FCC C2PC Test Report

FCC ID	:	**ZQ6-AP6234A**
Equipment	:	**Wifi Dual Band + BT combo module**
Model No.	:	**AP6234A**
Brand Name	:	**Ampak**
Applicant	:	**Ampak Technology Inc.**
Address	:	**No.1 Jen Al Road, Hsinchu Industrial Park, Hukou, Hsinchu, Taiwan, 30352**
Standard	:	**47 CFR FCC Part 15.407**
Received Date	:	**Oct. 27, 2015**
Tested Date	:	**Oct. 27 ~ Dec. 01, 2015**

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

Approved & Reviewed by:

Gary Chang / Manager

Testing Laboratory
2732

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Release Record

Report No.	Version	Description	Issued Date
FR440102-23AI	Rev. 01	Initial issue	May 03, 2016

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.156MHz 54.70 (Margin -10.95dB) - QP	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5725.00MHz 77.18 (Margin -1.02dB) - PK	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]: 15.07	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

This report is prepared for FCC Class II Permissive change.

This report is issued as a supplementary report to the original ICC report no. FR440102-11AI.

The modification is complying with New U-NII rule requirement for model **AP6234A with PIFA antenna** only. Therefore, related test items had been performed and presented in the following sections.

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**
5725-5850	a	5745-5825	149-165 [5]	1	6-54 Mbps
5725-5850	n (HT20)	5745-5825	149-165 [5]	1	MCS 0-7
5725-5850	n (HT40)	5755-5795	151-159 [2]	1	MCS 0-7
Note 1: RF output power specifies that Maximum Conducted Output Power. Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	**Type**	**Operating Frequency (MHz) / Gain (dBi)**					**Connector**
		2400~2483.5	**5150~5250**	**5250~5350**	**5470~5725**	**5725~5850**	
1	PIFA	3.53	5.30	4.93	5.31	5.55	UFL

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host.

1.1.4 Accessories

N/A

1.1.5 Channel List

802.11 a / HT20		HT40	
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	wl command, V6.10 RC197.39		
Duty Cycle and Duty Factor	**Mode**	**Duty cycle (%)**	**Duty factor (dB)**
	11a	99.52%	0.02
	HT20	99.11%	0.04
	HT40	98.19%	0.08

1.1.7 Power Setting

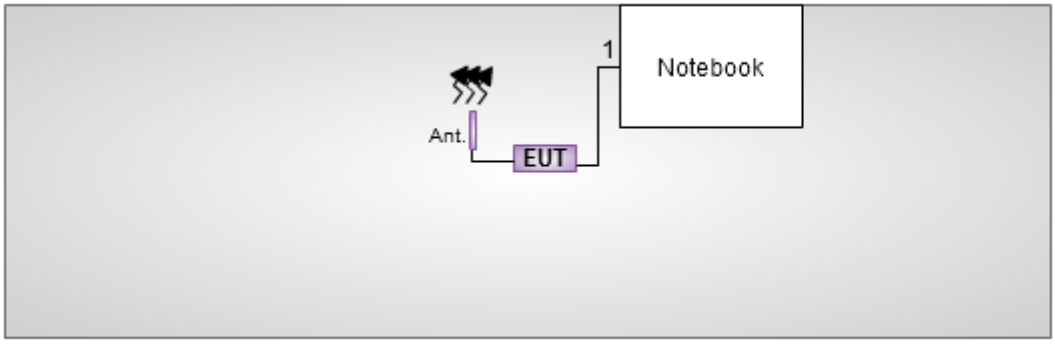
For Frequency band 5725~5850 MHz		
Modulation Mode	**Test Frequency (MHz)**	**Power Set**
11a	5745	58
11a	5785	58
11a	5825	60
HT20	5745	56
HT20	5785	60
HT20	5825	58
HT40	5755	56
HT40	5795	62

1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Signal cable / Length (m)**
1	Notebook	DELL	E6430	DoC	USB, 1.0m shielded.

1.3 Test Setup Chart

Test Setup Diagram



1. USB, 1.0m shielded w/o core

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Test date	Nov. 06, 2015				
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. 17, 2014	Nov. 16, 2015
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 31, 2014	Dec. 30, 2015
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 3 / (03CH03-WS)				
Test date	Oct. 27 ~ Oct. 30, 2015				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 14, 2015	Sep. 13, 2016
Receiver	Agilent	N9038A	MY53290044	Oct. 14, 2015	Oct. 13, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-563	Dec. 30, 2014	Dec. 29, 2015
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 03, 2015	Feb. 02, 2016
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 10, 2014	Nov. 09, 2015
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 10, 2014	Nov. 09, 2015
Preamplifier	EMC	EMC02325	980187	Sep. 21, 2015	Sep. 20, 2016
Preamplifier	Agilent	83017A	MY53270014	Sep. 07, 2015	Sep. 06, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 09, 2015	Feb. 08, 2016
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22601/4	Feb. 09, 2015	Feb. 08, 2016
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 09, 2015	Feb. 08, 2016
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 09, 2015	Feb. 08, 2016
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 09, 2015	Feb. 08, 2016
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 09, 2015	Feb. 08, 2016
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 09, 2015	Feb. 08, 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)				
Test date	Dec. 01, 2015				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 27, 2015	Nov. 26, 2016
Power Meter	Anritsu	ML2495A	1241002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor	Anritsu	MA2411B	1207366	Sep. 21, 2015	Sep. 20, 2016
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 v01
FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.6 Measurement Uncertainty

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

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Frequency error	±34.134 Hz
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.99 dB
Radiated emission > 1GHz	±5.52 dB
Time	±0.1%
Temperature	±0.6 ^{o}C

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 55%	Peter Lin
Radiated Emissions	03CH03-WS	21-23°C / 61-64%	Anderson Hung Felix Sung
RF Conducted	TH01-WS	23°C / 64%	Felix Sung

- FCC site registration No.: 390588
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

For Frequency band 5725-5850 MHz				
Test item	**Modulation Mode**	**Test Frequency (MHz)**	**Data Rate (Mbps) / MCS**	**Test Configuration**
Conducted Emissions	HT40	5795	MCS 0	---
Radiated Emissions ≤1GHz	HT40	5795	MCS 0	---
RF Output Power	11a	5745 / 5785 / 5825	6 Mbps	---
	HT20	5745 / 5785 / 5825	MCS 0	
	HT40	5755 / 5795	MCS 0	
Radiated Emissions >1GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	11a	5745 / 5785 / 5825	6 Mbps	---
	HT20	5745 / 5785 / 5825	MCS 0	
	HT40	5755 / 5795	MCS 0	
Frequency Stability	Un-modulation	5785	---	---
NOTE: The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.				

3 Transmitter Test Results

3.1 Conducted Emissions

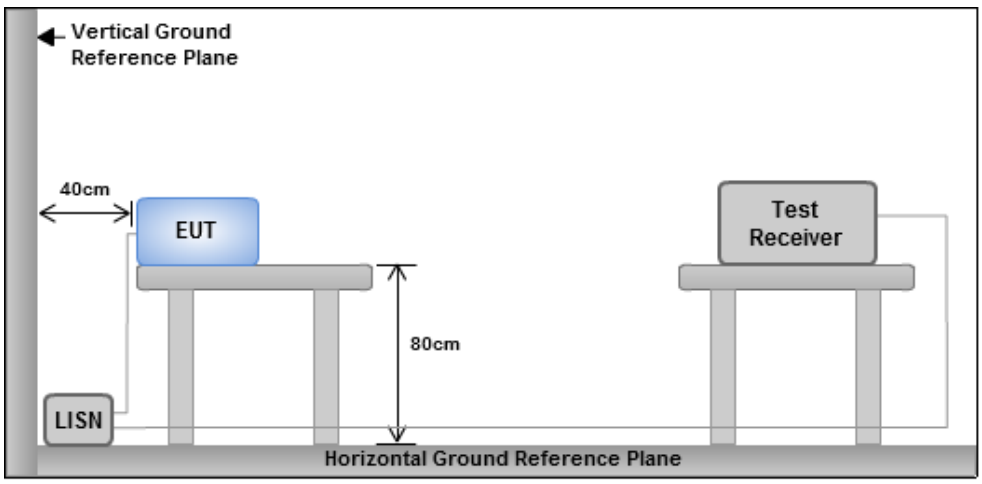
3.1.1 Limit of Conducted Emissions

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

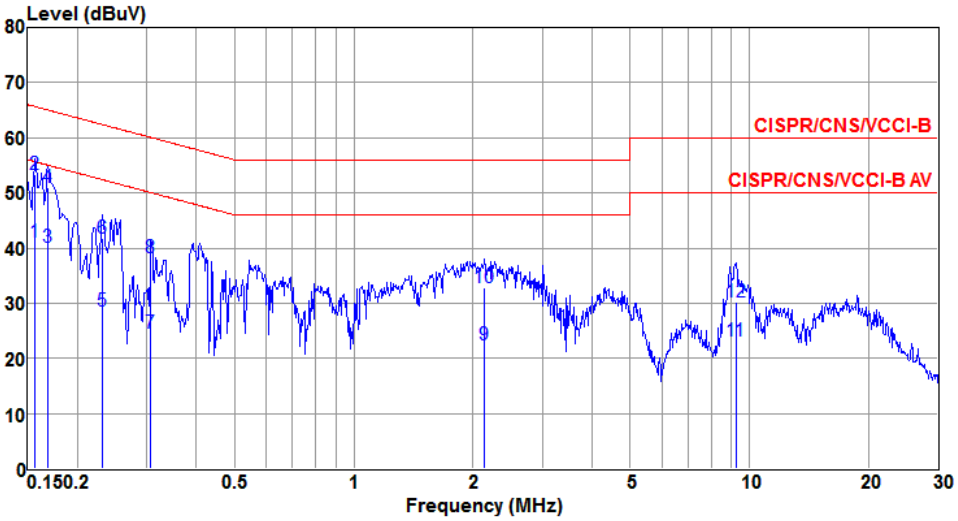


Note: 1. Support units were connected to second LISN.

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

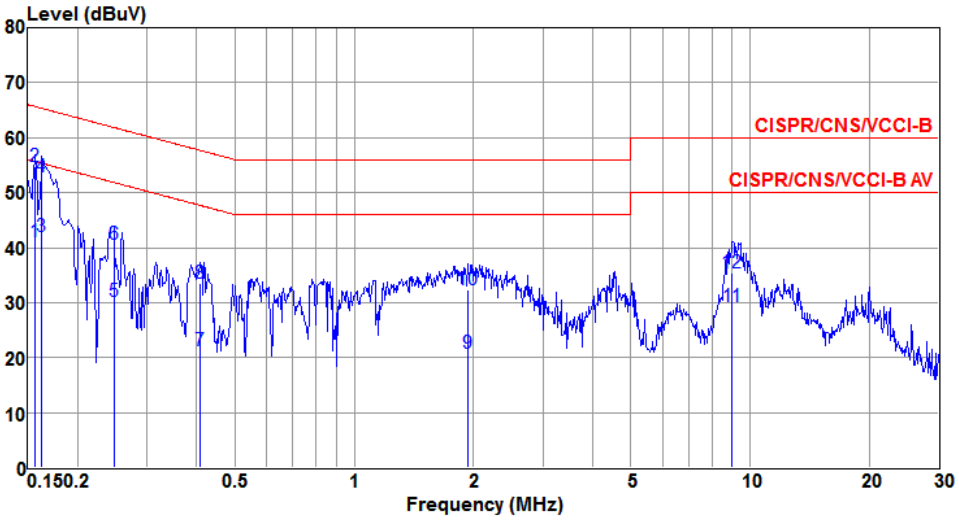
Modulation	HT40	Test Freq. (MHz)	5795
Power Phase	Line		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.156	41.03	55.65	-14.62	40.88	0.07	0.08	Average
2@	0.156	53.29	65.65	-12.36	53.14	0.07	0.08	QP
3	0.169	40.15	55.03	-14.88	40.00	0.07	0.08	Average
4	0.169	51.09	65.03	-13.94	50.94	0.07	0.08	QP
5	0.232	28.58	52.39	-23.81	28.42	0.07	0.09	Average
6	0.232	41.66	62.39	-20.73	41.50	0.07	0.09	QP
7	0.307	24.47	50.06	-25.59	24.30	0.07	0.10	Average
8	0.307	38.34	60.06	-21.72	38.17	0.07	0.10	QP
9	2.144	22.46	46.00	-23.54	22.11	0.10	0.25	Average
10	2.144	32.81	56.00	-23.19	32.46	0.10	0.25	QP
11	9.253	23.13	50.00	-26.87	22.63	0.20	0.30	Average
12	9.253	30.25	60.00	-29.75	29.75	0.20	0.30	QP

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

Modulation	HT40	Test Freq. (MHz)	5795
Power Phase	Neutral		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.156	41.03	55.65	-14.62	40.88	0.07	0.08	Average
2@	0.156	54.70	65.65	-10.95	54.55	0.07	0.08	QP
3	0.162	42.07	55.34	-13.27	41.92	0.07	0.08	Average
4	0.162	52.85	65.34	-12.49	52.70	0.07	0.08	QP
5	0.247	30.13	51.86	-21.73	29.96	0.07	0.10	Average
6	0.247	40.65	61.86	-21.21	40.48	0.07	0.10	QP
7	0.408	21.28	47.68	-26.40	21.10	0.07	0.11	Average
8	0.408	33.59	57.68	-24.09	33.41	0.07	0.11	QP
9	1.939	20.69	46.00	-25.31	20.35	0.10	0.24	Average
10	1.939	32.41	56.00	-23.59	32.07	0.10	0.24	QP
11	9.011	29.33	50.00	-20.67	28.81	0.22	0.30	Average
12	9.011	35.40	60.00	-24.60	34.88	0.22	0.30	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

The minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

3.2.2 Test Procedures

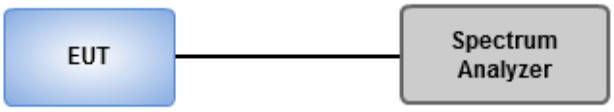
6dB Bandwidth

1. Set RBW = 100 kHz, video bandwidth = 300 kHz
2. Detector = Peak, Trace mode = max hold, Sweep = auto couple, Allow the trace to stabilize
3. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

Occupied Bandwidth

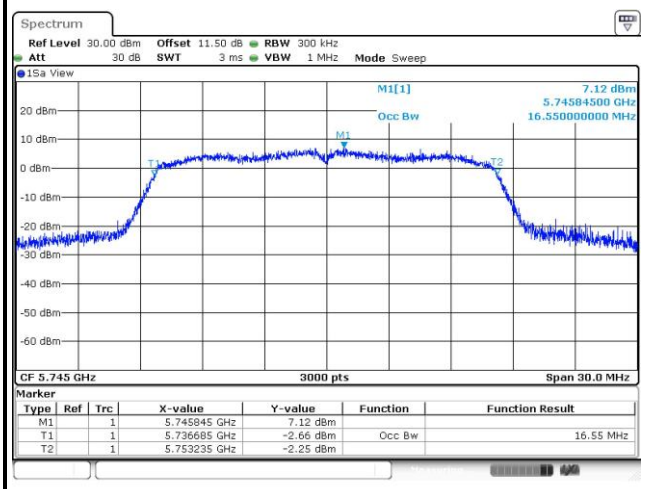
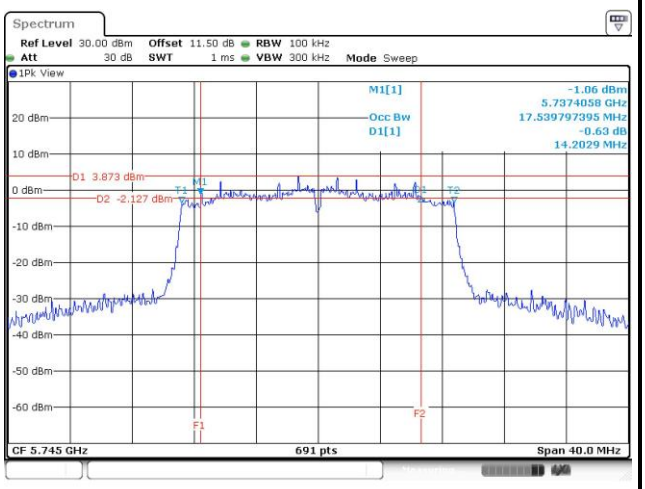
1. Set RBW = 1 % to 5 % of the OBW
2. Set VBW ≥ 3 RBW
3. Sample detection and single sweep mode shall be used
4. Use the 99 % power bandwidth function of the instrument

3.2.3 Test Setup



3.2.4 Test Result of Emission Bandwidth

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)
11a	1	5745	16.55	---	---	---	15.07	---	---	---	0.5
11a	1	5785	16.56	---	---	---	14.49	---	---	---	0.5
11a	1	5825	16.60	---	---	---	14.72	---	---	---	0.5
HT20	1	5745	17.56	---	---	---	14.20	---	---	---	0.5
HT20	1	5785	17.57	---	---	---	15.94	---	---	---	0.5
HT20	1	5825	17.54	---	---	---	15.13	---	---	---	0.5
HT40	1	5755	36.18	---	---	---	35.13	---	---	---	0.5
HT40	1	5795	36.28	---	---	---	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

The maximum conducted output power over the frequency band of operation shall not exceed 1 W

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 5725-5850 MHz									
Mode	N_{TX}	Freq. (MHz)	Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11a	1	5745	14.97	---	---	---	31.405	14.97	30.00
11a	1	5785	14.89	---	---	---	30.832	14.89	30.00
11a	1	5825	14.74	---	---	---	29.785	14.74	30.00
HT20	1	5745	14.21	---	---	---	26.363	14.21	30.00
HT20	1	5785	14.91	---	---	---	30.974	14.91	30.00
HT20	1	5825	14.60	---	---	---	28.840	14.60	30.00
HT40	1	5755	13.72	---	---	---	23.550	13.72	30.00
HT40	1	5795	15.07	---	---	---	32.137	**15.07**	30.00

3.4 Peak Power Spectral Density

3.4.1 Limit of Peak Power Spectral Density

The maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

3.4.2 Test Procedures

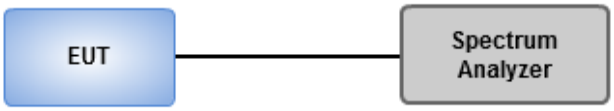
☒ Method SA-1

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

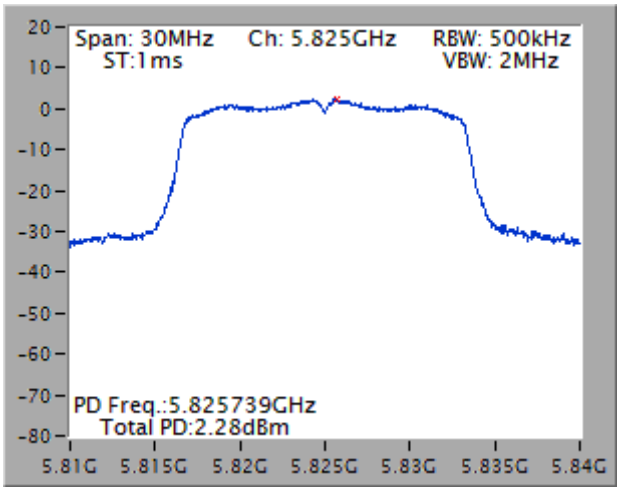


3.4.4 Test Result of Peak Power Spectral Density

Condition			Peak Power Spectral Density (dBm/500kHz)			
Modulation Mode	N_{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/500kHz)	Duty Factor (dB)	PPSD with D.F (dBm/500kHz)	PPSD Limit (dBm/500kHz)
11a	1	5745	2.21	0.00	2.21	30.00
11a	1	5785	2.06	0.00	2.06	30.00
11a	1	5825	2.28	0.00	2.28	30.00
HT20	1	5745	1.08	0.00	1.08	30.00
HT20	1	5785	2.19	0.00	2.19	30.00
HT20	1	5825	1.62	0.00	1.62	30.00
HT40	1	5755	-2.06	0.00	-2.06	30.00
HT40	1	5795	-0.76	0.00	-0.76	30.00

Note: D.F is duty factor.

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]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.850 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.850 5.860 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m]

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

3.5.2 Test Procedures

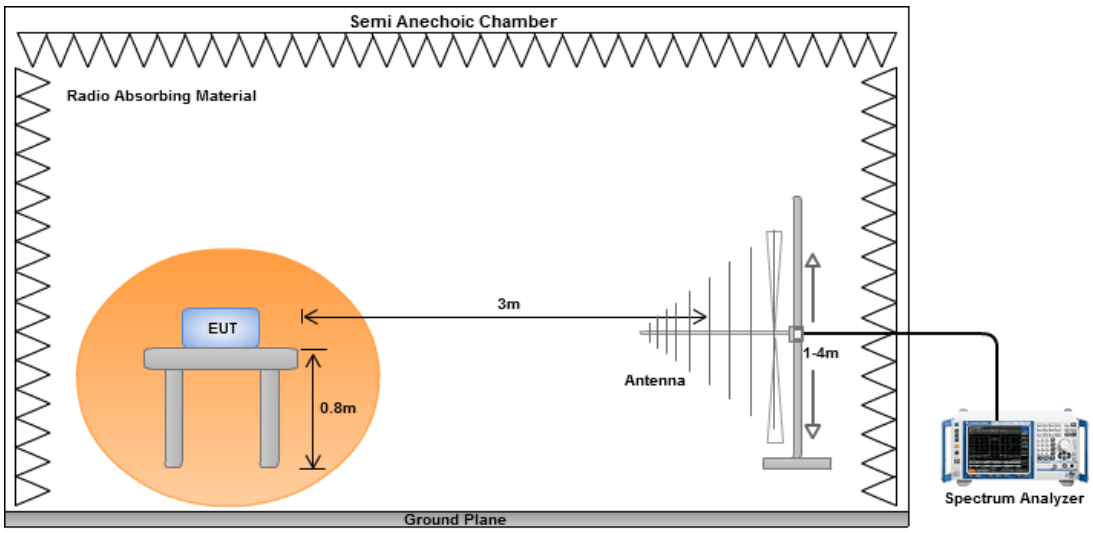
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

Note:

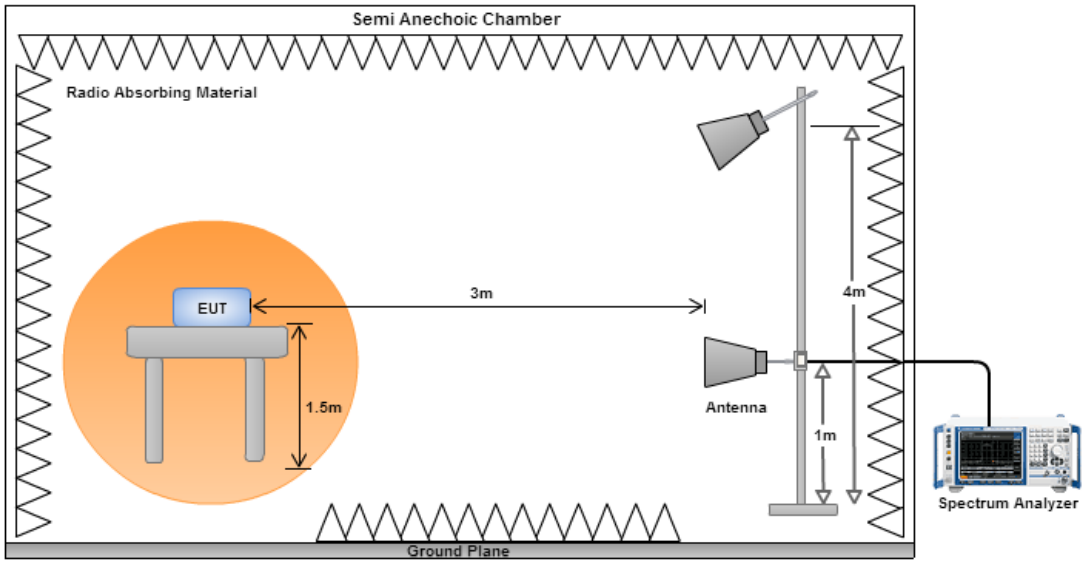
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

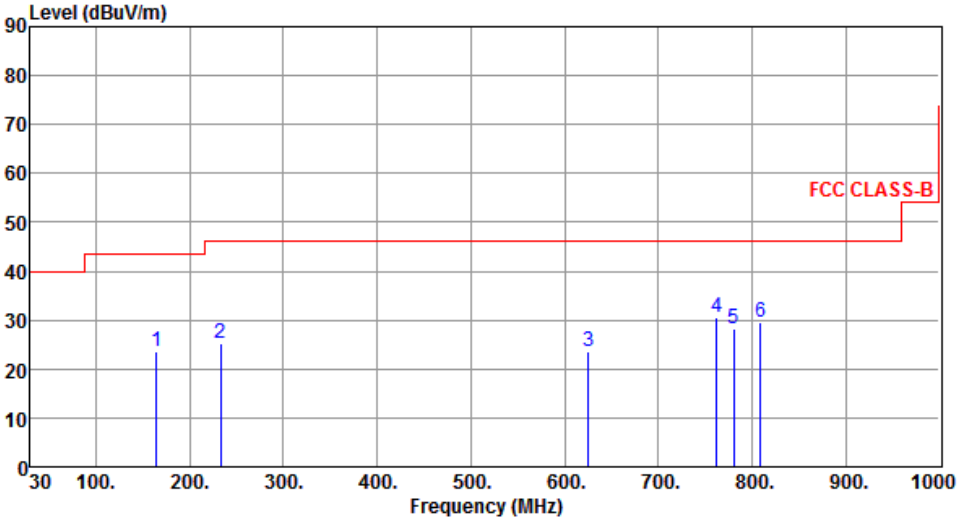


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

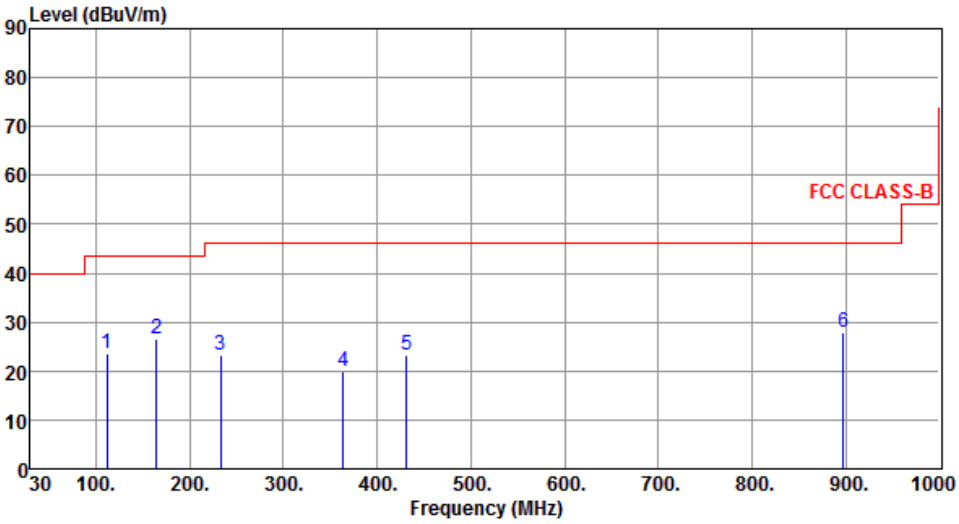
Modulation	HT40	**Test Freq. (MHz)**	5795
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	164.83	23.44	43.50	-20.06	37.29	-13.85	Peak	---	---
2	232.73	25.17	46.00	-20.83	40.37	-15.20	Peak	---	---
3	625.58	23.62	46.00	-22.38	29.03	-5.41	Peak	---	---
4	762.35	30.52	46.00	-15.48	33.65	-3.13	Peak	---	---
5	780.75	28.34	46.00	-17.66	31.22	-2.88	Peak	---	---
6	808.91	29.39	46.00	-16.61	31.87	-2.48	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	HT40	Test Freq. (MHz)	5795
Polarization	Vertical		

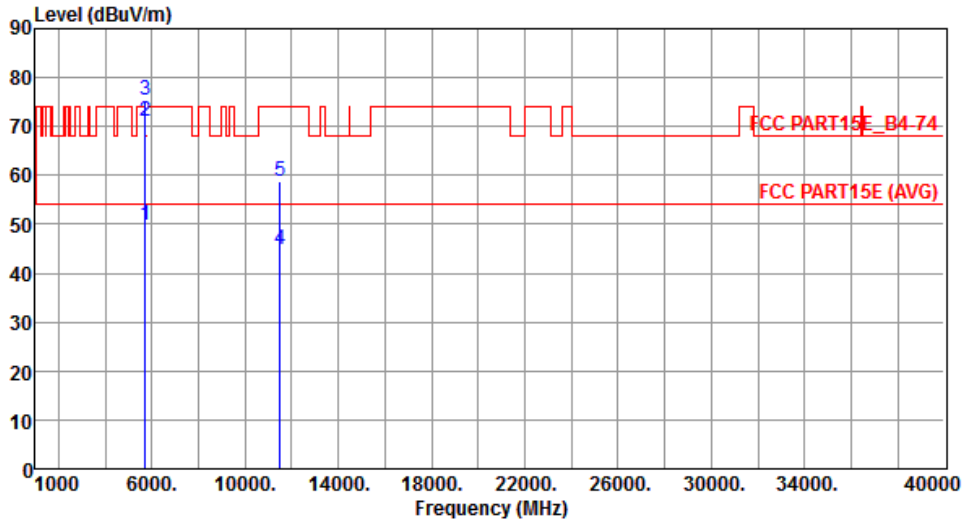


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	111.48	23.69	43.50	-19.81	40.21	-16.52	Peak	---	---
2	164.83	26.44	43.50	-17.06	40.29	-13.85	Peak	---	---
3	232.73	23.31	46.00	-22.69	38.51	-15.20	Peak	---	---
4	363.68	19.92	46.00	-26.08	31.00	-11.08	Peak	---	---
5	431.58	23.15	46.00	-22.85	32.40	-9.25	Peak	---	---
6	897.18	28.06	46.00	-17.94	28.85	-0.79	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.

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

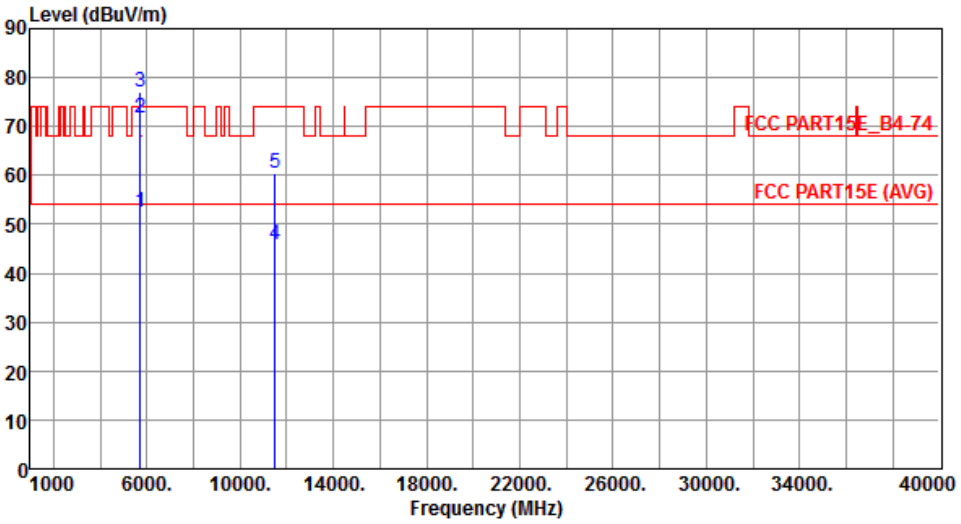
Modulation	11a	Test Freq. (MHz)	5745
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	49.68	54.00	-4.32	42.48	7.20	Average	177	109
2	5715.00	70.97	74.00	-3.03	63.77	7.20	Peak	177	109
3	5725.00	75.42	78.20	-2.78	68.18	7.24	Peak	177	109
4	11490.00	44.82	54.00	-9.18	27.91	16.91	Average	199	103
5	11490.00	58.77	74.00	-15.23	41.86	16.91	Peak	199	103

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

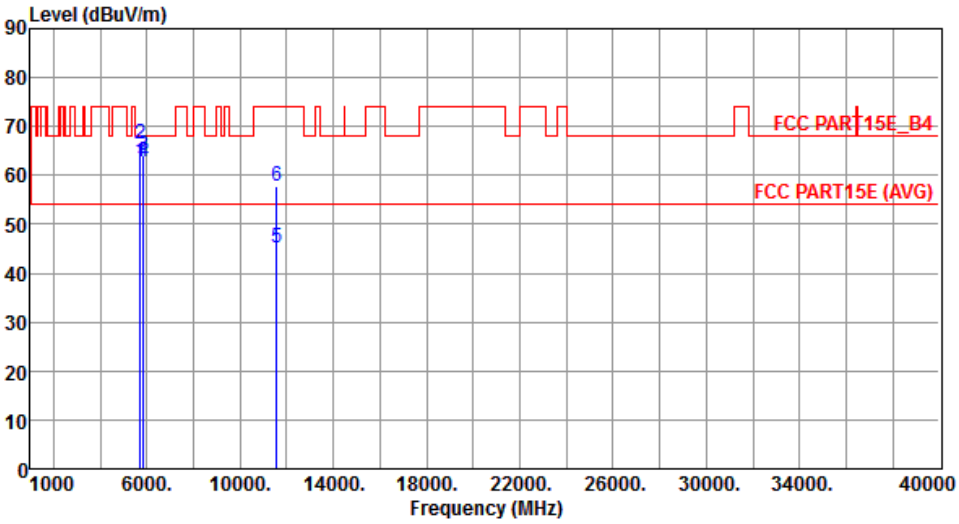
Modulation	11a	Test Freq. (MHz)	5745
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	52.41	54.00	-1.59	45.21	7.20	Average	165	131
2	5715.00	71.81	74.00	-2.19	64.61	7.20	Peak	165	131
3	5725.00	77.18	78.20	-1.02	69.94	7.24	Peak	165	131
4	11490.00	45.95	54.00	-8.05	29.04	16.91	Average	185	116
5	11490.00	60.29	74.00	-13.71	43.38	16.91	Peak	185	116

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

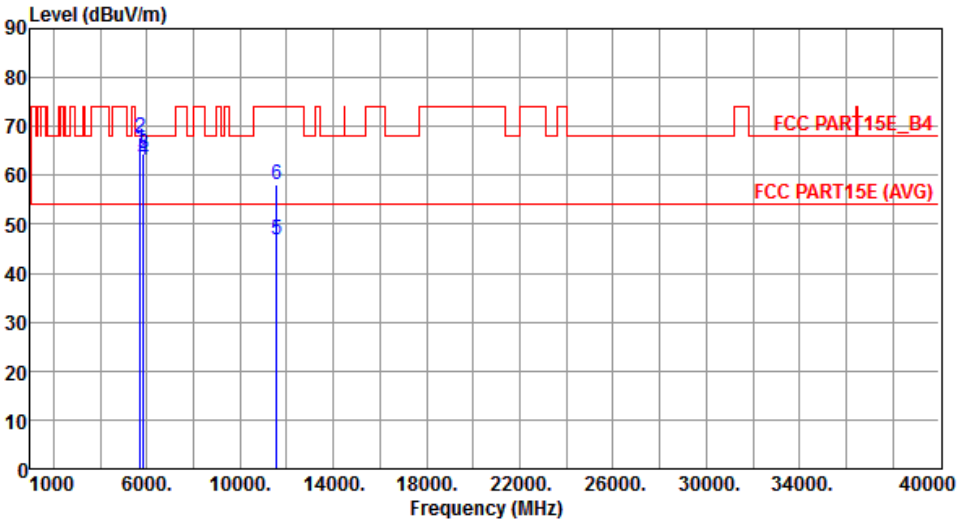
Modulation	11a	Test Freq. (MHz)	5785
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	62.84	68.20	-5.36	55.64	7.20	Peak	218	107
2	5725.00	66.33	78.20	-11.87	59.09	7.24	Peak	218	107
3	5850.00	64.10	78.20	-14.10	56.60	7.50	Peak	218	107
4	5860.00	62.75	68.20	-5.45	55.24	7.51	Peak	218	107
5	11570.00	45.14	54.00	-8.86	28.34	16.80	Average	212	98
6	11570.00	57.77	74.00	-16.23	40.97	16.80	Peak	212	98

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

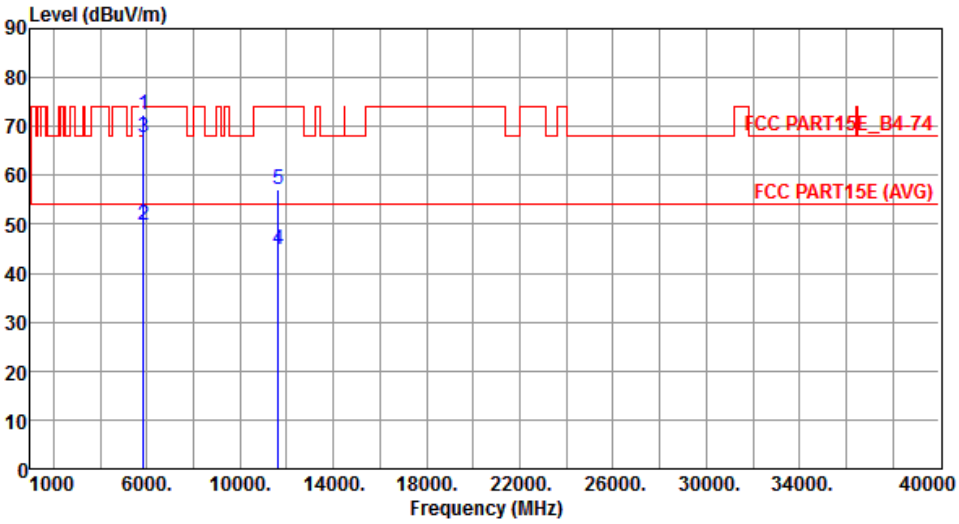
Modulation	11a	**Test Freq. (MHz)**	5785
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	65.28	68.20	-2.92	58.08	7.20	Peak	151	163
2	5725.00	67.82	78.20	-10.38	60.58	7.24	Peak	151	163
3	5850.00	64.39	78.20	-13.81	56.89	7.50	Peak	151	163
4	5860.00	63.18	68.20	-5.02	55.67	7.51	Peak	151	163
5	11570.00	46.90	54.00	-7.10	30.10	16.80	Average	154	114
6	11570.00	58.01	74.00	-15.99	41.21	16.80	Peak	154	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).

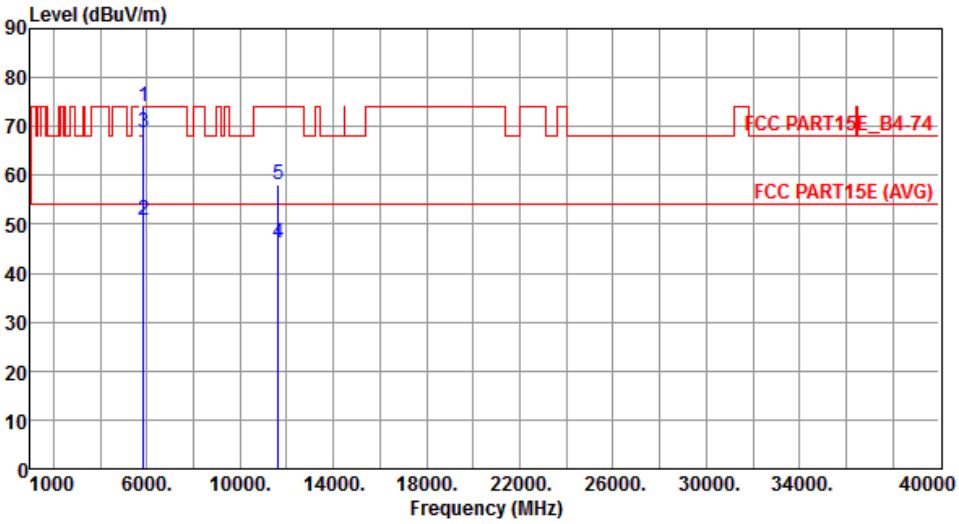
Modulation	11a	Test Freq. (MHz)	5825
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	72.42	78.20	-5.78	64.92	7.50	Peak	167	108
2	5860.00	49.95	54.00	-4.05	42.44	7.51	Average	167	108
3	5860.00	67.81	74.00	-6.19	60.30	7.51	Peak	167	108
4	11650.00	44.83	54.00	-9.17	28.18	16.65	Average	215	92
5	11650.00	57.26	74.00	-16.74	40.61	16.65	Peak	215	92

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

Modulation	11a	Test Freq. (MHz)	5825
Polarization	Vertical		

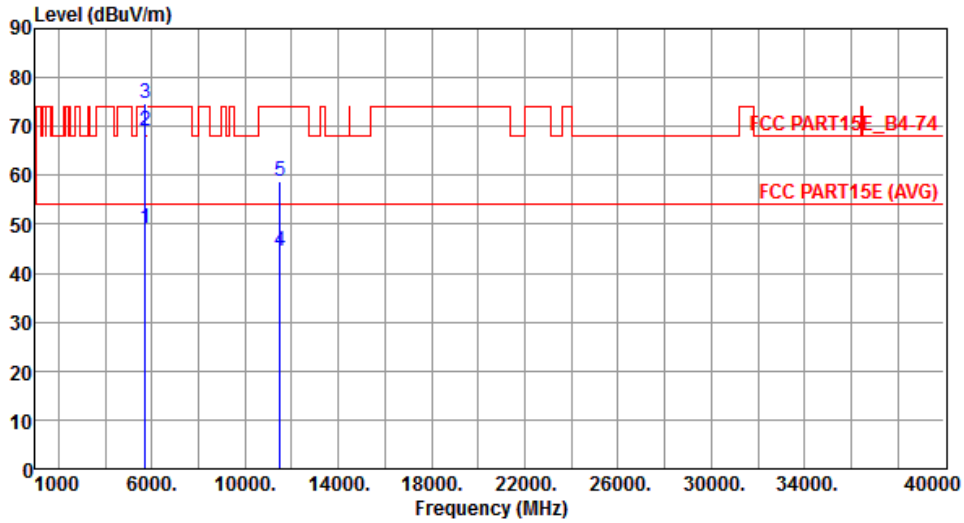


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	74.06	78.20	-4.14	66.56	7.50	Peak	192	129
2	5860.00	50.93	54.00	-3.07	43.42	7.51	Average	192	129
3	5860.00	68.86	74.00	-5.14	61.35	7.51	Peak	192	129
4	11650.00	46.22	54.00	-7.78	29.57	16.65	Average	159	118
5	11650.00	58.22	74.00	-15.78	41.57	16.65	Peak	159	118

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).

3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

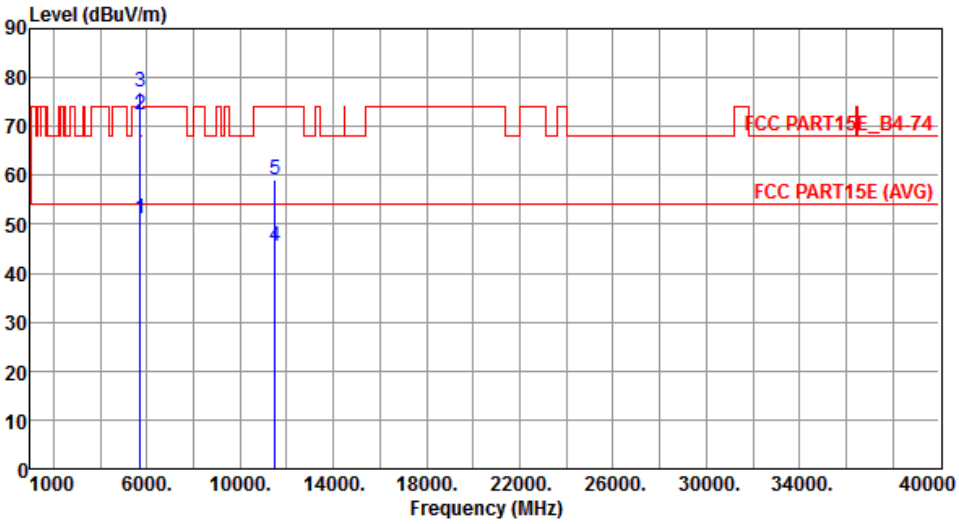
Modulation	HT20	Test Freq. (MHz)	5745
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	49.14	54.00	-4.86	41.94	7.20	Average	185	109
2	5715.00	69.23	74.00	-4.77	62.03	7.20	Peak	185	109
3	5725.00	74.74	78.20	-3.46	67.50	7.24	Peak	185	109
4	11490.00	44.63	54.00	-9.37	27.72	16.91	Average	182	100
5	11490.00	58.65	74.00	-15.35	41.74	16.91	Peak	182	100

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).

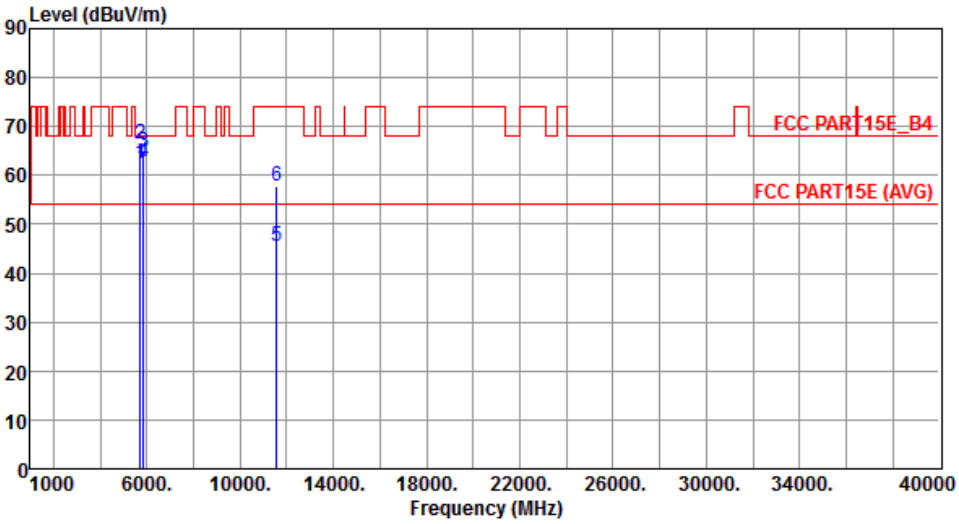
Modulation	HT20	Test Freq. (MHz)	5745
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	51.18	54.00	-2.82	43.98	7.20	Average	163	129
2	5715.00	72.36	74.00	-1.64	65.16	7.20	Peak	163	129
3	5725.00	77.04	78.20	-1.16	69.80	7.24	Peak	163	129
4	11490.00	45.53	54.00	-8.47	28.62	16.91	Average	172	112
5	11490.00	59.11	74.00	-14.89	42.20	16.91	Peak	172	112

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).

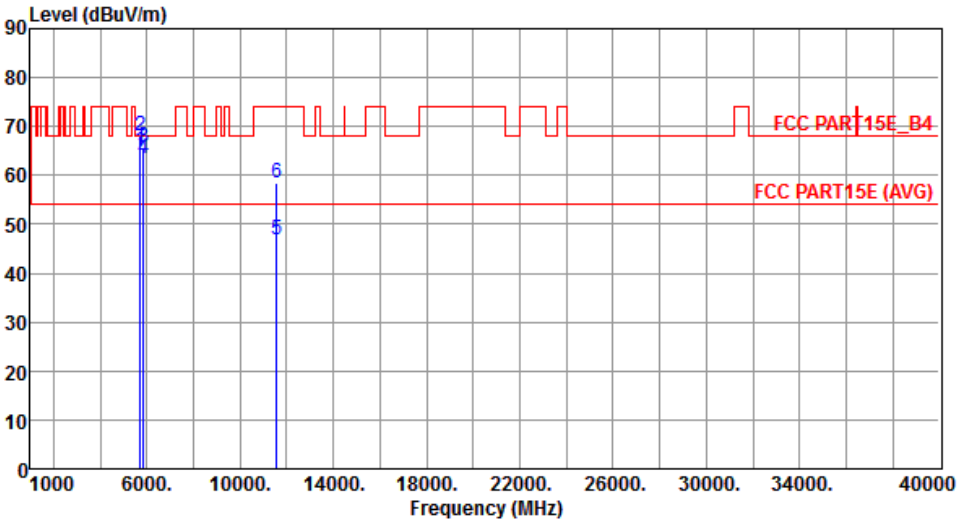
Modulation	HT20	Test Freq. (MHz)	5785
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	62.33	68.20	-5.87	55.13	7.20	Peak	155	168
2	5725.00	66.57	78.20	-11.63	59.33	7.24	Peak	155	168
3	5850.00	64.74	78.20	-13.46	57.24	7.50	Peak	155	168
4	5860.00	62.76	68.20	-5.44	55.25	7.51	Peak	155	168
5	11570.00	45.57	54.00	-8.43	28.77	16.80	Average	157	112
6	11570.00	57.63	74.00	-16.37	40.83	16.80	Peak	157	112

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).

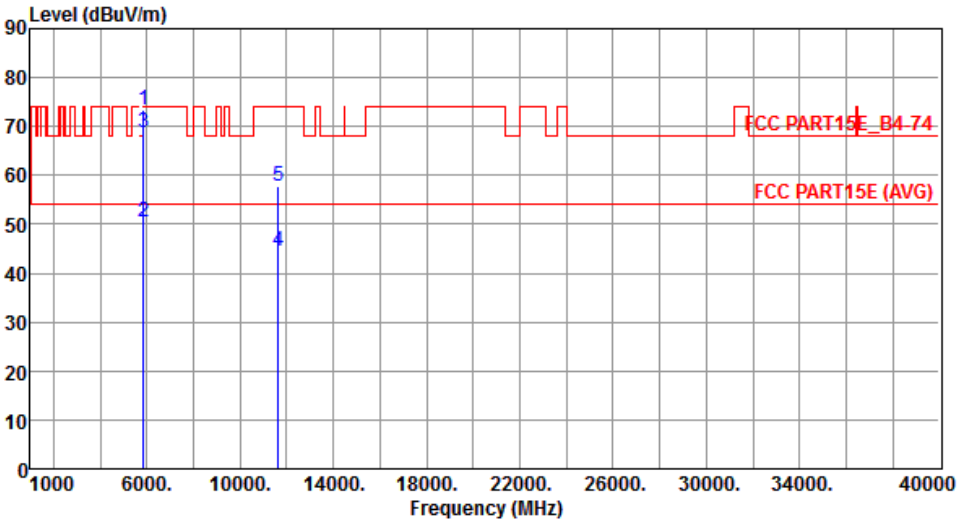
Modulation	HT20	Test Freq. (MHz)	5785
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	65.18	68.20	-3.02	57.98	7.20	Peak	215	103
2	5725.00	68.12	78.20	-10.08	60.88	7.24	Peak	215	103
3	5850.00	65.62	78.20	-12.58	58.12	7.50	Peak	215	103
4	5860.00	63.30	68.20	-4.90	55.79	7.51	Peak	215	103
5	11570.00	46.89	54.00	-7.11	30.09	16.80	Average	219	96
6	11570.00	58.42	74.00	-15.58	41.62	16.80	Peak	219	96

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).

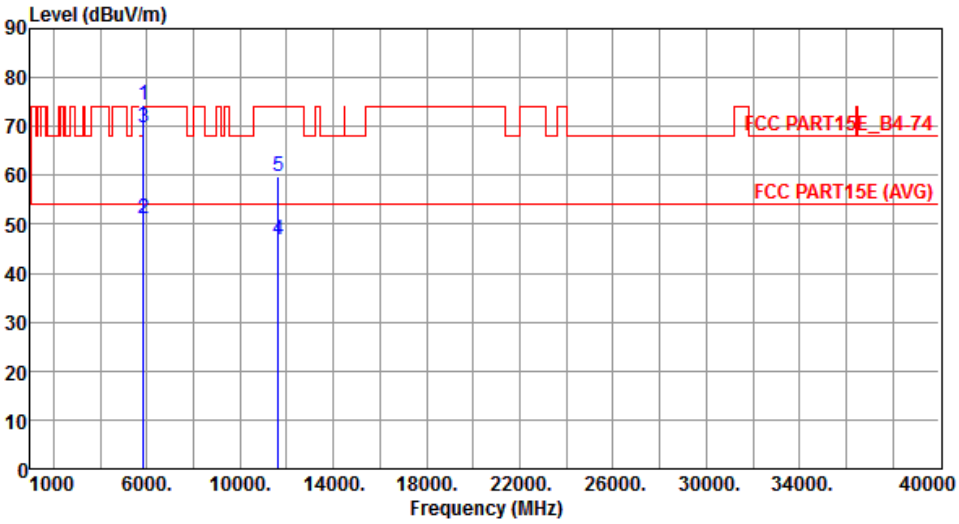
Modulation	HT20	Test Freq. (MHz)	5825
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	73.25	78.20	-4.95	65.75	7.50	Peak	179	109
2	5860.00	50.52	54.00	-3.48	43.01	7.51	Average	179	109
3	5860.00	68.84	74.00	-5.16	61.33	7.51	Peak	179	109
4	11650.00	44.43	54.00	-9.57	27.78	16.65	Average	217	87
5	11650.00	57.86	74.00	-16.14	41.21	16.65	Peak	217	87

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	HT20	Test Freq. (MHz)	5825
Polarization	Vertical		

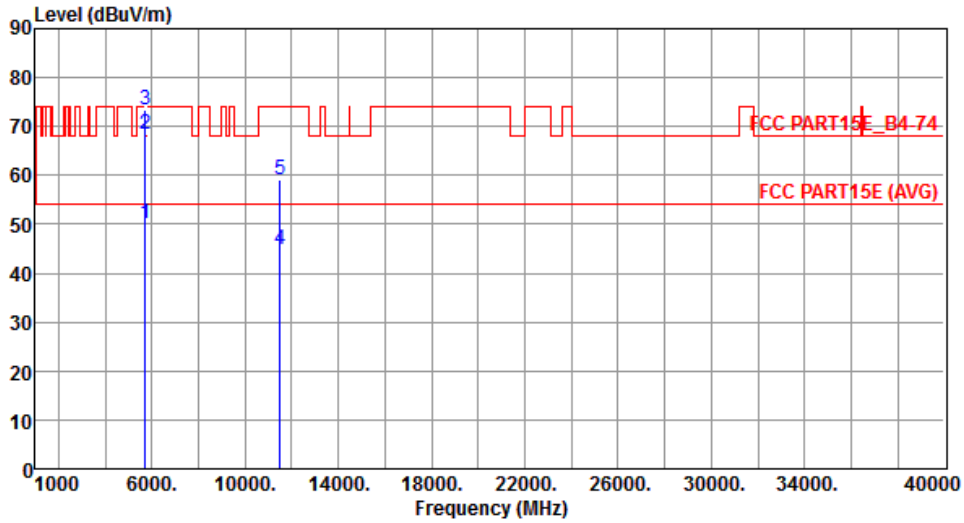


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	74.26	78.20	-3.94	66.76	7.50	Peak	176	129
2	5860.00	51.21	54.00	-2.79	43.70	7.51	Average	176	129
3	5860.00	69.86	74.00	-4.14	62.35	7.51	Peak	176	129
4	11650.00	46.96	54.00	-7.04	30.31	16.65	Average	155	113
5	11650.00	59.87	74.00	-14.13	43.22	16.65	Peak	155	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).

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40

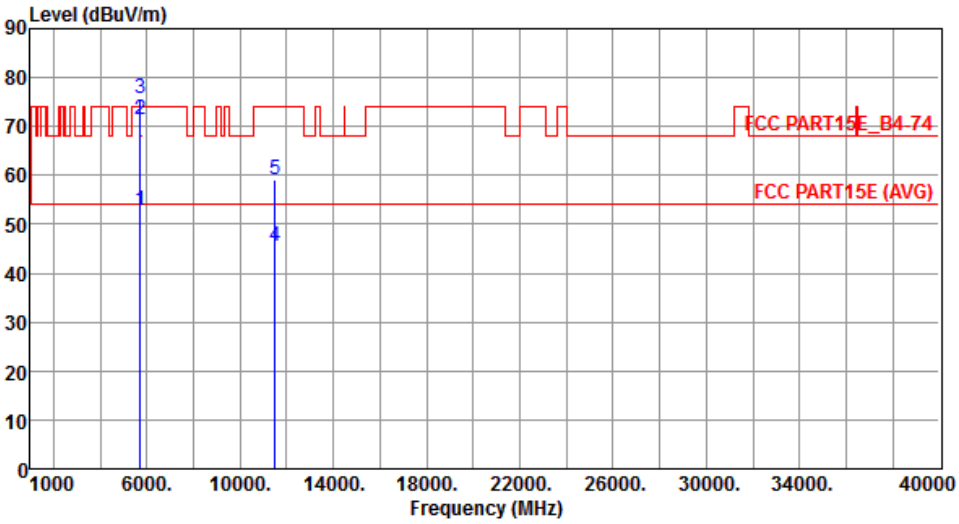
Modulation	HT40	Test Freq. (MHz)	5755
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	50.31	54.00	-3.69	43.11	7.20	Average	175	110
2	5715.00	68.42	74.00	-5.58	61.22	7.20	Peak	175	110
3	5725.00	73.51	78.20	-4.69	66.27	7.24	Peak	175	110
4	11510.00	44.87	54.00	-9.13	27.97	16.90	Average	188	106
5	11510.00	58.97	74.00	-15.03	42.07	16.90	Peak	188	106

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).

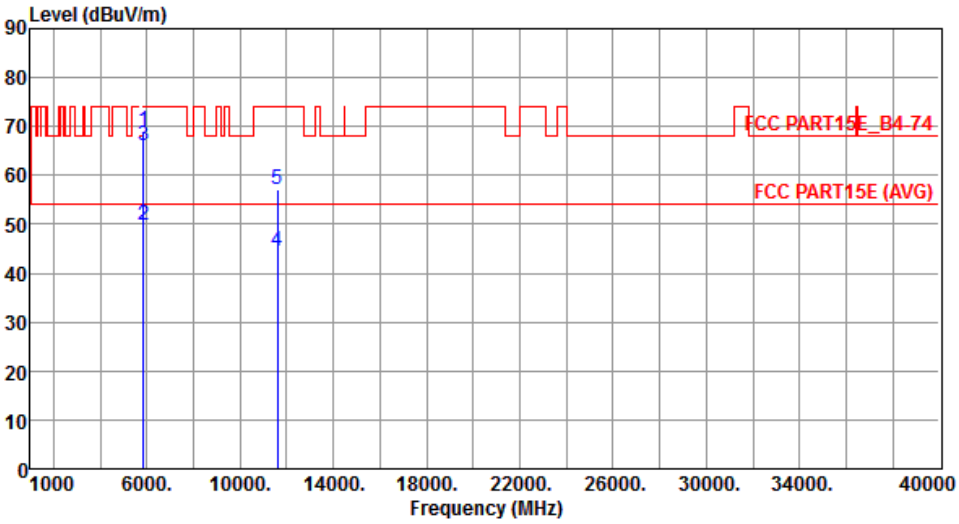
Modulation	HT40	Test Freq. (MHz)	5755
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	52.69	54.00	-1.31	45.49	7.20	Average	171	130
2	5715.00	71.41	74.00	-2.59	64.21	7.20	Peak	171	130
3	5725.00	75.72	78.20	-2.48	68.48	7.24	Peak	171	130
4	11510.00	45.34	54.00	-8.66	28.44	16.90	Average	178	120
5	11510.00	58.95	74.00	-15.05	42.05	16.90	Peak	178	120

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).

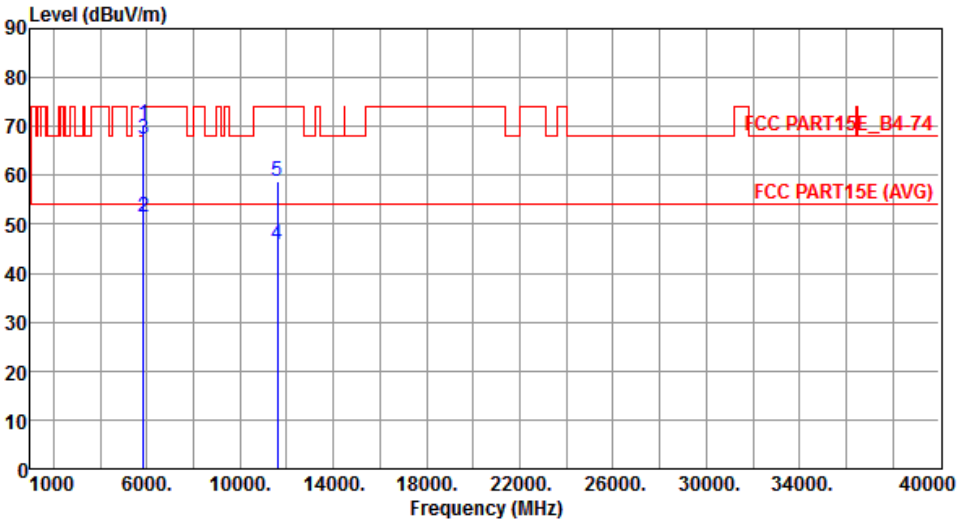
Modulation	HT40	Test Freq. (MHz)	5795
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	69.10	78.20	-9.10	61.60	7.50	Peak	178	105
2	5860.00	49.75	54.00	-4.25	42.24	7.51	Average	178	105
3	5860.00	66.03	74.00	-7.97	58.52	7.51	Peak	178	105
4	11590.00	44.51	54.00	-9.49	27.75	16.76	Average	213	85
5	11590.00	56.97	74.00	-17.03	40.21	16.76	Peak	213	85

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	HT40	**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	5850.00	70.40	78.20	-7.80	62.90	7.50	Peak	157	132
2	5860.00	51.49	54.00	-2.51	43.98	7.51	Average	157	132
3	5860.00	67.55	74.00	-6.45	60.04	7.51	Peak	157	132
4	11590.00	45.87	54.00	-8.13	29.11	16.76	Average	159	116
5	11590.00	58.68	74.00	-15.32	41.92	16.76	Peak	159	116

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

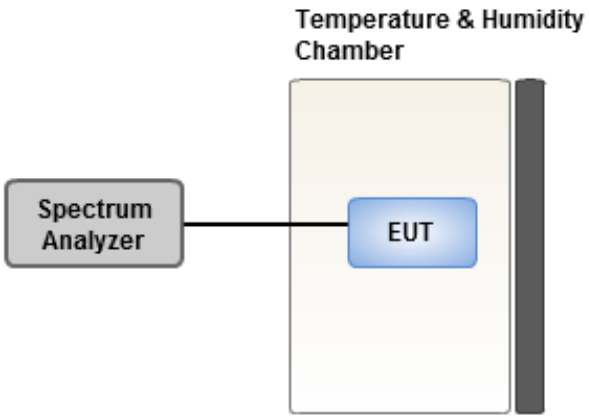
3.6.1 Limit of Frequency Stability

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: 5785 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°CVmax	6.56	6.12	5.58	6.20
T20°CVmin	4.79	4.99	5.10	5.11
T85°CVnom	5.92	5.53	5.70	5.91
T80°CVnom	4.53	5.18	5.00	5.05
T70°CVnom	4.42	3.46	3.46	4.17
T60°CVnom	4.53	5.04	4.44	4.80
T50°CVnom	4.80	4.28	5.33	4.85
T40°CVnom	4.19	4.45	4.19	3.85
T30°CVnom	4.87	4.68	4.38	5.27
T20°CVnom	3.46	3.91	3.84	3.72
T10°CVnom	3.24	3.46	4.02	3.55
T0°CVnom	3.48	3.87	3.56	3.56
T-10°CVnom	1.59	1.70	1.21	1.85
T-20°CVnom	1.57	2.01	2.15	1.74
T-30°CVnom	2.22	2.56	2.51	2.56
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 85		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

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