FCC C2PC Test Report

FCC ID	:	**BKMAE-E92**
Equipment	:	**11nabg 2x2 USB RF module**
Model No.	:	**DNUK-E92**
Brand Name	:	**EPSON**
Applicant	:	**Seiko Epson Corporation**
Address	:	**3-3-5 Owa,Suwa-shi,Nagano 392-8502 Japan**
Standard	:	**47 CFR FCC Part 15.407**
Received Date	:	**Sep. 24, 2015**
Tested Date	:	**Sep. 24 ~ Oct. 28, 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
FR410802-03	Rev. 01	Initial issue	Nov. 16, 2015

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.339MHz 43.65 (Margin -15.57dB) - QP	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5725.00MHz 77.69 (Margin -0.51dB) - 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]: 15.04	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 issued as a FCC Class II Permissive Change for complying with New U-NII rule requirement. In this test report, all test items has been re-tested and only its data was recorded 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 (HT20)	5745-5825	149-165 [5]	2	MCS 8-15
5725-5850	n (HT40)	5755-5795	151-159 [2]	1	MCS 0-7
5725-5850	n (HT40)	5755-5795	151-159 [2]	2	MCS 8-15
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. Note 3: 802.11n supports diversity function.					

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Antenna Gain (dBi)
1	S203L ANT1	PIFA	NA	0.89
2	S203L ANT2	PIFA	NA	1.92

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from Host

1.1.4 Accessories

N/A

1.1.5 Channel List

802.11 a / HT20		802.11n 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	Mptool, version: 0.0023.1101.2013		
Duty Cycle and Duty Factor	**Mode**	**Duty cycle (%)**	**Duty factor (dB)**
	11a	96.20%	0.17
	HT20	86.82%	0.61
	HT40	58.17%	2.35

1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11a	5745	52
11a	5785	54
11a	5825	55
HT20	5745	44/47
HT20	5785	43/46
HT20	5825	47/50
HT40	5755	46/49
HT40	5795	47/50

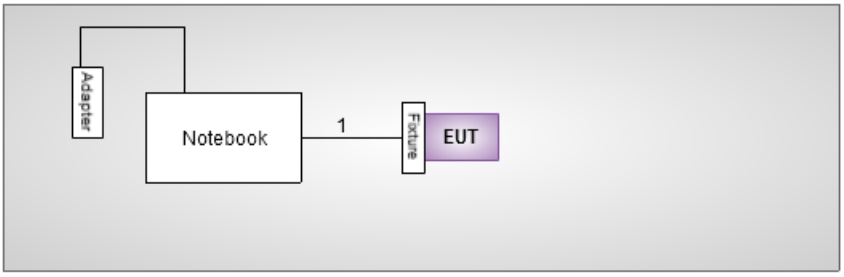
1.2 Local Support Equipment List

Support Equipment List						
No.	**Equipment**	**Brand**	**Model**	**S/N**	**FCC ID**	**Signal cable / Length (m)**
1	Notebook	DELL	Latitude E6440	JPXMD12	DoC	---
2	Fixture	---	---	---	---	USB, 1m shielded w/o core

Note: No. 2 was supplied by applicant.

1.3 Test Setup Chart

Test Setup Diagram



1. USB, 1m shielded w/o core

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**
Receiver	R&S	ESR3	101657	Jan. 15, 2015	Jan. 14, 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)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 14, 2015	Sep. 13, 2016
Receiver	R&S	ESR3	101657	Jan. 15, 2015	Jan. 14, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-562	Jan. 19, 2015	Jan. 18, 2016
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
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)				
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	Dec. 03, 2014	Dec. 02, 2015
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 644545 D03 Guidance for IEEE 802 11ac New Rules v01
FCC KDB 662911 D01 Multiple Transmitter Output v02r01
FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.6 Measurement Uncertainty

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

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Frequency error	±34.134 Hz
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.99 dB
Radiated emission > 1GHz	±5.52 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	22°C / 59%	Peter Lin
Radiated Emissions	03CH03-WS	21°C / 60-61%	Anderson Hung Warren Lee
RF Conducted	TH01-WS	22°C / 64%	Brad Wu

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

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	HT40	5795	MCS 8	---
Radiated Emissions ≤1GHz	HT40	5795	MCS 8	---
RF Output Power	11a HT20 HT40	5745 / 5785 / 5825 5745 / 5785 / 5825 5755 / 5795	6 Mbps MCS 8 MCS 8	---
Radiated Emissions >1GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	11a HT20 HT40	5745 / 5785 / 5825 5745 / 5785 / 5825 5755 / 5795	6 Mbps MCS 8 MCS 8	---
Frequency Stability	Un-modulation	5785	---	---

3 Transmitter Test Results

3.1 Conducted Emissions

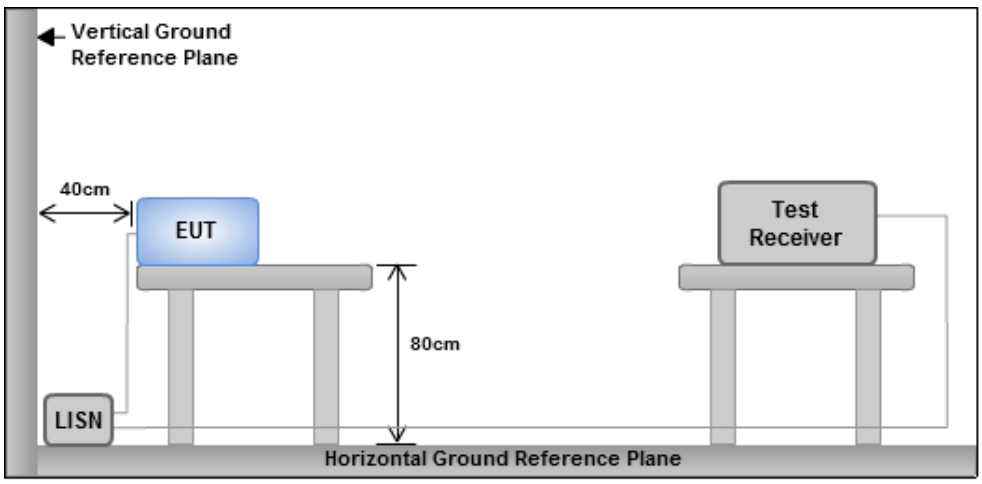
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Test Procedures

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

3.1.3 Test Setup

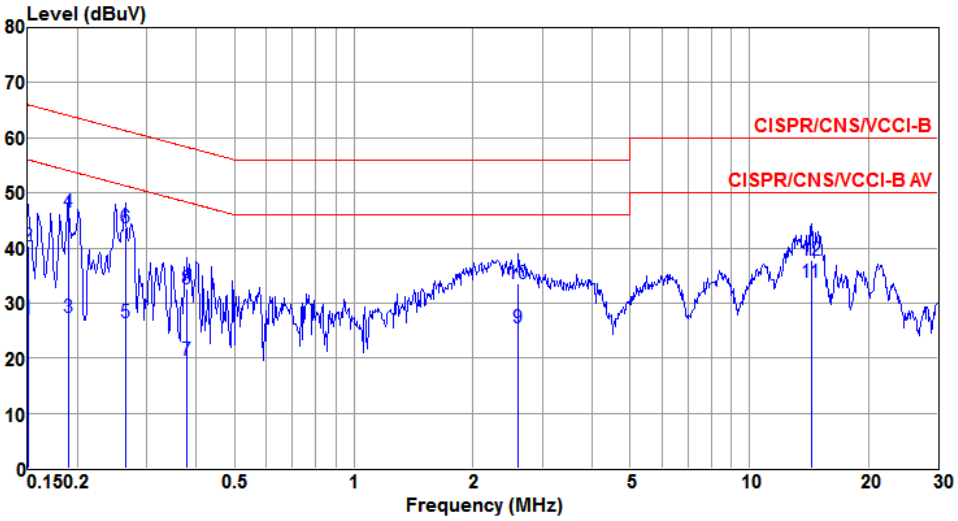


Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

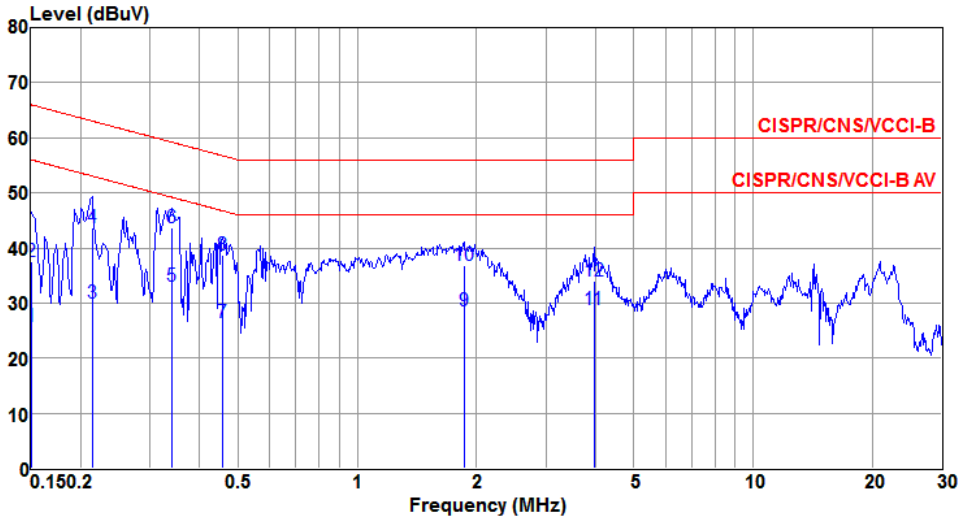
Modulation	HT40	Test Freq. (MHz)	5795
Power Phase	Line		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.150	27.11	56.00	-28.89	26.96	0.07	0.08	Average
2	0.150	40.46	66.00	-25.54	40.31	0.07	0.08	QP
3	0.189	27.40	54.06	-26.66	27.24	0.07	0.09	Average
4	0.189	46.50	64.06	-17.56	46.34	0.07	0.09	QP
5	0.264	26.38	51.29	-24.91	26.21	0.07	0.10	Average
6	0.264	43.71	61.29	-17.58	43.54	0.07	0.10	QP
7	0.379	19.57	48.30	-28.73	19.39	0.07	0.11	Average
8	0.379	32.47	58.30	-25.83	32.29	0.07	0.11	QP
9	2.608	25.41	46.00	-20.59	25.03	0.11	0.27	Average
10	2.608	33.40	56.00	-22.60	33.02	0.11	0.27	QP
11@	14.364	33.77	50.00	-16.23	33.29	0.27	0.21	Average
12	14.364	37.88	60.00	-22.12	37.40	0.27	0.21	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	0.150	25.70	56.00	-30.30	25.55	0.07	0.08	Average
2	0.150	37.50	66.00	-28.50	37.35	0.07	0.08	QP
3	0.214	29.94	53.05	-23.11	29.78	0.07	0.09	Average
4	0.214	43.74	63.05	-19.31	43.58	0.07	0.09	QP
5	0.339	33.07	49.22	-16.15	32.89	0.07	0.11	Average
6@	0.339	43.65	59.22	-15.57	43.47	0.07	0.11	QP
7	0.456	26.52	46.76	-20.24	26.33	0.07	0.12	Average
8	0.456	38.69	56.76	-18.07	38.50	0.07	0.12	QP
9	1.858	28.52	46.00	-17.48	28.19	0.10	0.23	Average
10	1.858	36.84	56.00	-19.16	36.51	0.10	0.23	QP
11	3.964	28.78	46.00	-17.22	28.34	0.13	0.31	Average
12	3.964	33.92	56.00	-22.08	33.48	0.13	0.31	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

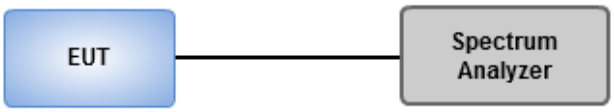
Occupied Bandwidth

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

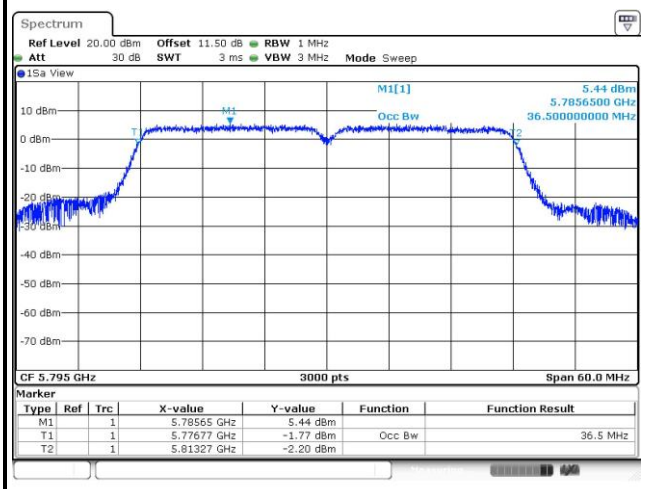
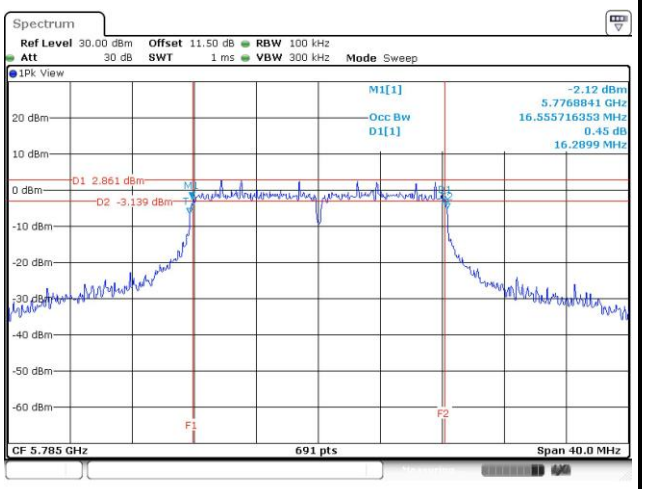
1. Set RBW = 100kHz, VBW = 300kHz
2. Detector = Peak,Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB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

3.2.3 Test Setup



3.2.4 Test Result of Emission Bandwidth

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	17.07	---	---	---	16.35	---	---	---	0.5
11a	1	5785	17.11	---	---	---	16.29	---	---	---	0.5
11a	1	5825	17.07	---	---	---	16.29	---	---	---	0.5
HT20	2	5745	18.01	17.84	---	---	17.33	17.57	---	---	0.5
HT20	2	5785	18.03	17.84	---	---	17.57	17.57	---	---	0.5
HT20	2	5825	18.01	17.83	---	---	17.57	17.57	---	---	0.5
HT40	2	5755	36.44	36.40	---	---	35.71	35.94	---	---	0.5
HT40	2	5795	36.40	36.50	---	---	35.71	36.29	---	---	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

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	14.16	---	---	---	26.062	14.16	30.00
11a	1	5785	14.07	---	---	---	25.527	14.07	30.00
11a	1	5825	13.94	---	---	---	24.774	13.94	30.00
HT20	2	5745	10.71	11.08	---	---	24.599	13.91	30.00
HT20	2	5785	9.37	9.84	---	---	18.288	12.62	30.00
HT20	2	5825	10.59	10.93	---	---	23.843	13.77	30.00
HT40	2	5755	11.71	12.23	---	---	31.536	14.99	30.00
HT40	2	5795	11.86	12.19	---	---	31.904	**15.04**	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 = 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.

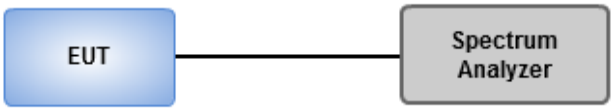
☐ Method SA-2

1. Set RBW = 1 MHz, VBW = 3 MHz, Sweep time = auto, Detector = RMS.
2. Trace average at 100 traces
3. Use the peak marker function to determine the maximum amplitude level.
4. Add 10 log(1/x), where x is the duty cycle

☒ 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.

3.4.3 Test Setup

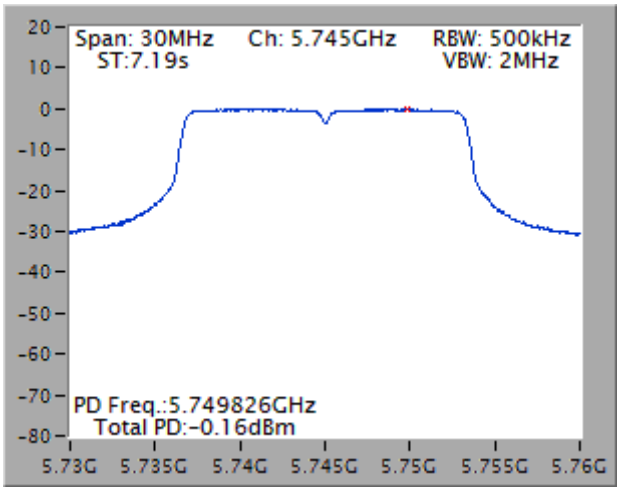


3.4.4 Test Result of Peak Power Spectral Density

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	-0.16	0.17	0.01	30.00
11a	1	5785	-0.81	0.17	-0.64	30.00
11a	1	5825	-0.86	0.17	-0.69	30.00
HT20	2	5745	-3.02	0.61	-2.41	30.00
HT20	2	5785	-3.68	0.61	-3.07	30.00
HT20	2	5825	-2.84	0.61	-2.23	30.00
HT40	2	5755	-4.47	2.35	-2.12	30.00
HT40	2	5795	-5.19	2.35	-2.84	30.00

Note:
1. D.F is duty factor.
2. Test result for HT20 / HT40 is bin-by-bin summing measured value of each TX port.

Worst Plot



Note: Power Spectral Density plot is 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**
5.725 - 5.850 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.85 5.86 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m]

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

3.5.2 Test Procedures

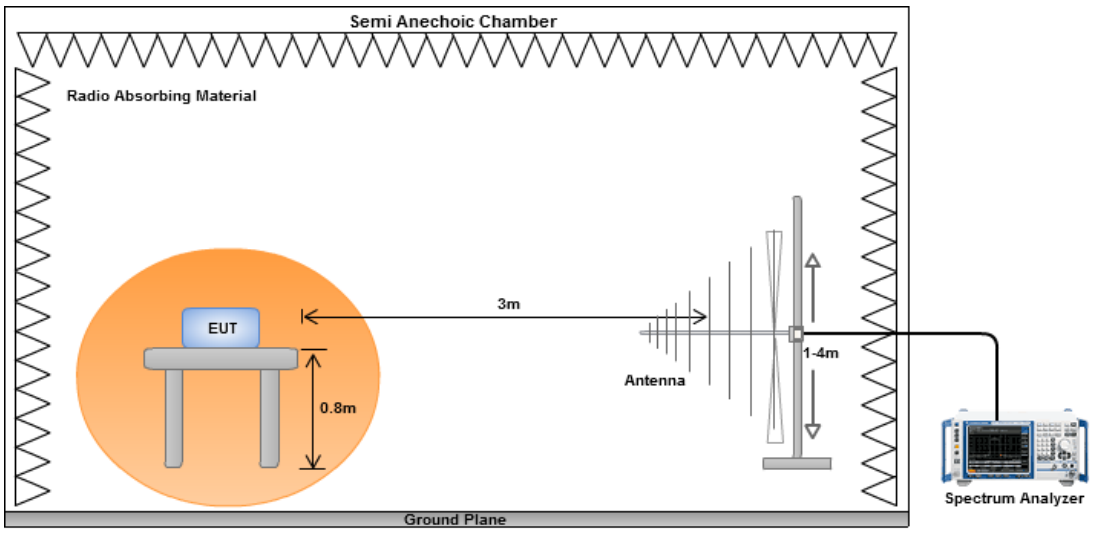
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

Note:

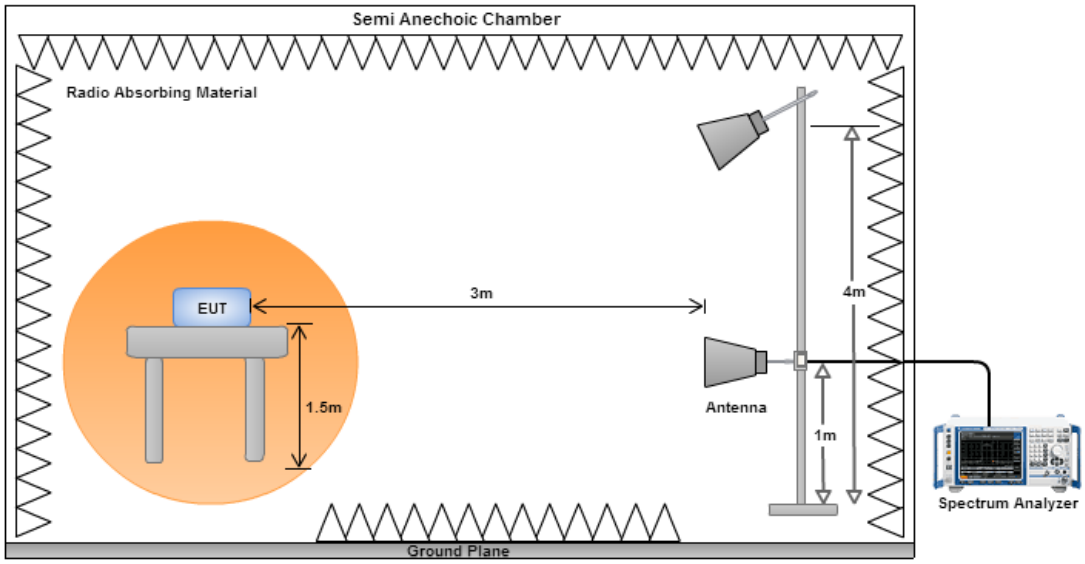
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

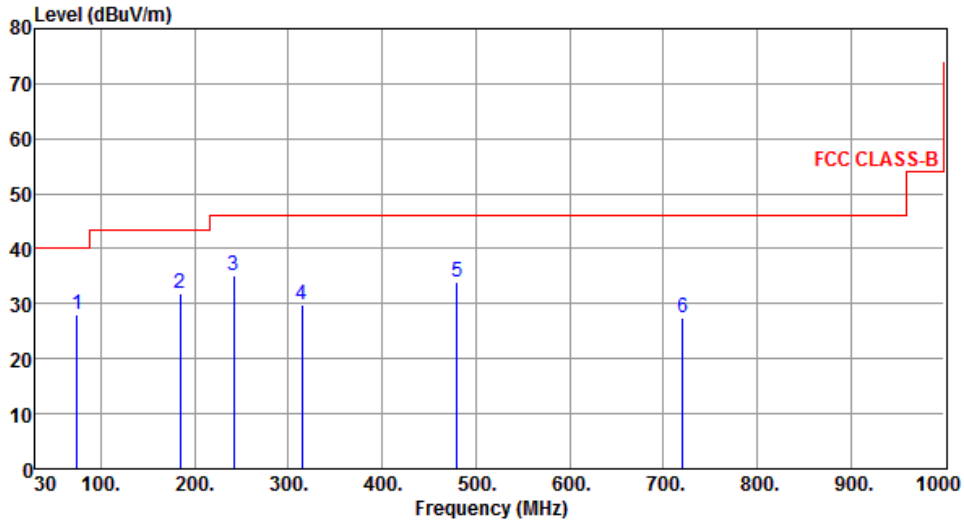


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

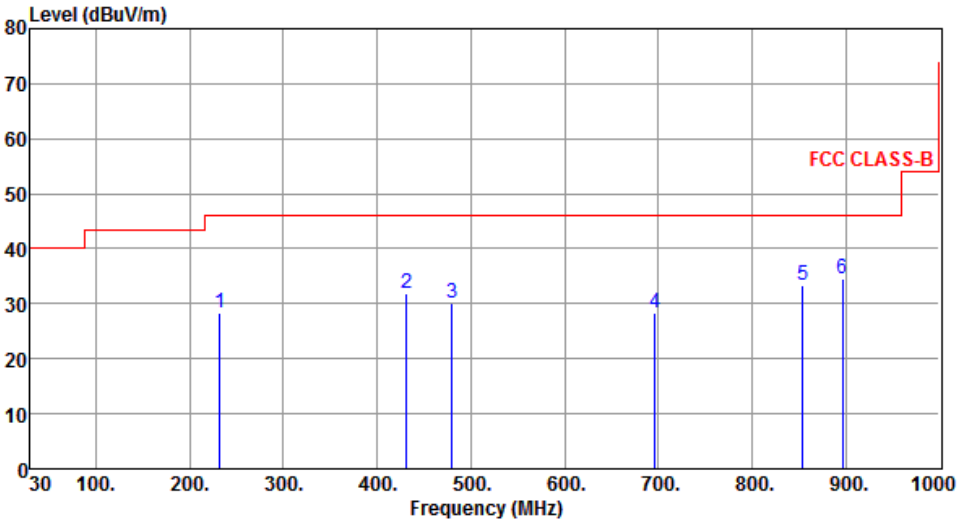
Modulation	HT40	Test Freq. (MHz)	5795
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	74.62	28.09	40.00	-11.91	44.67	-16.58	Peak	---	---
2	184.23	32.03	43.50	-11.47	47.75	-15.72	Peak	---	---
3	241.46	35.21	46.00	-10.79	49.96	-14.75	Peak	---	---
4	314.21	29.94	46.00	-16.06	42.28	-12.34	Peak	---	---
5	480.08	33.97	46.00	-12.03	42.08	-8.11	Peak	---	---
6	720.64	27.45	46.00	-18.55	31.41	-3.96	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		

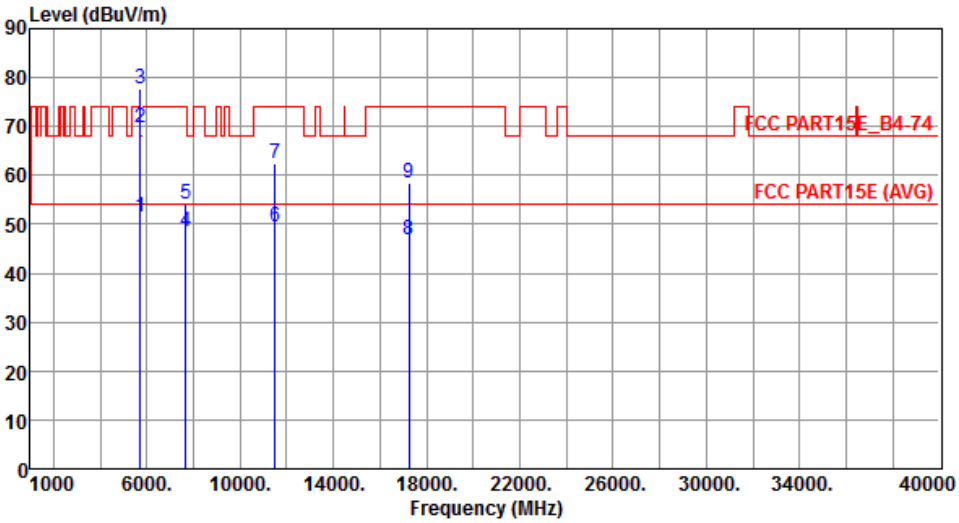


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	231.76	28.30	46.00	-17.70	43.55	-15.25	Peak	---	---
2	431.58	31.94	46.00	-14.06	41.19	-9.25	Peak	---	---
3	480.08	29.99	46.00	-16.01	38.10	-8.11	Peak	---	---
4	696.39	28.42	46.00	-17.58	32.90	-4.48	Peak	---	---
5	854.50	33.24	46.00	-12.76	34.94	-1.70	Peak	---	---
6	896.21	34.39	46.00	-11.61	35.19	-0.80	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

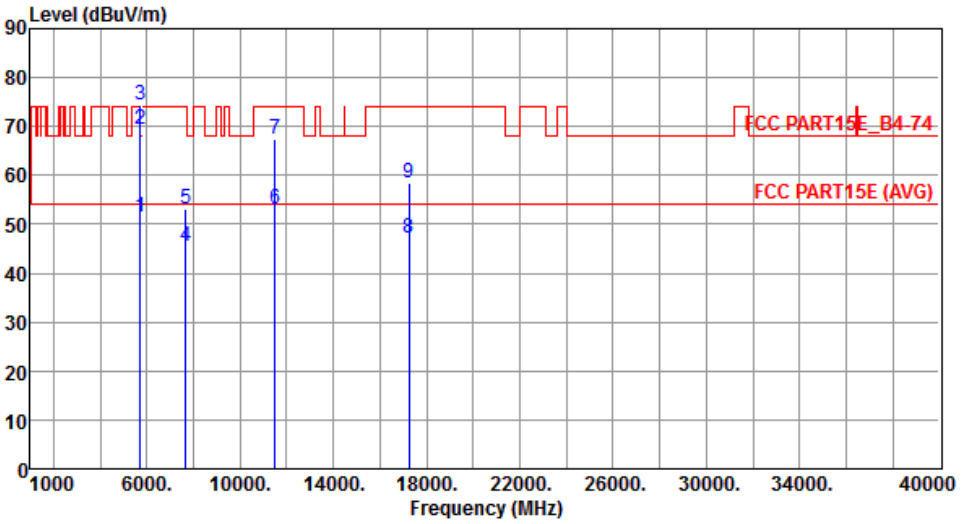
Modulation	11a	Test Freq. (MHz)	5745
Polarization	Horizontal		



	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	51.54	54.00	-2.46	44.34	7.20	Average	212	241
2	5715.00	69.58	74.00	-4.42	62.38	7.20	Peak	212	241
3	5725.00	77.69	78.20	-0.51	70.45	7.24	Peak	212	241
4	7660.00	48.36	54.00	-5.64	36.93	11.43	Average	208	224
5	7660.00	54.08	74.00	-19.92	42.65	11.43	Peak	208	224
6	11490.00	49.56	54.00	-4.44	32.65	16.91	Average	184	250
7	11490.00	62.46	74.00	-11.54	45.55	16.91	Peak	184	250
8	17235.00	46.80	54.00	-7.20	27.48	19.32	Average	174	268
9	17235.00	58.58	74.00	-15.42	39.26	19.32	Peak	174	268

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).

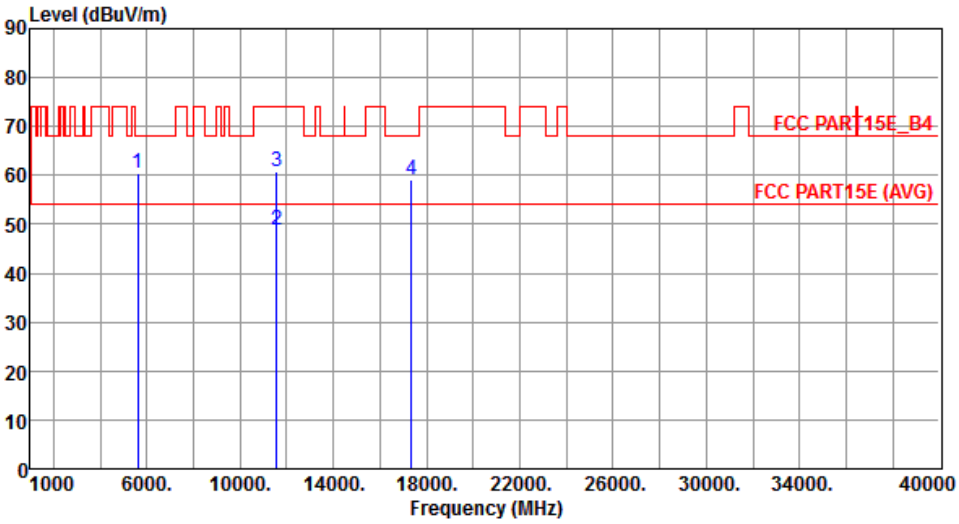
Modulation	11a	Test Freq. (MHz)	5745
Polarization	Vertical		



	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	51.36	54.00	-2.64	44.16	7.20	Average	340	286
2	5715.00	69.48	74.00	-4.52	62.28	7.20	Peak	340	286
3	5725.00	74.55	78.20	-3.65	67.31	7.24	Peak	340	286
4	7660.00	45.34	54.00	-8.66	33.91	11.43	Average	314	285
5	7660.00	53.19	74.00	-20.81	41.76	11.43	Peak	314	285
6	11490.00	52.98	54.00	-1.02	36.07	16.91	Average	343	278
7	11490.00	67.36	74.00	-6.64	50.45	16.91	Peak	343	278
8	17235.00	47.11	54.00	-6.89	27.79	19.32	Average	156	47
9	17235.00	58.56	74.00	-15.44	39.24	19.32	Peak	156	47

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).

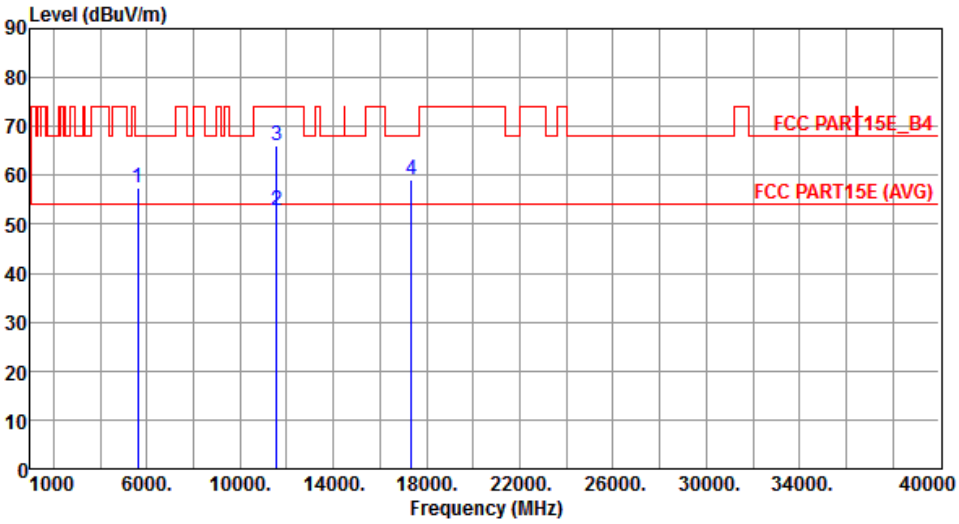
Modulation	11a	Test Freq. (MHz)	5785
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5620.00	60.43	68.20	-7.77	53.47	6.96	Peak	217	237
2	11570.00	48.78	54.00	-5.22	31.98	16.80	Average	185	250
3	11570.00	60.82	74.00	-13.18	44.02	16.80	Peak	185	250
4	17355.00	59.02	68.20	-9.18	39.53	19.49	Peak	250	269

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).

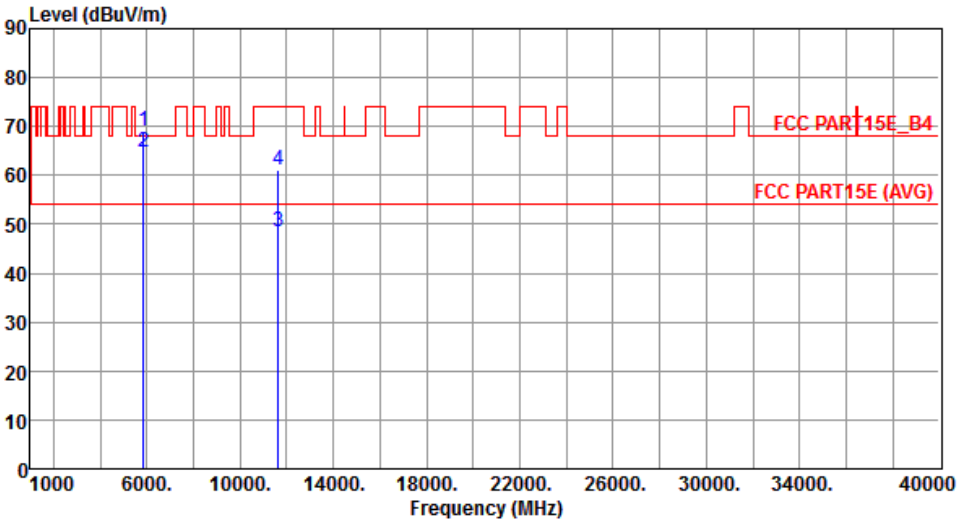
Modulation	11a	Test Freq. (MHz)	5785
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5620.00	57.57	68.20	-10.63	50.61	6.96	Peak	371	205
2	11570.00	52.91	54.00	-1.09	36.11	16.80	Average	338	279
3	11570.00	66.15	74.00	-7.85	49.35	16.80	Peak	338	279
4	17355.00	59.08	68.20	-9.12	39.59	19.49	Peak	271	281

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).

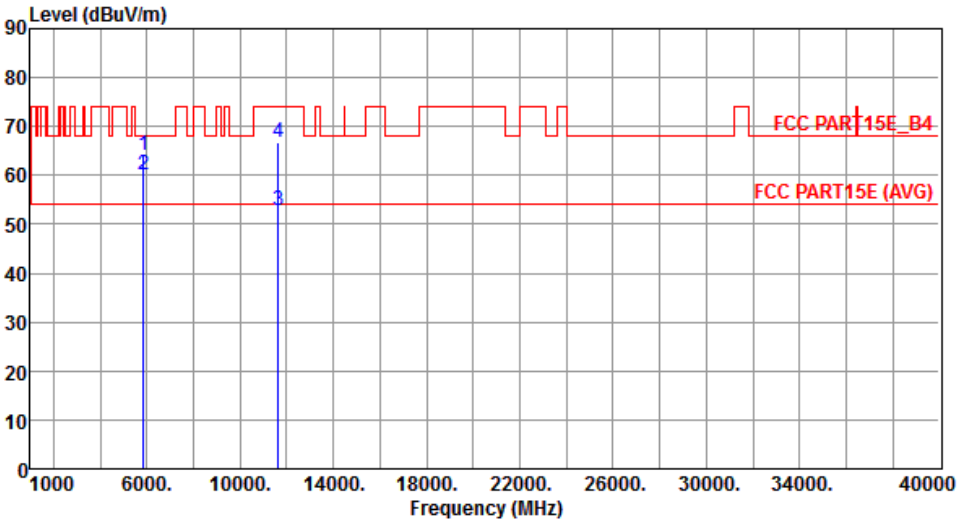
Modulation	11a	Test Freq. (MHz)	5825
Polarization	Horizontal		



	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	68.93	78.20	-9.27	61.43	7.50	Peak	212	240
2	5860.00	64.77	68.20	-3.43	57.26	7.51	Peak	212	240
3	11650.00	48.35	54.00	-5.65	31.70	16.65	Average	185	251
4	11650.00	61.05	74.00	-12.95	44.40	16.65	Peak	185	251

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		

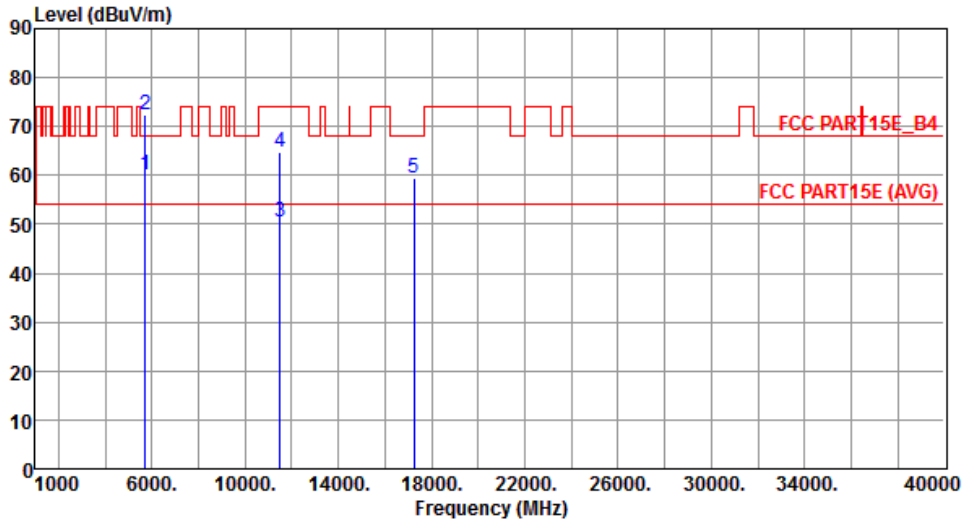


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	64.20	78.20	-14.00	56.70	7.50	Peak	396	300
2	5860.00	60.21	68.20	-7.99	52.70	7.51	Peak	396	300
3	11650.00	52.72	54.00	-1.28	36.07	16.65	Average	254	284
4	11650.00	66.74	74.00	-7.26	50.09	16.65	Peak	254	284

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

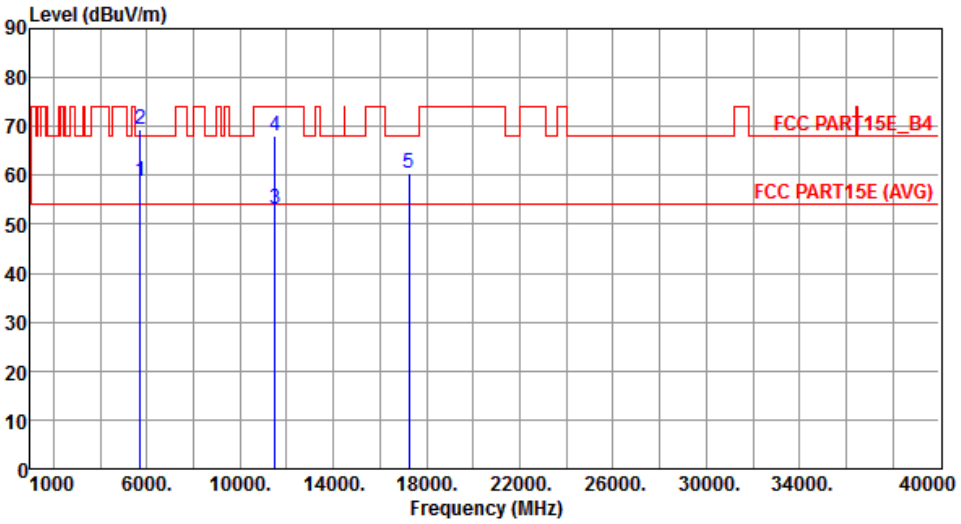
Modulation	HT20	Test Freq. (MHz)	5745
Polarization	Horizontal		



	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	60.26	68.20	-7.94	53.06	7.20	Peak	212	235
2	5725.00	72.31	78.20	-5.89	65.07	7.24	Peak	212	235
3	11490.00	50.47	54.00	-3.53	33.56	16.91	Average	173	115
4	11490.00	64.78	74.00	-9.22	47.87	16.91	Peak	173	115
5	17235.00	59.55	68.20	-8.65	40.23	19.32	Peak	205	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).

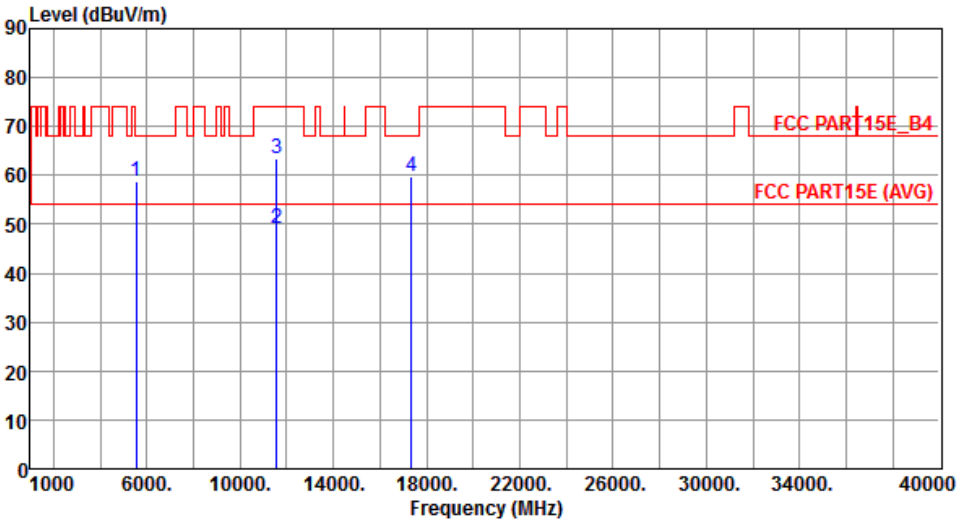
Modulation	HT20	Test Freq. (MHz)	5745
Polarization	Vertical		



	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	58.80	68.20	-9.40	51.60	7.20	Peak	256	225
2	5725.00	69.50	78.20	-8.70	62.26	7.24	Peak	256	225
3	11490.00	52.99	54.00	-1.01	36.08	16.91	Average	347	83
4	11490.00	68.04	74.00	-5.96	51.13	16.91	Peak	347	83
5	17235.00	60.58	68.20	-7.62	41.26	19.32	Peak	256	225

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).

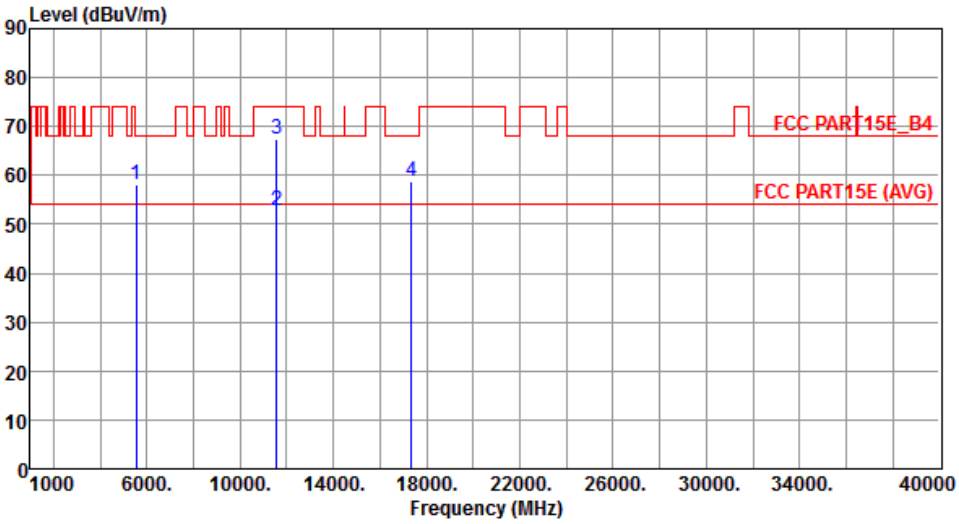
Modulation	HT20	Test Freq. (MHz)	5785
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5539.00	58.82	68.20	-9.38	51.99	6.83	Peak	274	260
2	11570.00	49.20	54.00	-4.80	32.40	16.80	Average	176	102
3	11570.00	63.50	74.00	-10.50	46.70	16.80	Peak	176	102
4	17355.00	59.75	68.20	-8.45	40.26	19.49	Peak	274	260

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).

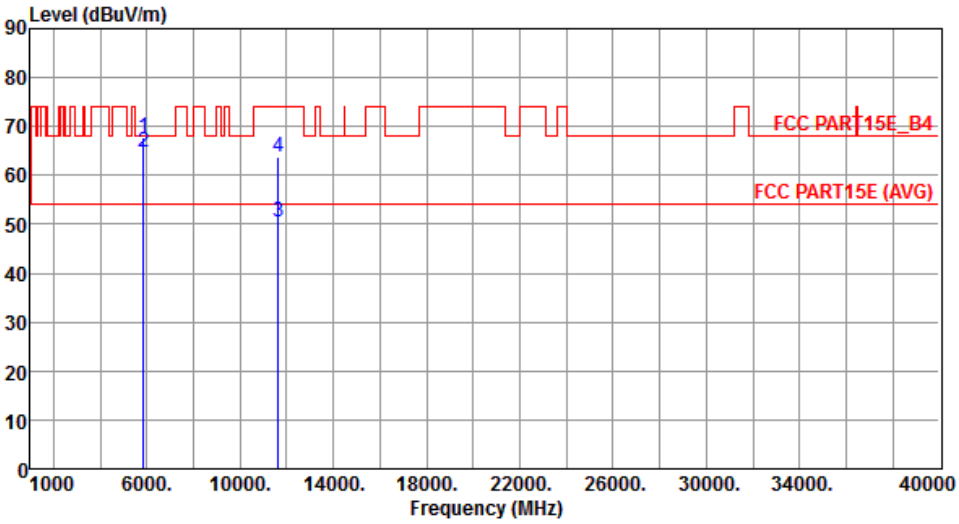
Modulation	HT20	**Test Freq. (MHz)**	5785
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5539.00	58.16	68.20	-10.04	51.33	6.83	Peak	352	276
2	11570.00	52.97	54.00	-1.03	36.17	16.80	Average	335	90
3	11570.00	67.49	74.00	-6.51	50.69	16.80	Peak	335	90
4	17355.00	58.66	68.20	-9.54	39.17	19.49	Peak	305	141

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).

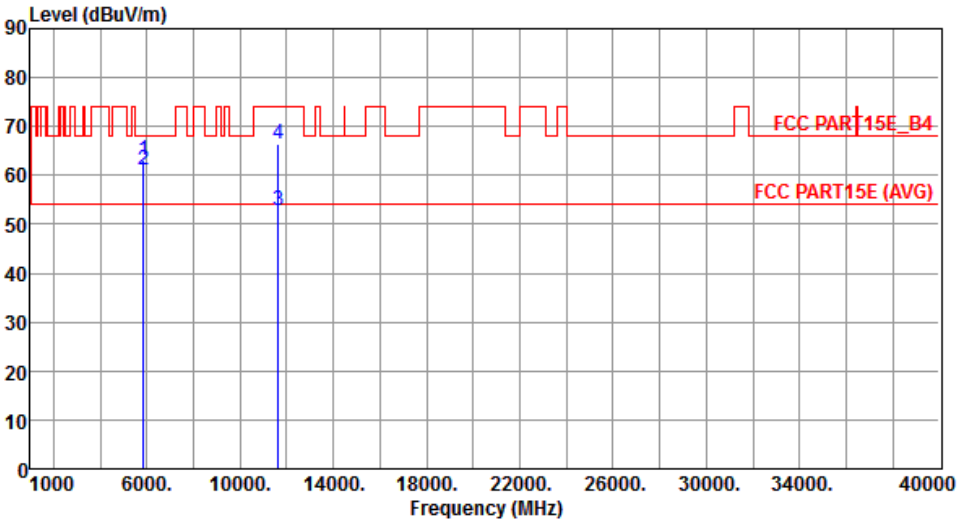
Modulation	HT20	Test Freq. (MHz)	5825
Polarization	Horizontal		



	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	67.76	78.20	-10.44	60.26	7.50	Peak	180	115
2	5860.00	64.86	68.20	-3.34	57.35	7.51	Peak	180	115
3	11650.00	50.47	54.00	-3.53	33.82	16.65	Average	180	115
4	11650.00	63.91	74.00	-10.09	47.26	16.65	Peak	180	115

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		

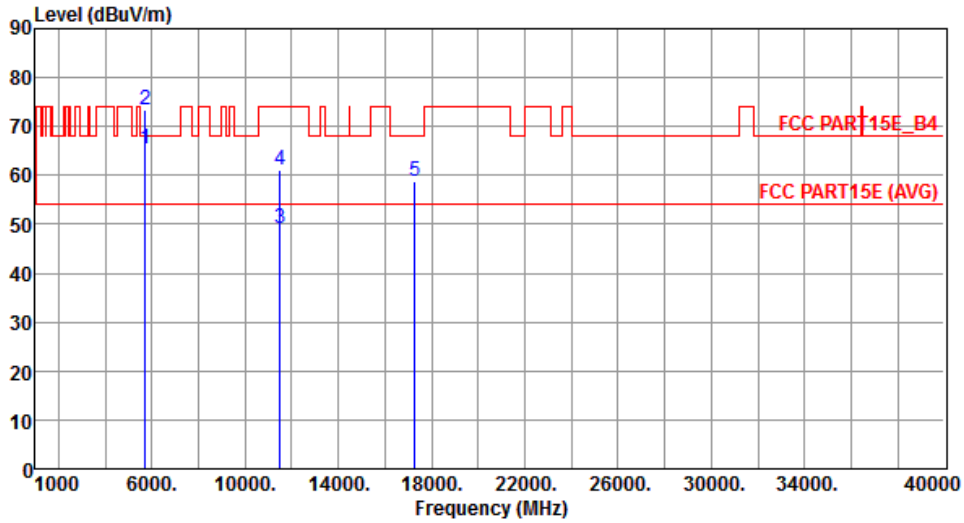


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	63.20	78.20	-15.00	55.70	7.50	Peak	343	284
2	5860.00	61.08	68.20	-7.12	53.57	7.51	Peak	343	284
3	11650.00	52.92	54.00	-1.08	36.27	16.65	Average	373	84
4	11650.00	66.55	74.00	-7.45	49.90	16.65	Peak	373	84

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

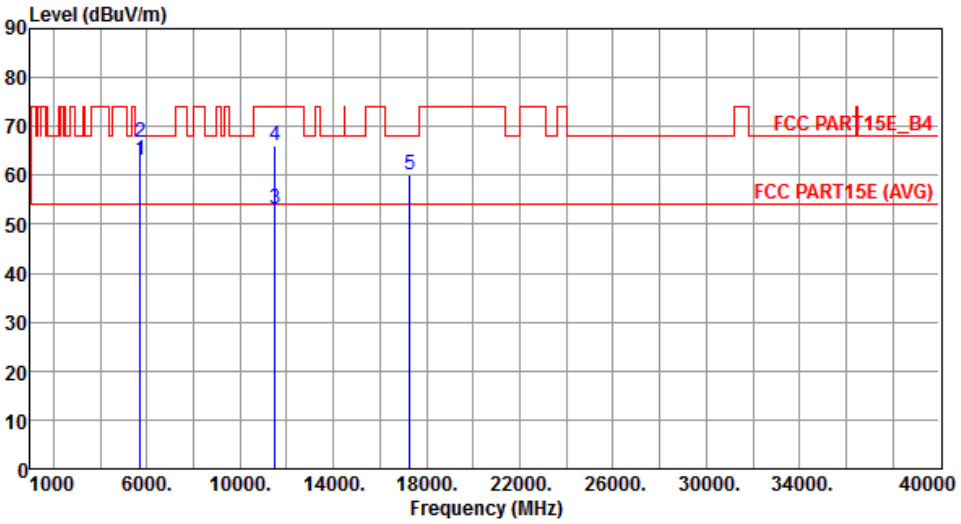
Modulation	HT40	Test Freq. (MHz)	5755
Polarization	Horizontal		



	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	65.29	68.20	-2.91	58.09	7.20	Peak	211	235
2	5725.00	73.46	78.20	-4.74	66.22	7.24	Peak	211	235
3	11510.00	49.30	54.00	-4.70	32.40	16.90	Average	173	113
4	11510.00	61.16	74.00	-12.84	44.26	16.90	Peak	173	113
5	17265.00	58.62	68.20	-9.58	39.26	19.36	Peak	267	225

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).

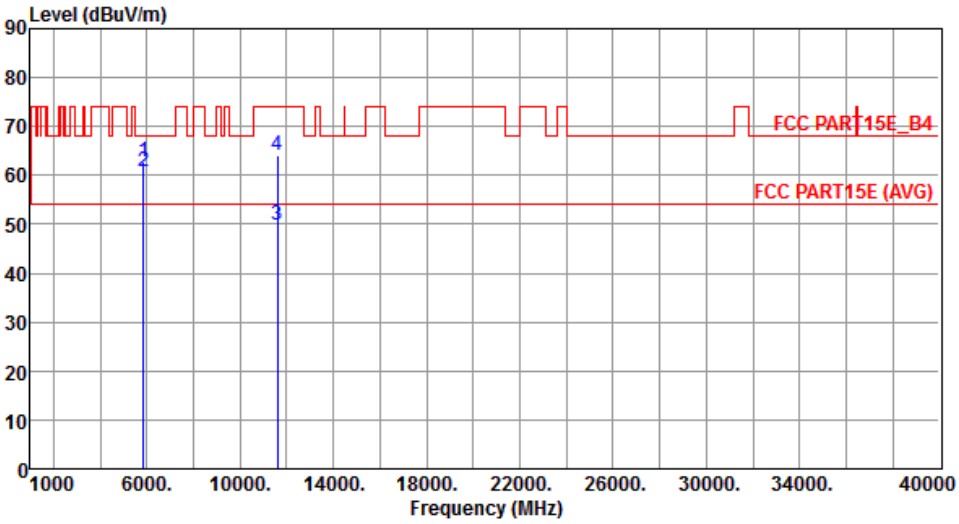
Modulation	HT40	Test Freq. (MHz)	5755
Polarization	Vertical		



	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	63.01	68.20	-5.19	55.81	7.20	Peak	245	237
2	5725.00	66.64	78.20	-11.56	59.40	7.24	Peak	245	237
3	11510.00	52.98	54.00	-1.02	36.08	16.90	Average	329	90
4	11510.00	66.16	74.00	-7.84	49.26	16.90	Peak	329	90
5	17265.00	59.95	68.20	-8.25	40.59	19.36	Peak	245	237

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).

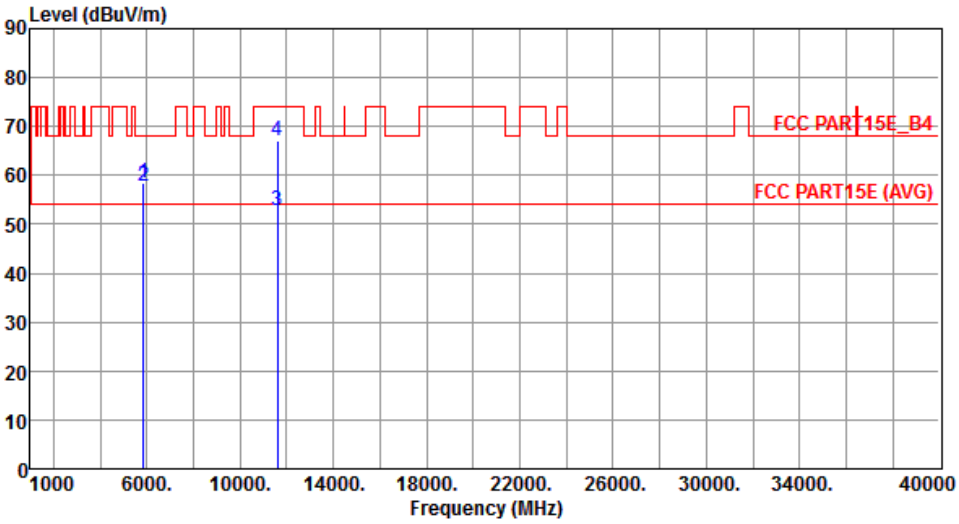
Modulation	HT40	Test Freq. (MHz)	5795
Polarization	Horizontal		



	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	62.76	78.20	-15.44	55.26	7.50	Peak	213	236
2	5860.00	60.77	68.20	-7.43	53.26	7.51	Peak	213	236
3	11590.00	49.66	54.00	-4.34	32.90	16.76	Average	188	109
4	11590.00	64.10	74.00	-9.90	47.34	16.76	Peak	188	109

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	58.56	78.20	-19.64	51.06	7.50	Peak	284	302
2	5860.00	57.87	68.20	-10.33	50.36	7.51	Peak	284	302
3	11590.00	52.94	54.00	-1.06	36.18	16.76	Average	342	90
4	11590.00	67.02	74.00	-6.98	50.26	16.76	Peak	342	90

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

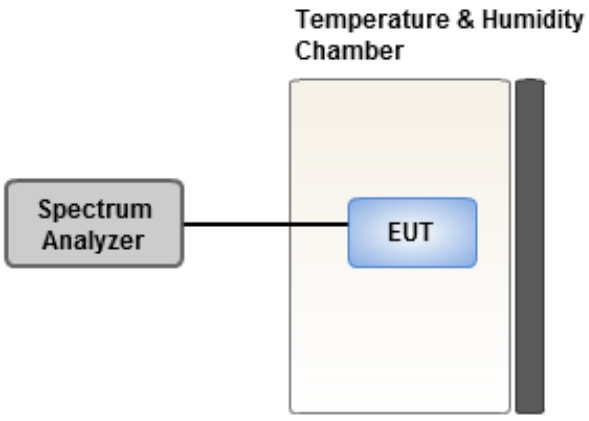
3.6.1 Limit of Frequency Stability

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	5.17	5.02	4.82	4.85
T20°CVmin	3.56	3.49	3.37	3.49
T50°CVnom	3.92	3.97	4.14	4.05
T40°CVnom	3.02	3.18	3.61	3.57
T30°CVnom	2.44	2.93	2.69	2.06
T20°CVnom	2.25	2.62	2.70	2.39
T10°CVnom	2.49	3.17	2.41	3.07
T0°CVnom	2.95	2.67	3.01	3.35
T-10°CVnom	1.11	1.72	1.52	1.21
T-20°CVnom	0.43	0.90	0.82	0.12
T-30°CVnom	1.43	1.43	1.91	1.79
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 50		Tmin [°C]: -30

4 Test laboratory information

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

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

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

Linkou	**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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