

FCC PART 15.407

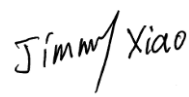
TEST REPORT

For

Crestron Electronics Inc

15 Volvo Drive, Rockleigh, New Jersey 07647, USA

FCC ID: EROUC-2

Report Type: Original Report	Product Type: Tabletop Conference System
Report Number: RSZ200120001-00D	
Report Date: 2020-05-06	
Reviewed By: RF Engineer Jimmy Xiao 	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Tabletop Conference System
Model	M201928001
Frequency Range	5G Wi-Fi: 5150-5250MHz; 5250-5350MHz; 5470-5725MHz; 5725-5850MHz
Maximum Conducted Average Output Power	5150-5250 MHz: 14.33dBm (802.11a), 14.06dBm(802.11n20), 13.14 dBm(802.11n40) 14.22dBm (802.11ac20), 13.76dBm(802.11 ac40), 12.53dBm(802.11 ac80) 5250-5350MHz: 12.60dBm (802.11a), 12.58dBm(802.11n20), 12.17 dBm(802.11n40) 12.56dBm (802.11ac20), 12.15dBm(802.11 ac40), 11.45dBm(802.11 ac80) 5470-5725MHz: 14.26dBm (802.11a), 14.29dBm(802.11n20), 14.59 dBm(802.11n40) 14.16dBm (802.11ac20), 14.81dBm(802.11 ac40), 13.21dBm(802.11 ac80) 5725-5850 MHz: 13.43dBm (802.11a), 13.21dBm(802.11n20), 12.29dBm(802.11n40) 13.24dBm (802.11ac20), 13.07dBm(802.11 ac40), 12.06dBm(802.11 ac80)
Modulation Technique	OFDM
Antenna Specification	5dBi
Voltage Range	DC 48V from POE
Date of Test	2020-01-20 to 2020-05-06
Sample serial number	RSZ200120001-RF-S1(Assigned by BACL, Shenzhen)
Received date	2020-01-19
Sample/EUT Status	Good condition
POE information	Model: G0720-480-050 Input: 100-240V~ 50/60Hz 0.75A Output: DC 48.0V, 0.5A 24W

Objective

This type approval report is prepared on behalf of *Crestron Electronics Inc* 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.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS/DSS and FCC Part 15B JAB submissions with FCC ID: EROUC-2.

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 KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). 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 with Power meter		±0.73dB
RF conducted test with spectrum		±1.6dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
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 Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The EUT can operate in 802.11a/n20/n40/ac20/ac40/ac80 modes.

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

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

For 5250-5350MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
54	5270	62	5310
56	5280	64	5320
58	5290	/	/

For 5470-5725MHz Band, 18 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
102	5510	126	5630
104	5520	128	5640
106	5530	132	5660
108	5540	134	5670
110	5550	136	5680
112	5560	140	5700
116	5580	/	/
118	5590	/	/
120	5600	/	/
122	5610	/	/

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

EUT Exercise Software

SecureCRT was used. Test frequencies and power level were configured as below:

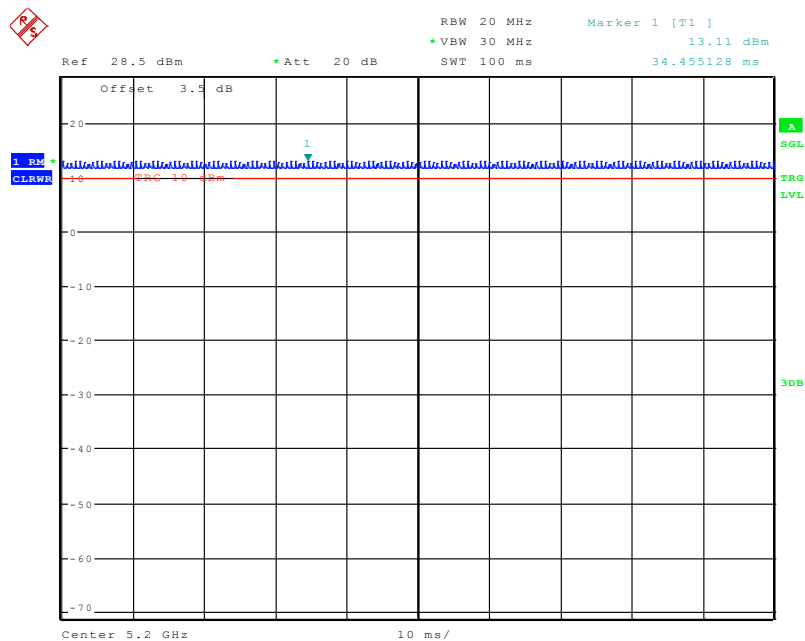
U-NII	Mode	Channel Number	Frequency (MHz)	Rate (Mbps)	Power Level
5150 – 5250MHz	802.11 a	CH36	5180	54	15
		CH40	5200	54	15
		CH48	5240	54	15
	802.11 n20	CH36	5180	MCS7	15
		CH40	5200	MCS7	15
		CH48	5240	MCS7	15
	802.11 n40	CH38	5190	MCS7	14
		CH46	5230	MCS7	15
	802.11 ac20	CH36	5180	MCS7	15
		CH40	5200	MCS7	15
		CH48	5240	MCS7	15
	802.11 ac40	CH38	5190	MCS8	15
		CH46	5230	MCS8	15
	802.11 ac80	CH42	5210	MCS9	15
5250 – 5350MHz	802.11 a	CH52	5260	54	15
		CH56	5280	54	15
		CH64	5320	54	15
	802.11 n20	CH52	5260	MCS7	15
		CH56	5280	MCS7	15
		CH64	5320	MCS7	15
	802.11 n40	CH54	5270	MCS7	14
		CH62	5310	MCS7	15
	802.11 ac20	CH52	5260	MCS7	15
		CH56	5280	MCS7	15
		CH64	5320	MCS7	15
	802.11 ac40	CH54	5270	MCS8	15
		CH62	5310	MCS8	15
	802.11 ac80	CH58	5290	MCS9	15

U-NII	Mode	Channel Number	Frequency (MHz)	Rate (Mbps)	Power Level
5470 – 5725MHz	802.11 a	CH100	5500	54	15
		CH116	5580	54	15
		CH140	5700	54	15
	802.11 n20	CH100	5500	MCS7	15
		CH116	5580	MCS7	15
		CH140	5700	MCS7	15
	802.11 n40	CH102	5510	MCS7	14
		CH110	5550	MCS7	15
		CH134	5670	MCS8	15
	802.11 ac20	CH100	5500	MCS7	15
		CH116	5580	MCS7	15
		CH140	5700	MCS7	15
	802.11 ac40	CH102	5510	MCS8	15
		CH110	5550	MCS8	15
		CH134	5670	MCS8	15
	802.11 ac80	CH106	5530	MCS9	15
		CH122	5610	MCS9	15
5725 – 5850MHz	802.11 a	CH149	5745	54	15
		CH157	5785	54	15
		CH165	5825	54	15
	802.11 n20	CH149	5745	MCS7	15
		CH157	5785	MCS7	15
		CH165	5825	MCS7	15
	802.11 n40	CH151	5755	MCS7	14
		CH159	5795	MCS7	15
	802.11 ac20	CH149	5745	MCS7	15
		CH157	5785	MCS7	15
		CH165	5825	MCS7	15
	802.11 ac40	CH151	5755	MCS8	15
		CH159	5795	MCS8	15
	802.11 ac80	CH155	5775	MCS9	15

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

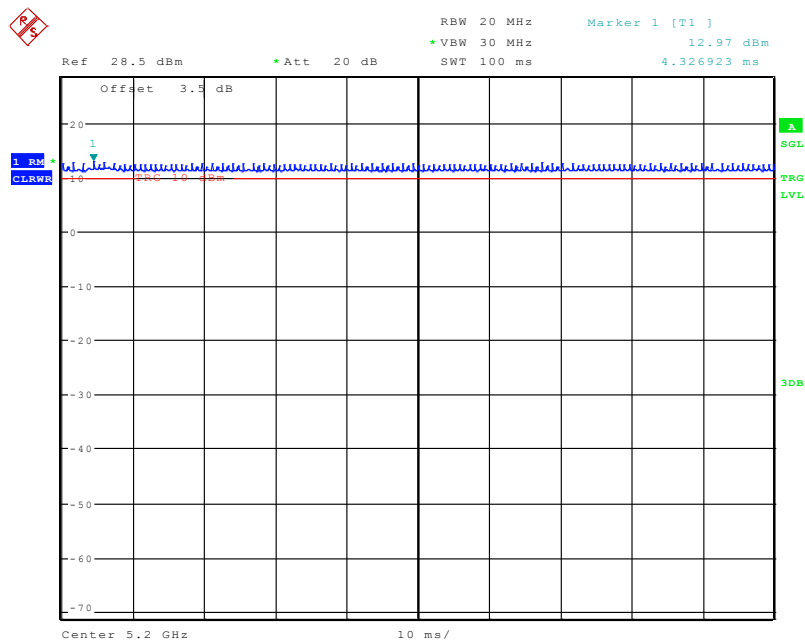
Duty cycle

802.11a mode



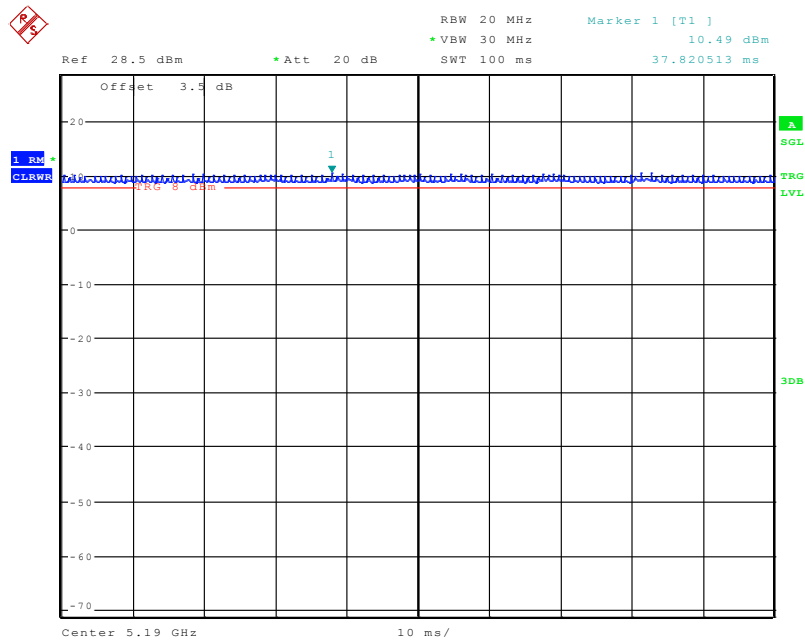
Date: 26.FEB.2020 15:04:03

802.11n20 mode



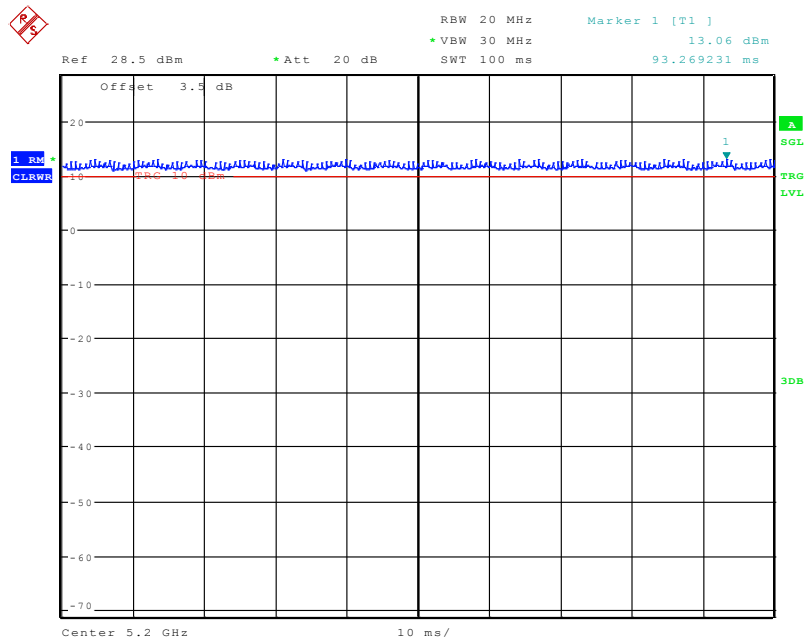
Date: 26.FEB.2020 15:03:33

802.11n40 mode



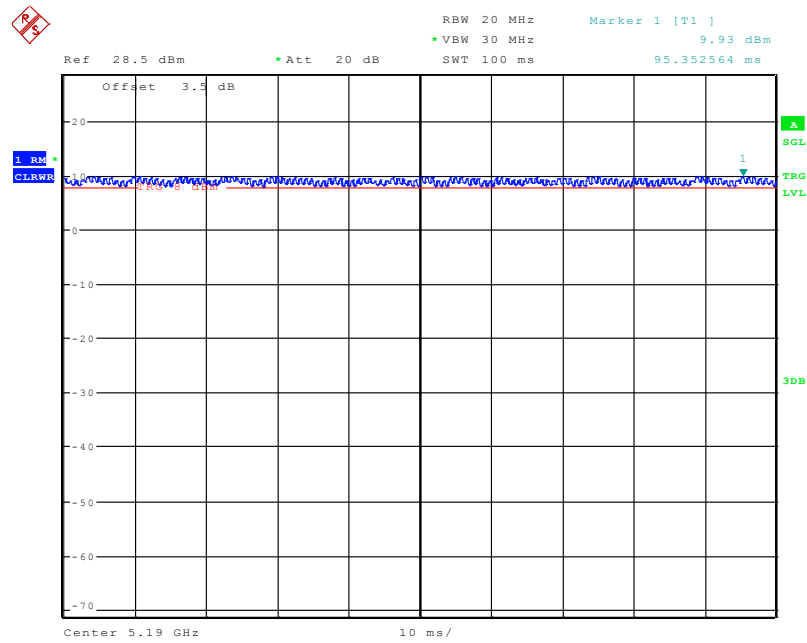
Date: 26.FEB.2020 15:04:31

802.11ac20 Mode



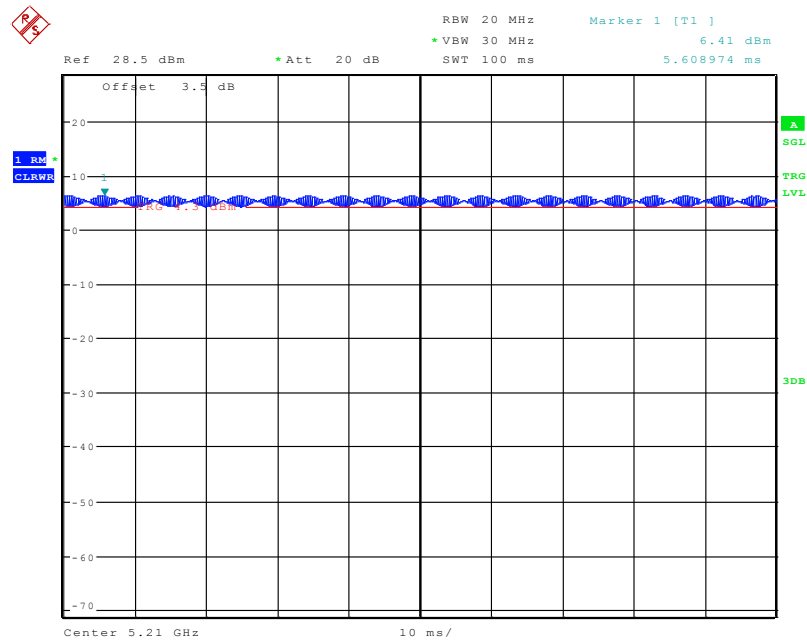
Date: 26.FEB.2020 15:02:57

802.11ac40 Mode



Date: 26.FEB.2020 15:04:56

802.11ac80 Mode



Date: 26.FEB.2020 15:05:37

Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	100	-	-	10Hz	-
802.11n20	100	-	-	10Hz	-
802.11n40	100	-	-	10Hz	-
802.11ac20	100	-	-	10Hz	-
802.11ac40	100	-	-	10Hz	-
802.11ac80	100	-	-	10Hz	-

Equipment Modifications

No modification was made to the EUT tested.

External I/O Cable

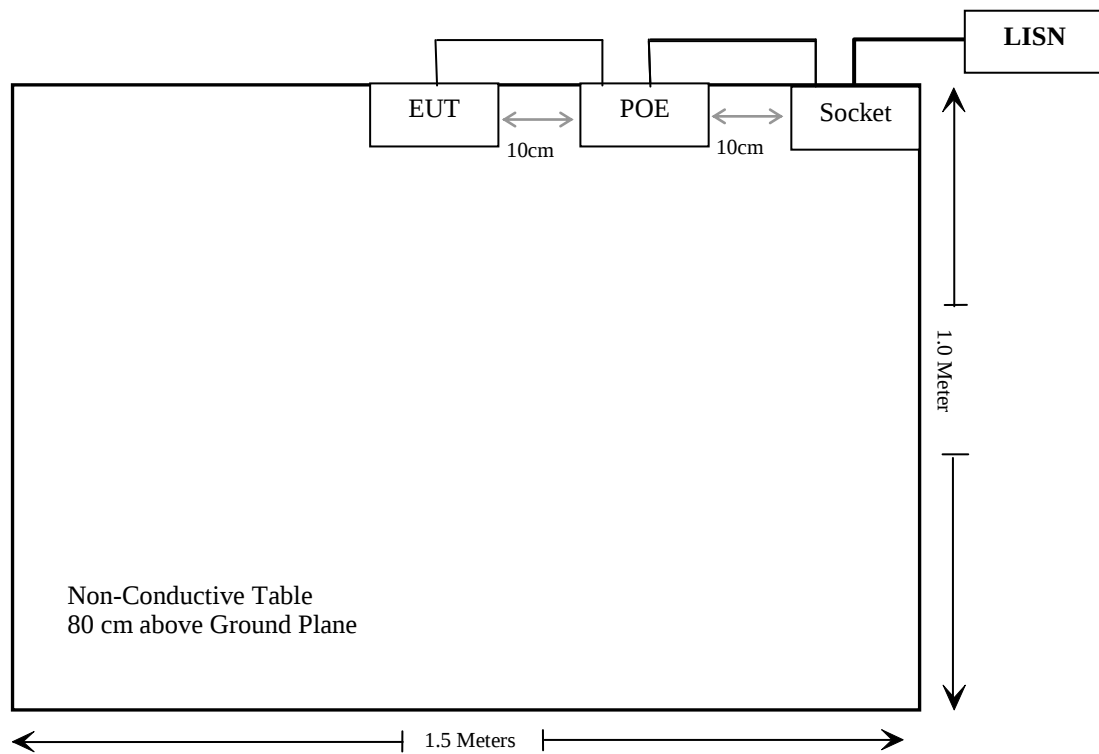
Manufacturer	Description	Model	Serial Number
BULL	Socket	GN-212	A37209315081183

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielded Un-detachable AC Cable	1.2	LISN	Socket
Un-shielded detachable AC cable	1.0	Socket	POE
Un-shielded detachable RJ45 Cable	3.1	POE	EUT

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §2.1091	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 & §15.407(b) (1), (2), (3), (4), (6) (7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (1), (5),(e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliance
§15.407(a)(1),(2), (3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1), (2), (3)	Power Spectral Density	Compliance
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Compliance*

Not Applicable: the EUT has no TPC function which was declared by the applicant.

Compliance*: Please refer to the DFS report: RSZ200120002-00A.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2019/7/9	2020/7/8
Rohde & Schwarz	LISN	ENV216	101613	2020/1/22	2021/1/21
Rohde & Schwarz	Transient Limitor	ESH3Z2	DE25985	2019/11/29	2020/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
Sonoma instrument	Pre-amplifier	310 N	186238	2019/4/20	2020/4/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
Unknown	Cable 2	RF Cable 2	F-03-EM197	2019/11/29	2020/11/28
Unknown	Cable	Chamber Cable 1	F-03-EM236	2019/11/29	2020/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2019/7/22	2020/7/21
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
Ducommun technologies	RF Cable	RG-214	1	2019-11-12	2020-11-12
Ducommun technologies	RF Cable	RG-214	2	2019-11-12	2020-11-12
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2019/4/20	2020/4/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2017/12/6	2020/12/5
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-03	2017/12/6	2020/12/5
RF Conducted Test					
Agilent	USB Wideband Power Sensor	U2021XA	MY54250003	2019/7/10	2020/7/9
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2019/3/2	2020/3/1
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2020/3/1	2021/3/1
WEINSCHL	3dB Attenuator	Unknown	Unknown	2019/11/29	2020/11/28
Unknown	RF Cable	Unknown	2301 276	2019/11/29	2020/11/28

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 1.1307 (b)(1), 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/cm²)

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)

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	5.0	3.16	15.0	31.62	20	0.0199	1
5250-5350	5.0	3.16	13.0	19.95	20	0.0125	1
5470-5725	5.0	3.16	15.0	31.62	20	0.0199	1
5725-5850	5.0	3.16	14.0	25.12	20	0.0158	1

Note: The 2.4G Wi-Fi can't transmit with the 5G Wi-Fi at the same time.

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 one internal antenna arrangement for 5G Wi-Fi, which was permanently attached and the antenna gain is 5.0dBi, fulfill the requirement of this section. Please refer to the EUT photos.

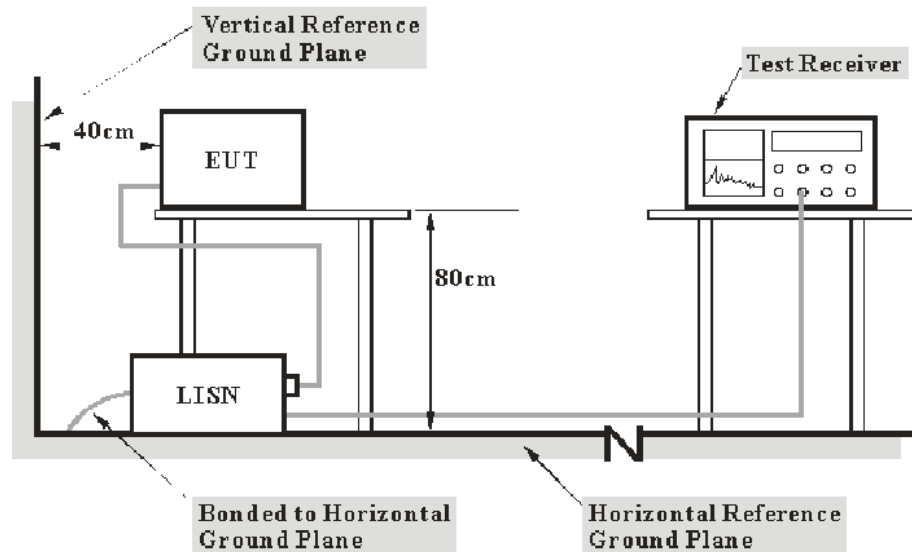
Result: Compliance.

FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (6)

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 Results Summary

According to the EUT complied with the FCC Part 15.207.

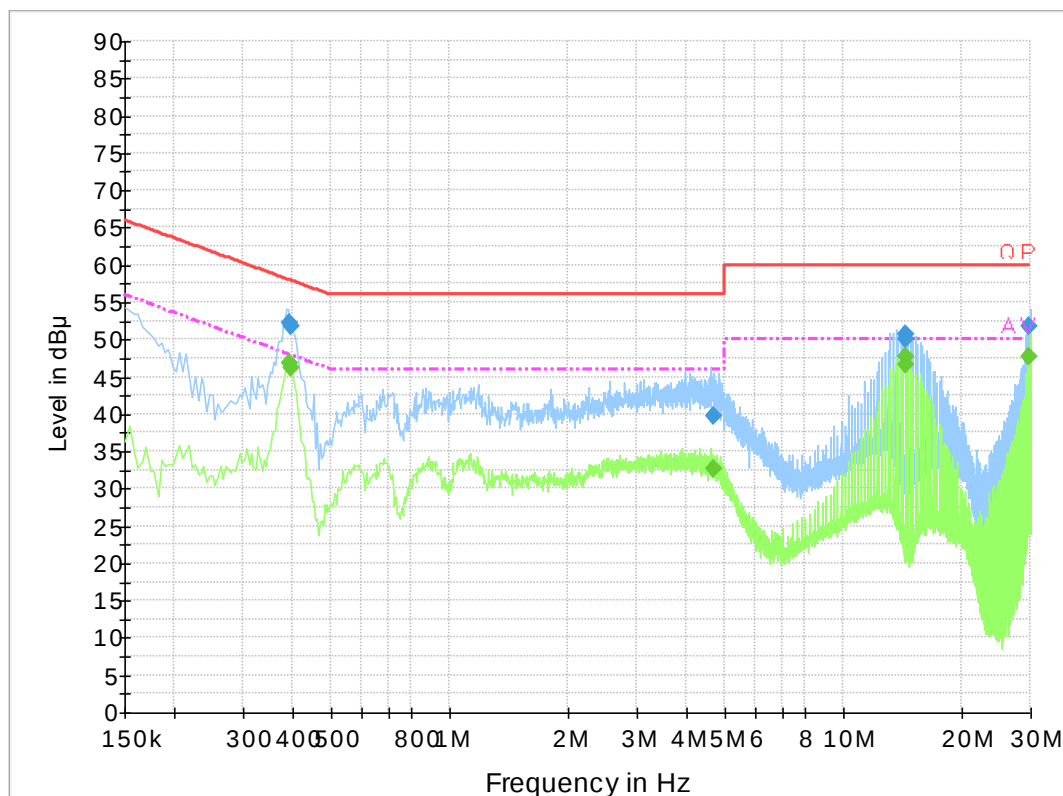
Test Data

Environmental Conditions

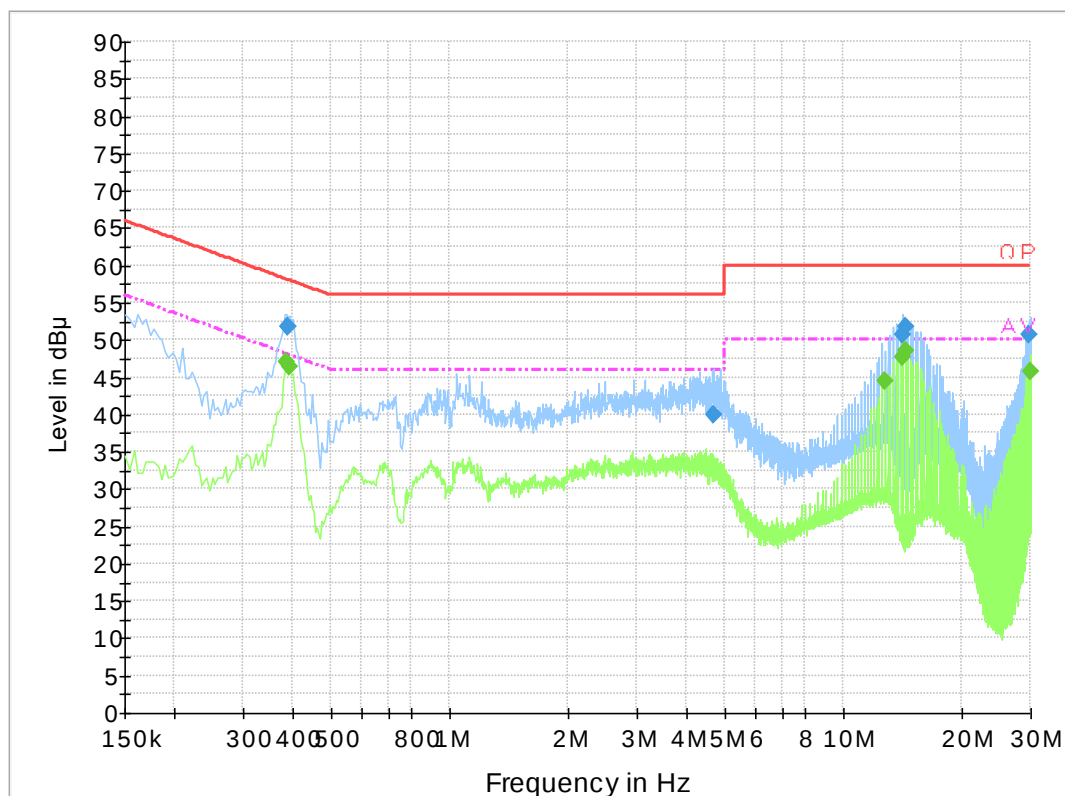
Temperature:	25 °C
Relative Humidity:	55%
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2020-03-02.

EUT operation mode: Transmitting (worst case is 802.11a mode 5180 MHz)

AC 120V/60 Hz, Line:

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.391790	52.2	19.9	58.0	5.8	QP
0.395850	51.8	19.9	57.9	6.1	QP
4.700490	39.7	19.9	56.0	16.3	QP
14.433490	50.6	20.0	60.0	9.4	QP
14.436550	50.0	20.0	60.0	10.0	QP
29.693470	51.7	20.2	60.0	8.3	QP
0.391790	46.8	19.9	48.0	1.2	Ave.
0.395850	46.2	19.9	47.9	1.7	Ave.
4.700490	32.6	19.9	46.0	13.4	Ave.
14.433490	47.7	20.0	50.0	2.3	Ave.
14.436550	46.5	20.0	50.0	3.5	Ave.
29.693470	47.7	20.2	50.0	2.3	Ave.

AC120V, 60 Hz, Neutral:

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.388090	51.9	19.8	58.1	6.2	QP
0.388210	51.9	19.8	58.1	6.2	QP
4.691770	40.0	19.9	56.0	16.0	QP
14.229490	50.7	19.9	60.0	9.3	QP
14.436550	51.7	19.9	60.0	8.3	QP
29.697470	50.7	20.1	60.0	9.3	QP
0.386000	47.1	19.8	48.1	1.0	Ave.
0.394000	46.5	19.8	48.0	1.5	Ave.
12.786000	44.5	19.9	50.0	5.5	Ave.
14.230000	47.8	19.9	50.0	2.2	Ave.
14.434000	48.6	19.9	50.0	1.4	Ave.
29.902000	45.7	20.1	50.0	4.3	Ave.

Note:

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

§15.205 & §15.209 & §15.407(B) (1), (2), (3), (4),(6),(7) – UNDESIRABLE EMISSION

Applicable Standard

FCC §15.407 (b) (1), (2), (3), (4), (6), (7); §15.209; §15.205;

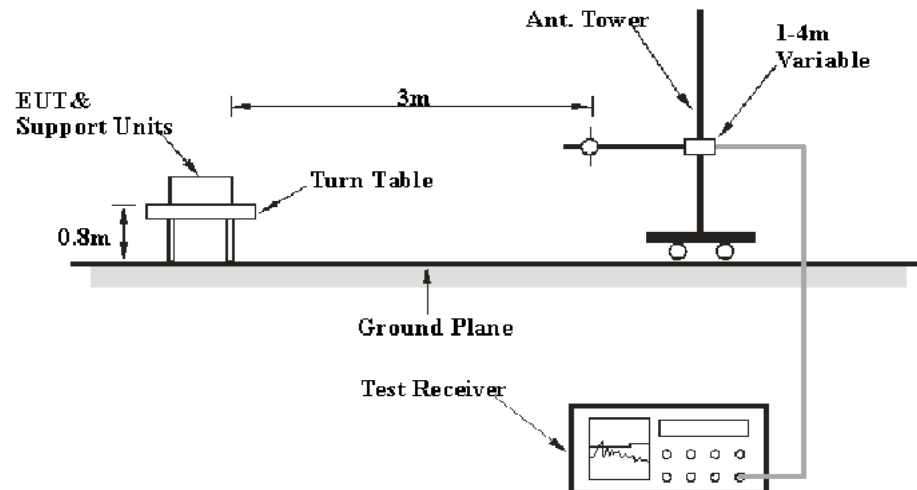
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

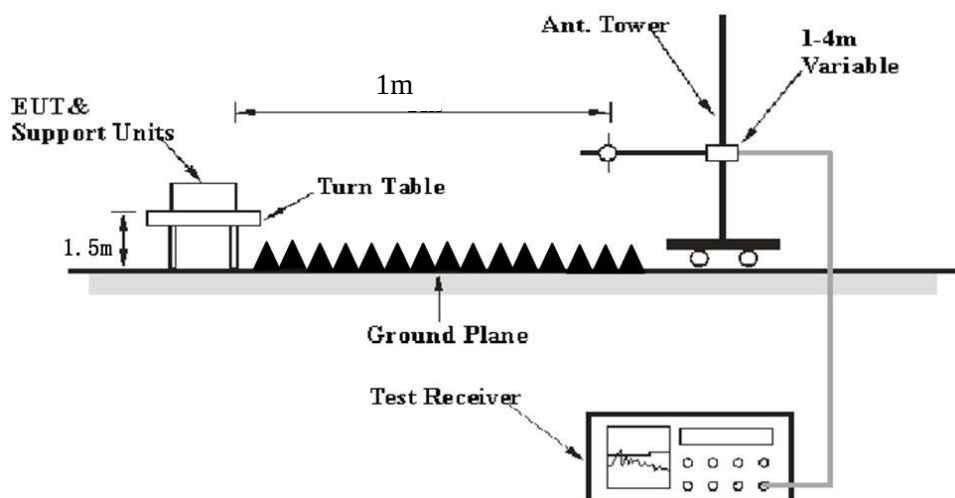
- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 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.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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**

During the radiated emission test, the adapter was connected to the AC floor outlet.

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

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

Corrected Amplitude & Margin Calculation

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

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

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart E, section 15.205, 15.209 and 15.407 rules.

Test Data

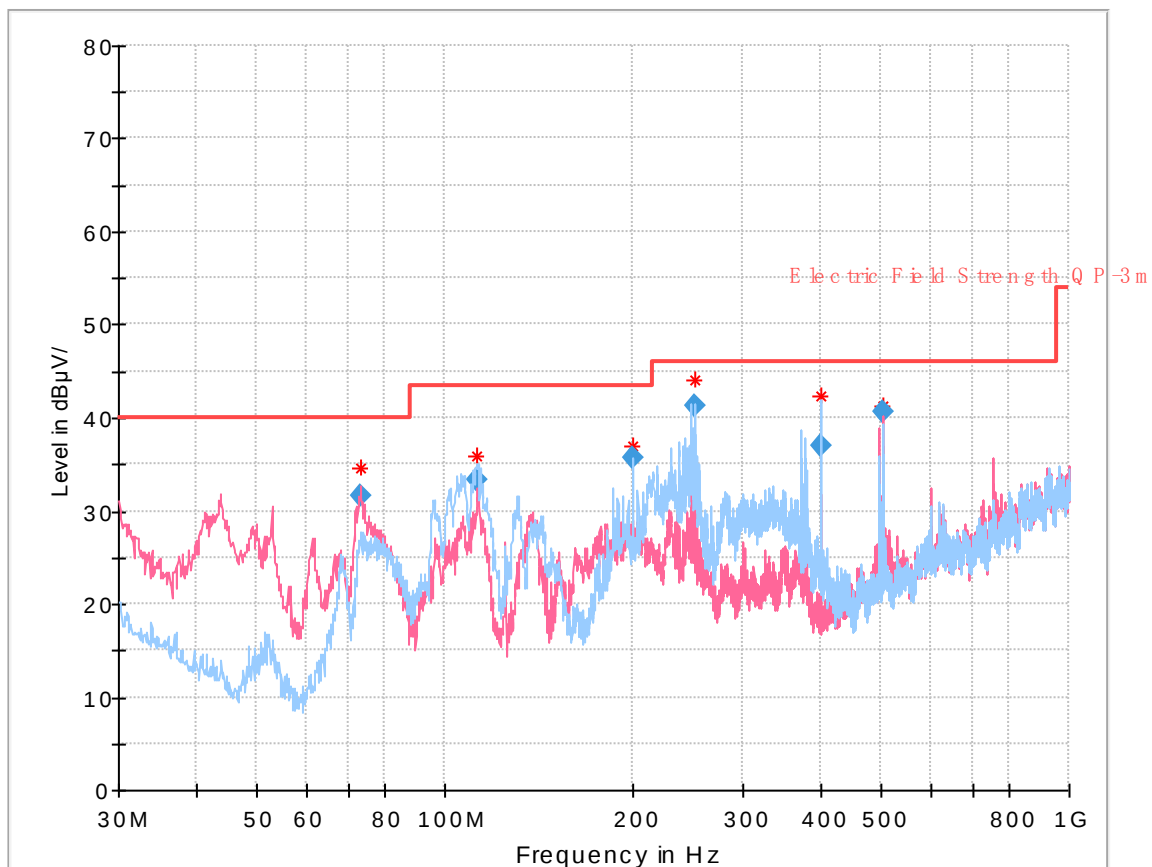
Environmental Conditions

Temperature:	21°C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Holland Yang on 2020-03-16 for below 1G and Leo Huang on 2020-01-20.

EUT operation mode: Transmitting

30 MHz – 1 GHz: (worst case is 802.11a mode 5180 MHz)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
73.393125	31.54	101.0	V	191.0	-20.4	40.00	8.46
112.875625	33.26	265.0	H	15.0	-15.1	43.50	10.24
199.992375	35.65	160.0	H	319.0	-13.8	43.50	7.85
251.893750	41.38	101.0	H	255.0	-14.0	46.00	4.62
399.986875	36.92	188.0	H	292.0	-10.3	46.00	9.08
503.783375	40.75	114.0	V	193.0	-5.1	46.00	5.25

1 ~ 40 GHz:

Note: The test distance is 1m, so the correct factor from 3m to 1m is $20\log(3/1)=9.5\text{dB}$ which was added into the final limit.

5150-5250 MHz:

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									
5149.89	40.21	PK	130	1.5	H	38.36	78.57	83.5	4.93
5149.89	20.99	Ave.	130	1.5	H	38.36	59.35	63.5	4.15
5376.51	30.65	PK	244	1.6	H	39.09	69.74	83.5	13.76
5376.51	16.88	Ave.	244	1.6	H	39.09	55.97	63.5	7.53
10360.00	42.07	PK	5	1.6	H	17.42	59.49	77.7	18.21
5200 MHz									
10400.00	41.08	PK	309	1.7	H	17.52	58.60	77.7	19.10
5240 MHz									
5149.32	30.32	PK	309	1.2	H	38.36	68.68	83.5	14.82
5149.32	16.57	Ave.	309	1.2	H	38.36	54.93	63.5	8.57
5369.41	30.26	PK	20	1.7	H	39.09	69.35	83.5	14.15
5369.41	16.43	Ave.	20	1.7	H	39.09	55.52	63.5	7.98
10480.00	41.08	PK	85	2.4	H	17.25	58.33	77.7	19.37
802.11n20									
5180 MHz									
5148.59	42.64	PK	146	1.7	H	38.36	81.00	83.5	2.50
5148.59	20.59	Ave.	146	1.7	H	38.36	58.95	63.5	4.55
5369.37	30.23	PK	294	1.8	H	39.09	69.32	83.5	14.18
5369.37	16.71	Ave.	294	1.8	H	39.09	55.80	63.5	7.70
10360.00	42.01	PK	49	1.4	H	17.42	59.43	77.7	18.27
5200 MHz									
10400.00	41.76	PK	162	1.1	H	17.52	59.28	77.7	18.42
5240 MHz									
5148.96	30.26	PK	111	2.3	H	38.36	68.62	83.5	14.88
5148.96	16.43	Ave.	111	2.3	H	38.36	54.79	63.5	8.71
5379.83	30.33	PK	311	1.9	H	39.09	69.42	83.5	14.08
5379.83	16.54	Ave.	311	1.9	H	39.09	55.63	63.5	7.87
10480.00	41.72	PK	158	2.3	H	17.25	58.97	77.7	18.73

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)
802.11n40									
5190 MHz									
5145.77	43.43	PK	309	1.1	H	38.36	81.79	83.5	1.71
5145.77	22.34	Ave.	309	1.1	H	38.36	60.70	63.5	2.80
5362.87	30.46	PK	51	1.9	H	39.09	69.55	83.5	13.95
5362.87	16.55	Ave.	51	1.9	H	39.09	55.64	63.5	7.86
10380.00	41.90	PK	267	2.4	H	17.42	59.32	77.7	18.38
5230 MHz									
5149.42	30.26	PK	214	1.9	H	38.36	68.62	83.5	14.88
5149.42	16.37	Ave.	214	1.9	H	38.36	54.73	63.5	8.77
5383.66	30.22	PK	196	1.8	H	39.09	69.31	83.5	14.19
5383.66	16.39	Ave.	196	1.8	H	39.09	55.48	63.5	8.02
10460.00	41.43	PK	148	2.0	H	17.15	58.58	77.7	19.12
802.11ac20									
5180 MHz									
5149.63	40.36	PK	319	1.5	H	38.36	78.72	83.5	4.78
5149.63	20.13	Ave.	319	1.5	H	38.36	58.49	63.5	5.01
5388.26	30.26	PK	81	1.6	H	39.19	69.45	83.5	14.05
5388.26	16.35	Ave.	81	1.6	H	39.19	55.54	63.5	7.96
10360.00	41.69	PK	133	1.4	H	17.42	59.11	77.7	18.59
5200 MHz									
10400.00	41.83	PK	69	1.2	H	17.52	59.35	77.7	18.35
5240 MHz									
5149.33	30.26	PK	268	1.7	H	38.36	68.62	83.5	14.88
5149.33	16.38	Ave.	268	1.7	H	38.36	54.74	63.5	8.76
5376.85	30.41	PK	124	1.7	H	39.09	69.50	83.5	14.00
5376.85	16.55	Ave.	124	1.7	H	39.09	55.64	63.5	7.86
10480.00	41.68	PK	302	1.9	H	17.25	58.93	77.7	18.77
802.11ac40									
5190 MHz									
5145.98	44.13	PK	129	1.9	H	38.36	82.49	83.5	1.01
5145.98	22.79	Ave.	129	1.9	H	38.36	61.15	63.5	2.35
5369.43	30.26	PK	185	2.2	H	39.09	69.35	83.5	14.15
5369.43	16.37	Ave.	185	2.2	H	39.09	55.46	63.5	8.04
10380.00	41.97	PK	16	1.3	H	17.42	59.39	77.7	18.31
5230 MHz									
5145.33	34.93	PK	289	2.0	H	38.36	73.29	83.5	10.21
5145.33	16.88	Ave.	289	2.0	H	38.36	55.24	63.5	8.26
5375.26	30.67	PK	281	1.9	H	39.09	69.76	83.5	13.74
5375.26	16.55	Ave.	281	1.9	H	39.09	55.64	63.5	7.86
10460.00	41.63	PK	5	1.1	H	17.15	58.78	77.7	18.92

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									
5149.02	42.77	PK	9	1.8	H	38.36	81.13	83.5	2.37
5149.02	22.92	Ave.	9	1.8	H	38.36	61.28	63.5	2.22
5364.55	30.46	PK	198	1.1	H	39.09	69.55	83.5	13.95
5364.55	16.32	Ave.	198	1.1	H	39.09	55.41	63.5	8.09
10420.00	40.74	PK	146	2.2	H	17.52	58.26	77.7	19.44

5250-5350 MH:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5260 MHz									
5149.63	30.36	PK	203	1.2	H	38.36	68.72	83.5	14.78
5149.63	16.35	Ave.	203	1.2	H	38.36	54.71	63.5	8.79
5365.27	30.29	PK	59	1.2	H	39.09	69.38	83.5	14.12
5365.27	16.33	Ave.	59	1.2	H	39.09	55.42	63.5	8.08
10520.00	41.98	PK	299	1.4	H	17.25	59.23	77.7	18.47
5280 MHz									
10560.00	41.59	PK	38	1.8	H	17.91	59.50	77.7	18.20
5320 MHz									
5149.87	30.26	PK	62	1.8	H	38.36	68.62	83.5	14.88
5149.87	16.52	Ave.	62	1.8	H	38.36	54.88	63.5	8.62
5352.95	35.53	PK	263	2.3	H	39.09	74.62	83.5	8.88
5352.95	18.97	Ave.	263	2.3	H	39.09	58.06	63.5	5.44
10640.00	41.94	PK	309	2.2	H	18.01	59.95	83.5	23.55
10640.00	26.78	Ave.	309	2.2	H	18.01	44.79	63.5	18.71
802.11n20									
5260 MHz									
5148.79	30.58	PK	52	2.3	H	38.36	68.94	83.5	14.56
5148.79	16.71	Ave.	52	2.3	H	38.36	55.07	63.5	8.43
5350.88	30.29	PK	23	1.1	H	39.09	69.38	83.5	14.12
5350.88	16.34	Ave.	23	1.1	H	39.09	55.43	63.5	8.07
10520.00	41.41	PK	349	2.3	H	17.25	58.66	77.7	19.04
5280 MHz									
10560.00	41.37	PK	353	2.4	H	17.91	59.28	77.7	18.42
5320 MHz									
5149.68	30.53	PK	316	1.5	H	38.36	68.89	83.5	14.61
5149.68	16.48	Ave.	316	1.5	H	38.36	54.84	63.5	8.66
5350.24	35.67	PK	146	1.4	H	39.09	74.76	83.5	8.74
5350.24	18.57	Ave.	146	1.4	H	39.09	57.66	63.5	5.84
10640.00	41.57	PK	357	1.0	H	18.01	59.58	83.5	23.92
10640.00	26.26	Ave.	357	1.0	H	18.01	44.27	63.5	19.23

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5270MHz									
5148.79	30.26	PK	171	1.6	H	38.36	68.62	83.5	14.88
5148.79	16.56	Ave.	171	1.6	H	38.36	54.92	63.5	8.58
5357.82	30.57	PK	27	1.1	H	39.09	69.66	83.5	13.84
5357.82	16.62	Ave.	27	1.1	H	39.09	55.71	63.5	7.79
10540.00	41.59	PK	44	1.2	H	17.25	58.84	77.7	18.86
5310MHz									
5149.82	30.73	PK	343	1.7	H	38.36	69.09	83.5	14.41
5149.82	16.52	Ave.	343	1.7	H	38.36	54.88	63.5	8.62
5350.40	42.80	PK	239	1.3	H	39.09	81.89	83.5	1.61
5350.40	21.47	Ave.	239	1.3	H	39.09	60.56	63.5	2.94
10620.00	41.85	PK	19	2.2	H	18.01	59.86	83.5	23.64
10620.00	26.38	Ave.	19	2.2	H	18.01	44.39	63.5	19.11
802.11ac20									
5260 MHz									
5148.99	30.64	PK	11	1.4	H	38.36	69.00	83.5	14.50
5148.99	16.71	Ave.	11	1.4	H	38.36	55.07	63.5	8.43
5356.89	30.62	PK	5	2.1	H	39.09	69.71	83.5	13.79
5356.89	16.53	Ave.	5	2.1	H	39.09	55.62	63.5	7.88
10520.00	41.88	PK	32	1.9	H	17.25	59.13	77.7	18.57
5280 MHz									
10560.00	41.77	PK	179	2.4	H	17.91	59.68	77.7	18.02
5320 MHz									
5149.37	30.75	PK	165	1.2	H	38.36	69.11	83.5	14.39
5149.37	16.29	Ave.	165	1.2	H	38.36	54.65	63.5	8.85
5350.85	35.26	PK	198	1.8	H	39.09	74.35	83.5	9.15
5350.85	18.57	Ave.	198	1.8	H	39.09	57.66	63.5	5.84
10640.00	41.83	PK	336	1.9	H	18.01	59.84	83.5	23.66
10640.00	26.52	Ave.	336	1.9	H	18.01	44.53	63.5	18.97

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11ac40									
5270 MHz									
5149.86	30.29	PK	278	1.1	H	38.36	68.65	83.5	14.85
5149.86	16.38	Ave.	278	1.1	H	38.36	54.74	63.5	8.76
5352.65	30.47	PK	279	1.2	H	39.09	69.56	83.5	13.94
5352.65	16.52	Ave.	279	1.2	H	39.09	55.61	63.5	7.89
10540.00	41.63	PK	129	2.4	H	17.25	58.88	77.7	18.82
5310 MHz									
5148.96	30.54	PK	139	2.3	H	38.36	68.90	83.5	14.60
5148.96	16.65	Ave.	139	2.3	H	38.36	55.01	63.5	8.49
5350.08	42.14	PK	184	1.9	H	39.09	81.23	83.5	2.27
5350.08	20.61	Ave.	184	1.9	H	39.09	59.70	63.5	3.80
10620.00	41.55	PK	214	1.7	H	18.01	59.56	83.5	23.94
10620.00	26.68	Ave.	214	1.7	H	18.01	44.69	63.5	18.81
802.11ac80									
5290MHz									
5148.86	30.58	PK	110	1.1	H	38.36	68.94	83.5	14.56
5148.86	16.59	Ave.	110	1.1	H	38.36	54.95	63.5	8.55
5352.79	41.72	PK	156	2.5	H	39.09	80.81	83.5	2.69
5352.79	21.78	Ave.	156	2.5	H	39.09	60.87	63.5	2.63
10580.00	41.63	PK	82	1.6	H	17.91	59.54	77.7	18.16

5470-5725MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5500 MHz									
5470.00	37.18	PK	334	2.1	H	39.37	76.55	77.7	1.15
5726.39	30.39	PK	148	2.4	H	39.49	69.88	77.7	7.82
11000.00	41.62	PK	201	1.7	H	17.66	59.28	83.5	24.22
11000.00	26.32	Ave.	201	1.7	H	17.66	43.98	63.5	19.52
5580MHz									
11160.00	41.84	PK	263	1.9	H	17.39	59.23	83.5	24.27
11160.00	26.73	Ave.	263	1.9	H	17.39	44.12	63.5	19.38
5700 MHz									
5468.59	30.48	PK	51	1.2	H	39.37	69.85	77.7	7.85
5728.84	36.15	PK	162	2.0	H	39.49	75.64	77.7	2.06
11400.00	41.58	PK	81	1.5	H	17.73	59.31	83.5	24.19
11400.00	26.67	Ave.	81	1.5	H	17.73	44.40	63.5	19.10
802.11n20									
5500 MHz									
5469.63	35.26	PK	190	2.1	H	39.37	74.63	77.7	3.07
5726.43	30.73	PK	250	1.3	H	39.49	70.22	77.7	7.48
11000.00	41.62	PK	75	2.1	H	17.66	59.28	83.5	24.22
11000.00	26.33	Ave.	75	2.1	H	17.66	43.99	63.5	19.51
5580 MHz									
11160.00	41.52	PK	118	2.0	H	17.39	58.91	83.5	24.59
11160.00	27.15	Ave.	118	2.0	H	17.39	44.54	63.5	18.96
5700MHz									
5469.83	30.54	PK	285	2.4	H	39.37	69.91	77.7	7.79
5725.59	34.27	PK	163	1.6	H	39.49	73.76	77.7	3.94
11400.00	41.39	PK	278	1.9	H	17.73	59.12	83.5	24.38
11400.00	26.84	Ave.	278	1.9	H	17.73	44.57	63.5	18.93

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5510 MHz									
5468.93	33.49	PK	218	2.1	H	39.37	72.86	77.7	4.84
5726.13	30.48	PK	253	2.3	H	39.49	69.97	77.7	7.73
11400.00	41.39	PK	278	1.9	H	17.73	59.12	83.5	24.38
11400.00	26.84	Ave.	278	1.9	H	17.73	44.57	63.5	18.93
5550 MHz									
11100.00	41.54	PK	354	2.0	H	16.72	58.26	83.5	25.24
11100.00	26.37	Ave.	354	2.0	H	16.72	43.09	63.5	20.41
5670 MHz									
5469.37	30.16	PK	278	1.9	H	39.37	69.53	77.7	8.17
5725.26	35.13	PK	297	1.6	H	39.49	74.62	77.7	3.08
11340.00	41.63	PK	161	2.0	H	17.43	59.06	83.5	24.44
11340.00	26.46	Ave.	161	2.0	H	17.43	43.89	63.5	19.61
802.11ac20									
5745 MHz									
5469.37	35.26	PK	105	1.2	H	39.37	74.63	77.7	3.07
5728.43	30.53	PK	287	1.7	H	39.49	70.02	77.7	7.68
11340.00	41.63	PK	161	2.0	H	17.43	59.06	83.5	24.44
11340.00	26.46	Ave.	161	2.0	H	17.43	43.89	63.5	19.61
5580 MHz									
11160.00	41.52	PK	63	2.5	H	17.39	58.91	83.5	24.59
11160.00	26.33	Ave.	63	2.5	H	17.39	43.72	63.5	19.78
5700 MHz									
5468.49	30.26	PK	277	2.0	H	39.37	69.63	77.7	8.07
5725.33	34.69	PK	240	1.6	H	39.49	74.18	77.7	3.52
11400.00	41.61	PK	215	2.3	H	17.73	59.34	83.5	24.16
11400.00	26.42	Ave.	215	2.3	H	17.73	44.15	63.5	19.35

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11ac40									
5510 MHz									
5469.38	34.88	PK	139	2.4	H	39.37	74.25	77.7	3.45
5726.53	30.26	PK	77	2.0	H	39.49	69.75	77.7	7.95
11020.00	41.49	PK	100	1.2	H	17.66	59.15	83.5	24.35
11020.00	26.48	Ave.	100	1.2	H	17.66	44.14	63.5	19.36
5550 MHz									
11100.00	41.62	PK	234	2.2	H	16.72	58.34	83.5	25.16
11100.00	26.63	Ave.	234	2.2	H	16.72	43.35	63.5	20.15
5670 MHz									
5469.12	30.47	PK	282	2.5	H	39.37	69.84	77.7	7.86
5725.69	34.18	PK	39	2.0	H	39.49	73.67	77.7	4.03
11340.00	41.29	PK	139	1.9	H	17.43	58.72	83.5	24.78
11340.00	26.53	Ave.	139	1.9	H	17.43	43.96	63.5	19.54
802.11ac80									
5530MHz									
5468.69	32.16	PK	271	2.5	H	39.37	71.53	77.7	6.17
5725.43	31.43	PK	296	2.0	H	39.49	70.92	77.7	6.78
11060.00	41.24	PK	56	2.4	H	16.72	57.96	83.5	25.54
11060.00	26.15	Ave.	56	2.4	H	16.72	42.87	63.5	20.63
5610 MHz									
5469.37	32.43	PK	50	2.0	H	39.37	71.80	77.7	5.90
5725.38	32.18	PK	87	1.4	H	39.49	71.67	77.7	6.03
11220.00	41.56	PK	48	2.4	H	17.39	58.95	83.5	24.55
11220.00	26.38	Ave.	48	2.4	H	17.39	43.77	63.5	19.73

5725-5850 MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5745 MHz									
5724.57	37.46	PK	238	2.5	H	39.49	76.95	130.72	53.77
5717.43	35.24	PK	238	2.5	H	39.49	74.73	119.58	44.85
5698.34	33.52	PK	327	1.7	H	39.49	73.01	113.47	40.46
5649.38	31.23	PK	142	1.8	H	39.46	70.69	77.7	7.01
11490.00	40.54	PK	324	1.1	H	17.47	58.01	83.5	25.49
11490.00	26.37	Ave.	324	1.1	H	17.47	43.84	63.5	19.66
5785 MHz									
11570.00	39.80	PK	230	2.2	H	23.10	62.90	83.5	20.60
11570.00	26.32	Ave.	230	2.2	H	23.10	49.42	63.5	14.08
5825 MHz									
5851.43	35.46	PK	136	2.3	H	39.87	75.33	128.44	53.11
5856.74	35.12	PK	136	2.3	H	39.87	74.99	119.81	44.82
5877.46	32.42	PK	279	1.2	H	39.87	72.29	112.88	40.59
5926.73	30.62	PK	141	2.3	H	39.97	70.59	77.7	7.11
11650.00	40.03	PK	12	1.6	H	22.37	62.40	83.5	21.10
11650.00	26.55	Ave.	12	1.6	H	22.37	48.92	63.5	14.58
802.11n20									
5745 MHz									
5724.86	36.33	PK	283	1.9	H	39.49	75.82	131.38	55.56
5719.43	35.19	PK	283	1.9	H	39.49	74.68	120.14	45.46
5693.45	34.08	PK	187	2.3	H	39.49	73.57	109.85	36.28
5649.21	31.53	PK	262	2.3	H	39.46	70.99	77.7	6.71
11490.00	40.37	PK	315	1.8	H	17.47	57.84	83.5	25.66
11490.00	26.49	Ave.	315	1.8	H	17.47	43.96	63.5	19.54
5785 MHz									
11570.00	39.80	PK	305	1.8	H	23.10	62.90	83.5	20.60
11570.00	26.13	Ave.	305	1.8	H	23.10	49.23	63.5	14.27
5825 MHz									
5850.79	35.61	PK	246	1.4	H	39.87	75.48	129.9	54.42
5855.81	34.25	PK	246	1.4	H	39.87	74.12	120.07	45.95
5881.43	33.76	PK	276	1.6	H	39.87	73.63	109.94	36.31
5925.89	31.18	PK	339	2.4	H	39.97	71.15	77.7	6.55
11650.00	40.31	PK	80	1.1	H	22.37	62.68	83.5	20.82
11650.00	26.25	Ave.	80	1.1	H	22.37	48.62	63.5	14.88

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5755 MHz									
5698.81	32.61	PK	308	2.0	H	39.49	72.10	113.81	41.71
5718.13	37.43	PK	27	1.5	H	39.49	76.92	119.78	42.86
5724.05	36.98	PK	229	1.4	H	39.49	76.47	129.53	53.06
5648.73	31.52	PK	0	1.5	H	39.46	70.98	77.7	6.72
11510.00	41.08	PK	131	1.8	H	17.47	58.55	83.5	24.95
11510.00	26.79	Ave.	131	1.8	H	17.47	44.26	63.5	19.24
5795 MHz									
5850.83	34.21	PK	45	2.2	H	42.76	76.97	129.81	52.84
5856.73	33.26	PK	201	1.6	H	42.76	76.02	119.82	43.80
5879.35	33.26	PK	306	2.4	H	42.76	76.02	111.48	35.46
5926.39	30.56	PK	71	1.3	H	39.97	70.53	77.7	7.17
11590.00	40.96	PK	123	1.9	H	17.51	58.47	83.5	25.03
11590.00	26.84	Ave.	123	1.9	H	17.51	44.35	63.5	19.15
802.11ac20									
5745 MHz									
5724.63	36.52	PK	309	1.5	H	39.49	76.01	130.86	54.85
5718.97	35.21	PK	309	1.5	H	39.49	74.70	120.01	45.31
5698.43	33.86	PK	72	1.2	H	39.49	73.35	113.54	40.19
5649.83	31.26	PK	125	1.3	H	39.46	70.72	77.7	6.98
11490.00	41.50	PK	283	1.0	H	24.17	65.67	83.5	17.83
11490.00	26.70	Ave.	283	1.0	H	24.17	50.87	63.5	12.63
5785 MHz									
11570.00	40.36	PK	242	2.2	H	23.10	63.46	83.5	20.04
11570.00	26.20	Ave.	242	2.2	H	23.10	49.30	63.5	14.20
5825 MHz									
5852.13	34.56	PK	132	2.2	H	39.87	74.43	126.84	52.41
5857.65	34.27	PK	132	2.2	H	39.87	74.14	119.56	45.42
5880.29	33.61	PK	296	1.6	H	39.87	73.48	110.79	37.31
5926.53	31.23	PK	330	2.3	H	39.97	71.20	77.7	6.50
11650.00	40.69	PK	237	1.3	H	22.37	63.06	83.5	20.44
11650.00	27.80	Ave.	237	1.3	H	22.37	50.17	63.5	13.33

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11ac40									
5755 MHz									
5723.86	35.43	PK	23	1.5	H	39.49	74.92	129.1	54.18
5719.88	34.71	PK	23	1.5	H	39.49	74.20	120.27	46.07
5693.48	33.59	PK	199	2.1	H	39.49	73.08	109.88	36.80
5647.83	31.25	PK	232	1.2	H	39.46	70.71	77.7	6.99
11510.00	41.36	PK	117	1.8	H	24.17	65.53	83.5	17.97
11510.00	27.05	Ave.	117	1.8	H	24.17	51.22	63.5	12.28
5795 MHz									
5850.79	34.84	PK	311	2.0	H	39.87	74.71	129.9	55.19
5856.13	34.27	PK	311	2.0	H	39.87	74.14	119.98	45.84
5875.24	33.51	PK	338	1.2	H	39.87	73.38	114.52	41.14
5926.53	31.32	PK	254	1.5	H	39.97	71.29	77.7	6.41
11590.00	40.56	PK	274	2.2	H	23.10	63.66	83.5	19.84
11590.00	27.50	Ave.	274	2.2	H	23.10	50.60	63.5	12.90
802.11ac80									
5775 MHz									
5698.44	40.18	PK	262	1.2	H	39.49	79.67	113.55	33.88
5719.23	41.39	PK	306	2.2	H	55.25	96.64	120.08	23.44
5724.69	43.04	PK	271	1.6	H	39.49	82.53	130.98	48.45
5647.89	31.33	PK	74	1.8	H	39.46	70.79	77.7	6.91
5925.92	31.29	PK	56	2.3	H	39.97	71.26	77.7	6.44
5852.17	40.41	PK	268	1.5	H	39.87	80.28	126.75	46.47
5856.78	39.37	PK	122	1.1	H	39.87	79.24	119.80	40.56
5882.27	35.82	PK	4	1.5	H	39.87	75.69	109.32	33.63
11550.00	40.93	PK	272	1.3	H	23.10	64.03	83.5	19.47
11550.00	26.75	Ave.	272	1.3	H	23.10	49.85	63.5	13.65

Note:

Corrected Amplitude = Corrected Factor + Reading

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

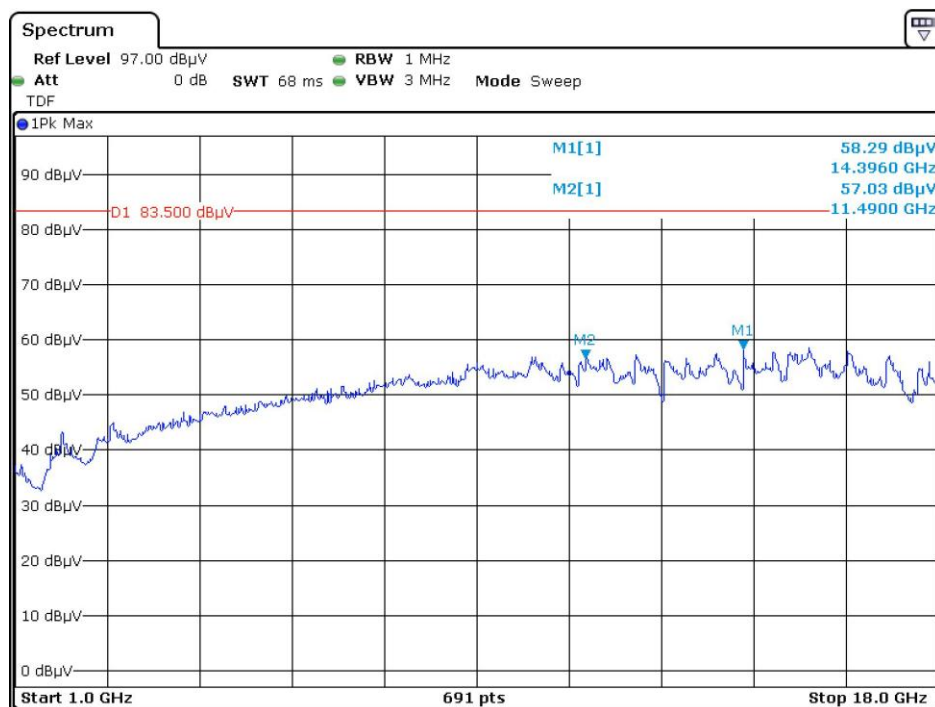
Margin = Limit- Corr. Amplitude

All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

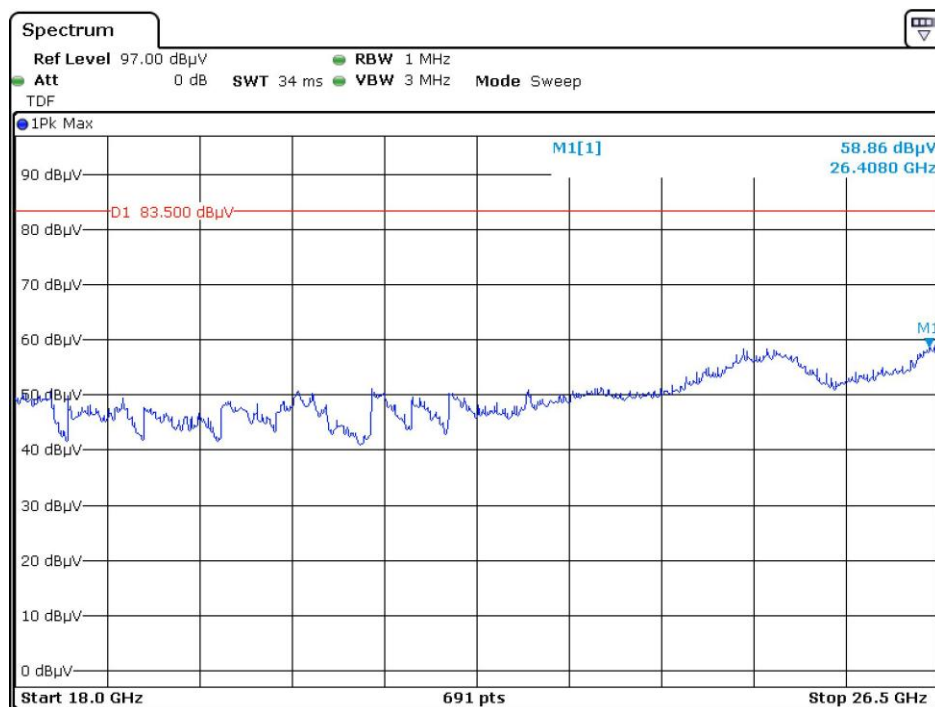
Peak

Pre-scan with 802.11ac20 5745MHz

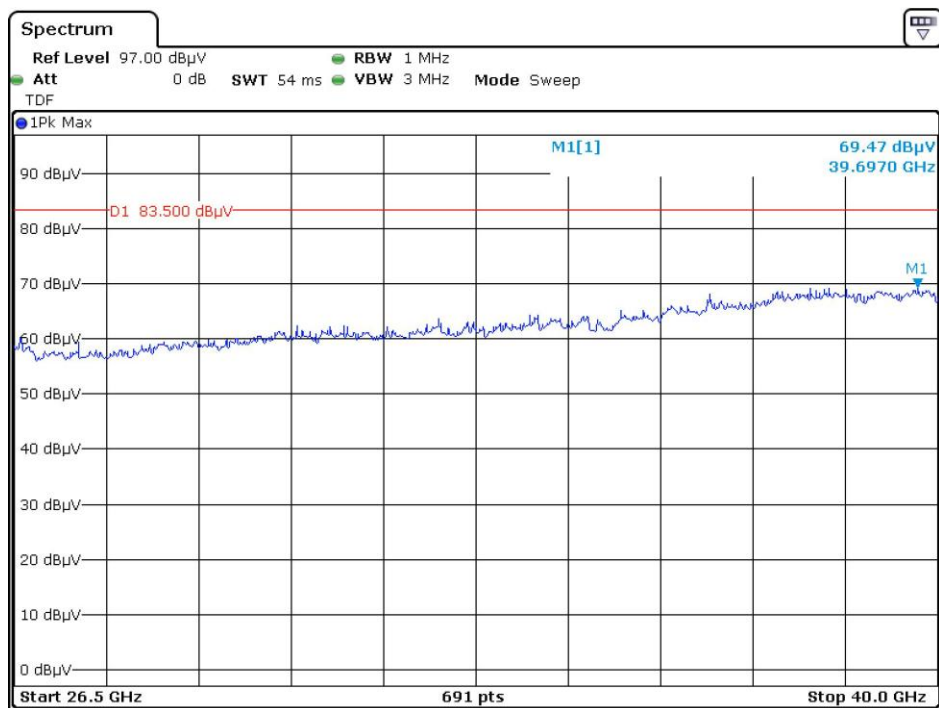
Horizontal



Date: 20.JAN.2020 18:50:23

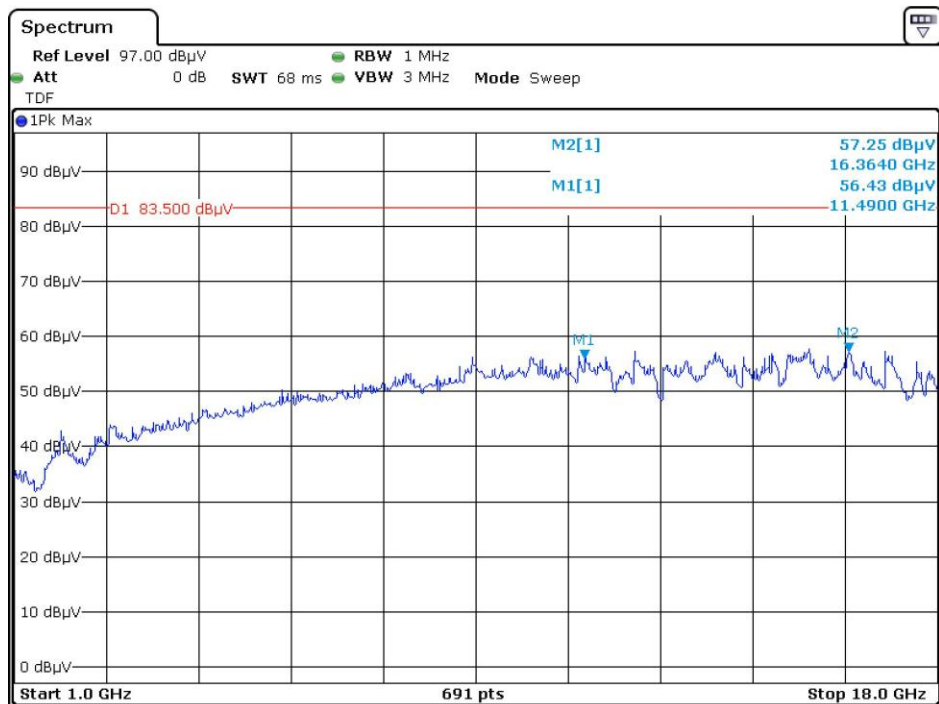


Date: 20.JAN.2020 19:33:37

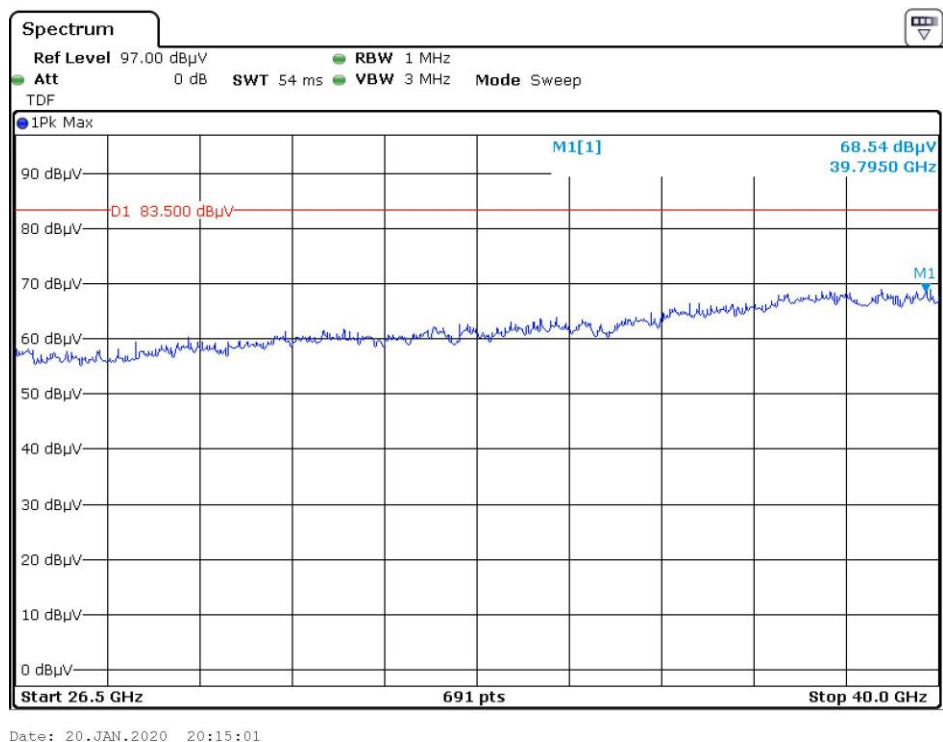
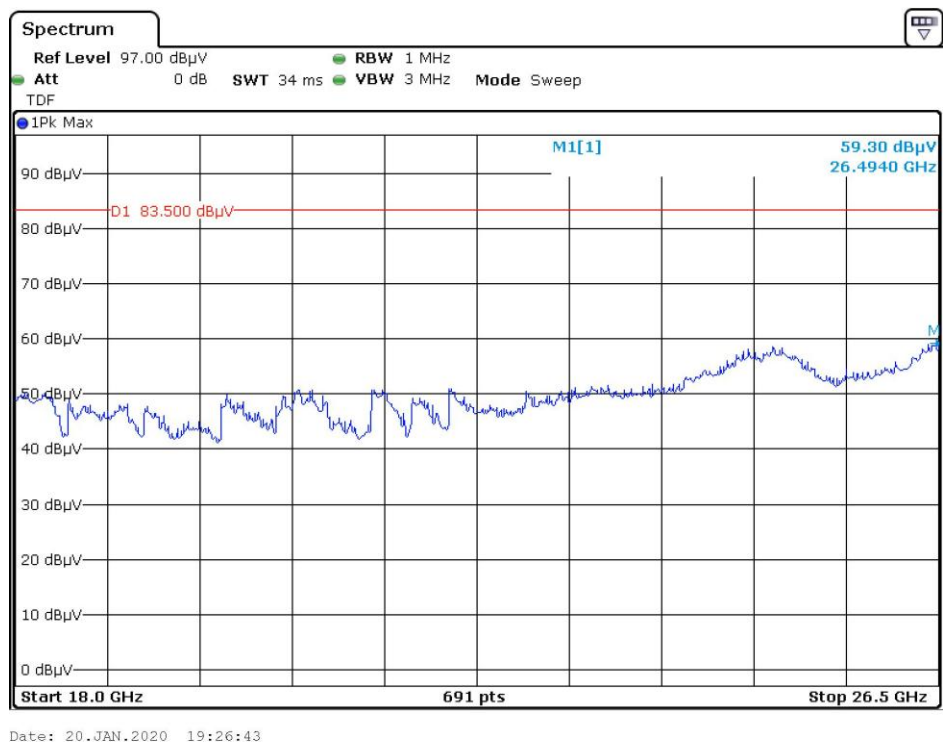


Date: 20.JAN.2020 20:07:57

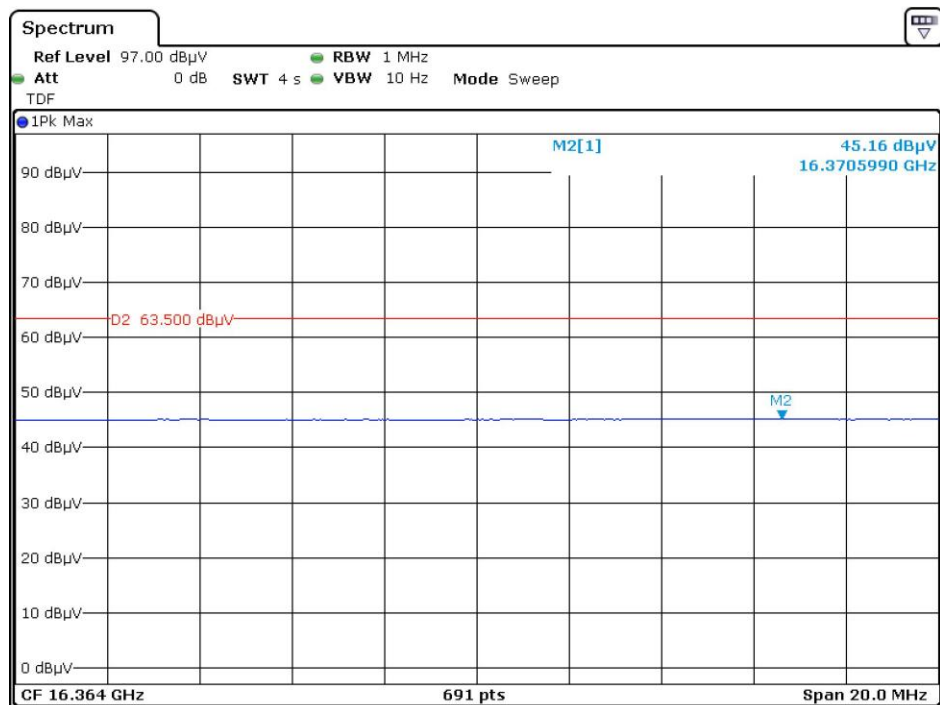
Vertical



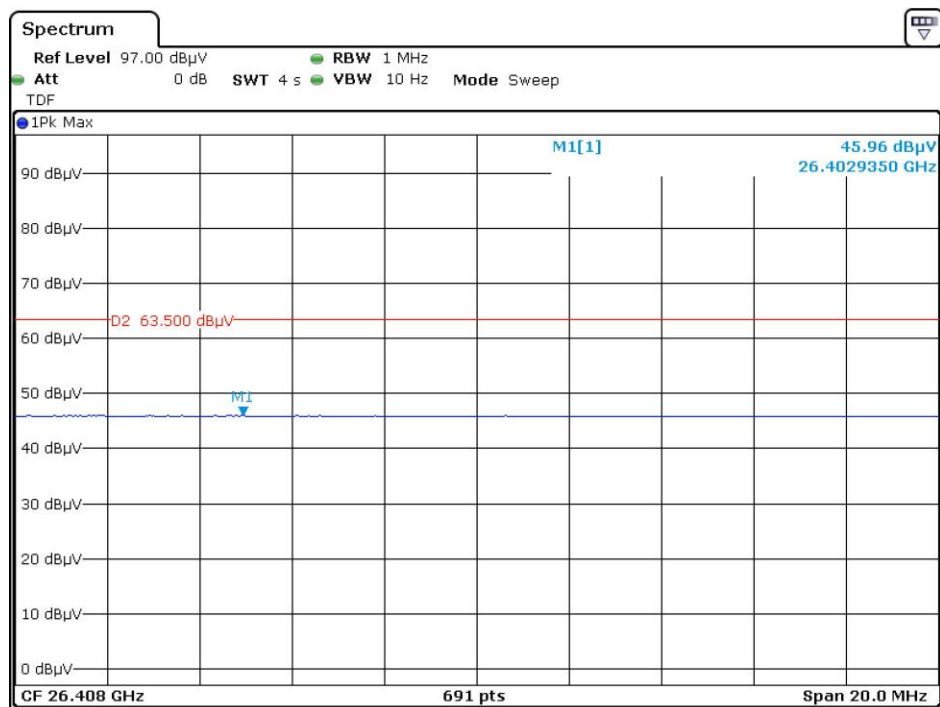
Date: 20.JAN.2020 18:43:10



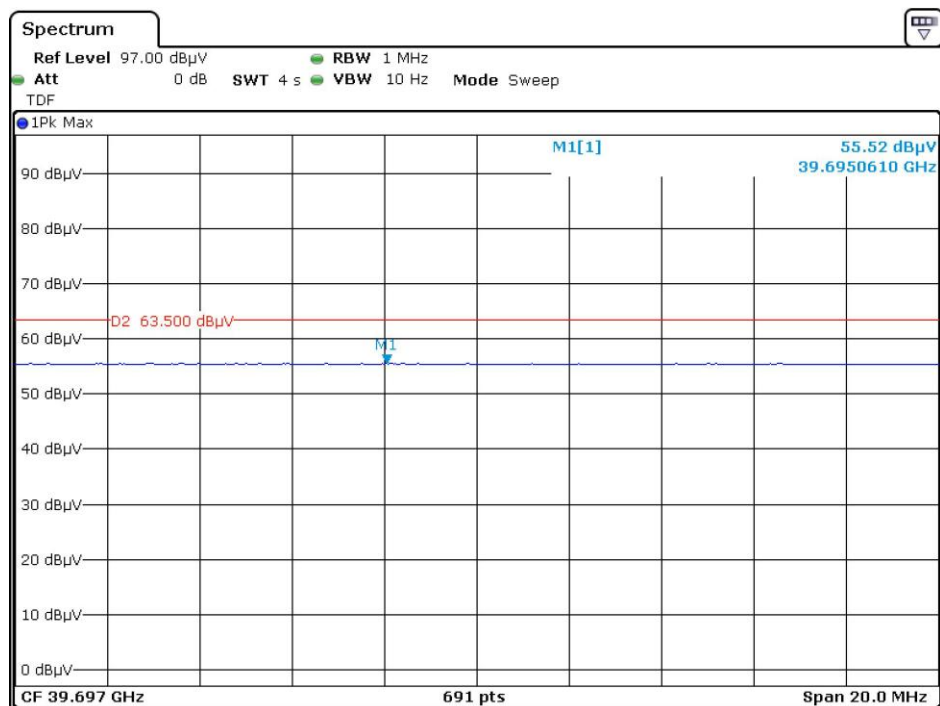
Average Horizontal



Date: 20.JAN.2020 18:46:44

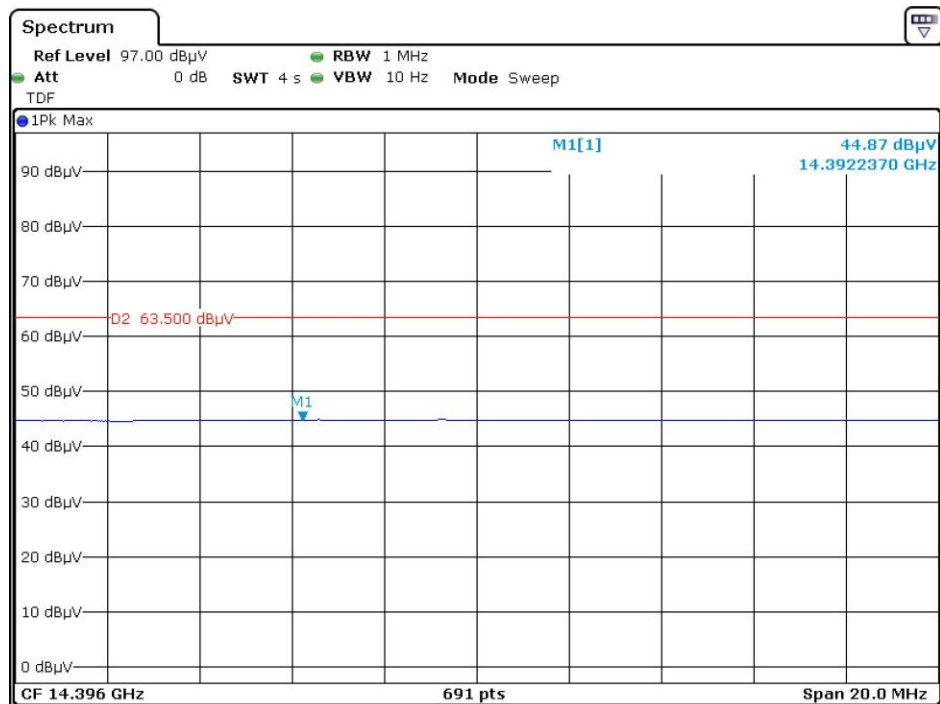


Date: 20.JAN.2020 19:37:02

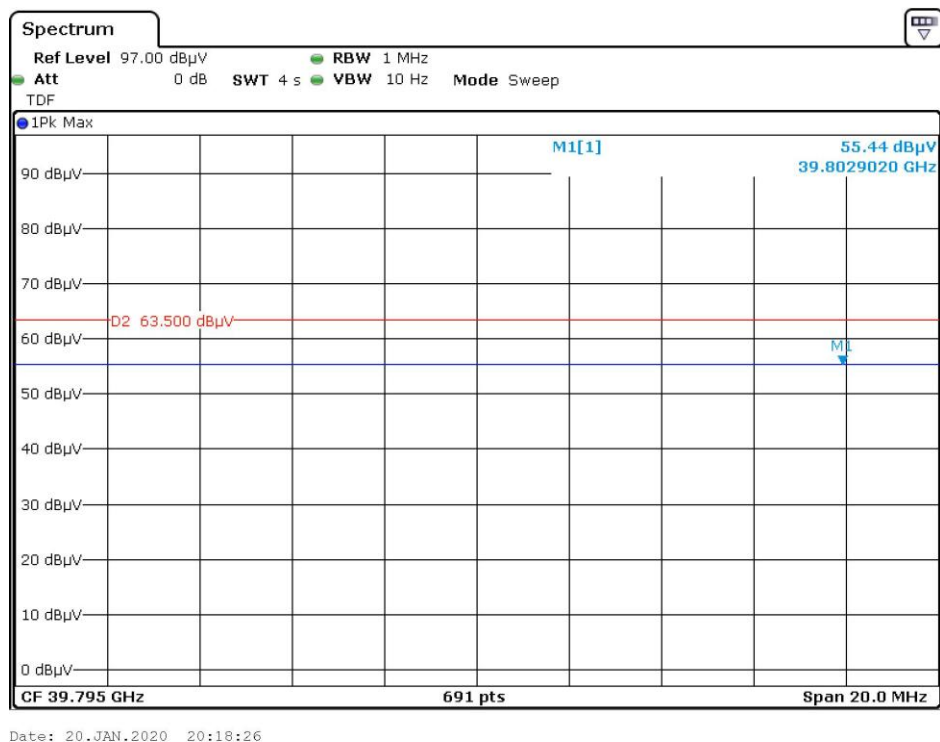
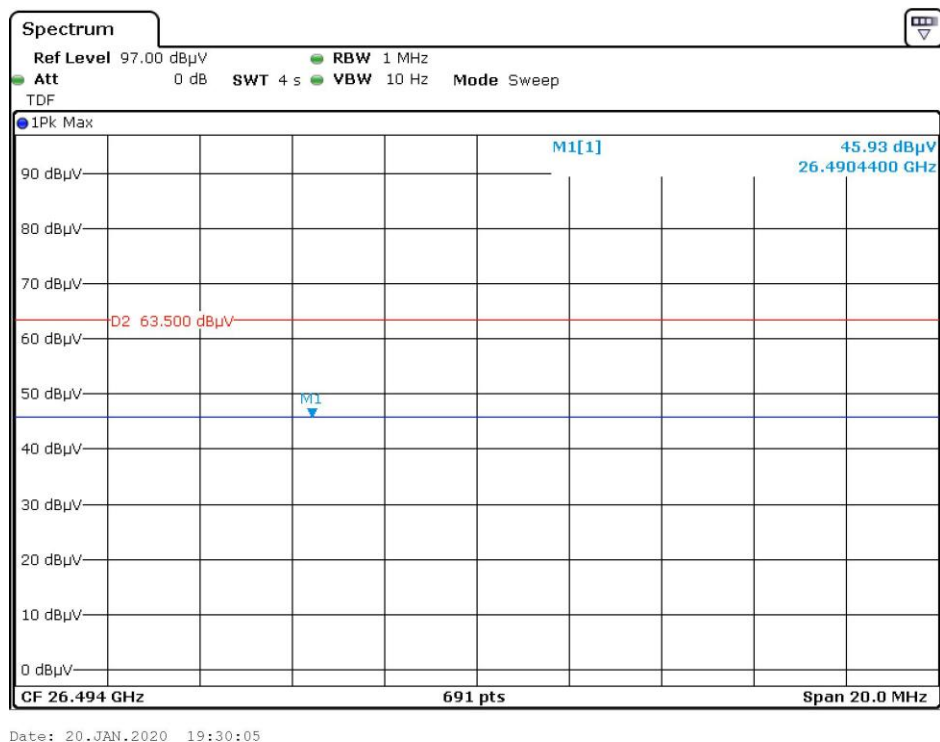


Date: 20.JAN.2020 20:11:22

Vertical



Date: 20.JAN.2020 18:53:52



FCC §15.407(1), (5),(e) – 26 dB & 6dB EMISSION 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

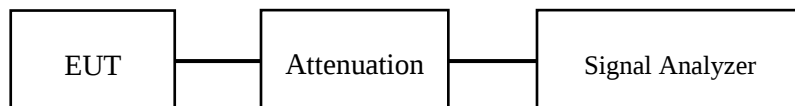
1. Emission Bandwidth (EBW)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- 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:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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

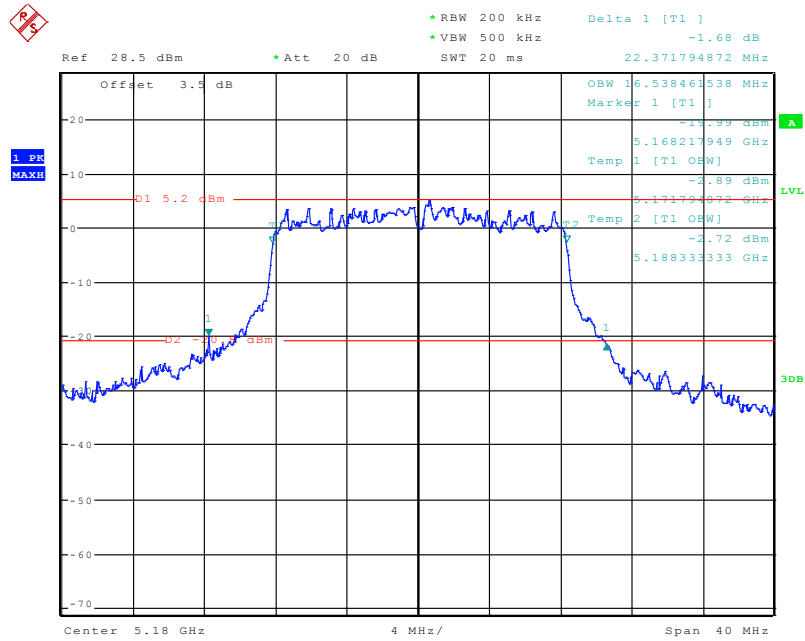
The testing was performed by George Zhong from 2020-02-26 to 2020-02-27.

EUT operation mode: Transmitting

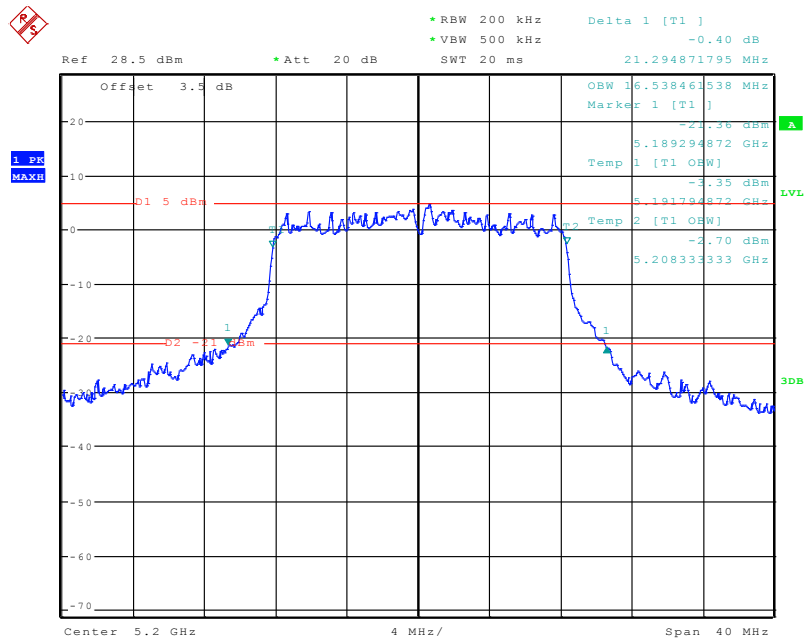
Test Result: Pass; please refer to the following tables and plots.

5150 MHz - 5250 MHz:

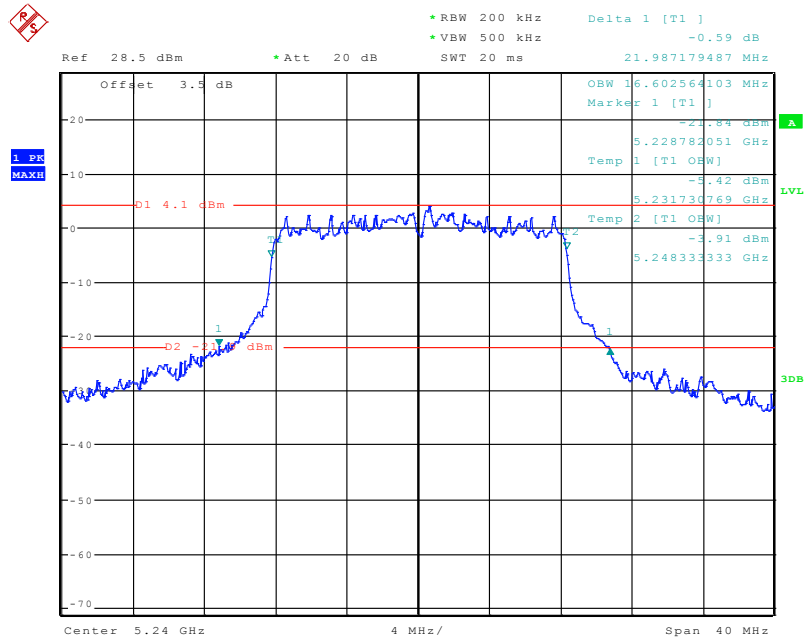
Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Remark
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2A band
5180	22.37	16.54	
5200	21.29	16.54	
5240	21.99	16.60	
802.11n20			
5180	23.00	17.95	
5200	23.26	17.88	
5240	23.65	17.88	
802.11n40			
5190	43.46	36.54	
5230	56.36	36.54	
802.11ac20			
5180	22.10	17.95	
5200	23.46	17.95	
5240	24.36	17.95	
802.11ac40			
5190	70.38	36.79	
5230	69.82	36.79	
11ac80			
5210	96.26	76.15	

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz

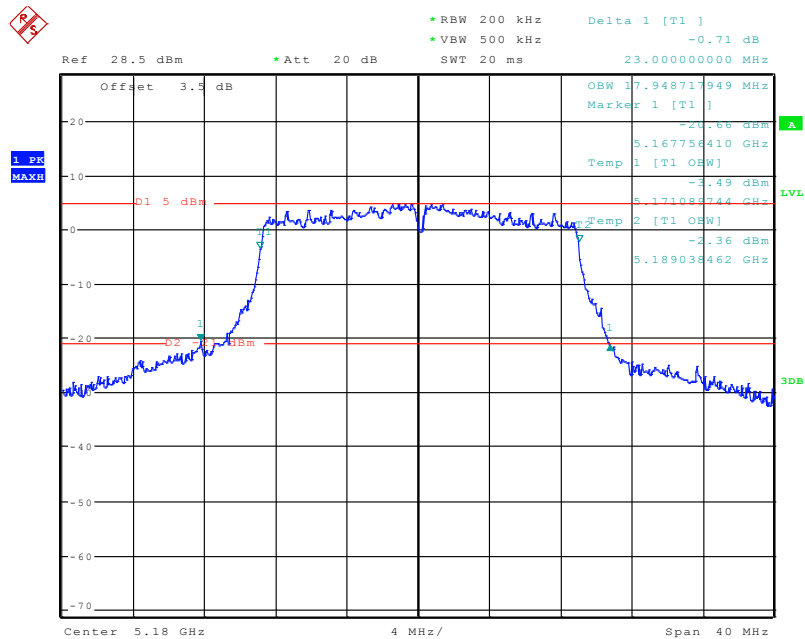
Date: 26.FEB.2020 15:40:55

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz

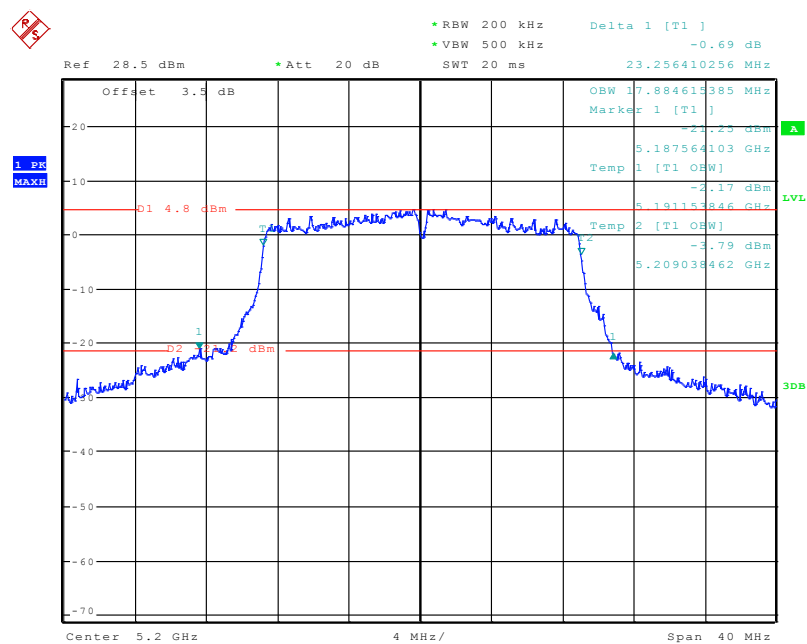
Date: 26.FEB.2020 15:41:53

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz

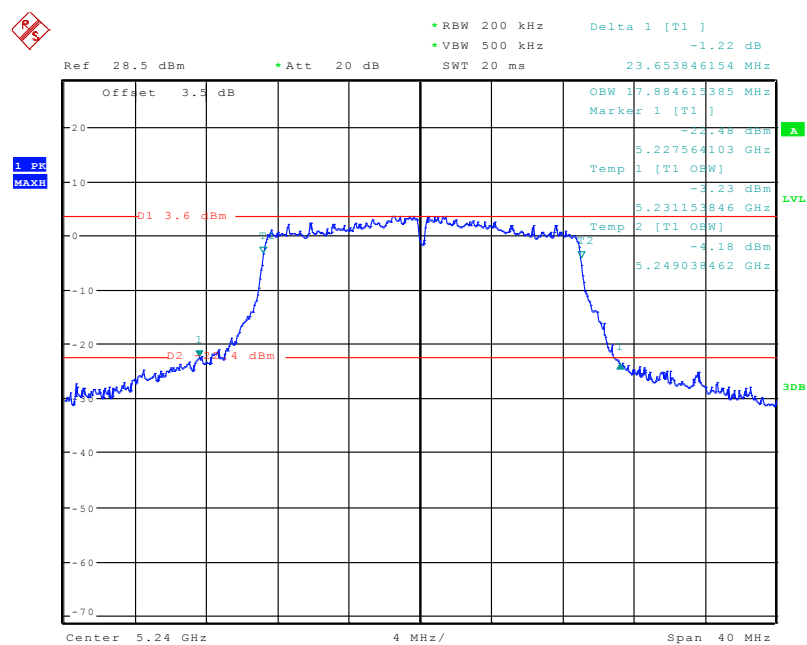
Date: 26.FEB.2020 15:42:58

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz

Date: 26.FEB.2020 15:35:56

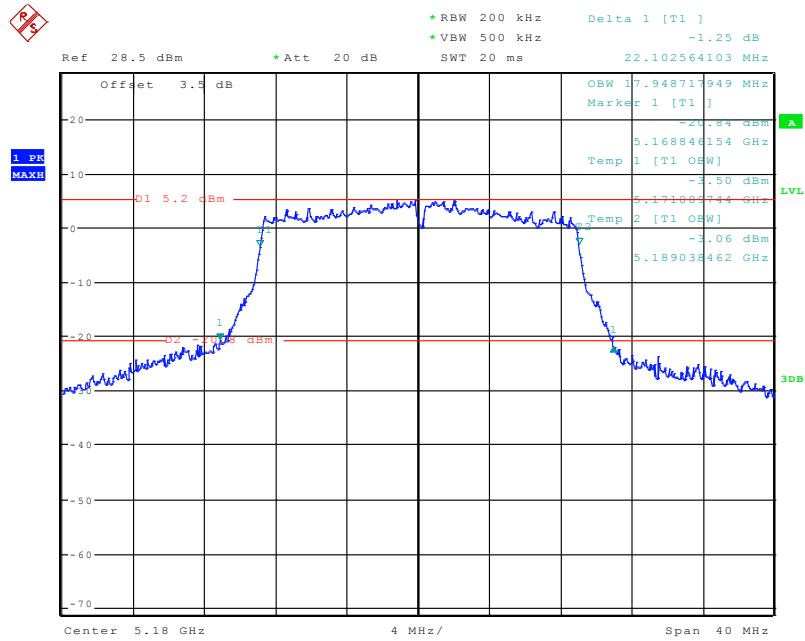
802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz

Date: 26.FEB.2020 15:36:58

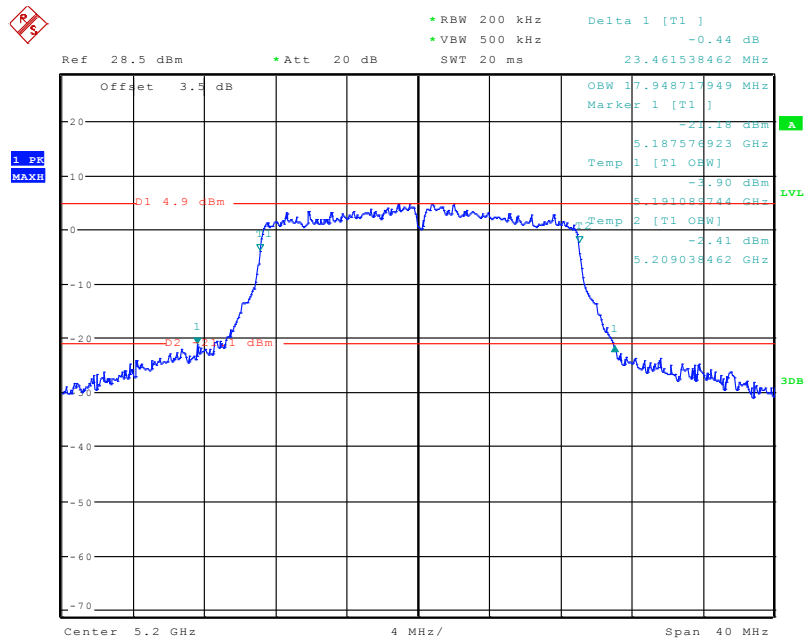
802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz

Date: 26.FEB.2020 15:39:01

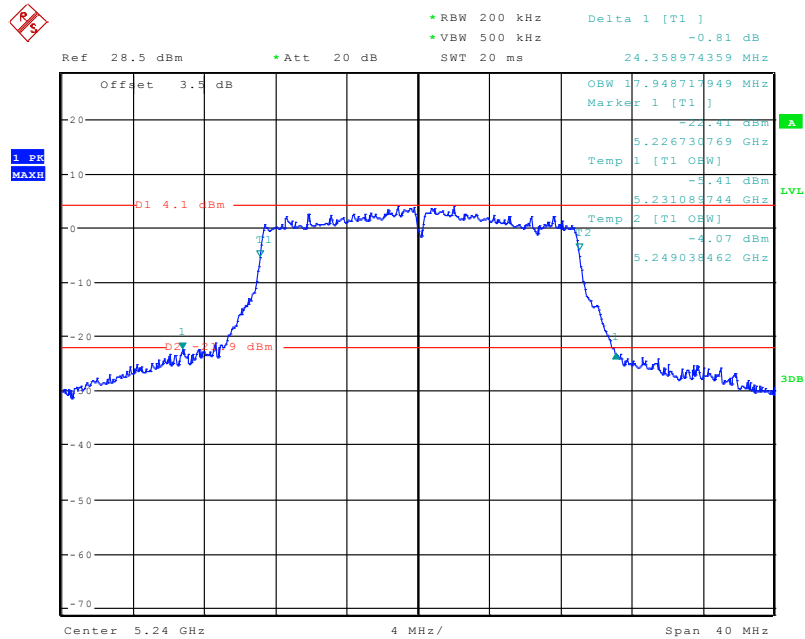


802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz

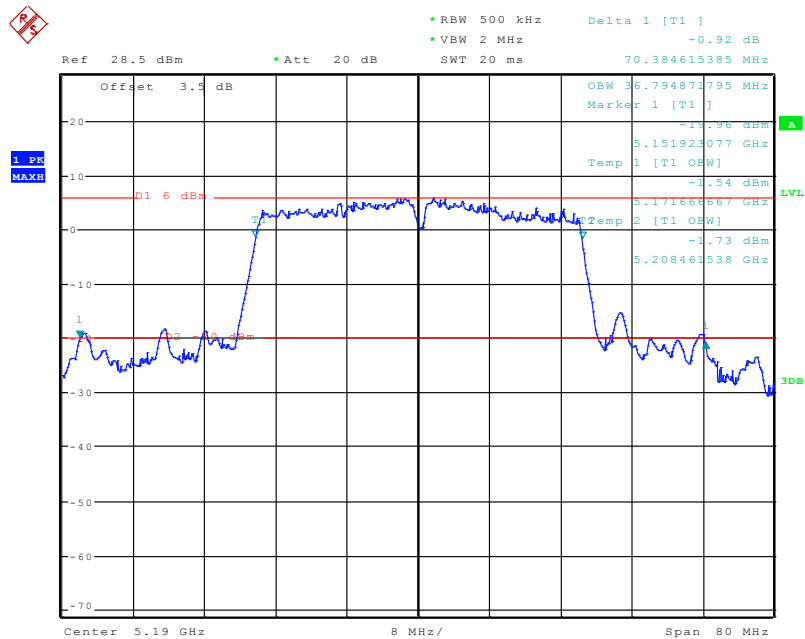
Date: 26.FEB.2020 15:34:31

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz

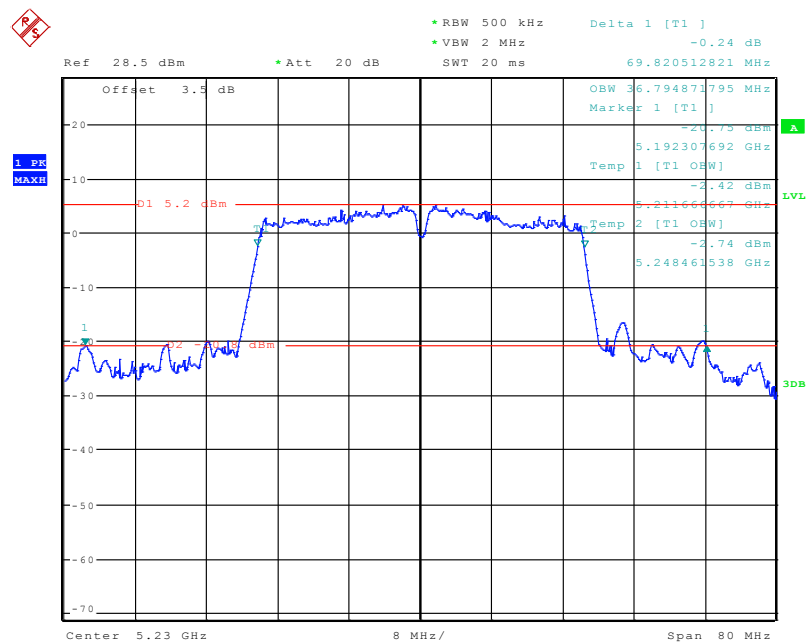
Date: 26.FEB.2020 15:32:55

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz

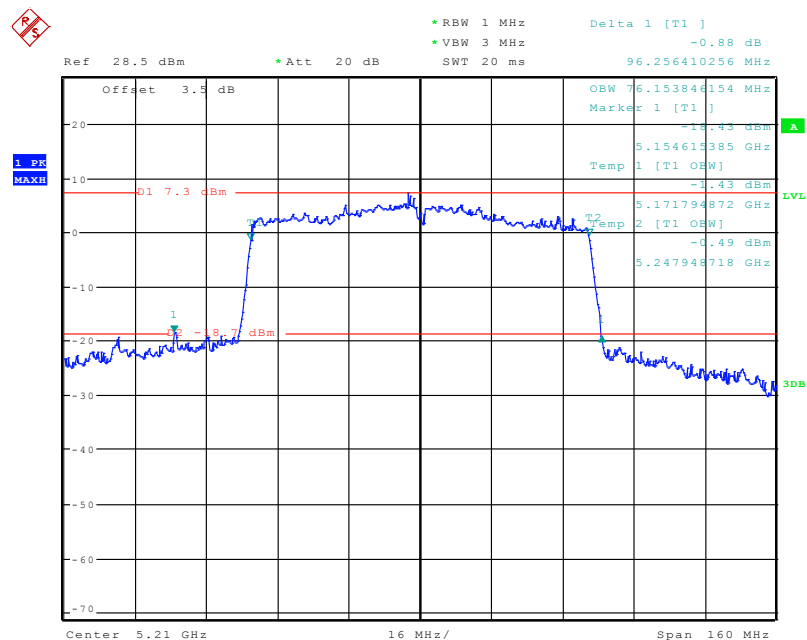
Date: 26.FEB.2020 15:30:47

802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5190 MHz

Date: 26.FEB.2020 15:50:55

802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5230 MHz

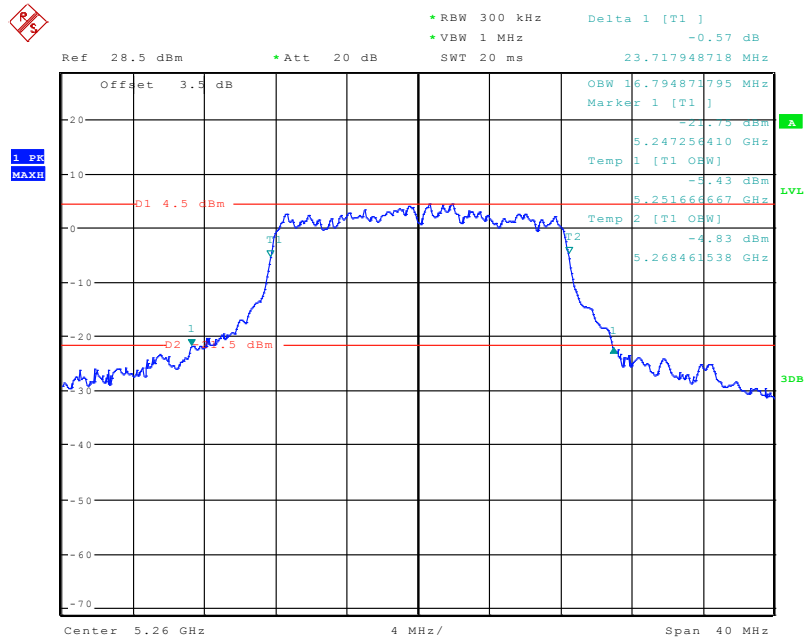
Date: 26.FEB.2020 15:49:56

802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5230 MHz

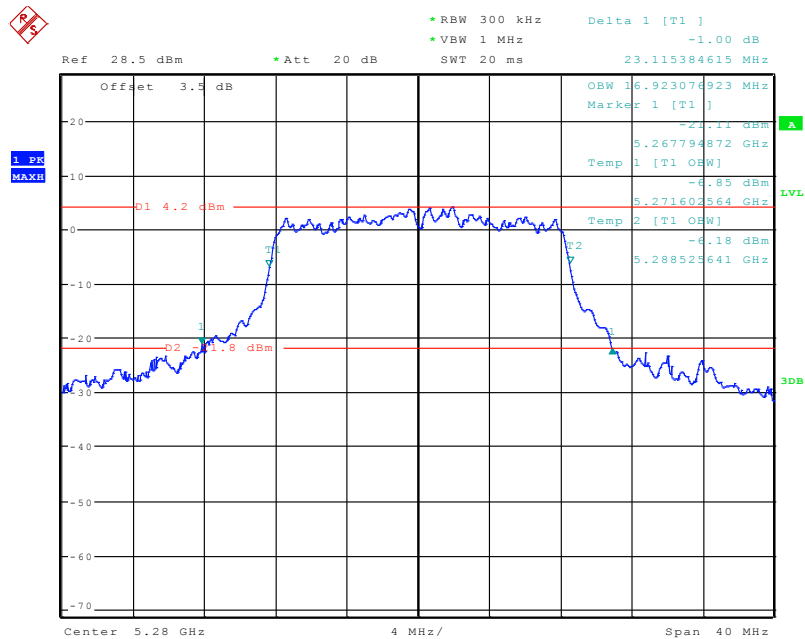
Date: 26.FEB.2020 15:53:23

5250 MHz - 5350 MHz:

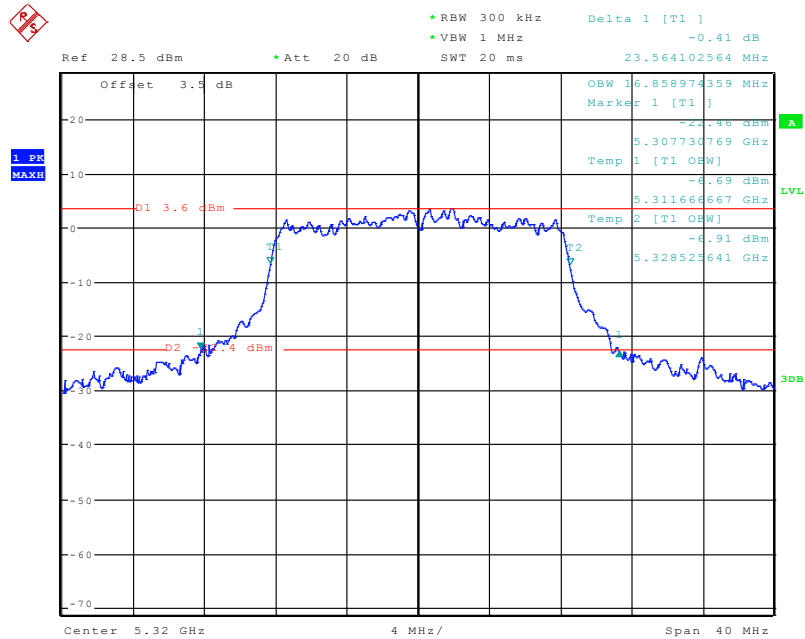
Frequency (MHz)	26dB bandwidth (MHz)	99% Bandwidth (MHz)
802.11a		
5260	23.72	16.79
5280	23.12	16.92
5320	23.56	16.86
802.11n20		
5260	24.23	18.21
5280	25.76	18.27
5320	25.56	18.27
802.11n40		
5270	43.31	36.54
5310	53.29	36.67
802.11ac20		
5260	27.15	18.33
5280	27.18	18.33
5320	27.23	18.27
802.11ac40		
5270	70.09	36.79
5310	56.50	36.92
802.11ac80		
5290	100.87	76.41

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5260 MHz

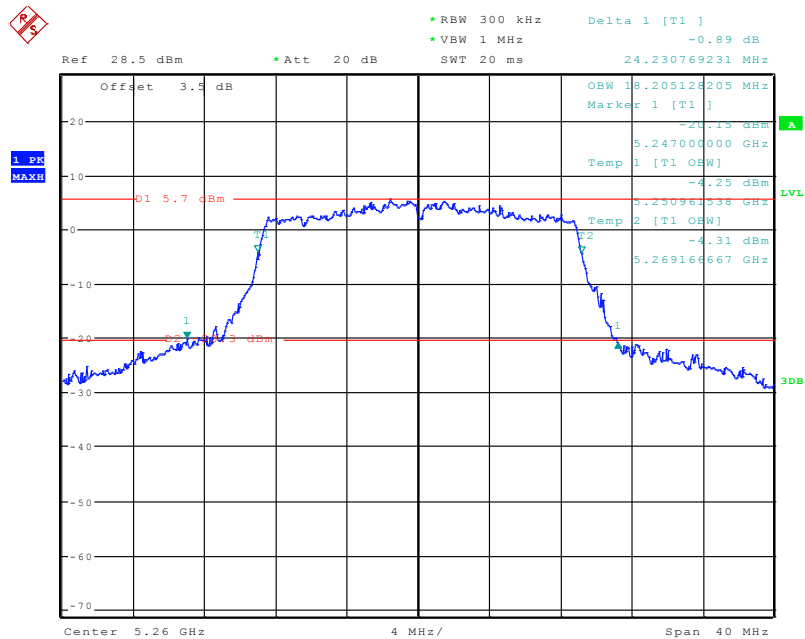
Date: 26.FEB.2020 17:09:26

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5280 MHz

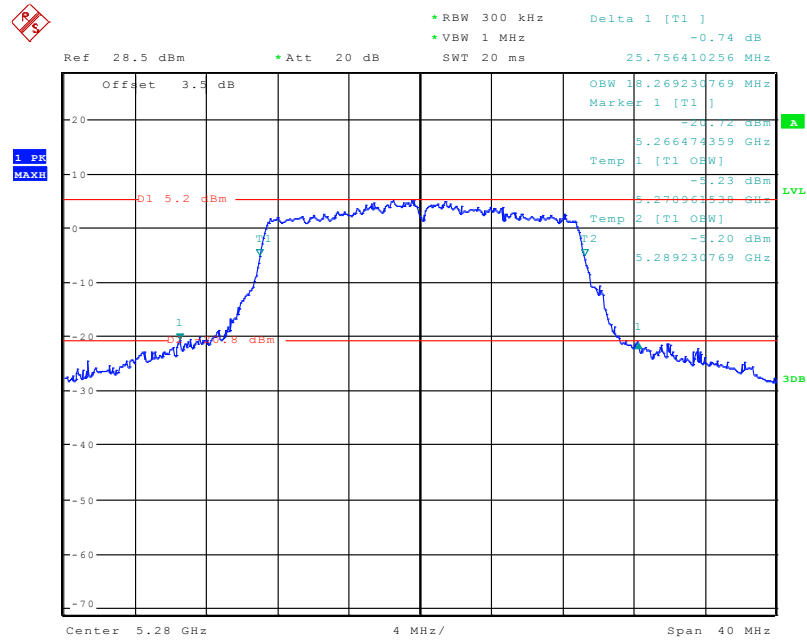
Date: 26.FEB.2020 17:08:22

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5320 MHz

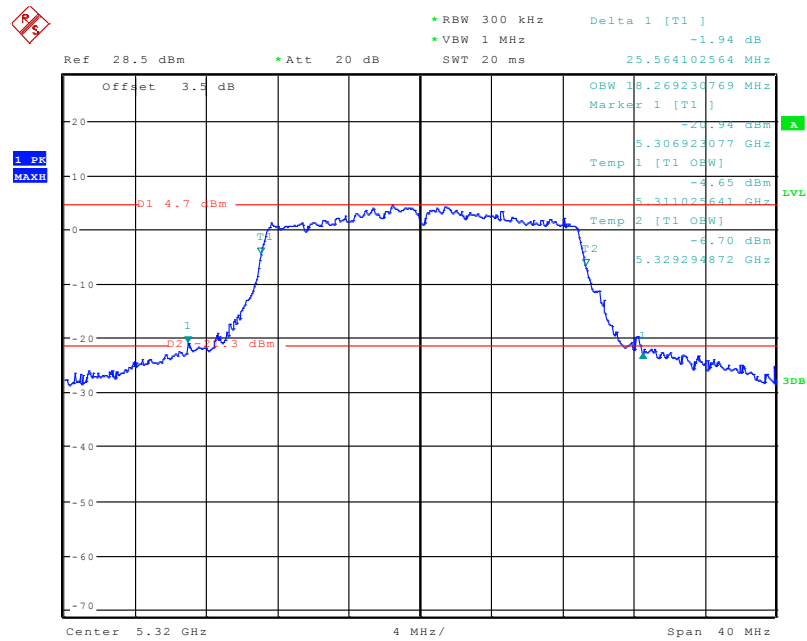
Date: 26.FEB.2020 17:07:23

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5260 MHz

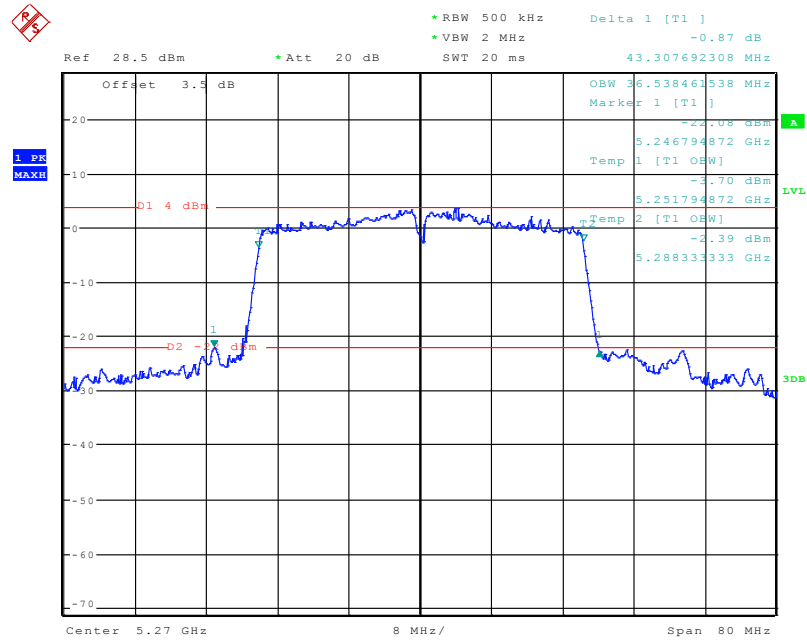
Date: 26.FEB.2020 17:11:17

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5280 MHz

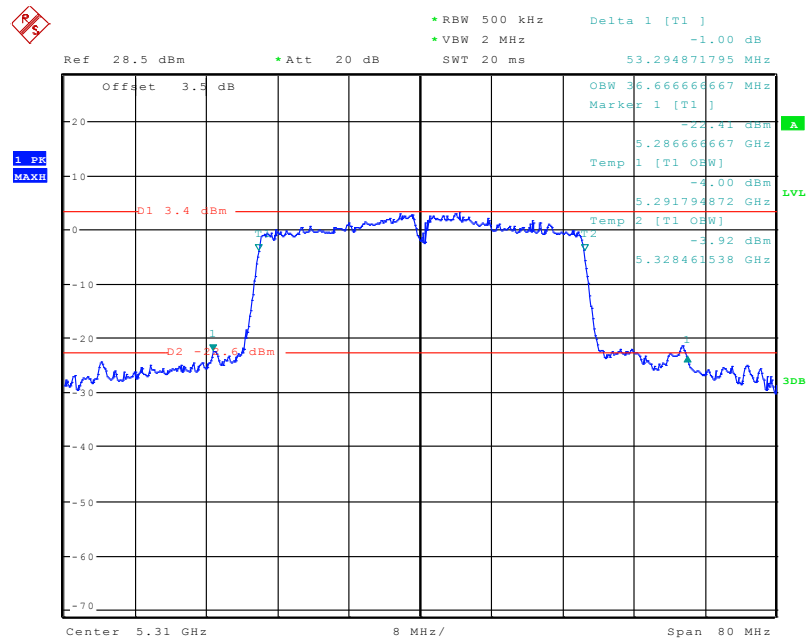
Date: 26.FEB.2020 17:13:07

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5320 MHz

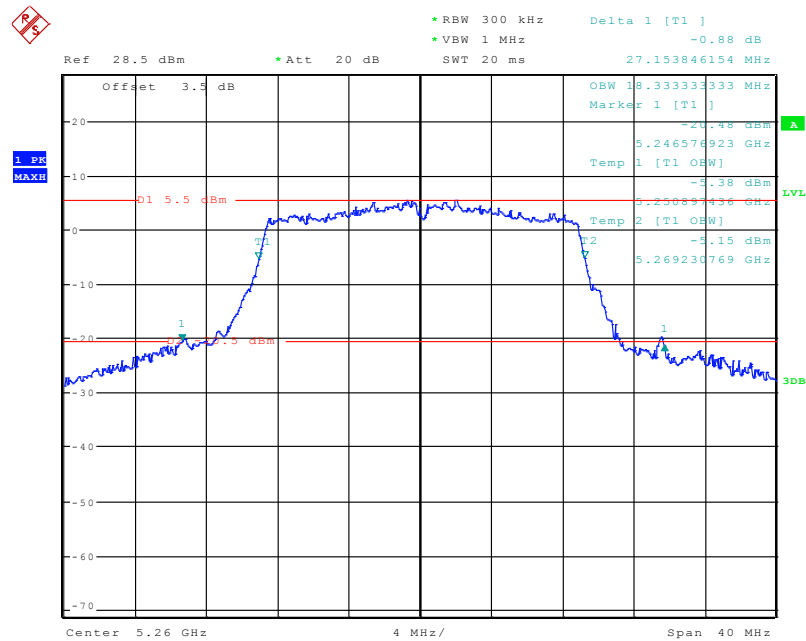
Date: 26.FEB.2020 17:14:41

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5270 MHz

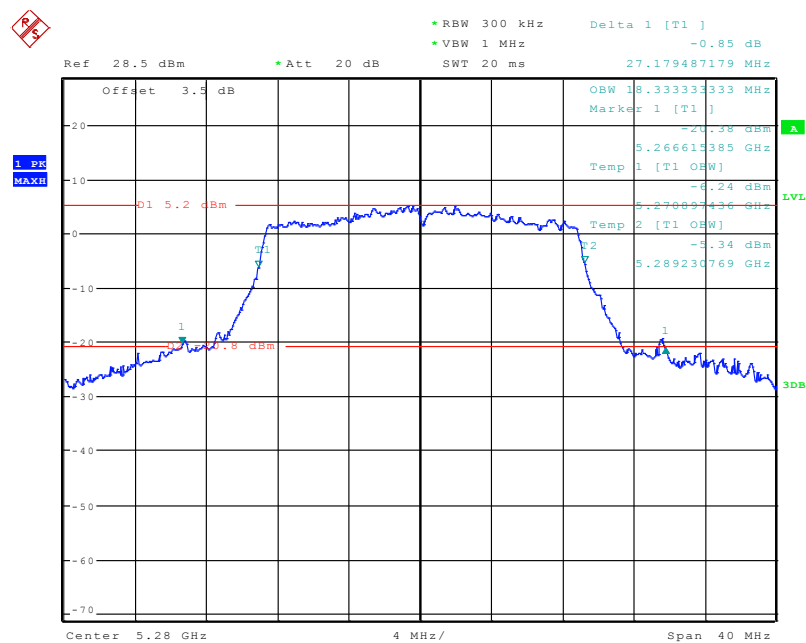
Date: 26.FEB.2020 17:35:11

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5310 MHz

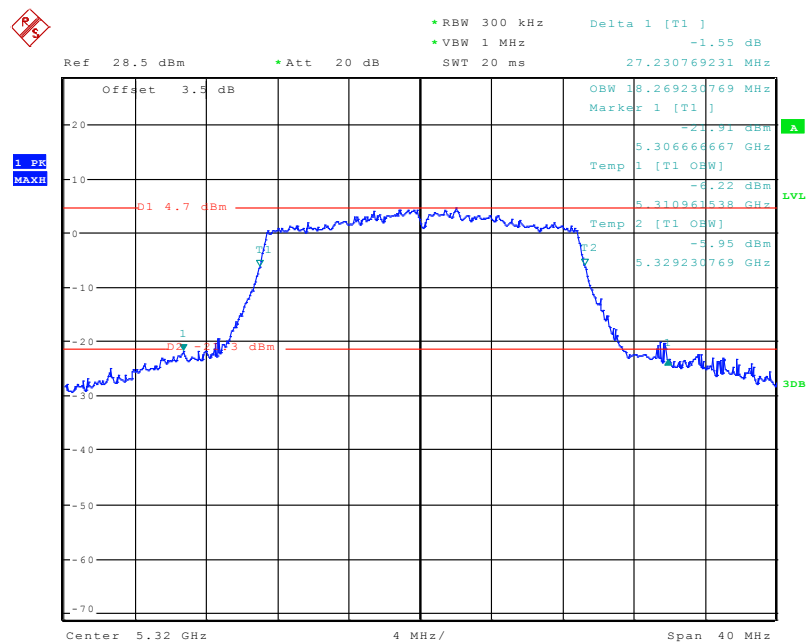
Date: 26.FEB.2020 17:33:45

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5260 MHz

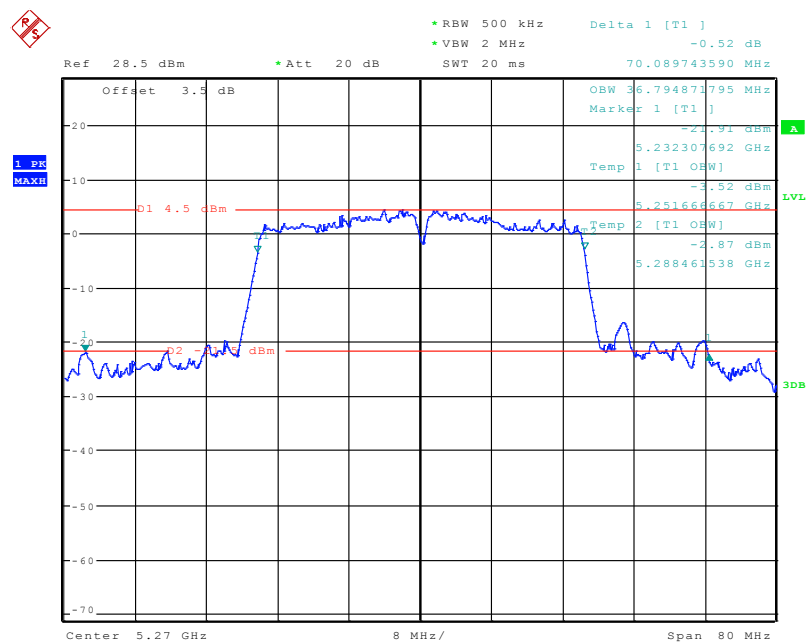
Date: 26.FEB.2020 17:19:43

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5280 MHz

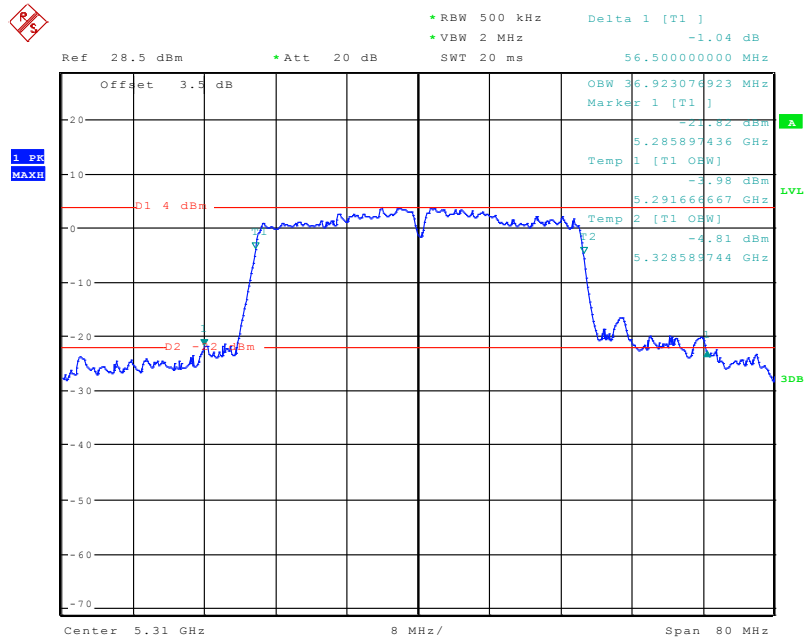
Date: 26.FEB.2020 17:18:31

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5320 MHz

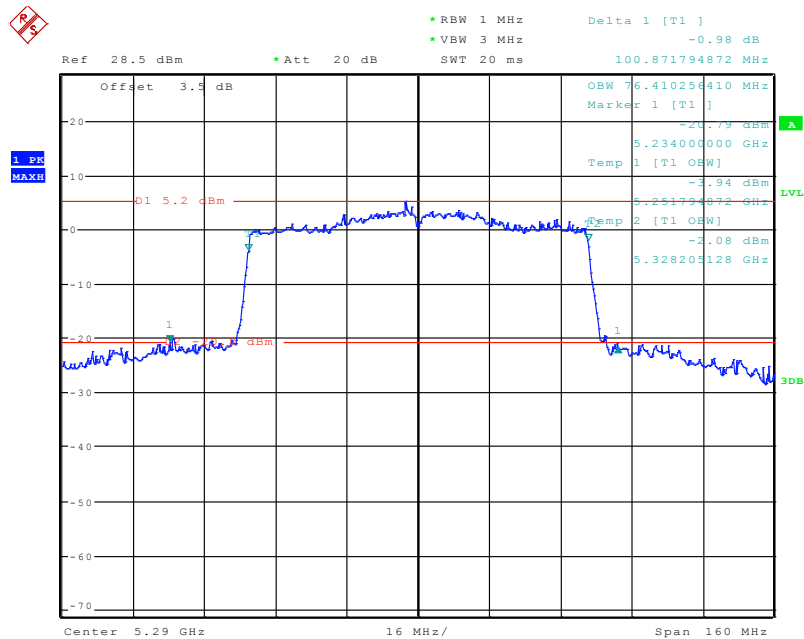
Date: 26.FEB.2020 17:16:14

802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5270 MHz

Date: 26.FEB.2020 17:23:18

802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5310 MHz

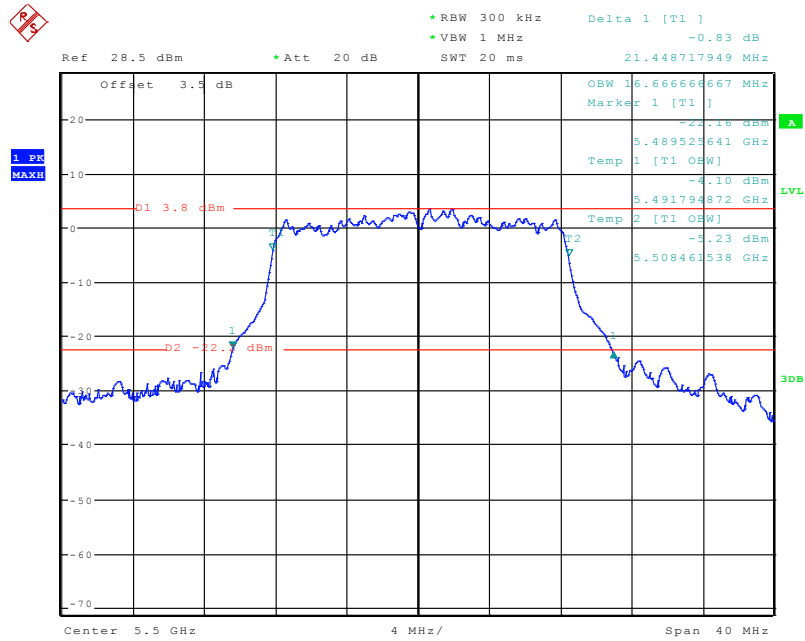
Date: 26.FEB.2020 17:32:10

802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5290 MHz

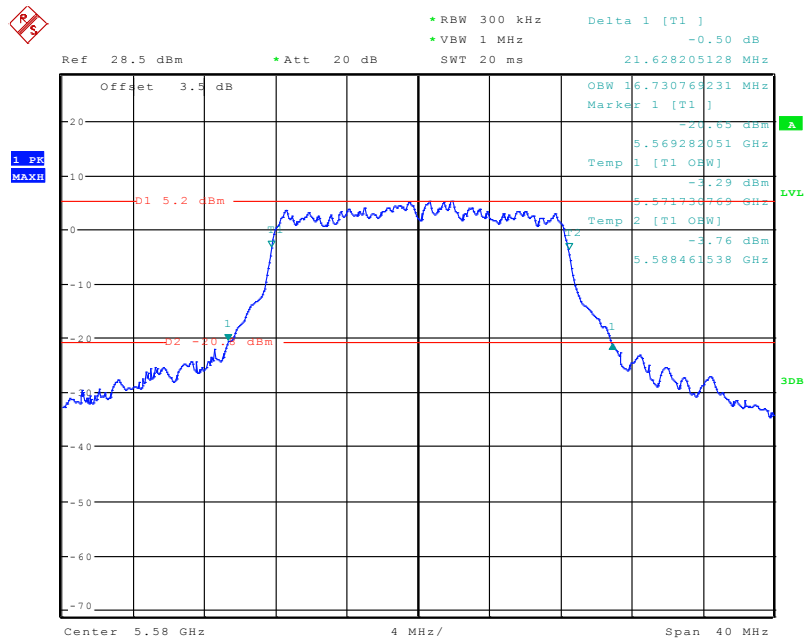
Date: 26.FEB.2020 17:37:24

5470 MHz – 5725 MHz:

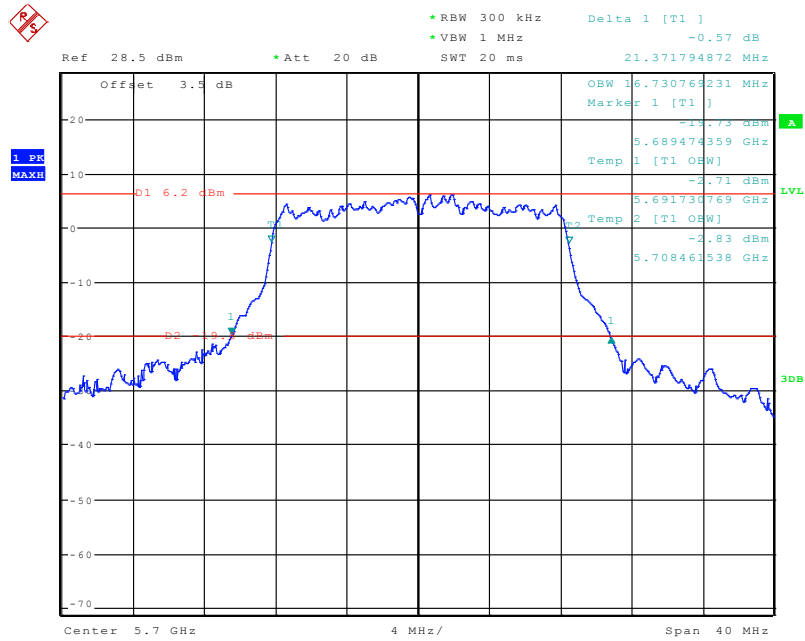
Frequency (MHz)	26dB bandwidth (MHz)	99% Bandwidth (MHz)
802.11a		
5500	21.45	16.67
5580	21.63	16.73
5700	21.37	16.73
802.11n20		
5500	21.95	18.14
5580	21.82	18.14
5700	21.76	18.08
802.11n40		
5510	49.28	36.54
5550	49.41	36.54
5670	43.44	36.54
802.11ac20		
5500	22.01	18.08
5580	22.01	18.14
5700	22.14	18.14
802.11ac40		
5510	52.36	36.54
5550	44.03	36.54
5670	43.77	36.54
802.11ac80		
5530	81.64	75.90
5610	81.64	75.90

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5500 MHz

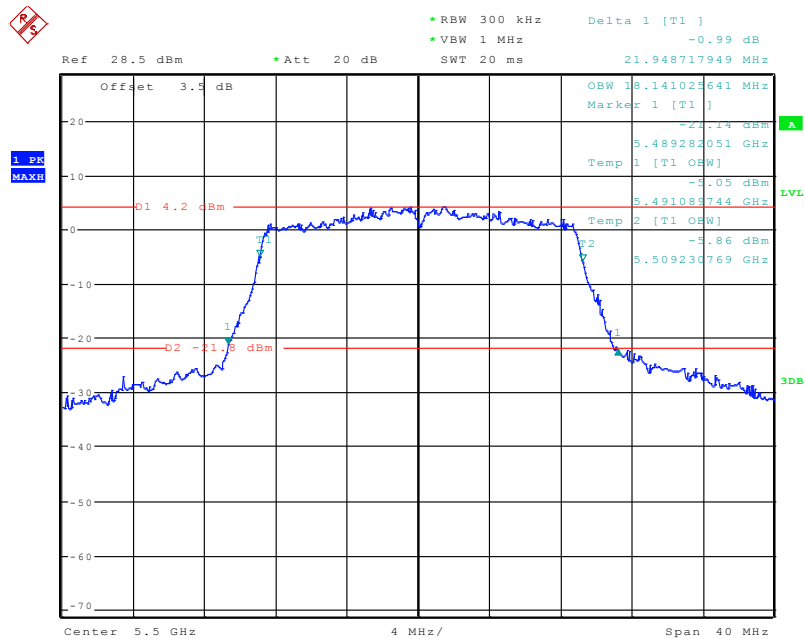
Date: 27.FEB.2020 15:41:24

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5580 MHz

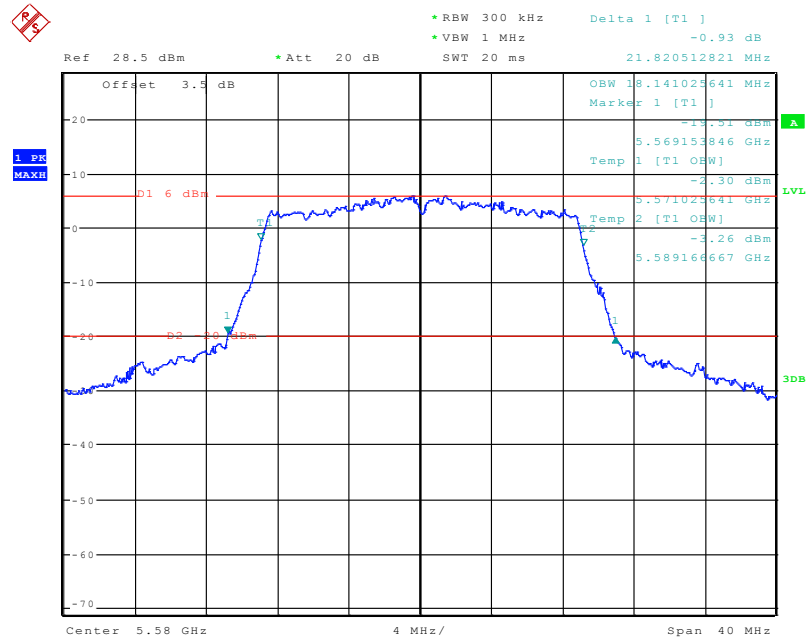
Date: 27.FEB.2020 15:42:35

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5700 MHz

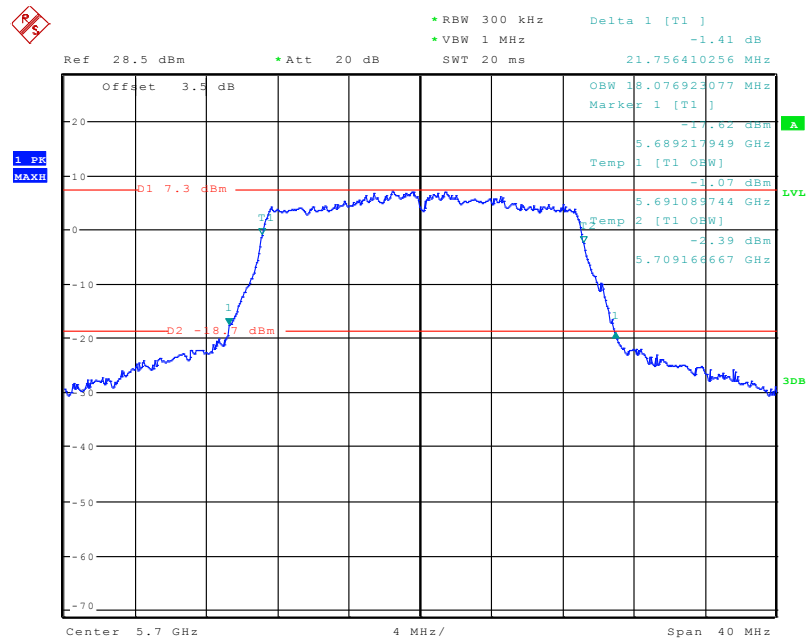
Date: 27.FEB.2020 15:43:39

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5500 MHz

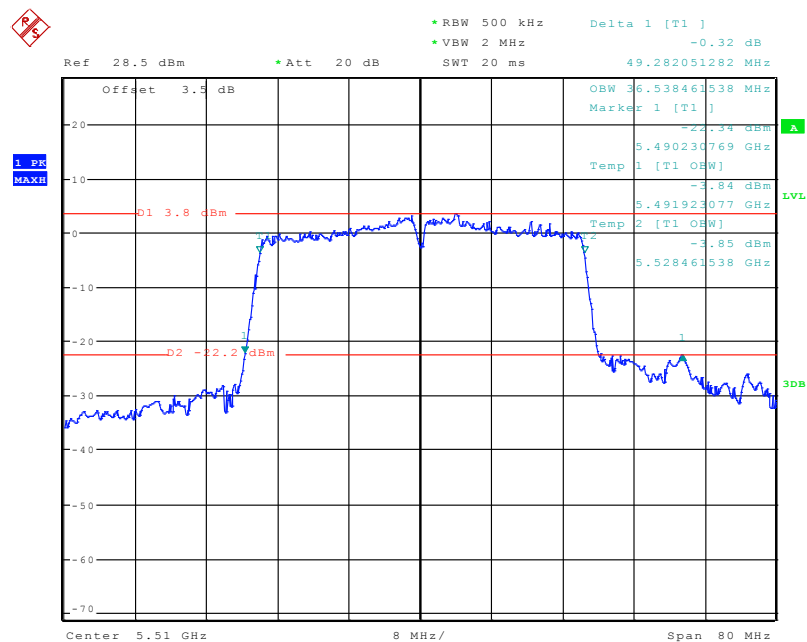
Date: 27.FEB.2020 15:48:36

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5580 MHz

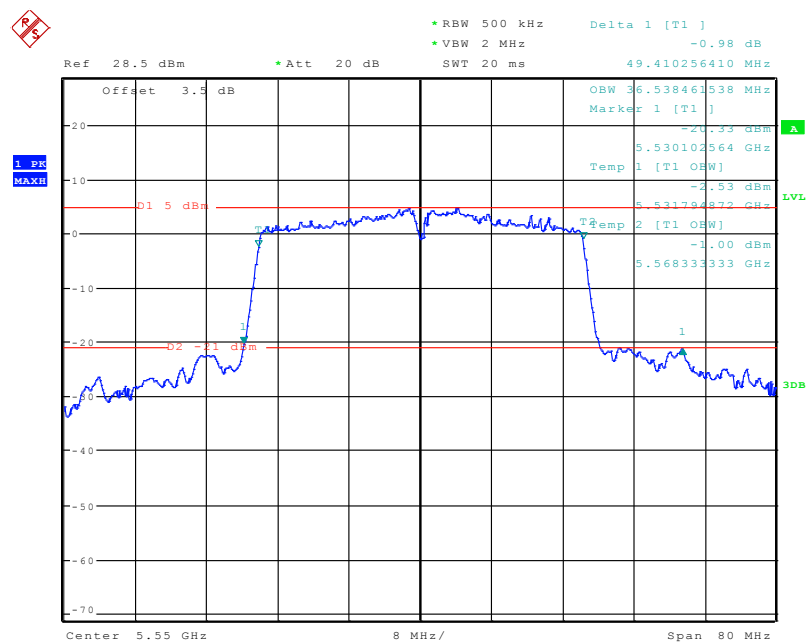
Date: 27.FEB.2020 15:46:25

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5700 MHz

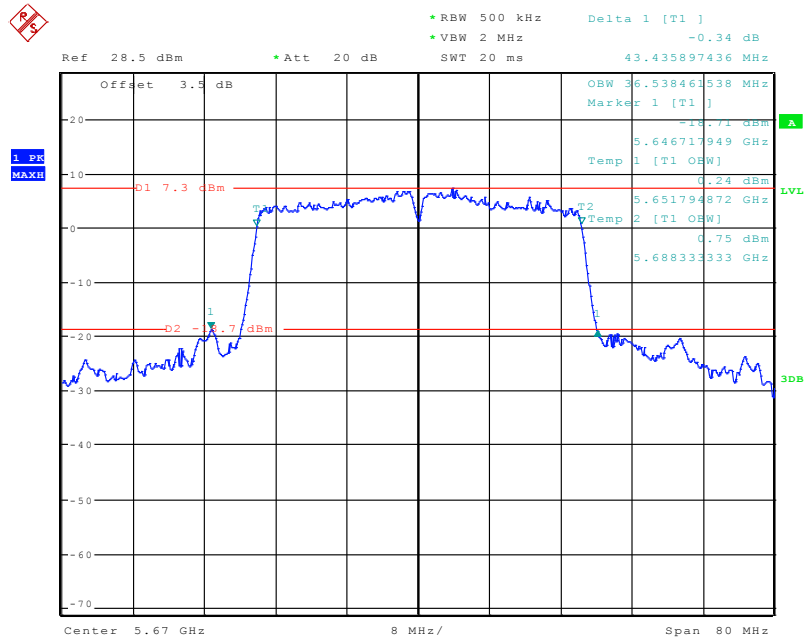
Date: 27.FEB.2020 15:45:02

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5510 MHz

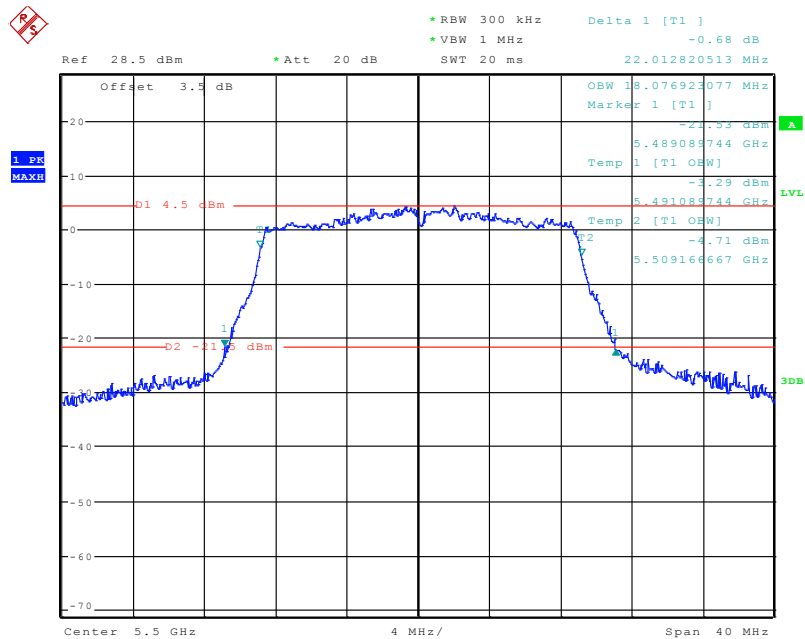
Date: 27.FEB.2020 15:39:05

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5550 MHz

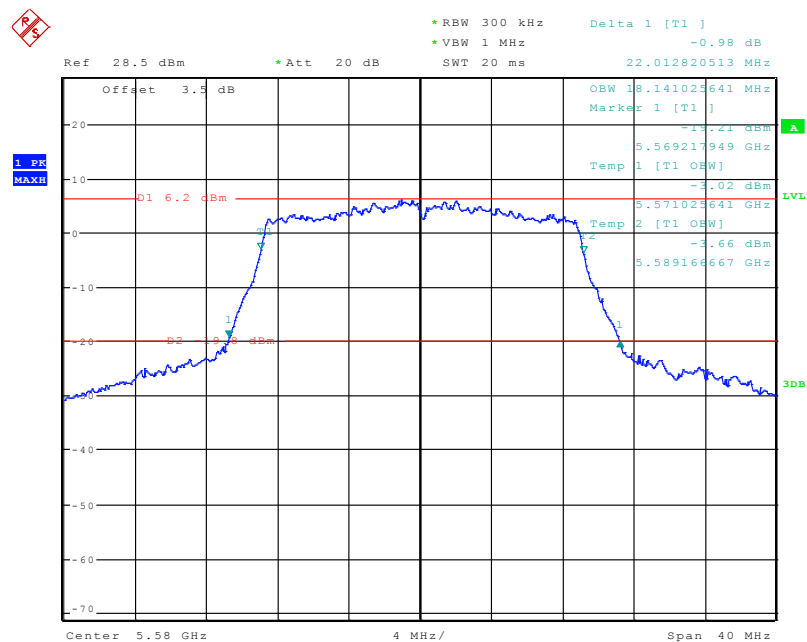
Date: 27.FEB.2020 15:37:26

802.11 n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5670 MHz

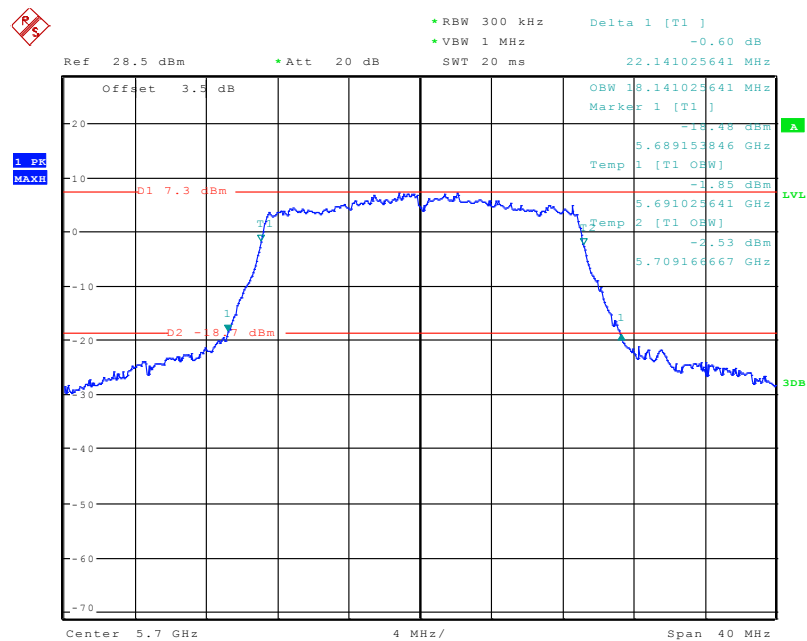
Date: 27.FEB.2020 15:34:47

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5500 MHz

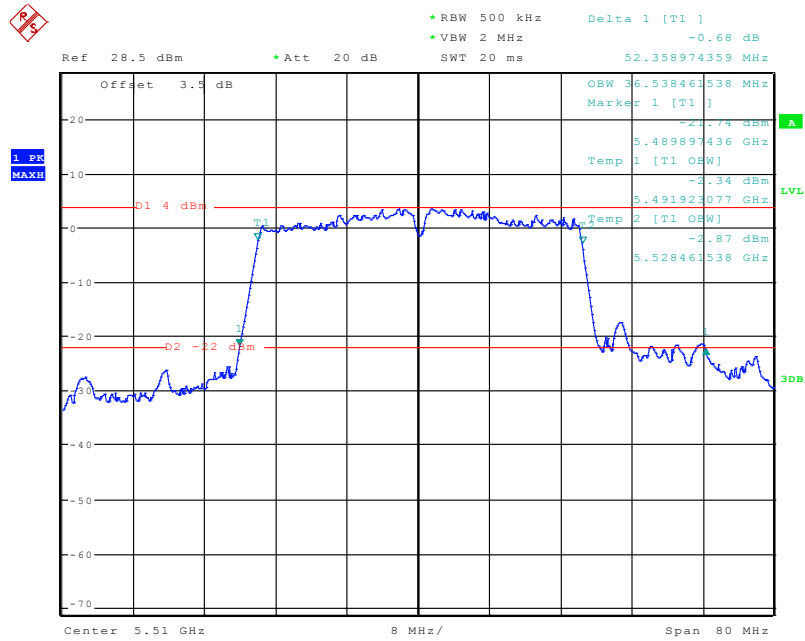
Date: 27.FEB.2020 15:50:16

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5580MHz

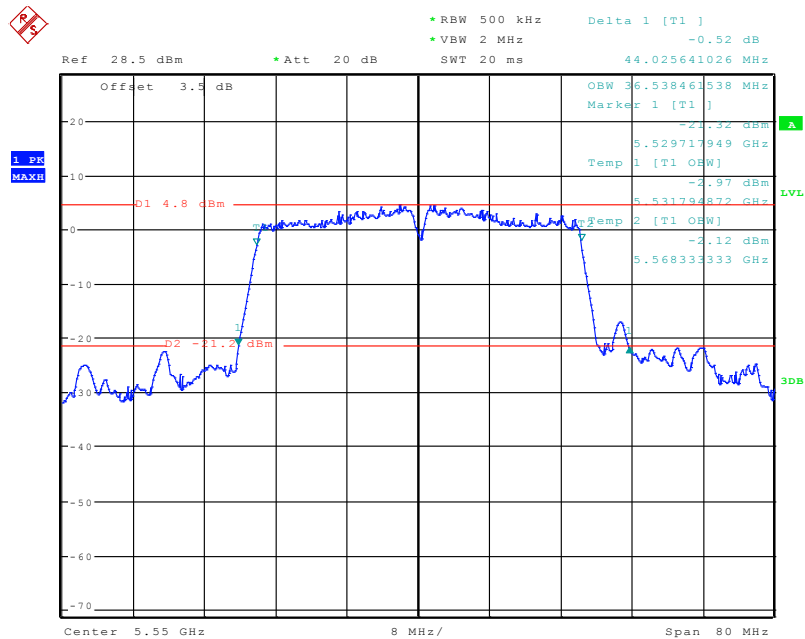
Date: 27.FEB.2020 15:52:20

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5700 MHz

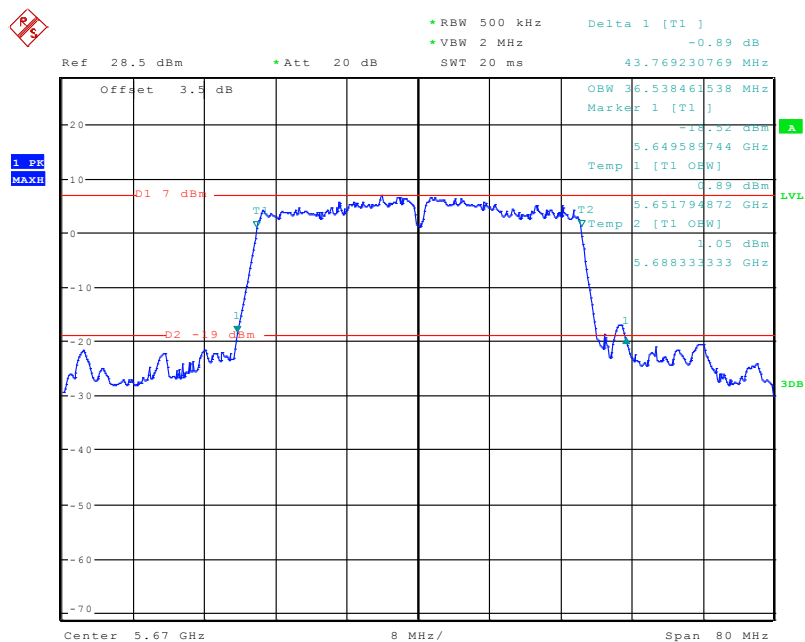
Date: 27.FEB.2020 15:55:13

802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5510 MHz

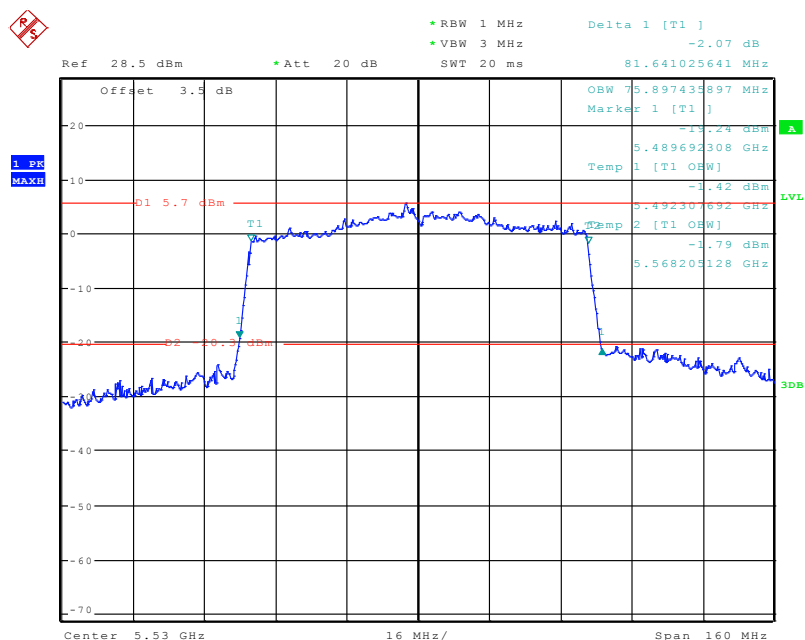
Date: 27.FEB.2020 15:28:18

802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5550 MHz

Date: 27.FEB.2020 15:31:30

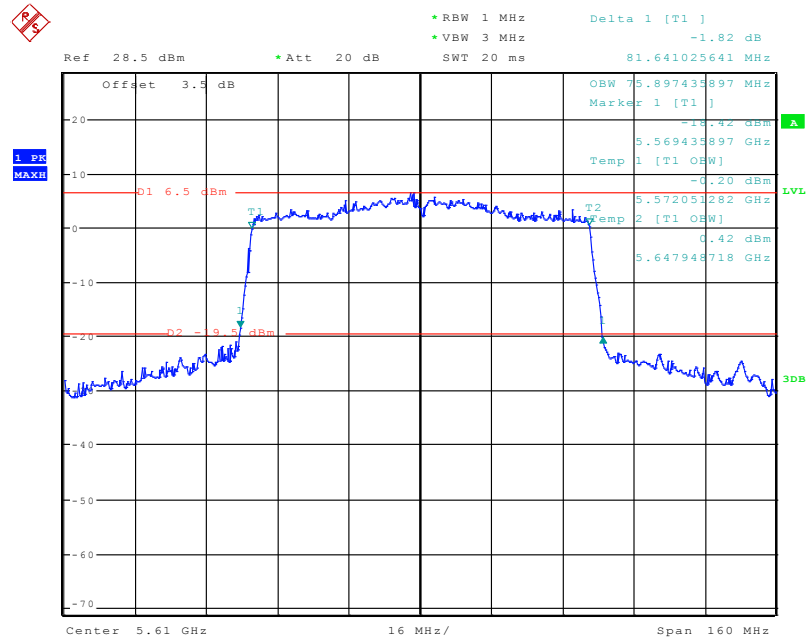
802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5670 MHz

Date: 27.FEB.2020 15:33:33

802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5530 MHz

Date: 27.FEB.2020 15:24:01

802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5610 MHz

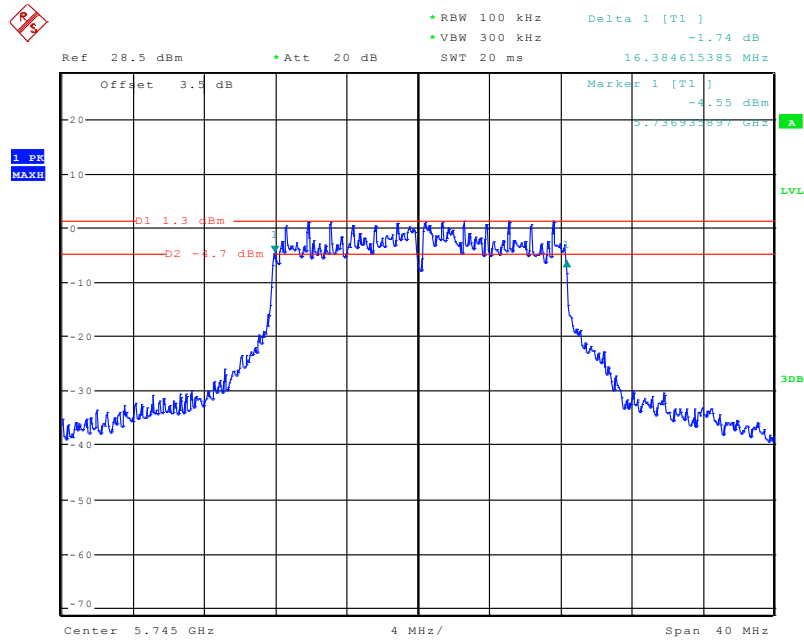


Date: 27.FEB.2020 15:26:16

5725 MHz – 5850 MHz:

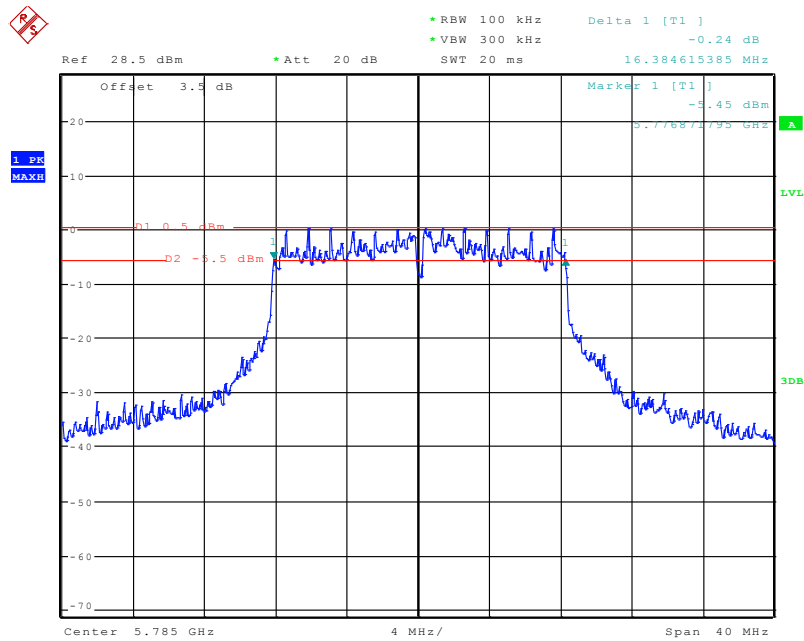
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Remark
802.11a				No transmitted signal in the 99% bandwidth extends into the U-NII-2C band
5745	16.38	16.79	0.5	
5785	16.38	16.79	0.5	
5825	16.44	16.79	0.5	
802.11n20				
5745	17.79	18.14	0.5	
5785	17.76	18.14	0.5	
5825	17.73	18.14	0.5	
802.11n40				
5755	36.49	36.41	0.5	
5795	36.65	36.67	0.5	
802.11ac20				
5745	17.73	18.14	0.5	
5785	17.73	18.21	0.5	
5825	17.73	18.21	0.5	
802.11ac40				
5755	36.73	36.67	0.5	
5795	36.65	36.92	0.5	
802.11ac80				
5775	75.41	75.90	0.5	

802.11a mode, 6dB Emission Bandwidth, 5745 MHz

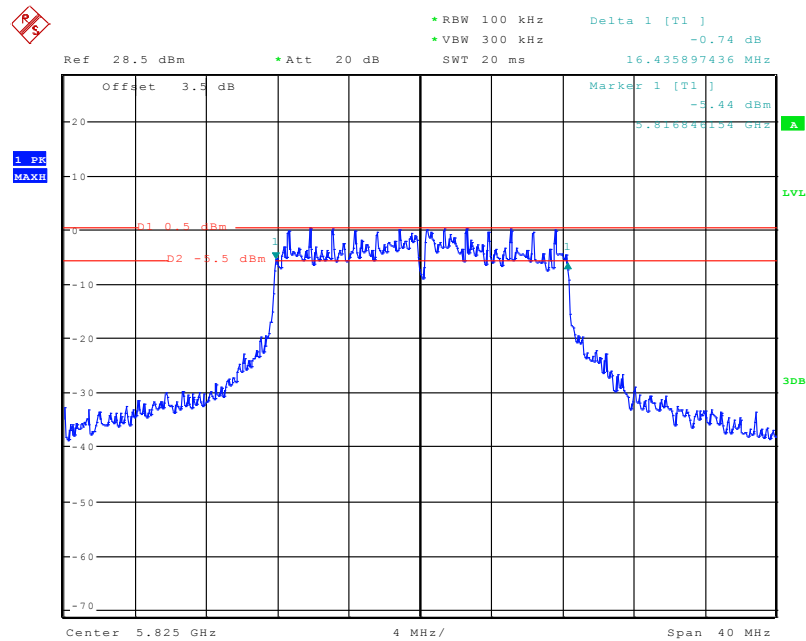


Date: 27.FEB.2020 16:49:24

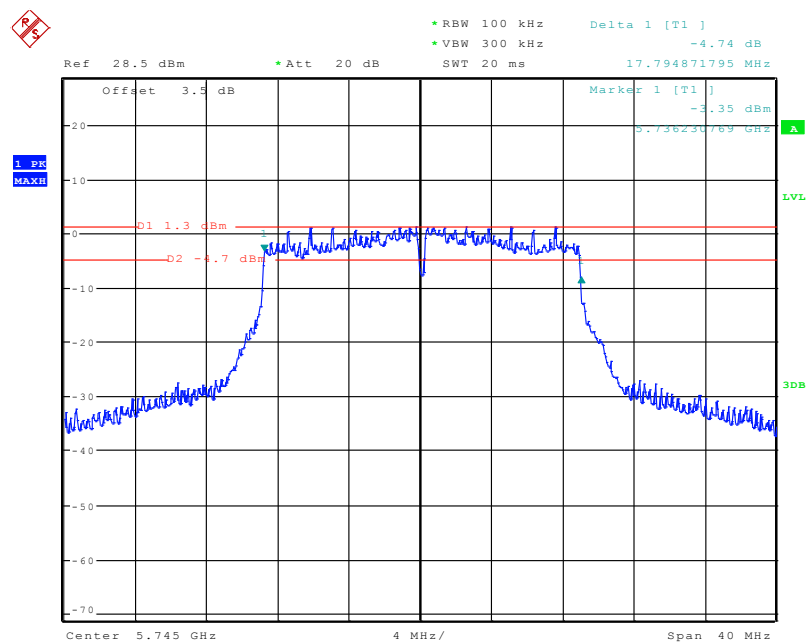
802.11a mode, 6dB Emission Bandwidth, 5785 MHz



Date: 27.FEB.2020 16:48:12

802.11a mode, 6dB Emission Bandwidth, 5825 MHz

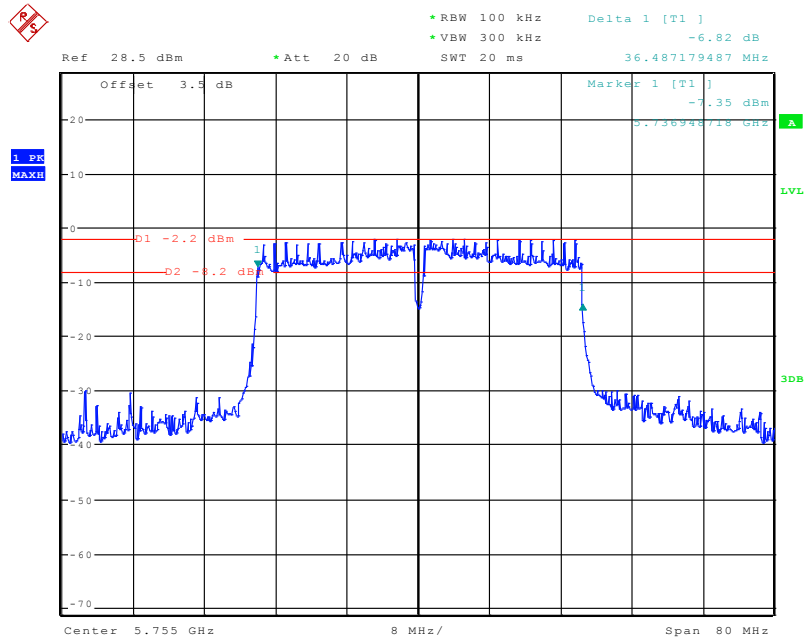
Date: 27.FEB.2020 16:46:39

802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz

Date: 27.FEB.2020 16:51:33

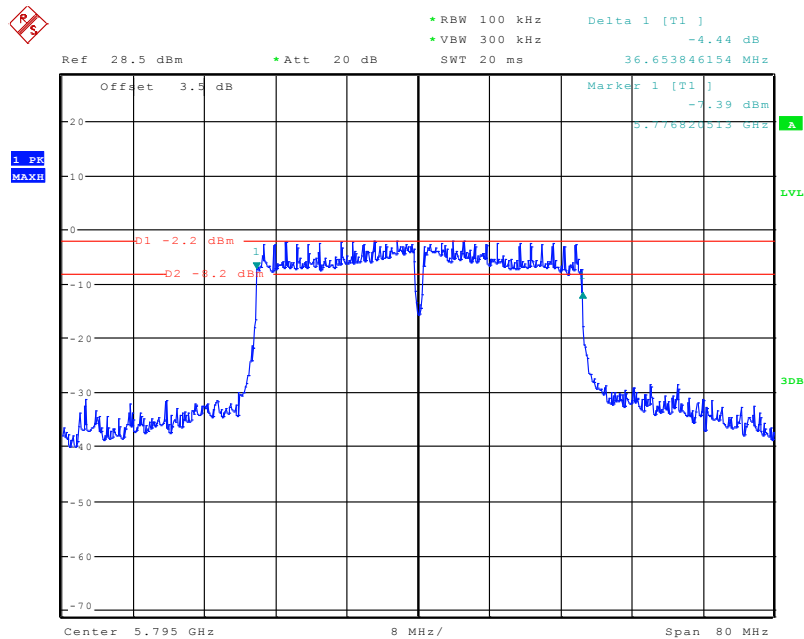


802.11n40 mode, 6dB Emission Bandwidth, 5755 MHz

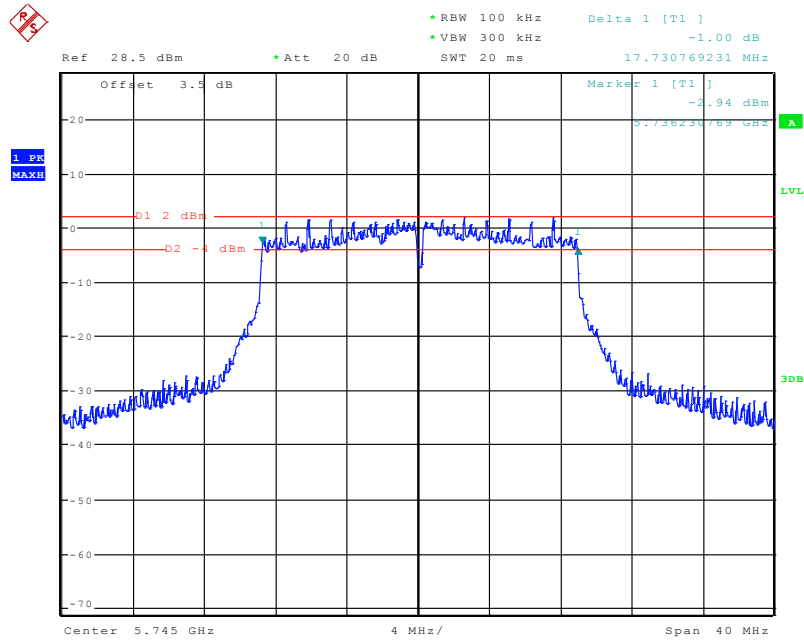


Date: 27.FEB.2020 17:05:59

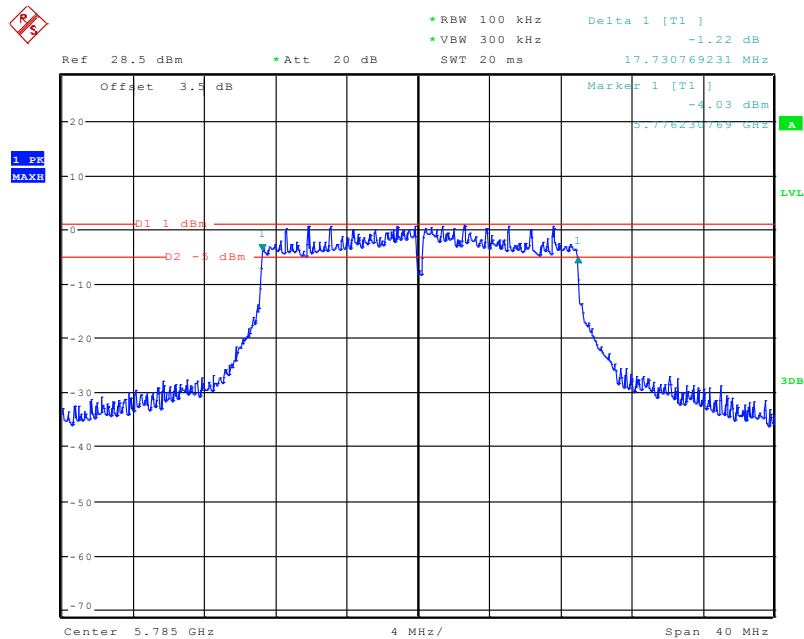
802.11n40 mode, 6dB Emission Bandwidth, 5795 MHz



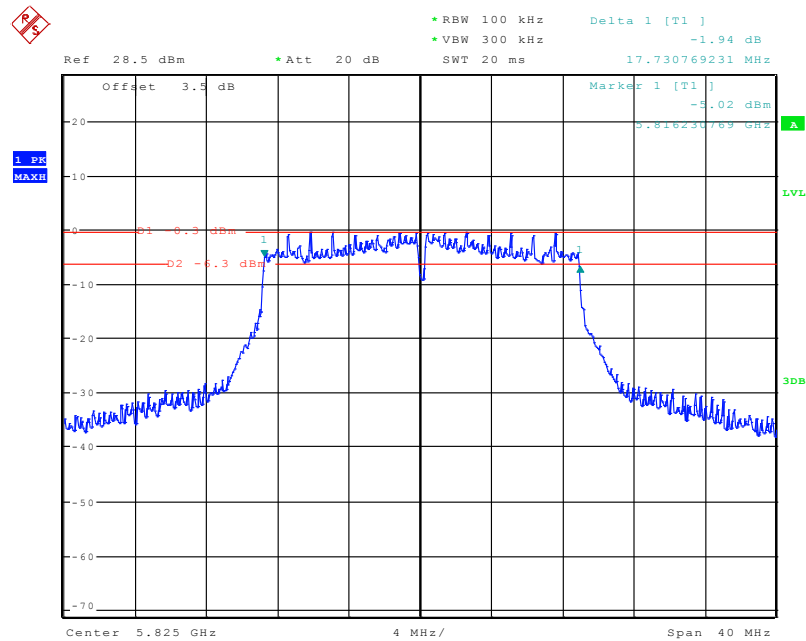
Date: 27.FEB.2020 17:04:13

802.11ac20 mode, 6dB Emission Bandwidth, 5745 MHz

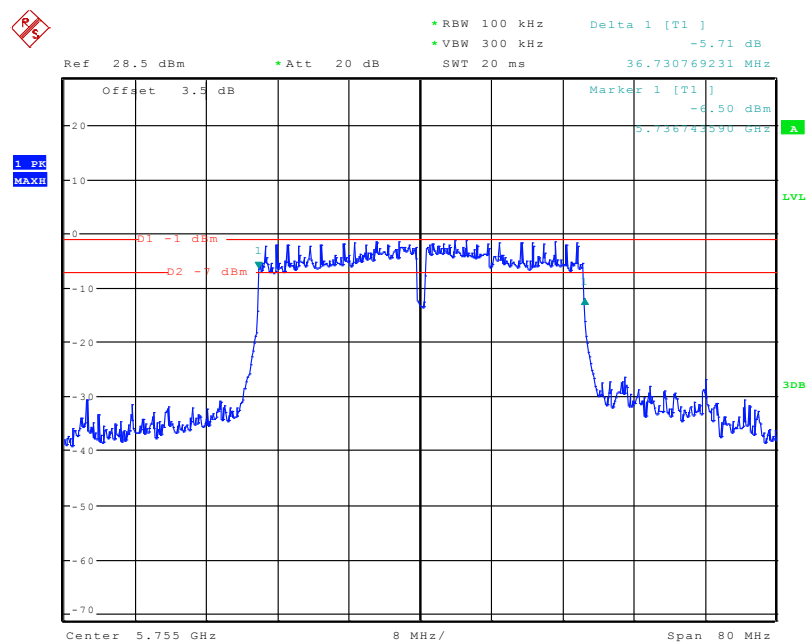
Date: 27.FEB.2020 16:58:32

802.11ac20 mode, 6dB Emission Bandwidth, 5785 MHz

Date: 27.FEB.2020 16:57:21

802.11ac20 mode, 6dB Emission Bandwidth, 5825 MHz

Date: 27.FEB.2020 16:55:54

802.11ac40 mode, 6dB Emission Bandwidth, 5755 MHz

Date: 27.FEB.2020 17:01:07

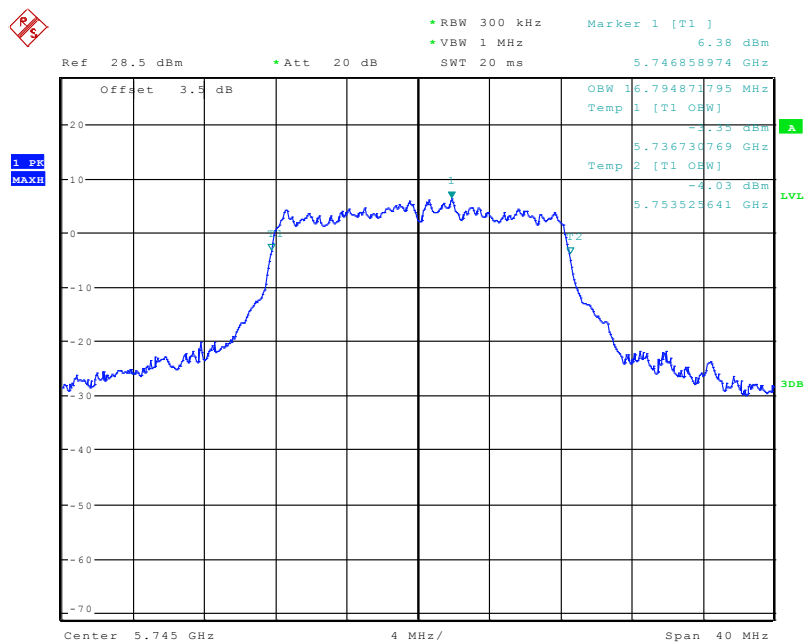


LVL



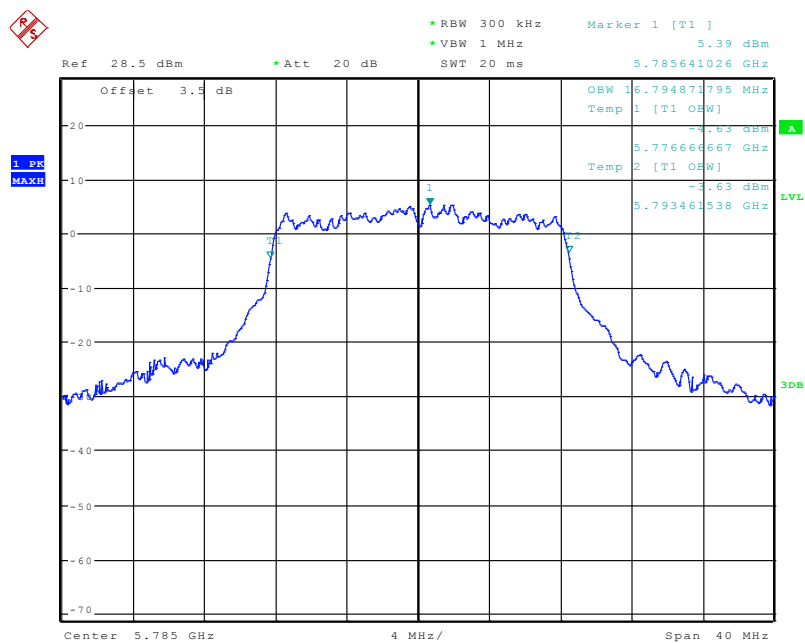
T.V.T.

802.11a mode, 99% Occupied Bandwidth, 5745 MHz

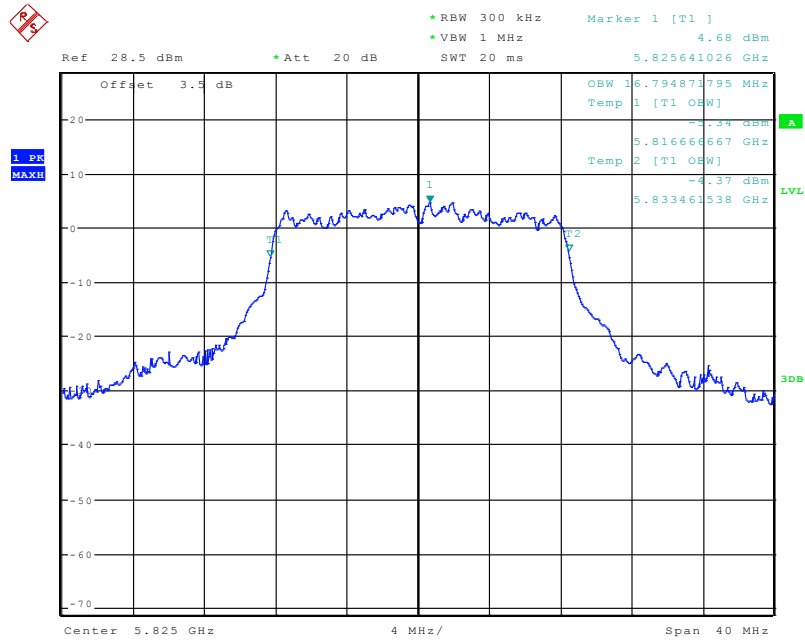


Date: 27.FEB.2020 16:01:38

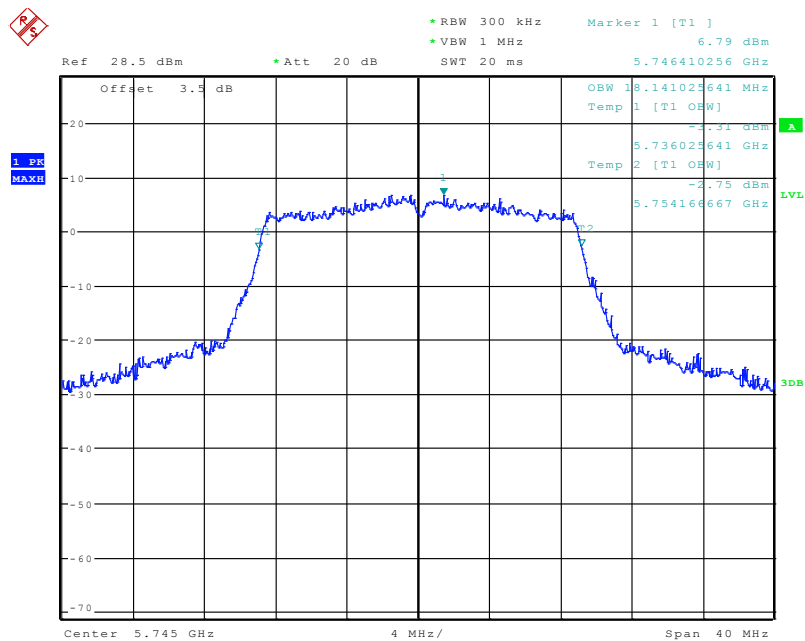
802.11a mode, 99% Occupied Bandwidth, 5785 MHz



Date: 27.FEB.2020 16:03:14

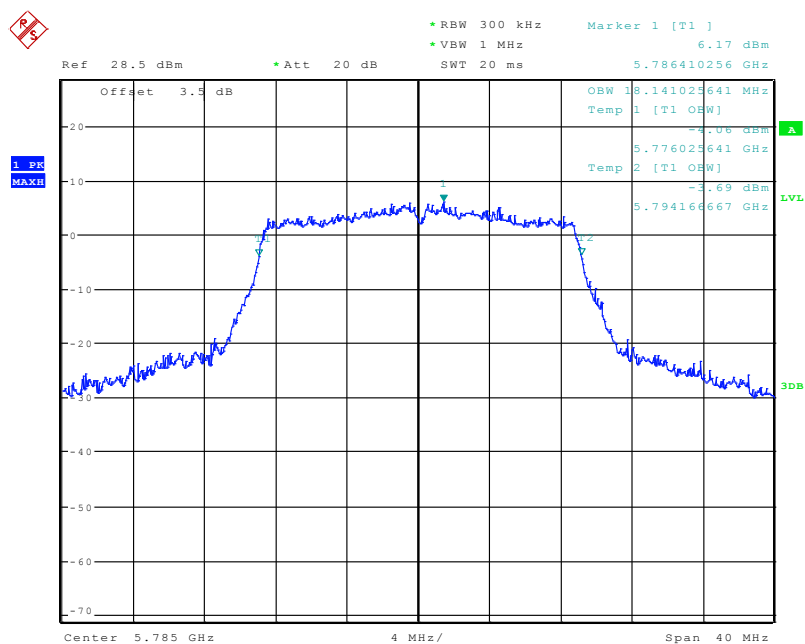
802.11a mode, 99% Occupied Bandwidth, 5825 MHz

Date: 27.FEB.2020 16:03:56

802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz

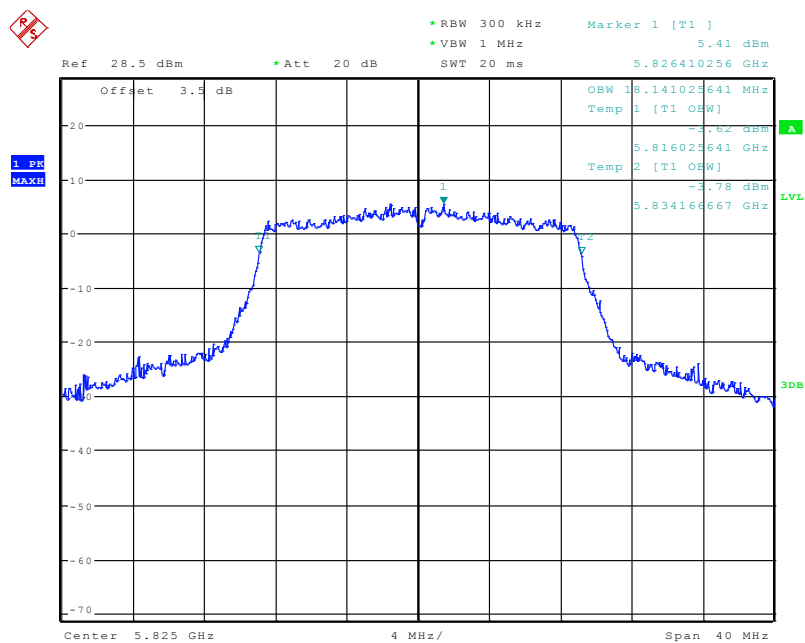
Date: 27.FEB.2020 16:05:45

802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



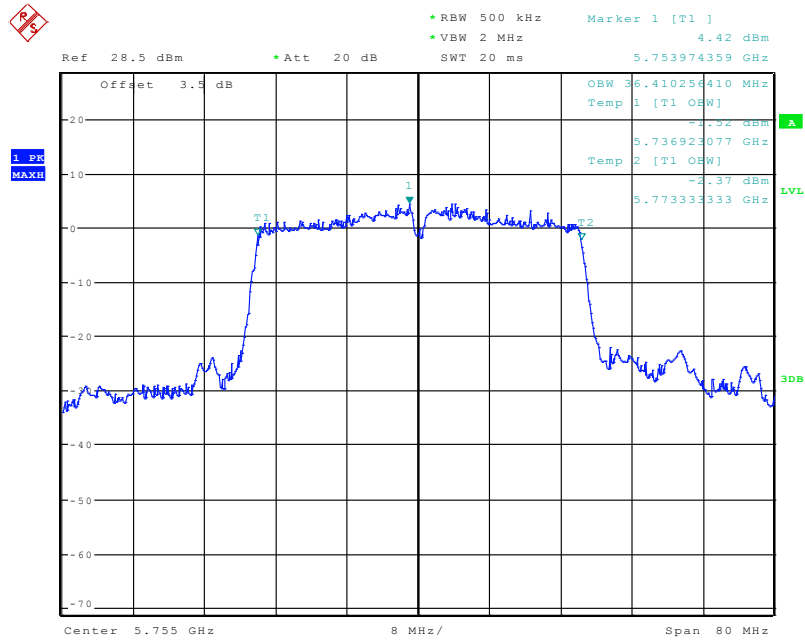
Date: 27.FEB.2020 16:05:17

802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



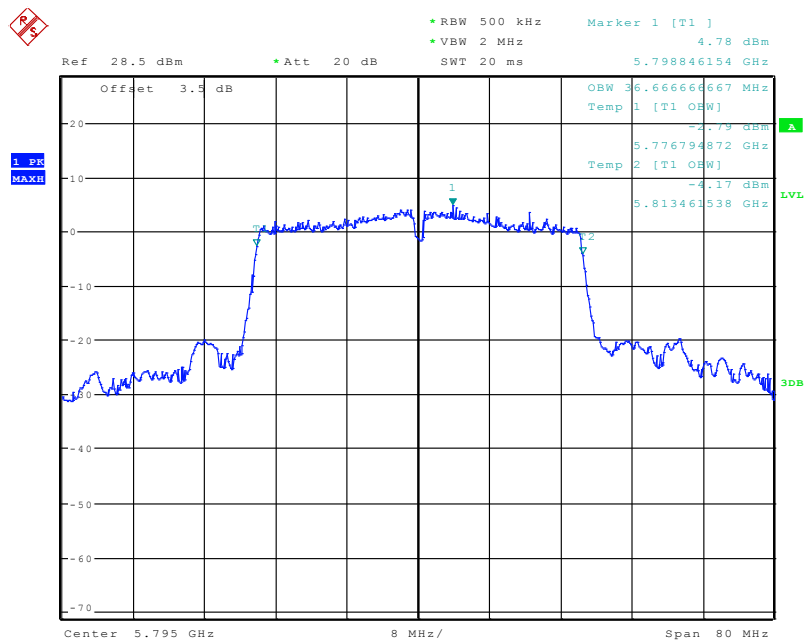
Date: 27.FEB.2020 16:04:50

802.11n40 mode, 99% Occupied Bandwidth, 5755 MHz



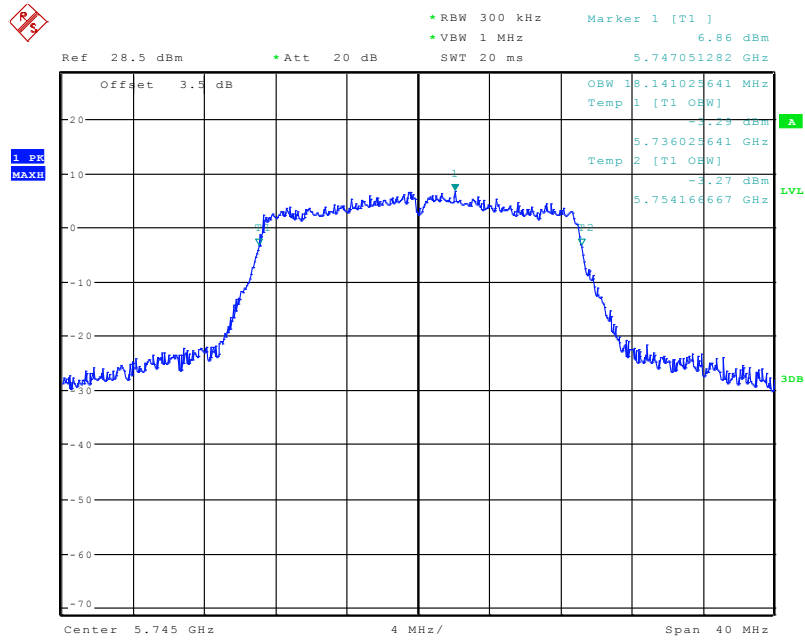
Date: 27.FEB.2020 16:15:47

802.11n40 mode, 99% Occupied Bandwidth, 5795 MHz



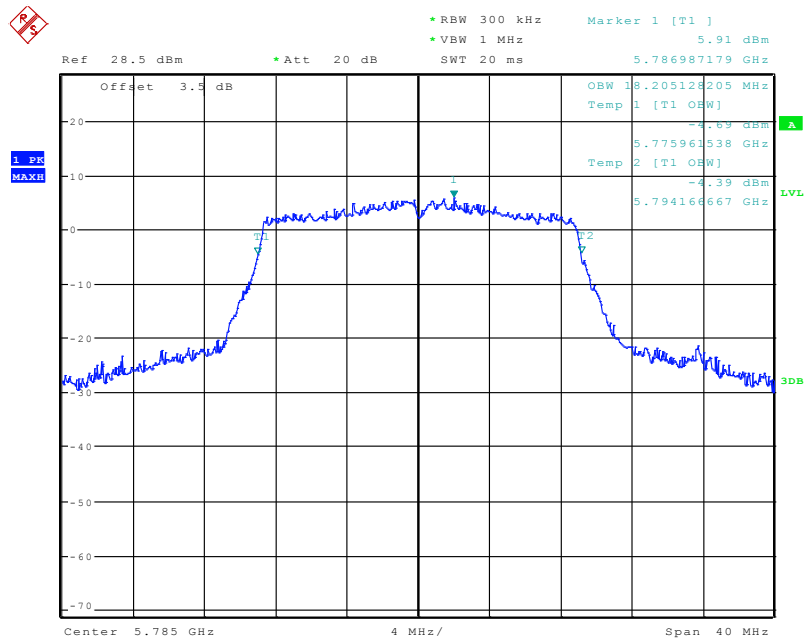
Date: 27.FEB.2020 16:16:43

802.11ac20 mode, 99% Occupied Bandwidth, 5745 MHz

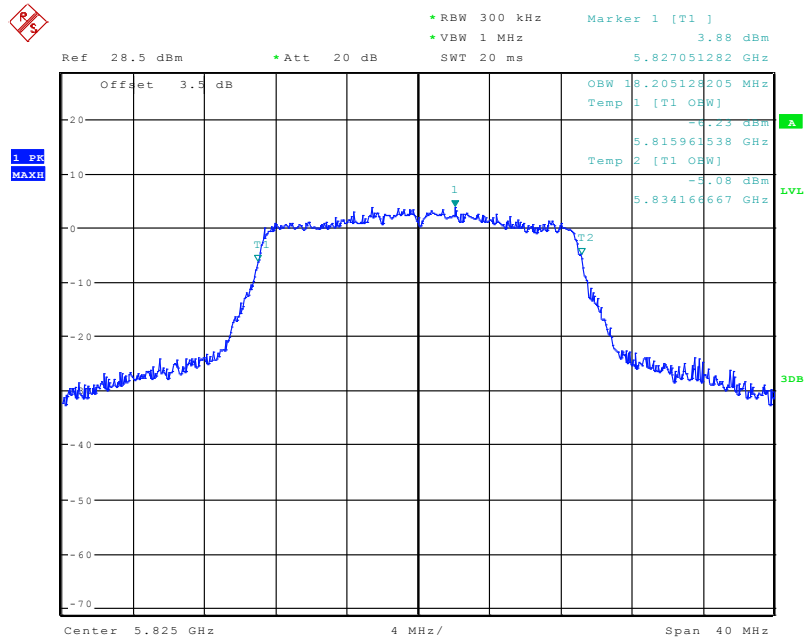


Date: 27.FEB.2020 16:06:32

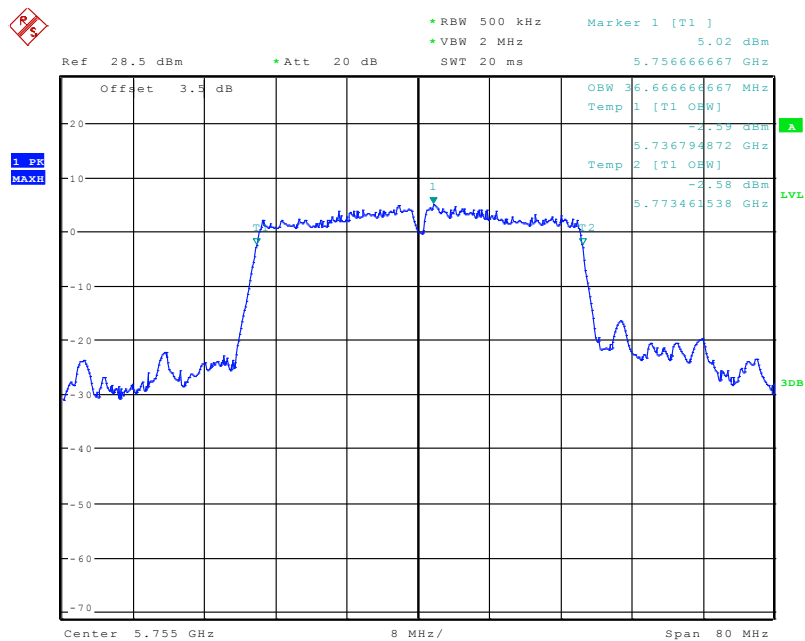
802.11ac20 mode, 99% Occupied Bandwidth, 5785 MHz



Date: 27.FEB.2020 16:07:27

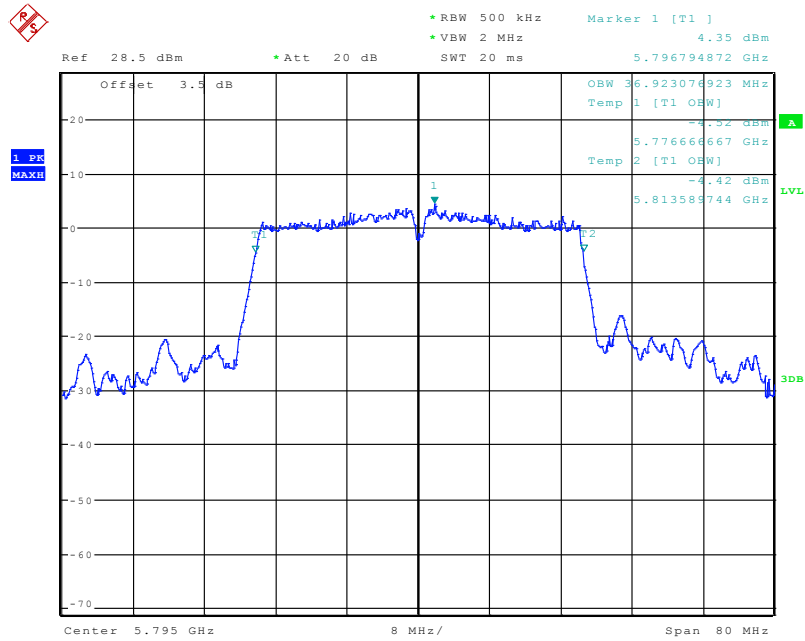
802.11ac20 mode, 99% Occupied Bandwidth, 5825 MHz

Date: 27.FEB.2020 16:07:48

802.11ac40 mode, 99% Occupied Bandwidth, 5755 MHz

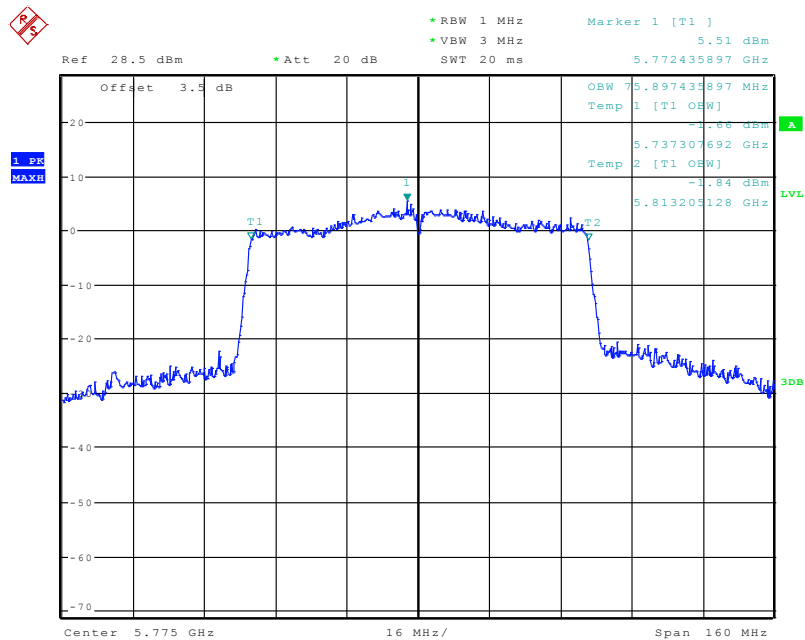
Date: 27.FEB.2020 16:09:12

802.11ac40 mode, 99% Occupied Bandwidth, 5795 MHz



Date: 27.FEB.2020 16:13:43

802.11ac80 mode, 99% Occupied Bandwidth, 5775 MHz



Date: 27.FEB.2020 16:20:17

FCC §15.407(a)(1)(2)(3) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

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

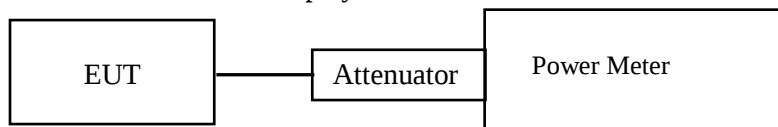
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting 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 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. 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 George Zhong on 2020-02-20.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

5150 MHz – 5250 MHz

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5180	14.33	24
5200	13.96	
5240	13.07	
802.11n20		
5180	14.06	24
5200	13.90	
5240	13.28	
802.11n40		
5190	12.91	24
5230	13.14	
802.11ac20		
5180	14.22	24
5200	13.93	
5240	13.19	
802.11ac40		
5190	13.76	24
5230	13.07	
802.11ac80		
5210	12.53	24

5250 MHz – 5350 MHz

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5260	12.60	24
5280	12.15	
5320	11.63	
802.11n20		
5260	12.58	24
5280	12.11	
5320	11.58	
802.11n40		
5270	12.17	24
5310	11.58	
802.11ac20		
5260	12.56	24
5280	12.25	
5320	11.54	
802.11ac40		
5270	12.15	24
5310	11.57	
802.11ac80		
5290	11.45	24

5470 MHz – 5725 MHz

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5500	11.04	24
5580	12.63	
5700	14.26	
802.11n20		
5500	11.09	24
5580	12.65	
5700	14.29	
802.11n40		
5510	12.19	24
5550	12.72	
5670	14.59	
802.11ac20		
5500	10.93	24
5580	12.36	
5700	14.16	
802.11ac40		
5510	11.25	24
5550	11.94	
5670	14.81	
802.11ac80		
5530	11.64	24
5610	13.21	

5725 MHz – 5825 MHz:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5745	13.43	30
5785	12.45	
5825	11.38	
802.11n20		
5745	13.21	30
5785	12.32	
5825	11.33	
802.11n40		
5755	12.29	30
5795	12.10	
802.11ac20		
5745	13.24	30
5785	12.48	
5825	11.09	
802.11ac40		
5755	13.07	30
5795	12.21	
802.11ac80		
5775	12.06	30

FCC §15.407(a) (1) (2) (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 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. 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 ($< 1 \text{ MHz}$, or $< 500 \text{ kHz}$) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set $\text{RBW} \geq 1/T$, where T is defined in section II.B.1.a).
- b) Set $\text{VBW} \geq 3 \text{ RBW}$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500 \text{ kHz}/\text{RBW})$ to the measured result, whereas $\text{RBW} (< 500 \text{ kHz})$ 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 $10 \log (1\text{MHz}/\text{RBW})$ to the measured result, whereas $\text{RBW} (< 1 \text{ MHz})$ 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 George Zhong from 2020-02-26 to 2020-05-06.

EUT operation mode: Transmitting

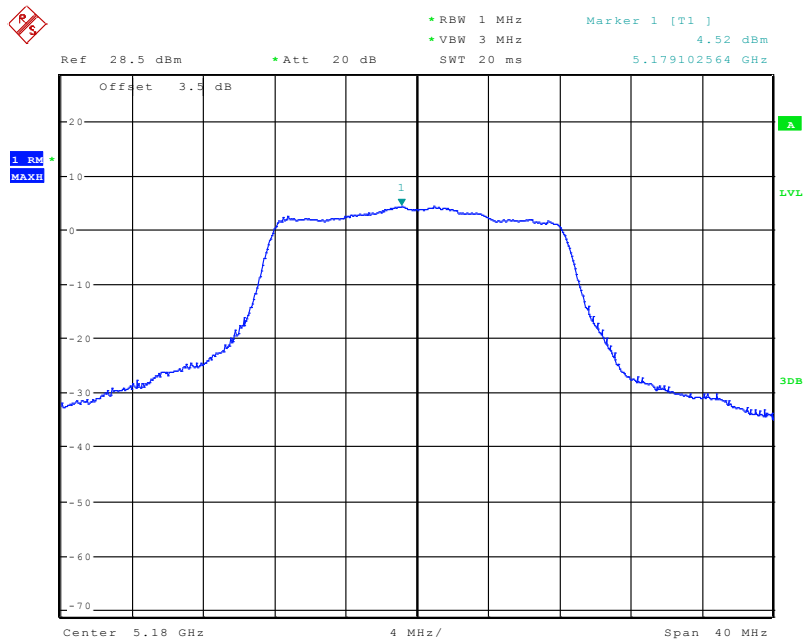
Test Result: Pass

Please refer to the following tables and plots.

5150 MHz – 5250MHz:

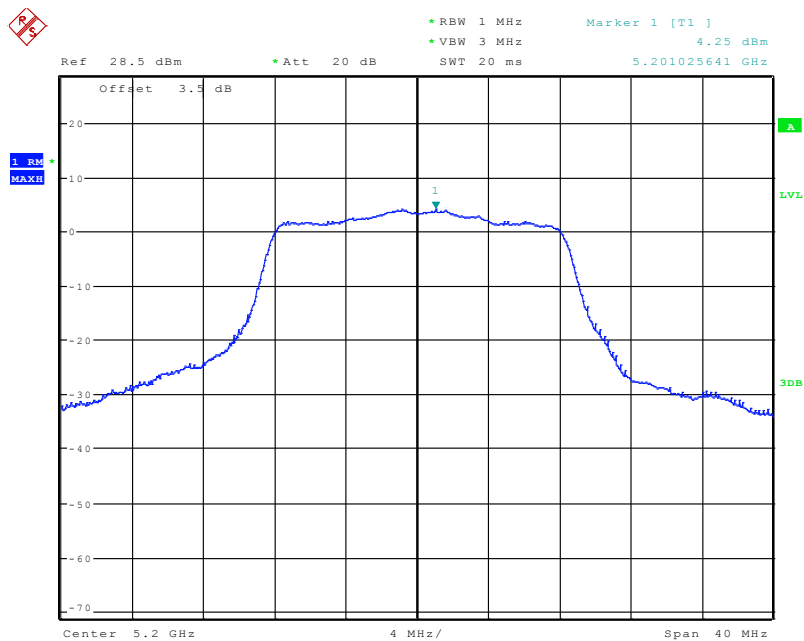
Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5180	4.52	11
5200	4.25	
5240	3.05	
802.11n20		
5180	4.17	11
5200	4.00	
5240	2.96	
802.11n40		
5190	0.02	11
5230	0.19	
802. 11ac20		
5180	4.27	11
5200	3.95	
5240	2.89	
802. 11ac40		
5190	0.94	11
5230	-0.06	
802. 11ac80		
5210	-2.63	11

802.11a mode, Power Spectral Density, 5180 MHz



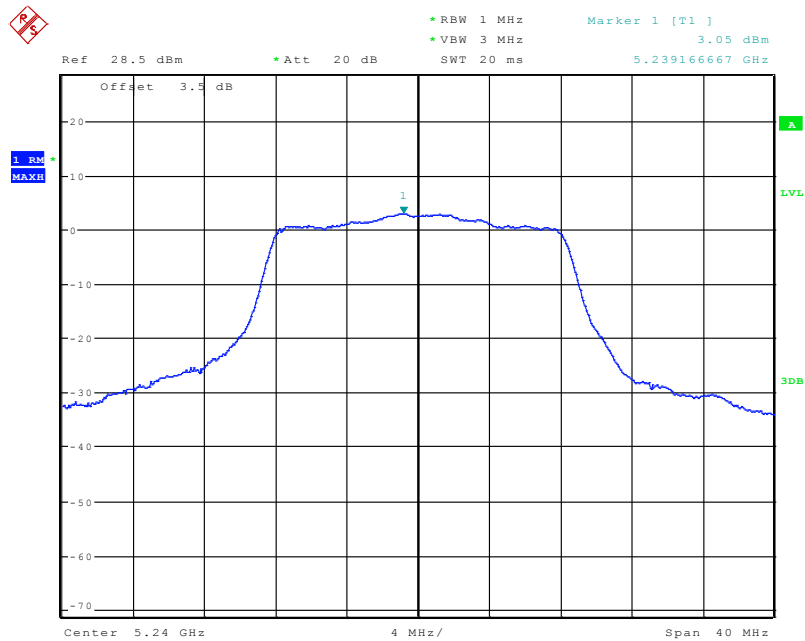
Date: 26.FEB.2020 15:11:39

802.11a mode, Power Spectral Density, 5200 MHz



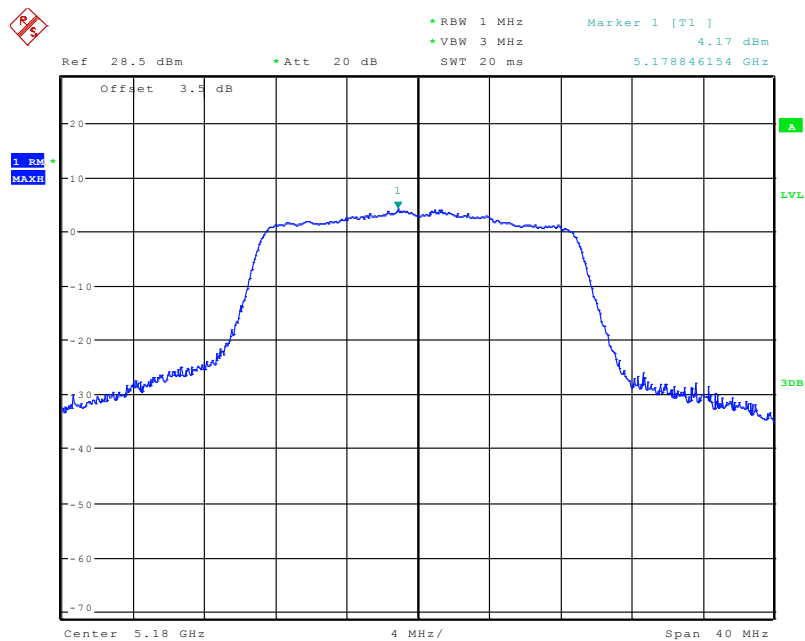
Date: 26.FEB.2020 15:12:01

802.11a mode, Power Spectral Density, 5240 MHz



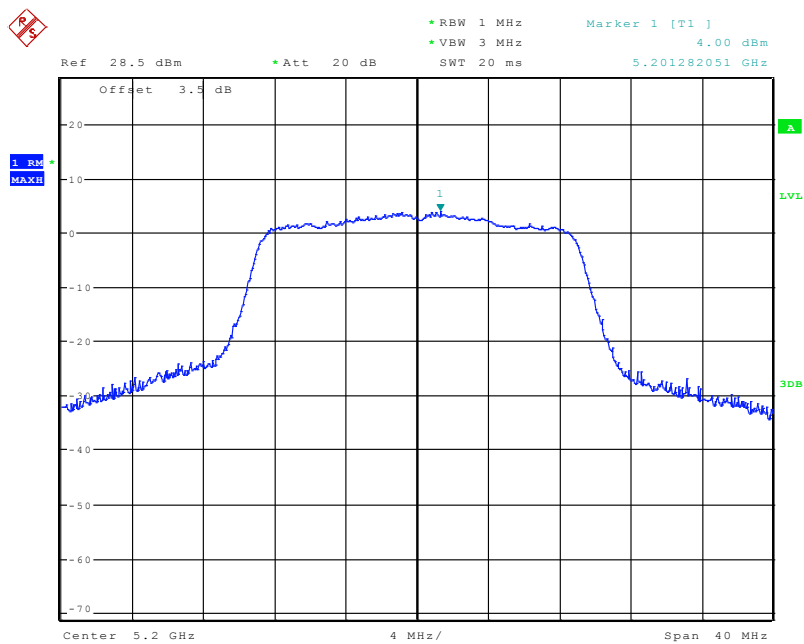
Date: 26.FEB.2020 15:12:23

802.11n20 mode, Power Spectral Density, 5180 MHz



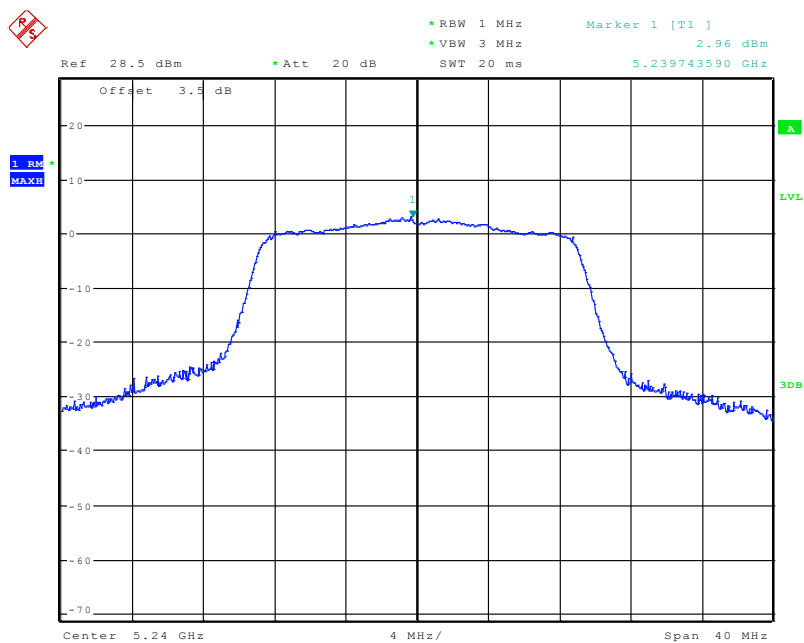
Date: 26.FEB.2020 15:13:46

802.11n20 mode, Power Spectral Density, 5200 MHz



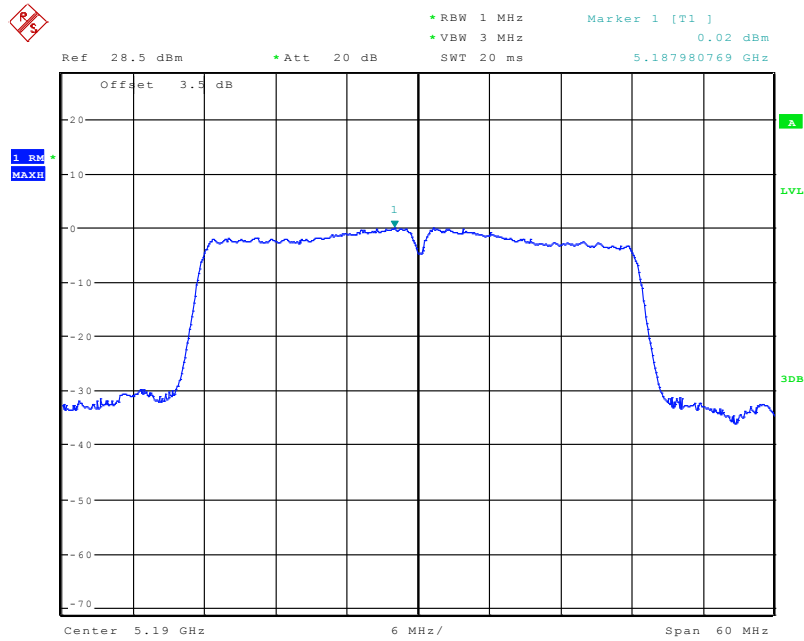
Date: 26.FEB.2020 15:13:23

802.11n20 mode, Power Spectral Density, 5240 MHz



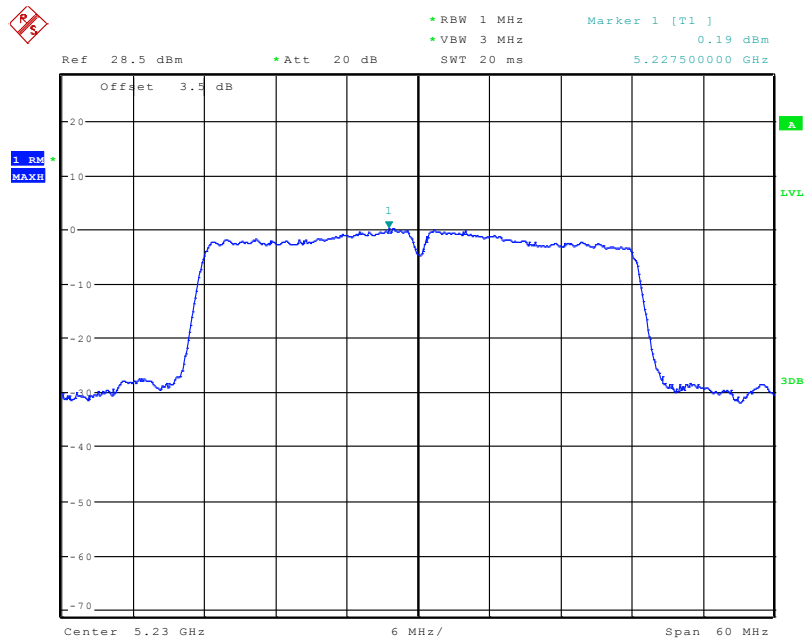
Date: 26.FEB.2020 15:13:01

802.11n40 mode, Power Spectral Density, 5190 MHz

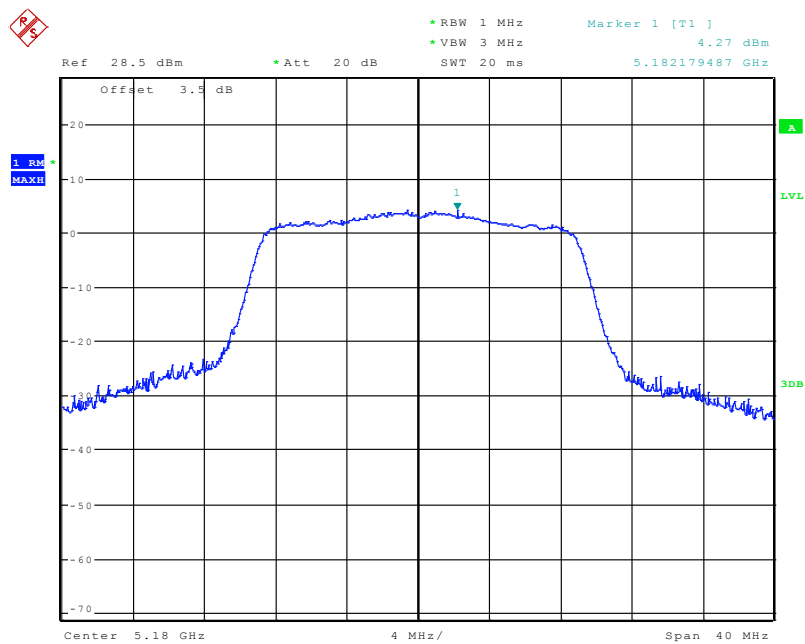


Date: 26.FEB.2020 15:11:02

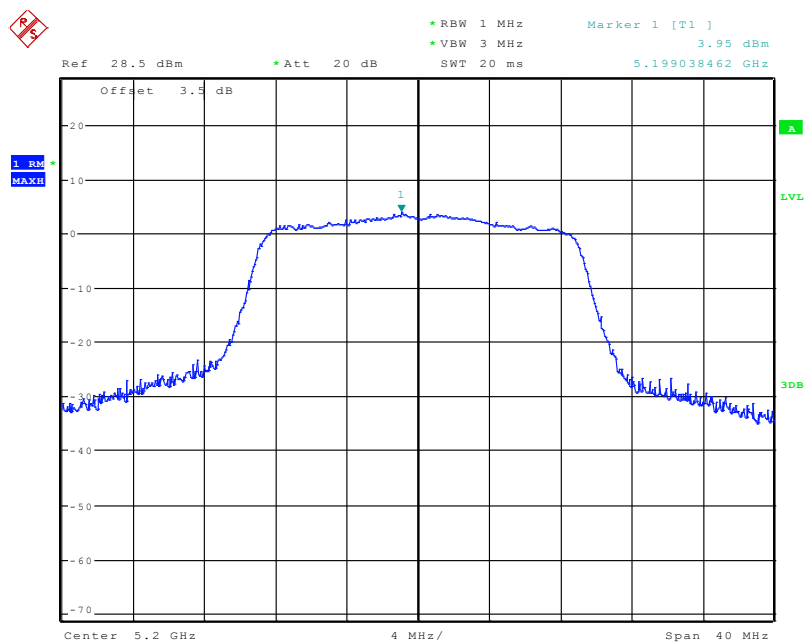
802.11n40 mode, Power Spectral Density, 5230 MHz



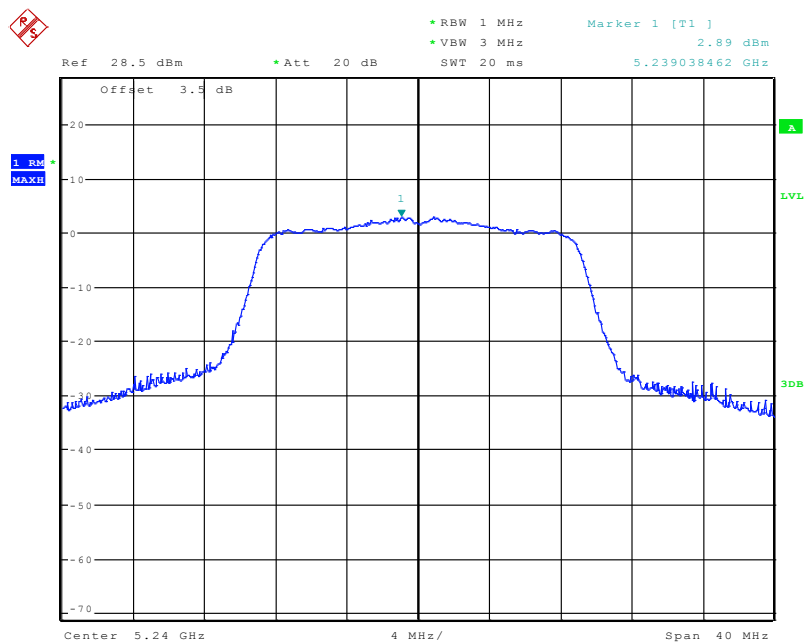
Date: 26.FEB.2020 15:09:59

802.11ac20 mode, Power Spectral Density, 5180 MHz

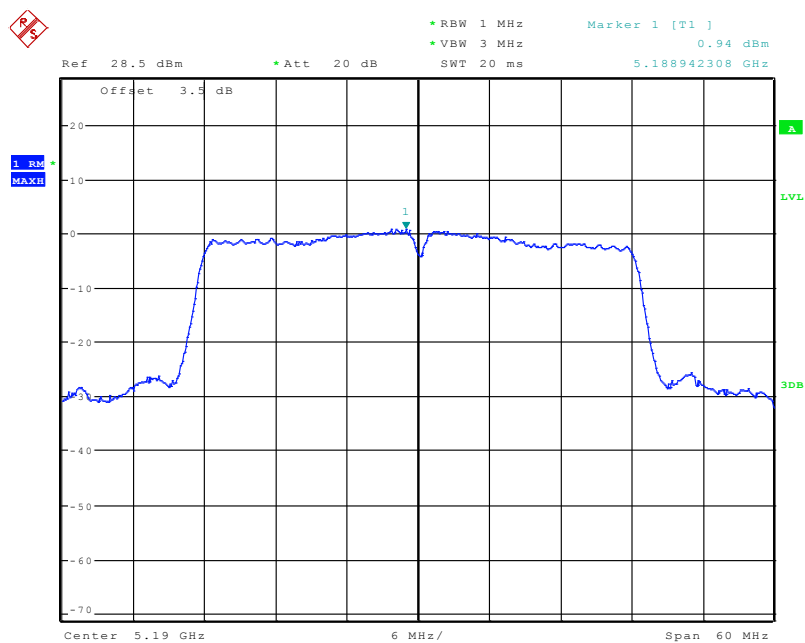
Date: 26.FEB.2020 15:14:10

802.11ac20 mode, Power Spectral Density, 5200 MHz

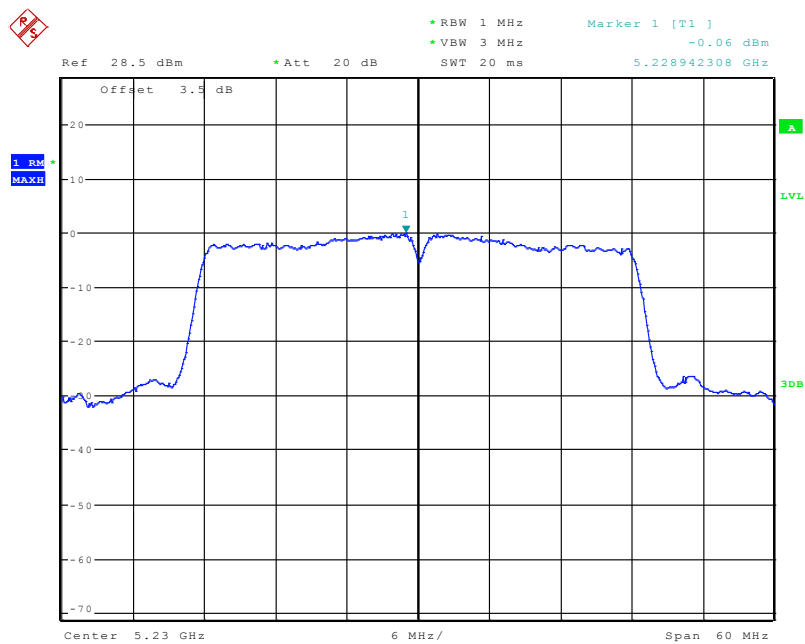
Date: 26.FEB.2020 15:14:35

802.11ac20 mode, Power Spectral Density, 5240 MHz

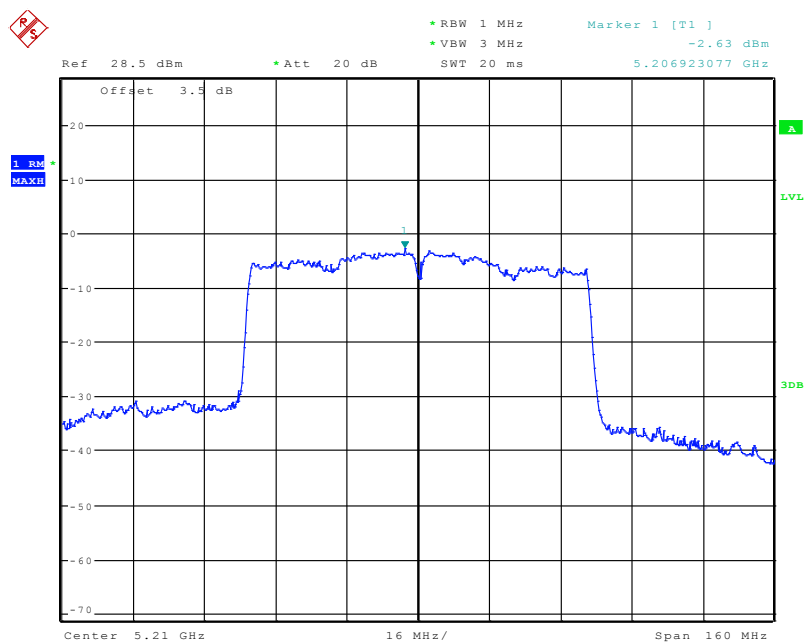
Date: 26.FEB.2020 15:14:59

802.11ac40 mode, Power Spectral Density, 5190 MHz

Date: 26.FEB.2020 15:08:59

802.11ac40 mode, Power Spectral Density, 5230 MHz

Date: 26.FEB.2020 15:09:25

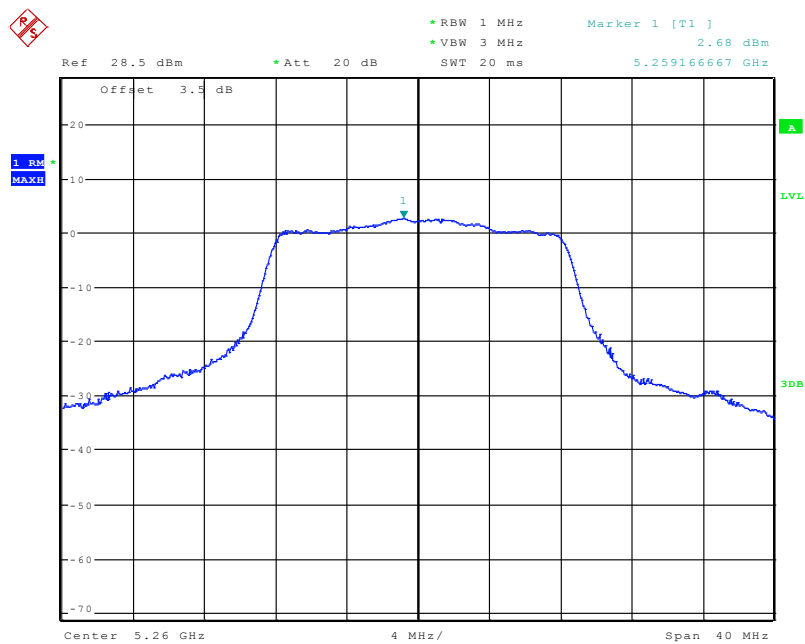
802.11ac80 mode, Power Spectral Density, 5210 MHz

Date: 26.FEB.2020 15:08:19

5250 MHz – 5350 MHz:

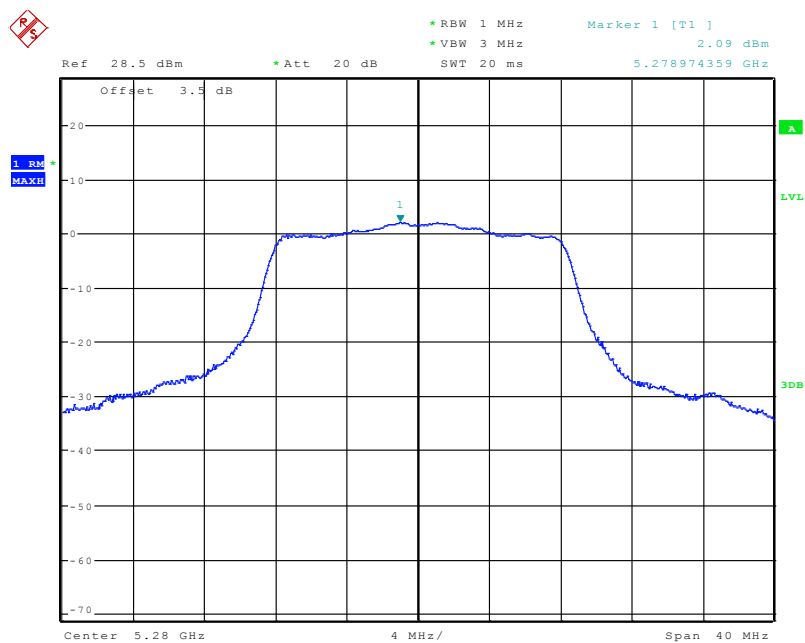
Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5260	2.68	11
5280	2.09	
5320	1.60	
802.11n20		
5260	2.53	11
5280	2.14	
5320	1.60	
802.11n40		
5270	-1.74	11
5310	-1.61	
802. 11ac20		
5260	2.72	11
5280	2.25	
5320	1.56	
802. 11ac40		
5270	-0.89	11
5310	-1.18	
802. 11ac80		
5290	-4.53	11

802.11a mode, Power Spectral Density, 5260 MHz



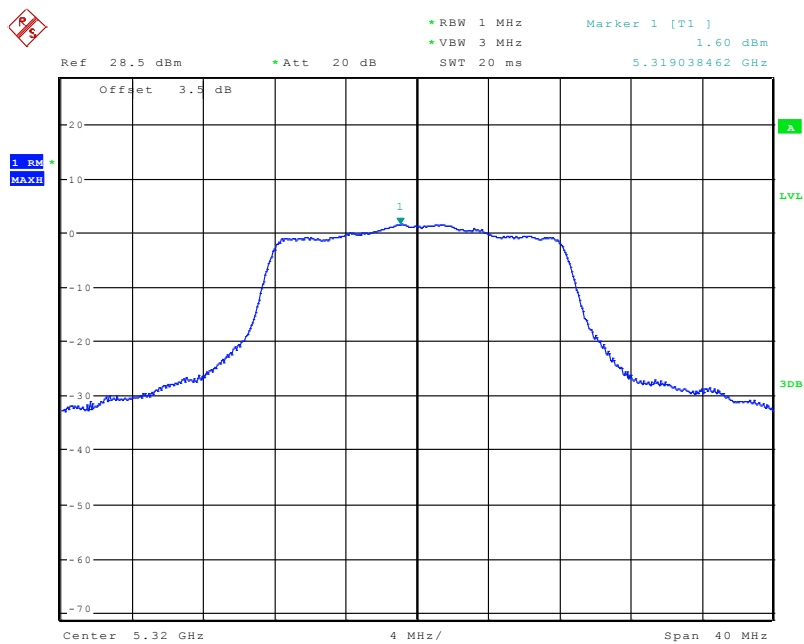
Date: 26.FEB.2020 17:02:40

802.11a mode, Power Spectral Density, 5280 MHz



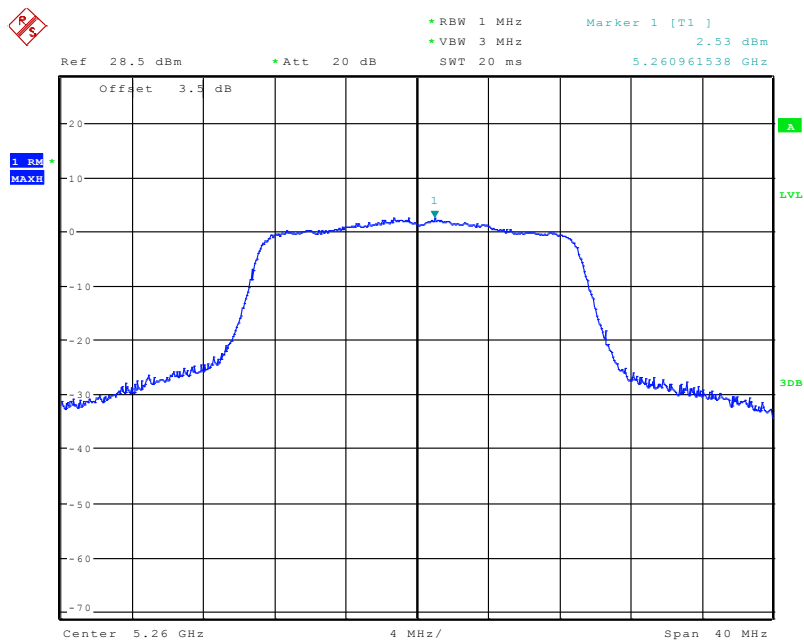
Date: 26.FEB.2020 17:03:11

802.11a mode, Power Spectral Density, 5320 MHz



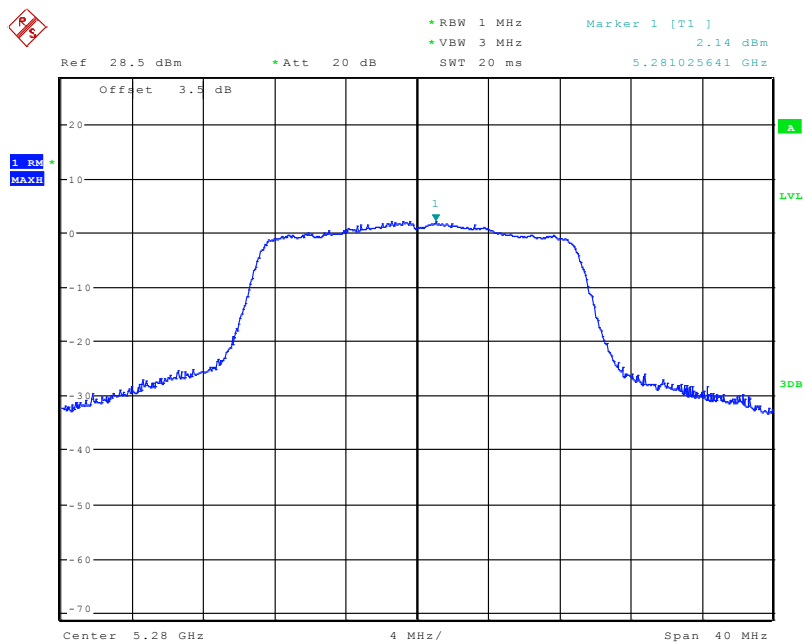
Date: 26.FEB.2020 17:03:31

802.11n20 mode, Power Spectral Density, 5260 MHz



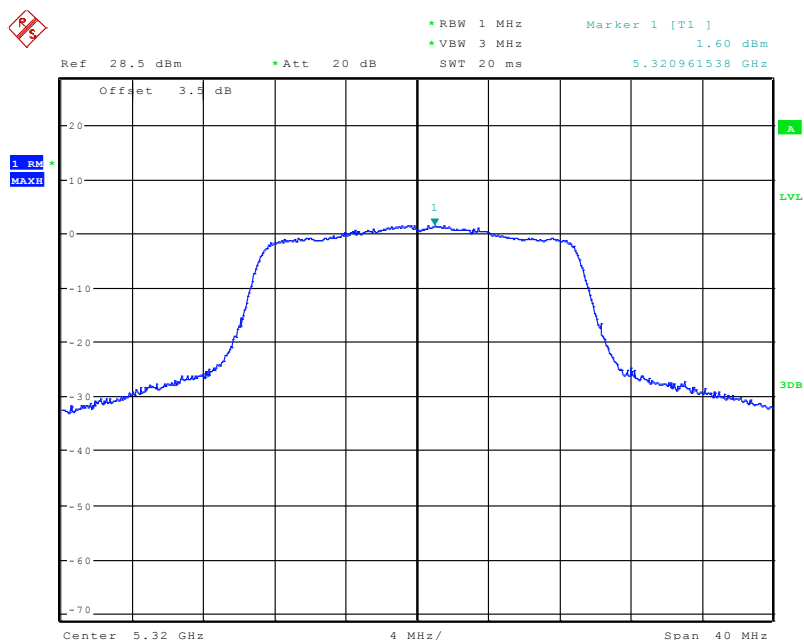
Date: 26.FEB.2020 17:02:12

802.11n20 mode, Power Spectral Density, 5280 MHz



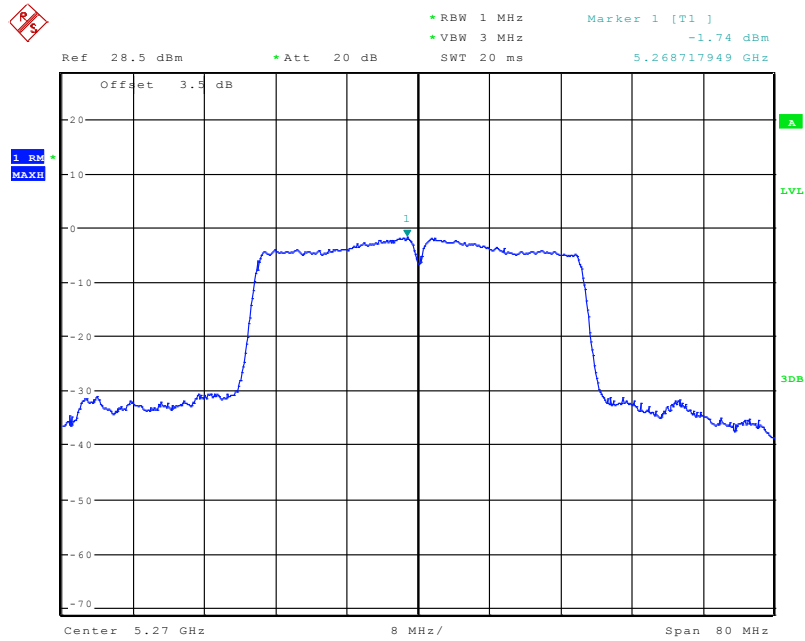
Date: 26.FEB.2020 17:01:54

802.11n20 mode, Power Spectral Density, 5320 MHz



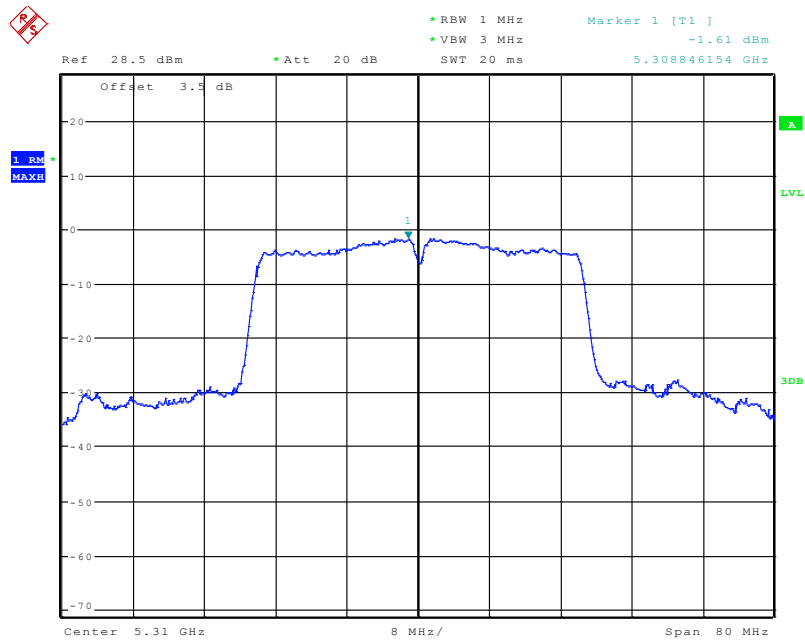
Date: 26.FEB.2020 17:01:29

802.11n40 mode, Power Spectral Density, 5270 MHz

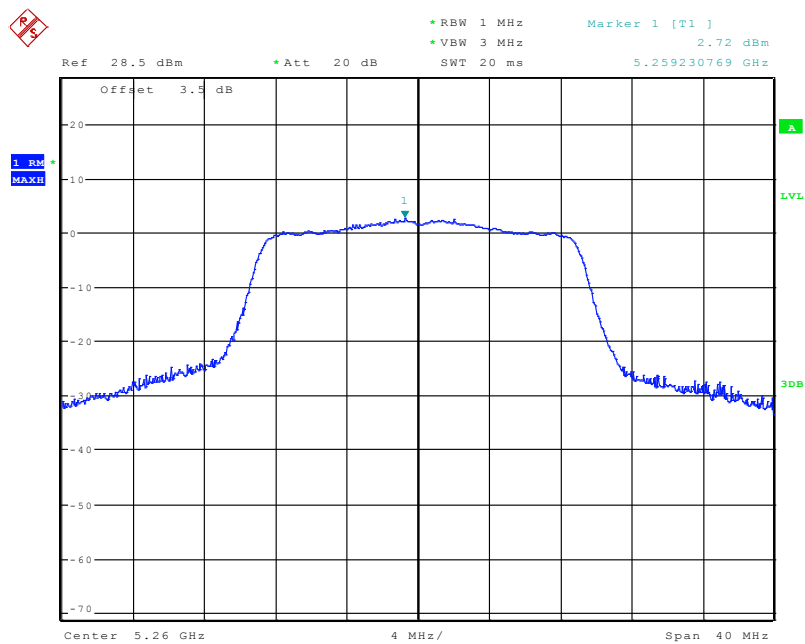


Date: 26.FEB.2020 16:58:02

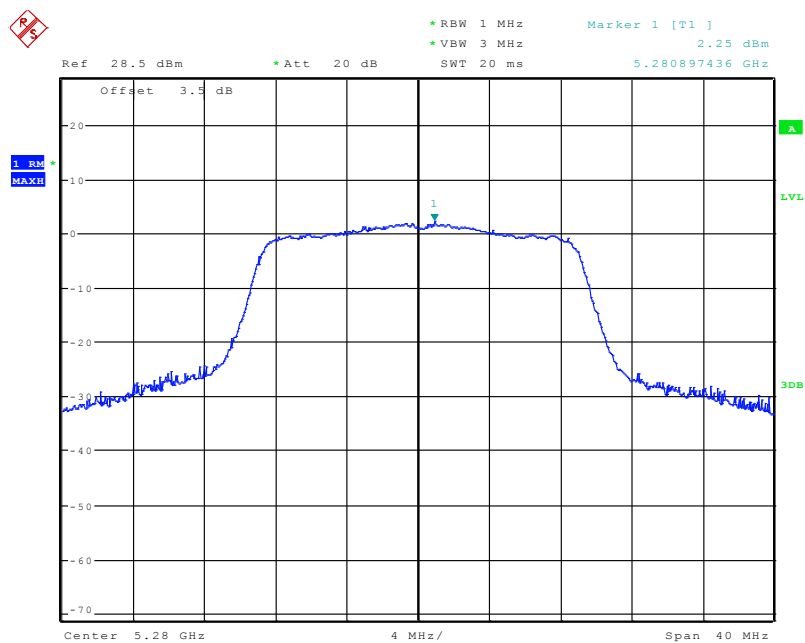
802.11n40 mode, Power Spectral Density, 5310 MHz



Date: 26.FEB.2020 16:58:39

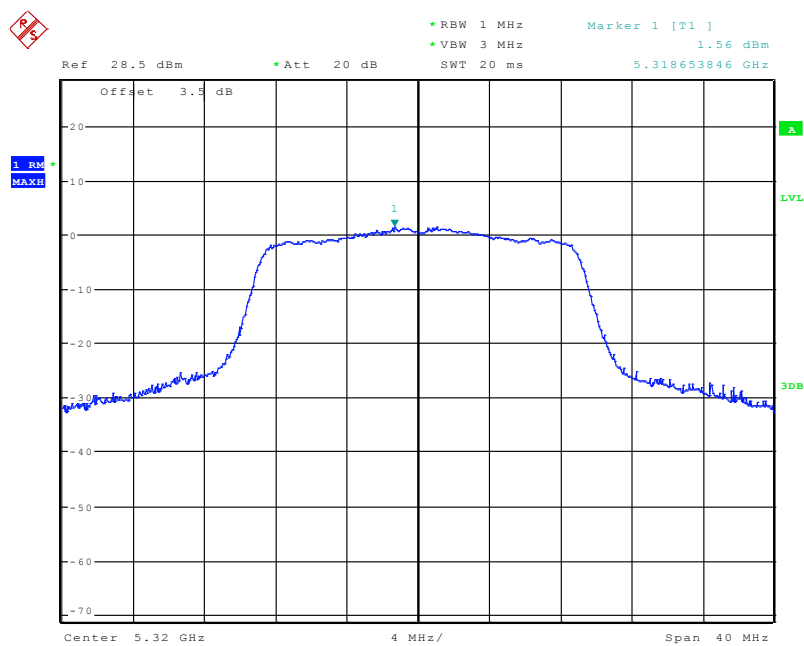
802.11ac20 mode, Power Spectral Density, 5260 MHz

Date: 26.FEB.2020 16:59:53

802. 11ac20 mode, Power Spectral Density, 5280 MHz

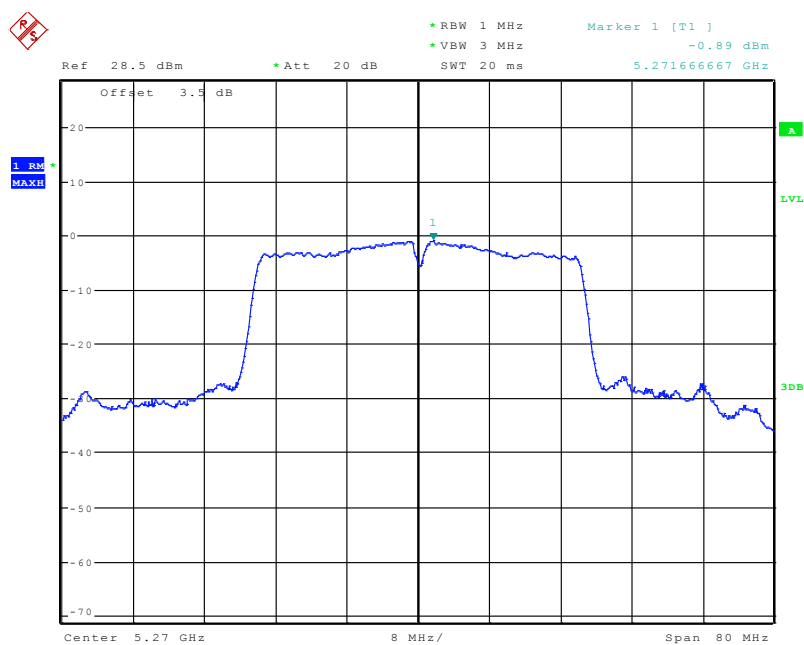
Date: 26.FEB.2020 17:00:20

802.11ac20 mode, Power Spectral Density, 5320 MHz



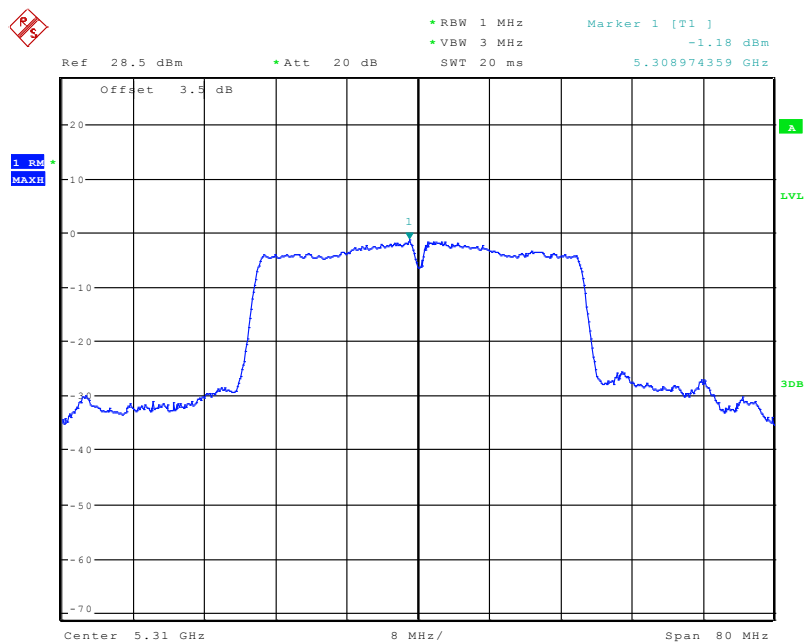
Date: 26.FEB.2020 17:00:43

802.11ac40 mode, Power Spectral Density, 5270 MHz



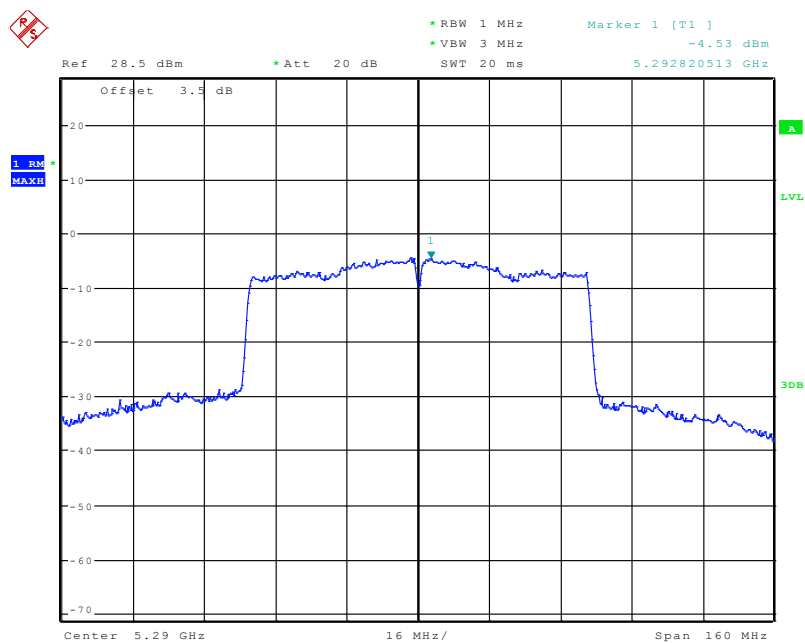
Date: 26.FEB.2020 16:54:26

802.11ac40 mode, Power Spectral Density, 5310 MHz



Date: 26.FEB.2020 16:55:17

802.11ac80 mode, Power Spectral Density, 5290 MHz

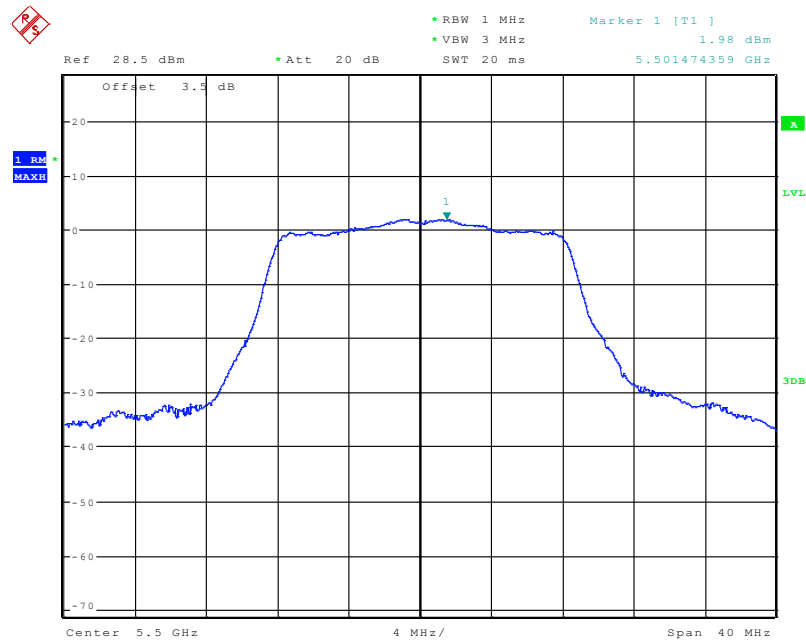


Date: 26.FEB.2020 16:53:35

5470 MHz – 5725 MHz:

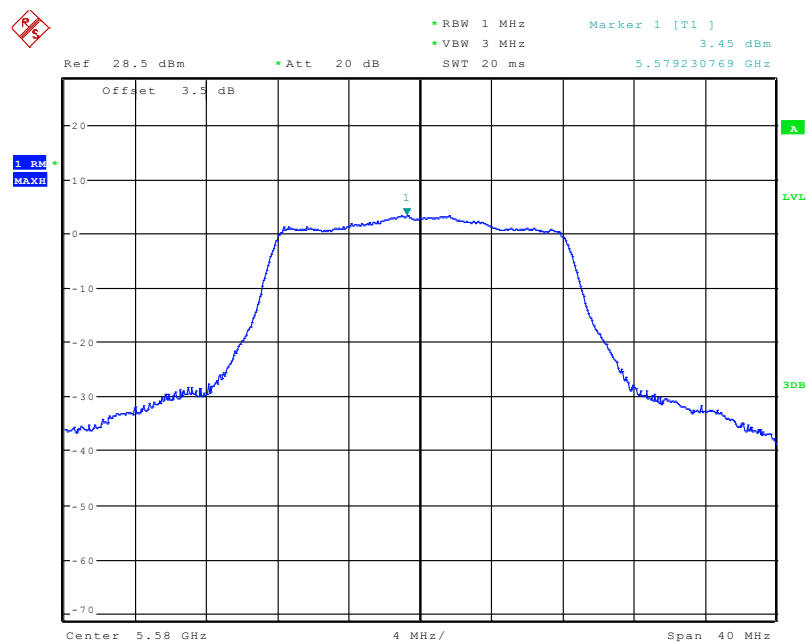
Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5500	1.98	11
5580	3.45	
5700	4.60	
802.11n20		
5500	1.53	11
5580	3.21	
5700	4.35	
802.11n40		
5510	-2.25	11
5550	-0.44	
5670	1.59	
802. 11ac20		
5500	1.61	11
5580	3.31	
5700	4.28	
802. 11ac40		
5510	-1.31	11
5550	-0.77	
5670	1.64	
802. 11ac80		
5530	-4.36	11
5610	-2.39	

802.11a mode, Power Spectral Density, 5500 MHz



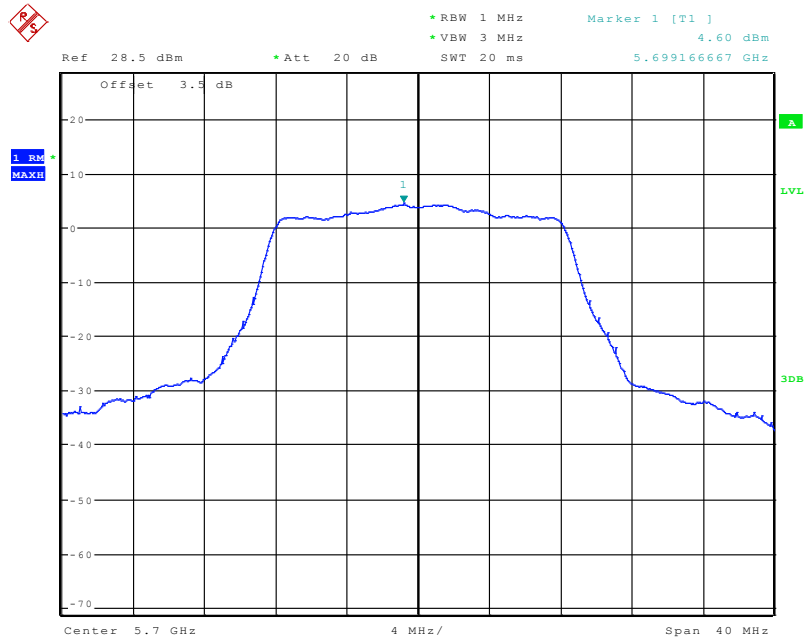
Date: 27.FEB.2020 15:14:38

802.11a mode, Power Spectral Density, 5580 MHz



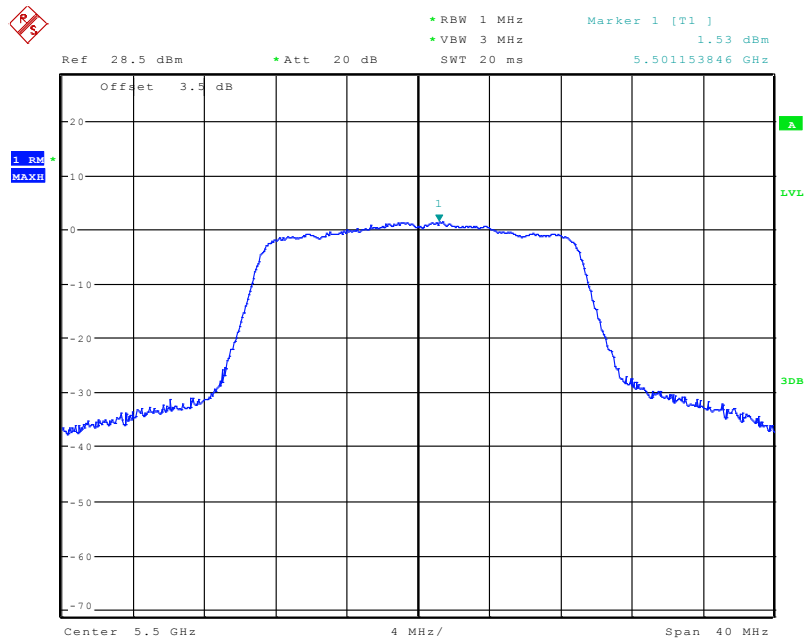
Date: 27.FEB.2020 15:15:35

802.11a mode, Power Spectral Density, 5700 MHz



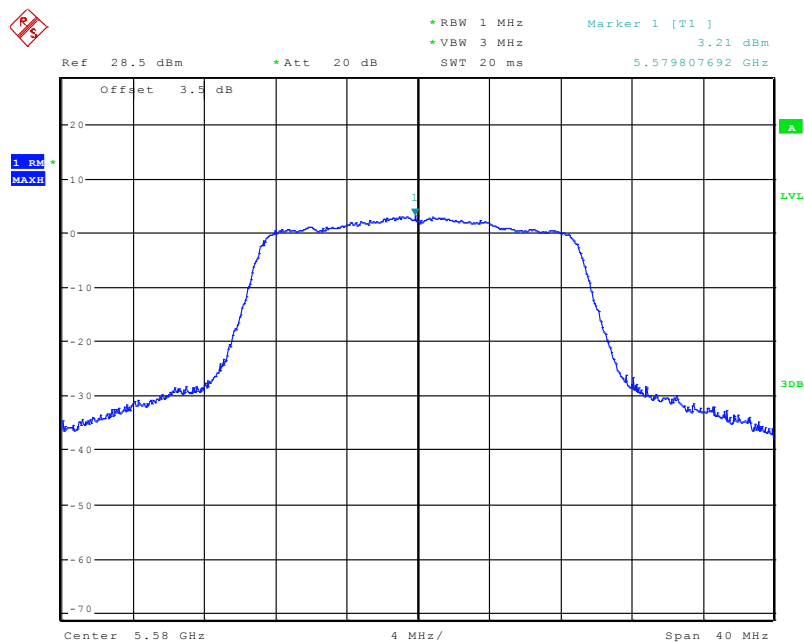
Date: 27.FEB.2020 15:15:02

802.11n20 mode, Power Spectral Density, 5500 MHz



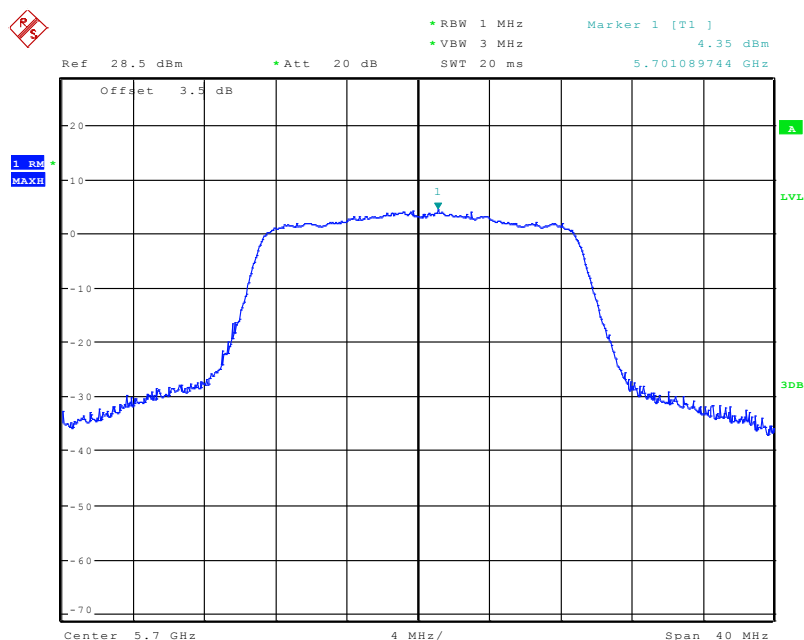
Date: 27.FEB.2020 15:14:14

802.11n20 mode, Power Spectral Density, 5580 MHz



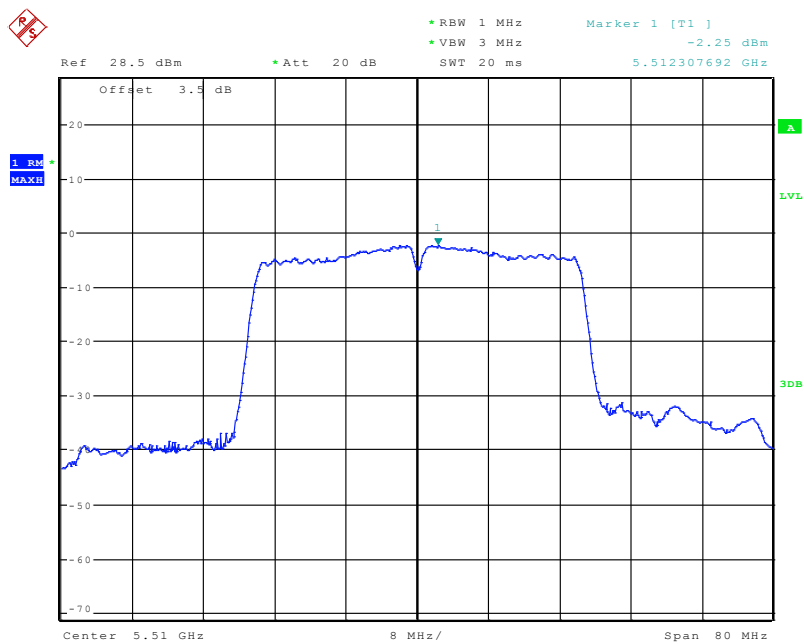
Date: 27.FEB.2020 15:13:52

802.11n20 mode, Power Spectral Density, 5700 MHz



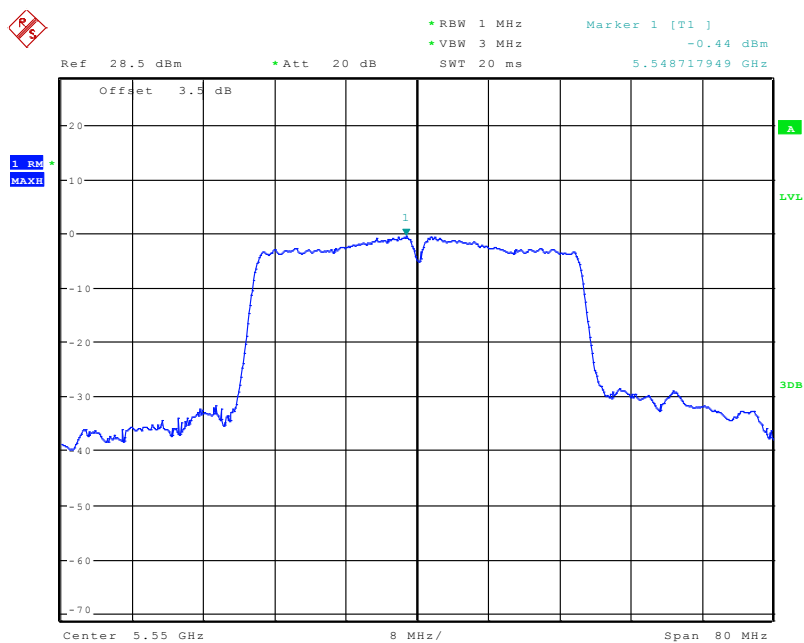
Date: 27.FEB.2020 15:13:20

802.11n40 mode, Power Spectral Density, 5510 MHz



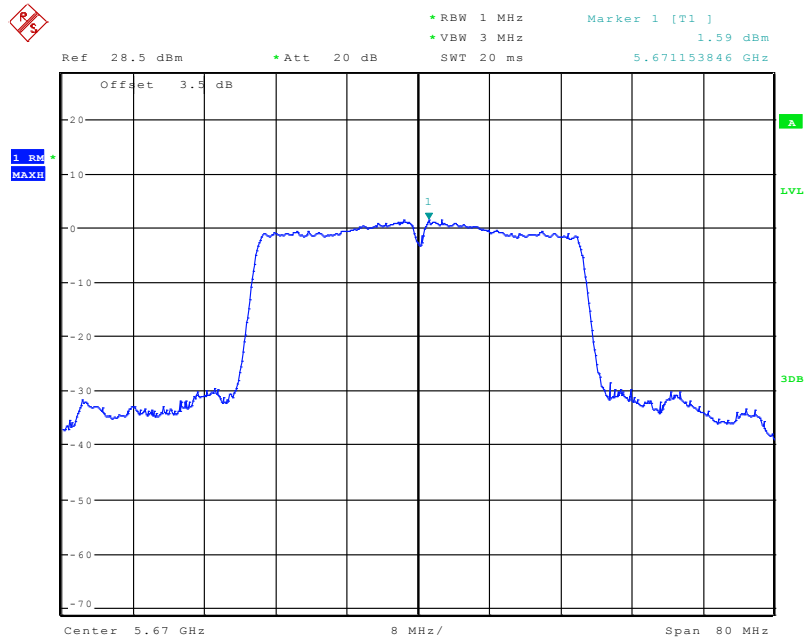
Date: 27.FEB.2020 15:09:53

802.11n40 mode, Power Spectral Density, 5550 MHz



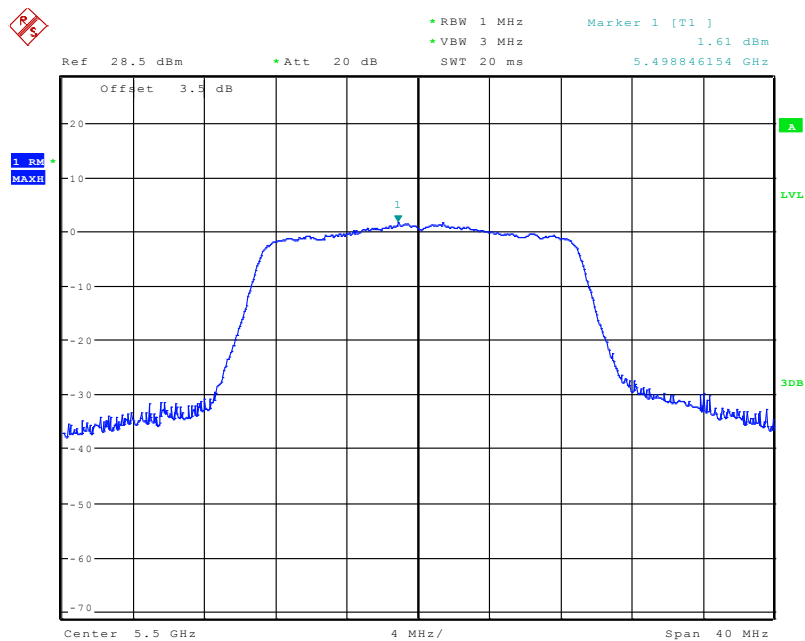
Date: 27.FEB.2020 15:09:24

802.11n40 mode, Power Spectral Density, 5670 MHz



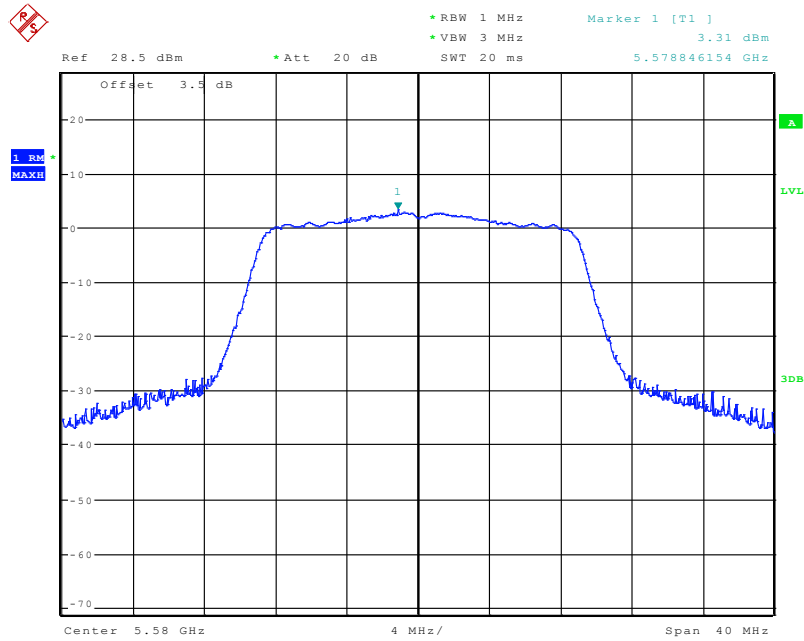
Date: 27.FEB.2020 15:08:55

802.11ac20 mode, Power Spectral Density, 5500 MHz



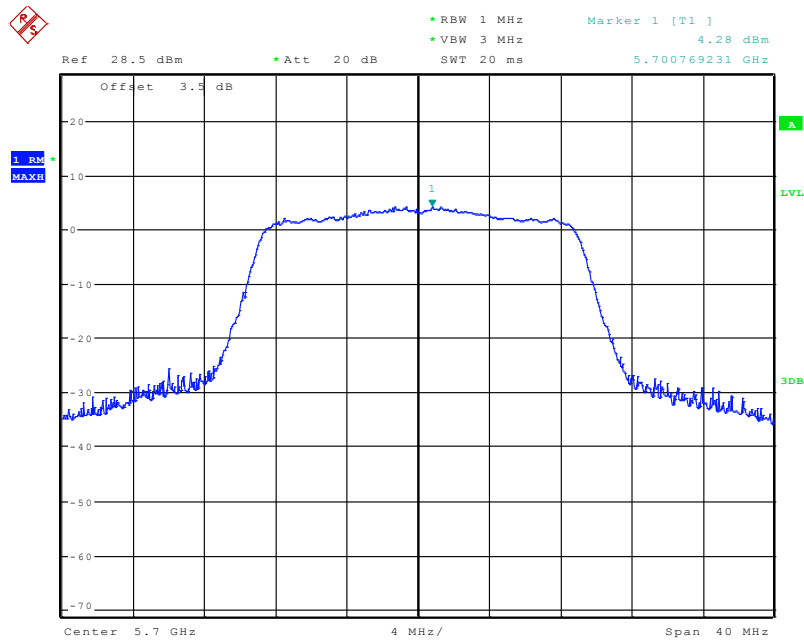
Date: 27.FEB.2020 15:11:01

802.11ac20 mode, Power Spectral Density, 5580 MHz



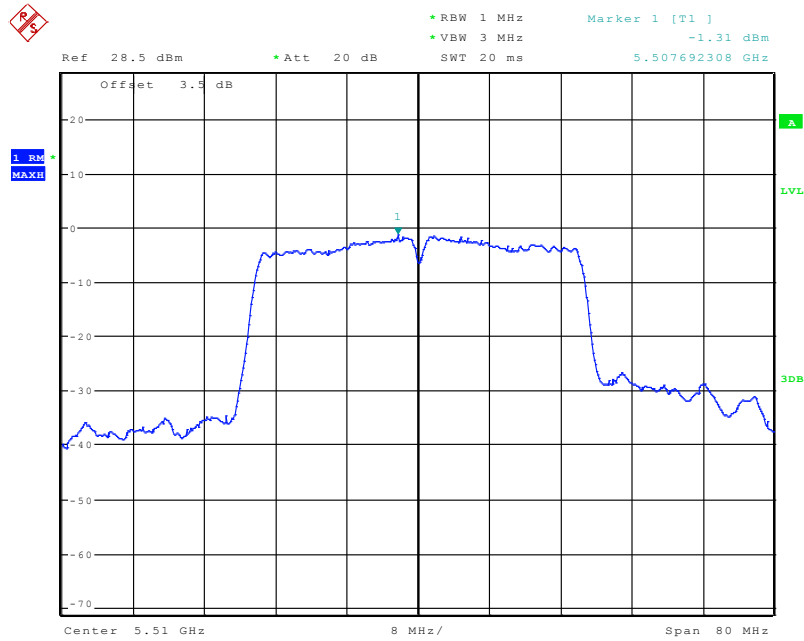
Date: 27.FEB.2020 15:11:39

802.11ac20 mode, Power Spectral Density, 5700 MHz



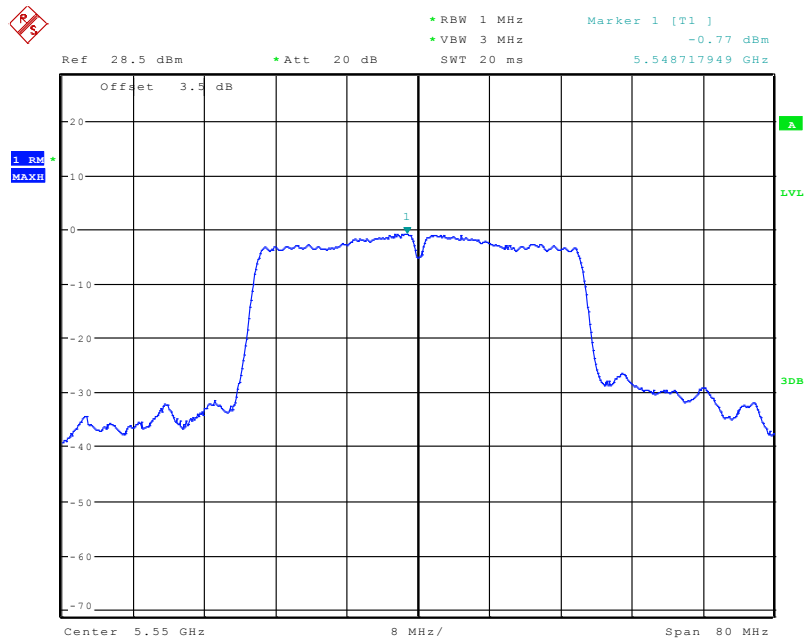
Date: 27.FEB.2020 15:12:37

802.11ac40 mode, Power Spectral Density, 5510 MHz



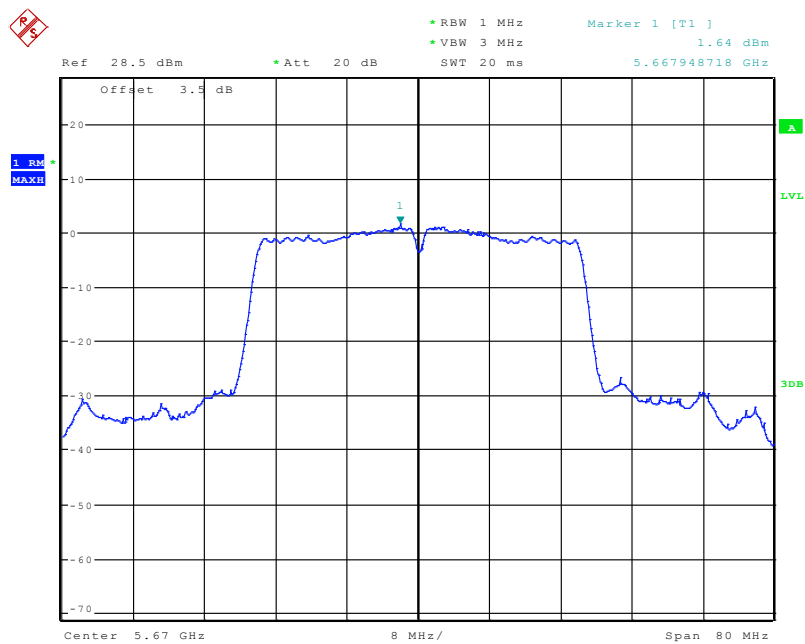
Date: 27.FEB.2020 15:05:15

802.11ac40 mode, Power Spectral Density, 5590 MHz



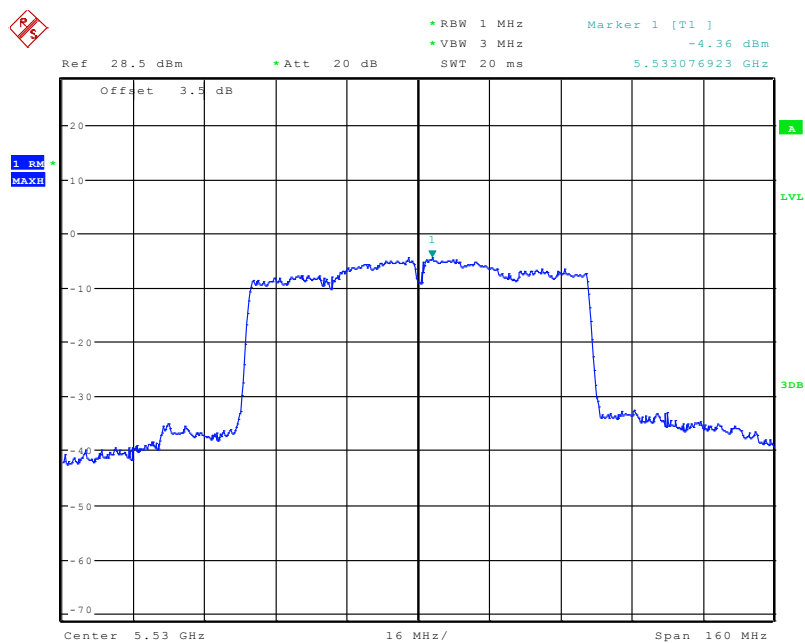
Date: 27.FEB.2020 15:05:47

802.11ac40 mode, Power Spectral Density, 5670 MHz



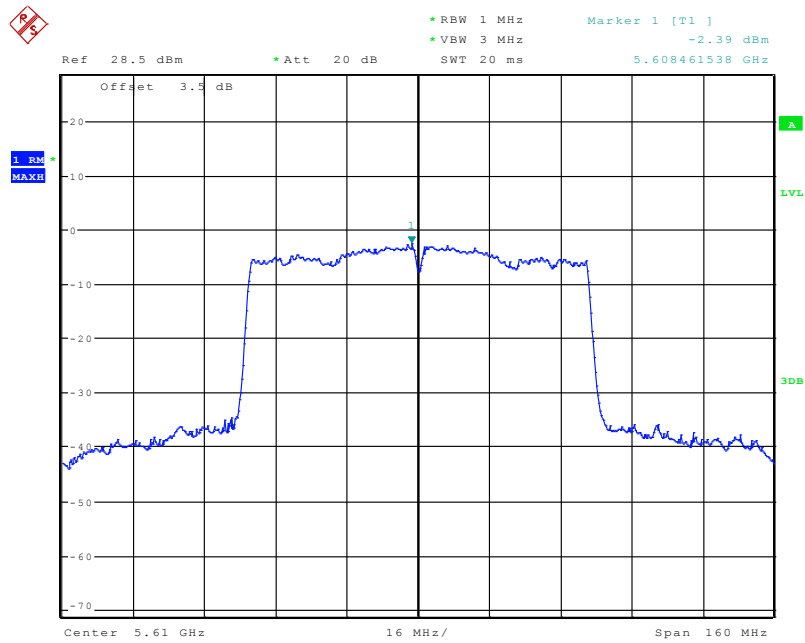
Date: 27.FEB.2020 15:06:43

802.11ac80 mode, Power Spectral Density, 5530 MHz



Date: 27.FEB.2020 15:04:32

802. 11ac80 mode, Power Spectral Density, 5610 MHz

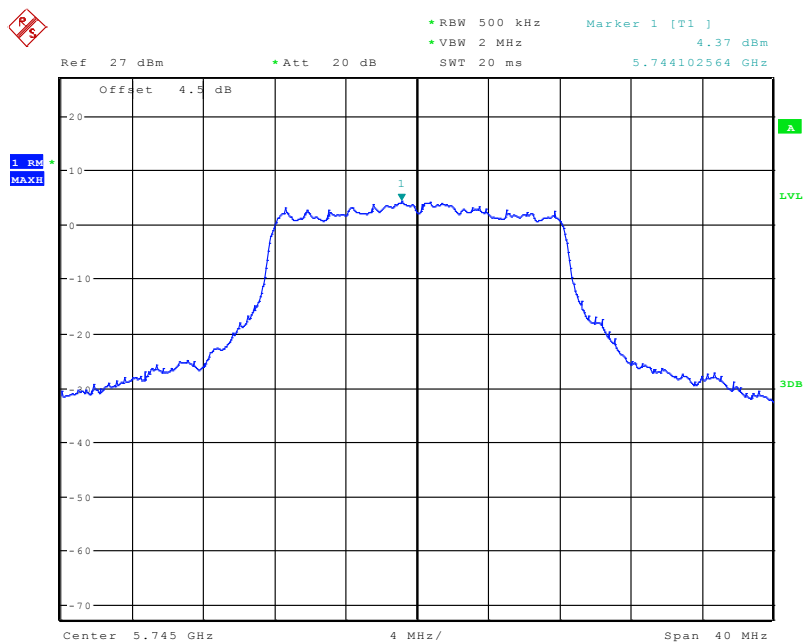


Date: 27.FEB.2020 15:03:42

5725 MHz – 5850 MHz:

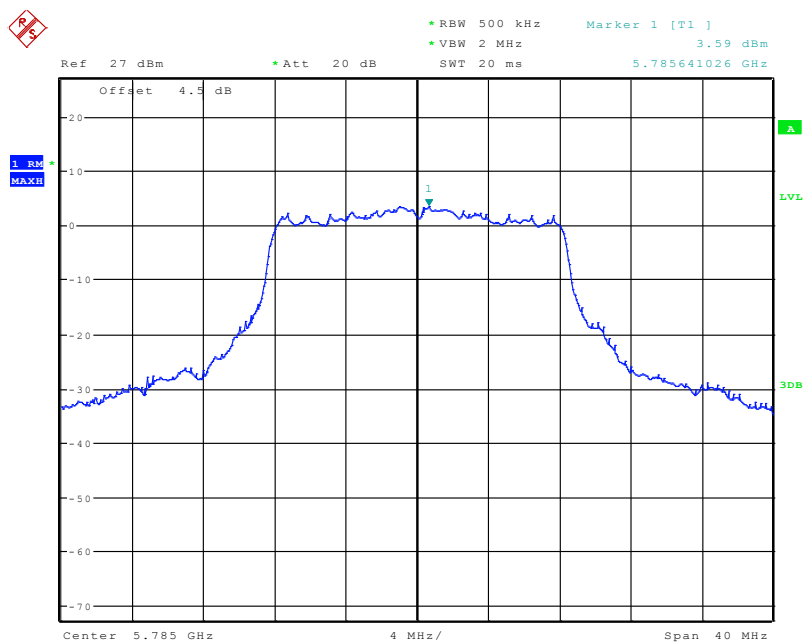
Frequency (MHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)
802.11a		
5745	4.37	30
5785	3.59	
5825	3.09	
802.11n20		
5745	4.23	30
5785	3.90	
5825	2.98	
802.11n40		
5755	0.31	30
5795	0.53	
802.11ac20		
5745	3.99	30
5785	3.58	
5825	3.08	
802.11ac40		
5755	0.88	30
5795	0.56	
802.11ac80		
5775	-2.57	30

802.11a mode, Power Spectral Density, 5745 MHz

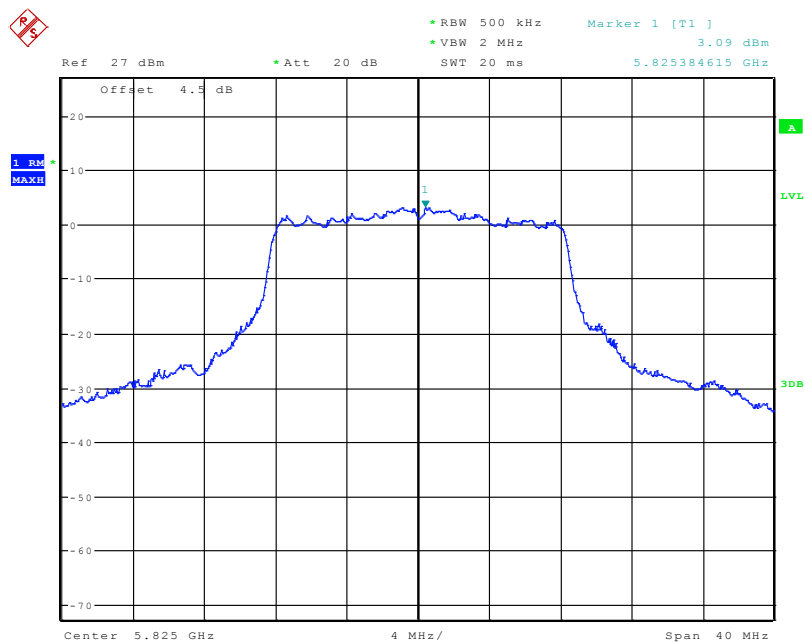


Date: 6.MAY.2020 14:38:48

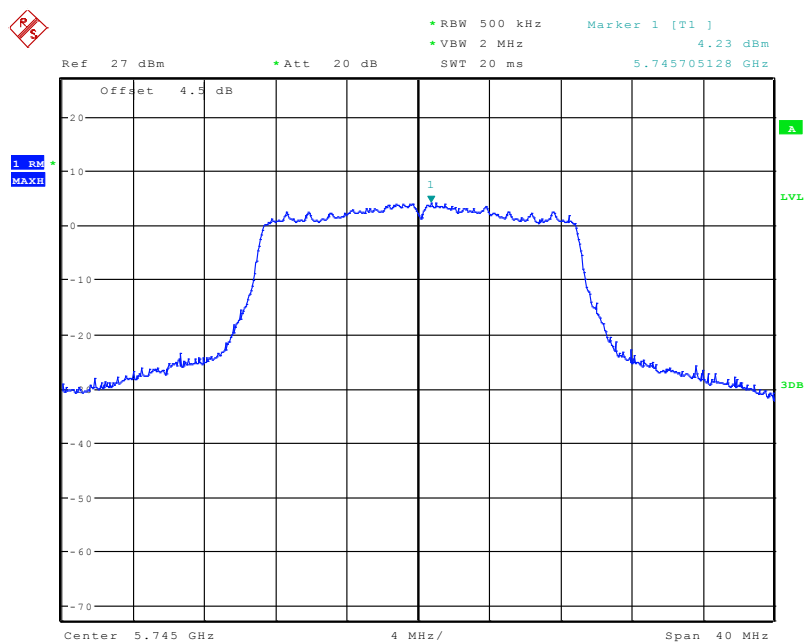
802.11a mode, Power Spectral Density, 5785 MHz



Date: 6.MAY.2020 14:40:01

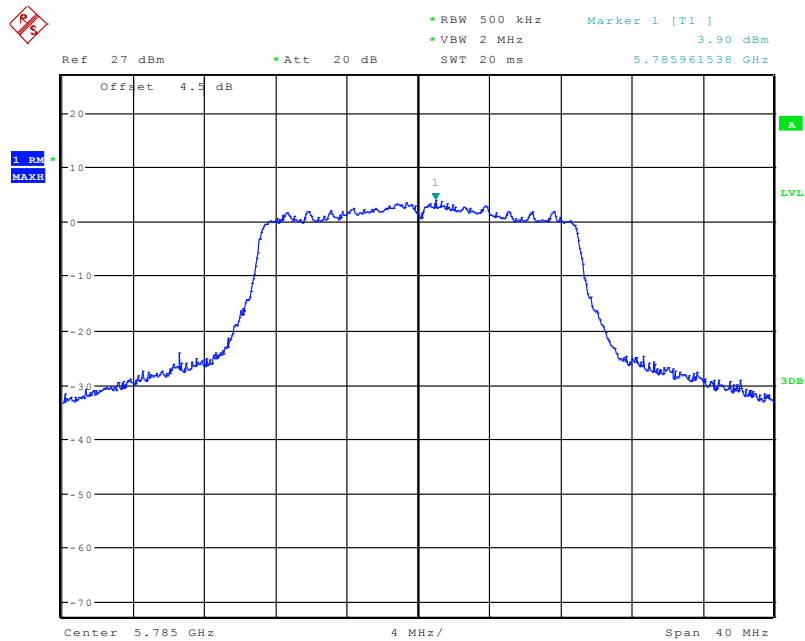
802.11a mode, Power Spectral Density, 5825 MHz

Date: 6.MAY.2020 14:40:38

802.11n20 mode, Power Spectral Density, 5745 MHz

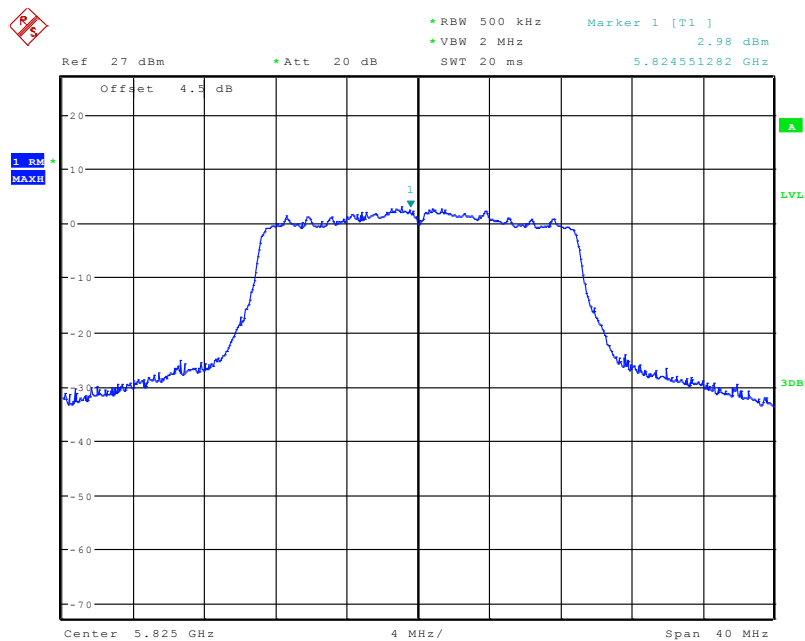
Date: 6.MAY.2020 14:41:57

802.11n20 mode, Power Spectral Density, 5785 MHz

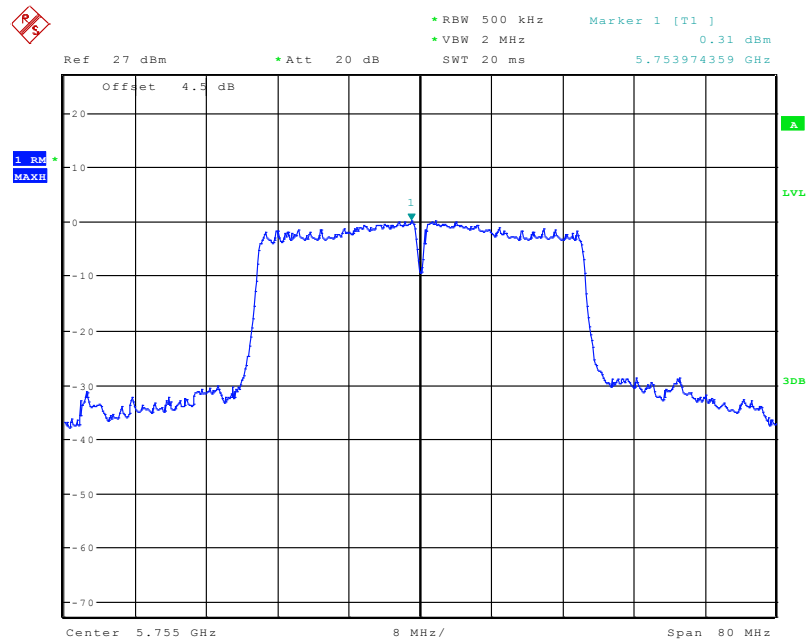


Date: 6.MAY.2020 14:42:41

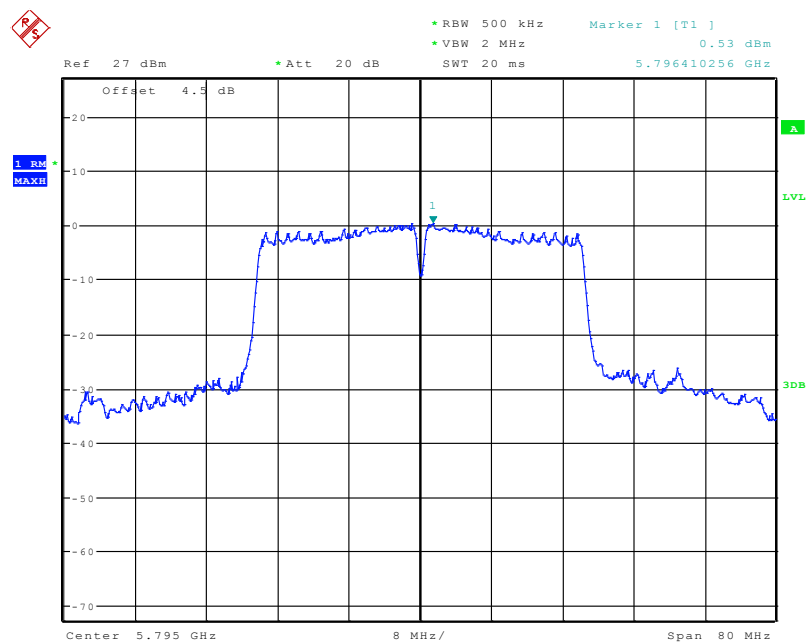
802.11n20 mode, Power Spectral Density, 5825 MHz



Date: 6.MAY.2020 14:43:22

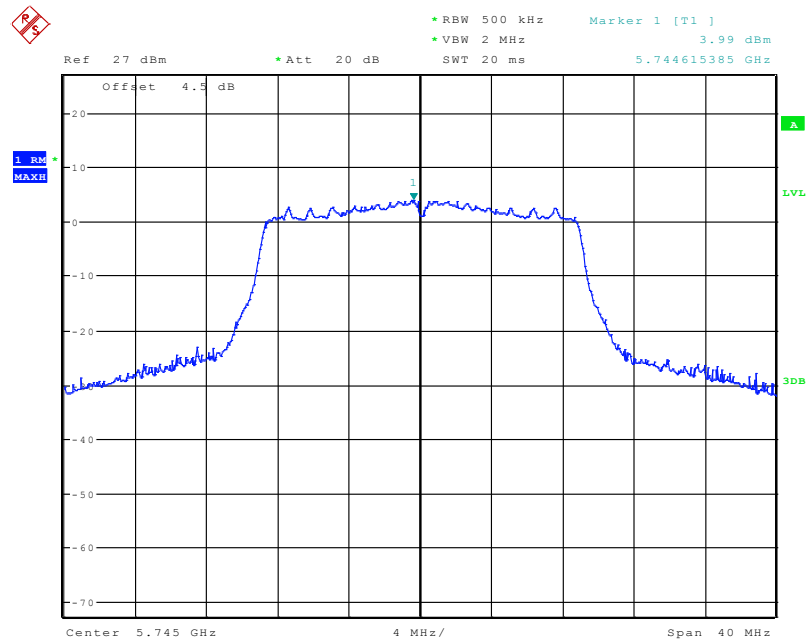
802.11n40 mode, Power Spectral Density, 5755 MHz

Date: 6.MAY.2020 14:48:50

802.11n40 mode, Power Spectral Density, 5795 MHz

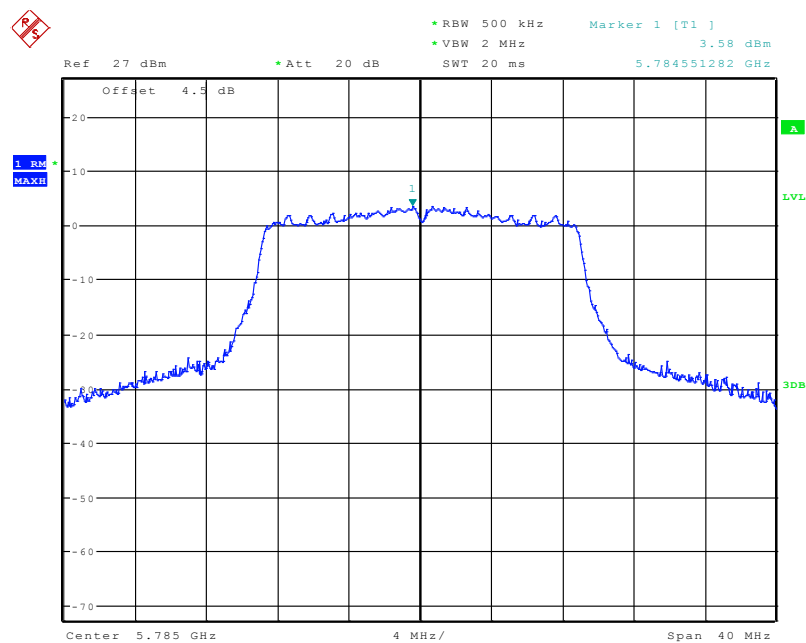
Date: 6.MAY.2020 14:49:44

802.11ac20 mode, Power Spectral Density, 5745 MHz



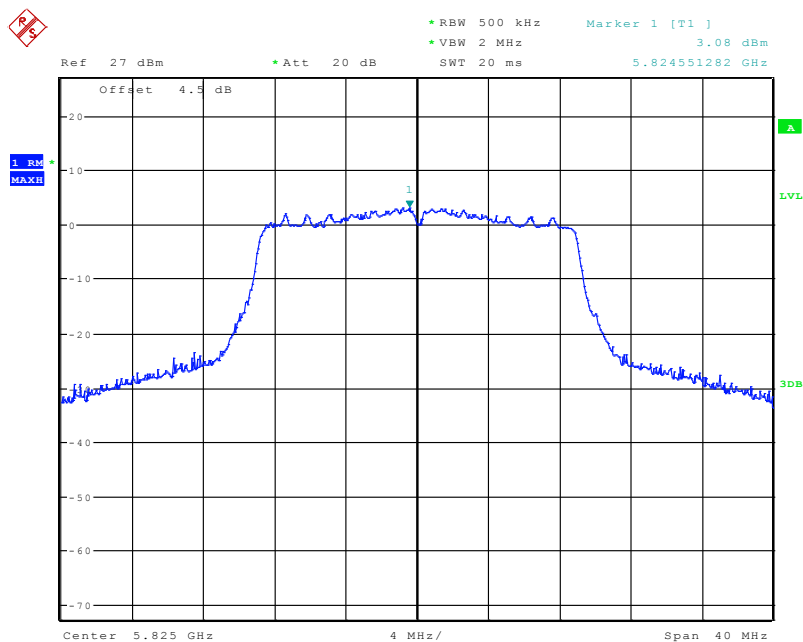
Date: 6.MAY.2020 14:44:31

802.11ac20 mode, Power Spectral Density, 5785 MHz



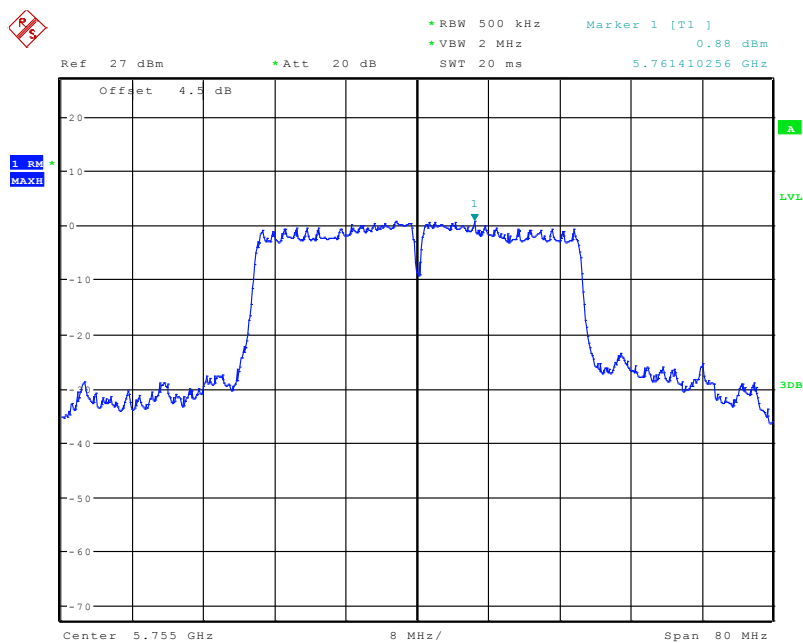
Date: 6.MAY.2020 14:45:29

802.11ac20 mode, Power Spectral Density, 5825 MHz

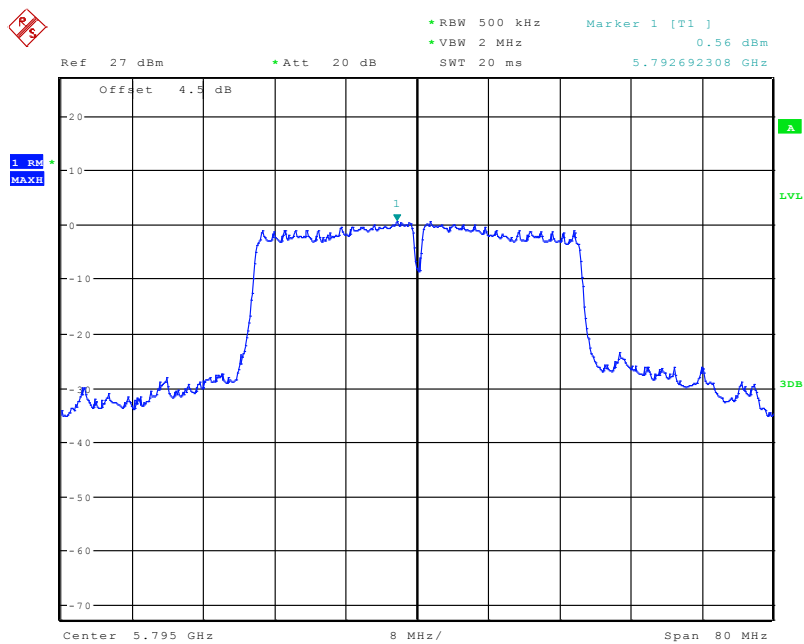


Date: 6.MAY.2020 14:46:56

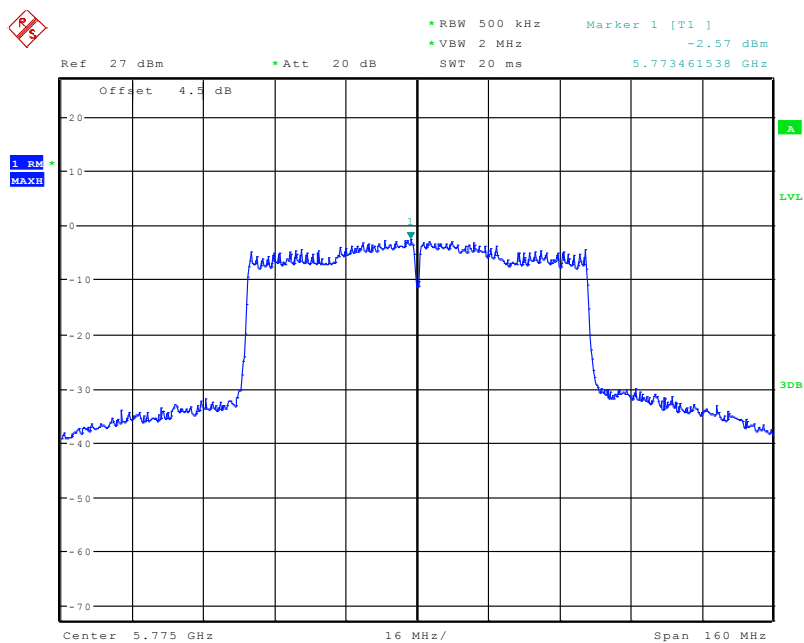
802.11ac40 mode, Power Spectral Density, 5755 MHz



Date: 6.MAY.2020 14:51:09

802. 11ac40 mode, Power Spectral Density, 5795 MHz

Date: 6.MAY.2020 14:51:58

802. 11ac80 mode, Power Spectral Density, 5775 MHz

Date: 6.MAY.2020 14:53:49

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