TEST REPORT

Applicant Name :	Vanstone Electronic (Beijing) Co., Ltd.
Address :	3F No.2 Building, Aisino Corporation Park 18A, Xingshikou Road, Haidian District, Beijing, China 100195
Report Number :	SZNN210609-55441E-RF-00C
FCC ID:	OWLA75

Test Standard (s)

FCC PART 15.407

Sample Description

Product Type:	Android POS Terminal
Model No.:	A75
Multiple Model(s) No.:	N/A
Trade Mark:	Aisino
Date Received:	2021/06/09
Date of Test:	2021/10/10~2021/11/25
Report Date:	2021/11/25

Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Black Ding
EMC Engineer

Approved By:

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★ ".
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	5G Wi-Fi: 5180-5240MHz; 5260-5320MHz; 5500-5700MHz; 5745-5825MHz
Mode	802.11a/n20/n40
Maximum Conducted Average Ouput Power	5180-5240 MHz: 12.89dBm 5260-5320MHz: 10.56dBm 5500-5700MHz: 11.91dBm 5745-5825MHz: 12.52dBm
Modulation Technique	OFDM
Antenna Specification*	Antenna gain:1.0 dBi (It is provided by the manufacturer)
Voltage Range	DC 3.60V from battery or DC 5.0V from adapter
Sample serial number	SZNN210609-55441E-RF-S1 for RE&CE SZNN210609-55441E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: TPA-46050200UU Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2000mA

Objective

This test report is 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.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. And KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082*10^{-7}$
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device only supports 5G Wi-Fi 802.11a/n20/n40 modes.

For 5150-5250MHz Band, 6 channels are provided to testing:

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

For 802.11a, 802.11n20 mode: channel 36, 40, 48 were tested;
For 802.11n40 mode: channel 38, 46 were tested.

For 5250-5350MHz Band, 6 channels are provided to testing:

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

For 802.11a, 802.11n20 mode: channel 52, 56, 64 were tested;
For 802.11n40 mode: channel 54, 62 were tested.

For 5470-5725MHz Band, 16 channels are provided to testing:

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

For 802.11a, 802.11n20 mode: channel 100, 116, 140 were tested; For 802.11n40 mode: channel 102, 110, 134 were tested.

For 5725-5850MHz Band, 7 channels are provided to testing:

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

For 802.11a, 802.11n20 mode: channel 149, 157, 165 were tested;
For 802.11n40 mode: channel 151, 159 were tested.

EUT Exercise Software

"QRCT3"* software was used. The software and power level was provided by the applicant.

The worst case was performed under:

U-NII	Mode	Frequency (MHz)	Data Rate	Power Level*
5150 – 5250MHz	802.11 a	5180	6Mbps	16
		5200	6Mbps	16
		5240	6Mbps	16
	802.11 n20	5180	MCS0	16
		5200	MCS0	16
		5240	MCS0	16
	802.11 n40	5190	MCS0	16
		5230	MCS0	16
5250 – 5350MHz	802.11 a	5260	6Mbps	16
		5280	6Mbps	16
		5320	6Mbps	16
	802.11 n20	5260	MCS0	16
		5280	MCS0	16
		5320	MCS0	16
	802.11 n40	5270	MCS0	16
		5310	MCS0	16
5470 – 5725MHz	802.11 a	5500	6Mbps	16
		5580	6Mbps	16
		5700	6Mbps	14
	802.11 n20	5500	MCS0	16
		5580	MCS0	16
		5700	MCS0	14
	802.11 n40	5510	MCS0	16
		5550	MCS0	16
		5670	MCS0	16

U-NII	Mode	Frequency (MHz)	Data Rate	Power Level*
5725 – 5850MHz	802.11 a	5745	6Mbps	16
		5785	6Mbps	16
		5825	6Mbps	16
	802.11 n20	5745	MCS0	16
		5785	MCS0	16
		5825	MCS0	16
	802.11 n40	5755	MCS0	16
		5795	MCS0	16

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

Duty cycle

Test Result: Pass. Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

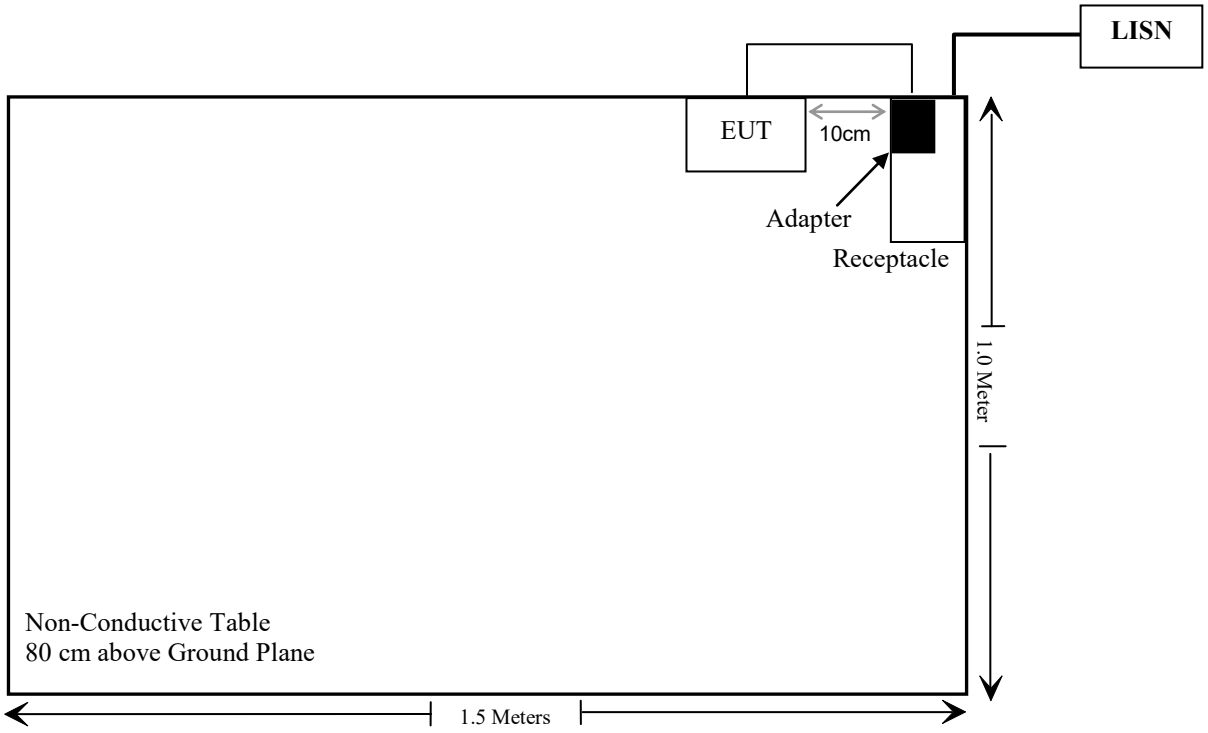
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

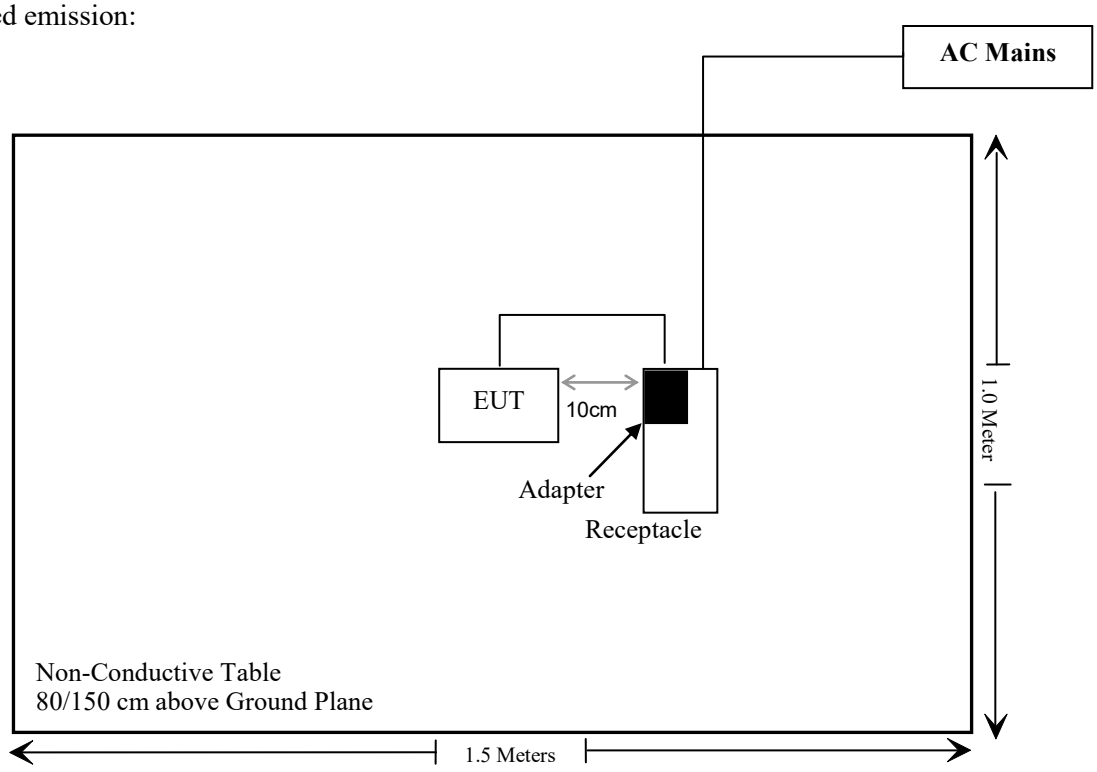
Cable Description	Length (m)	From Port	To
Un-shielded detachable USB cable	1.0	adapter	EUT

Block Diagram of Test Setup

For conducted emission:



For radiated emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(9)& §15.207(a)	Conducted Emissions	Compliant
§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliant
§15.407(a)	Conducted Transmitter Output Power	Compliant
§15.407 (a)	Power Spectral Density	Compliant
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Compliant*

Not Applicable: the EUT has no TPC function which was declarded by the applicant.
Compliant*: Please refer to the DFS report: SZNN210609-55441E-RF-00D.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2021/02/03	2022/02/02
R & S	L.I.S.N.	ENV216	101314	2020/12/25	2021/12/24
Anritsu Corp	50ΩCoaxial Switch	MP59B	6200506474	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-2m	No.2	2020/12/25	2021/12/24
Conducted Emission Test Software: e3 19821G (V9)					
Radiated emission test					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde&Schwarz	Spectrum Analyzer	FSV40	101495	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/28	2021/11/27
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-10m	No.7	2021/11/09	2022/11/08
Unknown	RF Coaxial Cable	N-2m	No.8	2021/11/09	2022/11/08
CD	High Pass Filter	HPM-8.0/18G-60	020	2020/12/25	2021/12/24
Radiated Emission Test Software: e3 19821G (V9)					

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF conducted test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2020/12/24	2021/12/23
Tonscend	RF Control Unit	JS0806-2	19G8060182	2021/07/06	2022/07/05

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

§1.1307 (b) (1) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Measurement Result

Please refer to SAR test report: CR21110041-20A,CR21110041-20B.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has one internal antenna arrangement for 5GHz Wi-Fi which were permanently attached. Please refer to the EUT photos.

Type	Antenna Gain	Impedance	Frequency Range
PIFA	1.0dBi	50Ω	5150-5850MHz

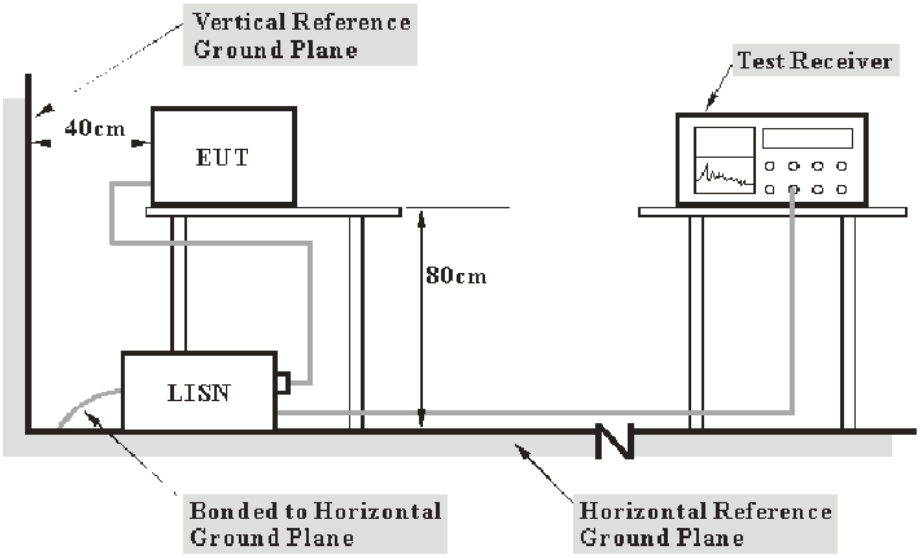
Result: Compliant.

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

Applicable Standard

FCC §15.207, §15.407(b) (6)

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

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

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

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

Test Procedure

During the conducted emission test, the adapter was connected to the LISN.

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

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

Transd Factor & Margin Calculation

The Transd factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss. The basic equation is as follows:

Transd Factor = LISN VDF + Cable Loss

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

Over Limit = level – Limit
Level= reading level+ Transd Factor

Test Data

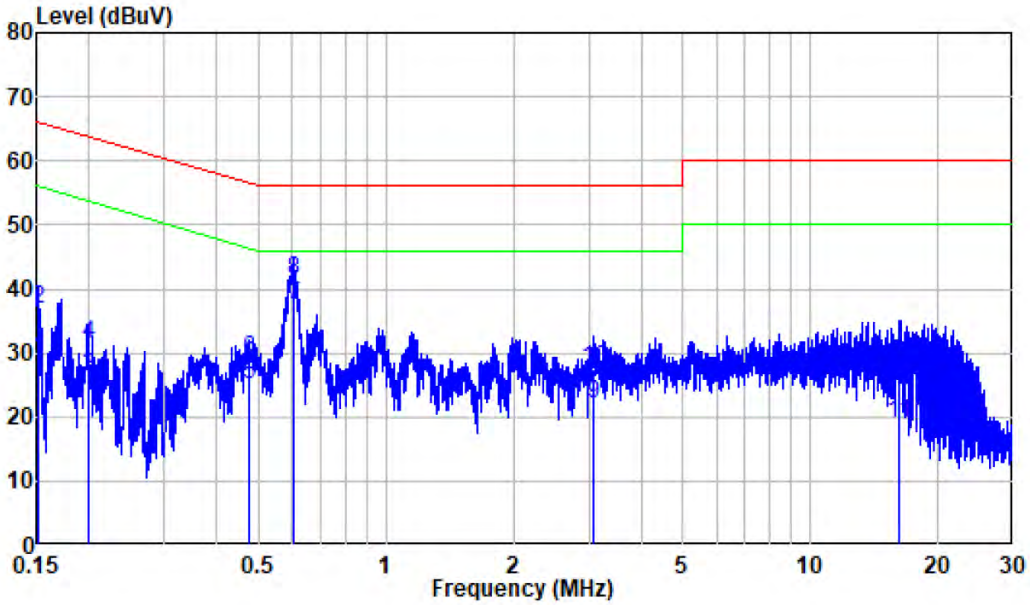
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	64 %
ATM Pressure:	101.0 kPa

The testing was performed by Bin Deng on 2021-11-19.

EUT operation mode: Transmitting (worst case is 802.11 n40 mode, 5795MHz)

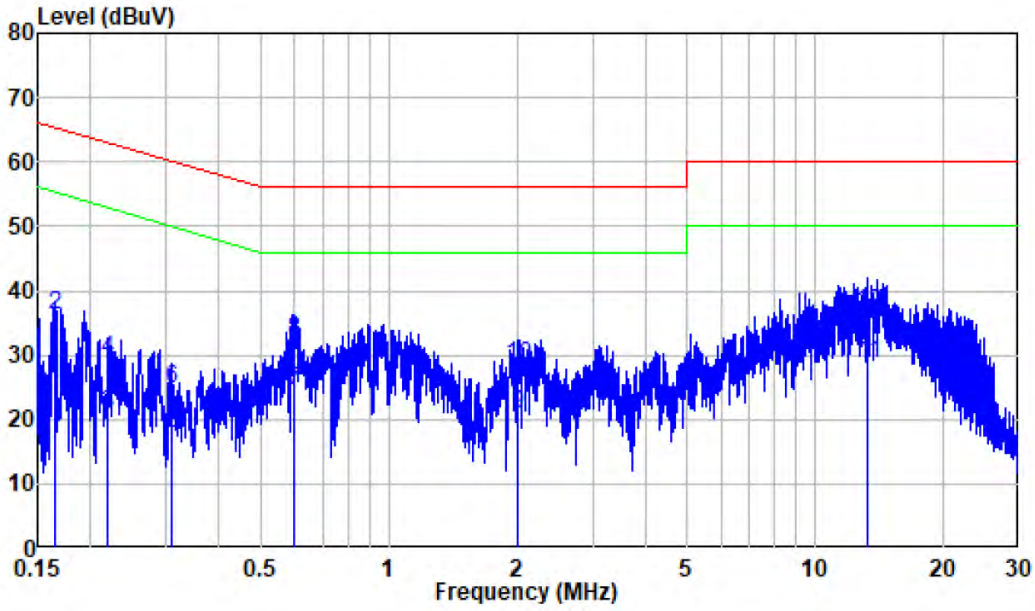
AC 120V/60 Hz, Line:



Site : Shielding Room
Condition: Line
Mode : 5G WIFI
Model : A75

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.151	9.90	19.05	28.95	55.94	-26.99	Average
2	0.151	9.90	26.83	36.73	65.94	-29.21	QP
3	0.200	9.80	16.51	26.31	53.62	-27.31	Average
4	0.200	9.80	21.45	31.25	63.62	-32.37	QP
5	0.474	9.80	15.36	25.16	46.45	-21.29	Average
6	0.474	9.80	19.23	29.03	56.45	-27.42	QP
7	0.604	9.81	27.67	37.48	46.00	-8.52	Average
8	0.604	9.81	31.59	41.40	56.00	-14.60	QP
9	3.076	9.93	12.13	22.06	46.00	-23.94	Average
10	3.076	9.93	17.43	27.36	56.00	-28.64	QP
11	16.172	10.09	9.02	19.11	50.00	-30.89	Average
12	16.172	10.09	17.57	27.66	60.00	-32.34	QP

AC 120V/60 Hz, Neutral:



Site : Shielding Room
Condition: Neutral
Mode : 5G WIFI
Model : A75

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.166	9.93	15.88	25.81	55.18	-29.37	Average
2	0.166	9.93	26.16	36.09	65.18	-29.09	QP
3	0.220	9.99	10.76	20.75	52.83	-32.08	Average
4	0.220	9.99	19.30	29.29	62.83	-33.54	QP
5	0.309	9.95	8.00	17.95	50.00	-32.05	Average
6	0.309	9.95	14.94	24.89	60.00	-35.11	QP
7	0.596	9.91	14.55	24.46	46.00	-21.54	Average
8	0.596	9.91	22.40	32.31	56.00	-23.69	QP
9	2.011	9.92	10.78	20.70	46.00	-25.30	Average
10	2.011	9.92	18.34	28.26	56.00	-27.74	QP
11	13.284	10.06	18.67	28.73	50.00	-21.27	Average
12	13.284	10.06	26.50	36.56	60.00	-23.44	QP

§15.205 & §15.209 & §15.407(B)– UNDESIRABLE EMISSION

Applicable Standard

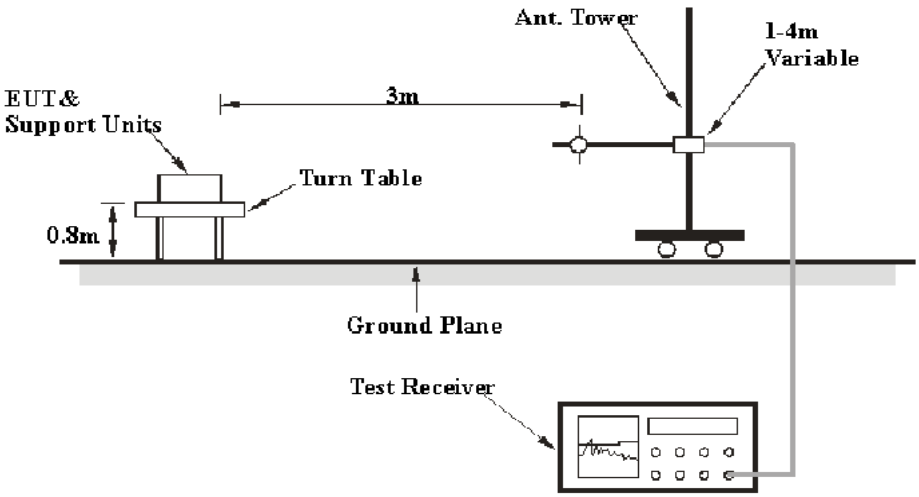
FCC §15.407 (b); §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

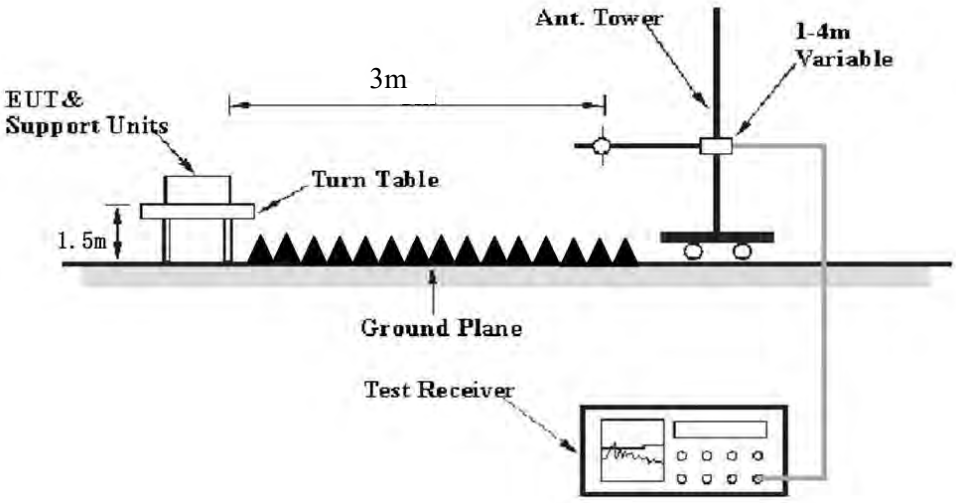
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Average
	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

Test Procedure

Radiated Spurious Emission

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

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

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

Factor & Margin Calculation

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

Factor = Antenna Factor + Cable Loss - Amplifier Gain

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

Over Limit/Margin = Result/Corrected Amplitude-Limit
Result/Corrected Amplitude = Reading + Factor

Test Data

Environmental Conditions

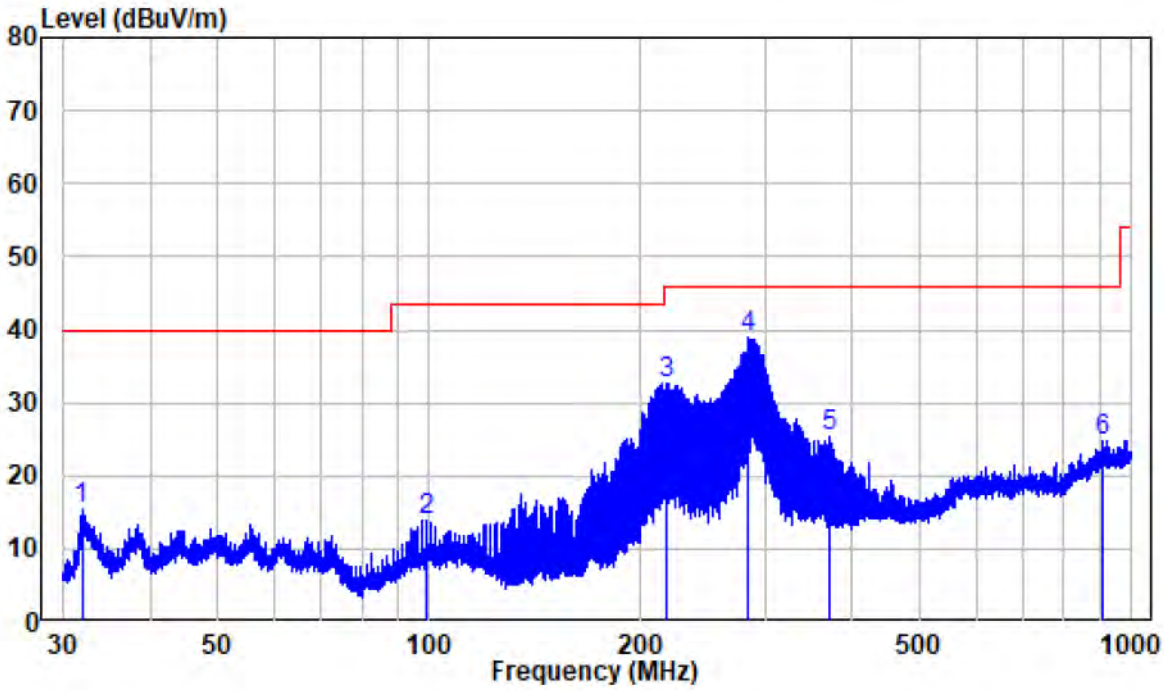
Temperature:	25℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Bin Deng on 2021-11-17 for below 1GHz and 2021-11-18 for above 1GHz.(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

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

30 MHz – 1 GHz: *(worst case is 802.11 A mode, 5240MHz)*

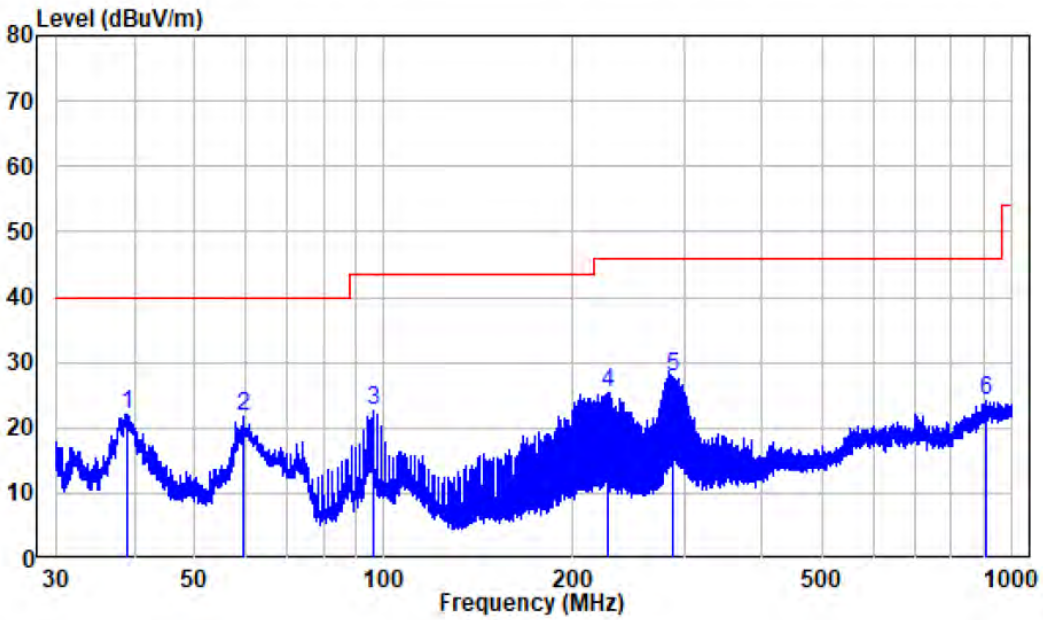
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNN210609-55441E-RF
Mode : TX 11A

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	31.97	-20.12	35.49	15.37	40.00	-24.63	Peak
2	98.75	-19.43	33.35	13.92	43.50	-29.58	Peak
3	217.93	-18.98	51.72	32.74	46.00	-13.26	Peak
4	284.73	-17.49	56.45	38.96	46.00	-7.04	Peak
5	372.00	-15.75	41.04	25.29	46.00	-20.71	Peak
6	908.47	-8.02	32.87	24.85	46.00	-21.15	Peak

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : SZNN210609-55441E-RF
Mode : TX 11A

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	38.99	-18.81	40.90	22.09	40.00	-17.91	Peak
2	59.54	-19.42	41.06	21.64	40.00	-18.36	Peak
3	95.85	-20.03	42.77	22.74	43.50	-20.76	Peak
4	226.79	-18.91	44.38	25.47	46.00	-20.53	Peak
5	287.86	-17.30	45.05	27.75	46.00	-18.25	Peak
6	911.26	-7.98	32.09	24.11	46.00	-21.89	Peak

5150-5250 MHz:

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/Ave.	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5180 MHz									
4500	66.53	PK	113	1	H	-5.53	61.00	74	-13
4500	52.87	Ave	113	1	H	-5.53	47.34	54	-6.66
4500	64.40	PK	311	1	V	-5.53	58.87	74	-15.13
4500	50.77	Ave	311	1	V	-5.53	45.24	54	-8.76
5150	63.71	PK	154	1.2	H	-3.54	60.17	74	-13.83
5150	49.74	Ave	154	1.2	H	-3.54	46.20	54	-7.8
5150	61.55	PK	155	1.2	V	-3.54	58.01	74	-15.99
5150	47.62	Ave	155	1.2	V	-3.54	44.08	54	-9.92
10360	45.95	PK	174	1.9	H	5.83	51.78	68.2	-16.42
10360	43.69	PK	126	1.9	V	5.83	49.52	68.2	-18.68
5200 MHz									
10400	45.69	PK	317	1.8	H	5.94	51.63	68.2	-16.57
10400	43.43	PK	46	1.8	V	5.94	49.37	68.2	-18.83
5240 MHz									
5350	62.84	PK	294	1.7	H	-2.68	60.16	74	-13.84
5350	49.69	Ave	294	1.7	H	-2.68	47.01	54	-6.99
5350	60.72	PK	117	2.5	V	-2.68	58.04	74	-15.96
5350	47.55	Ave	117	2.5	V	-2.68	44.87	54	-9.13
5460	63.86	PK	1	1.9	H	-2.14	61.72	74	-12.28
5460	50.18	Ave	1	1.9	H	-2.14	48.04	54	-5.96
5460	61.68	PK	13	1.8	V	-2.14	59.54	74	-14.46
5460	47.99	Ave	13	1.8	V	-2.14	45.85	54	-8.15
10480	44.83	PK	297	1.7	H	6.26	51.09	68.2	-17.11
10480	42.62	PK	146	1.7	V	6.26	48.88	68.2	-19.32

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	PK/QP/Ave.	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5180 MHz									
4500	66.76	PK	249	2	H	-5.53	61.23	74	-12.77
4500	52.94	Ave	249	2	H	-5.53	47.41	54	-6.59
4500	64.64	PK	7	1.3	V	-5.53	59.11	74	-14.89
4500	50.75	Ave	7	1.3	V	-5.53	45.22	54	-8.78
5150	64.00	PK	140	2.3	H	-3.54	60.46	74	-13.54
5150	49.84	Ave	140	2.3	H	-3.54	46.30	54	-7.7
5150	61.80	PK	222	2.3	V	-3.54	58.26	74	-15.74
5150	47.68	Ave	222	2.3	V	-3.54	44.14	54	-9.86
10360	44.14	PK	73	1	H	5.83	49.97	68.2	-18.23
10360	42.03	PK	10	1	V	5.83	47.86	68.2	-20.34
5200 MHz									
10400	43.97	PK	120	1.7	H	5.94	49.91	68.2	-18.29
10400	41.80	PK	318	1.7	V	5.94	47.74	68.2	-20.46
5240 MHz									
5350	62.55	PK	232	1.4	H	-2.68	59.87	74	-14.13
5350	49.84	Ave	232	1.4	H	-2.68	47.16	54	-6.84
5350	60.20	PK	245	1.3	V	-2.68	57.52	74	-16.48
5350	47.71	Ave	245	1.3	V	-2.68	45.03	54	-8.97
5460	63.85	PK	32	1.4	H	-2.14	61.71	74	-12.29
5460	50.43	Ave	32	1.4	H	-2.14	48.29	54	-5.71
5460	61.58	PK	16	2.3	V	-2.14	59.44	74	-14.56
5460	48.25	Ave	16	2.3	V	-2.14	46.11	54	-7.89
10480	43.34	PK	142	1.7	H	6.26	49.60	68.2	-18.6
10480	41.12	PK	95	1.7	V	6.26	47.38	68.2	-20.82

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	PK/QP/Ave.	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5190 MHz									
4500	72.41	PK	316	1.2	H	-5.53	66.88	74	-7.12
4500	57.72	Ave	316	1.2	H	-5.53	52.19	54	-1.81
4500	70.19	PK	60	1.1	V	-5.53	64.66	74	-9.34
4500	55.60	Ave	60	1.1	V	-5.53	50.07	54	-3.93
5150	63.97	PK	259	1.6	H	-3.54	60.43	74	-13.57
5150	52.11	Ave	259	1.6	H	-3.54	48.57	54	-5.43
5150	61.75	PK	102	1.8	V	-3.54	58.21	74	-15.79
5150	49.68	Ave	102	1.8	V	-3.54	46.14	54	-7.86
10380	42.90	PK	171	1.5	H	5.94	48.84	68.2	-19.36
10380	40.83	PK	75	1.5	V	5.94	46.77	68.2	-21.43
5230 MHz									
5350	62.20	PK	199	1.7	H	-2.68	59.52	74	-14.48
5350	50.32	Ave	199	1.7	H	-2.68	47.64	54	-6.36
5350	60.00	PK	280	2.1	V	-2.68	57.32	74	-16.68
5350	48.15	Ave	280	2.1	V	-2.68	45.47	54	-8.53
5460	63.77	PK	220	1	H	-2.14	61.63	74	-12.37
5460	50.47	Ave	220	1	H	-2.14	48.33	54	-5.67
5460	61.65	PK	32	1.3	V	-2.14	59.51	74	-14.49
5460	48.30	Ave	32	1.3	V	-2.14	46.16	54	-7.84
10460	42.92	PK	197	1.7	H	5.99	48.91	68.2	-19.29
10460	40.76	PK	205	1.7	V	5.99	46.75	68.2	-21.45

5250-5350 MHz:

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5260 MHz									
4500	66.46	PK	145	1.8	H	-5.53	60.93	74	-13.07
4500	52.72	Ave	145	1.8	H	-5.53	47.19	54	-6.81
4500	64.17	PK	295	1.8	V	-5.53	58.64	74	-15.36
4500	50.55	Ave	295	1.8	V	-5.53	45.02	54	-8.98
5150	66.04	PK	106	1.8	H	-3.54	62.50	74	-11.5
5150	51.65	Ave	106	1.8	H	-3.54	48.11	54	-5.89
5150	63.65	PK	252	2.2	V	-3.54	60.11	74	-13.89
5150	49.38	Ave	252	2.2	V	-3.54	45.84	54	-8.16
10520	43.29	PK	77	1.8	H	6.20	49.49	68.2	-18.71
10520	41.06	PK	32	1.8	V	6.20	47.26	68.2	-20.94
5280 MHz									
10560	44.03	PK	3	1.8	H	6.11	50.14	68.2	-18.06
10560	41.66	PK	59	1.8	V	6.11	47.77	68.2	-20.43
5320 MHz									
5350	61.91	PK	59	2.3	H	-2.68	59.23	74	-14.77
5350	49.17	Ave	59	2.3	H	-2.68	46.49	54	-7.51
5350	59.65	PK	162	1.9	V	-2.68	56.97	74	-17.03
5350	46.73	Ave	162	1.9	V	-2.68	44.05	54	-9.95
5460	63.72	PK	89	1.5	H	-2.14	61.58	74	-12.42
5460	50.74	Ave	89	1.5	H	-2.14	48.6	54	-5.4
5460	61.17	PK	139	1.7	V	-2.14	59.03	74	-14.97
5460	48.25	Ave	139	1.7	V	-2.14	46.11	54	-7.89
10640	44.09	PK	304	1.8	H	6.29	50.38	74	-23.62
10640	22.01	PK	304	1.8	V	6.29	28.30	54	-25.7

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	PK/QP/Ave.	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5260 MHz									
4500	65.56	PK	260	1.1	H	-5.53	60.03	74	-13.97
4500	52.39	Ave	260	1.1	H	-5.53	46.86	54	-7.14
4500	63.30	PK	97	1.1	V	-5.53	57.77	74	-16.23
4500	50.08	Ave	97	1.1	V	-5.53	44.55	54	-9.45
5150	65.23	PK	86	2.3	H	-3.54	61.69	74	-12.31
5150	51.62	Ave	86	2.3	H	-3.54	48.08	54	-5.92
5150	63.01	PK	228	2.3	V	-3.54	59.47	74	-14.53
5150	49.02	Ave	228	2.3	V	-3.54	45.48	54	-8.52
10520	43.18	PK	357	2	H	6.20	49.38	68.2	-18.82
10520	40.89	PK	11	2	V	6.20	47.09	68.2	-21.11
5280 MHz									
10560	44.24	PK	102	2.5	H	6.11	50.35	68.2	-17.85
10560	42.08	PK	52	2.5	V	6.11	48.19	68.2	-20.01
5320 MHz									
5350	63.15	PK	201	1.5	H	-2.68	60.47	74	-13.53
5350	49.92	Ave	201	1.5	H	-2.68	47.24	54	-6.76
5350	60.70	PK	64	1.1	V	-2.68	58.02	74	-15.98
5350	47.58	Ave	64	1.1	V	-2.68	44.9	54	-9.1
5460	64.03	PK	84	1.8	H	-2.14	61.89	74	-12.11
5460	50.69	Ave	84	1.8	H	-2.14	48.55	54	-5.45
5460	61.52	PK	192	1.9	V	-2.14	59.38	74	-14.62
5460	48.28	Ave	192	1.9	V	-2.14	46.14	54	-7.86
10640	44.19	PK	231	1	H	6.29	50.48	74	-23.52
10640	22.00	PK	231	1	V	6.29	28.29	54	-25.71

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5270 MHz									
4500	66.26	PK	161	1.1	H	-5.53	60.73	74	-13.27
4500	53.07	Ave	161	1.1	H	-5.53	47.54	54	-6.46
4500	63.88	PK	125	2.2	V	-5.53	58.35	74	-15.65
4500	50.62	Ave	125	2.2	V	-5.53	45.09	54	-8.91
5150	64.99	PK	5	2.4	H	-3.54	61.45	74	-12.55
5150	52.17	Ave	5	2.4	H	-3.54	48.63	54	-5.37
5150	62.68	PK	61	1.3	V	-3.54	59.14	74	-14.86
5150	49.75	Ave	61	1.3	V	-3.54	46.21	54	-7.79
10540	43.19	PK	2	1.5	H	6.09	49.28	68.2	-18.92
10540	40.77	PK	255	1.5	V	6.09	46.86	68.2	-21.34
5310 MHz									
5350	62.77	PK	43	2.2	H	-2.68	60.09	74	-13.91
5350	50.05	Ave	43	2.2	H	-2.68	47.37	54	-6.63
5350	60.32	PK	61	2.5	V	-2.68	57.64	74	-16.36
5350	47.69	Ave	61	2.5	V	-2.68	45.01	54	-8.99
5460	69.45	PK	199	2.3	H	-2.14	67.31	74	-6.69
5460	54.50	Ave	199	2.3	H	-2.14	52.36	54	-1.64
5460	67.23	PK	256	1.8	V	-2.14	65.09	74	-8.91
5460	52.82	Ave	256	1.8	V	-2.14	50.68	54	-3.32
10620	43.83	PK	228	2	H	6.29	50.12	74	-23.88
10620	21.52	PK	228	2	V	6.29	27.81	54	-26.19

5470-5725MHz:

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5500 MHz									
5400	68.56	PK	227	1.8	H	-2.34	66.22	74	-7.78
5400	52.18	Ave	227	1.8	H	-2.34	49.84	54	-4.16
5400	66.48	PK	176	1.6	V	-2.34	64.14	74	-9.86
5400	50.22	Ave	176	1.6	V	-2.34	47.88	54	-6.12
5470	65.94	PK	332	2.4	H	-2.11	63.83	68.2	-4.37
5470	63.86	PK	3	2.4	V	-2.11	61.75	68.2	-6.45
11000	42.98	PK	276	2	H	7.53	50.51	74	-23.49
11000	41.44	PK	112	2.3	V	7.53	48.97	74	-25.03
5580 MHz									
11160	42.05	PK	89	1.4	H	7.99	50.04	74	-23.96
11160	39.52	PK	114	1.3	V	7.99	47.51	74	-26.49
5700 MHz									
5725	60.99	PK	326	1.6	H	1.68	62.67	68.2	-5.53
5725	58.88	PK	144	2.1	V	1.68	60.56	68.2	-7.64
5745	64.88	PK	210	2.4	H	2.24	67.12	68.2	-1.08
5745	62.91	PK	4	1.2	V	2.24	65.15	68.2	-3.05
11400	42.20	PK	58	1.1	H	8.88	51.08	74	-22.92
11400	39.18	PK	351	1.5	V	8.88	48.06	74	-25.94

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5500 MHz									
5400	71.31	PK	121	2.2	H	-2.34	68.97	74	-5.03
5400	54.42	Ave	121	2.2	H	-2.34	52.08	54	-1.92
5400	69.09	PK	184	1.5	V	-2.34	66.75	74	-7.25
5400	52.21	Ave	184	1.5	V	-2.34	49.87	54	-4.13
5470	64.79	PK	100	2.3	H	-2.11	62.68	68.2	-5.52
5470	62.63	PK	339	1.8	V	-2.11	60.52	68.2	-7.68
11000	42.92	PK	43	2	H	7.53	50.45	74	-23.55
11000	40.74	PK	311	1.2	V	7.53	48.27	74	-25.73
5580 MHz									
11160	42.47	PK	185	2.5	H	7.99	50.46	74	-23.54
11160	40.38	PK	180	1.6	V	7.99	48.37	74	-25.63
5700 MHz									
5725	60.34	PK	212	1.3	H	1.68	62.02	68.2	-6.18
5725	58.16	PK	275	2.4	V	1.68	59.84	68.2	-8.36
5745	64.94	PK	174	1.5	H	2.24	67.18	68.2	-1.02
5745	62.85	PK	228	1.1	V	2.24	65.09	68.2	-3.11
11400	42.01	PK	280	1	H	8.88	50.89	74	-23.11
11400	39.42	PK	166	2.1	V	8.88	48.30	74	-25.7

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5510 MHz									
5400	68.78	PK	199	2.5	H	-2.34	66.44	74	-7.56
5400	51.85	Ave	199	2.5	H	-2.34	49.51	54	-4.49
5400	66.47	PK	201	2.4	V	-2.34	64.13	74	-9.87
5400	49.58	Ave	201	2.4	V	-2.34	47.24	54	-6.76
5470	66.38	PK	83	2	H	-2.11	64.27	68.2	-3.93
5470	63.46	PK	98	1.2	V	-2.11	61.35	68.2	-6.85
11020	42.88	PK	311	1.2	H	7.54	50.42	74	-23.58
11020	40.58	PK	84	1.9	V	7.54	48.12	74	-25.88
5550 MHz									
11100	41.87	PK	268	2.3	H	7.72	49.59	74	-24.41
11100	39.51	PK	222	2	V	7.72	47.23	74	-26.77
5670 MHz									
5725	62.03	PK	300	1.6	H	1.68	63.71	68.2	-4.49
5725	59.57	PK	155	1.7	V	1.68	61.25	68.2	-6.95
5745	61.49	PK	300	2.5	H	2.24	63.73	68.2	-4.47
5745	59.03	PK	234	1.3	V	2.24	61.27	68.2	-6.93
11340	41.57	PK	162	2	H	8.94	50.51	74	-23.49
11340	39.25	PK	101	1.9	V	8.94	48.19	74	-25.81

5725-5850 MHz:

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5745 MHz									
5725	79.55	PK	301	2.5	H	1.68	81.23	122.2	-40.97
5725	77.21	PK	348	2.5	V	1.68	78.89	122.2	-43.31
5720	72.48	PK	1	2.1	H	1.68	74.16	110.8	-36.64
5720	70.23	PK	241	2.3	V	1.68	71.91	110.8	-38.89
5700	70.21	PK	10	1.5	H	1.18	71.39	105.2	-33.81
5700	68.00	PK	311	1.2	V	1.18	69.18	105.2	-36.02
5650	62.07	PK	342	1.2	H	-0.65	61.42	68.2	-6.78
5650	59.73	PK	52	2.3	V	-0.65	59.08	68.2	-9.12
11490	40.68	PK	263	1.9	H	8.97	49.65	74	-24.35
11490	37.89	PK	67	2	V	8.97	46.86	74	-27.14
5785 MHz									
11570	40.34	PK	208	1.4	H	9.05	49.39	74	-24.61
11570	37.38	PK	181	2.4	V	9.05	46.43	74	-27.57
5825 MHz									
5850	76.71	PK	218	1.6	H	0.74	77.45	122.2	-44.75
5850	74.43	PK	184	2.4	V	0.74	75.17	122.2	-47.03
5855	65.71	PK	147	2.3	H	0.74	66.45	110.8	-44.35
5855	63.27	PK	331	1.6	V	0.74	64.01	110.8	-46.79
5875	68.04	PK	228	1.4	H	0.37	68.41	105.2	-36.79
5875	65.73	PK	41	1.5	V	0.37	66.10	105.2	-39.1
5925	64.75	PK	287	1.9	H	-0.43	64.32	68.2	-3.88
5925	62.17	PK	297	2.1	V	-0.43	61.74	68.2	-6.46
11650	39.02	PK	185	1.9	H	9.07	48.09	74	-25.91
11650	35.98	PK	6	2.2	V	9.07	45.05	74	-28.95

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5745 MHz									
5725	78.47	PK	293	1.8	H	1.68	80.15	122.2	-42.05
5725	75.65	PK	142	1.8	V	1.68	77.33	122.2	-44.87
5720	72.37	PK	145	1.8	H	1.68	74.05	110.8	-36.75
5720	70.17	PK	124	2.2	V	1.68	71.85	110.8	-38.95
5700	70.96	PK	42	1.5	H	1.18	72.14	105.2	-33.06
5700	68.16	PK	289	2	V	1.18	69.34	105.2	-35.86
5650	62.81	PK	161	2.3	H	-0.65	62.16	68.2	-6.04
5650	60.50	PK	24	1.8	V	-0.65	59.85	68.2	-8.35
11490	40.81	PK	33	2.5	H	8.97	49.78	74	-24.22
11490	38.14	PK	64	1.9	V	8.97	47.11	74	-26.89
5785 MHz									
11570	41.09	PK	200	1.2	H	9.05	50.14	74	-23.86
11570	39.04	PK	198	1.7	V	9.05	48.09	74	-25.91
5825 MHz									
5850	71.14	PK	134	2.4	H	0.74	71.88	122.2	-50.32
5850	69.33	PK	132	2.4	V	0.74	70.07	122.2	-52.13
5855	65.13	PK	274	1.1	H	0.74	65.87	110.8	-44.93
5855	62.74	PK	221	1.1	V	0.74	63.48	110.8	-47.32
5875	65.45	PK	322	2.4	H	0.37	65.82	105.2	-39.38
5875	62.97	PK	63	1.4	V	0.37	63.34	105.2	-41.86
5925	64.65	PK	309	1.4	H	-0.43	64.22	68.2	-3.98
5925	62.47	PK	23	1.7	V	-0.43	62.04	68.2	-6.16
11650	39.94	PK	37	1.6	H	9.07	49.01	74	-24.99
11650	37.00	PK	15	2.1	V	9.07	46.07	74	-27.93

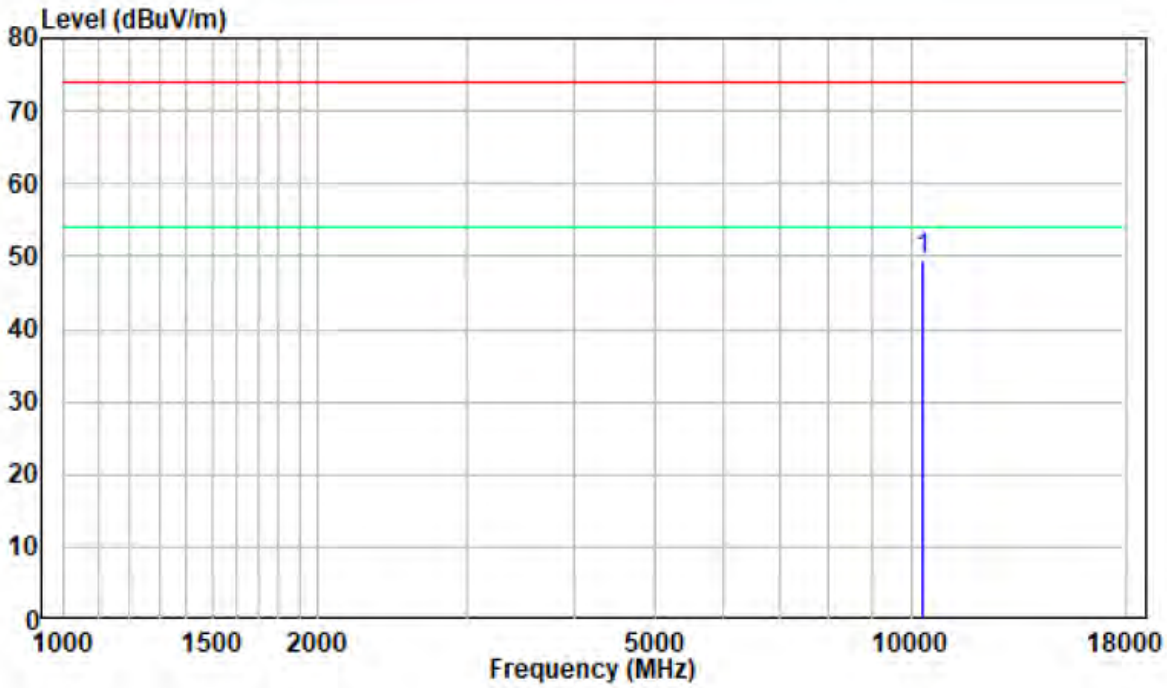
Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	PK/QP/Ave.	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5755 MHz									
5725	72.21	PK	213	2.1	H	1.68	73.89	122.2	-48.31
5725	69.63	PK	312	2.1	V	1.68	71.31	122.2	-50.89
5720	65.11	PK	301	1.5	H	1.68	66.79	110.8	-44.01
5720	62.33	PK	203	2.4	V	1.68	64.01	110.8	-46.79
5700	61.86	PK	14	1.9	H	1.18	63.04	105.2	-42.16
5700	59.37	PK	360	1.8	V	1.18	60.55	105.2	-44.65
5650	64.75	PK	22	2.1	H	-0.65	64.10	68.2	-4.1
5650	62.61	PK	182	1	V	-0.65	61.96	68.2	-6.24
11510	41.85	PK	78	1.7	H	8.97	50.82	74	-23.18
11510	39.53	PK	339	2	V	8.97	48.50	74	-25.5
5795 MHz									
5850	70.56	PK	34	1.8	H	0.74	71.30	122.2	-50.9
5850	68.22	PK	115	2.5	V	0.74	68.96	122.2	-53.24
5855	64.67	PK	125	1.2	H	0.74	65.41	110.8	-45.39
5855	62.52	PK	63	1.5	V	0.74	63.26	110.8	-47.54
5875	70.52	PK	193	1.4	H	0.37	70.89	105.2	-34.31
5875	68.41	PK	92	2.3	V	0.37	68.78	105.2	-36.42
5925	65.20	PK	282	2.4	H	-0.43	64.77	68.2	-3.43
5925	62.99	PK	309	2	V	-0.43	62.56	68.2	-5.64
11590	41.64	PK	129	2.4	H	9.09	50.73	74	-23.27
11590	39.36	PK	42	1.4	V	9.09	48.45	74	-25.55

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Corrected. Amplitude - Limit
The other spurious emission which is in the noise floor level was not recorded.
The test result of peak was less than the limit of average, so just peak values were recorded.

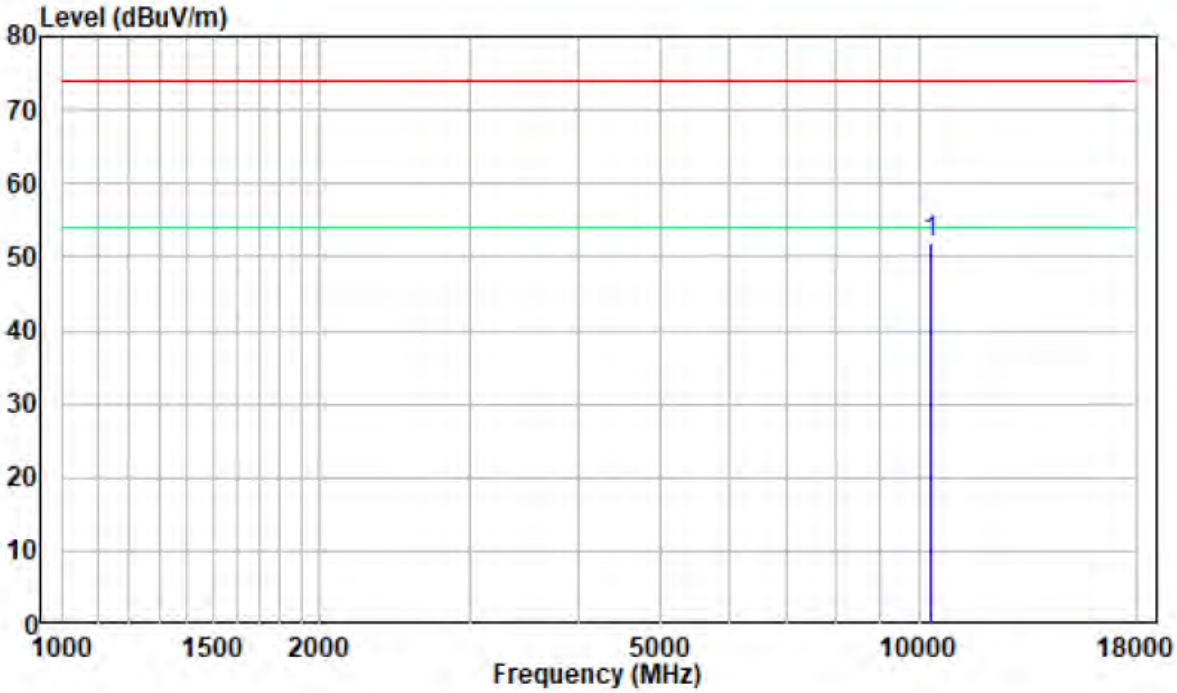
1-18GHz

Pre-scan for 802.11a, 5180MHz

Horizontal:



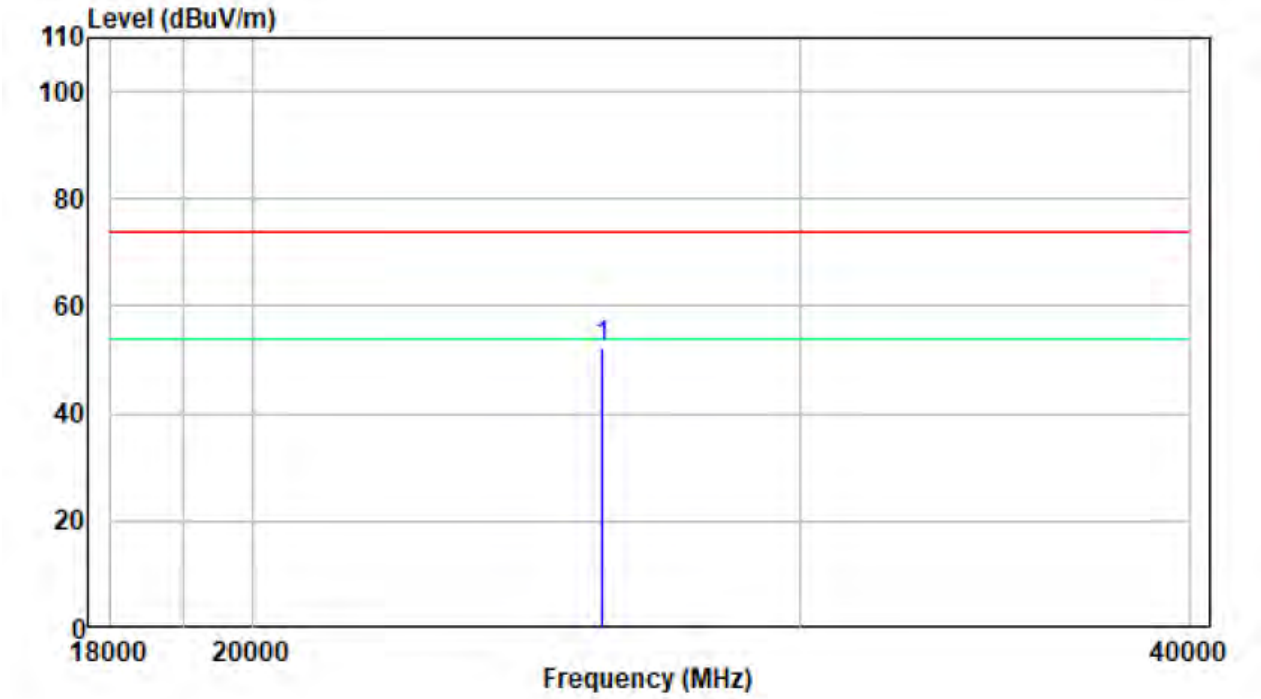
Vertical:



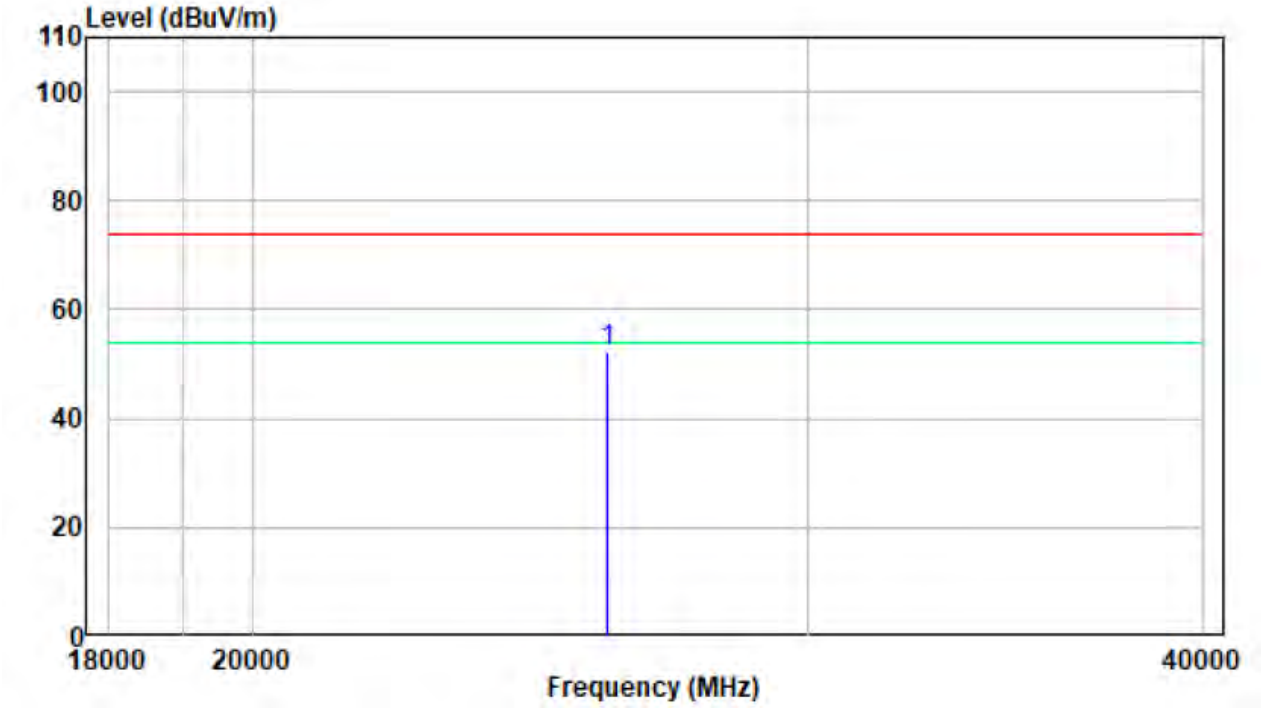
18-40GHz

Pre-scan for 802.11a, 5180MHz

Horizontal:



Vertical:



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

Applicable Standard

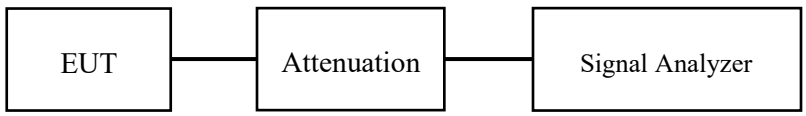
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

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

Test Procedure

1. Emission Bandwidth (EBW)
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 ℃
Relative Humidity:	61 %
ATM Pressure:	101.0 kPa

The testing was performed by Black Ding from on 2021-10-10.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

FCC §15.407(a) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

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

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

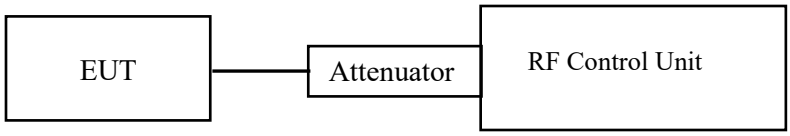
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

c. Place the EUT on a bench and set it in transmitting mode.

d. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.

e. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	61 %
ATM Pressure:	101.0 kPa

The testing was performed by Black Ding from on 2021-10-10.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

FCC §15.407(a) - POWER SPECTRAL DENSITY

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

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

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	61 %
ATM Pressure:	101.0 kPa

The testing was performed by Black Ding from on 2021-11-25.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

APPENDIX

Appendix A1: Emission Bandwidth

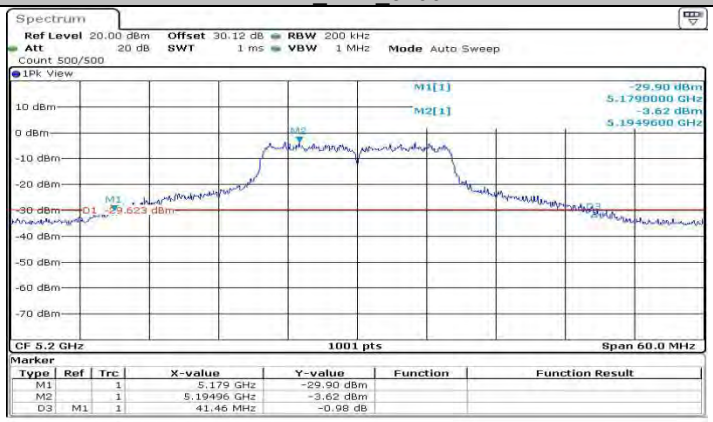
Test Result

Test Mode	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	43.140	---	PASS
		5200	41.460	---	PASS
		5240	40.620	---	PASS
		5260	43.320	---	PASS
		5280	41.040	---	PASS
		5320	47.100	---	PASS
		5500	42.480	---	PASS
		5580	59.760	---	PASS
		5700	35.520	---	PASS
11N20SISO	Ant1	5180	42.540	---	PASS
		5200	44.400	---	PASS
		5240	43.680	---	PASS
		5260	44.400	---	PASS
		5280	45.600	---	PASS
		5320	48.540	---	PASS
		5500	31.020	---	PASS
		5580	31.020	---	PASS
		5700	27.720	---	PASS
11N40SISO	Ant1	5190	87.000	---	PASS
		5230	88.100	---	PASS
		5270	84.600	---	PASS
		5310	89.200	---	PASS
		5510	58.100	---	PASS
		5550	61.800	---	PASS
		5670	59.000	---	PASS

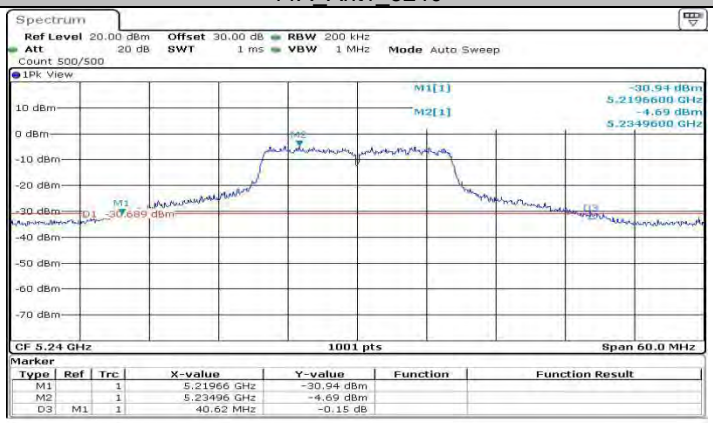
Test Graphs

11A_Ant1_5180

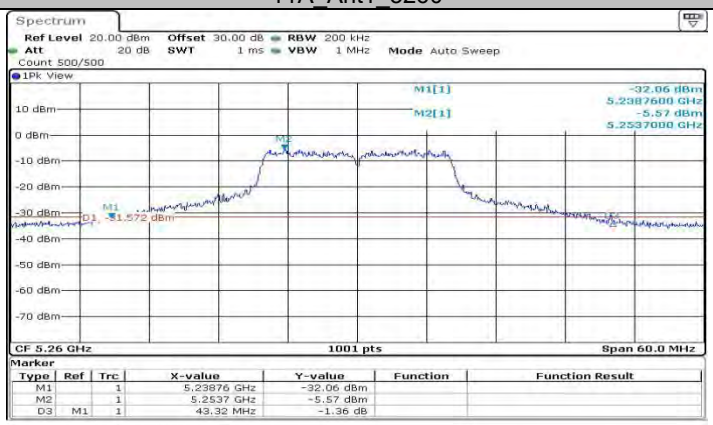
11A_Ant1_5200



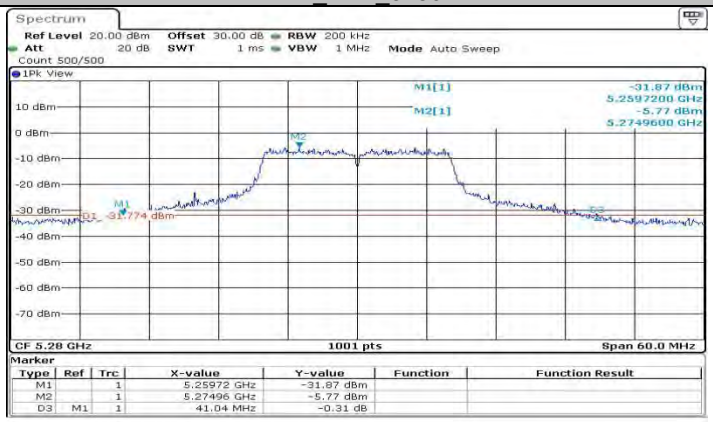
11A_Ant1_5240



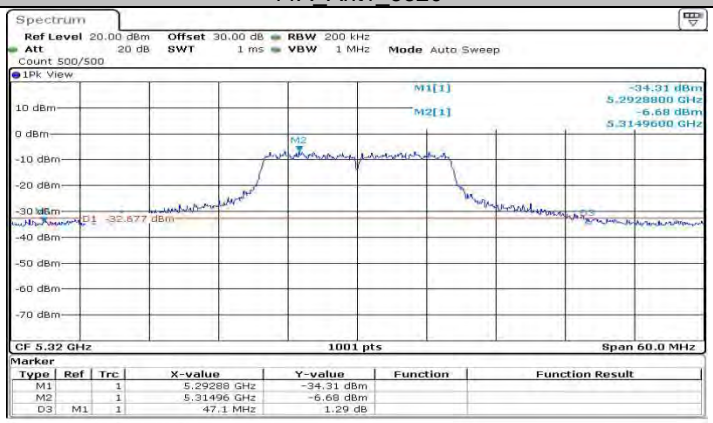
11A_Ant1_5260



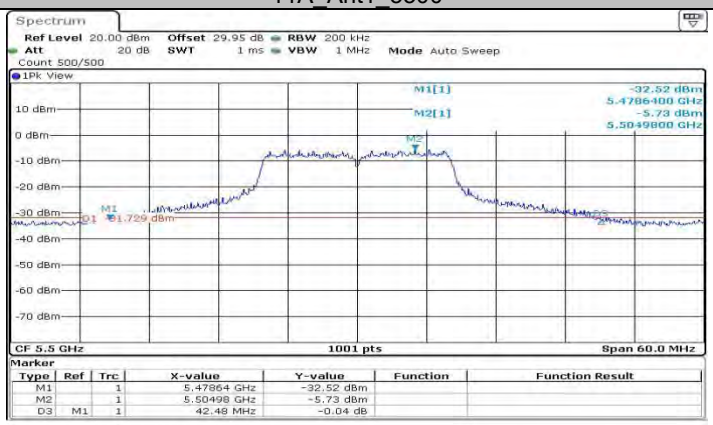
11A_Ant1_5280



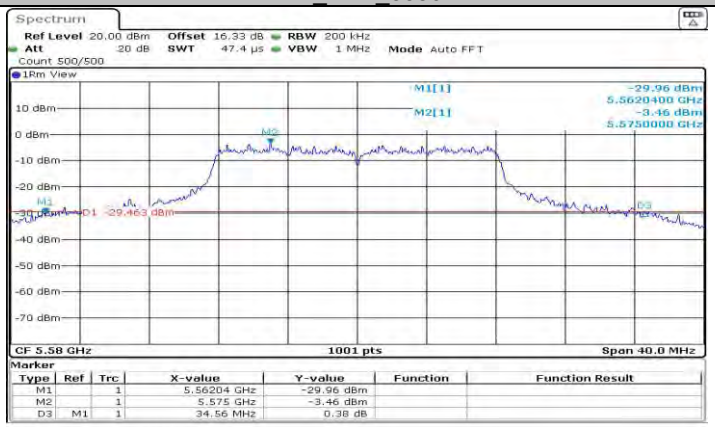
11A_Ant1_5320



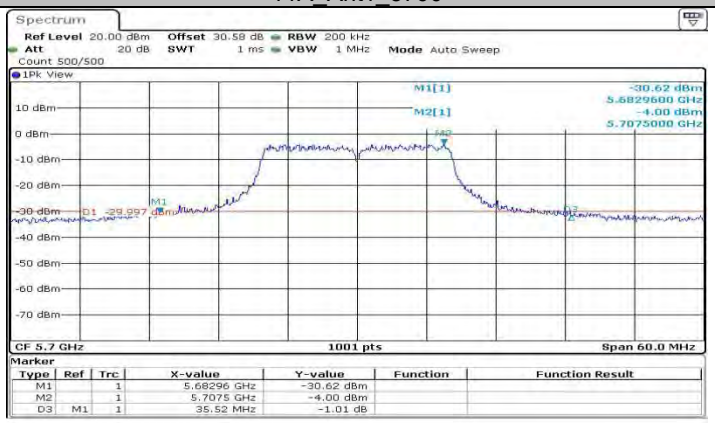
11A_Ant1_5500



11A_Ant1_5580



11A_Ant1_5700



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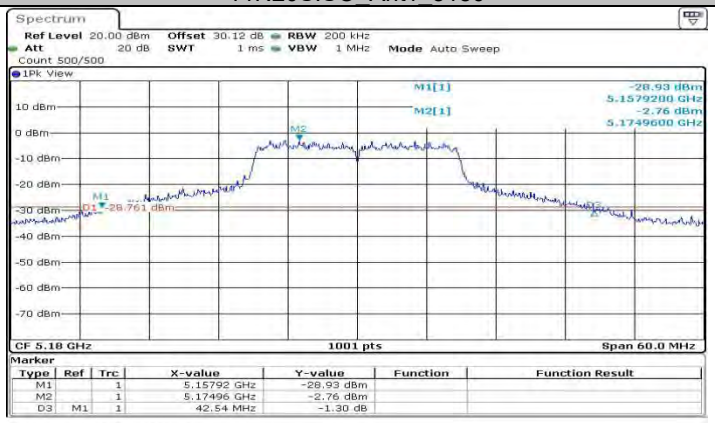
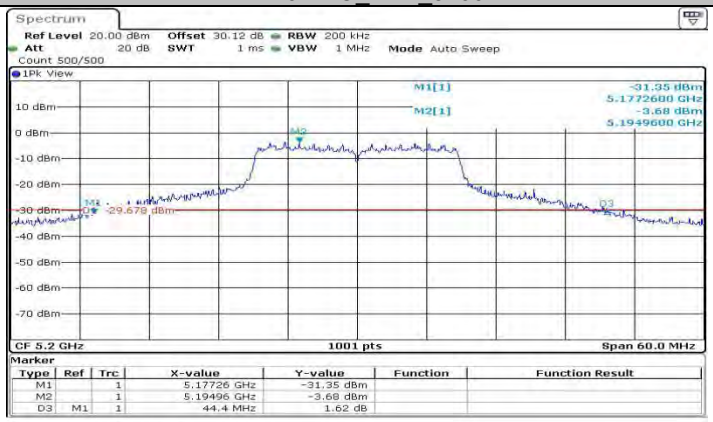
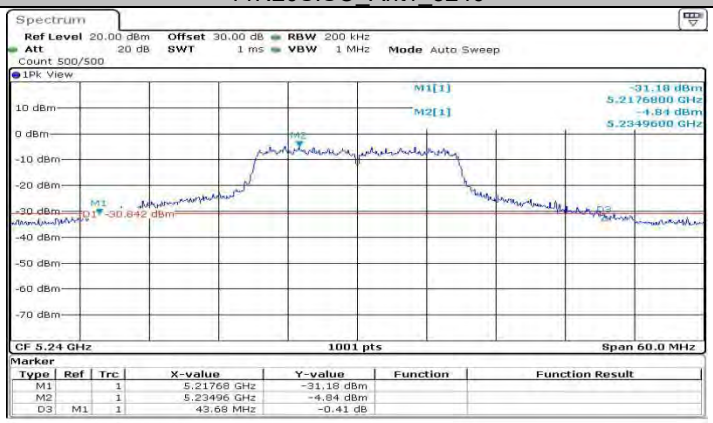


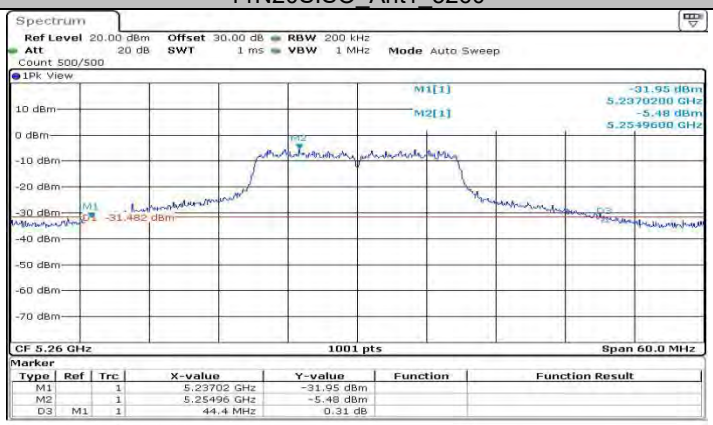
11N20SISO_Ant1_5200



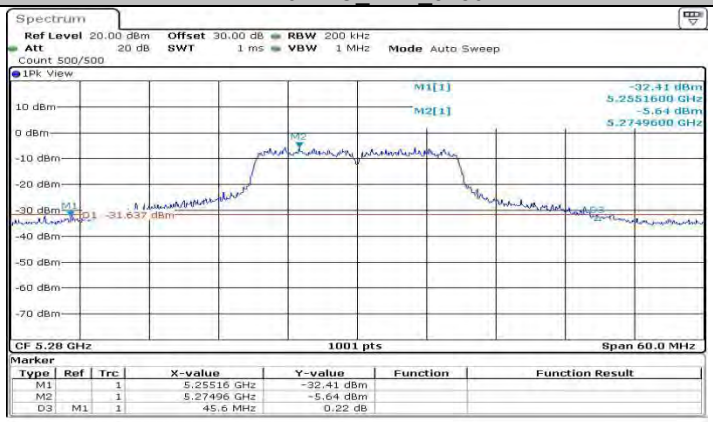
11N20SISO_Ant1_5240



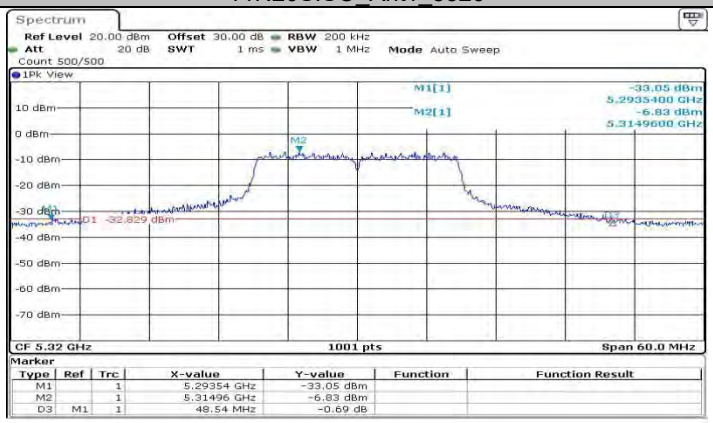
11N20SISO_Ant1_5260



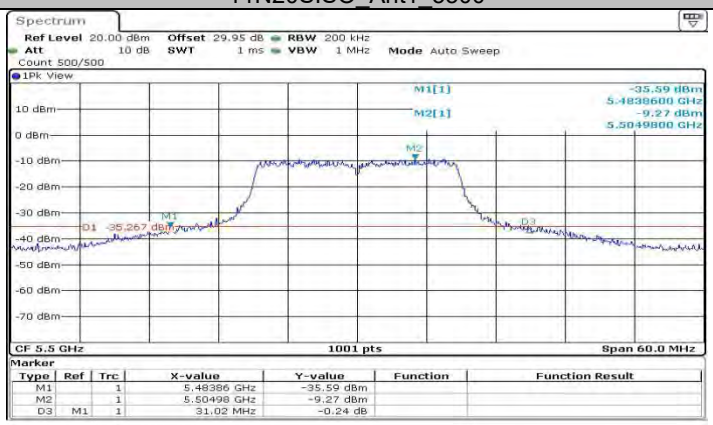
11N20SISO_Ant1_5280



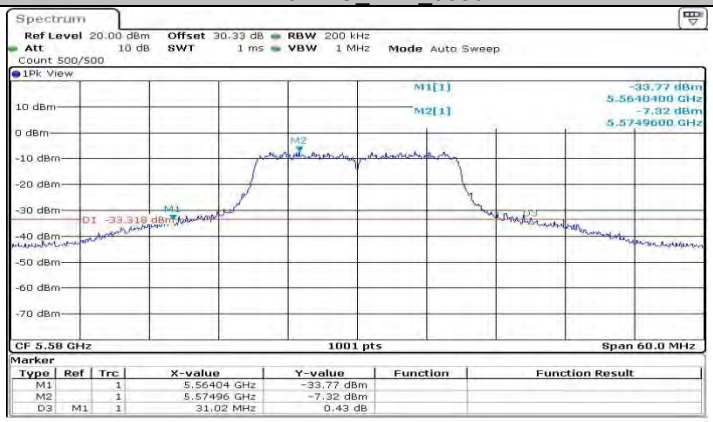
11N20SISO_Ant1_5320



11N20SISO_Ant1_5500



11N20SISO_Ant1_5580



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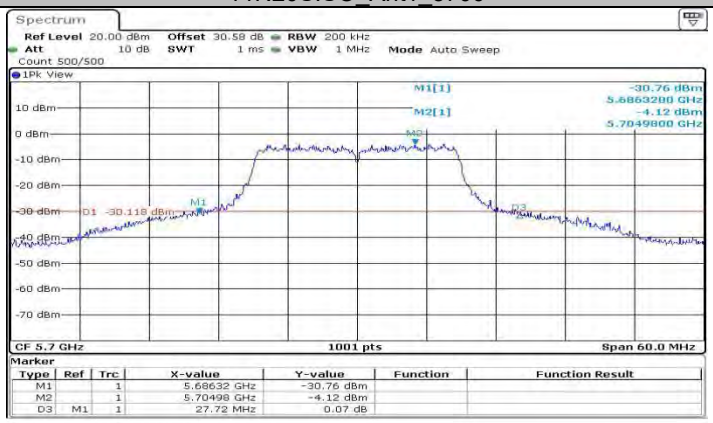
11N20SISO_Ant1_5700



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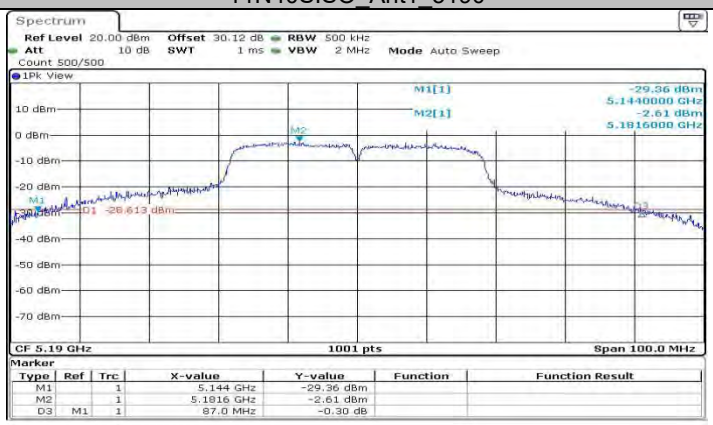
11N40SISO_Ant1_5190



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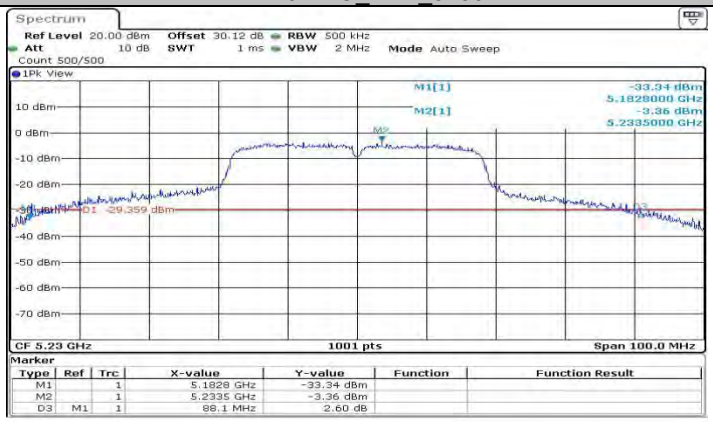
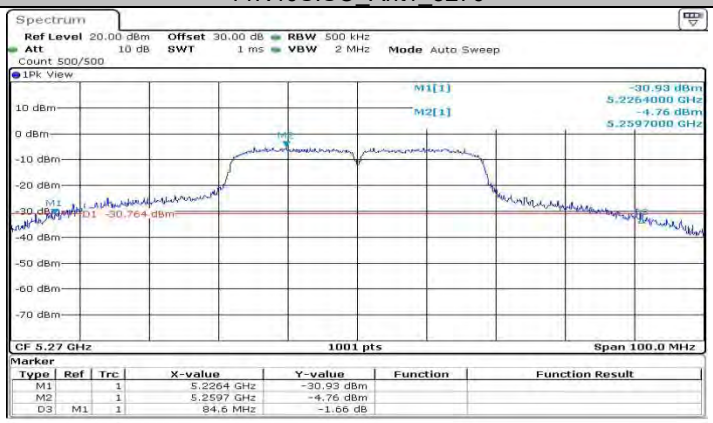


11N40SISO_Ant1_5270



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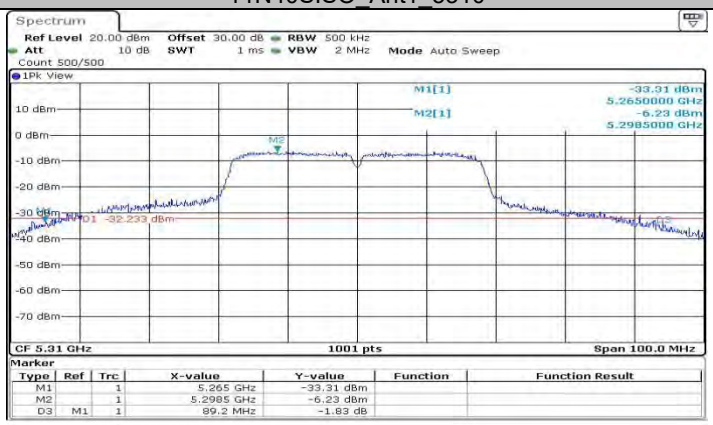

11N40SISO_Ant1_5510

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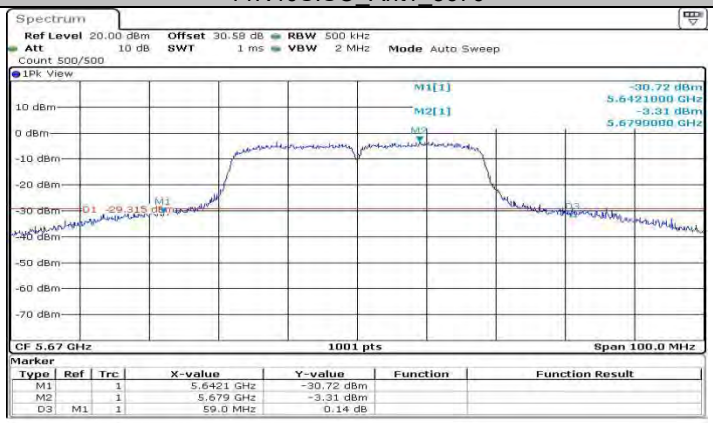
11N40SISO_Ant1_5550

Date: 10.OCT.2021 21:03:16

11N40SISO_Ant1_5670



Date: 10.OCT.2021 21:04:29

Appendix A2: Occupied channel bandwidth

Test Result

Test Mode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	25.694	---	PASS
		5200	26.094	---	PASS
		5240	24.336	---	PASS
		5260	24.496	---	PASS
		5280	23.457	---	PASS
		5320	22.857	---	PASS
		5500	24.216	---	PASS
		5580	19.54	---	PASS
		5700	18.981	---	PASS
		5745	18.821	---	PASS
		5785	19.101	---	PASS
		5825	18.581	---	PASS
11N20SISO	Ant1	5180	26.494	---	PASS
		5200	26.973	---	PASS
		5240	25.255	---	PASS
		5260	25.055	---	PASS
		5280	24.136	---	PASS
		5320	23.736	---	PASS
		5500	20.42	---	PASS
		5580	20.06	---	PASS
		5700	19.62	---	PASS
		5745	19.62	---	PASS
		5785	19.78	---	PASS
		5825	19.221	---	PASS
11N40SISO	Ant1	5190	50.35	---	PASS
		5230	48.272	---	PASS
		5270	47.313	---	PASS
		5310	46.114	---	PASS
		5510	42.677	---	PASS
		5550	40.999	---	PASS
		5670	38.601	---	PASS
		5755	38.122	---	PASS
		5795	38.442	---	PASS

Test Graphs

11A_Ant1_5180

11A_Ant1_5200

11A_Ant1_5240

11A_Ant1_5260

11A_Ant1_5280

11A_Ant1_5320

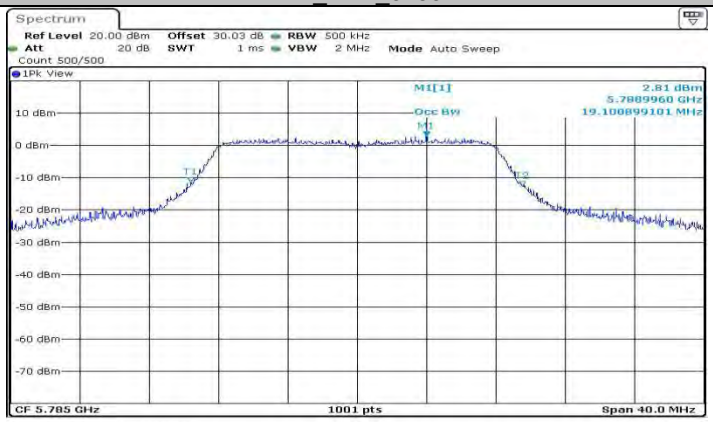
11A_Ant1_5500

11A_Ant1_5580

11A_Ant1_5700

11A_Ant1_5745

11A_Ant1_5785



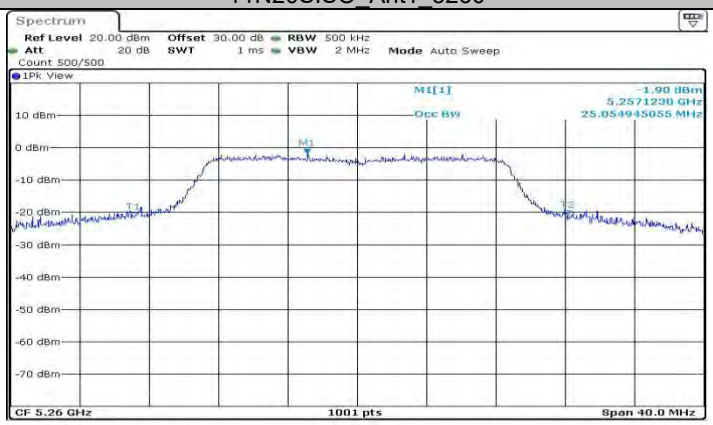
11A_Ant1_5825

11N20SISO_Ant1_5180

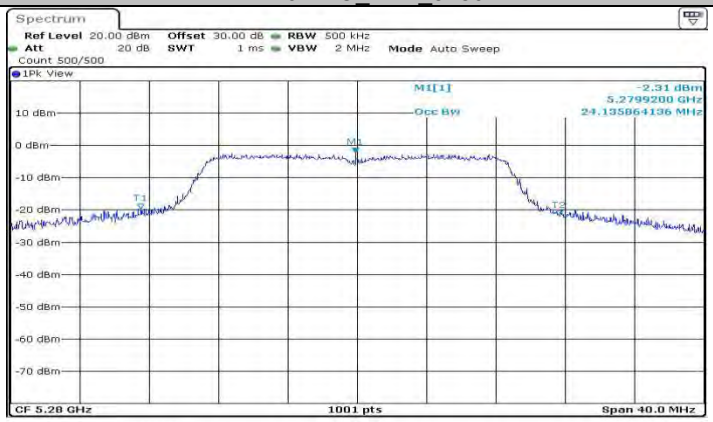
11N20SISO_Ant1_5200

11N20SISO_Ant1_5240

11N20SISO_Ant1_5260

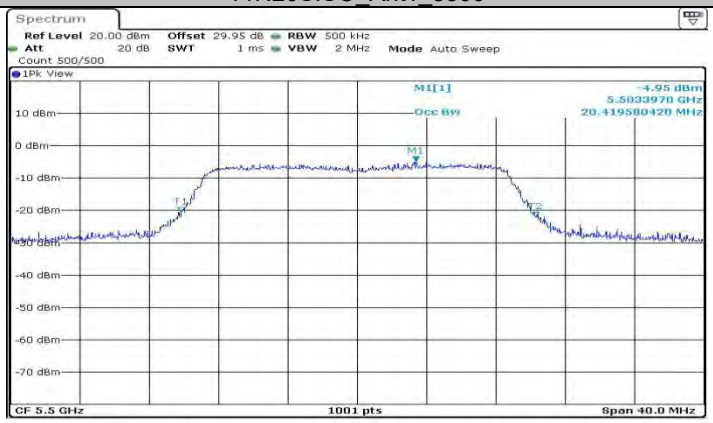


11N20SISO_Ant1_5280



11N20SISO_Ant1_5320

11N20SISO_Ant1_5500

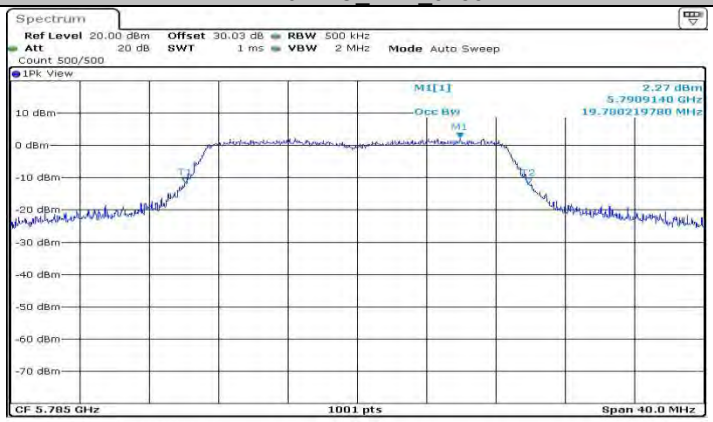


11N20SISO_Ant1_5580

11N20SISO_Ant1_5700

11N20SISO_Ant1_5745

11N20SISO_Ant1_5785



11N20SISO_Ant1_5825

11N40SISO_Ant1_5190

11N40SISO_Ant1_5230

11N40SISO_Ant1_5270

11N40SISO_Ant1_5310

11N40SISO_Ant1_5510

11N40SISO_Ant1_5550

11N40SISO_Ant1_5670

11N40SISO_Ant1_5755
11N40SISO_Ant1_5795

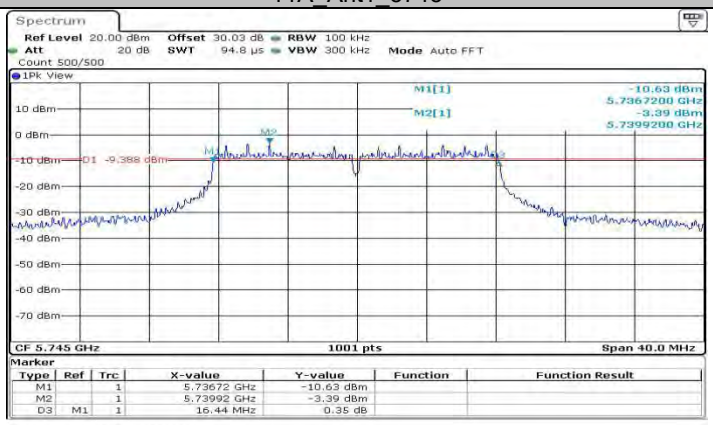
Appendix A3: Min emission bandwidth

Test Result

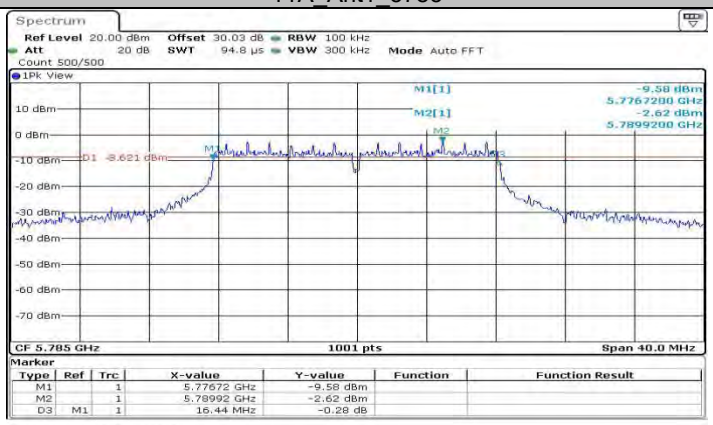
Test Mode	Antenna	Channel	6db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	16.440	0.5	PASS
		5785	16.440	0.5	PASS
		5825	16.440	0.5	PASS
11N20SISO	Ant1	5745	17.640	0.5	PASS
		5785	17.640	0.5	PASS
		5825	17.640	0.5	PASS
11N40SISO	Ant1	5755	35.280	0.5	PASS
		5795	35.360	0.5	PASS

Test Graphs

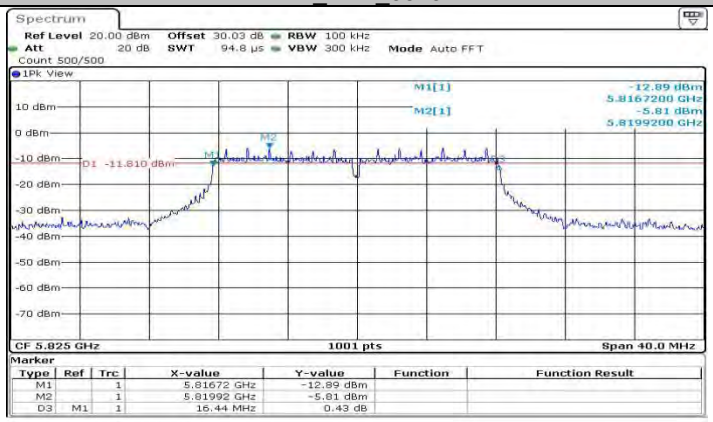
11A_Ant1_5745



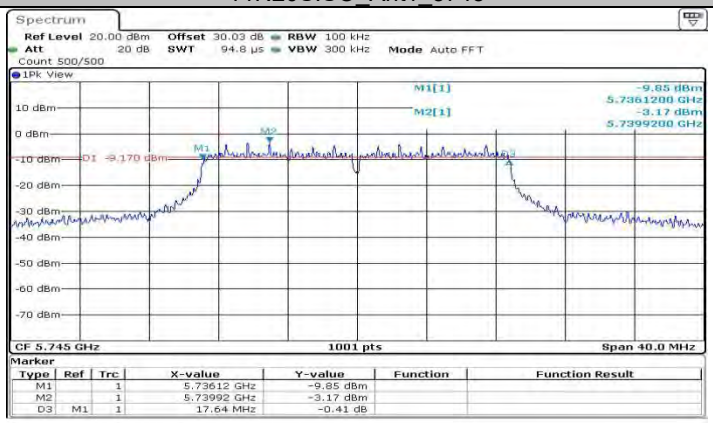
11A_Ant1_5785



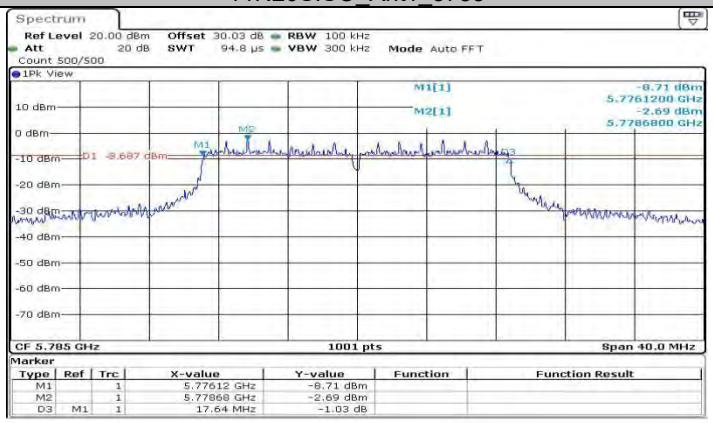
11A_Ant1_5825



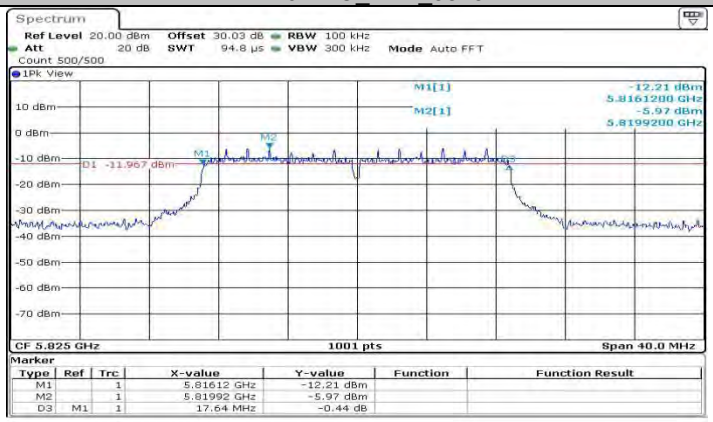
11N20SISO_Ant1_5745



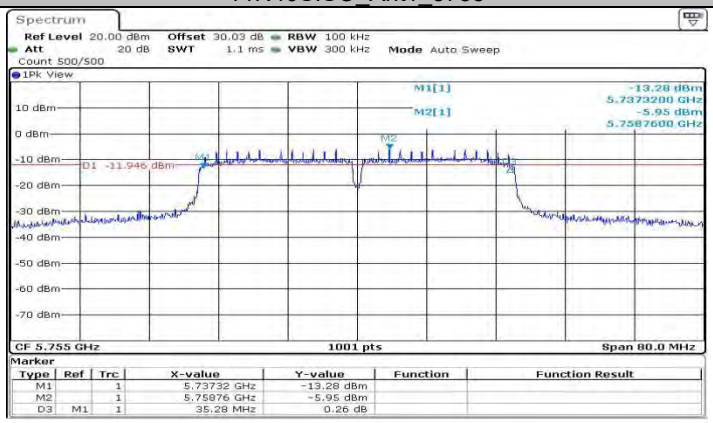
11N20SISO_Ant1_5785



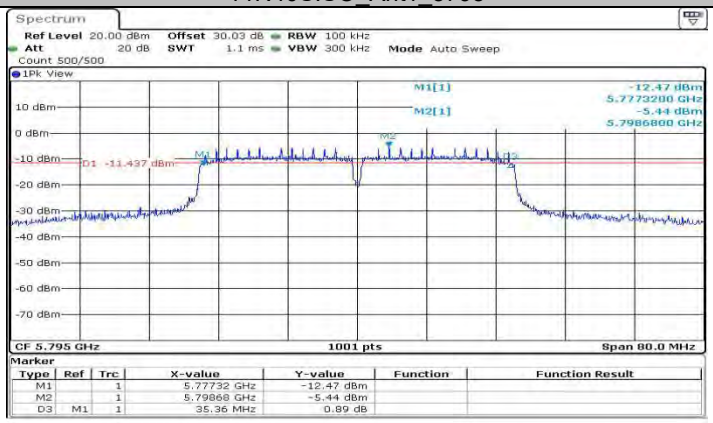
11N20SISO_Ant1_5825



11N40SISO_Ant1_5755



11N40SISO_Ant1_5795



Appendix B: Maximum conducted output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11A	Ant1	5180	9.08	≤23.98	PASS
		5200	11.22	≤23.98	PASS
		5240	11.21	≤23.98	PASS
		5260	10.31	≤23.98	PASS
		5280	9.44	≤23.98	PASS
		5320	9.81	≤23.98	PASS
		5500	11.43	≤23.98	PASS
		5580	11.56	≤23.98	PASS
		5700	10.32	≤23.98	PASS
		5745	11.24	≤30	PASS
		5785	11.36	≤30	PASS
		5825	11.66	≤30	PASS
11N20SISO	Ant1	5180	8.99	≤23.98	PASS
		5200	8.95	≤23.98	PASS
		5240	11.06	≤23.98	PASS
		5260	10.29	≤23.98	PASS
		5280	9.39	≤23.98	PASS
		5320	9.80	≤23.98	PASS
		5500	11.44	≤23.98	PASS
		5580	11.65	≤23.98	PASS
		5700	10.29	≤23.98	PASS
		5745	11.42	≤30	PASS
		5785	11.30	≤30	PASS
		5825	11.18	≤30	PASS
11N40SISO	Ant1	5190	12.89	≤23.98	PASS
		5230	11.31	≤23.98	PASS
		5270	10.14	≤23.98	PASS
		5310	10.56	≤23.98	PASS
		5510	11.60	≤23.98	PASS
		5550	11.58	≤23.98	PASS
		5670	11.91	≤23.98	PASS
		5755	12.52	≤30	PASS
		5795	11.87	≤30	PASS

Appendix C: Maximum power spectral density

Test Result

TestMode	Antenna	Channel	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5180	-2.8	≤11	PASS
		5200	-0.64	≤11	PASS
		5240	-0.58	≤11	PASS
		5260	-1.71	≤11	PASS
		5280	-2.23	≤11	PASS
		5320	-2.14	≤11	PASS
		5500	-0.46	≤11	PASS
		5580	-0.13	≤11	PASS
		5700	-1.49	≤11	PASS
		5745	-4.19	≤30	PASS
		5785	-3.97	≤30	PASS
		5825	-3.41	≤30	PASS
11N20SISO	Ant1	5180	-3.2	≤11	PASS
		5200	-3.45	≤11	PASS
		5240	-1.06	≤11	PASS
		5260	-1.82	≤11	PASS
		5280	-2.44	≤11	PASS
		5320	-2.37	≤11	PASS
		5500	-0.66	≤11	PASS
		5580	-0.32	≤11	PASS
		5700	-1.82	≤11	PASS
		5745	-4.29	≤30	PASS
		5785	-4.32	≤30	PASS
		5825	-4.35	≤30	PASS
11N40SISO	Ant1	5190	-2.24	≤11	PASS
		5230	-3.6	≤11	PASS
		5270	-4.61	≤11	PASS
		5310	-4.27	≤11	PASS
		5510	-3.44	≤11	PASS
		5550	-3.6	≤11	PASS
		5670	-2.75	≤11	PASS
		5755	-4.86	≤30	PASS
		5795	-5.73	≤30	PASS

Note: 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.
2.The Duty Cycle Factor is compensated in the graph.

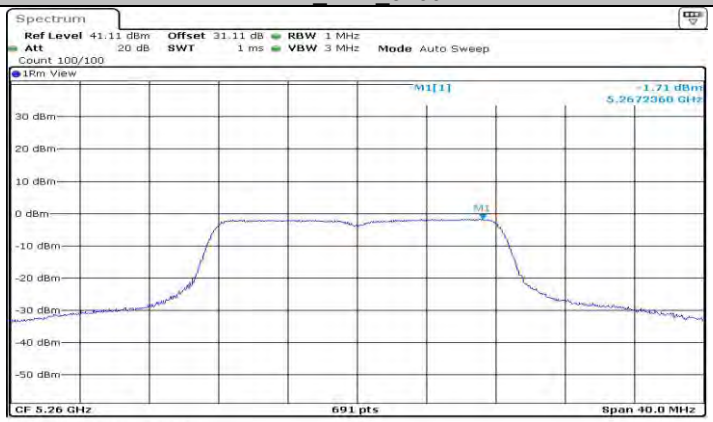
Test Graphs

11A_Ant1_5180

11A_Ant1_5200

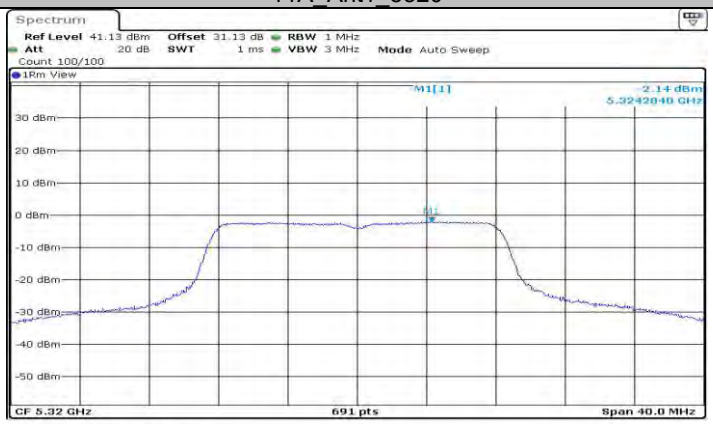
11A_Ant1_5240

11A_Ant1_5260

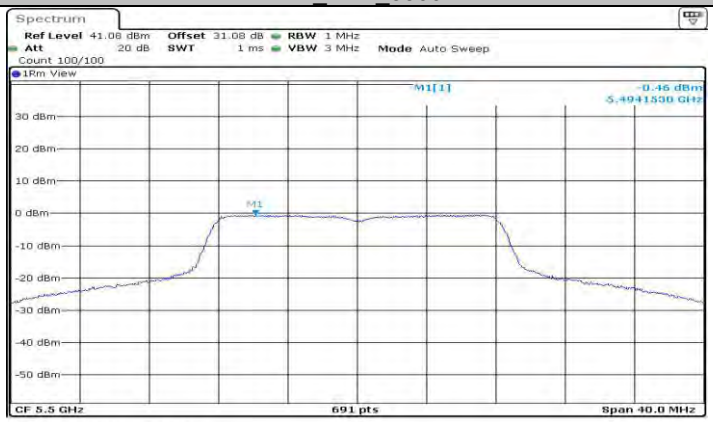


11A_Ant1_5280

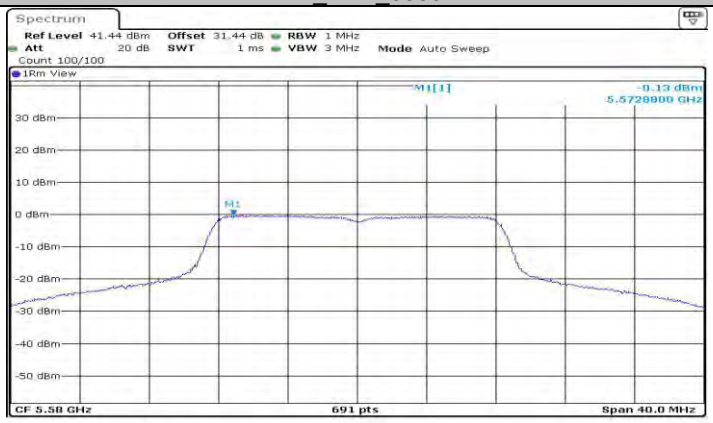
11A_Ant1_5320



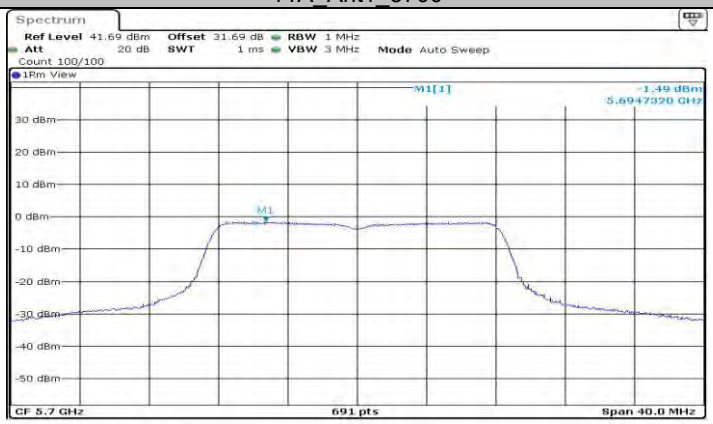
11A_Ant1_5500



11A_Ant1_5580

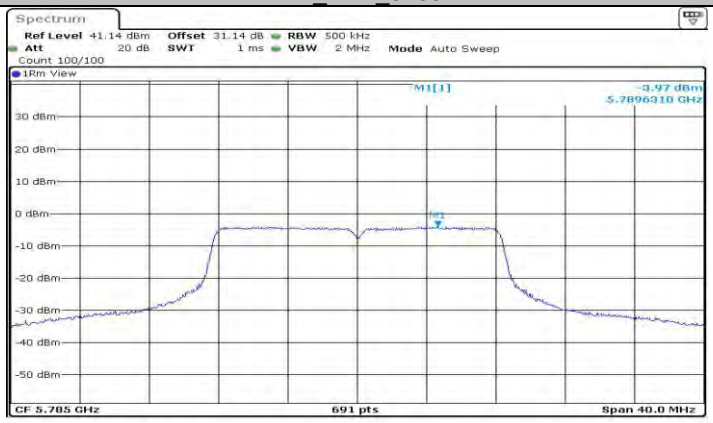


11A_Ant1_5700

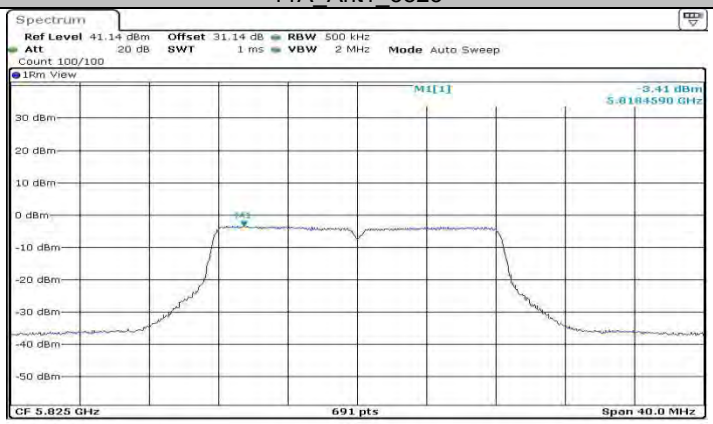


11A_Ant1_5745

11A_Ant1_5785



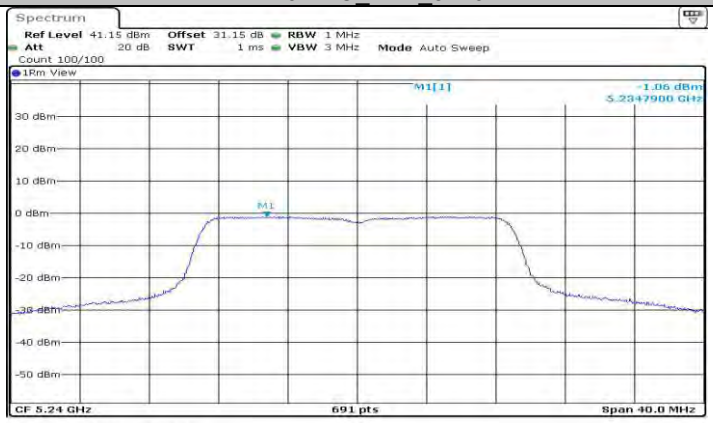
11A_Ant1_5825



11N20SISO_Ant1_5180

11N20SISO_Ant1_5200

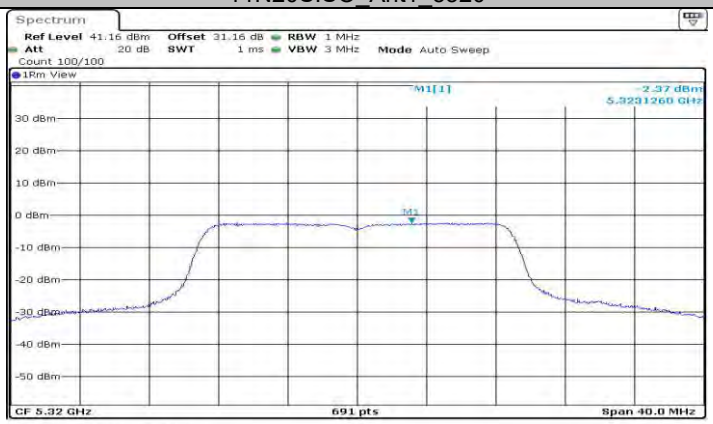
11N20SISO_Ant1_5240



11N20SISO_Ant1_5260

11N20SISO_Ant1_5280

11N20SISO_Ant1_5320



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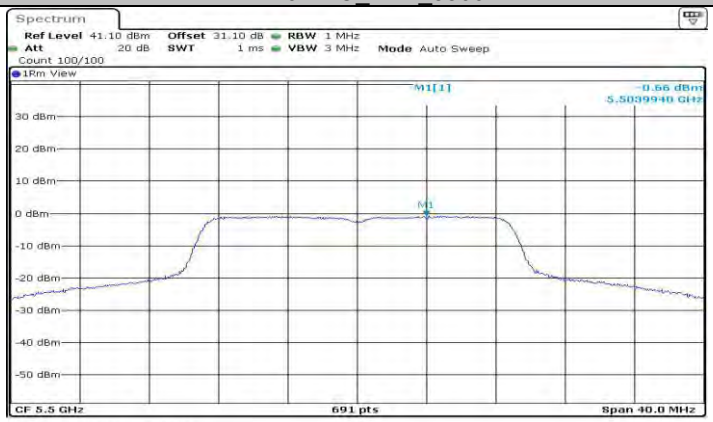
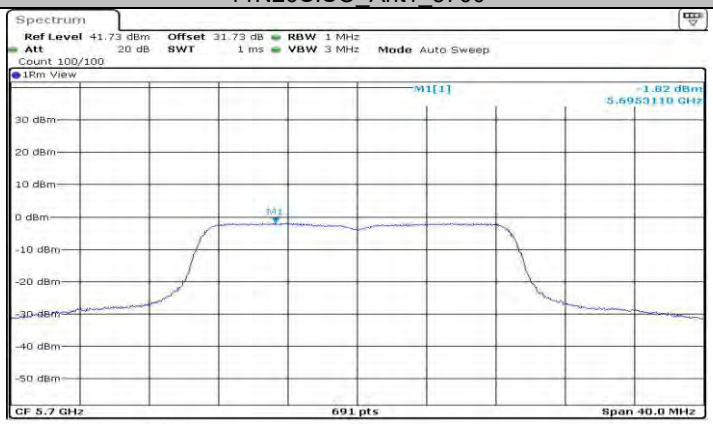


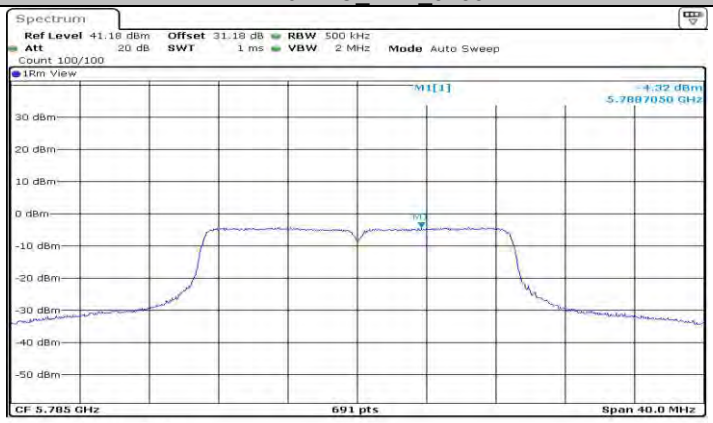
11N20SISO_Ant1_5580

11N20SISO_Ant1_5700



11N20SISO_Ant1_5745

11N20SISO_Ant1_5785



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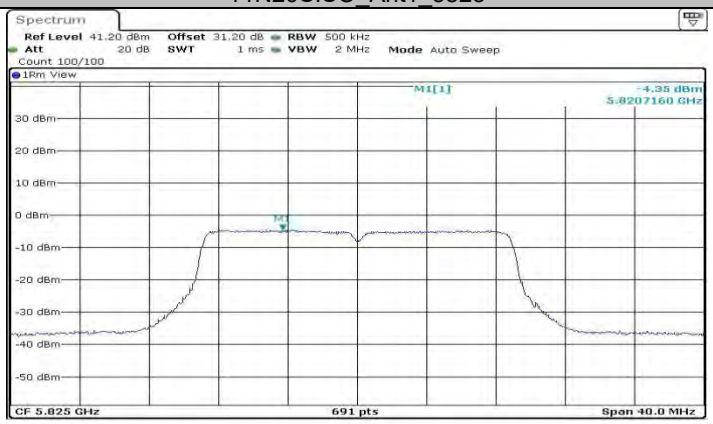

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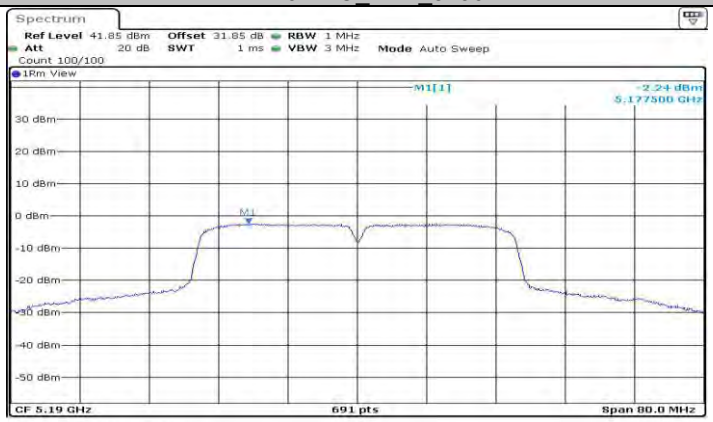

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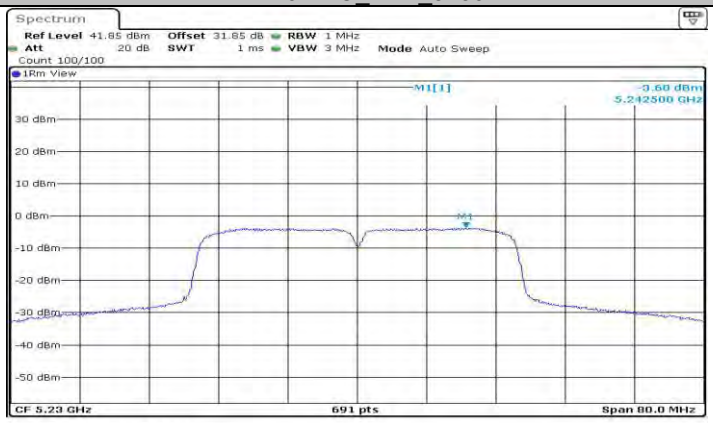

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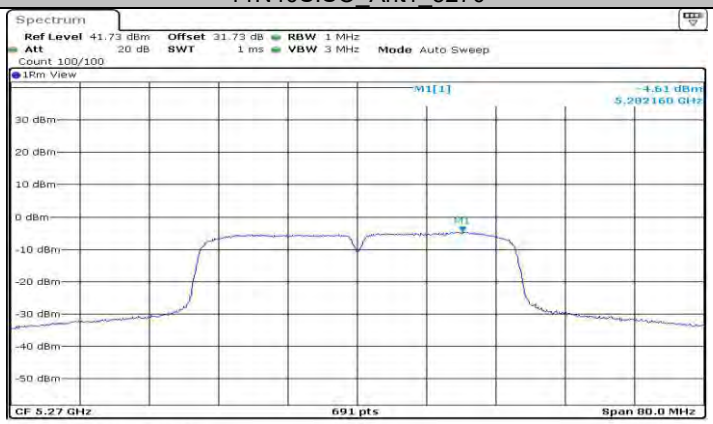

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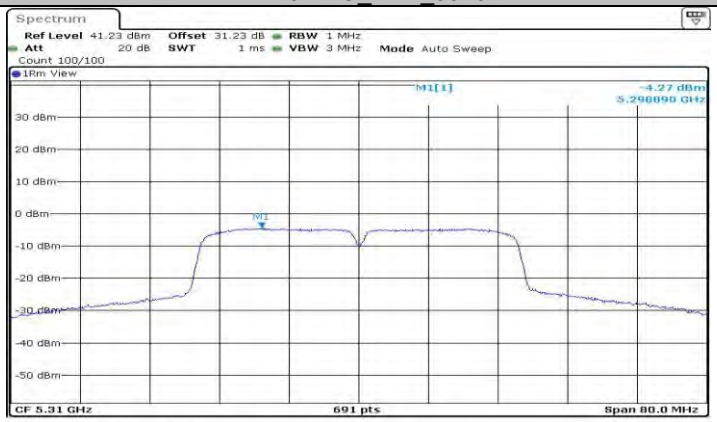

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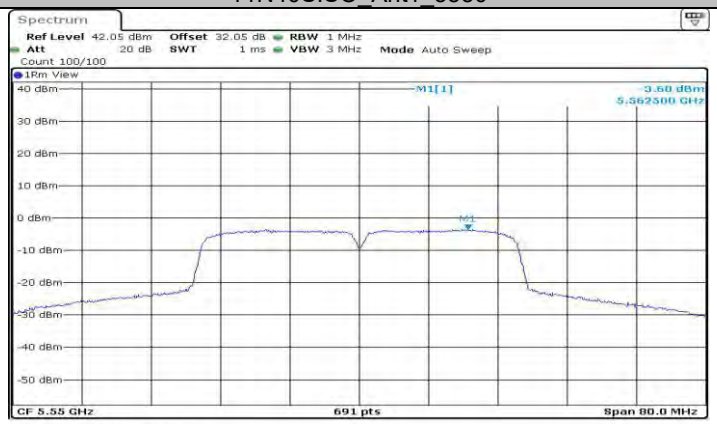

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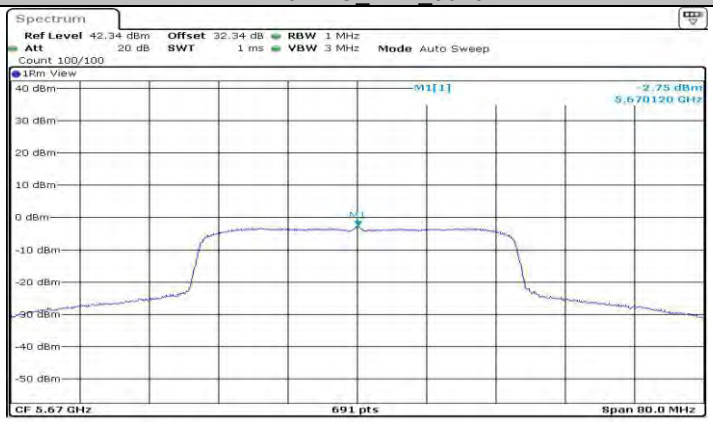

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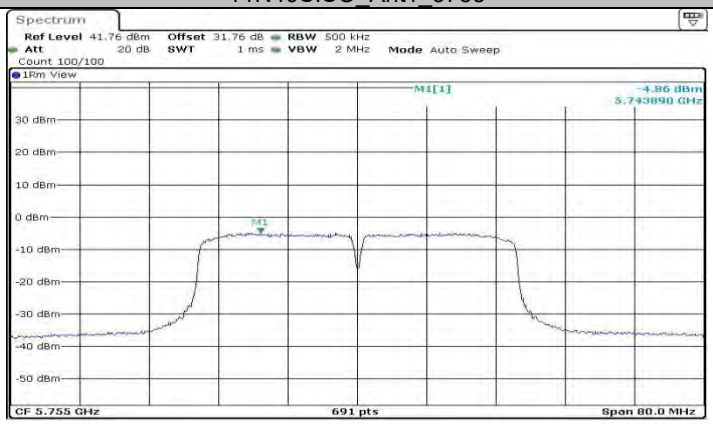

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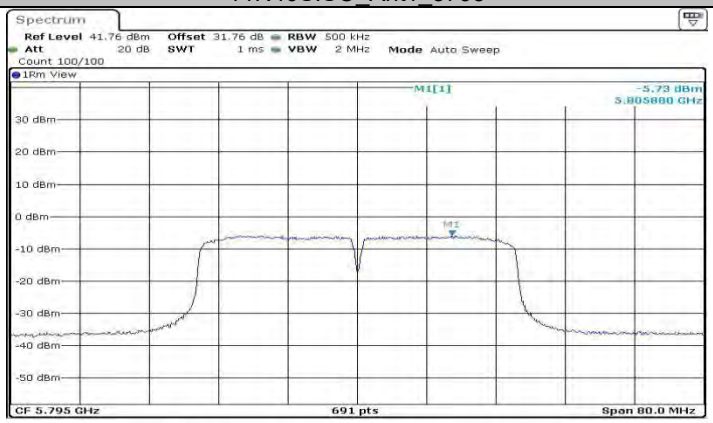


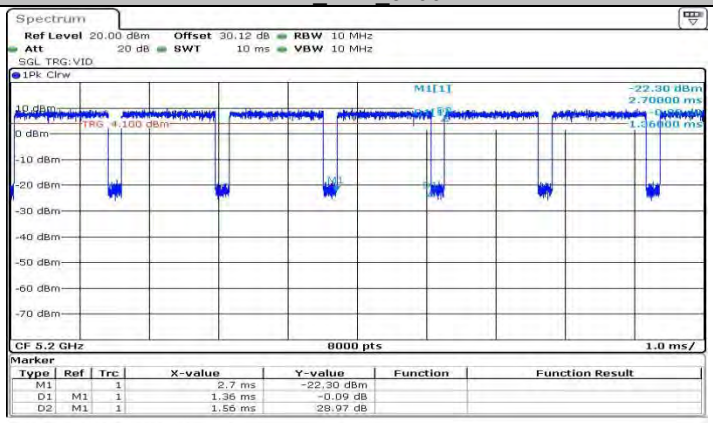
Appendix D: Duty Cycle

Test Result

Test Mode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5200	1.36	1.56	87.18
		5280	1.35	1.55	87.10
		5580	1.35	1.55	87.10
		5785	1.36	1.56	87.18
11N20SISO	Ant1	5200	1.27	1.46	86.99
		5280	1.27	1.46	86.99
		5580	1.27	1.46	86.99
		5785	1.27	1.47	86.39
11N40SISO	Ant1	5190	0.63	0.83	75.90
		5230	0.63	0.83	75.90
		5670	0.63	0.83	75.90
		5755	0.63	0.83	75.90

Test Graphs

11A_Ant1_5200



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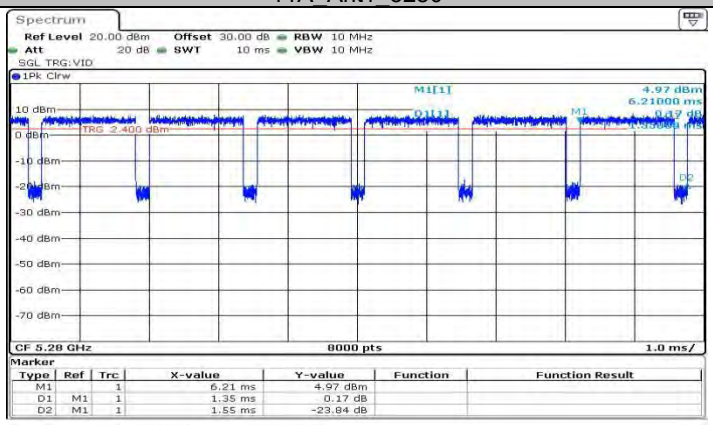

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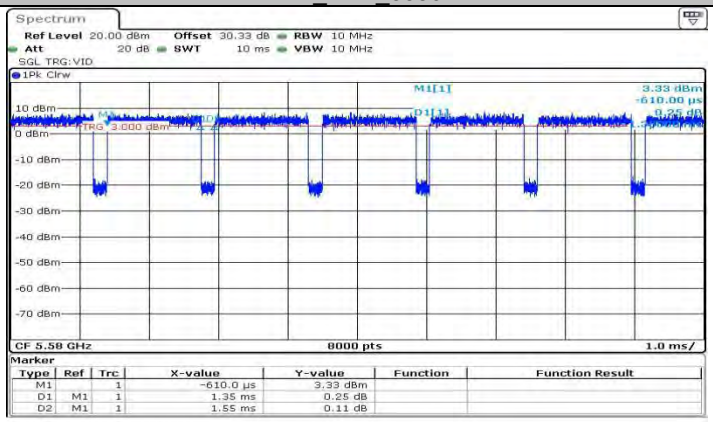

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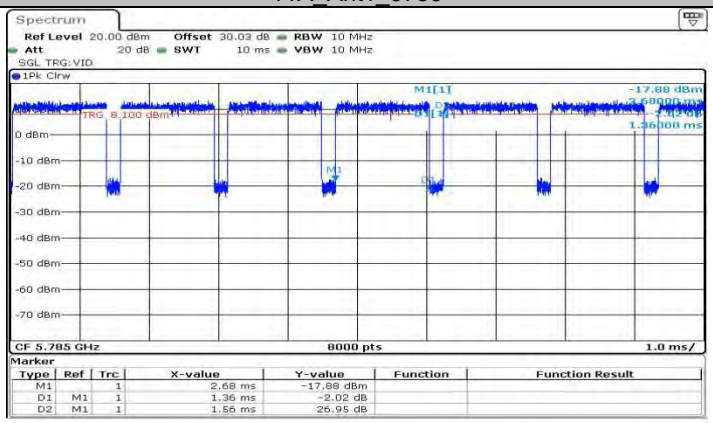

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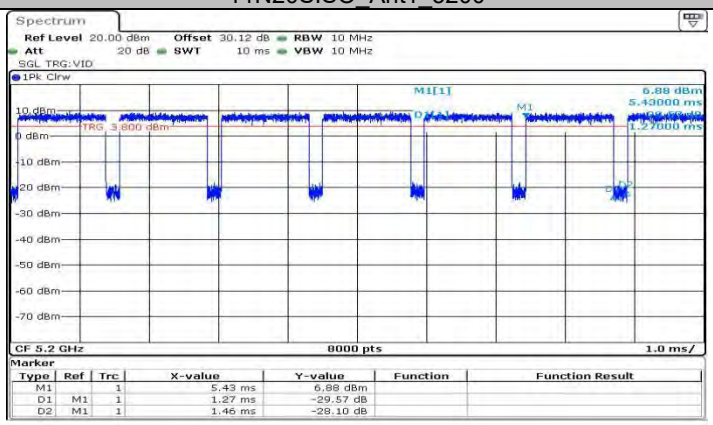

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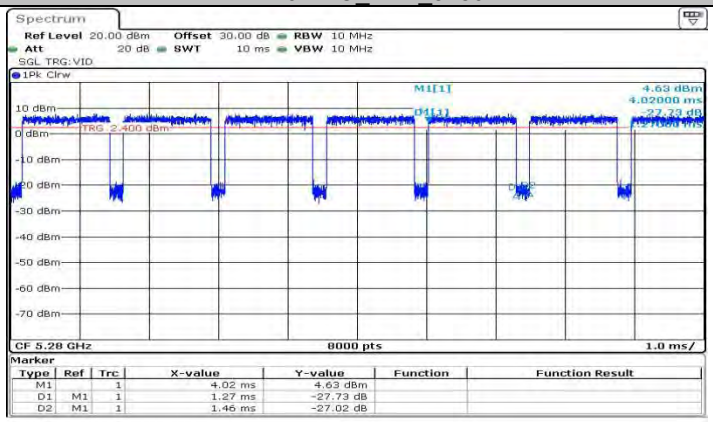

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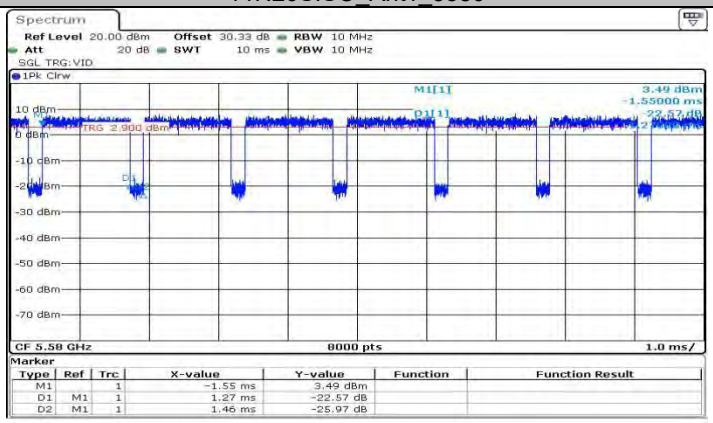

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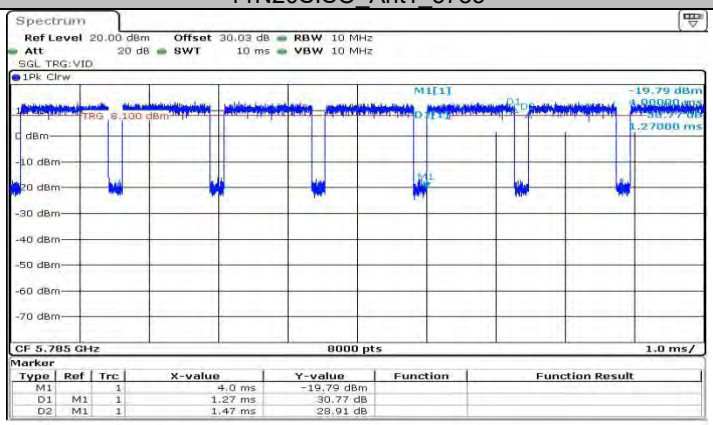

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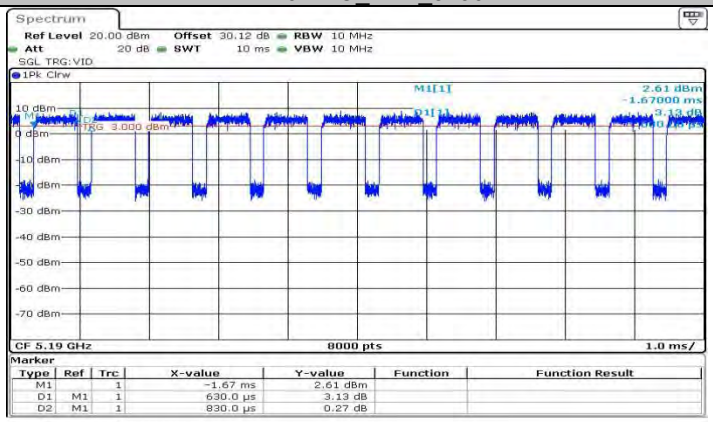

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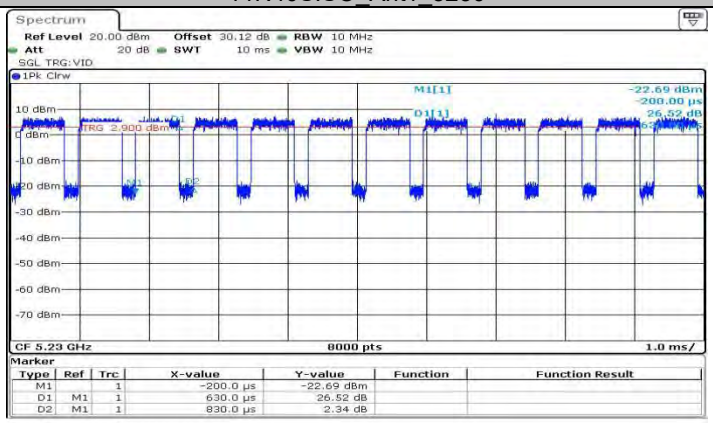

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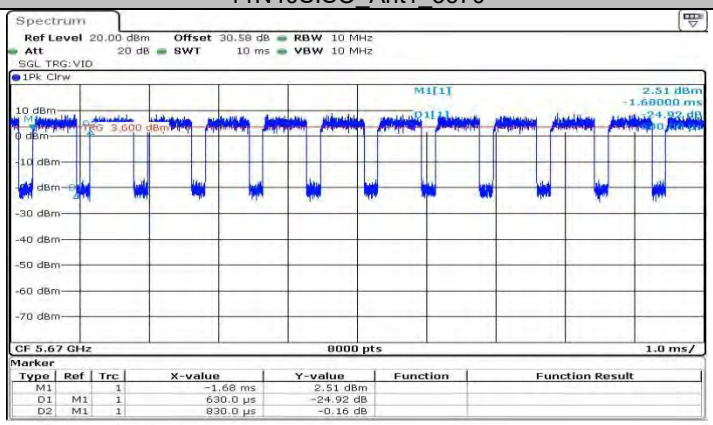

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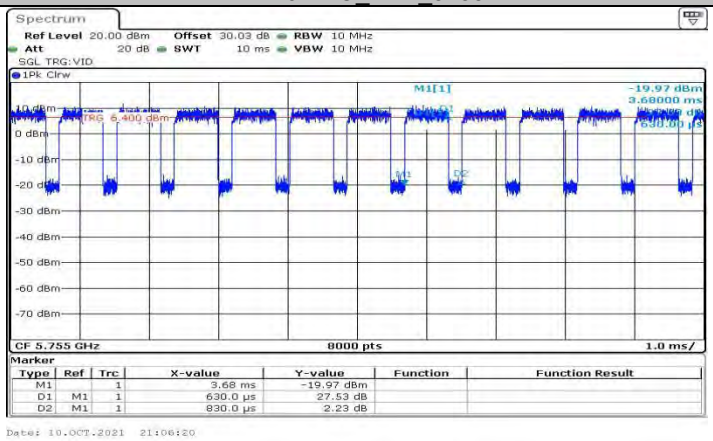

******* END OF REPORT *******