TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 15.407

TEST REPORT

For

SWIT Electronics Co., Ltd.

10 Heng Tong Road, Xin'gang Economic and Technological Development Zone, Nanjing 210038
China

FCC ID: 2AFFC-FLOW10KRX

Report Type: Original Report	**Product Type:** 10000ft/3km Wireless HD
Test Engineer:	Stone Zhang
Report Number:	RSHA200616001-00A
Report Date:	2020-07-29
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	SWIT Electronics Co., Ltd.
Tested Model	FLOW10K Panel Rx
Series Model	FLOW6500 Panel Rx, S-6230P Rx, S-6220P Rx
Product Type	10000ft/3km Wireless HD
Operating Frequency	5182.5~5222.5 MHz, 5762.5~5822.5 MHz
Power Supply	DC 7~34V
Modulation Type	OFDM
Antenna Type	Directional Antenna
Maximum Antenna Gain	14.0 dBi

Note: The model difference was explained in the attached declaration letter.

**All measurement and test data in this report was gathered from production sample serial number: 20200616001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-06-16)*

Objective

This type approval report is prepared on behalf of *SWIT Electronics 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)

Part of system grant with FCC ID: 2AFFCS-FLOW2000TX.

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%

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.

The channel list is as below, Channel 00, 01, 02, 03, 04, 06 were tested.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	5182.5	04	5782.5
01	5202.5	05	5802.5
02	5222.5	06	5822.5
03	5762.5	/	/

EUT Exercise Software

RF test tool: ARSiriusPCTool_V1.0.1.exe

Pre-scan with all the data rates, and the worst case was performed as below:

5182.5-5222.5 MHz

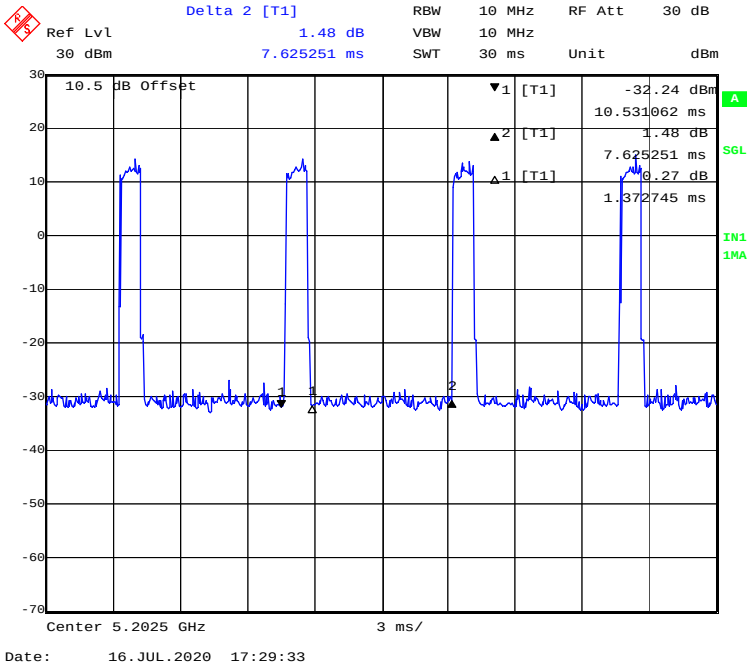
Frequency (MHz)	Data Rate	Power Lever Setting
5182.5	MCS 0	7
5202.5		7
5222.5		7

5762.5-5822.5 MHz

Frequency (MHz)	Data Rate	Power Lever Setting
5762.5	MCS 0	7
5782.5		7
5822.5		7

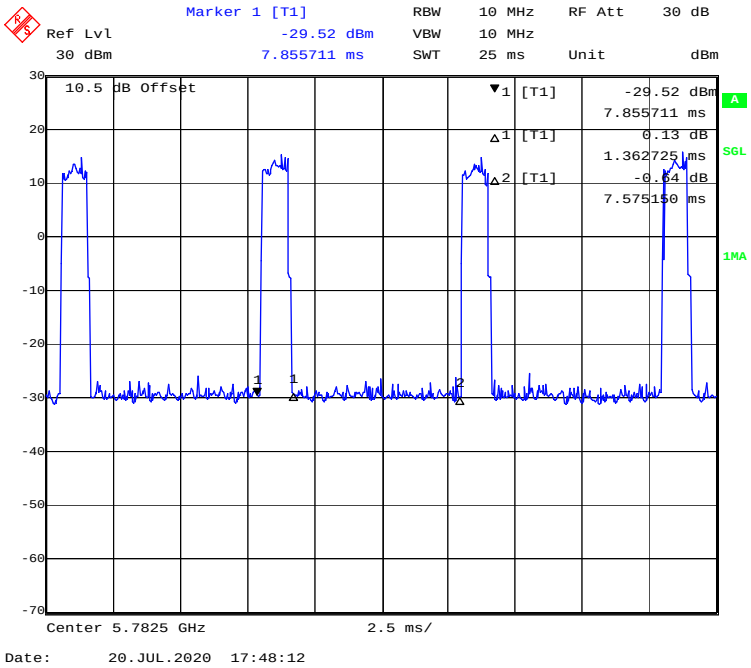
Duty Cycle
5182.5-5222.5 MHz:

Frequency: 5202.5 MHz



5762.5-5822.5 MHz:

Frequency: 5782.5 MHz



Frequency Range (MHz)	Duty Cycle (%)	T (ms)	1/T (kHz)	10log(1/x)
5182.5-5222.5	18.01	1.373	0.728	7.45
5762.5-5822.5	17.99	1.363	0.734	7.45

Note: "x" means duty cycle.

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

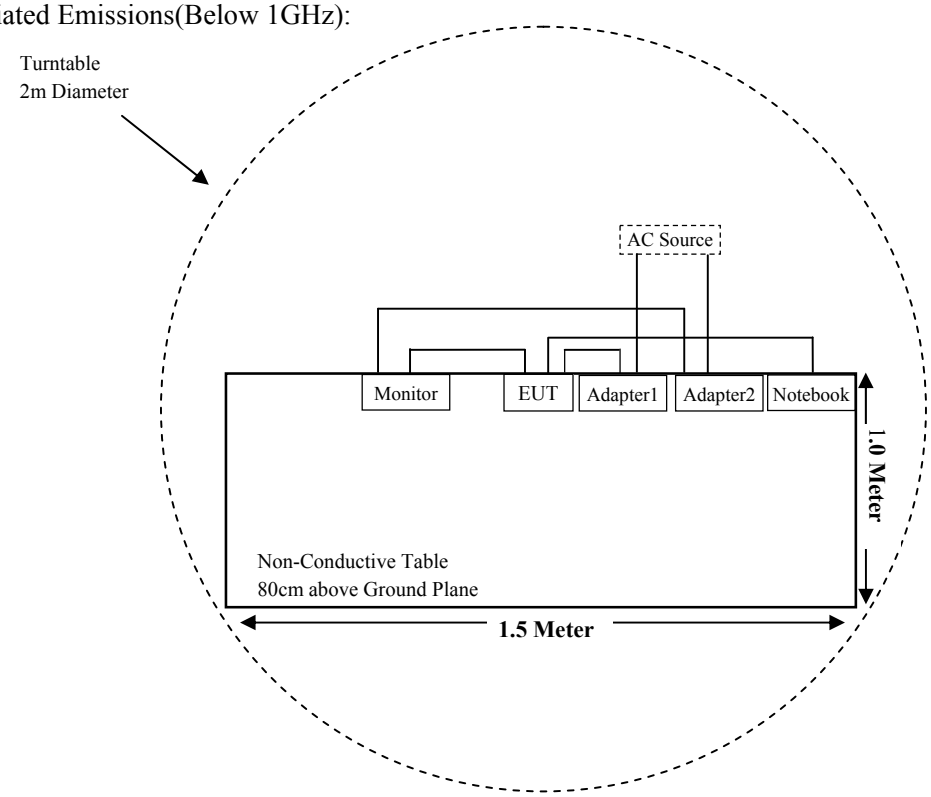
Manufacturer	Description	Model	Serial Number
SWIT	Adapter1	A241-1202000I	/
SWIT	Monitor	/	/
SWIT	Adapter2	GP304U-120-200	/
DELL	Notebook	GX620	D65874152

External I/O Cable

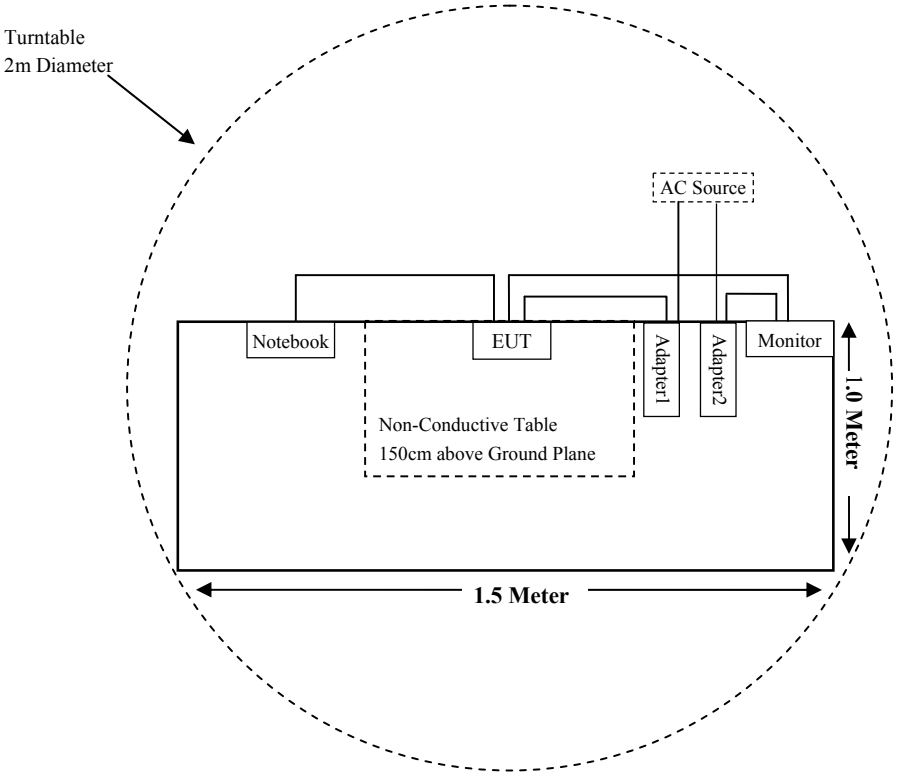
Cable Description	Length (m)	From/Port	To
Power Cable	1.5	EUT	Adapter1
Power Cable	1.0	Adapter1	AC Source
SDI Cable	1.2	EUT	Monitor
Power Cable	1.0	Monitor	Adapter2
Power Cable	1.0	Adapter2	AC Source
USB Cable	1.0	EUT	Notebook

Block Diagram of Test Setup

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) &§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 Instrunent	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Rohde & Schwarz	Auto Test Software	EMC32	100361	N/A	N/A
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	2020-04-01	2021-03-31
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2019-08-05	2020-08-04
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
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	2019-08-05	2020-08-04
MICRO-TRONICS	Band Reject Filter	BRC50705	G085	2019-08-05	2020-08-04
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
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	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	2019-08-15	2020-08-14
SWIT	RF Cable	SWIT C01	C01	Each Time	/
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-08-05	2020-08-04
Rohde & Schwarz	LISN	ENV216	3560655016	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	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).

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

Applicable Standard

According to subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure				
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/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 (worst case):

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)			
5182.5~5222.5	14.0	25.12	6.00	3.98	20	0.0199	1.00
5762.5~5822.5	14.0	25.12	6.50	4.47	20	0.0223	1.00

Note: The Tune-up conducted 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 a Directional antenna which the antenna gain is 14.0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

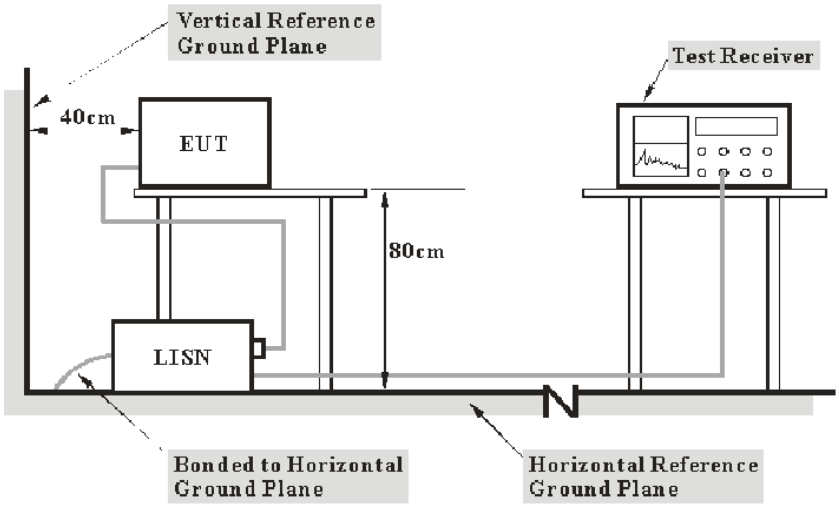
Result: Compliant.

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 adapter was connected to the LISN.

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

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

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:

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 7dB 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

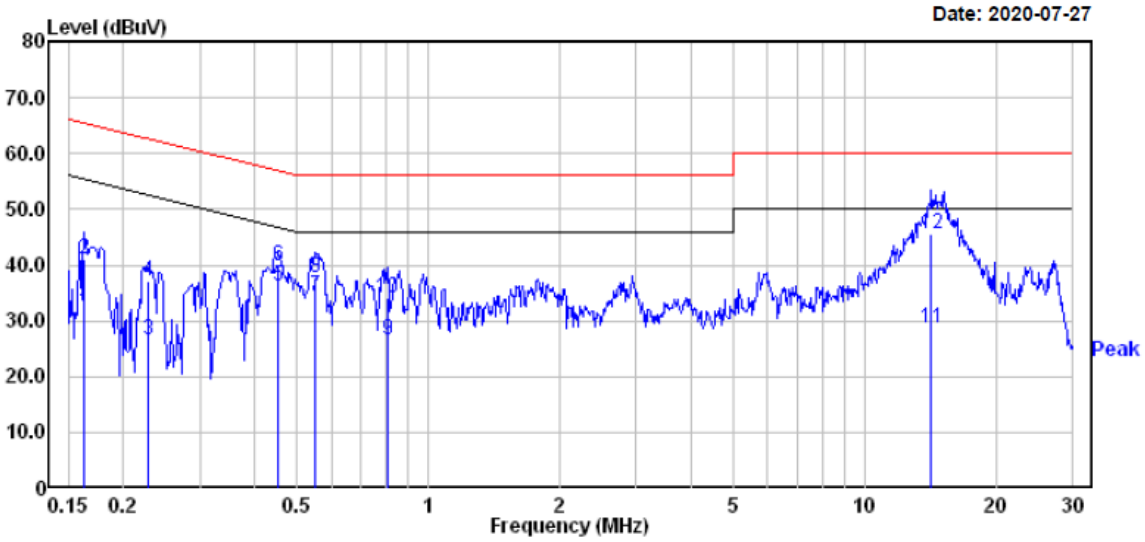
Environmental Conditions

Temperature:	24.7 ℃
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

The testing was performed by Stone Zhang on 2020-07-27.

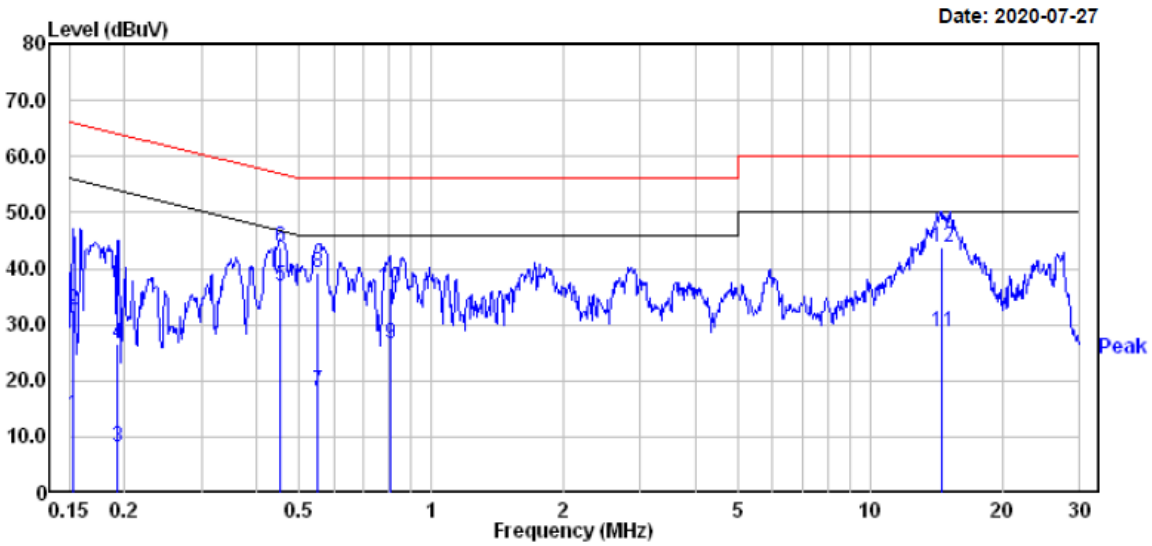
EUT operation mode: Transmitting in low channel of 5182.5-5222.5 MHz (worst case)

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.163	11.90	19.83	31.73	55.30	-23.57	Average
2	0.163	21.30	19.83	41.13	65.30	-24.17	QP
3	0.228	6.70	19.82	26.52	52.52	-26.00	Average
4	0.228	17.40	19.82	37.22	62.52	-25.30	QP
5	0.454	16.50	19.75	36.25	46.80	-10.55	Average
6	0.454	20.00	19.75	39.75	56.80	-17.05	QP
7	0.552	14.80	19.75	34.55	46.00	-11.45	Average
8	0.552	18.00	19.75	37.75	56.00	-18.25	QP
9	0.804	6.90	19.70	26.60	46.00	-19.40	Average
10	0.804	14.50	19.70	34.20	56.00	-21.80	QP
11	14.213	9.00	19.62	28.62	50.00	-21.38	Average
12	14.213	25.90	19.62	45.52	60.00	-14.48	QP

AC 120V/60 Hz, Neutral

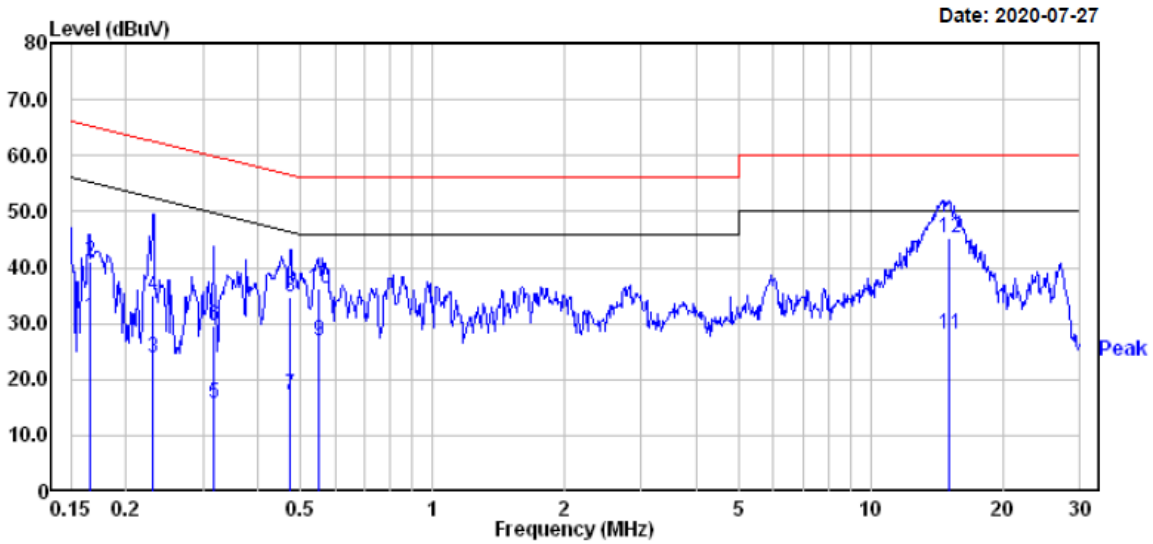


	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.153	-5.90	19.82	13.92	55.82	-41.90	Average
2	0.153	12.90	19.82	32.72	65.82	-33.10	QP
3	0.193	-11.80	19.82	8.02	53.89	-45.87	Average
4	0.193	6.80	19.82	26.62	63.89	-37.27	QP
5	0.454	17.20	19.75	36.95	46.80	-9.85	Average
6	0.454	24.00	19.75	43.75	56.80	-13.05	QP
7	0.552	-1.50	19.75	18.25	46.00	-27.75	Average
8	0.552	19.40	19.75	39.15	56.00	-16.85	QP
9	0.804	6.90	19.70	26.60	46.00	-19.40	Average
10	0.804	16.90	19.70	36.60	56.00	-19.40	QP
11	14.594	8.99	19.63	28.62	50.00	-21.38	Average
12	14.594	24.09	19.63	43.72	60.00	-16.28	QP

Note:
1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
2) Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

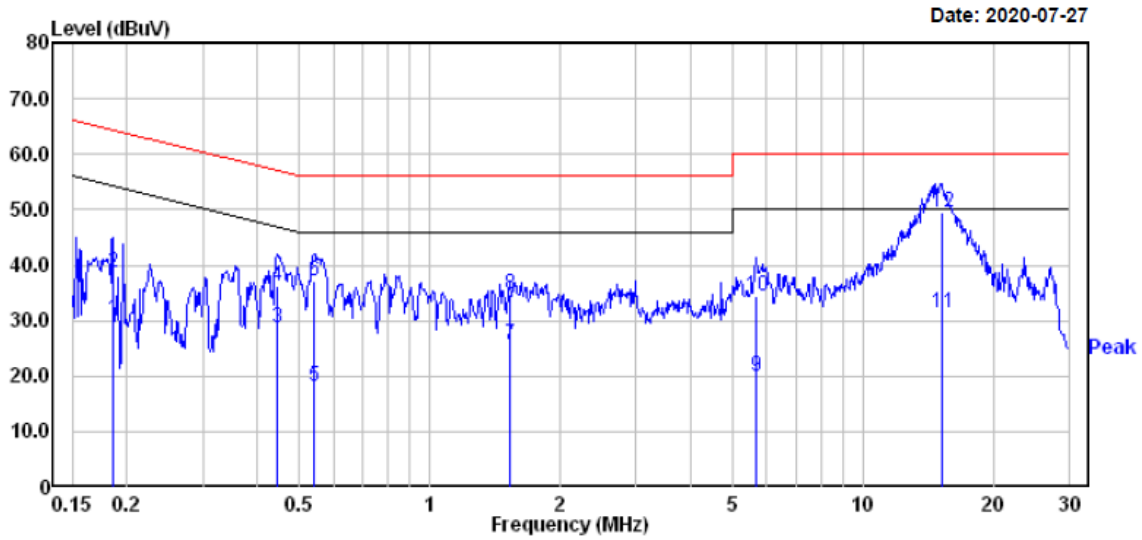
EUT operation mode: Transmitting in high channel of 5762.5-5822.5 MHz (worst case)

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.165	11.20	19.83	31.03	55.21	-24.18	Average
2	0.165	21.10	19.83	40.93	65.21	-24.28	QP
3	0.230	3.90	19.82	23.72	52.44	-28.72	Average
4	0.230	15.20	19.82	35.02	62.44	-27.42	QP
5	0.318	-4.10	19.82	15.72	49.75	-34.03	Average
6	0.318	9.90	19.82	29.72	59.75	-30.03	QP
7	0.474	-2.60	19.76	17.16	46.45	-29.29	Average
8	0.474	15.10	19.76	34.86	56.45	-21.59	QP
9	0.552	7.00	19.75	26.75	46.00	-19.25	Average
10	0.552	16.40	19.75	36.15	56.00	-19.85	QP
11	15.066	8.40	19.63	28.03	50.00	-21.97	Average
12	15.066	25.60	19.63	45.23	60.00	-14.77	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.185	10.31	19.82	30.13	54.24	-24.11	Average
2	0.185	18.91	19.82	38.73	64.24	-25.51	QP
3	0.444	9.00	19.75	28.75	46.98	-18.23	Average
4	0.444	16.50	19.75	36.25	56.98	-20.73	QP
5	0.541	-1.59	19.75	18.16	46.00	-27.84	Average
6	0.541	17.41	19.75	37.16	56.00	-18.84	QP
7	1.527	5.79	19.85	25.64	46.00	-20.36	Average
8	1.527	14.79	19.85	34.64	56.00	-21.36	QP
9	5.683	0.40	19.50	19.90	50.00	-30.10	Average
10	5.683	14.80	19.50	34.30	60.00	-25.70	QP
11	15.226	11.61	19.64	31.25	50.00	-18.75	Average
12	15.226	29.81	19.64	49.45	60.00	-10.55	QP

Note:
1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
2) Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

§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 e.i.r.p. of −27 dBm/MHz.

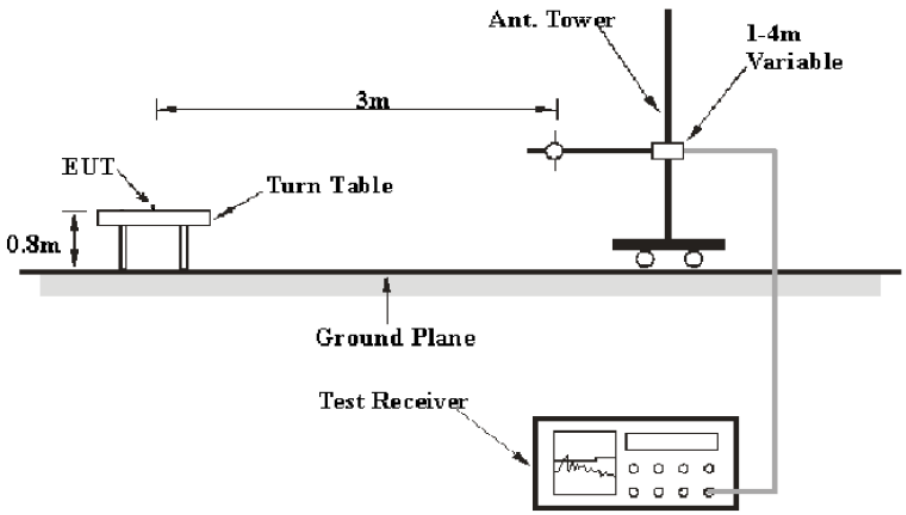
For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to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

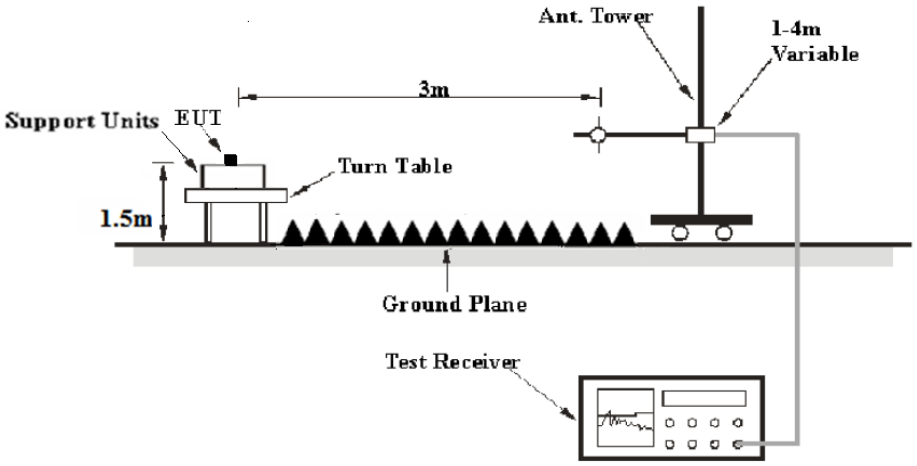
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP [dBm] + 95.2, for d = 3 meters.

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 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:

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

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

Margin = Limit –Corrected Amplitude

Test Data

Environmental Conditions

Temperature:	23.2~23.9 ℃
Relative Humidity:	48~51 %
ATM Pressure:	101.1~101.7 kPa

The testing was performed by Stone Zhang from 2020-06-23 to 2020-07-20.

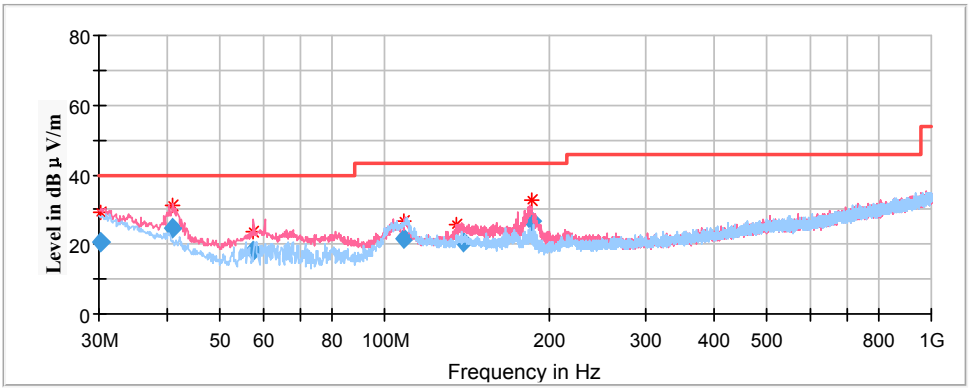
Test Mode: Transmitting

Spurious Emission Test

For 5182.5-5222.5 MHz band:

30MHz-1GHz:

Pre-Scan with low, middle, high of operation in the X,Y and Z axes of orientation, the worst case ***low channel in Y-axis of orientation*** *was recorded*



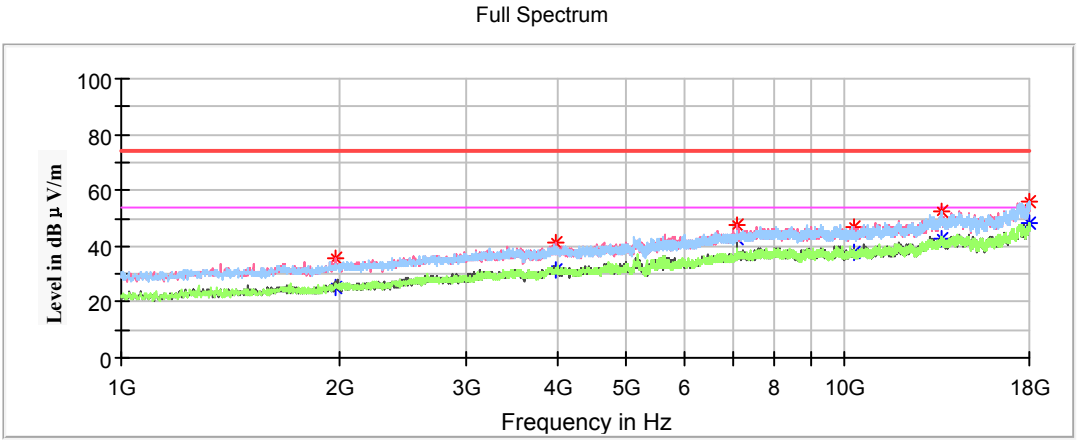
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	Quasi-peak (dBµV/m)	Height (cm)	Polar (H/V)				
30.276581	20.87	200.0	V	61.0	-4.6	40.00	19.13
40.952450	24.42	100.0	V	111.0	-11.8	40.00	15.58
57.398100	17.91	100.0	V	196.0	-18.3	40.00	22.09
108.766250	21.77	100.0	V	202.0	-13.7	43.50	21.73
138.939300	20.51	100.0	V	271.0	-12.3	43.50	22.99
185.211650	26.80	100.0	V	2.0	-13.8	43.50	16.70

1GHz-18GHz:

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

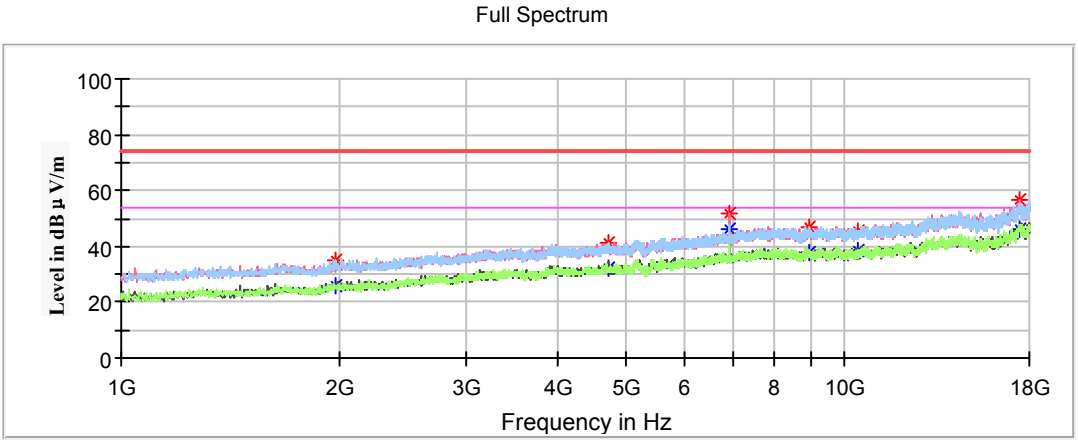
Note:
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5182.5 MHz



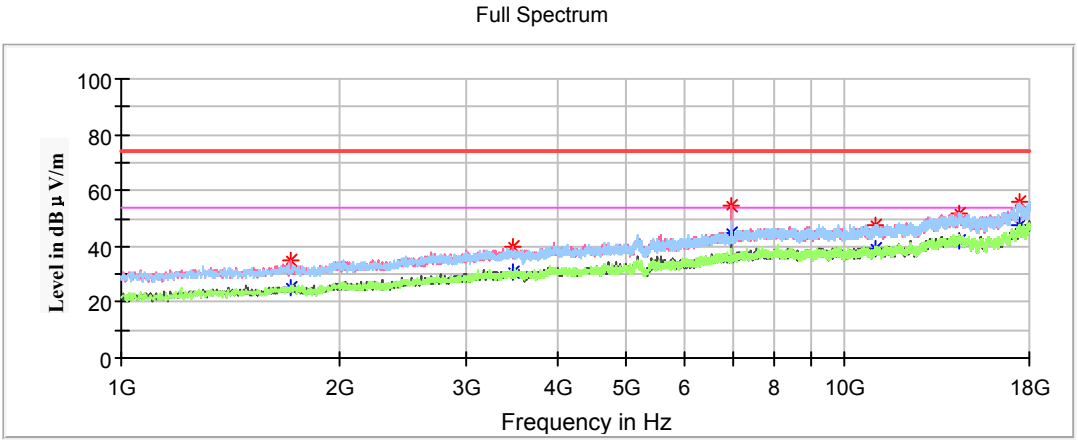
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1974.10	35.99	---	150.0	V	264.0	-14.6	68.20	32.21
3992.00	41.37	---	150.0	H	40.0	-7.0	74.00	32.63
3992.00	---	31.72	150.0	H	40.0	-7.0	54.00	22.28
7096.20	47.61	---	200.0	V	351.0	0.1	68.20	20.59
10285.40	47.08	---	200.0	H	323.0	2.1	68.20	21.12
13632.70	52.58	---	200.0	H	123.0	5.8	68.20	15.62
17981.30	55.69	---	150.0	H	184.0	8.8	74.00	18.31
17981.30	---	48.44	150.0	H	184.0	8.8	54.00	5.56

Middle Channel: 5202.5 MHz



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)				
1977.50	35.19	---	150.0	H	20.0	-14.6	68.20	33.01
4728.10	---	31.95	150.0	V	194.0	-5.7	54.00	22.05
4728.10	41.18	---	150.0	V	194.0	-5.7	74.00	32.82
6936.40	52.02	---	200.0	V	340.0	-0.2	68.20	16.18
8952.60	47.04	---	150.0	H	50.0	1.8	68.20	21.16
10431.60	45.59	---	200.0	H	48.0	2.3	68.20	22.61
17466.20	56.64	---	150.0	V	118.0	8.8	68.20	11.56

High Channel: 5222.5 MHz

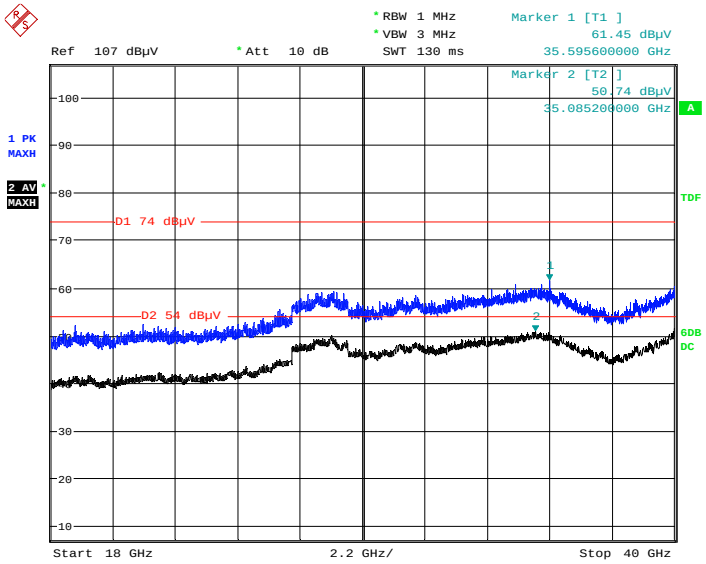


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1719.10	---	25.12	150.0	V	327.0	-15.5	54.00	28.88
1719.10	35.02	---	150.0	V	327.0	-15.5	74.00	38.98
3480.30	39.72	---	200.0	V	81.0	-8.9	68.20	28.48
6961.90	54.39	---	200.0	V	2.0	-0.1	68.20	13.81
11023.20	---	39.49	150.0	H	320.0	2.9	54.00	14.51
11023.20	47.82	---	150.0	H	320.0	2.9	74.00	26.18
14418.10	51.82	---	200.0	H	348.0	6.5	68.20	16.38
17469.60	56.19	---	150.0	V	327.0	8.8	68.20	12.01

18GHz-40GHz:

Pre-Scan with low, middle, high of operation in the X,Y and Z axes of orientation, the worst case ***low channel in Y-axis of orientation*** *was recorded*

Horizontal



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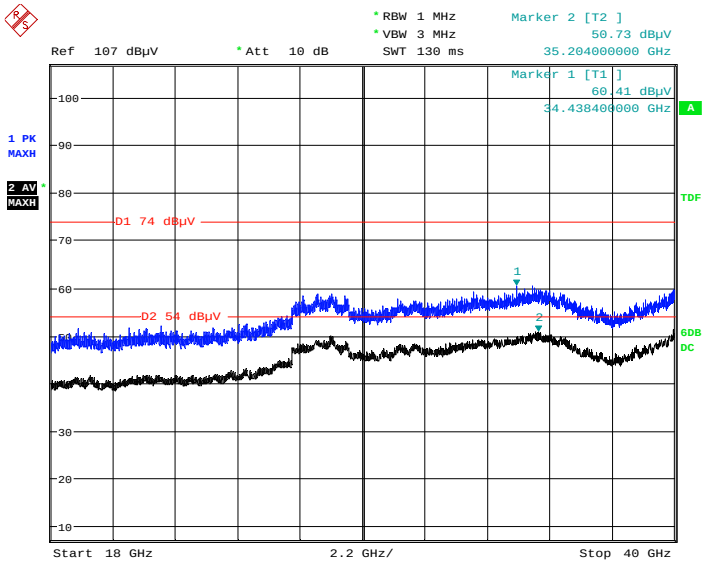
Vertical



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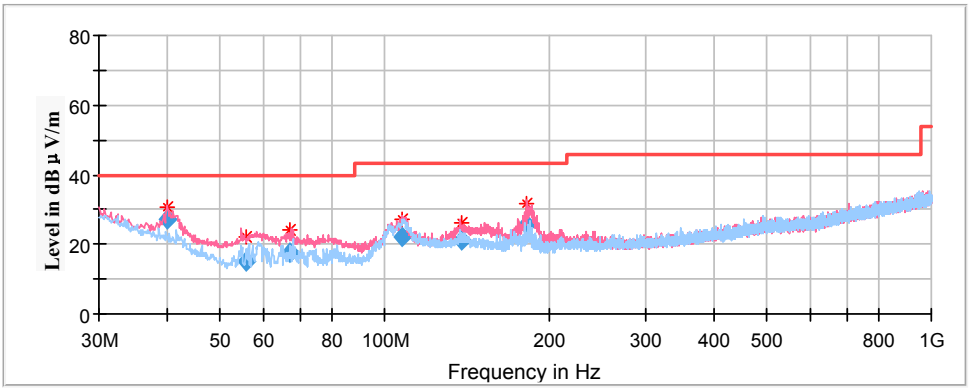
Spurious Emission Test

For 5762.5-5822.5 MHz band:

30MHz-1GHz:

Pre-Scan with low, middle, high of operation in the X,Y and Z axes of orientation, the worst case ***high channel in Y-axis of orientation*** *was recorded*



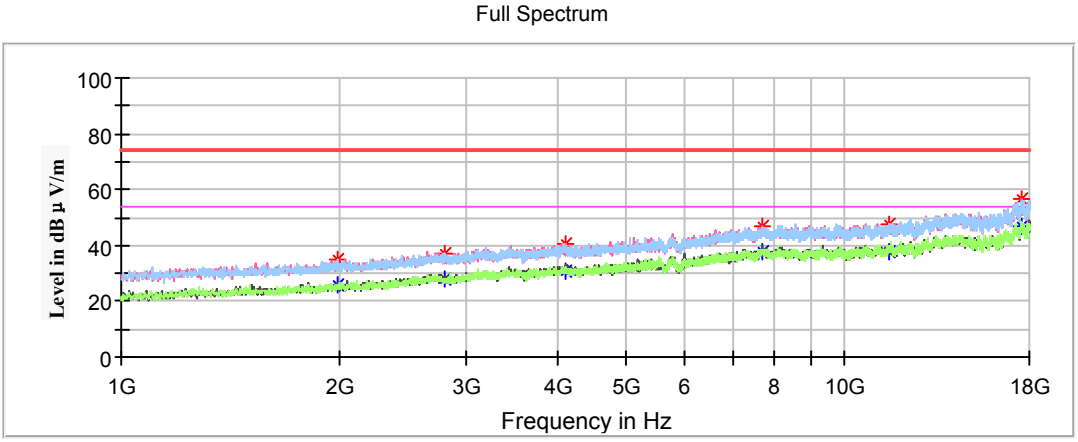
Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	Quasi-peak (dBµV/m)	Height (cm)	Polar (H/V)				
40.022900	27.10	100.0	V	118.0	-11.2	40.00	12.90
55.883100	15.17	100.0	V	298.0	-18.2	40.00	24.83
66.881200	17.45	100.0	V	107.0	-17.9	40.00	22.55
107.273950	22.00	100.0	V	218.0	-14.0	43.50	21.50
138.199800	21.15	100.0	V	292.0	-12.3	43.50	22.35
181.212700	25.91	100.0	V	330.0	-14.0	43.50	17.59

1GHz-18GHz:

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

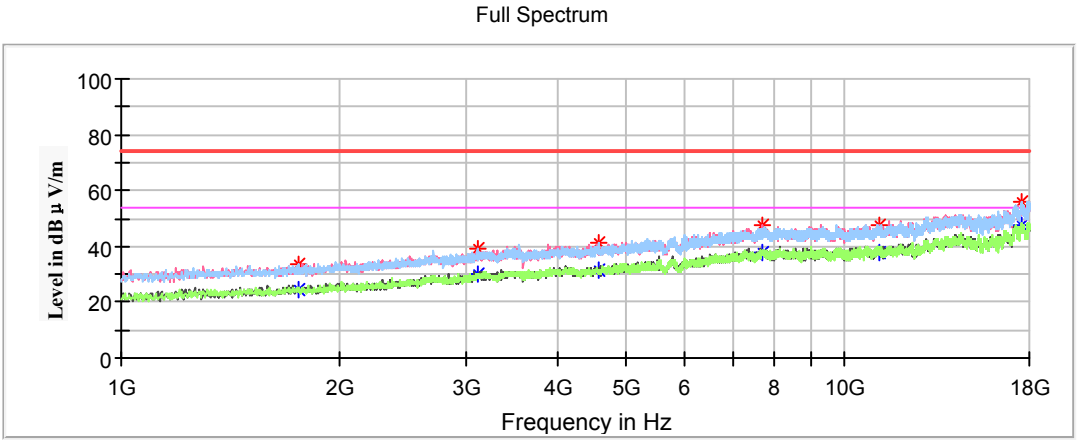
Note:
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
   Corrected Amplitude = Corrected Factor + Reading
   Margin = Limit - Corrected. Amplitude

Low Channel: 5762.5 MHz



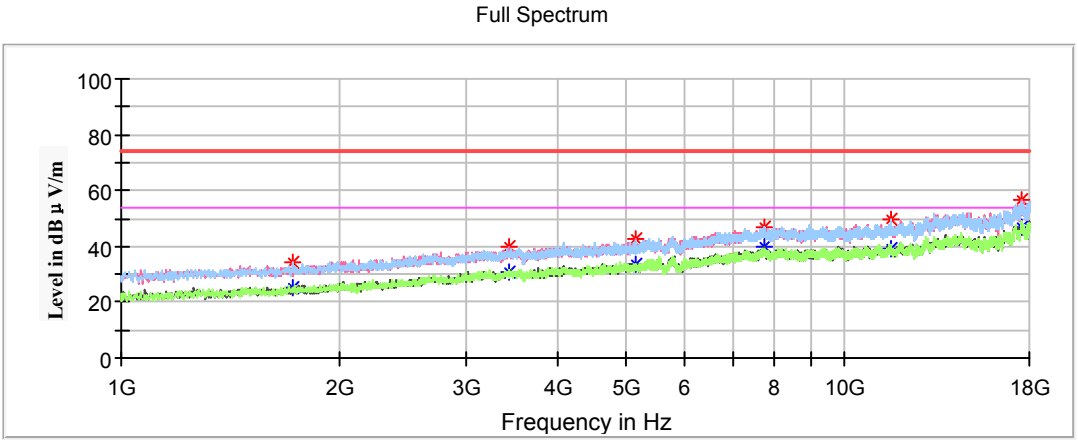
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1991.10	34.62	---	150.0	H	187.0	-14.5	68.20	33.58
2805.40	---	27.73	150.0	H	112.0	-11.0	54.00	26.27
2805.40	37.37	---	150.0	H	112.0	-11.0	74.00	36.63
4109.30	---	30.96	200.0	V	159.0	-6.8	54.00	23.04
4109.30	40.76	---	200.0	V	159.0	-6.8	74.00	33.24
7687.80	---	38.08	150.0	H	248.0	1.3	54.00	15.92
7687.80	47.20	---	150.0	H	248.0	1.3	74.00	26.80
11519.60	---	37.85	150.0	H	325.0	2.8	54.00	16.15
11519.60	47.87	---	150.0	H	325.0	2.8	74.00	26.13
17592.00	56.35	---	200.0	V	2.0	8.9	68.20	11.85

Middle Channel: 5782.5 MHz



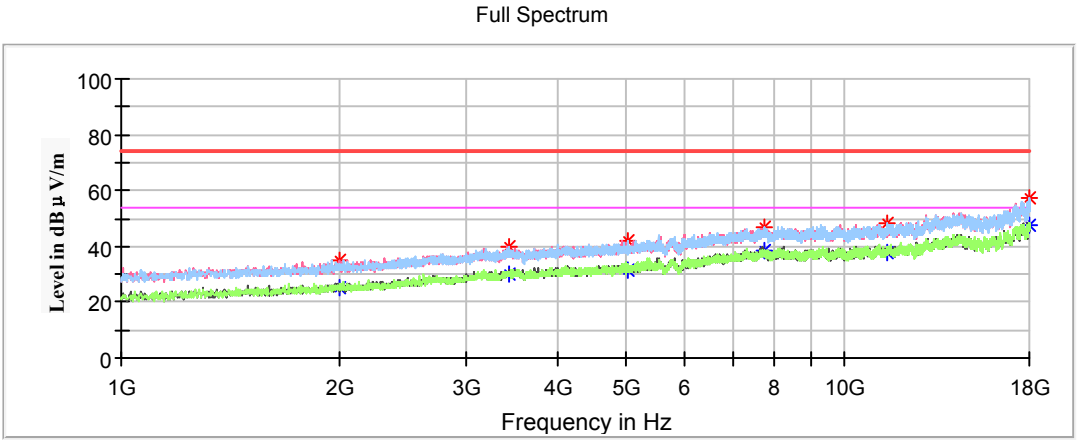
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1756.50	33.62	---	200.0	V	102.0	-15.4	68.20	34.58
3102.90	39.00	---	200.0	H	38.0	-9.8	68.20	29.20
4558.10	---	31.57	150.0	H	148.0	-6.1	54.00	22.43
4558.10	41.14	---	150.0	H	148.0	-6.1	74.00	32.86
7677.60	---	37.72	150.0	H	101.0	1.3	54.00	16.28
7677.60	47.28	---	150.0	H	101.0	1.3	74.00	26.72
11155.80	---	38.02	200.0	V	53.0	2.9	54.00	15.98
11155.80	47.78	---	200.0	V	53.0	2.9	74.00	26.22
17590.30	56.28	---	150.0	H	343.0	8.9	68.20	11.92

Middle Channel: 5802.5 MHz



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	33.95	---	150.0	H	0.0	-15.5	68.20	34.25
3425.90	39.77	---	200.0	V	158.0	-9.0	68.20	28.43
5137.80	---	33.39	150.0	V	213.0	-4.8	54.00	20.61
5137.80	42.63	---	150.0	V	213.0	-4.8	74.00	31.37
7740.50	46.75	---	200.0	V	143.0	1.4	74.00	27.25
7740.50	---	39.78	200.0	V	143.0	1.4	54.00	14.22
11555.30	---	39.30	200.0	H	279.0	2.9	54.00	14.70
11555.30	49.30	---	200.0	H	279.0	2.9	74.00	24.70
17566.50	56.62	---	200.0	V	247.0	8.9	68.20	11.58

High Channel: 5822.5 MHz

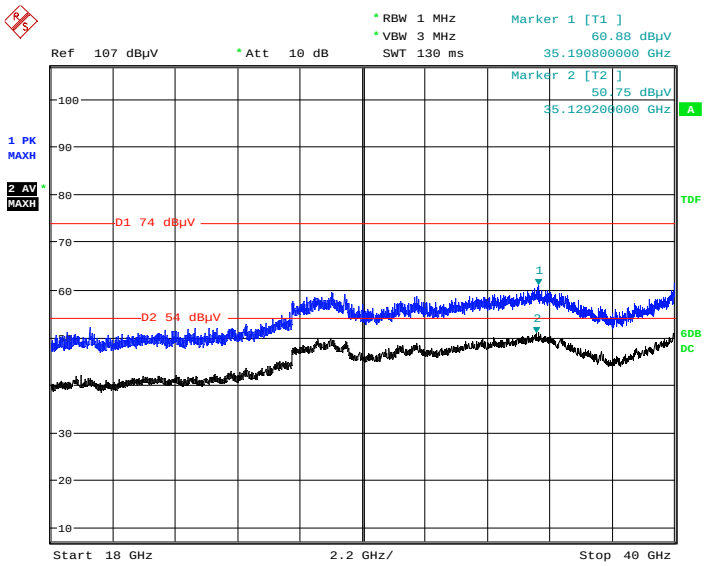


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1997.90	34.94	---	200.0	H	34.0	-14.5	68.20	33.26
3442.90	39.79	---	200.0	H	341.0	-9.0	68.20	28.41
5012.00	---	31.63	200.0	V	262.0	-5.1	54.00	22.37
5012.00	41.79	---	200.0	V	262.0	-5.1	74.00	32.21
7733.70	---	38.15	150.0	V	292.0	1.4	54.00	15.85
7733.70	46.99	---	150.0	V	292.0	1.4	74.00	27.01
11415.90	---	37.75	200.0	H	217.0	2.8	54.00	16.25
11415.90	48.10	---	200.0	H	217.0	2.8	74.00	25.90
17954.10	---	47.28	150.0	V	78.0	8.8	54.00	6.72
17954.10	57.24	---	150.0	V	78.0	8.8	74.00	16.76

18GHz-40GHz:

Pre-Scan with low, middle, high of operation in the X,Y and Z axes of orientation, the worst case ***high channel in Y-axis of orientation*** *was recorded*

Horizontal



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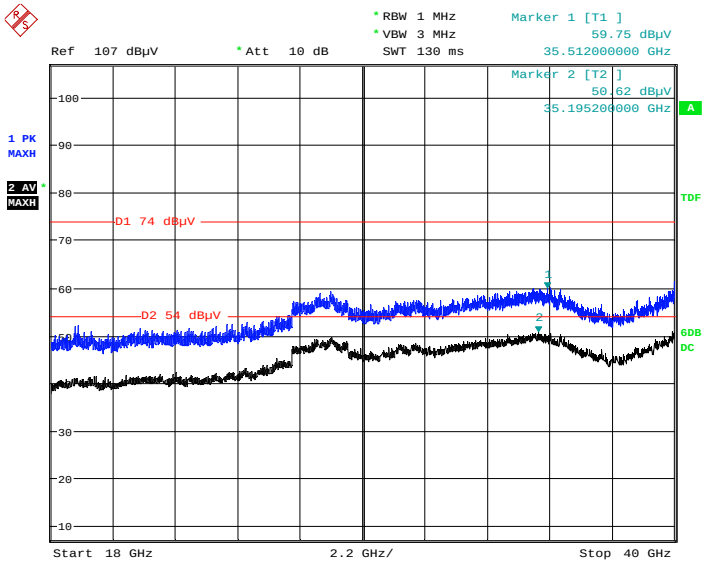
Vertical



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Restricted Bands Emissions Test:

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

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

For 5182.5-5222.5 MHz band:

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: 5182.5 MHz								
5150.00	57.94	---	150.0	H	0.0	5.2	74.00	16.06
5150.00	---	47.02	150.0	H	0.0	5.2	54.00	6.98
High Channel: 5222.5 MHz								
5350.00	49.28	---	150.0	H	0.0	5.7	74.00	24.72
5350.00	---	44.66	150.0	H	0.0	5.7	54.00	9.34

For 5762.5-5822.5 MHz band:

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: 5762.5 MHz								
5650.00	50.42	---	200.0	V	149.0	6.4	67.80	17.38
5700.00	53.41	---	150.0	V	1.0	6.5	105.20	51.79
5720.00	51.87	---	150.0	V	5.0	6.5	110.80	58.93
5725.00	52.79	---	150.0	V	53.0	6.5	122.20	69.41
High Channel: 5822.5 MHz								
5850.00	50.08	---	150.0	V	118.0	6.7	122.20	72.12
5855.00	63.59	---	150.0	V	5.0	6.7	110.80	47.21
5875.00	49.58	---	200.0	V	342.0	6.8	105.20	55.62
5925.00	49.14	---	150.0	V	157.0	6.9	67.80	18.66

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 band is 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.

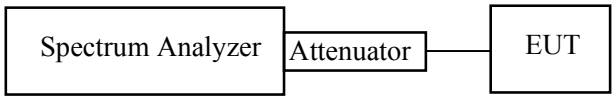
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

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:	24.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.7 kPa

The testing was performed by Stone Zhang on 2020-07-16.

Test Result: Compliant

5182.5-5222.5 MHz:

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5182.5	5.030	4.609
Middle	5202.5	5.030	4.609
High	5222.5	4.990	4.589

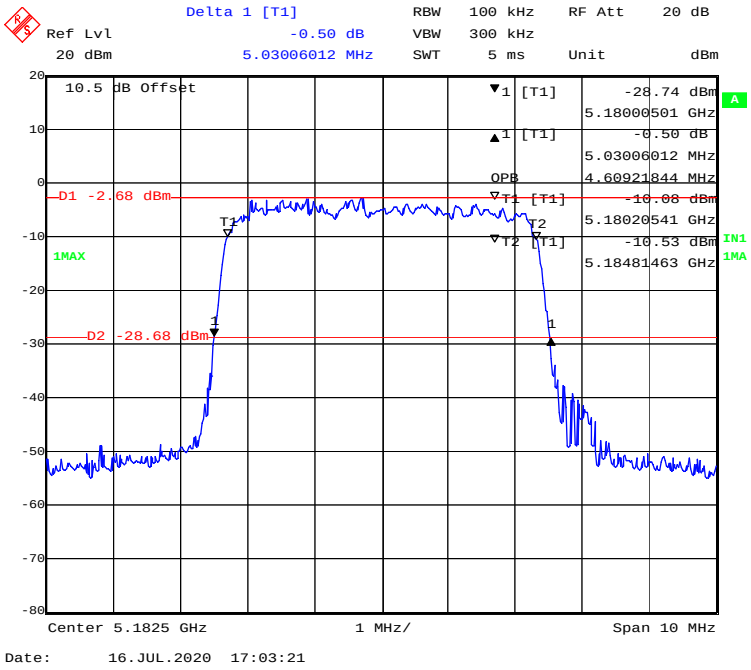
5762.5-5822.5 MHz:

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5762.5	4.389	4.599
Middle	5782.5	4.389	4.599
High	5822.5	4.449	4.599

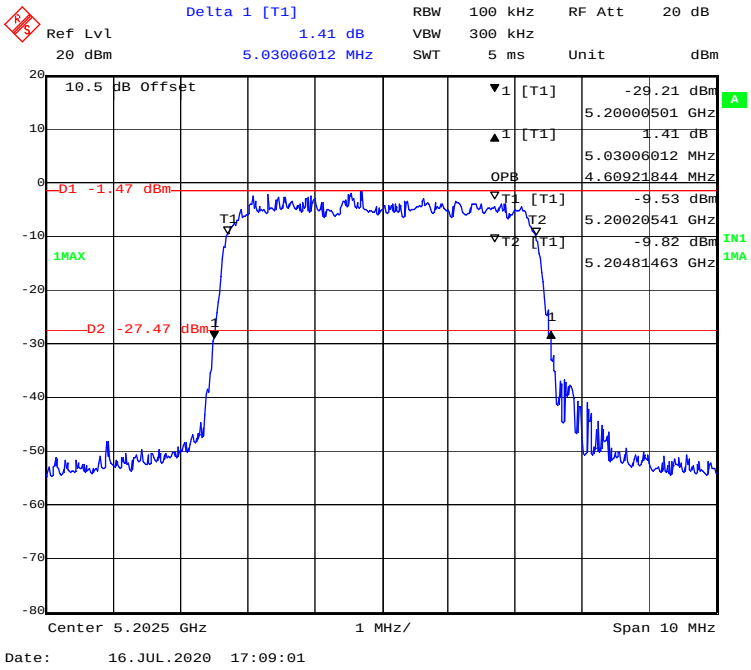
5182.5-5222.5 MHz:

26 Bandwidth&99% Occupied Bandwidth

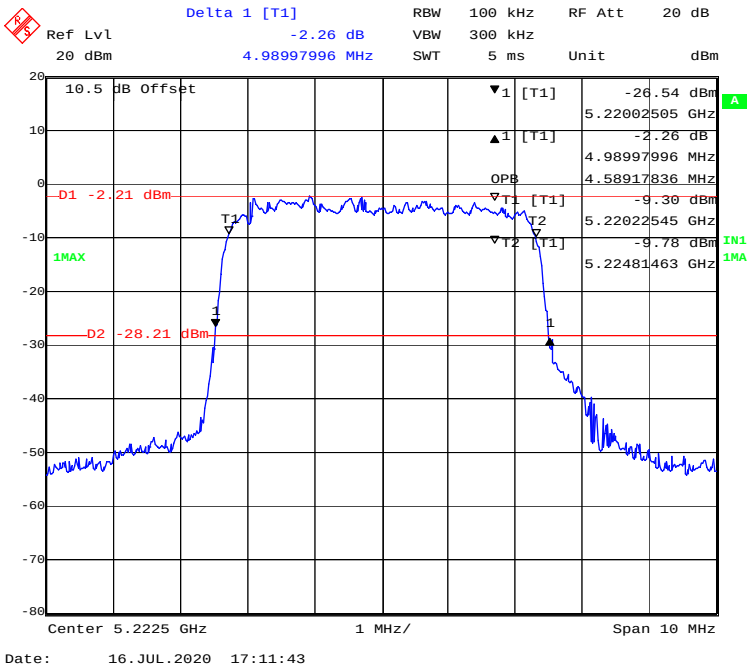
Frequency: 5182.5 MHz



Frequency: 5202.5 MHz

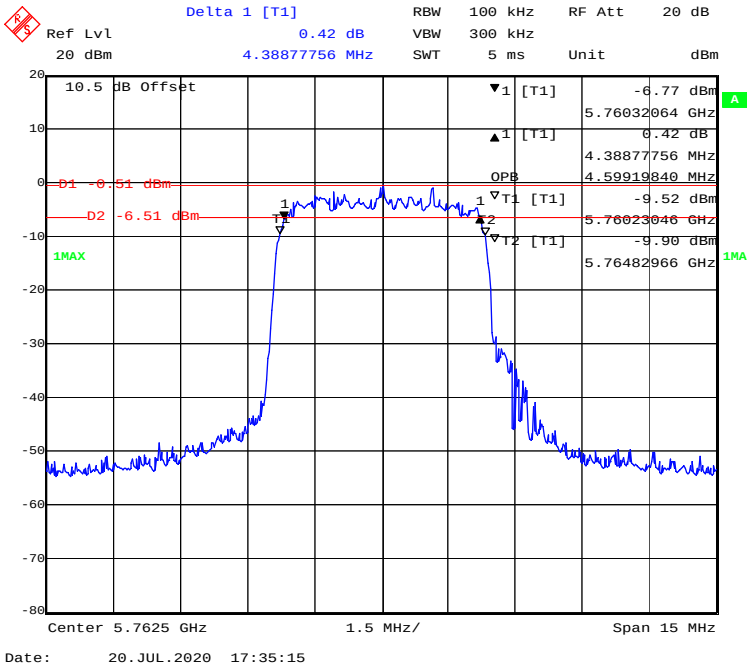


Frequency: 5222.5 MHz

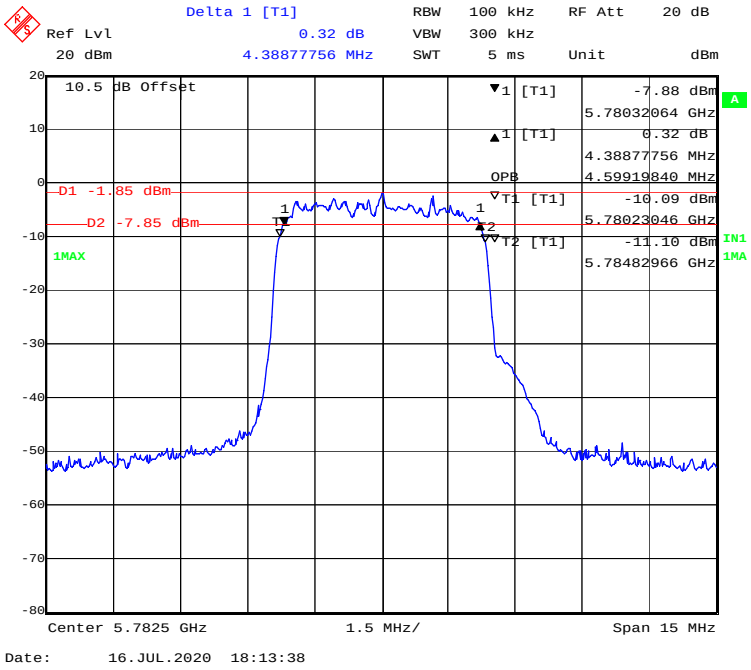


5762.5-5822.5 MHz:
6 Bandwidth & 99% Occupied Bandwidth

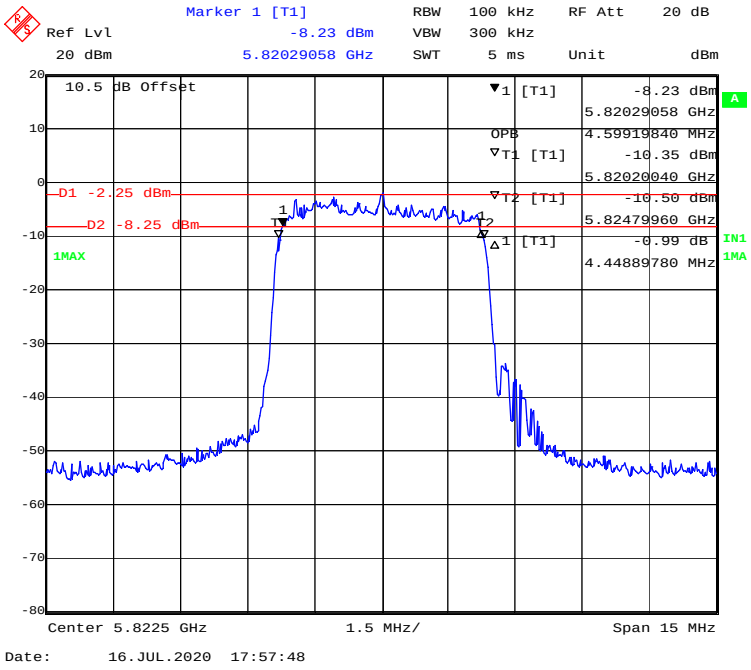
Frequency: 5762.5 MHz



Frequency: 5782.5 MHz



Frequency: 5822.5 MHz



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

Applicable Standard

According to §15.407(a)(1)

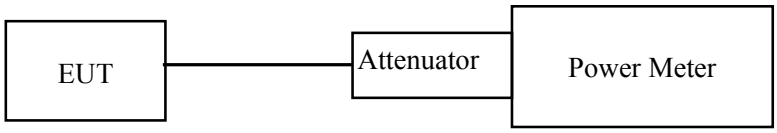
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

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 duty cycle factor to the display.



Test Data

Environmental Conditions

Temperature:	24.2 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Stone Zhang on 2020-07-16.

Test Mode: Transmitting

Frequency Range (MHz)	Frequency (MHz)	Average Conducted Output Power (dBm)	Limit (dBm)	Result
5182.5-5222.5 MHz	5182.5	5.67	22	PASS
	5202.5	5.44	22	PASS
	5222.5	5.42	22	PASS
5762.5-5822.5 MHz	5762.5	6.18	22	PASS
	5782.5	4.58	22	PASS
	5822.5	6.41	22	PASS

NOTE:The antenna gain is 14dBi＞6dBi，so the limit shall be reduced by 14-6=8dB

Frequency Range(MHz)	Maximum Conducted Output Power (dBm)	Maximum Antenna gain (dBi)	Maximum e.i.r.p (dBm)	e.i.r.p Limit elevation angle above 30 degrees (dBm)	Result
5182.5-5222.5 MHz	5.67	14.0	19.67	21	PASS

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

Applicable Standard

According to §15.407(a)(1)

(i) 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

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)， Method SA-2 (power averaging (rms) detection with trace averaging) was used.

Test Data

Environmental Conditions

Temperature:	24.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Stone Zhang on 2020-07-24.

Test Mode: Transmitting

5182.5-5222.5 MHz:

Frequency (MHz)	Reading (dBm/100kHz)	Reading (dBm/MHz)	10log(1/X) (dB)	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
5182.5	-72.24	-62.24	7.45	-54.79	9	PASS
5202.5	-70.97	-60.97	7.45	-53.52	9	PASS
5222.5	-70.24	-60.24	7.45	-52.79	9	PASS

5762.5-5822.5 MHz:

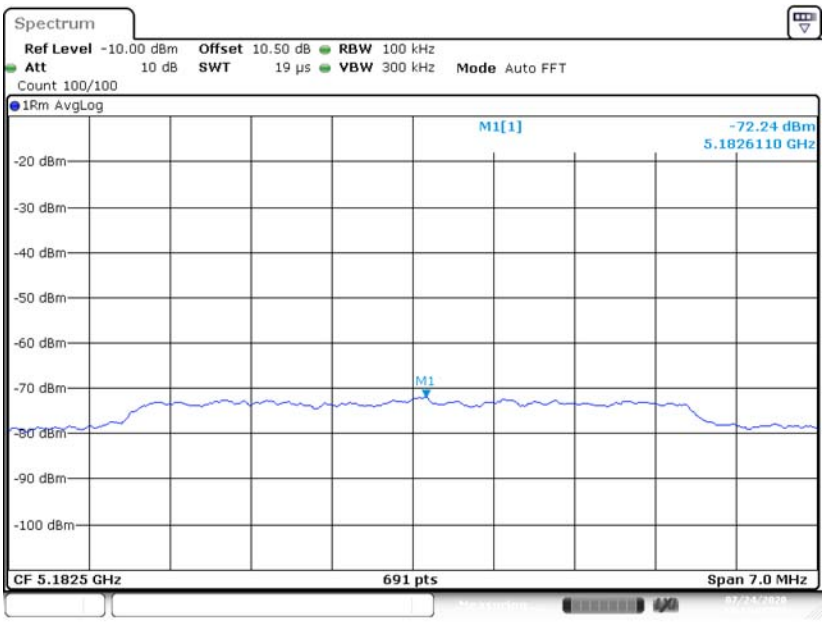
Frequency (MHz)	Reading (dBm/100kHz)	Reading (dBm/500kHz)	10log(1/X) (dB)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
5762.5	-68.15	-61.15	7.45	-53.70	22	PASS
5782.5	-68.24	-61.24	7.45	-53.79	22	PASS
5822.5	-68.19	-61.19	7.45	-53.74	22	PASS

Note:

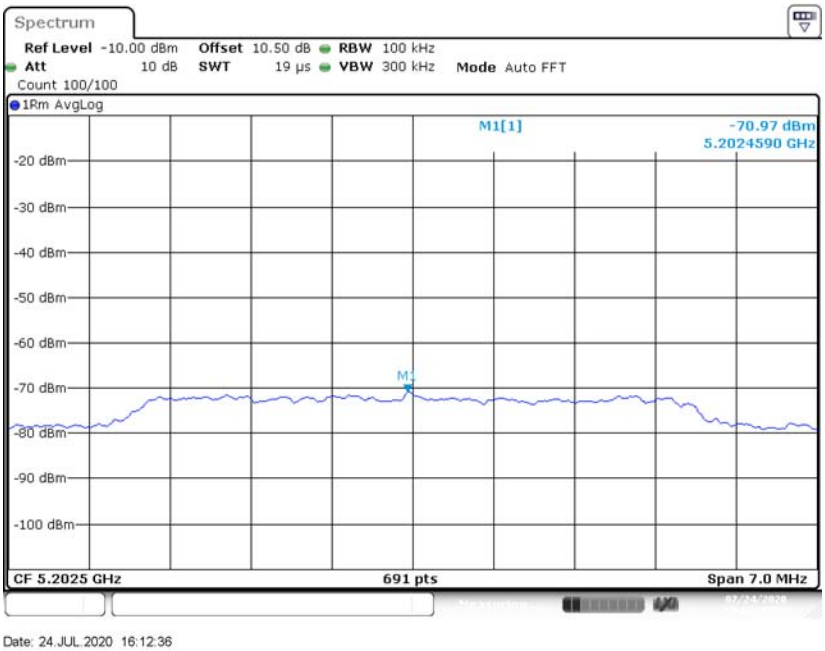
1. “x” means duty cycle.
2. dBm/100kHz conversion to dBm/500kHz need add a factor 10*log(500kHz/100kHz)=7.0dB.
3. dBm/100kHz conversion to dBm/MHz need add a factor 10*log(1000kHz/100kHz)=10.0dB.
4. The antenna gain is 14dBi＞6dBi，so the limit shall be reduced by 14-6=8dB

5182.5-5222.5 MHz:

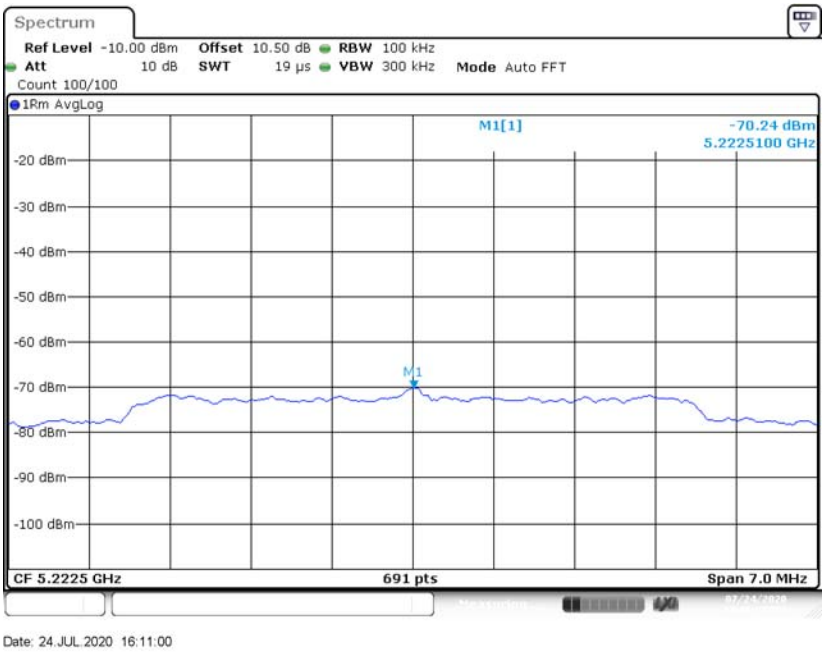
Power spectral density-5182.5 MHz



Power spectral density-5202.5 MHz

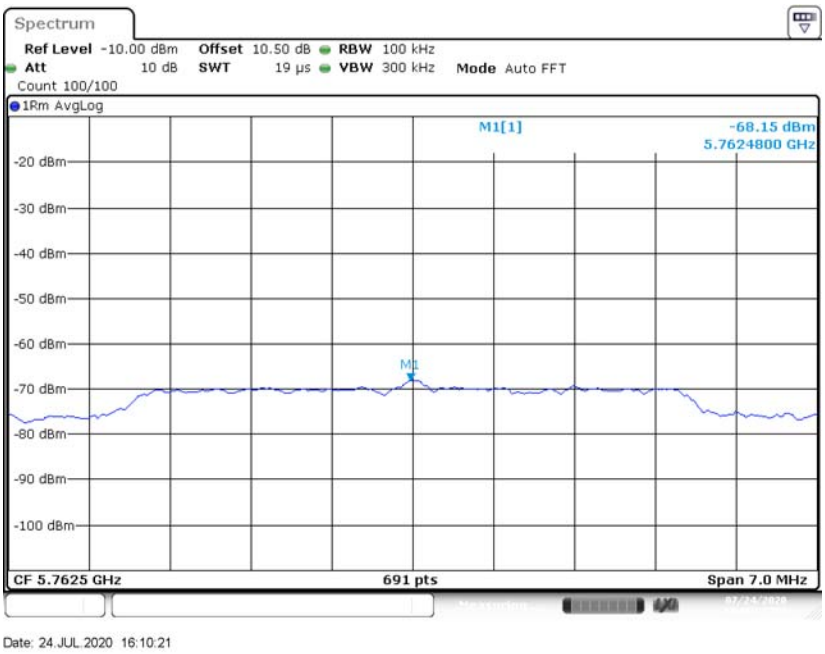


Power spectral density-5222.5 MHz

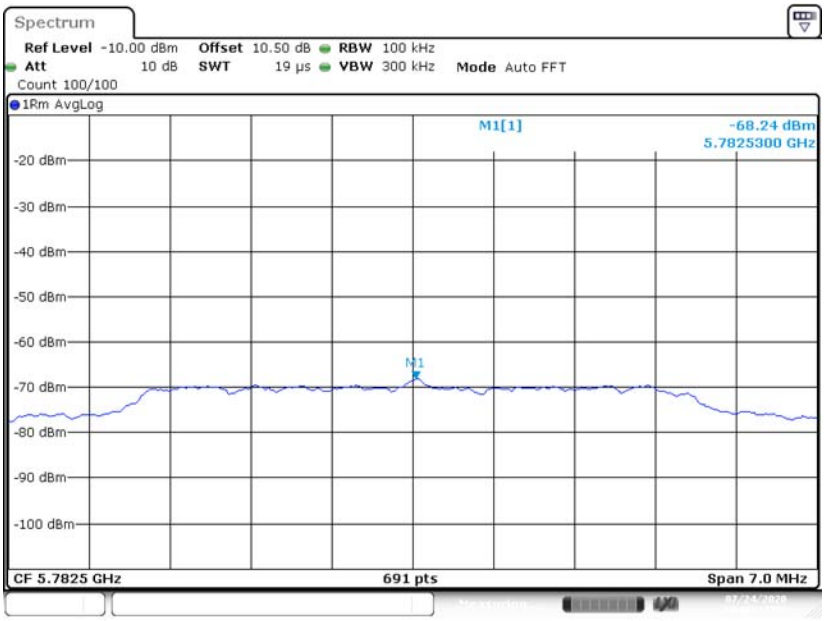


5762.5-5822.5 MHz:

Power spectral density-5762.5 MHz



Power spectral density-5782.5 MHz



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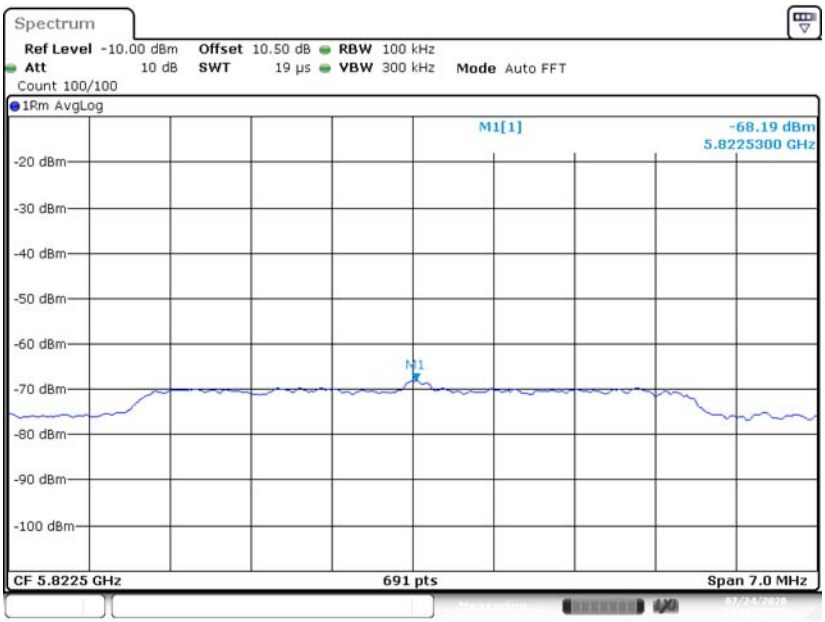
Power spectral density-5822.5 MHz



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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.

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