FCC Test Report

FCC ID	:	**JVPWDC10R**
Equipment	:	**InstaShow Host**
Model No.	:	**WDC10R**
Brand Name	:	**BenQ**
Applicant	:	**BenQ Corporation**
Address	:	**16 Jihu Road, Neihu, Taipei 114, Taiwan**
Standard	:	**47 CFR FCC Part 15.407**
Received Date	:	**Apr. 06, 2016**
Tested Date	:	**Apr. 25 ~ May 04, 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:

Along Chen

Along Chen / Assistant Manager

Testing Laboratory
2732

Table of Contents

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Local Support Equipment List 8
1.3 Test Setup Chart 8
1.4 The Equipment List 9
1.5 Testing Applied Standards 10
1.6 Measurement Uncertainty 10

2 TEST CONFIGURATION 11

2.1 Testing Condition 11
2.2 The Worst Test Modes and Channel Details 11

3 TRANSMITTER TEST RESULTS 12

3.1 Conducted Emissions 12
3.2 Emission Bandwidth 17
3.3 RF Output Power 20
3.4 Peak Power Spectral Density 22
3.5 Transmitter Radiated and Band Edge Emissions 26
3.6 Frequency Stability 63

4 TEST LABORATORY INFORMATION 65

Release Record

Report No.	Version	Description	Issued Date
FR640602-01	Rev. 01	Initial issue	May 18, 2016

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.169MHz 56.56 (Margin -8.47dB) - QP	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 668.26MHz 45.00 (Margin -1.00dB) - QP	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: 15.39 5725-5850MHz: 17.13	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	ac (VHT20)	5180-5240	36-48 [4]	2	MCS 0-9
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	2	MCS 0-9
Note 1: RF output power specifies that Maximum Conducted Output Power. Note 2: 802.11ac 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	ac (VHT20)	5745-5825	149-165 [5]	2	MCS 0-9
5725-5850	ac (VHT40)	5755-5795	151-159 [2]	2	MCS 0-9
Note 1: RF output power specifies that Maximum Conducted Output Power. Note 2: 802.11ac uses a combination of OFDM-BPSK, -QPSK, -16QAM, -64QAM, -256QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Antenna Gain (dBi)
1	M.gear	C529-510386-A	Dipole	SMA Straight Plug Reverse	2

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	AC Adapter	Brand Name: Zzu Model Name: ZZU1001-150050U Power Rating: I/P: 100-240Vac, 50-60Hz, 0.5A O/P: 5Vdc, 1.5A
2	USB cable (for charging use)	1.435m shielded without core
3	HDMI cable	0.73m shielded without core

1.1.5 Channel List

For Frequency band 5150-5250 MHz			
802.11 ac VHT20		**802.11 ac VHT40**	
Channel	**Frequency(MHz)**	**Channel**	**Frequency(MHz)**
36	5180	38	5190
40	5200	46	5230
44	5220	---	---
48	5240	---	---

For Frequency band 5725~5850 MHz			
802.11 ac VHT20		**802.11 ac VHT40**	
Channel	**Frequency(MHz)**	**Channel**	**Frequency(MHz)**
149	5745	151	5755
153	5765	159	5795
157	5785	---	---
161	5805	---	---
165	5825	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	Telnet		
Duty Cycle and Duty Factor	**Mode**	**Duty cycle (%)**	**Duty factor (dB)**
	VHT20	87.20%	0.59
	VHT40	78.63%	1.04

1.1.7 Power Setting

For Frequency band 5150-5250 MHz		
Modulation Mode	**Test Frequency (MHz)**	**Power Set**
VHT20	5180	11/12
VHT20	5200	11/12
VHT20	5240	10/11
VHT40	5190	12/13
VHT40	5230	10/11

For Frequency band 5725~5850 MHz		
Modulation Mode	**Test Frequency (MHz)**	**Power Set**
VHT20	5745	26/24
VHT20	5785	26/24
VHT20	5825	27/25
VHT40	5755	24/22
VHT40	5795	27/25

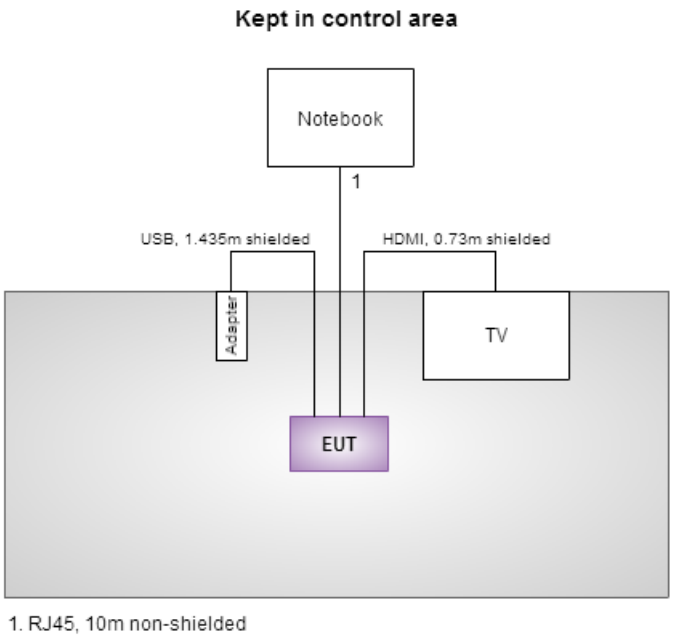
1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Signal cable / Length (m)**
1	Notebook	DELL	Latitude E5420	DoC	RJ45, 10m non-shielded.
2	TV	CHIMEI	TL-24LF500D	---	HDMI, 0.73m shielded.
3	Console board	---	---	---	---

Note: Console board is provided by applicant.

1.3 Test Setup Chart

Test Setup Diagram



Note: The console board is disconnected from EUT and removed from test table after sending commend from notebook to control EUT to transmit continuously.

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. 21, 2015	Oct. 20, 2016
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2015	Nov. 12, 2016
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 21, 2015	Dec. 20, 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 chamber 2 / (03CH02-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101499	Dec. 17, 2015	Dec. 16, 2016
Receiver	R&S	ESR3	101657	Jan. 12, 2016	Jan. 11, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-523	Nov. 09, 2015	Nov. 08, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Oct. 07, 2015	Oct. 06, 2016
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
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 10, 2015	Dec. 09, 2016
Preamplifier	Burgeon	BPA-530	100218	Nov. 03, 2015	Nov. 02, 2016
Preamplifier	Agilent	83017A	MY39501309	Sep. 22, 2015	Sep. 21, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 10, 2015	Dec. 09, 2016
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 10, 2015	Dec. 09, 2016
LF cable 10M	EMCC	CFD400-E	CFD400-001	Dec. 10, 2015	Dec. 09, 2016
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)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 17, 2016	Feb. 16, 2017
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
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 v01r02
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	±2.90 dB
Radiated emission ≤ 1GHz	±3.87 dB
Radiated emission > 1GHz	±5.60 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	21°C / 60%	Howard Huang
Radiated Emissions	03CH02-WS	21°C / 61%	Vincent Yeh Anderson Hong
RF Conducted	TH01-WS	22°C / 64%	Alex Huang

- FCC site registration No.: 181692
- IC site registration No.: 10807A-2

2.2 The Worst Test Modes and Channel Details

For Frequency band 5150-5250 MHz			
Test item	**Modulation Mode**	**Test Frequency (MHz)**	**Data Rate**
Conducted Emissions	VHT40	5190	MCS 0
Radiated Emissions ≤1GHz	VHT40	5190	MCS 0
RF Output Power Radiated Emissions >1GHz Emission Bandwidth Peak Power Spectral Density	VHT20 VHT40	5180 / 5200 / 5240 5190 / 5230	MCS 0 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** result was found as the worst case and was shown in this report.

For Frequency band 5725-5850 MHz			
Test item	**Modulation Mode**	**Test Frequency (MHz)**	**Data Rate**
Conducted Emissions	VHT20	5825	MCS 0
Radiated Emissions ≤1GHz	VHT20	5825	MCS 0
RF Output Power Radiated Emissions >1GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	VHT20 VHT40	5745 / 5785 / 5825 5755 / 5795	MCS 0 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** result was found as the worst case and was shown in this report.

3 Transmitter Test Results

3.1 Conducted Emissions

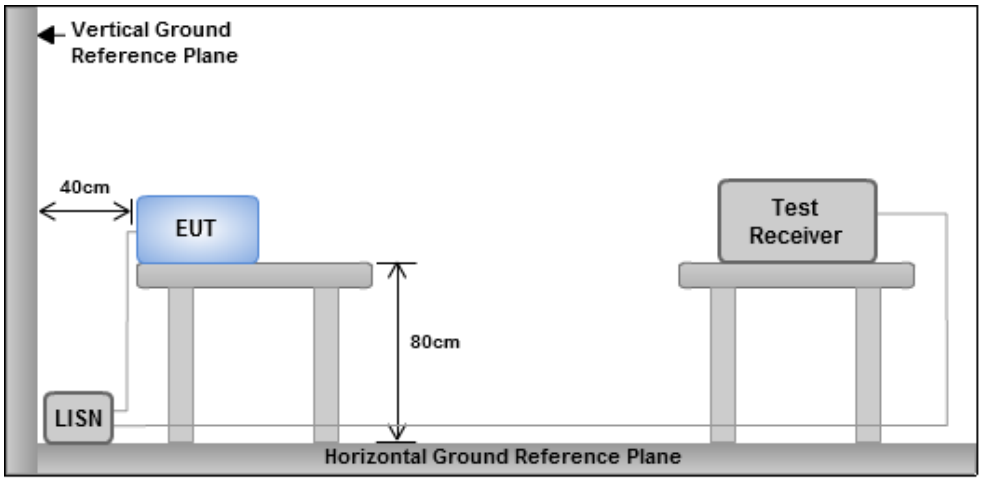
3.1.1 Limit of Conducted Emissions

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.

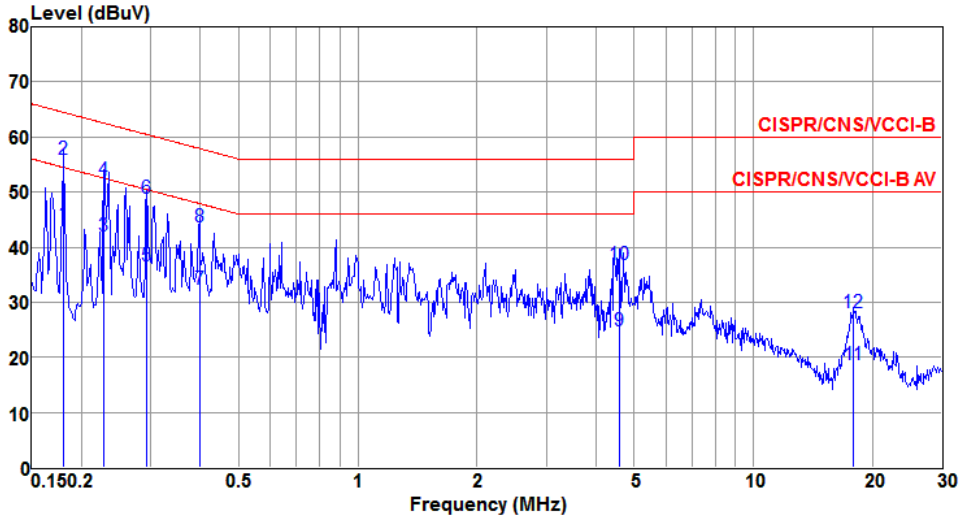
3.1.3 Test Setup



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

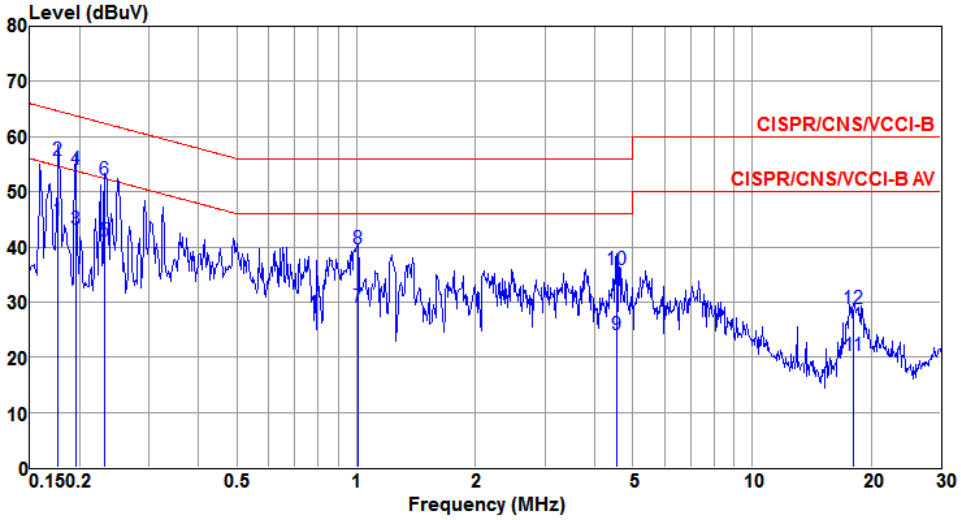
Modulation	VHT40	Test Freq. (MHz)	5190
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.181	44.07	54.46	-10.39	43.57	0.48	0.02	Average
2@	0.181	55.97	64.46	-8.49	55.47	0.48	0.02	QP
3	0.228	41.95	52.52	-10.57	41.69	0.24	0.02	Average
4	0.228	52.05	62.52	-10.47	51.79	0.24	0.02	QP
5	0.292	36.50	50.46	-13.96	36.26	0.21	0.03	Average
6	0.292	48.81	60.46	-11.65	48.57	0.21	0.03	QP
7	0.398	32.34	47.90	-15.56	32.13	0.18	0.03	Average
8	0.398	43.63	57.90	-14.27	43.42	0.18	0.03	QP
9	4.574	24.86	46.00	-21.14	24.41	0.32	0.13	Average
10	4.574	36.71	56.00	-19.29	36.26	0.32	0.13	QP
11	17.944	18.66	50.00	-31.34	17.73	0.75	0.18	Average
12	17.944	28.19	60.00	-31.81	27.26	0.75	0.18	QP

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

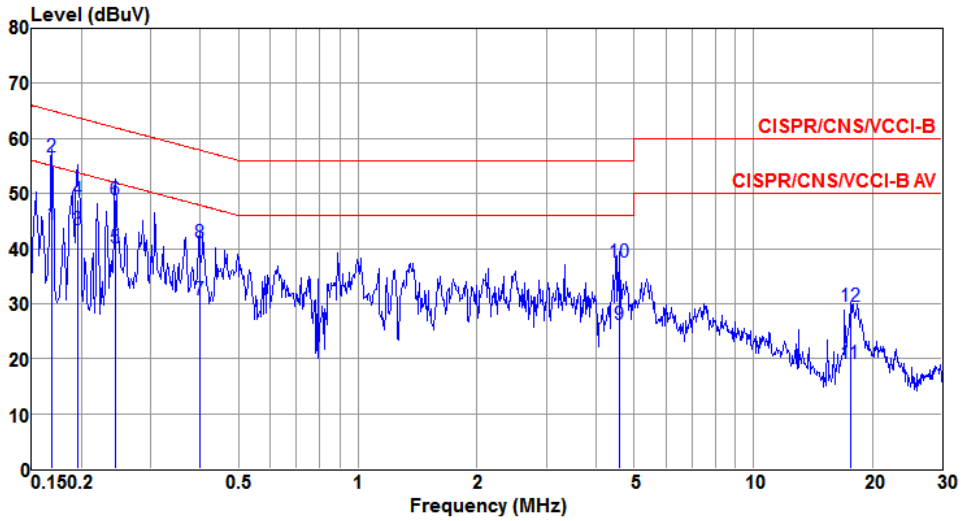
Modulation	VHT40	Test Freq. (MHz)	5190
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.177	44.94	54.64	-9.70	44.42	0.50	0.02	Average
2@	0.177	55.70	64.64	-8.94	55.18	0.50	0.02	QP
3	0.195	43.17	53.80	-10.63	42.86	0.29	0.02	Average
4	0.195	53.99	63.80	-9.81	53.68	0.29	0.02	QP
5	0.232	41.14	52.39	-11.25	40.90	0.22	0.02	Average
6	0.232	52.18	62.39	-10.21	51.94	0.22	0.02	QP
7	1.010	28.98	46.00	-17.02	28.65	0.27	0.06	Average
8	1.010	39.70	56.00	-16.30	39.37	0.27	0.06	QP
9	4.549	24.20	46.00	-21.80	23.36	0.71	0.13	Average
10	4.549	35.77	56.00	-20.23	34.93	0.71	0.13	QP
11	18.039	20.39	50.00	-29.61	19.50	0.71	0.18	Average
12	18.039	28.69	60.00	-31.31	27.80	0.71	0.18	QP

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

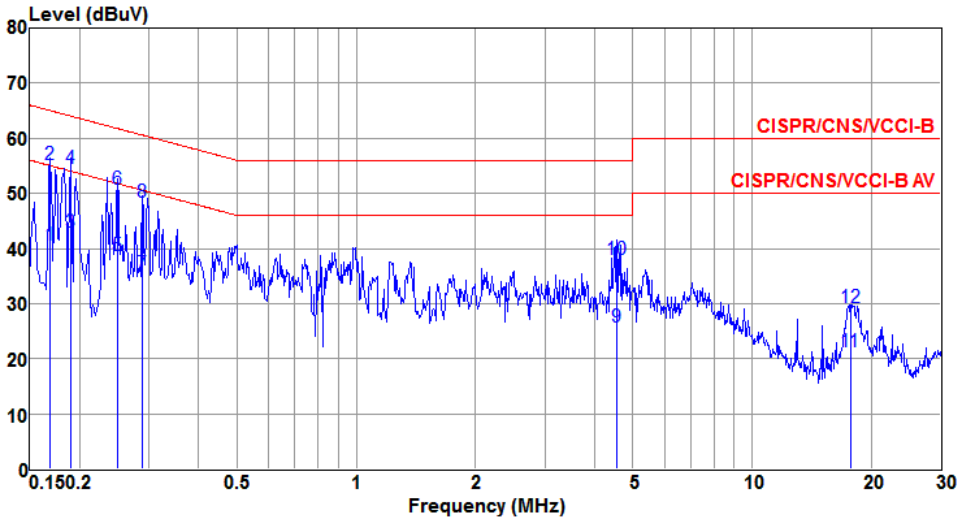
Modulation	VHT20	Test Freq. (MHz)	5825
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.169	44.45	55.03	-10.58	43.78	0.65	0.02	Average
2@	0.169	56.56	65.03	-8.47	55.89	0.65	0.02	QP
3	0.195	43.32	53.80	-10.48	42.99	0.31	0.02	Average
4	0.195	48.86	63.80	-14.94	48.53	0.31	0.02	QP
5	0.244	40.02	51.95	-11.93	39.77	0.23	0.02	Average
6	0.244	48.85	61.95	-13.10	48.60	0.23	0.02	QP
7	0.398	30.77	47.90	-17.13	30.56	0.18	0.03	Average
8	0.398	41.09	57.90	-16.81	40.88	0.18	0.03	QP
9	4.598	26.31	46.00	-19.69	25.86	0.32	0.13	Average
10	4.598	37.59	56.00	-18.41	37.14	0.32	0.13	QP
11	17.568	19.07	50.00	-30.93	18.13	0.75	0.19	Average
12	17.568	29.42	60.00	-30.58	28.48	0.75	0.19	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)	5825
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.169	40.56	55.03	-14.47	39.93	0.61	0.02	Average
2	0.169	55.31	65.03	-9.72	54.68	0.61	0.02	QP
3	0.189	42.96	54.06	-11.10	42.60	0.34	0.02	Average
4@	0.189	54.55	64.06	-9.51	54.19	0.34	0.02	QP
5	0.249	38.74	51.78	-13.04	38.52	0.20	0.02	Average
6	0.249	50.72	61.78	-11.06	50.50	0.20	0.02	QP
7	0.288	35.44	50.59	-15.15	35.23	0.18	0.03	Average
8	0.288	48.40	60.59	-12.19	48.19	0.18	0.03	QP
9	4.549	25.69	46.00	-20.31	24.85	0.71	0.13	Average
10	4.549	37.98	56.00	-18.02	37.14	0.71	0.13	QP
11	17.755	21.24	50.00	-28.76	20.35	0.70	0.19	Average
12	17.755	29.31	60.00	-30.69	28.42	0.70	0.19	QP

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.

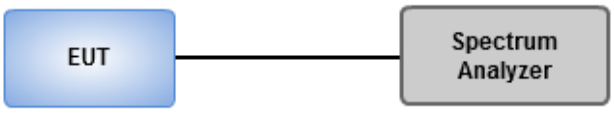
Occupied Bandwidth

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

6dB Bandwidth

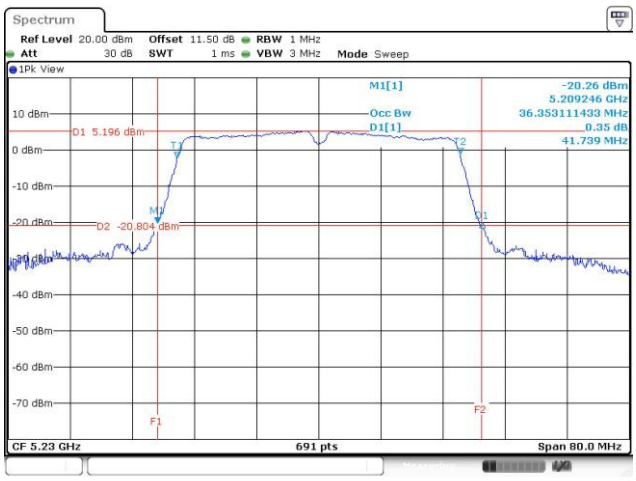
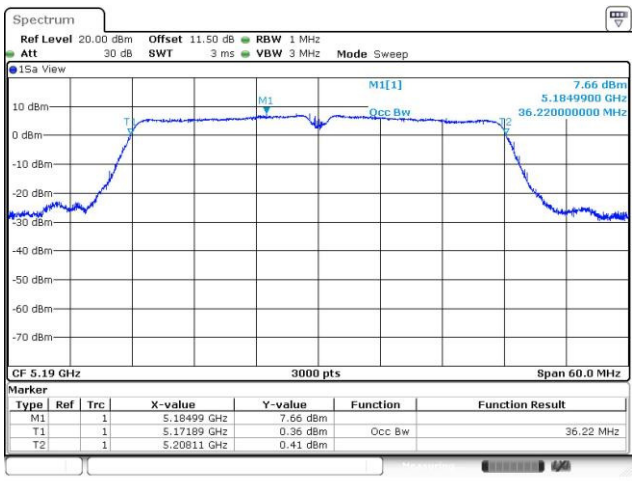
1. Set RBW = 100kHz, VBW = 300kHz
2. Detector = Peak,Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB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

3.2.3 Test Setup

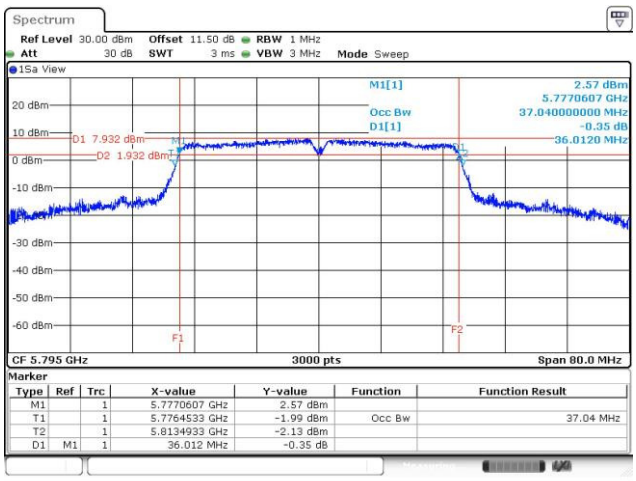
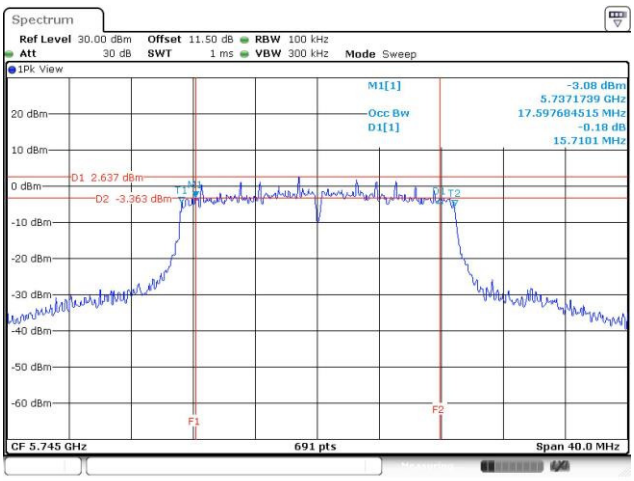


3.2.4 Test Result of Emission Bandwidth

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
VHT20	2	5180	20.46	20.41	---	---	17.68	17.69	---	---
VHT20	2	5200	20.41	20.52	---	---	17.70	17.68	---	---
VHT20	2	5240	20.52	20.46	---	---	17.69	17.68	---	---
VHT40	2	5190	41.74	41.16	---	---	36.22	36.16	---	---
VHT40	2	5230	41.74	41.51	---	---	36.18	36.16	---	---

Worst Plot of 26dB Bandwidth	Worst Plot of 99% Bandwidth
	

For Frequency band 5725-5850 MHz											
Emission Bandwidth											
Mode	N_{TX}	Freq. (MHz)	OBW Bandwidth (MHz)				6dB Bandwidth (MHz)				
			Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	6dB BW Limit (MHz)
VHT20	2	5745	18.19	17.80	---	---	16.29	15.71	---	---	0.5
VHT20	2	5785	18.16	17.77	---	---	17.04	16.06	---	---	0.5
VHT20	2	5825	18.17	17.85	---	---	16.70	16.12	---	---	0.5
VHT40	2	5755	36.69	36.27	---	---	35.13	35.13	---	---	0.5
VHT40	2	5795	37.04	36.43	---	---	35.13	35.13	---	---	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			
VHT20	2	5180	12.06	11.32	---	---	29.621	14.72	30.00
VHT20	2	5200	11.89	11.20	---	---	28.635	14.57	30.00
VHT20	2	5240	11.61	11.15	---	---	27.519	14.40	30.00
VHT40	2	5190	12.52	12.23	---	---	34.576	**15.39**	30.00
VHT40	2	5230	11.24	11.17	---	---	26.396	14.22	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			
VHT20	2	5745	13.39	13.01	---	---	41.826	16.21	30.00
VHT20	2	5785	13.22	13.09	---	---	41.360	16.17	30.00
VHT20	2	5825	14.08	14.16	---	---	51.647	**17.13**	30.00
VHT40	2	5755	12.93	12.81	---	---	38.732	15.88	30.00
VHT40	2	5795	13.85	14.18	---	---	50.448	17.03	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 ≥ 10 * (number of points in sweep) * (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

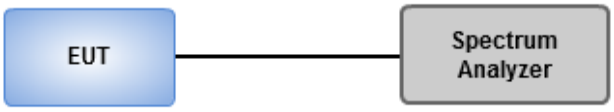
☐ Method SA-1

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 ≥ 10 * (number of points in sweep) * (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

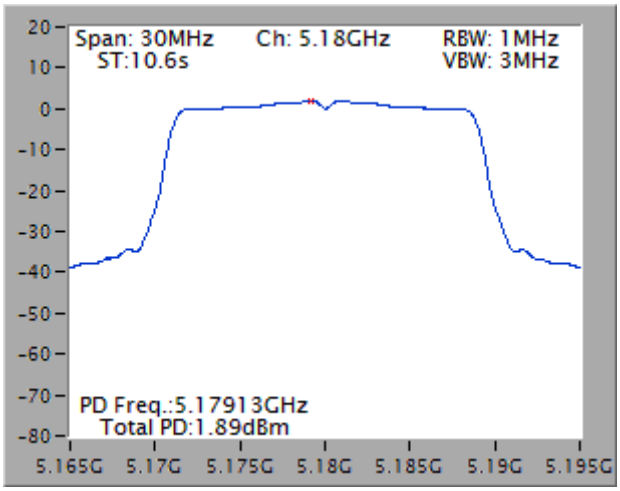


3.4.4 Test Result of Peak Power Spectral Density

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)
VHT20	2	5180	1.89	0.59	2.48	17
VHT20	2	5200	1.70	0.59	2.29	17
VHT20	2	5240	1.26	0.59	1.85	17
VHT40	2	5190	-1.21	1.04	-0.17	17
VHT40	2	5230	-2.55	1.04	-1.51	17

Note:
1. D.F is duty factor.
2. Test results are bin-by-bin summing measured value of each TX port.

Worst Plot

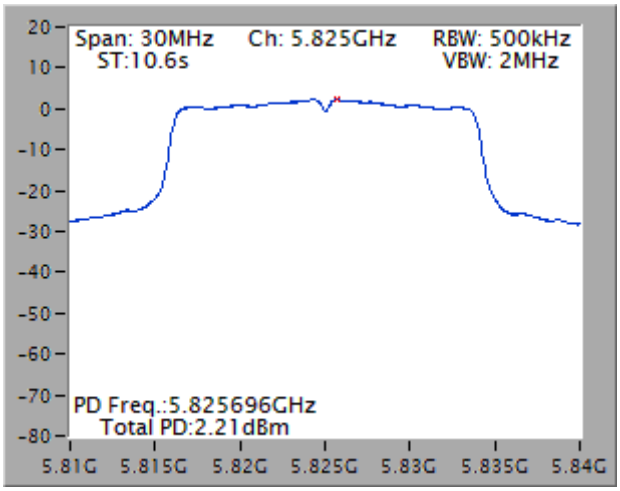


Note: The plot without duty factor.

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)
VHT20	2	5745	1.74	0.59	2.33	30.00
VHT20	2	5785	1.93	0.59	2.52	30.00
VHT20	2	5825	2.21	0.59	2.80	30.00
VHT40	2	5755	-2.65	1.04	-1.61	30.00
VHT40	2	5795	-1.15	1.04	-0.11	30.00

Note:
1. D.F is duty factor.
2. Test results are bin-by-bin summing measured value of each TX port.

Worst Plot



Note: The plot without duty factor.

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	☒	15.407(b)(4)(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
	☐	15.407(b)(4)(ii) ,compliance with the emission limits in § 15.247(d) Shall be at least 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power,. Attenuation below the general limits specified in §15.209(a) is not required. In addition,radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see § 15.205(c))
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

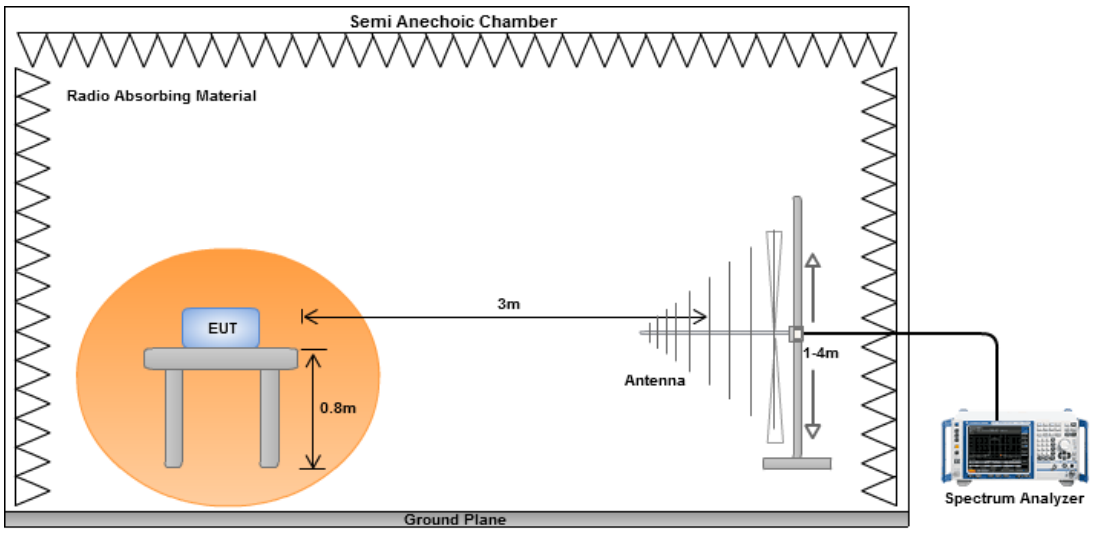
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

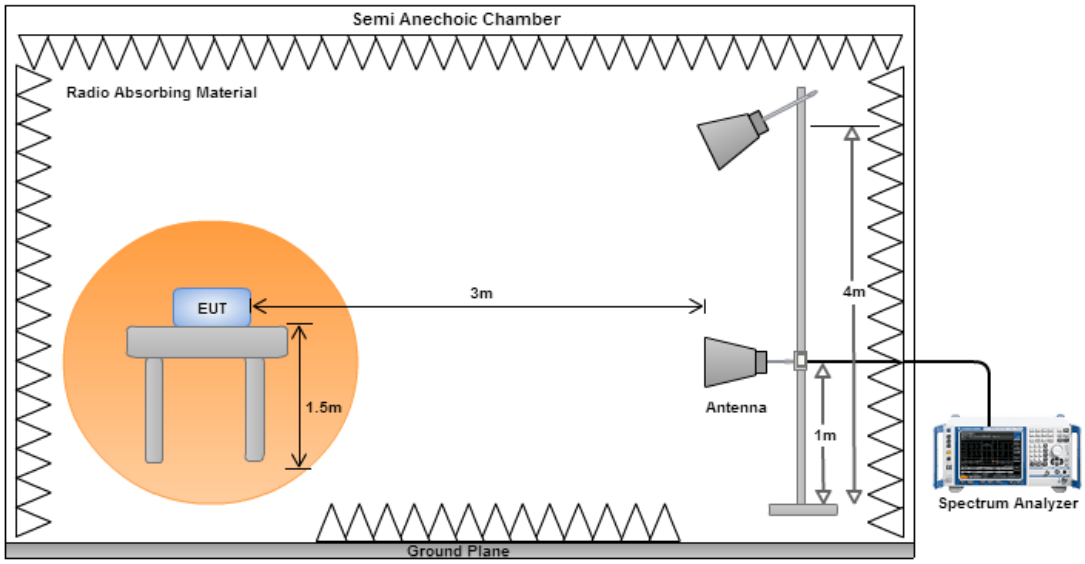
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

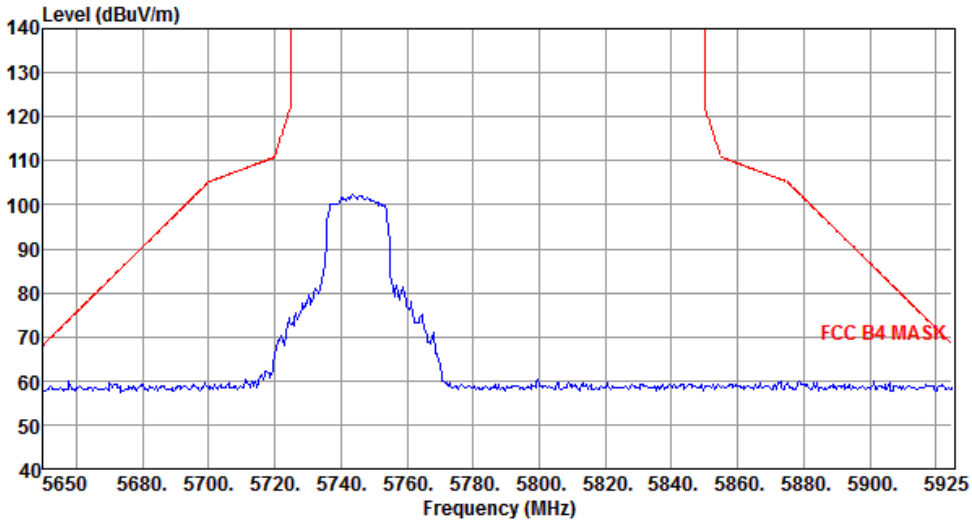


Radiated Emissions above 1 GHz

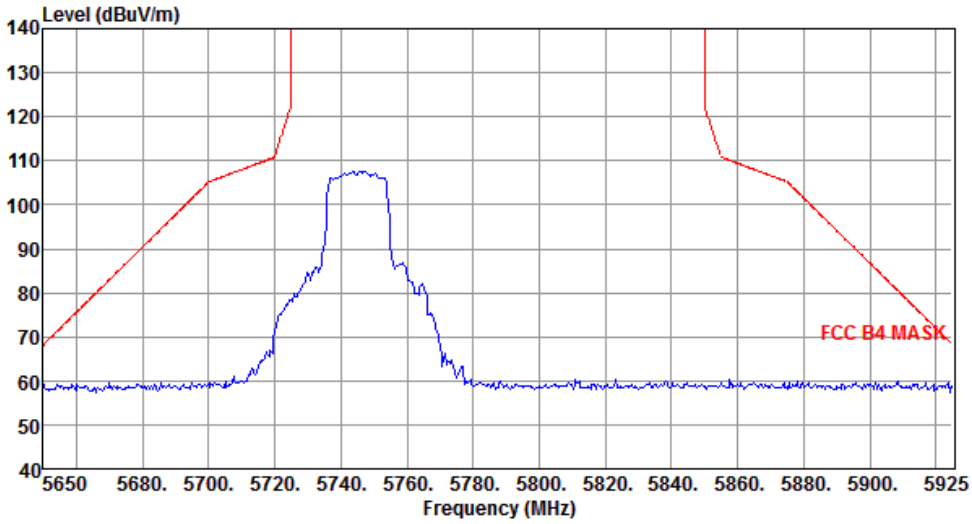


3.5.4 Transmitter Radiated Band Edge for VHT20

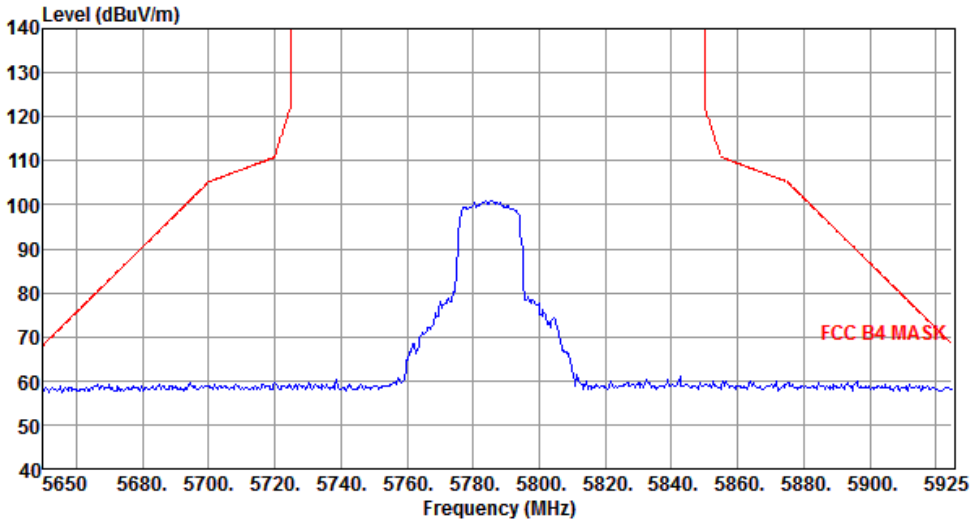
Modulation	VHT20	**Test Freq. (MHz)**	5745
Polarization	Horizontal		



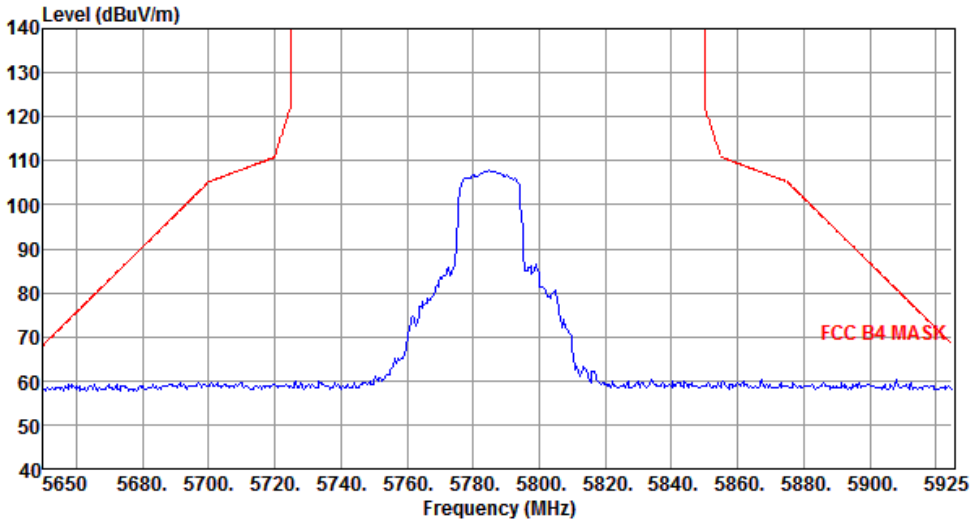
Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Vertical		



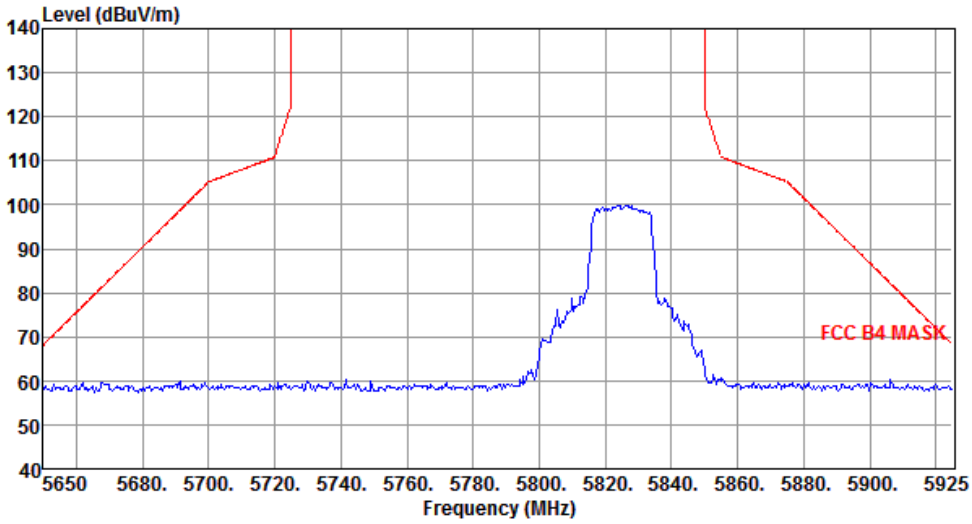
Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Horizontal		



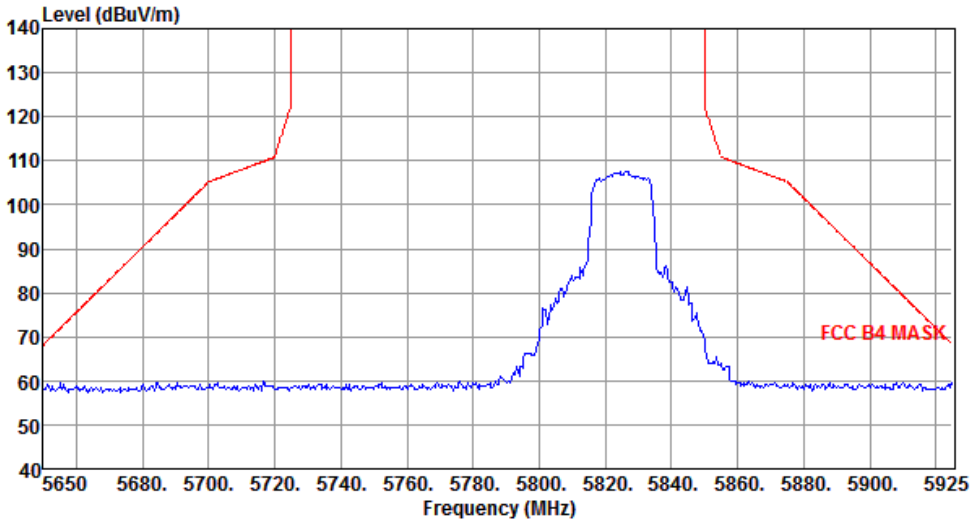
Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Vertical		



Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Horizontal		

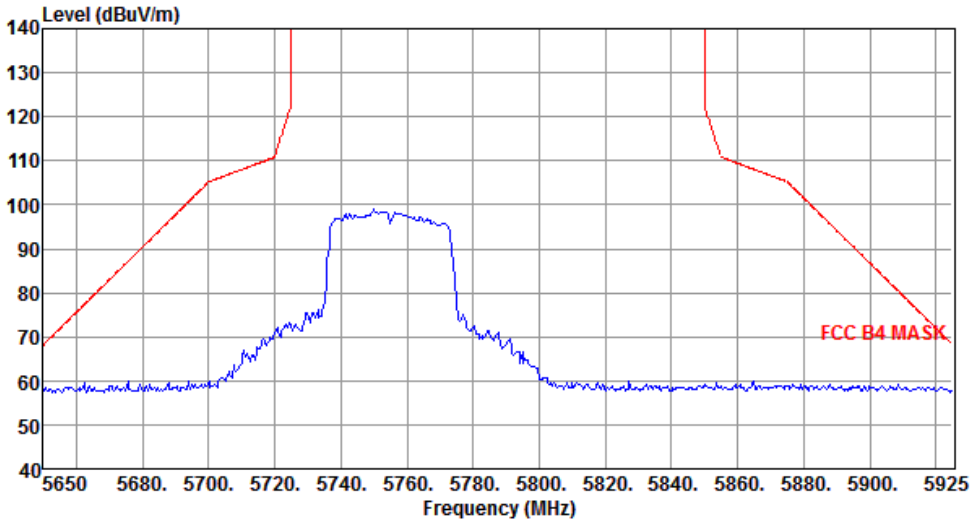


Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Vertical		

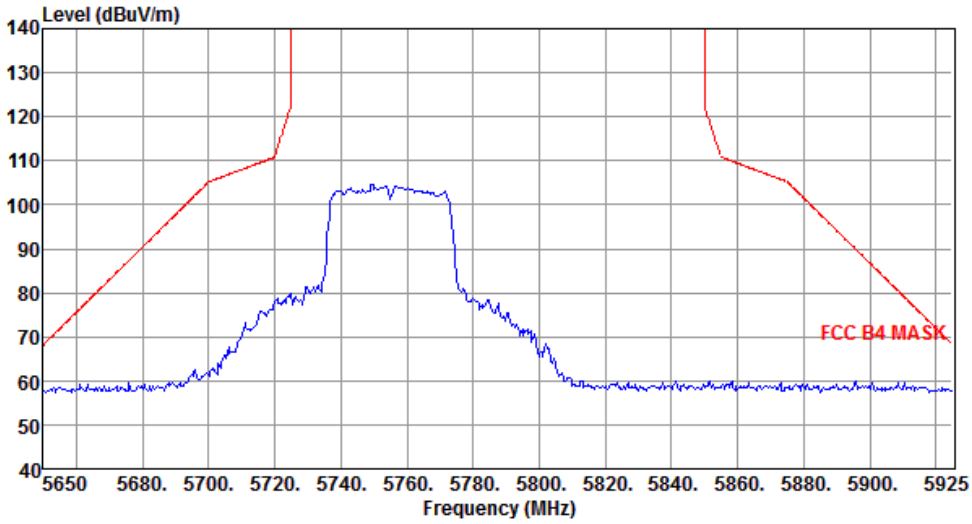


3.5.5 Transmitter Radiated Band Edge for VHT40

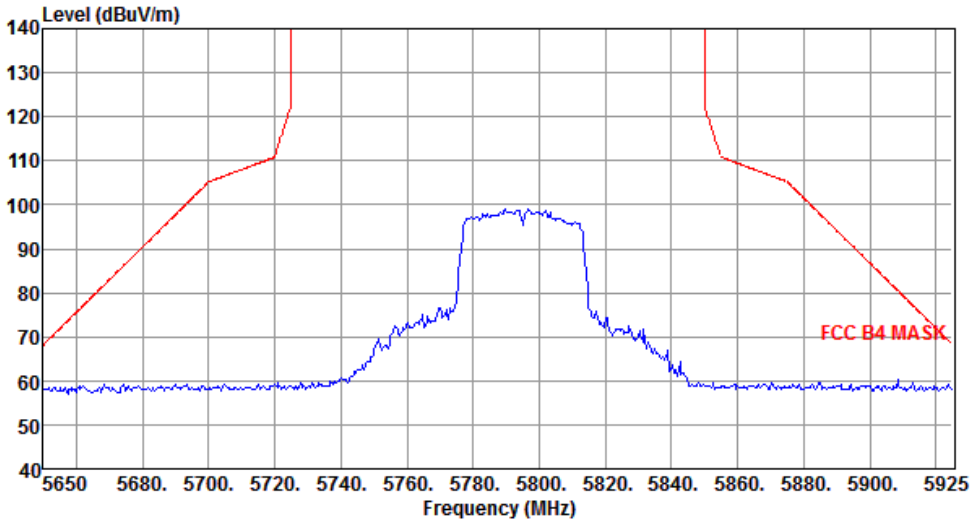
Modulation	VHT40	**Test Freq. (MHz)**	5755
Polarization	Horizontal		



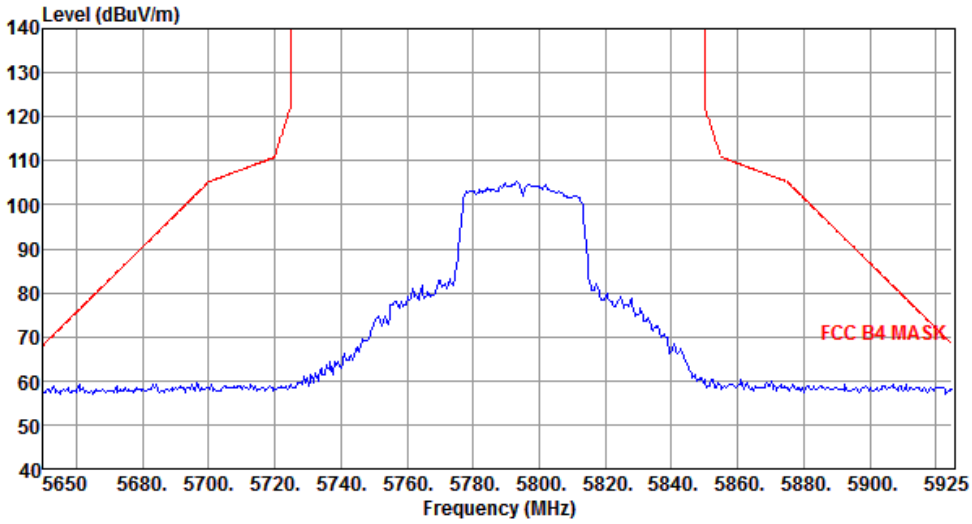
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		



Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		

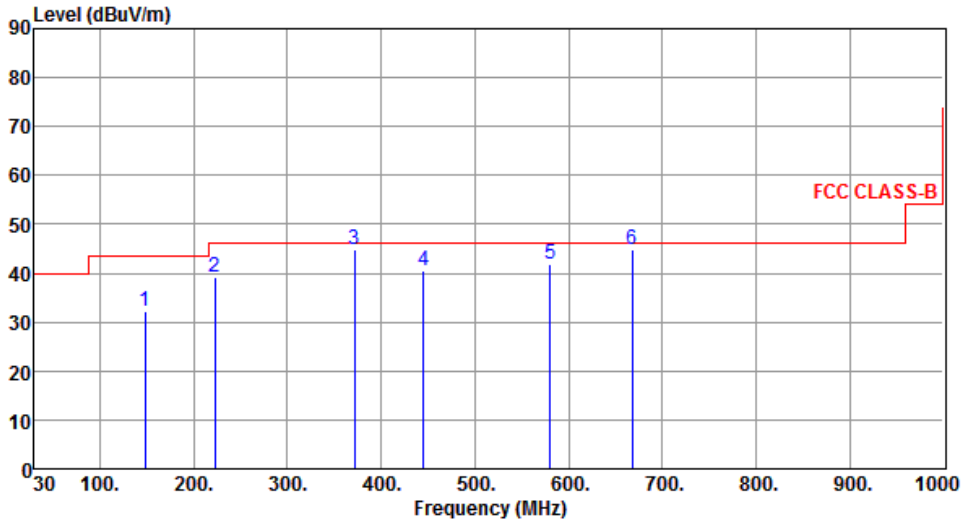


Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Vertical		



3.5.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

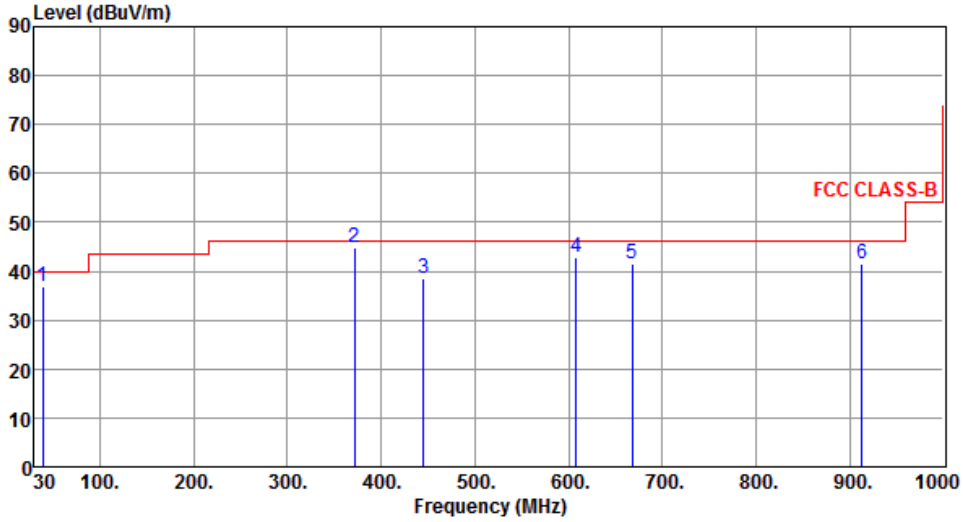
Modulation	VHT40	**Test Freq. (MHz)**	5190
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	148.34	32.12	43.50	-11.38	44.10	-11.98	Peak	---	---
2	223.03	39.04	46.00	-6.96	53.19	-14.15	Peak	---	---
3	371.44	44.87	46.00	-1.13	54.30	-9.43	QP	100	155
4	445.16	40.40	46.00	-5.60	48.06	-7.66	Peak	---	---
5	579.99	41.98	46.00	-4.02	46.98	-5.00	Peak	---	---
6	668.26	45.00	46.00	-1.00	48.69	-3.69	QP	116	9

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.

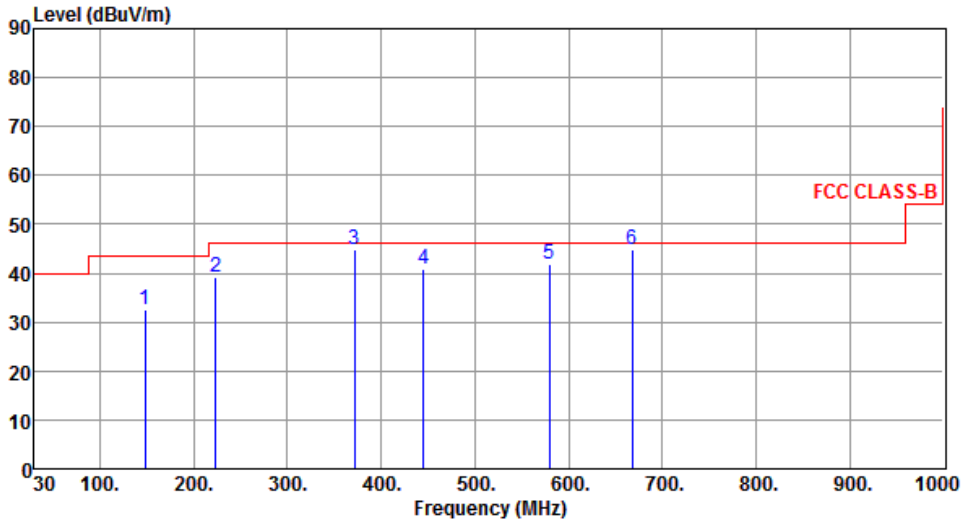
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	38.73	37.01	40.00	-2.99	48.99	-11.98	Peak	---	---
2	371.44	44.83	46.00	-1.17	54.26	-9.43	QP	137	66
3	445.16	38.63	46.00	-7.37	46.29	-7.66	Peak	---	---
4	608.12	42.74	46.00	-3.26	47.22	-4.48	Peak	---	---
5	668.26	41.45	46.00	-4.55	45.14	-3.69	Peak	---	---
6	912.70	41.42	46.00	-4.58	41.84	-0.42	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.

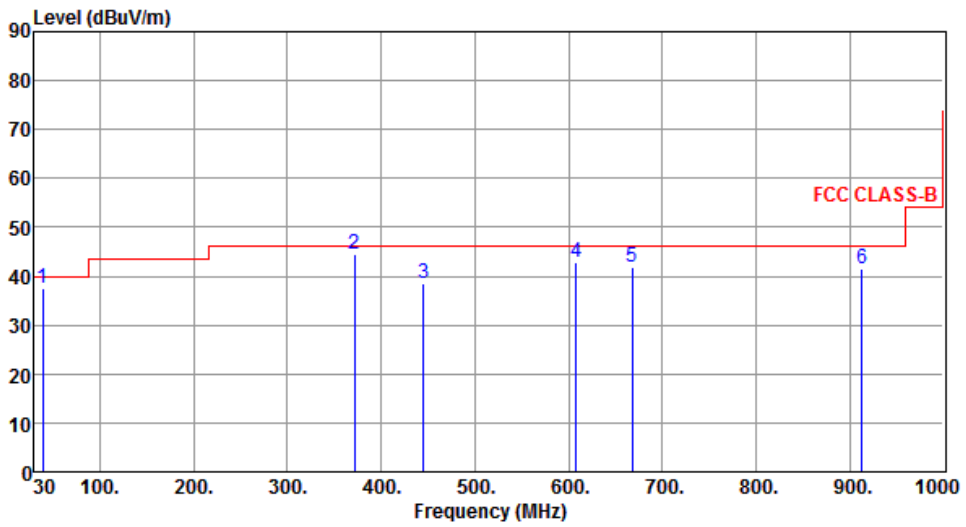
Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	148.36	32.43	43.50	-11.07	44.41	-11.98	Peak	---	---
2	223.08	39.26	46.00	-6.74	53.40	-14.14	Peak	---	---
3	371.42	44.72	46.00	-1.28	54.15	-9.43	QP	104	153
4	445.12	40.72	46.00	-5.28	48.38	-7.66	Peak	---	---
5	579.93	41.84	46.00	-4.16	46.84	-5.00	Peak	---	---
6	668.21	44.89	46.00	-1.11	48.59	-3.70	QP	113	5

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)	5825
Polarization	Vertical		

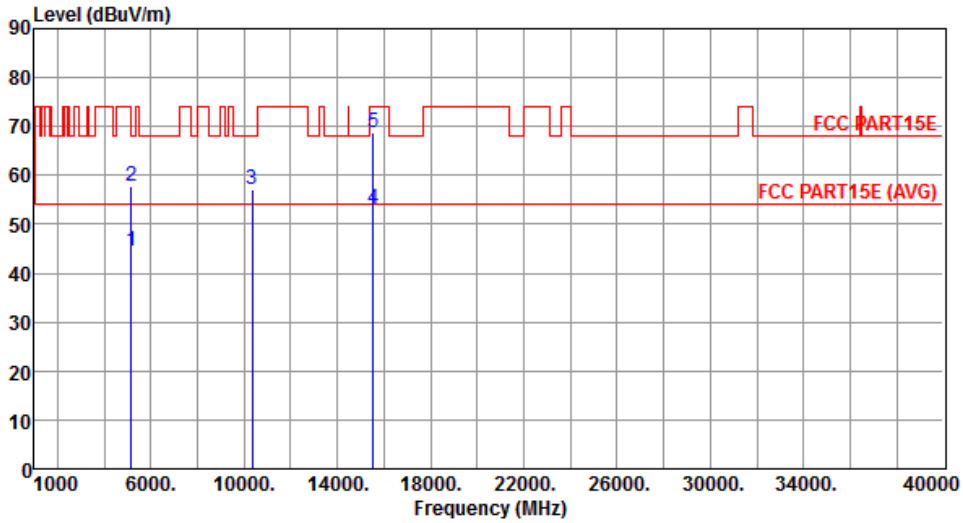


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	38.76	37.41	40.00	-2.59	49.38	-11.97	Peak	---	---
2	371.42	44.65	46.00	-1.35	54.08	-9.43	QP	132	62
3	445.12	38.54	46.00	-7.46	46.20	-7.66	Peak	---	---
4	608.19	42.96	46.00	-3.04	47.44	-4.48	Peak	---	---
5	668.22	41.71	46.00	-4.29	45.40	-3.69	Peak	---	---
6	912.78	41.55	46.00	-4.45	41.97	-0.42	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.

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

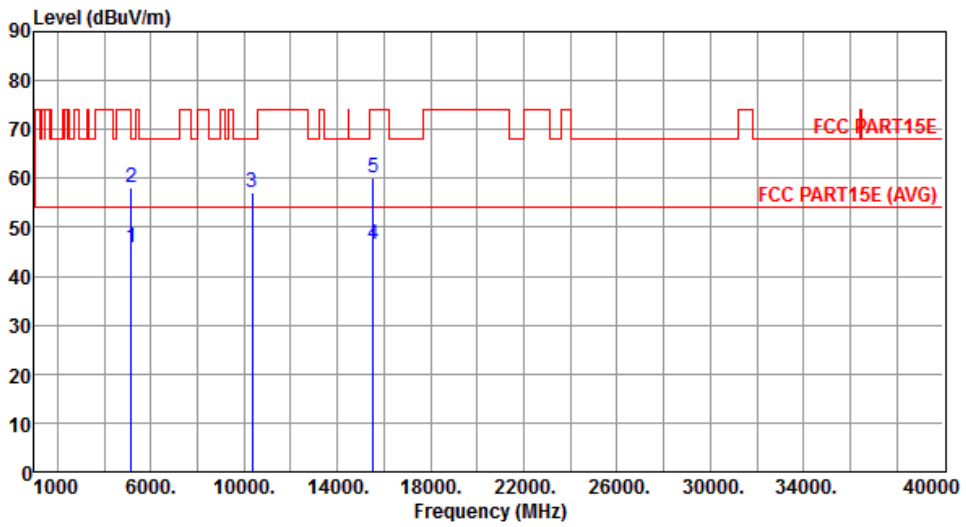
Modulation	VHT20	**Test Freq. (MHz)**	5180
Polarization	Horizontal		



	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	44.45	54.00	-9.55	39.55	4.90	Average	260	201
2	5150.00	57.64	74.00	-16.36	52.74	4.90	Peak	260	201
3	10360.00	57.15	68.20	-11.05	43.48	13.67	Peak	195	337
4	15540.00	52.98	54.00	-1.02	37.26	15.72	Average	209	290
5	15540.00	68.82	74.00	-5.18	53.10	15.72	Peak	209	290

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).

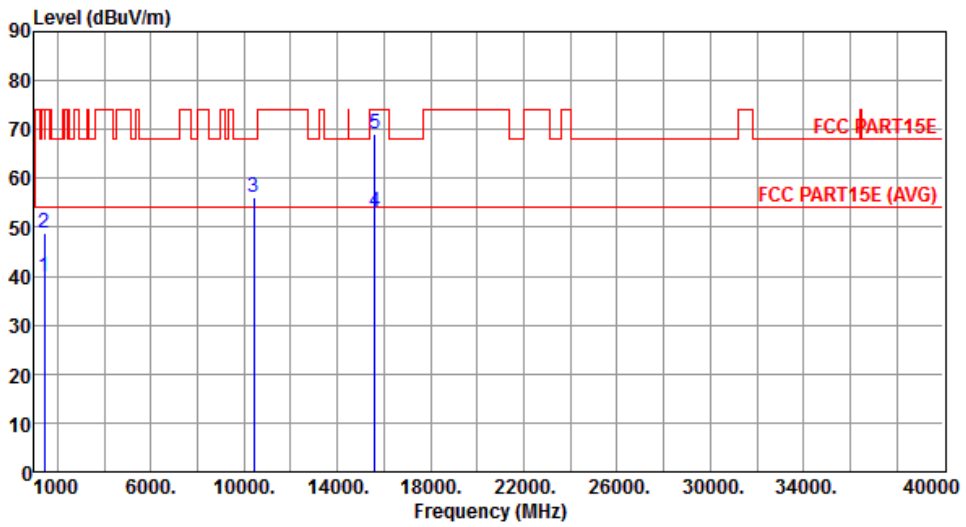
Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	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	45.73	54.00	-8.27	40.83	4.90	Average	193	36
2	5150.00	58.14	74.00	-15.86	53.24	4.90	Peak	193	36
3	10360.00	56.97	68.20	-11.23	43.30	13.67	Peak	232	14
4	15540.00	46.54	54.00	-7.46	30.82	15.72	Average	227	19
5	15540.00	60.02	74.00	-13.98	44.30	15.72	Peak	227	19

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).

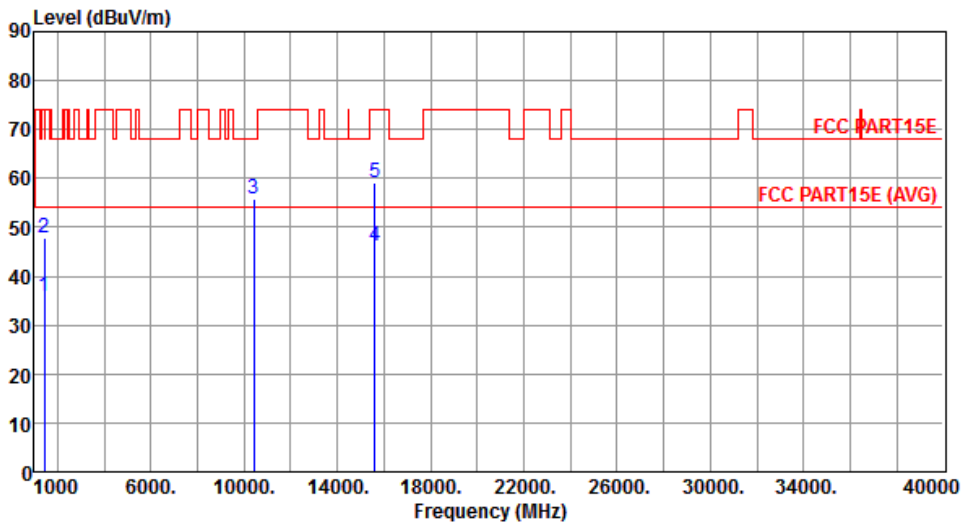
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	39.76	54.00	-14.24	46.56	-6.80	Average	132	337
2	1443.00	48.96	74.00	-25.04	55.76	-6.80	Peak	132	337
3	10400.00	56.26	68.20	-11.94	42.51	13.75	Peak	170	69
4	15600.00	52.98	54.00	-1.02	37.37	15.61	Average	204	304
5	15600.00	68.93	74.00	-5.07	53.32	15.61	Peak	204	304

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).

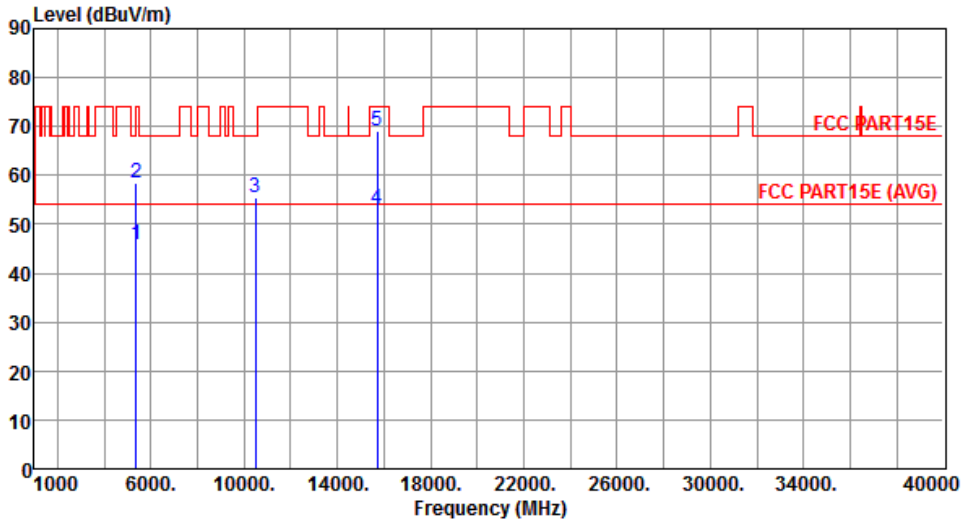
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	35.86	54.00	-18.14	42.66	-6.80	Average	179	181
2	1443.00	47.95	74.00	-26.05	54.75	-6.80	Peak	179	181
3	10400.00	55.84	68.20	-12.36	42.09	13.75	Peak	314	182
4	15600.00	46.02	54.00	-7.98	30.41	15.61	Average	225	9
5	15600.00	59.09	74.00	-14.91	43.48	15.61	Peak	225	9

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).

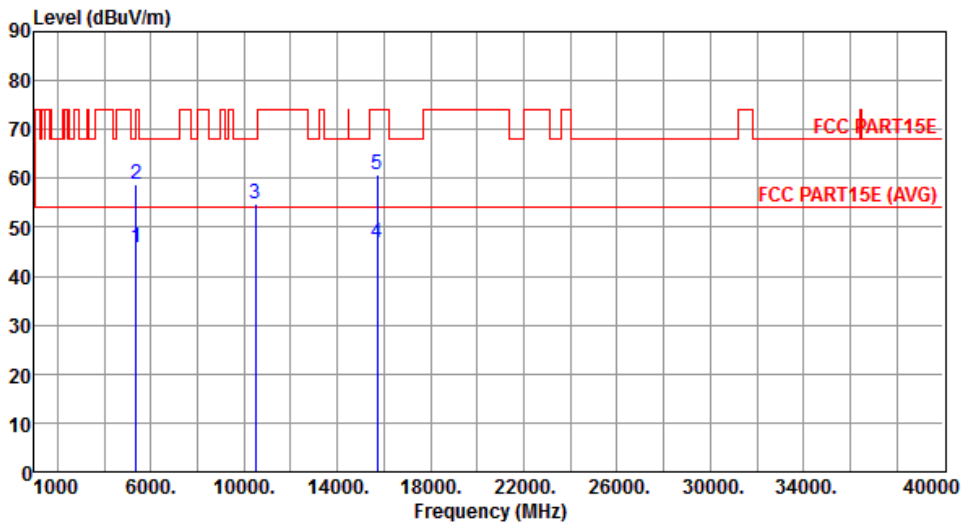
Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	45.67	54.00	-8.33	40.54	5.13	Average	222	327
2	5350.00	58.45	74.00	-15.55	53.32	5.13	Peak	222	327
3	10480.00	55.40	68.20	-12.80	41.50	13.90	Peak	193	34
4	15720.00	52.99	54.00	-1.01	37.60	15.39	Average	205	304
5	15720.00	69.02	74.00	-4.98	53.63	15.39	Peak	205	304

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).

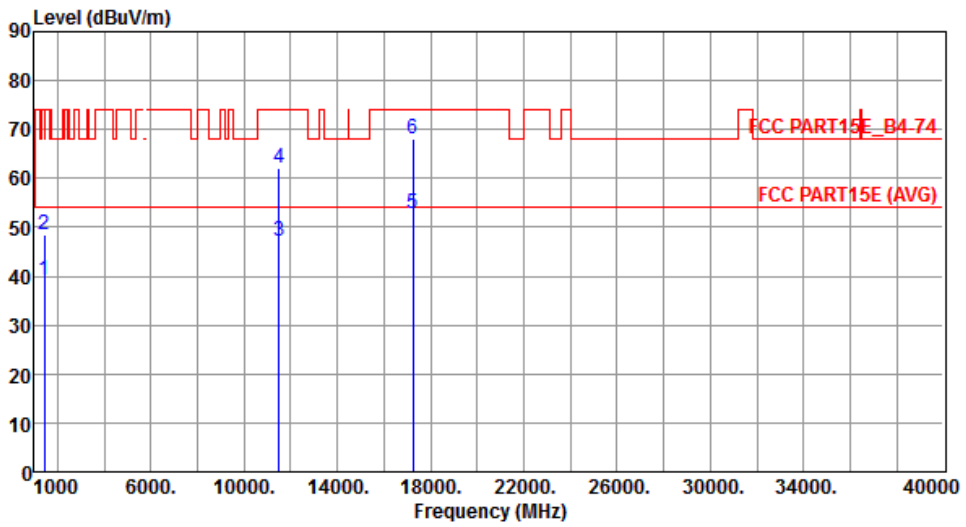
Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	45.83	54.00	-8.17	40.70	5.13	Average	184	17
2	5350.00	58.66	74.00	-15.34	53.53	5.13	Peak	184	17
3	10480.00	54.96	68.20	-13.24	41.06	13.90	Peak	241	352
4	15720.00	46.68	54.00	-7.32	31.29	15.39	Average	378	19
5	15720.00	60.82	74.00	-13.18	45.43	15.39	Peak	378	19

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).

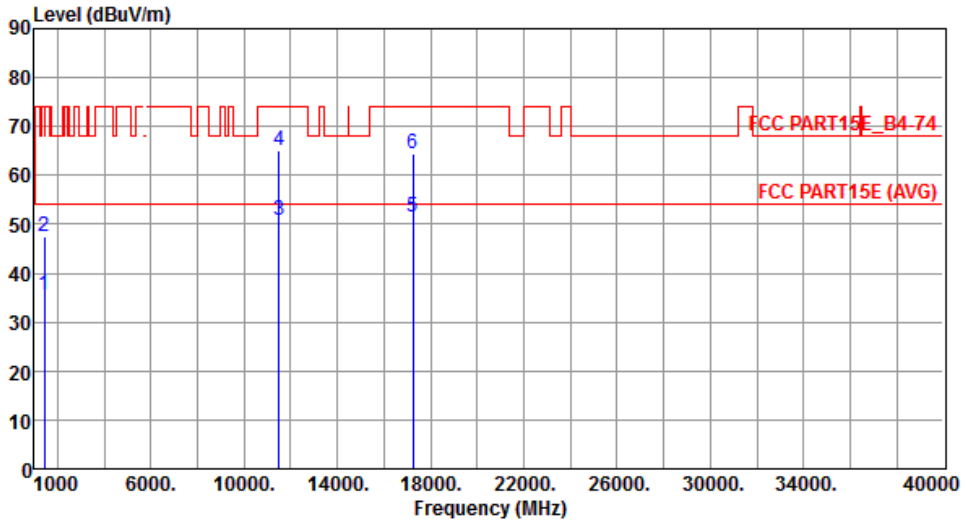
Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	39.35	54.00	-14.65	46.15	-6.80	Average	138	336
2	1443.00	48.65	74.00	-25.35	55.45	-6.80	Peak	138	336
3	11490.00	47.23	54.00	-6.77	32.61	14.62	Average	264	43
4	11490.00	62.11	74.00	-11.89	47.49	14.62	Peak	264	43
5	17235.00	52.86	54.00	-1.14	32.22	20.64	Average	203	46
6	17235.00	68.12	74.00	-5.88	47.48	20.64	Peak	203	46

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).

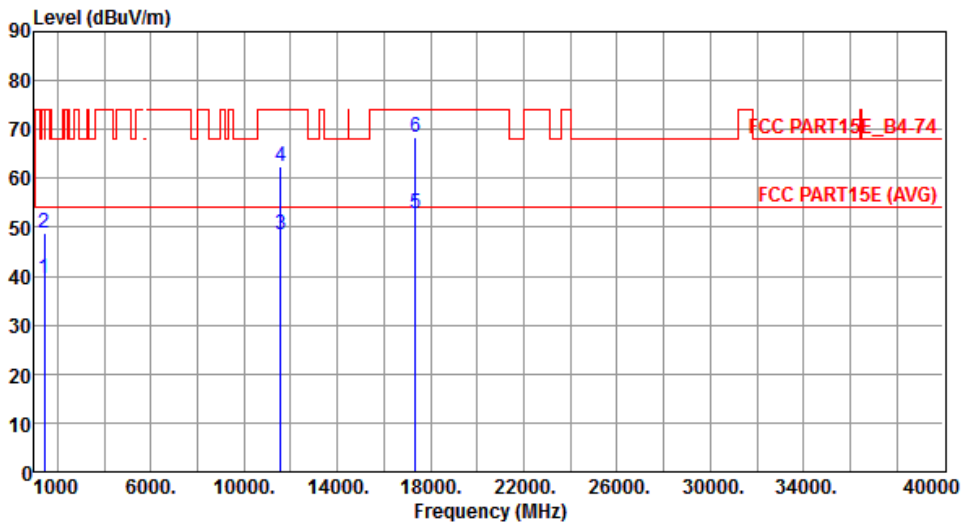
Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	35.47	54.00	-18.53	42.27	-6.80	Average	172	185
2	1443.00	47.52	74.00	-26.48	54.32	-6.80	Peak	172	185
3	11490.00	50.90	54.00	-3.10	36.28	14.62	Average	224	6
4	11490.00	65.24	74.00	-8.76	50.62	14.62	Peak	224	6
5	17235.00	51.63	54.00	-2.37	30.99	20.64	Average	205	46
6	17235.00	64.26	74.00	-9.74	43.62	20.64	Peak	205	46

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).

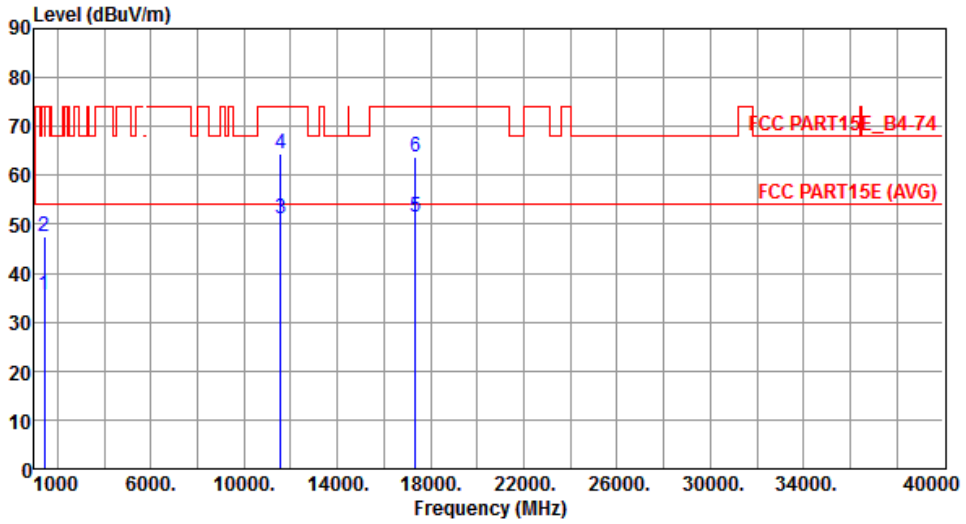
Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	39.46	54.00	-14.54	46.26	-6.80	Average	142	349
2	1443.00	48.93	74.00	-25.07	55.73	-6.80	Peak	142	349
3	11570.00	48.47	54.00	-5.53	33.95	14.52	Average	242	8
4	11570.00	62.47	74.00	-11.53	47.95	14.52	Peak	242	8
5	17355.00	52.93	54.00	-1.07	31.64	21.29	Average	206	298
6	17355.00	68.41	74.00	-5.59	47.12	21.29	Peak	206	298

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).

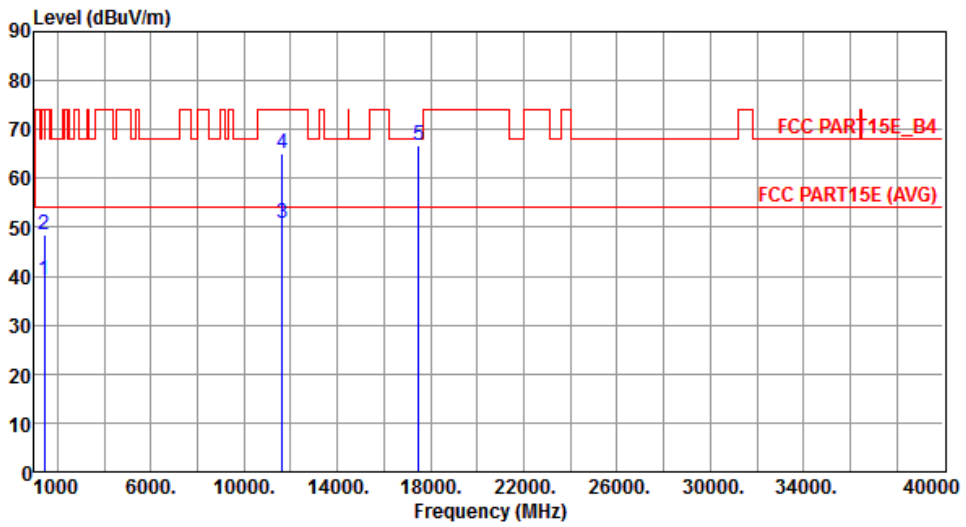
Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	35.60	54.00	-18.40	42.40	-6.80	Average	175	182
2	1443.00	47.49	74.00	-26.51	54.29	-6.80	Peak	175	182
3	11570.00	51.06	54.00	-2.94	36.54	14.52	Average	221	7
4	11570.00	64.32	74.00	-9.68	49.80	14.52	Peak	221	7
5	17355.00	51.39	54.00	-2.61	30.10	21.29	Average	259	313
6	17355.00	63.83	74.00	-10.17	42.54	21.29	Peak	259	313

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).

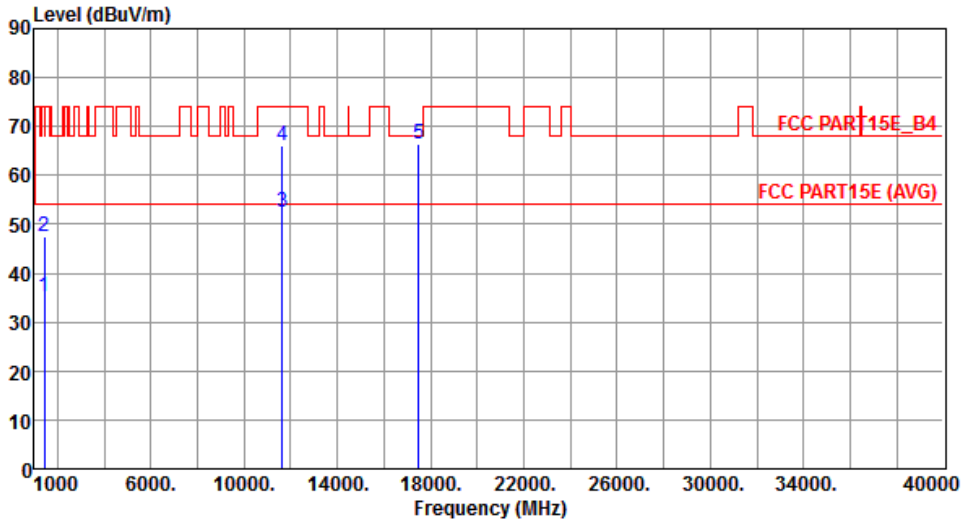
Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	39.22	54.00	-14.78	46.02	-6.80	Average	147	343
2	1443.00	48.54	74.00	-25.46	55.34	-6.80	Peak	147	343
3	11650.00	50.85	54.00	-3.15	36.45	14.40	Average	237	35
4	11650.00	65.01	74.00	-8.99	50.61	14.40	Peak	237	35
5	17475.00	66.69	68.20	-1.51	44.75	21.94	Peak	283	296

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	Vertical		

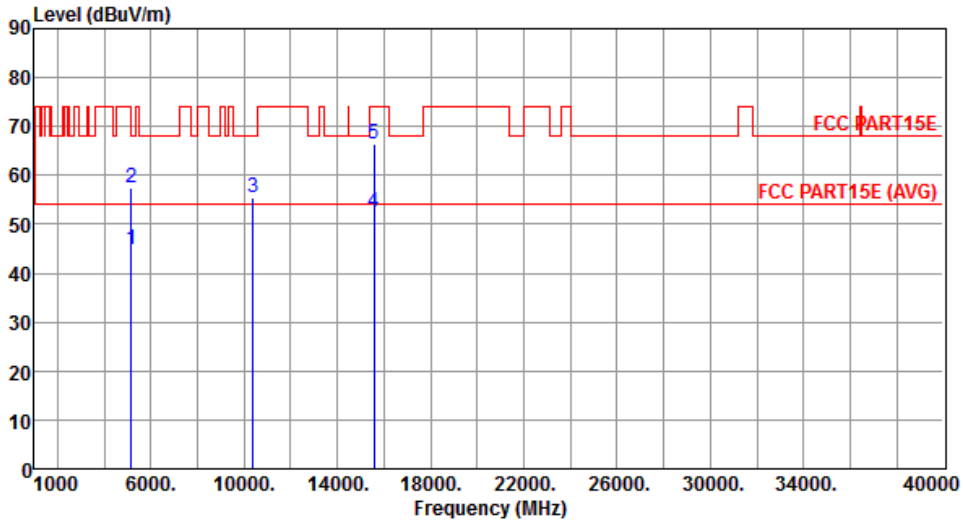


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	35.33	54.00	-18.67	42.13	-6.80	Average	174	186
2	1443.00	47.38	74.00	-26.62	54.18	-6.80	Peak	174	186
3	11650.00	52.62	54.00	-1.38	38.22	14.40	Average	230	355
4	11650.00	66.00	74.00	-8.00	51.60	14.40	Peak	243	7
5	17475.00	66.51	68.20	-1.69	44.57	21.94	Peak	201	113

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).

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

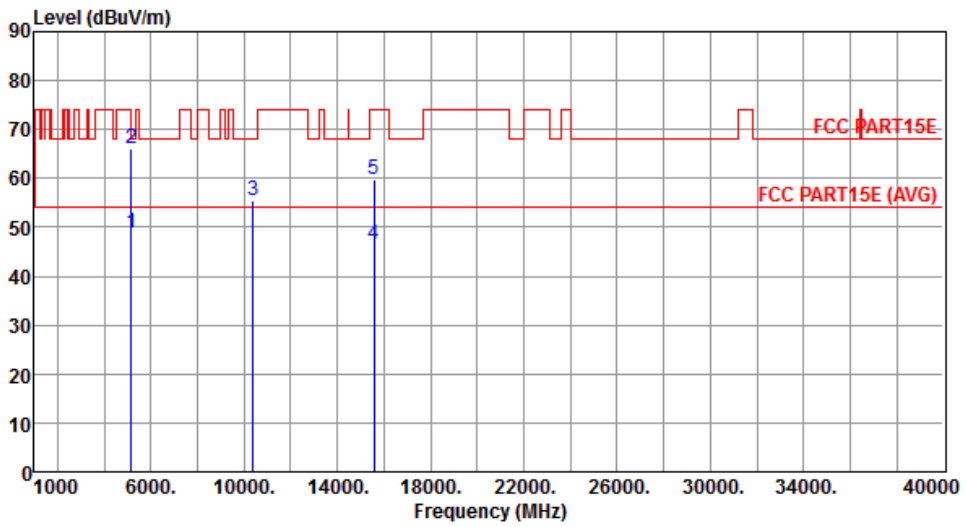
Modulation	VHT40	**Test Freq. (MHz)**	5190
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	44.87	54.00	-9.13	39.97	4.90	Average	219	150
2	5150.00	57.39	74.00	-16.61	52.49	4.90	Peak	219	150
3	10380.00	55.47	68.20	-12.73	41.76	13.71	Peak	100	119
4	15570.00	52.52	54.00	-1.48	36.85	15.67	Average	204	317
5	15570.00	66.53	74.00	-7.47	50.86	15.67	Peak	204	317

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).

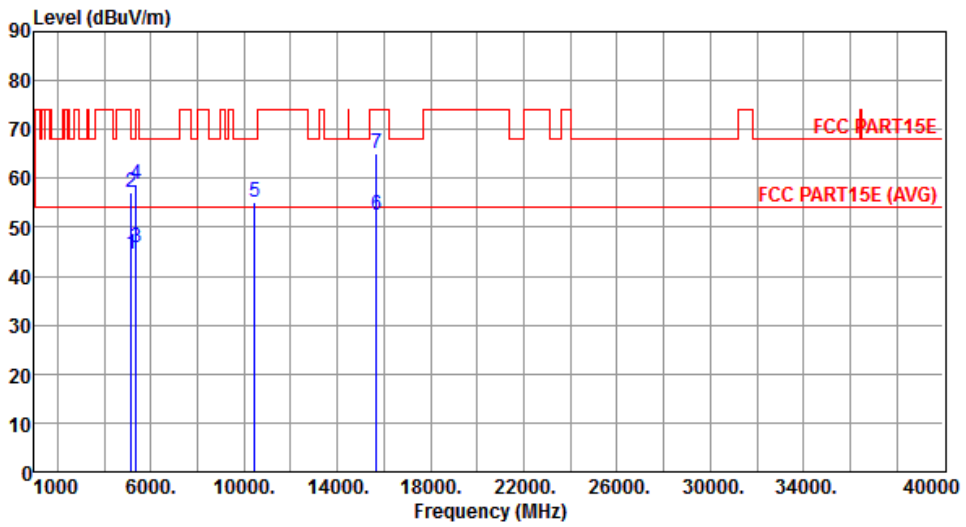
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		



	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	48.82	54.00	-5.18	43.92	4.90	Average	165	301
2	5150.00	66.00	74.00	-8.00	61.10	4.90	Peak	165	301
3	10380.00	55.63	68.20	-12.57	41.92	13.71	Peak	100	76
4	15570.00	46.50	54.00	-7.50	30.83	15.67	Average	100	304
5	15570.00	59.64	74.00	-14.36	43.97	15.67	Peak	100	304

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).

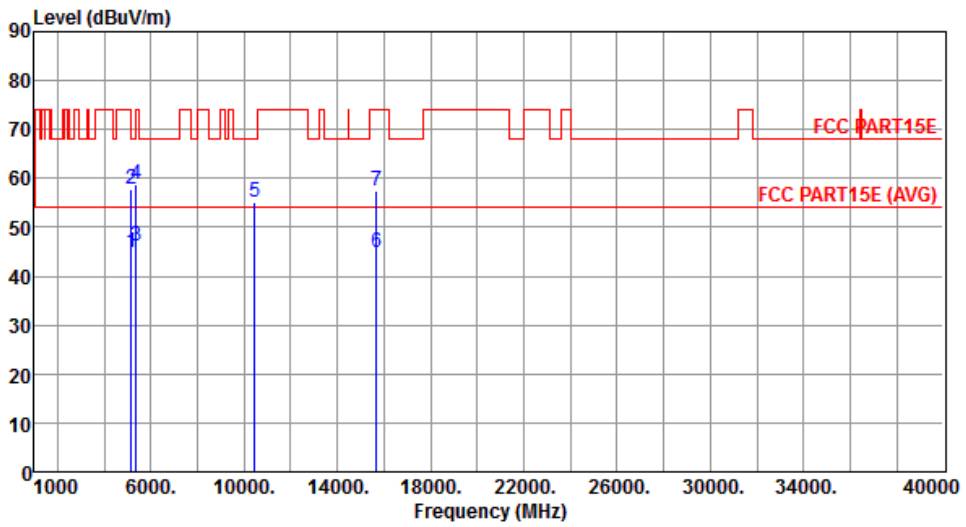
Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal		



	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	44.60	54.00	-9.40	39.70	4.90	Average	230	337
2	5150.00	57.28	74.00	-16.72	52.38	4.90	Peak	230	337
3	5350.00	45.84	54.00	-8.16	40.71	5.13	Average	230	337
4	5350.00	58.83	74.00	-15.17	53.70	5.13	Peak	230	337
5	10460.00	55.14	68.20	-13.06	41.28	13.86	Peak	100	83
6	15690.00	52.62	54.00	-1.38	37.19	15.43	Average	202	314
7	15690.00	64.97	74.00	-9.03	49.54	15.43	Peak	202	314

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).

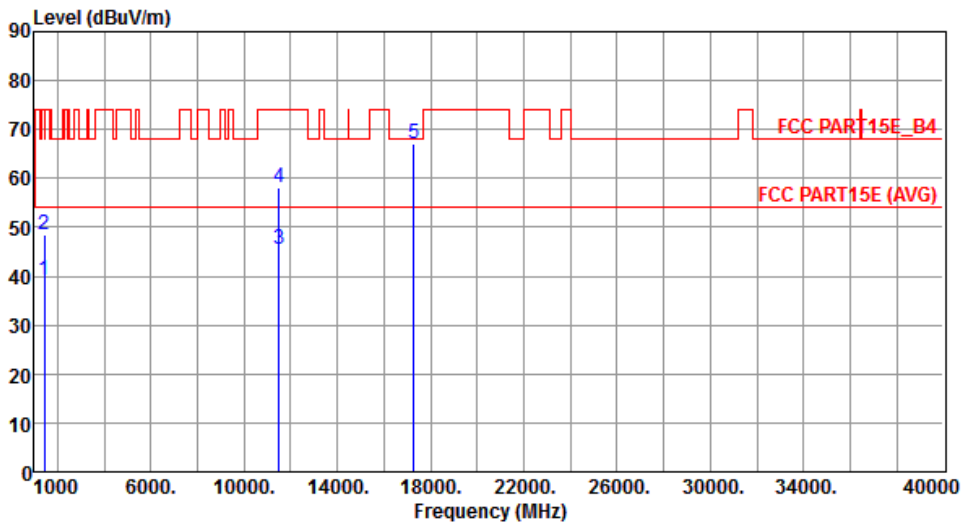
Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		



	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	44.95	54.00	-9.05	40.05	4.90	Average	182	298
2	5150.00	57.77	74.00	-16.23	52.87	4.90	Peak	182	298
3	5350.00	46.32	54.00	-7.68	41.19	5.13	Average	182	298
4	5350.00	58.62	74.00	-15.38	53.49	5.13	Peak	182	298
5	10460.00	55.17	68.20	-13.03	41.31	13.86	Peak	100	189
6	15690.00	44.90	54.00	-9.10	29.47	15.43	Average	100	294
7	15690.00	57.37	74.00	-16.63	41.94	15.43	Peak	100	294

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).

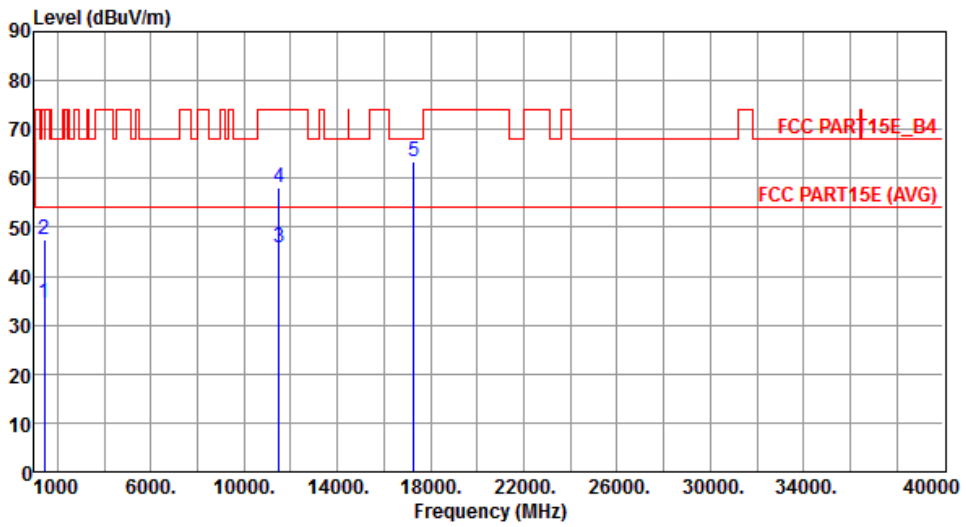
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	39.30	54.00	-14.70	46.10	-6.80	Average	100	10
2	1443.00	48.63	74.00	-25.37	55.43	-6.80	Peak	100	10
3	11510.00	45.53	54.00	-8.47	30.91	14.62	Average	295	42
4	11510.00	58.19	74.00	-15.81	43.57	14.62	Peak	295	42
5	17265.00	67.19	68.20	-1.01	46.38	20.81	Peak	202	299

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).

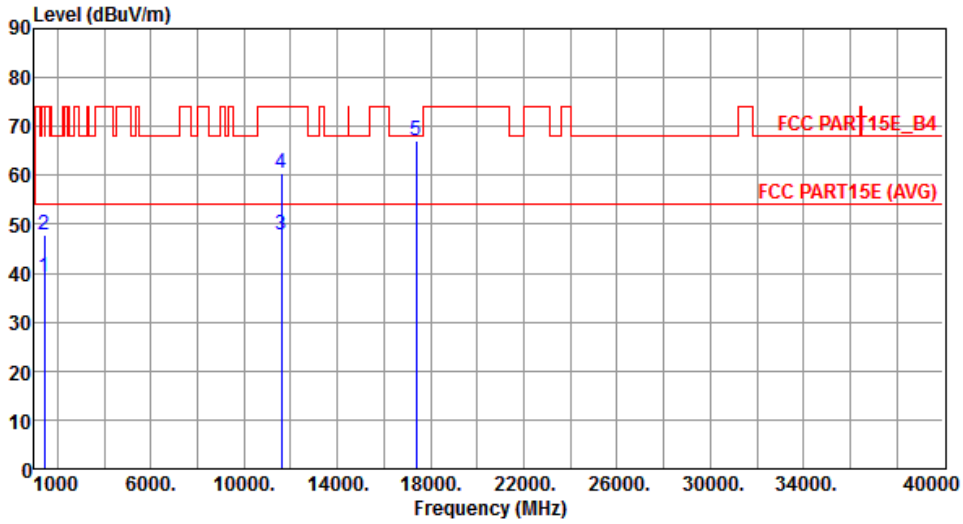
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	34.64	54.00	-19.36	41.44	-6.80	Average	100	34
2	1443.00	47.59	74.00	-26.41	54.39	-6.80	Peak	100	34
3	11510.00	45.85	54.00	-8.15	31.23	14.62	Average	228	339
4	11510.00	58.26	74.00	-15.74	43.64	14.62	Peak	228	339
5	17265.00	63.33	68.20	-4.87	42.52	20.81	Peak	100	309

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).

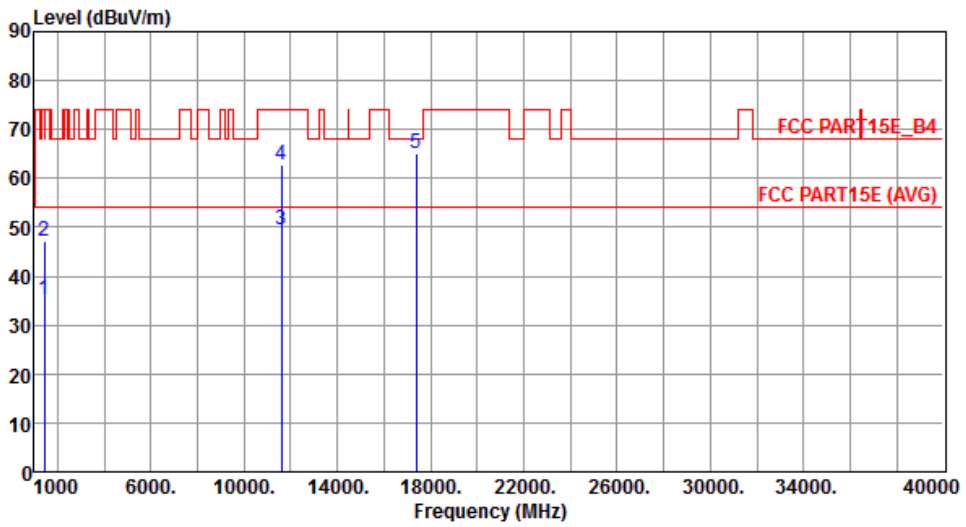
Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1443.00	39.27	54.00	-14.73	46.07	-6.80	Average	100	353
2	1443.00	47.97	74.00	-26.03	54.77	-6.80	Peak	100	353
3	11590.00	47.92	54.00	-6.08	33.42	14.50	Average	243	350
4	11590.00	60.53	74.00	-13.47	46.03	14.50	Peak	243	350
5	17385.00	67.16	68.20	-1.04	45.70	21.46	Peak	236	307

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	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	1443.00	35.07	54.00	-18.93	41.87	-6.80	Average	100	0
2	1443.00	47.05	74.00	-26.95	53.85	-6.80	Peak	100	0
3	11590.00	49.47	54.00	-4.53	34.97	14.50	Average	234	342
4	11590.00	62.88	74.00	-11.12	48.38	14.50	Peak	234	342
5	17385.00	65.01	68.20	-3.19	43.55	21.46	Peak	100	302

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

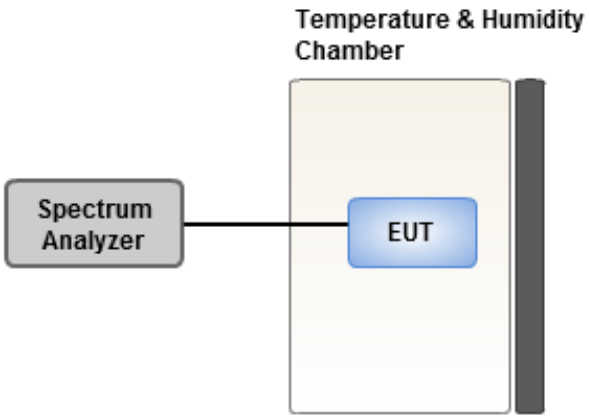
3.6.1 Limit of Frequency Stability

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 -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°CVmax	2.08	2.84	2.29	2.71
T20°CVmin	1.04	1.59	0.84	1.28
T50°CVnom	0.62	0.48	0.62	1.01
T40°CVnom	1.37	1.54	1.65	1.80
T30°CVnom	0.72	0.48	0.50	0.62
T20°CVnom	0.12	-0.26	0.08	-0.06
T10°CVnom	1.43	2.10	1.35	1.02
T0°CVnom	1.05	1.16	1.79	1.65
T-10°CVnom	0.47	0.59	0.48	0.09
T-20°CVnom	1.36	1.57	1.67	1.82
T-30°CVnom	0.29	0.06	0.33	0.55
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°CVmax	1.07	0.71	1.07	0.76
T20°CVmin	0.51	0.49	0.81	0.67
T50°CVnom	0.75	1.05	0.83	0.91
T40°CVnom	0.02	-0.23	0.04	0.35
T30°CVnom	0.26	0.42	0.24	0.07
T20°CVnom	0.76	1.10	0.95	0.40
T10°CVnom	1.10	1.53	1.30	0.89
T0°CVnom	0.36	0.55	0.04	0.70
T-10°CVnom	0.75	1.09	0.94	0.39
T-20°CVnom	1.02	1.02	1.12	1.10
T-30°CVnom	0.13	0.73	0.56	0.51
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	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.	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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