

FCC PART 15.407

TEST REPORT

For

Shanghai Sunmi Technology Co.,Ltd.

Room 605, Block 7, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai 200433 China

FCC ID: 2AH25TW010

Report Type: Original Report	Product Type: Wireless Router
Test Engineer:	CK Huang
Report Number:	RKSA200818001-00C
Report Date:	2020-10-15
Reviewed By:	Oscar Ye EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	5
MEASUREMENT UNCERTAINTY	6
TEST FACILITY	6
SYSTEM TEST CONFIGURATION.....	7
DESCRIPTION OF TEST CONFIGURATION	7
EUT EXERCISE SOFTWARE	7
EQUIPMENT MODIFICATIONS	21
SUPPORT EQUIPMENT LIST AND DETAILS	22
EXTERNAL I/O CABLE.....	22
BLOCK DIAGRAM OF TEST SETUP	23
SUMMARY OF TEST RESULTS	25
TEST EQUIPMENT LIST	26
§1.1310& §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)	27
APPLICABLE STANDARD	27
CALCULATED FORMULARY:.....	27
FCC §15.203 – ANTENNA REQUIREMENT.....	29
APPLICABLE STANDARD	29
ANTENNA CONNECTOR CONSTRUCTION	29
FCC §15.407 (b) (6) §15.207 (a) – AC POWER LINE CONDUCTED EMISSIONS	30
APPLICABLE STANDARD	30
EUT SETUP	30
EMI TEST RECEIVER SETUP.....	30
TEST PROCEDURE	31
FACTOR & OVER LIMIT CALCULATION.....	31
TEST RESULTS SUMMARY	31
TEST DATA	31
§15.205 & §15.209 & §15.407(B)(1)(4) (8)(9) – UNDESIRABLE EMISSION & RESTRICTED BANDS	36
APPLICABLE STANDARD	36
EUT SETUP	36
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	37
TEST PROCEDURE	37
CORRECTED AMPLITUDE & MARGIN CALCULATION	38
TEST DATA	38
FCC §15.407(a) & §15.407(e)–EMISSION BANDWIDTH.....	84
APPLICABLE STANDARD	84
TEST PROCEDURE	84
TEST DATA	85
FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER	129
APPLICABLE STANDARD	129
TEST PROCEDURE	129
TEST DATA	129
FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY	131

APPLICABLE STANDARD	131
TEST PROCEDURE	131
TEST DATA	131

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Product Type:	Wireless Router
Test Model	TW010
Power Supply:	AC 100-240V
RF Function:	5G Wi-Fi
Operating Band/Frequency:	5G Wi-Fi B1: 5150-5250 MHz, B4: 5725-5850 MHz
Channel Number:	5G Wi-Fi B1: 7, B4: 8
Channel Separation:	802.11a/802.11ac20/n20: 20MHz; 802.11n40/802.11ac40:40 MHz, 802.11ac80: 80 MHz
Modulation Type:	OFDM
Antenna Type:	FPC Antenna
Maximum Antenna Gain:	Band 1 Chain 0: 4.97dBi & Chain 1: 3.55dBi Band 4 Chain 0: 4.98dBi & Chain 1: 3.65dBi

**All measurement and test data in this report was gathered from production sample serial number: 20200818001. (Assigned by the BACL). The EUT supplied by the applicant was received on 2020-08-18.*

Objective

This type approval report is prepared on behalf of *Shanghai Sunmi Technology Co.,Ltd.* 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 submissions with FCC ID: 2AH25TW010

FCC Part 15B JAB submissions with FCC ID: 2AH25TW010

Part 22H24E27Part 90 PCB submissions with FCC ID: 2AH25TW010

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 and Bay Area Compliance Laboratories Corp. (Kunshan).

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01), the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

In **5150~5250 MHz** band, test channel list is as below,

802.11a/802.11ac20/n20 mode Channel 36, 40, 48 were tested.

802.11n40/802.11ac40 mode Channel 38, 46 were tested.

802.11ac80 mode Channel 42 was tested

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

For **5725~5850 MHz** band,

802.11a/802.11ac20/n20 mode Channel 149, 157, 165 were tested.

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

802.11ac80 mode Channel 155 was tested.

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

For Conducted Test:

802.11a: each transmit chains were tested

802.11ac: each transmit chains were tested

802.11n: each transmit chains were tested

For Radiated Test:

For 802.11a: SISO for each transmit chain

For 802.11ac: MIMO for two transmit chains

For 802.11n: MIMO for two transmit chains

EUT Exercise Software

RF test tool: QRCT3

The worst case was performed under:

5150MHz-5250MHz Band:

Mode	Data rate	Frequency (MHz)	Power Setting	
			Chain 0	Chain 1
802.11a	6 Mbps	5180	25	23
		5200	25	27
		5240	30	30
802.11ac20	MCS0	5180	22	22
		5200	22	23
		5240	24	24
802.11n-HT20	MCS0	5180	22	22
		5200	22	23
		5240	23	24
802.11ac40	MCS0	5190	23	23
		5230	23	23
802.11n-HT40	MCS0	5190	20	20
		5230	23	23
802.11ac80	MCS0	5210	20	20

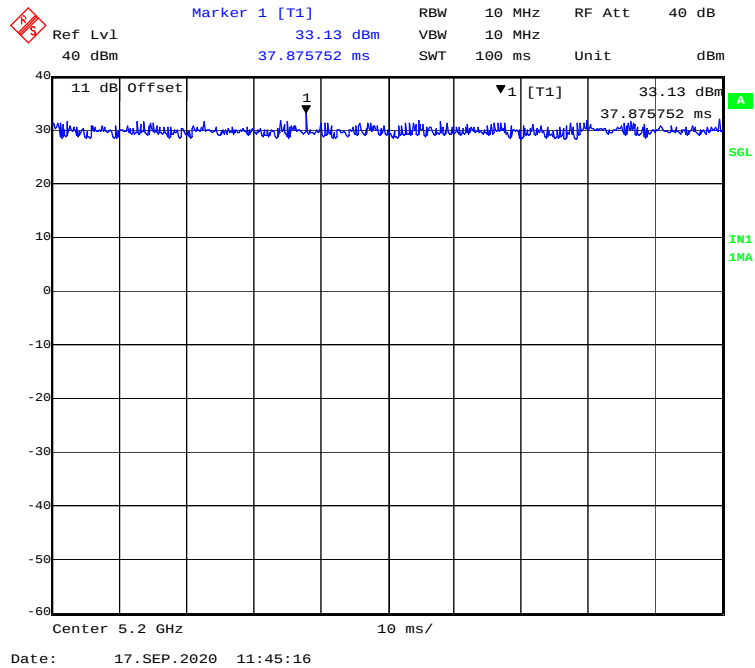
5725MHz-5850MHz Band:

Mode	Data rate	Channel	Power Setting	
			Chain 0	Chain 1
802.11a	6 Mbps	5745	27	27
		5785	28	27
		5825	28	28
802.11ac20	MCS0	5745	25	25
		5785	26	26
		5825	26	26
802.11n-HT20	MCS0	5745	25	25
		5785	26	26
		5825	26	26
802.11ac40	MCS0	5755	25	25
		5795	25	25
802.11n-HT40	MCS0	5755	25	25
		5795	25	25
802.11ac80	MCS0	5775	25	25

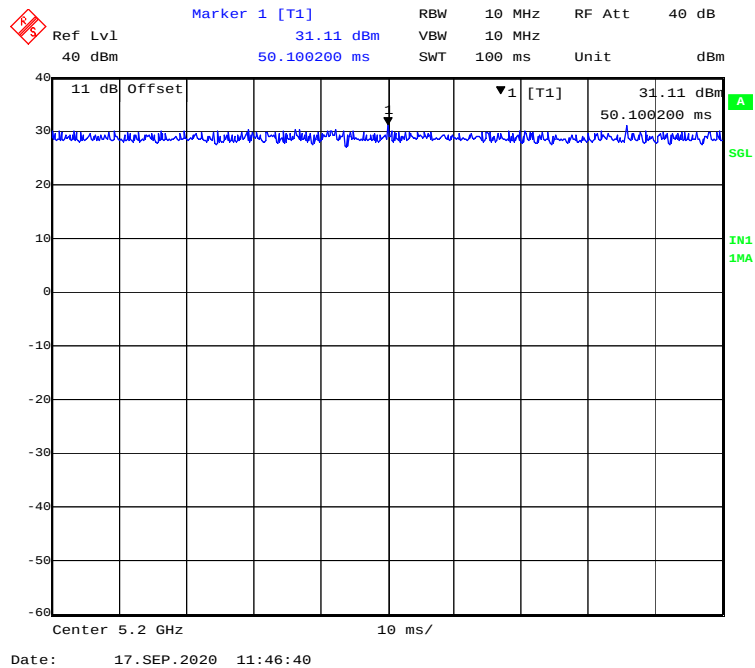
Duty Cycle (Chain 0)

5150MHz-5250MHz Band:

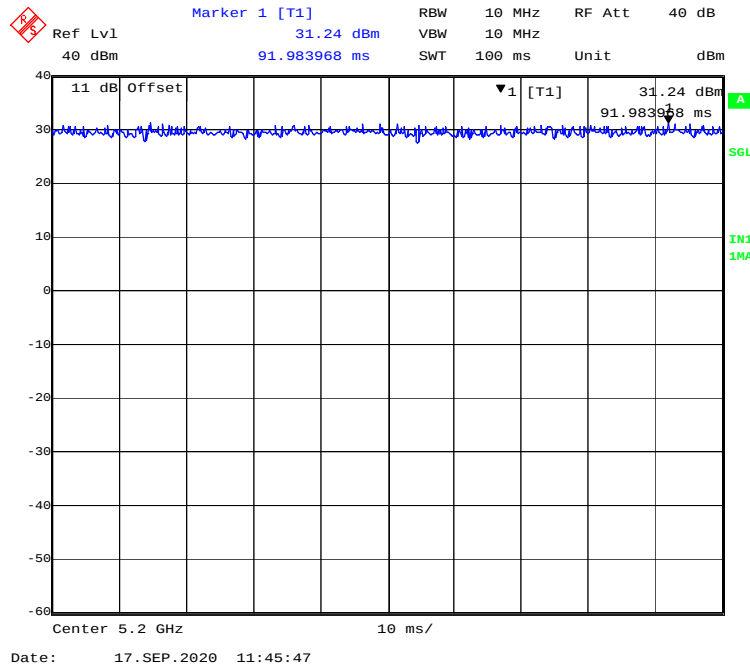
802.11a mode



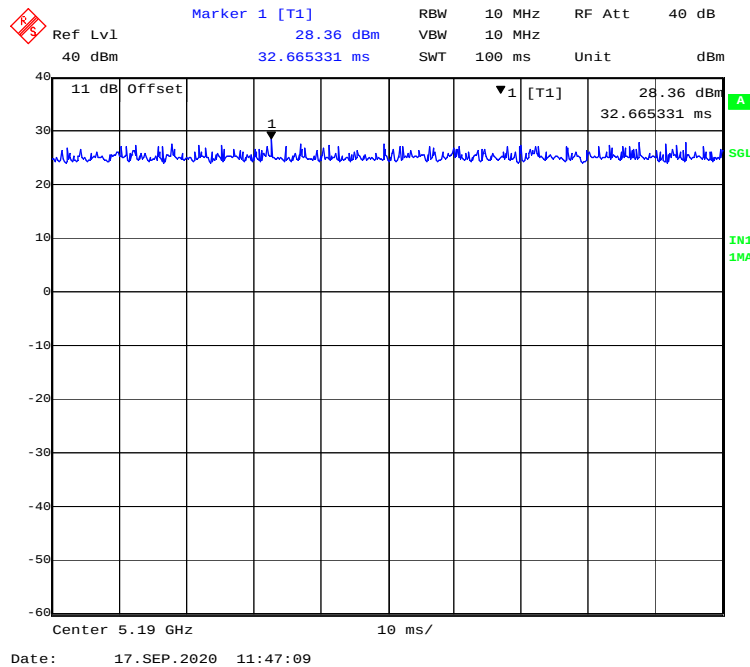
802.11ac20 mode



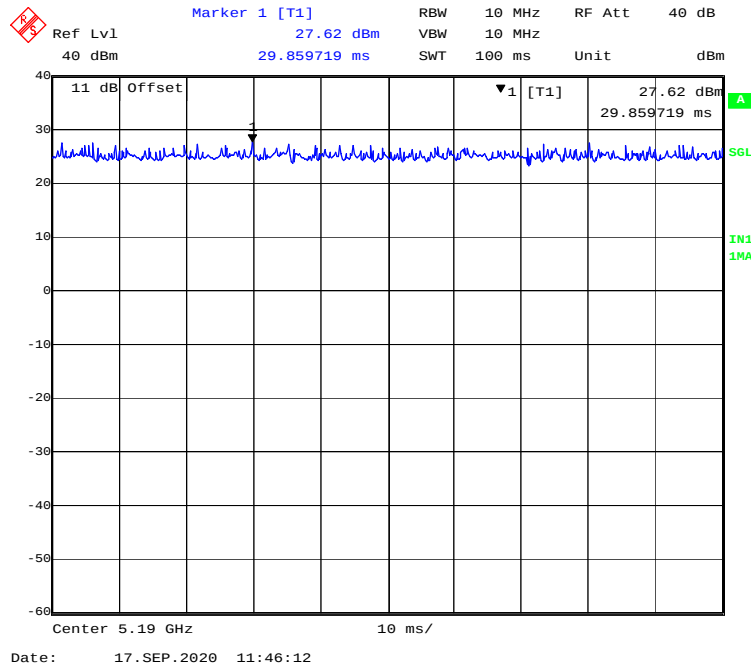
802.11n-HT20 mode



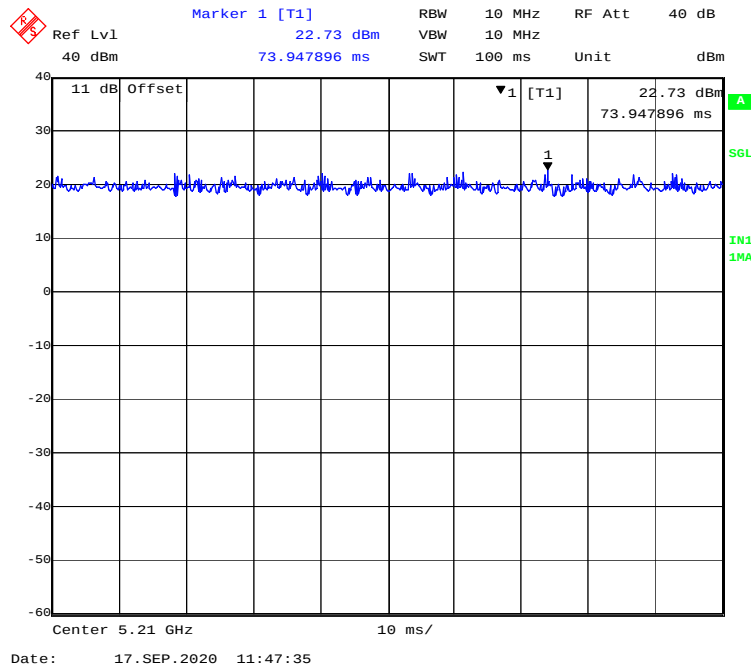
802.11 ac40 mode



802.11n-HT40 mode



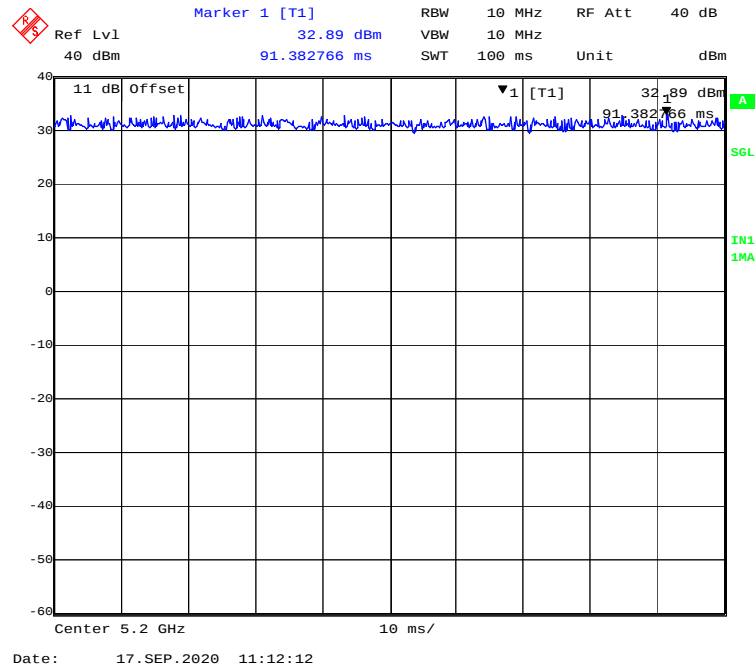
802.11 ac80 mode



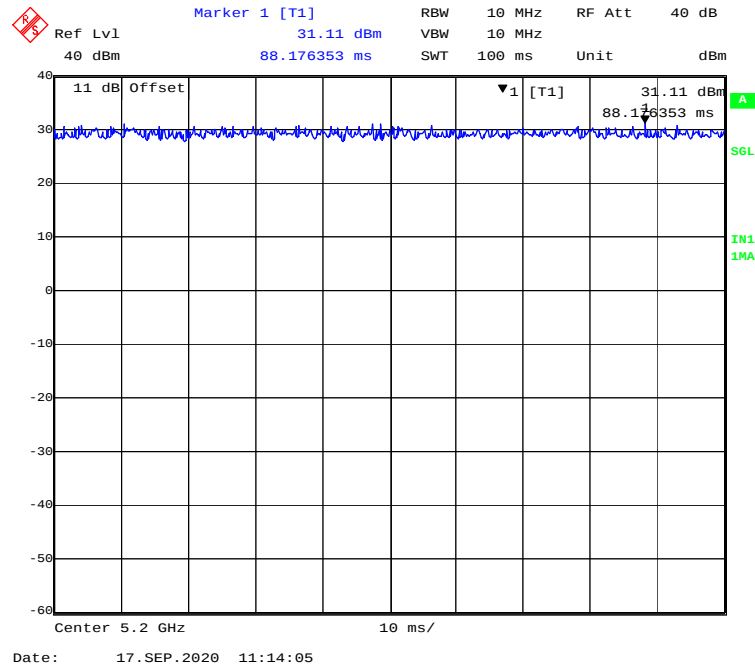
Duty Cycle(Chain 1)

5150MHz-5250MHz Band:

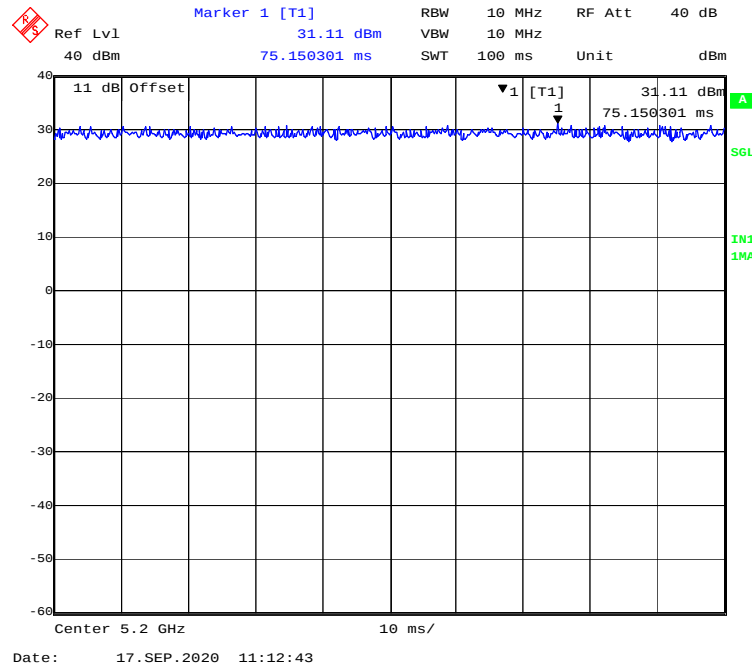
802.11a mode



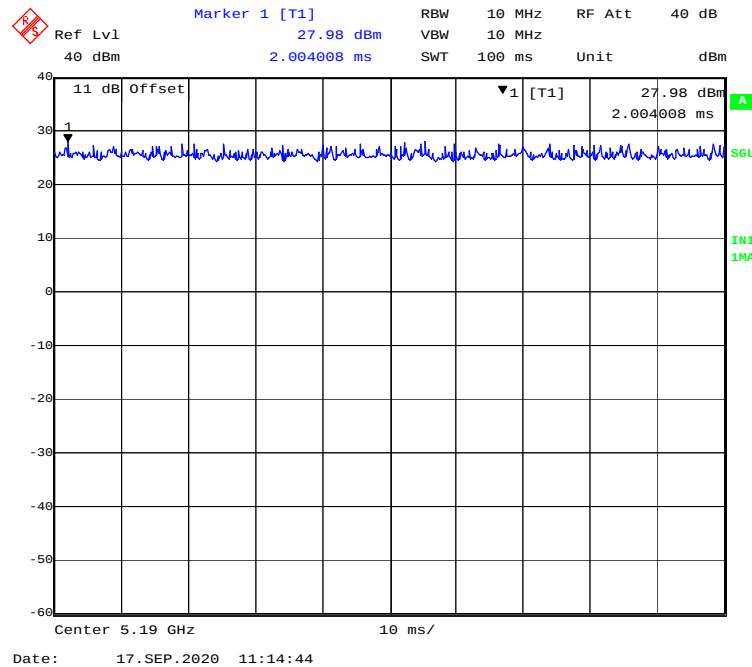
802.11ac20 mode



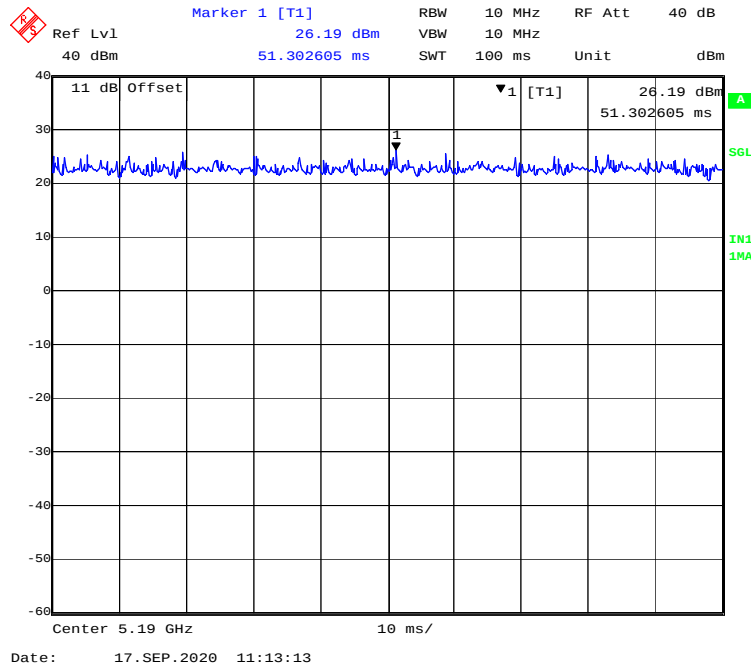
802.11n-HT20 mode



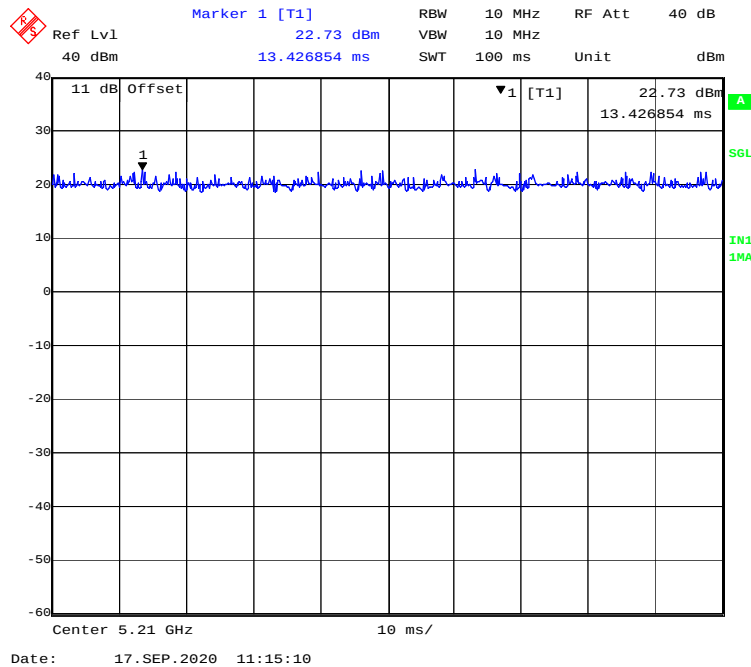
802.11 ac40 mode



802.11n-HT40 mode



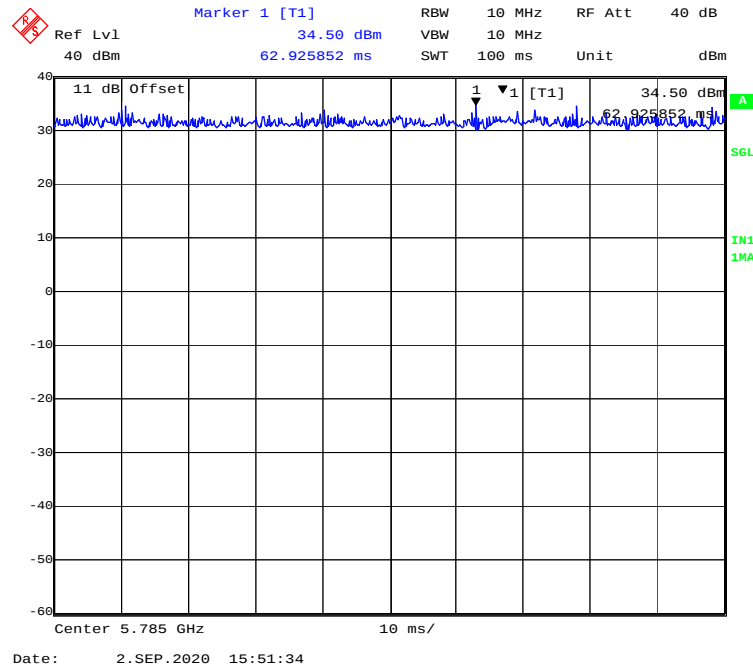
802.11 ac80 mode



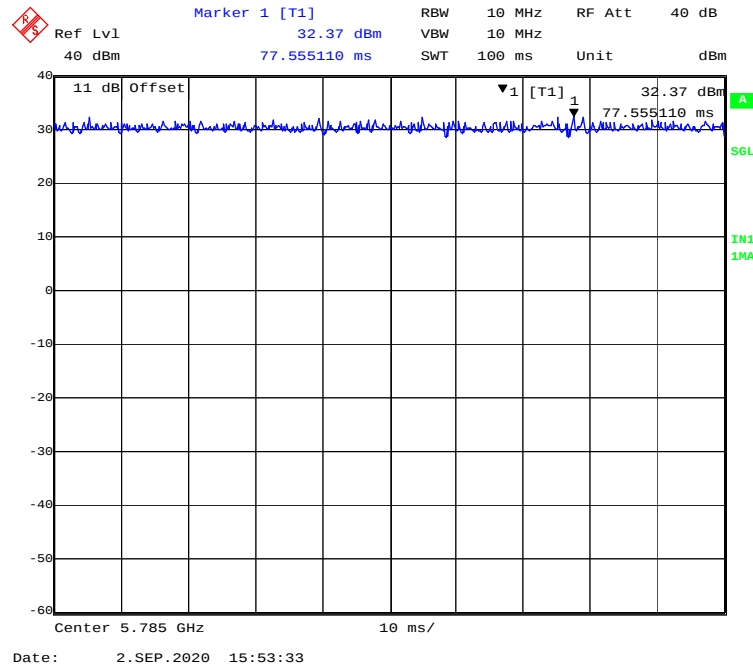
Chain 0:

5725MHz-5850MHz Band:

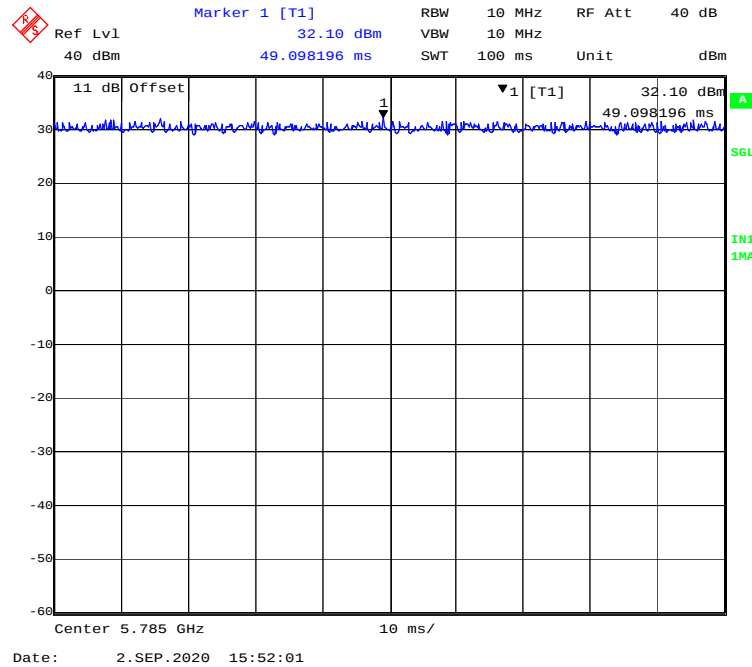
802.11a mode



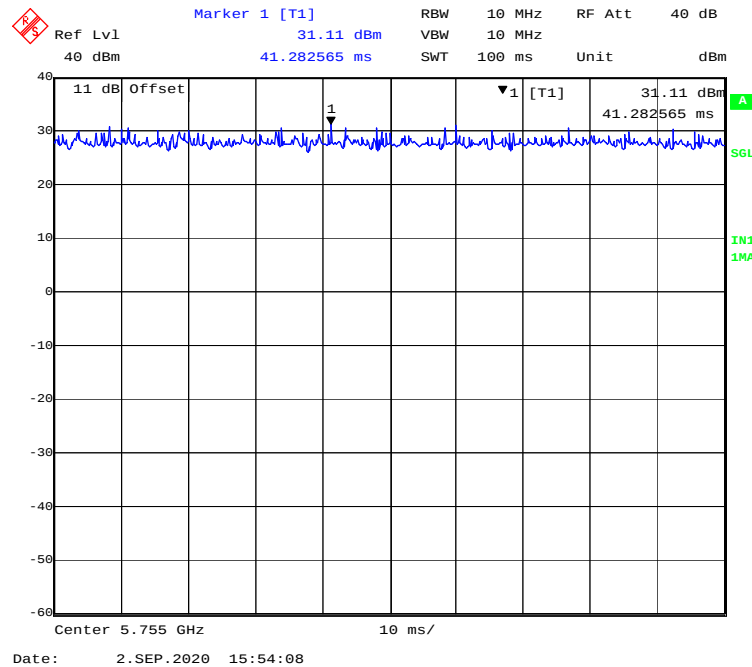
802.11ac20 mode



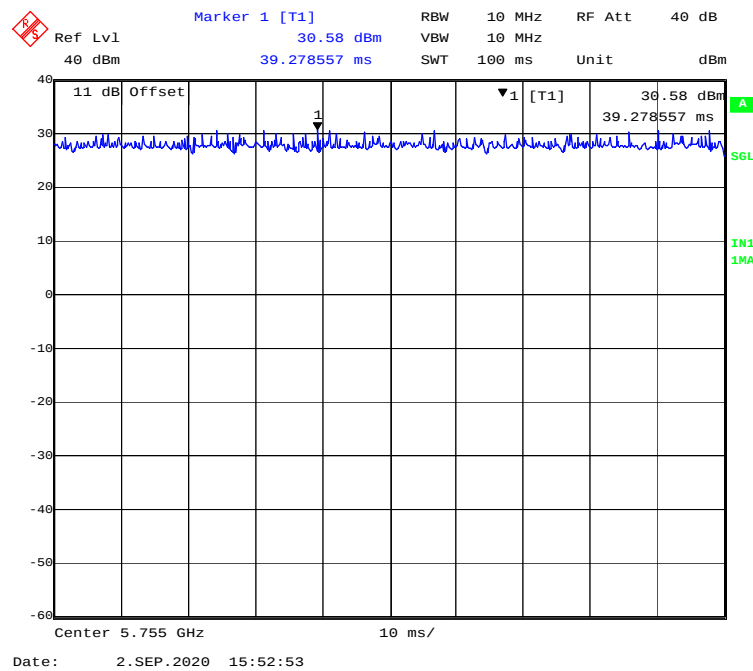
802.11n-HT20 mode



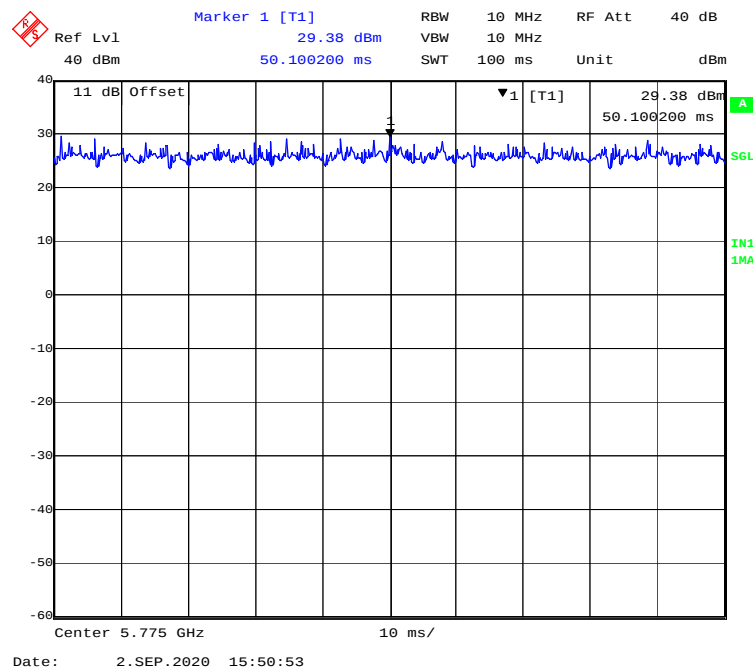
802.11 ac40 mode



802.11n-HT40 mode



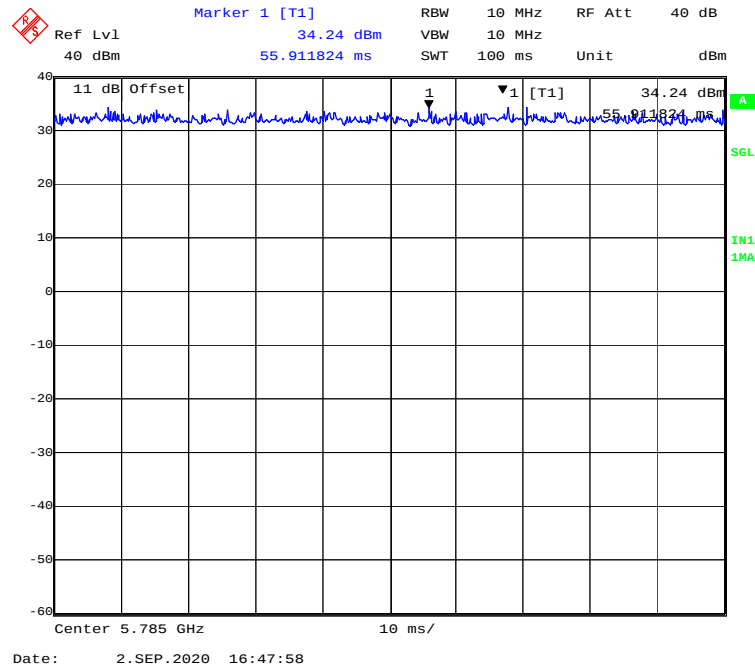
802.11n- ac80 mode



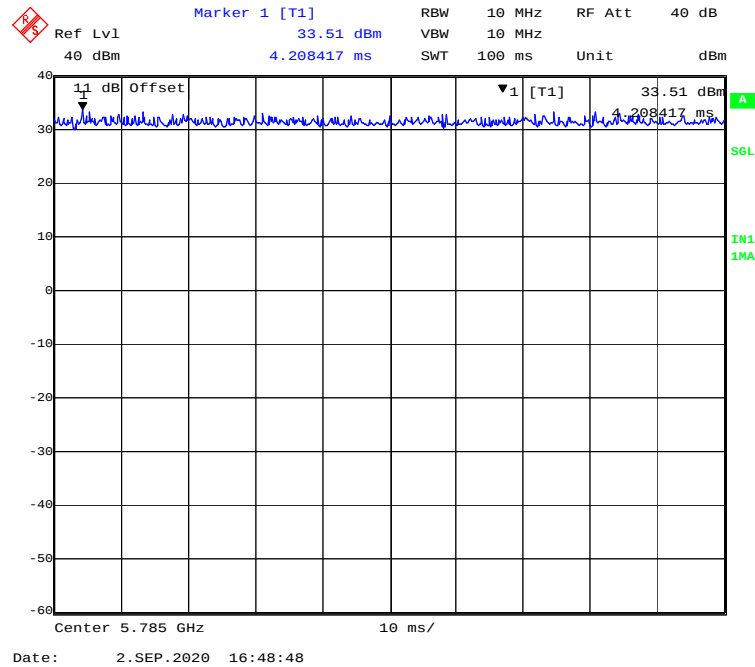
Chain 1:

5725MHz-5850MHz Band:

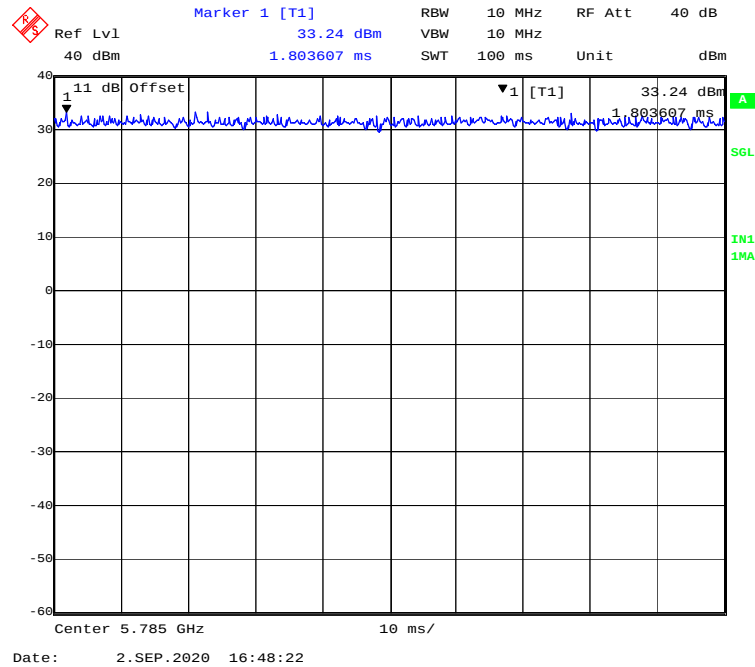
802.11a mode



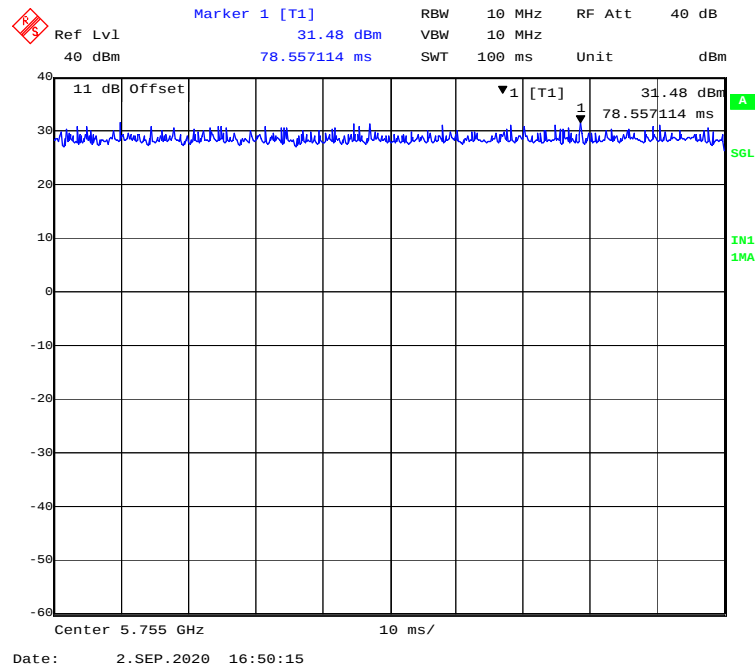
802.11ac20 mode



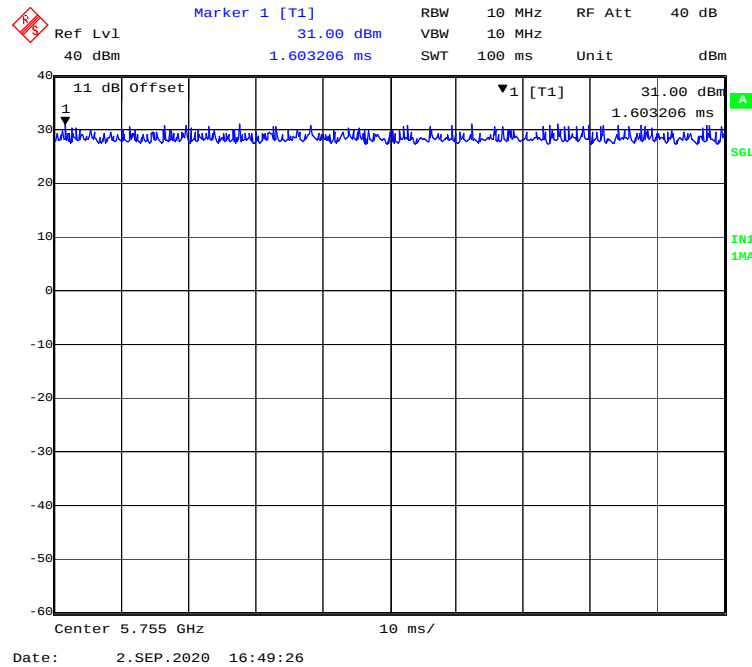
802.11n-HT20 mode



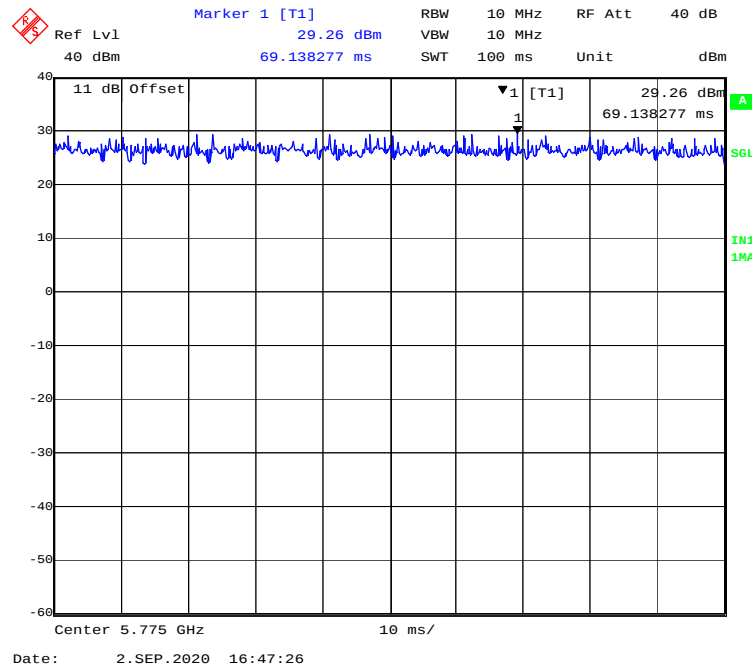
802.11 ac40 mode



802.11n-HT40 mode



802.11n- ac80 mode



Chain 0:

Mode	Frequency Range (MHz)	Duty Cycle (%)	T (ms)	1/T (kHz)	10log(1/x)
802.11a	5150-5250	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0
802.11a	5725-5850	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0

Chain 1:

Mode	Frequency Range (MHz)	Duty Cycle (%)	T (ms)	1/T (kHz)	10log(1/x)
802.11a	5150-5250	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0
802.11a	5725-5850	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0

Note: “x” means duty cycle.

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

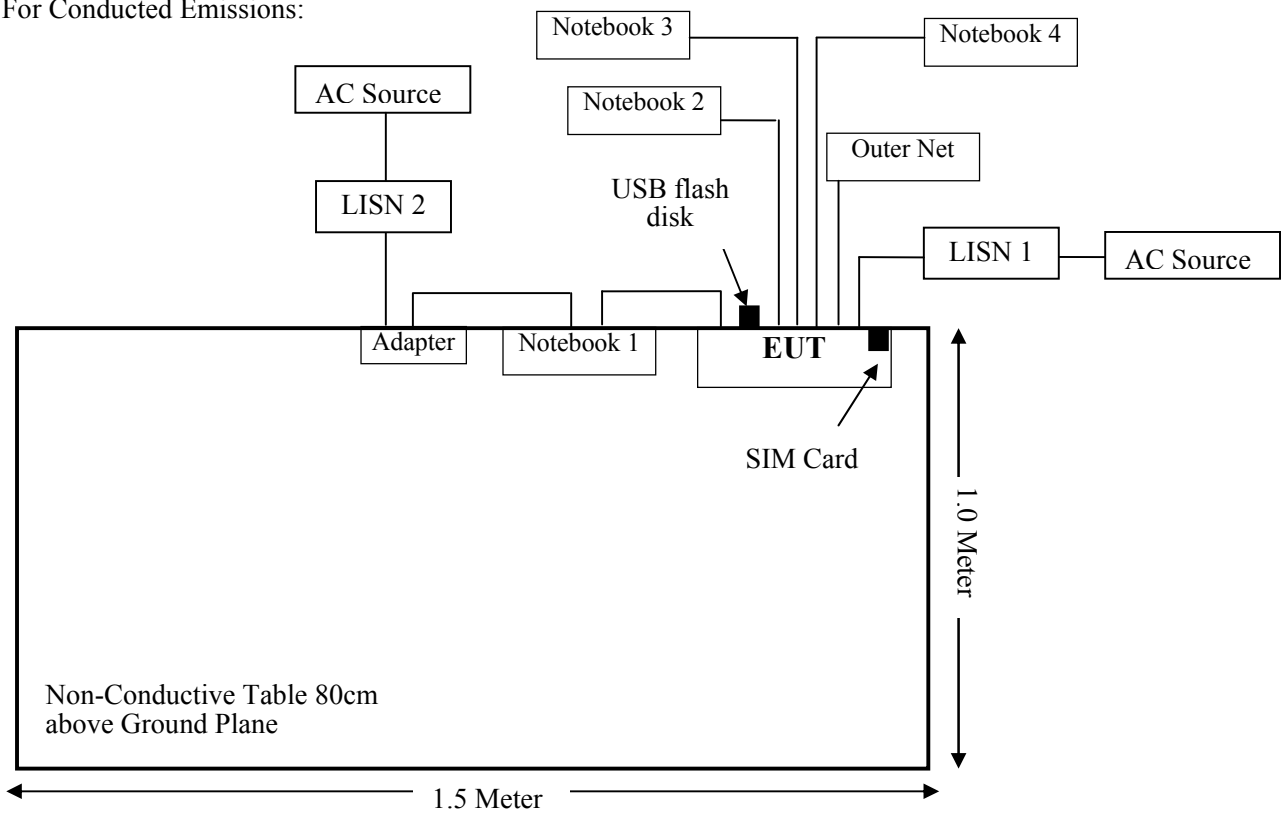
Manufacturer	Description	Model	Serial Number
DELL	Notebook 1	015K3N	00190-098-766-241
DELL	Notebook 2	0T7570	00045-644-426-785
DELL	Notebook 3	E6410	3094742521
DELL	Notebook 4	/	/
Guang Bao Technology Co.,Ltd	Adapter	SU10462	/
Sandisk	USB flash disk	/	/
/	SIM Card	/	/

External I/O Cable

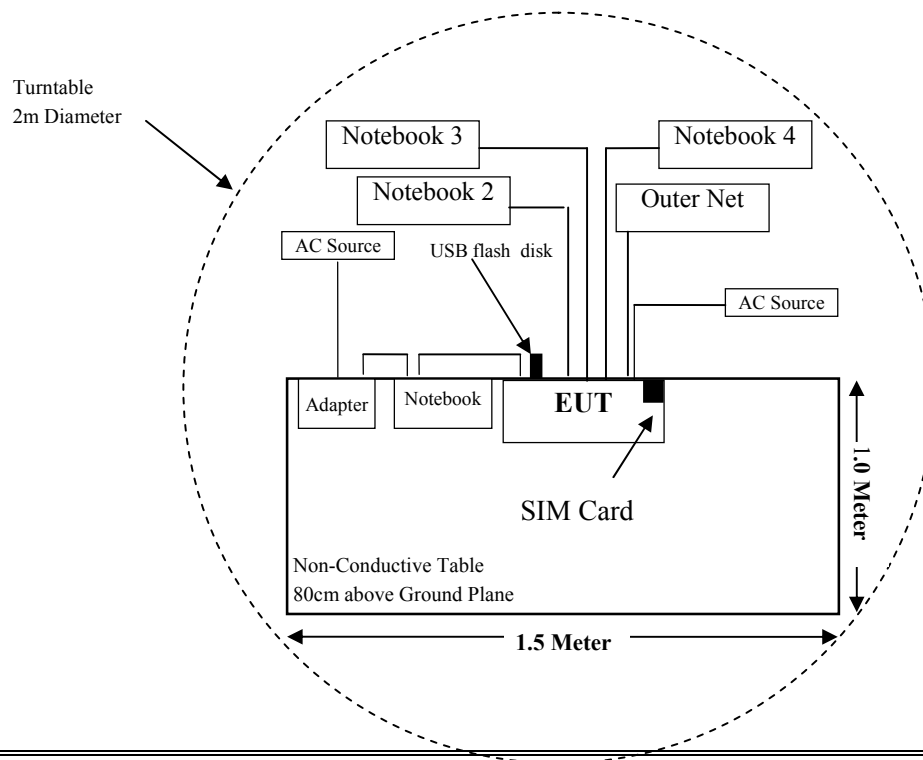
Cable Description	Shielding Type	Length (m)	From Port	To
RJ45 Cable	Un-shielding	15	EUT	Notebook2/3/4
RJ45 Cable	Un-shielding	1.5	EUT	Notebook1
Power Cable 1	Un-shielding	1.0	EUT	Adapter
Power Cable 2	Un-shielding	1.0	Adapter	AC Source

Block Diagram of Test Setup

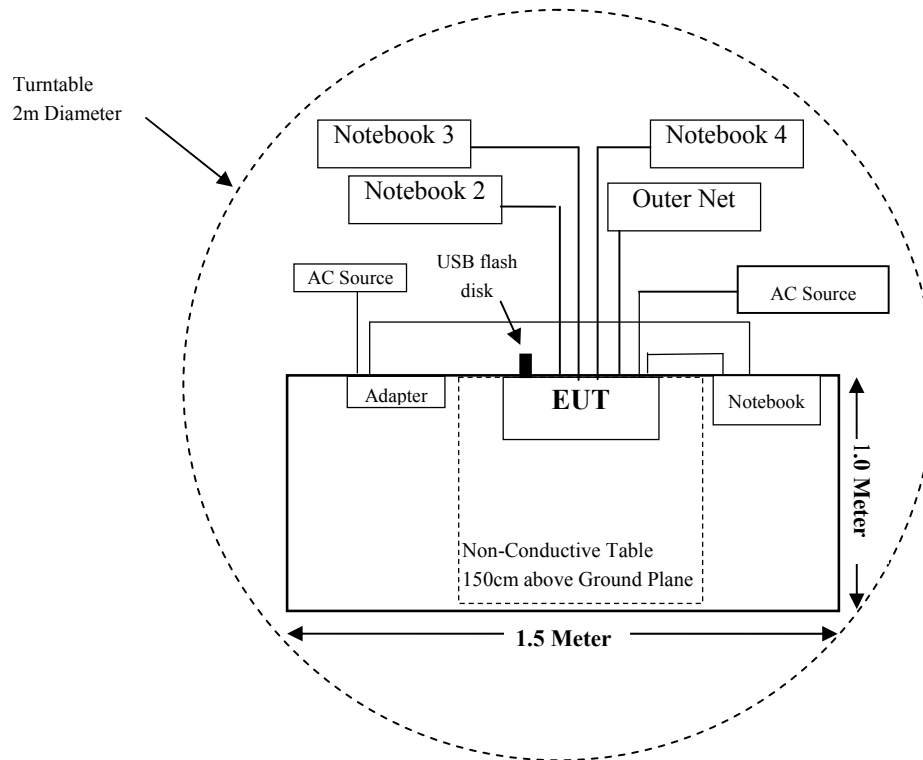
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 & §15.407(b) (6)	AC Power Line Conducted Emissions	Compliant
§15.205 & §15.209 & §15.407(B)(1)(4) (8)(9)	Undesirable Emission & Restricted Bands	Compliant
§15.407(a)(1) (5) & §15.407 (e)	Emission Bandwidth	Compliant
§15.407(a) (1) (3)	Conducted Transmitter Output Power	Compliant
§15.407(a) (1) (3)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-12-14	2020-12-13
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2017-12-26	2020-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	Auto Test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2020-07-15	2023-07-14
ETS-LINDGREN	Horn Antenna	3116	00084159	2019-12-12	2022-12-11
A.H.Systems, inc	Amplifier	PAM-0118P	512	2020-02-20	2021-02-19
SELECTOR	Amplifier	EM18G40G	060726	2020-03-22	2021-03-21
MICRO-TRONICS	Band Reject Filter	BRC50703	G094	2020-08-05	2021-08-04
MICRO-TRONICS	Band Reject Filter	BRC50705	G085	2020-08-05	2021-08-04
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2020-08-15	2021-08-14
RF Conducted Test					
Rohde & Schwarz	EMI Test Receiver	ESIB26	100146	2019-12-14	2020-12-13
Agilent	Power Meter	N1912A	MY5000492	2019-11-18	2020-11-17
Agilent	Power Sensor	N1921A	MY54210024	2019-11-18	2020-11-17
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
Sunmi Co.,Ltd.	RF Cable	Sunmi C01	C01	Each Time	/
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2020-08-05	2021-08-04
Rohde & Schwarz	LISN	ENV216	3560655016	2019-11-30	2020-11-29
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2019-11-30	2020-11-29
Audix	Test Software	e3	V9	--	--
Rohde & Schwarz	Pulse limiter	ESH3-Z2	0357.8810.54	2020-04-03	2021-04-02
MICRO-COAX	Coaxial Cable	Cable-15	015	2020-08-15	2021-08-14

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

§1.1310& §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) 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;

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

2.4G WiFi:

Mode	Frequency Range (MHz)	Maximum Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412-2462	3.58	2.28	26.50	446.68	20	0.2026	1.0
802.11g		3.58	2.28	27.00	501.19	20	0.2273	1.0
802.11n-HT20		3.58	2.28	26.00	398.11	20	0.1806	1.0
802.11n-HT40	2422-2452	3.58	2.28	20.00	100.00	20	0.0454	1.0

5G Wi-Fi/WCDMA/LTE:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5150~5250	4.97	3.14	25.0	316.23	20	0.1975	1.0
	5725~5850	4.98	3.15	24.0	251.19	20	0.1573	1.0
802.11ac20	5150~5250	4.97	3.14	24.0	251.19	20	0.1569	1.0
	5725~5850	4.98	3.15	25.5	354.81	20	0.2222	1.0
802.11n20	5150~5250	4.97	3.14	22.0	158.49	20	0.0990	1.0
	5725~5850	4.98	3.15	25.5	354.81	20	0.2222	1.0
802.11ac40	5150~5250	4.97	3.14	24.5	281.84	20	0.1760	1.0
	5725~5850	4.98	3.15	26.0	398.11	20	0.2493	1.0
802.11n40	5150~5250	4.97	3.14	24.0	251.19	20	0.1569	1.0
	5725~5850	4.98	3.15	25.5	354.81	20	0.2222	1.0
802.11ac80	5210	4.97	3.14	21.0	125.89	20	0.0786	1.0
	5775	4.98	3.15	25.0	316.23	20	0.1980	1.0
WCDMA Band II	1850-1910	2.32	1.71	22.5	177.83	20	0.0603	1.0
WCDMA Band IV	1710-1755	3.53	2.25	22.5	177.83	20	0.0796	1.0
WCDMA Band V	824-849	2.61	1.82	22.5	177.83	20	0.0645	0.55
LTE Band 2	1850-1910	2.32	1.71	23.0	199.53	20	0.0679	1.0
LTE Band 4	1710-1755	3.53	2.25	22.5	177.83	20	0.0796	1.0
LTE Band 12	699-716	1.34	1.36	22.5	177.83	20	0.0482	0.47
LTE Band 13	777-787	2.25	1.68	22.5	177.83	20	0.0594	0.52
LTE Band 14	788-798	2.25	1.68	22.5	177.83	20	0.0594	0.53
LTE Band 66	1710-1780	3.53	2.25	23.0	199.53	20	0.0893	1.0
LTE Band 71	663-698	1.93	1.56	22.5	177.83	20	0.0552	0.44

Note:

1. For the above tune up power were declared by the manufacturer.
2. 2.4G Wi-Fi, 5G Wi-Fi and LTE can transmit simultaneously, The worst condition is 802.11g of 2.4G Wi-Fi, 802.11ac 40 of 5G Wi-Fi Band 4 & LTE Band 71, as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.2273/1.00 + 0.2493/1.0 + 0.0552/0.44 = 0.6021 < 1.0$$

Result: The device meet FCC MPE at 20 cm distance.

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, if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Connector Construction

The EUT has two FPC antennas for 5G Wi-Fi, for band 1, chain 0 antenna gain is 4.97 dBi and chain 1 antenna gain is 3.55 dBi; For band 4, chain 0 antenna gain is 4.98 dBi and chain 1 antenna gain is 3.65 dBi; Which were permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

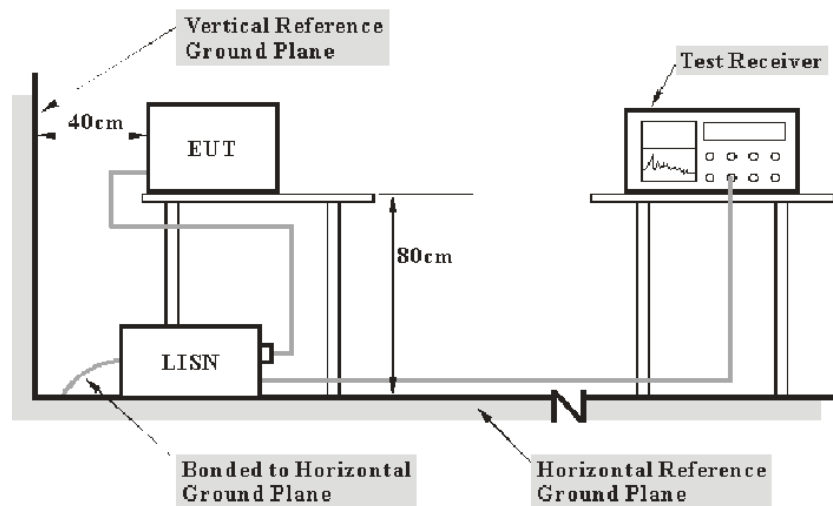
Result: Compliant.

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

Applicable Standard

FCC §15.207(a), §15.407(b) (6)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the EUT was connected to the outlet of the LISN.

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

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

Factor & Over Limit Calculation

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

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

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

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

Test Results Summary

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

Test Data

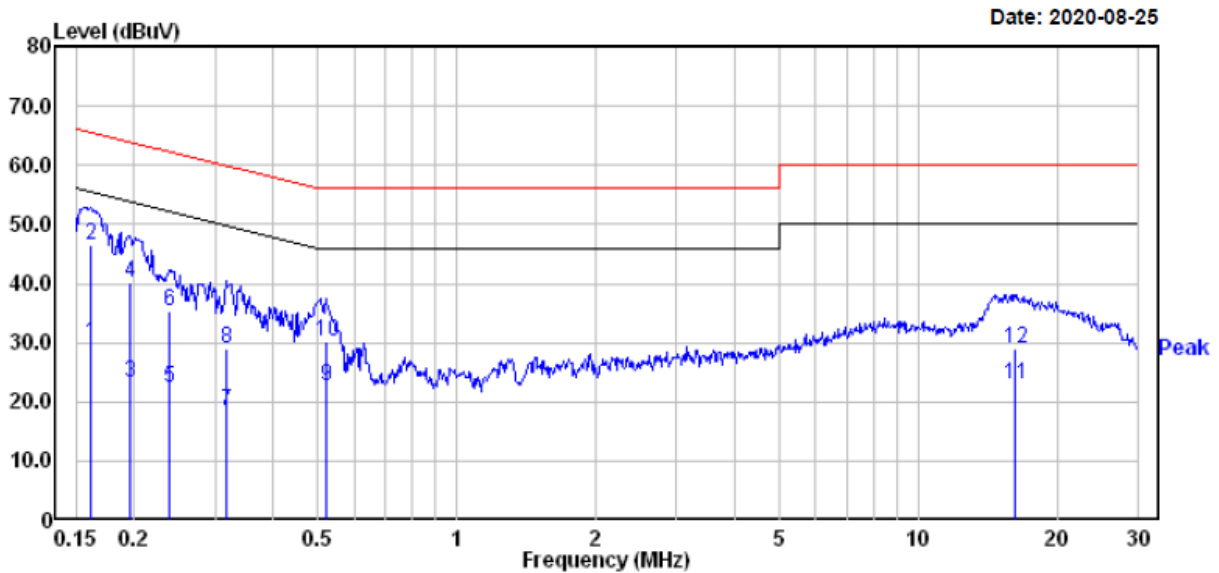
Environmental Conditions

Temperature:	24.5 °C
Relative Humidity:	51 %
ATM Pressure:	100.9 kPa

The testing was performed by CK Huang on 2020-08-25.

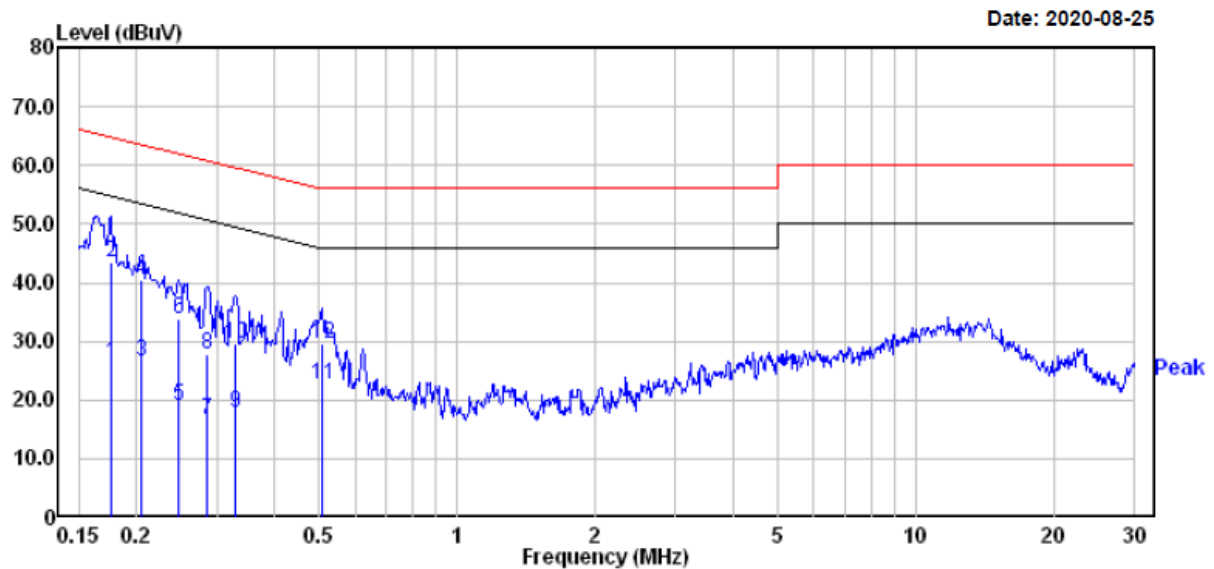
EUT operation mode: Transmitting in 802.11a mode high channel of 5150~5250MHz (worst case)

AC 120V/60 Hz, Line



	Freq	Read		Limit	Over	
	MHz	Level	Factor	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.161	10.10	19.83	29.93	55.43	-25.50 Average
2	0.161	26.80	19.83	46.63	65.43	-18.80 QP
3	0.196	3.50	19.82	23.32	53.80	-30.48 Average
4	0.196	20.40	19.82	40.22	63.80	-23.58 QP
5	0.239	2.60	19.82	22.42	52.13	-29.71 Average
6	0.239	15.50	19.82	35.32	62.13	-26.81 QP
7	0.317	-1.30	19.82	18.52	49.79	-31.27 Average
8	0.317	9.30	19.82	29.12	59.79	-30.67 QP
9	0.521	2.80	19.76	22.56	46.00	-23.44 Average
10	0.521	10.40	19.76	30.16	56.00	-25.84 QP
11	16.226	3.10	19.72	22.82	50.00	-27.18 Average
12	16.226	9.30	19.72	29.02	60.00	-30.98 QP

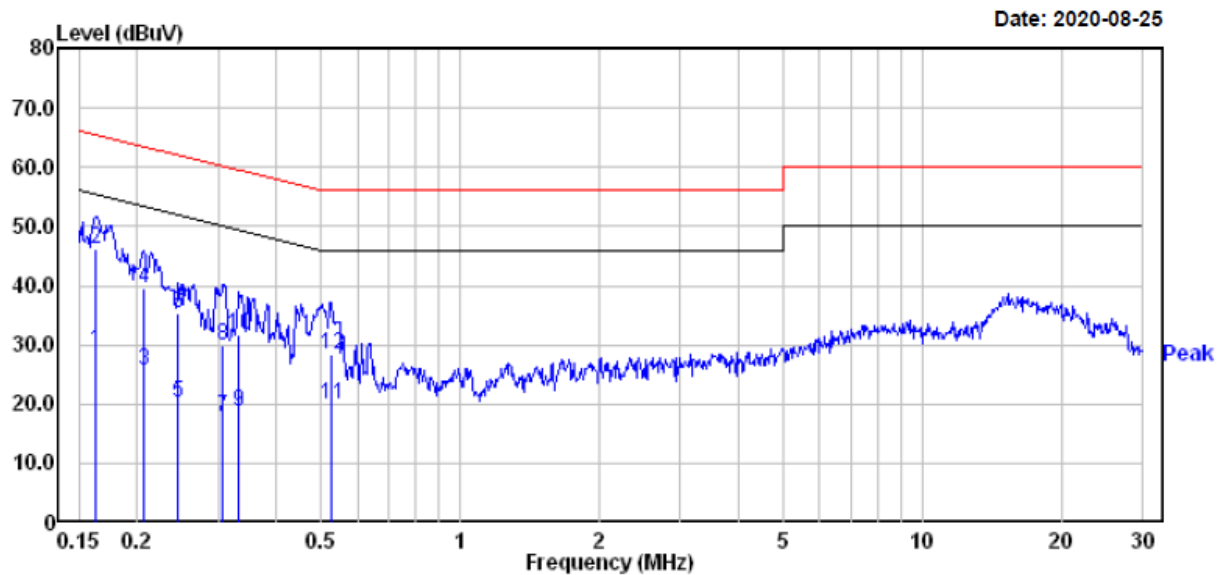
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.176	6.40	19.83	26.23	54.68	-28.45	Average
2	0.176	23.60	19.83	43.43	64.68	-21.25	QP
3	0.205	6.60	19.82	26.42	53.40	-26.98	Average
4	0.205	20.70	19.82	40.52	63.40	-22.88	QP
5	0.247	-0.70	19.82	19.12	51.86	-32.74	Average
6	0.247	14.10	19.82	33.92	61.86	-27.94	QP
7	0.285	-3.30	19.82	16.52	50.68	-34.16	Average
8	0.285	8.00	19.82	27.82	60.68	-32.86	QP
9	0.329	-1.91	19.82	17.91	49.49	-31.58	Average
10	0.329	9.69	19.82	29.51	59.49	-29.98	QP
11	0.510	2.80	19.76	22.56	46.00	-23.44	Average
12	0.510	9.80	19.76	29.56	56.00	-26.44	QP

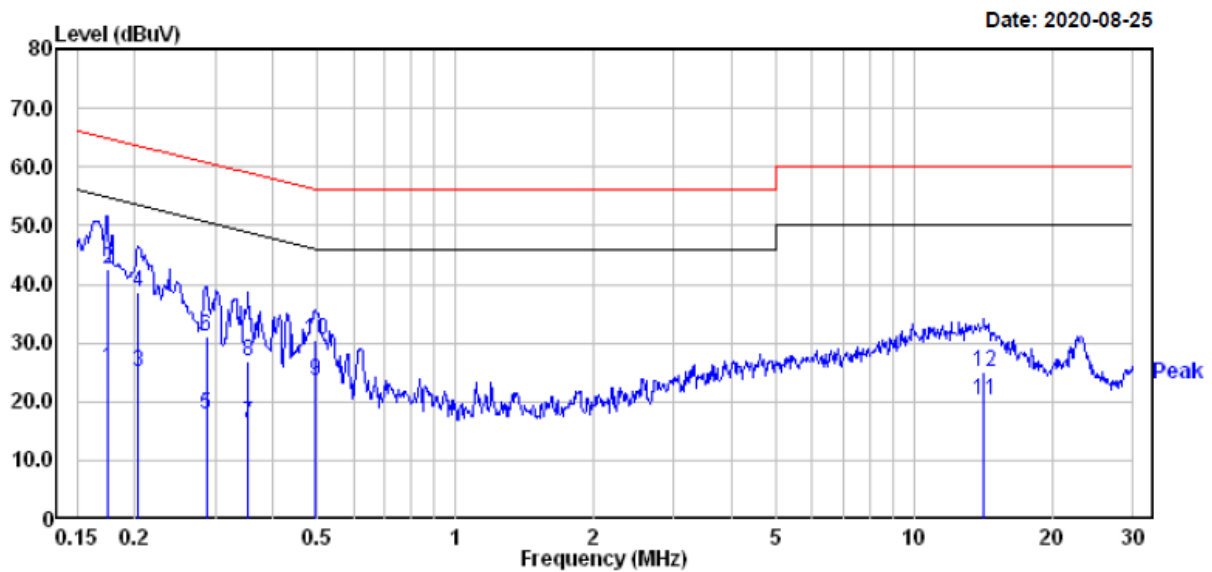
EUT operation mode: Transmitting in 802.11a mode low channel of 5725-5850MHz (worst case)

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.163	9.10	19.83	28.93	55.30	-26.37	Average
2	0.163	26.50	19.83	46.33	65.30	-18.97	QP
3	0.206	5.80	19.82	25.62	53.36	-27.74	Average
4	0.206	19.60	19.82	39.42	63.36	-23.94	QP
5	0.246	0.50	19.82	20.32	51.91	-31.59	Average
6	0.246	15.50	19.82	35.32	61.91	-26.59	QP
7	0.307	-2.01	19.83	17.82	50.06	-32.24	Average
8	0.307	10.09	19.83	29.92	60.06	-30.14	QP
9	0.332	-1.01	19.82	18.81	49.40	-30.59	Average
10	0.332	11.79	19.82	31.61	59.40	-27.79	QP
11	0.527	0.11	19.75	19.86	46.00	-26.14	Average
12	0.527	8.51	19.75	28.26	56.00	-27.74	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.174	5.90	19.83	25.73	54.77	-29.04	Average
2	0.174	22.80	19.83	42.63	64.77	-22.14	QP
3	0.204	5.20	19.82	25.02	53.45	-28.43	Average
4	0.204	18.80	19.82	38.62	63.45	-24.83	QP
5	0.286	-2.00	19.82	17.82	50.63	-32.81	Average
6	0.286	11.30	19.82	31.12	60.63	-29.51	QP
7	0.354	-3.50	19.80	16.30	48.87	-32.57	Average
8	0.354	7.10	19.80	26.90	58.87	-31.97	QP
9	0.494	3.80	19.76	23.56	46.10	-22.54	Average
10	0.494	10.80	19.76	30.56	56.10	-25.54	QP
11	14.213	0.70	19.62	20.32	50.00	-29.68	Average
12	14.213	5.30	19.62	24.92	60.00	-35.08	QP

§15.205 & §15.209 & §15.407(B)(1)(4) (8)(9) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

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

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 5.725-5.85 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.

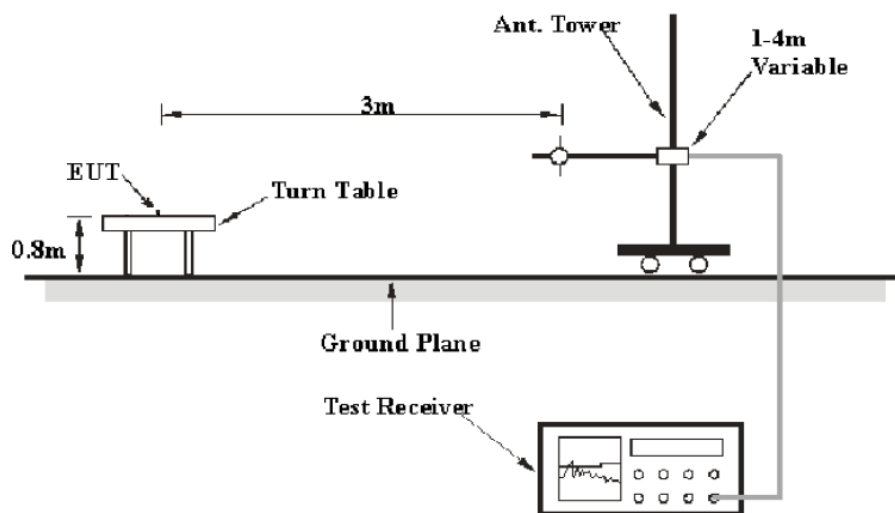
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz.

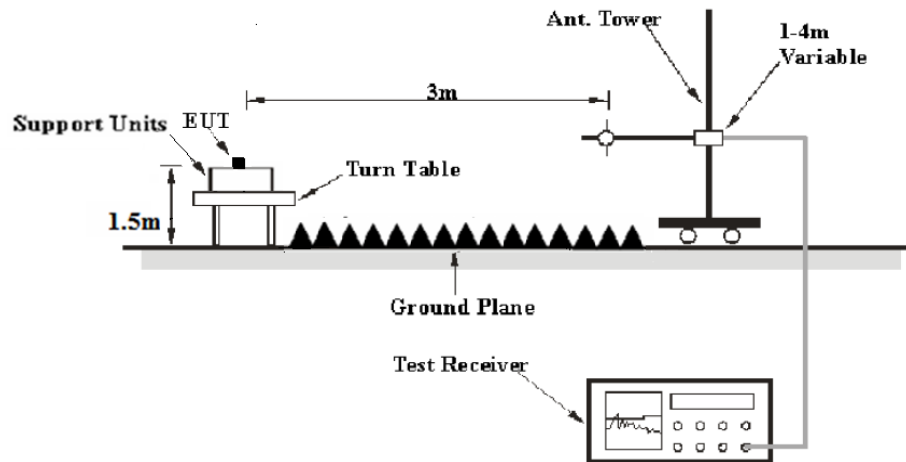
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: $E \text{ [dB}\mu\text{V/m]} = \text{EIRP [dBm]} + 95.2$, for $d = 3$ meters.

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 spacing between the peripherals was 10 cm.

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 Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	PK
	1MHz	3 MHz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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

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

Corrected Amplitude & Margin Calculation

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

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

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

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

Test Data

Environmental Conditions

Temperature:	24.6~25.0°C
Relative Humidity:	48~53%
ATM Pressure:	100.7~101.3 kPa

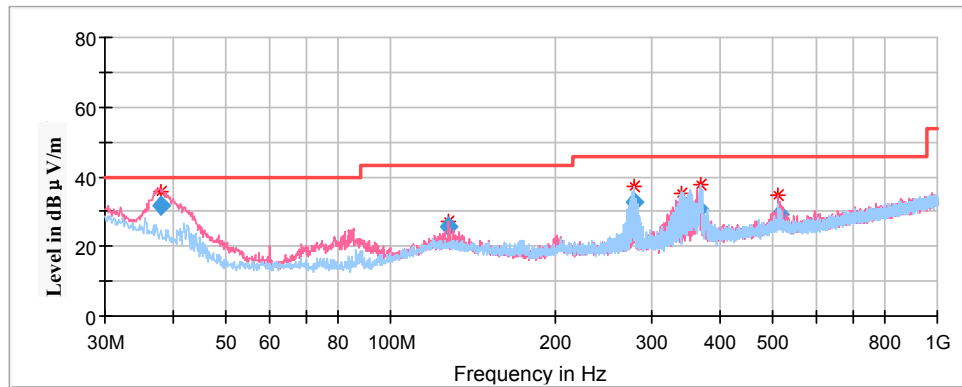
The testing was performed by CK Huang from 2020-09-14 to 2020-09-15.

Test Mode: Transmitting

Spurious Emission Test

30MHz-1GHz(5150-5250MHz Band):

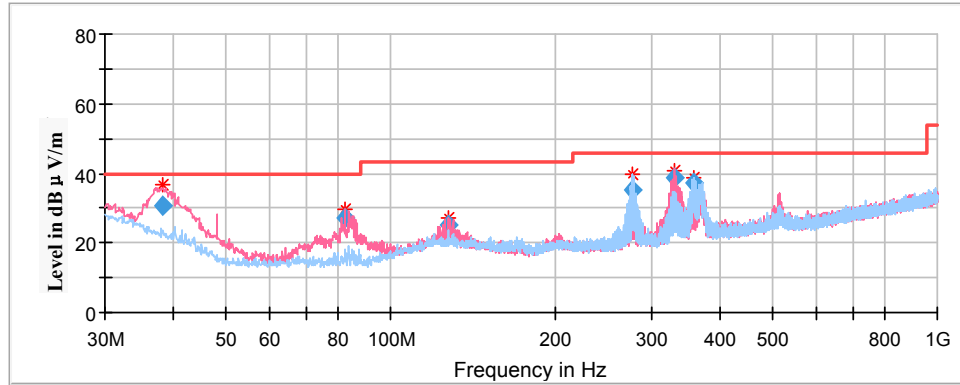
Pre-scan with 802.11a, 802.11ac20, 802.11n-HT20, 802.11ac40, 802.11n-HT40 and 802.11 ac80 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11a mode in high channel in Z-axis of orientation was recorded.



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
38.10	31.70	100.0	V	117.0	-9.9	40.00	8.30
127.27	25.46	100.0	V	170.0	-11.9	43.50	18.04
277.88	32.52	100.0	H	35.0	-11.7	46.00	13.48
341.07	28.77	100.0	H	110.0	-10.0	46.00	17.23
366.97	30.45	100.0	H	30.0	-9.4	46.00	15.55
512.96	29.25	100.0	V	266.0	-6.0	46.00	16.75

30MHz-1GHz(5725-5850MHz Band):

Pre-scan with 802.11a, 802.11ac20, 802.11n-HT20, 802.11ac40, 802.11n-HT40 and 802.11 ac80 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11a mode in low channel in Z-axis of orientation was recorded



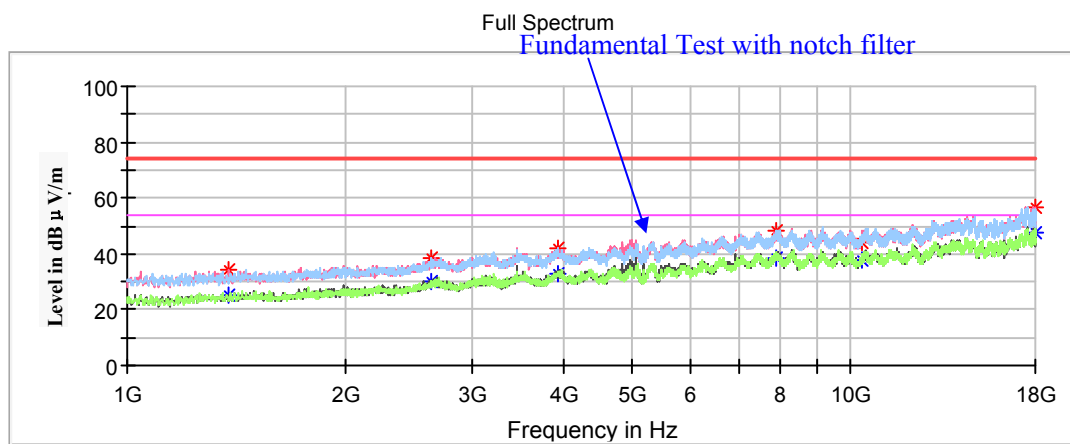
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
38.30	30.90	100.0	V	160.0	-10.0	40.00	9.10
82.57	27.04	100.0	V	218.0	-18.1	40.00	12.96
127.24	25.19	100.0	V	176.0	-11.9	43.50	18.31
276.77	35.38	100.0	H	241.0	-11.7	46.00	10.62
330.31	38.71	200.0	V	103.0	-10.3	46.00	7.29
357.94	37.25	100.0	H	283.0	-9.6	46.00	8.75

1GHz-18GHz(5150-5250MHz Band):**802.11a Mode(Chain 0):**

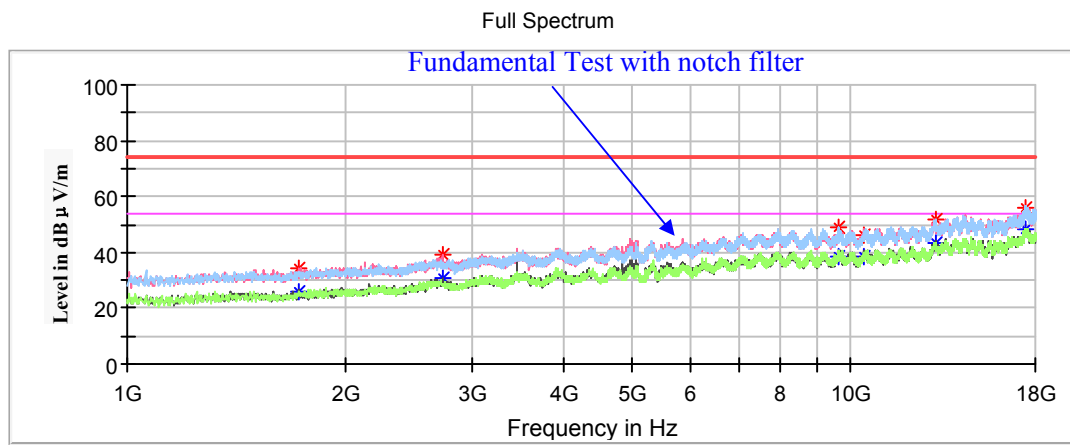
(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

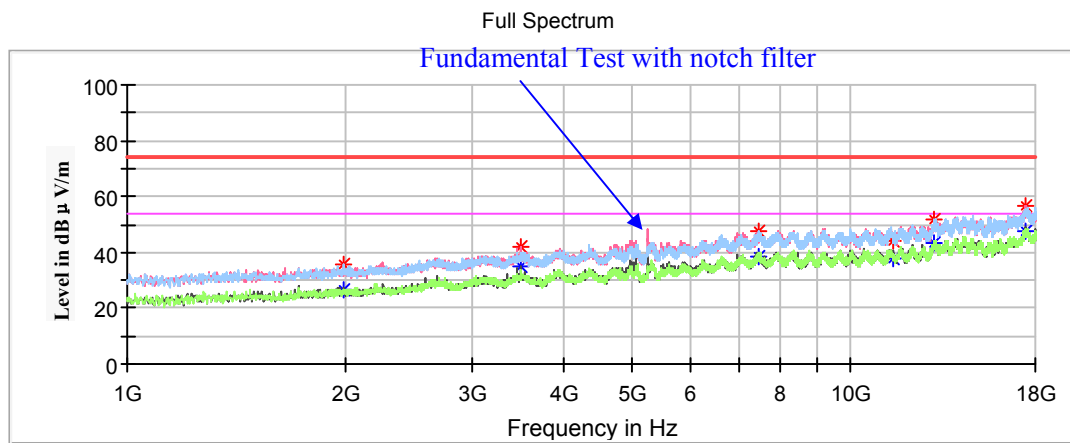
Low Channel: 5180MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1384.20	---	25.26	200	V	128.0	-17.0	54.00	28.74
1384.20	33.93	---	200	V	128.0	-17.0	74.00	40.07
2628.60	38.73	---	200	V	35.0	-11.8	68.20	29.47
3941.00	---	33.15	150	V	239.0	-7.2	54.00	20.85
3941.00	42.08	---	150	V	239.0	-7.2	74.00	31.92
7903.70	48.56	---	200	V	194.0	1.7	68.20	19.64
10360.20	44.13	---	200	H	321.0	2.2	68.20	24.07
17945.60	---	47.74	150	H	199.0	8.8	54.00	6.26
17945.60	56.86	---	150	H	199.0	8.8	74.00	17.14

Middle Channel: 5200MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1731.00	34.57	---	200	H	180.0	-15.5	68.20	33.63
2723.80	---	30.53	200	V	224.0	-11.4	54.00	23.47
2723.80	39.08	---	200	V	224.0	-11.4	74.00	34.92
9639.40	48.93	---	150	H	116.0	2.1	68.20	19.27
10399.30	45.92	---	150	V	137.0	2.2	68.20	22.28
13088.70	51.81	---	150	H	0.0	5.3	68.20	16.39
17444.10	55.73	---	150	H	160.0	8.7	68.20	12.47

High Channel: 5240MHz



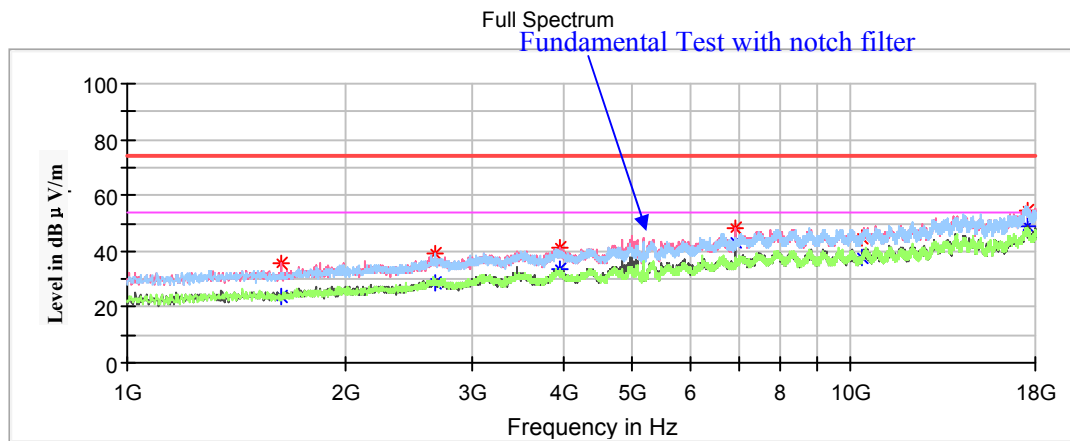
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1989.40	35.87	---	200	V	48.0	-14.5	68.20	32.33
3492.20	41.67	---	150	V	88.0	-8.8	68.20	26.53
7463.40	---	38.36	150	H	0.0	1.0	54.00	15.64
7463.40	47.56	---	150	H	0.0	1.0	74.00	26.44
11480.50	---	37.78	150	H	179.0	2.8	54.00	16.22
11480.50	44.35	---	150	V	24.0	2.8	74.00	29.65
13053.00	51.77	---	200	H	249.0	5.3	68.20	16.43
17493.40	56.86	---	200	V	356.0	8.9	68.20	11.34

802.11a Mode(Chain 1):

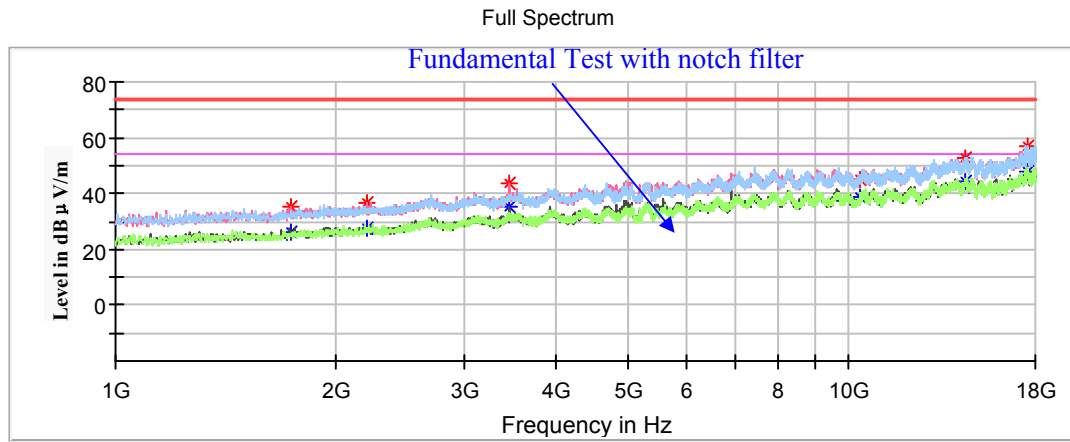
(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

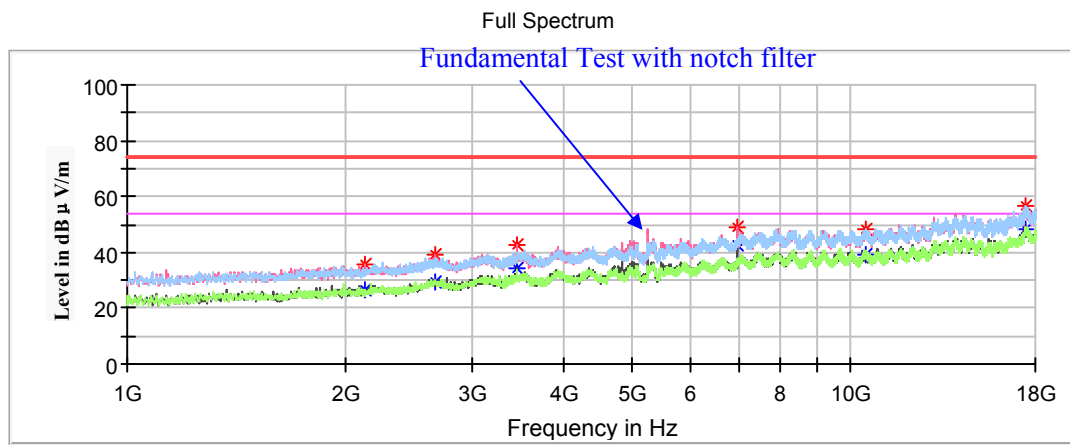
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1632.40	35.51	---	200	V	284.0	-15.9	68.20	32.69
2664.30	38.90	---	200	H	61.0	-11.7	68.20	29.30
3968.20	---	33.60	150	V	292.0	-7.1	54.00	20.40
3968.20	41.19	---	150	V	292.0	-7.1	74.00	32.81
6905.80	48.33	---	200	V	144.0	-0.3	68.20	19.87
10360.20	44.99	---	200	V	78.0	2.2	68.20	23.21
17512.10	54.73	---	200	H	244.0	8.9	68.20	13.47

Middle Channel: 5200MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1736.10	35.46	---	150	V	80.00	-15.50	68.20	32.74
2207.00	---	27.77	150	V	266.00	-13.60	54.00	26.23
2207.00	36.63	---	150	V	266.00	-13.60	74.00	37.37
3454.80	43.40	---	200	V	321.00	-8.90	68.20	24.80
10399.30	45.05	---	150	V	174.00	2.20	68.20	23.15
14411.30	52.68	---	150	H	280.00	6.50	68.20	15.52
17522.30	57.12	---	150	H	106.00	8.90	68.20	11.08

High Channel: 5240MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
2128.80	35.62	---	200	V	65.0	-13.9	68.20	32.58
2662.60	39.30	---	200	V	231.0	-11.7	68.20	28.90
3454.80	42.57	---	200	V	310.0	-8.9	68.20	25.63
6985.70	48.94	---	150	V	194.0	-0.1	68.20	19.26
10472.40	48.57	---	150	H	1.0	2.3	68.20	19.63
17445.80	56.42	---	150	H	358.0	8.7	68.20	11.78

Chain 0&1:**802.11ac20 Mode:**

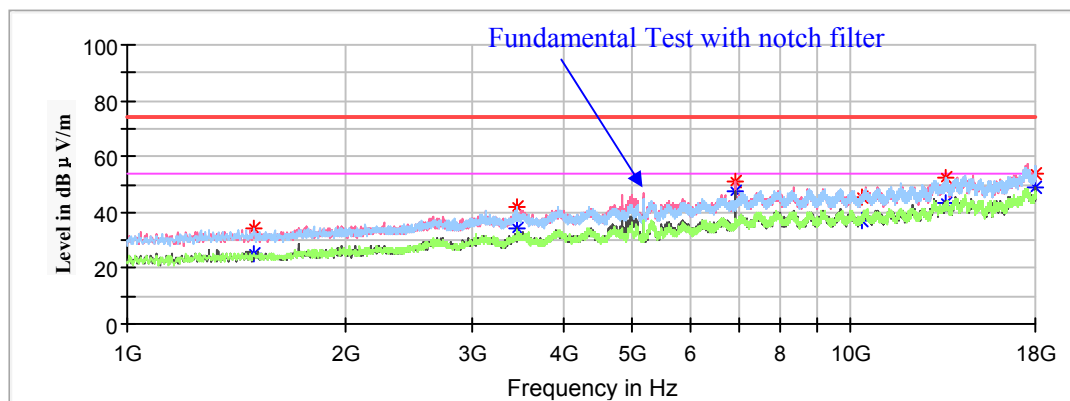
(Pre-scan in the X, Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz

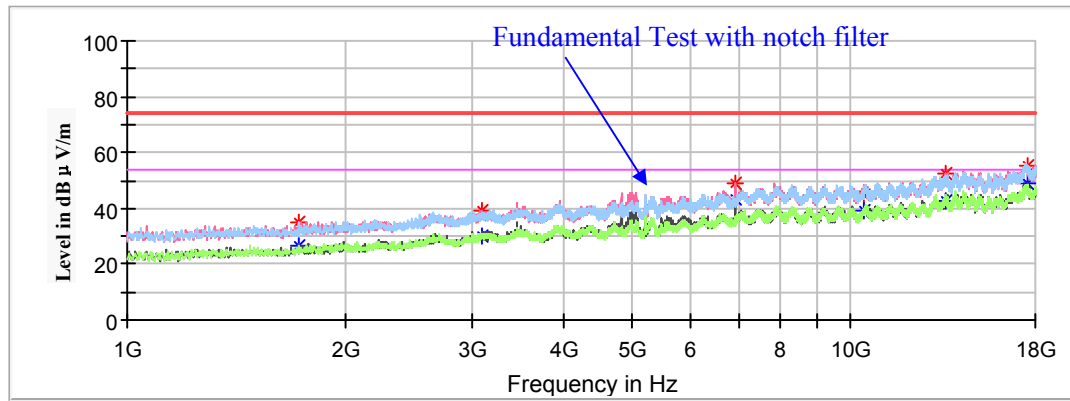
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1499.80	---	25.29	200	H	274.0	-16.4	54.00	28.71
1499.80	34.46	---	200	H	274.0	-16.4	74.00	39.54
3453.10	42.00	---	150	H	245.0	-8.9	68.20	26.20
6905.80	50.98	---	150	V	194.0	-0.3	68.20	17.22
10360.20	45.65	---	200	V	335.0	2.2	68.20	22.55
13569.80	52.26	---	150	H	298.0	5.7	68.20	15.94
17967.70	54.07	---	200	V	161.0	8.8	74.00	19.93
17967.70	---	48.87	200	V	161.0	8.8	54.00	5.13

Middle Channel: 5200MHz

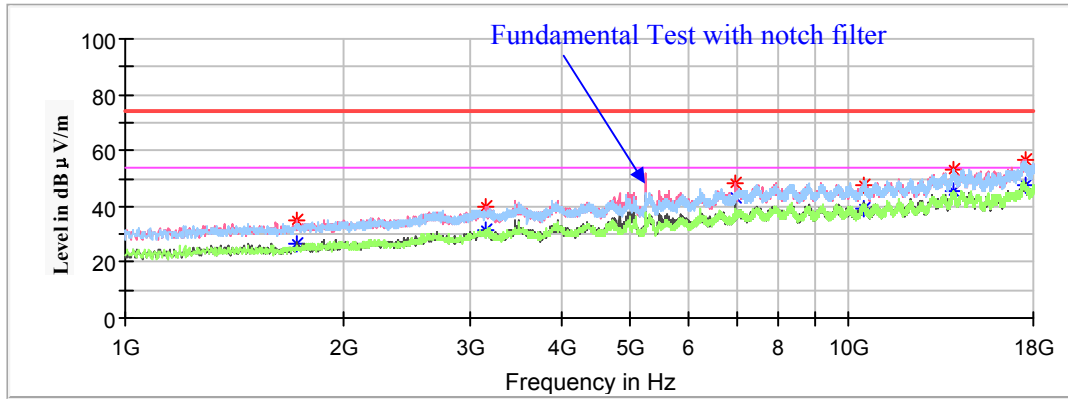
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1722.50	34.90	---	150	H	39.0	-15.5	68.20	33.30
3087.60	39.46	---	150	V	269.0	-9.9	68.20	28.74
6933.00	48.76	---	150	V	193.0	-0.2	68.20	19.44
10399.30	44.62	---	200	V	352.0	2.2	68.20	23.58
13546.00	52.61	---	200	V	142.0	5.7	68.20	15.59
17527.40	54.95	---	200	V	98.0	8.9	68.20	13.25

High Channel: 5240MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1725.90	34.80	---	200	V	206.0	-15.5	68.20	33.40
3147.10	39.81	---	150	V	223.0	-9.7	68.20	28.39
6985.70	48.40	---	150	V	198.0	-0.1	68.20	19.80
10479.20	47.21	---	150	V	107.0	2.3	68.20	20.99
13974.40	53.20	---	200	H	338.0	6.1	68.20	15.00
17576.70	56.60	---	150	V	325.0	8.9	68.20	11.60

802.11n-HT20 Mode:

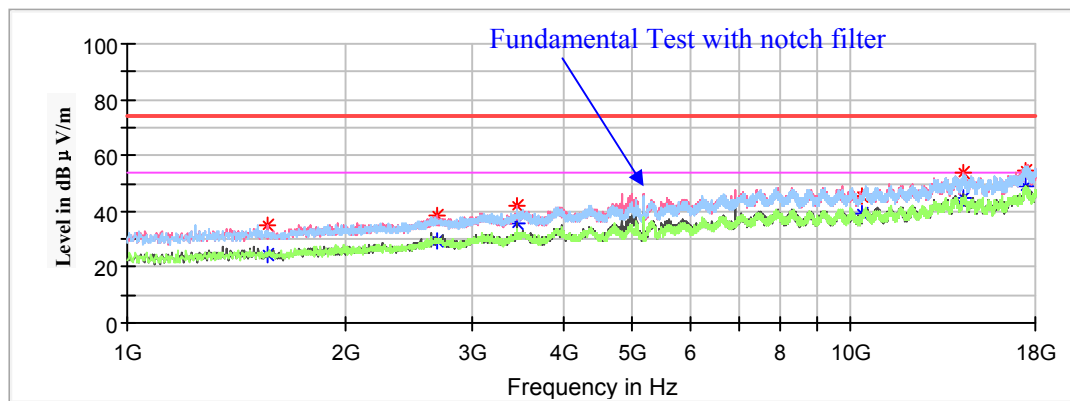
Pre-scan with X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz

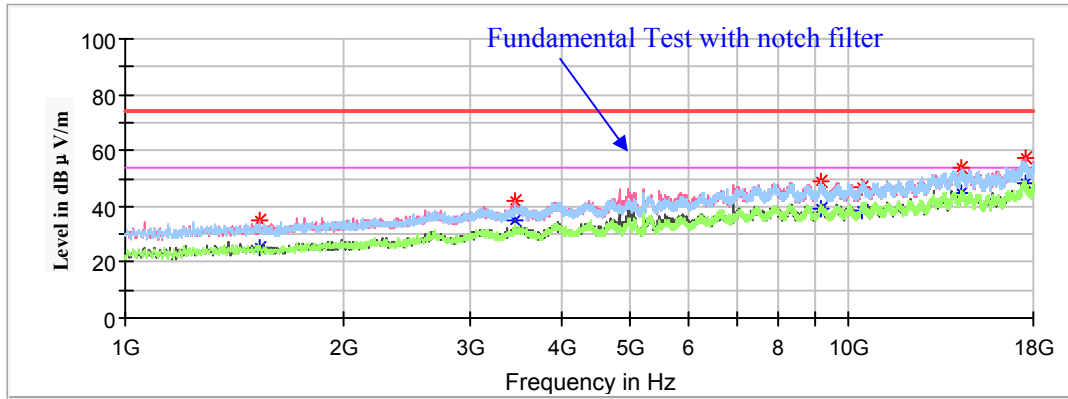
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1566.10	---	24.35	150	H	0.0	-16.1	54.00	29.65
1566.10	35.02	---	150	H	0.0	-16.1	74.00	38.98
2674.50	38.26	---	150	V	274.0	-11.6	68.20	29.94
3454.80	41.80	---	200	V	0.0	-8.9	68.20	26.40
10360.20	45.28	---	150	H	112.0	2.2	68.20	22.92
14333.10	53.68	---	150	V	249.0	6.4	68.20	14.52
17476.40	54.44	---	150	V	249.0	8.8	68.20	13.76

Middle Channel: 5200MHz

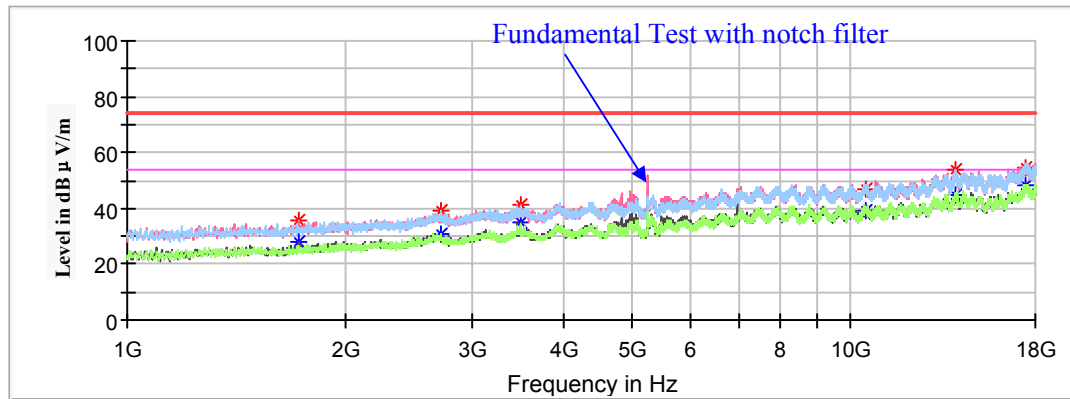
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1533.80	---	25.12	150	H	4.0	-16.2	54.00	28.88
1533.80	34.85	---	150	H	4.0	-16.2	74.00	39.15
3465.00	41.70	---	200	V	117.0	-8.9	68.20	26.50
9148.10	---	39.21	200	H	62.0	2.0	54.00	14.79
9148.10	49.14	---	200	H	62.0	2.0	74.00	24.86
10399.30	46.71	---	200	V	180.0	2.2	68.20	21.49
14328.00	53.83	---	150	V	0.0	6.4	68.20	14.37
17563.10	57.11	---	150	V	54.0	8.9	68.20	11.09

High Channel: 5240MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1727.60	35.77	---	200	V	218.0	-15.5	68.20	35.43
2720.40	---	30.92	150	H	90.0	-11.4	54.00	23.08
2720.40	38.94	---	150	H	90.0	-11.4	74.00	35.06
3492.20	41.49	---	200	V	116.0	-8.8	68.20	26.71
10480.90	46.94	---	150	V	0.0	2.3	68.20	21.26
13921.70	53.88	---	150	H	335.0	6.1	68.20	14.32
17501.90	54.77	---	200	V	98.0	8.9	68.20	13.43

802.11ac40 Mode:

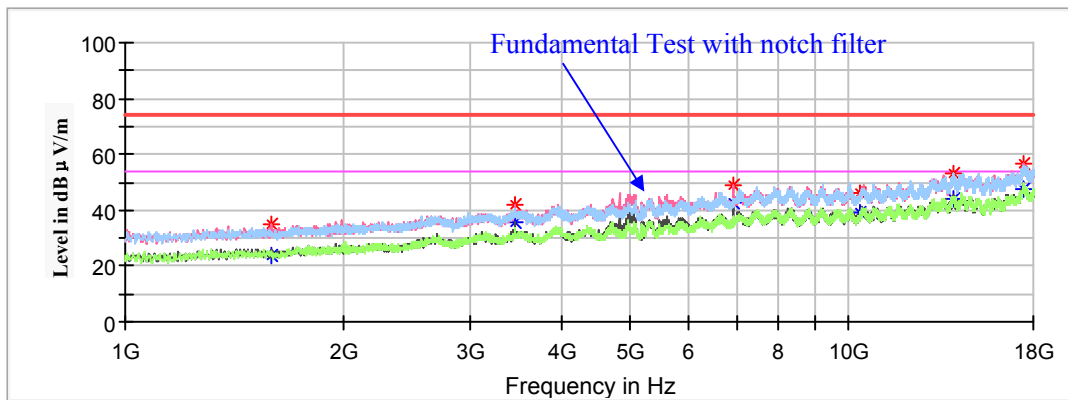
(Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.)

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5190MHz

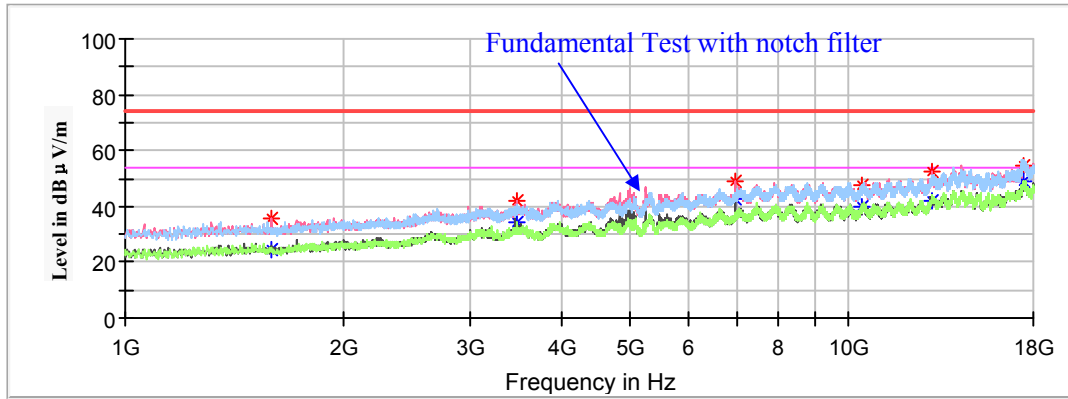
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1589.90	---	23.86	150	V	257.0	-16.0	54.00	30.14
1589.90	35.31	---	150	V	257.0	-16.0	74.00	38.69
3454.80	41.66	---	150	V	295.0	-8.9	68.20	26.54
6919.40	49.01	---	150	V	193.0	-0.2	68.20	19.19
10380.60	46.42	---	200	H	0.0	2.2	68.20	21.78
13979.50	53.09	---	150	V	0.0	6.1	68.20	15.11
17444.10	56.49	---	200	V	324.0	8.7	68.20	11.71

High Channel: 5230MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1589.90	---	24.42	200	H	25.0	-16.0	54.00	29.58
1589.90	35.65	---	200	H	25.0	-16.0	74.00	38.35
3485.40	42.01	---	200	V	121.0	-8.9	68.20	26.19
6972.10	49.22	---	150	V	198.0	-0.1	68.20	18.98
10460.50	47.51	---	150	H	335.0	2.3	68.20	20.69
13029.20	52.63	---	200	V	60.0	5.2	68.20	15.57
17500.20	54.62	---	200	H	0.0	8.9	68.20	13.58

802.11n-HT40 Mode:

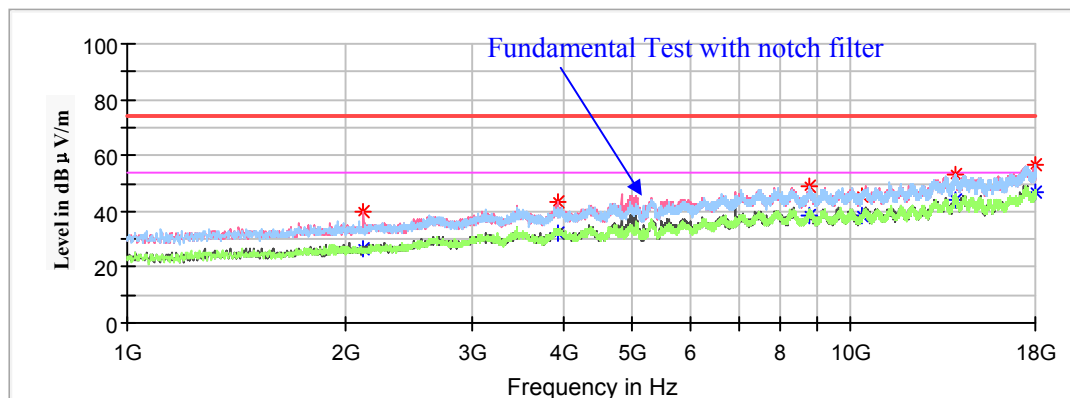
Pre-scan with X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5190MHz

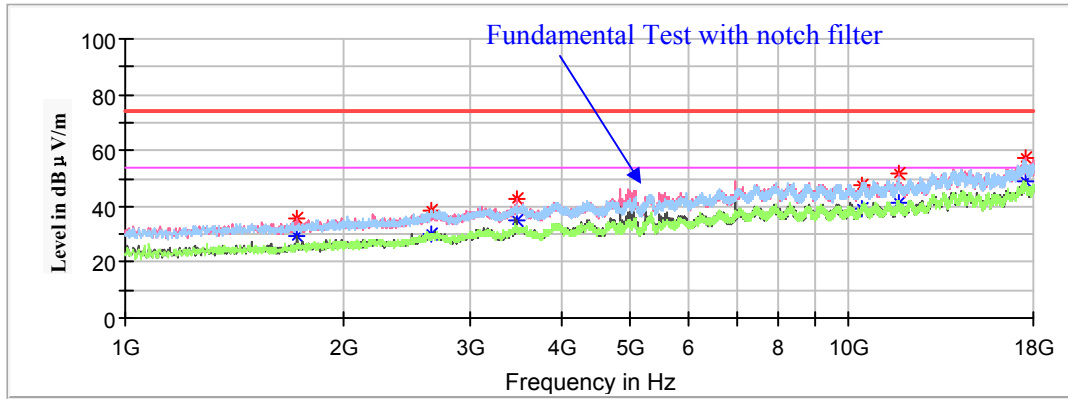
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
2123.70	39.56	---	200	V	65.0	-14.0	68.20	28.64
3942.70	---	32.34	200	V	283.0	-7.2	54.00	21.66
3942.70	43.02	---	200	V	283.0	-7.2	74.00	30.98
8792.80	48.91	---	150	H	61.0	1.7	68.20	19.29
10360.20	45.55	---	150	H	48.0	2.2	68.20	22.65
13977.80	53.05	---	200	V	180.0	6.1	68.20	15.15
17950.70	---	46.86	150	H	226.0	8.8	54.00	7.14
17950.70	56.89	---	150	H	226.0	8.8	74.00	17.11

High Channel: 5230MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1731.00	35.70	---	200	V	218.0	-15.5	68.20	32.50
2654.10	38.57	---	150	H	162.0	-11.7	68.20	29.63
3485.40	42.95	---	200	V	90.0	-8.9	68.20	25.25
10460.50	47.54	---	200	V	1.0	2.3	68.20	20.66
11766.10	---	41.22	200	V	103.0	3.3	54.00	12.78
11766.10	51.64	---	200	V	103.0	3.3	74.00	22.36
17527.40	57.29	---	200	V	90.0	8.9	68.20	10.91

802.11ac80 Mode:

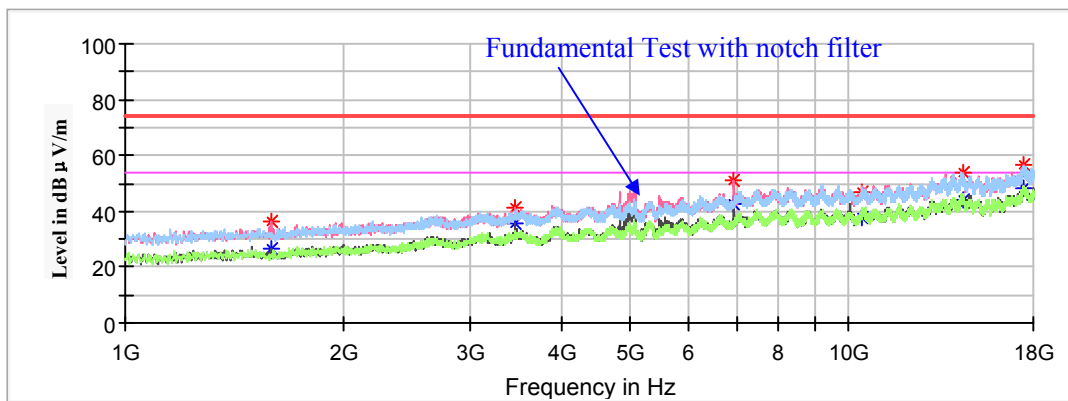
Pre-scan with X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5210MHz

Full Spectrum



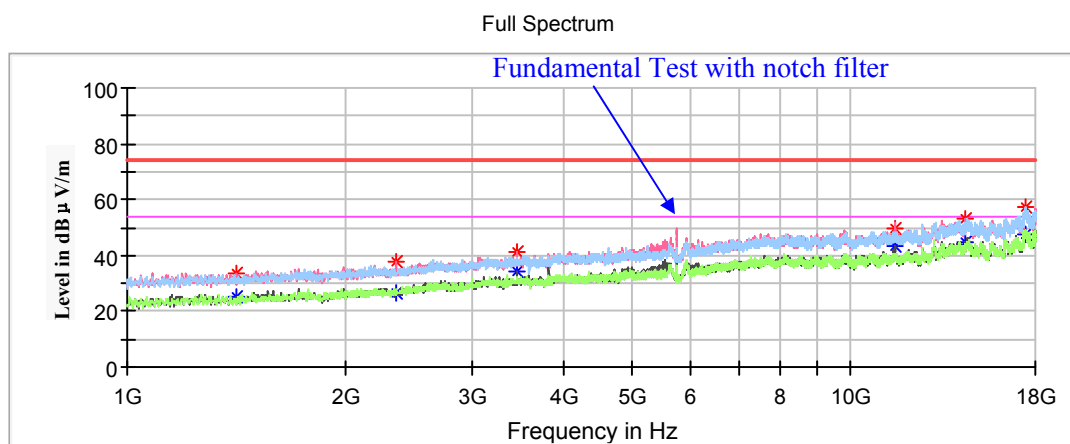
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.00	---	26.24	200	V	175.0	-16.0	54.00	27.76
1595.00	36.38	---	200	V	175.0	-16.0	74.00	37.62
3454.80	41.24	---	150	V	301.0	-8.9	68.20	26.96
6946.60	50.86	---	150	V	195.0	-0.2	68.20	17.34
10419.70	46.98	---	200	V	162.0	2.2	68.20	21.22
14389.20	53.72	---	150	V	143.0	6.4	68.20	14.48
17498.50	56.97	---	150	V	339.0	8.9	68.20	11.23

5725-5850MHz Band:**1GHz-18GHz:****802.11a Mode(Chain 0):**

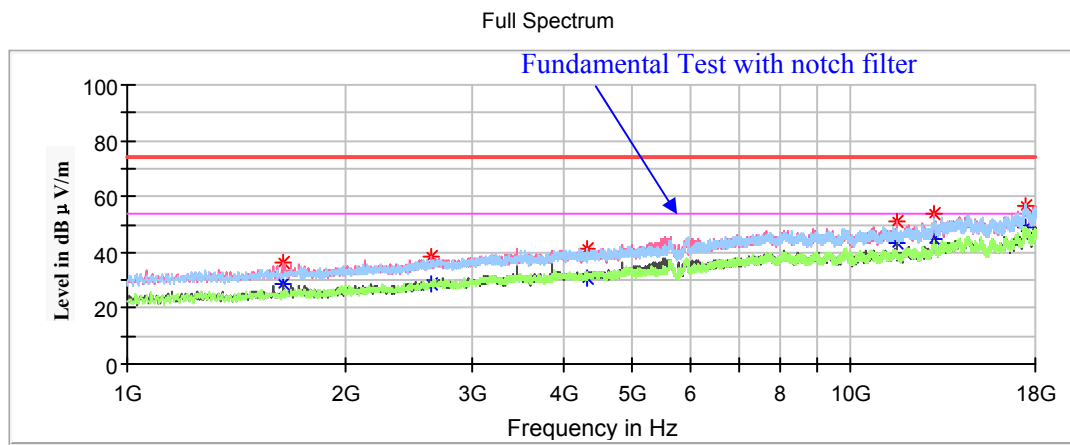
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz

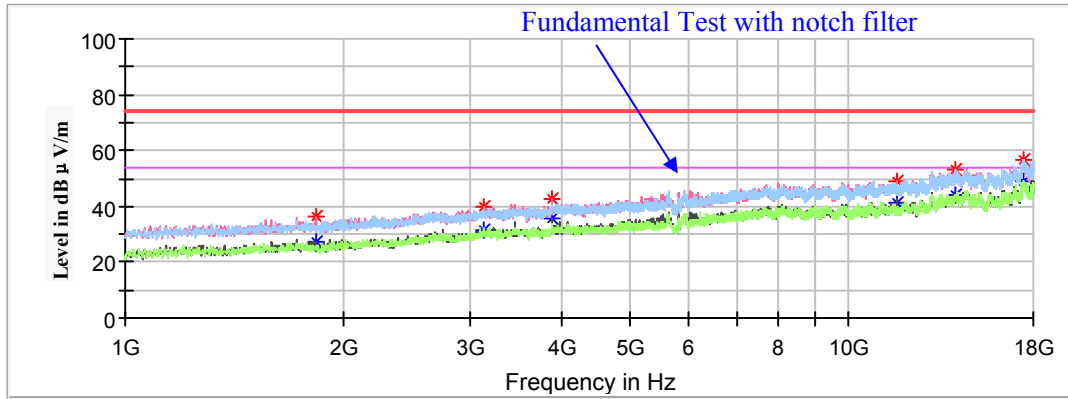
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1411.40	---	25.35	150	V	76.0	-16.8	54.00	28.65
1411.40	33.63	---	150	V	76.0	-16.8	74.00	40.37
2358.30	---	26.57	150	V	63.0	-13.0	54.00	27.43
2358.30	37.49	---	150	V	63.0	-13.0	74.00	36.51
3454.80	41.00	---	150	V	296.0	-8.9	68.20	27.20
11490.70	---	43.28	200	V	4.0	2.8	54.00	10.72
11490.70	49.79	---	200	V	4.0	2.8	74.00	24.21
14433.40	53.44	---	200	V	353.0	6.5	68.20	14.76
17501.90	57.03	---	200	H	326.0	8.9	68.20	11.17

Middle Channel: 5785MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1637.50	36.03	---	150	V	283.0	-15.8	68.20	32.17
2632.00	38.61	---	150	V	116.0	-11.8	68.20	29.59
4333.70	---	30.74	200	H	76.0	-6.5	54.00	23.26
4333.70	41.02	---	200	H	76.0	-6.5	74.00	32.98
11570.60	---	43.33	200	V	4.0	2.9	54.00	10.67
11570.60	51.05	---	200	V	4.0	2.9	74.00	22.95
13068.30	53.62	---	200	V	335.0	5.3	68.20	14.58
17405.00	56.80	---	150	V	155.0	8.6	68.20	11.40

High Channel: 5825MHz

Full Spectrum



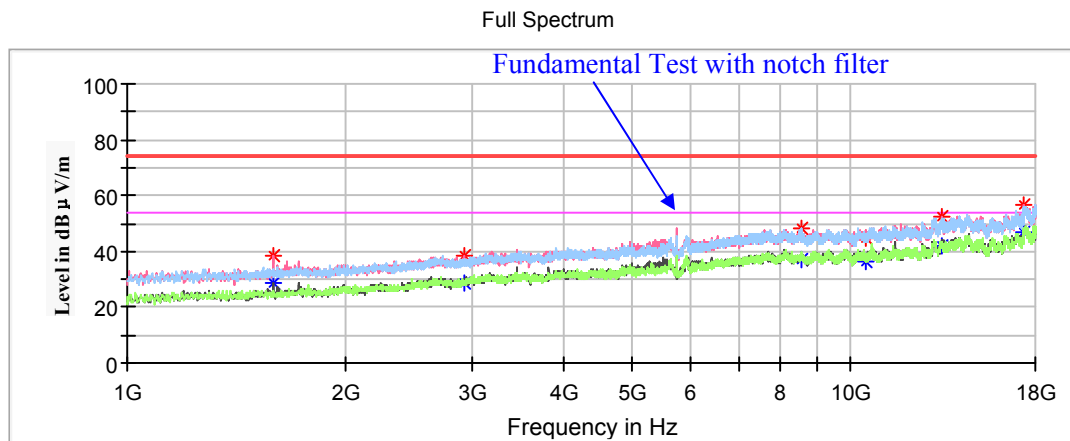
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1831.30	36.15	---	150	V	263.0	-15.1	68.20	32.05
3133.50	40.05	---	150	V	116.0	-9.8	68.20	28.15
3883.20	---	35.33	150	V	63.0	-7.4	54.00	18.67
3883.20	42.70	---	150	V	63.0	-7.4	74.00	31.30
11650.50	---	41.33	150	V	156.0	3.1	54.00	12.67
11650.50	48.84	---	150	V	156.0	3.1	74.00	25.16
14088.30	53.07	---	200	H	321.0	6.2	68.20	15.13
17430.50	56.53	---	150	V	0.0	8.7	68.20	11.67

802.11a Mode(Chain 1):

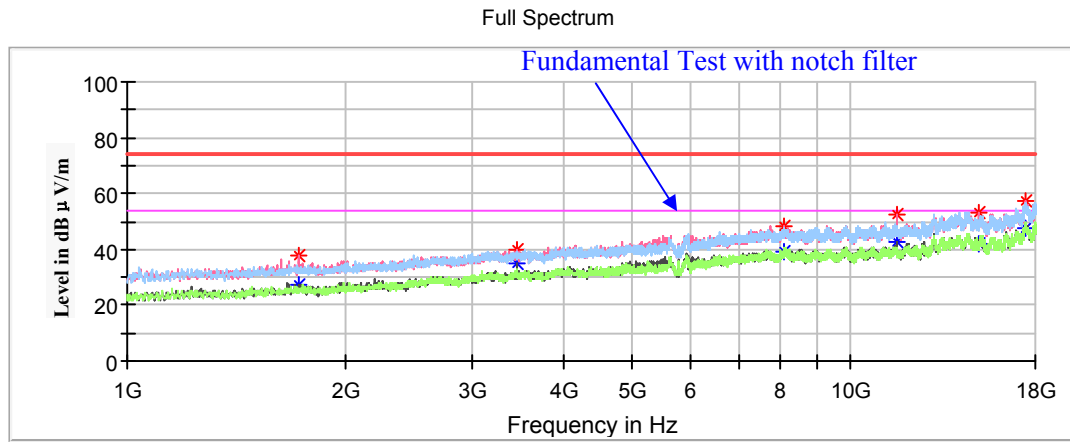
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz

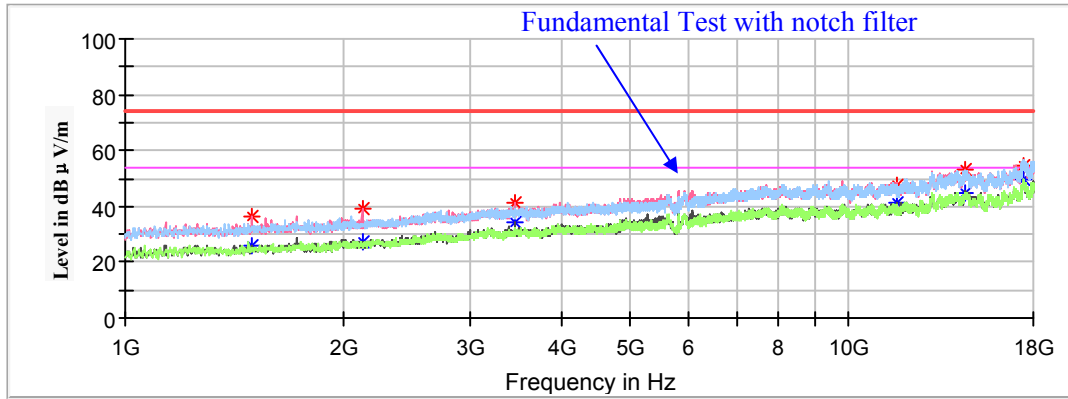
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1591.60	---	28.66	200	V	64.0	-16.0	54.00	25.34
1591.60	38.20	---	200	V	64.0	-16.0	74.00	35.80
2915.90	38.37	---	150	V	288.0	-10.5	68.20	29.83
8541.20	48.57	---	150	H	136.0	1.4	68.20	19.63
10489.40	45.01	---	200	H	300.0	2.3	68.20	23.19
13367.50	---	42.14	200	V	14.0	5.6	54.00	11.86
13367.50	52.32	---	200	V	14.0	5.6	74.00	21.68
17393.10	56.88	---	150	V	173.0	8.5	68.20	11.32

Middle Channel: 5785MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1722.50	37.52	---	150	V	296.0	-15.5	68.20	30.68
3454.80	40.03	---	150	V	296.0	-8.9	68.20	28.17
8087.30	---	39.12	150	H	76.0	1.7	54.00	14.88
8087.30	48.19	---	150	H	76.0	1.7	74.00	25.81
11570.60	---	42.54	200	V	216.0	2.9	54.00	11.46
11570.60	52.75	---	200	V	216.0	2.9	74.00	21.25
15074.30	53.01	---	150	V	334.0	5.0	68.20	15.19
17493.40	57.41	---	150	V	77.0	8.9	68.20	10.79

High Channel: 5825MHz

Full Spectrum



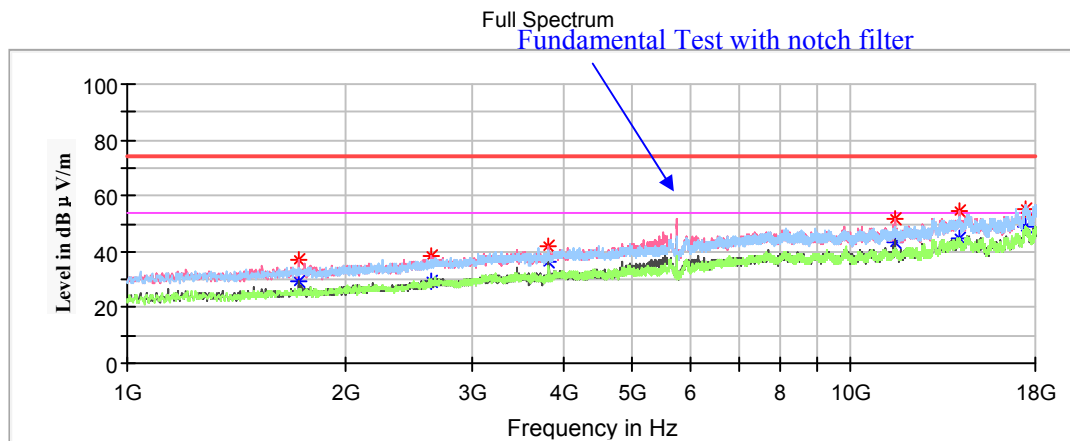
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Height (cm)	Polar (H/V)				
1498.10	---	25.98	200	V	271.0	-16.4	54.00	28.02
1498.10	36.08	---	200	V	271.0	-16.4	74.00	37.92
2125.40	39.01	---	200	V	65.0	-14.0	68.20	29.19
3454.80	41.18	---	200	V	311.0	-8.9	68.20	27.02
11650.50	47.60	---	150	V	339.0	3.1	74.00	26.40
11650.50	---	41.20	150	V	339.0	3.1	54.00	12.80
14513.30	53.13	---	200	V	65.0	6.5	68.20	15.07
17479.80	54.73	---	200	H	295.0	8.8	68.20	13.47

Chain 0&1:**802.11ac20 Mode:**

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

Note:

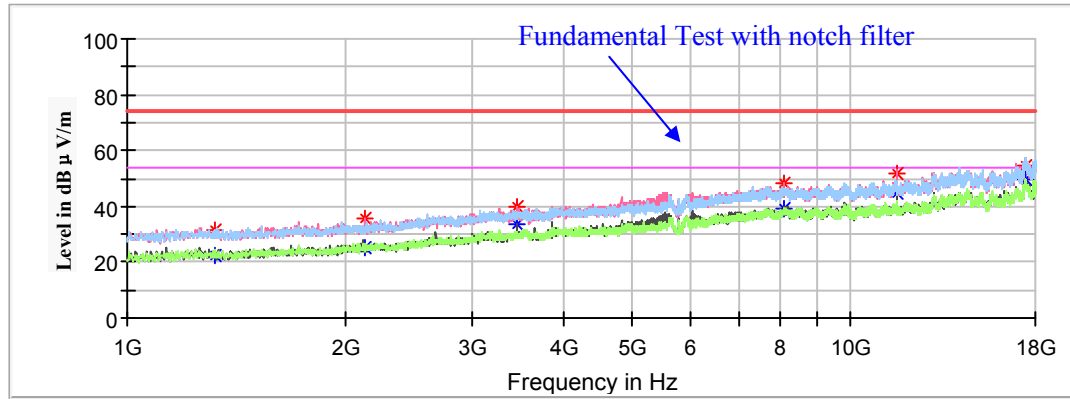
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz

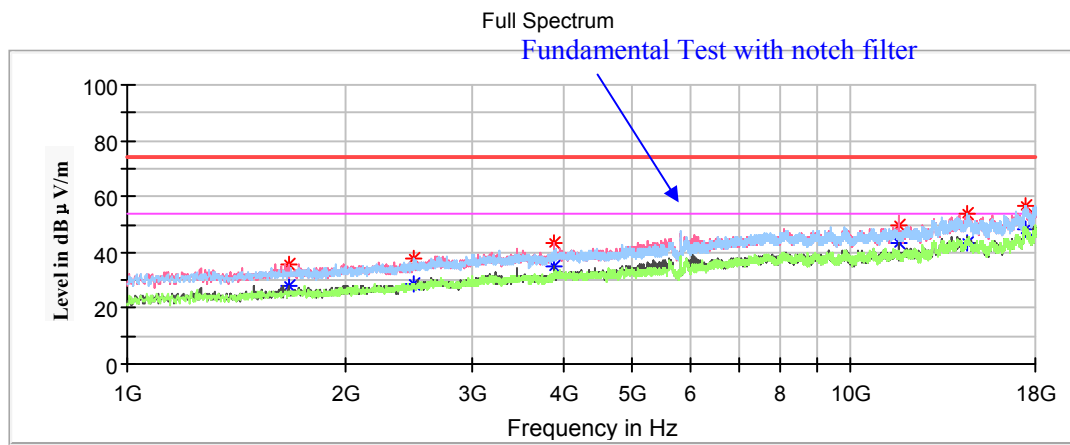
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1725.90	36.89	---	150	V	357.0	-15.5	68.20	31.31
2632.00	38.35	---	150	V	301.0	-11.8	68.20	29.85
3828.80	---	36.12	200	V	230.0	-7.6	54.00	17.88
3828.80	42.00	---	200	V	230.0	-7.6	74.00	32.00
11490.70	51.55	---	150	V	276.0	2.8	74.00	22.45
11490.70	---	43.56	150	V	276.0	2.8	54.00	10.44
14093.40	54.45	---	200	V	282.0	6.2	68.20	13.75
17493.40	55.59	---	150	H	0.0	8.9	68.20	12.61

Middle Channel: 5785MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1324.70	---	22.11	150	H	1.0	-17.3	54.00	31.89
1324.70	31.79	---	150	H	1.0	-17.3	74.00	42.21
2130.50	35.63	---	200	V	64.0	-13.9	68.20	32.57
3454.80	40.19	---	200	V	1.0	-8.9	68.20	28.01
8092.40	48.22	---	150	V	51.0	1.7	74.00	25.78
8092.40	---	39.39	150	V	51.0	1.7	54.00	14.61
11570.60	---	45.10	200	V	217.0	2.9	54.00	8.90
11570.60	51.59	---	200	V	217.0	2.9	74.00	16.61
17447.50	54.71	---	200	V	140.0	8.7	68.20	13.49

High Channel: 5825MHz

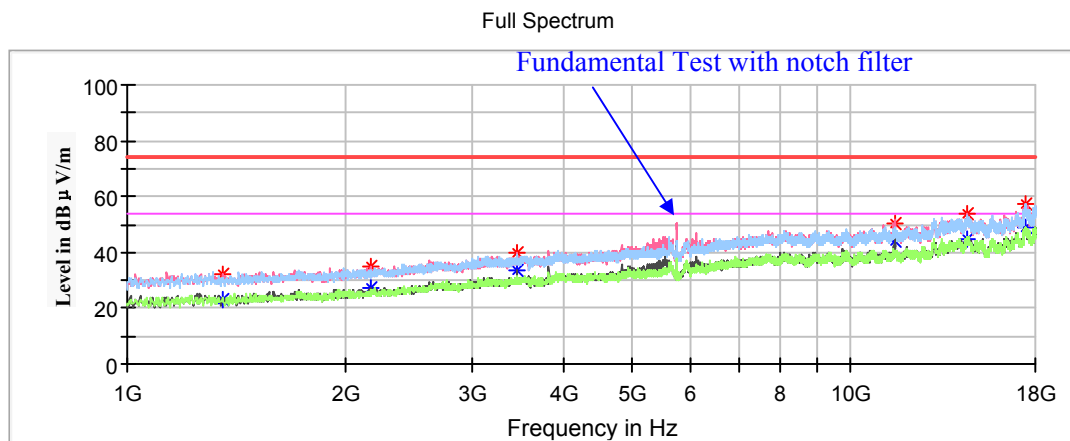
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1669.80	---	27.75	150	V	276.0	-15.7	54.00	26.25
1669.80	35.40	---	150	V	276.0	-15.7	74.00	38.60
2490.90	---	28.57	200	H	36.0	-12.5	54.00	25.43
2490.90	37.70	---	200	H	36.0	-12.5	74.00	36.30
3883.20	---	34.90	150	V	220.0	-7.4	54.00	19.10
3883.20	43.21	---	150	V	220.0	-7.4	74.00	30.79
11650.50	---	43.09	200	V	200.0	3.1	54.00	10.91
11650.50	49.35	---	200	V	200.0	3.1	74.00	24.65
14494.60	---	43.15	150	H	11.0	6.5	54.00	10.85
14494.60	53.58	---	150	H	11.0	6.5	74.00	20.42
17442.40	56.73	---	200	V	187.0	8.7	68.20	11.47

802.11n-HT20 Mode:

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

Note:

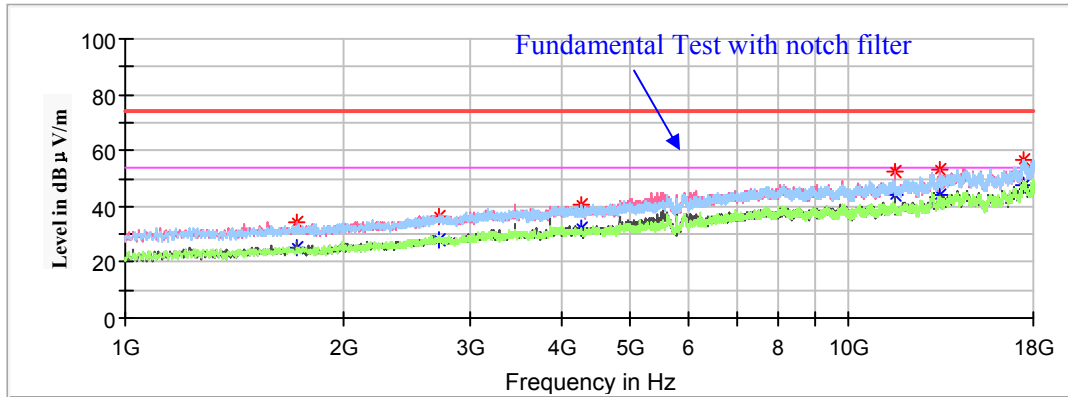
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz

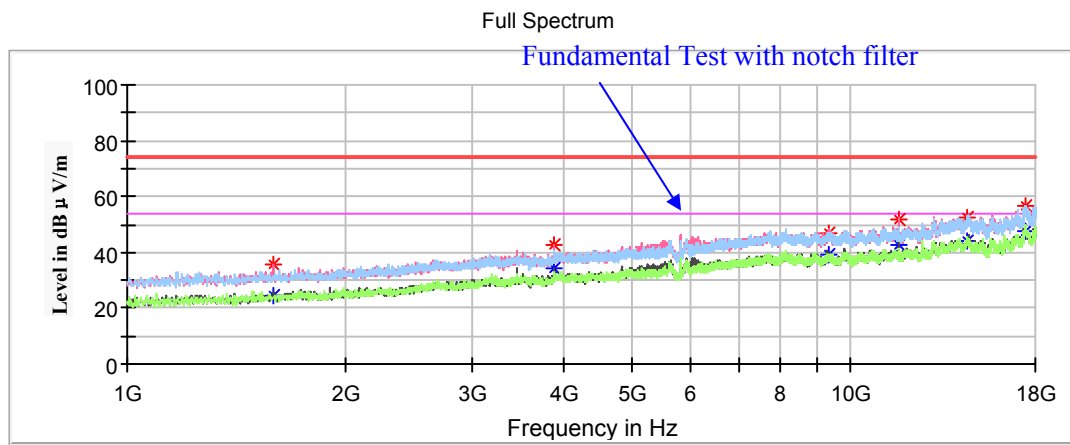
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1353.60	---	23.27	150	V	258.0	-17.2	54.00	30.73
1353.60	32.32	---	150	V	258.0	-17.2	74.00	41.68
2166.20	34.96	---	150	V	4.0	-13.8	68.20	33.24
3454.80	39.57	---	200	V	301.0	-8.9	68.20	28.63
11490.70	---	43.90	200	V	186.0	2.8	54.00	10.10
11490.70	50.47	---	200	V	186.0	2.8	74.00	23.53
14521.80	54.07	---	200	V	82.0	6.5	68.20	14.13
17454.30	57.56	---	200	H	244.0	8.7	68.20	10.64

Middle Channel: 5785MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1724.20	34.58	---	200	V	220.0	-15.5	68.20	33.62
2722.10	---	27.77	150	V	161.0	-11.4	54.00	26.23
2722.10	36.46	---	150	H	313.0	-11.4	74.00	37.54
4260.60	---	32.37	200	H	176.0	-6.6	54.00	21.63
4260.60	40.90	---	200	H	176.0	-6.6	74.00	33.10
11568.90	---	44.08	200	V	207.0	2.9	54.00	9.92
11568.90	52.14	---	200	V	207.0	2.9	74.00	21.86
13382.80	---	44.17	150	V	123.0	5.6	54.00	9.83
13382.80	53.25	---	150	V	123.0	5.6	74.00	20.75
17462.80	56.46	---	200	H	8.0	8.8	68.20	11.74

High Channel: 5825MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1591.60	35.47	---	200	V	262.0	-16.0	74.00	38.53
1591.60	---	24.51	200	V	262.0	-16.0	54.00	29.49
3883.20	42.72	---	150	V	191.0	-7.4	74.00	31.28
3883.20	---	34.03	150	V	191.0	-7.4	54.00	19.97
9341.90	46.58	---	150	H	219.0	2.1	74.00	27.42
9341.90	---	39.46	150	H	219.0	2.1	54.00	14.54
11650.50	---	42.70	150	V	115.0	3.1	54.00	11.30
11650.50	51.55	---	150	V	115.0	3.1	74.00	22.45
14482.70	52.76	---	200	V	326.0	6.5	74.00	21.24
14482.70	---	44.13	200	V	326.0	6.5	54.00	9.87
17415.20	56.41	---	200	H	113.0	8.6	68.20	11.79

802.11ac40 Mode:

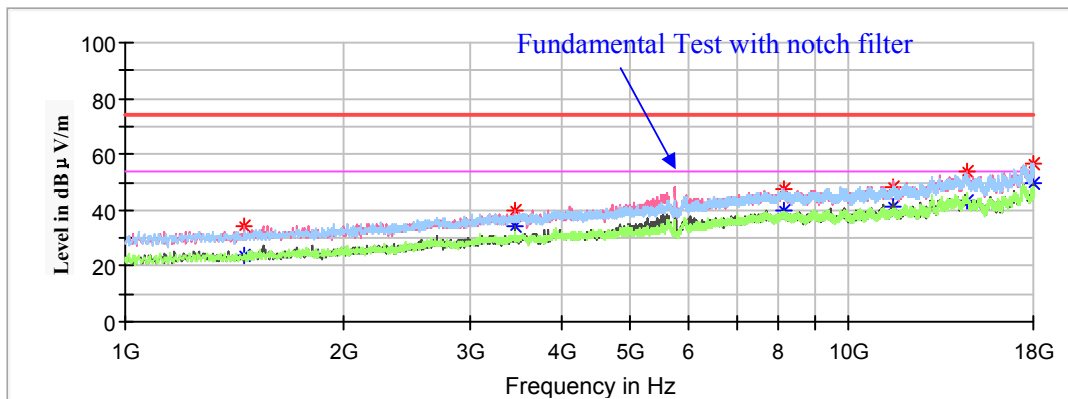
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

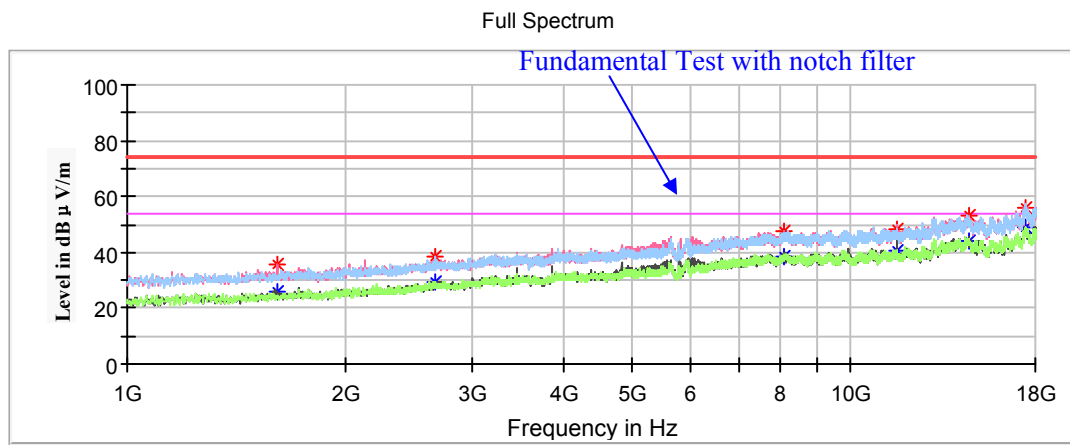
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5755MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1462.40	---	23.54	150	V	284.0	-16.6	54.00	30.46
1462.40	34.17	---	150	V	284.0	-16.6	74.00	39.83
3454.80	40.06	---	200	V	299.0	-8.9	68.20	28.14
8123.00	---	39.86	200	V	299.0	1.7	54.00	14.14
8123.00	47.80	---	200	V	299.0	1.7	74.00	26.20
11500.90	---	41.53	200	V	337.0	2.8	54.00	12.47
11500.90	48.55	---	200	V	337.0	2.8	74.00	25.45
14567.70	53.70	---	200	V	120.0	6.3	68.20	14.50
17967.70	56.69	---	150	V	232.0	8.8	74.00	17.31
17967.70	---	49.92	150	V	232.0	8.8	54.00	4.08

High Channel: 5795MHz

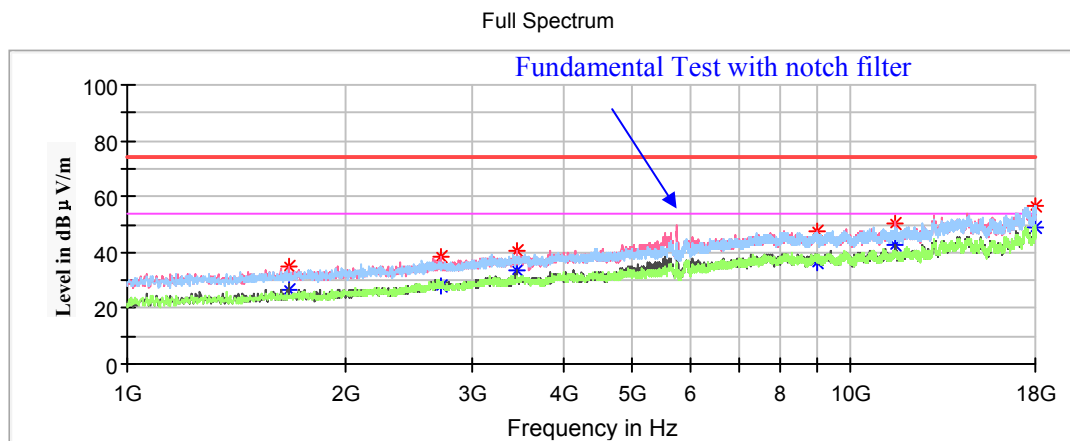
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1610.30	---	25.97	200	V	2.0	-15.9	54.00	28.03
1610.30	35.68	---	200	V	2.0	-15.9	74.00	38.32
2667.70	38.71	---	150	H	134.0	-11.6	68.20	29.49
8107.70	---	38.29	200	V	220.0	1.7	54.00	15.71
8107.70	47.84	---	200	V	220.0	1.7	74.00	26.16
11589.30	---	40.91	150	H	223.0	3.0	54.00	13.09
11589.30	48.06	---	150	H	223.0	3.0	74.00	25.94
14598.30	53.28	---	150	V	225.0	6.2	68.20	14.92
17422.00	55.71	---	200	V	0.0	8.6	68.20	12.49

802.11n-HT40 Mode:

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

Note:

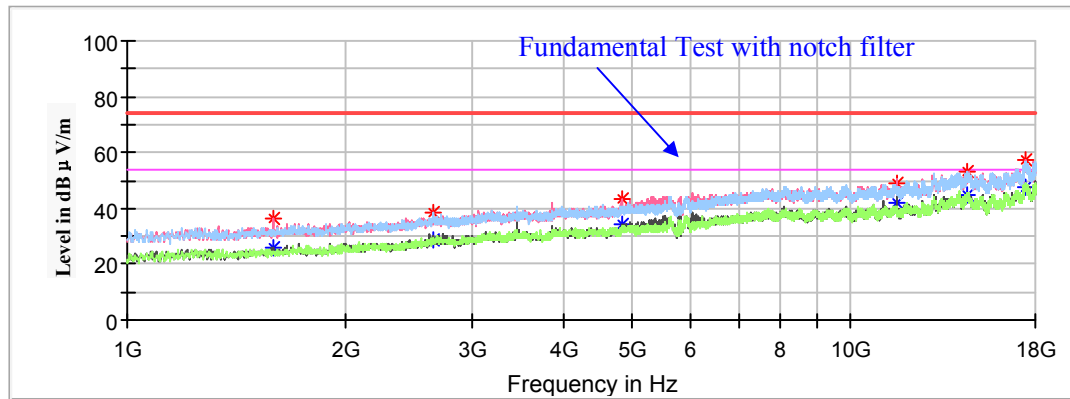
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5755MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1669.80	35.19	---	200	V	289.0	-15.7	74.00	38.81
1669.80	---	26.70	200	V	289.0	-15.7	54.00	27.30
2720.40	---	28.07	200	V	0.0	-11.4	54.00	25.93
2720.40	38.23	---	150	V	230.0	-11.4	74.00	35.77
3454.80	40.25	---	200	V	302.0	-8.9	68.20	27.95
8988.30	47.87	---	150	V	0.0	1.9	68.20	20.33
11509.40	50.10	---	200	V	226.0	2.8	74.00	23.90
11509.40	---	42.73	200	V	226.0	2.8	54.00	11.27
17966.00	---	48.80	200	H	187.0	8.8	54.00	5.20
17966.00	56.57	---	200	H	187.0	8.8	74.00	17.43

High Channel: 5795MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1593.30	---	25.87	200	V	262.0	-16.0	54.00	28.13
1593.30	36.36	---	200	V	262.0	-16.0	74.00	37.64
2647.30	38.22	---	200	H	244.0	-11.7	68.20	29.98
4818.20	---	34.12	150	V	149.0	-5.6	54.00	19.88
4818.20	43.30	---	150	V	149.0	-5.6	74.00	30.70
11589.30	49.02	---	200	V	224.0	3.0	74.00	24.98
11589.30	---	42.03	200	V	224.0	3.0	54.00	11.97
14489.50	---	45.03	200	H	205.0	6.5	54.00	8.97
14489.50	53.14	---	200	H	205.0	6.5	74.00	20.86
17474.70	57.03	---	200	V	0.0	8.8	68.20	11.17

802.11ac80 Mode:

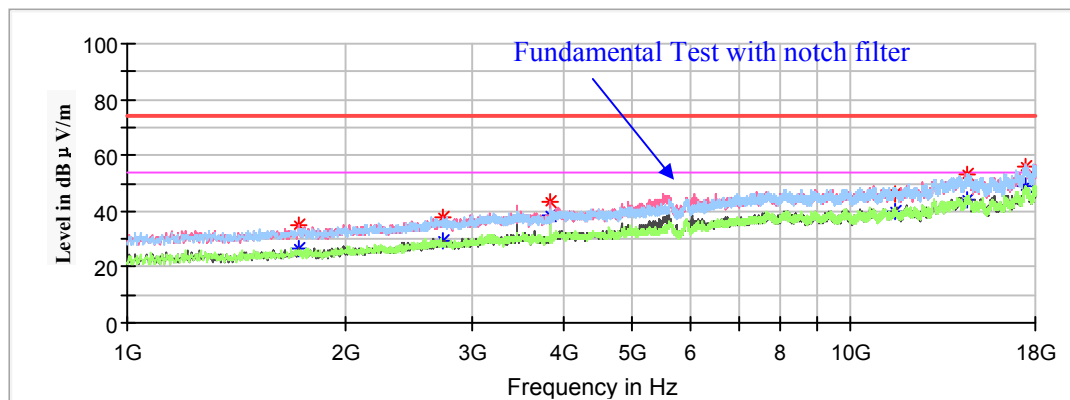
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5775MHz

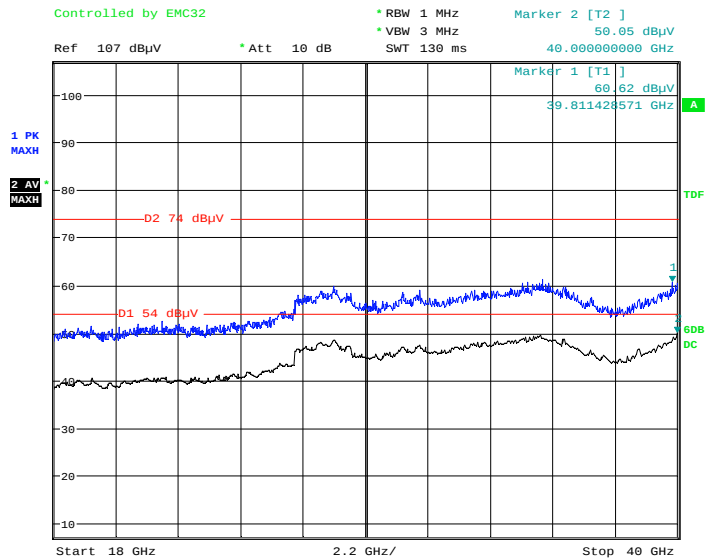
Full Spectrum



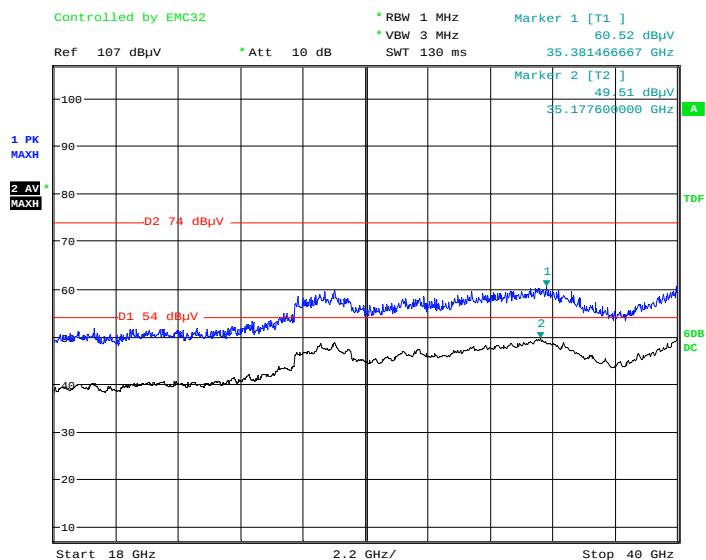
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1727.60	35.13	---	150	V	358.0	-15.5	68.20	33.07
2725.50	---	29.57	200	V	349.0	-11.4	54.00	24.43
2725.50	37.77	---	200	V	349.0	-11.4	74.00	36.23
3849.20	---	38.80	150	V	192.0	-7.5	54.00	15.20
3849.20	43.14	---	150	V	192.0	-7.5	74.00	30.86
11550.20	---	40.10	200	V	231.0	2.9	54.00	13.90
11550.20	46.39	---	200	V	231.0	2.9	74.00	27.61
14504.80	53.36	---	150	H	116.0	6.5	68.20	14.84
17415.20	55.85	---	150	V	192.0	8.6	68.20	12.35

18GHz-40GHz(5150-5250MHz Band):

Pre-scan with 802.11a, 802.11ac20, 802.11n-HT20, 802.11ac40, 802.11n-HT40 and 802.11 ac80 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11a mode in channel 5240 in Z-axis of orientation was recorded.

Horizontal

Date: 14.SEP.2020 23:00:38

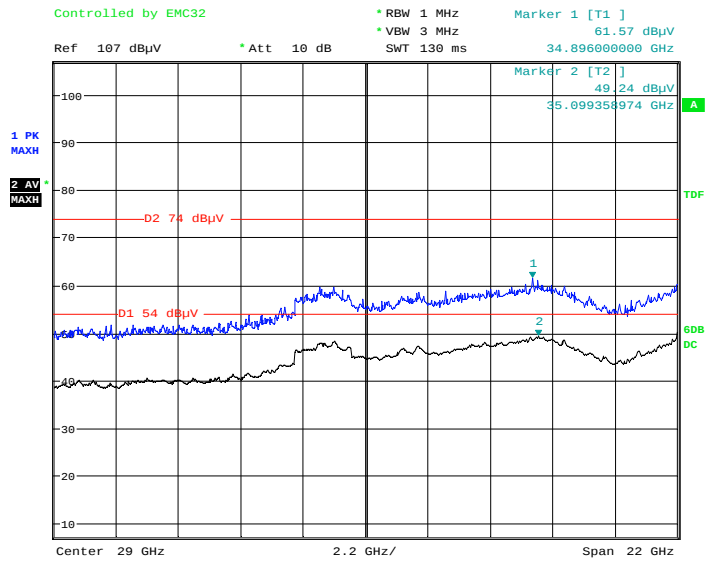
Vertical

Date: 14.SEP.2020 23:12:25

18GHz-40GHz(5725-5850MHz Band):

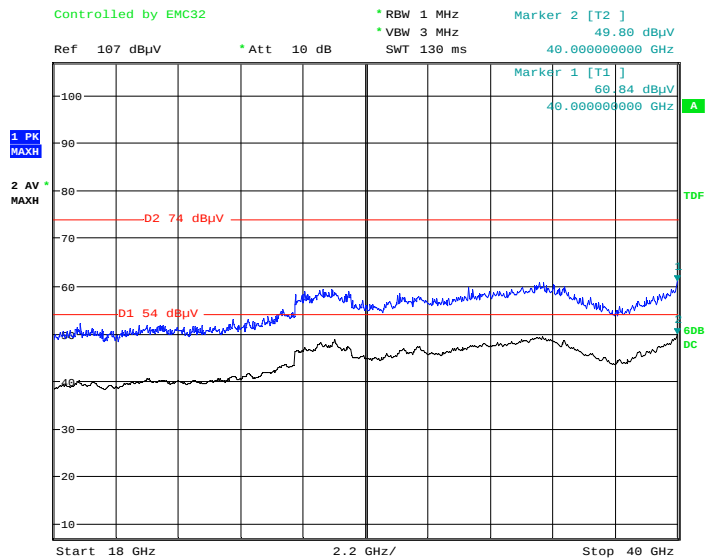
Pre-scan with 802.11a, 802.11ac20, 802.11n-HT20, 802.11ac40, 802.11n-HT40 and 802.11 ac80 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11a mode in channel 5825 in Z-axis of orientation was recorded.

Horizontal



Date: 14.SEP.2020 22:46:23

Vertical



Date: 14.SEP.2020 22:34:25

Restricted Bands Emissions Test (5150-5250MHz Band):

Note:

1. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
2. Corrected Amplitude = Corrected Factor + Reading
3. Margin = Limit - Corrected. Amplitude

Chain 0:**802.11a Mode:** (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5150.00	61.07	---	150.0	H	269.0	-4.8	74.00	12.93
5150.00	---	51.53	150.0	H	269.0	-4.8	54.00	2.47
High Channel: 5240MHz								
5350.00	54.39	---	150.0	V	333.0	5.7	74.00	19.61
5350.00	---	50.74	150.0	V	333.0	5.7	54.00	3.26

Chain 1:**802.11a Mode:** (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5150.00	60.61	---	150.0	V	341.0	-4.8	74.00	13.39
5150.00	---	51.38	150.0	V	341.0	-4.8	54.00	2.62
High Channel: 5240MHz								
5350.00	54.52	---	150.0	V	23.0	5.7	74.00	19.48
5350.00	---	51.25	150.0	V	23.0	5.7	54.00	2.75

Chain 0&1:

802.11ac20 Mode : (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5150.00	---	48.67	150.0	V	159.0	-4.8	54.00	5.33
5150.00	60.57	---	150.0	V	159.0	-4.8	74.00	13.43
High Channel: 5240MHz								
5350.00	53.55	---	150.0	V	349.0	5.7	74.00	20.45
5350.00	---	50.69	150.0	V	349.0	5.7	54.00	3.31

802.11n-HT20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5150.00	---	49.74	150.0	V	155.0	-4.8	54.00	4.26
5150.00	60.83	---	150.0	V	155.0	-4.8	74.00	13.17
High Channel: 5240MHz								
5350.00	53.89	---	150.0	H	190.0	5.7	74.00	20.11
5350.00	---	50.90	150.0	H	190.0	5.7	54.00	3.10

802.11ac40 Mode : (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5190MHz								
5150.00	---	53.80	200.0	V	126.0	-4.8	54.00	0.20
5150.00	64.43	---	200.0	V	126.0	-4.8	74.00	9.57
High Channel: 5230MHz								
5350.00	---	51.95	150.0	V	186.0	5.7	54.00	2.05
5350.00	55.39	---	150.0	V	186.0	5.7	74.00	18.61

802.11n-HT40 Mode : (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5190MHz								
5150.00	57.18	---	200.0	V	96.0	-4.8	74.00	16.82
5150.00	---	52.69	200.0	V	96.0	-4.8	54.00	1.31
High Channel: 5230MHz								
5350.00	53.75	---	150.0	V	203.0	5.7	74.00	20.25
5350.00	---	51.04	150.0	V	203.0	5.7	54.00	2.96

802.11ac80 Mode : (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5210MHz								
5150.00	---	47.95	150.0	V	18.0	-4.8	54.00	6.05
5150.00	56.40	---	150.0	V	18.0	-4.8	74.00	17.60
5350.00	---	35.41	150.0	V	0.0	-4.3	54.00	18.59
5350.00	44.80	---	150.0	V	0.0	-4.3	74.00	29.20

Restricted Bands Emissions Test (5725-5850MHz Band):

Note:

1. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
2. Corrected Amplitude = Corrected Factor + Reading
3. Margin = Limit - Corrected. Amplitude

Chain 0:**802.11a Mode:** (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5745MHz								
5650.00	54.62	---	150.0	V	240.0	6.4	68.20	1358
5700.00	59.01	---	150.0	V	143.0	6.5	105.20	46.19
5720.00	68.62	---	150.0	V	271.0	6.5	110.80	42.18
5725.00	83.44	---	150.0	V	109.0	6.5	122.20	38.76
High Channel: 5825MHz								
5850.00	68.93	---	150.0	V	132.0	6.7	122.20	53.27
5855.00	66.50	---	150.0	V	44.0	6.7	110.80	44.30
5875.00	54.86	---	150.0	V	63.0	6.8	105.20	50.34
5925.00	55.31	---	150.0	V	244.0	6.9	68.20	12.89

Chain 1:**802.11a Mode:** (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5745MHz								
5650.00	54.01	---	150.0	H	191.0	6.4	68.20	14.19
5700.00	59.02	---	150.0	V	190.0	6.5	105.20	46.18
5720.00	71.35	---	150.0	V	224.0	6.5	110.80	39.45
5725.00	84.25	---	150.0	V	336.0	6.5	122.20	37.95
High Channel: 5825MHz								
5850.00	67.99	---	150.0	V	247.0	6.7	122.20	54.21
5855.00	65.16	---	150.0	V	327.0	6.7	110.80	45.64
5875.00	55.73	---	150.0	V	311.0	6.8	105.20	49.47
5925.00	55.17	---	150.0	H	114.0	6.9	68.20	13.03

Chain 0&1:

802.11ac20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5745MHz								
5650.00	54.18	---	150.0	V	0.0	6.4	68.20	14.02
5700.00	59.16	---	150.0	V	145.0	6.5	105.20	46.04
5720.00	77.83	---	150.0	V	210.0	6.5	110.80	32.97
5725.00	87.53	---	150.0	V	58.0	6.5	122.20	34.67
High Channel: 5825MHz								
5850.00	79.88	---	150.0	V	209.0	6.7	122.20	42.32
5855.00	71.82	---	150.0	V	128.0	6.7	110.80	38.98
5875.00	58.92	---	150.0	V	76.0	6.8	105.20	46.28
5925.00	54.83	---	150.0	H	247.0	6.9	68.20	13.37

802.11n-HT20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5745MHz								
5650.00	54.67	---	150.0	V	246.0	6.4	68.20	13.53
5700.00	61.01	---	150.0	V	277.0	6.5	105.20	44.19
5720.00	78.25	---	150.0	V	214.0	6.5	110.80	32.55
5725.00	83.53	---	150.0	V	99.0	6.5	122.20	38.67
High Channel: 5825MHz								
5850.00	82.88	---	150.0	V	145.0	6.7	122.20	39.32
5855.00	73.17	---	150.0	V	94.0	6.7	110.80	37.63
5875.00	60.52	---	150.0	V	278.0	6.8	105.20	44.68
5925.00	55.12	---	150.0	V	0.0	6.9	68.20	13.08

802.11ac40 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5755MHz								
5650.00	55.18	---	150.0	V	326.0	6.4	68.20	13.02
5700.00	76.04	---	150.0	V	152.0	6.5	105.20	29.16
5720.00	87.25	---	150.0	V	117.0	6.5	110.80	23.55
5725.00	90.29	---	150.0	V	100.0	6.5	122.20	31.91
High Channel: 5795MHz								
5850.00	74.50	---	150.0	V	130.0	6.7	122.20	47.70
5855.00	73.29	---	150.0	V	130.0	6.7	110.80	37.51
5875.00	66.79	---	150.0	V	130.0	6.8	105.20	38.41
5925.00	56.06	---	150.0	V	212.0	6.9	68.20	12.14

802.11n-HT40 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5755MHz								
5650.00	57.05	---	150.0	V	296.0	6.4	68.20	11.15
5700.00	75.51	---	150.0	V	96.0	6.5	105.20	29.69
5720.00	87.41	---	150.0	V	113.0	6.5	110.80	23.39
5725.00	90.29	---	150.0	V	113.0	6.5	122.20	31.91
High Channel: 5795MHz								
5850.00	75.94	---	150.0	V	136.0	6.7	122.20	46.26
5855.00	69.25	---	150.0	V	338.0	6.7	110.80	41.55
5875.00	64.13	---	150.0	V	216.0	6.8	105.20	41.07
5925.00	55.78	---	150.0	V	170.0	6.9	68.20	12.42

802.11ac80 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
Low Channel: 5775MHz								
5650.00	55.32	---	150.0	V	140.0	6.4	68.20	12.88
5700.00	63.75	---	150.0	V	158.0	6.5	105.20	41.45
5720.00	68.31	---	150.0	V	158.0	6.5	110.80	42.49
5725.00	71.75	---	150.0	V	140.0	6.5	122.20	50.45
5850.00	65.09	---	150.0	V	140.0	6.7	122.20	57.11
5855.00	64.35	---	150.0	V	25.0	6.7	110.80	46.45
5875.00	57.08	---	150.0	V	206.0	6.8	105.20	48.12
5925.00	55.34	---	150.0	V	315.0	6.9	68.20	12.86

FCC §15.407(a) & §15.407(e)–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

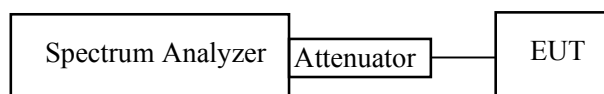
1. Emission Bandwidth (EBW)

- 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 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

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



Test Data**Environmental Conditions**

Temperature:	23.5~24.8℃
Relative Humidity:	49~54%
ATM Pressure:	100.7~101.5 kPa

The testing was performed by CK Huang from 2020-09-02 to 2020-09-17 .

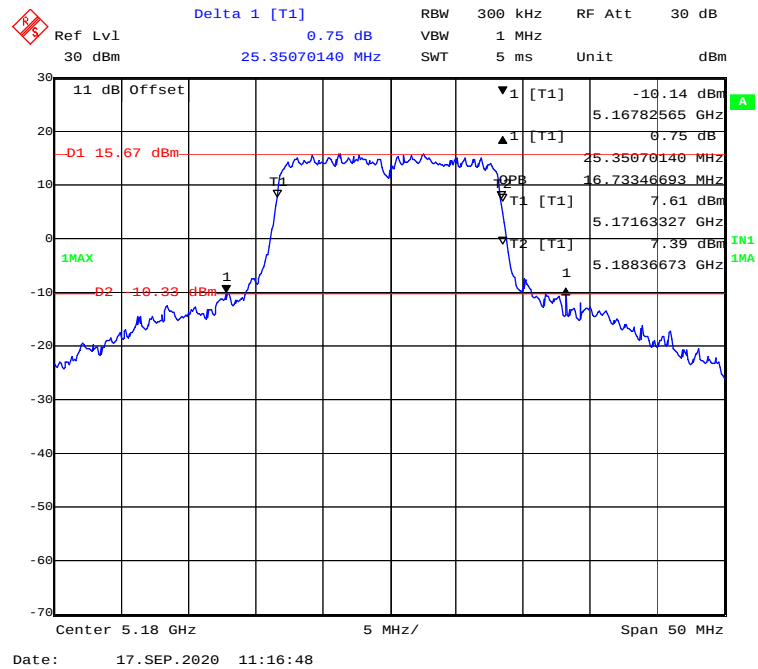
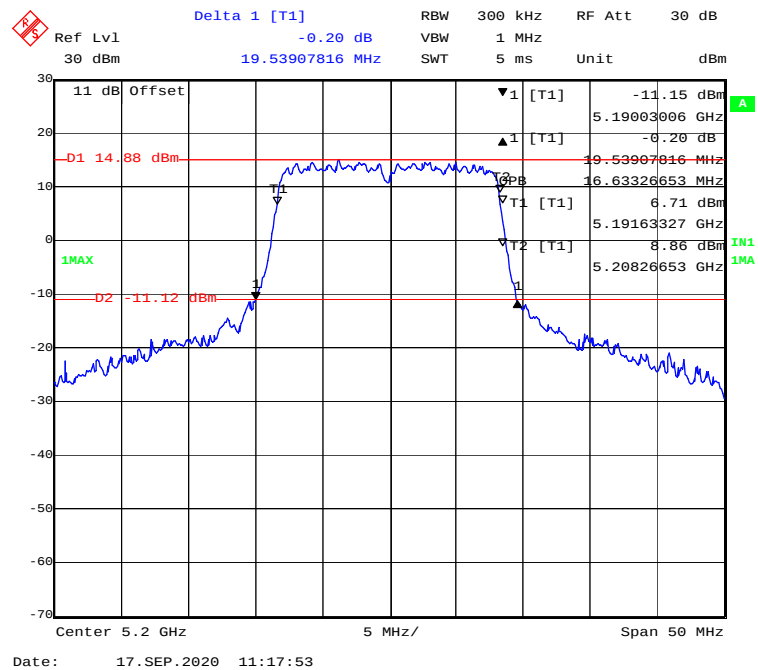
Test Result: Compliant

5150-5250 MHz:

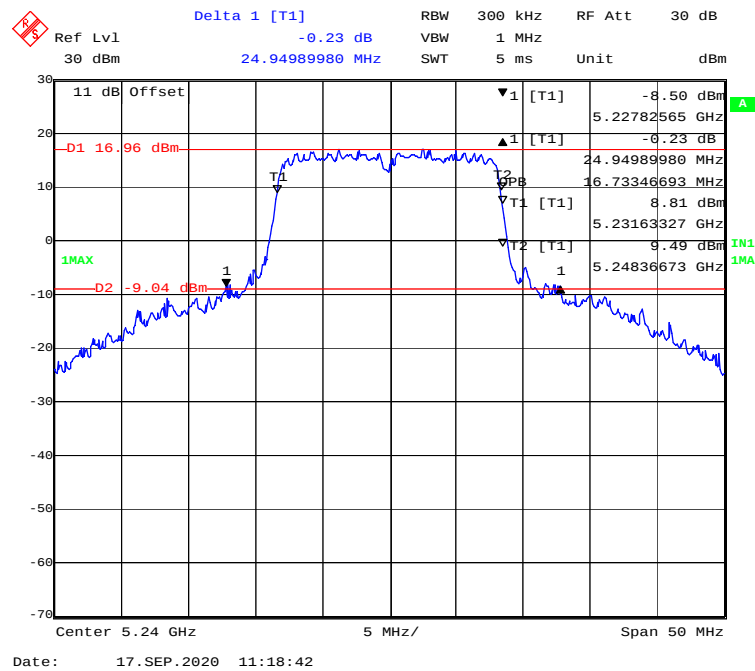
Test mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			Chain 0	Chain 1	Chain 0	Chain 1
802.11a	Low	5180	25.35	19.64	16.73	16.73
	Middle	5200	19.54	34.27	16.63	17.13
	High	5240	24.95	21.04	16.73	16.73
802.11ac20	Low	5180	20.74	20.64	17.74	17.73
	Middle	5200	20.54	20.84	17.74	17.74
	High	5240	20.54	20.54	17.74	17.74
802.11n-HT20	Low	5180	20.84	20.54	17.74	17.74
	Middle	5200	20.54	20.64	17.74	17.74
	High	5240	20.54	20.34	17.74	17.74
802.11ac40	Low	5190	40.08	40.40	36.07	36.07
	High	5230	39.76	39.92	36.07	36.07
802.11n-HT40	Low	5190	39.76	39.92	36.07	36.07
	High	5230	40.08	40.08	36.07	36.07
802.11ac80	Low	5210	83.93	84.17	75.99	76.23

5725-5850MHz:

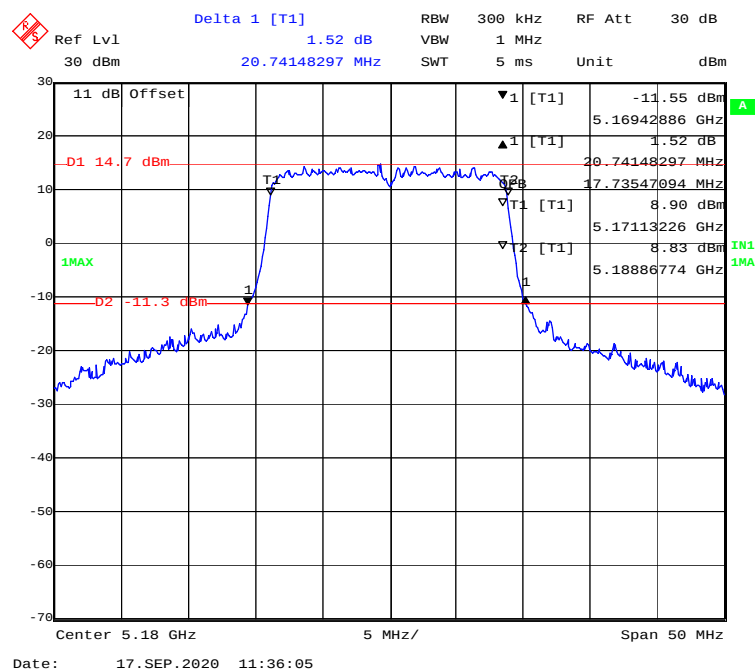
Test mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		99% Bandwidth (MHz)		Limit (MHz)
			Chain 0	Chain 1	Chain 0	Chain 1	
802.11a	Low	5745	16.35	16.35	19.36	19.42	≥0.5
	Middle	5785	16.35	16.35	18.34	19.48	≥0.5
	High	5825	16.35	16.29	21.16	21.34	≥0.5
802.11ac20	Low	5745	17.62	17.68	17.86	17.80	≥0.5
	Middle	5785	17.68	17.56	17.80	18.10	≥0.5
	High	5825	17.62	17.68	17.92	18.04	≥0.5
802.11n-HT20	Low	5745	17.62	17.61	17.86	17.80	≥0.5
	Middle	5785	17.68	17.56	17.80	18.04	≥0.5
	High	5825	17.62	17.62	18.04	18.10	≥0.5
802.11ac40	Low	5755	35.47	35.59	36.31	36.43	≥0.5
	High	5795	35.71	35.59	36.31	36.43	≥0.5
802.11n-HT40	Low	5755	35.47	35.59	36.31	36.43	≥0.5
	High	5795	35.71	35.47	36.43	36.43	≥0.5
802.11ac80	Low	5775	76.23	76.47	75.99	76.71	≥0.5

5150-5250 MHz Band:**26 Bandwidth&99% Bandwidth (Chain 0)****802.11a mode, 5180MHz****802.11a mode, 5200MHz**

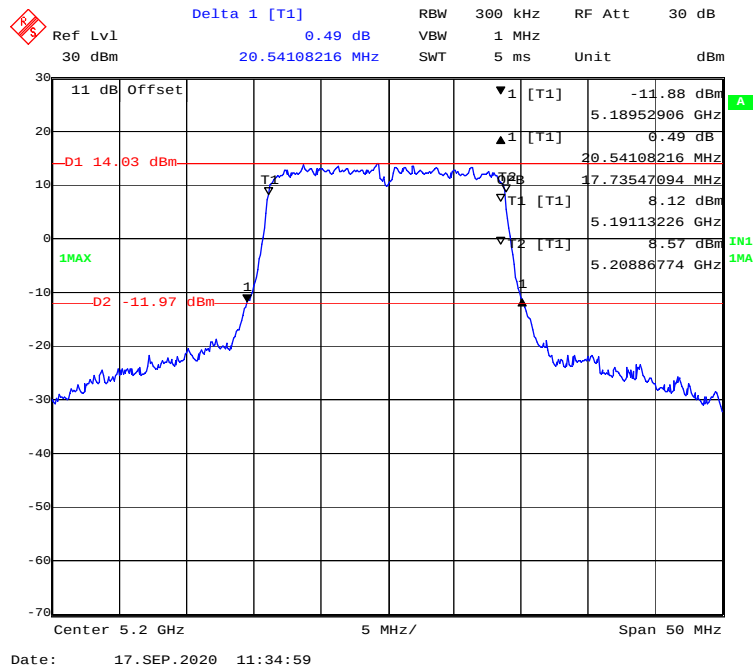
802.11a mode, 5240MHz



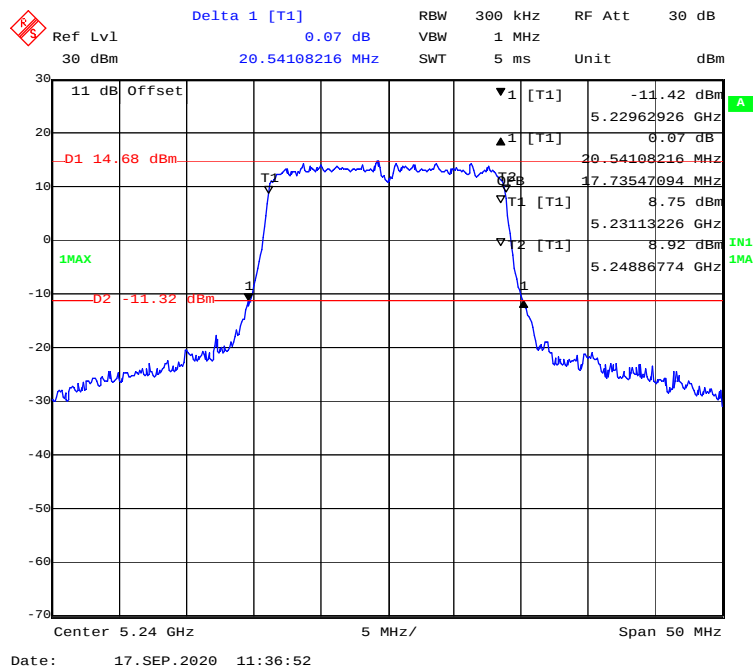
802.11ac20 mode, 5180MHz



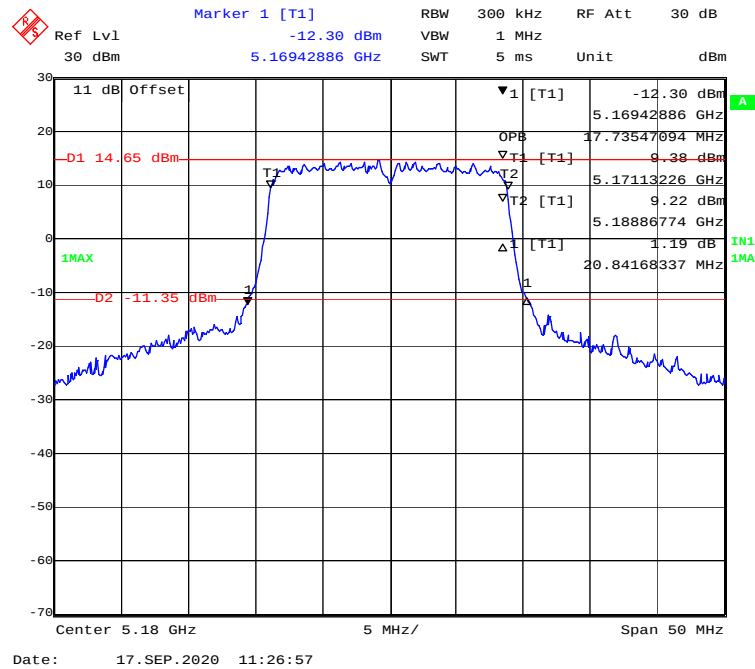
802.11 ac20 mode, 5200MHz



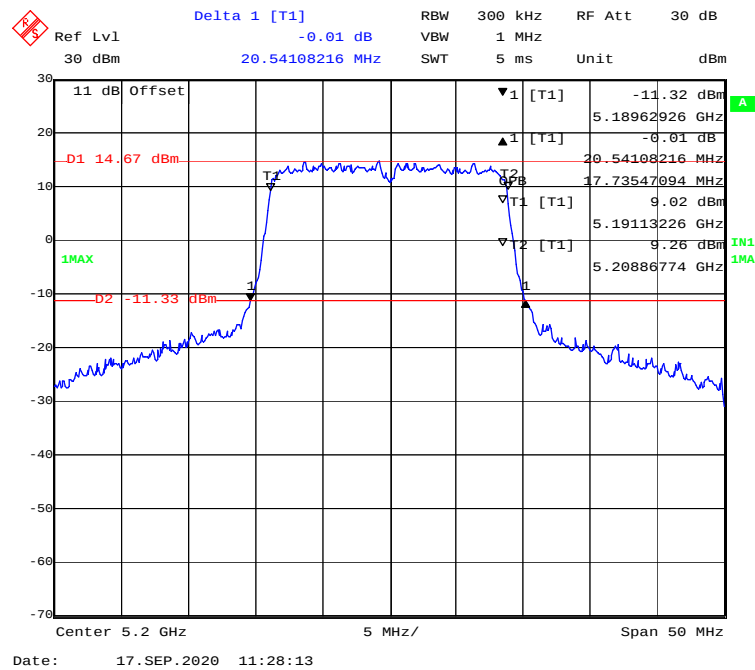
802.11 ac20 mode, 5240MHz



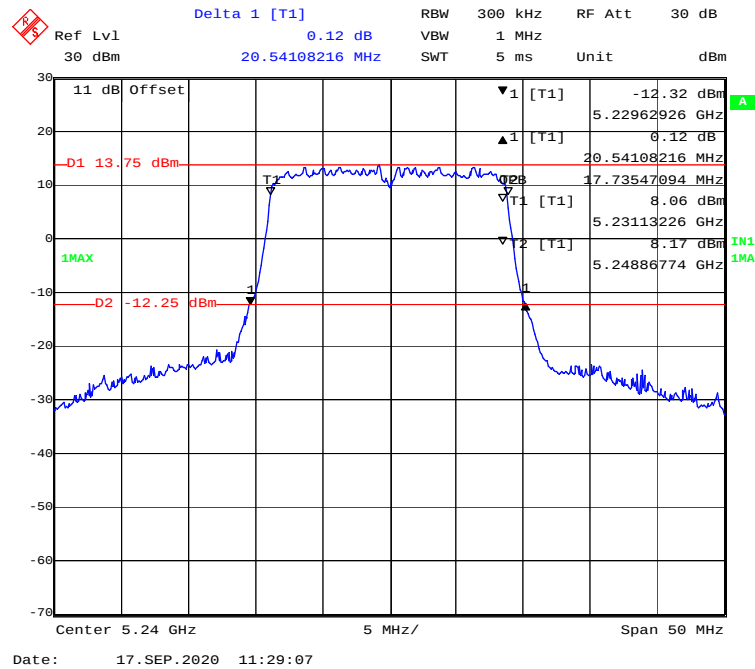
802.11n-HT20 mode, 5180MHz



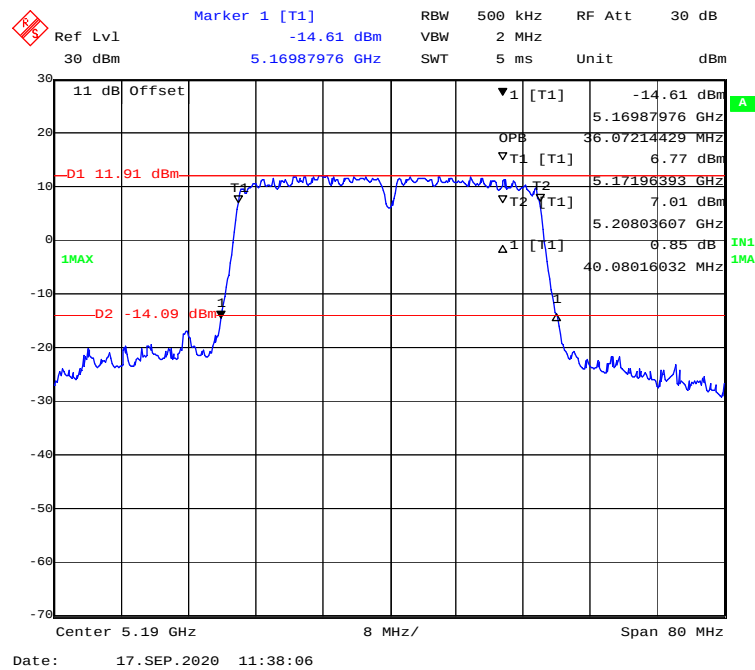
802.11n-HT20 mode, 5200MHz



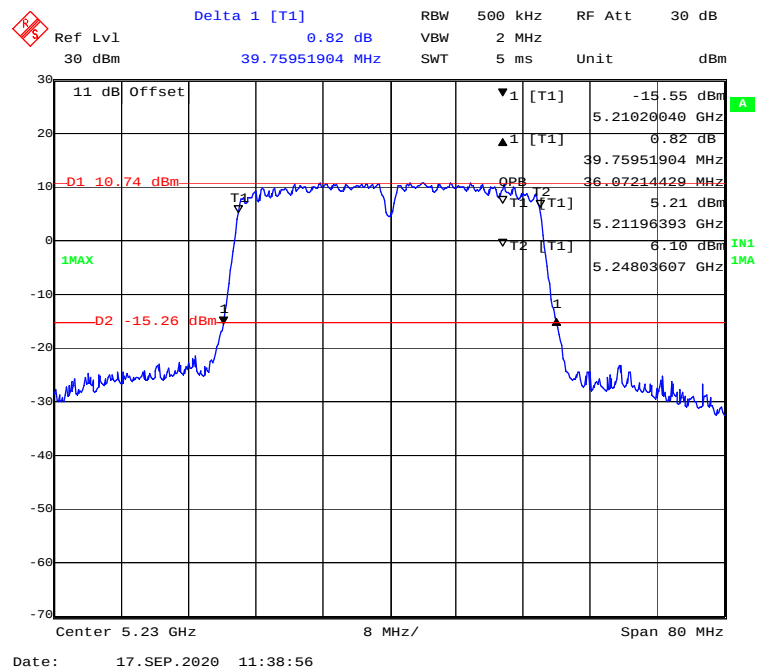
802.11n-HT20 mode, 5240MHz



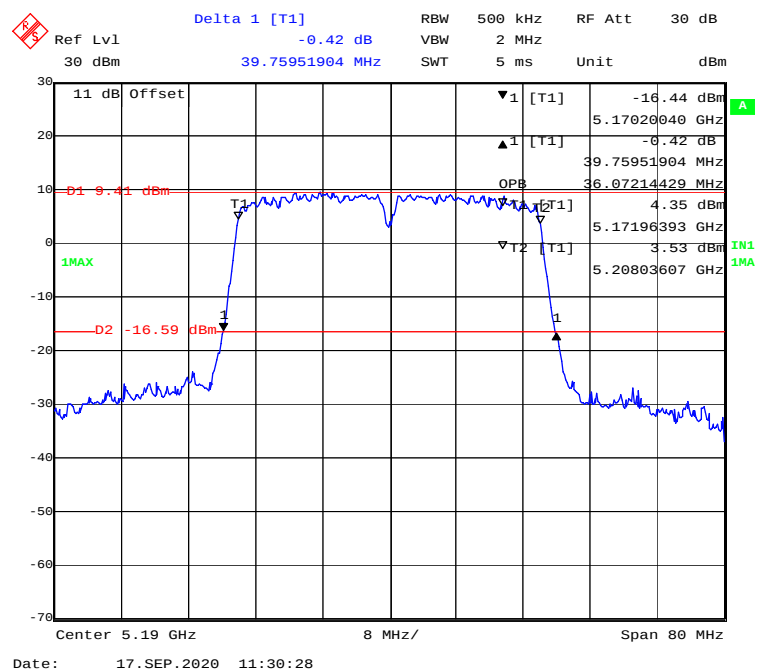
802.11ac40 mode, 5190MHz



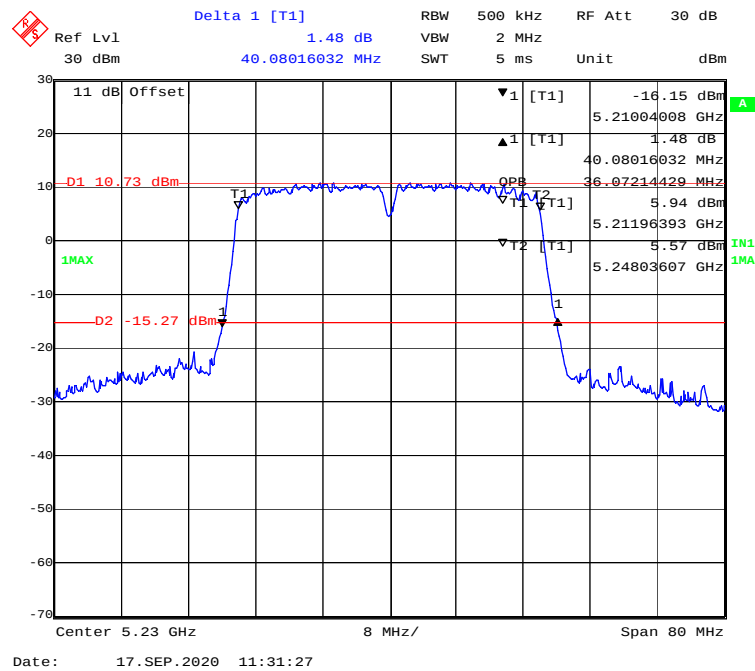
802.11 ac40 mode, 5230MHz



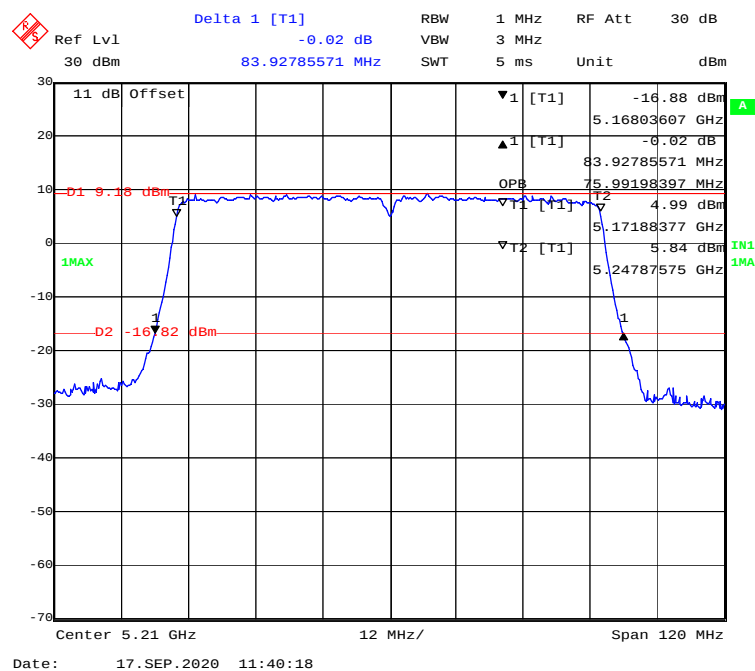
802.11n-HT40 mode, 5190MHz



802.11n-HT40 mode, 5230MHz

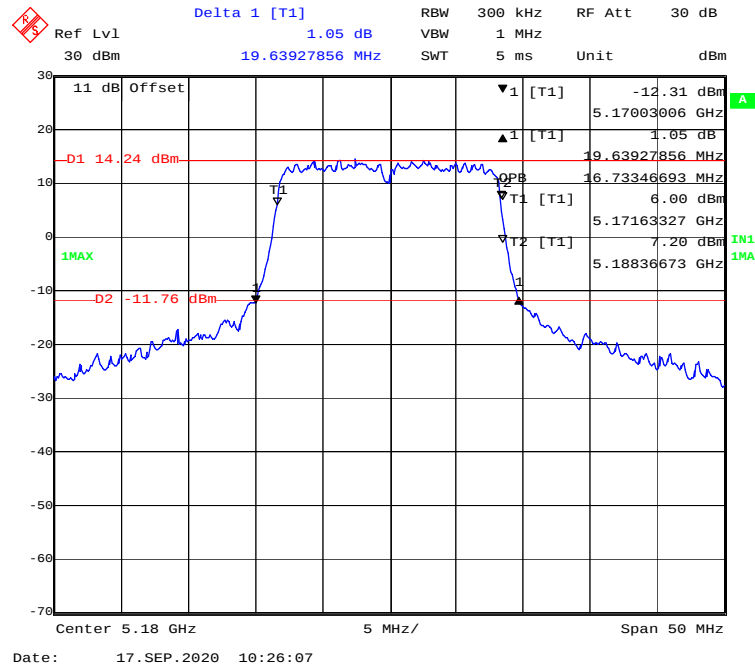


802.11ac80 mode, 5210MHz

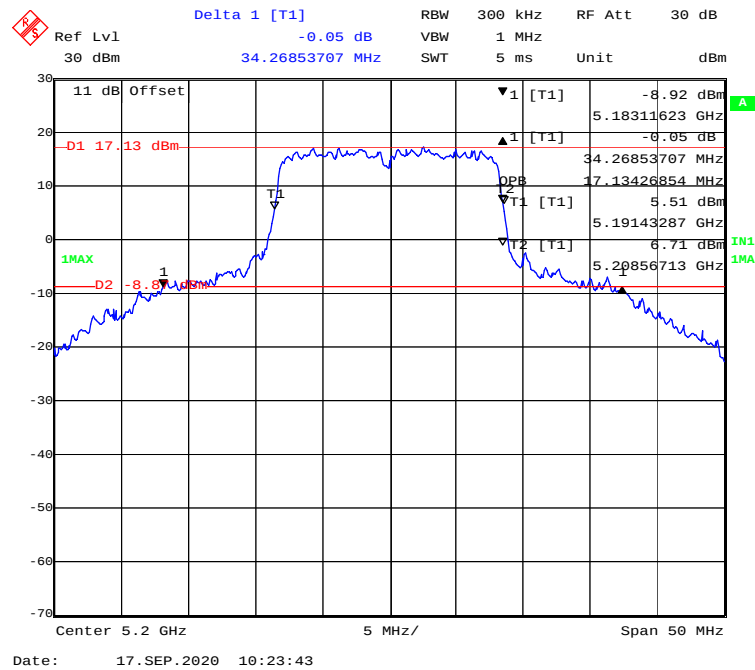


26 Bandwidth&99% Bandwidth (Chain 1)

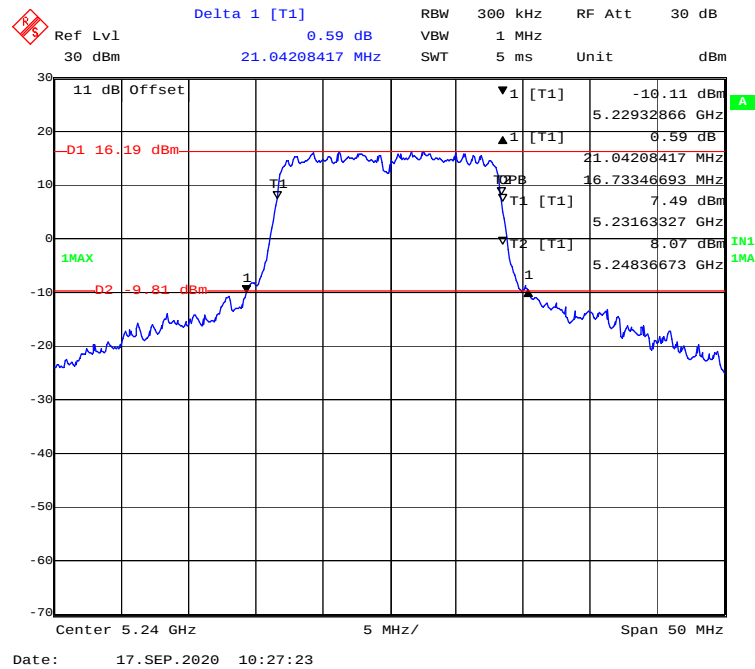
802.11a mode, 5180MHz



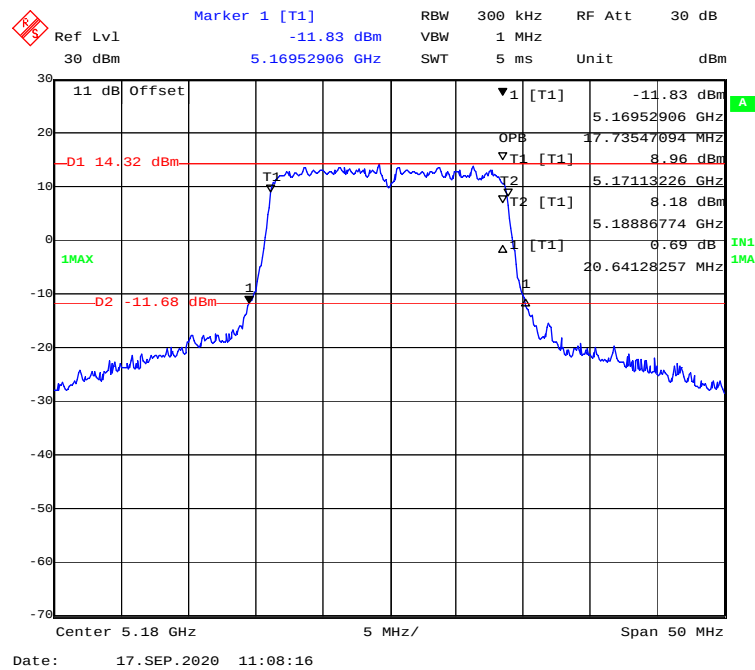
802.11a mode, 5200MHz



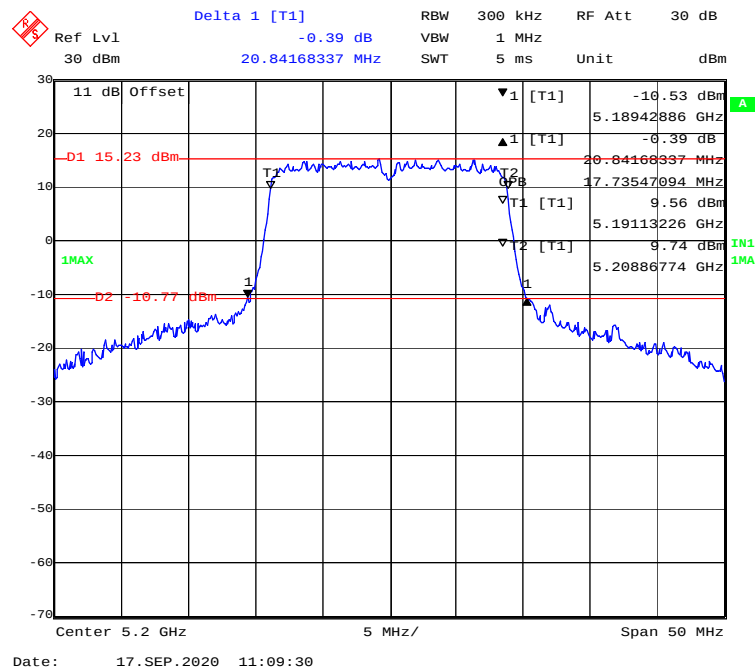
802.11a mode, 5240MHz



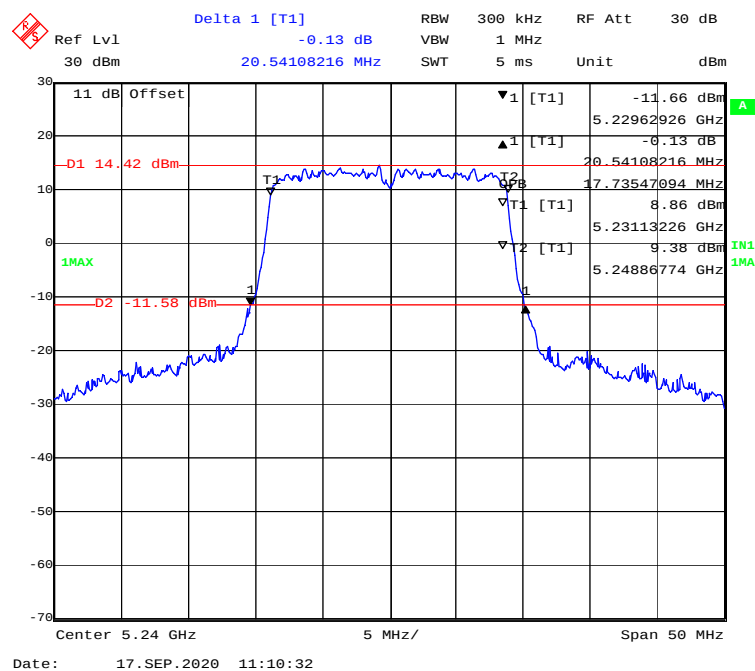
802.11ac20 mode, 5180MHz



802.11 ac20 mode, 5200MHz



802.11 ac20 mode, 5240MHz



Delta 1 [T1]

Ref Lvl 0.20 dB

30 dBm

20.54108216 MHz

RBW 300 kHz

SWT 1 ms

RF Att 30 dB

Unit dBm

11 dB Offset

-D1 14.14 dBm

1MAX

D2 -11.86 dBm

1

▼1 [T1] -11.29 dBm

▲1 [T1] 0.20 dB

▽1 [T1] 17.73547094 MHz

▽2 [T1] 5.17113226 GHz

1

5.18886774 GHz

Center 5.18 GHz

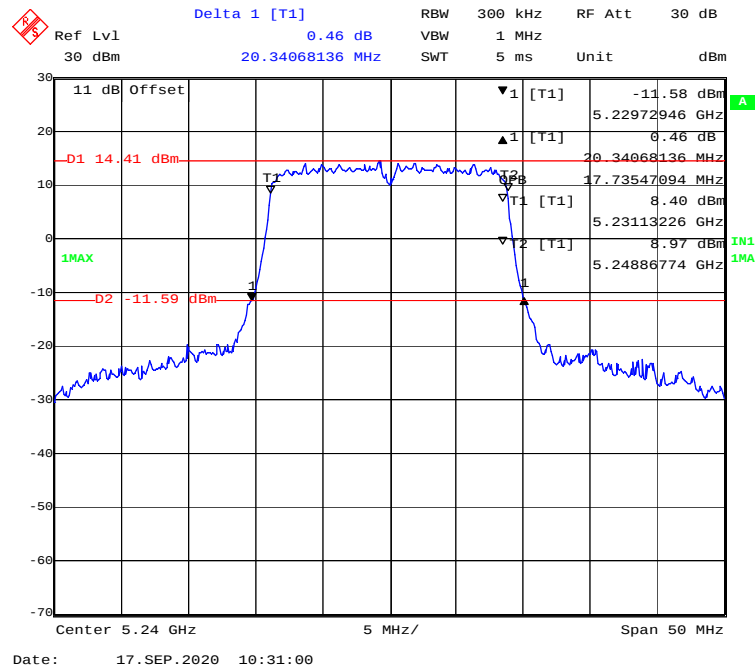
5 MHz/

Span 50 MHz

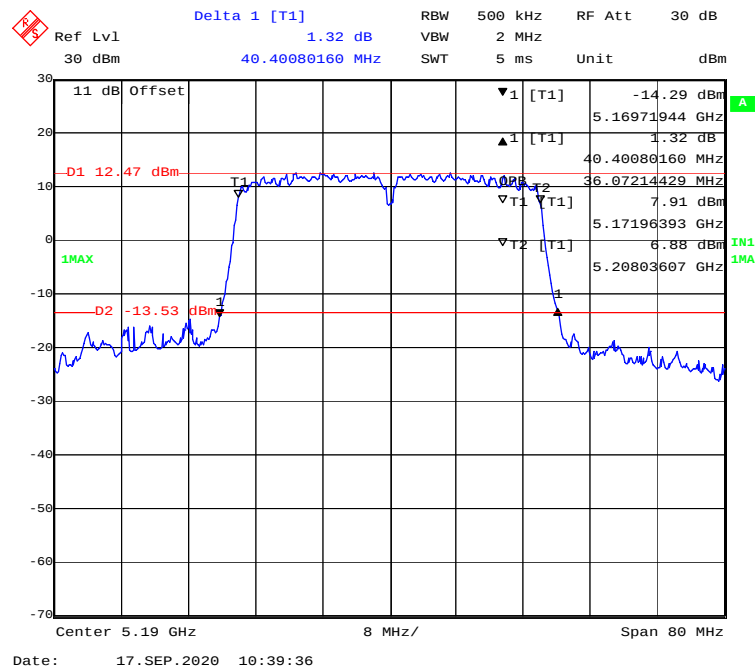
Date: 17.SEP.2020 11:05:56

[illegible]

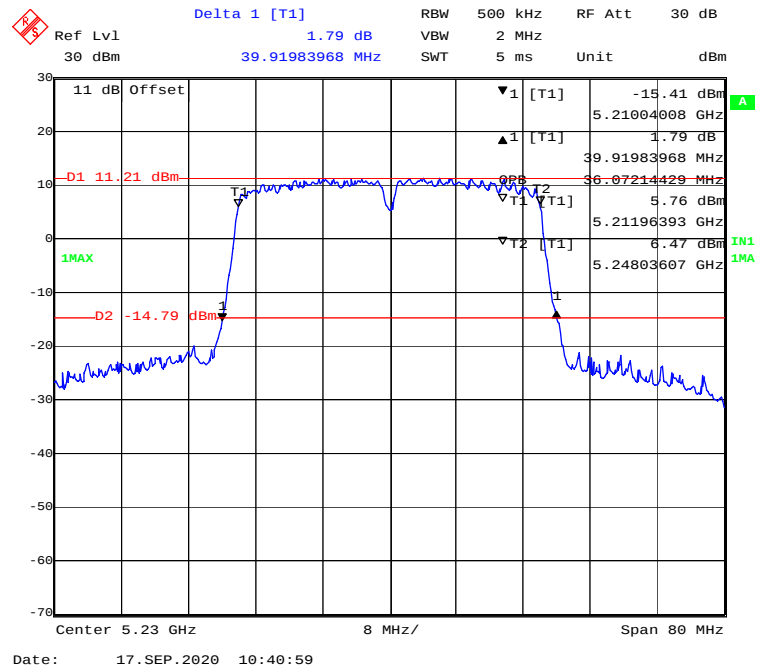
802.11n-HT20 mode, 5240MHz



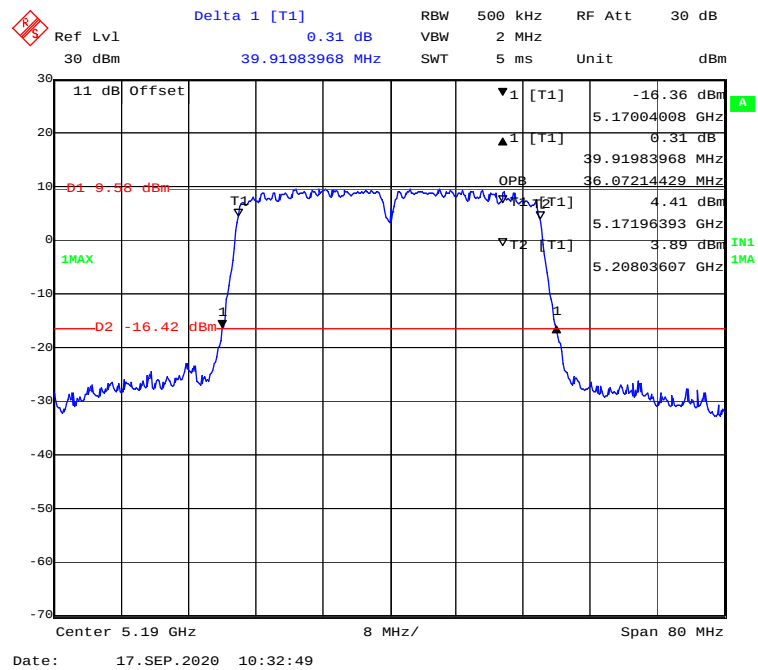
802.11ac40 mode, 5190MHz



802.11 ac40 mode, 5230MHz



802.11n-HT40 mode, 5190MHz



Delta 1 [T1] 0.93 dB RBW 500 KHz RF Att 30 dB
 Ref Lvl 30 dBm VBW 2 MHz
 30 dBm 5 ms Unit dBm

11 dB Offset
 -15.42 dBm
 5.21004008 GHz
 0.93 dB
 40.08016032 MHz
 36.07214429 MHz
 5.84 dBm
 5.21196393 GHz
 5.88 dBm
 5.24803607 GHz

D1 11.18 dBm
 1MAX
 D2 -14.82 dBm
 IN1
 1MA

Center 5.23 GHz 8 MHz/ Span 80 MHz

Date: 17. SEP. 2020 10:33:48

Delta 1 [T1] 0.41 dB
 Ref Lvl 30 dBm
 RBW 1 MHz
 RF Att 30 dB
 VBW 3 MHz
 SWT 5 ms
 Unit dBm

11 dB Offset
 84.16833667 MHz
 5.16779559 GHz
 84.16833667 MHz
 76.23246493 MHz
 5.27 dBm
 5.17188377 GHz
 5.22 dBm
 5.24811623 GHz

D1 9.55 dBm
 1MAX
 D2 -16.45 dBm
 1
 IN1 1MA

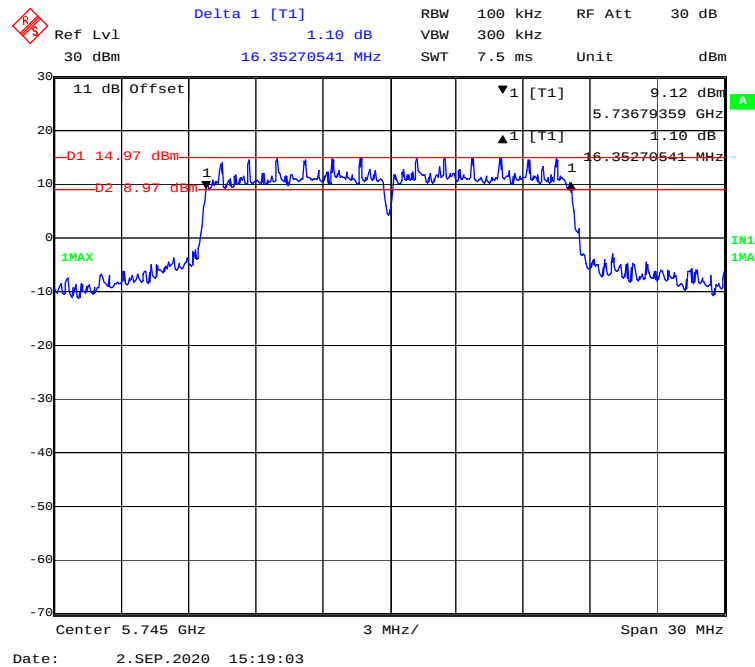
Center 5.21 GHz
 12 MHz/
 Span 120 MHz

Date: 17. SEP. 2020 10:42:25

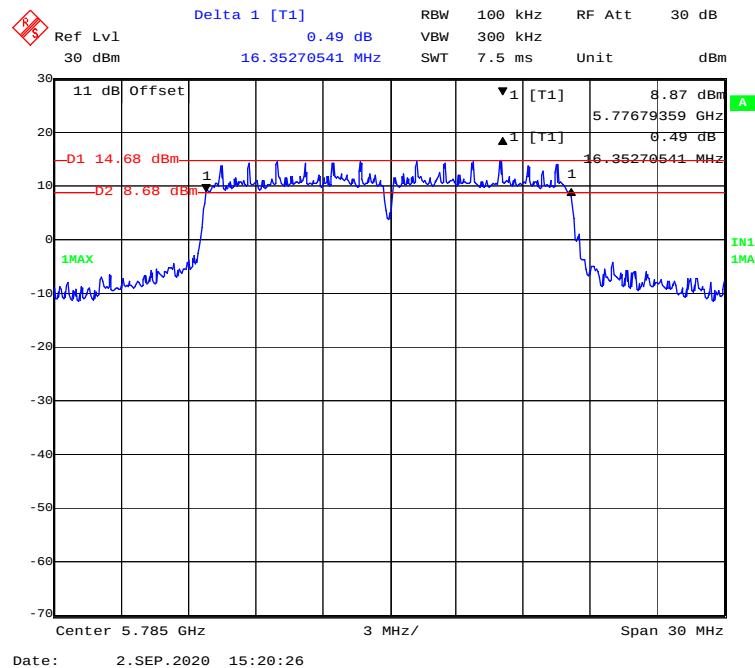
5725-5850 MHz Band

6 Bandwidth(Chain 0)

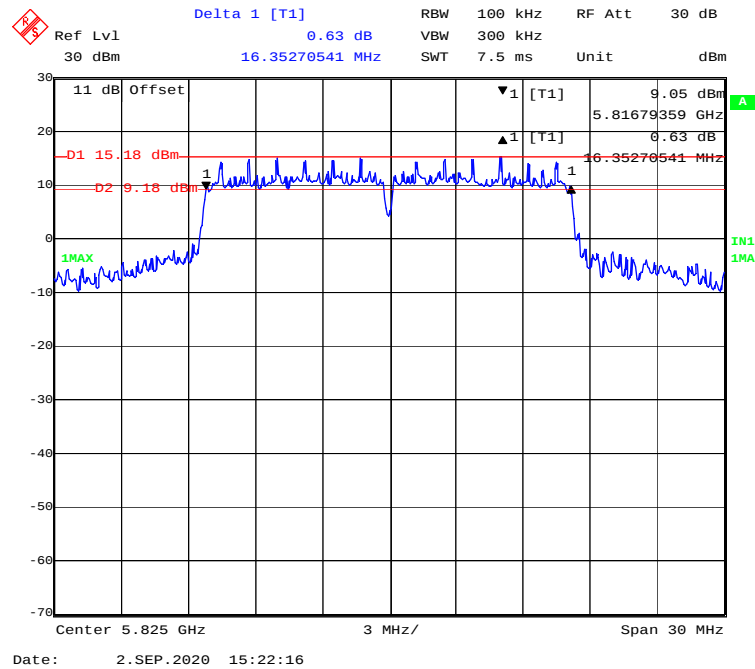
802.11a mode, 5745MHz



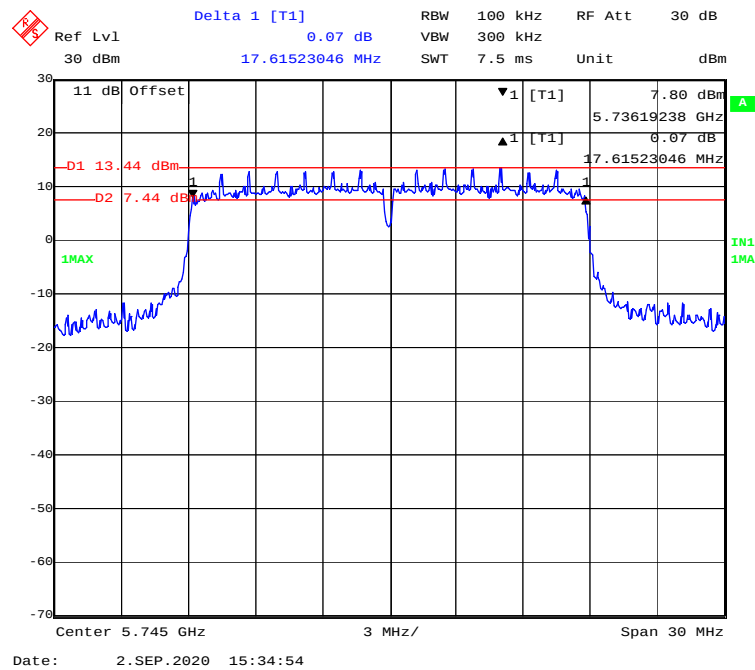
802.11a mode, 5785MHz



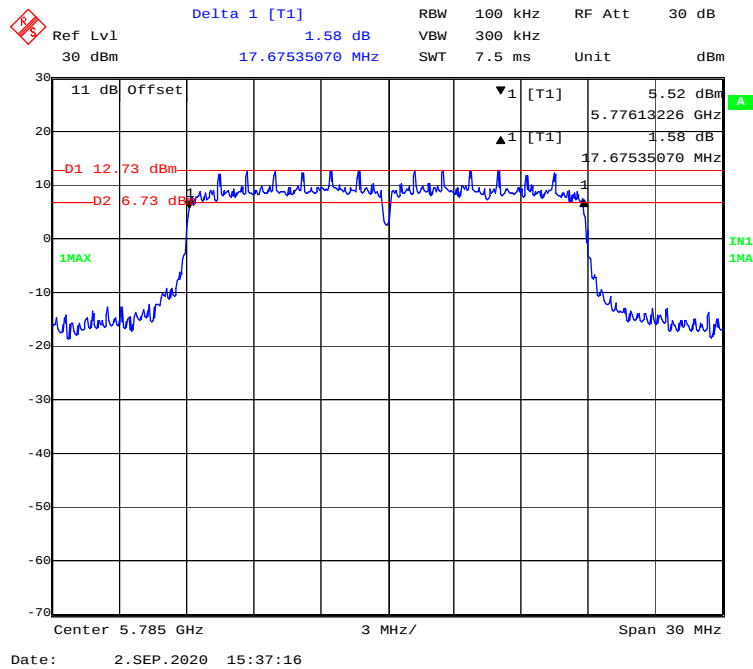
802.11a mode, 5825MHz



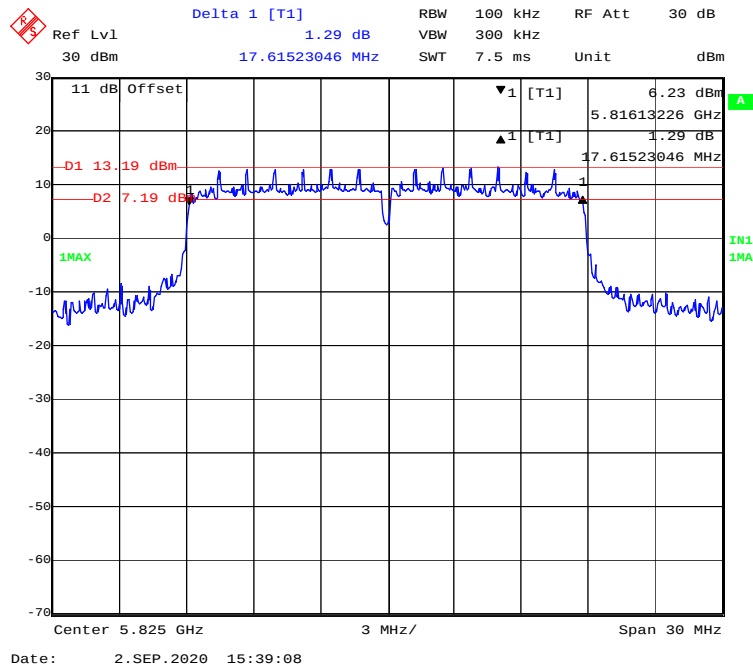
802.11ac20 mode, 5745MHz



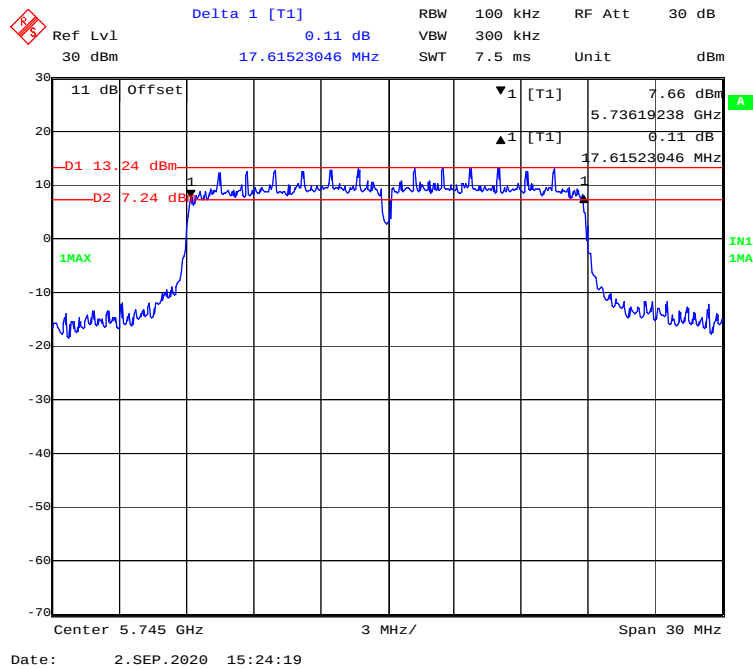
802.11 ac20 mode, 5785MHz



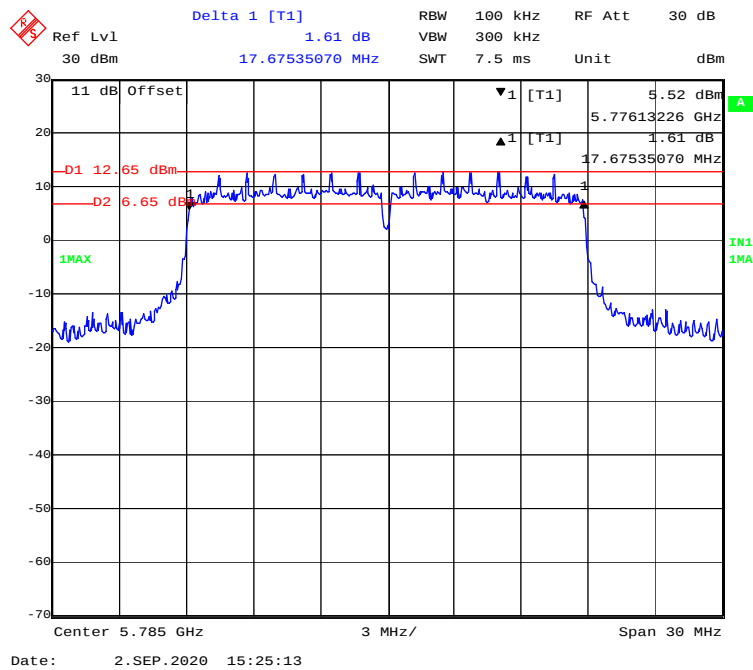
802.11 ac20 mode, 5825MHz



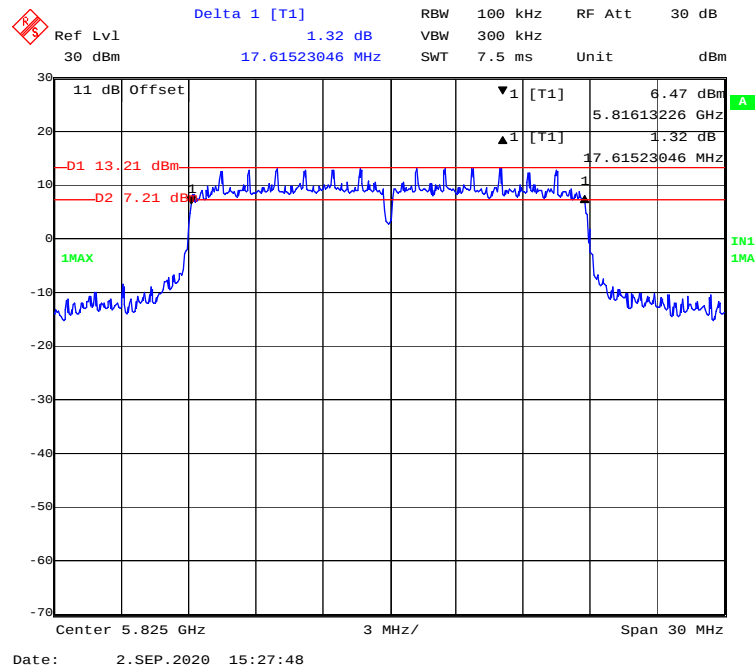
802.11n-HT20 mode, 5745MHz



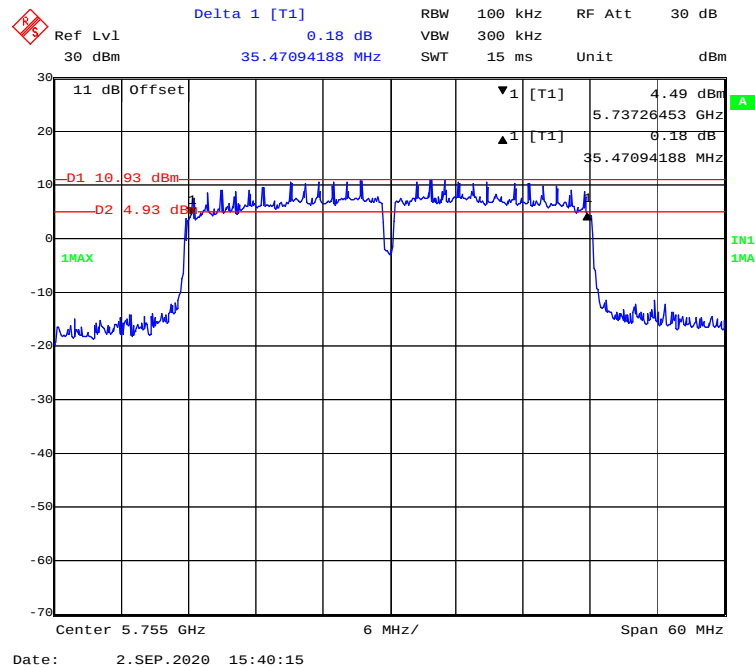
802.11n-HT20 mode, 5785MHz



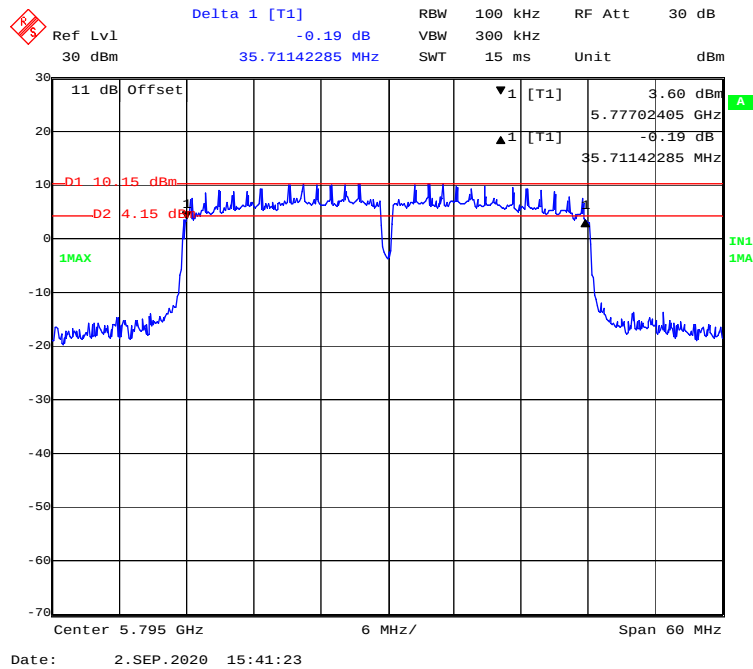
802.11n-HT20 mode, 5825MHz



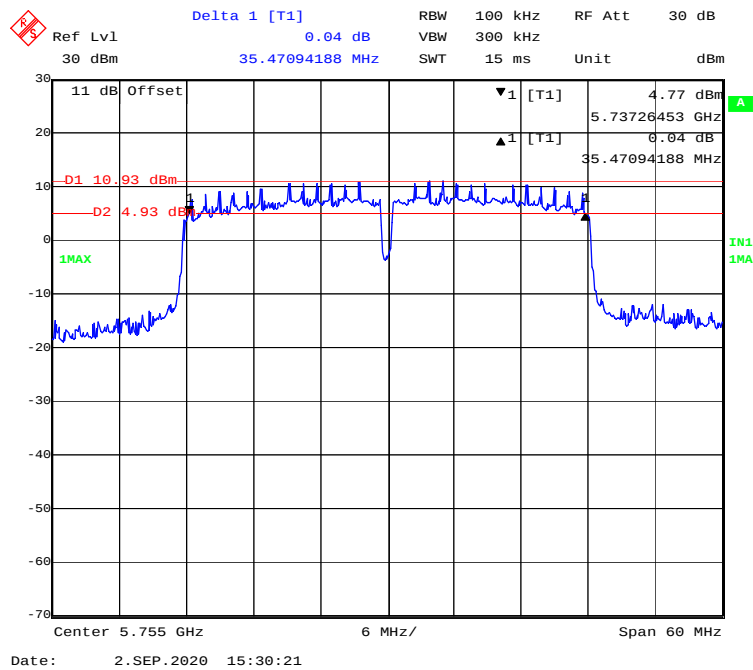
802.11ac40 mode, 5755MHz



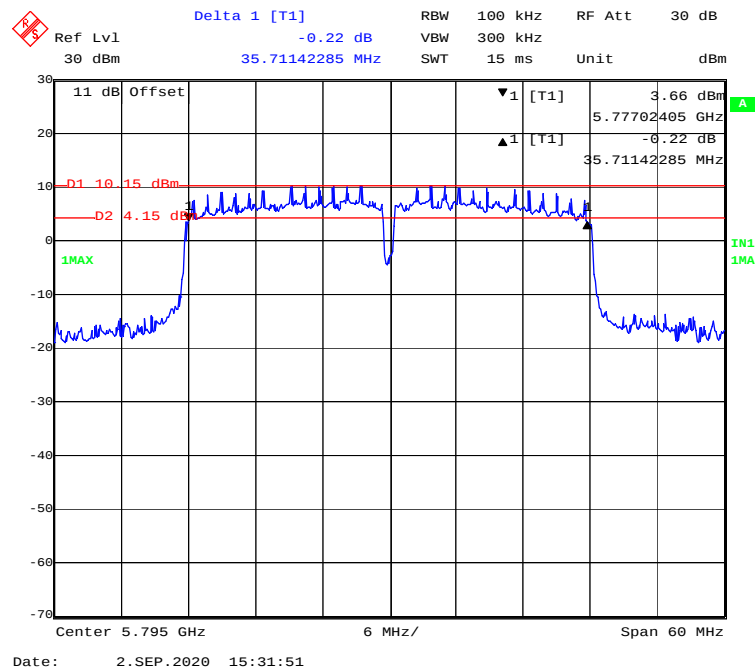
802.11 ac40 mode, 5795MHz



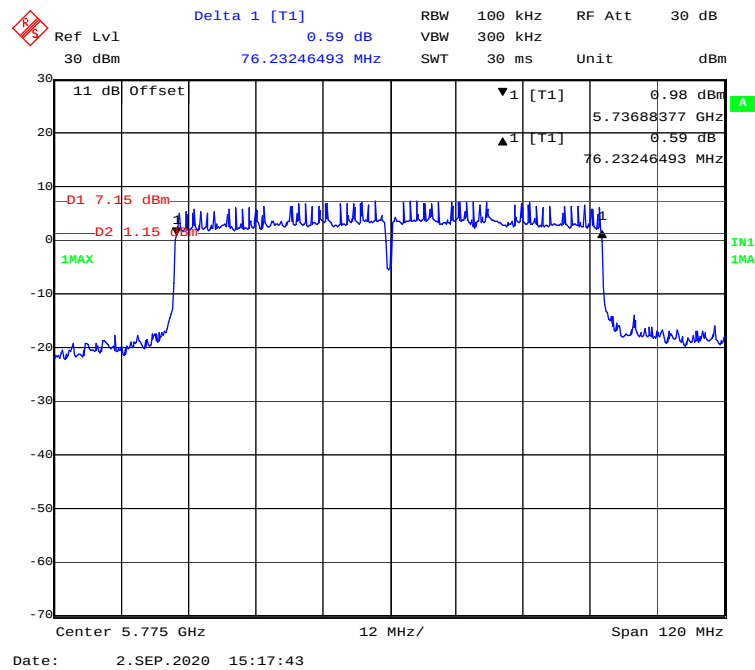
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz

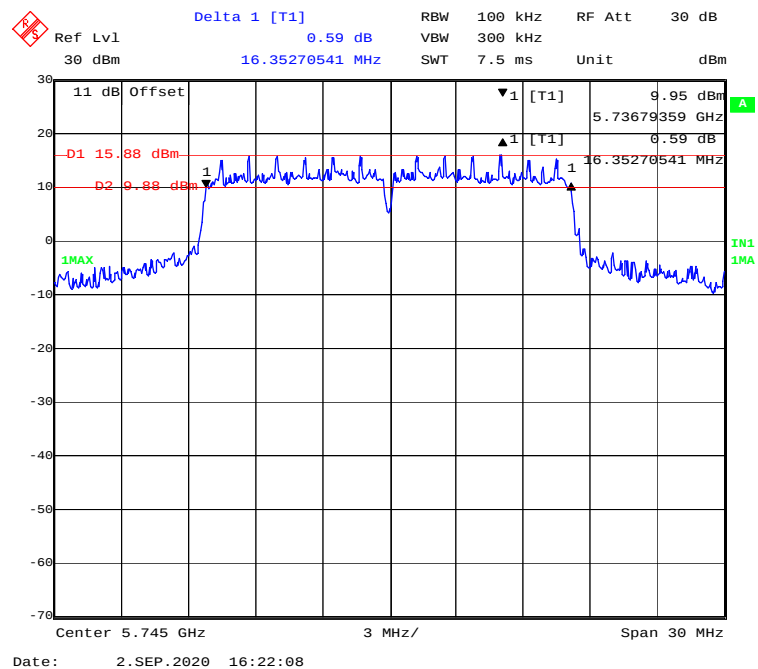


802.11ac80 mode, 5775MHz

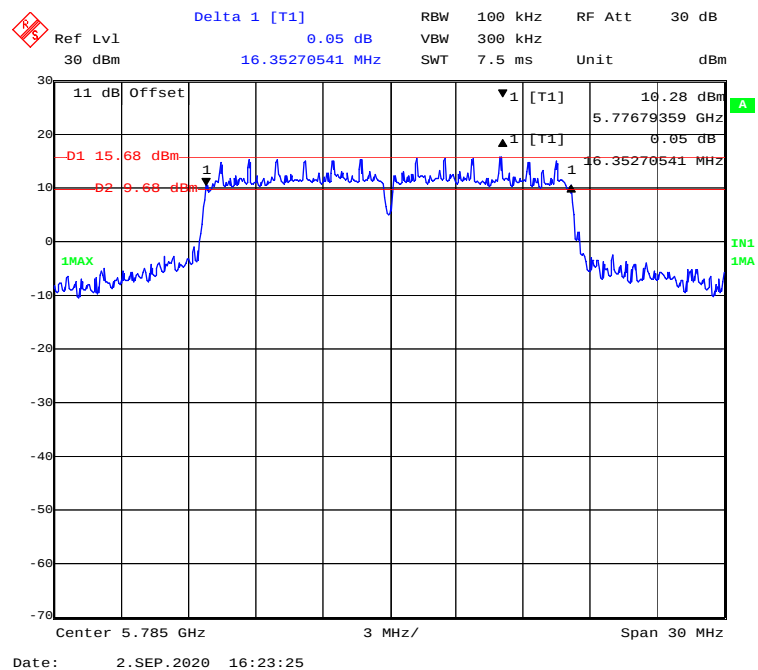


6 Bandwidth(Chain 1)

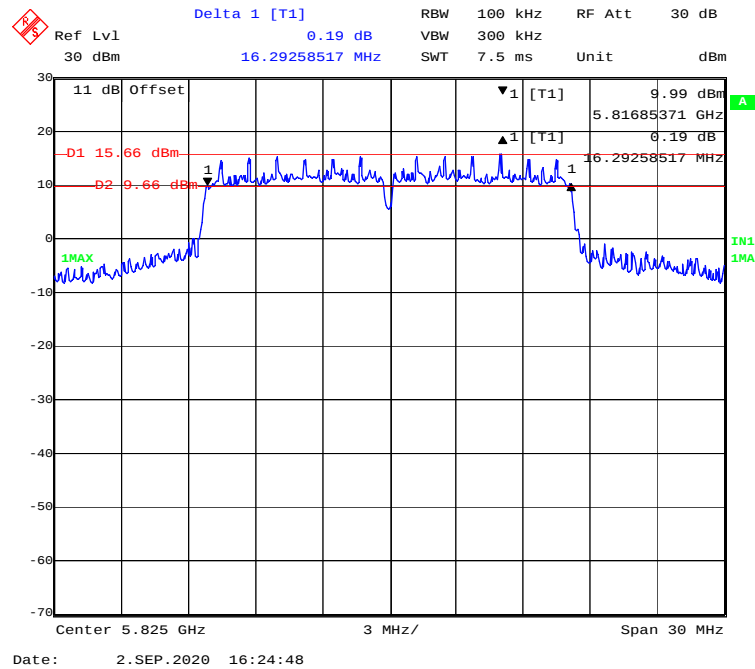
802.11a mode, 5745MHz



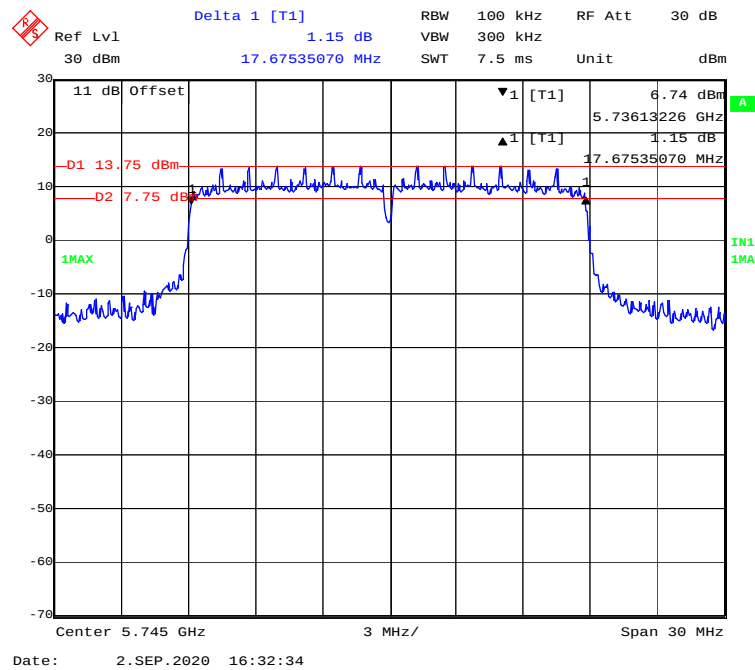
802.11a mode, 5785MHz



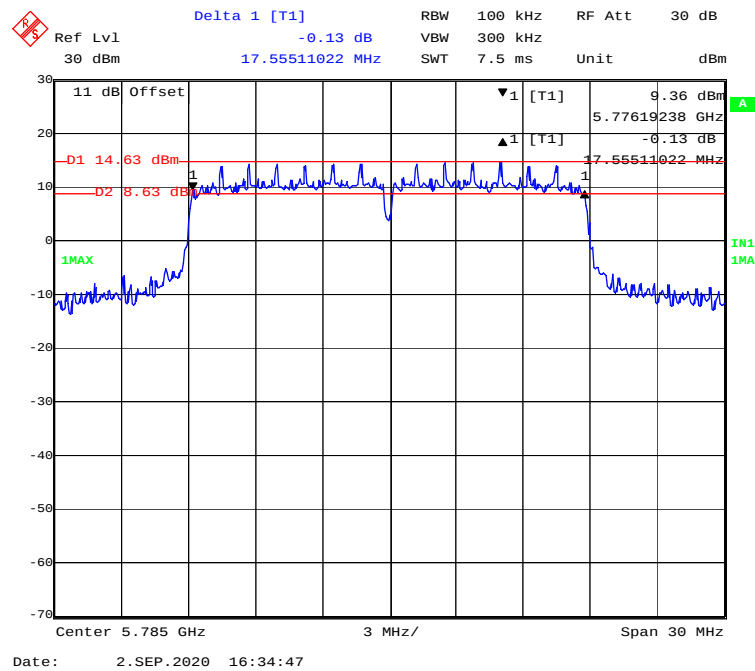
802.11a mode, 5825MHz



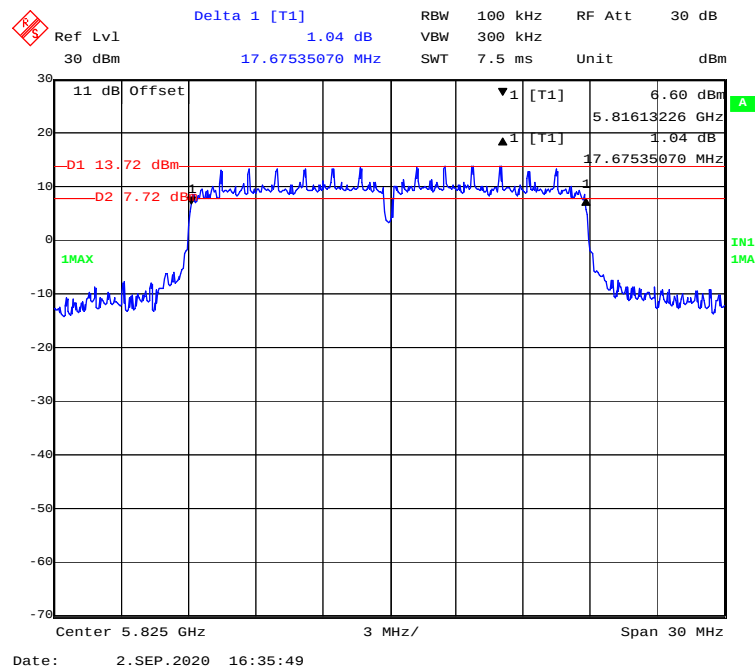
802.11ac20 mode, 5745MHz



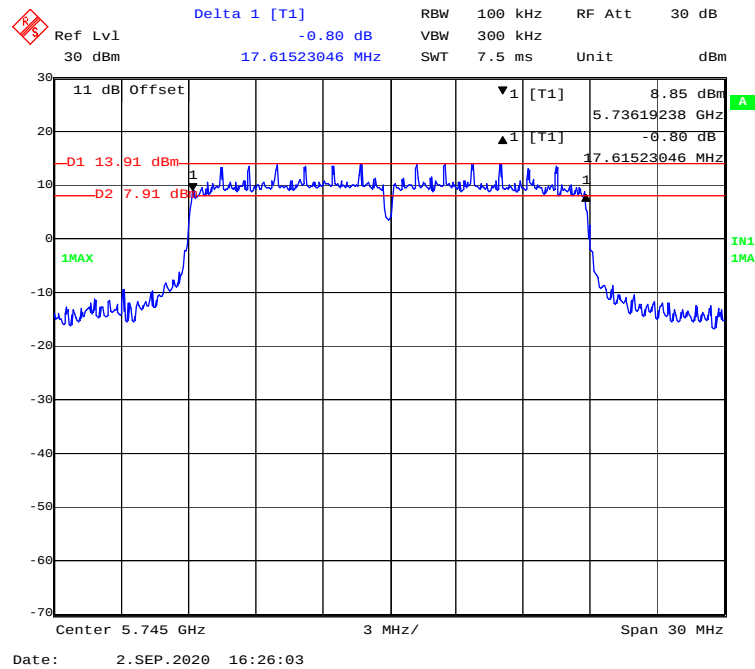
802.11 ac20 mode, 5785MHz



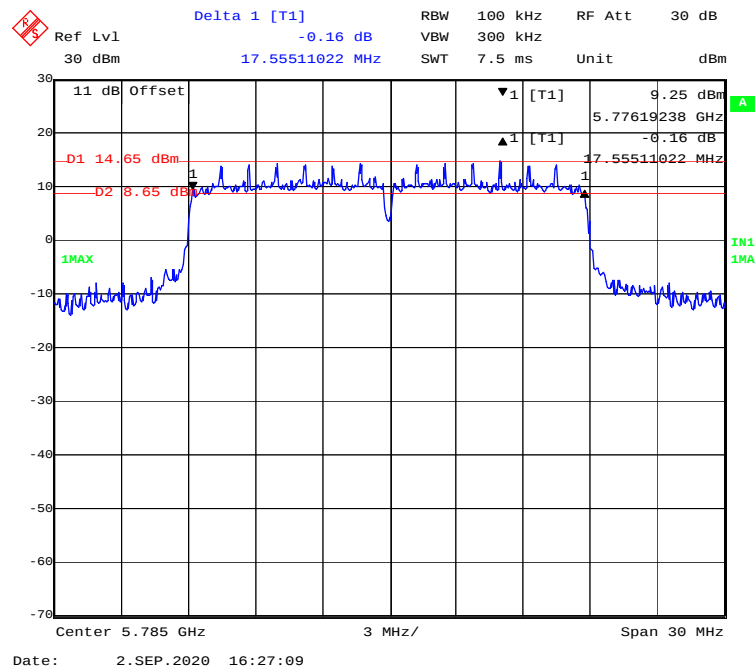
802.11 ac20 mode, 5825MHz



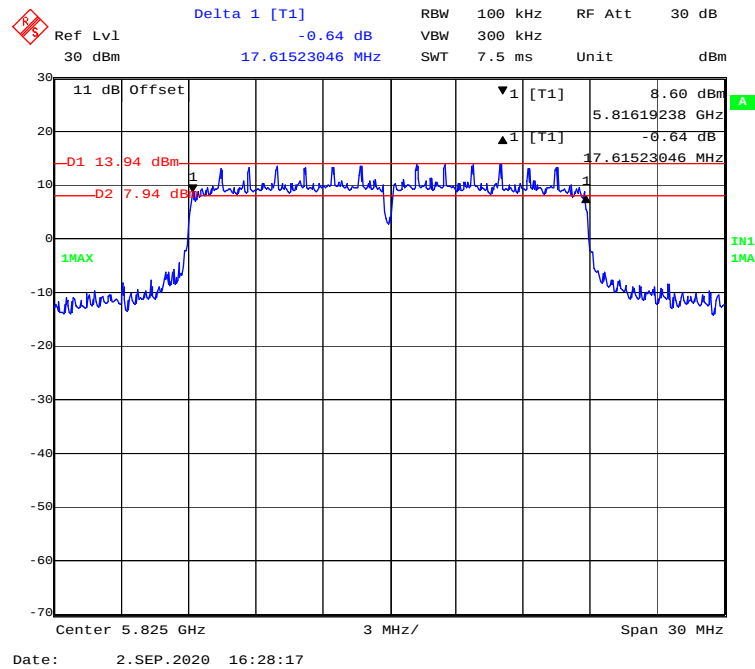
802.11n-HT20 mode, 5745MHz



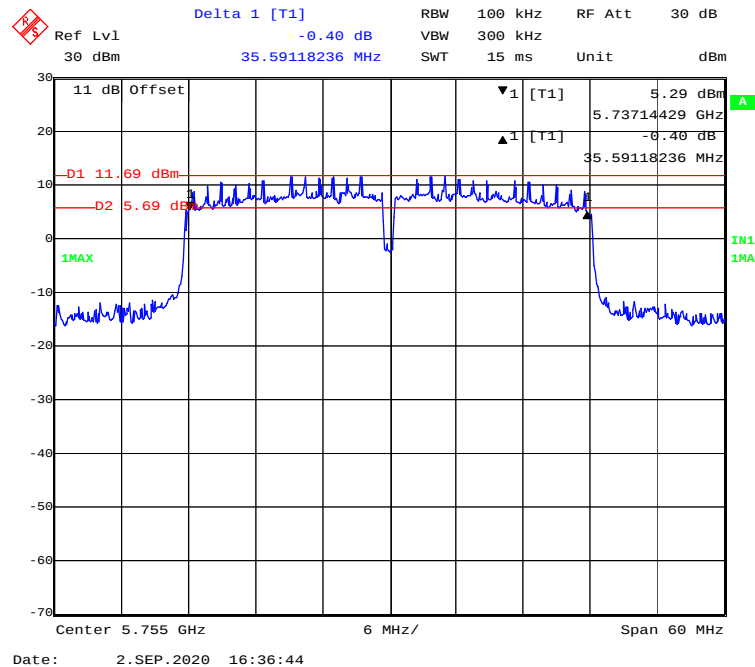
802.11n-HT20 mode, 5785MHz



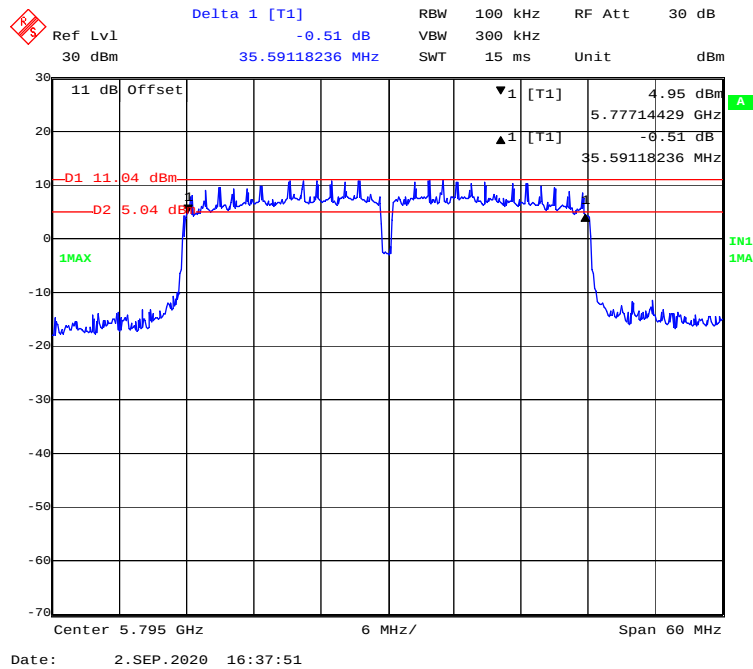
802.11n-HT20 mode, 5825MHz



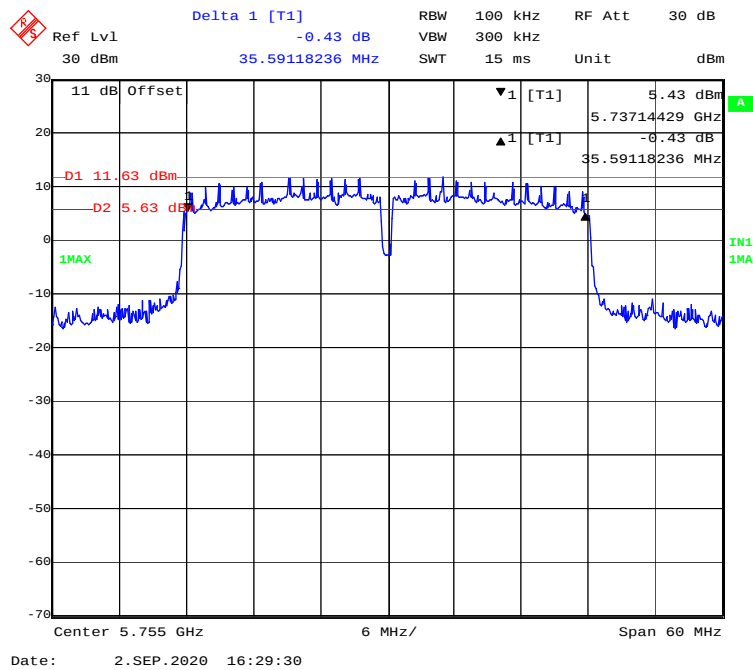
802.11ac40 mode, 5755MHz



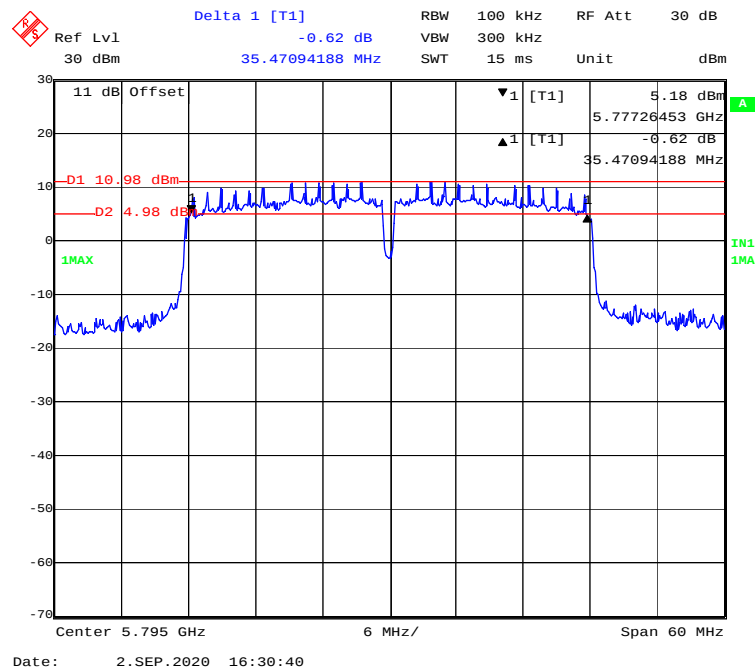
802.11 ac40 mode, 5795MHz



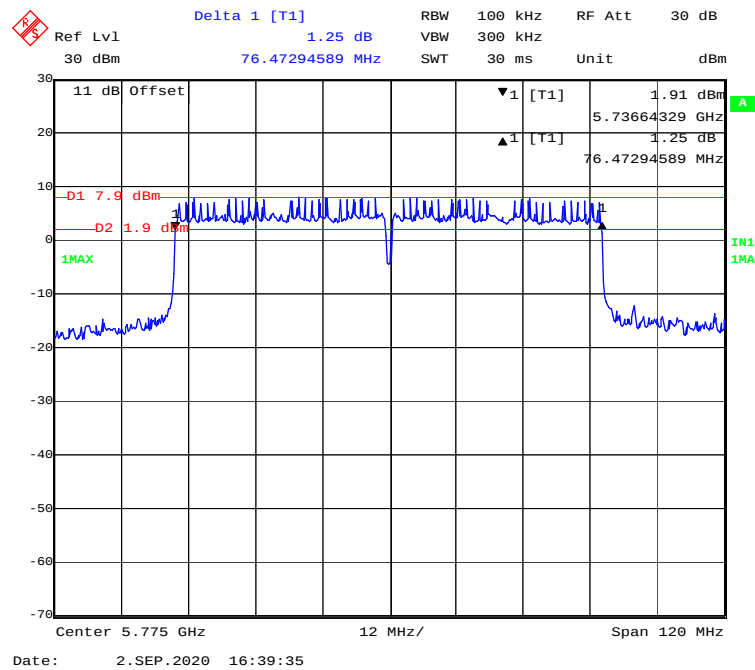
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz

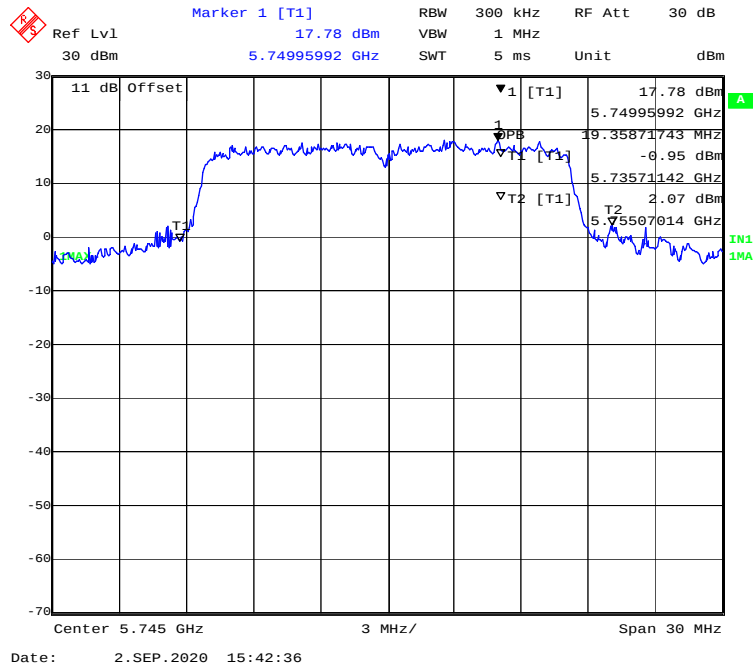


802.11ac80 mode, 5775MHz

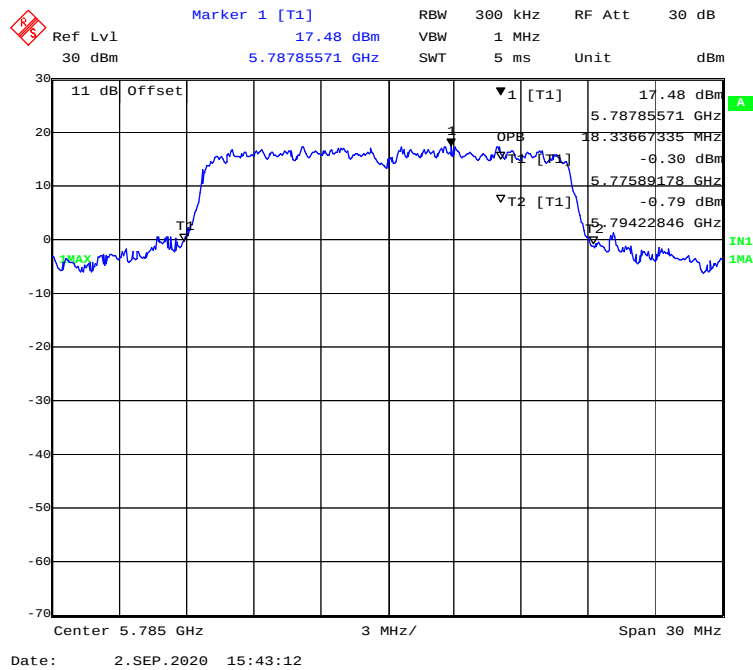


99% Bandwidth (Chain 0):

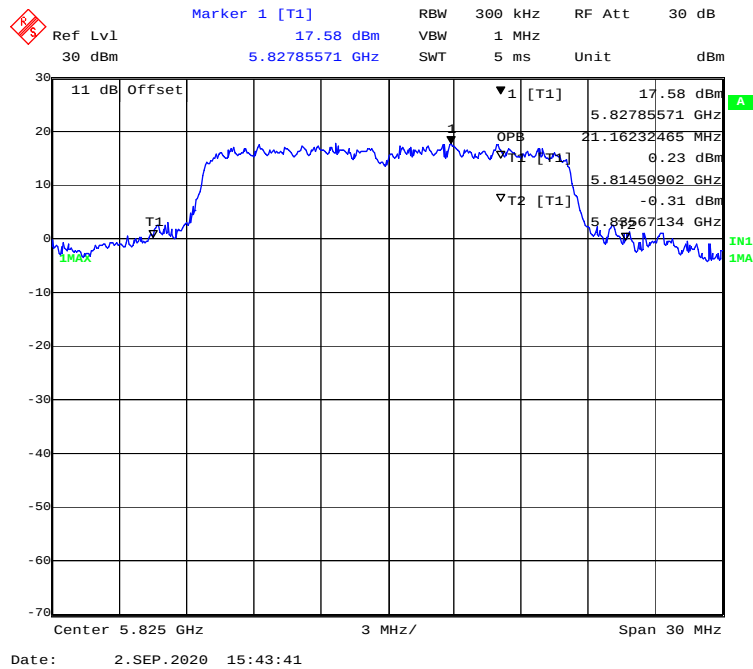
802.11a mode, 5745MHz



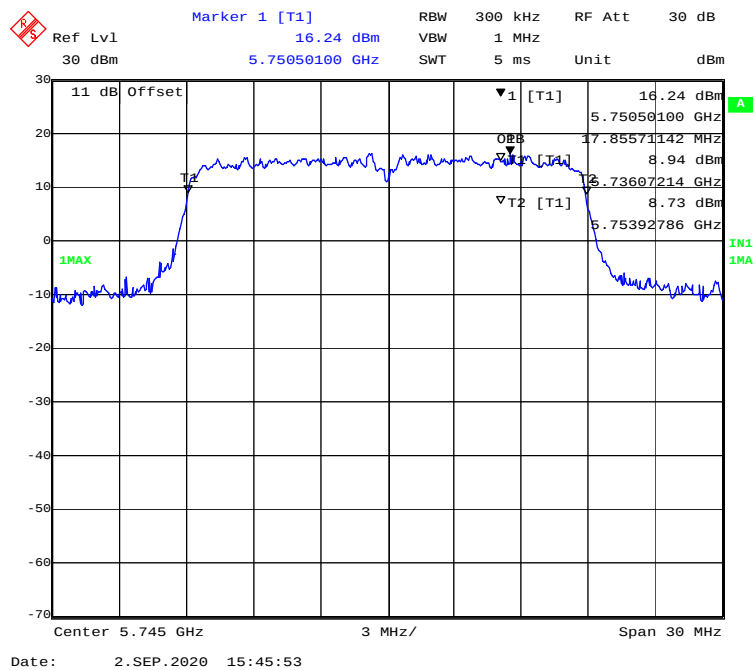
802.11a mode, 5785MHz



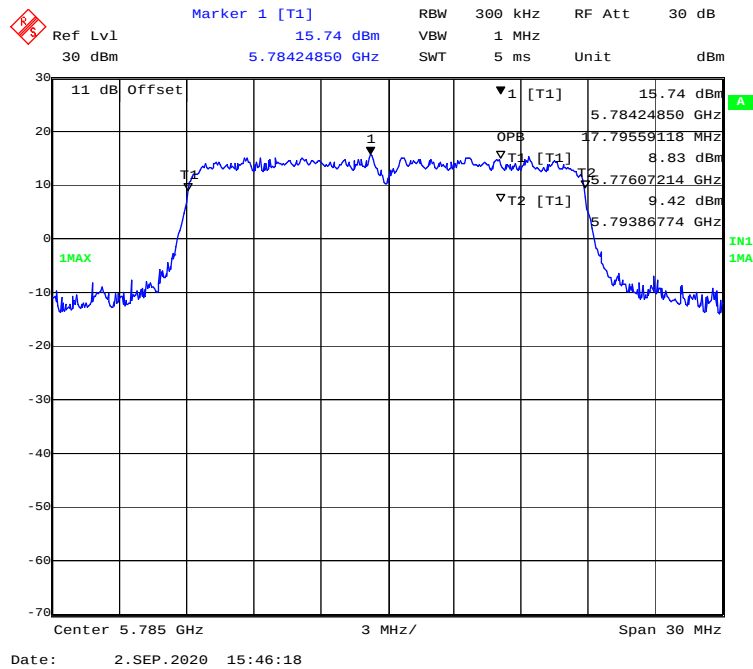
802.11a mode, 5825MHz



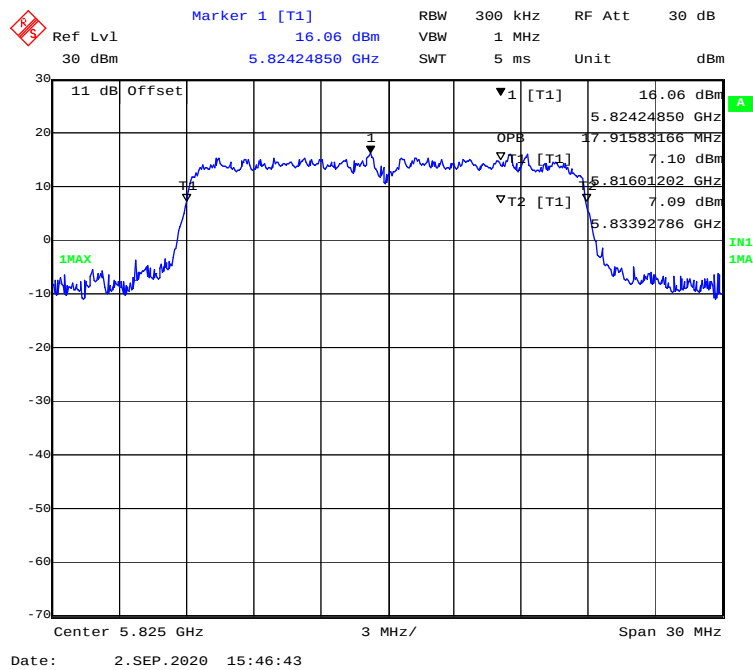
802.11ac20 mode, 5745MHz



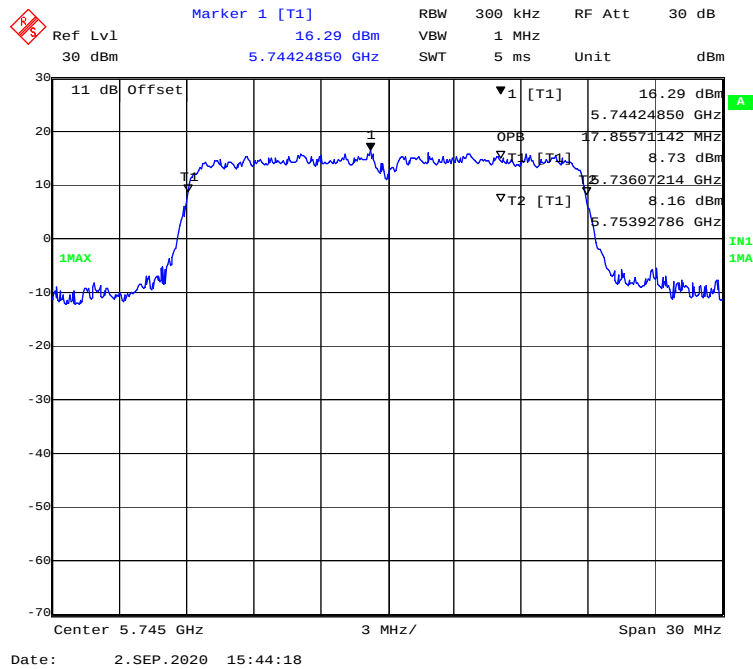
802.11 ac20 mode, 5785MHz



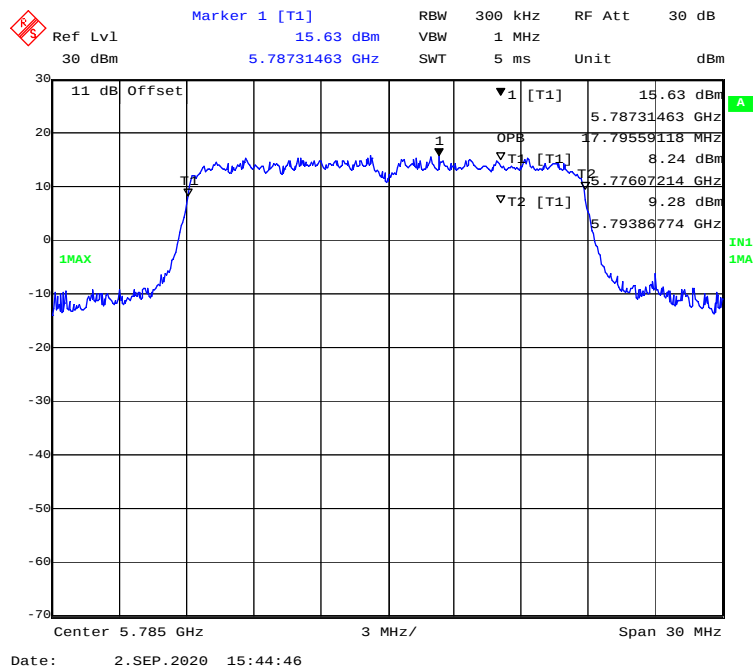
802.11 ac20 mode, 5825MHz



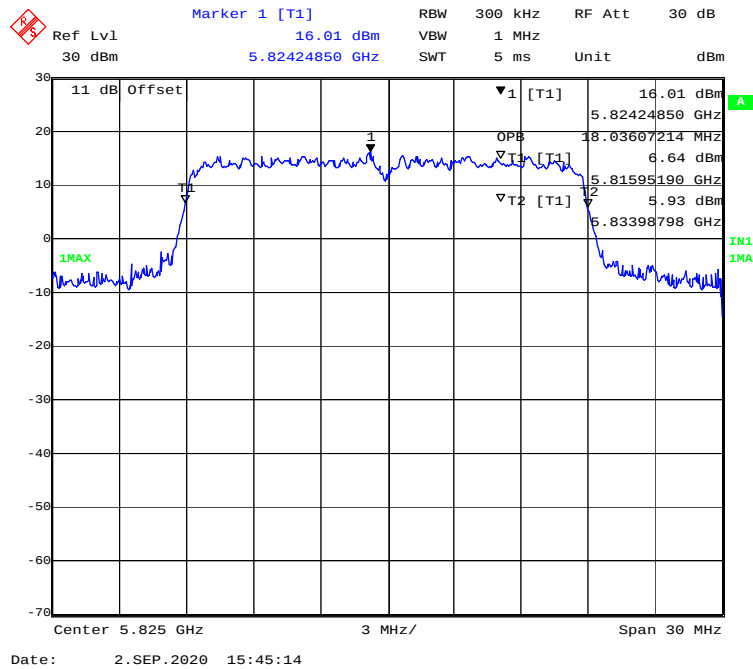
802.11n-HT20 mode, 5745MHz



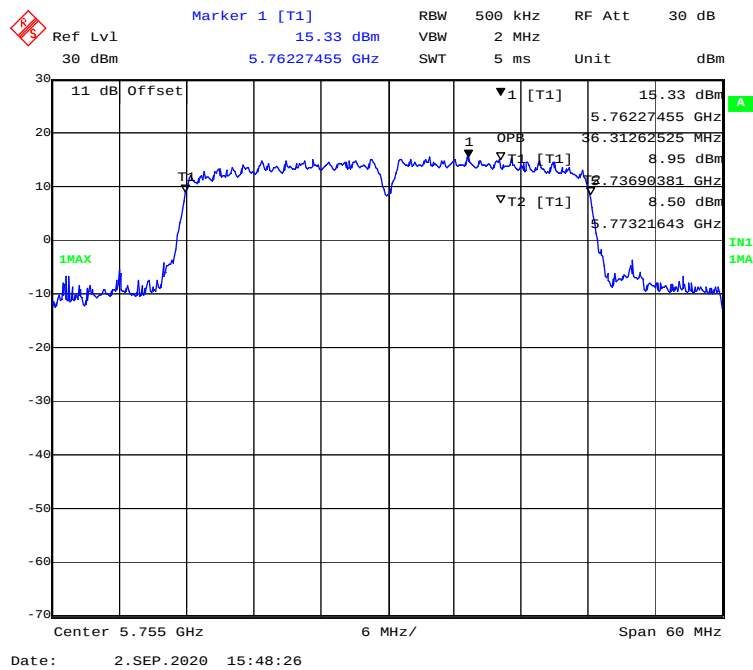
802.11n-HT20 mode, 5785MHz



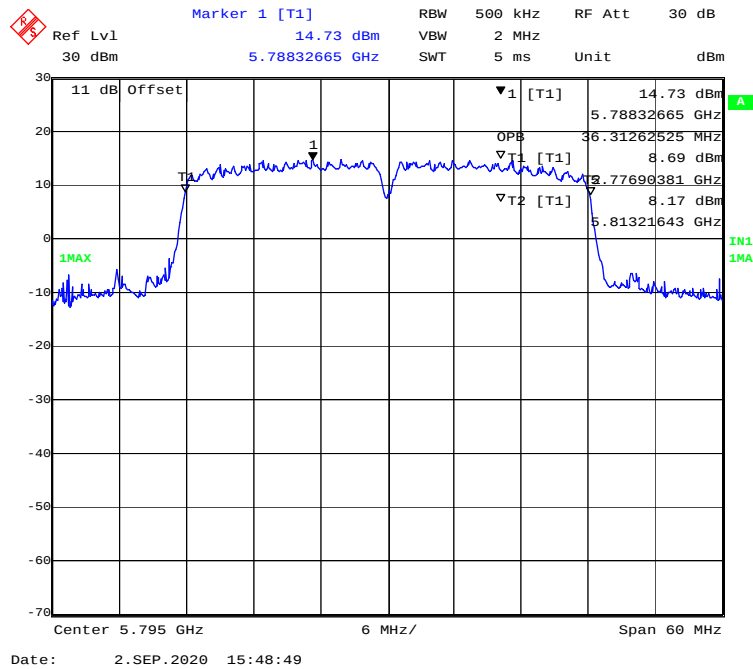
802.11n-HT20 mode, 5825MHz



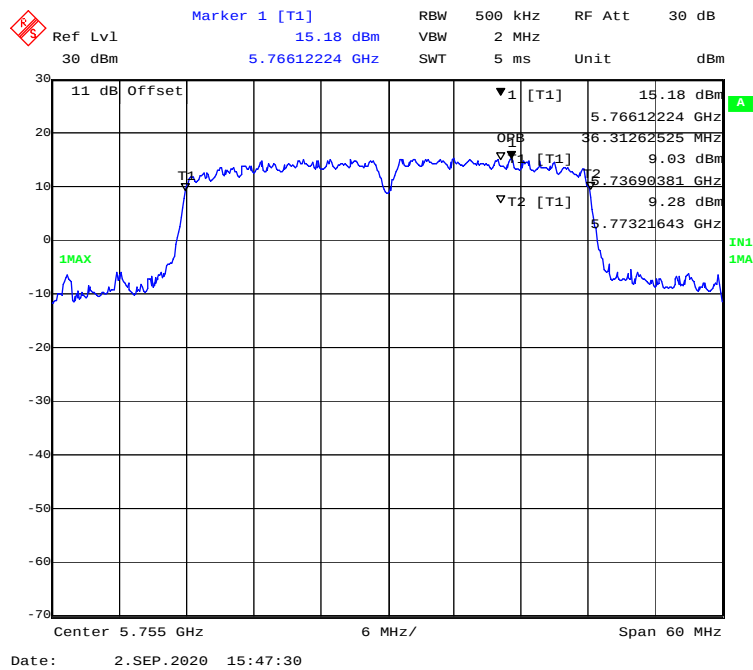
802.11ac40 mode, 5755MHz



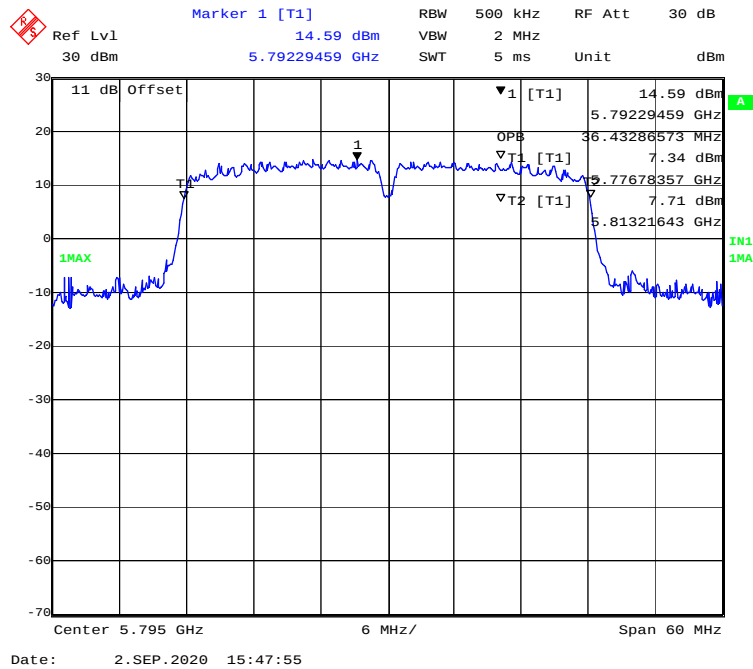
802.11 ac40 mode, 5795MHz



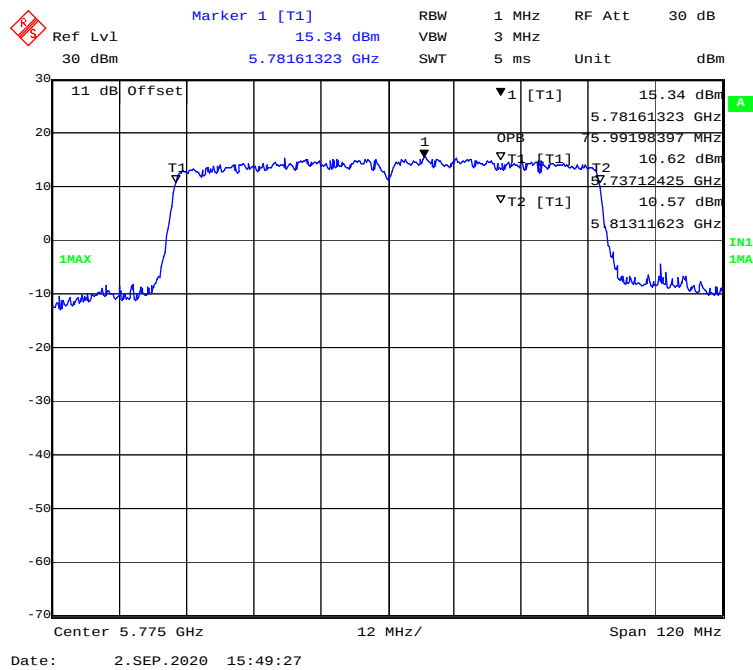
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz

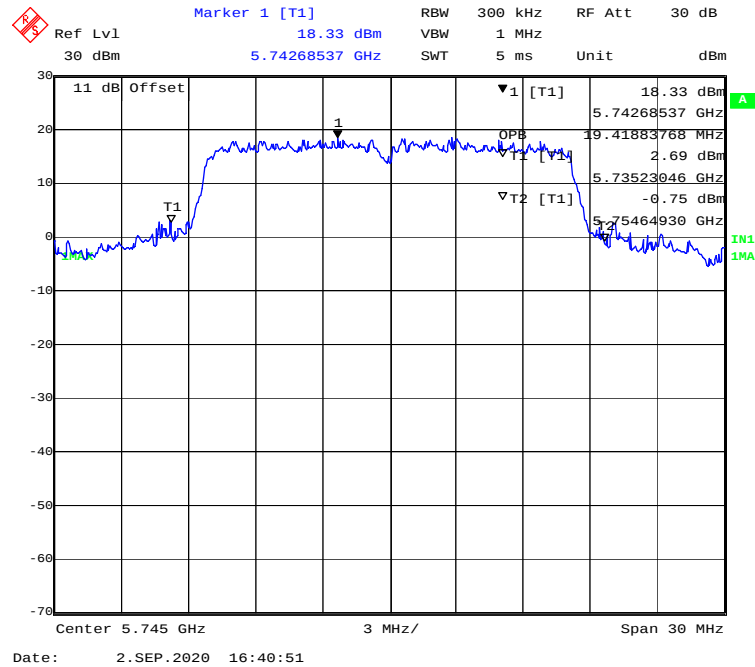


802.11n-ac80 mode, 5775MHz

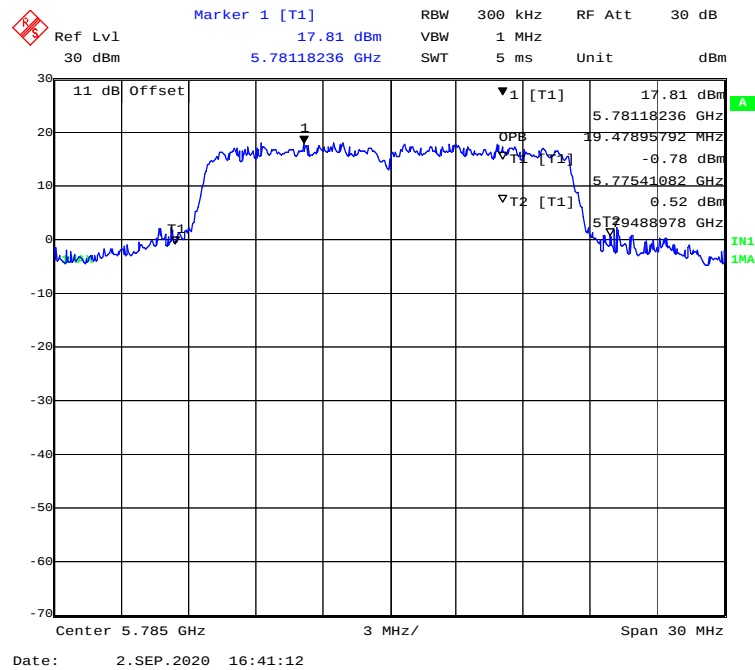


99% Bandwidth (Chain 1):

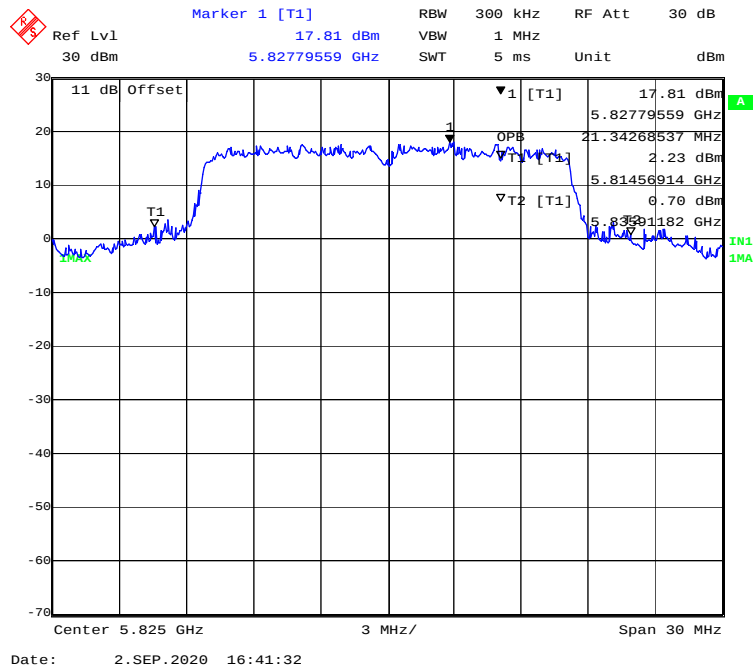
802.11a mode, 5745MHz



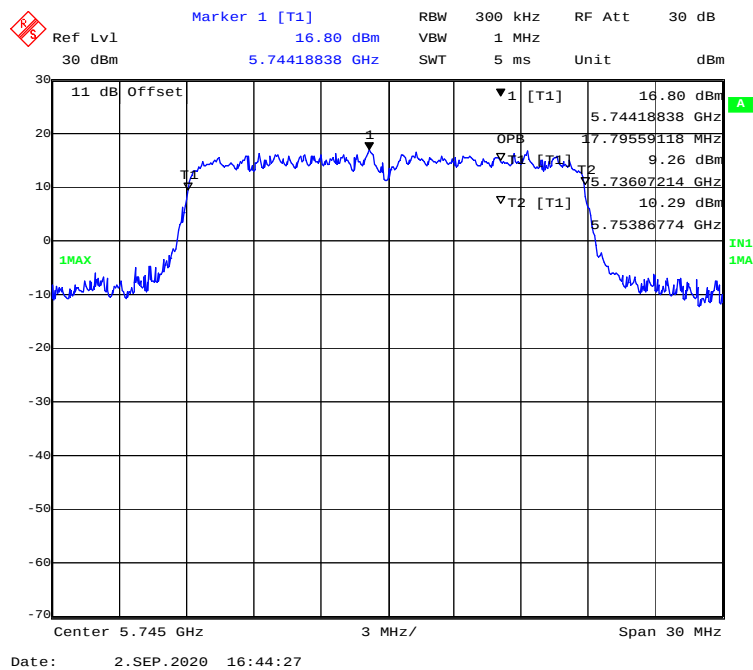
802.11a mode, 5785MHz



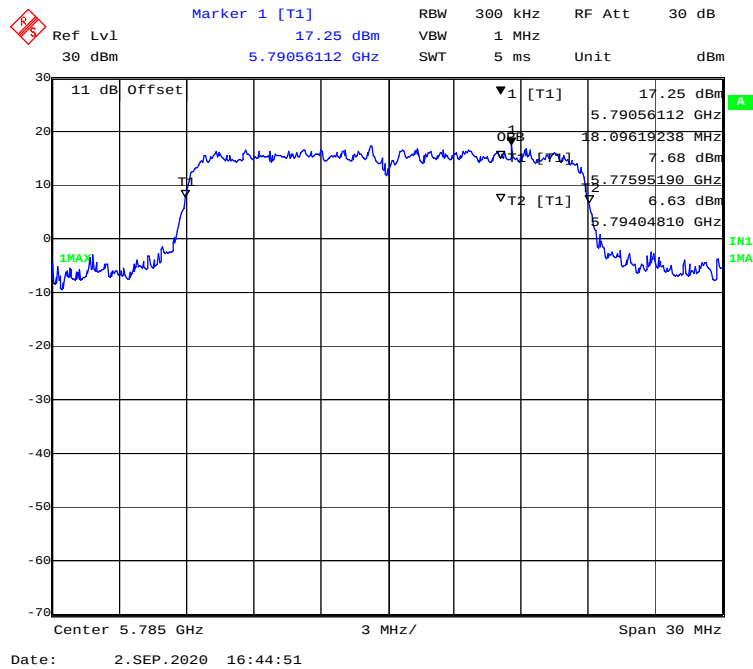
802.11a mode, 5825MHz



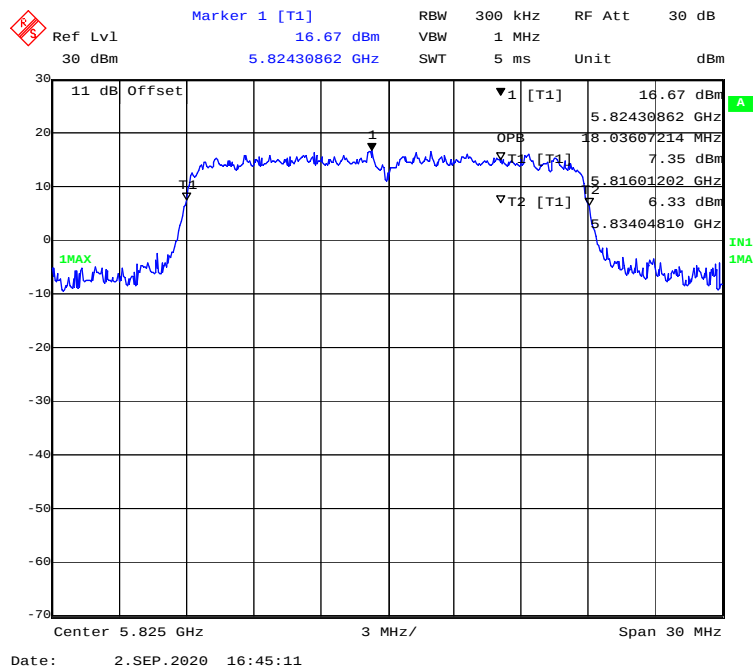
802.11ac20 mode, 5745MHz



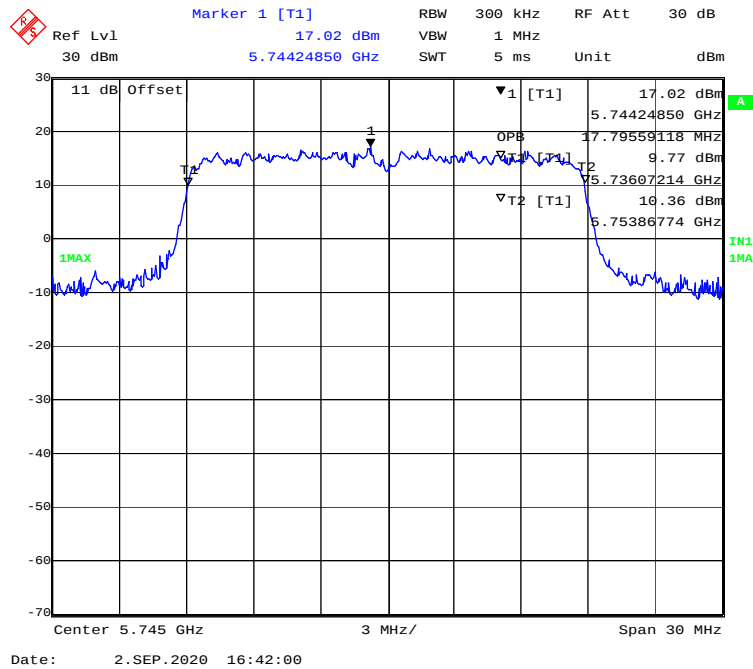
802.11 ac20 mode, 5785MHz



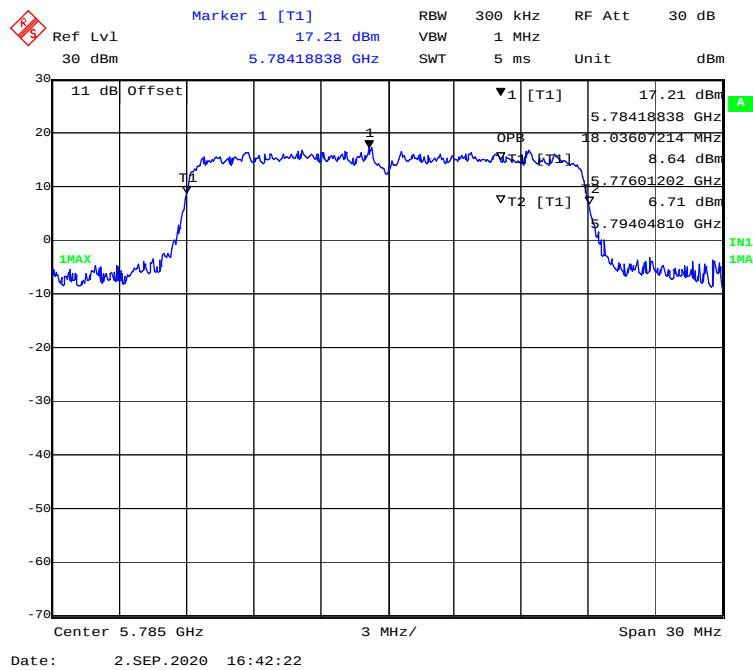
802.11 ac20 mode, 5825MHz



802.11n-HT20 mode, 5745MHz



802.11n-HT20 mode, 5785MHz



[illegible]

Ref Lvl 15.75 dBm
30 dBm 5.75710421 GHz

RBW 500 kHz
VBW 2 MHz
SWT 5 ms

RF Att 30 dB
Unit dBm

11 dB Offset

▼1 [T1] 15.75 dBm
5.75710421 GHz

OPB 36.43286573 MHz
▽T1 [T1] 9.20 dBm
▽T2 [T1] 9.37 dBm
5.73678357 GHz

1MAX

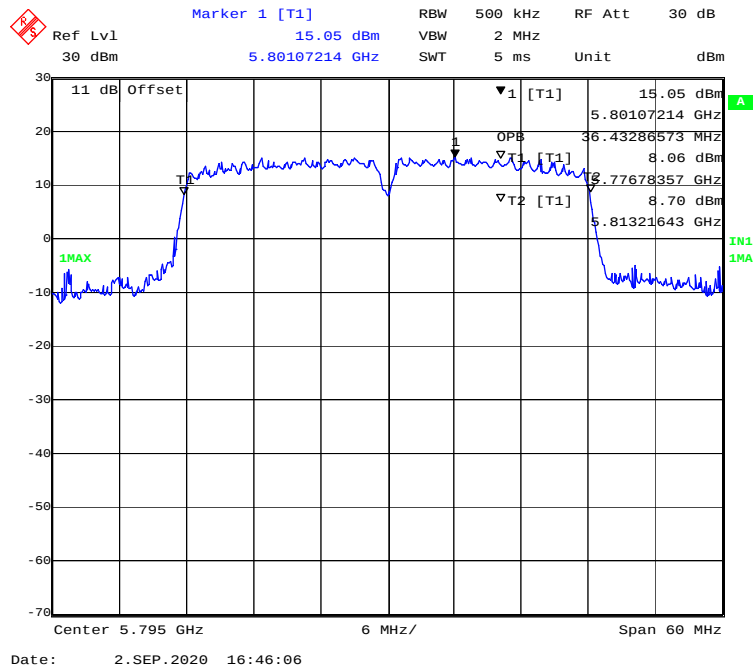
1

IN1 1MAX

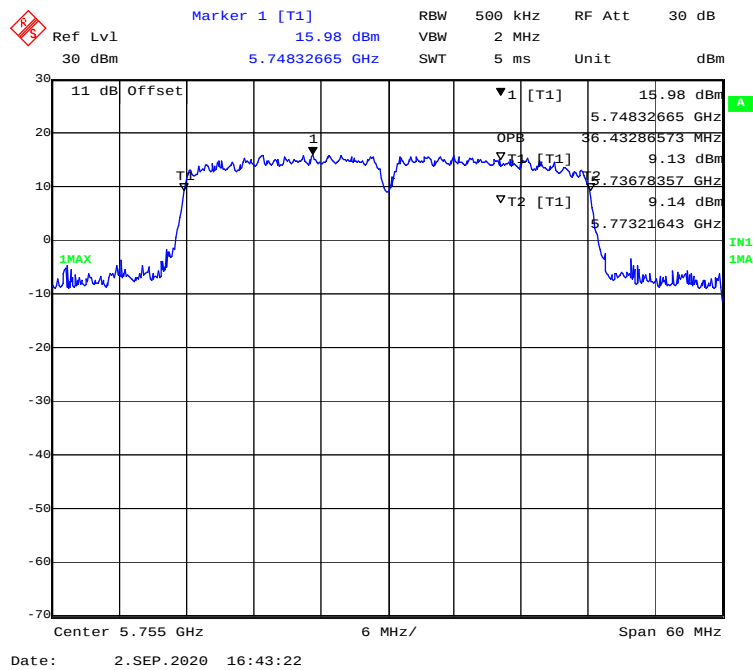
Center 5.755 GHz 6 MHz/ Span 60 MHz

Date: 2.SEP.2020 16:45:47

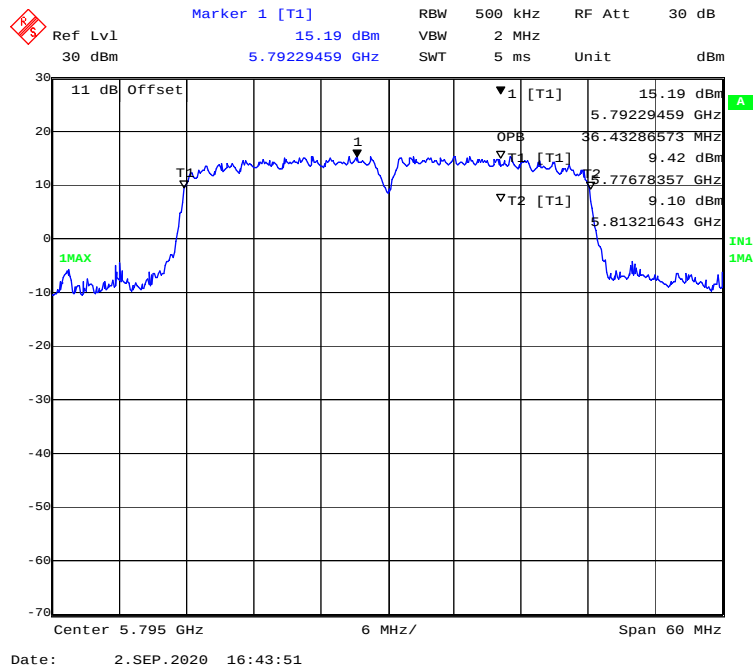
802.11 ac40 mode, 5795MHz



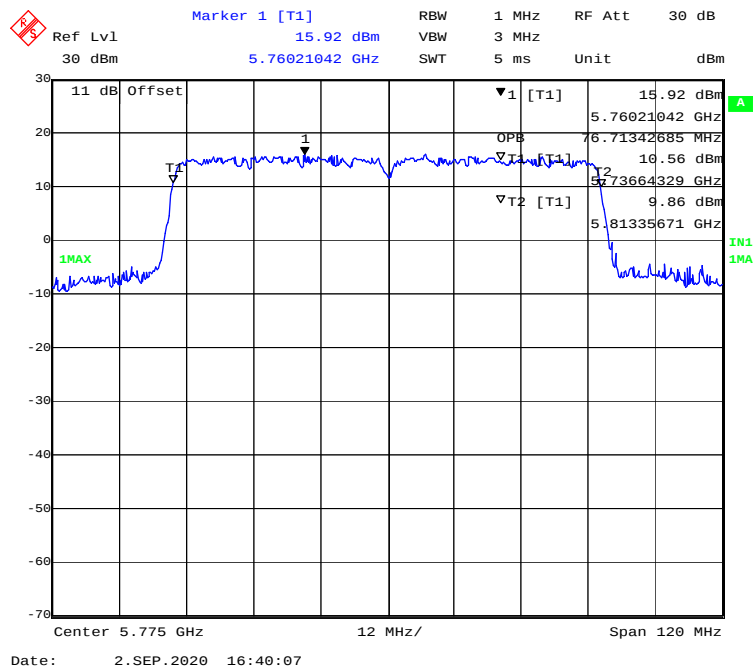
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz



802.11n-ac80 mode, 5775MHz



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

According to §15.407(a)(1)

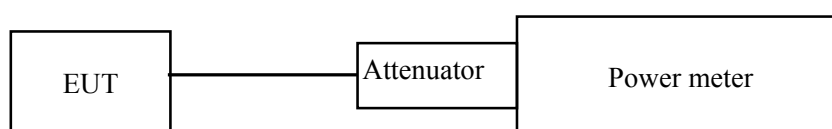
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz 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.

According to §15.407(a) (3)

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:	24.8°C~25°C
Relative Humidity:	49%~50%
ATM Pressure:	101.2 kPa ~101.5 kPa

The testing was performed by CK Huang from 2020-09-02 to 2020-09-17.

Test Mode: Transmitting

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)			Limit (dBm)	Result
				Chain 0	Chain 1	Total		
802.11a	5150-5250 MHz	Low	5180	22.70	21.22	/	30	PASS
		Middle	5200	22.45	24.19	/	30	PASS
		High	5240	24.93	23.92	/	30	PASS
	5725-5850 MHz	Low	5745	23.49	23.97	/	30	PASS
		Middle	5785	23.51	23.66	/	30	PASS
		High	5825	23.01	23.48	/	30	PASS
802.11n-HT20	5150-5250 MHz	Low	5180	20.79	21.44	24.14	30	PASS
		Middle	5200	21.68	21.67	24.69	30	PASS
		High	5240	21.43	21.67	24.56	30	PASS
	5725-5850 MHz	Low	5745	21.98	22.88	25.46	30	PASS
		Middle	5785	21.71	23.10	25.47	30	PASS
		High	5825	21.87	22.58	25.25	30	PASS
802.11n-HT40	5150-5250 MHz	Low	5190	19.15	18.31	21.76	30	PASS
		High	5230	21.13	20.09	23.65	30	PASS
	5725-5850 MHz	Low	5755	19.17	21.04	23.22	30	PASS
		High	5795	21.61	22.54	25.11	30	PASS
802.11ac20	5150-5250 MHz	Low	5180	20.39	21.07	23.75	30	PASS
		Middle	5200	20.19	21.79	24.07	30	PASS
		High	5240	21.68	23.71	25.82	30	PASS
	5725-5850 MHz	Low	5745	22.10	22.83	25.49	30	PASS
		Middle	5785	21.54	23.06	25.38	30	PASS
		High	5825	21.87	22.59	25.26	30	PASS
802.11ac40	5150-5250 MHz	Low	5190	21.47	21.00	24.25	30	PASS
		High	5230	20.73	19.52	23.18	30	PASS
	5725-5850 MHz	Low	5755	21.99	23.04	25.56	30	PASS
		High	5795	21.55	22.54	25.08	30	PASS
802.11ac80	5150-5250 MHz	/	5210	18.27	17.13	20.75	30	PASS
	5725-5850 MHz	/	5775	21.61	22.01	24.82	30	PASS

Note 1: The total output power= $10\log_{10}(10^{Chain\ 0/10}+10^{Chain\ 1/10})$

Note 2: The maximum antenna gain is 4.98 dBi, the device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4 ;

So: Directional gain = GANT + Array Gain = 4.98dBi < 6dBi

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

According to §15.407(a)(1)

(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.

According to §15.407(a) (3)

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

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Maximum power spectral density (PPSD)

Test Data**Environmental Conditions**

Temperature:	22.8°C~24°C
Relative Humidity:	49%~50%
ATM Pressure:	101.2 kPa ~101.5 kPa

The testing was performed by CK Huang from 2020-09-17 to 2020-10-15.

Test Mode: Transmitting

5150MHz-5250MHz:

Mode	Channel	Frequency (MHz)	PSD (dBm/MHz)			Limit (dBm/MHz)	Result
			Chain 0	Chain 1	Total		
802.11a	Low	5180	13.84	12.67	/	17	PASS
	Middle	5200	13.13	15.34	/	17	PASS
	High	5240	15.24	14.70	/	17	PASS
802.11ac20	Low	5180	11.55	11.30	14.44	15.02	PASS
	Middle	5200	11.48	11.29	14.40	15.02	PASS
	High	5240	11.89	11.08	14.51	15.02	PASS
802.11n20	Low	5180	11.75	11.46	14.62	15.02	PASS
	Middle	5200	11.23	11.45	14.35	15.02	PASS
	High	5240	11.32	11.21	14.27	15.02	PASS
802.11ac40	Low	5190	8.71	9.06	11.90	15.02	PASS
	High	5230	7.39	7.80	10.61	15.02	PASS
802.11n40	Low	5190	5.81	6.29	9.07	15.02	PASS
	High	5230	7.38	8.31	10.88	15.02	PASS
802.11ac80	/	5210	1.80	2.12	4.97	15.02	PASS

Note1: The total PSD= $10\log_{10}(10^{Chain\ 0/10}+10^{Chain\ 1/10})$

Note2: The maximum antenna gain is 4.97dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

Array Gain = $10\log(NANT/NSS)$ dB.

So: Directional gain = GANT + Array Gain = $4.97+10*\log(2/1)=7.98$ dBi, power spectral density limit reduced $7.98-6=1.98$ dB.

5725MHz-5850MHz:

Mode	Channel	Frequency MHz	PSD (dBm/500kHz)			Limit (dBm/500kHz)	Result
			Chain 0	Chain 1	Total		
802.11a	Low	5745	10.29	10.50	/	30	PASS
	Middle	5785	10.41	9.81	/	30	PASS
	High	5825	10.52	10.10	/	30	PASS
802.11ac20	Low	5745	10.76	10.58	13.68	28.01	PASS
	Middle	5785	10.31	10.30	13.32	28.01	PASS
	High	5825	10.39	10.05	13.23	28.01	PASS
802.11n20	Low	5745	10.45	9.82	13.16	28.01	PASS
	Middle	5785	10.66	10.01	13.36	28.01	PASS
	High	5825	10.57	10.28	13.44	28.01	PASS
802.11ac40	Low	5755	8.64	9.19	11.93	28.01	PASS
	High	5795	8.66	9.36	12.04	28.01	PASS
802.11n40	Low	5755	8.55	9.34	11.97	28.01	PASS
	High	5795	8.65	9.47	12.09	28.01	PASS
802.11ac80	/	5775	6.75	6.20	9.49	28.01	PASS

Note1: The total PSD= $10\log_{10}(10^{Chain\ 0/10}+10^{Chain\ 1/10})$

Note2: The maximum antenna gain is 4.98dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

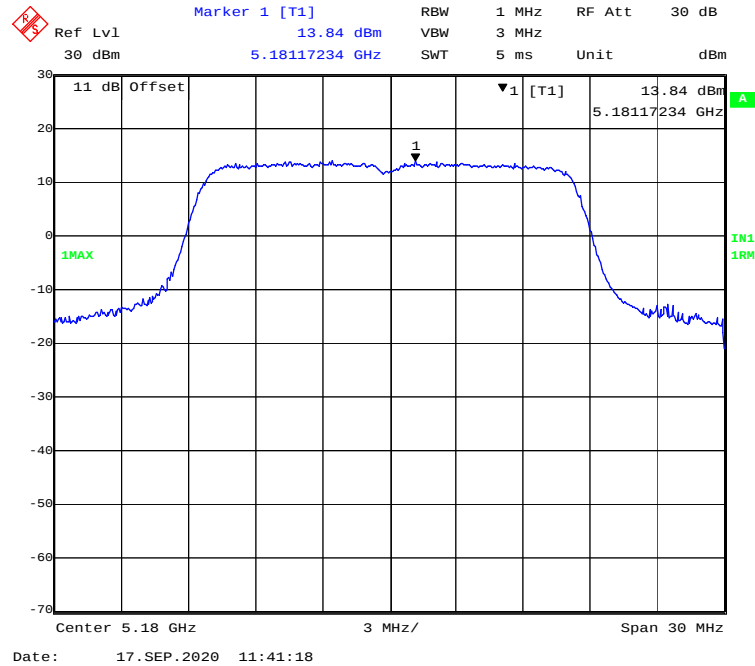
Array Gain = $10\log(N_{ANT}/N_{SS})$ dB.

So: Directional gain = GANT + Array Gain = $4.98+10*\log(2/1)=7.99$ dBi, power spectral density limit reduced $7.99-6=1.99$ dB.

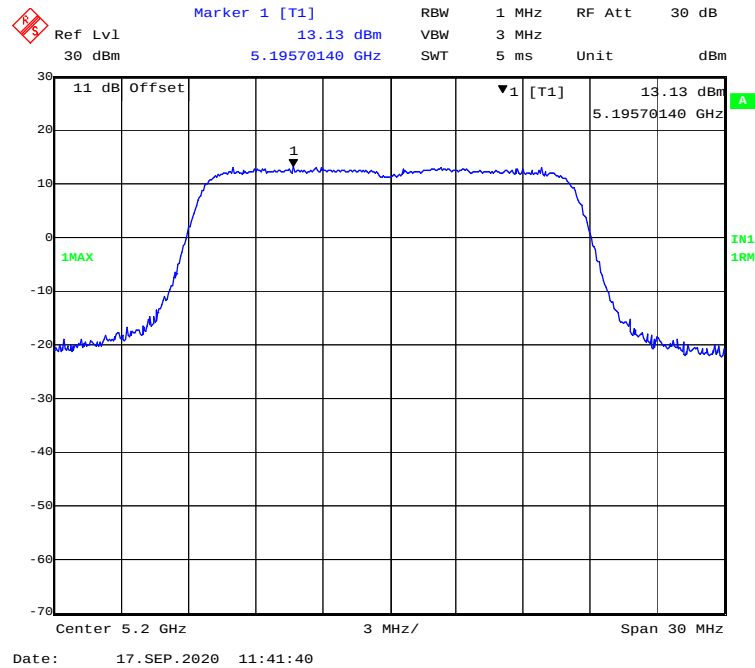
5150MHz-5250MHz Band:

Chain 0:

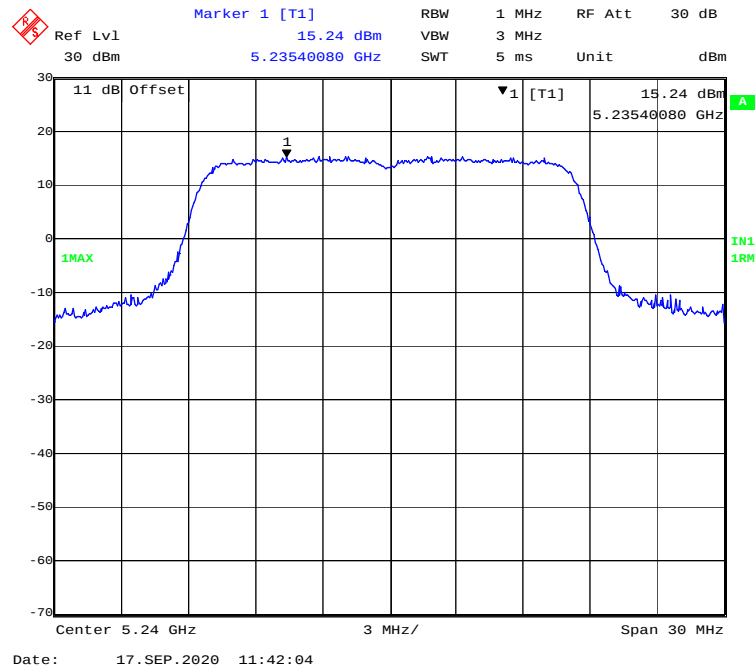
802.11a mode, Power spectral density-5180MHz



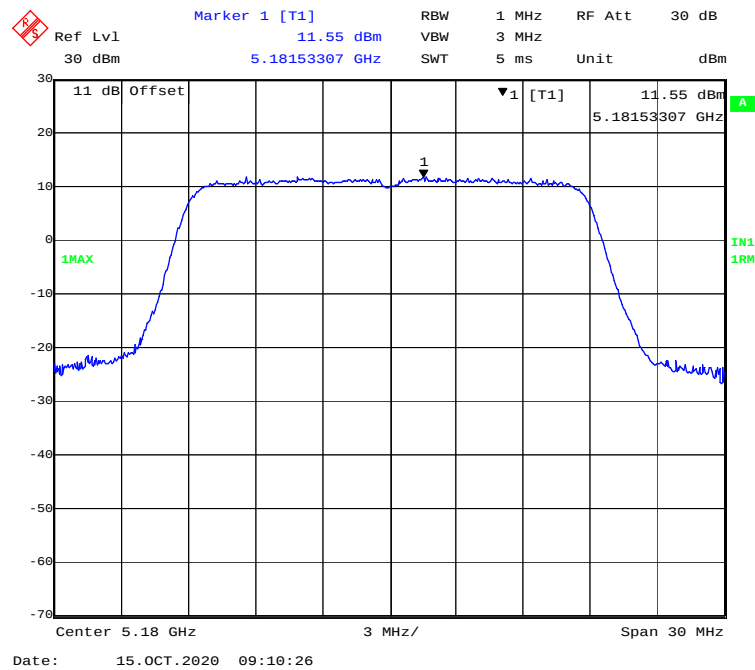
802.11a mode, Power spectral density-5200MHz



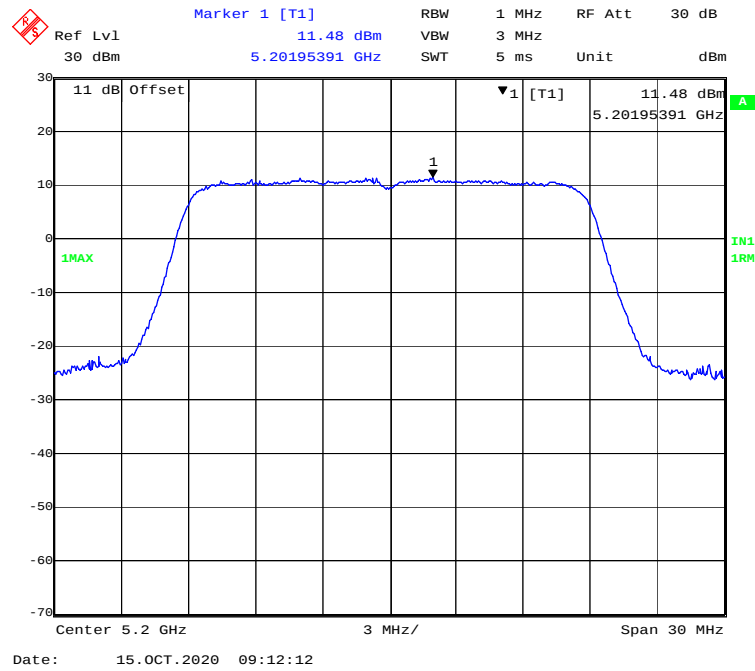
802.11a mode, Power spectral density-5240MHz



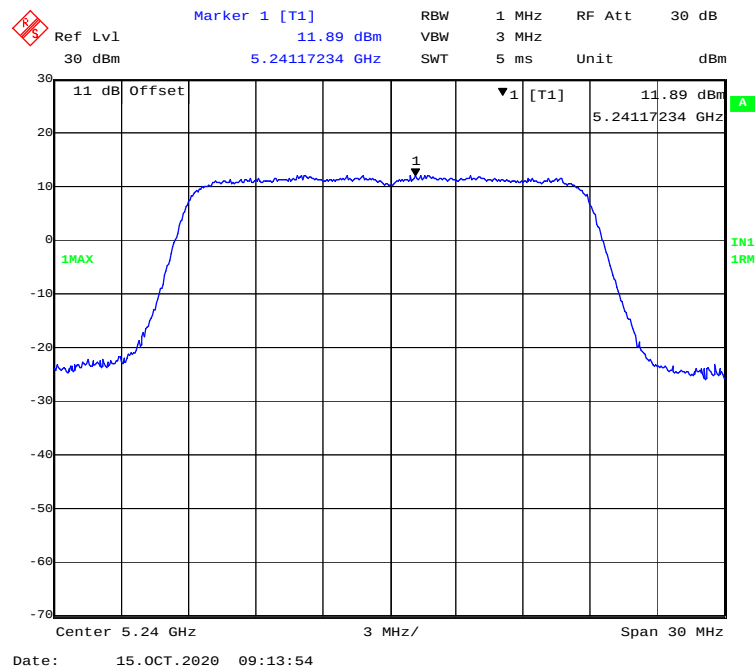
802.11ac20 mode, Power spectral density-5180MHz



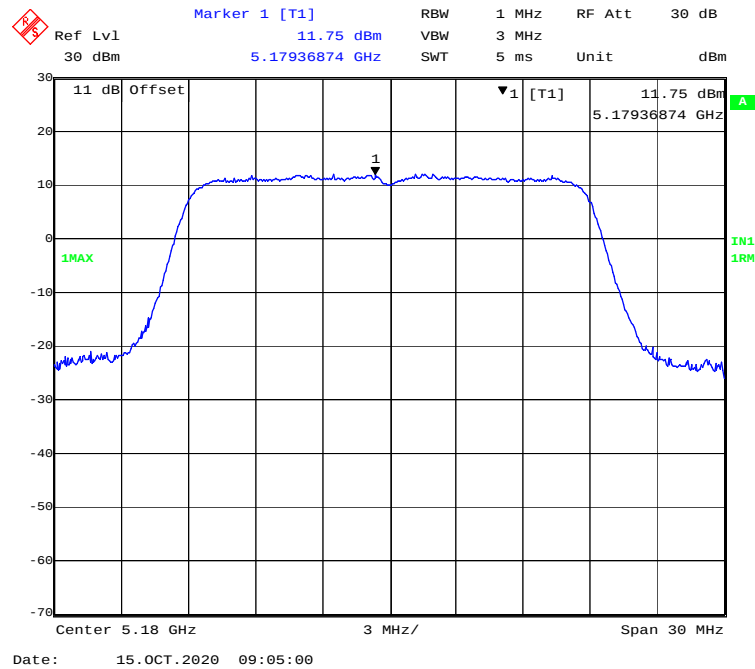
802.11 ac20 mode, Power spectral density-5200MHz



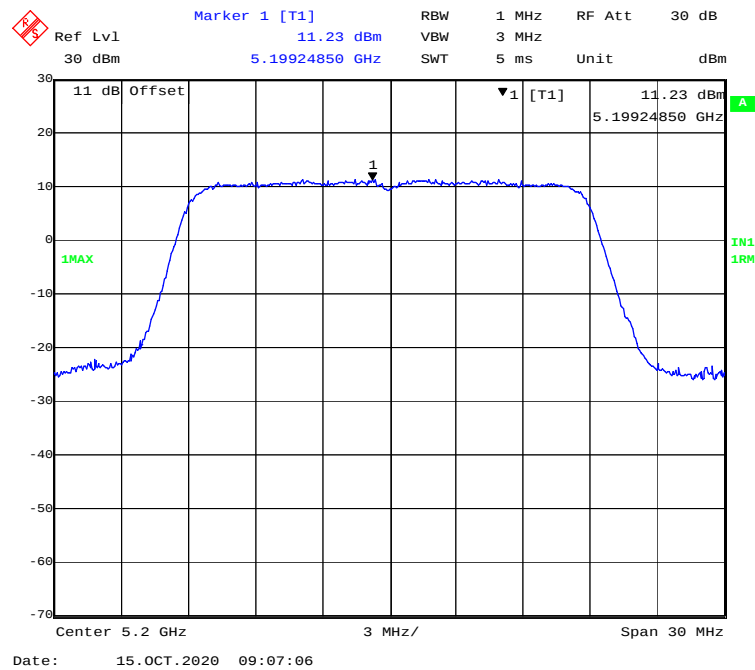
802.11ac20 mode, Power spectral density-5240MHz

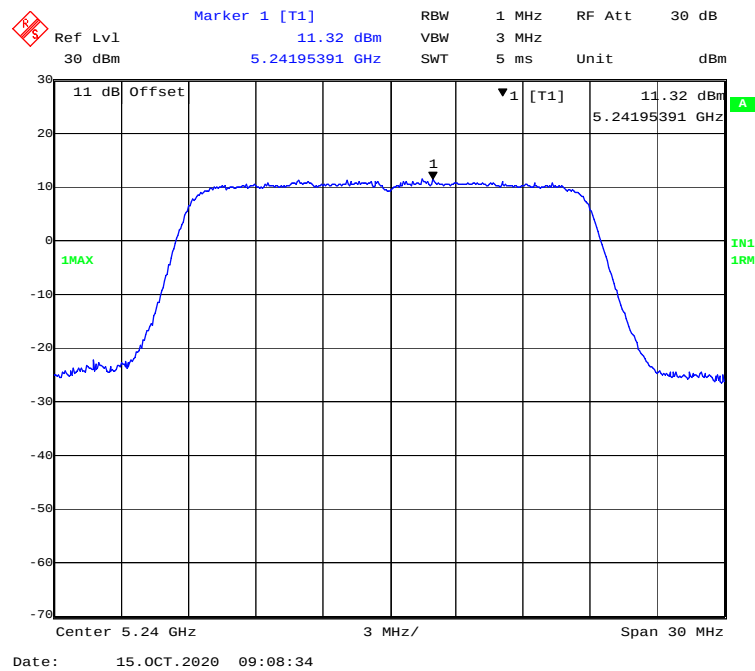
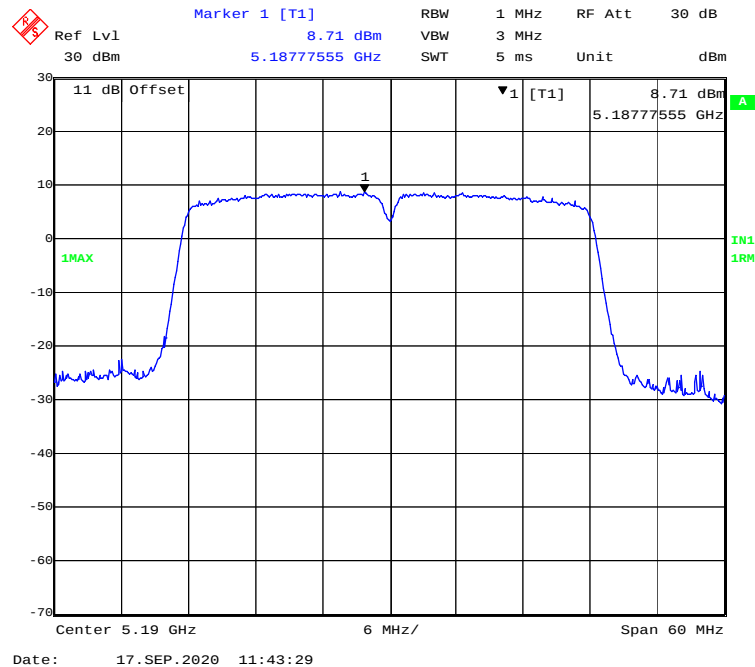


802.11n-HT20 mode, Power spectral density-5180MHz

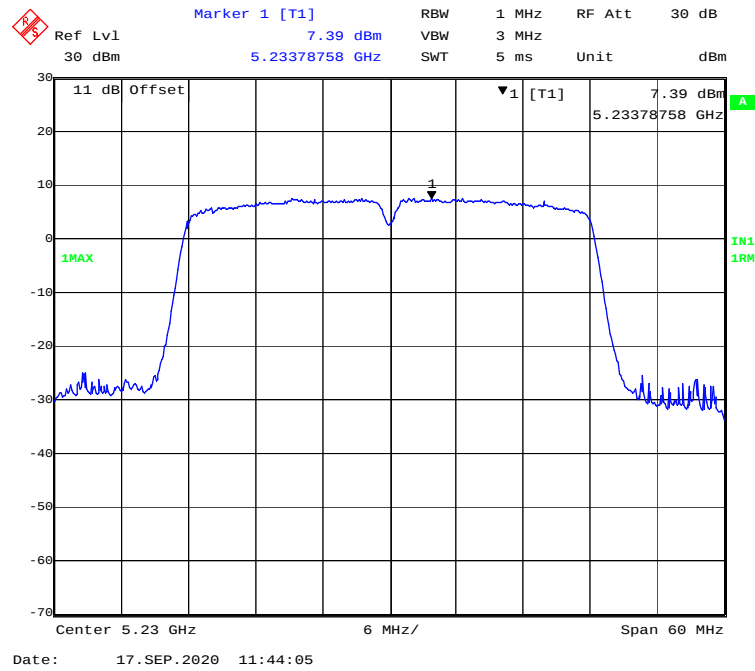


802.11n-HT20 mode, Power spectral density-5200MHz

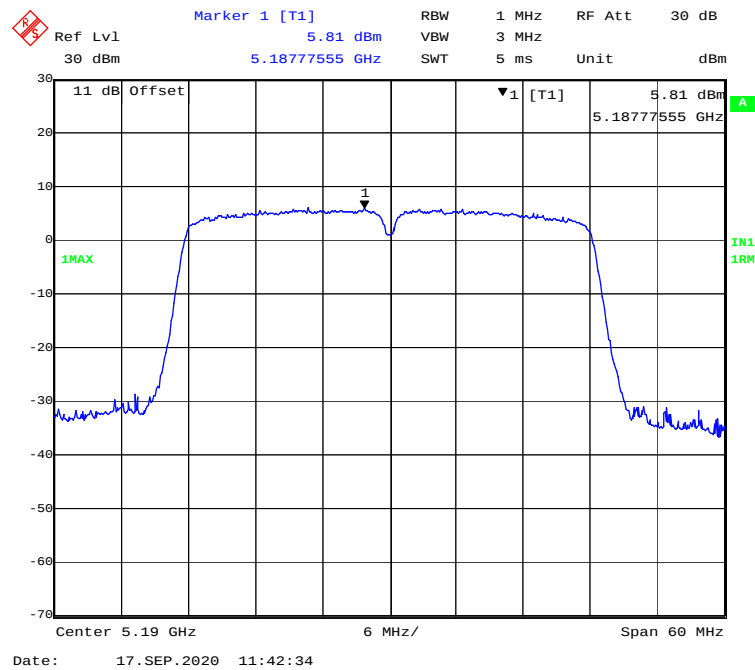


802.11n-HT20 mode, Power spectral density-5240MHz**802.11ac40 mode, Power spectral density-5190MHz**

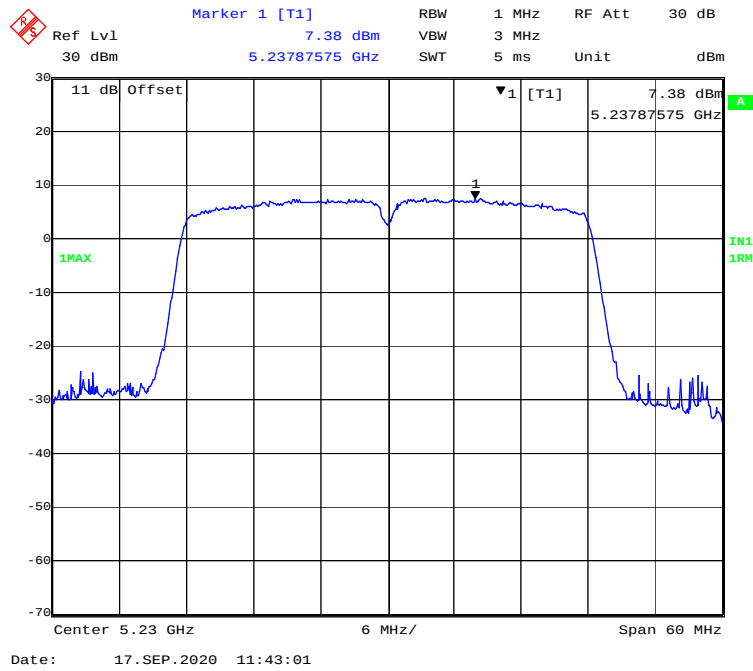
802.11 ac40 mode, Power spectral density-5230MHz



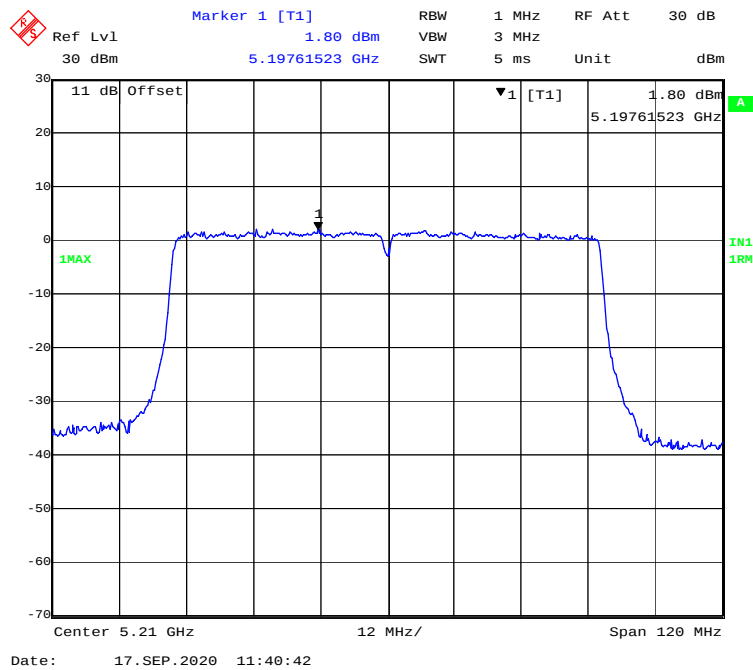
802.11n-HT40 mode, Power spectral density-5190MHz



802.11n-HT40 mode, Power spectral density-5230MHz

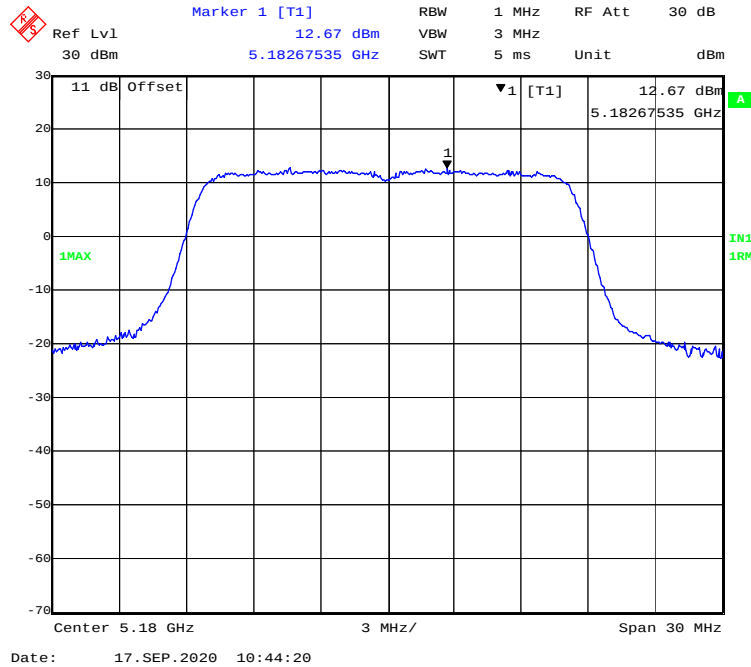


802.11n- ac80 mode, Power spectral density-5210MHz

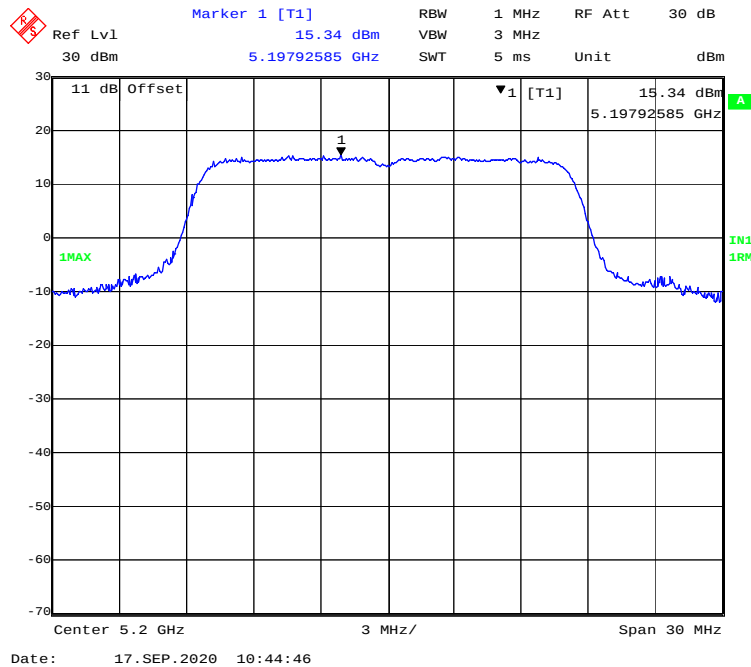


Chain 1:

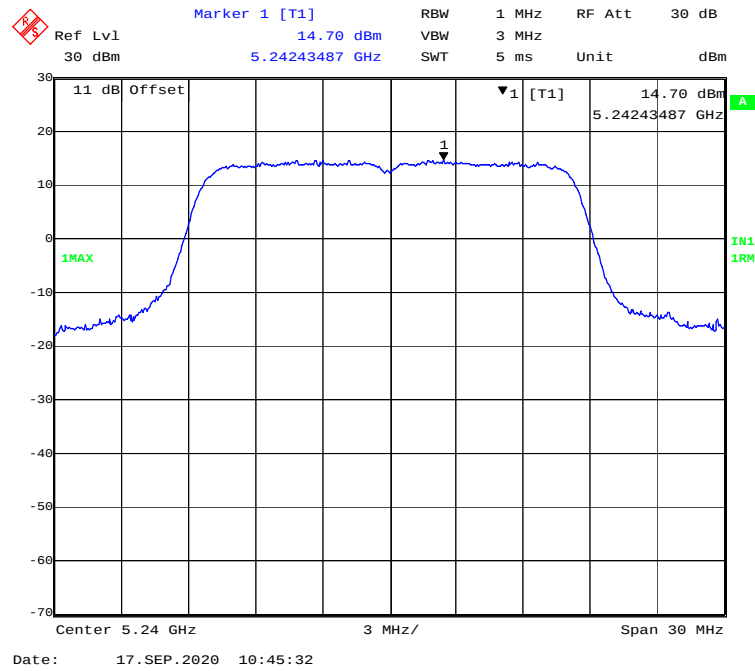
802.11a mode, Power spectral density-5180MHz



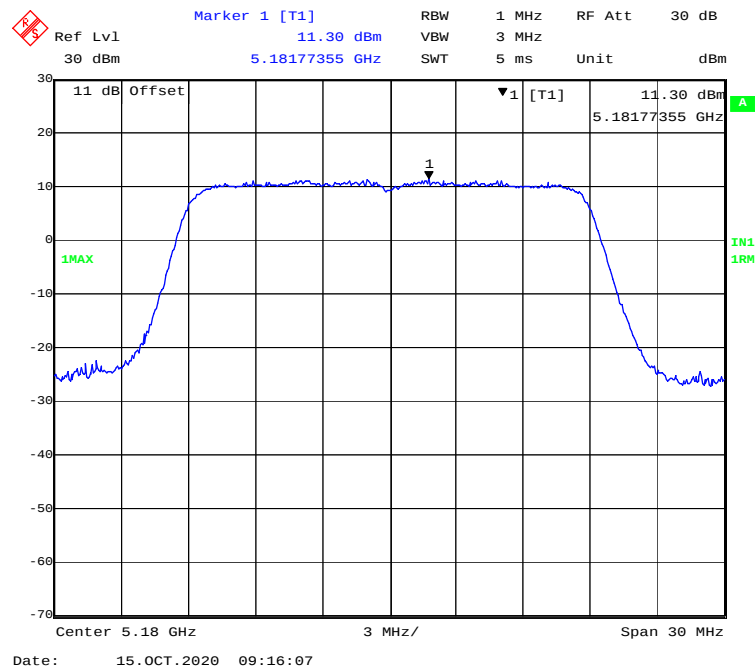
802.11a mode, Power spectral density-5200MHz



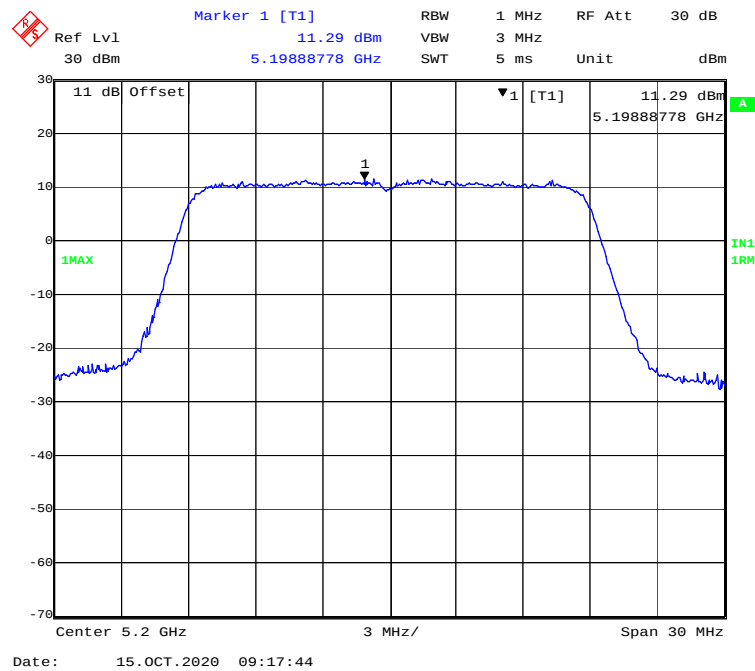
802.11a mode, Power spectral density-5240MHz



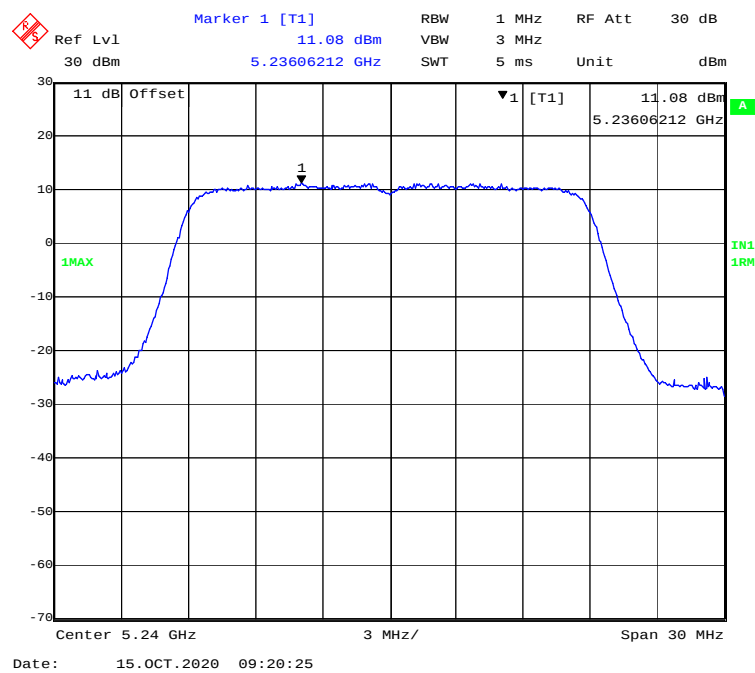
802.11ac20 mode, Power spectral density-5180MHz



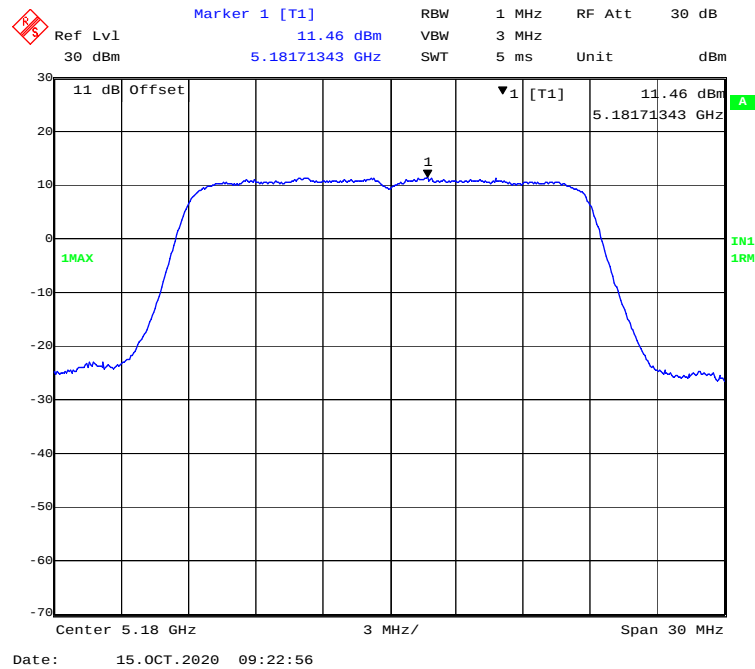
802.11 ac20 mode, Power spectral density-5200MHz



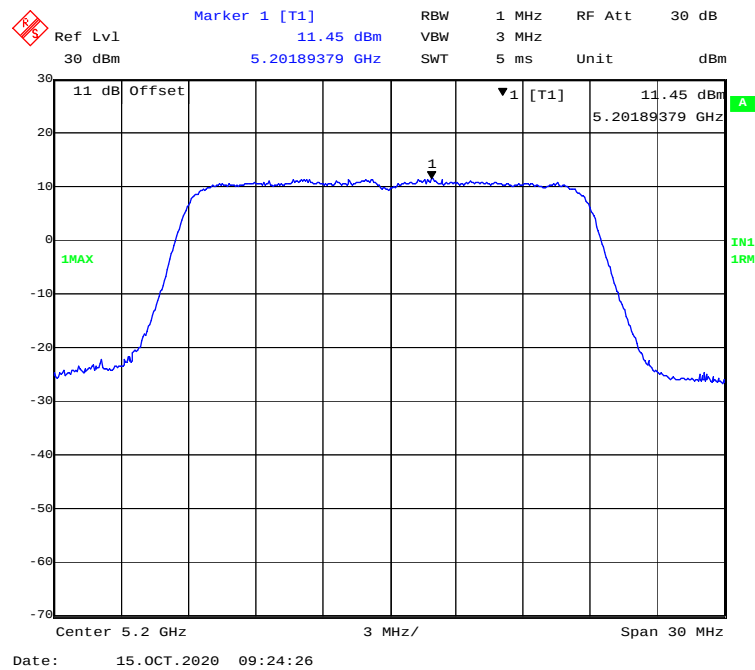
802.11ac20 mode, Power spectral density-5240MHz

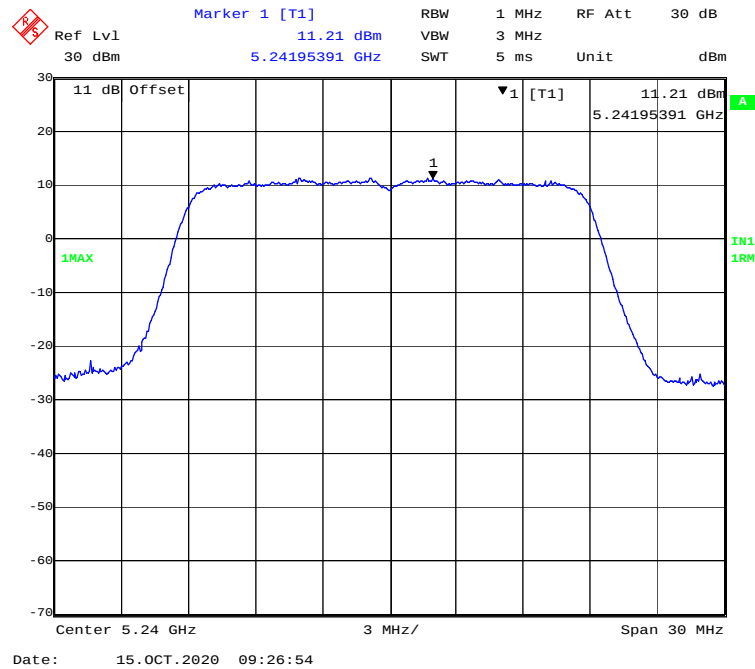
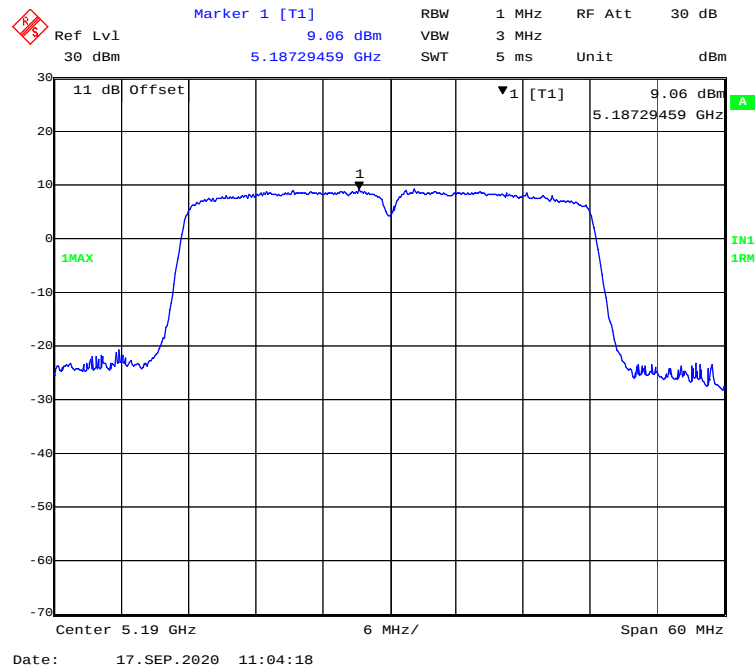


802.11n-HT20 mode, Power spectral density-5180MHz

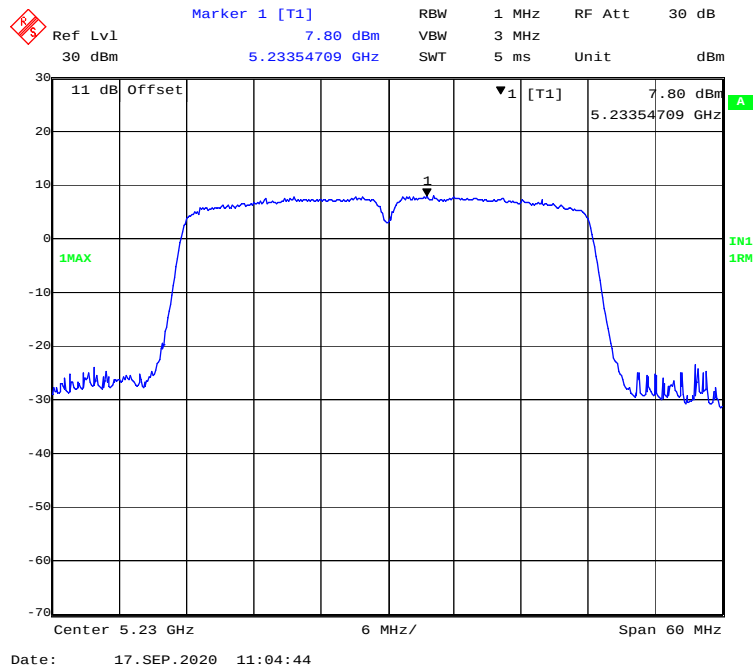


802.11n-HT20 mode, Power spectral density-5200MHz

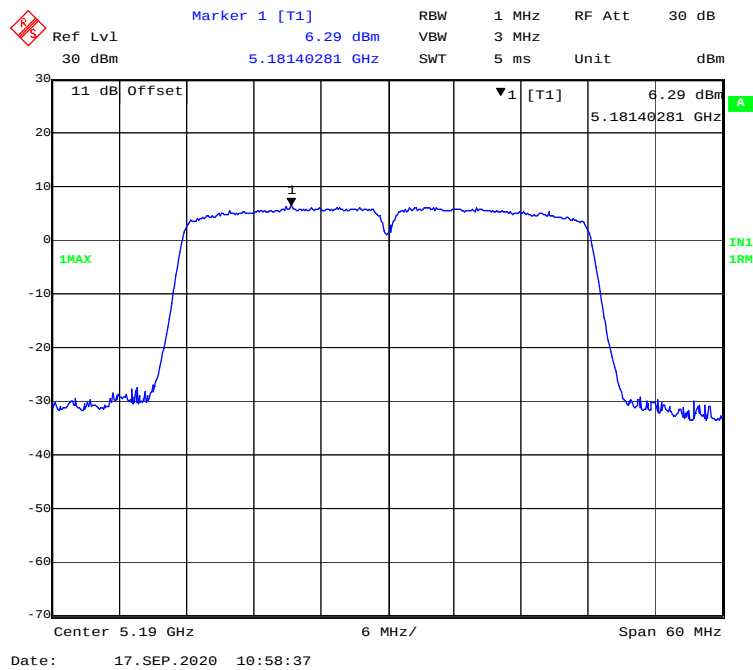


802.11n-HT20 mode, Power spectral density-5240MHz**802.11ac40 mode, Power spectral density-5190MHz**

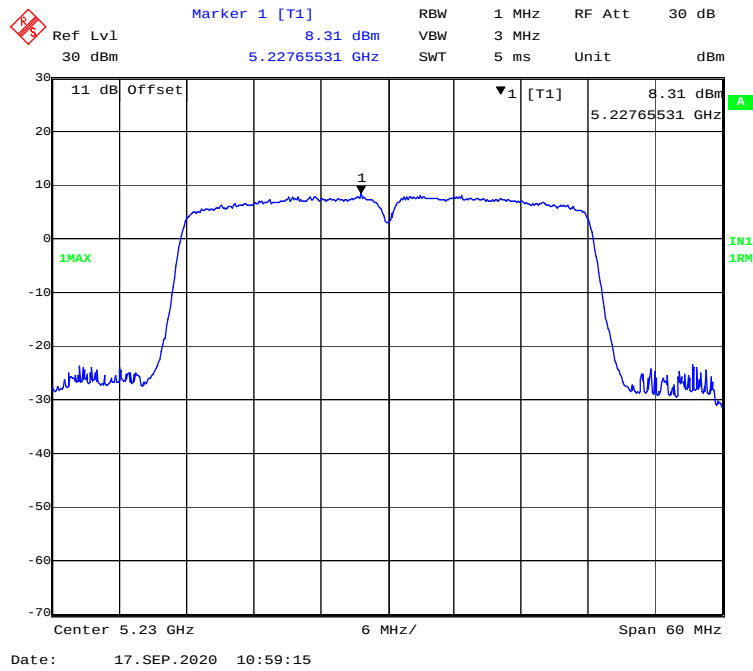
802.11 ac40 mode, Power spectral density-5230MHz



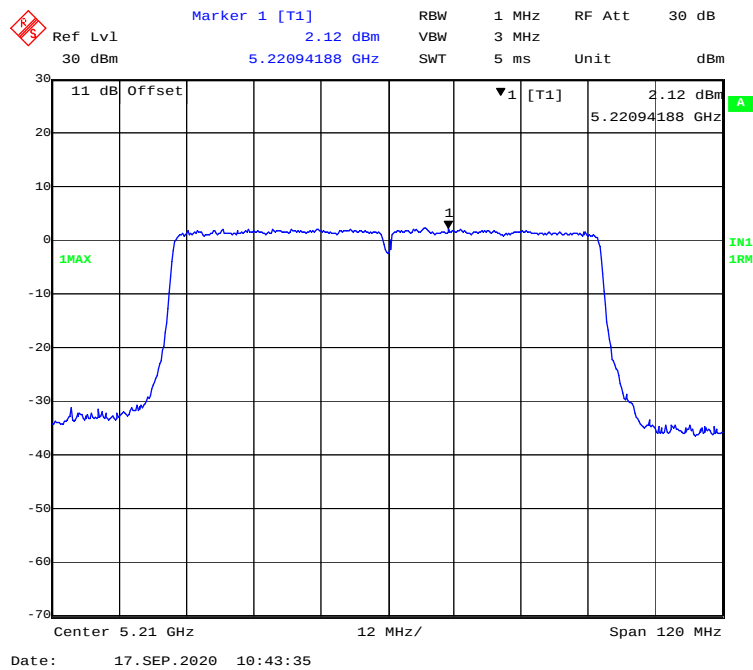
802.11n-HT40 mode, Power spectral density-5190MHz

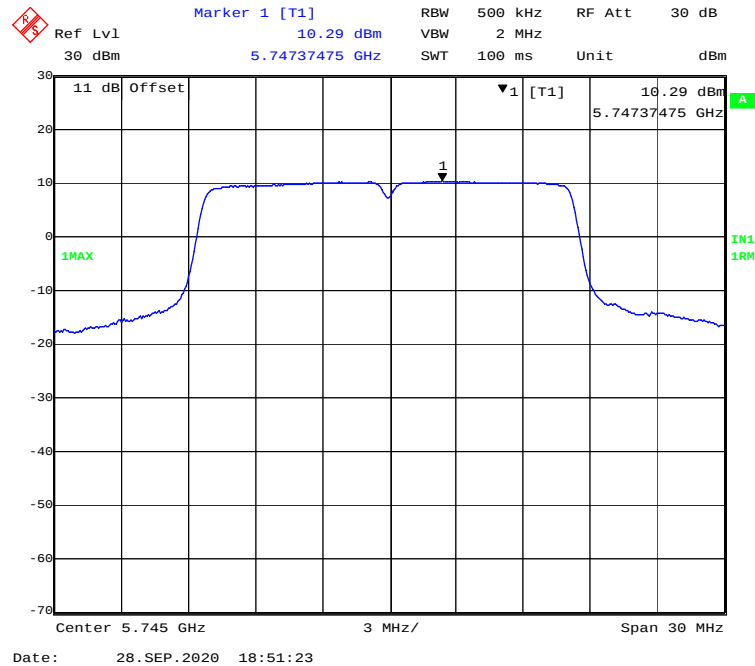
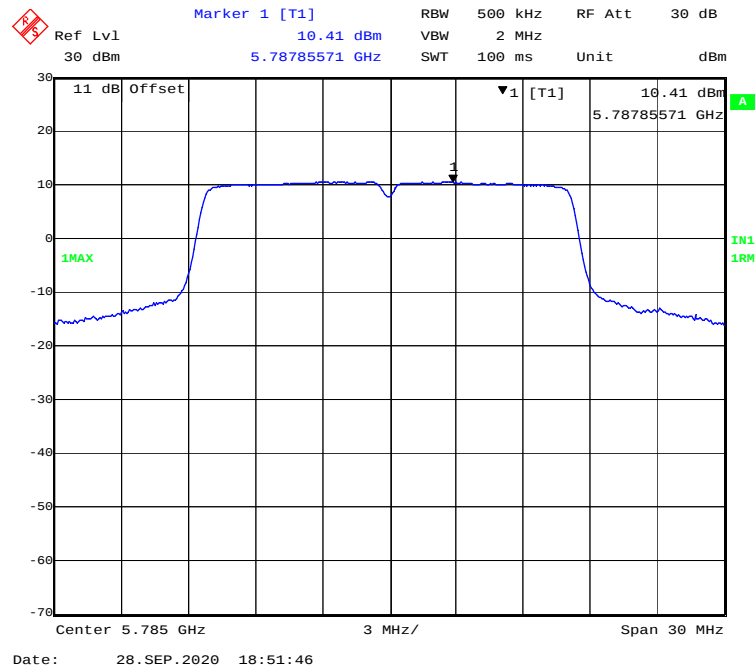


802.11n-HT40 mode, Power spectral density-5230MHz

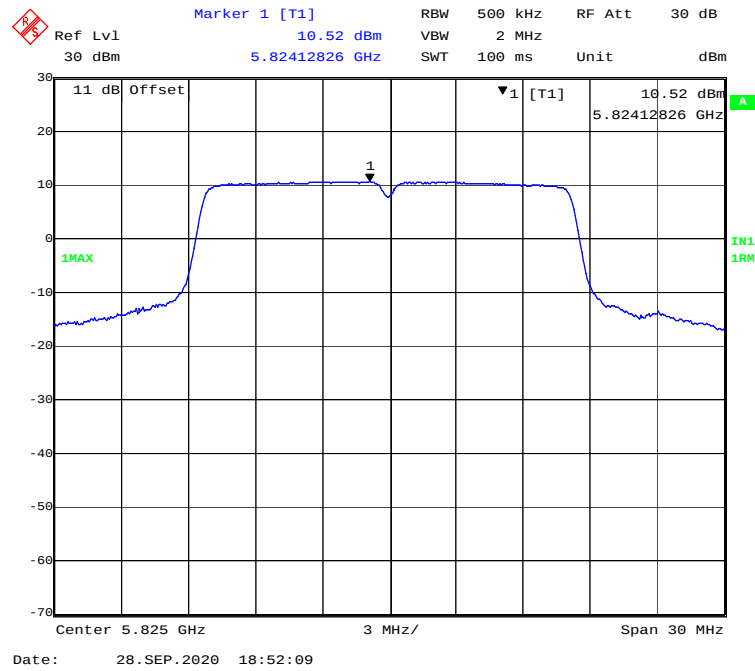


802.11n- ac80 mode, Power spectral density-5210MHz

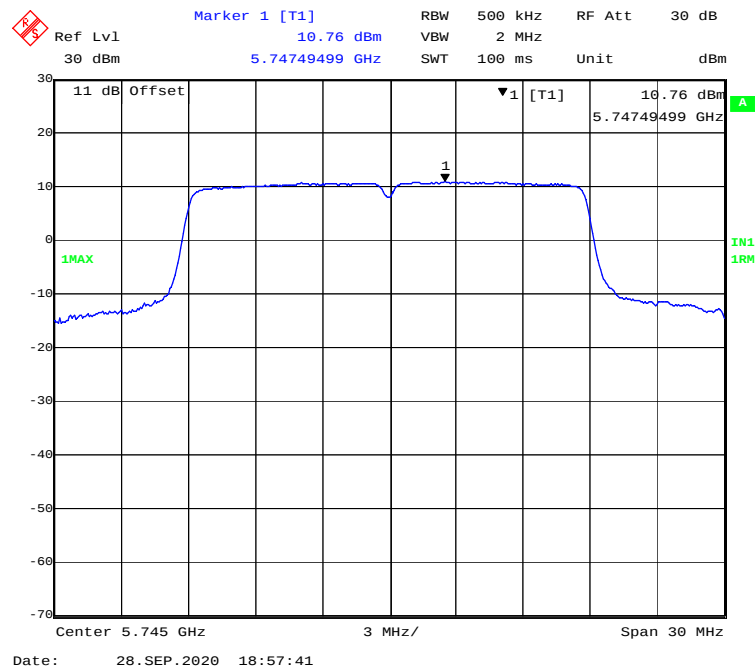


5725MHz-5850 MHz Band:**Chain 0:****802.11a mode, Power spectral density-5745MHz****802.11a mode, Power spectral density-5785MHz**

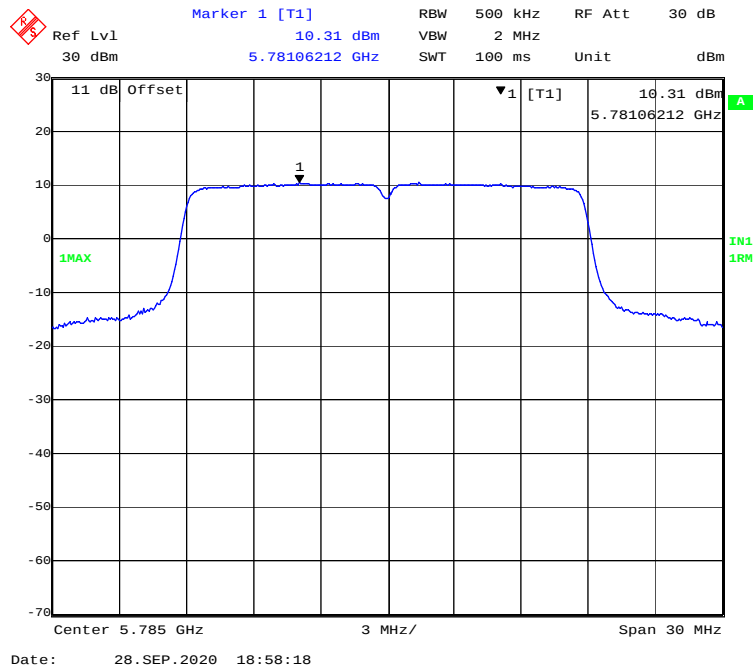
802.11a mode, Power spectral density-5825MHz



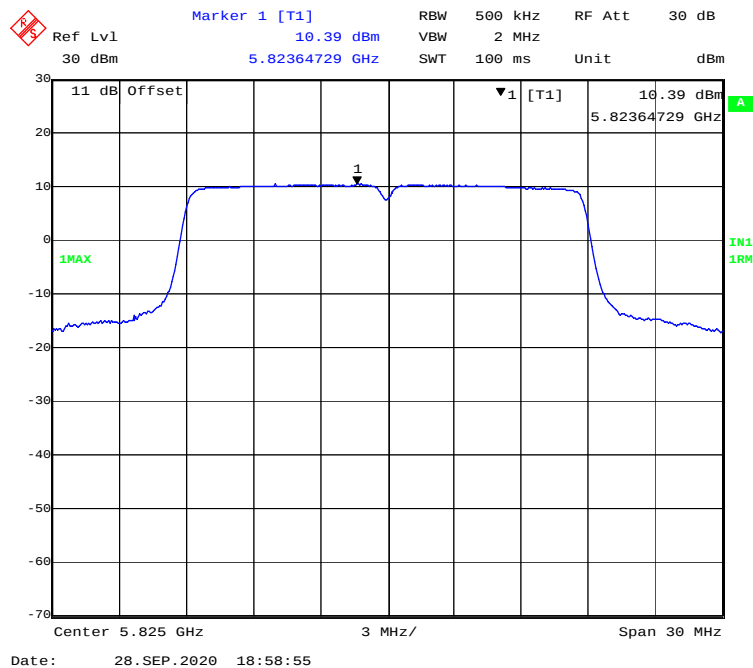
802.11ac20 mode, Power spectral density-5745MHz



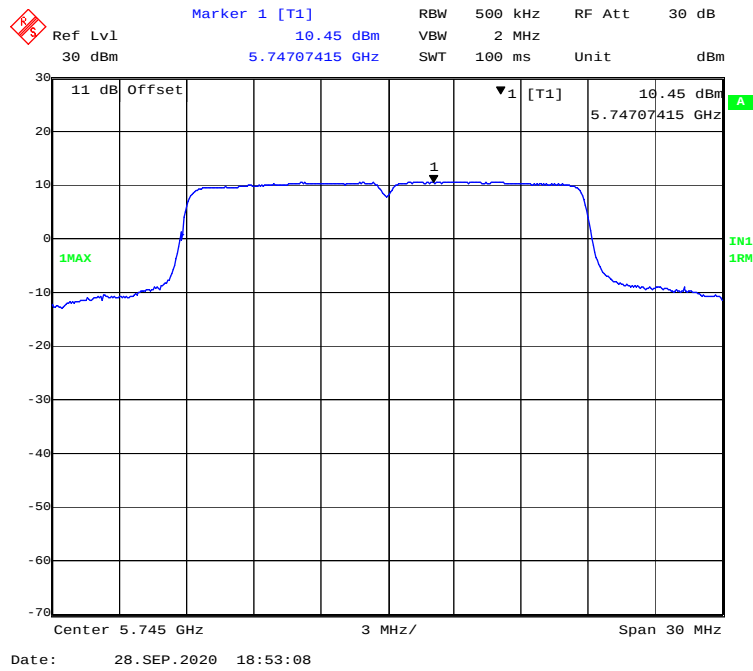
802.11 ac20 mode, Power spectral density-5785MHz



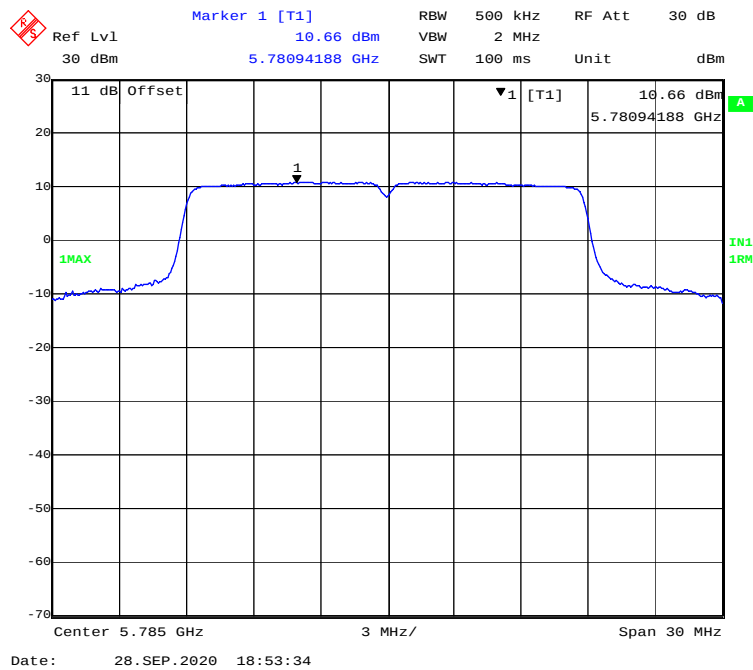
802.11 ac20 mode, Power spectral density-5825MHz



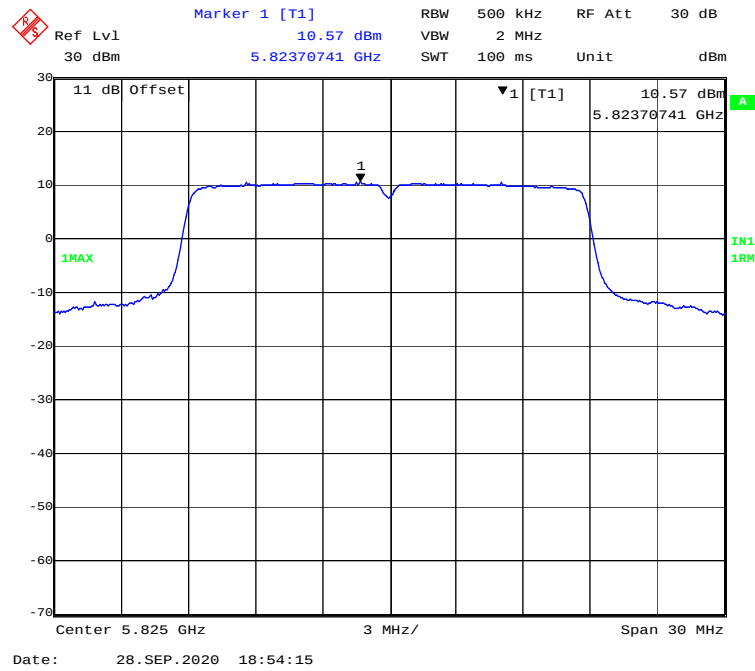
802.11n-HT20 mode, Power spectral density-5745MHz



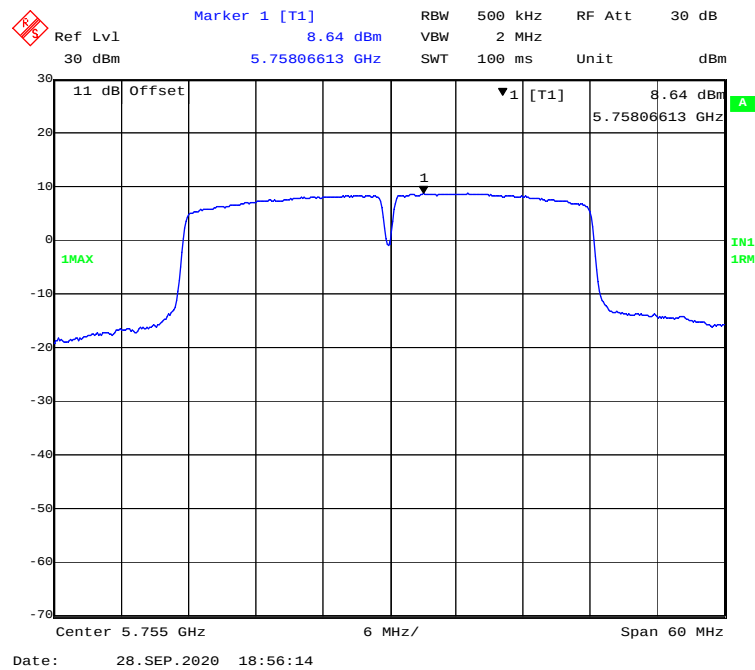
802.11n-HT20 mode, Power spectral density-5785MHz



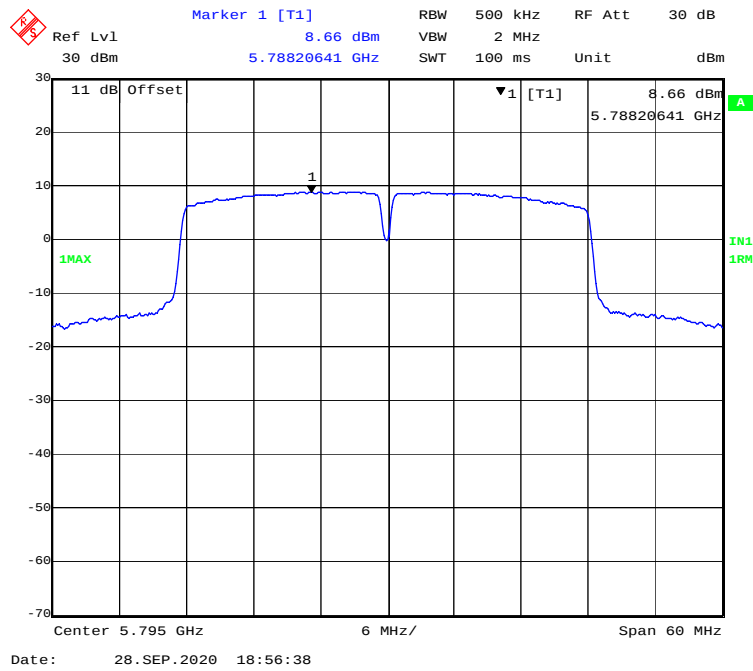
802.11n-HT20 mode, Power spectral density-5825MHz



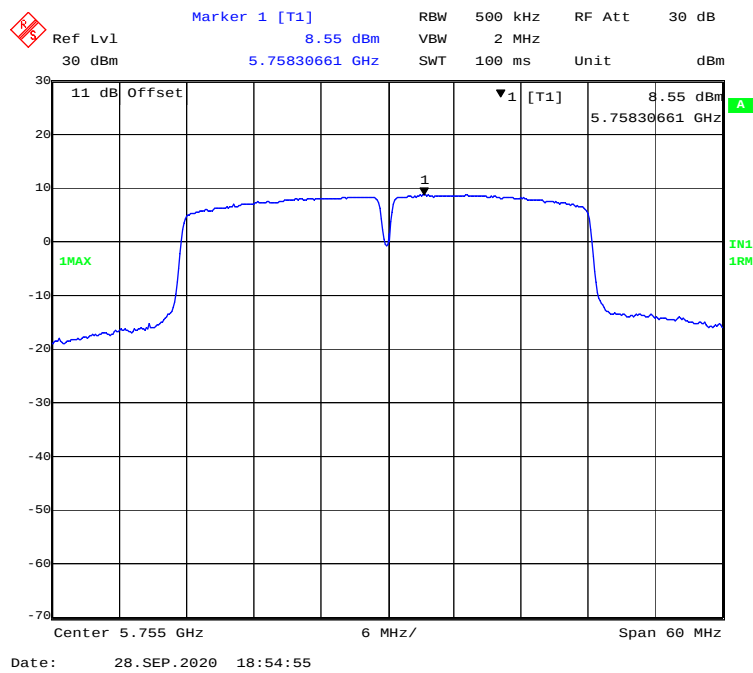
802.11ac40 mode, Power spectral density-5755MHz

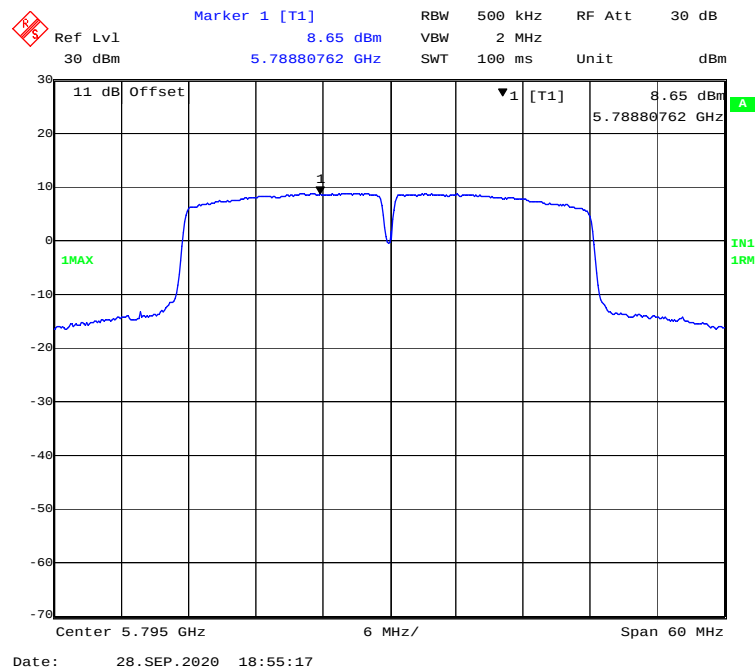
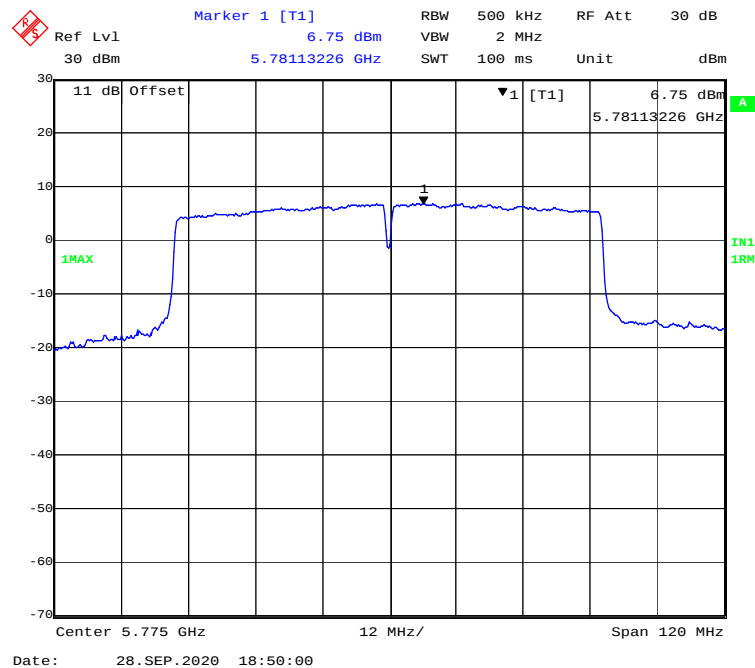


802.11 ac40 mode, Power spectral density-5795MHz



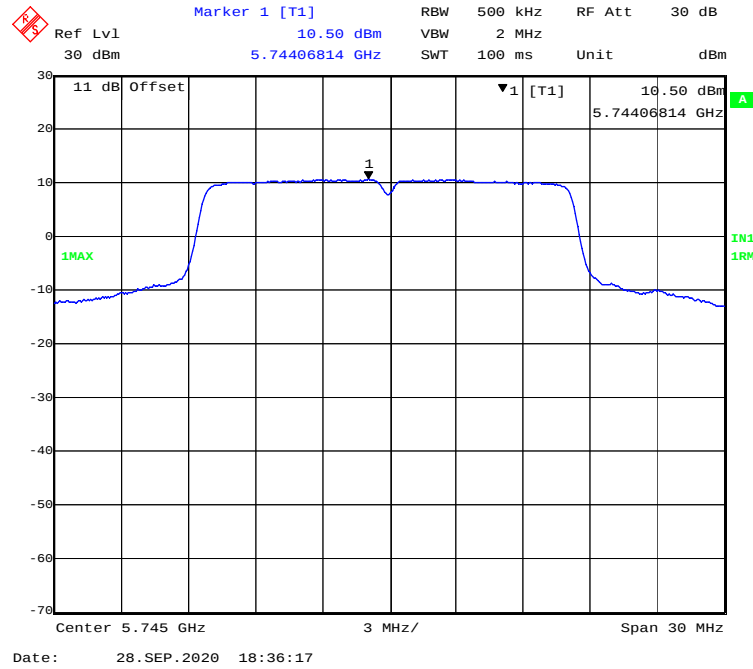
802.11n-HT40 mode, Power spectral density-5755MHz



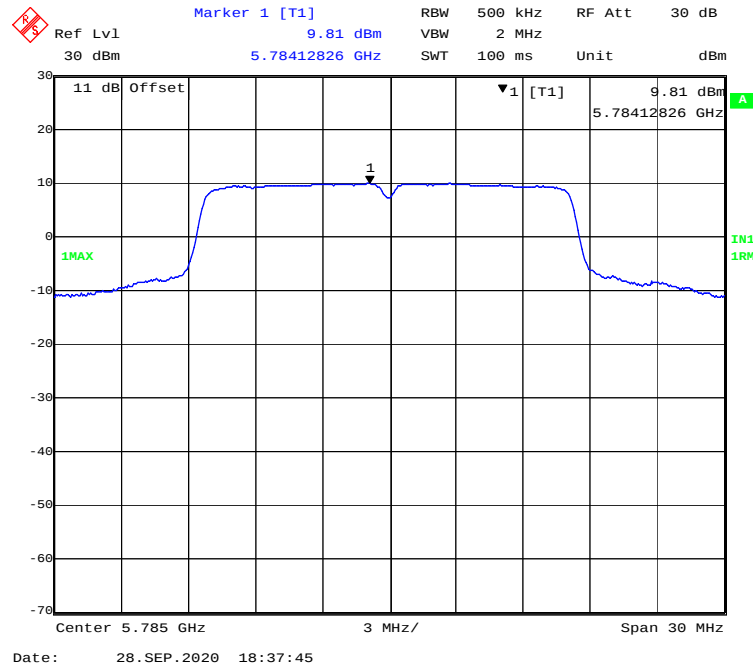
802.11n-HT40 mode, Power spectral density-5795MHz**802.11 ac80 mode, Power spectral density-5775MHz**

Chain 1:

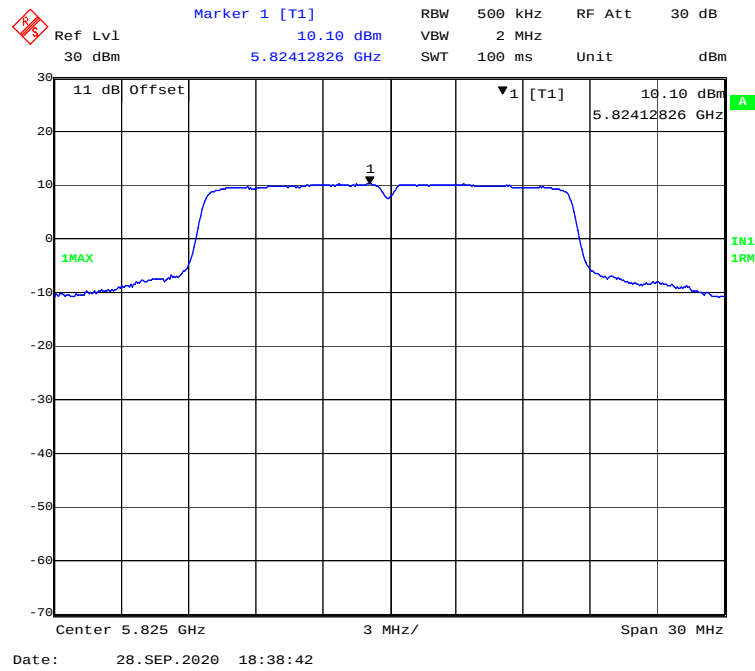
802.11a mode, Power spectral density-5745MHz



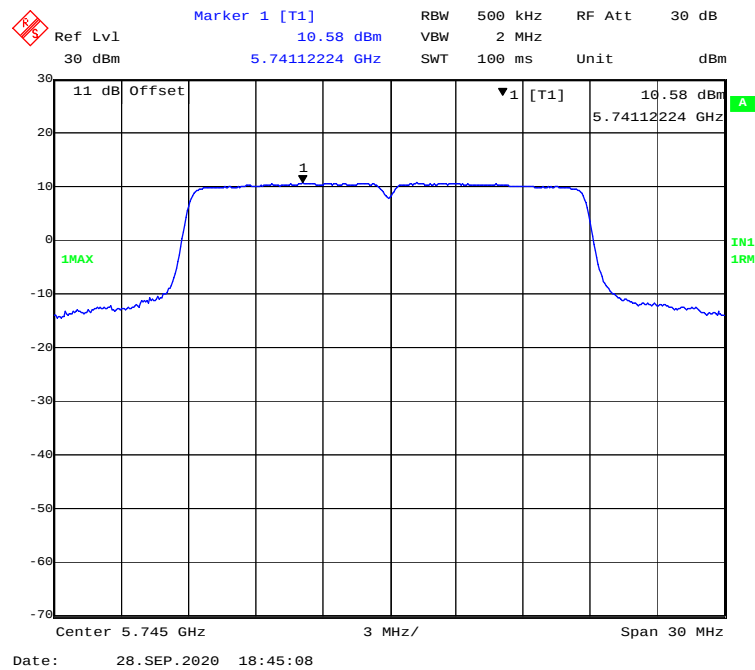
802.11a mode, Power spectral density-5785MHz



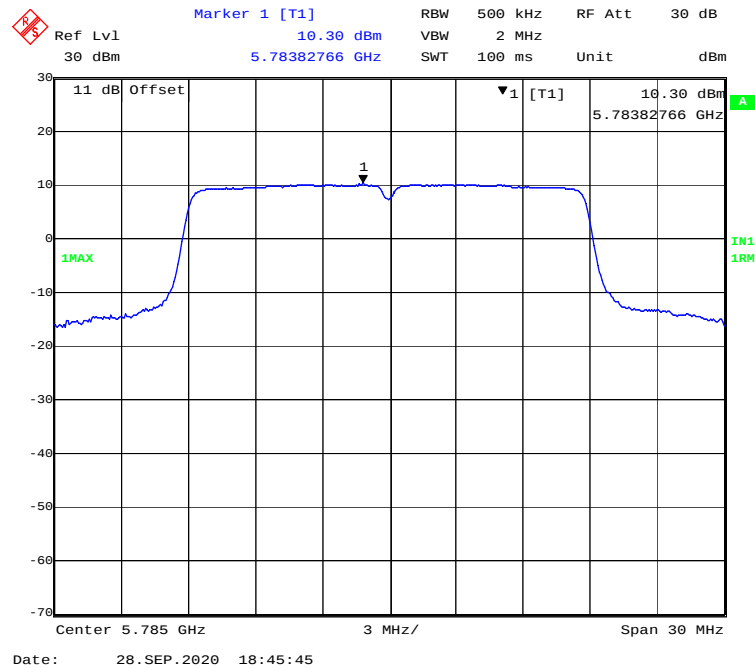
802.11a mode, Power spectral density-5825MHz



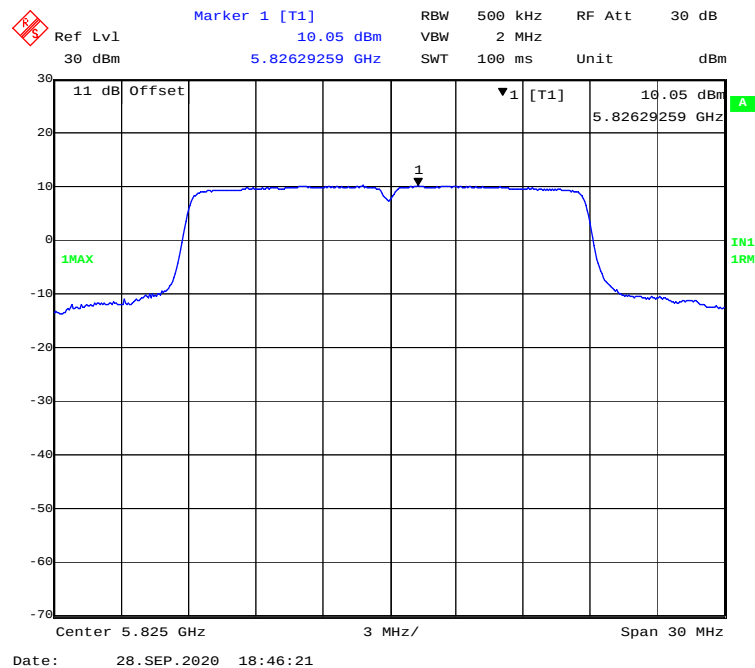
802.11ac20 mode, Power spectral density-5745MHz

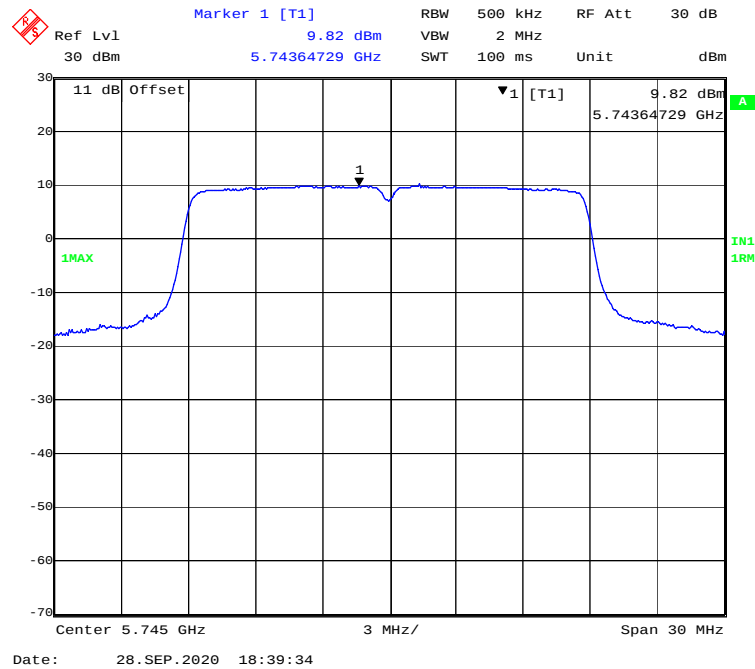
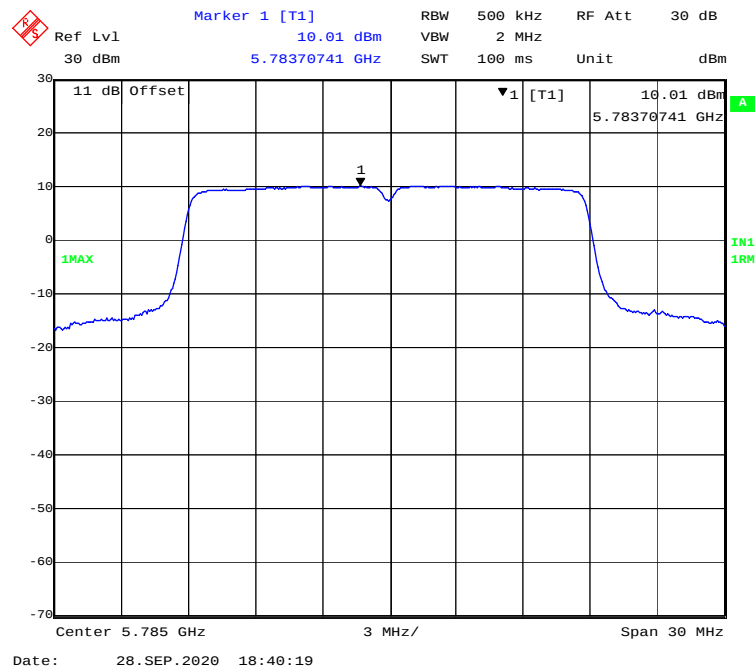


802.11 ac20 mode, Power spectral density-5785MHz



802.11 ac20 mode, Power spectral density-5825MHz



802.11n-HT20 mode, Power spectral density-5745MHz**802.11n-HT20 mode, Power spectral density-5785MHz**

Ref Lvl 10.28 dBm RBW 500 kHz RF Att 30 dB
 30 dBm 5.82382766 GHz VBW 2 MHz Unit dBm
 100 ms

▼ 1 [T1] 10.28 dBm
 5.82382766 GHz

11 dB Offset

1MAX

1

Center 5.825 GHz 3 MHz/ Span 30 MHz

Date: 28.SEP.2020 18:40:50

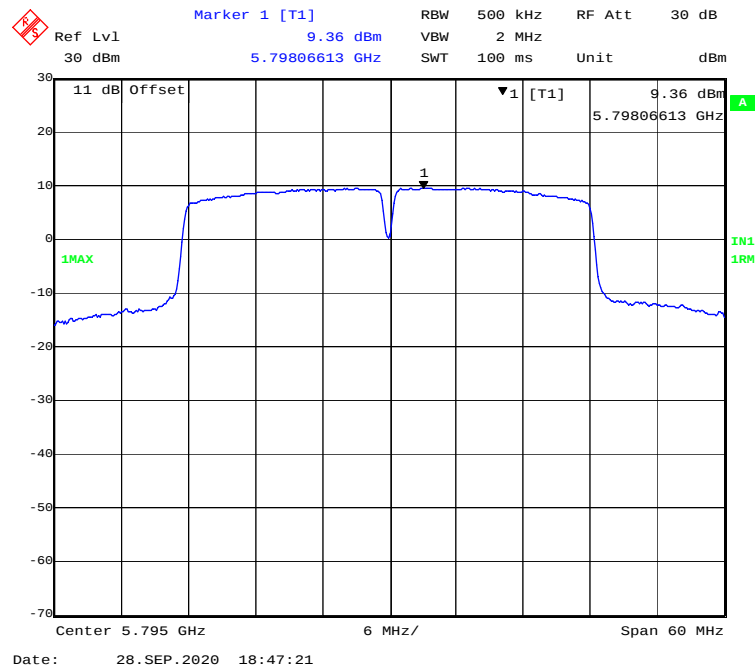
Ref Lvl 30 dBm
 30 dBm
 Marker 1 [T1]
 9.19 dBm
 5.75830661 GHz
 RBW 500 kHz
 VBW 2 MHz
 SWT 100 ms
 RF Att 30 dB
 Unit dBm

11 dB Offset
 ▼1 [T1]
 9.19 dBm
 5.75830661 GHz
 1MAX
 IN1 1RM

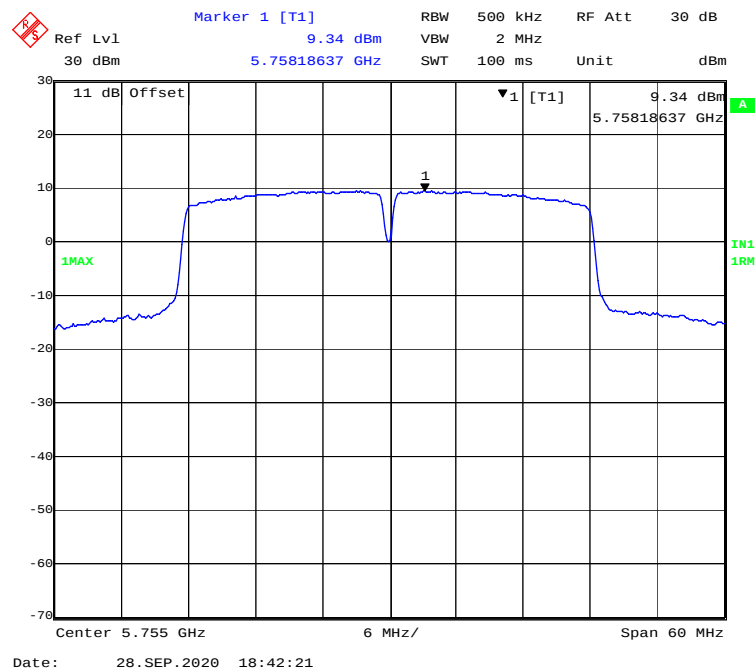
Center 5.755 GHz
 6 MHz/
 Span 60 MHz

Date: 28.SEP.2020 18:46:59

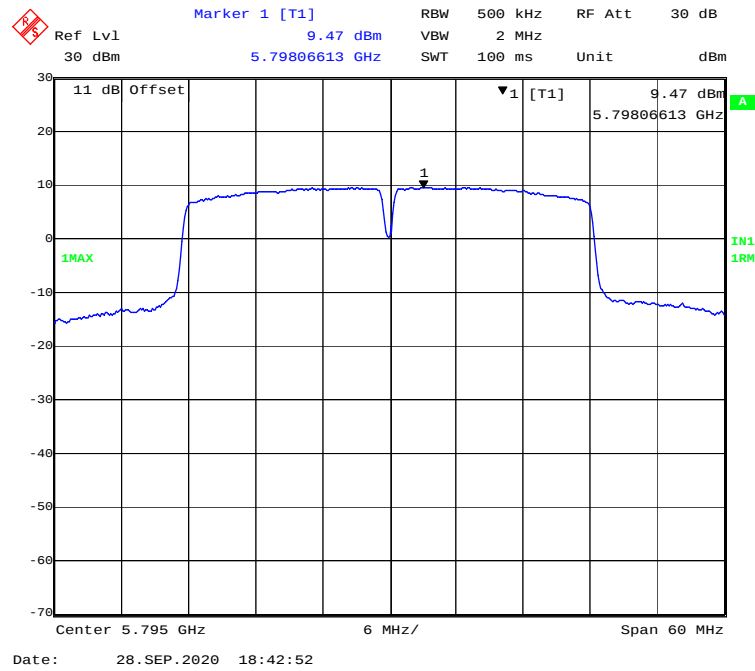
802.11 ac40 mode, Power spectral density-5795MHz



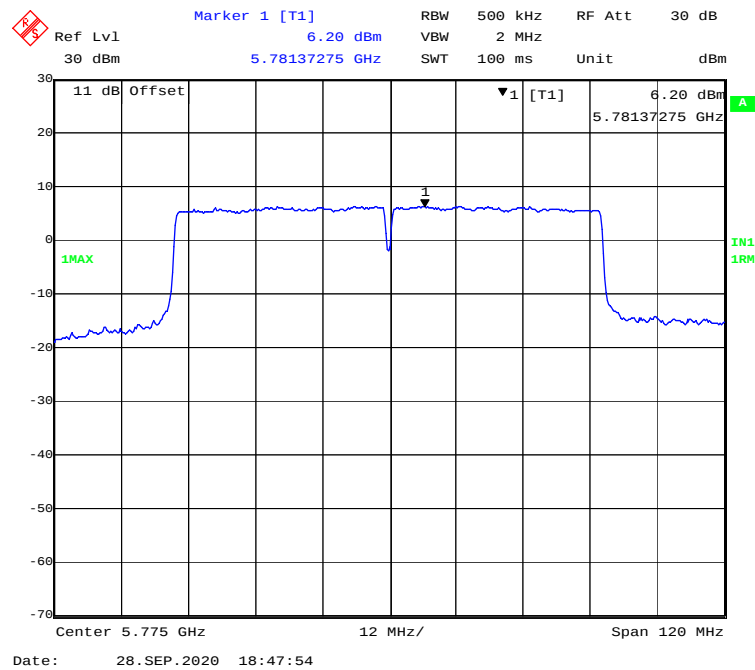
802.11n-HT40 mode, Power spectral density-5755MHz



802.11n-HT40 mode, Power spectral density-5795MHz



802.11 ac80 mode, Power spectral density-5775MHz



Declarations

1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

3: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

5: This report cannot be reproduced except in full, without prior written approval of the Company.

6: This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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