

FCC PART 15.407

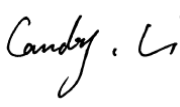
TEST REPORT

For

Shenzhen Huafurui Technology Co., Ltd

Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street, Xili, Nan shan district, Shenzhen, China

FCC ID:2AHZ5KK7

Report Type: Original Report	Product Type: Smartphone
Report Number: SZ1210507-15650E-00C	
Report Date: 2021-06-22	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Smartphone
Trademark	CUBOT
Tested Model	KINGKONG 7
Frequency Range	5G Wi-Fi: 5150-5250 MHz
Maximum Average Conducted Output Power	5G Wi-Fi: 5150-5250 MHz 6.93dBm (802.11a), 6.88dBm(802.11n20), 6.72dBm(802.11n40) 6.96dBm (802.11ac20), 6.59dBm (802.11ac40), 5.82dBm (802.11ac80)
Modulation Technique	OFDM
Antenna Specification	PIFA Antenna: 1.11dBi(provided by the applicant)
Voltage Range	DC3.85V by battery or DC 5V from adapter.
Date of Test	2021-05-22 to 2021-06-30
Sample serial number	SZ1210507-15650E-RF- S_4NF (Assigned by ATC)
Received date	2021-05-20
Sample/EUT Status	Good condition
Adapter information	Model: HJ-0502000W2-US Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2.0A

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 °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 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 (ISED), 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/ac20/ac40/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, 802.11ac20 channel 36, 40, 48 were tested;

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

For 802.11ac80 channel 42 was tested.

EUT Exercise Software

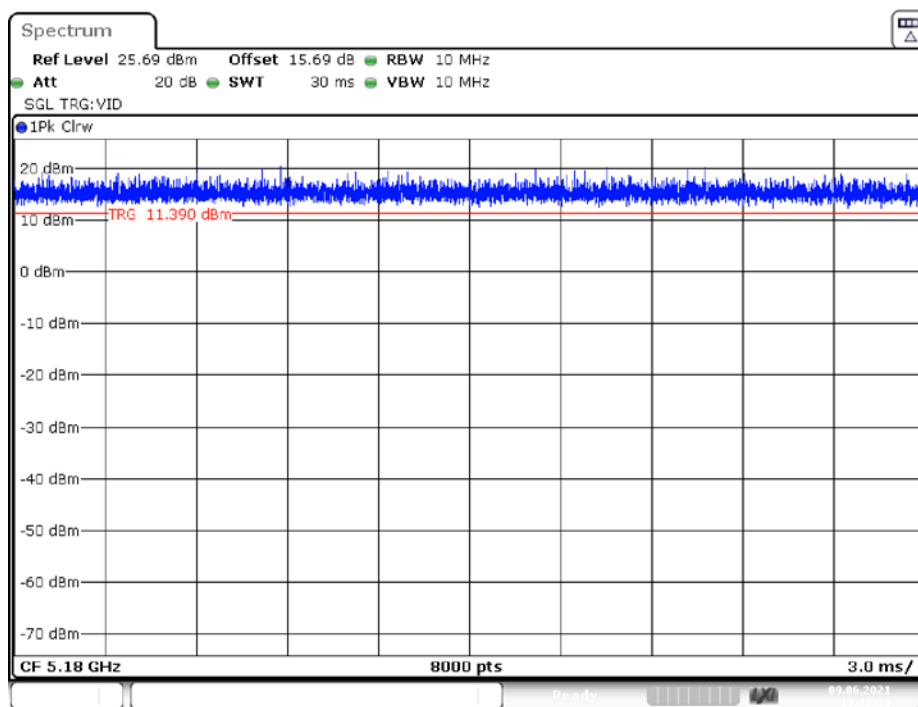
Test in the engineer mode during testing and power level as below:

Mode	Data Rate (Mbps)	Power Level*
802.11 a	6	5
802.11 n20/n40/ac20/ac40/ac80	MCS0	5

Duty cycle

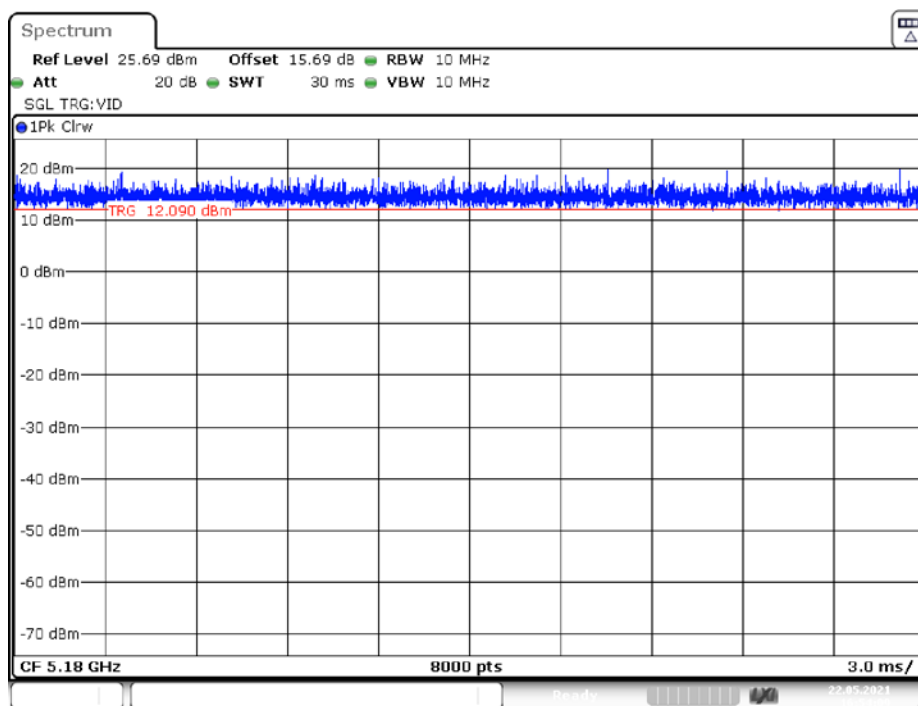
Mode	Ton (ms)	Ton+off (ms)	Duty Cycle (%)	10*log(1/duty cycle) (dB)
802.11a	30.00	30.00	100	0
802.11n20	30.00	30.00	100	0
802.11n40	30.00	30.00	100	0
802.11ac20	30.00	30.00	100	0
802.11ac40	30.00	30.00	100	0
802.11ac80	30.00	30.00	100	0

802.11a mode

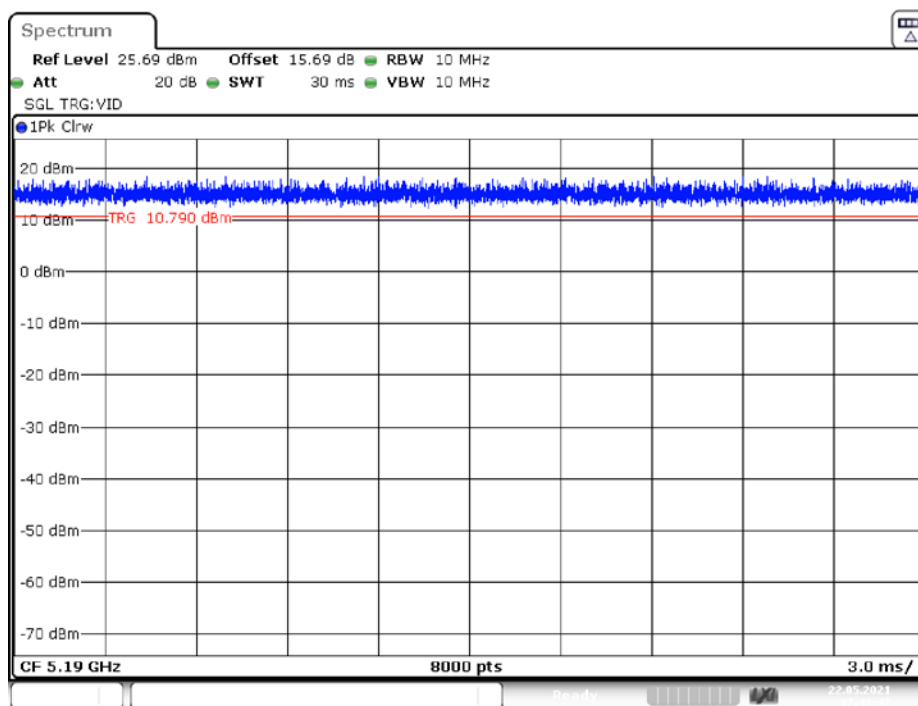


Date: 9.JUN.2021 19:22:33

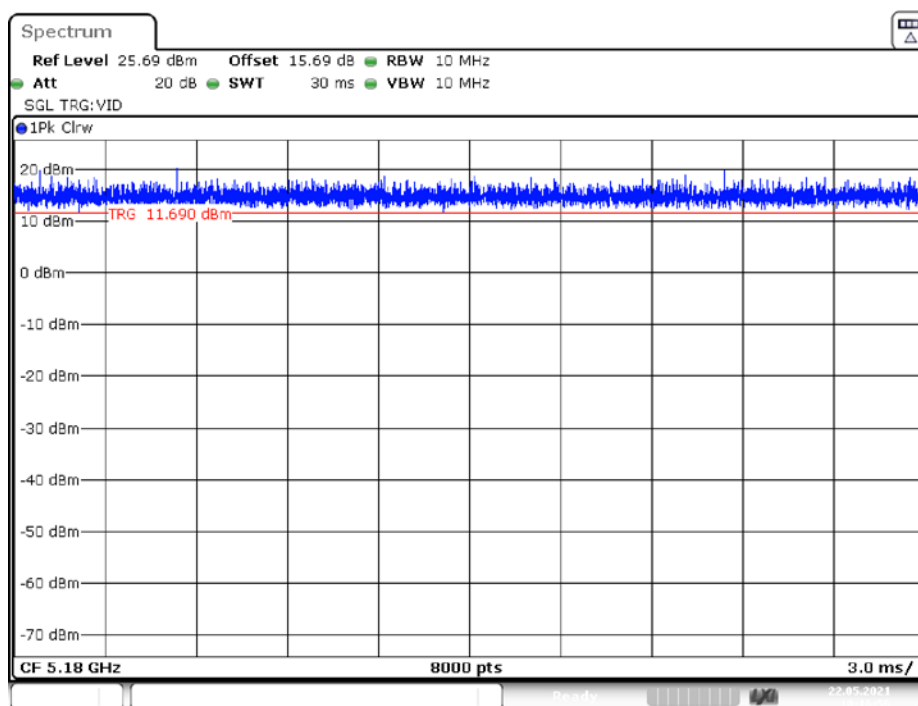
802.11n20 mode



Date: 22.MAY.2021 16:54:10

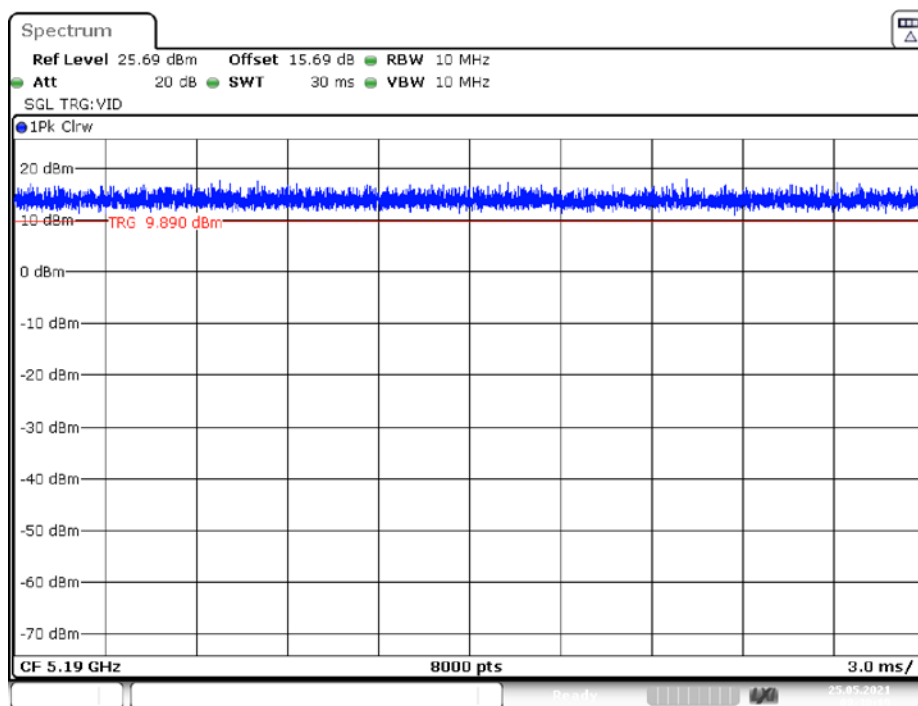
802.11n40 mode

Date: 22.MAY.2021 17:41:47

802.11ac20 Mode

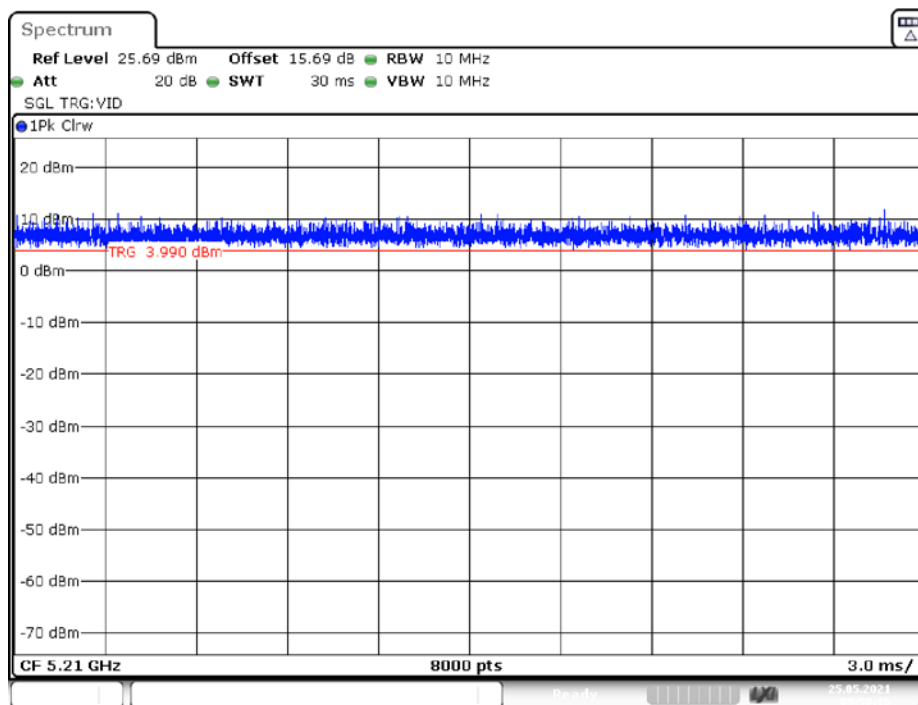
Date: 22.MAY.2021 18:16:56

802.11ac40 Mode



Date: 25.MAY.2021 08:30:19

802.11ac80 Mode



Date: 25.MAY.2021 08:50:10

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

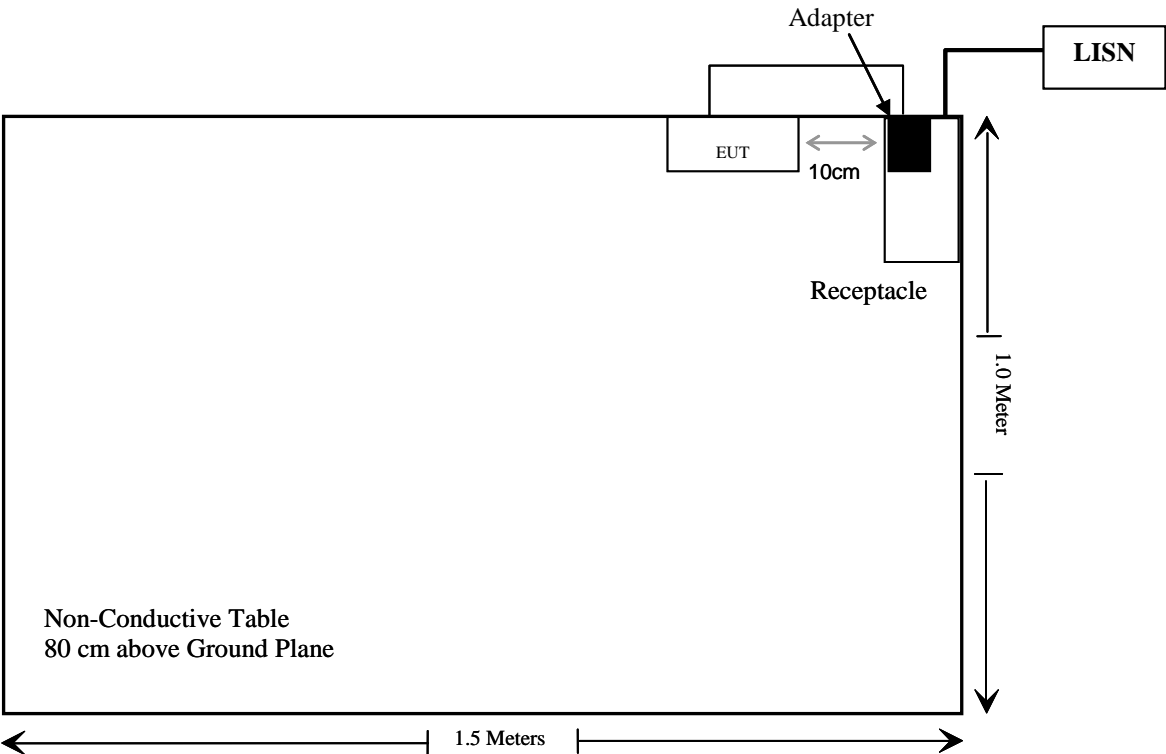
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable USB Cable	1.0	Adapter	EUT

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 , §2.1093	RF Exposure	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), (7), (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	2020/07/08	2021/07/07
Quinstar	Amplifier	QLW-184055 36-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 §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.

2. Power and distance are rounded to the nearest mW and mm before calculation.

3. The result is rounded to one decimal place for comparison.

4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Test Result:

For worst case:

Mode	Frequency (MHz)	Maximum Tune-up power		Calculated Distance (mm)	Calculated Value	Threshold (1-g SAR)	SAR Test Exclusion
		(dBm)	(mW)				
5.2G Wi-Fi	5240	7.0	5.01	5	2.3	3.0	Yes

Result: No Standalone SAR test is required for 5.2G Wi-Fi mode.

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 one internal antenna arrangement, which was permanently attached and the antenna gain is 1.11dBi, fulfill the requirement of this section. Please refer to the EUT photos.

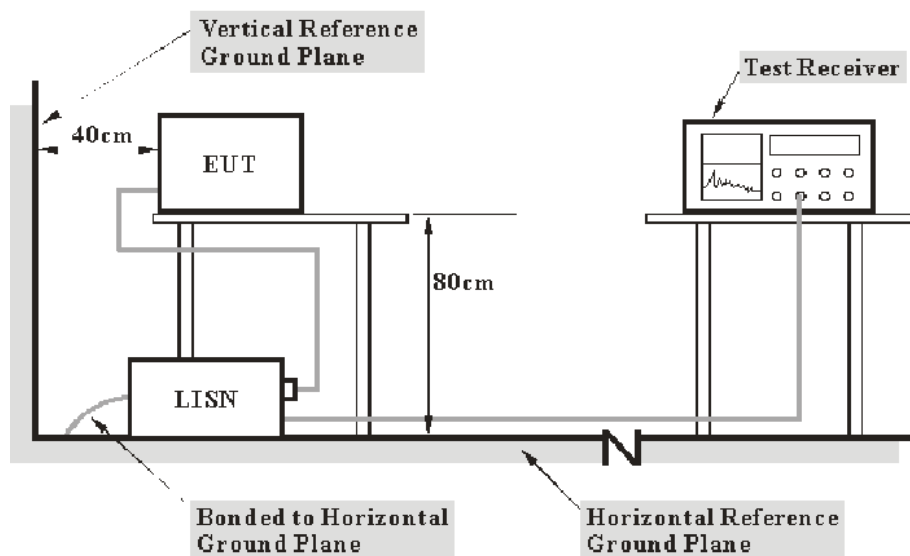
Result: Compliance.

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.

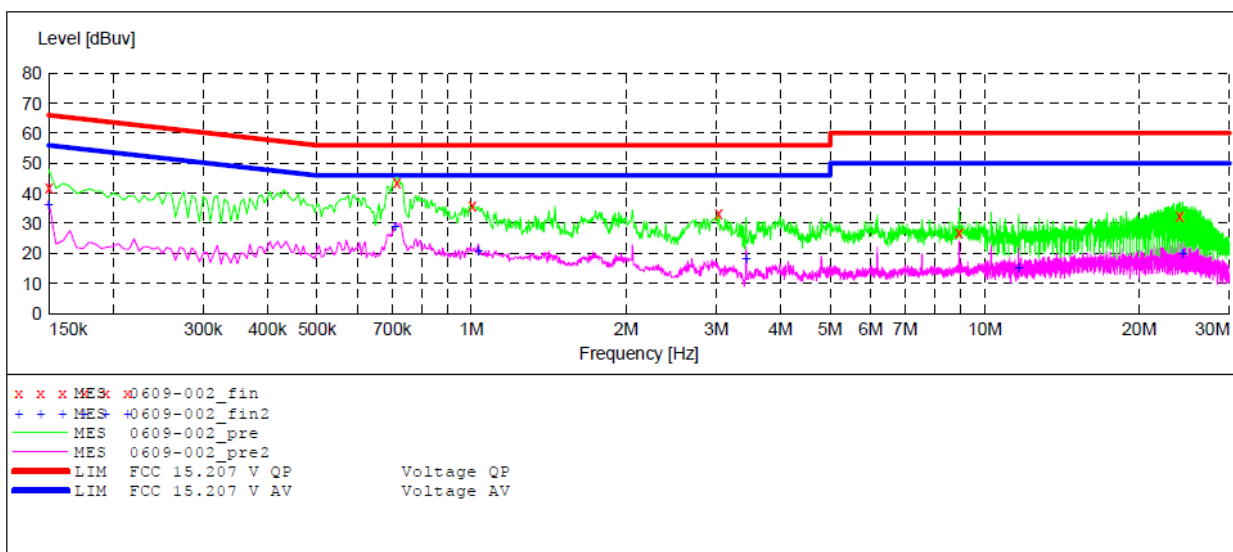
All data was recorded in the Quasi-peak and average detection mode.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-06-09

EUT operation mode: Transmitting (Worst case as below)

AC 120V/60 Hz, Line**MEASUREMENT RESULT: "0609-002_fin"**

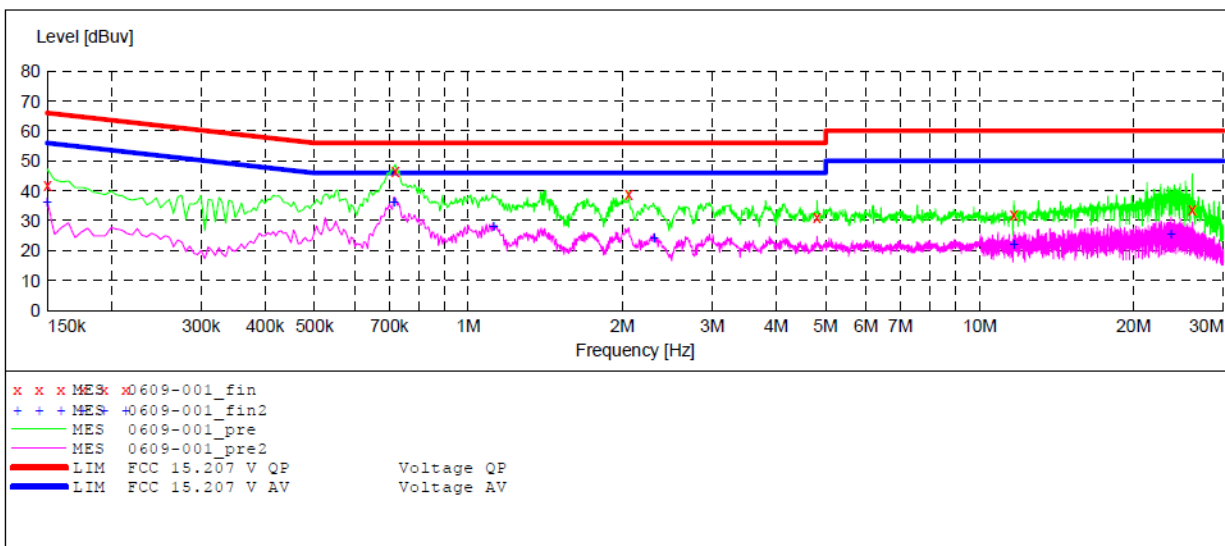
2021-6-9 03:27

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	42.10	10.8	66	23.9	QP	L1	GND
0.715000	43.80	11.1	56	12.2	QP	L1	GND
1.005000	41.80	11.1	56	14.2	QP	L1	GND
3.030000	33.20	11.3	56	22.8	QP	L1	GND
8.910000	27.00	11.5	60	33.0	QP	L1	GND
23.975000	32.40	11.7	60	27.6	QP	L1	GND

MEASUREMENT RESULT: "0609-002_fin2"

2021-6-9 03:27

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	36.40	10.8	56	19.6	AV	L1	GND
0.710000	29.30	11.1	46	16.7	AV	L1	GND
1.030000	21.20	11.1	46	24.8	AV	L1	GND
3.430000	18.20	11.4	46	27.8	AV	L1	GND
11.650000	15.30	11.6	50	34.7	AV	L1	GND
24.300000	20.10	11.7	50	29.9	AV	L1	GND

AC 120V/60 Hz, Neutral**MEASUREMENT RESULT: "0609-001_fin"**

2021-6-9 03:24

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.150000	41.90	10.8	66	24.1	QP	N	GND
0.720000	46.80	11.1	56	9.2	QP	N	GND
2.060000	38.90	11.3	56	17.1	QP	N	GND
4.810000	31.40	11.4	56	24.6	QP	N	GND
11.675000	32.30	11.6	60	27.7	QP	N	GND
26.075000	33.60	11.8	60	26.4	QP	N	GND

MEASUREMENT RESULT: "0609-001_fin2"

2021-6-9 03:24

Frequency MHz	Level dBuv	Transd dB	Limit dBuv	Margin dB	Detector	Line	PE
0.150000	36.50	10.8	56	19.5	AV	N	GND
0.715000	36.30	11.1	46	9.7	AV	N	GND
1.120000	28.20	11.2	46	17.8	AV	N	GND
2.310000	24.30	11.3	46	21.7	AV	N	GND
11.675000	22.40	11.6	50	27.6	AV	N	GND
23.700000	25.50	11.7	50	24.5	AV	N	GND

§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;

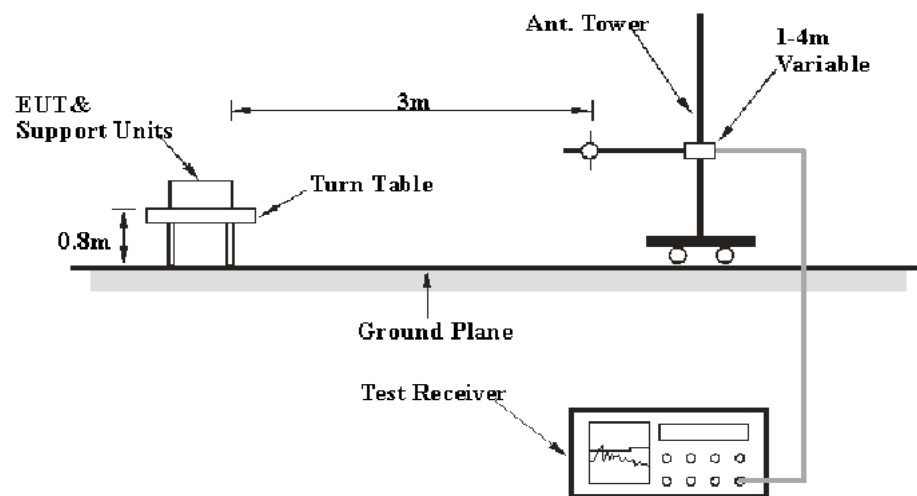
(b) Undesirable emission limits. Except as shown in paragraph (b) (7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

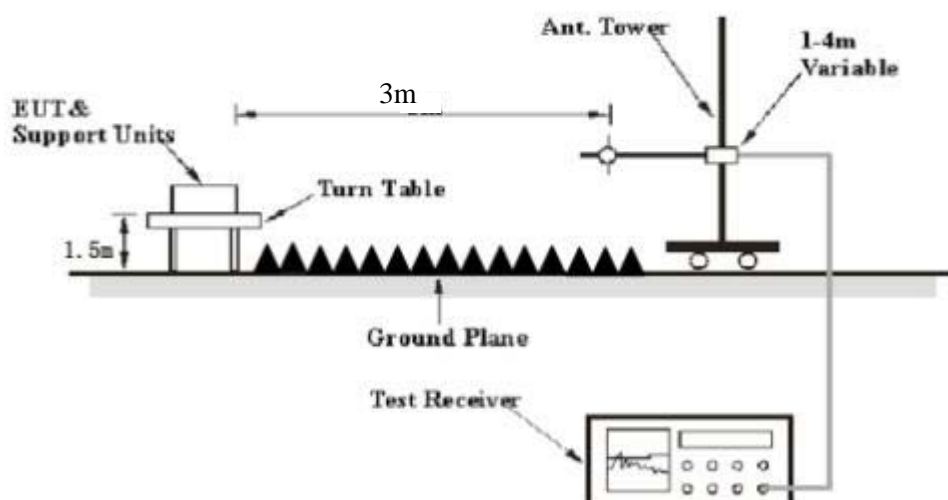
- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
- (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above 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:

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;

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

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 $20 \cdot \lg(1/3) = -9.5$ 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:

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

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:

$$\begin{aligned} \text{Margin} &= \text{Result} - \text{Limit} \\ \text{Result} &= \text{Reading} + \text{Factor} \end{aligned}$$

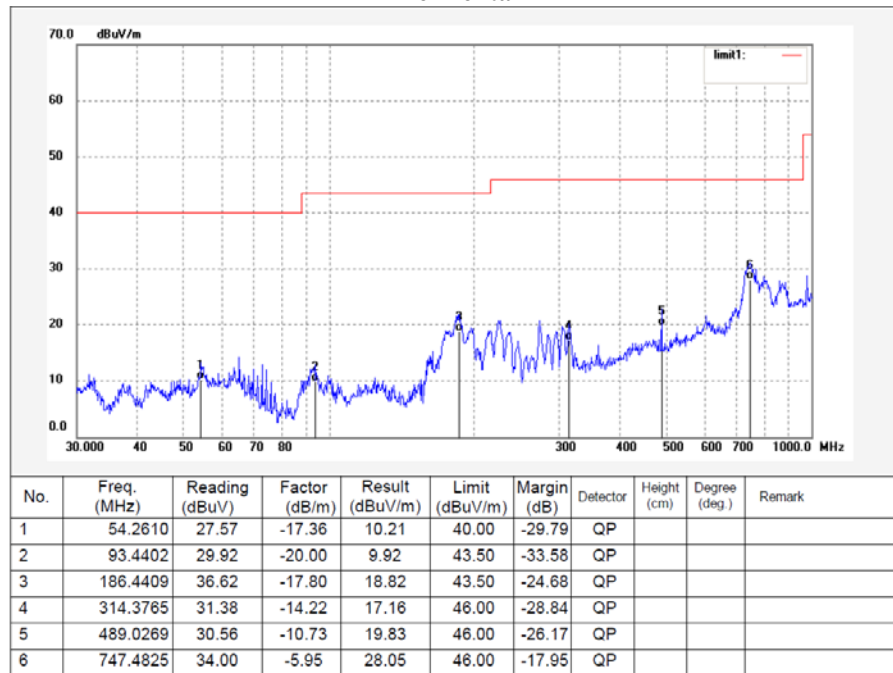
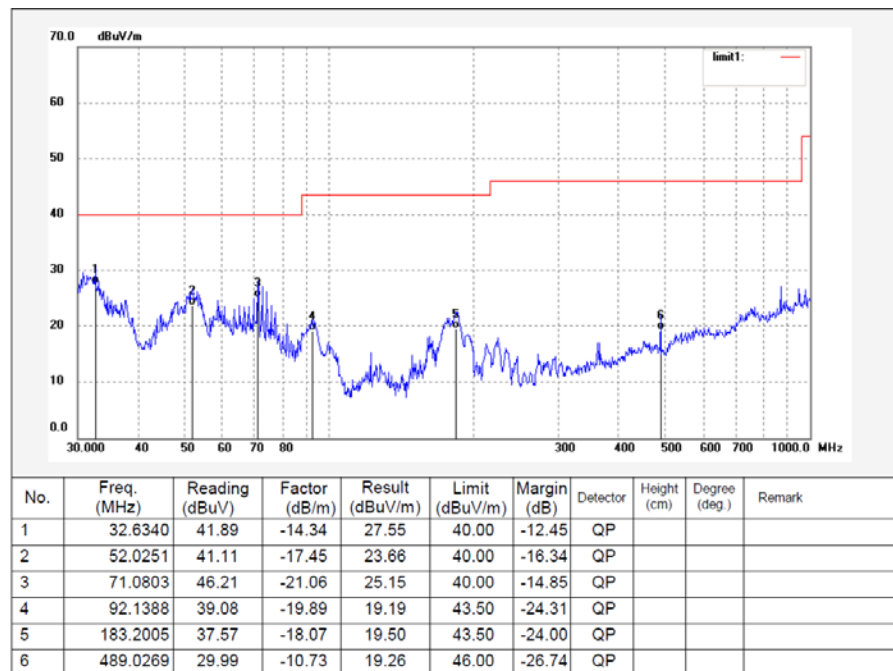
Test Data

Environmental Conditions

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

The testing was performed by Fan Yang from 2021-05-25 to 2021-06-21.

EUT operation mode: Transmitting

30 MHz~1 GHz:**802.11a Middle Channel (Worst case)****Horizontal****Vertical**

1 ~ 40 GHz:

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									
5180 MHz									
4500.00	44.50	PK	69	1.3	H	1.89	46.39	74	27.61
4500.00	44.10	PK	293	1.9	V	1.89	45.99	74	28.01
5150.00	43.16	PK	104	1.7	H	3.37	46.53	74	27.47
5150.00	43.24	PK	8	1.9	V	3.37	46.61	74	27.39
10360.00	42.02	PK	37	1.4	H	11.41	53.43	68.2	14.77
10360.00	40.88	PK	249	1.4	V	11.41	52.29	68.2	15.91
5200 MHz									
10400.00	42.29	PK	97	1.4	H	11.46	53.75	68.2	14.45
10400.00	41.67	PK	200	1	V	11.46	53.13	68.2	15.07
5240 MHz									
5350.00	43.78	PK	130	1.5	H	3.43	47.21	74	26.79
5350.00	43.86	PK	186	1.1	V	3.43	47.29	74	26.71
5460.00	43.79	PK	97	1.1	H	3.58	47.37	74	26.63
5460.00	43.83	PK	199	1.1	V	3.58	47.41	74	26.59
10480.00	41.06	PK	54	1.4	H	11.53	52.59	68.2	15.61
10480.00	40.73	PK	65	1.6	V	11.53	52.26	68.2	15.94
802.11N20									
5180 MHz									
4500.00	44.95	PK	331	2	H	1.89	46.84	74	27.16
4500.00	45.06	PK	91	1.5	V	1.89	46.95	74	27.05
5150.00	43.74	PK	207	1.8	H	3.37	47.11	74	26.89
5150.00	43.73	PK	148	1.4	V	3.37	47.10	74	26.90
10360.00	42.41	PK	251	1.6	H	11.41	53.82	68.2	14.38
10360.00	41.07	PK	333	1.6	V	11.41	52.48	68.2	15.72
5200 MHz									
10400.00	42.83	PK	47	1.7	H	11.46	54.29	68.2	13.91
10400.00	42.18	PK	231	1.6	V	11.46	53.64	68.2	14.56
5240 MHz									
5350.00	44.71	PK	298	1.3	H	3.43	48.14	74	25.86
5350.00	44.13	PK	324	2	V	3.43	47.56	74	26.44
5460.00	44.40	PK	74	2.1	H	3.58	47.98	74	26.02
5460.00	44.63	PK	212	1.2	V	3.58	48.21	74	25.79
10480.00	41.56	PK	92	1.1	H	11.53	53.09	68.2	15.11
10480.00	41.23	PK	146	1.5	V	11.53	52.76	68.2	15.44
802.11N40									
5190 MHz									
4500.00	44.30	PK	291	1.5	H	1.89	46.19	74	27.81
4500.00	43.52	PK	122	1.5	V	1.89	45.41	74	28.59
5150.00	44.46	PK	146	1.7	H	3.37	47.83	74	26.17
5150.00	44.04	PK	2	2	V	3.37	47.41	74	26.59
10380.00	40.38	PK	76	1.7	H	11.43	51.81	68.2	16.39
10380.00	40.87	PK	106	1.1	V	11.43	52.30	68.2	15.90
5230 MHz									
5350.00	45.15	PK	332	2.1	H	3.43	48.58	74	25.42

5350.00	44.72	PK	204	1.8	V	3.43	48.15	74	25.85
5460.00	44.39	PK	29	1.6	H	3.58	47.97	74	26.03
5460.00	44.80	PK	210	2.2	V	3.58	48.38	74	25.62
10460.00	41.02	PK	137	1.4	H	11.5	52.52	68.2	15.68
10460.00	40.66	PK	162	1.5	V	11.5	52.16	68.2	16.04
802.11AC20									
5180 MHz									
4500.00	44.89	PK	316	1.8	H	1.89	46.78	74	27.22
4500.00	44.42	PK	236	2.1	V	1.89	46.31	74	27.69
5150.00	43.35	PK	6	1	H	3.37	46.72	74	27.28
5150.00	43.82	PK	194	1.5	V	3.37	47.19	74	26.81
10360.00	42.64	PK	214	2.1	H	11.41	54.05	68.2	14.15
10360.00	41.77	PK	184	1.1	V	11.41	53.18	68.2	15.02
5200 MHz									
10400	42.58	PK	177	2.1	H	11.46	54.04	68.2	14.16
10400	42.10	PK	301	1.5	V	11.46	53.56	68.2	14.64
5240 MHz									
5350	44.58	PK	335	1.6	H	3.43	48.01	74	25.99
5350	44.18	PK	225	1.5	V	3.43	47.61	74	26.39
5460	44.74	PK	244	1.2	H	3.58	48.32	74	25.68
5460	44.14	PK	268	1.5	V	3.58	47.72	74	26.28
10480	42.01	PK	163	1.1	H	11.53	53.54	68.2	14.66
10480	40.84	PK	180	1.6	V	11.53	52.37	68.2	15.83
802.11AC40									
5190 MHz									
4500	45.05	PK	197	1.5	H	1.89	46.94	74	27.06
4500	43.97	PK	226	1.9	V	1.89	45.86	74	28.14
5150	45.19	PK	261	1.2	H	3.37	48.56	74	25.44
5150	44.10	PK	116	1.5	V	3.37	47.47	74	26.53
10380	40.51	PK	240	1.4	H	11.43	51.94	68.2	16.26
10380	41.76	PK	318	1.1	V	11.43	53.19	68.2	15.01
5230 MHz									
5350	45.23	PK	164	1.5	H	3.43	48.66	74	25.34
5350	45.66	PK	91	1.1	V	3.43	49.09	74	24.91
5460	45.06	PK	351	1.3	H	3.58	48.64	74	25.36
5460	45.66	PK	116	1.1	V	3.58	49.24	74	24.76
10460	41.83	PK	134	1.4	H	11.5	53.33	68.2	14.87
10460	41.42	PK	270	1.8	V	11.5	52.92	68.2	15.28
802.11AC80									
5210 MHz									
4500.00	44.99	PK	83	1.2	H	1.89	46.88	74	27.12
4500.00	43.68	PK	156	1.6	V	1.89	45.57	74	28.43
5150.00	45.27	PK	344	1.8	H	3.37	48.64	74	25.36
5150.00	44.24	PK	41	1.7	V	3.37	47.61	74	26.39
10420.00	40.44	PK	218	1.2	H	11.47	51.91	68.2	16.29
10420.00	40.87	PK	70	2.1	V	11.47	52.34	68.2	15.86

Note:

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

Corrected Amplitude = Corrected Factor + Reading

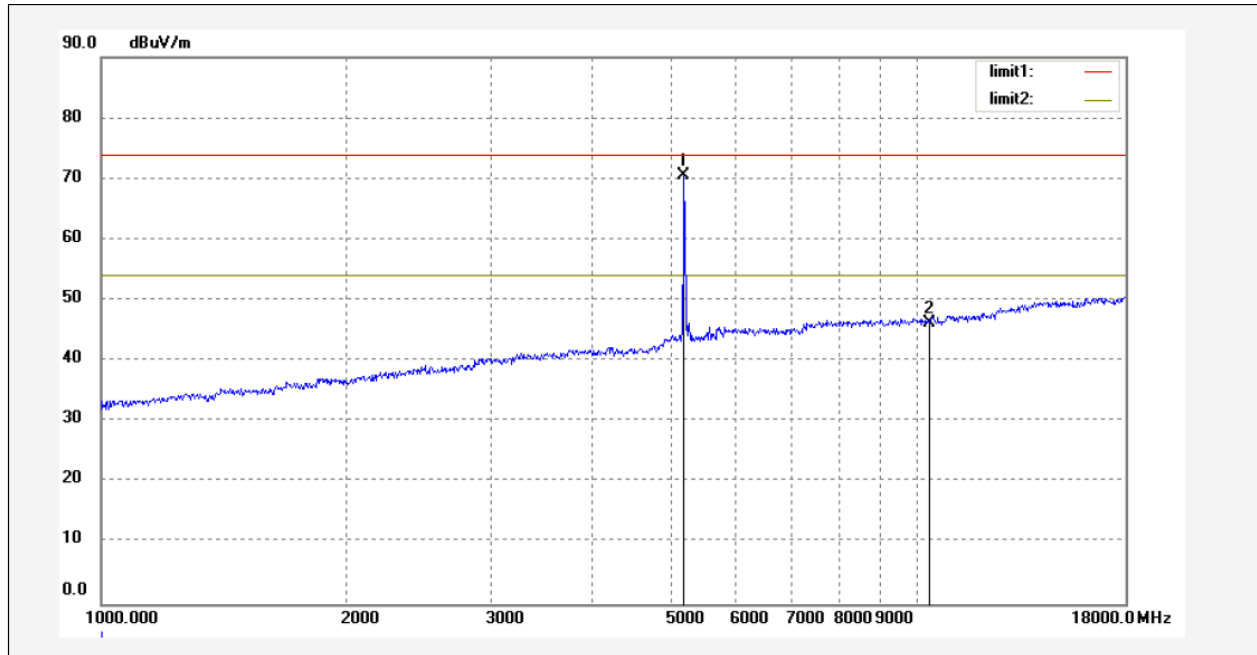
Margin = Limit - Corrected. Amplitude

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

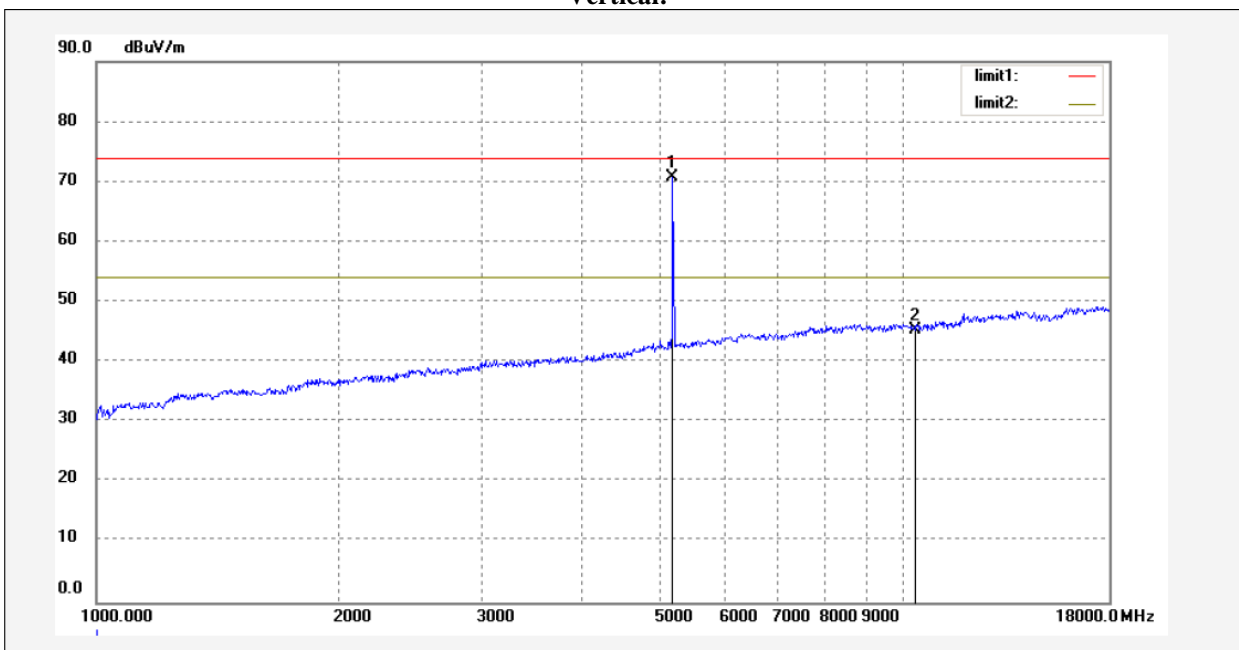
The test result of peak was less than the limit of average, so just peak values were recorded.

1-18 GHz:

**Pre-scan for Peak
802.11a 5180MHz
Horizontal:**

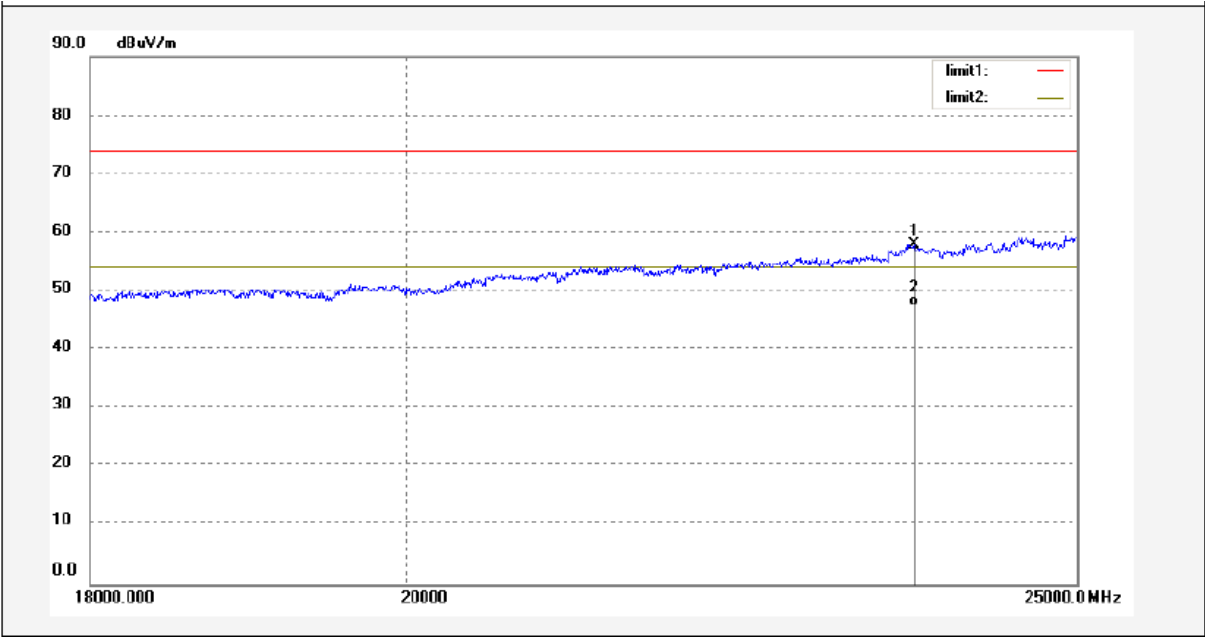


Vertical:

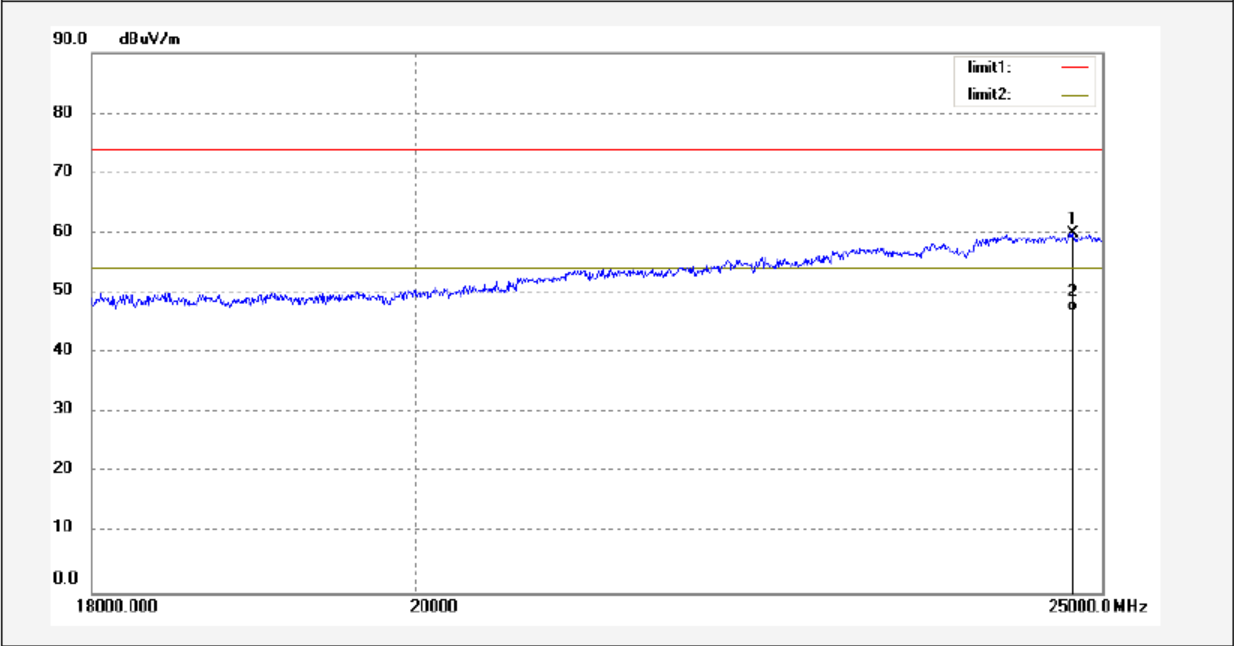


18-25 GHz:

Pre-scan for Peak
802.11a 5180MHz
Horizontal:

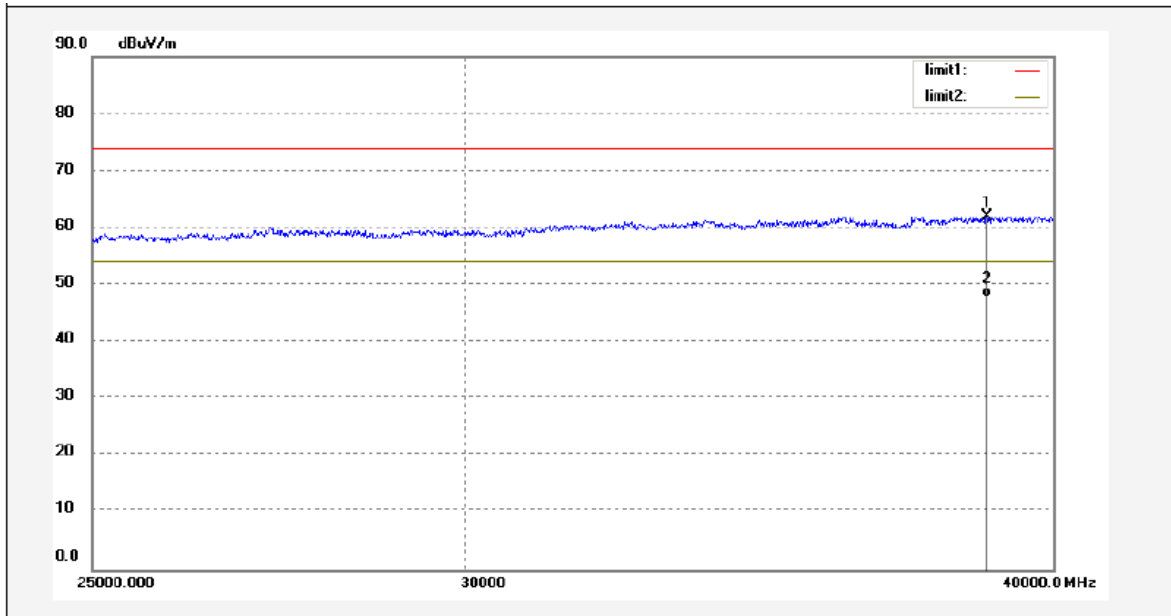


Vertical:

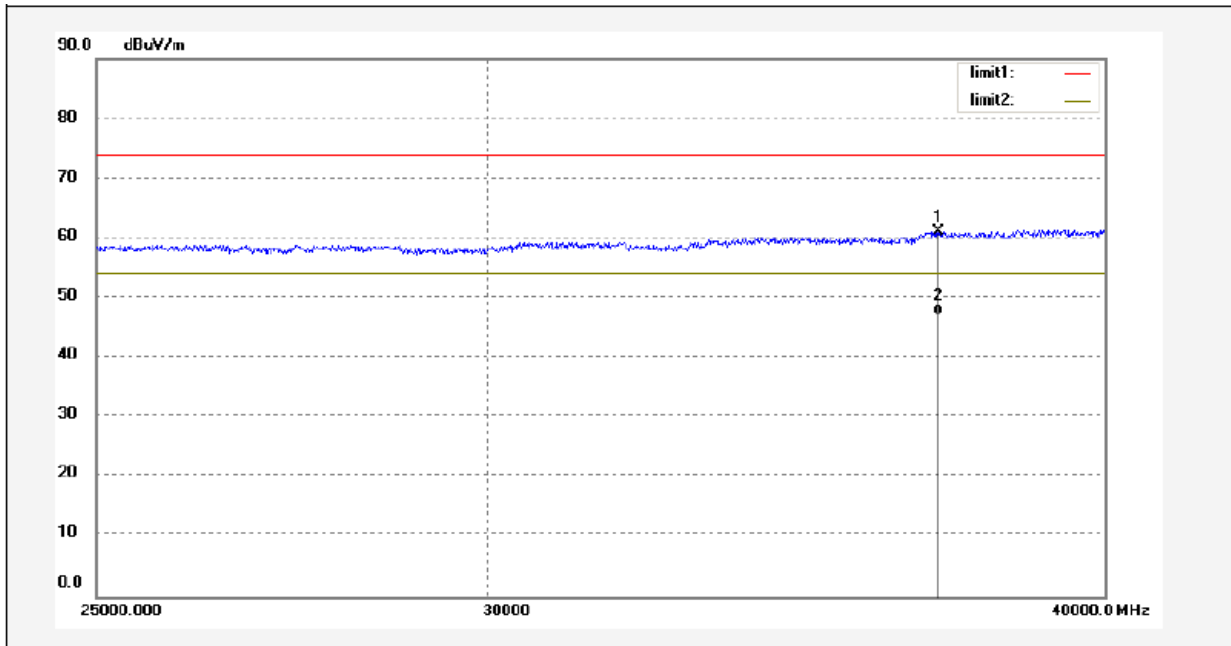


25-40 GHz:

**Pre-scan for Peak
802.11a 5180MHz
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

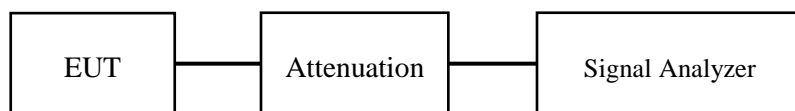
1. Emission Bandwidth (EBW)

- 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) $\geq 3 \times$ 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.



Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang from 2021-05-22 to 2021-06-09.

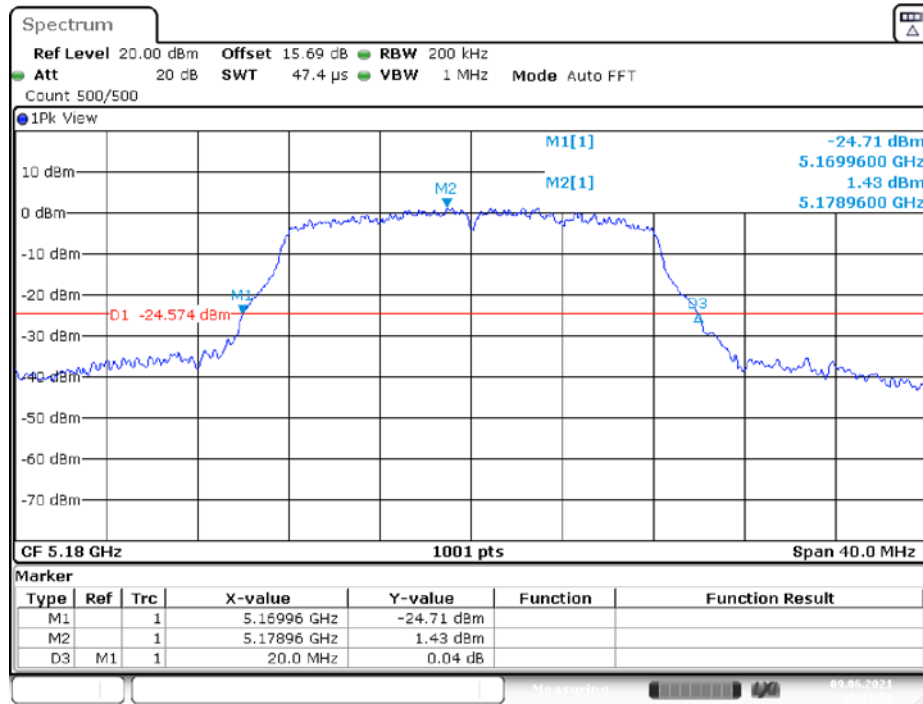
EUT operation mode: Transmitting

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

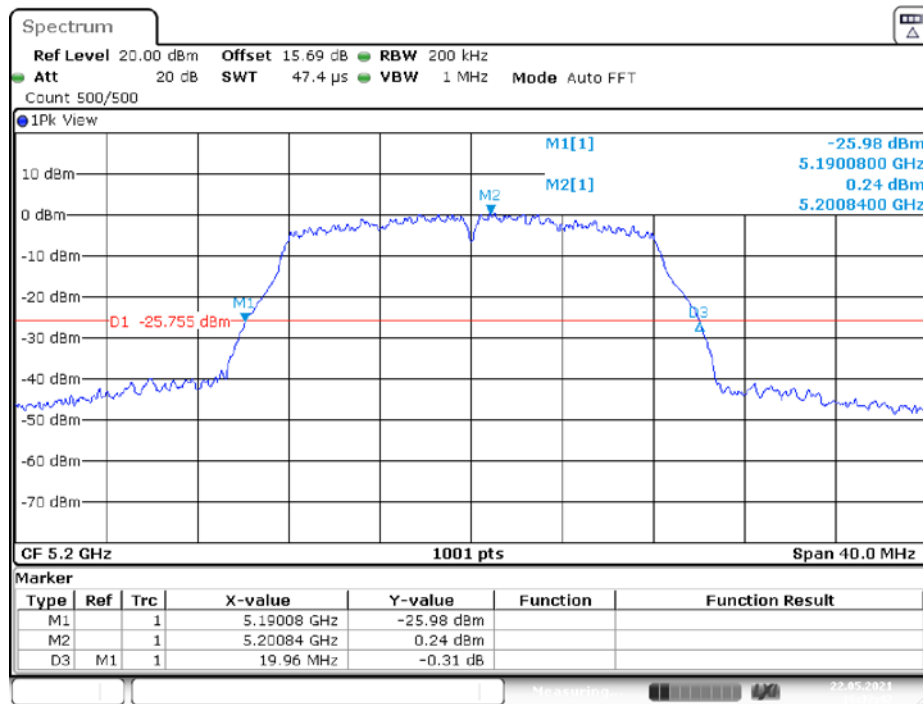
5150 MHz - 5250 MHz:

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	20.000	17.183	
5200	19.960	17.183	
5240	19.920	17.143	
802.11n20			
5180	20.160	17.982	
5200	19.760	17.183	
5240	20.280	18.022	
802.11n40			
5190	40.880	36.444	
5230	40.640	36.364	
802.11ac20			
5180	20.320	17.942	
5200	20.400	18.022	
5240	20.440	17.982	
802.11ac40			
5190	40.720	36.364	
5230	41.280	36.364	
802.11ac80			
5210	81.760	75.604	

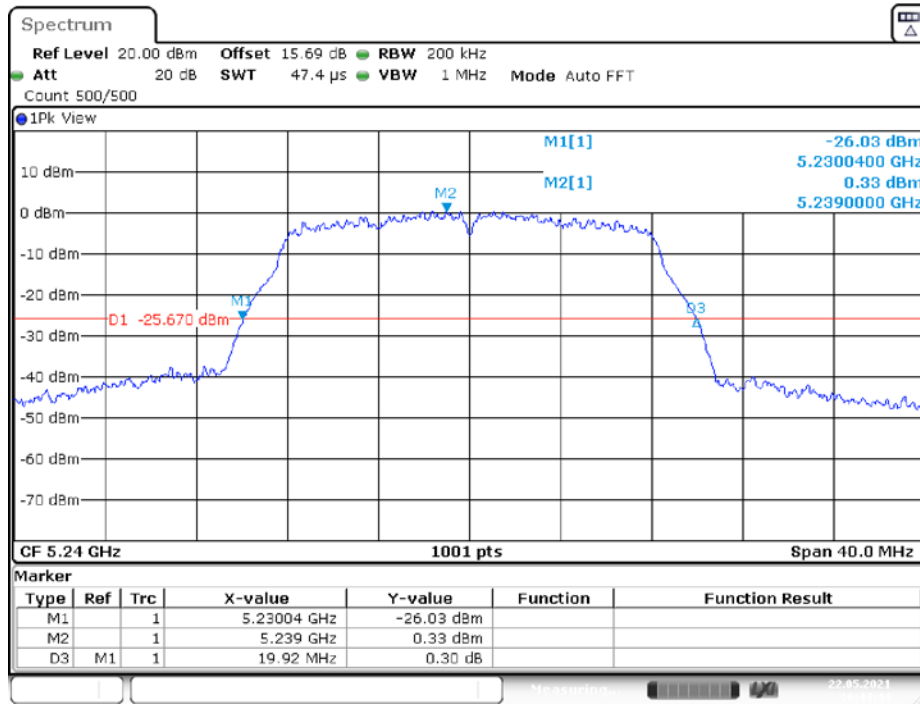
802.11a mode, 26 dB Emissions, 5180 MHz



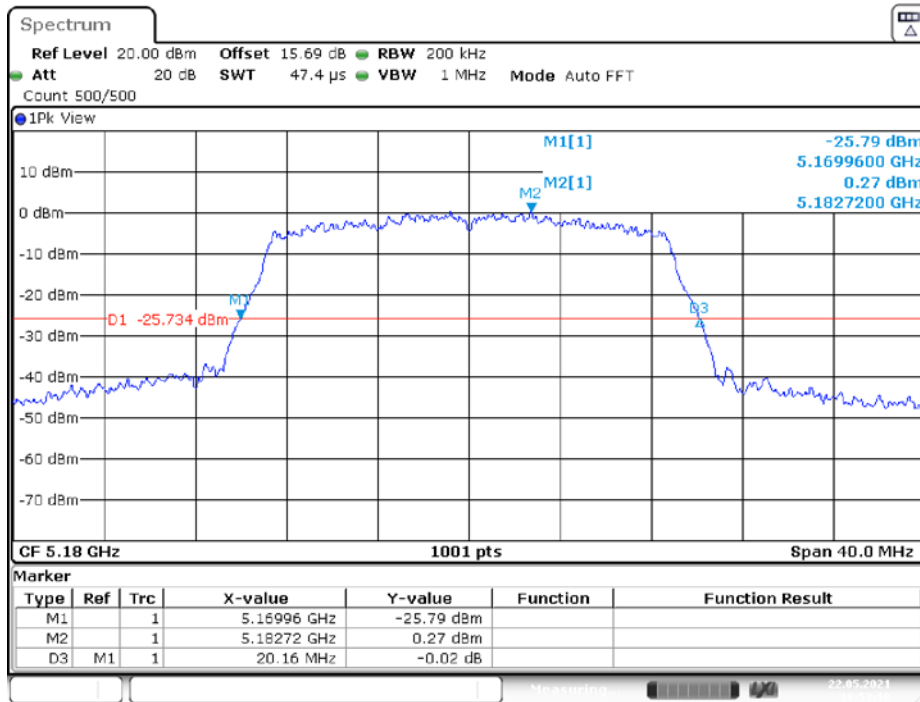
802.11a mode, 26 dB Emissions, 5200 MHz



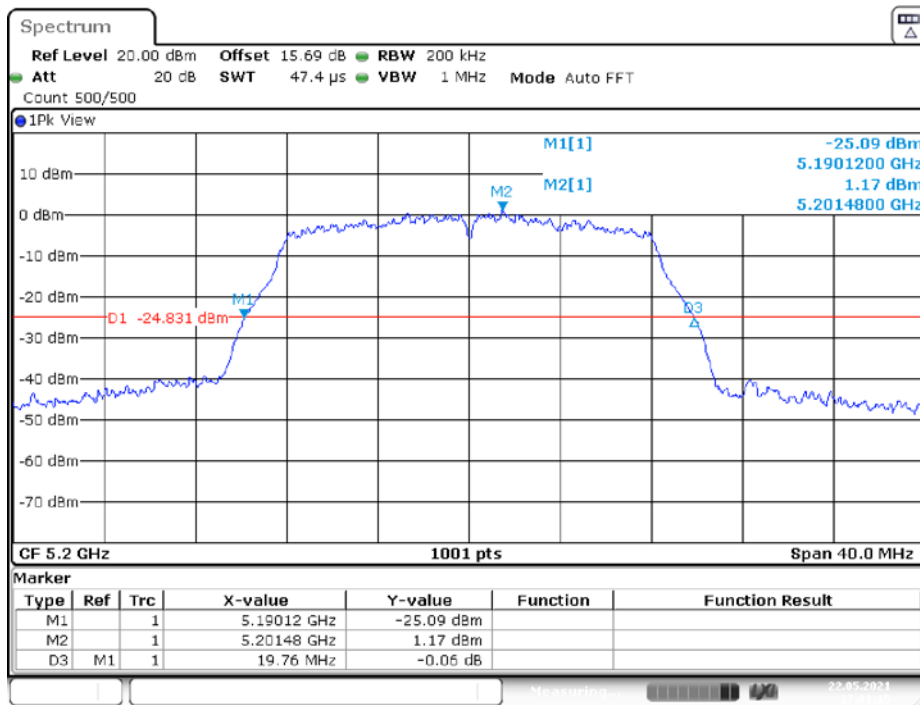
802.11a mode, 26 dB Emissions, 5240 MHz



802.11n20 mode, 26 dB Emissions, 5180 MHz

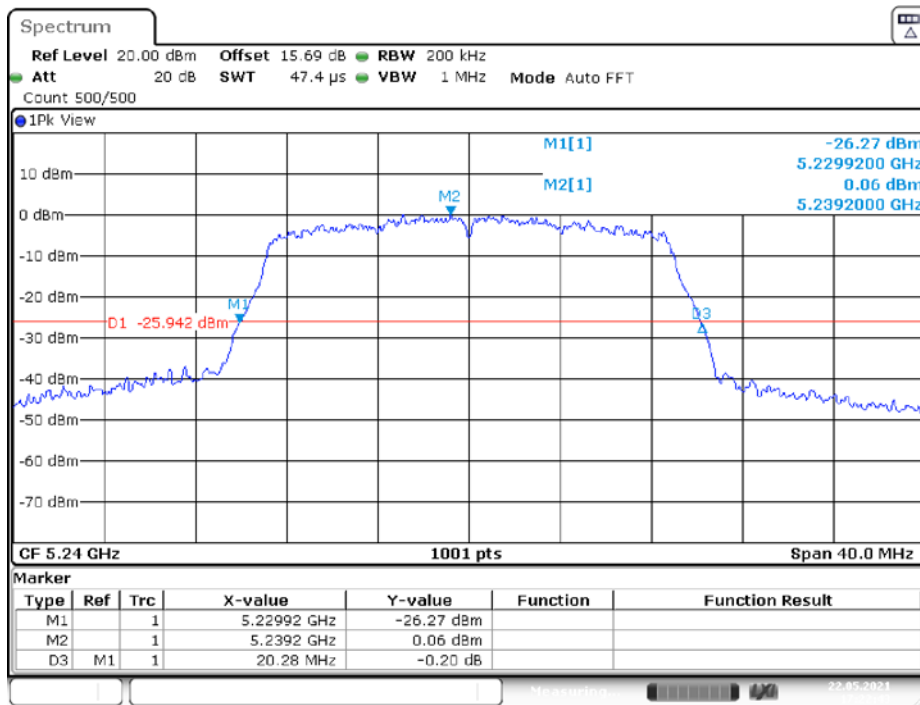


802.11n20 mode, 26 dB Emissions, 5200 MHz



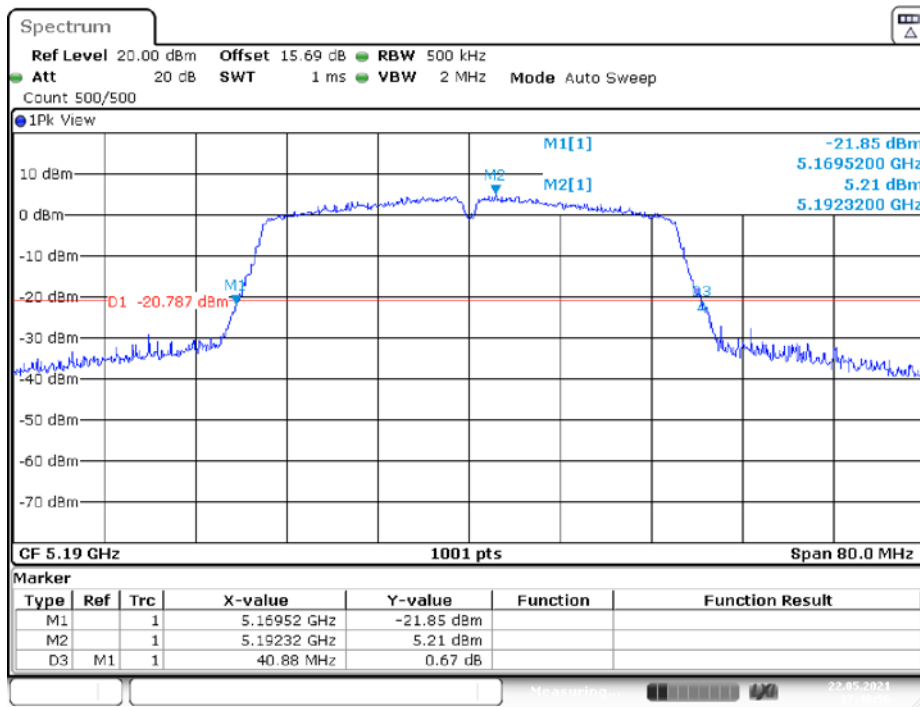
Date: 22.MAY.2021 17:01:15

802.11n20 mode, 26 dB Emissions, 5240 MHz

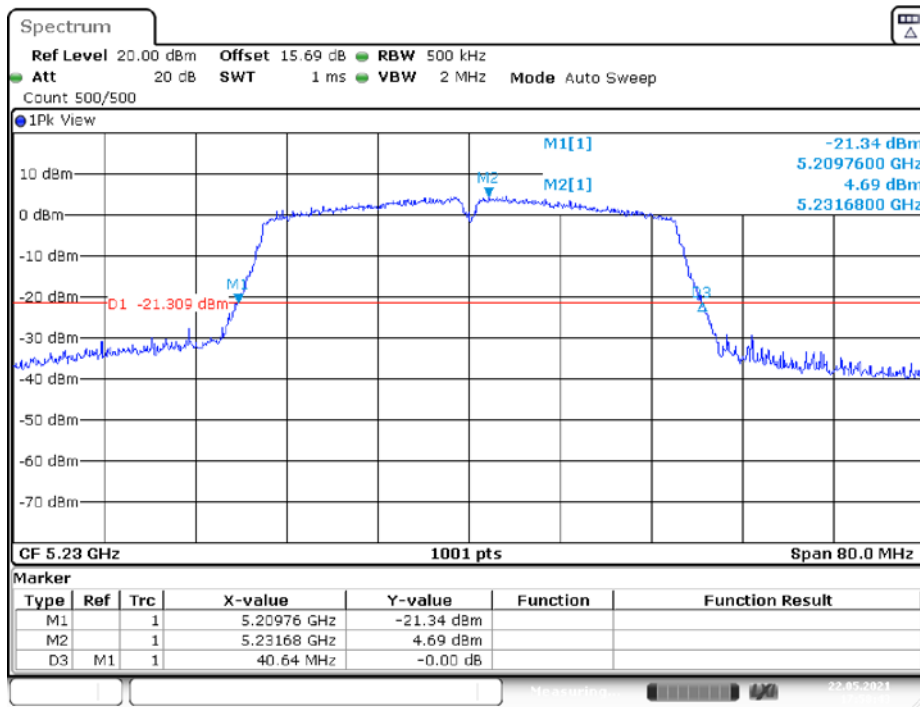


Date: 22.MAY.2021 17:22:43

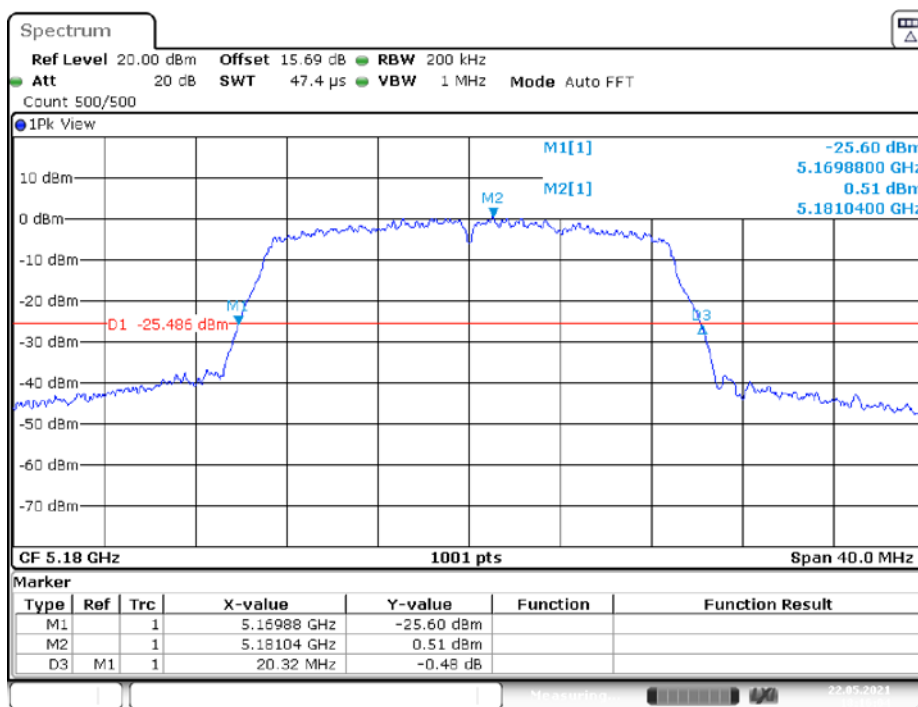
802.11n40 mode, 26 dB Emissions, 5190 MHz



802.11n40 mode, 26 dB Emissions, 5230 MHz

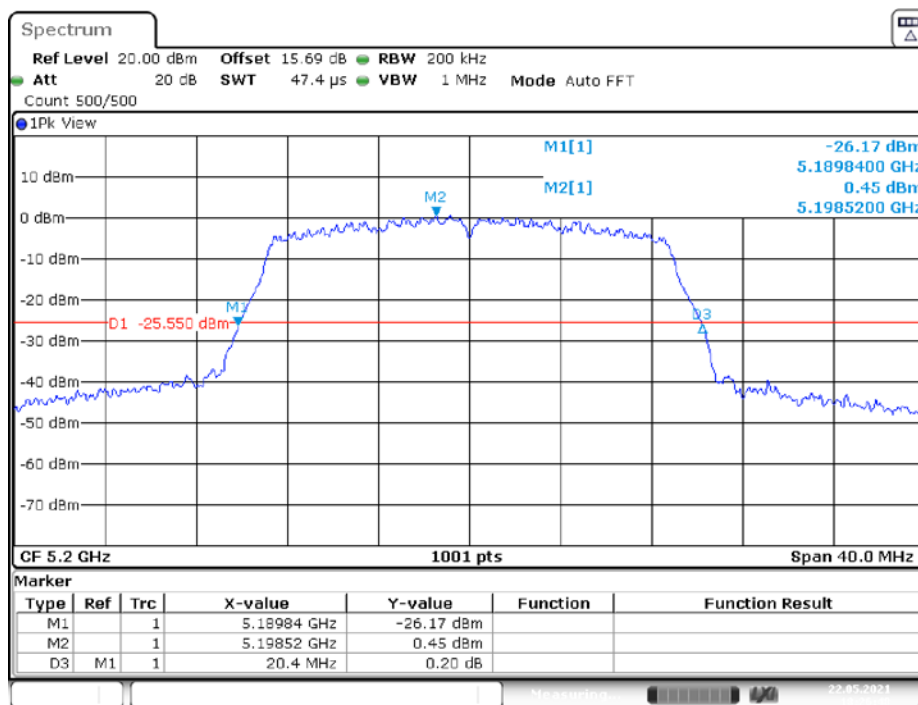


802.11ac20 mode, 26 dB Emissions, 5180 MHz



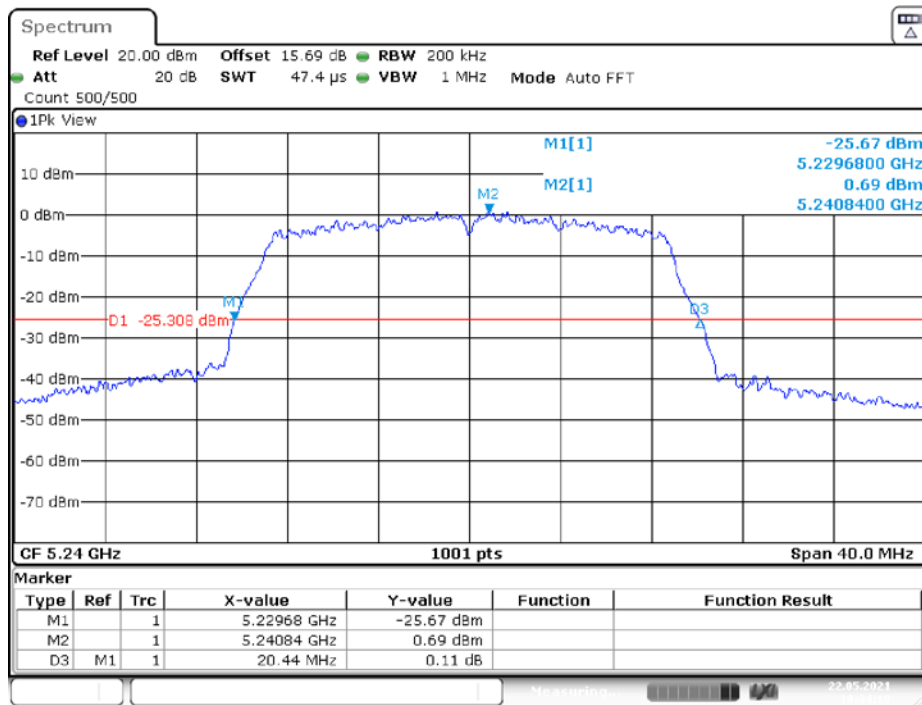
Date: 22.MAY.2021 18:16:04

802.11ac20 mode, 26 dB Emissions, 5200 MHz



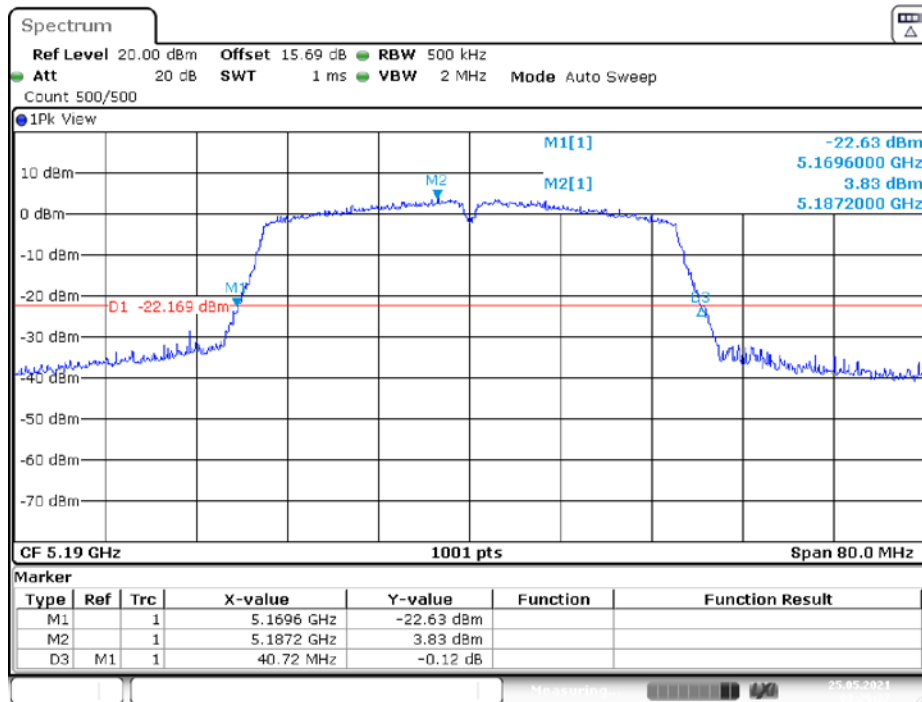
Date: 22.MAY.2021 18:26:48

802.11ac20 mode, 26 dB Emissions, 5240 MHz



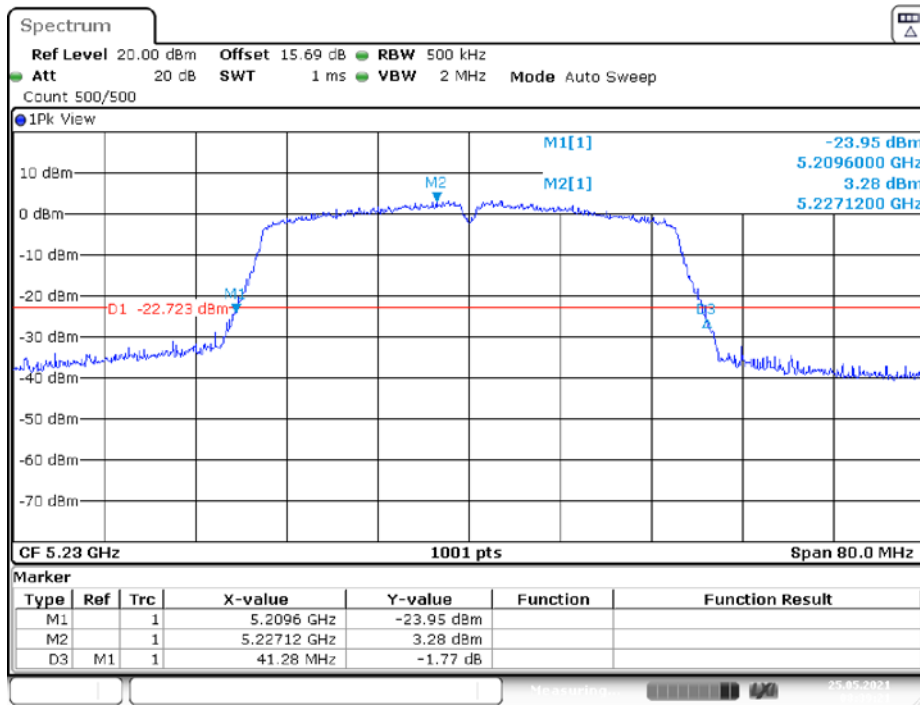
Date: 22.MAY.2021 18:34:18

802.11ac40 mode, 26 dB Emissions, 5190 MHz



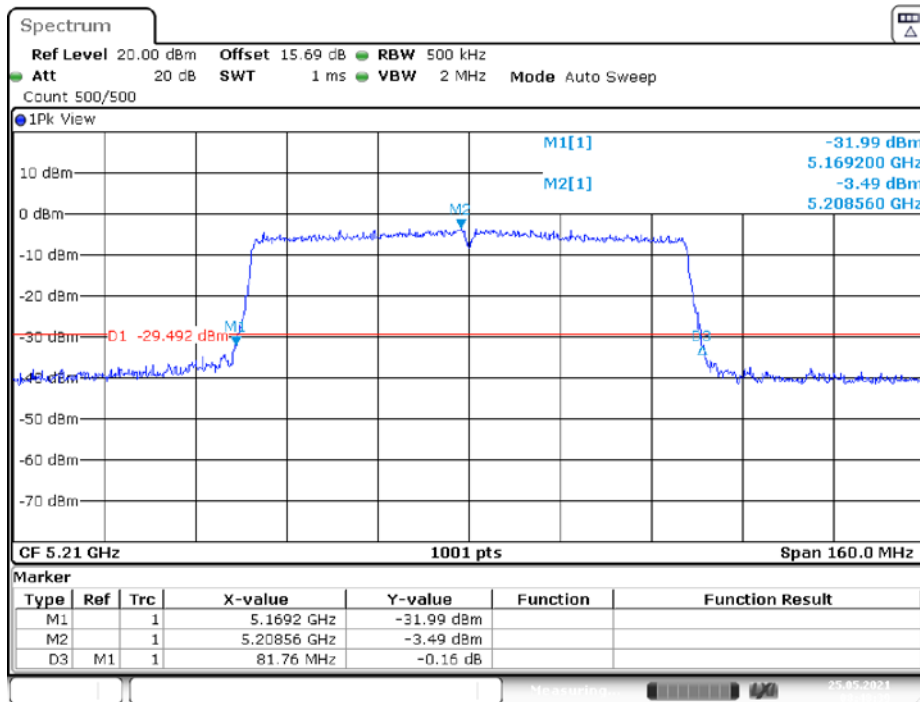
Date: 25.MAY.2021 08:29:27

802.11ac40 mode, 26 dB Emissions, 5230 MHz

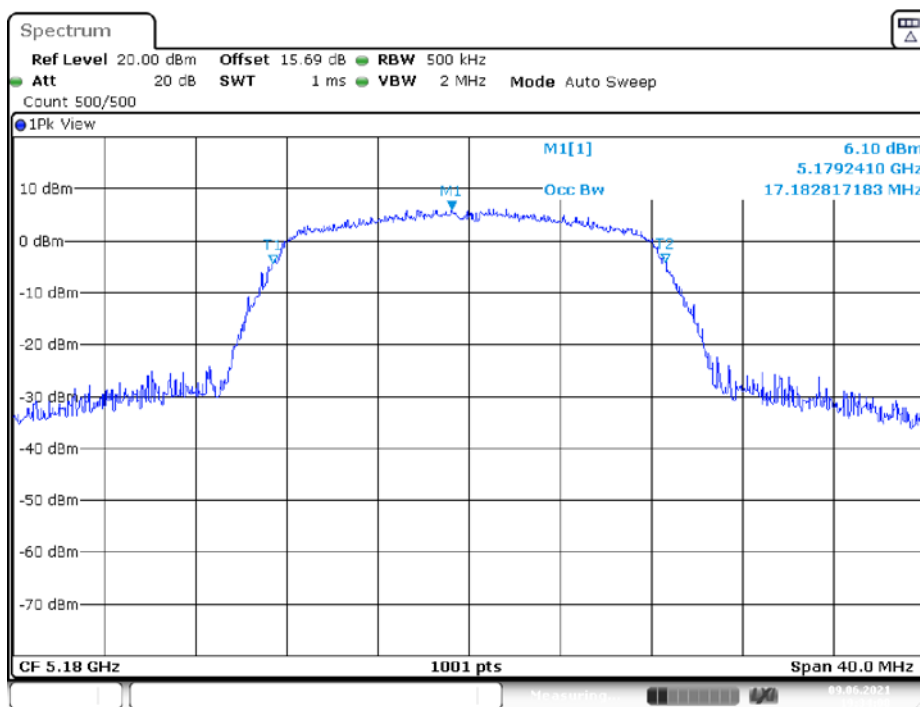
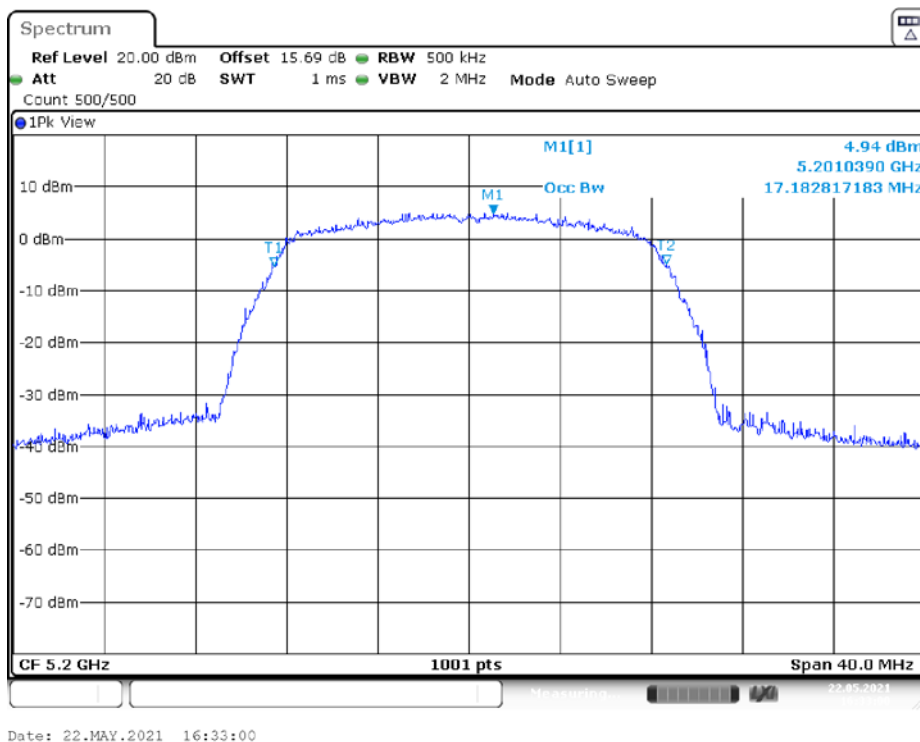


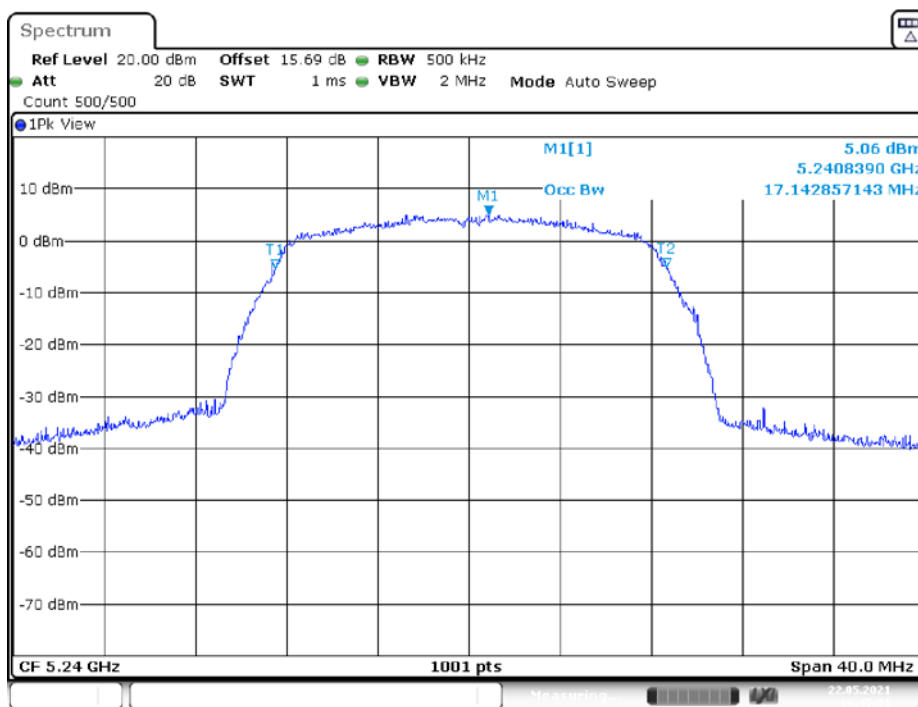
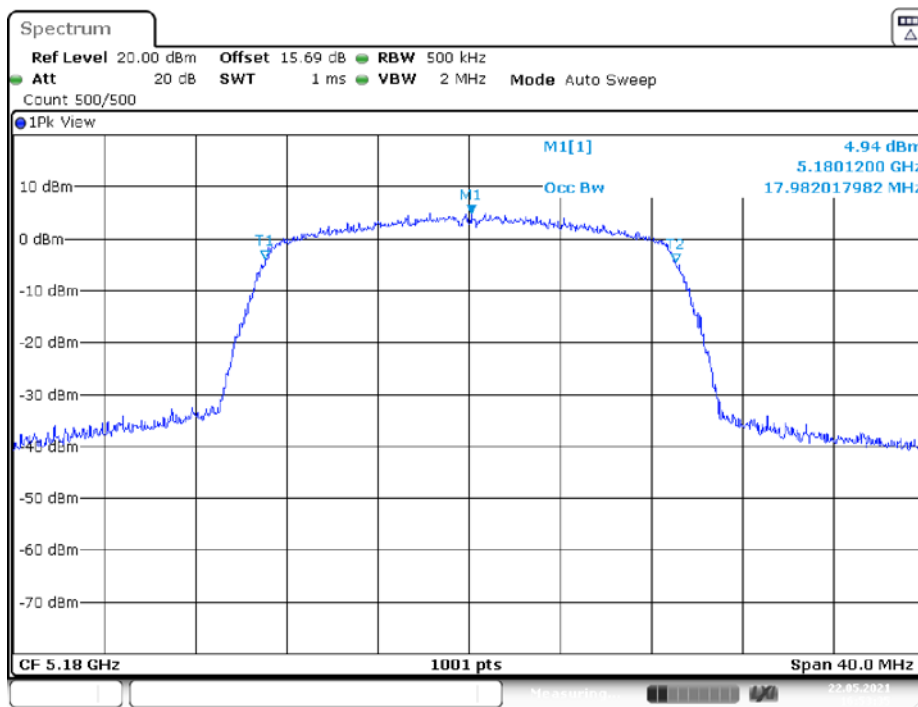
Date: 25.MAY.2021 08:39:21

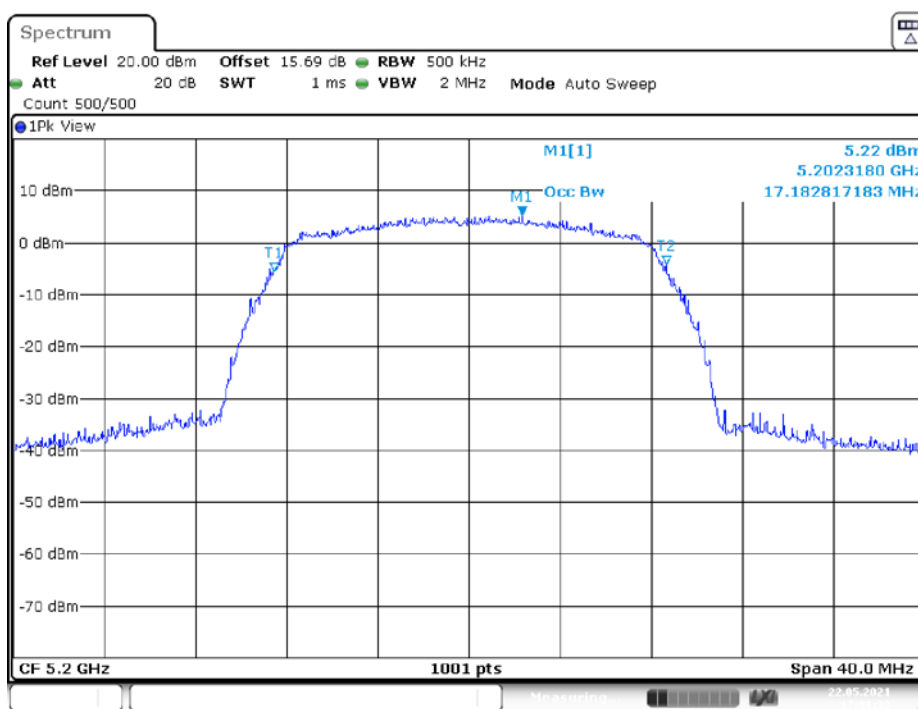
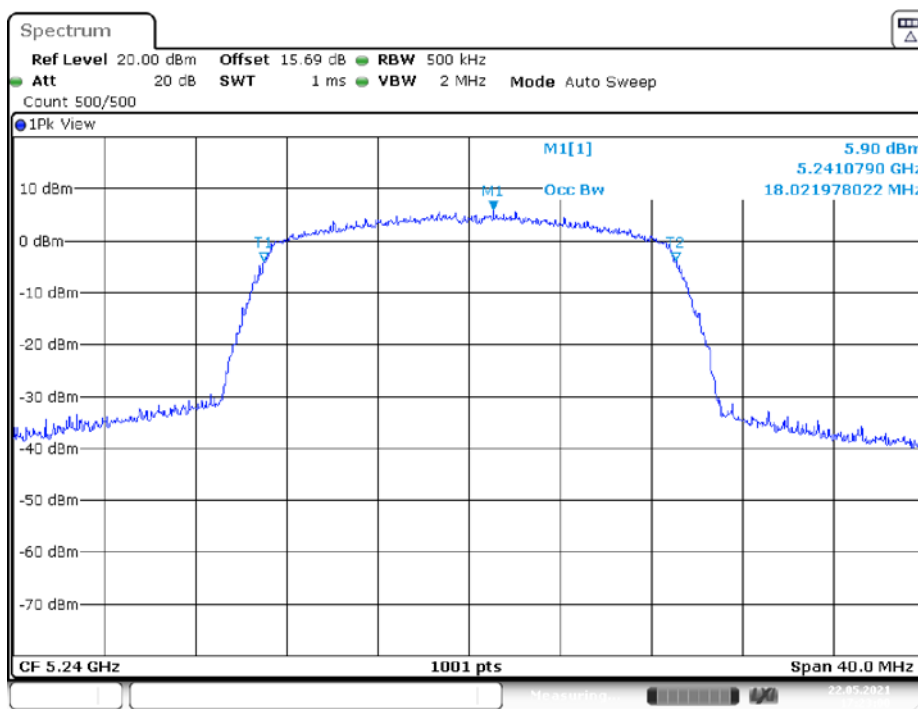
802.11ac80 mode, 26 dB Emissions, 5210 MHz

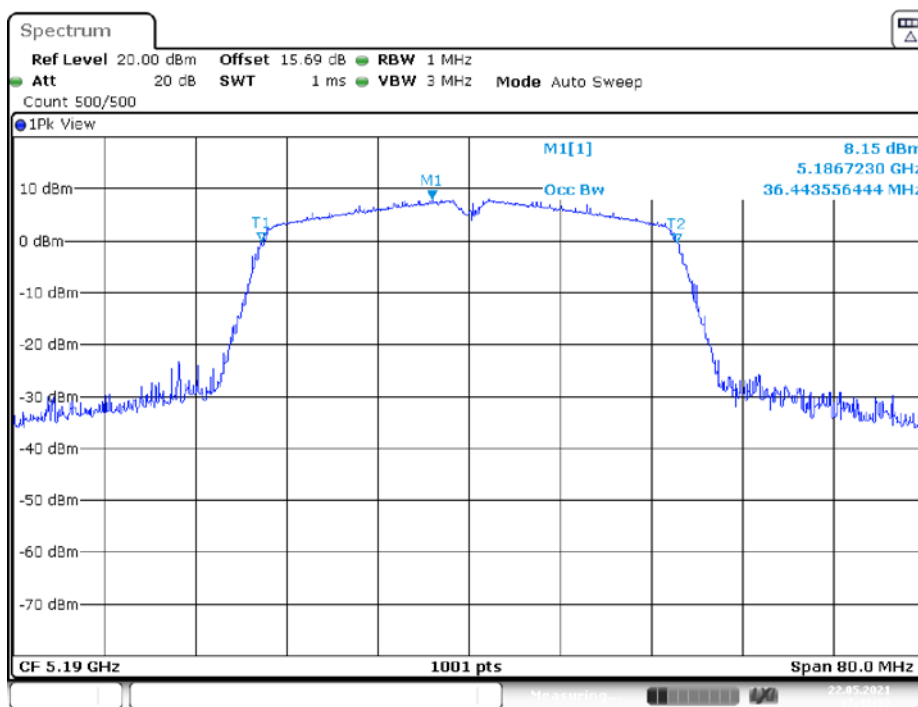
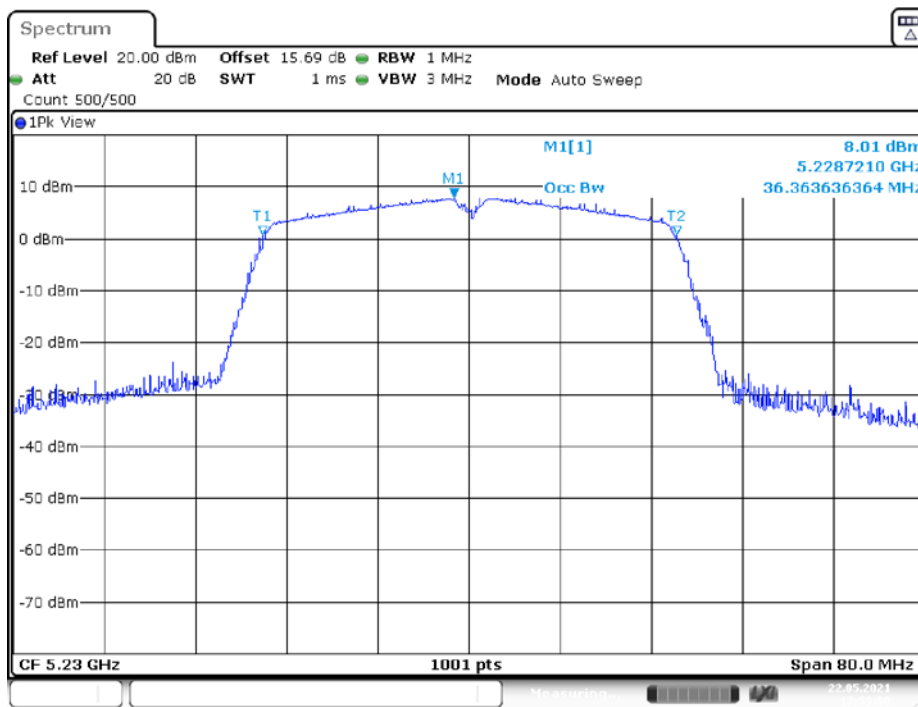


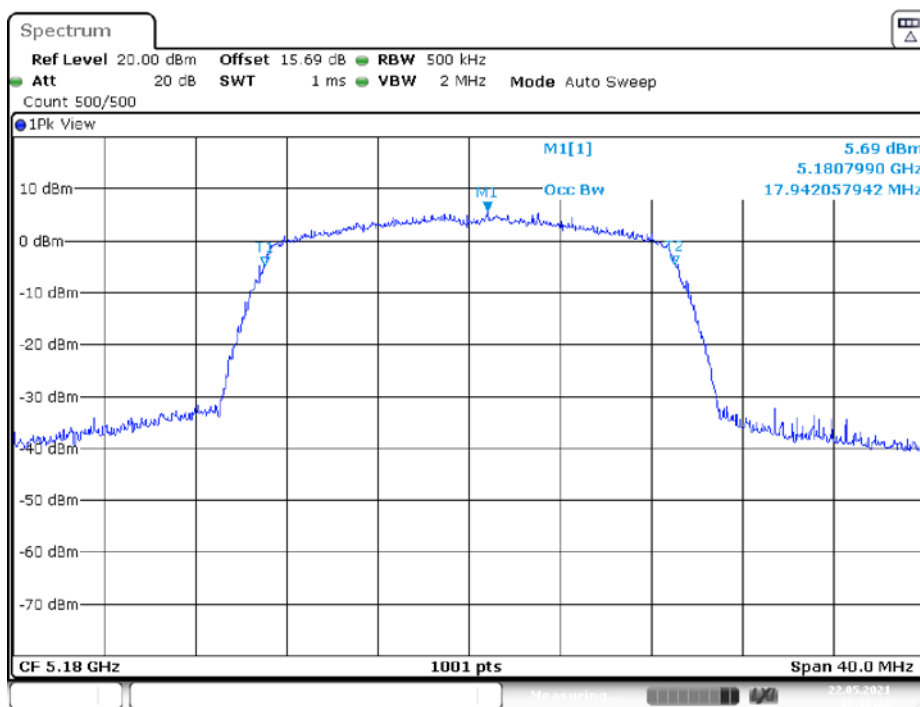
Date: 25.MAY.2021 08:48:39

802.11a mode, 99% Occupied Bandwidth, 5180 MHz**802.11a mode, 99% Occupied Bandwidth, 5200 MHz**

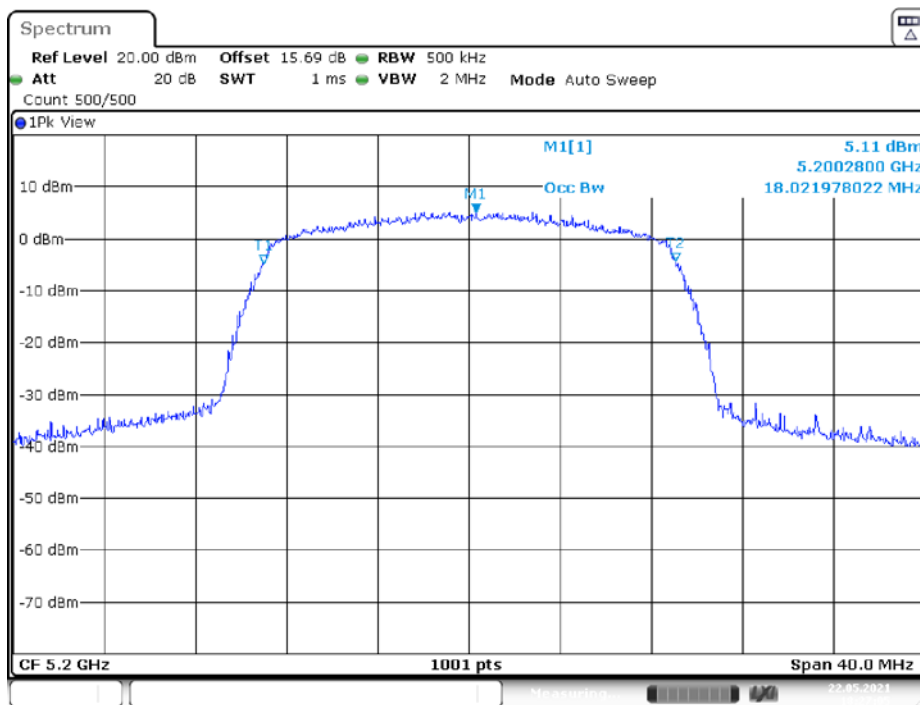
802.11a mode, 99% Occupied Bandwidth, 5240 MHz**802.11n20 mode, 99% Occupied Bandwidth, 5180 MHz**

802.11n20 mode, 99% Occupied Bandwidth, 5200 MHz**802.11n20 mode, 99% Occupied Bandwidth, 5240 MHz**

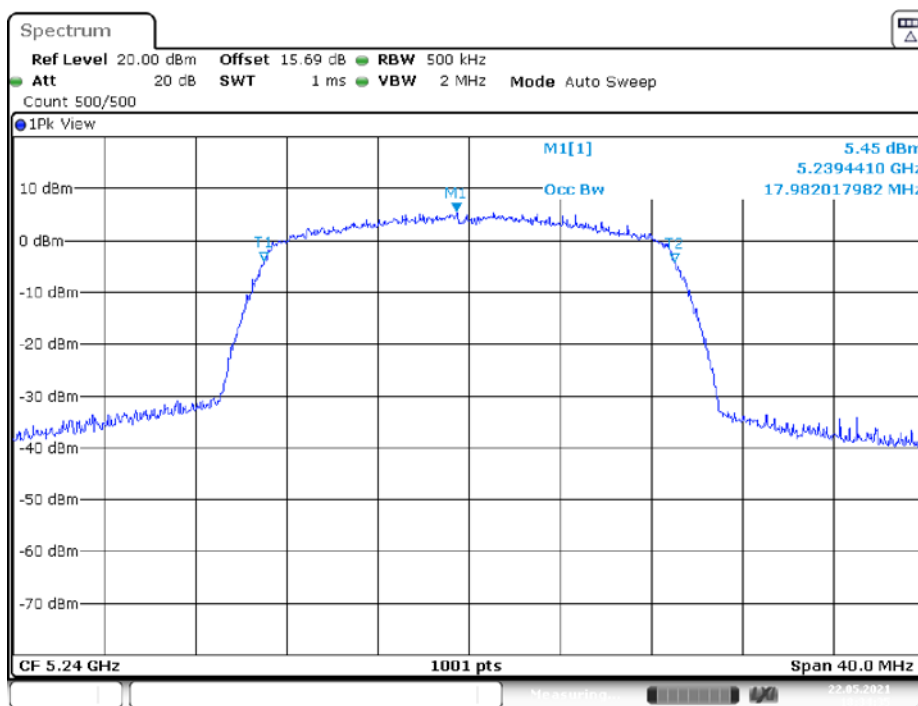
802.11n40 mode, 99% Occupied Bandwidth, 5190 MHz**802.11n40 mode, 99% Occupied Bandwidth, 5230 MHz**

802.11ac20 mode, 99% Occupied Bandwidth, 5180 MHz

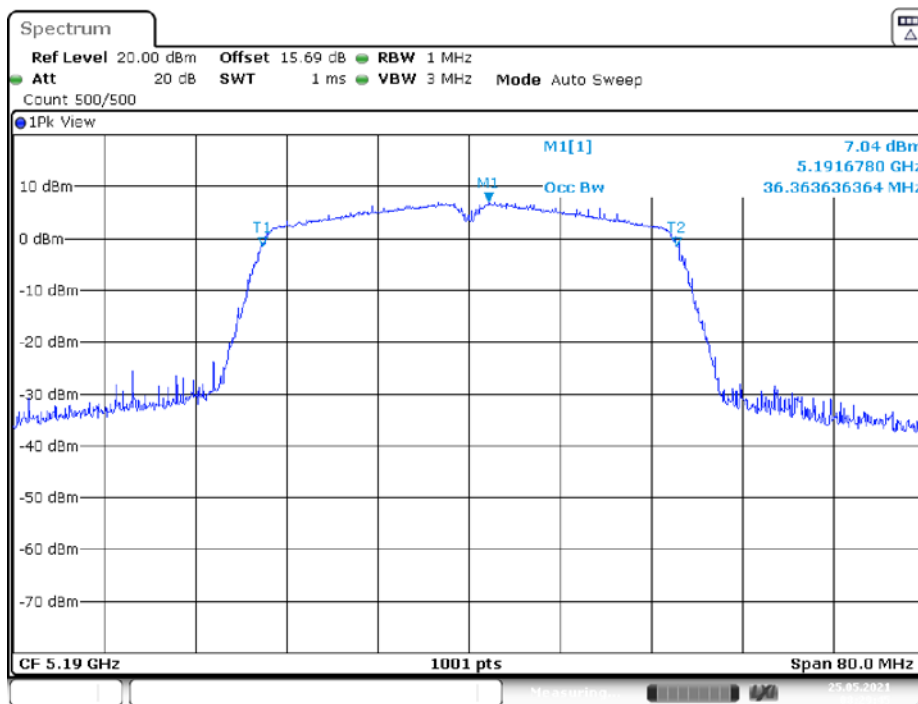
Date: 22.MAY.2021 18:16:22

802.11ac20 mode, 99% Occupied Bandwidth, 5200 MHz

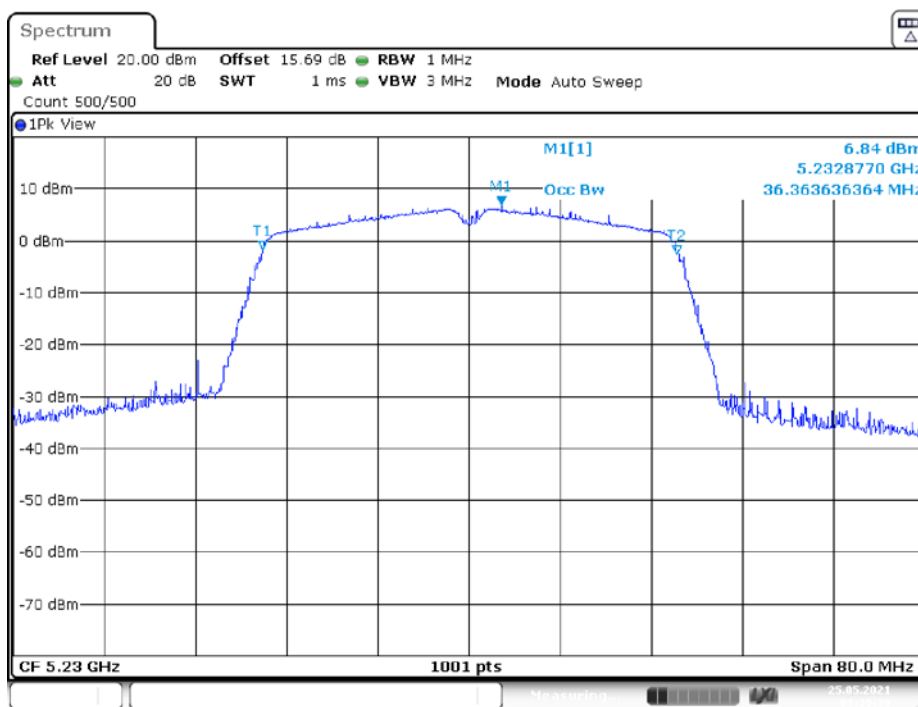
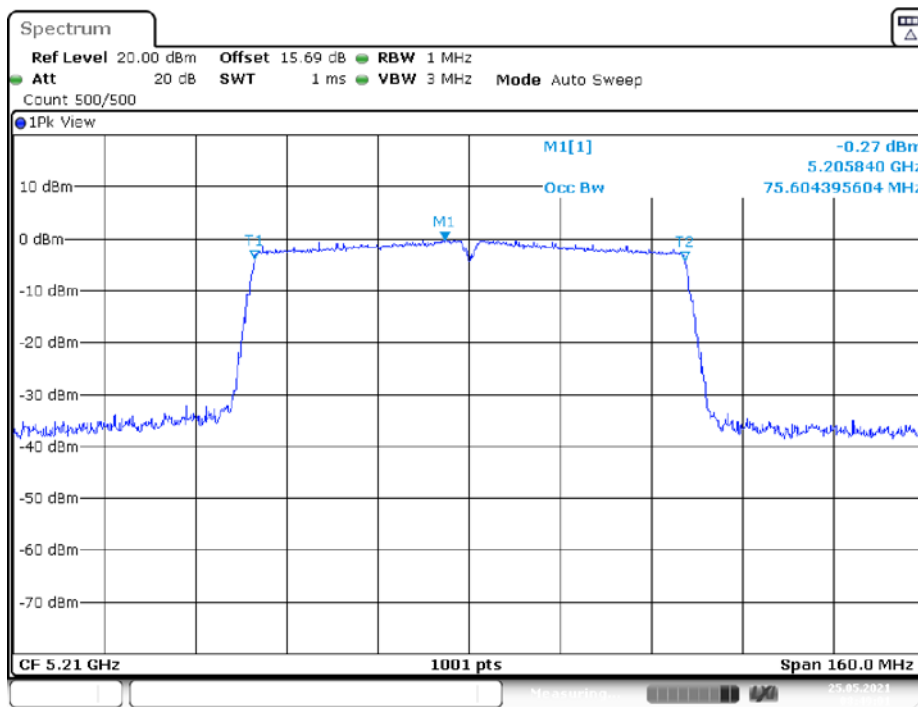
Date: 22.MAY.2021 18:27:06

802.11ac20 mode, 99% Occupied Bandwidth, 5240 MHz

Date: 22.MAY.2021 18:34:36

802.11ac40 mode, 99% Occupied Bandwidth, 5190 MHz

Date: 25.MAY.2021 08:29:44

802.11ac40 mode, 99% Occupied Bandwidth, 5230 MHz**802.11ac80 mode, 99% Occupied Bandwidth, 5210 MHz**

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

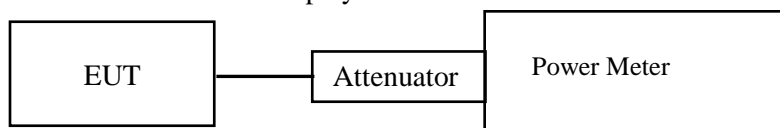
Applicable Standard

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 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-06-30.

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	6.82	24
5200	6.80	
5240	6.93	
802.11n20		
5180	6.81	24
5200	6.88	
5240	6.86	
802.11n40		
5190	6.72	24
5230	6.54	
802.11ac20		
5180	6.96	24
5200	6.85	
5240	6.80	
802.11ac40		
5190	6.59	24
5230	6.34	
802.11ac80		
5210	5.82	24

Note: This product is used for client device.

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 $RBW \geq 1/T$, where T is defined in section II.B.1.a).
- b) Set $VBW \geq 3 RBW$.
- c) 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 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 $10 \log(1\text{MHz}/RBW)$ 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 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-06-30.

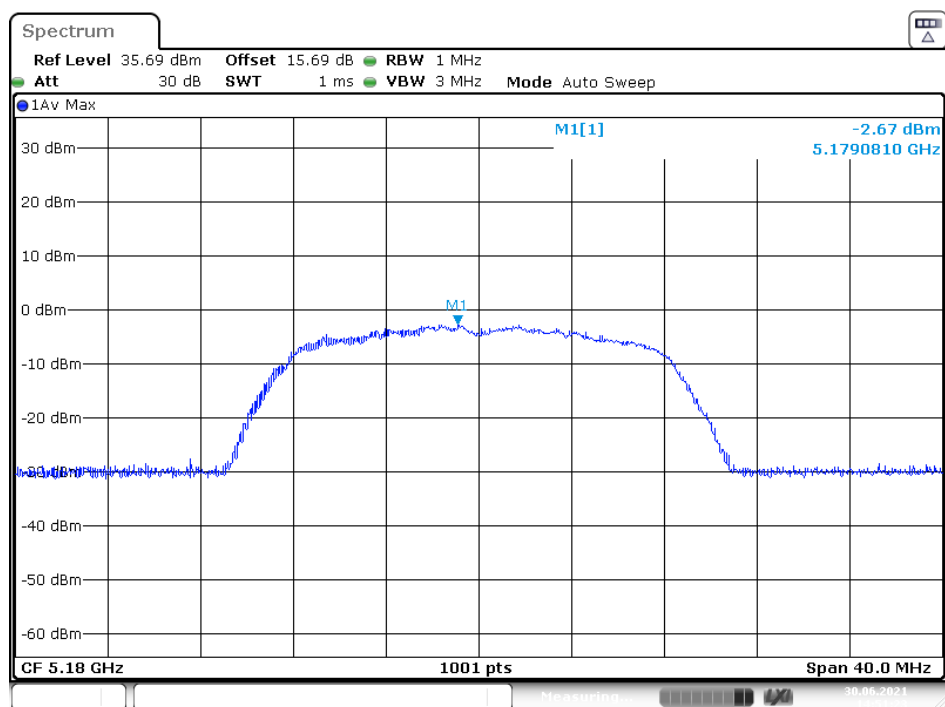
EUT operation mode: Transmitting

Test Result: Pass

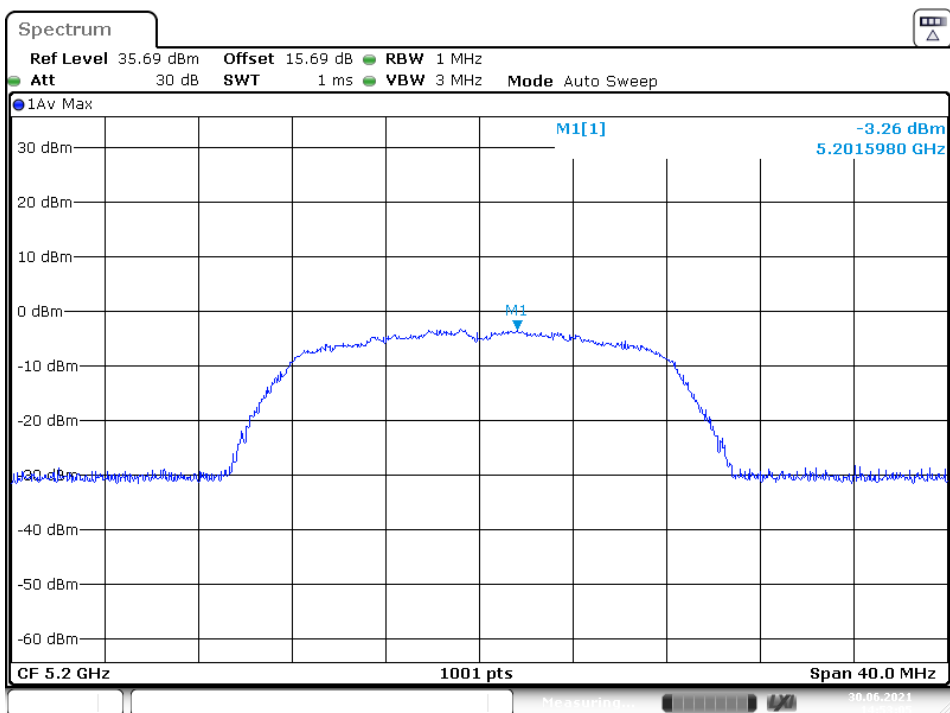
Please refer to the following tables and plots.

5150 – 5250 MHz

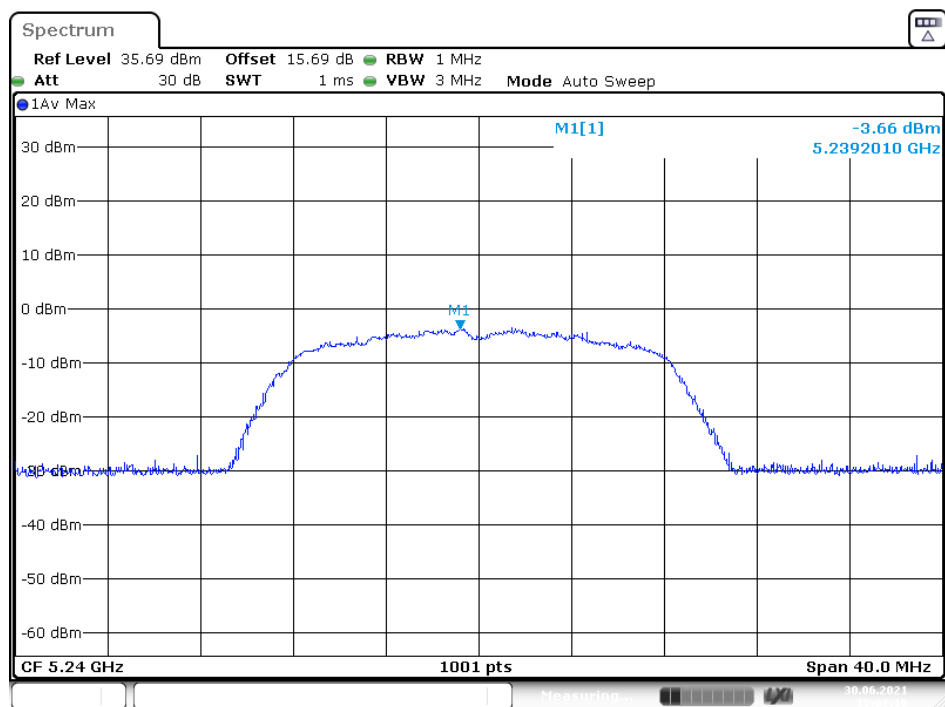
Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5180	-2.67	11
5200	-3.26	
5240	-3.66	
802.11n20		
5180	-3.03	11
5200	-3.27	
5240	-3.93	
802.11n40		
5190	-4.28	11
5230	-4.52	
802.11ac20		
5180	-2.69	11
5200	-3.10	
5240	-3.66	
802.11ac40		
5190	-4.02	11
5230	-4.33	
802.11ac80		
5210	-7.44	11

802.11a mode, Power Spectral Density, 5180 MHz

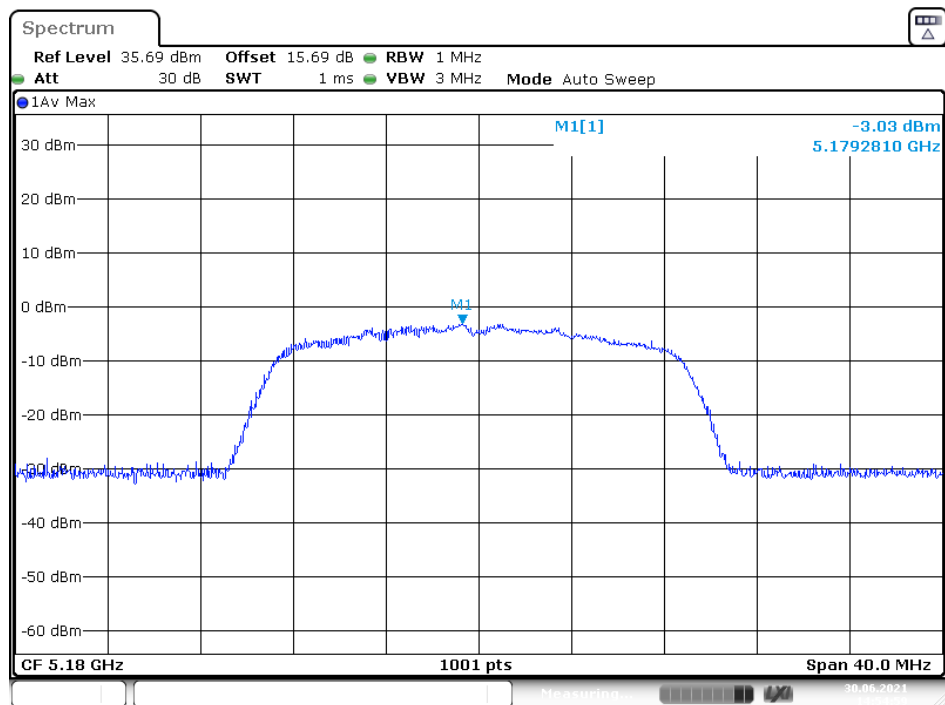
Date: 30.JUN.2021 14:51:23

802.11a mode, Power Spectral Density, 5200 MHz

Date: 30.JUN.2021 14:53:06

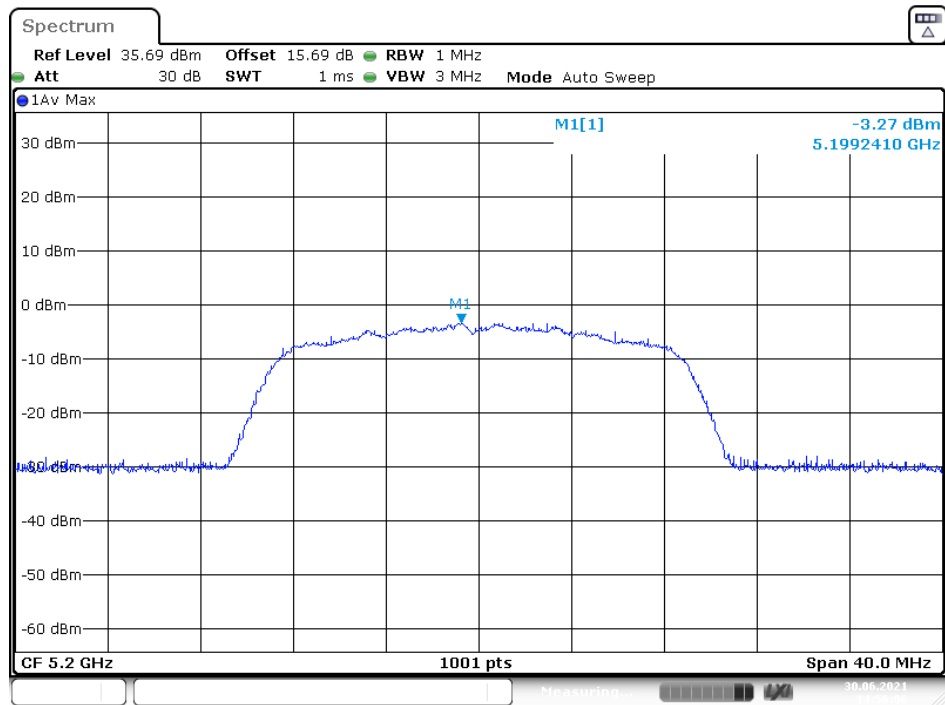
802.11a mode, Power Spectral Density, 5240 MHz

Date: 30.JUN.2021 15:01:11

802.11n20 mode, Power Spectral Density, 5180 MHz

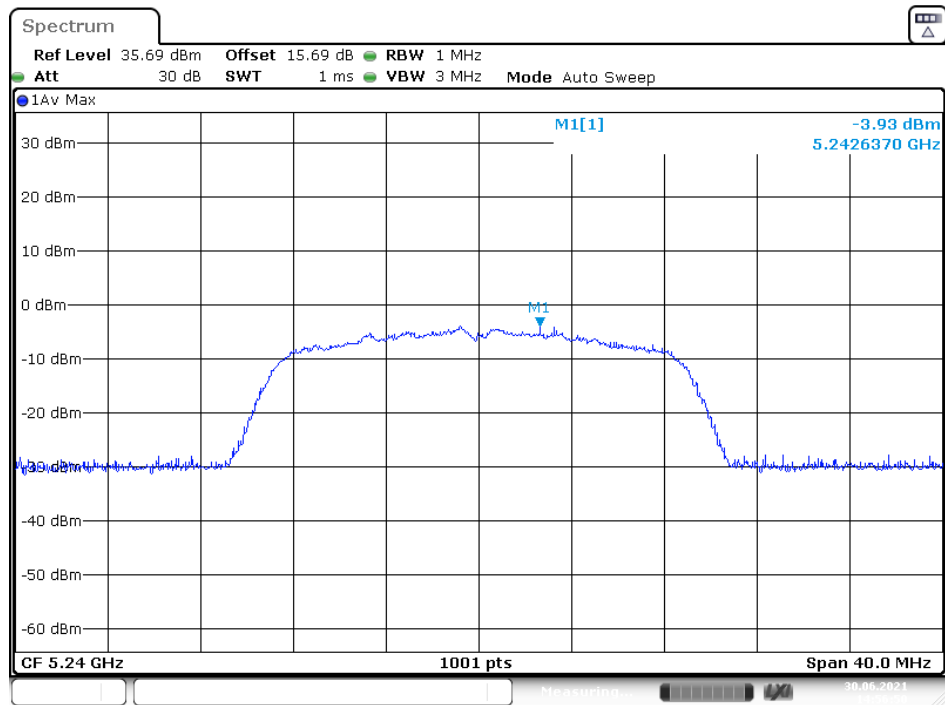
Date: 30.JUN.2021 14:55:00

802.11n20 mode, Power Spectral Density, 5200 MHz



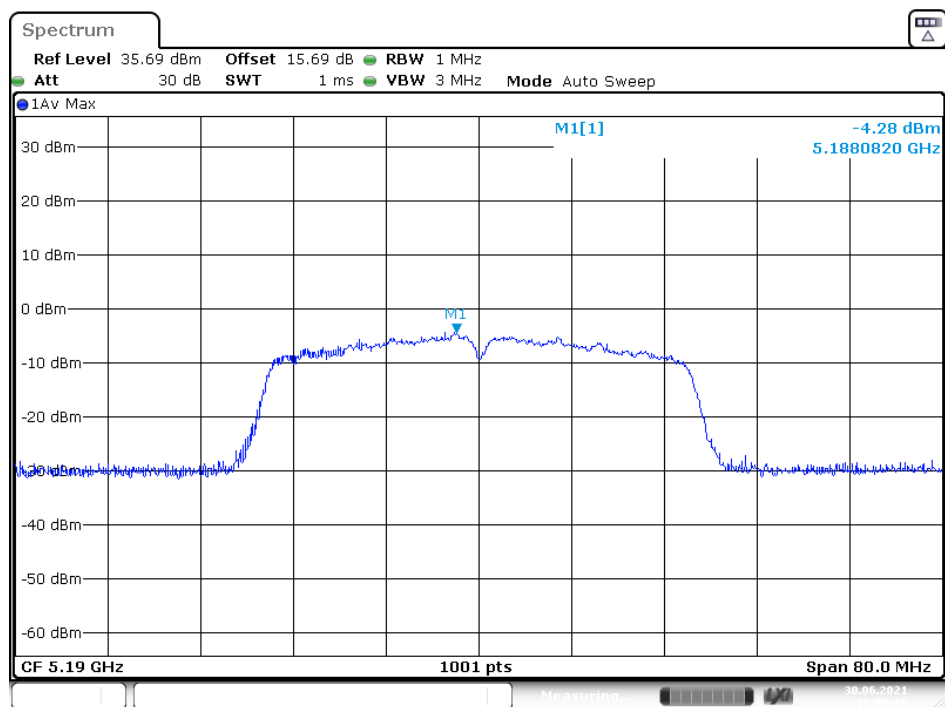
Date: 30.JUN.2021 14:56:07

802.11n20 mode, Power Spectral Density, 5240 MHz



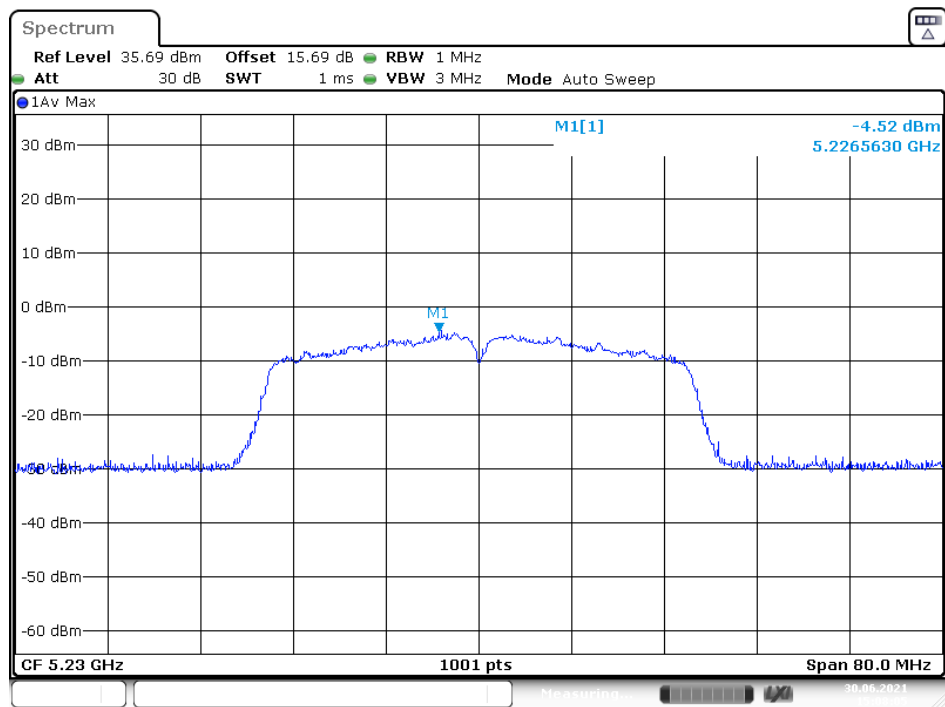
Date: 30.JUN.2021 14:56:51

802.11n40 mode, Power Spectral Density, 5190 MHz



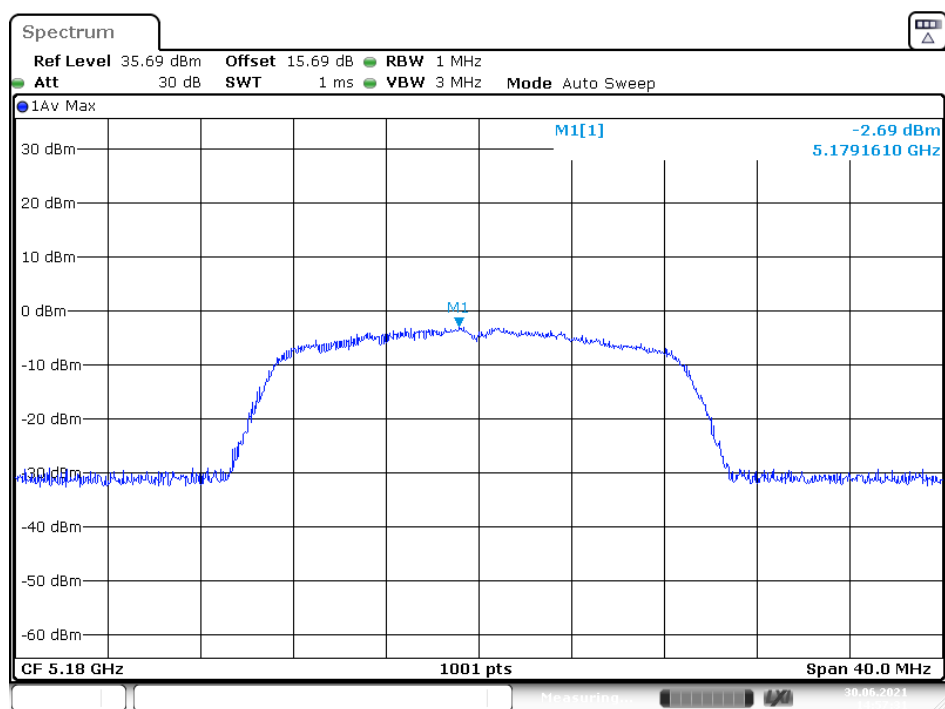
Date: 30.JUN.2021 15:05:16

802.11n40 mode, Power Spectral Density, 5230 MHz



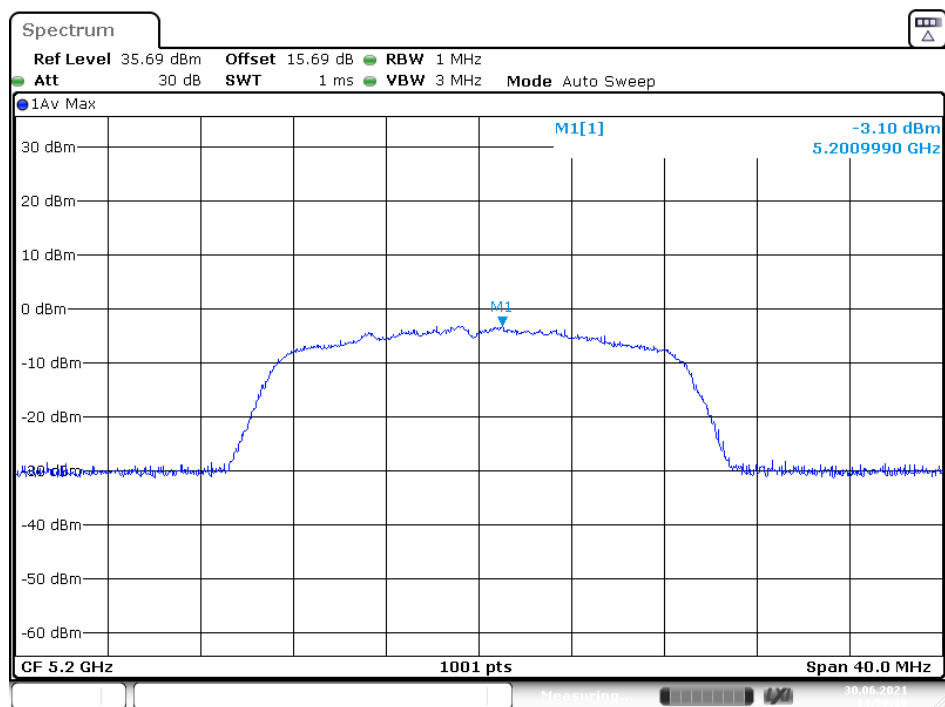
Date: 30.JUN.2021 15:08:06

802.11ac20 mode, Power Spectral Density, 5180 MHz

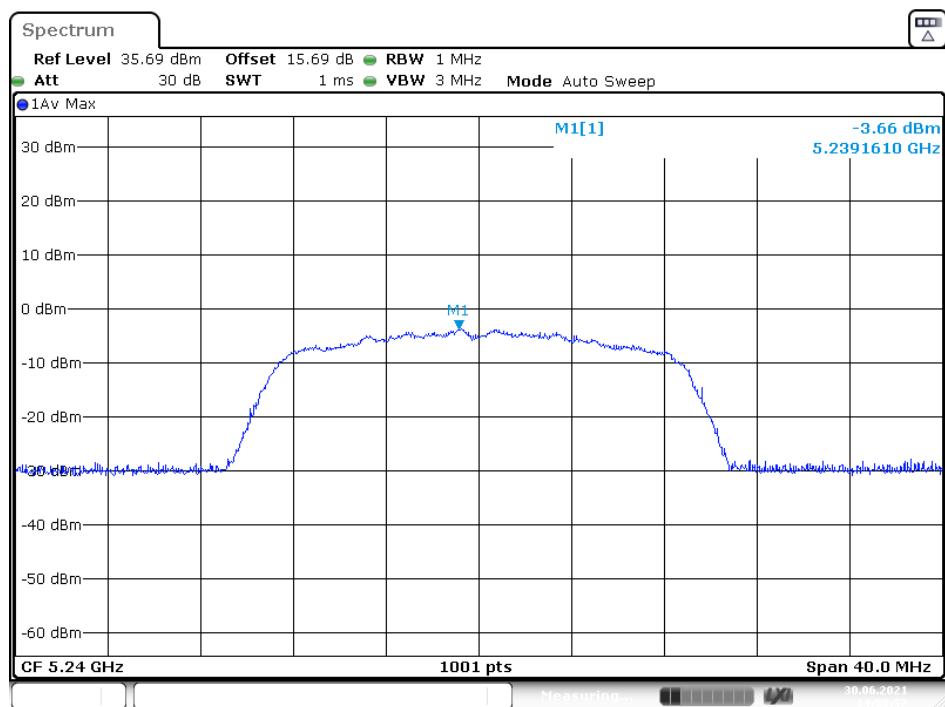


Date: 30.JUN.2021 14:57:32

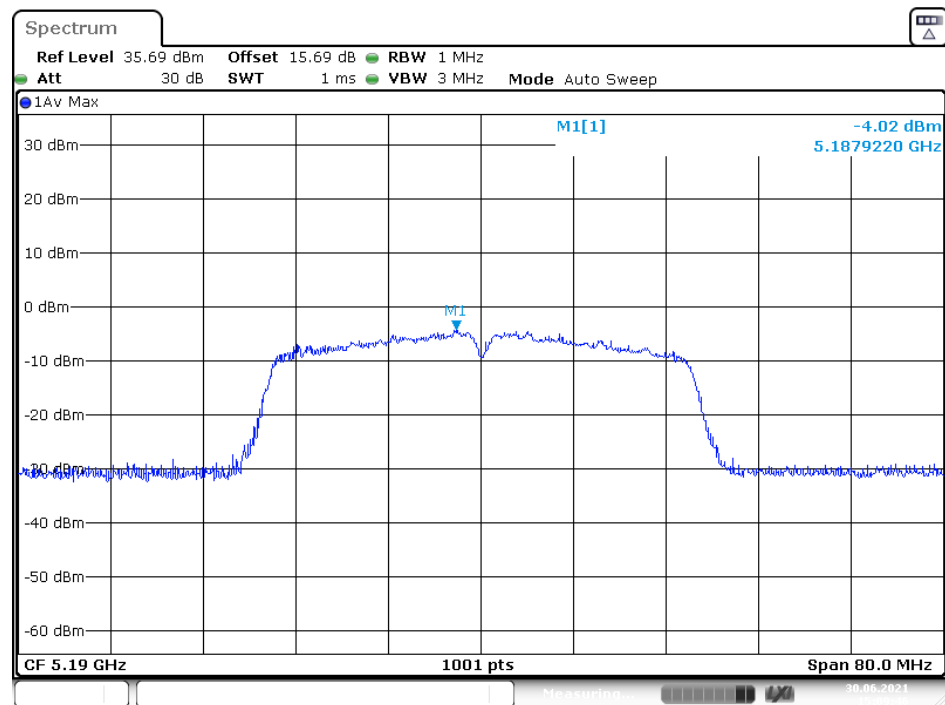
802.11ac20 mode, Power Spectral Density, 5200 MHz



Date: 30.JUN.2021 14:58:11

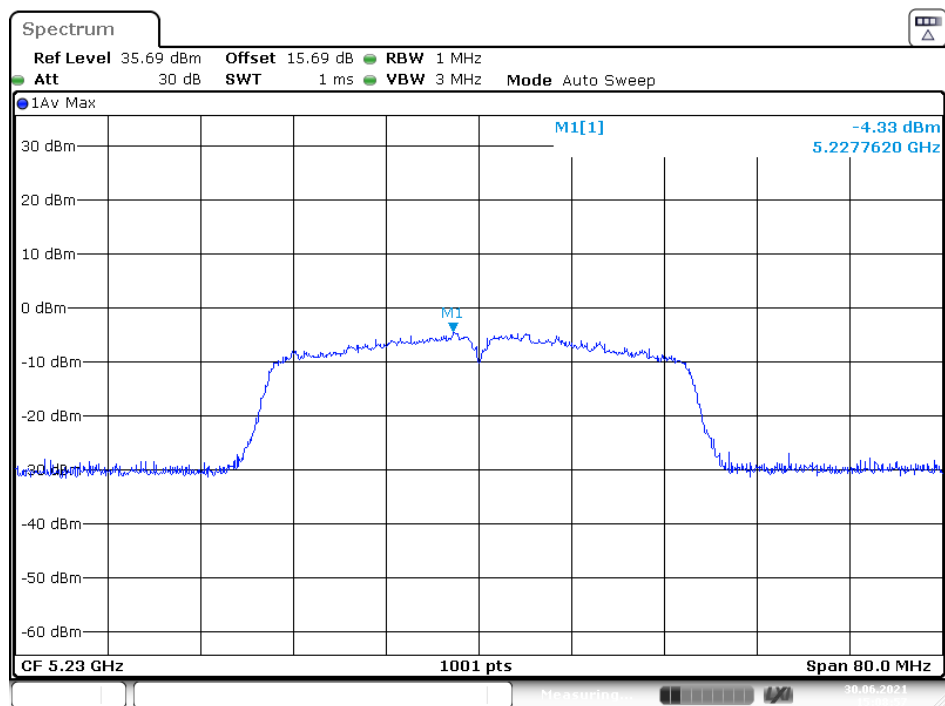
802.11ac20 mode, Power Spectral Density, 5240 MHz

Date: 30.JUN.2021 14:58:58

802.11ac40 mode, Pwer Spectral Density, 5190 MHz

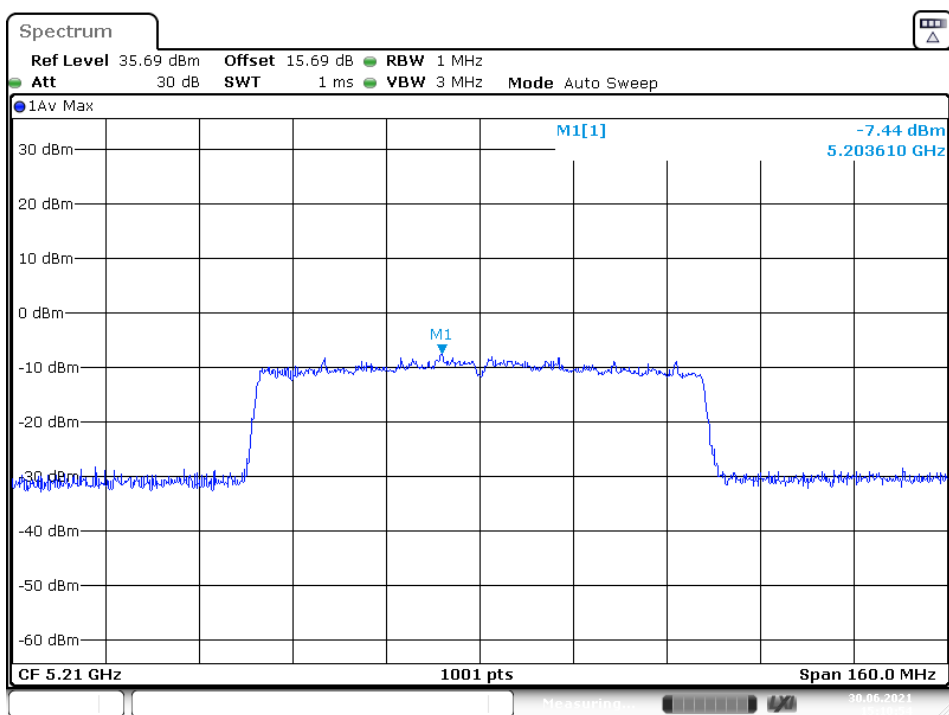
Date: 30.JUN.2021 15:09:47

802.11ac40 mode, Power Spectral Density, 5230 MHz



Date: 30.JUN.2021 15:08:58

802.11ac40 mode, Power Spectral Density, 5210 MHz



Date: 30.JUN.2021 15:10:54

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