TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 15.407

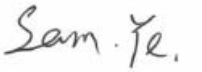
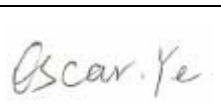
TEST REPORT

For

Xiamen Huoshiquan Import & Export CO., LTD

Room 703, No. 813-2 Xiahe Road, Siming District, XIAMEN, China

FCC ID: 2AJ55HOLYSTONEZS

Report Type: Original Report	**Product Type:** RC quadcopter	
Test Engineer:	Sam Ye	
Report Number:	RXM190929051-00B	
Report Date:	2019-12-13	
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	

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Xiamen Huoshiquan Import & Export CO., LTD
Tested Model:	HS270
Series Model:	HS110S,HS200S,HS110pro,HS200pro,HS110G,HS200G,HS100D,HS100G,HS100S, HS100pro,HS270,HS270D,HS270G,DE25,DE25S,DE22,DE22S,DE22pro,HS210D, HS210pro,HS165,HS165D,HS150D,HS220D,DE24,HS310D,HS410,HS440,HS450, HS470,HS320,HS330,HS500,HS600,HS240,HS300,HS400,HS730,HS740,HS760, HS770,HS820,HS920,HS330,HS430,HS530,HS630,HS730,HS830,HS930,HS340, HS440,HS540,HS640,HS740,HS840,HS940,HS350,HS450,HS650,HS460,HS560, HS660,HS760,HS470,HS570,HS670,HT01,HT02,HT03,HT04,HT05,HT06,HT07, HT08,HT09,HT10
Model Difference:	Model Names
Product Type:	RC quadcopter
Power Supply:	DC 7.4V from battery
RF Function:	5G Wi-Fi
Operating Band/Frequency:	5G Wi-Fi B1: 5150-5250MHz, B4: 5725-5850MHz
Channel Number:	5G Wi-Fi B1:4, B4:5
Channel Separation:	5G Wi-Fi B1/B4 a/ n20 mode: 20MHz
Modulation Type:	5GWi-Fi: DSSS, OFDM
Antenna Type:	5Wi-Fi: Monopole antenna
Maximum Antenna Gain:	ANT 0&1: 1.5 dBi

**All measurement and test data in this report was gathered from production sample serial number: 20190929051. (Assigned by the BACL. The EUT supplied by the applicant was received on 2019-09-29)*

Objective

This type approval report is prepared on behalf of *Xiamen Huoshiquan Import & Export 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 15.249 DXX Submittal with FCC ID: 2AJ55HOLYSTONEZD.

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℃
Humidity		6%

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

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (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.

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

For 802.11a/ n-HT20 bandwidth system, channel 36,40 and 48 was tested.

Channel	Frequency (MHz)
36	5180
40	5200
44	5220
48	5240

For **5725~5850 MHz** band, test channel list is as below:

802.11a/802.11n20 mode bandwidth system, channel 149, 157 and 165 were tested.

Channel No.	Frequency (MHz)
149	5745
153	5765
157	5785
161	5805
165	5825

For Conducted Test:
802.11a: each transmit antenna were tested
802.11n: each transmit antenna were tested

For Radiated Test:
For 802.11a: SISO for each transmit antenna
For 802.11n: MIMO for two transmit antennas

EUT Exercise Software

RF test tool: SecureCRT

The worst case was performed under:

For **5150~5250 MHz** band:

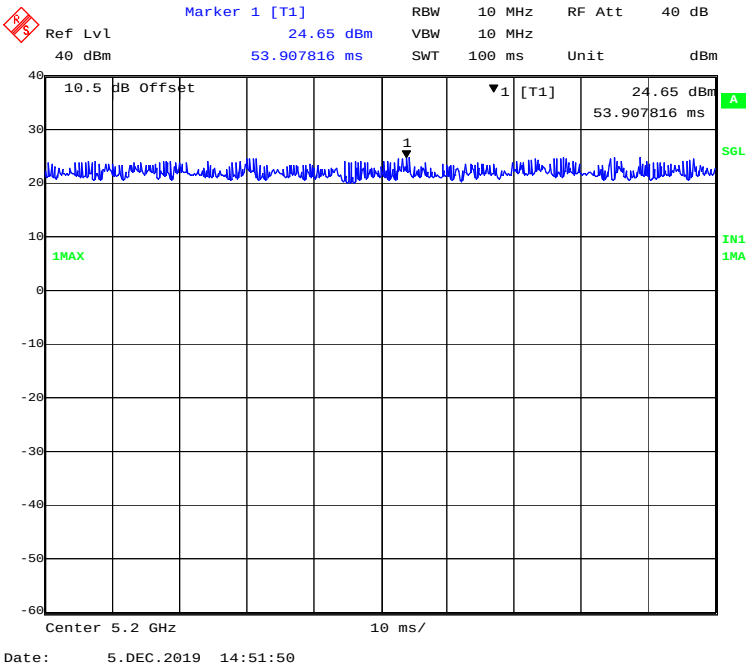
Mode	Data rate	Channel	Power Setting	
			ANT 0	ANT 1
802.11a	6 Mbps	5180	17	17
		5200	17	17
		5240	17	17
802.11n-HT20	MCS0	5180	14	14
		5200	14	14
		5240	14	14

For **5725~5850 MHz** band:

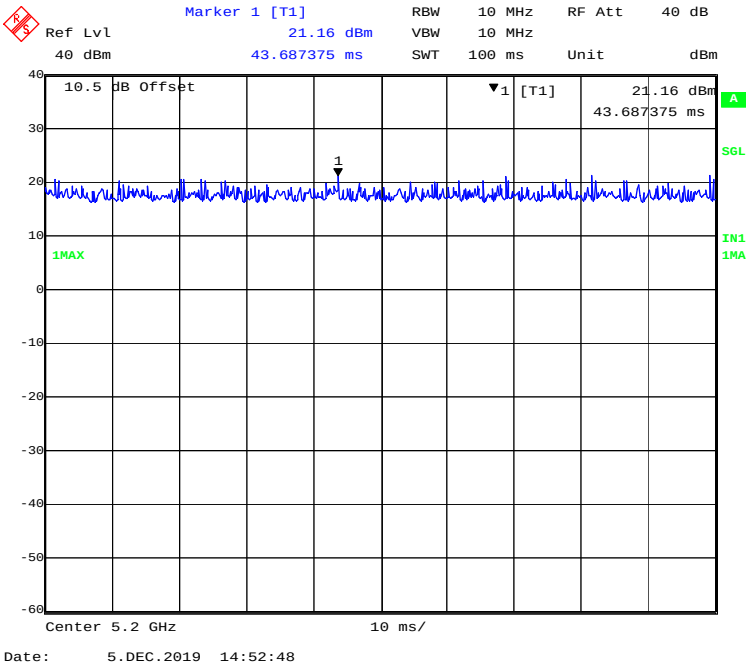
Mode	Data rate	Channel	Power Setting	
			ANT 0	ANT 1
802.11a	6 Mbps	5745	17	17
		5785	17	17
		5825	17	17
802.11n-HT20	MCS0	5745	14	14
		5785	14	14
		5825	14	14

5150MHz-5250MHz Band-ANT 0:

802.11a mode

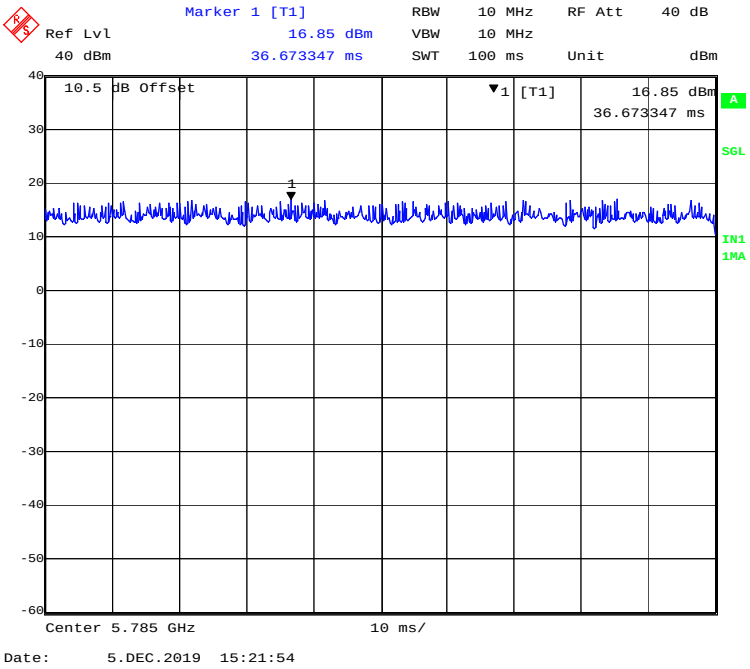


802.11n-HT20 mode

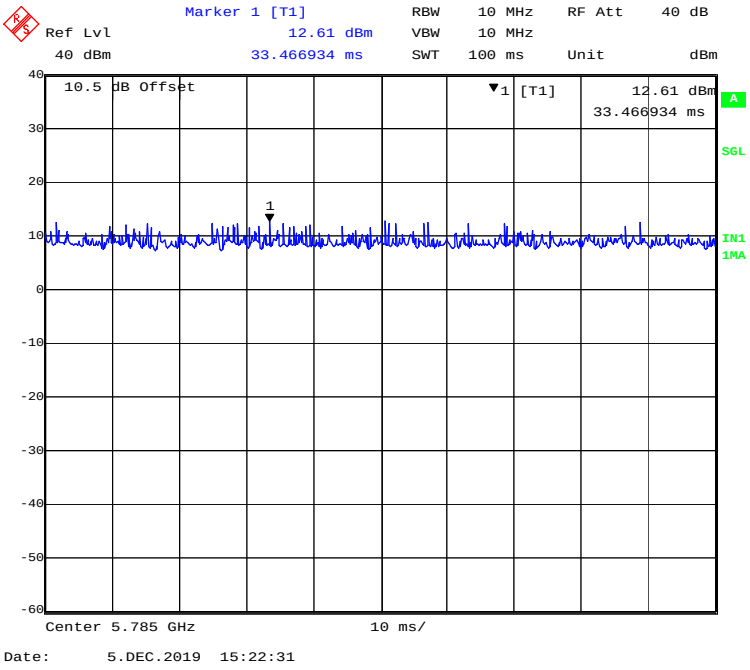


5725MHz-5850MHz Band-ANT 0:

802.11a mode

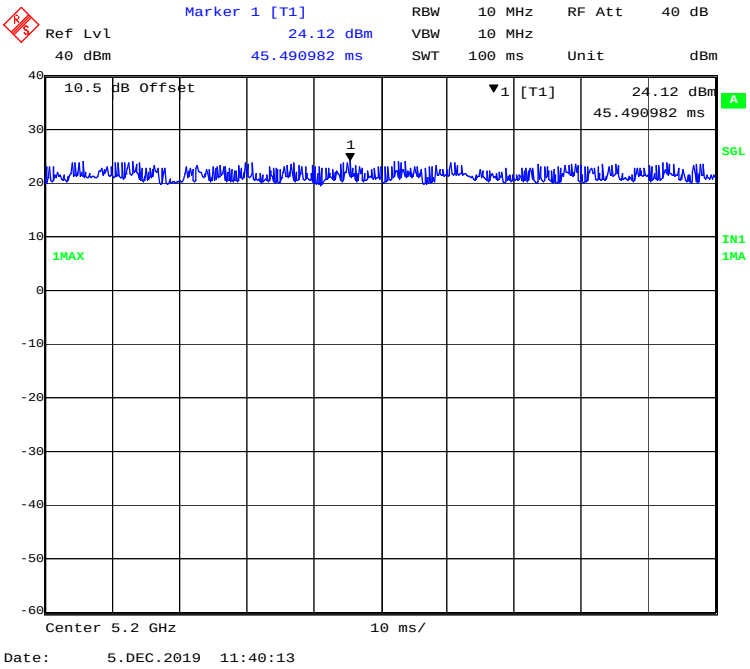


802.11n-HT20 mode

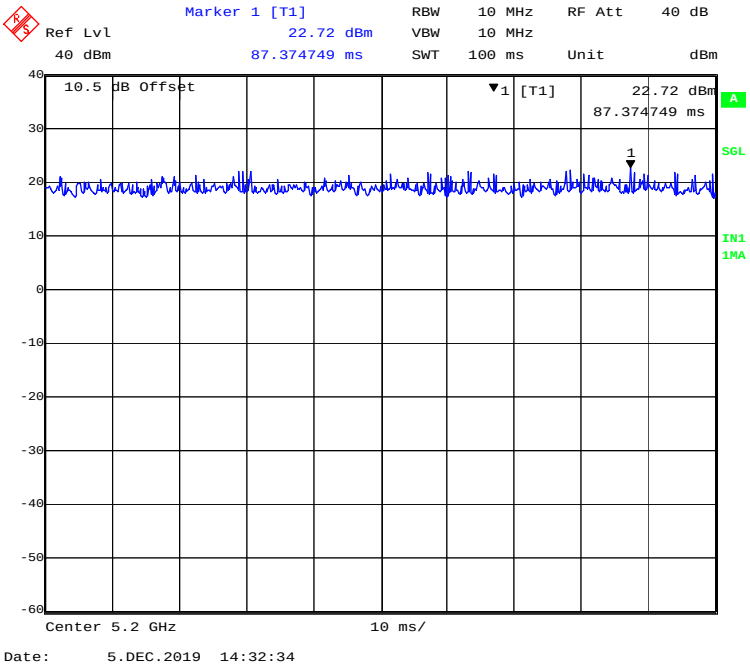


5150MHz-5250MHz Band-ANT 1:

802.11a mode

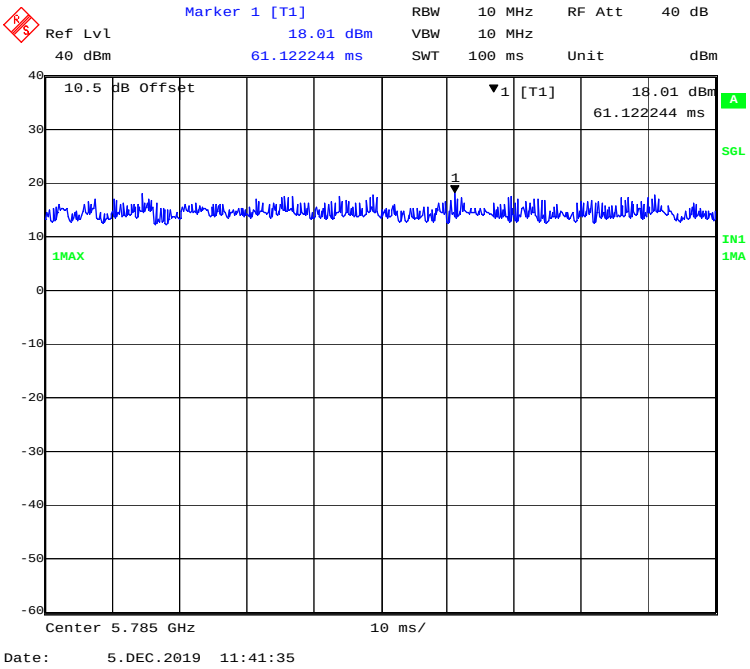


802.11n-HT20 mode

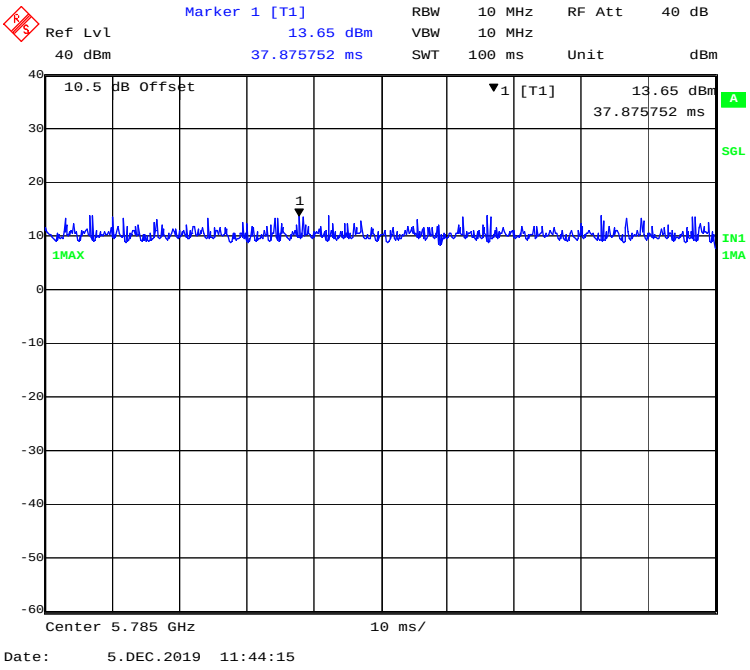


5725MHz-5850MHz Band-ANT 1:

802.11a mode



802.11n-HT20 mode



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

Note: "x" means duty cycle.

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

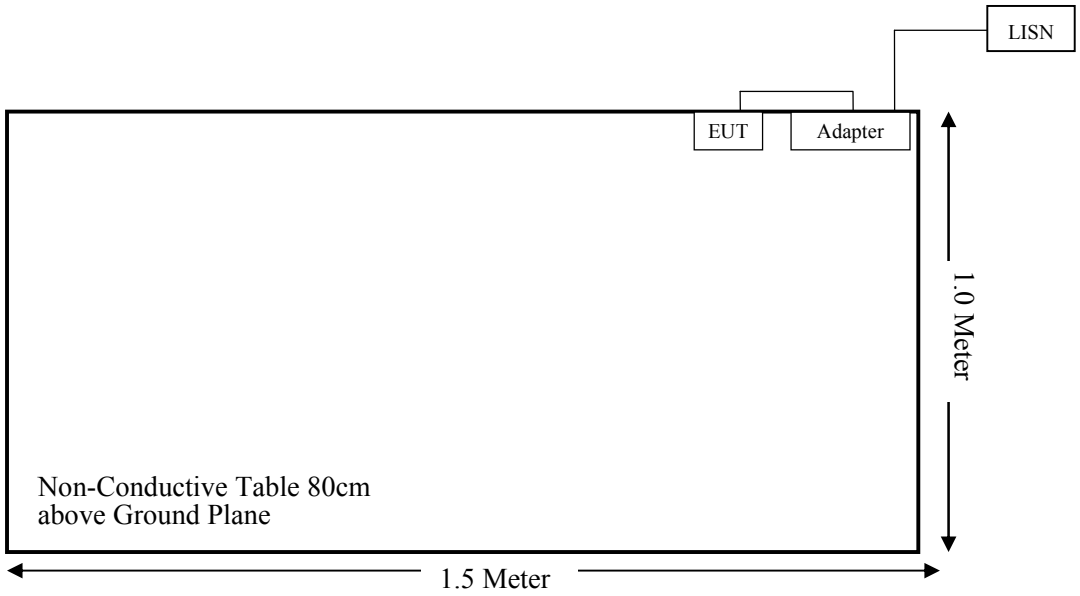
Manufacturer	Description	Model	Serial Number
Samsung electronics co. LTD	Adapter	EP-TA200	R37M1SBL3X1DK3

External I/O Cable

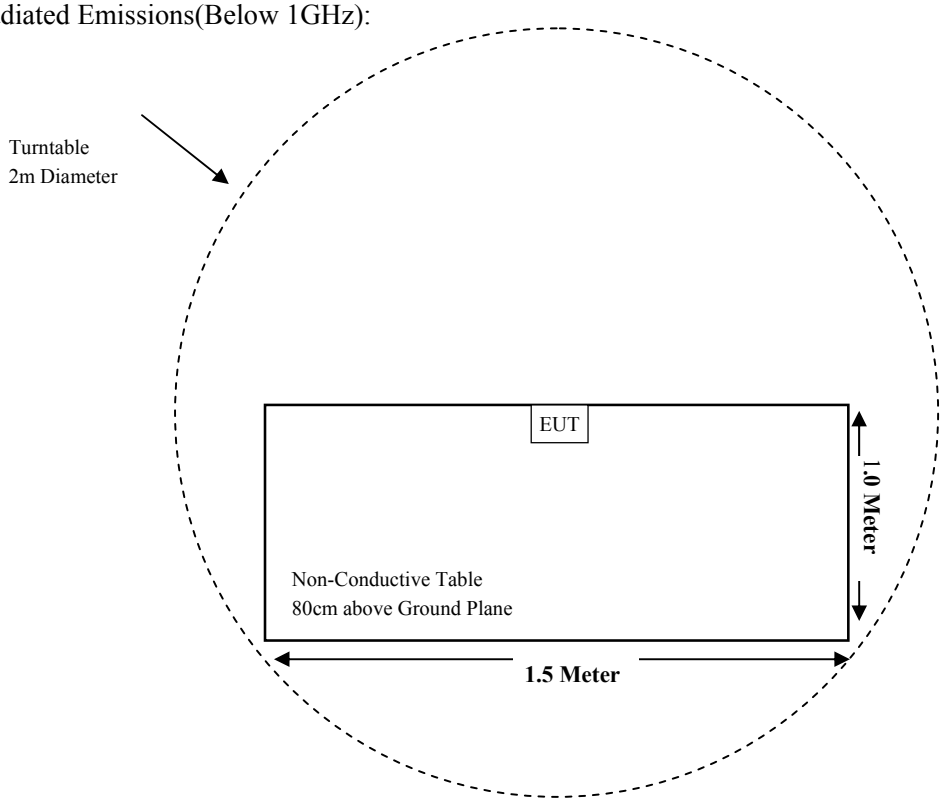
Cable Description	Length (m)	From Port	To
Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

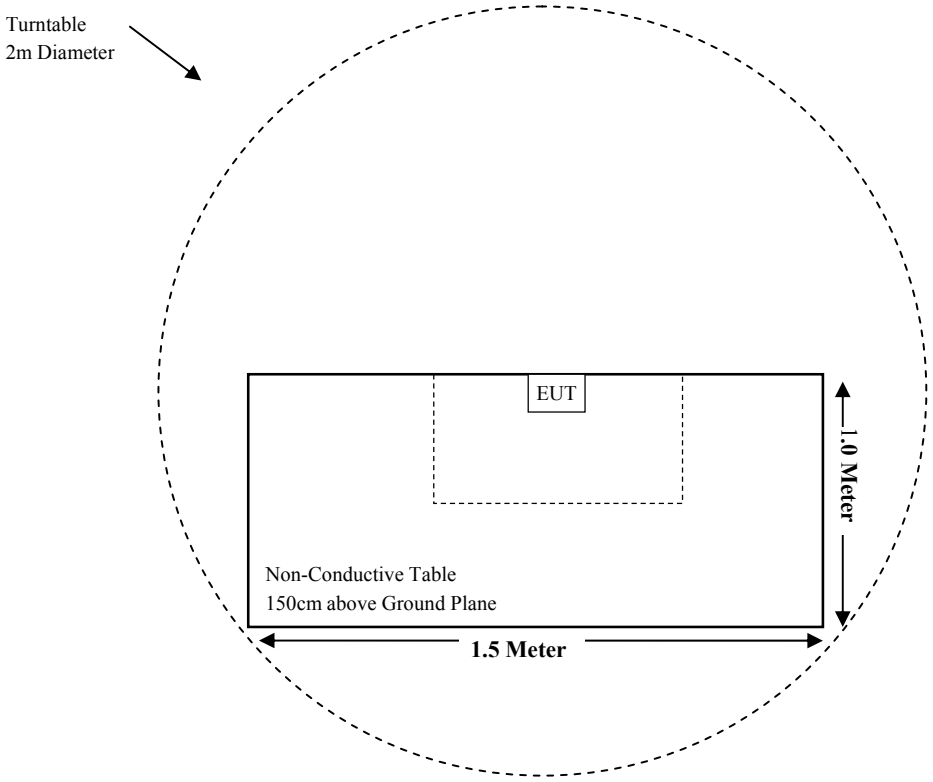
For Conducted Emissions:



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
FCC §15.207 & §15.407(b) (6)	AC Power Line Conducted Emissions	Compliant
§15.205 & §15.209 & §15.407(b) (1) ,(6) ,(7)	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	2019-11-30	2020-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sonoma Instrunent	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Audix	Test Software	e3	V9	--	--
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
Radiated Emission Test（Chamber 2#）					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2019-08-27	2020-08-26
ETS-LINDGREN	Horn Antenna	3115	6229	2019-08-15	2020-08-14
ETS-LINDGREN	Horn Antenna	3116	00084159	2019-08-15	2020-08-14
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
SELECTOR	Amplifier	EM18G40G	060726	2019-03-22	2020-03-21
MICRO-TRONICS	Band Reject Filter	BRC50703	G094	2019-08-05	2020-08-04
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2019-08-15	2020-08-14
RF Conducted Test					
Rohde & Schwarz	FSV40 Signal Analyzer	FSV40	101116	2019-07-23	2020-07-22
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2019-09-21	2020-09-20
Agilent	Power Meter	N1912A	MY5000492	2019-02-28	2020-02-27
Agilent	Power Sensor	N1921A	MY54210024	2018-01-02	2021-01-01
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
BACL	Temperature & Humidity Chamber	BTH-150	30023	2018-12-20	2019-12-19
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	N/A	N/A
Huoshiquan	RF Cable	Huoshiquan C01	C01	Each Time	N/A

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-07-11	2020-07-10
Rohde & Schwarz	LISN	ENV216	3560655016	2019-08-30	2020-08-29
Audix	Test Software	e3	V9	---	---
Rohde & Schwarz	PULSE LIMITER	ESH3-Z2	0357.8810.54	2019-01-10	2020-01-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-08-15	2020-08-14

*** 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 15.247(i) and 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;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

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)			
802.11a	5150~5250	1.50	1.41	22.0	158.49	20	0.0445	1.0
	5725~5850	1.50	1.41	16.5	44.67	20	0.0126	1.0
802.11n-HT20	5150~5250	1.50	1.41	21.5	141.25	20	0.0397	1.0
	5725~5850	1.50	1.41	16.0	39.81	20	0.0112	1.0

Note:

(1) The Tune-up output power was declared by the Manufacturer.

Conclusion: The device meets MPE at distance 20cm.

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 6 dBi.

Antenna Connector Construction

The EUT has two Monopole antennas for 5G Wi-Fi which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

ANT	Antenna Type	Max. Antenna Gain
0	Monopole	1.5 dBi
1	Monopole	1.5 dBi

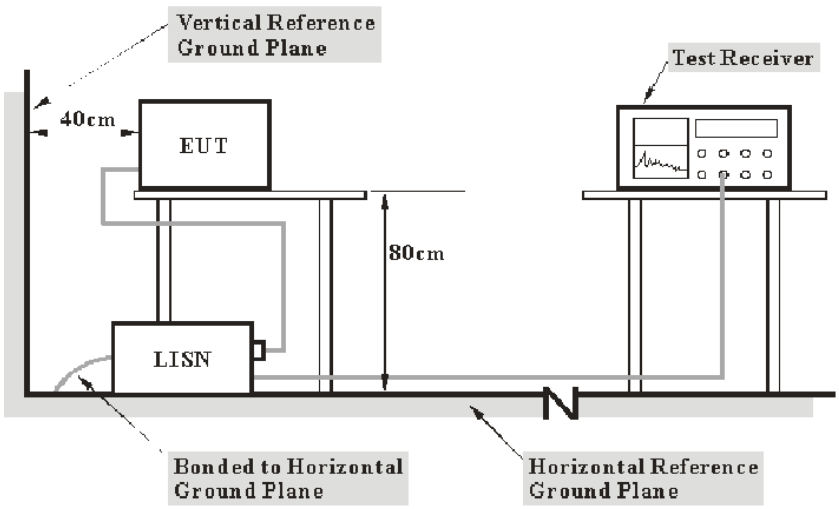
Result: Compliant.

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 adapter was connected to the first LISN and the other support equipments were connected to the outlet of the second 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.

Corrected 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:

Corrected Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + 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 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

Test Results Summary

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

Test Data

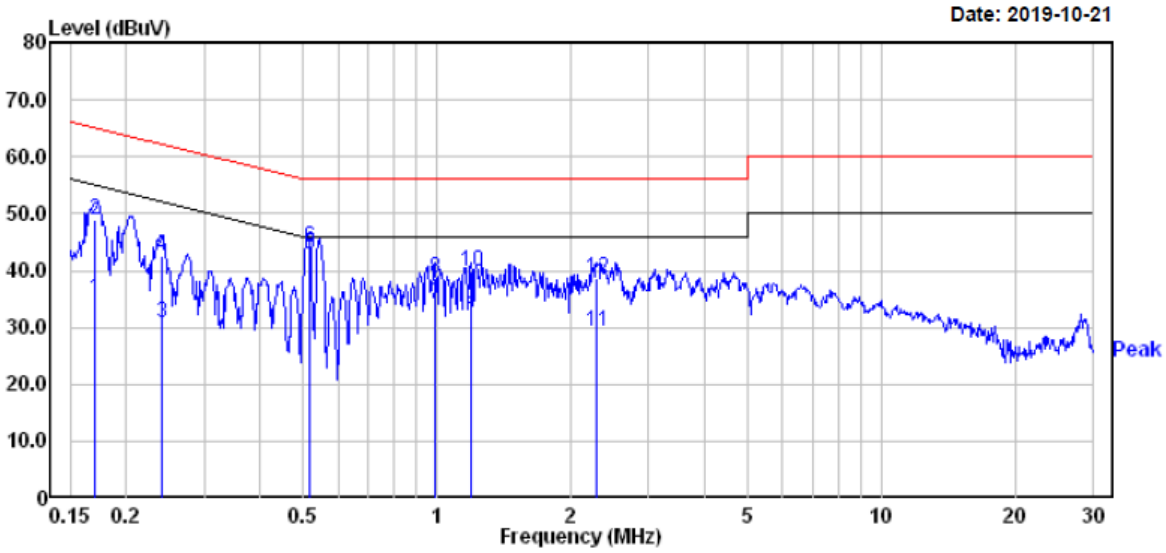
Environmental Conditions

Temperature:	20.1~22.5 ℃
Relative Humidity:	52~54 %
ATM Pressure:	101.3~102.0 kPa

The testing was performed by Sam Ye from 2019-10-21 to 2019-12-13.

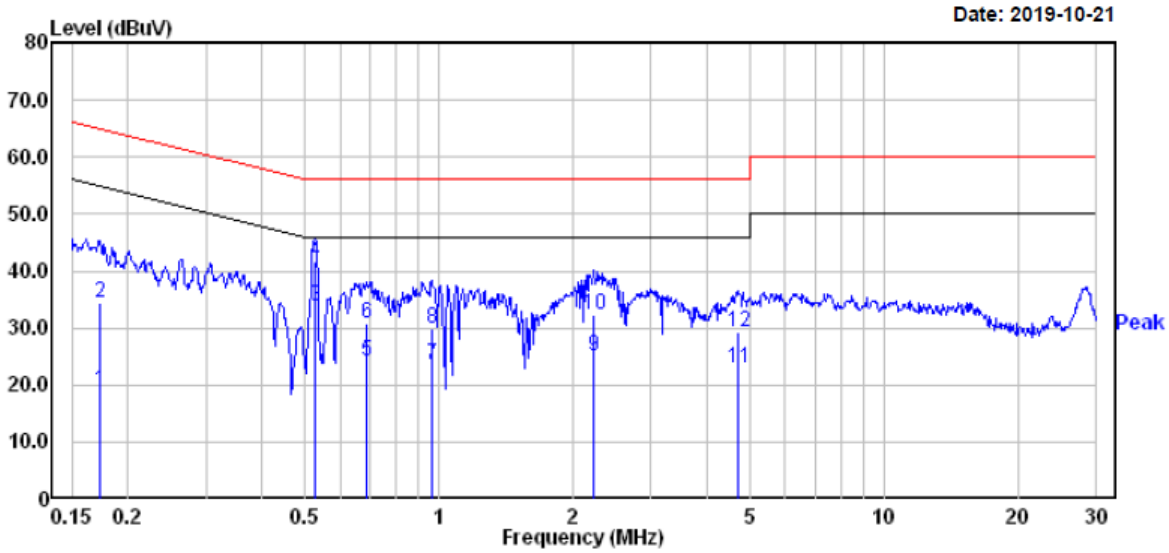
EUT operation mode: Charging

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.170	15.10	19.83	34.93	54.94	-20.01	Average
2	0.170	29.00	19.83	48.83	64.94	-16.11	QP
3	0.240	11.10	19.82	30.92	52.08	-21.16	Average
4	0.240	22.70	19.82	42.52	62.08	-19.56	QP
5	0.516	23.10	19.76	42.86	46.00	-3.14	Average
6	0.516	24.40	19.76	44.16	56.00	-11.84	QP
7	0.989	14.20	19.81	34.01	46.00	-11.99	Average
8	0.989	18.90	19.81	38.71	56.00	-17.29	QP
9	1.197	13.50	19.81	33.31	46.00	-12.69	Average
10	1.197	20.00	19.81	39.81	56.00	-16.19	QP
11	2.285	9.80	19.62	29.42	46.00	-16.58	Average
12	2.285	18.90	19.62	38.52	56.00	-17.48	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.173	-0.70	19.83	19.13	54.81	-35.68	Average
2	0.173	14.50	19.83	34.33	64.81	-30.48	QP
3	0.527	14.21	19.75	33.96	46.00	-12.04	Average
4	0.527	22.01	19.75	41.76	56.00	-14.24	QP
5	0.690	4.30	19.75	24.05	46.00	-21.95	Average
6	0.690	11.00	19.75	30.75	56.00	-25.25	QP
7	0.963	3.80	19.79	23.59	46.00	-22.41	Average
8	0.963	10.00	19.79	29.79	56.00	-26.21	QP
9	2.237	5.30	19.65	24.95	46.00	-21.05	Average
10	2.237	12.60	19.65	32.25	56.00	-23.75	QP
11	4.696	3.59	19.49	23.08	46.00	-22.92	Average
12	4.696	9.79	19.49	29.28	56.00	-26.72	QP

§15.205 & §15.209 & §15.407(B) (1),(6),(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1), (6), (7); §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

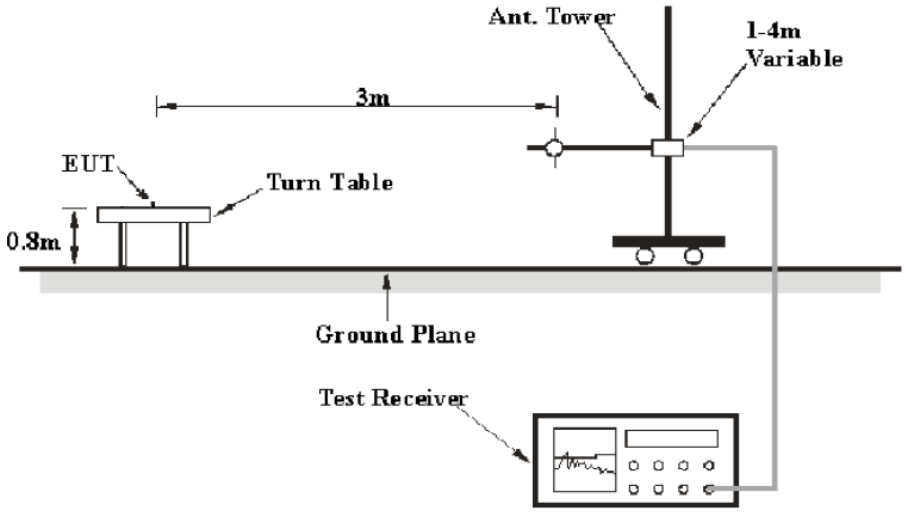
For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to 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.

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

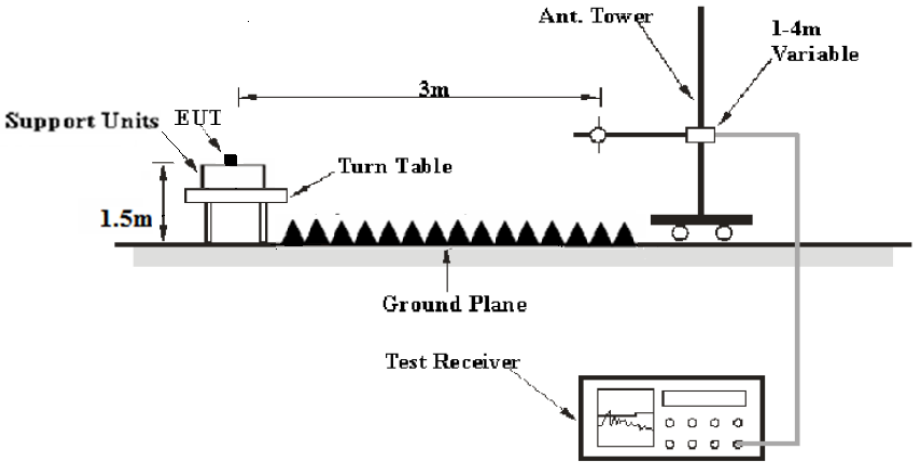
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP [dBm] + 95.2, for d = 3 meters.

EUT Setup

Below 1 GHz:



1 GHz-40GHz:



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.

Factor & Over Limit Calculation(For Below 1 GHz)

The Factor is calculated by adding Antenna Factor, Cable Loss and Amplifier Gain. The basic equation is as follows:

Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB) + Amplifier Gain (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 7 dB means the emission is 7 dB above the limit. The equation for margin calculation is as follows:

Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

Corrected Amplitude & Margin Calculation(For Above 1 GHz)

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

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

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

Margin = Limit – Corrected Amplitude

Test Data

Environmental Conditions

Temperature:	20℃~22.3 ℃
Relative Humidity:	50 %~52 %
ATM Pressure:	101.3 kPa~102.0 kPa

The testing was performed by Sam Ye from 2019-10-10 to 2019-11-29.

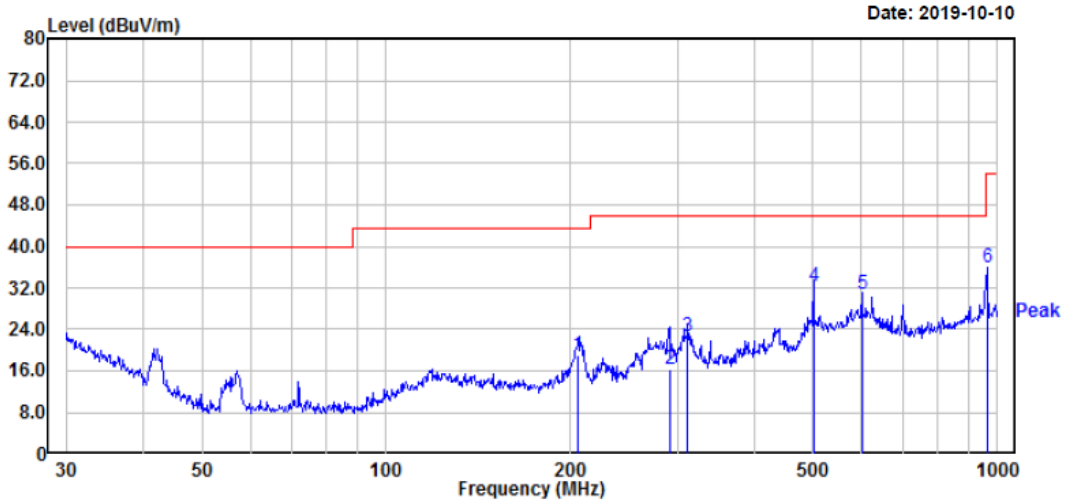
Test Mode: Transmitting

Spurious Emission Test

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

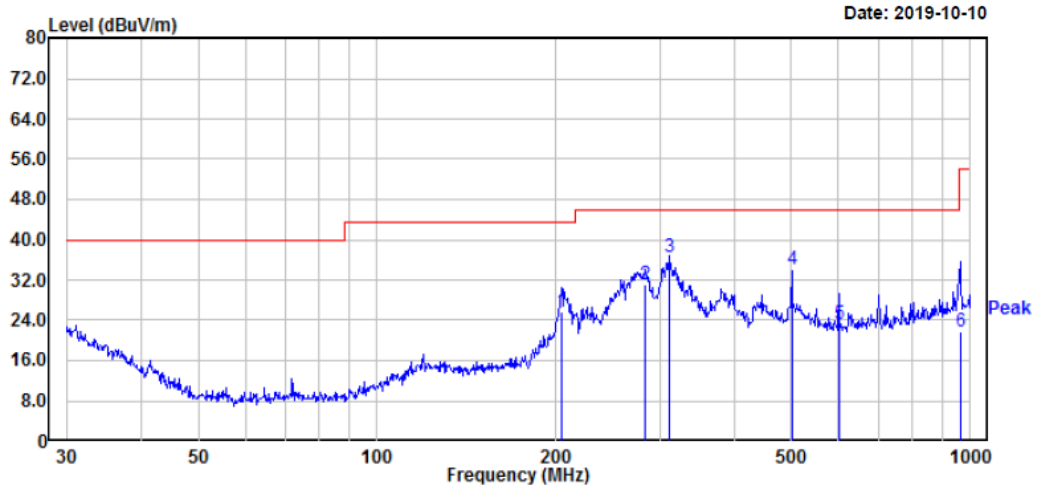
Pre-scan with 802.11a and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11n-HT20 MIMO mode in channel 5180MHz in Z-axis of orientation was recorded.

Vertical:



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	206.40	31.29	-12.21	19.08	43.50	-24.42	100	31	QP
2	291.04	26.79	-10.39	16.40	46.00	-29.60	100	360	QP
3	312.18	32.60	-10.01	22.59	46.00	-23.41	100	359	QP
4	501.18	37.81	-5.48	32.33	46.00	-13.67	100	218	QP
5	601.43	34.90	-3.96	30.94	46.00	-15.06	100	212	QP
6	962.16	33.50	2.29	35.79	54.00	-18.21	200	253	QP

Horizontal:

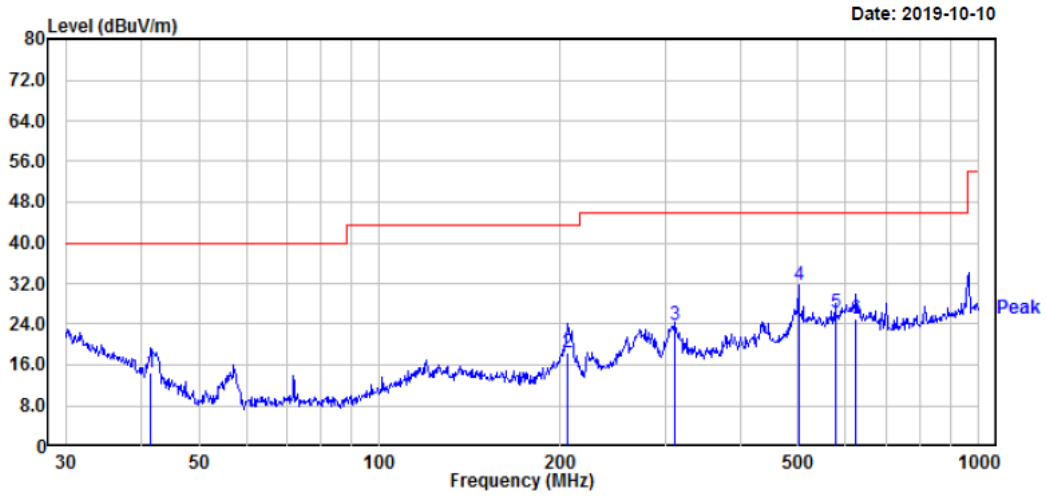


	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	204.96	37.70	-12.08	25.62	43.50	-17.88	200	337	QP
2	282.99	41.60	-10.53	31.07	46.00	-14.93	100	148	QP
3	312.18	46.40	-10.01	36.39	46.00	-9.61	100	103	QP
4	501.18	39.61	-5.48	34.13	46.00	-11.87	200	318	QP
5	601.43	27.30	-3.96	23.34	46.00	-22.66	200	0	QP
6	962.16	19.40	2.29	21.69	54.00	-32.31	100	310	QP

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

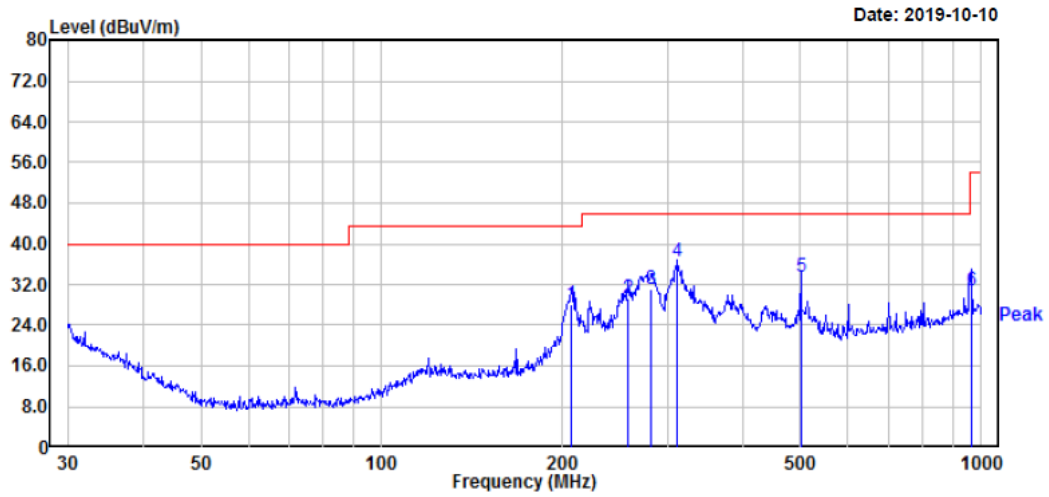
Pre-scan with 802.11a and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11n-HT20 MIMO mode in channel 5745MHz in Z-axis of orientation was recorded.

Vertical:



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	41.57	26.69	-12.30	14.39	40.00	-25.61	100	358	QP
2	205.68	30.70	-12.15	18.55	43.50	-24.95	100	358	QP
3	312.18	34.00	-10.01	23.99	46.00	-22.01	100	358	QP
4	501.18	37.31	-5.48	31.83	46.00	-14.17	100	264	QP
5	576.64	30.71	-4.36	26.35	46.00	-19.65	100	145	QP
6	625.08	28.49	-3.52	24.97	46.00	-21.03	100	171	QP

Horizontal:



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	207.12	40.50	-12.28	28.22	43.50	-15.28	100	138	QP
2	258.33	41.00	-11.69	29.31	46.00	-16.69	100	174	QP
3	282.00	41.70	-10.55	31.15	46.00	-14.85	100	0	QP
4	312.18	46.40	-10.01	36.39	46.00	-9.61	100	323	QP
5	501.18	39.11	-5.48	33.63	46.00	-12.37	200	306	QP
6	962.16	28.50	2.29	30.79	54.00	-23.21	100	323	QP

Note:

1) Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB) + Amplifier Gain (dB)
2) Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

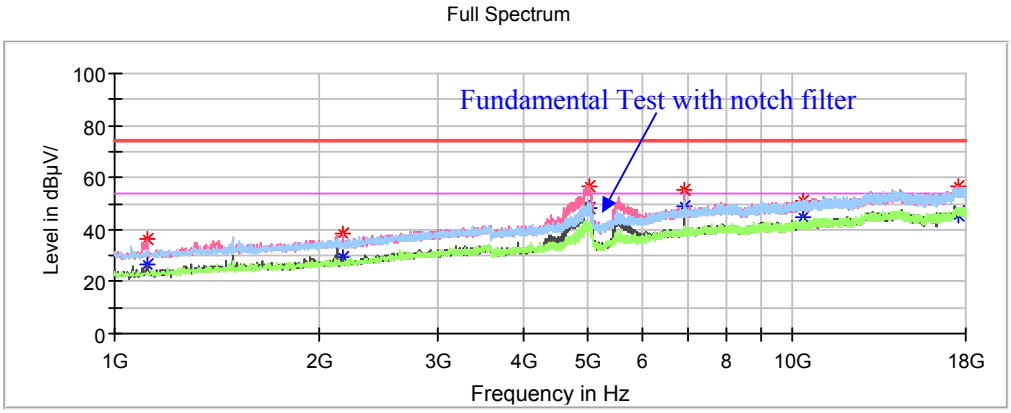
1GHz-18GHz(5150-5250MHz band):

802.11a mode(ANT 0):

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

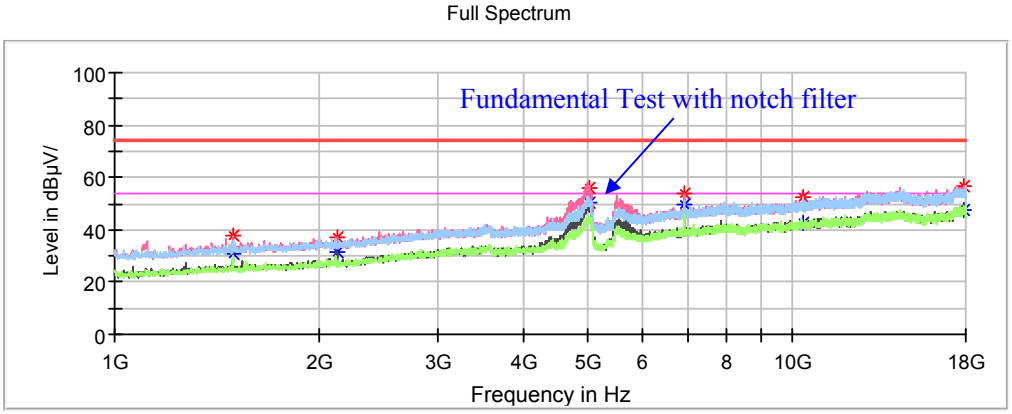
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz



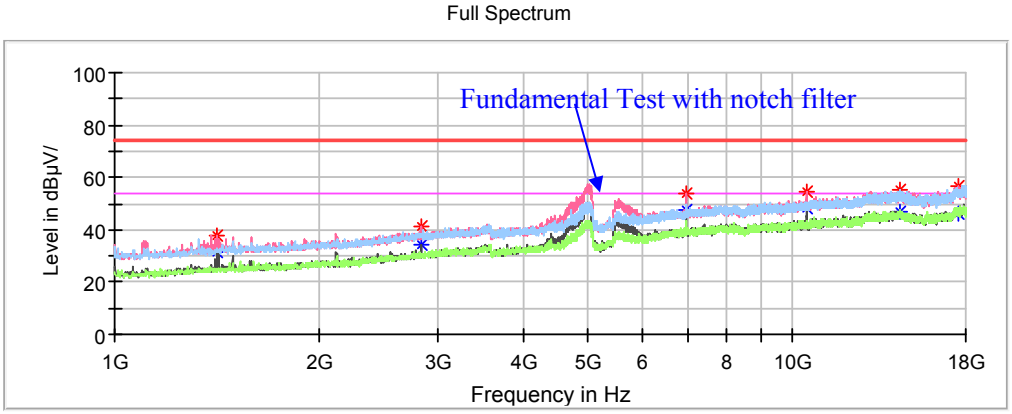
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1115.60	---	26.51	200	V	341.0	-12.0	54.00	27.49
1115.60	36.22	---	200	V	341.0	-12.0	74.00	37.78
2169.60	38.61	---	200	V	188.0	-7.8	68.20	29.59
5020.50	---	48.20	100	V	140.0	-0.2	54.00	5.80
5020.50	56.97	---	100	V	140.0	-0.2	74.00	17.03
6905.80	55.09	---	100	V	185.0	5.2	68.20	13.11
10360.00	51.39	---	150	V	66.0	8.8	68.20	16.81
17549.50	56.81	---	100	V	245.0	14.2	68.20	11.39

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)				
1493.00	---	30.58	200	V	127.0	-10.0	54.00	23.42
1493.00	37.87	---	200	V	127.0	-10.0	74.00	36.13
2127.10	37.15	---	150	V	202.0	-7.9	68.20	31.05
5001.80	---	50.24	200	V	266.0	-0.3	54.00	3.76
5001.80	56.22	---	200	V	266.0	-0.3	74.00	17.78
6933.00	53.89	---	100	V	142.0	5.2	68.20	14.31
10400.00	52.51	---	200	H	341.0	8.7	68.20	15.69
17853.80	---	47.77	200	V	319.0	13.7	54.00	6.23
17853.80	56.99	---	200	V	319.0	13.7	74.00	17.01

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)				
1414.80	---	31.19	200	V	71.0	-10.4	54.00	22.81
1414.80	37.70	---	200	V	71.0	-10.4	74.00	36.30
2832.60	---	34.18	200	V	145.0	-5.2	54.00	19.82
2832.60	41.44	---	200	V	145.0	-5.2	74.00	32.56
6985.70	53.71	---	100	V	180.0	5.3	68.20	14.49
10480.00	54.42	---	100	V	340.0	9.0	68.20	13.78
14426.60	55.11	---	150	H	237.0	12.7	68.20	13.09
17530.80	56.70	---	100	V	14.0	14.2	68.20	11.50

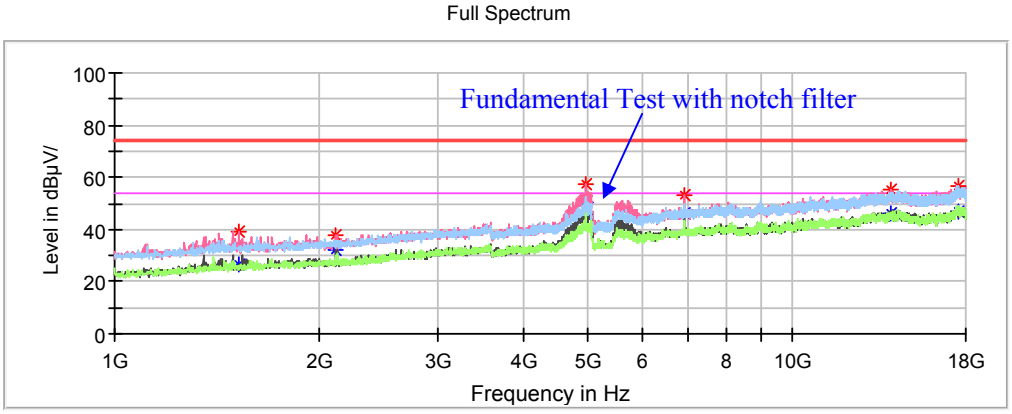
1GHz-18GHz(5150-5250MHz band):

802.11a mode(ANT 1):

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

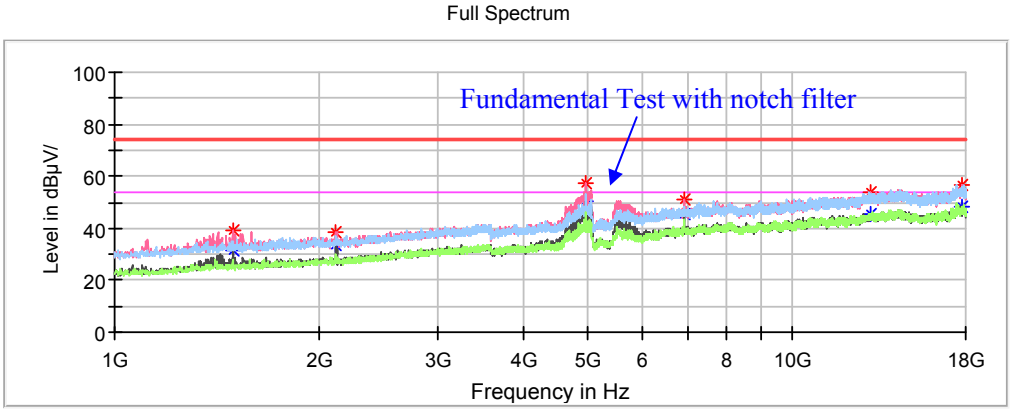
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz



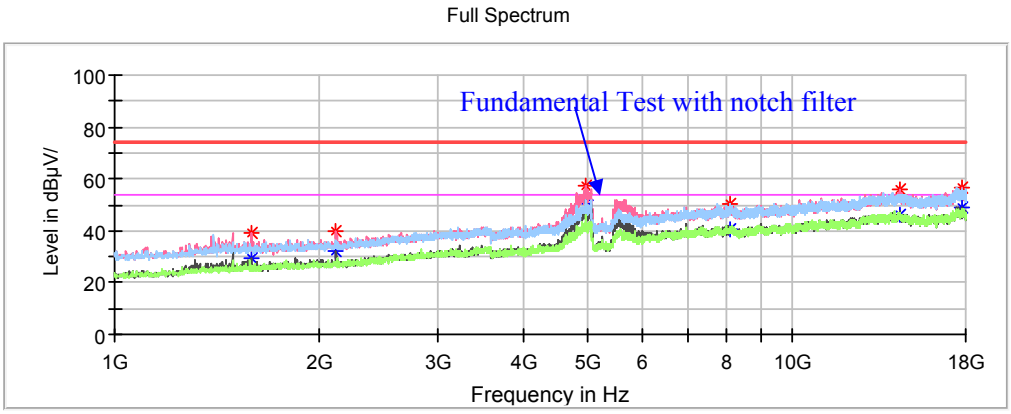
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1527.00	39.24	---	150	V	66.0	-9.8	74.00	34.76
1527.00	---	26.61	150	V	66.0	-9.8	54.00	27.39
2123.70	37.49	---	200	V	345.0	-7.9	68.20	30.71
4959.30	---	50.34	150	V	66.0	-0.3	54.00	3.66
4959.30	57.36	---	150	V	66.0	-0.3	74.00	16.64
6905.80	52.95	---	200	V	327.0	5.2	68.20	15.25
13923.40	54.98	---	150	V	246.0	12.4	68.20	13.22
17507.00	56.79	---	150	H	0.0	14.3	68.20	11.41

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)				
1494.70	---	31.35	150	V	83.0	-10.0	54.00	22.65
1494.70	39.26	---	150	V	83.0	-10.0	74.00	34.74
2123.70	38.32	---	200	V	171.0	-7.9	68.20	29.88
4959.30	57.23	---	150	V	13.0	-0.3	68.20	10.97
6933.00	50.73	---	200	V	317.0	5.2	68.20	17.47
13030.90	54.07	---	200	V	80.0	12.1	68.20	14.13
17792.60	---	48.01	200	V	0.0	13.8	54.00	5.99
17792.60	56.47	---	200	V	0.0	13.8	74.00	17.53

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)				
1593.30	---	29.07	200	V	47.0	-9.6	54.00	24.93
1593.30	39.46	---	200	V	47.0	-9.6	74.00	34.54
2123.70	39.89	---	200	V	183.0	-7.9	68.20	28.31
4959.30	---	51.65	150	V	33.0	-0.3	54.00	2.35
4959.30	57.37	---	150	V	33.0	-0.3	74.00	16.63
8100.90	---	40.80	200	H	94.0	6.9	54.00	13.20
8100.90	50.44	---	200	H	94.0	6.9	74.00	23.56
14353.50	55.74	---	150	V	314.0	12.6	68.20	12.46
17785.80	---	48.74	150	V	267.0	13.8	54.00	5.26
17785.80	56.51	---	150	V	267.0	13.8	74.00	17.49

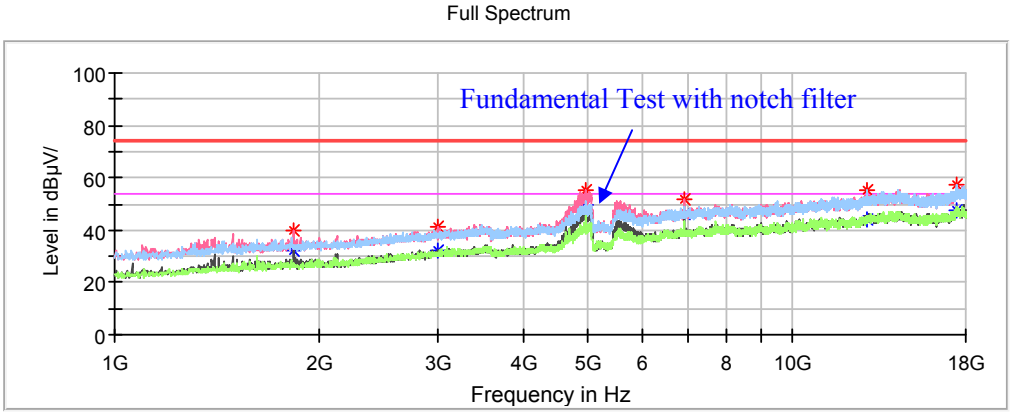
1GHz-18GHz(5150-5250MHz band):

802.11n-HT20 Mode(ANT 0 & ANT 1):

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

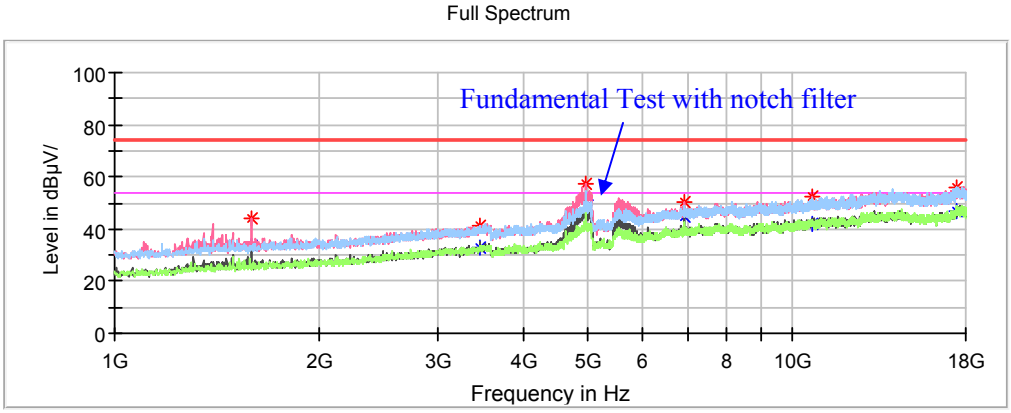
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz



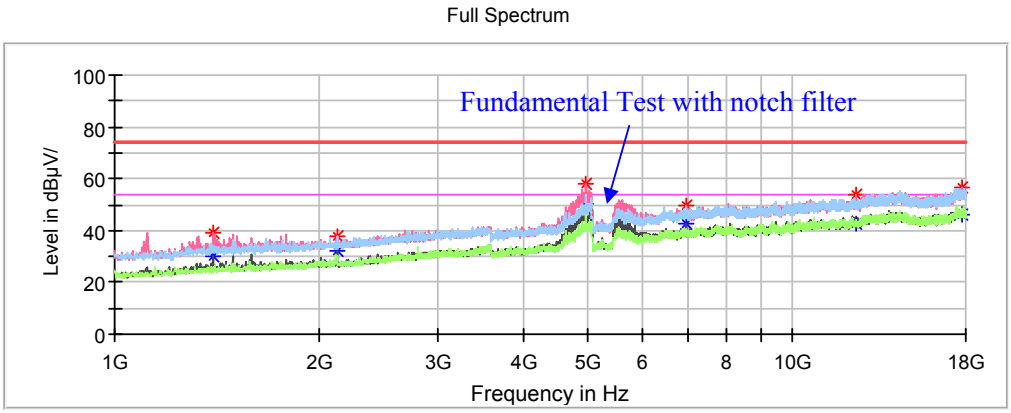
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1838.10	39.57	---	200	V	170.0	-8.8	68.20	28.63
2995.80	41.05	---	200	V	358.0	-4.4	68.20	27.15
4959.30	---	49.75	150	V	0.0	-0.3	54.00	4.25
4959.30	55.24	---	150	V	0.0	-0.3	74.00	18.76
6905.80	51.97	---	150	V	328.0	5.2	68.20	16.23
12840.50	55.32	---	150	H	214.0	11.5	68.20	12.88
17479.80	57.65	---	200	H	266.0	14.2	68.20	10.55

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)				
1593.30	---	33.82	150	V	206.0	-9.6	54.00	20.18
1593.30	43.86	---	150	V	206.0	-9.6	74.00	30.14
3463.30	41.59	---	150	H	0.0	-3.6	68.20	26.61
4959.30	---	50.85	150	V	147.0	-0.3	54.00	3.15
4959.30	57.06	---	150	V	147.0	-0.3	74.00	16.94
6933.00	50.13	---	150	V	7.0	5.2	68.20	18.07
10705.30	---	41.69	200	V	250.0	9.3	54.00	12.31
10705.30	52.39	---	200	V	250.0	9.3	74.00	21.61
17450.90	56.28	---	200	V	220.0	14.0	68.20	11.92

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)				
1396.10	---	29.93	150	V	191.0	-10.5	54.00	24.07
1396.10	39.40	---	150	V	191.0	-10.5	74.00	34.60
2125.40	38.06	---	200	V	341.0	-7.9	68.20	30.14
4959.30	---	50.48	150	V	147.0	-0.3	54.00	3.52
4959.30	57.95	---	150	V	147.0	-0.3	74.00	16.05
6985.70	49.56	---	200	V	0.0	5.3	68.20	18.64
12415.50	---	42.60	150	V	266.0	10.3	54.00	11.40
12415.50	53.80	---	150	V	266.0	10.3	74.00	20.20
17738.20	---	46.06	150	V	104.0	13.9	54.00	7.94
17738.20	56.45	---	150	V	104.0	13.9	74.00	17.55

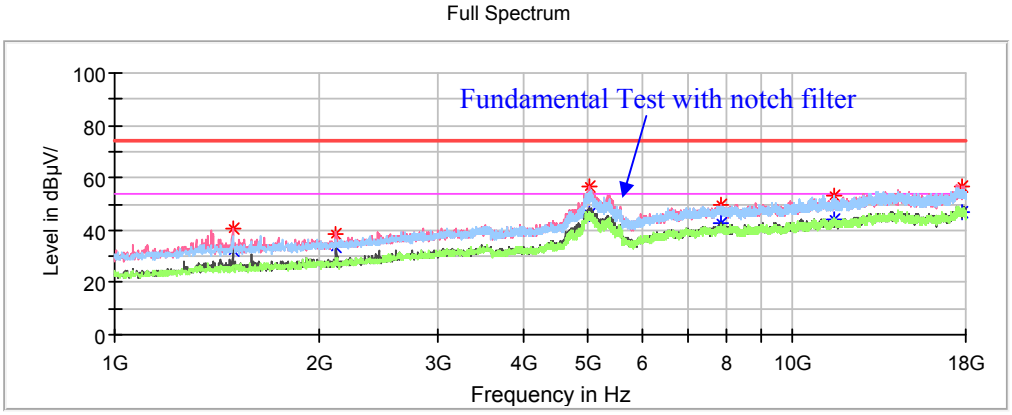
1GHz-18GHz(5725-5850MHz band):

802.11a mode(ANT 0):

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

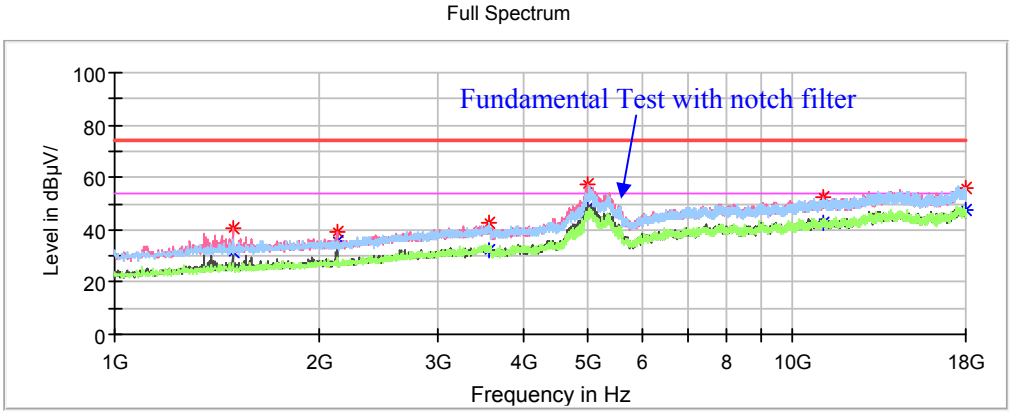
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz



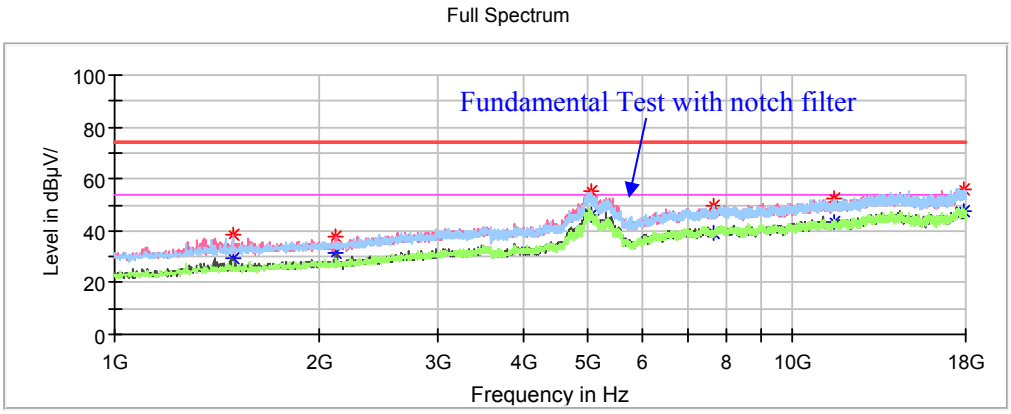
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1494.70	40.56	---	150	V	84.0	-10.0	74.00	33.44
1494.70	---	32.22	150	V	84.0	-10.0	54.00	21.78
2123.70	38.75	---	200	V	96.0	-7.9	68.20	29.45
5029.00	---	45.98	150	V	234.0	-0.2	54.00	8.02
5029.00	56.30	---	150	V	234.0	-0.2	74.00	17.70
7839.10	49.75	---	200	V	350.0	6.8	68.20	18.45
11490.00	---	44.25	150	H	64.0	9.8	54.00	9.75
11490.00	53.10	---	150	H	64.0	9.8	74.00	20.90
17760.30	---	46.73	150	V	40.0	13.9	54.00	7.27
17760.30	56.67	---	150	V	40.0	13.9	74.00	17.33

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)				
1494.70	---	31.25	150	V	64.0	-10.0	54.00	22.75
1494.70	40.51	---	150	V	64.0	-10.0	74.00	33.49
2127.10	38.99	---	200	V	310.0	-7.9	68.20	29.21
3560.20	42.58	---	150	H	239.0	-3.3	68.20	25.62
4981.40	---	48.16	150	V	328.0	-0.3	54.00	5.84
4981.40	57.20	---	150	V	328.0	-0.3	74.00	16.80
11120.10	---	42.88	200	V	310.0	9.8	54.00	11.12
11120.10	52.29	---	200	V	310.0	9.8	74.00	21.71
17950.70	---	47.26	200	H	29.0	13.6	54.00	6.74
17950.70	56.22	---	200	H	29.0	13.6	74.00	17.78

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)				
1494.70	---	29.26	150	V	70.0	-10.0	54.00	24.74
1494.70	38.14	---	150	V	70.0	-10.0	74.00	35.86
2123.70	37.52	---	200	V	218.0	-7.9	68.20	30.68
5042.60	---	46.09	200	V	328.0	-0.1	54.00	7.91
5042.60	55.57	---	200	V	328.0	-0.1	74.00	18.43
7667.40	---	39.16	150	H	310.0	6.4	54.00	14.84
7667.40	49.33	---	150	H	310.0	6.4	74.00	24.67
11507.70	---	43.25	150	V	114.0	9.8	54.00	10.75
11507.70	52.44	---	150	V	114.0	9.8	74.00	21.56
17911.60	---	47.55	150	V	249.0	13.6	54.00	6.45
17911.60	56.02	---	150	V	249.0	13.6	74.00	17.98

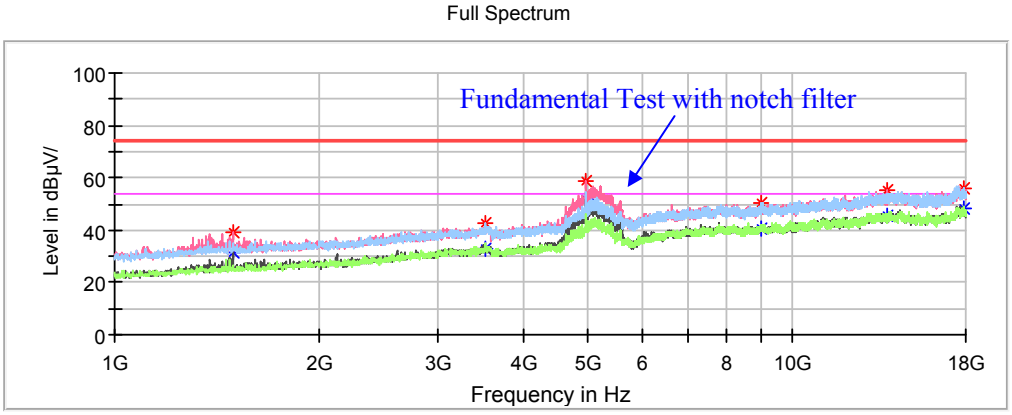
1GHz-18GHz(5725-5850MHz band):

802.11a mode(ANT 1):

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

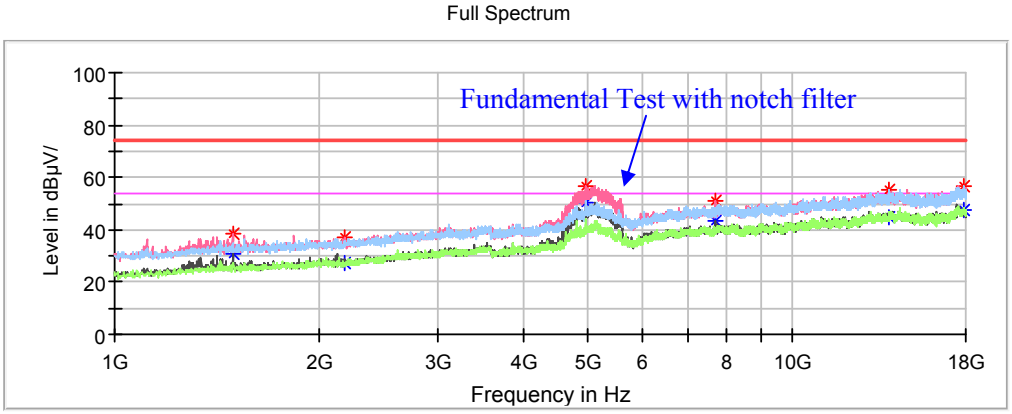
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz



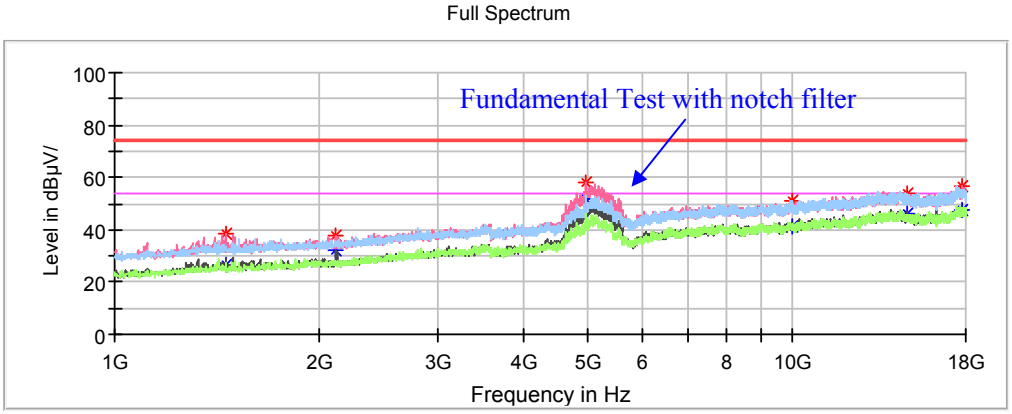
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1494.70	---	31.17	150	V	63.0	-10.0	54.00	22.83
1494.70	39.14	---	150	V	63.0	-10.0	74.00	34.86
3521.10	42.74	---	150	H	289.0	-3.5	68.20	25.46
4959.30	---	51.60	150	V	77.0	-0.3	54.00	2.40
4959.30	58.43	---	150	V	77.0	-0.3	74.00	15.57
9005.30	---	40.53	200	H	334.0	7.7	54.00	13.47
9005.30	50.10	---	200	H	334.0	7.7	74.00	23.90
13770.40	54.98	---	150	V	208.0	12.2	68.20	13.22
17937.10	---	48.33	150	V	6.0	13.6	54.00	5.67
17937.10	56.14	---	150	V	6.0	13.6	74.00	17.86

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)				
1494.70	---	30.96	150	V	70.0	-10.0	54.00	23.04
1494.70	38.67	---	150	V	70.0	-10.0	74.00	35.33
2190.00	37.01	---	200	V	300.0	-7.7	68.20	31.19
4959.30	---	50.62	150	V	0.0	-0.3	54.00	3.38
4959.30	56.96	---	150	V	0.0	-0.3	74.00	17.04
7713.30	---	43.22	150	V	0.0	6.5	54.00	10.78
7713.30	50.91	---	150	V	0.0	6.5	74.00	23.09
13865.60	55.40	---	150	H	304.0	12.3	68.20	12.80
17867.40	---	47.48	150	H	216.0	13.7	54.00	6.52
17867.40	56.99	---	150	H	216.0	13.7	74.00	17.01

Low 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)				
1455.60	---	26.27	150	V	118.0	-10.2	54.00	27.73
1455.60	38.39	---	150	V	118.0	-10.2	74.00	35.61
2123.70	37.91	---	200	V	221.0	-7.9	68.20	30.29
4959.30	---	51.94	150	V	32.0	-0.3	54.00	2.06
4959.30	57.83	---	150	V	32.0	-0.3	74.00	16.17
10013.40	51.21	---	150	H	348.0	8.2	68.20	16.99
14764.90	---	46.12	200	V	347.0	12.1	54.00	7.88
14764.90	53.80	---	200	V	347.0	12.1	74.00	20.20
17745.00	---	47.25	200	V	277.0	13.9	54.00	6.75
17745.00	56.78	---	200	V	277.0	13.9	74.00	17.22

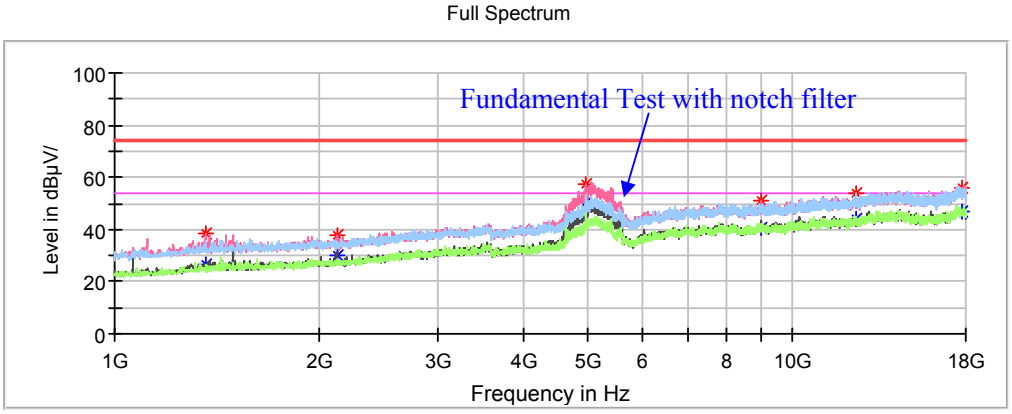
1GHz-18GHz(5725-5850MHz band):

802.11n-HT20 Mode(ANT 0 & ANT 1):

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

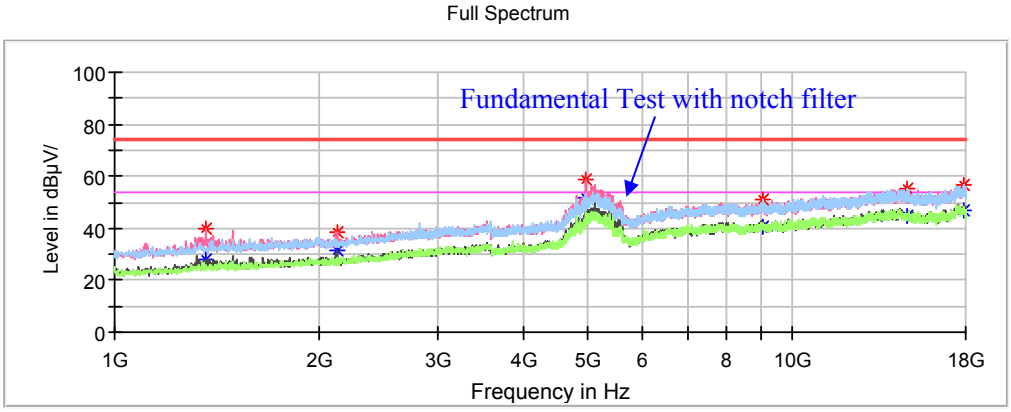
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz



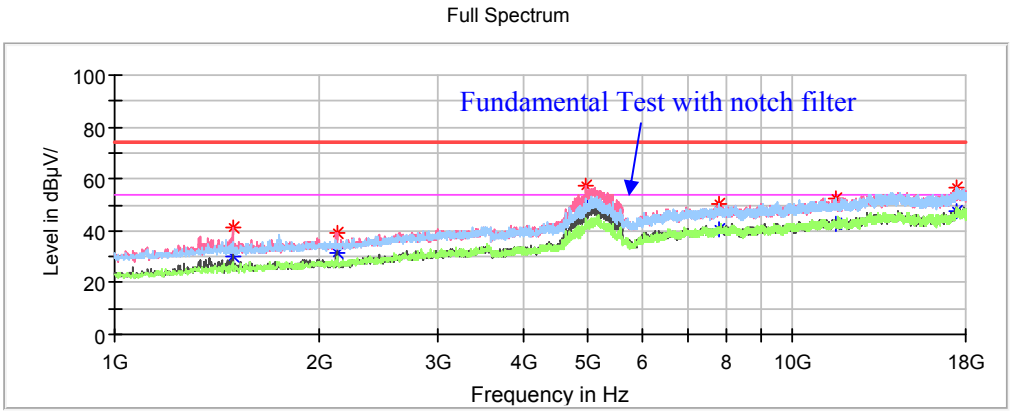
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1360.40	---	26.41	150	V	147.0	-10.7	54.00	27.59
1360.40	38.41	---	150	V	147.0	-10.7	74.00	35.59
2125.40	37.56	---	150	V	206.0	-7.9	68.20	30.64
4959.30	---	50.38	150	V	147.0	-0.3	54.00	3.62
4959.30	57.31	---	150	V	147.0	-0.3	74.00	16.69
9000.20	---	40.88	200	V	313.0	7.7	54.00	13.12
9000.20	51.08	---	200	V	313.0	7.7	74.00	22.92
12417.20	---	43.86	150	H	0.0	10.3	54.00	10.14
12417.20	54.15	---	150	H	0.0	10.3	74.00	19.85
17806.20	---	46.83	200	V	244.0	13.8	54.00	7.17
17806.20	56.08	---	200	V	244.0	13.8	74.00	17.92

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)				
1360.40	---	28.30	150	V	186.0	-10.7	54.00	25.70
1362.40	39.57	---	150	V	186.0	-10.7	74.00	34.43
2127.10	38.42	---	150	V	221.0	-7.9	68.20	29.78
4959.30	---	51.58	150	V	142.0	-0.3	54.00	2.42
4959.30	58.58	---	150	V	142.0	-0.3	74.00	15.42
9030.80	---	40.50	200	H	160.0	7.7	54.00	13.50
9030.80	50.72	---	200	H	160.0	7.7	74.00	23.28
14804.00	55.38	---	150	H	279.0	12.0	68.20	12.82
17858.90	---	46.93	200	H	348.0	13.7	54.00	7.07
17858.90	56.39	---	200	H	348.0	13.7	74.00	17.61

High Channel: 5825MHz

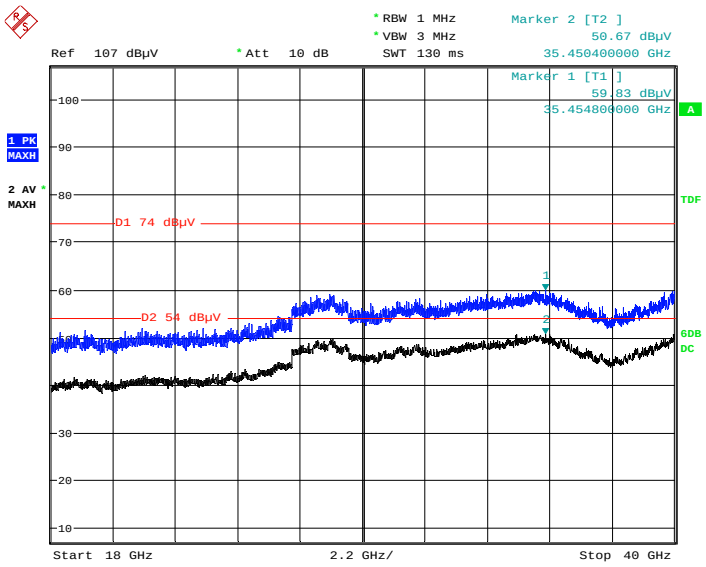


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1493.00	---	30.33	150	V	69.0	-10.0	54.00	23.67
1493.00	41.07	---	150	V	69.0	-10.0	74.00	32.93
2127.10	39.24	---	150	V	206.0	-7.9	68.20	28.96
4959.30	---	50.70	150	V	13.0	-0.3	54.00	3.30
4959.30	57.10	---	150	V	13.0	-0.3	74.00	16.90
7796.60	50.21	---	200	H	265.0	6.7	68.20	17.99
11558.70	---	42.57	150	H	250.0	9.8	54.00	11.43
11558.70	52.68	---	150	H	250.0	9.8	74.00	21.32
17498.50	56.63	---	150	H	191.0	14.3	68.20	11.57

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

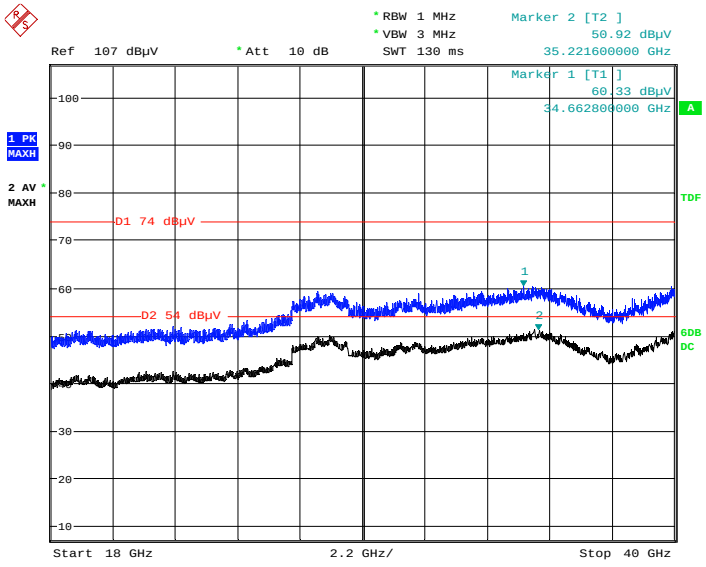
Pre-scan with 802.11a and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case ***802.11n-HT20 mode in channel 5180MHz in Z-axis of orientation*** *was recorded*

Horizontal



Date: 29.NOV.2019 16:30:20

Vertical

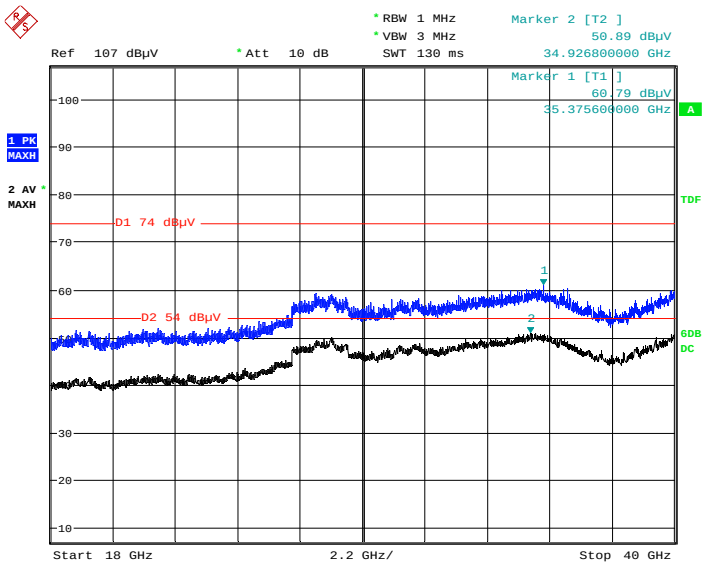


Date: 29.NOV.2019 16:55:05

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

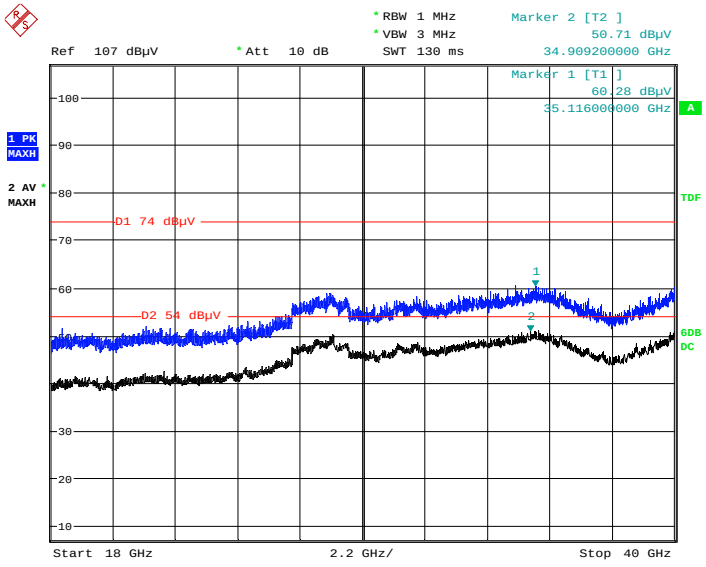
Pre-scan with 802.11a and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case ***802.11n-HT20 mode in channel 5745MHz in Z-axis of orientation*** *was recorded*

Horizontal



Date: 29.NOV.2019 14:51:39

Vertical



Date: 29.NOV.2019 14:25:05

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

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

802.11a Mode(ANT 0): *(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	57.43	---	150	V	20	10.2	74	16.57
5150.00	---	49.98	150	V	20	10.2	54	4.02
High Channel: 5240MHz								
5350.00	56.76	---	200	V	171	10.9	74	17.24
5350.00	---	48.51	200	V	171	10.9	54	5.49

802.11a Mode(ANT 1): *(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	57.98	---	150	V	100	10.2	74	16.02
5150.00	---	50.36	150	V	100	10.2	54	3.64
High Channel: 5240MHz								
5350.00	56.23	---	150	V	247	10.9	74	17.77
5350.00	---	48.37	150	V	247	10.9	54	5.63

802.11n-HT20 Mode(ANT 0& ANT 1): *(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	57.15	---	150	V	119	10.2	74	16.85
5150.00	---	50.64	150	V	119	10.2	54	3.36
High Channel: 5240MHz								
5350.00	55.96	---	200	V	13	10.9	74	18.04
5350.00	---	48.37	200	V	13	10.9	54	5.63

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

802.11a Mode(ANT 0): *(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	55.17	---	200	V	255	12.2	68.2	12.4
5700.00	60.83	---	200	V	300	12.2	105.2	44.8
5720.00	55.36	---	200	V	355	12.2	110.8	55.68
5725.00	63.12	---	150	V	220	12	122.2	58.13
High Channel: 5825MHz								
5850.00	63.87	---	150	V	220	12	122.2	58.13
5855.00	55.12	---	200	V	355	12.2	110.8	55.68
5875.00	60.40	---	200	V	300	12.2	105.2	44.8
5925.00	55.80	---	200	V	255	12.2	68.2	12.4

802.11a Mode(ANT 1): *(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	54.73	---	200	V	132	12.2	68.2	13.47
5700.00	61.65	---	200	V	279	12.2	105.2	43.55
5720.00	56.17	---	200	V	158	12.2	110.8	54.63
5725.00	62.75	---	150	V	156	12	122.2	59.45
High Channel: 5825MHz								
5850.00	64.16	---	150	V	274	12	122.2	58.04
5855.00	54.23	---	200	V	312	12.2	110.8	56.57
5875.00	61.45	---	200	V	237	12.2	105.2	43.75
5925.00	54.86	---	200	V	167	12.2	68.2	13.34

802.11n-HT20 Mode(ANT 0& ANT 1): *(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	53.27	---	200	H	217	12.3	68.2	14.93
5700.00	56.19	---	150	H	179	12.2	105.2	49.01
5720.00	61.58	---	200	V	314	12.2	110.8	49.22
5725.00	60.78	---	200	V	16	12.2	122.2	61.42
High Channel: 5825MHz								
5850.00	61.21	---	200	V	79	12.2	122.2	60.99
5855.00	61.45	---	200	V	331	12.2	110.8	49.35
5875.00	56.23	---	150	H	189	12.2	105.2	48.97
5925.00	56.74	---	200	H	246	12.3	68.2	11.46

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 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.

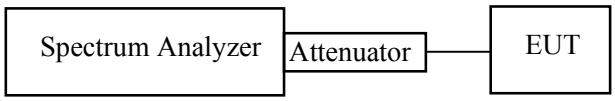
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

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) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	20°C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Sam Ye on 2019-12-05.

Test Result: Pass.

5150-5250 MHz:

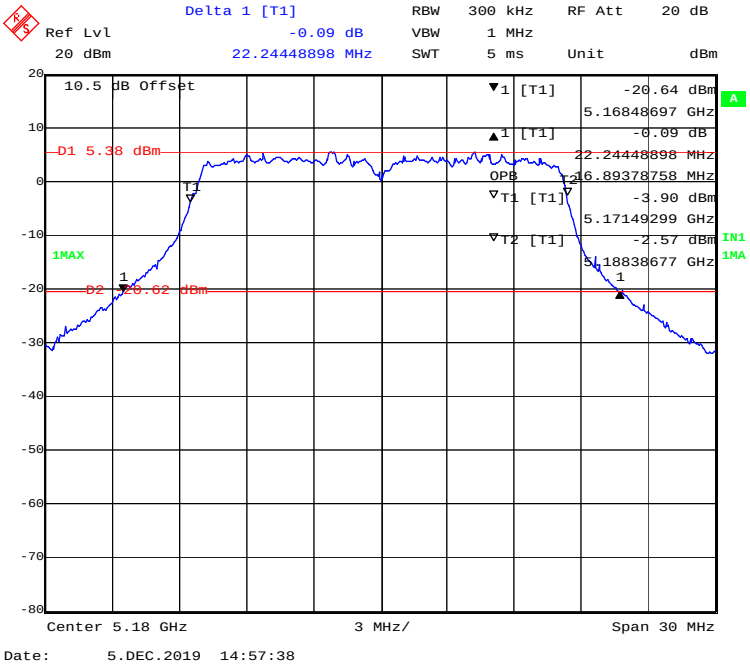
Test mode	Frequency (MHz)	26dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		ANT 0	ANT 1	ANT 0	ANT 1
802.11a	5180	22.244	22.124	16.894	16.894
	5200	22.244	22.184	16.894	16.894
	5240	22.425	22.244	16.894	16.894
802.11n-HT20	5180	23.267	23.447	17.976	17.976
	5200	23.587	23.267	17.976	17.976
	5240	23.146	23.387	17.976	17.976

5725-5850 MHz:

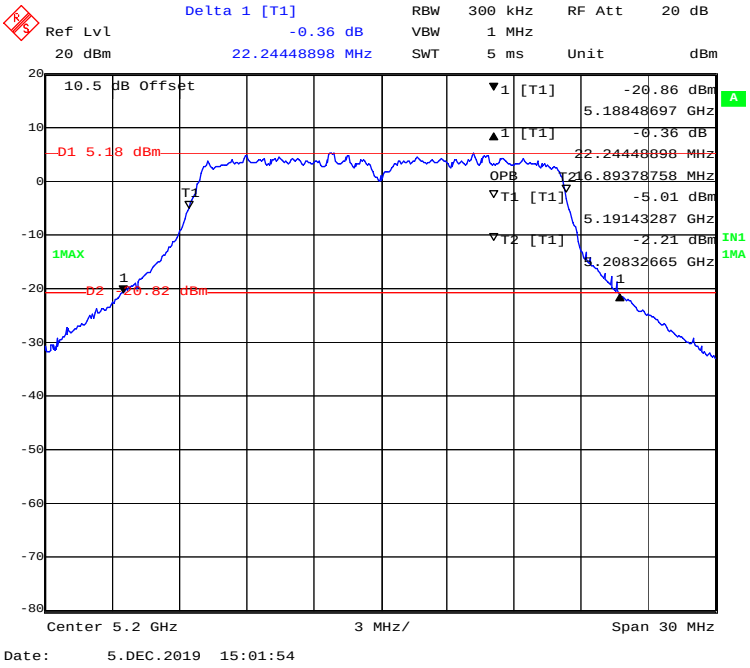
Test mode	Frequency (MHz)	6dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		ANT 0	ANT 1	ANT 0	ANT 1
802.11a	5745	16.413	16.413	17.014	17.074
	5785	16.473	16.413	17.014	16.994
	5825	16.413	16.473	17.014	17.041
802.11n-HT20	5745	17.435	17.675	18.036	18.036
	5785	17.615	17.615	18.036	18.036
	5825	17.615	17.615	18.096	18.036

5150-5250 MHz Band:
ANT 0:
26dB Bandwidth&99% Occupied Bandwidth

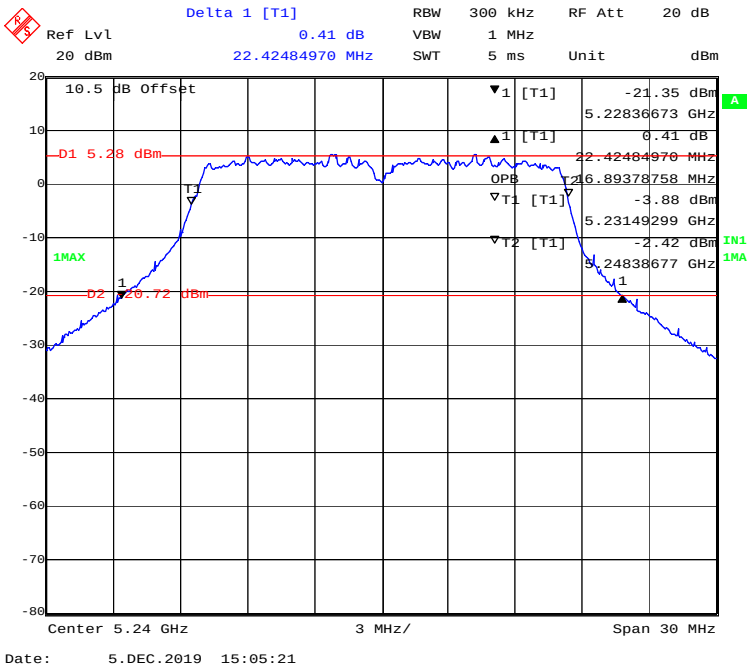
802.11a mode, 5180MHz



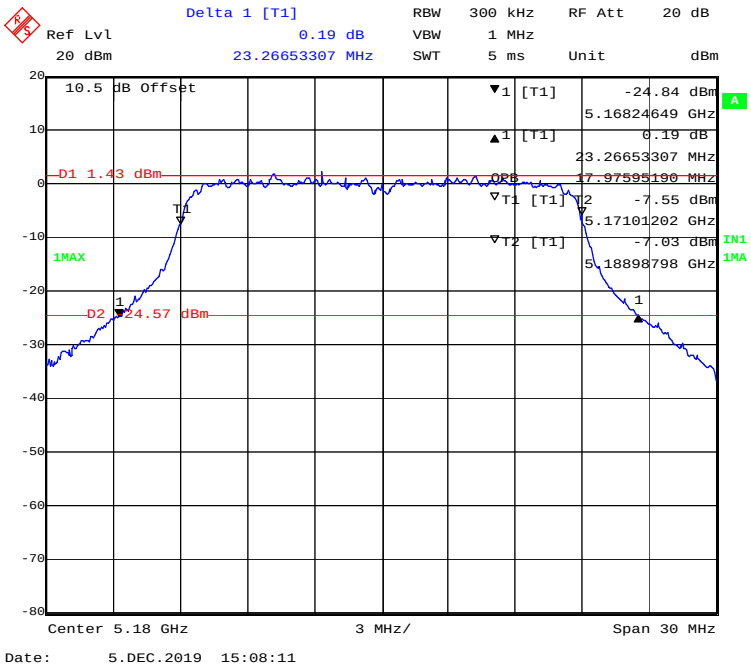
802.11a mode, 5200MHz



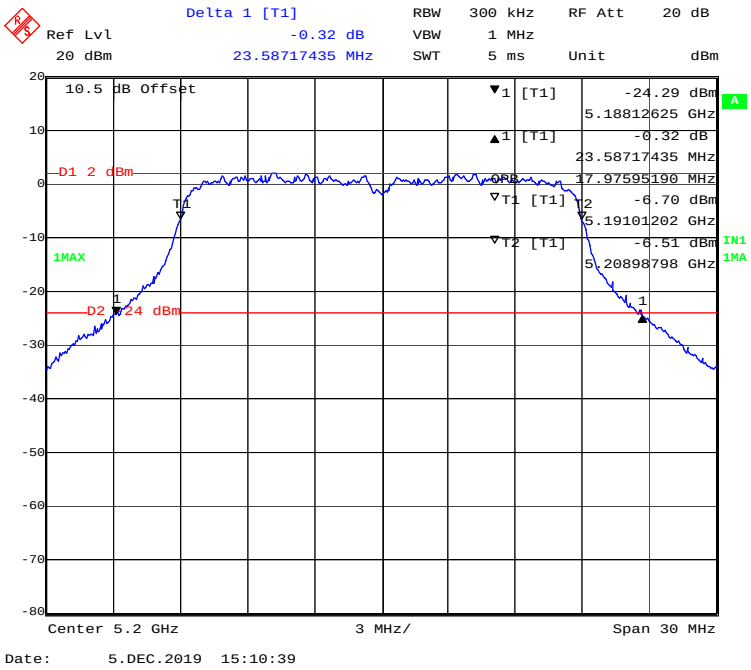
802.11a mode, 5240MHz



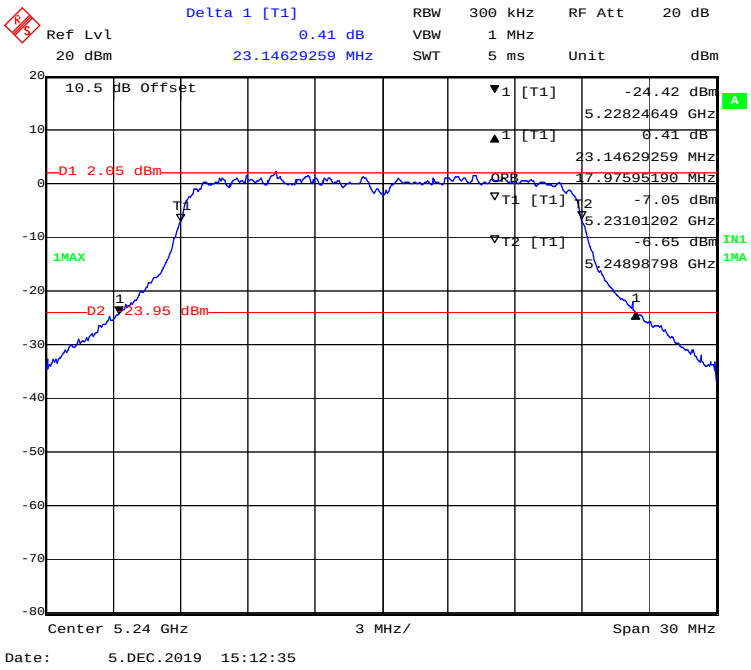
802.11n-HT20 mode,5180MHz



802.11n-HT20 mode, 5200MHz

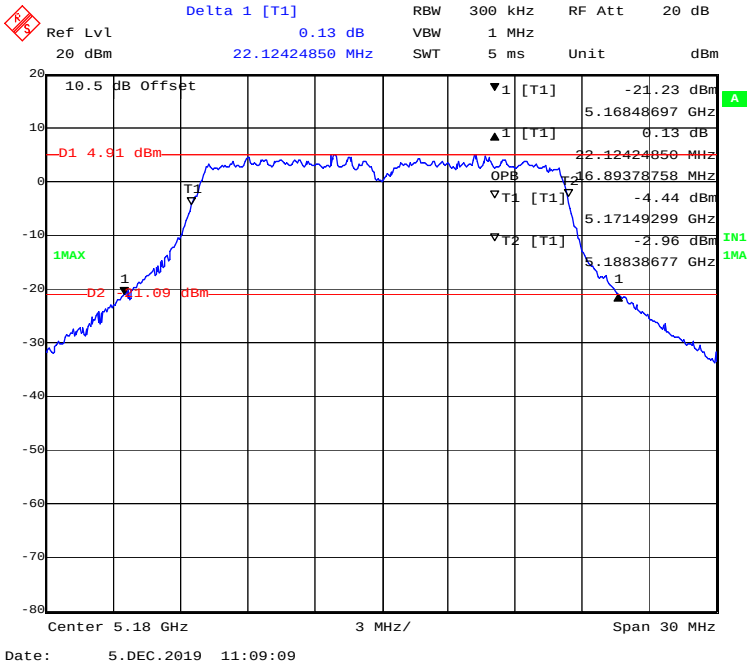


802.11n-HT20 mode, 5240MHz

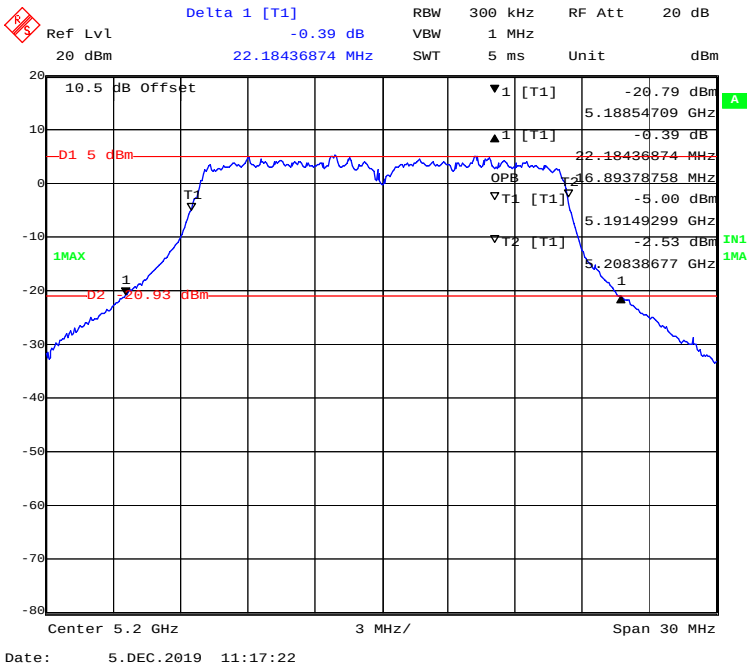


ANT 1:
26dB Bandwidth&99% Occupied Bandwidth

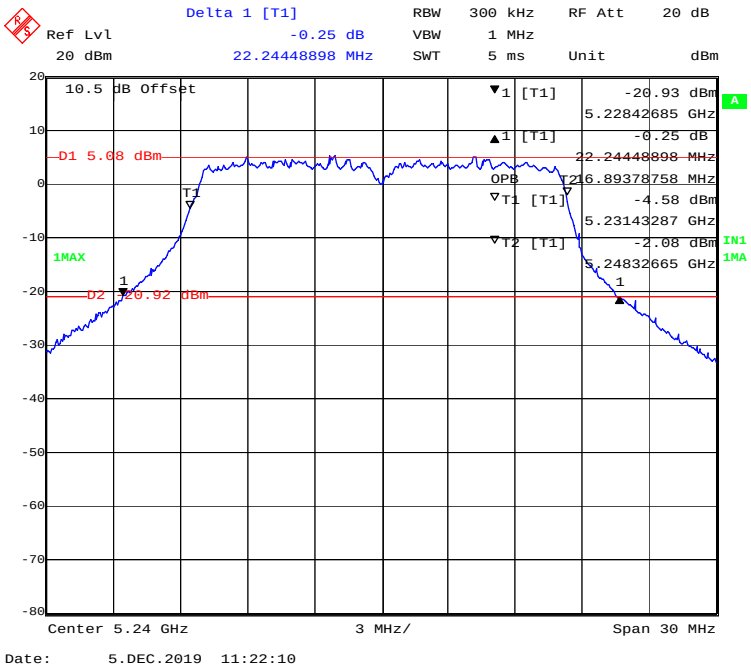
802.11a mode, 5180MHz



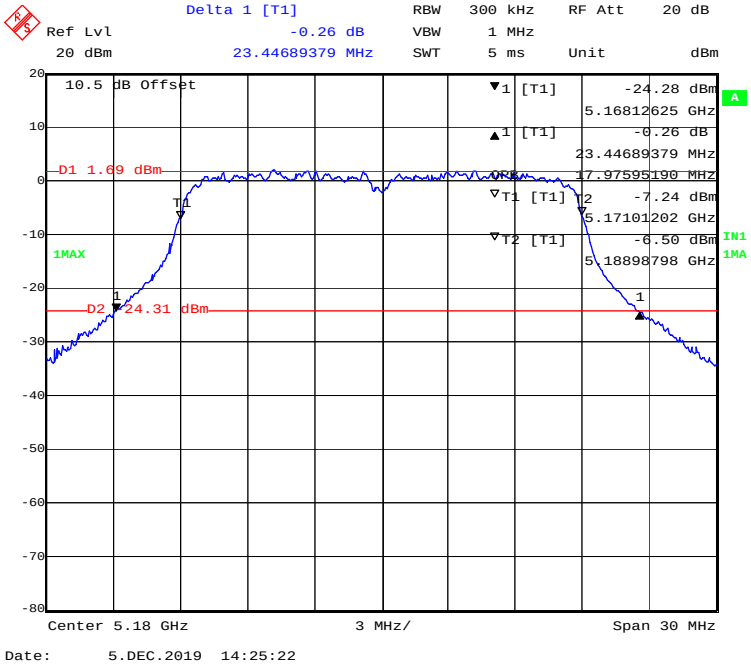
802.11a mode, 5200MHz



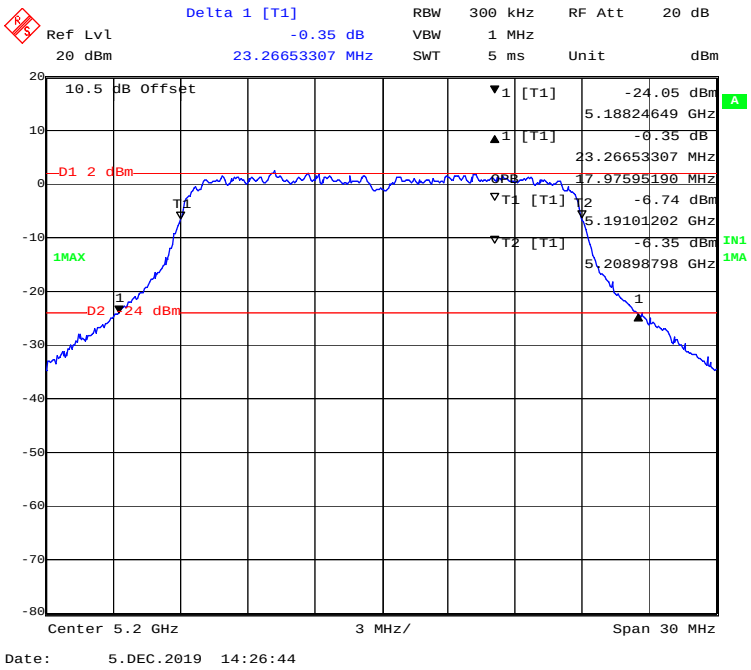
802.11a mode, 5240MHz



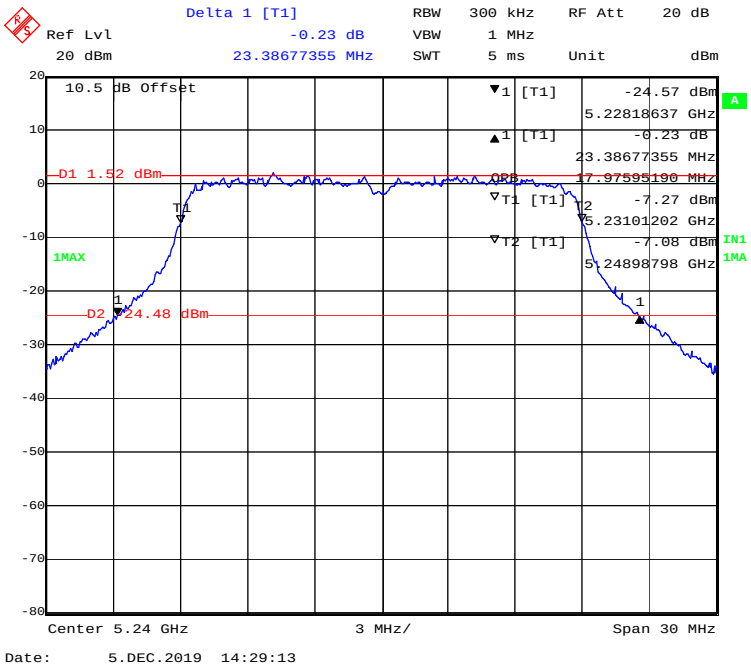
802.11n-HT20 mode,5180MHz



802.11n-HT20 mode, 5200MHz

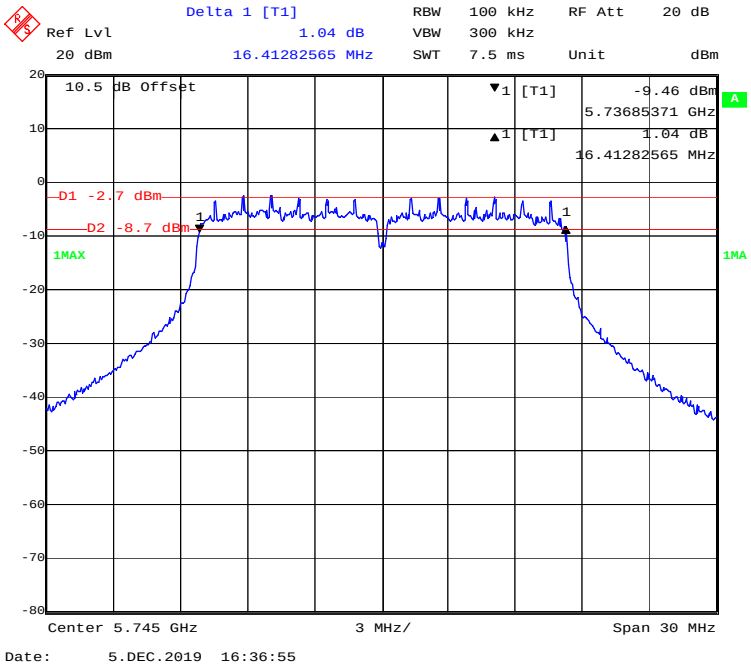


802.11n-HT20 mode, 5240MHz

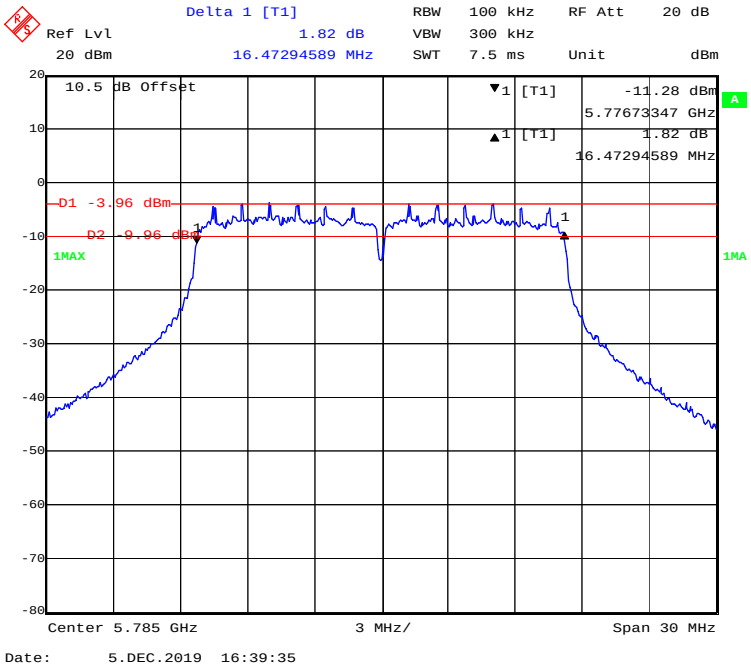


5725-5850 MHz Band:
ANT 0:
6dB Bandwidth

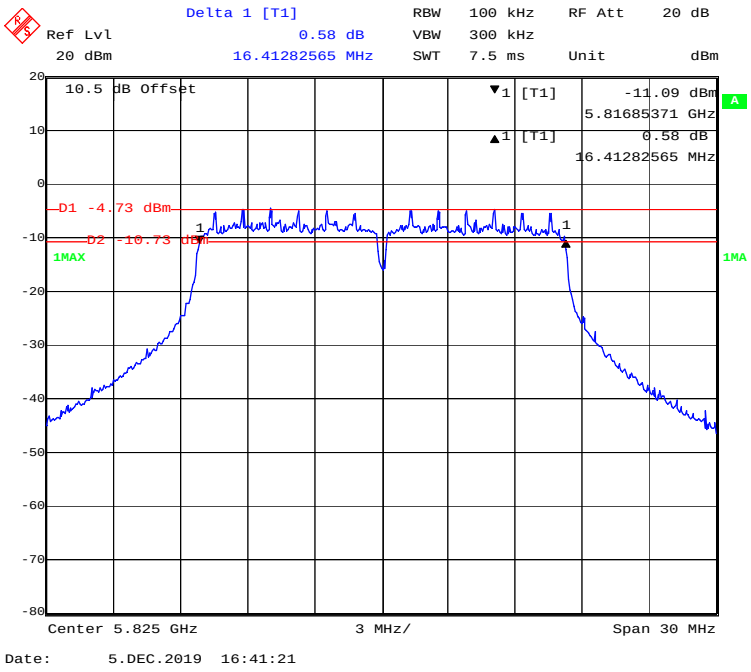
802.11a mode, 5745MHz



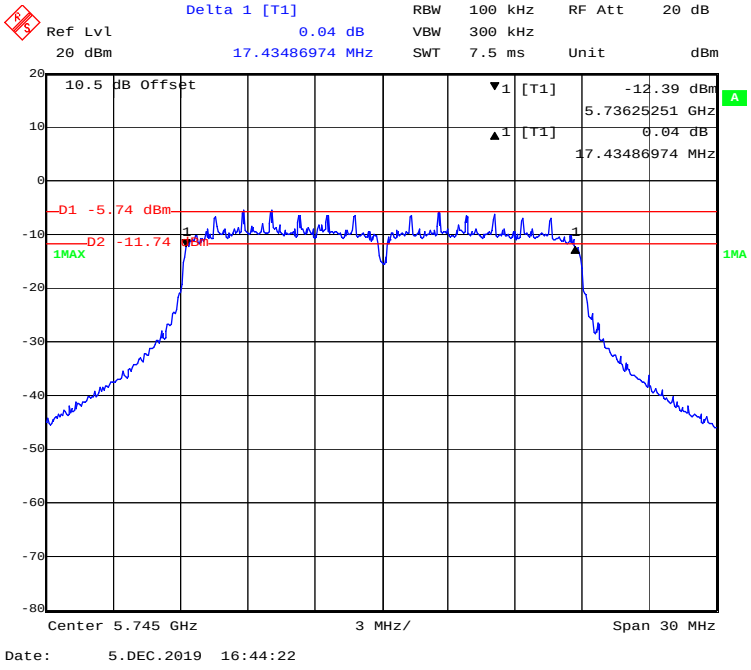
802.11a mode, 5785MHz



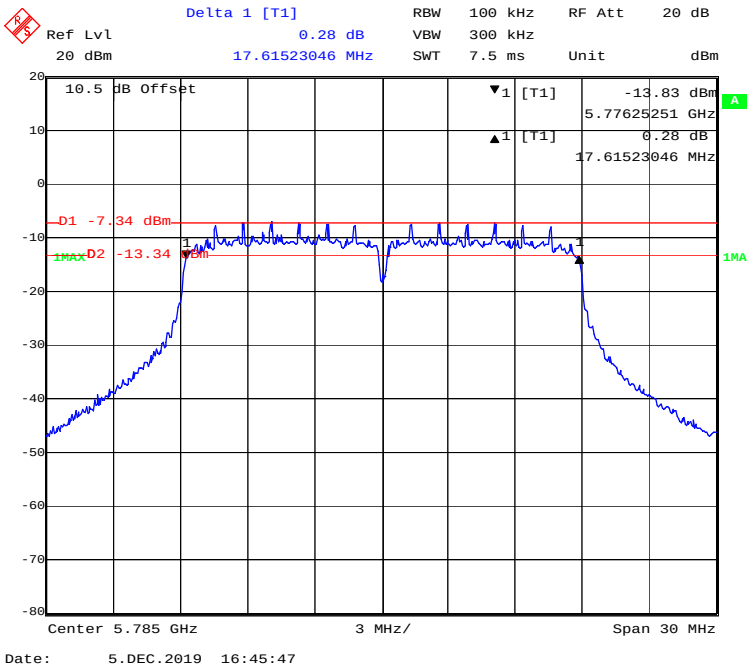
802.11a mode, 5825MHz



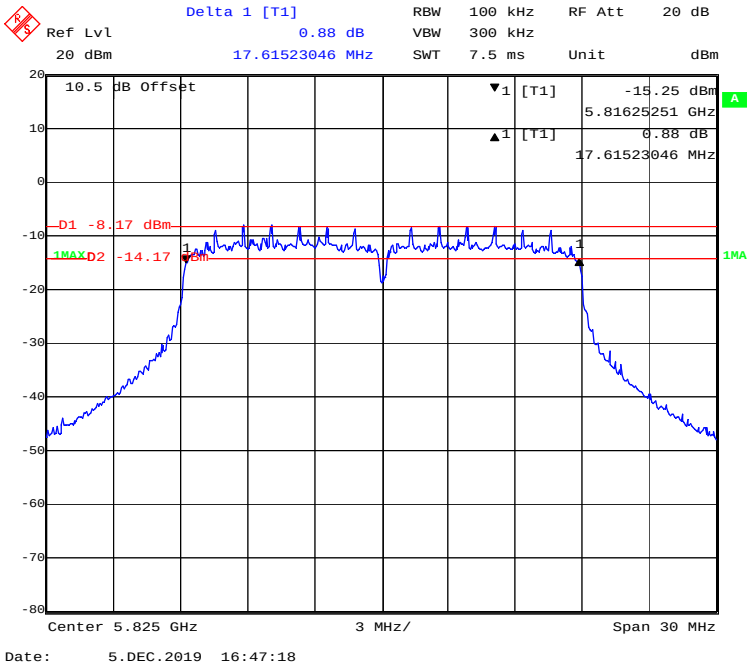
802.11n-HT20 mode, 5745MHz



802.11n-HT20 mode, 5785MHz

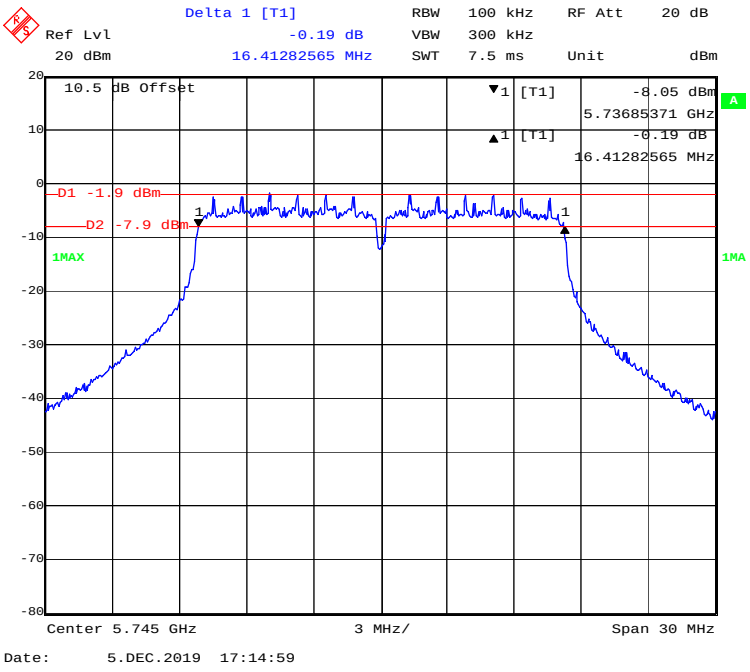


802.11n-HT20 mode, 5825MHz

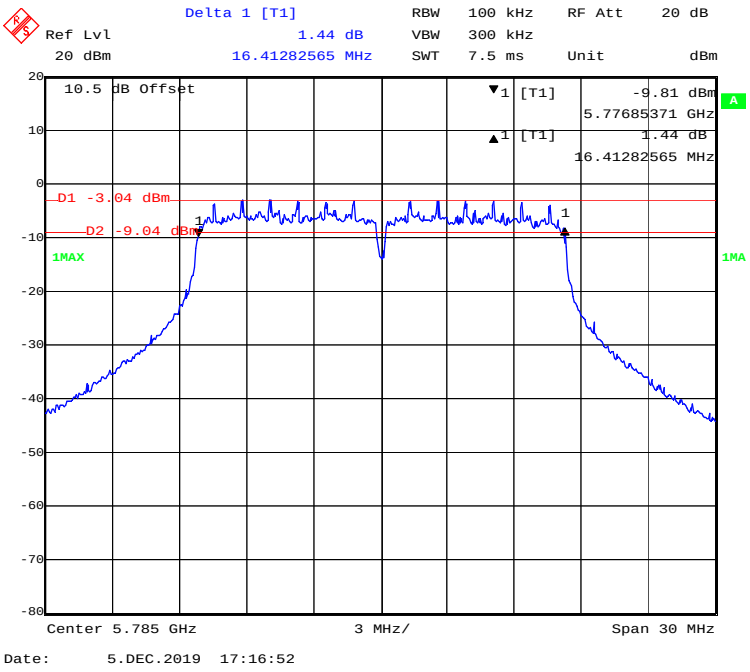


ANT 1:
6dB Bandwidth

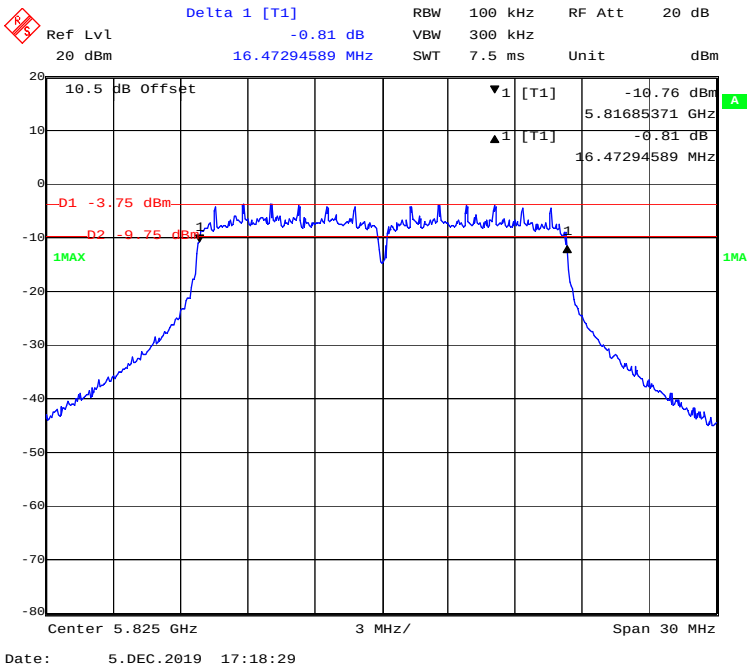
802.11a mode, 5745MHz



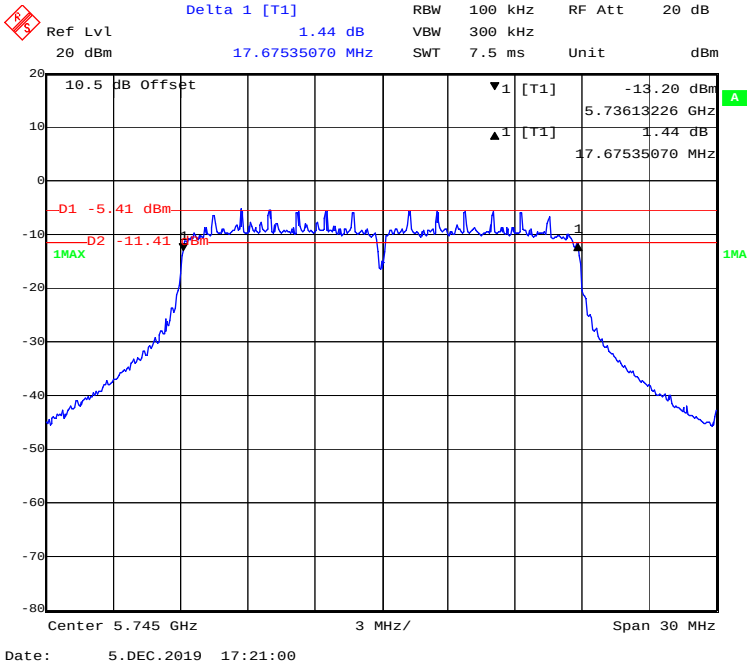
802.11a mode, 5785MHz



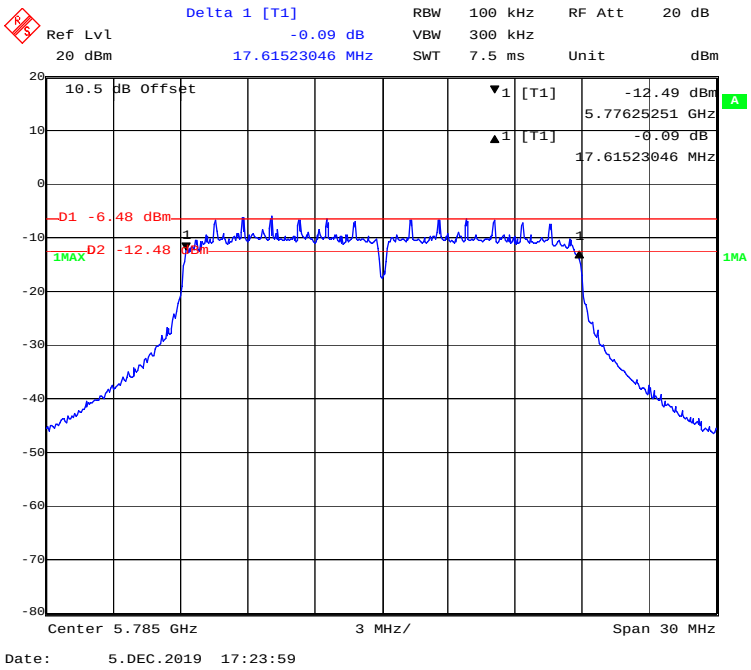
802.11a mode, 5825MHz



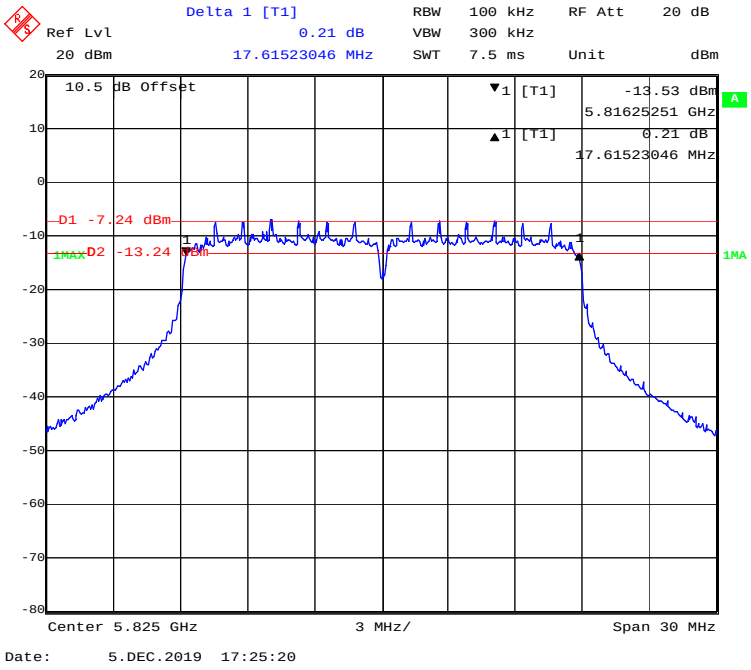
802.11n-HT20 mode, 5745MHz



802.11n-HT20 mode, 5785MHz

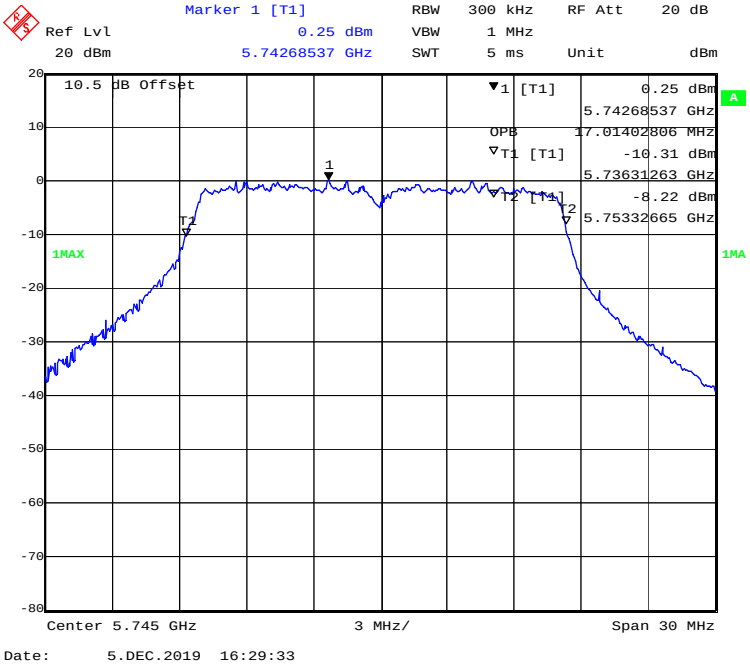


802.11n-HT20 mode, 5825MHz

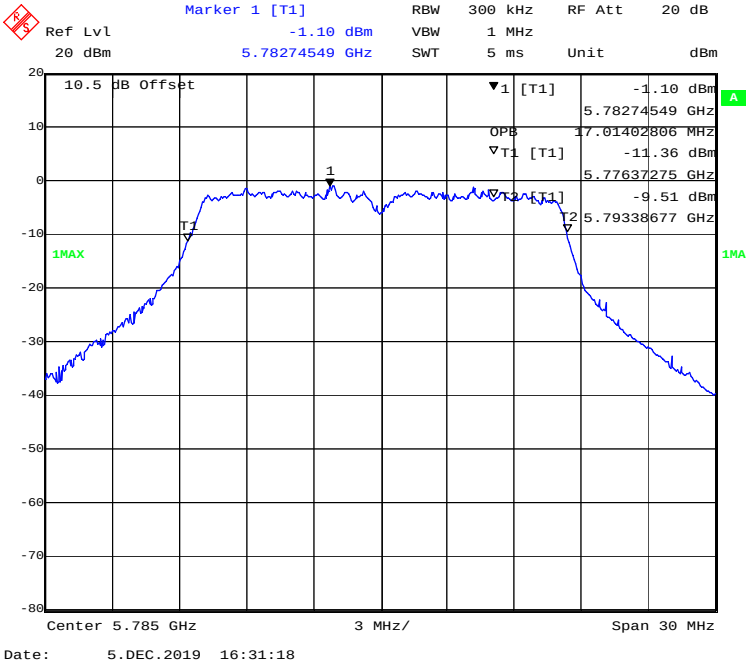


5725~5850MHz Band:
ANT 0:
99% Occupied Bandwidth

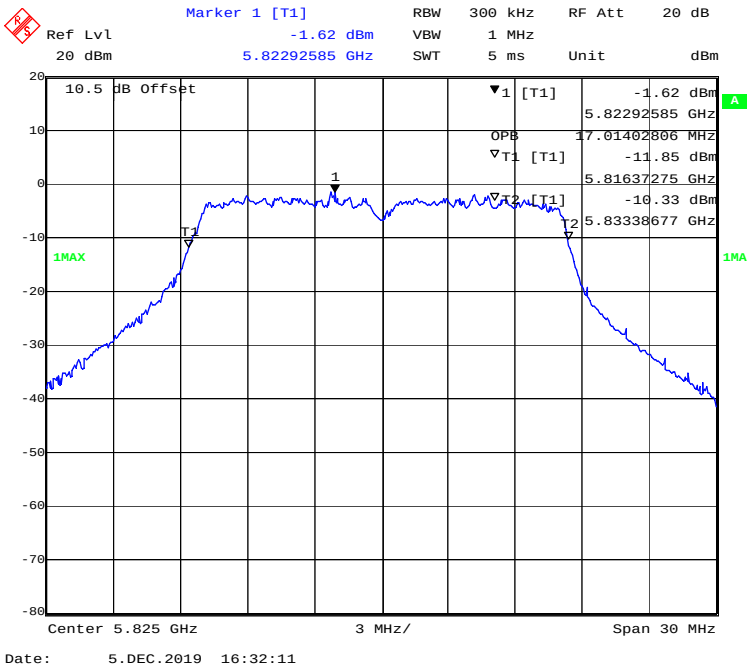
802.11a mode, 5745MHz



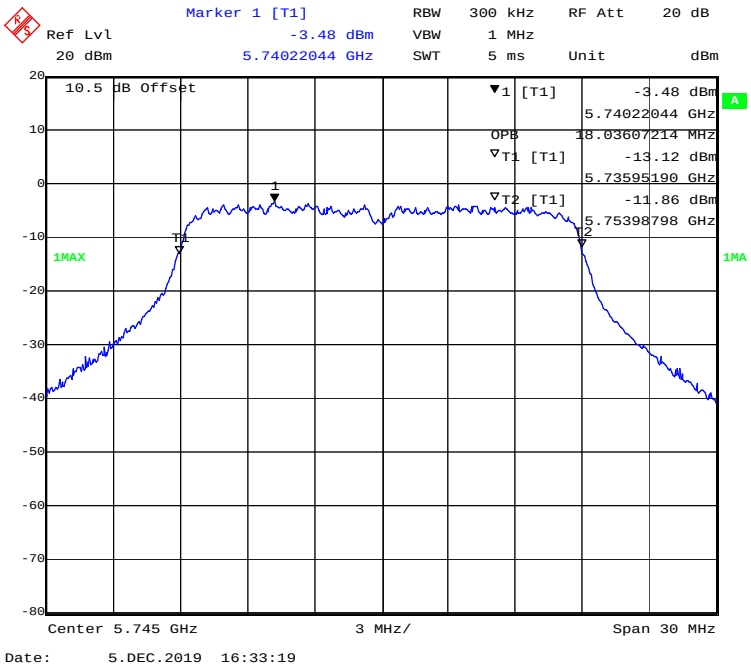
802.11a mode, 5785MHz



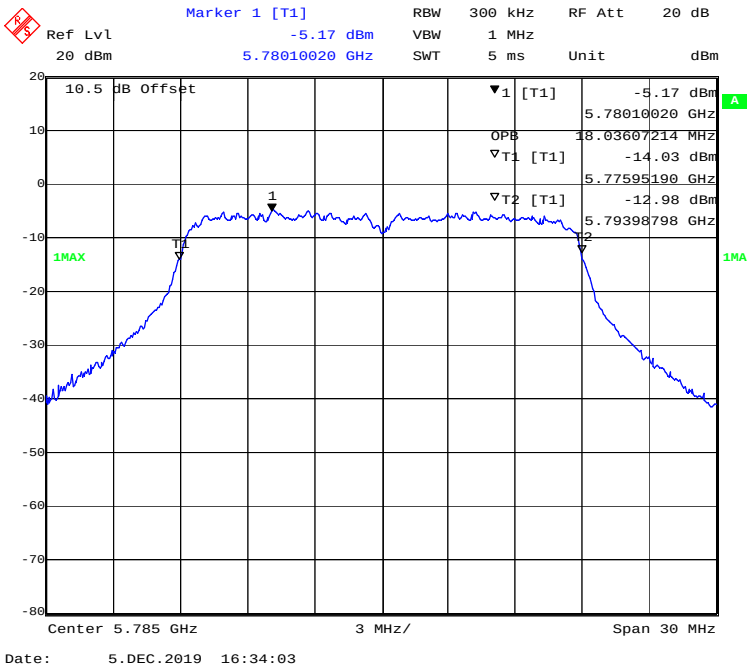
802.11a mode, 5825MHz



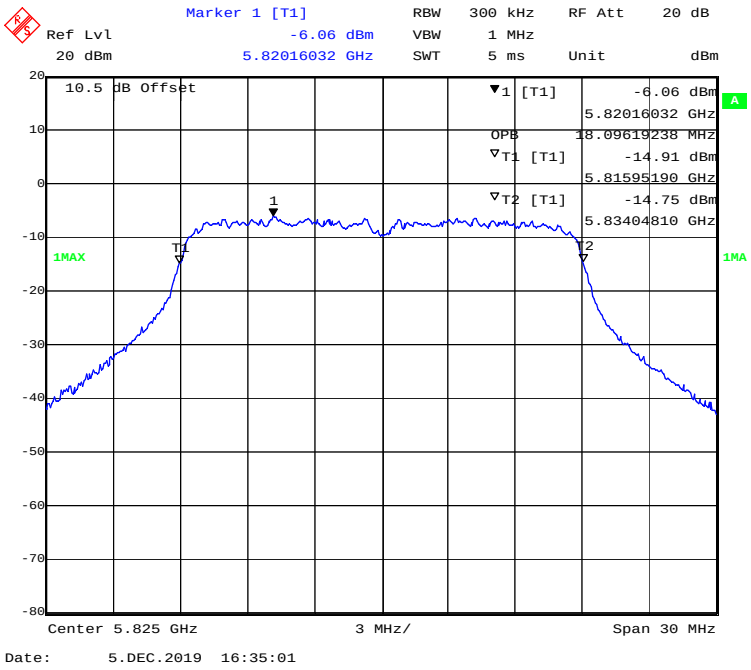
802.11n-HT20 mode, 5745MHz



802.11n-HT20 mode, 5785MHz

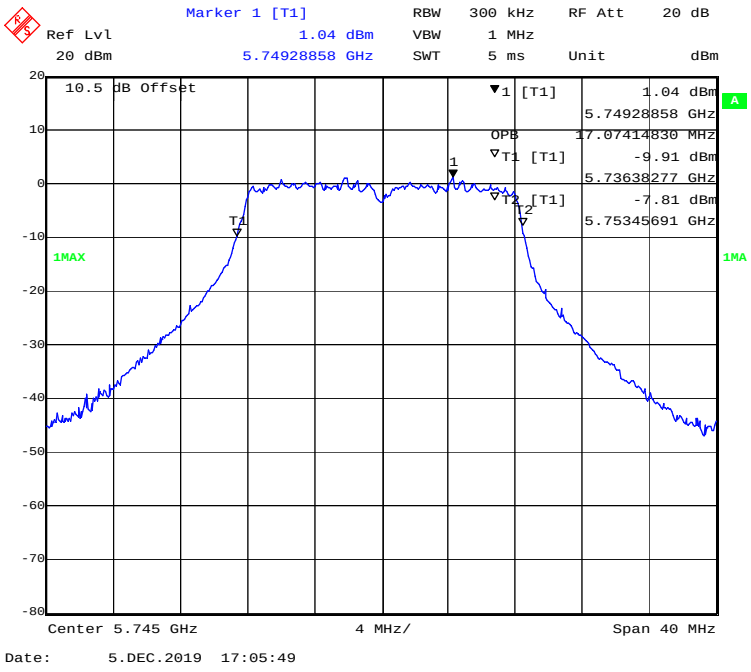


802.11n-HT20 mode, 5825MHz

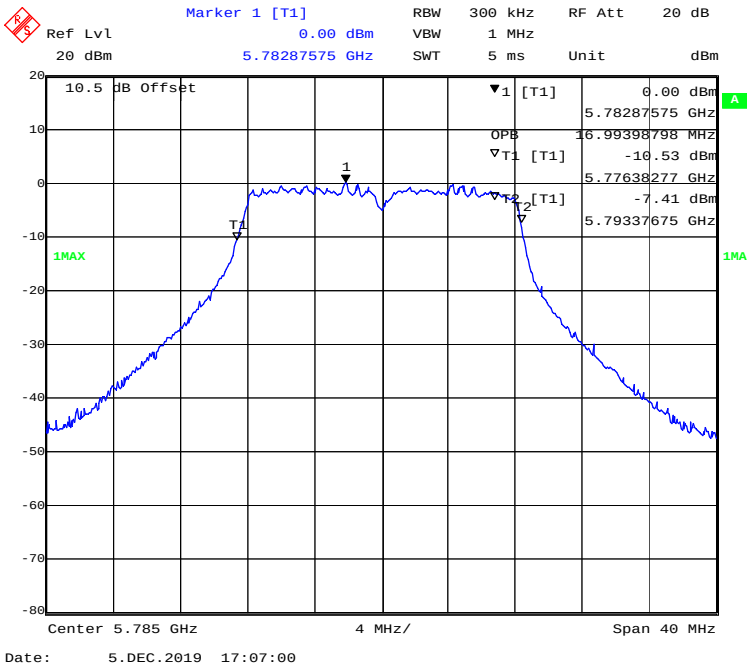


ANT 1:
99% Occupied Bandwidth

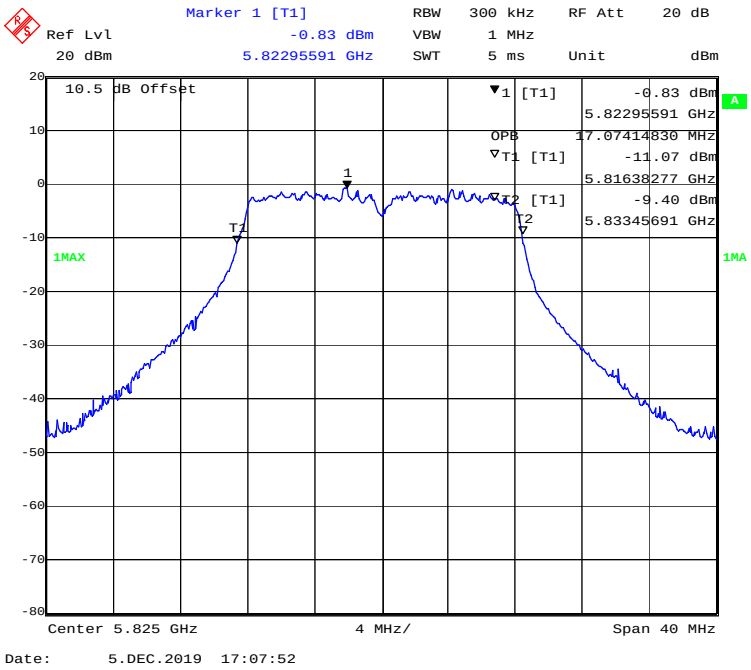
802.11a mode, 5745MHz



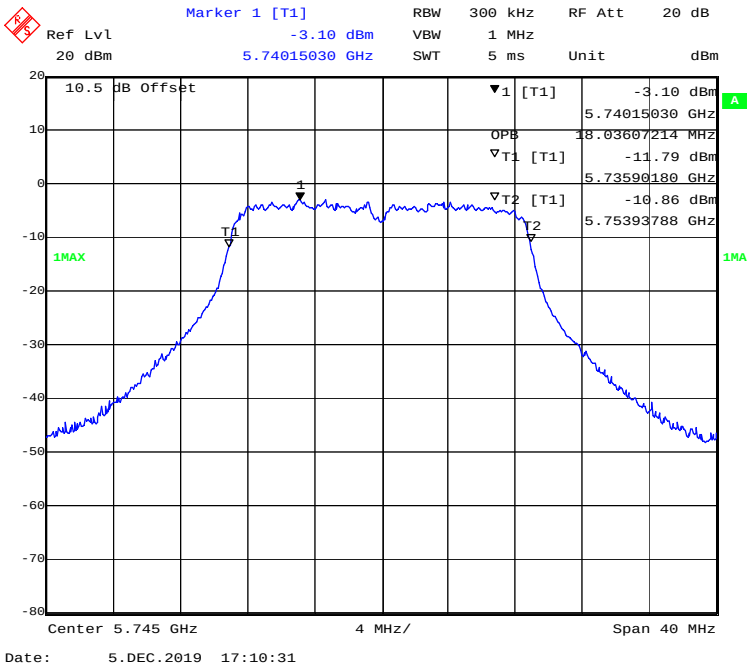
802.11a mode, 5785MHz



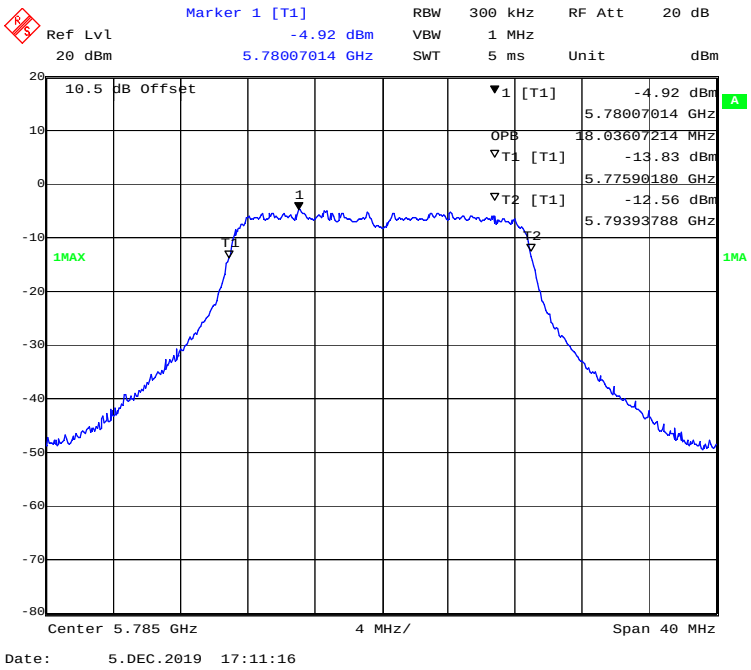
802.11a mode, 5825MHz



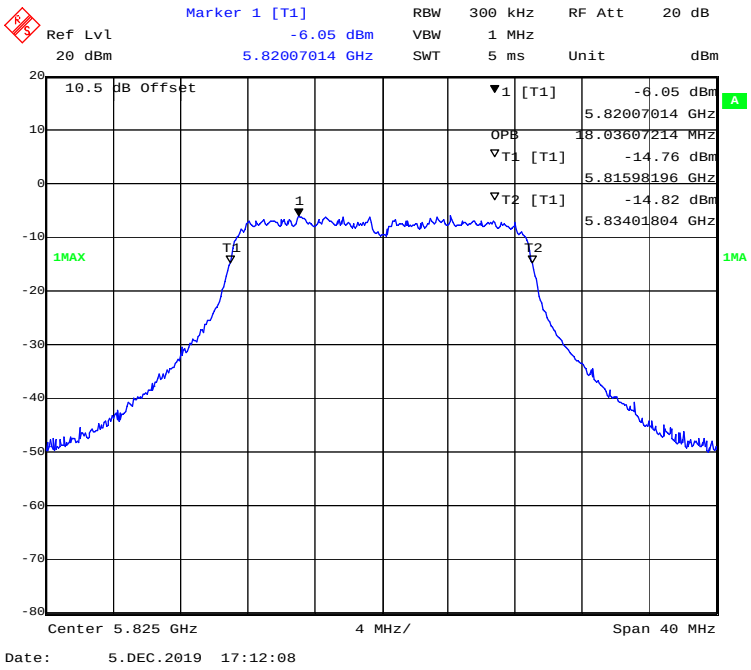
802.11n-HT20 mode, 5745MHz



802.11n-HT20 mode, 5785MHz



802.11n-HT20 mode, 5825MHz



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

Applicable Standard

According to §15.407(a)(1)

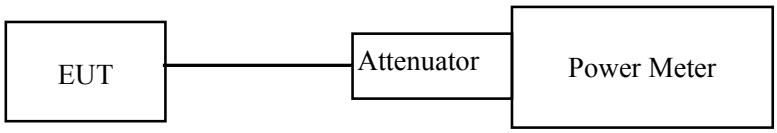
(ii) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 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:	20°C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Sam Ye on 2019-12-05.

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Average Conducted Output Power(dBm)			Limit	Result
				ANT 0	ANT 1	Total	(dBm)	
802.11a	5150~5250MHz	Low	5180	21.20	21.35	/	30	PASS
		Middle	5200	21.27	21.65	/	30	PASS
		High	5240	21.16	21.05	/	30	PASS
	5725~5850MHz	Low	5745	14.99	16.15	/	30	PASS
		Middle	5785	14.05	15.04	/	30	PASS
		High	5825	13.23	14.17	/	30	PASS
802.11n-HT20	5150~5250MHz	Low	5180	18.48	18.01	21.26	30	PASS
		Middle	5200	18.79	18.10	21.47	30	PASS
		High	5240	18.88	17.86	21.41	30	PASS
	5725~5850MHz	Low	5745	12.09	13.16	15.67	30	PASS
		Middle	5785	10.81	11.99	14.45	30	PASS
		High	5825	9.83	10.96	13.44	30	PASS

Note 1: The total output power=10Log10(10^(ANT 0/10)+10^(ANT 1/10))
Note 2: The maximum antenna gain is 1.5 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 = 1.5dBi < 6dBi, the limit is not need reduced.

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

Applicable Standard

According to §15.407(a)(1)

(ii) For an outdoor 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 Procedyres 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:	20°C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Sam Ye on 2019-12-05.

Test Mode: Transmitting

5150MHz-5250MHz:

Mode	Frequency (MHz)	PSD (dBm/MHz)			Limit (dBm/MHz)	Result
		ANT 0	ANT 1	Total		
802.11a	5180	3.77	3.91	/	17	PASS
	5200	4.06	3.87	/	17	PASS
	5240	3.63	3.24	/	17	PASS
802.11n20	5180	0.22	0.79	3.52	17	PASS
	5200	0.36	0.98	3.69	17	PASS
	5240	0.04	0.56	3.32	17	PASS

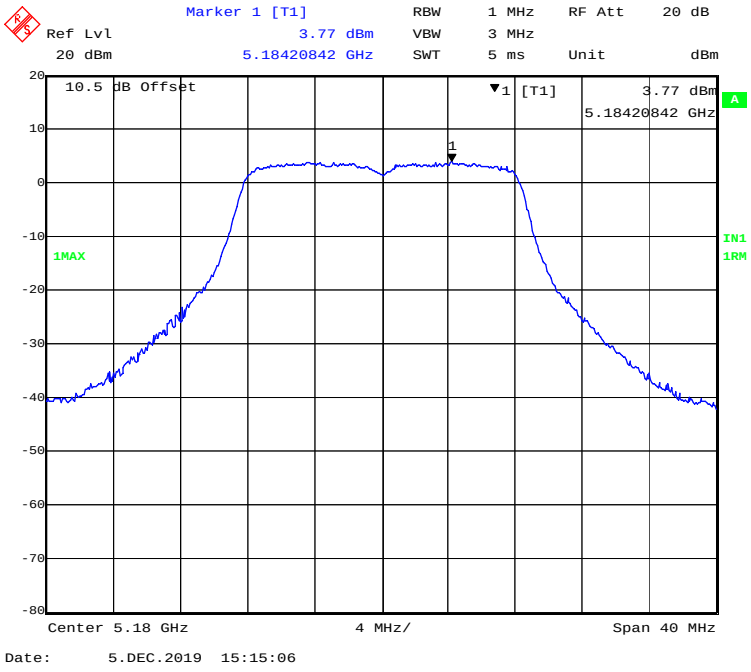
5725MHz-5850MHz:

Mode	Frequency (MHz)	PSD (dBm/500kHz)			Limit (dBm/500kHz)	Result
		ANT 0	ANT 1	Total		
802.11a	5745	-2.55	-2.80	/	30	PASS
	5785	-4.52	-3.27	/	30	PASS
	5825	-5.62	-4.07	/	30	PASS
802.11n20	5745	-6.33	-5.49	-2.92	30	PASS
	5785	-7.50	-6.81	-4.09	30	PASS
	5825	-8.50	-8.12	-5.38	30	PASS

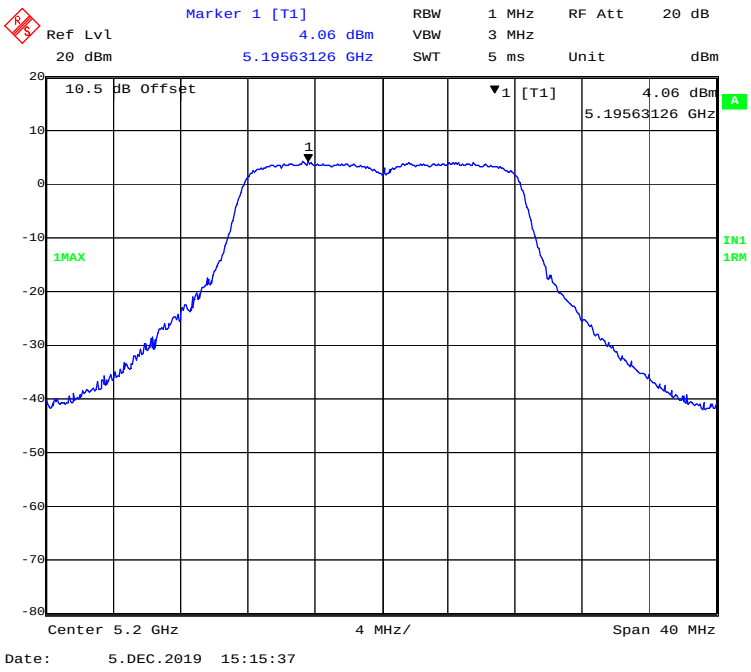
Note1: The total PSD=10Log10(10^(ANT 0/10)+10^(ANT 1/10))
Note2: The maximum antenna gain is 1.5 dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD)measurements on the devices:
Array Gain = 10 log(N_{ANT}/N_{SS}) dB.
So: Directional gain = GANT + Array Gain = 1.5+10*log(2/1) =4.51 dBi< 6dBi.The limit is not need reduced.

5150MHz-5250MHz Band-ANT 0 :

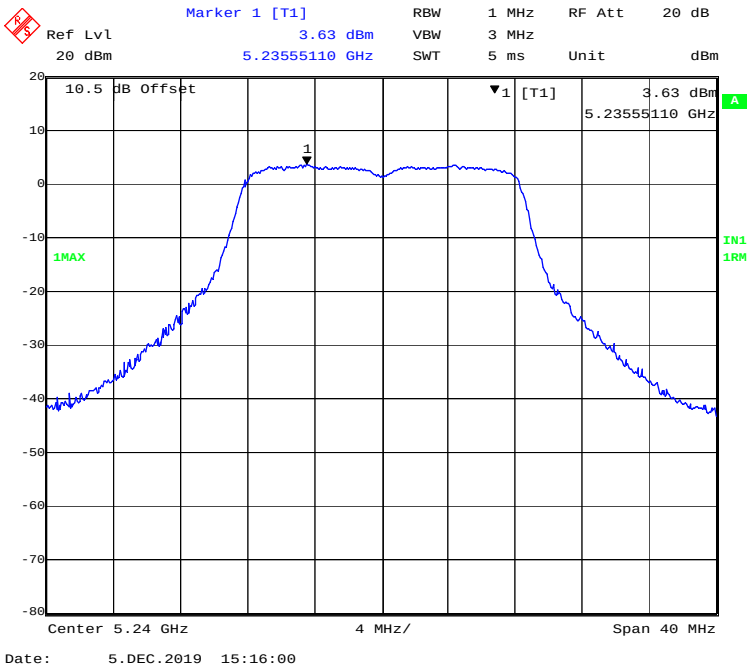
802.11a mode, Power spectral density-5180MHz



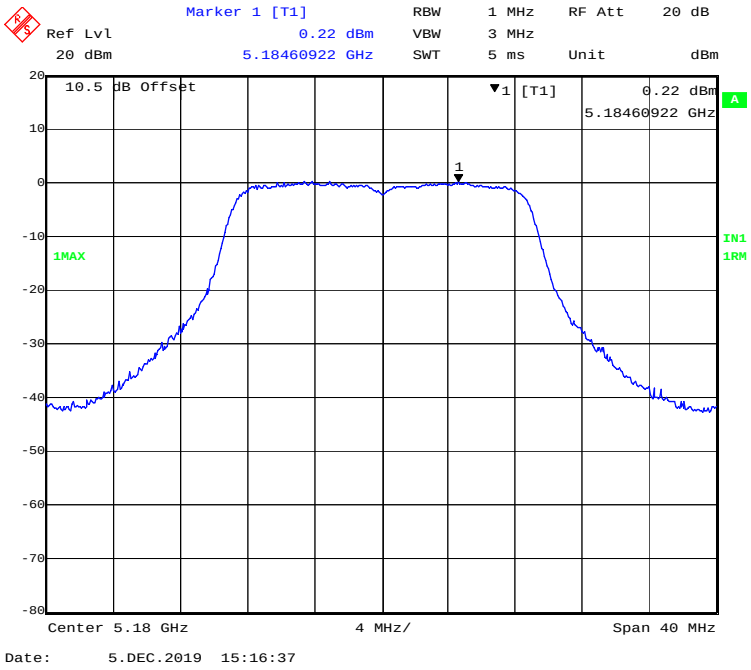
802.11a mode, Power spectral density-5200MHz



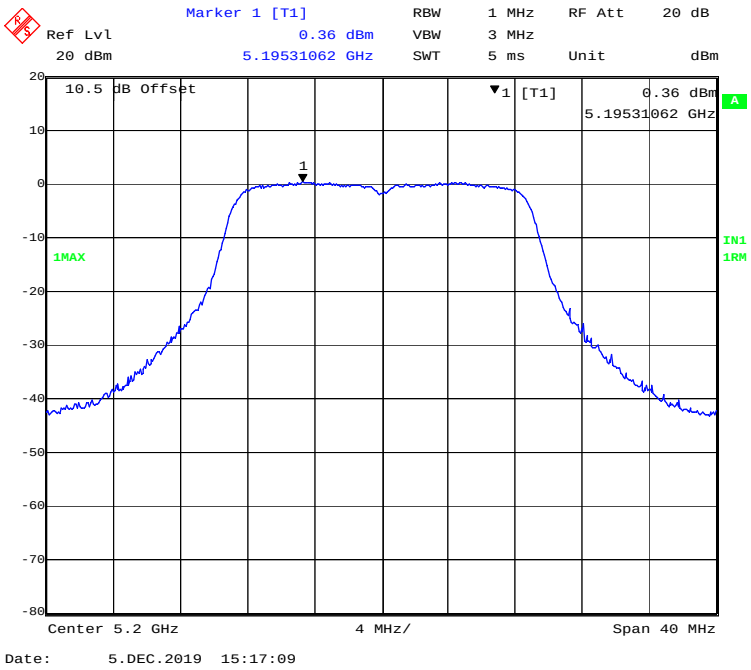
802.11a mode, Power spectral density-5240MHz



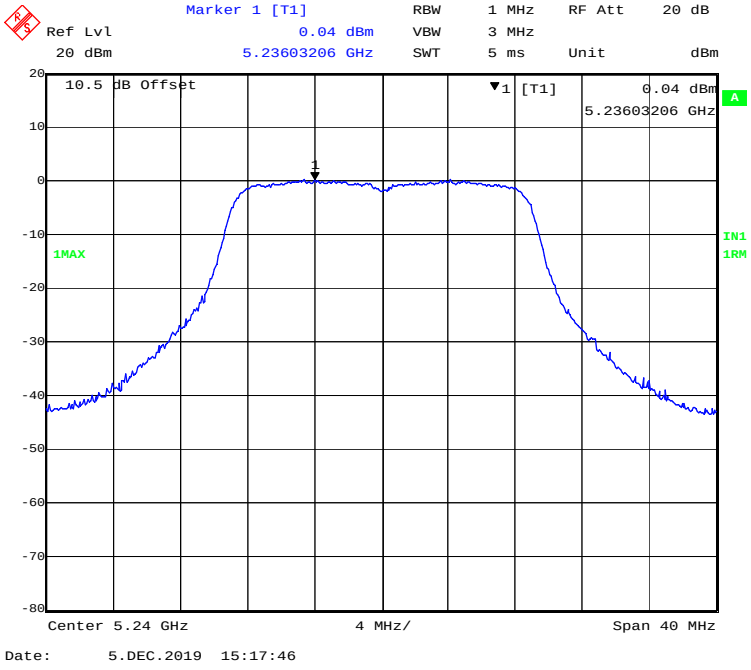
802.11n-HT20 mode, Power spectral density-5180MHz



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

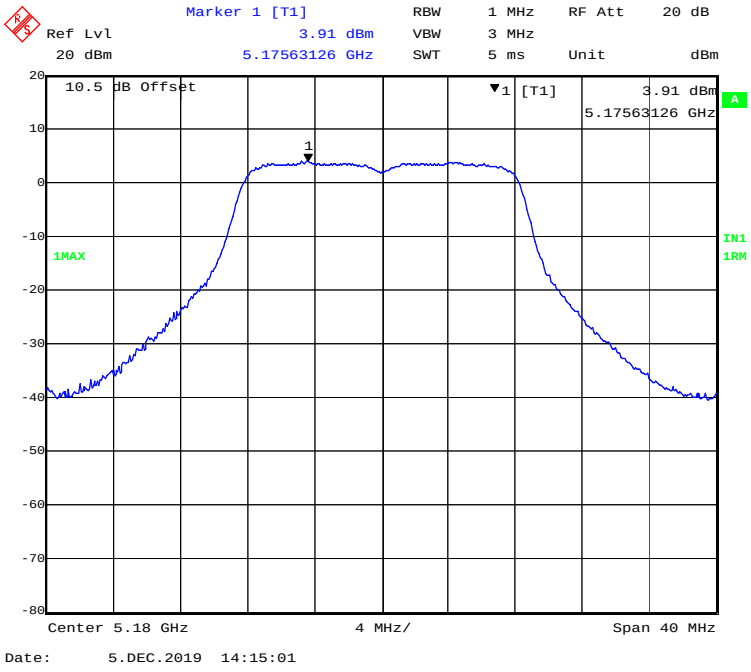


802.11n-HT20 mode, Power spectral density-5240MHz

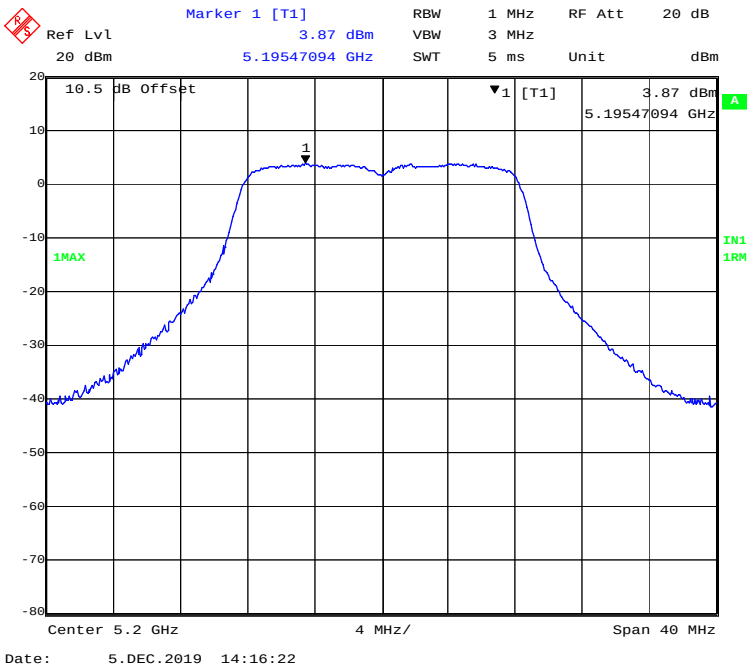


5150MHz-5250MHz Band-ANT 1 :

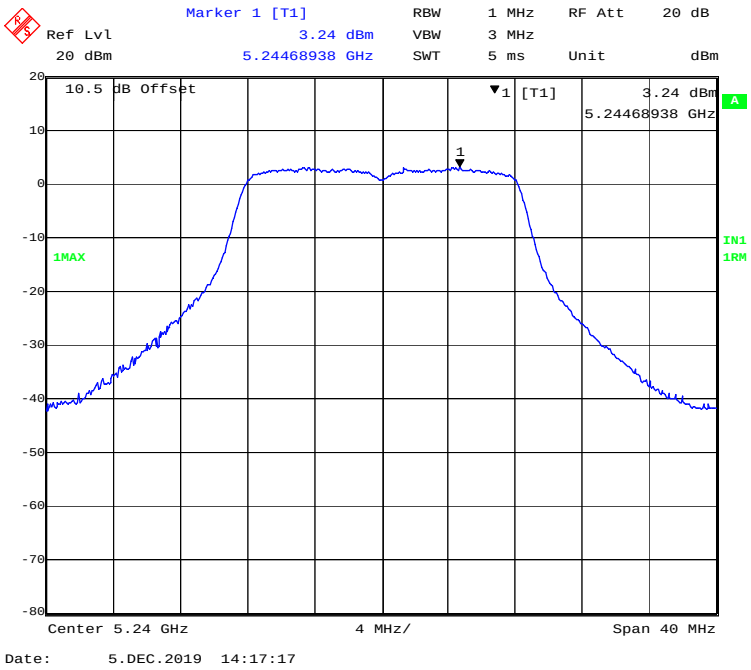
802.11a mode, Power spectral density-5180MHz



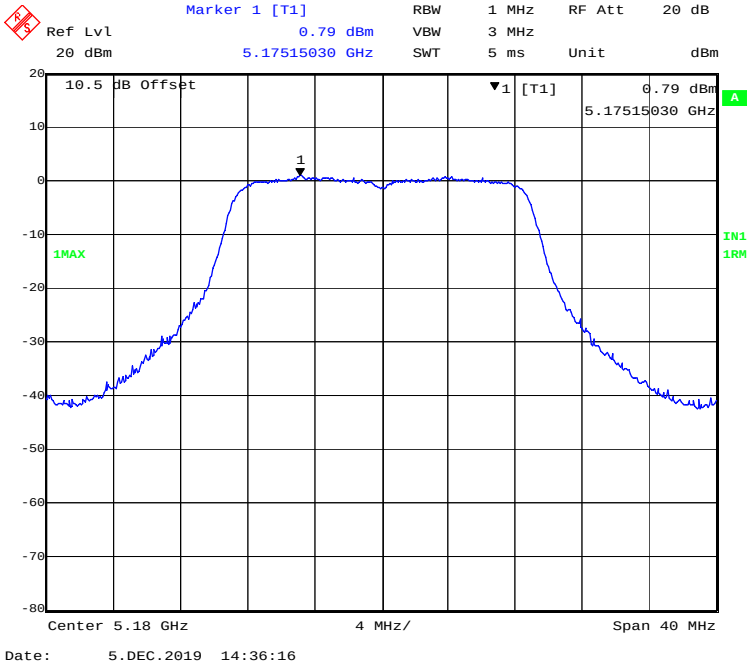
802.11a mode, Power spectral density-5200MHz



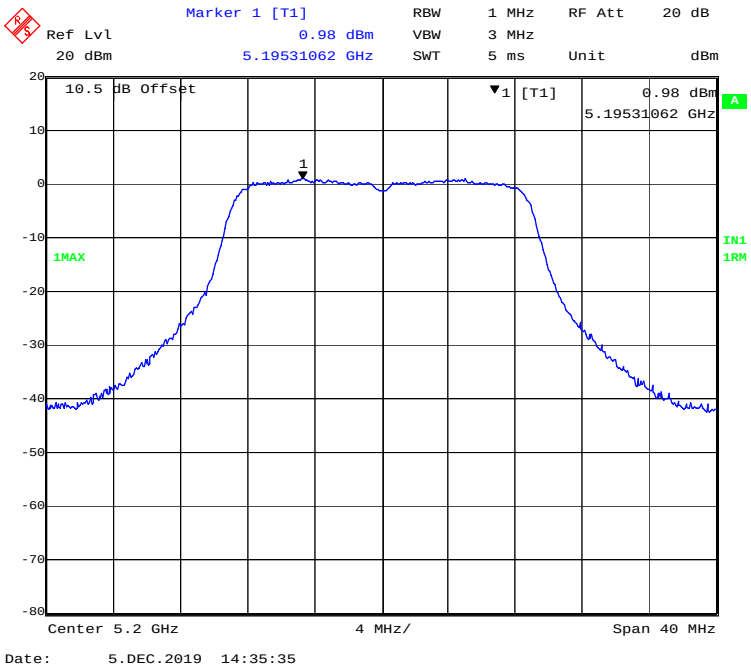
802.11a mode, Power spectral density-5240MHz



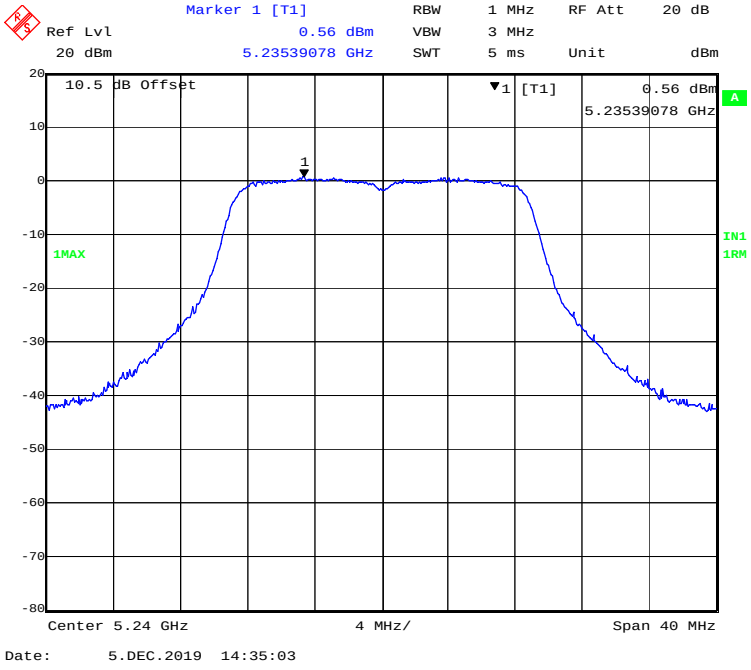
802.11n-HT20 mode, Power spectral density-5180MHz



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

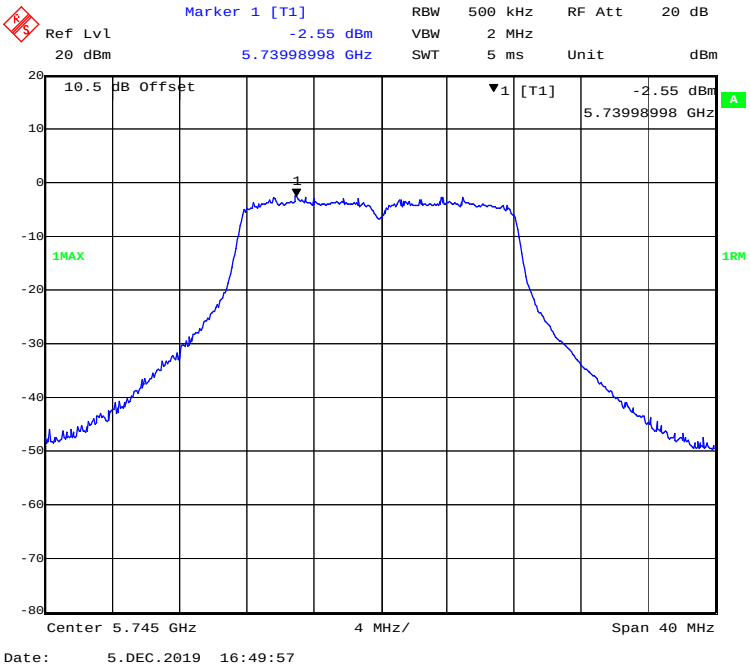


802.11n-HT20 mode, Power spectral density-5240MHz

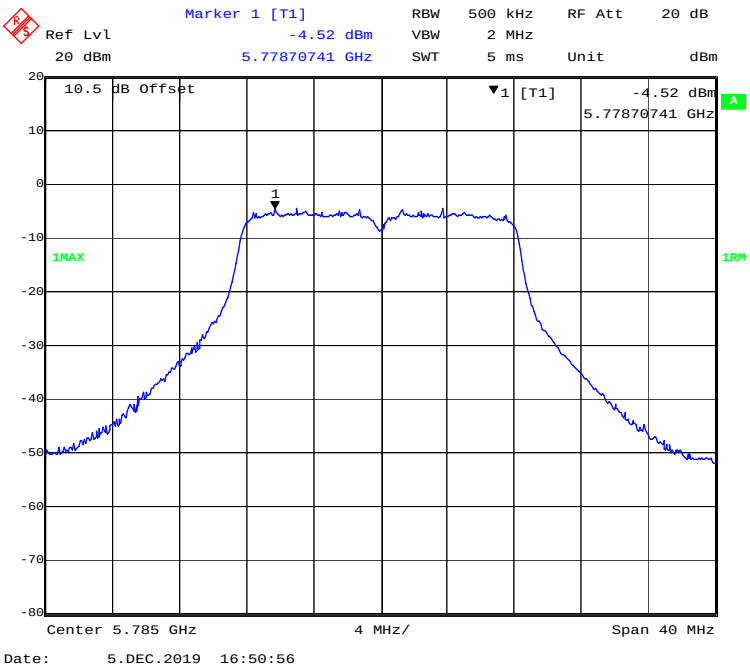


55725MHz-5850MHz Band-ANT 0 :

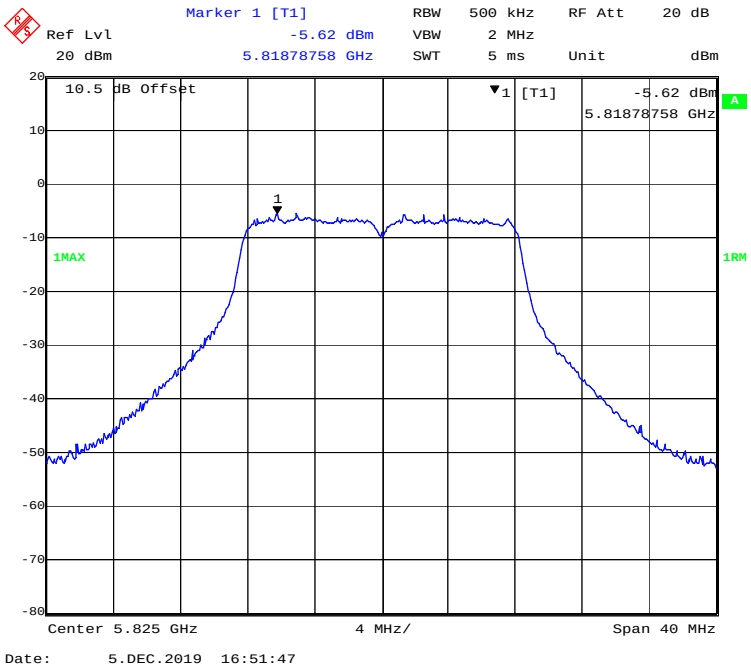
802.11a mode, Power spectral density-5745MHz



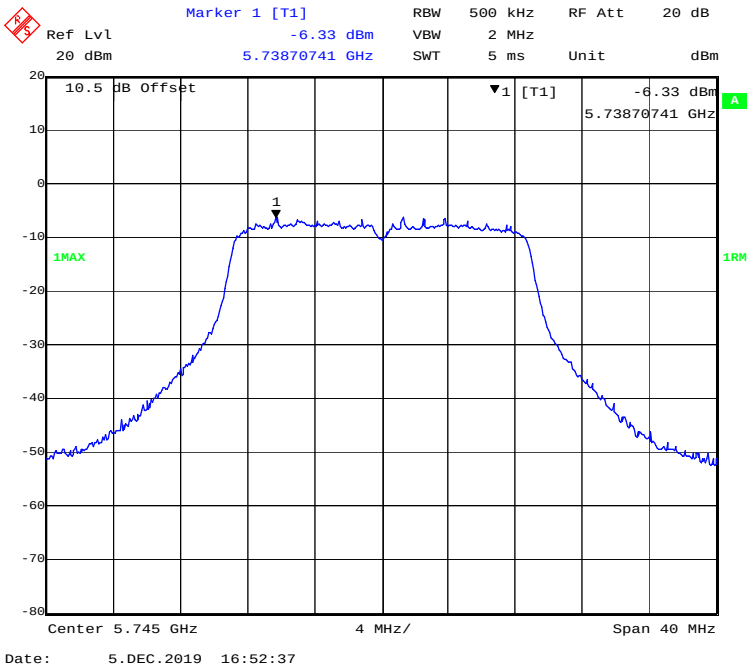
802.11a mode, Power spectral density-5785MHz



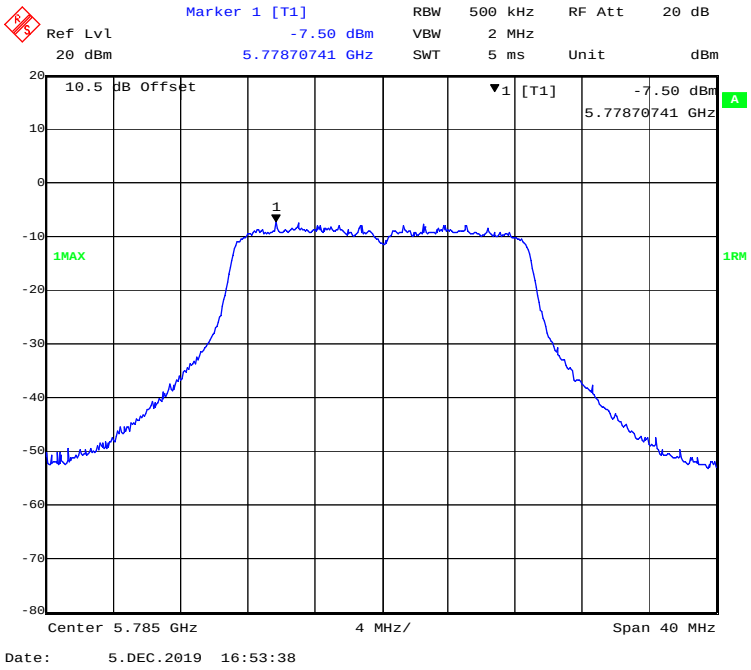
802.11a mode, Power spectral density-5825MHz



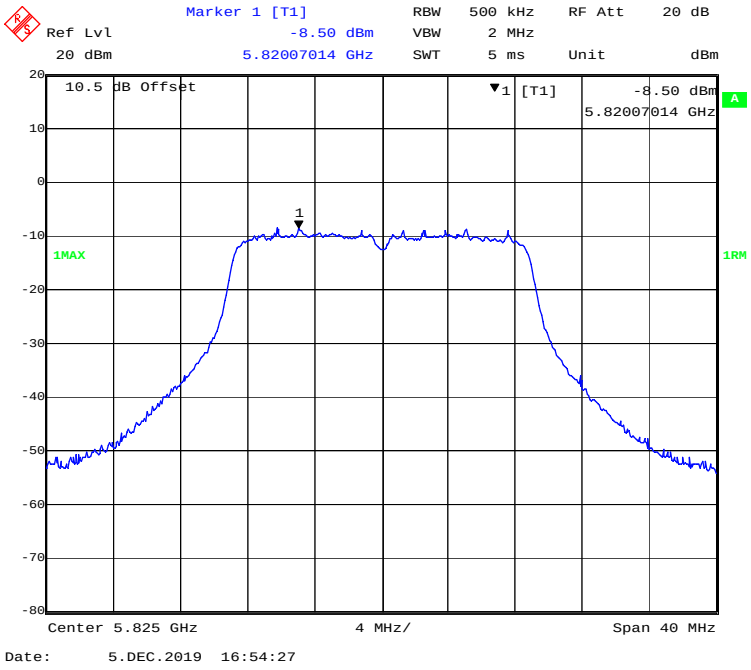
802.11n-HT20 mode, Power spectral density-5745MHz



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

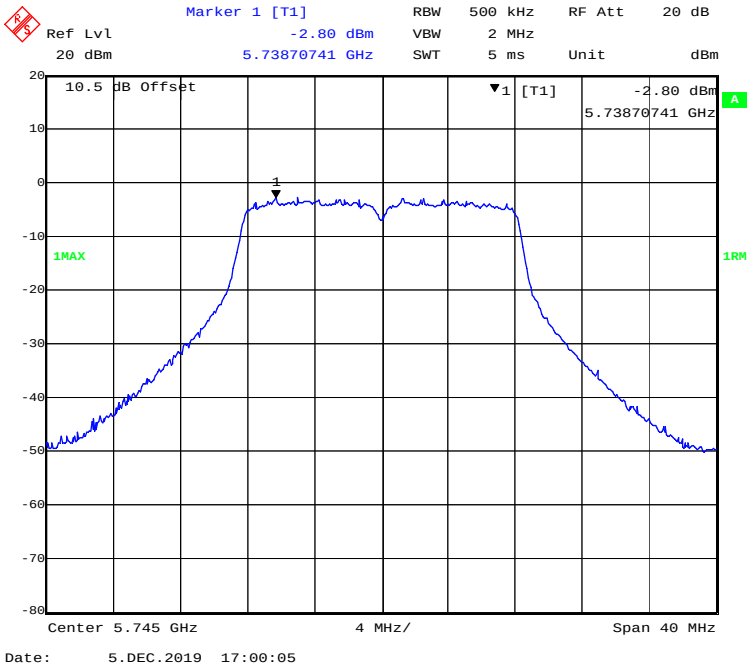


802.11n-HT20 mode, Power spectral density-5825MHz

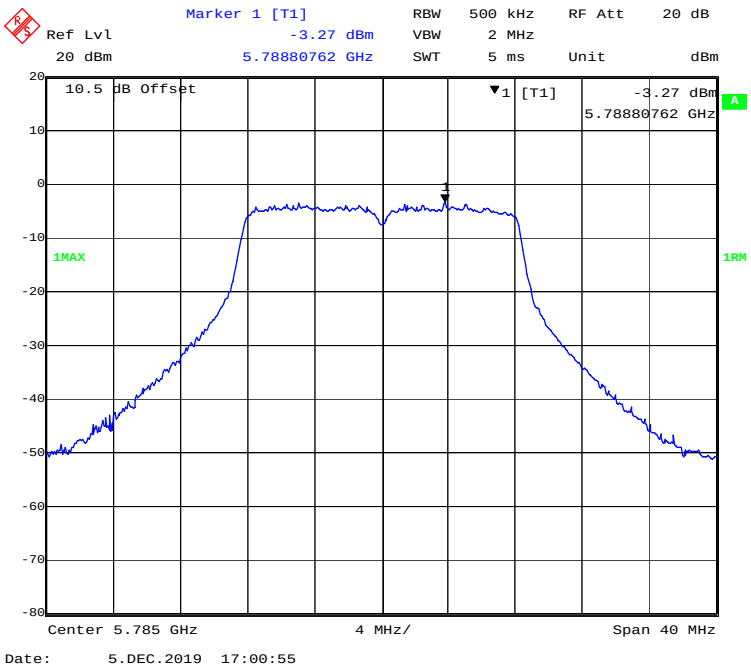


55725MHz-5850MHz Band-ANT 1 :

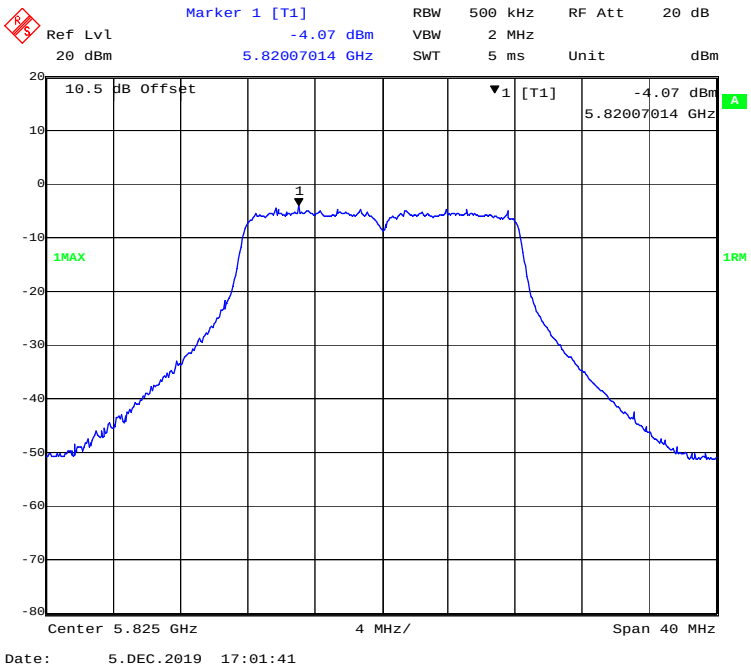
802.11a mode, Power spectral density-5745MHz



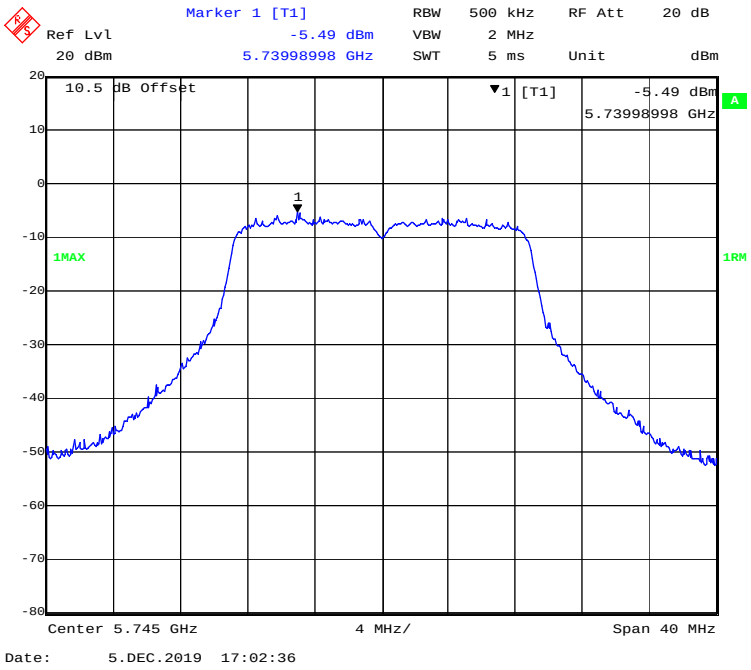
802.11a mode, Power spectral density-5785MHz



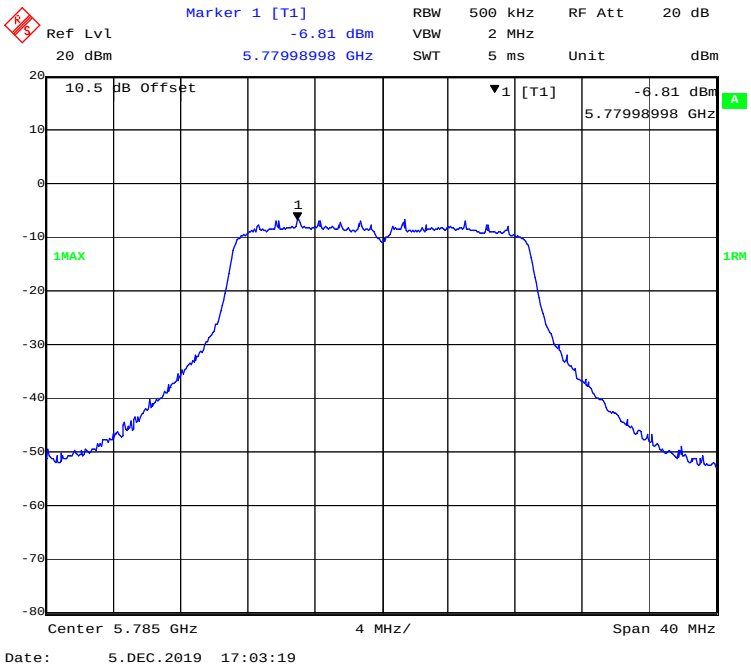
802.11a mode, Power spectral density-5825MHz



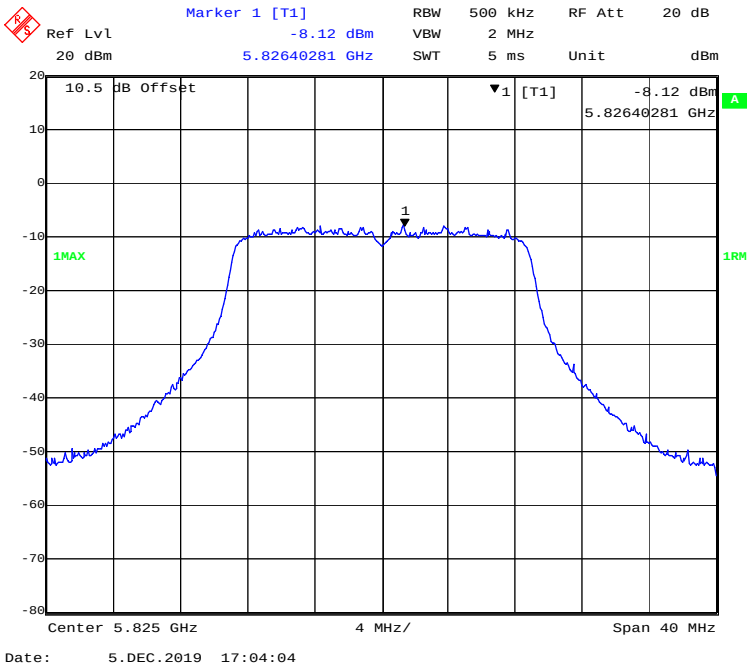
802.11n-HT20 mode, Power spectral density-5745MHz



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



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



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