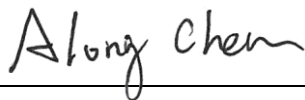


FCC Test Report

FCC ID : MXF-WRTD303N
Equipment : Easy Connect
Model No. : WRTD-303N
Brand Name : Gemtek
Applicant : Gemtek Technology Co., Ltd.
Address : No.15-1 Zhonghua Road, Hsinchu Industrial
Park, Hukou, Hsinchu, Taiwan, 30352
Standard : 47 CFR FCC Part 15.407
Received Date : Jun. 03, 2014
Tested Date : Jun. 05 ~ Aug. 12, 2014

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:



Along Chen / Assistant Manager



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Release Record

Report No.	Version	Description	Issued Date
FR462101AN	Rev. 01	Initial issue	Sep. 11, 2014

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.164MHz 51.36 (Margin -13.89dB) - QP	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 10400.00MHz 52.99 (Margin -1.01dB) - 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: 20.92 5725~5850MHz: 20.42	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]	2	6-54 Mbps
5150-5250	n (HT20)	5180-5240	36-48 [4]	2	MCS 0-15
5150-5250	n (HT40)	5190-5230	38-46 [2]	2	MCS 0-15
5150-5250	ac (VHT20)	5180-5240	36-48 [4]	2	MCS 0-8
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	2	MCS 0-9
5150-5250	ac (VHT80)	5210	42 [1]	2	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]	2	6-54 Mbps
5725-5850	n (HT20)	5745-5825	149-165 [5]	2	MCS 0-15
5725-5850	n (HT40)	5755-5795	151-159 [2]	2	MCS 0-15
5725-5850	ac (VHT20)	5745-5825	149-165 [5]	2	MCS 0-8
5725-5850	ac (VHT40)	5755-5795	151-159 [2]	2	MCS 0-9
5725-5850	ac (VHT80)	5775	155 [1]	2	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.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	WRTD-303N	PIFA	I-PEX	2.5	3.02	3.02	2.8	3.03

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from AC adapter
-------------------	-----------------------

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC Adapter 1	Brand Name: AOEM Model Name: ADS0248-W 120200 Power Rating: I/P: 100-240Vac, 50-60Hz, 0.6A O/P: 12Vdc, 2A Power Line: 1.2m non-shielded cable with one core
2	AC Adapter 2	Brand Name: APD Model Name: WA-24Q12FU Power Rating: I/P: 100-240Vac, 50-60Hz, 0.6A O/P: 12Vdc, 2A Power Line: 1.8m non-shielded cable with one core
3	AC Adapter 3	Brand Name: MOSO Model Name: MSP-C2000IC12.0-24W-US Power Rating: I/P: 100-240Vac, 50-60Hz, 0.8A O/P: 12Vdc, 2.0A Power Line: 1.4m non-shielded cable with one core
4	Battery 1	Brand Name: WTE Battery Model Name: 303N Rating: 7.4Vdc, 4050mAh (29.97Wh)
5	Battery 2	Brand Name: MAXELL Battery Model Name: ML2032 Lithium 3Vdc Battery Button Cell
6	HDD	Brand Name: TOSHIBA Model Name: MQ01ABF050 Capacity: 500GB

1.1.5 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	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	MP TOOL, Version: 1.3.8.0		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11a	100.00%	0.00
	VHT20	100.00%	0.00
	VHT40	100.00%	0.00
	VHT80	100.00%	0.00

1.1.7 Power Setting

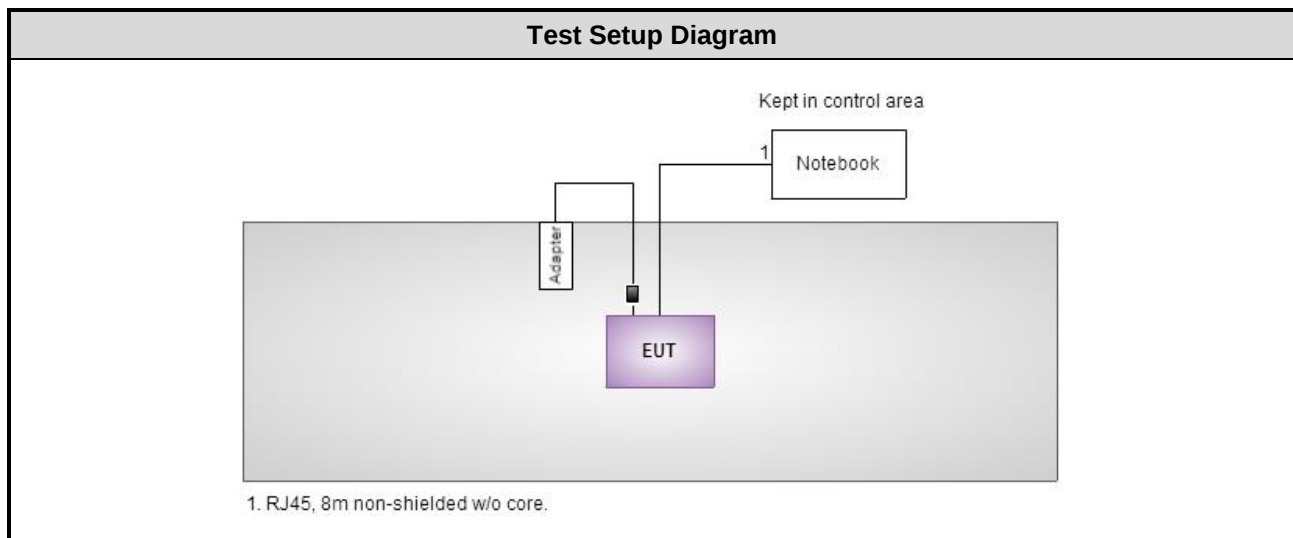
For Frequency band 5150-5250 MHz		
Modulation Mode	Test Frequency (MHz)	Power Set
11a	5180	57/57
11a	5200	56/56
11a	5240	55/55
HT20	5180	57/57
HT20	5200	56/57
HT20	5240	55/55
HT40	5190	54/53
HT40	5230	63/63
VHT20	5180	57/57
VHT20	5200	56/57
VHT20	5240	55/55
VHT40	5190	54/53
VHT40	5230	63/63
VHT80	5210	47/47

For Frequency band 5725~5850 MHz		
Modulation Mode	Test Frequency (MHz)	Power Set
11a	5745	63/57
11a	5785	63/57
11a	5825	63/57
HT20	5745	58/53
HT20	5785	63/57
HT20	5825	63/57
HT40	5755	54/49
HT40	5795	63/57
VHT20	5745	58/53
VHT20	5785	63/57
VHT20	5825	63/57
VHT40	5755	54/49
VHT40	5795	63/57
VHT80	5775	52/47

1.2 Local Support Equipment List

Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	E6430	---	DoC	RJ45, 8m non-shielded cable w/o core.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
EMC Receiver	R&S	ESCS 30	100169	Oct. 15, 2013	Oct. 14, 2014
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 23, 2013	Nov. 22, 2014
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Dec. 04, 2013	Dec. 03, 2014
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Apr. 23, 2014	Apr. 22, 2015
50 ohm terminal (Support Unit)	NA	50	04	Apr. 18, 2014	Apr. 17, 2015
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Jan. 25, 2014	Jan. 24, 2015
Receiver	R&S	ESR3	101658	Jan. 10, 2014	Jan. 09, 2015
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jan. 02, 2014	Jan. 01, 2015
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Feb. 13, 2014	Feb. 12, 2015
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Dec. 27, 2013	Dec. 26, 2014
Preamplifier	Burgeon	BPA-530	SN:100219	Nov. 28, 2013	Nov. 27, 2014
Preamplifier	Agilent	83017A	MY39501308	Dec. 16, 2013	Dec. 15, 2014
Preamplifier	WM	TF-130N-R1	923365	Oct. 23, 2013	Oct. 22, 2014
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 16, 2013	Dec. 15, 2014
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 16, 2013	Dec. 15, 2014
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 16, 2013	Dec. 15, 2014
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 16, 2013	Dec. 15, 2014
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 16, 2013	Dec. 15, 2014
Note: Calibration Interval of instruments listed above is one year.					

Loop Antenna	R&S	HFH2-Z2	100330	Nov. 15, 2012	Nov. 14, 2014
Note: Calibration Interval of instruments listed above is two year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	Agilent	N9010A	MY53400091	Oct. 07, 2013	Oct. 06, 2014
Receiver	Agilent	N9038A	MY53290044	Jan. 08, 2014	Jan. 07, 2015
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-562	Feb. 07, 2014	Feb. 06, 2015
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 20, 2014	Feb. 19, 2015
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Dec. 27, 2013	Dec. 26, 2014
Preamplifier	EMC	EMC02325	980187	Nov. 22, 2013	Nov. 21, 2014
Preamplifier	Agilent	83017A	MY53270014	Nov. 22, 2013	Nov. 21, 2014
Preamplifier	WM	TF-130N-R1	923365	Oct. 23, 2013	Oct. 22, 2014
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 19, 2014	Feb. 18, 2015
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22601/4	Feb. 19, 2014	Feb. 18, 2015
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 19, 2014	Feb. 18, 2015
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 17, 2014	Feb. 16, 2015
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 17, 2014	Feb. 16, 2015
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 17, 2014	Feb. 16, 2015
Note: Calibration Interval of instruments listed above is one year.					

Loop Antenna	R&S	HFH2-Z2	100330	Nov. 15, 2012	Nov. 14, 2014
Note: Calibration Interval of instruments listed above is two year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 17, 2014	Feb. 16, 2015
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Dec. 11, 2013	Dec. 10, 2014
Power Meter	Anritsu	ML2495A	1241002	Oct. 24, 2013	Oct. 23, 2014
Power Sensor	Anritsu	MA2411B	1207366	Oct. 24, 2013	Oct. 23, 2014
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 C63.10-2009

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01

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

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

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
Temperature	±0.6 °C
Conducted emission	±2.670 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.26 dB
Radiated emission > 1GHz	±4.94 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C / 53%	Skys Huang
Radiated Emissions	03CH01-WS 03CH03-WS	22-25°C / 65-67%	Haru Yang Anderson Hung Aska Huang
RF Conducted	TH01-WS	24°C / 65%	Brad Wu

➤ FCC site registration No.: 657002 / 390588

➤ IC site registration No.: 10807A-1 / 10807C-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 ≤1GHz	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 >1GHz 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	---	---
NOTE:				
1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The Y-plane results were found as the worst case and were shown in this report.				
2. 3 Adapters: AOEM, APD, and MOSO had been pretested and found that APD adapter was the worst for final testing.				

For Frequency band 5725-5850 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	11a	5785	MCS 0	---
Radiated Emissions ≤1GHz	11a	5785	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 >1GHz	11a	5745 / 5785 / 5825	6 Mbps	---
Emission Bandwidth	VHT20	5745 / 5785 / 5825	MCS 0	
6dB bandwidth	VHT40	5755 / 5795	MCS 0	
Peak Power Spectral Density	VHT80	5775	MCS 0	
Frequency Stability	Un-modulation	5785	---	---
NOTE: 1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The Y-plane results were found as the worst case and were shown in this report. 2. 3 Adapters: AOEM , APD , and MOSO had been pretested and found that APD adapter was the worst for final testing.				

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

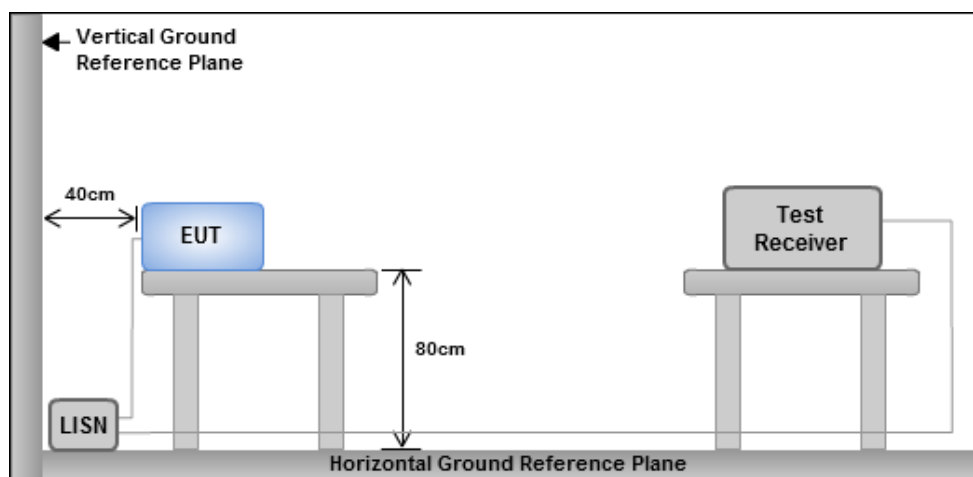
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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



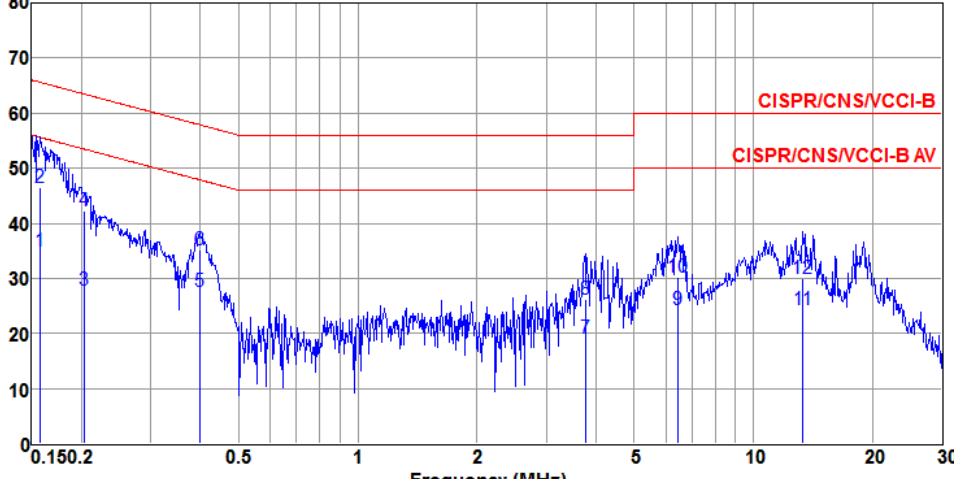
- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

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

Level (dBuV)

Date: 2014-08-12



Frequency (MHz)

	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.157	35.02	55.60	-20.58	34.59	0.41	0.02	Average
2*	0.157	46.40	65.60	-19.20	45.97	0.41	0.02	QP
3	0.203	27.86	53.49	-25.63	27.43	0.42	0.01	Average
4	0.203	42.30	63.49	-21.19	41.87	0.42	0.01	QP
5	0.398	27.54	47.90	-20.36	26.99	0.53	0.02	Average
6	0.398	35.22	57.90	-22.68	34.67	0.53	0.02	QP
7	3.759	19.05	46.00	-26.95	17.85	1.06	0.14	Average
8	3.759	26.16	56.00	-29.84	24.96	1.06	0.14	QP
9	6.454	24.33	50.00	-25.67	22.73	1.40	0.20	Average
10	6.454	30.30	60.00	-29.70	28.70	1.40	0.20	QP
11	13.337	24.24	50.00	-25.76	22.09	1.86	0.29	Average
12	13.337	30.07	60.00	-29.93	27.92	1.86	0.29	QP

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

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

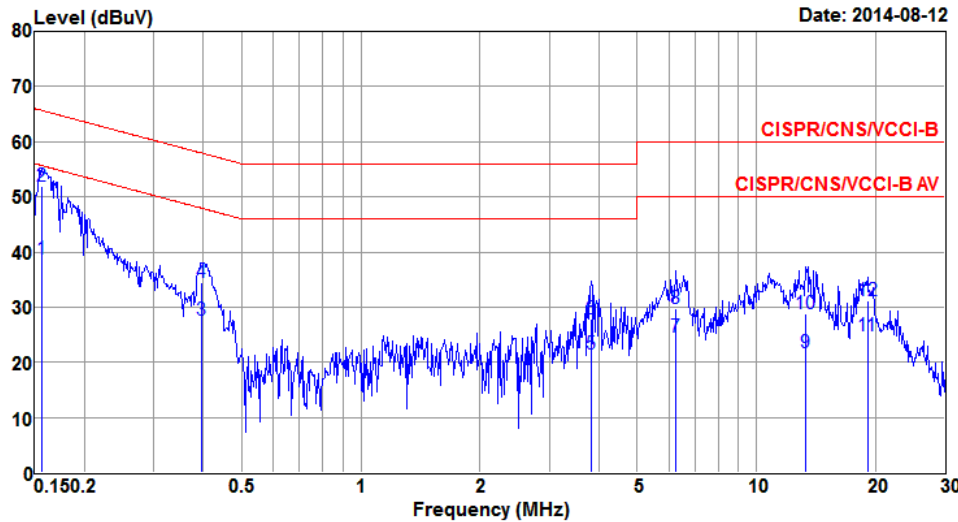
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Neutral		

Level (dBUV)

Modulation	11a	Test Freq. (MHz)	5785
Power Phase	Line		

Level (dBUV)

Date: 2014-08-12



Frequency (MHz)

	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.156	38.68	55.69	-17.01	38.25	0.41	0.02	Average
2*	0.156	51.83	65.69	-13.86	51.40	0.41	0.02	QP
3	0.396	27.51	47.95	-20.44	26.96	0.53	0.02	Average
4	0.396	34.40	57.95	-23.55	33.85	0.53	0.02	QP
5	3.820	21.52	46.00	-24.48	20.31	1.07	0.14	Average
6	3.820	27.95	56.00	-28.05	26.74	1.07	0.14	QP
7	6.252	24.52	50.00	-25.48	22.94	1.38	0.20	Average
8	6.252	29.78	60.00	-30.22	28.20	1.38	0.20	QP
9	13.337	21.75	50.00	-28.25	19.60	1.86	0.29	Average
10	13.337	28.80	60.00	-31.20	26.65	1.86	0.29	QP
11	19.122	24.83	50.00	-25.17	22.39	2.06	0.38	Average
12	19.122	31.07	60.00	-28.93	28.63	2.06	0.38	QP

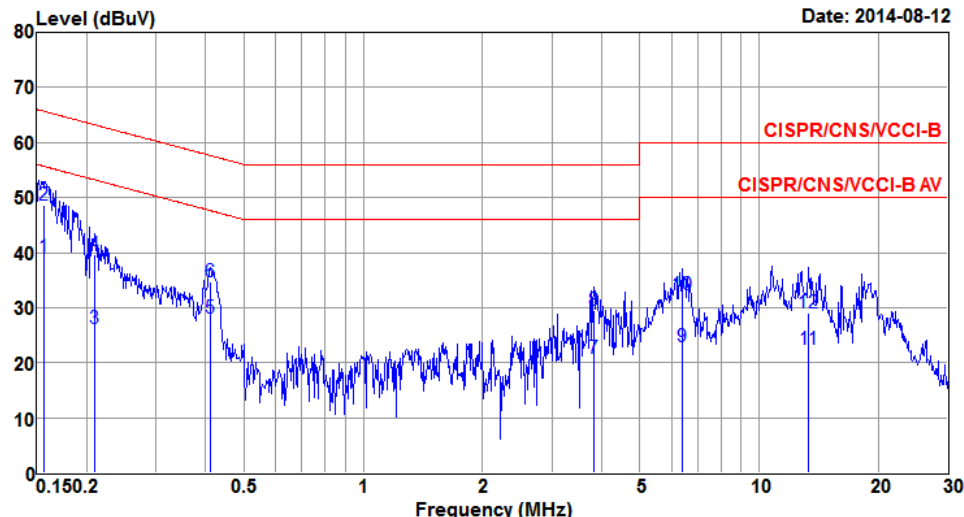
Note 1: Level (dBUV) = Read Level (dBUV) + LISN Factor (dB) + Cable Loss (dB).

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

Modulation	11a	Test Freq. (MHz)	5785
Power Phase	Neutral		

Level (dBUV)

Date: 2014-08-12



	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1*	0.156	39.24	55.65	-16.41	38.73	0.49	0.02	Average
2	0.156	48.71	65.65	-16.94	48.20	0.49	0.02	QP
3	0.209	26.09	53.23	-27.14	25.56	0.52	0.01	Average
4	0.209	39.74	63.23	-23.49	39.21	0.52	0.01	QP
5	0.410	28.03	47.64	-19.61	27.39	0.62	0.02	Average
6	0.410	34.62	57.64	-23.02	33.98	0.62	0.02	QP
7	3.820	20.79	46.00	-25.21	19.52	1.13	0.14	Average
8	3.820	29.61	56.00	-26.39	28.34	1.13	0.14	QP
9	6.420	22.89	50.00	-27.11	21.26	1.43	0.20	Average
10	6.420	32.27	60.00	-27.73	30.64	1.43	0.20	QP
11	13.337	22.41	50.00	-27.59	20.04	2.08	0.29	Average
12	13.337	28.94	60.00	-31.06	26.57	2.08	0.29	QP

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

Note 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.

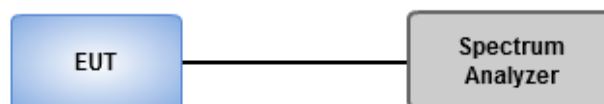
Occupied Bandwidth

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

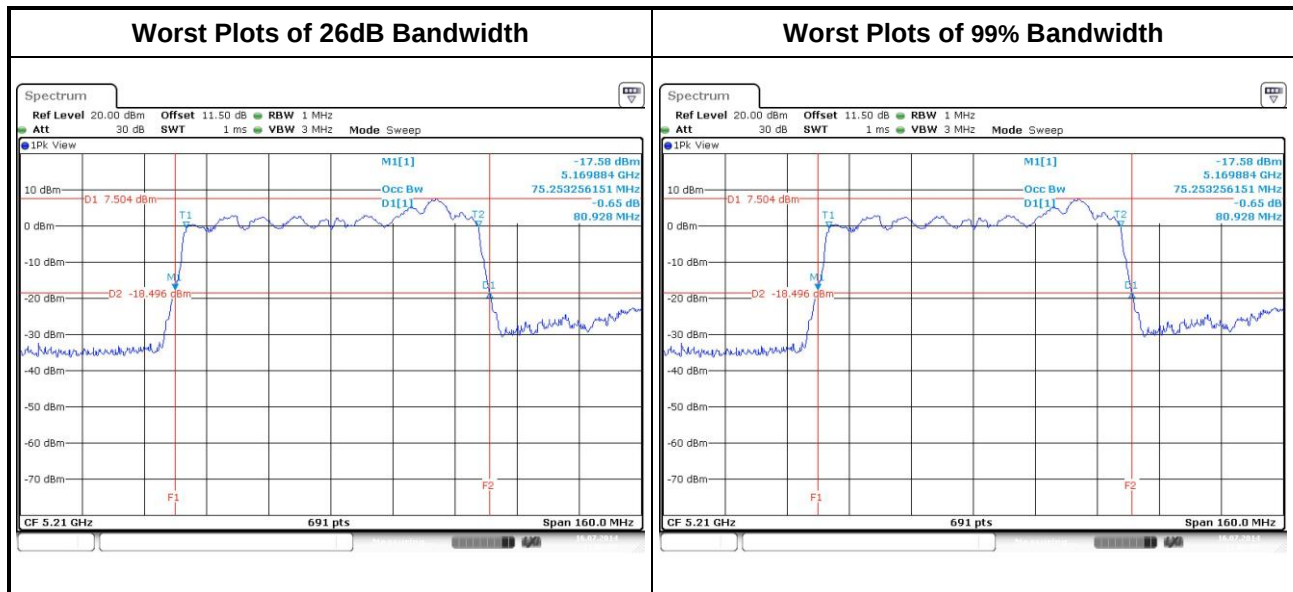
1. Set RBW = 100kHz, VBW = 300kHz
2. Detector = Peak, Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB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

3.2.3 Test Setup



3.2.4 Test Result of Emission Bandwidth

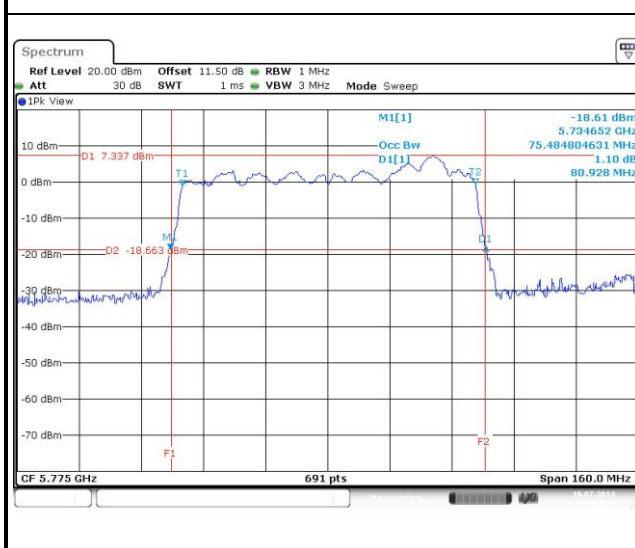
For Frequency band 5150~5250 MHz										
Mode	N _{TX}	Freq. (MHz)	26dB Bandwidth (MHz)				99% Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
11a	2	5180	21.51	21.39	---	---	16.90	16.90	---	---
11a	2	5200	21.39	21.33	---	---	16.85	16.85	---	---
11a	2	5240	21.39	21.39	---	---	16.85	16.85	---	---
VHT20	2	5180	21.45	21.28	---	---	16.90	16.79	---	---
VHT20	2	5200	21.45	21.39	---	---	16.85	16.79	---	---
VHT20	2	5240	21.39	21.39	---	---	16.85	16.79	---	---
VHT40	2	5190	44.29	44.29	---	---	36.93	36.93	---	---
VHT40	2	5230	59.71	53.57	---	---	37.51	37.28	---	---
VHT80	2	5210	80.23	80.93	---	---	75.02	75.25	---	---



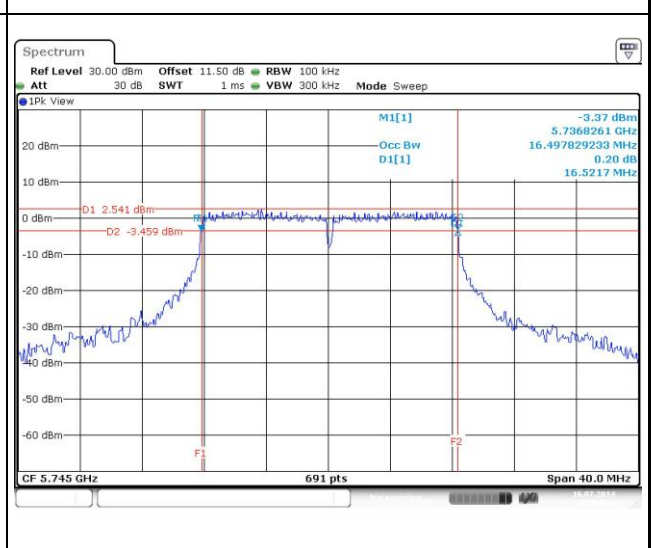
For Frequency band 5725-5850 MHz

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	2	5745	25.33	23.01	---	---	16.58	16.52	---	---	0.5
11a	2	5785	28.87	25.10	---	---	16.58	16.58	---	---	0.5
11a	2	5825	28.23	25.28	---	---	16.58	16.52	---	---	0.5
VHT20	2	5745	21.39	21.28	---	---	17.74	17.80	---	---	0.5
VHT20	2	5785	29.10	25.10	---	---	17.74	17.80	---	---	0.5
VHT20	2	5825	27.54	25.16	---	---	17.74	17.80	---	---	0.5
VHT40	2	5755	44.87	44.52	---	---	36.52	36.52	---	---	0.5
VHT40	2	5795	50.78	51.25	---	---	36.52	36.52	---	---	0.5
VHT80	2	5775	80.46	80.93	---	---	74.44	73.51	---	---	0.5

Worst Plots of 99% Bandwidth



Worst Plots 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

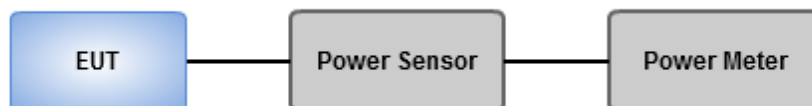
Frequency Band (MHz)		Limit
☐	5250 ~ 5350	250mW or 11dBm+10 log B
☐	5470 ~ 5725	250mW or 11dBm+10 log B
☒	5725 ~ 5850	1 W

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

3.3.2 Test Procedures

- ☒ Power meter
 - ☒ Measurements 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	2	5180	15.79	15.15	---	---	70.666	18.49	30.00
11a	2	5200	15.61	15.03	---	---	68.233	18.34	30.00
11a	2	5240	15.78	15.41	---	---	72.598	18.61	30.00
HT20	2	5180	15.75	15.32	---	---	71.625	18.55	30.00
HT20	2	5200	15.72	15.54	---	---	73.135	18.64	30.00
HT20	2	5240	15.76	15.28	---	---	71.399	18.54	30.00
HT40	2	5190	14.36	13.24	---	---	48.376	16.85	30.00
HT40	2	5230	17.95	17.68	---	---	120.987	20.83	30.00
VHT20	2	5180	15.87	15.44	---	---	73.631	18.67	30.00
VHT20	2	5200	15.84	15.65	---	---	75.099	18.76	30.00
VHT20	2	5240	15.85	15.38	---	---	72.974	18.63	30.00
VHT40	2	5190	14.48	13.35	---	---	49.682	16.96	30.00
VHT40	2	5230	18.03	17.78	---	---	123.512	20.92	30.00
VHT80	2	5210	12.68	12.15	---	---	34.941	15.43	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	2	5745	17.68	16.88	---	---	107.367	20.31	30.00
11a	2	5785	17.57	17.25	---	---	110.236	20.42	30.00
11a	2	5825	16.97	16.96	---	---	99.433	19.98	30.00
HT20	2	5745	15.71	15.34	---	---	71.437	18.54	30.00
HT20	2	5785	17.28	16.95	---	---	103.001	20.13	30.00
HT20	2	5825	16.88	16.76	---	---	96.177	19.83	30.00
HT40	2	5755	13.59	12.88	---	---	42.265	16.26	30.00
HT40	2	5795	16.75	16.96	---	---	96.974	19.87	30.00
VHT20	2	5745	15.8	15.42	---	---	72.853	18.62	30.00
VHT20	2	5785	17.39	17.08	---	---	105.878	20.25	30.00
VHT20	2	5825	16.95	16.91	---	---	98.636	19.94	30.00
VHT40	2	5755	13.68	12.96	---	---	43.104	16.35	30.00
VHT40	2	5795	16.88	17.08	---	---	99.803	19.99	30.00
VHT80	2	5775	12.90	12.17	---	---	35.980	15.56	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, 5250~5350 MHz, 5470~5725 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

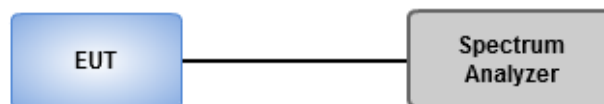
☒ Method SA-1

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

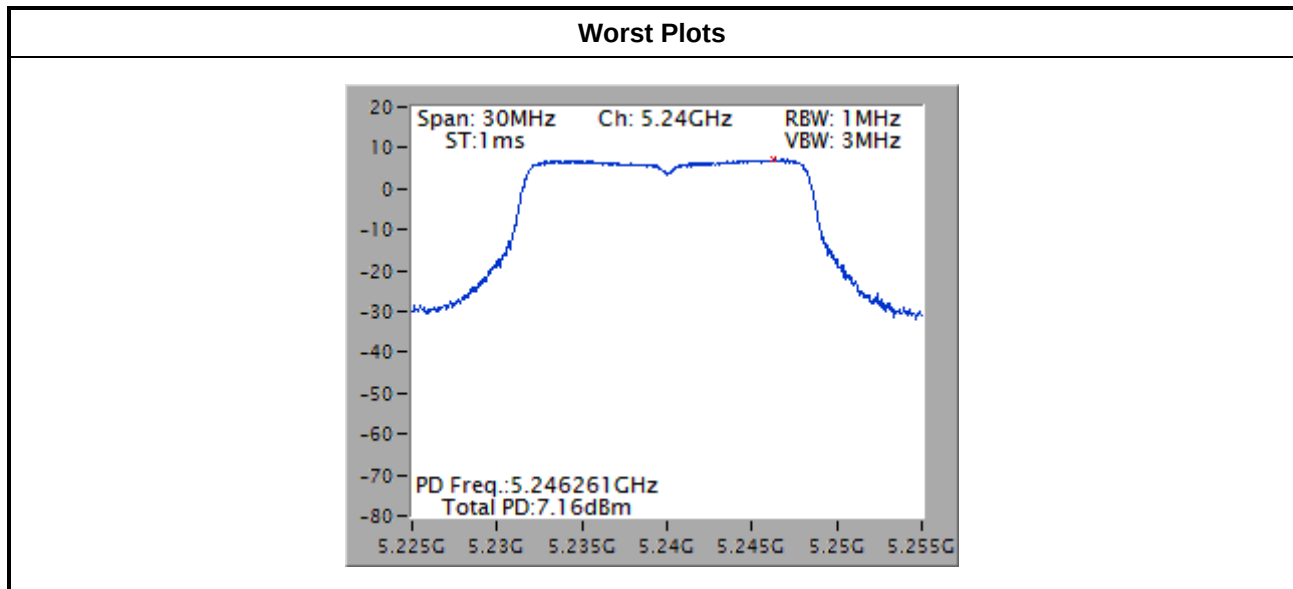


3.4.4 Test Result of Peak Power Spectral Density

Frequency band			5150~5250 MHz			
Condition			Peak Power Spectral Density (dBm/MHz)			
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	2	5180	6.60	0.00	6.60	16.97
11a	2	5200	6.07	0.00	6.07	16.97
11a	2	5240	7.16	0.00	7.16	16.97
VHT20	2	5180	5.31	0.00	5.31	16.97
VHT20	2	5200	6.74	0.00	6.74	16.97
VHT20	2	5240	5.79	0.00	5.79	16.97
VHT40	2	5190	0.53	0.00	0.53	16.97
VHT40	2	5230	4.77	0.00	4.77	16.97
VHT80	2	5210	-3.72	0.00	-3.72	16.97

Note:

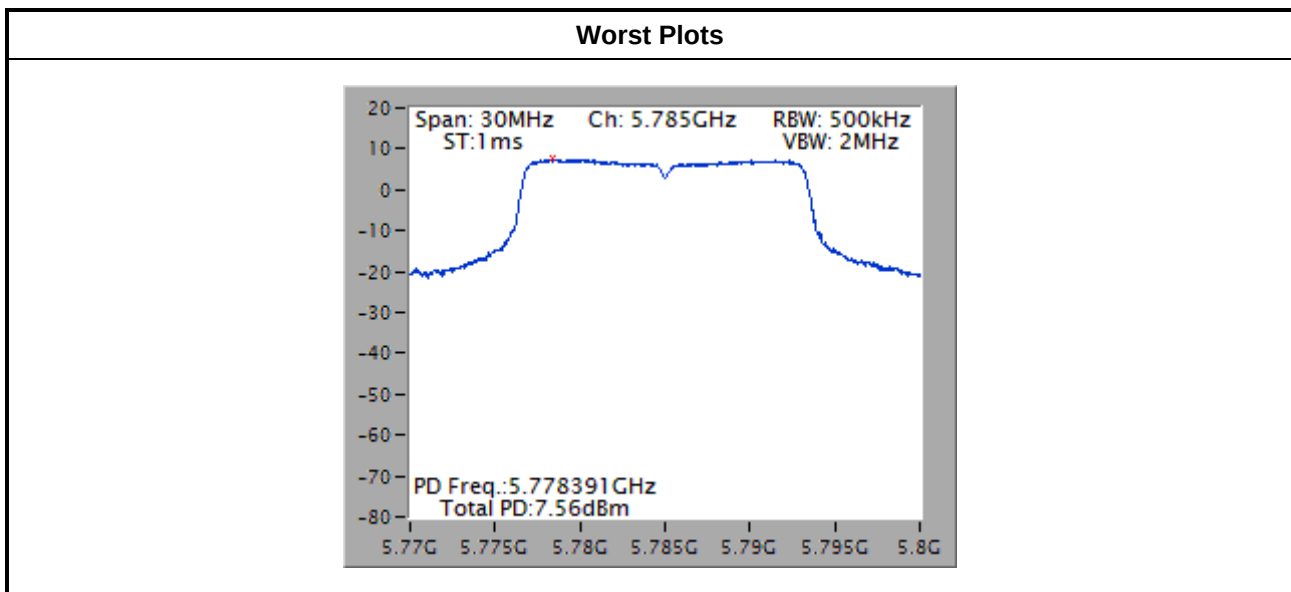
1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $10 * \log((10^{3.02/20} + 10^{3.02/20})^2 / 2) = 6.03 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $17 \text{ dBm} - (6.03 \text{ dBi} - 6 \text{ dBi}) = 16.97 \text{ dBm}$.



Frequency band			5725-5850 MHz			
Condition			Peak Power Spectral Density (dBm/500kHz)			
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	2	5745	6.59	0.00	6.59	29.96
11a	2	5785	7.56	0.00	7.56	29.96
11a	2	5825	6.88	0.00	6.88	29.96
VHT20	2	5745	4.25	0.00	4.25	29.96
VHT20	2	5785	5.87	0.00	5.87	29.96
VHT20	2	5825	5.25	0.00	5.25	29.96
VHT40	2	5755	-1.44	0.00	-1.44	29.96
VHT40	2	5795	2.69	0.00	2.69	29.96
VHT80	2	5775	-4.95	0.00	-4.95	29.96

Note:

1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $10 * \log((10^{3.03/20} + 10^{3.03/20})/2) = 6.04 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $30 \text{ dBm} - (6.04 \text{ dBi} - 6 \text{ dBi}) = 29.96 \text{ dBm}$.



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]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.825 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.825 5.835 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

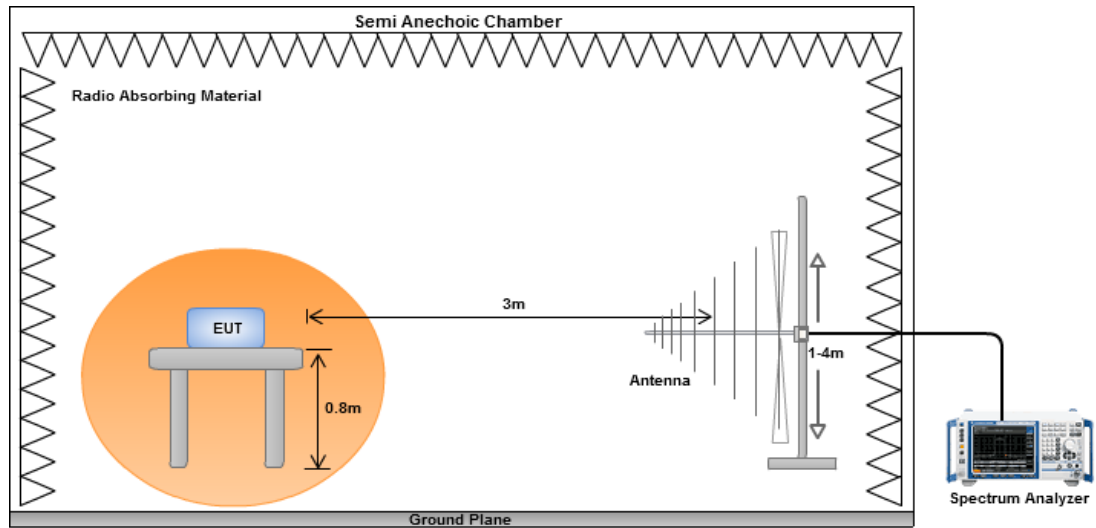
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
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:

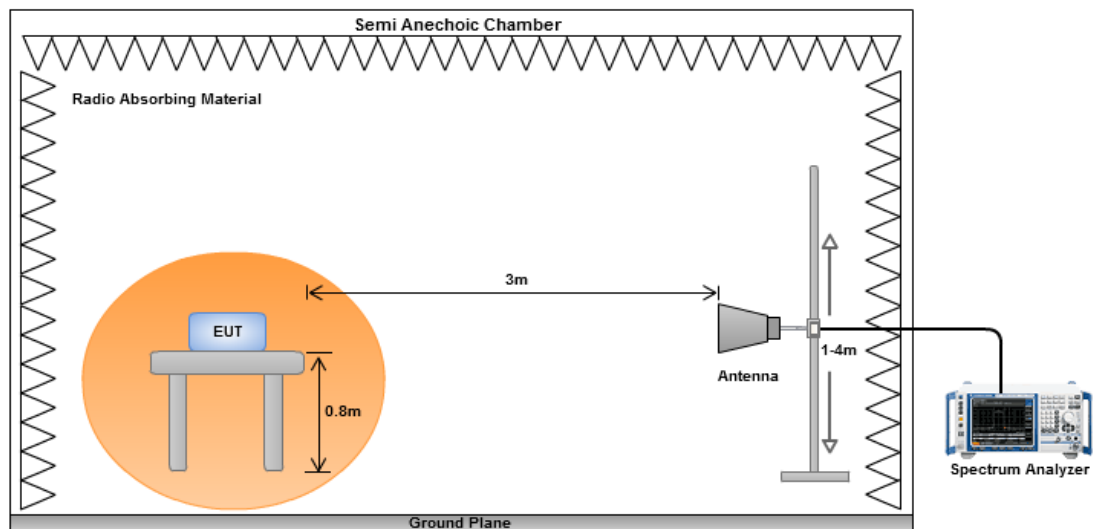
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

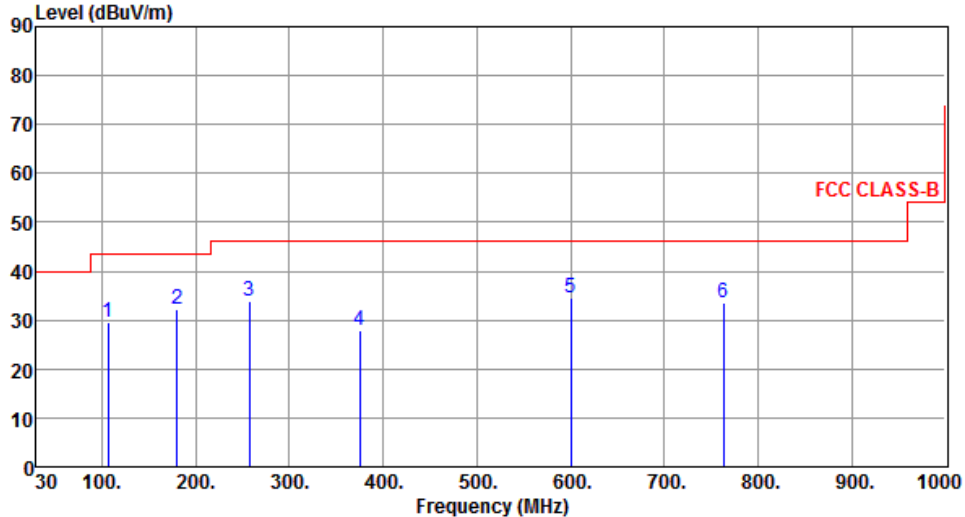


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal		



The graph displays the radiated unwanted emissions for a transmitter. The y-axis represents the Level in dBUV/m, ranging from 0 to 90. The x-axis represents the Frequency in MHz, ranging from 30 to 1000. A red line indicates the FCC CLASS-B limit, which is 40 dBUV/m from 30 MHz to 100 MHz, 45 dBUV/m from 100 MHz to 1000 MHz, and 55 dBUV/m from 1000 MHz to 1100 MHz. Six emission peaks are identified and labeled 1 through 6, with their corresponding data provided in the table below.

	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	106.63	29.65	43.50	-13.85	50.39	-20.74	Peak	---	---
2	180.35	32.22	43.50	-11.28	50.77	-18.55	Peak	---	---
3	256.98	34.00	46.00	-12.00	51.69	-17.69	Peak	---	---
4	375.32	28.02	46.00	-17.98	42.36	-14.34	Peak	---	---
5	600.36	34.47	46.00	-11.53	44.02	-9.55	Peak	---	---
6	763.32	33.42	46.00	-12.58	40.53	-7.11	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	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		
Level (dBuV/m)			

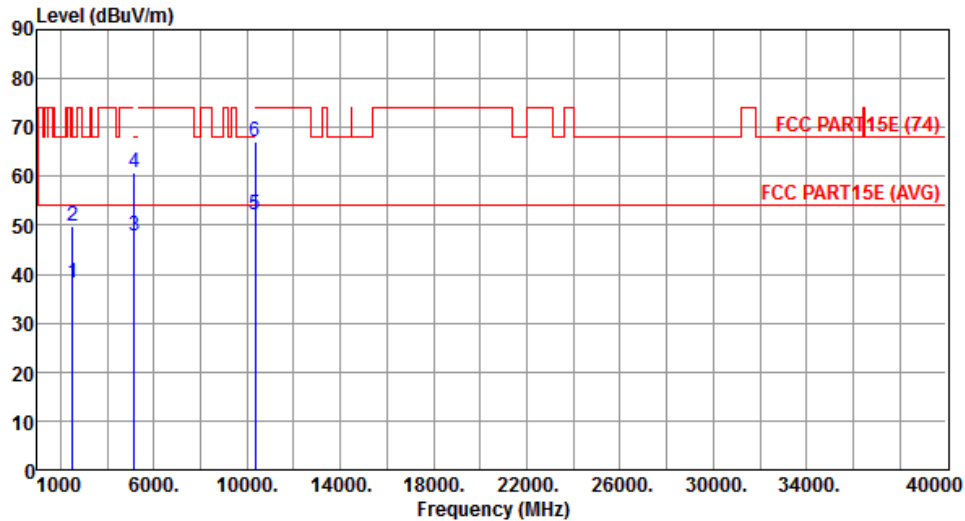
Modulation	11a	Test Freq. (MHz)	5785
Polarization	Horizontal		
Level (dBuV/m)			

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

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		



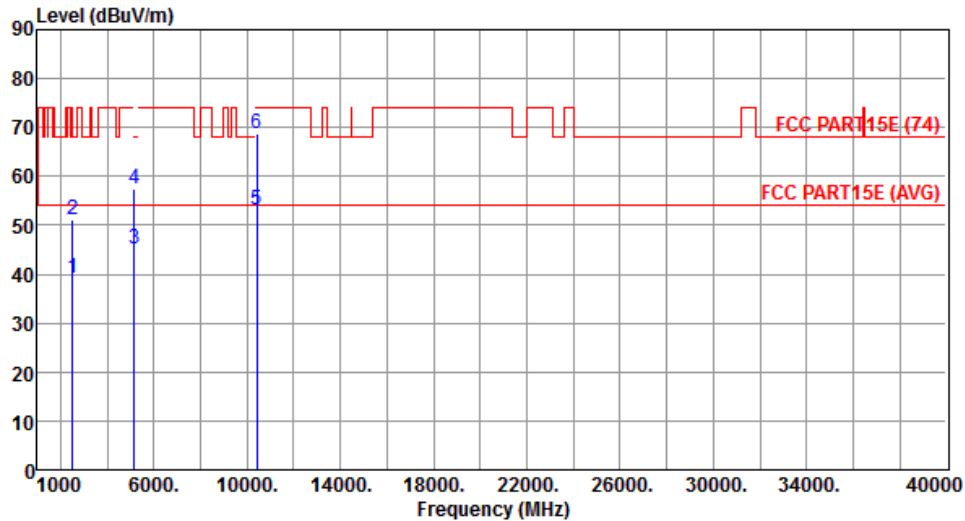
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	38.04	54.00	-15.96	39.37	-1.33	Average	---	---
2	2500.00	49.90	74.00	-24.10	51.23	-1.33	Peak	---	---
3	5150.00	47.82	54.00	-6.18	41.65	6.17	Average	---	---
4	5150.00	60.74	74.00	-13.26	54.57	6.17	Peak	---	---
5	10360.00	52.18	54.00	-1.82	35.26	16.92	Average	---	---
6	10360.00	66.97	74.00	-7.03	50.05	16.92	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).

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	2500.00	39.03	54.00	-14.97	40.36	-1.33	Average	---	---
2	2500.00	51.12	74.00	-22.88	52.45	-1.33	Peak	---	---
3	5150.00	45.13	54.00	-8.87	38.96	6.17	Average	---	---
4	5150.00	57.53	74.00	-16.47	51.36	6.17	Peak	---	---
5	10400.00	52.99	54.00	-1.01	35.95	17.04	Average	---	---
6	10400.00	68.67	74.00	-5.33	51.63	17.04	Peak	---	---

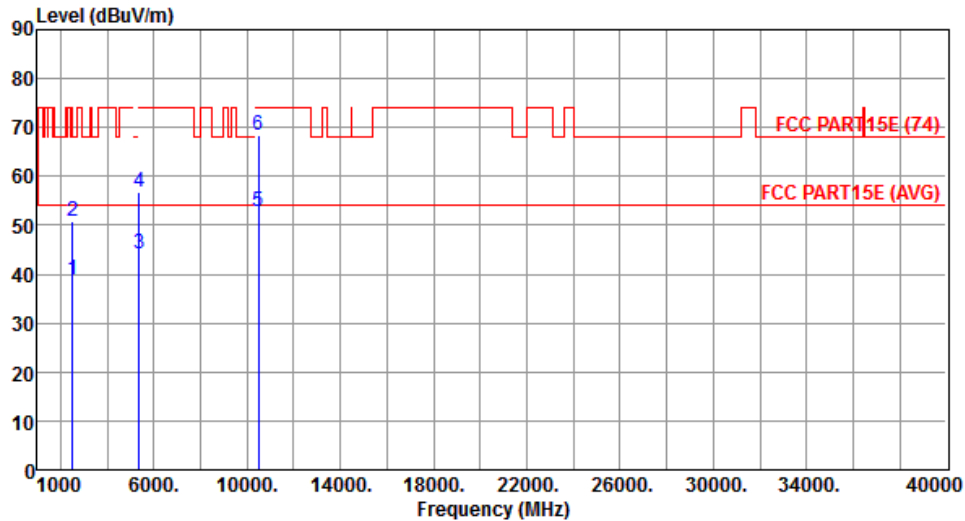
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	11a	Test Freq. (MHz)	5200																																																																						
Polarization	Vertical																																																																								
Level (dBUV/m) Frequency (MHz) <table><thead><tr><th></th><th>Freq. MHz</th><th>Emission level dBUV/m</th><th>Limit dBUV/m</th><th>Margin dB</th><th>SA reading dBUV</th><th>Factor dB</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr></thead><tbody><tr><td>1</td><td>2500.00</td><td>38.24</td><td>54.00</td><td>-15.76</td><td>39.57</td><td>-1.33</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>2</td><td>2500.00</td><td>50.15</td><td>74.00</td><td>-23.85</td><td>51.48</td><td>-1.33</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>3</td><td>5150.00</td><td>45.24</td><td>54.00</td><td>-8.76</td><td>39.07</td><td>6.17</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>4</td><td>5150.00</td><td>57.34</td><td>74.00</td><td>-16.66</td><td>51.17</td><td>6.17</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>5</td><td>10400.00</td><td>52.95</td><td>54.00</td><td>-1.05</td><td>35.91</td><td>17.04</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>6</td><td>10400.00</td><td>68.20</td><td>74.00</td><td>-5.80</td><td>51.16</td><td>17.04</td><td>Peak</td><td>---</td><td>---</td></tr></tbody></table>					Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg	1	2500.00	38.24	54.00	-15.76	39.57	-1.33	Average	---	---	2	2500.00	50.15	74.00	-23.85	51.48	-1.33	Peak	---	---	3	5150.00	45.24	54.00	-8.76	39.07	6.17	Average	---	---	4	5150.00	57.34	74.00	-16.66	51.17	6.17	Peak	---	---	5	10400.00	52.95	54.00	-1.05	35.91	17.04	Average	---	---	6	10400.00	68.20	74.00	-5.80	51.16	17.04	Peak	---	---
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg																																																																
1	2500.00	38.24	54.00	-15.76	39.57	-1.33	Average	---	---																																																																
2	2500.00	50.15	74.00	-23.85	51.48	-1.33	Peak	---	---																																																																
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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)	5240
Polarization	Horizontal		



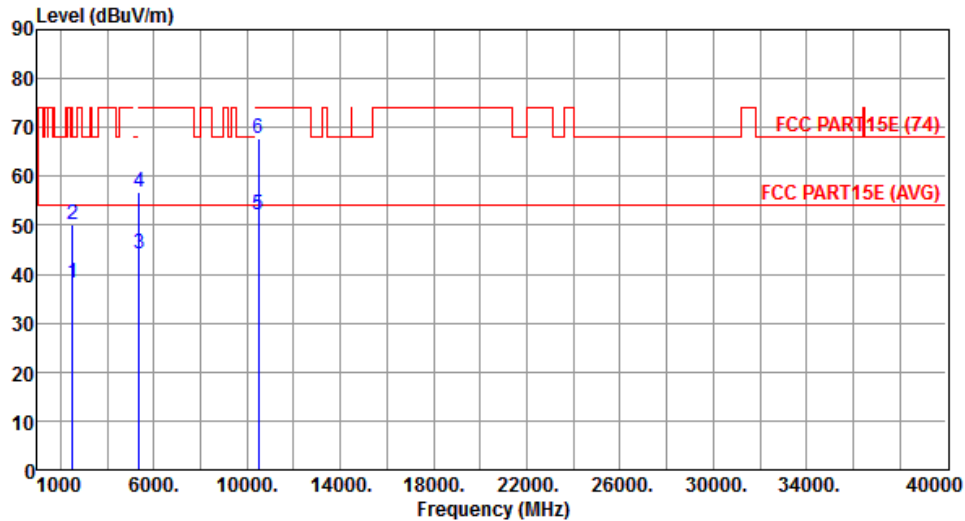
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	39.00	54.00	-15.00	40.33	-1.33	Average	---	---
2	2500.00	50.85	74.00	-23.15	52.18	-1.33	Peak	---	---
3	5350.00	44.03	54.00	-9.97	37.53	6.50	Average	---	---
4	5350.00	56.66	74.00	-17.34	50.16	6.50	Peak	---	---
5	10480.00	52.68	54.00	-1.32	35.40	17.28	Average	---	---
6	10480.00	68.33	74.00	-5.67	51.05	17.28	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).

Modulation	11a	Test Freq. (MHz)	5240
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	2500.00	38.17	54.00	-15.83	39.50	-1.33	Average	---	---
2	2500.00	50.03	74.00	-23.97	51.36	-1.33	Peak	---	---
3	5350.00	44.22	54.00	-9.78	37.72	6.50	Average	---	---
4	5350.00	56.84	74.00	-17.16	50.34	6.50	Peak	---	---
5	10480.00	52.19	54.00	-1.81	34.91	17.28	Average	---	---
6	10480.00	67.83	74.00	-6.17	50.55	17.28	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).

Modulation	11a	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	5715.00	62.37	68.20	-5.83	55.30	7.07	Peak	---	---
2	5725.00	69.32	78.20	-8.88	62.25	7.07	Peak	---	---
3	11490.00	50.65	54.00	-3.35	33.43	17.22	Average	---	---
4	11490.00	64.58	74.00	-9.42	47.36	17.22	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).

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) </			

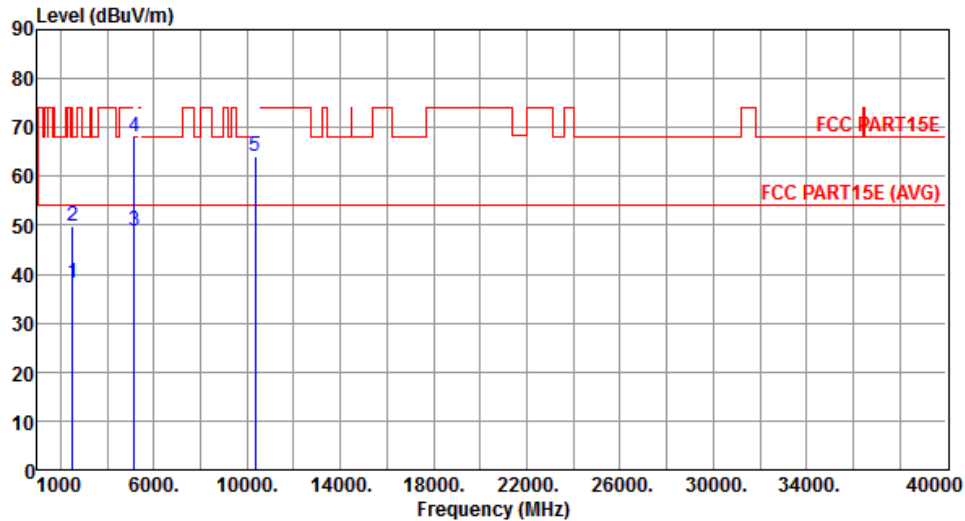
Modulation	11a	Test Freq. (MHz)	5825
Polarization	Horizontal		
Level (dBuV/m)			

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		



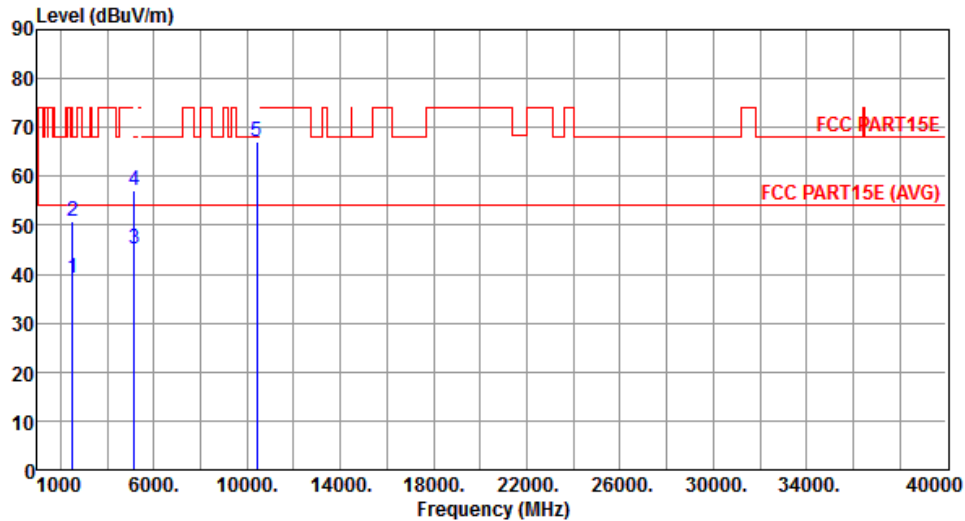
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	38.31	54.00	-15.69	39.64	-1.33	Average	---	---
2	2500.00	49.92	74.00	-24.08	51.25	-1.33	Peak	---	---
3	5150.00	48.81	54.00	-5.19	42.64	6.17	Average	---	---
4	5150.00	68.06	74.00	-5.94	61.89	6.17	Peak	---	---
5	10360.00	64.03	68.20	-4.17	47.11	16.92	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).

Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Horizontal		



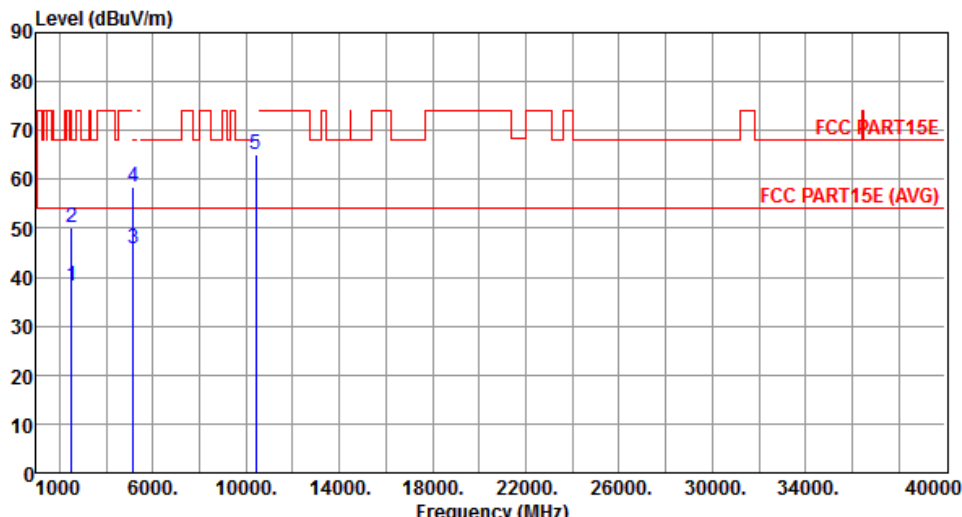
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	39.10	54.00	-14.90	40.43	-1.33	Average	---	---
2	2500.00	50.85	74.00	-23.15	52.18	-1.33	Peak	---	---
3	5150.00	45.20	54.00	-8.80	39.03	6.17	Average	---	---
4	5150.00	57.26	74.00	-16.74	51.09	6.17	Peak	---	---
5	10400.00	67.11	68.20	-1.09	50.07	17.04	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).

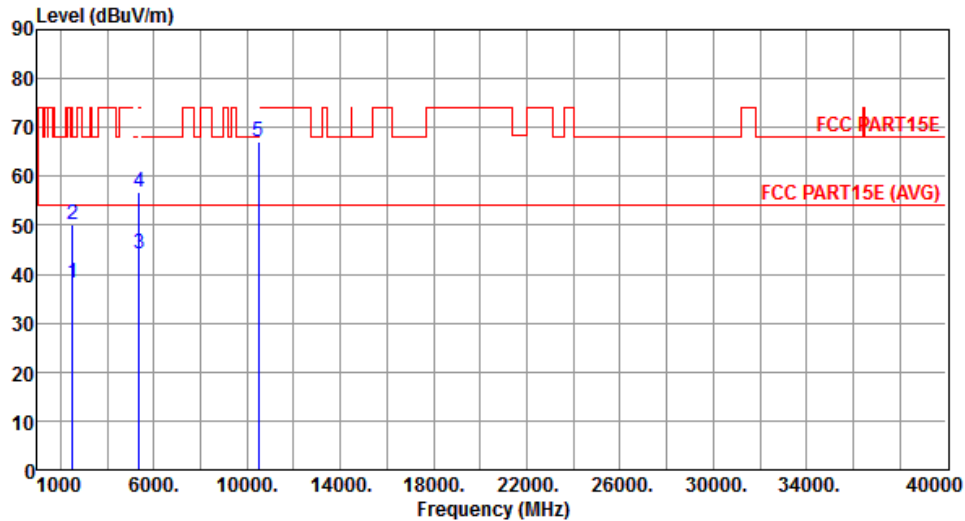
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	38.20	54.00	-15.80	39.53	-1.33	Average	---	---
2	2500.00	50.15	74.00	-23.85	51.48	-1.33	Peak	---	---
3	5150.00	45.94	54.00	-8.06	39.77	6.17	Average	---	---
4	5150.00	58.33	74.00	-15.67	52.16	6.17	Peak	---	---
5	10400.00	65.05	68.20	-3.15	48.01	17.04	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).

Modulation	VHT20	Test Freq. (MHz)	5240
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	2500.00	38.33	54.00	-15.67	39.66	-1.33	Average	---	---
2	2500.00	50.13	74.00	-23.87	51.46	-1.33	Peak	---	---
3	5350.00	44.07	54.00	-9.93	37.57	6.50	Average	---	---
4	5350.00	56.65	74.00	-17.35	50.15	6.50	Peak	---	---
5	10480.00	67.10	68.20	-1.10	49.82	17.28	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).

Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Vertical		

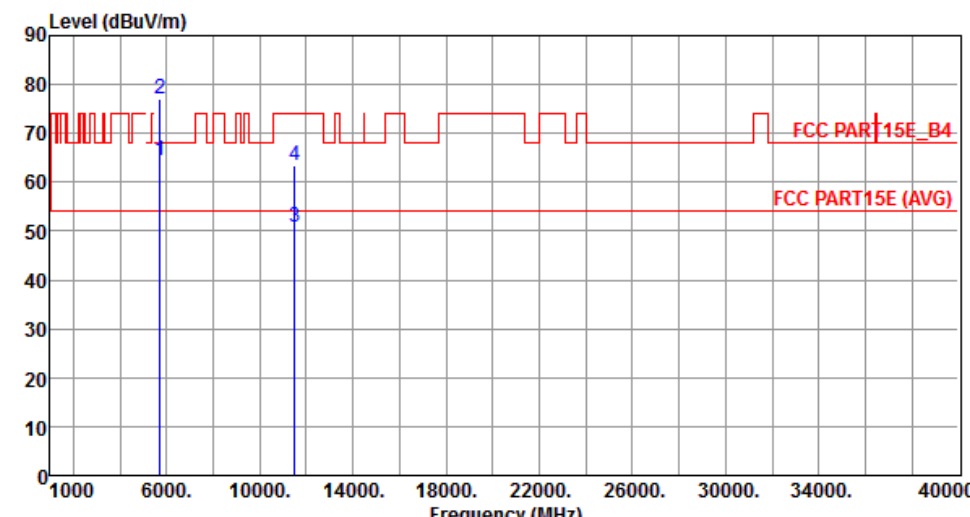
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	38.97	54.00	-15.03	40.30	-1.33	Average	---	---
2	2500.00	50.92	74.00	-23.08	52.25	-1.33	Peak	---	---
3	5350.00	44.38	54.00	-9.62	37.88	6.50	Average	---	---
4	5350.00	56.16	74.00	-17.84	49.66	6.50	Peak	---	---
5	10480.00	65.49	68.20	-2.71	48.21	17.28	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).

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

Modulation	VHT20	Test Freq. (MHz)	5745
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	5715.00	64.43	68.20	-3.77	57.36	7.07	Peak	---	---
2	5725.00	77.15	78.20	-1.05	70.08	7.07	Peak	---	---
3	11490.00	50.94	54.00	-3.06	33.72	17.22	Average	---	---
4	11490.00	63.59	74.00	-10.41	46.37	17.22	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).

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

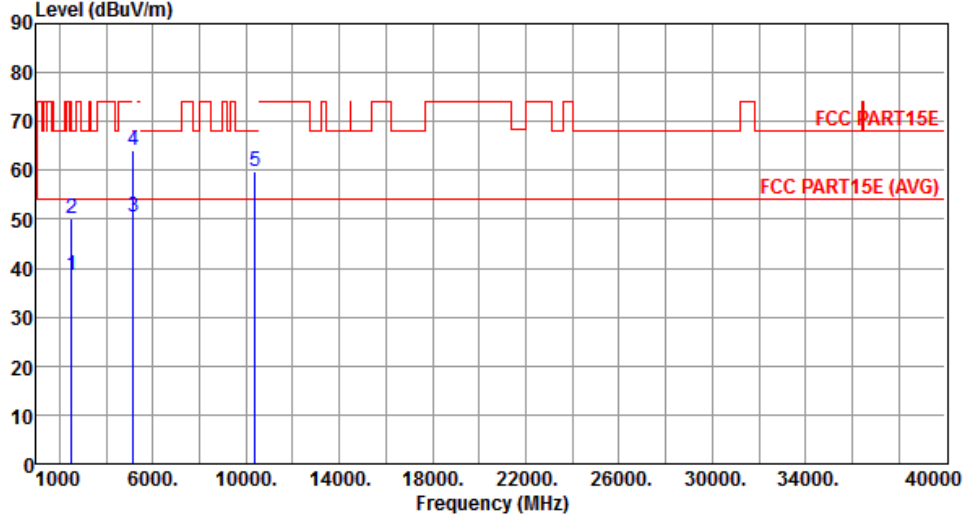
Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Vertical		
Level (dBuV/m) </			

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

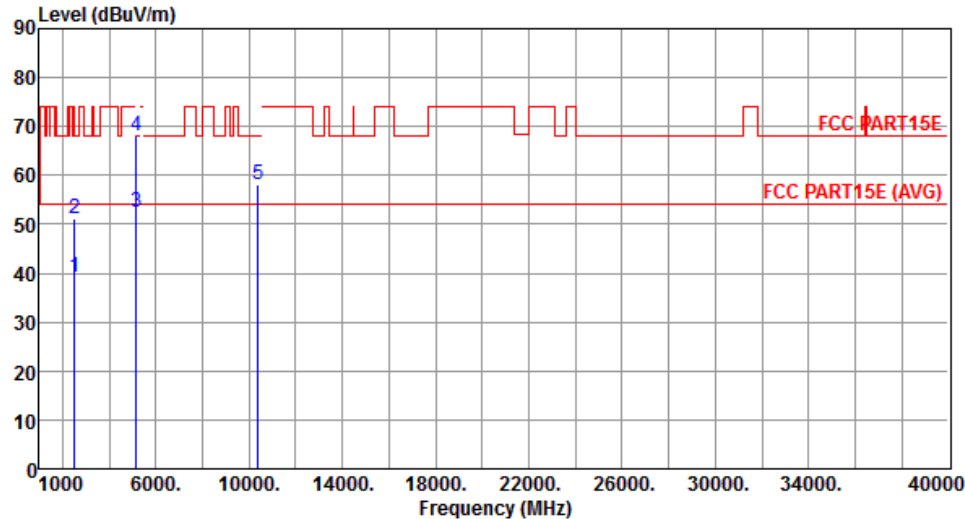
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	38.49	54.00	-15.51	39.82	-1.33	Average	---	---
2	2500.00	50.31	74.00	-23.69	51.64	-1.33	Peak	---	---
3	5150.00	50.45	54.00	-3.55	44.28	6.17	Average	---	---
4	5150.00	64.07	74.00	-9.93	57.90	6.17	Peak	---	---
5	10380.00	59.76	68.20	-8.44	42.77	16.99	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).

Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		



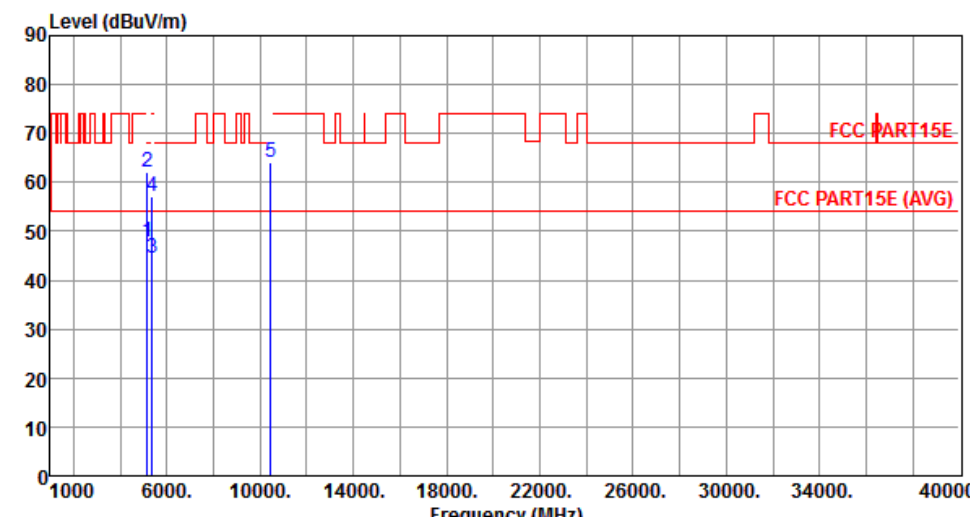
The graph displays the emission level in dBuV/m against frequency in MHz. The y-axis ranges from 0 to 90 dBuV/m, and the x-axis ranges from 1000 to 40000 MHz. A red line represents the FCC PART15E limit, which is 74 dBuV/m for frequencies between 1000 and 10000 MHz, and 68 dBuV/m for frequencies above 10000 MHz. A horizontal red line at 54 dBuV/m represents the FCC PART15E (AVG) limit. Five test points are marked with blue vertical lines and numbered 1 through 5.

	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2500.00	39.20	54.00	-14.80	40.53	-1.33	Average	---	---
2	2500.00	51.04	74.00	-22.96	52.37	-1.33	Peak	---	---
3	5150.00	52.62	54.00	-1.38	46.45	6.17	Average	---	---
4	5150.00	68.23	74.00	-5.77	62.06	6.17	Peak	---	---
5	10380.00	58.23	68.20	-9.97	41.24	16.99	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).

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

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		



	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB		High	Table
								cm	deg
1	5150.00	47.76	54.00	-6.24	41.59	6.17	Average	---	---
2	5150.00	61.99	74.00	-12.01	55.82	6.17	Peak	---	---
3	5350.00	44.52	54.00	-9.48	38.02	6.50	Average	---	---
4	5350.00	57.03	74.00	-16.97	50.53	6.50	Peak	---	---
5	10460.00	64.24	68.20	-3.96	47.02	17.22	Peak	---	---

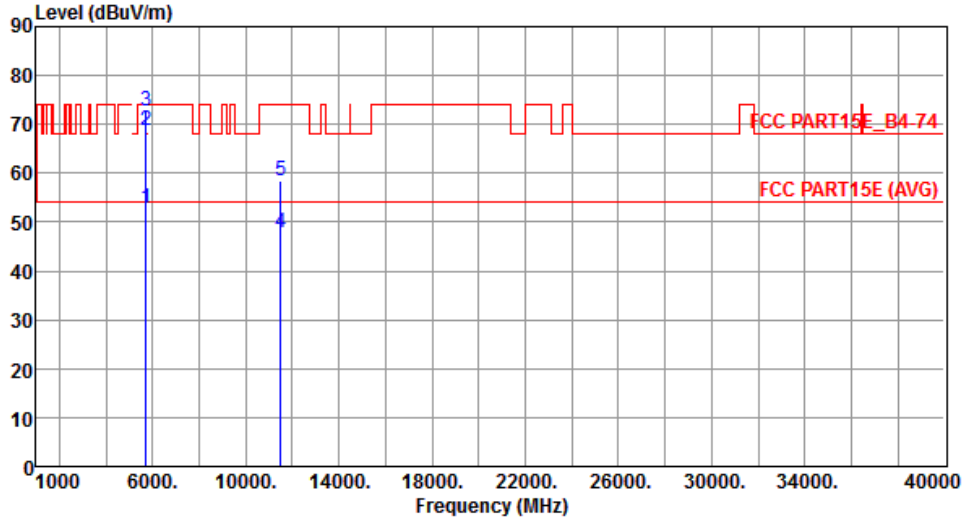
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Horizontal		
Level (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	5715.00	52.96	54.00	-1.04	45.89	7.07	Average	---	---
2	5715.00	68.85	74.00	-5.15	61.78	7.07	Peak	---	---
3	5725.00	72.66	78.20	-5.54	65.59	7.07	Peak	---	---
4	11510.00	47.85	54.00	-6.15	30.66	17.19	Average	---	---
5	11510.00	58.47	74.00	-15.53	41.28	17.19	Peak	---	---

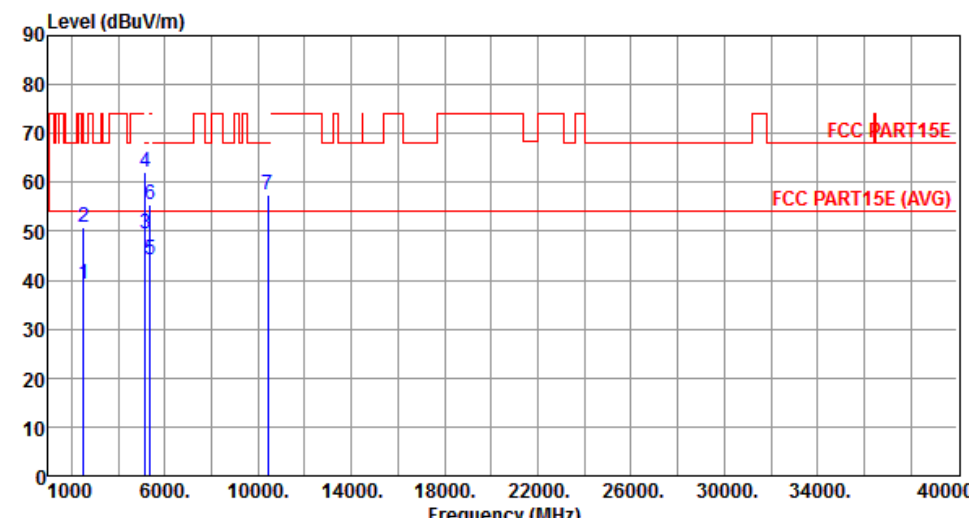
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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	2500.00	39.26	54.00	-14.74	40.59	-1.33	Average	---	---
2	2500.00	50.81	74.00	-23.19	52.14	-1.33	Peak	---	---
3	5150.00	49.52	54.00	-4.48	43.35	6.17	Average	---	---
4	5150.00	61.94	74.00	-12.06	55.77	6.17	Peak	---	---
5	5350.00	44.02	54.00	-9.98	37.52	6.50	Average	---	---
6	5350.00	55.38	74.00	-18.62	48.88	6.50	Peak	---	---
7	10420.00	57.47	68.20	-10.73	40.37	17.10	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).

Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Vertical		
Level (dBuV/m)			

Modulation	VHT80	Test Freq. (MHz)	5775
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	VHT80	Test Freq. (MHz)	5775
Polarization	Vertical		
Level (dBuV/m)			

3.6 Frequency Stability

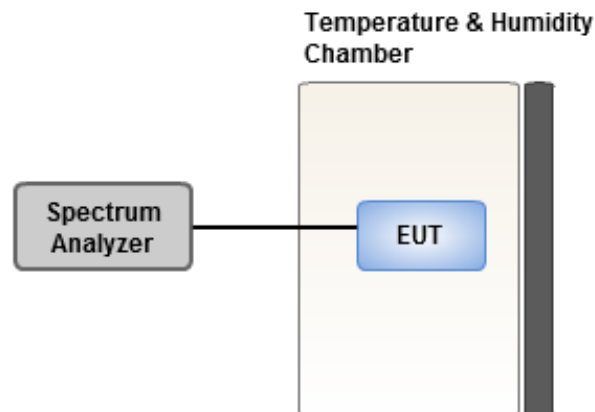
3.6.1 Limit of Frequency Stability

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 -30 to 50 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°C Vmax	11.35	11.38	11.46	11.48
T20°C Vmin	10.75	10.77	10.96	11.27
T50°C Vnom	13.57	13.97	14.83	15.47
T40°C Vnom	12.50	12.84	13.05	12.49
T30°C Vnom	11.81	12.10	12.50	12.57
T20°C Vnom	11.05	11.19	11.53	11.75
T10°C Vnom	10.14	10.21	10.57	10.80
T0°C Vnom	7.97	8.17	8.38	8.72
T-10°C Vnom	10.49	10.55	10.85	10.99
T-20°C Vnom	12.88	13.05	13.33	13.40
T-30°C Vnom	13.35	13.64	13.60	13.89
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 50		Tmin [°C]: -30

Frequency: 5785 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°C Vmax	9.99	10.14	10.37	10.57
T20°C Vmin	9.43	9.63	10.23	10.68
T50°C Vnom	12.08	12.95	13.78	13.68
T40°C Vnom	11.49	11.85	11.30	11.45
T30°C Vnom	10.21	11.18	11.00	11.32
T20°C Vnom	10.34	9.80	10.08	10.26
T10°C Vnom	9.41	9.33	9.64	9.69
T0°C Vnom	6.84	7.07	7.57	8.06
T-10°C Vnom	8.89	9.10	10.16	9.33
T-20°C Vnom	11.94	11.98	12.22	11.90
T-30°C Vnom	11.84	12.02	12.20	12.79
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 50		Tmin [°C]: -30

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

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Kwei Shan

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

Kwei Shan Site II

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

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