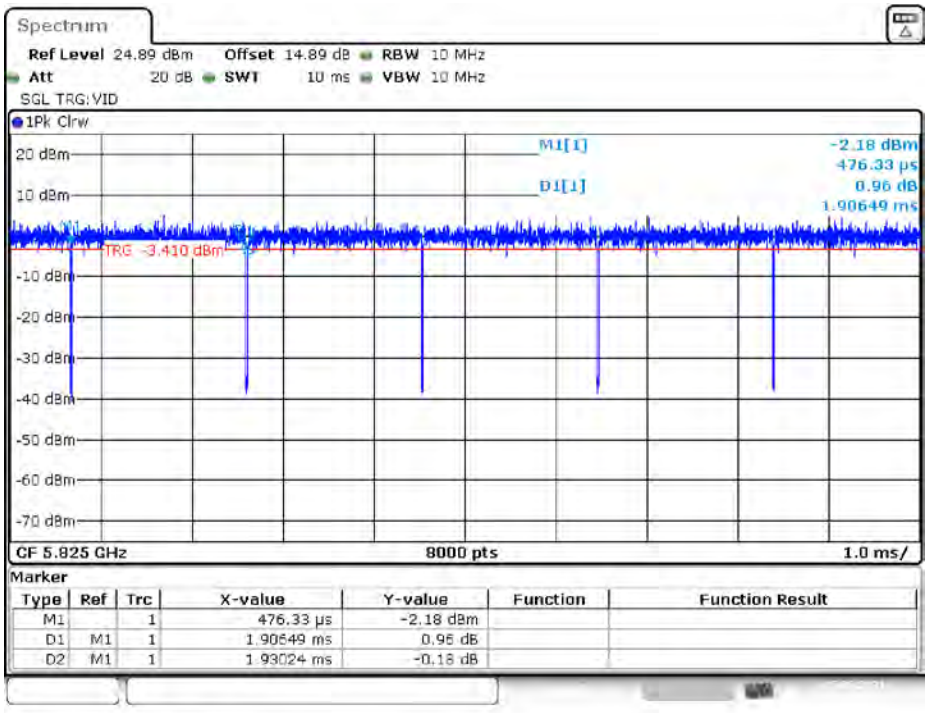

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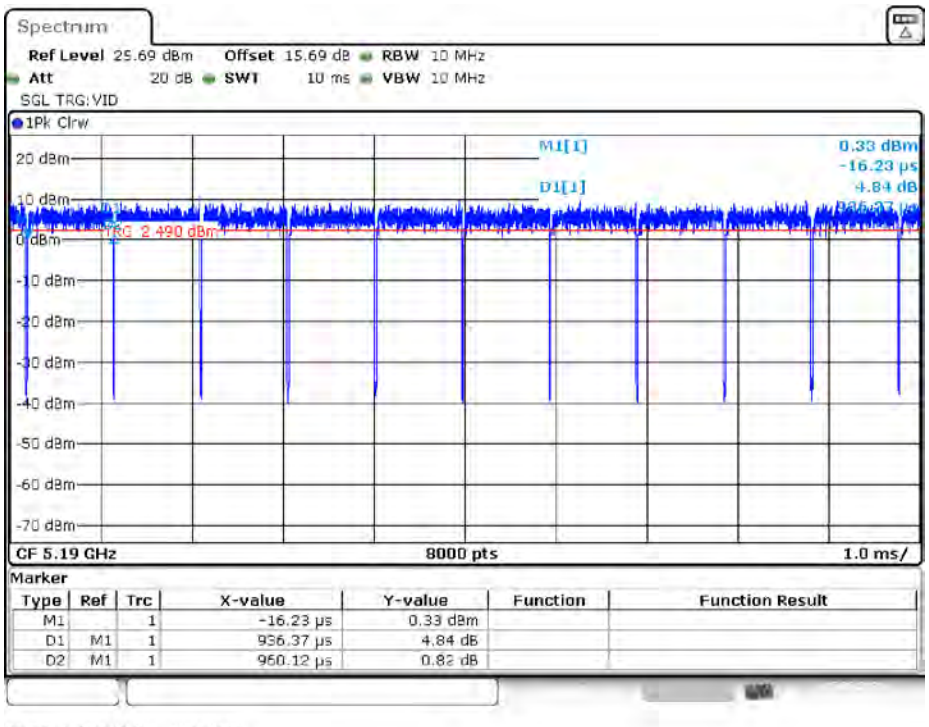

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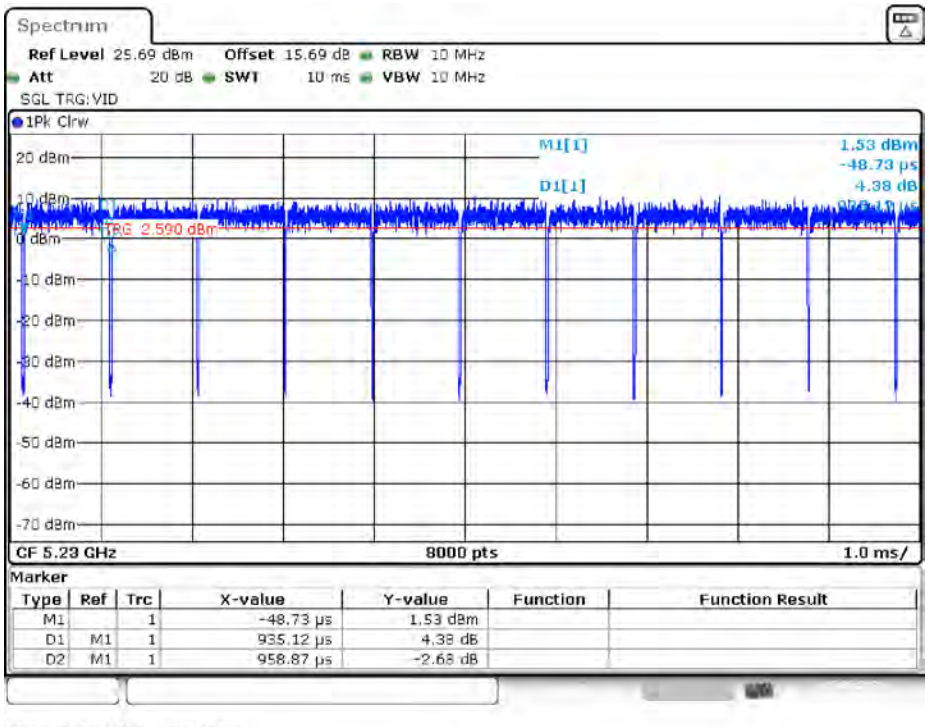

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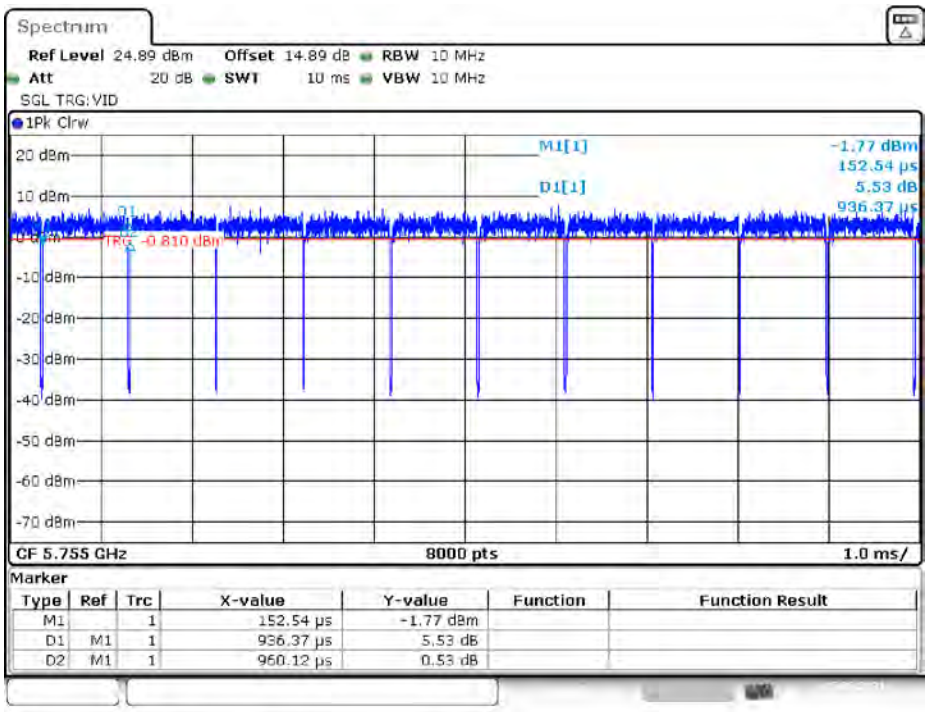

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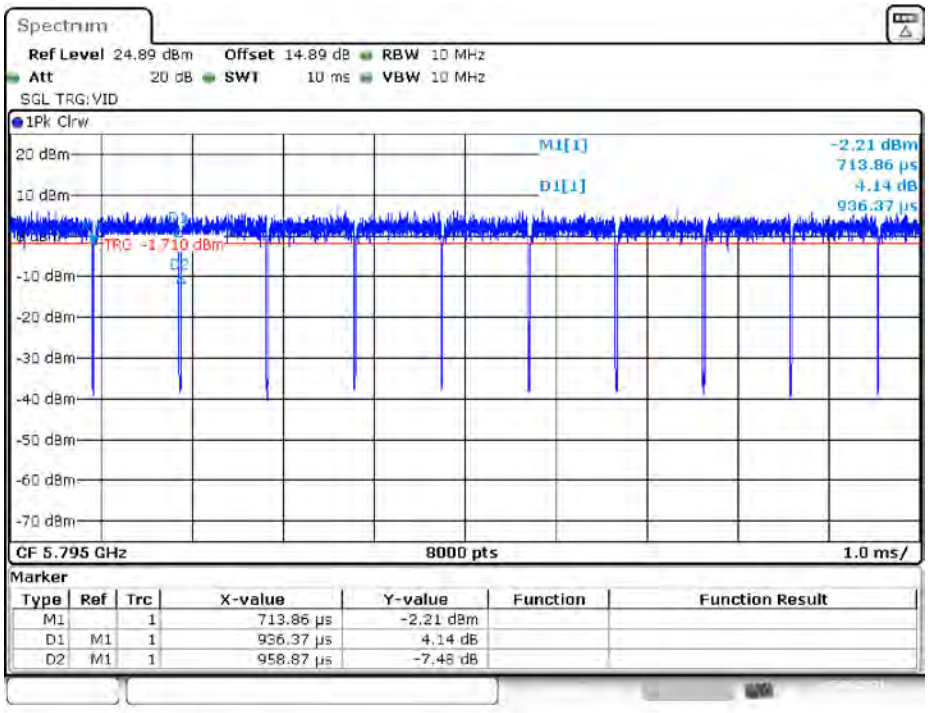

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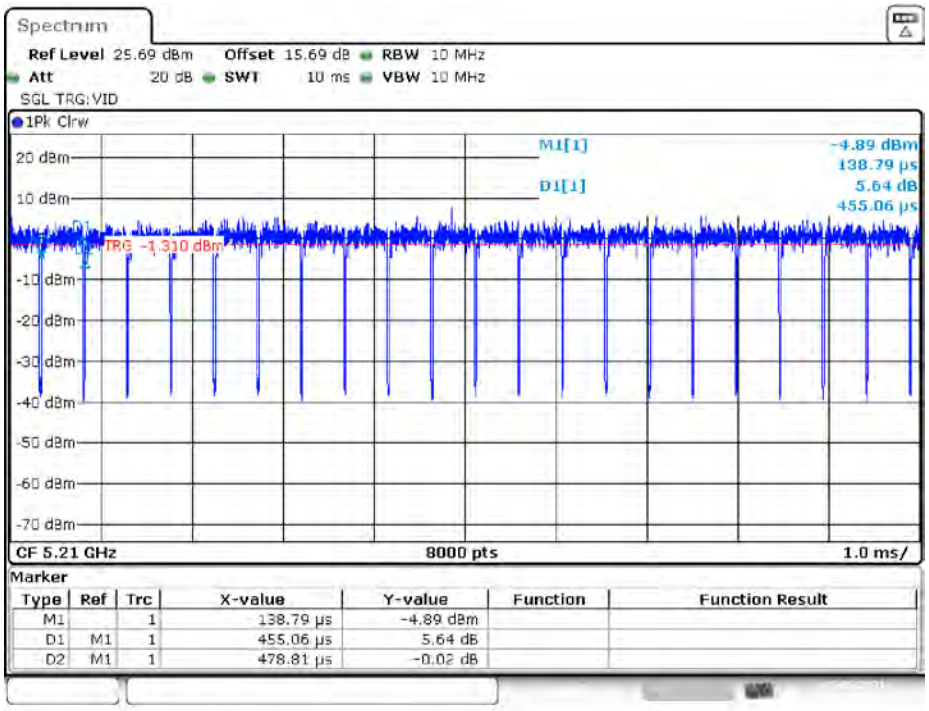

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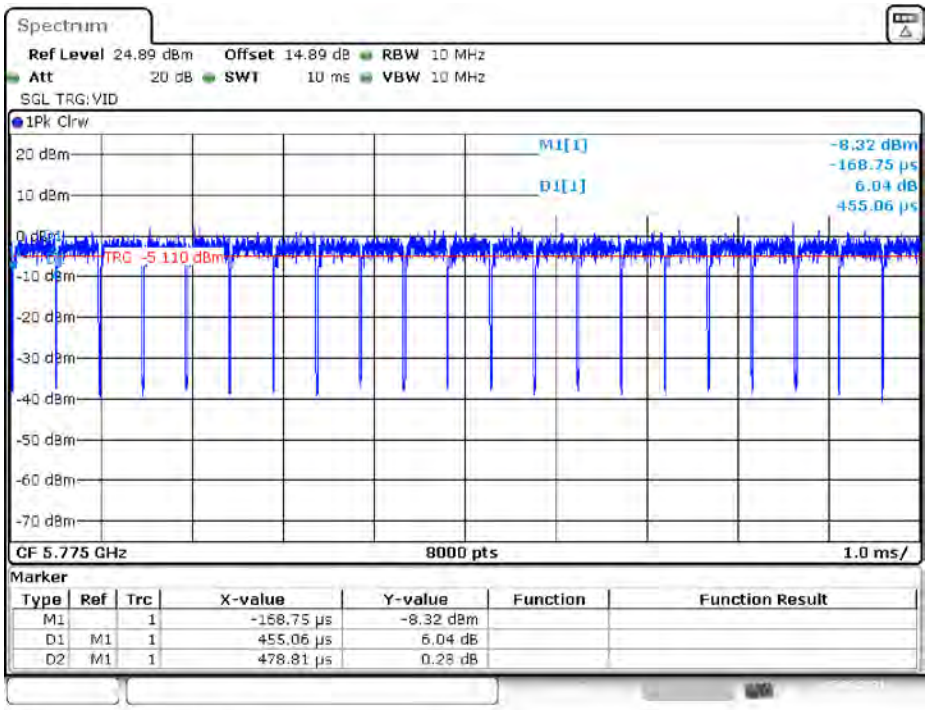

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Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

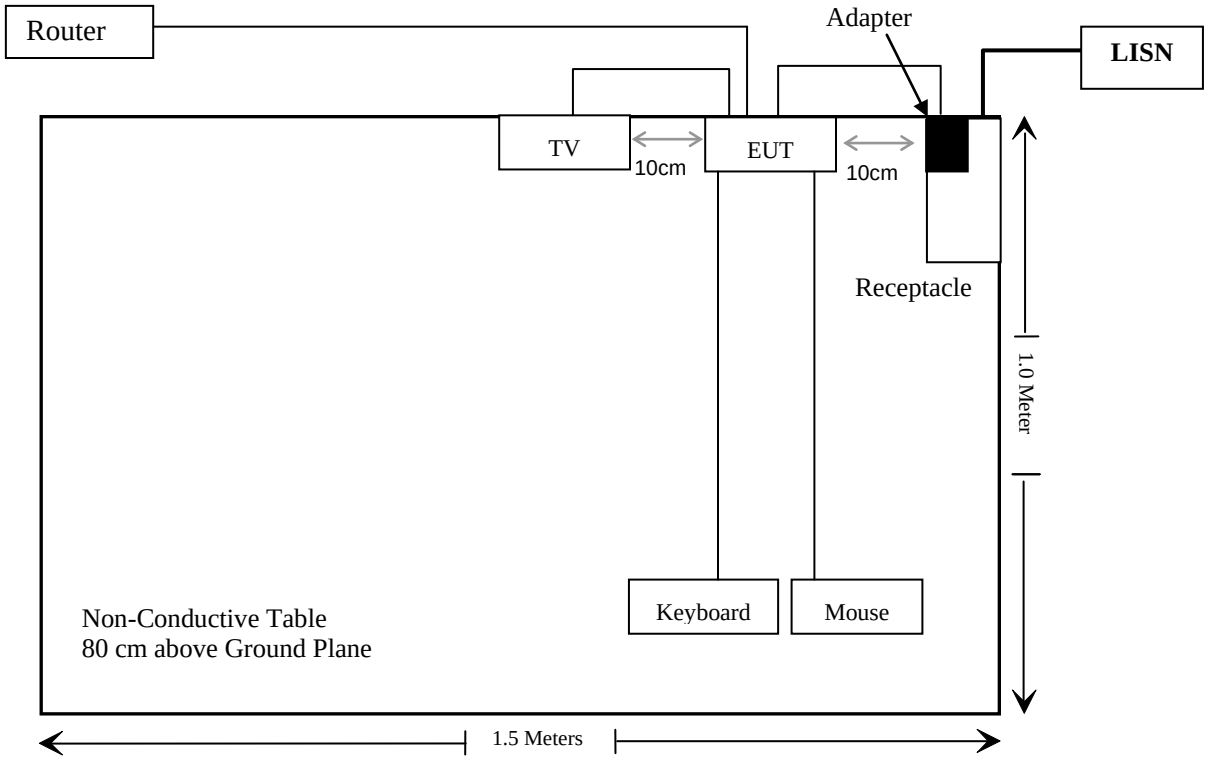
Manufacturer	Description	Model	Serial Number
HUAWEI	Wireless ADSL Router	WS5100	DLJ7S18609013316 10
PENGSHENGYE	Adapter	PSYC0504000	Unknown
XIAOMI	TV	L43M5-ES	25131/114100057334
DELL	Keyboard	L100	CN0RH66658985C018C
DELL	Mouse	MOC5UG	Unknown
SANBAODE	Ferrite Core	740408	Unknown
SANBAODE	Ferrite Core	740421	Unknown
SANBAODE	Ferrite Core	740408	Unknown
SANBAODE	Ferrite Core	740408	Unknown
SANBAODE	Ferrite Core	740415	Unknown
SCI	Ferrite Core	SCRC-130A	Unknown
SCI	Ferrite Core	SCRC-100	Unknown
DONGYANG	Ferrite Core	DYR-2928-160A	Unknown
SCI	Ferrite Core	SCRC-130A	Unknown

External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable USB Cable	1.0	Adapter	EUT
Unshielded Detachable HDMI Cable	1.2	TV	EUT
Unshielded Detachable USB Cable	1.5	EUT	Mouse
Unshielded Detachable USB Cable	1.5	EUT	Keyboard
Unshielded Detachable RJ45 Cable	3.0	Router	EUT

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i), §2.1091	Maximum Permissible Exposure(MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(8) & §15.207(a)	Conducted Emissions	Compliance
§15.205 & §15.209 & §15.407(b) (1), (4), (8), (9), (10)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (12), (e)	Bandwidth	Compliance
§15.407(a) (1), (3)	Conducted Transmitter Output Power	Compliance
§15.407 (a) (1), (3)	Power Spectral Density	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission test					
Rohde& Schwarz	Test Receiver	ESPI3	100396	2020/12/24	2021/12/23
R & S	L.I.S.N.	ENV216	101314	2020/12/25	2021/12/24
Anritsu Corp	50ΩCoaxial Switch	MP59B	6200506474	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-2m	No.2	2020/12/25	2021/12/24
Radiated emission test					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde&Schwarz	Spectrum Analyzer	FSV40	101495	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2021/07/08	2022/07/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/28	2021/11/27
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24
RF conducted test					
Rohde&Schwarz	Spectrum Analyzer	FSV40	101495	2020/12/24	2021/12/23
Rohde & Schwarz	Open Switch and Control Unit	OSP120 +OSP-B157	101244 + 100866	2020/12/24	2021/12/23

*** 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) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) 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.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (Minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For worst case:

Frequency (MHz)	**Antenna Gain**		**Tune up conducted power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
5150-5250	2.3	1.7	5.0	3.16	20	0.0011	1
5725-5850	2.3	1.7	5.0	3.16	20	0.0011	1

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

Result: Compliance

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 15.407 (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 three types of configuration about antenna, which was permanently attached or used a unique connector, and the maximum antenna gain is 2.3dBi, fulfill the requirement of this section. Please refer to the EUT photos.

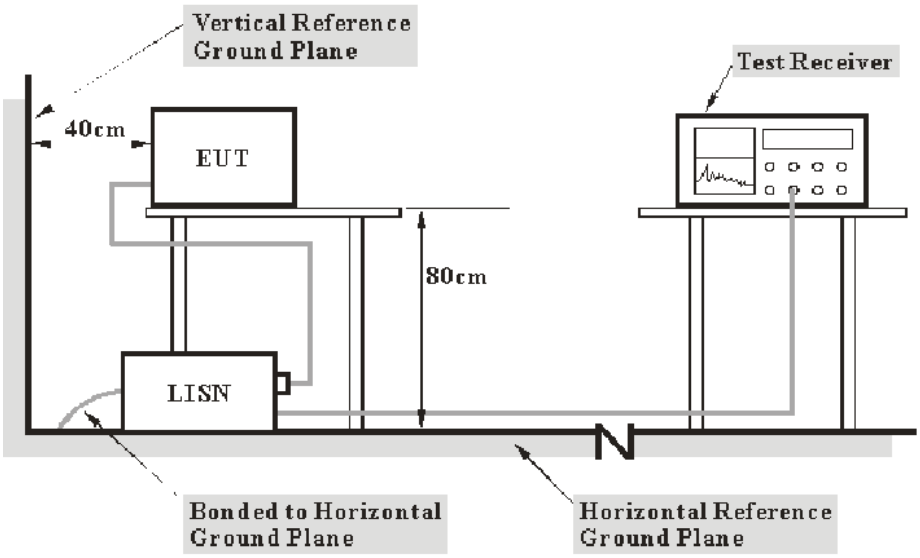
Result: Compliance.

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.

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

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

Test Data

Environmental Conditions

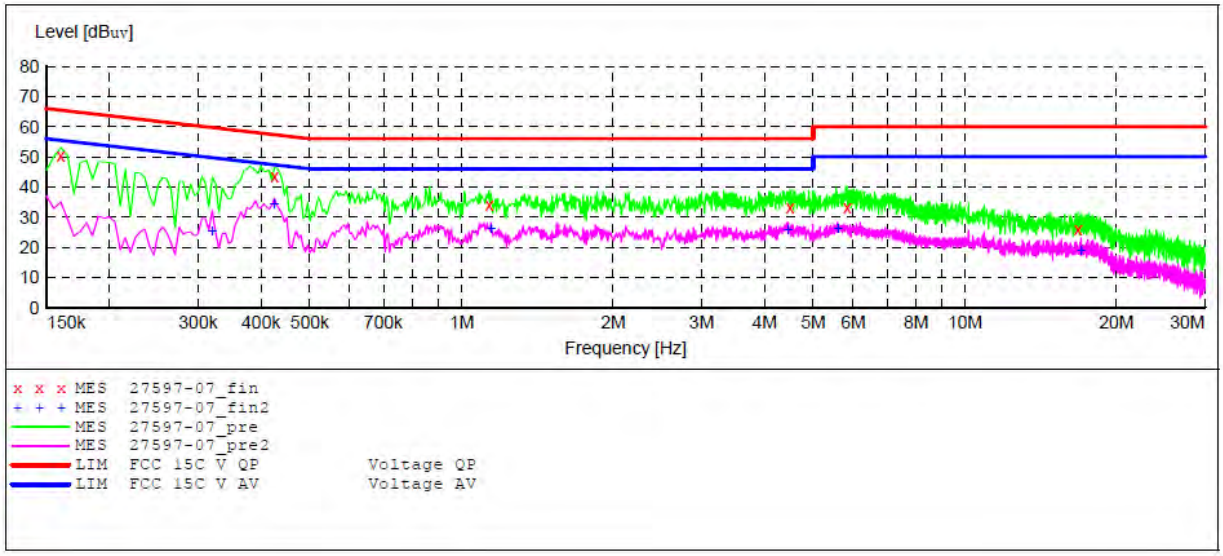
Temperature:	25 ℃
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-08-09

EUT operation mode: Transmitting

5150-5250MHz: 802.11a Middle Channel, Ant 2 (Worst case)

AC 120V/60 Hz, Line



MEASUREMENT RESULT: "27597-07_fin"

2021-8-9 05:30

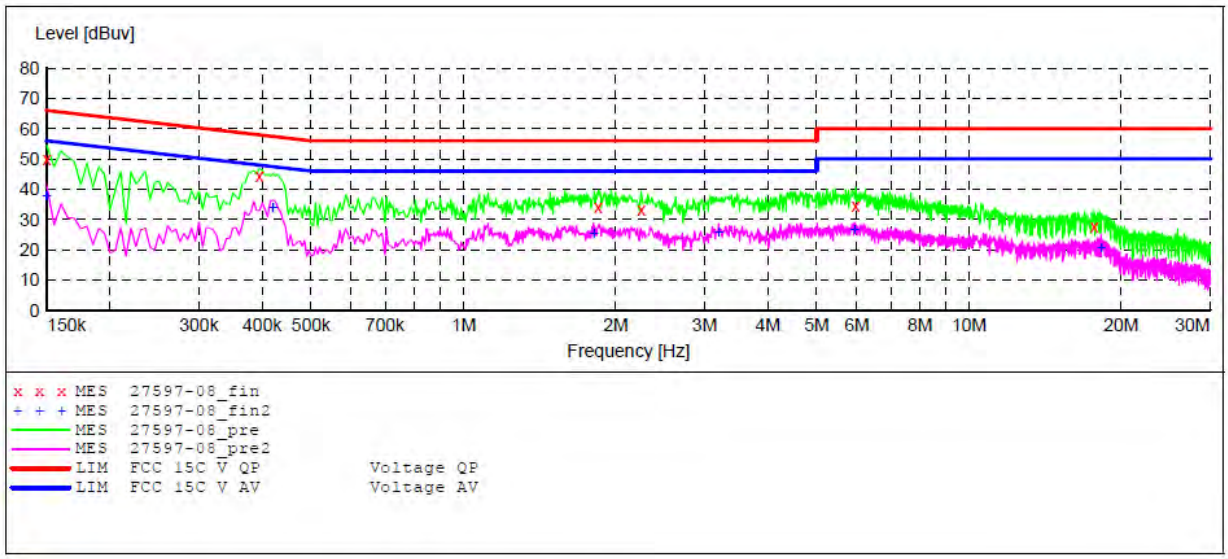
Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.160000	50.90	10.8	66	15.1	QP	L1	GND
0.425000	43.20	11.0	57	13.8	QP	L1	GND
1.135000	34.10	11.2	56	21.9	QP	L1	GND
4.500000	33.40	11.4	56	22.6	QP	L1	GND
5.840000	33.40	11.5	60	26.6	QP	L1	GND
16.775000	26.00	11.7	60	34.0	QP	L1	GND

MEASUREMENT RESULT: "27597-07_fin2"

2021-8-9 05:30

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.320000	25.80	10.9	50	24.2	AV	L1	GND
0.425000	34.10	11.0	47	12.9	AV	L1	GND
1.145000	26.60	11.2	46	19.4	AV	L1	GND
4.460000	26.00	11.4	46	20.0	AV	L1	GND
5.590000	26.40	11.5	50	23.6	AV	L1	GND
17.025000	19.20	11.7	50	30.8	AV	L1	GND

AC 120V/60 Hz, Neutral



MEASUREMENT RESULT: "27597-08_fin"

2021-8-9 05:33

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.150000	50.00	10.8	66	16.0	QP	N	GND
0.395000	44.20	11.0	58	13.8	QP	N	GND
1.850000	34.30	11.2	56	21.7	QP	N	GND
2.250000	33.10	11.3	56	22.9	QP	N	GND
5.970000	34.40	11.5	60	25.6	QP	N	GND
17.700000	27.80	11.7	60	32.2	QP	N	GND

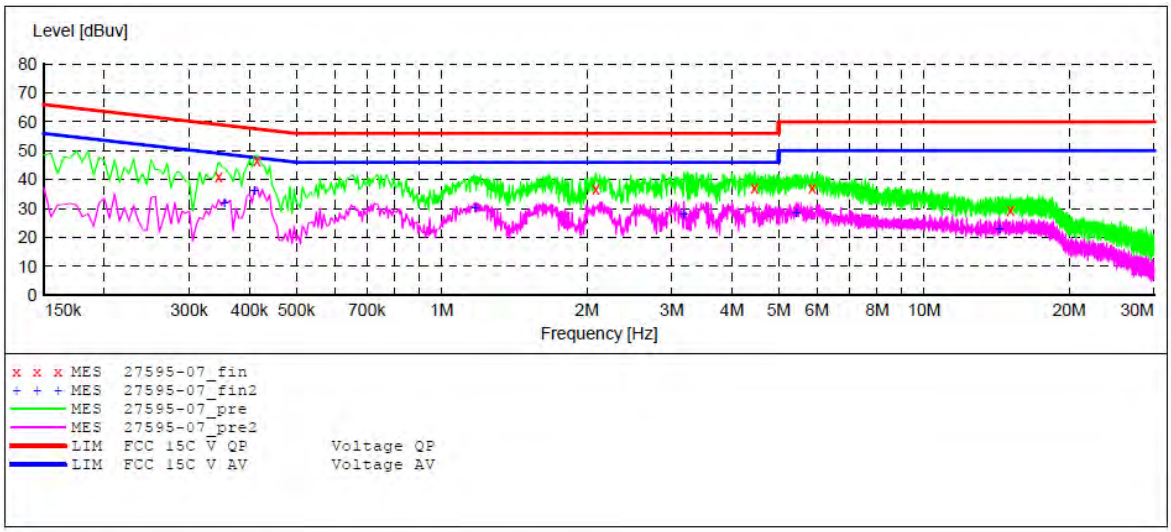
MEASUREMENT RESULT: "27597-08_fin2"

2021-8-9 05:33

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.150000	38.00	10.8	56	18.0	AV	N	GND
0.420000	34.70	11.0	47	13.3	AV	N	GND
1.810000	25.70	11.2	46	20.3	AV	N	GND
3.200000	26.10	11.4	46	19.9	AV	N	GND
5.940000	26.80	11.5	50	23.2	AV	N	GND
18.250000	20.90	11.7	50	29.1	AV	N	GND

5725-5850MHz: 802.11a Middle Channel, Ant 2 (Worst case)

AC 120V/60 Hz, Line



MEASUREMENT RESULT: "27595-07_fin"

2021-8-9 04:58

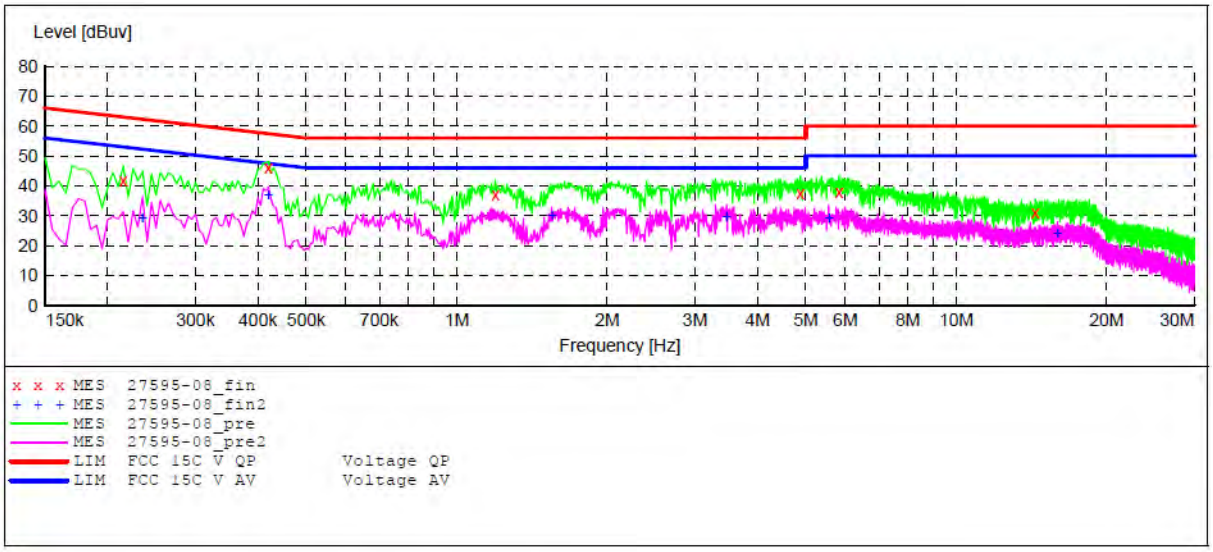
Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.345000	41.00	10.9	59	18.0	QP	L1	GND
0.415000	46.50	11.0	58	11.5	QP	L1	GND
2.090000	36.80	11.3	56	19.2	QP	L1	GND
4.460000	37.40	11.4	56	18.6	QP	L1	GND
5.870000	37.20	11.5	60	22.8	QP	L1	GND
15.125000	29.60	11.6	60	30.4	QP	L1	GND

MEASUREMENT RESULT: "27595-07_fin2"

2021-8-9 04:58

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.355000	32.40	10.9	49	16.6	AV	L1	GND
0.410000	36.70	11.0	48	11.3	AV	L1	GND
1.175000	30.50	11.2	46	15.5	AV	L1	GND
3.180000	28.20	11.4	46	17.8	AV	L1	GND
5.440000	28.70	11.5	50	21.3	AV	L1	GND
14.325000	23.20	11.6	50	26.8	AV	L1	GND

AC 120V/60 Hz, Neutral



MEASUREMENT RESULT: "27595-08_fin"

2021-8-9 05:00

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.215000	41.70	10.8	63	21.3	QP	N	GND
0.420000	46.00	11.0	57	11.0	QP	N	GND
1.195000	37.10	11.2	56	18.9	QP	N	GND
4.880000	37.60	11.4	56	18.4	QP	N	GND
5.830000	38.00	11.5	60	22.0	QP	N	GND
14.400000	31.00	11.6	60	29.0	QP	N	GND

MEASUREMENT RESULT: "27595-08_fin2"

2021-8-9 05:00

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.235000	29.00	10.9	52	23.0	AV	N	GND
0.420000	37.00	11.0	47	10.0	AV	N	GND
1.550000	30.20	11.2	46	15.8	AV	N	GND
3.470000	30.00	11.4	46	16.0	AV	N	GND
5.560000	29.30	11.5	50	20.7	AV	N	GND
15.950000	24.30	11.7	50	25.7	AV	N	GND

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

Applicable Standard

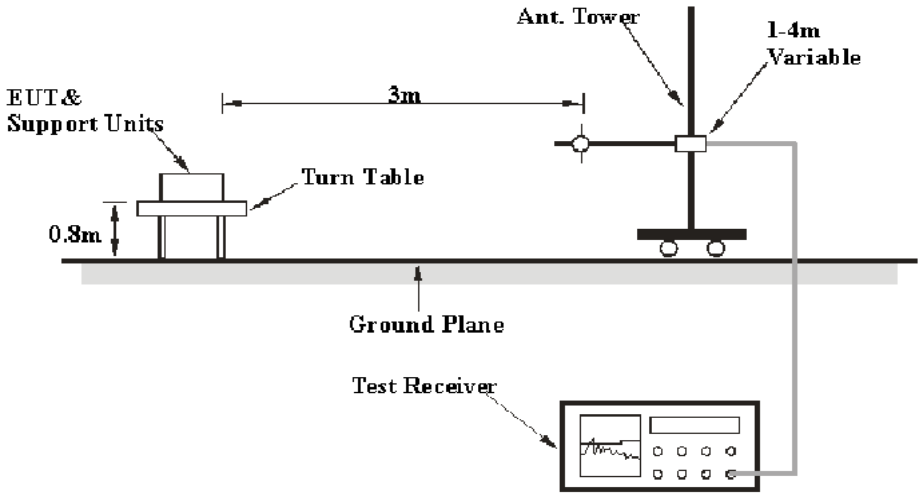
FCC §15.407 (b) (1), (4), (8), (9), (10); §15.209; §15.205;

(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.

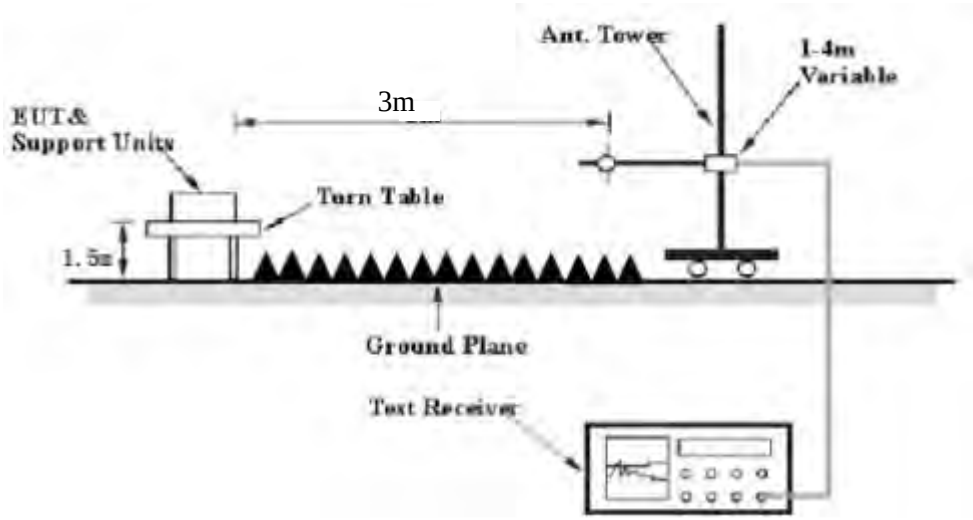
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

Below 1 GHz:



Above 1 GHz:



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%

Test Procedure

Radiated Spurious Emission

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

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;

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

where

$E_{SpecLimit}$	is the field strength of the emission at the distance specified by the limit, in dBμV/m
E_{Meas}	is the field strength of the emission at the measurement distance, in dBμV/m
d_{Meas}	is the measurement distance, in m
$d_{SpecLimit}$	is the distance specified by the limit, in m

So the extrapolation factor of 1m is 20*lg(1/3)= -9.5 dB

Factor & Margin Calculation

The Factor 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:

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

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

Margin = Result-Limit
Result = Reading + Factor

Test Data

Environmental Conditions

Temperature:	22~29 ℃
Relative Humidity:	50~56 %
ATM Pressure:	101.0 kPa

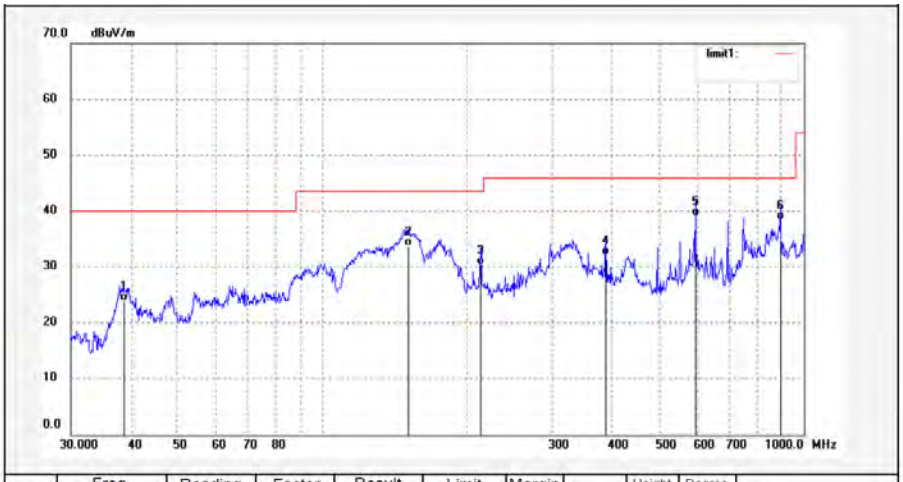
The testing was performed by Fan Yang on 2021-08-07 for below 1GHz and 2021-08-10 for above 1GHz.

EUT operation mode: Transmitting

30 MHz~1 GHz: 802.11a Middle Channel, Ant 2 (Worst case)

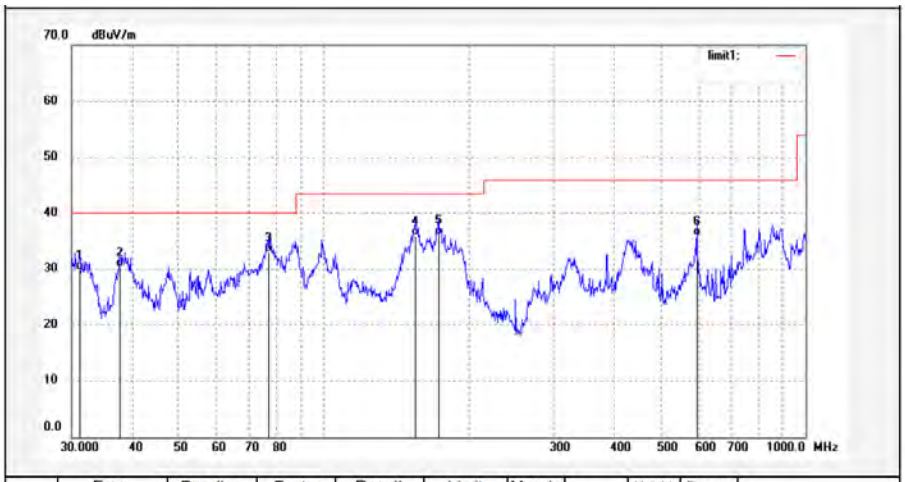
5150-5250MHz:

Horizontal



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	38.6160	42.65	-18.69	23.96	40.00	-16.04	QP			
2	150.5378	53.68	-20.05	33.63	43.50	-9.87	QP			
3	213.0149	47.67	-17.31	30.36	43.50	-13.14	QP			
4	387.9920	44.90	-12.85	32.05	46.00	-13.95	QP			
5	595.1326	47.04	-7.91	39.13	46.00	-6.87	QP			
6	893.8567	42.04	-3.69	38.35	46.00	-7.65	QP			

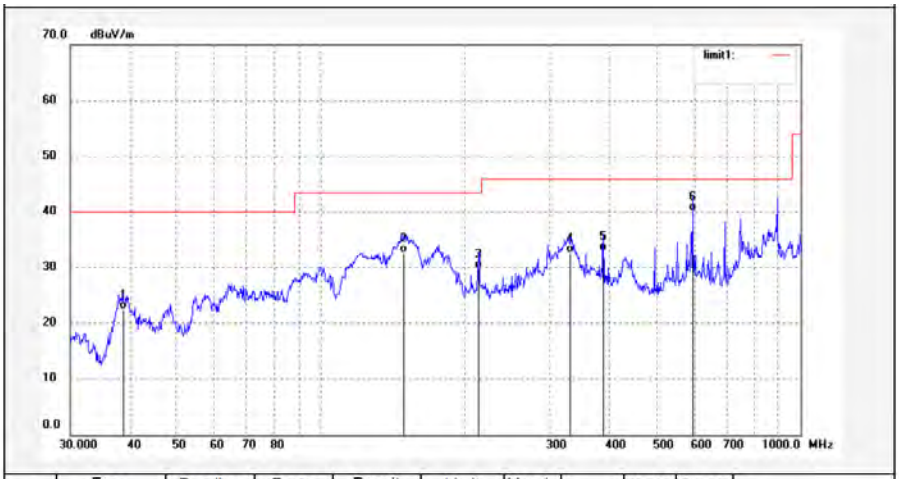
Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.1798	43.72	-13.90	29.82	40.00	-10.18	QP			
2	37.8121	46.10	-15.70	30.40	40.00	-9.60	QP			
3	77.0502	54.47	-21.51	32.96	40.00	-7.04	QP			
4	155.3642	55.88	-19.98	35.90	43.50	-7.60	QP			
5	173.2050	54.88	-18.68	36.20	43.50	-7.30	QP			
6	595.1326	43.79	-7.91	35.88	46.00	-10.12	QP			

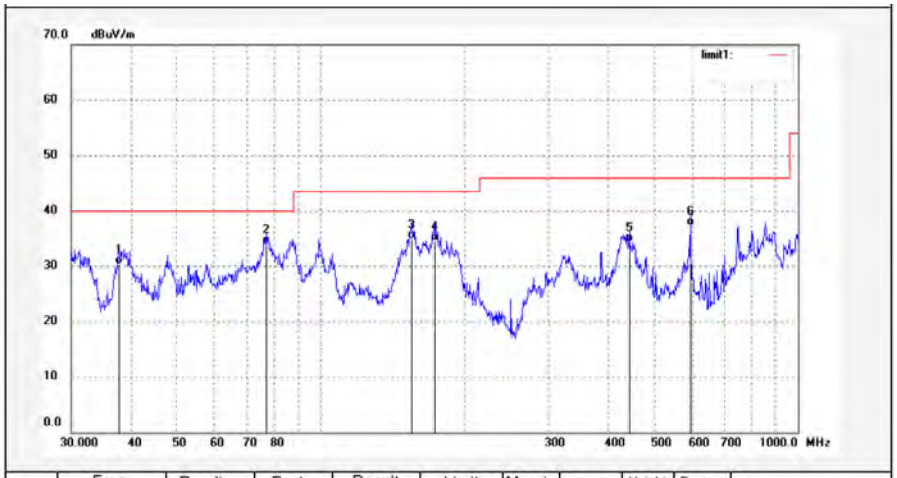
5725-5850MHz:

Horizontal



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	38.6160	41.15	-18.69	22.46	40.00	-17.54	QP			
2	148.9625	52.79	-20.07	32.72	43.50	-10.78	QP			
3	213.0149	47.17	-17.31	29.86	43.50	-13.64	QP			
4	331.3546	46.45	-13.75	32.70	46.00	-13.30	QP			
5	387.9920	45.90	-12.85	33.05	46.00	-12.95	QP			
6	595.1326	48.04	-7.91	40.13	46.00	-5.87	QP			

Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	37.8121	46.10	-15.70	30.40	40.00	-9.60	QP			
2	77.0502	55.47	-21.51	33.96	40.00	-6.04	QP			
3	155.3642	54.88	-19.98	34.90	43.50	-8.60	QP			
4	173.2050	53.28	-18.68	34.60	43.50	-8.90	QP			
5	443.2943	45.28	-10.86	34.42	46.00	-11.58	QP			
6	595.1326	45.29	-7.91	37.38	46.00	-8.62	QP			

1 ~ 40 GHz:

5150-5250MHz:

Ant 0:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11A, Low Channel									
4500	43.45	PK	232	1.8	H	1.89	45.34	74	28.66
4500	43.09	PK	265	2.0	V	1.89	44.98	74	29.02
5150	43.1	PK	163	2.3	H	3.37	46.47	74	27.53
5150	43.66	PK	340	1.6	V	3.37	47.03	74	26.97
10360	27.36	PK	150	1.1	H	14.41	41.77	68.2	26.43
10360	27.91	PK	212	1.9	V	14.41	42.32	68.2	25.88
802.11A, Middle Channel									
10400	31.67	PK	316	1.7	H	11.46	43.13	68.2	25.07
10400	32.14	PK	266	1.3	V	11.46	43.6	68.2	24.6
802.11A, High Channel									
5350	43.62	PK	203	1.1	H	3.43	47.05	74	26.95
5350	43.55	PK	139	1.9	V	3.43	46.98	74	27.02
5460	43.91	PK	291	2.0	H	3.58	47.49	74	26.51
5460	44.19	PK	114	2.3	V	3.58	47.77	74	26.23
10480	30.96	PK	274	1.1	H	11.53	42.49	68.2	25.71
10480	30.42	PK	239	1.1	V	11.53	41.95	68.2	26.25
802.11N20, Low Channel									
4500	42.99	PK	285	1.9	H	1.89	44.88	74	29.12
4500	42.16	PK	264	1.4	V	1.89	44.05	74	29.95
5150	42.52	PK	135	2.3	H	3.37	45.89	74	28.11
5150	43.18	PK	319	1.3	V	3.37	46.55	74	27.45
10360	27.18	PK	218	2.3	H	14.41	41.59	68.2	26.61
10360	27.85	PK	72	1.8	V	14.41	42.26	68.2	25.94
802.11N 20, Middle Channel									
10400	30.72	PK	131	2.3	H	11.46	42.18	68.2	26.02
10400	31.40	PK	320	1.5	V	11.46	42.86	68.2	25.34
802.11N 20, High Channel									
5350	42.71	PK	143	2.5	H	3.43	46.14	74	27.86
5350	43.35	PK	49	2.5	V	3.43	46.78	74	27.22
5460	43.48	PK	236	1.8	H	3.58	47.06	74	26.94
5460	43.91	PK	84	1.7	V	3.58	47.49	74	26.51
10480	30.50	PK	289	1.2	H	11.53	42.03	68.2	26.17
10480	30.05	PK	58	1.1	V	11.53	41.58	68.2	26.62

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11N40, Low Channel									
4500	43.1	PK	358	1.9	H	1.89	44.99	74	29.01
4500	43.17	PK	76	1.2	V	1.89	45.06	74	28.94
5150	43.19	PK	344	1.8	H	3.37	46.56	74	27.44
5150	43.78	PK	321	2.2	V	3.37	47.15	74	26.85
10380	30.26	PK	350	1.2	H	11.43	41.69	68.2	26.51
10380	30.65	PK	54	1.2	V	11.43	42.08	68.2	26.12
802.11N40, High Channel									
5350	44.33	PK	92	2.1	H	3.43	47.76	74	26.24
5350	44.44	PK	38	1.9	V	3.43	47.87	74	26.13
5460	44.03	PK	104	1.1	H	3.58	47.61	74	26.39
5460	44.14	PK	173	1.5	V	3.58	47.72	74	26.28
10460	31.77	PK	193	1.2	H	11.5	43.27	68.2	24.93
10460	31.66	PK	49	1.1	V	11.5	43.16	68.2	25.04
802.11AC80									
4500	43.15	PK	277	1.7	H	1.89	45.04	74	28.96
4500	43.59	PK	219	1.5	V	1.89	45.48	74	28.52
5150	43.7	PK	335	1.3	H	3.37	47.07	74	26.93
5150	43.08	PK	235	1.4	V	3.37	46.45	74	27.55
5350	44.16	PK	33	1.3	H	3.43	47.59	74	26.41
5350	44.2	PK	231	1.2	V	3.43	47.63	74	26.37
5460	44	PK	180	1.6	H	3.58	47.58	74	26.42
5460	44.17	PK	111	2.5	V	3.58	47.75	74	26.25
10420	31.89	PK	31	1.8	H	11.49	43.38	68.2	24.82
10420	31.35	PK	81	1.6	V	11.49	42.84	68.2	25.36

Ant 1:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11A, Low Channel									
4500	43.4	PK	343	2.5	H	1.89	45.29	74	28.71
4500	42.69	PK	283	2.4	V	1.89	44.58	74	29.42
5150	43.09	PK	241	1.9	H	3.37	46.46	74	27.54
5150	43.46	PK	148	1.5	V	3.37	46.83	74	27.17
10360	27.01	PK	209	1.1	H	14.41	41.42	68.2	26.78
10360	27.71	PK	360	1.8	V	14.41	42.12	68.2	26.08
802.11A, Middle Channel									
10400	31.38	PK	312	2.4	H	11.46	42.84	68.2	25.36
10400	31.65	PK	80	2.1	V	11.46	43.11	68.2	25.09
802.11A, High Channel									
5350	43.33	PK	98	2.0	H	3.43	46.76	74	27.24
5350	43.2	PK	197	1.6	V	3.43	46.63	74	27.37
5460	43.55	PK	243	2.3	H	3.58	47.13	74	26.87
5460	44.14	PK	242	2.3	V	3.58	47.72	74	26.28
10480	30.92	PK	75	1.5	H	11.53	42.45	68.2	25.75
10480	30.05	PK	144	1.5	V	11.53	41.58	68.2	26.62
802.11N20, Low Channel									
4500	43.76	PK	80	1.8	H	1.89	45.65	74	28.35
4500	42.71	PK	352	1.1	V	1.89	44.60	74	29.40
5150	43.04	PK	7	2.4	H	3.37	46.41	74	27.59
5150	44.13	PK	149	1.5	V	3.37	47.50	74	26.50
10360	27.90	PK	249	1.4	H	14.41	42.31	68.2	25.89
10360	27.89	PK	99	1.5	V	14.41	42.30	68.2	25.90
802.11N20, Middle Channel									
10400	31.23	PK	123	1.7	H	11.46	42.69	68.2	25.51
10400	31.62	PK	296	2.1	V	11.46	43.08	68.2	25.12
802.11N20, High Channel									
5350	43.47	PK	186	1.7	H	3.43	46.90	74	27.10
5350	44.34	PK	21	1.2	V	3.43	47.77	74	26.23
5460	44.45	PK	180	1.3	H	3.58	48.03	74	25.97
5460	44.29	PK	266	2.1	V	3.58	47.87	74	26.13
10480	30.76	PK	106	1.7	H	11.53	42.29	68.2	25.91
10480	30.77	PK	146	1.6	V	11.53	42.30	68.2	25.90

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11N40, Low Channel									
4500	42.97	PK	178	1.4	H	1.89	44.86	74	29.14
4500	42.86	PK	83	2.0	V	1.89	44.75	74	29.25
5150	42.93	PK	194	2.1	H	3.37	46.3	74	27.7
5150	43.34	PK	292	2.2	V	3.37	46.71	74	27.29
10380	30	PK	237	1.1	H	11.43	41.43	68.2	26.77
10380	30.33	PK	299	2.4	V	11.43	41.76	68.2	26.44
802.11N40, High Channel									
5350	43.9	PK	45	1.9	H	3.43	47.33	74	26.67
5350	44.09	PK	157	1.3	V	3.43	47.52	74	26.48
5460	43.75	PK	197	1.3	H	3.58	47.33	74	26.67
5460	44.01	PK	299	2.2	V	3.58	47.59	74	26.41
10460	31.49	PK	208	1.9	H	11.5	42.99	68.2	25.21
10460	31.61	PK	267	2.2	V	11.5	43.11	68.2	25.09
802.11AC80									
4500	42.94	PK	98	1.6	H	1.89	44.83	74	29.17
4500	43.59	PK	204	1.7	V	1.89	45.48	74	28.52
5150	43.53	PK	196	1.3	H	3.37	46.9	74	27.1
5150	42.73	PK	279	1.6	V	3.37	46.1	74	27.9
5350	43.79	PK	331	2.3	H	3.43	47.22	74	26.78
5350	44.16	PK	250	1.3	V	3.43	47.59	74	26.41
5460	43.81	PK	222	2.2	H	3.58	47.39	74	26.61
5460	43.96	PK	52	2.3	V	3.58	47.54	74	26.46
10420	31.67	PK	355	1.2	H	11.49	43.16	68.2	25.04
10420	31.31	PK	320	1.1	V	11.49	42.8	68.2	25.4

Ant 2:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11A, Low Channel									
4500	43.42	PK	90	1.5	H	1.89	45.31	74	28.69
4500	42.83	PK	161	2.0	V	1.89	44.72	74	29.28
5150	42.92	PK	328	2.2	H	3.37	46.29	74	27.71
5150	43.43	PK	212	1.1	V	3.37	46.8	74	27.2
10360	27.2	PK	130	1.6	H	14.41	41.61	68.2	26.59
10360	27.83	PK	283	2.3	V	14.41	42.24	68.2	25.96
802.11A, Middle Channel									
10400	31.24	PK	177	1.2	H	11.46	42.7	68.2	25.5
10400	31.72	PK	319	1.2	V	11.46	43.18	68.2	25.02
802.11A, High Channel									
5350	43.28	PK	130	1.4	H	3.43	46.71	74	27.29
5350	43.12	PK	27	1.7	V	3.43	46.55	74	27.45
5460	43.84	PK	23	1.2	H	3.58	47.42	74	26.58
5460	43.72	PK	284	2.2	V	3.58	47.3	74	26.7
10480	30.79	PK	322	1.5	H	11.53	42.32	68.2	25.88
10480	30.13	PK	228	1.9	V	11.53	41.66	68.2	26.54
802.11N20, Low Channel									
4500	43.59	PK	234	2.4	H	1.89	45.48	74	28.52
4500	42.47	PK	22	1.2	V	1.89	44.36	74	29.64
5150	42.71	PK	240	2.5	H	3.37	46.08	74	27.92
5150	43.57	PK	291	1.9	V	3.37	46.94	74	27.06
10360	27.35	PK	56	2.3	H	14.41	41.76	68.2	26.44
10360	27.39	PK	230	1.4	V	14.41	41.80	68.2	26.40
802.11 N20, Middle Channel									
10400	30.79	PK	282	2.0	H	11.46	42.25	68.2	25.95
10400	31.32	PK	136	1.8	V	11.46	42.78	68.2	25.42
802.11N20, High Channel									
5350	43.04	PK	173	1.5	H	3.43	46.47	74	27.53
5350	44.19	PK	327	2.0	V	3.43	47.62	74	26.38
5460	44.39	PK	127	2.1	H	3.58	47.97	74	26.03
5460	43.90	PK	30	1.1	V	3.58	47.48	74	26.52
10480	29.90	PK	28	1.6	H	11.53	41.43	68.2	26.77
10480	30.56	PK	243	1.2	V	11.53	42.09	68.2	26.11

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11N40, Low Channel									
4500	42.78	PK	37	1.2	H	1.89	44.67	74	29.33
4500	42.78	PK	359	1.7	V	1.89	44.67	74	29.33
5150	42.88	PK	314	1.9	H	3.37	46.25	74	27.75
5150	43.36	PK	110	1.3	V	3.37	46.73	74	27.27
10380	29.94	PK	338	1.3	H	11.43	41.37	68.2	26.83
10380	30.59	PK	88	1.8	V	11.43	42.02	68.2	26.18
802.11N40, High Channel									
5350	44.09	PK	62	2.5	H	3.43	47.52	74	26.48
5350	44.28	PK	275	1.1	V	3.43	47.71	74	26.29
5460	43.95	PK	197	2.2	H	3.58	47.53	74	26.47
5460	44.09	PK	31	1.7	V	3.58	47.67	74	26.33
10460	31.52	PK	309	1.7	H	11.5	43.02	68.2	25.18
10460	31.49	PK	49	1.6	V	11.5	42.99	68.2	25.21
802.11AC80									
4500	42.73	PK	322	1.3	H	1.89	44.62	74	29.38
4500	43.2	PK	117	1.0	V	1.89	45.09	74	28.91
5150	43.37	PK	49	2.1	H	3.37	46.74	74	27.26
5150	42.72	PK	73	1.6	V	3.37	46.09	74	27.91
5350	43.99	PK	325	2.3	H	3.43	47.42	74	26.58
5350	43.74	PK	359	2.1	V	3.43	47.17	74	26.83
5460	43.52	PK	180	2.4	H	3.58	47.1	74	26.9
5460	43.87	PK	178	1.3	V	3.58	47.45	74	26.55
10420	31.61	PK	280	1.8	H	11.49	43.1	68.2	25.1
10420	30.99	PK	44	2.2	V	11.49	42.48	68.2	25.72

5725-5850MHz:
Ant 0:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11A, Low Channel									
5725	54.67	PK	316	2	H	3.97	58.64	122.2	63.56
5725	54.61	PK	327	1.7	V	3.97	58.58	122.2	63.62
5720	53.43	PK	192	1.3	H	3.95	57.38	110.8	53.42
5720	53.65	PK	246	1.9	V	3.95	57.60	110.8	53.20
5700	54.65	PK	245	1.9	H	3.89	58.54	105.2	46.66
5700	55.14	PK	47	2.5	V	3.89	59.03	105.2	46.17
5650	54.07	PK	51	1.1	H	3.75	57.82	68.2	10.38
5650	54.12	PK	224	1.1	V	3.75	57.87	68.2	10.33
11490	32.31	PK	136	2.1	H	14.74	47.05	74	26.95
11490	32.14	PK	51	2.4	V	14.74	46.88	74	27.12
802.11A, Middle Channel									
11570	33.02	PK	308	2.4	H	14.74	47.76	74	26.24
11570	31.97	PK	149	1.7	V	14.74	46.71	74	27.29
802.11A, High Channel									
5850	55.52	PK	191	2.3	H	4.33	59.85	122.2	62.35
5850	55.53	PK	161	2.3	V	4.33	59.86	122.2	62.34
5855	54.61	PK	203	1.8	H	4.35	58.96	110.8	51.84
5855	54.82	PK	285	2	V	4.35	59.17	110.8	51.63
5875	55.11	PK	232	2.3	H	4.41	59.52	105.2	45.68
5875	55.53	PK	14	2.1	V	4.41	59.94	105.2	45.26
5925	54.48	PK	256	1.4	H	4.55	59.03	68.2	9.17
5925	54.10	PK	285	1.2	V	4.55	58.65	68.2	9.55
11650	32.56	PK	50	2.5	H	14.79	47.35	74	26.65
11650	32.18	PK	16	1.6	V	14.79	46.97	74	27.03
802.11N20, Low Channel									
5725	54.52	PK	148	1.1	H	3.97	58.49	122.2	63.71
5725	54.42	PK	216	2.5	V	3.97	58.39	122.2	63.81
5720	53.05	PK	52	2	H	3.95	57.00	110.8	53.80
5720	53.39	PK	282	2.1	V	3.95	57.34	110.8	53.46
5700	53.98	PK	15	2	H	3.89	57.87	105.2	47.33
5700	54.59	PK	170	1.4	V	3.89	58.48	105.2	46.72
5650	53.43	PK	209	2.2	H	3.75	57.18	68.2	11.02
5650	54.07	PK	179	2.3	V	3.75	57.82	68.2	10.38
11490	32.24	PK	268	1.2	H	14.74	46.98	74	27.02
11490	31.57	PK	210	1.5	V	14.74	46.31	74	27.69
802.11N20, Middle Channel									
11570	32.79	PK	201	1.2	H	14.74	47.53	74	26.47
11570	30.98	PK	260	1.3	V	14.74	45.72	74	28.28

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11N20, High Channel									
5850	55.28	PK	180	1.4	H	4.33	59.61	122.2	62.59
5850	54.96	PK	230	2	V	4.33	59.29	122.2	62.91
5855	54.42	PK	100	2.2	H	4.35	58.77	110.8	52.03
5855	53.90	PK	91	1.9	V	4.35	58.25	110.8	52.55
5875	54.39	PK	137	1.9	H	4.41	58.80	105.2	46.40
5875	55.50	PK	232	1.6	V	4.41	59.91	105.2	45.29
5925	53.97	PK	70	2	H	4.55	58.52	68.2	9.68
5925	53.94	PK	271	1.5	V	4.55	58.49	68.2	9.71
11650	31.56	PK	321	2.2	H	14.79	46.35	74	27.65
11650	31.36	PK	44	2.3	V	14.79	46.15	74	27.85
802.11N40, Low Channel									
5725	54.80	PK	32	1.3	H	3.97	58.77	122.2	63.43
5725	55.20	PK	223	1.8	V	3.97	59.17	122.2	63.03
5720	53.95	PK	36	2.4	H	3.95	57.90	110.8	52.90
5720	53.92	PK	126	1.2	V	3.95	57.87	110.8	52.93
5700	55.02	PK	177	1.8	H	3.89	58.91	105.2	46.29
5700	54.74	PK	208	1.9	V	3.89	58.63	105.2	46.57
5650	53.51	PK	90	1.4	H	3.75	57.26	68.2	10.94
5650	53.98	PK	290	1.1	V	3.75	57.73	68.2	10.47
11510	32.46	PK	51	1.1	H	14.74	47.2	74	26.8
11510	32.58	PK	257	2.0	V	14.74	47.32	74	26.68
802.11N40, High Channel									
5850	55.85	PK	345	1.8	H	4.33	60.18	122.2	62.02
5850	55.05	PK	210	1.8	V	4.33	59.38	122.2	62.82
5855	54.32	PK	36	1.1	H	4.35	58.67	110.8	52.13
5855	54.78	PK	137	1.5	V	4.35	59.13	110.8	51.67
5875	55.55	PK	40	2.3	H	4.41	59.96	105.2	45.24
5875	55.36	PK	161	1.2	V	4.41	59.77	105.2	45.43
5925	53.73	PK	171	1.6	H	4.55	58.28	68.2	9.92
5925	54.07	PK	98	1.9	V	4.55	58.62	68.2	9.58
11590	33.05	PK	85	1.5	H	14.74	47.79	74	26.21
11590	32.17	PK	259	2.0	V	14.74	46.91	74	27.09

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11AC80									
5725	54.95	PK	201	2	H	3.97	58.92	122.2	63.28
5725	54.52	PK	279	1.1	V	3.97	58.49	122.2	63.71
5720	53.26	PK	147	1.4	H	3.95	57.21	110.8	53.59
5720	53.93	PK	270	1.1	V	3.95	57.88	110.8	52.92
5700	55.28	PK	228	2.4	H	3.89	59.17	105.2	46.03
5700	55.02	PK	226	1.8	V	3.89	58.91	105.2	46.29
5650	53.66	PK	109	2.3	H	3.75	57.41	68.2	10.79
5650	54.17	PK	288	1.3	V	3.75	57.92	68.2	10.28
5850	55.86	PK	179	1.1	H	4.33	60.19	122.2	62.01
5850	55.24	PK	77	1.6	V	4.33	59.57	122.2	62.63
5855	54.22	PK	96	1.9	H	4.35	58.57	110.8	52.23
5855	54.02	PK	67	1.6	V	4.35	58.37	110.8	52.43
5875	55.59	PK	355	1.8	V	4.41	60.00	105.2	45.20
5875	55.16	PK	232	1.7	H	4.41	59.57	105.2	45.63
5925	54.22	PK	128	1	V	4.55	58.77	68.2	9.43
5925	54.45	PK	199	1.3	H	4.55	59.00	68.2	9.20
11550	33.26	PK	215	1.9	H	14.74	48	74	26
11550	32.08	PK	159	2.3	V	14.74	46.82	74	27.18

Ant 1:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11A, Low Channel									
5725	54.22	PK	350	1.4	H	3.97	58.19	122.2	64.01
5725	54.13	PK	290	1.4	V	3.97	58.10	122.2	64.10
5720	52.59	PK	237	2.5	H	3.95	56.54	110.8	54.26
5720	53.06	PK	224	1.6	V	3.95	57.01	110.8	53.79
5700	53.77	PK	280	2.4	H	3.89	57.66	105.2	47.54
5700	54.98	PK	192	1.1	V	3.89	58.87	105.2	46.33
5650	53.34	PK	269	1.7	H	3.75	57.09	68.2	11.11
5650	54.09	PK	343	2.2	V	3.75	57.84	68.2	10.36
11490	31.99	PK	144	1.4	H	14.74	46.73	74	27.27
11490	31.99	PK	166	2.3	V	14.74	46.73	74	27.27
802.11A, Middle Channel									
11570	33	PK	279	1.3	H	14.74	47.74	74	26.26
11570	31.62	PK	137	1.5	V	14.74	46.36	74	27.64
802.11A, High Channel									
5850	54.58	PK	147	2.2	H	4.33	58.91	122.2	63.29
5850	55.51	PK	197	1	V	4.33	59.84	122.2	62.36
5855	53.66	PK	261	2	H	4.35	58.01	110.8	52.79
5855	54.36	PK	261	1.2	V	4.35	58.71	110.8	52.09
5875	54.73	PK	166	1.6	H	4.41	59.14	105.2	46.06
5875	55.39	PK	208	1.2	V	4.41	59.80	105.2	45.40
5925	54.04	PK	234	2.3	H	4.55	58.59	68.2	9.61
5925	53.71	PK	75	1.2	V	4.55	58.26	68.2	9.94
11650	32.26	PK	205	2.3	H	14.79	47.05	74	26.95
11650	31.85	PK	217	1.6	V	14.79	46.64	74	27.36
802.11N20, Low Channel									
5725	55.30	PK	154	2.4	H	3.97	59.27	122.2	62.93
5725	55.39	PK	198	2.5	V	3.97	59.36	122.2	62.84
5720	53.63	PK	255	2.3	H	3.95	57.58	110.8	53.22
5720	53.54	PK	193	1.3	V	3.95	57.49	110.8	53.31
5700	54.89	PK	65	2.2	H	3.89	58.78	105.2	46.42
5700	54.68	PK	86	2.5	V	3.89	58.57	105.2	46.63
5650	54.12	PK	155	1.5	H	3.75	57.87	68.2	10.33
5650	54.75	PK	73	2.3	V	3.75	58.50	68.2	9.70
11490	32.40	PK	9	2.5	H	14.74	47.14	74	26.86
11490	32.12	PK	326	1.6	V	14.74	46.86	74	27.14
802.11N20, Middle Channel									
11570	33.78	PK	199	2.5	H	14.74	48.52	74	25.48
11570	31.61	PK	128	2	V	14.74	46.35	74	27.65

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/AV	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11N20, High Channel									
5850	55.80	PK	156	1.6	H	4.33	60.13	122.2	62.07
5850	55.57	PK	146	1.1	V	4.33	59.90	122.2	62.30
5855	54.89	PK	245	1.9	H	4.35	59.24	110.8	51.56
5855	54.69	PK	163	1.4	V	4.35	59.04	110.8	51.76
5875	54.40	PK	15	2.5	H	4.41	58.81	105.2	46.39
5875	55.89	PK	259	1.8	V	4.41	60.30	105.2	44.90
5925	54.08	PK	356	2.5	H	4.55	58.63	68.2	9.57
5925	54.87	PK	166	2.4	V	4.55	59.42	68.2	8.78
11650	32.53	PK	257	2.4	H	14.79	47.32	74	26.68
11650	32.00	PK	37	1.5	V	14.79	46.79	74	27.21
802.11N40, Low Channel									
5725	54.18	PK	83	1.5	H	3.97	58.15	122.2	64.05
5725	54.82	PK	272	1.4	V	3.97	58.79	122.2	63.41
5720	53.37	PK	92	1.6	H	3.95	57.32	110.8	53.48
5720	53.07	PK	234	1.6	V	3.95	57.02	110.8	53.78
5700	54.75	PK	131	2.2	H	3.89	58.64	105.2	46.56
5700	54.37	PK	157	2	V	3.89	58.26	105.2	46.94
5650	53.41	PK	231	2.3	H	3.75	57.16	68.2	11.04
5650	53.35	PK	114	2.1	V	3.75	57.10	68.2	11.10
11510	32.44	PK	64	1.6	H	14.74	47.18	74	26.82
11510	32.51	PK	173	1.2	V	14.74	47.25	74	26.75
802.11N40, High Channel									
5850	55.78	PK	269	1.4	H	4.33	60.11	122.2	62.09
5850	54.20	PK	43	1.9	V	4.33	58.53	122.2	63.67
5855	53.57	PK	98	1.2	H	4.35	57.92	110.8	52.88
5855	54.66	PK	126	2.1	V	4.35	59.01	110.8	51.79
5875	55.22	PK	303	1.2	H	4.41	59.63	105.2	45.57
5875	54.98	PK	136	1.5	V	4.41	59.39	105.2	45.81
5925	53.56	PK	306	1.9	H	4.55	58.11	68.2	10.09
5925	53.50	PK	53	2.4	V	4.55	58.05	68.2	10.15
11590	32.78	PK	218	2.2	H	14.74	47.52	74	26.48
11590	32.01	PK	334	2.3	V	14.74	46.75	74	27.25

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11AC80									
5725	54.80	PK	42	1.1	H	3.97	58.77	122.2	63.43
5725	53.99	PK	178	1.3	V	3.97	57.96	122.2	64.24
5720	52.52	PK	184	1.9	H	3.95	56.47	110.8	54.33
5720	53.49	PK	129	1.8	V	3.95	57.44	110.8	53.36
5700	54.63	PK	318	1.2	H	3.89	58.52	105.2	46.68
5700	54.25	PK	139	1.6	V	3.89	58.14	105.2	47.06
5650	52.95	PK	210	1.3	H	3.75	56.70	68.2	11.50
5650	54.09	PK	142	1.1	V	3.75	57.84	68.2	10.36
5850	55.54	PK	110	1.7	H	4.33	59.87	122.2	62.33
5850	54.54	PK	116	1.9	V	4.33	58.87	122.2	63.33
5855	53.79	PK	105	2.1	H	4.35	58.14	110.8	52.66
5855	53.23	PK	352	1.5	V	4.35	57.58	110.8	53.22
5875	55.14	PK	208	2.2	V	4.41	59.55	105.2	45.65
5875	54.98	PK	204	1.2	H	4.41	59.39	105.2	45.81
5925	54.07	PK	203	1.5	V	4.55	58.62	68.2	9.58
5925	54.41	PK	258	2.1	H	4.55	58.96	68.2	9.24
11550	32.97	PK	110	1.8	H	14.74	47.71	74	26.29
11550	31.63	PK	226	2.5	V	14.74	46.37	74	27.63

Ant2:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11A, Low Channel									
5725	54.21	PK	273	1.4	H	3.97	58.18	122.2	64.02
5725	54.05	PK	286	1.1	V	3.97	58.02	122.2	64.18
5720	53.33	PK	243	1.2	H	3.95	57.28	110.8	53.52
5720	52.78	PK	204	2.3	V	3.95	56.73	110.8	54.07
5700	54.65	PK	307	1.5	H	3.89	58.54	105.2	46.66
5700	54.21	PK	106	1.6	V	3.89	58.10	105.2	47.10
5650	54.02	PK	348	1.4	H	3.75	57.77	68.2	10.43
5650	53.54	PK	259	2	V	3.75	57.29	68.2	10.91
11490	31.94	PK	39	2.4	H	14.74	46.68	74	27.32
11490	31.82	PK	255	1.4	V	14.74	46.56	74	27.44
802.11A, Middle Channel									
11570	32.7	PK	4	1.8	H	14.74	47.44	74	26.56
11570	31.66	PK	330	2.0	V	14.74	46.4	74	27.6
802.11A, High Channel									
5850	54.98	PK	340	1.5	H	4.33	59.31	122.2	62.89
5850	55.43	PK	307	2.4	V	4.33	59.76	122.2	62.44
5855	53.98	PK	21	1.8	H	4.35	58.33	110.8	52.47
5855	53.93	PK	82	1.7	V	4.35	58.28	110.8	52.52
5875	54.78	PK	321	1.6	H	4.41	59.19	105.2	46.01
5875	55.07	PK	179	2.2	V	4.41	59.48	105.2	45.72
5925	53.77	PK	138	2.3	H	4.55	58.32	68.2	9.88
5925	53.23	PK	122	1.8	V	4.55	57.78	68.2	10.42
11650	32.36	PK	106	1.9	H	14.79	47.15	74	26.85
11650	31.76	PK	58	2.4	V	14.79	46.55	74	27.45
802.11N20, Low Channel									
5725	54.37	PK	359	2.3	H	3.97	58.34	122.2	63.86
5725	54.89	PK	187	1.2	V	3.97	58.86	122.2	63.34
5720	53.23	PK	166	1.8	H	3.95	57.18	110.8	53.62
5720	53.10	PK	278	1.1	V	3.95	57.05	110.8	53.75
5700	54.19	PK	26	1.7	H	3.89	58.08	105.2	47.12
5700	54.26	PK	228	1.6	V	3.89	58.15	105.2	47.05
5650	53.90	PK	133	2.1	H	3.75	57.65	68.2	10.55
5650	54.57	PK	346	1.8	V	3.75	58.32	68.2	9.88
11490	32.32	PK	63	1.9	H	14.74	47.06	74	26.94
11490	31.45	PK	221	2.5	V	14.74	46.19	74	27.81
802.11N20, Middle Channel									
11570	32.92	PK	136	2.1	H	14.74	47.66	74	26.34
11570	31.07	PK	237	1.5	V	14.74	45.81	74	28.19

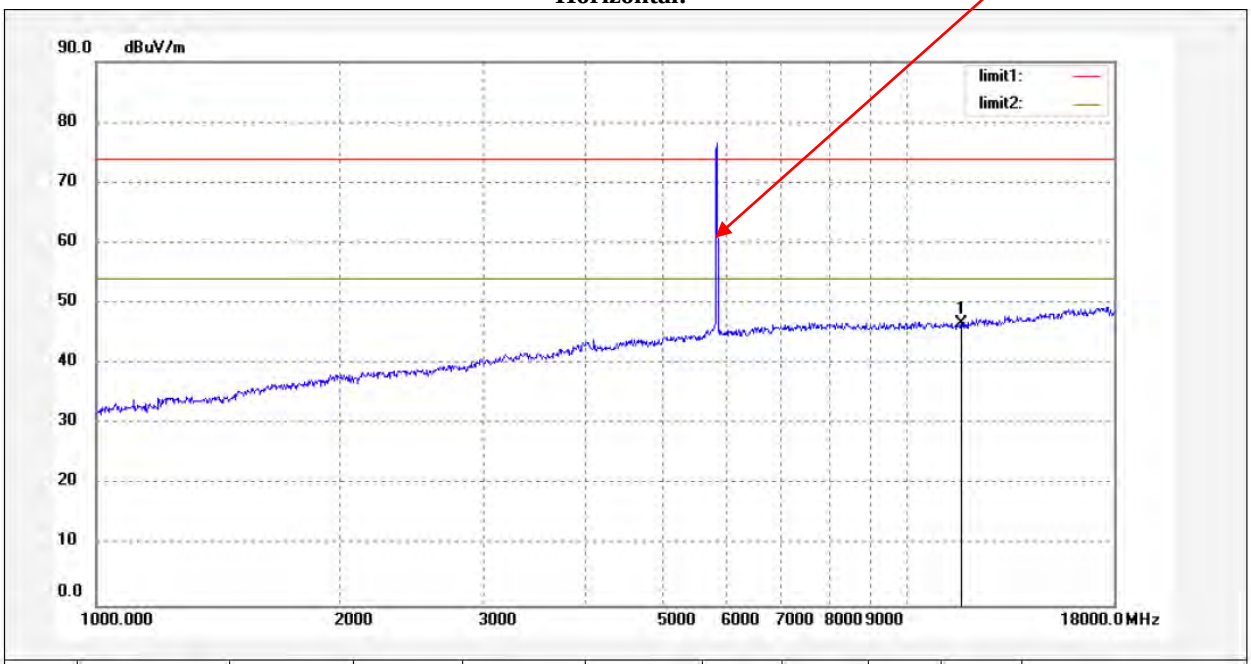
Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11N20, High Channel									
5850	55.15	PK	11	2.2	H	4.33	59.48	122.2	62.72
5850	55.48	PK	13	1.1	V	4.33	59.81	122.2	62.39
5855	54.38	PK	346	1.1	H	4.35	58.73	110.8	52.07
5855	54.25	PK	32	1.7	V	4.35	58.60	110.8	52.20
5875	53.67	PK	269	2.4	H	4.41	58.08	105.2	47.12
5875	55.72	PK	302	1.7	V	4.41	60.13	105.2	45.07
5925	53.21	PK	18	1.2	H	4.55	57.76	68.2	10.44
5925	54.15	PK	239	1.2	V	4.55	58.70	68.2	9.50
11650	32.23	PK	130	1.3	H	14.79	47.02	74	26.98
11650	31.11	PK	62	2	V	14.79	45.90	74	28.10
802.11N40, Low Channel									
5725	54.16	PK	86	2.1	H	3.97	58.13	122.2	64.07
5725	54.95	PK	195	2.3	V	3.97	58.92	122.2	63.28
5720	53.10	PK	255	2.5	H	3.95	57.05	110.8	53.75
5720	53.67	PK	209	1	V	3.95	57.62	110.8	53.18
5700	54.03	PK	286	2.3	H	3.89	57.92	105.2	47.28
5700	54.20	PK	304	2.1	V	3.89	58.09	105.2	47.11
5650	53.32	PK	85	1.9	H	3.75	57.07	68.2	11.13
5650	53.79	PK	290	1.1	V	3.75	57.54	68.2	10.66
11510	32.04	PK	358	1.7	H	14.74	46.78	74	27.22
11510	32.23	PK	173	2.3	V	14.74	46.97	74	27.03
802.11N40, High Channel									
5850	55.03	PK	20	2	H	4.33	59.36	122.2	62.84
5850	54.89	PK	14	2.2	V	4.33	59.22	122.2	62.98
5855	54.06	PK	93	2.3	H	4.35	58.41	110.8	52.39
5855	53.99	PK	138	2.4	V	4.35	58.34	110.8	52.46
5875	54.78	PK	306	1.6	H	4.41	59.19	105.2	46.01
5875	54.48	PK	329	1.2	V	4.41	58.89	105.2	46.31
5925	52.98	PK	190	1.6	H	4.55	57.53	68.2	10.67
5925	53.29	PK	225	1	V	4.55	57.84	68.2	10.36
11590	32.9	PK	204	1.1	H	14.74	47.64	74	26.36
11590	32.01	PK	163	1.9	V	14.74	46.75	74	27.25

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11AC80									
5725	54.71	PK	28	1.9	H	3.97	58.68	122.2	63.52
5725	53.78	PK	30	1.1	V	3.97	57.75	122.2	64.45
5720	53.16	PK	182	1.3	H	3.95	57.11	110.8	53.69
5720	53.87	PK	189	2.4	V	3.95	57.82	110.8	52.98
5700	54.34	PK	161	1.4	H	3.89	58.23	105.2	46.97
5700	54.13	PK	337	1.4	V	3.89	58.02	105.2	47.18
5650	52.70	PK	44	1.1	H	3.75	56.45	68.2	11.75
5650	53.76	PK	356	1.7	V	3.75	57.51	68.2	10.69
5850	55.40	PK	183	1.3	H	4.33	59.73	122.2	62.47
5850	55.02	PK	188	1.1	V	4.33	59.35	122.2	62.85
5855	53.36	PK	37	1.3	H	4.35	57.71	110.8	53.09
5855	53.82	PK	22	2.2	V	4.35	58.17	110.8	52.63
5875	55.12	PK	261	2.1	V	4.41	59.53	105.2	45.67
5875	54.43	PK	148	1.7	H	4.41	58.84	105.2	46.36
5925	53.73	PK	27	1.5	V	4.55	58.28	68.2	9.92
5925	53.59	PK	18	1.8	H	4.55	58.14	68.2	10.06
11550	32.79	PK	29	1.9	H	14.74	47.53	74	26.47
11550	31.65	PK	181	1.3	V	14.74	46.39	74	27.61

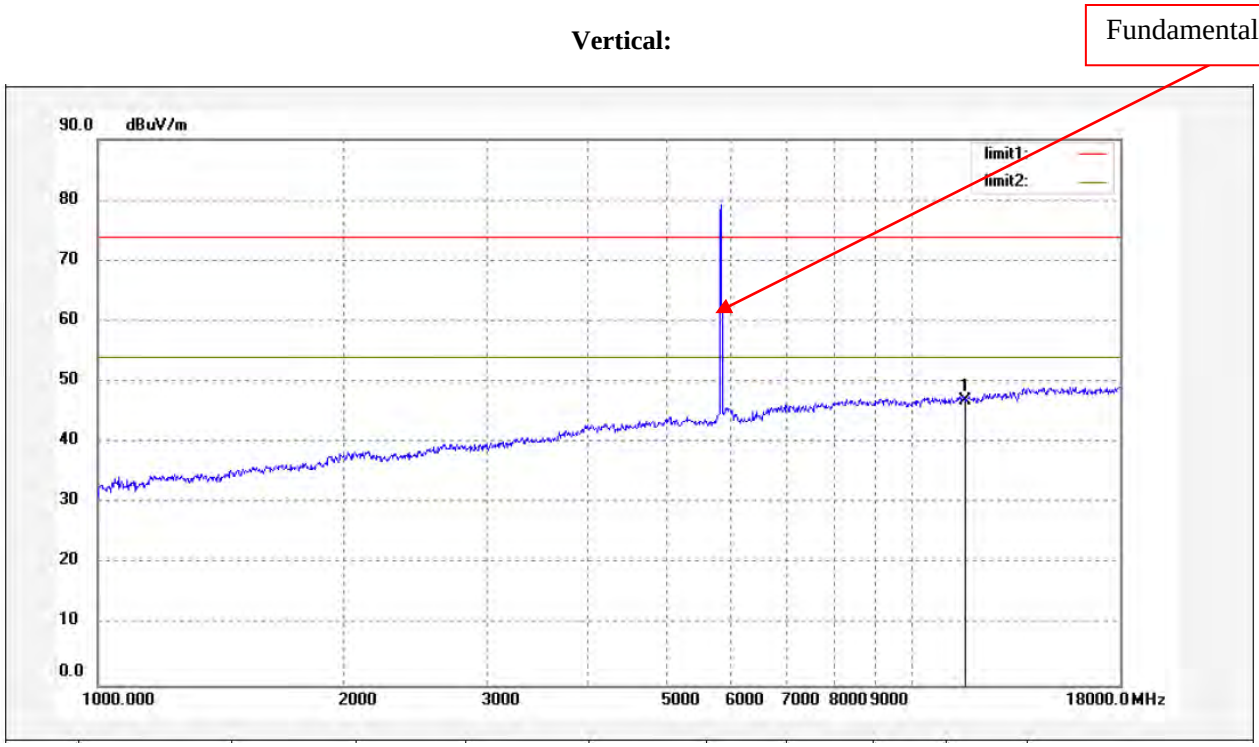
Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude
The other spurious emission which is in the noise floor level was not recorded.
The test result of peak was less than the limit of average, so just peak values were recorded.

1-18 GHz:

Pre-scan for Peak
802.11a 5825MHz, Ant 1
Horizontal:

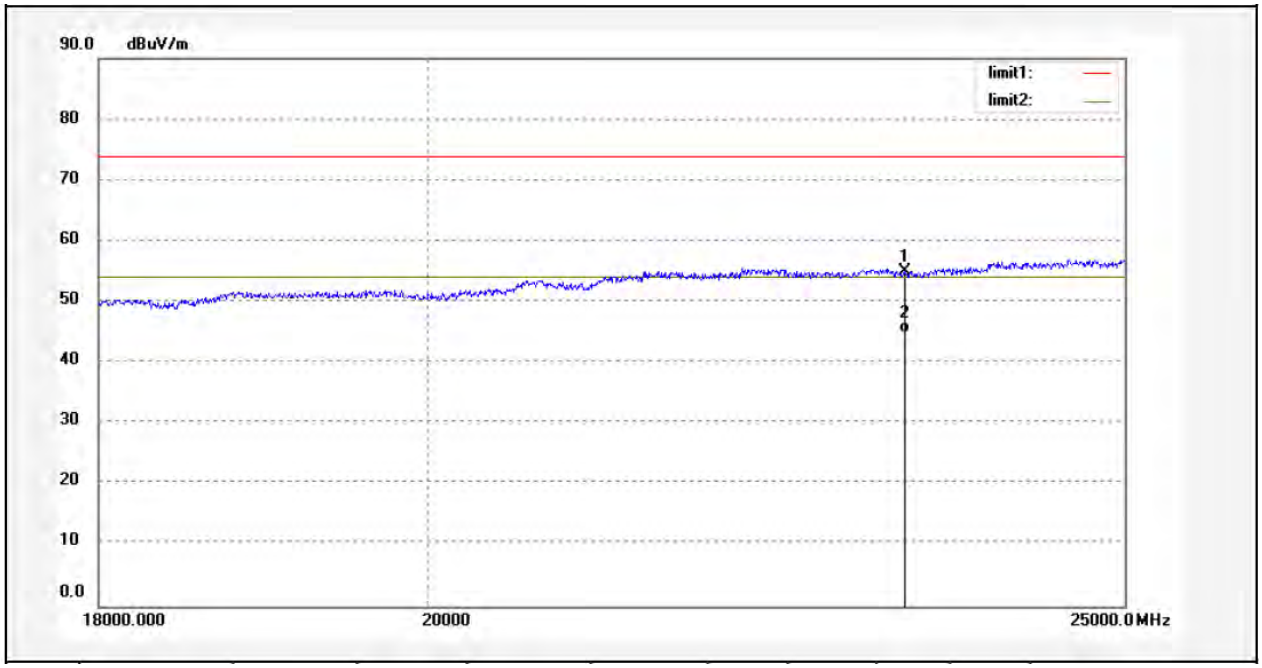


Vertical:

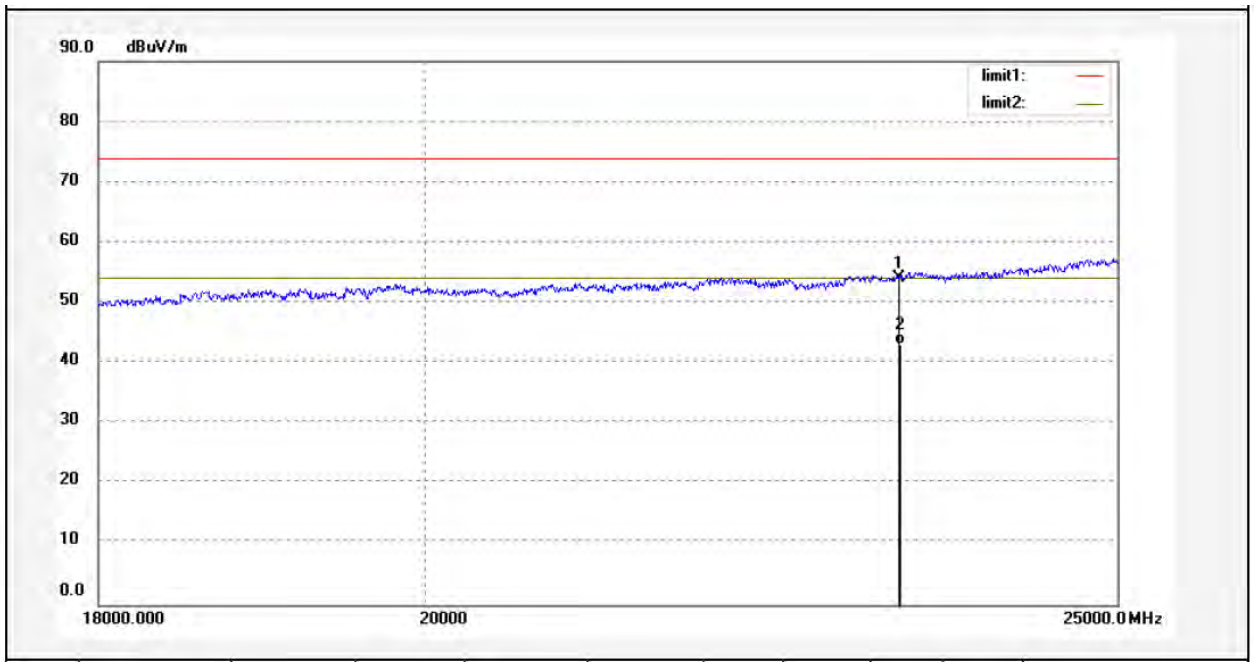


18-25 GHz:

Pre-scan for Peak
802.11a 5825MHz, Ant 1
Horizontal:

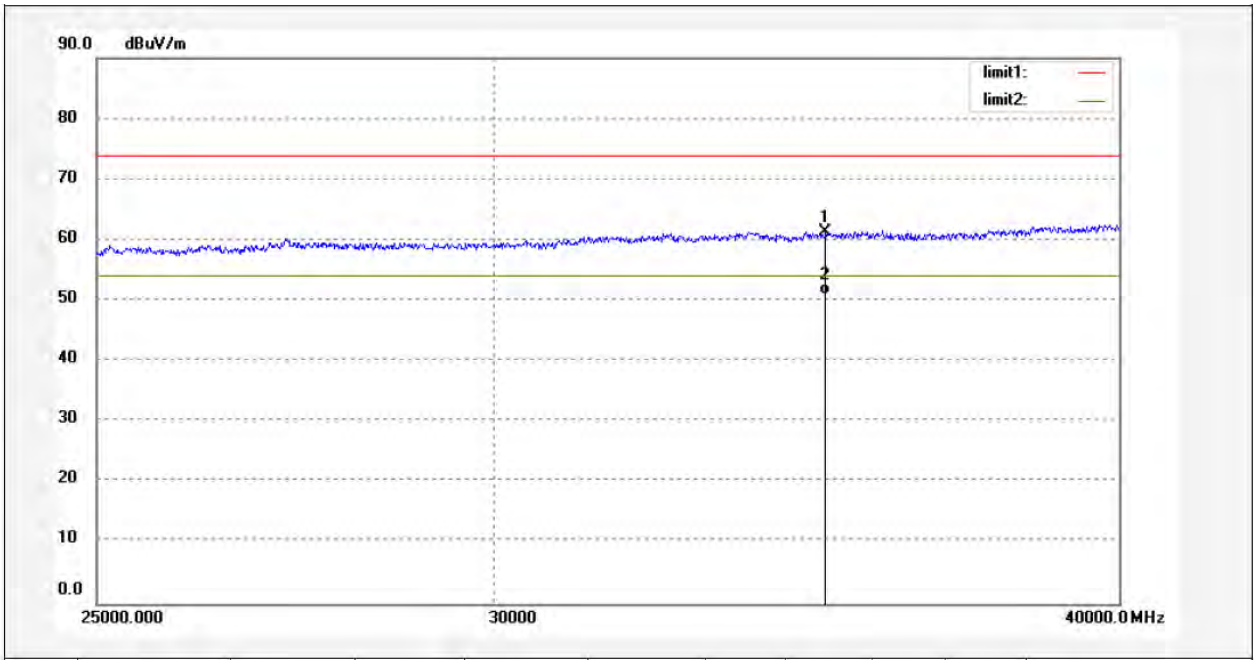


Vertical:

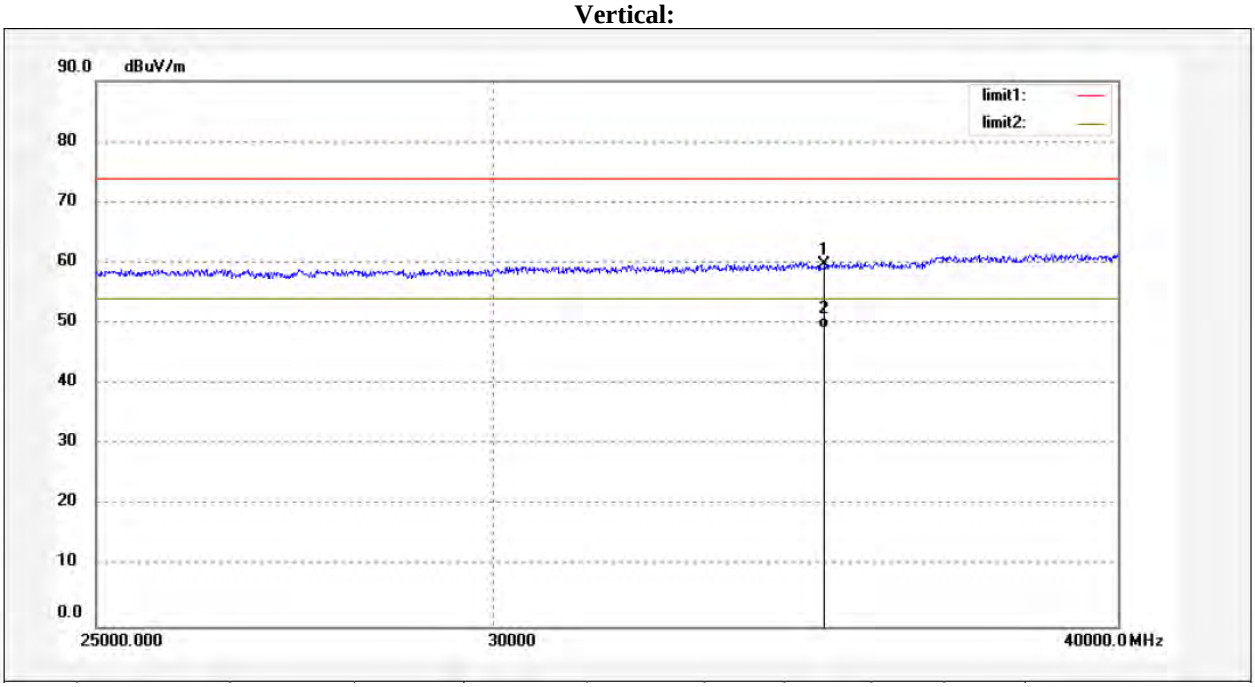


25-40 GHz:

Pre-scan for Peak
802.11a 5825MHz, Ant
Horizontal:



Vertical:



FCC §15.407(a)(e) – BANDWIDTH

Applicable Standard

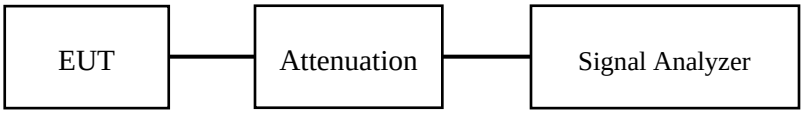
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band 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

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 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × 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.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-08-05.

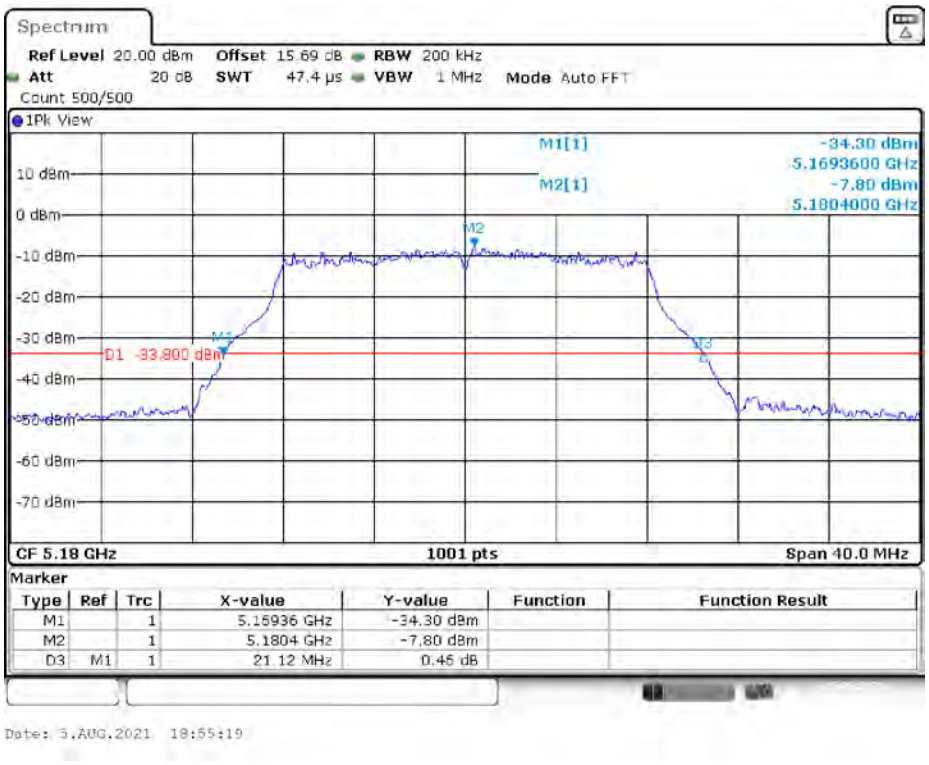
EUT operation mode: Transmitting

Test Result: Pass; please refer to the following tables and plots.

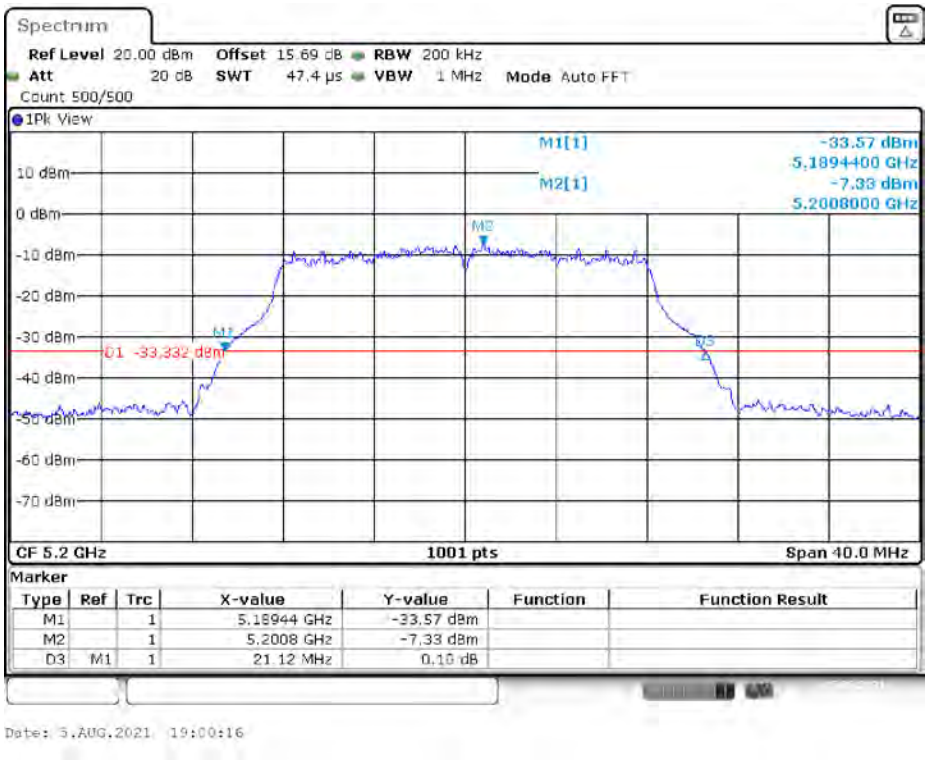
5150 MHz - 5250 MHz:

Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Remark
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2A band
5180	21.120	17.742	
5200	21.120	17.742	
5240	21.120	17.742	
802.11n20			
5180	21.680	18.581	
5200	21.400	18.701	
5240	21.440	18.741	
802.11n40			
5190	41.600	36.763	
5230	40.800	36.763	
802.11ac80			
5210	81.440	75.604	

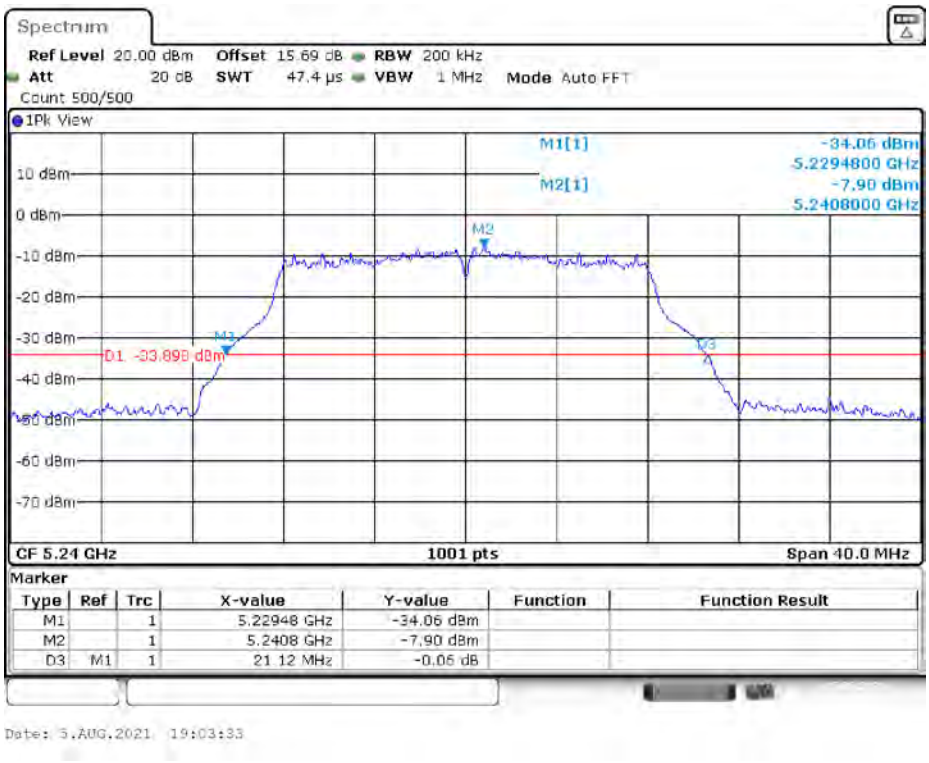
802.11a mode, 26 dB Emissions, 5180 MHz



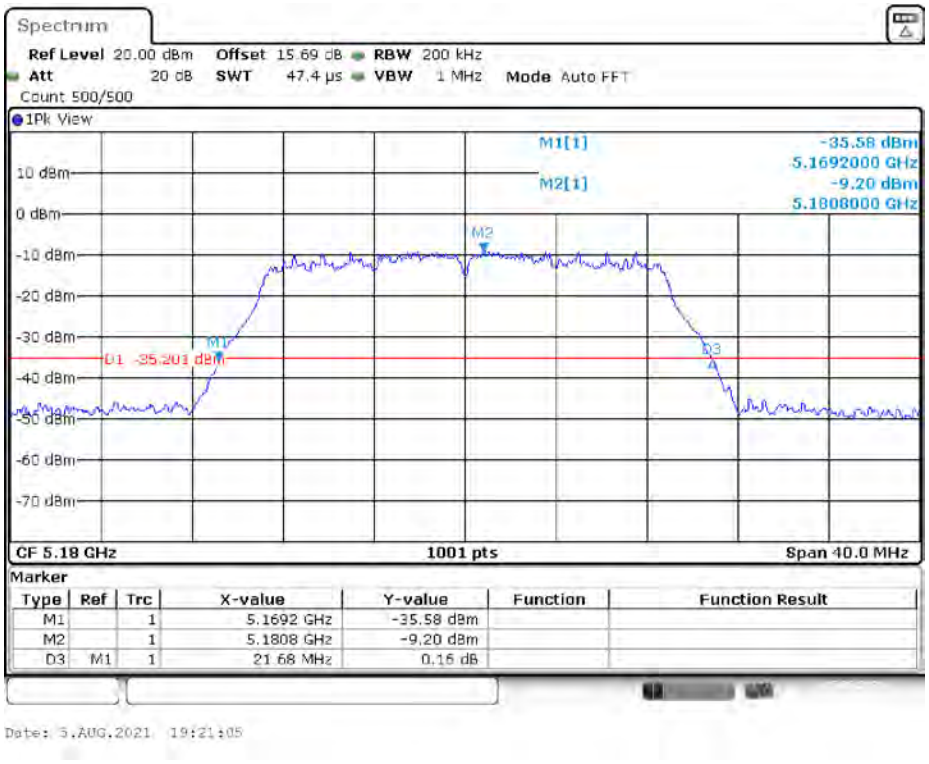
802.11a mode, 26 dB Emissions, 5200 MHz



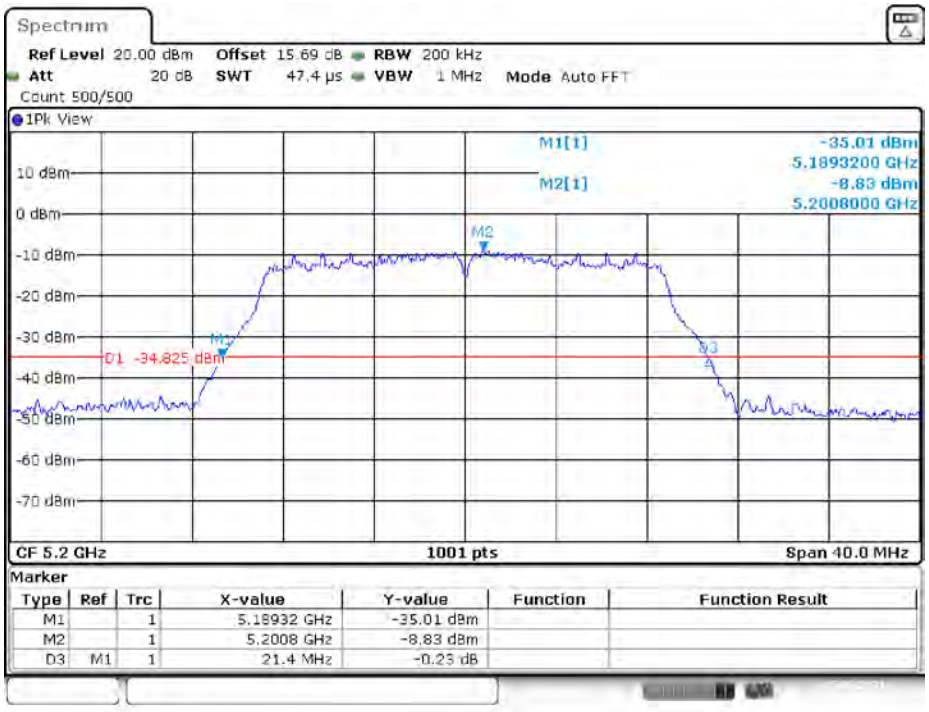
802.11a mode, 26 dB Emissions, 5240 MHz



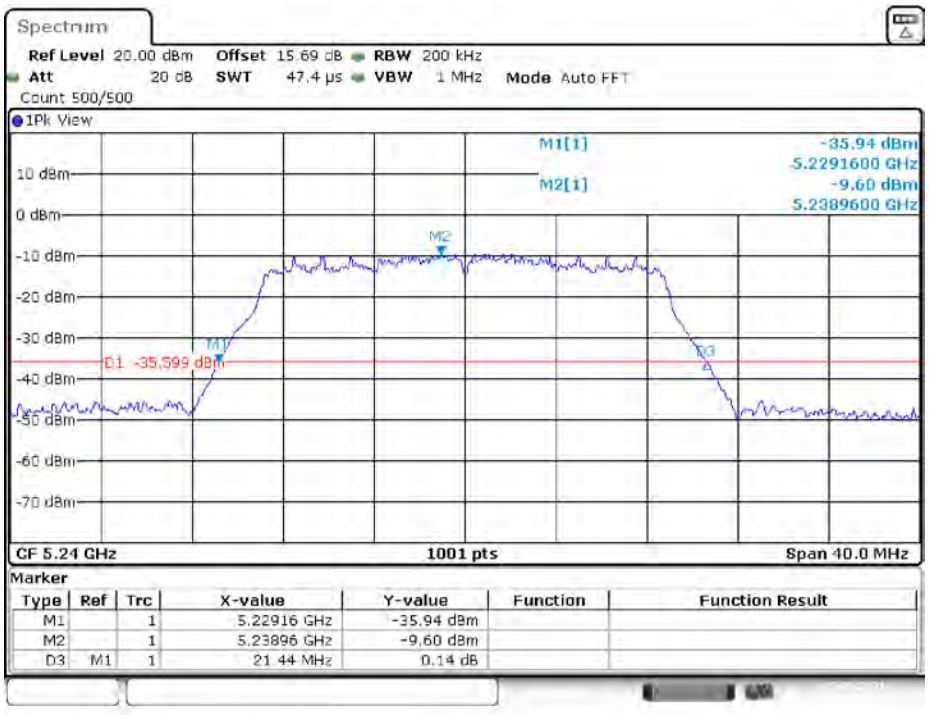
802.11n20 mode, 26 dB Emissions, 5180 MHz



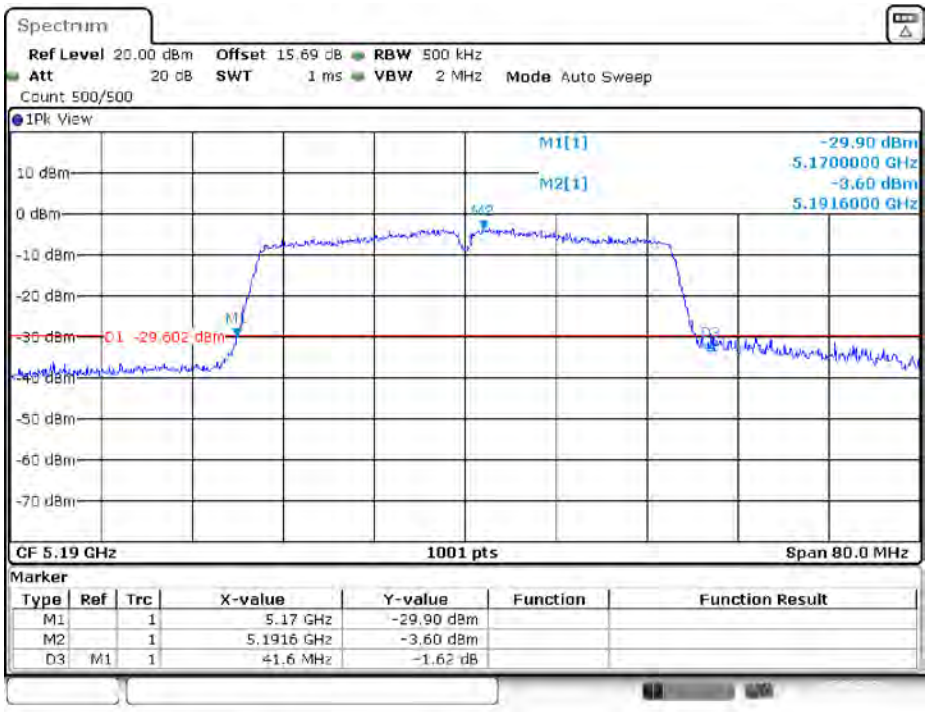
802.11n20 mode, 26 dB Emissions, 5200 MHz



802.11n20 mode, 26 dB Emissions, 5240 MHz

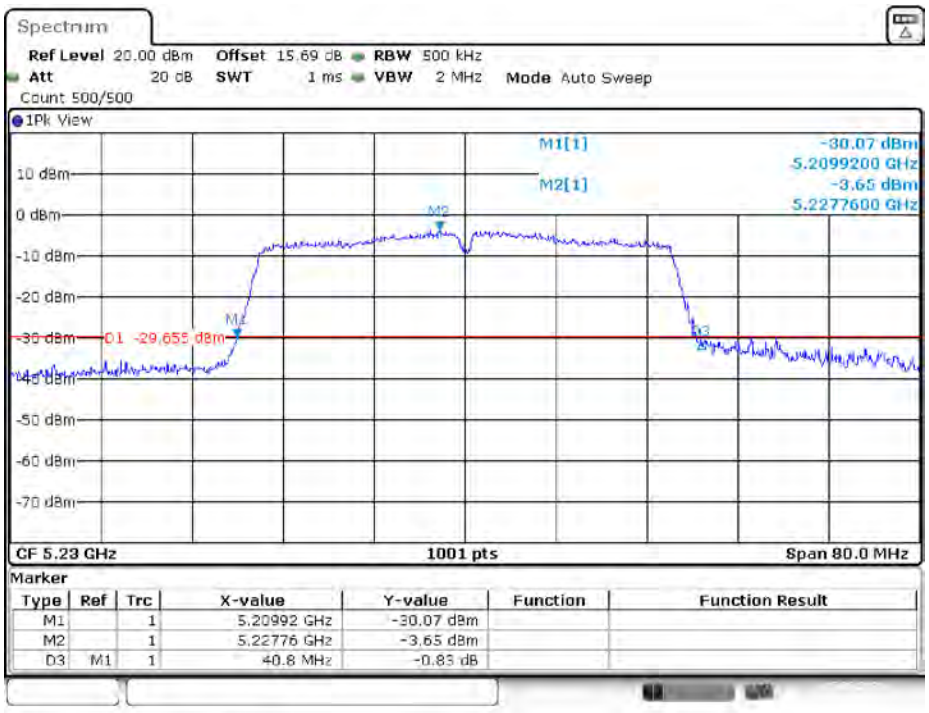


802.11n40 mode, 26 dB Emissions, 5190 MHz



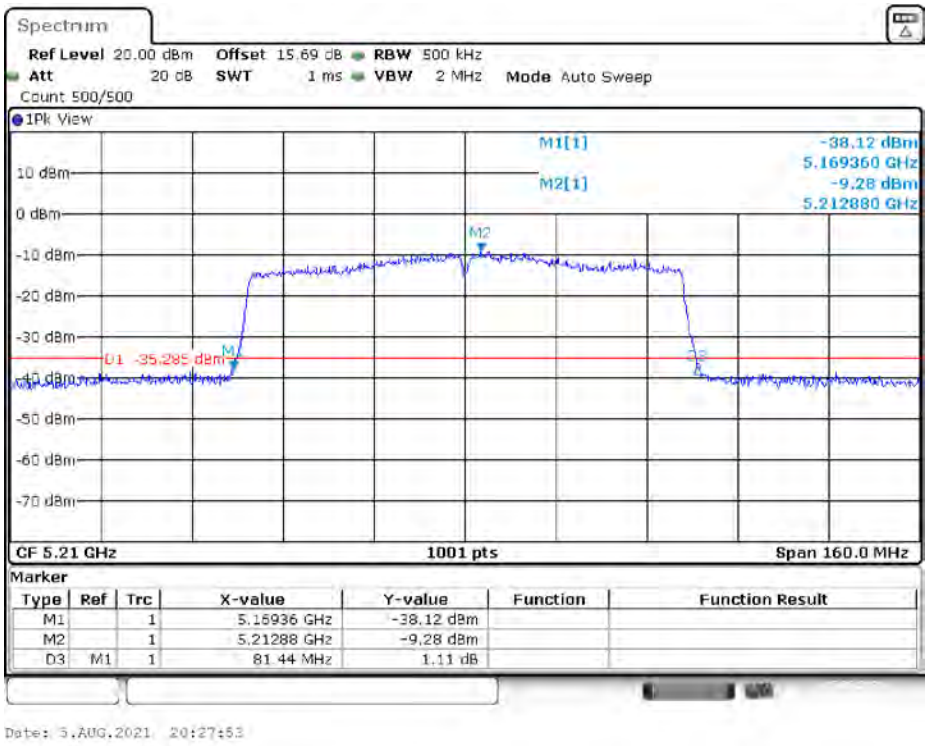
Date: 3.AUG.2021 20:10:15

802.11n40 mode, 26 dB Emissions, 5230 MHz

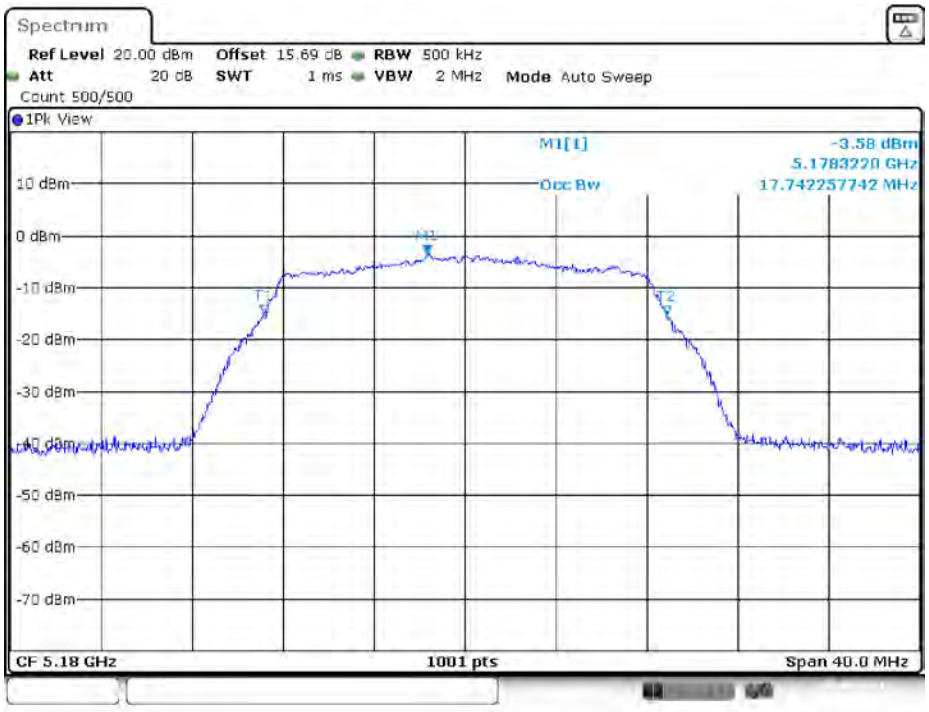


Date: 3.AUG.2021 20:15:04

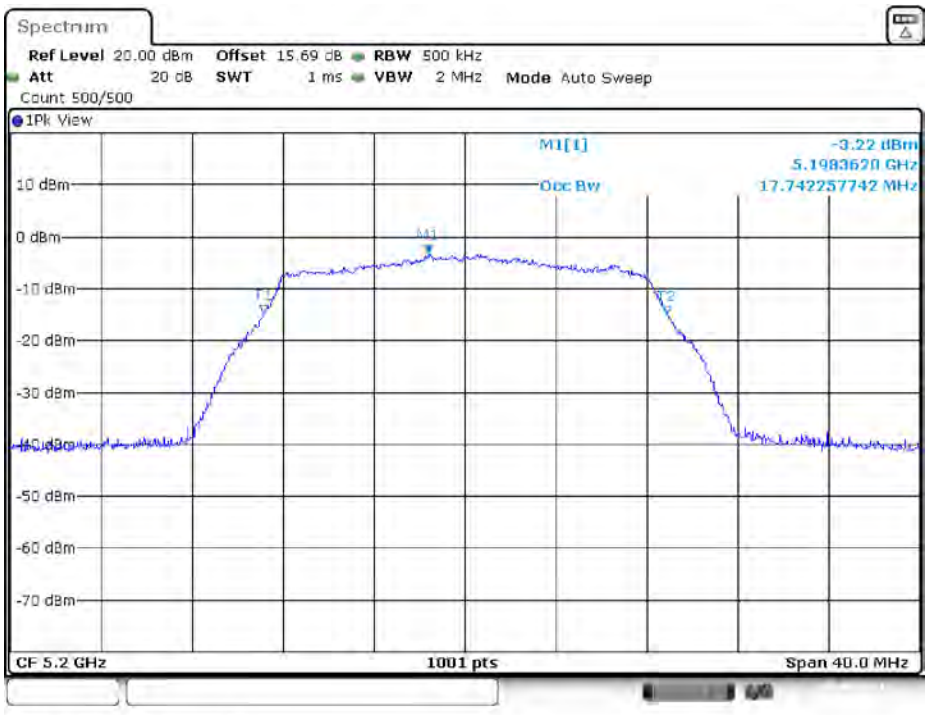
802.11ac80 mode, 26 dB Emissions, 5210 MHz



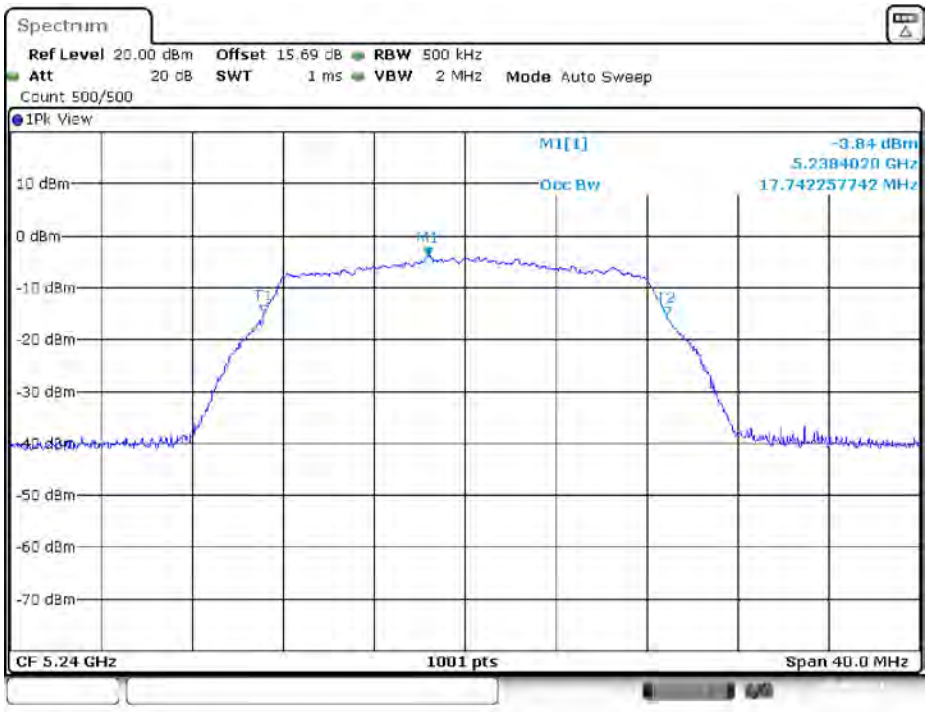
802.11a mode, 99% Occupied Bandwidth, 5180 MHz



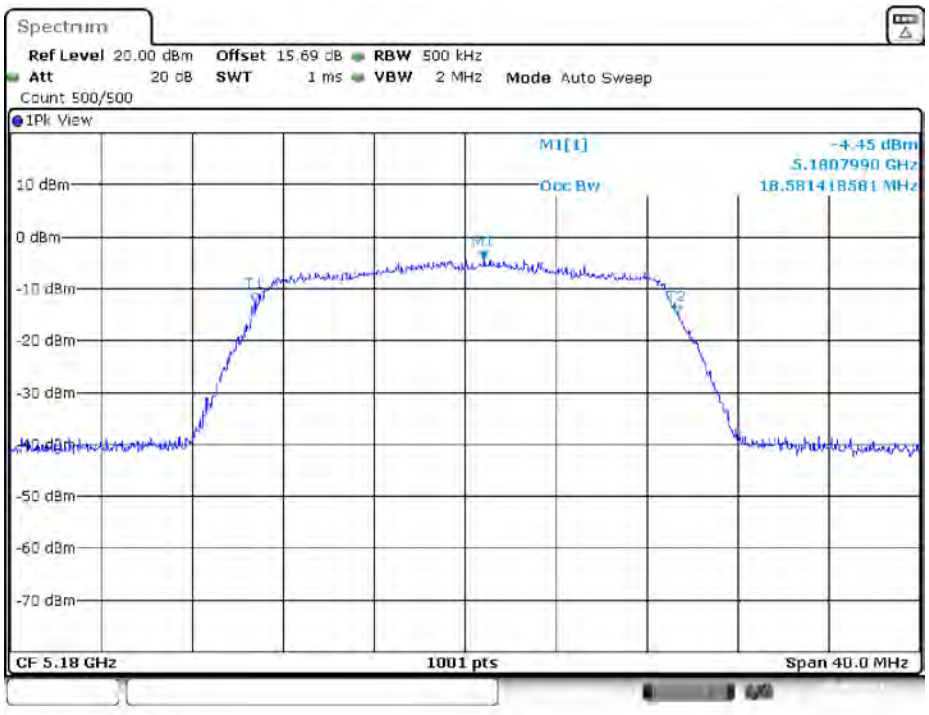
802.11a mode, 99% Occupied Bandwidth, 5200 MHz



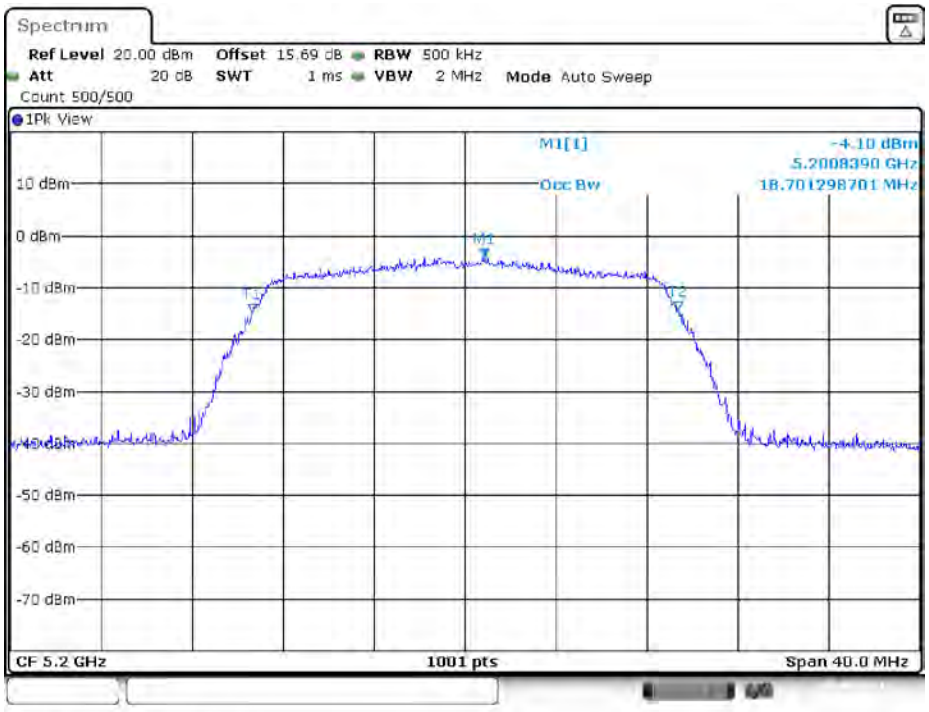
802.11a mode, 99% Occupied Bandwidth, 5240 MHz



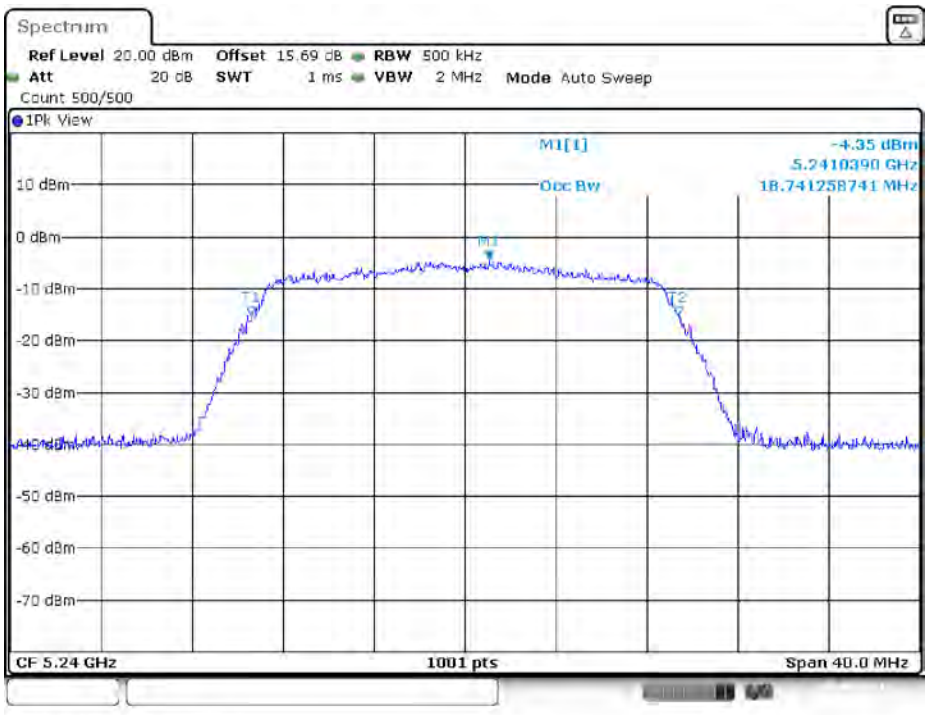
802.11n20 mode, 99% Occupied Bandwidth, 5180 MHz



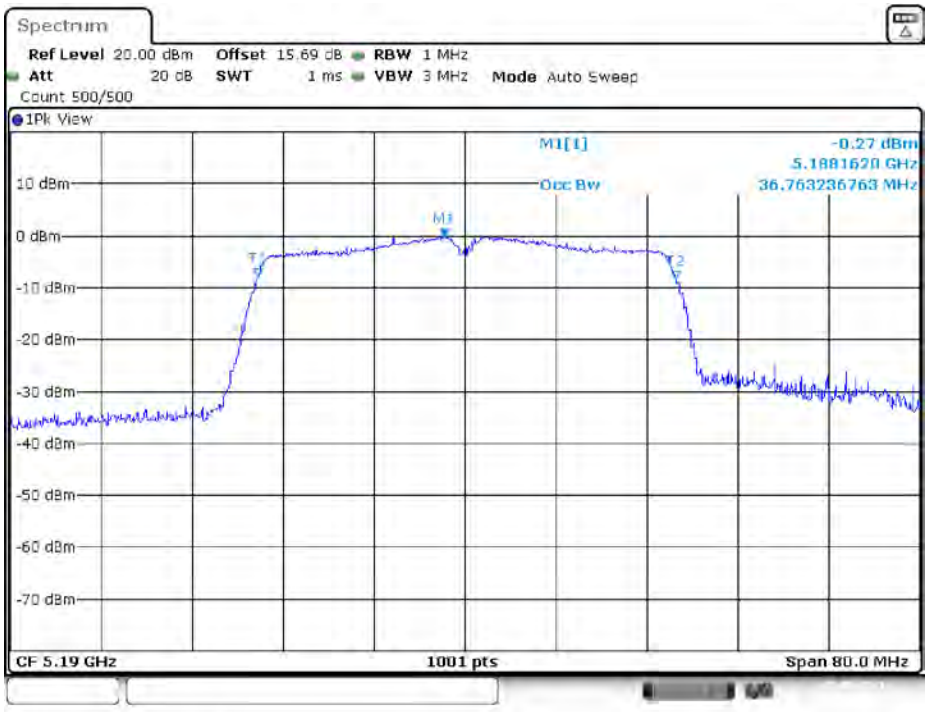
802.11n20 mode, 99% Occupied Bandwidth, 5200 MHz



802.11n20 mode, 99% Occupied Bandwidth, 5240 MHz



802.11n40 mode, 99% Occupied Bandwidth, 5190 MHz



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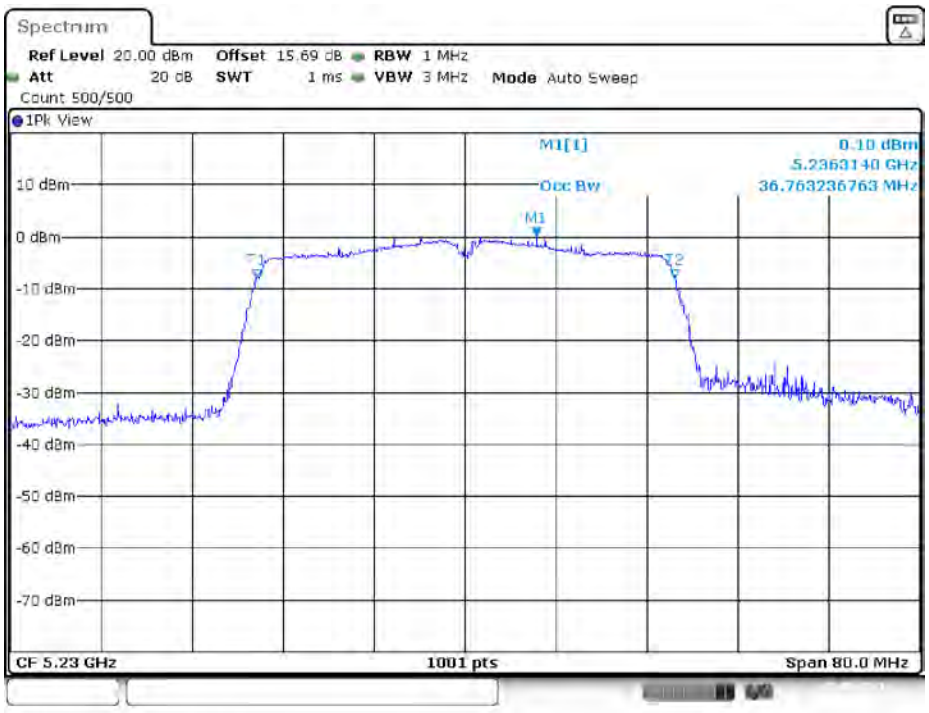
802.11n40 mode, 99% Occupied Bandwidth, 5230 MHz



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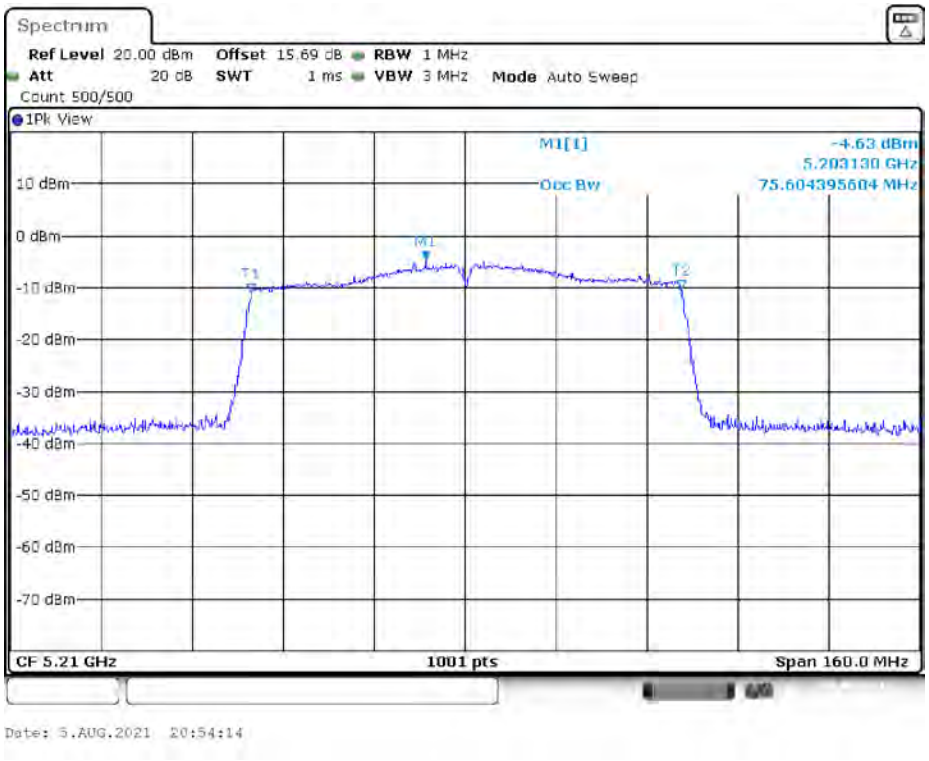
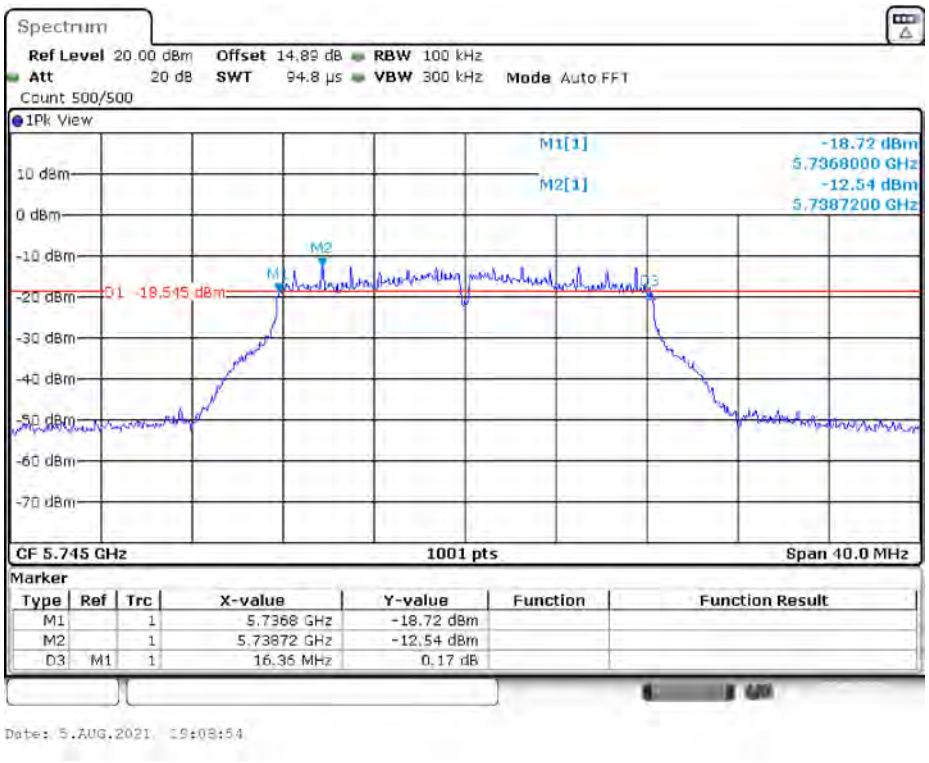
802.11ac80 mode, 99% Occupied Bandwidth, 5210 MHz



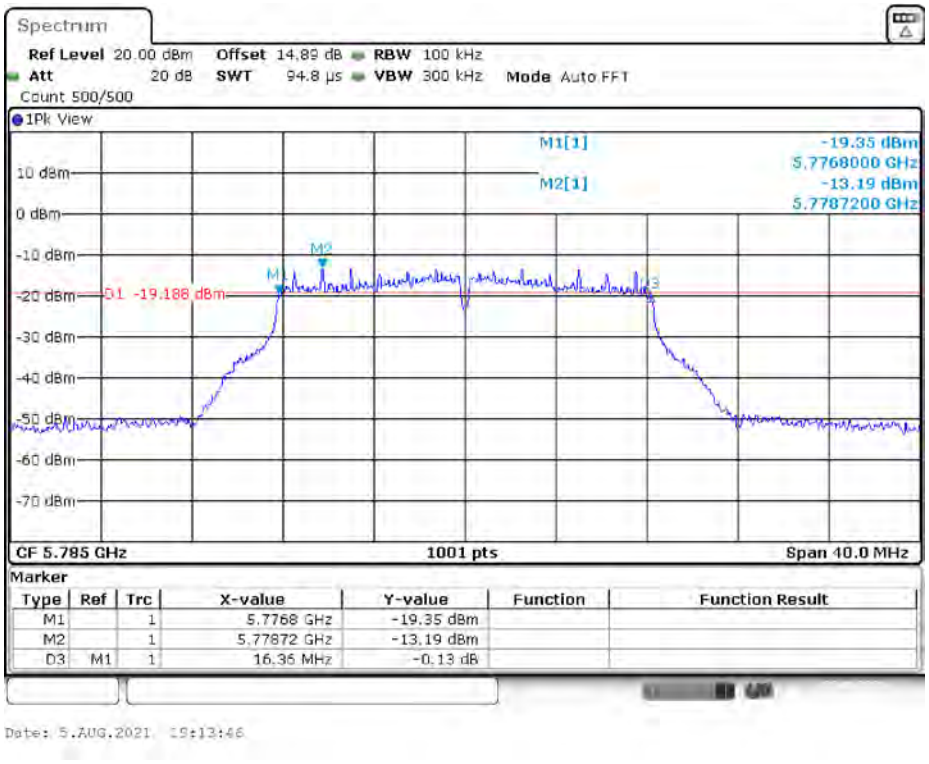
5725 MHz - 5850 MHz:

Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Remark
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2C band
5745	16.36	17.822	
5785	16.36	17.902	
5825	16.36	17.862	
802.11n20			
5745	17.64	18.741	
5785	17.40	18.861	
5825	17.64	18.821	
802.11n40			
5755	36.24	36.923	
5795	36.24	37.003	
802.11ac80			
5775	75.52	75.924	

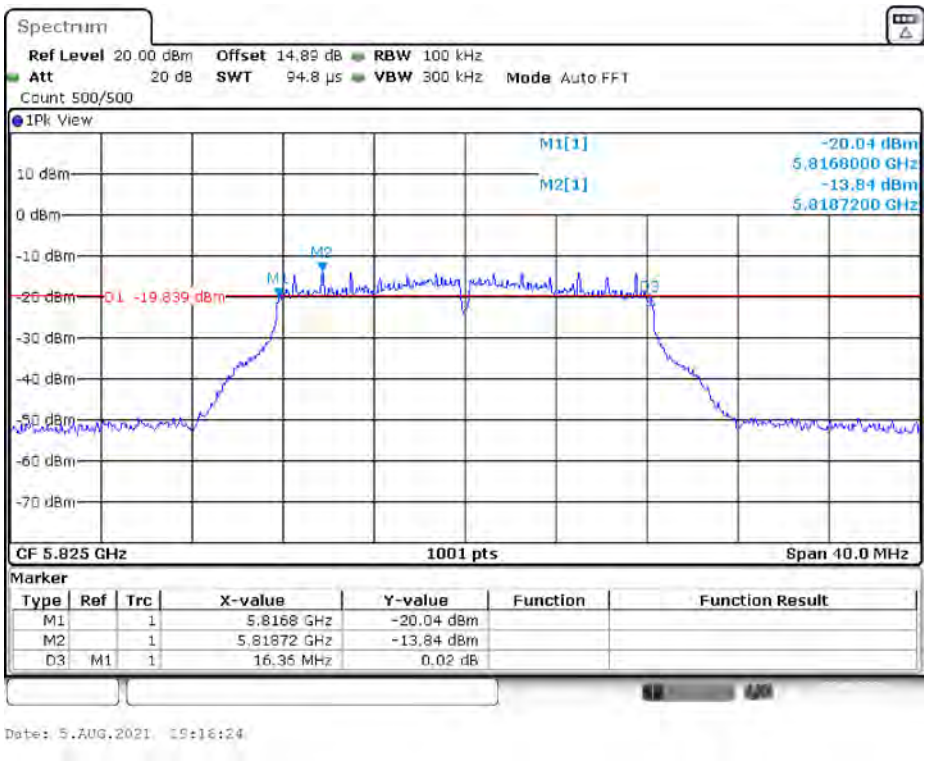
802.11a mode, 6 dB Emissions, 5745 MHz



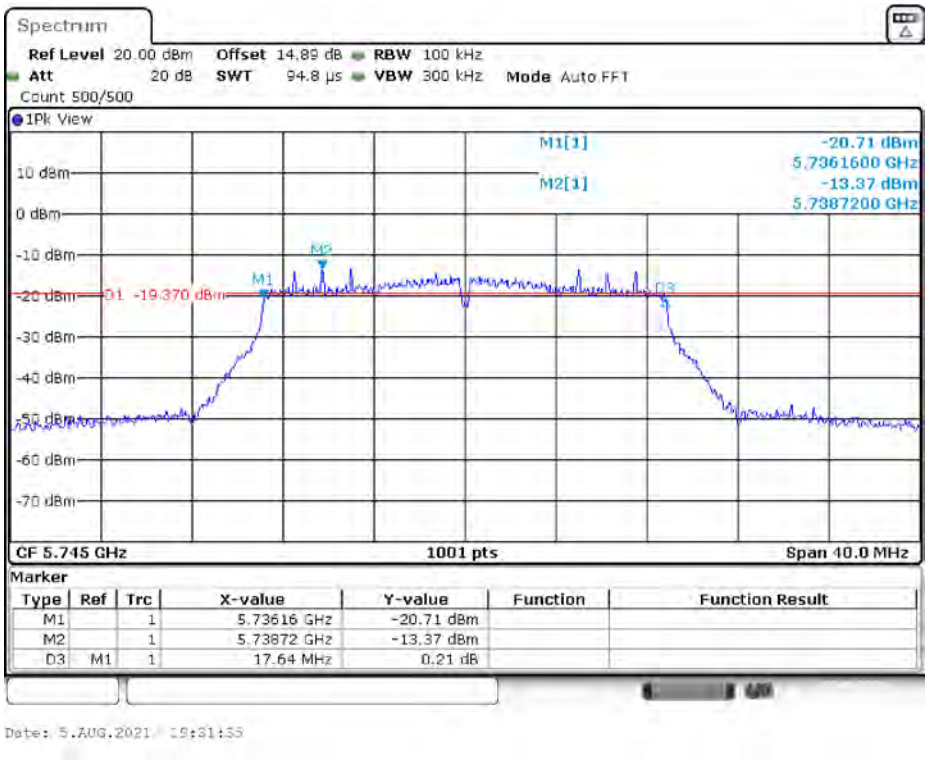
802.11a mode, 6 dB Emissions, 5785 MHz



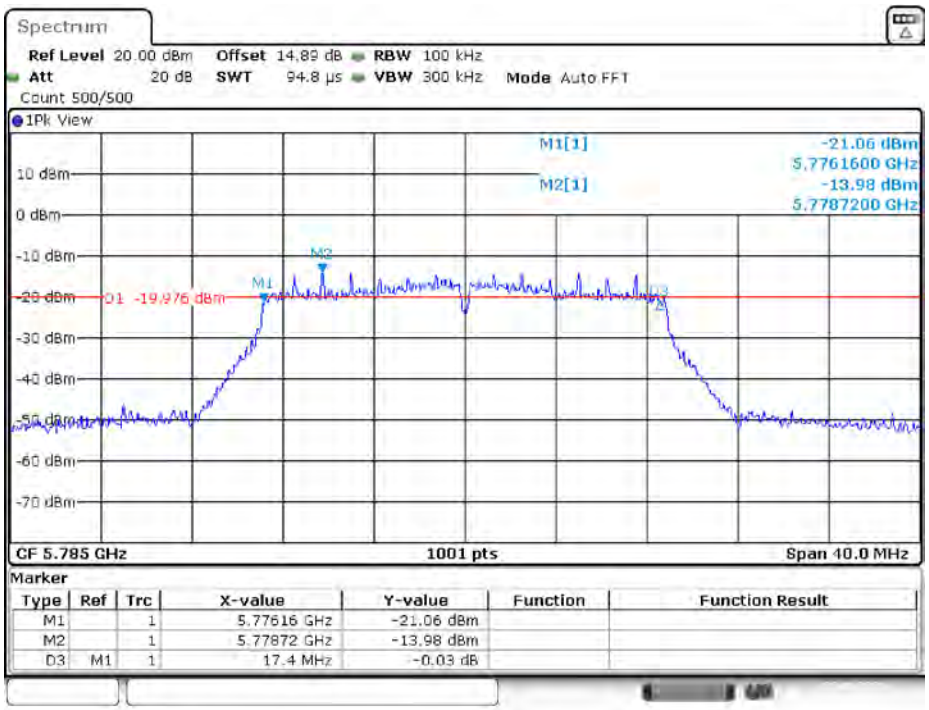
802.11a mode, 6 dB Emissions, 5825 MHz



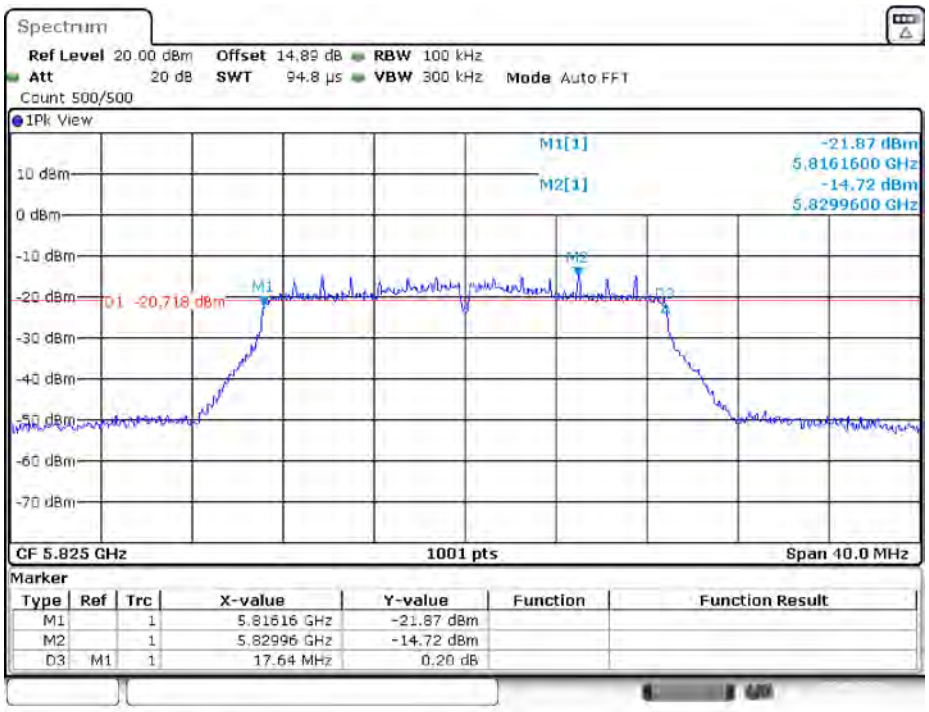
802.11n20 mode, 6 dB Emissions, 5745 MHz



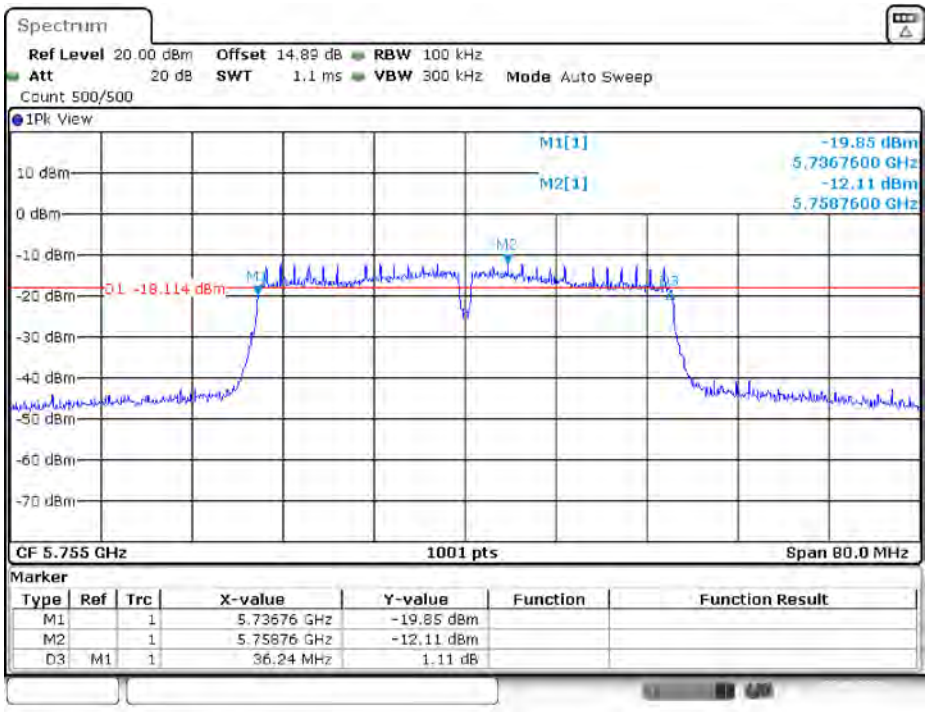
802.11n20 mode, 6 dB Emissions, 5785 MHz



802.11n20 mode, 6 dB Emissions, 5825 MHz



802.11n40 mode, 6 dB Emissions, 5755 MHz



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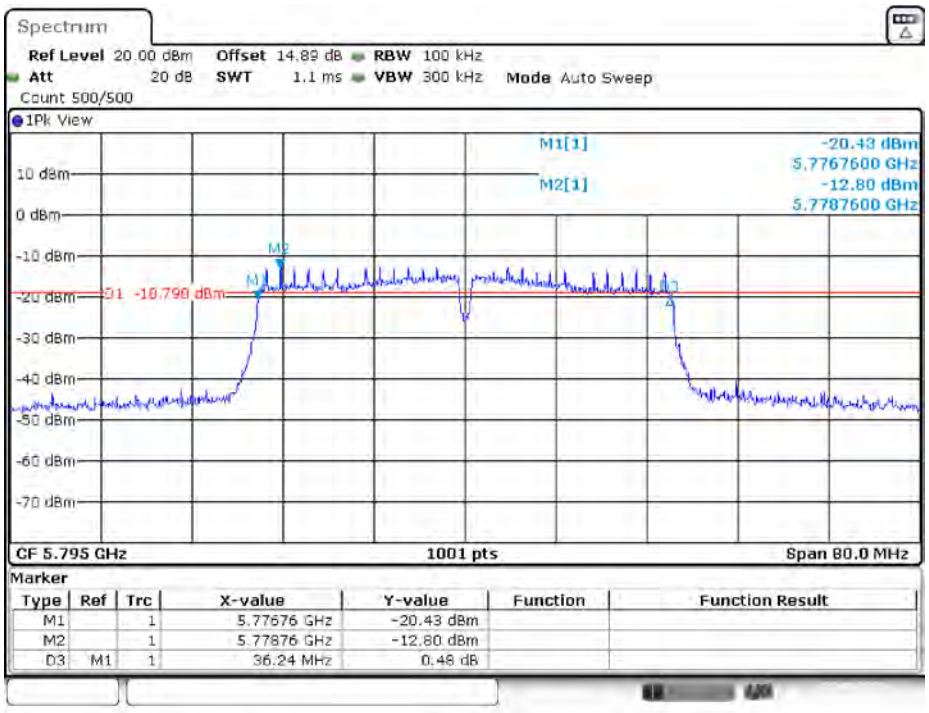
802.11n40 mode, 6 dB Emissions, 5795 MHz



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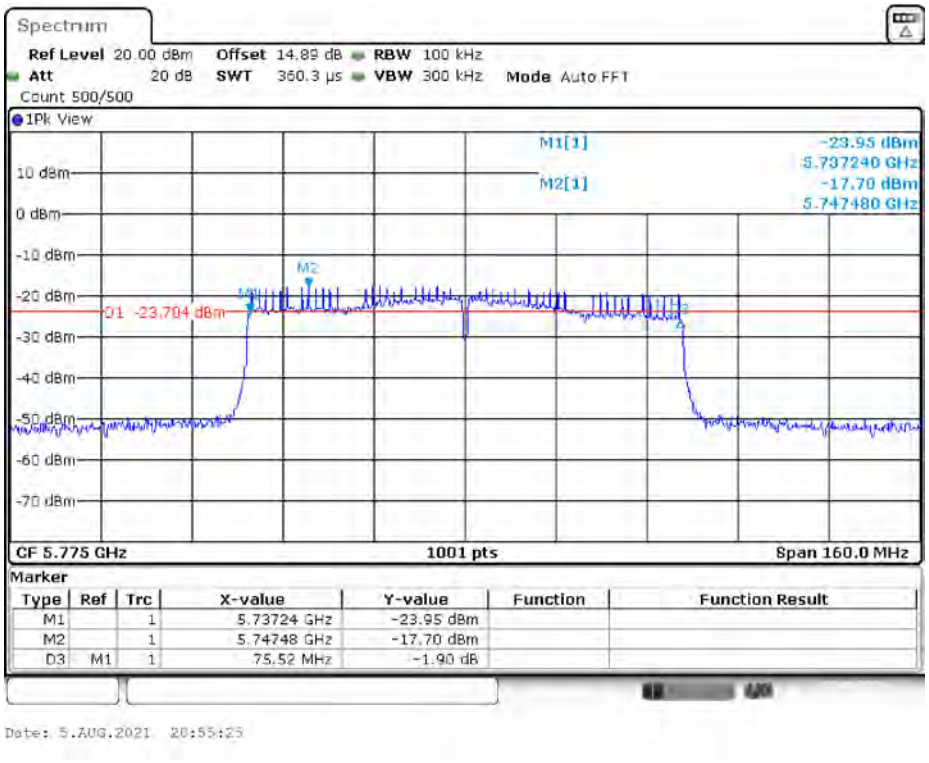
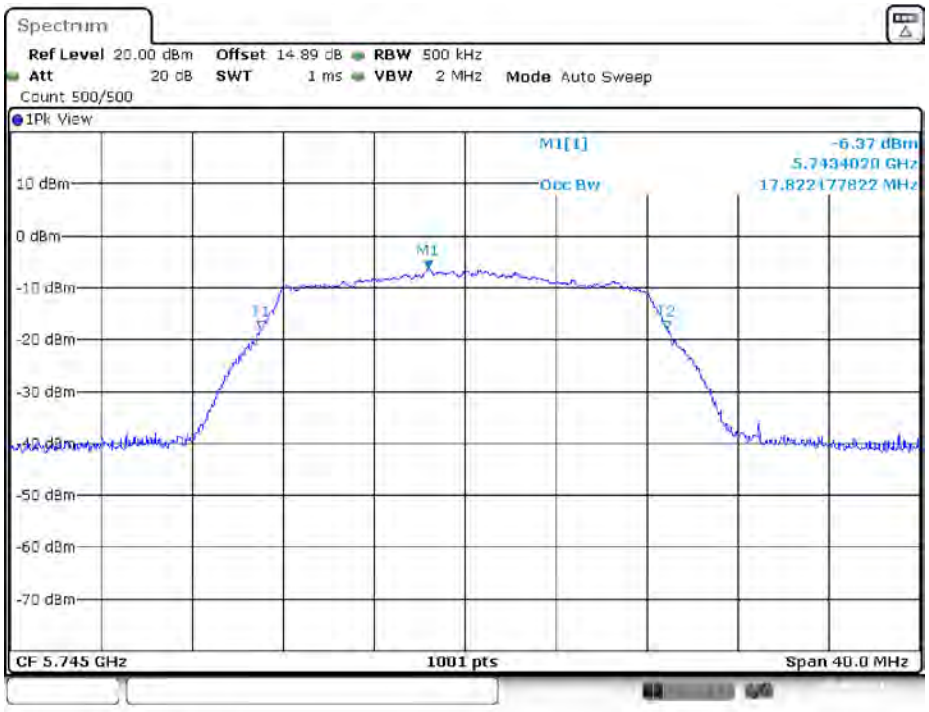
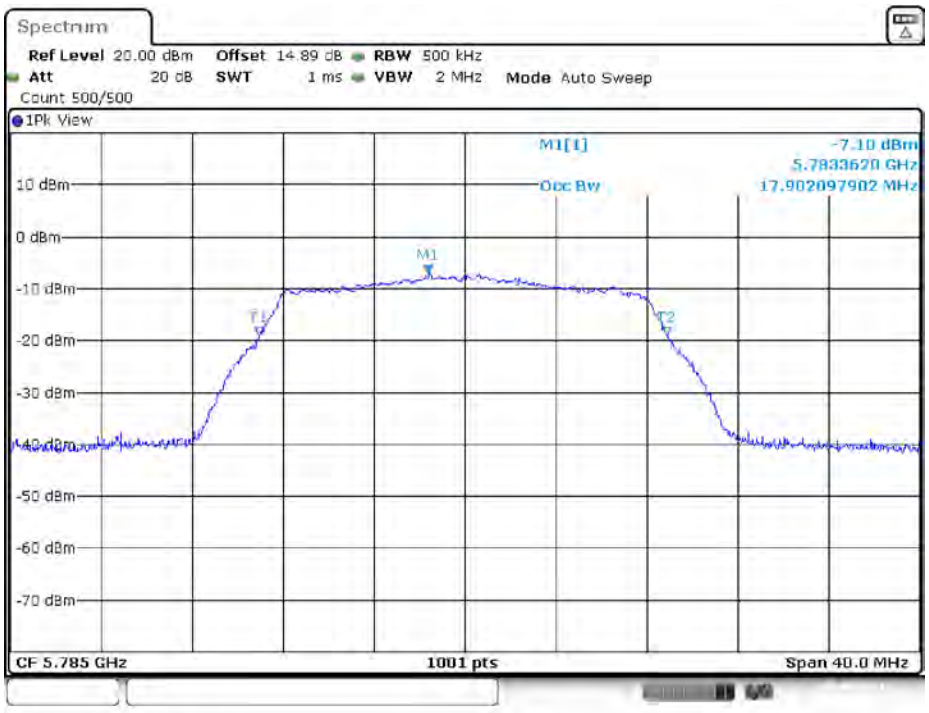
802.11ac80 mode, 6 dB Emissions, 5775 MHz



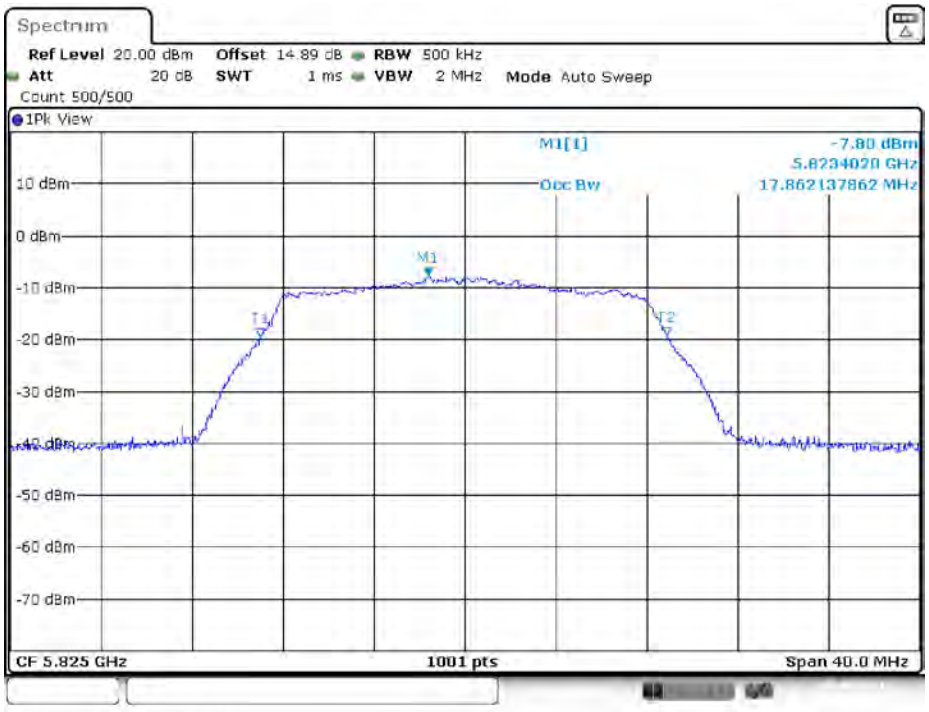
802.11a mode, 99% Occupied Bandwidth, 5745 MHz



802.11a mode, 99% Occupied Bandwidth, 5785 MHz



802.11a mode, 99% Occupied Bandwidth, 5825 MHz



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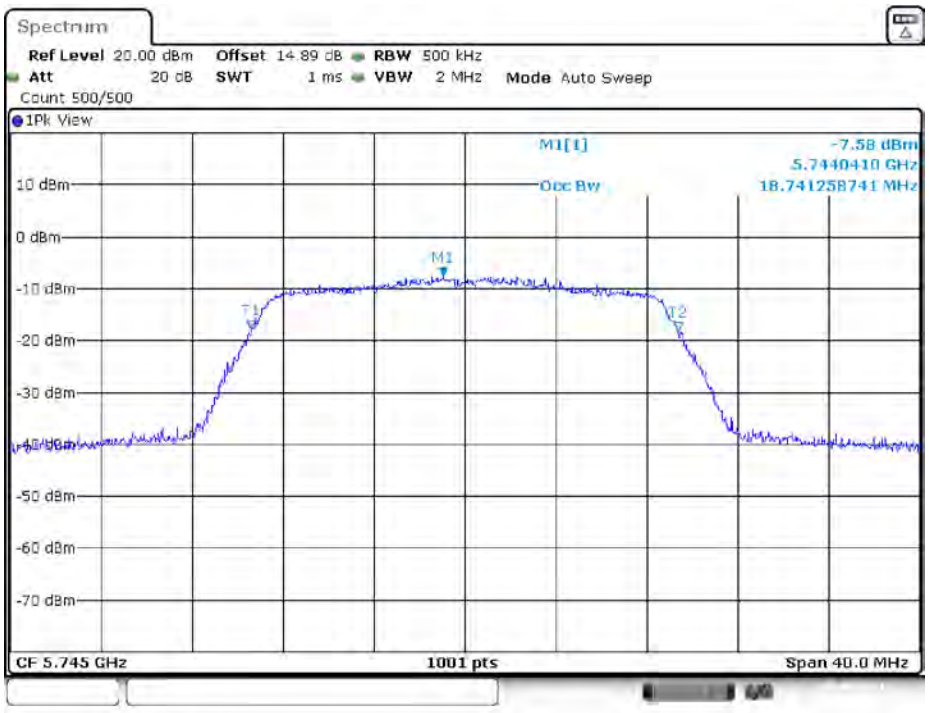
802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz



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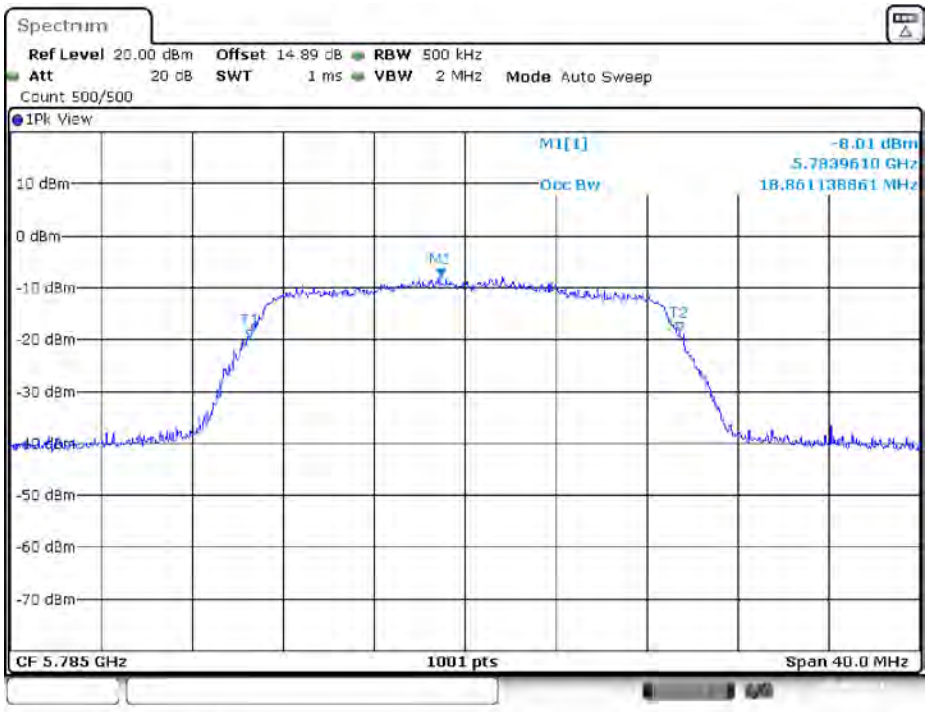
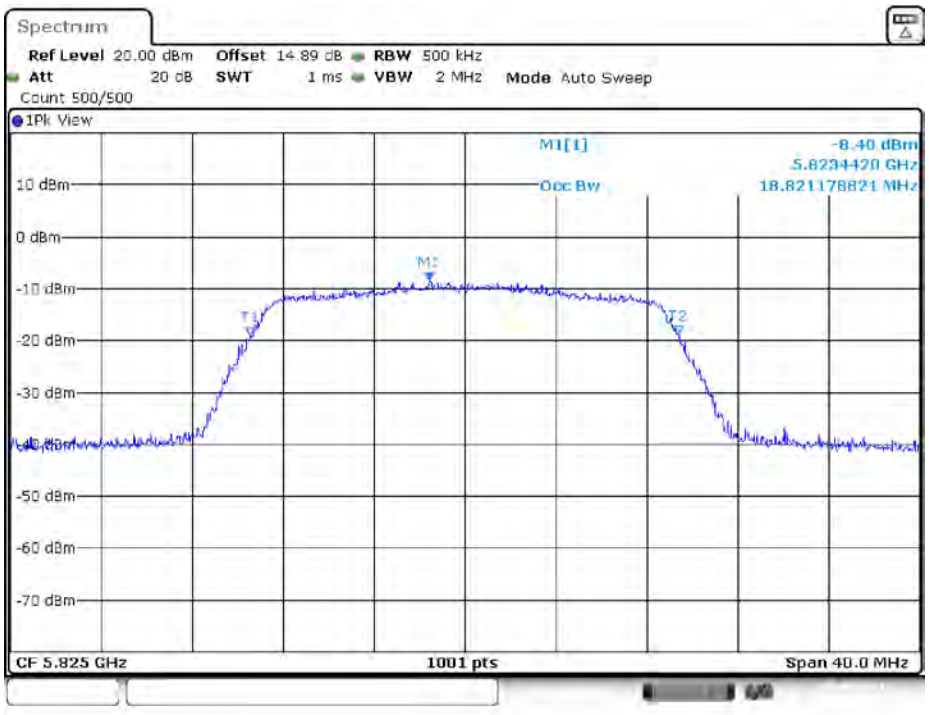
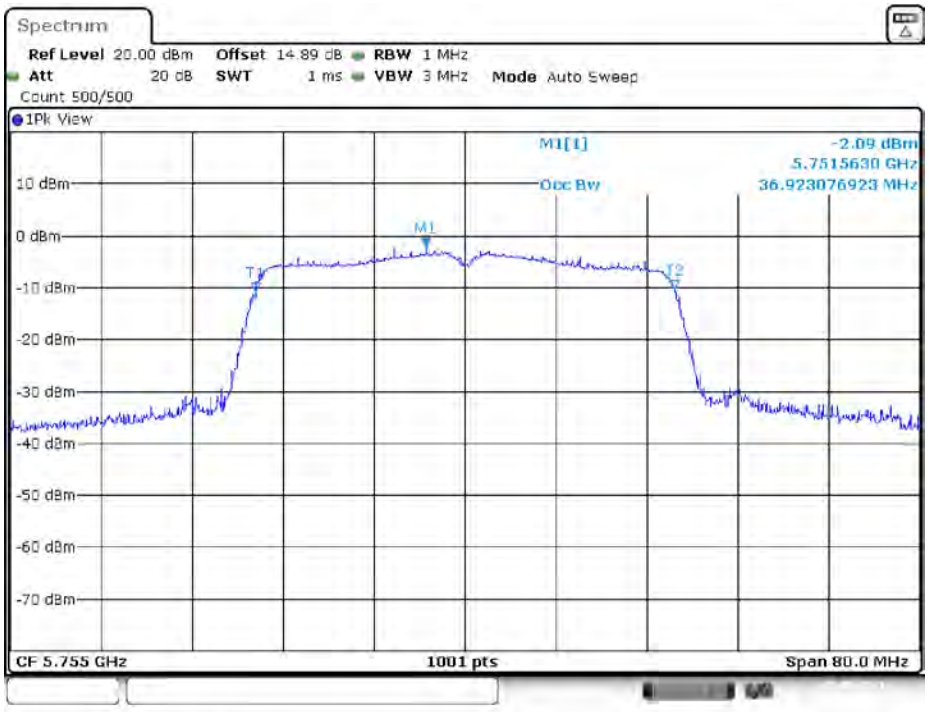
802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



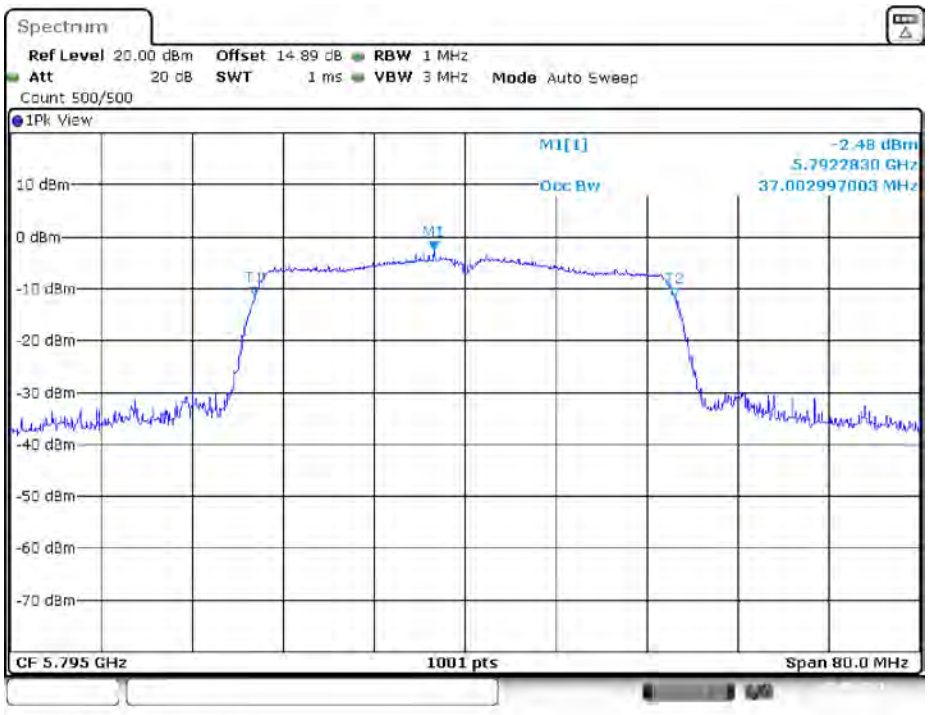
802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



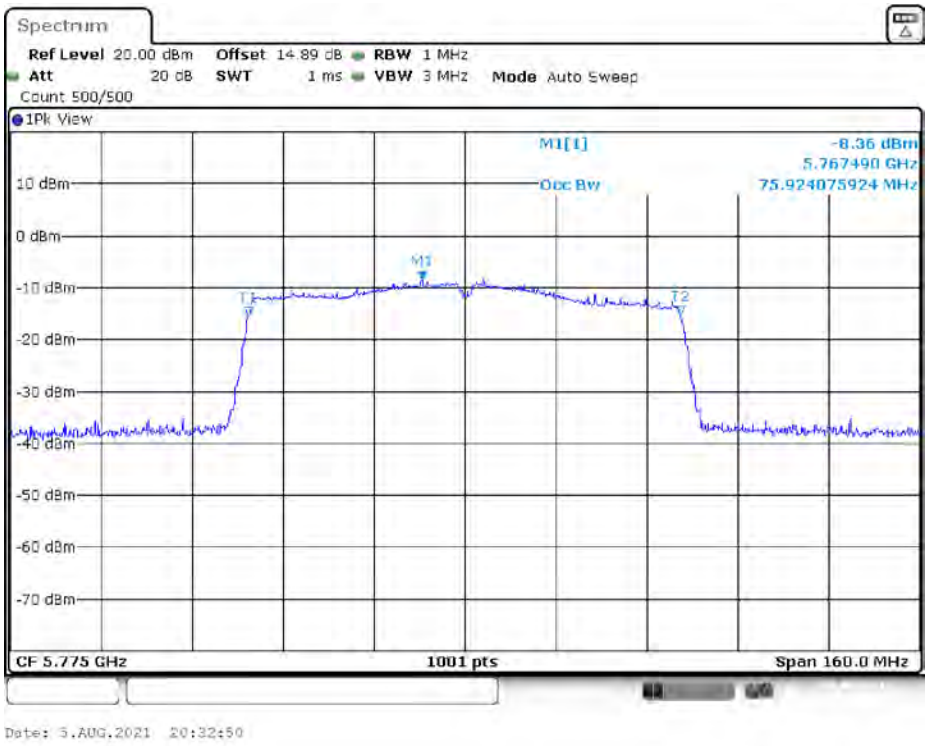
802.11n40 mode, 99% Occupied Bandwidth, 5755 MHz



802.11n40 mode, 99% Occupied Bandwidth, 5795 MHz



802.11ac80 mode, 99% Occupied Bandwidth, 5775 MHz



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

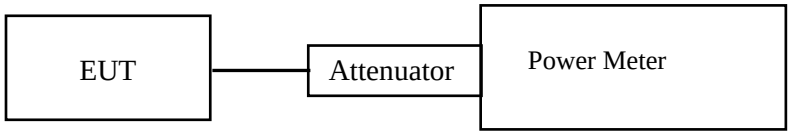
Applicable Standard

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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

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:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-08-05.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

5150 MHz – 5250 MHz

Frequency (MHz)	Conducted Output Average Power (dBm)	Limit (dBm)
802.11a		
5180	4.62	23.98
5200	4.07	
5240	4.39	
802.11n20		
5180	4.62	23.98
5200	4.08	
5240	4.37	
802.11n40		
5190	4.09	23.98
5230	3.96	
802.11ac80		
5210	4.05	23.98

5725 MHz – 5850 MHz

Frequency (MHz)	Conducted Output Average Power (dBm)	Limit (dBm)
802.11a		
5745	4.19	30
5785	3.95	
5825	3.74	
802.11n20		
5745	4.05	30
5785	3.99	
5825	3.66	
802.11n40		
5755	2.91	30
5795	2.90	
802.11ac80		
5775	2.49	30

Note: This product supports to work as a master and client, and duty cycle factor had been added into result.

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

Applicable Standard

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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

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:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) 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:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-08-05.

EUT operation mode: Transmitting

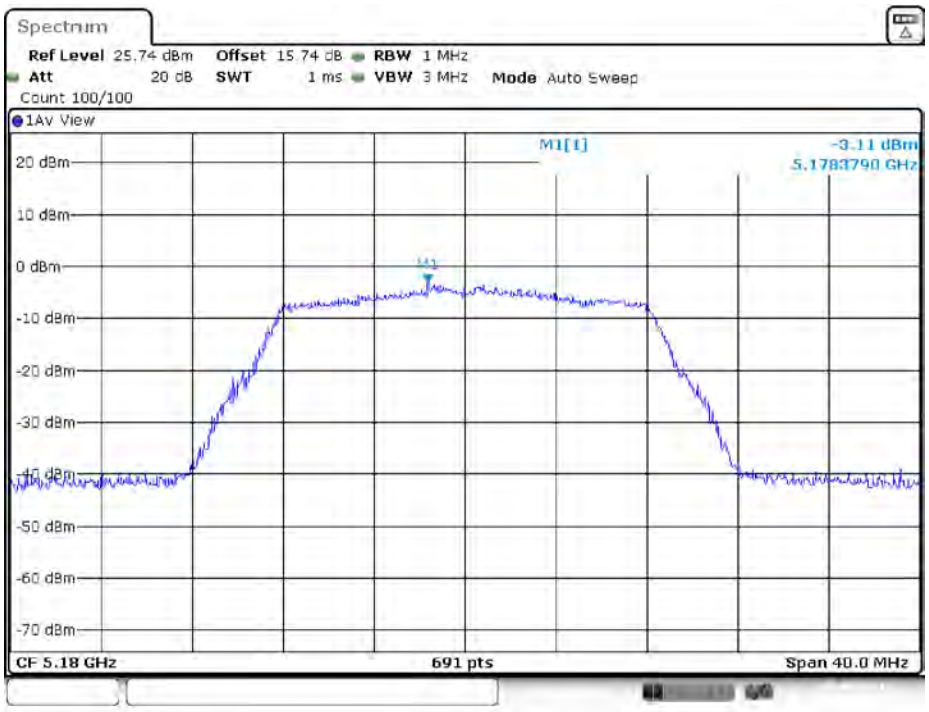
Test Result: Pass

Please refer to the following tables and plots.

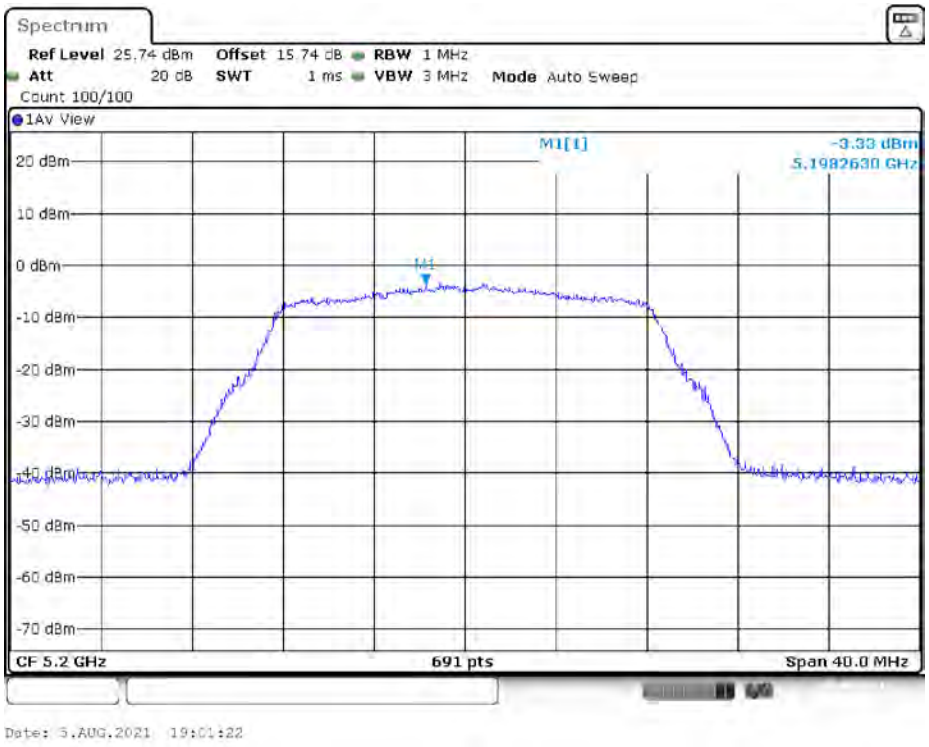
5150 – 5250 MHz

Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5180	-3.11	11
5200	-3.33	
5240	-3.87	
802.11n20		
5180	-4.13	11
5200	-4.71	
5240	-5.05	
802.11n40		
5190	-3.23	11
5230	-3.95	
802.11ac80		
5210	-9.77	11

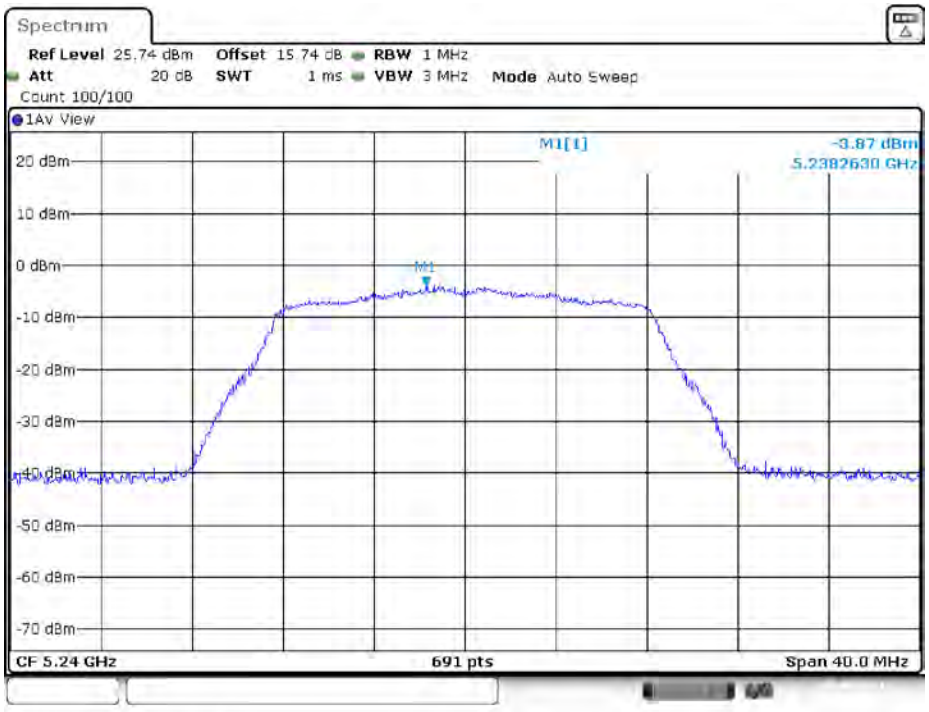
802.11a mode, Power Spectral Density, 5180 MHz



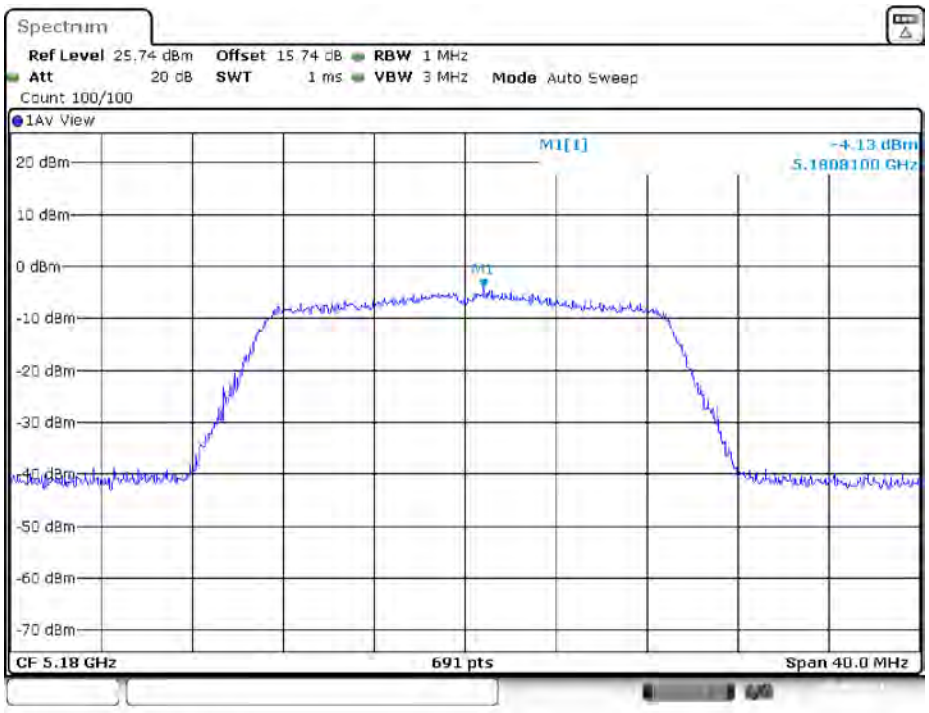
802.11a mode, Power Spectral Density, 5200 MHz



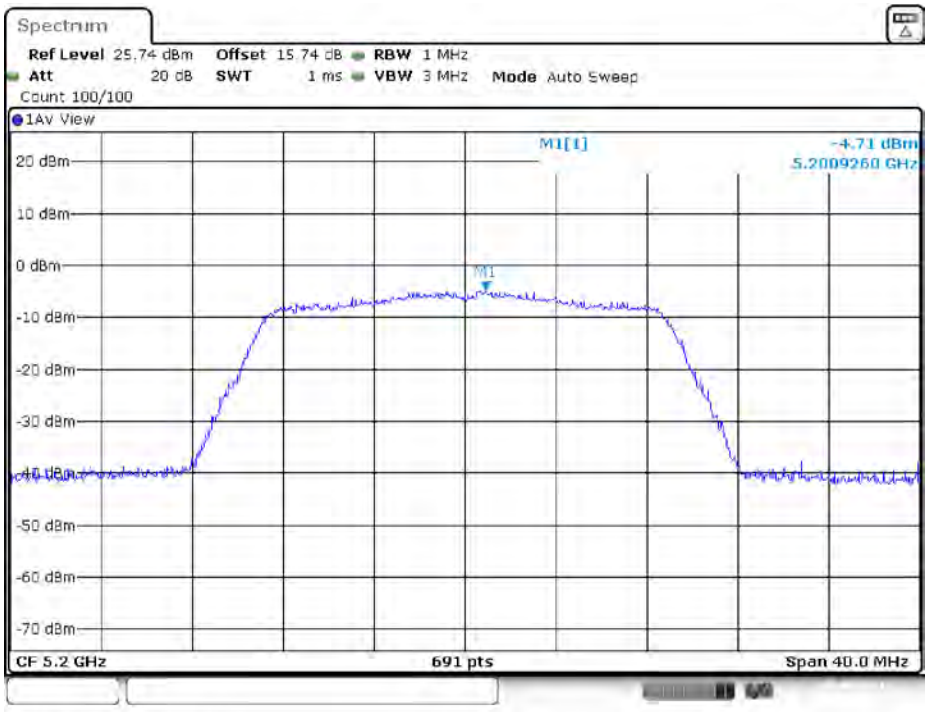
802.11a mode, Power Spectral Density, 5240 MHz



802.11n20 mode, Power Spectral Density, 5180 MHz



802.11n20 mode, Power Spectral Density, 5200 MHz



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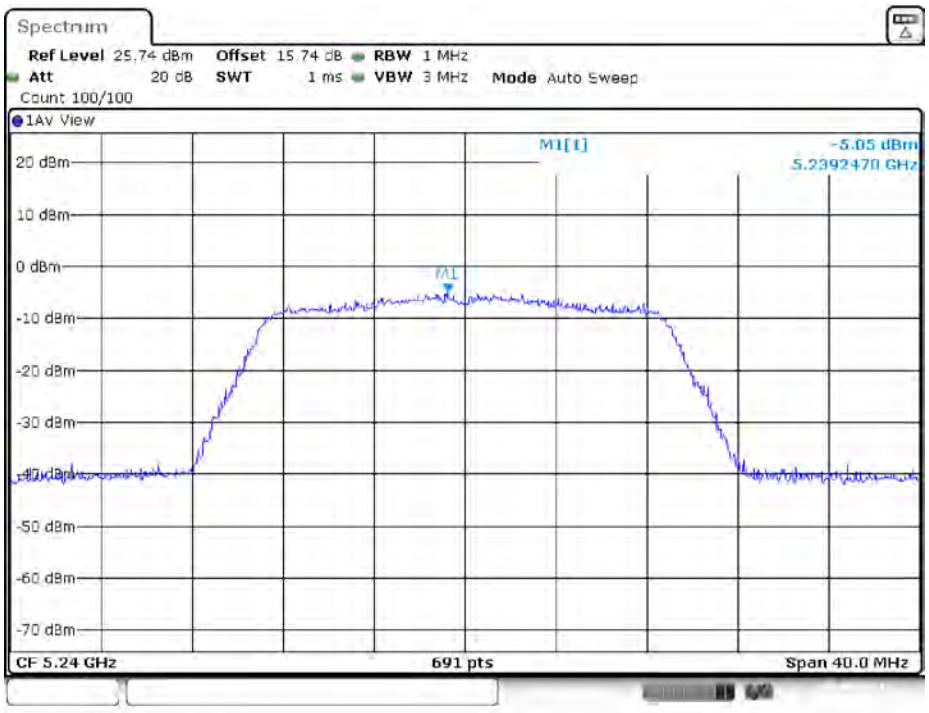
802.11n20 mode, Power Spectral Density, 5240 MHz



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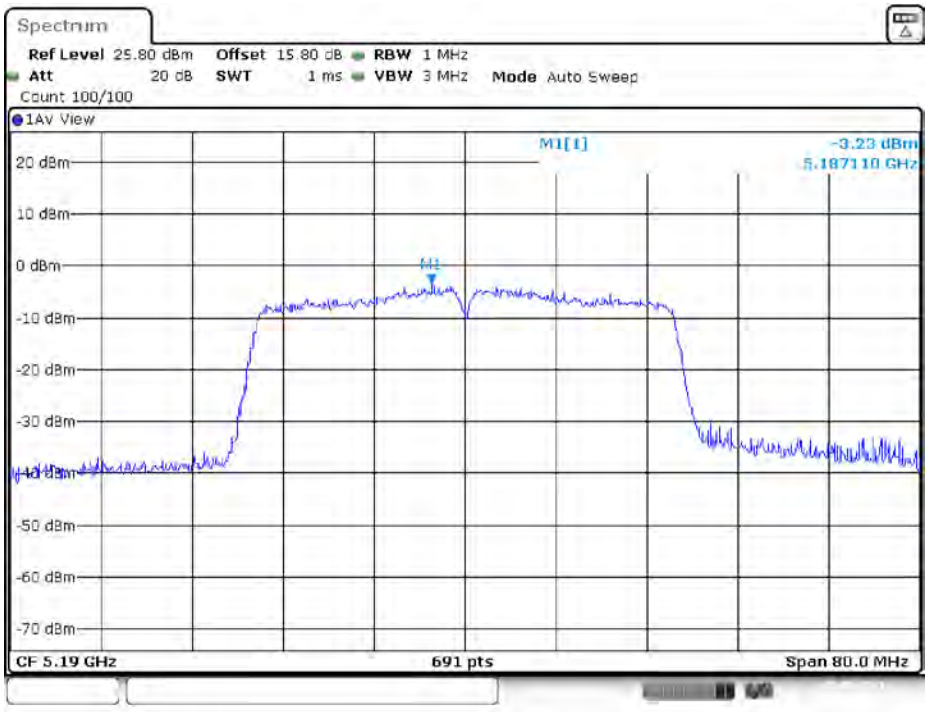
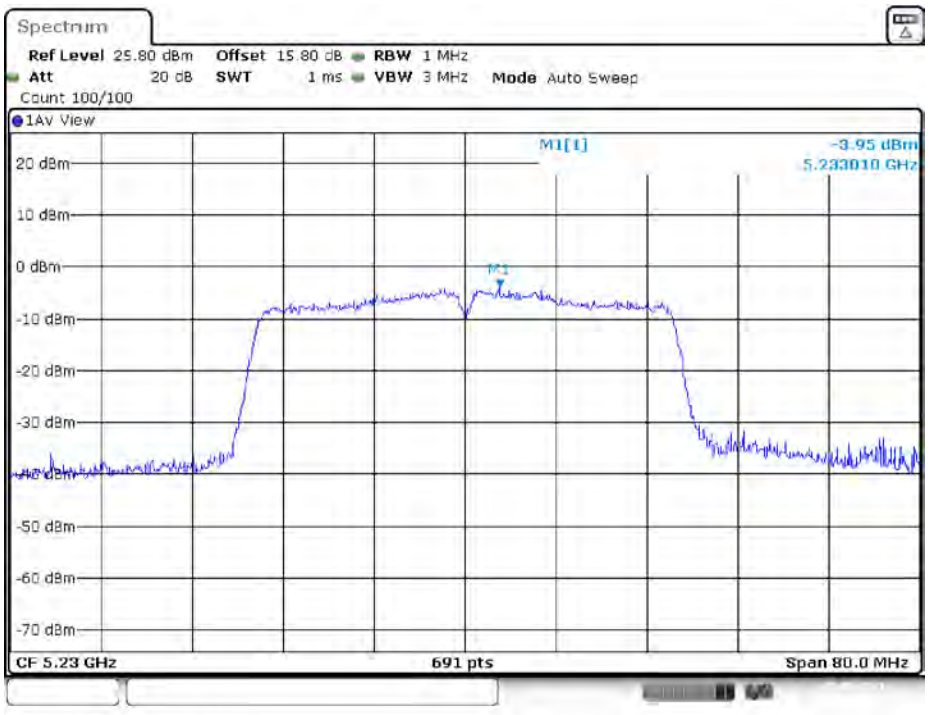
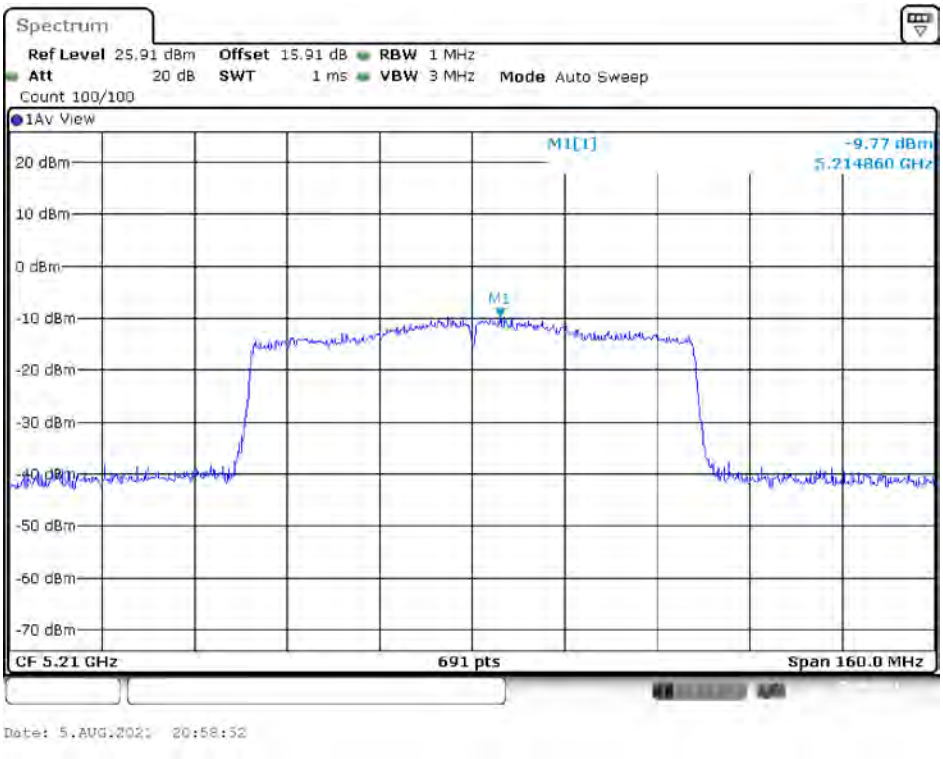
802.11n40 mode, Power Spectral Density, 5190 MHz



802.11n40 mode, Power Spectral Density, 5230 MHz



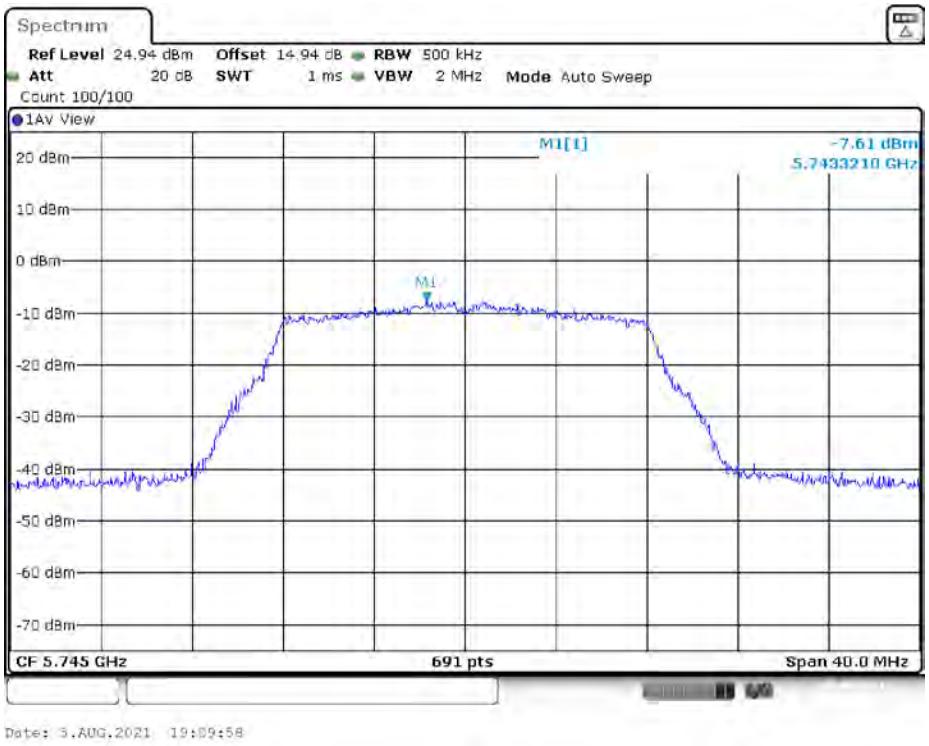
802.11ac80 mode, Power Spectral Density, 5210 MHz



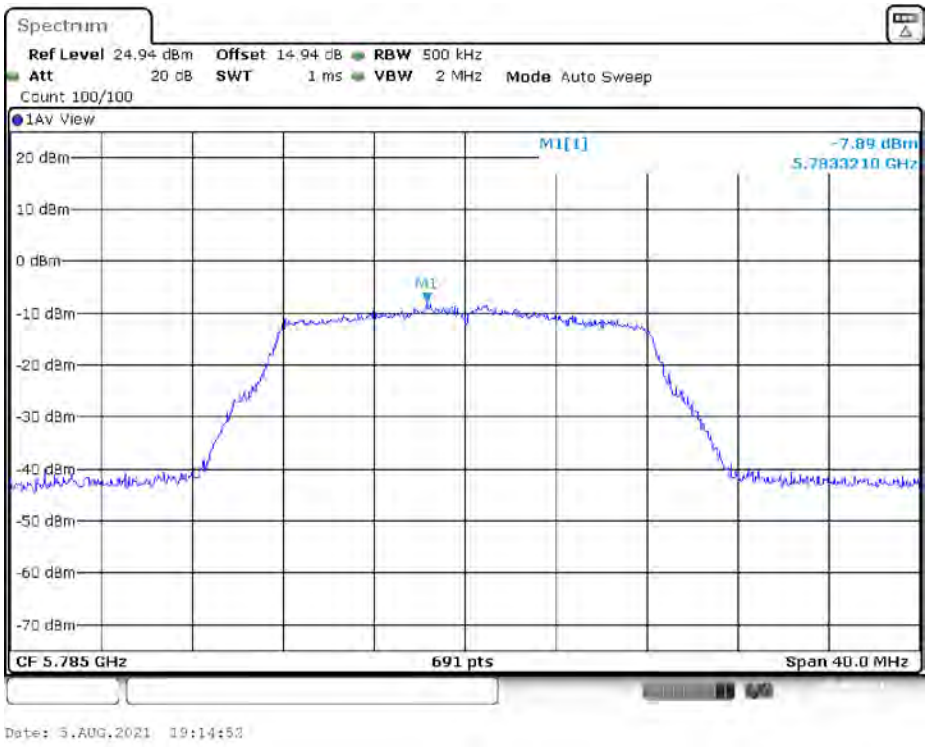
5725 – 5850 MHz

Frequency (MHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)
802.11a		
5745	-7.61	30
5785	-7.89	
5825	-8.84	
802.11n20		
5745	-9.07	30
5785	-10.02	
5825	-9.96	
802.11n40		
5755	-7.72	30
5795	-8.76	
802.11ac80		
5775	-13.27	30

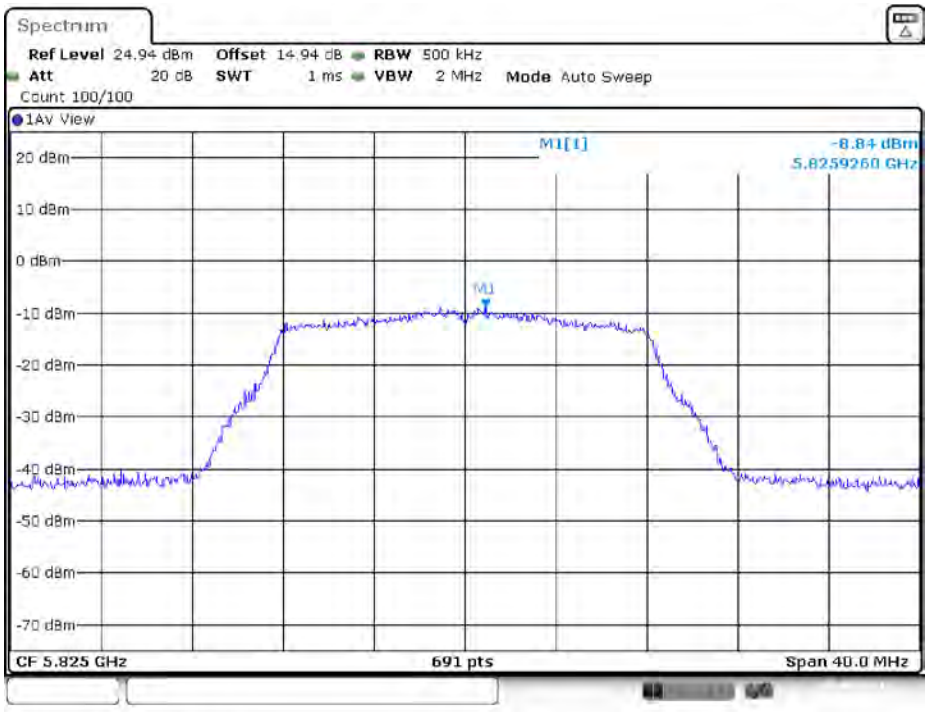
802.11a mode, Power Spectral Density, 5745 MHz



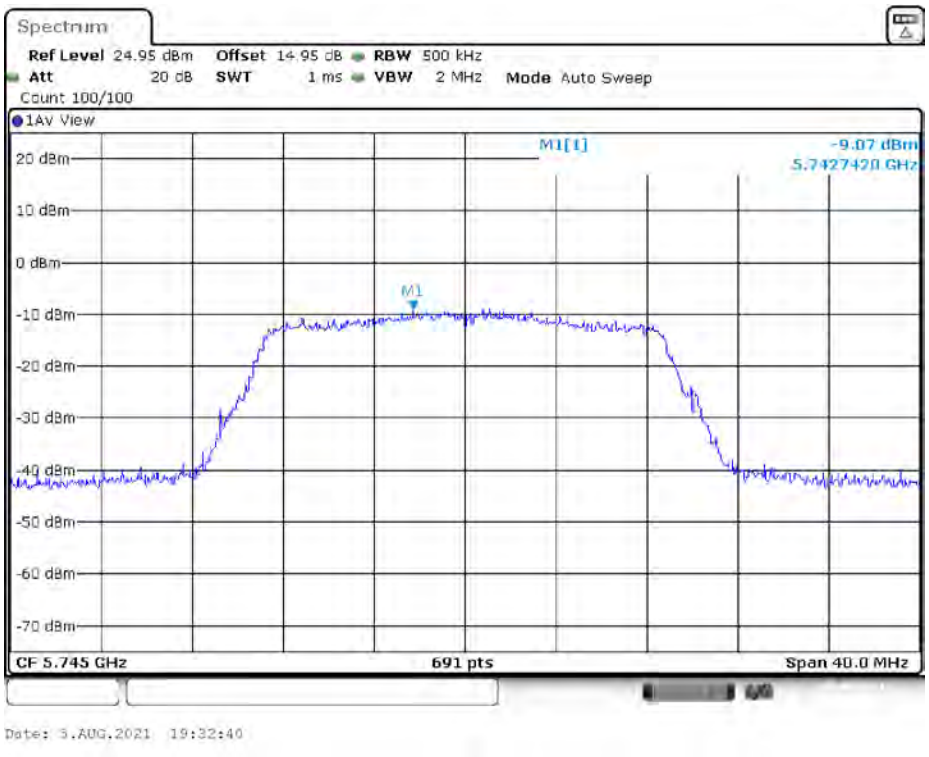
802.11a mode, Power Spectral Density, 5785 MHz



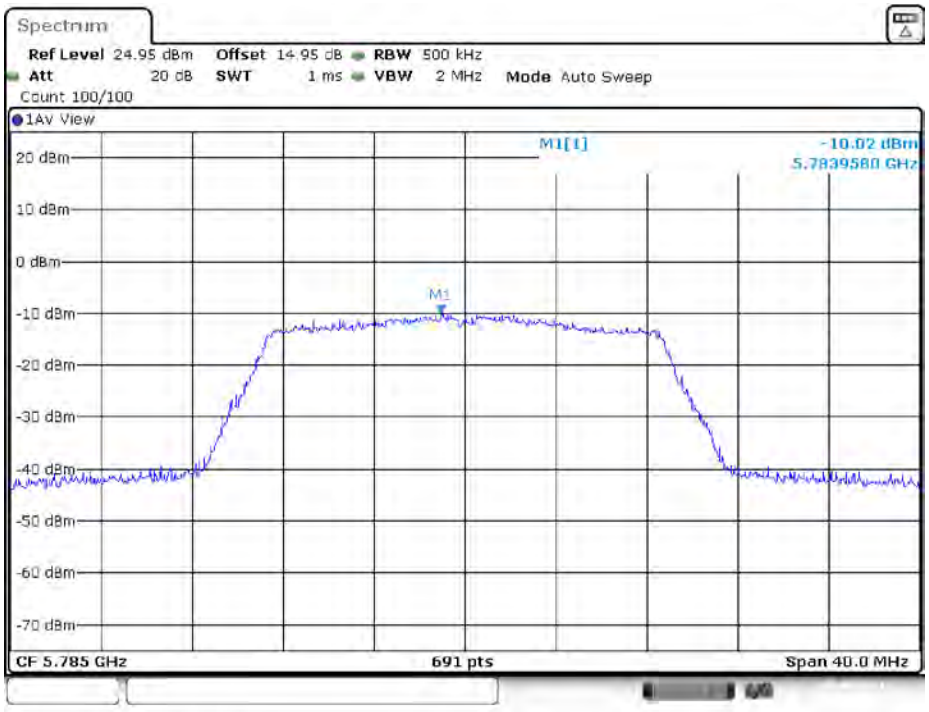
802.11a mode, Power Spectral Density, 5825 MHz



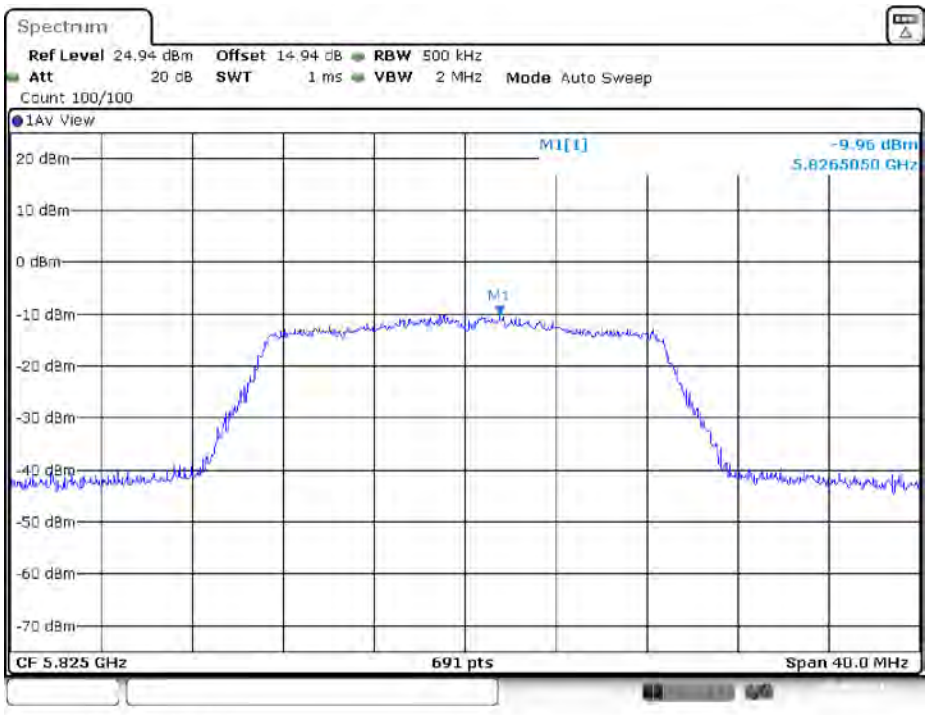
802.11n20 mode, Power Spectral Density, 5745 MHz



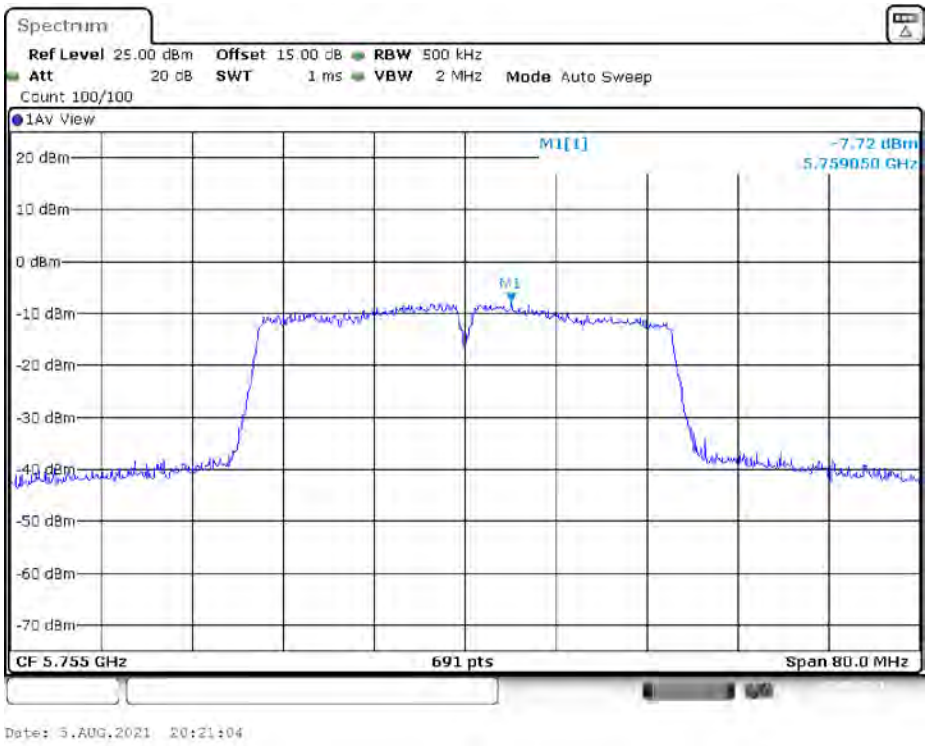
802.11n20 mode, Power Spectral Density, 5785 MHz



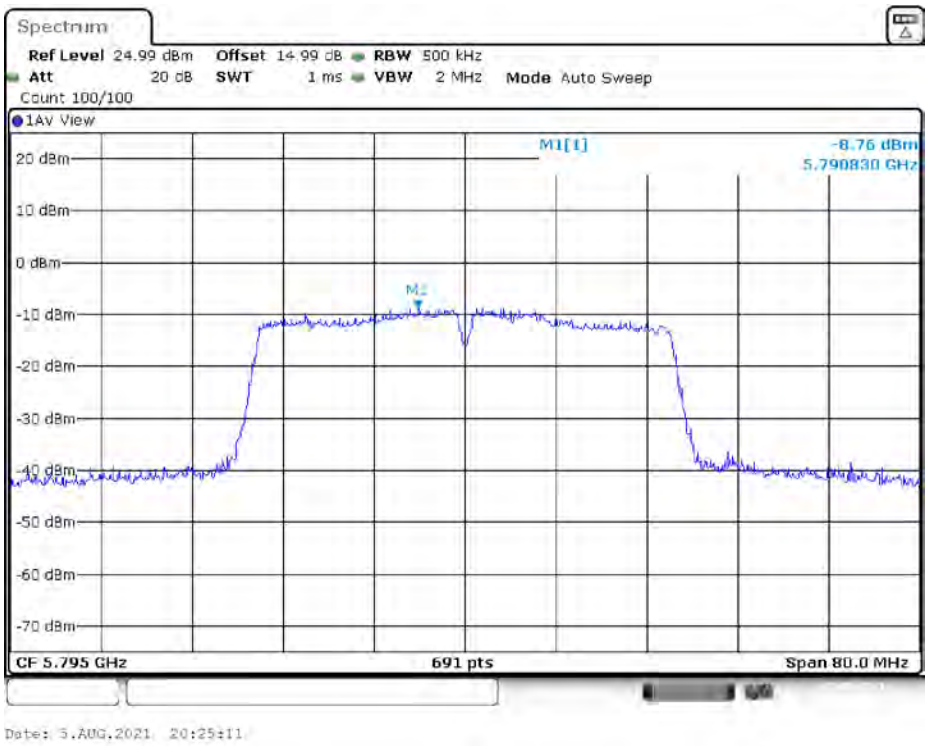
802.11n20 mode, Power Spectral Density, 5825 MHz



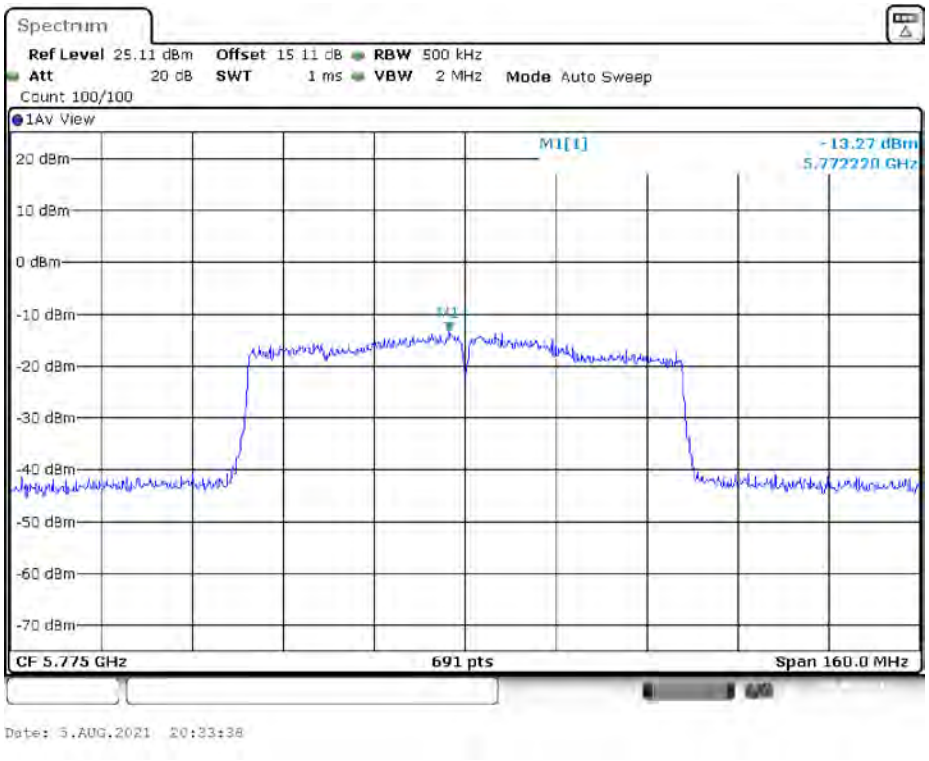
802.11n40 mode, Power Spectral Density, 5755 MHz



802.11n40 mode, Power Spectral Density, 5795 MHz



802.11ac80 mode, Power Spectral Density, 5775 MHz



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