

FCC Test Report

FCC ID : I88EMG3425Q10A
Equipment : Simultaneous Dual-Band Wireless AC2200
Gigabit Ethernet Gateway
Model No. : EMG3425-Q10A
Brand Name : ZyXEL
Applicant : ZyXEL Communications Corporation
Address : No. 2, Gongye E. 9th Road, Hsinchu Science
Park, Hsinchu, Taiwan.
Standard : 47 CFR FCC Part 15.407
Received Date : Jun. 16, 2015
Tested Date : Jul. 17 ~ Aug. 14, 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



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Local Support Equipment List	9
1.3	Test Setup Chart	9
1.4	The Equipment List	10
1.5	Testing Applied Standards	11
1.6	Measurement Uncertainty	11
2	TEST CONFIGURATION	12
2.1	Testing Condition	12
2.2	The Worst Test Modes and Channel Details	13
3	TRANSMITTER TEST RESULTS.....	15
3.1	Conducted Emissions.....	15
3.2	Emission Bandwidth	24
3.3	RF Output Power	29
3.4	Peak Power Spectral Density	32
3.5	Transmitter Radiated and Band Edge Emissions	38
3.6	Frequency Stability	109
4	TEST LABORATORY INFORMATION	111

Release Record

Report No.	Version	Description	Issued Date
FR570601AN	Rev. 01	Initial issue	Sep. 09, 2015

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.437MHz 34.69 (Margin -12.42dB) - AV	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5715.00MHz 53.89 (Margin -0.11dB) - AV	Pass
15.407(a)	Emission Bandwidth	Meet the requirement of limit	Pass
15.407(e)	6dB bandwidth	Meet the requirement of limit	Pass
15.407(a)	RF Output Power	Max Power [dBm]: Non-beamforming mode 5150-5250MHz: 29.89 5725-5850MHz: 28.09 Beamforming mode 5150-5250MHz: 27.92 5725-5850MHz: 27.99	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]	4	6-54 Mbps
5150-5250	n (HT20)	5180-5240	36-48 [4]	4	MCS 0-31
5150-5250	n (HT40)	5190-5230	38-46 [2]	4	MCS 0-31
5150-5250	ac (VHT20)	5180-5240	36-48 [4]	4	MCS 0-9
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	4	MCS 0-9
5150-5250	ac (VHT80)	5210	42 [1]	4	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.
 Note 3: 802.11ac supports beamforming function.

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]	4	6-54 Mbps
5725-5850	n (HT20)	5745-5825	149-165 [5]	4	MCS 0-31
5725-5850	n (HT40)	5755-5795	151-159 [2]	4	MCS 0-31
5725-5850	ac (VHT20)	5745-5825	149-165 [5]	4	MCS 0-9
5725-5850	ac (VHT40)	5755-5795	151-159 [2]	4	MCS 0-9
5725-5850	ac (VHT80)	5775	155 [1]	4	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.
 Note 3: 802.11ac supports beamforming function.

1.1.2 Antenna Details

Ant. No.	Type	Operating Frequency / Gain (dBi)		Connector
		2.4GHz	5GHz	
1	Dipole	1.53	1.92	UFL

1.1.3 Power Supply Type of Equipment under Test (EUT)

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

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand Name: APD Model Name: DA-48T12 Power Rating: I/P: 100-240Vac, 50-60Hz, 1.4A Max O/P: 12Vdc, 4A Power Line: AC 1.5m non-shielded cable w/o core DC 1.2m non-shielded cable w/o core
2	AC adapter	Brand Name: APD Model Name: WA-36A12FU Power Rating: I/P: 100-240Vac, 50-60Hz, 0.9A Max O/P: 12Vdc, 3A Power Line: DC 1.5m non-shielded cable with one core
3	RJ45 cable	1.0m 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	VHT 80	
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	Telnet				
Duty Cycle and Duty Factor	Mode	Non-beamforming		Beamforming	
		Duty cycle (%)	Duty factor (dB)	Duty cycle (%)	Duty factor (dB)
	11a	99.60%	0.02	---	---
	VHT20	99.57%	0.02	98.42%	0.07
	VHT40	98.54%	0.06	99.01%	0.04
	VHT80	96.62%	0.15	97.53%	0.11

1.1.7 Power Setting

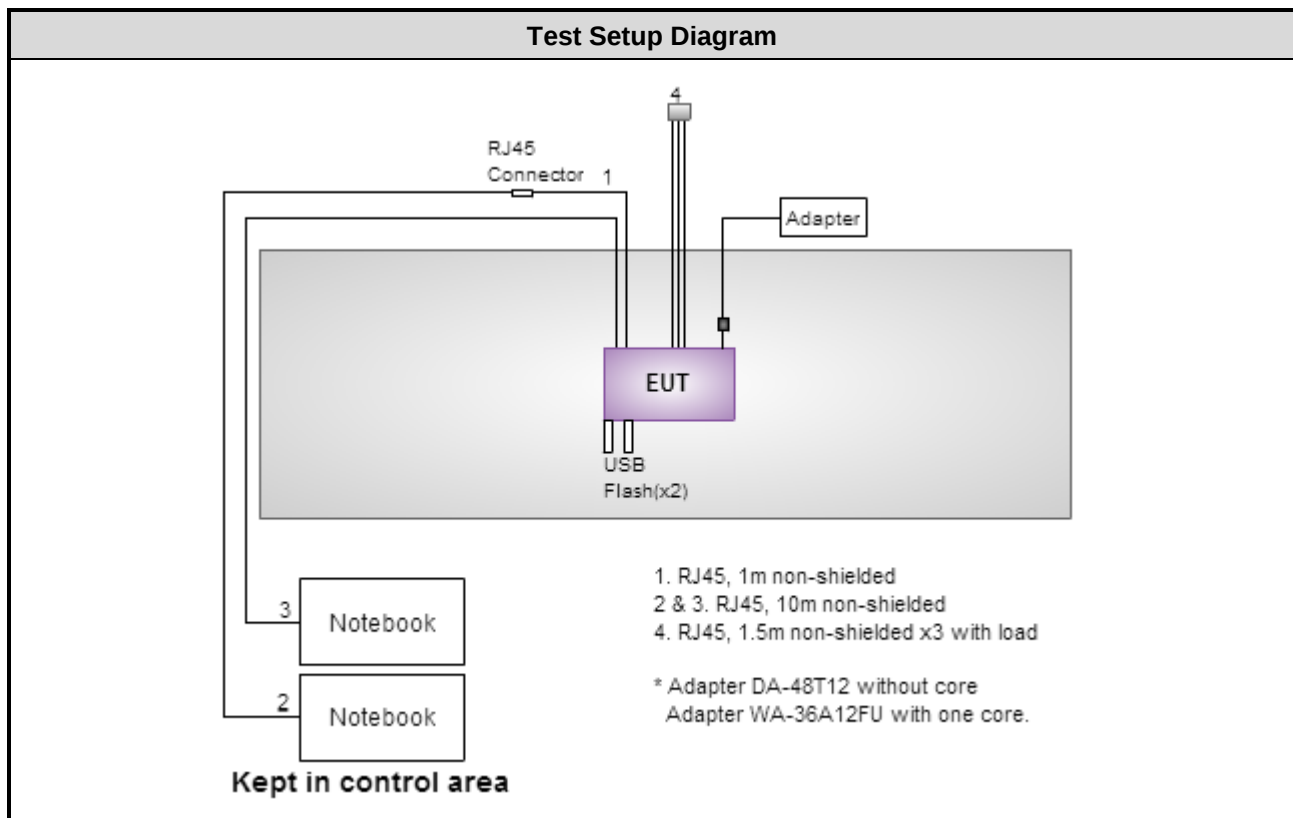
For Frequency band 5150-5250 MHz			
Modulation Mode	Test Frequency (MHz)	Power Set	
		Non-Beamforming	Beamforming
11a	5180	21	---
11a	5200	21	---
11a	5240	21	---
HT20	5180	21	---
HT20	5200	21	---
HT20	5240	21	---
HT40	5190	20	---
HT40	5230	24	---
VHT20	5180	21	19
VHT20	5200	21	20
VHT20	5240	21	21
VHT40	5190	20	17
VHT40	5230	24	22
VHT80	5210	15	14

For Frequency band 5725~5850 MHz			
Modulation Mode	Test Frequency (MHz)	Power Set	
		Non-Beamforming	Beamforming
11a	5745	22	---
11a	5785	25	---
11a	5825	25	---
HT20	5745	20	---
HT20	5785	25	---
HT20	5825	24	---
HT40	5755	16	---
HT40	5795	25	---
VHT20	5745	20	18
VHT20	5785	25	25
VHT20	5825	24	22
VHT40	5755	16	14
VHT40	5795	25	22
VHT80	5775	17	15

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6440	DoC	RJ45, 10m non-shielded.
2	Notebook	DELL	Latitude E6440	DoC	RJ45, 10m non-shielded.
3	USB Flash	Kingston	DTSE9	---	---
4	USB Flash	Kingston	DTSE9	---	---
5	Load	ICC	---	---	RJ45x3, 1.5m non-shielded.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
EMC Receiver	R&S	ESCS 30	100169	Oct. 17, 2014	Oct. 16, 2015
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. 16, 2014	Sep. 15, 2015
Receiver	Agilent	N9038A	MY53290044	Oct. 21, 2014	Oct. 20, 2015
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. 26, 2014	Sep. 25, 2015
Preamplifier	Agilent	83017A	MY53270014	Sep. 17, 2014	Sep. 16, 2015
Preamplifier	EMC	EMC184045B	980192	Aug. 26, 2014	Aug. 25, 2015
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. 29, 2014	Sep. 28, 2015
Power Sensor	Anritsu	MA2411B	1207366	Sep. 29, 2014	Sep. 28, 2015
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 / 52%	Kevin Ma
Radiated Emissions	03CH03-WS	21-22°C / 61-67%	Anderson Hong Felix Sung Warren Lee Morgan Chen
RF Conducted	TH01-WS	22°C / 64%	Felix Sung

➤ FCC site registration No.: 390588

➤ IC site registration No.: 10807C -1

2.2 The Worst Test Modes and Channel Details

Non-beamforming mode

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	2
Radiated Emissions ≤ 1 GHz	VHT40	5230	MCS 0	1
RF Output Power	11a HT20 HT40 VHT20 VHT40 VHT80	5180 / 5200 / 5240 5180 / 5200 / 5240 5190 / 5230 5180 / 5200 / 5240 5190 / 5230 5210	6 Mbps MCS 0 MCS 0 MCS 0 MCS 0 MCS 0	1
Radiated Emissions > 1 GHz Emission Bandwidth Peak Power Spectral Density	11a VHT20 VHT40 VHT80	5180 / 5200 / 5240 5180 / 5200 / 5240 5190 / 5230 5210	6 Mbps MCS 0 MCS 0 MCS 0	1
Frequency Stability	Un-modulation	5200	---	1
NOTE: 1. Adapter 1 and Adapter 2 had been covered during pretest. Worst adapter was final testing as below test configuration. (Adapter 1: DA-48T12; Adapter 2: WA-36A12FU). 2. Test configurations are listed as below: 1) Configuration 1: Adapter 1: DA-48T12 2) Configuration 2: Adapter 2: WA-36A12FU				

For Frequency band 5725-5850 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	11a	5785	6 Mbps	2
Radiated Emissions ≤ 1 GHz	11a	5785	6 Mbps	1
RF Output Power	11a HT20 HT40 VHT20 VHT40 VHT80	5745 / 5785 / 5825 5745 / 5785 / 5825 5755 / 5795 5745 / 5785 / 5825 5755 / 5795 5775	6 Mbps MCS 0 MCS 0 MCS 0 MCS 0 MCS 0	1
Radiated Emissions > 1 GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	11a VHT20 VHT40 VHT80	5745 / 5785 / 5825 5745 / 5785 / 5825 5755 / 5795 5775	6 Mbps MCS 0 MCS 0 MCS 0	1
Frequency Stability	Un-modulation	5785	---	1
NOTE: 1. Adapter 1 and Adapter 2 had been covered during pretest. Worst adapter was final testing as below test configuration. (Adapter 1: DA-48T12; Adapter 2: WA-36A12FU). 2. Test configurations are listed as below: 1) Configuration 1: Adapter 1: DA-48T12 2) Configuration 2: Adapter 2: WA-36A12FU				

Beamforming mode

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	2
Radiated Emissions ≤1GHz	VHT40	5230	MCS 0	1
RF Output Power	VHT20 VHT40 VHT80	5180 / 5200 / 5240 5190 / 5230 5210	MCS 0 MCS 0 MCS 0	1
Radiated Emissions >1GHz Emission Bandwidth Peak Power Spectral Density	VHT20 VHT40 VHT80	5180 / 5200 / 5240 5190 / 5230 5210	MCS 0 MCS 0 MCS 0	1
NOTE: 1. Adapter 1 and Adapter 2 had been covered during pretest. Worst adapter was final testing as below test configuration. (Adapter 1: DA-48T12; Adapter 2: WA-36A12FU). 2. Test configurations are listed as below: 1) Configuration 1: Adapter 1: DA-48T12 2) Configuration 2: Adapter 2: WA-36A12FU				

For Frequency band 5725-5850 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	VHT20	5785	MCS 0	2
Radiated Emissions ≤1GHz	VHT20	5785	MCS 0	1
RF Output Power	VHT20 VHT40 VHT80	5745 / 5785 / 5825 5755 / 5795 5775	MCS 0 MCS 0 MCS 0	1
Radiated Emissions >1GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	VHT20 VHT40 VHT80	5745 / 5785 / 5825 5755 / 5795 5775	MCS 0 MCS 0 MCS 0	1
NOTE: 1. Adapter 1 and Adapter 2 had been covered during pretest. Worst adapter was final testing as below test configuration. (Adapter 1: DA-48T12; Adapter 2: WA-36A12FU). 2. Test configurations are listed as below: 1) Configuration 1: Adapter 1: DA-48T12 2) Configuration 2: Adapter 2: WA-36A12FU				

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

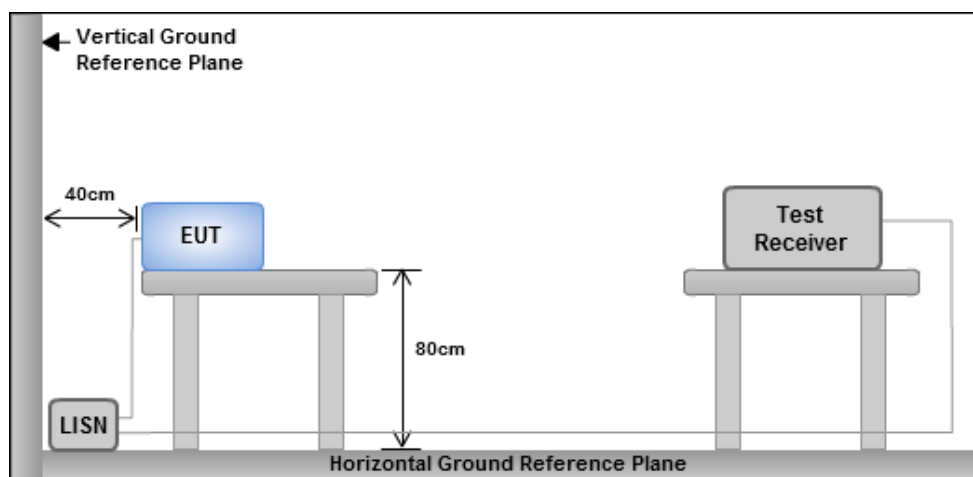
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

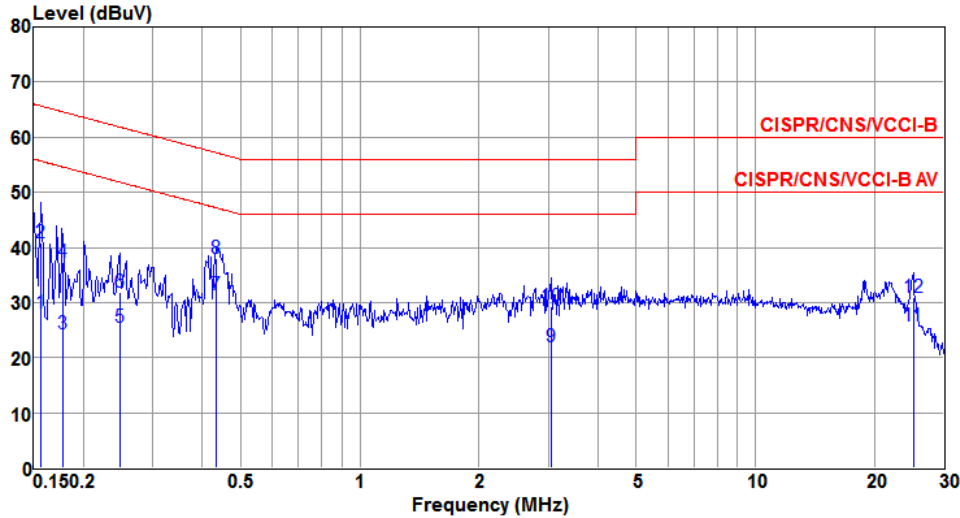


- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Non-beamforming mode

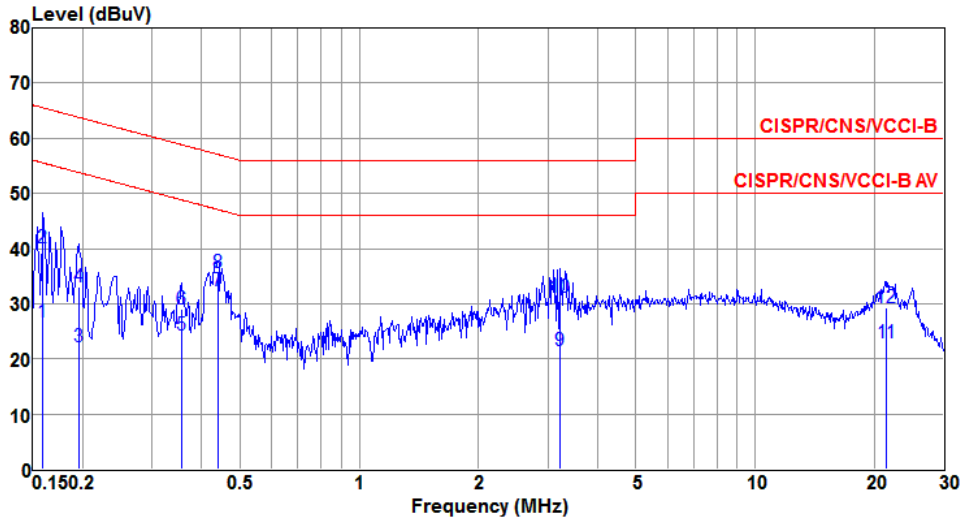
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	28.00	55.65	-27.65	18.25	9.67	0.08	Average
2	0.156	40.80	65.65	-24.85	31.05	9.67	0.08	QP
3	0.178	24.33	54.59	-30.26	14.58	9.66	0.09	Average
4	0.178	37.37	64.59	-27.22	27.62	9.66	0.09	QP
5	0.247	25.58	51.86	-26.28	15.82	9.66	0.10	Average
6	0.247	31.81	61.86	-30.05	22.05	9.66	0.10	QP
7*	0.433	31.49	47.20	-15.71	21.72	9.66	0.11	Average
8	0.433	38.02	57.20	-19.18	28.25	9.66	0.11	QP
9	3.041	22.05	46.00	-23.95	12.09	9.68	0.28	Average
10	3.041	29.18	56.00	-26.82	19.22	9.68	0.28	QP
11	25.055	25.73	50.00	-24.27	15.99	9.65	0.09	Average
12	25.055	30.83	60.00	-29.17	21.09	9.65	0.09	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		

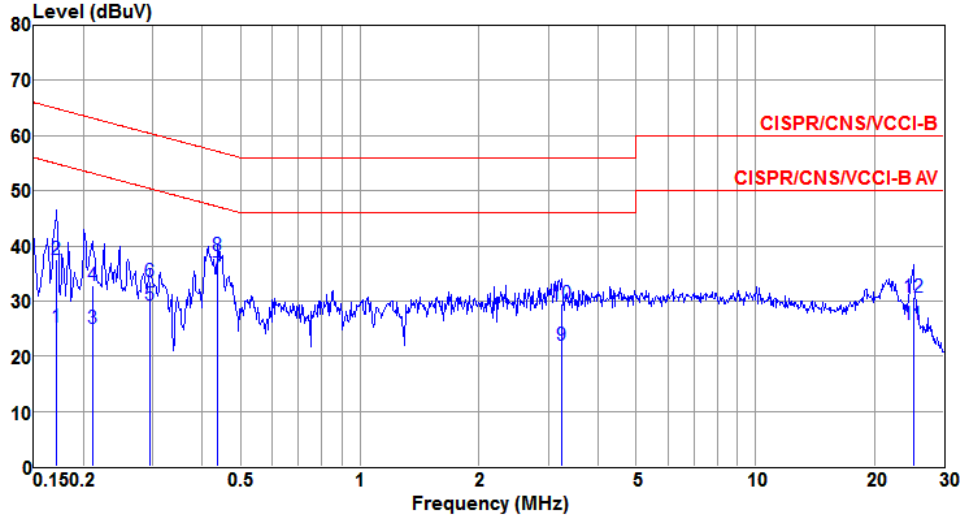


The graph displays the measured electromagnetic interference level in dBuV against frequency in MHz. The x-axis ranges from 0.15 to 30 MHz, and the y-axis ranges from 0 to 80 dBuV. Two red limit lines are shown: CISPR/CNS/VCCI-B (upper) and CISPR/CNS/VCCI-B AV (lower). The measured signal is a blue line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

	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	26.57	55.52	-28.95	16.82	9.67	0.08	Average
2	0.159	40.09	65.52	-25.43	30.34	9.67	0.08	QP
3	0.195	22.13	53.80	-31.67	12.38	9.66	0.09	Average
4	0.195	33.03	63.80	-30.77	23.28	9.66	0.09	QP
5	0.356	24.23	48.83	-24.60	14.46	9.66	0.11	Average
6	0.356	29.02	58.83	-29.81	19.25	9.66	0.11	QP
7*	0.440	32.25	47.07	-14.82	22.48	9.66	0.11	Average
8	0.440	35.72	57.07	-21.35	25.95	9.66	0.11	QP
9	3.224	21.37	46.00	-24.63	11.40	9.68	0.29	Average
10	3.224	31.04	56.00	-24.96	21.07	9.68	0.29	QP
11	21.486	22.80	50.00	-27.20	12.97	9.79	0.04	Average
12	21.486	29.37	60.00	-30.63	19.54	9.79	0.04	QP

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

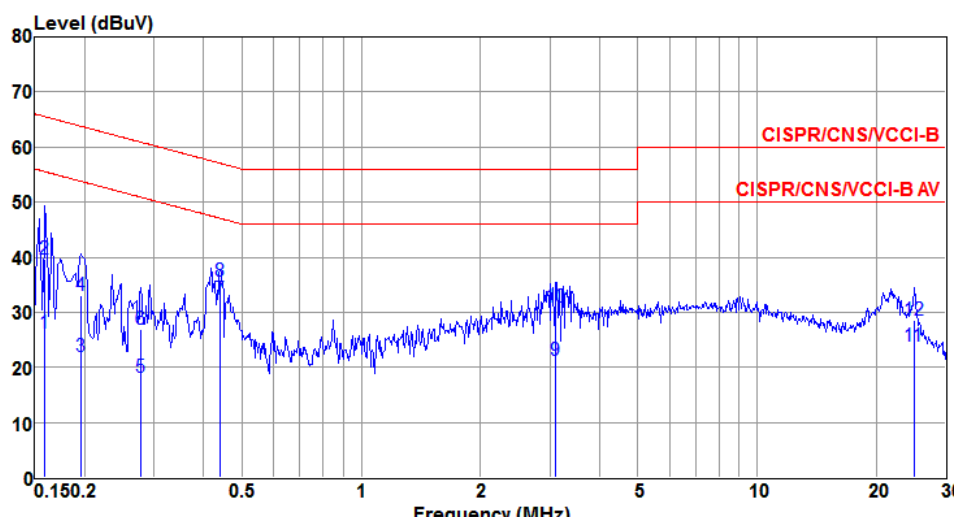
Modulation	11a	Test Freq. (MHz)	5785
Power Phase	Line		



	Freq MHz	Level dBUV	Limit Line dBUV	Over Limit dB	Read Level dBUV	LISN factor dB	cable loss dB	Remark
1	0.171	25.15	54.90	-29.75	15.40	9.67	0.08	Average
2	0.171	37.44	64.90	-27.46	27.69	9.67	0.08	QP
3	0.211	25.07	53.18	-28.11	15.32	9.66	0.09	Average
4	0.211	32.72	63.18	-30.46	22.97	9.66	0.09	QP
5	0.294	29.18	50.41	-21.23	19.42	9.66	0.10	Average
6	0.294	33.57	60.41	-26.84	23.81	9.66	0.10	QP
7*	0.437	34.69	47.11	-12.42	24.92	9.66	0.11	Average
8	0.437	38.23	57.11	-18.88	28.46	9.66	0.11	QP
9	3.241	21.85	46.00	-24.15	11.88	9.68	0.29	Average
10	3.241	29.40	56.00	-26.60	19.43	9.68	0.29	QP
11	25.055	25.84	50.00	-24.16	16.10	9.65	0.09	Average
12	25.055	30.65	60.00	-29.35	20.91	9.65	0.09	QP

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

Modulation	11a	Test Freq. (MHz)	5785
Power Phase	Neutral		



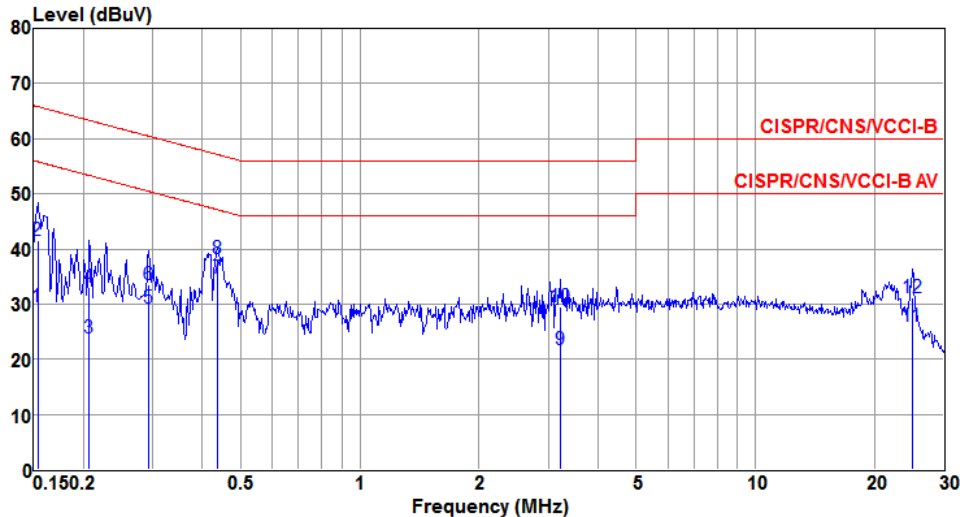
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	26.10	55.52	-29.42	16.35	9.67	0.08	Average
2	0.159	39.64	65.52	-25.88	29.89	9.67	0.08	QP
3	0.195	22.00	53.80	-31.80	12.25	9.66	0.09	Average
4	0.195	32.95	63.80	-30.85	23.20	9.66	0.09	QP
5	0.277	18.28	50.90	-32.62	8.52	9.66	0.10	Average
6	0.277	27.01	60.90	-33.89	17.25	9.66	0.10	QP
7*	0.440	32.25	47.07	-14.82	22.48	9.66	0.11	Average
8	0.440	35.74	57.07	-21.33	25.97	9.66	0.11	QP
9	3.107	21.27	46.00	-24.73	11.31	9.68	0.28	Average
10	3.107	31.00	56.00	-25.00	21.04	9.68	0.28	QP
11	24.922	23.84	50.00	-26.16	13.98	9.77	0.09	Average
12	24.922	28.66	60.00	-31.34	18.80	9.77	0.09	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Beamforming mode

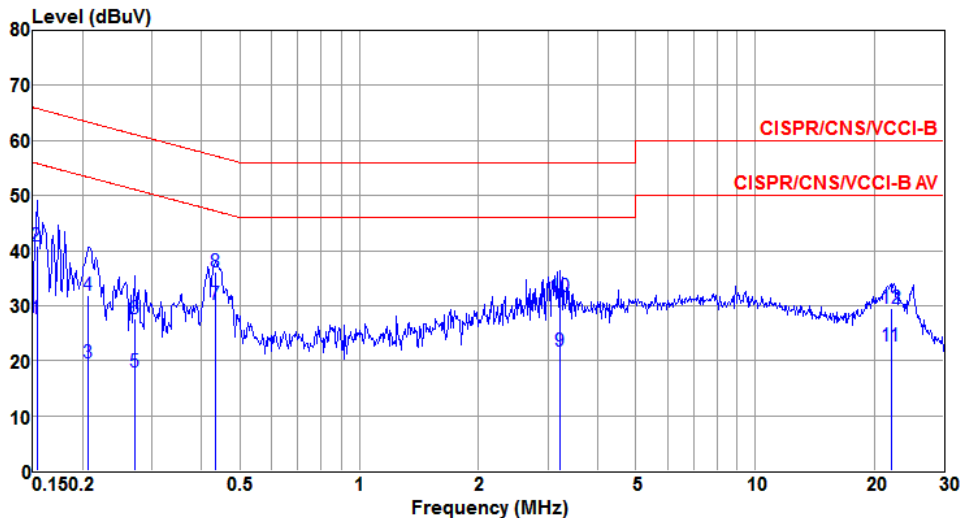
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.153	29.44	55.82	-26.38	19.69	9.67	0.08	Average
2	0.153	41.47	65.82	-24.35	31.72	9.67	0.08	QP
3	0.207	23.93	53.32	-29.39	14.18	9.66	0.09	Average
4	0.207	33.03	63.32	-30.29	23.28	9.66	0.09	QP
5	0.292	29.37	50.46	-21.09	19.61	9.66	0.10	Average
6	0.292	33.45	60.46	-27.01	23.69	9.66	0.10	QP
7*	0.437	34.69	47.11	-12.42	24.92	9.66	0.11	Average
8	0.437	38.23	57.11	-18.88	28.46	9.66	0.11	QP
9	3.207	21.83	46.00	-24.17	11.86	9.68	0.29	Average
10	3.207	29.44	56.00	-26.56	19.47	9.68	0.29	QP
11	24.922	25.85	50.00	-24.15	16.10	9.66	0.09	Average
12	24.922	31.11	60.00	-28.89	21.36	9.66	0.09	QP

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

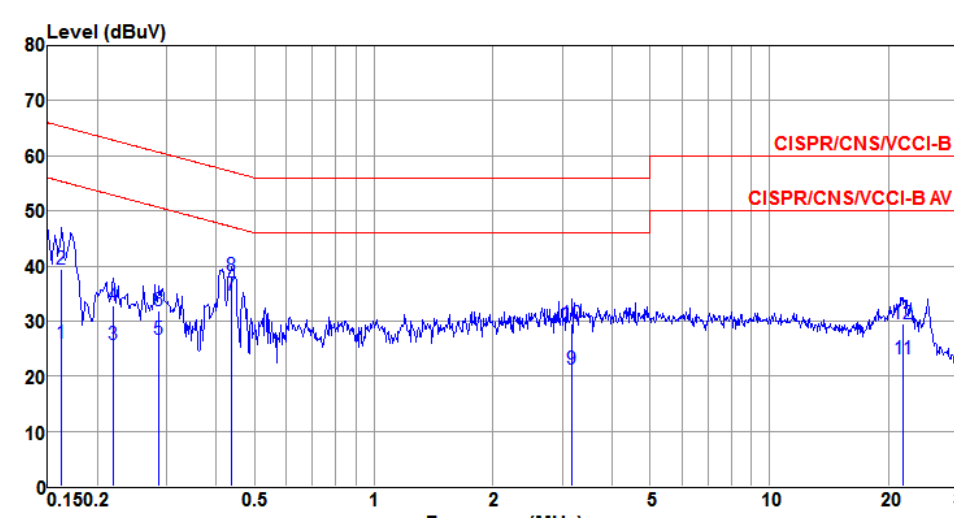
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Neutral		



	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.153	27.58	55.82	-28.24	17.83	9.67	0.08	Average
2	0.153	40.92	65.82	-24.90	31.17	9.67	0.08	QP
3	0.207	19.68	53.32	-33.64	9.93	9.66	0.09	Average
4	0.207	31.85	63.32	-31.47	22.10	9.66	0.09	QP
5	0.270	17.85	51.12	-33.27	8.09	9.66	0.10	Average
6	0.270	27.71	61.12	-33.41	17.95	9.66	0.10	QP
7*	0.433	30.12	47.20	-17.08	20.35	9.66	0.11	Average
8	0.433	36.05	57.20	-21.15	26.28	9.66	0.11	QP
9	3.207	21.60	46.00	-24.40	11.63	9.68	0.29	Average
10	3.207	31.52	56.00	-24.48	21.55	9.68	0.29	QP
11	22.063	22.56	50.00	-27.44	12.72	9.79	0.05	Average
12	22.063	29.42	60.00	-30.58	19.58	9.79	0.05	QP

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

Modulation	VHT20	Test Freq. (MHz)	5785
Power Phase	Line		

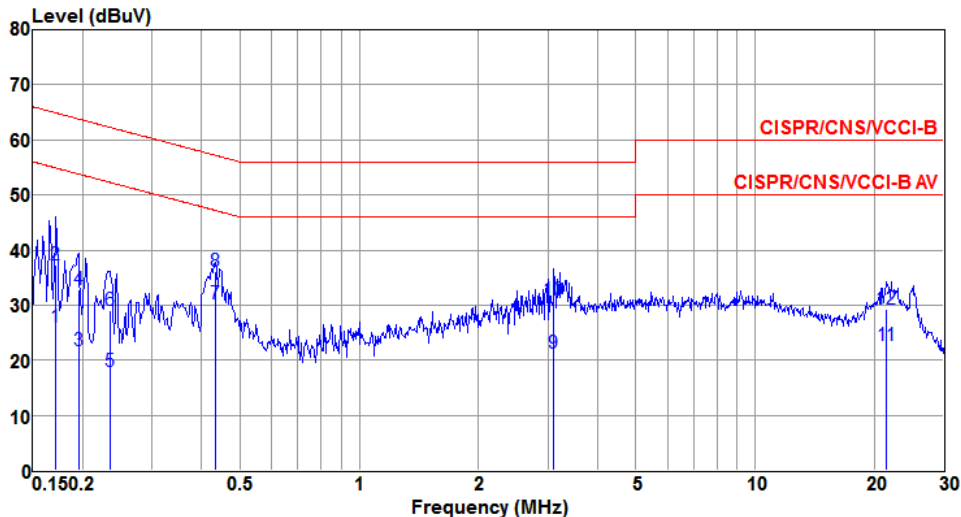


Freq	Level	Limit	Over	Read	LISN	cable	Remark	
MHz	dBuV	dBuV	Limit	Level	factor	loss		
			dB	dBuV	dB	dB		
1	0.162	26.08	55.34	-29.26	16.33	9.67	0.08	Average
2	0.162	39.45	65.34	-25.89	29.70	9.67	0.08	QP
3	0.220	25.68	52.83	-27.15	15.93	9.66	0.09	Average
4	0.220	32.92	62.83	-29.91	23.17	9.66	0.09	QP
5	0.286	26.63	50.63	-24.00	16.87	9.66	0.10	Average
6	0.286	31.94	60.63	-28.69	22.18	9.66	0.10	QP
7*	0.437	34.69	47.11	-12.42	24.92	9.66	0.11	Average
8	0.437	38.21	57.11	-18.90	28.44	9.66	0.11	QP
9	3.173	21.35	46.00	-24.65	11.38	9.68	0.29	Average
10	3.173	29.55	56.00	-26.45	19.58	9.68	0.29	QP
11	21.830	23.20	50.00	-26.80	13.46	9.69	0.05	Average
12	21.830	29.47	60.00	-30.53	19.73	9.69	0.05	QP

Note 1: Level (dBUV) = Read Level (dBUV) + LISN Factor (dB) + Cable Loss (dB).

2: Over Limit (dB) = Level (dBUV) – Limit Line (dBUV).

Modulation	VHT20	Test Freq. (MHz)	5785
Power Phase	Neutral		



The graph displays the measured electromagnetic interference level in dBuV across a frequency range from 0.150 to 30 MHz. Two red lines represent the CISPR/CNS/VCCI-B and CISPR/CNS/VCCI-B AV limits. The blue line shows the measured spectrum with several peaks labeled 1 through 12. The y-axis ranges from 0 to 80 dBuV, and the x-axis is logarithmic from 0.150 to 30 MHz.

	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.171	25.90	54.90	-29.00	16.15	9.67	0.08	Average
2	0.171	37.36	64.90	-27.54	27.61	9.67	0.08	QP
3	0.195	21.82	53.80	-31.98	12.07	9.66	0.09	Average
4	0.195	32.77	63.80	-31.03	23.02	9.66	0.09	QP
5	0.234	17.88	52.30	-34.42	8.13	9.66	0.09	Average
6	0.234	29.01	62.30	-33.29	19.26	9.66	0.09	QP
7*	0.433	30.12	47.20	-17.08	20.35	9.66	0.11	Average
8	0.433	36.01	57.20	-21.19	26.24	9.66	0.11	QP
9	3.107	21.32	46.00	-24.68	11.36	9.68	0.28	Average
10	3.107	30.92	56.00	-25.08	20.96	9.68	0.28	QP
11	21.486	22.55	50.00	-27.45	12.72	9.79	0.04	Average
12	21.486	29.19	60.00	-30.81	19.36	9.79	0.04	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.

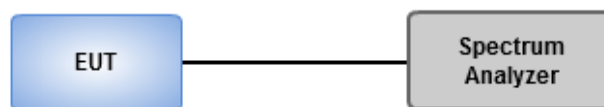
Occupied Bandwidth

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

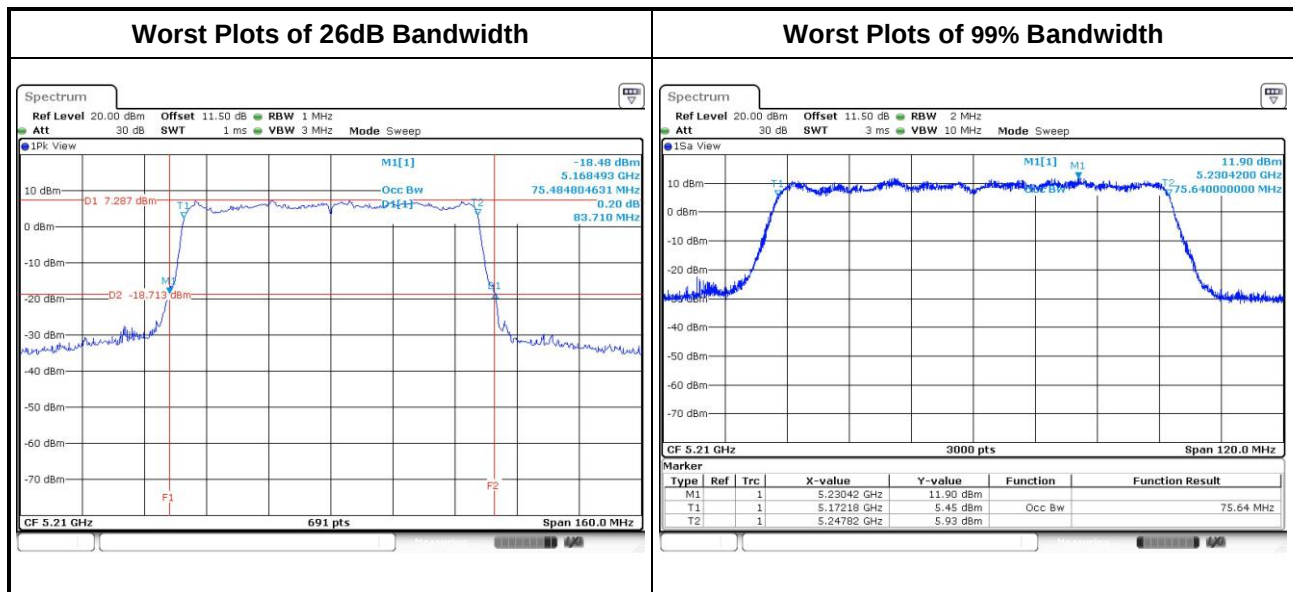
3.2.3 Test Setup



3.2.4 Test Result of Emission Bandwidth

Non-beamforming mode

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	4	5180	23.07	23.42	23.19	23.54	16.97	16.79	16.94	16.90
11a	4	5200	23.01	23.54	23.30	23.59	16.94	16.81	16.95	16.94
11a	4	5240	23.07	23.54	23.25	23.59	16.95	16.84	17.00	16.89
VHT20	4	5180	25.10	25.10	23.94	24.06	18.00	17.97	18.17	18.18
VHT20	4	5200	25.28	25.16	24.00	24.06	18.00	18.02	18.17	18.18
VHT20	4	5240	25.16	25.16	24.12	23.77	18.00	18.02	18.20	18.19
VHT40	4	5190	44.29	44.41	44.17	44.41	37.16	36.88	37.04	36.72
VHT40	4	5230	75.65	58.44	61.30	74.87	37.42	37.02	37.42	36.98
VHT80	4	5210	83.48	81.39	83.71	83.01	75.52	75.32	75.64	75.64

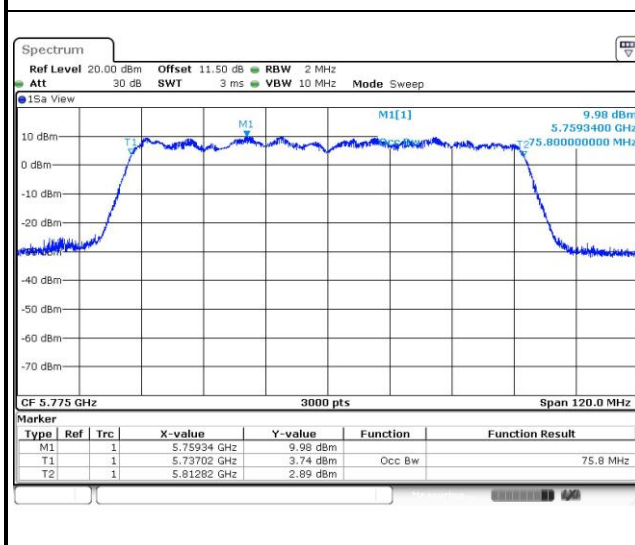


For Frequency band 5725-5850 MHz

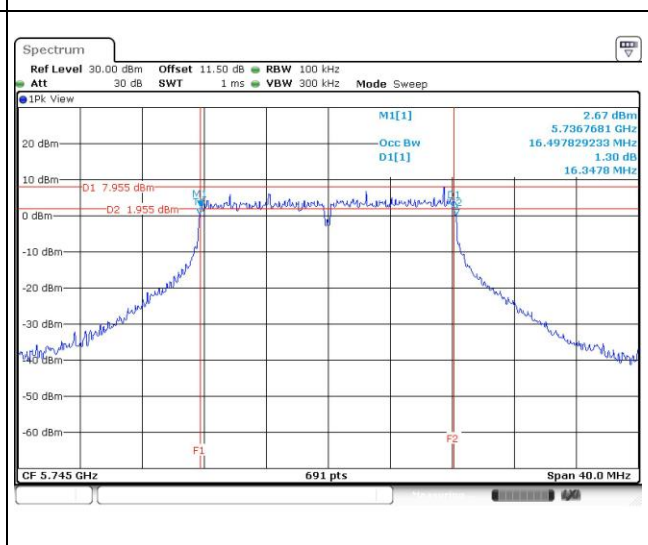
Emission Bandwidth

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	4	5745	16.94	16.84	17.04	16.89	16.35	16.35	16.35	16.35	0.5
11a	4	5785	16.93	16.92	17.11	16.93	16.35	16.46	16.35	16.35	0.5
11a	4	5825	16.91	16.99	17.16	16.94	16.35	16.35	16.35	16.35	0.5
VHT20	4	5745	17.99	17.99	18.19	18.19	17.62	17.62	17.62	17.62	0.5
VHT20	4	5785	18.02	18.06	18.27	18.26	17.62	17.62	17.57	17.62	0.5
VHT20	4	5825	17.98	18.13	18.22	18.20	17.62	17.62	17.62	17.62	0.5
VHT40	4	5755	37.16	36.82	37.00	36.76	36.29	36.29	36.29	36.29	0.5
VHT40	4	5795	37.06	36.98	36.92	36.92	36.41	36.06	36.29	36.41	0.5
VHT80	4	5775	75.52	75.32	75.52	75.80	75.13	75.13	75.13	75.13	0.5

Worst Plots of 99% Bandwidth

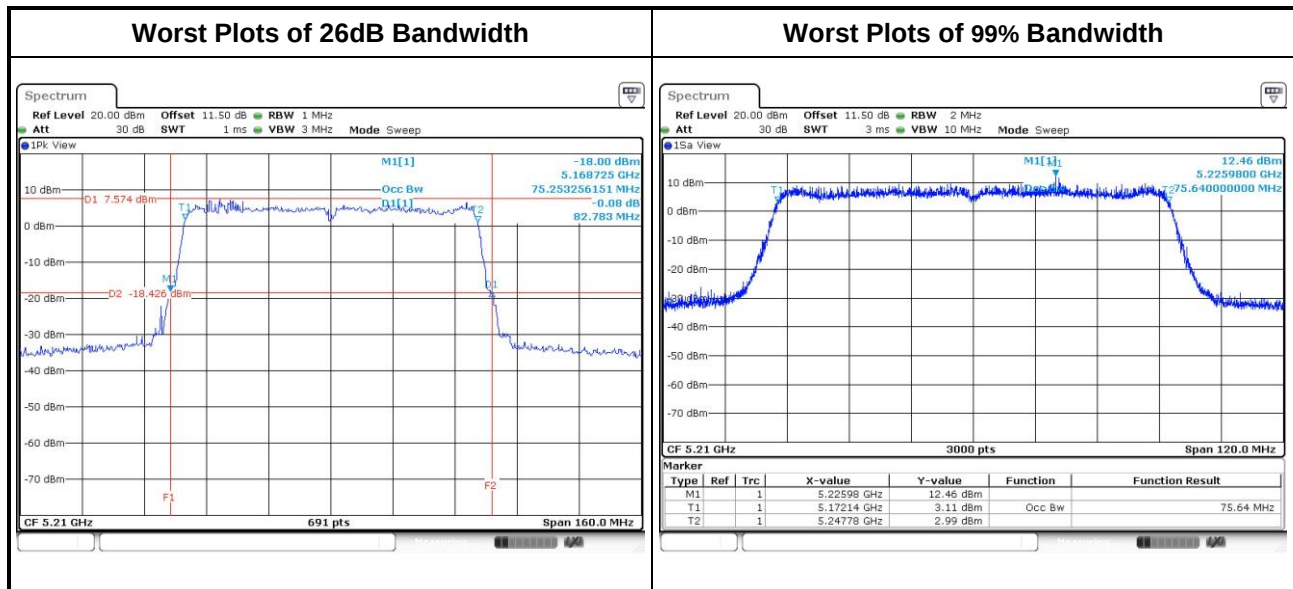


Worst Plots of 6dB Bandwidth



Beamforming mode

For Frequency band 5150-5250 MHz										
Emission Bandwidth										
Mode	N _{TX}	Freq. (MHz)	26dB Bandwidth (MHz)				99% Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
VHT20	4	5180	24.75	24.64	24.52	24.75	18.16	18.17	18.19	18.17
VHT20	4	5200	24.46	24.70	24.23	25.04	18.18	18.16	18.18	18.19
VHT20	4	5240	24.75	24.46	24.41	26.49	18.21	18.20	18.19	18.21
VHT40	4	5190	44.52	43.94	44.41	43.71	36.96	36.92	36.90	36.88
VHT40	4	5230	44.75	44.17	43.71	43.83	36.94	36.86	36.96	37.04
VHT80	4	5210	82.55	82.09	81.39	82.78	75.64	75.60	75.32	75.48

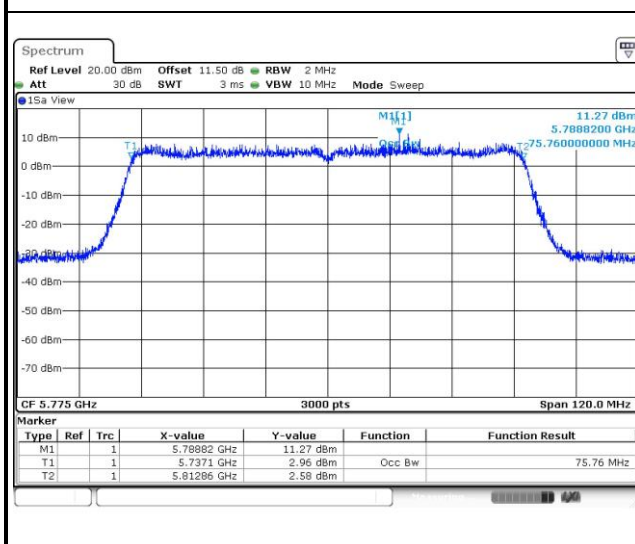


For Frequency band 5725-5850 MHz

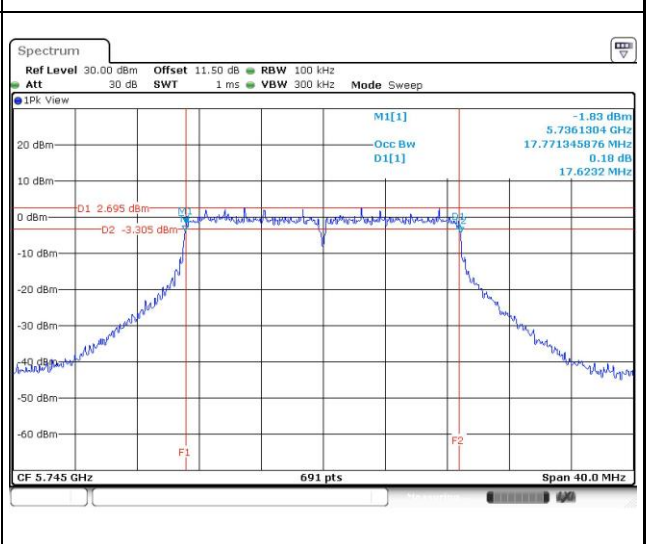
Emission Bandwidth

Mode	N _{TX}	Freq. (MHz)	OBW Bandwidth (MHz)				6dB Bandwidth (MHz)				
			Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	6dB BW Limit (MHz)
VHT20	4	5745	18.20	18.18	18.19	18.18	17.62	17.62	17.62	17.62	0.5
VHT20	4	5785	18.20	18.24	18.25	18.23	17.62	17.62	17.62	17.62	0.5
VHT20	4	5825	18.20	18.18	18.18	18.17	17.62	17.62	17.68	17.62	0.5
VHT40	4	5755	36.94	36.86	36.96	37.14	36.41	36.52	36.29	35.83	0.5
VHT40	4	5795	37.04	37.06	37.08	37.18	35.71	36.17	36.06	35.71	0.5
VHT80	4	5775	75.44	75.64	75.76	75.64	75.13	75.13	71.42	73.97	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
☐	Mobile and portable client devices	Conducted Power: 250 mW

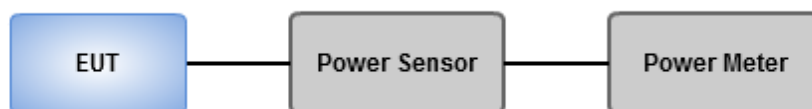
Frequency Band (MHz)	Limit
☐ 5250 ~ 5350	250mW or 11dBm+10 log B
☐ 5470 ~ 5725	250mW or 11dBm+10 log B
☒ 5725 ~ 5850	1 W

Note: "B" is the 26dB emission bandwidth in MHz.

3.3.2 Test Procedures

- ☒ **Method PM-G (Measurement using a gated RF average power meter)**
 - ☒ Measurements 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

Non-beamforming mode

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	4	5180	21.34	21.49	21.52	21.93	574.934	27.60	30.00
11a	4	5200	20.86	20.99	20.62	21.38	500.251	26.99	30.00
11a	4	5240	20.69	20.66	21.03	21.21	492.527	26.92	30.00
HT20	4	5180	21.38	21.42	21.35	21.72	561.132	27.49	30.00
HT20	4	5200	21.14	20.75	21.06	21.32	512.030	27.09	30.00
HT20	4	5240	20.91	20.72	20.81	21.12	491.266	26.91	30.00
HT40	4	5190	20.76	20.45	20.72	20.86	469.973	26.72	30.00
HT40	4	5230	23.69	23.74	23.76	23.75	945.297	29.76	30.00
VHT20	4	5180	21.49	21.53	21.43	21.86	575.619	27.60	30.00
VHT20	4	5200	21.25	20.89	21.13	21.44	525.130	27.20	30.00
VHT20	4	5240	21.03	20.88	20.96	21.26	507.625	27.06	30.00
VHT40	4	5190	20.88	20.56	20.83	21.09	485.813	26.86	30.00
VHT40	4	5230	23.83	23.87	23.88	23.89	974.577	29.89	30.00
VHT80	4	5210	16.03	15.65	16.16	16.03	158.206	21.99	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	4	5745	19.33	19.79	20.06	18.39	351.399	25.46	30.00
11a	4	5785	22.09	22.43	22.53	21.06	643.497	28.09	30.00
11a	4	5825	21.88	22.43	22.39	20.69	619.755	27.92	30.00
HT20	4	5745	17.54	17.91	18.21	16.94	234.209	23.70	30.00
HT20	4	5785	21.85	22.24	22.53	20.91	622.974	27.94	30.00
HT20	4	5825	20.92	21.85	21.46	19.85	513.267	27.10	30.00
HT40	4	5755	14.23	14.45	14.75	13.21	105.141	20.22	30.00
HT40	4	5795	21.68	22.24	22.35	20.64	602.394	27.80	30.00
VHT20	4	5745	17.68	18.02	18.32	17.02	240.271	23.81	30.00
VHT20	4	5785	21.96	22.36	22.65	21.03	640.066	28.06	30.00
VHT20	4	5825	21.02	21.96	21.59	19.96	526.805	27.22	30.00
VHT40	4	5755	14.35	14.51	14.89	13.32	107.786	20.33	30.00
VHT40	4	5795	21.80	22.31	22.46	20.73	616.074	27.90	30.00
VHT80	4	5775	14.62	15.42	15.39	15.31	132.364	21.22	30.00

Beamforming mode

For Frequency band 5150-5250 MHz									
Mode	N _{TX}	Freq. (MHz)	Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
VHT20	4	5180	20.71	19.42	19.33	19.43	378.663	25.78	28.06
VHT20	4	5200	20.67	20.06	20.55	20.51	444.034	26.47	28.06
VHT20	4	5240	20.88	20.89	21	21.3	505.994	27.04	28.06
VHT40	4	5190	18.11	17.68	17.49	17.79	239.550	23.79	28.06
VHT40	4	5230	22.29	21.78	21.66	21.85	619.758	27.92	28.06
VHT80	4	5210	14.89	13.99	14.16	14.46	109.880	20.41	28.06

Note:

- Directional gain = $1.92 + 10 \cdot \log(4/1) = 7.94 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $30 \text{ dBm} - (7.94 \text{ dBi} - 6 \text{ dBi}) = 28.06 \text{ dBm}$.

For Frequency band 5725-5850 MHz									
Mode	N _{TX}	Freq. (MHz)	Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
VHT20	4	5745	14.83	15.99	15.92	15.53	144.939	21.61	28.06
VHT20	4	5785	21.05	22.52	22.49	21.66	629.973	27.99	28.06
VHT20	4	5825	18.09	19.58	19.56	19.22	329.124	25.17	28.06
VHT40	4	5755	11.21	12.36	12.11	11.39	60.459	17.81	28.06
VHT40	4	5795	18.21	19.78	19.63	19.14	335.151	25.25	28.06
VHT80	4	5775	12.01	13.49	13.52	12.66	79.162	18.99	28.06

Note:

- Directional gain = $1.92 + 10 \cdot \log(4/1) = 7.94 \text{ dBi} > 6 \text{ dBi}$.
Limit shall be reduced to $30 \text{ dBm} - (7.94 \text{ dBi} - 6 \text{ dBi}) = 28.06 \text{ dBm}$.

3.4 Peak Power Spectral Density

3.4.1 Limit of Peak Power Spectral Density

Frequency band 5150-5250 MHz		
Operating Mode		Limit
☐	Outdoor access point	17 dBm / MHz
☒	Indoor access point	17 dBm / MHz
☐	Fixed point-to-point access points	17 dBm / MHz
☐	Mobile and portable client devices	11 dBm / MHz

Frequency Band (MHz)		Limit
☐	5250 ~ 5350	11 dBm / MHz
☐	5470 ~ 5725	11 dBm / MHz
☒	5725 ~ 5850	30 dBm / 500 kHz

3.4.2 Test Procedures

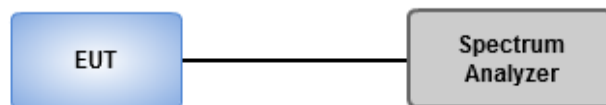
For 5150 ~ 5250 MHz

- ☒ Method SA-1 (Non- Beamforming: 802.11a/VHT20/VHT40 / Beamforming: 11ac VHT20/VHT40)
 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 (Non- Beamforming: VHT80 / Beamforming: 11ac VHT80)
 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 (Non- Beamforming: 802.11a/VHT20/VHT40 / Beamforming: 11ac VHT20/VHT40)
 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 (Non- Beamforming: VHT80 / Beamforming: 11ac VHT80)
 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



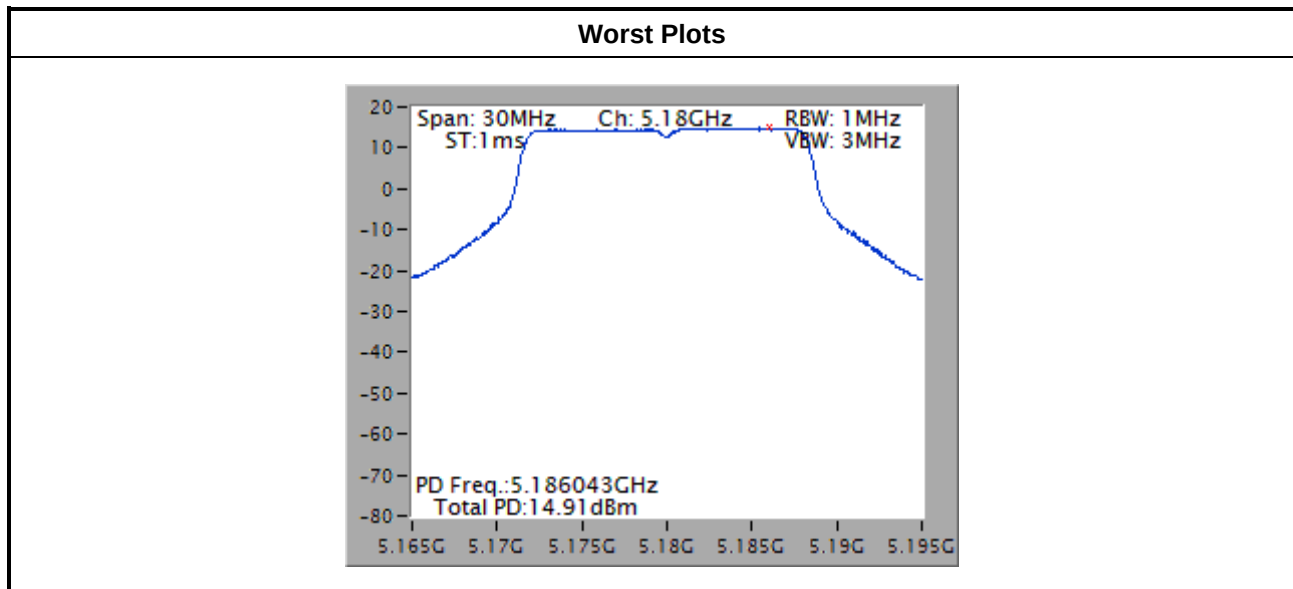
3.4.4 Test Result of Peak Power Spectral Density

Non-beamforming mode

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	4	5180	14.91	0.00	14.91	15.06
11a	4	5200	14.90	0.00	14.90	15.06
11a	4	5240	14.71	0.00	14.71	15.06
VHT20	4	5180	14.50	0.00	14.50	15.06
VHT20	4	5200	14.58	0.00	14.58	15.06
VHT20	4	5240	14.33	0.00	14.33	15.06
VHT40	4	5190	10.54	0.00	10.54	15.06
VHT40	4	5230	13.95	0.00	13.95	15.06
VHT80	4	5210	2.84	0.15	2.99	15.06

Note:

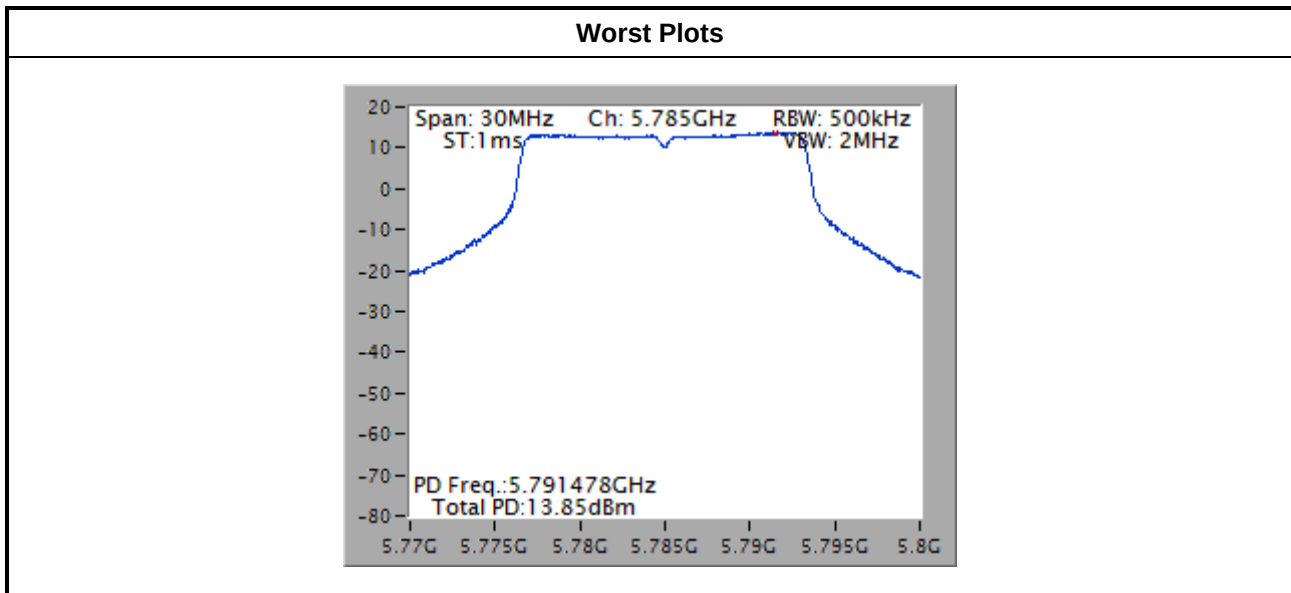
1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $1.92 + 10 \cdot \log(4/1) = 7.94$ dBi
Limit shall be reduced to 17 dBm – (7.94 dBi – 6 dBi) = 15.06 dBm.



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	4	5745	11.09	0.00	11.09	28.06
11a	4	5785	13.85	0.00	13.85	28.06
11a	4	5825	13.45	0.00	13.45	28.06
VHT20	4	5745	9.00	0.00	9.00	28.06
VHT20	4	5785	13.59	0.00	13.59	28.06
VHT20	4	5825	12.72	0.00	12.72	28.06
VHT40	4	5755	2.48	0.00	2.48	28.06
VHT40	4	5795	10.33	0.00	10.33	28.06
VHT80	4	5775	0.42	0.15	0.57	28.06

Note:

1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $1.92 + 10 \cdot \log(4/1) = 7.94$ dBi
Limit shall be reduced to 30 dBm – (7.94 dBi – 6 dBi) = 28.06 dBm.

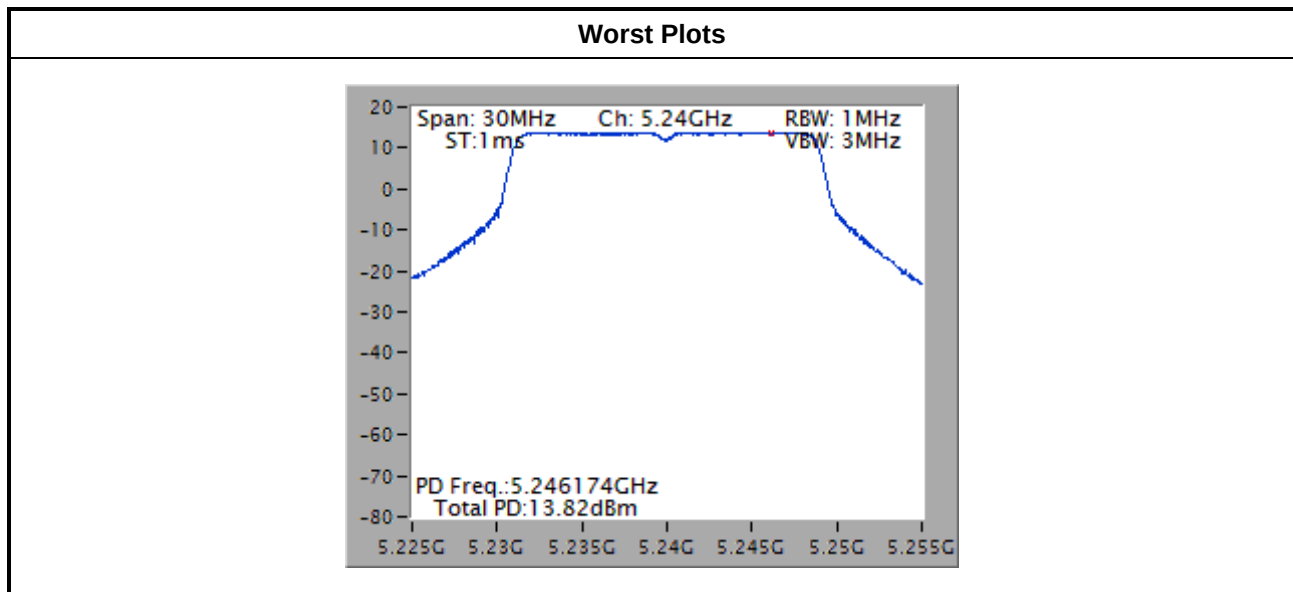


Beamforming mode

For Frequency band 5150-5250 MHz						
Condition			Peak Power Spectral Density (dBm/MHz)			
Modulation Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/MHz)	Duty Factor (dB)	PPSD with D.F (dBm/MHz)	PPSD Limit (dBm/MHz)
VHT20	4	5180	12.09	0.00	12.09	15.06
VHT20	4	5200	13.02	0.00	13.02	15.06
VHT20	4	5240	13.82	0.00	13.82	15.06
VHT40	4	5190	7.30	0.00	7.30	15.06
VHT40	4	5230	11.74	0.00	11.74	15.06
VHT80	4	5210	0.97	0.11	1.08	15.06

Note:

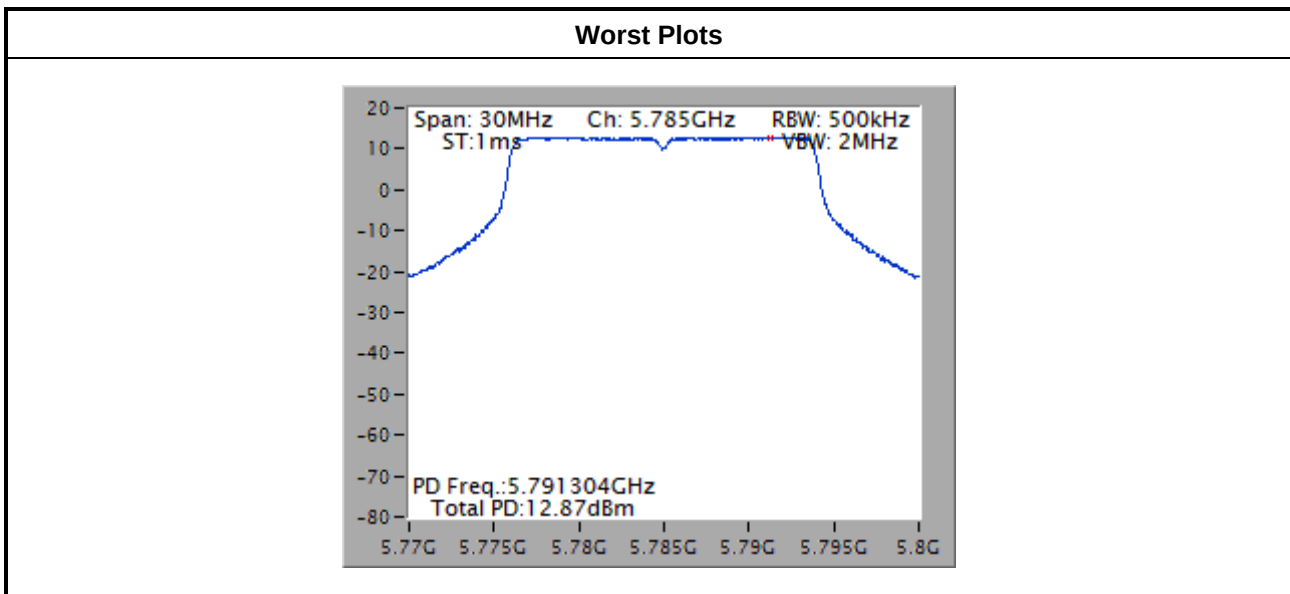
1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $1.92 + 10 \cdot \log(4/1) = 7.94$ dBi
Limit shall be reduced to 17 dBm – (7.94 dBi – 6 dBi) = 15.06 dBm.



For Frequency band 5725-5850 MHz						
Condition			Peak Power Spectral Density (dBm/500kHz)			
Modulation Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/500kHz)	Duty Factor (dB)	PPSD with D.F (dBm/500kHz)	PPSD Limit (dBm/500kHz)
VHT20	4	5745	6.71	0.00	6.71	28.06
VHT20	4	5785	12.87	0.00	12.87	28.06
VHT20	4	5825	10.24	0.00	10.24	28.06
VHT40	4	5755	-0.30	0.00	-0.30	28.06
VHT40	4	5795	7.35	0.00	7.35	28.06
VHT80	4	5775	-2.40	0.11	-2.29	28.06

Note:

1. D.F is duty factor.
2. Test result is bin-by-bin summing measured value of each TX port.
3. Directional gain = $1.92 + 10 \cdot \log(4/1) = 7.94$ dBi
Limit shall be reduced to 30 dBm – (7.94 dBi – 6 dBi) = 28.06 dBm.



3.5 Transmitter Radiated and Band Edge Emissions

3.5.1 Limit of Transmitter Radiated and Band Edge Emissions

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

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

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

Un-restricted band emissions above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.850 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.85 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

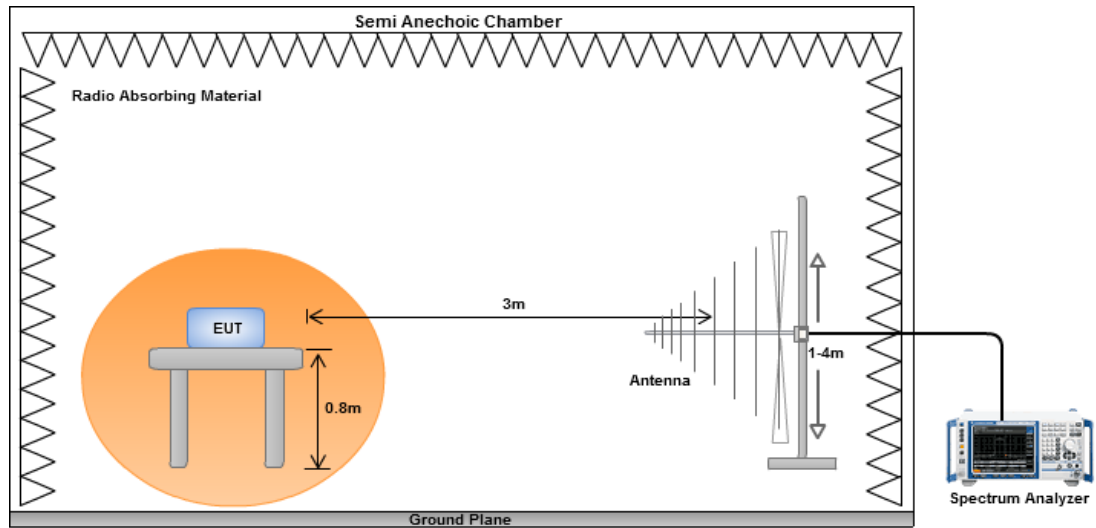
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

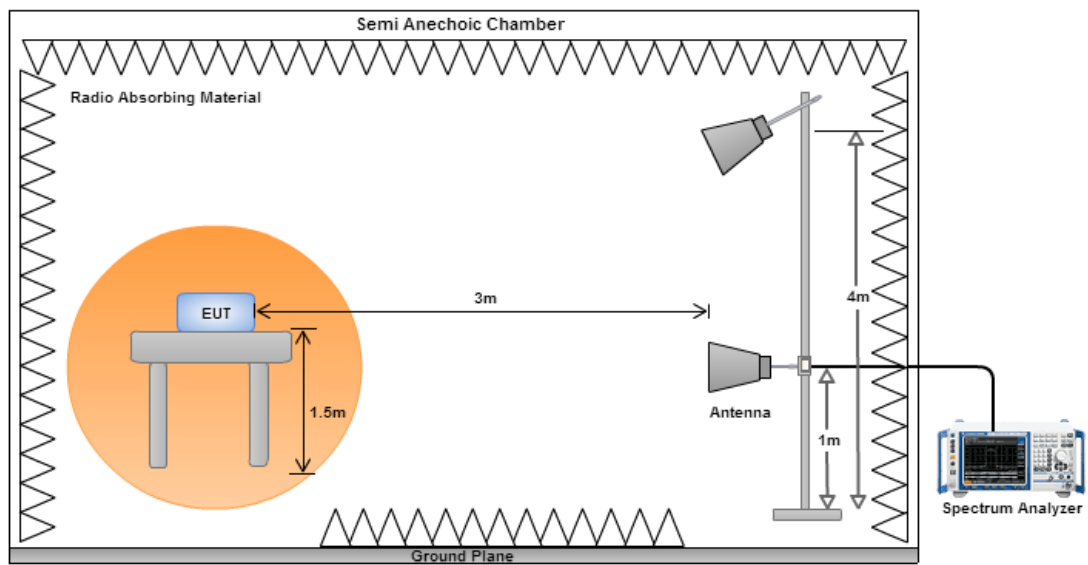
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



Non- beamforming mode

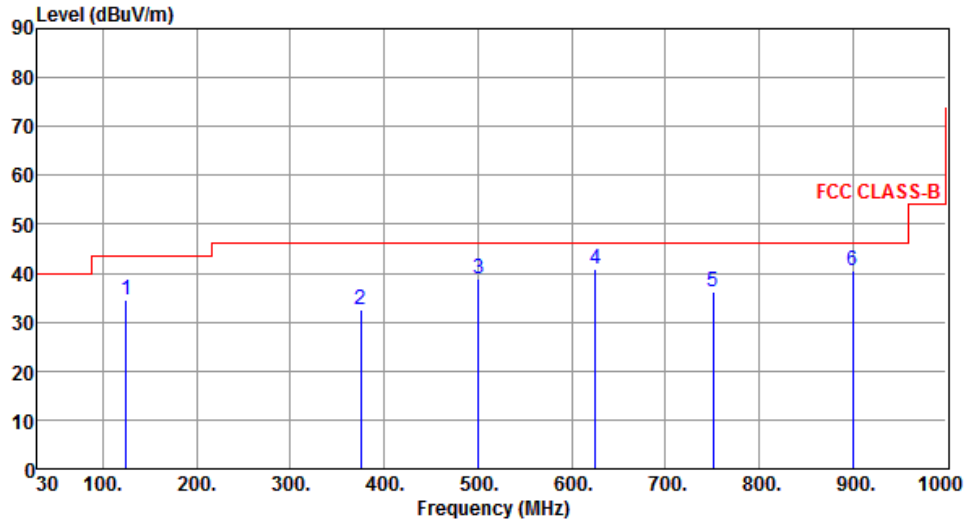
3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

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

Modulation	11a	Test Freq. (MHz)	5785
Polarization	Horizontal		
Level (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	125.06	34.49	43.50	-9.01	49.59	-15.10	Peak	---	---
2	375.32	32.46	46.00	-13.54	43.19	-10.73	Peak	---	---
3	500.45	38.72	46.00	-7.28	46.36	-7.64	Peak	---	---
4	625.58	40.70	46.00	-5.30	46.02	-5.32	Peak	---	---
5	750.71	36.31	46.00	-9.69	39.49	-3.18	Peak	---	---
6	900.09	40.62	46.00	-5.38	41.29	-0.67	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.

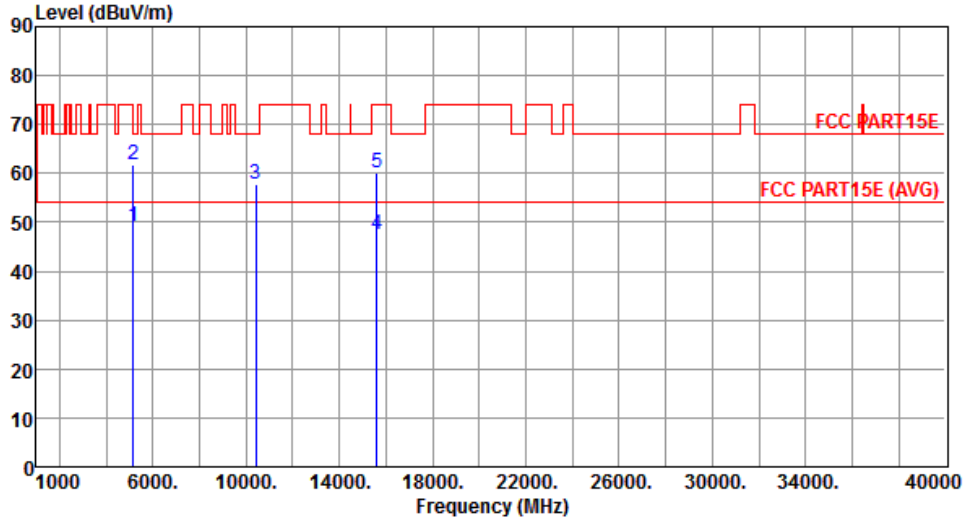
3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11a

Modulation	11a	Test Freq. (MHz)	5180
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation	11a	Test Freq. (MHz)	5180
Polarization	Vertical		
Level (dBuV/m)			

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

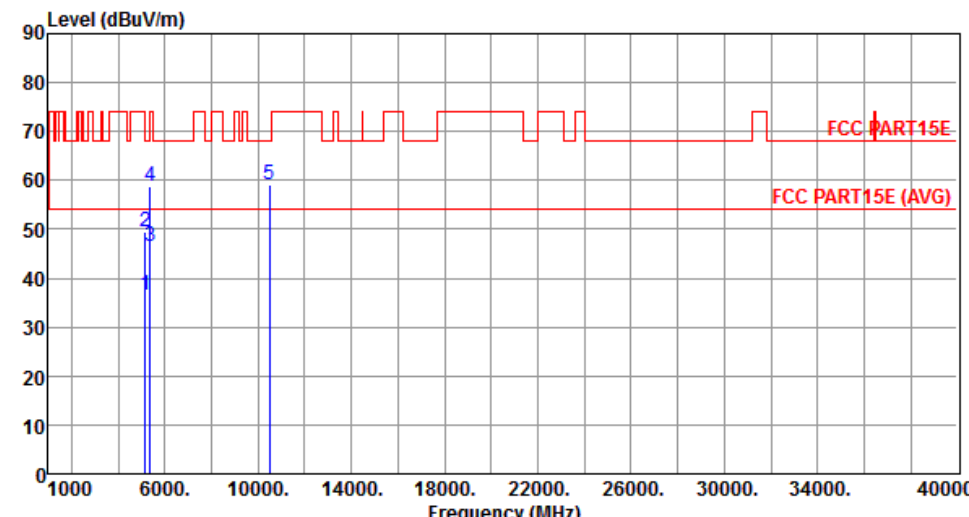
Modulation	11a	Test Freq. (MHz)	5200
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	49.25	54.00	-4.75	42.67	6.58	Average	209	302
2	5150.00	61.68	74.00	-12.32	55.10	6.58	Peak	209	302
3	10400.00	57.76	68.20	-10.44	41.27	16.49	Peak	199	328
4	15600.00	47.62	54.00	-6.38	29.89	17.73	Average	209	295
5	15600.00	59.99	74.00	-14.01	42.26	17.73	Peak	209	295

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).

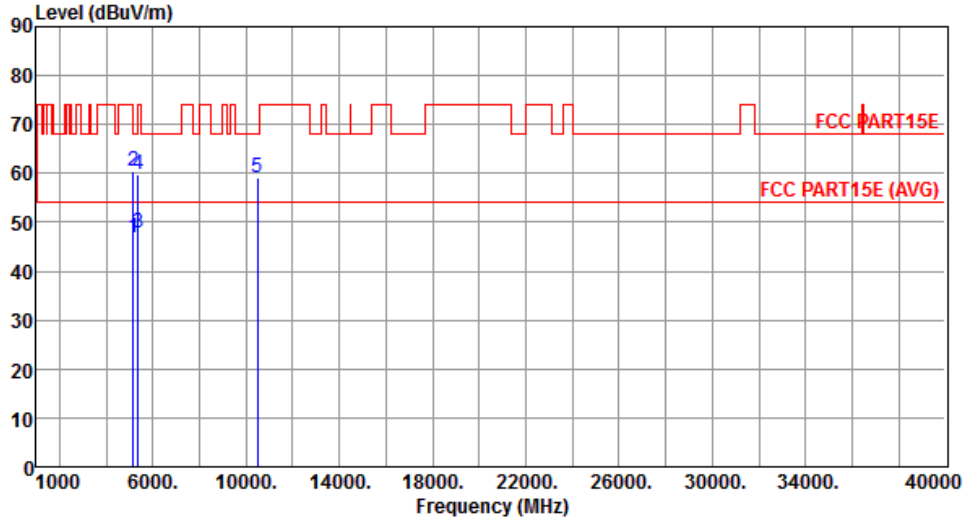
Modulation	11a	Test Freq. (MHz)	5240
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	36.69	54.00	-17.31	30.11	6.58	Average	154	330
2	5150.00	49.48	74.00	-24.52	42.90	6.58	Peak	154	330
3	5350.00	46.35	54.00	-7.65	39.32	7.03	Average	154	330
4	5350.00	58.65	74.00	-15.35	51.62	7.03	Peak	154	330
5	10480.00	58.96	68.20	-9.24	42.30	16.66	Peak	185	63

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)	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	5150.00	46.85	54.00	-7.15	40.27	6.58	Average	209	310
2	5150.00	60.38	74.00	-13.62	53.80	6.58	Peak	209	310
3	5350.00	47.69	54.00	-6.31	40.66	7.03	Average	209	310
4	5350.00	59.72	74.00	-14.28	52.69	7.03	Peak	209	310
5	10480.00	59.25	68.20	-8.95	42.59	16.66	Peak	192	302

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

Modulation	11a	Test Freq. (MHz)	5745
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5745
Polarization	Vertical		
Level (dBuV/m) </			

Modulation	11a	Test Freq. (MHz)	5785
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	11a	Test Freq. (MHz)	5785
Polarization	Vertical		
Level (dBuV/m)			

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

Modulation	11a	Test Freq. (MHz)	5825
Polarization	Vertical		
Level (dBuV/m) <			

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

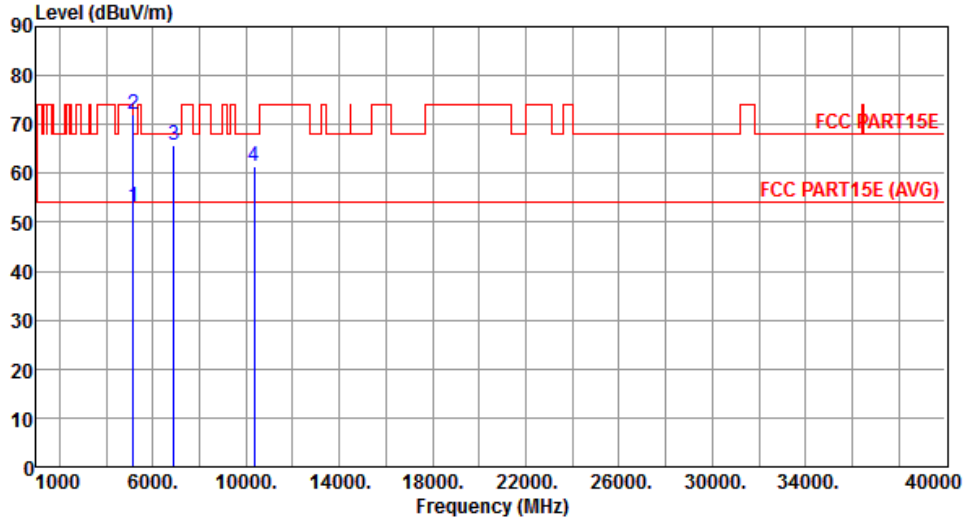
*Factor includes antenna factor , cable loss and amplifier gain

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

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

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

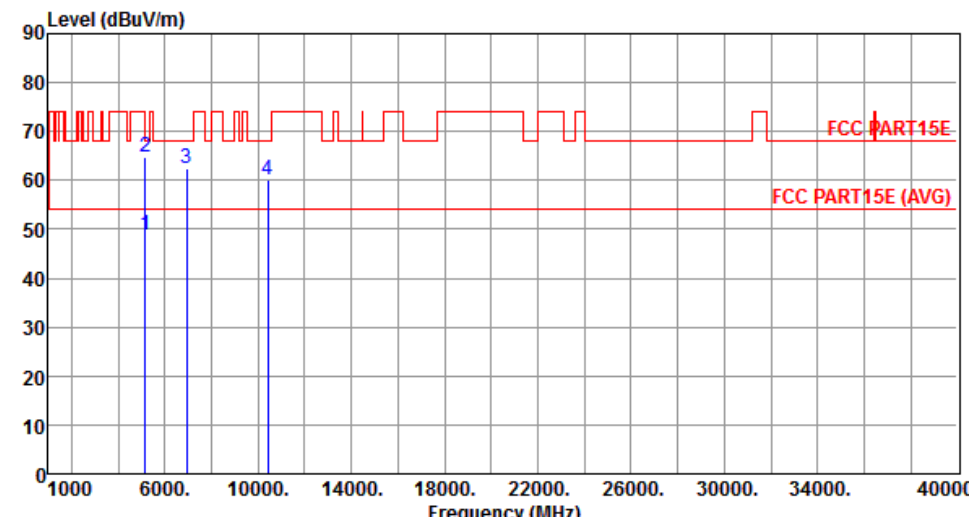
Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.00	54.00	-1.00	46.42	6.58	Average	150	297
2	5150.00	71.92	74.00	-2.08	65.34	6.58	Peak	150	297
3	6906.00	65.80	68.20	-2.40	55.72	10.08	Peak	189	266
4	10360.00	61.46	68.20	-6.74	45.05	16.41	Peak	154	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).

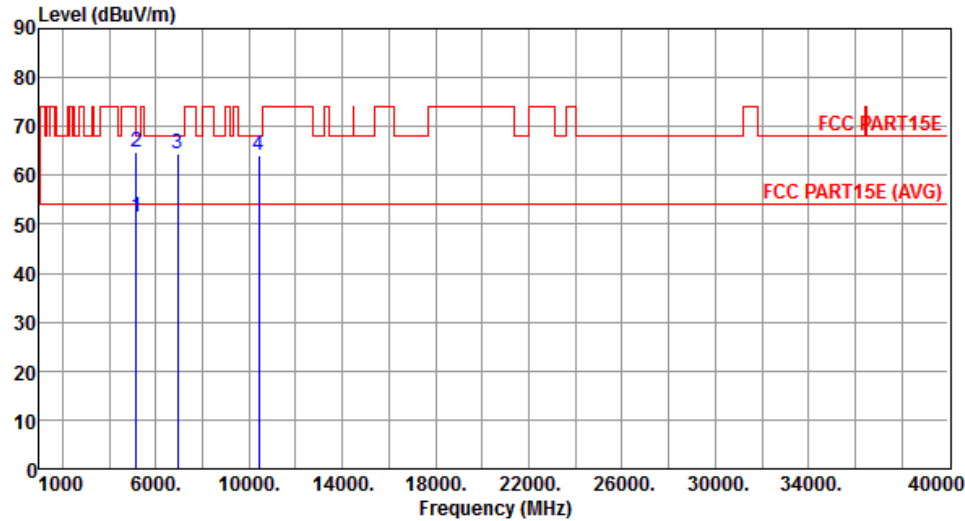
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	48.73	54.00	-5.27	42.15	6.58	Average	170	111
2	5150.00	64.66	74.00	-9.34	58.08	6.58	Peak	170	111
3	6933.00	62.43	68.20	-5.77	52.30	10.13	Peak	306	331
4	10400.00	60.25	68.20	-7.95	43.76	16.49	Peak	155	8

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

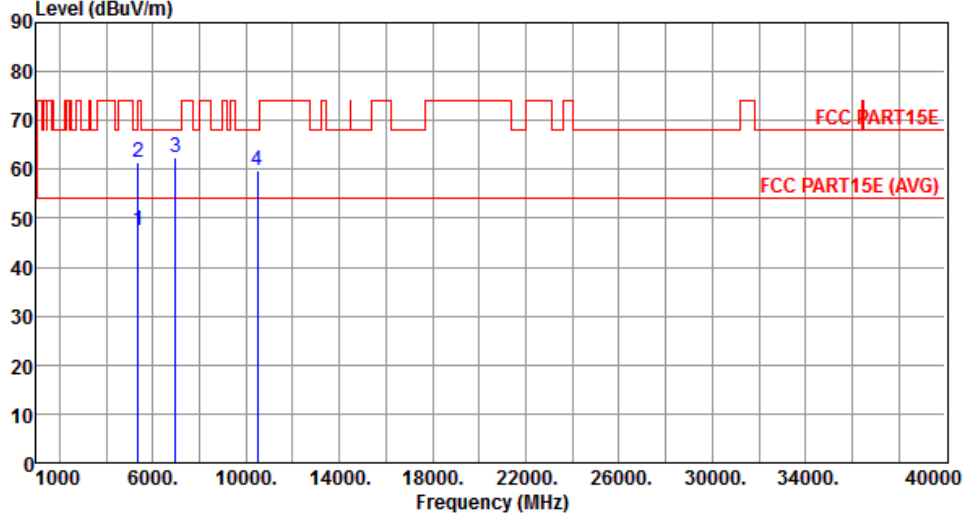
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	51.64	54.00	-2.36	45.06	6.58	Average	159	287
2	5150.00	64.80	74.00	-9.20	58.22	6.58	Peak	159	287
3	6933.00	64.54	68.20	-3.66	54.41	10.13	Peak	190	334
4	10400.00	64.26	68.20	-3.94	47.77	16.49	Peak	156	11

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

Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Horizontal		



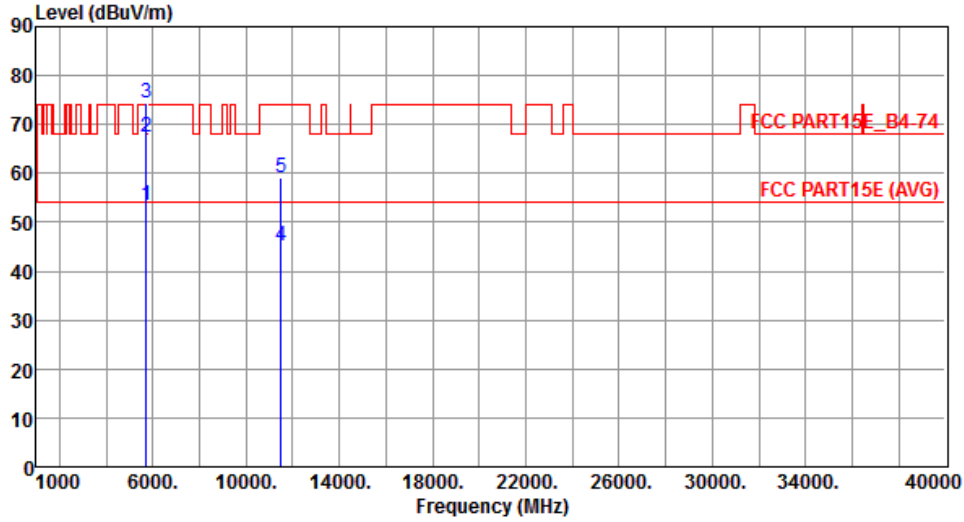
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	47.62	54.00	-6.38	40.59	7.03	Average	150	195
2	5350.00	61.43	74.00	-12.57	54.40	7.03	Peak	150	195
3	6986.00	62.44	68.20	-5.76	52.22	10.22	Peak	306	320
4	10480.00	59.86	68.20	-8.34	43.20	16.66	Peak	151	4

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		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Horizontal		
Level (dBuV/m)			

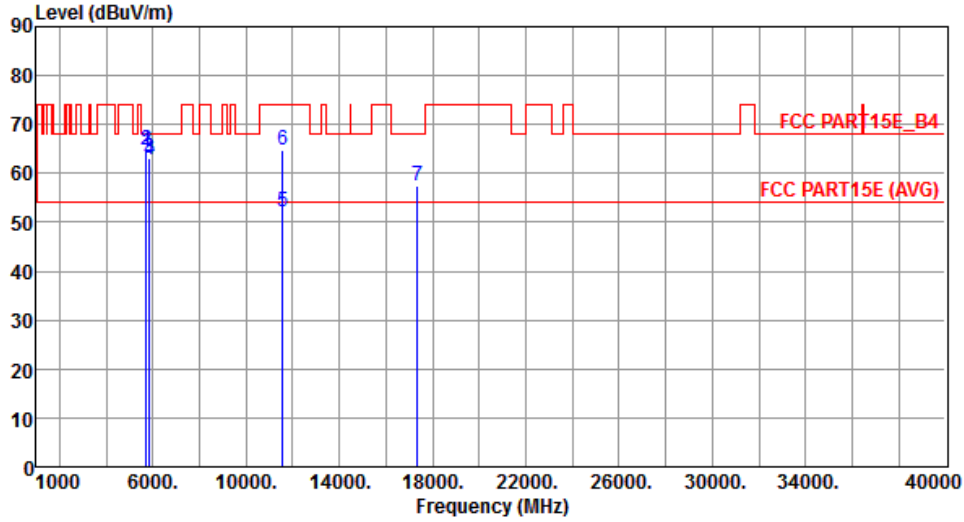
Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Vertical		



	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	53.30	54.00	-0.70	45.77	7.53	Average	206	306
2	5715.00	67.40	74.00	-6.60	59.87	7.53	Peak	206	306
3	5725.00	74.53	78.20	-3.67	66.96	7.57	Peak	180	38
4	11490.00	45.12	54.00	-8.88	27.85	17.27	Average	213	334
5	11490.00	59.18	74.00	-14.82	41.91	17.27	Peak	213	334

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

Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Horizontal		



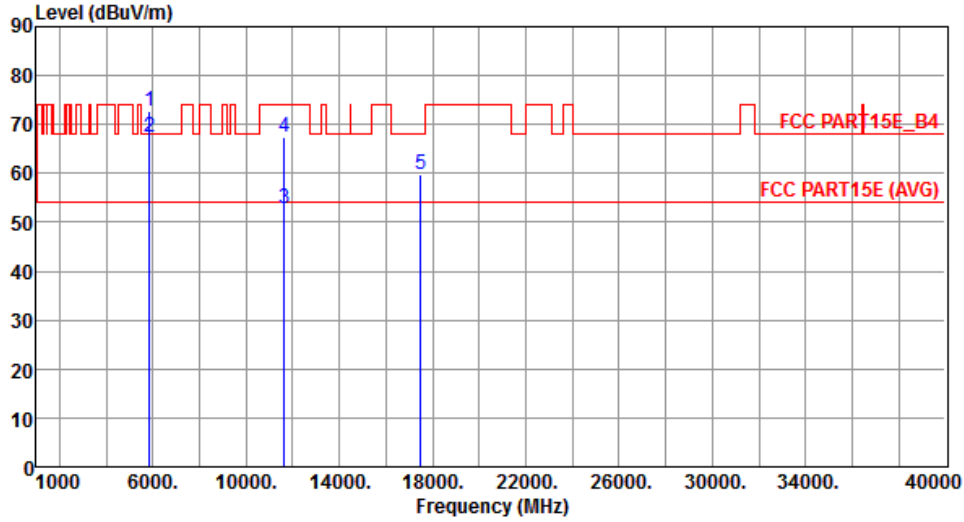
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	64.38	68.20	-3.82	56.85	7.53	Peak	215	264
2	5725.00	64.76	78.20	-13.44	57.19	7.57	Peak	222	257
3	5850.00	63.05	78.20	-15.15	55.16	7.89	Peak	224	261
4	5860.00	62.63	68.20	-5.57	54.72	7.91	Peak	238	241
5	11570.00	52.12	54.00	-1.88	34.94	17.18	Average	150	132
6	11570.00	64.72	74.00	-9.28	47.54	17.18	Peak	150	132
7	17355.00	57.49	68.20	-10.71	38.27	19.22	Peak	212	261

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

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

Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Horizontal		
 </			

Modulation	VHT20	Test Freq. (MHz)	5825
Polarization	Vertical		



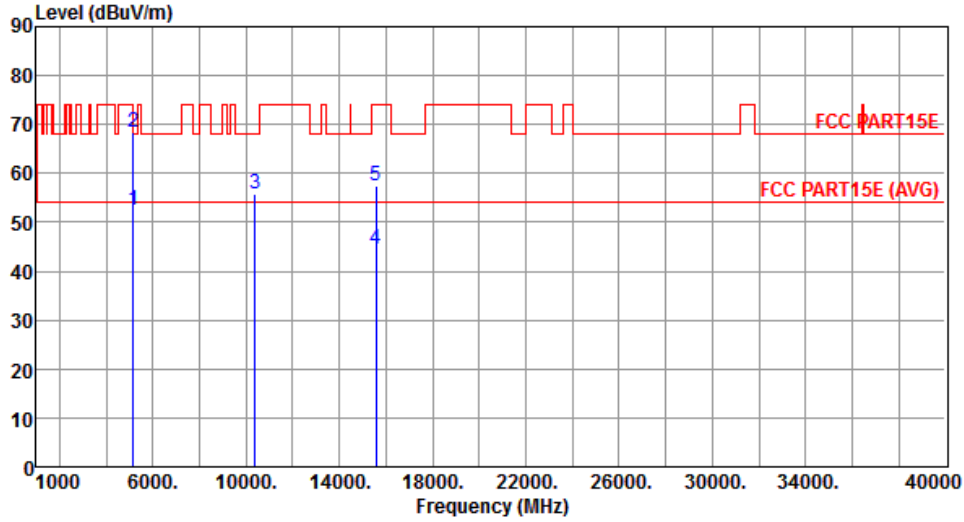
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5850.00	72.59	78.20	-5.61	64.70	7.89	Peak	150	326
2	5860.00	67.33	68.20	-0.87	59.42	7.91	Peak	150	318
3	11650.00	52.93	54.00	-1.07	35.86	17.07	Average	150	335
4	11650.00	67.28	74.00	-6.72	50.21	17.07	Peak	150	335
5	17475.00	59.91	68.20	-8.29	40.54	19.37	Peak	189	166

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		

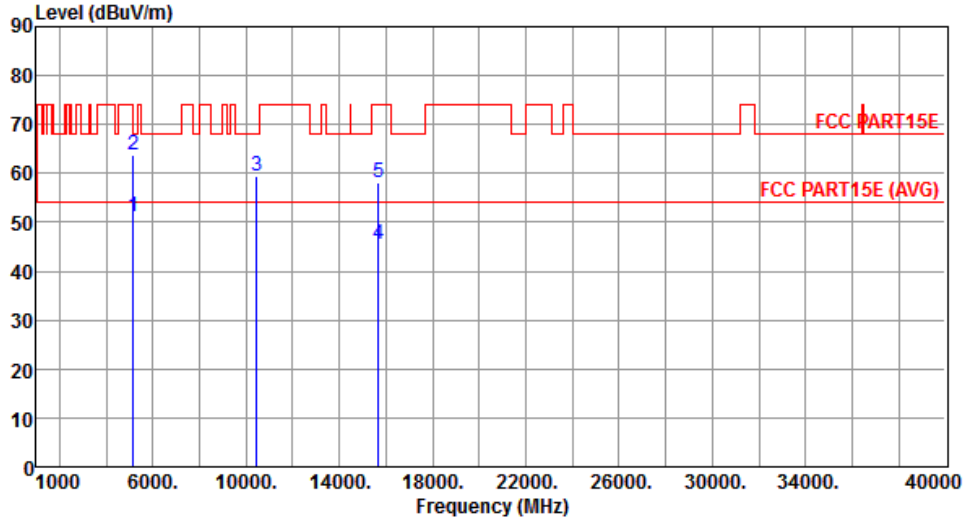


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	52.58	54.00	-1.42	46.00	6.58	Average	185	11
2	5150.00	68.38	74.00	-5.62	61.80	6.58	Peak	185	11
3	10380.00	55.89	68.20	-12.31	39.45	16.44	Peak	166	349
4	15570.00	44.46	54.00	-9.54	26.64	17.82	Average	280	165
5	15570.00	57.57	74.00	-16.43	39.75	17.82	Peak	280	165

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		
Level (dBuV/m)			

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		

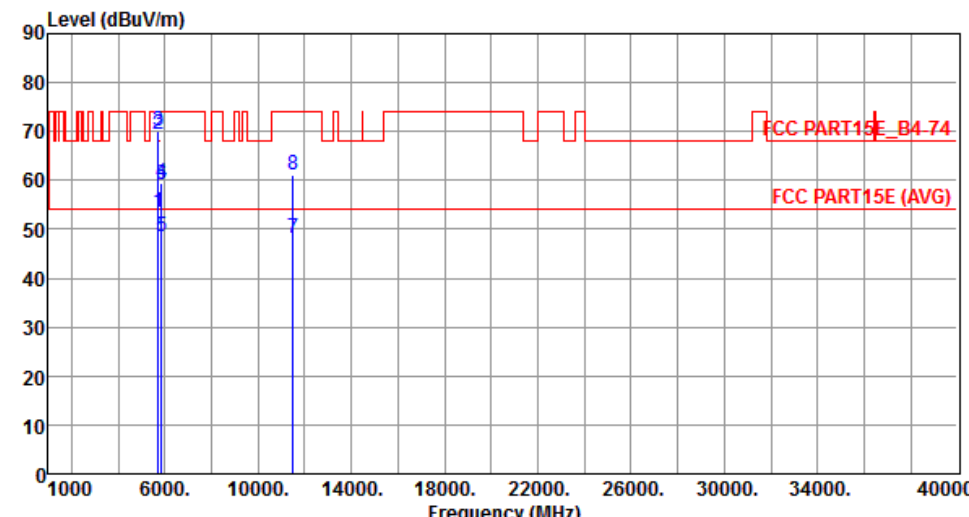


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	51.24	54.00	-2.76	44.66	6.58	Average	150	276
2	5150.00	63.93	74.00	-10.07	57.35	6.58	Peak	150	276
3	10460.00	59.42	68.20	-8.78	42.79	16.63	Peak	150	12
4	15690.00	45.35	54.00	-8.65	27.88	17.47	Average	206	296
5	15690.00	58.05	74.00	-15.95	40.58	17.47	Peak	206	296

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

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

Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	53.52	54.00	-0.48	45.99	7.53	Average	170	38
2	5715.00	69.38	74.00	-4.62	61.85	7.53	Peak	170	38
3	5725.00	70.15	78.20	-8.05	62.58	7.57	Peak	207	305
4	5850.00	59.61	78.20	-18.59	51.72	7.89	Peak	165	10
5	5860.00	48.49	54.00	-5.51	40.58	7.91	Average	165	200
6	5860.00	59.02	74.00	-14.98	51.11	7.91	Peak	165	200
7	11510.00	48.21	54.00	-5.79	31.42	16.79	Average	152	133
8	11510.00	61.24	74.00	-12.76	44.45	16.79	Peak	152	133

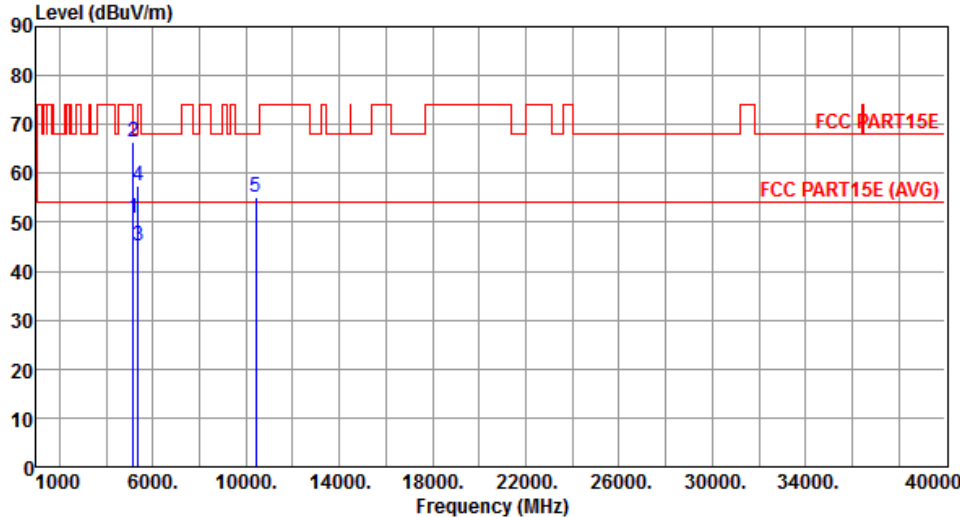
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		
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

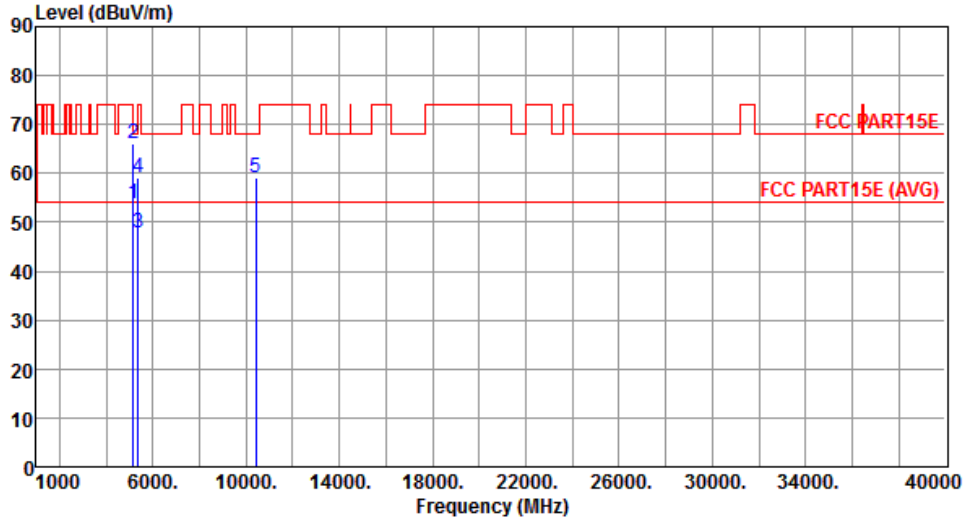
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal		



	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	50.85	54.00	-3.15	44.27	6.58	Average	154	164
2	5150.00	66.38	74.00	-7.62	59.80	6.58	Peak	154	164
3	5350.00	45.31	54.00	-8.69	38.28	7.03	Average	165	234
4	5350.00	57.29	74.00	-16.71	50.26	7.03	Peak	165	234
5	10420.00	55.09	68.20	-13.11	38.56	16.53	Peak	158	20

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		

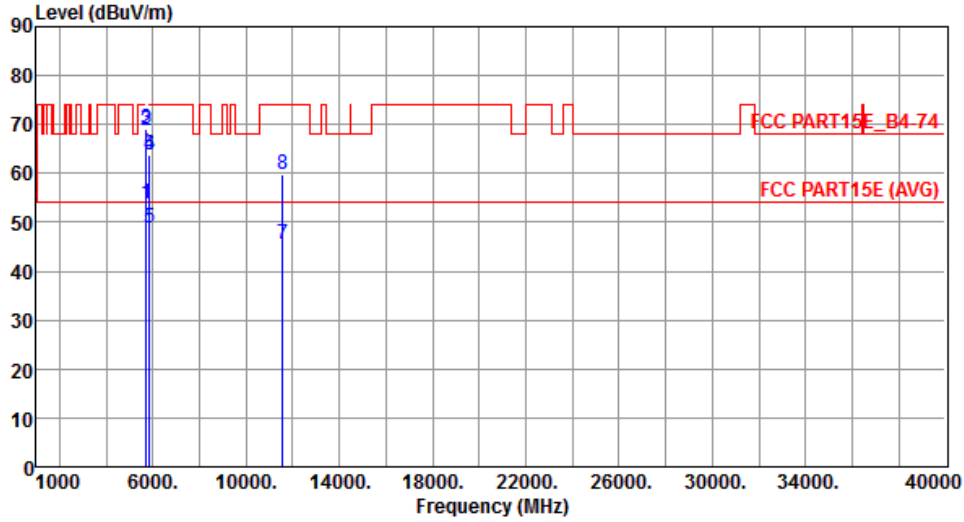


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.77	54.00	-0.23	47.19	6.58	Average	224	360
2	5150.00	65.96	74.00	-8.04	59.38	6.58	Peak	224	360
3	5350.00	47.74	54.00	-6.26	40.71	7.03	Average	224	360
4	5350.00	59.14	74.00	-14.86	52.11	7.03	Peak	224	360
5	10420.00	59.11	68.20	-9.09	42.58	16.53	Peak	210	45

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		



	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	53.89	54.00	-0.11	46.36	7.53	Average	170	290
2	5715.00	68.87	74.00	-5.13	61.34	7.53	Peak	170	290
3	5725.00	69.12	78.20	-9.08	61.55	7.57	Peak	150	233
4	5850.00	63.74	78.20	-14.46	55.85	7.89	Peak	150	29
5	5860.00	48.80	54.00	-5.20	40.89	7.91	Average	150	29
6	5860.00	63.65	74.00	-10.35	55.74	7.91	Peak	150	29
7	11550.00	45.63	54.00	-8.37	28.91	16.72	Average	159	127
8	11550.00	59.92	74.00	-14.08	43.20	16.72	Peak	159	127

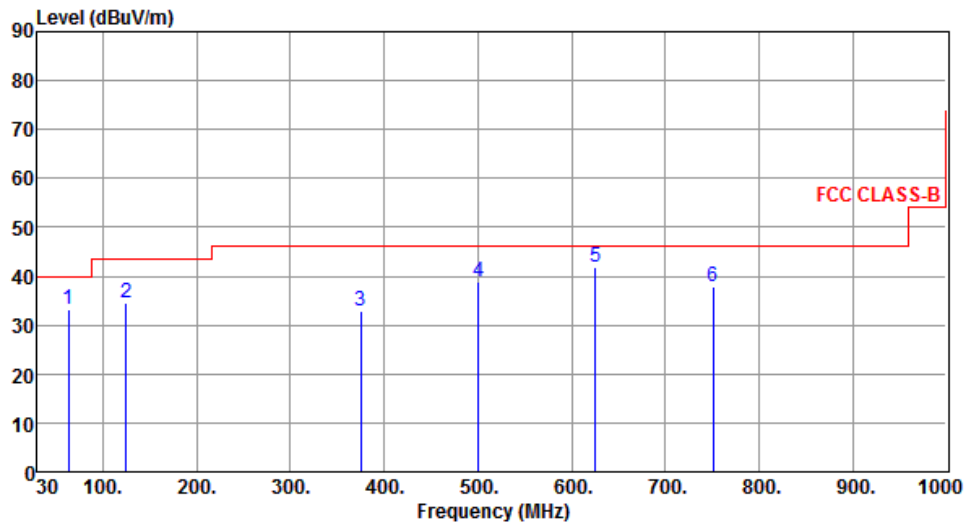
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Beamforming mode

3.5.9 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		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	62.95	33.36	40.00	-6.64	48.06	-14.70	Peak	---	---
2	125.06	34.70	43.50	-8.80	49.80	-15.10	Peak	---	---
3	375.32	32.88	46.00	-13.12	43.61	-10.73	Peak	---	---
4	500.42	38.71	46.00	-7.29	46.35	-7.64	Peak	---	---
5	625.57	41.89	46.00	-4.11	47.21	-5.32	Peak	---	---
6	750.79	37.79	46.00	-8.21	40.97	-3.18	Peak	---	---

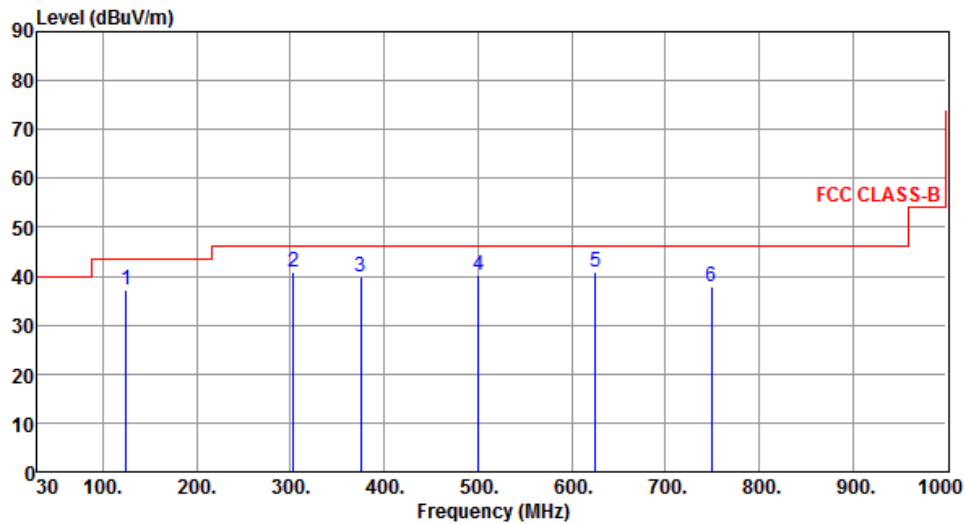
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	VHT20	Test Freq. (MHz)	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	125.11	37.19	43.50	-6.31	52.29	-15.10	Peak	---	---
2	303.59	40.82	46.00	-5.18	53.38	-12.56	Peak	---	---
3	375.36	39.72	46.00	-6.28	50.45	-10.73	Peak	---	---
4	500.42	40.25	46.00	-5.75	47.89	-7.64	Peak	---	---
5	625.53	40.93	46.00	-5.07	46.25	-5.32	Peak	---	---
6	749.72	37.91	46.00	-8.09	41.11	-3.20	Peak	---	---

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

*Factor includes antenna factor , cable loss and amplifier gain

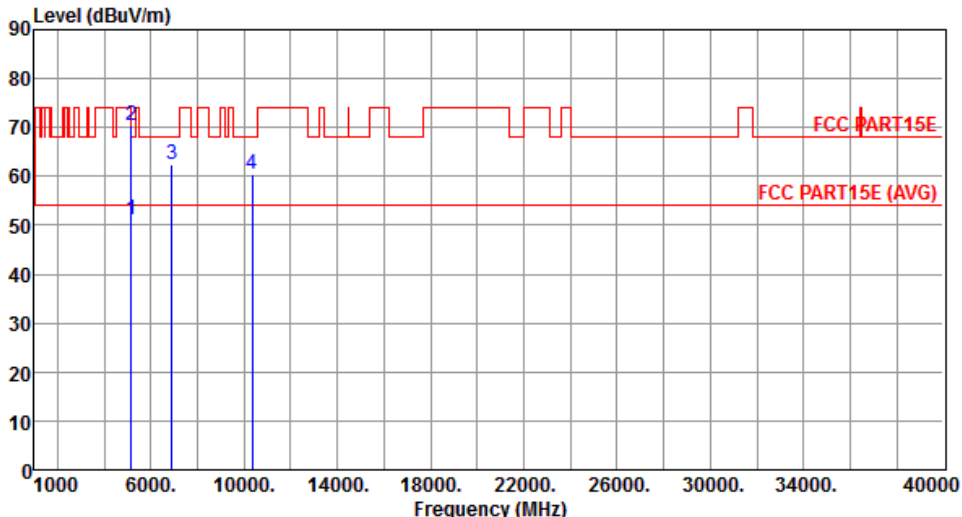
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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

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

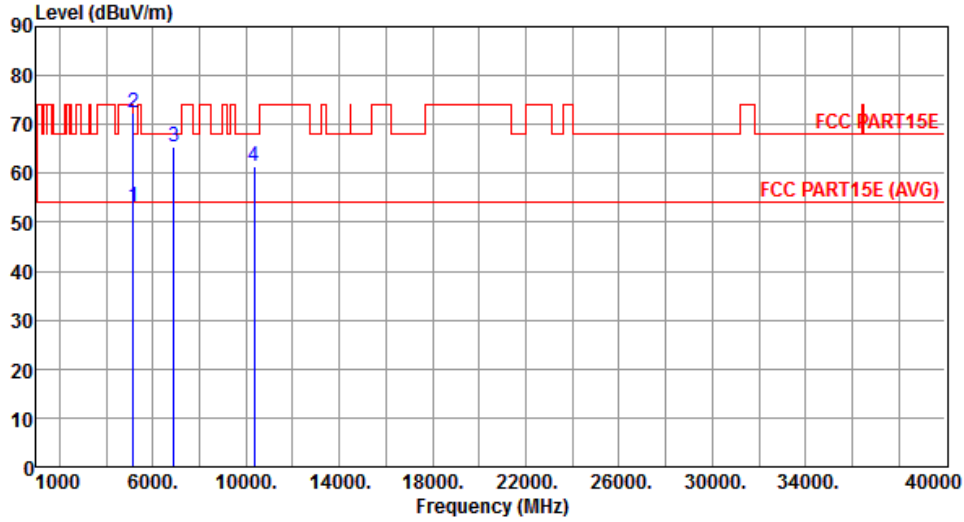
Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Horizontal		



	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	51.05	54.00	-2.95	44.86	6.19	Average	173	165
2	5150.00	70.54	74.00	-3.46	64.35	6.19	Peak	173	165
3	6906.00	62.52	68.20	-5.68	52.87	9.65	Peak	287	354
4	10360.00	60.57	68.20	-7.63	44.33	16.24	Peak	158	357

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

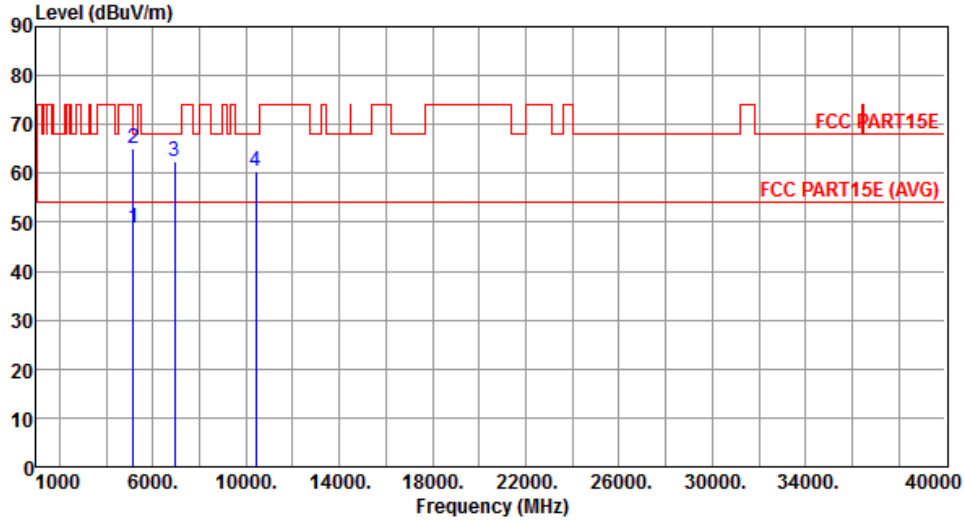
Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.06	54.00	-0.94	46.87	6.19	Average	166	32
2	5150.00	72.41	74.00	-1.59	66.22	6.19	Peak	166	32
3	6906.00	65.46	68.20	-2.74	55.81	9.65	Peak	179	255
4	10360.00	61.57	68.20	-6.63	45.33	16.24	Peak	162	247

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

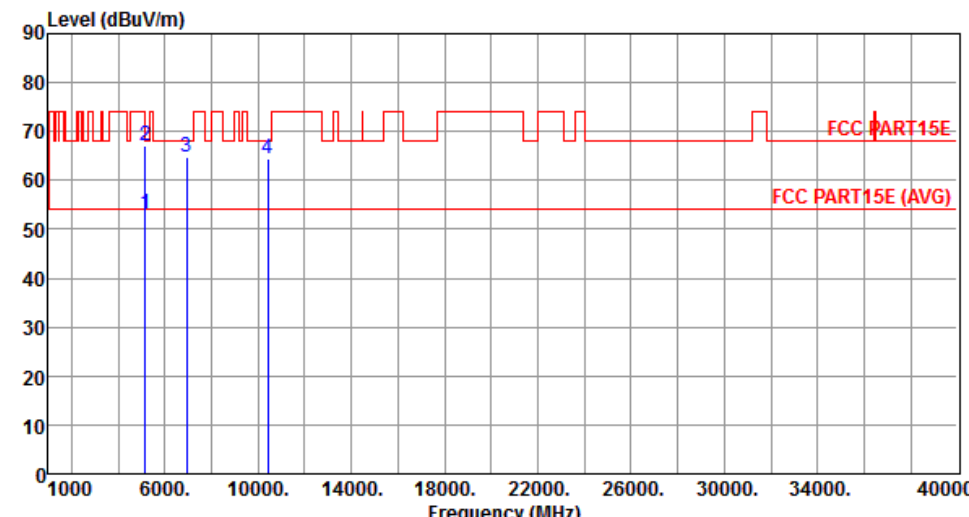
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	48.91	54.00	-5.09	42.72	6.19	Average	165	89
2	5150.00	65.19	74.00	-8.81	59.00	6.19	Peak	165	89
3	6933.00	62.57	68.20	-5.63	52.87	9.70	Peak	157	154
4	10400.00	60.35	68.20	-7.85	44.04	16.31	Peak	150	2

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

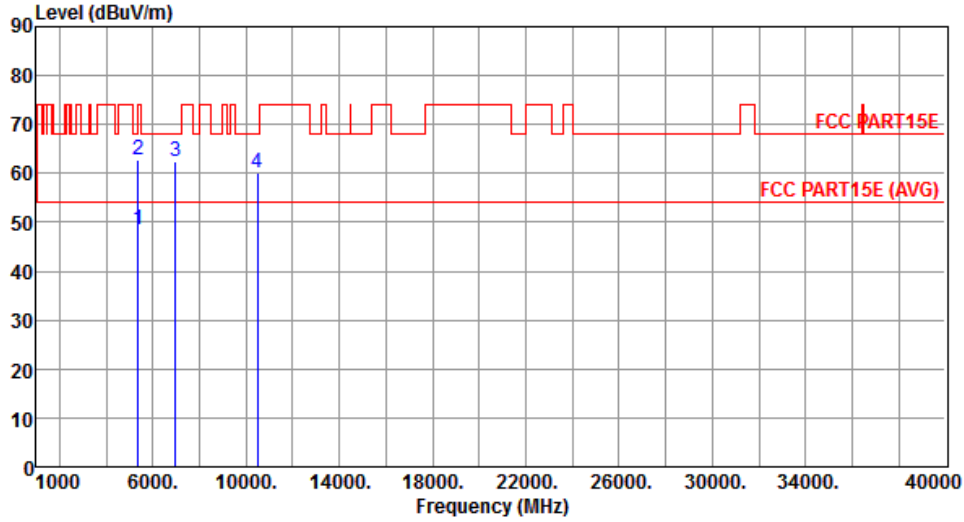
Modulation	VHT20	Test Freq. (MHz)	5200
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.29	54.00	-0.71	47.10	6.19	Average	173	357
2	5150.00	67.14	74.00	-6.86	60.95	6.19	Peak	173	357
3	6933.00	64.63	68.20	-3.57	54.93	9.70	Peak	189	334
4	10400.00	64.57	68.20	-3.63	48.26	16.31	Peak	185	27

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

Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Horizontal		



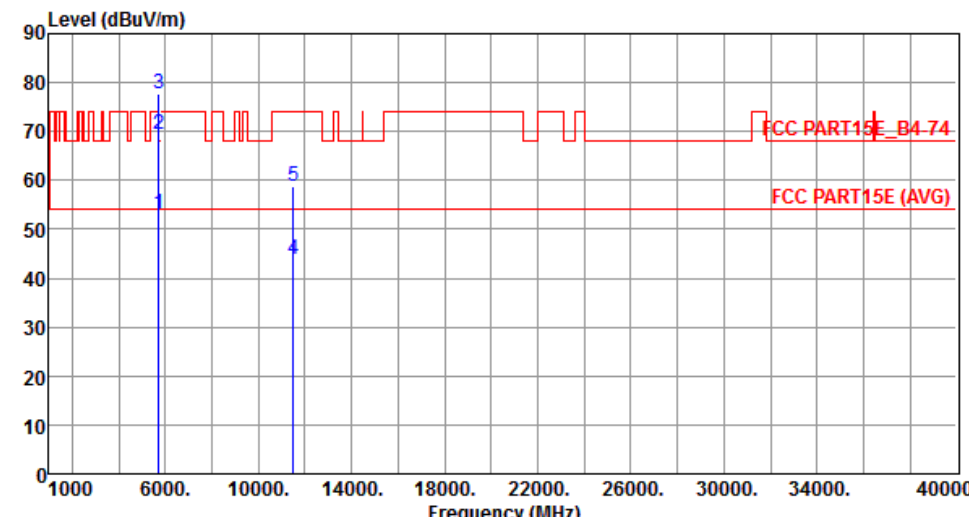
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	48.57	54.00	-5.43	42.06	6.51	Average	165	127
2	5350.00	62.64	74.00	-11.36	56.13	6.51	Peak	165	127
3	6986.00	62.54	68.20	-5.66	52.74	9.80	Peak	277	312
4	10480.00	59.98	68.20	-8.22	43.53	16.45	Peak	168	9

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

Modulation	VHT20	Test Freq. (MHz)	5240
Polarization	Vertical		
Level (dBuV/m) </			

Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5745
Polarization	Vertical		

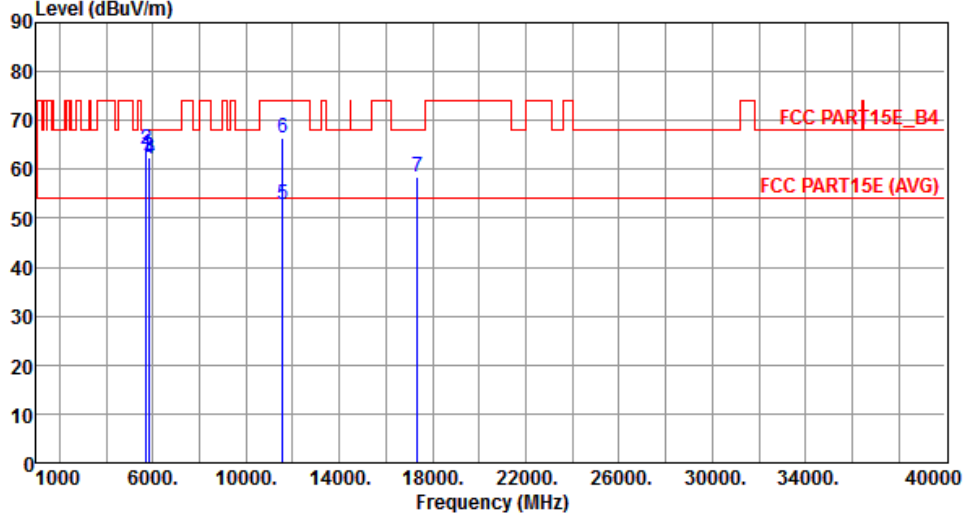


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	53.14	54.00	-0.86	46.05	7.09	Average	187	147
2	5715.00	69.43	74.00	-4.57	62.34	7.09	Peak	187	147
3	5725.00	77.67	78.20	-0.53	70.54	7.13	Peak	187	147
4	11490.00	43.88	54.00	-10.12	27.08	16.80	Average	212	312
5	11490.00	58.88	74.00	-15.12	42.08	16.80	Peak	212	312

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		

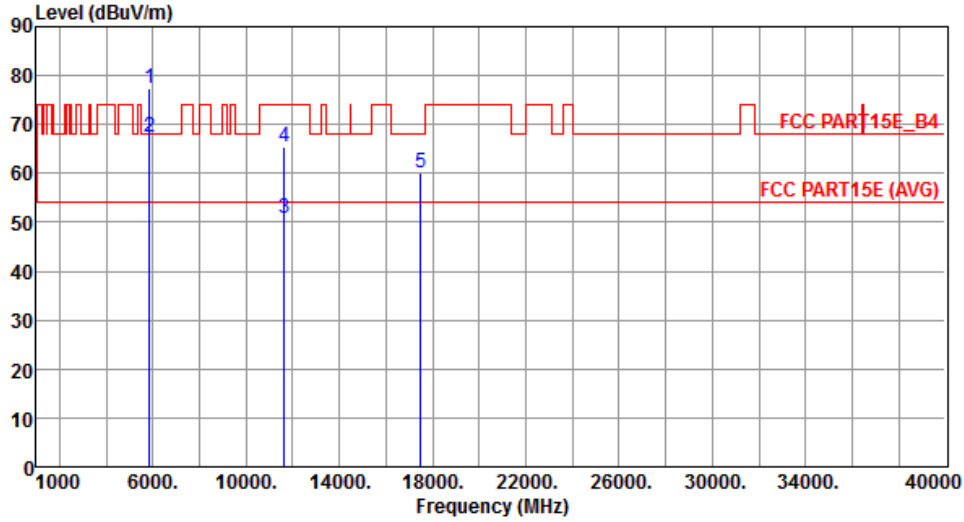


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	63.08	68.20	-5.12	55.99	7.09	Peak	153	320
2	5725.00	64.00	78.20	-14.20	56.87	7.13	Peak	153	320
3	5850.00	62.35	78.20	-15.85	54.96	7.39	Peak	153	320
4	5860.00	62.14	68.20	-6.06	54.74	7.40	Peak	153	320
5	11570.00	52.84	54.00	-1.16	36.15	16.69	Average	155	299
6	11570.00	66.37	74.00	-7.63	49.68	16.69	Peak	155	299
7	17355.00	58.56	68.20	-9.64	39.21	19.35	Peak	177	75

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		
Level (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	77.35	78.20	-0.85	69.96	7.39	Peak	170	305
2	5860.00	67.32	68.20	-0.88	59.92	7.40	Peak	170	305
3	11650.00	50.89	54.00	-3.11	34.35	16.54	Average	154	325
4	11650.00	65.57	74.00	-8.43	49.03	16.54	Peak	154	325
5	17475.00	60.03	68.20	-8.17	40.50	19.53	Peak	176	165

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).

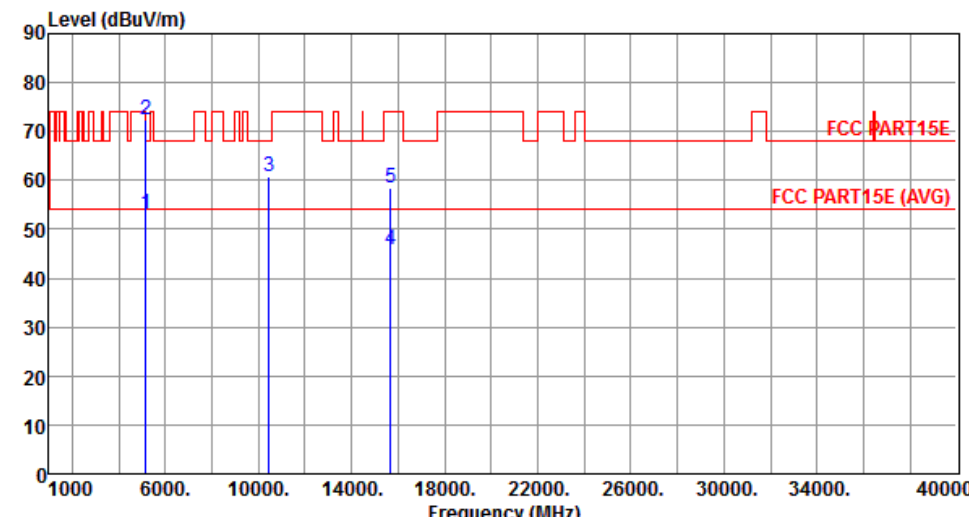
3.5.11 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT40

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

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

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

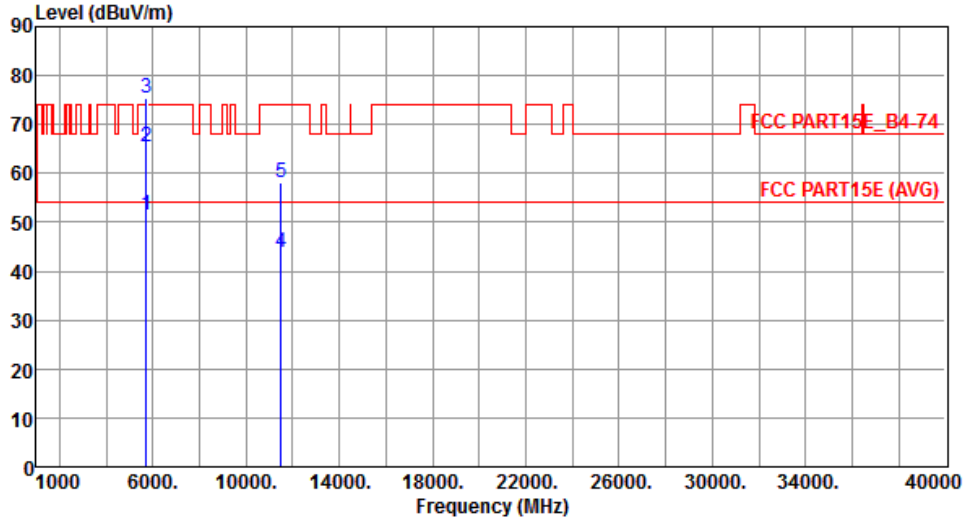
Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.15	54.00	-0.85	46.96	6.19	Average	150	327
2	5150.00	72.33	74.00	-1.67	66.14	6.19	Peak	150	327
3	10460.00	60.75	68.20	-7.45	44.33	16.42	Peak	153	32
4	15690.00	45.89	54.00	-8.11	28.78	17.11	Average	211	311
5	15690.00	58.36	74.00	-15.64	41.25	17.11	Peak	211	311

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

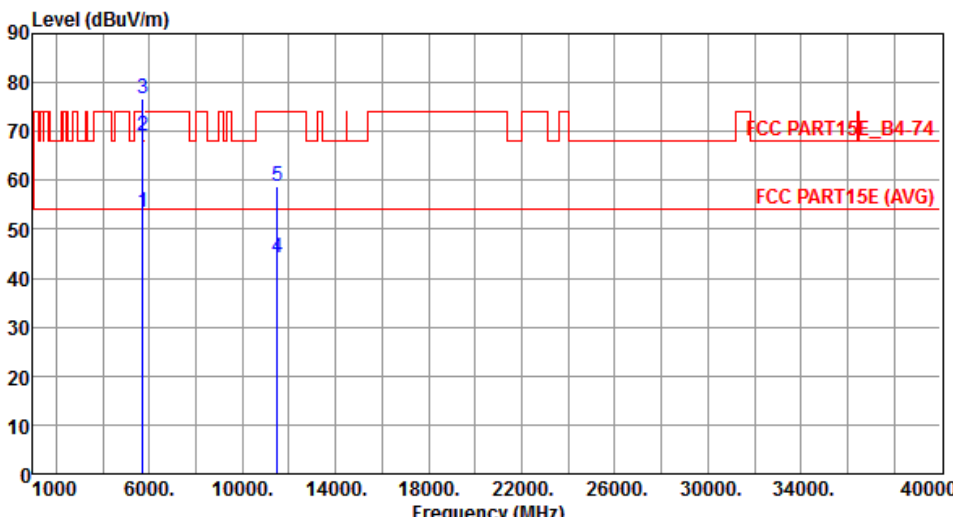
Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	51.60	54.00	-2.40	44.51	7.09	Average	233	159
2	5715.00	65.45	74.00	-8.55	58.36	7.09	Peak	233	159
3	5725.00	75.54	78.20	-2.66	68.41	7.13	Peak	233	159
4	11510.00	43.67	54.00	-10.33	26.88	16.79	Average	197	66
5	11510.00	58.07	74.00	-15.93	41.28	16.79	Peak	197	66

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

Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5715.00	53.45	54.00	-0.55	46.36	7.09	Average	150	336
2	5715.00	68.96	74.00	-5.04	61.87	7.09	Peak	150	336
3	5725.00	76.71	78.20	-1.49	69.58	7.13	Peak	150	336
4	11510.00	44.04	54.00	-9.96	27.25	16.79	Average	185	344
5	11510.00	58.77	74.00	-15.23	41.98	16.79	Peak	185	344

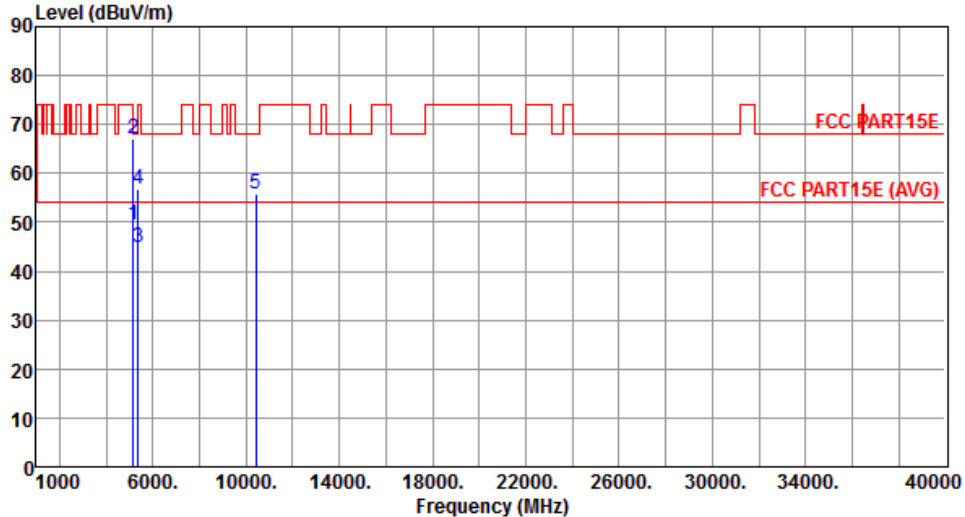
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

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

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

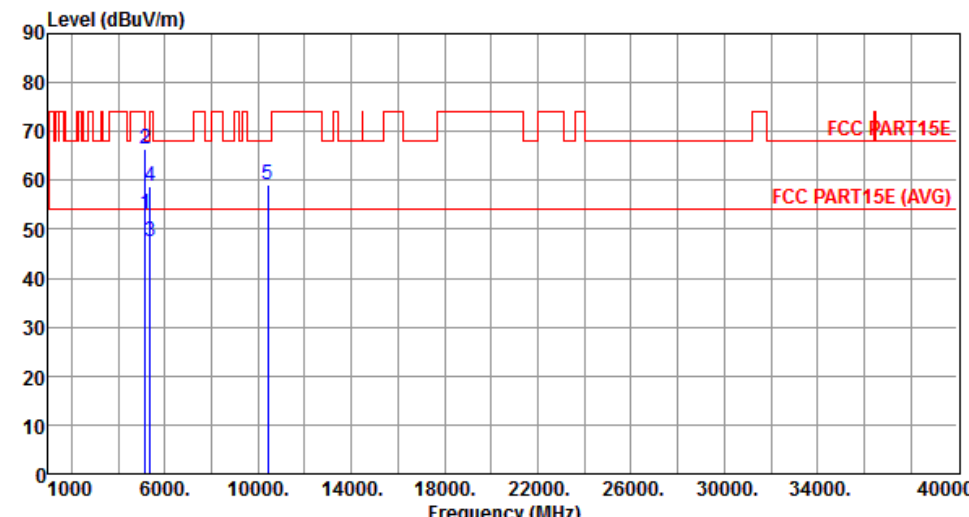
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal		



	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	49.42	54.00	-4.58	43.23	6.19	Average	152	169
2	5150.00	67.12	74.00	-6.88	60.93	6.19	Peak	152	169
3	5350.00	44.90	54.00	-9.10	38.39	6.51	Average	152	190
4	5350.00	56.90	74.00	-17.10	50.39	6.51	Peak	152	190
5	10420.00	55.85	68.20	-12.35	39.51	16.34	Peak	155	33

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	53.24	54.00	-0.76	47.05	6.19	Average	170	264
2	5150.00	66.56	74.00	-7.44	60.37	6.19	Peak	170	264
3	5350.00	47.39	54.00	-6.61	40.88	6.51	Average	153	268
4	5350.00	58.86	74.00	-15.14	52.35	6.51	Peak	153	268
5	10420.00	59.19	68.20	-9.01	42.85	16.34	Peak	222	51

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		
Level (dBuV/m)			

3.6 Frequency Stability

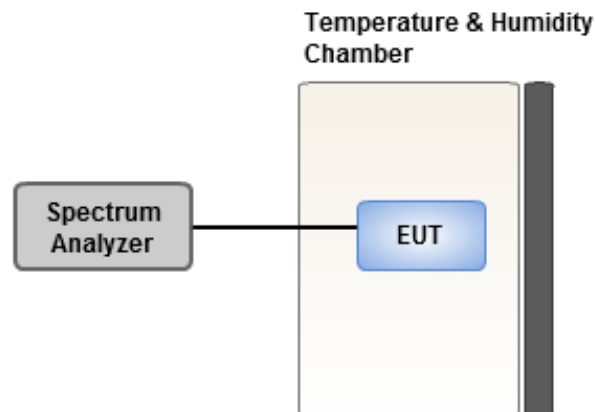
3.6.1 Limit of Frequency Stability

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	4.72	4.74	4.71	4.69
T20°C Vmin	3.94	4.19	3.60	4.51
T50°C Vnom	3.65	4.21	3.80	3.81
T40°C Vnom	3.53	3.88	3.87	3.88
T30°C Vnom	3.23	2.92	3.57	3.07
T20°C Vnom	3.16	3.51	3.07	3.93
T10°C Vnom	2.59	2.77	2.13	3.27
T0°C Vnom	2.82	3.20	1.49	2.54
T-10°C Vnom	1.53	2.13	1.48	1.52
T-20°C Vnom	0.63	1.06	0.82	0.73
T-30°C Vnom	1.05	1.32	1.69	0.78
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	4.44	4.89	4.12	4.91
T20°C Vmin	3.80	4.52	3.46	3.49
T50°C Vnom	3.41	3.43	3.99	3.05
T40°C Vnom	3.19	4.01	3.11	3.22
T30°C Vnom	2.72	2.83	3.05	3.49
T20°C Vnom	1.88	2.45	1.93	1.92
T10°C Vnom	1.72	1.63	1.59	1.47
T0°C Vnom	1.71	3.25	3.14	2.69
T-10°C Vnom	1.77	2.46	1.72	1.55
T-20°C Vnom	0.55	0.88	0.51	0.28
T-30°C Vnom	1.16	1.50	1.23	1.20
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

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan,
R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd
St., Kwei Shan Hsiang, Tao Yuan
Hsien 333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd
St., Kwei Shan Hsiang, Tao Yuan
Hsien 333, Taiwan, R.O.C.

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

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==