FCC Test Report

FCC ID	:	**JVPWDC10T**
Equipment	:	**InstaShow Button**
Model No.	:	**WDC10T**
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 09, 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

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Release Record

Report No.	Version	Description	Issued Date
FR640601-01	Rev. 01	Initial issue	May 18, 2016

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.502MHz 33.36 (Margin -12.64dB) - AV	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5150.00MHz 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: 17.19 5725-5850MHz: 17.09	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 (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 (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	YAGEO	ANT3216LL05R5000A	SMD Chip	---	5.71

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from host

1.1.4 Accessories

No.	Equipment	Description
1	USB cable	Undetachable, 5.5cm non-shielded without core
2	HDMI cable	Undetachable, 5.5cm shielded without core
3	USB cable	0.8m non-shielded without core
4	USB cable	0.15m non-shielded without core

1.1.5 Channel List

For Frequency band 5150-5250 MHz	
Channel	**Frequency(MHz)**
38	5190
46	5230

For Frequency band 5725~5850 MHz	
Channel	**Frequency(MHz)**
151	5755
159	5795

1.1.6 Test Tool and Duty Cycle

Test Tool	Telnet		
Duty Cycle and Duty Factor	**Mode**	**Duty cycle (%)**	**Duty factor (dB)**
	VHT40	100.00%	0.00

1.1.7 Power Setting

For Frequency band 5150-5250 MHz		
Modulation Mode	**Test Frequency (MHz)**	**Power Set**
VHT40	5190	24/17
VHT40	5230	24/17

For Frequency band 5725~5850 MHz		
Modulation Mode	**Test Frequency (MHz)**	**Power Set**
VHT40	5755	30/20
VHT40	5795	30/20

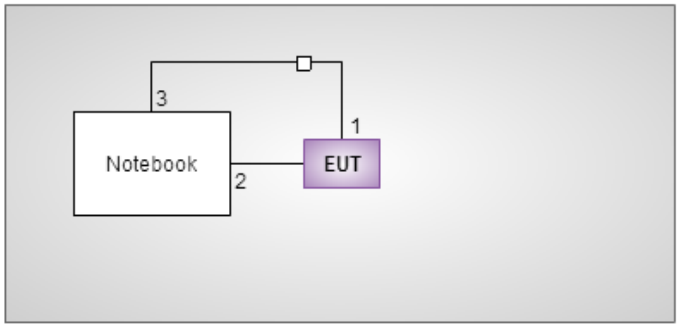
1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Signal cable / Length (m)**
1	Notebook	ASUS	PU301L	DoC	---
2	Console board	---	---	---	---

Note: Console board is provided by applicant.

1.3 Test Setup Chart

Test Setup Diagram



1. USB, undetachable, 5.5cm non-shielded
2. HDMI, undetachable, 5.5cm shielded
3. USB, 0.8m non-shielded

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 / 59%	Alex Tsai
Radiated Emissions	03CH02-WS	21-24°C / 60-61%	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	VHT40	5190 / 5230	MCS 0
Frequency Stability	Un-modulation	5230	---

NOTE:

1. Two USB cable (0.8m & 0.15m) had been covered during the pretest and found that 0.8m cable was the worst case and was selected for final test.

For Frequency band 5725-5850 MHz			
Test item	**Modulation Mode**	**Test Frequency (MHz)**	**Data Rate**
Conducted Emissions	VHT40	5755	MCS 0
Radiated Emissions ≤1GHz	VHT40	5755	MCS 0
RF Output Power Radiated Emissions >1GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	VHT40	5755 / 5795	MCS 0
Frequency Stability	Un-modulation	5795	---

NOTE:

2. Two USB cable (0.8m & 0.15m) had been covered during the pretest and found that 0.8m cable was the worst case and was selected for final test.

3 Transmitter Test Results

3.1 Conducted Emissions

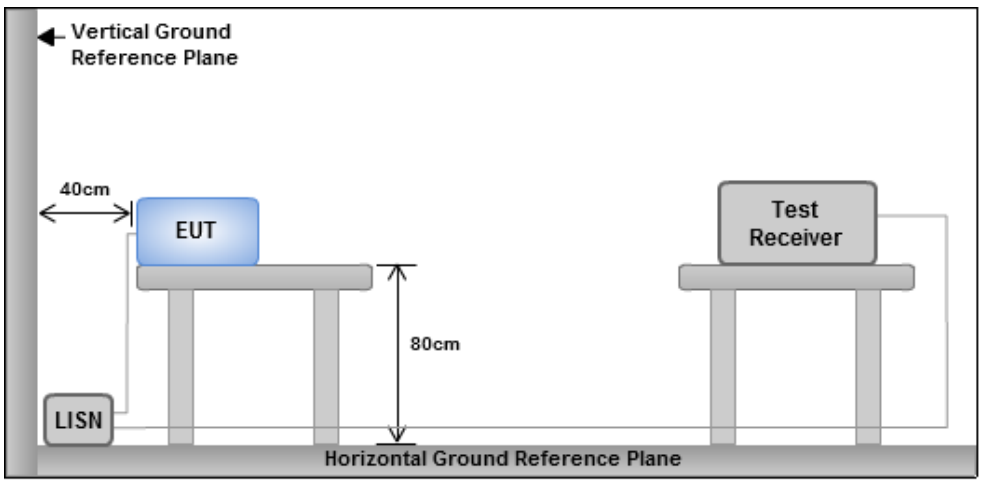
3.1.1 Limit of Conducted Emissions

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

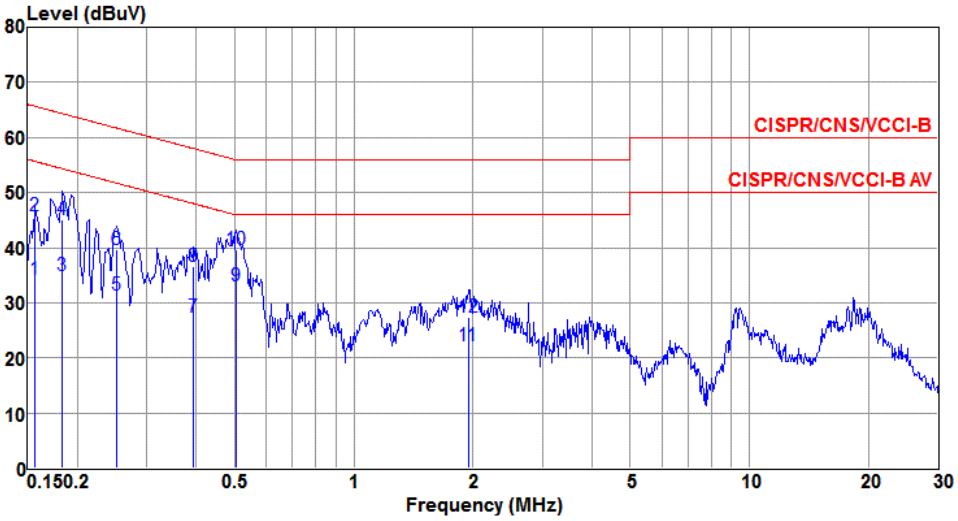


Note: 1. Support units were connected to second LISN.

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

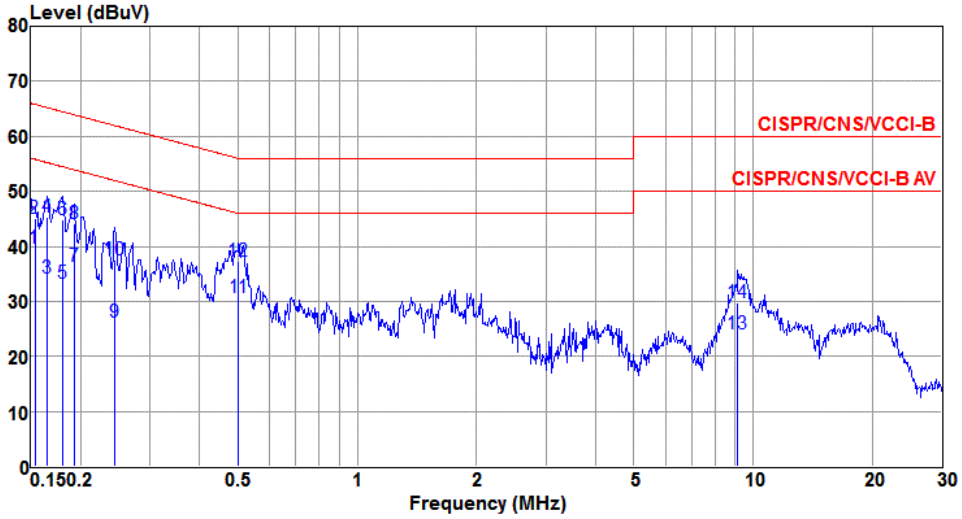
Modulation	VHT40	Test Freq. (MHz)	5190
Power Phase	Line		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.156	34.16	55.65	-21.49	34.03	0.11	0.02	Average
2	0.156	45.74	65.65	-19.91	45.61	0.11	0.02	QP
3	0.183	34.88	54.33	-19.45	34.75	0.11	0.02	Average
4	0.183	44.99	64.33	-19.34	44.86	0.11	0.02	QP
5	0.252	31.33	51.69	-20.36	31.19	0.12	0.02	Average
6	0.252	39.65	61.69	-22.04	39.51	0.12	0.02	QP
7	0.393	27.39	47.99	-20.60	27.23	0.13	0.03	Average
8	0.393	36.60	57.99	-21.39	36.44	0.13	0.03	QP
9@	0.505	32.98	46.00	-13.02	32.81	0.13	0.04	Average
10	0.505	39.72	56.00	-16.28	39.55	0.13	0.04	QP
11	1.949	22.16	46.00	-23.84	21.92	0.16	0.08	Average
12	1.949	27.36	56.00	-28.64	27.12	0.16	0.08	QP

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

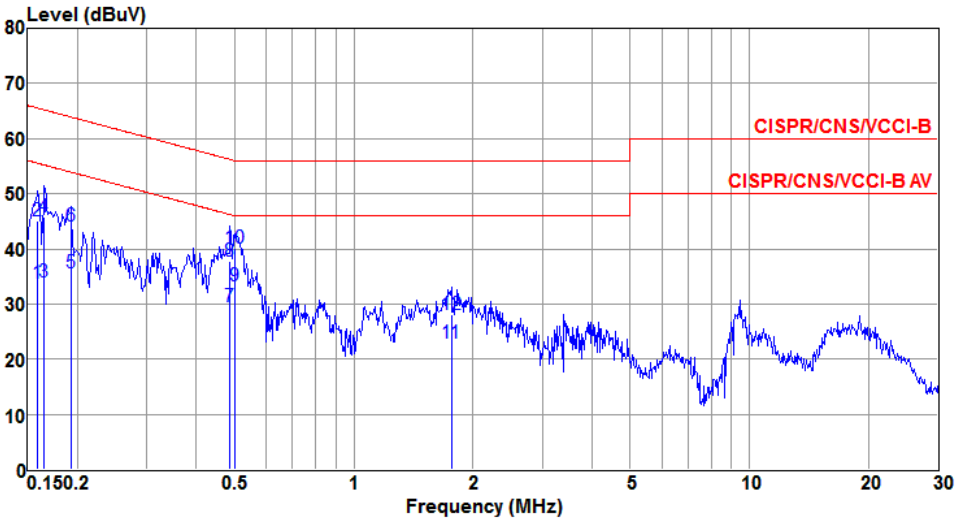
Modulation	VHT40	Test Freq. (MHz)	5190
Power Phase	Neutral		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.153	39.67	55.82	-16.15	39.52	0.13	0.02	Average
2	0.153	45.12	65.82	-20.70	44.97	0.13	0.02	QP
3	0.165	34.22	55.21	-20.99	34.08	0.12	0.02	Average
4	0.165	45.30	65.21	-19.91	45.16	0.12	0.02	QP
5	0.181	33.36	54.46	-21.10	33.23	0.11	0.02	Average
6	0.181	44.78	64.46	-19.68	44.65	0.11	0.02	QP
7	0.192	36.46	53.93	-17.47	36.34	0.10	0.02	Average
8	0.192	44.15	63.93	-19.78	44.03	0.10	0.02	QP
9	0.244	26.27	51.95	-25.68	26.14	0.11	0.02	Average
10	0.244	37.45	61.95	-24.50	37.32	0.11	0.02	QP
11@	0.502	30.73	46.00	-15.27	30.55	0.14	0.04	Average
12	0.502	37.38	56.00	-18.62	37.20	0.14	0.04	QP
13	9.156	24.18	50.00	-25.82	23.76	0.26	0.16	Average
14	9.156	29.73	60.00	-30.27	29.31	0.26	0.16	QP

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

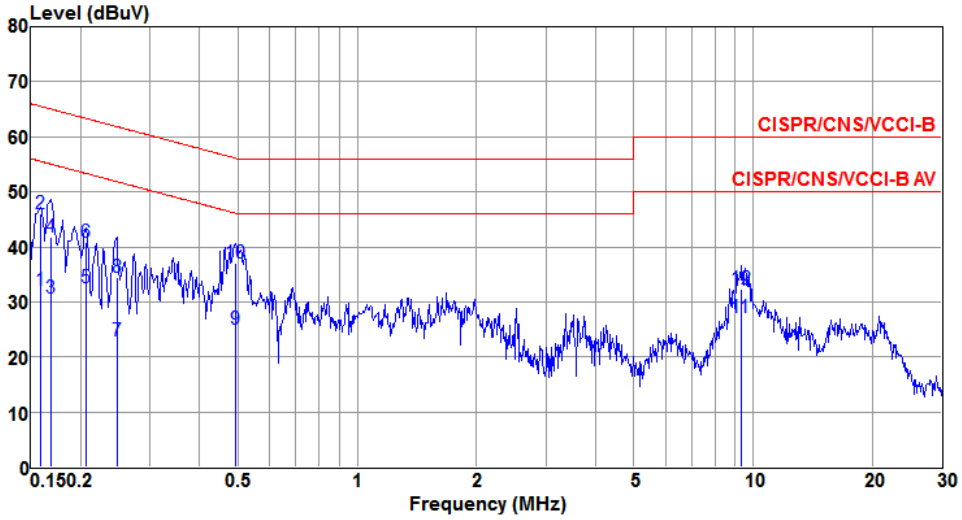
Modulation	VHT40	Test Freq. (MHz)	5755
Power Phase	Line		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.159	33.73	55.52	-21.79	33.60	0.11	0.02	Average
2	0.159	45.16	65.52	-20.36	45.03	0.11	0.02	QP
3	0.165	34.09	55.21	-21.12	33.96	0.11	0.02	Average
4	0.165	45.82	65.21	-19.39	45.69	0.11	0.02	QP
5	0.192	35.58	53.93	-18.35	35.45	0.11	0.02	Average
6	0.192	44.12	63.93	-19.81	43.99	0.11	0.02	QP
7	0.486	29.61	46.23	-16.62	29.44	0.13	0.04	Average
8	0.486	37.82	56.23	-18.41	37.65	0.13	0.04	QP
9@	0.502	33.36	46.00	-12.64	33.19	0.13	0.04	Average
10	0.502	40.22	56.00	-15.78	40.05	0.13	0.04	QP
11	1.762	22.95	46.00	-23.05	22.72	0.15	0.08	Average
12	1.762	28.15	56.00	-27.85	27.92	0.15	0.08	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)	5755
Power Phase	Neutral		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.159	32.09	55.52	-23.43	31.95	0.12	0.02	Average
2	0.159	45.98	65.52	-19.54	45.84	0.12	0.02	QP
3	0.169	30.79	55.03	-24.24	30.65	0.12	0.02	Average
4	0.169	41.69	65.03	-23.34	41.55	0.12	0.02	QP
5	0.207	32.64	53.32	-20.68	32.52	0.10	0.02	Average
6	0.207	40.92	63.32	-22.40	40.80	0.10	0.02	QP
7	0.247	23.00	51.86	-28.86	22.87	0.11	0.02	Average
8	0.247	34.56	61.86	-27.30	34.43	0.11	0.02	QP
9	0.494	25.07	46.10	-21.03	24.89	0.14	0.04	Average
10@	0.494	37.17	56.10	-18.93	36.99	0.14	0.04	QP
11	9.302	27.10	50.00	-22.90	26.68	0.26	0.16	Average
12	9.302	32.38	60.00	-27.62	31.96	0.26	0.16	QP

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

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.

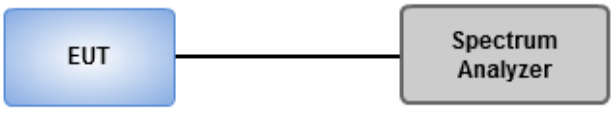
Occupied Bandwidth

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

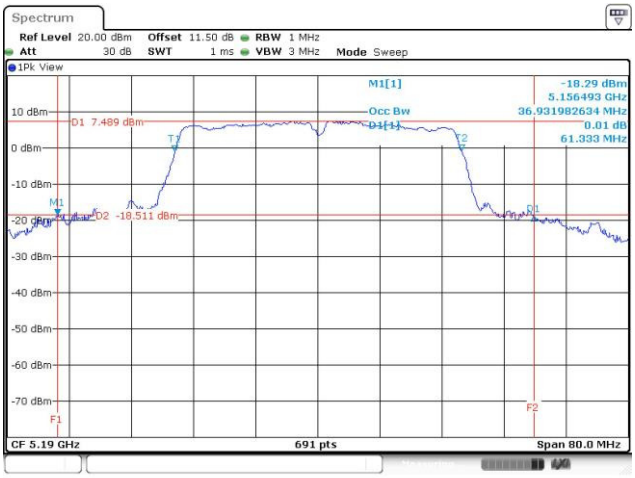
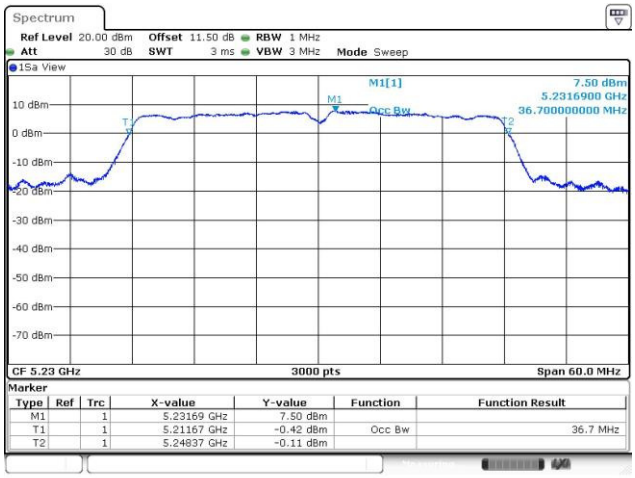
1. Set RBW = 100kHz, VBW = 300kHz
2. Detector = Peak,Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB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

3.2.3 Test Setup

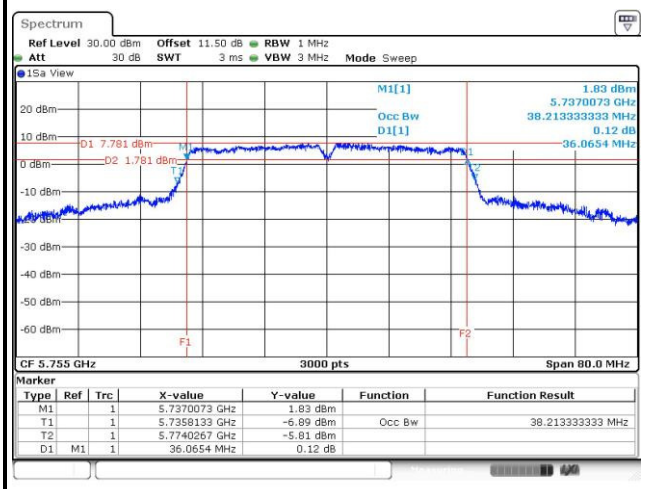
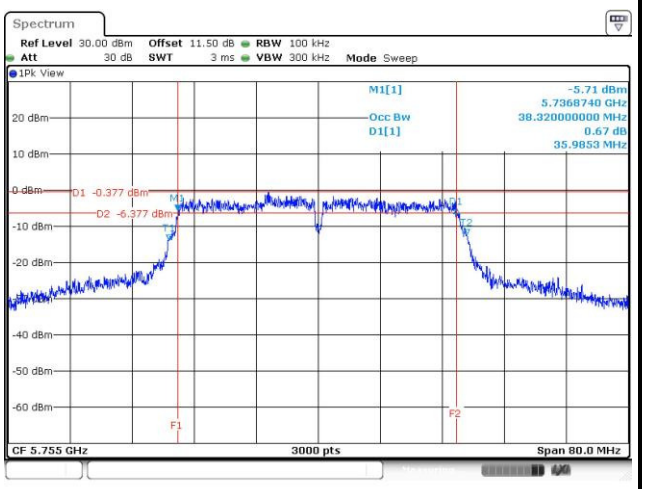


3.2.4 Test Result of Emission Bandwidth

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
VHT40	2	5190	41.97	61.33	---	---	36.60	36.34	---	---
VHT40	2	5230	43.25	61.33	---	---	36.70	36.34	---	---

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)
VHT40	2	5755	38.21	36.40	---	---	35.99	36.07	---	---	0.5
VHT40	2	5795	37.81	36.43	---	---	36.33	36.33	---	---	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
☒	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			
VHT40	2	5190	14.32	14.03	---	---	52.333	**17.19**	24.00
VHT40	2	5230	14.21	14.05	---	---	51.773	17.14	24.00

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			
VHT40	2	5755	14.03	14.12	---	---	51.116	**17.09**	30.00
VHT40	2	5795	14.05	14.09	---	---	51.055	17.08	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

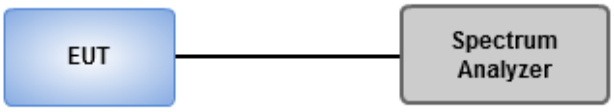
☒ Method SA-1

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

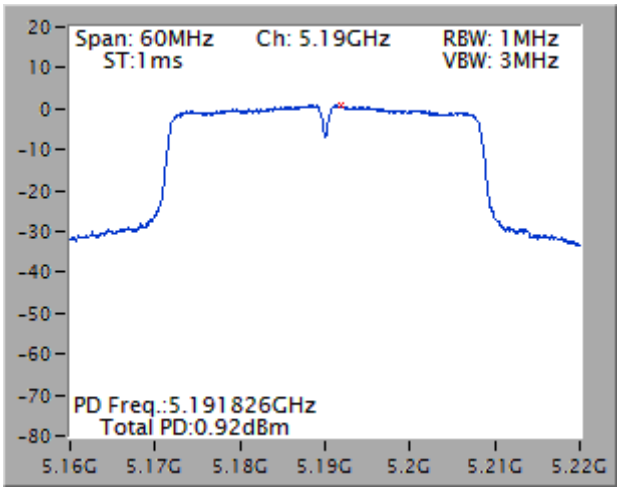


3.4.4 Test Result of Peak Power Spectral Density

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)
VHT40	2	5190	0.92	0.00	0.92	8.28
VHT40	2	5230	0.81	0.00	0.81	8.28

Note:
1. D.F is duty factor.
2. Test results are bin-by-bin summing measured value of each TX port.
3. Directional gain = 5.71+10* log(2/1) = 8.72 dBi > 6 dBi.
   Limit shall be reduced to 11 dBm – (8.72 dBi – 6 dBi) = 8.28 dBm.

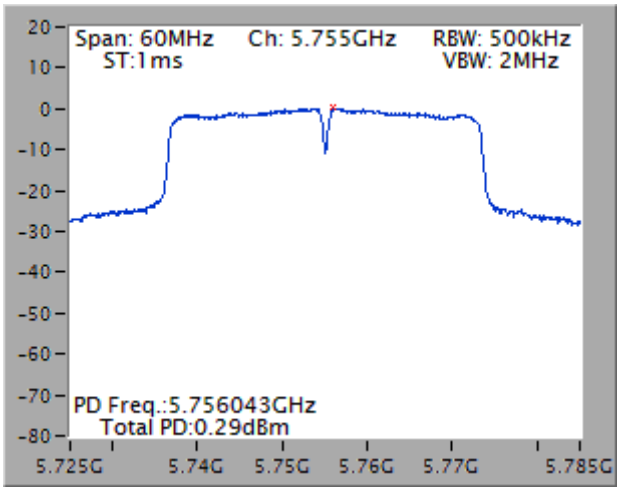
Worst Plot



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)
VHT40	2	5755	0.29	0.00	0.29	27.28
VHT40	2	5795	0.00	0.00	0.00	27.28

Note:
1. D.F is duty factor.
2. Test results are bin-by-bin summing measured value of each TX port.
3. Directional gain = 5.71+10* log(2/1) = 8.72 dBi > 6 dBi.
   Limit shall be reduced to 30 dBm – (8.72 dBi – 6 dBi) = 27.28 dBm.

Worst Plot



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

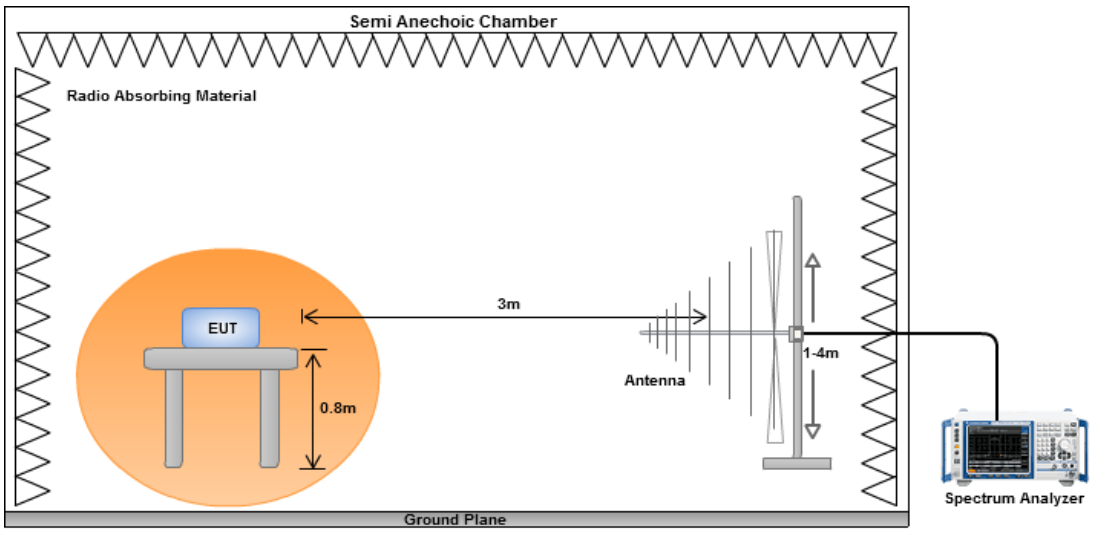
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

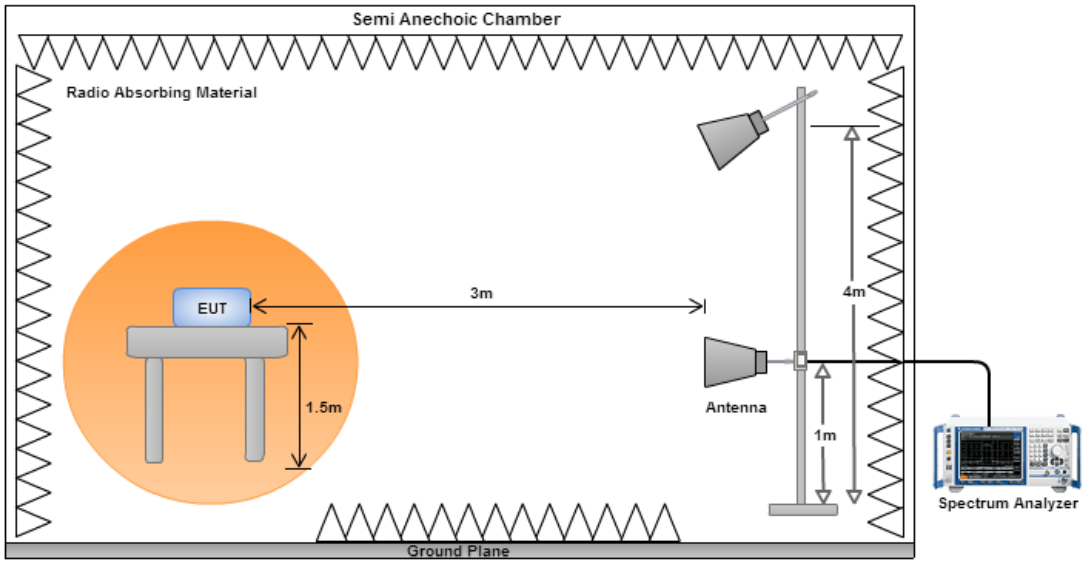
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

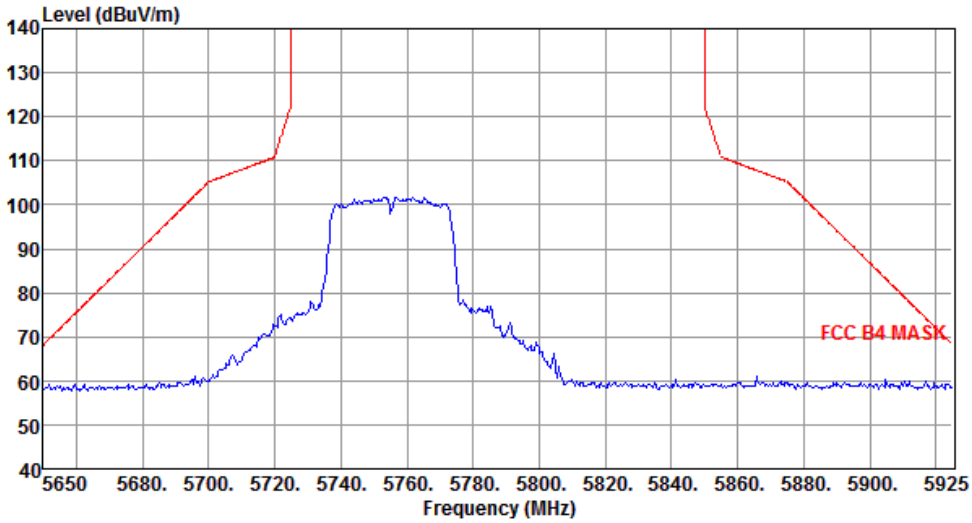


Radiated Emissions above 1 GHz

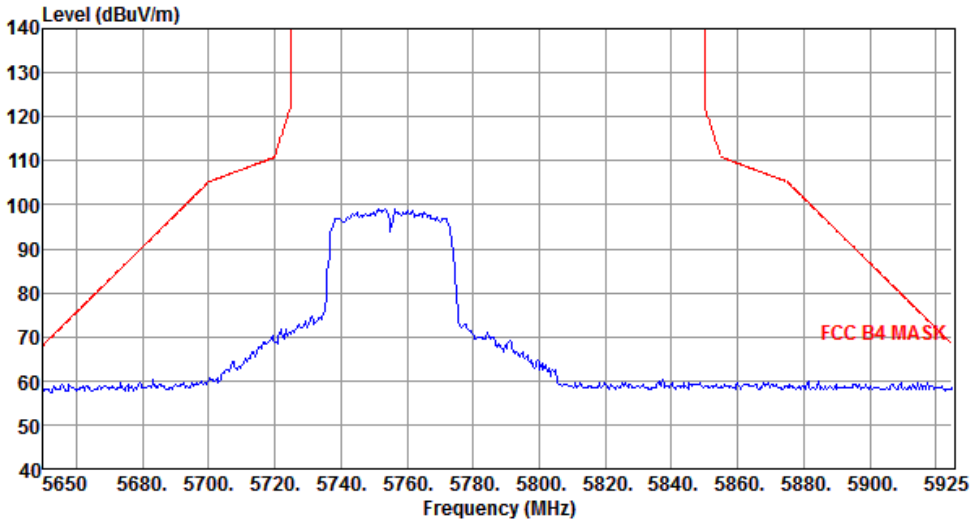


3.5.4 Transmitter Radiated Band Edge for VHT40

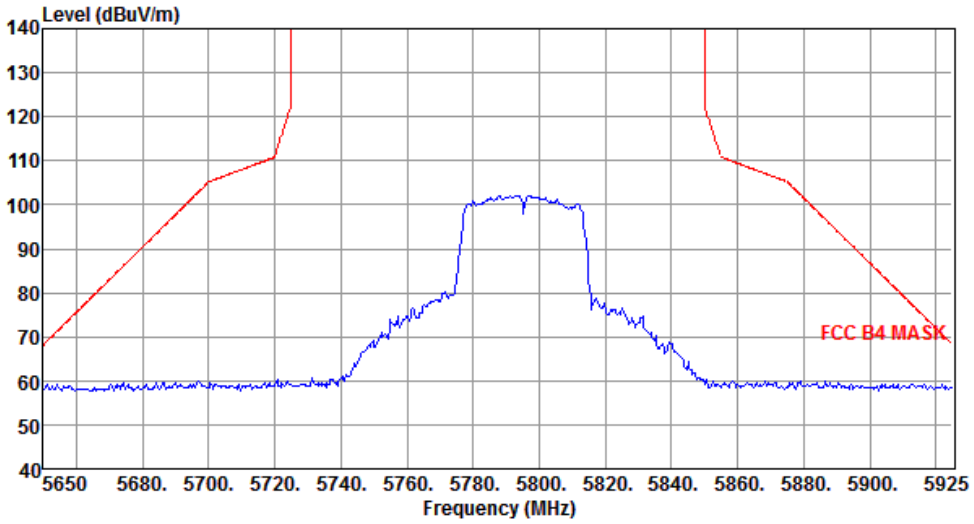
Modulation	VHT40	**Test Freq. (MHz)**	5755
Polarization	Horizontal		



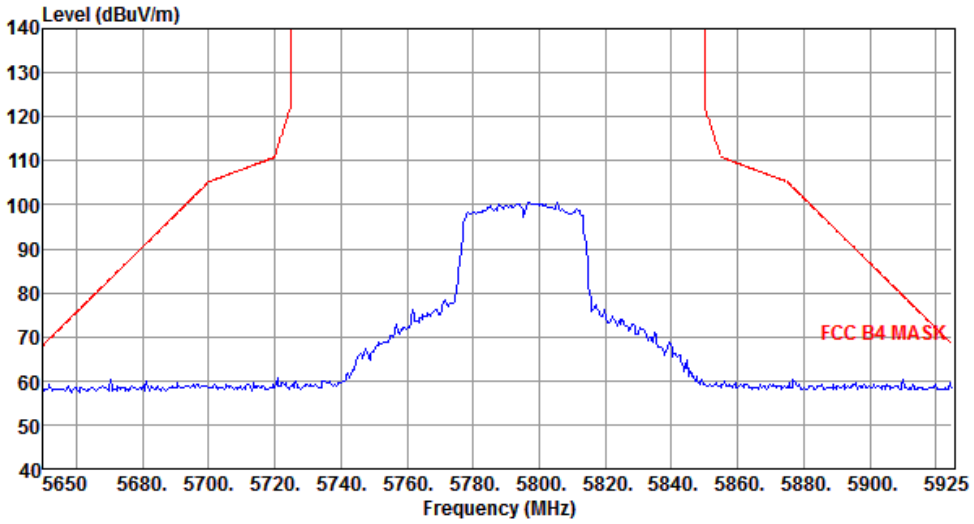
Modulation	VHT40	**Test Freq. (MHz)**	5755
Polarization	Vertical		



Modulation	VHT40	**Test Freq. (MHz)**	5795
Polarization	Horizontal		

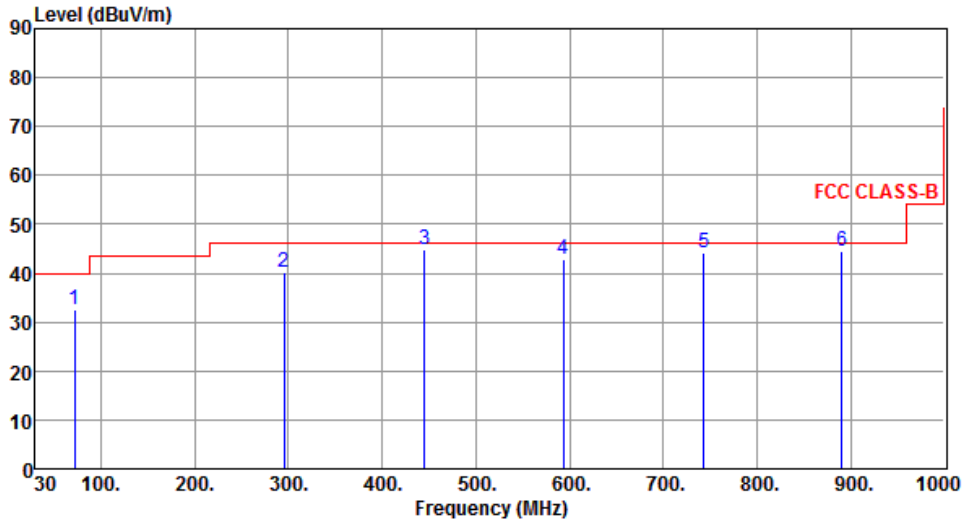


Modulation	VHT40	**Test Freq. (MHz)**	5795
Polarization	Vertical		



3.5.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

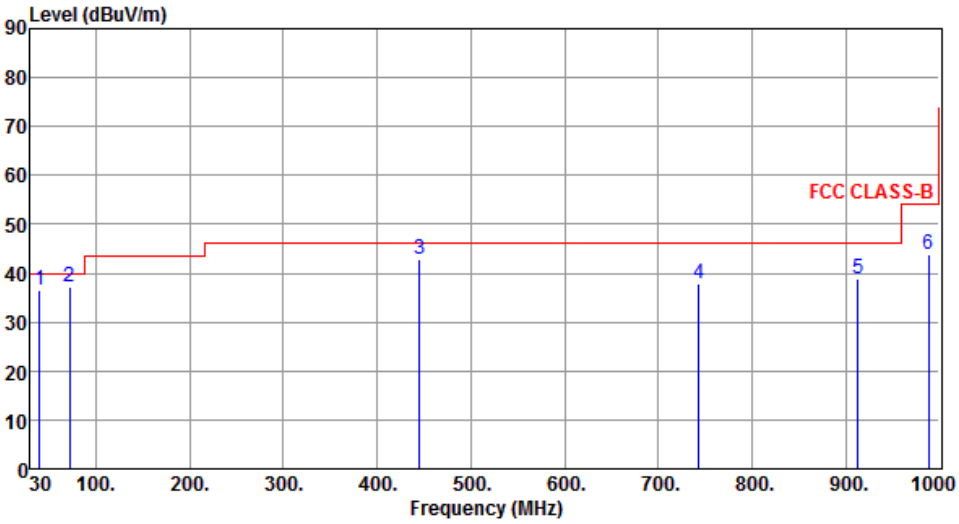
Modulation	VHT40	**Test Freq. (MHz)**	5190
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	71.71	32.53	40.00	-7.47	47.25	-14.72	Peak	---	---
2	295.78	40.30	46.00	-5.70	51.50	-11.20	Peak	---	---
3	445.16	44.85	46.00	-1.15	52.51	-7.66	QP	201	324
4	593.57	42.99	46.00	-3.01	47.70	-4.71	Peak	---	---
5	742.95	44.31	46.00	-1.69	46.80	-2.49	QP	112	162
6	890.39	44.59	46.00	-1.41	45.30	-0.71	QP	100	136

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.

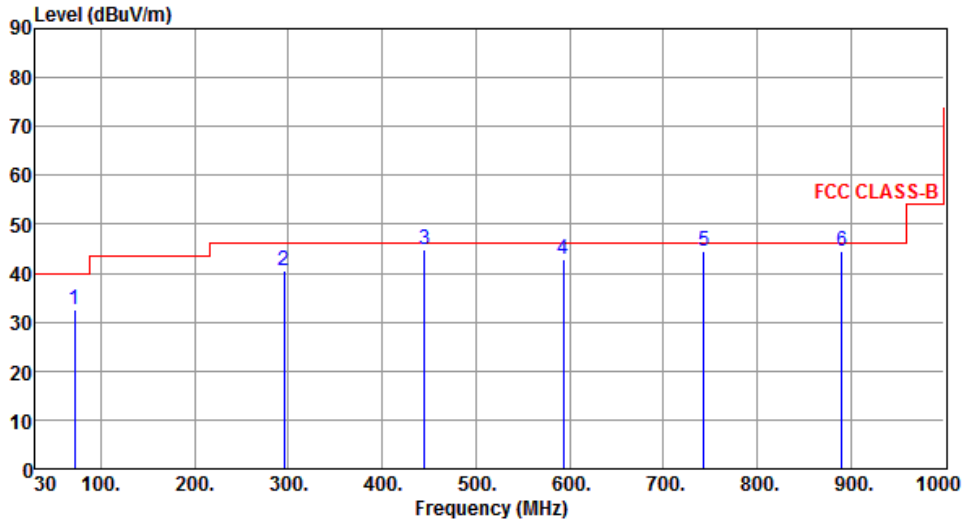
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	39.70	36.46	40.00	-3.54	48.33	-11.87	Peak	---	---
2	71.71	37.08	40.00	-2.92	51.80	-14.72	Peak	---	---
3	445.16	43.00	46.00	-3.00	50.66	-7.66	Peak	---	---
4	742.95	37.77	46.00	-8.23	40.26	-2.49	Peak	---	---
5	912.70	38.96	46.00	-7.04	39.38	-0.42	Peak	---	---
6	988.36	43.88	54.00	-10.12	43.36	0.52	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.

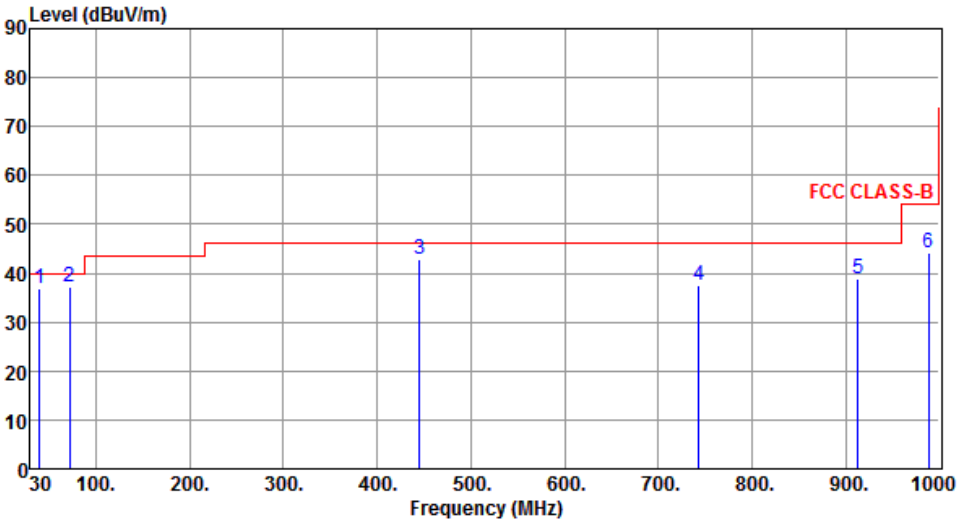
Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	71.68	32.64	40.00	-7.36	47.35	-14.71	Peak	---	---
2	295.72	40.46	46.00	-5.54	51.67	-11.21	Peak	---	---
3	445.12	44.72	46.00	-1.28	52.38	-7.66	QP	198	322
4	593.52	42.82	46.00	-3.18	47.53	-4.71	Peak	---	---
5	742.91	44.36	46.00	-1.64	46.85	-2.49	QP	111	168
6	890.35	44.41	46.00	-1.59	45.12	-0.71	QP	100	139

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)	5795
Polarization	Vertical		

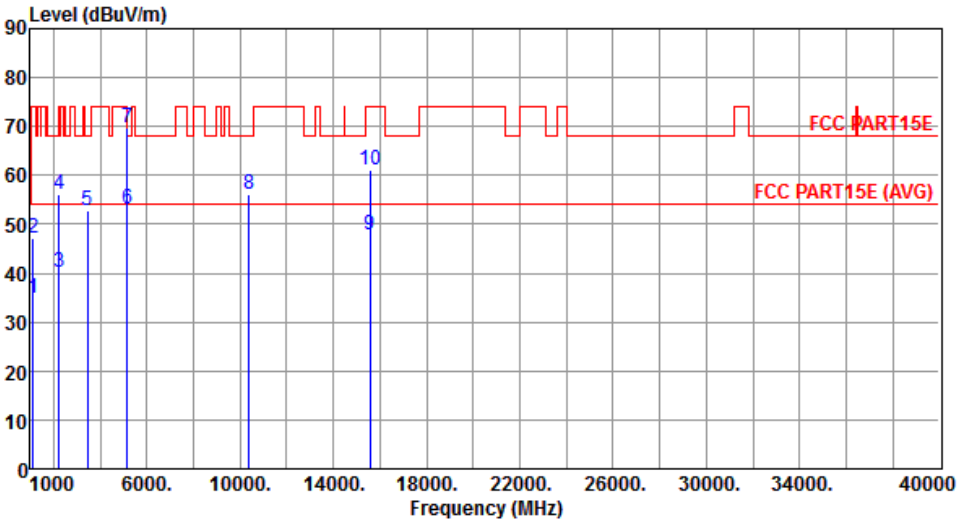


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	39.65	36.71	40.00	-3.29	48.58	-11.87	Peak	---	---
2	71.75	37.24	40.00	-2.76	51.97	-14.73	Peak	---	---
3	445.13	42.78	46.00	-3.22	50.44	-7.66	Peak	---	---
4	742.92	37.64	46.00	-8.36	40.13	-2.49	Peak	---	---
5	912.68	38.72	46.00	-7.28	39.14	-0.42	Peak	---	---
6	988.24	44.17	54.00	-9.83	43.65	0.52	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.

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

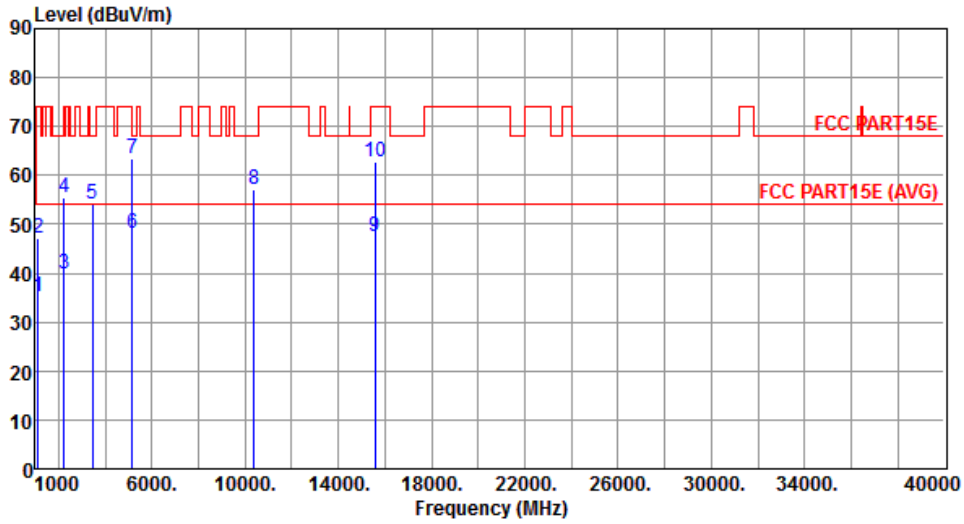
Modulation	VHT40	**Test Freq. (MHz)**	5190
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1132.00	34.98	54.00	-19.02	44.23	-9.25	Average	108	210
2	1132.00	47.29	74.00	-26.71	56.54	-9.25	Peak	108	210
3	2225.00	40.09	54.00	-13.91	43.77	-3.68	Average	100	213
4	2225.00	56.02	74.00	-17.98	59.70	-3.68	Peak	100	213
5	3460.00	52.82	68.20	-15.38	52.77	0.05	Peak	100	232
6	5150.00	52.99	54.00	-1.01	48.09	4.90	Average	282	70
7	5150.00	69.58	74.00	-4.42	64.68	4.90	Peak	282	70
8	10380.00	56.07	68.20	-12.13	42.36	13.71	Peak	100	346
9	15570.00	47.81	54.00	-6.19	32.14	15.67	Average	100	135
10	15570.00	60.97	74.00	-13.03	45.30	15.67	Peak	100	135

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).

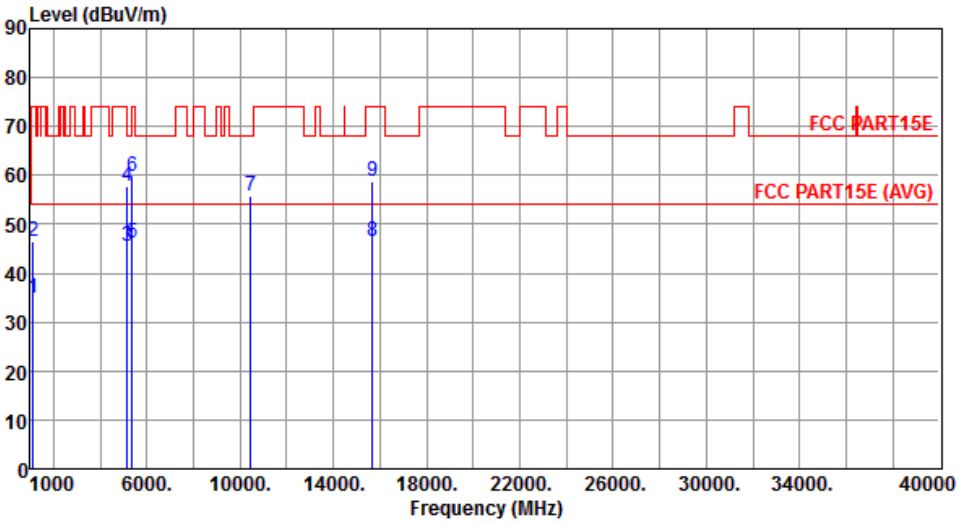
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1132.00	35.32	54.00	-18.68	44.57	-9.25	Average	145	283
2	1132.00	47.13	74.00	-26.87	56.38	-9.25	Peak	145	283
3	2225.00	39.88	54.00	-14.12	43.56	-3.68	Average	103	215
4	2225.00	55.39	74.00	-18.61	59.07	-3.68	Peak	103	215
5	3460.00	53.97	68.20	-14.23	53.92	0.05	Peak	100	202
6	5150.00	48.19	54.00	-5.81	43.29	4.90	Average	100	160
7	5150.00	63.36	74.00	-10.64	58.46	4.90	Peak	100	160
8	10380.00	57.10	68.20	-11.10	43.39	13.71	Peak	100	126
9	15570.00	47.59	54.00	-6.41	31.92	15.67	Average	100	56
10	15570.00	62.90	74.00	-11.10	47.23	15.67	Peak	100	56

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).

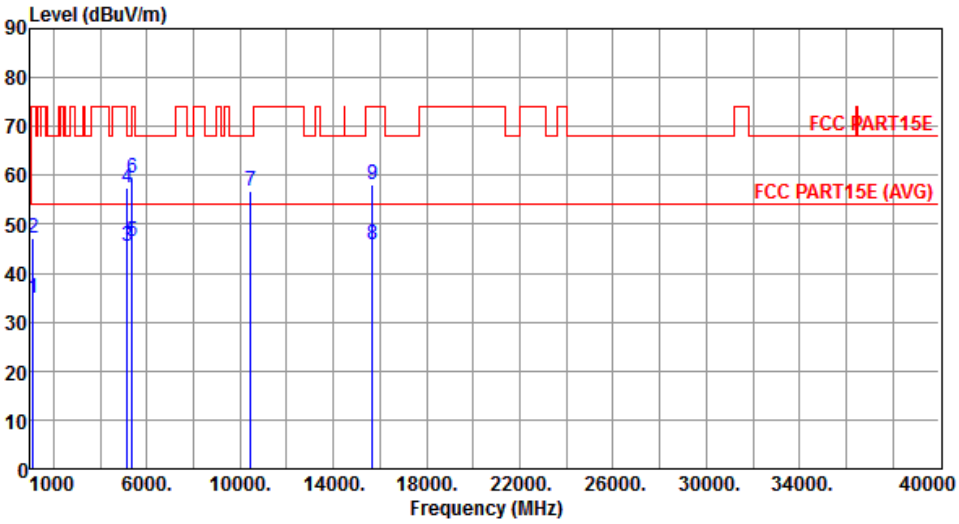
Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1132.00	34.80	54.00	-19.20	44.05	-9.25	Average	100	214
2	1132.00	46.58	74.00	-27.42	55.83	-9.25	Peak	100	214
3	5150.00	45.59	54.00	-8.41	40.69	4.90	Average	100	93
4	5150.00	57.80	74.00	-16.20	52.90	4.90	Peak	100	93
5	5350.00	46.21	54.00	-7.79	41.08	5.13	Average	100	93
6	5350.00	59.91	74.00	-14.09	54.78	5.13	Peak	100	93
7	10460.00	55.88	68.20	-12.32	42.02	13.86	Peak	100	166
8	15690.00	46.38	54.00	-7.62	30.95	15.43	Average	100	152
9	15690.00	58.89	74.00	-15.11	43.46	15.43	Peak	100	152

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).

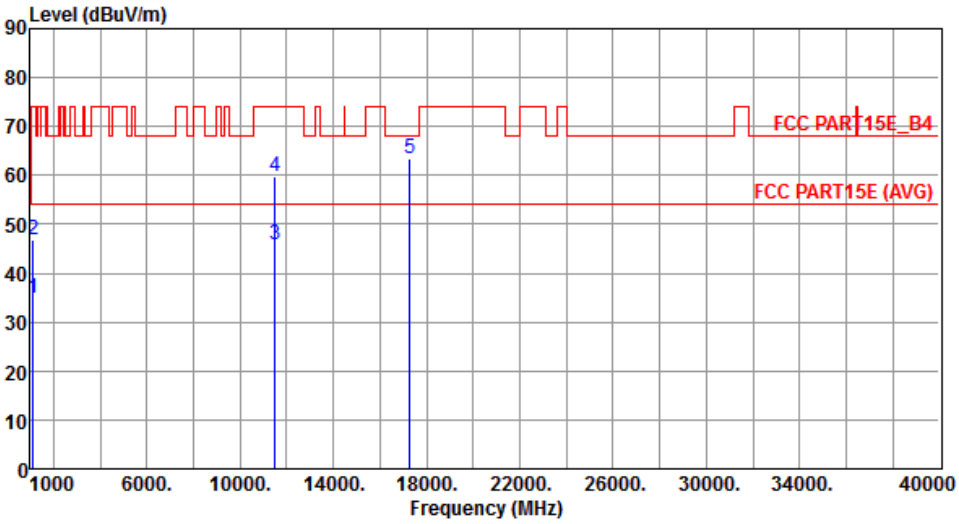
Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1132.00	34.76	54.00	-19.24	44.01	-9.25	Average	100	228
2	1132.00	47.17	74.00	-26.83	56.42	-9.25	Peak	100	228
3	5150.00	45.65	54.00	-8.35	40.75	4.90	Average	114	234
4	5150.00	57.59	74.00	-16.41	52.69	4.90	Peak	114	234
5	5350.00	46.38	54.00	-7.62	41.25	5.13	Average	114	234
6	5350.00	59.51	74.00	-14.49	54.38	5.13	Peak	114	234
7	10460.00	56.79	68.20	-11.41	42.93	13.86	Peak	100	130
8	15690.00	45.78	54.00	-8.22	30.35	15.43	Average	100	59
9	15690.00	58.18	74.00	-15.82	42.75	15.43	Peak	100	59

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).

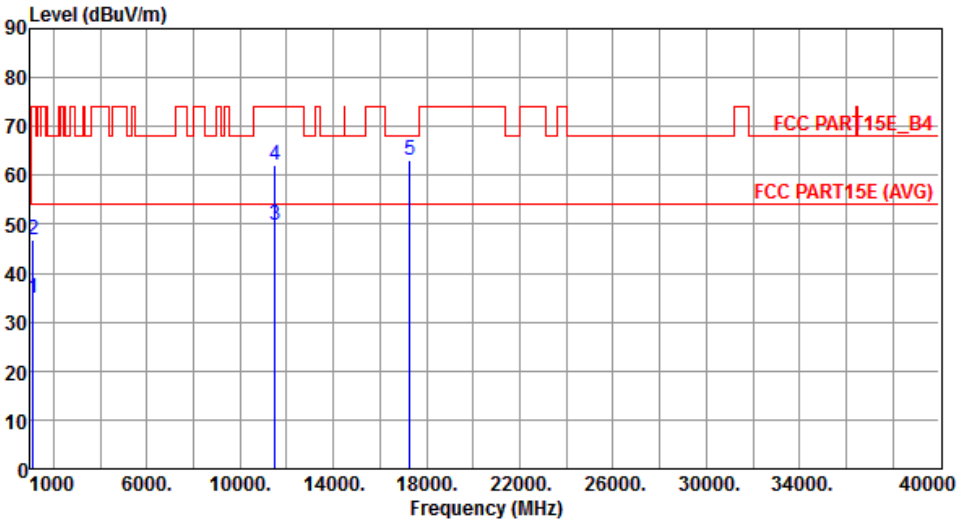
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1132.00	34.92	54.00	-19.08	44.17	-9.25	Average	100	209
2	1132.00	46.76	74.00	-27.24	56.01	-9.25	Peak	100	209
3	11510.00	45.99	54.00	-8.01	31.37	14.62	Average	100	137
4	11510.00	59.72	74.00	-14.28	45.10	14.62	Peak	100	137
5	17265.00	63.48	68.20	-4.72	42.67	20.81	Peak	100	114

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).

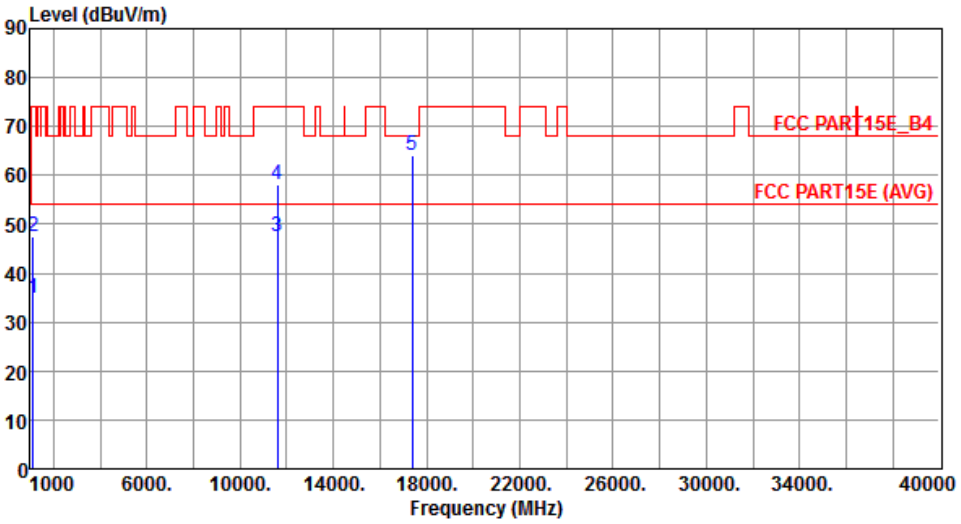
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1132.00	35.02	54.00	-18.98	44.27	-9.25	Average	140	278
2	1132.00	46.69	74.00	-27.31	55.94	-9.25	Peak	140	278
3	11510.00	49.65	54.00	-4.35	35.03	14.62	Average	100	147
4	11510.00	62.12	74.00	-11.88	47.50	14.62	Peak	100	147
5	17265.00	62.98	68.20	-5.22	42.17	20.81	Peak	100	73

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).

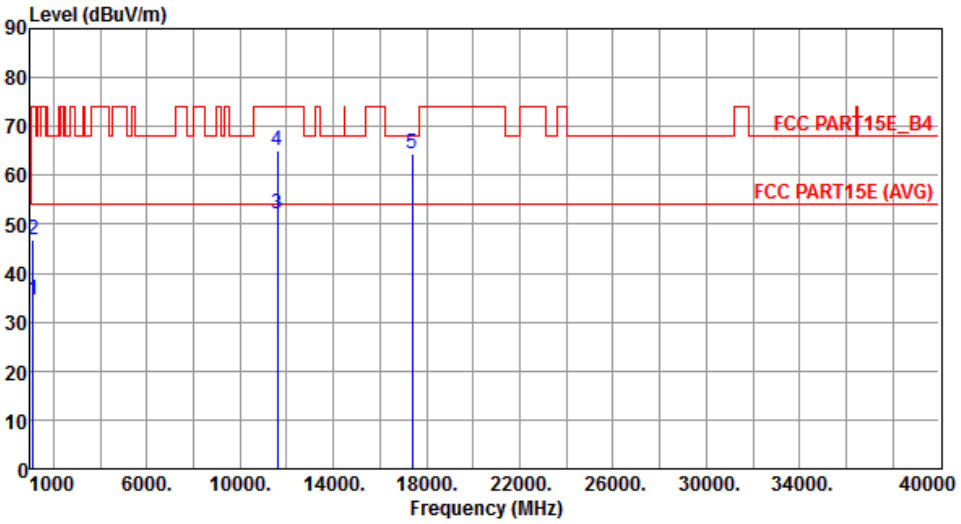
Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1132.00	34.79	54.00	-19.21	44.04	-9.25	Average	100	213
2	1132.00	47.51	74.00	-26.49	56.76	-9.25	Peak	100	213
3	11590.00	47.44	54.00	-6.56	32.94	14.50	Average	100	137
4	11590.00	58.24	74.00	-15.76	43.74	14.50	Peak	100	137
5	17385.00	64.10	68.20	-4.10	42.64	21.46	Peak	100	174

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	1132.00	34.70	54.00	-19.30	43.95	-9.25	Average	100	208
2	1132.00	46.69	74.00	-27.31	55.94	-9.25	Peak	100	208
3	11590.00	52.17	54.00	-1.83	37.67	14.50	Average	265	141
4	11590.00	65.04	74.00	-8.96	50.54	14.50	Peak	265	141
5	17385.00	64.33	68.20	-3.87	42.87	21.46	Peak	100	275

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

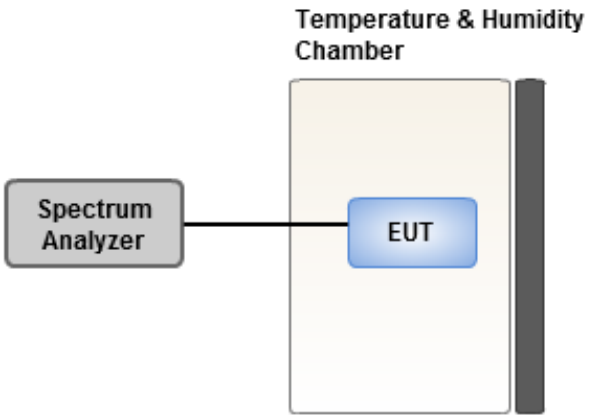
3.6.1 Limit of Frequency Stability

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: 5230 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°CVmax	-0.11	0.55	-0.41	-0.13
T20°CVmin	-0.24	-0.10	0.47	-0.21
T50°CVnom	0.76	0.78	0.72	0.76
T40°CVnom	-0.14	-0.32	-0.20	0.31
T30°CVnom	0.19	0.46	0.90	0.91
T20°CVnom	-0.03	0.09	0.41	0.33
T10°CVnom	0.36	0.55	0.62	0.75
T0°CVnom	-0.17	-0.23	-0.23	-0.01
T-10°CVnom	-0.01	0.59	0.20	0.08
T-20°CVnom	0.24	0.48	0.62	0.52
T-30°CVnom	-0.13	0.46	0.01	0.12
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 50		Tmin [°C]: -30

Frequency: 5795 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°CVmax	0.43	0.53	0.81	0.55
T20°CVmin	0.28	0.34	0.43	0.58
T50°CVnom	1.06	1.15	1.42	0.73
T40°CVnom	0.08	0.36	0.41	-0.21
T30°CVnom	-0.23	-0.19	0.22	0.06
T20°CVnom	0.19	0.38	0.10	-0.12
T10°CVnom	0.57	-0.17	0.66	0.79
T0°CVnom	0.03	-0.18	-0.18	0.26
T-10°CVnom	0.21	0.43	0.40	0.29
T-20°CVnom	0.56	0.84	0.55	0.97
T-30°CVnom	-0.36	-0.62	-0.18	-0.31
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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Email: ICC_Service@icertifi.com.tw

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