



TEST REPORT

FCC ID: 2A3MU-N50

Product : Geodetic GNSS Receiver

Model Name : N50

Brand : **farnav**

Report No. : NCT26017785E1-3

Prepared for

Shanghai EFIX Geomatics Co., Ltd.

**Room 1137, Area D, 11th Floor, Building 1, No. 158, Shuanglian Road, Qingpu District,
Shanghai**

Prepared by

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District,Shenzhen,China**

TEL: 400-8868-419

1 TEST RESULT CERTIFICATION

Applicant : Shanghai EFIX Geomatics Co., Ltd.
Address : Room 1137, Area D, 11th Floor, Building 1, No. 158, Shuanglian Road,
Qingpu District, Shanghai
Manufacturer : Shanghai EFIX Geomatics Co., Ltd.
Address : Room 1137, Area D, 11th Floor, Building 1, No. 158, Shuanglian Road,
Qingpu District, Shanghai
Product name : Geodetic GNSS Receiver
Model name : N50
Standards : FCC Rules and Regulations Part 15 Subpart E
Test procedure : ANSI C63.10-2020
Date of test : Jan. 20, 2026 to Apr. 10, 2026
Date of Issue : Apr. 10, 2026

This device described above has been tested by NCT, 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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2 Test Summary

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
Part 15.203	Antenna requirement	Pass	
47 CFR Part 15.207(a)	Conducted Emission at AC power line	PASS	
47 CFR Part 15.407(a)	Maximum conducted output power	Pass	
47 CFR Part 15.407(a)	Power spectral density	Pass	
47 CFR Part 15.407(e)	Emission bandwidth and occupied bandwidth	Pass	
47 CFR Part 15.407(h)(2)(ii)	Channel Availability Check Time	N/A	
47 CFR Part 15.407(h)(2)	U-NII Detection Bandwidth	N/A	
KDB 905462 D02, Clause 5.1 Table 2	Statistical Performance Check	N/A	
47 CFR Part 15.407(h)(2)(iii)	Channel Move Time, Channel Closing Transmission Time	N/A	The test results are reflected in the DFS report
47 CFR Part 15.407(h)(2)(iv)	Non-Occupancy Period Test	N/A	
KDB 905462 D02, Clause 5.2 Table 3	DFS Detection Thresholds	N/A	The test results are reflected in the DFS repor
47 CFR Part 15.407(b)	Band edge emissions	Pass	
47 CFR Part 15.407(b)	Undesirable emission limits	Pass	
15.205&15.209 (a)	Radiated Emission	Pass	
15.205&15.209 (a)	Radiated Band Edge	Pass	

Remark:

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

3 TEST FACILITY

Site Description

EMC Lab. : Accredited by CNAS, 2022-09-27

The certificate is valid until 2028.01.07

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)

The Certificate Registration Number is L8251

Designation Number: CN1347

Test Firm Registration Number: 894804

Accredited by A2LA, June 14, 2023

The Certificate Registration Number is 6837.01

Accredited by Industry Canada, November 09, 2018

The Conformity Assessment Body Identifier is CN0150

Company Number: 30806

Name of Firm : Shenzhen NCT Testing Technology Co., Ltd.

Site Location : A101,B2,Fuqiao 6th Area ,xintian Community,Fuhai Street,Baoan District,Shenzhen,China

4 General Information

4.1 General Description of E.U.T.

Product Name:	Geodetic GNSS Receiver
Model No.:	N50
HVIN:	NCT26017785E1-0001
Sample ID	Engineer sample
Operation Frequency Range:	U-NII Band 1: 5.210 GHz U-NII Band 3: 5.775 GHz
Frequency Block	U-NII Band 1: 5.210 GHz U-NII Band 3: 5.775 GHz
Modulation type:	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11ac
Antenna Type:	PCB Antenna
Channel Bandwidth	802.11ac: 80 MHz
Antenna gain:	3.89dBi
Power supply	DC 7.2V from battery and DC 5V from adapter
Hardware Version:	V1.1.0
Software Version:	V1.0
Remark:	the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.

☒ Wifi 5G with U-NII - 1

Frequency and Channel list for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210				

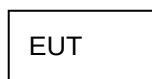
☒ Wifi 5G with U-NII -3

Frequency and Channel list for 802.11ac (VHT80):

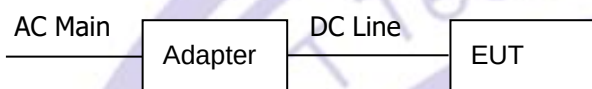
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
155	5775				

4.2 Test Setup Configuration

Radiated Emission



Conducted Emission



Radiated Spurious



Conducted Spurious



4.3 Test Mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, 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.	

Test Software	SecureCRT
Power level setup	default

5 Equipment During Test

5.1 Equipments List

Conducted emission Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	944 Room	/	EMToni	2025/1/17	2028/1/16
EMI Test Receiver	ESPI	101604	Rohde & Schwarz	2025/6/10	2026/6/09
liminator	ESH3-Z2	NA	Ronde&Schwarz	2025/6/10	2026/6/09
Attenuation	PCL-10dB	221126	HTEC	2025/6/10	2026/6/09
LISN	ENV 216	102796	Rohde & Schwarz	2025/6/10	2026/6/09
LISN	VN1-13S	004023	CRANAGE	2025/6/10	2026/6/09
Cable	RG223-1500MM	NA	RG	2025/6/10	2026/6/09

Radiated emission & Radio Frequency Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/1/17	2028/1/16
EMI Test Receiver	ESCI	101178	Rohde & Schwarz	2025/6/10	2026/6/09
Amplifi (30MHz-1GHz)	BBV 9743 B	00374	SCHNWARZBECK	2025/6/10	2026/6/09
Power Meter	ML2495A	10084	Anritu	2025/6/10	2026/6/09
Bilog Antenna (30MHz-1GHz)	VULB9162	00473	SCHNWARZBECK	2025/6/10	2026/6/09
Horn antenna (1GHz-18GHz)	BBHA 9120 D	02622	SCHNWARZBECK	2025/3/08	2026/3/07
Pream plifier (1GHz-18GHz)	BBV 9718D	0024	SCHNWARZBECK	2025/6/10	2026/6/09
Spectrum Analyze (10Hz-40GHz)	FSV 40	100952	Rohde & Schwarz	2025/6/10	2026/6/09
Pream plifier (18GHz-40GHz)	BBV 9721	0056	SCHNWARZBECK	2025/6/10	2026/6/09
Double Ridge Guide Horn Antenna (18GHz- 40GHz)	SAS-574	588	A.H.System	2025/6/10	2026/6/09

Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHNWARZBECK	2025/6/10	2026/6/09
Comprehensive tester	CWM500	104995	Rohde & Schwarz	2025/6/10	2026/6/09
Amplifier (9KHz-30MHz)	BBV 9745	00109	CHNWARZBECK	2025/6/10	2026/6/09
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2025/6/10	2026/6/09
MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2025/6/10	2026/6/09
MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2025/6/10	2026/6/09
Power Sensor	TR1029-2	512364	Techoy	2025/6/10	2026/6/09
RF Swith	TR1029-1	512364	Techoy	2025/6/10	2026/6/09
Cable	DA800- 4000MM	NA	DA	2025/6/10	2026/6/09
Cable	DA800- 11000MM	NA	DA	2025/6/10	2026/6/09

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
Horn antenna (1GHz-18GHz)	BBHA 9120 D	02622	SCHWARZBECK	2026/3/07	2027/3/06

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ-EMC	Ver.EMC-CON 3A1.1+
2	EMC radiation test system	FALA	EZ-EMC	Ver.FA-03A2 RE+
3	RF test system	TACHOY	RFTtest	V1.0.0
4	RF communication test system	TACHOY	RFTtest	V1.0.0

5.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 × 10 ⁻⁶
Bandwidth	± 1.5 × 10 ⁻⁶
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.24dB
Radiated Emission(9KHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Radiated Emission(25GHz~40GHz)	±3.38dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

5.3 Description of Support Units

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
E-1	Geodetic GNSS Receiver		N50	/	EUT

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.

6 Conducted Emission

Test Requirement: : FCC CFR 47 Part 15 Section 15.207
Test Method: : ANSI C63.10-2020
Test Result: : PASS
Frequency Range: : 150kHz to 30MHz
Class/Severity: : Class B
Detector: : Peak for pre-scan (9kHz Resolution Bandwidth)

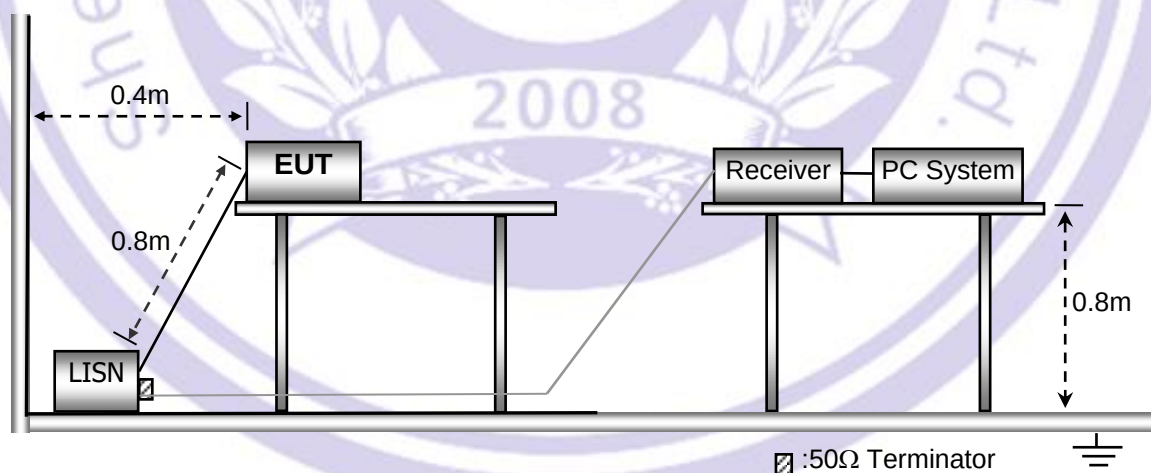
6.1 E.U.T. Operation

Operating Environment :

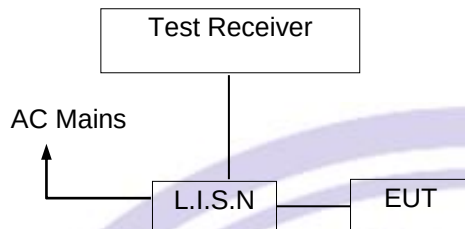
Temperature: : 23.6°C
Humidity: : 53 % RH
Atmospheric Pressure: : 101.1 kPa
Test Voltage : AC 120V/60Hz

6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10



6.3 Test SET-UP (Block Diagram of Configuration)



6.4 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

6.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

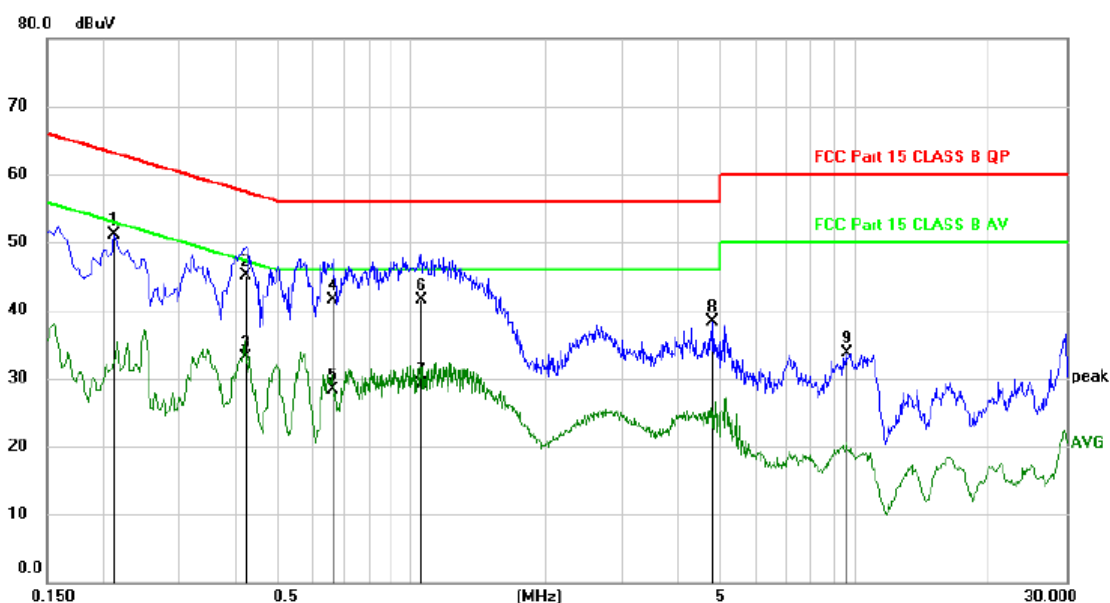
6.6 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.7 Conducted Emission Test Result

All the modes have been tested, and only the data of the worst mode 802.11ac 5210MHz.

Phase: L



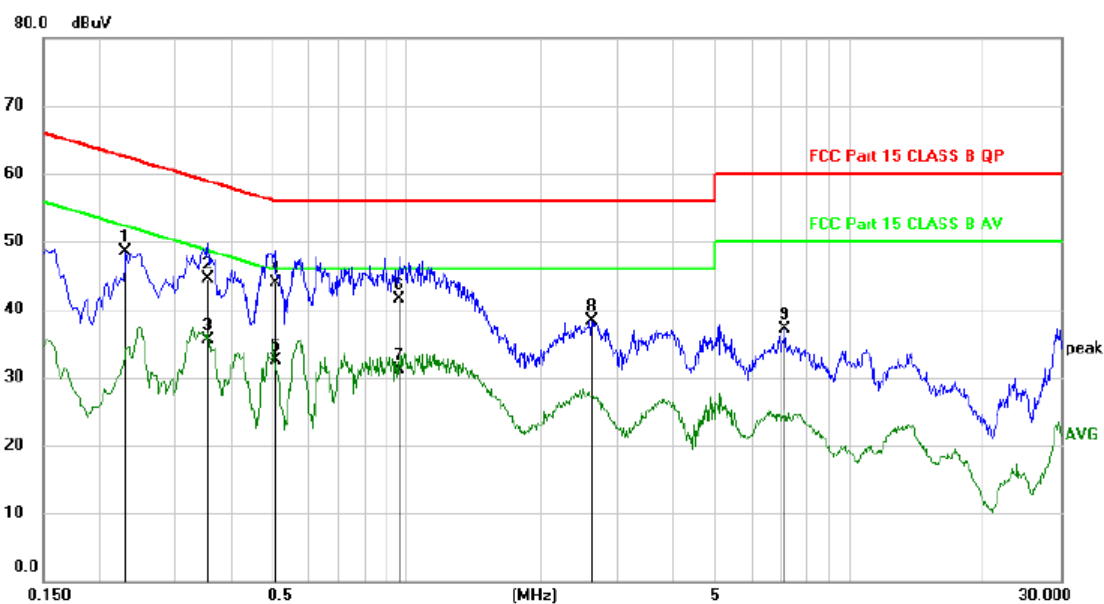
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.2130	40.34	10.68	51.02	63.09	-12.07	peak	
2		0.4230	34.02	11.04	45.06	57.39	-12.33	QP	
3		0.4230	22.03	11.04	33.07	47.39	-14.32	AVG	
4		0.6630	30.58	10.92	41.50	56.00	-14.50	QP	
5		0.6630	17.41	10.92	28.33	46.00	-17.67	AVG	
6		1.0530	30.64	10.95	41.59	56.00	-14.41	QP	
7		1.0530	18.25	10.95	29.20	46.00	-16.80	AVG	
8		4.7819	27.31	11.00	38.31	56.00	-17.69	peak	
9		9.5550	22.38	11.30	33.68	60.00	-26.32	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Phase: N



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2310	37.82	10.71	48.53	62.41	-13.88	peak	
2		0.3540	33.45	10.96	44.41	58.87	-14.46	QP	
3		0.3540	24.56	10.96	35.52	48.87	-13.35	AVG	
4	*	0.5039	32.91	11.00	43.91	56.00	-12.09	QP	
5		0.5039	21.46	11.00	32.46	46.00	-13.54	AVG	
6		0.9630	30.47	10.94	41.41	56.00	-14.59	QP	
7		0.9630	20.22	10.94	31.16	46.00	-14.84	AVG	
8		2.6190	27.60	10.78	38.38	56.00	-17.62	peak	
9		7.1490	25.98	11.12	37.10	60.00	-22.90	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

7 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.407
Test Method : ANSI C63.10-2020
Test Result : PASS
Measurement Distance : 3m
Limit : See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

FCC Part 15.407 (b) Undesirable emission limits. Except as shown in paragraph (b)(10) 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 solely in the 5.725-5.850 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.

7.1 EUT Operation

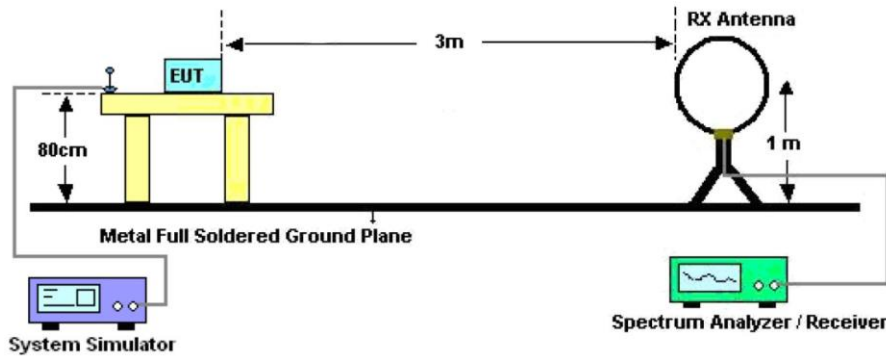
Operating Environment :

Temperature	: 24.4 °C
Humidity	: 55.1% RH
Atmospheric Pressure	: 101.2kPa
Test Voltage	: AC 120V60Hz

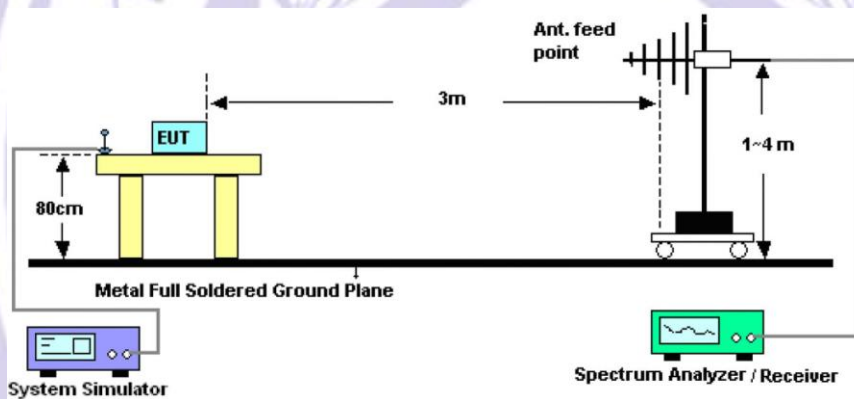
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

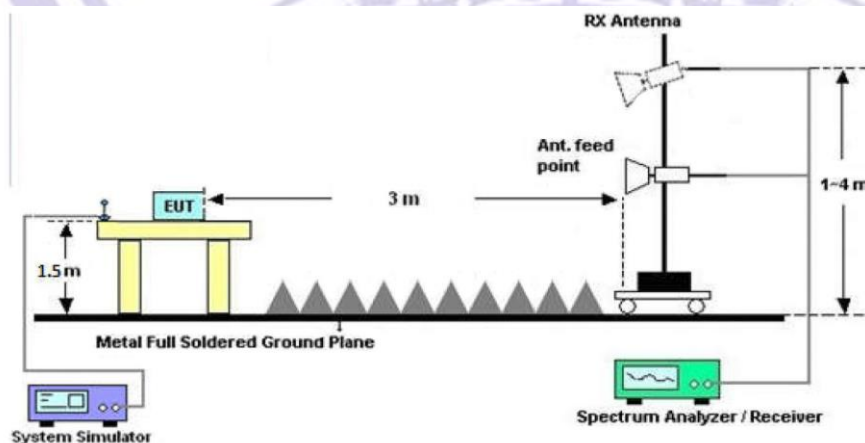
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

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

7.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2020.
2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.
7. Test Procedure of measurement (For Above 1GHz):
 - 1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).
 - 2) Change the antenna polarization and repeat 1) with vertical polarization.
 - 3) Make a hardcopy of the spectrum.
 - 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
 - 5) Change the analyser mode to Clear/ Write and found the cone of emission.
 - 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.
 - 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.
 - 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

7.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

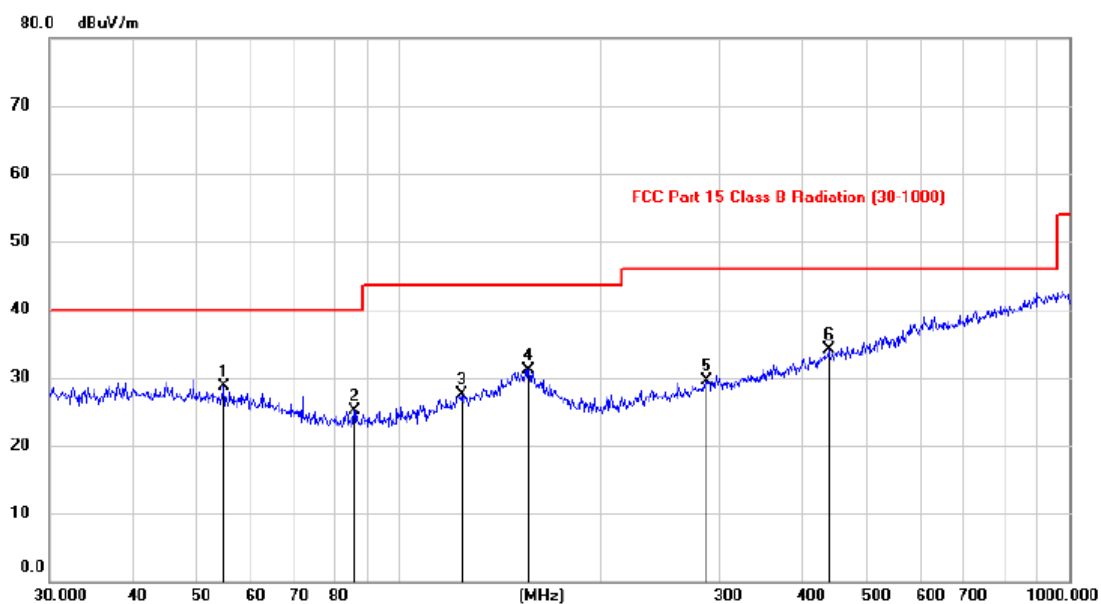
Distance extrapolation factor = $40\log(\text{Specific distance} / \text{test distance})$ (dB);

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

Test Frequency: 30MHz ~ 1GHz

Please refer to the following test plots. Worst case 802.11ac for record:

Polarization: Horizontal



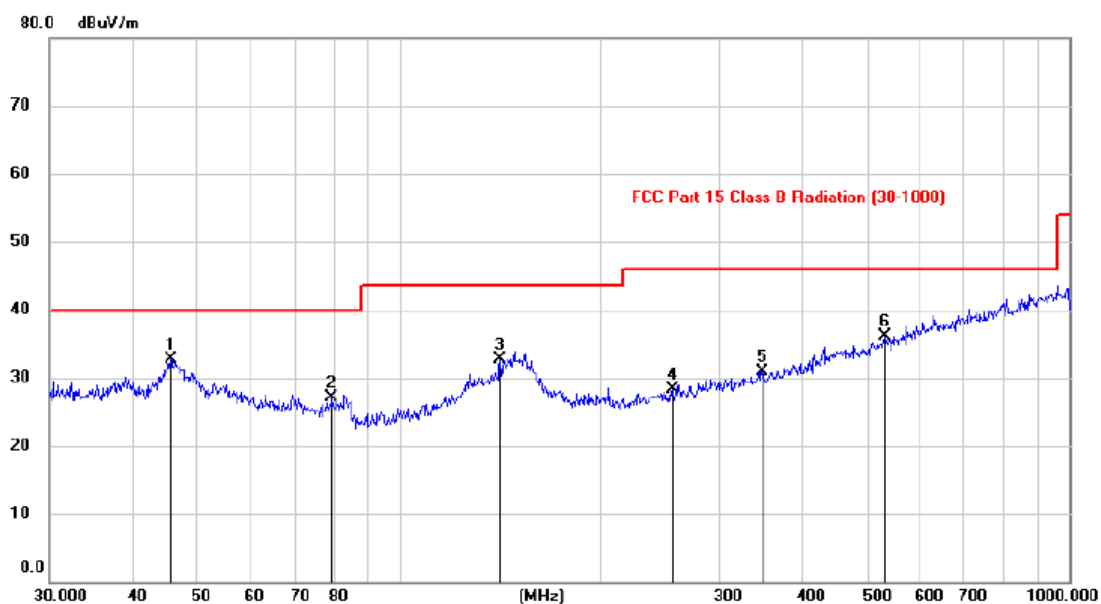
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	54.7260	9.52	19.20	28.72	40.00	-11.28	peak		
2		85.7178	9.82	15.33	25.15	40.00	-14.85	peak		
3		123.8142	8.84	18.72	27.56	43.50	-15.94	peak		
4		156.2385	10.40	20.66	31.06	43.50	-12.44	peak		
5		287.4859	9.73	19.85	29.58	46.00	-16.42	peak		
6		437.2221	10.35	23.78	34.13	46.00	-11.87	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Polarization: Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	45.5667	13.20	19.56	32.76	40.00	-7.24	peak		
2		79.3167	11.58	15.49	27.07	40.00	-12.93	peak		
3		141.5943	12.82	19.93	32.75	43.50	-10.75	peak		
4		256.0119	9.41	18.81	28.22	46.00	-17.78	peak		
5		348.0681	9.50	21.45	30.95	46.00	-15.05	peak		
6		530.5353	10.53	25.50	36.03	46.00	-9.97	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Test Frequency: Above 1GHz

802.11ac 5210MHz

Detector: PK

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10420.15	51.91	16.29	17.66	34.46	51.40	74.00	-22.60	Vertical
15630.01	49.93	21.83	17.66	34.46	54.96	74.00	-19.04	Vertical
10420.11	54.45	8.73	17.66	34.46	46.38	74.00	-27.62	Horizontal
15630.31	45.85	11.73	17.66	34.46	40.78	74.00	-33.22	Horizontal

Detector: AV

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10420.32	46.42	16.29	17.66	34.46	45.91	54.00	-8.09	Vertical
15630.13	42.54	21.83	17.66	34.46	47.57	54.00	-6.43	Vertical
10420.06	45.19	8.73	17.66	34.46	37.12	54.00	-16.88	Horizontal
15630.12	37.96	11.73	17.66	34.46	32.89	54.00	-21.11	Horizontal

802.11ac 5775MHz

Detector: PK

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11550.05	50.52	16.29	17.66	34.46	50.01	74.00	-23.99	Vertical
17325.13	48.07	21.83	17.66	34.46	53.10	74.00	-20.90	Vertical
11550.21	55.29	8.73	17.66	34.46	47.22	74.00	-26.78	Horizontal
17325.02	45.50	11.73	17.66	34.46	40.43	74.00	-33.57	Horizontal

Detector: AV

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11550.02	42.74	16.29	17.66	34.46	42.23	54.00	-11.77	Vertical
17325.15	39.69	21.83	17.66	34.46	44.72	54.00	-9.28	Vertical
11550.02	46.88	8.73	17.66	34.46	38.81	54.00	-15.19	Horizontal
17325.04	39.98	11.73	17.66	34.46	34.91	54.00	-19.09	Horizontal

Note:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamplifier Factor.
2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Restricted bands:
Band1

Mode:		802.11ac		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	31.90	17.18	49.08	68.20	-19.12	PK
V	5150.00	33.54	17.18	50.72	68.20	-17.48	PK
Mode:		802.11ac		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	23.51	17.18	40.69	54.00	-13.31	AV
V	5150.00	23.90	17.18	41.08	54.00	-12.92	AV
Mode:		802.11ac		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	33.13	17.18	50.31	68.20	-17.89	PK
V	5350.00	33.11	17.18	50.29	68.20	-17.91	PK
Mode:		802.11ac		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	22.38	17.18	39.56	54.00	-14.44	AV
V	5350.00	23.43	17.18	40.61	54.00	-13.39	AV

Band 4

Mode:		802.11ac		Frequency:		5775MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5725.00	34.86	17.18	52.04	68.20	-16.16	PK
V	5725.00	33.09	17.18	50.27	68.20	-17.93	PK
Mode:		802.11ac		Frequency:		5775MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5725.00	22.26	17.18	39.44	54.00	-14.56	AV
V	5725.00	24.76	17.18	41.94	54.00	-12.06	AV
Mode:		802.11ac		Frequency:		5775MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)
H	5850.00	31.21	17.18	48.39	68.20	-19.81	PK
V	5850.00	35.78	17.18	52.96	68.20	-15.24	PK
Mode:		802.11ac		Frequency:		5775MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)
H	5850.00	21.84	17.18	39.02	54.00	-14.98	AV
V	5850.00	26.43	17.18	43.61	54.00	-10.39	AV

8 POWER SPECTRAL DENSITY TEST

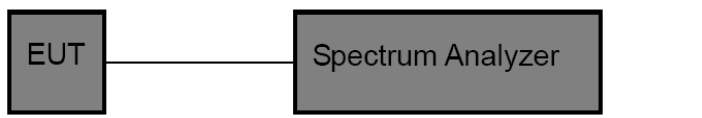
8.1 Test Standard and Limit

According to FCC §15.407(3)

- (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.

8.2 Test Setup



8.3 Test Procedure

Method AVGPS-1 uses trace averaging with EUT transmitting at full power throughout each sweep.

The following procedure may be used when the maximum (average) conducted output power was used to determine compliance to the fundamental output power limit. This is the baseline method for determining the maximum (average) conducted PSD level. If the instrument has a power averaging (rms) detector, then

it must be used; otherwise, use the sample detector. The EUT must be configured to transmit continuously ($D \geq 98\%$), or else sweep triggering/signal gating must be implemented to help ensure that measurements are made only when the EUT is transmitting at its maximum power control level (no transmitter OFF time to be considered):

- Set instrument center frequency to DTS channel center frequency.
- Set span to > 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Detector = power averaging (rms) or sample detector (when rms not available).
- Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
- Sweep time = auto couple.
- Employ trace averaging (rms) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this might require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

8.4 Test Data

Please refer to 5.2GWIFI and 5.8GWIFI data Annex.

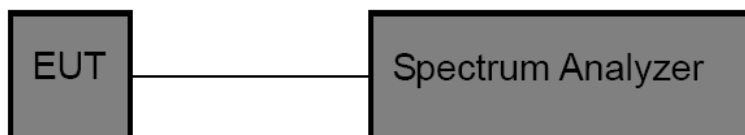


9 26DB & 6DB & 99% Emission Bandwidth Test

9.1 Test Standard

Test Standard	FCC Part15 C Section 15.407
	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, the minimum bandwidth 6 dB bandwidth of U-NII devices shall be at least 500KHz. 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.

9.2 Test Setup



9.3 Test Procedure

Emission bandwidth:

The emission bandwidth (EBW) is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least the specified amount below the maximum level of the modulated carrier.

The following procedure shall be used for measurement of the bandwidth for millimeter-wave devices:

a) Use the following spectrum analyzer settings:

- 1) Span equal to approximately 1.5 times the EBW, centered on the carrier frequency
- 2) RBW, prefer 1% to 5% of EBW
- 3) VBW approximately $3 \times$ RBW
- 4) Set the reference level of the instrument as required to reduce the chance of the signal amplitude exceeding the maximum spectrum analyzer input mixer level for linear operation.

See guidance provided in 4.1.6.

5) Sweep = No faster than coupled (auto) time.

6) Detector function = peak.

7) Trace = max-hold.

b) The EUT shall be transmitting at its maximum data rate. Allow the trace to stabilize.

c) Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure the specified dB down one side of the emission.

d) Reset the marker-delta function, and move the marker to the other side of the emission, until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth. The spectral envelope can cross the “-X dB amplitude” at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the “-X dB amplitude.”

e) The EBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

f) Repeat this test for each modulation scheme using the guidance of 5.6.2.1.

Occupied bandwidth:

The following procedure shall be used for measuring 99% power bandwidth: Use the following spectrum analyzer settings:

1) Span equal to approximately 1.5 times the OBW, centered on the carrier frequency

2) RBW, prefer 1% to 5% of OBW

3) VBW approximately $3 \times$ RBW

4) Set the reference level of the instrument as required to reduce the chance of the signal amplitude exceeding the maximum spectrum analyzer input mixer level for linear operation.

See guidance provided in 4.1.6.

5) Sweep = No faster than coupled (auto) time.

6) Detector function = peak.

7) Trace = max-hold.

b) The EUT shall be transmitting at its maximum data rate. Allow the trace to stabilize.

c) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

d) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

e) Repeat this test for each modulation scheme using the guidance of 5.6.2.1.

9.4 Test Data

Please refer to 5.2GWIFI and 5.8GWIFI data Annex.



10 Maximum Conducted Output Power

10.1 Test Standard and Limit

For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power 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).

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.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For fixed point-to-point access points 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.

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.

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 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.

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.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power 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.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna

exceeds 6 dBi.

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power 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.

10.2 Test Setup



10.3 Test Procedure

Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:

- a) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
 - 1) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
 - 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
 - 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b) If the transmitter does not transmit continuously, measure the duty cycle D of the transmitter output signal as described in 12.2.
- c) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
- d) Correct the measurement in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle {e.g., $[10 \log (1 / 0.25)]$, if the duty cycle is 25%}.

10.4 Test Data

Please refer to 5.2GWIFI and 5.8GWIFI data Annex.

11 Antenna Requirement

11.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	1) 15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

11.2 Antenna Connected Construction

The antenna is PCB Antenna which permanently attached, and the best case gain of the antenna is U-NII Band 1, U-NII Band 3: 3.89dBi. It complies with the standard requirement.

12 TEST SETUP & EUT PHOTOGRAPH

Please see the attachment for details.

----- End of Report -----

