FCC Test Report

FCC ID	:	**ACQ-MG3OTA**
Equipment	:	**Set Top Box**
Model No.	:	**MG3-OTA-H, MG3-OTA-L**
Brand Name	:	**TiVo**
Applicant	:	**ARRIS**
Address	:	**101 Tournament Drive, Horsham Pennsylvania, United States, 19044**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**May 20, 2019**
Tested Date	:	**May 24 ~ Jun. 03, 2019**

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

Reviewed by:

Along Chen / Assistant Manager

Approved by:

Gary Chang / Manager

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR932003-02AC	Rev. 01	Initial issue	Jun. 14, 2019

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.168MHz 47.15 (Margin -7.93dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2340.00MHz 73.82 (Margin -0.18dB) - PK	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: ***Non-beamforming mode*** 29.65 ***Beamforming mode*** 25.37	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Product Details

The following models are provided to this EUT.

Model Name	Difference
MG3-OTA-H	ATSC tuner*4, 2TB HDD
MG3-OTA-L	ATSC tuner*2, 500GB HDD
✦ The above models had been covered during the pretest and found that model **MG3-OTA-H** was the worst one and selected for final test and only its data was recorded in this report.	

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**
2400-2483.5	b	2412-2462	1-11 [11]	4	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	4	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	4	MCS 0-31
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	4	MCS 0-31
2400-2483.5	ac (VHT20)	2412-2462	1-11 [11]	4	MCS 0-9
2400-2483.5	ac (VHT40)	2422-2452	3-9 [7]	4	MCS 0-9
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.. Note 4: 802.11ac supports beamforming function.					

1.1.3 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	M2420ARVSU_G115U	PIFA	UFL	3.2	4.1	4.7	5.1	5.1
2	M2420ARHSU_G55U	PIFA	UFL	3	4.9	4.2	5.3	5.5
3	M2420SDARVSU_G120U	PIFA	UFL	2.5	5.3	6	5.5	3
4	M2420SDARVSU_G270U	PIFA	UFL	2.8	4.5	4.5	4.2	2.8

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter

1.1.5 Accessories

Accessories		
No.	**Equipment**	**Description**
1	Adapter	Brand: TiVo Manufacturer: LITE-ON INC Model: PB-1300-3AR5 Power Rating: I/P: 100-120Vac, 1.0A, 60Hz O/P: 12Vdc, 2.5A Power Line: 1.8m non-shielded without core
2	Adapter	Brand: TiVo Manufacturer: NETBIT ELECTRONICS LTD. Model: NBS36E120250VU Power Rating: I/P: 100-120Vac, 60Hz, 0.8A O/P: 12.0Vdc, 2.5A Power Line: 1.8m non-shielded without core
3	HDMI cable	1.8m shielded without core
4	HDD	Brand: SEAGATE Model: ST2000VT000 Product: Video 2.5 HDD
5	HDD	Brand: SEAGATE Model: ST500VT003 Product: Video 2.5 HDD
6	Remote Control	Brand: REMOTESOLUTION CO.,LTD Model: SBOM_03031_000
7	AA Battery for Remote Control	1.5Vdc *2

1.1.6 Channel List

Frequency band (MHz)		2400~2483.5	
802.11 b / g / n HT20 / ac VHT20		802.11n HT40 / ac VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447	---	---
9	2452	---	---
10	2457	---	---
11	2462	---	---

1.1.7 Test Tool and Duty Cycle

Test Tool	Mtool, V3.1.0.3				
Duty Cycle and Duty Factor	Mode	Non-beamforming		Beamforming	
		Duty cycle (%)	Duty factor (dB)	Duty cycle (%)	Duty factor (dB)
	11b	96.69%	0.15	---	---
	11g	95.67%	0.19	---	---
	VHT20	99.26%	0.03	97.15%	0.13
	VHT40	99.11%	0.04	---	---

1.1.8 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index	
		Non-beamforming	Beamforming
11b	2412	80	---
11b	2437	92	---
11b	2462	92	---
11g	2412	72	---
11g	2437	80	---
11g	2462	74	---
VHT20	2412	70	70
VHT20	2437	76	76
VHT20	2462	72	72
VHT40	2422	54	30
VHT40	2437	68	44
VHT40	2452	58	34

1.2 Local Support Equipment List

Non-beamforming mode

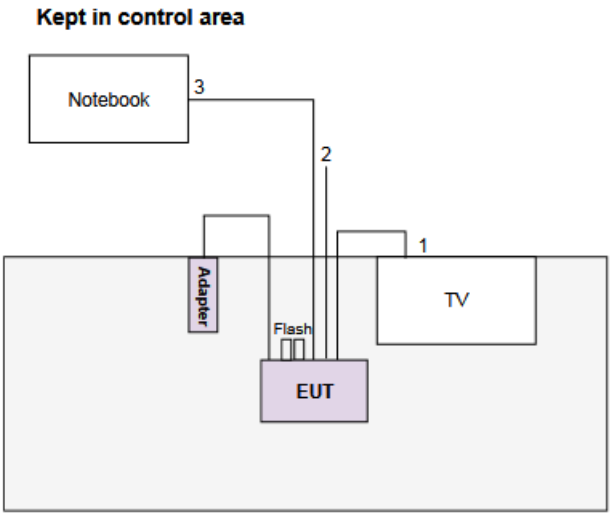
Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Notebook	DELL	Latitude E6440	DoC	---
2	TV	CHIMEI	TL-24LF500D	---	---
3	USB Flash	Kingston	DTSE9	---	---
4	USB Flash	Kingston	DTSE9	---	---

Beamforming mode

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Notebook	DELL	Latitude E6440	DoC	---
2	TV	CHIMEI	TL-24LF500D	---	---
3	USB Flash	Kingston	DTSE9	---	---
4	USB Flash	Kingston	DTSE9	---	---
5	Notebook	DELL	Latitude E5470	DoC	---
6	BF Client	TiVo	MG3-R	---	Provided by applicant.

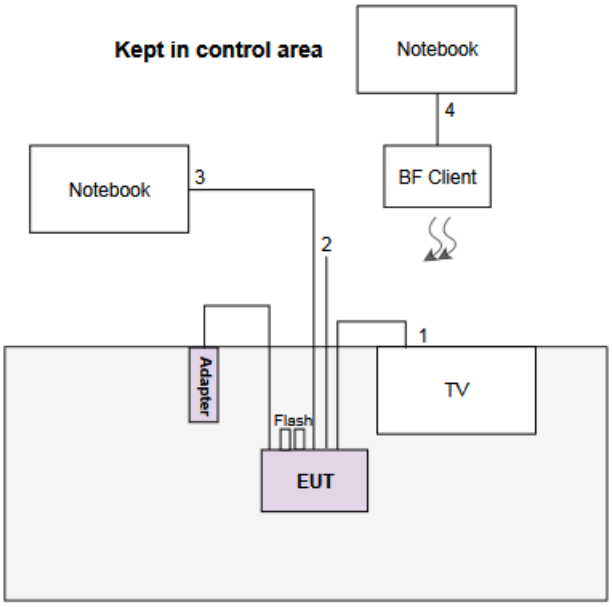
1.3 Test Setup Chart

Non-beamforming mode

Test Setup Diagram


No.	Signal cable / Length (m)
1	HDMI, 1.8m shielded.
2	Fiber, 1.2m non-shielded.
3	RJ45, 10m non-shielded.

Beamforming mode

Test Setup Diagram


No.	Signal cable / Length (m)
1	HDMI, 1.8m shielded.
2	Fiber, 1.2m non-shielded.
3	RJ45, 10m non-shielded.
4	RJ45, 1m non-shielded.

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101657	Jan. 08, 2019	Jan. 07, 2020
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 05, 2018	Nov. 04, 2019
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 29, 2018	Nov. 28, 2019
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 23, 2018	Oct. 23, 2019
50 ohm terminal (Support Unit)	NA	50	02	Apr. 19, 2019	Apr. 18, 2020
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	R&S	FSV40	101499	Jan. 07, 2019	Jan. 06, 2020
Receiver	R&S	ESR3	101658	Dec. 11, 2018	Dec. 10, 2019
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 17, 2019	Apr. 16, 2020
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 07, 2019	Jan. 06, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 08, 2018	Oct. 07, 2019
Preamplifier	EMC	EMC02325	980187	Aug. 24, 2018	Aug. 23, 2019
Preamplifier	Agilent	83017A	MY53270014	Aug. 09, 2018	Aug. 08, 2019
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/**4**	Oct. 01, 2018	Sep. 30, 2019
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Oct. 01, 2018	Sep. 30, 2019
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Oct. 01, 2018	Sep. 30, 2019
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Oct. 01, 2018	Sep. 30, 2019
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Oct. 01, 2018	Sep. 30, 2019
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Oct. 01, 2018	Sep. 30, 2019
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	Apr. 17, 2019	Apr. 16, 2020
Power Meter	Anritsu	ML2495A	1241002	Oct. 09, 2018	Oct. 08, 2019
Power Sensor	Anritsu	MA2411B	1207366	Oct. 09, 2018	Oct. 08, 2019
AC POWER SOURCE	APC	AFC-500W	F312060012	Nov. 29, 2018	Nov. 28, 2019
Measurement Software	SENSE-15247_FS	SENSE-15247_FS	V5.10.1	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247
ANSI C63.10-2013
FCC KDB 558074 D01 15.247 Meas Guidance v05r02
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 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	±34.130 Hz
Conducted power	±0.808 dB
Power density	±0.583 dB
Conducted emission	±2.715 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.96 dB
Radiated emission > 1GHz	±4.51 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 65%	Alex Tsai
Radiated Emissions	03CH03-WS	24°C / 63-68%	Roger Lu
RF Conducted	TH01-WS	24°C / 66%	Aska Huang

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Non-beamforming mode

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	11b	2437	1 Mbps	---
Radiated Emissions ≤1GHz	11b	2437	1 Mbps	---
Maximum Output Power Radiated Emissions >1GHz 6dB bandwidth Power spectral density	11b 11g VHT20 VHT40	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462 2422 / 2437 / 2452	1 Mbps 6 Mbps MCS 0 MCS 0	---
NOTE: Two adapters (LITE-ON & NETBIT) had been covered during the pretest and found that **NETBIT** adapter was the worst case for radiated emission test and **LITE-ON** adapter was the worst case for conducted emission test.				

Beamforming mode

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	VHT20	2437	MCS 0	---
Radiated Emissions ≤1GHz	VHT20	2437	MCS 0	---
Maximum Output Power	VHT20 VHT40	2412 / 2437 / 2462 2422 / 2437 / 2452	MCS 0 MCS 0	---
Radiated Emissions >1GHz 6dB bandwidth Power spectral density	VHT20	2412 / 2437 / 2462	MCS 0	---
NOTE: 1. Two adapters (LITE-ON & NETBIT) had been covered during the pretest and found that **NETBIT** adapter was the worst case for radiated emission test and **LITE-ON** adapter was the worst case for conducted emission test. 2. VHT40 mode of beamforming mode is not tested for other items since the output power is lower 6.02 dB than VHT40 mode of non-beamforming mode.				

3 Transmitter Test Results

3.1 Conducted Emissions

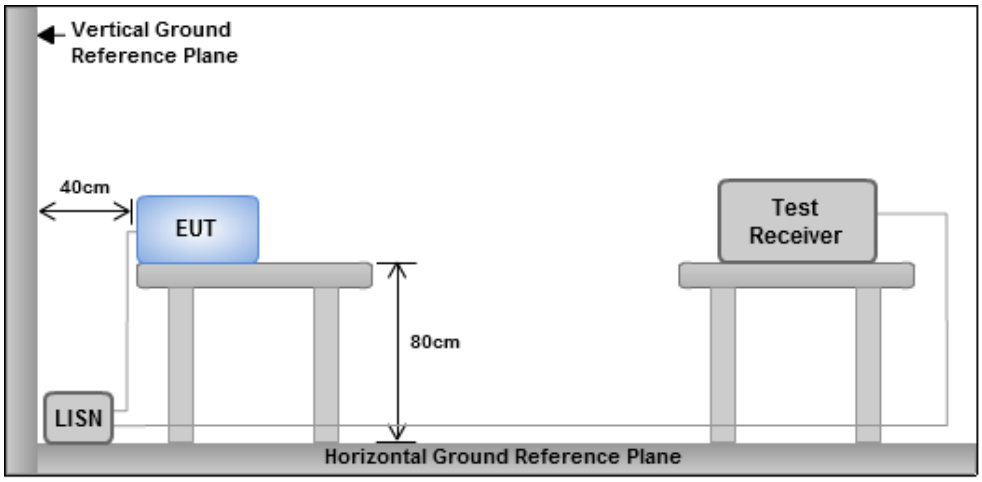
3.1.1 Limit of Conducted Emissions

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

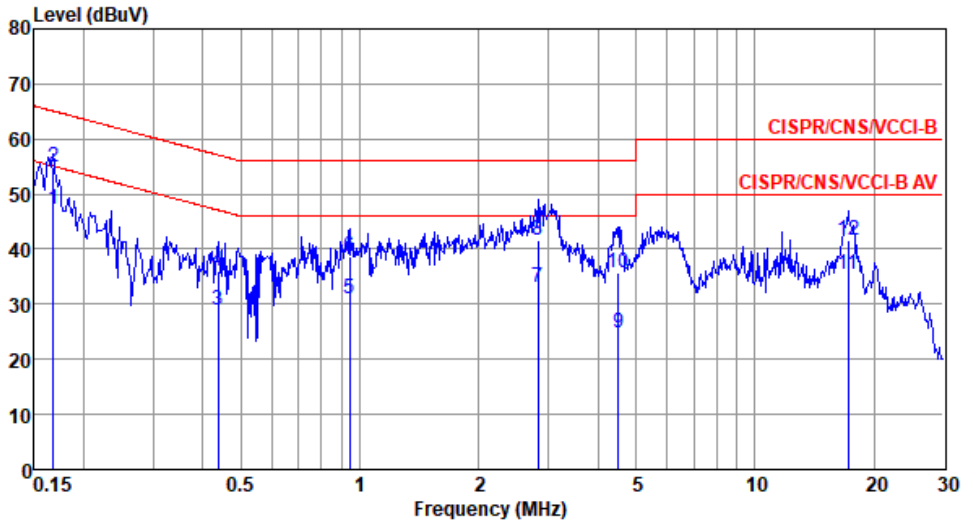


Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Non-beamforming mode

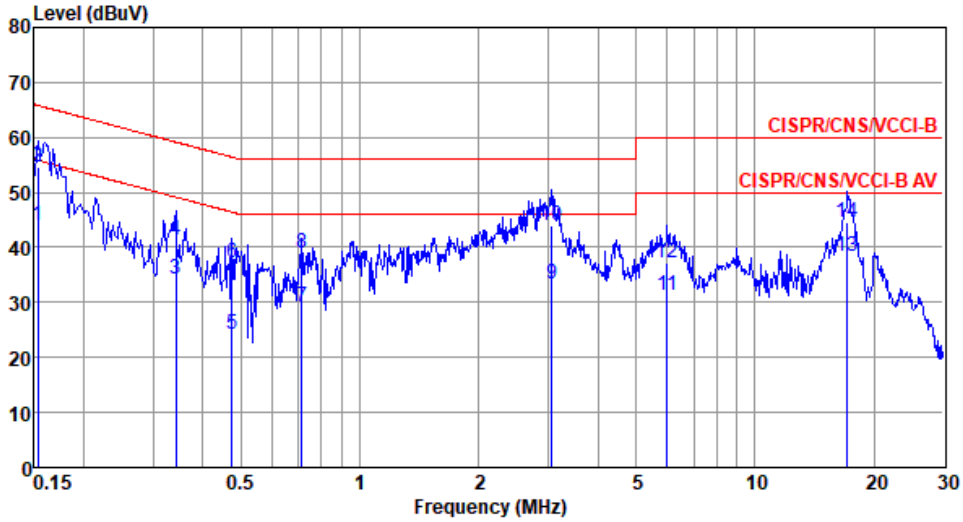
Modulation	11b	**Test Freq. (MHz)**	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1*	0.168	47.15	55.08	-7.93	37.41	9.53	0.06	Average
2	0.168	54.94	65.08	-10.14	45.20	9.53	0.06	QP
3	0.437	29.04	47.11	-18.07	19.13	9.57	0.08	Average
4	0.437	35.94	57.11	-21.17	26.03	9.57	0.08	QP
5	0.943	31.01	46.00	-14.99	21.01	9.60	0.10	Average
6	0.943	38.58	56.00	-17.42	28.58	9.60	0.10	QP
7	2.824	32.92	46.00	-13.08	22.73	9.60	0.22	Average
8	2.824	41.56	56.00	-14.44	31.37	9.60	0.22	QP
9	4.501	24.94	46.00	-21.06	14.65	9.61	0.30	Average
10	4.501	35.84	56.00	-20.16	25.55	9.61	0.30	QP
11	17.199	35.51	50.00	-14.49	24.74	9.66	0.58	Average
12	17.199	41.52	60.00	-18.48	30.75	9.66	0.58	QP

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

Modulation	11b	Test Freq. (MHz)	2437
Power Phase	Neutral		

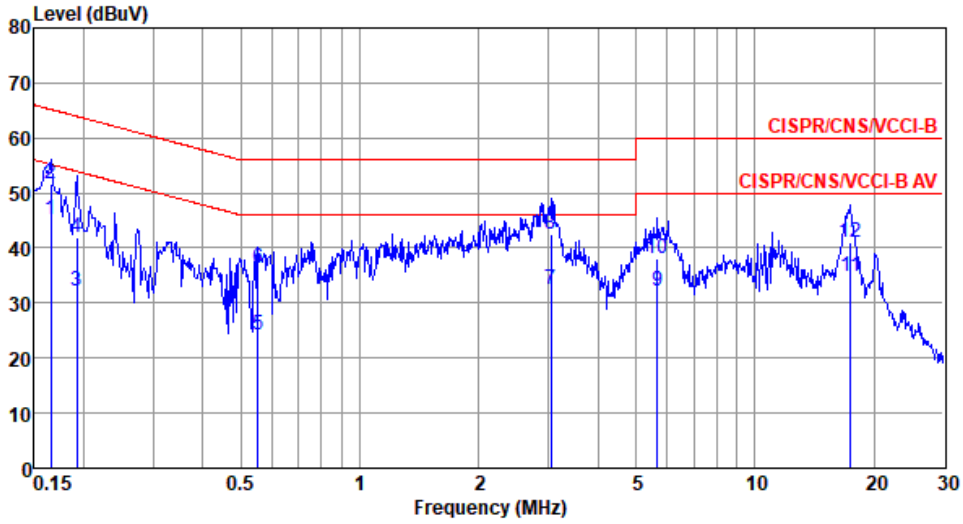


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.153	44.04	55.82	-11.78	34.31	9.57	0.05	Average
2*	0.153	54.58	65.82	-11.24	44.85	9.57	0.05	QP
3	0.343	34.10	49.13	-15.03	24.30	9.60	0.08	Average
4	0.343	41.41	59.13	-17.72	31.61	9.60	0.08	QP
5	0.474	24.31	46.45	-22.14	14.47	9.62	0.08	Average
6	0.474	37.20	56.45	-19.25	27.36	9.62	0.08	QP
7	0.712	29.19	46.00	-16.81	19.28	9.63	0.09	Average
8	0.712	38.82	56.00	-17.18	28.91	9.63	0.09	QP
9	3.058	33.50	46.00	-12.50	23.35	9.66	0.23	Average
10	3.058	43.85	56.00	-12.15	33.70	9.66	0.23	QP
11	5.993	31.28	50.00	-18.72	20.97	9.68	0.35	Average
12	5.993	37.22	60.00	-22.78	26.91	9.68	0.35	QP
13	17.109	38.40	50.00	-11.60	27.64	9.79	0.58	Average
14	17.109	44.45	60.00	-15.55	33.69	9.79	0.58	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

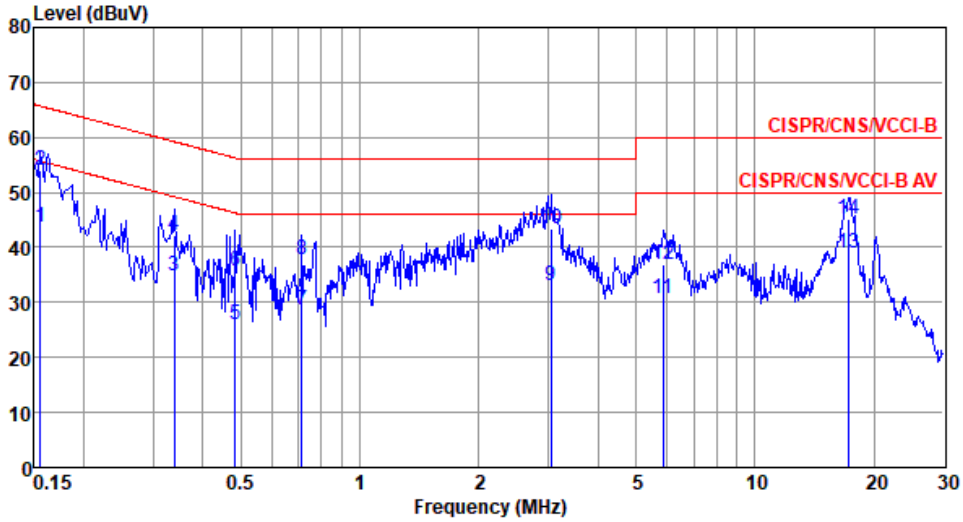
Modulation	VHT20	**Test Freq. (MHz)**	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1*	0.165	45.06	55.21	-10.15	35.33	9.53	0.06	Average
2	0.165	51.76	65.21	-13.45	42.03	9.53	0.06	QP
3	0.192	32.08	53.93	-21.85	22.29	9.54	0.07	Average
4	0.192	41.95	63.93	-21.98	32.16	9.54	0.07	QP
5	0.552	24.31	46.00	-21.69	14.37	9.58	0.09	Average
6	0.552	36.30	56.00	-19.70	26.36	9.58	0.09	QP
7	3.041	32.44	46.00	-13.56	22.23	9.61	0.23	Average
8	3.041	42.37	56.00	-13.63	32.16	9.61	0.23	QP
9	5.653	32.12	50.00	-17.88	21.77	9.62	0.34	Average
10	5.653	38.19	60.00	-21.81	27.84	9.62	0.34	QP
11	17.475	34.82	50.00	-15.18	24.04	9.66	0.58	Average
12	17.475	41.08	60.00	-18.92	30.30	9.66	0.58	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)	2437
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	43.83	55.69	-11.86	34.10	9.57	0.05	Average
2	0.156	54.00	65.69	-11.69	44.27	9.57	0.05	QP
3	0.339	34.81	49.22	-14.41	25.01	9.60	0.08	Average
4	0.339	42.28	59.22	-16.94	32.48	9.60	0.08	QP
5	0.484	26.04	46.27	-20.23	16.20	9.62	0.08	Average
6	0.484	35.79	56.27	-20.48	25.95	9.62	0.08	QP
7	0.712	28.56	46.00	-17.44	18.65	9.63	0.09	Average
8	0.712	37.86	56.00	-18.14	27.95	9.63	0.09	QP
9	3.041	33.16	46.00	-12.84	23.01	9.66	0.23	Average
10	3.041	43.33	56.00	-12.67	33.18	9.66	0.23	QP
11	5.867	30.61	50.00	-19.39	20.30	9.68	0.35	Average
12	5.867	36.78	60.00	-23.22	26.47	9.68	0.35	QP
13*	17.291	39.02	50.00	-10.98	28.26	9.79	0.58	Average
14	17.291	45.21	60.00	-14.79	34.45	9.79	0.58	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 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.2.2 Test Procedures

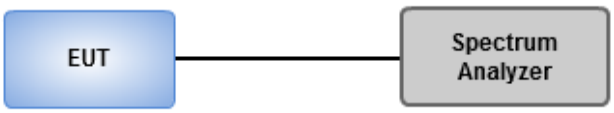
6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, 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) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
2. Detector = Sample, Trace mode = max hold.
3 Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.2.3 Test Setup



3.2.4 Test Result of 6dB and Occupied Bandwidth

Non-beamforming mode

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11b_Nss1,(1Mbps)_4TX	8.116M	10.347M	10M3G1D	7.536M	10.275M
802.11g_Nss1,(6Mbps)_4TX	16.087M	16.498M	16M5D1D	13.768M	16.281M
802.11ac VHT20_Nss1,(MCS0)_4TX	17.319M	17.583M	17M6D1D	14.42M	17.511M
802.11ac VHT40_Nss1,(MCS0)_4TX	36.522M	36.469M	36M5D1D	36.232M	36.179M

Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

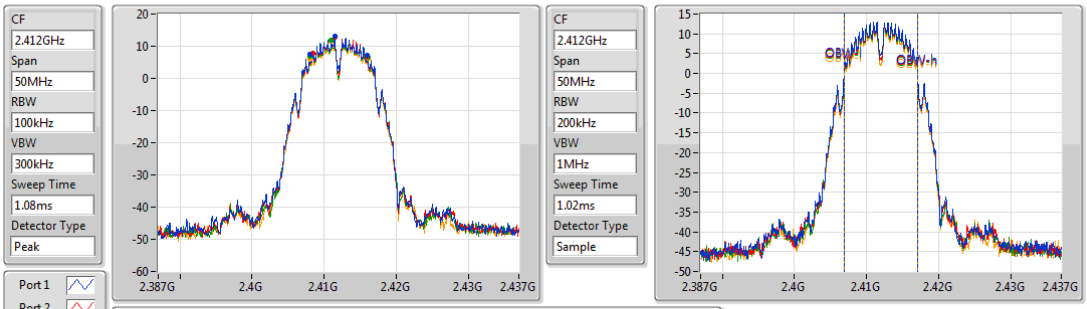
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)	Port 3-N dB (Hz)	Port 3-OBW (Hz)	Port 4-N dB (Hz)	Port 4-OBW (Hz)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	7.971M	10.275M	7.536M	10.275M	8.043M	10.275M	8.043M	10.275M
2437MHz	Pass	500k	7.609M	10.275M	8.116M	10.275M	8.043M	10.275M	8.043M	10.275M
2462MHz	Pass	500k	7.609M	10.347M	8.116M	10.275M	7.536M	10.347M	8.043M	10.275M
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	13.768M	16.425M	15.652M	16.353M	15.435M	16.353M	15.435M	16.353M
2437MHz	Pass	500k	15.58M	16.425M	16.014M	16.425M	15M	16.281M	15.652M	16.353M
2462MHz	Pass	500k	15.29M	16.498M	15.652M	16.425M	15.072M	16.353M	16.087M	16.425M
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	15.942M	17.511M	15.072M	17.511M	14.42M	17.511M	16.304M	17.511M
2437MHz	Pass	500k	15M	17.583M	15.072M	17.583M	15.145M	17.583M	15.725M	17.583M
2462MHz	Pass	500k	15.145M	17.583M	17.319M	17.583M	16.304M	17.583M	15.725M	17.583M
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	500k	36.232M	36.324M	36.232M	36.179M	36.232M	36.324M	36.232M	36.179M
2437MHz	Pass	500k	36.232M	36.324M	36.232M	36.324M	36.232M	36.324M	36.232M	36.324M
2452MHz	Pass	500k	36.377M	36.324M	36.522M	36.324M	36.377M	36.324M	36.377M	36.469M

Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

802.11b_Nss1,(1Mbps)_4TX EBW

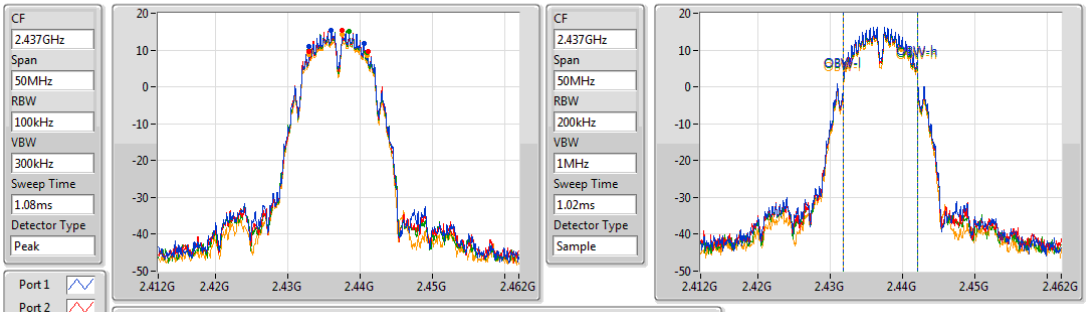
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.971M	2.408014G	2.415986G	10.275M	2.406863G	2.417137G	500k	1
7.536M	2.408449G	2.415986G	10.275M	2.406863G	2.417137G	500k	2
8.043M	2.408014G	2.416058G	10.275M	2.406863G	2.417137G	500k	3
8.043M	2.408014G	2.416058G	10.275M	2.406863G	2.417137G	500k	4

802.11b_Nss1,(1Mbps)_4TX EBW

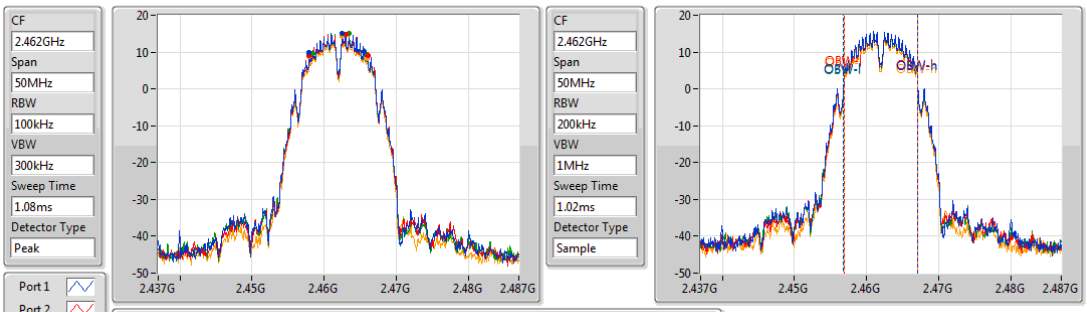
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.609M	2.432942G	2.440551G	10.275M	2.43179G	2.442065G	500k	1
8.116M	2.432942G	2.441058G	10.275M	2.43179G	2.442065G	500k	2
8.043M	2.432942G	2.440986G	10.275M	2.43179G	2.442065G	500k	3
8.043M	2.432942G	2.440986G	10.275M	2.43179G	2.442065G	500k	4

802.11b_Nss1,(1Mbps)_4TX EBW

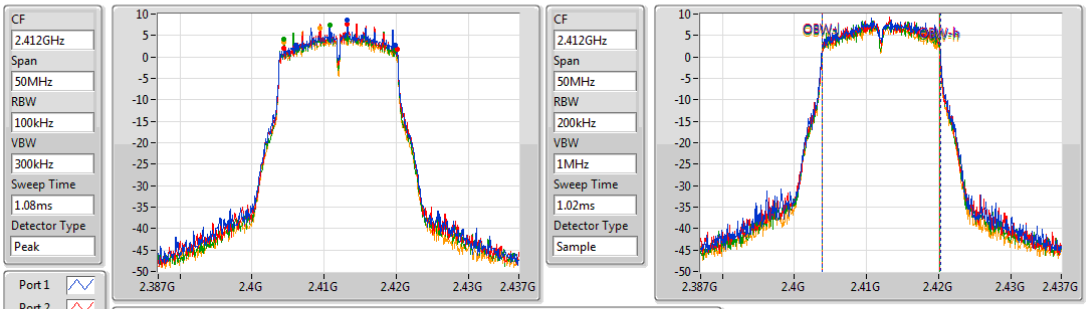
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.609M	2.457942G	2.465551G	10.347M	2.45679G	2.467137G	500k	1
8.116M	2.457942G	2.466058G	10.275M	2.456863G	2.467137G	500k	2
7.536M	2.458449G	2.465986G	10.347M	2.45679G	2.467137G	500k	3
8.043M	2.457942G	2.465986G	10.275M	2.456863G	2.467137G	500k	4

802.11g_Nss1,(6Mbps)_4TX EBW

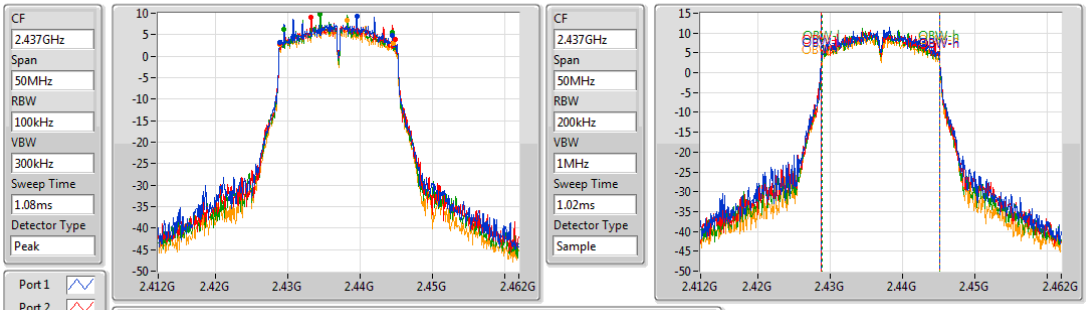
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
13.768M	2.40613G	2.419899G	16.425M	2.403823G	2.420249G	500k	1
15.652M	2.404464G	2.420116G	16.353M	2.403823G	2.420177G	500k	2
15.435M	2.404464G	2.419899G	16.353M	2.403823G	2.420177G	500k	3
15.435M	2.404464G	2.419899G	16.353M	2.403823G	2.420177G	500k	4

802.11g_Nss1,(6Mbps)_4TX EBW

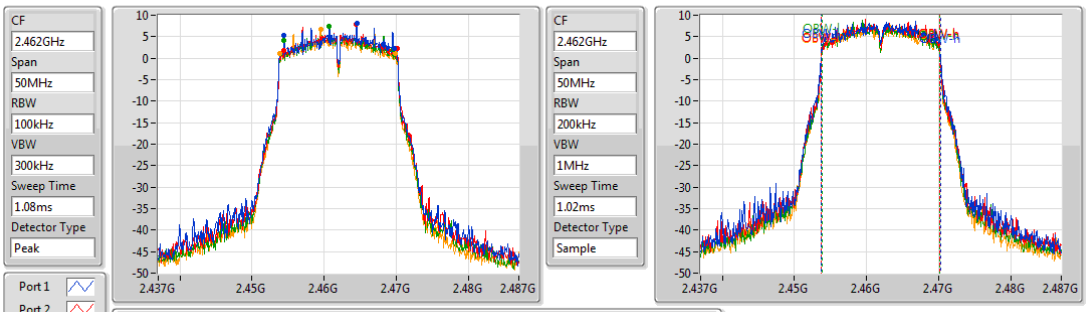
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.58M	2.428884G	2.444464G	16.425M	2.428751G	2.445177G	500k	1
16.014M	2.428884G	2.444899G	16.425M	2.428751G	2.445177G	500k	2
15M	2.429464G	2.444464G	16.281M	2.428823G	2.445104G	500k	3
15.652M	2.428884G	2.444536G	16.353M	2.428751G	2.445104G	500k	4

802.11g_Nss1,(6Mbps)_4TX EBW

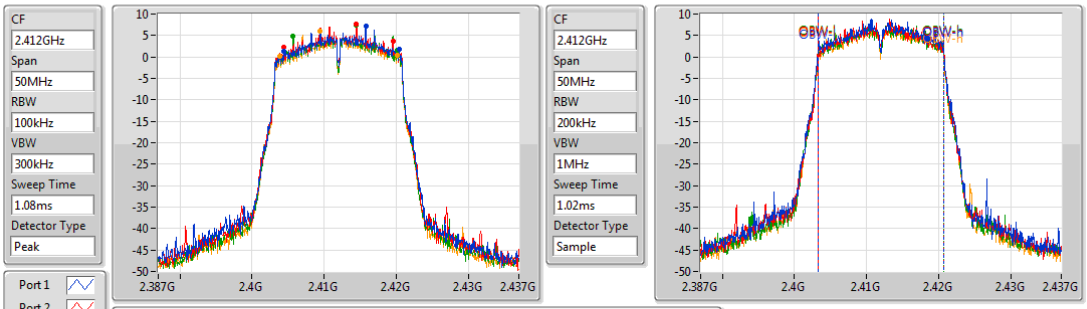
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.29M	2.454464G	2.469754G	16.498M	2.453751G	2.470249G	500k	1
15.652M	2.454464G	2.470116G	16.425M	2.453751G	2.470177G	500k	2
15.072M	2.454464G	2.469536G	16.353M	2.453823G	2.470177G	500k	3
16.087M	2.453812G	2.469899G	16.425M	2.453751G	2.470177G	500k	4

802.11ac VHT20_Nss1,(MCS0)_4TX EBW

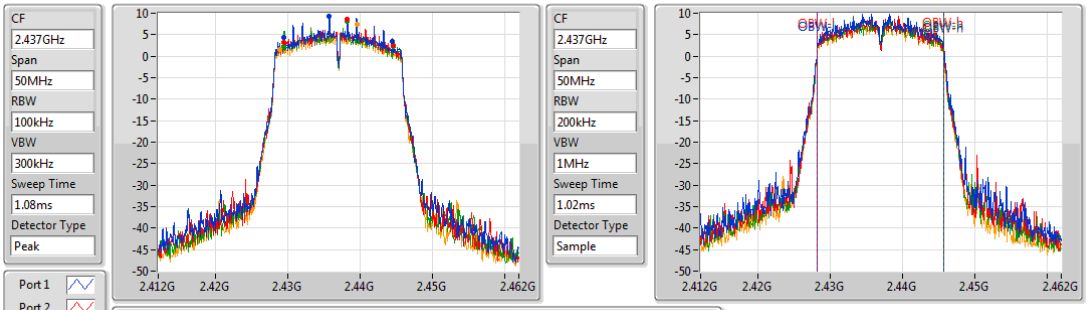
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.942M	2.404464G	2.420406G	17.511M	2.403245G	2.420755G	500k	1
15.072M	2.404464G	2.419536G	17.511M	2.403245G	2.420755G	500k	2
14.42M	2.405696G	2.420116G	17.511M	2.403245G	2.420755G	500k	3
16.304M	2.403884G	2.420188G	17.511M	2.403245G	2.420755G	500k	4

802.11ac VHT20_Nss1,(MCS0)_4TX EBW

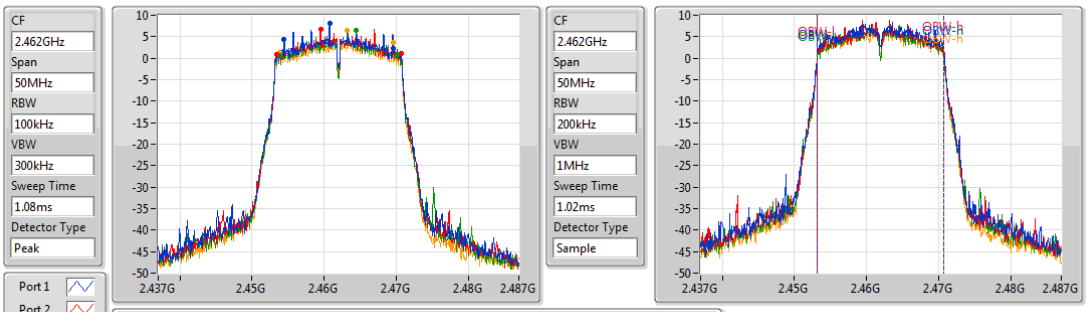
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15M	2.429464G	2.444464G	17.583M	2.428172G	2.445755G	500k	1
15.072M	2.429464G	2.444536G	17.583M	2.428172G	2.445755G	500k	2
15.145M	2.429391G	2.444536G	17.583M	2.428172G	2.445755G	500k	3
15.725M	2.428812G	2.444536G	17.583M	2.428172G	2.445755G	500k	4

802.11ac VHT20_Nss1,(MCS0)_4TX EBW

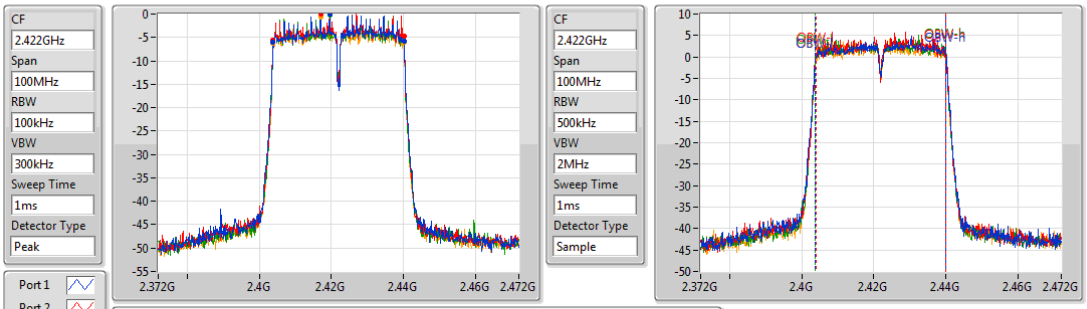
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.145M	2.454464G	2.469609G	17.583M	2.453172G	2.470755G	500k	1
17.319M	2.453449G	2.470768G	17.583M	2.453172G	2.470755G	500k	2
16.304M	2.453812G	2.470116G	17.583M	2.453172G	2.470755G	500k	3
15.725M	2.453812G	2.469536G	17.583M	2.453172G	2.470755G	500k	4

802.11ac VHT40_Nss1,(MCS0)_4TX **EBW**

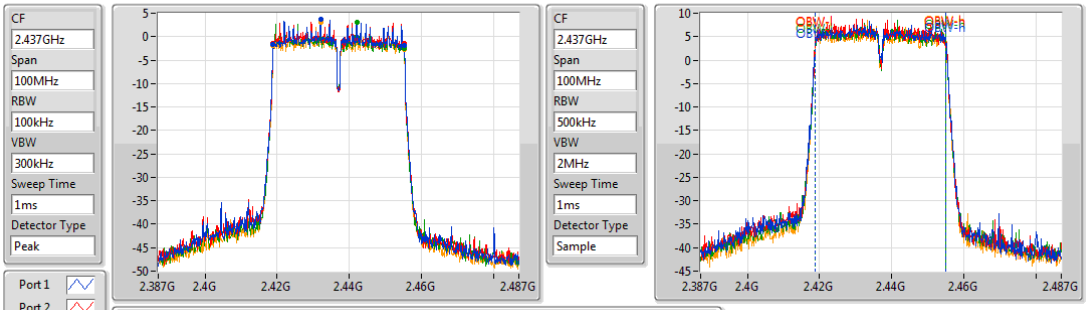
2422MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
36.232M	2.403884G	2.440116G	36.324M	2.403766G	2.44009G	500k	1
36.232M	2.403884G	2.440116G	36.179M	2.40391G	2.44009G	500k	2
36.232M	2.403884G	2.440116G	36.324M	2.403766G	2.44009G	500k	3
36.232M	2.403884G	2.440116G	36.179M	2.40391G	2.44009G	500k	4

802.11ac VHT40_Nss1,(MCS0)_4TX **EBW**

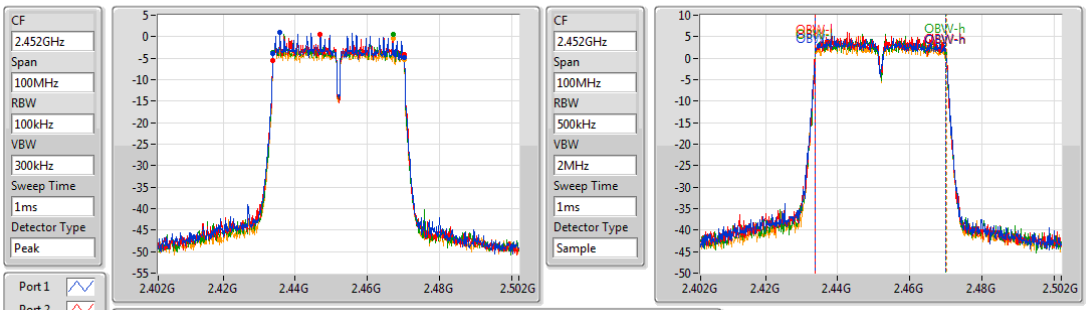
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
36.232M	2.418884G	2.455116G	36.324M	2.418766G	2.45509G	500k	1
36.232M	2.418884G	2.455116G	36.324M	2.418766G	2.45509G	500k	2
36.232M	2.418884G	2.455116G	36.324M	2.418766G	2.45509G	500k	3
36.232M	2.418884G	2.455116G	36.324M	2.418766G	2.45509G	500k	4

802.11ac VHT40_Nss1,(MCS0)_4TX **EBW**

2452MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
36.377M	2.433884G	2.470261G	36.324M	2.433766G	2.47009G	500k	1
36.522M	2.433739G	2.470261G	36.324M	2.433766G	2.47009G	500k	2
36.377M	2.433884G	2.470261G	36.324M	2.433766G	2.47009G	500k	3
36.377M	2.433884G	2.470261G	36.469M	2.433766G	2.470234G	500k	4

Beamforming mode

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	16.304M	17.728M	17M7D1D	11.667M	17.438M

Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

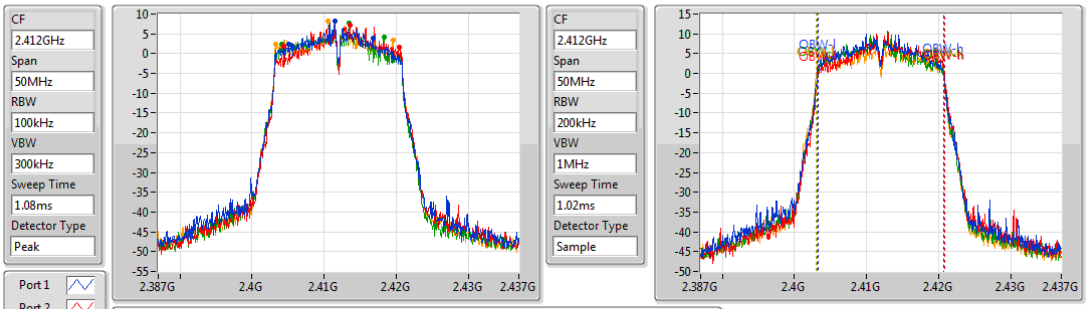
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)	Port 3-N dB (Hz)	Port 3-OBW (Hz)	Port 4-N dB (Hz)	Port 4-OBW (Hz)
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	11.667M	17.438M	15.942M	17.511M	14.203M	17.511M	16.304M	17.728M
2437MHz	Pass	500k	15.072M	17.583M	12.754M	17.511M	13.188M	17.511M	12.899M	17.511M
2462MHz	Pass	500k	15.942M	17.583M	12.754M	17.511M	16.304M	17.511M	15.072M	17.511M

Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

802.11ac VHT20-BF_Nss1,(MCS0)_4TX **EBW**

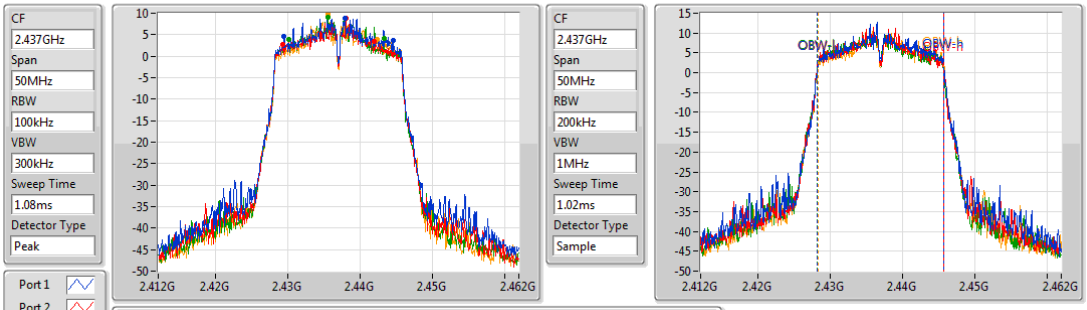
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
11.667M	2.405116G	2.416783G	17.438M	2.403245G	2.420683G	500k	1
15.942M	2.404464G	2.420406G	17.511M	2.403317G	2.420828G	500k	2
14.203M	2.404101G	2.418304G	17.511M	2.403172G	2.420683G	500k	3
16.304M	2.403232G	2.419536G	17.728M	2.403027G	2.420755G	500k	4

802.11ac VHT20-BF_Nss1,(MCS0)_4TX **EBW**

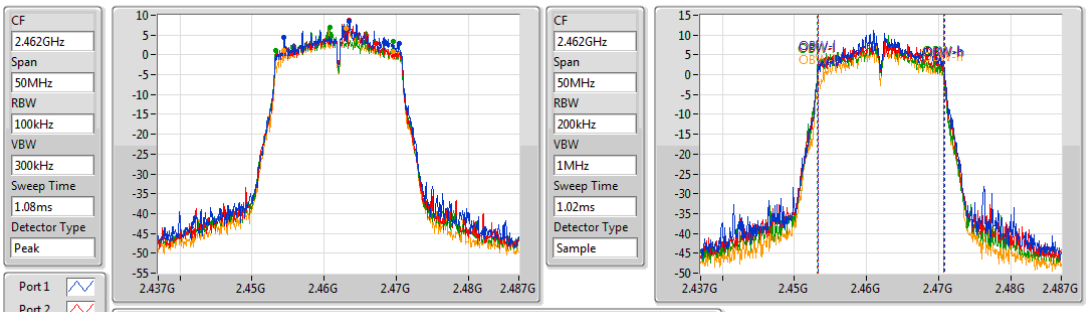
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.072M	2.429464G	2.444536G	17.583M	2.428172G	2.445755G	500k	1
12.754M	2.429246G	2.442G	17.511M	2.428172G	2.445683G	500k	2
13.188M	2.430116G	2.443304G	17.511M	2.428172G	2.445683G	500k	3
12.899M	2.429464G	2.442362G	17.511M	2.428245G	2.445755G	500k	4

802.11ac VHT20-BF_Nss1,(MCS0)_4TX **EBW**

2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.942M	2.454464G	2.470406G	17.583M	2.453245G	2.470828G	500k	1
12.754M	2.454464G	2.467217G	17.511M	2.453245G	2.470755G	500k	2
16.304M	2.453232G	2.469536G	17.511M	2.453172G	2.470683G	500k	3
15.072M	2.454464G	2.469536G	17.511M	2.453245G	2.470755G	500k	4

3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

Antenna gain > 6dBi

Non Fixed, point to point operations.
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB

Fixed, point to point operations
Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point Operations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Test Procedures

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.3.3 Test Setup

3.3.4 Test Result of Maximum Output Power

Non-beamforming mode

Summary of Conducted (Average) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_4TX	29.65	0.92257
802.11g_Nss1,(6Mbps)_4TX	26.66	0.46345
802.11ac VHT20_Nss1,(MCS0)_4TX	25.40	0.34674
802.11ac VHT40_Nss1,(MCS0)_4TX	23.30	0.21380

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Port 3 (dBm)	Port 4 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	3.20	21.35	20.86	20.76	20.28	26.85	30.00	30.05	36.00
2437MHz	Pass	3.20	24.05	23.98	23.46	22.94	29.65	30.00	32.85	36.00
2462MHz	Pass	3.20	23.81	23.71	23.38	22.90	29.48	30.00	32.68	36.00
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	3.20	19.24	18.93	18.86	18.07	24.82	30.00	28.02	36.00
2437MHz	Pass	3.20	20.98	20.88	20.63	19.98	26.66	30.00	29.86	36.00
2462MHz	Pass	3.20	19.25	18.96	18.80	18.39	24.88	30.00	28.08	36.00
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	3.20	18.46	18.13	18.05	17.51	24.07	30.00	27.27	36.00
2437MHz	Pass	3.20	19.93	19.45	19.23	18.84	25.40	30.00	28.60	36.00
2462MHz	Pass	3.20	18.76	18.45	18.24	17.75	24.34	30.00	27.54	36.00
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	3.20	14.05	13.90	14.05	13.12	19.82	30.00	23.02	36.00
2437MHz	Pass	3.20	17.75	17.33	17.39	16.57	23.30	30.00	26.50	36.00
2452MHz	Pass	3.20	14.95	14.79	14.73	14.02	20.66	30.00	23.86	36.00

DG = Directional Gain; **Port X** = Port X output power

Beamforming mode

Summary of Conducted (Average) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	25.37	0.34435
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	17.28	0.05346

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Port 3 (dBm)	Port 4 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	8.90	18.23	18.05	17.86	18.01	24.06	27.10	32.96	36.00
2437MHz	Pass	8.90	19.66	19.31	19.54	18.83	25.37	27.10	34.27	36.00
2462MHz	Pass	8.90	18.57	18.27	18.35	17.77	24.27	27.10	33.17	36.00
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	8.90	8.03	7.88	8.03	7.10	13.80	27.10	22.70	36.00
2437MHz	Pass	8.90	11.73	11.31	11.37	10.55	17.28	27.10	26.18	36.00
2452MHz	Pass	8.90	8.93	8.77	8.71	8.00	14.64	27.10	23.54	36.00

DG = Directional Gain; **Port X** = Port X output power

Note:

Directional gain = $10 * \log((10^{3.2/20}+10^{3/20}+10^{2.5/20}+10^{2.8/20})^2/4)$ = 8.90 dBi > 6 dBi. Limit shall be reduced to 30 dBm – (8.90 dBi – 6 dBi) = 27.10 dBm.

3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.4.2 Test Procedures

Peak PSD

1. Set the RBW = 3 kHz, VBW = 10 kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

Average PSD, duty cycle ≥ 98%

1. Set the RBW = 30 kHz, VBW = 100 kHz.
2. Detector = RMS, Sweep time = auto couple.
3. Sweep time = auto couple.
4. Employ trace averaging (RMS) mode over a minimum of 100 traces.
5. Use the peak marker function to determine the maximum amplitude level.

Average PSD, duty cycle < 98%

1 Set the RBW = 30 kHz, VBW = 100 kHz. Detector = RMS.

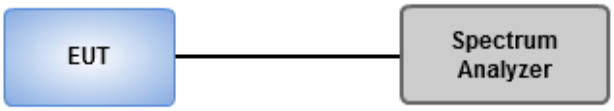
2 Set the sweep time to: ≥ 10 (number of measurement points in sweep) x (total on/off period of the transmitted signal).

3 Perform the measurement over 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 Power Spectral Density

Non-beamforming mode

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_4TX	3.44
802.11g_Nss1,(6Mbps)_4TX	3.01
802.11ac VHT20_Nss1,(MCS0)_4TX	0.95
802.11ac VHT40_Nss1,(MCS0)_4TX	-4.68

Result

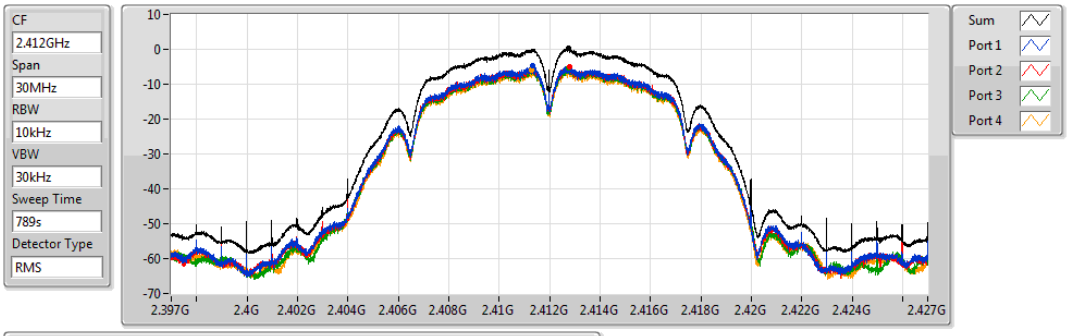
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	Port 3 (dBm/RBW)	Port 4 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	8.90	-4.72	-5.06	-5.40	-5.79	0.19	5.10
2437MHz	Pass	8.90	-1.68	-2.29	-2.21	-2.41	3.44	5.10
2462MHz	Pass	8.90	-2.03	-1.80	-2.45	-2.96	3.25	5.10
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	8.90	-4.22	-4.39	-4.52	-5.27	1.44	5.10
2437MHz	Pass	8.90	-2.58	-2.74	-3.02	-3.66	3.01	5.10
2462MHz	Pass	8.90	-4.16	-4.55	-4.88	-5.45	1.29	5.10
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	8.90	-5.40	-5.25	-5.80	-6.20	-0.12	5.10
2437MHz	Pass	8.90	-4.10	-4.37	-4.61	-4.92	0.95	5.10
2462MHz	Pass	8.90	-5.23	-5.44	-5.79	-6.33	-0.17	5.10
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2422MHz	Pass	8.90	-13.39	-13.40	-13.92	-13.79	-8.10	5.10
2437MHz	Pass	8.90	-9.69	-10.23	-10.16	-10.46	-4.68	5.10
2452MHz	Pass	8.90	-12.29	-12.63	-13.02	-13.54	-7.26	5.10

DG = Directional Gain;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

Note:
Directional gain = 10 * log((10$^{3.2/20}$+10$^{3/20}$+10$^{2.5/20}$+10$^{2.8/20}$)^2/4) = 8.90 dBi > 6 dBi. Limit shall be reduced to 8dBm – (8.90 dBi – 6 dBi) = 5.1 dBm.

802.11b_Nss1,(1Mbps)_4TX PSD

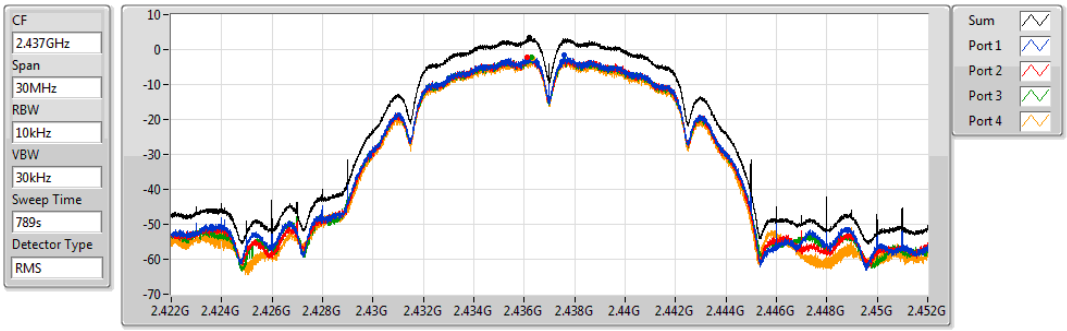
2412MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.19	0.19	-4.72	-5.06	-5.40	-5.79

802.11b_Nss1,(1Mbps)_4TX PSD

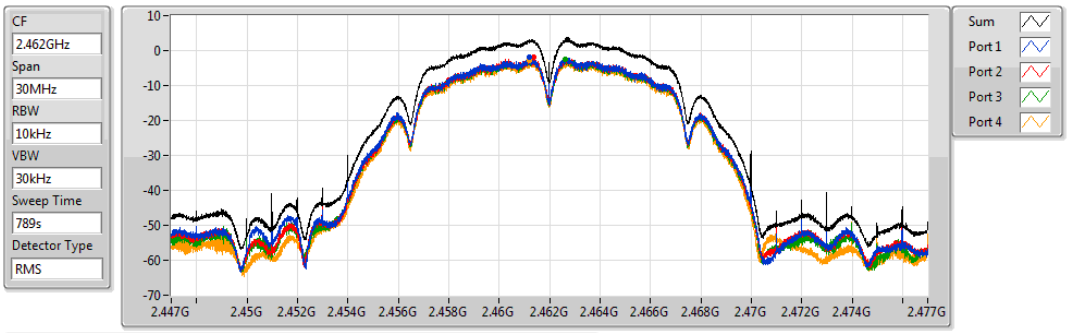
2437MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.44	3.44	-1.68	-2.29	-2.21	-2.41

802.11b_Nss1,(1Mbps)_4TX PSD

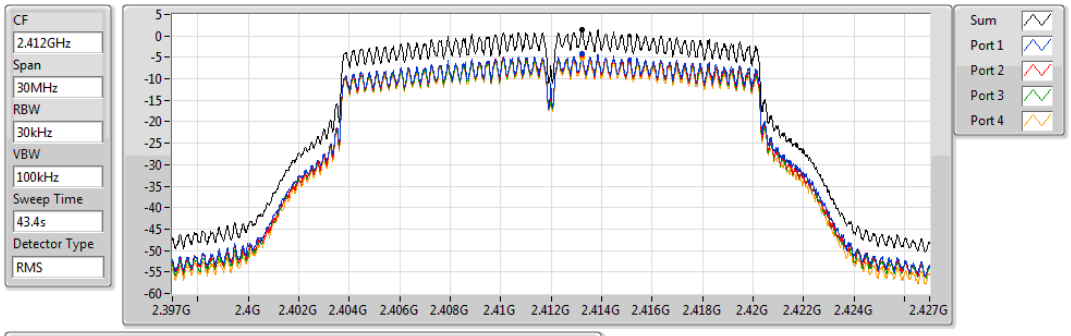
2462MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.25	3.25	-2.03	-1.80	-2.45	-2.96

802.11g_Nss1,(6Mbps)_4TX PSD

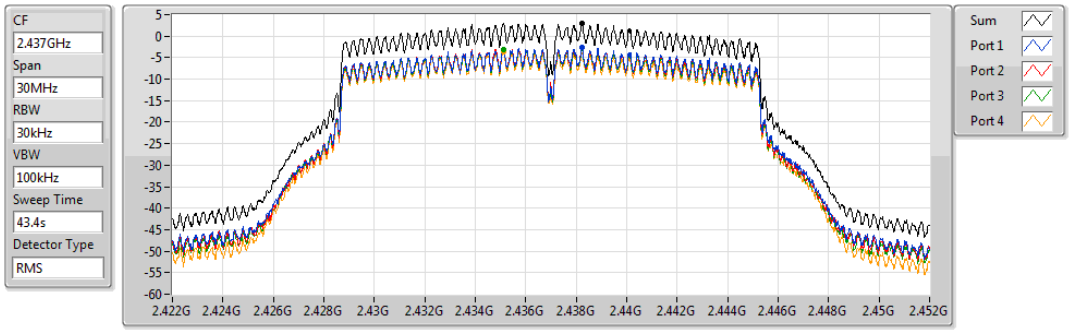
2412MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.44	1.44	-4.22	-4.39	-4.52	-5.27

802.11g_Nss1,(6Mbps)_4TX PSD

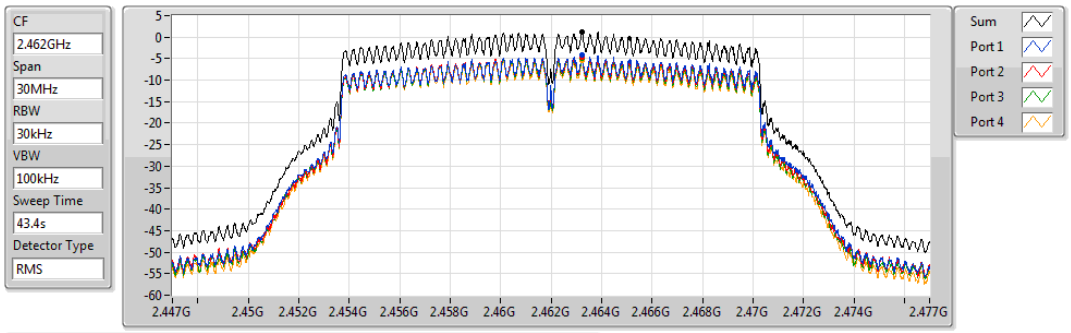
2437MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.01	3.01	-2.58	-2.74	-3.02	-3.66

802.11g_Nss1,(6Mbps)_4TX PSD

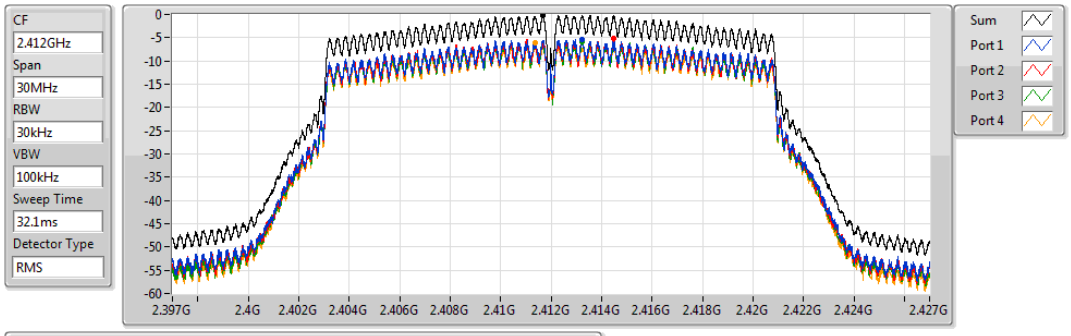
2462MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.29	1.29	-4.16	-4.55	-4.88	-5.45

802.11ac VHT20_Nss1,(MCS0)_4TX PSD

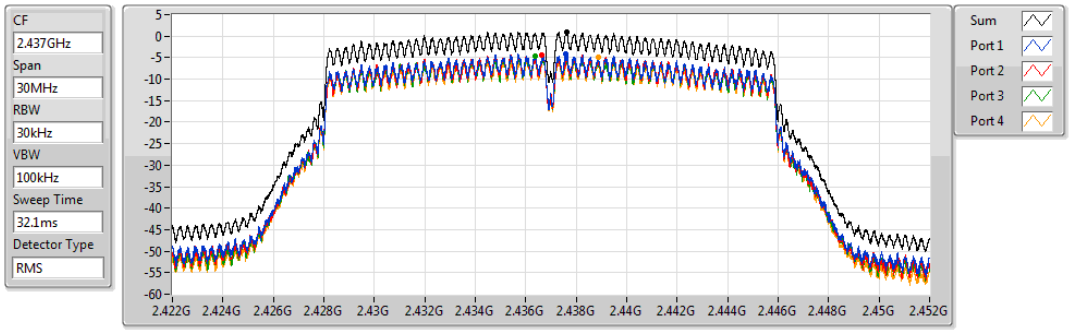
2412MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-0.12	-0.12	-5.40	-5.25	-5.80	-6.20

802.11ac VHT20_Nss1,(MCS0)_4TX PSD

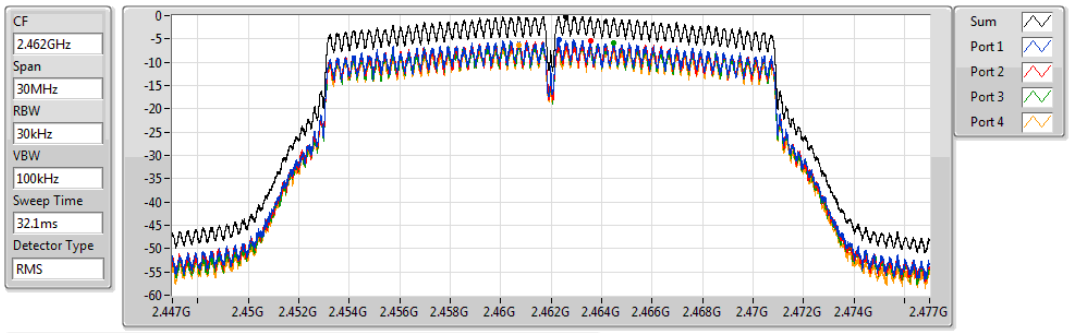
2437MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.95	0.95	-4.10	-4.37	-4.61	-4.92

802.11ac VHT20_Nss1,(MCS0)_4TX PSD

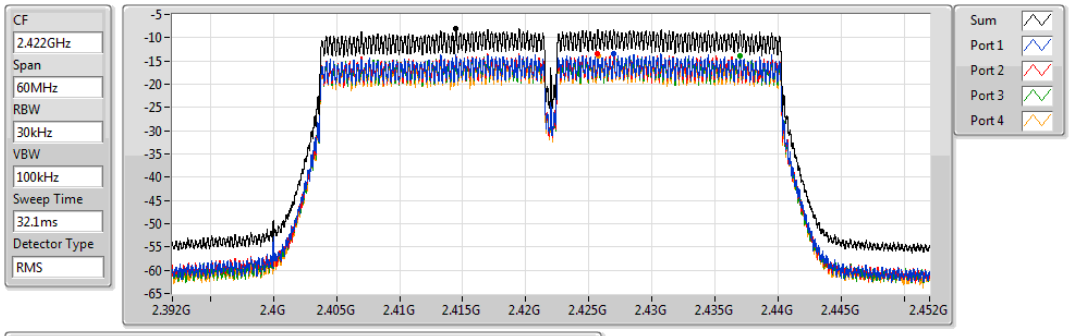
2462MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-0.17	-0.17	-5.23	-5.44	-5.79	-6.33

802.11ac VHT40_Nss1,(MCS0)_4TX PSD

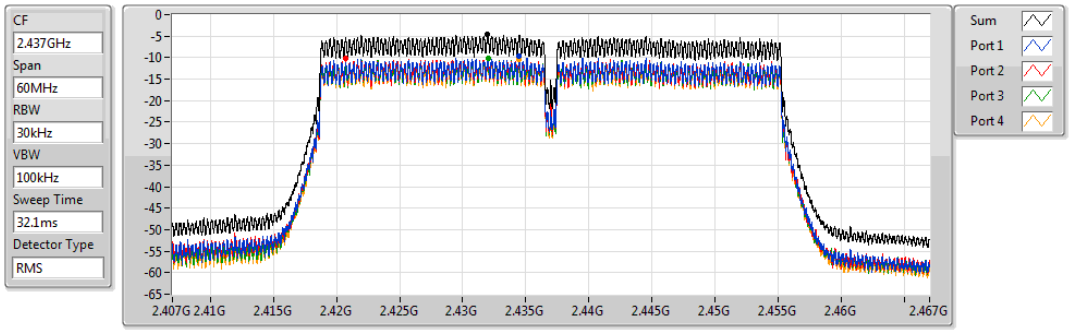
2422MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.10	-8.10	-13.39	-13.40	-13.92	-13.79

802.11ac VHT40_Nss1,(MCS0)_4TX PSD

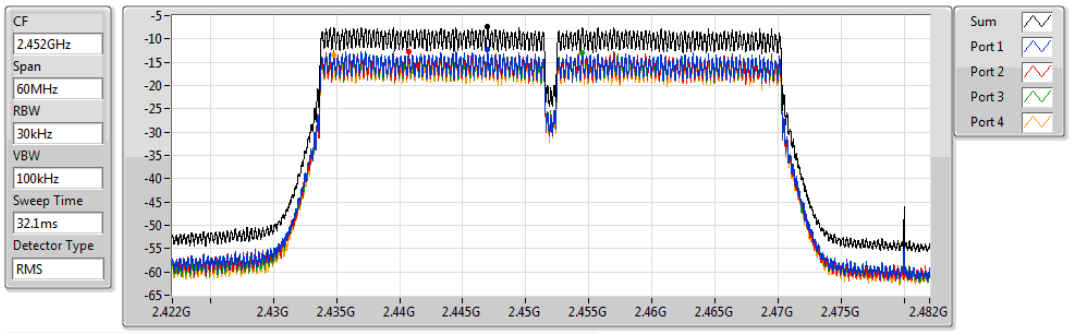
2437MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-4.68	-4.68	-9.69	-10.23	-10.16	-10.46

802.11ac VHT40_Nss1,(MCS0)_4TX PSD

2452MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.26	-7.26	-12.29	-12.63	-13.02	-13.54

Beamforming mode

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	3.88

Result

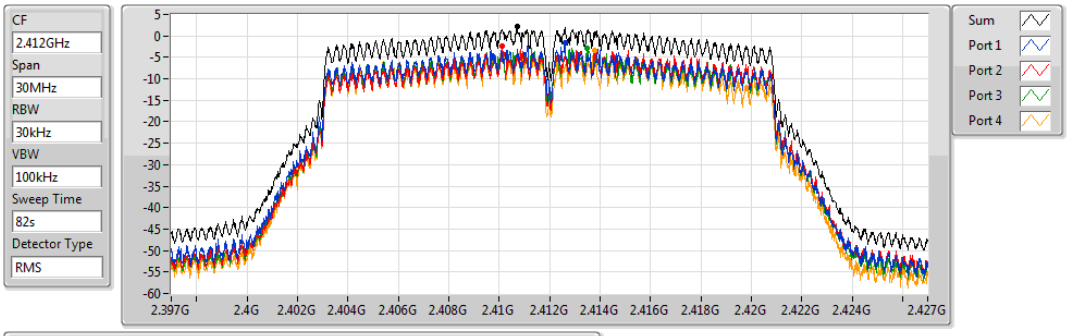
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	Port 3 (dBm/RBW)	Port 4 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	8.90	-1.61	-2.38	-2.79	-3.32	2.11	5.10
2437MHz	Pass	8.90	-0.08	-0.27	-0.62	-0.90	3.88	5.10
2462MHz	Pass	8.90	-1.95	-2.22	-3.31	-2.72	2.26	5.10

DG = Directional Gain;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

Note: Directional gain = 10 * log((10$^{3.2/20}$+10$^{3/20}$+10$^{2.5/20}$+10$^{2.8/20}$)^2/4) = 8.90 dBi > 6 dBi. Limit shall be reduced to 8 dBm – (8.90 dBi – 6 dBi) = 5.10 dBm.

802.11ac VHT20-BF_Nss1,(MCS0)_4TX PSD

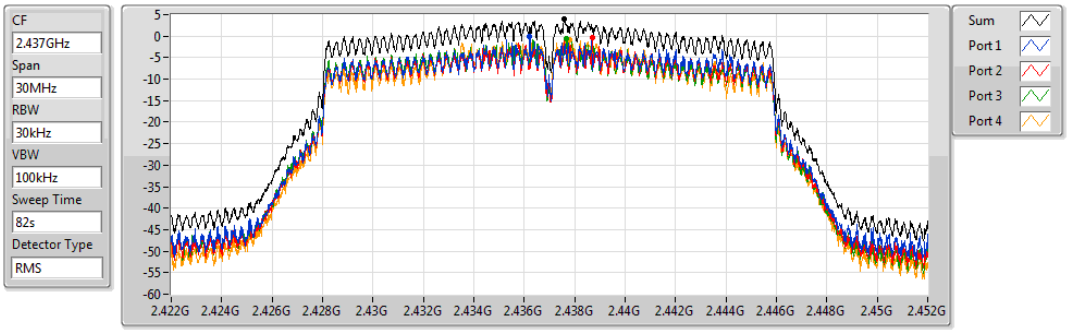
2412MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.11	2.11	-1.61	-2.38	-2.79	-3.32

802.11ac VHT20-BF_Nss1,(MCS0)_4TX PSD

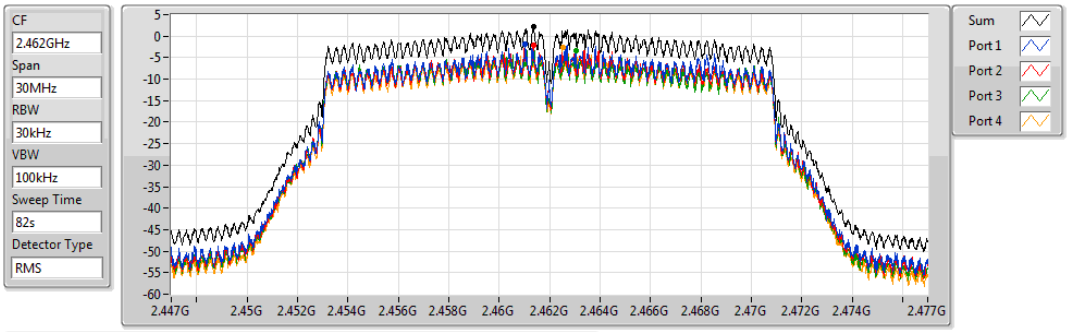
2437MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.88	3.88	-0.08	-0.27	-0.62	-0.90

802.11ac VHT20-BF_Nss1,(MCS0)_4TX PSD

2462MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.26	2.26	-1.95	-2.22	-3.31	-2.72

3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

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.

3.5.2 Test Procedures

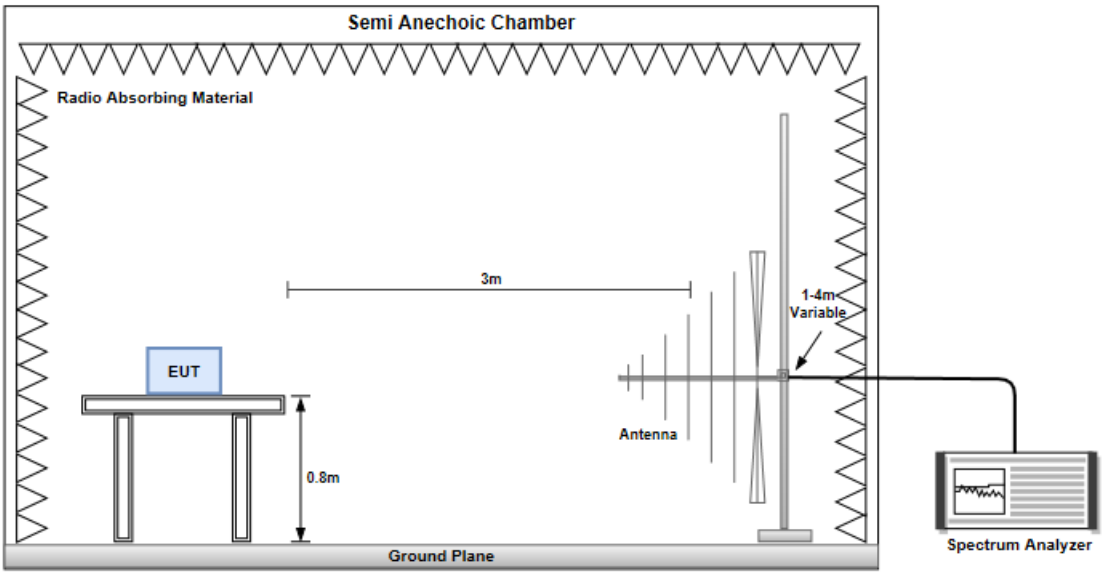
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

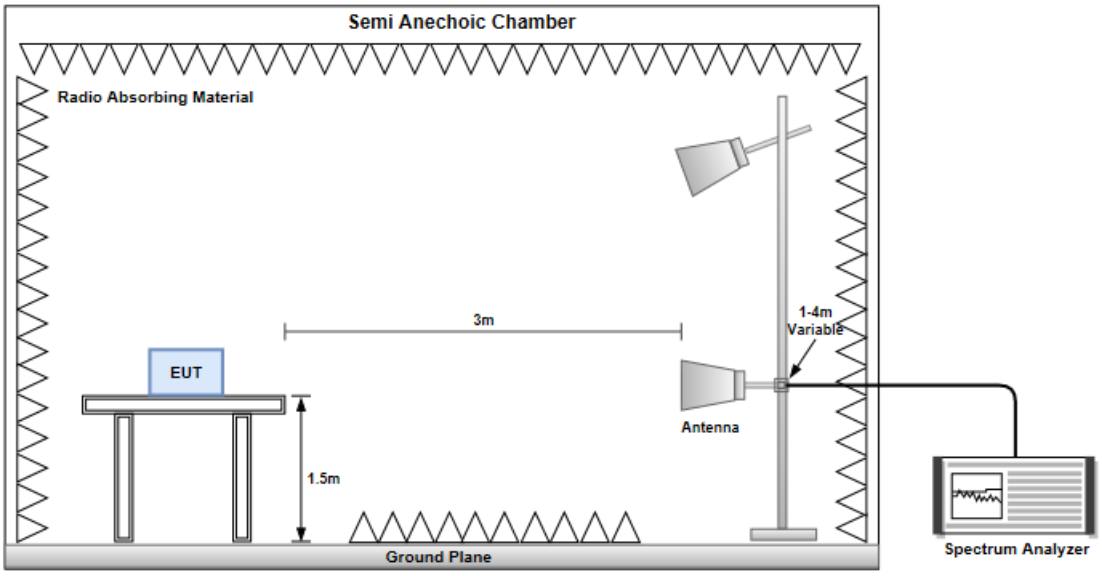
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



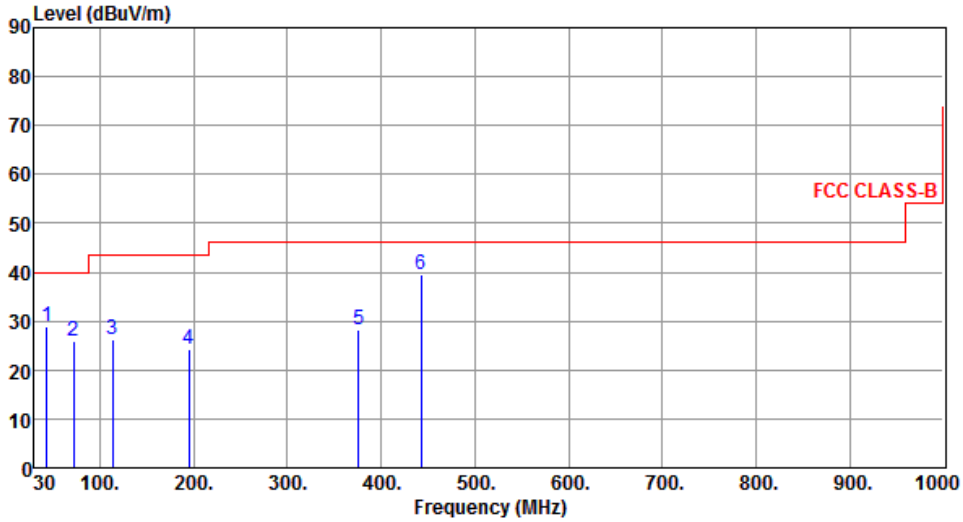
Radiated Emissions above 1 GHz



Non-beamforming mode

3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

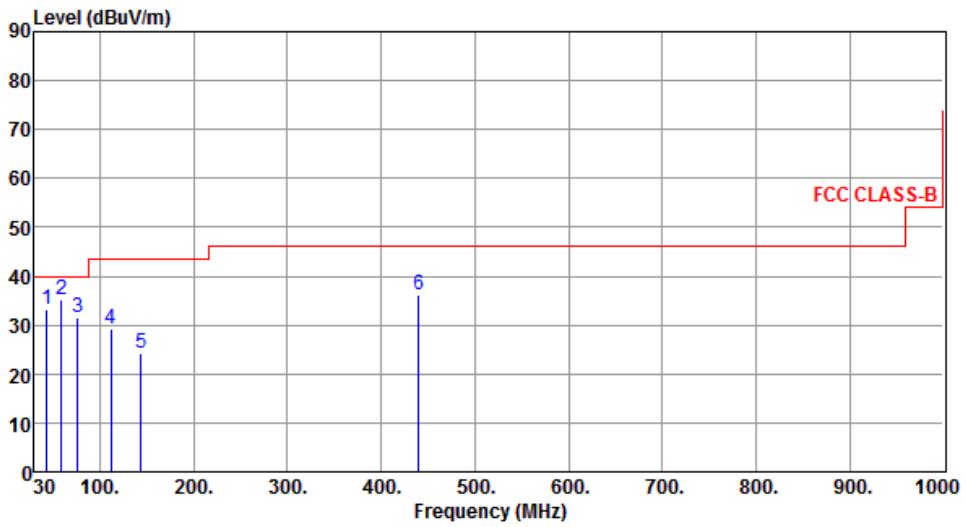
Modulation	11b	**Test Freq. (MHz)**	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	43.42	28.86	40.00	-11.14	37.78	-8.92	Peak	---	---
2	71.69	25.81	40.00	-14.19	36.79	-10.98	Peak	---	---
3	113.39	26.38	43.50	-17.12	38.18	-11.80	Peak	---	---
4	194.90	24.16	43.50	-19.34	36.01	-11.85	Peak	---	---
5	376.31	28.27	46.00	-17.73	34.66	-6.39	Peak	---	---
6	442.31	39.68	46.00	-6.32	44.09	-4.41	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	11b	Test Freq. (MHz)	2437
Polarization	Vertical		

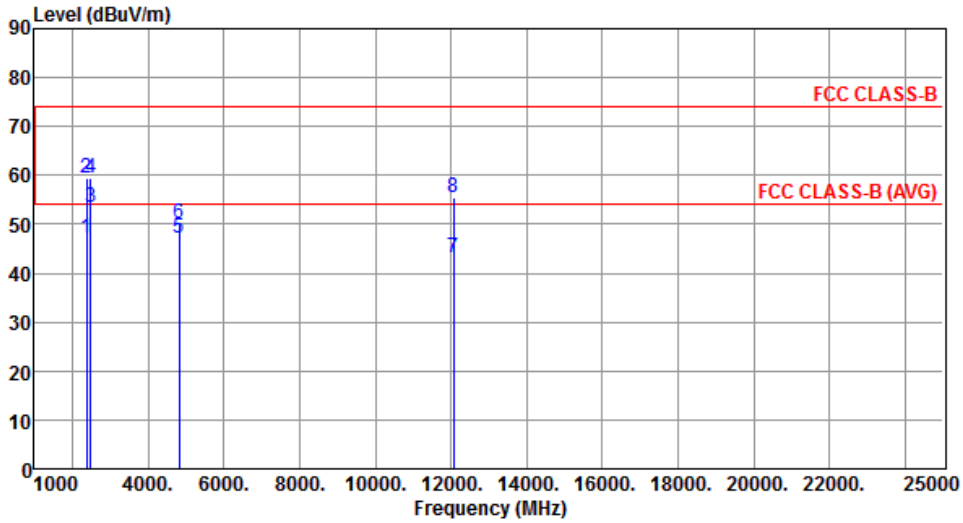


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	43.48	33.28	40.00	-6.72	42.20	-8.92	Peak	---	---
2	59.26	35.31	40.00	-4.69	44.57	-9.26	Peak	---	---
3	76.59	31.68	40.00	-8.32	44.21	-12.53	Peak	---	---
4	111.52	29.21	43.50	-14.29	41.25	-12.04	Peak	---	---
5	143.52	24.29	43.50	-19.21	33.28	-8.99	Peak	---	---
6	440.29	36.31	46.00	-9.69	40.77	-4.46	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 11b

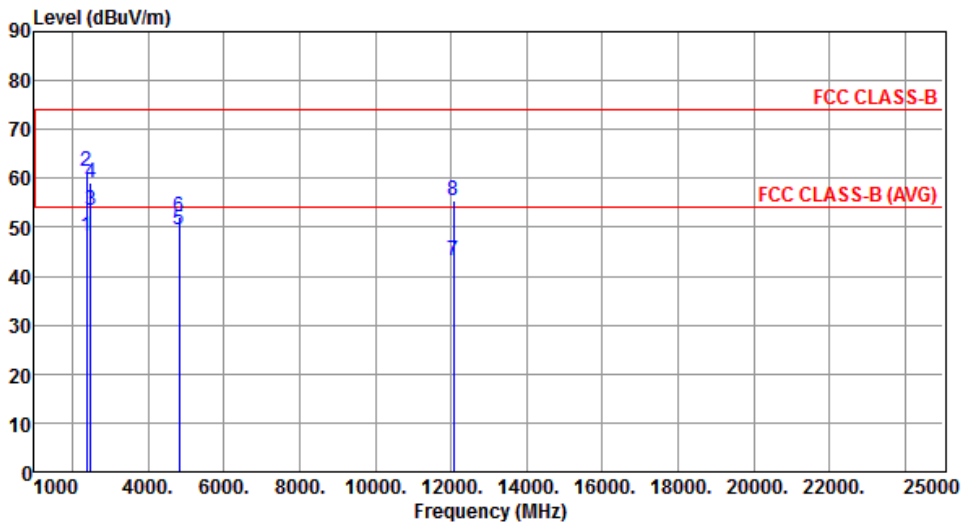
Modulation	11b	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	47.25	54.00	-6.75	48.21	-0.96	Average	175	92
2	2390.00	59.49	74.00	-14.51	60.45	-0.96	Peak	175	92
3	2487.00	53.52	54.00	-0.48	54.65	-1.13	Average	196	80
4	2487.00	59.36	74.00	-14.64	60.49	-1.13	Peak	196	80
5	4824.00	47.04	54.00	-6.96	42.17	4.87	Average	243	155
6	4824.00	50.17	74.00	-23.83	45.30	4.87	Peak	243	155
7	12060.00	43.33	54.00	-10.67	28.41	14.92	Average	100	40
8	12060.00	55.61	74.00	-18.39	40.69	14.92	Peak	100	40

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).

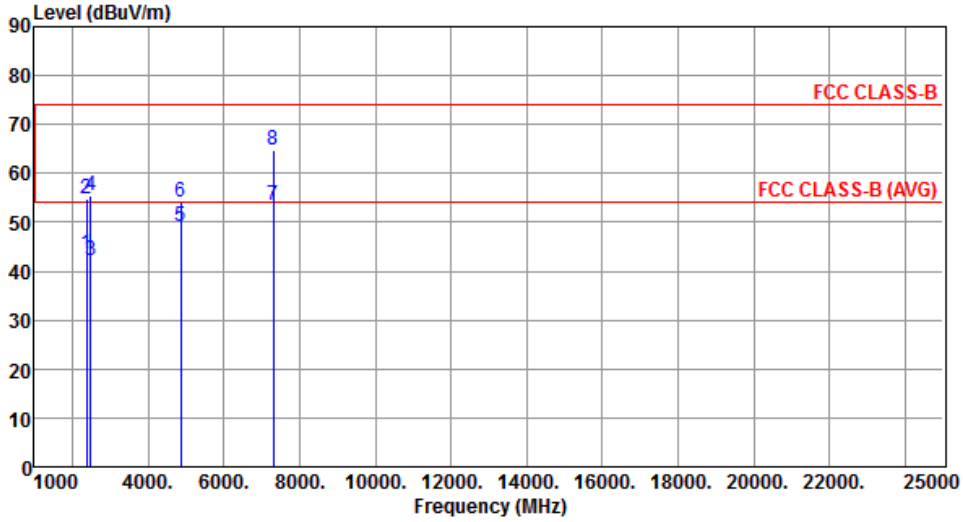
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	48.30	54.00	-5.70	49.26	-0.96	Average	112	236
2	2390.00	61.40	74.00	-12.60	62.36	-0.96	Peak	112	236
3	2487.00	53.36	54.00	-0.64	54.49	-1.13	Average	100	219
4	2487.00	59.23	74.00	-14.77	60.36	-1.13	Peak	100	219
5	4824.00	49.32	54.00	-4.68	44.45	4.87	Average	100	229
6	4824.00	52.12	74.00	-21.88	47.25	4.87	Peak	100	229
7	12060.00	43.28	54.00	-10.72	28.36	14.92	Average	100	30
8	12060.00	55.51	74.00	-18.49	40.59	14.92	Peak	100	30

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).

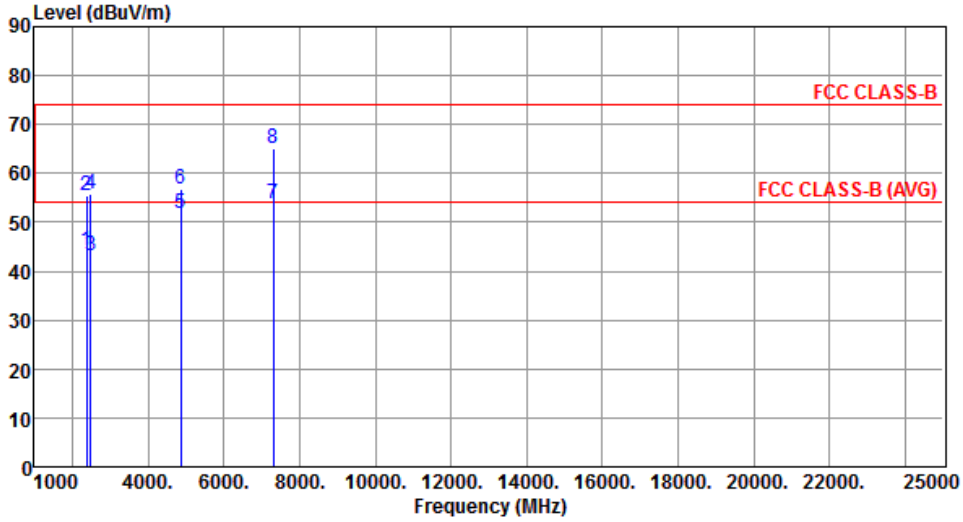
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	43.35	54.00	-10.65	44.31	-0.96	Average	175	92
2	2390.00	54.67	74.00	-19.33	55.63	-0.96	Peak	175	92
3	2483.50	42.29	54.00	-11.71	43.41	-1.12	Average	175	92
4	2483.50	55.40	74.00	-18.60	56.52	-1.12	Peak	175	92
5	4874.00	49.12	54.00	-4.88	44.21	4.91	Average	248	159
6	4874.00	54.23	74.00	-19.77	49.32	4.91	Peak	248	159
7	7311.00	53.42	54.00	-0.58	43.07	10.35	Average	247	140
8	7311.00	64.71	74.00	-9.29	54.36	10.35	Peak	247	140

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).

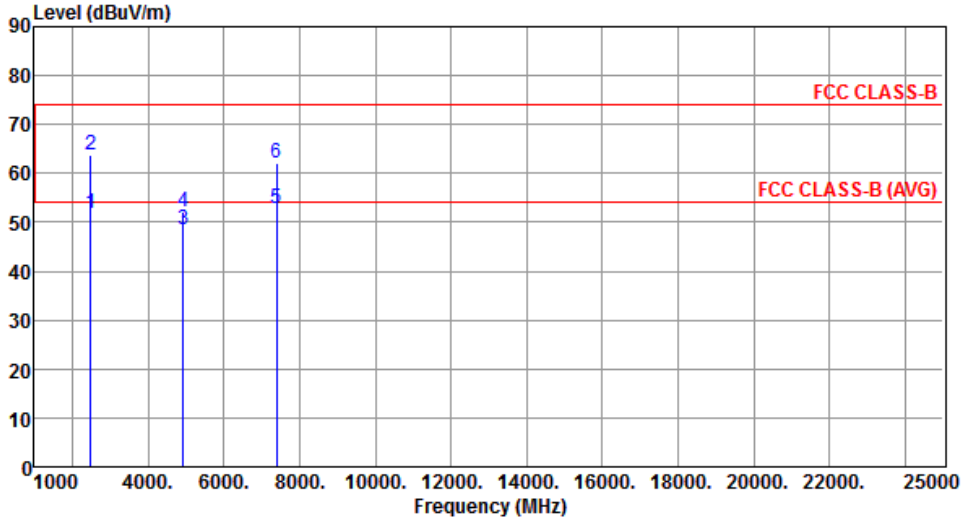
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.20	54.00	-9.80	45.16	-0.96	Average	115	236
2	2390.00	55.58	74.00	-18.42	56.54	-0.96	Peak	115	236
3	2483.50	43.22	54.00	-10.78	44.34	-1.12	Average	115	236
4	2483.50	55.90	74.00	-18.10	57.02	-1.12	Peak	115	236
5	4874.00	51.95	54.00	-2.05	47.04	4.91	Average	100	230
6	4874.00	56.63	74.00	-17.37	51.72	4.91	Peak	100	230
7	7311.00	53.68	54.00	-0.32	43.33	10.35	Average	112	139
8	7311.00	65.09	74.00	-8.91	54.74	10.35	Peak	112	139

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).

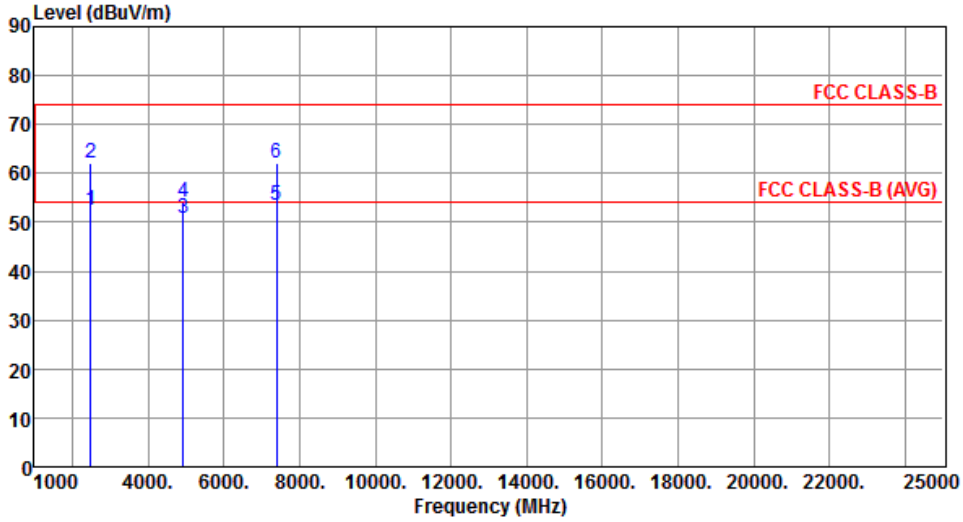
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.85	54.00	-2.15	52.97	-1.12	Average	178	95
2	2483.50	63.77	74.00	-10.23	64.89	-1.12	Peak	178	95
3	4924.00	48.42	54.00	-5.58	43.41	5.01	Average	245	156
4	4924.00	52.30	74.00	-21.70	47.29	5.01	Peak	245	156
5	7386.00	52.94	54.00	-1.06	42.79	10.15	Average	225	106
6	7386.00	62.27	74.00	-11.73	52.12	10.15	Peak	225	106

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

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		

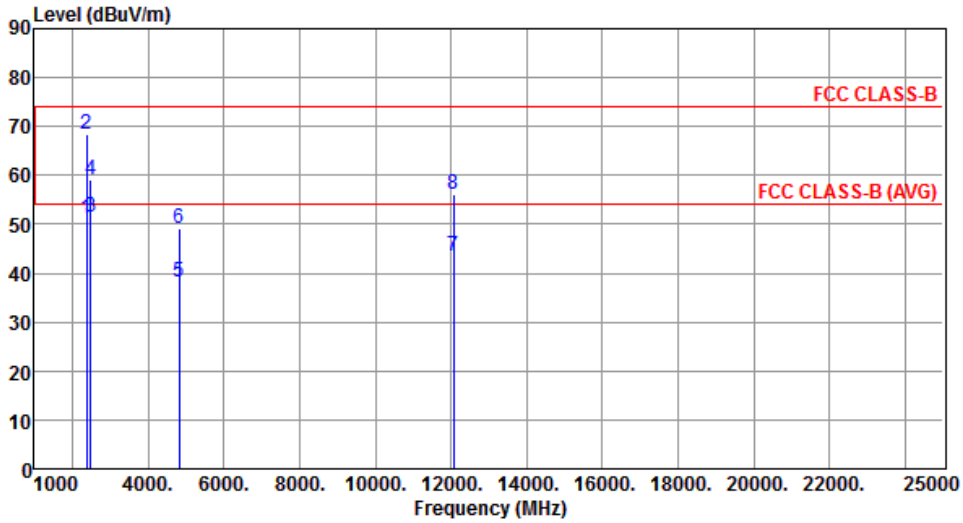


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.33	54.00	-1.67	53.45	-1.12	Average	114	237
2	2483.50	62.15	74.00	-11.85	63.27	-1.12	Peak	114	237
3	4924.00	50.69	54.00	-3.31	45.68	5.01	Average	100	231
4	4924.00	54.18	74.00	-19.82	49.17	5.01	Peak	100	231
5	7386.00	53.50	54.00	-0.50	43.35	10.15	Average	114	119
6	7386.00	62.19	74.00	-11.81	52.04	10.15	Peak	114	119

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 11g

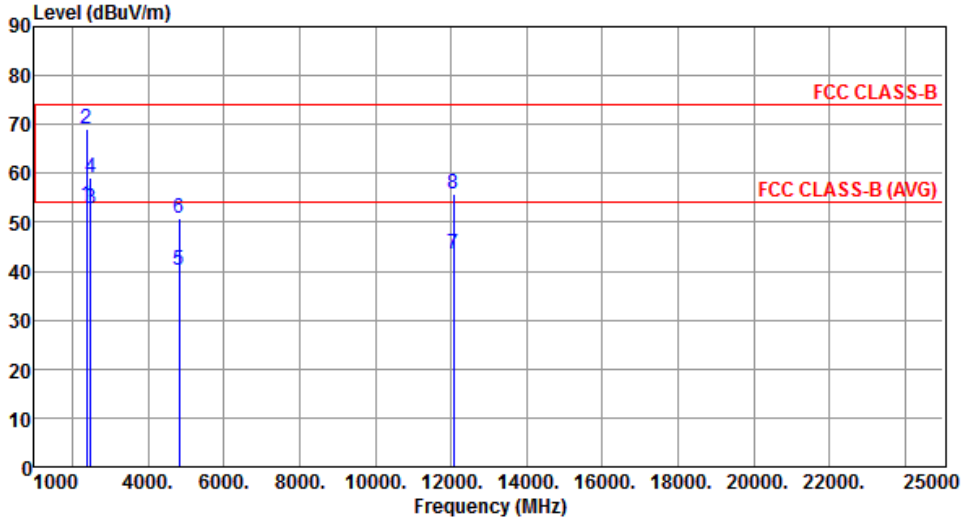
Modulation	11g	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.01	54.00	-2.99	51.97	-0.96	Average	149	133
2	2390.00	68.45	74.00	-5.55	69.41	-0.96	Peak	149	133
3	2487.00	51.43	54.00	-2.57	52.56	-1.13	Average	141	139
4	2487.00	59.25	74.00	-14.75	60.38	-1.13	Peak	141	139
5	4824.00	38.04	54.00	-15.96	33.17	4.87	Average	235	162
6	4824.00	49.02	74.00	-24.98	44.15	4.87	Peak	235	162
7	12060.00	43.55	54.00	-10.45	28.63	14.92	Average	100	20
8	12060.00	56.15	74.00	-17.85	41.23	14.92	Peak	100	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).

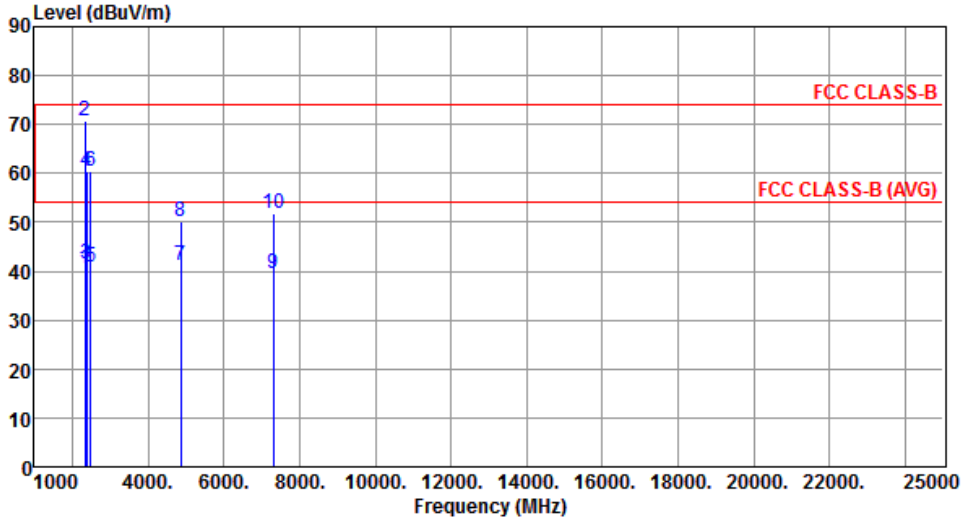
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.55	54.00	-0.45	54.51	-0.96	Average	100	237
2	2390.00	68.93	74.00	-5.07	69.89	-0.96	Peak	100	237
3	2487.00	52.73	54.00	-1.27	53.86	-1.13	Average	100	59
4	2487.00	59.05	74.00	-14.95	60.18	-1.13	Peak	100	59
5	4824.00	40.04	54.00	-13.96	35.17	4.87	Average	100	233
6	4824.00	50.91	74.00	-23.09	46.04	4.87	Peak	100	233
7	12060.00	43.46	54.00	-10.54	28.54	14.92	Average	100	30
8	12060.00	55.71	74.00	-18.29	40.79	14.92	Peak	100	30

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).

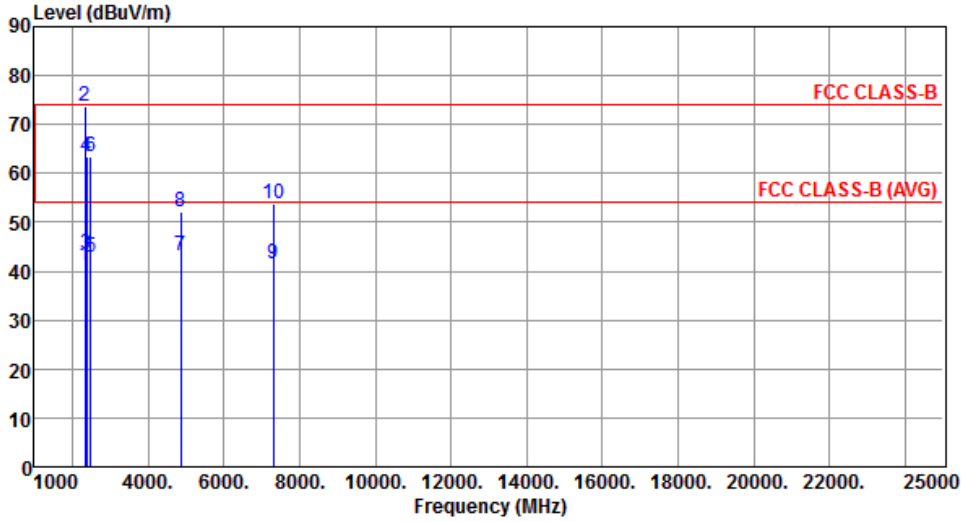
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2340.00	40.40	54.00	-13.60	41.23	-0.83	Average	145	132
2	2340.00	70.76	74.00	-3.24	71.59	-0.83	Peak	145	132
3	2390.00	41.40	54.00	-12.60	42.36	-0.96	Average	145	132
4	2390.00	60.30	74.00	-13.70	61.26	-0.96	Peak	145	132
5	2483.50	40.73	54.00	-13.27	41.85	-1.12	Average	145	132
6	2483.50	60.41	74.00	-13.59	61.53	-1.12	Peak	145	132
7	4874.00	41.09	54.00	-12.91	36.18	4.91	Average	240	159
8	4874.00	50.30	74.00	-23.70	45.39	4.91	Peak	240	159
9	7311.00	39.47	54.00	-14.53	29.12	10.35	Average	100	105
10	7311.00	51.91	74.00	-22.09	41.56	10.35	Peak	100	105

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).

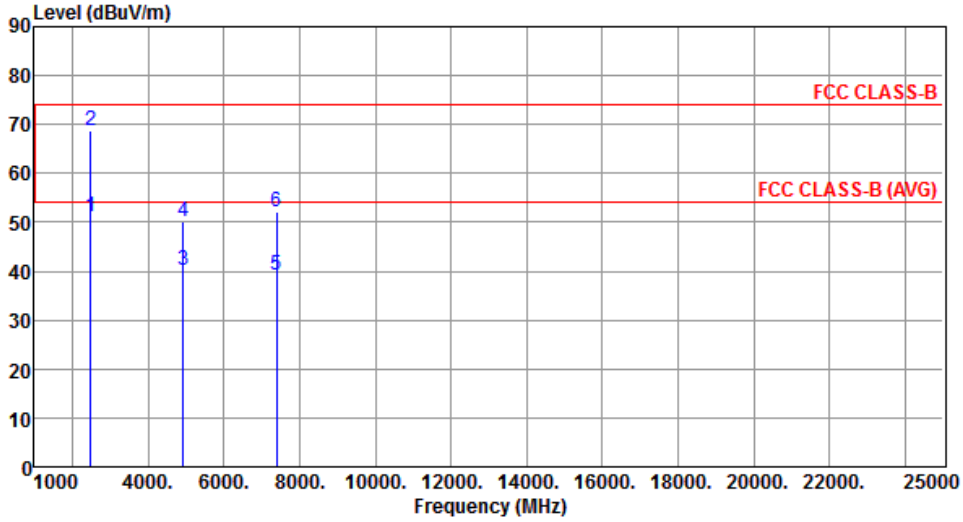
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2340.00	41.12	54.00	-12.88	41.95	-0.83	Average	100	235
2	2340.00	73.82	74.00	-0.18	74.65	-0.83	Peak	100	235
3	2390.00	43.45	54.00	-10.55	44.41	-0.96	Average	100	235
4	2390.00	63.38	74.00	-10.62	64.34	-0.96	Peak	100	235
5	2483.50	42.84	54.00	-11.16	43.96	-1.12	Average	100	235
6	2483.50	63.49	74.00	-10.51	64.61	-1.12	Peak	100	235
7	4874.00	43.12	54.00	-10.88	38.21	4.91	Average	100	232
8	4874.00	52.12	74.00	-21.88	47.21	4.91	Peak	100	232
9	7311.00	41.66	54.00	-12.34	31.31	10.35	Average	100	119
10	7311.00	53.77	74.00	-20.23	43.42	10.35	Peak	100	119

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).

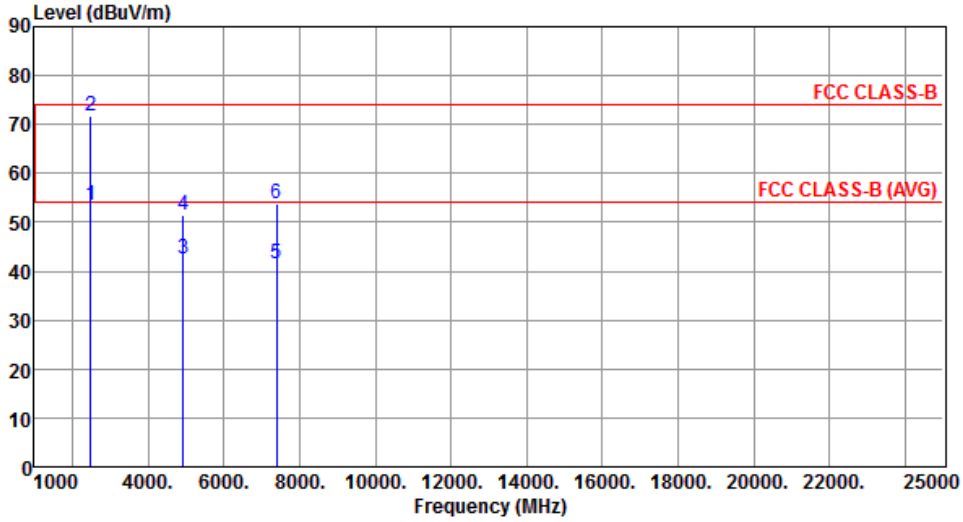
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.06	54.00	-2.94	52.18	-1.12	Average	152	135
2	2483.50	68.73	74.00	-5.27	69.85	-1.12	Peak	152	135
3	4924.00	40.22	54.00	-13.78	35.21	5.01	Average	243	155
4	4924.00	50.29	74.00	-23.71	45.28	5.01	Peak	243	155
5	7386.00	39.33	54.00	-14.67	29.18	10.15	Average	100	100
6	7386.00	52.30	74.00	-21.70	42.15	10.15	Peak	100	100

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

Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical		

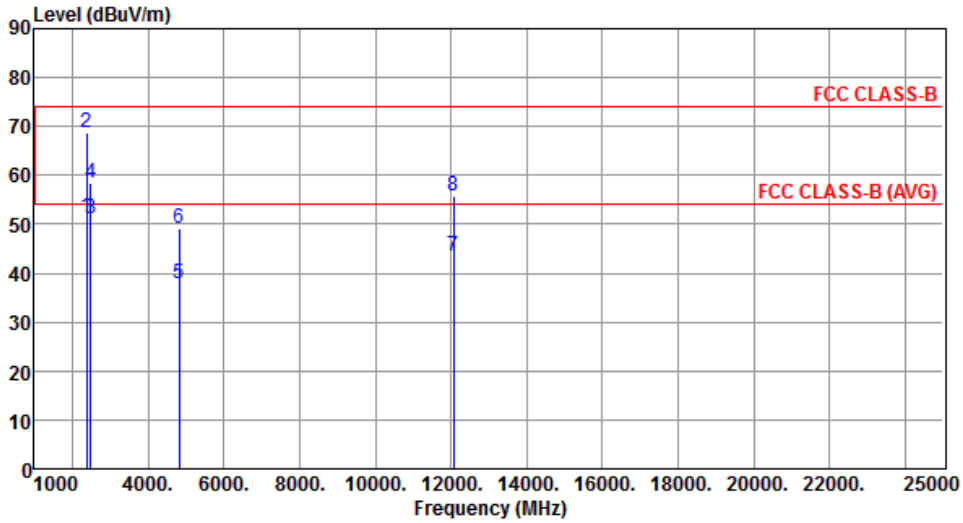


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.53	54.00	-0.47	54.65	-1.12	Average	120	234
2	2483.50	71.81	74.00	-2.19	72.93	-1.12	Peak	120	234
3	4924.00	42.46	54.00	-11.54	37.45	5.01	Average	100	235
4	4924.00	51.36	74.00	-22.64	46.35	5.01	Peak	100	235
5	7386.00	41.36	54.00	-12.64	31.21	10.15	Average	100	118
6	7386.00	53.67	74.00	-20.33	43.52	10.15	Peak	100	118

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

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

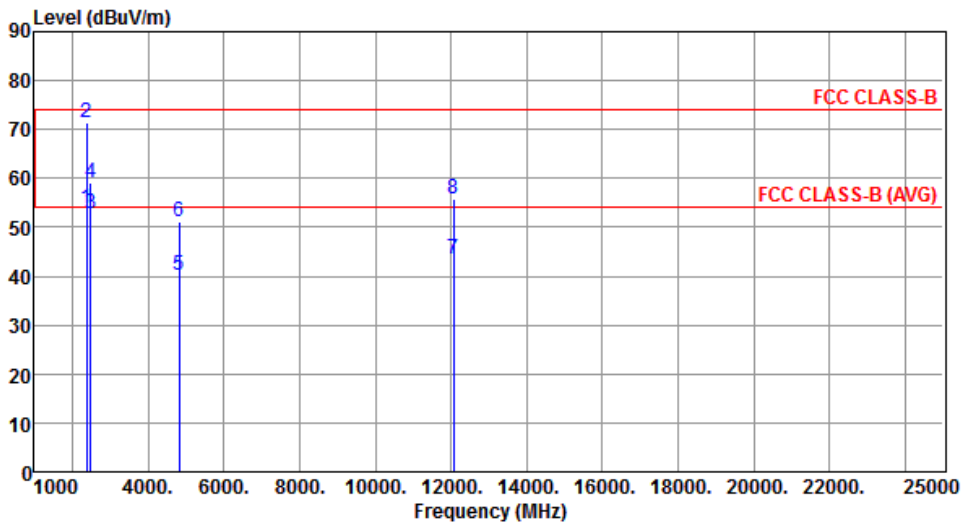
Modulation	VHT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.56	54.00	-2.44	52.52	-0.96	Average	145	135
2	2390.00	68.90	74.00	-5.10	69.86	-0.96	Peak	145	135
3	2487.00	51.10	54.00	-2.90	52.23	-1.13	Average	137	130
4	2487.00	58.36	74.00	-15.64	59.49	-1.13	Peak	137	130
5	4824.00	38.01	54.00	-15.99	33.14	4.87	Average	240	153
6	4824.00	49.15	74.00	-24.85	44.28	4.87	Peak	240	153
7	12060.00	43.61	54.00	-10.39	28.69	14.92	Average	100	60
8	12060.00	55.77	74.00	-18.23	40.85	14.92	Peak	100	60

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).

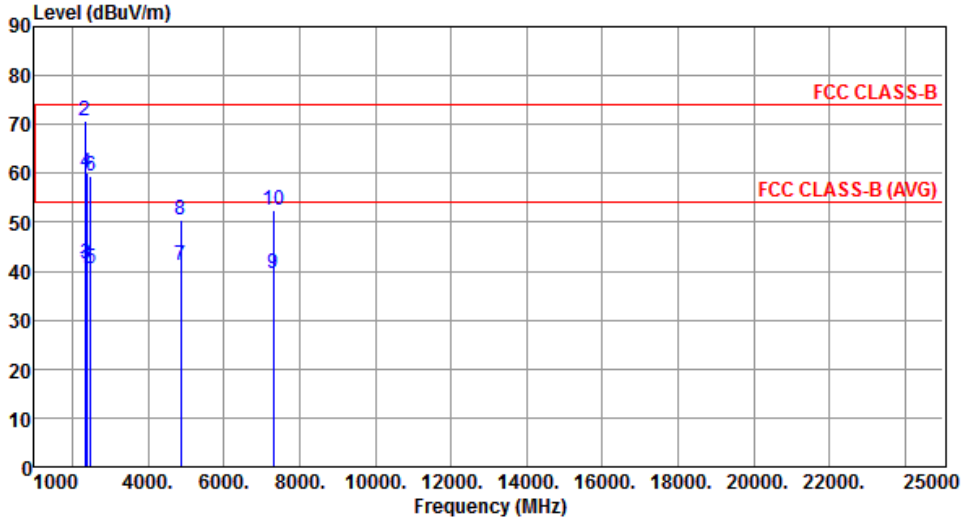
Modulation	VHT20	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.67	54.00	-0.33	54.63	-0.96	Average	100	292
2	2390.00	71.24	74.00	-2.76	72.20	-0.96	Peak	100	292
3	2487.00	52.89	54.00	-1.11	54.02	-1.13	Average	100	64
4	2487.00	59.16	74.00	-14.84	60.29	-1.13	Peak	100	64
5	4824.00	40.12	54.00	-13.88	35.25	4.87	Average	100	236
6	4824.00	51.01	74.00	-22.99	46.14	4.87	Peak	100	236
7	12060.00	43.38	54.00	-10.62	28.46	14.92	Average	100	50
8	12060.00	55.80	74.00	-18.20	40.88	14.92	Peak	100	50

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).

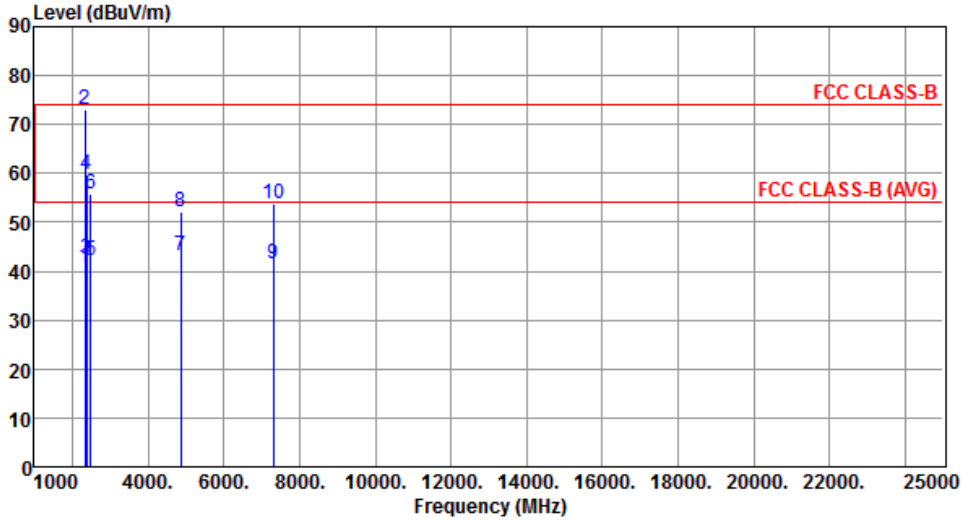
Modulation	VHT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2340.00	40.53	54.00	-13.47	41.36	-0.83	Average	151	132
2	2340.00	70.72	74.00	-3.28	71.55	-0.83	Peak	151	132
3	2390.00	41.60	54.00	-12.40	42.56	-0.96	Average	151	132
4	2390.00	60.26	74.00	-13.74	61.22	-0.96	Peak	151	132
5	2483.50	40.53	54.00	-13.47	41.65	-1.12	Average	151	132
6	2483.50	59.51	74.00	-14.49	60.63	-1.12	Peak	151	132
7	4874.00	41.07	54.00	-12.93	36.16	4.91	Average	230	157
8	4874.00	50.50	74.00	-23.50	45.59	4.91	Peak	230	157
9	7311.00	39.50	54.00	-14.50	29.15	10.35	Average	100	105
10	7311.00	52.51	74.00	-21.49	42.16	10.35	Peak	100	105

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).

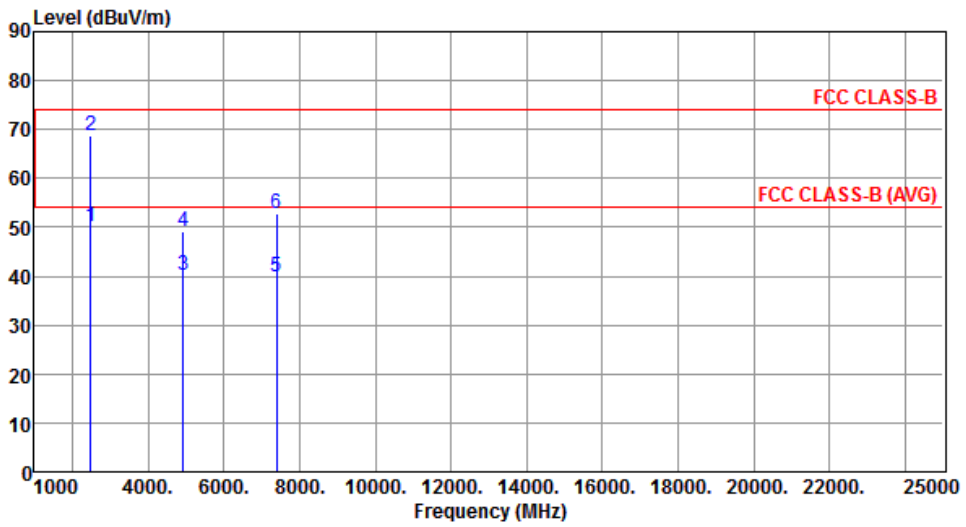
Modulation	VHT20	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2340.00	40.73	54.00	-13.27	41.56	-0.83	Average	100	292
2	2340.00	73.02	74.00	-0.98	73.85	-0.83	Peak	100	292
3	2390.00	42.60	54.00	-11.40	43.56	-0.96	Average	100	278
4	2390.00	59.89	74.00	-14.11	60.85	-0.96	Peak	100	278
5	2483.50	42.13	54.00	-11.87	43.25	-1.12	Average	100	278
6	2483.50	55.79	74.00	-18.21	56.91	-1.12	Peak	100	278
7	4874.00	43.09	54.00	-10.91	38.18	4.91	Average	100	230
8	4874.00	52.07	74.00	-21.93	47.16	4.91	Peak	100	230
9	7311.00	41.64	54.00	-12.36	31.29	10.35	Average	100	118
10	7311.00	53.66	74.00	-20.34	43.31	10.35	Peak	100	118

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

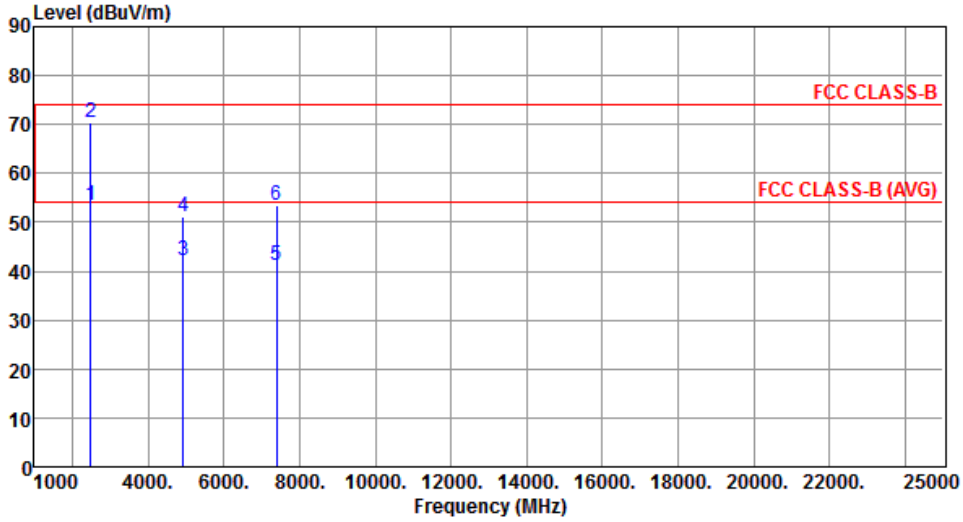
Modulation	VHT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	50.17	54.00	-3.83	51.29	-1.12	Average	148	139
2	2483.50	68.76	74.00	-5.24	69.88	-1.12	Peak	148	139
3	4924.00	40.22	54.00	-13.78	35.21	5.01	Average	243	159
4	4924.00	49.29	74.00	-24.71	44.28	5.01	Peak	243	159
5	7386.00	39.71	54.00	-14.29	29.56	10.15	Average	100	101
6	7386.00	52.71	74.00	-21.29	42.56	10.15	Peak	100	101

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)	2462
Polarization	Vertical		

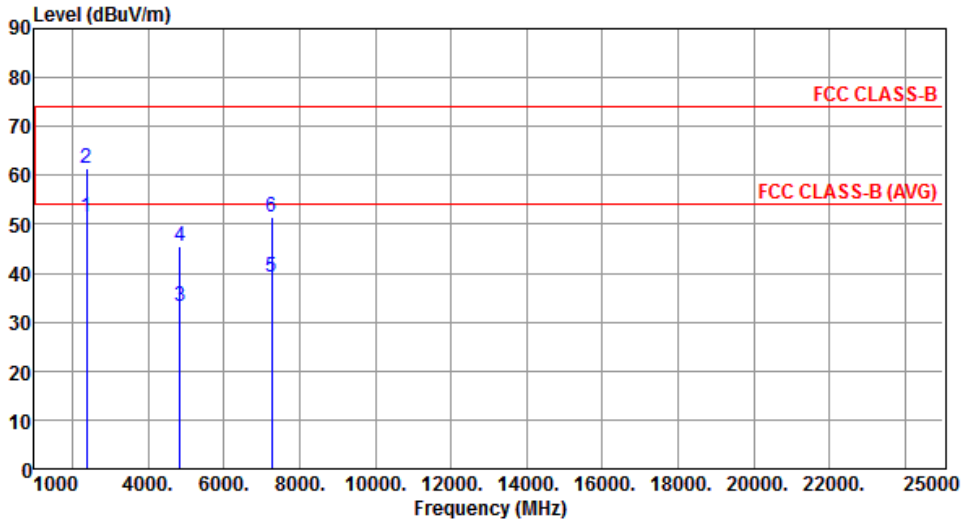


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.51	54.00	-0.49	54.63	-1.12	Average	100	221
2	2483.50	70.53	74.00	-3.47	71.65	-1.12	Peak	100	221
3	4924.00	42.22	54.00	-11.78	37.21	5.01	Average	100	233
4	4924.00	51.16	74.00	-22.84	46.15	5.01	Peak	100	233
5	7386.00	41.34	54.00	-12.66	31.19	10.15	Average	100	115
6	7386.00	53.57	74.00	-20.43	43.42	10.15	Peak	100	115

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

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

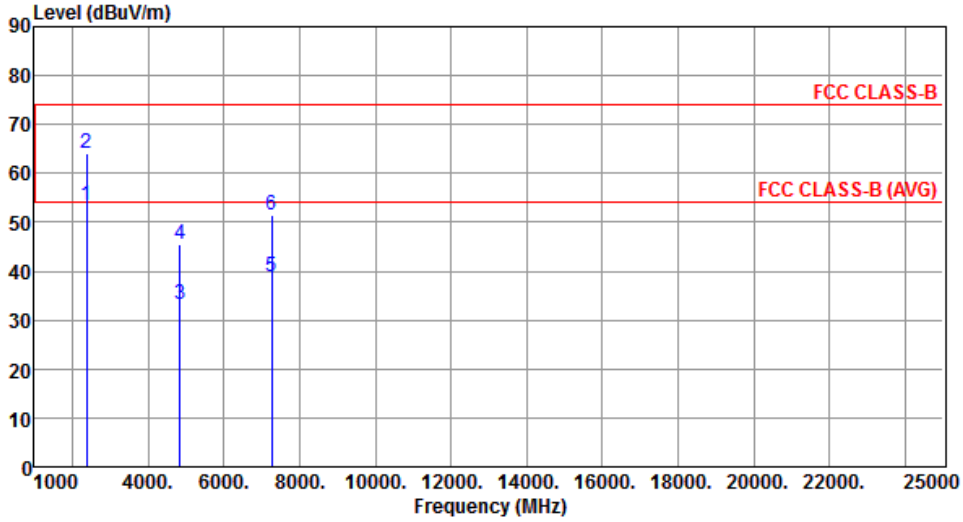
Modulation	VHT40	**Test Freq. (MHz)**	2422
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.49	54.00	-2.51	52.45	-0.96	Average	140	136
2	2390.00	61.37	74.00	-12.63	62.33	-0.96	Peak	140	136
3	4844.00	33.23	54.00	-20.77	28.30	4.93	Average	100	30
4	4844.00	45.46	74.00	-28.54	40.53	4.93	Peak	100	30
5	7266.00	39.09	54.00	-14.91	28.69	10.40	Average	100	50
6	7266.00	51.52	74.00	-22.48	41.12	10.40	Peak	100	50

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).

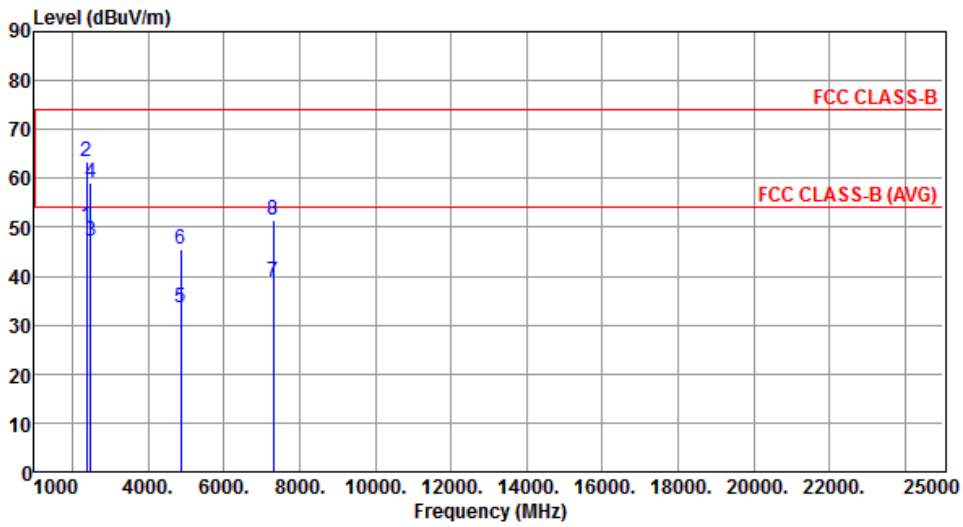
Modulation	VHT40	Test Freq. (MHz)	2422
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.57	54.00	-0.43	54.53	-0.96	Average	102	295
2	2390.00	64.15	74.00	-9.85	65.11	-0.96	Peak	102	295
3	4844.00	33.18	54.00	-20.82	28.25	4.93	Average	100	30
4	4844.00	45.48	74.00	-28.52	40.55	4.93	Peak	100	30
5	7266.00	38.96	54.00	-15.04	28.56	10.40	Average	100	40
6	7266.00	51.63	74.00	-22.37	41.23	10.40	Peak	100	40

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).

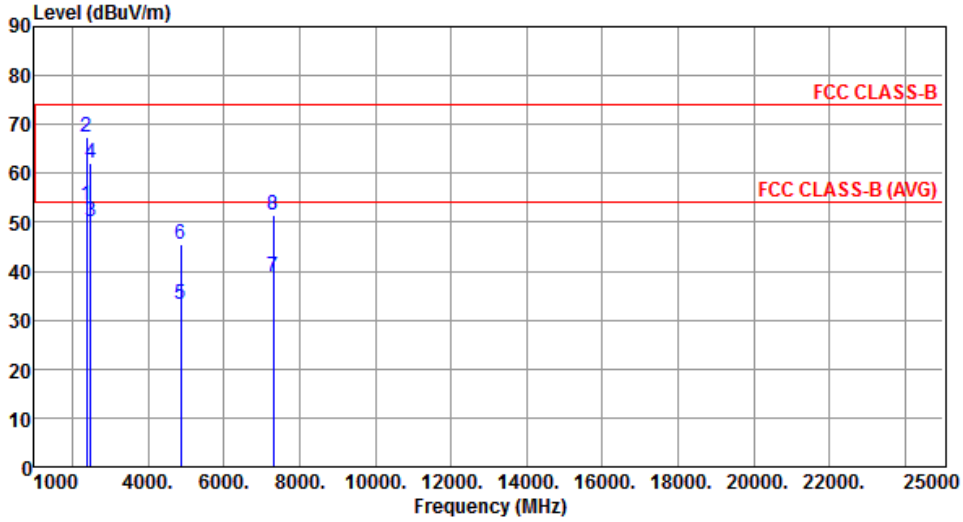
Modulation	VHT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.30	54.00	-3.70	51.26	-0.96	Average	142	134
2	2390.00	63.32	74.00	-10.68	64.28	-0.96	Peak	142	134
3	2483.50	47.14	54.00	-6.86	48.26	-1.12	Average	142	134
4	2483.50	59.19	74.00	-14.81	60.31	-1.12	Peak	142	134
5	4874.00	33.46	54.00	-20.54	28.55	4.91	Average	100	70
6	4874.00	45.46	74.00	-28.54	40.55	4.91	Peak	100	70
7	7311.00	38.90	54.00	-15.10	28.55	10.35	Average	100	80
8	7311.00	51.51	74.00	-22.49	41.16	10.35	Peak	100	80

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).

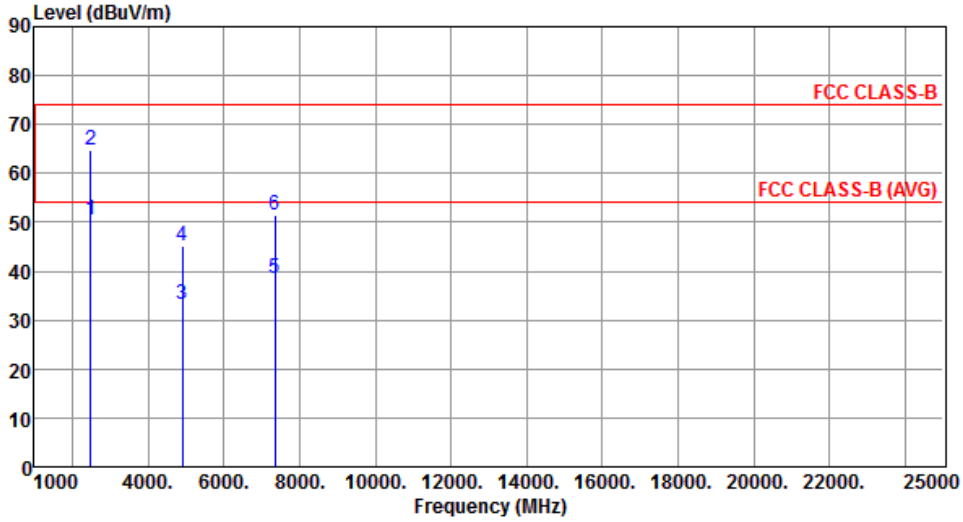
Modulation	VHT40	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.51	54.00	-0.49	54.47	-0.96	Average	100	296
2	2390.00	67.30	74.00	-6.70	68.26	-0.96	Peak	100	296
3	2483.50	50.13	54.00	-3.87	51.25	-1.12	Average	100	296
4	2483.50	62.14	74.00	-11.86	63.26	-1.12	Peak	100	296
5	4874.00	33.37	54.00	-20.63	28.46	4.91	Average	100	50
6	4874.00	45.49	74.00	-28.51	40.58	4.91	Peak	100	50
7	7311.00	39.00	54.00	-15.00	28.65	10.35	Average	100	90
8	7311.00	51.57	74.00	-22.43	41.22	10.35	Peak	100	90

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

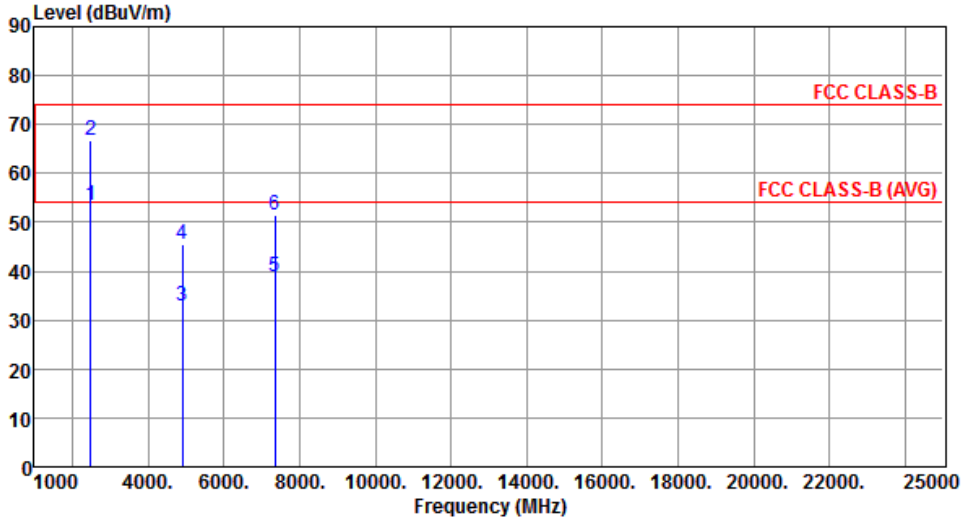
Modulation	VHT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	50.44	54.00	-3.56	51.56	-1.12	Average	145	139
2	2483.50	64.73	74.00	-9.27	65.85	-1.12	Peak	145	139
3	4904.00	33.17	54.00	-20.83	28.26	4.91	Average	100	40
4	4904.00	45.28	74.00	-28.72	40.37	4.91	Peak	100	40
5	7356.00	38.65	54.00	-15.35	28.42	10.23	Average	100	35
6	7356.00	51.49	74.00	-22.51	41.26	10.23	Peak	100	35

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)	2452
Polarization	Vertical		



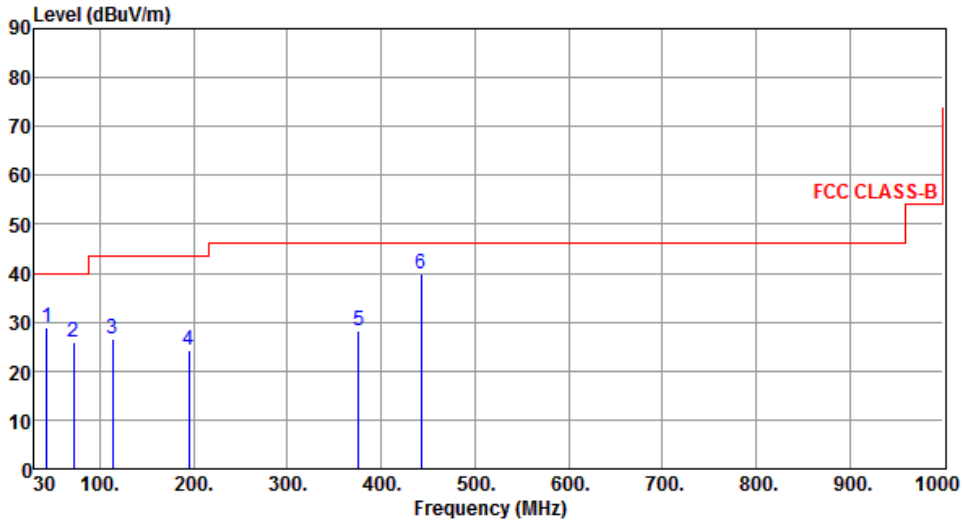
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.56	54.00	-0.44	54.68	-1.12	Average	100	259
2	2483.50	66.80	74.00	-7.20	67.92	-1.12	Peak	100	259
3	4904.00	33.03	54.00	-20.97	28.12	4.91	Average	100	25
4	4904.00	45.36	74.00	-28.64	40.45	4.91	Peak	100	25
5	7356.00	38.76	54.00	-15.24	28.53	10.23	Average	100	90
6	7356.00	51.51	74.00	-22.49	41.28	10.23	Peak	100	90

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

Beamforming mode

3.5.9 Transmitter Radiated Unwanted Emissions (Below 1GHz)

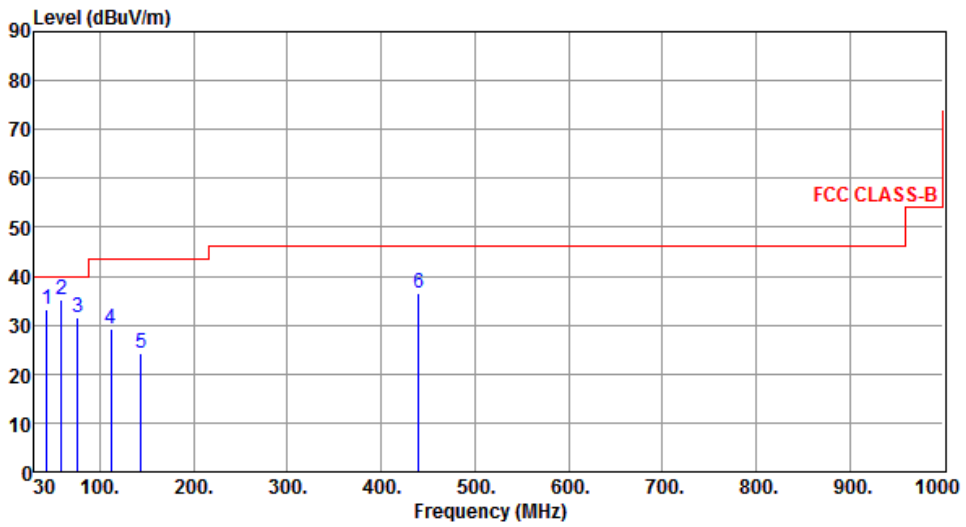
Modulation	VHT20	**Test Freq. (MHz)**	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	43.52	28.88	40.00	-11.12	37.80	-8.92	Peak	---	---
2	71.54	25.89	40.00	-14.11	36.85	-10.96	Peak	---	---
3	113.39	26.48	43.50	-17.02	38.28	-11.80	Peak	---	---
4	194.87	24.29	43.50	-19.21	36.14	-11.85	Peak	---	---
5	376.22	28.37	46.00	-17.63	34.77	-6.40	Peak	---	---
6	442.28	39.74	46.00	-6.26	44.15	-4.41	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)	2437
Polarization	Vertical		

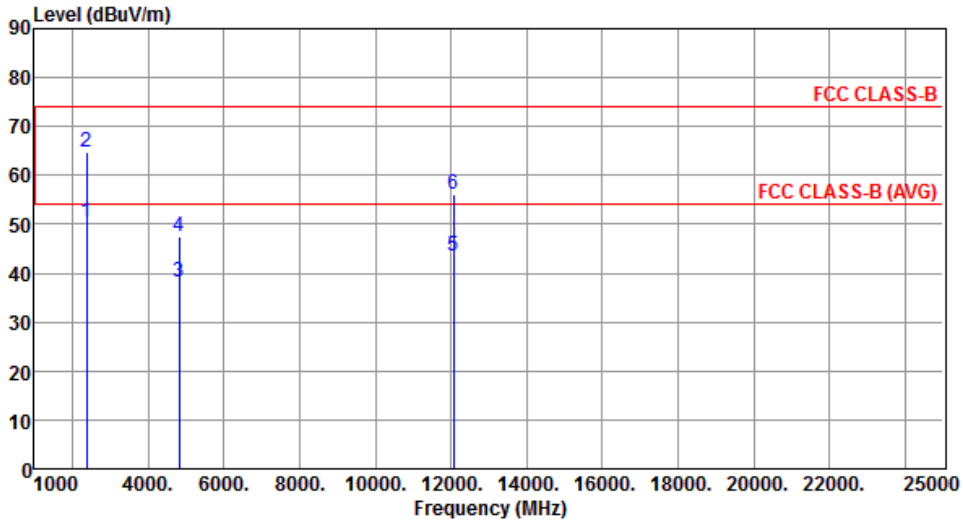


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	43.51	33.34	40.00	-6.66	42.26	-8.92	Peak	---	---
2	59.33	35.26	40.00	-4.74	44.52	-9.26	Peak	---	---
3	76.49	31.57	40.00	-8.43	44.06	-12.49	Peak	---	---
4	111.48	29.24	43.50	-14.26	41.28	-12.04	Peak	---	---
5	143.49	24.36	43.50	-19.14	33.35	-8.99	Peak	---	---
6	440.31	36.45	46.00	-9.55	40.91	-4.46	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

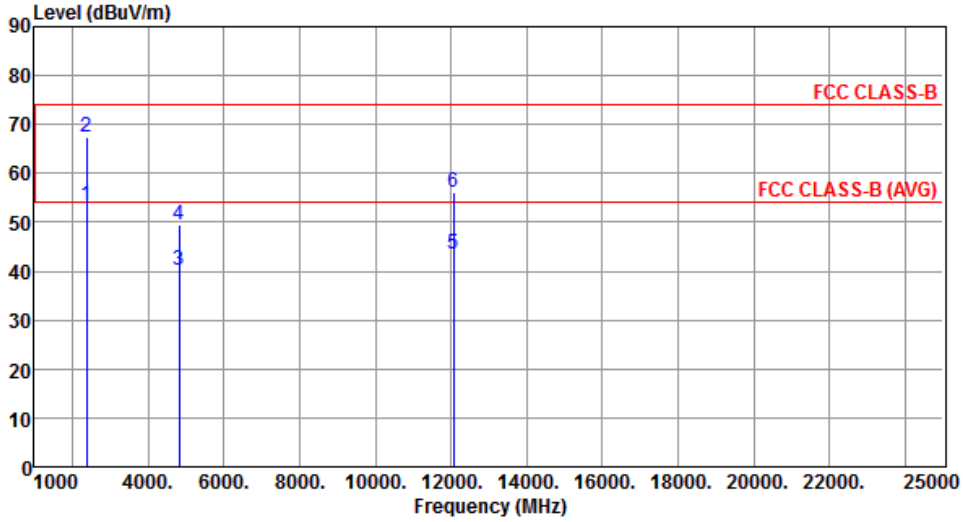
Modulation	VHT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.50	54.00	-3.50	51.46	-0.96	Average	298	96
2	2390.00	64.63	74.00	-9.37	65.59	-0.96	Peak	298	96
3	4824.00	38.17	54.00	-15.83	33.30	4.87	Average	100	162
4	4824.00	47.45	74.00	-26.55	42.58	4.87	Peak	100	162
5	12060.00	43.39	54.00	-10.61	28.47	14.92	Average	100	60
6	12060.00	56.20	74.00	-17.80	41.28	14.92	Peak	100	60

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).

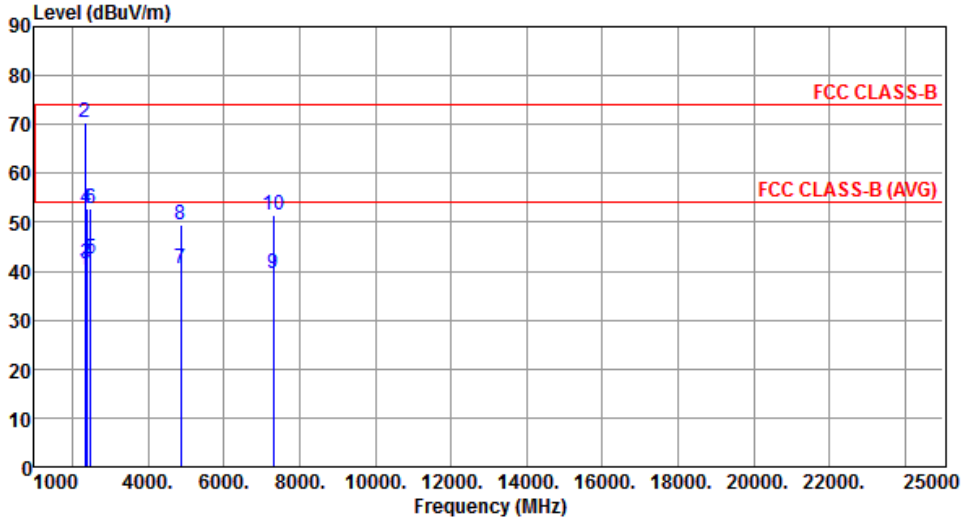
Modulation	VHT20	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.57	54.00	-0.43	54.53	-0.96	Average	100	219
2	2390.00	67.49	74.00	-6.51	68.45	-0.96	Peak	100	219
3	4824.00	40.32	54.00	-13.68	35.45	4.87	Average	100	235
4	4824.00	49.44	74.00	-24.56	44.57	4.87	Peak	100	235
5	12060.00	43.48	54.00	-10.52	28.56	14.92	Average	100	20
6	12060.00	56.18	74.00	-17.82	41.26	14.92	Peak	100	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).

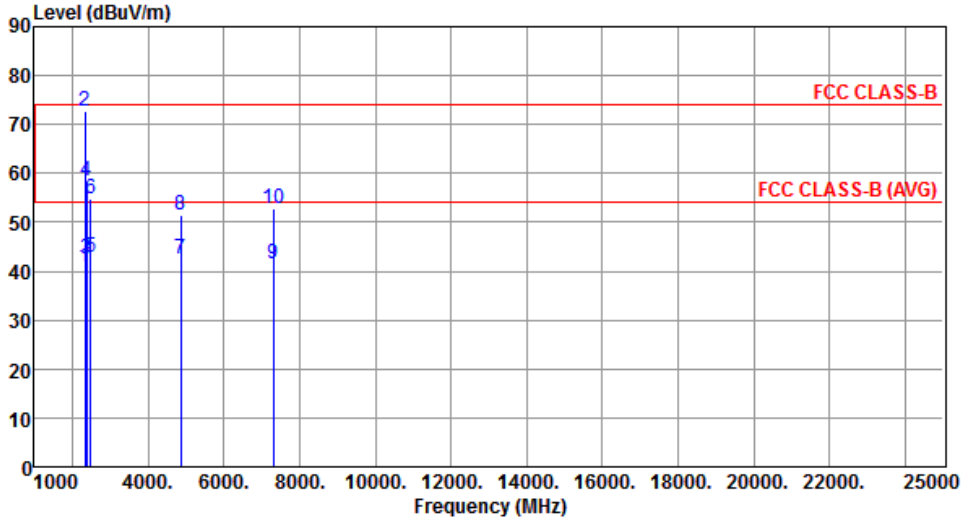
Modulation	VHT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2340.00	40.12	54.00	-13.88	40.95	-0.83	Average	295	95
2	2340.00	70.26	74.00	-3.74	71.09	-0.83	Peak	295	95
3	2390.00	41.52	54.00	-12.48	42.48	-0.96	Average	295	95
4	2390.00	52.67	74.00	-21.33	53.63	-0.96	Peak	295	95
5	2483.50	42.46	54.00	-11.54	43.58	-1.12	Average	295	95
6	2483.50	52.70	74.00	-21.30	53.82	-1.12	Peak	295	95
7	4874.00	40.56	54.00	-13.44	35.65	4.91	Average	100	161
8	4874.00	49.47	74.00	-24.53	44.56	4.91	Peak	100	161
9	7311.00	39.40	54.00	-14.60	29.05	10.35	Average	100	20
10	7311.00	51.61	74.00	-22.39	41.26	10.35	Peak	100	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).

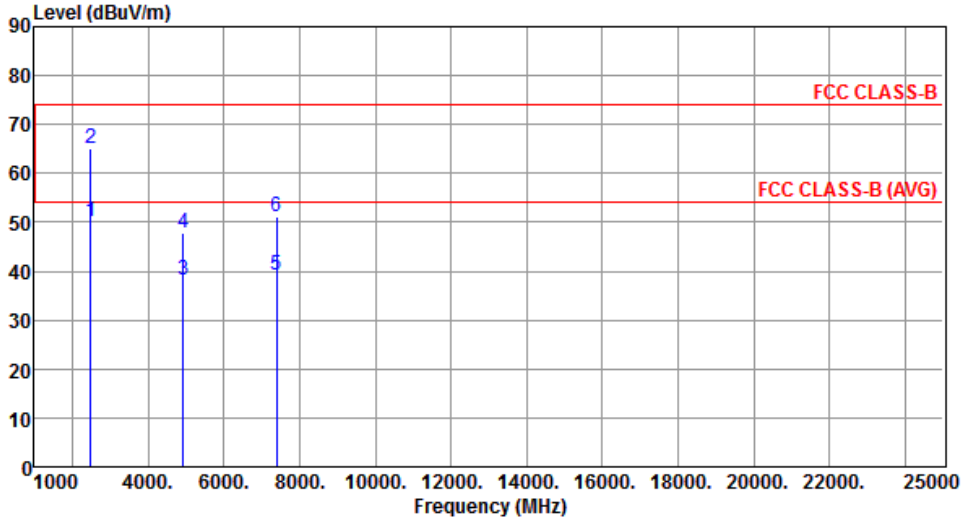
Modulation	VHT20	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2340.00	40.96	54.00	-13.04	41.79	-0.83	Average	100	150
2	2340.00	72.78	74.00	-1.22	73.61	-0.83	Peak	100	150
3	2390.00	42.56	54.00	-11.44	43.52	-0.96	Average	100	150
4	2390.00	58.37	74.00	-15.63	59.33	-0.96	Peak	100	150
5	2483.50	42.76	54.00	-11.24	43.88	-1.12	Average	100	150
6	2483.50	54.89	74.00	-19.11	56.01	-1.12	Peak	100	150
7	4874.00	42.47	54.00	-11.53	37.56	4.91	Average	100	232
8	4874.00	51.50	74.00	-22.50	46.59	4.91	Peak	100	232
9	7311.00	41.66	54.00	-12.34	31.31	10.35	Average	100	119
10	7311.00	52.70	74.00	-21.30	42.35	10.35	Peak	100	119

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).

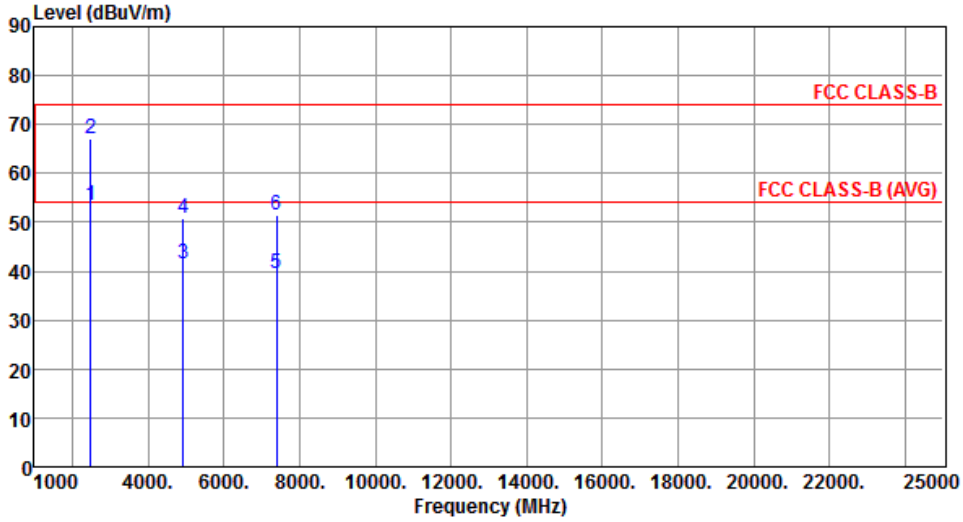
Modulation	VHT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	50.14	54.00	-3.86	51.26	-1.12	Average	297	98
2	2483.50	65.15	74.00	-8.85	66.27	-1.12	Peak	297	98
3	4924.00	38.30	54.00	-15.70	33.29	5.01	Average	100	162
4	4924.00	47.76	74.00	-26.24	42.75	5.01	Peak	100	162
5	7386.00	39.33	54.00	-14.67	29.18	10.15	Average	100	70
6	7386.00	51.30	74.00	-22.70	41.15	10.15	Peak	100	70

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)	2462
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	2483.50	53.41	54.00	-0.59	54.53	-1.12	Average	100	211
2	2483.50	67.16	74.00	-6.84	68.28	-1.12	Peak	100	211
3	4924.00	41.42	54.00	-12.58	36.41	5.01	Average	100	234
4	4924.00	50.69	74.00	-23.31	45.68	5.01	Peak	100	234
5	7386.00	39.41	54.00	-14.59	29.26	10.15	Average	100	100
6	7386.00	51.38	74.00	-22.62	41.23	10.15	Peak	100	100

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

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.6.2 Test Procedures

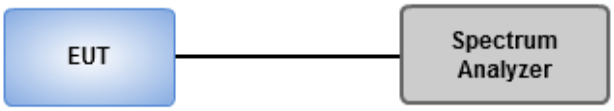
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.6.3 Test Setup

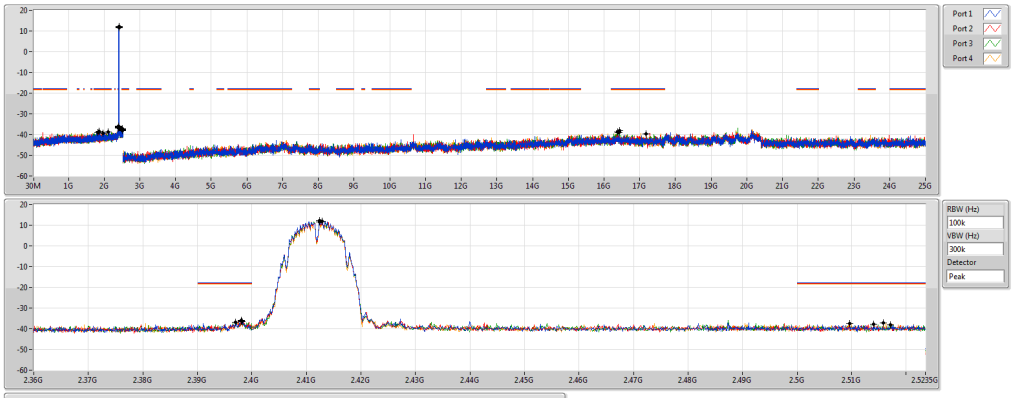


Non-beamforming mode

3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

802.11b_Nss1,(1Mbps)_4TX **CSE NdB**

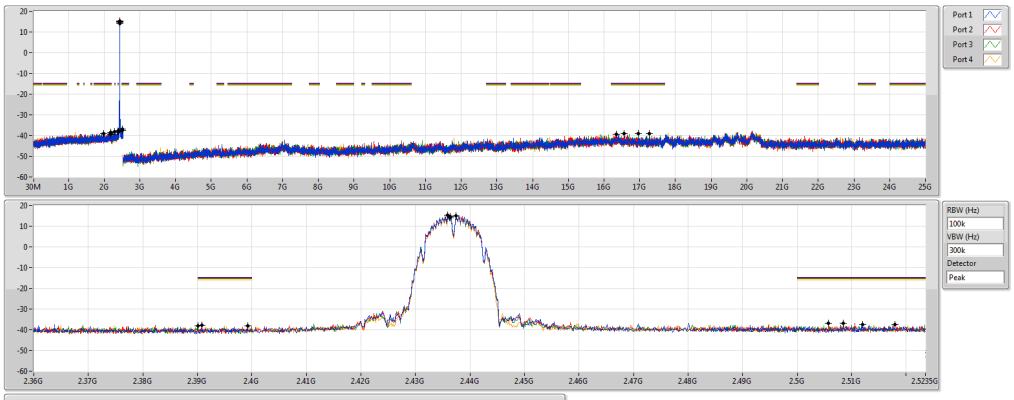
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41236G	12.10	-17.90	1.86022G	-38.44	2.398G	-35.96	2.51406G	-37.82	17.18099G	-39.66	1
2.41286G	12.00	-18.00	2.10836G	-38.78	2.398G	-36.39	2.50958G	-37.47	16.40836G	-39.02	2
2.41236G	12.12	-17.88	1.97089G	-39.30	2.39816G	-36.54	2.5171G	-38.12	16.42802G	-38.01	3
2.41236G	11.56	-18.44	1.82177G	-39.14	2.39696G	-36.72	2.51582G	-37.16	16.38307G	-38.88	4

802.11b_Nss1,(1Mbps)_4TX **CSE NdB**

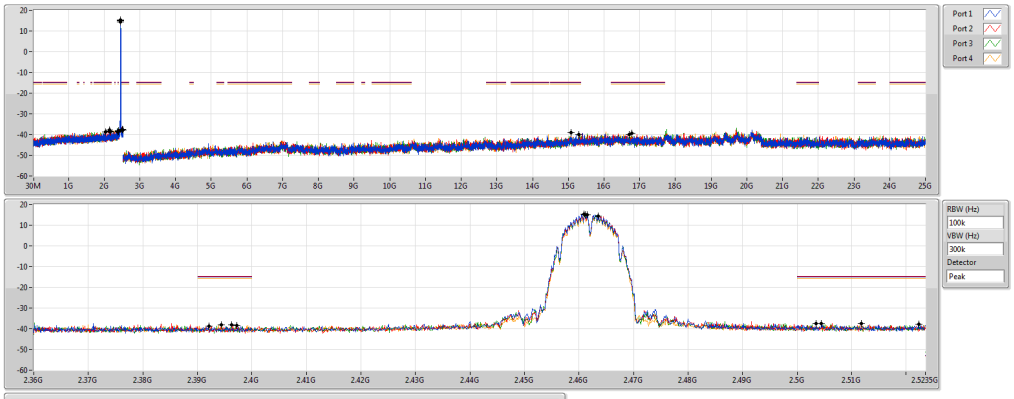
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43591G	15.22	-14.78	2.30175G	-38.05	2.39088G	-37.67	2.51198G	-37.36	17.27651G	-39.16	1
2.43741G	15.14	-14.86	2.18642G	-38.50	2.39016G	-38.14	2.50846G	-36.74	16.56569G	-39.05	2
2.43641G	14.74	-15.26	2.17943G	-39.29	2.39008G	-38.15	2.5179G	-37.46	16.95903G	-38.97	3
2.43641G	14.21	-15.79	1.98953G	-39.04	2.3992G	-38.09	2.50574G	-37.00	16.35217G	-39.32	4

802.11b_Nss1,(1Mbps)_4TX **CSE NdB**

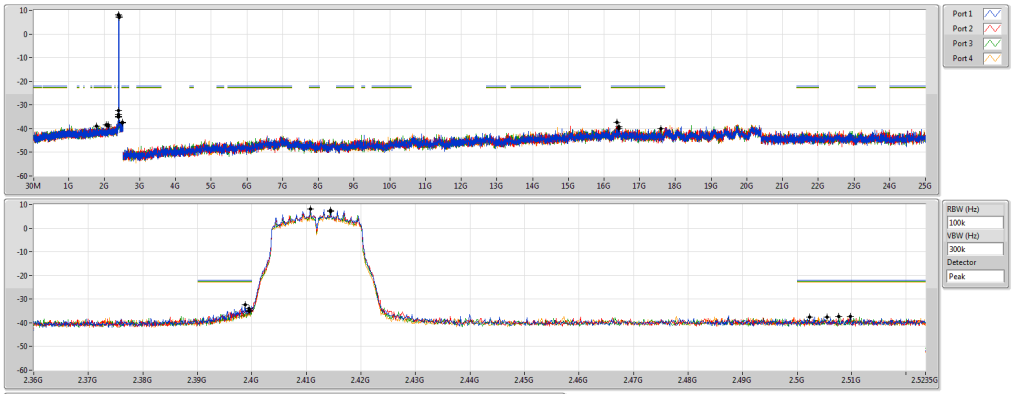
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46112G	15.06	-14.94	2.1538G	-37.78	2.39208G	-38.78	2.50446G	-37.56	16.70617G	-40.07	1
2.46096G	15.32	-14.68	2.17244G	-38.39	2.3944G	-38.15	2.5035G	-37.55	15.07382G	-39.01	2
2.46146G	15.01	-14.99	2.04312G	-38.73	2.39728G	-38.49	2.5223G	-37.88	15.28734G	-39.92	3
2.46346G	14.41	-15.59	2.18428G	-38.72	2.39632G	-38.16	2.51182G	-37.36	16.77079G	-39.53	4

802.11g_Nss1,(6Mbps)_4TX **CSE NdB**

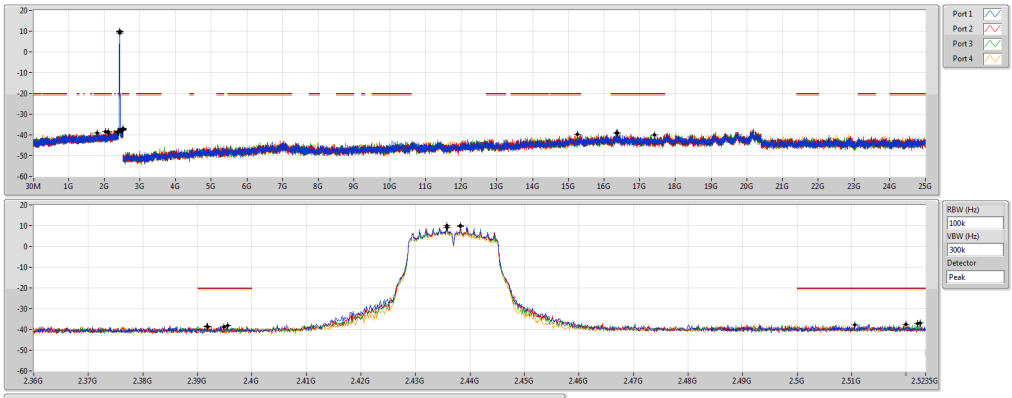
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41069G	8.08	-21.92	2.1072G	-39.00	2.39872G	-32.45	2.50974G	-37.37	16.41679G	-40.14	1
2.41069G	8.13	-21.87	2.06526G	-38.44	2.39952G	-33.99	2.50222G	-37.61	16.35498G	-37.32	2
2.41436G	7.44	-22.56	2.12001G	-38.27	2.39952G	-35.05	2.50766G	-37.34	17.59961G	-40.12	3
2.41436G	7.06	-22.94	1.77983G	-38.89	2.39952G	-34.86	2.50542G	-37.48	16.41117G	-39.28	4

802.11g_Nss1,(6Mbps)_4TX **CSE NdB**

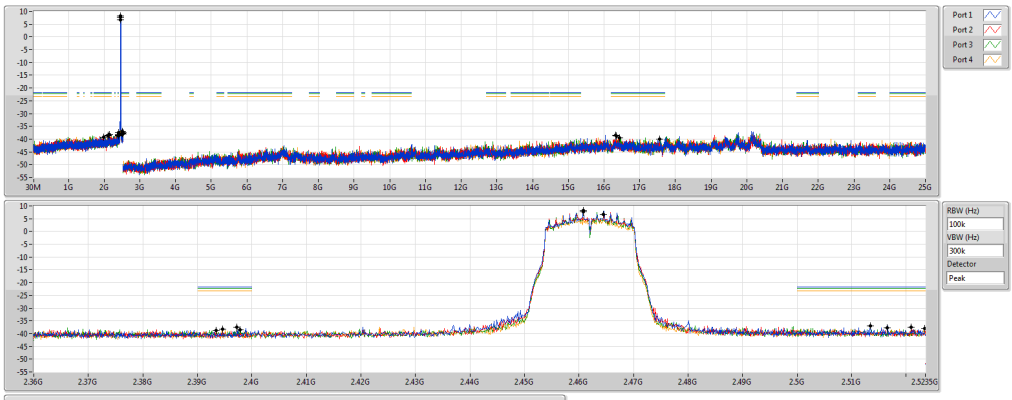
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43824G	9.99	-20.01	1.8043G	-38.92	2.39552G	-38.14	2.51054G	-37.73	17.4198G	-40.02	1
2.43824G	9.69	-20.31	2.11652G	-39.00	2.3948G	-38.73	2.52254G	-36.93	15.25925G	-39.79	2
2.43574G	10.03	-19.97	2.10953G	-38.55	2.39176G	-38.35	2.52206G	-37.33	16.33812G	-39.09	3
2.43574G	9.00	-21.00	2.04662G	-38.31	2.39192G	-38.74	2.5199G	-37.56	16.38026G	-39.13	4

802.11g_Nss1,(6Mbps)_4TX **CSE NdB**

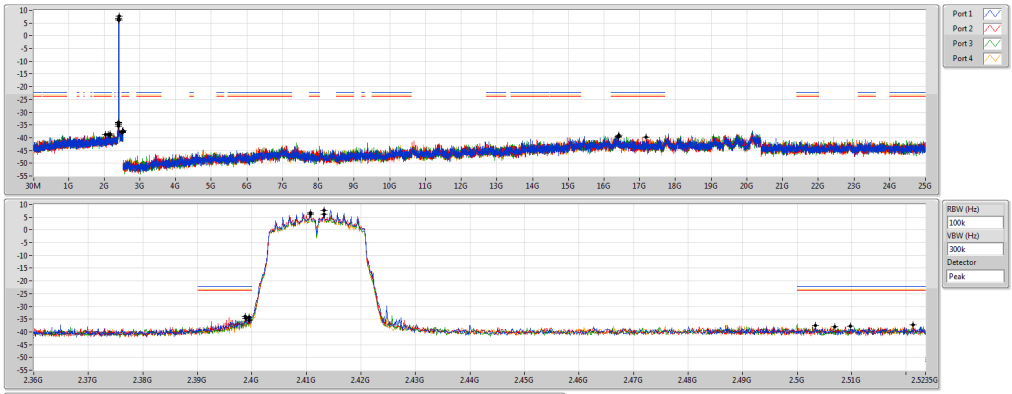
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46079G	8.18	-21.82	2.14681G	-38.28	2.39728G	-37.44	2.51342G	-36.96	16.32126G	-38.61	1
2.46079G	8.23	-21.77	2.11535G	-38.83	2.39464G	-38.27	2.52342G	-38.10	17.55747G	-39.90	2
2.46079G	7.79	-22.21	1.9872G	-39.30	2.39784G	-38.48	2.51654G	-37.62	16.33812G	-38.81	3
2.46446G	6.81	-23.19	2.12118G	-38.48	2.39344G	-38.66	2.52086G	-37.49	16.43926G	-39.47	4

802.11ac VHT20_Nss1,(MCS0)_4TX **CSE NdB**

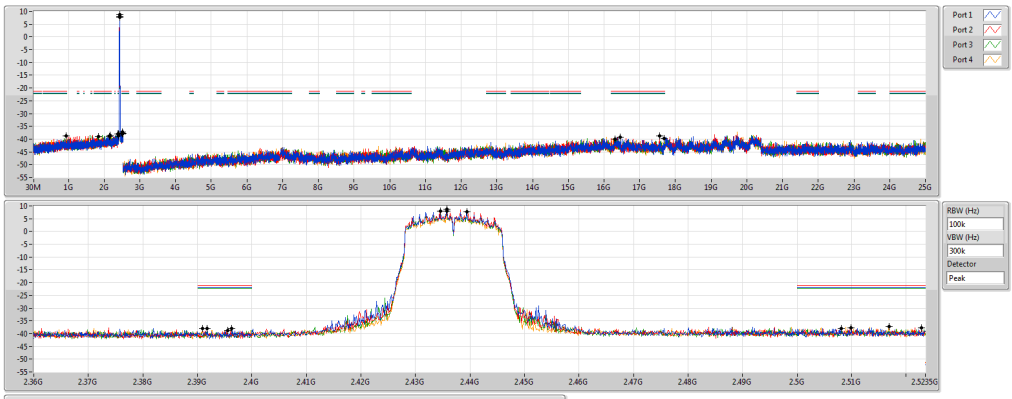
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41319G	7.71	-22.29	2.03963G	-38.82	2.3988G	-33.95	2.50694G	-37.90	16.41679G	-39.05	1
2.41319G	6.19	-23.81	2.11885G	-38.72	2.39952G	-34.29	2.50334G	-37.48	16.39431G	-39.65	2
2.41069G	6.29	-23.71	2.16079G	-38.49	2.39888G	-34.70	2.50974G	-37.69	16.40274G	-39.39	3
2.41069G	6.75	-23.25	2.17011G	-38.97	2.39952G	-35.51	2.52126G	-37.34	17.18099G	-39.65	4

802.11ac VHT20_Nss1,(MCS0)_4TX **CSE NdB**

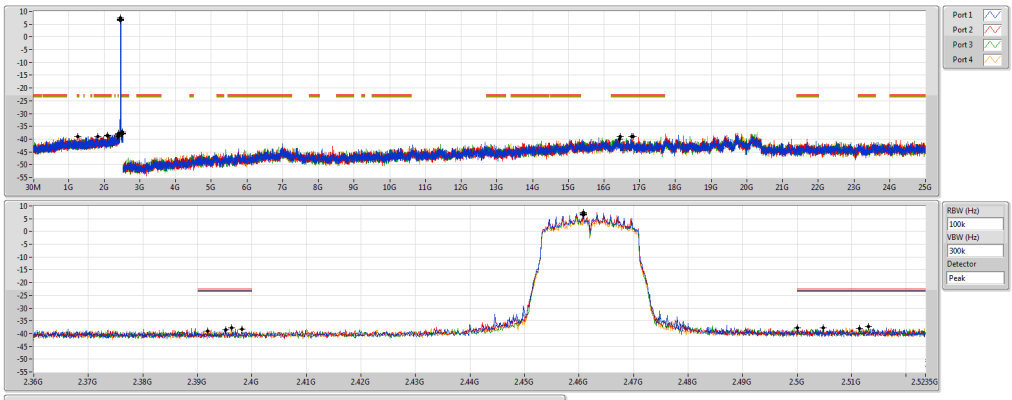
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43457G	7.86	-22.04	1.84391G	-39.06	2.39632G	-38.11	2.5099G	-37.71	16.45612G	-39.18	1
2.43574G	8.73	-21.27	2.14098G	-38.88	2.39552G	-38.76	2.52278G	-37.62	17.54904G	-38.77	2
2.43941G	7.76	-22.24	2.17477G	-38.45	2.39176G	-37.98	2.50814G	-38.09	16.30721G	-39.95	3
2.43574G	8.08	-21.92	939.87M	-38.80	2.39096G	-37.99	2.51686G	-37.32	17.68671G	-39.65	4

802.11ac VHT20_Nss1,(MCS0)_4TX **CSE NdB**

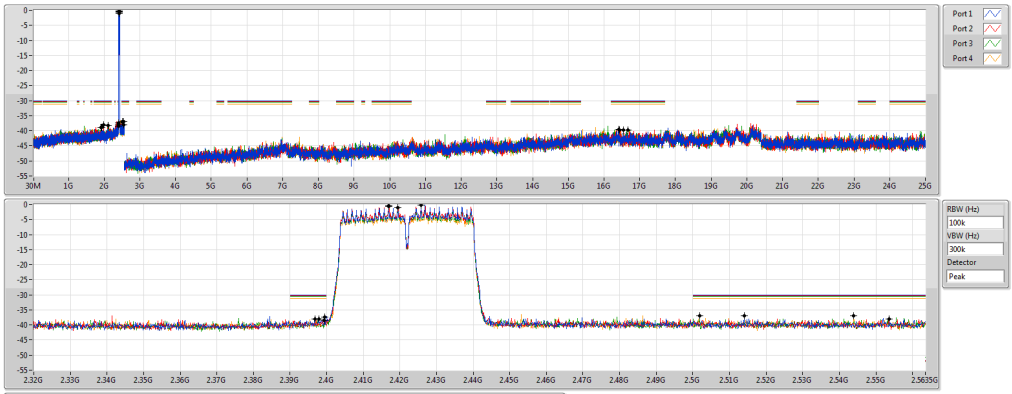
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46079G	6.89	-23.11	2.08739G	-38.48	2.39816G	-38.13	2.50478G	-37.79	16.44207G	-39.94	1
2.46079G	7.51	-22.49	2.10021G	-38.72	2.39184G	-39.05	2.50006G	-37.81	16.77922G	-39.02	2
2.46079G	6.47	-23.53	1.81478G	-38.98	2.3952G	-38.43	2.51142G	-38.03	16.44769G	-39.10	3
2.46079G	6.62	-23.38	1.25675G	-39.06	2.39624G	-37.84	2.5131G	-37.33	16.81574G	-39.13	4

802.11ac VHT40_Nss1,(MCS0)_4TX **CSE NdB**

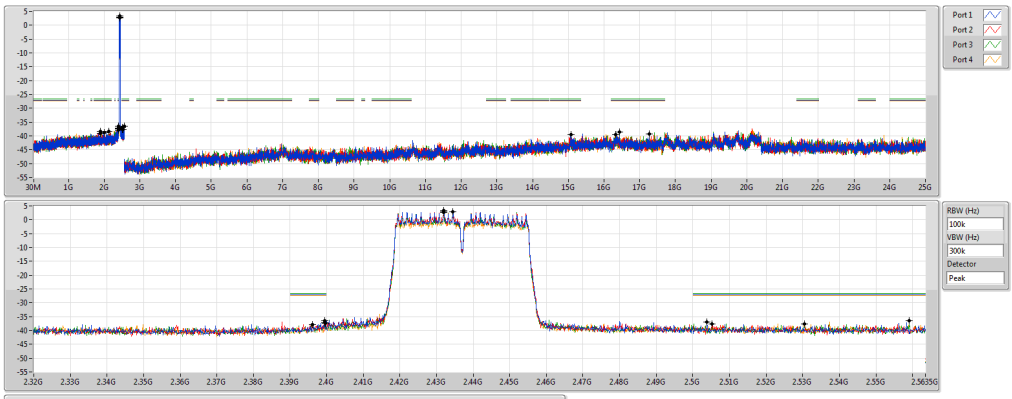
2422MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.42572G	-0.17	-30.17	1.91696G	-38.91	2.39792G	-37.98	2.51406G	-36.98	16.41523G	-39.60	1
2.41687G	-0.37	-30.37	1.98681G	-38.06	2.3968G	-37.97	2.55358G	-38.02	16.66204G	-39.67	2
2.41687G	-0.58	-30.58	2.10818G	-38.24	2.3992G	-38.40	2.5019G	-36.98	16.55266G	-39.69	3
2.41937G	-1.10	-31.10	1.93872G	-38.81	2.39952G	-37.28	2.54398G	-36.96	16.42926G	-39.67	4

802.11ac VHT40_Nss1,(MCS0)_4TX **CSE NdB**

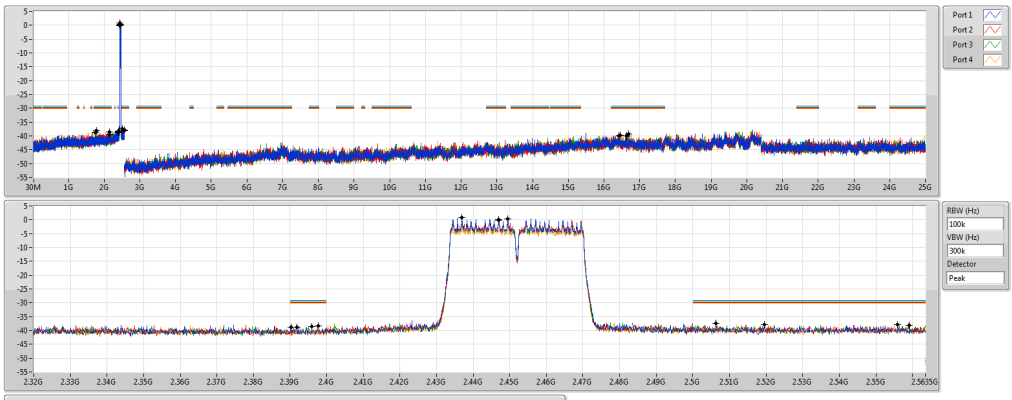
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.4344G	2.91	-27.09	2.12764G	-38.45	2.39952G	-37.10	2.50382G	-37.05	17.27343G	-39.33	1
2.4319G	3.00	-27.00	2.00398G	-38.88	2.39952G	-36.55	2.50526G	-37.76	15.07465G	-39.61	2
2.4319G	3.32	-26.68	1.90208G	-38.43	2.39968G	-37.31	2.53054G	-37.54	16.42645G	-38.61	3
2.4319G	2.60	-27.40	1.89635G	-39.01	2.39616G	-37.94	2.55902G	-36.59	16.3339G	-39.48	4

802.11ac VHT40_Nss1,(MCS0)_4TX **CSE NdB**

2452MHz



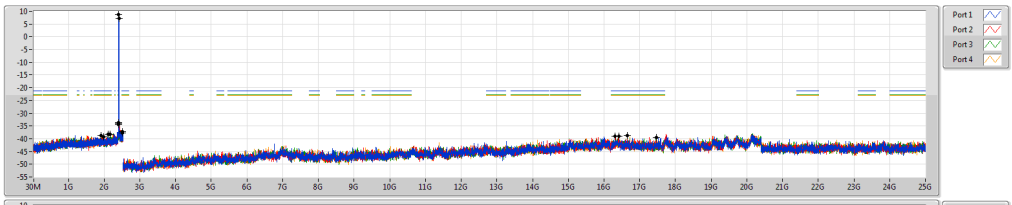
Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43691G	0.67	-29.33	2.15054G	-39.46	2.39024G	-38.80	2.5195G	-37.94	16.63679G	-39.91	1
2.44693G	0.17	-29.83	1.75208G	-38.94	2.39776G	-38.32	2.55598G	-37.99	16.42365G	-39.94	2
2.44943G	0.22	-29.78	2.15398G	-38.59	2.396G	-38.57	2.55902G	-38.04	16.4545G	-39.88	3
2.44693G	-0.22	-30.22	1.79101G	-38.07	2.39184G	-38.87	2.50622G	-37.38	16.68447G	-39.31	4

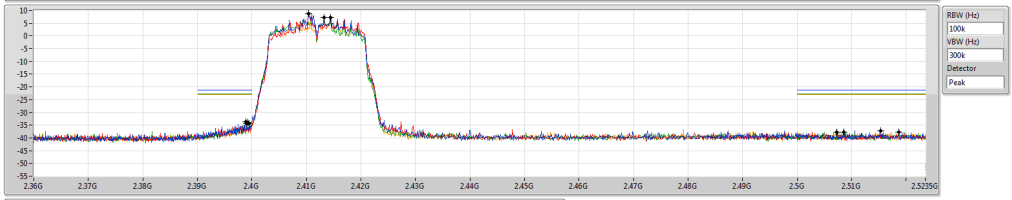
Beamforming mode

3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands

802.11ac VHT20-BF_Nss1,(MCS0)_4TX **CSE NdB**

2412MHz

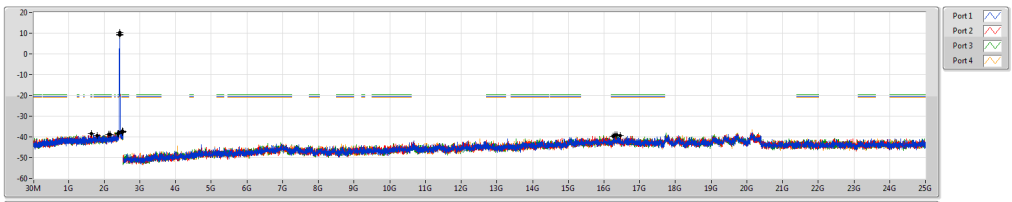


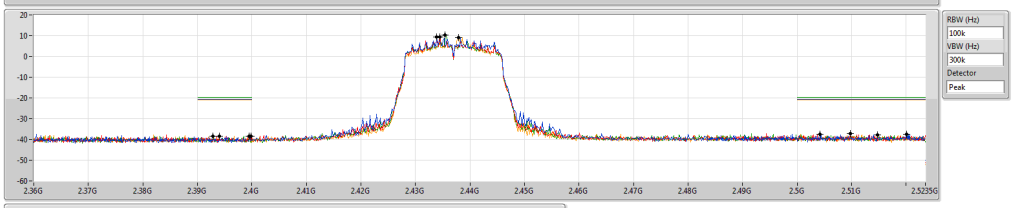


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41035G	8.76	-21.24	2.10953G	-38.33	2.39888G	-33.73	2.51534G	-37.20	17.46475G	-39.59	1
2.41035G	8.79	-21.21	1.99419G	-39.18	2.39928G	-33.94	2.50726G	-37.76	16.64717G	-38.76	2
2.41319G	7.12	-22.88	1.91264G	-38.78	2.39904G	-34.53	2.51862G	-37.69	16.31564G	-39.12	3
2.41436G	7.11	-22.89	2.17244G	-38.33	2.39952G	-34.42	2.50862G	-37.83	16.41679G	-39.01	4

802.11ac VHT20-BF_Nss1,(MCS0)_4TX **CSE NdB**

2437MHz

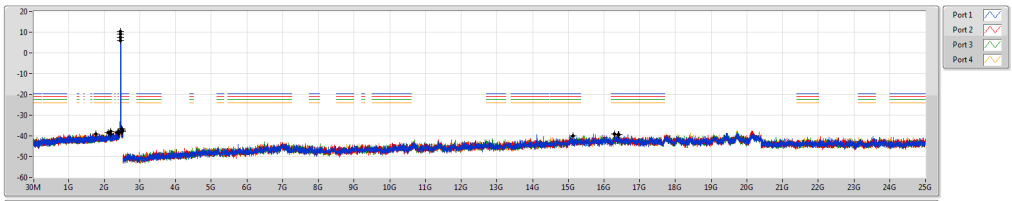


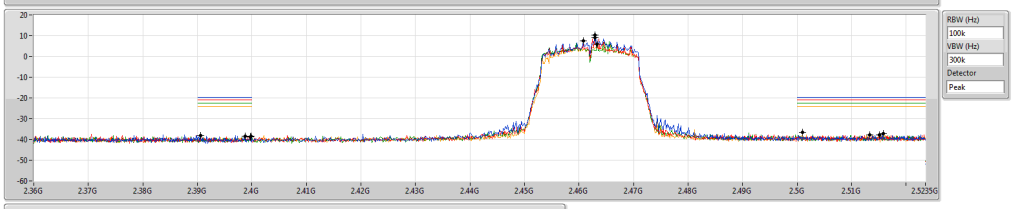


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.4339G	9.53	-20.47	2.13399G	-38.77	2.39984G	-38.32	2.52006G	-37.42	16.45612G	-39.38	1
2.4344G	9.32	-20.68	2.16545G	-38.87	2.3928G	-38.35	2.50974G	-37.31	16.31002G	-39.04	2
2.4354G	10.38	-19.62	1.64935G	-38.35	2.39952G	-38.32	2.5147G	-37.77	16.25664G	-39.57	3
2.43791G	9.14	-20.86	1.8043G	-39.24	2.39408G	-38.54	2.50422G	-37.44	16.35498G	-38.92	4

802.11ac VHT20-BF_Nss1,(MCS0)_4TX **CSE NdB**

2462MHz





Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46296G	10.40	-19.60	1.77051G	-39.16	2.39056G	-37.97	2.51574G	-37.10	16.29598G	-38.93	1
2.46296G	8.99	-21.01	2.17593G	-39.12	2.39872G	-38.30	2.51334G	-37.78	15.12439G	-40.05	2
2.46079G	7.54	-22.46	2.18758G	-37.85	2.39968G	-38.68	2.5151G	-37.84	16.3915G	-39.40	3
2.46329G	5.95	-24.05	2.11069G	-38.29	2.39984G	-38.59	2.50094G	-36.49	16.40836G	-39.23	4

4 Test laboratory information

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

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

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

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

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

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