

Test Report

Product name: 2T2R Wi-Fi + Bluetooth Module

Trademark: n.a.

Model no......: T7663B2

Series Model(s).: n.a.

FCC ID.....: 2ANM3T7663B2

IC: 23165-T7663B2

HVIN: T7663B2

Report No: C240918050-RF04

Test Standards: CFR47 FCC Part 15: Subpart E Section 15.407
CFR47 FCC Part 15: Subpart C Section 15.207
CFR47 FCC Part 15: Subpart C Section 15.209
RSS-247 Issue 3
RSS-Gen Issue 5

Applicant: Shenzhen Chuangwei-RGB Electronics Co., Ltd.

Address of applicant: 13F-16F, Unit A, Skyworth Building, Shennan Road,
Nanshan District, Shenzhen, Guangdong, China.

Manufacturer.....: Shenzhen Chuangwei-RGB Electronics Co., Ltd.

Manufacturer Address.....: 13F-16F, Unit A, Skyworth Building, Shennan Road,
Nanshan District, Shenzhen, Guangdong, China.

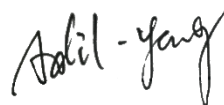
Date of Test Date.....: Sep 18, 2024 to Jan 20, 2025

Date of issue.: Mar 29, 2025

Test result.....: Compliance

Prepared By

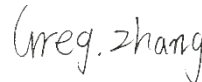
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Adil Yang/Engineer

Reviewed By

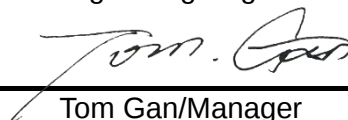
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Greg Zhang/Engineer

Approved By

:



Tom Gan/Manager

The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of preparer, reviewer and approver. Any objections must be raised to CSIC within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit.

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	Mar.29, 2025	Initial Issue	ALL	Adil Yang

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1. TEST SUMMARY

1.1. TEST DESCRIPTION

Test procedures according to the technical standards:

Item	Clause	Result	Note
Conducted Emission on AC Mains	Part 15.207(a) RSS-GEN clause 8.8	PASS*	
Radiated Spurious Emission	Part 15.407(b) Part 15.205 Part 15.209 RSS-247 clause 6.2 RSS-GEN clause 8.9 RSS-GEN clause 8.10	PASS	
Maximum Conducted Output Power	Part 15.407(a) RSS-247 clause 6.2	PASS*	
Conducted Power Spectral Density	Part 15.407(a) RSS-247 clause 6.2	PASS*	
6dB Bandwidth	Part 15.407(e) RSS-247 clause 6.2	PASS*	
26dB Bandwidth	Part 15.407(e) RSS-Gen Clause 6.6	PASS*	
99% Bandwidth	Part 15.407(a) RSS-Gen Clause 6.6	PASS*	
Frequency Stability	Part 15.407(g) RSS-Gen Clause 6.11	PASS*	
Dynamic Frequency Selection (DFS)	Part 15.407(h) RSS-247 clause 6.3	PASS	
Antenna Requirement	Part 15.407(b)(4) Part 15.203	PASS	

Note:

- 1) "PASS*", The manufacturer added an optional antenna. We have retested the Radiated Spurious Emissions item. The other test terms were not affected, thus, the other test data were continued to be referenced. details refer to the original test report C240918049-RF04 published by Shenzhen Central Standard International Center Co., Ltd. on Nov 21,2024.
- 2) All tests are according to ANSI C63.10-2013.
- 3) The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.
- 4) The information of measurement uncertainty is available upon the customer's request.

1.2. TEST FACILITY

Shenzhen Central Standard International Center Co., Ltd. (CSIC)

Room 201, Building 1, Mogen Fashion Industrial Park, No. 10, Shilongzai Road, Xinshi Community, Dalang Street, Longhua District, Shenzhen.

The test facility is recognized, certified or accredited by the following organizations:

CNAS Registration No.: L11671

FCC Registration No.: 0031378433 Designation Number: CN1317

IC CAB identifier: CN0051

A2LA Lab Cert. No.: 6426.01

1.3. MEASUREMENT UNCERTAINTY

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Below is the best measurement capability for Shenzhen Central Standard International Center Co., Ltd.

Test Items	Measurement Uncertainty	Notes
RF output power, conducted	$\pm 1.04\text{dB}$	(1)
Unwanted Emissions, conducted	$\pm 1.38\text{dB}$	(1)
All emissions, radiated 9KHz-30MHz	$\pm 4.44\text{dB}$	(1)
All emissions, radiated 30-1GHz	$\pm 4.56\text{dB}$	(1)
All emissions, radiated 1G-6GHz	$\pm 4.84\text{dB}$	(1)
All emissions, radiated >6G	$\pm 4.84\text{dB}$	(1)
Conducted Emission (9KHz-150KHz)	$\pm 3.22\text{dB}$	(1)
Conducted Emission (150KHz-30MHz)	$\pm 3.24\text{dB}$	(1)

Note(1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

2. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

EUT(Product Specifications)	
Product Name:	2T2R Wi-Fi + Bluetooth Module
Model No.:	T7663B2
Series Models:	n.a.
Power supply:	DC 3.3V
Hardware version:	VER 00.03
Software version:	7E7. 09.19
WIFI-5G (RF Specifications)	
Operating Frequency	5150-5350MHz, 5470-5725MHz, 5725-5850MHz
Channel number:	5180-5320MHz, 14CHs, 802.11 a/n20/n40/ac20/ac40/ac80 5500-5700MHz, 21CHs, 802.11 a/n20/n40/ac20/ac40/ac80 5745-5825MHz, 8CHs, 802.11 a/n20/n40/ac20/ac40/ac80
Channel Spacing	20MHz, 40MHz, 80MHz
Modulation	OFDM (BPSK, QPSK, 16QAM, 64QAM,256QAM)
Type of Product	Adaptive equipment and does not support non-adaptive mode: LBT based Detect and Avoid (load-based equipment)
Type of Product	Client Device without Radar Detection
TX Power Control (TPC)	Not Supported
Antenna Type	On-board Antenna
Antenna Gain	ANT1/2: 5150MHz to 5350MHz: 2.68 dBi, 5470MHz to 5725MHz: 2.89 dBi, 5725MHz to 5850MHz: 2.55 dBi

Note:

1. For a more detailed features description, please refer to the manufacture's specifications or the user's manual.
2. Full tests were applied to sample C240918050-Y01/01 only in this document.

2.2. DESCRIPTION OF TEST MODES AND TEST FREQUENCY

The EUT has been tested under typical operating conditions. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting mode for testing.

Operation Frequency List for WIFI:

Channel List for 802.11a/n20/ac20							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200	44	5220	48	5240
52	5260	56	5280	60	5300	64	5320
100	5500	104	5520	108	5540	112	5560
116	5580	120	5600	124	5620	128	5640
132	5660	136	5680	140	5700	149	5745
153	5765	157	5785	159	5795	165	5825

Channel List for 802.11n40/ac40							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230	54	5270	62	5310
102	5510	110	5550	118	5590	126	5630
134	5670	151	5755	159	5795		

Channel List for 802.11ac80							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	58	5290	106	5530	155	5775

Note: The channels in bold in the table are used for testing. Per RSS-247 section 6.2.3, transmission on channels which overlap 5600-5650MHz is prohibited.

2.3. MEASUREMENT INSTRUMENTS LIST

RF Connected Test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY50200391	May. 26, 2025
2	Spectrum Analyzer	R&S	FSV40	1632339B	May. 26, 2025
3	Power sensor	KEYSIGHT	U2021XA	MY55080015	May. 26, 2025
4	Power sensor	KEYSIGHT	U2021XA	MY54250016	May. 26, 2025
5	Power sensor	KEYSIGHT	U2021XA	MY54250020	May. 26, 2025
6	Power sensor	KEYSIGHT	U2021XA	MY54210030	May. 26, 2025
7	Vector Signal Generator	Agilent	N5182A	MY50140130	May. 26, 2025
8	Signal generator	Agilent	SML03	100925	May. 26, 2025
9	Temperature Humidity Chamber	GZ-ESPEC	ER-10AGT	0005091-2	May. 26, 2025
10	EXTENDED RANGE DC POWER SUPPLY	TAKASAGO	ZX-400LA	N/A	May. 26, 2025
11	Inverter power supply	AKE	AKE-2003-P2	N/A	May. 26, 2025
12	Power sensor Box	MWRFTest	N/A	N/A	N/A
13	RF Switch Box	MWRFTest	MW100-RFCB	N/A	N/A
14	MTS 8310	MWRFTest	V: 2.0.0.0		

Radiation Test equipment					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI TEST RECEIVER	R&S	ESIB26	100342	May. 26, 2025
2	Spectrum Analyzer	R&S	FSV40	1632339B	May. 26, 2025
3	Amplifier	EMCO	EM330	980204	May. 26, 2025
4	Amplifier	MW	DPA8-1000-18000-1012	8220837	Mar. 06, 2025
5	Amplifier	SKET	LNPA_1840-50	SK201801801	Mar. 05, 2025
6	Loop Antenna	SCHNARZBECK	FMZB1519B	00023	Nov. 12, 2025
7	Bilog Antenna	Sunol Sciences	JB1	n.a.	Jul. 01, 2025
8	Horn Antenna	COMMW	ZAB-1-18G-50	20171109	Jul. 01, 2025
9	Horn Antenna	A-INFOMW	LB-180400-KF	J211020657	Sep. 25, 2025
10	3M Chamber	Maor	9*6*6	--	Mar. 01, 2026
11	EZ-EMC	Farad	V3.1		

Mains Terminal Disturbance Voltage Test equipment					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESRP3	101936	May. 26, 2025
2	LISN	R&S	ENV216	100002	May. 26, 2025
3	LISN	MEB	NNB 42	--	May. 26, 2025
4	Shelding Room	Maor	8*4*3	--	Mar. 01, 2025
8	EZ-EMC	Fara	V3.1		

Note:

- 1) The cable loss has calculated in test result which connection between each test instruments.

2.4. DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11a CH36&CH40&CH48	6 Mbps
Mode 2	TX IEEE 802.11n HT20 CH36&CH40&CH48	6.5 Mbps
Mode 3	TX IEEE 802.11ac VHT20 CH36&CH40&CH48	6.5 Mbps
Mode 4	TX IEEE 802.11a CH52&CH60&CH64	6 Mbps
Mode 5	TX IEEE 802.11n HT20 CH52&CH60&CH64	6.5 Mbps
Mode 6	TX IEEE 802.11ac VHT20 CH52&CH60&CH64	6.5 Mbps
Mode 7	TX IEEE 802.11a CH100&CH116&CH140	6 Mbps
Mode 8	TX IEEE 802.11n HT20 CH100&CH116&CH140	6.5 Mbps
Mode 9	TX IEEE 802.11ac VHT20 CH100&CH116&CH140	6.5 Mbps
Mode 10	TX IEEE 802.11a CH149&CH157&CH165	6 Mbps
Mode 11	TX IEEE 802.11n HT20 CH149&CH157&CH165	6.5 Mbps
Mode 12	TX IEEE 802.11ac VHT20 CH149&CH157&CH165	6.5 Mbps
Mode 13	TX IEEE 802.11n HT40 CH38&CH46	13.5 Mbps
Mode 14	TX IEEE 802.11ac VHT40 CH38&CH46	13.5 Mbps
Mode 15	TX IEEE 802.11n HT40 CH54&CH62	13.5 Mbps
Mode 16	TX IEEE 802.11ac VHT40 CH54&CH62	13.5 Mbps
Mode 17	TX IEEE 802.11n HT40 CH102&CH110&CH134	13.5 Mbps
Mode 18	TX IEEE 802.11ac VHT40 CH102&CH110&CH134	13.5 Mbps
Mode 19	TX IEEE 802.11n HT40 CH151&CH159	13.5 Mbps
Mode 20	TX IEEE 802.11ac VHT40 CH151&CH159	13.5 Mbps
Mode 21	TX IEEE 802.11ac VHT80 CH42	29 Mbps
Mode 22	TX IEEE 802.11ac VHT80 CH58	29 Mbps
Mode 23	TX IEEE 802.11ac VHT80 CH106&122	29 Mbps
Mode 24	TX IEEE 802.11ac VHT80 CH155	29 Mbps

Note:

- 1) The measurements are performed at the high, middle, low available channels.
- 2) All the bit rate of transmitter have been tested and found the lowest rate is found to be the worst case and recorded.
- 3) This test was performed with EUT in X, Y, Z position and worst case was found when EUT in X position.
- 4) For radiated emission above 1 GHz test, 1GHz-40GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.

2.5. TEST SOFTWARE AND POWER LEVEL

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

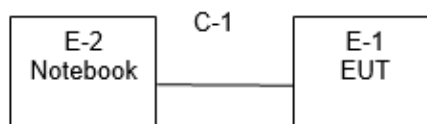
RF Function	Type	Mode Or Modulation type	Ant Gain(dBi)	Power Setting	Software For Testing
WIFI(5G)	5G WIFI	802.11a	5150MHz to 5350MHz: 2.68 dBi, 5470MHz to 5725MHz: 2.89 dBi, 5725MHz to 5850MHz: 2.55 dBi(ANT1& 2).	0A	QA UI(MT76 63) V 0.0.2.6
		802.11n20		0A	
		802.11n40		0C	
		802.11ac20		0A	
		802.11ac40		0C	
		802.11ac80		0A	

2.6. BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

a. Radiated Spurious Emission Test



b. Conducted Emission Test



2.7. DESCRIPTION OF NECESSARY ACCESSORIES AND 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.

Necessary accessories					
Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units					
Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-2	Notebook	DELL	Vostro 3400	N/A	N/A
E-3	Router	GL iNet	GL-MT3000	N/A	N/A
C-1	RJ45 Cable	N/A	100cm	N/A	N/A

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) The Router FCC ID: 2AFIW-MT3000; IC ID: 23019-MT3000.

2.8. ENVIRONMENTAL CONDITIONS FOR TESTING

Test Item	Temperature (°C)	Relative Humidity (%)	Test Voltage	Tested by
Radiated Spurious Emission	24.3	52.0	DC 3.3V	Adil Yang
Dynamic Frequency Selection	23.8	51.0	AC 110V 60Hz	Adil Yang

3. EMC TEST

3.1. Radiated Spurious Emission Measurement

Limit

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205 (a)&209(a) and RSS-247 3.3 limit in the table and according to ANSI C63.10-2013 and RSS-Gen below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

For FCC:

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

For IC:

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	6.37/F(KHz)	300
0.490~1.705	63.7/F(KHz)	30
1.705~30.0	0.08	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- 1) The limit for radiated test was performed according to FCC PART 15C.
- 2) The tighter limit applies at the band edges.
- 3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

For FCC:

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	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	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	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	Above 38.6
13.36-13.41			

For IC:

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	13.36-13.41	960-1427	9.0-9.2
0.495-0.505	16.42-16.423	1435-1626.5	9.3-9.5
2.1735-2.1905	16.69475-16.69525	1645.5-1646.5	10.6-12.7
3.020-3.026	16.80425-16.80475	1660-1710	13.25-13.4
4.125-4.128	25.5-25.67	1718.8-1722.2	14.47-14.5
4.17725-4.17775	37.5-38.25	2200-2300	15.35-16.2
4.20725-4.20775	73-74.6	2310-2390	17.7-21.4
5.677-5.683	74.8-75.2	2483.5-2500	22.01-23.12
6.215-6.218	108-138	2655-2900	23.6-24.0
6.26775-6.26825	149.9-150.05	3260-3267	31.2-31.8
6.31175-6.31225	156.52475-156.52525	3332-3339	36.43-36.5
8.291-8.294	156.7-156.9	3345.8-3358	Above 38.6
8.362-8.366	162.0125-167.17	3500-4400	--
8.37625-8.38675	167.72-173.2	4500-5150	--
8.41425-8.41475	240-285	5350-5460	--
12.29-12.293	322-335.4	7250-7750	--
12.51975-12.52025	399.9-410	8025-8500	--
12.57675-12.57725	608-614	--	--

For Radiated Emission	
Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AVG
Start Frequency	9 KHz/150KHz(Peak/QP/AVG)
Stop Frequency	150KHz/30MHz(Peak/QP/AVG)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/
	9KHz (From 0.15MHz to 30MHz);
	200Hz (From 9kHz to 0.15MHz)/
	9KHz (From 0.15MHz to 30MHz)
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 300 KHz
Attenuation	Auto
Detector	Peak/AVG
Start Frequency	1000 MHz(Peak/AVG)
Stop Frequency	10th carrier hamonic(Peak/AVG)
RB / VB (emission in restricted band)	1 MHz / 3 MHz(Peak)
	1 MHz/1/T MHz(AVG)
For Restricted band	
Spectrum Parameter	Setting
Detector	Peak/AVG
Start/Stop Frequency	Lower Band Edge: 2310 to 2410 MHz
	Upper Band Edge: 2476 to 2500 MHz
RB / VB	1 MHz / 3 MHz(Peak)
	1 MHz/1/T MHz(AVG)
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for Peak & AVG
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for Peak & AVG
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

Test Procedure

- a) The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b) The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c) The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) 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 QuasiPeak detector mode re-measured.
- e) 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.
- f) For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

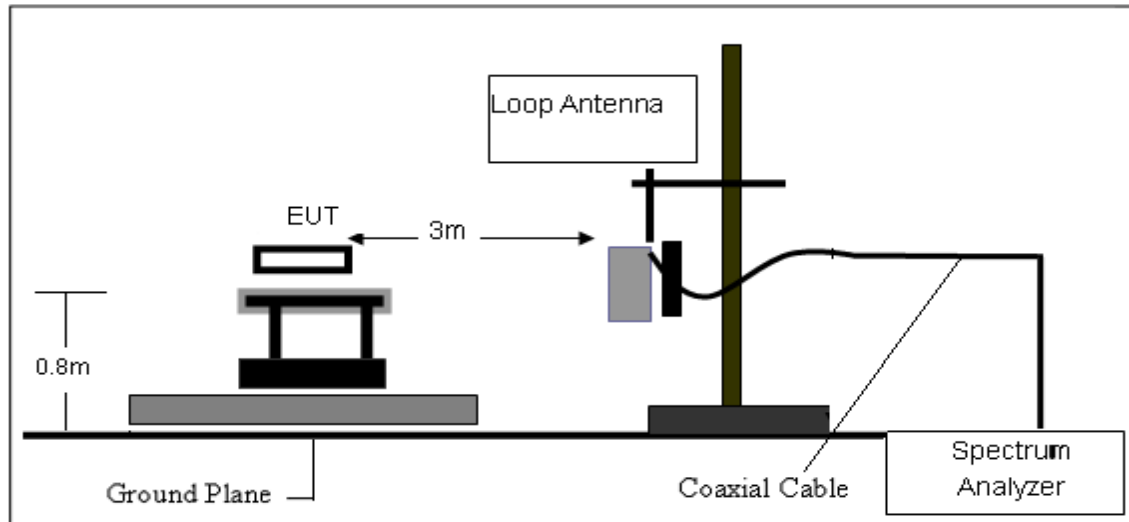
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

DEVIATION FROM TEST STANDARD

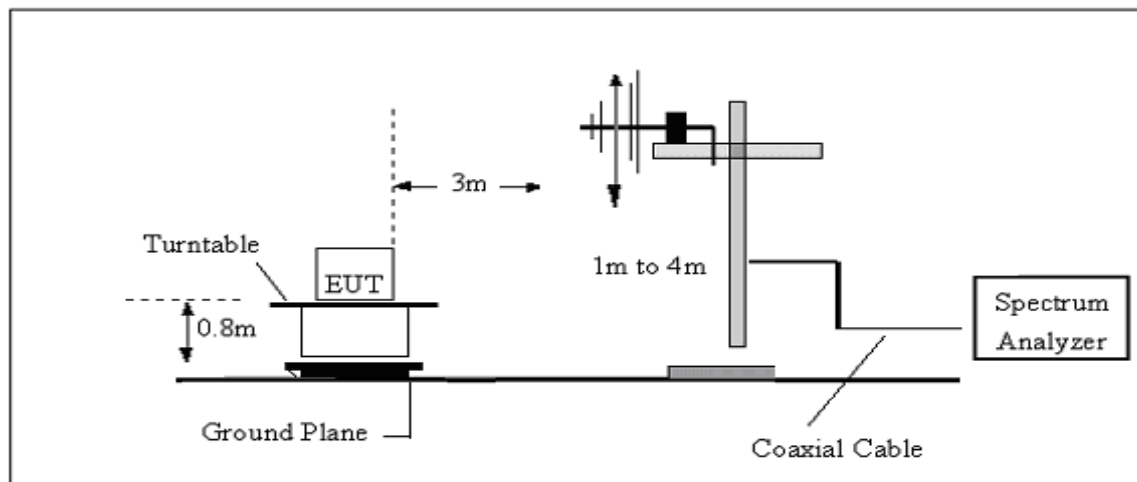
No deviation.

Test Setup

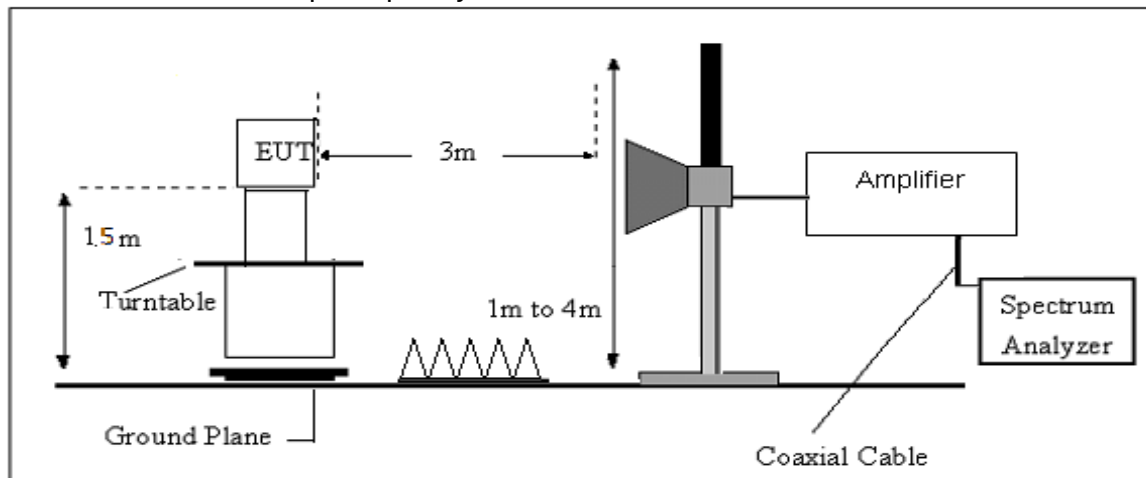
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency Below 1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz

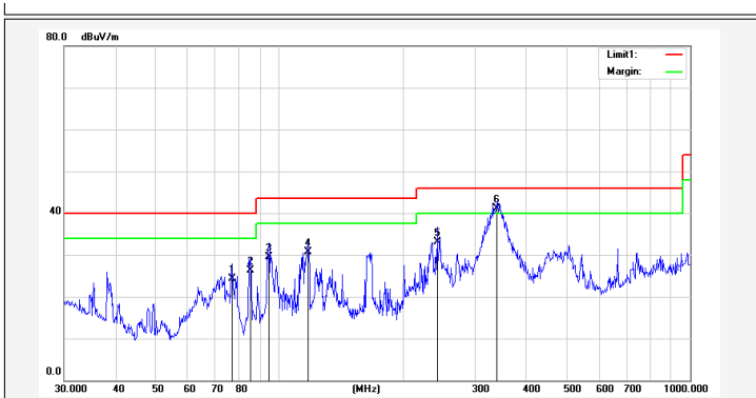


EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.5 Unless otherwise a special operating condition is specified in the follows during the testing.

Test Result

Note: Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 40GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported. All the data rate and configurations have been tested and only the worst case mode (ac(VHT20)) reported.

Below 1G:																																																																															
Test Mode :		working			Test Voltage :		DC 3.3V																																																																								
Horizontal																																																																															
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark																																																																						
1	77.0502	43.01	-18.73	24.28	40.00	-15.72			QP																																																																						
2	85.2980	45.33	-19.09	26.24	40.00	-13.76			QP																																																																						
3	94.4282	48.00	-18.51	29.49	43.50	-14.01			QP																																																																						
4	117.7724	43.22	-12.60	30.62	43.50	-12.88			QP																																																																						
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark																																																																						
1	85.5977	47.73	-19.09	28.64	40.00	-11.36			QP																																																																						
2	87.7248	46.15	-19.10	27.05	40.00	-12.95			QP																																																																						
3	169.5990	40.73	-13.56	27.17	43.50	-16.33			QP																																																																						
4*	337.2155	46.21	-10.35	35.86	46.00	-10.14			QP																																																																						
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6	574.6258	34.97	-4.99	29.98	46.00	-16.02			QP																																																																						

Correction Factor = antenna factor + cable loss – amplifier gain;

Reading = Reading Amplitude in the instrument;

Result = Correction Factor + Reading;

Margin = Result – Limit

Above 1GHz:

Note: All modes and antenna have been tested, and the report only reflects the worst mode(802.11ac(VHT20) MIMO).

Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

Band I:

802.11 ac20-Low Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4876	56.55	-13	43.55	68.2	-24.65	peak
2	4876	51.93	-13	38.93	54	-15.07	AVG
3	6100	55.55	-10.06	45.49	68.2	-22.71	peak
4	6100	51.49	-10.06	41.43	54	-12.57	AVG
5	7392	54.73	-7.13	47.6	68.2	-20.6	peak
6	7392	49.28	-7.13	42.15	54	-11.85	AVG
7	11030	55.08	-2.75	52.33	68.2	-15.87	peak
8	11030	48.79	-2.75	46.04	54	-7.96	AVG
9	15756	55.03	6.55	61.58	68.2	-6.62	peak
10	15756	42.58	6.55	49.13	54	-4.87	AVG
11	17966	51.67	9.99	61.66	68.2	-6.54	peak
12	17966	40.18	10.05	50.23	54	-3.77	AVG

802.11 ac20-Low Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1986	71.89	-21.01	50.88	68.2	-17.32	peak
2	1986	61.96	-21.01	40.95	54	-13.05	AVG
3	6168	58.4	-9.92	48.48	68.2	-19.72	peak
4	6168	48.56	-9.92	38.64	54	-15.36	AVG
5	7324	56.51	-7.38	49.13	68.2	-19.07	peak
6	7324	48.3	-7.38	40.92	54	-13.08	AVG
7	11336	55.78	-2.04	53.74	68.2	-14.46	peak
8	11336	48.81	-2.04	46.77	54	-7.23	AVG
9	15246	53.73	6.7	60.43	68.2	-7.77	peak
10	15246	42.99	6.7	49.69	54	-4.31	AVG
11	17524	54.6	9.07	63.67	68.2	-4.53	peak
12	17524	40.91	9.06	49.97	54	-4.03	AVG

802.11 ac20-Middle Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4944	57.55	-12.85	44.7	68.2	-23.5	peak
2	4944	51.69	-12.85	38.84	54	-15.16	AVG
3	6032	57	-10.1	46.9	68.2	-21.3	peak
4	6032	50.52	-10.1	40.42	54	-13.58	AVG
5	8072	57.54	-7.75	49.79	68.2	-18.41	peak
6	8072	50.74	-7.75	42.99	54	-11.01	AVG
7	11370	55.04	-1.94	53.1	68.2	-15.1	peak
8	11370	48.71	-1.94	46.77	54	-7.23	AVG
9	16402	54.59	6.86	61.45	68.2	-6.75	peak
10	16402	42.76	6.86	49.62	54	-4.38	AVG
11	17524	53.95	9.07	63.02	68.2	-5.18	peak
12	17524	40.98	9.07	50.05	54	-3.95	AVG

802.11 ac20-Middle Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4944	57.49	-12.85	44.64	68.2	-23.56	peak
2	4944	50.14	-12.85	37.29	54	-16.71	AVG
3	5726	57.89	-11.86	46.03	68.2	-22.17	peak
4	5726	51.54	-11.86	39.68	54	-14.32	AVG
5	7494	55.29	-7.13	48.16	68.2	-20.04	peak
6	7494	48.64	-7.13	41.51	54	-12.49	AVG
7	11132	54.52	-2.48	52.04	68.2	-16.16	peak
8	11132	47.86	-2.48	45.38	54	-8.62	AVG
9	15314	53.24	6.82	60.06	68.2	-8.14	peak
10	15314	42.8	6.82	49.62	54	-4.38	AVG
11	17966	52.52	9.99	62.51	68.2	-5.69	peak
12	17966	40.2	10	50.2	54	-3.8	AVG

802.11 ac20-High Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4910	57.02	-12.91	44.11	68.2	-24.09	peak
2	4910	51.89	-12.91	38.98	54	-15.02	AVG
3	6270	56.25	-9.94	46.31	68.2	-21.89	peak
4	6270	49.12	-9.94	39.18	54	-14.82	AVG
5	7358	55.44	-7.23	48.21	68.2	-19.99	peak
6	7358	48.32	-7.23	41.09	54	-12.91	AVG
7	11166	55.05	-2.41	52.64	68.2	-15.56	peak
8	11166	47.89	-2.41	45.48	54	-8.52	AVG
9	15824	53.39	6.65	60.04	68.2	-8.16	peak
10	15824	42.86	6.65	49.51	54	-4.49	AVG
11	18000	52.11	10.19	62.3	68.2	-5.9	peak
12	18000	40.51	10.18	50.69	54	-3.31	AVG

802.11 ac20-High Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1986	68.45	-21.01	47.44	68.2	-20.76	peak
2	1986	61.58	-21.01	40.57	54	-13.43	AVG
3	3958	62.18	-15.09	47.09	68.2	-21.11	peak
4	3958	54.54	-15.09	39.45	54	-14.55	AVG
5	8446	56.93	-7.38	49.55	68.2	-18.65	peak
6	8446	47.41	-7.38	40.03	54	-13.97	AVG
7	10724	56	-3	53	68.2	-15.2	peak
8	10724	49.21	-3	46.21	54	-7.79	AVG
9	15416	54	6.95	60.95	68.2	-7.25	peak
10	15416	42.66	6.95	49.61	54	-4.39	AVG
11	17864	54.27	9.35	63.62	68.2	-4.58	peak
12	17864	41.36	9.3	50.66	54	-3.34	AVG

Band II:

Note: All modes and antenna have been tested, and the report only reflects the worst mode (802.11ac (VHT20) MIMO).

Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

802.11 ac20-Low Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4842	57.92	-13.14	44.78	68.2	-23.42	peak
2	4842	49.38	-13.14	36.24	54	-17.76	AVG
3	6202	56.88	-9.91	46.97	68.2	-21.23	peak
4	6202	47.97	-9.91	38.06	54	-15.94	AVG
5	7358	56.87	-7.23	49.64	68.2	-18.56	peak
6	7358	48.99	-7.23	41.76	54	-12.24	AVG
7	11302	55.38	-2.14	53.24	68.2	-14.96	peak
8	11302	48.31	-2.14	46.17	54	-7.83	AVG
9	15212	53.59	6.63	60.22	68.2	-7.98	peak
10	15212	43.33	6.63	49.96	54	-4.04	AVG
11	17422	53.83	9.04	62.87	68.2	-5.33	peak
12	17422	41.17	9.04	50.21	54	-3.79	AVG

802.11 ac20-Low Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3958	60.17	-15.09	45.08	68.2	-23.12	peak
2	3958	52.76	-15.09	37.67	54	-16.33	AVG
3	6168	56.3	-9.92	46.38	68.2	-21.82	peak
4	6168	49.7	-9.92	39.78	54	-14.22	AVG
5	7562	56.25	-7.22	49.03	68.2	-19.17	peak
6	7562	48.3	-7.22	41.08	54	-12.92	AVG
7	13138	54.74	0.12	54.86	68.2	-13.34	peak
8	13138	46.32	0.12	46.44	54	-7.56	AVG
9	16402	53.87	6.86	60.73	68.2	-7.47	peak
10	16402	42.97	6.86	49.83	54	-4.17	AVG
11	18000	52.57	10.19	62.76	68.2	-5.44	peak
12	18000	40.62	10.15	50.77	54	-3.23	AVG

802.11 ac20-Middle Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6168	56.41	-9.92	46.49	68.2	-21.71	peak
2	6168	49.38	-9.92	39.46	54	-14.54	AVG
3	7460	56.18	-7.09	49.09	68.2	-19.11	peak
4	7460	48.8	-7.09	41.71	54	-12.29	AVG
5	8140	54.98	-7.71	47.27	68.2	-20.93	peak
6	8140	47.29	-7.71	39.58	54	-14.42	AVG
7	11370	54.51	-1.94	52.57	68.2	-15.63	peak
8	11370	47.06	-1.94	45.12	54	-8.88	AVG
9	16096	54.7	6.11	60.81	68.2	-7.39	peak
10	16096	43.85	6.11	49.96	54	-4.04	AVG
11	17796	52.95	8.92	61.87	68.2	-6.33	peak
12	17796	41.37	8.92	50.29	54	-3.71	AVG

802.11 ac20-Middle Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1986	69.09	-21.01	48.08	68.2	-20.12	peak
2	1986	59.16	-21.01	38.15	54	-15.85	AVG
3	6304	57.21	-9.91	47.3	68.2	-20.9	peak
4	6304	49.76	-9.91	39.85	54	-14.15	AVG
5	7426	56.49	-7.09	49.4	68.2	-18.8	peak
6	7426	47.82	-7.09	40.73	54	-13.27	AVG
7	10656	54.98	-2.77	52.21	68.2	-15.99	peak
8	10656	48.02	-2.77	45.25	54	-8.75	AVG
9	15382	54.07	7.02	61.09	68.2	-7.11	peak
10	15382	42.12	7.02	49.14	54	-4.86	AVG
11	17830	53.82	9.12	62.94	68.2	-5.26	peak
12	17830	40.97	9.18	50.15	54	-3.85	AVG

802.11 ac20-High Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4876	57.19	-13	44.19	68.2	-24.01	peak
2	4876	50.16	-13	37.16	54	-16.84	AVG
3	7630	56.4	-7.44	48.96	68.2	-19.24	peak
4	7630	47.8	-7.44	40.36	54	-13.64	AVG
5	10656	54.19	-2.77	51.42	68.2	-16.78	peak
6	10656	44.97	-2.77	42.2	54	-11.8	AVG
7	13104	54.4	-0.02	54.38	68.2	-13.82	peak
8	13104	45.43	-0.02	45.41	54	-8.59	AVG
9	15824	54.14	6.65	60.79	68.2	-7.41	peak
10	15824	42.62	6.65	49.27	54	-4.73	AVG
11	17456	53.11	9.05	62.16	68.2	-6.04	peak
12	17456	40.88	9.05	49.93	54	-4.07	AVG

802.11 ac20-High Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4332	58.28	-14.54	43.74	68.2	-24.46	peak
2	4332	51.51	-14.54	36.97	54	-17.03	AVG
3	6406	56.54	-9.93	46.61	68.2	-21.59	peak
4	6406	49.34	-9.93	39.41	54	-14.59	AVG
5	7494	55.19	-7.13	48.06	68.2	-20.14	peak
6	7494	48.45	-7.13	41.32	54	-12.68	AVG
7	11064	54.78	-2.65	52.13	68.2	-16.07	peak
8	11064	48.31	-2.65	45.66	54	-8.34	AVG
9	15382	53.28	7.02	60.3	68.2	-7.9	peak
10	15382	42.35	7.02	49.37	54	-4.63	AVG
11	17796	53.14	8.92	62.06	68.2	-6.14	peak
12	17796	41.29	8.91	50.2	54	-3.8	AVG

Band III:

Note: All modes and antenna have been tested, and the report only reflects the worst mode (802.11ac (VHT20) MIMO).

Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

802.11 ac20-Low Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3584	59.55	-16.33	43.22	68.2	-24.98	peak
2	3584	52.01	-16.33	35.68	54	-18.32	AVG
3	7358	55.59	-7.23	48.36	68.2	-19.84	peak
4	7358	46.61	-7.23	39.38	54	-14.62	AVG
5	8412	55.82	-7.14	48.68	68.2	-19.52	peak
6	8412	47.47	-7.14	40.33	54	-13.67	AVG
7	11336	54.26	-2.04	52.22	68.2	-15.98	peak
8	11336	46.17	-2.04	44.13	54	-9.87	AVG
9	15416	53.53	6.95	60.48	68.2	-7.72	peak
10	15416	42.21	6.95	49.16	54	-4.84	AVG
11	17932	52.43	9.79	62.22	68.2	-5.98	peak
12	17932	39.95	9.79	49.74	54	-4.26	AVG

802.11 ac20-Low Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3992	60.44	-15.01	45.43	68.2	-22.77	peak
2	3992	53.7	-15.01	38.69	54	-15.31	AVG
3	4944	58.33	-12.85	45.48	68.2	-22.72	peak
4	4944	52.14	-12.85	39.29	54	-14.71	AVG
5	7324	56.77	-7.38	49.39	68.2	-18.81	peak
6	7324	50.29	-7.38	42.91	54	-11.09	AVG
7	11302	55.4	-2.14	53.26	68.2	-14.94	peak
8	11302	48.82	-2.14	46.68	54	-7.32	AVG
9	15212	54.09	6.63	60.72	68.2	-7.48	peak
10	15212	43.02	6.63	49.65	54	-4.35	AVG
11	17864	53.73	9.35	63.08	68.2	-5.12	peak
12	17864	41.49	9.3	50.79	54	-3.21	AVG

802.11 ac20-Middle Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4910	58.46	-12.91	45.55	68.2	-22.65	peak
2	4910	49.99	-12.91	37.08	54	-16.92	AVG
3	6168	58.4	-9.92	48.48	68.2	-19.72	peak
4	6168	50.89	-9.92	40.97	54	-13.03	AVG
5	7562	56	-7.22	48.78	68.2	-19.42	peak
6	7562	49.26	-7.22	42.04	54	-11.96	AVG
7	11132	55.63	-2.48	53.15	68.2	-15.05	peak
8	11132	47.79	-2.48	45.31	54	-8.69	AVG
9	15178	53.8	6.43	60.23	68.2	-7.97	peak
10	15178	43.46	6.43	49.89	54	-4.11	AVG
11	17660	53.91	9.07	62.98	68.2	-5.22	peak
12	17660	40.44	9.07	49.51	54	-4.49	AVG

802.11 ac20-Middle Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3958	59.81	-15.09	44.72	68.2	-23.48	peak
2	3958	52.92	-15.09	37.83	54	-16.17	AVG
3	4910	57.4	-12.91	44.49	68.2	-23.71	peak
4	4910	51.17	-12.91	38.26	54	-15.74	AVG
5	7494	55.13	-7.13	48	68.2	-20.2	peak
6	7494	48.25	-7.13	41.12	54	-12.88	AVG
7	10690	54.64	-2.89	51.75	68.2	-16.45	peak
8	10690	47.9	-2.89	45.01	54	-8.99	AVG
9	15212	52.79	6.63	59.42	68.2	-8.78	peak
10	15212	42.97	6.63	49.6	54	-4.4	AVG
11	17830	53.15	9.12	62.27	68.2	-5.93	peak
12	17830	41.13	9.12	50.25	54	-3.75	AVG

802.11 ac20-High Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6032	57.23	-10.1	47.13	68.2	-21.07	peak
2	6032	48.04	-10.1	37.94	54	-16.06	AVG
3	8378	54.99	-7.1	47.89	68.2	-20.31	peak
4	8378	46.74	-7.1	39.64	54	-14.36	AVG
5	10248	55.34	-3.89	51.45	68.2	-16.75	peak
6	10248	46.61	-3.89	42.72	54	-11.28	AVG
7	12118	55.45	-2.34	53.11	68.2	-15.09	peak
8	12118	48.91	-2.34	46.57	54	-7.43	AVG
9	16300	52.95	6.93	59.88	68.2	-8.32	peak
10	16300	42.15	6.93	49.08	54	-4.92	AVG
11	17966	53.24	9.99	63.23	68.2	-4.97	peak
12	17966	40.2	9.99	50.19	54	-3.81	AVG

802.11 ac20-High Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1986	67.83	-21.01	46.82	68.2	-21.38	peak
2	1986	58.04	-21.01	37.03	54	-16.97	AVG
3	2666	67.55	-20.39	47.16	68.2	-21.04	peak
4	2666	59.95	-20.39	39.56	54	-14.44	AVG
5	3958	61.93	-15.09	46.84	68.2	-21.36	peak
6	3958	55.84	-15.09	40.75	54	-13.25	AVG
7	11370	55.79	-1.94	53.85	68.2	-14.35	peak
8	11370	46.73	-1.94	44.79	54	-9.21	AVG
9	15314	54.63	6.82	61.45	68.2	-6.75	peak
10	15314	43.02	6.82	49.84	54	-4.16	AVG
11	17416	54.2	9.04	63.24	68.2	-4.96	peak
12	17416	41.52	9.04	50.56	54	-3.44	AVG

Band IV:

Note: All modes and antenna have been tested, and the report only reflects the worst mode (802.11ac (VHT20) MIMO).

Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

802.11 ac20-Low Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4876	58.38	-13	45.38	68.2	-22.82	peak
2	4876	49.11	-13	36.11	54	-17.89	AVG
3	6168	57.04	-9.92	47.12	68.2	-21.08	peak
4	6168	47.93	-9.92	38.01	54	-15.99	AVG
5	7562	56.46	-7.22	49.24	68.2	-18.96	peak
6	7562	48.39	-7.22	41.17	54	-12.83	AVG
7	10588	55.09	-2.7	52.39	68.2	-15.81	peak
8	10588	48.45	-2.7	45.75	54	-8.25	AVG
9	16266	54.91	6.98	61.89	68.2	-6.31	peak
10	16266	42.8	6.98	49.78	54	-4.22	AVG
11	17728	54.37	9.01	63.38	68.2	-4.82	peak
12	17728	40.8	9.01	49.81	54	-4.19	AVG

802.11 ac20-Low Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4842	57.41	-13.14	44.27	68.2	-23.93	peak
2	4842	51.87	-13.14	38.73	54	-15.27	AVG
3	6032	58.13	-10.1	48.03	68.2	-20.17	peak
4	6032	50.69	-10.1	40.59	54	-13.41	AVG
5	7358	55.44	-7.23	48.21	68.2	-19.99	peak
6	7358	50.1	-7.23	42.87	54	-11.13	AVG
7	10248	56.51	-3.89	52.62	68.2	-15.58	peak
8	10248	49.38	-3.89	45.49	54	-8.51	AVG
9	15076	54.52	5.56	60.08	68.2	-8.12	peak
10	15076	44.1	5.56	49.66	54	-4.34	AVG
11	17796	54	8.92	62.92	68.2	-5.28	peak
12	17796	41.85	8.92	50.77	54	-3.23	AVG

802.11 ac20-Middle Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3924	59.12	-15.19	43.93	68.2	-24.27	peak
2	3924	51.91	-15.19	36.72	54	-17.28	AVG
3	8344	55.46	-7.2	48.26	68.2	-19.94	peak
4	8344	48.22	-7.2	41.02	54	-12.98	AVG
5	10690	56.05	-2.89	53.16	68.2	-15.04	peak
6	10690	48.8	-2.89	45.91	54	-8.09	AVG
7	13104	54.69	-0.02	54.67	68.2	-13.53	peak
8	13104	47.71	-0.02	47.69	54	-6.31	AVG
9	15722	53.17	6.31	59.48	68.2	-8.72	peak
10	15722	42.76	6.31	49.07	54	-4.93	AVG
11	17796	53.71	8.92	62.63	68.2	-5.57	peak
12	17796	41.34	8.92	50.26	54	-3.74	AVG

802.11 ac20-Middle Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4876	58.77	-13	45.77	68.2	-22.43	peak
2	4876	49.03	-13	36.03	54	-17.97	AVG
3	6168	57.56	-9.92	47.64	68.2	-20.56	peak
4	6168	48.29	-9.92	38.37	54	-15.63	AVG
5	8276	56.99	-7.36	49.63	68.2	-18.57	peak
6	8276	47.97	-7.36	40.61	54	-13.39	AVG
7	11098	55.64	-2.54	53.1	68.2	-15.1	peak
8	11098	48.89	-2.54	46.35	54	-7.65	AVG
9	16436	55.22	6.82	62.04	68.2	-6.16	peak
10	16436	42.6	6.82	49.42	54	-4.58	AVG
11	17796	55.51	8.92	64.43	68.2	-3.77	peak
12	17796	41.24	8.92	50.16	54	-3.84	AVG

802.11 ac20-High Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4876	58.33	-13	45.33	68.2	-22.87	peak
2	4876	50.46	-13	37.46	54	-16.54	AVG
3	6168	57.11	-9.92	47.19	68.2	-21.01	peak
4	6168	49.86	-9.92	39.94	54	-14.06	AVG
5	7664	57.87	-7.61	50.26	68.2	-17.94	peak
6	7664	48.99	-7.61	41.38	54	-12.62	AVG
7	10554	55.4	-2.97	52.43	68.2	-15.77	peak
8	10554	48.55	-2.97	45.58	54	-8.42	AVG
9	15790	54.31	6.78	61.09	68.2	-7.11	peak
10	15790	43.04	6.78	49.82	54	-4.18	AVG
11	18000	53.97	10.19	64.16	68.2	-4.04	peak
12	18000	40.58	10.19	50.77	54	-3.23	AVG

802.11 ac20-High Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	7528	55.87	-7.17	48.7	68.2	-19.5	peak
2	7528	48.01	-7.17	40.84	54	-13.16	AVG
3	8412	56.56	-7.14	49.42	68.2	-18.78	peak
4	8412	49.19	-7.14	42.05	54	-11.95	AVG
5	12458	55.16	-1.59	53.57	68.2	-14.63	peak
6	12458	46.75	-1.59	45.16	54	-8.84	AVG
7	13172	55.48	0.25	55.73	68.2	-12.47	peak
8	13172	45.36	0.25	45.61	54	-8.39	AVG
9	15110	53.93	5.84	59.77	68.2	-8.43	peak
10	15110	43.5	5.84	49.34	54	-4.66	AVG
11	17830	52.68	9.12	61.8	68.2	-6.4	peak
12	17830	41.06	9.12	50.18	54	-3.82	AVG

Node:

- 1、Radiated emissions measured in frequency above 1GHz were made with an instrument using peak/average detector mode.
- 2、Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 3、Margin (dB), result in dBuV/m – limit in dBuV/m.

Restricted band Requirements							
Band I							
Note: Since the distance of band IV exceeds 200 MHz and the distance limit is greater than 20 dB, only band I to band III data is reflected in this document All antennas and bandwidths are tested, and only the worst mode (802.11ac (VHT20) MIMO) is reported in the report.							
802.11 ac (VHT20)-Low (worst mode)							
Horizontal							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4950.8	57.54	-12.83	44.71	68.2	-23.49	peak
2	4950.8	51.16	-12.83	38.33	54	-15.67	AVG
3	5150	57.43	-12.61	44.82	68.2	-23.38	peak
4	5150	48.81	-12.61	36.2	54	-17.8	AVG
Vertical							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5081	59.8	-12.5	47.3	68.2	-20.9	peak
2	5081	51.57	-12.5	39.07	54	-14.93	AVG
3	5150	57.66	-12.61	45.05	68.2	-23.15	peak
4	5150	50.43	-12.61	37.82	54	-16.18	AVG
802.11 ac (VHT20)-High (worst mode)							
Horizontal							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350	59.36	-12.59	46.77	68.2	-21.43	peak
2	5350	50.81	-12.59	38.22	54	-15.78	AVG
3	5389.3	60.41	-12.53	47.88	68.2	-20.32	peak
4	5389.3	50.64	-12.53	38.11	54	-15.89	AVG
Vertical							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350	56.43	-12.59	43.84	68.2	-24.36	peak
2	5350	49.71	-12.59	37.12	54	-16.88	AVG
3	5393.6	58.8	-12.52	46.28	68.2	-21.92	peak
4	5393.6	50.31	-12.52	37.79	54	-16.21	AVG

Correction Factor = antenna factor + cable loss – amplifier gain;

Reading = Reading Amplitude in the instrument;

Result = Correction Factor + Reading;

Margin = Result – Limit

Band II							
Note: Since the distance of band IV exceeds 200 MHz and the distance limit is greater than 20 dB, only band I to band III data is reflected in this document All antennas and bandwidths are tested, and only the worst mode (802.11ac (VHT20) MIMO) is reported in the report.							
802.11 ac (VHT20)-Low (worst mode)							
Horizontal							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5103.2	62.37	-12.46	49.91	68.2	-18.29	peak
2	5103.2	50.67	-12.46	38.21	54	-15.79	AVG
3	5150	58.33	-12.61	45.72	68.2	-22.48	peak
4	5150	50.87	-12.61	38.26	54	-15.74	AVG
Vertical							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5071.2	60.1	-12.52	47.58	68.2	-20.62	peak
2	5071.2	50.2	-12.52	37.68	54	-16.32	AVG
3	5150	58.83	-12.61	46.22	68.2	-21.98	peak
4	5150	49.42	-12.61	36.81	54	-17.19	AVG
802.11 ac (VHT20)-High (worst mode)							
Horizontal							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350	75.89	-12.59	63.3	68.2	-4.9	peak
2	5350	56.67	-12.59	44.08	54	-9.92	AVG
3	5353.7	77.09	-12.58	64.51	68.2	-3.69	peak
4	5353.7	54.39	-12.58	41.81	54	-12.19	AVG
Vertical							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350	60.86	-12.59	48.27	68.2	-19.93	peak
2	5350	50.73	-12.59	38.14	54	-15.86	AVG
3	5389.9	61.18	-12.53	48.65	68.2	-19.55	peak
4	5389.9	51.37	-12.53	38.84	54	-15.16	AVG

Correction Factor = antenna factor + cable loss – amplifier gain;

Reading = Reading Amplitude in the instrument;

Result = Correction Factor + Reading;

Margin = Result – Limit

Band III							
Note: Since the distance of band IV exceeds 200 MHz and the distance limit is greater than 20 dB, only band I to band III data is reflected in this document All antennas and bandwidths are tested, and only the worst mode (802.11ac (VHT20) MIMO) is reported in the report.							
802.11 ac(VHT20)-Low (worst mode)							
Horizontal							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5460	64.51	-12.3	52.21	68.2	-15.99	peak
2	5460	50.63	-12.3	38.33	54	-15.67	AVG
3	5471	74.22	-12.24	61.98	68.2	-6.22	peak
4	5471	54.15	-12.24	41.91	54	-12.09	AVG
Vertical							
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5460	61.45	-12.3	49.15	68.2	-19.05	peak
2	5460	48.15	-12.3	35.85	54	-18.15	AVG
3	5472.48	67.39	-12.24	55.15	68.2	-13.05	peak
4	5472.48	49.94	-12.24	37.7	54	-16.3	AVG
802.11 ac (VHT20)-High (worst mode)							
Note: Since the distance restricted band of this part frequency exceeds 200 MHz and the distance limit is greater than 20 dB.							

Correction Factor = antenna factor + cable loss – amplifier gain;

Reading = Reading Amplitude in the instrument;

Result = Correction Factor + Reading;

Margin = Result – Limit

3.2. Dynamic Frequency Selection (DFS) Measurement

Applicability of DFS requirements

Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	☐ Master	☒ Client Without Radar Detection	☐ Client with Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	☐ Master Device or Client with Radar Detection	☒ Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	☐ Master Device or Client with Radar Detection	☒ Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW Mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20MHz channels and the channel center frequency.		

Limit

DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required facilitating a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

Parameters of radar test waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup} \left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each

additional

waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test

B and must also be unique and not repeated from the previous waveforms in Tests A or B.

Calibration of radar waveform

Radar Waveform Calibration Procedure:

(1) A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to place of the master

(2) The interference Radar Detection Threshold Level is $-62\text{dBm} + 0\text{dBi} + 1\text{dB} = -61\text{dBm}$ that had been taken into account the output power range and antenna gain.

(3) The following equipment setup was used to calibrate the conducted radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) at the frequency of the radar waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz. The spectrum analyzer had offset -1.0dB to compensate RF cable loss 1.0dB .

(4) The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was $-62\text{dBm} + 0\text{dBi} + 1\text{dB} = -61\text{dBm}$. Capture the spectrum analyzer plots on short pulse radar waveform.

Conducted Calibration Setup:

Channel closing transmission time, channel move time and non-occupancy period

Block diagram of test setup Test Procedure:

(1) The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a $1\mu\text{s}$ pulse width and a $1428\mu\text{s}$ PRI is used for the testing.

(2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device.

(3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.

(4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Test Software in order to properly load the network for the entire period of the test.

(5) When radar burst with a level equal to the DFS Detection Threshold $+1\text{dB}$ is generated on the operating channel of the U-NII device. At time T_0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold $+1\text{dB}$.

(6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type.

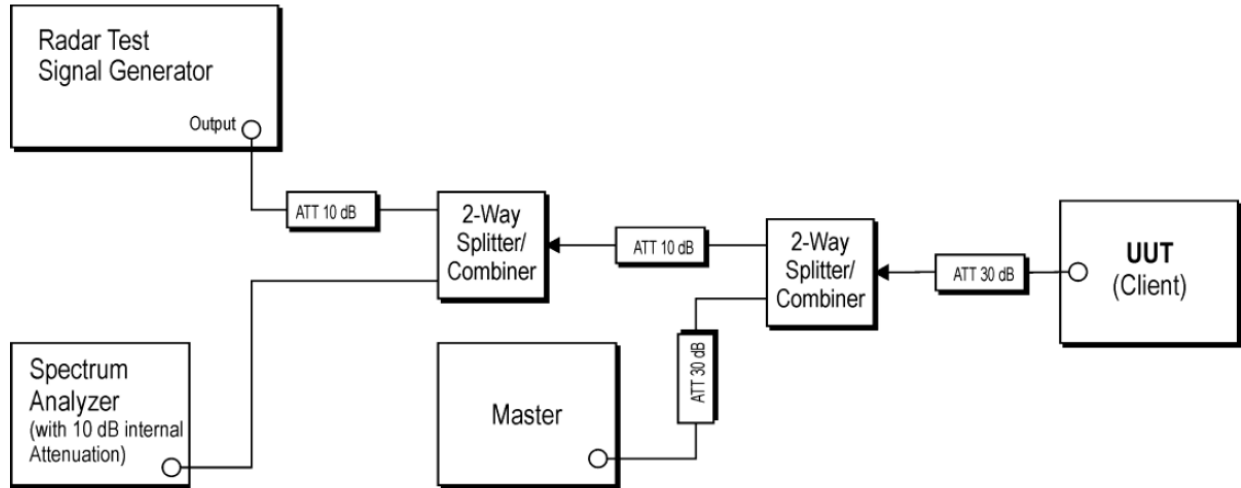
(7) Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the

(8) spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: $D_{\text{well}} (0.3\text{ms}) = S (12000\text{ms}) / B (4000)$; where D_{well} is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: $C (\text{ms}) = N \times D_{\text{well}} (0.3\text{ms})$; where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control

signals) showing a U-NII transmission and Dwell is the dwell time per bin.

(9) Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

Test setup

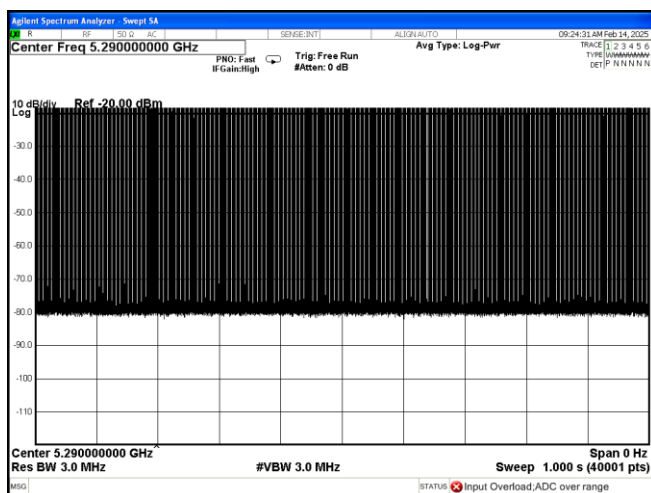


Test result

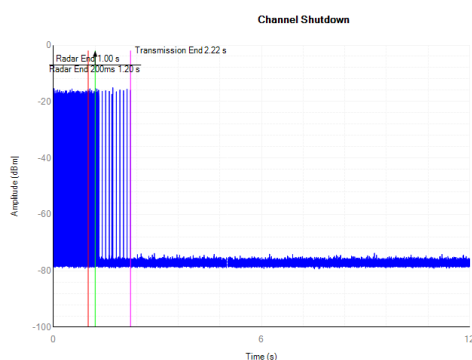
Band II					
Description	Radar Type	Radar Freq.	Measured Val.(s)	Requirement	Status
Channel closing transmission time	1	5290	0.0366	<60ms	Complies
Channel move time	1	5290	1.2221	<10s	Complies
Non-Occupancy Period	1	5290	not be less than 30 Min	30 Minutes	Complies

Band III					
Description	Radar Type	Radar Freq.	Measured Val.(s)	Requirement	Status
Channel closing transmission time	1	5530	0.0078	<60ms	Complies
Channel move time	1	5530	1.0961	<10s	Complies
Non-Occupancy Period	1	5530	not be less than 30 Min	30 Minutes	Complies

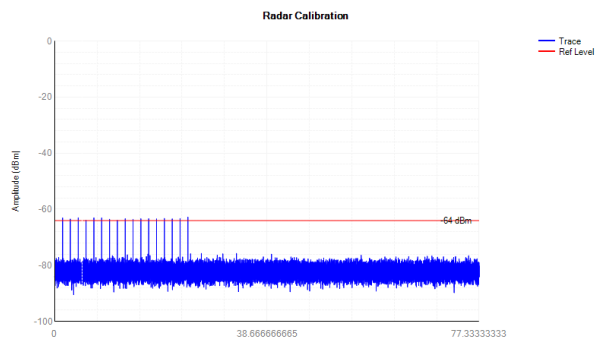
Remark: Tests were performed using the conduction test method. DFS is not applicable to 5600-5650 frequency band for IC.



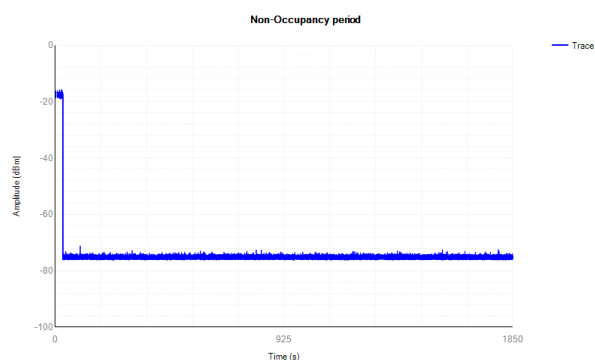
Bandwidth 80MHz



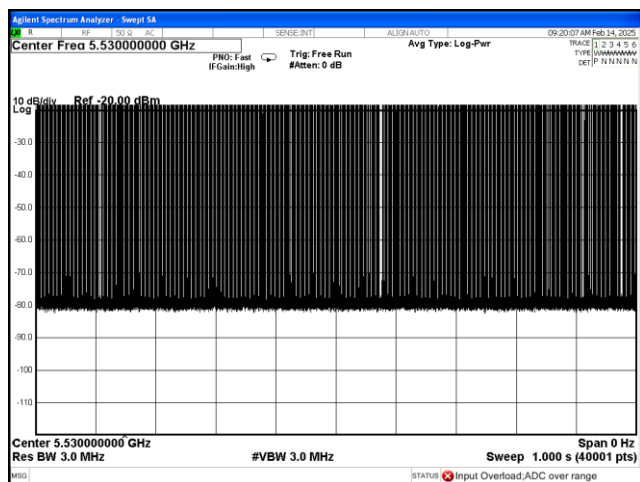
5290MHz Shutdown



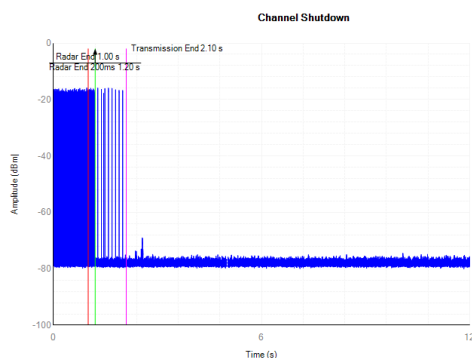
DFS Detection Thresholds



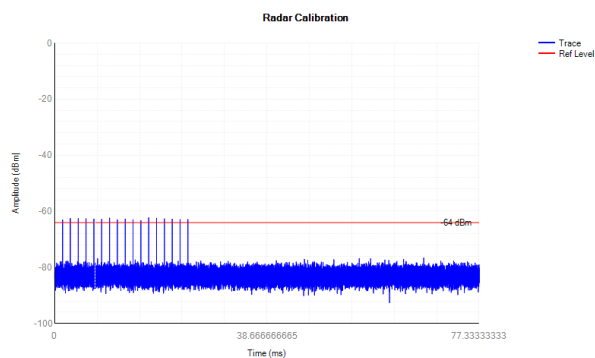
5290MHz Non-Occupancy Period



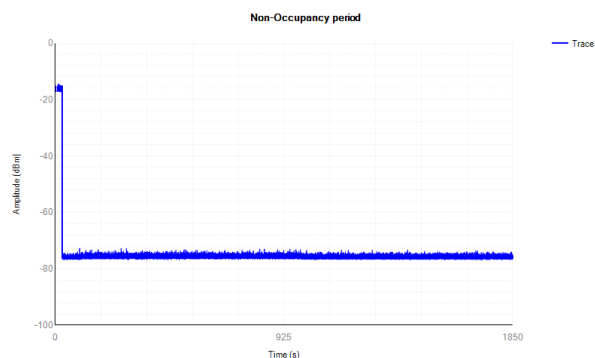
Bandwidth 80MHz



5530MHz Shutdown



DFS Detection Thresholds



5530MHz Non-Occupancy Period

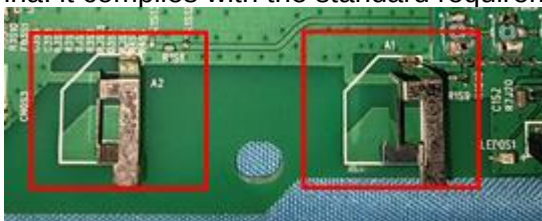
3.3. ANTENNA REQUIREMENT

STANDARD REQUIREMENT

According to the manufacturer declared, the EUT has On-board antenna, the directional gain of antenna is 5150MHz to 5350MHz: 2.68 dBi; 5470MHz to 5725MHz: 2.89 dBi; 5725MHz to 5850MHz: 2.55 dBi(ANT1&2), and the antenna and other components are all on the same PCB and cannot be replaced. Therefore, the EUT is considered sufficient to comply with the provision.

EUT ANTENNA

The WLAN is On-board antenna. it complies with the standard requirement.



4. TEST PHOTOS

Please refer to Appendix C Test Setup.

5. EUT PHOTOS

External Photos Please refer to Appendix A and Internal Photos Please refer to Appendix B.

*****THE END*****