

TEST REPORT

Applicant Name : Shenzhen ViewComm Technology Co., Ltd.
Address : RM 605, BLDG 4, Private Enterprise Science Park, No.65 Lishan Rd, Nanshan Dist, Shenzhen, China
Report Number : SZNS211026-55055E-RF-00
FCC ID: 2A3H2-ISPAC2

Test Standard (s)

FCC PART 15.407

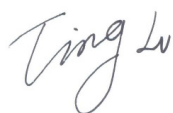
Sample Description

Product Type: Intelligent portable projector
Model No.: iSpace 2
Multiple Model(s) No.: iSpace 2 Pro, iSpace 2 SE
Trade Mark: VIEWCOMM
Date Received: 2021/10/26
Date of Test: 2021/11/12~2021/12/07
Report Date: 2021/12/08

Test Result:	Pass*
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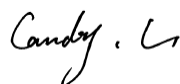
* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:



Ting Lü
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: 5150-5250MHz; 5725-5850MHz
Mode	802.11a/n20/n40/ac20/ac40/ac80
Maximum Conducted Average Output Power	5150-5250 MHz: 13.7dBm 5725-5850 MHz: 13.2dBm
Modulation Technique	OFDM
Antenna Specification*	5150-5250 MHz Antenna 1:4.67dBi Antenna 2:6.65dBi 5725-5850 MHz Antenna 1:6.48dBi Antenna 2:6.48dBi (It is provided by the manufacturer)
Voltage Range	DC 7.4V from battery or DC 12.0V from adapter
Sample serial number	SZNS211026-55055E-RF-S1 (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter 1 information	Model: ICP60A-120-4200 Input: AC 100-240V, 50/60Hz, 1.3A Output: DC 12.0V,4.2A, 50.4W
Adapter 2 information	Model: RYF909A120400VU Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 12.0V,4.0A

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 °C
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 (ISED), 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 supports 5G Wi-Fi 802.11a/n20/n40/ac20/ac40/ac80 modes.

For 5150-5250MHz Band, 7 channels are provided to testing:

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

For 802.11a/n20/ac20 mode: channel 36, 40, 48 were tested;

For 802.11n40/ac40 mode: channel 38, 46 were tested;

For 802.11ac80 mode, channel 42 was tested.

For 5725-5850MHz Band, 8 channels are provided to testing:

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

For 802.11a/n20/ac20 mode: channel 149, 157, 165 were tested;

For 802.11n40/ac40 mode: channel 151, 159 were tested;

For 802.11ac80/ax80 mode, channel 155 was tested.

EUT Exercise Software

“SceureCRT” exercise 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	60
		5200	6Mbps	60
		5240	6Mbps	60
	802.11 n20	5180	MCS0	60
		5200	MCS0	60
		5240	MCS0	60
	802.11 n40	5190	MCS0	60
		5230	MCS0	60
	802.11 ac20	5180	MCS0	60
		5200	MCS0	60
		5240	MCS0	60
	802.11 ac40	5190	MCS0	60
		5230	MCS0	60
	802.11 ac80	5210	MCS0	60
5725 – 5850MHz	802.11 a	5745	6Mbps	60
		5785	6Mbps	60
		5825	6Mbps	60
	802.11 n20	5745	MCS0	60
		5785	MCS0	60
		5825	MCS0	60
	802.11 n40	5755	MCS0	60
		5795	MCS0	60
	802.11 ac20	5745	MCS0	60
		5785	MCS0	60
		5825	MCS0	60
	802.11 ac40	5755	MCS0	60
		5795	MCS0	60
	802.11 ac80	5775	MCS0	60

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.

The device supports SISO and MIMO in all modes, per pretest, the MIMO mode was the worst mode for all the modes. All the antenna ports have the same power level.

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
Sandisk	USB disk	SDCZ38	BL210426179Z
GIEC	DVD player	BDP-G4308	BD4308KXM17070100086
Samsung	Mobile phone	SM-G9500	R28JC2RS6NM

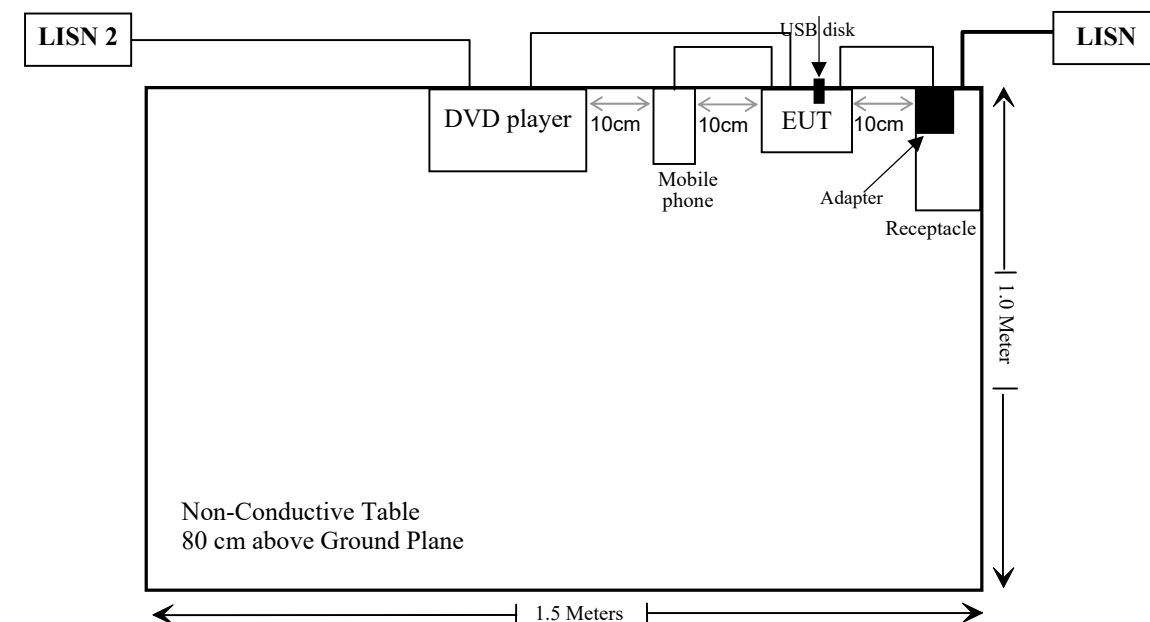
External I/O Cable

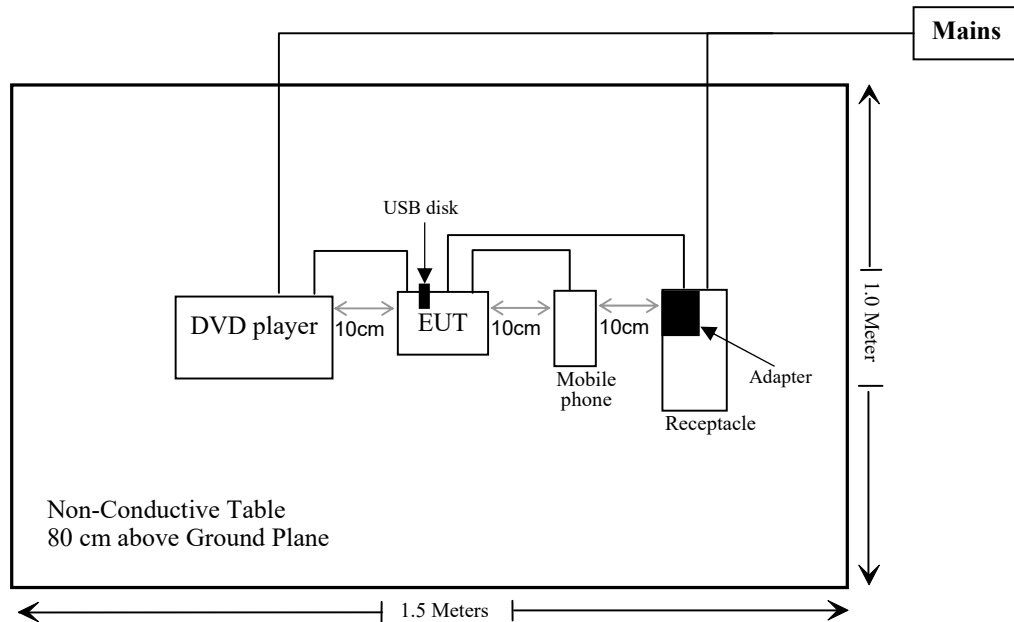
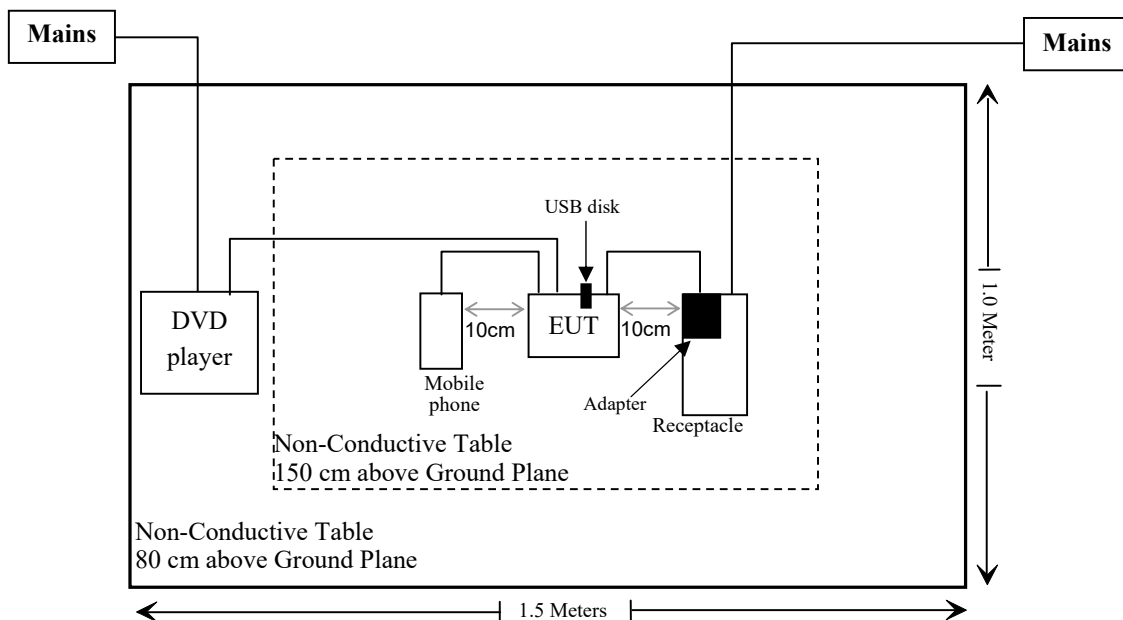
Cable Description	Length (m)	From Port	To
Un-shielding Un-Detachable DC Cable	1.5	Adapter	EUT
Un-shielding Detachable HDMI Cable	2.0	EUT	DVD player
Un-shielding Detachable Type-C Cable	0.3	EUT	Mobile phone
Un-shielding Un-Detachable AC Cable	1.5	DVD player	LISN 2

Block Diagram of Test Setup

For conducted emission:

For Conducted Emissions



For Spurious Emissions(Below 1G)**For Spurious Emissions(Above 1G)**

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §2.1091	Maximum Permissible exposure (MPE)	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)	Not Applicable*

Not Applicable: the EUT has no TPC function which was declared by the applicant.

Not Applicable*: the EUT only operate withing frequency range of 5150-5250MHz&5725-5850MHz.

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 19821b (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
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/28	2021/11/27
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
Radiated Emission Test Software: e3 19821b (V9)					
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	Band Reject Filter	BRM-5.15/5.35g-45	075	2020/12/25	2021/12/24
CD	Band Reject Filter	BRM-5.725/5.875G-45	065	2020/12/25	2021/12/24

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) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

a)

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

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

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

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

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

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

Mode	Frequency (MHz)	Antenna Gain		Tune up conducted power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
BT	2402-2480	3.87	2.44	2.0	1.58	20	0.0008	1
BLE	2402-2480	3.87	2.44	0	1.00	20	0.0005	1
2.4GHz Wi-Fi	2412-2472	3.87	2.44	15.0	31.62	20	0.0153	1
5GHz Wi-Fi	5150-5250	6.65	4.62	14.0	25.12	20	0.0231	1
	5725-5850	6.48	4.45	14.0	25.12	20	0.0222	1

Note: 1. The tune up conducted power was declared by the applicant.

2. The BT, 2.4GHz Wi-Fi and 5GHz Wi-Fi can transmit at same time.

Simultaneous transmitting consideration (worst case):

The ratio= $MPE_{BT}/limit + MPE_{2.4G\ Wi-Fi}/limit + MPE_{5G\ Wi-Fi}/limit = 0.0008/1 + 0.0153/1 + 0.0231/1 = 0.0392 < 1.0$

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Pass

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:

- b. Antenna must be permanently attached to the unit.
- c. 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 two internal antennas for 5G Wi-Fi which were permanently attached. Please refer to the EUT photos.

ANT	Type	Antenna Gain	Impedance
ANT 1	FPC	4.67dBi(5150-5250MHz) 6.48 dBi(5725-5850MHz)	50 Ω
ANT 2	FPC	6.65 dBi(5150-5250MHz) 6.48 dBi(5725-5850MHz)	50 Ω

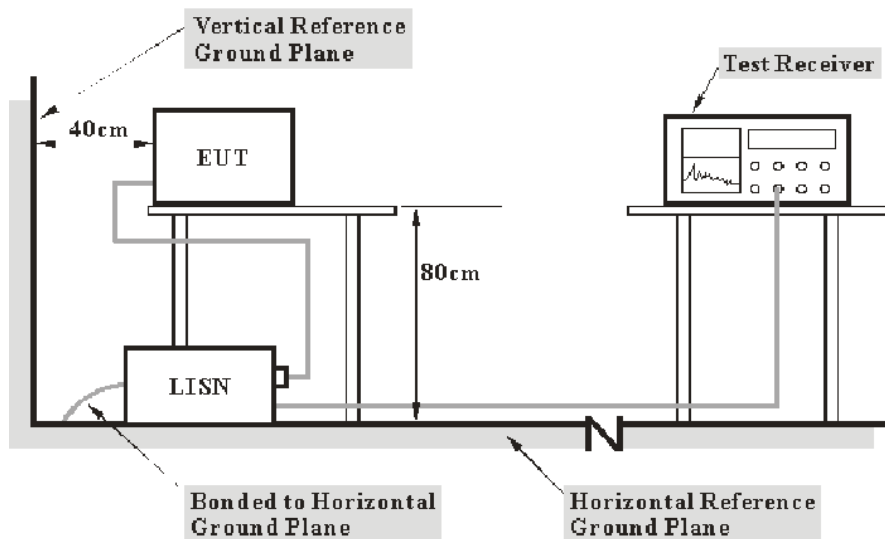
Result: Compliant.

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.

Corrected Factor & Margin Calculation

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

$$\text{Transd Factor} = \text{LISN VDF} + \text{Cable Loss}$$

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:

$$\text{Over Limit} = \text{level} - \text{Limit}$$

$$\text{Level} = \text{reading level} + \text{Transd Factor}$$

Test Data

Environmental Conditions

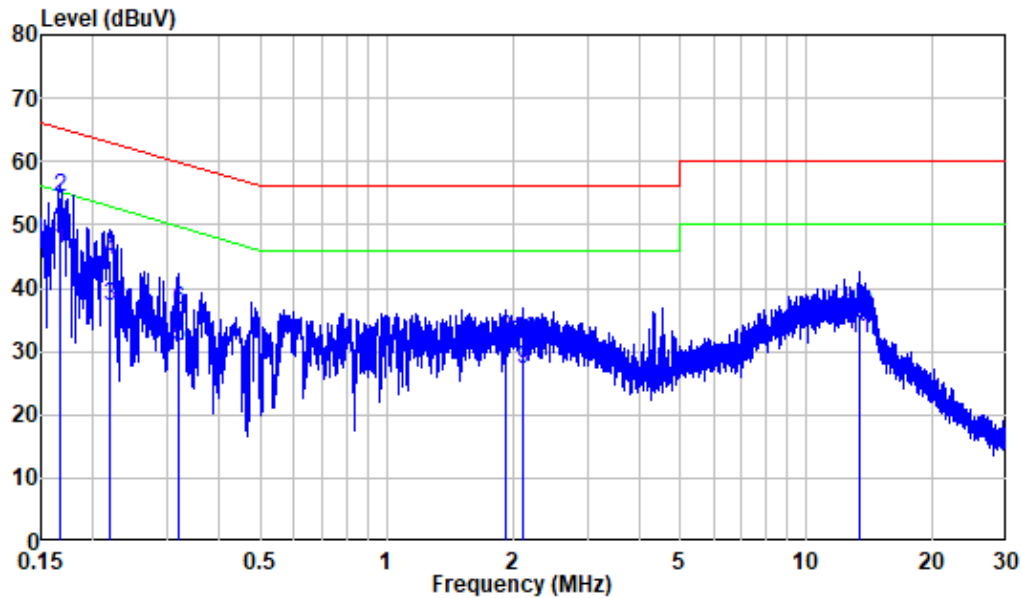
Temperature:	25 °C
Relative Humidity:	64 %
ATM Pressure:	101.0 kPa

The testing was performed by Bin Duan on 2021-11-22.

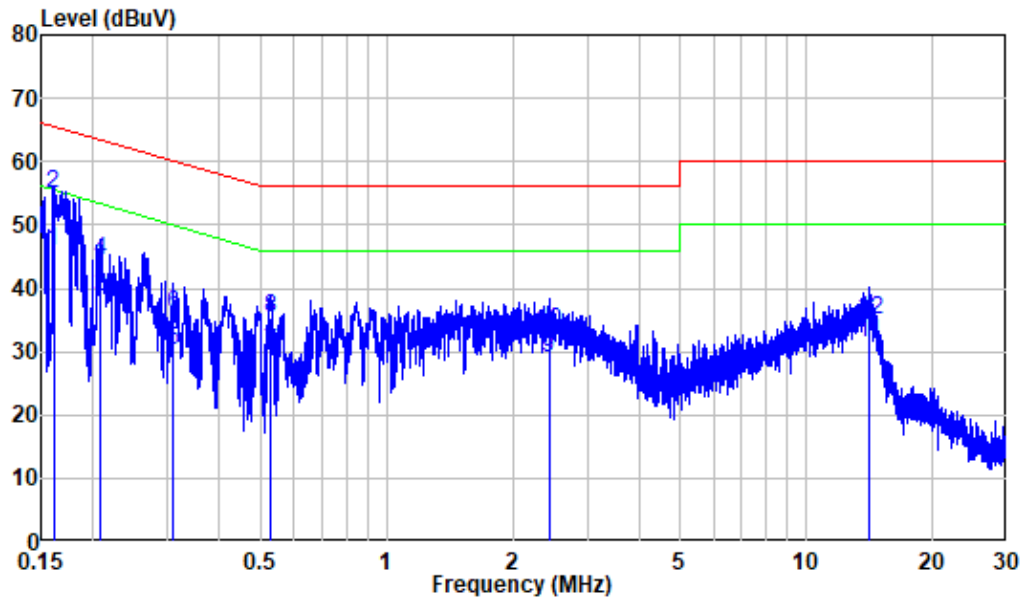
EUT operation mode: Transmitting(worst case is 802.11 a mode, 5180MHz)

Adapter 1

AC 120V/60 Hz, Line:



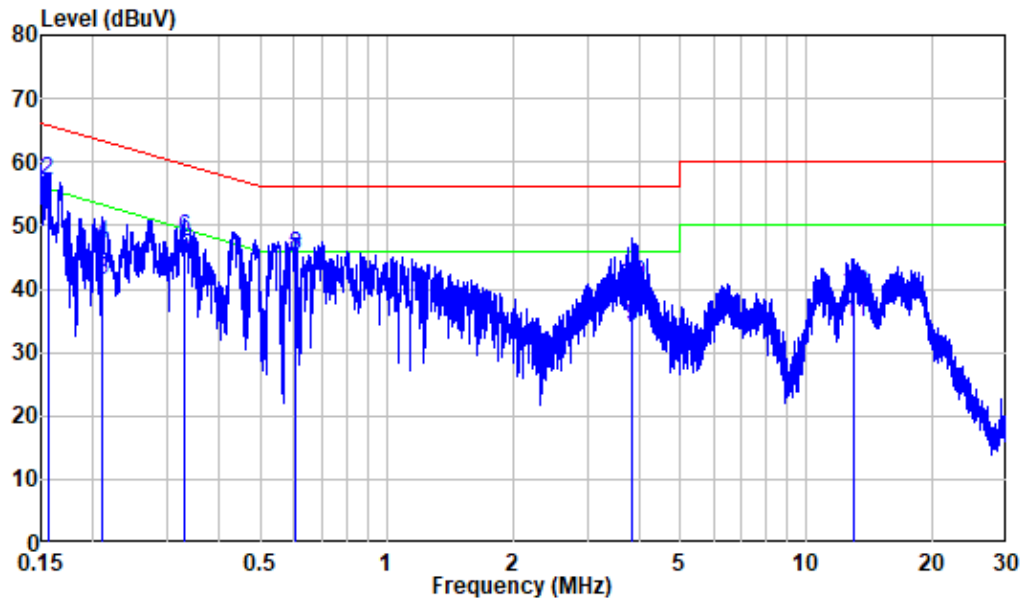
	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.167	9.86	36.33	46.19	55.10	-8.91	Average
2	0.167	9.86	44.40	54.26	65.10	-10.84	QP
3	0.219	9.80	27.30	37.10	52.85	-15.75	Average
4	0.219	9.80	34.60	44.40	62.85	-18.45	QP
5	0.319	9.80	20.97	30.77	49.73	-18.96	Average
6	0.319	9.80	26.69	36.49	59.73	-23.24	QP
7	1.925	9.91	18.02	27.93	46.00	-18.07	Average
8	1.925	9.91	22.13	32.04	56.00	-23.96	QP
9	2.103	9.92	17.35	27.27	46.00	-18.73	Average
10	2.103	9.92	21.67	31.59	56.00	-24.41	QP
11	13.311	10.06	21.88	31.94	50.00	-18.06	Average
12	13.311	10.06	25.96	36.02	60.00	-23.98	QP

AC 120V/60 Hz, Neutral:

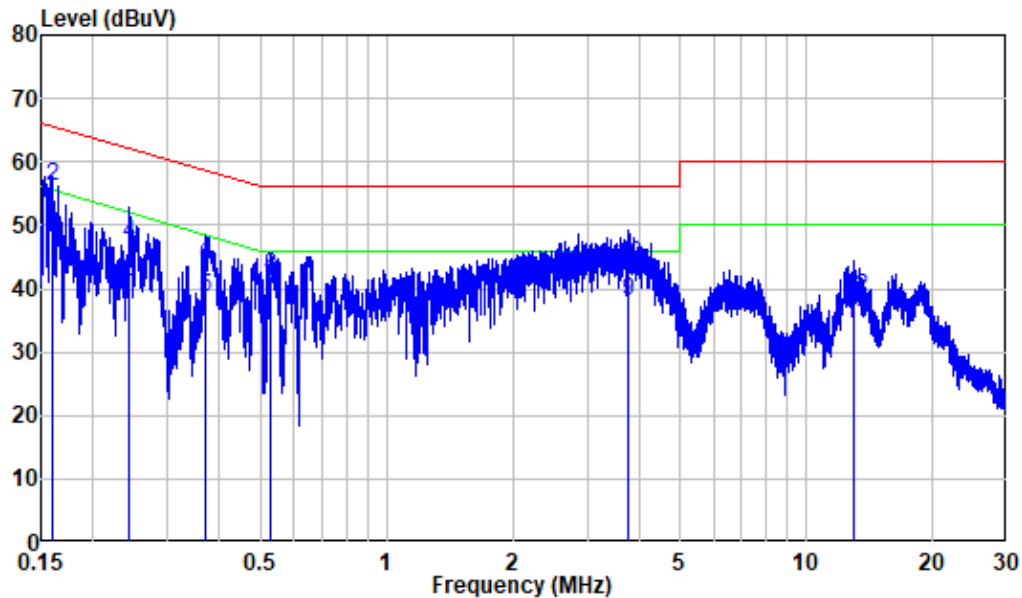
	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.161	9.92	35.89	45.81	55.43	-9.62	Average
2	0.161	9.92	45.14	55.06	65.43	-10.37	QP
3	0.207	10.00	28.54	38.54	53.33	-14.79	Average
4	0.207	10.00	34.44	44.44	63.33	-18.89	QP
5	0.310	9.95	20.17	30.12	49.97	-19.85	Average
6	0.310	9.95	26.03	35.98	59.97	-23.99	QP
7	0.530	9.91	20.03	29.94	46.00	-16.06	Average
8	0.530	9.91	25.38	35.29	56.00	-20.71	QP
9	2.431	9.95	18.91	28.86	46.00	-17.14	Average
10	2.431	9.95	23.30	33.25	56.00	-22.75	QP
11	14.044	10.06	21.22	31.28	50.00	-18.72	Average
12	14.044	10.06	24.92	34.98	60.00	-25.02	QP

Adapter 2

AC 120V/60 Hz, Line:



	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.156	9.89	39.93	49.82	55.69	-5.87	Average
2	0.156	9.89	47.10	56.99	65.69	-8.70	QP
3	0.210	9.80	31.68	41.48	53.19	-11.71	Average
4	0.210	9.80	37.18	46.98	63.19	-16.21	QP
5	0.330	9.80	35.30	45.10	49.45	-4.35	Average
6	0.330	9.80	38.22	48.02	59.45	-11.43	QP
7	0.604	9.81	34.57	44.38	46.00	-1.62	Average
8	0.604	9.81	35.33	45.14	56.00	-10.86	QP
9	3.822	9.94	24.22	34.16	46.00	-11.84	Average
10	3.822	9.94	30.82	40.76	56.00	-15.24	QP
11	12.997	10.07	24.66	34.73	50.00	-15.27	Average
12	12.997	10.07	29.25	39.32	60.00	-20.68	QP

AC 120V/60 Hz, Neutral:

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.159	9.92	37.83	47.75	55.50	-7.75	Average
2	0.159	9.92	46.18	56.10	65.50	-9.40	QP
3	0.243	9.98	31.11	41.09	52.01	-10.92	Average
4	0.243	9.98	37.11	47.09	62.01	-14.92	QP
5	0.369	9.93	28.77	38.70	48.51	-9.81	Average
6	0.369	9.93	33.53	43.46	58.51	-15.05	QP
7	0.529	9.91	30.23	40.14	46.00	-5.86	Average
8	0.529	9.91	32.01	41.92	56.00	-14.08	QP
9	3.744	10.03	28.12	38.15	46.00	-7.85	Average
10	3.744	10.03	33.73	43.76	56.00	-12.24	QP
11	13.023	10.06	24.26	34.32	50.00	-15.68	Average
12	13.023	10.06	28.51	38.57	60.00	-21.43	QP

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

Applicable Standard

FCC §15.407 (b); §15.209; §15.205;

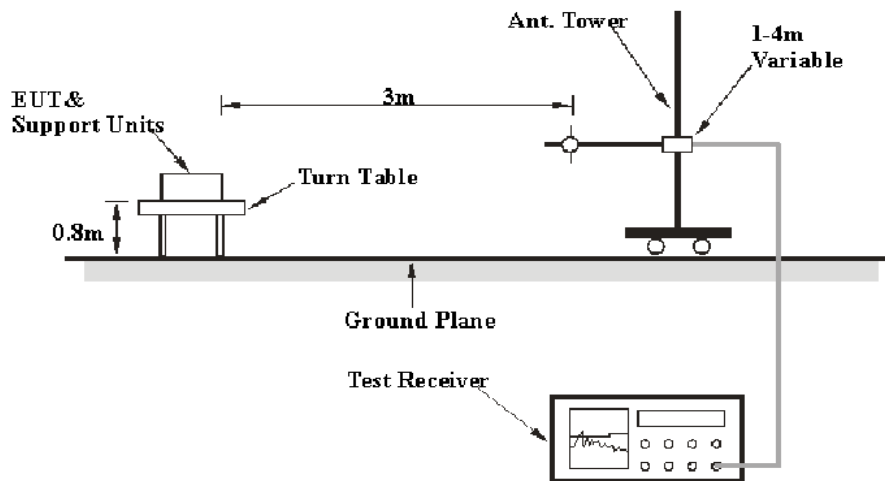
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

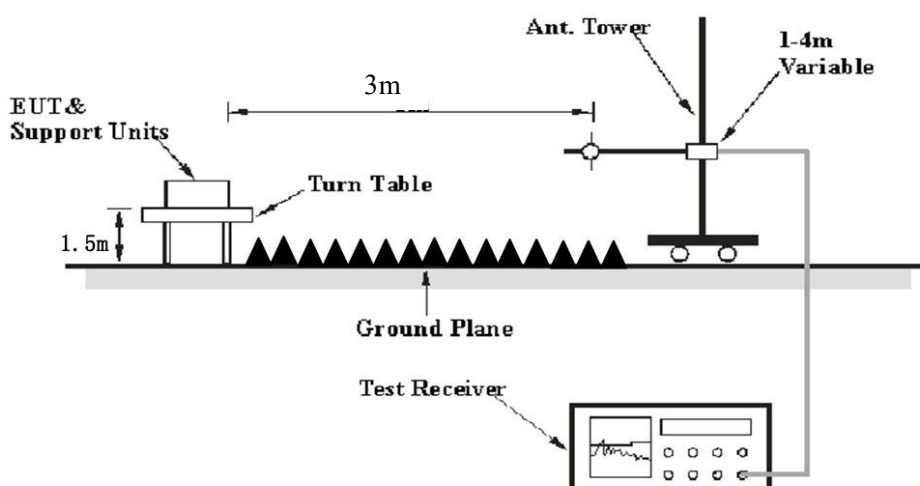
- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.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

Corrected 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:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\begin{aligned}\text{Margin/Over Limit} &= \text{Corrected Amplitude/Level-Limit} \\ \text{Corrected Amplitude/Level} &= \text{Reading} + \text{Corrected Factor}\end{aligned}$$

Test Data

Environmental Conditions

Temperature:	25~27.3 °C
Relative Humidity:	53~64 %
ATM Pressure:	101.0 kPa

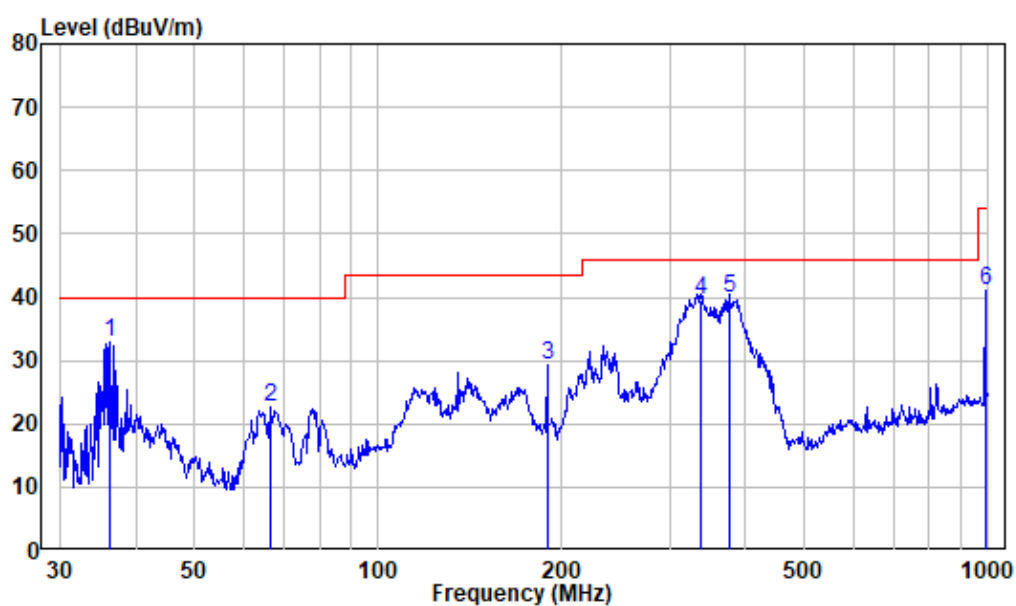
The testing was performed by Bin Deng on 2021-11-21 for below 1GHz, Bin Deng and Caro Hu on 2021-11-12 and 2021-11-21 for above 1GHz.

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, 5180MHz)

Adapter 1

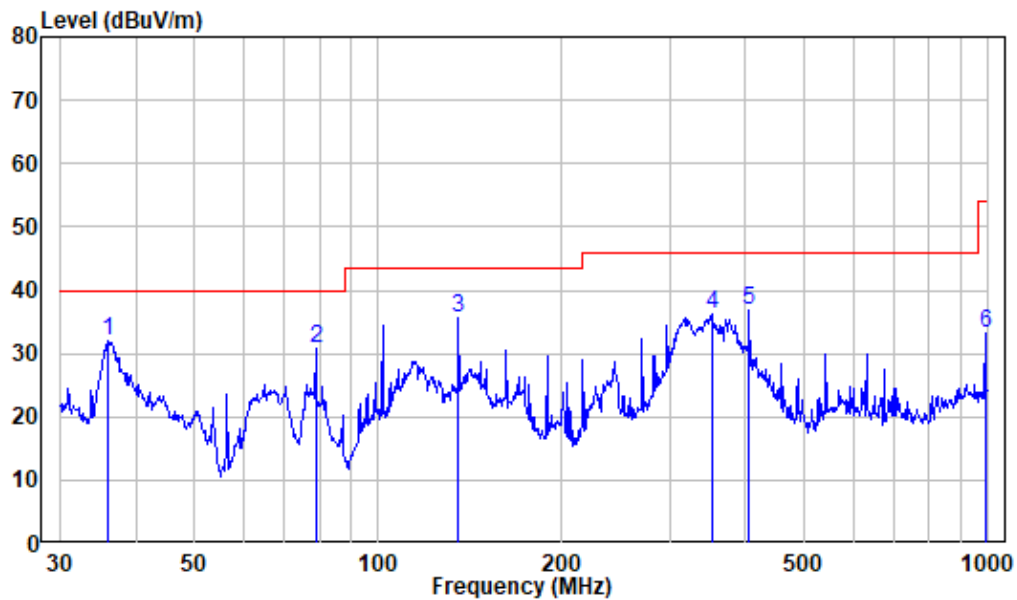
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNS211026-55055E-RF
Test Mode: 5G WIFI

	Freq	Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	36.38	-19.23	52.21	32.98	40.00	-7.02	Peak
2	66.50	-20.68	43.17	22.49	40.00	-17.51	Peak
3	189.07	-20.27	49.48	29.21	43.50	-14.29	Peak
4	338.40	-16.41	55.98	39.57	46.00	-6.43	QP
5	375.94	-15.70	55.63	39.93	46.00	-6.07	QP
6	989.54	-7.58	48.78	41.20	54.00	-12.80	Peak

Vertical

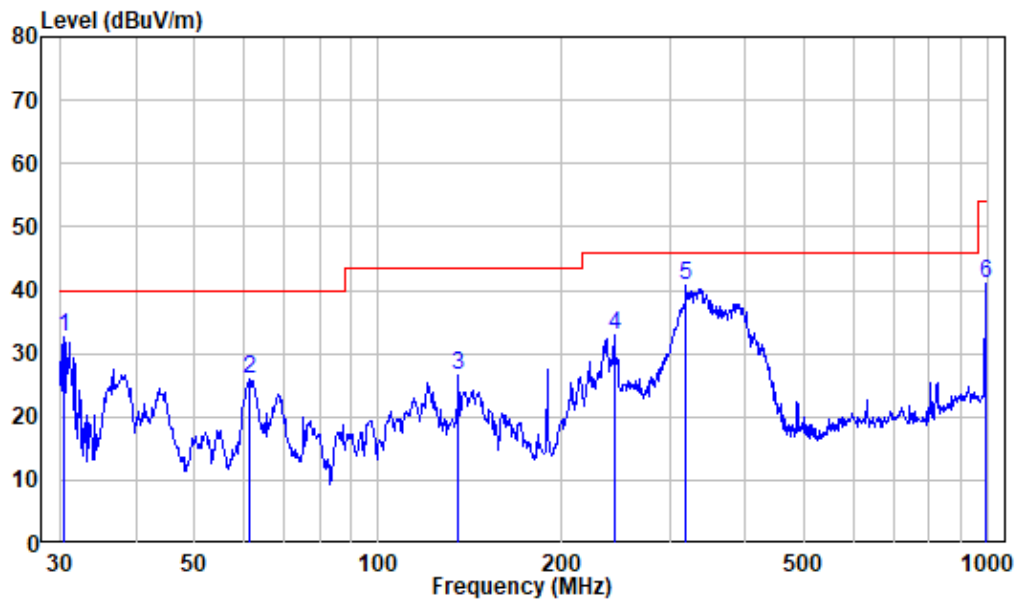


Site : chamber
 Condition: 3m VERTICAL
 Job No. : SZNS211026-55055E-RF
 Test Mode: 5G WIFI

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	36.00	-19.29	51.29	32.00	40.00	-8.00	Peak
2	78.97	-23.07	53.91	30.84	40.00	-9.16	Peak
3	135.03	-22.49	58.00	35.51	43.50	-7.99	Peak
4	351.71	-16.05	52.32	36.27	46.00	-9.73	Peak
5	404.67	-15.55	52.42	36.87	46.00	-9.13	Peak
6	989.54	-7.58	40.72	33.14	54.00	-20.86	Peak

Adapter 2

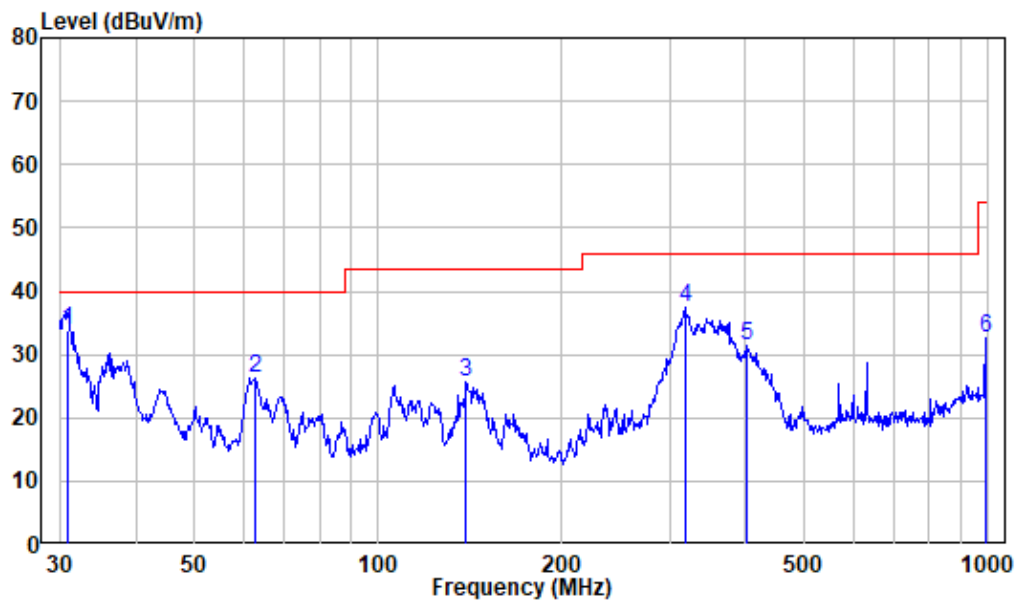
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNS211026-55055E-RF
Test Mode: 5G WIFI

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.53	-20.43	53.13	32.70	40.00	-7.30	Peak
2	61.56	-19.79	45.70	25.91	40.00	-14.09	Peak
3	135.03	-22.49	49.13	26.64	43.50	-16.86	Peak
4	243.38	-18.63	51.44	32.81	46.00	-13.19	Peak
5	319.94	-16.75	57.37	40.62	46.00	-5.38	QP
6	989.54	-7.58	48.70	41.12	54.00	-12.88	Peak

Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : SZNS211026-55055E-RF

Test Mode: 5G WIFI

	Freq	Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.85	-20.36	54.32	33.96	40.00	-6.04	QP
2	62.65	-20.00	46.28	26.28	40.00	-13.72	Peak
3	139.36	-22.02	47.54	25.52	43.50	-17.98	Peak
4	318.82	-16.74	54.08	37.34	46.00	-8.66	Peak
5	401.84	-15.72	47.02	31.30	46.00	-14.70	Peak
6	989.54	-7.58	40.16	32.58	54.00	-21.42	Peak

1– 40 GHz: (worst case is adapter 1)

5150-5250 MHz:

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5180 MHz									
4500	64.46	PK	242	1.2	H	-5.53	58.93	74	-15.07
4500	51.01	AV	242	1.2	H	-5.53	45.48	54	-8.52
4500	64.98	PK	56	1.9	V	-5.53	59.45	74	-14.55
4500	51.03	AV	56	1.9	V	-5.53	45.50	54	-8.50
5150	63.53	PK	347	1.8	H	-3.54	59.99	74	-14.01
5150	51.17	AV	347	1.8	H	-3.54	47.63	54	-6.37
5150	63.66	PK	219	1.1	V	-3.54	60.12	74	-13.88
5150	51.14	AV	219	1.1	V	-3.54	47.60	54	-6.40
10360	44.60	PK	332	2	H	5.85	50.45	68.2	-17.75
10360	44.26	PK	214	2	V	5.85	50.11	68.2	-18.09
5200 MHz									
10400	44.62	PK	136	1.8	H	5.94	50.56	68.2	-17.64
10400	44.10	PK	208	1.8	V	5.94	50.04	68.2	-18.16
5240 MHz									
5350	63.48	PK	311	2	H	-2.68	60.80	74	-13.20
5350	50.68	AV	311	2	H	-2.68	48.00	54	-6.00
5350	63.75	PK	116	1.1	V	-2.68	61.07	74	-12.93
5350	50.60	AV	116	1.1	V	-2.68	47.92	54	-6.08
5460	63.80	PK	184	1.4	H	-2.15	61.65	74	-12.35
5460	50.68	AV	184	1.4	H	-2.15	48.53	54	-5.47
5460	63.13	PK	348	1	V	-2.15	60.98	74	-13.02
5460	50.69	AV	348	1	V	-2.15	48.54	54	-5.46
10480	44.24	PK	345	1.7	H	6.15	50.39	68.2	-17.81
10480	43.70	PK	343	1.7	V	6.15	49.85	68.2	-18.35

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5180 MHz									
4500	64.53	PK	192	1.8	H	-5.53	59.00	74	-15.00
4500	51.00	AV	192	1.8	H	-5.53	45.47	54	-8.53
4500	64.76	PK	93	2.1	V	-5.53	59.23	74	-14.77
4500	51.34	AV	93	2.1	V	-5.53	45.81	54	-8.19
5150	64.12	PK	165	2.5	H	-3.54	60.58	74	-13.42
5150	51.06	AV	165	2.5	H	-3.54	47.52	54	-6.48
5150	64.16	PK	110	1.1	V	-3.54	60.62	74	-13.38
5150	51.23	AV	110	1.1	V	-3.54	47.69	54	-6.31
10360	44.62	PK	127	1.5	H	5.85	50.47	68.2	-17.73
10360	44.31	PK	112	1.5	V	5.85	50.16	68.2	-18.04
5200 MHz									
10400	45.05	PK	216	2.1	H	5.94	50.99	68.2	-17.21
10400	44.21	PK	255	2.1	V	5.94	50.15	68.2	-18.05
5240 MHz									
5350	63.87	PK	55	1.6	H	-2.68	61.19	74	-12.81
5350	50.67	AV	55	1.6	H	-2.68	47.99	54	-6.01
5350	63.44	PK	89	2.4	V	-2.68	60.76	74	-13.24
5350	50.54	AV	89	2.4	V	-2.68	47.86	54	-6.14
5460	63.05	PK	188	1	H	-2.15	60.90	74	-13.10
5460	50.74	AV	188	1	H	-2.15	48.59	54	-5.41
5460	63.10	PK	128	1	V	-2.15	60.95	74	-13.05
5460	50.84	AV	128	1	V	-2.15	48.69	54	-5.31
10480	44.33	PK	242	1.7	H	6.15	50.48	68.2	-17.72
10480	43.79	PK	243	1.7	V	6.15	49.94	68.2	-18.26

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5190 MHz									
4500	64.82	PK	70	1.9	H	-5.53	59.29	74	-14.71
4500	51.43	AV	70	1.9	H	-5.53	45.90	54	-8.10
4500	64.91	PK	256	2.5	V	-5.53	59.38	74	-14.62
4500	51.48	AV	256	2.5	V	-5.53	45.95	54	-8.05
5150	64.24	PK	20	1.8	H	-3.54	60.70	74	-13.30
5150	51.41	AV	20	1.8	H	-3.54	47.87	54	-6.13
5150	64.21	PK	345	2.4	V	-3.54	60.67	74	-13.33
5150	51.38	AV	345	2.4	V	-3.54	47.84	54	-6.16
10380	44.67	PK	262	2.4	H	5.90	50.57	68.2	-17.63
10380	44.13	PK	184	2.4	V	5.90	50.03	68.2	-18.17
5230 MHz									
5350	64.15	PK	35	1.6	H	-2.68	61.47	74	-12.53
5350	51.39	AV	35	1.6	H	-2.68	48.71	54	-5.29
5350	63.85	PK	71	1.5	V	-2.68	61.17	74	-12.83
5350	51.19	AV	71	1.5	V	-2.68	48.51	54	-5.49
5460	63.18	PK	278	1.6	H	-2.15	61.03	74	-12.97
5460	51.22	AV	278	1.6	H	-2.15	49.07	54	-4.93
5460	63.63	PK	221	2.3	V	-2.15	61.48	74	-12.52
5460	51.29	AV	221	2.3	V	-2.15	49.14	54	-4.86
10460	44.36	PK	165	1.7	H	6.04	50.40	68.2	-17.80
10460	44.00	PK	19	1.7	V	6.04	50.04	68.2	-18.16

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Correcte d Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11ac20									
5180 MHz									
4500	65.18	PK	312	1.1	H	-5.53	59.65	74	-14.35
4500	51.20	AV	312	1.1	H	-5.53	45.67	54	-8.33
4500	64.48	PK	64	2.1	V	-5.53	58.95	74	-15.05
4500	51.12	AV	64	2.1	V	-5.53	45.59	54	-8.41
5150	63.62	PK	22	2	H	-3.54	60.08	74	-13.92
5150	51.34	AV	22	2	H	-3.54	47.80	54	-6.20
5150	64.42	PK	230	1.5	V	-3.54	60.88	74	-13.12
5150	51.19	AV	230	1.5	V	-3.54	47.65	54	-6.35
10360	44.81	PK	301	1.3	H	5.85	50.66	68.2	-17.54
10360	44.18	PK	248	1.3	V	5.85	50.03	68.2	-18.17
5200 MHz									
10400	45.00	PK	84	2.1	H	5.94	50.94	68.2	-17.26
10400	44.21	PK	154	2.1	V	5.94	50.15	68.2	-18.05
5240 MHz									
5350	63.64	PK	343	1.5	H	-2.68	60.96	74	-13.04
5350	50.59	AV	343	1.5	H	-2.68	47.91	54	-6.09
5350	63.61	PK	269	2.2	V	-2.68	60.93	74	-13.07
5350	50.34	AV	269	2.2	V	-2.68	47.66	54	-6.34
5460	63.26	PK	64	1	H	-2.15	61.11	74	-12.89
5460	50.74	AV	64	1	H	-2.15	48.59	54	-5.41
5460	63.04	PK	225	1	V	-2.15	60.89	74	-13.11
5460	50.55	AV	225	1	V	-2.15	48.40	54	-5.60
10480	44.46	PK	291	1.7	H	6.15	50.61	68.2	-17.59
10480	43.96	PK	348	1.7	V	6.15	50.11	68.2	-18.09

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Correcte d Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	Detector (PK/QP/AV)		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11ac40									
5190 MHz									
4500	65.37	PK	155	1.7	H	-5.53	59.84	74	-14.16
4500	51.81	AV	155	1.7	H	-5.53	46.28	54	-7.72
4500	64.79	PK	130	1.5	V	-5.53	59.26	74	-14.74
4500	51.57	AV	130	1.5	V	-5.53	46.04	54	-7.96
5150	64.37	PK	27	1.2	H	-3.54	60.83	74	-13.17
5150	51.60	AV	27	1.2	H	-3.54	48.06	54	-5.94
5150	63.95	PK	86	1.2	V	-3.54	60.41	74	-13.59
5150	51.67	AV	86	1.2	V	-3.54	48.13	54	-5.87
10380	44.62	PK	231	2.2	H	5.90	50.52	68.2	-17.68
10380	44.40	PK	109	2.2	V	5.90	50.30	68.2	-17.90
5230 MHz									
5350	63.46	PK	165	2.4	H	-2.68	60.78	74	-13.22
5350	50.94	AV	165	2.4	H	-2.68	48.26	54	-5.74
5350	63.52	PK	37	2.2	V	-2.68	60.84	74	-13.16
5350	50.96	AV	37	2.2	V	-2.68	48.28	54	-5.72
5460	63.06	PK	93	2.4	H	-2.15	60.91	74	-13.09
5460	51.85	AV	93	2.4	H	-2.15	49.70	54	-4.30
5460	63.69	PK	52	2.1	V	-2.15	61.54	74	-12.46
5460	51.73	AV	52	2.1	V	-2.15	49.58	54	-4.42
10460	44.46	PK	51	1.7	H	6.04	50.50	68.2	-17.70
10460	44.03	PK	79	1.7	V	6.04	50.07	68.2	-18.13

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Correcte d Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	Detector (PK/QP/AV)		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11ac80									
5210MHz									
4500	65.25	PK	264	1.3	H	-5.53	59.72	74	-14.28
4500	51.95	AV	264	1.3	H	-5.53	46.42	54	-7.58
4500	64.53	PK	317	1.6	V	-5.53	59.00	74	-15.00
4500	51.87	AV	317	1.6	V	-5.53	46.34	54	-7.66
5150	63.77	PK	200	1.2	H	-3.54	60.23	74	-13.77
5150	52.34	AV	200	1.2	H	-3.54	48.80	54	-5.20
5150	63.53	PK	160	1.9	V	-3.54	59.99	74	-14.01
5150	52.01	AV	160	1.9	V	-3.54	48.47	54	-5.53
5350	63.74	PK	162	1.6	H	-2.68	61.06	74	-12.94
5350	51.01	AV	162	1.6	H	-2.68	48.33	54	-5.67
5350	64.08	PK	211	1	V	-2.68	61.40	74	-12.60
5350	51.12	AV	211	1	V	-2.68	48.44	54	-5.56
5460	63.27	PK	16	2.2	H	-2.15	61.12	74	-12.88
5460	51.73	AV	16	2.2	H	-2.15	49.58	54	-4.42
5460	63.76	PK	230	2.1	V	-2.15	61.61	74	-12.39
5460	51.57	AV	230	2.1	V	-2.15	49.42	54	-4.58
10420	44.84	PK	116	1.8	H	5.96	50.80	68.2	-17.40
10420	44.49	PK	87	2.2	V	5.96	50.45	68.2	-17.75

5725-5850 MHz:

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5745 MHz									
5650	63.66	PK	80	1.9	H	-0.65	63.01	68.2	-5.19
5650	63.71	PK	196	1.6	V	-0.65	63.06	68.2	-5.14
5700	61.75	PK	286	2.1	H	1.18	62.93	105.2	-42.27
5700	61.66	PK	155	1.5	V	1.18	62.84	105.2	-42.36
5720	61.25	PK	21	1.6	H	1.60	62.85	110.8	-47.95
5720	61.17	PK	187	1.5	V	1.60	62.77	110.8	-48.03
5725	61.54	PK	138	1.2	H	1.71	63.25	122.2	-58.95
5725	61.45	PK	176	2.4	V	1.71	63.16	122.2	-59.04
11490	40.67	PK	196	1.2	H	8.95	49.62	74	-24.38
11490	40.33	PK	297	1.8	V	8.95	49.28	74	-24.72
5785 MHz									
11570	40.99	PK	190	1.9	H	9.01	50.00	74	-24.00
11570	40.28	PK	342	1.3	V	9.01	49.29	74	-24.71
5825 MHz									
5850	63.87	PK	233	2.4	H	0.74	64.61	122.2	-57.59
5850	63.69	PK	220	1.9	V	0.74	64.43	122.2	-57.77
5855	64.03	PK	325	1.4	H	0.65	64.68	110.8	-46.12
5855	63.88	PK	273	1	V	0.65	64.53	110.8	-46.27
5875	63.50	PK	78	1.5	H	0.30	63.80	105.2	-41.40
5875	63.48	PK	268	1.9	V	0.30	63.78	105.2	-41.42
5925	64.06	PK	120	1.4	H	-0.48	63.58	68.2	-4.62
5925	64.45	PK	155	1.9	V	-0.48	63.97	68.2	-4.23
11650	39.21	PK	71	2.4	H	9.07	48.28	74	-25.72
11650	38.70	PK	336	1.9	V	9.07	47.77	74	-26.23

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5745 MHz									
5650	63.81	PK	195	1.1	H	-0.65	63.16	68.2	-5.04
5650	63.74	PK	356	1.2	V	-0.65	63.09	68.2	-5.11
5700	62.19	PK	248	1.9	H	1.18	63.37	105.2	-41.83
5700	61.89	PK	58	2.3	V	1.18	63.07	105.2	-42.13
5720	62.30	PK	48	1.2	H	1.60	63.90	110.8	-46.90
5720	62.18	PK	198	1.8	V	1.60	63.78	110.8	-47.02
5725	62.25	PK	120	1.1	H	1.71	63.96	122.2	-58.24
5725	62.12	PK	6	2.5	V	1.71	63.83	122.2	-58.37
11490	40.55	PK	56	1.7	H	8.95	49.50	74	-24.50
11490	40.24	PK	19	1.7	V	8.95	49.19	74	-24.81
5785 MHz									
11570	40.76	PK	121	1.2	H	9.01	49.77	74	-24.23
11570	40.44	PK	272	2.5	V	9.01	49.45	74	-24.55
5825 MHz									
5850	63.88	PK	51	2.4	H	0.74	64.62	122.2	-57.58
5850	64.09	PK	255	1.6	V	0.74	64.83	122.2	-57.37
5855	64.09	PK	287	1	H	0.65	64.74	110.8	-46.06
5855	64.02	PK	17	2.2	V	0.65	64.67	110.8	-46.13
5875	63.11	PK	317	1.1	H	0.30	63.41	105.2	-41.79
5875	63.31	PK	208	1.5	V	0.30	63.61	105.2	-41.59
5925	63.96	PK	302	1.9	H	-0.48	63.48	68.2	-4.72
5925	64.11	PK	238	1.5	V	-0.48	63.63	68.2	-4.57
11650	39.40	PK	285	2.5	H	9.07	48.47	74	-25.53
11650	38.62	PK	154	1.1	V	9.07	47.69	74	-26.31

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5755 MHz									
5650	63.73	PK	346	1.8	H	-0.65	63.08	68.2	-5.12
5650	63.74	PK	133	2.1	V	-0.65	63.09	68.2	-5.11
5700	61.84	PK	94	1.7	H	1.18	63.02	105.2	-42.18
5700	62.25	PK	177	2.1	V	1.18	63.43	105.2	-41.77
5720	62.06	PK	135	1.3	H	1.60	63.66	110.8	-47.14
5720	61.97	PK	31	1.7	V	1.60	63.57	110.8	-47.23
5725	61.79	PK	166	1.3	H	1.71	63.50	122.2	-58.70
5725	61.80	PK	138	1.3	V	1.71	63.51	122.2	-58.69
11510	40.74	PK	217	1.1	H	8.98	49.72	74	-24.28
11510	40.44	PK	296	2.2	V	8.98	49.42	74	-24.58
5795 MHz									
5850	63.90	PK	292	1.4	H	0.74	64.64	122.2	-57.56
5850	63.94	PK	35	2.2	V	0.74	64.68	122.2	-57.52
5855	64.21	PK	196	1.3	H	0.65	64.86	110.8	-45.94
5855	64.13	PK	307	1.4	V	0.65	64.78	110.8	-46.02
5875	63.19	PK	42	2.1	H	0.30	63.49	105.2	-41.71
5875	63.18	PK	30	1.5	V	0.30	63.48	105.2	-41.72
5925	64.00	PK	213	2.4	H	-0.48	63.52	68.2	-4.68
5925	63.98	PK	24	2.2	V	-0.48	63.50	68.2	-4.70
11590	40.65	PK	205	1	H	9.01	49.66	74	-24.34
11590	40.01	PK	280	1.4	V	9.01	49.02	74	-24.98

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Correcte d Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11ac20									
5745 MHz									
5650	63.93	PK	236	1.4	H	-0.65	63.28	68.2	-4.92
5650	64.01	PK	248	2.1	V	-0.65	63.36	68.2	-4.84
5700	61.93	PK	20	1.7	H	1.18	63.11	105.2	-42.09
5700	62.19	PK	12	2	V	1.18	63.37	105.2	-41.83
5720	62.04	PK	80	2.1	H	1.60	63.64	110.8	-47.16
5720	62.31	PK	224	2.5	V	1.60	63.91	110.8	-46.89
5725	61.80	PK	99	2.2	H	1.71	63.51	122.2	-58.69
5725	61.97	PK	269	1.2	V	1.71	63.68	122.2	-58.52
11490	40.55	PK	129	1.9	H	8.95	49.50	74	-24.50
11490	40.24	PK	246	1.1	V	8.95	49.19	74	-24.81
5785 MHz									
11570	40.68	PK	10	2.4	H	9.01	49.69	74	-24.31
11570	40.24	PK	338	1.1	V	9.01	49.25	74	-24.75
5825 MHz									
5850	63.90	PK	278	2.4	H	0.74	64.64	122.2	-57.56
5850	63.94	PK	41	1.9	V	0.74	64.68	122.2	-57.52
5855	64.21	PK	46	2.3	H	0.65	64.86	110.8	-45.94
5855	64.13	PK	251	2.4	V	0.65	64.78	110.8	-46.02
5875	63.19	PK	25	2.1	H	0.30	63.49	105.2	-41.71
5875	63.18	PK	220	1.4	V	0.30	63.48	105.2	-41.72
5925	64.00	PK	181	2.4	H	-0.48	63.52	68.2	-4.68
5925	63.98	PK	117	1.2	V	-0.48	63.50	68.2	-4.70
11650	39.40	PK	220	1.9	H	9.07	48.47	74	-25.53
11650	38.62	PK	64	1.8	V	9.07	47.69	74	-26.31

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Correcte d Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	Detector (PK/QP/AV)		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11ac40									
5755 MHz									
5650	63.91	PK	56	1.3	H	-0.65	63.26	68.2	-4.94
5650	63.92	PK	112	2	V	-0.65	63.27	68.2	-4.93
5700	61.85	PK	355	2.2	H	1.18	63.03	105.2	-42.17
5700	61.94	PK	8	1.7	V	1.18	63.12	105.2	-42.08
5720	62.22	PK	305	1.5	H	1.60	63.82	110.8	-46.98
5720	62.07	PK	285	2.2	V	1.60	63.67	110.8	-47.13
5725	62.02	PK	319	1.6	H	1.71	63.73	122.2	-58.47
5725	62.07	PK	164	1.3	V	1.71	63.78	122.2	-58.42
11510	40.61	PK	14	2.3	H	8.98	49.59	74	-24.41
11510	40.01	PK	288	1.6	V	8.98	48.99	74	-25.01
5795 MHz									
5850	63.67	PK	267	2.2	H	0.74	64.41	122.2	-57.79
5850	63.76	PK	91	2.3	V	0.74	64.50	122.2	-57.70
5855	64.10	PK	122	1.5	H	0.65	64.75	110.8	-46.05
5855	64.03	PK	192	2.3	V	0.65	64.68	110.8	-46.12
5875	63.17	PK	45	2	H	0.30	63.47	105.2	-41.73
5875	63.40	PK	318	2.3	V	0.30	63.70	105.2	-41.50
5925	64.25	PK	218	2.3	H	-0.48	63.77	68.2	-4.43
5925	64.43	PK	72	2.1	V	-0.48	63.95	68.2	-4.25
11590	40.63	PK	187	2.2	H	9.01	49.64	74	-24.36
11590	40.30	PK	320	1.1	V	9.01	49.31	74	-24.69

Frequency (MHz)	Receiver		Turn- Table Angle Degree	Rx Antenna		Correcte d Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	Detector (PK/QP/AV)		Heigh t (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11ac80									
5775MHz									
5650	63.73	PK	306	1.5	H	-0.65	63.08	68.2	-5.12
5650	63.64	PK	259	1.9	V	-0.65	62.99	68.2	-5.21
5700	62.26	PK	38	1.4	H	1.18	63.44	105.2	-41.76
5700	62.20	PK	342	1.6	V	1.18	63.38	105.2	-41.82
5720	62.68	PK	149	1.1	H	1.60	64.28	110.8	-46.52
5720	62.46	PK	334	1.7	V	1.60	64.06	110.8	-46.74
5725	62.71	PK	216	2	H	1.71	64.42	122.2	-57.78
5725	62.30	PK	166	1.2	V	1.71	64.01	122.2	-58.19
5850	63.97	PK	305	2.2	H	0.74	64.71	122.2	-57.49
5850	63.74	PK	27	2.3	V	0.74	64.48	122.2	-57.72
5855	64.13	PK	24	2	H	0.65	64.78	110.8	-46.02
5855	63.91	PK	305	2.3	V	0.65	64.56	110.8	-46.24
5875	63.32	PK	153	1.6	H	0.30	63.62	105.2	-41.58
5875	63.34	PK	314	1	V	0.30	63.64	105.2	-41.56
5925	64.09	PK	79	1.7	H	-0.48	63.61	68.2	-4.59
5925	64.24	PK	154	2.1	V	-0.48	63.76	68.2	-4.44
11550	40.60	PK	321	1.2	H	9.03	49.63	74	-24.37
11550	40.05	PK	19	1.3	V	9.03	49.08	74	-24.92

Simultaneous transmitting: (worst case)

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	PK/Ave		Height (m)	Polar (H/V)				
BLE 1M 2480MHz + 2.4G wifi 802.11b 2442MHz + 5G wifi 802.11n20 5200MHz									
135.03	63.53	PK	168	1.4	H	-22.49	41.04	43.5	-2.46
135.03	58.24	PK	347	1.3	V	-22.49	35.75	43.5	-7.75
4960	55.66	PK	226	1.6	H	-4.24	51.42	74	-22.58
4960	56.05	PK	298	1.5	V	-4.24	51.81	74	-22.19
4884	55.81	PK	342	1.5	H	-4.48	51.33	74	-22.67
4884	57.16	PK	98	1.4	V	-4.48	52.68	74	-21.32
10400	45.18	PK	214	2.0	H	5.94	51.12	68.2	-17.08
10400	44.14	PK	263	1.8	V	5.94	50.08	68.2	-18.12

Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Corrected Amplitude = Corrected Factor + Reading

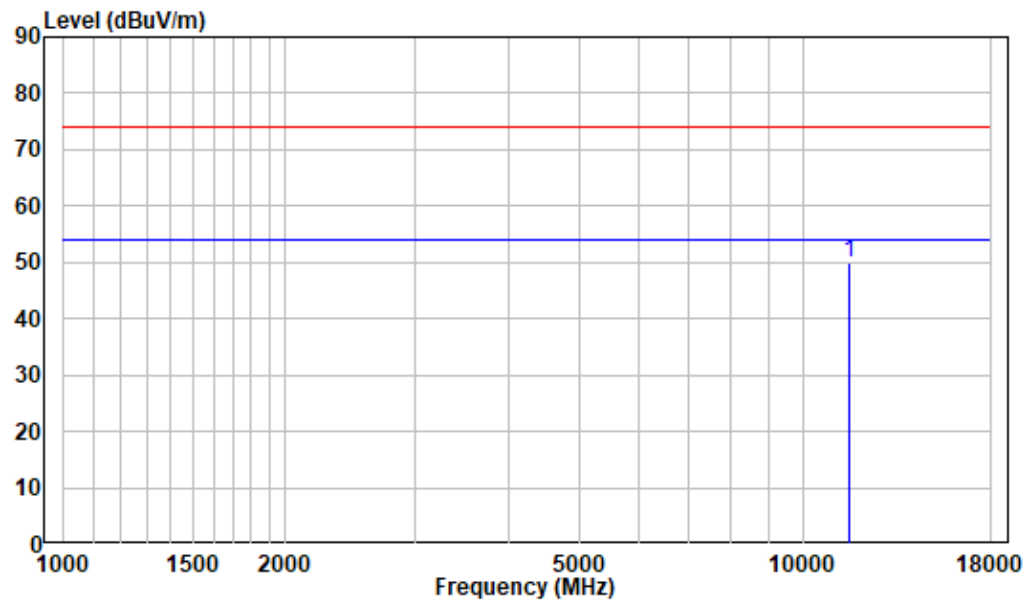
Margin = Corrected. Amplitude - Limit

The other spurious emission which is in the noise floor level was not recorded.

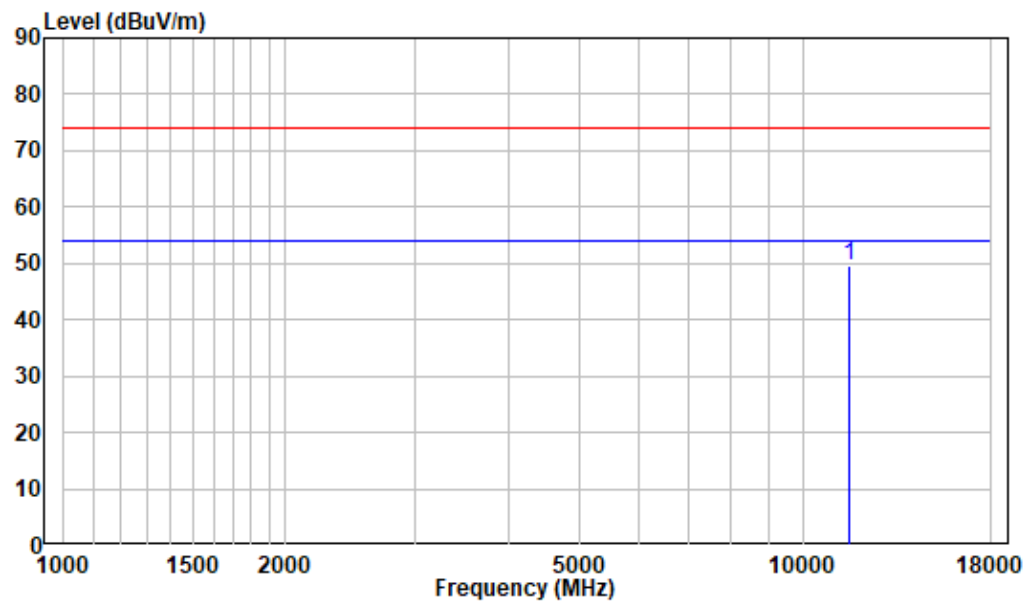
The test result of peak was less than the limit of average, so just peak values were recorded.

1-18 GHz:

Pre-scan with 802.11n20 5200MHz
Horizontal

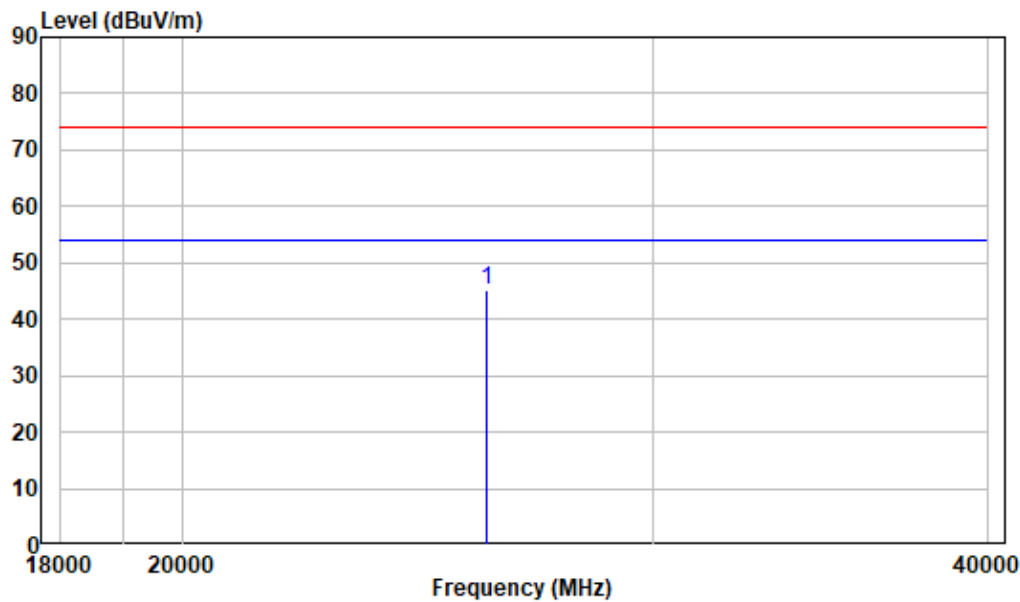


Vertical

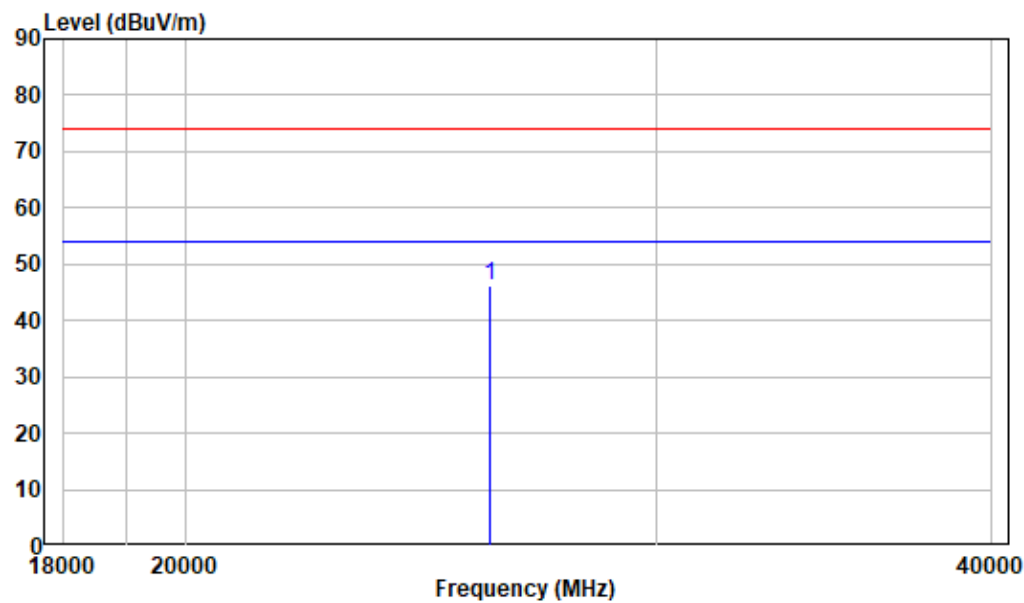


18-40 GHz:

Pre-scan with 802.11n20 5200MHz
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

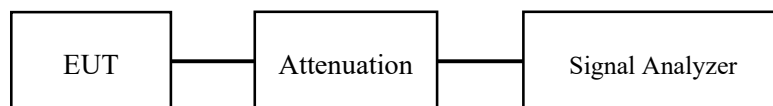
1. Emission Bandwidth (EBW)

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



Test Data**Environmental Conditions**

Temperature:	21 °C
Relative Humidity:	62 %
ATM Pressure:	101.0 kPa

The testing was performed by Paul Liu on 2021-11-25.

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.

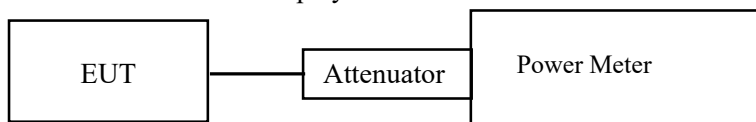
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting 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 $11 \text{ dBm} + 10 \log B$, 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

- d. Place the EUT on a bench and set it in transmitting mode.
- e. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
- f. Add a correction factor to the display.



Test Data**Environmental Conditions**

Temperature:	21 °C
Relative Humidity:	62 %
ATM Pressure:	101.0 kPa

The testing was performed by Paul Liu on 2021-11-25.

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 $11 \text{ dBm} + 10 \log B$, 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 ($< 1 \text{ MHz}$, or $< 500 \text{ kHz}$) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set $\text{RBW} \geq 1/T$, where T is defined in section II.B.1.a).
- b) Set $\text{VBW} \geq 3 \text{ RBW}$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500 \text{ kHz}/\text{RBW})$ to the measured result, whereas $\text{RBW} (< 500 \text{ kHz})$ 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 $10 \log (1\text{MHz}/\text{RBW})$ to the measured result, whereas $\text{RBW} (< 1 \text{ MHz})$ 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:	21 °C
Relative Humidity:	62 %
ATM Pressure:	101.0 kPa

The testing was performed by Paul Liu on 2021-11-25 and 2021-12-07.

EUT operation mode: Transmitting

Test Result: Pass

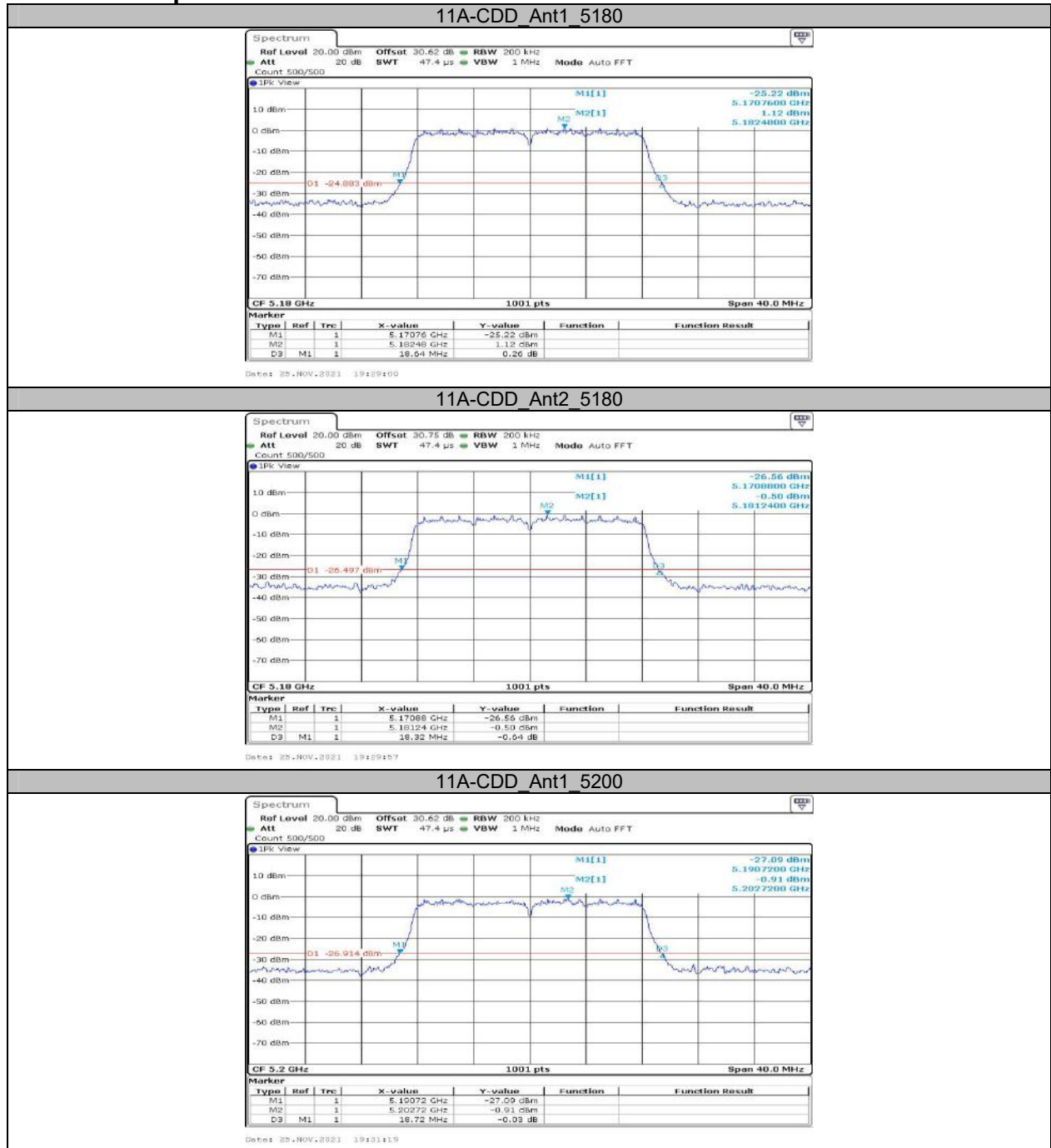
Please refer to the Appendix.

APPENDIX

Appendix A1: Emission Bandwidth Test Result

Test Mode	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5180	18.640	---	PASS
	Ant2	5180	18.320	---	PASS
	Ant1	5200	18.720	---	PASS
	Ant2	5200	18.600	---	PASS
	Ant1	5240	18.600	---	PASS
	Ant2	5240	18.480	---	PASS
11N20MIMO	Ant1	5180	19.440	---	PASS
	Ant2	5180	19.480	---	PASS
	Ant1	5200	19.480	---	PASS
	Ant2	5200	19.360	---	PASS
	Ant1	5240	19.480	---	PASS
	Ant2	5240	19.360	---	PASS
11N40MIMO	Ant1	5190	43.760	---	PASS
	Ant2	5190	43.520	---	PASS
	Ant1	5230	42.960	---	PASS
	Ant2	5230	43.600	---	PASS
11AC20MIMO	Ant1	5180	19.480	---	PASS
	Ant2	5180	19.560	---	PASS
	Ant1	5200	19.520	---	PASS
	Ant2	5200	19.560	---	PASS
	Ant1	5240	19.480	---	PASS
	Ant2	5240	19.520	---	PASS
11AC40MIMO	Ant1	5190	42.960	---	PASS
	Ant2	5190	43.120	---	PASS
	Ant1	5230	42.560	---	PASS
	Ant2	5230	42.720	---	PASS
11AC80MIMO	Ant1	5210	81.760	---	PASS
	Ant2	5210	81.920	---	PASS

Test Graphs





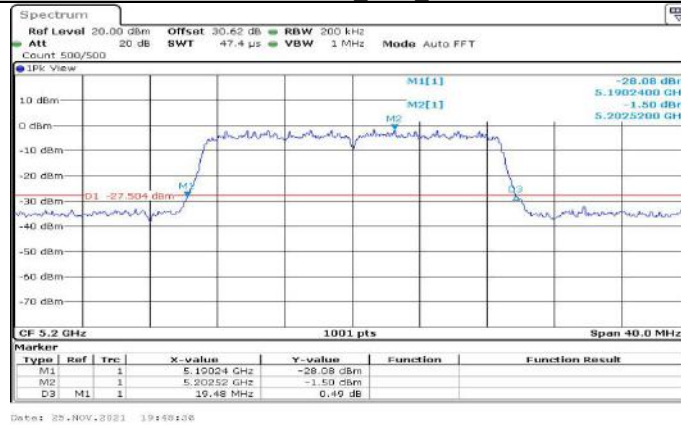
11N20MIMO_Ant1_5180



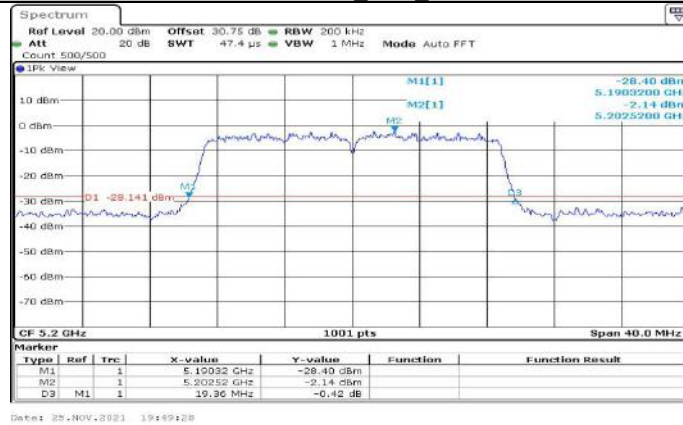
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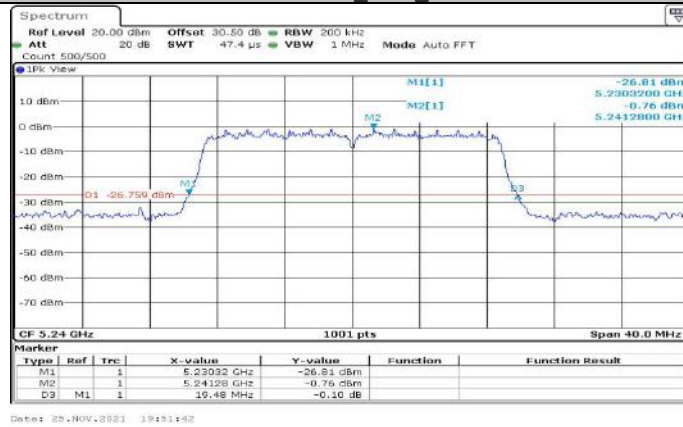
11N20MIMO_Ant1_5200



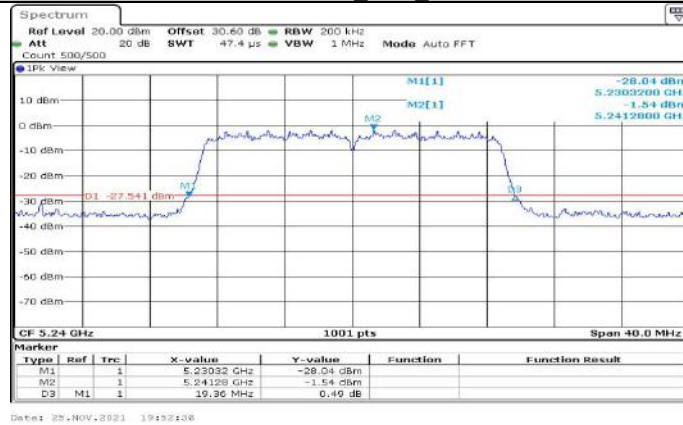
11N20MIMO_Ant2_5200



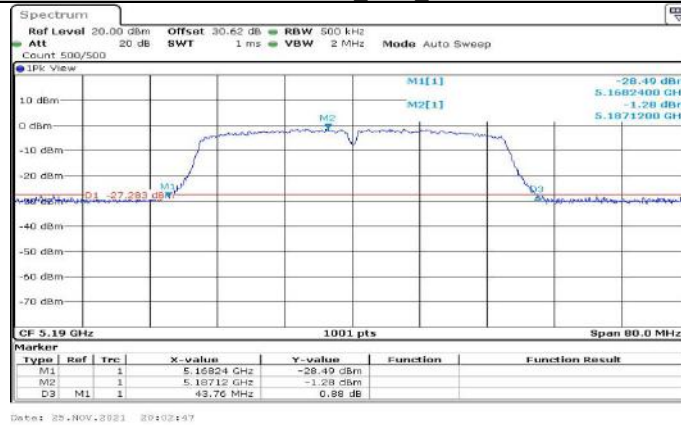
11N20MIMO_Ant1_5240



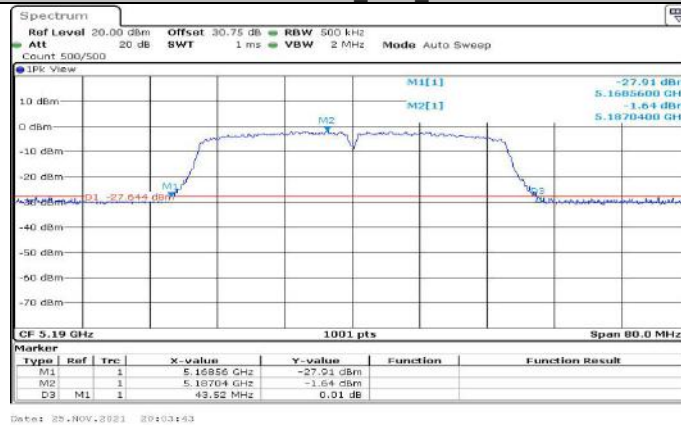
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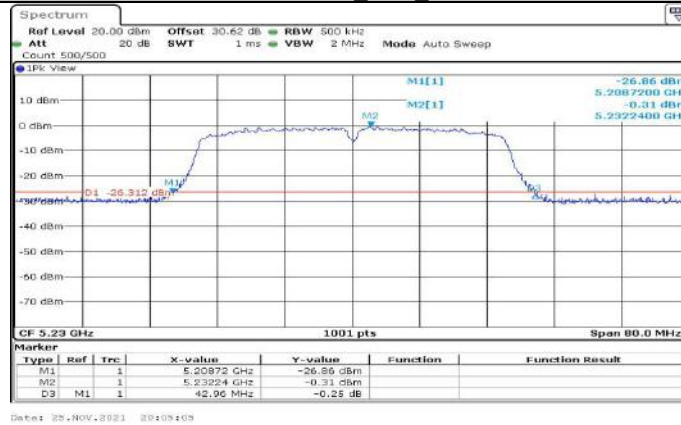
11N40MIMO_Ant1_5190



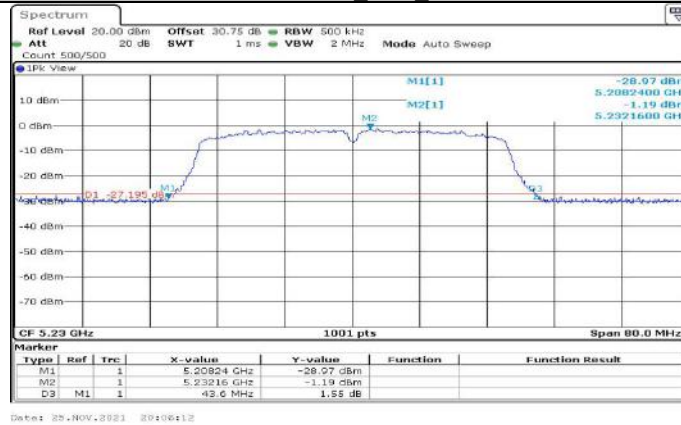
11N40MIMO_Ant2_5190



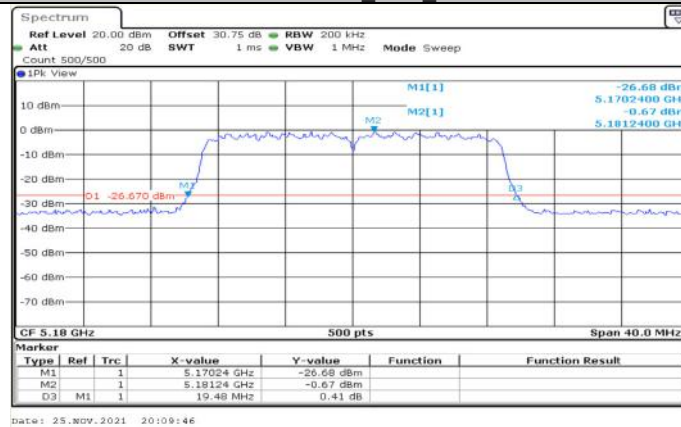
11N40MIMO_Ant1_5230



11N40MIMO_Ant2_5230



11AC20MIMO_Ant1_5180



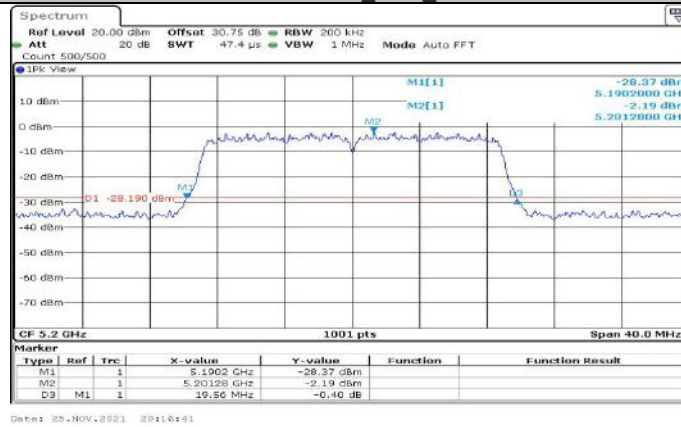
11AC20MIMO_Ant2_5180



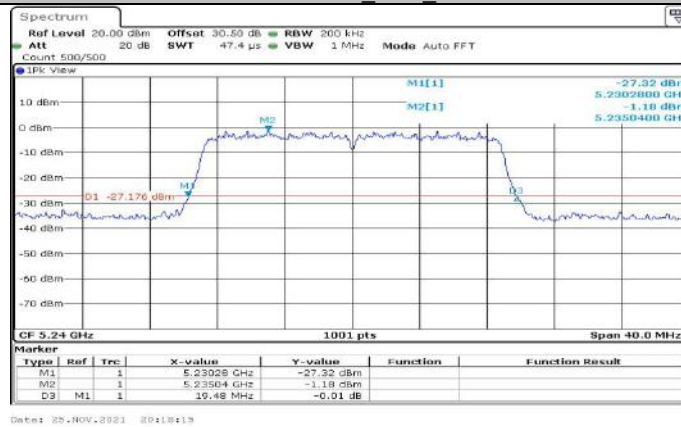
11AC20MIMO Ant1 5200



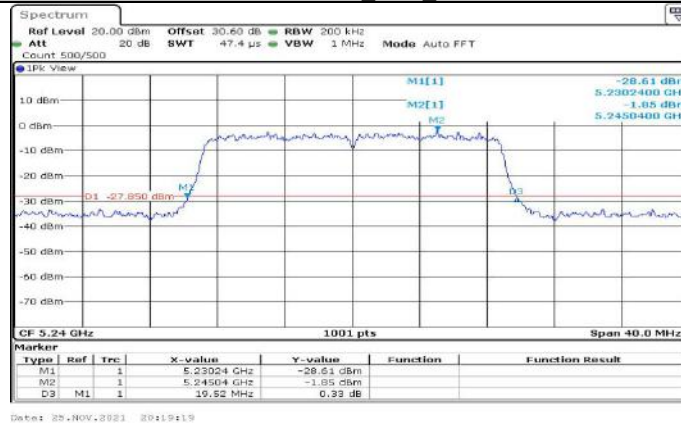
11AC20MIMO Ant2 5200



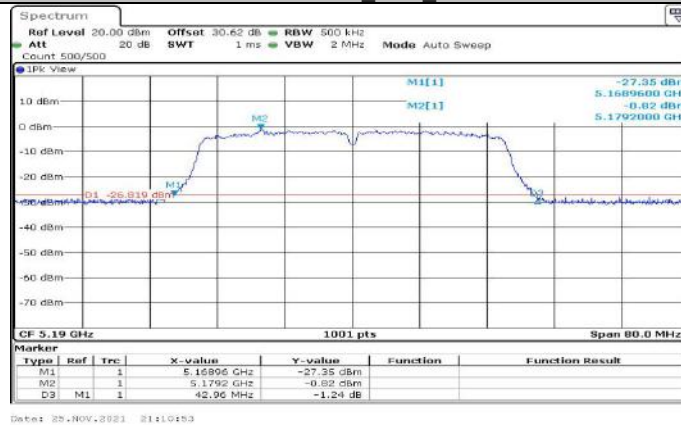
11AC20MIMO Ant1 5240



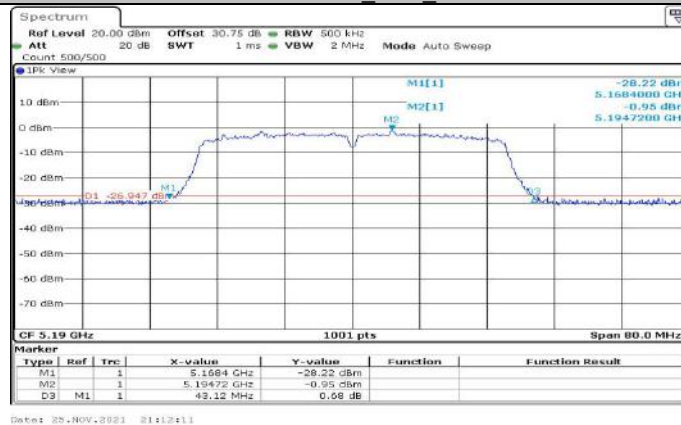
11AC20MIMO Ant2 5240



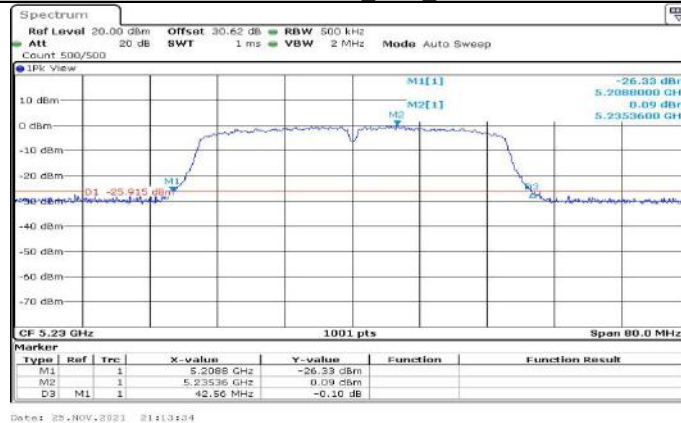
11AC40MIMO Ant1 5190



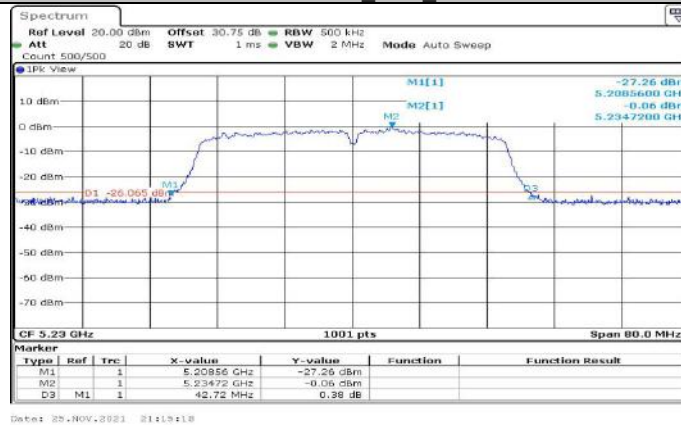
11AC40MIMO Ant2 5190



11AC40MIMO Ant1 5230

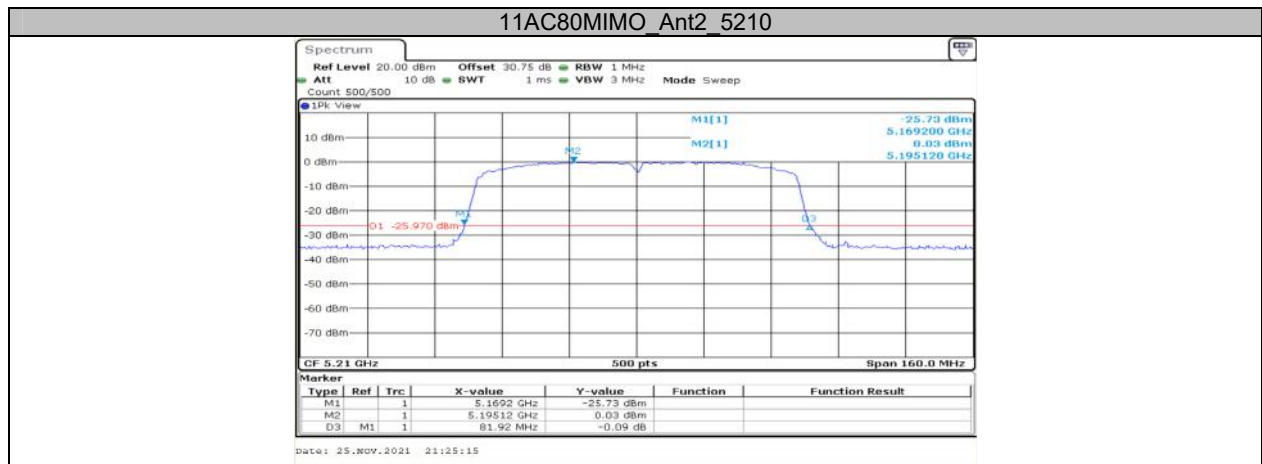


11AC40MIMO Ant2 5230



11AC80MIMO Ant1 5210



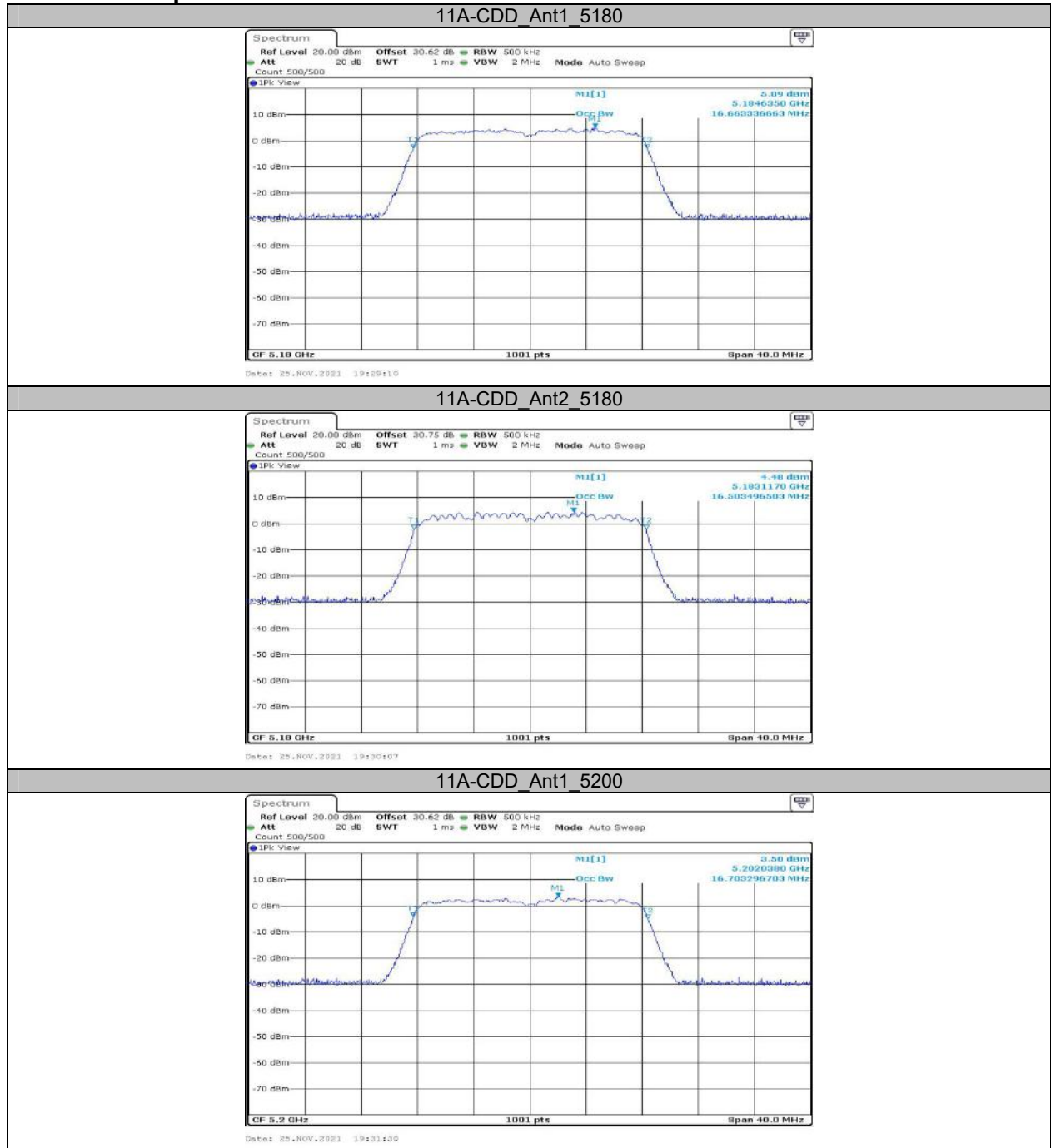


Appendix A2: Occupied channel bandwidth

Test Result

Test Mode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5180	16.663	---	PASS
	Ant2	5180	16.503	---	PASS
	Ant1	5200	16.703	---	PASS
	Ant2	5200	16.543	---	PASS
	Ant1	5240	16.663	---	PASS
	Ant2	5240	16.583	---	PASS
	Ant1	5745	16.743	---	PASS
	Ant2	5745	16.623	---	PASS
	Ant1	5785	16.783	---	PASS
	Ant2	5785	16.623	---	PASS
	Ant1	5825	16.783	---	PASS
	Ant2	5825	16.663	---	PASS
11N20MIMO	Ant1	5180	17.782	---	PASS
	Ant2	5180	17.782	---	PASS
	Ant1	5200	17.782	---	PASS
	Ant2	5200	17.822	---	PASS
	Ant1	5240	17.782	---	PASS
	Ant2	5240	17.782	---	PASS
	Ant1	5745	17.782	---	PASS
	Ant2	5745	17.782	---	PASS
	Ant1	5785	17.822	---	PASS
	Ant2	5785	17.822	---	PASS
	Ant1	5825	17.862	---	PASS
	Ant2	5825	17.942	---	PASS
11N40MIMO	Ant1	5190	36.923	---	PASS
	Ant2	5190	36.923	---	PASS
	Ant1	5230	36.843	---	PASS
	Ant2	5230	36.923	---	PASS
	Ant1	5755	36.923	---	PASS
	Ant2	5755	36.923	---	PASS
	Ant1	5795	36.923	---	PASS
	Ant2	5795	37.163	---	PASS
11AC20MIMO	Ant1	5180	17.742	---	PASS
	Ant2	5180	17.742	---	PASS
	Ant1	5200	17.742	---	PASS
	Ant2	5200	17.742	---	PASS
	Ant1	5240	17.742	---	PASS
	Ant2	5240	17.742	---	PASS
	Ant1	5745	17.822	---	PASS
	Ant2	5745	17.822	---	PASS
	Ant1	5785	17.822	---	PASS
	Ant2	5785	17.822	---	PASS
	Ant1	5825	17.862	---	PASS
	Ant2	5825	17.902	---	PASS
11AC40MIMO	Ant1	5190	36.683	---	PASS
	Ant2	5190	36.763	---	PASS
	Ant1	5230	36.603	---	PASS
	Ant2	5230	36.603	---	PASS
	Ant1	5755	36.923	---	PASS
	Ant2	5755	37.003	---	PASS
	Ant1	5795	36.683	---	PASS
	Ant2	5795	36.923	---	PASS
11AC80MIMO	Ant1	5210	75.445	---	PASS
	Ant2	5210	75.604	---	PASS
	Ant1	5775	75.764	---	PASS
	Ant2	5775	75.764	---	PASS

Test Graphs



11A-CDD_Ant2_5200



11A-CDD_Ant1_5240



11A-CDD_Ant2_5240



11A-CDD_Ant1_5745



11A-CDD_Ant2_5745



11A-CDD_Ant1_5785



11A-CDD_Ant2_5785



11A-CDD_Ant1_5825



11A-CDD_Ant2_5825



11N20MIMO_Ant1_5180

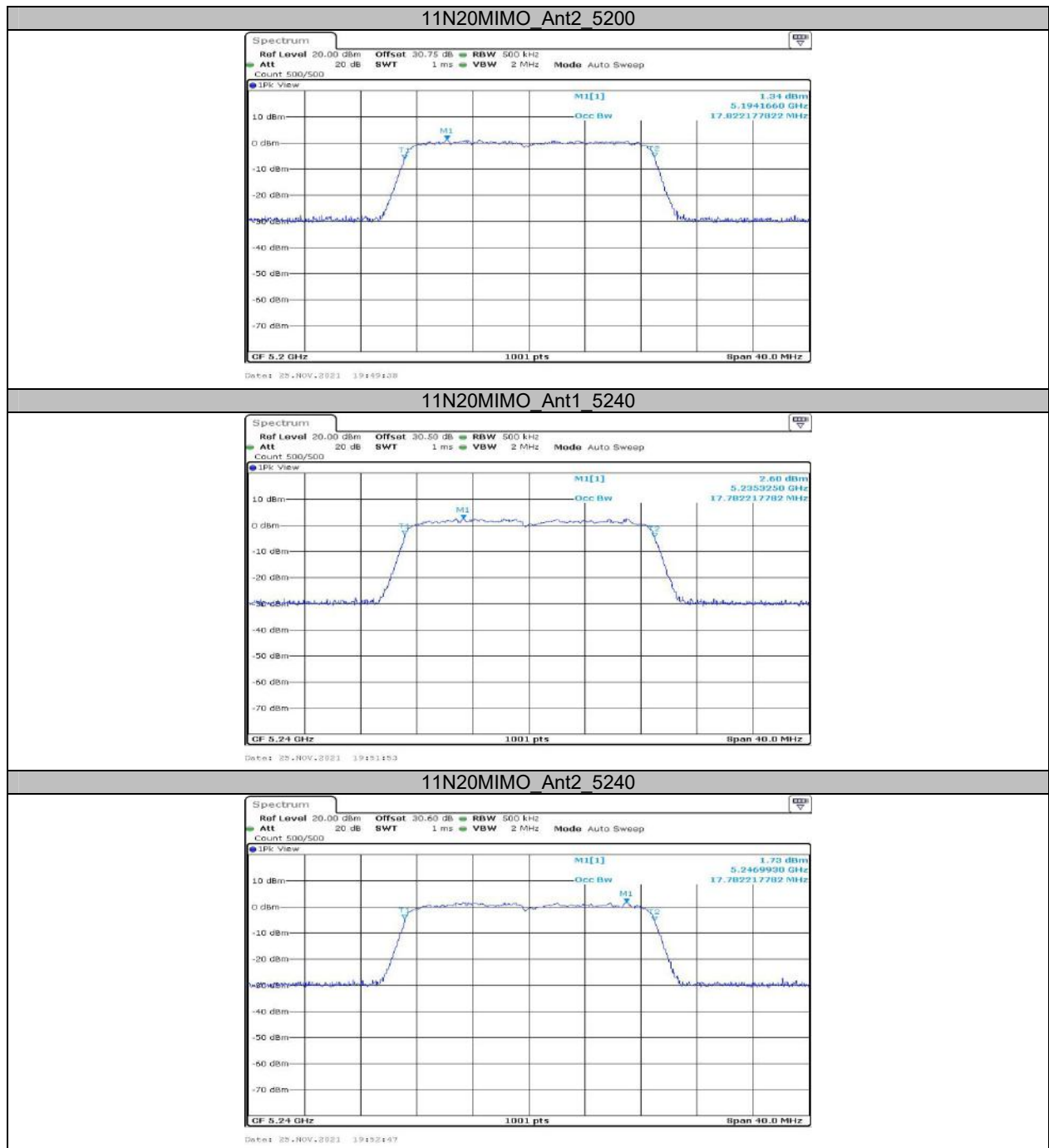


11N20MIMO_Ant2_5180



11N20MIMO_Ant1_5200





11N20MIMO_Ant1_5745



11N20MIMO_Ant2_5745



11N20MIMO_Ant1_5785



11N20MIMO_Ant2_5785



11N20MIMO_Ant1_5825



11N20MIMO_Ant2_5825



11N40MIMO_Ant1_5190



11N40MIMO_Ant2_5190



11N40MIMO_Ant1_5230



