TEST REPORT

Report No.:	BCTC2209305453-2E
Applicant:	Pacific Time Trading(Shenzhen)Limited
Product Name:	Carplay
Model/Type reference:	R9
Tested Date:	2022-09-07 to 2022-10-31
Issued Date:	2022-10-31

Shenzhen BCTC Testing Co., Ltd.

FCC ID: 2AV8I-R9

Product Name:	Carplay
Trademark:	Coral Vision
Model/Type reference:	R9 D9, M9, S9
Prepared For:	Pacific Time Trading(Shenzhen)Limited
Address:	Unit 607, block A, Rong Chaoying Long building, 5 longfuRoad, Longcheng street, Longgang District, Shenzhen, China
Manufacturer:	TFVC SHANGHAI CO.,LTD
Address:	Rm 103, 1 Lane 666 Xinhua Road, Changning District, Shanghai, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2022-09-07
Sample tested Date:	2022-09-07 to 2022-10-31
Issue Date:	2022-10-31
Report No.:	BCTC2209305453-2E
Test Standards:	FCC Part15 15.407 ANSI C63.10-2013 KDB 789033 D02 v02r01
Test Results:	PASS

Tested by:

Lei Chen

Lei Chen/Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

Table Of Content

Test Report Declaration Page
1. Version 5
2. Test Summary 6
3. Measurement Uncertainty 7
4. Product Information And Test Setup 8
4.1 Product Information 8
4.2 Test Setup Configuration 8
4.3 Support Equipment 9
4.4 Channel List 9
4.5 Test Mode 9
4.6 Table Of Parameters Of Text Software Setting 10
5. Test Facility And Test Instrument Used 11
5.1 Test Facility 11
5.2 Test Instrument Used 11
6. Conducted Emissions 13
6.1 Block Diagram Of Test Setup 13
6.2 Limit 13
6.3 Test Procedure 13
6.4 EUT Operating Conditions 13
6.5 Test Result 14
7. Radiated Emissions 16
7.1 Block Diagram Of Test Setup 16
7.2 Limit 17
7.3 Test Procedure 18
7.4 EUT Operating Conditions 19
7.5 Test Result 19
8. Power Spectral Density Test 28
8.1 Block Diagram Of Test Setup 28
8.2 Limit 28
8.3 Test Procedure 29
8.4 EUT Operating Conditions 29
8.5 Test Result 30
9. 26dB & 99% Emission Bandwidth 34
9.1 Block Diagram Of Test Setup 34
9.2 Limit 34
9.3 Test Procedure 34
9.4 EUT Operating Conditions 34
9.5 Test Result 35
10. Maximum Conducted Output Power 39
10.1 Block Diagram Of Test Setup 39
10.2 Limit 39
10.3 Test Procedure 39
10.4 EUT Operating Conditions 40
10.5 Test Result 41

11. Out Of Band Emissions 42
11.1 Block Diagram Of Test Setup 42
11.2 Limit 42
11.3 Test Procedure 42
11.4 EUT Operating Conditions 42
11.5 Test Result 43
12. Spurious RF Conducted Emissions 46
12.1 Block Diagram Of Test Setup 46
12.2 Limit 46
12.3 Test Procedure 46
12.4 Test Result 46
13. Frequency Stability Measurement 54
13.1 Block Diagram Of Test Setup 54
13.2 Limit 54
13.3 Test Procedure 54
13.4 Test Result 55
14. Antenna Requirement 58
14.1 Limit 58
14.2 EUT Antenna 58
15. EUT Photographs 59
16. EUT Test Setup Photographs 60

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2209305453-2E	2022-10-31	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
1	Spurious Radiated Emissions	15.209(a), 15.407 (b)(1) 15.407 (b)(9) 15.205	PASS
2	Conducted Emission	15.207	PASS
3	26 dB and 99% Emission Bandwidth	15.407 (a)(12) 15.1049	PASS
4	Maximum Conducted Output Power	15.407 (a)(1)	PASS
5	Band Edge	2.1051, 15.407(b)(1)	PASS
6	Power Spectral Density	15.407 (a)(1)	PASS
7	Antenna Requirement	15.203	PASS
8	Frequency Stability	15.407(g)	PASS

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(9KHz-30MHz)	U=3.7dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission (150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59℃

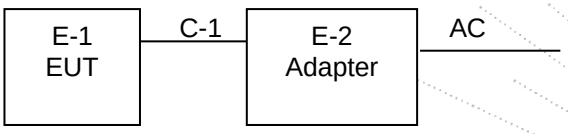
4. Product Information And Test Setup

4.1 Product Information

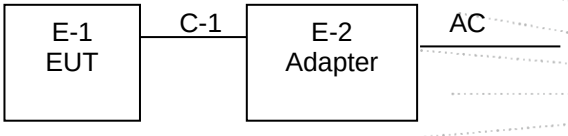
Model/Type reference:	R9 D9, M9, S9
Model differences:	All the model are the same circuit and RF module, except model names and color.
Hardware Version:	Coral Vision-R9-1-v1.1
Software Version:	CORAL_R9-335-V1.1.25-g7e0506c-20220820-110038
IEEE 802.11 WLAN Mode Supported	802.11a/n/ac(20MHz channel bandwidth) 802.11n/ac(40MHz channel bandwidth) 802.11ac(80MHz channel bandwidth)
Operation Frequency:	5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80;
Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40/VHT80):NSS1, MCS0-MCS9
Type of Modulation:	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
Number Of Channel	4 channels for 802.11a/n20 in the 5180-5240MHz band; 2 channels for 802.11 n40 in the 5190-5230MHz band; 1 channels for 802.11 ac80 in the 5210MHz band;
Antenna installation:	FPC antenna
Antenna Gain:	0.4 dBi
Ratings:	DC 5V

4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.
Conducted Emission:



Radiated Spurious Emission



4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	Carplay	Coral Vision	R9	D9, M9, S9	EUT
E-2	Adapter	N/A	BCTC001	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.5M	DC cable unshielded

Notes:
1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

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

802.11n /ac(40MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	-	-	-	-
46	5230	-	-	-	-	-	-

802.11ac (80MHz) Carrier Frequency Channel	
Channel	Frequency (MHz)
42	5210

4.5 Test Mode

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.

Pretest Mode	Description
Mode 1	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 2	802.11n/ ac40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42
Mode 4	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 2	802.11n/ ac40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42

Note:

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

4.6 Table Of Parameters Of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Test software Version	RTL11ac_8821CS		
Parameters	DEF	DEF	DEF

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

FCC Test Firm Registration Number: 712850

IC Registered No.: 23583

5.2 Test Instrument Used

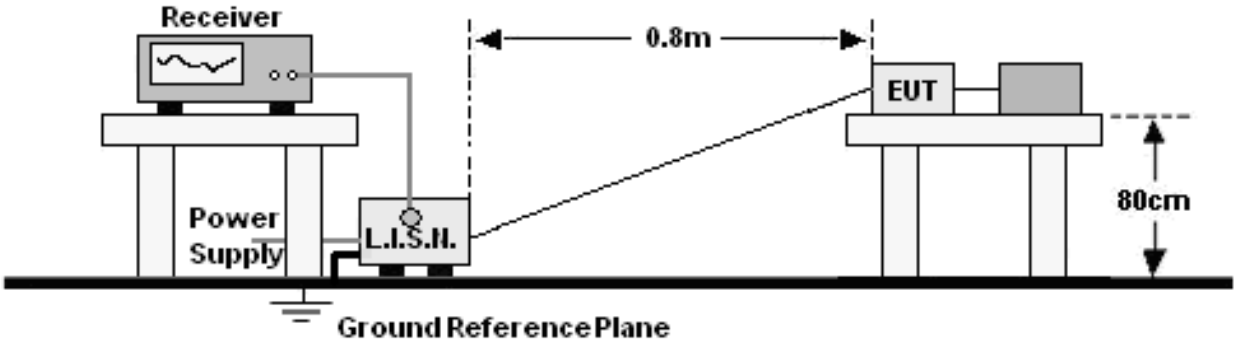
Conducted Emissions Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023
LISN	R&S	ENV216	101375	May 24, 2022	May 23, 2023
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\
Attenuator	\	10dB DC-6GHz	1650	May 24, 2022	May 23, 2023

RF Conducted Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Power Metter	Keysight	E4419	\	May 24, 2022	May 23, 2023
Power Sensor (AV)	Keysight	E9300A	\	May 24, 2022	May 23, 2023
Signal Analyzer 20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 24, 2022	May 23, 2023
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	\	May 24, 2022	May 23, 2023

Radiated Emissions Test (966 Chamber)					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023
Receiver	R&S	ESRP	101154	May 24, 2022	May 23, 2023
Amplifier	SKET	LAPA_01G18G-45dB	\	May 24, 2022	May 23, 2023
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 24, 2022	May 23, 2023
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 26, 2022	May 25, 2023
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 06, 2022	Jun. 05, 2023
Horn Antenn (18GHz-40GHz)	Schwarzbeck	BBHA9170	00822	Jun. 06, 2022	Jun. 05, 2023
Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35-HG	2034381	May 26, 2022	May 25, 2023
Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	May 26, 2022	May 25, 2023
RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-0008	May 26, 2022	May 25, 2023
RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	May 26, 2022	May 25, 2023
RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	May 26, 2022	May 25, 2023
Power Metter	Keysight	E4419	\	May 26, 2022	May 25, 2023
Power Sensor (AV)	Keysight	E9300A	\	May 26, 2022	May 25, 2023
Signal Analyzer 20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 26, 2022	May 25, 2023
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	\	May 26, 2022	May 25, 2023
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

FREQUENCY (MHz)	Limit (dBuV)	
	Quas-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00
Notes: 1. *Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.		

6.3 Test Procedure

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

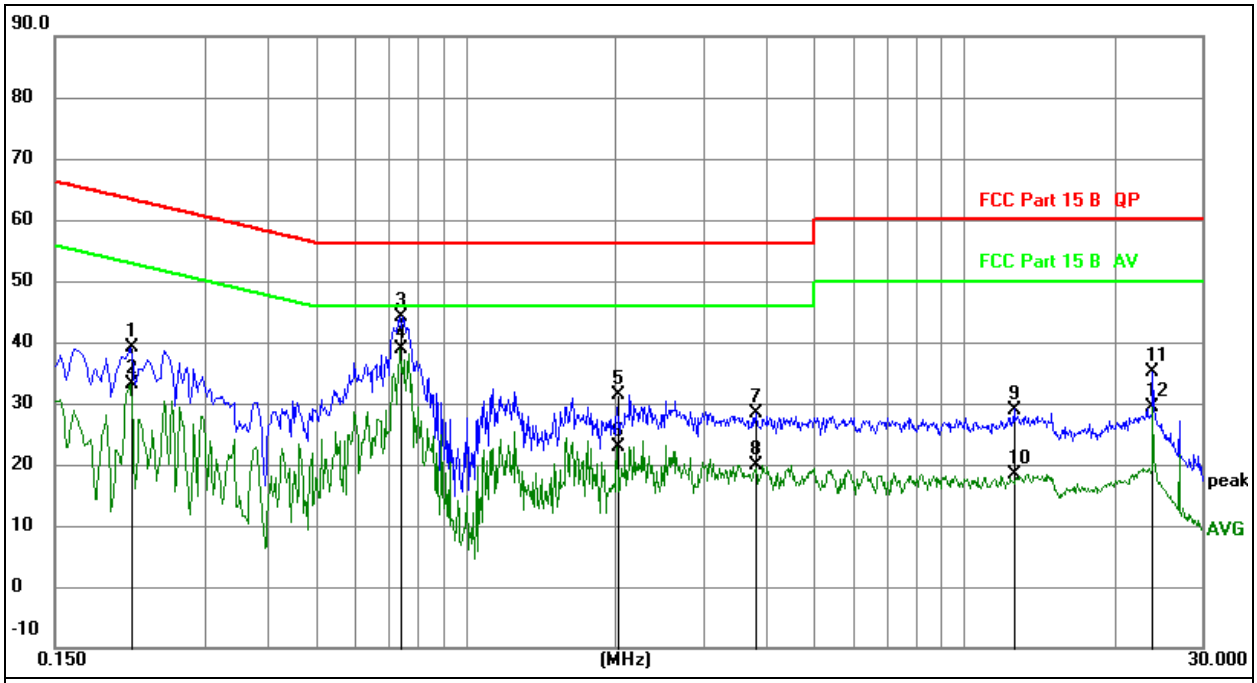
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

6.4 EUT Operating Conditions

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

6.5 Test Result

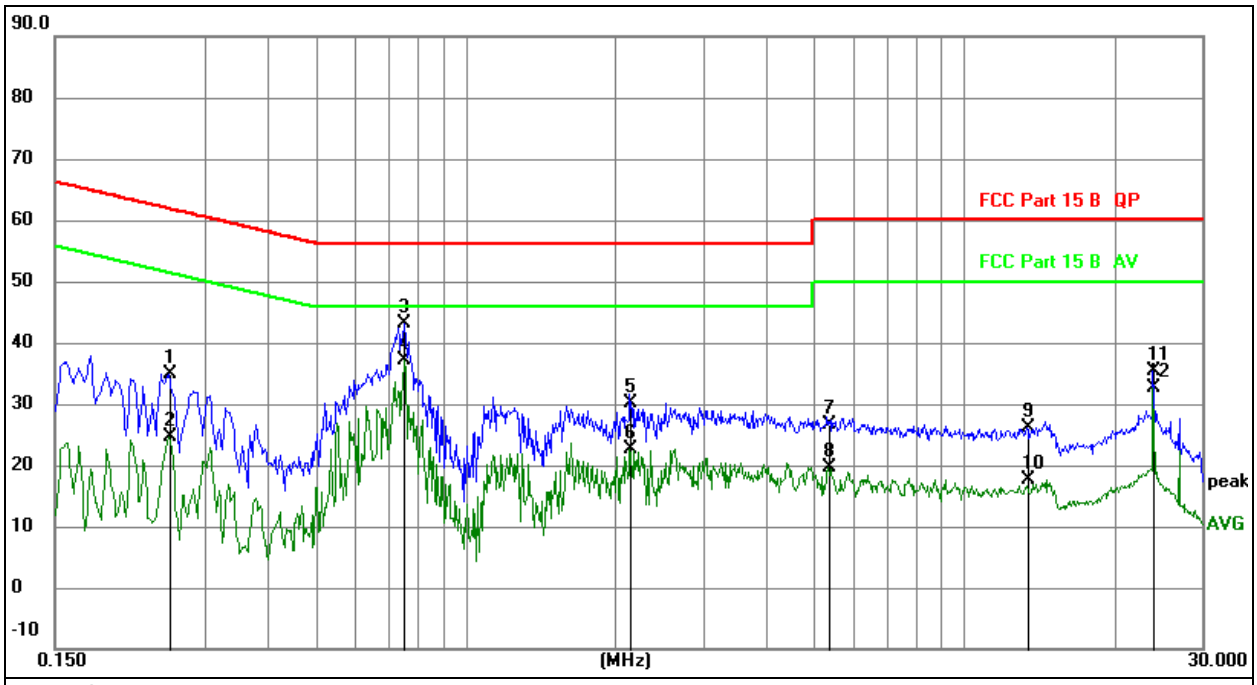
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Line
Test Voltage :	AC120/60Hz	Test Mode:	Mode 4



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement = Reading Level + Correct Factor
4. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.2128	19.38	19.80	39.18	63.10	-23.92	QP
2		0.2128	13.39	19.80	33.19	53.10	-19.91	AVG
3		0.7391	24.47	19.74	44.21	56.00	-11.79	QP
4	*	0.7391	19.16	19.74	38.90	46.00	-7.10	AVG
5		2.0119	11.42	19.88	31.30	56.00	-24.70	QP
6		2.0119	3.12	19.88	23.00	46.00	-23.00	AVG
7		3.8196	8.18	20.08	28.26	56.00	-27.74	QP
8		3.8196	-0.16	20.08	19.92	46.00	-26.08	AVG
9		12.5821	8.72	20.28	29.00	60.00	-31.00	QP
10		12.5821	-1.89	20.28	18.39	50.00	-31.61	AVG
11		23.8878	14.50	20.52	35.02	60.00	-24.98	QP
12		23.8878	8.80	20.52	29.32	50.00	-20.68	AVG

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Neutral
Test Voltage :	AC120/60Hz	Test Mode:	Mode 4



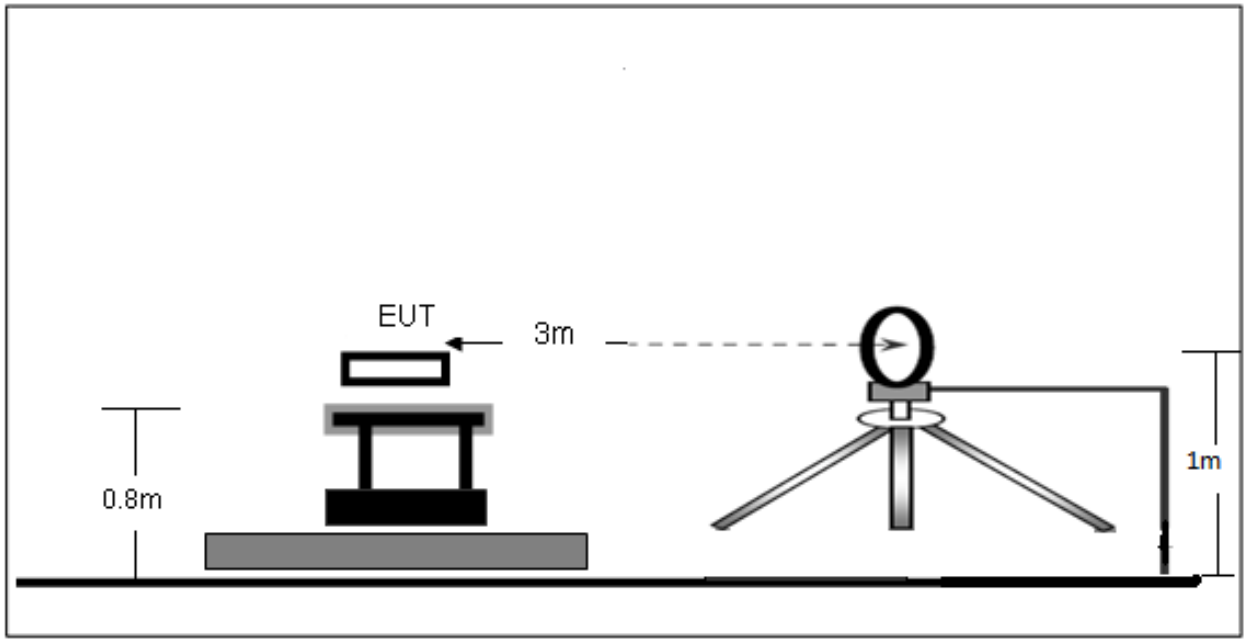
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement = Reading Level + Correct Factor
4. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.2535	15.09	19.79	34.88	61.64	-26.76	QP
2		0.2535	4.81	19.79	24.60	51.64	-27.04	AVG
3		0.7529	23.38	19.74	43.12	56.00	-12.88	QP
4	*	0.7529	17.39	19.74	37.13	46.00	-8.87	AVG
5		2.1389	10.33	19.90	30.23	56.00	-25.77	QP
6		2.1389	2.76	19.90	22.66	46.00	-23.34	AVG
7		5.3385	6.59	20.14	26.73	60.00	-33.27	QP
8		5.3385	-0.52	20.14	19.62	50.00	-30.38	AVG
9		13.3620	5.95	20.28	26.23	60.00	-33.77	QP
10		13.3620	-2.68	20.28	17.60	50.00	-32.40	AVG
11		24.0045	14.87	20.52	35.39	60.00	-24.61	QP
12		24.0045	12.07	20.52	32.59	50.00	-17.41	AVG

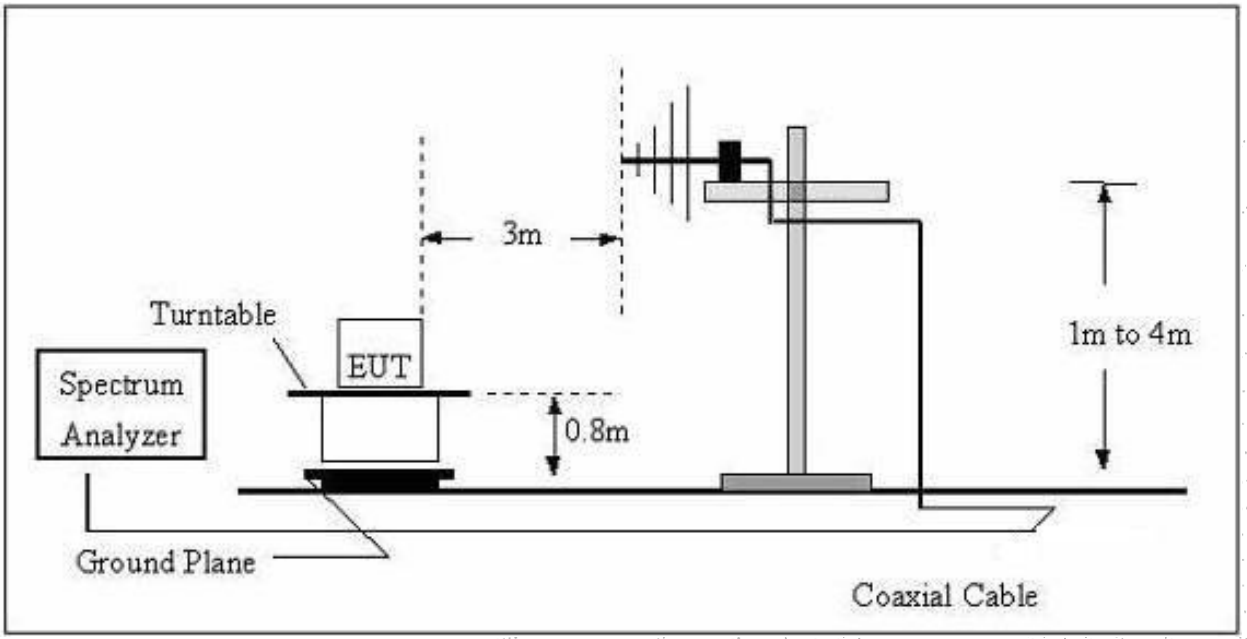
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

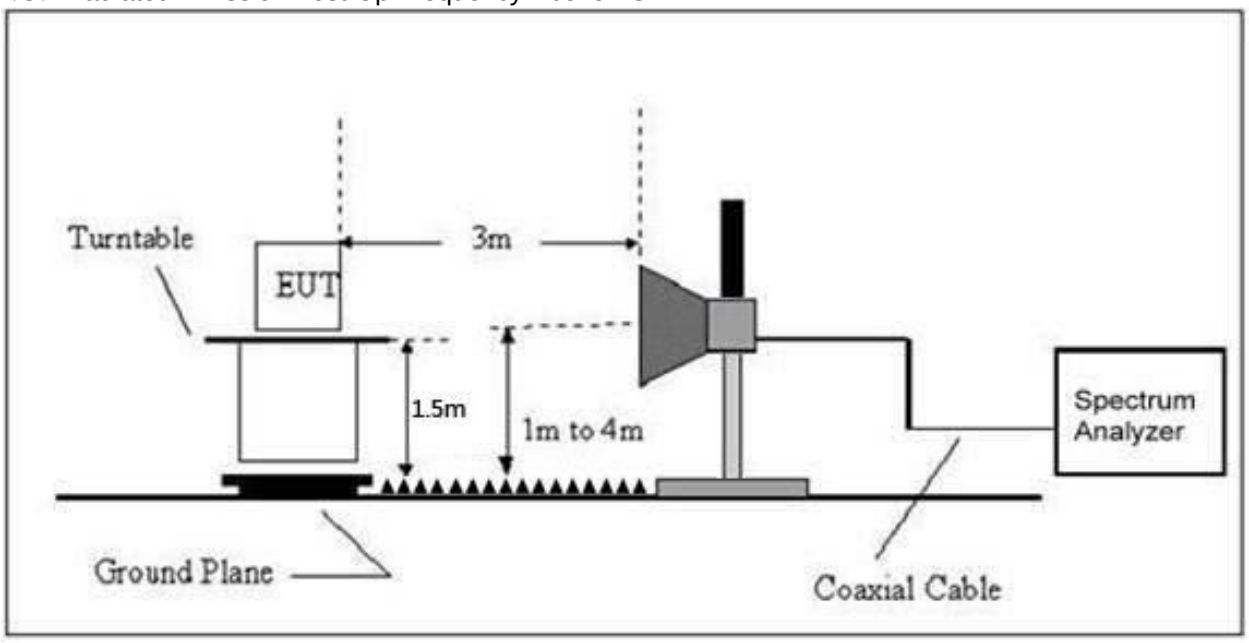
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance	
(MHz)	uV/m	(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	$20\log^{(500)}$

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (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).

7.3 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205.
It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

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

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

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
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 Quasi Peak 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

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

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

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

7.4 EUT Operating Conditions

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

7.5 Test Result

Below 30MHz

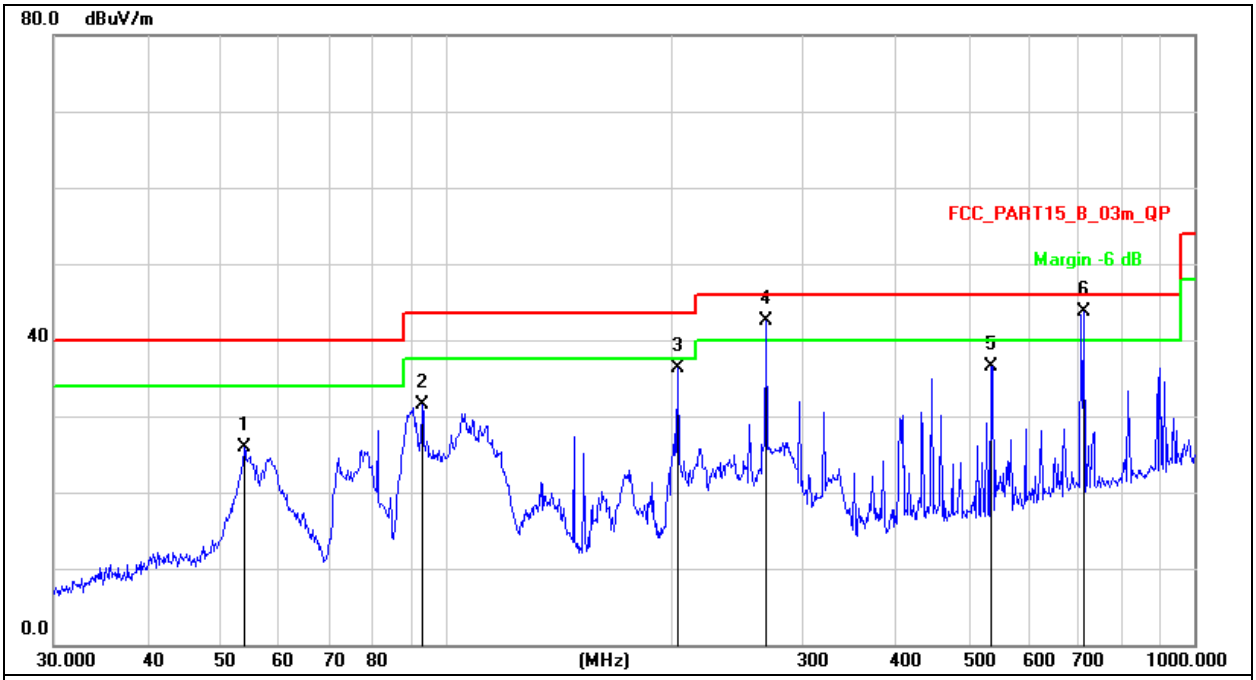
Temperature：	26℃	Relative Humidity：	24%
Pressure：	101 kPa	Test Voltage ：	AC120/60Hz
Test Mode ：	Mode 4	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

Between 30MHz – 1GHz

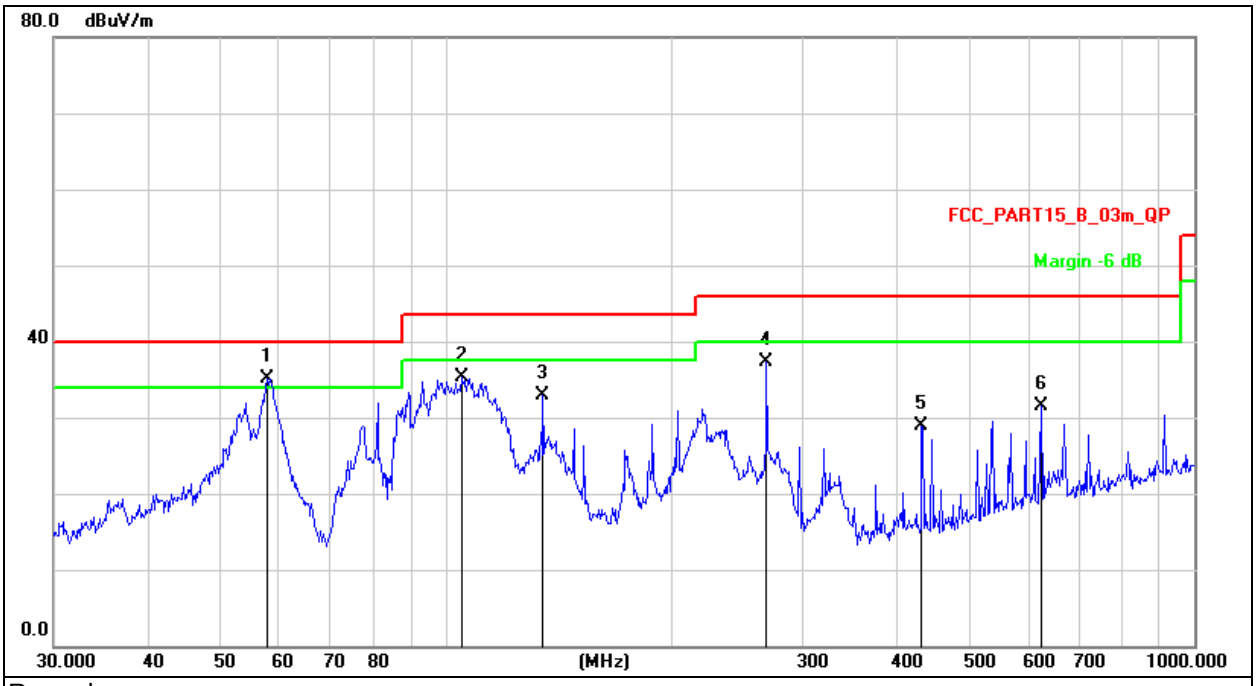
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101 kPa	Test Voltage ：	AC120/60Hz
Test Mode ：	Mode 4	Polarization :	Horizontal



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement = Reading Level + Correct Factor
3. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		53.8818	41.54	-15.70	25.84	40.00	-14.16	QP
2		93.1132	49.42	-17.84	31.58	43.50	-11.92	QP
3		204.2377	52.14	-15.80	36.34	43.50	-7.16	QP
4	!	268.4852	55.86	-13.37	42.49	46.00	-3.51	QP
5		535.7073	43.62	-7.11	36.51	46.00	-9.49	QP
6	*	711.6734	47.47	-3.86	43.61	46.00	-2.39	QP

Temperature：	26℃	Relative Humidity：	54%
Pressure：	101 kpa	Test Voltage ：	AC120/60Hz
Test Mode ：	Mode 4	Polarization :	Vertical



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement = Reading Level + Correct Factor
3. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	57.7961	51.51	-16.36	35.15	40.00	-4.85	QP
2		105.2716	52.36	-17.06	35.30	43.50	-8.20	QP
3		135.0319	51.88	-18.92	32.96	43.50	-10.54	QP
4		268.4852	50.77	-13.37	37.40	46.00	-8.60	QP
5		432.5457	38.43	-9.54	28.89	46.00	-17.11	QP
6		625.0778	36.57	-5.11	31.46	46.00	-14.54	QP

Between 1GHz – 40GHz

Test Mode :	TX(5.1G) - 802.11a

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5180 MHz)-Above 1G									
V	4434.155	62.34	5.94	35.40	44.00	59.68	68.2	-8.52	PK
V	4434.155	43.06	5.94	35.40	44.00	40.40	54	-13.60	AV
V	10360.004	63.37	8.46	39.75	44.50	67.08	68.2	-1.12	PK
V	10360.004	43.45	8.46	39.75	44.50	47.16	54	-6.84	AV
V	15540.096	64.35	10.12	38.80	44.10	69.17	74	-4.83	PK
V	15540.096	43.24	10.12	38.80	42.70	49.46	54	-4.54	AV
H	4434.043	60.24	5.94	35.18	44.00	57.36	68.2	-10.84	PK
H	4434.043	43.50	5.94	35.18	44.00	40.62	54	-13.38	AV
H	10360.152	50.17	8.46	38.71	44.50	52.84	68.2	-15.36	PK
H	10360.152	43.49	8.46	38.71	44.50	46.16	54	-7.84	AV
H	15540.193	51.97	10.12	38.38	44.10	56.37	74	-17.63	PK
H	15540.193	44.25	10.12	38.38	44.10	48.65	54	-5.35	AV
middle Channel (5200 MHz)-Above 1G									
V	4592.176	62.49	6.48	36.35	44.05	61.27	74	-12.73	PK
V	4592.176	43.90	6.48	36.35	44.05	42.68	54	-11.32	AV
V	10400.003	63.10	8.47	37.88	44.51	64.94	68.2	-3.26	PK
V	10400.003	43.67	8.47	37.88	44.51	45.51	54	-8.49	AV
V	15600.019	61.92	10.12	38.80	44.10	66.74	74	-7.26	PK
V	15600.019	43.93	10.12	38.80	42.70	50.15	54	-3.85	AV
H	4592.079	64.00	6.48	36.37	44.05	62.80	74	-11.20	PK
H	4592.079	43.70	6.48	36.37	44.05	42.50	54	-11.50	AV
H	10400.150	54.93	8.47	38.64	44.50	57.54	68.2	-10.66	PK
H	10400.150	43.13	8.47	38.64	44.50	45.74	54	-8.26	AV
H	15600.055	53.09	10.12	38.38	44.10	57.49	74	-16.51	PK
H	15600.055	41.39	10.12	38.38	44.10	45.79	54	-8.21	AV
High Channel (5240 MHz)-Above 1G									
V	4739.165	64.12	7.10	37.24	43.50	64.96	74	-9.04	PK
V	4739.165	43.11	7.10	37.24	43.50	43.95	54	-10.05	AV
V	10480.121	63.59	8.46	37.68	44.50	65.23	68.2	-2.97	PK
V	10480.121	43.74	8.46	37.68	44.50	45.38	54	-8.62	AV
V	15720.172	62.18	10.12	38.80	44.10	67.00	74	-7.00	PK
V	15720.172	43.91	10.12	38.80	42.70	50.13	54	-3.87	AV
H	4739.024	61.63	7.10	37.24	43.50	62.47	74	-11.53	PK
H	4739.024	43.55	7.10	37.24	43.50	44.39	54	-9.61	AV
H	10480.039	54.40	8.46	38.57	44.50	56.93	68.2	-11.27	PK
H	10480.039	43.64	8.46	38.57	44.50	46.17	54	-7.83	AV
H	15720.122	52.21	10.12	38.38	44.10	56.61	74	-17.39	PK
H	15720.122	41.53	10.12	38.38	44.10	45.93	54	-8.07	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.1G) - 802.11n-HT20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5180 MHz)-Above 1G									
V	4434.113	62.88	5.94	35.40	44.00	60.22	68.2	-7.98	PK
V	4434.113	43.44	5.94	35.40	44.00	40.78	54	-13.22	AV
V	10360.080	61.40	8.46	39.75	44.50	65.11	68.2	-3.09	PK
V	10360.080	43.85	8.46	39.75	44.50	47.56	54	-6.44	AV
V	15540.101	64.17	10.12	38.80	44.10	68.99	74	-5.01	PK
V	15540.101	43.71	10.12	38.80	42.70	49.93	54	-4.07	AV
H	4434.056	64.00	5.94	35.18	44.00	61.12	68.2	-7.08	PK
H	4434.056	43.13	5.94	35.18	44.00	40.25	54	-13.75	AV
H	10360.031	54.83	8.46	38.71	44.50	57.50	68.2	-10.70	PK
H	10360.031	42.65	8.46	38.71	44.50	45.32	54	-8.68	AV
H	15540.186	54.99	10.12	38.38	44.10	59.39	74	-14.61	PK
H	15540.186	43.17	10.12	38.38	44.10	47.57	54	-6.43	AV
middle Channel (5200 MHz)-Above 1G									
V	4592.022	60.65	6.48	36.35	44.05	59.43	74	-14.57	PK
V	4592.022	43.17	6.48	36.35	44.05	41.95	54	-12.05	AV
V	10400.009	62.68	8.47	37.88	44.51	64.52	68.2	-3.68	PK
V	10400.009	43.78	8.47	37.88	44.51	45.62	54	-8.38	AV
V	15600.186	63.99	10.12	38.80	44.10	68.81	74	-5.19	PK
V	15600.186	43.50	10.12	38.80	42.70	49.72	54	-4.28	AV
H	4592.141	63.94	6.48	36.37	44.05	62.74	74	-11.26	PK
H	4592.141	43.79	6.48	36.37	44.05	42.59	54	-11.41	AV
H	10400.169	53.42	8.47	38.64	44.50	56.03	68.2	-12.17	PK
H	10400.169	40.24	8.47	38.64	44.50	42.85	54	-11.15	AV
H	15600.113	50.86	10.12	38.38	44.10	55.26	74	-18.74	PK
H	15600.113	44.59	10.12	38.38	44.10	48.99	54	-5.01	AV
High Channel (5240 MHz)-Above 1G									
V	4739.150	64.62	7.10	37.24	43.50	65.46	74	-8.54	PK
V	4739.150	43.40	7.10	37.24	43.50	44.24	54	-9.76	AV
V	10480.125	61.25	8.46	37.68	44.50	62.89	68.2	-5.31	PK
V	10480.125	43.66	8.46	37.68	44.50	45.30	54	-8.70	AV
V	15720.088	61.83	10.12	38.80	44.10	66.65	74	-7.35	PK
V	15720.088	43.44	10.12	38.80	42.70	49.66	54	-4.34	AV
H	4739.157	62.96	7.10	37.24	43.50	63.80	74	-10.20	PK
H	4739.157	43.66	7.10	37.24	43.50	44.50	54	-9.50	AV
H	10480.143	53.30	8.46	38.57	44.50	55.83	68.2	-12.37	PK
H	10480.143	43.96	8.46	38.57	44.50	46.49	54	-7.51	AV
H	15720.123	51.29	10.12	38.38	44.10	55.69	74	-18.31	PK
H	15720.123	40.26	10.12	38.38	44.10	44.66	54	-9.34	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.1G) - 802.11n-HT40

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5190 MHz)-Above 1G									
V	4434.066	64.40	5.94	35.40	44.00	61.74	68.2	-6.46	PK
V	4434.066	43.82	5.94	35.40	44.00	41.16	54	-12.84	AV
V	10380.106	63.26	8.46	39.75	44.50	66.97	68.2	-1.23	PK
V	10380.106	43.32	8.46	39.75	44.50	47.03	54	-6.97	AV
V	15570.109	61.15	10.12	38.80	44.10	65.97	74	-8.03	PK
V	15570.109	43.58	10.12	38.80	42.70	49.80	54	-4.20	AV
H	4434.076	61.48	5.94	35.18	44.00	58.60	74	-15.40	PK
H	4434.076	43.90	5.94	35.18	44.00	41.02	54	-12.98	AV
H	10380.187	51.99	8.46	38.71	44.50	54.66	68.2	-13.54	PK
H	10380.187	44.36	8.46	38.71	44.50	47.03	54	-6.97	AV
H	15570.060	50.04	10.12	38.38	44.10	54.44	74	-19.56	PK
H	15570.060	41.38	10.12	38.38	44.10	45.78	54	-8.22	AV
middle Channel (5230 MHz)-Above 1G									
V	4739.028	60.19	6.48	36.35	44.05	58.97	68.2	-9.23	PK
V	4739.028	43.01	6.48	36.35	44.05	41.79	54	-12.21	AV
V	10460.172	61.78	8.47	37.88	44.51	63.62	68.2	-4.58	PK
V	10460.172	43.85	8.47	37.88	44.51	45.69	54	-8.31	AV
V	15690.073	63.39	10.12	38.80	44.10	68.21	74	-5.79	PK
V	15690.073	43.22	10.12	38.80	42.70	49.44	54	-4.56	AV
H	4739.132	63.32	6.48	36.37	44.05	62.12	68.2	-6.08	PK
H	4739.132	43.96	6.48	36.37	44.05	42.76	54	-11.24	AV
H	10460.186	53.36	8.47	38.64	44.50	55.97	68.2	-12.23	PK
H	10460.186	43.71	8.47	38.64	44.50	46.32	54	-7.68	AV
H	15690.193	52.47	10.12	38.38	44.10	56.87	74	-17.13	PK
H	15690.193	44.65	10.12	38.38	44.10	49.05	54	-4.95	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.1G) - 802.11 AC20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5180 MHz)-Above 1G									
V	4434.004	60.35	5.94	35.40	44.00	57.69	68.2	-10.51	PK
V	4434.004	43.02	5.94	35.40	44.00	40.36	54	-13.64	AV
V	10360.077	61.91	8.46	39.75	44.50	65.62	68.2	-2.58	PK
V	10360.077	43.34	8.46	39.75	44.50	47.05	54	-6.95	AV
V	15540.015	60.75	10.12	38.80	44.10	65.57	74	-8.43	PK
V	15540.015	43.22	10.12	38.80	42.70	49.44	54	-4.56	AV
H	4434.053	63.31	5.94	35.18	44.00	60.43	68.2	-7.77	PK
H	4434.053	43.81	5.94	35.18	44.00	40.93	54	-13.07	AV
H	10360.001	53.29	8.46	38.71	44.50	55.96	68.2	-12.24	PK
H	10360.001	44.90	8.46	38.71	44.50	47.57	54	-6.43	AV
H	15540.072	51.41	10.12	38.38	44.10	55.81	74	-18.19	PK
H	15540.072	41.02	10.12	38.38	44.10	45.42	54	-8.58	AV
middle Channel (5200 MHz)-Above 1G									
V	4592.076	61.36	6.48	36.35	44.05	60.14	74	-13.86	PK
V	4592.076	43.91	6.48	36.35	44.05	42.69	54	-11.31	AV
V	10400.171	63.73	8.47	37.88	44.51	65.57	68.2	-2.63	PK
V	10400.171	43.71	8.47	37.88	44.51	45.55	54	-8.45	AV
V	15600.052	62.89	10.12	38.80	44.10	67.71	74	-6.29	PK
V	15600.052	43.67	10.12	38.80	42.70	49.89	54	-4.11	AV
H	4592.121	60.23	6.48	36.37	44.05	59.03	74	-14.97	PK
H	4592.121	43.16	6.48	36.37	44.05	41.96	54	-12.04	AV
H	10400.089	51.31	8.47	38.64	44.50	53.92	68.2	-14.28	PK
H	10400.089	42.85	8.47	38.64	44.50	45.46	54	-8.54	AV
H	15600.034	54.77	10.12	38.38	44.10	59.17	74	-14.83	PK
H	15600.034	44.17	10.12	38.38	44.10	48.57	54	-5.43	AV
High Channel (5240 MHz)-Above 1G									
V	4739.016	61.93	7.10	37.24	43.50	62.77	74	-11.23	PK
V	4739.016	43.67	7.10	37.24	43.50	44.51	54	-9.49	AV
V	10480.108	64.56	8.46	37.68	44.50	66.20	68.2	-2.00	PK
V	10480.108	43.47	8.46	37.68	44.50	45.11	54	-8.89	AV
V	15720.180	62.32	10.12	38.80	44.10	67.14	74	-6.86	PK
V	15720.180	43.17	10.12	38.80	42.70	49.39	54	-4.61	AV
H	4739.142	63.92	7.10	37.24	43.50	64.76	74	-9.24	PK
H	4739.142	43.59	7.10	37.24	43.50	44.43	54	-9.57	AV
H	10480.128	51.00	8.46	38.57	44.50	53.53	68.2	-14.67	PK
H	10480.128	42.51	8.46	38.57	44.50	45.04	54	-8.96	AV
H	15720.182	54.68	10.12	38.38	44.10	59.08	74	-14.92	PK
H	15720.182	44.58	10.12	38.38	44.10	48.98	54	-5.02	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.1G) - 802.11 AC40

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5190 MHz)-Above 1G									
V	4434.065	63.84	5.94	35.40	44.00	61.18	68.2	-7.02	PK
V	4434.065	43.90	5.94	35.40	44.00	41.24	54	-12.76	AV
V	10380.032	62.54	8.46	39.75	44.50	66.25	68.2	-1.95	PK
V	10380.032	43.49	8.46	39.75	44.50	47.20	54	-6.80	AV
V	15570.186	60.61	10.12	38.80	44.10	65.43	74	-8.57	PK
V	15570.186	43.51	10.12	38.80	42.70	49.73	54	-4.27	AV
H	4434.193	62.45	5.94	35.18	44.00	59.57	74	-14.43	PK
H	4434.193	43.52	5.94	35.18	44.00	40.64	54	-13.36	AV
H	10380.133	51.26	8.46	38.71	44.50	53.93	68.2	-14.27	PK
H	10380.133	43.76	8.46	38.71	44.50	46.43	54	-7.57	AV
H	15570.029	51.38	10.12	38.38	44.10	55.78	74	-18.22	PK
H	15570.029	43.26	10.12	38.38	44.10	47.66	54	-6.34	AV
middle Channel (5230 MHz)-Above 1G									
V	4739.123	63.98	6.48	36.35	44.05	62.76	68.2	-5.44	PK
V	4739.123	43.38	6.48	36.35	44.05	42.16	54	-11.84	AV
V	10460.008	64.01	8.47	37.88	44.51	65.85	68.2	-2.35	PK
V	10460.008	43.00	8.47	37.88	44.51	44.84	54	-9.16	AV
V	15690.170	61.83	10.12	38.80	44.10	66.65	74	-7.35	PK
V	15690.170	43.58	10.12	38.80	42.70	49.80	54	-4.20	AV
H	4739.052	60.06	6.48	36.37	44.05	58.86	68.2	-9.34	PK
H	4739.052	43.45	6.48	36.37	44.05	42.25	54	-11.75	AV
H	10460.030	52.85	8.47	38.64	44.50	55.46	68.2	-12.74	PK
H	10460.030	42.58	8.47	38.64	44.50	45.19	54	-8.81	AV
H	15690.043	51.47	10.12	38.38	44.10	55.87	74	-18.13	PK
H	15690.043	44.78	10.12	38.38	44.10	49.18	54	-4.82	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

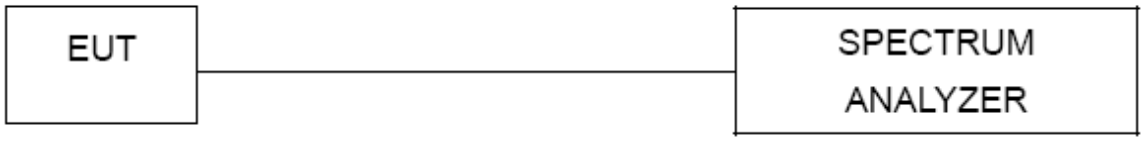
Test Mode :	TX(5.1G) - 802.11 AC80

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
(5210 MHz)-Above 1G									
V	4434.169	62.37	5.94	35.40	44.00	59.71	68.2	-8.49	PK
V	4434.169	43.52	5.94	35.40	44.00	40.86	54	-13.14	AV
V	10420.175	60.93	8.46	39.75	44.50	64.64	68.2	-3.56	PK
V	10420.175	43.84	8.46	39.75	44.50	47.55	54	-6.45	AV
V	15630.082	60.59	10.12	38.80	44.10	65.41	74	-8.59	PK
V	15630.082	43.04	10.12	38.80	42.70	49.26	54	-4.74	AV
H	4434.066	62.43	5.94	35.18	44.00	59.55	68.2	-8.65	PK
H	4434.066	43.48	5.94	35.18	44.00	40.60	54	-13.40	AV
H	10420.110	53.35	8.46	38.71	44.50	56.02	68.2	-12.18	PK
H	10420.110	44.35	8.46	38.71	44.50	47.02	54	-6.98	AV
H	15630.018	50.42	10.12	38.38	44.10	54.82	74	-19.18	PK
H	15630.018	44.85	10.12	38.38	44.10	49.25	54	-4.75	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

8. Power Spectral Density Test

8.1 Block Diagram Of Test Setup



8.2 Limit

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.

For the band 5.725-5.85 GHz

(3)For the band 5.725-5.85 GHz, 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.

8.3 Test Procedure

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

a) Set RBW ≥ 1/T, where T is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

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

8.4 EUT Operating Conditions

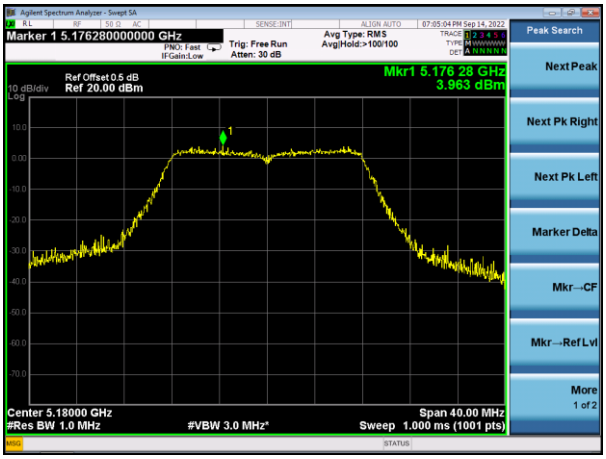
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

8.5 Test Result

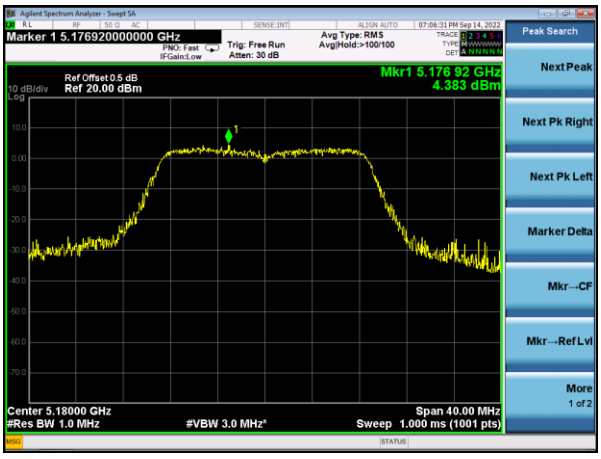
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 5V
Test Mode:	TX Frequency U-NII-1 (5180-5240MHz)		

Test Mode	Frequency	Measured Power Density (dBm/MHz)	Limit (dBm/MHz)	Result
802.11 a	5180 MHz	3.963	11	PASS
	5200 MHz	4.081	11	PASS
	5240 MHz	3.545	11	PASS
802.11 n20	5180 MHz	4.383	11	PASS
	5200 MHz	3.003	11	PASS
	5240 MHz	2.180	11	PASS
802.11 n40	5190 MHz	0.237	11	PASS
	5230 MHz	-1.371	11	PASS
802.11 AC20	5180 MHz	4.120	11	PASS
	5200 MHz	3.392	11	PASS
	5240 MHz	2.380	11	PASS
802.11 AC40	5190 MHz	-0.660	11	PASS
	5230 MHz	-1.774	11	PASS
802.11 AC80	5210 MHz	-2.411	11	PASS

(802.11a) PSD plot on channel 36

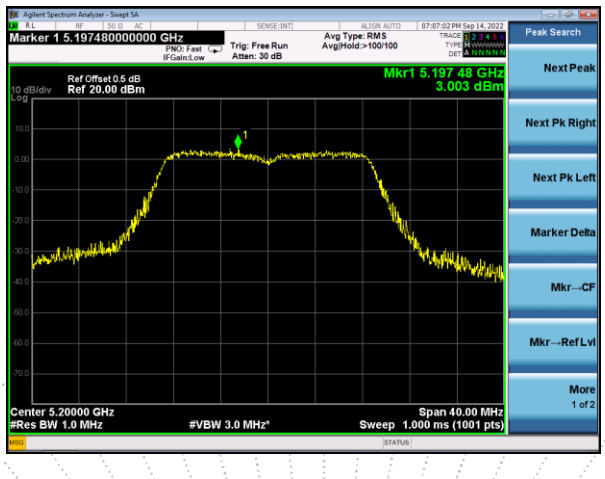


(802.11n20) PSD plot on channel 36



(802.11a) PSD plot on channel 40

(802.11n20) PSD plot on channel 40



(802.11a) PSD plot on channel 48

(802.11n20) PSD plot on channel 48

(802.11n40) PSD plot on channel 38

(802.11ac20) PSD plot on channel 36

(802.11n40) PSD plot on channel 46

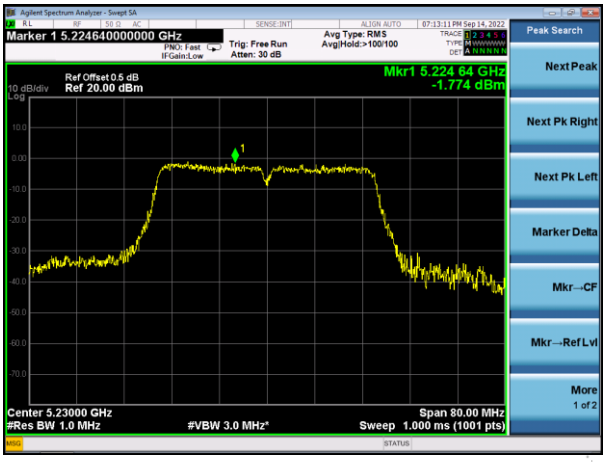
(802.11ac20) PSD plot on channel 40

(802.11ac20) PSD plot on channel 48

(802.11ac40) PSD plot on channel 38

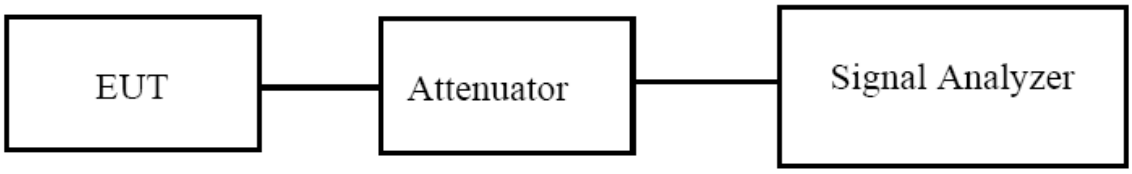
(802.11ac80) PSD plot on channel 42

(802.11ac40) PSD plot on channel 46



9. 26dB & 99% Emission Bandwidth

9.1 Block Diagram Of Test Setup



9.2 Limit

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

9.3 Test Procedure

a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

9.4 EUT Operating Conditions

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

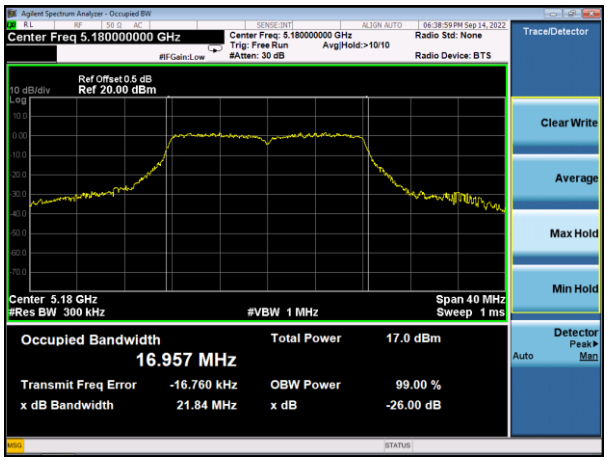
9.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 5V
Test Mode:	TX Frequency U-NII-1 (5180-5240MHz)		

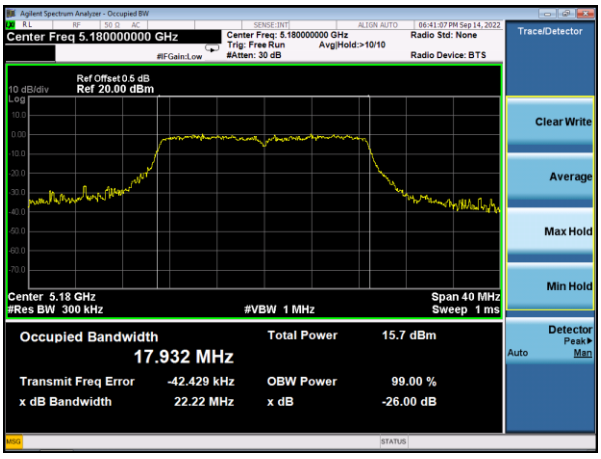
Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)	26dB bandwidth(MHz)	Result
802.11a	CH36	5180	16.96	21.84	Pass
	CH40	5200	16.94	21.44	Pass
	CH48	5240	16.91	21.83	Pass
802.11 n20	CH36	5180	17.93	22.22	Pass
	CH40	5200	17.92	21.69	Pass
	CH48	5240	17.86	22.28	Pass
802.11 n40	CH 38	5190	36.80	44.28	Pass
	CH 46	5230	36.79	43.71	Pass
802.11 AC20	CH36	5180	17.96	21.99	Pass
	CH40	5200	17.92	21.93	Pass
	CH48	5240	17.88	21.89	Pass
802.11 AC40	CH 38	5190	36.75	43.64	Pass
	CH 46	5230	36.83	43.65	Pass
802.11 AC80	CH 42	5210	76.10	82.07	Pass

Test plot

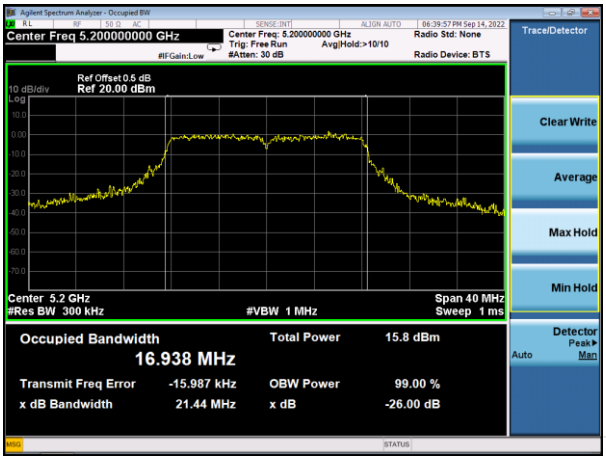
(802.11a) 26dB&99%Bandwidth plot on channel 36



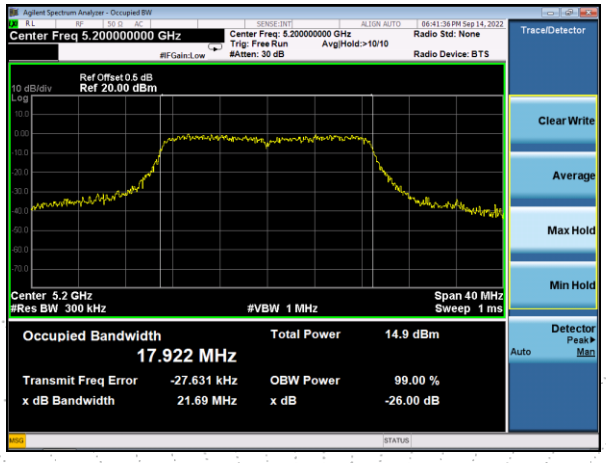
(802.11 n20) 26dB&99%Bandwidth plot on channel 36



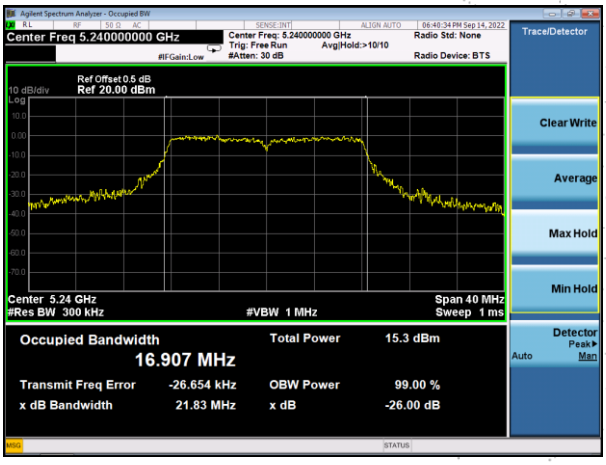
(802.11a) 26dB&99%Bandwidth plot on channel 40



(802.11 n20) 26dB&99%Bandwidth plot on channel 40



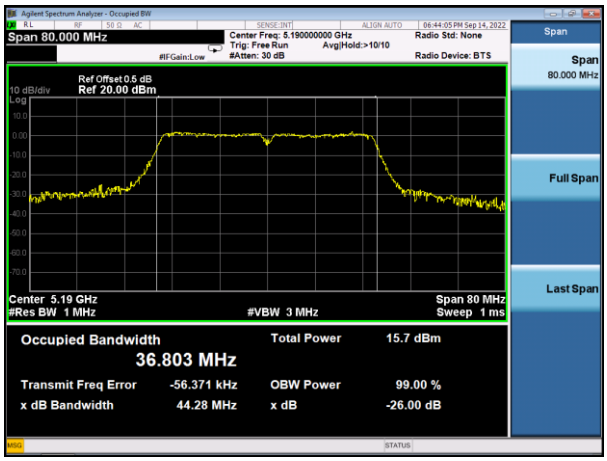
(802.11a) 26dB&99%Bandwidth plot on channel 48



(802.11 n20) 26dB&99%Bandwidth plot on channel 48

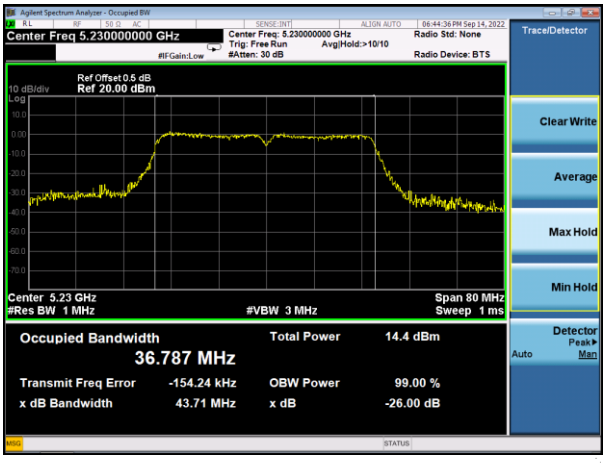
Test plot

(802.11 n40) 26dB&99%Bandwidth plot on channel 38

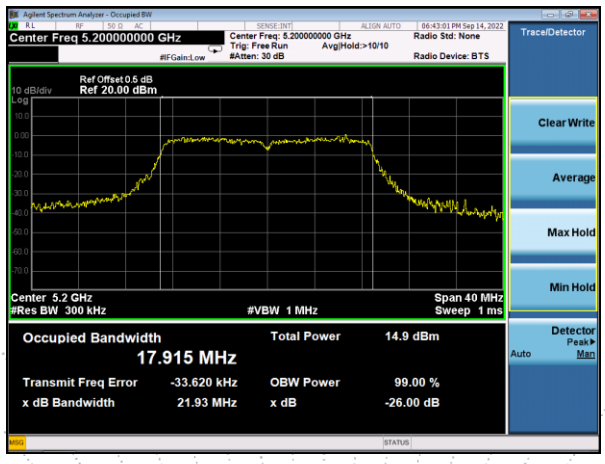


(802.11 AC20) -26dB&99%Bandwidth plot on channel 36

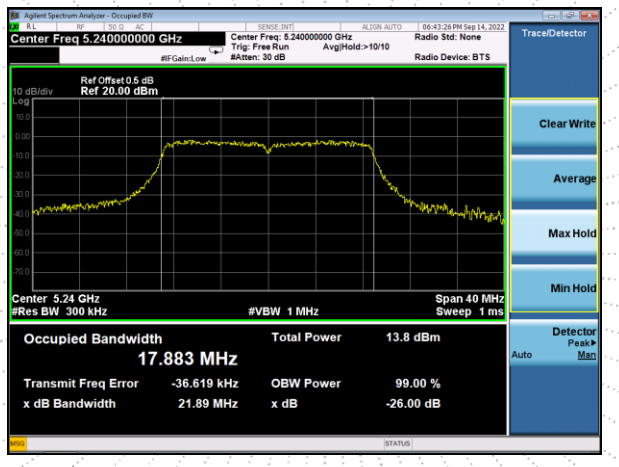
(802.11 n40) 26dB&99%Bandwidth plot on channel 46



(802.11 AC20) -26dB&99%Bandwidth plot on channel 40

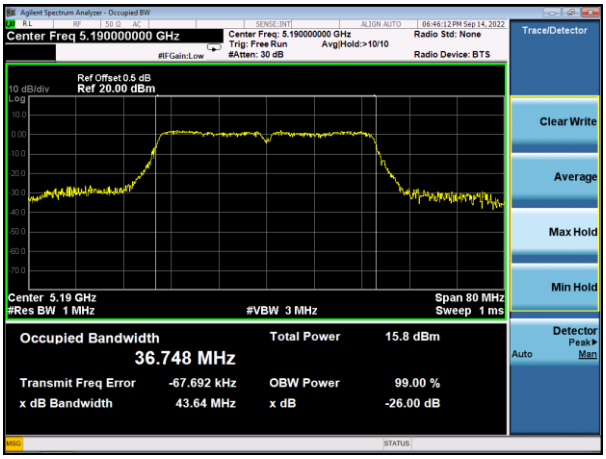


(802.11 AC20) -26dB&99%Bandwidth plot on channel 48

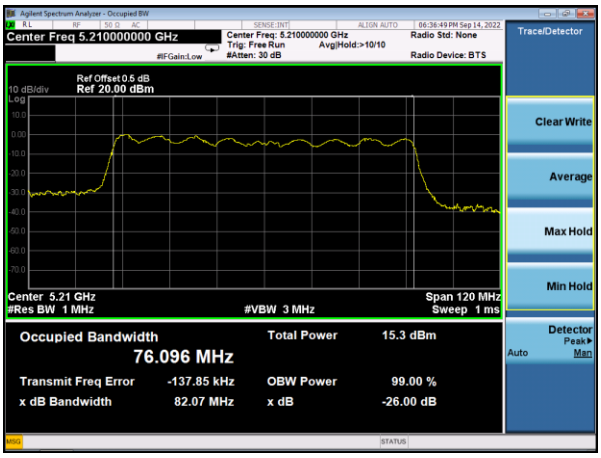


Test plot

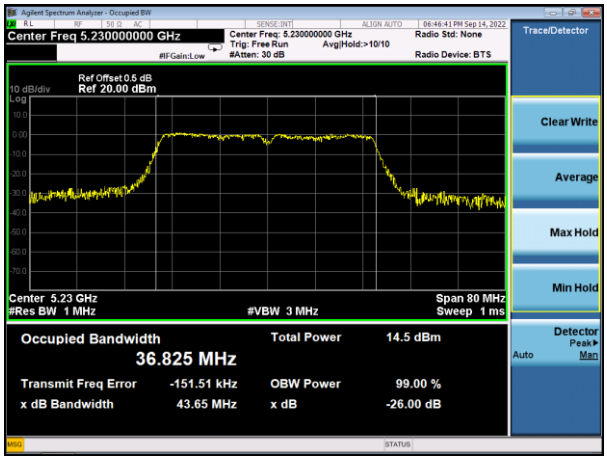
(802.11 AC40) -26dB&99%Bandwidth plot on channel 38



(802.11 AC80) -26dB&99%Bandwidth plot on channel 42

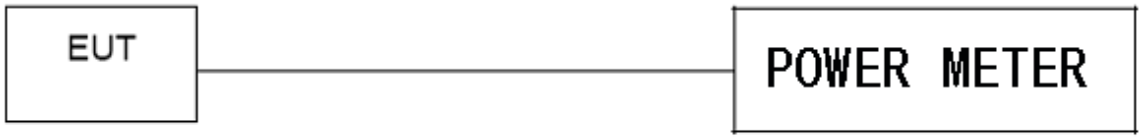


(802.11 AC40) -26dB&99%Bandwidth plot on channel 46



10. Maximum Conducted Output Power

10.1 Block Diagram Of Test Setup



10.2 Limit

According to FCC §15.407

The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	1W
5725~5850	1W

10.3 Test Procedure

Maximum conducted output power may be measured using a spectrum analyzer/EMI receiver or an RF power meter.

1. Device Configuration

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)

Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).

a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:

• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).

• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.

(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold)

shall be applied if the conditions of (i) and (ii) cannot be achieved.

b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

10.4 EUT Operating Conditions

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

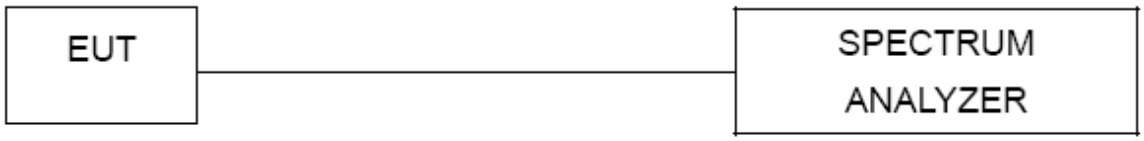
10.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage :	DC 5V
Test Mode:	TX (5.1G) Mode Frequency U-NII-1 (5180-5240MHz)		

Test Channel	Frequency (MHz)	Maximum output power. Antenna port (AV) (dBm)	LIMIT dBm	Result
TX 802.11a Mode				
CH36	5180	10.14	23.98	Pass
CH40	5200	9.84	23.98	Pass
CH48	5240	8.83	23.98	Pass
TX 802.11 n20M Mode				
CH36	5180	9.33	23.98	Pass
CH40	5200	9.21	23.98	Pass
CH48	5240	8.02	23.98	Pass
TX 802.11 n40M Mode				
CH38	5190	8.23	23.98	Pass
CH46	5230	6.86	23.98	Pass
TX 802.11 AC20M Mode				
CH36	5180	9.09	23.98	Pass
CH40	5200	8.71	23.98	Pass
CH48	5240	8.30	23.98	Pass
TX 802.11 AC40M Mode				
CH38	5190	8.10	23.98	Pass
CH46	5230	6.77	23.98	Pass
TX 802.11 AC80M Mode				
CH42	5210	6.56	23.98	Pass

11. Out Of Band Emissions

11.1 Block Diagram Of Test Setup



11.2 Limit

According to FCC §15.407(b)
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) 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.

11.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

11.4 EUT Operating Conditions

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

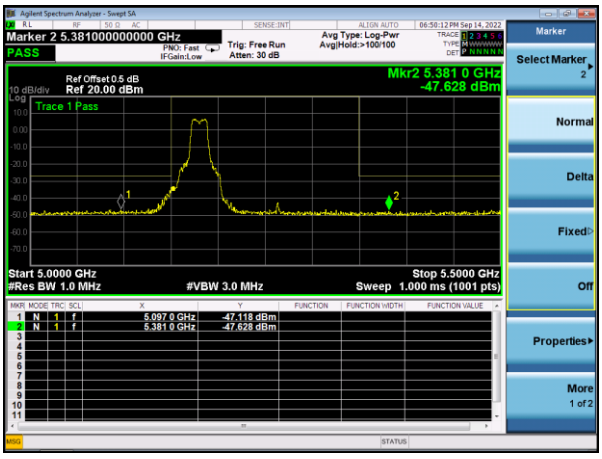
11.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 5V

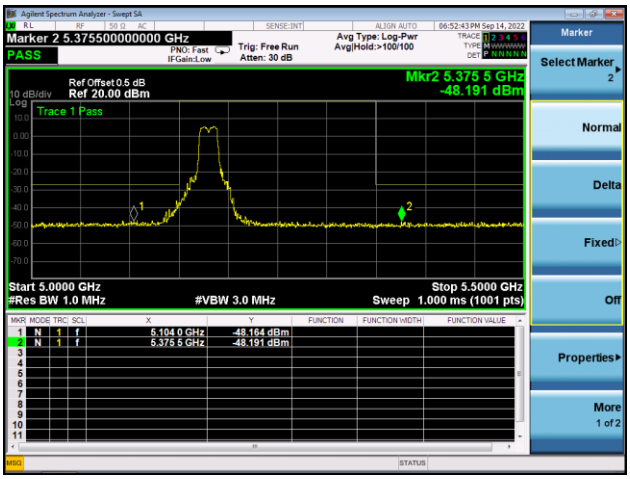
5.1G

5.180~5.240 GHz

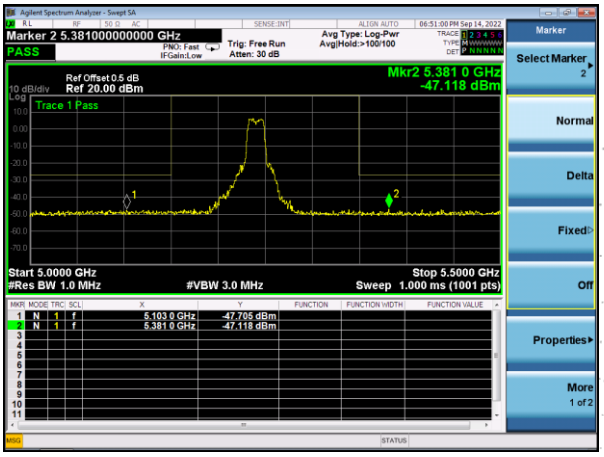
(802.11a) Band Edge, Left Side



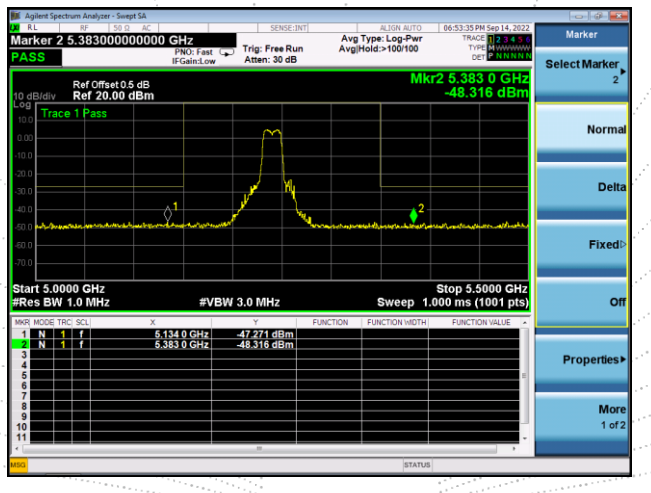
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side

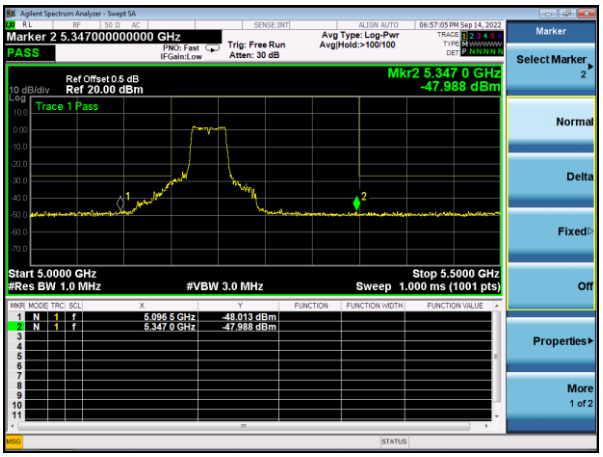


(802.11n20) Band Edge, Right Side

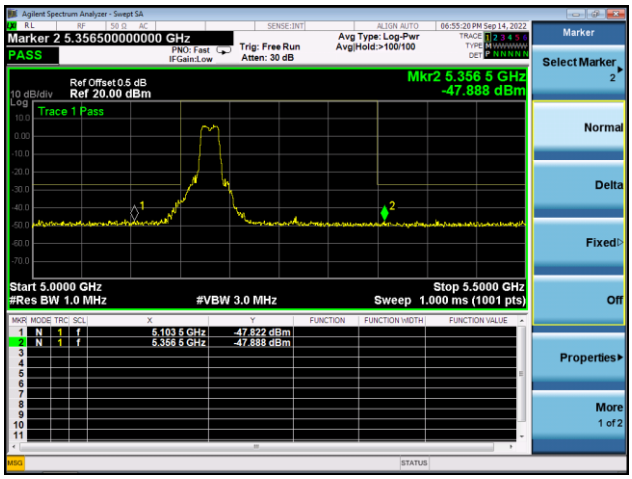


5.180~5.240 GHz

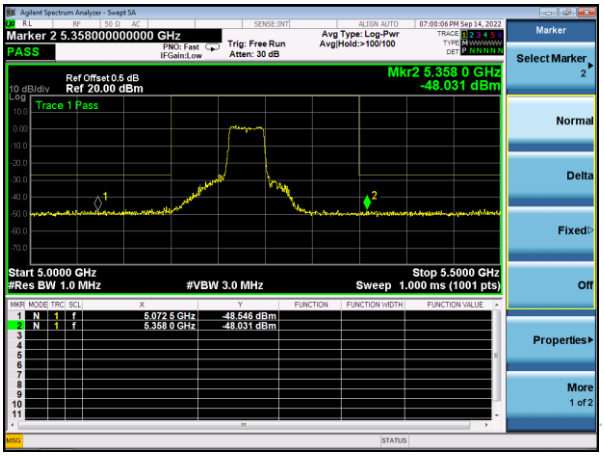
(802.11n40) Band Edge, Left Side



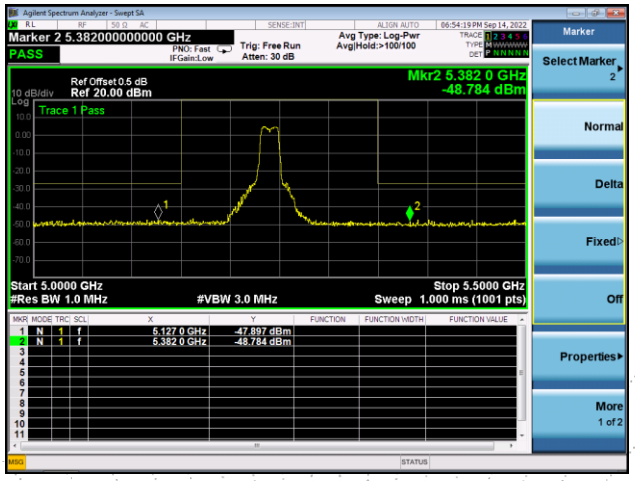
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Right Side

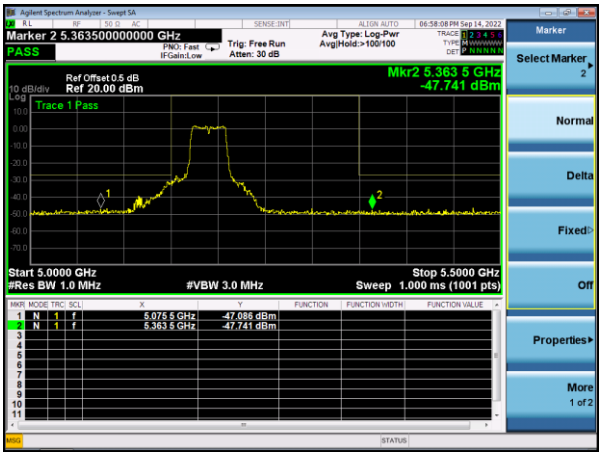


(802.11ac20) Band Edge, Right Side



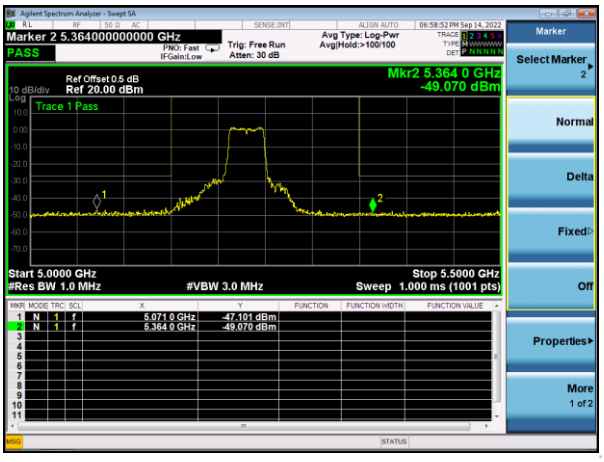
5.180~5.240 GHz

(802.11ac40) Band Edge, Left Side



(802.11ac80) Band Edge, Left Side

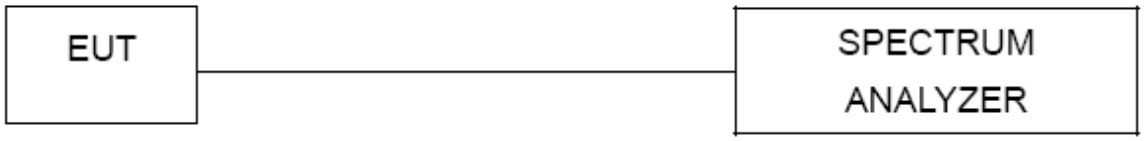
(802.11ac40) Band Edge, Right Side



(802.11ac80) Band Edge, Right Side

12. Spurious RF Conducted Emissions

12.1 Block Diagram Of Test Setup



12.2 Limit

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

12.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

12.4 Test Result

Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.