



FCC TEST REPORT

FCC ID:2A9BE-E3-DBB1

Report Number..... : ZKT-2209076553E-1

Date of Test..... Sep. 05, 2022 to Nov. 15, 2022

Date of issue..... : Nov. 15, 2022

Total number of pages..... 66

Test Result : PASS

Testing Laboratory..... : **Shenzhen ZKT Technology Co., Ltd.**

Address : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : **Hangzhou LinknLink Technology Co., Ltd.**

Address : Room 02, 25th Floor, Block A, Building 1, No. 57, Jianger Road, Changhe Street, Binjiang District, Hangzhou, China (Zhejiang) Pilot Free Trade Zone

Manufacturer's name : **Shenzhen Junuo Electronics Co., Ltd.**

Address : 401/401, Workshop, No. 36, Hezhou Road, Hezhou Community, Hangcheng Street, Bao 'an District, Shenzhen

Test specification:

Standard..... : FCC CFR Title 47 Part 15 Subpart E Section 15.407
ANSI C63.10:2013
KDB 789033 D02 v02r01

Test procedure..... : /

Non-standard test method : N/A

Test Report Form No..... : TRF-EL-113_V0

Test Report Form(s) Originator..... : ZKT Testing

Master TRF : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : **Digital Signage Box**

Trademark : LinknLink

Model/Type reference..... : E3-DBB1

Ratings..... : Input: 100-240V, 50/60Hz
Output: DC 5V/2A



Testing procedure and testing location:

Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.

Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: Jim Liu

Jim Liu

Reviewer (name + signature).....: Jackson Fang

Jackson Fang

Approved (name + signature).....: Lake Xie





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1. VERSION

Report No.	Version	Description	Approved
ZKT-2209076553E-1	Rev.01	Initial issue of report	Nov. 15, 2022



2.SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(8)	Spurious Radiated Emissions	PASS	
15.207	Conducted Emission	PASS	
15.407 (a)(12) 15.1049	26 dB and 99% Emission Bandwidth	PASS	
15.407(e)	6 dB bandwidth	PASS	
15.407 (a)(1) 15.407 (a)(3)	Maximum Conducted Output Power	PASS	
2.1051, 15.407(b)(1) 15.407(b)(4)	Band Edge	PASS	
15.407 (a)(1) 15.407 (a)(3)	Power Spectral Density	PASS	
2.1051, 15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$ · where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$ · providing a level of confidence of approximately 95 % .

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59°C



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Digital Signage Box	
Model No.:	E3-DBB1	
Model Different.:	N/A	
Sample ID	ZKT-2209076553E-1	
Sample(s) Status:	Engineer sample	
Product Description	IEEE 802.11 WLAN Mode Supported	☒ 802.11a/ac/n (20MHz channel bandwidth)
	Data Rate	802.11a 802.11/ac/n(HT20):MCS0-MCS15;
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
	Operating Frequency Range	☒ 5180-5240MHz for 802.11a/ac/n(HT20); ☒ 5745-5825 MHz for 802.11a/ac/n(HT20);
	Number of Channels	☒ 4 channels for 802.11a/ac/n20 in the 5180-5240MHz band ; ☒ 5 channels for 802.11a/ac/n20 in the 5745-5825MHz band ;
Channel List	Please refer to the Note 2.	
Antenna Type:	FPCB Antenna	
Antenna gain:	3.42dBi	
Power supply:	Input: 100-240V, 50/60Hz Output: DC 5V/2A	
SWITCHING POWER ADAPTER:	N/A	

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

802.11a/ac/n(20MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	-	-	-	-
40	5200	48	5240	-	-	-	-

802.11a/ac/n(20 MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	-	-	-	-	-	-



3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Pretest Mode	Description
Mode 1	802.11a /ac / n 20 CH36/ CH40/ CH 48 802.11ac /n 20 CH149/ CH157/ CH 165
Mode 2	Link Mode

Conducted Emission	
Final Test Mode	Description
Mode 2	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a /ac / n 20 CH36/ CH40/ CH 48 802.11ac /n 20 CH149/ CH157/ CH 165

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.



Test Software	Realtek Test Tool
Power level setup	<12dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



Conducted Spurious



3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E1	Digital Signage Box	LinknLink	E3-DBB1	N/A	EUT
E2	Laptop	ASUS	ZKT-001	N/A	Auxiliary
A1	AC/DC ADAPTER	N/A	BF-0520	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	Oct. 18, 2022	Oct. 17, 2023
2	Spectrum Analyzer (1GHz-40GHz)	R&S	FSQ	100363	Oct. 17, 2022	Oct. 16, 2023
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Oct. 18, 2022	Oct. 17, 2023
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	Oct. 17, 2022	Oct. 16, 2023
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	Oct. 17, 2022	Oct. 16, 2023
6	Loop Antenna	TESEQ	HLA6121	58357	Oct. 17, 2022	Oct. 16, 2023
7	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	060747	Oct. 18, 2022	Oct. 17, 2023
8	Amplifier (1GHz-26.5GHz)	Agilent	8449B	3008A00315	Oct. 18, 2022	Oct. 17, 2023
9	RF cables1 (9kHz-30MHz)	N/A	9kHz-30MHz	N/A	Oct. 18, 2022	Oct. 17, 2023
10	RF cables2 (30MHz-1GHz)	N/A	30MHz-1GHz	N/A	Oct. 18, 2022	Oct. 17, 2023
11	RF cables3 (1GHz-40GHz)	N/A	1GHz-40GHz	N/A	Oct. 18, 2022	Oct. 17, 2023
12	ESG Signal Generator	Agilent	E4421B	N/A	Oct. 22, 2022	Oct. 21, 2023
13	Signal Generator	Agilent	N5182A	N/A	Oct. 22, 2022	Oct. 21, 2023
14	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	Oct. 17, 2022	Oct. 16, 2023
15	MWRF Power Meter Test system	MW	MW100-RP CB	N/A	Oct. 22, 2022	Oct. 21, 2023
16	D.C. Power Supply	LongWei	TPR-6405D	N/A	\	\
17	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	\	\
18	RF Software	MW	MTS8310	V2.0.0.0	\	\
19	Turntable	MF	MF-7802BS	N/A	\	\
20	Antenna tower	MF	MF-7802BS	N/A	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Oct. 22, 2022	Oct. 21, 2023
2	LISN	CYBERTEK	EM5040A	E1850400149	Oct. 22, 2022	Oct. 21, 2023
3	Test Cable	N/A	C01	N/A	Oct. 18, 2022	Oct. 17, 2023
4	Test Cable	N/A	C02	N/A	Oct. 18, 2022	Oct. 17, 2023
5	EMI Test Receiver	R&S	ESCI3	101393	Oct. 17, 2022	Oct. 16, 2023
6	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	\	\



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

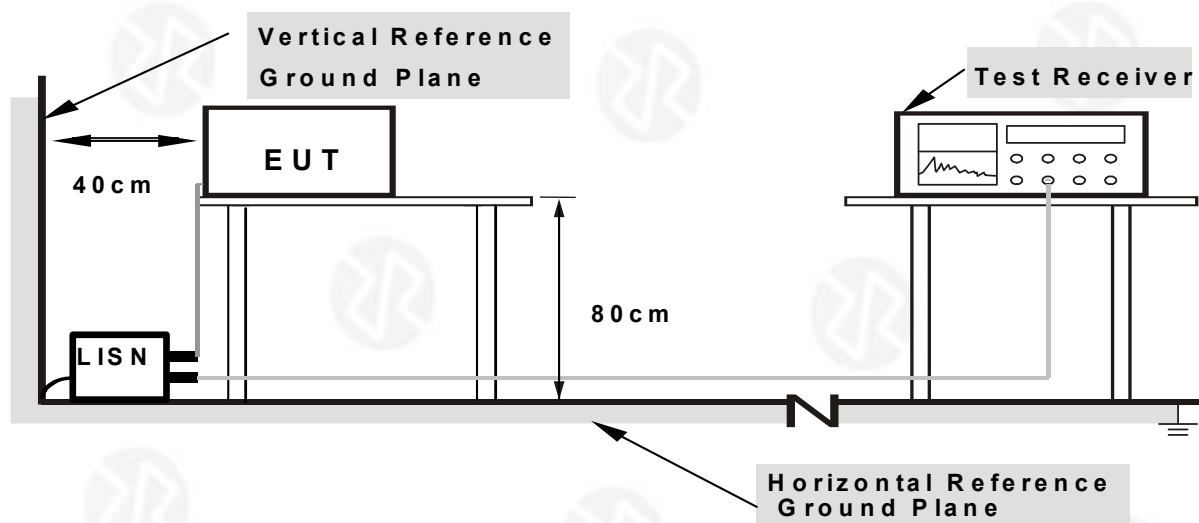
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation



4.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

4.1.5 EUT OPERATING CONDITIONS

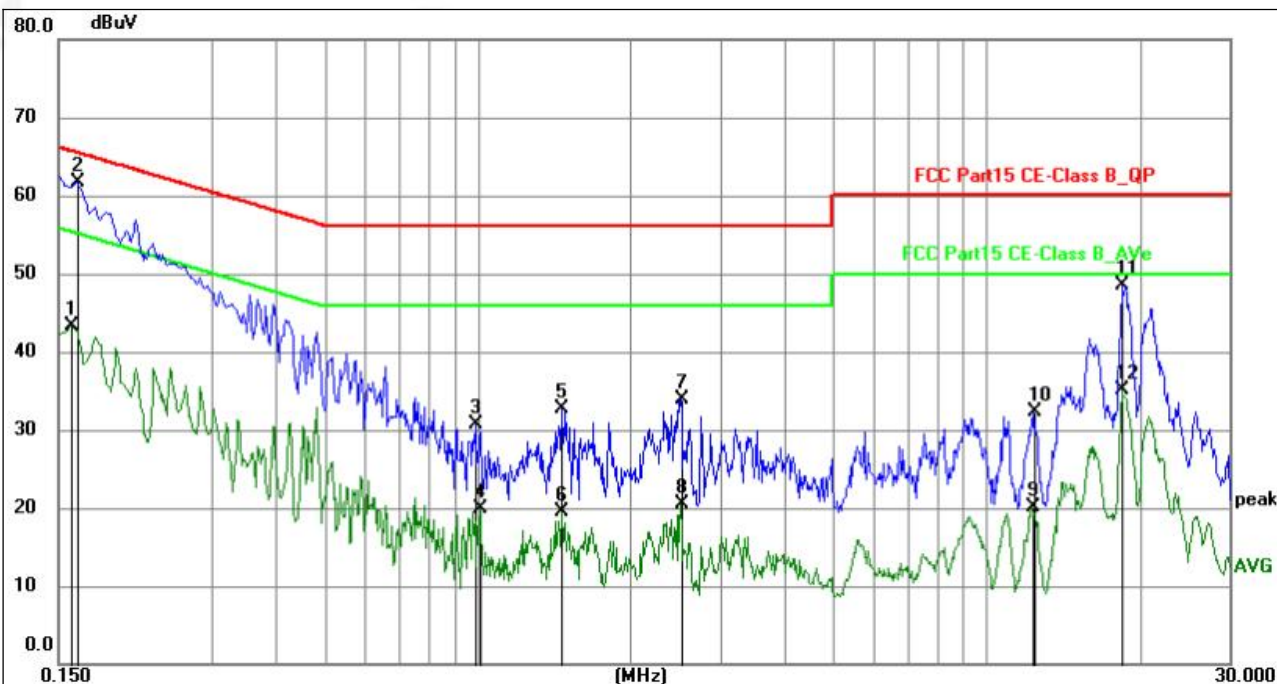
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.



4.1.6 TEST RESULT

Temperature :	26℃	Relative Humidity:	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz		



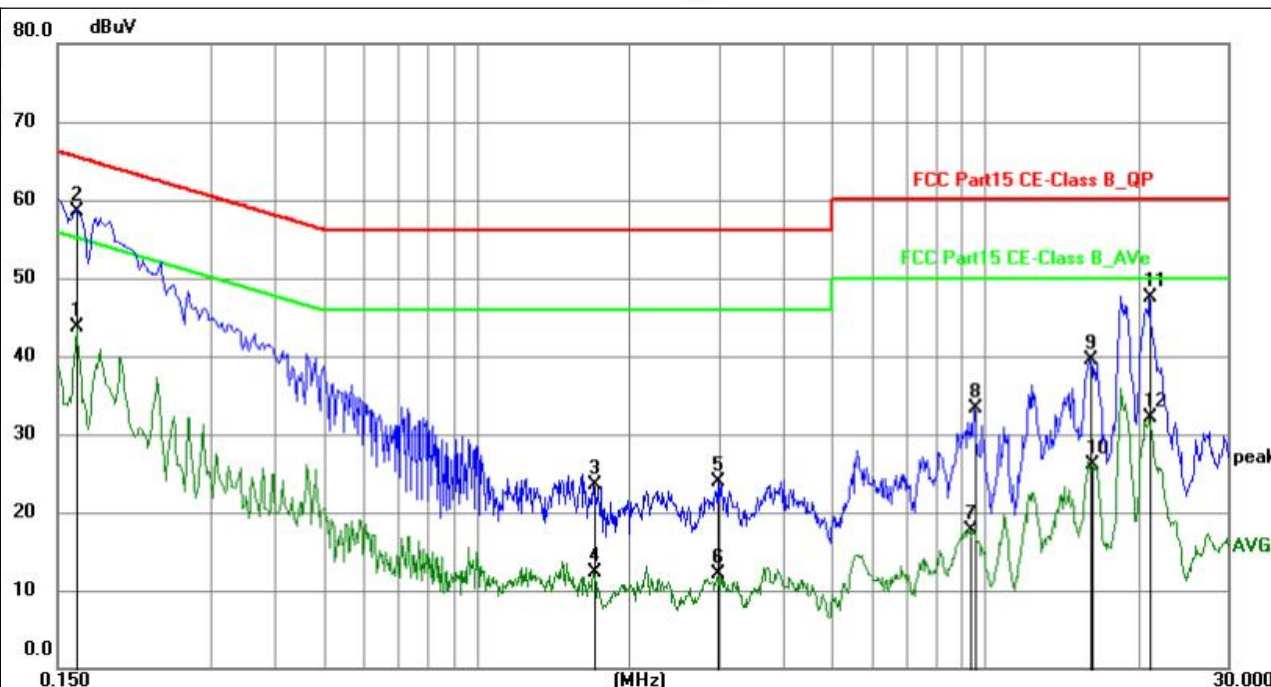
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz					dB	Detector
1		0.1590	30.46	12.81	43.27	55.52	-12.25	AVG
2	*	0.1635	49.06	12.71	61.77	65.28	-3.51	QP
3		0.9913	20.34	10.44	30.78	56.00	-25.22	QP
4		1.0139	9.51	10.44	19.95	46.00	-26.05	AVG
5		1.4638	22.41	10.32	32.73	56.00	-23.27	QP
6		1.4638	9.13	10.32	19.45	46.00	-26.55	AVG
7		2.5034	23.89	10.06	33.95	56.00	-22.05	QP
8		2.5034	10.46	10.06	20.52	46.00	-25.48	AVG
9		12.3000	11.38	8.78	20.16	50.00	-29.84	AVG
10		12.3945	23.57	8.80	32.37	60.00	-27.63	QP
11		18.4785	38.86	9.65	48.51	60.00	-11.49	QP
12		18.4785	25.36	9.65	35.01	50.00	-14.99	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor



Temperature :	26℃	Relative Humidity:	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz						Detector
1		0.1635	30.99	12.71	43.70	55.28	-11.58	AVG
2	*	0.1640	45.88	12.70	58.58	65.26	-6.68	QP
3		1.7023	13.28	10.26	23.54	56.00	-32.46	QP
4		1.7023	2.08	10.26	12.34	46.00	-33.66	AVG
5		2.9849	13.93	9.94	23.87	56.00	-32.13	QP
6		2.9849	2.25	9.94	12.19	46.00	-33.81	AVG
7		9.3569	9.18	8.49	17.67	50.00	-32.33	AVG
8		9.5100	24.82	8.48	33.30	60.00	-26.70	QP
9		16.1340	30.24	9.32	39.56	60.00	-20.44	QP
10		16.1430	16.78	9.32	26.10	50.00	-23.90	AVG
11		21.0839	37.57	9.87	47.44	60.00	-12.56	QP
12		21.0839	22.22	9.87	32.09	50.00	-17.91	AVG

Notes:

- 1.An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3.Measurement Level = Reading level + Correct Factor



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

4.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Remark :1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor.

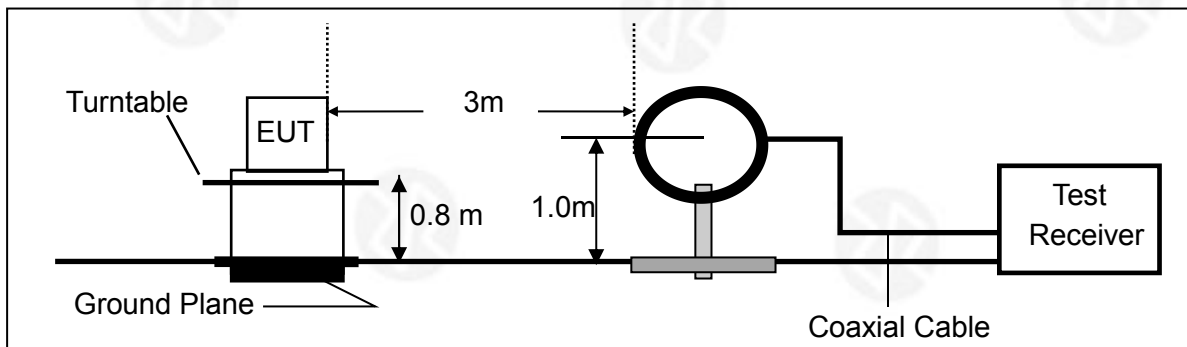
4.2.3 MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 6.3 of this test report.

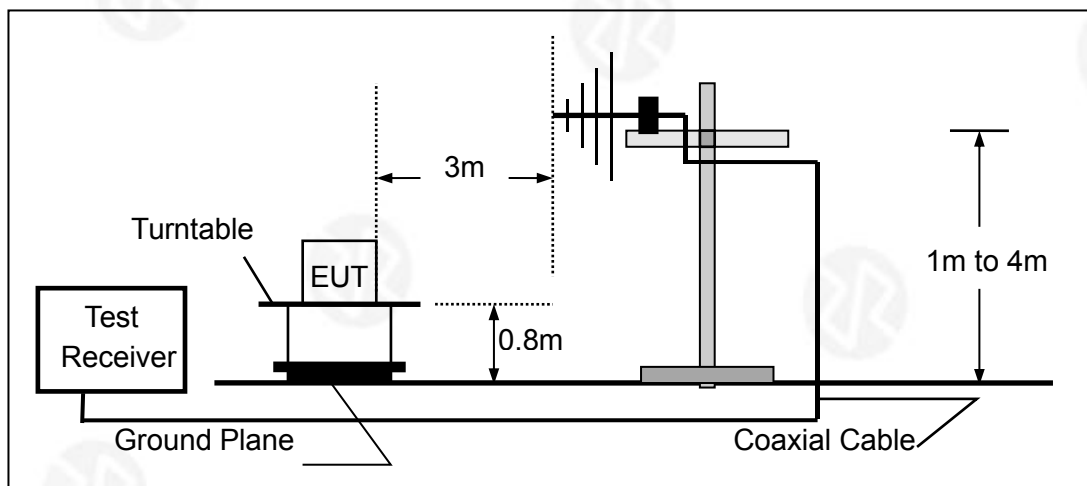


4.2.4 TEST CONFIGURATION

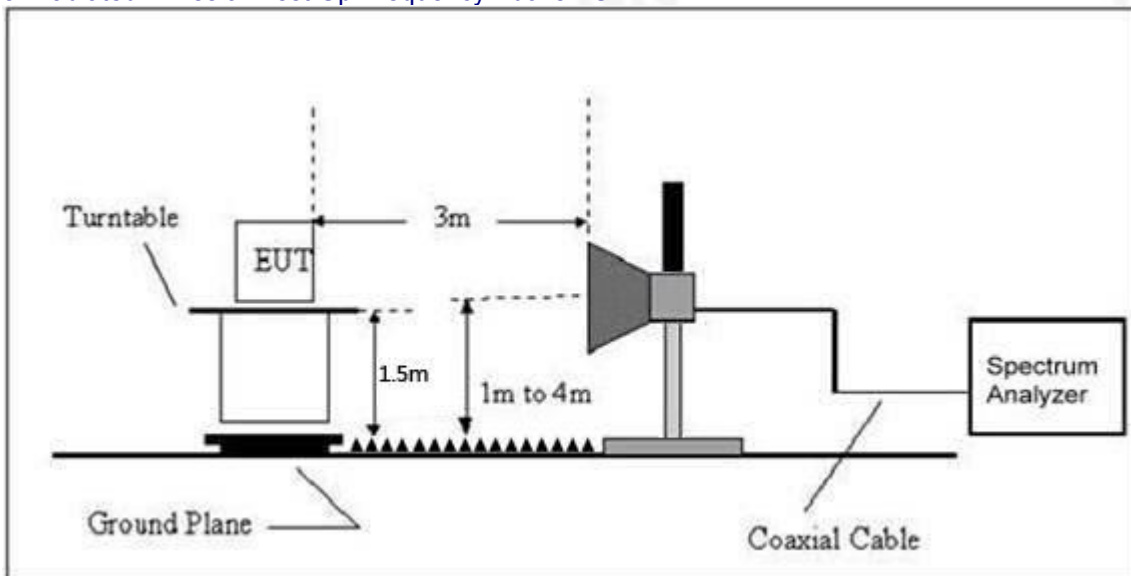
1. For radiated emissions below 30MHz



2. For radiated emissions from 30MHz to 1000MHz



3. Radiated Emission Test-Up Frequency Above 1GHz





4.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.

Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW [kHz]})$. , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.



4.2.6 TEST RESULT

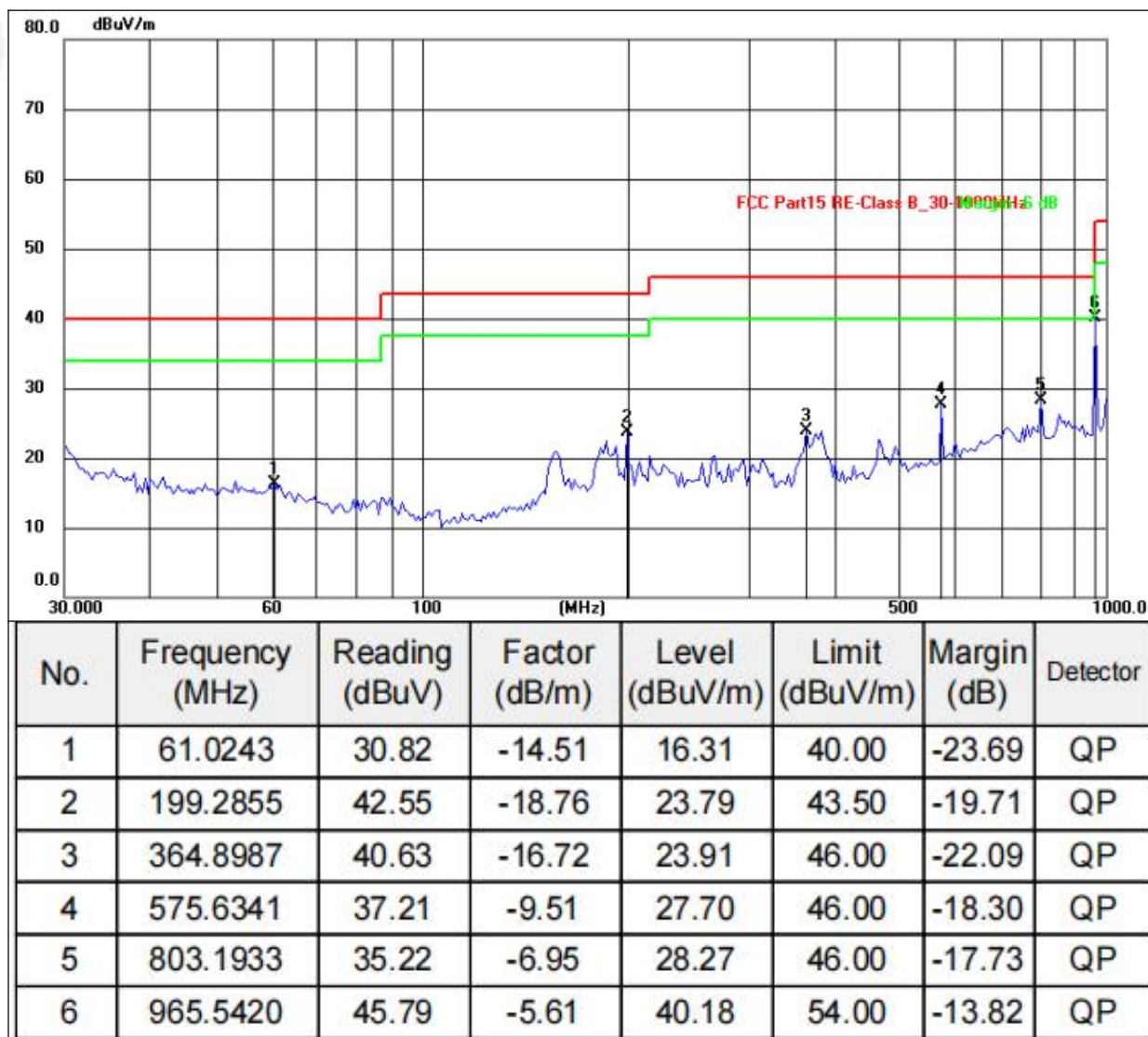
Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.



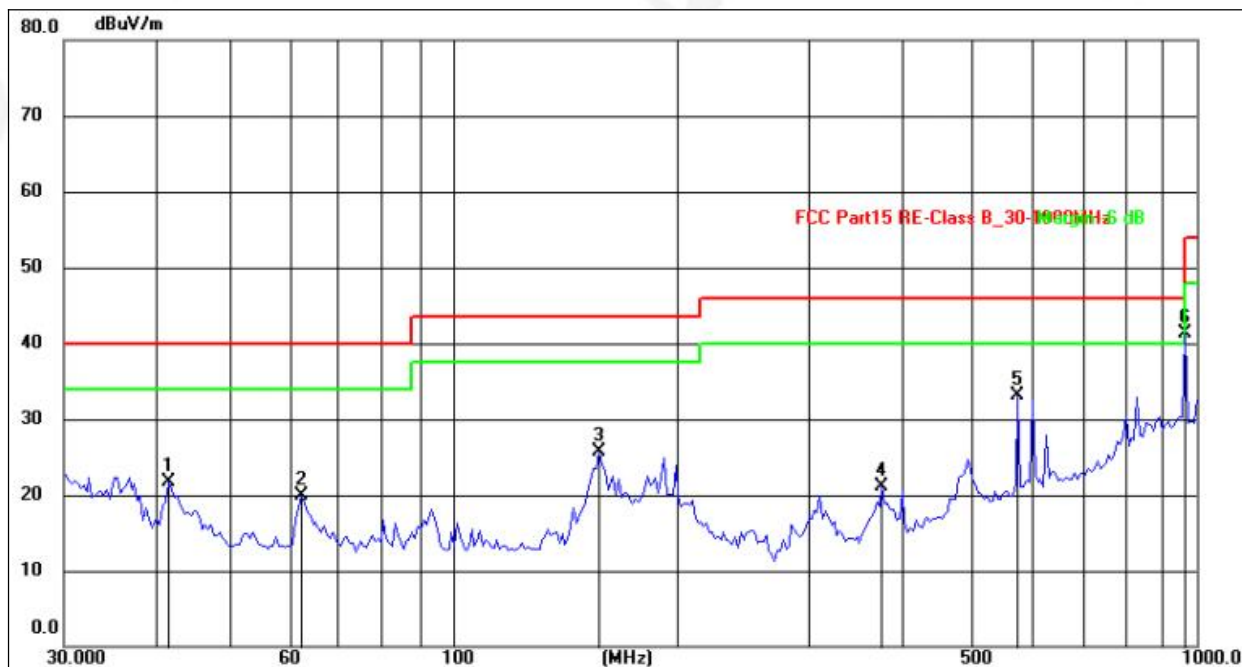
Between 30MHz – 1GHz

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		





Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	41.4941	38.60	-16.93	21.67	40.00	-18.33	QP
2	62.6505	38.45	-18.59	19.86	40.00	-20.14	QP
3	157.2828	45.98	-20.28	25.70	43.50	-17.80	QP
4	377.9211	36.94	-15.76	21.18	46.00	-24.82	QP
5	575.6341	41.86	-8.70	33.16	46.00	-12.84	QP
6	965.5420	41.79	-0.40	41.39	54.00	-12.61	QP

Remarks:

- 1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2.The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3.The test data shows only the worst case 802.11n20 mode



Between 1GHz – 40GHz

Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	5.2G TX- 802.11n20		

802.11n20

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:5180MHz									
V	5150.00	44.38	30.45	8.77	38.66	61.36	74.00	-12.64	PK
V	5150.00	31.35	30.45	8.77	38.66	48.33	54.00	-5.67	AV
V	10360.00	53.84	30.55	5.77	24.66	53.72	74.00	-20.28	PK
V	10360.00	43.71	30.55	5.77	24.66	43.59	54.00	-10.41	AV
V	15540.00	52.10	30.33	6.32	24.55	52.64	74.00	-21.36	PK
V	15540.00	43.14	30.33	6.32	24.55	43.68	54.00	-10.32	AV
V	20720.00	50.27	30.85	7.45	24.69	51.56	74.00	-22.44	PK
V	20720.00	43.23	30.85	7.45	24.69	44.52	54.00	-9.48	AV
V	25900.00	50.65	31.02	8.99	25.57	54.19	74.00	-19.81	PK
V	25900.00	43.47	31.02	8.99	25.57	47.01	54.00	-6.99	AV
H	5150.00	42.17	30.45	8.77	38.66	59.15	74.00	-14.85	PK
H	5150.00	32.56	30.45	8.77	38.66	49.54	54.00	-4.46	AV
H	10360.00	54.14	30.55	5.77	24.66	54.02	74.00	-19.98	PK
H	10360.00	43.73	30.55	5.77	24.66	43.61	54.00	-10.39	AV
H	15540.00	53.07	30.33	6.32	24.55	53.61	74.00	-20.39	PK
H	15540.00	43.33	30.33	6.32	24.55	43.87	54.00	-10.13	AV
H	20720.00	51.75	30.85	7.45	24.69	53.04	74.00	-20.96	PK
H	20720.00	43.88	30.85	7.45	24.69	45.17	54.00	-8.83	AV
H	25900.00	51.93	31.02	8.99	25.57	55.47	74.00	-18.53	PK
H	25900.00	43.08	31.02	8.99	25.57	46.62	54.00	-7.38	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:5200MHz									
V	5150.00	42.37	30.45	8.77	38.66	59.35	74.00	-14.65	PK
V	5150.00	32.65	30.45	8.77	38.66	49.63	54.00	-4.37	AV
V	10400.00	53.54	30.55	5.77	24.66	53.42	74.00	-20.58	PK
V	10400.00	43.03	30.55	5.77	24.66	42.91	54.00	-11.09	AV
V	15600.00	53.98	30.33	6.32	24.55	54.52	74.00	-19.48	PK
V	15600.00	43.91	30.33	6.32	24.55	44.45	54.00	-9.55	AV
V	20800.00	52.63	30.85	7.45	24.69	53.92	74.00	-20.08	PK
V	20800.00	43.17	30.85	7.45	24.69	44.46	54.00	-9.54	AV
V	26000.00	51.58	31.02	8.99	25.57	55.12	74.00	-18.88	PK
V	26000.00	43.94	31.02	8.99	25.57	47.48	54.00	-6.52	AV
H	5150.00	43.25	30.45	8.77	38.66	60.23	74.00	-13.77	PK
H	5150.00	33.46	30.45	8.77	38.66	50.44	54.00	-3.56	AV
H	10400.00	53.15	30.55	5.77	24.66	53.03	74.00	-20.97	PK
H	10400.00	43.03	30.55	5.77	24.66	42.91	54.00	-11.09	AV
H	15600.00	51.44	30.33	6.32	24.55	51.98	74.00	-22.02	PK



H	15600.00	43.87	30.33	6.32	24.55	44.41	54.00	-9.59	AV
H	20800.00	53.93	30.85	7.45	24.69	55.22	74.00	-18.78	PK
H	20800.00	43.34	30.85	7.45	24.69	44.63	54.00	-9.37	AV
H	26000.00	52.57	31.02	8.99	25.57	56.11	74.00	-17.89	PK
H	26000.00	43.78	31.02	8.99	25.57	47.32	54.00	-6.68	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-ampli fier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
High Channel:5240MHz									
V	5350.00	42.94	30.45	8.77	38.66	59.92	74.00	-14.08	PK
V	5350.00	32.45	30.45	8.77	38.66	49.43	54.00	-4.57	AV
V	10480.00	52.92	30.55	5.77	24.66	52.80	74.00	-21.20	PK
V	10480.00	43.84	30.55	5.77	24.66	43.72	54.00	-10.28	AV
V	15720.00	54.25	30.33	6.32	24.55	54.79	74.00	-19.21	PK
V	15720.00	43.93	30.33	6.32	24.55	44.47	54.00	-9.53	AV
V	20960.00	50.32	30.85	7.45	24.69	51.61	74.00	-22.39	PK
V	20960.00	43.68	30.85	7.45	24.69	44.97	54.00	-9.03	AV
V	26200.00	52.63	31.02	8.99	25.57	56.17	74.00	-17.83	PK
V	26200.00	43.91	31.02	8.99	25.57	47.45	54.00	-6.55	AV
H	5350.00	42.16	30.45	8.77	38.66	59.14	74.00	-14.86	PK
H	5350.00	32.57	30.45	8.77	38.66	49.55	54.00	-4.45	AV
H	10480.00	50.85	30.55	5.77	24.66	50.73	74.00	-23.27	PK
H	10480.00	43.71	30.55	5.77	24.66	43.59	54.00	-10.41	AV
H	15720.00	53.79	30.33	6.32	24.55	54.33	74.00	-19.67	PK
H	15720.00	43.83	30.33	6.32	24.55	44.37	54.00	-9.63	AV
H	20960.00	51.35	30.85	7.45	24.69	52.64	74.00	-21.36	PK
H	20960.00	43.98	30.85	7.45	24.69	45.27	54.00	-8.73	AV
H	26200.00	50.77	31.02	8.99	25.57	54.31	74.00	-19.69	PK
H	26200.00	43.15	31.02	8.99	25.57	46.69	54.00	-7.31	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4. The worst mode is 802.11n20, only the worst data is recorded.



Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	5.8G TX- 802.11n20		

802.11n20

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:5745MHz									
V	5725.00	42.38	30.45	8.77	38.66	59.36	68.20	-8.84	PK
V	11490.00	51.74	30.55	5.77	24.66	51.62	74.00	-22.38	PK
V	11490.00	43.43	30.55	5.77	24.66	43.31	54.00	-10.69	AV
V	17235.00	52.98	30.33	6.32	24.55	53.52	68.20	-14.68	PK
V	17235.00	43.54	30.33	6.32	24.55	44.08	54.00	-9.92	AV
V	22980.00	50.83	30.85	7.45	24.69	52.12	74.00	-21.88	PK
V	22980.00	43.95	30.85	7.45	24.69	45.24	54.00	-8.76	AV
V	28725.00	53.95	31.02	8.99	25.57	57.49	68.20	-10.71	PK
V	28725.00	43.41	31.02	8.99	25.57	46.95	54.00	-7.05	AV
H	5725.00	41.54	30.45	8.77	38.66	58.52	68.20	-9.68	PK
H	11490.00	52.47	30.55	5.77	24.66	52.35	74.00	-21.65	PK
H	11490.00	43.53	30.55	5.77	24.66	43.41	54.00	-10.59	AV
H	17235.00	54.11	30.33	6.32	24.55	54.65	68.20	-13.55	PK
H	17235.00	43.96	30.33	6.32	24.55	44.50	54.00	-9.50	AV
H	22980.00	52.24	30.85	7.45	24.69	53.53	74.00	-20.47	PK
H	22980.00	43.33	30.85	7.45	24.69	44.62	54.00	-9.38	AV
H	28725.00	52.76	31.02	8.99	25.57	56.30	68.20	-11.90	PK
H	28725.00	43.47	31.02	8.99	25.57	47.01	54.00	-6.99	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:5785MHz									
V	5725.00	41.64	30.45	8.77	38.66	58.62	68.20	-9.58	PK
V	11570.00	51.08	30.55	5.77	24.66	50.96	74.00	-23.04	PK
V	11570.00	43.25	30.55	5.77	24.66	43.13	54.00	-10.87	AV
V	17355.00	50.54	30.33	6.32	24.55	51.08	68.20	-17.12	PK
V	17355.00	43.47	30.33	6.32	24.55	44.01	54.00	-9.99	AV
V	23140.00	52.92	30.85	7.45	24.69	54.21	68.20	-13.99	PK
V	23140.00	43.73	30.85	7.45	24.69	45.02	54.00	-8.98	AV
V	28925.00	50.45	31.02	8.99	25.57	53.99	68.20	-14.21	PK
V	28925.00	43.68	31.02	8.99	25.57	47.22	54.00	-6.78	AV
H	5725.00	41.56	30.45	8.77	38.66	58.54	68.20	-9.66	PK
H	11570.00	50.57	30.55	5.77	24.66	50.45	74.00	-23.55	PK
H	11570.00	43.52	30.55	5.77	24.66	43.40	54.00	-10.60	AV
H	17355.00	54.35	30.33	6.32	24.55	54.89	68.20	-13.31	PK
H	17355.00	43.15	30.33	6.32	24.55	43.69	54.00	-10.31	AV
H	23140.00	52.23	30.85	7.45	24.69	53.52	68.20	-14.68	PK
H	23140.00	43.95	30.85	7.45	24.69	45.24	54.00	-8.76	AV
H	28925.00	50.34	31.02	8.99	25.57	53.88	68.20	-14.32	PK
H	28925.00	43.87	31.02	8.99	25.57	47.41	54.00	-6.59	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
High Channel:5825MHz									
V	5850.00	41.68	30.45	8.77	38.66	58.66	68.20	-9.54	PK
V	11650.00	51.17	30.55	5.77	24.66	51.05	74.00	-22.95	PK
V	11650.00	43.15	30.55	5.77	24.66	43.03	54.00	-10.97	AV
V	17475.00	50.53	30.33	6.32	24.55	51.07	68.20	-17.13	PK
V	17475.00	43.59	30.33	6.32	24.55	44.13	54.00	-9.87	AV
V	23300.00	51.97	30.85	7.45	24.69	53.26	68.20	-14.94	PK
V	23300.00	43.78	30.85	7.45	24.69	45.07	54.00	-8.93	AV
V	29125.00	54.46	31.02	8.99	25.57	58.00	68.20	-10.20	PK
V	29125.00	43.35	31.02	8.99	25.57	46.89	54.00	-7.11	AV
H	5850.00	42.43	30.45	8.77	38.66	59.41	68.20	-8.79	PK
H	11650.00	52.54	30.55	5.77	24.66	52.42	74.00	-21.58	PK
H	11650.00	43.42	30.55	5.77	24.66	43.30	54.00	-10.70	AV
H	17475.00	53.47	30.33	6.32	24.55	54.01	68.20	-14.19	PK
H	17475.00	43.16	30.33	6.32	24.55	43.70	54.00	-10.30	AV
H	23300.00	54.91	30.85	7.45	24.69	56.20	68.20	-12.00	PK
H	23300.00	43.48	30.85	7.45	24.69	44.77	54.00	-9.23	AV
H	29125.00	50.38	31.02	8.99	25.57	53.92	68.20	-14.28	PK
H	29125.00	43.23	31.02	8.99	25.57	46.77	54.00	-7.23	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4. The worst mode is 802.11n20, only the worst data is recorded.



5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(3)

Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(iv) For client devices in the 5.15-5.25 GHz band, 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.

(2) 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.

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



5.2 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 $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ 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 $10\log(1\text{MHz}/RBW)$ 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.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.



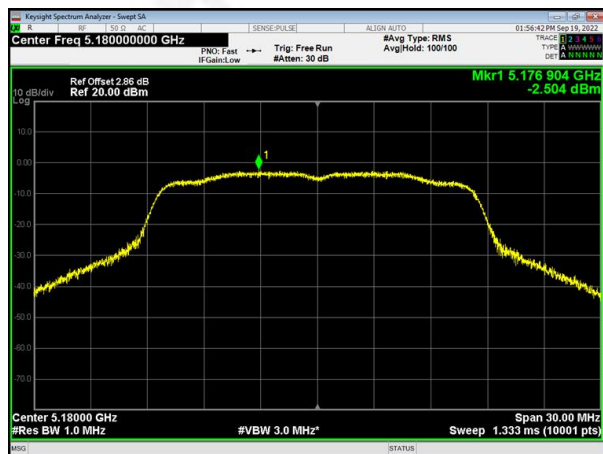
5.6 TEST RESULTS

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX		

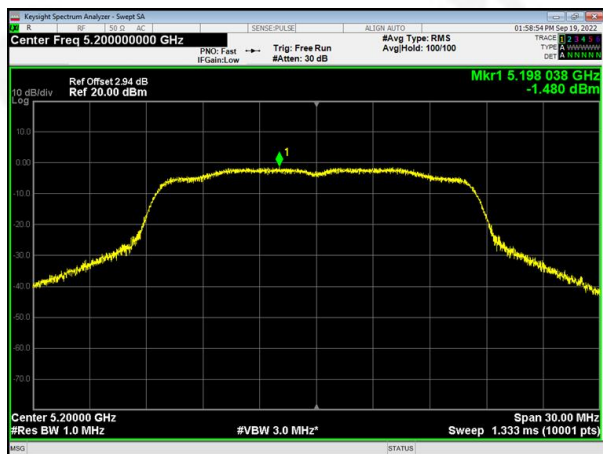
Test mode	Test Channel (MHz)	PSD [dBm/MHz]	Limit (dBm/MHz)	Result
802.11a	5180	-2.504	11	Pass
	5200	-1.48	11	Pass
	5240	-1.064	11	Pass
802.11n(HT20)	5180	-2.476	11	Pass
	5200	-1.674	11	Pass
	5240	-2.053	11	Pass
802.11ac(VH20)	5180	-2.992	11	Pass
	5200	-1.792	11	Pass
	5240	-1.466	11	Pass



(802.11a) PSD plot on channel 36



(802.11a) PSD plot on channel 40

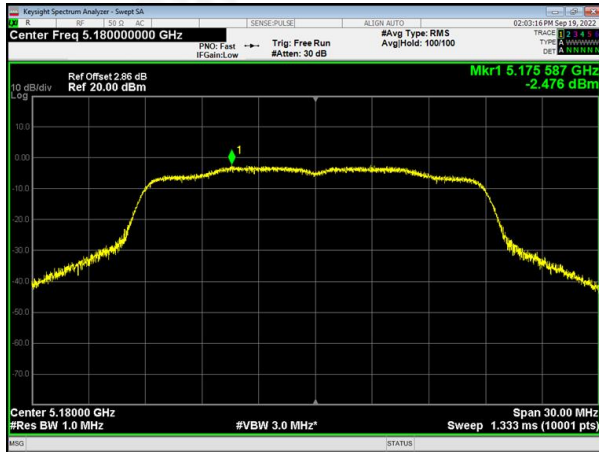


(802.11a) PSD plot on channel 48

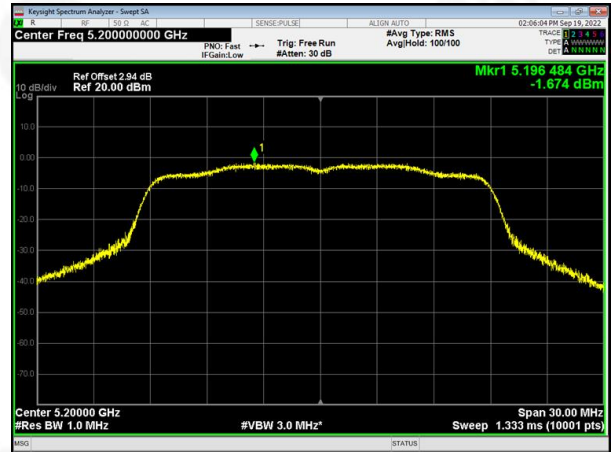




(802.11n20) PSD plot on channel 36



(802.11n20) PSD plot on channel 40



(802.11n20) PSD plot on channel 48

