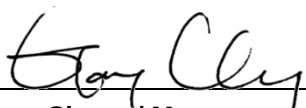


FCC Test Report

FCC ID : RYK-WPEQ353ACNI
Equipment : 802.11ac/b/g/n Mini PCIe Module
Model No. : WPEQ-353ACNI
Brand Name : SparkLAN
Applicant : SparkLAN Communications, Inc.
Address : 8F., No.257, Sec. 2, Tiding Blvd., Neihu
District, Taipei City 11493, Taiwan.
Standard : 47 CFR FCC Part 15.407
Received Date : Dec. 01, 2015
Tested Date : Dec. 07, 2015 ~ Jan. 14, 2016

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR610402AN	Rev. 01	Initial issue	Mar. 15, 2016
FR610402AN	Rev. 02	Revised model name of antenna (page 6.)	Mar. 25, 2016

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.497MHz 41.61 (Margin -14.44dB) - QP	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5350.00MHz 53.39 (Margin -0.61dB) - AV	Pass
15.407(a)	Emission Bandwidth	Meet the requirement of limit	Pass
15.407(e)	6dB bandwidth	Meet the requirement of limit	Pass
15.407(a)	RF Output Power	Max Power [dBm]: 5150-5250MHz: 21.49 5725-5850MHz: 17.51	Pass
15.407(a)	Peak Power Spectral Density	Meet the requirement of limit	Pass
15.407(g)	Frequency Stability	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
5150-5250	a	5180-5240	36-48 [4]	3	6-54 Mbps
5150-5250	n (HT20)	5180-5240	36-48 [4]	3	MCS 0-23
5150-5250	n (HT40)	5190-5230	38-46 [2]	3	MCS 0-23
5150-5250	ac (VHT20)	5180-5240	36-48 [4]	3	MCS 0-9
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	3	MCS 0-9
5150-5250	ac (VHT80)	5210	42 [1]	3	MCS 0-9

Note 1: RF output power specifies that Maximum Conducted Output Power.
 Note 2: 802.11a/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
5725-5850	a	5745-5825	149-165 [5]	3	6-54 Mbps
5725-5850	n (HT20)	5745-5825	149-165 [5]	3	MCS 0-23
5725-5850	n (HT40)	5755-5795	151-159 [2]	3	MCS 0-23
5725-5850	ac (VHT20)	5745-5825	149-165 [5]	3	MCS 0-9
5725-5850	ac (VHT40)	5755-5795	151-159 [2]	3	MCS 0-9
5725-5850	ac (VHT80)	5775	155 [1]	3	MCS 0-9

Note 1: RF output power specifies that Maximum Conducted Output Power.
 Note 2: 802.11a/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)		
					2400~2483.5MHz	5150~5250MHz	5725~5850MHz
1	Long Cheng Tech. Int'l Co., Ltd.	DB B-SMA THIN PADDLE Ant. GEC6200	Dipole	RP-SMA	3	5	5
2	Wanshih Electronic Co., Ltd.	WSS003	Dipole	RP-SMA	2	2	2
3	Long Cheng Tech. Int'l Co., Ltd.	FDBX_F41150-I3B	Dipole	IPEX	2	2.5	2.5

Note: Antenna 1 with highest gain was chosen for final test

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host
-------------------	------------------

1.1.4 Channel List

For Frequency band 5150-5250 MHz			
802.11 a / HT20 / VHT20		HT40 / VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	VHT 80	
48	5240	42	5210

For Frequency band 5725~5850 MHz			
802.11 a / HT20 / VHT20		HT40 / VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
149	5745	151	5755
153	5765	159	5795
157	5785	VHT80	
161	5805	155	5775
165	5825	---	---

1.1.5 Test Tool and Duty Cycle

Test Tool	ART2 GUI, V2.3		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11a	100.00%	0.00
	HT20	100.00%	0.00
	HT40	100.00%	0.00
	VHT20	100.00%	0.00
	VHT40	100.00%	0.00
	VHT80	100.00%	0.00

1.1.6 Power Setting

For Frequency band 5150-5250 MHz		
Modulation Mode	Test Frequency (MHz)	Power Set
11a	5180	15
11a	5200	15
11a	5240	17
HT20	5180	15
HT20	5200	15.5
HT20	5240	17
HT40	5190	13
HT40	5230	20.5
VHT20	5180	15
VHT20	5200	15.5
VHT20	5240	17
VHT40	5190	13
VHT40	5230	20.5
VHT80	5210	10

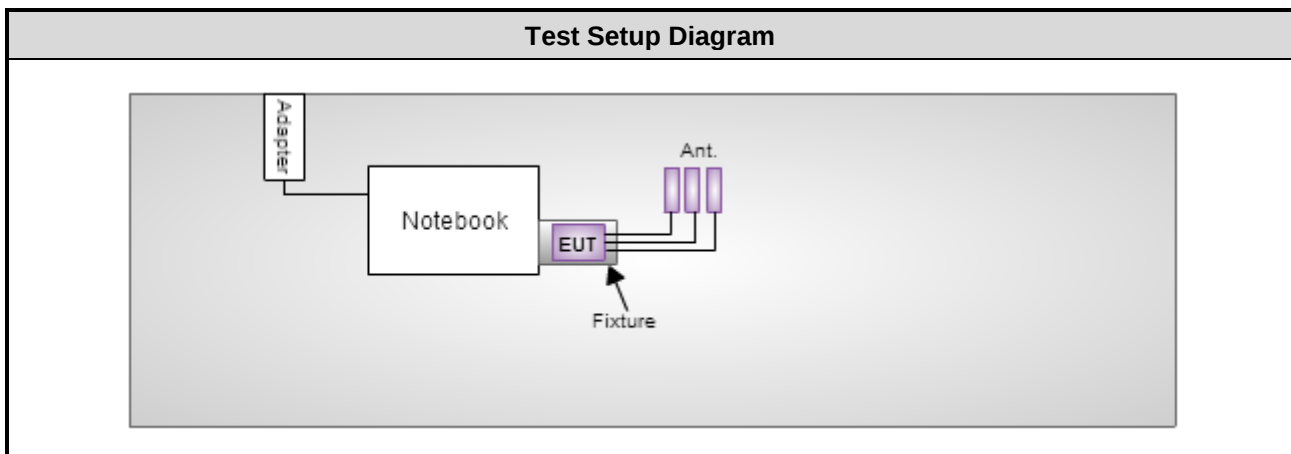
For Frequency band 5725~5850 MHz		
Modulation Mode	Test Frequency (MHz)	Power Set
11a	5745	16
11a	5785	15.5
11a	5825	15.5
HT20	5745	16
HT20	5785	15.5
HT20	5825	15.5
HT40	5755	14
HT40	5795	15
VHT20	5745	16
VHT20	5785	15.5
VHT20	5825	15.5
VHT40	5755	14
VHT40	5795	15
VHT80	5775	12

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6430	DoC	---
2	Fixture	---	---	---	---

Note: Fixture was provided by applicant.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Jan. 14, 2016				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
EMC Receiver	R&S	ESCS 30	100169	Oct. 21, 2015	Oct. 20, 2016
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2015	Nov. 12, 2016
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 26, 2015	Nov. 25, 2016
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 21, 2015	Dec. 20, 2016
50 ohm terminal (Support Unit)	NA	50	04	Apr. 15, 2015	Apr. 14, 2016
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Dec. 07 ~ Dec. 08, 2015				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Dec. 09, 2014	Dec. 08, 2015
Receiver	R&S	ESR3	101658	Nov. 04, 2015	Nov. 03, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 20, 2015	Aug. 19, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2014	Dec. 10, 2015
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 04, 2015	Nov. 03, 2016
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 16, 2015	Nov. 15, 2016
Preamplifier	Burgeon	BPA-530	SN:100219	Sep. 10, 2015	Sep. 09, 2016
Preamplifier	Agilent	83017A	MY39501308	Oct. 02, 2015	Oct. 01, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 15, 2014	Dec. 14, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 15, 2014	Dec. 14, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 15, 2014	Dec. 14, 2015
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 15, 2014	Dec. 14, 2015
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 15, 2014	Dec. 14, 2015
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Jan. 13, 2016				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 14, 2015	Sep. 13, 2016
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 27, 2015	Nov. 26, 2016
Power Meter	Anritsu	ML2495A	1241002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor	Anritsu	MA2411B	1207366	Sep. 21, 2015	Sep. 20, 2016
Signal Generator	R&S	SMB100A	175727	Oct. 05, 2015	Oct. 04, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Testing Applied Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.407

ANSI C63.10-2013

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01

FCC KDB 644545 D03 Guidance for IEEE 802.11ac New Rules v01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Frequency error	±34.134 Hz
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.63 dB
Time	±0.1%
Temperature	±0.6 °C

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	17°C / 61%	Sky Huang
Radiated Emissions	03CH01-WS	21-23°C / 61-64%	Anderson Hong Warren Lee
RF Conducted	TH01-WS	21°C / 64%	Alex Huang

➤ FCC site registration No.: 657002

➤ IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

For Frequency band 5150-5250 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	VHT40	5230	MCS 0	---
Radiated Emissions ≤ 1 GHz	VHT40	5230	MCS 0	---
RF Output Power	11a	5180 / 5200 / 5240	6 Mbps	---
	HT20	5180 / 5200 / 5240	MCS 0	
	HT40	5190 / 5230	MCS 0	
	VHT20	5180 / 5200 / 5240	MCS 0	
	VHT40	5190 / 5230	MCS 0	
	VHT80	5210	MCS 0	
Radiated Emissions > 1 GHz Emission Bandwidth Peak Power Spectral Density	11a	5180 / 5200 / 5240	6 Mbps	---
	VHT20	5180 / 5200 / 5240	MCS 0	
	VHT40	5190 / 5230	MCS 0	
	VHT80	5210	MCS 0	
Frequency Stability	Un-modulation	5200	---	---

For Frequency band 5725-5850 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	VHT20	5745	MCS 0	---
Radiated Emissions ≤ 1 GHz	VHT20	5745	MCS 0	---
RF Output Power	11a	5745 / 5785 / 5825	6 Mbps	---
	HT20	5745 / 5785 / 5825	MCS 0	
	HT40	5755 / 5795	MCS 0	
	VHT20	5745 / 5785 / 5825	MCS 0	
	VHT40	5755 / 5795	MCS 0	
	VHT80	5775	MCS 0	
Radiated Emissions > 1 GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	11a	5745 / 5785 / 5825	6 Mbps	---
	VHT20	5745 / 5785 / 5825	MCS 0	
	VHT40	5755 / 5795	MCS 0	
	VHT80	5775	MCS 0	
Frequency Stability	Un-modulation	5785	---	---

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

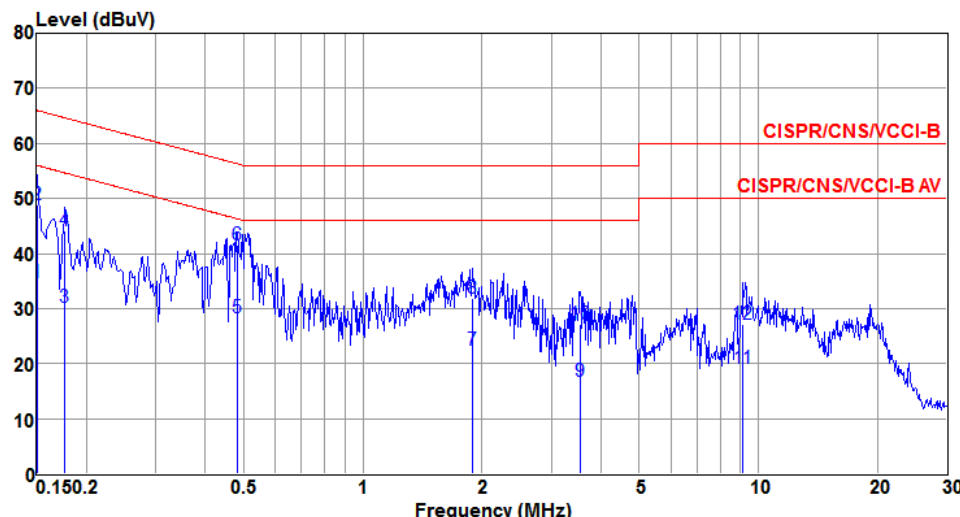
3.1.3 Test Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line		

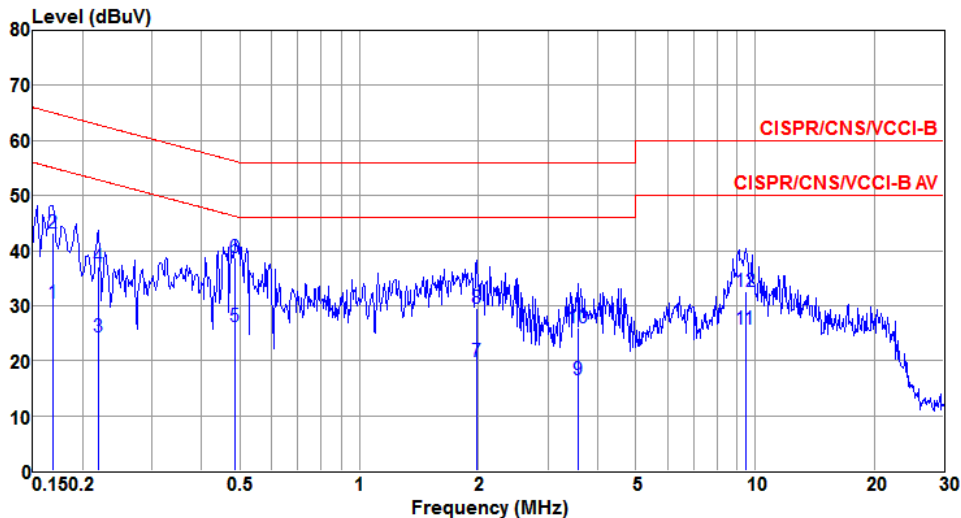


	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.150	34.68	56.00	-21.32	34.55	0.11	0.02	Average
2	0.150	48.91	66.00	-17.09	48.78	0.11	0.02	QP
3	0.177	30.30	54.64	-24.34	30.17	0.11	0.02	Average
4	0.177	44.15	64.64	-20.49	44.02	0.11	0.02	QP
5	0.481	28.33	46.32	-17.99	28.16	0.13	0.04	Average
6	0.481	41.63	56.32	-14.69	41.46	0.13	0.04	QP
7	1.888	22.47	46.00	-23.53	22.23	0.16	0.08	Average
8	1.888	31.90	56.00	-24.10	31.66	0.16	0.08	QP
9	3.547	16.65	46.00	-29.35	16.36	0.18	0.11	Average
10	3.547	27.22	56.00	-28.78	26.93	0.18	0.11	QP
11	9.156	19.18	50.00	-30.82	18.78	0.24	0.16	Average
12	9.156	27.11	60.00	-32.89	26.71	0.24	0.16	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Neutral		

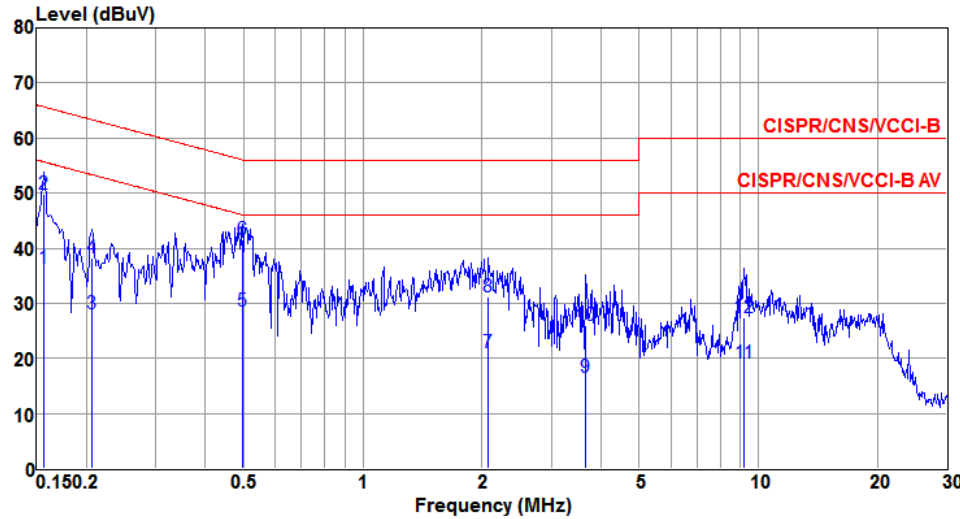


The graph displays the radio frequency interference (RFI) level in dBuV across a frequency range from 0.150 to 30 MHz. Two red limit lines are shown: CISPR/CNS/VCCI-B (upper) and CISPR/CNS/VCCI-B AV (lower). The measured signal is represented by a blue line with several peaks labeled with numbers 1 through 12. The levels generally decrease as frequency increases, with some localized peaks.

	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.169	30.45	55.03	-24.58	30.31	0.12	0.02	Average
2	0.169	43.25	65.03	-21.78	43.11	0.12	0.02	QP
3	0.220	24.42	52.83	-28.41	24.29	0.11	0.02	Average
4	0.220	37.00	62.83	-25.83	36.87	0.11	0.02	QP
5	0.486	26.26	46.23	-19.97	26.08	0.14	0.04	Average
6	0.486	38.66	56.23	-17.57	38.48	0.14	0.04	QP
7	1.980	19.87	46.00	-26.13	19.62	0.17	0.08	Average
8	1.980	29.42	56.00	-26.58	29.17	0.17	0.08	QP
9	3.565	16.48	46.00	-29.52	16.20	0.17	0.11	Average
10	3.565	26.03	56.00	-29.97	25.75	0.17	0.11	QP
11	9.451	25.79	50.00	-24.21	25.37	0.26	0.16	Average
12	9.451	32.68	60.00	-27.32	32.26	0.26	0.16	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	VHT20	Test Freq. (MHz)	5745
Power Phase	Line		



The graph displays the measured level (blue line) against frequency (MHz) on a logarithmic scale. Two red limit lines are shown: CISPR/CNS/VCCI-B (upper) and CISPR/CNS/VCCI-B AV (lower). The measured level generally stays below the limits, with some peaks near 0.156 MHz and 0.207 MHz.

	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	36.24	55.65	-19.41	36.11	0.11	0.02	Average
2	0.156	49.84	65.65	-15.81	49.71	0.11	0.02	QP
3	0.207	28.04	53.32	-25.28	27.91	0.11	0.02	Average
4	0.207	38.31	63.32	-25.01	38.18	0.11	0.02	QP
5	0.497	28.59	46.05	-17.46	28.42	0.13	0.04	Average
6	0.497	41.61	56.05	-14.44	41.44	0.13	0.04	QP
7	2.077	21.07	46.00	-24.93	20.83	0.16	0.08	Average
8	2.077	31.06	56.00	-24.94	30.82	0.16	0.08	QP
9	3.661	16.57	46.00	-29.43	16.27	0.19	0.11	Average
10	3.661	25.99	56.00	-30.01	25.69	0.19	0.11	QP
11	9.204	19.09	50.00	-30.91	18.69	0.24	0.16	Average
12	9.204	27.28	60.00	-32.72	26.88	0.24	0.16	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	VHT20	Test Freq. (MHz)	5745																																																																																																																																							
Power Phase	Neutral																																																																																																																																									
Level (dBuV) <table><thead><tr><th></th><th>Freq</th><th>Level</th><th>Limit</th><th>Over</th><th>Read</th><th>LISN</th><th>cable</th><th></th></tr><tr><th></th><th>MHz</th><th>dBuV</th><th>Line</th><th>Limit</th><th>Level</th><th>factor</th><th>loss</th><th>Remark</th></tr><tr><th></th><th></th><th></th><th>dBuV</th><th>dB</th><th>dBuV</th><th>dB</th><th>dB</th><th></th></tr></thead><tbody><tr><td>1</td><td>0.159</td><td>34.30</td><td>55.52</td><td>-21.22</td><td>34.16</td><td>0.12</td><td>0.02</td><td>Average</td></tr><tr><td>2</td><td>0.159</td><td>46.98</td><td>65.52</td><td>-18.54</td><td>46.84</td><td>0.12</td><td>0.02</td><td>QP</td></tr><tr><td>3</td><td>0.204</td><td>25.82</td><td>53.45</td><td>-27.63</td><td>25.70</td><td>0.10</td><td>0.02</td><td>Average</td></tr><tr><td>4</td><td>0.204</td><td>39.14</td><td>63.45</td><td>-24.31</td><td>39.02</td><td>0.10</td><td>0.02</td><td>QP</td></tr><tr><td>5</td><td>0.507</td><td>24.45</td><td>46.00</td><td>-21.55</td><td>24.27</td><td>0.14</td><td>0.04</td><td>Average</td></tr><tr><td>6@</td><td>0.507</td><td>37.84</td><td>56.00</td><td>-18.16</td><td>37.66</td><td>0.14</td><td>0.04</td><td>QP</td></tr><tr><td>7</td><td>2.055</td><td>18.65</td><td>46.00</td><td>-27.35</td><td>18.40</td><td>0.17</td><td>0.08</td><td>Average</td></tr><tr><td>8</td><td>2.055</td><td>29.66</td><td>56.00</td><td>-26.34</td><td>29.41</td><td>0.17</td><td>0.08</td><td>QP</td></tr><tr><td>9</td><td>3.603</td><td>16.64</td><td>46.00</td><td>-29.36</td><td>16.36</td><td>0.17</td><td>0.11</td><td>Average</td></tr><tr><td>10</td><td>3.603</td><td>26.08</td><td>56.00</td><td>-29.92</td><td>25.80</td><td>0.17</td><td>0.11</td><td>QP</td></tr><tr><td>11</td><td>9.156</td><td>26.79</td><td>50.00</td><td>-23.21</td><td>26.37</td><td>0.26</td><td>0.16</td><td>Average</td></tr><tr><td>12</td><td>9.156</td><td>34.18</td><td>60.00</td><td>-25.82</td><td>33.76</td><td>0.26</td><td>0.16</td><td>QP</td></tr></tbody></table>					Freq	Level	Limit	Over	Read	LISN	cable			MHz	dBuV	Line	Limit	Level	factor	loss	Remark				dBuV	dB	dBuV	dB	dB		1	0.159	34.30	55.52	-21.22	34.16	0.12	0.02	Average	2	0.159	46.98	65.52	-18.54	46.84	0.12	0.02	QP	3	0.204	25.82	53.45	-27.63	25.70	0.10	0.02	Average	4	0.204	39.14	63.45	-24.31	39.02	0.10	0.02	QP	5	0.507	24.45	46.00	-21.55	24.27	0.14	0.04	Average	6@	0.507	37.84	56.00	-18.16	37.66	0.14	0.04	QP	7	2.055	18.65	46.00	-27.35	18.40	0.17	0.08	Average	8	2.055	29.66	56.00	-26.34	29.41	0.17	0.08	QP	9	3.603	16.64	46.00	-29.36	16.36	0.17	0.11	Average	10	3.603	26.08	56.00	-29.92	25.80	0.17	0.11	QP	11	9.156	26.79	50.00	-23.21	26.37	0.26	0.16	Average	12	9.156	34.18	60.00	-25.82	33.76	0.26	0.16	QP
	Freq	Level	Limit	Over	Read	LISN	cable																																																																																																																																			
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Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).																																																																																																																																										

3.2 Emission Bandwidth

3.2.1 Limit of Emission bandwidth

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

3.2.2 Test Procedures

26dB Bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW, Detector = Peak.
3. Trace mode = max hold.
4. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

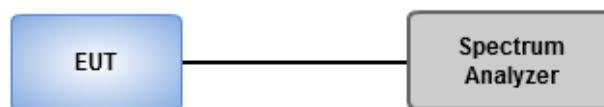
Occupied Bandwidth

1. Set RBW = 1 % to 5 % of the OBW
2. Set VBW $\geq$ 3 RBW
3. Sample detection and single sweep mode shall be used
4. Use the 99 % power bandwidth function of the instrument

6dB Bandwidth

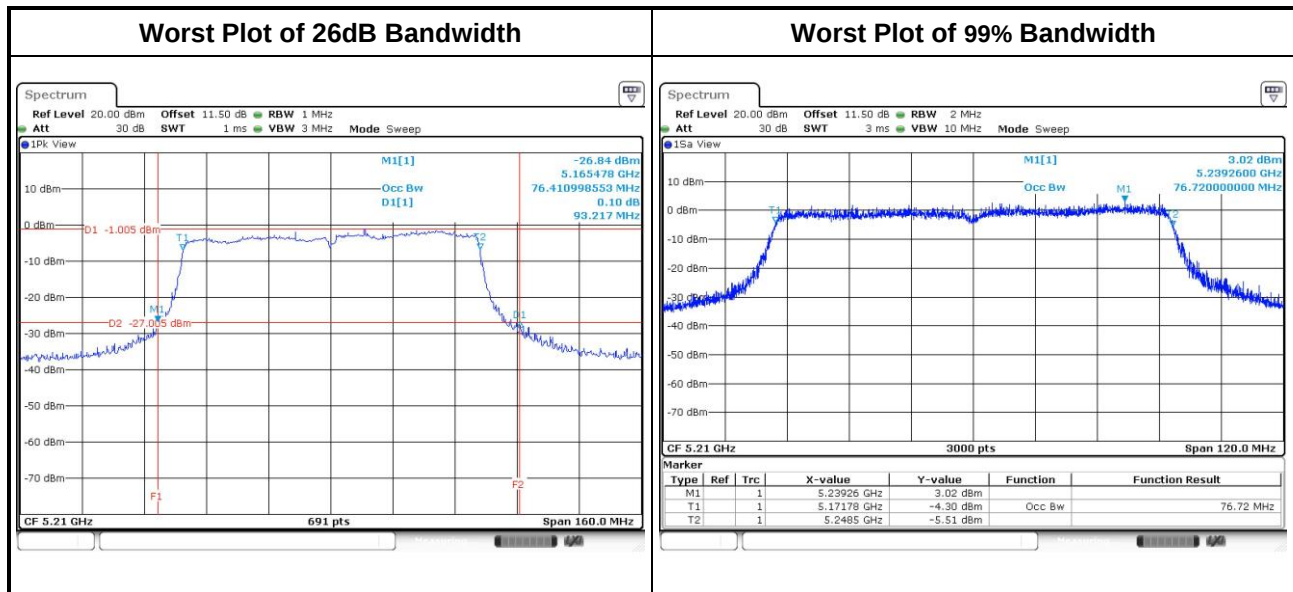
1. Set RBW = 100kHz, VBW = 300kHz
2. Detector = Peak, Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

3.2.3 Test Setup



3.2.4 Test Result of Emission Bandwidth

For Frequency band 5150-5250 MHz										
Emission Bandwidth										
Mode	N _{TX}	Freq. (MHz)	26dB Bandwidth (MHz)				99% Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
11a	3	5180	24.29	22.84	22.67	---	16.81	16.75	16.70	---
11a	3	5200	23.54	23.30	23.01	---	16.78	16.75	16.72	---
11a	3	5240	24.70	23.30	23.77	---	16.82	16.76	16.71	---
VHT20	3	5180	23.54	23.71	23.71	---	17.91	17.89	17.90	---
VHT20	3	5200	23.71	24.46	24.93	---	17.91	17.90	17.88	---
VHT20	3	5240	24.75	24.17	24.46	---	17.91	17.89	17.86	---
VHT40	3	5190	45.57	46.38	46.38	---	36.86	36.86	36.84	---
VHT40	3	5230	62.49	60.52	72.58	---	37.12	37.10	37.12	---
VHT80	3	5210	93.22	89.04	91.83	---	76.68	76.72	76.60	---

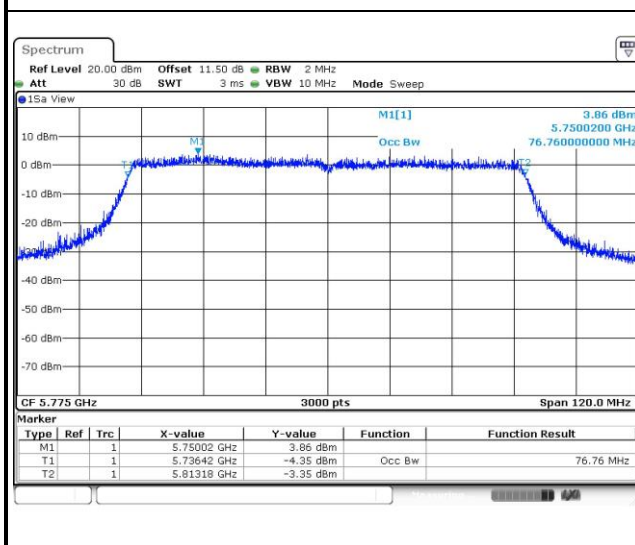


For Frequency band 5725-5850 MHz

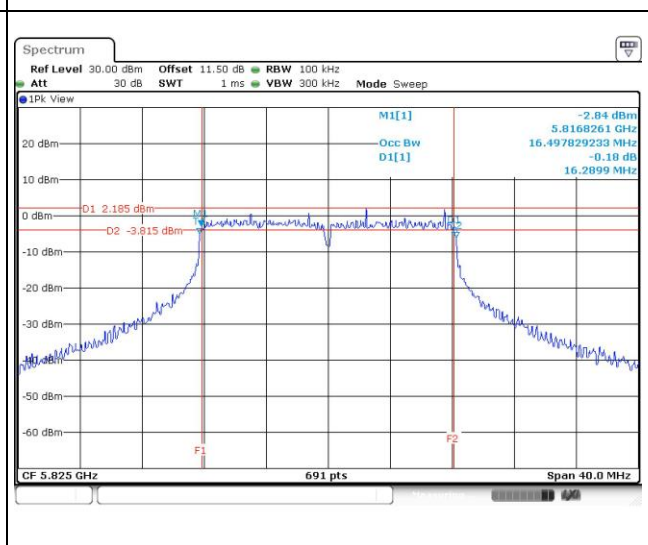
Emission Bandwidth

Mode	N _{TX}	Freq. (MHz)	OBW Bandwidth (MHz)				6dB Bandwidth (MHz)				6dB BW Limit (MHz)
			Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	
11a	3	5745	16.80	16.75	16.70	---	16.35	16.35	16.35	---	0.5
11a	3	5785	16.77	16.71	16.68	---	16.58	16.41	16.35	---	0.5
11a	3	5825	16.83	16.74	16.69	---	16.29	16.35	16.29	---	0.5
VHT20	3	5745	17.97	17.85	17.86	---	17.57	17.80	17.62	---	0.5
VHT20	3	5785	17.92	17.88	17.87	---	17.74	17.57	17.68	---	0.5
VHT20	3	5825	17.89	17.87	17.83	---	17.57	17.62	17.57	---	0.5
VHT40	3	5755	36.90	37.14	36.72	---	35.83	36.41	36.29	---	0.5
VHT40	3	5795	36.82	36.90	36.78	---	35.48	35.59	36.41	---	0.5
VHT80	3	5775	76.72	76.76	76.76	---	75.83	75.83	76.52	---	0.5

Worst Plot of 99% Bandwidth



Worst Plot of 6dB Bandwidth



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Frequency band 5150-5250 MHz		
Operating Mode		Limit
☐	Outdoor access point	Conducted Power: 1 W 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)
☒	Indoor access point	Conducted Power: 1 W
☐	Fixed point-to-point access points	Conducted Power: 1 W
☐	Mobile and portable client devices	Conducted Power: 250 mW

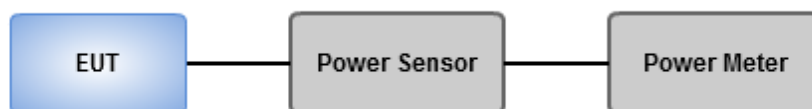
Frequency Band (MHz)		Limit
☐	5250 ~ 5350	250mW or 11dBm+10 log B
☐	5470 ~ 5725	250mW or 11dBm+10 log B
☒	5725 ~ 5850	1 W

Note: "B" is the 26dB emission bandwidth in MHz.

3.3.2 Test Procedures

- ☒ **Method PM-G (Measurement using a gated RF average power meter)**
 - ☒ Measurements may is performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

3.3.3 Test Setup



3.3.4 Test Result of Maximum Conducted Output Power

For Frequency band 5150-5250 MHz									
Mode	N _{TX}	Freq. (MHz)	Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11a	3	5180	12.35	12.61	11.80	---	50.554	17.04	30.00
11a	3	5200	12.25	12.46	12.16	---	50.852	17.06	30.00
11a	3	5240	14.22	14.32	14.2	---	79.766	19.02	30.00
HT20	3	5180	12.48	12.98	11.89	---	53.015	17.24	30.00
HT20	3	5200	12.78	13.02	12.41	---	56.430	17.52	30.00
HT20	3	5240	14.51	14.69	14.46	---	85.618	19.33	30.00
HT40	3	5190	10.07	10.57	10.08	---	31.751	15.02	30.00
HT40	3	5230	16.48	16.77	16.75	---	139.312	21.44	30.00
VHT20	3	5180	12.52	13.01	11.92	---	53.423	17.28	30.00
VHT20	3	5200	12.81	13.08	12.46	---	57.042	17.56	30.00
VHT20	3	5240	14.55	14.75	14.50	---	86.548	19.37	30.00
VHT40	3	5190	10.12	10.62	10.13	---	32.119	15.07	30.00
VHT40	3	5230	16.52	16.82	16.82	---	141.042	21.49	30.00
VHT80	3	5210	7.07	7.43	7.09	---	15.744	11.97	30.00

For Frequency band 5725-5850 MHz									
Mode	N _{TX}	Freq. (MHz)	Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11a	3	5745	12.47	12.33	13.11	---	55.225	17.42	30.00
11a	3	5785	12.02	11.87	12.56	---	49.334	16.93	30.00
11a	3	5825	13.35	11.37	12.29	---	52.279	17.18	30.00
HT20	3	5745	12.43	12.27	13.29	---	55.694	17.46	30.00
HT20	3	5785	12.01	11.68	12.41	---	48.027	16.81	30.00
HT20	3	5825	13.24	11.38	12.11	---	51.082	17.08	30.00
HT40	3	5755	10.68	11.21	10.49	---	36.102	15.58	30.00
HT40	3	5795	11.39	11.48	10.92	---	40.192	16.04	30.00
VHT20	3	5745	12.49	12.32	13.33	---	56.331	17.51	30.00
VHT20	3	5785	12.03	11.73	12.47	---	48.513	16.86	30.00
VHT20	3	5825	13.26	11.45	12.14	---	51.515	17.12	30.00
VHT40	3	5755	10.72	11.25	10.54	---	36.462	15.62	30.00
VHT40	3	5795	11.45	11.52	10.99	---	40.715	16.10	30.00
VHT80	3	5775	8.16	8.45	7.89	---	19.697	12.94	30.00

3.4 Peak Power Spectral Density

3.4.1 Limit of Peak Power Spectral Density

Frequency band 5150-5250 MHz		
Operating Mode		Limit
☐	Outdoor access point	17 dBm / MHz
☒	Indoor access point	17 dBm / MHz
☐	Fixed point-to-point access points	17 dBm / MHz
☐	Mobile and portable client devices	11 dBm / MHz

Frequency Band (MHz)		Limit
☐	5250 ~ 5350	11 dBm / MHz
☐	5470 ~ 5725	11 dBm / MHz
☒	5725 ~ 5850	30 dBm / 500 kHz

3.4.2 Test Procedures

For 5150 ~ 5250 MHz

☒ Method SA-1

1. Set RBW = 1 MHz, VBW = 3 MHz, Sweep time = auto, Detector = RMS.
2. Trace average 100 traces.
3. Use the peak marker function to determine the maximum amplitude level.

☐ Method SA-2 Alternative

1. Set RBW = 1 MHz, VBW = 3 MHz, Detector = RMS.
2. Set sweep time $\geq 10 * (\text{number of points in sweep}) * (\text{total on/off period of the transmitted signal})$.
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add $10 \log(1/x)$, where x is the duty cycle.

For 5725 ~ 5850 MHz

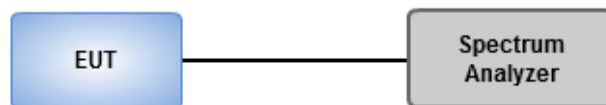
☒ Method SA-1

1. Set RBW = 500 kHz, VBW = 2 MHz, Sweep time = auto, Detector = RMS.
2. Trace average 100 traces.
3. Use the peak marker function to determine the maximum amplitude level.

☐ Method SA-2 Alternative

1. Set RBW = 500 kHz, VBW = 2 MHz, Detector = RMS.
2. Set sweep time $\geq 10 * (\text{number of points in sweep}) * (\text{total on/off period of the transmitted signal})$.
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add $10 \log(1/x)$, where x is the duty cycle.

3.4.3 Test Setup

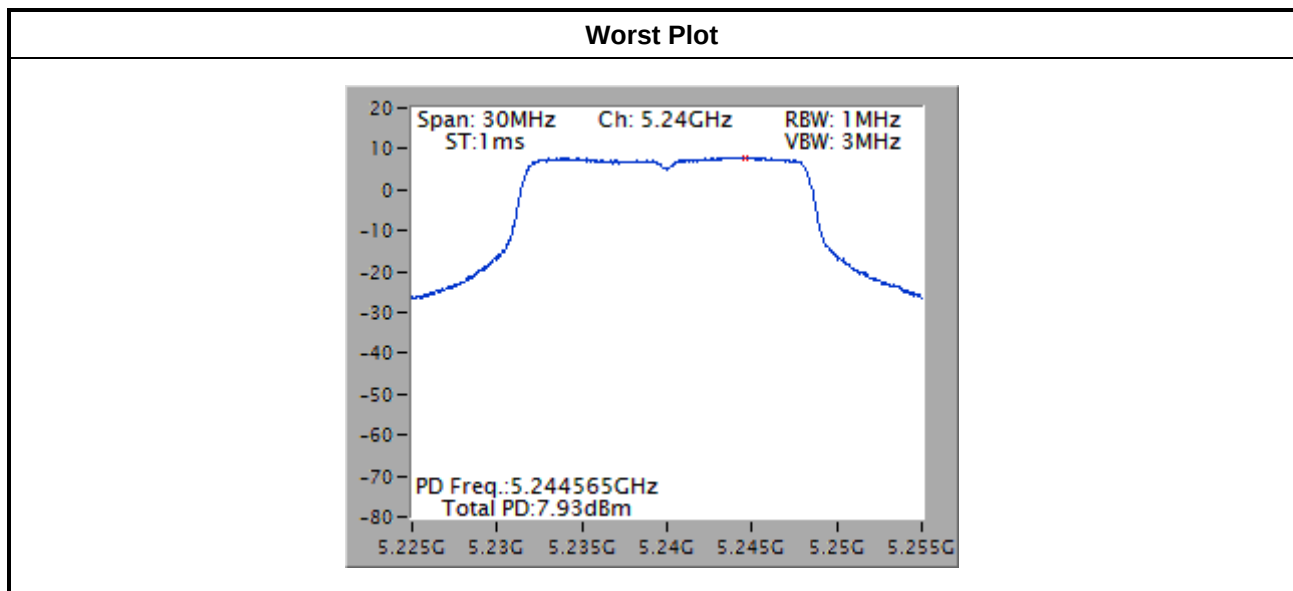


3.4.4 Test Result of Peak Power Spectral Density

For Frequency band 5150-5250 MHz						
Condition			Peak Power Spectral Density (dBm/MHz)			
Modulation Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/MHz)	Duty Factor (dB)	PPSD with D.F (dBm/MHz)	PPSD Limit (dBm/MHz)
11a	3	5180	5.05	0.00	5.05	13.23
11a	3	5200	5.00	0.00	5.00	13.23
11a	3	5240	7.93	0.00	7.93	13.23
VHT20	3	5180	4.49	0.00	4.49	13.23
VHT20	3	5200	4.51	0.00	4.51	13.23
VHT20	3	5240	6.15	0.00	6.15	13.23
VHT40	3	5190	-0.32	0.00	-0.32	13.23
VHT40	3	5230	6.19	0.00	6.19	13.23
VHT80	3	5210	-6.12	0.00	-6.12	13.23

Note:

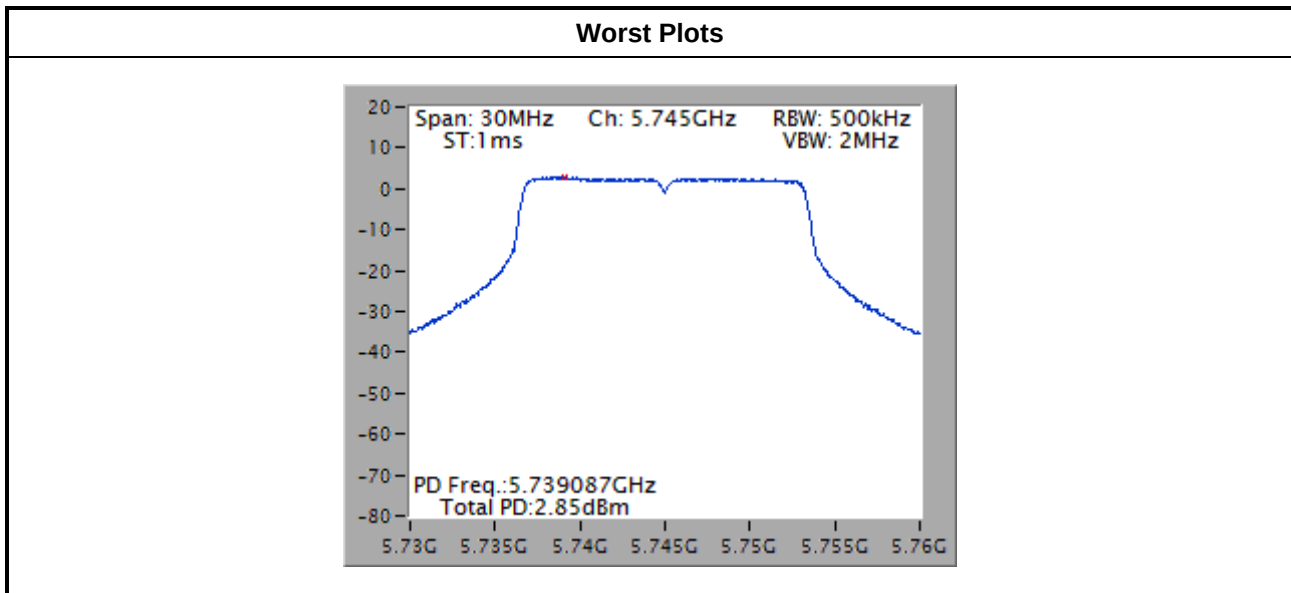
1. D.F is duty factor.
2. Test results are bin-by-bin summing measured value of each TX port.
3. Directional gain = $5 + 10 \cdot \log(3/1) = 9.77 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $17 \text{ dBm} - (9.77 \text{ dBi} - 6 \text{ dBi}) = 13.23 \text{ dBm}$.



For Frequency band 5725-5850 MHz						
Condition			Peak Power Spectral Density (dBm/500kHz)			
Modulation Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/500kHz)	Duty Factor (dB)	PPSD with D.F (dBm/500kHz)	PPSD Limit (dBm/500kHz)
11a	3	5745	2.85	0.00	2.85	26.23
11a	3	5785	1.98	0.00	1.98	26.23
11a	3	5825	2.12	0.00	2.12	26.23
VHT20	3	5745	2.57	0.00	2.57	26.23
VHT20	3	5785	1.95	0.00	1.95	26.23
VHT20	3	5825	1.72	0.00	1.72	26.23
VHT40	3	5755	-3.32	0.00	-3.32	26.23
VHT40	3	5795	-1.94	0.00	-1.94	26.23
VHT80	3	5775	-7.98	0.00	-7.98	26.23

Note:

1. D.F is duty factor.
2. Test results are bin-by-bin summing measured value of each TX port.
3. Directional gain = $5 + 10 \cdot \log(3/1) = 9.77 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $30 \text{ dBm} - (9.77 \text{ dBi} - 6 \text{ dBi}) = 26.23 \text{ dBm}$.



3.5 Transmitter Radiated and Band Edge Emissions

3.5.1 Limit of Transmitter Radiated and Band Edge Emissions

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

Un-restricted band emissions above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.850 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.85 5.86 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m]

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

3.5.2 Test Procedures

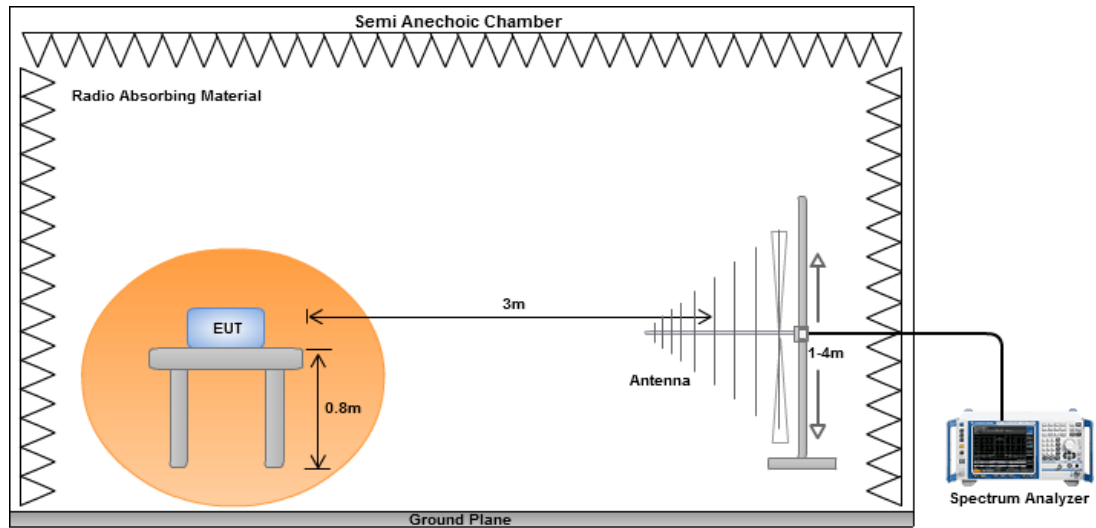
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

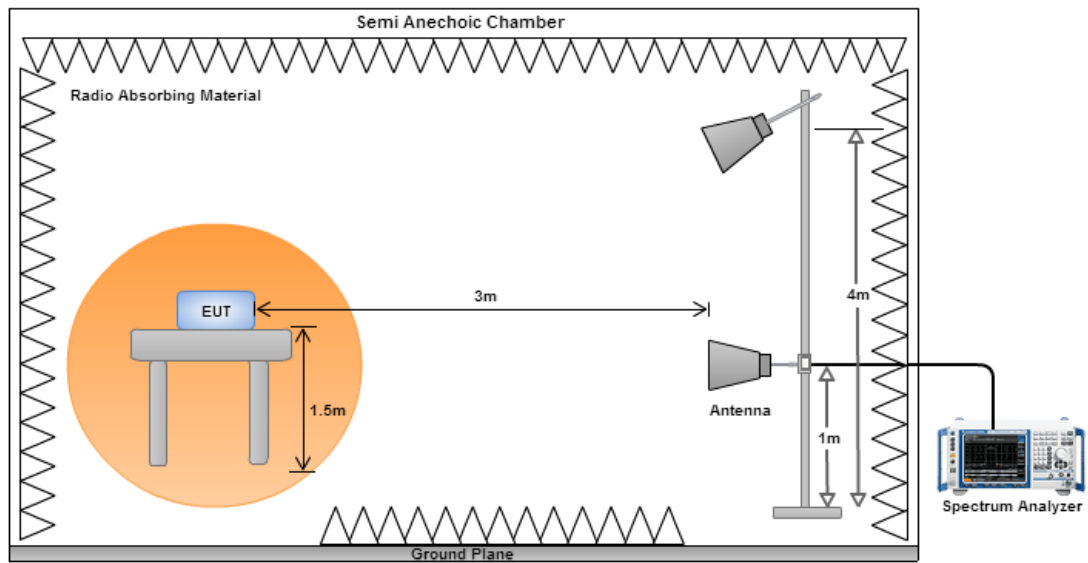
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.5.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

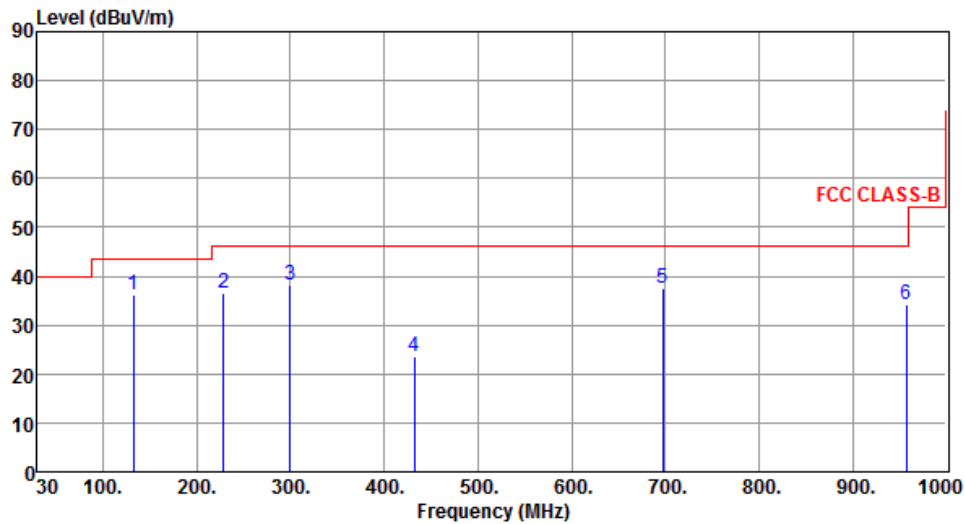


3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		
Level (dBuV/m) <			

Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	132.82	36.04	43.50	-7.46	53.76	-17.72	Peak	---	---
2	228.85	36.57	46.00	-9.43	55.27	-18.70	Peak	---	---
3	299.66	38.33	46.00	-7.67	54.19	-15.86	Peak	---	---
4	432.55	23.69	46.00	-22.31	36.36	-12.67	Peak	---	---
5	697.36	37.68	46.00	-8.32	45.88	-8.20	Peak	---	---
6	957.32	34.22	46.00	-11.78	38.78	-4.56	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

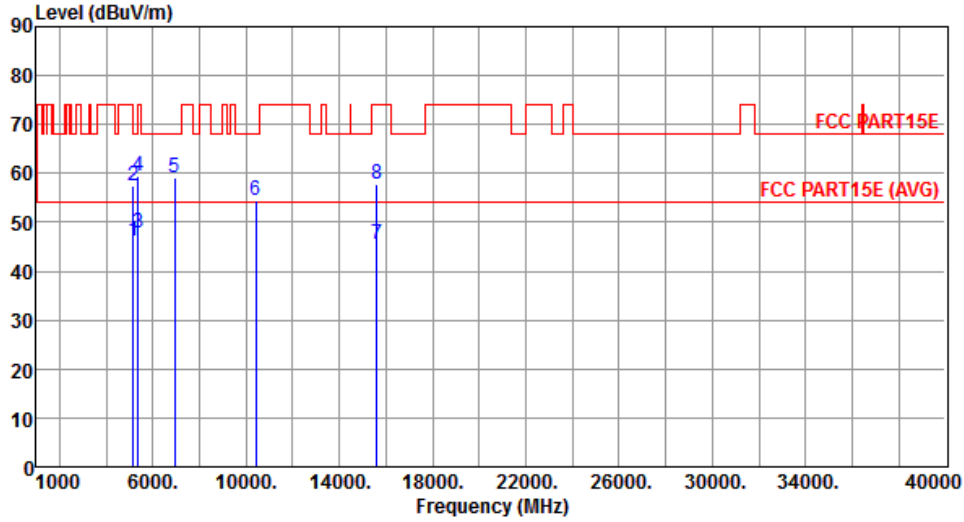
Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Vertical		
Level (dBuV/m)			

3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11a

Modulation	11a	Test Freq. (MHz)	5180
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation	11a	Test Freq. (MHz)	5180
Polarization	Vertical		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5200
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	46.01	54.00	-7.99	40.46	5.55	Average	300	22
2	5150.00	57.46	74.00	-16.54	51.91	5.55	Peak	300	22
3	5350.00	47.83	54.00	-6.17	42.16	5.67	Average	300	22
4	5350.00	59.37	74.00	-14.63	53.70	5.67	Peak	300	22
5	6933.00	59.24	68.20	-8.96	50.82	8.42	Peak	277	66
6	10400.00	54.61	68.20	-13.59	39.04	15.57	Peak	157	267
7	15600.00	45.60	54.00	-8.40	30.08	15.52	Average	231	20
8	15600.00	57.85	74.00	-16.15	42.33	15.52	Peak	231	20

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Modulation	11a	Test Freq. (MHz)	5200
Polarization	Vertical		
Level (dBuV/m) <			

Modulation	11a	Test Freq. (MHz)	5240
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	11a	Test Freq. (MHz)	5240
Polarization	Vertical		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5745
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5745
Polarization	Vertical		
Level (dBuV/m) <			

Modulation	11a	Test Freq. (MHz)	5785
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5785
Polarization	Vertical		
Level (dBuV/m)			

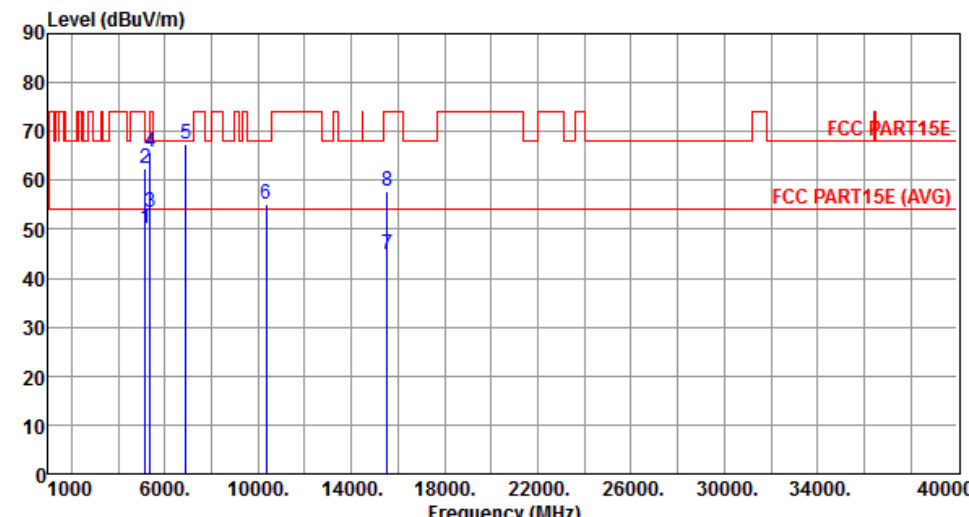
Modulation	11a	Test Freq. (MHz)	5825
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	11a	Test Freq. (MHz)	5825
Polarization	Vertical		
Level (dBuV/m) </			

3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT20

Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	50.20	54.00	-3.80	44.65	5.55	Average	166	128
2	5150.00	62.46	74.00	-11.54	56.91	5.55	Peak	166	128
3	5350.00	53.39	54.00	-0.61	47.72	5.67	Average	358	304
4	5350.00	65.87	74.00	-8.13	60.20	5.67	Peak	358	304
5	6906.00	67.29	68.20	-0.91	58.90	8.39	Peak	373	306
6	10360.00	55.19	68.20	-13.01	39.77	15.42	Peak	119	49
7	15540.00	44.86	54.00	-9.14	29.09	15.77	Average	131	295
8	15540.00	57.64	74.00	-16.36	41.87	15.77	Peak	131	295

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

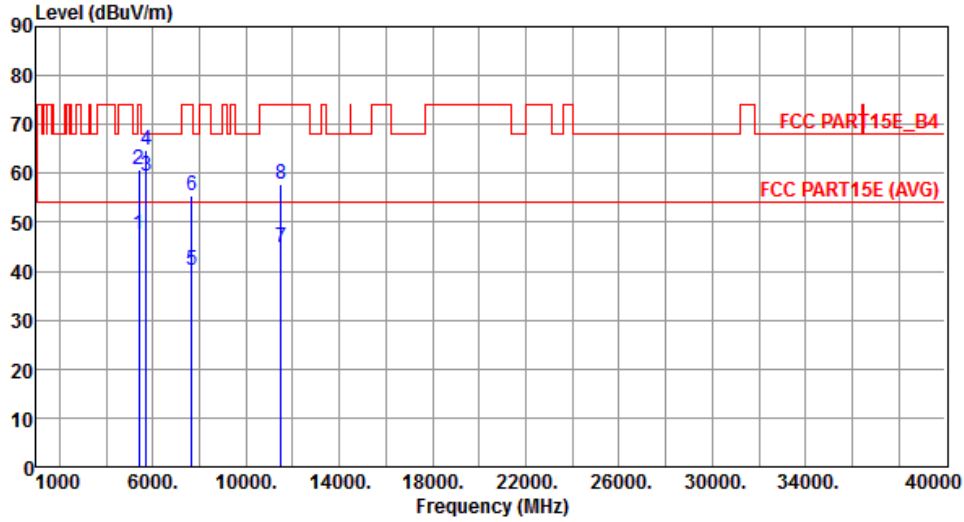
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Vertical		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Vertical		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Horizontal		



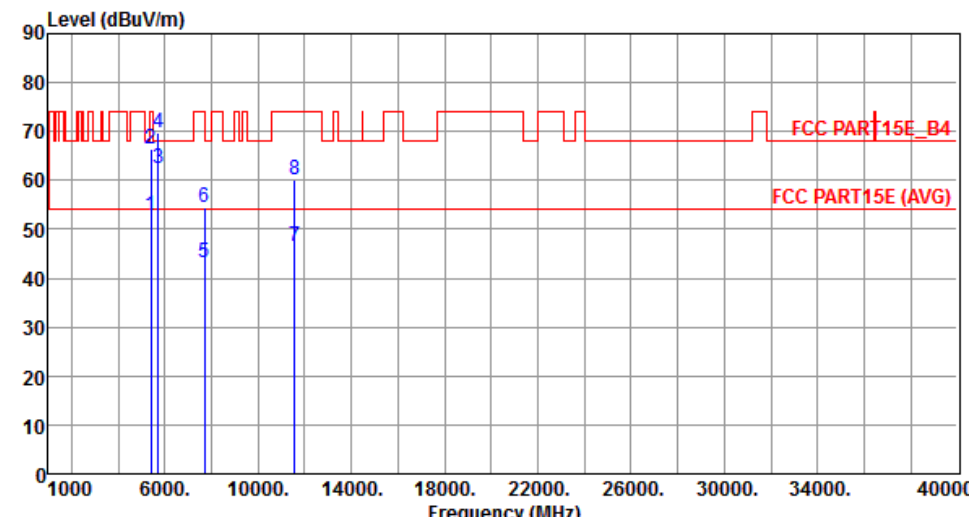
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5400.00	47.55	54.00	-6.45	41.85	5.70	Average	255	223
2	5400.00	60.66	74.00	-13.34	54.96	5.70	Peak	255	223
3	5715.00	59.49	68.20	-8.71	53.74	5.75	Peak	255	223
4	5725.00	64.91	78.20	-13.29	59.18	5.73	Peak	255	223
5	7660.00	40.28	54.00	-13.72	30.21	10.07	Average	262	240
6	7660.00	55.36	74.00	-18.64	45.29	10.07	Peak	262	240
7	11490.00	44.90	54.00	-9.10	28.98	15.92	Average	301	336
8	11490.00	57.73	74.00	-16.27	41.81	15.92	Peak	301	336

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Vertical		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5400.00	52.84	54.00	-1.16	47.14	5.70	Average	155	352
2	5400.00	66.37	74.00	-7.63	60.67	5.70	Peak	155	352
3	5715.00	62.39	68.20	-5.81	56.64	5.75	Peak	225	43
4	5725.00	69.89	78.20	-8.31	64.16	5.73	Peak	225	43
5	7713.00	43.22	54.00	-10.78	33.19	10.03	Average	212	352
6	7713.00	54.39	74.00	-19.61	44.36	10.03	Peak	212	352
7	11570.00	46.55	54.00	-7.45	30.80	15.75	Average	233	145
8	11570.00	59.98	74.00	-14.02	44.23	15.75	Peak	233	145

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Vertical		
Level (dBuV/m) </			

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT40

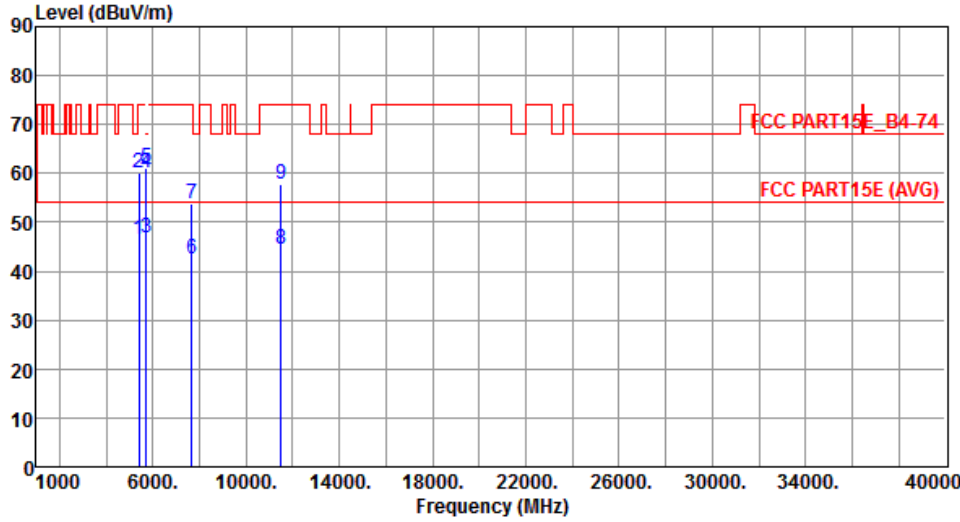
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		
Level (dBuV/m)			

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		
Level (dBuV/m) </			

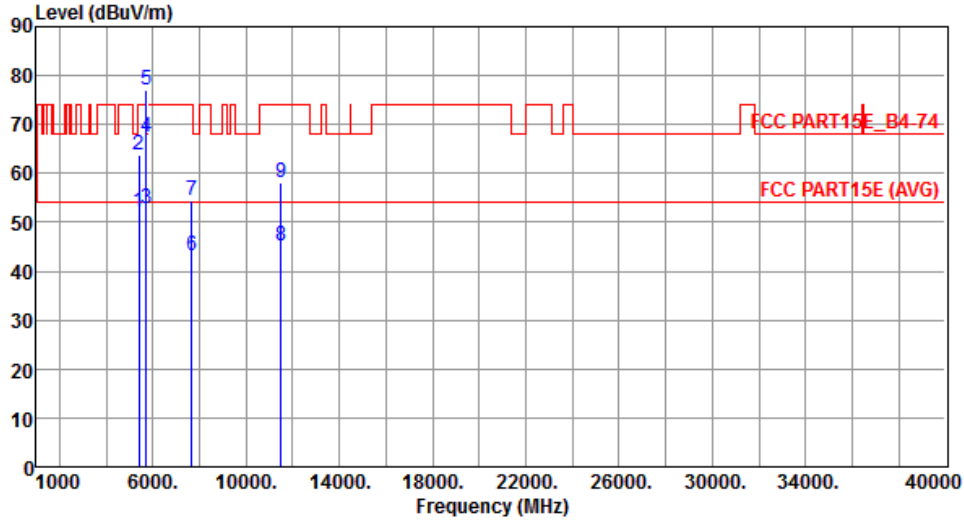
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5400.00	46.51	54.00	-7.49	40.81	5.70	Average	273	169
2	5400.00	60.12	74.00	-13.88	54.42	5.70	Peak	273	169
3	5715.00	46.77	54.00	-7.23	41.02	5.75	Average	273	169
4	5715.00	59.98	74.00	-14.02	54.23	5.75	Peak	273	169
5	5725.00	61.08	78.20	-17.12	55.35	5.73	Peak	273	169
6	7673.00	42.45	54.00	-11.55	32.39	10.06	Average	250	315
7	7673.00	53.88	74.00	-20.12	43.82	10.06	Peak	250	315
8	11510.00	44.63	54.00	-9.37	28.72	15.91	Average	315	328
9	11510.00	57.68	74.00	-16.32	41.77	15.91	Peak	315	328

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5400.00	51.99	54.00	-2.01	46.29	5.70	Average	233	41
2	5400.00	63.81	74.00	-10.19	58.11	5.70	Peak	233	41
3	5715.00	52.88	54.00	-1.12	47.13	5.75	Average	233	41
4	5715.00	67.51	74.00	-6.49	61.76	5.75	Peak	233	41
5	5725.00	76.94	78.20	-1.26	71.21	5.73	Peak	233	41
6	7673.00	43.27	54.00	-10.73	33.21	10.06	Average	222	277
7	7673.00	54.51	74.00	-19.49	44.45	10.06	Peak	222	277
8	11510.00	45.03	54.00	-8.97	29.12	15.91	Average	250	339
9	11510.00	58.19	74.00	-15.81	42.28	15.91	Peak	250	339

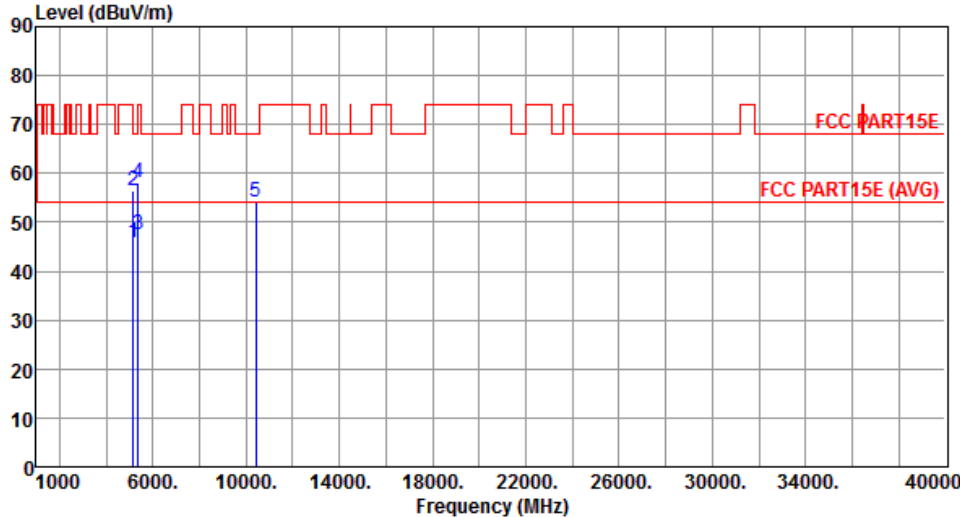
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Vertical		
Level (dBuV/m)			

3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT80

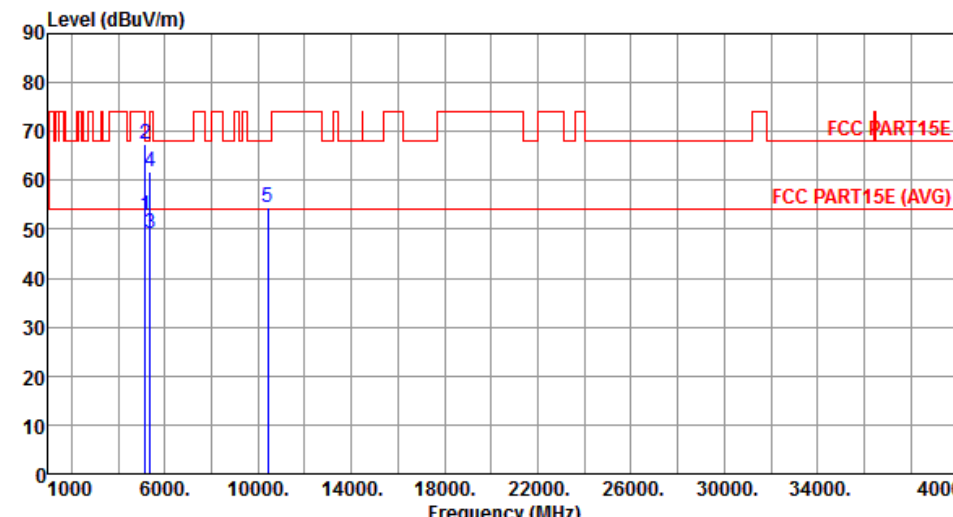
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	45.96	54.00	-8.04	40.41	5.55	Average	107	320
2	5150.00	56.38	74.00	-17.62	50.83	5.55	Peak	107	320
3	5350.00	47.51	54.00	-6.49	41.84	5.67	Average	107	320
4	5350.00	58.09	74.00	-15.91	52.42	5.67	Peak	107	320
5	10420.00	54.16	68.20	-14.04	38.51	15.65	Peak	156	37

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

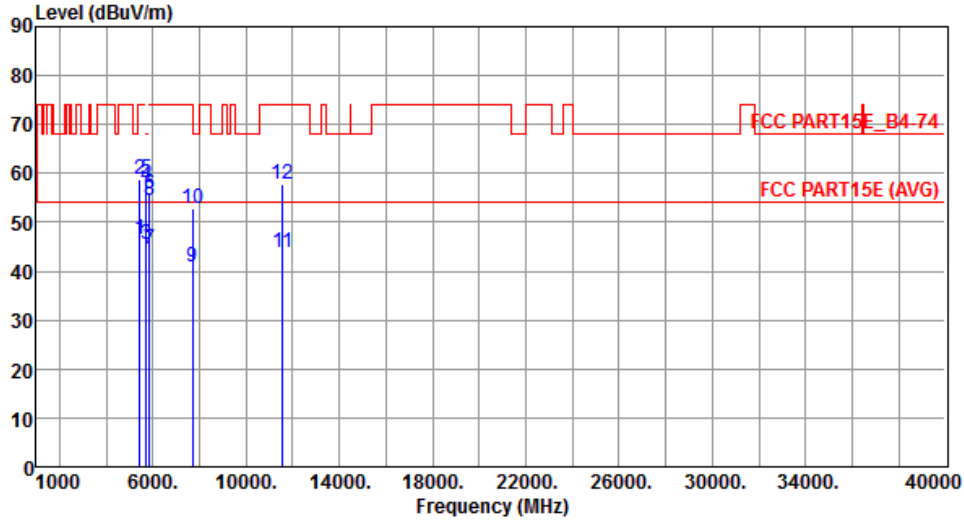
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	52.77	54.00	-1.23	47.22	5.55	Average	128	181
2	5150.00	67.54	74.00	-6.46	61.99	5.55	Peak	128	181
3	5350.00	49.28	54.00	-4.72	43.61	5.67	Average	222	353
4	5350.00	61.75	74.00	-12.25	56.08	5.67	Peak	222	353
5	10420.00	54.42	68.20	-13.78	38.77	15.65	Peak	208	111

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

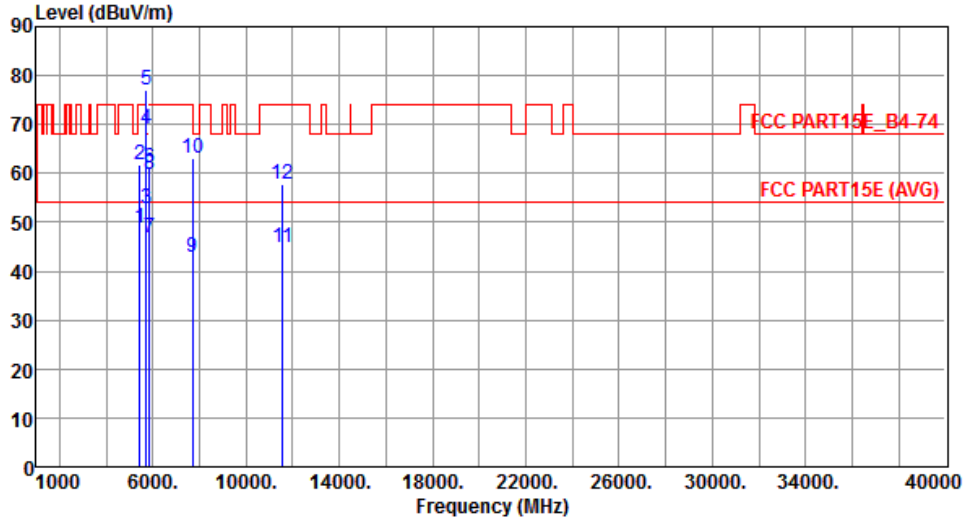
Modulation	VHT80	Test Freq. (MHz)	5775
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5440.00	46.36	54.00	-7.64	40.65	5.71	Average	222	221
2	5440.00	58.92	74.00	-15.08	53.21	5.71	Peak	222	221
3	5715.00	45.62	54.00	-8.38	39.87	5.75	Average	222	221
4	5715.00	57.29	74.00	-16.71	51.54	5.75	Peak	222	221
5	5725.00	58.83	78.20	-19.37	53.10	5.73	Peak	222	221
6	5850.00	55.71	78.20	-22.49	49.88	5.83	Peak	222	221
7	5860.00	44.40	54.00	-9.60	38.56	5.84	Average	222	221
8	5860.00	54.54	74.00	-19.46	48.70	5.84	Peak	222	221
9	7700.00	40.73	54.00	-13.27	30.69	10.04	Average	258	13
10	7700.00	52.89	74.00	-21.11	42.85	10.04	Peak	258	13
11	11550.00	43.92	54.00	-10.08	28.12	15.80	Average	306	354
12	11550.00	57.68	74.00	-16.32	41.88	15.80	Peak	306	354

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	VHT80	Test Freq. (MHz)	5775
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5440.00	48.83	54.00	-5.17	43.12	5.71	Average	244	53
2	5440.00	61.68	74.00	-12.32	55.97	5.71	Peak	244	53
3	5715.00	52.95	54.00	-1.05	47.20	5.75	Average	239	45
4	5715.00	68.94	74.00	-5.06	63.19	5.75	Peak	239	45
5	5725.00	77.19	78.20	-1.01	71.46	5.73	Peak	239	45
6	5850.00	60.95	78.20	-17.25	55.12	5.83	Peak	239	45
7	5860.00	46.69	54.00	-7.31	40.85	5.84	Average	239	45
8	5860.00	59.72	74.00	-14.28	53.88	5.84	Peak	239	45
9	7700.00	42.71	54.00	-11.29	32.67	10.04	Average	221	225
10	7700.00	63.15	74.00	-10.85	53.11	10.04	Peak	221	225
11	11550.00	44.81	54.00	-9.19	29.01	15.80	Average	311	16
12	11550.00	57.81	74.00	-16.19	42.01	15.80	Peak	311	16

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.6 Frequency Stability

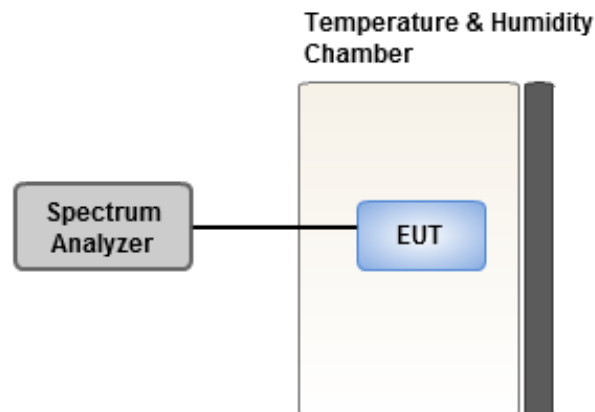
3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

3.6.2 Test Procedures

1. The EUT is installed in an environment test chamber with external power source.
2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.
3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
4. When temperature is stabled, measure the frequency stability.
5. The test shall be performed under -40 to 85 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.

3.6.3 Test Setup



3.6.4 Test Result of Frequency Stability

Frequency: 5200 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°CVmax	0.98	1.02	0.95	0.94
T20°CVmin	1.21	1.23	1.24	1.20
T85°CVnom	0.98	0.96	0.96	1.01
T80°CVnom	1.24	1.27	1.30	1.30
T70°CVnom	0.77	0.76	0.75	0.85
T60°CVnom	0.90	0.91	0.93	0.90
T50°CVnom	1.00	1.00	1.09	1.10
T40°CVnom	1.20	1.24	1.19	1.24
T30°CVnom	0.79	0.76	0.88	0.90
T20°CVnom	0.93	0.92	0.97	0.98
T10°CVnom	0.92	1.01	0.91	0.94
T0°CVnom	1.35	1.37	1.30	1.41
T-10°CVnom	1.32	1.30	1.31	1.41
T-20°CVnom	1.16	1.15	1.14	1.14
T-30°CVnom	1.51	1.61	1.57	1.60
T-40°CVnom	1.12	1.19	1.12	1.14
Vnom [Vac]: 120	Vmax [Vac]: 138		Vmin [Vac]: 102	
Tnom [°C]: 20	Tmax [°C]: 85		Tmin [°C]: -40	

Frequency: 5785 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°CVmax	0.92	0.93	0.94	0.89
T20°CVmin	1.16	1.19	1.16	1.12
T85°CVnom	0.72	0.68	0.73	0.73
T80°CVnom	0.81	0.81	0.76	0.86
T70°CVnom	0.76	0.71	0.76	0.80
T60°CVnom	1.24	1.14	1.22	1.22
T50°CVnom	0.95	0.94	0.85	0.88
T40°CVnom	1.07	1.16	1.17	1.09
T30°CVnom	0.69	0.66	0.68	0.77
T20°CVnom	0.77	0.75	0.74	0.85
T10°CVnom	0.75	0.70	0.74	0.76
T0°CVnom	1.15	1.20	1.14	1.23
T-10°CVnom	1.18	1.15	1.17	1.18
T-20°CVnom	1.04	1.03	1.08	1.01
T-30°CVnom	1.38	1.39	1.41	1.39
T-40°CVnom	1.00	1.02	1.08	1.10
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 85		Tmin [°C]: -40

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan,
R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd
St., Kwei Shan Hsiang, Tao Yuan
Hsien 333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd
St., Kwei Shan Hsiang, Tao Yuan
Hsien 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666

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