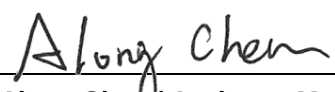


FCC Test Report

FCC ID : MXF-WLTFSM13643
Equipment : LTE B43 Cat 6 Single-Mode Indoor CPE
Model No. : WLTFSM-136ACN
Brand Name : Gemtek
Applicant : Gemtek Technology Co., Ltd.
Address : No.15-1 Zhonghua Road, Hsinchu Industrial
Park, Hukou, Hsinchu, Taiwan, 30352
Standard : 47 CFR FCC Part 15.407
Received Date : Dec. 02, 2016
Tested Date : Dec. 14, 2016 ~ Feb. 20, 2017

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.

Reviewed by:


Along Chen / Assistant Manager

Approved by:

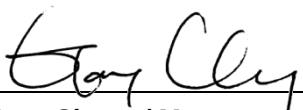

Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR6D0201AN	Rev. 01	Initial issue	Mar. 13, 2017

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.428MHz 35.66 (Margin -11.63dB) - AV	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5150.00MHz 52.99 (Margin -1.01dB) - AV 5715.00MHz 67.19 (Margin -1.01dB) - 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]: 5150-5250MHz:18.68 5725-5850MHz:19.72	Pass
15.407(a)	Peak Power Spectral Density	Meet the requirement of limit	Pass
15.407(g)	Frequency Stability	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
5150-5250	a	5180-5240	36-48 [4]	2	6-54 Mbps
5150-5250	n (HT20)	5180-5240	36-48 [4]	2	MCS 0-15
5150-5250	n (HT40)	5190-5230	38-46 [2]	2	MCS 0-15
5150-5250	ac (VHT20)	5180-5240	36-48 [4]	2	MCS 0-9
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	2	MCS 0-9
5150-5250	ac (VHT80)	5210	42 [1]	2	MCS 0-9

Note 1: RF output power specifies that Maximum Conducted Output Power.
Note 2: 802.11a/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
5725-5850	a	5745-5825	149-165 [5]	2	6-54 Mbps
5725-5850	n (HT20)	5745-5825	149-165 [5]	2	MCS 0-15
5725-5850	n (HT40)	5755-5795	151-159 [2]	2	MCS 0-15
5725-5850	ac (VHT20)	5745-5825	149-165 [5]	2	MCS 0-9
5725-5850	ac (VHT40)	5755-5795	151-159 [2]	2	MCS 0-9
5725-5850	ac (VHT80)	5775	155 [1]	2	MCS 0-9

Note 1: RF output power specifies that Maximum Conducted Output Power.
Note 2: 802.11a/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)		
				2400~2483.5	5150~5250	5725~5850
1	WLTFSM-136ACN	Dipole	UFL	4.11	3.94	4.34
2	WLTFSM-136ACN	Dipole	UFL	1.29	2.95	3.97

1.1.3 Power Supply Type of Equipment under Test (EUT)

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

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter 1	Brand Name: SHENZHEN FRECOM Model Name: F18W8-120150SPAU Power Rating: I/P: 100-240Vac, 50-60Hz, 0.6A O/P: 12Vdc, 1.5A DC 1.2m non-shielded cable w/o core
2	AC adapter 2	Brand Name: Leader Model Name: MU18AY120150-A1 Power Rating: I/P: 100-240Vac, 50-60Hz, 0.6A O/P: 12Vdc, 1.5A DC 1.5m non-shielded cable w/o core

1.1.5 Channel List

For Frequency band 5150-5250 MHz			
802.11 a / HT20 / VHT20		HT40 / VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	VHT80	
48	5240	42	5210

For Frequency band 5725~5850 MHz			
802.11 a / HT20 / VHT20		HT40 / VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
149	5745	151	5755
153	5765	159	5795
157	5785	VHT80	
161	5805	155	5775
165	5825	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	Tera Term, V.4.74		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11a	87.81%	0.56
	VHT20	88.16%	0.55
	VHT40	78.20%	1.07
	VHT80	62.76%	2.02

1.1.7 Power Setting

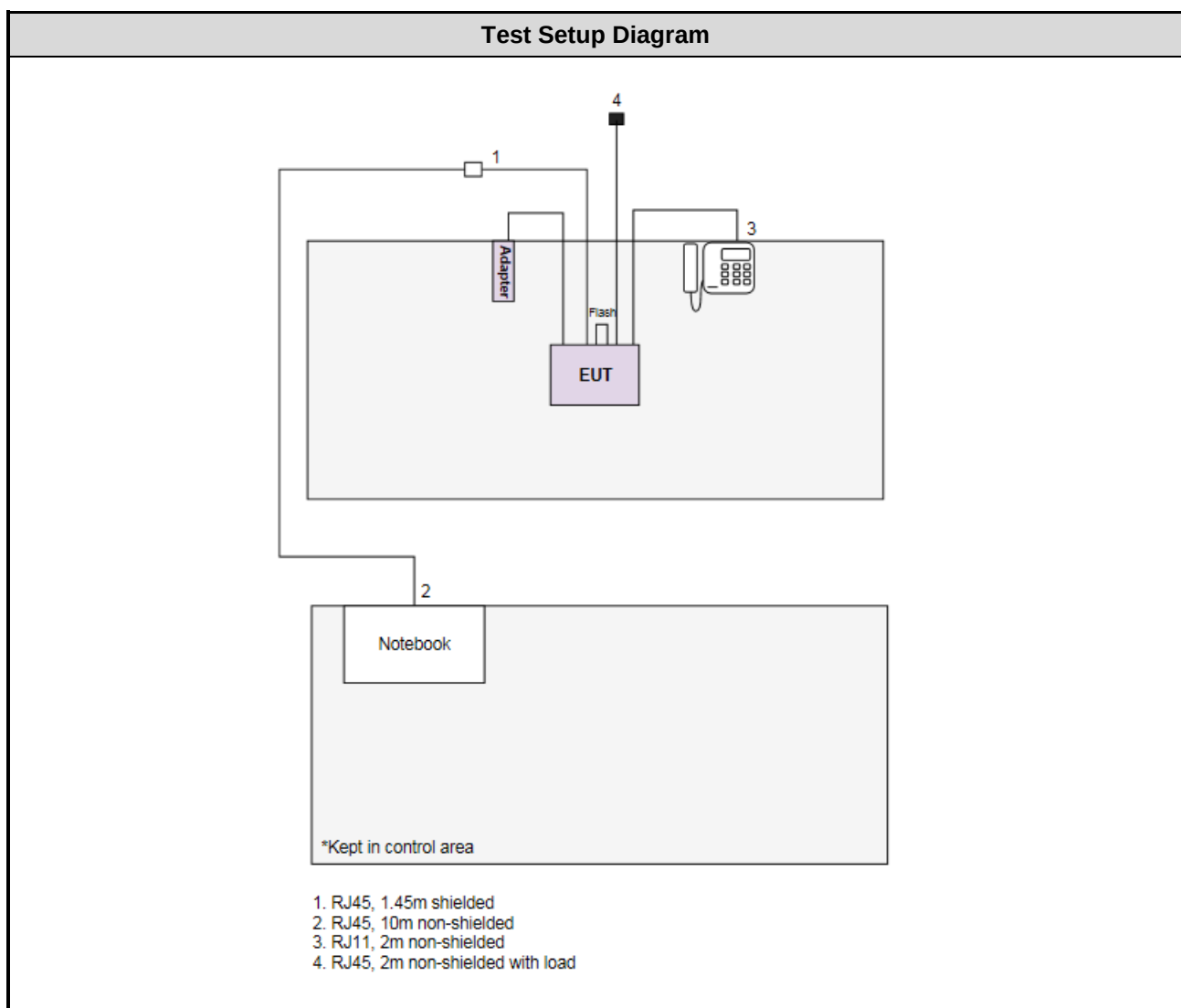
For Frequency band 5150-5250 MHz		
Modulation Mode	Test Frequency (MHz)	Power Set
11a	5180	13/13
11a	5200	13/13
11a	5240	13/13
HT20	5180	14/14
HT20	5200	14/14
HT20	5240	14/14
HT40	5190	13/13
HT40	5230	19/19
VHT20	5180	14/14
VHT20	5200	14/14
VHT20	5240	14/14
VHT40	5190	13/13
VHT40	5230	19/19
VHT80	5210	6/6

For Frequency band 5725~5850 MHz		
Modulation Mode	Test Frequency (MHz)	Power Set
11a	5745	16/16
11a	5785	18/18
11a	5825	18/18
HT20	5745	12/12
HT20	5785	15/15
HT20	5825	15/15
HT40	5755	10/10
HT40	5795	22/22
VHT20	5745	12/12
VHT20	5785	15/15
VHT20	5825	15/15
VHT40	5755	10/10
VHT40	5795	22/22
VHT80	5775	6/6

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6430	DoC	RJ45, 10m non-shielded.
2	Telephone	HTT	HTT-806	---	RJ11, 2m non-shielded.
3	USB Flash	SONY	USM16GU	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Feb. 20, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017
RF Cable-CON	EMC	EMCCFD300-BM-B M-6000	50821	Dec. 20, 2016	Dec. 19, 2017
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 chamber1 / (03CH01-WS)				
Tested Date	Dec. 14, 2016				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Nov. 25, 2016	Nov. 24, 2017
Receiver	R&S	ESR3	101658	Nov. 24, 2016	Nov. 23, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 04, 2016	Aug. 03, 2017
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 16, 2015	Dec. 15, 2016
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980225	Aug. 05, 2016	Aug. 04, 2017
Preamplifier	Agilent	83017A	MY39501308	Oct. 06, 2016	Oct. 05, 2017
Preamplifier	EMC	EMC184045B	980192	Aug. 24, 2016	Aug. 23, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 09, 2016	Dec. 08, 2017
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	16052	Dec. 09, 2016	Dec. 08, 2017
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 09, 2016	Dec. 08, 2017
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 09, 2016	Dec. 08, 2017
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Feb. 20, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Nov. 25, 2016	Nov. 24, 2017
Receiver	R&S	ESR3	101658	Nov. 24, 2016	Nov. 23, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 04, 2016	Aug. 03, 2017
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 21, 2016	Dec. 20, 2017
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980225	Aug. 05, 2016	Aug. 04, 2017
Preamplifier	Agilent	83017A	MY39501308	Oct. 06, 2016	Oct. 05, 2017
Preamplifier	EMC	EMC184045B	980192	Aug. 24, 2016	Aug. 23, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 09, 2016	Dec. 08, 2017
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	16052	Dec. 09, 2016	Dec. 08, 2017
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 09, 2016	Dec. 08, 2017
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 09, 2016	Dec. 08, 2017
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)				
Tested Date	Jan. 04 ~ Jan. 06, 2017				
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. 21, 2016	Nov. 20, 2017
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017
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 v01r03

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 ≤ 1 GHz	± 3.66 dB
Radiated emission > 1 GHz	± 5.63 dB
Time	$\pm 0.1\%$
Temperature	± 0.6 °C

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	17°C / 62%	Howard Huang
Radiated Emissions	03CH01-WS	23-24°C / 61-62%	Kevin Lee Vincent Yeh
RF Conducted	TH01-WS	22°C / 63%	Brad Wu

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

For Frequency band 5150-5250 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	VHT40	5230	MCS 0	---
Radiated Emissions ≤ 1 GHz	VHT40	5230	MCS 0	---
RF Output Power	11a	5180 / 5200 / 5240	6 Mbps	---
	HT20	5180 / 5200 / 5240	MCS 0	
	HT40	5190 / 5230	MCS 0	
	VHT20	5180 / 5200 / 5240	MCS 0	
	VHT40	5190 / 5230	MCS 0	
	VHT80	5210	MCS 0	
Radiated Emissions > 1 GHz Emission Bandwidth Peak Power Spectral Density	11a	5180 / 5200 / 5240	6 Mbps	---
	VHT20	5180 / 5200 / 5240	MCS 0	
	VHT40	5190 / 5230	MCS 0	
	VHT80	5210	MCS 0	
Frequency Stability	Un-modulation	5200	---	---
NOTE:				
1. Two adapters had been covered during the pretest and found that Adapter 1 was the worst case and was selected for final testing (Adapter 1: SHENZHEN FRECOM adapter; Adapter 2: Leader adapter).				

For Frequency band 5725-5850 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	VHT40	5795	MCS 0	---
Radiated Emissions ≤ 1 GHz	VHT40	5795	MCS 0	---
RF Output Power	11a	5745 / 5785 / 5825	6 Mbps	---
	HT20	5745 / 5785 / 5825	MCS 0	
	HT40	5755 / 5795	MCS 0	
	VHT20	5745 / 5785 / 5825	MCS 0	
	VHT40	5755 / 5795	MCS 0	
	VHT80	5775	MCS 0	
Radiated Emissions > 1 GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	11a	5745 / 5785 / 5825	6 Mbps	---
	VHT20	5745 / 5785 / 5825	MCS 0	
	VHT40	5755 / 5795	MCS 0	
	VHT80	5775	MCS 0	
Frequency Stability	Un-modulation	5785	---	---
NOTE:				
1. Two adapters had been covered during the pretest and found that Adapter 1 was the worst case and was selected for final testing (Adapter 1: SHENZHEN FRECOM adapter; Adapter 2: Leader adapter).				

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

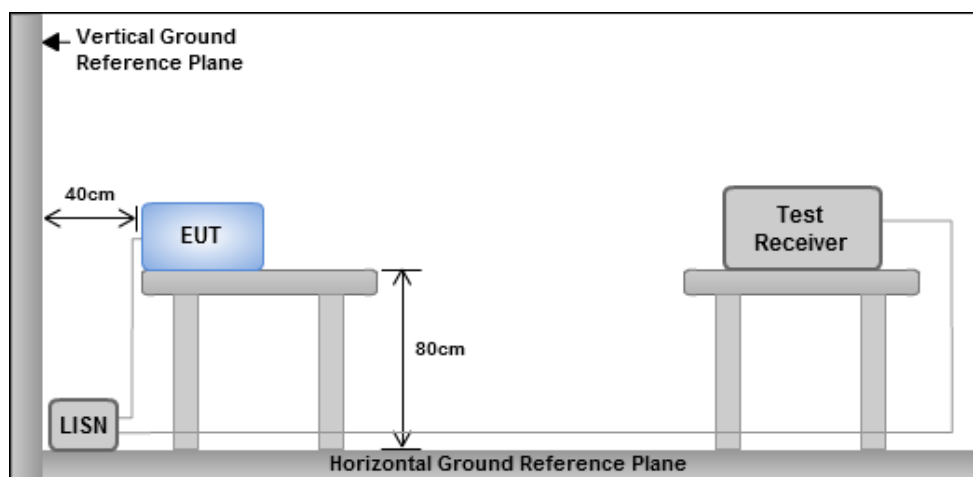
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.1.2 Test Procedures

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

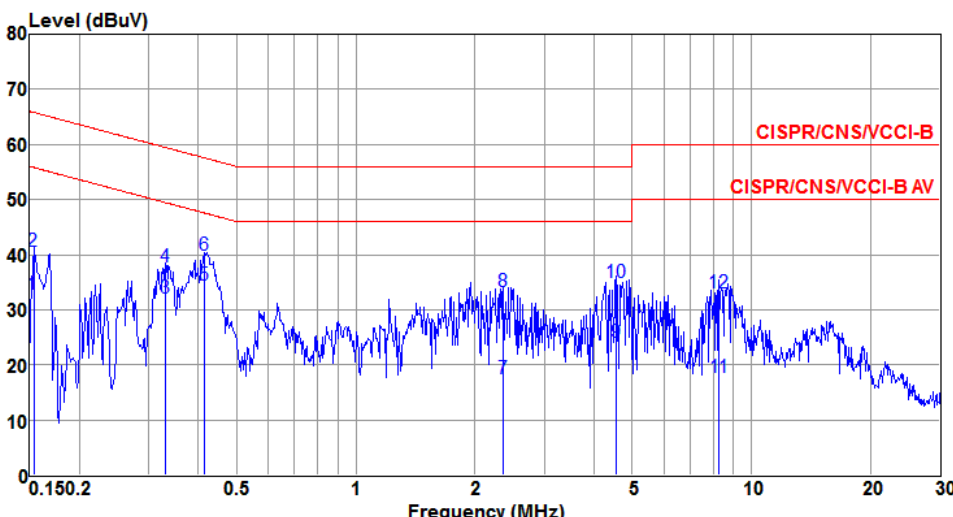
3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

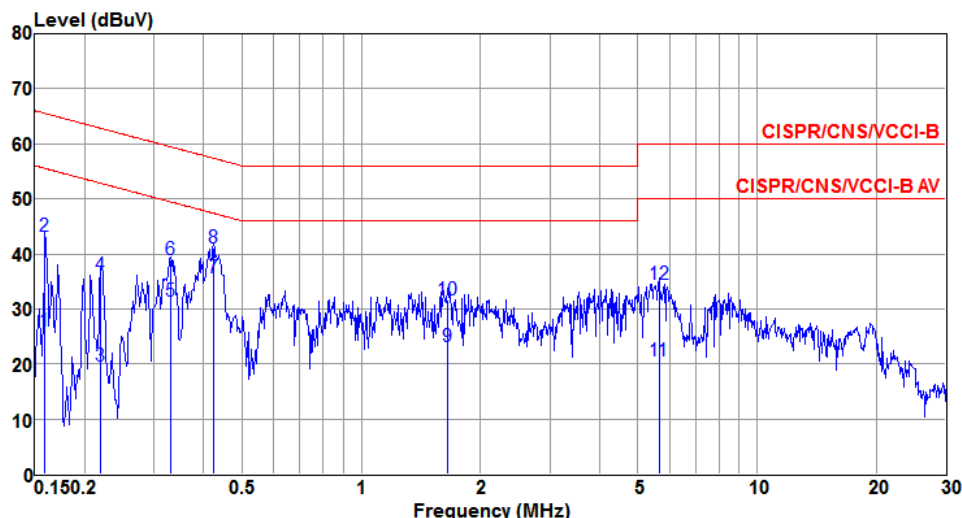
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line		



	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.153	32.83	55.82	-22.99	32.74	0.07	0.02	Average
2	0.153	40.68	65.82	-25.14	40.59	0.07	0.02	QP
3	0.330	32.18	49.44	-17.26	32.08	0.07	0.03	Average
4	0.330	37.73	59.44	-21.71	37.63	0.07	0.03	QP
5	0.413	34.56	47.59	-13.03	34.47	0.06	0.03	Average
6	0.413	39.96	57.59	-17.63	39.87	0.06	0.03	QP
7	2.358	17.53	46.00	-28.47	17.30	0.14	0.09	Average
8	2.358	33.28	56.00	-22.72	33.05	0.14	0.09	QP
9	4.549	24.01	46.00	-21.99	23.71	0.17	0.13	Average
10	4.549	34.83	56.00	-21.17	34.53	0.17	0.13	QP
11	8.279	17.68	50.00	-32.32	17.34	0.19	0.15	Average
12	8.279	33.04	60.00	-26.96	32.70	0.19	0.15	QP

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

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



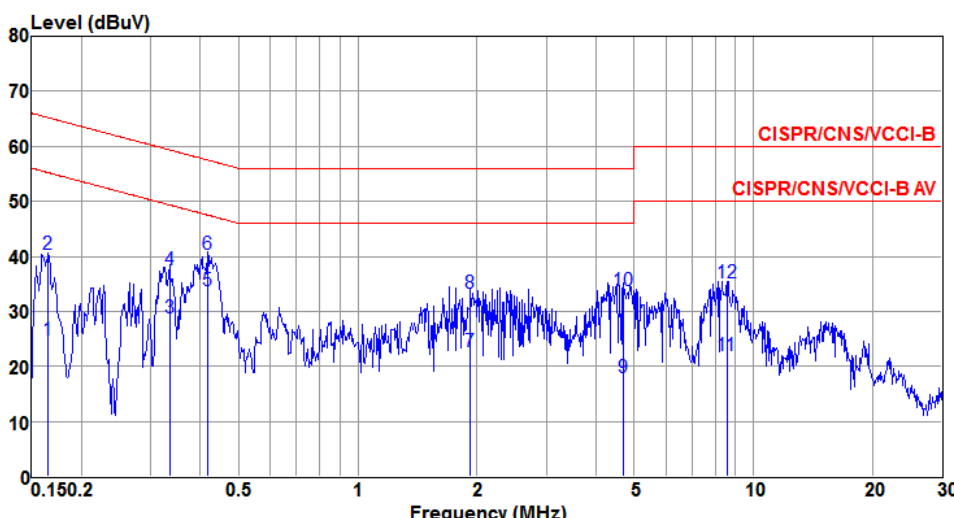
The graph displays the measured level in dBuV against frequency in MHz. Two red limit lines are shown: CISPR/CNS/VCCI-B (upper) and CISPR/CNS/VCCI-B AV (lower). The measured signal is a blue line with several peaks labeled 1 through 12. The x-axis is logarithmic from 0.15 to 30 MHz, and the y-axis is linear from 0 to 80 dBuV.

Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	25.92	55.52	-29.60	25.80	0.10	0.02	Average
2	43.28	65.52	-22.24	43.16	0.10	0.02	QP
3	19.53	52.83	-33.30	19.41	0.10	0.02	Average
4	36.16	62.83	-26.67	36.04	0.10	0.02	QP
5	31.49	49.44	-17.95	31.34	0.12	0.03	Average
6	38.99	59.44	-20.45	38.84	0.12	0.03	QP
7@	35.70	47.37	-11.67	35.54	0.13	0.03	Average
8	41.10	57.37	-16.27	40.94	0.13	0.03	QP
9	23.12	46.00	-22.88	22.91	0.14	0.07	Average
10	31.53	56.00	-24.47	31.32	0.14	0.07	QP
11	20.56	50.00	-29.44	20.23	0.20	0.13	Average
12	34.39	60.00	-25.61	34.06	0.20	0.13	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)	5795
Power Phase	Line		

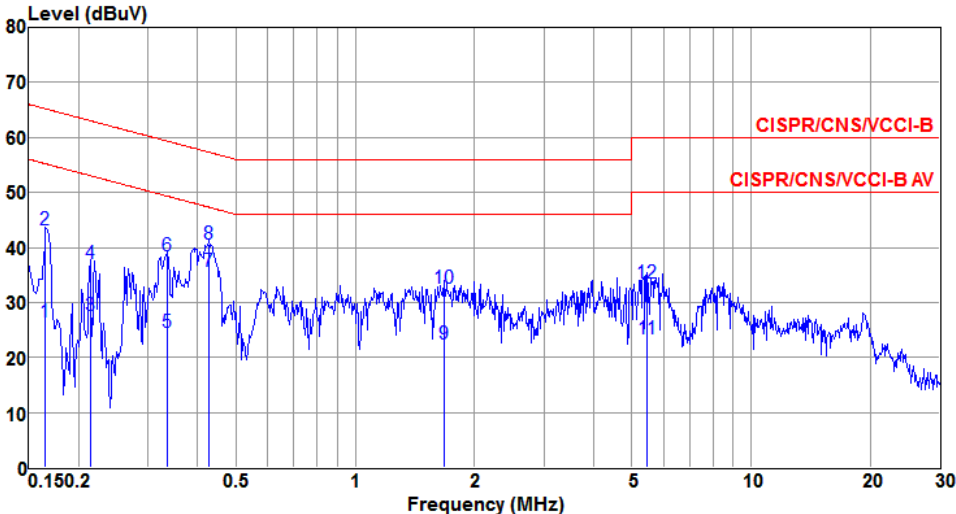


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.165	24.88	55.21	-30.33	24.78	0.08	0.02	Average
2	0.165	40.26	65.21	-24.95	40.16	0.08	0.02	QP
3	0.334	28.77	49.35	-20.58	28.67	0.07	0.03	Average
4	0.334	37.60	59.35	-21.75	37.50	0.07	0.03	QP
5@	0.417	33.80	47.51	-13.71	33.71	0.06	0.03	Average
6	0.417	40.34	57.51	-17.17	40.25	0.06	0.03	QP
7	1.928	22.74	46.00	-23.26	22.53	0.13	0.08	Average
8	1.928	33.39	56.00	-22.61	33.18	0.13	0.08	QP
9	4.696	18.03	46.00	-27.97	17.72	0.18	0.13	Average
10	4.696	33.85	56.00	-22.15	33.54	0.18	0.13	QP
11	8.592	21.91	50.00	-28.09	21.57	0.19	0.15	Average
12	8.592	35.18	60.00	-24.82	34.84	0.19	0.15	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)	5795
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.165	26.46	55.21	-28.75	26.34	0.10	0.02	Average
2	0.165	43.24	65.21	-21.97	43.12	0.10	0.02	QP
3	0.214	27.61	53.05	-25.44	27.50	0.09	0.02	Average
4	0.214	37.18	63.05	-25.87	37.07	0.09	0.02	QP
5	0.336	24.51	49.31	-24.80	24.36	0.12	0.03	Average
6	0.336	38.43	59.31	-20.88	38.28	0.12	0.03	QP
7@	0.428	35.66	47.29	-11.63	35.50	0.13	0.03	Average
8	0.428	40.64	57.29	-16.65	40.48	0.13	0.03	QP
9	1.671	22.45	46.00	-23.55	22.24	0.14	0.07	Average
10	1.671	32.55	56.00	-23.45	32.34	0.14	0.07	QP
11	5.476	23.32	50.00	-26.68	22.99	0.20	0.13	Average
12	5.476	33.63	60.00	-26.37	33.30	0.20	0.13	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.

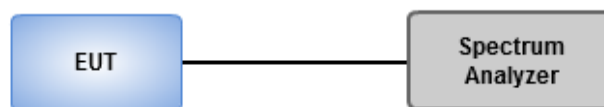
Occupied Bandwidth

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

6dB Bandwidth

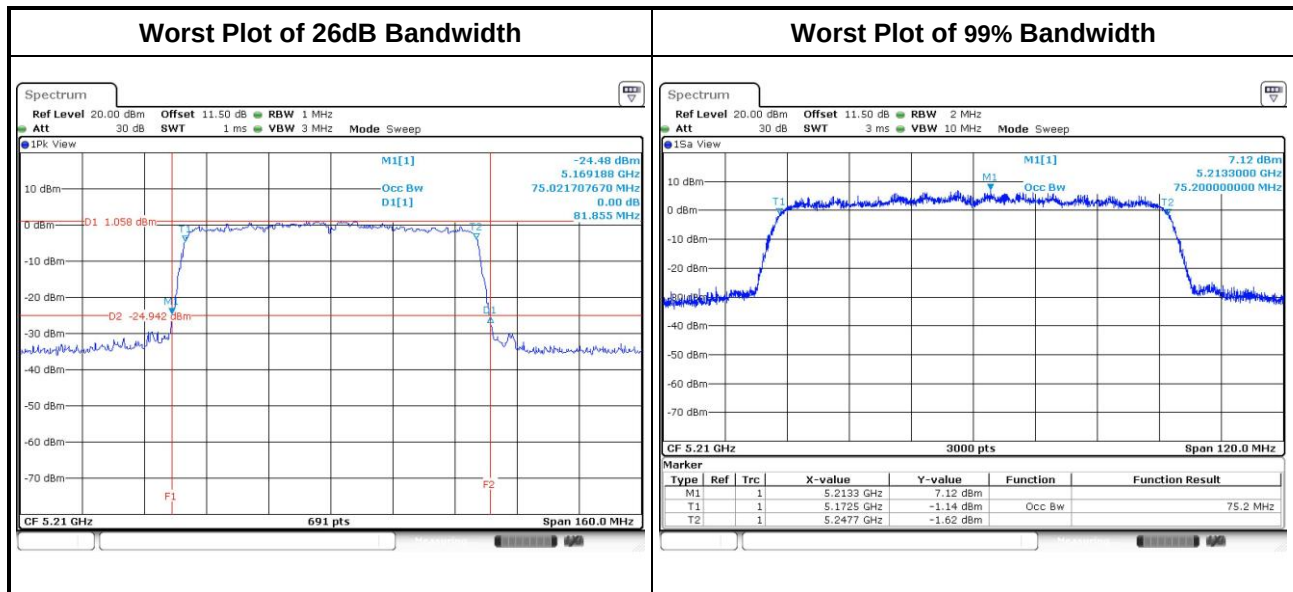
1. Set RBW = 100kHz, VBW = 300kHz
2. Detector = Peak, Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB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

3.2.3 Test Setup



3.2.4 Test Result of Emission Bandwidth

For Frequency band 5150-5250 MHz										
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
11a	2	5180	20.17	20.06	---	---	16.82	16.85	---	---
11a	2	5200	20.06	20.12	---	---	16.87	16.84	---	---
11a	2	5240	20.12	20.17	---	---	16.88	16.85	---	---
VHT20	2	5180	20.58	20.46	---	---	17.69	17.68	---	---
VHT20	2	5200	20.81	20.35	---	---	17.71	17.69	---	---
VHT20	2	5240	20.70	20.52	---	---	17.71	17.69	---	---
VHT40	2	5190	41.86	41.51	---	---	36.18	36.16	---	---
VHT40	2	5230	71.88	41.97	---	---	36.38	36.26	---	---
VHT80	2	5210	81.62	81.86	---	---	75.20	75.16	---	---

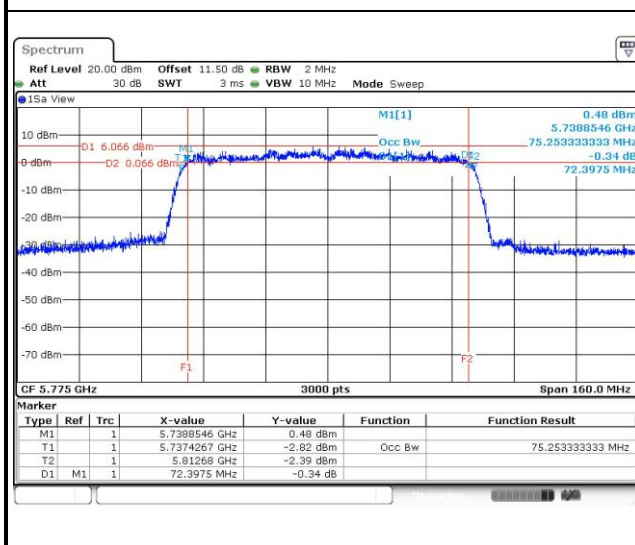


For Frequency band 5725-5850 MHz

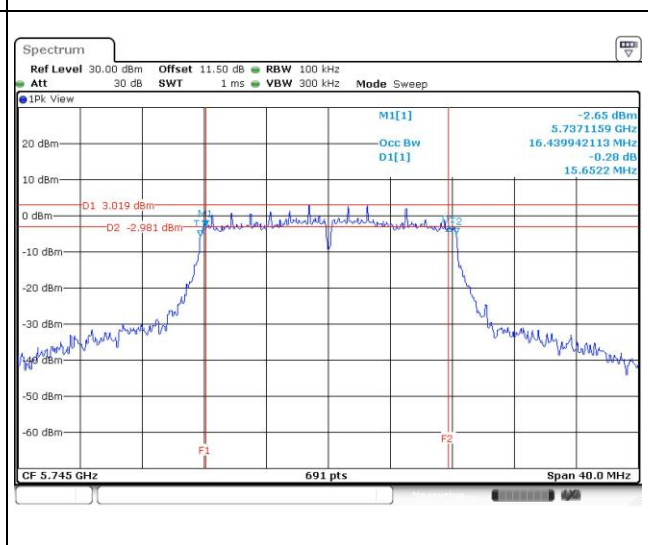
Emission Bandwidth

Mode	N _{TX}	Freq. (MHz)	OBW Bandwidth (MHz)				6dB Bandwidth (MHz)				6dB BW Limit (MHz)
			Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	
11a	2	5745	16.87	16.85	---	---	15.65	16.06	---	---	0.5
11a	2	5785	16.93	16.88	---	---	16.29	15.83	---	---	0.5
11a	2	5825	16.93	16.91	---	---	16.06	16.06	---	---	0.5
VHT20	2	5745	17.69	17.69	---	---	17.04	17.10	---	---	0.5
VHT20	2	5785	17.72	17.72	---	---	16.17	16.93	---	---	0.5
VHT20	2	5825	17.73	17.71	---	---	16.75	16.41	---	---	0.5
VHT40	2	5755	36.19	36.16	---	---	35.13	35.13	---	---	0.5
VHT40	2	5795	36.80	36.56	---	---	35.13	35.13	---	---	0.5
VHT80	2	5775	75.25	75.20	---	---	75.13	75.13	---	---	0.5

Worst Plots of 99% Bandwidth



Worst Plots of 6dB Bandwidth



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Frequency band 5150-5250 MHz		
Operating Mode		Limit
☐	Outdoor access point	Conducted Power: 1 W The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm)
☒	Indoor access point	Conducted Power: 1 W
☐	Fixed point-to-point access points	Conducted Power: 1 W
☐	Client devices	Conducted Power: 250 mW

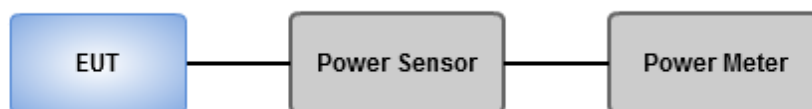
Frequency Band (MHz)	Limit
☐ 5250 ~ 5350	250mW or 11dBm+10 log B
☐ 5470 ~ 5725	250mW or 11dBm+10 log B
☒ 5725 ~ 5850	1 W

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			
11a	2	5180	12.71	12.03	---	---	34.623	15.39	30.00
11a	2	5200	12.86	12.72	---	---	38.027	15.80	30.00
11a	2	5240	13.5	12.63	---	---	40.710	16.10	30.00
HT20	2	5180	12.78	12.13	---	---	35.298	15.48	30.00
HT20	2	5200	13.42	13.69	---	---	45.367	16.57	30.00
HT20	2	5240	13.81	12.93	---	---	43.677	16.40	30.00
HT40	2	5190	12.74	12.65	---	---	37.201	15.71	30.00
HT40	2	5230	15.93	15.14	---	---	71.833	18.56	30.00
VHT20	2	5180	12.91	12.24	---	---	36.293	15.60	30.00
VHT20	2	5200	13.51	13.86	---	---	46.761	16.70	30.00
VHT20	2	5240	13.92	13.04	---	---	44.798	16.51	30.00
VHT40	2	5190	12.87	12.76	---	---	38.244	15.83	30.00
VHT40	2	5230	16.05	15.26	---	---	73.845	18.68	30.00
VHT80	2	5210	10.30	10.08	---	---	20.901	13.20	30.00

For Frequency band 5725-5850 MHz									
Mode	N _{TX}	Freq. (MHz)	Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11a	2	5745	13.88	13.83	---	---	48.589	16.87	30.00
11a	2	5785	14.78	15	---	---	61.684	17.90	30.00
11a	2	5825	15.11	14.94	---	---	63.623	18.04	30.00
HT20	2	5745	12.03	12.01	---	---	31.844	15.03	30.00
HT20	2	5785	13.35	13.21	---	---	42.568	16.29	30.00
HT20	2	5825	13.20	13.24	---	---	41.979	16.23	30.00
HT40	2	5755	11.31	11.42	---	---	27.388	14.38	30.00
HT40	2	5795	16.52	16.65	---	---	91.113	19.60	30.00
VHT20	2	5745	12.13	12.14	---	---	32.699	15.15	30.00
VHT20	2	5785	13.48	13.33	---	---	43.812	16.42	30.00
VHT20	2	5825	13.32	13.26	---	---	42.662	16.30	30.00
VHT40	2	5755	11.42	11.54	---	---	28.124	14.49	30.00
VHT40	2	5795	16.63	16.78	---	---	93.669	19.72	30.00
VHT80	2	5775	10.16	10.29	---	---	21.066	13.24	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
☐	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 $\geq 10 \times (\text{number of points in sweep}) \times (\text{total on/off period of the transmitted signal})$.
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add $10 \log(1/x)$, where x is the duty cycle.

For 5725 ~ 5850 MHz

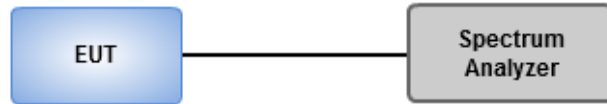
☐ Method SA-1

1. Set RBW = 500 kHz, VBW = 2 MHz, Sweep time = auto, Detector = RMS.
2. Trace average 100 traces.
3. Use the peak marker function to determine the maximum amplitude level.

☒ Method SA-2 Alternative

1. Set RBW = 500 kHz, VBW = 2 MHz, Detector = RMS.
2. Set sweep time $\geq 10 \times (\text{number of points in sweep}) \times (\text{total on/off period of the transmitted signal})$.
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add $10 \log(1/x)$, where x is the duty cycle.

3.4.3 Test Setup

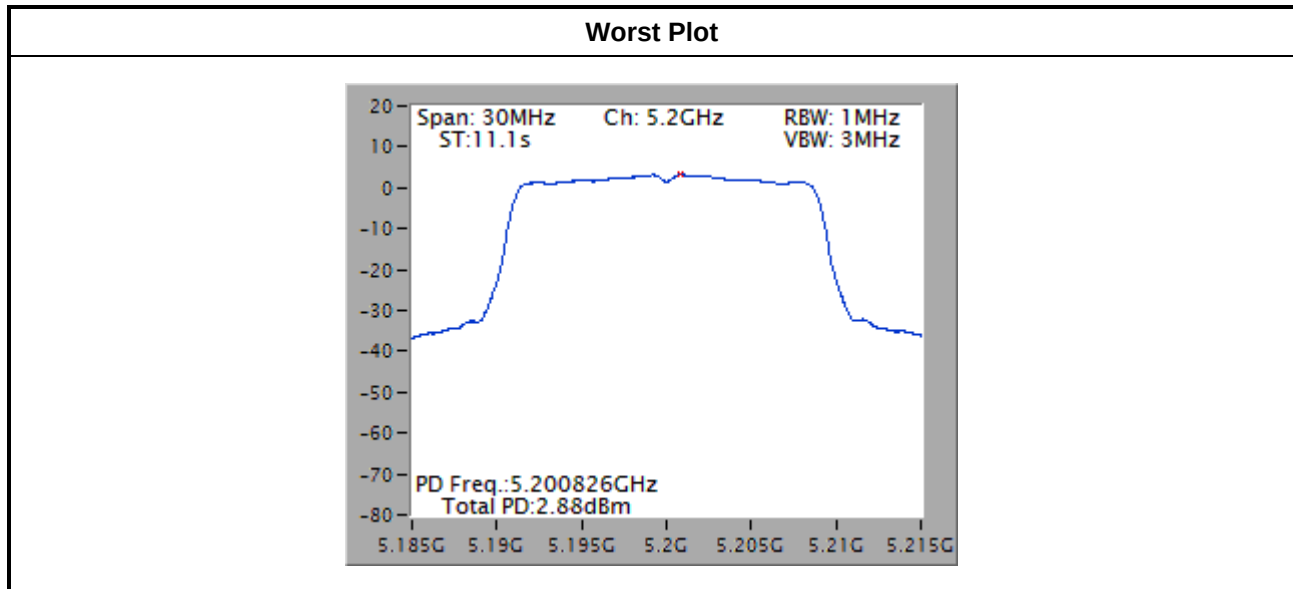


3.4.4 Test Result of Peak Power Spectral Density

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)
11a	2	5180	2.75	0.56	3.31	16.53
11a	2	5200	2.82	0.56	3.38	16.53
11a	2	5240	2.85	0.56	3.41	16.53
VHT20	2	5180	2.78	0.55	3.33	16.53
VHT20	2	5200	2.88	0.55	3.43	16.53
VHT20	2	5240	2.87	0.55	3.42	16.53
VHT40	2	5190	-0.80	1.07	0.27	16.53
VHT40	2	5230	1.65	1.07	2.72	16.53
VHT80	2	5210	-7.67	2.02	-5.65	16.53

Note:

1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $10 * \log((10^{3.94/20} + 10^{2.95/20})^2 / 2) = 6.47 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $17 \text{ dBm} - (6.47 \text{ dBi} - 6 \text{ dBi}) = 16.53 \text{ dBm}$

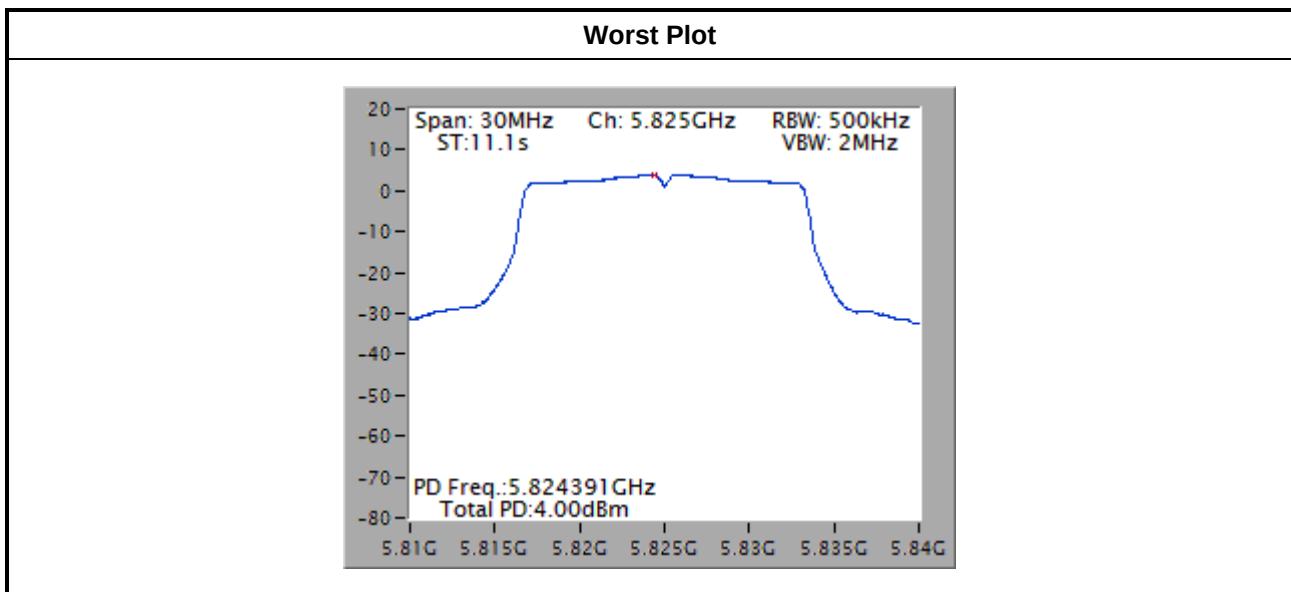


Note: The plot without duty factor.

For Frequency band 5725-5850 MHz						
Condition			Peak Power Spectral Density (dBm/500kHz)			
Modulation Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/500kHz)	Duty Factor (dB)	PPSD with D.F (dBm/500kHz)	PPSD Limit (dBm/500kHz)
11a	2	5745	2.72	0.56	3.28	28.83
11a	2	5785	3.60	0.56	4.16	28.83
11a	2	5825	4.00	0.56	4.56	28.83
VHT20	2	5745	0.69	0.55	1.24	28.83
VHT20	2	5785	1.95	0.55	2.50	28.83
VHT20	2	5825	1.93	0.55	2.48	28.83
VHT40	2	5755	-3.84	1.07	-2.77	28.83
VHT40	2	5795	1.33	1.07	2.40	28.83
VHT80	2	5775	-8.89	2.02	-6.87	28.83

Note:

1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $10 * \log((10^{4.34/20} + 10^{3.97/20})/2) = 7.17 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $30 \text{ dBm} - (7.17 \text{ dBi} - 6 \text{ dBi}) = 28.83 \text{ dBm}$



Note: The plot without duty factor.

3.5 Transmitter Radiated and Band Edge Emissions

3.5.1 Limit of Transmitter Radiated and Band Edge Emissions

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

Un-restricted band emissions above 1GHz Limit		
Operating Band	Limit	
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]	
5.725 - 5.850 GHz	☒	15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
	☐	15.407(b)(4)(ii) ,compliance with the emission limits in § 15.247(d) Shall be at least 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power,. Attenuation below the general limits specified in §15.209(a) is not required. In addition,radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see § 15.205(c))

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

3.5.2 Test Procedures

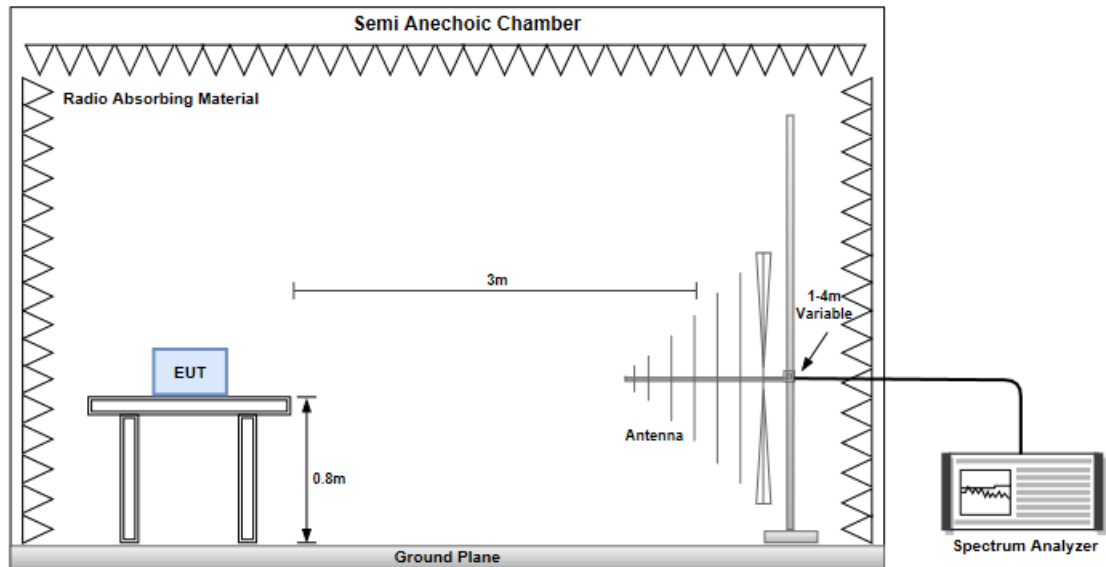
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

Note:

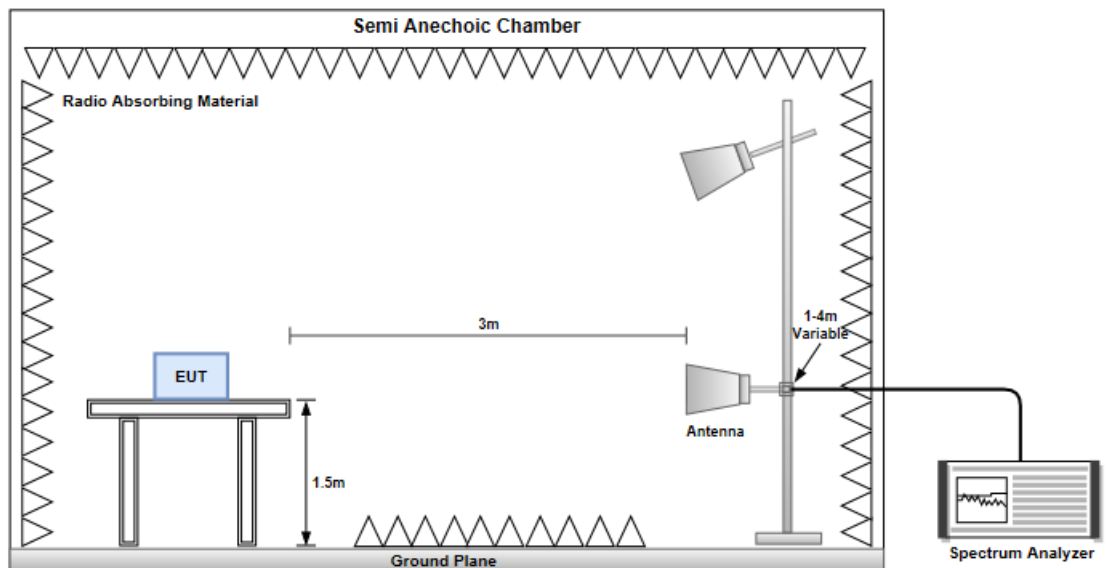
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

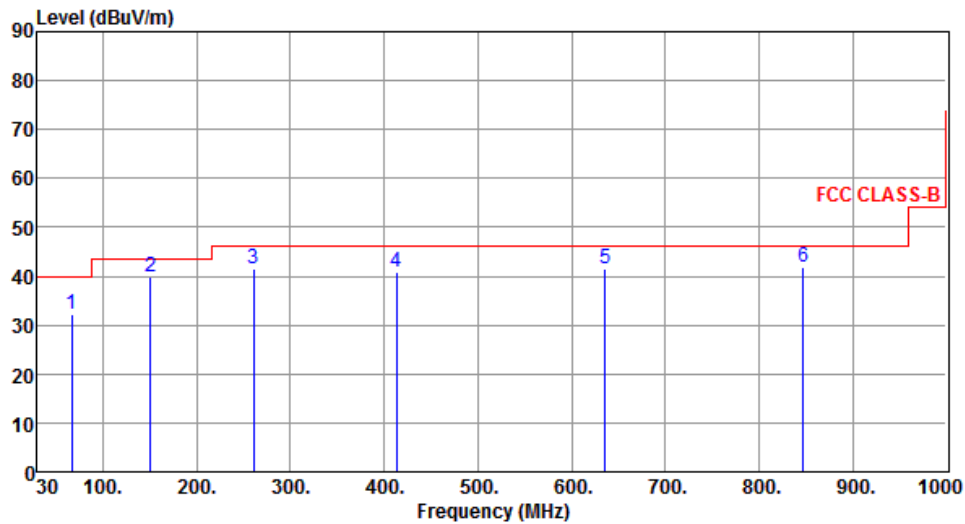


3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		
Level (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	66.83	32.31	40.00	-7.69	42.45	-10.14	Peak	---	---
2	150.43	39.86	43.50	-3.64	48.05	-8.19	Peak	---	---
3	261.07	41.65	46.00	-4.35	50.58	-8.93	Peak	---	---
4	413.00	40.72	46.00	-5.28	45.38	-4.66	Peak	---	---
5	636.27	41.36	46.00	-4.64	41.57	-0.21	Peak	---	---
6	847.34	41.83	46.00	-4.17	38.58	3.25	Peak	---	---

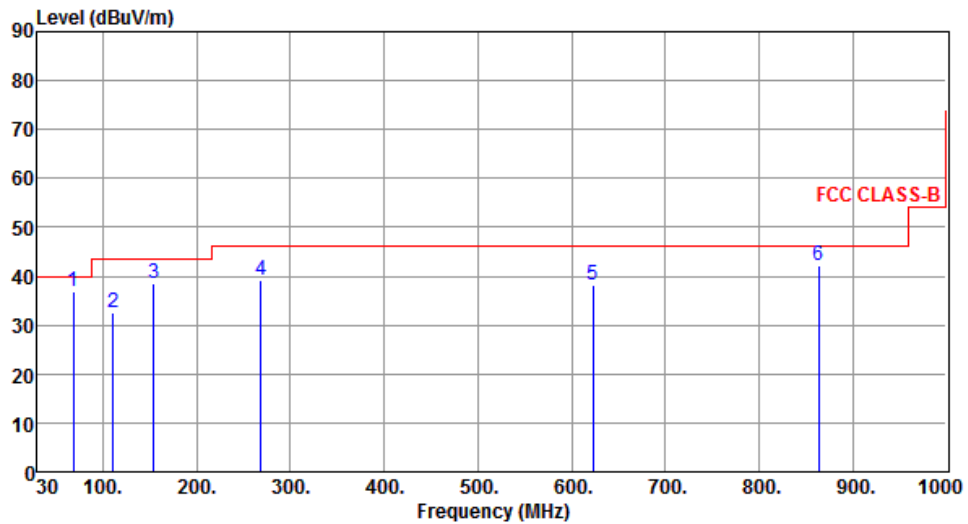
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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	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	68.40	36.83	40.00	-3.17	47.24	-10.41	QP	120	153
2	110.85	32.46	43.50	-11.04	43.54	-11.08	Peak	---	---
3	153.84	38.36	43.50	-5.14	46.51	-8.15	Peak	---	---
4	268.86	39.13	46.00	-6.87	47.57	-8.44	Peak	---	---
5	622.85	38.04	46.00	-7.96	38.41	-0.37	Peak	---	---
6	863.86	42.15	46.00	-3.85	38.58	3.57	Peak	---	---

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

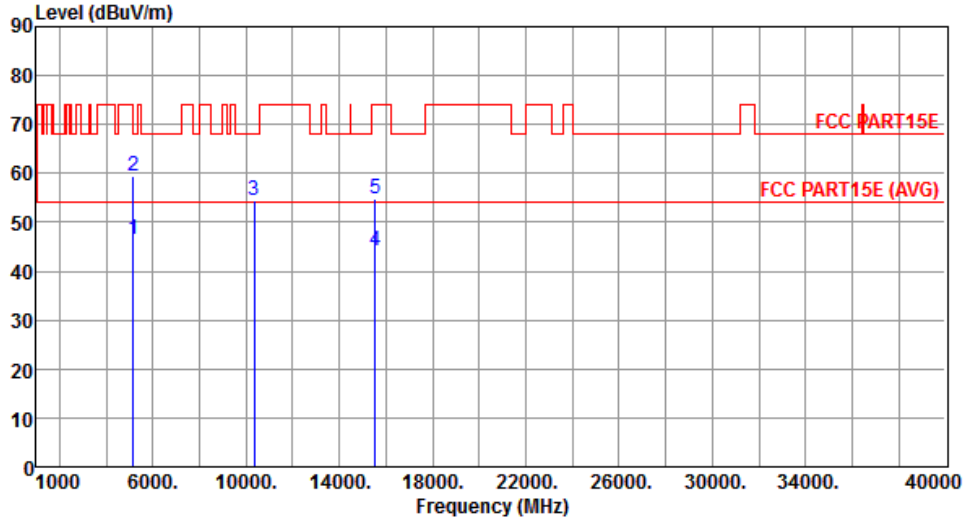
*Factor includes antenna factor , cable loss and amplifier gain

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)	5180
Polarization	Horizontal		

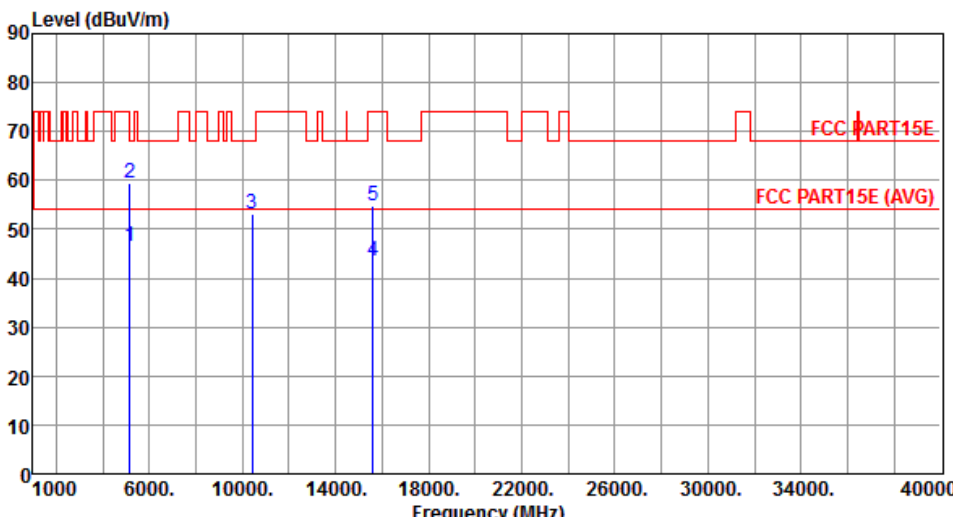


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	46.54	54.00	-7.46	40.74	5.80	Average	158	103
2	5150.00	59.41	74.00	-14.59	53.61	5.80	Peak	158	103
3	10360.00	54.36	68.20	-13.84	41.94	12.42	Peak	215	40
4	15540.00	44.17	54.00	-9.83	29.85	14.32	Average	158	325
5	15540.00	54.67	74.00	-19.33	40.35	14.32	Peak	158	325

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)	5180
Polarization	Vertical		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5200
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	46.43	54.00	-7.57	40.63	5.80	Average	100	234
2	5150.00	59.48	74.00	-14.52	53.68	5.80	Peak	100	234
3	10400.00	53.19	68.20	-15.01	40.74	12.45	Peak	205	114
4	15600.00	43.46	54.00	-10.54	29.20	14.26	Average	126	95
5	15600.00	54.92	74.00	-19.08	40.66	14.26	Peak	126	95

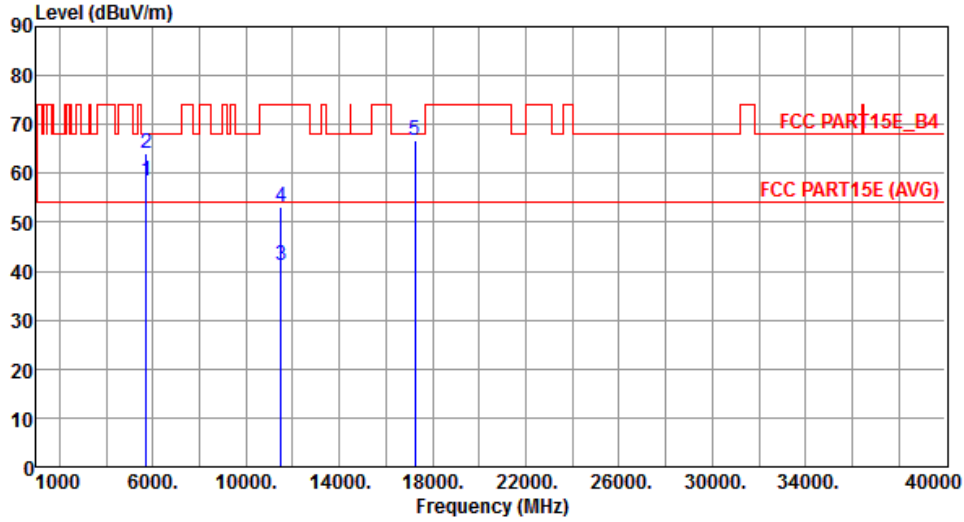
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Modulation	11a	Test Freq. (MHz)	5200
Polarization	Vertical		
Level (dBuV/m) </			

Modulation	11a	Test Freq. (MHz)	5240
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5240
Polarization	Vertical		
Level (dBuV/m)			

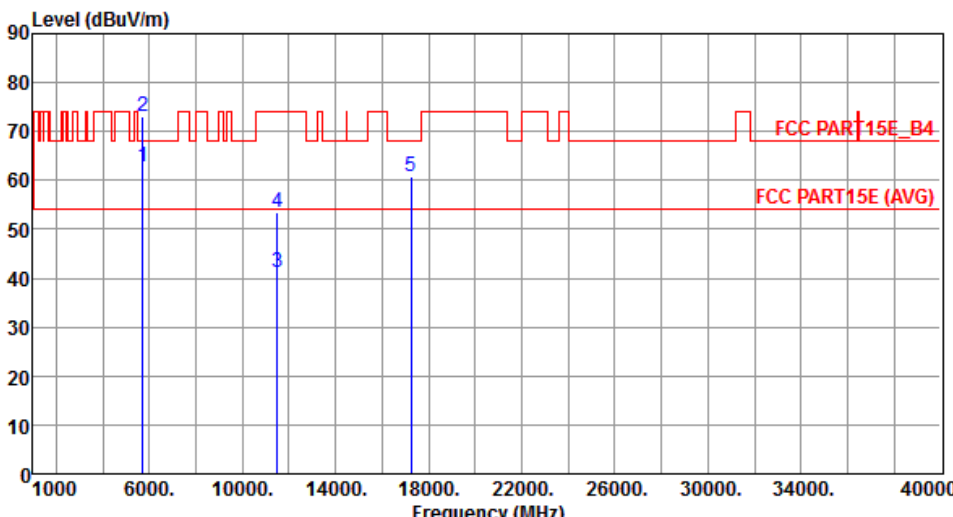
Modulation	11a	Test Freq. (MHz)	5745
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	58.53	68.20	-9.67	51.28	7.25	Peak	100	62
2	5725.00	64.18	78.20	-14.02	56.90	7.28	Peak	100	62
3	11490.00	41.06	54.00	-12.94	27.76	13.30	Average	100	239
4	11490.00	53.21	74.00	-20.79	39.91	13.30	Peak	100	239
5	17235.00	66.70	68.20	-1.50	48.88	17.82	Peak	203	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).

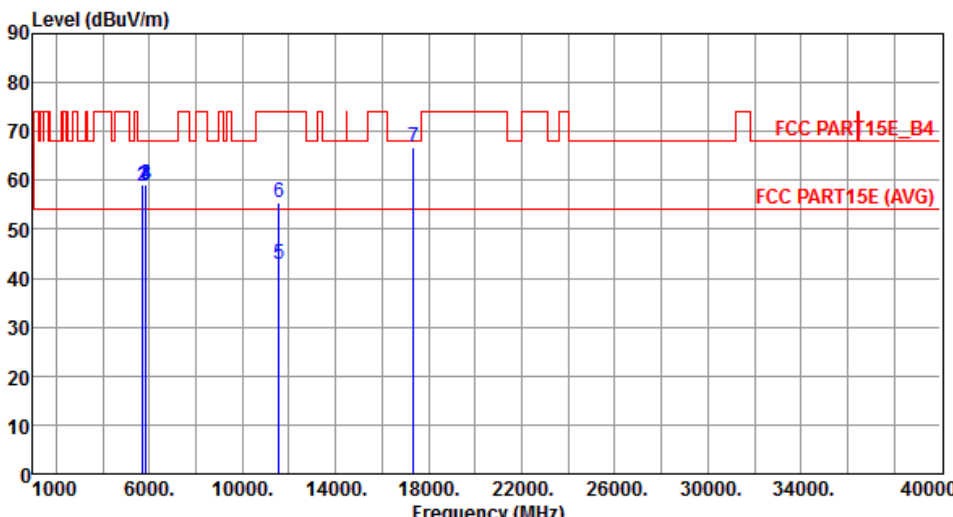
Modulation	11a	Test Freq. (MHz)	5745
Polarization	Vertical		



	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	62.69	68.20	-5.51	55.44	7.25	Peak	272	230
2	5725.00	73.06	78.20	-5.14	65.78	7.28	Peak	272	230
3	11490.00	41.26	54.00	-12.74	27.96	13.30	Average	100	275
4	11490.00	53.43	74.00	-20.57	40.13	13.30	Peak	100	275
5	17235.00	60.69	68.20	-7.51	42.87	17.82	Peak	137	233

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).

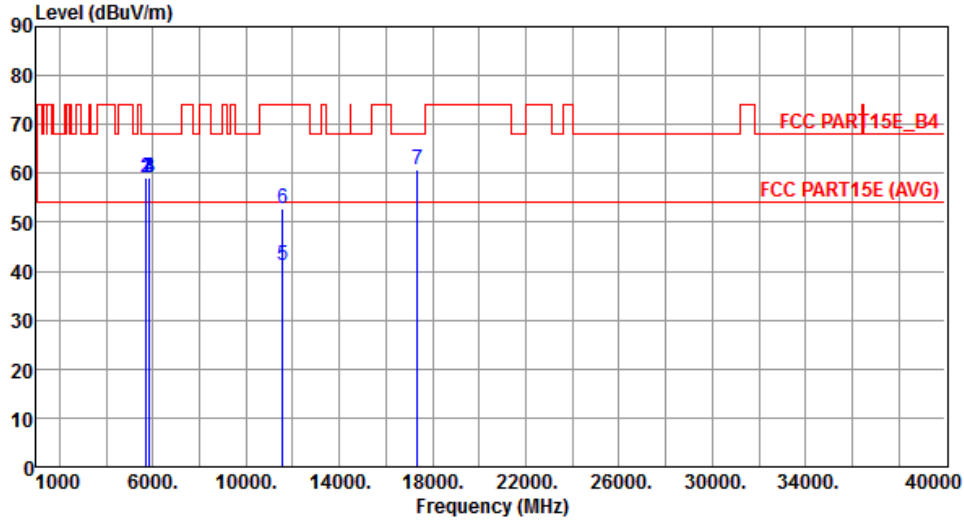
Modulation	11a	Test Freq. (MHz)	5785
Polarization	Horizontal		



	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	59.22	68.20	-8.98	51.97	7.25	Peak	100	218
2	5725.00	58.92	78.20	-19.28	51.64	7.28	Peak	100	218
3	5850.00	59.08	78.20	-19.12	51.40	7.68	Peak	100	218
4	5860.00	59.05	68.20	-9.15	51.34	7.71	Peak	100	218
5	11570.00	42.73	54.00	-11.27	29.48	13.25	Average	227	0
6	11570.00	55.43	74.00	-18.57	42.18	13.25	Peak	227	0
7	17355.00	66.89	68.20	-1.31	48.82	18.07	Peak	233	234

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).

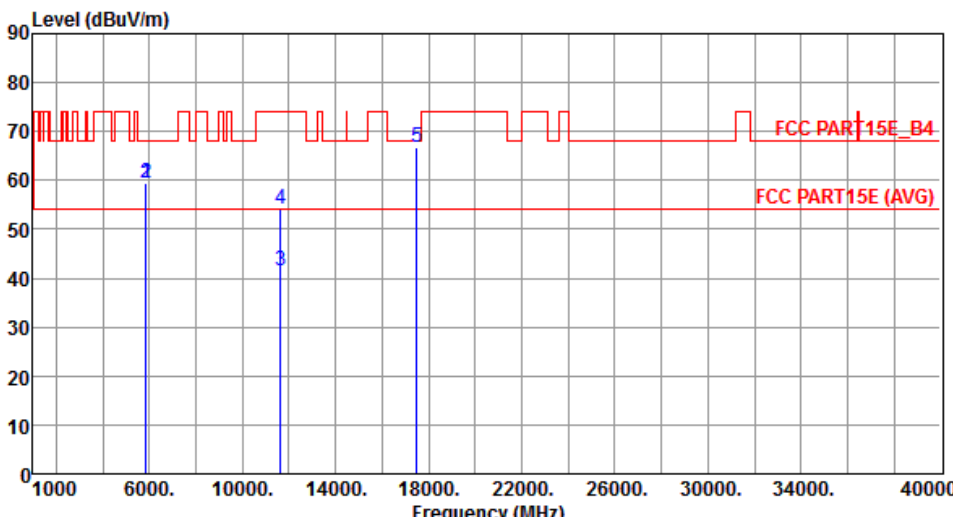
Modulation	11a	Test Freq. (MHz)	5785
Polarization	Vertical		



	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	59.15	68.20	-9.05	51.90	7.25	Peak	312	231
2	5725.00	58.98	78.20	-19.22	51.70	7.28	Peak	312	231
3	5850.00	59.21	78.20	-18.99	51.53	7.68	Peak	369	40
4	5860.00	59.18	68.20	-9.02	51.47	7.71	Peak	369	40
5	11570.00	41.14	54.00	-12.86	27.89	13.25	Average	100	221
6	11570.00	52.85	74.00	-21.15	39.60	13.25	Peak	100	221
7	17355.00	60.87	68.20	-7.33	42.80	18.07	Peak	100	221

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		



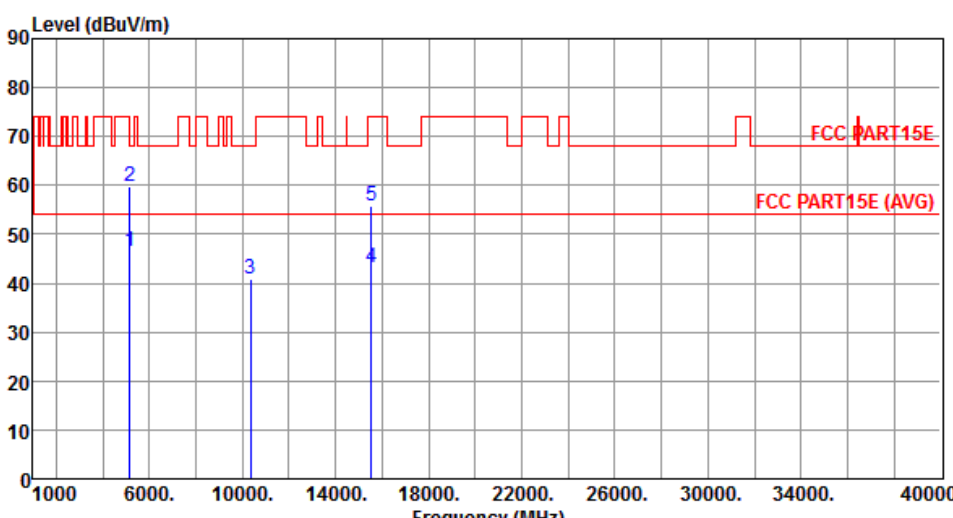
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	59.58	78.20	-18.62	51.90	7.68	Peak	141	84
2	5860.00	59.31	68.20	-8.89	51.60	7.71	Peak	141	84
3	11650.00	41.59	54.00	-12.41	28.41	13.18	Average	131	193
4	11650.00	54.22	74.00	-19.78	41.04	13.18	Peak	131	193
5	17475.00	66.83	68.20	-1.37	48.53	18.30	Peak	239	234

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		
Level (dBuV/m)			

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

Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	46.37	54.00	-7.63	40.57	5.80	Average	162	106
2	5150.00	59.65	74.00	-14.35	53.85	5.80	Peak	162	106
3	10360.00	40.84	68.20	-27.36	28.42	12.42	Peak	325	197
4	15540.00	43.33	54.00	-10.67	29.01	14.32	Average	173	68
5	15540.00	55.88	74.00	-18.12	41.56	14.32	Peak	173	68

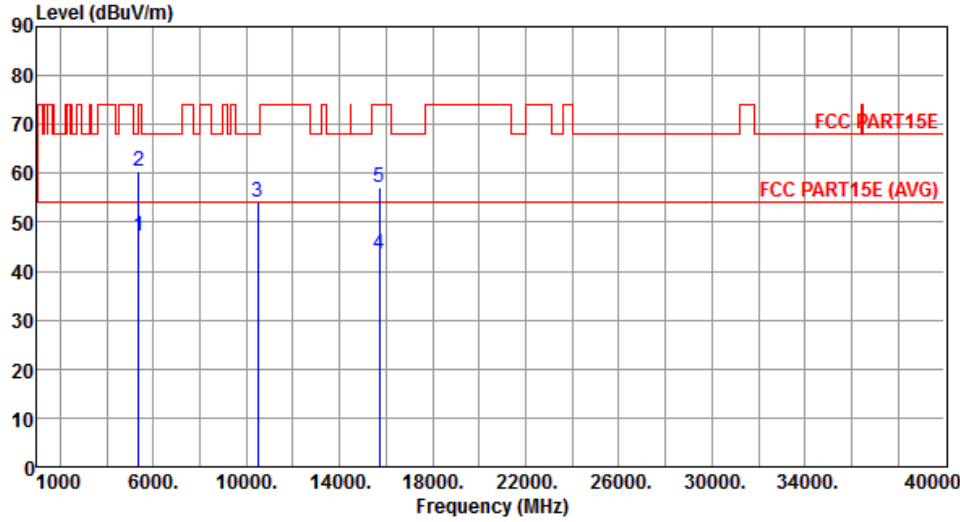
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Vertical		
Level (dBuV/m) <			

Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Vertical		
Level (dBUV/m)			

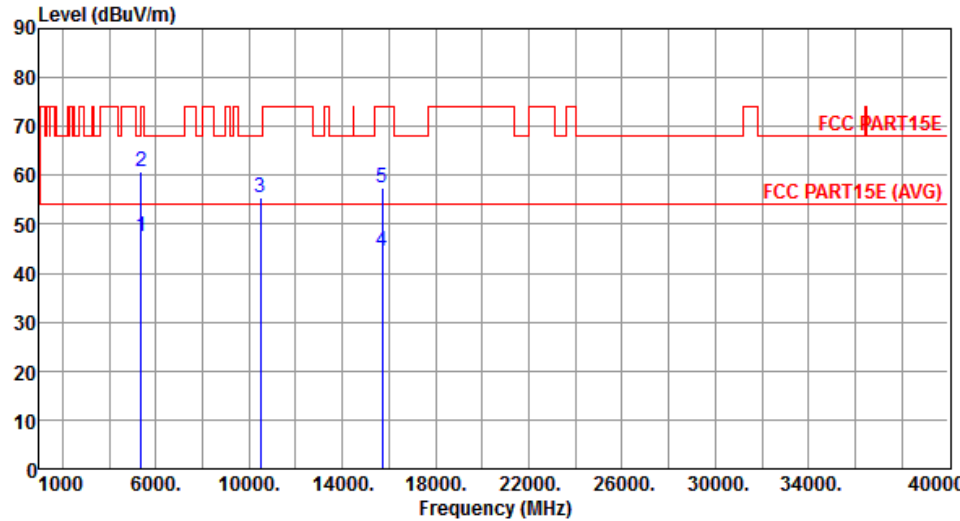
Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	47.10	54.00	-6.90	40.88	6.22	Average	157	103
2	5350.00	60.33	74.00	-13.67	54.11	6.22	Peak	157	103
3	10480.00	54.20	68.20	-14.00	41.73	12.47	Peak	295	342
4	15720.00	43.67	54.00	-10.33	29.53	14.14	Average	155	227
5	15720.00	57.07	74.00	-16.93	42.93	14.14	Peak	155	227

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

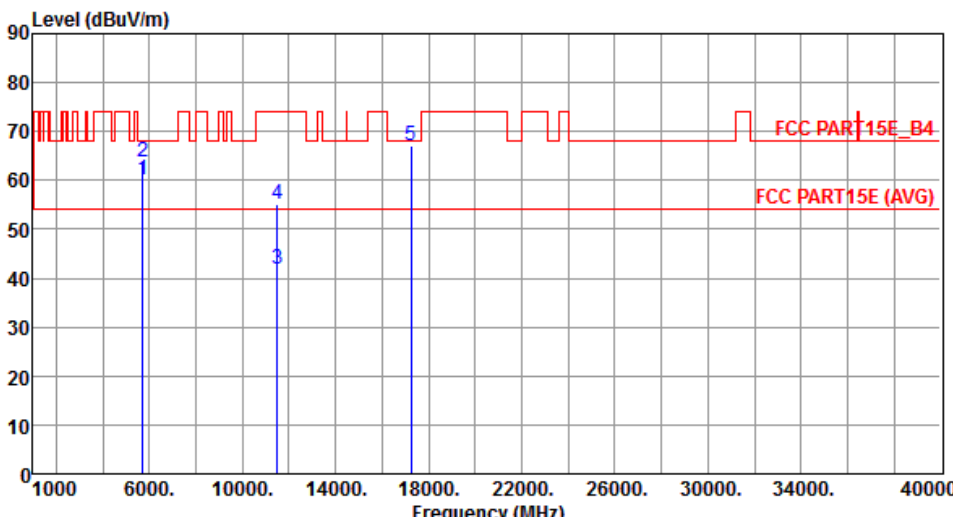
Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	47.37	54.00	-6.63	41.15	6.22	Average	121	203
2	5350.00	60.89	74.00	-13.11	54.67	6.22	Peak	121	203
3	10480.00	55.31	68.20	-12.89	42.84	12.47	Peak	112	69
4	15720.00	44.51	54.00	-9.49	30.37	14.14	Average	319	308
5	15720.00	57.41	74.00	-16.59	43.27	14.14	Peak	319	308

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

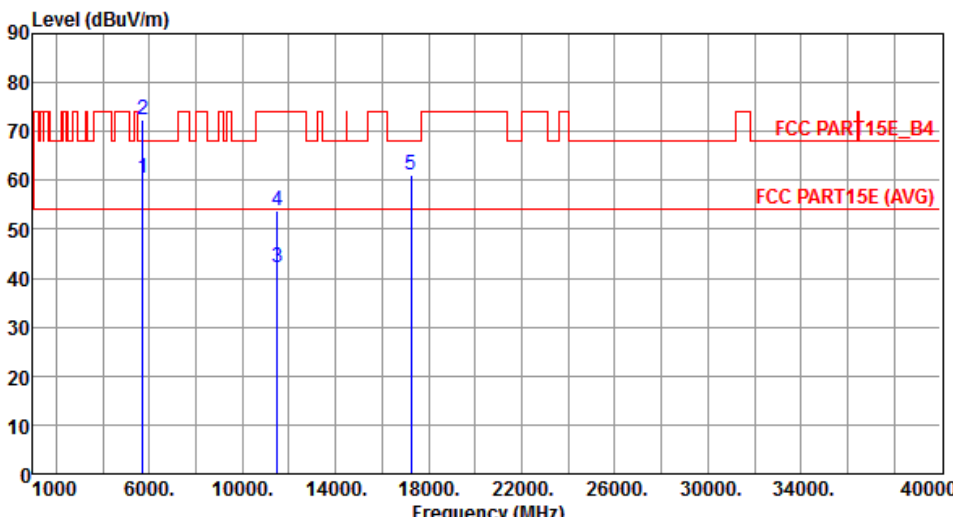
Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	60.16	68.20	-8.04	52.91	7.25	Peak	100	222
2	5725.00	63.74	78.20	-14.46	56.46	7.28	Peak	100	222
3	11490.00	41.73	54.00	-12.27	28.43	13.30	Average	112	84
4	11490.00	55.13	74.00	-18.87	41.83	13.30	Peak	112	84
5	17235.00	67.01	68.20	-1.19	49.19	17.82	Peak	146	240

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

Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Vertical		

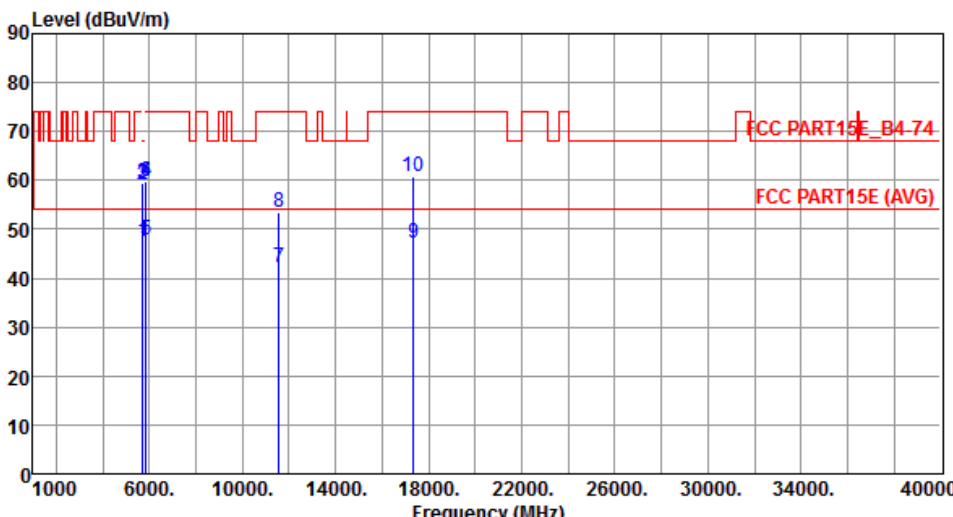


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	60.44	68.20	-7.76	53.19	7.25	Peak	295	231
2	5725.00	72.45	78.20	-5.75	65.17	7.28	Peak	295	231
3	11490.00	42.17	54.00	-11.83	28.87	13.30	Average	209	264
4	11490.00	53.76	74.00	-20.24	40.46	13.30	Peak	209	264
5	17235.00	61.13	68.20	-7.07	43.31	17.82	Peak	175	72

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

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

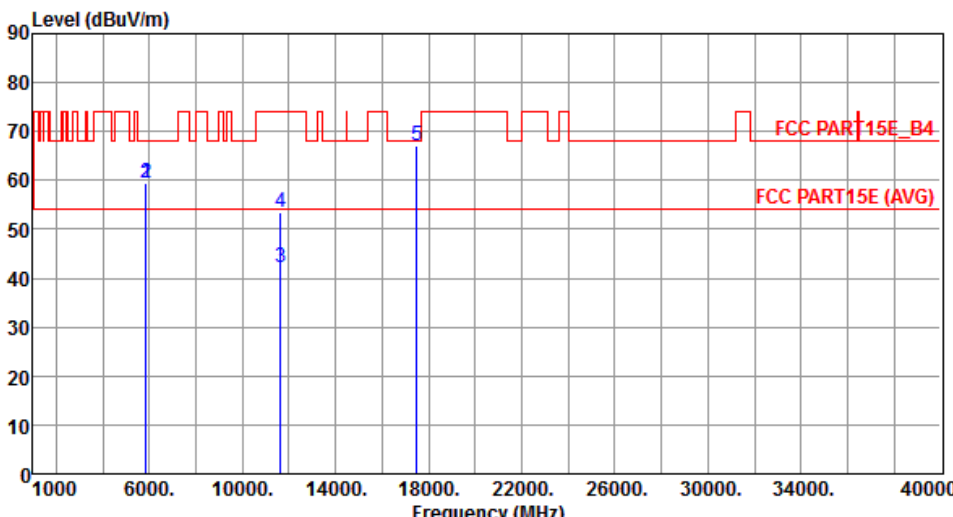
Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Vertical		



	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	47.46	54.00	-6.54	40.21	7.25	Average	247	243
2	5715.00	58.99	74.00	-15.01	51.74	7.25	Peak	247	243
3	5725.00	59.60	78.20	-18.60	52.32	7.28	Peak	247	243
4	5850.00	59.82	78.20	-18.38	52.14	7.68	Peak	247	243
5	5860.00	47.81	54.00	-6.19	40.10	7.71	Average	247	243
6	5860.00	59.71	74.00	-14.29	52.00	7.71	Peak	247	243
7	11570.00	42.06	54.00	-11.94	28.81	13.25	Average	135	49
8	11570.00	53.46	74.00	-20.54	40.21	13.25	Peak	135	49
9	17355.00	47.03	54.00	-6.97	28.96	18.07	Average	175	152
10	17355.00	60.76	74.00	-13.24	42.69	18.07	Peak	175	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).

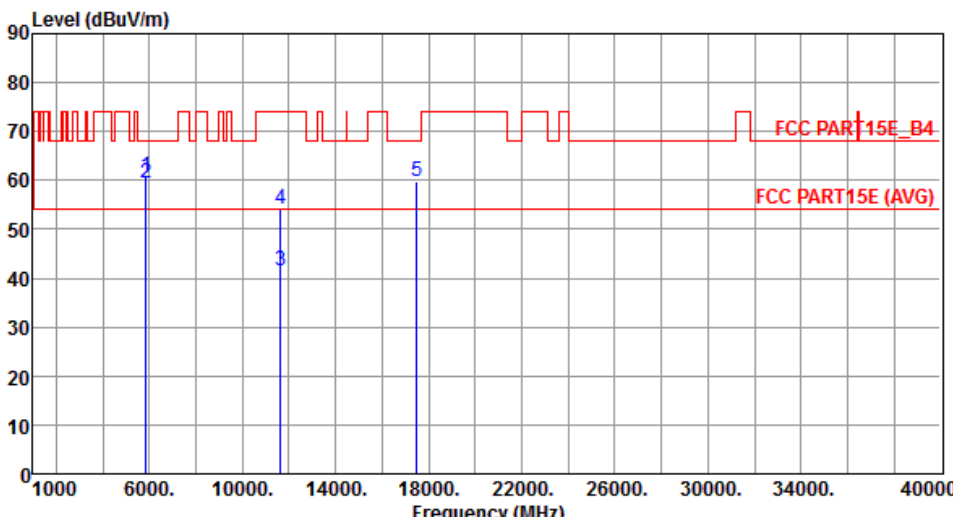
Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	59.55	78.20	-18.65	51.87	7.68	Peak	100	70
2	5860.00	59.31	68.20	-8.89	51.60	7.71	Peak	100	70
3	11650.00	42.10	54.00	-11.90	28.92	13.18	Average	134	96
4	11650.00	53.56	74.00	-20.44	40.38	13.18	Peak	134	96
5	17475.00	67.13	68.20	-1.07	48.83	18.30	Peak	151	240

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

Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Vertical		



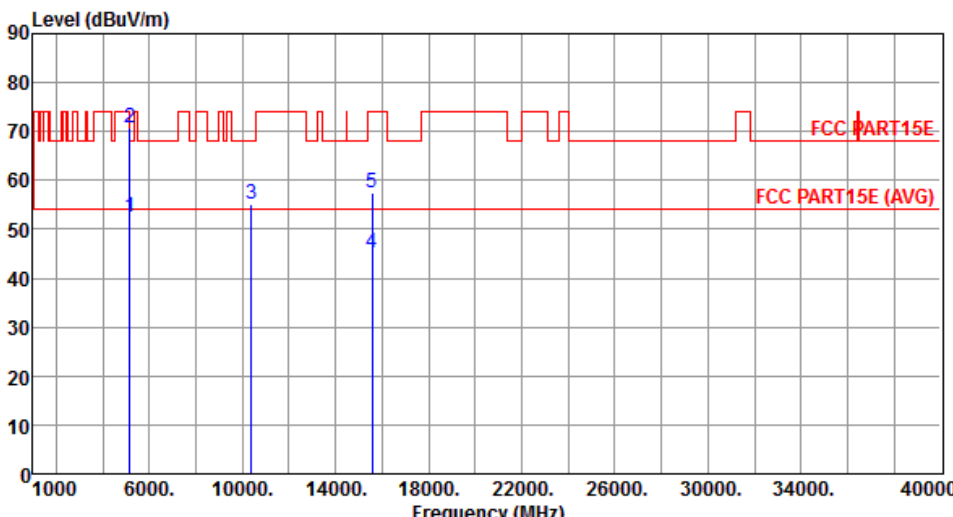
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	60.67	78.20	-17.53	52.99	7.68	Peak	249	247
2	5860.00	59.29	68.20	-8.91	51.58	7.71	Peak	249	247
3	11650.00	41.64	54.00	-12.36	28.46	13.18	Average	132	289
4	11650.00	54.11	74.00	-19.89	40.93	13.18	Peak	132	289
5	17475.00	59.80	68.20	-8.40	41.50	18.30	Peak	318	240

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 VHT40

Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Horizontal		
Level (dBuV/m)			

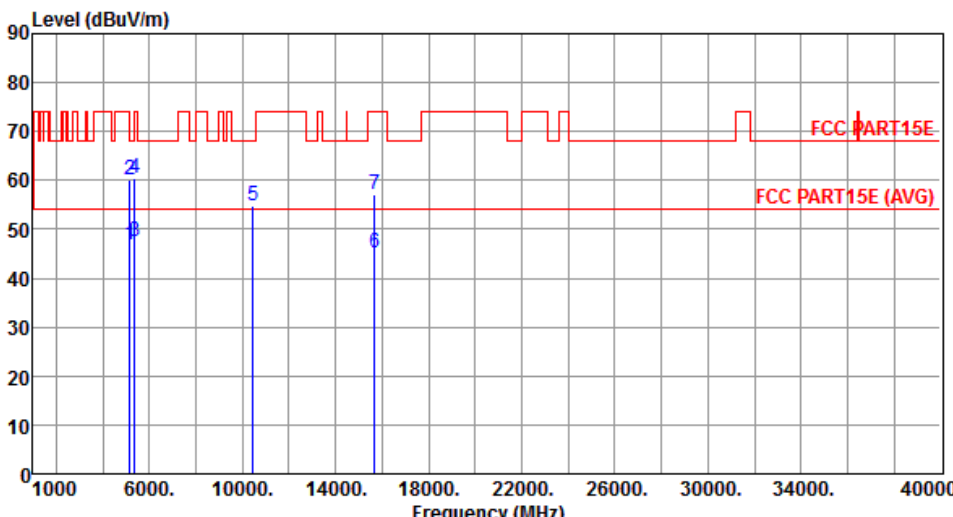
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	52.61	54.00	-1.39	46.81	5.80	Average	121	142
2	5150.00	70.76	74.00	-3.24	64.96	5.80	Peak	121	142
3	10380.00	55.20	68.20	-13.00	42.76	12.44	Peak	190	247
4	15570.00	45.03	54.00	-8.97	30.75	14.28	Average	273	142
5	15570.00	57.33	74.00	-16.67	43.05	14.28	Peak	273	142

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

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal		

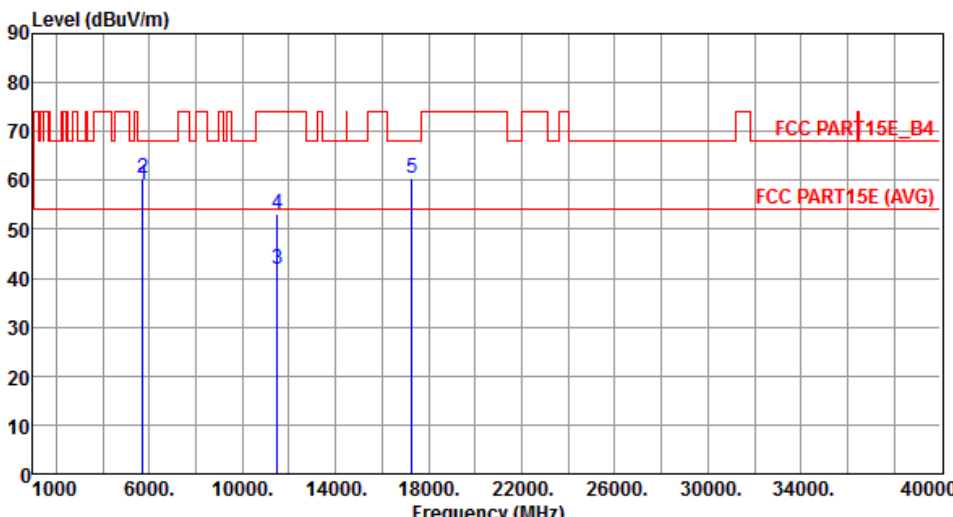


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	46.91	54.00	-7.09	41.11	5.80	Average	155	103
2	5150.00	60.02	74.00	-13.98	54.22	5.80	Peak	155	103
3	5350.00	47.53	54.00	-6.47	41.31	6.22	Average	155	103
4	5350.00	60.58	74.00	-13.42	54.36	6.22	Peak	155	103
5	10460.00	54.85	68.20	-13.35	42.38	12.47	Peak	261	133
6	15690.00	45.04	54.00	-8.96	30.87	14.17	Average	177	350
7	15690.00	57.01	74.00	-16.99	42.84	14.17	Peak	177	350

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		
Level (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	5715.00	59.17	68.20	-9.03	51.92	7.25	Peak	126	212
2	5725.00	60.45	78.20	-17.75	53.17	7.28	Peak	126	212
3	11510.00	41.73	54.00	-12.27	28.41	13.32	Average	100	133
4	11510.00	53.14	74.00	-20.86	39.82	13.32	Peak	100	133
5	17265.00	60.61	68.20	-7.59	42.74	17.87	Peak	198	240

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).

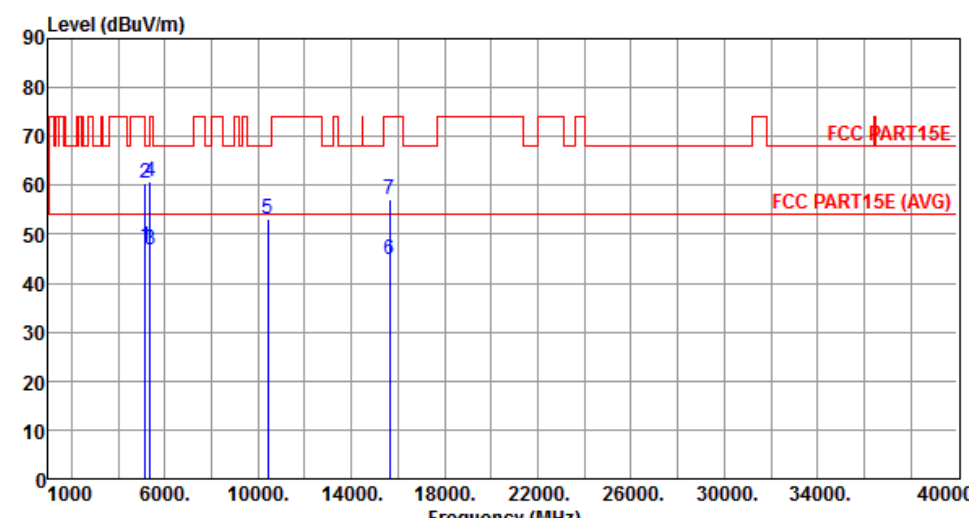
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		
Level (dBuV/m)			

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Vertical		
Level (dBuV/m)			

3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT80

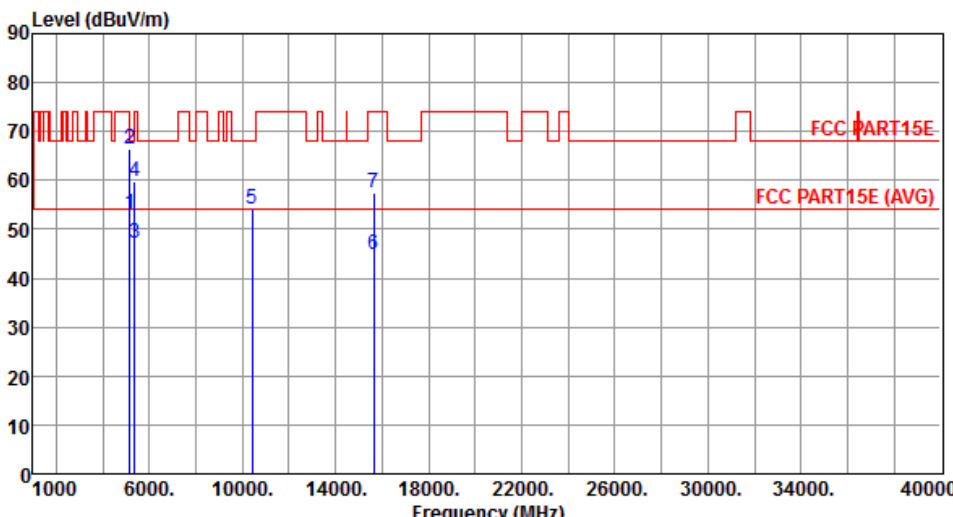
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	47.50	54.00	-6.50	41.70	5.80	Average	158	103
2	5150.00	60.37	74.00	-13.63	54.57	5.80	Peak	158	103
3	5350.00	46.94	54.00	-7.06	40.72	6.22	Average	158	103
4	5350.00	60.92	74.00	-13.08	54.70	6.22	Peak	158	103
5	10420.00	53.26	68.20	-14.94	40.81	12.45	Peak	163	182
6	15630.00	44.82	54.00	-9.18	30.59	14.23	Average	319	125
7	15630.00	57.07	74.00	-16.93	42.84	14.23	Peak	319	125

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

Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Vertical		

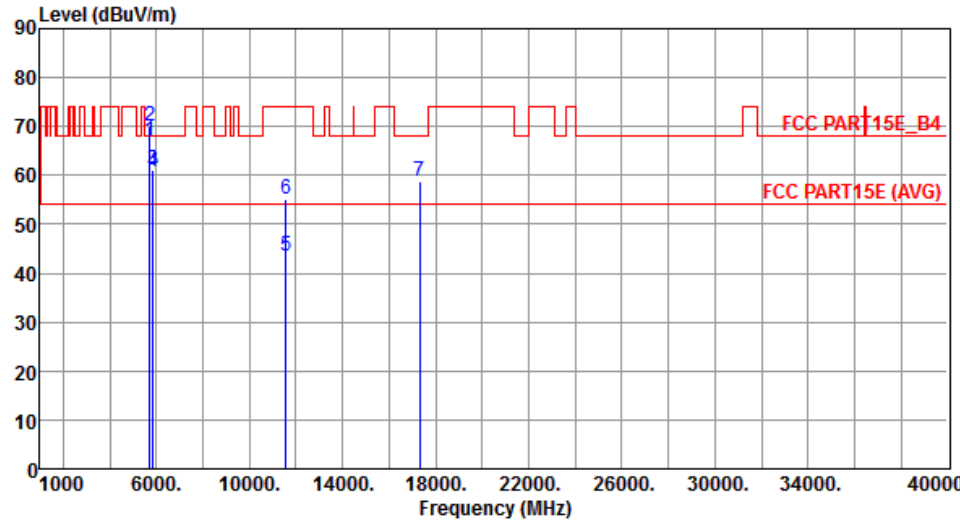


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	52.99	54.00	-1.01	47.19	5.80	Average	100	205
2	5150.00	66.27	74.00	-7.73	60.47	5.80	Peak	100	205
3	5350.00	47.24	54.00	-6.76	41.02	6.22	Average	100	205
4	5350.00	59.84	74.00	-14.16	53.62	6.22	Peak	100	205
5	10420.00	54.17	68.20	-14.03	41.72	12.45	Peak	268	252
6	15630.00	44.99	54.00	-9.01	30.76	14.23	Average	186	52
7	15630.00	57.31	74.00	-16.69	43.08	14.23	Peak	186	52

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

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

Modulation	VHT80	Test Freq. (MHz)	5775
Polarization	Vertical		



The spectrum plot displays the emission level in dBUV/m across a frequency range from 1000 to 40000 MHz. A red line represents the FCC PART 15E (AVG) limit, and another red line represents the FCC PART 15E_B4 limit. Blue vertical lines mark specific frequency points labeled 1 through 7. The emission level is generally higher than the limit, with a peak around 5715 MHz.

	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	67.19	68.20	-1.01	59.94	7.25	Peak	285	230
2	5725.00	70.11	78.20	-8.09	62.83	7.28	Peak	285	230
3	5850.00	61.14	78.20	-17.06	53.46	7.68	Peak	285	230
4	5860.00	60.91	68.20	-7.29	53.20	7.71	Peak	285	230
5	11550.00	43.45	54.00	-10.55	30.18	13.27	Average	134	241
6	11550.00	55.16	74.00	-18.84	41.89	13.27	Peak	134	241
7	17325.00	58.76	68.20	-9.44	40.76	18.00	Peak	116	289

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

*Factor includes antenna factor , cable loss and amplifier gain

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

3.6 Frequency Stability

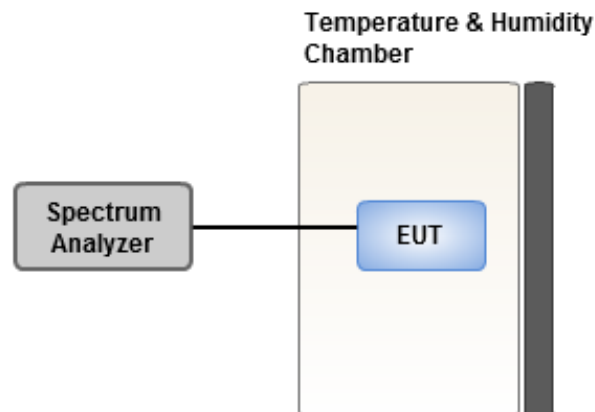
3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

3.6.2 Test Procedures

1. The EUT is installed in an environment test chamber with external power source.
2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.
3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
4. When temperature is stabled, measure the frequency stability.
5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.

3.6.3 Test Setup



3.6.4 Test Result of Frequency Stability

Frequency: 5200 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°C Vmax	3.82	4.42	3.91	4.20
T20°C Vmin	3.77	4.39	3.89	4.12
T50°C Vnom	3.68	4.32	3.86	4.08
T40°C Vnom	2.32	2.38	2.94	2.05
T30°C Vnom	1.60	1.72	1.68	2.40
T20°C Vnom	3.68	3.96	4.18	4.06
T10°C Vnom	2.71	2.91	3.27	2.81
T0°C Vnom	3.82	3.90	4.26	3.76
T-10°C Vnom	2.76	3.28	2.64	2.67
T-20°C Vnom	2.26	2.68	2.73	2.32
T-30°C Vnom	1.62	1.82	1.18	1.63
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 50		Tmin [°C]: -30

Frequency: 5785 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°C Vmax	3.92	3.80	4.15	3.61
T20°C Vmin	3.53	3.59	3.86	3.39
T50°C Vnom	3.45	3.67	3.55	3.13
T40°C Vnom	2.08	1.80	2.77	1.71
T30°C Vnom	1.41	1.32	1.42	2.18
T20°C Vnom	3.08	3.38	3.15	3.59
T10°C Vnom	2.34	2.84	2.41	2.32
T0°C Vnom	3.89	4.12	3.85	3.58
T-10°C Vnom	2.66	3.00	3.11	2.96
T-20°C Vnom	2.83	2.87	2.57	3.21
T-30°C Vnom	1.46	1.67	2.16	1.05
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 (EMC and Wireless Communication Laboratory), 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 District. Location map can be found on our website <http://www.icertifi.com.tw>.

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

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