

FCC Test Report

FCC ID : I88NBG6815
Equipment : Simultaneous Dual-Band Wireless AC2200
Gigabit Ethernet Gateway
Model No. : EMG3425-Q10A 、NBG6815
(Please refer to section 1.1.1 for more details.)
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 ~ Nov. 25, 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



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Release Record

Report No.	Version	Description	Issued Date
FR570601-01AN	Rev. 01	Initial issue	Nov. 26, 2015
FR570601-01AN	Rev. 02	Removed limit of emission bandwidth	Nov. 30, 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]: 5150.00MHz 53.77 (Margin -0.23dB) - 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]: <i>Non-beamforming mode</i> 5150-5250MHz: 29.89 <i>Beamforming mode</i> 5150-5250MHz: 27.92	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 Product Details

The following models are provided to this EUT.

Brand Name	Model Name	Product Name	Description
ZyXEL	EMG3425-Q10A	Simultaneous Dual-Band Wireless AC2200 Gigabit Ethernet Gateway	The difference between both models is only numbers of LED of non-RF portion
	NBG6815		

1.1.2 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.					

1.1.3 Antenna Details

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

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from AC adapter
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1.1.5 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.

1.1.6 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

1.1.7 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

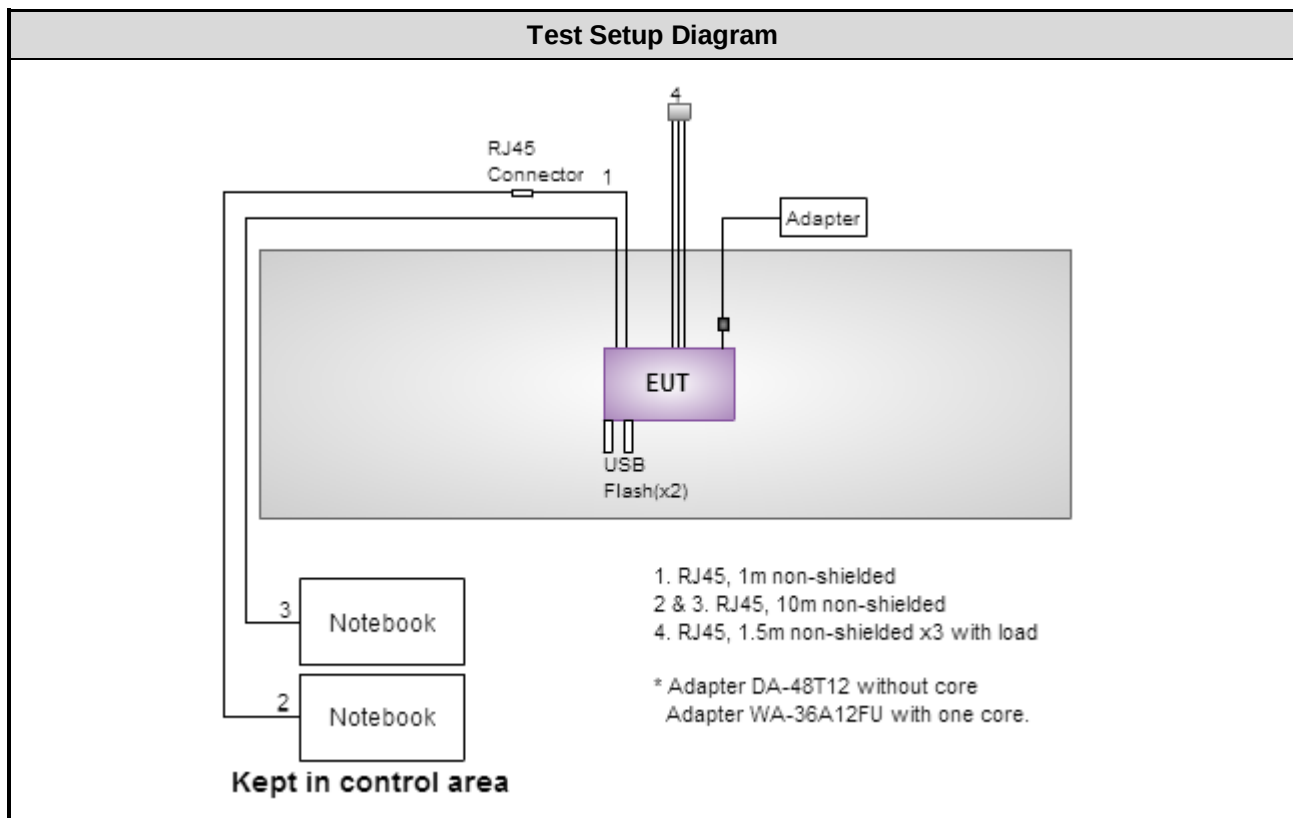
1.1.8 Power Setting

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

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)				
Tested Date	Aug. 14, 2015				
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	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Nov. 25, 2015				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
EMC Receiver	R&S	ESCS 30	100169	Oct. 21, 2015	Oct. 20, 2016
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2015	Nov. 12, 2016
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	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Aug. 11 ~ Aug. 19, 2015				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	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.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested date	Jul. 17 ~ Aug. 10, 2015				
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	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Nov. 24, 2015				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 14, 2015	Sep. 13, 2016
Receiver	Agilent	N9038A	MY53290044	Oct. 14, 2015	Oct. 13, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-562	Jan. 19, 2015	Jan. 18, 2016
Loop Antenna	TESEQ	HLA6120	24155	Mar. 12, 2015	Mar. 11, 2016
Preamplifier	EMC	EMC02325	980187	Sep. 21, 2015	Sep. 20, 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.					

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 ≤ 1 GHz	± 3.99 dB
Radiated emission > 1 GHz	± 5.52 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	22°C / 52% 21°C / 59%	Kevin Ma Peter Lin
Radiated Emissions	03CH03-WS	21-22°C / 61-68% 22°C / 68%	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, 4
Radiated Emissions ≤ 1 GHz	VHT40	5230	MCS 0	1, 3
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. Each model was selected for final testing as below test configuration. (Model 1: EMG3425-Q10A; Model 2: NBG6815) 2. 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). 3. Test configurations are listed as below: 1) Configuration 1: Model EMG3425-Q10A, Adapter 1: DA-48T12 2) Configuration 2: Model EMG3425-Q10A, Adapter 2: WA-36A12FU 3) Configuration 3: Model NBG6815, Adapter 1: DA-48T12 4) Configuration 4: Model NBG6815, 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, 4
Radiated Emissions ≤1GHz	VHT40	5230	MCS 0	1, 3
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: - Each model was selected for final testing as below test configuration. (Model 1: EMG3425-Q10A; Model 2: NBG6815) - 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). - Test configurations are listed as below: - Configuration 1: Model EMG3425-Q10A, Adapter 1: DA-48T12 - Configuration 2: Model EMG3425-Q10A, Adapter 2: WA-36A12FU - Configuration 3: Model NBG6815, Adapter 1: DA-48T12 - Configuration 4: Model NBG6815, Adapter 2: WA-36A12FU				

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

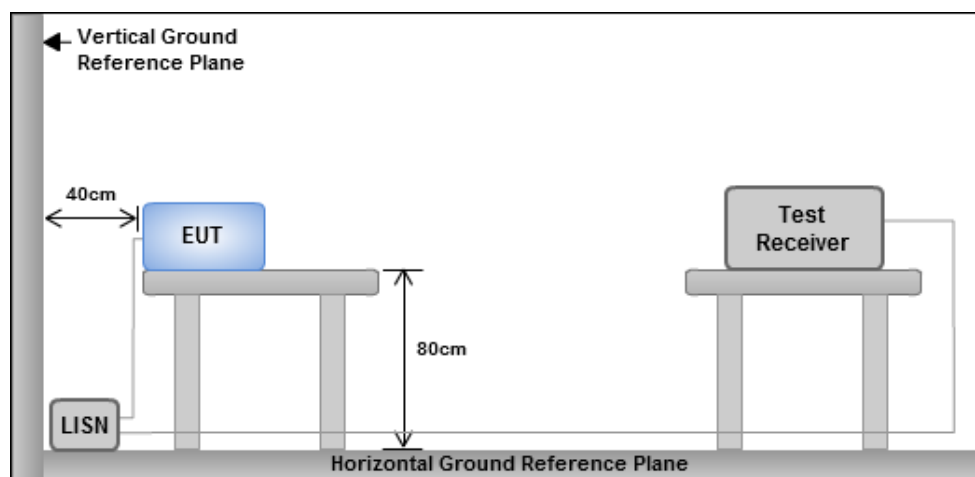
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

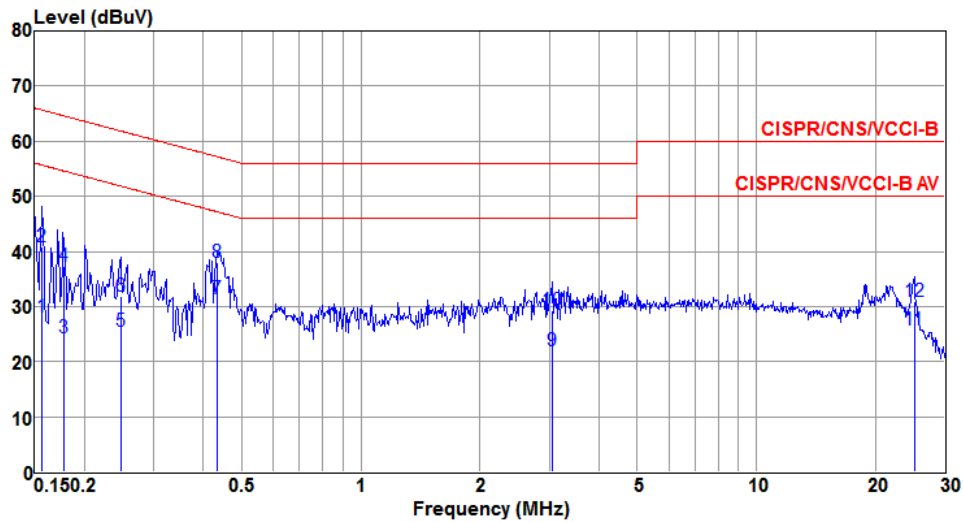


- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Non-beamforming mode

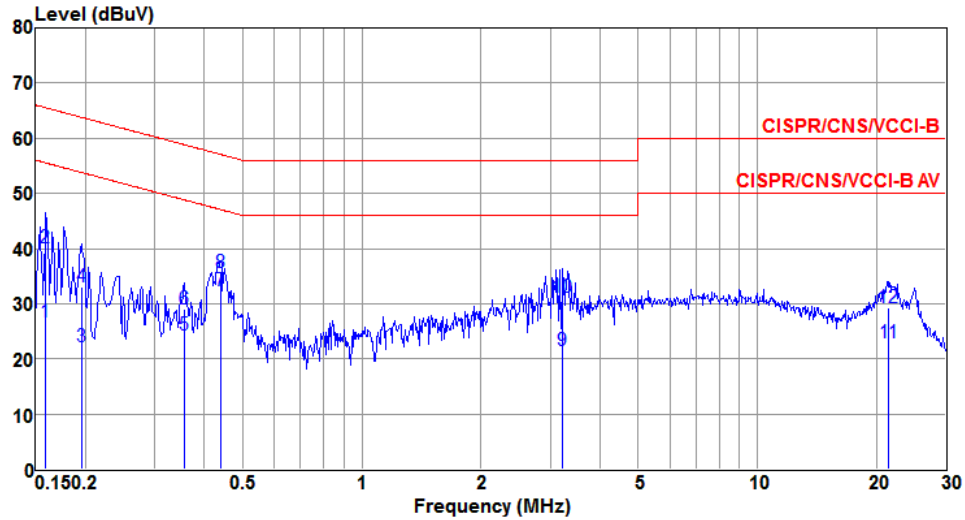
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line	Test Configuration	2



	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).

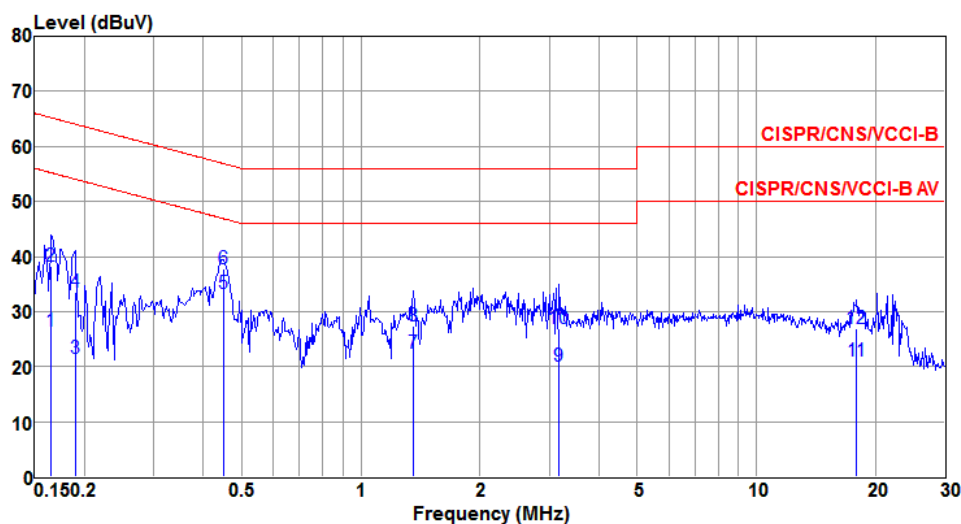
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Neutral	Test Configuration	2



	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).

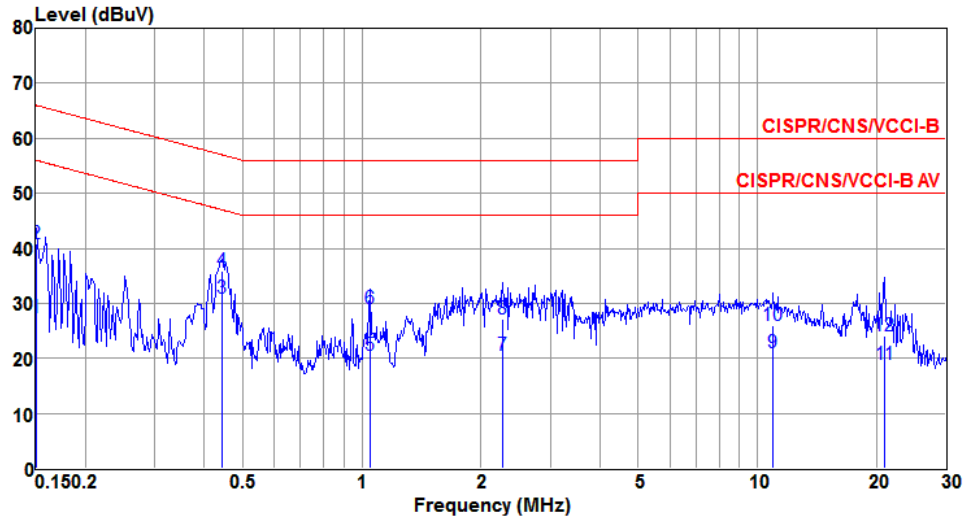
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line	Test Configuration	4



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.165	26.39	55.21	-28.82	26.26	0.11	0.02	Average
2	0.165	38.13	65.21	-27.08	38.00	0.11	0.02	QP
3	0.189	21.43	54.06	-32.63	21.30	0.11	0.02	Average
4	0.189	33.54	64.06	-30.52	33.41	0.11	0.02	QP
5@	0.449	33.23	46.89	-13.66	33.07	0.13	0.03	Average
6	0.449	37.77	56.89	-19.12	37.61	0.13	0.03	QP
7	1.359	22.35	46.00	-23.65	22.14	0.14	0.07	Average
8	1.359	27.34	56.00	-28.66	27.13	0.14	0.07	QP
9	3.173	20.13	46.00	-25.87	19.84	0.18	0.11	Average
10	3.173	26.94	56.00	-29.06	26.65	0.18	0.11	QP
11	17.944	21.10	50.00	-28.90	20.57	0.35	0.18	Average
12	17.944	26.88	60.00	-33.12	26.35	0.35	0.18	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	Test Configuration	4

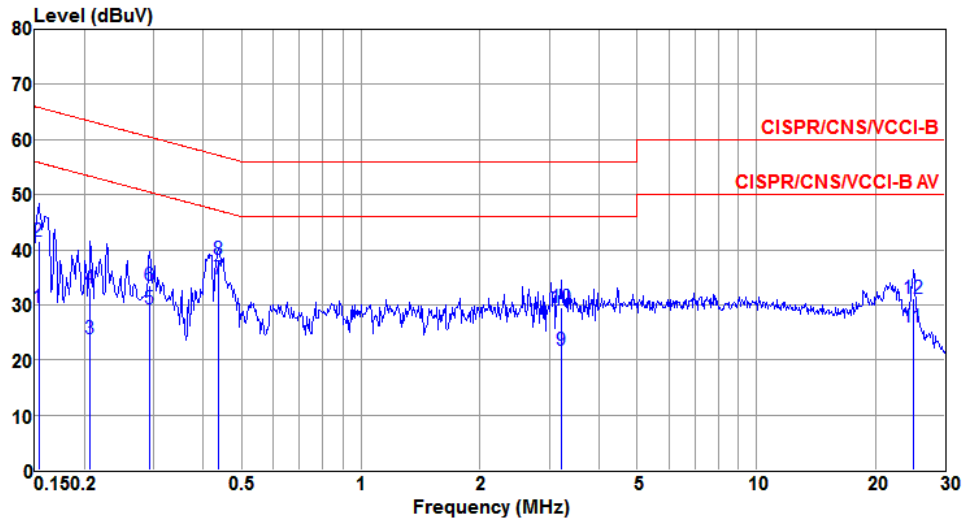


	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.150	27.42	56.00	-28.58	27.27	0.13	0.02	Average
2	0.150	40.88	66.00	-25.12	40.73	0.13	0.02	QP
3@	0.444	30.95	46.98	-16.03	30.78	0.14	0.03	Average
4	0.444	35.90	56.98	-21.08	35.73	0.14	0.03	QP
5	1.049	20.52	46.00	-25.48	20.33	0.13	0.06	Average
6	1.049	28.99	56.00	-27.01	28.80	0.13	0.06	QP
7	2.273	20.57	46.00	-25.43	20.31	0.17	0.09	Average
8	2.273	27.23	56.00	-28.77	26.97	0.17	0.09	QP
9	10.963	20.94	50.00	-29.06	20.48	0.29	0.17	Average
10	10.963	26.07	60.00	-33.93	25.61	0.29	0.17	QP
11	21.035	18.97	50.00	-31.03	18.37	0.41	0.19	Average
12	21.035	24.17	60.00	-35.83	23.57	0.41	0.19	QP

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

Beamforming mode

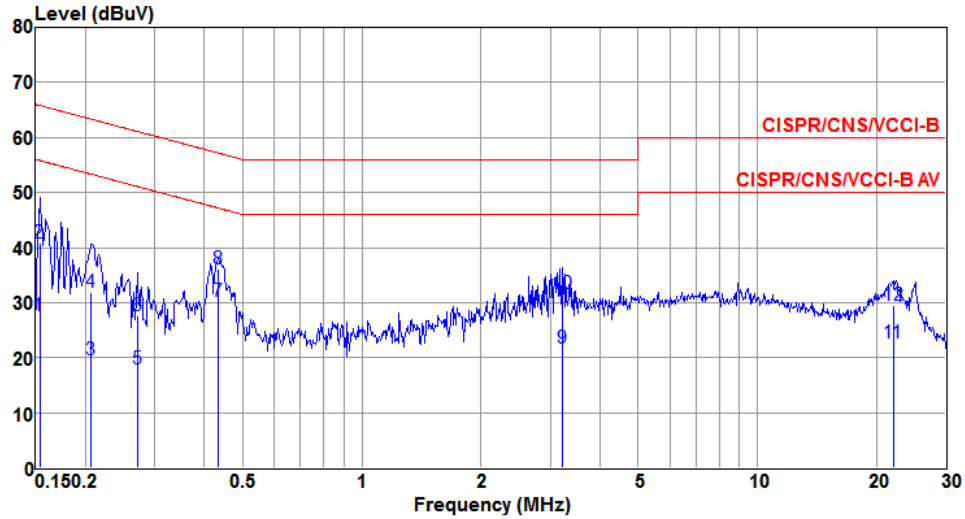
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line	Test Configuration	2



	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).

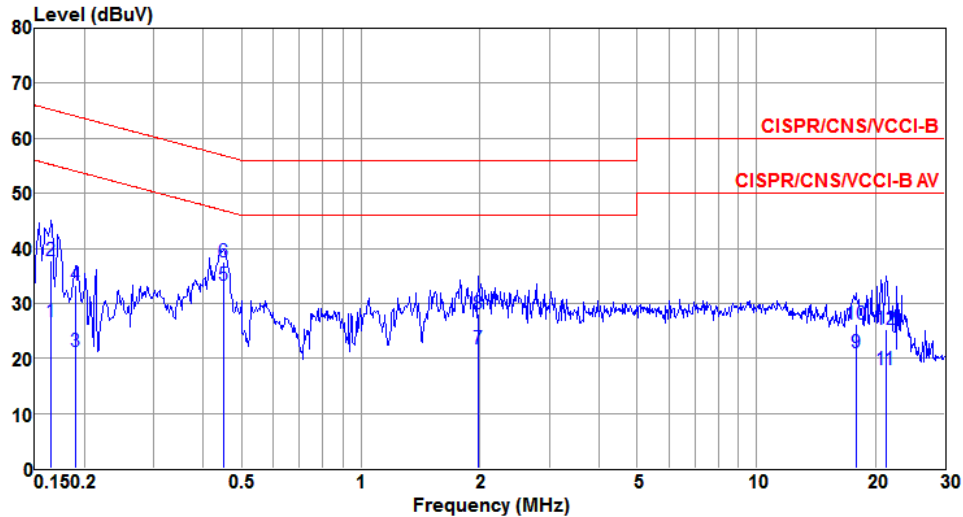
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Neutral	Test Configuration	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
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).

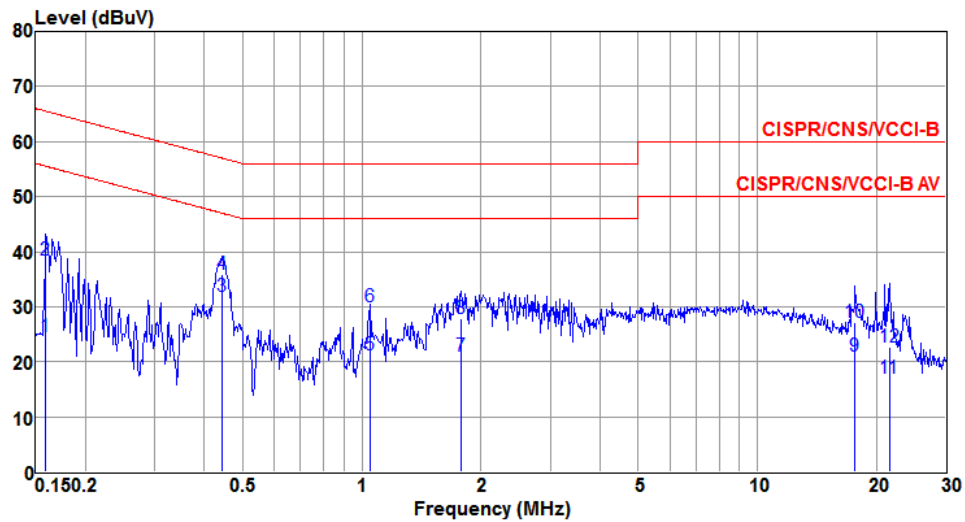
Modulation	VHT40	Test Freq. (MHz)	5230
Power Phase	Line	Test Configuration	4



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.165	26.65	55.21	-28.56	26.52	0.11	0.02	Average
2	0.165	37.76	65.21	-27.45	37.63	0.11	0.02	QP
3	0.189	21.19	54.06	-32.87	21.06	0.11	0.02	Average
4	0.189	33.34	64.06	-30.72	33.21	0.11	0.02	QP
5@	0.452	33.26	46.85	-13.59	33.10	0.13	0.03	Average
6	0.452	37.48	56.85	-19.37	37.32	0.13	0.03	QP
7	1.980	21.81	46.00	-24.19	21.57	0.16	0.08	Average
8	1.980	28.16	56.00	-27.84	27.92	0.16	0.08	QP
9	17.849	21.08	50.00	-28.92	20.54	0.35	0.19	Average
10	17.849	26.12	60.00	-33.88	25.58	0.35	0.19	QP
11	21.260	17.92	50.00	-32.08	17.35	0.38	0.19	Average
12	21.260	25.29	60.00	-34.71	24.72	0.38	0.19	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	Test Configuration	4



	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	dBuV	Limit	Level	factor	loss	Remark
1	0.159	24.57	55.52	-30.95	24.43	0.12	0.02	Average
2	0.159	38.50	65.52	-27.02	38.36	0.12	0.02	QP
3	0.442	31.92	47.02	-15.10	31.75	0.14	0.03	Average
4	0.442	35.80	57.02	-21.22	35.63	0.14	0.03	QP
5	1.049	21.17	46.00	-24.83	20.98	0.13	0.06	Average
6	1.049	29.93	56.00	-26.07	29.74	0.13	0.06	QP
7	1.781	21.03	46.00	-24.97	20.79	0.16	0.08	Average
8	1.781	27.93	56.00	-28.07	27.69	0.16	0.08	QP
9	17.661	21.03	50.00	-28.97	20.46	0.38	0.19	Average
10	17.661	27.04	60.00	-32.96	26.47	0.38	0.19	QP
11	21.600	17.11	50.00	-32.89	16.49	0.42	0.20	Average
12	21.600	22.72	60.00	-37.28	22.10	0.42	0.20	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 Test Procedures

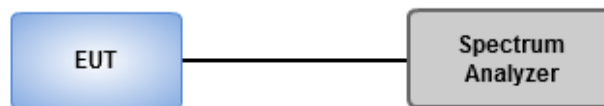
26dB Bandwidth

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

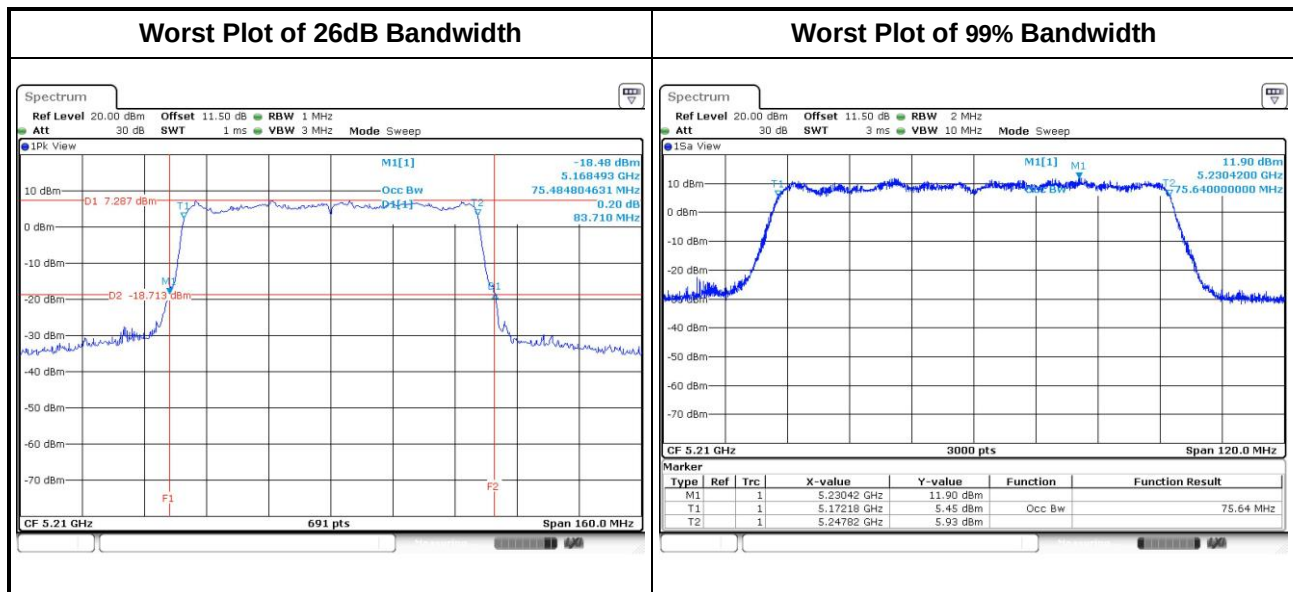
3.2.2 Test Setup



3.2.3 Test Result of Emission Bandwidth

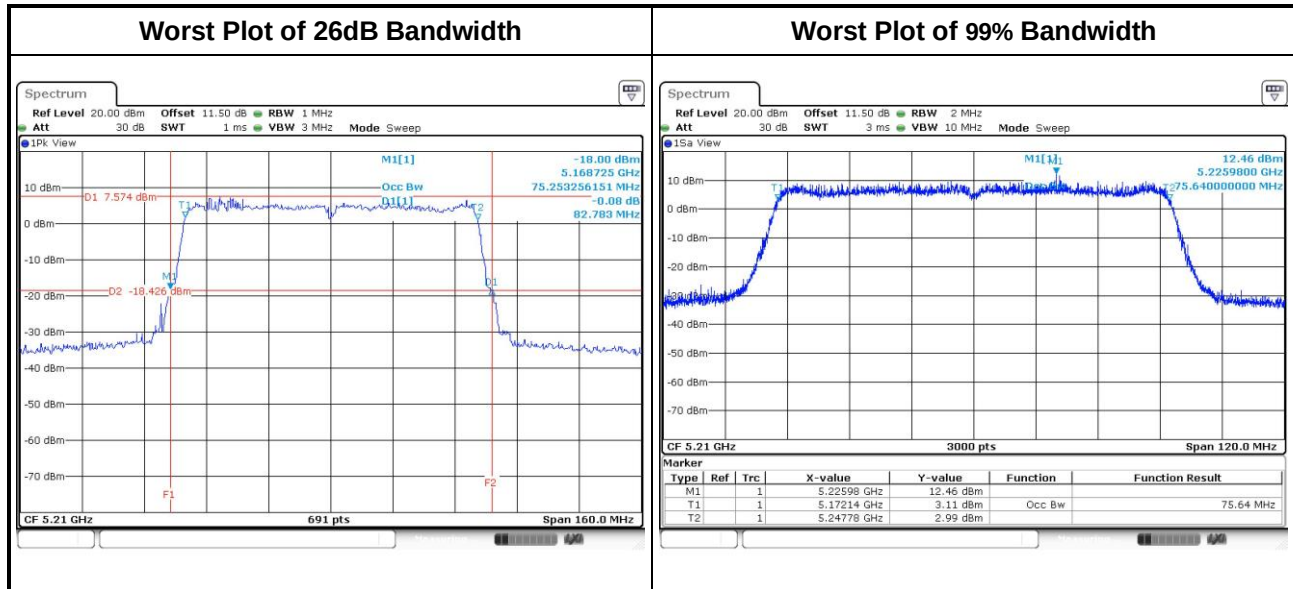
Non-beamforming mode

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



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



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

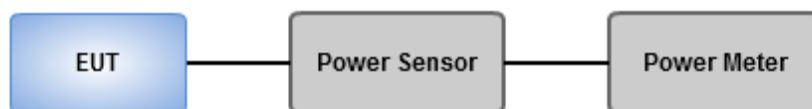
Frequency Band (MHz)	Limit
☐ 5250 ~ 5350	250mW or 11dBm+10 log B
☐ 5470 ~ 5725	250mW or 11dBm+10 log B
☐ 5725 ~ 5850	1 W

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

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 $30 \text{ dBm} - (7.94 \text{ dBi} - 6 \text{ dBi}) = 28.06 \text{ dBm}$.

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

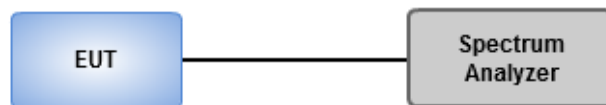
For 5150 ~ 5250 MHz

- ☒ 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 $\geq 10 * (\text{number of points in sweep}) * (\text{total on/off period of the transmitted signal})$.
 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 $\geq 10 * (\text{number of points in sweep}) * (\text{total on/off period of the transmitted signal})$.
 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



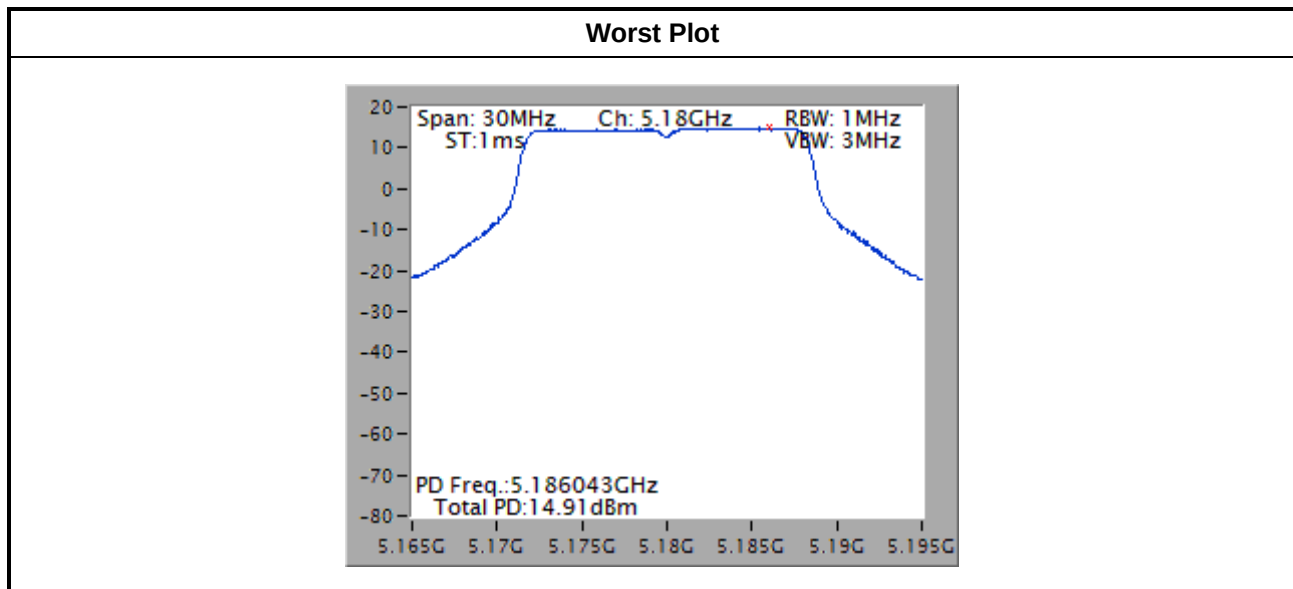
3.4.4 Test Result of Peak Power Spectral Density

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.

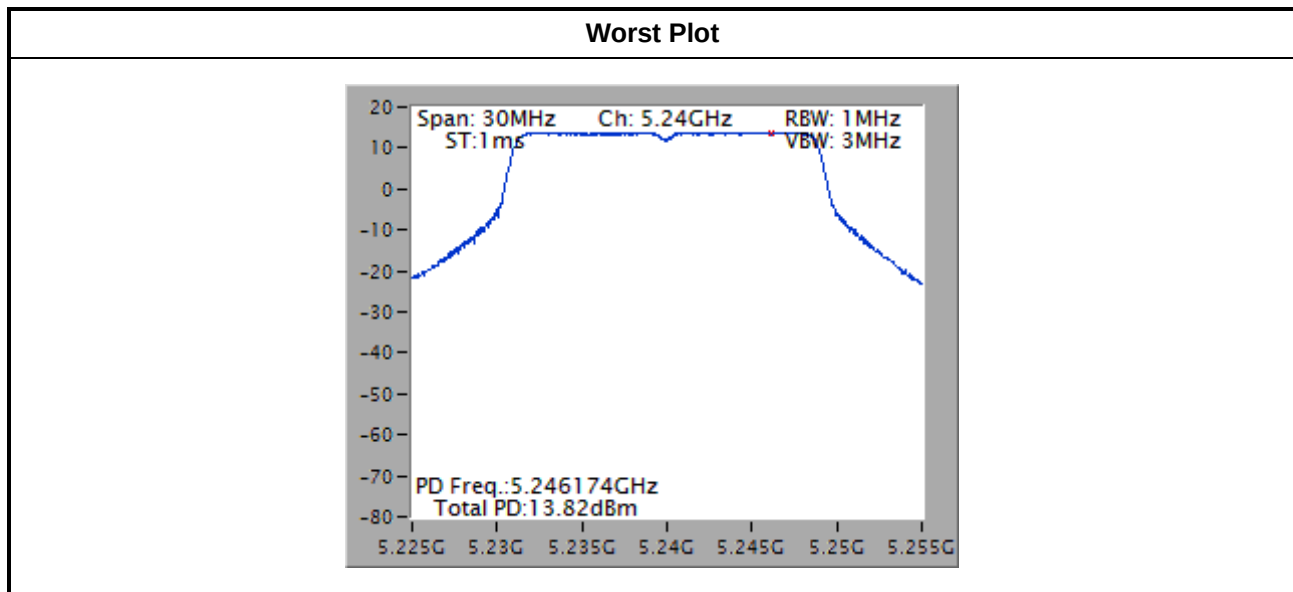


Beamforming mode

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.



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

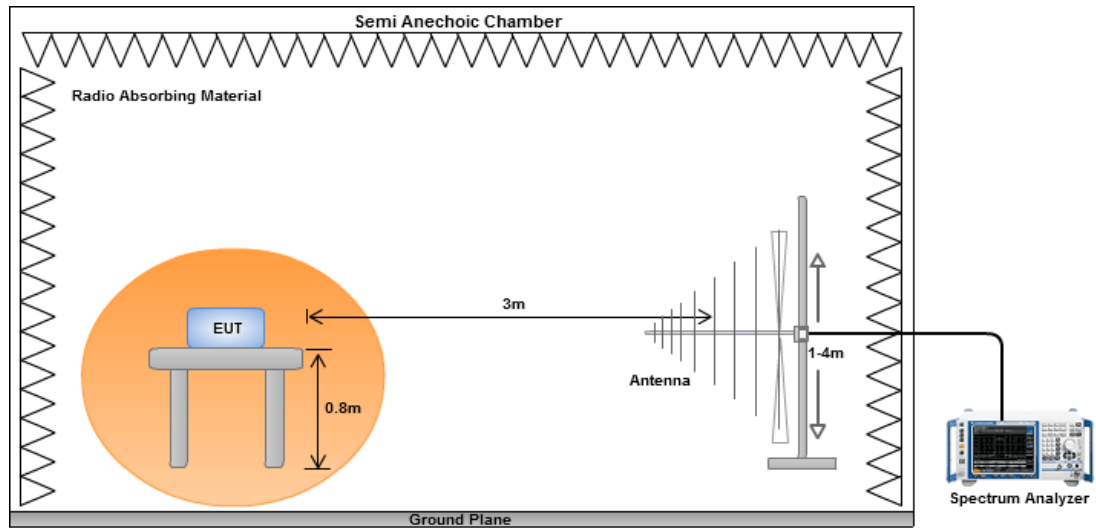
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

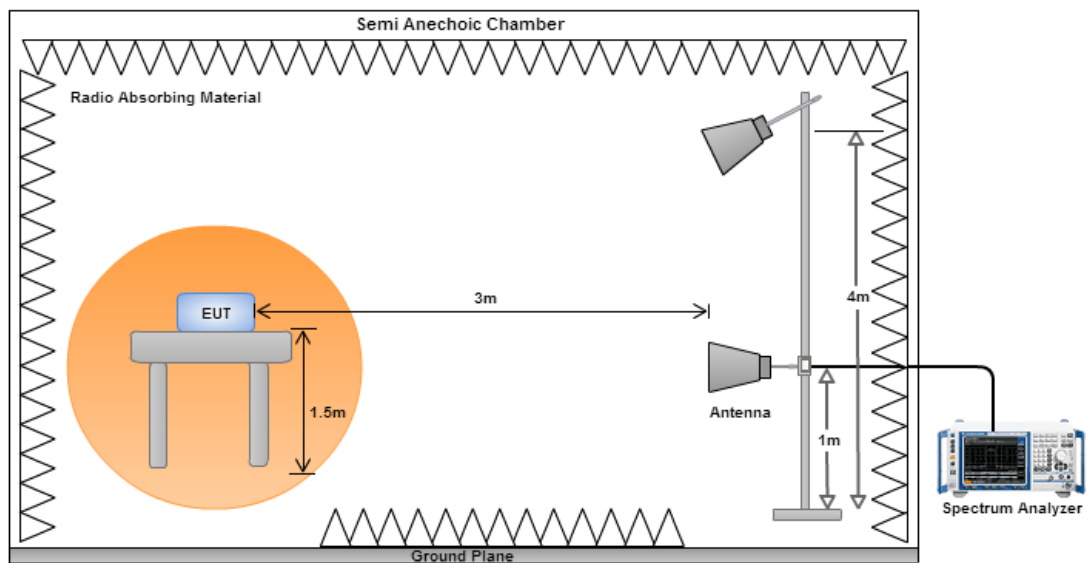
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



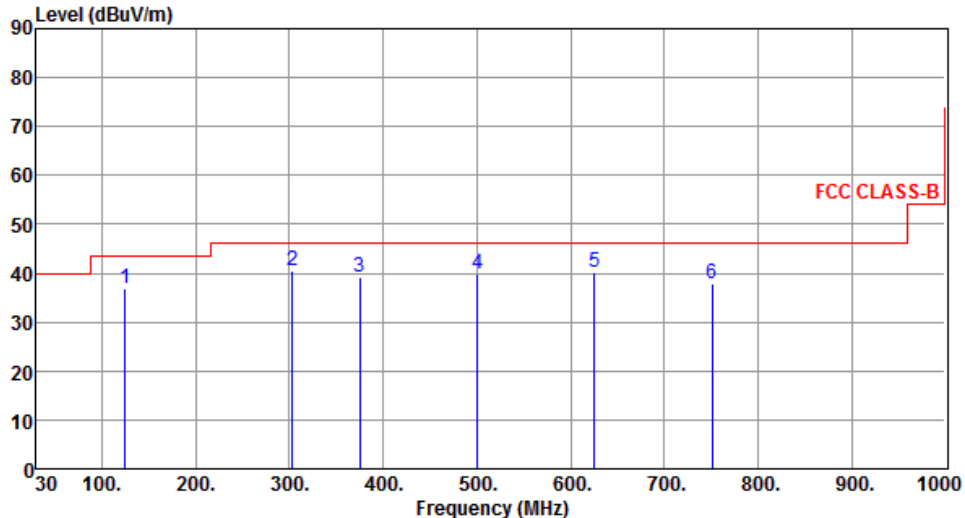
Radiated Emissions above 1 GHz



Non- beamforming mode

3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal	Test Configuration	1

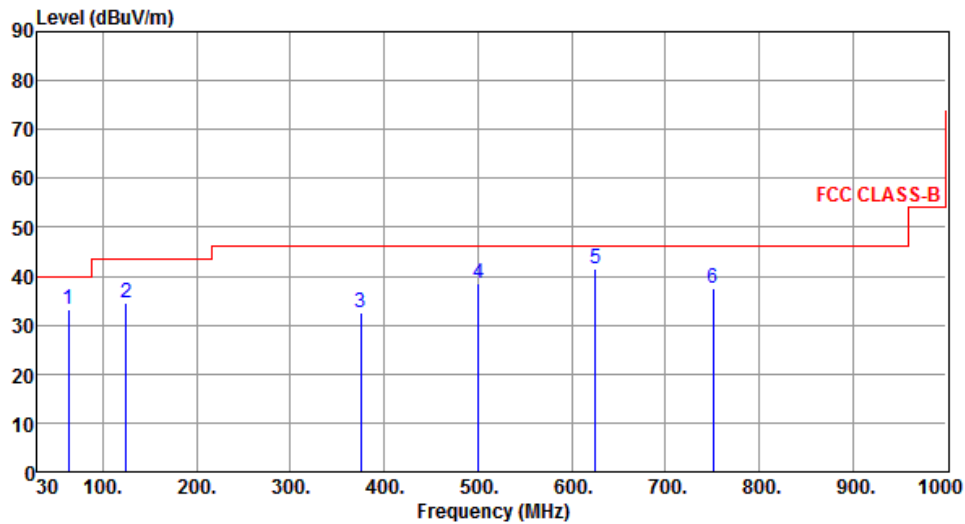


The graph displays the emission level in dBuV/m on the y-axis (0 to 90) against frequency in MHz on the x-axis (30 to 1000). A red line represents the FCC CLASS-B limit, which is 40 dBuV/m from 30 to 100 MHz, 45 dBuV/m from 100 to 300 MHz, and 55 dBuV/m from 300 to 1000 MHz. Six emission peaks are identified and labeled 1 through 6, with their corresponding frequency, emission level, limit, margin, SA reading, and factor listed in the table below.

	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	36.95	43.50	-6.55	52.05	-15.10	Peak	---	---
2	303.54	40.55	46.00	-5.45	53.11	-12.56	Peak	---	---
3	375.32	39.14	46.00	-6.86	49.87	-10.73	Peak	---	---
4	500.45	39.71	46.00	-6.29	47.35	-7.64	Peak	---	---
5	625.58	40.33	46.00	-5.67	45.65	-5.32	Peak	---	---
6	750.71	37.82	46.00	-8.18	41.00	-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	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	62.98	33.09	40.00	-6.91	47.80	-14.71	Peak	---	---
2	125.06	34.39	43.50	-9.11	49.49	-15.10	Peak	---	---
3	375.32	32.57	46.00	-13.43	43.30	-10.73	Peak	---	---
4	500.45	38.58	46.00	-7.42	46.22	-7.64	Peak	---	---
5	625.58	41.36	46.00	-4.64	46.68	-5.32	Peak	---	---
6	750.71	37.41	46.00	-8.59	40.59	-3.18	Peak	---	---

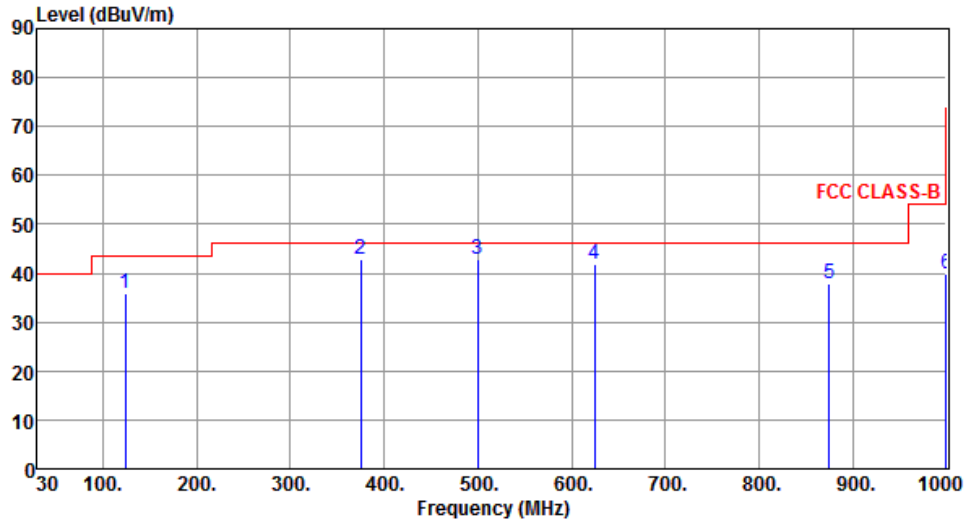
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal	Test Configuration	3



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	124.09	35.91	43.50	-7.59	51.14	-15.23	Peak	---	---
2	374.78	42.99	46.00	-3.01	53.76	-10.77	QP	100	189
3	499.98	42.89	46.00	-3.11	50.54	-7.65	QP	100	245
4	624.61	41.76	46.00	-4.24	47.20	-5.44	Peak	---	---
5	874.87	37.89	46.00	-8.11	39.15	-1.26	Peak	---	---
6	1000.00	39.71	54.00	-14.29	39.16	0.55	Peak	---	---

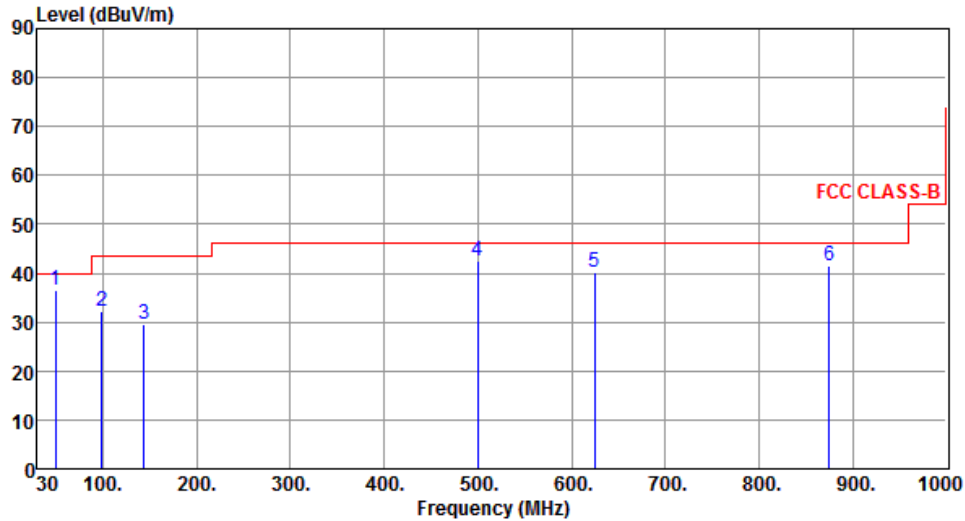
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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)	5230
Polarization	Vertical	Test Configuration	3



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	49.40	36.53	40.00	-3.47	49.47	-12.94	Peak	---	---
2	98.87	32.28	43.50	-11.22	50.87	-18.59	Peak	---	---
3	143.49	29.55	43.50	-13.95	43.19	-13.64	Peak	---	---
4	499.48	42.43	46.00	-3.57	50.09	-7.66	Peak	---	---
5	624.61	40.23	46.00	-5.77	45.67	-5.44	Peak	---	---
6	874.87	41.42	46.00	-4.58	42.68	-1.26	Peak	---	---

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

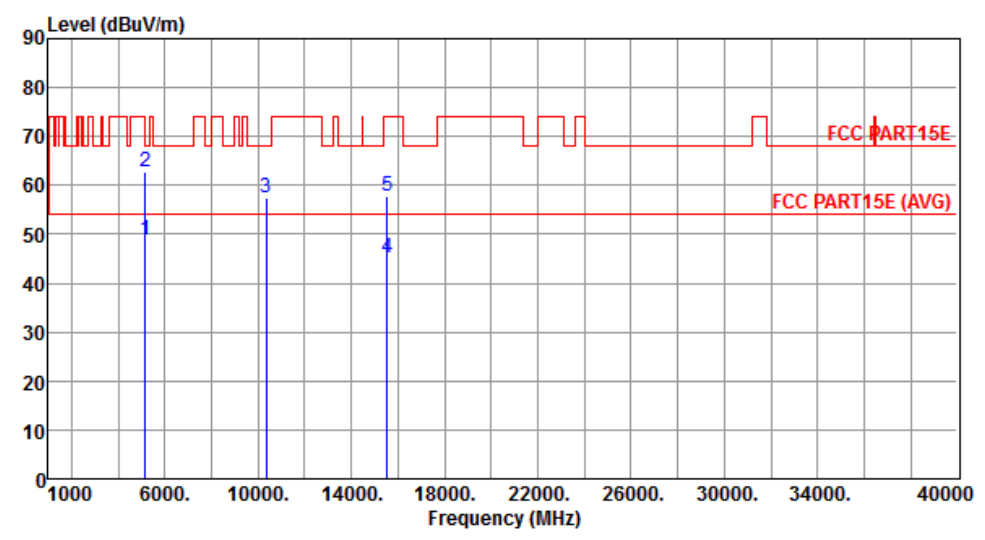
*Factor includes antenna factor , cable loss and amplifier gain

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

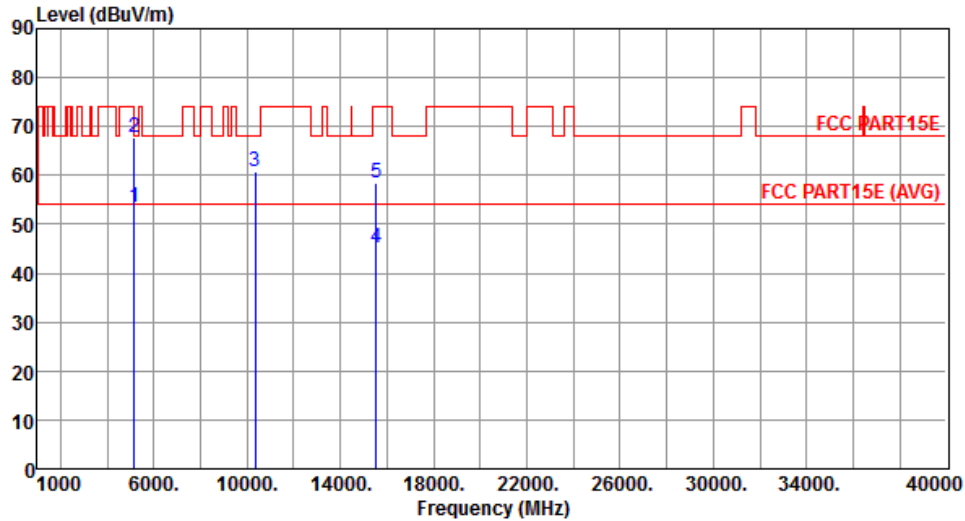
Modulation	11a	Test Freq. (MHz)	5180
Polarization	Horizontal	Test Configuration	1



	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	48.98	54.00	-5.02	42.40	6.58	Average	221	148
2	5150.00	62.79	74.00	-11.21	56.21	6.58	Peak	221	148
3	10360.00	57.35	68.20	-10.85	40.94	16.41	Peak	205	345
4	15540.00	45.26	54.00	-8.74	27.34	17.92	Average	313	236
5	15540.00	57.67	74.00	-16.33	39.75	17.92	Peak	313	236

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	Test Configuration	1



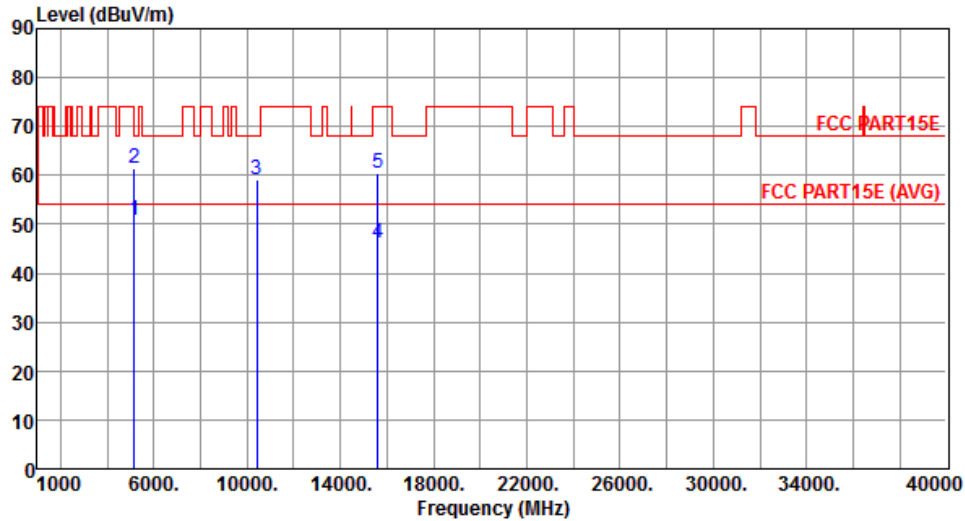
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.40	54.00	-0.60	46.82	6.58	Average	226	293
2	5150.00	67.73	74.00	-6.27	61.15	6.58	Peak	226	293
3	10360.00	60.80	68.20	-7.40	44.39	16.41	Peak	196	308
4	15540.00	45.23	54.00	-8.77	27.31	17.92	Average	325	164
5	15540.00	58.58	74.00	-15.42	40.66	17.92	Peak	325	164

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	Horizontal	Test Configuration	1



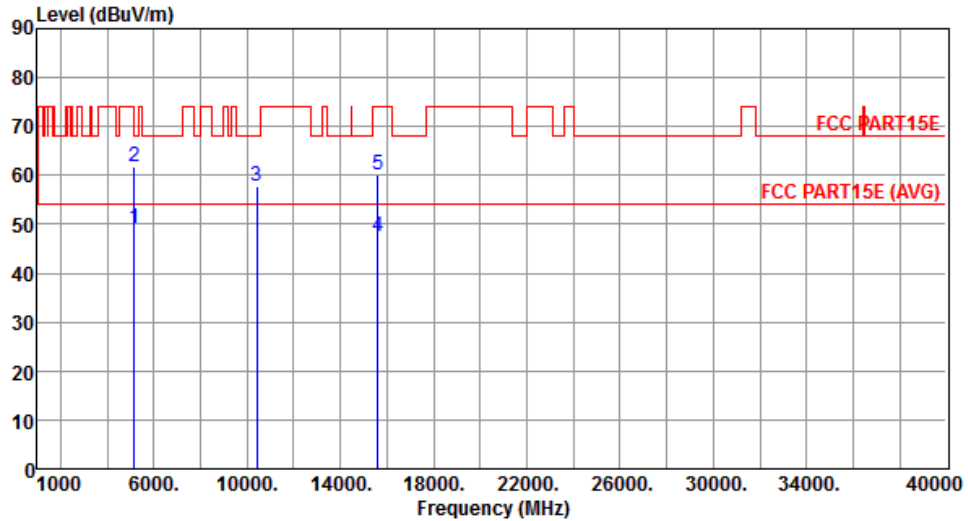
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	50.96	54.00	-3.04	44.38	6.58	Average	165	165
2	5150.00	61.49	74.00	-12.51	54.91	6.58	Peak	165	165
3	10400.00	59.18	68.20	-9.02	42.69	16.49	Peak	185	66
4	15600.00	46.07	54.00	-7.93	28.34	17.73	Average	184	204
5	15600.00	60.29	74.00	-13.71	42.56	17.73	Peak	184	204

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	Test Configuration	1



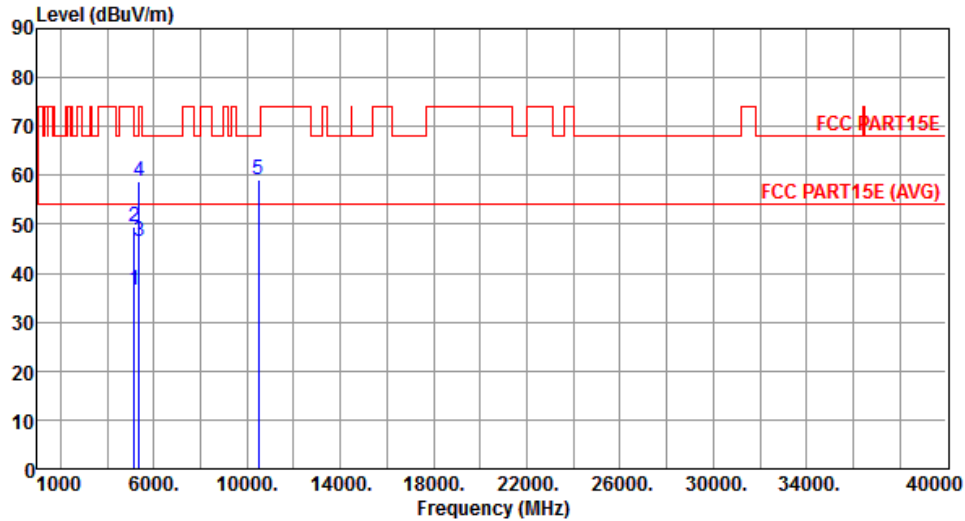
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	49.25	54.00	-4.75	42.67	6.58	Average	209	302
2	5150.00	61.68	74.00	-12.32	55.10	6.58	Peak	209	302
3	10400.00	57.76	68.20	-10.44	41.27	16.49	Peak	199	328
4	15600.00	47.62	54.00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



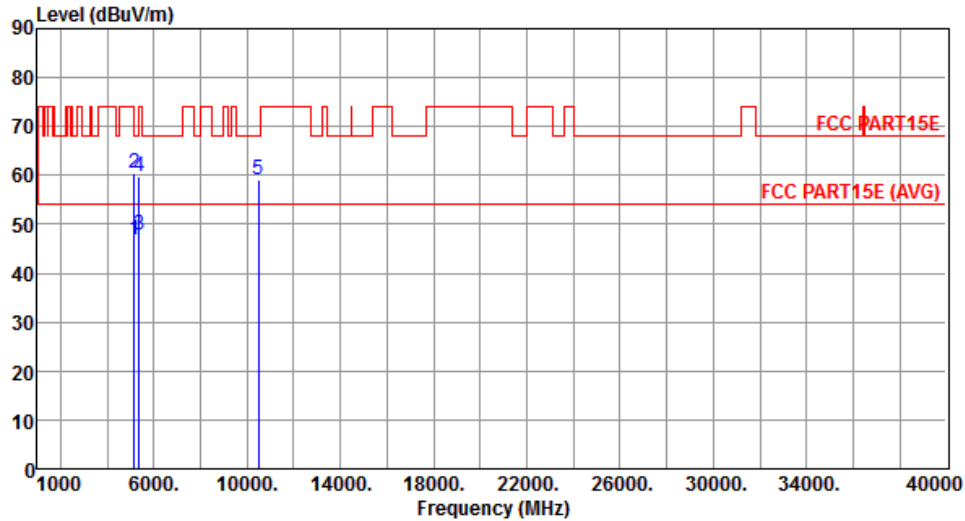
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	36.69	54.00	-17.31	30.11	6.58	Average	154	330
2	5150.00	49.48	74.00	-24.52	42.90	6.58	Peak	154	330
3	5350.00	46.35	54.00	-7.65	39.32	7.03	Average	154	330
4	5350.00	58.65	74.00	-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	Test Configuration	1



	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

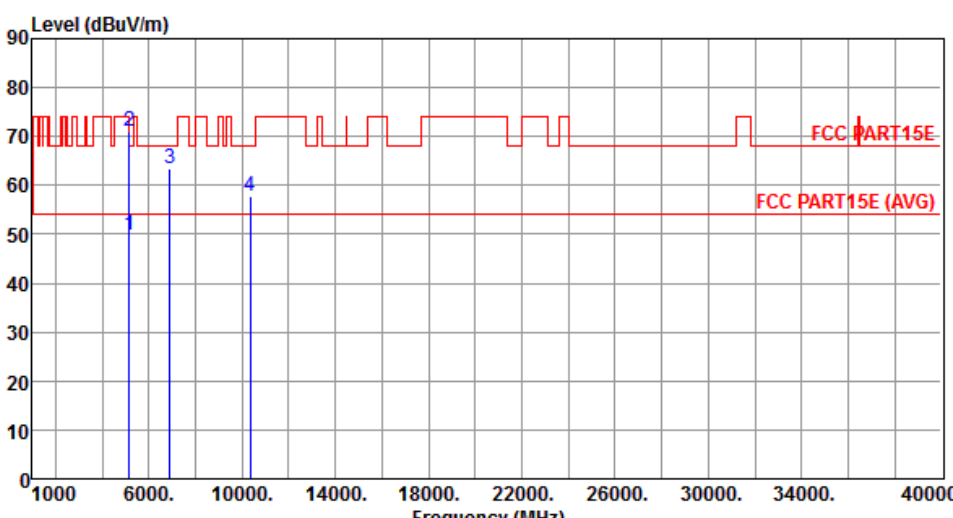
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

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

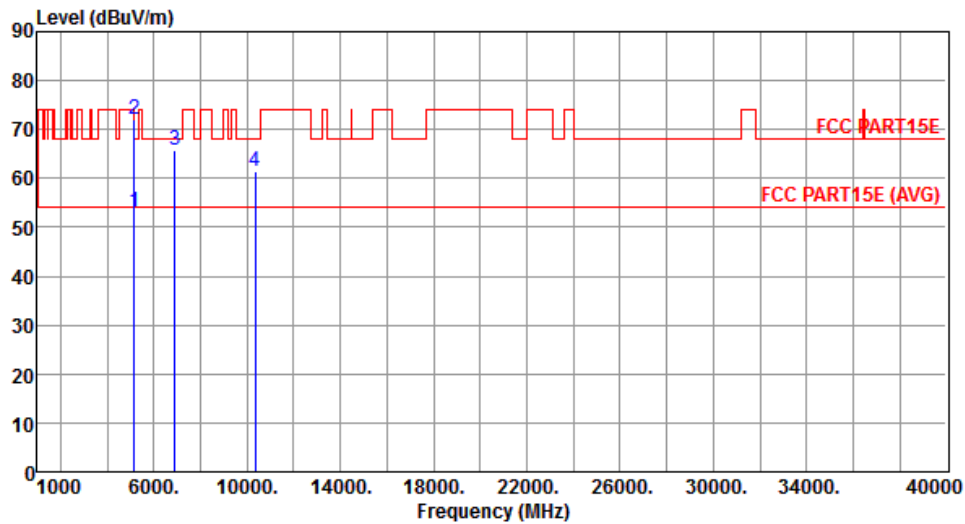
Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Horizontal	Test Configuration	1



	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	49.92	54.00	-4.08	43.34	6.58	Average	183	132
2	5150.00	71.08	74.00	-2.92	64.50	6.58	Peak	183	132
3	6906.00	63.29	68.20	-4.91	53.21	10.08	Peak	353	336
4	10360.00	57.93	68.20	-10.27	41.52	16.41	Peak	152	336

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	Test Configuration	1



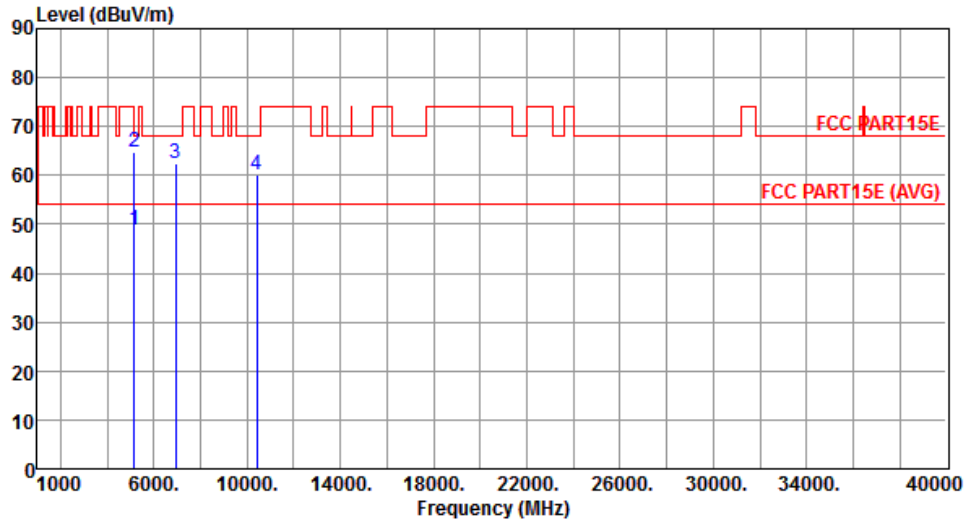
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.00	54.00	-1.00	46.42	6.58	Average	150	297
2	5150.00	71.92	74.00	-2.08	65.34	6.58	Peak	150	297
3	6906.00	65.80	68.20	-2.40	55.72	10.08	Peak	189	266
4	10360.00	61.46	68.20	-6.74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



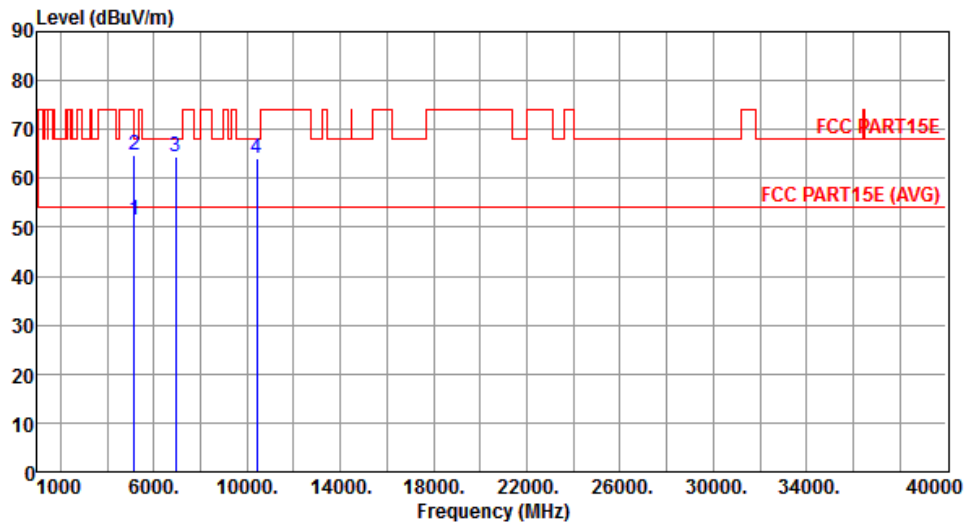
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	48.73	54.00	-5.27	42.15	6.58	Average	170	111
2	5150.00	64.66	74.00	-9.34	58.08	6.58	Peak	170	111
3	6933.00	62.43	68.20	-5.77	52.30	10.13	Peak	306	331
4	10400.00	60.25	68.20	-7.95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



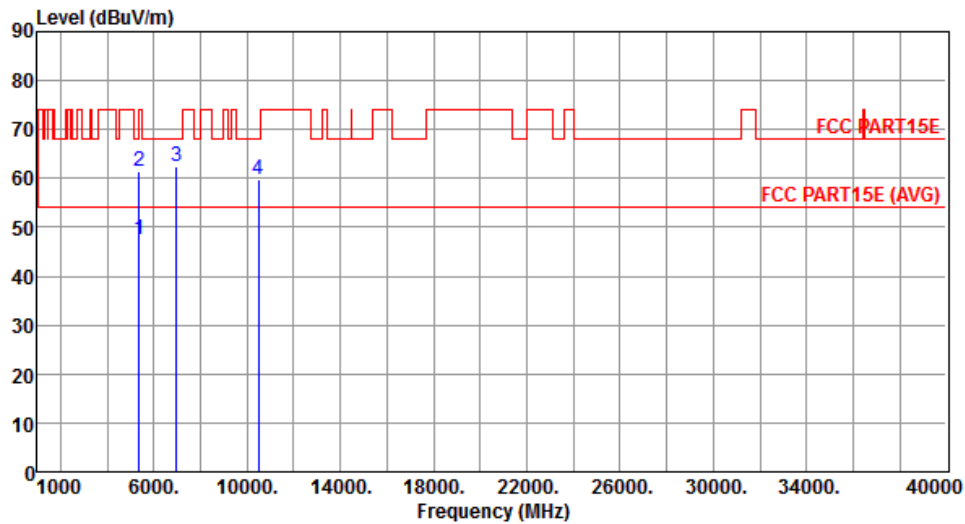
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	51.64	54.00	-2.36	45.06	6.58	Average	159	287
2	5150.00	64.80	74.00	-9.20	58.22	6.58	Peak	159	287
3	6933.00	64.54	68.20	-3.66	54.41	10.13	Peak	190	334
4	10400.00	64.26	68.20	-3.94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



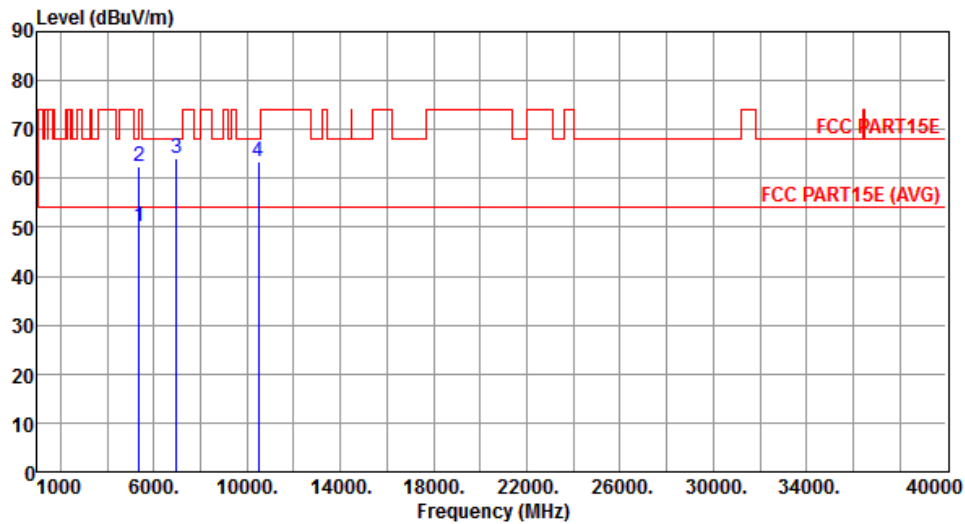
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	47.62	54.00	-6.38	40.59	7.03	Average	150	195
2	5350.00	61.43	74.00	-12.57	54.40	7.03	Peak	150	195
3	6986.00	62.44	68.20	-5.76	52.22	10.22	Peak	306	320
4	10480.00	59.86	68.20	-8.34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



	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	50.21	54.00	-3.79	43.18	7.03	Average	223	13
2	5350.00	62.33	74.00	-11.67	55.30	7.03	Peak	223	13
3	6986.00	64.19	68.20	-4.01	53.97	10.22	Peak	171	9
4	10480.00	63.29	68.20	-4.91	46.63	16.66	Peak	157	6

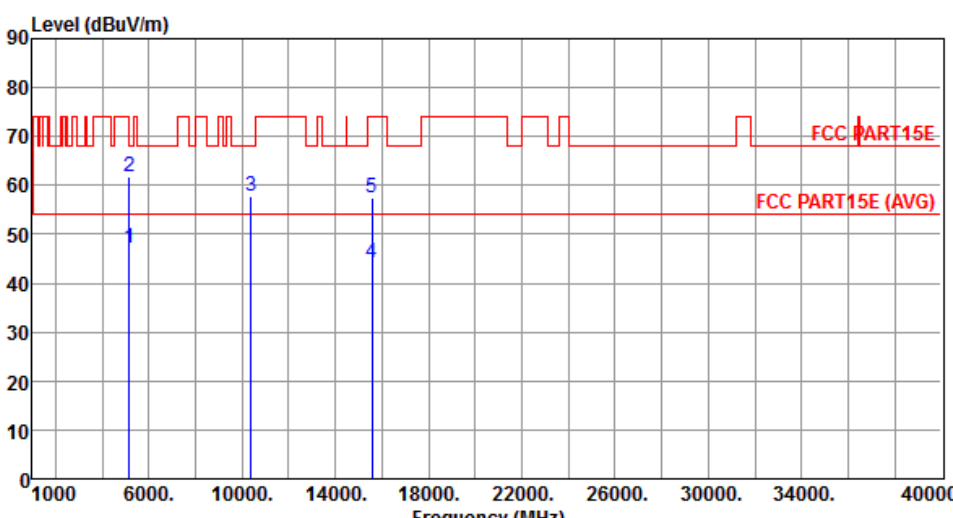
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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

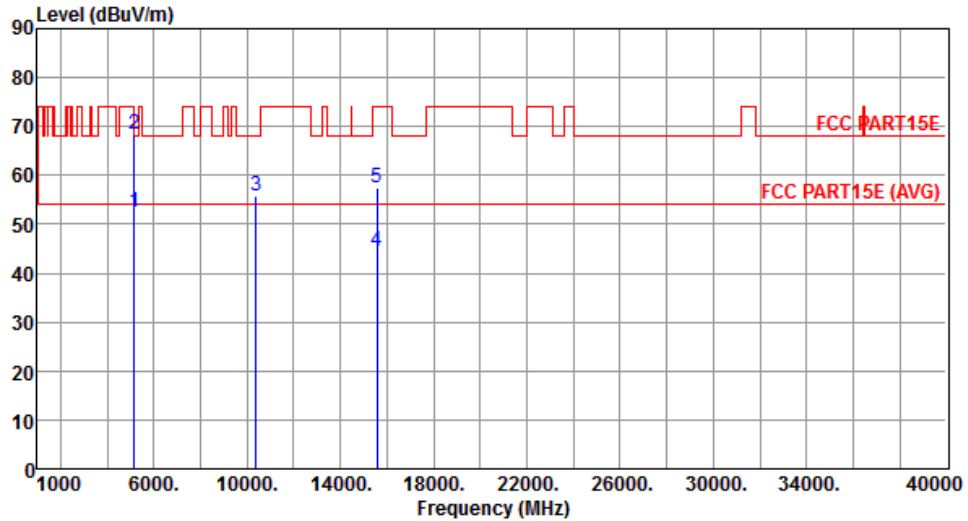
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Horizontal	Test Configuration	1



	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	47.16	54.00	-6.84	40.58	6.58	Average	167	314
2	5150.00	61.76	74.00	-12.24	55.18	6.58	Peak	167	314
3	10380.00	57.74	68.20	-10.46	41.30	16.44	Peak	192	68
4	15570.00	44.32	54.00	-9.68	26.50	17.82	Average	246	59
5	15570.00	57.38	74.00	-16.62	39.56	17.82	Peak	246	59

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

Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical	Test Configuration	1



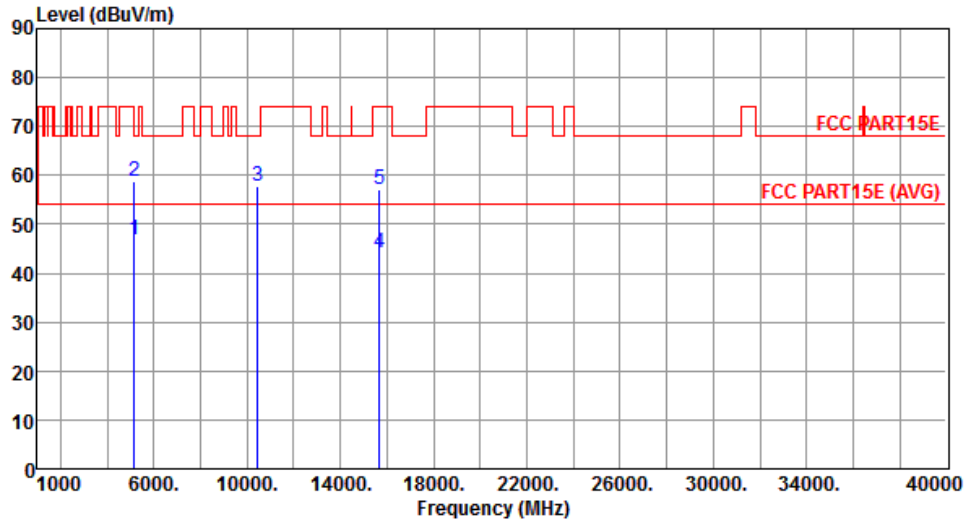
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	52.58	54.00	-1.42	46.00	6.58	Average	185	11
2	5150.00	68.38	74.00	-5.62	61.80	6.58	Peak	185	11
3	10380.00	55.89	68.20	-12.31	39.45	16.44	Peak	166	349
4	15570.00	44.46	54.00	-9.54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



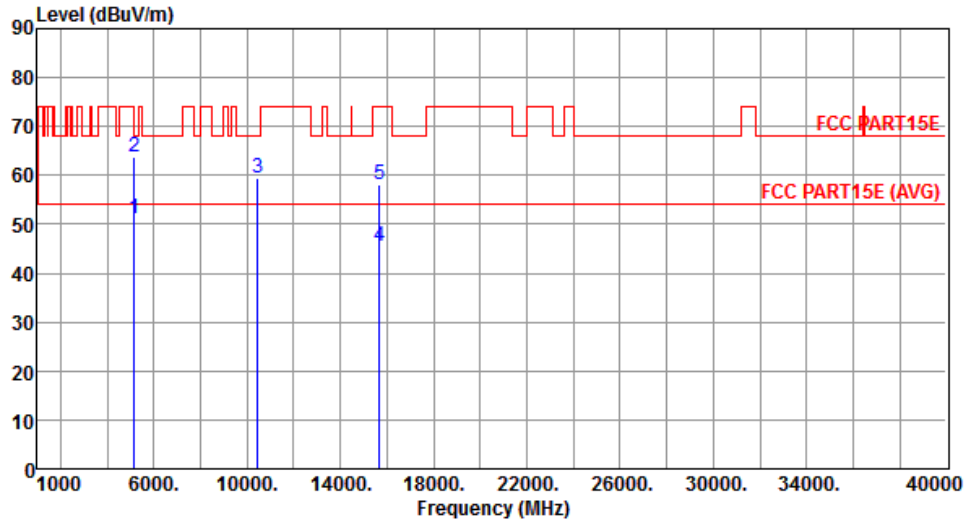
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	46.72	54.00	-7.28	40.14	6.58	Average	224	132
2	5150.00	58.69	74.00	-15.31	52.11	6.58	Peak	224	132
3	10460.00	57.92	68.20	-10.28	41.29	16.63	Peak	156	267
4	15690.00	44.02	54.00	-9.98	26.55	17.47	Average	268	752
5	15690.00	57.02	74.00	-16.98	39.55	17.47	Peak	268	752

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	Test Configuration	1



	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

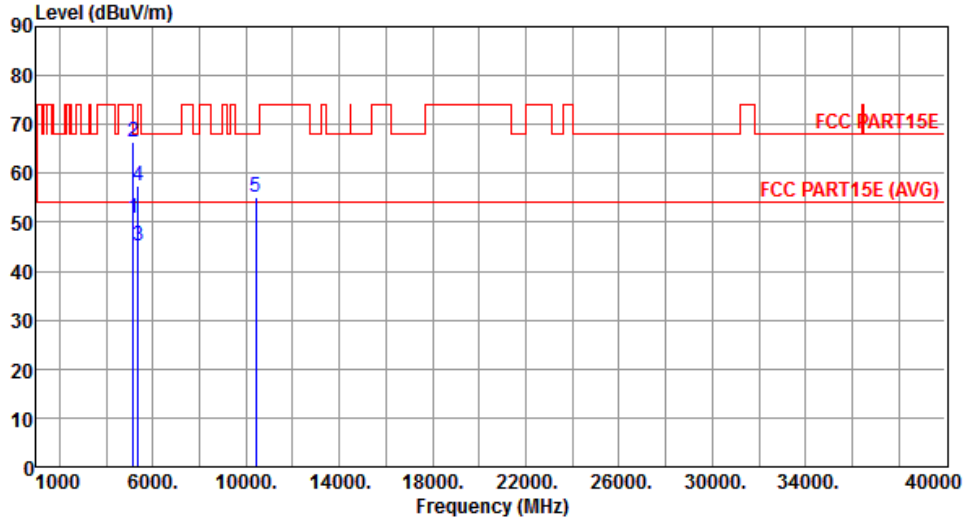
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

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

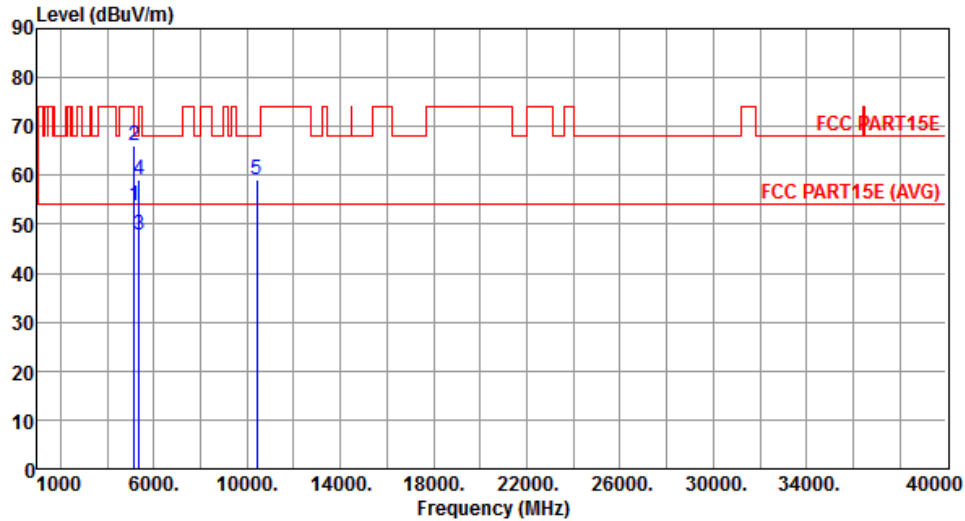
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal	Test Configuration	1



	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	Test Configuration	1



	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)

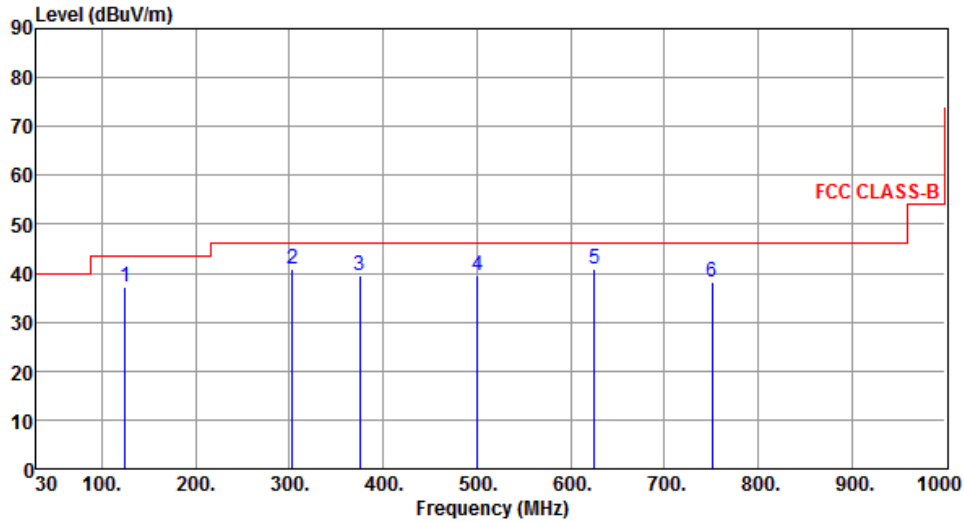
*Factor includes antenna factor , cable loss and amplifier gain

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

Beamforming mode

3.5.9 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal	Test Configuration	1

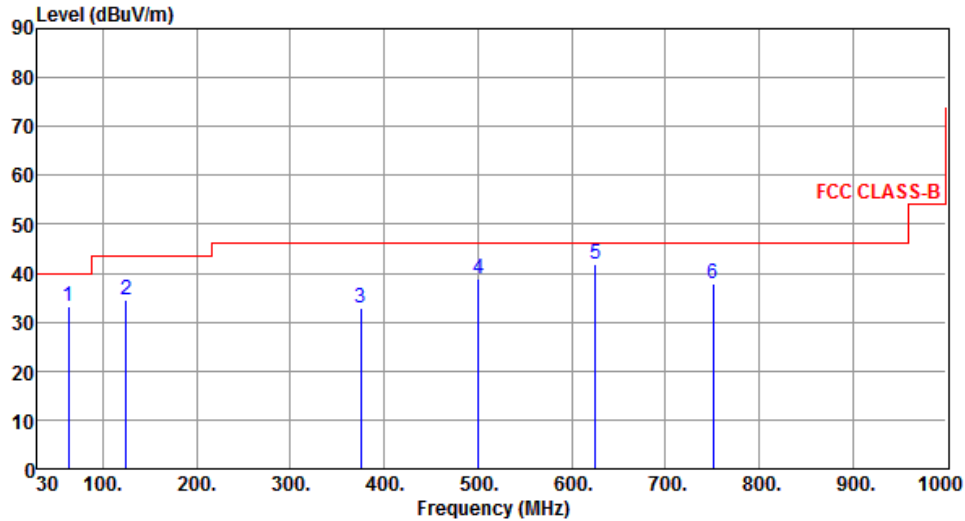


The graph displays the Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red line represents the FCC CLASS-B limit, which is 40 dBuV/m from 30 to 100 MHz, 45 dBuV/m from 100 to 300 MHz, and 55 dBuV/m from 300 to 1000 MHz. Six test results are plotted as blue vertical lines, labeled 1 through 6, corresponding to the data in the table below.

	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	125.09	37.14	43.50	-6.36	52.24	-15.10	Peak	---	---
2	303.51	40.78	46.00	-5.22	53.34	-12.56	Peak	---	---
3	375.35	39.62	46.00	-6.38	50.35	-10.73	Peak	---	---
4	500.42	39.66	46.00	-6.34	47.30	-7.64	Peak	---	---
5	625.52	40.70	46.00	-5.30	46.02	-5.32	Peak	---	---
6	750.80	38.17	46.00	-7.83	41.35	-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	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical	Test Configuration	1



	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	---	---

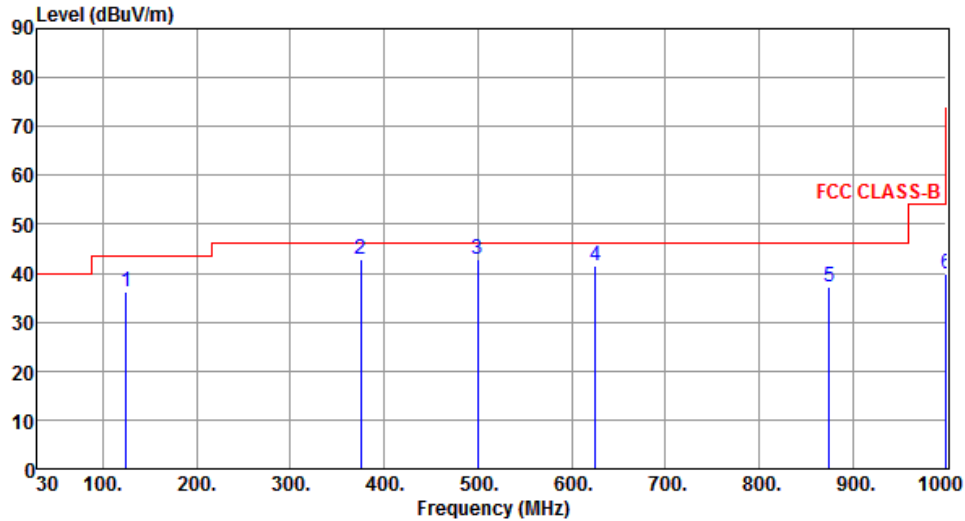
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal	Test Configuration	3



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	125.12	36.21	43.50	-7.29	51.33	-15.12	Peak	---	---
2	374.89	42.81	46.00	-3.19	53.57	-10.76	QP	100	179
3	499.98	42.95	46.00	-3.05	50.60	-7.65	QP	100	238
4	625.21	41.65	46.00	-4.35	47.07	-5.42	Peak	---	---
5	874.87	37.15	46.00	-8.85	38.41	-1.26	Peak	---	---
6	1000.00	39.95	54.00	-14.05	39.40	0.55	Peak	---	---

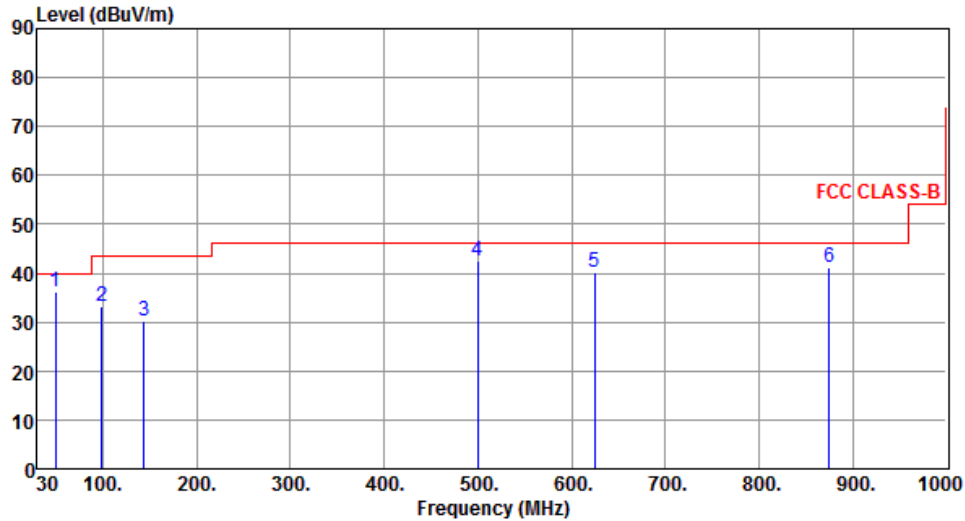
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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)	5230
Polarization	Vertical	Test Configuration	3



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	49.69	36.22	40.00	-3.78	49.17	-12.95	Peak	---	---
2	98.90	33.11	43.50	-10.39	51.70	-18.59	Peak	---	---
3	143.51	30.12	43.50	-13.38	43.75	-13.63	Peak	---	---
4	499.80	42.39	46.00	-3.61	50.04	-7.65	Peak	---	---
5	624.70	40.12	46.00	-5.88	45.56	-5.44	Peak	---	---
6	874.87	41.33	46.00	-4.67	42.59	-1.26	Peak	---	---

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

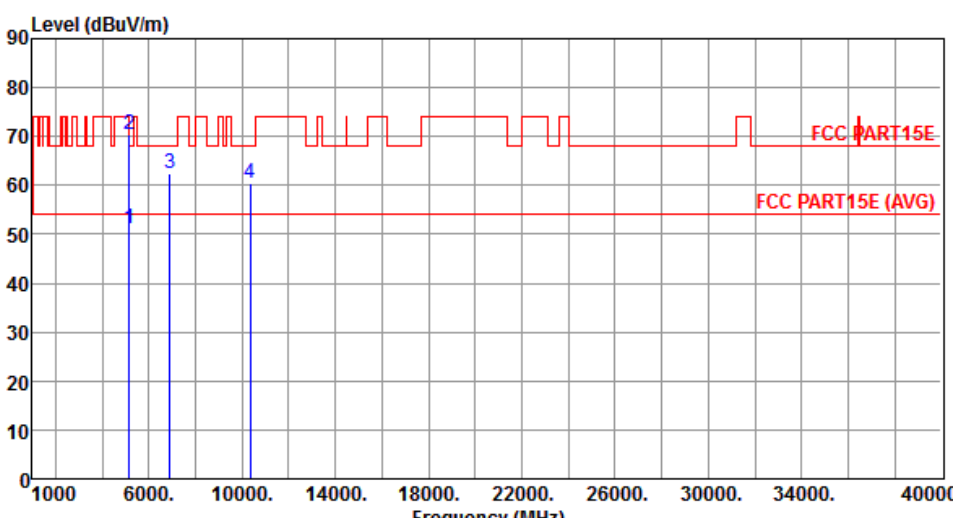
*Factor includes antenna factor , cable loss and amplifier gain

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.

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

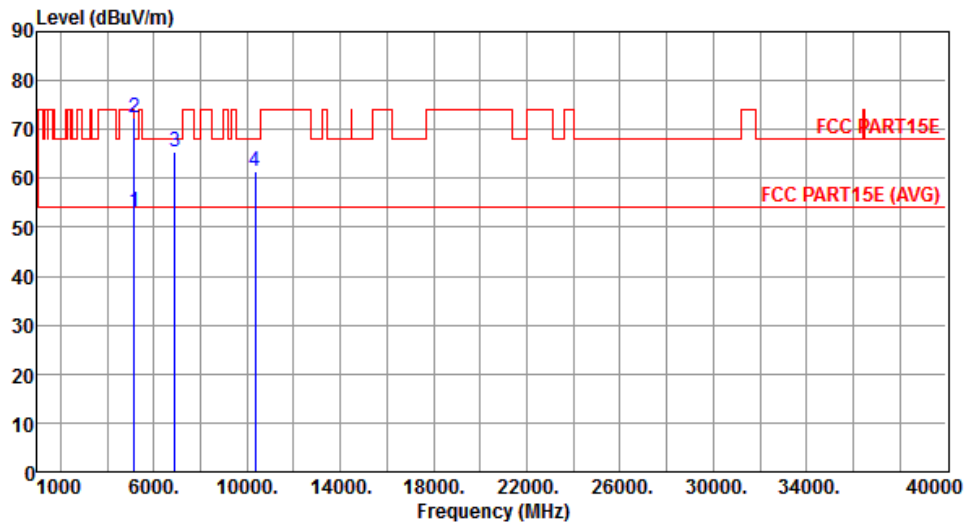
Modulation	VHT20	Test Freq. (MHz)	5180
Polarization	Horizontal	Test Configuration	1



	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	Test Configuration	1



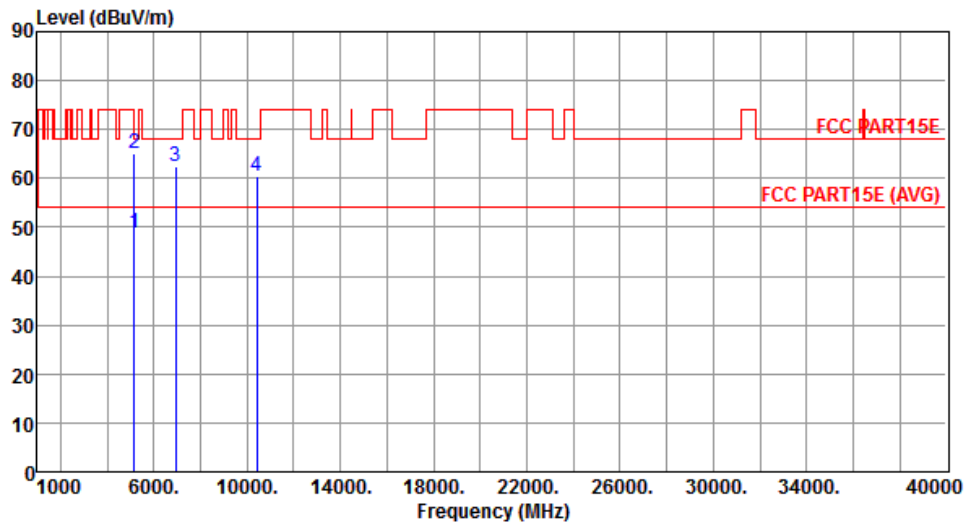
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.06	54.00	-0.94	46.87	6.19	Average	166	32
2	5150.00	72.41	74.00	-1.59	66.22	6.19	Peak	166	32
3	6906.00	65.46	68.20	-2.74	55.81	9.65	Peak	179	255
4	10360.00	61.57	68.20	-6.63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



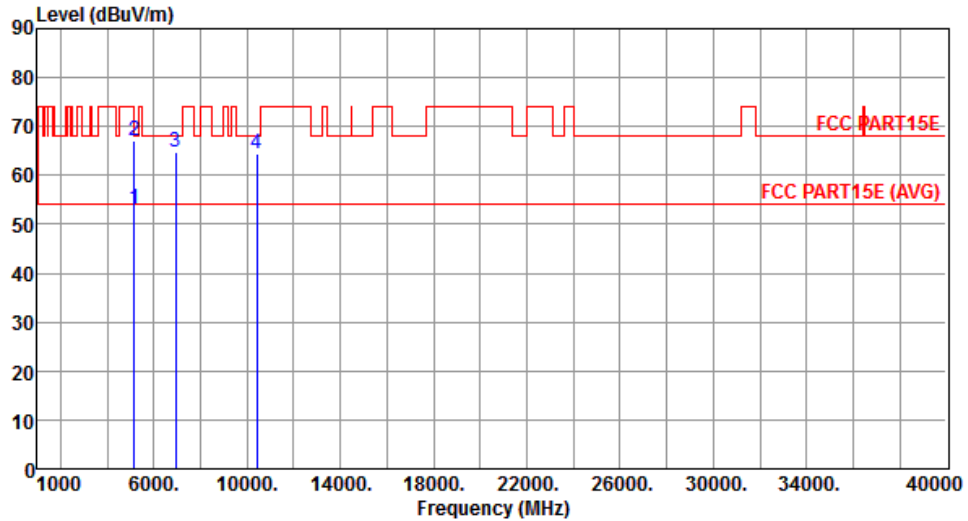
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	48.91	54.00	-5.09	42.72	6.19	Average	165	89
2	5150.00	65.19	74.00	-8.81	59.00	6.19	Peak	165	89
3	6933.00	62.57	68.20	-5.63	52.87	9.70	Peak	157	154
4	10400.00	60.35	68.20	-7.85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



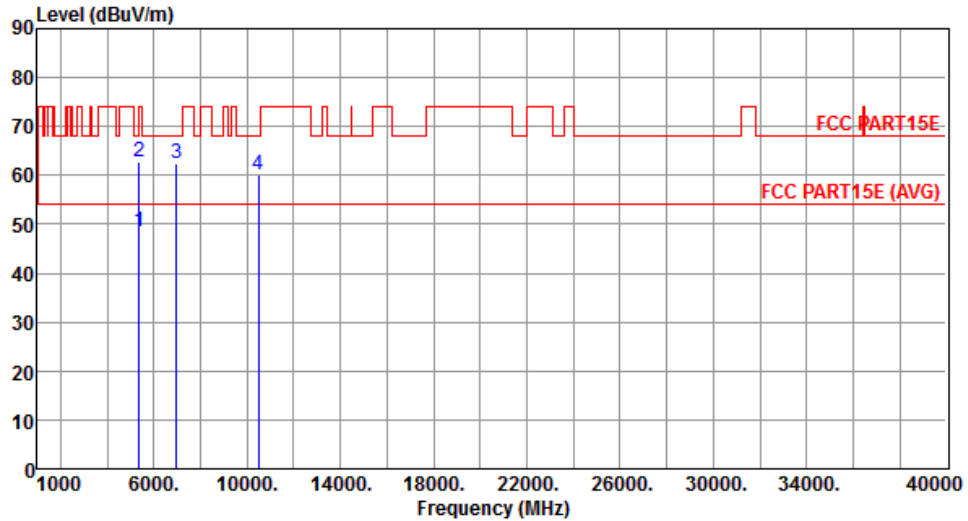
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.29	54.00	-0.71	47.10	6.19	Average	173	357
2	5150.00	67.14	74.00	-6.86	60.95	6.19	Peak	173	357
3	6933.00	64.63	68.20	-3.57	54.93	9.70	Peak	189	334
4	10400.00	64.57	68.20	-3.63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



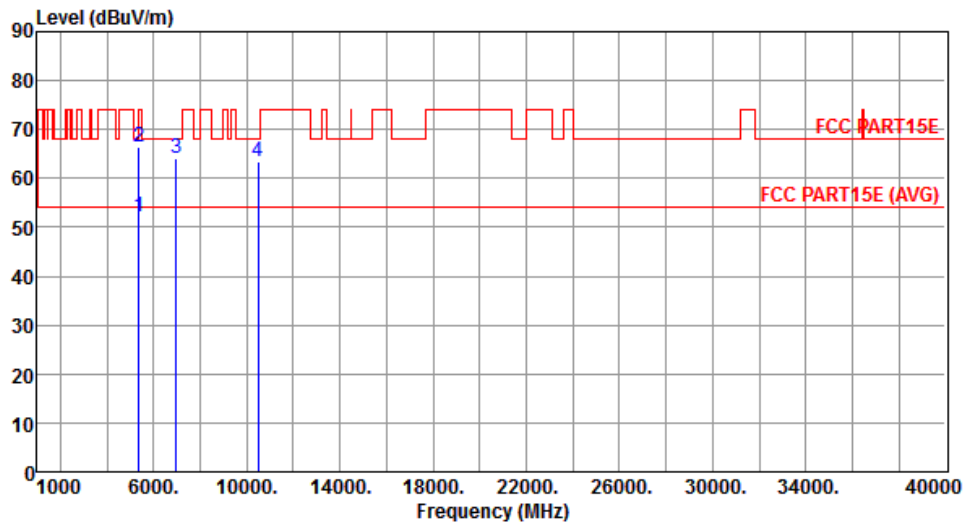
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5350.00	48.57	54.00	-5.43	42.06	6.51	Average	165	127
2	5350.00	62.64	74.00	-11.36	56.13	6.51	Peak	165	127
3	6986.00	62.54	68.20	-5.66	52.74	9.80	Peak	277	312
4	10480.00	59.98	68.20	-8.22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



	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	52.13	54.00	-1.87	45.62	6.51	Average	222	289
2	5350.00	66.35	74.00	-7.65	59.84	6.51	Peak	222	289
3	6986.00	64.23	68.20	-3.97	54.43	9.80	Peak	202	28
4	10480.00	63.57	68.20	-4.63	47.12	16.45	Peak	158	7

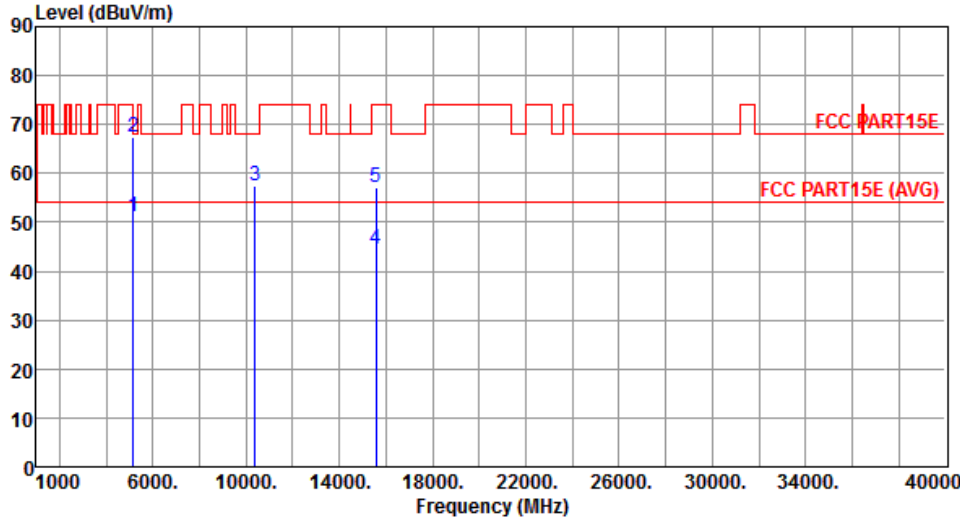
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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

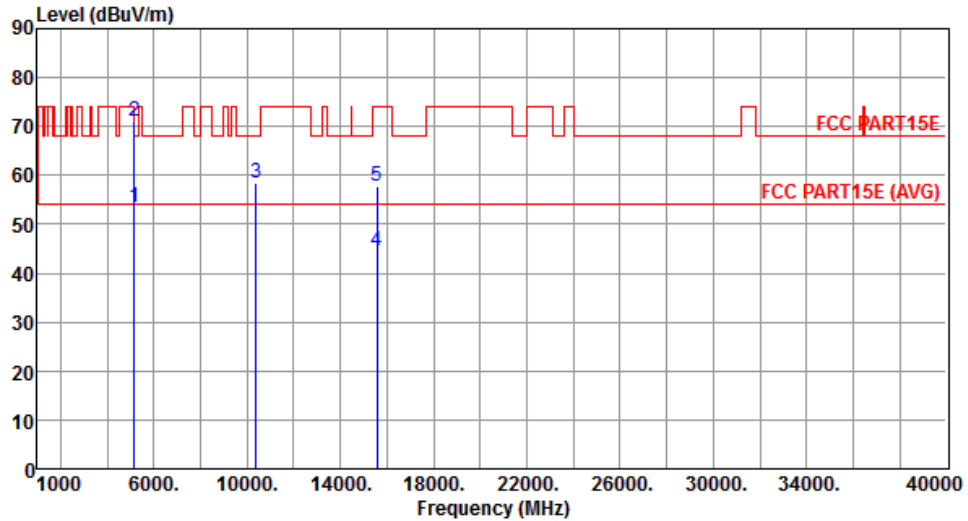
Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Horizontal	Test Configuration	1



	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	51.25	54.00	-2.75	45.06	6.19	Average	153	161
2	5150.00	67.36	74.00	-6.64	61.17	6.19	Peak	153	161
3	10380.00	57.60	68.20	-10.60	41.34	16.26	Peak	200	78
4	15570.00	44.41	54.00	-9.59	27.09	17.32	Average	238	68
5	15570.00	57.21	74.00	-16.79	39.89	17.32	Peak	238	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	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical	Test Configuration	1



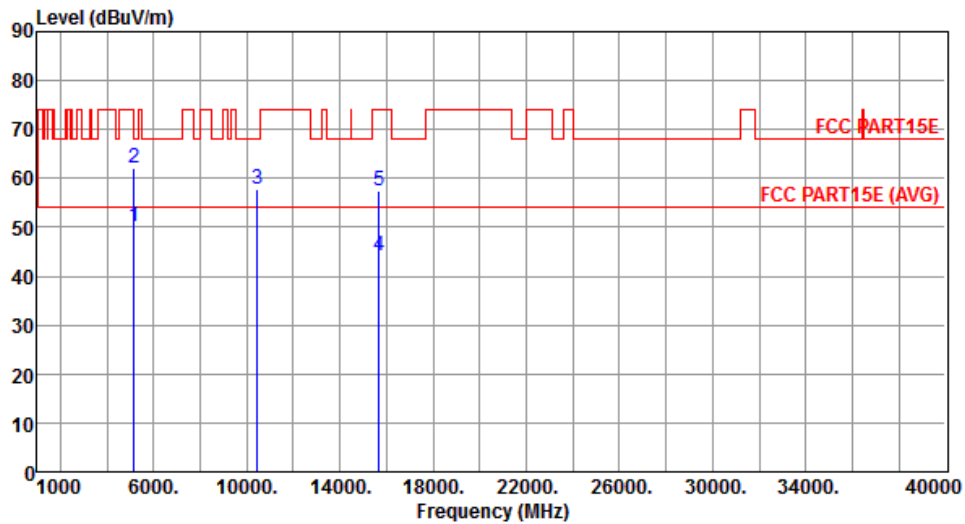
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.59	54.00	-0.41	47.40	6.19	Average	222	145
2	5150.00	71.06	74.00	-2.94	64.87	6.19	Peak	222	145
3	10380.00	58.52	68.20	-9.68	42.26	16.26	Peak	158	355
4	15570.00	44.51	54.00	-9.49	27.19	17.32	Average	270	160
5	15570.00	57.65	74.00	-16.35	40.33	17.32	Peak	270	160

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	Test Configuration	1



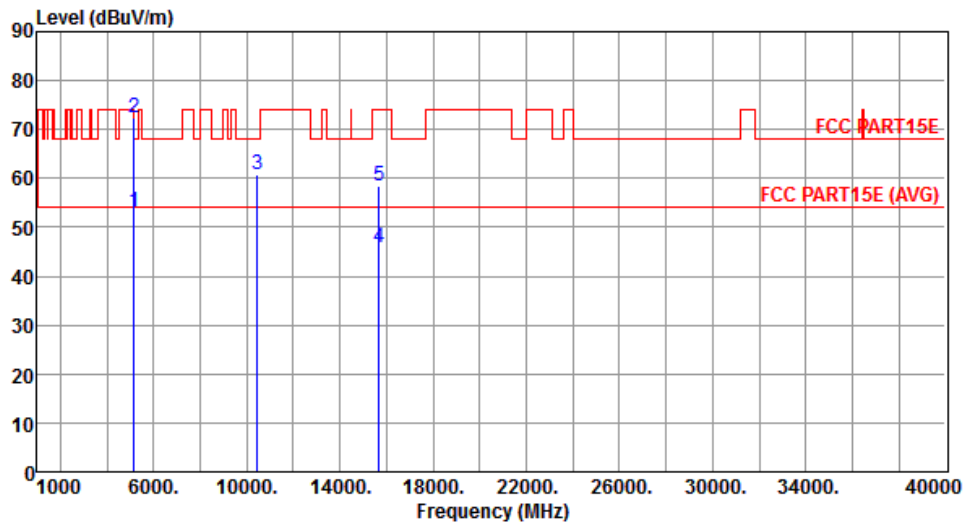
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	50.04	54.00	-3.96	43.85	6.19	Average	222	142
2	5150.00	62.08	74.00	-11.92	55.89	6.19	Peak	222	142
3	10460.00	57.77	68.20	-10.43	41.35	16.42	Peak	161	258
4	15690.00	44.12	54.00	-9.88	27.01	17.11	Average	257	255
5	15690.00	57.35	74.00	-16.65	40.24	17.11	Peak	257	255

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	Test Configuration	1



	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

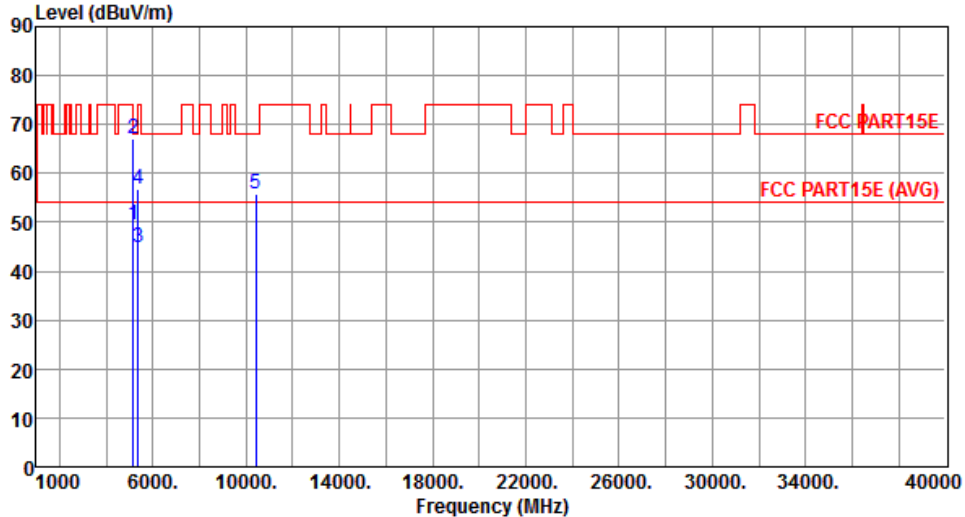
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

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

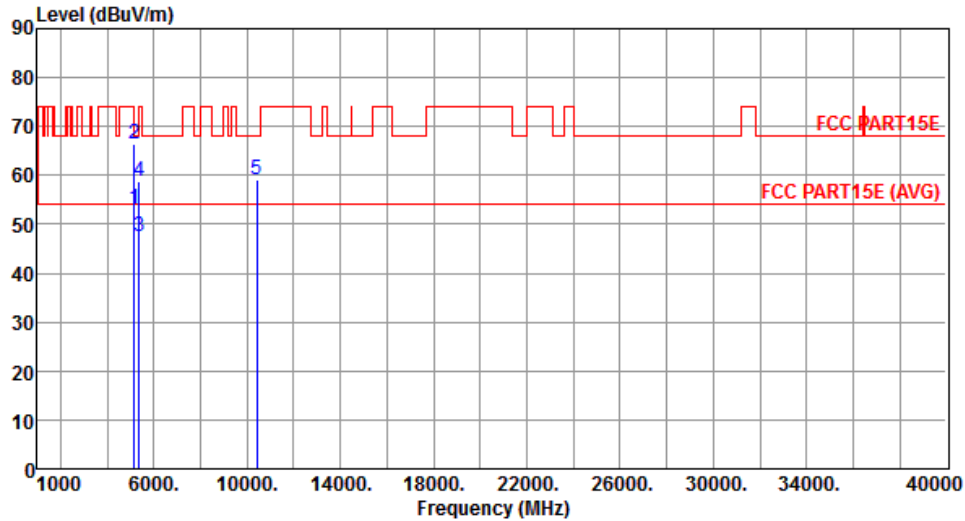
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal	Test Configuration	1



	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	Test Configuration	1



	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).

3.6 Frequency Stability

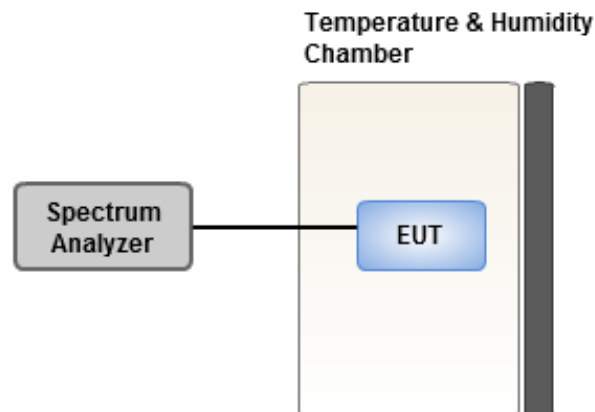
3.6.1 Limit of Frequency Stability

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

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>.

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