TESTING LABORATORY
CERTIFICATE # 4821.01

FCC PART 15.407

TEST REPORT

For

Grandstream Networks, Inc.

126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

FCC ID: YZZGRP2614

Report Type:	**Product Type:**
Original Report	IP Phone

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	IP Phone
Tested Model	GRP2614
Frequency Range	5G WI-FI: 5150-5250 MHz; 5250-5350 MHz; 5470-5725 MHz, 5725-5850 MHz
Transmit Power	5150-5250 MHz: 14.25dBm (802.11a), 13.33dBm(802.11n20), 12.71 dBm(802.11n40), 13.42dBm (802.11ac20), 12.72dBm(802.11 ac40), 11.32 dBm(802.11 ac80) 5250-5350 MHz: 14.03dBm (802.11a), 14.14dBm(802.11n20), 13.60dBm(802.11n40), 14.12dBm (802.11ac20), 13.65dBm(802.11 ac40), 11.54 dBm(802.11 ac80) 5470-5725 MHz 13.00dBm (802.11a), 12.18dBm(802.11n20), 14.34 dBm(802.11n40), 11.88dBm (802.11ac20), 13.14dBm(802.11 ac40), 10.79 dBm(802.11 ac80) 5725-5850 MHz 14.93dBm (802.11a), 13.89dBm(802.11n20), 14.36 dBm(802.11n40), 14.11dBm (802.11ac20), 13.50dBm(802.11 ac40), 11.41 dBm(802.11 ac80)
Modulation Technique	WIFI: DSSS, OFDM
Antenna Specification	PIFA Antenna: 4.5dBi
Voltage Range	DC 12V from adapter or DC 48V from POE
Date of Test	2019-03-05~ 2019-04-02
Sample serial number	190219002
Received date	2019-02-19
Sample/EUT Status	Good condition

Adapter 1 (MASSPOWER) Information:
Model: PEA-120100VA
Input: AC100-240V, 50/60Hz, 0.3A
Output: DC12.0V ,1.0A

Adapter 2 (SUNLIGHT) Information:
Model: F12US1200100A
Input: AC100-240V, 50/60Hz, 0.5A max
Output: DC12.0V ,1.0A

Objective

This type approval report is prepared on behalf of *Grandstream Networks, 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 JBP submissions with FCC ID: YZZGRP2614.

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

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℃
Humidity		±6%
Supply voltages		±0.4%

Note: 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 device support 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

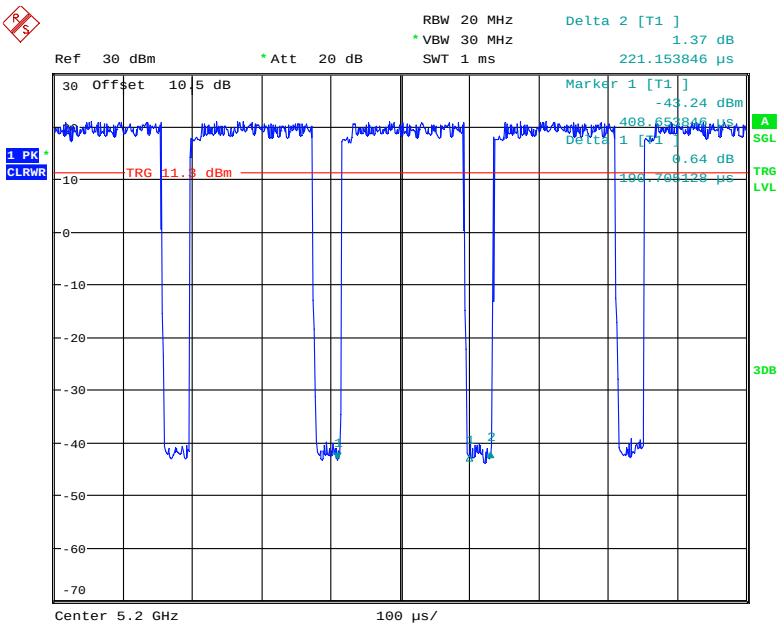
"SecureCRT6.1" software was used. Test frequencies and power level were configured as below:

U-NII	Mode	Channel Number	Frequency (MHz)	Rate (Mbps)	Power Level
5150 – 5250MHz	802.11 a	CH36	5180	6	14
		CH40	5200	6	15
		CH48	5240	6	14
	802.11 n20	CH36	5180	MCS0	13
		CH40	5200	MCS0	15
		CH48	5240	MCS0	13
	802.11 n40	CH38	5190	MCS0	12
		CH46	5230	MCS0	12
	802.11 ac20	CH36	5180	MCS0	13
		CH40	5200	MCS0	15
		CH48	5240	MCS0	13
	802.11 ac40	CH38	5190	MCS0	12
		CH46	5230	MCS0	12
	802.11 ac80	CH42	5210	MCS0	15
5250 – 5350MHz	802.11 a	CH52	5260	6	14
		CH56	5280	6	14
		CH64	5320	6	14
	802.11 n20	CH52	5260	MCS0	14
		CH56	5280	MCS0	14
		CH64	5320	MCS0	14
	802.11 n40	CH54	5270	MCS0	13
		CH62	5310	MCS0	13
	802.11 ac20	CH52	5260	MCS0	14
		CH56	5280	MCS0	14
		CH64	5320	MCS0	14
	802.11 ac40	CH54	5270	MCS0	13
		CH62	5310	MCS0	13
	802.11 ac80	CH58	5290	MCS0	15

U-NII	Mode	Channel Number	Frequency (MHz)	Rate (Mbps)	Power Level
5470 – 5725MHz	802.11 a	CH100	5500	6	14
		CH120	5600	6	15
		CH140	5700	6	14
	802.11 n20	CH100	5500	MCS0	12
		CH120	5600	MCS0	15
		CH140	5700	MCS0	15
	802.11 n40	CH102	5510	MCS0	11
		CH118	5590	MCS0	11
		CH134	5670	MCS0	12
	802.11 ac20	CH100	5500	MCS0	12
		CH120	5600	MCS0	15
		CH140	5700	MCS0	12
	802.11 ac40	CH102	5510	MCS0	12
		CH118	5590	MCS0	15
		CH134	5670	MCS0	13
	802.11 ac80	CH106	5530	MCS0	11
		CH122	5610	MCS0	15
5725 – 5850MHz	802.11 a	CH149	5745	6	15
		CH157	5785	6	15
		CH165	5825	6	15
	802.11 n20	CH149	5745	MCS0	15
		CH157	5785	MCS0	15
		CH165	5825	MCS0	15
	802.11 n40	CH151	5755	MCS0	15
		CH159	5795	MCS0	15
	802.11 ac20	CH149	5745	MCS0	15
		CH157	5785	MCS0	15
		CH165	5825	MCS0	15
	802.11 ac40	CH151	5755	MCS0	15
		CH159	5795	MCS0	15
	802.11 ac80	CH155	5775	MCS0	15

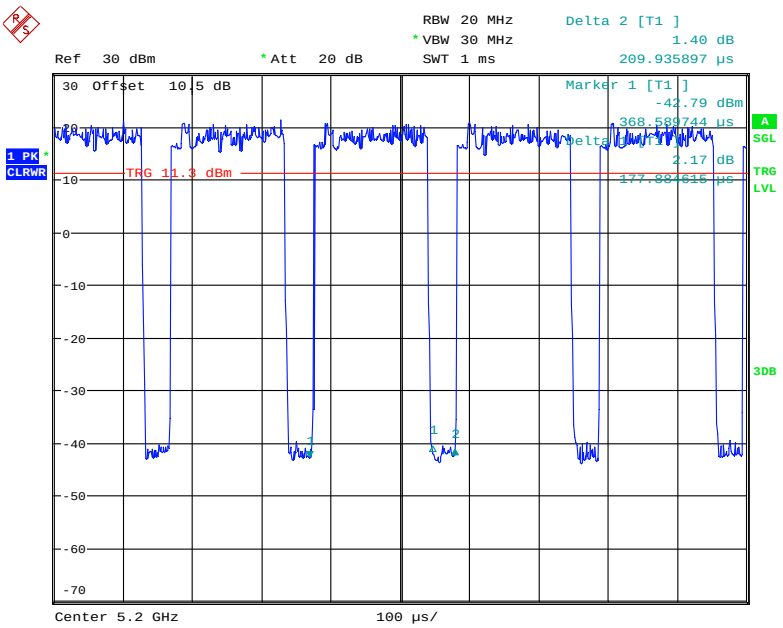
Duty cycle
5150-5250 MHz

802.11a mode



Date: 6.MAR.2019 15:45:08

802.11n20 mode



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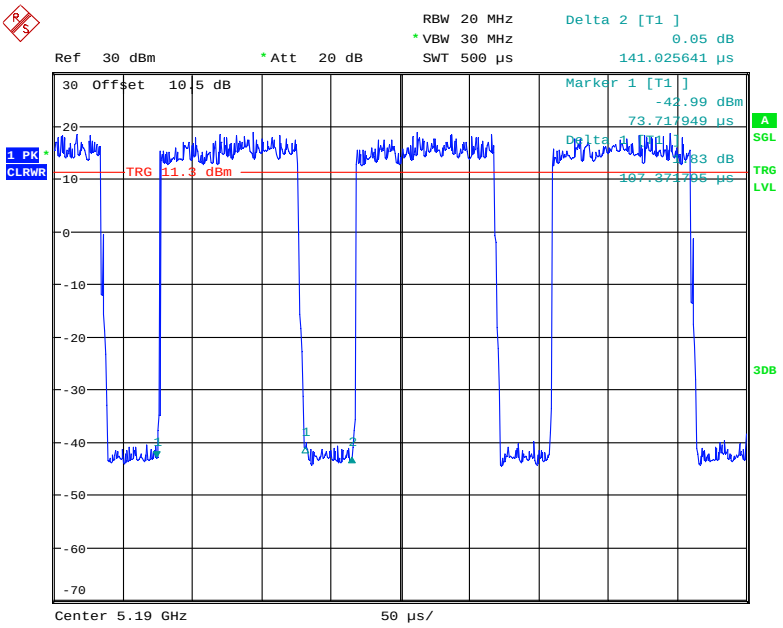
802.11n40 Mode



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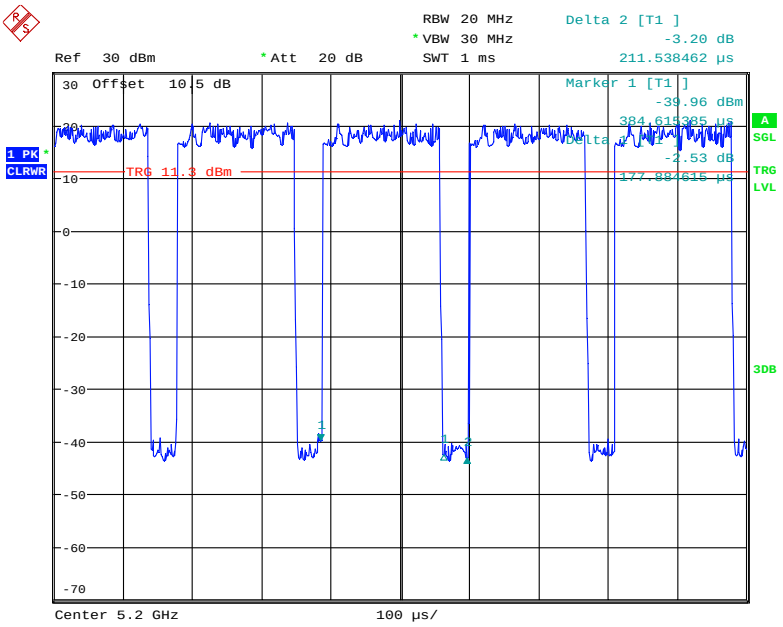
802.11ac20 Mode



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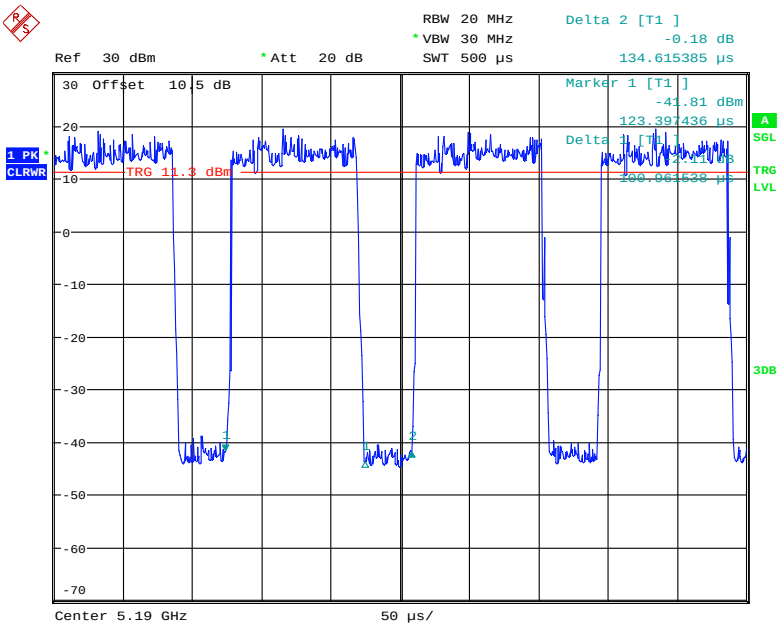
802.11ac40 Mode



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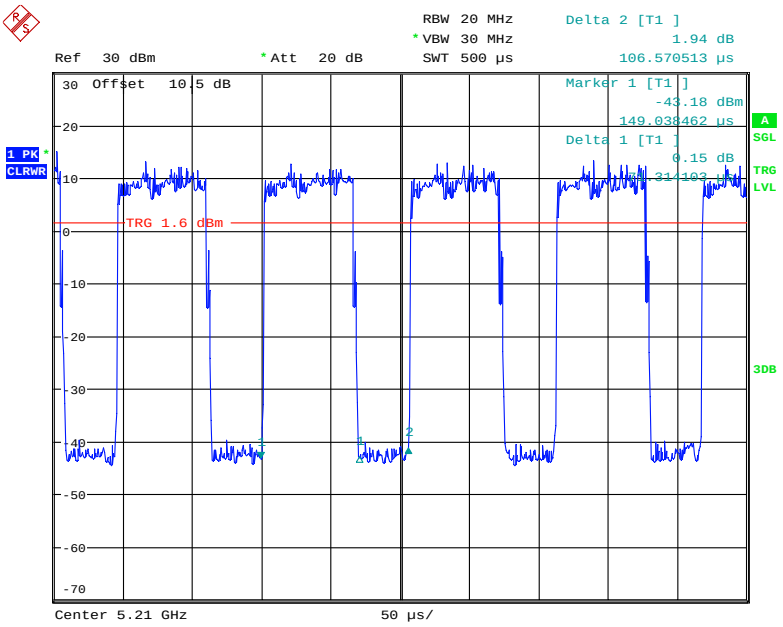
802.11ac80 Mode



Date: 6.MAR.2019 15:52:40

Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	86	0.191	5.24	10kHz	0.66
802.11n20	85	0.178	5.62	10kHz	0.71
802.11n40	76	0.107	9.35	10kHz	1.19
802.11ac20	84	0.178	5.62	10kHz	0.76
802.11ac40	75	0.101	9.90	10kHz	1.25
802.11ac80	66	0.071	14.08	30kHz	1.80

Note: 5250-5350MHz band, 5470-5725MHz band and 5725-5850MHz band was used the same duty cycle to test for each mode.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

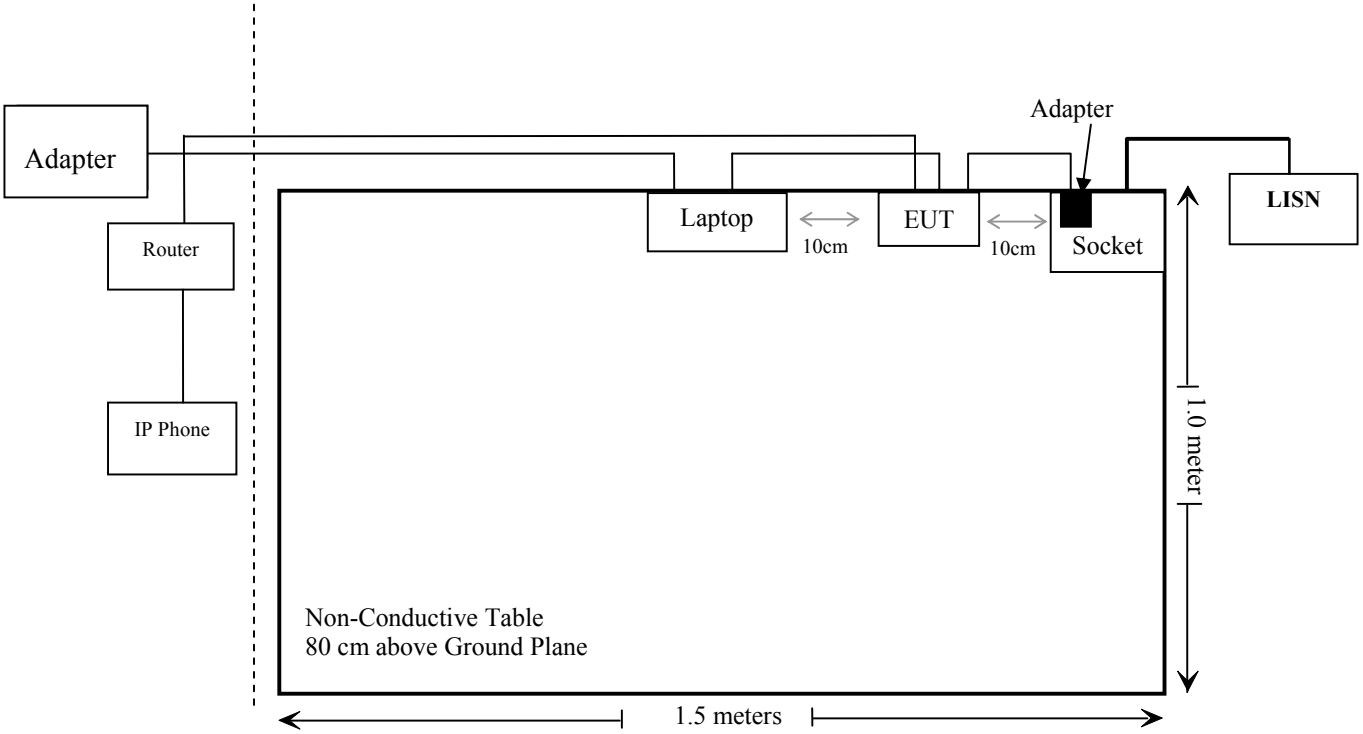
Manufacturer	Description	Model	Serial Number
BULL	Socket	GN-415K	5503290068073
Un-known	Router	Un-known	Un-known
Grandstream	IP phone	GXV3370	Un-known
Gigabit	POE	Un-known	Un-known
Un-known	Laptop	Un-known	Un-known

External I/O Cable

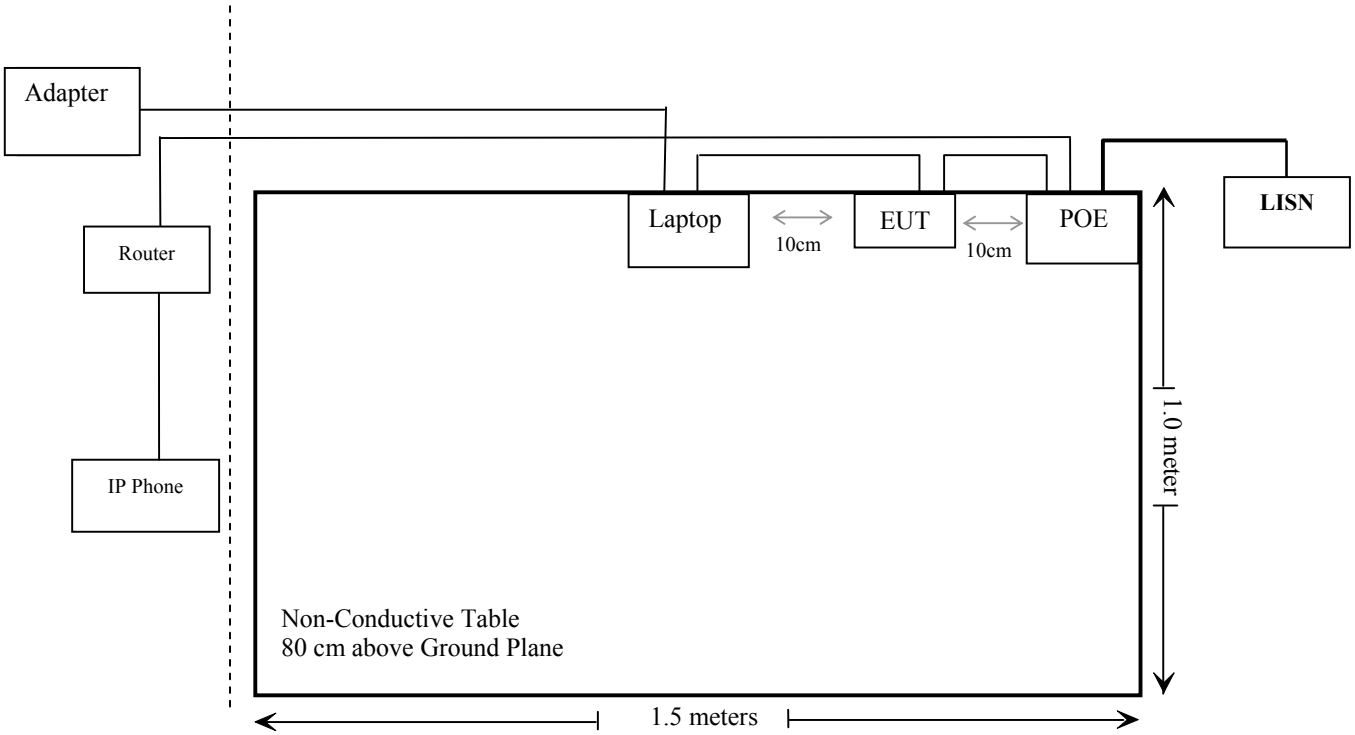
Cable Description	Length (m)	From/Port	To
Unshielded un-detachable AC cable	1.0	Socket	LISN
Unshielded un-detachable DC cable	2.55	Adapter	EUT
Unshielded detachable RJ45 cable	12	EUT	Laptop
Unshielded detachable RJ45 cable	1.0	Router	IP phone
Unshielded detachable RJ45 cable	10	EUT	Router
Unshielded detachable RJ45 cable	1.0	EUT	POE

Block Diagram of Test Setup

Powered by Adapter:



Powered by POE:



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),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1), (2), (3), (4)	Out Of Band Emission	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

DFS report please refere to RSZ190219003-00E issued by Bay Area Compliance Laboratories Corp. (Dongguan).

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2018-07-11	2019-07-11
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2018-12-21	2019-12-21
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2018-11-12	2019-11-12
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A Unknown	Conducted Emission Cable	78652	UF A210B-1-0720-504504	2018-11-12	2019-11-12
Radiated Emission Test					
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
Rohde & Schwarz	Signal Analyzer	FSV40	101473	2019-01-09	2020-01-08
Agilent	Spectrum Analyzer	8564E	3943A01781	2019-01-04	2020-01-04
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma instrument	Amplifier	310 N	186238	2018-11-12	2019-05-12
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2018-07-11	2019-07-11
Ducommun technologies	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-07-11	2021-07-10
Ducommun technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	RG-214	1	2018-11-19	2019-05-21
Ducommun technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-03	2017-12-29	2020-12-28
Heatsink Required	Amplifier	QLW-18405536-J0	15964001002	2018-11-12	2019-11-12
Un-known	Band Reject Filter	BSF5150-5850MN-0899-004	Un-known	2018-11-12	2019-11-12

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2018-12-24	2019-12-24
Agilent	USB wideband power meter	U2021XA	MY54250003	2018-06-23	2019-06-23
Ducommun technologies	RF Cable	RG-214	3	Each Time	
WEINSCHEL	10dB Attenuator	5324	AU 3842	Each Time	

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

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	4.5	2.82	14.5	28.18	20	0.016	1.0
5250-5350	4.5	2.82	14.5	28.18	20	0.016	1.0
5470-5725	4.5	2.82	14.5	28.18	20	0.016	1.0
5725-5850	4.5	2.82	15.0	31.62	20	0.018	1.0

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, which was permanently attached and the antenna gain is 4.5 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

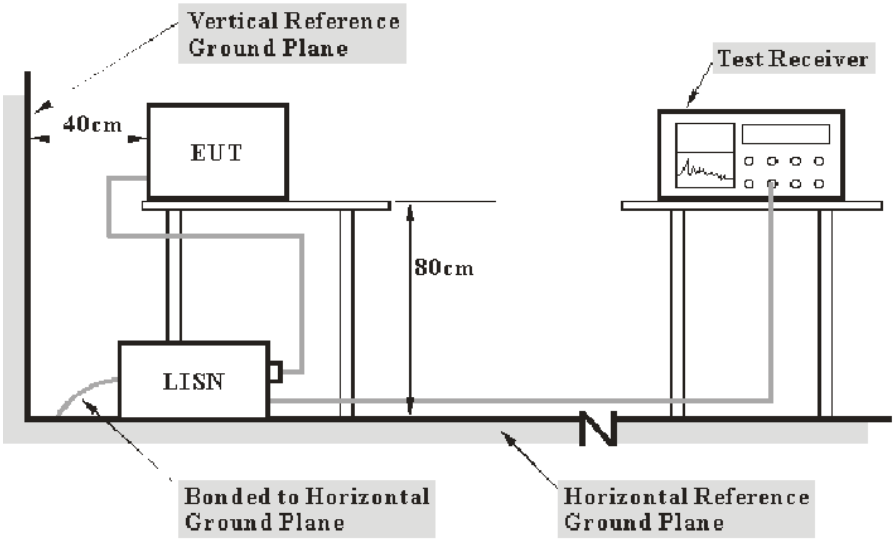
Result: Compliance.

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.

The adapter was connected to a 120VAC/60 Hz power source.

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 recorded data in following table, the EUT complied with the FCC Part 15.207.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

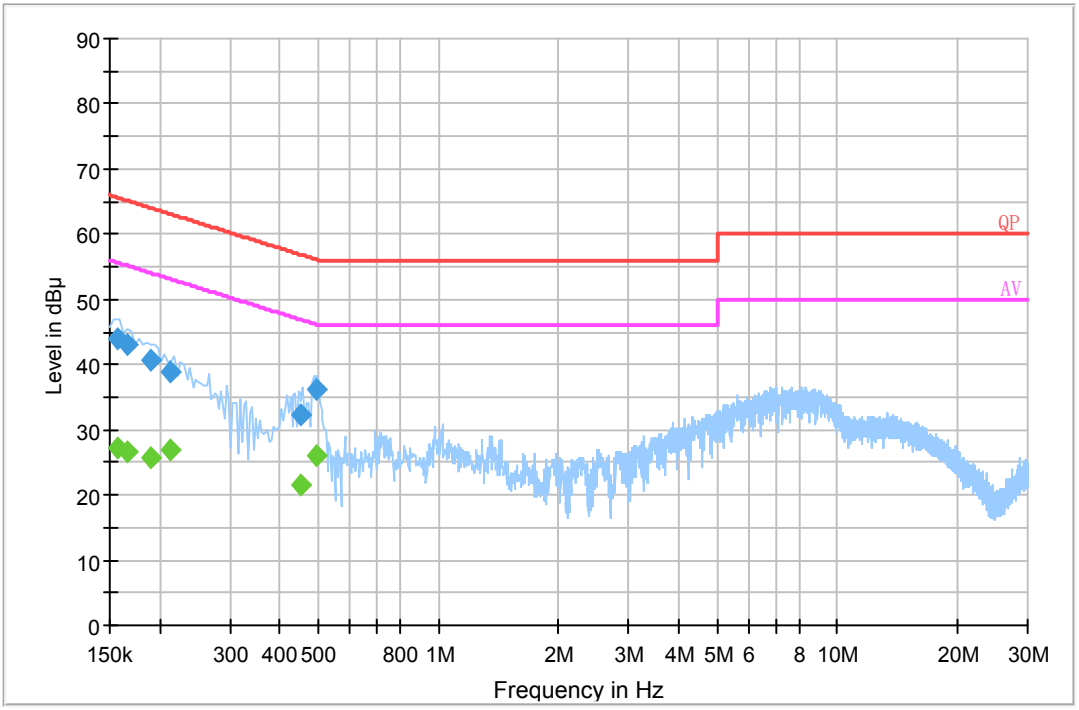
Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2019-04-01.

EUT operation mode: Transmitting (worst case)

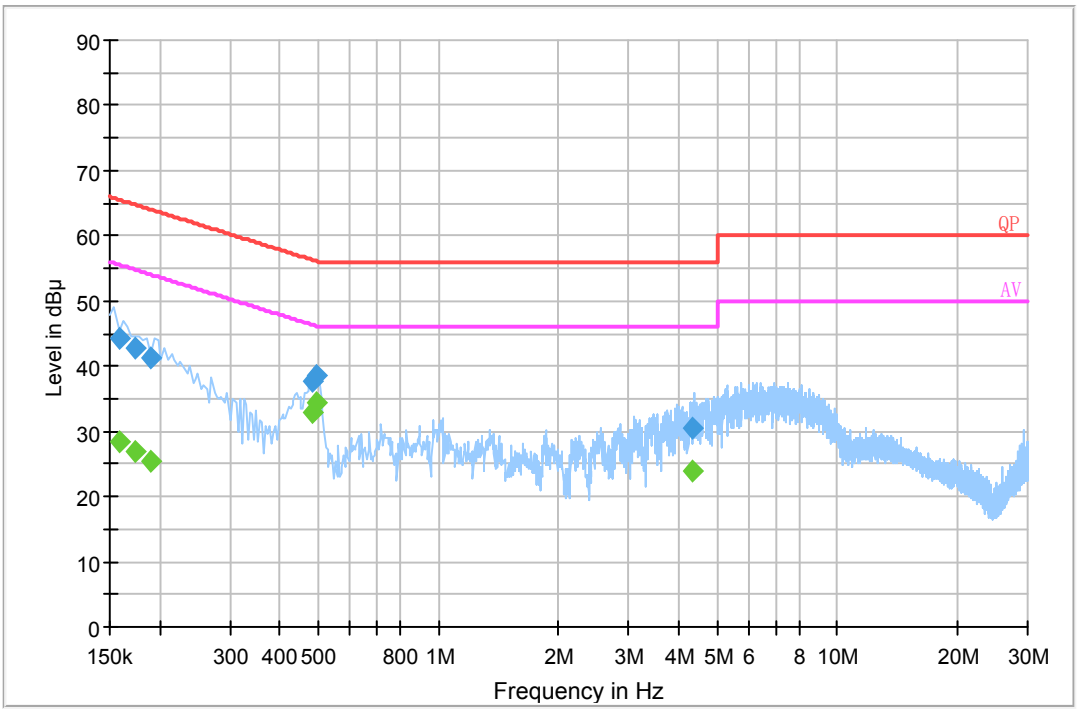
Powered by Adapter 1 (MASSPOWER):

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.157500	43.9	19.8	65.6	21.7	QP
0.165500	42.9	19.9	65.2	22.3	QP
0.189500	40.8	19.8	64.1	23.3	QP
0.213500	39.0	19.8	63.1	24.1	QP
0.451130	32.1	19.8	56.9	24.8	QP
0.494590	36.2	19.8	56.1	19.9	QP
0.157500	27.2	19.8	55.6	28.4	Ave.
0.165500	26.6	19.9	55.2	28.6	Ave.
0.189500	25.8	19.8	54.1	28.3	Ave.
0.213500	26.9	19.8	53.1	26.2	Ave.
0.451130	21.5	19.8	46.9	25.4	Ave.
0.494590	25.9	19.8	46.1	20.2	Ave.

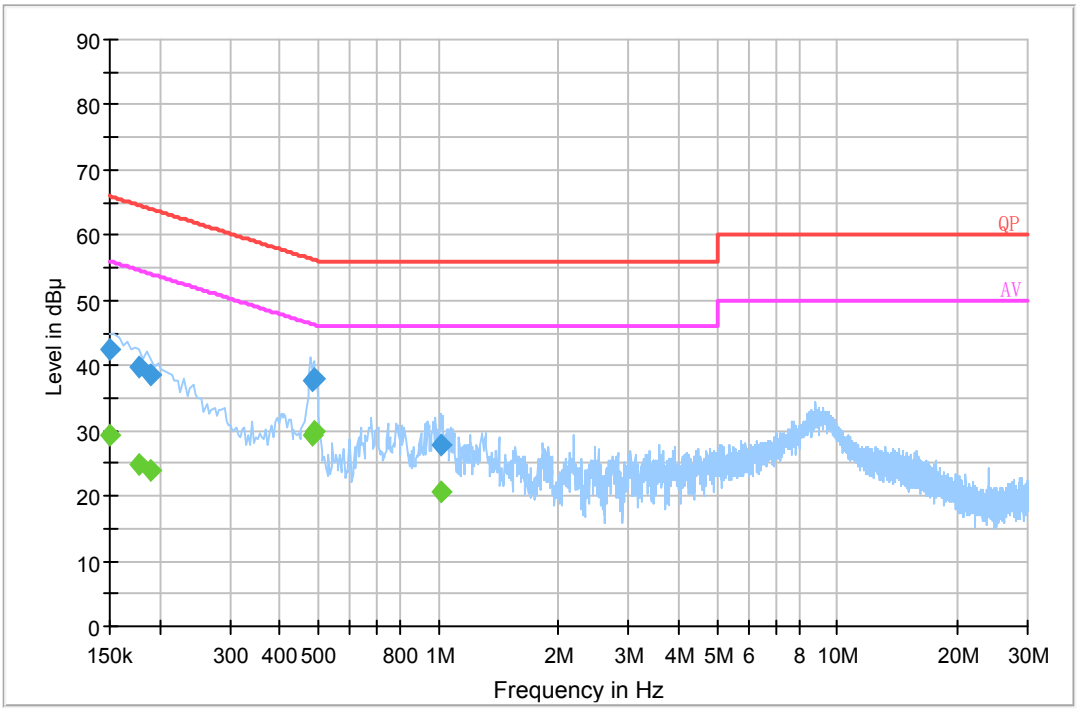
AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.158500	44.2	19.8	65.5	21.3	QP
0.173500	42.8	19.8	64.8	22	QP
0.189500	41.2	19.8	64.1	22.9	QP
0.485170	37.5	19.8	56.3	18.8	QP
0.493290	38.6	19.8	56.1	17.5	QP
4.320330	30.4	19.9	56.0	25.6	QP
0.158500	28.3	19.8	55.5	27.2	Ave.
0.173500	26.8	19.8	54.8	28	Ave.
0.189500	25.4	19.8	54.1	28.7	Ave.
0.485170	33.0	19.8	46.3	13.3	Ave.
0.493290	34.4	19.8	46.1	11.7	Ave.
4.320330	23.8	19.9	46.0	22.2	Ave.

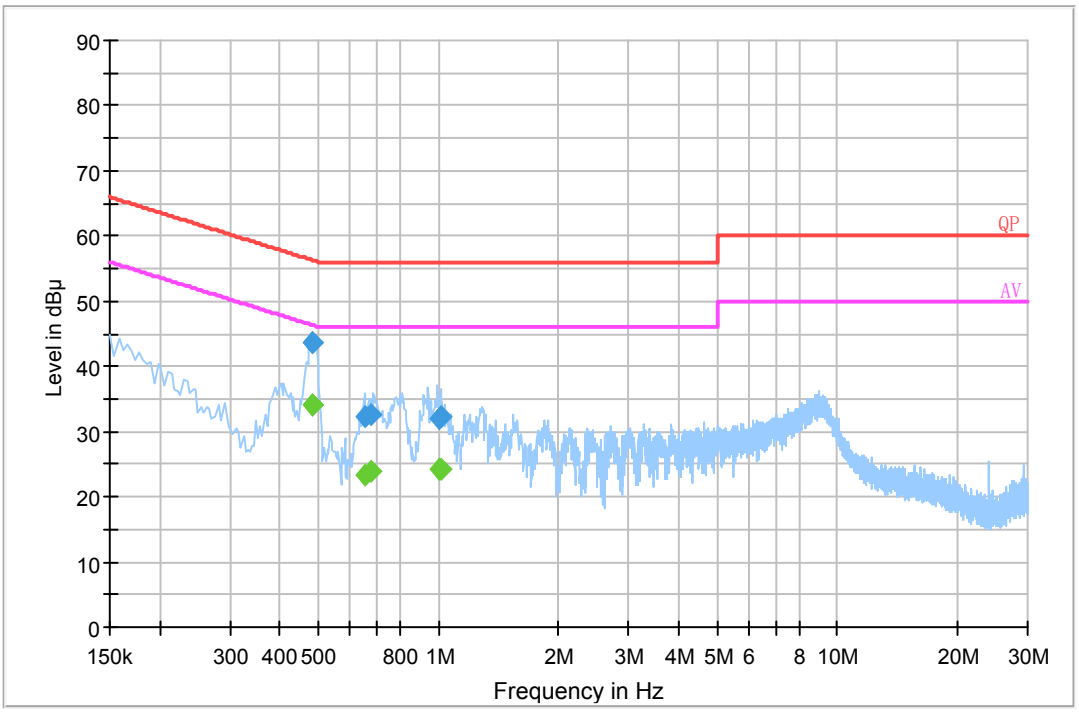
Powered by Adapter 2 (SUNLIGHT):

AC 120 V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.150000	42.6	19.8	66.0	23.4	QP
0.177500	39.9	19.9	64.6	24.7	QP
0.190501	38.6	19.8	64.0	25.4	QP
0.482830	37.8	19.8	56.3	18.5	QP
0.486710	38.1	19.8	56.2	18.1	QP
1.010790	27.7	19.9	56.0	28.3	QP
0.150000	29.3	19.8	56.0	26.7	Ave.
0.177500	24.7	19.9	54.6	29.9	Ave.
0.190501	23.9	19.8	54.0	30.1	Ave.
0.482830	29.4	19.8	46.3	16.9	Ave.
0.486710	29.9	19.8	46.2	16.3	Ave.
1.010790	20.7	19.9	46.0	25.3	Ave.

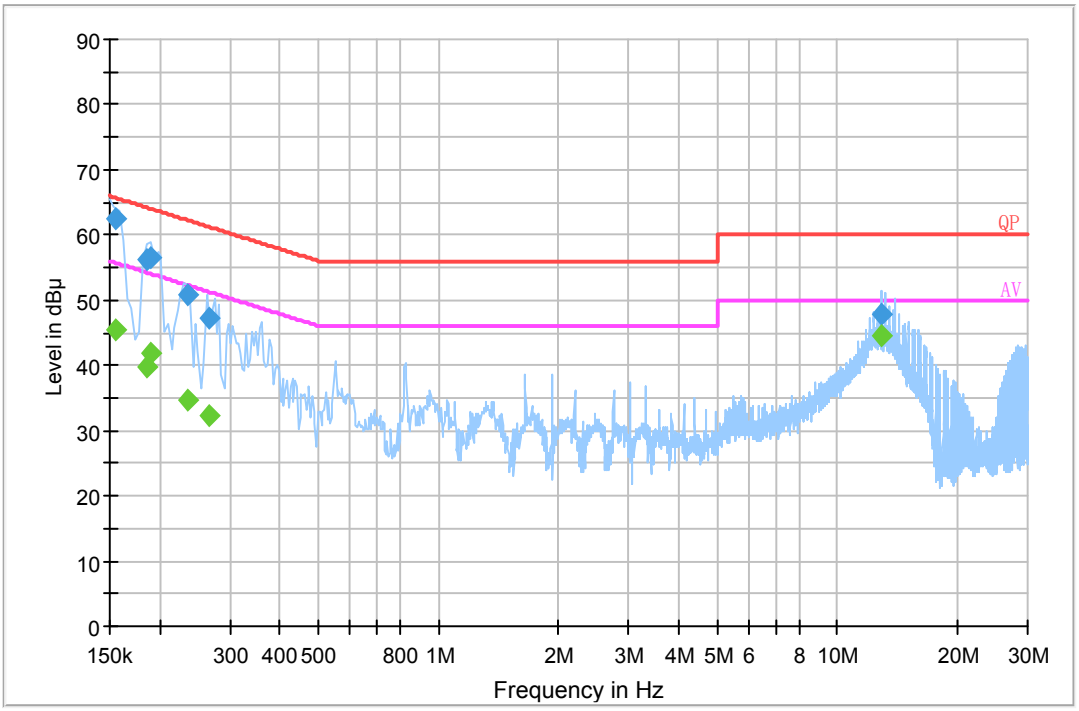
AC 120V/ 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.482770	43.5	19.8	56.3	12.8	QP
0.485170	43.7	19.8	56.3	12.6	QP
0.652190	32.2	19.8	56.0	23.8	QP
0.675710	32.7	19.8	56.0	23.3	QP
1.007090	32.0	19.8	56.0	24	QP
1.010790	32.1	19.8	56.0	23.9	QP
0.482770	34.0	19.8	46.3	12.3	Ave.
0.485170	34.1	19.8	46.3	12.2	Ave.
0.652190	23.2	19.8	46.0	22.8	Ave.
0.675710	24.0	19.8	46.0	22	Ave.
1.007090	24.1	19.8	46.0	21.9	Ave.
1.010790	24.3	19.8	46.0	21.7	Ave.

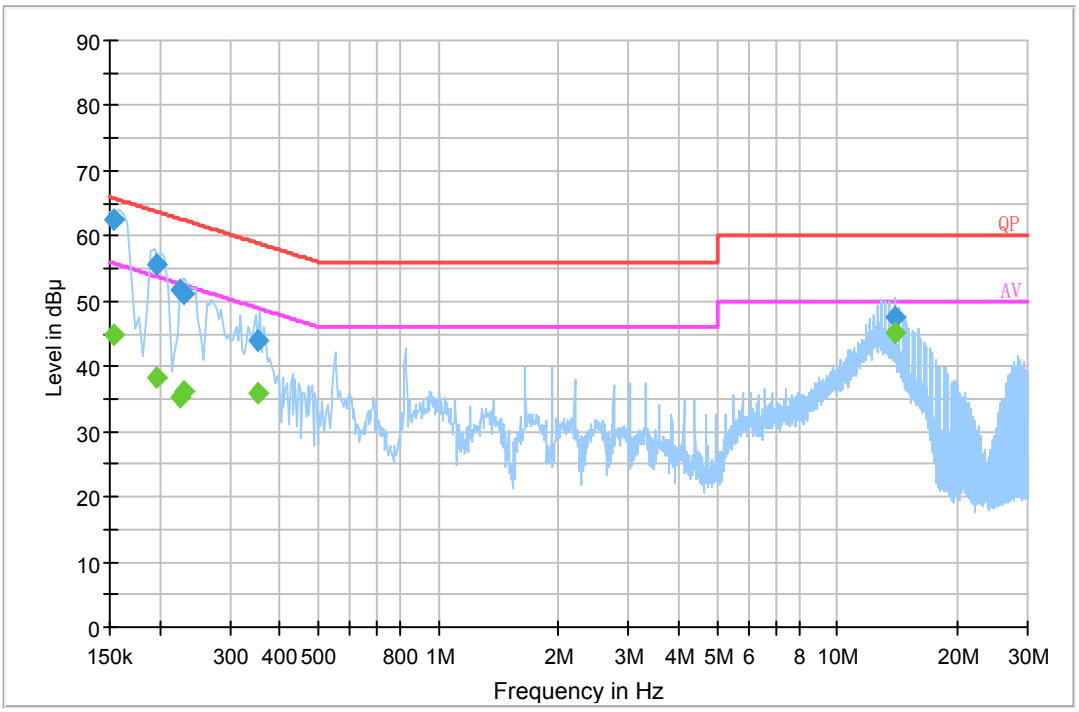
Powered by POE:

AC 120 V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.154500	62.4	19.8	65.8	3.4	QP
0.186500	56.1	19.8	64.2	8.1	QP
0.189500	56.5	19.8	64.1	7.6	QP
0.234500	50.7	19.8	62.3	11.6	QP
0.266500	47.3	19.8	61.2	13.9	QP
12.924170	48.0	20.0	60.0	12	QP
0.154500	45.6	19.8	55.8	10.2	Ave.
0.186500	39.9	19.8	54.2	14.3	Ave.
0.189500	41.9	19.8	54.1	12.2	Ave.
0.234500	34.8	19.8	52.3	17.5	Ave.
0.266500	32.2	19.8	51.2	19	Ave.
12.924170	44.6	20.0	50.0	5.4	Ave.

AC 120V/ 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.153500	62.5	19.8	65.8	3.3	QP
0.197500	55.5	19.8	63.7	8.2	QP
0.225500	51.6	19.8	62.6	11.0	QP
0.229500	51.2	19.8	62.5	11.3	QP
0.352630	44.0	19.9	58.9	14.9	QP
14.027670	47.5	19.9	60.0	12.5	QP
0.153500	44.8	19.8	55.8	11.0	Ave.
0.197500	38.4	19.8	53.7	15.3	Ave.
0.225500	35.1	19.8	52.6	17.5	Ave.
0.229500	36.3	19.8	52.5	16.2	Ave.
0.352630	35.9	19.9	48.9	13.0	Ave.
14.027670	45.2	19.9	50.0	4.8	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

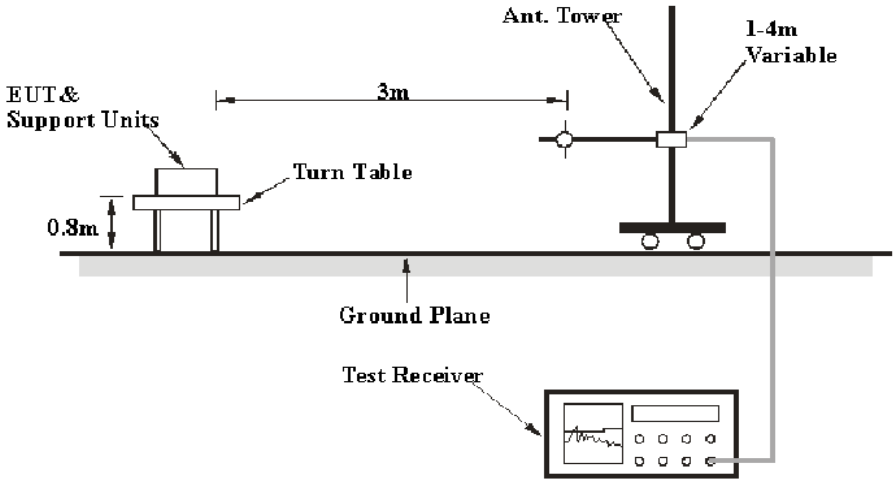
FCC §15.407 (b) (1), (2), (3), (4), (6), (7); §15.209; §15.205;

(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.

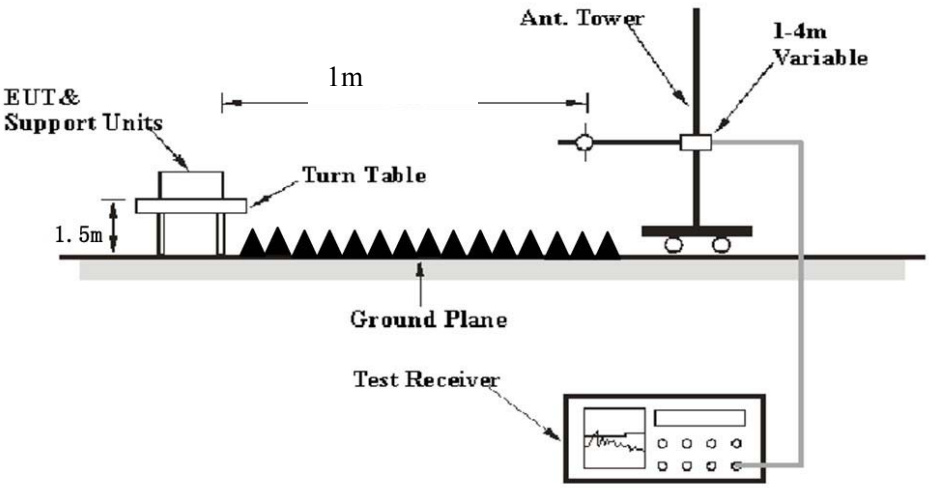
KDB 789033 D02 General UNII Test Procedures New Rules v02r01, clause G),
E[dBμV/m] = EIRP[dBm] - 20 log (d[m]) + 104.77, where E = field strength and d = distance at which field strength limit is specified.
For FCC §15.407 (b) (1), (2), (3) , (4), d=1m, non-Restricted bands limit=-27-20*log(1)+104.77=77.7 dBμV/m

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.

The adapter was connected to a 120VAC/60 Hz power source,

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	Measurements
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.

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

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

where

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

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

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:

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

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

Margin = Limit – Corrected Amplitude

Test Results Summary

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

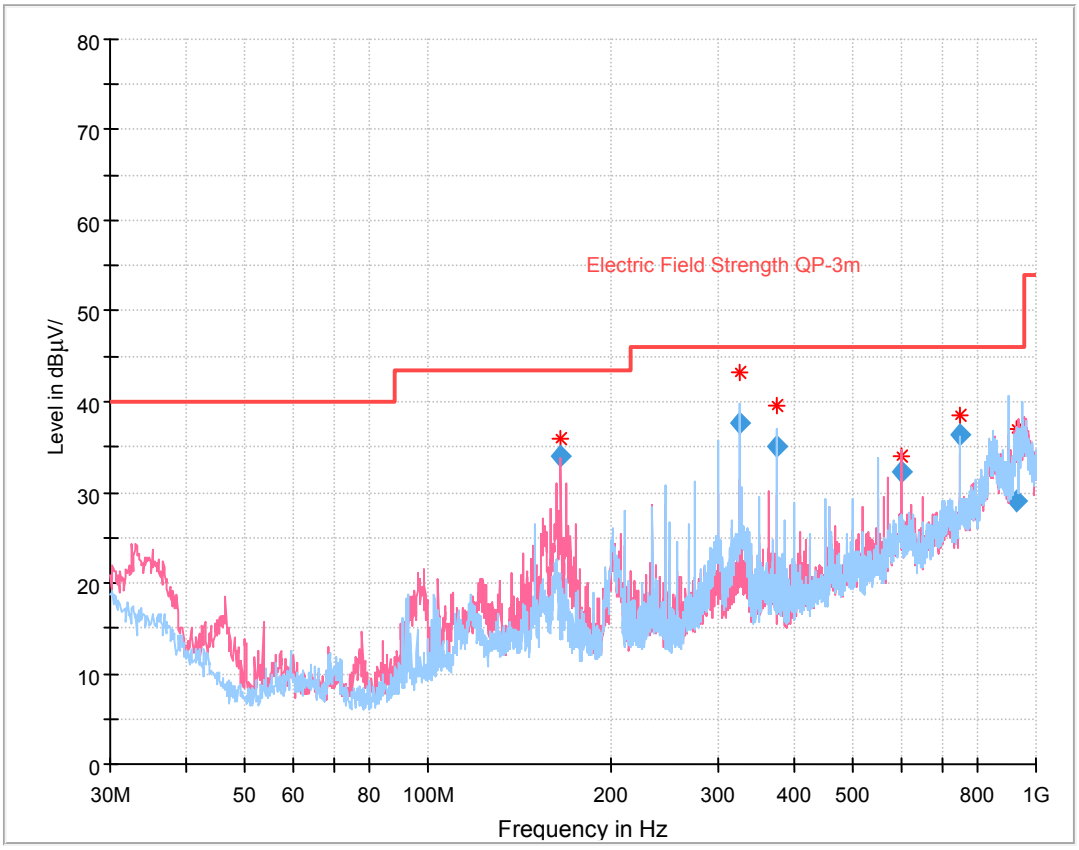
Temperature:	24~25 ℃
Relative Humidity:	50~56 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Hill He from 2019-03-23 to 2019-03-29.

EUT operation mode: Transmitting

Powered by Adapter 1 (MASSPOWER):

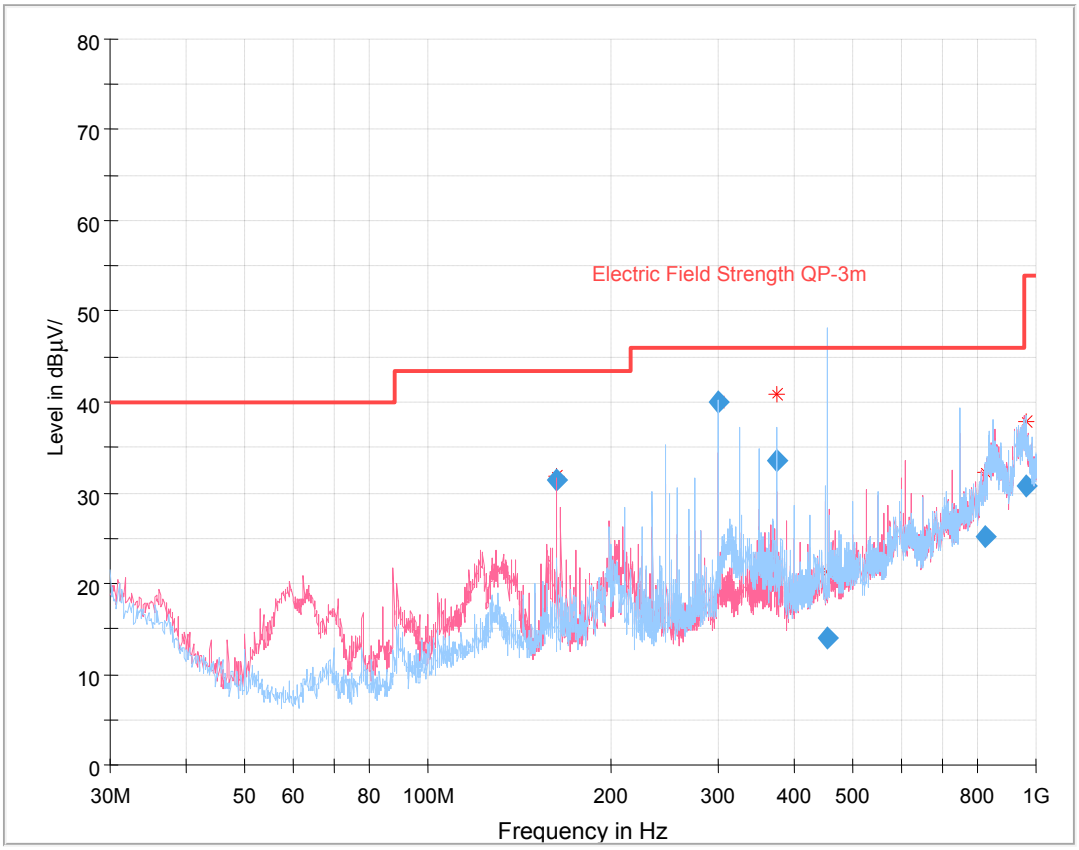
30 MHz~1 GHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
165.637125	34.07	100.0	V	214.0	-14.7	43.50	9.43
325.036625	37.73	109.0	H	353.0	-10.7	46.00	8.27
374.979000	34.96	102.0	H	323.0	-10.6	46.00	11.04
600.014750	32.25	100.0	V	103.0	-1.6	46.00	13.75
750.025000	36.30	226.0	H	0.0	-0.4	46.00	9.70
932.060125	29.07	273.0	V	136.0	7.9	46.00	16.93

Powered by Adapter 2 (SUNLIGHT):

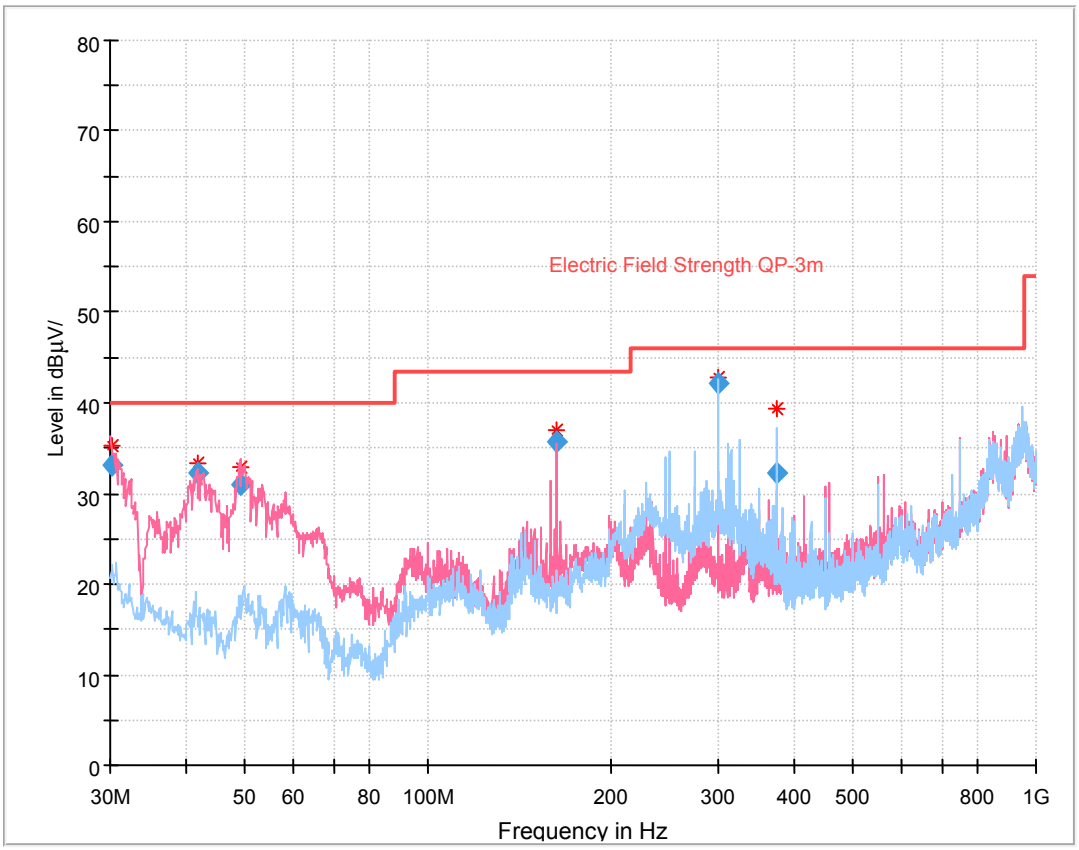
30 MHz~1 GHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
162.496750	31.48	100.0	V	90.0	-14.6	43.50	12.02
300.000375	39.98	122.0	H	0.0	-10.6	46.00	6.02
375.041250	33.48	111.0	H	219.0	-10.6	46.00	12.52
453.175375	14.05	260.0	H	120.0	-8.2	46.00	31.95
826.470375	25.12	245.0	V	64.0	4.6	46.00	20.88
961.643250	30.75	363.0	H	310.0	9.1	54.00	23.25

Powered by POE:

30 MHz~1 GHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
30.216312	33.12	109.0	V	0.0	-7.8	40.00	6.88
41.757625	32.33	100.0	V	351.0	-15.0	40.00	7.67
49.207000	31.00	100.0	V	0.0	-19.3	40.00	9.00
162.506750	35.79	100.0	V	207.0	-14.6	43.50	7.71
299.993375	42.12	102.0	H	0.0	-10.6	46.00	3.88
374.993000	32.21	109.0	H	0.0	-10.6	46.00	13.79

1000 MHz ~ 40 GHz:

5150-5250 MHz:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @1m	FCC Part 15.407	
	Reading (dBµV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBµV/m) @1m	Margin (dB)
802.11a mode									
5180MHz									
5142.00	63.40	PK	200	1.1	H	7.86	71.26	83.5	12.24
5142.00	50.93	Ave.	200	1.1	H	7.86	58.79	63.5	4.71
5361.50	52.94	PK	337	2.2	H	8.92	61.86	83.5	21.64
5361.50	39.97	Ave.	337	2.2	H	8.92	48.89	63.5	14.61
10360.00	40.51	PK	16	2.0	H	21.69	62.20	77.7	15.5
5200MHz									
10400.00	39.76	PK	172	1.9	H	21.79	61.55	83.5	21.55
5240 MHz									
5138.62	53.95	PK	357	1.4	H	7.86	61.81	83.5	21.69
5138.62	40.65	Ave.	357	1.4	H	7.86	48.51	63.5	14.99
5426.33	53.67	PK	49	1.6	H	9.02	62.69	83.5	20.81
5426.33	41.22	Ave.	49	1.6	H	9.02	50.24	63.5	13.26
10480.00	39.10	PK	153	2.4	H	21.49	60.59	77.7	17.11
802.11N20 mode									
5180MHz									
5149.53	68.28	PK	103	1.7	H	7.86	76.14	83.5	7.36
5149.53	51.92	Ave.	103	1.7	H	7.86	59.78	63.5	3.72
5364.25	52.52	PK	44	1.7	H	8.92	61.44	83.5	22.06
5364.25	41.34	Ave.	44	1.7	H	8.92	50.26	63.5	13.24
10360.00	40.06	PK	119	1.2	H	21.69	61.75	77.7	15.95
5200MHz									
10400.00	39.86	PK	158	2.3	H	21.79	61.65	83.5	21.85
5240 MHz									
5102.50	41.29	PK	297	1.0	H	7.76	49.05	83.5	34.45
5102.50	30.43	Ave.	297	1.0	H	7.76	38.19	63.5	25.31
5448.46	43.20	PK	39	2.4	H	9.12	52.32	83.5	31.18
5448.46	30.22	Ave.	39	2.4	H	9.12	39.34	63.5	24.16
10480.00	39.58	PK	106	2.1	H	21.49	61.07	77.7	16.63

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m) @1m	FCC Part 15.407	
	Reading (dBμV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m) @1m	Margin (dB)
802.11AC20 mode									
5180MHz									
5148.59	65.78	PK	306	1.0	H	7.86	73.64	83.5	9.86
5148.59	50.64	Ave.	306	1.0	H	7.86	58.50	63.5	5.00
5363.61	52.61	PK	310	1.4	H	8.92	61.53	83.5	21.97
5363.61	40.76	Ave.	310	1.4	H	8.92	49.68	63.5	13.82
10360.00	40.31	PK	122	2.1	H	21.69	62.00	77.7	15.70
5200MHz									
10400.00	40.17	PK	324	2.2	H	21.79	61.96	77.7	15.74
5240MHz									
5360.75	52.94	PK	310	1.3	H	8.92	61.86	83.5	21.64
5360.75	39.49	Ave.	310	1.3	H	8.92	48.41	63.5	15.09
10480.00	40.28	PK	118	1.8	H	21.49	61.77	77.7	15.93
802.11N40 mode									
5190MHz									
5146.85	53.04	PK	346	2.4	H	7.86	60.90	83.5	22.60
5146.85	30.19	Ave.	346	2.4	H	7.86	38.05	63.5	25.45
5365.80	51.91	PK	230	2.1	H	8.92	60.83	83.5	22.67
5365.80	37.48	Ave.	230	2.1	H	8.92	46.40	63.5	17.10
10380.00	39.56	PK	119	1.4	H	21.69	61.25	77.7	16.45
5230MHz									
5144.83	65.09	PK	136	1.5	H	7.86	72.95	83.5	10.55
5144.83	39.12	Ave.	136	1.5	H	7.86	46.98	63.5	16.52
5360.43	51.26	PK	39	1.1	H	8.92	60.18	83.5	23.32
5360.43	37.49	Ave.	39	1.1	H	8.92	46.41	63.5	17.09
10460.00	38.65	PK	230	1.8	H	21.39	60.04	77.7	17.66
802.11AC40 mode									
5190MHz									
5149.30	63.53	PK	290	1.0	H	7.86	71.39	83.5	12.11
5149.30	42.77	Ave.	290	1.0	H	7.86	50.63	63.5	12.87
5416.78	53.81	PK	127	1.6	H	9.02	62.83	83.5	20.67
5416.78	41.28	Ave.	127	1.6	H	9.02	50.30	63.5	13.20
10380.00	40.11	PK	11	1.1	H	21.69	61.80	77.7	15.90

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m) @1m	FCC Part 15.407	
	Reading (dBμV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m) @1m	Margin (dB)
5230MHz									
5148.59	54.80	PK	330	1.6	H	7.86	62.66	83.5	20.84
5148.59	45.13	Ave.	330	1.6	H	7.86	52.99	63.5	10.51
5430.79	54.45	PK	243	1.3	H	9.02	63.47	83.5	20.03
5430.79	41.79	Ave.	243	1.3	H	9.02	50.81	63.5	12.69
10460.00	39.72	PK	228	1.4	H	21.39	61.11	77.7	16.59
802.11AC80 mode									
5210MHz									
5121.31	63.73	PK	201	1.0	H	7.86	71.59	83.5	11.91
5121.31	50.26	Ave.	201	1.0	H	7.86	58.12	63.5	5.38
5390.78	55.75	PK	32	1.7	H	9.02	64.77	83.5	18.73
5390.78	41.58	Ave.	32	1.7	H	9.02	50.60	63.5	12.90
10420.00	39.70	PK	321	1.9	H	21.79	61.49	77.7	16.21

5250-5350 MHz:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @1m	FCC Part 15.407	
	Reading (dBµV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBµV/m) @1m	Margin (dB)
802.11a mode									
5260MHz									
5138.46	51.36	PK	36	2.1	H	7.86	59.22	83.5	24.28
5138.46	40.23	Ave.	36	2.1	H	7.86	48.09	63.5	15.41
5371.29	51.34	PK	343	1.7	H	8.92	60.26	83.5	23.24
5371.29	40.35	Ave.	343	1.7	H	8.92	49.27	63.5	14.23
10520.00	41.32	PK	335	2.0	H	21.49	62.81	77.7	14.89
5280MHz									
10560.00	40.62	PK	183	2.1	H	21.94	62.56	77.7	15.14
5320 MHz									
5143.62	50.86	PK	230	2.3	H	7.86	58.72	83.5	24.78
5143.62	40.21	Ave.	230	2.3	H	7.86	48.07	63.5	15.43
5368.42	51.22	PK	254	2.4	H	8.92	60.14	83.5	23.36
5368.42	40.16	Ave.	254	2.4	H	8.92	49.08	63.5	14.42
10640.00	40.47	PK	2	2.1	H	22.04	62.51	83.5	20.99
10640.00	28.33	Ave.	2	2.1	H	22.04	50.37	63.5	13.13
802.11N20 mode									
5260MHz									
5149.63	50.42	PK	2	1.5	H	7.86	58.28	83.5	25.22
5149.63	40.34	Ave.	2	1.5	H	7.86	48.20	63.5	15.30
5369.80	50.72	PK	204	2.0	H	8.92	59.64	83.5	23.86
5369.80	40.56	Ave.	204	2.0	H	8.92	49.48	63.5	14.02
10520.00	40.86	PK	39	1.7	H	20.91	61.77	77.7	15.93
5270MHz									
10540.00	41.52	PK	110	1.7	H	21.49	63.01	77.7	14.69
5280 MHz									
5148.79	50.33	PK	192	1.2	H	7.86	58.19	83.5	25.31
5148.79	40.25	Ave.	192	1.2	H	7.86	48.11	63.5	15.39
5368.26	50.36	PK	114	1.2	H	8.92	59.28	83.5	24.22
5368.26	40.15	Ave.	114	1.2	H	8.92	49.07	63.5	14.43
10640.00	41.06	PK	72	1.6	H	22.04	63.10	83.5	20.40
10640.00	27.63	Ave.	72	1.6	H	22.04	49.67	63.5	13.83

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m) @1m	FCC Part 15.407	
	Reading (dBμV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m) @1m	Margin (dB)
802.11AC20 mode									
5270MHz									
5143.58	50.46	PK	209	1.5	H	7.86	58.32	83.5	25.18
5143.58	40.26	Ave.	209	1.5	H	7.86	48.12	63.5	15.38
5371.40	50.54	PK	95	1.5	H	8.92	59.46	83.5	24.04
5371.40	40.63	Ave.	95	1.5	H	8.92	49.55	63.5	13.95
10520.00	42.36	PK	81	2.3	H	21.49	63.85	77.7	13.65
5280MHz									
10560.00	41.26	PK	7	1.1	H	21.94	63.20	77.7	14.50
5320MHz									
5138.49	50.43	PK	310	1.3	H	7.86	58.29	83.5	25.21
5138.49	40.62	Ave.	310	1.3	H	7.86	48.48	63.5	15.02
5387.56	50.71	PK	103	2.1	H	9.02	59.73	83.5	23.77
5387.56	40.29	Ave.	103	2.1	H	9.02	49.31	63.5	14.19
10640.00	41.35	PK	169	1.2	H	22.04	63.39	83.5	20.11
10640.00	28.62	Ave.	169	1.2	H	22.04	50.66	63.5	12.84
802.11N40 mode									
5270MHz									
5010.31	52.72	PK	175	2.4	H	7.64	60.36	83.5	23.14
5010.31	41.32	Ave.	175	2.4	H	7.64	48.96	63.5	14.54
5352.15	54.28	PK	290	2.2	H	8.92	63.20	83.5	20.30
5352.15	40.28	Ave.	290	2.2	H	8.92	49.20	63.5	14.30
10540.00	41.36	PK	75	1.1	H	21.49	62.85	77.7	14.85
5310MHz									
5036.00	52.82	PK	31	1.8	H	7.74	60.56	83.5	22.94
5036.00	41.03	Ave.	31	1.8	H	7.74	48.77	63.5	14.73
5352.15	55.36	PK	147	2.2	H	8.92	64.28	83.5	19.22
5352.15	43.07	Ave.	147	2.2	H	8.92	51.99	63.5	11.51
10620.00	41.35	PK	159	1.8	H	22.04	63.39	83.5	14.31
10620.00	28.35	PK	159	1.8	H	22.04	50.39	63.5	13.11
802.11AC40 mode									
5270MHz									
5043.90	51.94	PK	40	1.4	H	7.74	59.68	83.5	23.82
5043.90	40.96	Ave.	40	1.4	H	7.74	48.70	63.5	14.80
5350.80	51.09	PK	292	2.3	H	8.92	60.01	83.5	23.49
5350.80	40.11	Ave.	292	2.3	H	8.92	49.03	63.5	14.47
10540.00	39.56	PK	289	1.1	H	21.49	61.05	77.7	16.65

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m) @1m	FCC Part 15.407	
	Reading (dBμV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m) @1m	Margin (dB)
5310MHz									
5145.55	53.74	PK	47	1.5	H	7.86	61.60	83.5	21.90
5145.55	39.50	Ave.	47	1.5	H	7.86	47.36	63.5	16.14
5350.80	62.91	PK	264	1.6	H	8.92	71.83	83.5	11.67
5350.80	40.39	Ave.	264	1.6	H	8.92	49.31	63.5	14.19
10620.00	41.05	PK	147	2.1	H	22.04	63.09	83.5	20.41
10620.00	28.46	Ave.	147	2.1	H	22.04	50.50	63.5	13.00
802.11AC80 mode									
5290MHz									
5054.16	51.82	PK	96	1.3	H	7.66	59.48	83.5	24.02
5054.16	40.50	Ave.	96	1.3	H	7.66	48.16	63.5	15.34
5369.82	51.89	PK	267	1.7	H	8.92	60.81	83.5	22.69
5369.82	40.39	Ave.	267	1.7	H	8.92	49.31	63.5	14.19
10580.00	39.62	PK	251	1.2	H	21.31	60.93	77.7	16.77

5470-5725 MHz:

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @1m	FCC Part 15.407	
	Reading (dBµV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBµV/m) @1m	Margin (dB)
802.11a mode									
5500MHz									
5469.91	65.37	PK	220	2.1	H	10.28	75.65	77.7	2.05
5739.48	51.26	PK	291	2.2	H	9.60	60.86	77.7	16.84
11000.00	41.35	PK	330	1.6	H	22.24	63.59	83.5	19.91
11000.00	28.63	Ave.	330	1.6	H	22.24	50.87	63.5	12.63
5600MHz									
11200.00	40.69	PK	151	1.8	H	22.48	63.17	83.5	20.33
11200.00	27.96	Ave.	151	1.8	H	22.48	50.44	63.5	13.06
5700 MHz									
5463.85	51.55	PK	42	1.9	H	10.28	61.83	77.7	15.87
5727.80	67.00	PK	238	1.8	H	9.60	76.60	77.7	1.10
11400.00	41.26	PK	275	1.9	H	23.33	64.59	83.5	18.91
11400.00	28.13	Ave.	275	1.9	H	23.33	51.46	63.5	12.04
802.11N20 mode									
5500MHz									
5468.00	66.37	PK	58	1.7	H	10.28	76.65	77.7	1.05
5733.59	50.46	PK	213	1.4	H	9.60	60.06	77.7	17.64
11000.00	41.13	PK	256	1.6	H	22.24	63.37	83.5	20.13
11000.00	28.26	Ave.	256	1.6	H	22.24	50.50	63.5	13.00
5600MHz									
11200.00	41.17	PK	261	2.0	H	22.48	63.65	83.5	19.85
11200.00	28.64	Ave.	261	2.0	H	22.48	51.12	63.5	12.38
5700 MHz									
5437.59	51.26	PK	66	1.5	H	9.12	60.38	83.5	23.12
5437.59	40.39	Ave.	66	1.5	H	9.12	49.51	63.5	13.99
5725.38	66.83	PK	12	1.8	H	9.60	76.43	77.7	1.27
11400.00	40.59	PK	60	1.2	H	23.33	63.92	83.5	19.58
11400.00	27.96	Ave.	60	1.2	H	23.33	51.29	63.5	12.21

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m) @1m	FCC Part 15.407	
	Reading (dBμV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m) @1m	Margin (dB)
802.11AC20 mode									
5500MHz									
5468.00	66.35	PK	192	2.1	H	10.28	76.63	77.7	1.07
5731.26	50.67	PK	97	1.9	H	9.60	60.27	77.7	17.43
11000.00	41.22	PK	316	2.2	H	22.24	63.46	83.5	20.04
11000.00	28.56	Ave.	316	2.2	H	22.24	50.80	63.5	12.70
5600MHz									
11200.00	41.52	PK	216	1.2	H	22.48	64.00	83.5	19.50
11200.00	28.63	Ave.	216	1.2	H	22.48	51.11	63.5	12.39
5700MHz									
5468.23	66.19	PK	270	1.5	H	10.28	76.47	77.7	1.23
5725.16	66.33	PK	328	2.2	H	9.60	75.93	77.7	1.77
11400.00	40.35	PK	87	1.7	H	23.33	63.68	83.5	19.82
11400.00	28.43	Ave.	87	1.7	H	23.33	51.76	63.5	11.74
802.11N40 mode									
5510MHz									
5465.40	64.02	PK	222	1.2	H	10.28	74.30	77.7	3.40
5734.56	51.42	PK	355	2.3	H	9.60	61.02	77.7	16.68
11020.00	41.23	PK	21	1.1	H	22.24	63.47	83.5	20.03
11020.00	28.34	Ave.	21	1.1	H	22.24	50.58	63.5	12.92
5590MHz									
5431.04	28.67	PK	343	2.3	H	42.16	70.83	83.5	12.67
5431.04	14.46	Ave.	343	2.3	H	42.16	56.62	63.5	6.88
5790.12	28.29	PK	247	2.0	H	42.92	71.21	77.7	6.49
11180.00	41.12	PK	306	2.0	H	22.48	63.60	83.5	19.90
11180.00	26.80	Ave.	306	2.0	H	22.48	49.28	63.5	14.22
5670MHz									
5466.13	52.06	PK	51	2.0	H	10.28	62.34	77.7	15.36
5725.81	60.69	PK	292	1.5	H	9.60	70.29	77.7	7.41
11340.00	40.96	PK	148	2.1	H	23.09	64.05	83.5	19.45
11340.00	28.67	Ave.	148	2.1	H	23.09	51.76	63.5	11.74
802.11AC40 mode									
5510MHz									
5469.57	65.28	PK	66	1.3	H	10.28	75.56	77.7	2.14
5729.65	50.71	PK	268	1.3	H	9.60	60.31	77.7	17.39
11020.00	40.84	PK	280	2.4	H	22.24	63.08	83.5	20.42
11020.00	28.39	Ave.	280	2.4	H	22.24	50.63	63.5	12.87
5590MHz									
5425.03	28.21	PK	161	1.7	H	42.16	70.37	83.5	13.13
5425.03	14.43	Ave.	161	1.7	H	42.16	56.59	63.5	6.91
5806.16	28.70	PK	211	1.2	H	42.92	71.62	77.7	6.08
11180.00	40.84	PK	133	1.6	H	22.48	63.32	83.5	20.18
11180.00	26.85	Ave.	133	1.6	H	22.48	49.33	63.5	14.17

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @1m	FCC Part 15.407	
	Reading (dBµV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBµV/m) @1m	Margin (dB)
5670MHz									
5465.23	53.22	PK	140	1.5	H	10.28	63.50	77.7	14.20
5728.69	52.71	PK	194	1.9	H	9.60	62.31	77.7	15.39
11340.00	40.68	PK	172	2.4	H	23.09	63.77	83.5	19.73
11340.00	28.94	Ave.	172	2.4	H	23.09	52.03	63.5	11.47
802.11AC80 mode									
5530MHz									
5465.43	34.18	PK	66	2.4	H	42.36	76.54	77.7	1.16
5732.24	28.70	PK	95	2.0	H	42.78	71.48	77.7	6.22
11060.00	39.49	PK	331	2.0	H	21.97	61.46	83.5	22.04
11060.00	26.77	Ave.	331	2.0	H	21.97	48.74	63.5	14.76
5610MHz									
5465.75	55.32	PK	213	1.7	H	10.28	65.60	77.7	12.10
5733.52	53.35	PK	246	2.1	H	9.60	62.95	77.7	14.75
11220.00	41.38	PK	21	1.9	H	22.48	63.86	83.5	19.64
11220.00	29.31	Ave.	21	1.9	H	22.48	51.79	63.5	11.71

5725-5850 MHz:

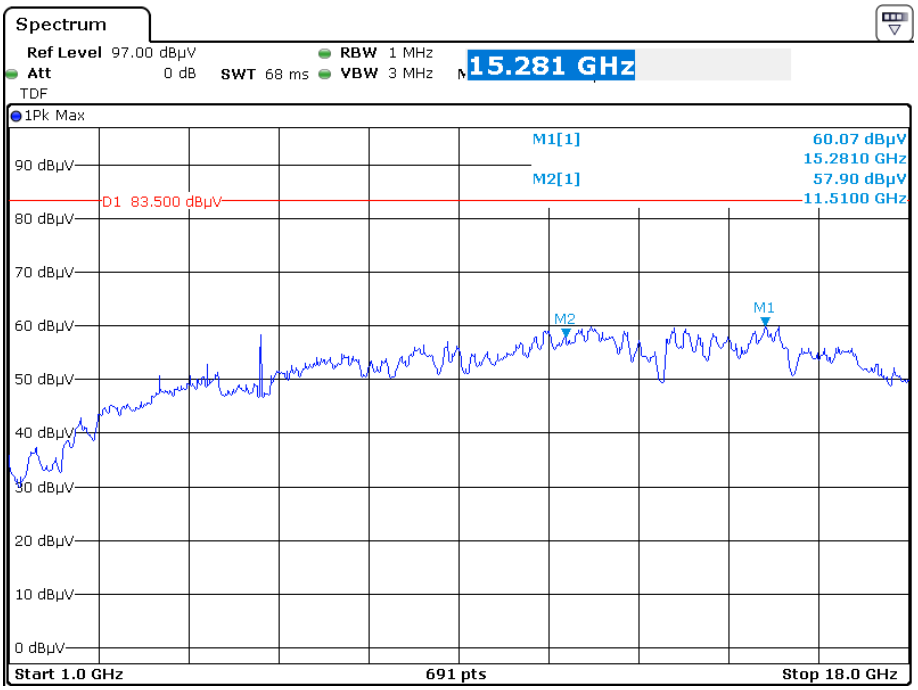
Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m) @1m	FCC Part 15.407	
	Reading (dBμV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m) @1m	Margin (dB)
802.11a mode									
5745MHz									
5657.99	33.12	PK	336	1.2	H	42.78	75.90	83.6	7.70
5719.55	39.47	PK	350	1.8	H	42.78	82.25	120.2	37.95
5724.85	42.60	PK	100	1.1	H	42.78	85.38	131.4	46.02
11490.00	41.45	PK	303	2.2	H	24.17	65.62	83.5	17.88
11490.00	26.52	Ave.	303	2.2	H	24.17	50.69	63.5	12.81
5785MHz									
11570.00	39.72	PK	56	1.5	H	23.10	62.82	83.5	20.68
11570.00	26.97	Ave.	56	1.5	H	23.10	50.07	63.5	13.43
5825 MHz									
5854.08	37.36	PK	158	2.3	H	42.87	80.23	122.4	42.17
5857.62	35.85	PK	63	2.1	H	42.87	78.72	119.57	40.85
5895.44	34.20	PK	136	1.6	H	42.87	77.07	99.57	22.50
11650.00	39.92	PK	293	2.2	H	22.37	62.29	83.5	21.21
11650.00	26.84	Ave.	293	2.2	H	22.37	49.21	63.5	14.29
802.11N20 mode									
5745MHz									
5698.44	33.62	PK	185	2.3	H	42.78	76.40	113.55	37.15
5719.47	35.92	PK	185	1.8	H	42.78	78.70	120.15	41.45
5724.12	40.75	PK	144	2.4	H	42.78	83.53	129.69	46.16
11490.00	40.05	PK	123	2.4	H	24.17	64.22	83.5	19.28
11490.00	26.89	Ave.	123	2.4	H	24.17	51.06	63.5	12.44
5785MHz									
11570.00	39.86	PK	349	1.8	H	23.10	62.96	83.5	20.54
11570.00	26.59	Ave.	349	1.8	H	23.10	49.69	63.5	13.81
5825 MHz									
5850.52	37.82	PK	345	1.5	H	42.87	80.69	130.51	49.82
5855.22	34.38	PK	16	1.1	H	42.87	77.25	120.24	42.99
5881.40	33.46	PK	187	2.5	H	42.87	76.33	109.96	33.63
11650.00	40.05	PK	83	2.4	H	22.37	62.42	83.5	21.08
11650.00	27.80	Ave.	83	2.4	H	22.37	50.17	63.5	13.33

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m) @1m	FCC Part 15.407	
	Reading (dBμV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11AC20 mode									
5745MHz									
5695.77	33.70	PK	260	1.2	H	42.78	76.48	111.57	35.09
5719.90	39.91	PK	130	1.5	H	42.78	82.69	120.27	37.58
5723.66	43.57	PK	289	1.3	H	42.78	86.35	128.64	42.29
11490.00	40.29	PK	240	1.3	H	24.17	64.46	83.5	19.04
11490.00	26.89	Ave.	240	1.3	H	24.17	51.06	63.5	12.44
5785MHz									
11570.00	39.47	PK	235	1.9	H	23.10	62.57	83.5	20.93
11570.00	27.13	Ave.	235	1.9	H	23.10	50.23	63.5	13.27
5825MHz									
5851.12	38.03	PK	267	1.3	H	42.87	80.90	129.51	48.61
5856.23	36.75	PK	39	1.1	H	42.87	79.62	119.96	40.34
5894.45	34.12	PK	151	1.3	H	42.87	76.99	100.31	23.32
11650.00	39.58	PK	218	2.0	H	22.37	61.95	83.5	21.55
11650.00	28.16	Ave.	218	2.0	H	22.37	50.53	63.5	12.97
802.11N40 mode									
5755MHz									
5698.73	33.65	PK	51	1.5	H	42.78	76.43	113.76	37.33
5716.02	40.80	PK	342	1.9	H	42.78	83.58	119.19	35.61
5723.13	43.23	PK	267	2.0	H	42.78	86.01	127.44	41.43
11490.00	39.86	PK	33	1.1	H	24.17	64.03	83.5	19.47
11490.00	27.31	Ave.	33	1.1	H	24.17	51.48	63.5	12.02
5795MHz									
5853.61	35.89	PK	205	1.3	H	42.87	78.76	123.47	44.71
5861.09	34.59	PK	105	1.5	H	42.87	77.46	118.59	41.13
5886.40	34.37	PK	19	1.2	H	42.87	77.24	106.26	29.02
11590.00	40.55	PK	125	1.0	H	23.10	63.65	83.5	19.85
11590.00	28.83	Ave.	125	1.0	H	23.10	51.93	63.5	11.57
802.11AC40 mode									
5755MHz									
5693.50	33.88	PK	25	1.2	H	42.78	76.66	109.89	33.23
5719.63	34.69	PK	298	1.4	H	42.78	77.47	120.2	42.73
5724.87	35.68	PK	136	1.3	H	42.78	78.46	131.4	52.94
11510.00	40.65	PK	145	2.4	H	24.17	64.82	83.5	18.68
11510.00	28.13	Ave.	145	2.4	H	24.17	52.30	63.5	11.20

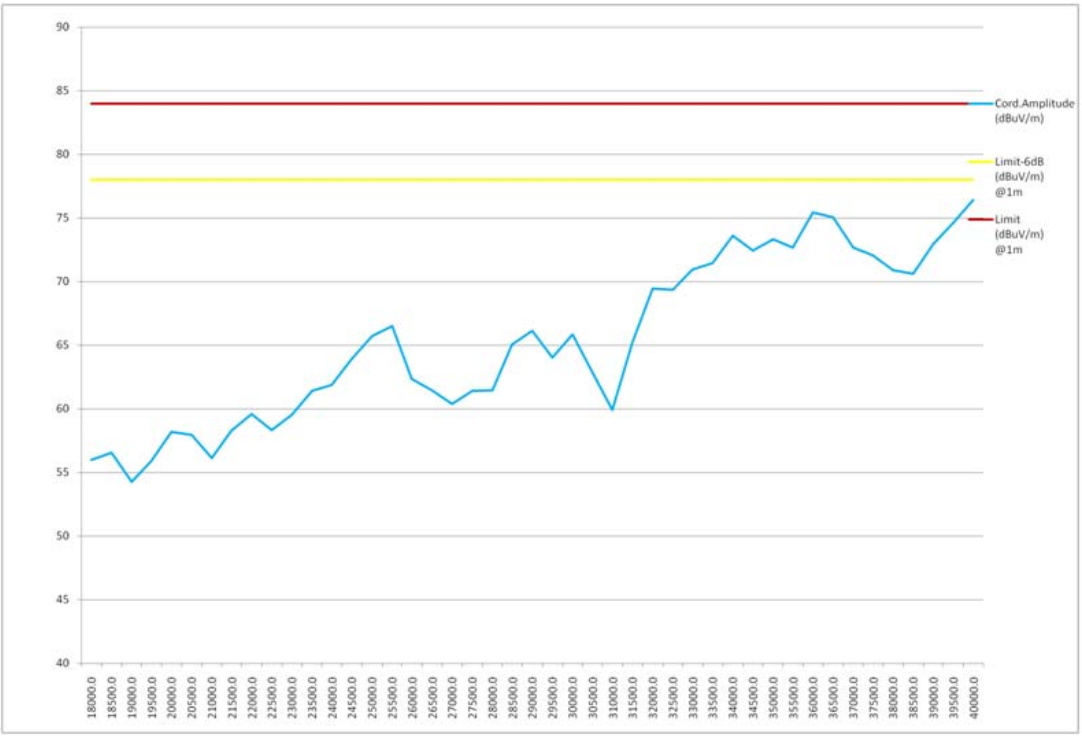
Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m) @1m	FCC Part 15.407	
	Reading (dBµV) @1m	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
5795MHz									
5851.62	35.27	PK	39	2.1	H	42.87	78.14	128.01	49.87
5857.43	34.65	PK	148	2.2	H	42.87	77.52	119.62	42.10
5879.48	33.74	PK	245	1.2	H	42.87	76.61	111.38	34.77
11590.00	40.26	PK	202	2.2	H	23.10	63.36	83.5	20.14
11590.00	27.68	Ave.	202	2.2	H	23.10	50.78	63.5	12.72
802.11AC80 mode									
5775MHz									
5688.10	33.35	PK	215	2.4	H	42.78	76.13	105.89	29.76
5713.53	34.17	PK	150	2.2	H	42.78	76.95	118.49	41.54
5723.32	34.74	PK	106	2.0	H	42.78	77.52	127.87	50.35
5851.51	34.81	PK	25	1.8	H	42.87	77.68	128.26	50.58
5874.38	34.54	PK	299	2.1	H	42.87	77.41	114.87	37.46
5913.82	34.56	PK	45	1.8	H	42.87	77.43	85.97	8.54
11550.00	40.96	PK	170	1.1	H	23.10	64.06	83.5	19.44
11550.00	28.68	Ave.	170	1.1	H	23.10	51.78	63.5	11.72

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.

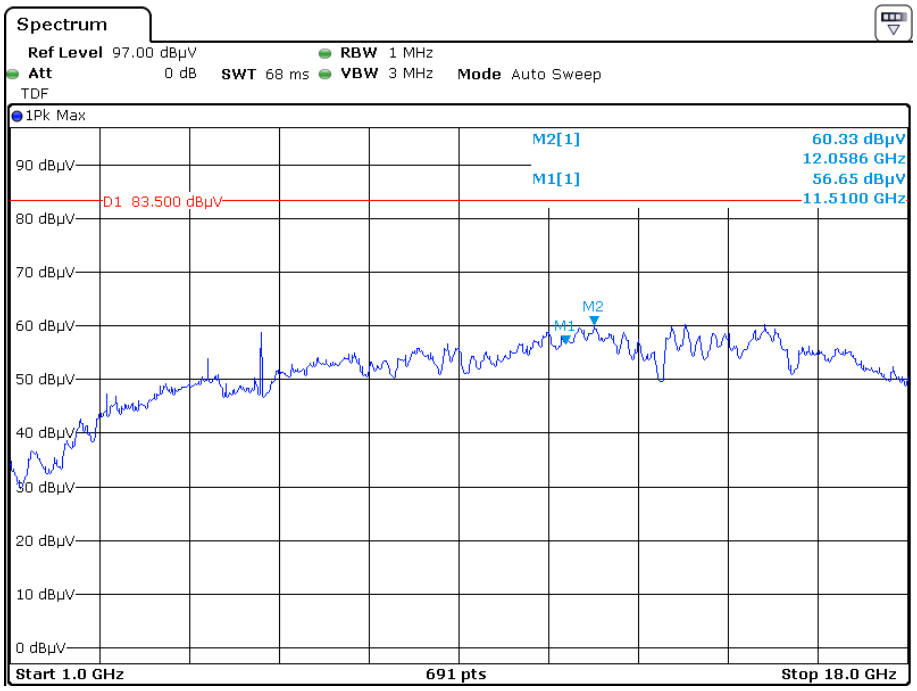
Pre-scan with 802.11ac40 5755MHz, for Peak
Horizontal



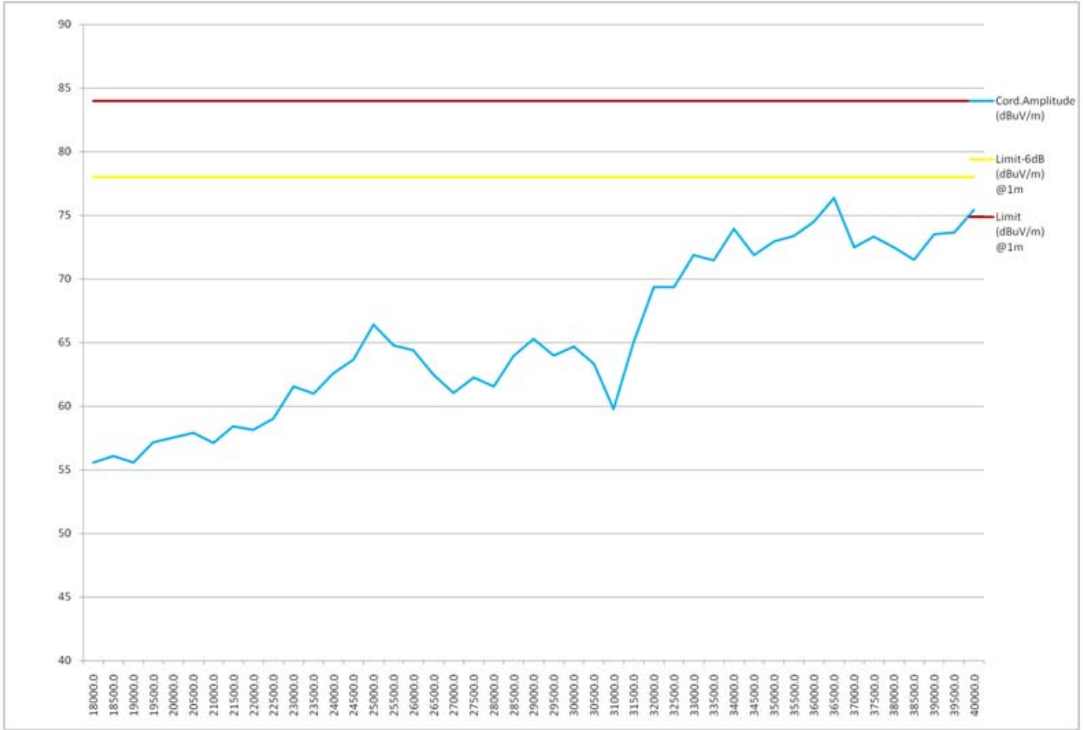
Date: 23.MAR.2019 19:00:25



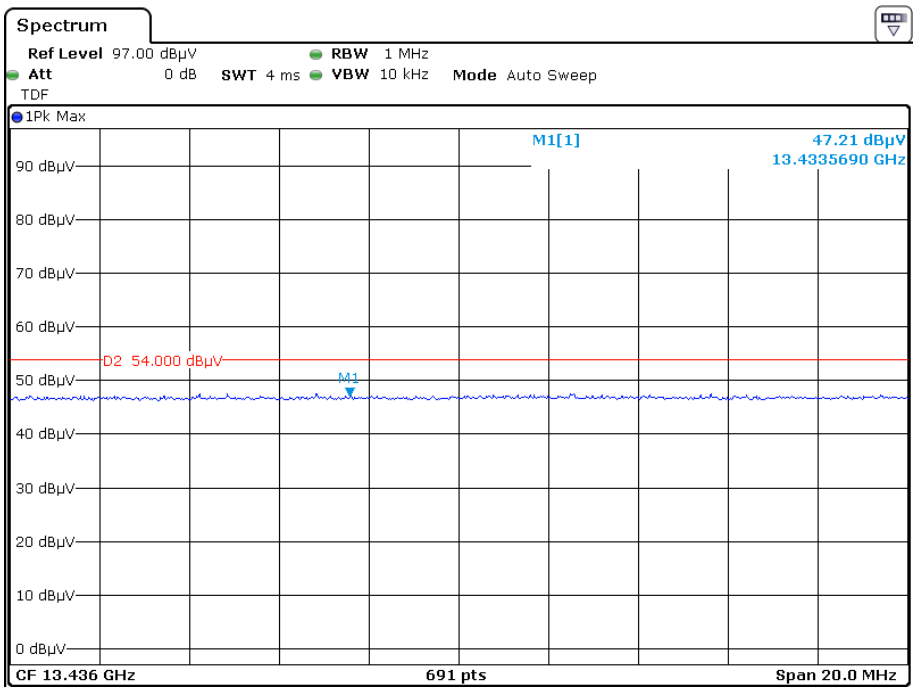
Vertical



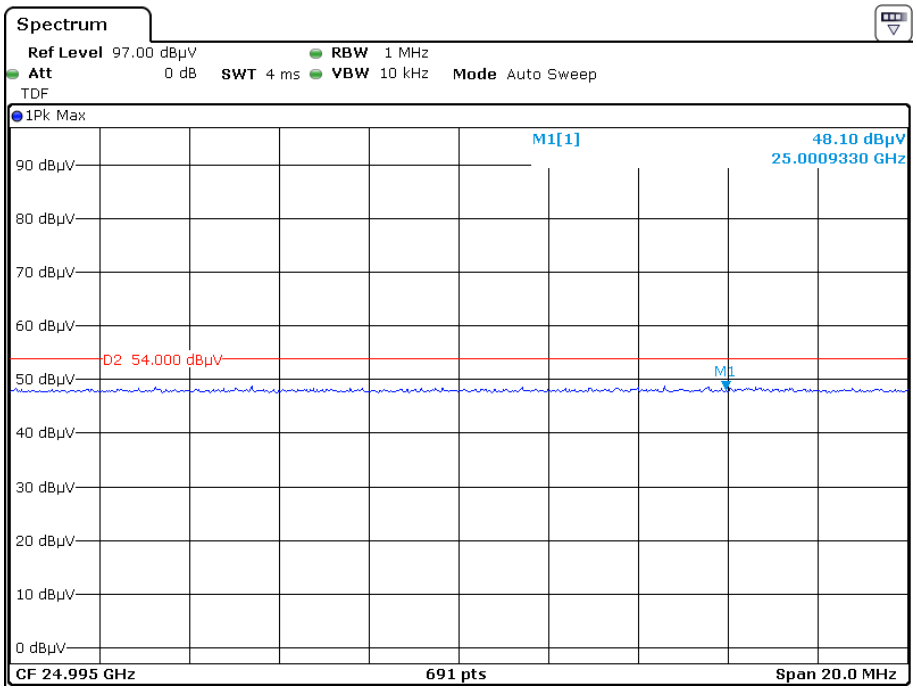
Date: 23.MAR.2019 18:53:35



Pre-scan with 802.11ac40 5755MHz, for **Average**
Horizontal

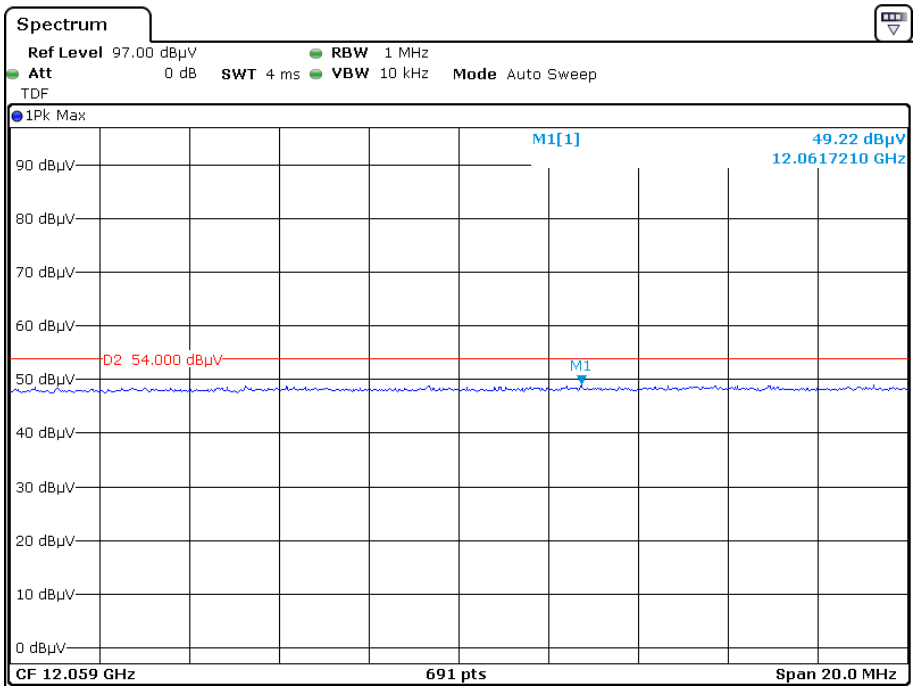


Date: 29.MAR.2019 11:28:42

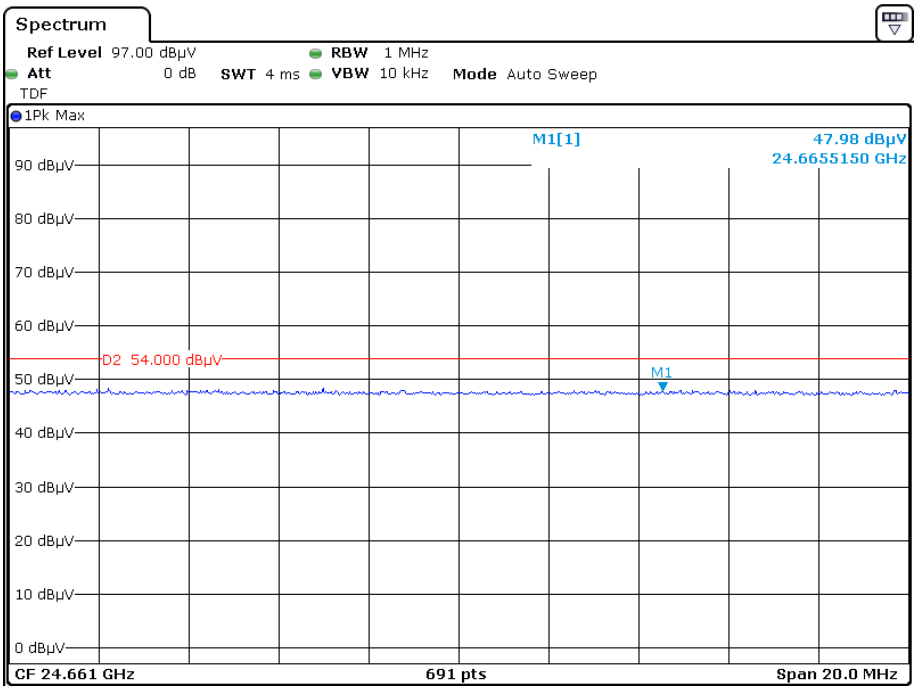


Date: 29.MAR.2019 00:15:23

Vertical



Date: 29.MAR.2019 11:34:38



Date: 29.MAR.2019 00:09:28

§15.407(B) (1), (2), (3), (4) –OUT OF BAND EMISSION

Applicable Standard

FCC §15.407 (b) (1), (2), (3), (4);

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 EIRP of –27dBm/MHz.

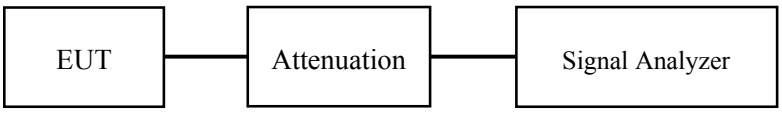
For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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.

For transmitters operating in the 5.725–5.825 GHz band: 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.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The Resolution bandwidth is set to 1MHz, The Video bandwidth is set to ≥ 1MHz, report the peak value out of the oprating band.
3. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	23.5~25 ℃
Relative Humidity:	49~56 %
ATM Pressure:	109.0~101.0 kPa

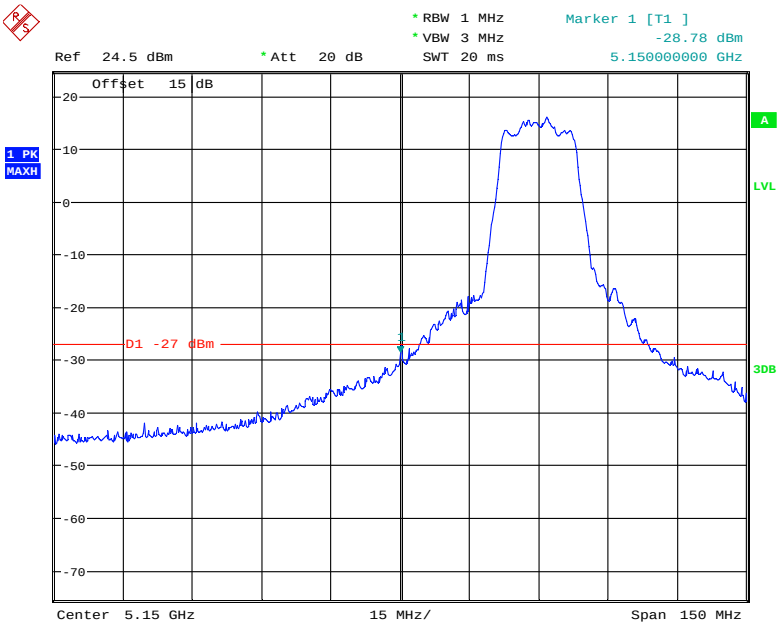
The testing was performed by Hill He from 2019-03-01 to 2019-04-02.

EUT operation mode: Transmitting

Note: Antenna gain was added into the test result.

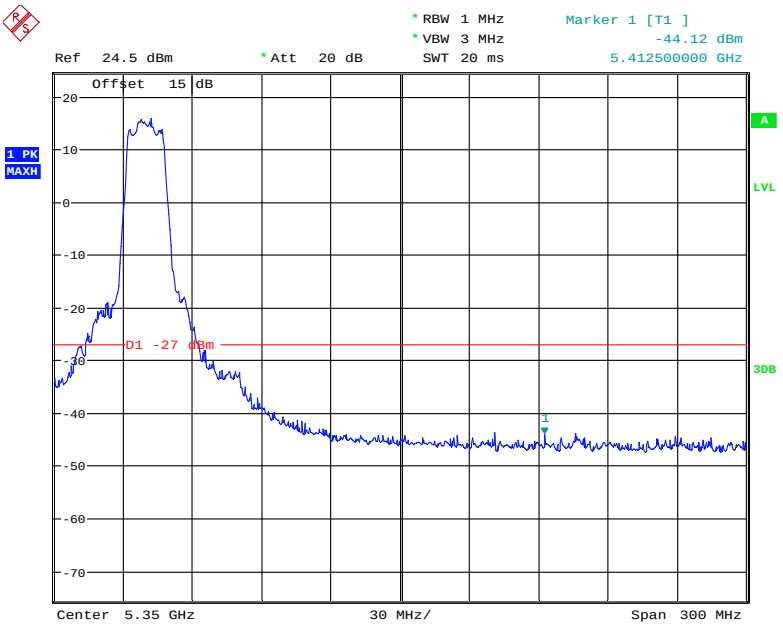
5150 – 5250 MHz:

802.11a mode, Band Edge, Left Side



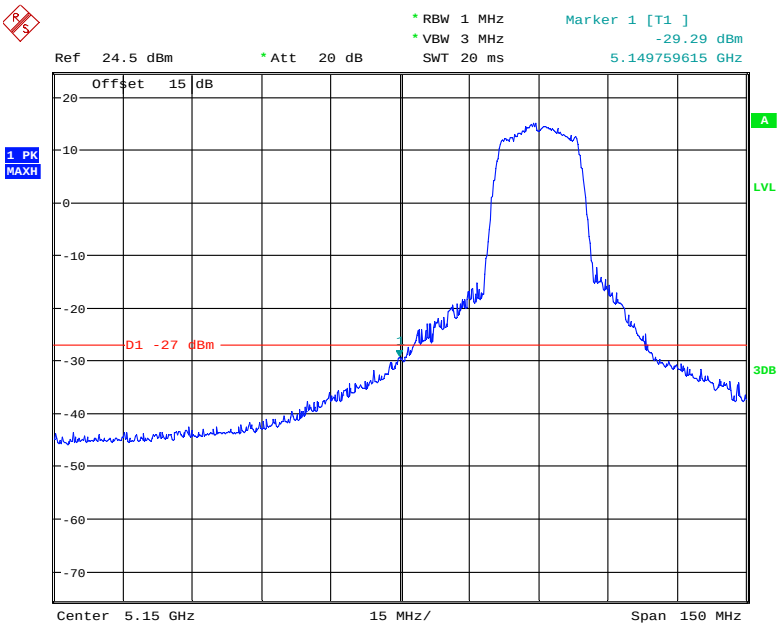
Date: 1.MAR.2019 13:46:47

802.11a mode, Band Edge, Right Side



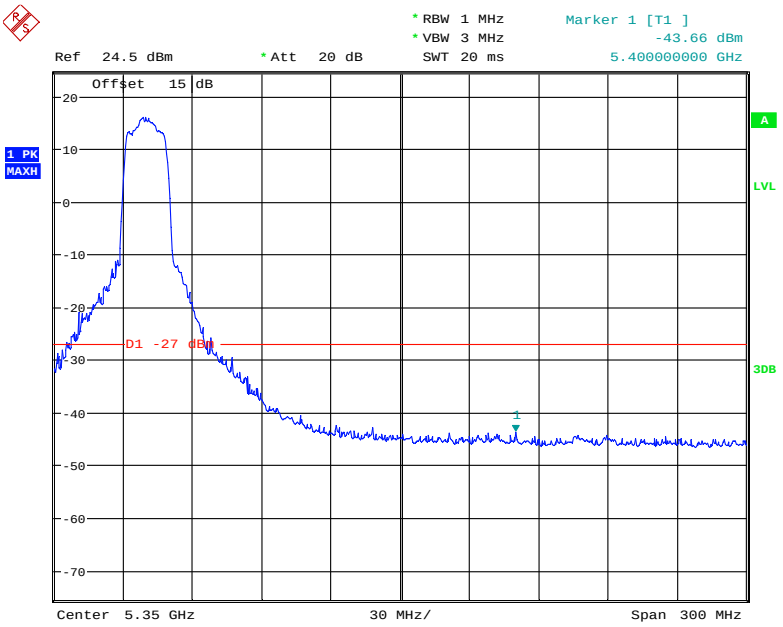
Date: 1.MAR.2019 13:43:03

802.11n20 mode, Band Edge, Left Side



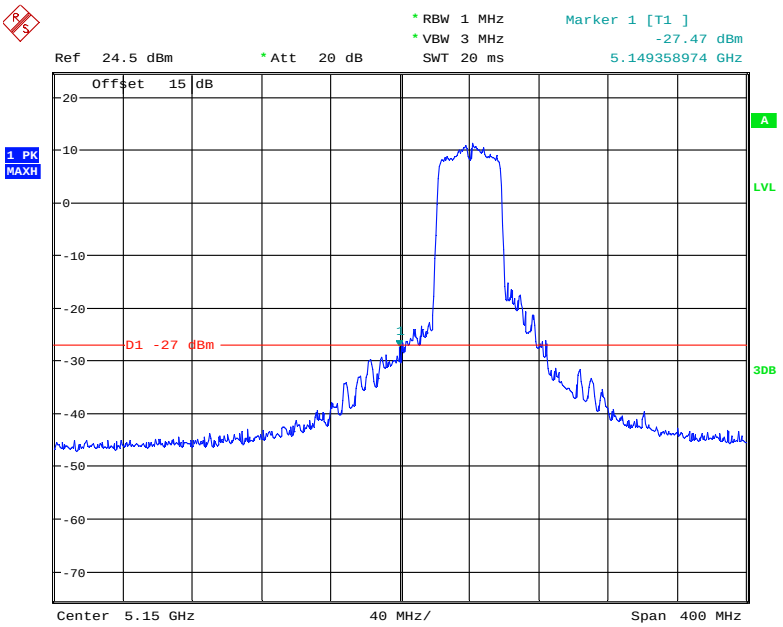
Date: 1.MAR.2019 13:41:50

802.11n20 mode, Band Edge, Right Side



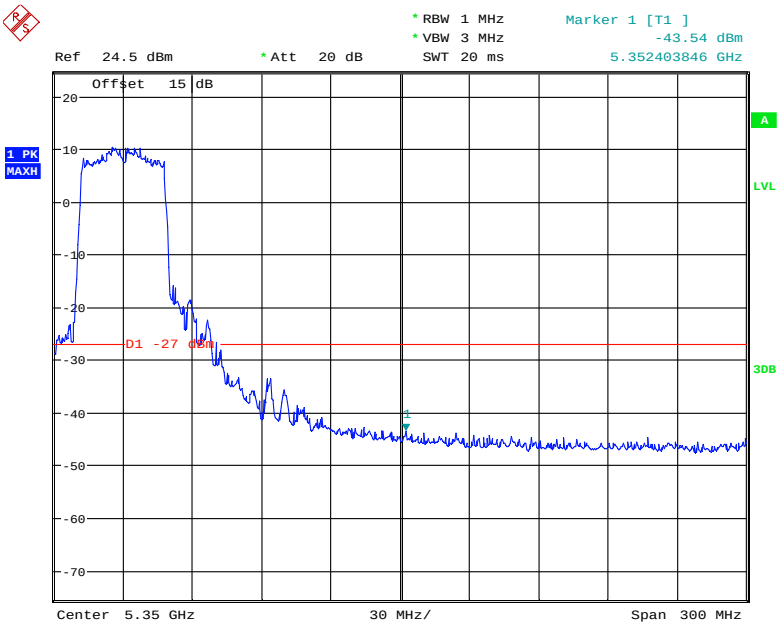
Date: 1.MAR.2019 13:40:21

802.11n40 mode, Band Edge, Left Side



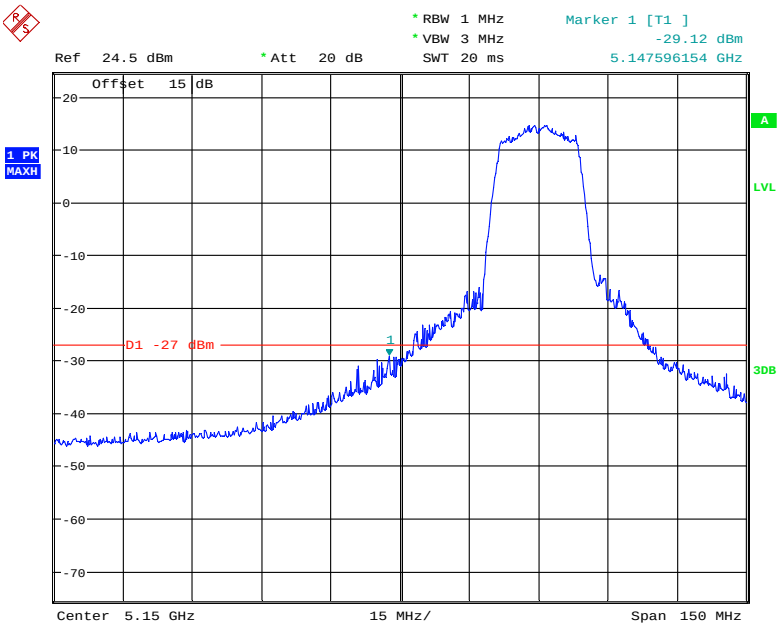
Date: 1.MAR.2019 13:56:13

802.11n40 mode, Band Edge, Right Side



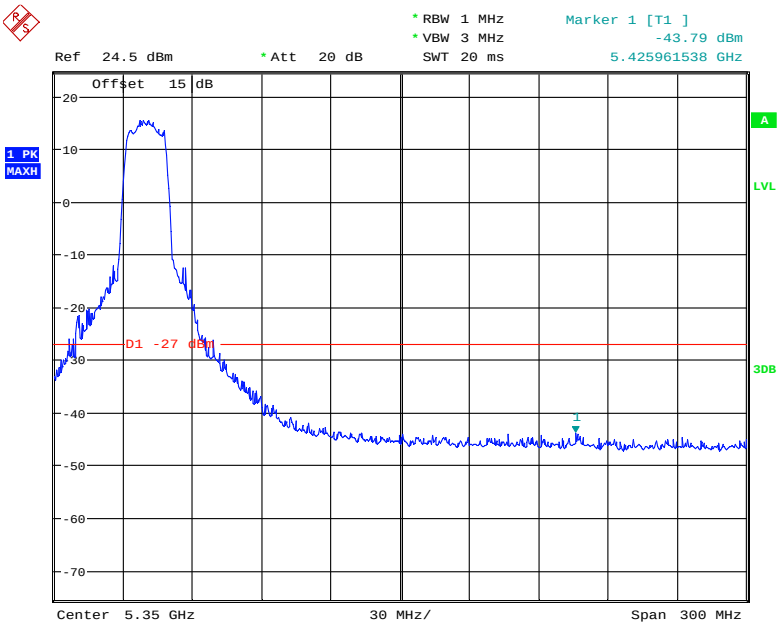
Date: 1.MAR.2019 13:59:10

802.11ac20 mode, Band Edge, Left Side



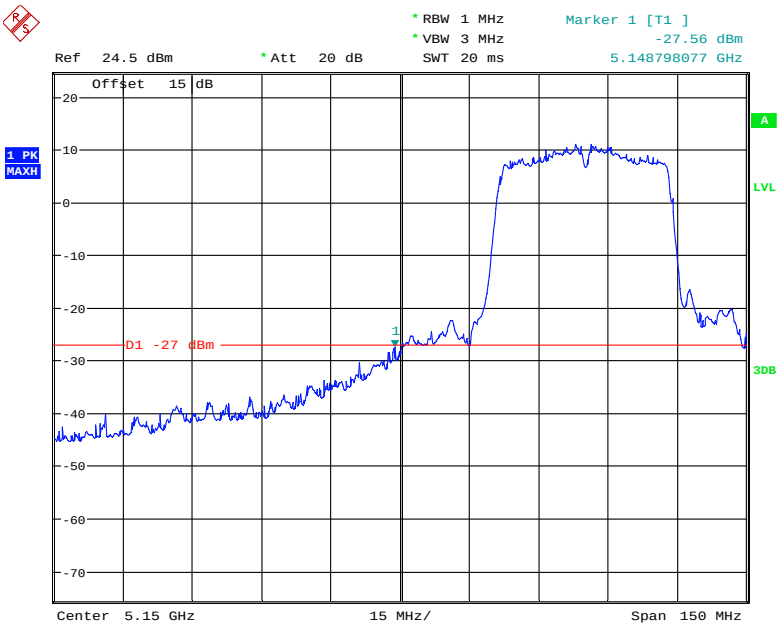
Date: 1.MAR.2019 13:49:27

802.11ac20 mode, Band Edge, Right Side



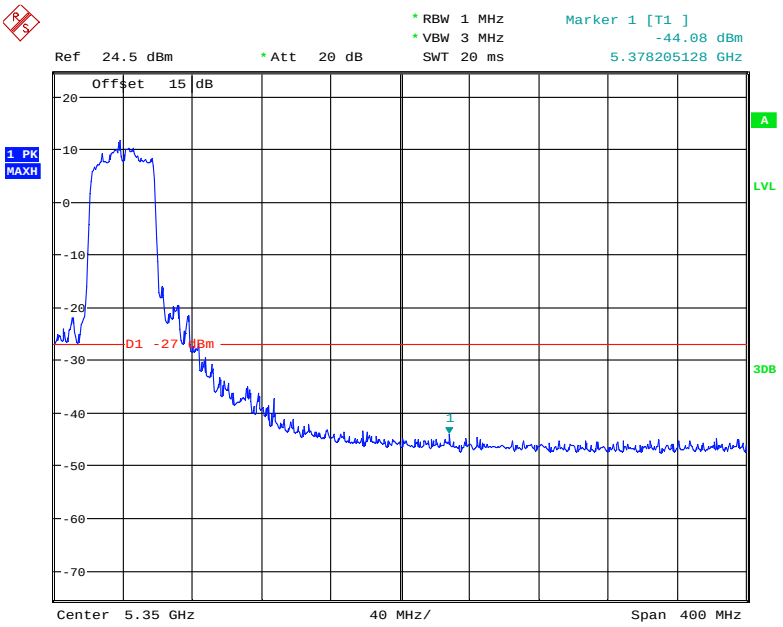
Date: 1.MAR.2019 13:48:03

802.11ac40 mode, Band Edge, Left Side



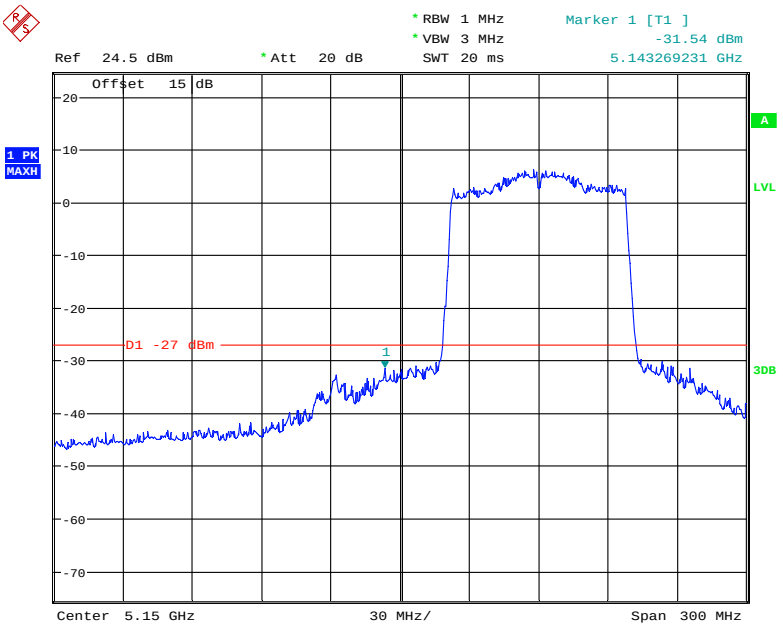
Date: 1.MAR.2019 13:53:02

802.11ac40 mode, Band Edge, Right Side



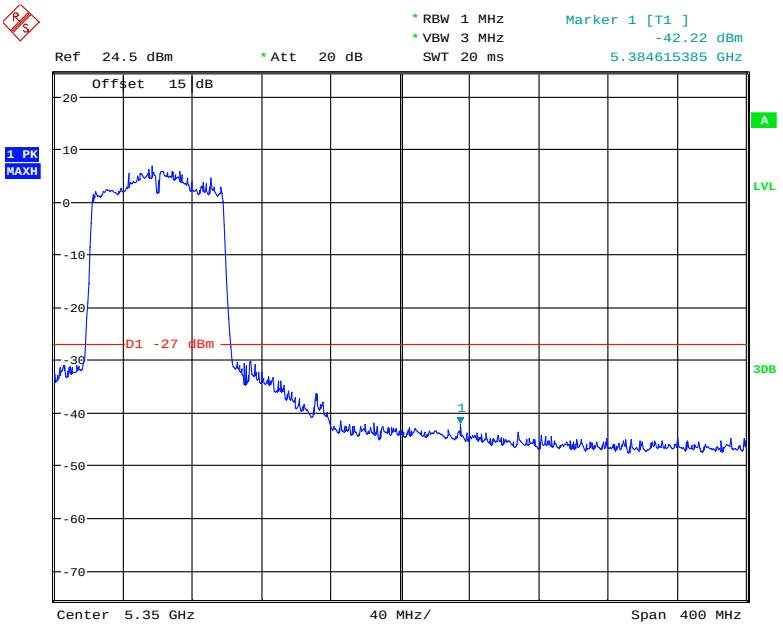
Date: 1.MAR.2019 13:55:06

802.11ac80 mode, Band Edge, Left Side



Date: 1.MAR.2019 14:00:26

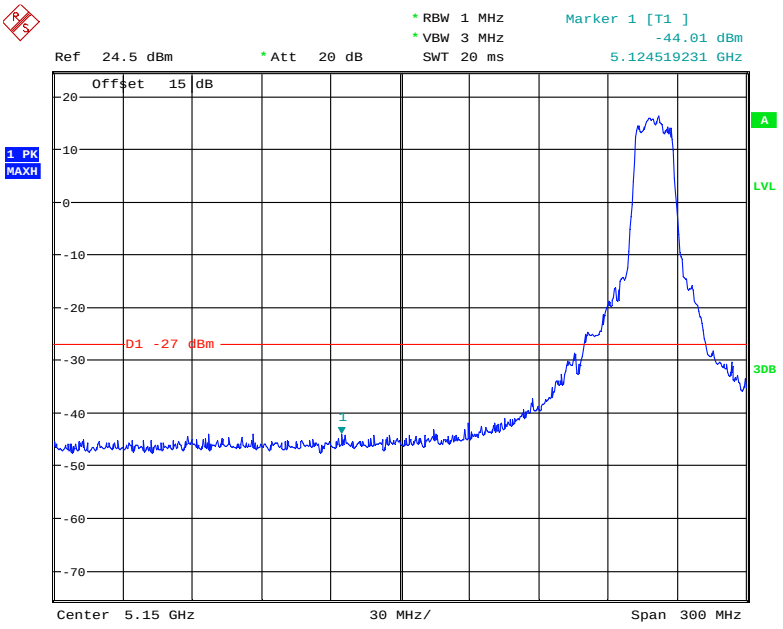
802.11ac80 mode, Band Edge, Right Side



Date: 1.MAR.2019 14:00:50

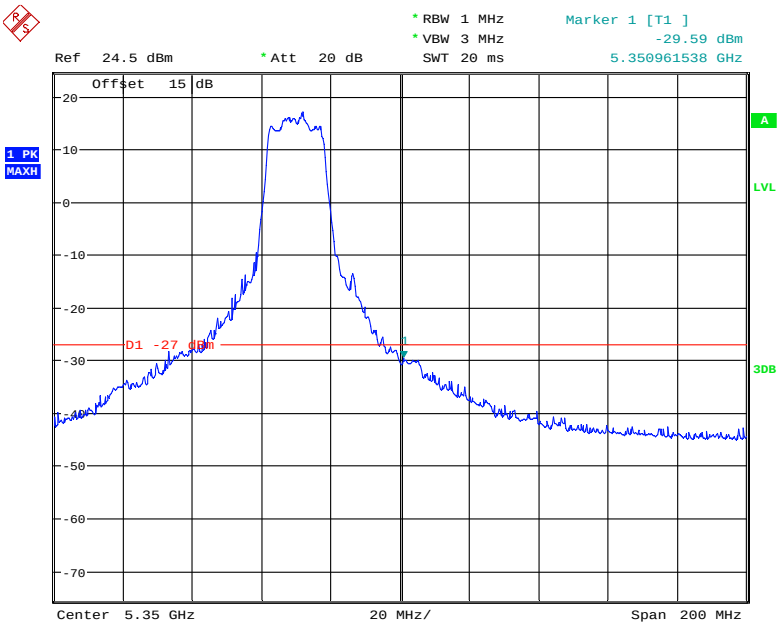
5250 – 5350 MHz:

802.11a mode, Band Edge, Left Side



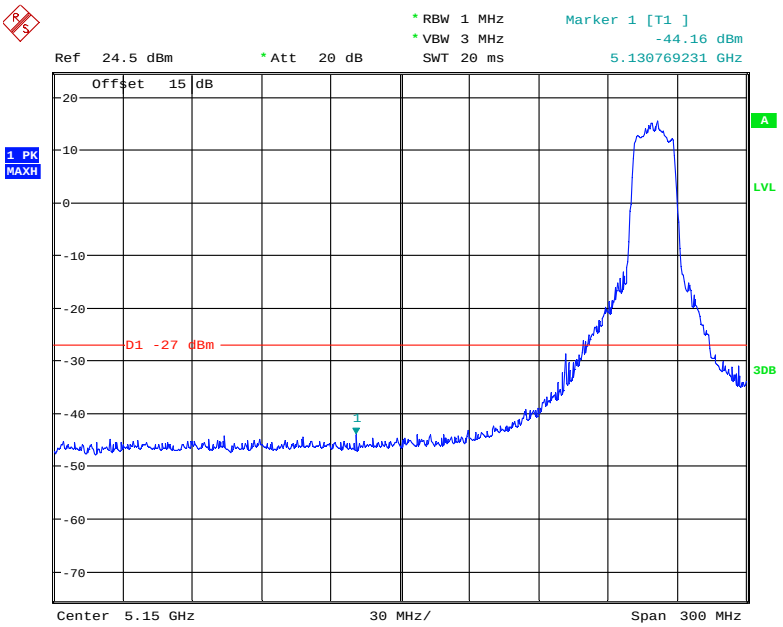
Date: 1.MAR.2019 14:11:27

802.11a mode, Band Edge, Right Side



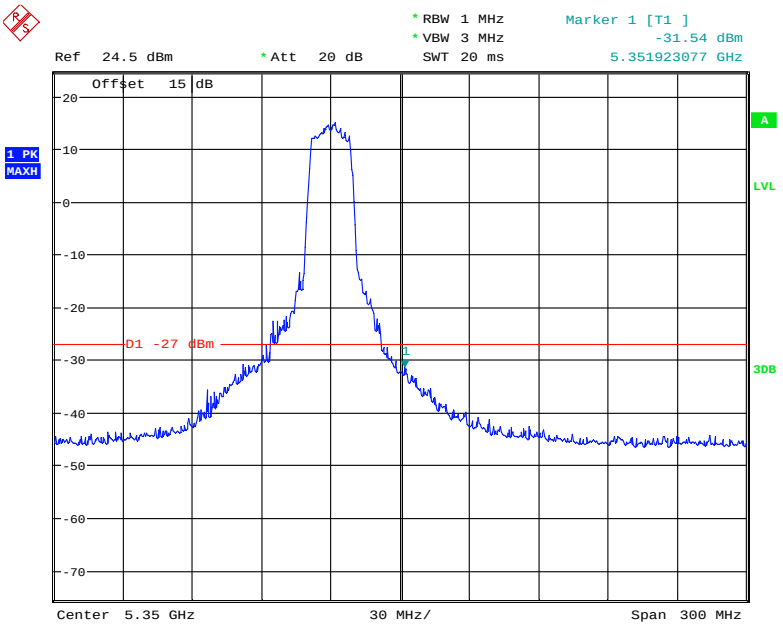
Date: 1.MAR.2019 14:10:01

802.11n20 mode, Band Edge, Left Side



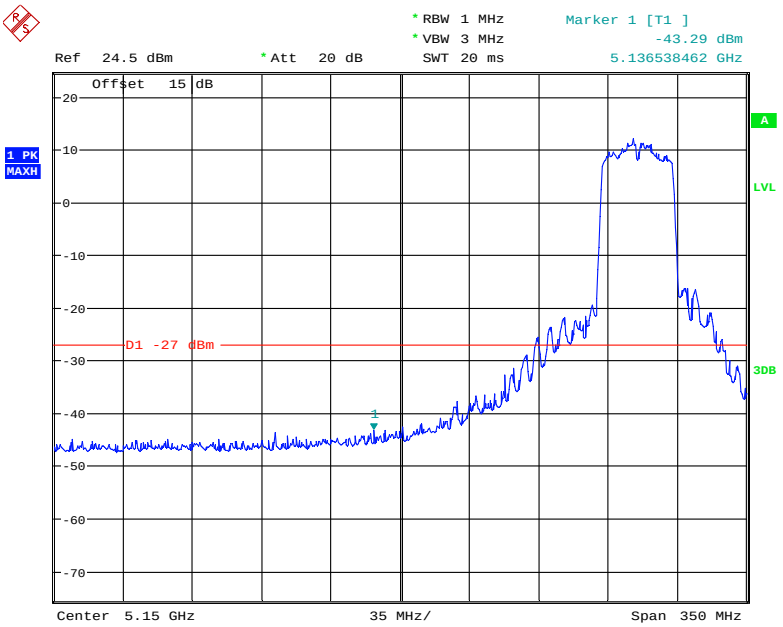
Date: 1.MAR.2019 14:13:33

802.11n20 mode, Band Edge, Right Side



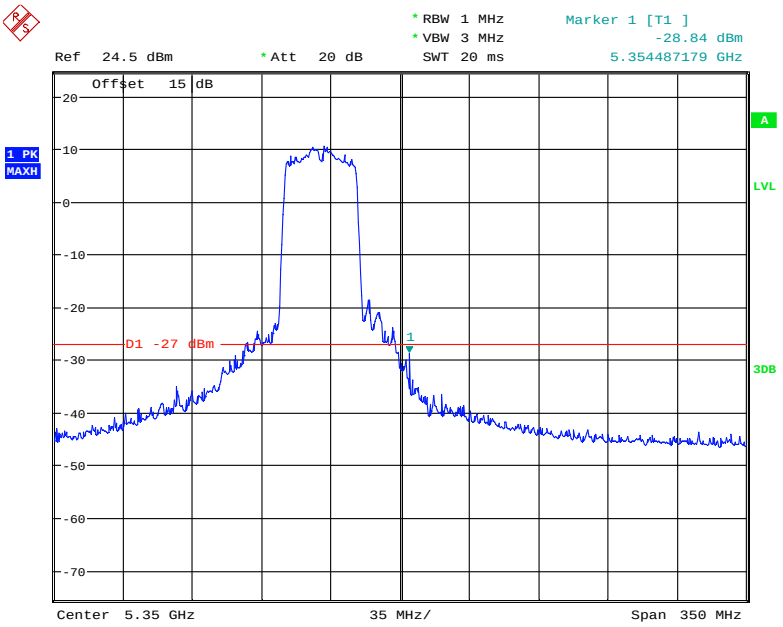
Date: 1.MAR.2019 14:12:44

802.11n40 mode, Band Edge, Left Side



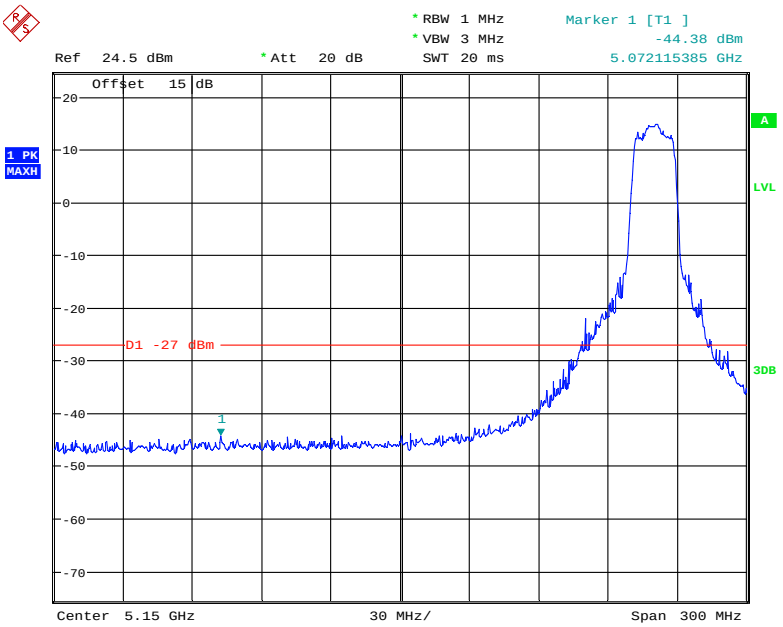
Date: 1.MAR.2019 14:22:28

802.11n40 mode, Band Edge, Right Side



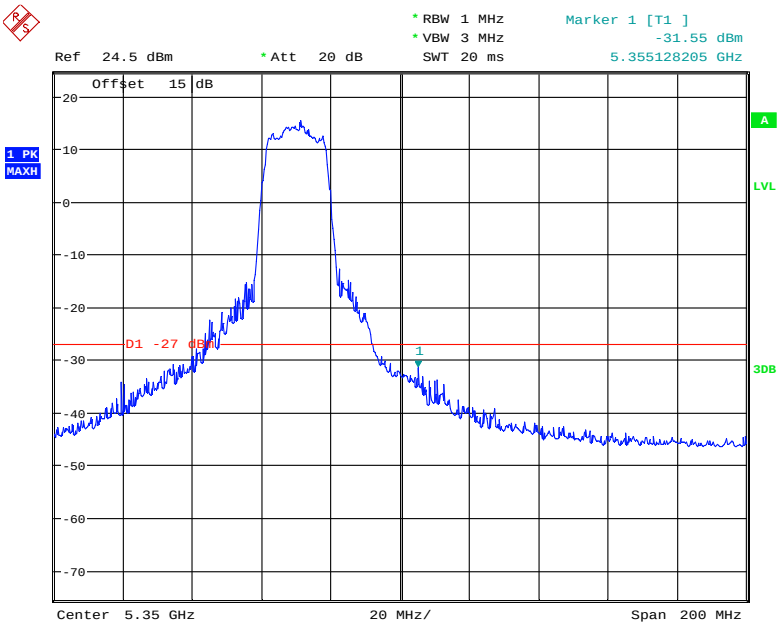
Date: 1.MAR.2019 14:21:06

802.11ac20 mode, Band Edge, Left Side



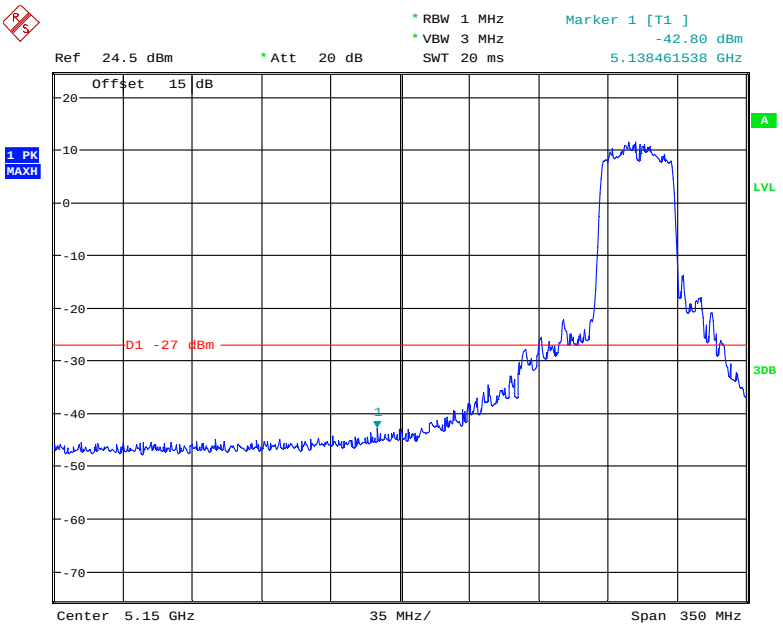
Date: 1.MAR.2019 14:15:01

802.11ac20 mode, Band Edge, Right Side



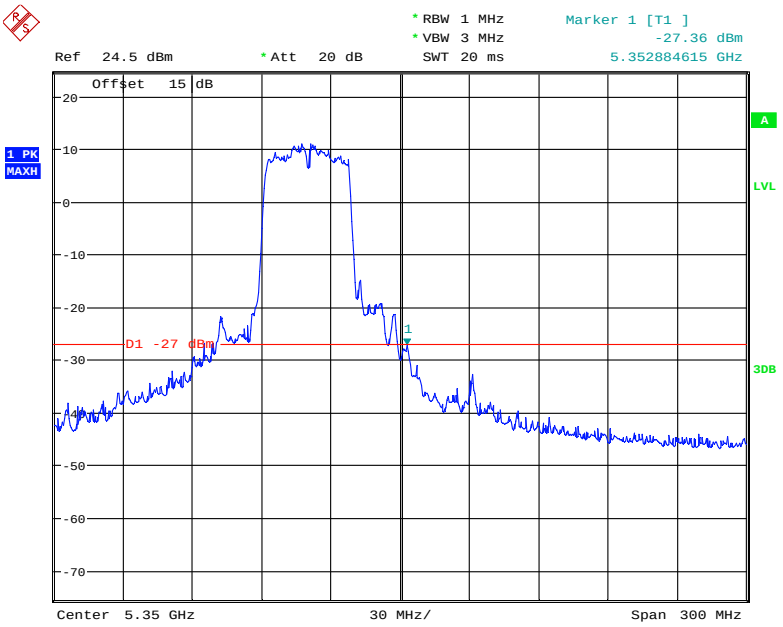
Date: 1.MAR.2019 14:14:23

802.11ac40 mode, Band Edge, Left Side



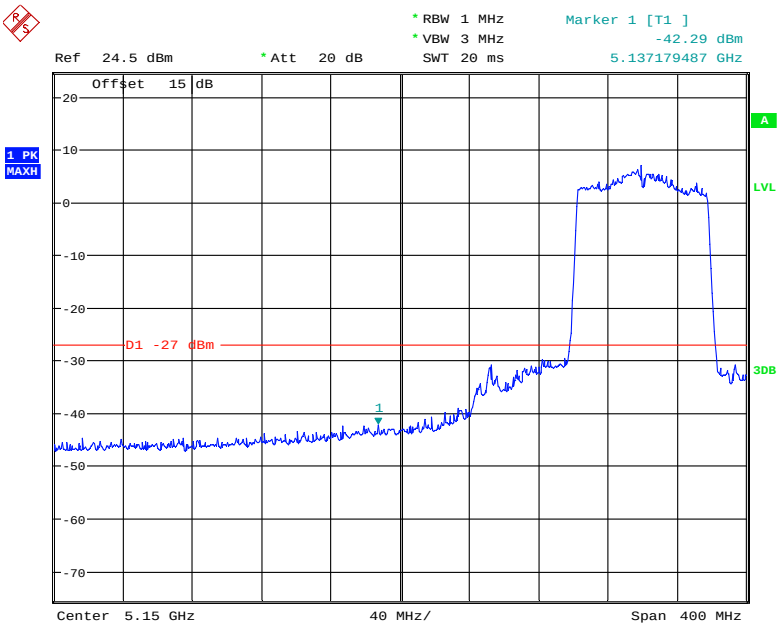
Date: 1.MAR.2019 14:19:19

802.11ac40 mode, Band Edge, Right Side



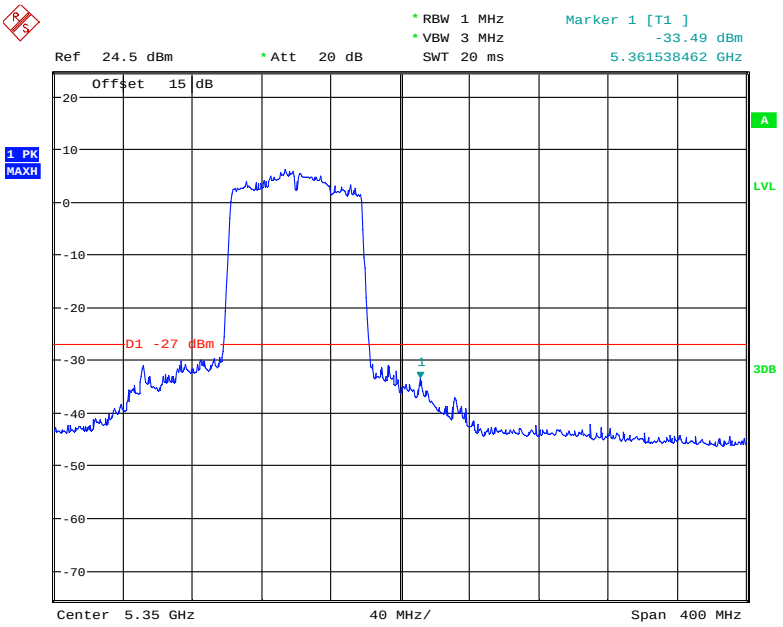
Date: 1.MAR.2019 14:18:18

802.11ac80 mode, Band Edge, Left Side



Date: 1.MAR.2019 14:24:13

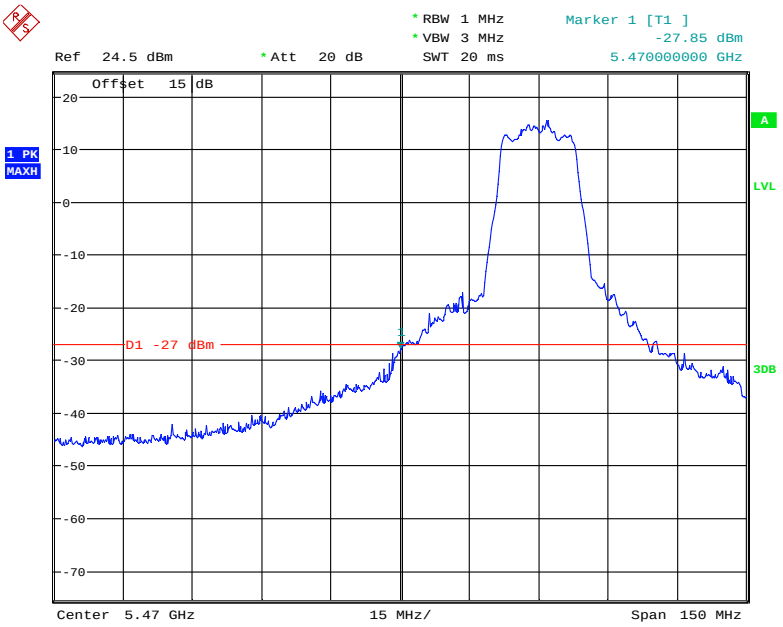
802.11ac80 mode, Band Edge, Right Side



Date: 1.MAR.2019 14:24:45

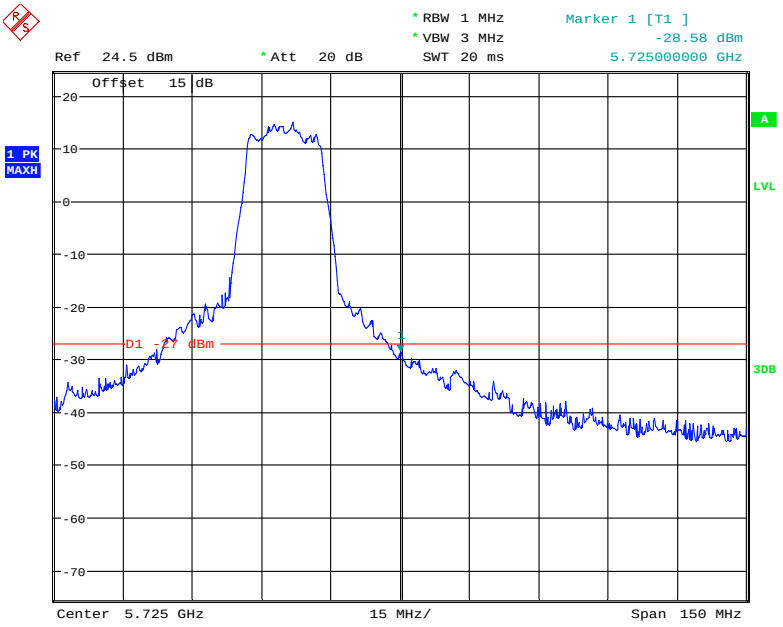
5470 – 5725 MHz:

802.11a mode, Band Edge, Left Side



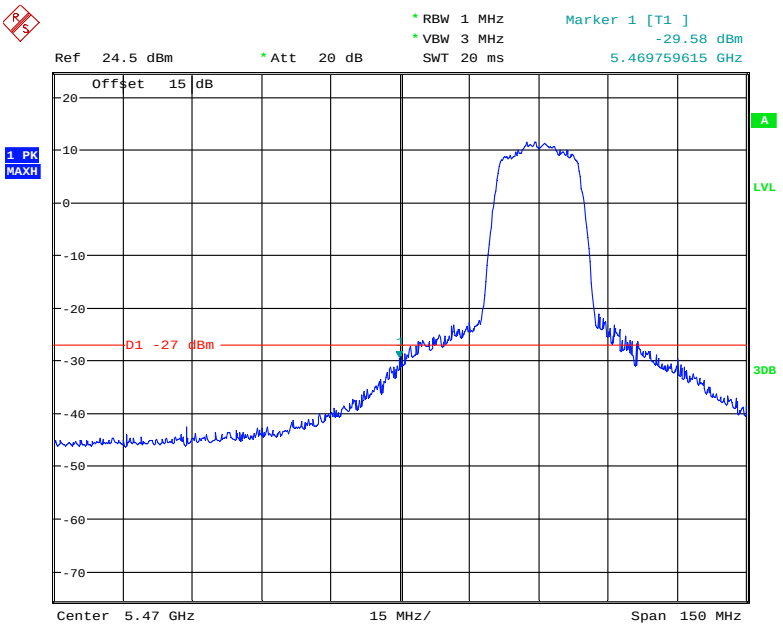
Date: 1.MAR.2019 14:30:37

802.11a mode, Band Edge, Right Side



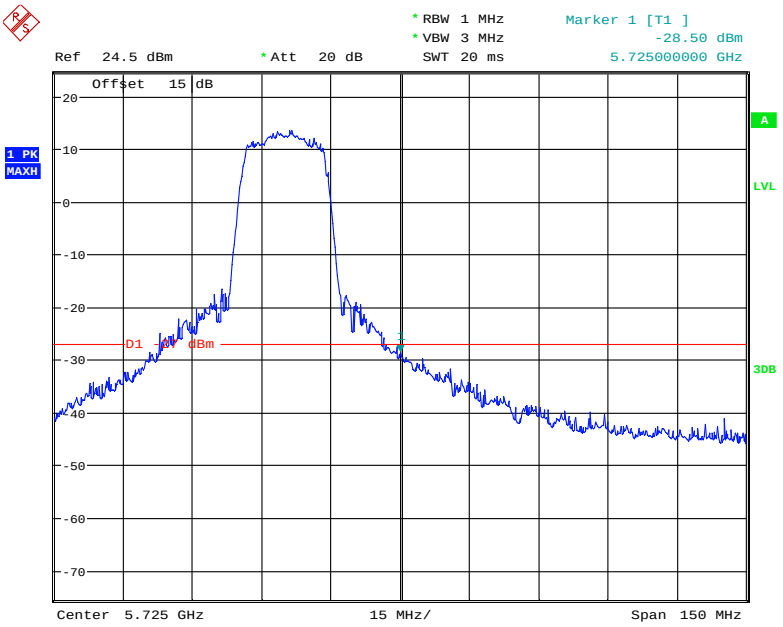
Date: 1.MAR.2019 14:31:26

802.11n20 mode, Band Edge, Left Side



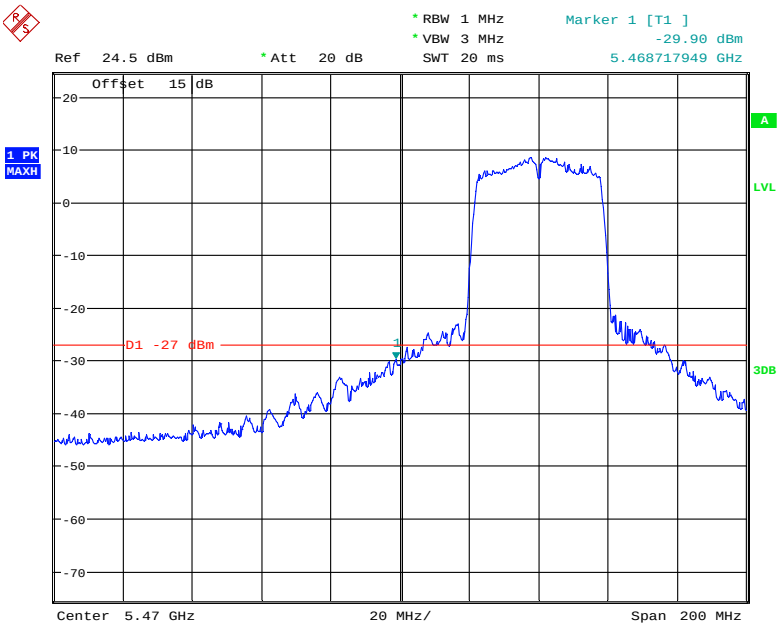
Date: 2.APR.2019 11:44:12

802.11n20 mode, Band Edge, Right Side



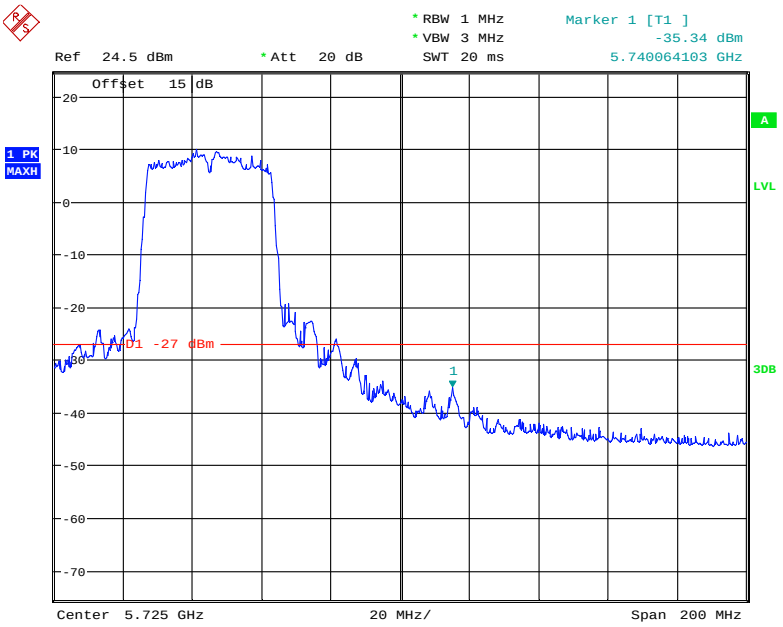
Date: 1.MAR.2019 14:37:22

802.11n40 mode, Band Edge, Left Side



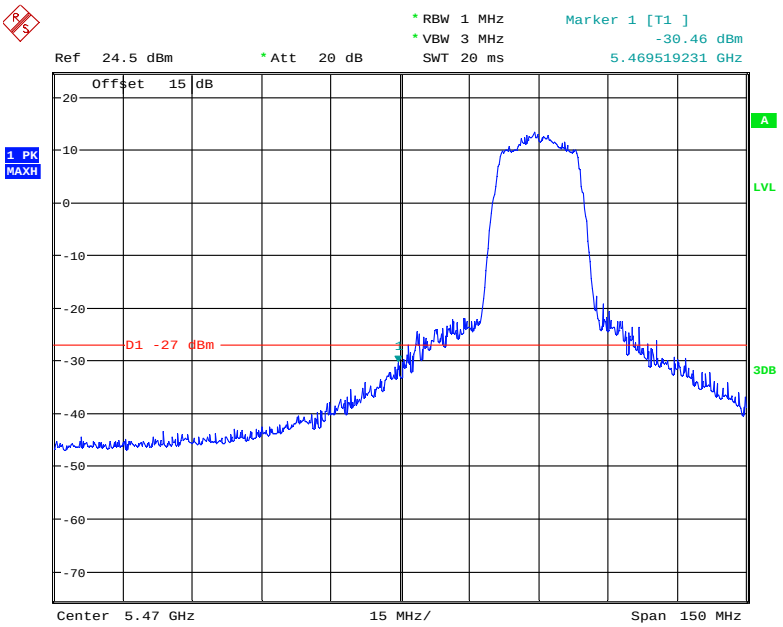
Date: 2.APR.2019 11:46:29

802.11n40 mode, Band Edge, Right Side



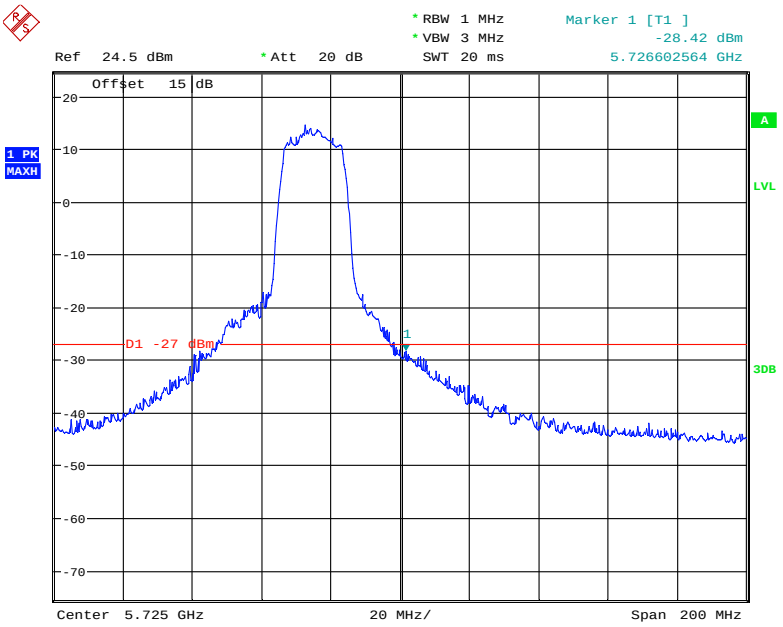
Date: 1.MAR.2019 14:46:51

802.11ac20 mode, Band Edge, Left Side



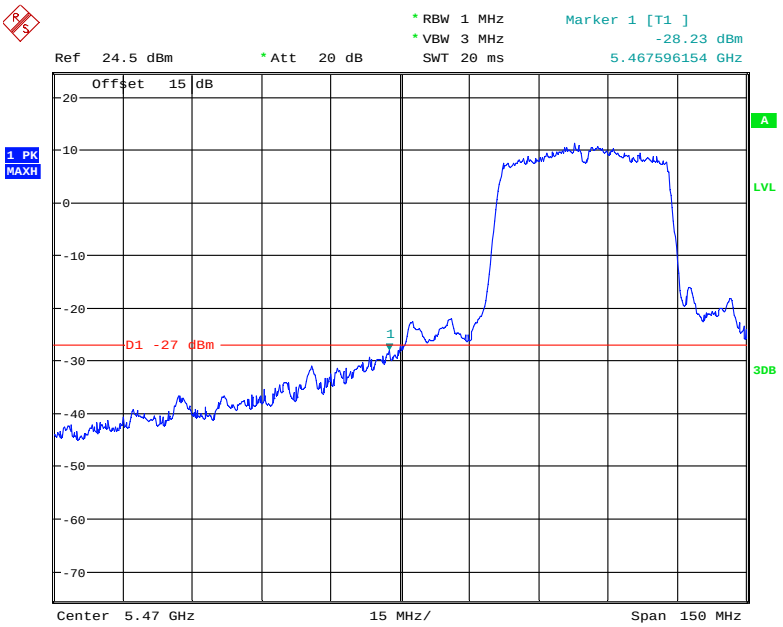
Date: 1.MAR.2019 14:39:18

802.11ac20 mode, Band Edge, Right Side



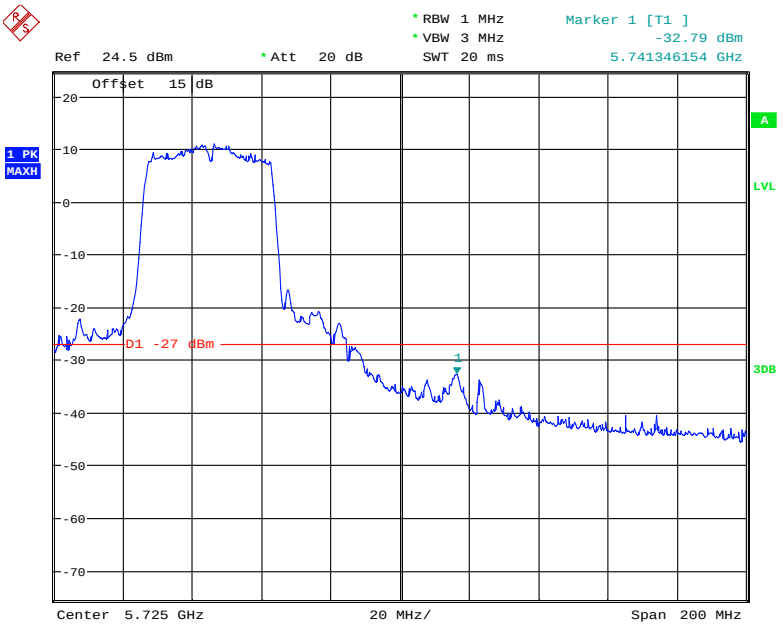
Date: 1.MAR.2019 18:48:44

802.11ac40 mode, Band Edge, Left Side



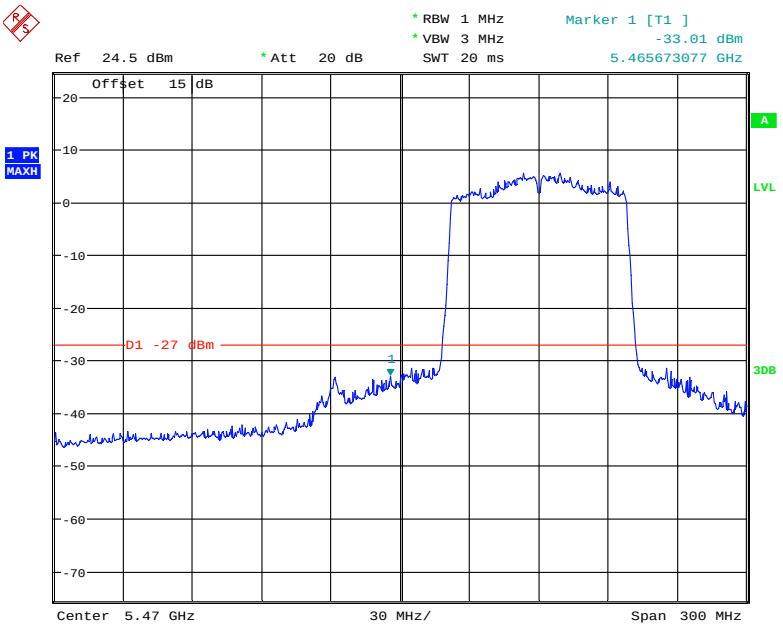
Date: 1.MAR.2019 14:42:22

802.11ac40 mode, Band Edge, Right Side



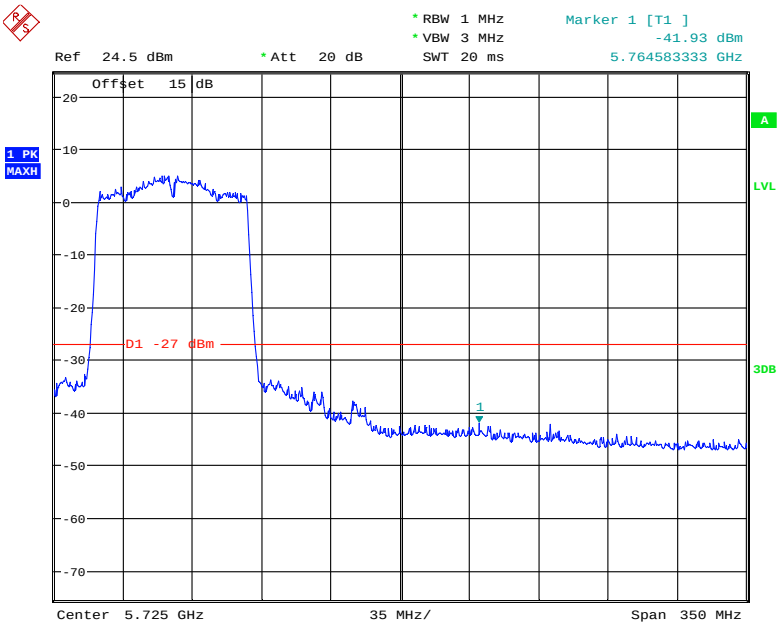
Date: 1.MAR.2019 14:44:34

802.11ac80 mode, Band Edge, Left Side



Date: 1.MAR.2019 14:48:15

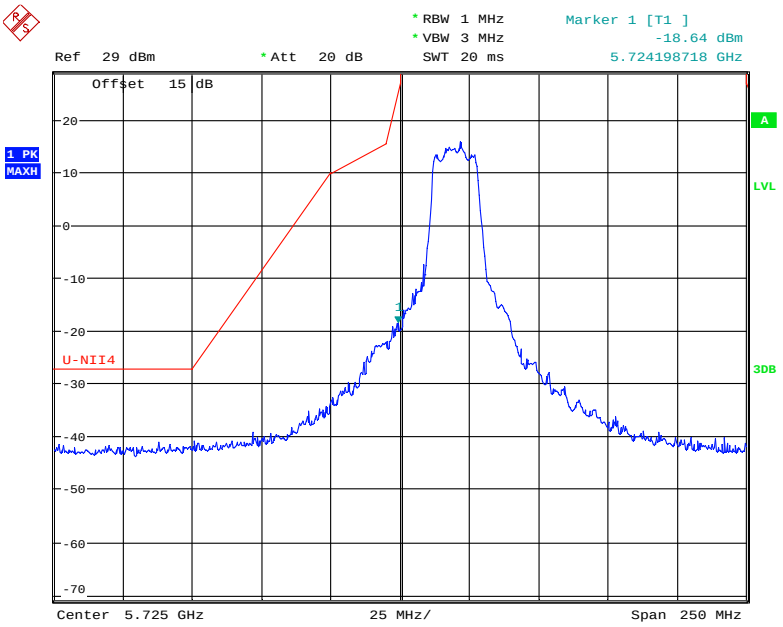
802.11ac80 mode, Band Edge, Right Side



Date: 1.MAR.2019 14:49:10

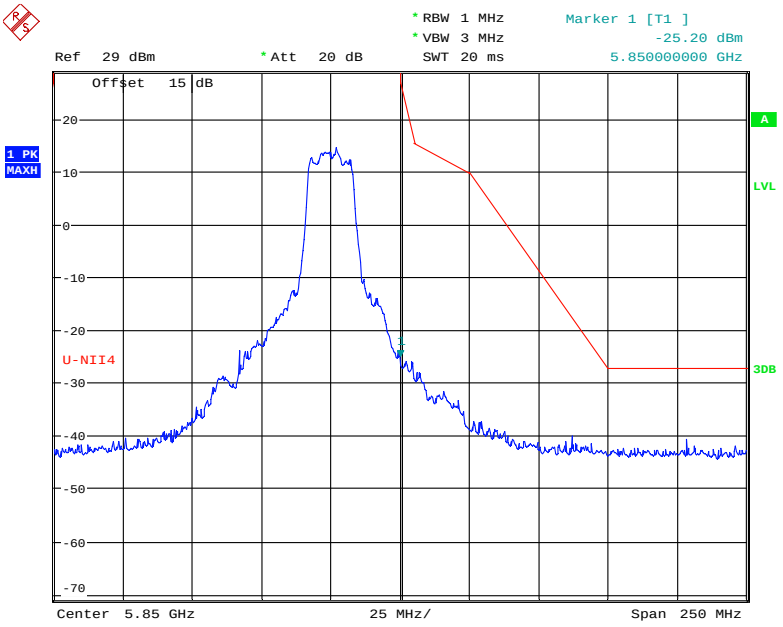
5725 – 5850 MHz:

802.11a mode, Band Edge, Left Side



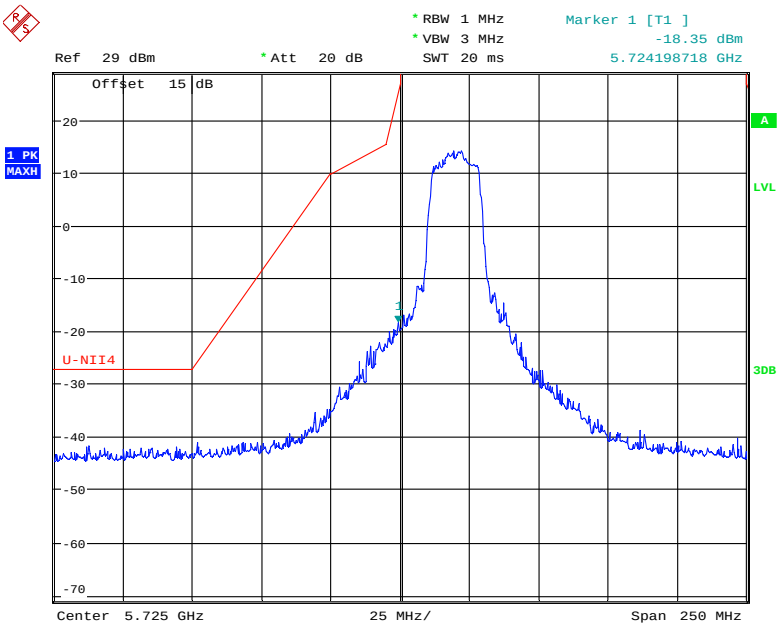
Date: 6.MAR.2019 14:49:25

802.11a mode, Band Edge, Right Side



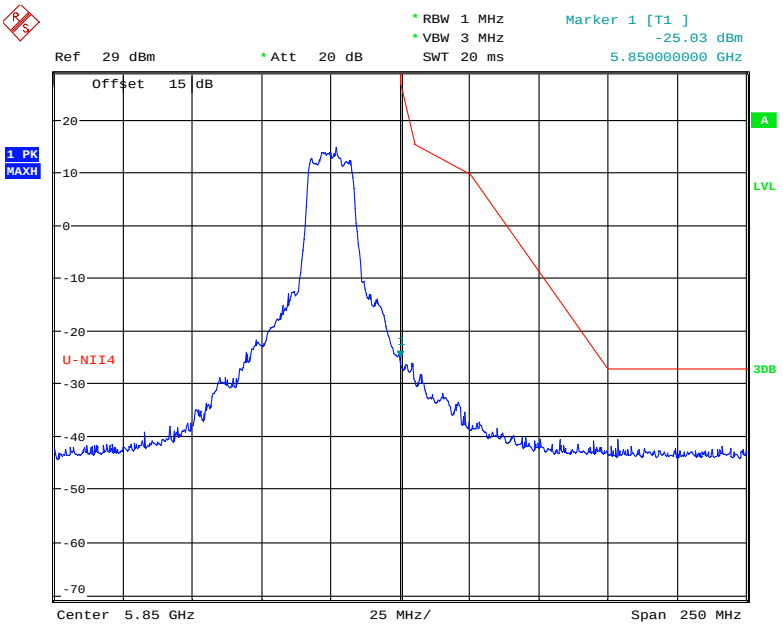
Date: 6.MAR.2019 14:50:17

802.11n20 mode, Band Edge, Left Side



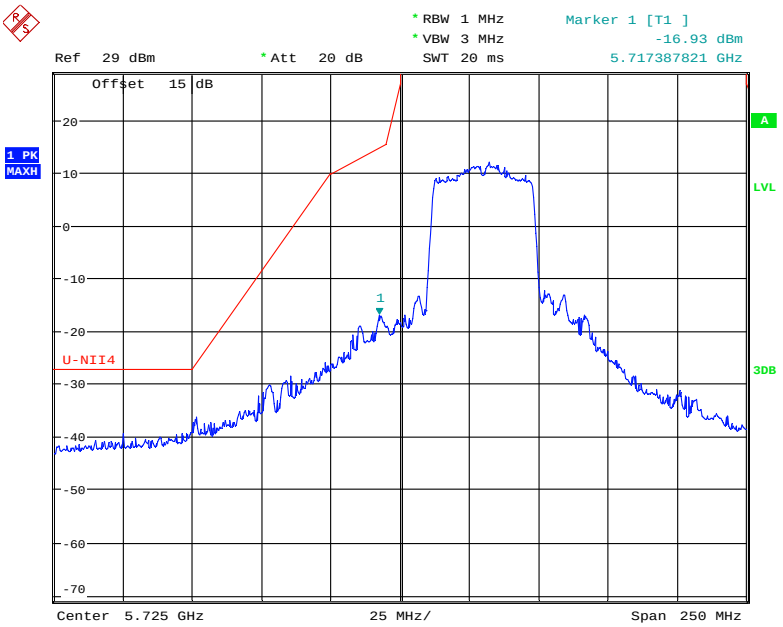
Date: 6.MAR.2019 14:48:13

802.11n20 mode, Band Edge, Right Side



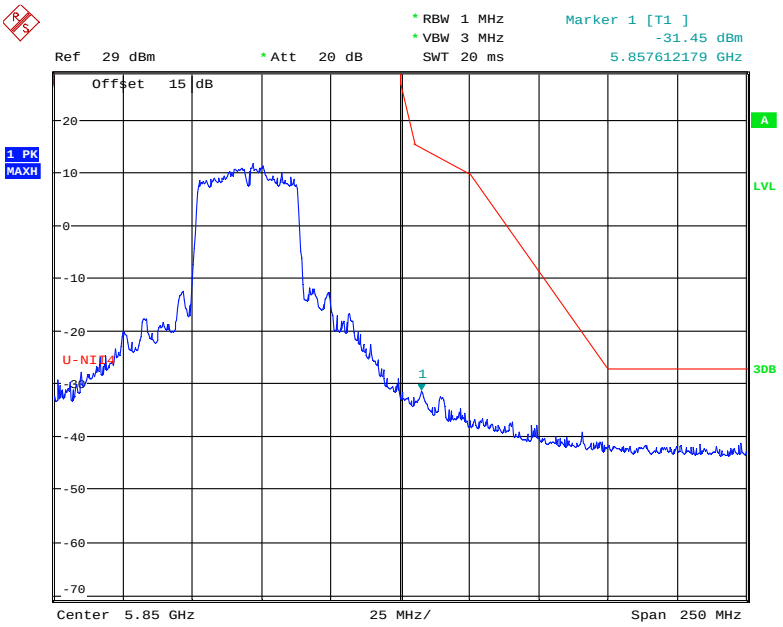
Date: 6.MAR.2019 14:46:44

802.11n40 mode, Band Edge, Left Side



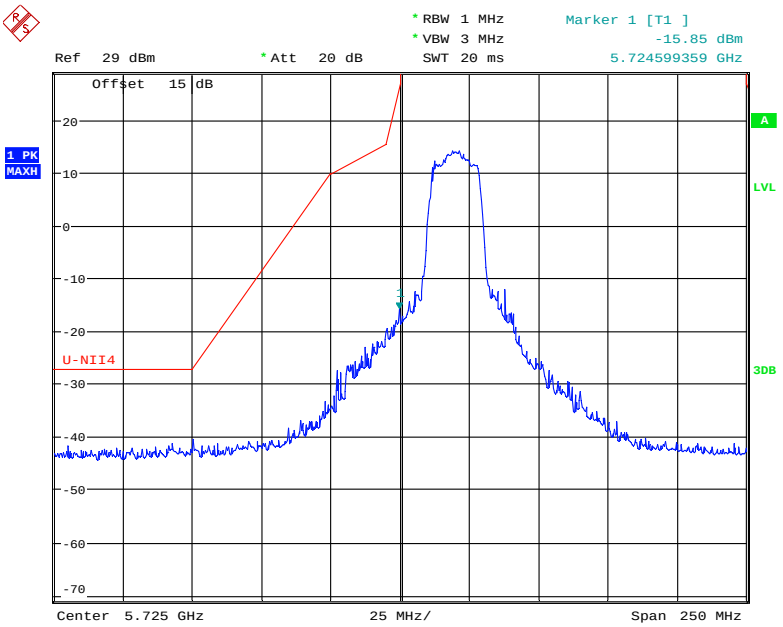
Date: 6.MAR.2019 14:53:33

802.11n40 mode, Band Edge, Right Side



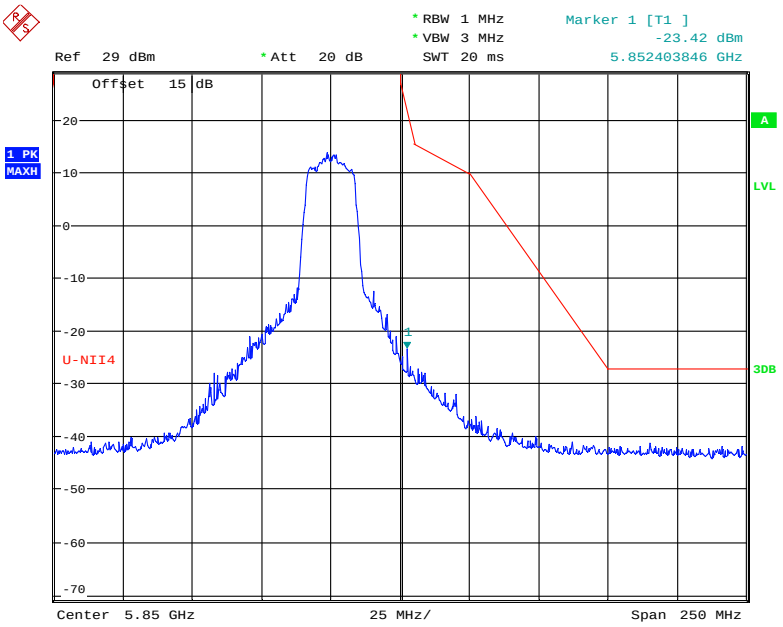
Date: 6.MAR.2019 14:52:12

802.11ac20 mode, Band Edge, Left Side



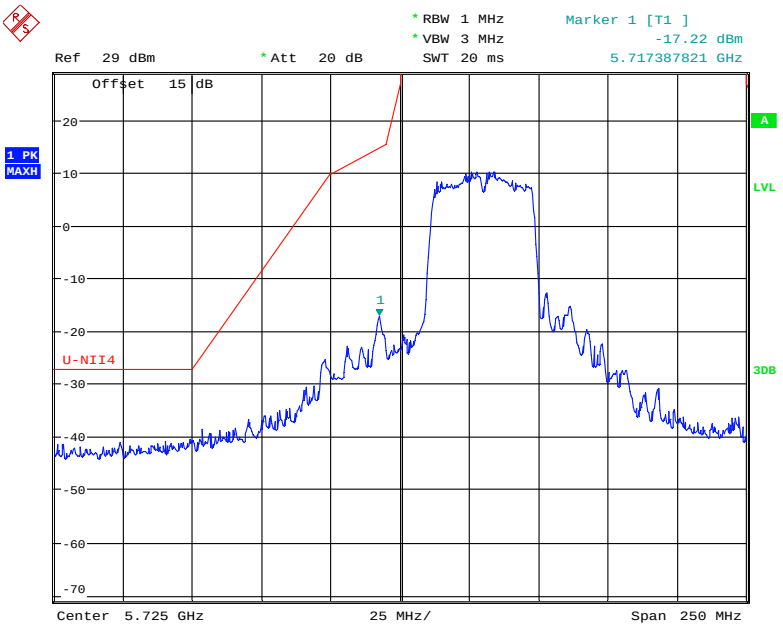
Date: 6.MAR.2019 14:45:51

802.11ac20 mode, Band Edge, Right Side



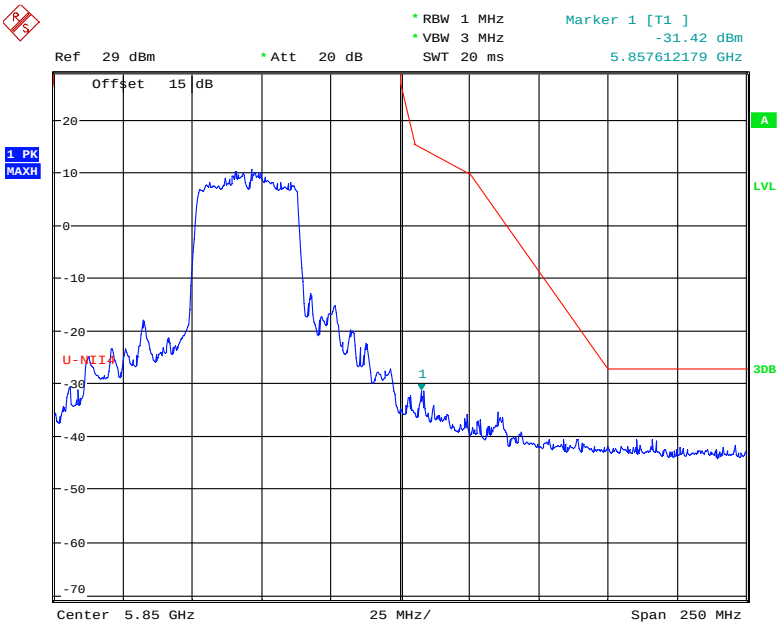
Date: 6.MAR.2019 14:44:21

802.11ac40 mode, Band Edge, Left Side



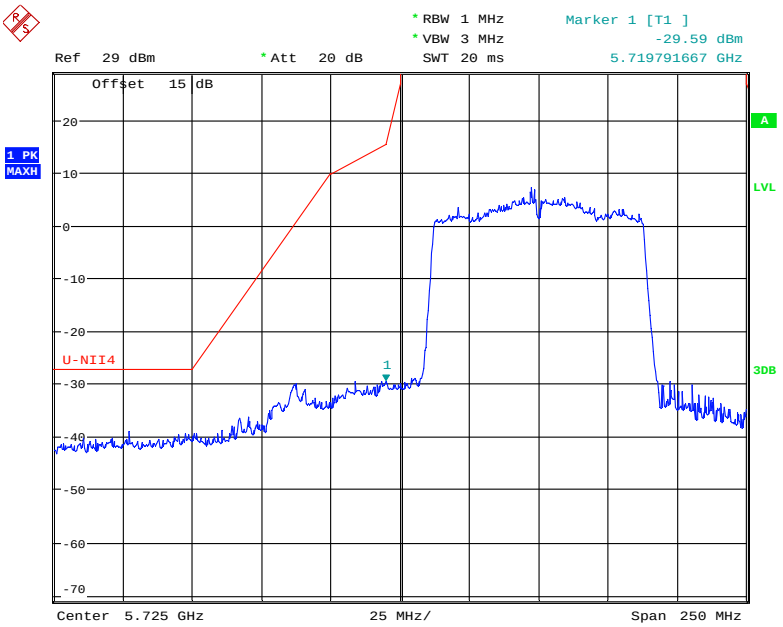
Date: 6.MAR.2019 14:55:05

802.11ac40 mode, Band Edge, Right Side



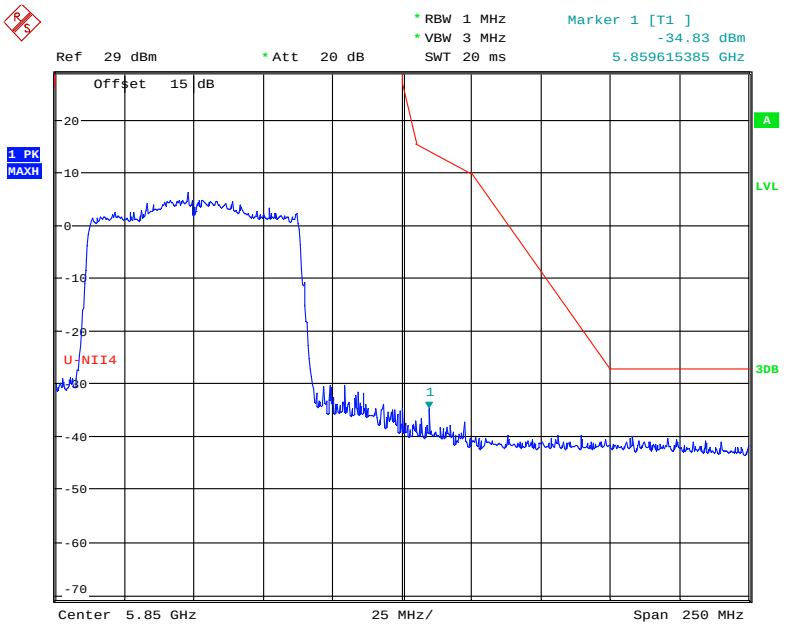
Date: 6.MAR.2019 14:54:20

802.11ac80 mode, Band Edge, Left Side



Date: 6.MAR.2019 14:55:47

802.11ac80 mode, Band Edge, Right Side



Date: 6.MAR.2019 14:56:20

FCC §15.407(a) (1) – 26 dB & 6dB EMISSION BANDWIDTH

Applicable Standard

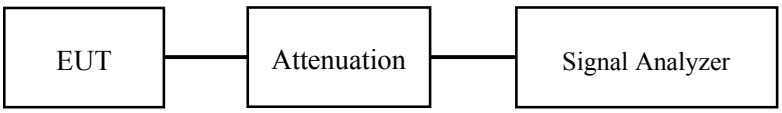
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band 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)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. **Minimum Emission Bandwidth for the band 5.725-5.85 GHz**
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	23.5~25 ℃
Relative Humidity:	49~56 %
ATM Pressure:	109.0~101.0 kPa

The testing was performed by Hill He from 2019-03-05 to 2019-03-06.

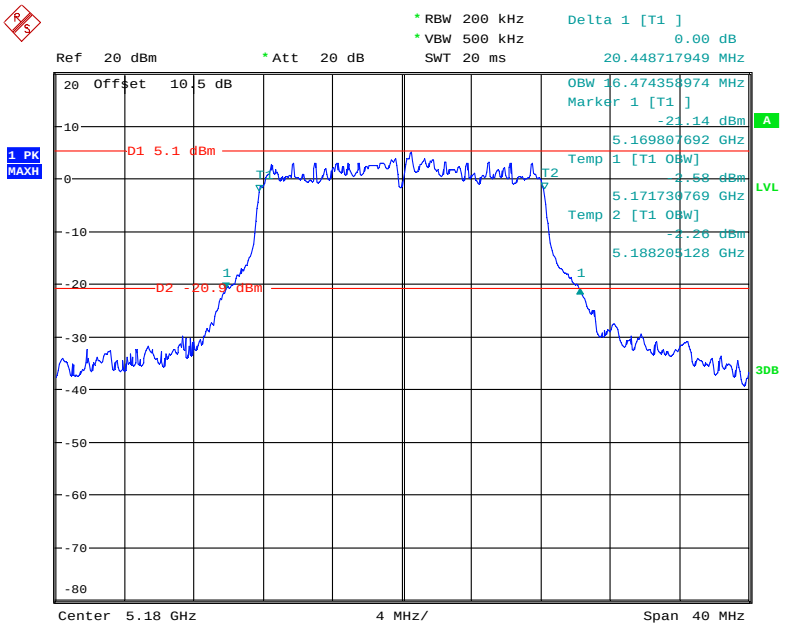
EUT operation mode: Transmitting

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

5150 MHz - 5250 MHz:

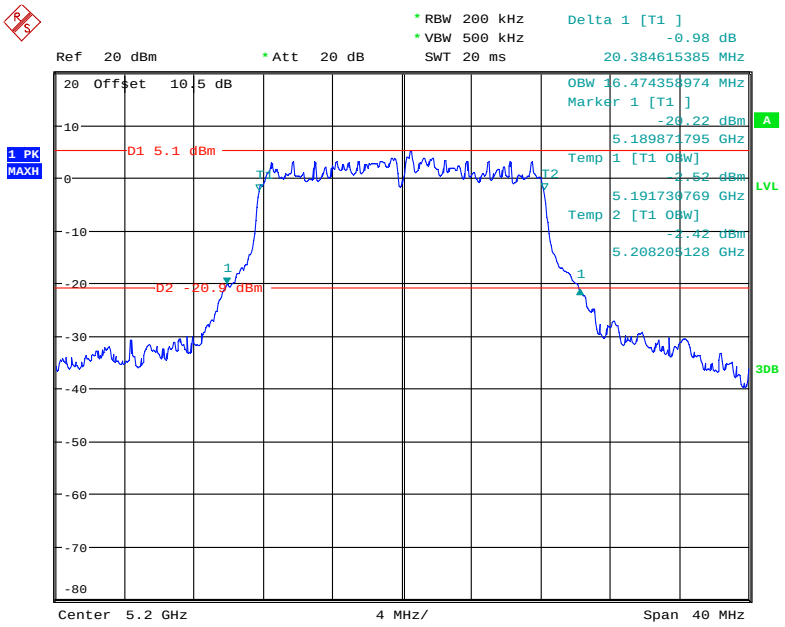
Frequency (MHz)	26dB bandwidth (MHz)	99% Bandwidth (MHz)	Remark
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2A band
5180	20.45	16.47	
5200	20.38	16.47	
5240	20.32	16.47	
802.11n20			
5180	21.28	17.82	
5200	21.28	17.82	
5240	21.22	17.82	
802.11n40			
5190	39.87	36.41	
5230	40.00	36.41	
802.11ac20			
5180	21.22	17.82	
5200	21.35	17.82	
5240	21.28	17.82	
802.11ac40			
5190	40.38	36.54	
5230	40.38	36.54	
	802.11ac80		
5210	81.03	75.64	

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



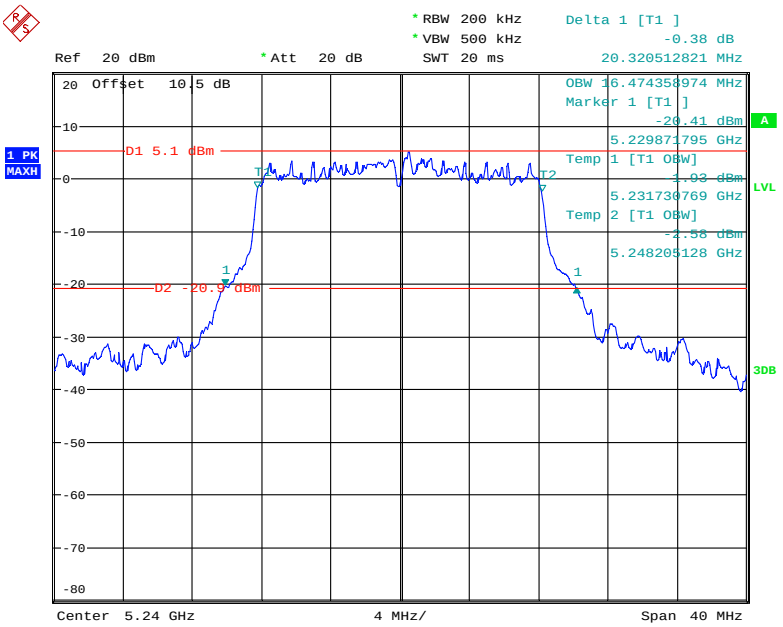
Date: 5.MAR.2019 14:30:06

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



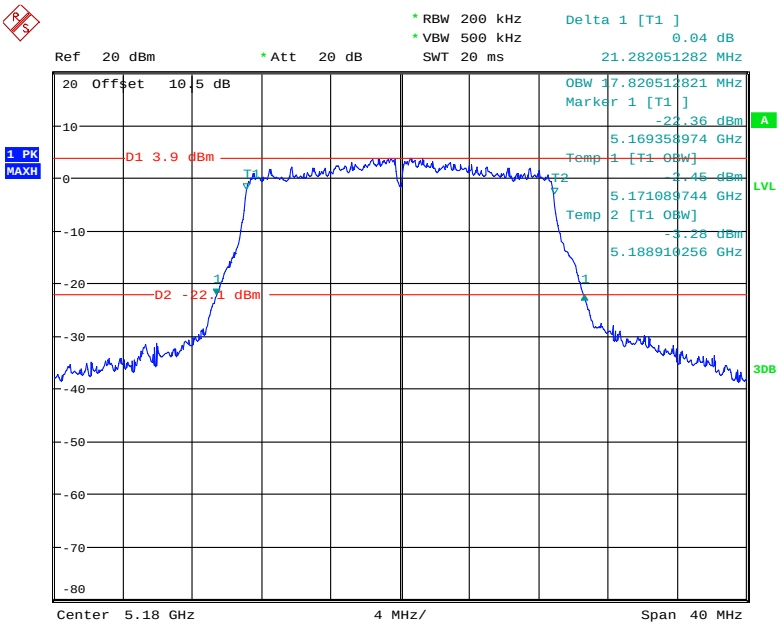
Date: 5.MAR.2019 14:32:03

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



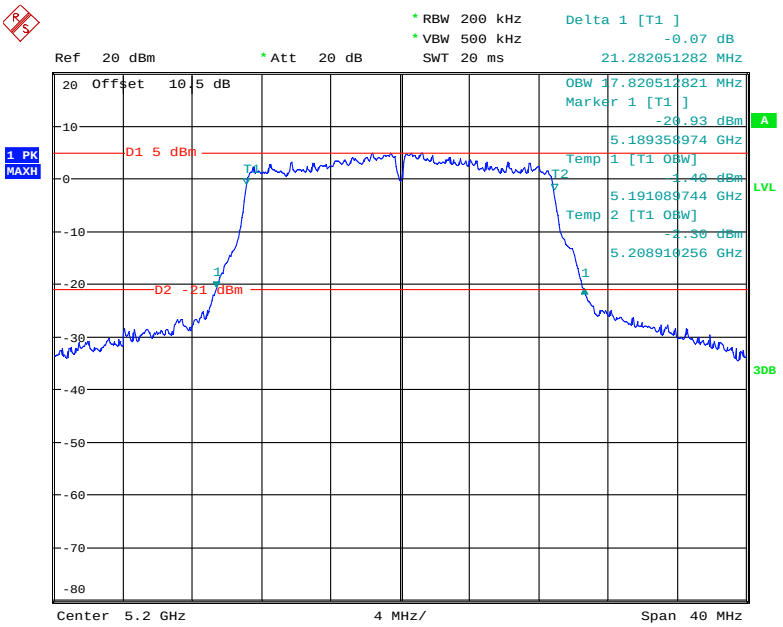
Date: 5.MAR.2019 14:33:57

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



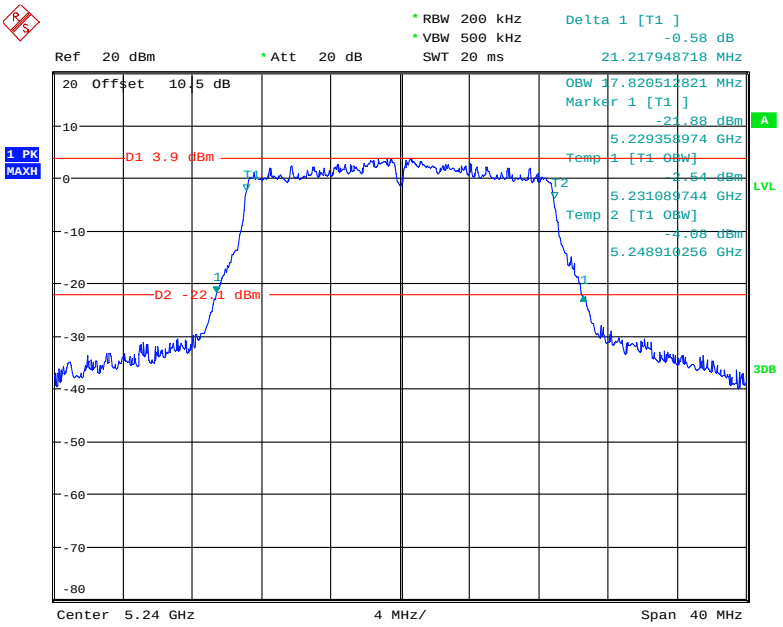
Date: 5.MAR.2019 14:36:47

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



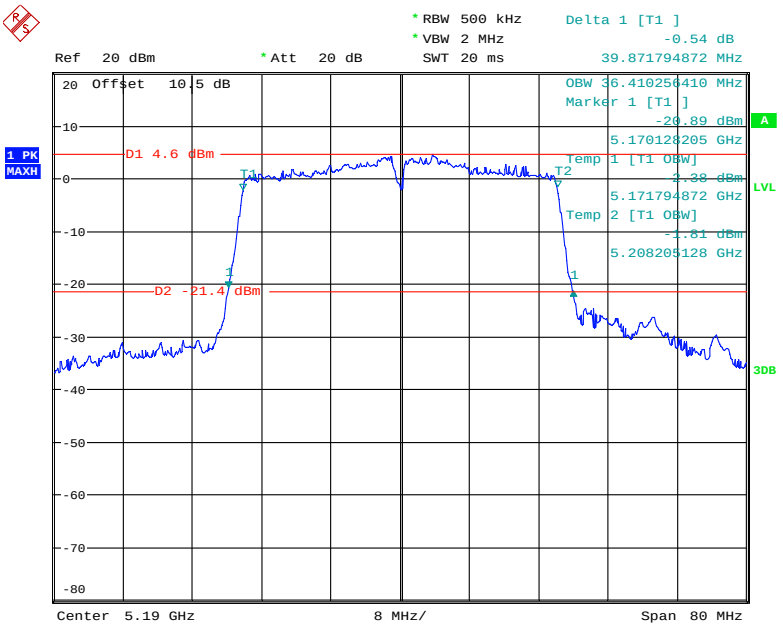
Date: 5.MAR.2019 14:44:05

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



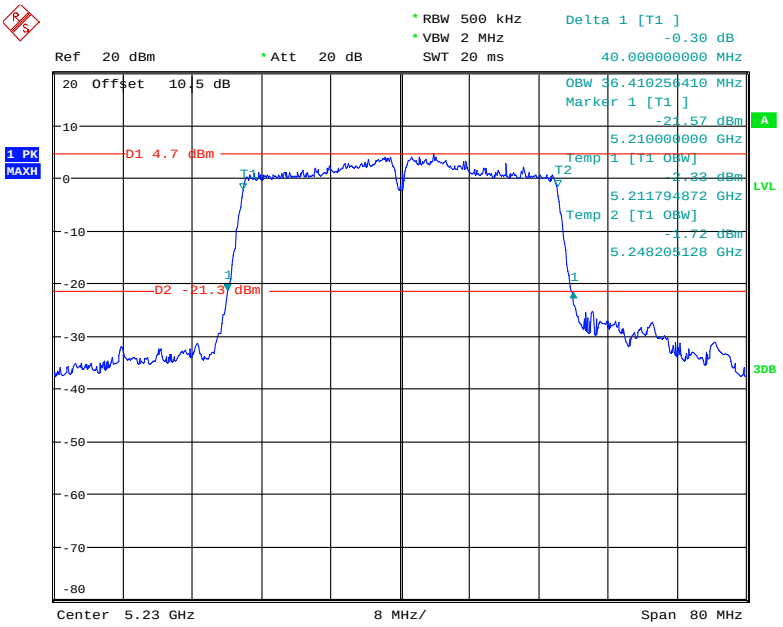
Date: 5.MAR.2019 14:37:53

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5190 MHz



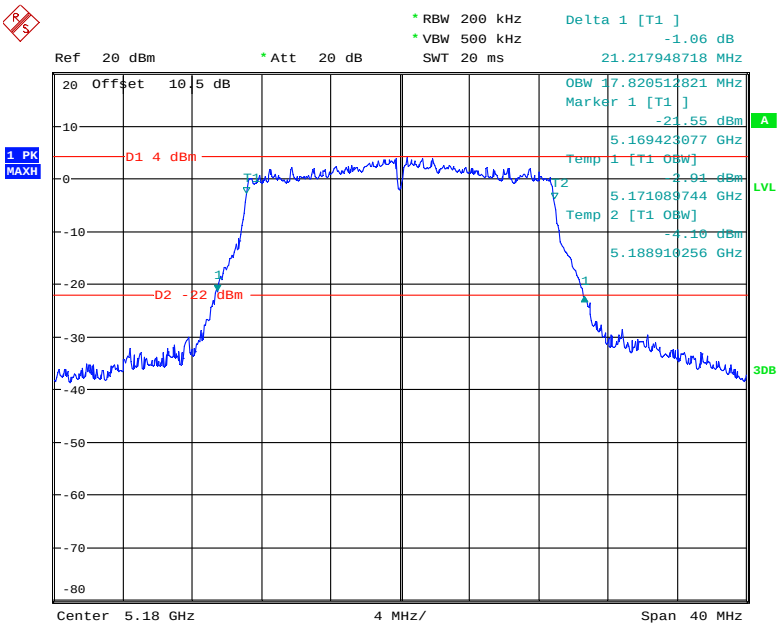
Date: 5.MAR.2019 15:03:21

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5230 MHz



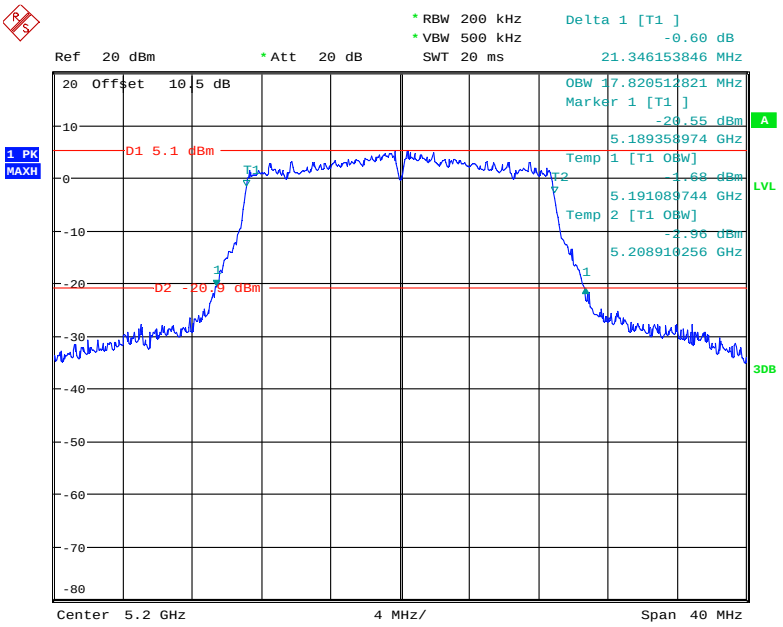
Date: 5.MAR.2019 15:01:15

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



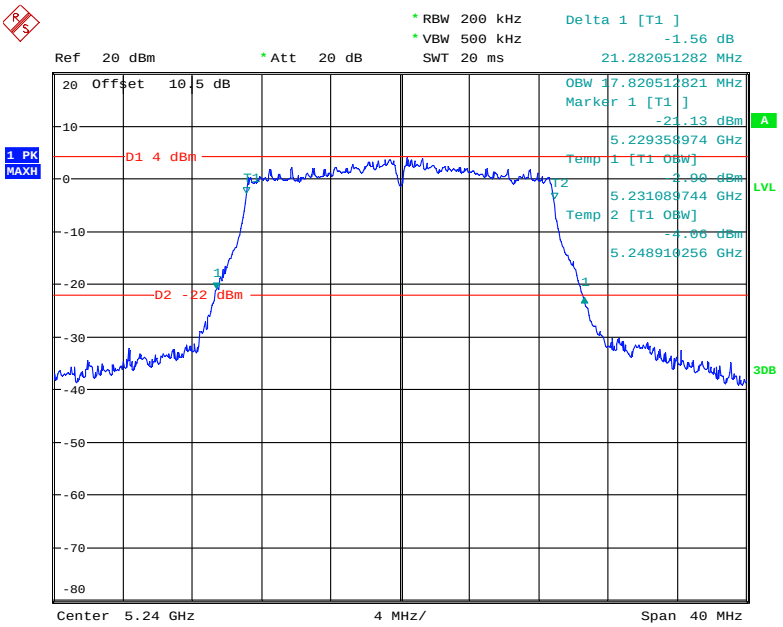
Date: 5.MAR.2019 14:49:35

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



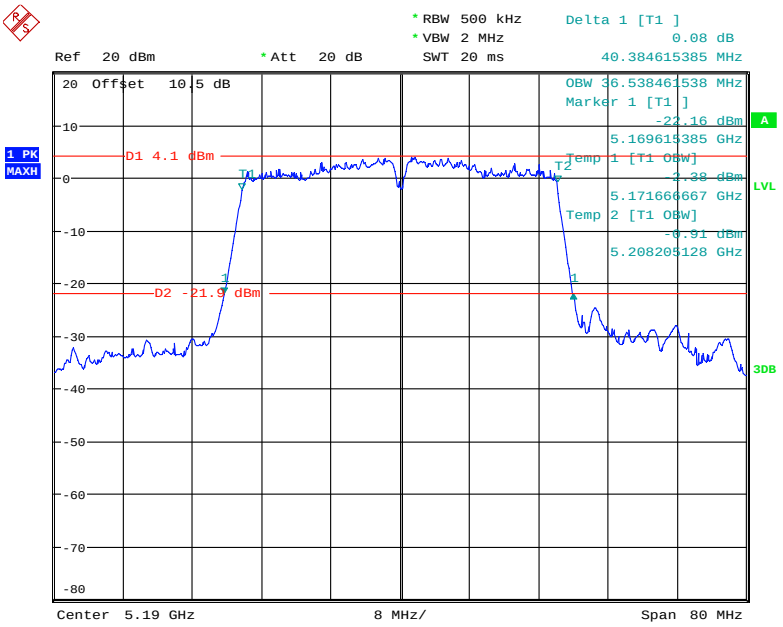
Date: 5.MAR.2019 14:56:09

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



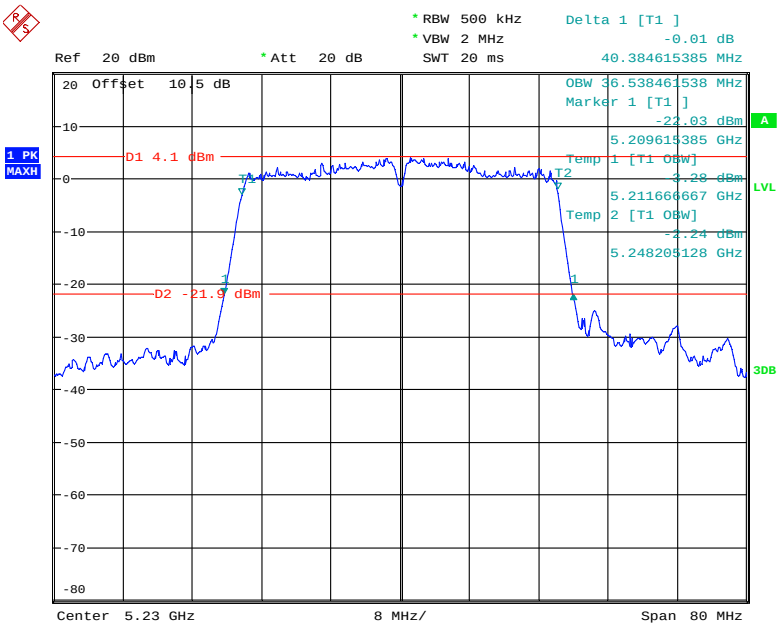
Date: 5.MAR.2019 14:47:50

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



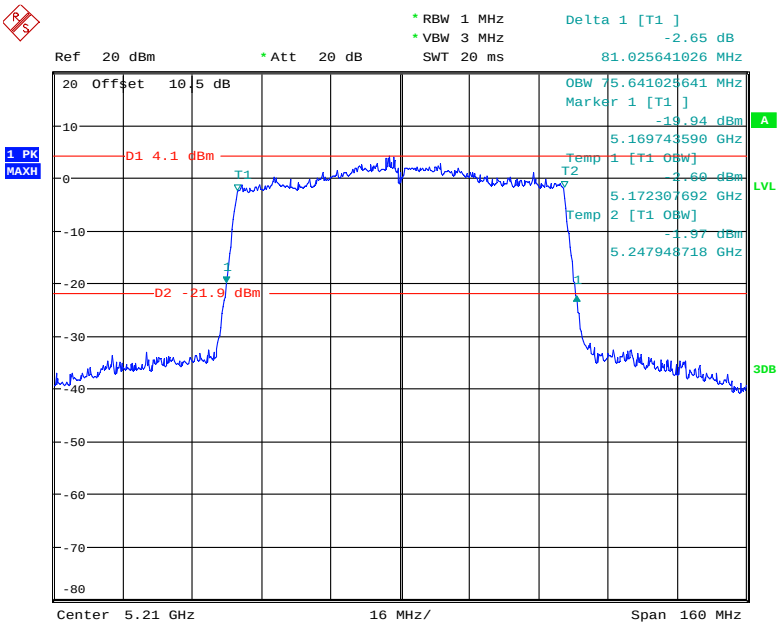
Date: 5.MAR.2019 15:06:41

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



Date: 5.MAR.2019 15:08:42

802.11ac80 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5210 MHz

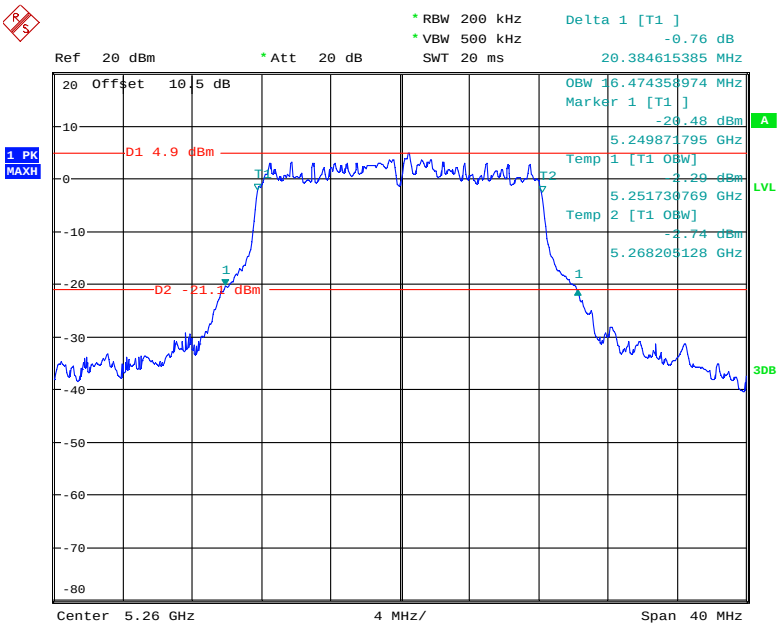


Date: 5.MAR.2019 14:28:04

5250 MHz - 5350 MHz:

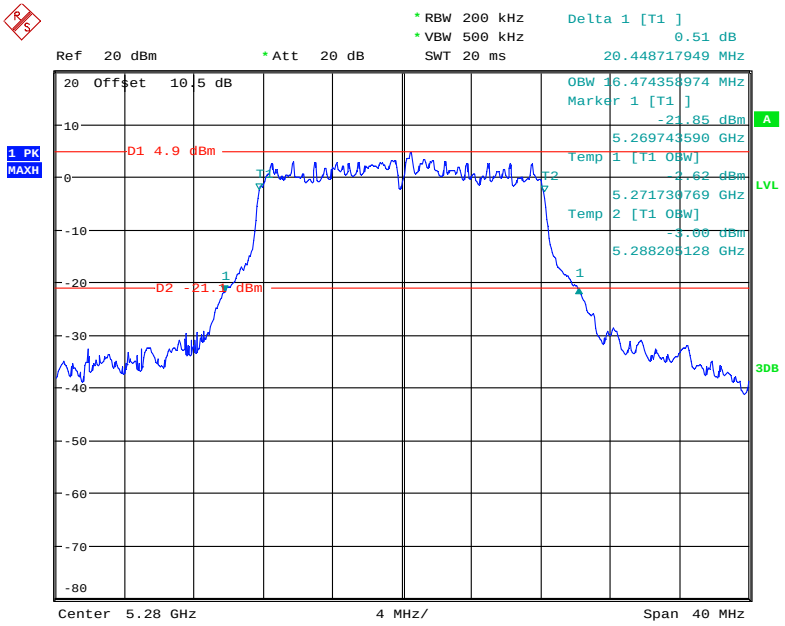
Frequency (MHz)	26dB bandwidth (MHz)	99% Bandwidth (MHz)
802.11a		
5260	20.38	16.47
5280	20.45	16.47
5320	20.51	16.47
802.11n20		
5260	21.28	17.82
5280	21.22	17.82
5320	21.28	17.82
802.11n40		
5270	40.00	36.41
5310	39.87	36.41
802.11ac20		
5260	21.41	17.88
5280	21.35	17.88
5320	21.35	17.88
802.11ac40		
5270	40.26	36.54
5310	40.26	36.54
802.11ac80		
5290	81.54	75.64

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



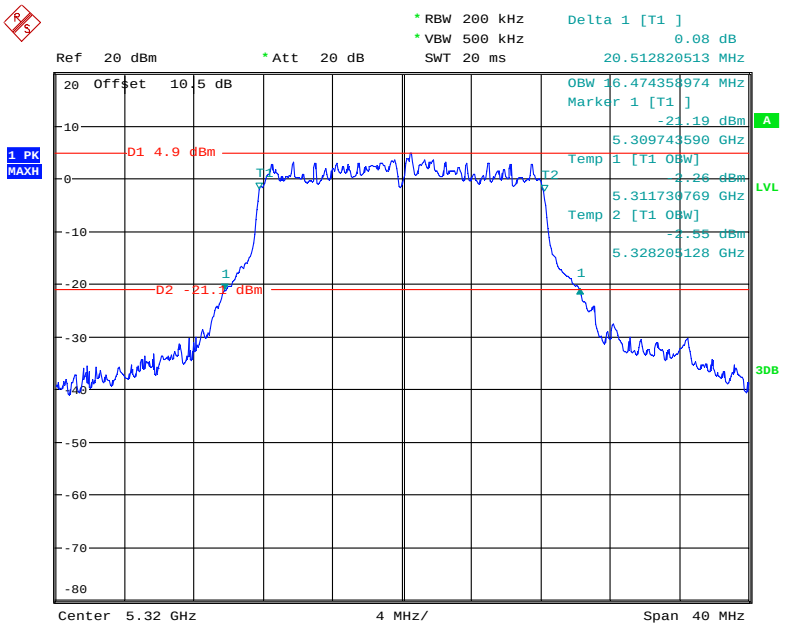
Date: 5.MAR.2019 15:39:17

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



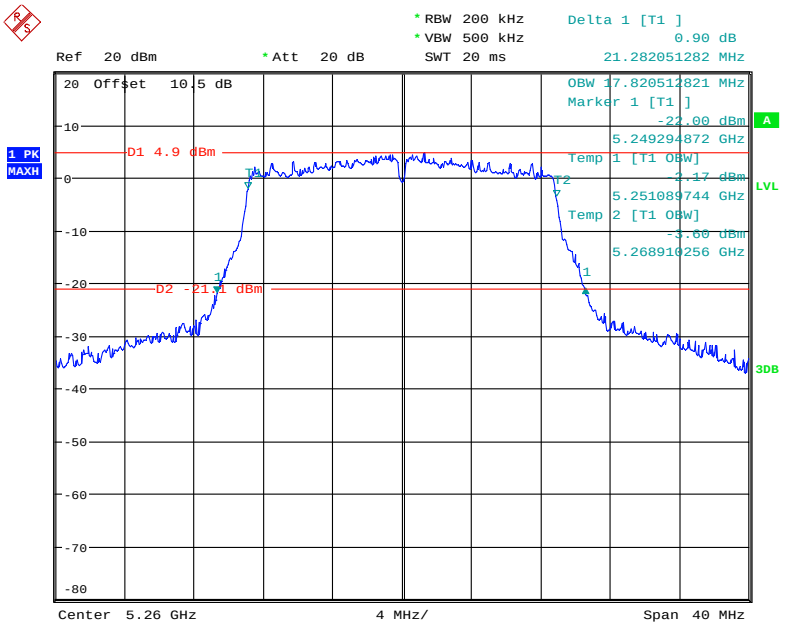
Date: 5.MAR.2019 15:40:48

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



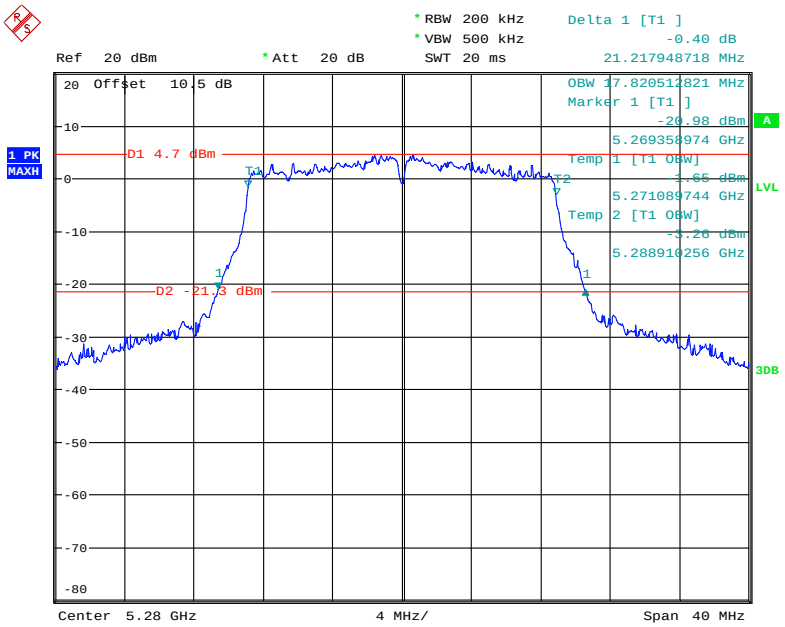
Date: 5.MAR.2019 15:42:55

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



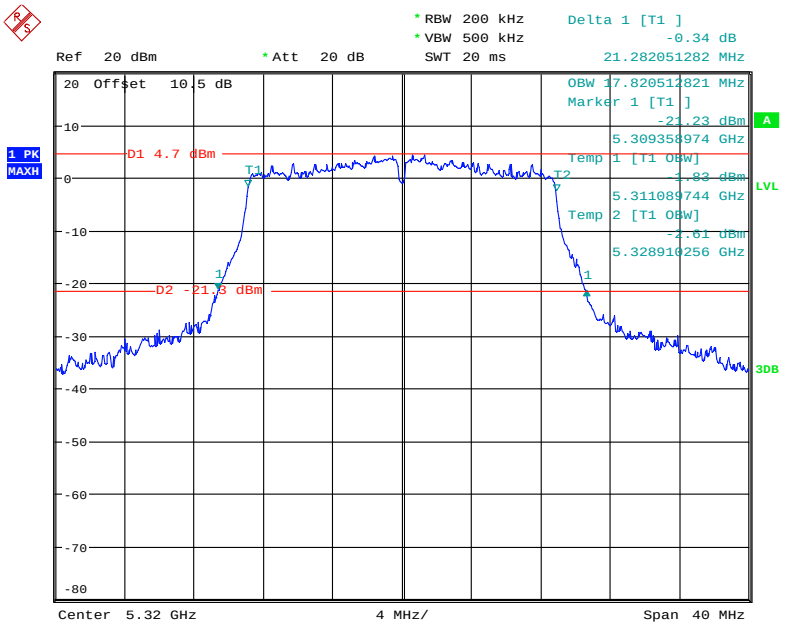
Date: 5.MAR.2019 15:45:56

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



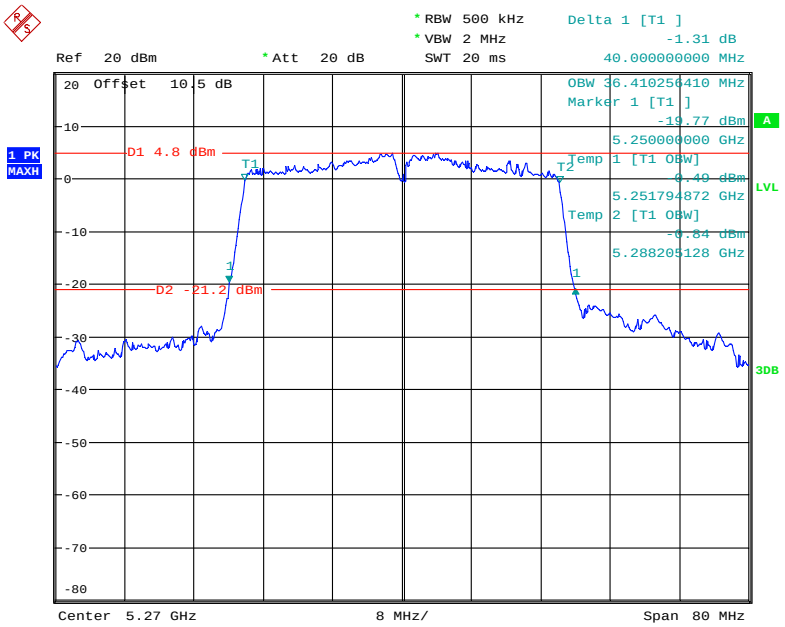
Date: 5.MAR.2019 15:47:29

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



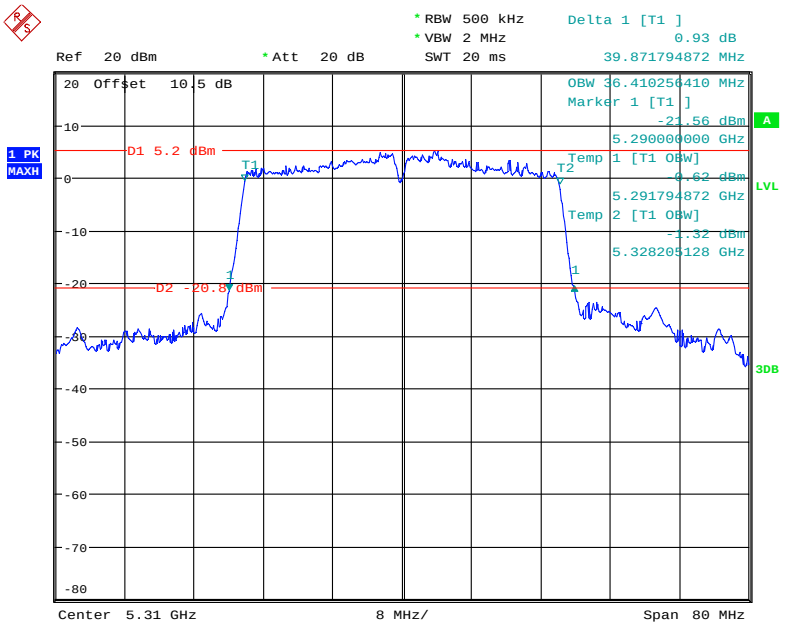
Date: 5.MAR.2019 15:54:59

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



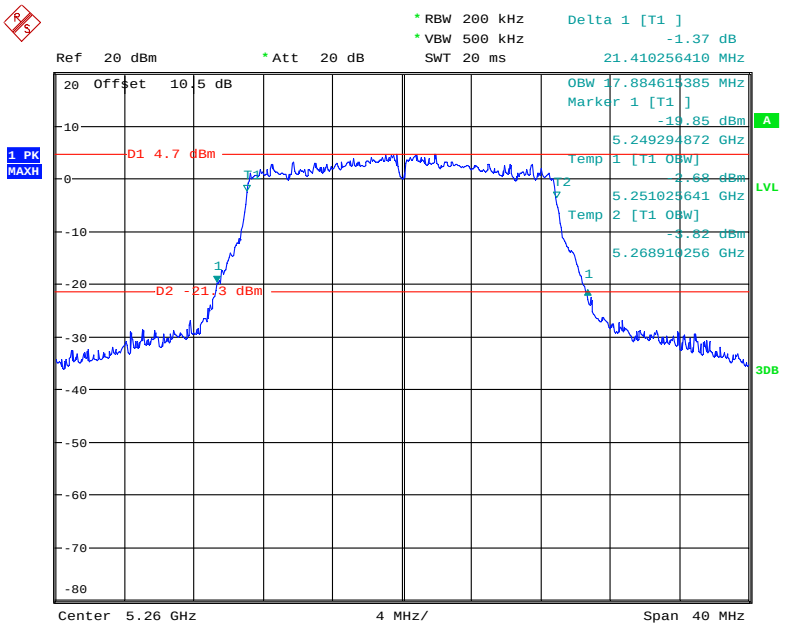
Date: 5.MAR.2019 15:35:37

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



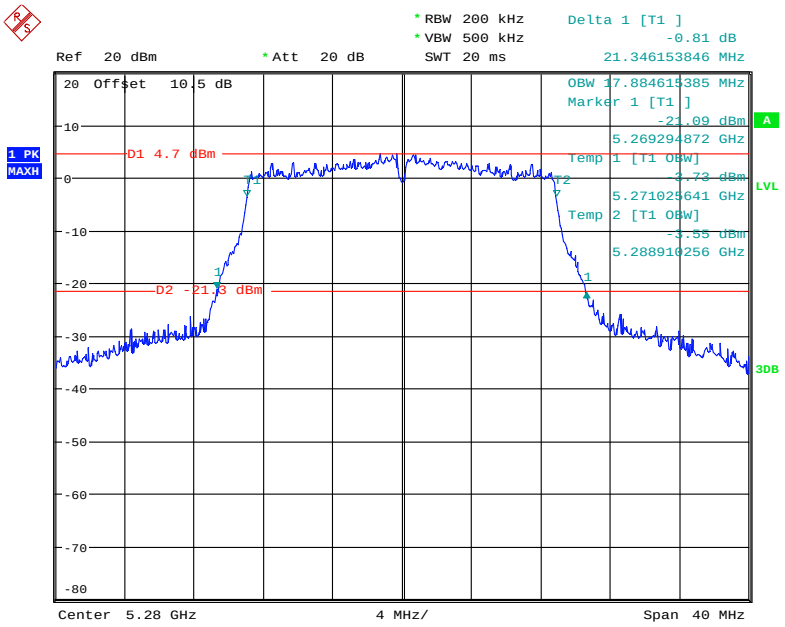
Date: 5.MAR.2019 15:36:51

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



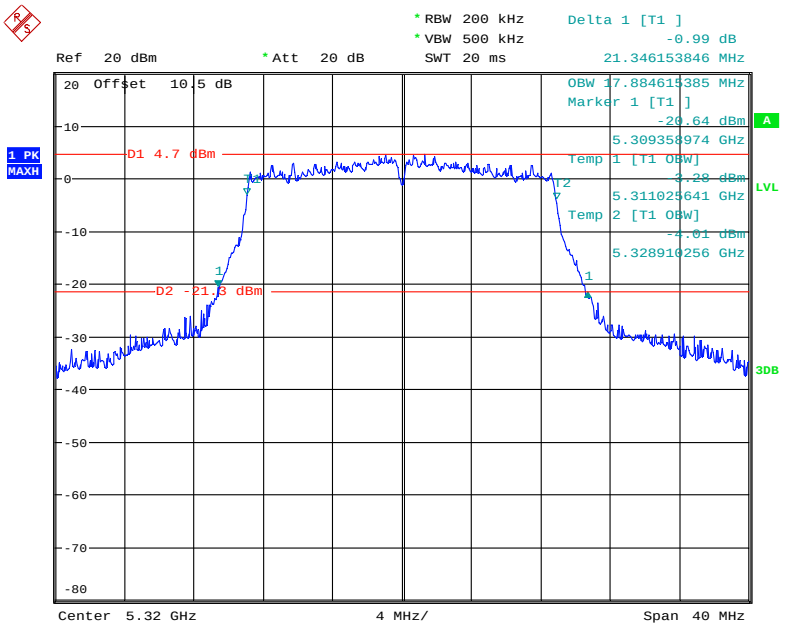
Date: 5.MAR.2019 15:56:53

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



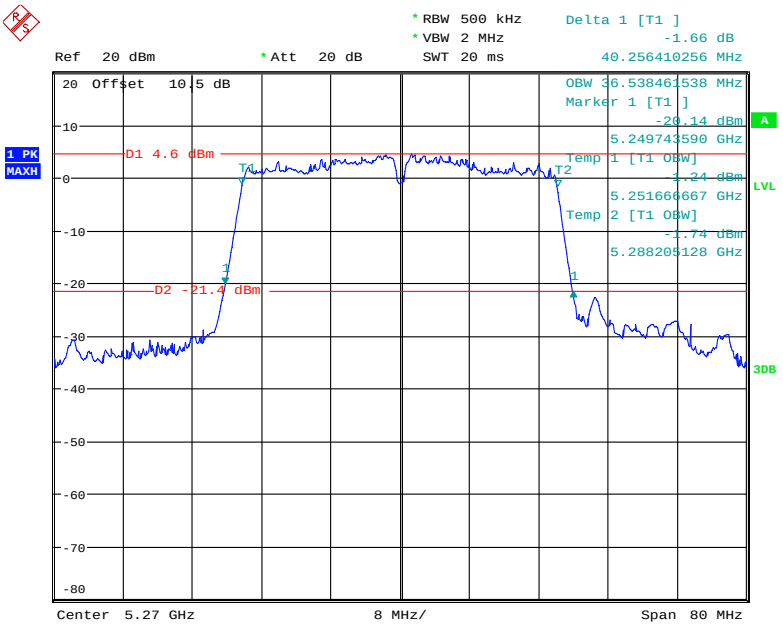
Date: 5.MAR.2019 15:58:13

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



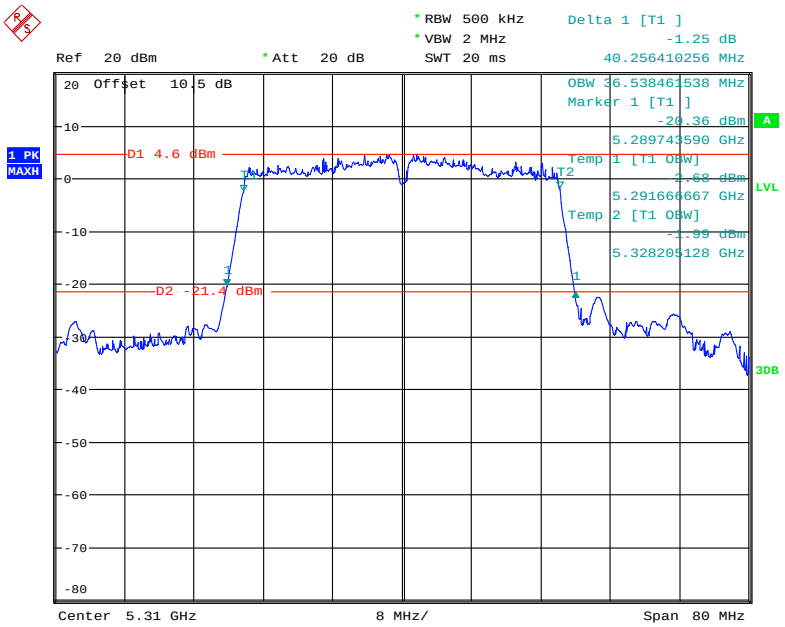
Date: 5.MAR.2019 16:01:13

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



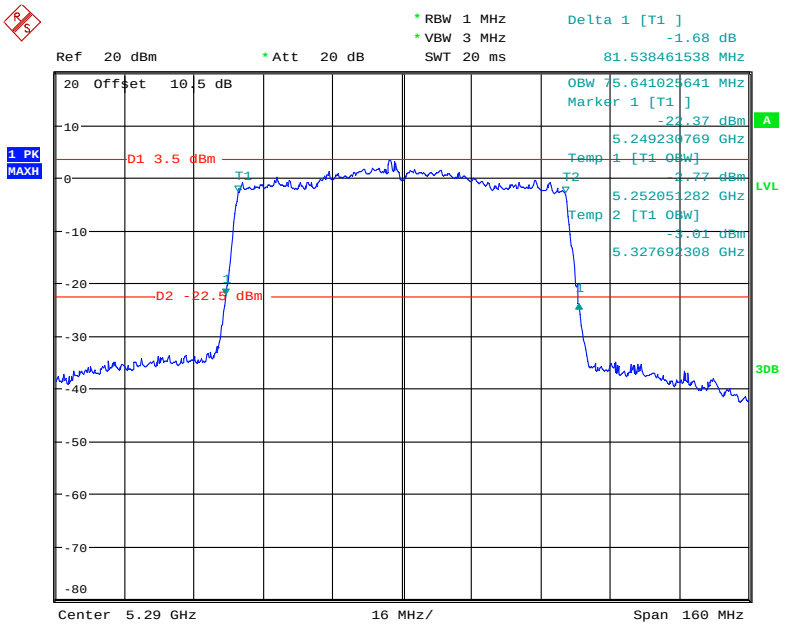
Date: 5.MAR.2019 15:32:42

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



Date: 5.MAR.2019 15:33:45

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

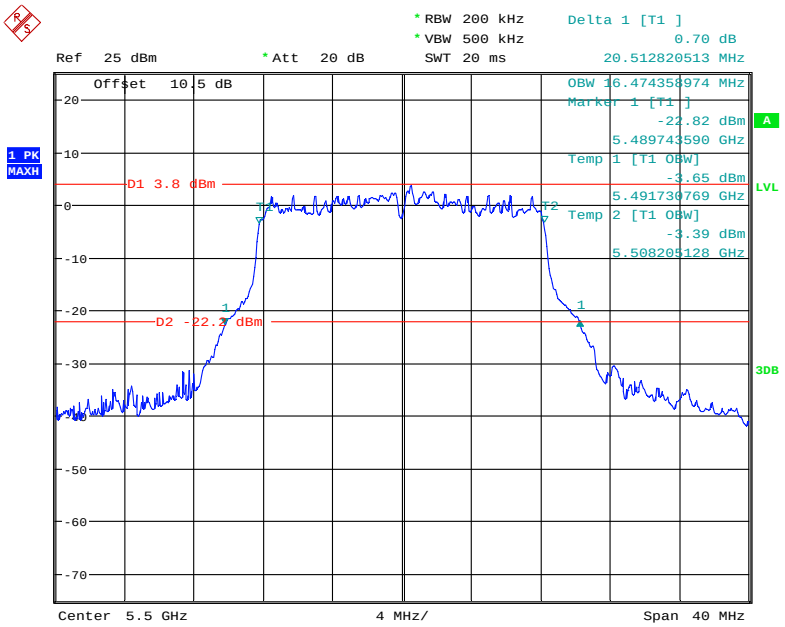


Date: 5.MAR.2019 16:05:41

5470 MHz – 5725 MHz:

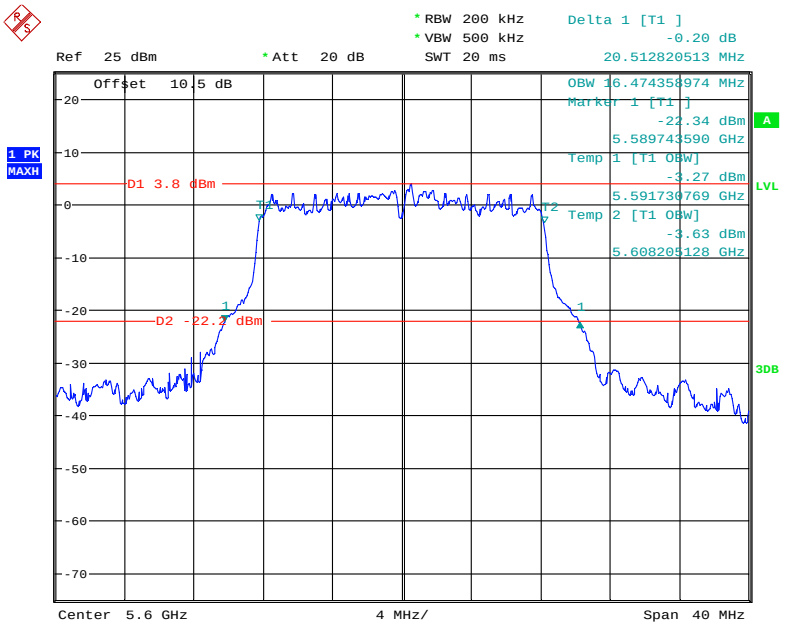
Frequency (MHz)	26dB bandwidth (MHz)	99% Bandwidth (MHz)
802.11a		
5500	20.51	16.47
5600	20.52	16.47
5700	20.26	16.47
802.11n20		
5500	21.35	17.82
5600	21.28	17.82
5700	21.47	17.82
802.11n40		
5510	40.00	36.41
5590	40.00	36.41
5670	40.00	36.41
802.11ac20		
5500	21.47	17.82
5600	21.15	17.82
5700	21.28	17.82
802.11ac40		
5510	40.38	36.54
5590	40.38	36.54
5670	40.38	36.54
802.11ac80		
5530	81.79	75.90
5610	81.54	75.90

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



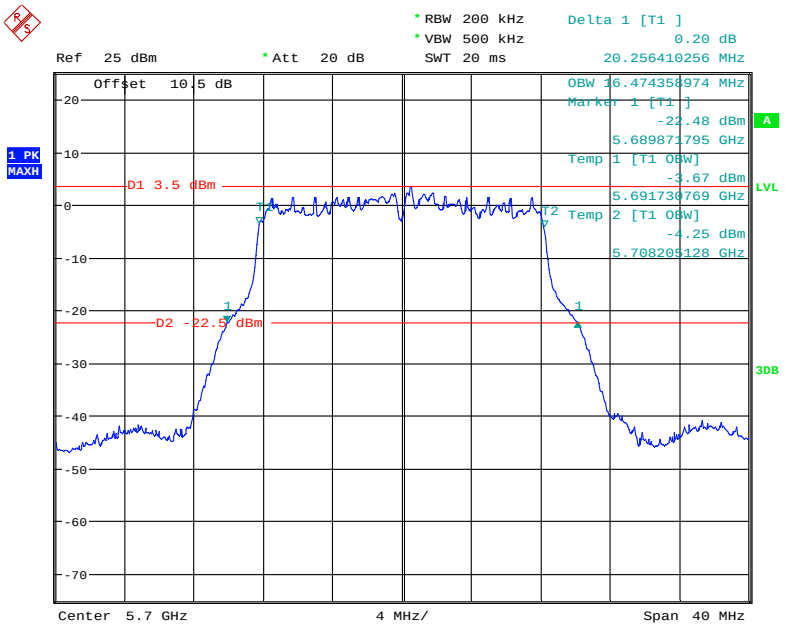
Date: 6.MAR.2019 10:05:50

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5600 MHz



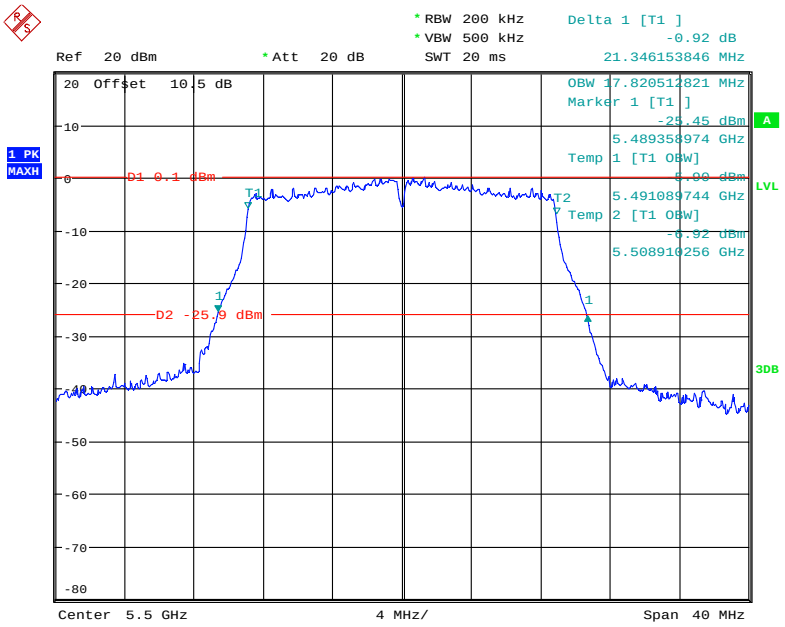
Date: 6.MAR.2019 10:07:19

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



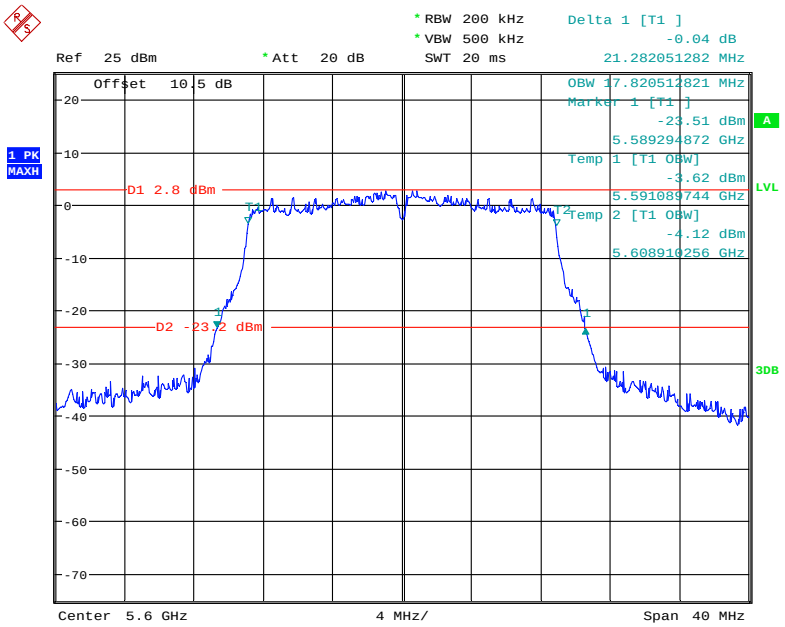
Date: 11.MAR.2019 08:06:24

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



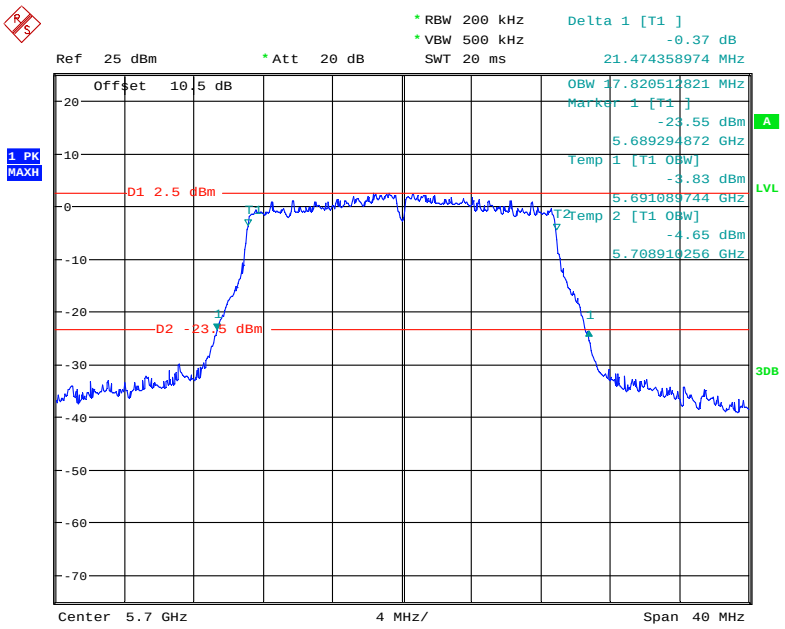
Date: 2.APR.2019 11:38:59

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5600 MHz



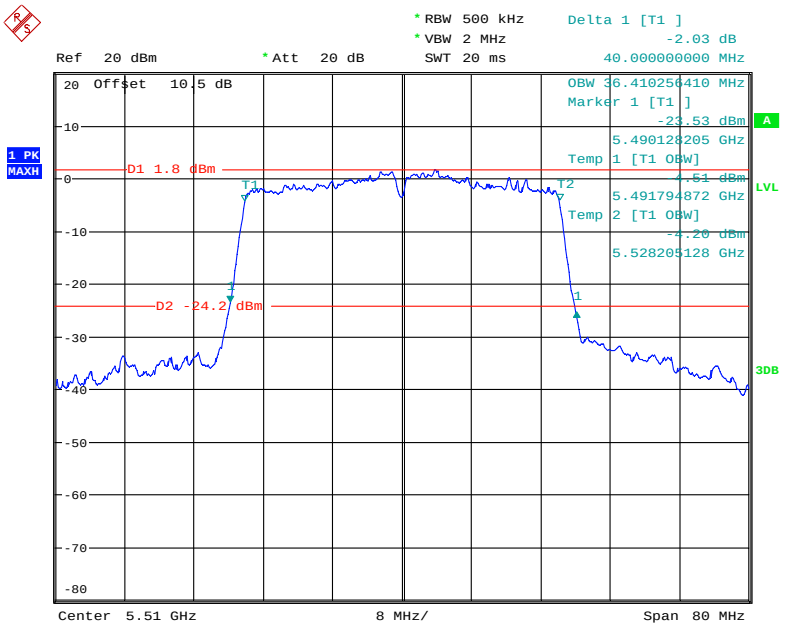
Date: 6.MAR.2019 10:18:18

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



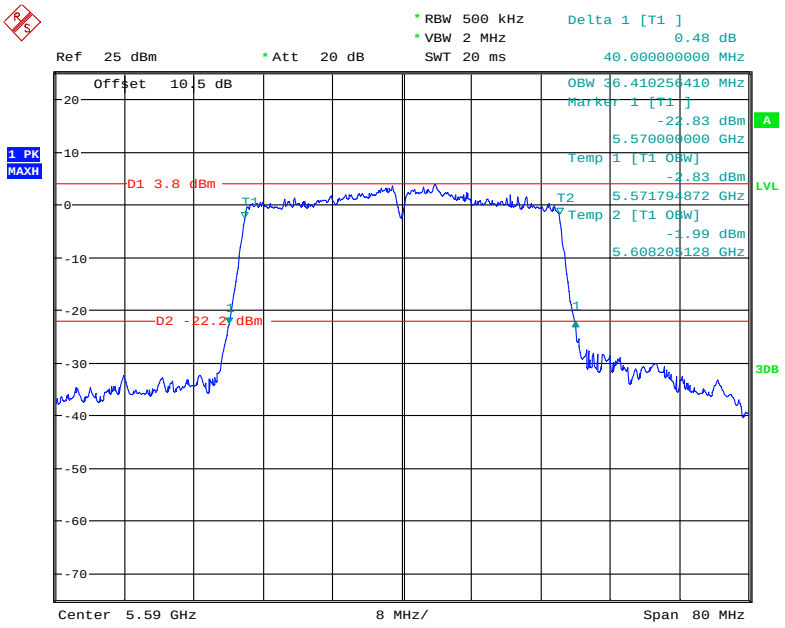
Date: 6.MAR.2019 10:19:41

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



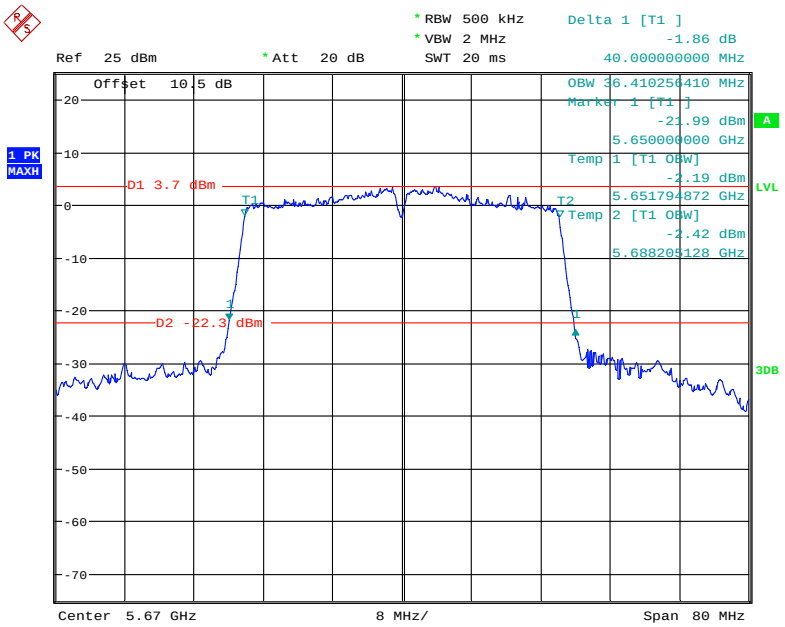
Date: 2.APR.2019 11:35:10

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5590 MHz



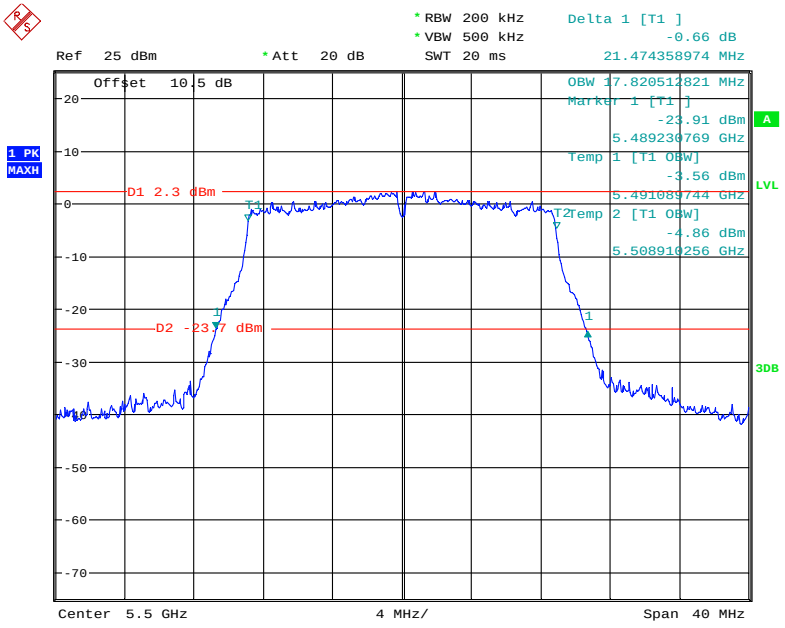
Date: 6.MAR.2019 12:17:03

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



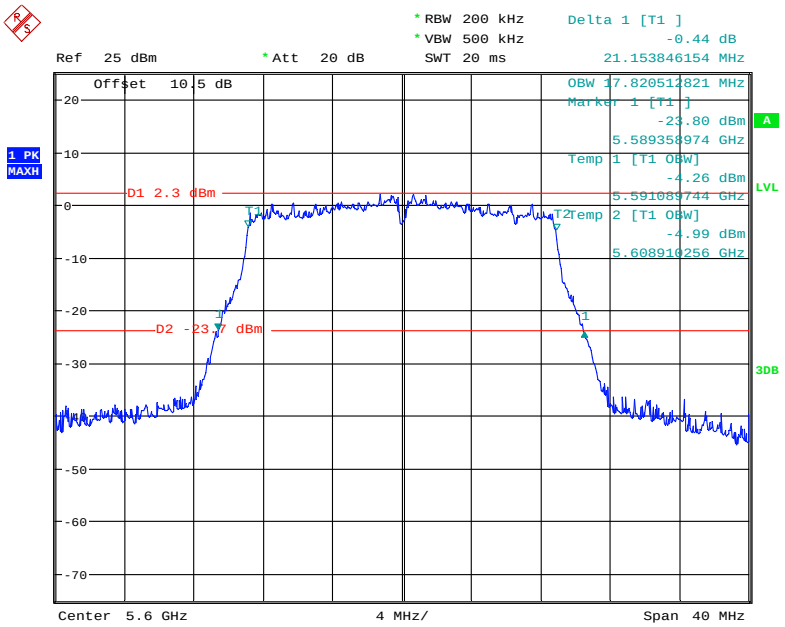
Date: 6.MAR.2019 12:18:42

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



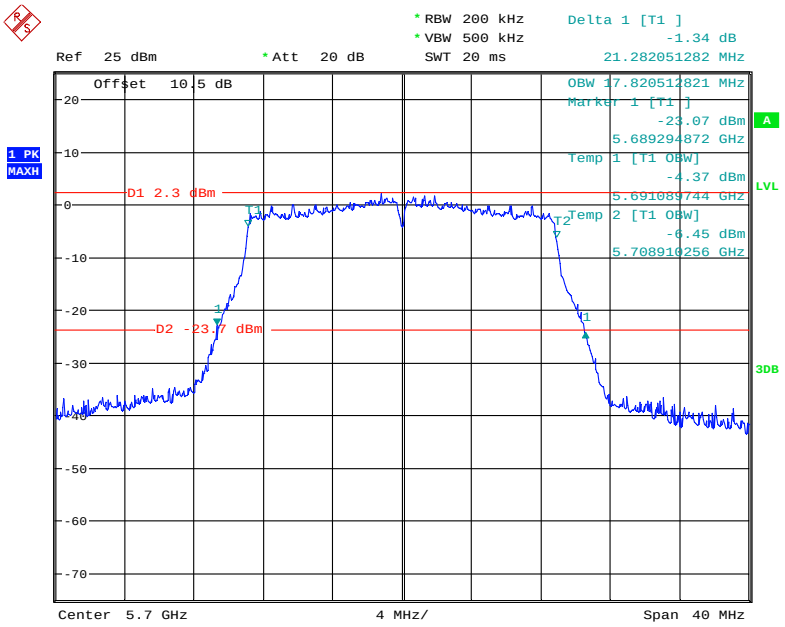
Date: 6.MAR.2019 10:26:36

802.11ac20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5600 MHz



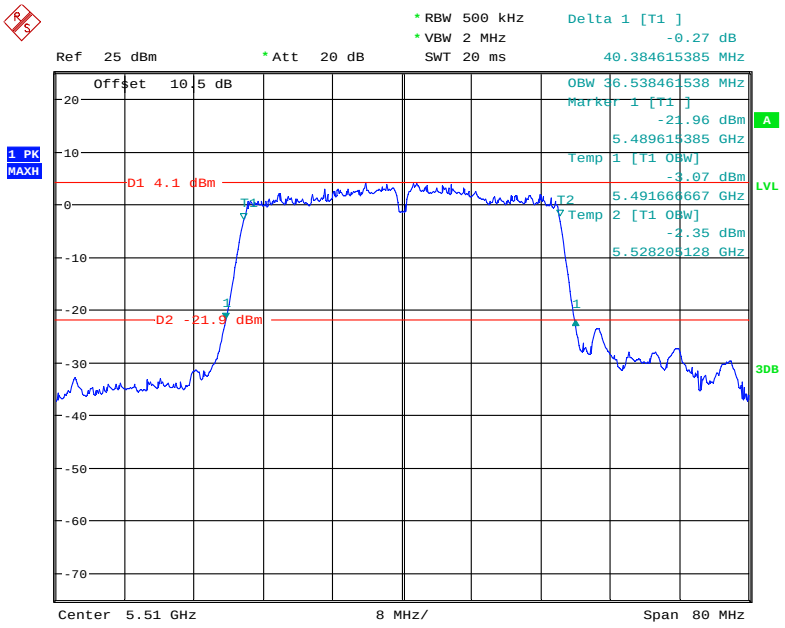
Date: 6.MAR.2019 10:27:24

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



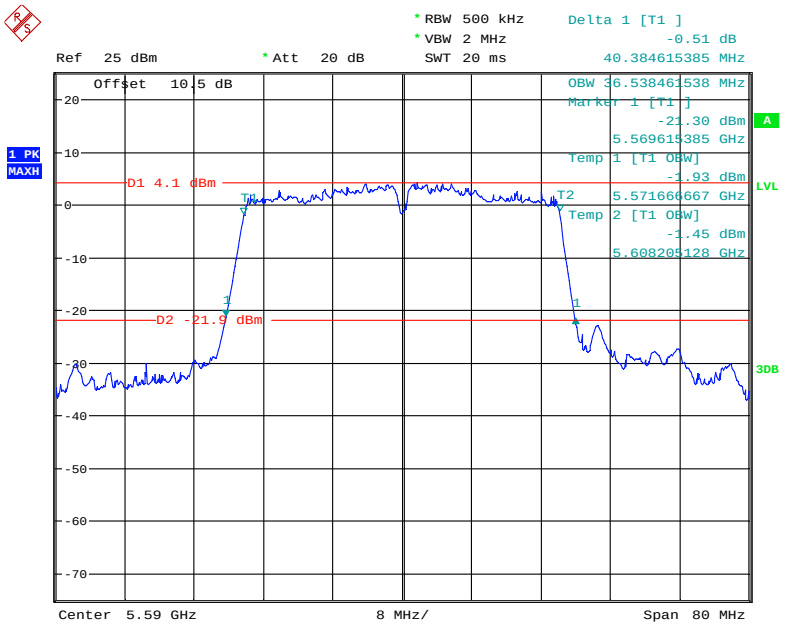
Date: 6.MAR.2019 10:28:30

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



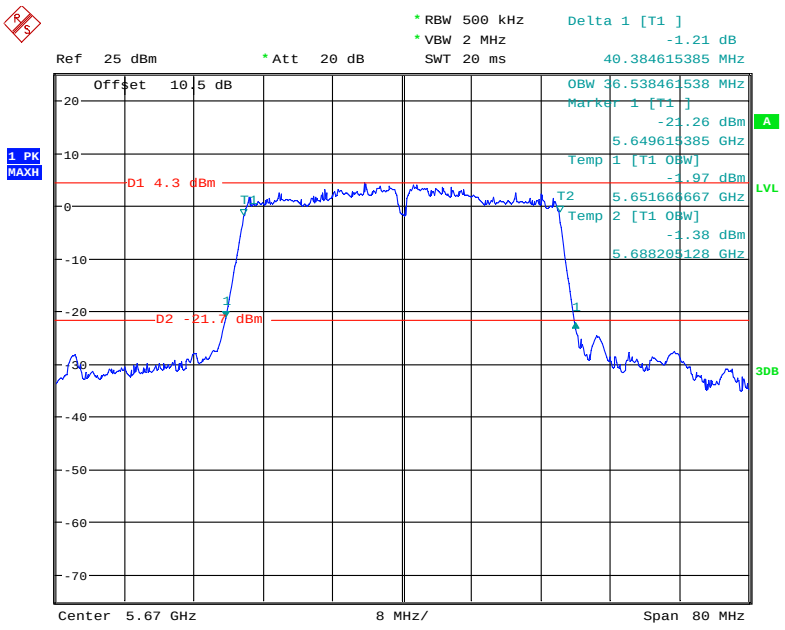
Date: 6.MAR.2019 10:40:01

802.11ac40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5590 MHz



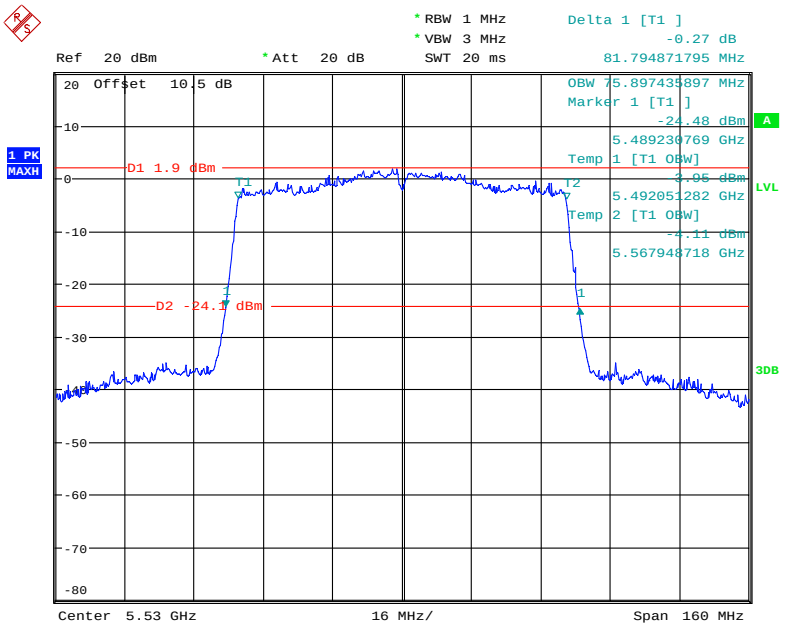
Date: 6.MAR.2019 10:43:24

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



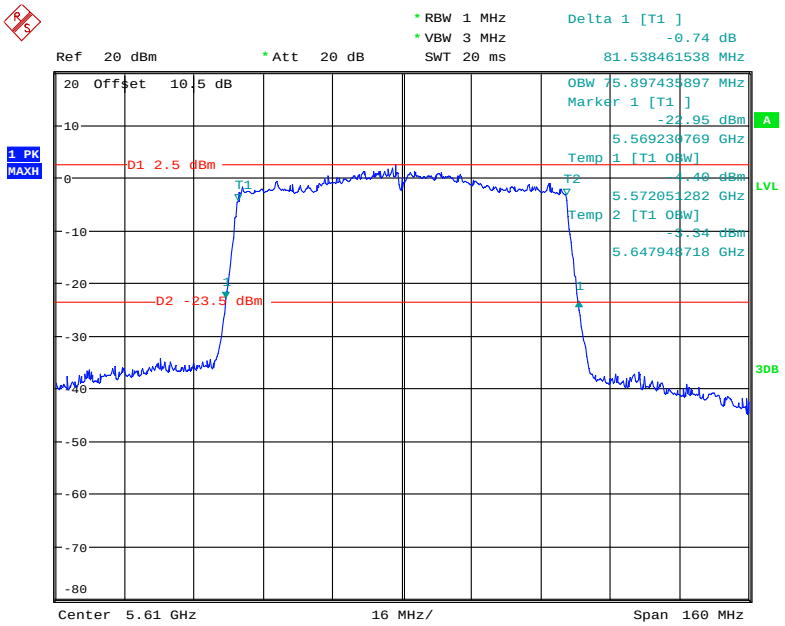
Date: 6.MAR.2019 10:45:11

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



Date: 6.MAR.2019 12:28:01

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

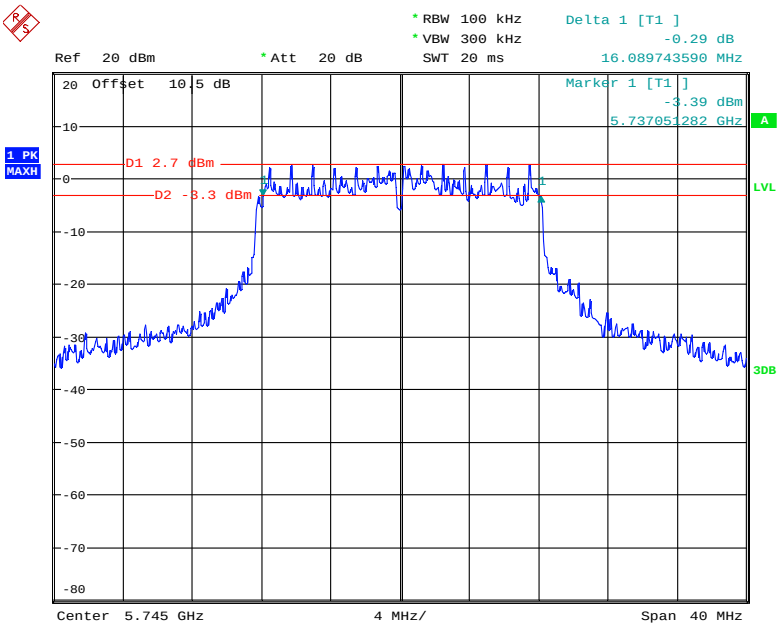


Date: 6.MAR.2019 12:29:52

5725 MHz – 5850 MHz:

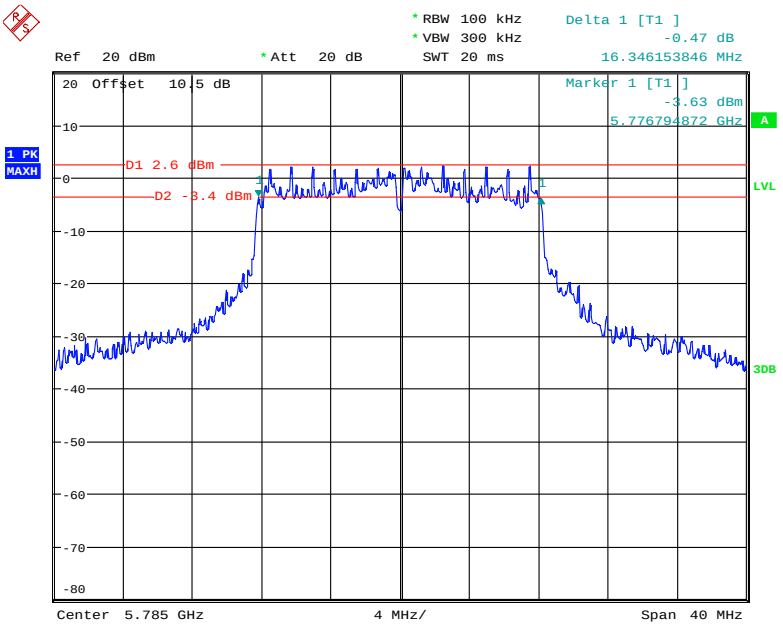
Frequency (MHz)	6dB bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Remark
802.11a				No transmitted signal in the 99% bandwidth extends into the U-NII-2C band
5745	16.09	16.60	0.5	
5785	16.35	16.60	0.5	
5825	16.28	16.60	0.5	
802.11n20				
5745	17.76	17.82	0.5	
5785	17.69	17.82	0.5	
5825	17.76	17.76	0.5	
802.11n40				
5755	36.54	36.41	0.5	
5795	36.54	36.54	0.5	
802.11ac20				
5745	17.76	17.82	0.5	
5785	17.63	17.88	0.5	
5825	17.82	17.88	0.5	
802.11ac40				
5755	36.54	36.67	0.5	
5795	36.54	36.54	0.5	
802.11ac80				
5775	76.41	75.90	0.5	

802.11a mode, 6dB Emission Bandwidth, 5745 MHz



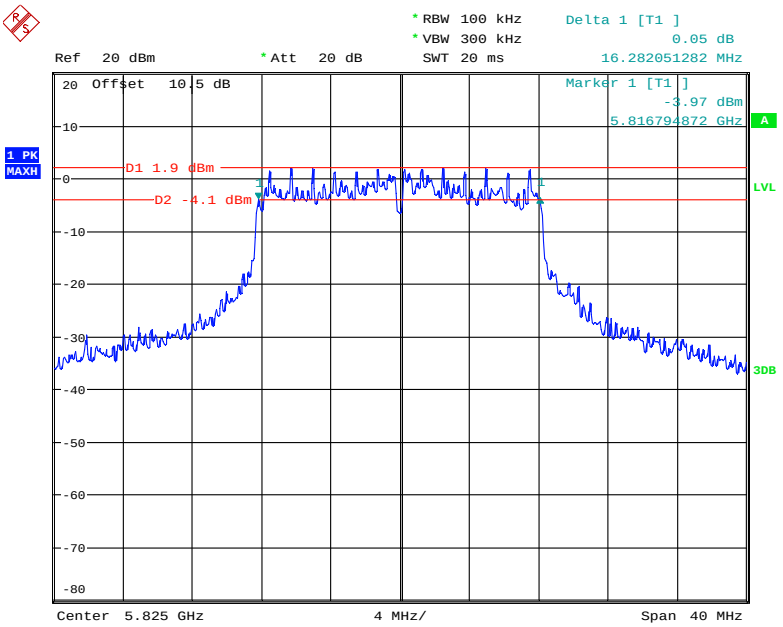
Date: 6.MAR.2019 13:36:55

802.11a mode, 6dB Emission Bandwidth, 5785 MHz



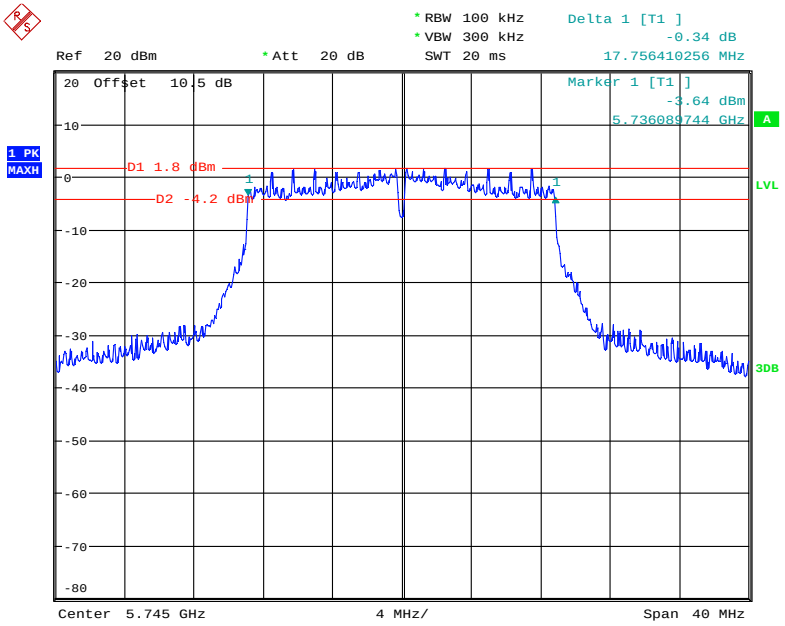
Date: 6.MAR.2019 13:37:55

802.11a mode, 6dB Emission Bandwidth, 5825 MHz



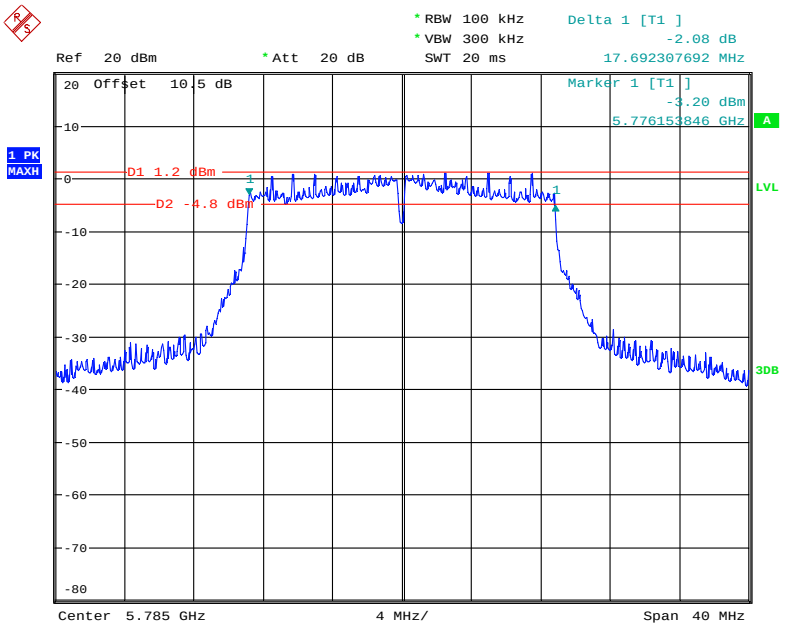
Date: 6.MAR.2019 13:45:36

802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



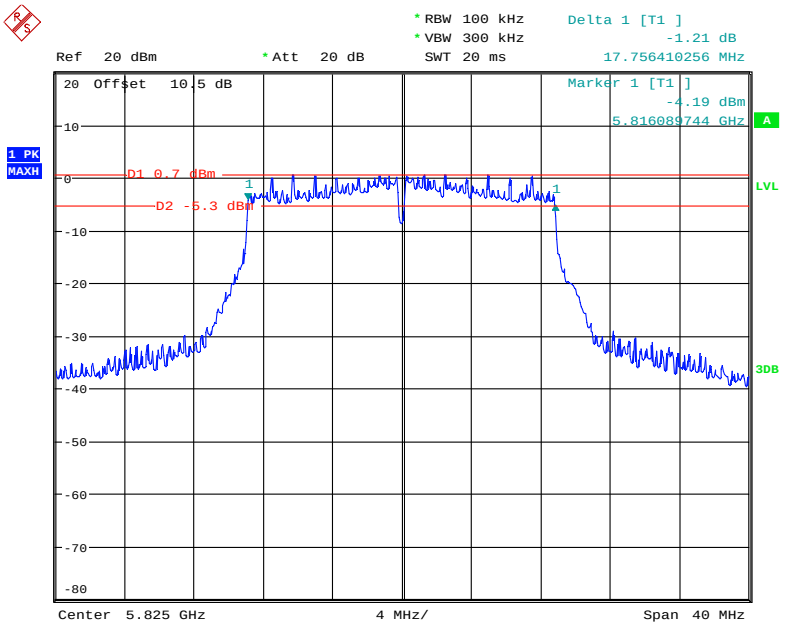
Date: 6.MAR.2019 13:48:52

802.11n20 mode, 6dB Emission Bandwidth, 5785 MHz



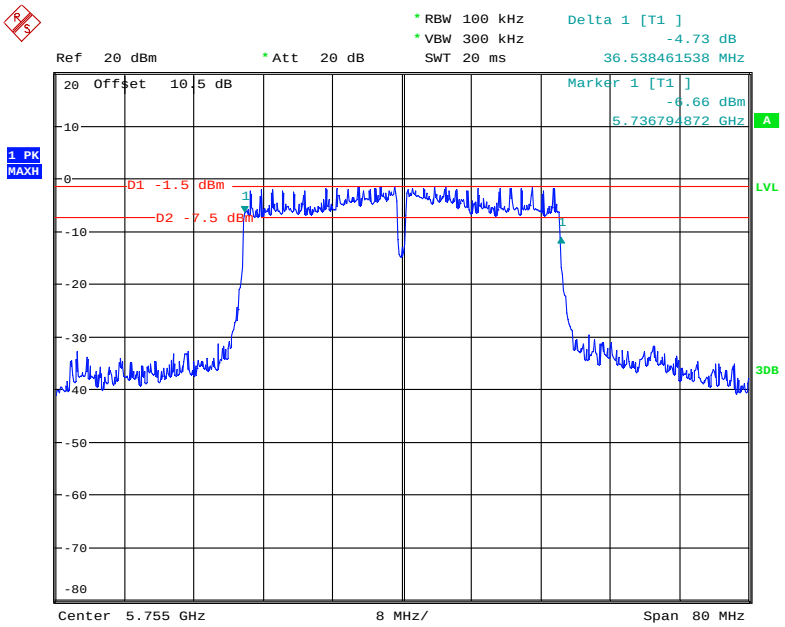
Date: 6.MAR.2019 13:50:10

802.11n20 mode, 6dB Emission Bandwidth, 5825 MHz



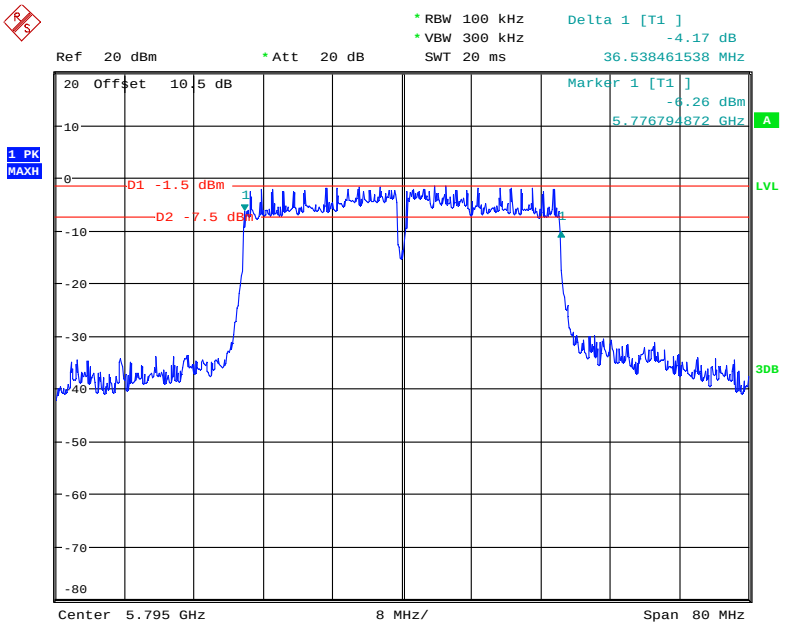
Date: 6.MAR.2019 13:51:21

802.11n40 mode, 6dB Emission Bandwidth, 5755 MHz



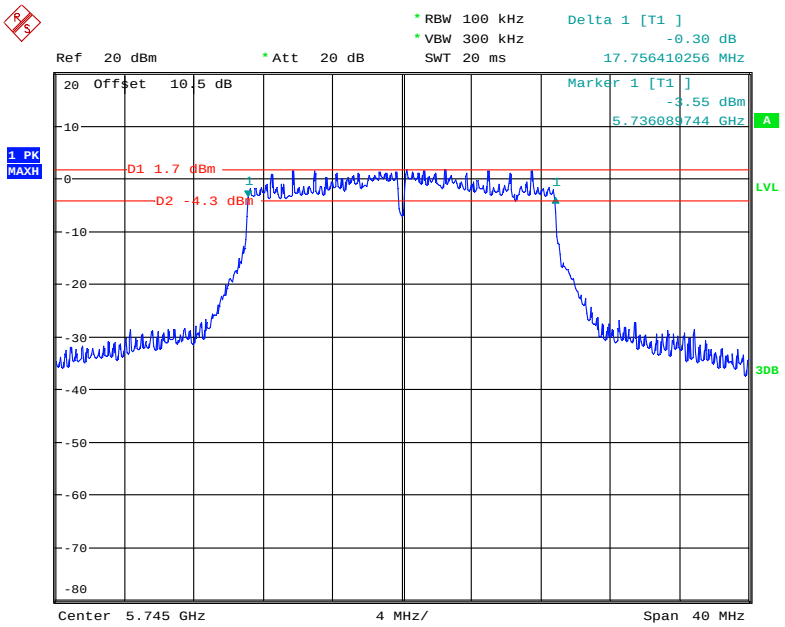
Date: 6.MAR.2019 13:32:56

802.11n40 mode, 6dB Emission Bandwidth, 5795 MHz



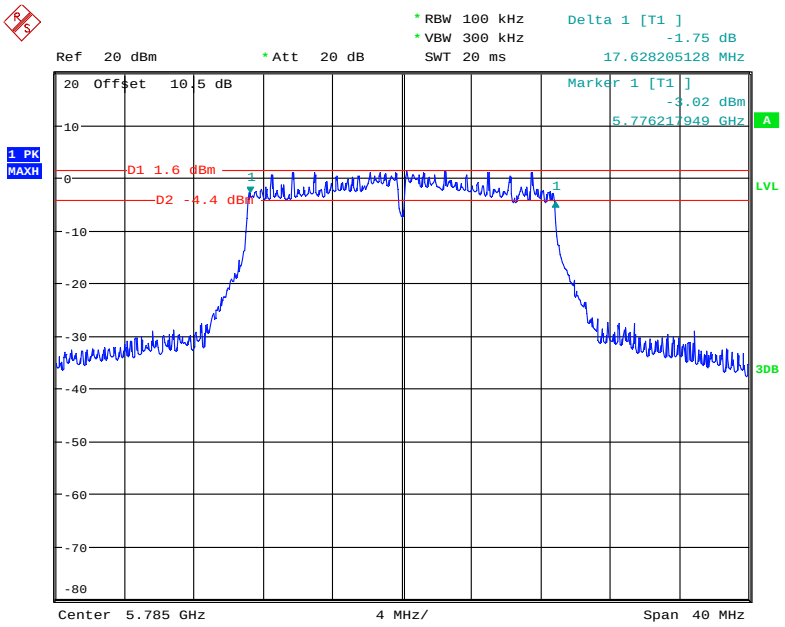
Date: 6.MAR.2019 13:34:53

802.11ac20 mode, 6dB Emission Bandwidth, 5745 MHz



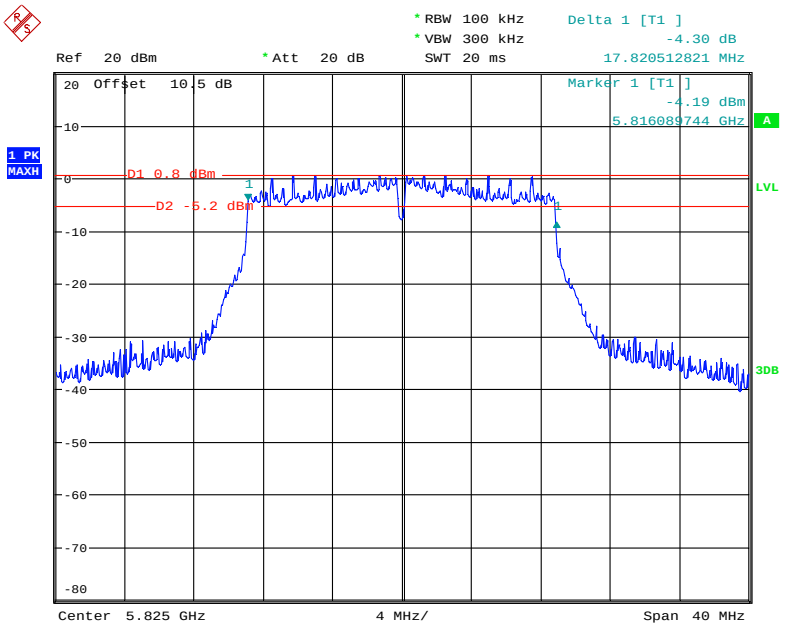
Date: 6.MAR.2019 13:53:43

802.11ac20 mode, 6dB Emission Bandwidth, 5785 MHz



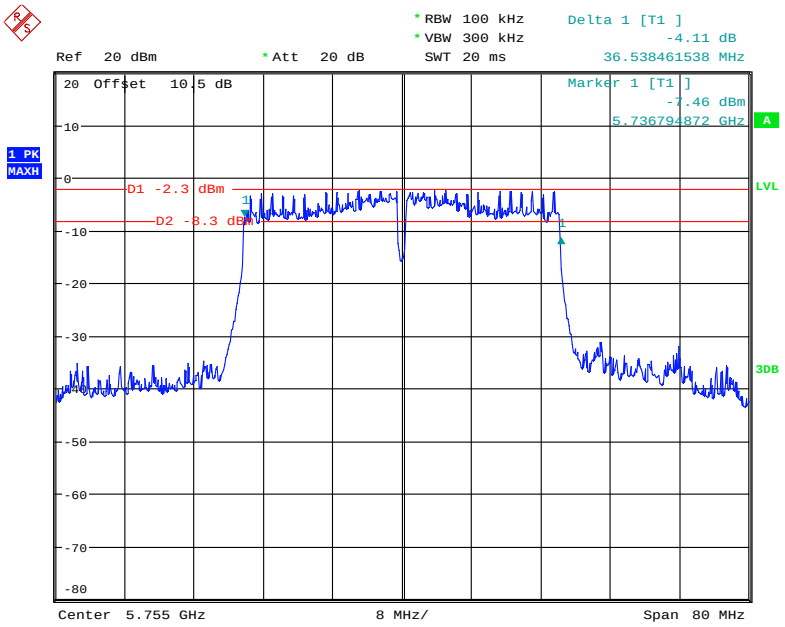
Date: 6.MAR.2019 13:55:25

802.11ac20 mode, 6dB Emission Bandwidth, 5825 MHz



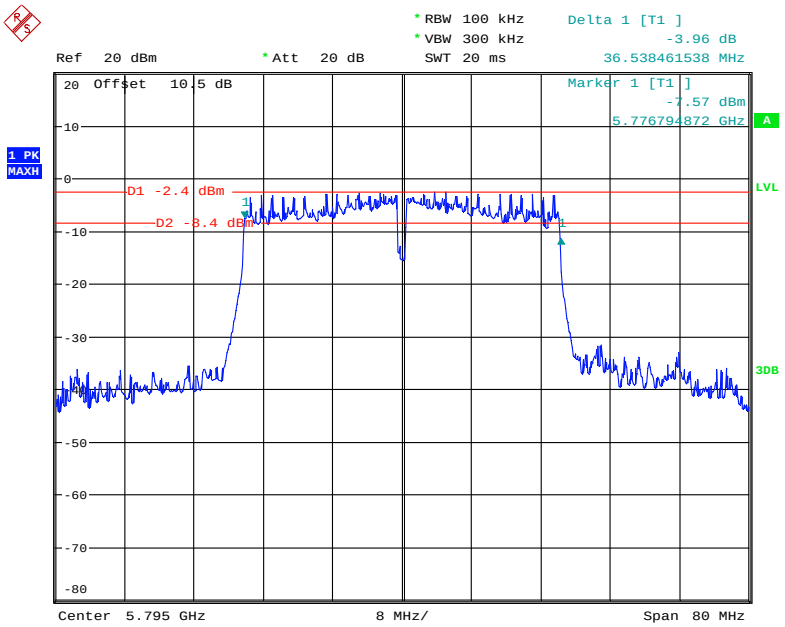
Date: 6.MAR.2019 13:56:29

802.11ac40 mode, 6dB Emission Bandwidth, 5755 MHz



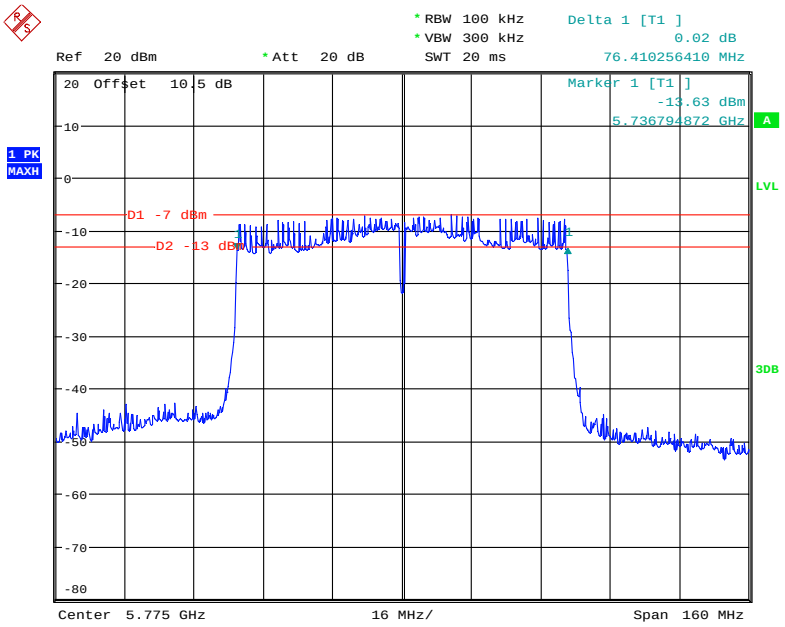
Date: 6.MAR.2019 13:29:39

802.11ac40 mode, 6dB Emission Bandwidth, 5795 MHz



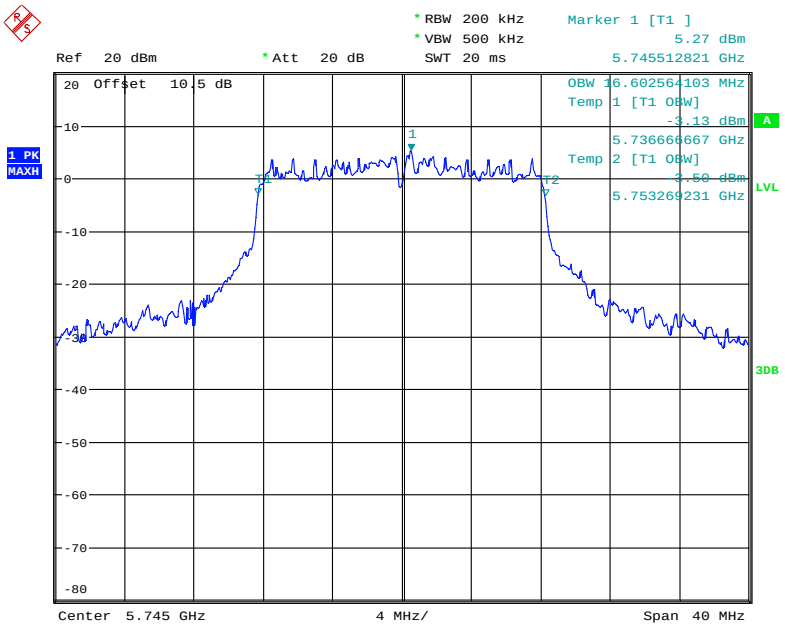
Date: 6.MAR.2019 13:31:46

802.11ac80 mode, 6dB Emission Bandwidth, 5775 MHz



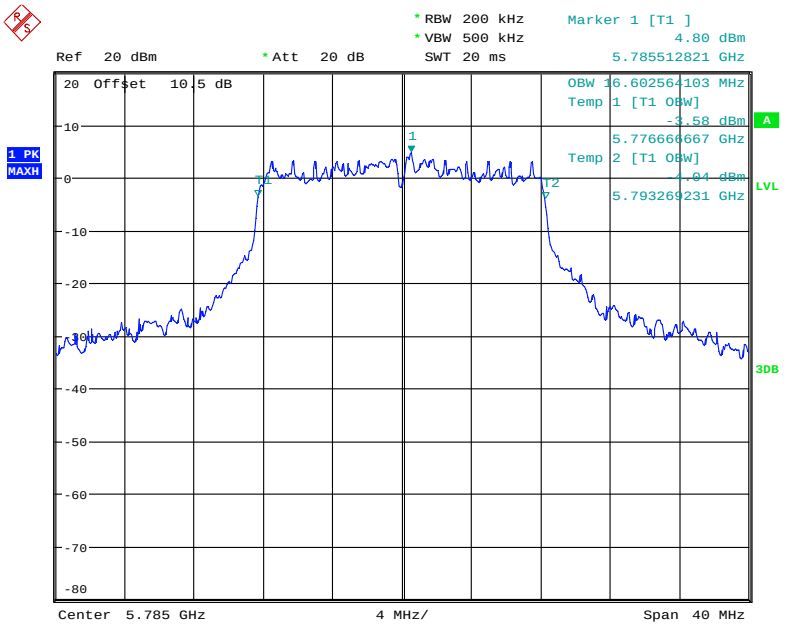
Date: 6.MAR.2019 13:19:24

802.11a mode, 99% Occupied Bandwidth, 5745 MHz



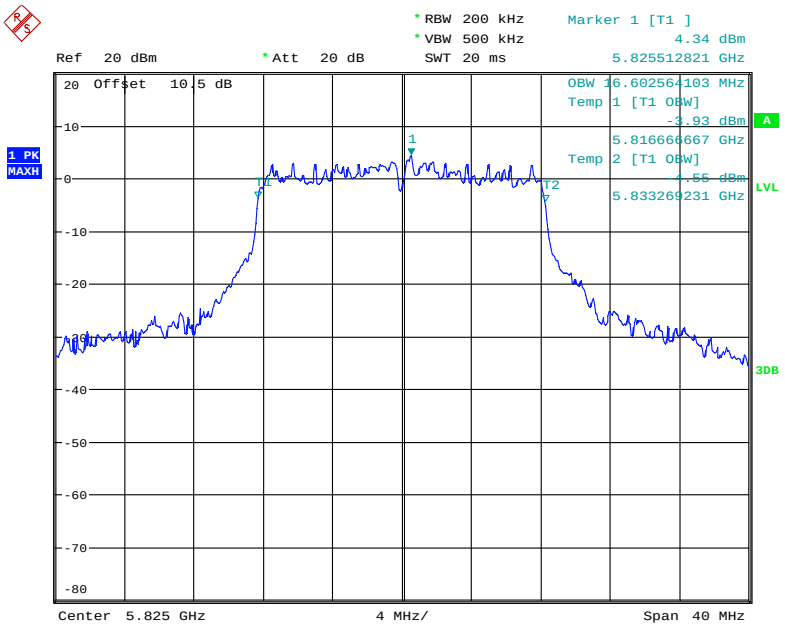
Date: 6.MAR.2019 13:11:35

802.11a mode, 99% Occupied Bandwidth, 5785 MHz



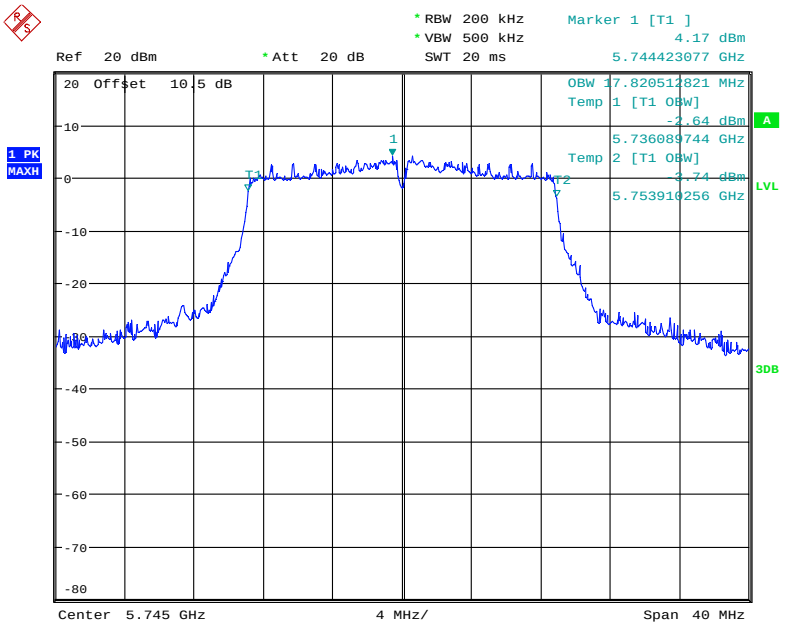
Date: 6.MAR.2019 13:11:00

802.11a mode, 99% Occupied Bandwidth, 5825 MHz



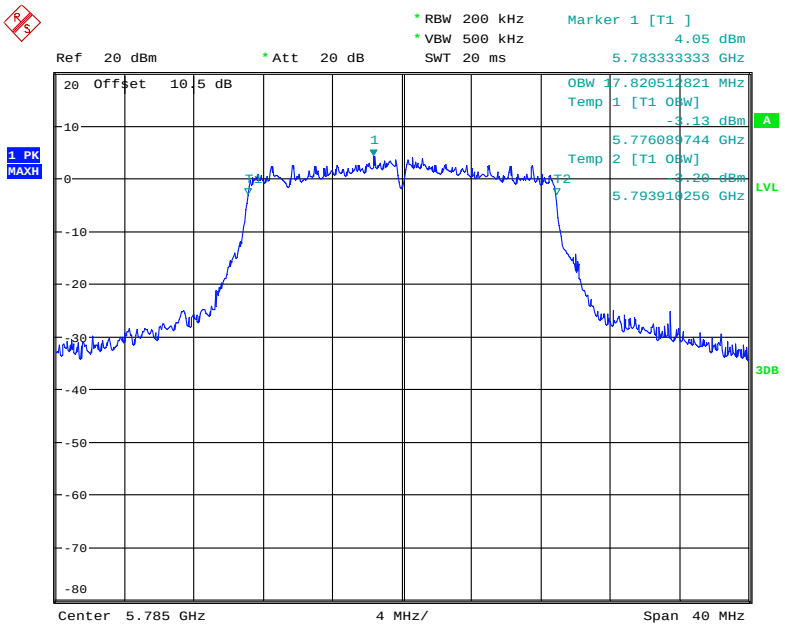
Date: 6.MAR.2019 13:10:19

802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz



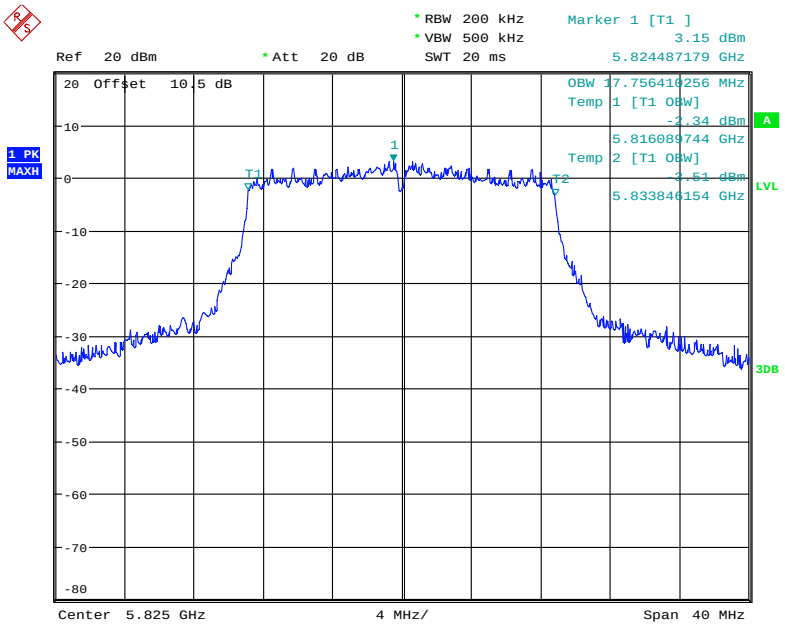
Date: 6.MAR.2019 13:09:36

802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



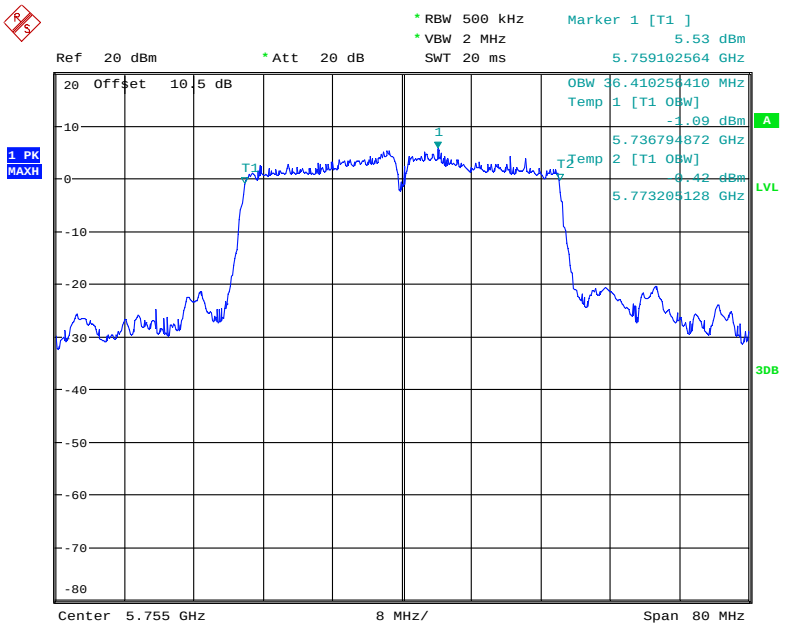
Date: 6.MAR.2019 13:08:58

802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



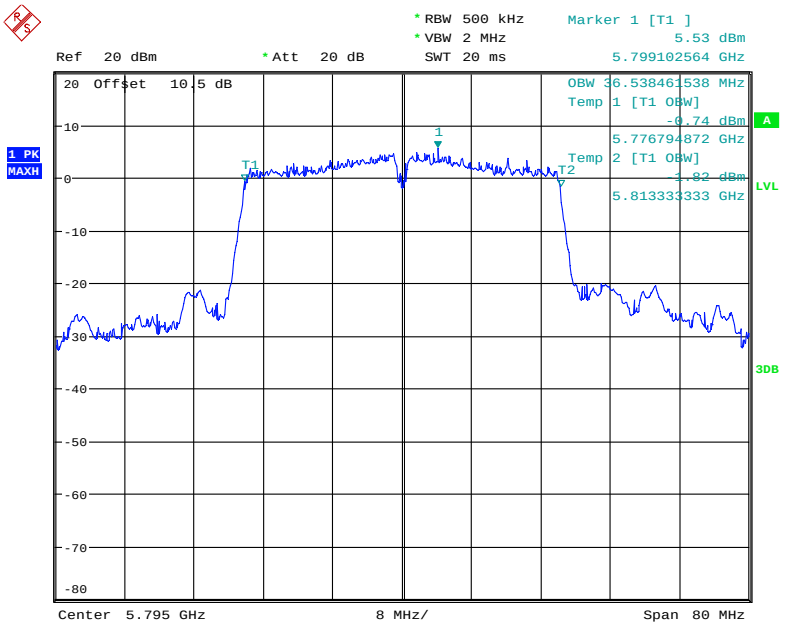
Date: 6.MAR.2019 13:08:07

802.11n40 mode, 99% Occupied Bandwidth, 5755 MHz



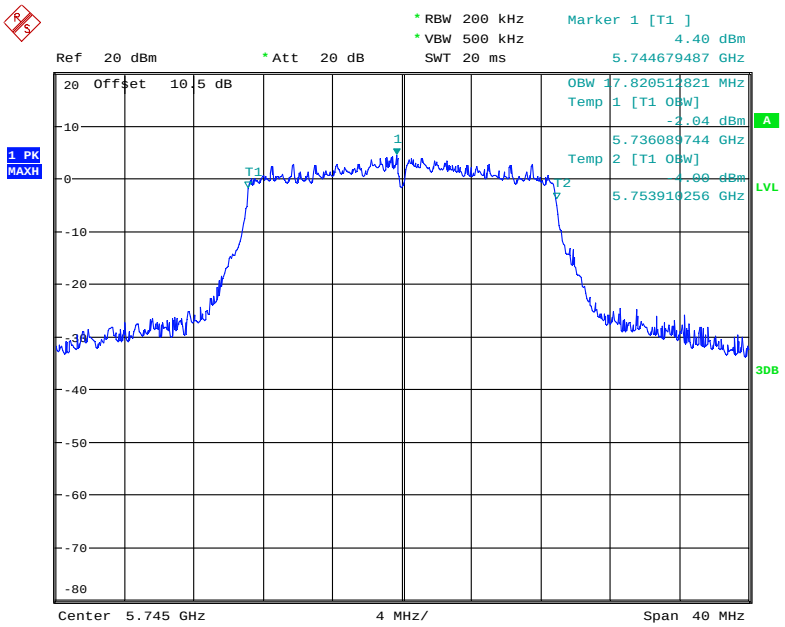
Date: 6.MAR.2019 13:13:41

802.11n40 mode, 99% Occupied Bandwidth, 5795 MHz



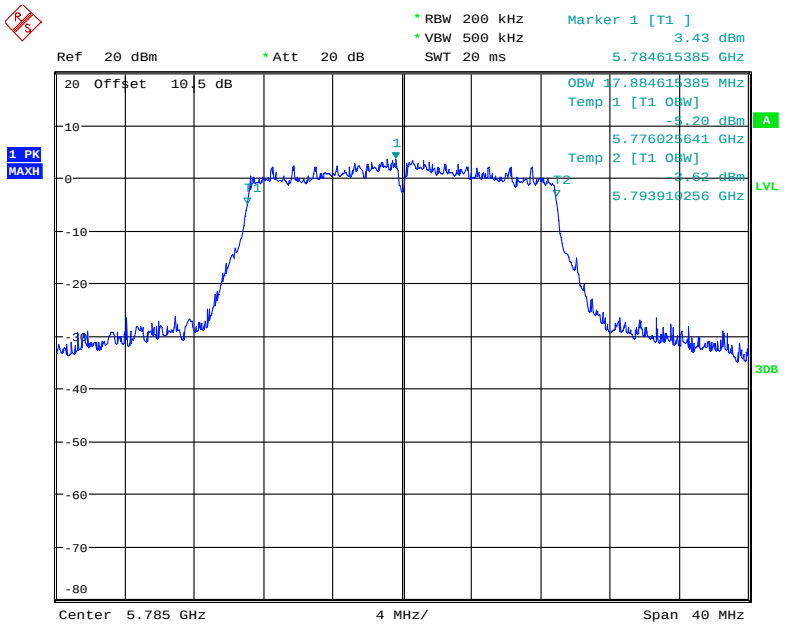
Date: 6.MAR.2019 13:12:59

802.11ac20 mode, 99% Occupied Bandwidth, 5745 MHz



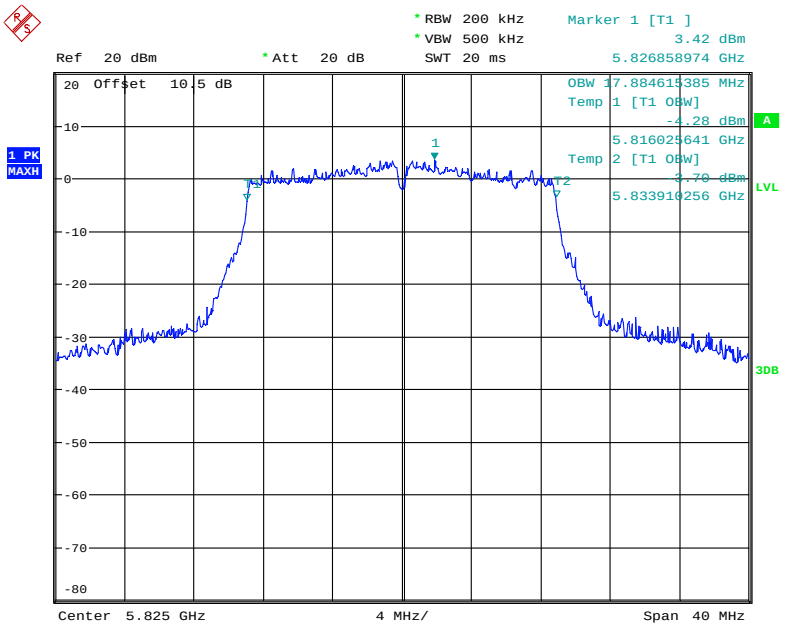
Date: 6.MAR.2019 13:07:16

802.11ac20 mode, 99% Occupied Bandwidth, 5785 MHz



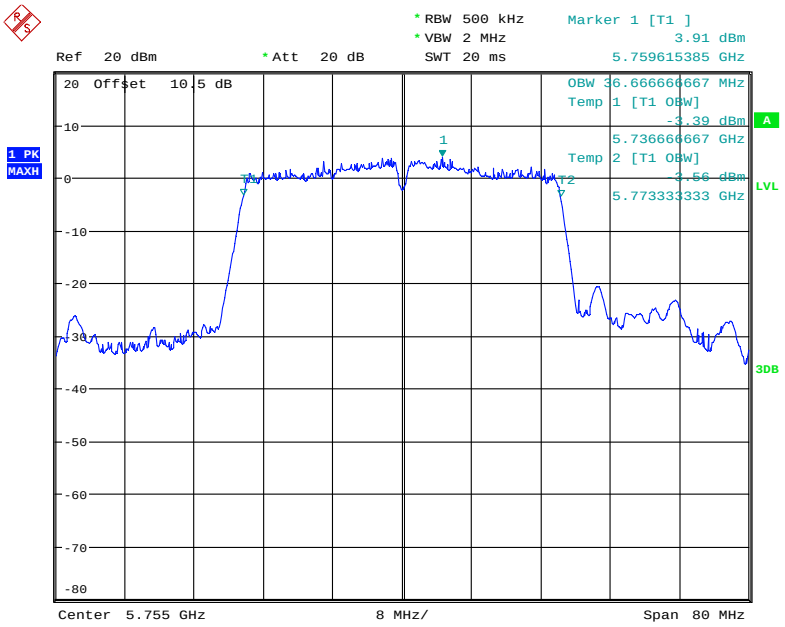
Date: 6.MAR.2019 13:06:37

802.11ac20 mode, 99% Occupied Bandwidth, 5825 MHz



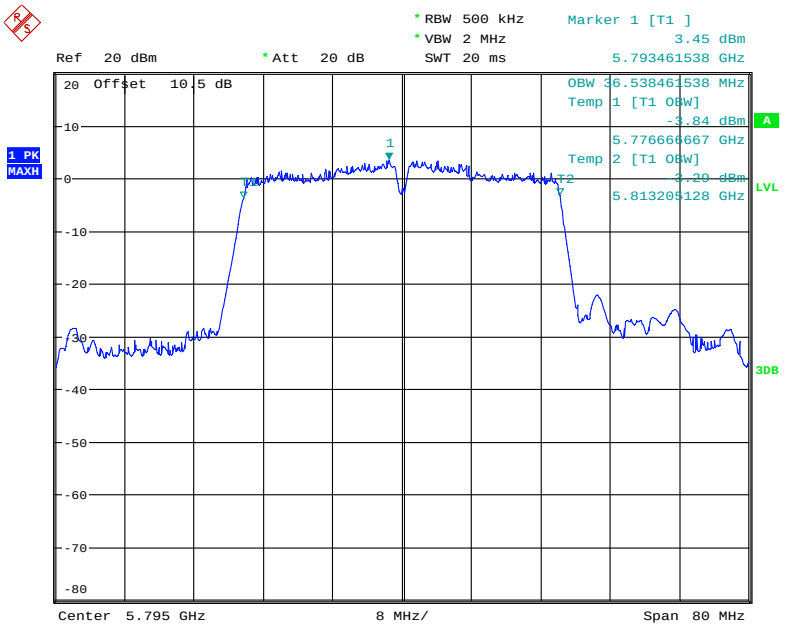
Date: 6.MAR.2019 13:05:23

802.11ac40 mode, 99% Occupied Bandwidth, 5755 MHz



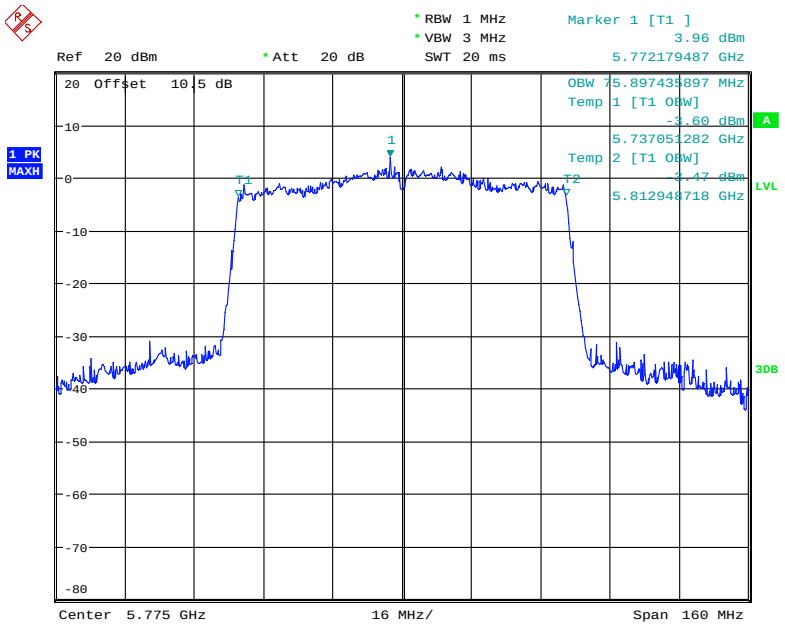
Date: 6.MAR.2019 13:16:18

802.11ac40 mode, 99% Occupied Bandwidth, 5795 MHz



Date: 6.MAR.2019 13:15:38

802.11ac80 mode, 99% Occupied Bandwidth, 5775 MHz



Date: 6.MAR.2019 13:17:10

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.

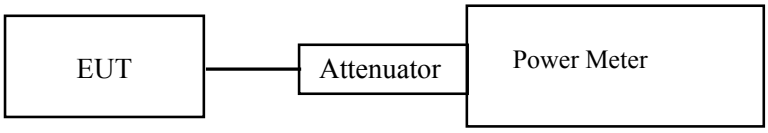
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting 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 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:	23 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2019-03-05.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

5150 MHz – 5250 MHz(this is a client device)

Frequency (MHz)	Reading (dBm)	Duty Cycle Factor	Average Output Power (dBm)	Limit (dBm)
802.11a				
5180	13.59	0.66	14.25	24
5200	13.58	0.66	14.24	
5240	13.56	0.66	14.22	
802.11n20				
5180	12.62	0.71	13.33	24
5200	12.51	0.71	13.22	
5240	12.57	0.71	13.28	
802.11n40				
5190	11.52	1.19	12.71	24
5230	11.43	1.19	12.62	
802.11ac20				
5180	12.63	0.76	13.39	24
5200	12.66	0.76	13.42	
5240	12.64	0.76	13.40	
802.11ac40				
5190	11.46	1.25	12.71	24
5230	11.47	1.25	12.72	
802.11ac80				
5210	9.52	1.80	11.32	24

5250 MHz – 5350 MHz:

Frequency (MHz)	Reading (dBm)	Duty Cycle Factor	Average Output Power (dBm)	Limit (dBm)
802.11a				
5260	13.36	0.66	14.02	24
5280	13.37	0.66	14.03	
5320	13.34	0.66	14.00	
802.11n20				
5260	13.43	0.71	14.14	24
5280	13.21	0.71	13.92	
5320	13.13	0.71	13.84	
802.11n40				
5270	12.36	1.19	13.55	24
5310	12.41	1.19	13.60	
802.11ac20				
5260	13.36	0.76	14.12	24
5280	13.30	0.76	14.06	
5320	13.35	0.76	14.11	
802.11ac40				
5270	12.27	1.25	13.52	24
5310	12.40	1.25	13.65	
802.11ac80				
5290	9.74	1.80	11.54	24

5470 MHz – 5725 MHz:

Frequency (MHz)	Reading (dBm)	Duty Cycle Factor	Average Output Power (dBm)	Limit (dBm)
802.11a				
5500	12.19	0.66	12.85	24
5600	12.34	0.66	13.00	
5700	12.07	0.66	12.73	
802.11n20				
5500	11.20	0.71	11.91	24
5600	11.47	0.71	12.18	
5700	11.19	0.71	11.90	
802.11n40				
5510	10.45	1.19	11.64	24
5550	13.15	1.19	14.34	
5670	10.60	1.19	11.79	
802.11ac20				
5500	11.12	0.76	11.88	24
5600	10.70	0.76	11.46	
5700	10.52	0.76	11.28	
802.11ac40				
5510	11.89	1.25	13.14	24
5590	11.33	1.25	12.58	
5670	11.54	1.25	12.79	
802.11ac80				
5530	8.99	1.80	10.79	24
5610	8.70	1.80	10.50	

5725 MHz – 5850 MHz:

Frequency (MHz)	Reading (dBm)	Duty Cycle Factor	Average Output Power (dBm)	Limit (dBm)
802.11a				
5745	14.20	0.66	14.86	30
5785	14.27	0.66	14.93	
5825	13.35	0.66	14.01	
802.11n20				
5745	13.18	0.71	13.89	30
5785	13.12	0.71	13.83	
5825	12.34	0.71	13.05	
802.11n40				
5755	13.17	1.19	14.36	30
5795	12.99	1.19	14.18	
802.11ac20				
5745	13.35	0.76	14.11	30
5785	13.15	0.76	13.91	
5825	12.32	0.76	13.08	
802.11ac40				
5755	12.25	1.25	13.50	30
5795	11.82	1.25	13.07	
802.11ac80				
5775	9.61	1.80	11.41	30

FCC §15.407(a) (1) (2) (3) - POWER SPECTRAL DENSITY

Applicable Standard

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

For the 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 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 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

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

Test Data

Environmental Conditions

Temperature:	23.5~25 ℃
Relative Humidity:	49~56 %
ATM Pressure:	109.0~101.0 kPa

The testing was performed by Hill He from 2019-03-05 to 2019-03-06.

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EUT operation mode: Transmitting

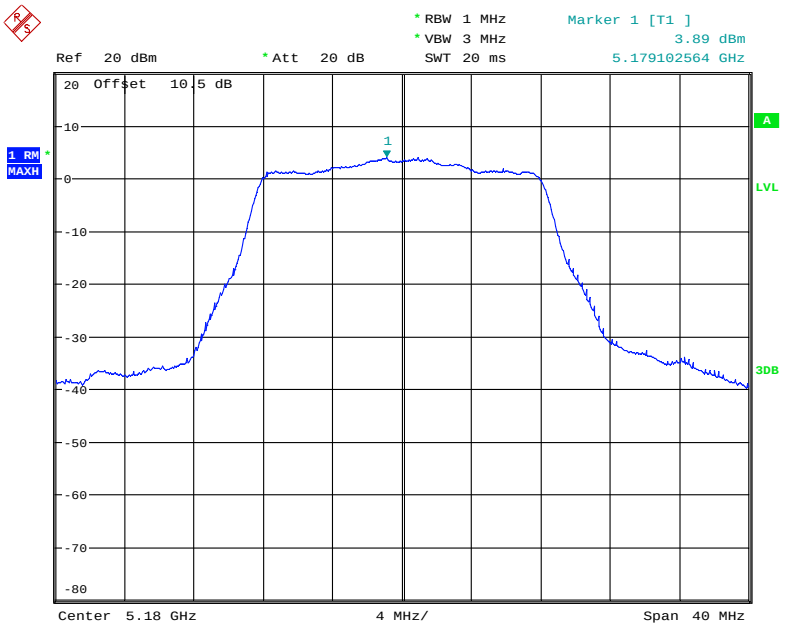
Test Result: Pass

Please refer to the following tables and plots.

5150 MHz – 5250 MHz(this is a client device):

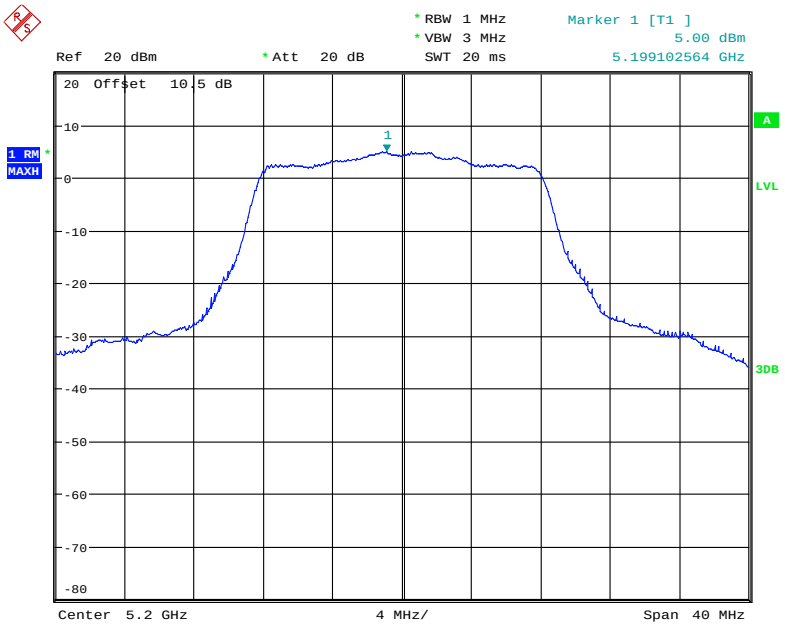
Frequency (MHz)	Power Spectral Density(dBm/MHz)	Duty Cycle Factor	Power Spectral Density(dBm/MHz)	Limit (dBm/MHz)
802.11a				
5180	3.89	0.66	4.55	11
5200	5.00	0.66	5.66	
5240	3.76	0.66	4.42	
802.11n20				
5180	3.20	0.71	3.91	11
5200	4.25	0.71	4.96	
5240	2.76	0.71	3.47	
802.11n40				
5190	-0.68	1.19	0.51	11
5230	-0.98	1.19	0.21	
802. 11ac20				
5180	2.64	0.76	3.40	11
5200	3.99	0.76	4.75	
5240	2.99	0.76	3.75	
802. 11ac40				
5190	-0.71	1.25	0.54	11
5230	-1.05	1.25	0.2	
802. 11ac80				
5210	-5.53	1.80	-3.73	11

802.11a mode, Power Spectral Density, 5180 MHz



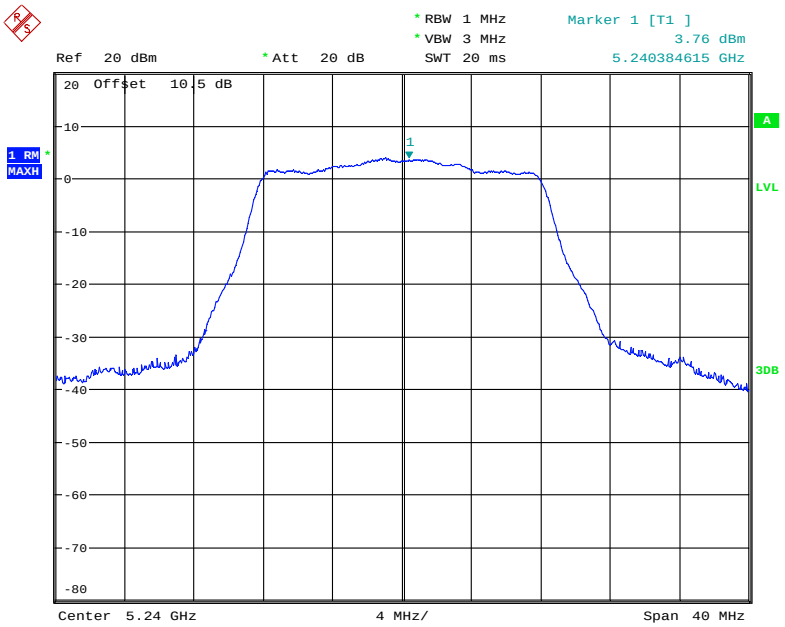
Date: 5.MAR.2019 14:05:10

802.11a mode, Power Spectral Density, 5200 MHz



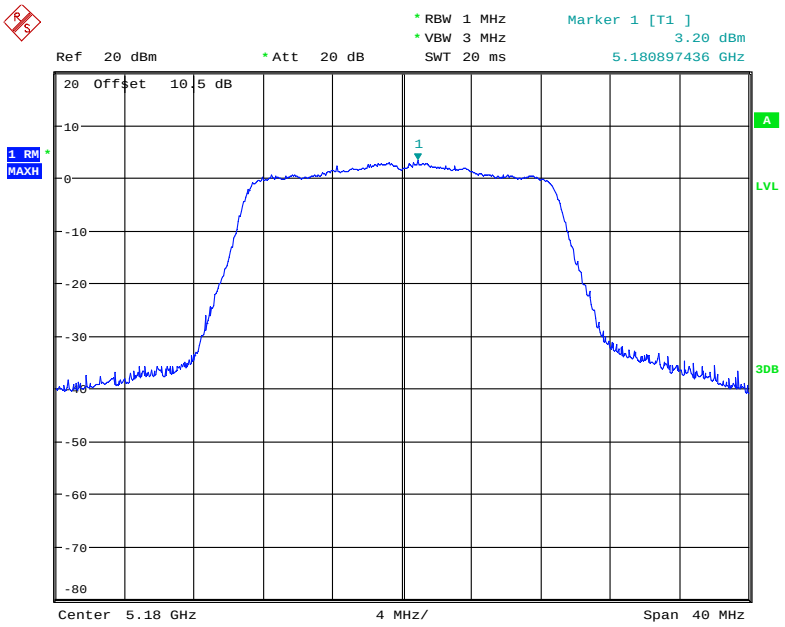
Date: 5.MAR.2019 14:03:01

802.11a mode, Power Spectral Density, 5240 MHz



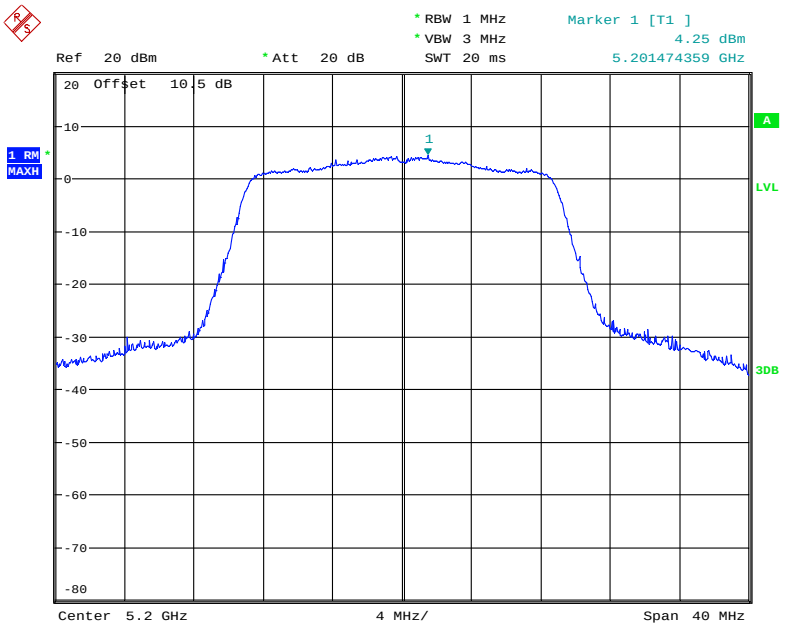
Date: 5.MAR.2019 14:04:38

802.11n20 mode, Power Spectral Density, 5180 MHz



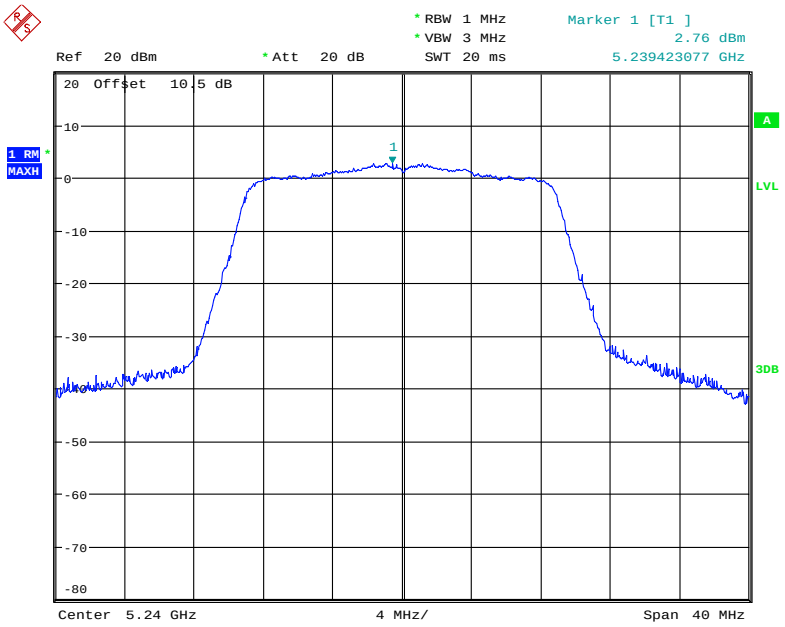
Date: 5.MAR.2019 14:00:43

802.11n20 mode, Power Spectral Density, 5200 MHz



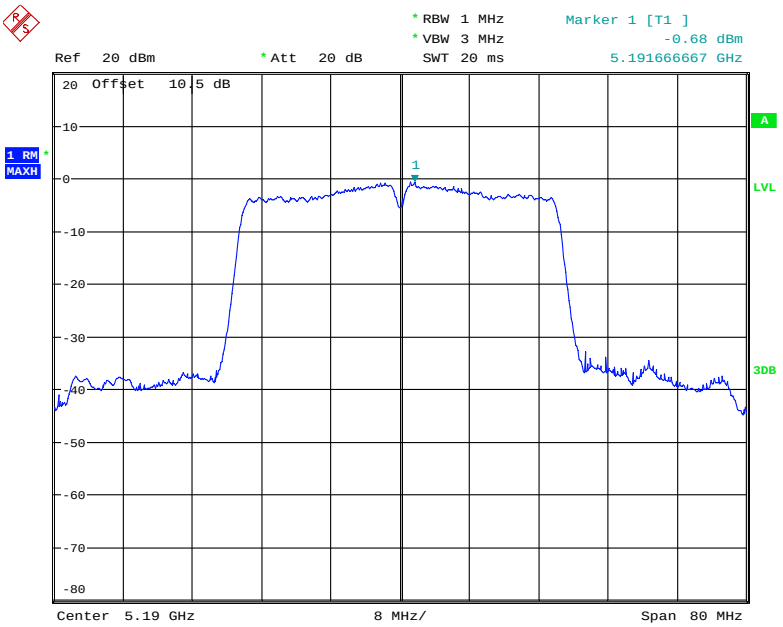
Date: 5.MAR.2019 13:58:35

802.11n20 mode, Power Spectral Density, 5240 MHz



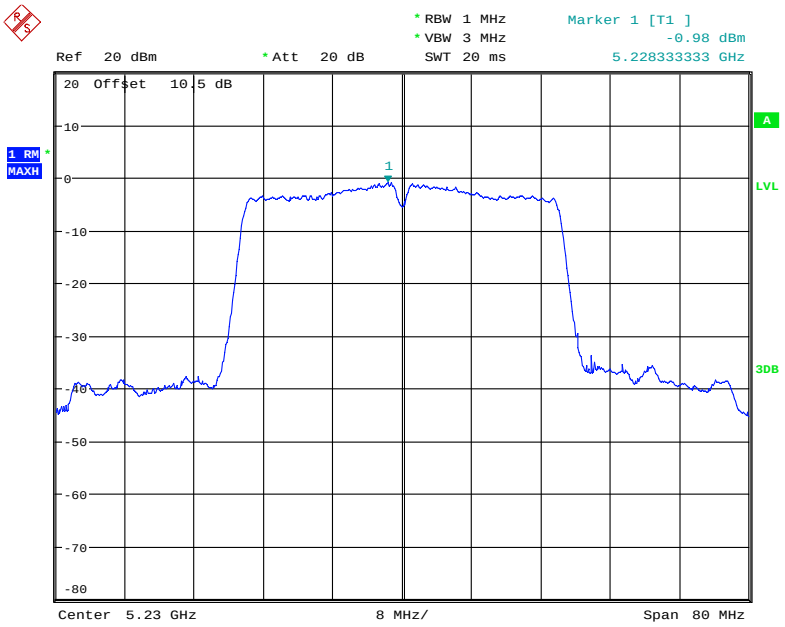
Date: 5.MAR.2019 13:59:16

802.11n40 mode, Power Spectral Density, 5190 MHz



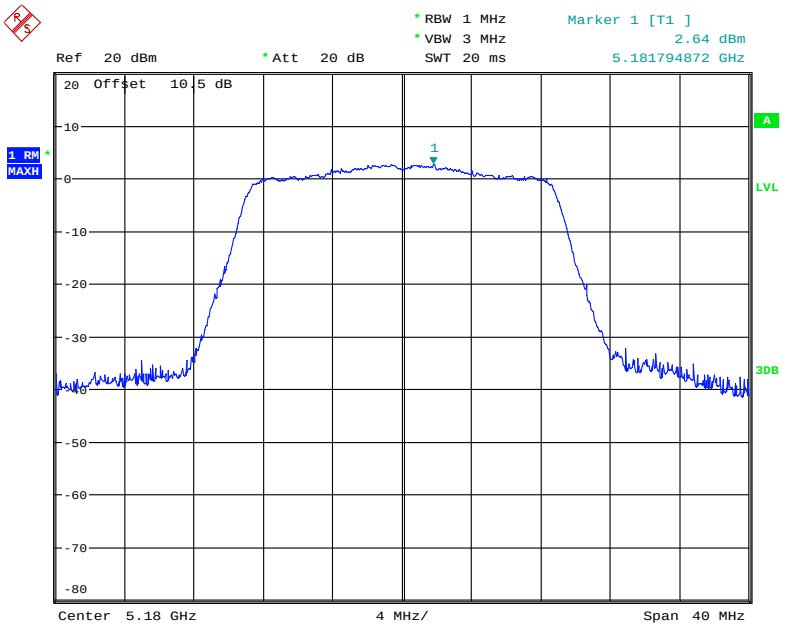
Date: 5.MAR.2019 14:09:12

802.11n40 mode, Power Spectral Density, 5230 MHz



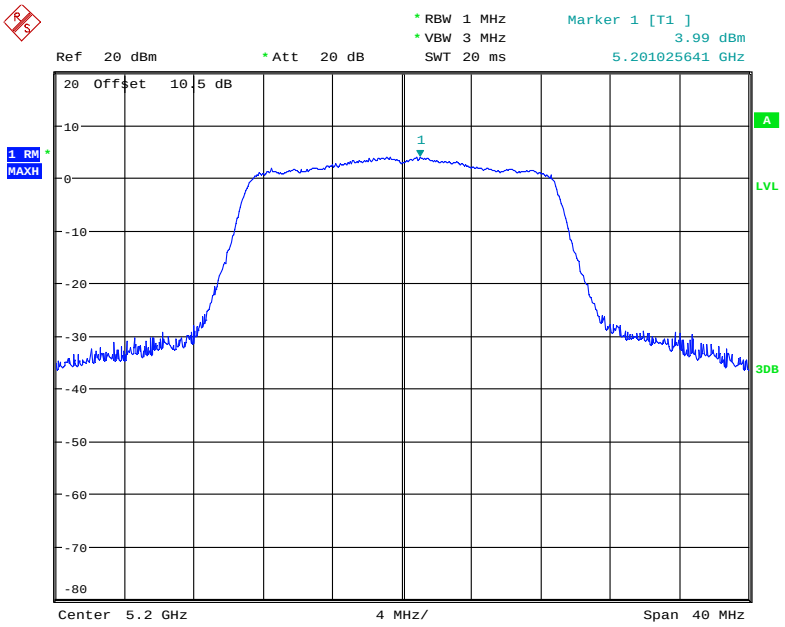
Date: 5.MAR.2019 14:10:12

802.11ac20 mode, Power Spectral Density, 5180 MHz



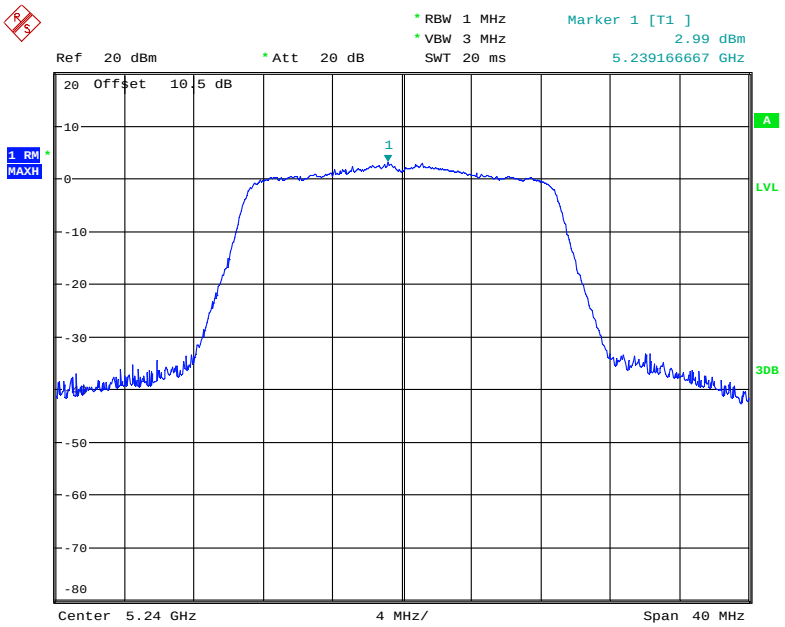
Date: 5.MAR.2019 13:54:07

802. 11ac20 mode, Power Spectral Density, 5200 MHz



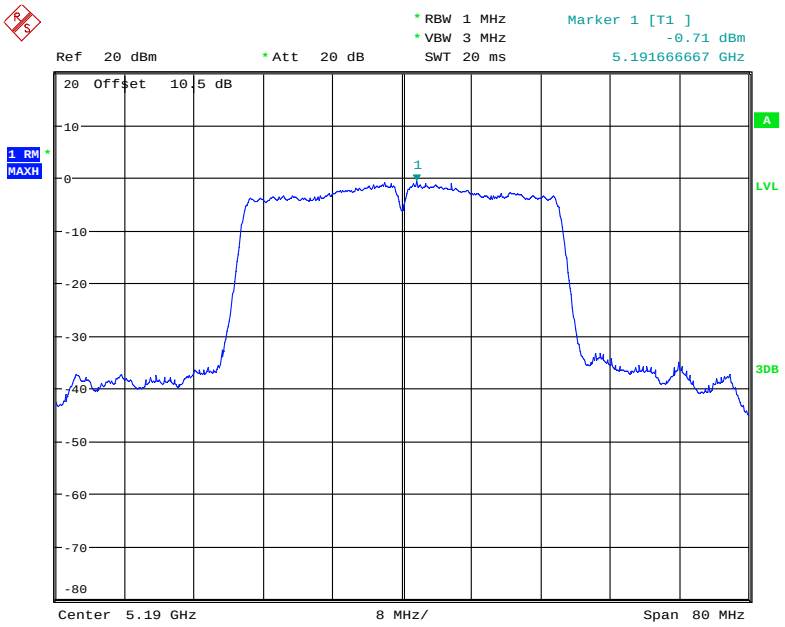
Date: 5.MAR.2019 13:51:47

802. 11ac20 mode, Power Spectral Density, 5240 MHz



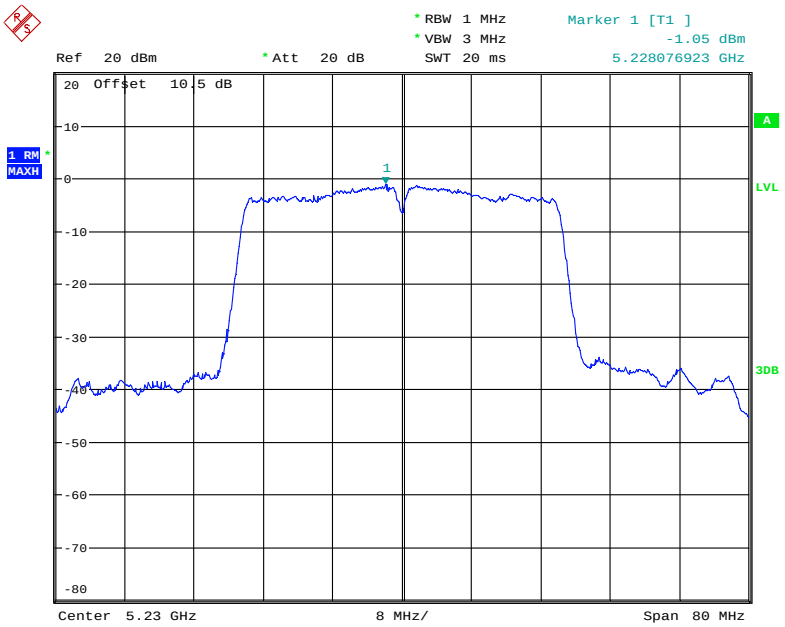
Date: 5.MAR.2019 13:54:45

802. 11ac40 mode, Power Spectral Density, 5190 MHz



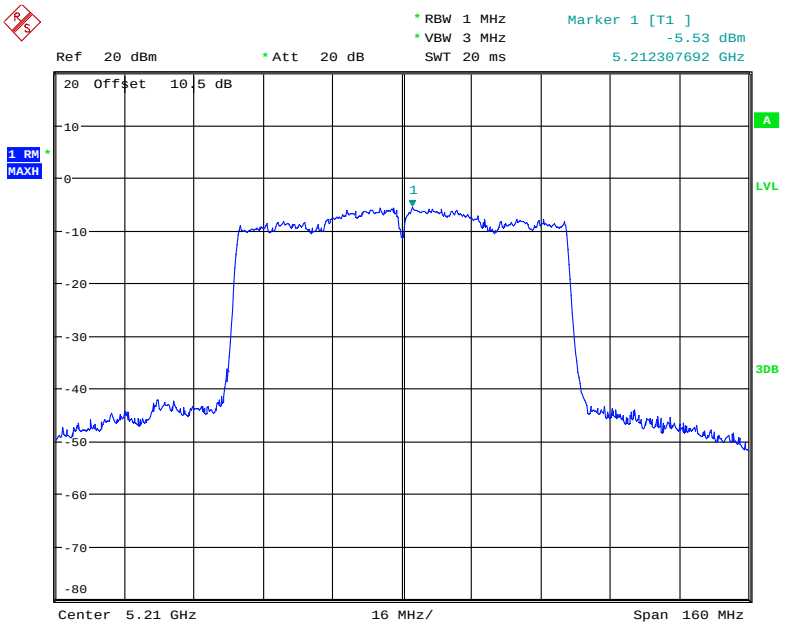
Date: 5.MAR.2019 14:11:46

802. 11ac40 mode, Power Spectral Density, 5230 MHz



Date: 5.MAR.2019 14:13:05

802. 11ac80 mode, Power Spectral Density, 5210 MHz

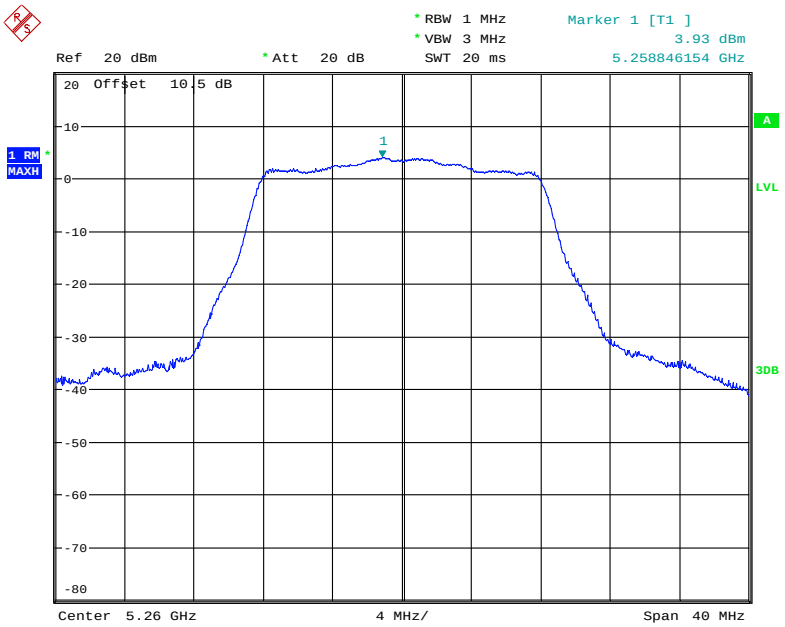


Date: 5.MAR.2019 14:15:19

5250 MHz – 5350 MHz:

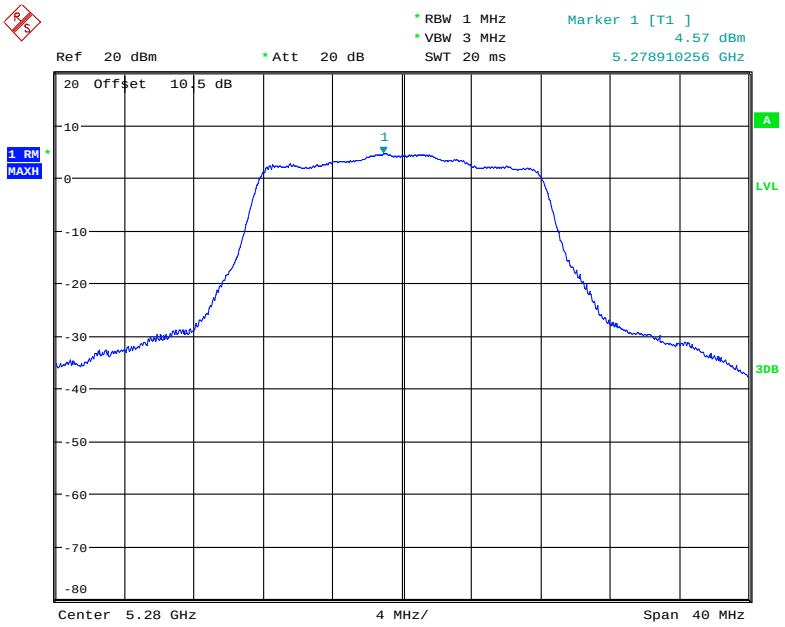
Frequency (MHz)	Power Spectral Density(dBm/MHz)	Duty Cycle Factor	Power Spectral Density(dBm/MHz)	Limit (dBm/MHz)
802.11a				
5260	3.93	0.66	4.59	11
5280	4.57	0.66	5.23	
5320	3.82	0.66	4.48	
802.11n20				
5260	3.82	0.71	4.53	11
5280	3.77	0.71	4.48	
5320	3.40	0.71	4.11	
802.11n40				
5270	-0.31	1.19	0.88	11
5310	-0.61	1.19	0.58	
802. 11ac20				
5260	4.00	0.76	4.76	11
5280	3.72	0.76	4.48	
5320	3.85	0.76	4.61	
802. 11ac40				
5270	-0.60	1.25	0.65	11
5310	-0.87	1.25	0.38	
802. 11ac80				
5290	-5.93	1.80	-4.13	11

802.11a mode, Power Spectral Density, 5260 MHz



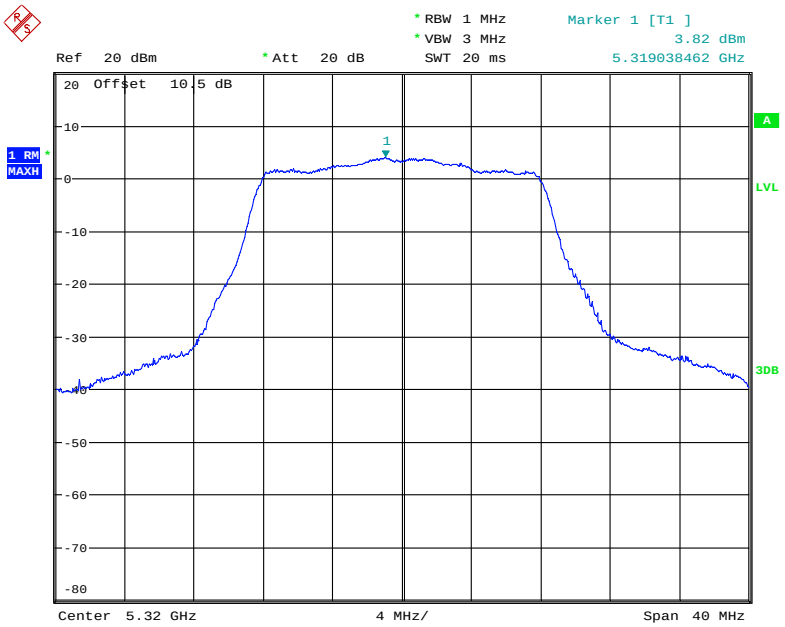
Date: 5.MAR.2019 17:43:50

802.11a mode, Power Spectral Density, 5280 MHz



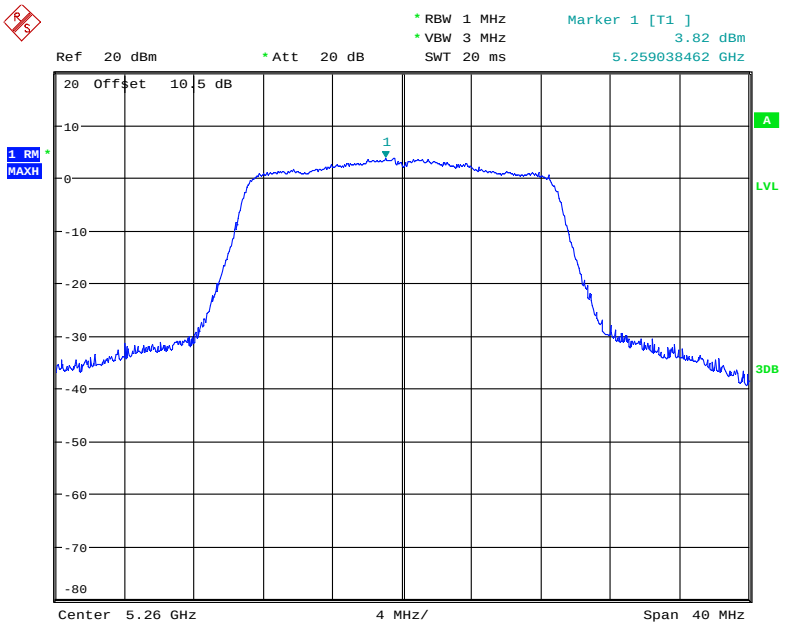
Date: 5.MAR.2019 17:42:50

802.11a mode, Power Spectral Density, 5320 MHz



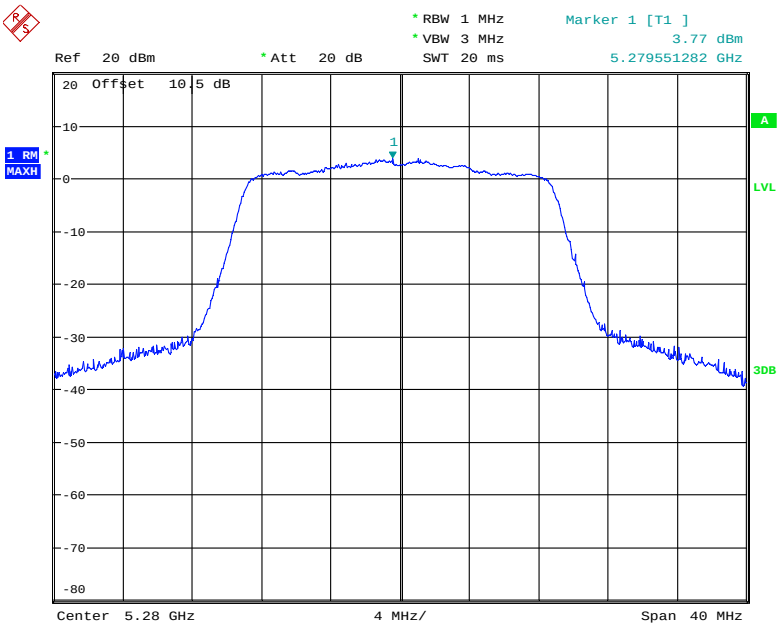
Date: 5.MAR.2019 17:44:23

802.11n20 mode, Power Spectral Density, 5260 MHz



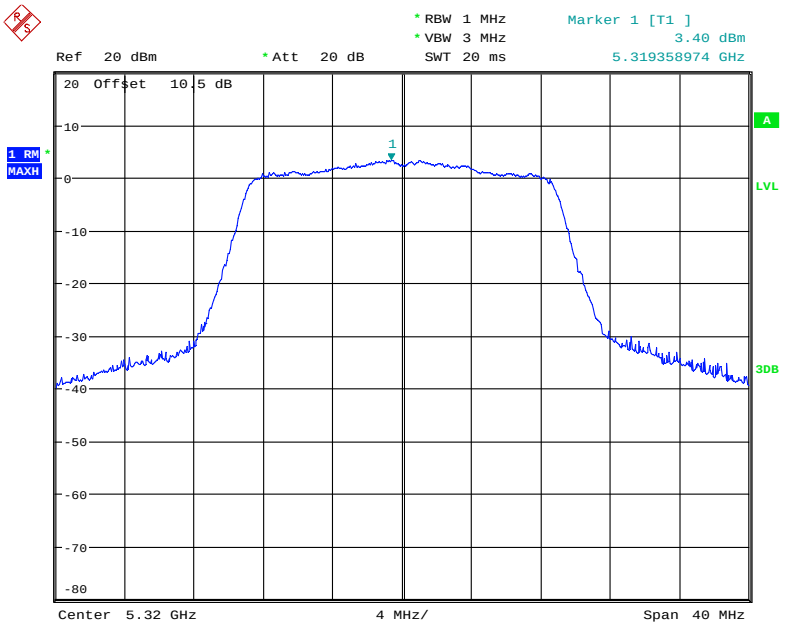
Date: 5.MAR.2019 17:39:10

802.11n20 mode, Power Spectral Density, 5280 MHz



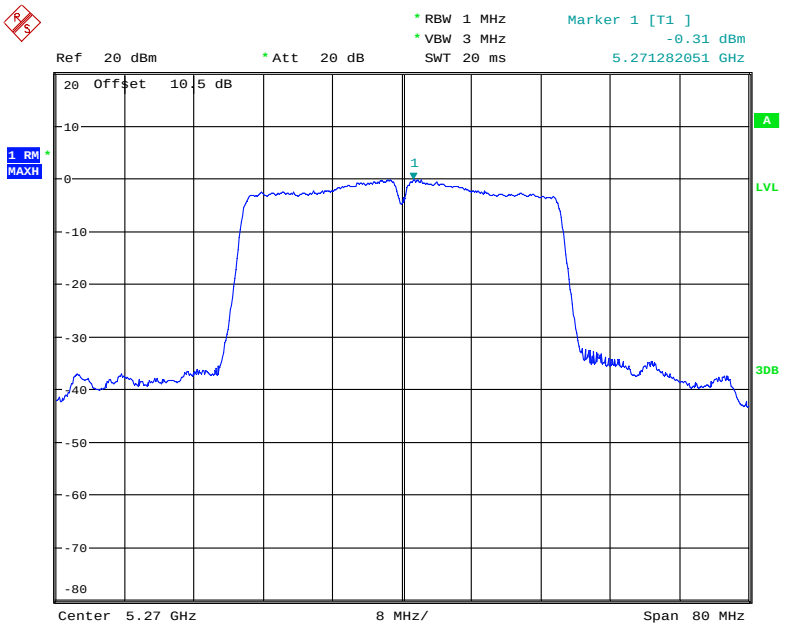
Date: 5.MAR.2019 17:35:11

802.11n20 mode, Power Spectral Density, 5320 MHz



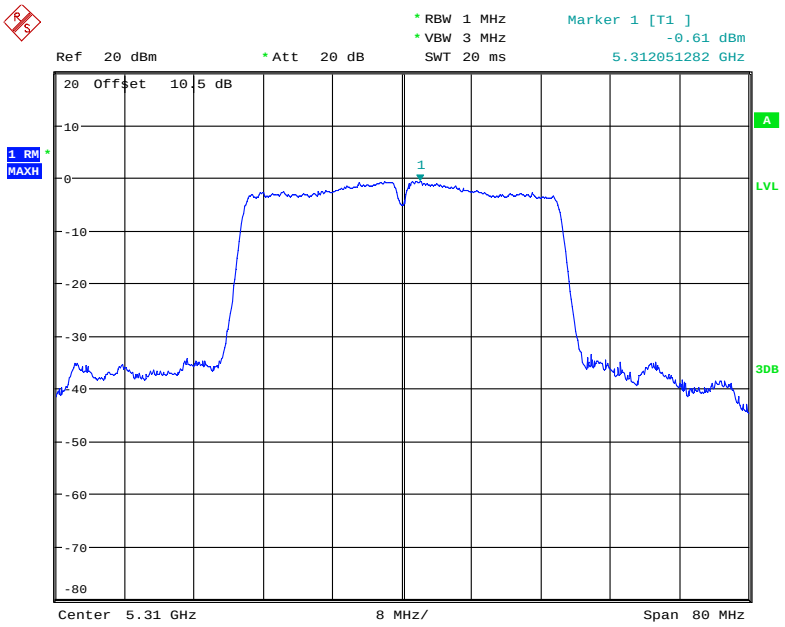
Date: 5.MAR.2019 17:38:28

802.11n40 mode, Power Spectral Density, 5270 MHz



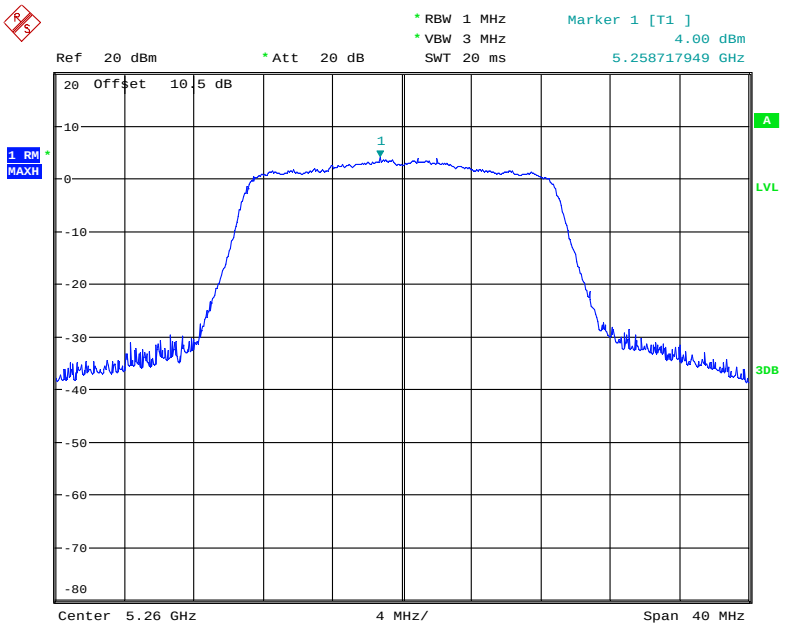
Date: 5.MAR.2019 17:47:56

802.11n40 mode, Power Spectral Density, 5310 MHz



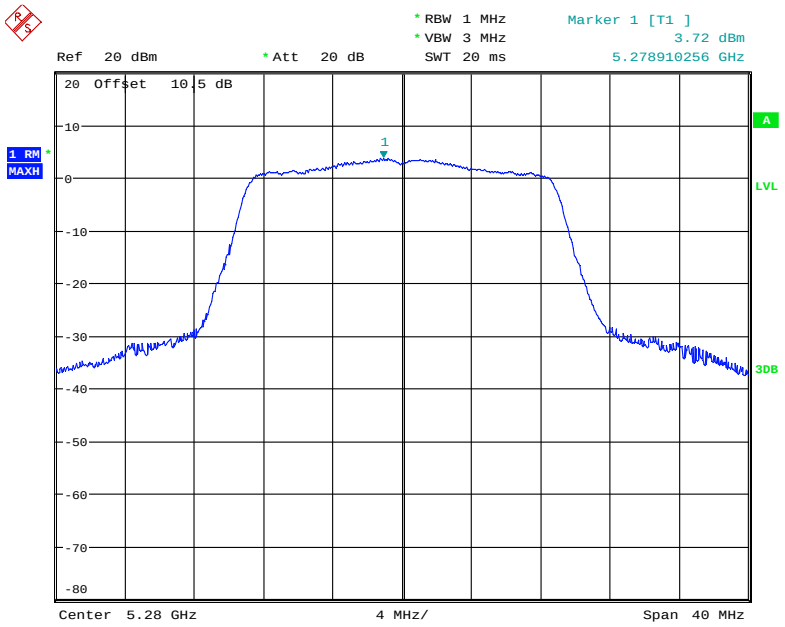
Date: 5.MAR.2019 17:46:32

802.11ac20 mode, Power Spectral Density, 5260 MHz



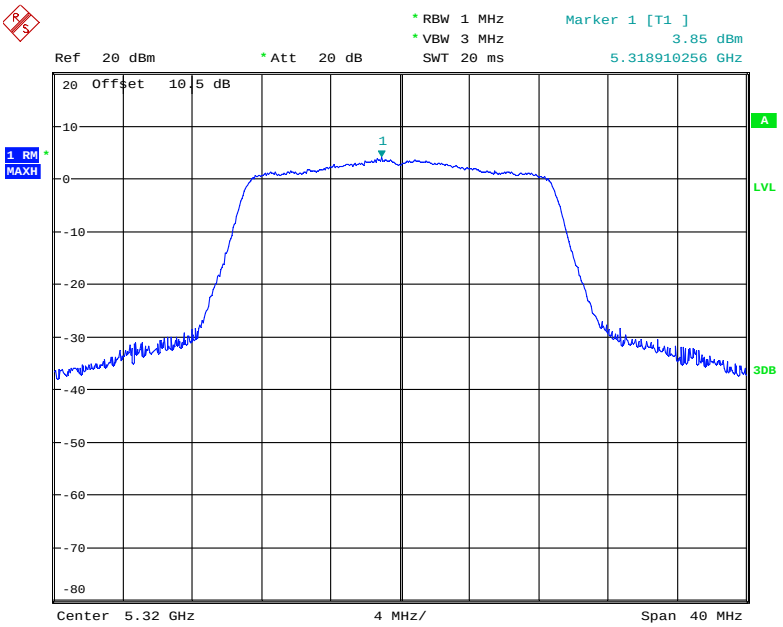
Date: 5.MAR.2019 17:34:14

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



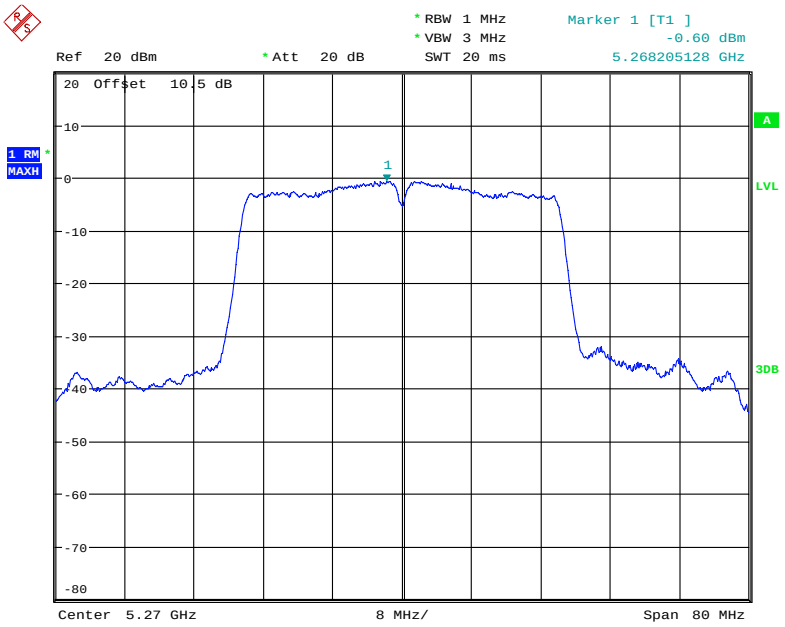
Date: 5.MAR.2019 17:28:47

802. 11ac20 mode, Power Spectral Density, 5320 MHz



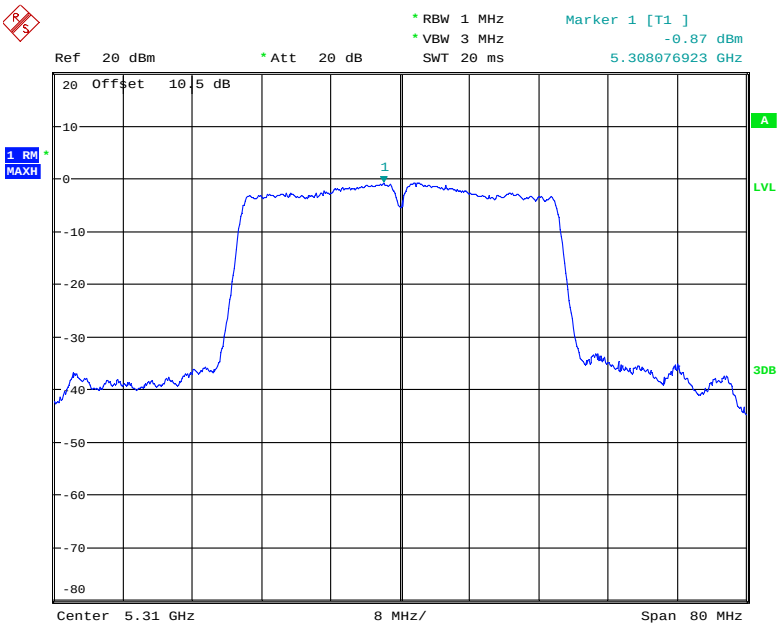
Date: 5.MAR.2019 17:31:57

802. 11ac40 mode, Power Spectral Density, 5270 MHz



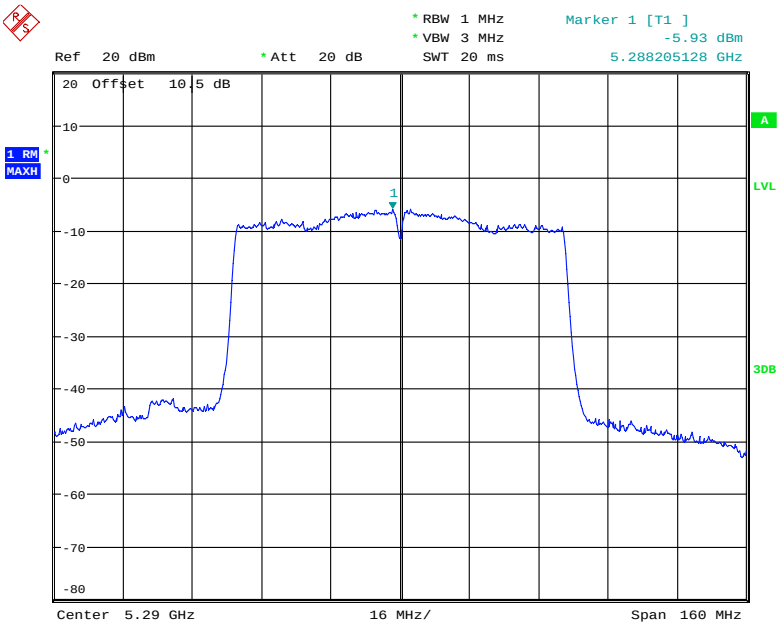
Date: 5.MAR.2019 17:49:13

802. 11ac40 mode, Power Spectral Density, 5310 MHz



Date: 5.MAR.2019 17:48:37

802. 11ac80 mode, Power Spectral Density, 5290 MHz

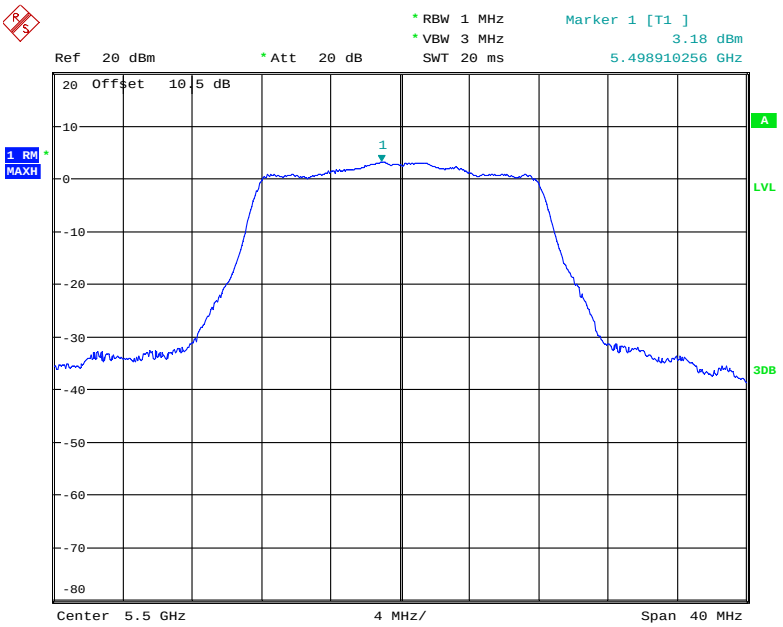


Date: 5.MAR.2019 17:50:13

5470 MHz – 5725 MHz:

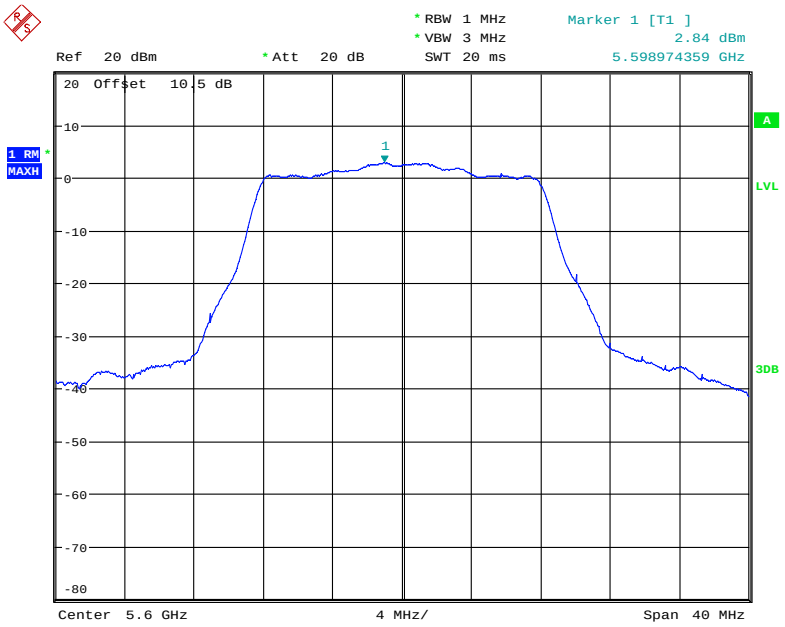
Frequency (MHz)	Power Spectral Density(dBm/MHz)	Duty Cycle Factor	Power Spectral Density(dBm/MHz)	Limit (dBm/MHz)
802.11a				
5500	3.18	0.66	3.84	11
5600	2.84	0.66	3.50	
5700	2.99	0.66	3.65	
802.11n20				
5500	-0.89	0.71	-0.18	11
5600	1.59	0.71	2.30	
5700	1.75	0.71	2.46	
802.11n40				
5510	-4.14	1.19	-2.99	11
5590	-1.86	1.19	-0.67	
5670	-2.25	1.19	-1.06	
802. 11ac20				
5500	1.09	0.76	1.85	11
5600	0.69	0.76	1.45	
5700	0.87	0.76	1.63	
802. 11ac40				
5510	-1.06	1.25	0.19	11
5590	-1.46	1.25	-0.21	
5670	-0.90	1.25	0.35	
802. 11ac80				
5530	-6.16	1.80	-4.36	11
5610	-6.07	1.80	-4.27	

802.11a mode, Power Spectral Density, 5500 MHz



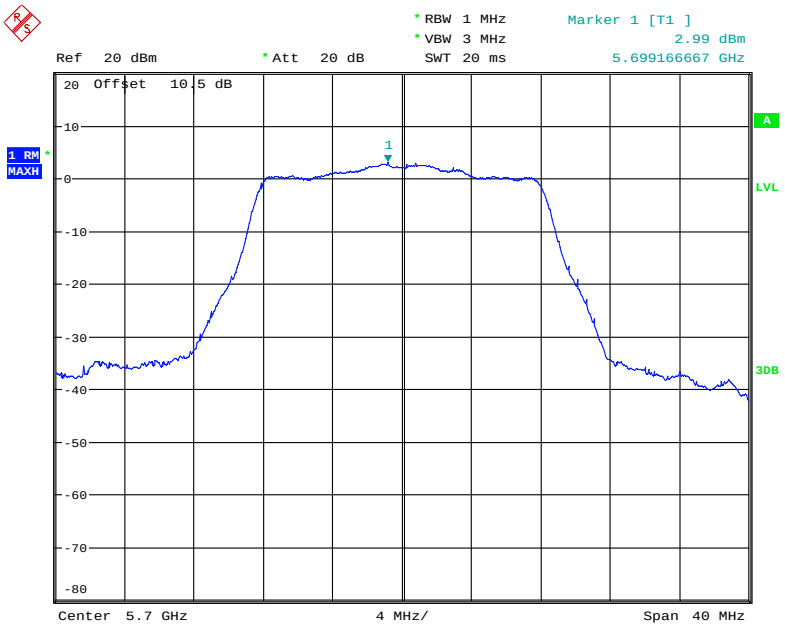
Date: 5.MAR.2019 18:57:41

802.11a mode, Power Spectral Density, 5600 MHz



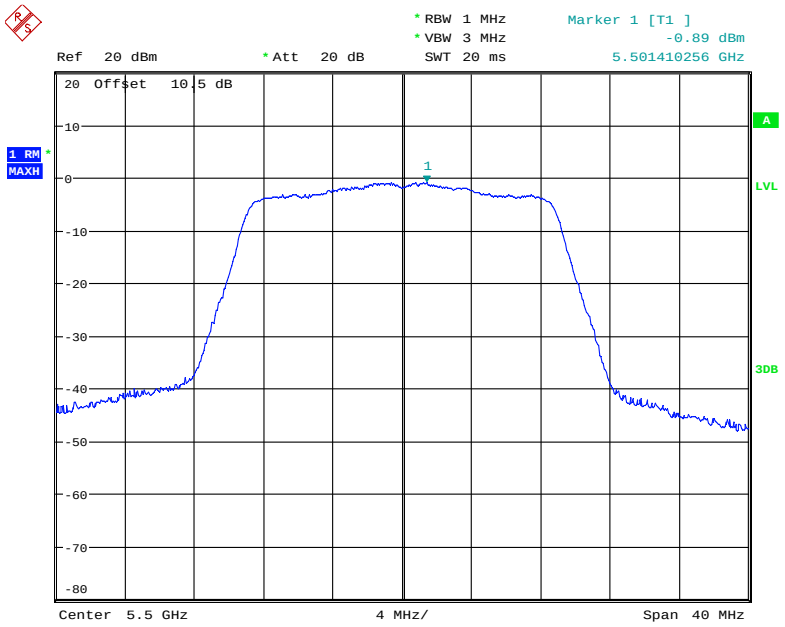
Date: 5.MAR.2019 18:56:18

802.11a mode, Power Spectral Density, 5700 MHz



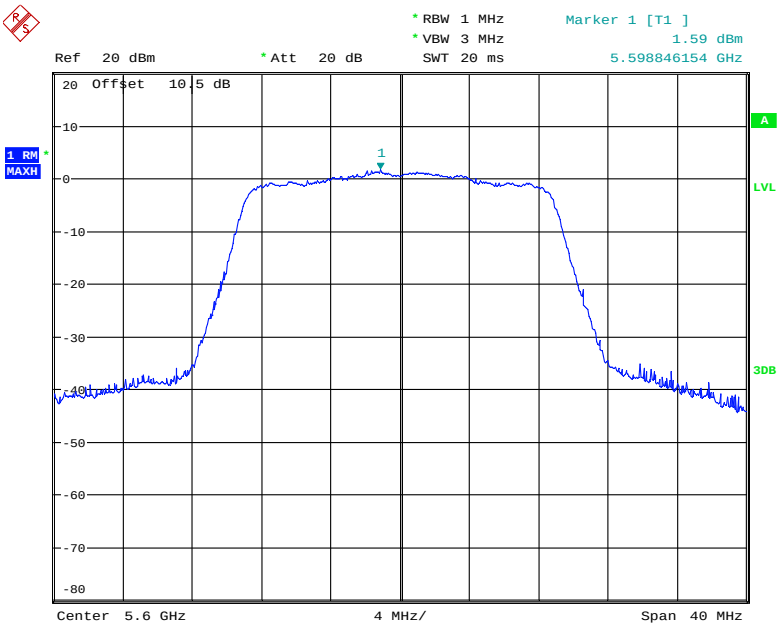
Date: 5.MAR.2019 18:57:06

802.11n20 mode, Power Spectral Density, 5500 MHz



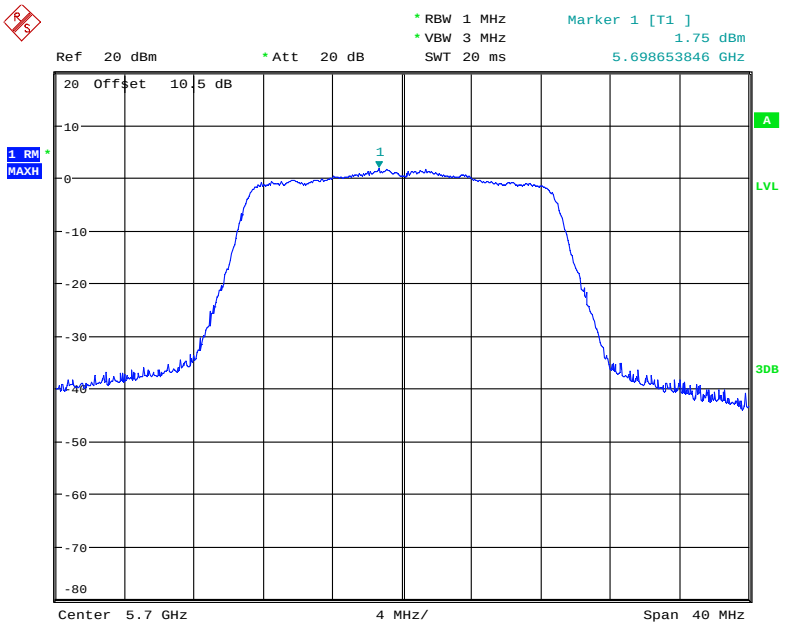
Date: 2.APR.2019 11:51:27

802.11n20 mode, Power Spectral Density, 5600 MHz



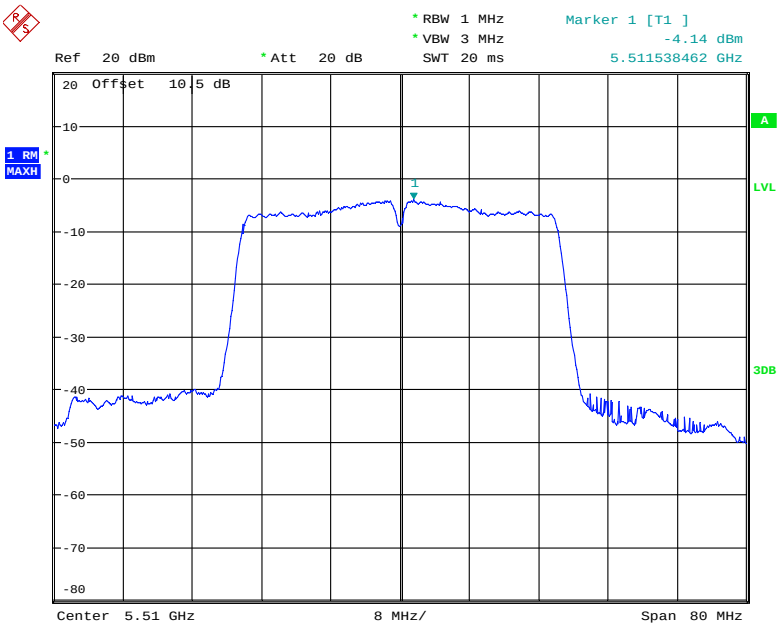
Date: 5.MAR.2019 19:02:50

802.11n20 mode, Power Spectral Density, 5700 MHz



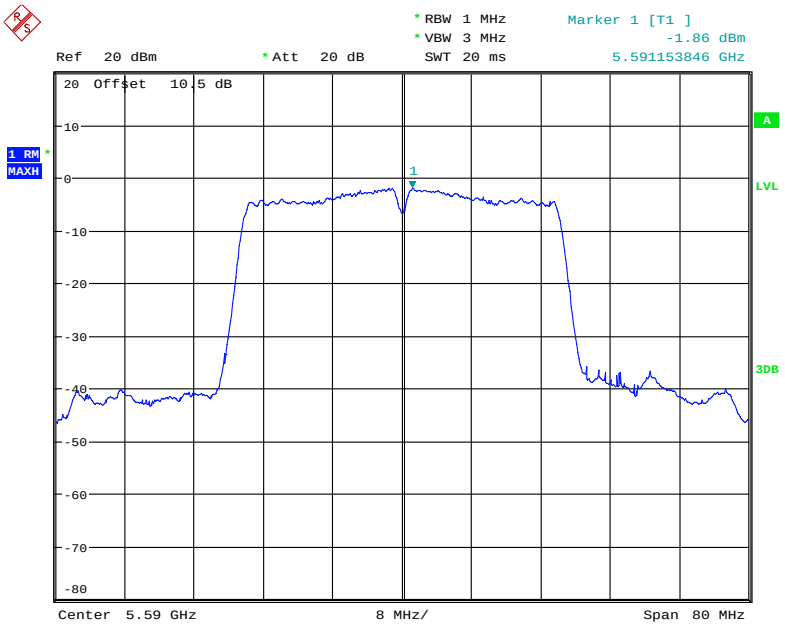
Date: 5.MAR.2019 19:02:01

802.11n40 mode, Power Spectral Density, 5510 MHz



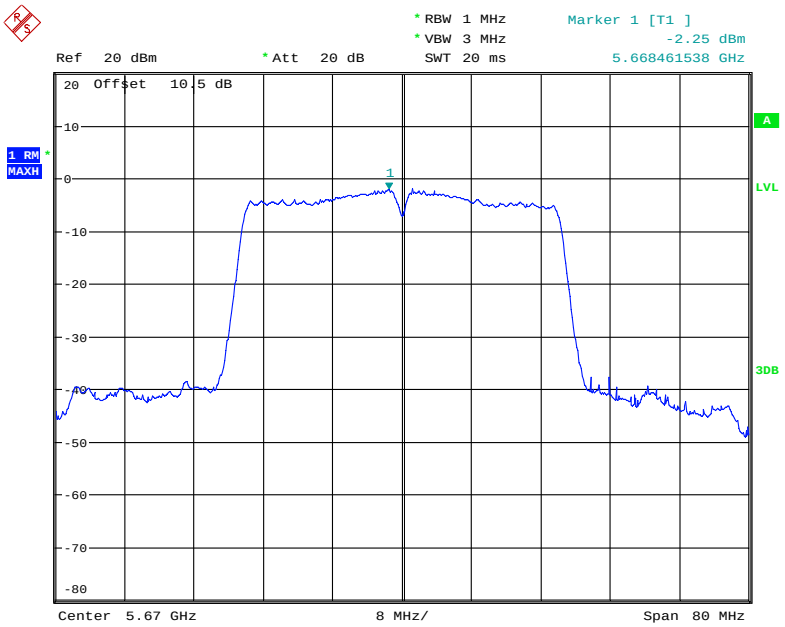
Date: 2.APR.2019 11:48:43

802.11n40 mode, Power Spectral Density, 5590 MHz



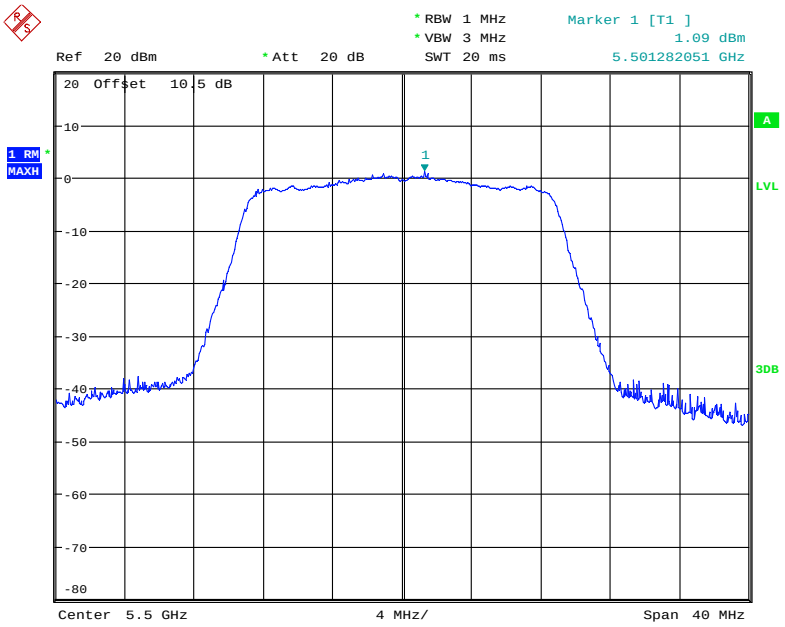
Date: 5.MAR.2019 18:45:35

802.11n40 mode, Power Spectral Density, 5670 MHz



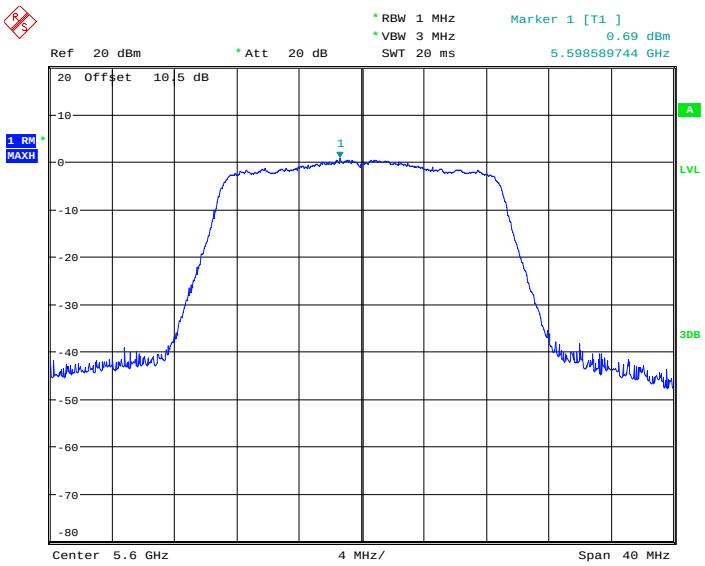
Date: 5.MAR.2019 18:46:48

802.11ac20 mode, Power Spectral Density, 5500 MHz



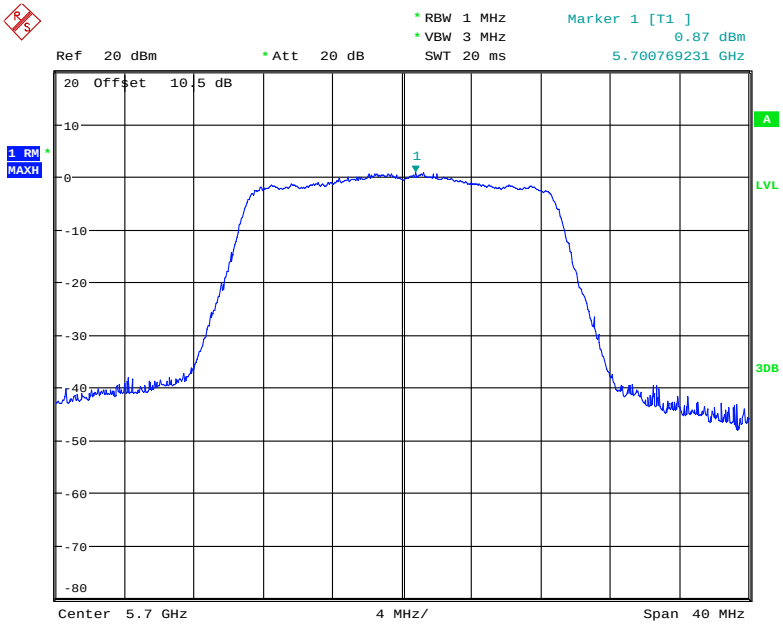
Date: 5.MAR.2019 19:07:39

802. 11ac20 mode, Power Spectral Density, 5600 MHz



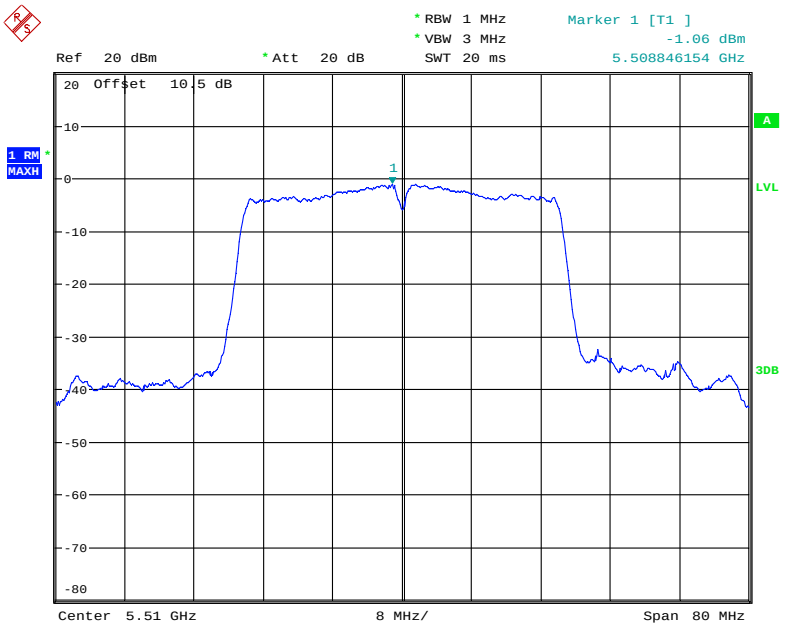
Date: 5.MAR.2019 19:08:19

802. 11ac20 mode, Power Spectral Density, 5700 MHz



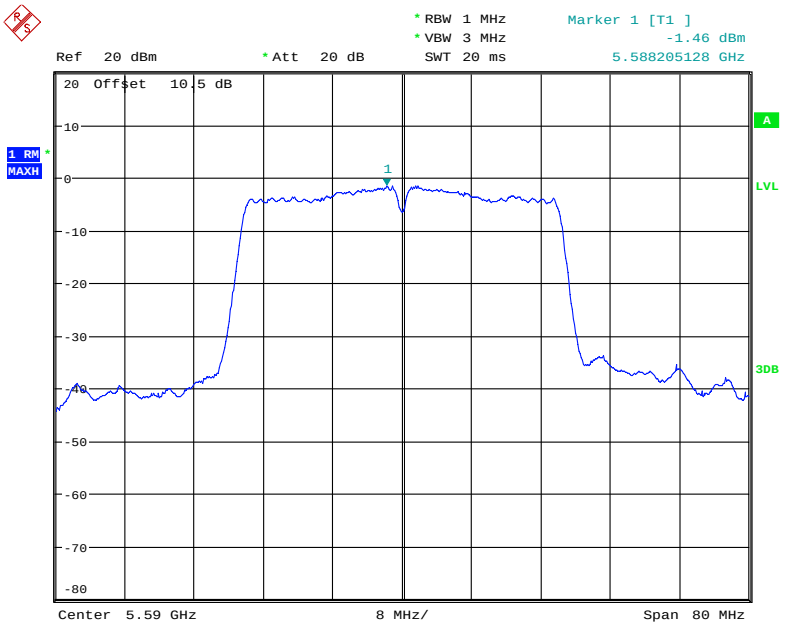
Date: 5.MAR.2019 19:10:04

802. 11ac40 mode, Power Spectral Density, 5510 MHz



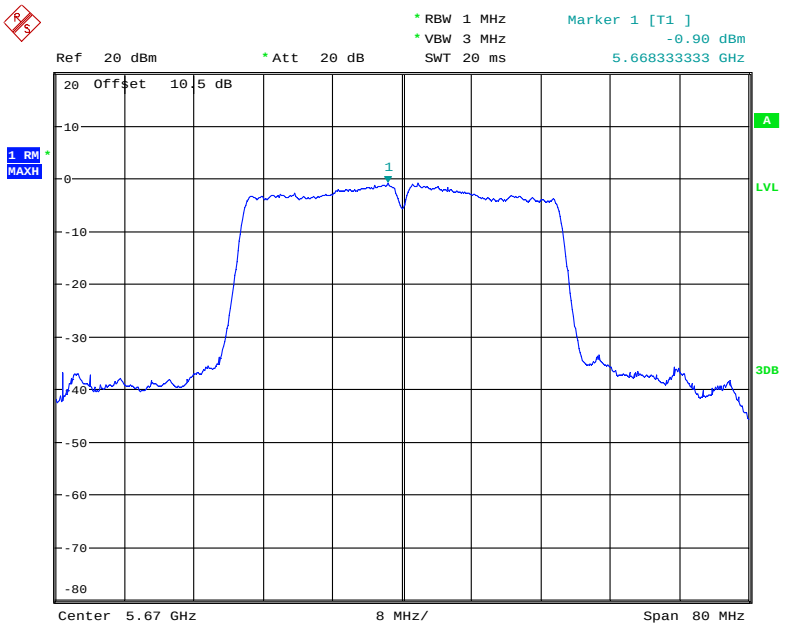
Date: 5.MAR.2019 18:35:04

802. 11ac40 mode, Power Spectral Density, 5590 MHz



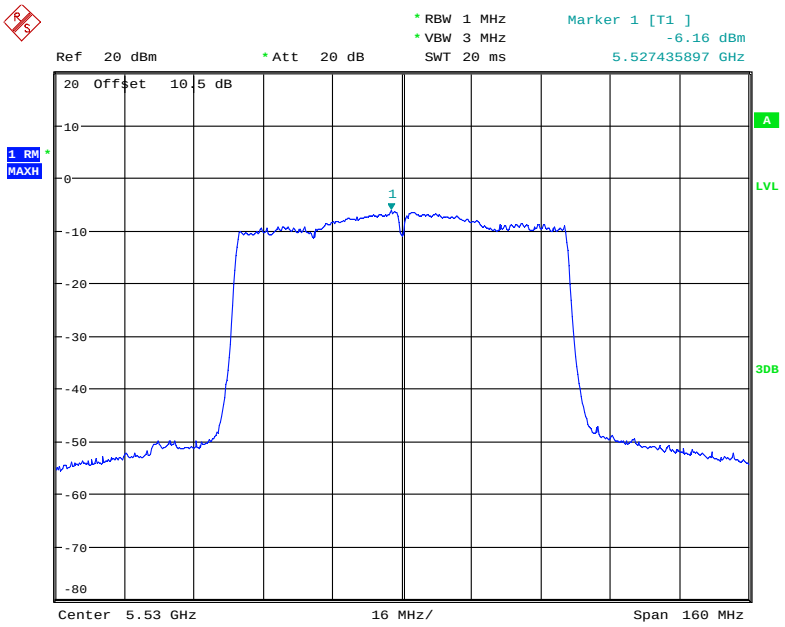
Date: 5.MAR.2019 18:38:11

802. 11ac40 mode, Power Spectral Density, 5670 MHz



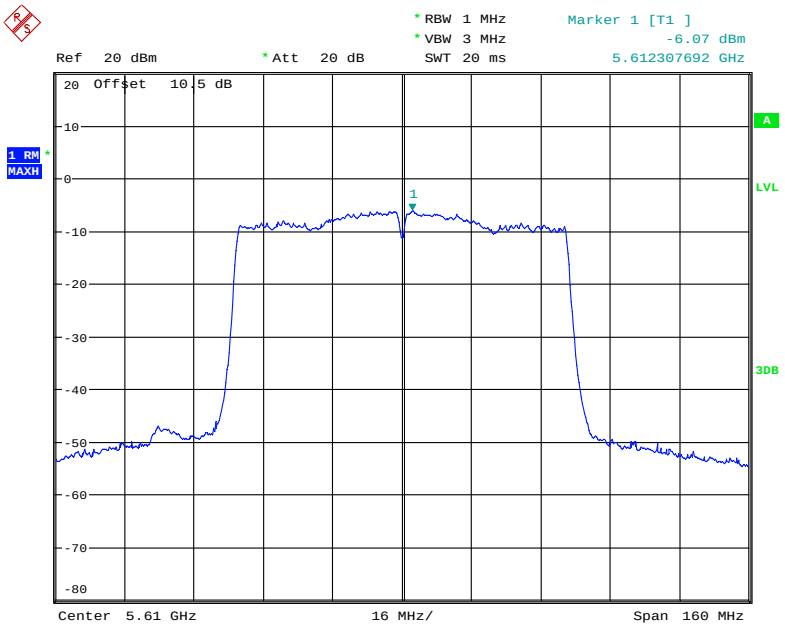
Date: 5.MAR.2019 18:37:02

802. 11ac80 mode, Power Spectral Density, 5530 MHz



Date: 11.MAR.2019 08:12:36

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

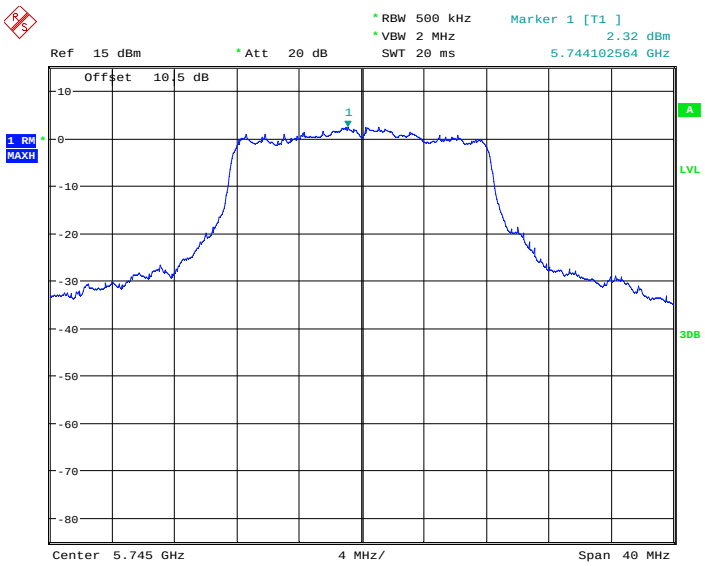


Date: 11.MAR.2019 08:13:52

5725 MHz – 5850 MHz:

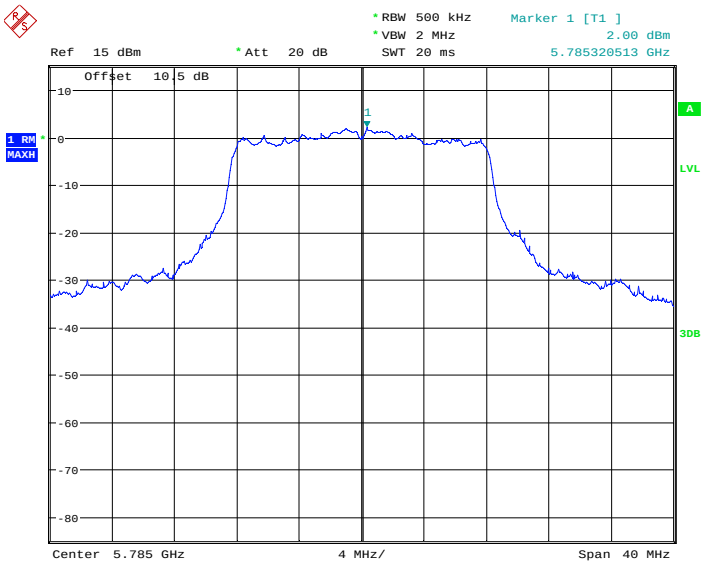
Frequency (MHz)	Power Spectral Density (dBm/500kHz)	Duty Cycle Factor	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)
802.11a				
5745	2.32	0.66	2.98	30
5785	2.00	0.66	2.66	
5825	1.27	0.66	1.93	
802.11n20				
5745	1.45	0.71	2.16	30
5785	0.56	0.71	1.27	
5825	0.37	0.71	1.08	
802.11n40				
5755	-1.91	1.19	-0.72	30
5795	-2.20	1.19	-1.01	
802. 11ac20				
5745	1.10	0.76	1.86	30
5785	0.72	0.76	1.48	
5825	0.51	0.76	1.27	
802. 11ac40				
5755	-3.12	1.25	-1.87	30
5795	-3.31	1.25	-2.06	
802. 11ac80				
5775	-7.85	1.80	-6.05	30

802.11a mode, Power Spectral Density, 5745 MHz



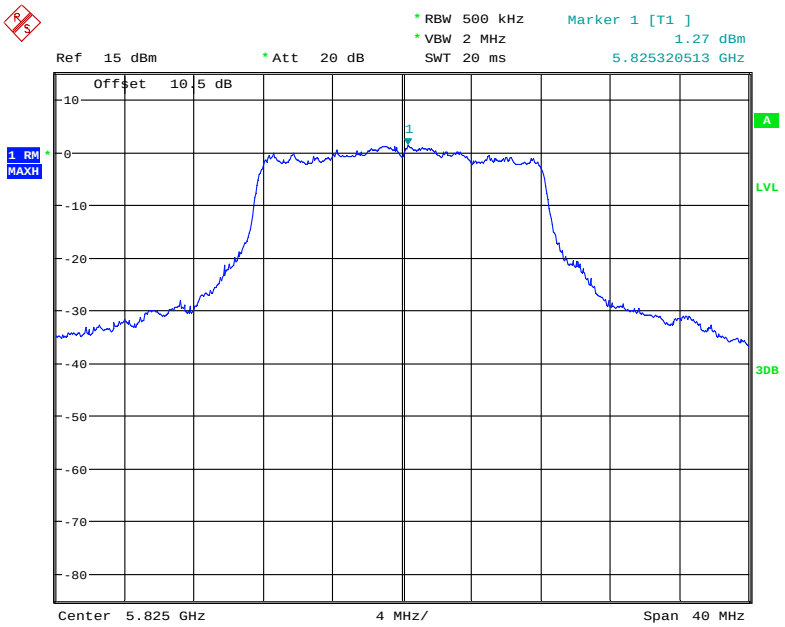
Date: 6.MAR.2019 12:54:49

802.11a mode, Power Spectral Density, 5785 MHz



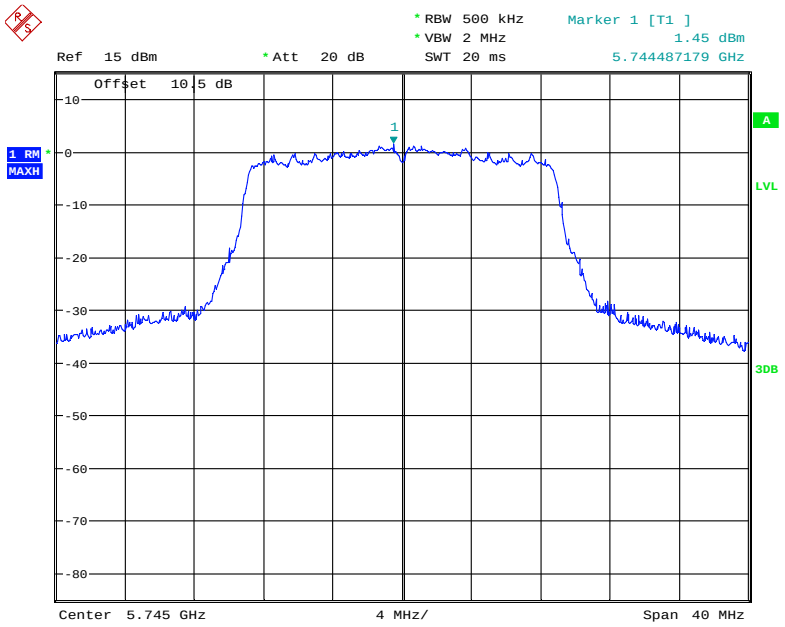
Date: 6.MAR.2019 12:55:41

802.11a mode, Power Spectral Density, 5825 MHz



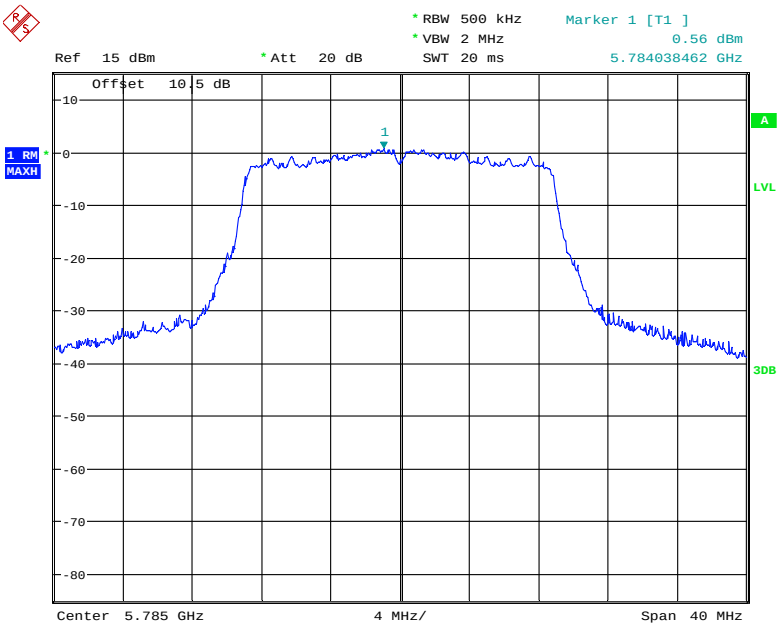
Date: 6.MAR.2019 12:56:15

802.11n20 mode, Power Spectral Density, 5745 MHz



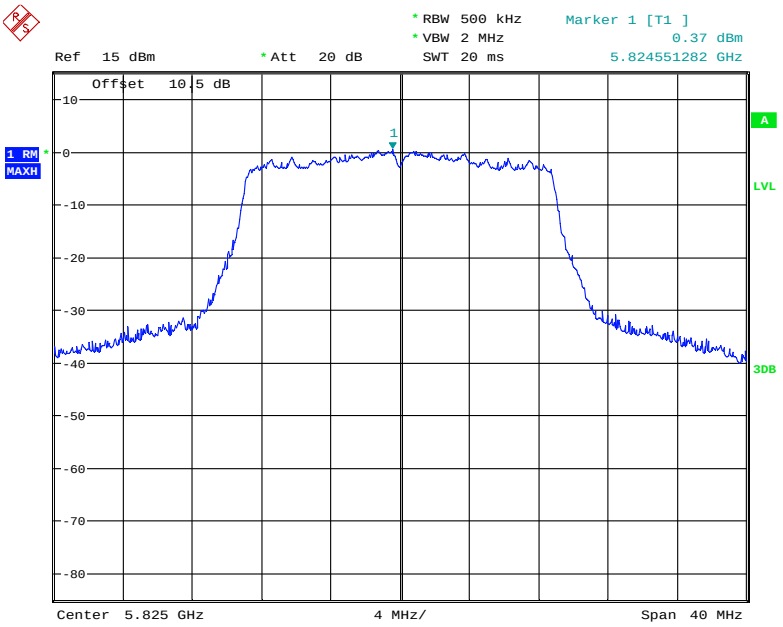
Date: 6.MAR.2019 12:56:48

802.11n20 mode, Power Spectral Density, 5785 MHz



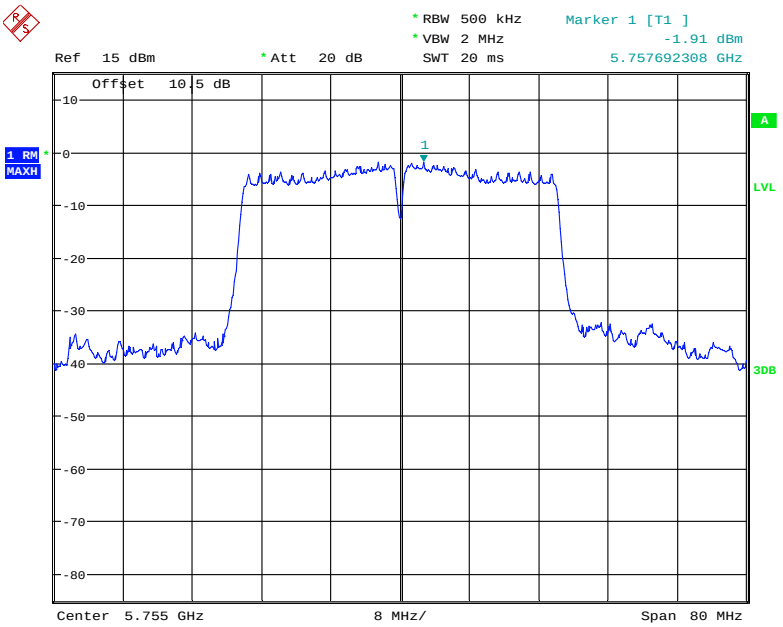
Date: 6.MAR.2019 12:57:25

802.11n20 mode, Power Spectral Density, 5825 MHz



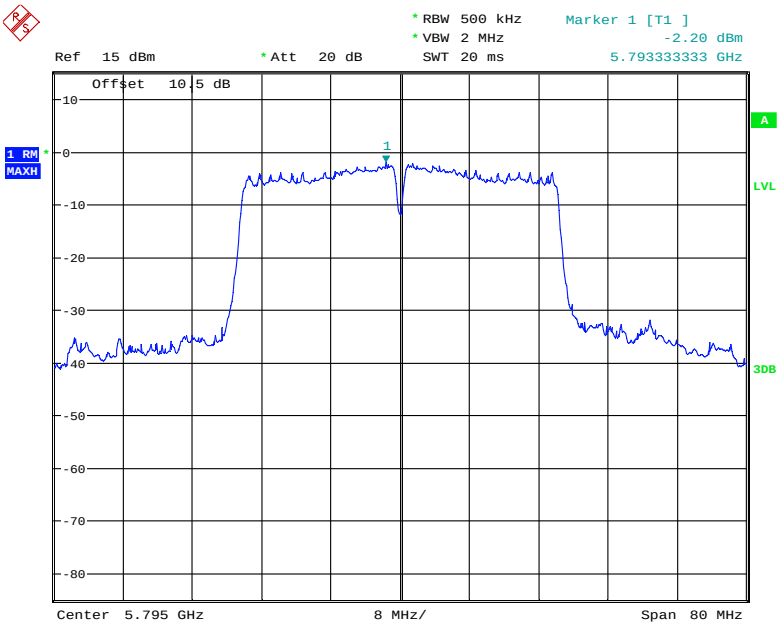
Date: 6.MAR.2019 12:58:05

802.11n40 mode, Power Spectral Density, 5755 MHz



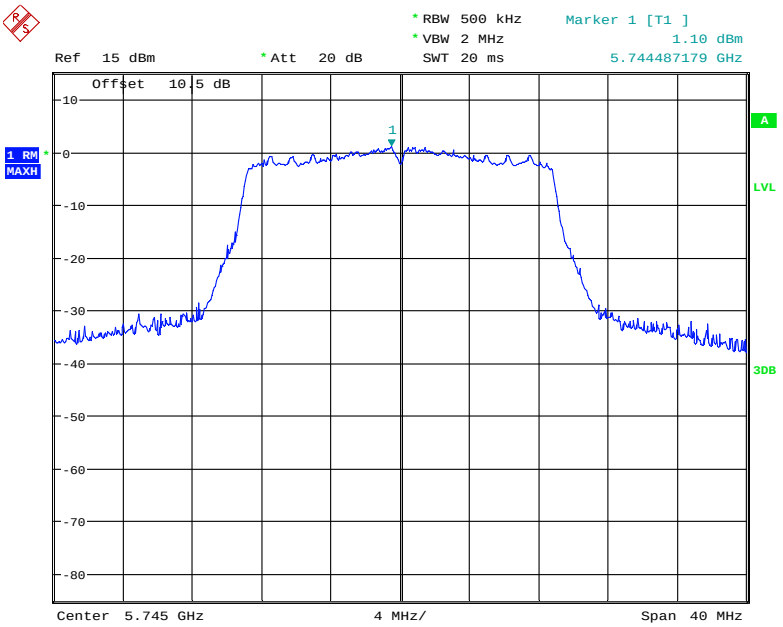
Date: 6.MAR.2019 12:53:00

802.11n40 mode, Power Spectral Density, 5795 MHz



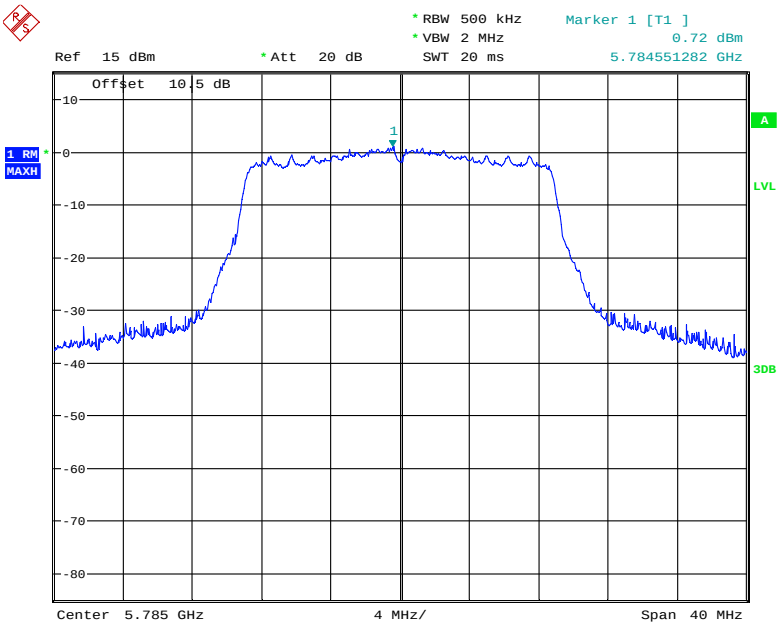
Date: 6.MAR.2019 12:53:59

802.11ac20 mode, Power Spectral Density, 5745 MHz



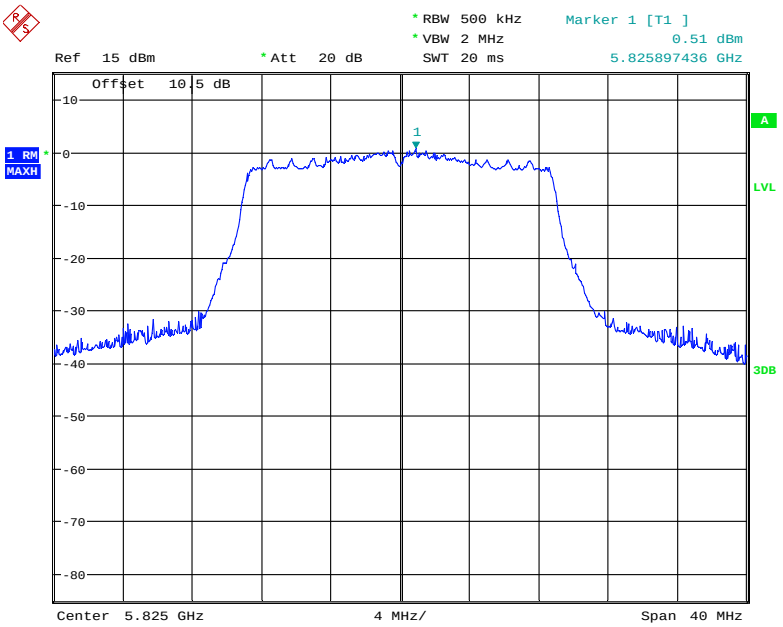
Date: 6.MAR.2019 12:59:59

802. 11ac20 mode, Power Spectral Density, 5785 MHz



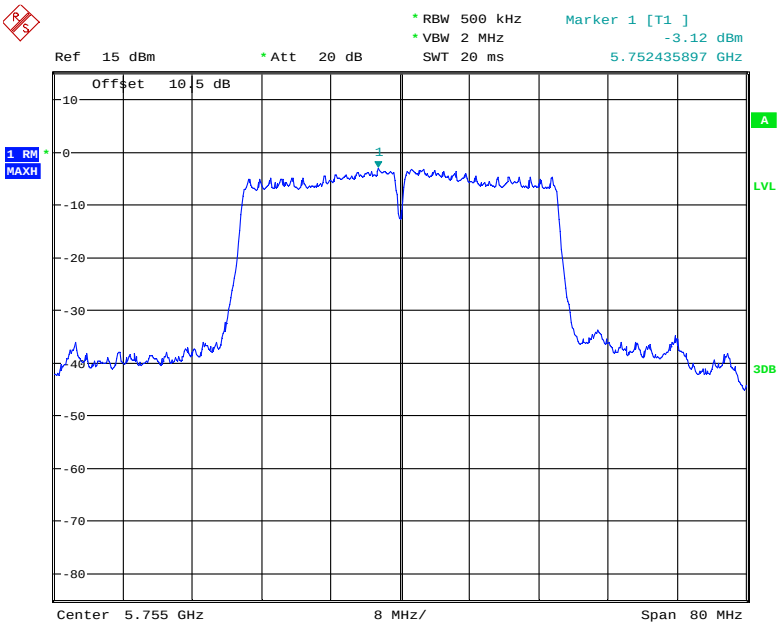
Date: 6.MAR.2019 13:00:47

802. 11ac20 mode, Power Spectral Density, 5825 MHz



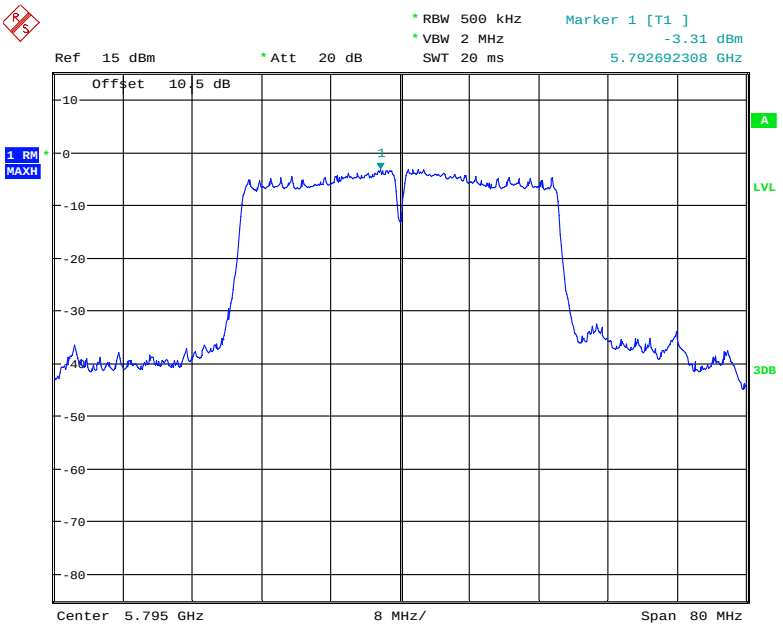
Date: 6.MAR.2019 13:01:46

802. 11ac40 mode, Power Spectral Density, 5755 MHz



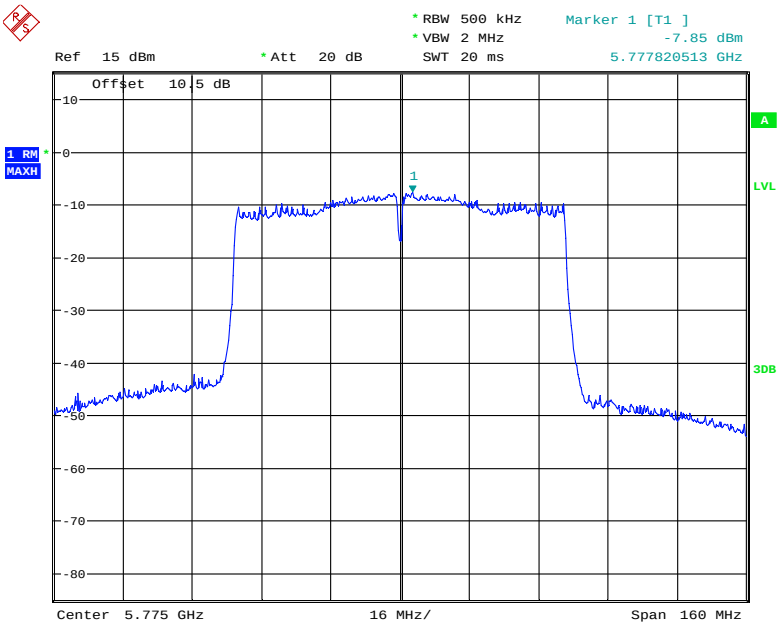
Date: 6.MAR.2019 12:50:53

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



Date: 6.MAR.2019 12:51:50

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



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