

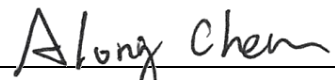
FCC Test Report

FCC ID : 2AQ68GEE810U-915U
Equipment : Enterprise Gateway
Model No. : GEE810U-915U
Brand Name : UfiSpace
Applicant : Hon Lin Technology Co Ltd.
Address : 11th Fl 32 Jihu Rd Neihu District Taipei 114
TAIWAN
Standard : 47 CFR FCC Part 15.247
Received Date : Dec. 03, 2020
Tested Date : Apr. 18 ~ Apr. 30, 2020

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.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

Reviewed by:


Along Chen / Assistant Manager

Approved by:


Gary Chang / Manager



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Local Support Equipment List	8
1.3	Test Setup Chart	8
1.4	The Equipment List	9
1.5	Test Standards	10
1.6	Deviation from Test Standard and Measurement Procedure.....	10
1.7	Measurement Uncertainty	10
2	TEST CONFIGURATION.....	11
2.1	Testing Condition	11
2.2	The Worst Test Modes and Channel Details	11
3	TRANSMITTER TEST RESULTS	12
3.1	Conducted Emissions.....	12
3.2	6dB and Occupied Bandwidth.....	15
3.3	RF Output Power.....	21
3.4	Power Spectral Density	24
3.5	Unwanted Emissions into Restricted Frequency Bands	30
3.6	Emissions in Non-Restricted Frequency Bands.....	58
4	TEST LABORATORY INFORMATION	63

Release Record

Report No.	Version	Description	Issued Date
FR882101-02	Rev. 01	Initial issue	Jun. 18, 2020

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.365MHz 38.60 (Margin -10.01dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2390.00MHz 52.98 (Margin -1.02dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 20.06	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 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]	1	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0-7
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	1	MCS 0-7
Note 1: RF output power specifies that Maximum Peak Conducted Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Model	Type	Gain (dBi)	Connector
1	ANTP2M1-CCG38-EH	Dipole	3.51	Ipex

1.1.3 Power Supply Type of Equipment under Test (EUT)

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

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand: DVE Model: DSA-30PFL-12 FCA 120250 Power Rating: I/P: 100-240Vac, 50/60Hz, 0.8A O/P: 12Vdc, 2.5A Power Line: 1.47m non-shielded without core

1.1.5 Channel List

Frequency band (MHz)		2400~2483.5	
802.11 b / g / n HT20		802.11n HT40	
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	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	Putty, V0.60.0.0		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	99.57%	0.02
	11g	94.17%	0.26
	HT20	93.10%	0.31
	HT40	84.06%	0.75

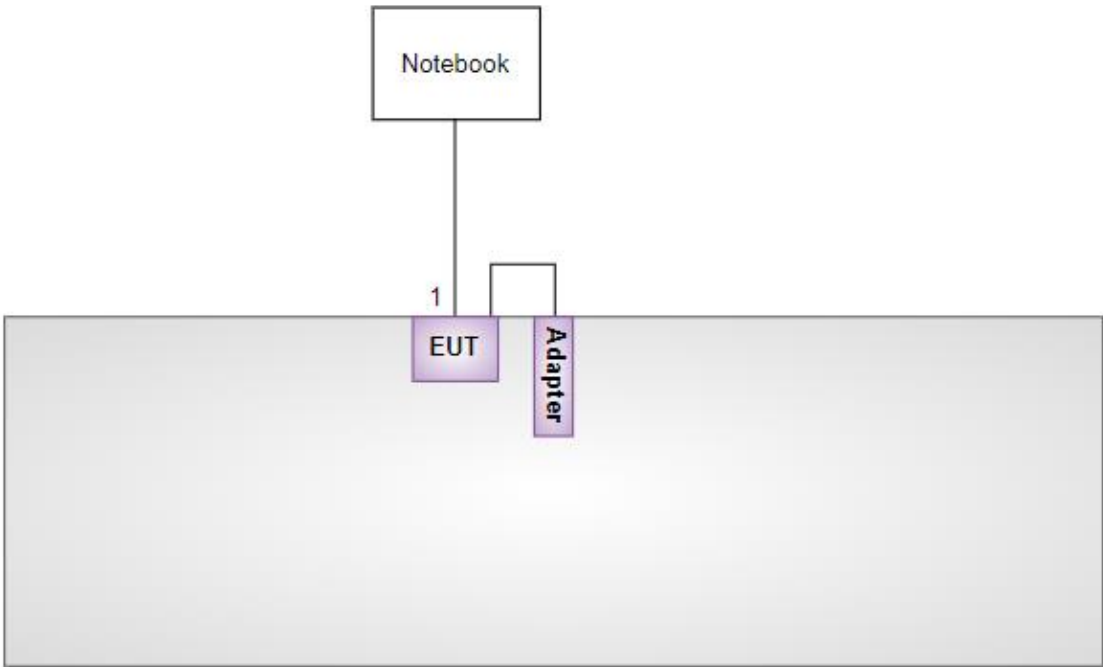
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	20000
11b	2437	20000
11b	2462	20000
11g	2412	20000
11g	2437	20000
11g	2462	20000
HT20	2412	12000
HT20	2437	20000
HT20	2462	12000
HT40	2422	10000
HT40	2437	20000
HT40	2452	11000

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E5470	DoC	---

1.3 Test Setup Chart

Test Setup Diagram	
Kept in control area 	
No.	Signal cable / Length (m)
1	RJ45, 10m non-shielded.

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Apr. 30, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Dec. 12, 2019	Dec. 11, 2020
LISN	R&S	ENV216	101579	Mar. 12, 2020	Mar. 11, 2021
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Dec. 20, 2019	Dec. 19, 2020
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 22, 2019	Oct. 21, 2020
50 ohm terminal (Support Unit)	NA	50	04	May 28, 2019	May 27, 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 chamber1 / (03CH03-OWS)				
Tested Date	Apr. 18, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 09, 2020	Jan. 08, 2021
Receiver	R&S	ESR3	101657	Feb. 14, 2020	Feb. 13, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 12, 2019	Jul. 11, 2020
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 27, 2019	Dec. 26, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2019	Nov. 14, 2020
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2019	Nov. 12, 2020
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 07, 2019	Oct. 06, 2020
Preamplifier	EMC	EMC02325	980187	Aug. 14, 2019	Aug. 13, 2020
Preamplifier	Agilent	83017A	MY53270014	Aug. 07, 2019	Aug. 06, 2020
Preamplifier	EMC	EMC184045B	980192	Aug. 01, 2019	Jul. 31, 2020
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 27, 2019	Sep. 26, 2020
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Sep. 27, 2019	Sep. 26, 2020
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Sep. 27, 2019	Sep. 26, 2020
LF cable-0.8M	EMC	EMC8D-NM-NM-8000	EMC8D-NM-NM-800-001	Sep. 27, 2019	Sep. 26, 2020
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Sep. 27, 2019	Sep. 26, 2020
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Sep. 27, 2019	Sep. 26, 2020
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Apr. 29, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 09, 2020	Jan. 08, 2021
Power Meter	Anritsu	ML2495A	1241002	Oct. 23, 2019	Oct. 22, 2020
Power Sensor	Anritsu	MA2411B	1207366	Oct. 23, 2019	Oct. 22, 2020
DC POWER SOURCE	GW INSTEK	GPC-6030D	GES855395	Oct. 29, 2019	Oct. 28, 2020
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 02, 2019	Dec. 01, 2020
Measurement Software	Sporton	Sporton_1	1.3.30	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

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 Measurement Uncertainty

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	19°C / 61%	Alex Tsai
Radiated Emissions	03CH03-WS	25°C / 62%	Brad Wu
RF Conducted	TH01-WS	25°C / 67%	Aska Huang

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

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	11g	2437	6 Mbps	---
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	---
Radiated Emissions >1GHz	11b	2412 / 2437 / 2462	1 Mbps	---
Maximum Output Power	11g	2412 / 2437 / 2462	6 Mbps	
6dB bandwidth	HT20	2412 / 2437 / 2462	MCS 0	
Power spectral density	HT40	2422 / 2437 / 2452	MCS 0	

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

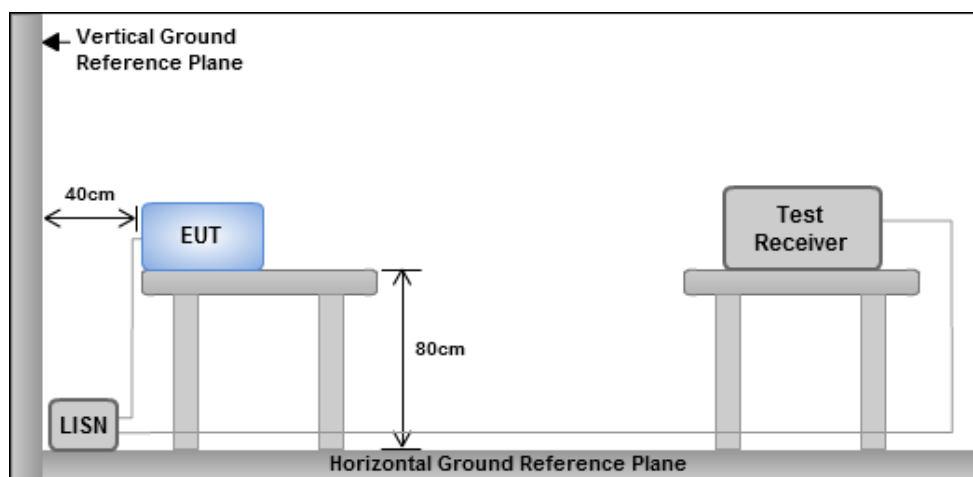
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

3.1.2 Test Procedures

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

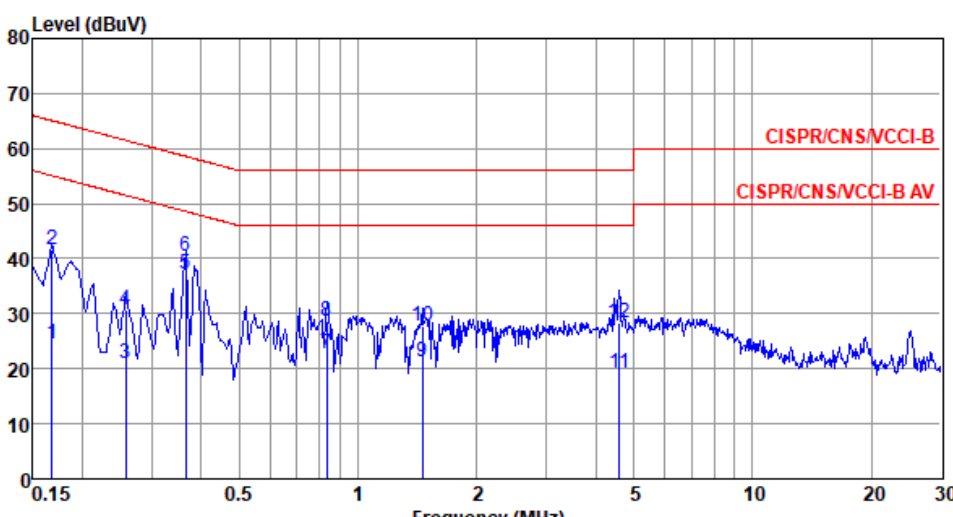
3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

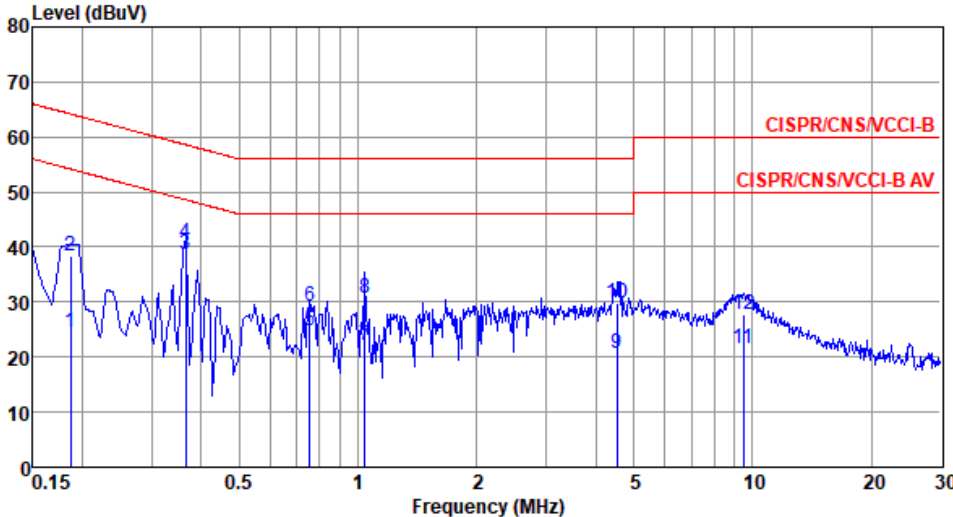
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.168	24.43	55.08	-30.65	14.57	9.64	0.05	Average
2	0.168	41.75	65.08	-23.33	31.89	9.64	0.05	QP
3	0.258	20.96	51.51	-30.55	11.05	9.63	0.07	Average
4	0.258	30.59	61.51	-30.92	20.68	9.63	0.07	QP
5*	0.365	37.05	48.61	-11.56	27.10	9.63	0.08	Average
6	0.365	40.35	58.61	-18.26	30.40	9.63	0.08	QP
7	0.835	22.79	46.00	-23.21	12.74	9.63	0.11	Average
8	0.835	28.54	56.00	-27.46	18.49	9.63	0.11	QP
9	1.456	21.12	46.00	-24.88	11.00	9.64	0.15	Average
10	1.456	27.77	56.00	-28.23	17.65	9.64	0.15	QP
11	4.598	19.15	46.00	-26.85	8.81	9.66	0.31	Average
12	4.598	28.22	56.00	-27.78	17.88	9.66	0.31	QP

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

Modulation	11g	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	0.186	24.52	54.20	-29.68	14.67	9.65	0.06	Average
2	0.186	38.24	64.20	-25.96	28.39	9.65	0.06	QP
3*	0.365	38.60	48.61	-10.01	28.70	9.65	0.08	Average
4	0.365	40.87	58.61	-17.74	30.97	9.65	0.08	QP
5	0.755	24.69	46.00	-21.31	14.74	9.65	0.11	Average
6	0.755	29.14	56.00	-26.86	19.19	9.65	0.11	QP
7	1.043	22.04	46.00	-23.96	12.07	9.65	0.12	Average
8	1.043	30.73	56.00	-25.27	20.76	9.65	0.12	QP
9	4.525	20.60	46.00	-25.40	10.35	9.68	0.30	Average
10	4.525	29.82	56.00	-26.18	19.57	9.68	0.30	QP
11	9.502	21.68	50.00	-28.32	11.24	9.73	0.38	Average
12	9.502	27.76	60.00	-32.24	17.32	9.73	0.38	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

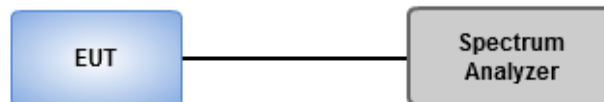
6dB Bandwidth

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

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)_1TX	9.565M	14.689M	14M7G1D	9.565M	14.689M
802.11g_Nss1,(6Mbps)_1TX	15.435M	18.813M	18M8D1D	14.783M	16.353M
802.11n HT20_Nss1,(MCS0)_1TX	14.783M	18.162M	18M2D1D	12.246M	17.438M
802.11n HT40_Nss1,(MCS0)_1TX	35.072M	36.324M	36M3D1D	32.609M	35.89M

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

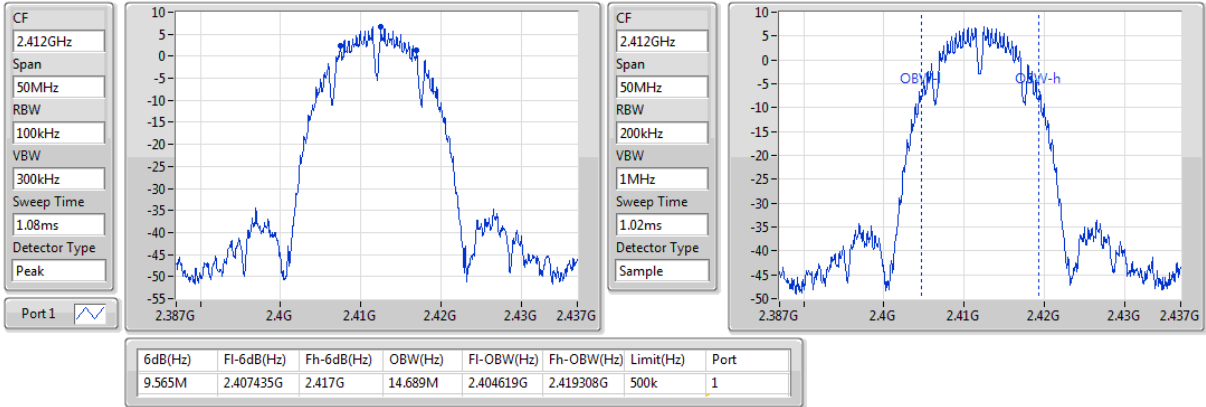
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	9.565M	14.689M
2437MHz	Pass	500k	9.565M	14.689M
2462MHz	Pass	500k	9.565M	14.689M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	15.435M	16.425M
2437MHz	Pass	500k	15M	18.813M
2462MHz	Pass	500k	14.783M	16.353M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	12.246M	17.438M
2437MHz	Pass	500k	13.841M	18.162M
2462MHz	Pass	500k	14.783M	17.438M
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-
2422MHz	Pass	500k	32.609M	36.035M
2437MHz	Pass	500k	33.913M	36.324M
2452MHz	Pass	500k	35.072M	35.89M

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

802.11b_Nss1,(1Mbps)_1TX

EBW

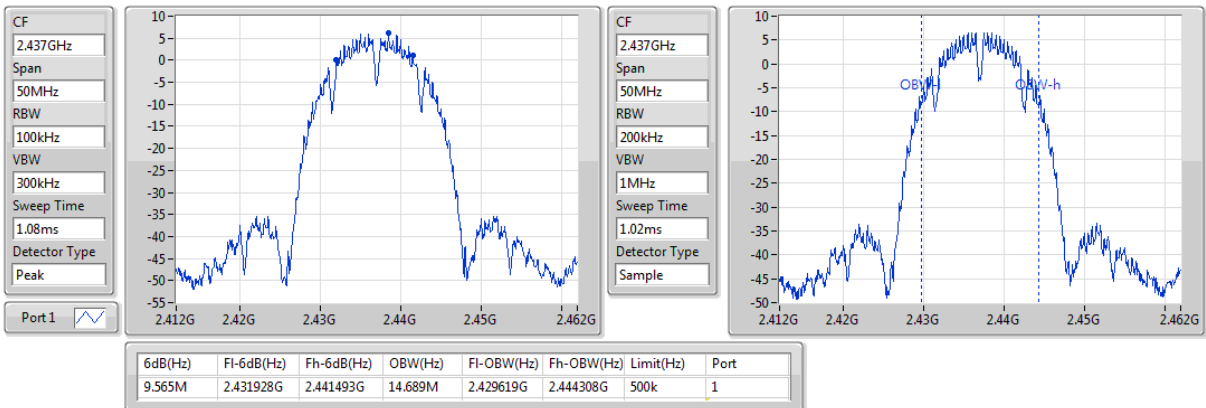
2412MHz



802.11b_Nss1,(1Mbps)_1TX

EBW

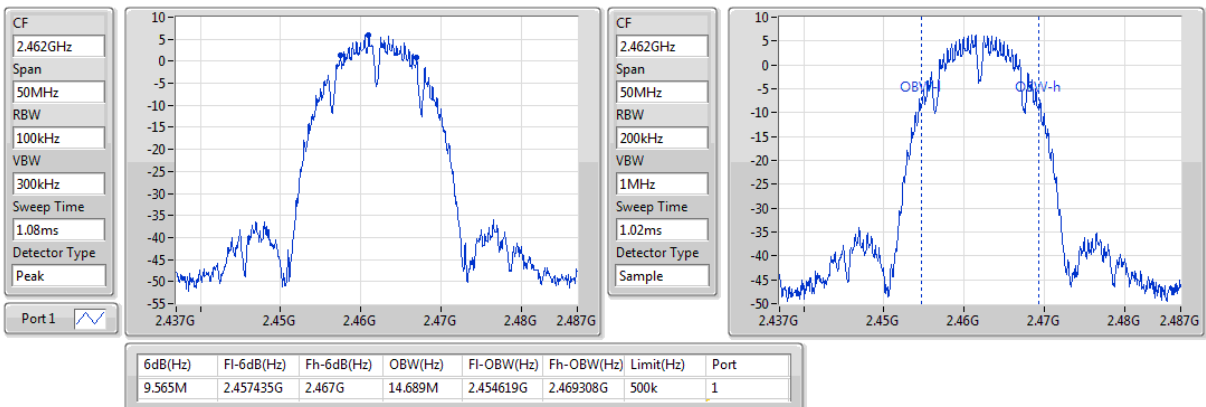
2437MHz



802.11b_Nss1,(1Mbps)_1TX

EBW

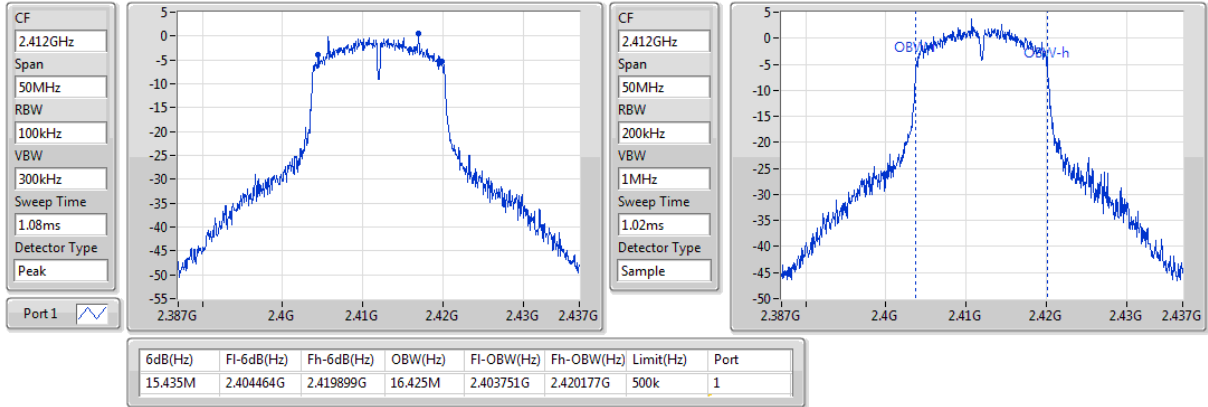
2462MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

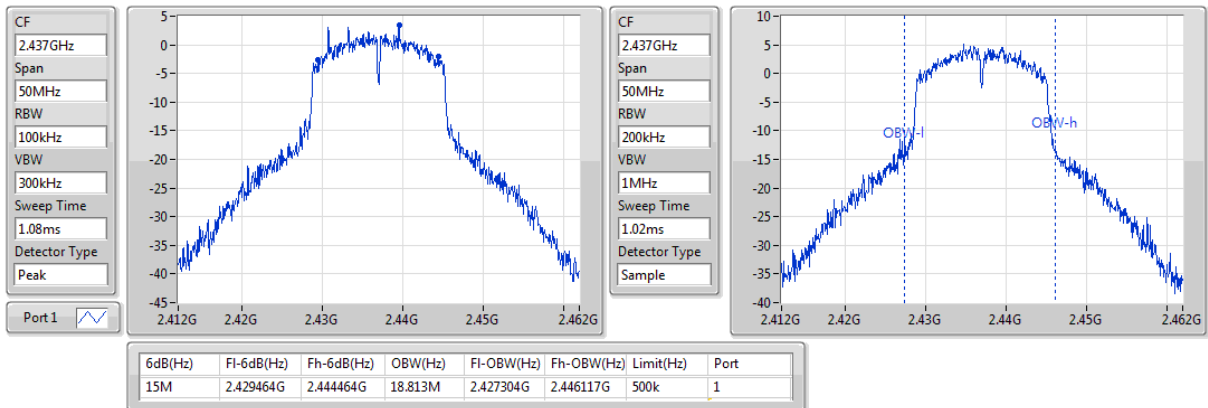
2412MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

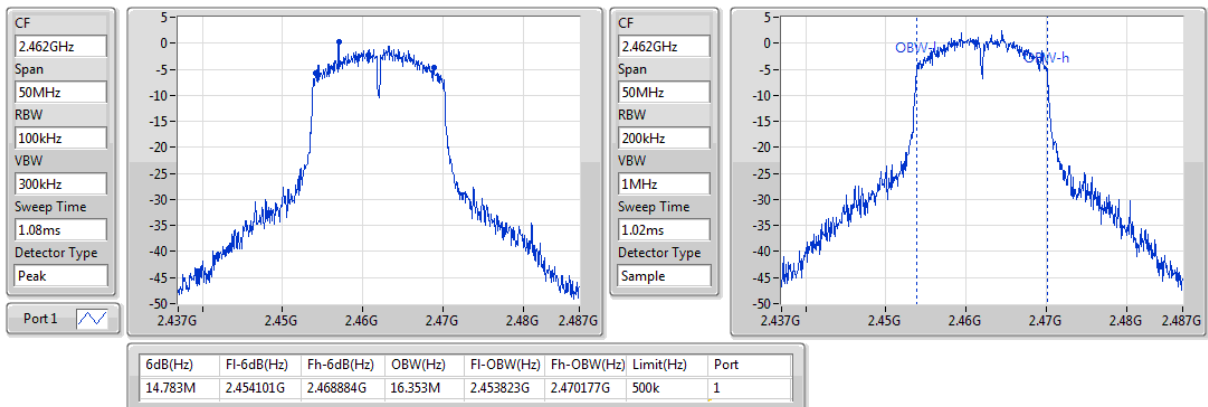
2437MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

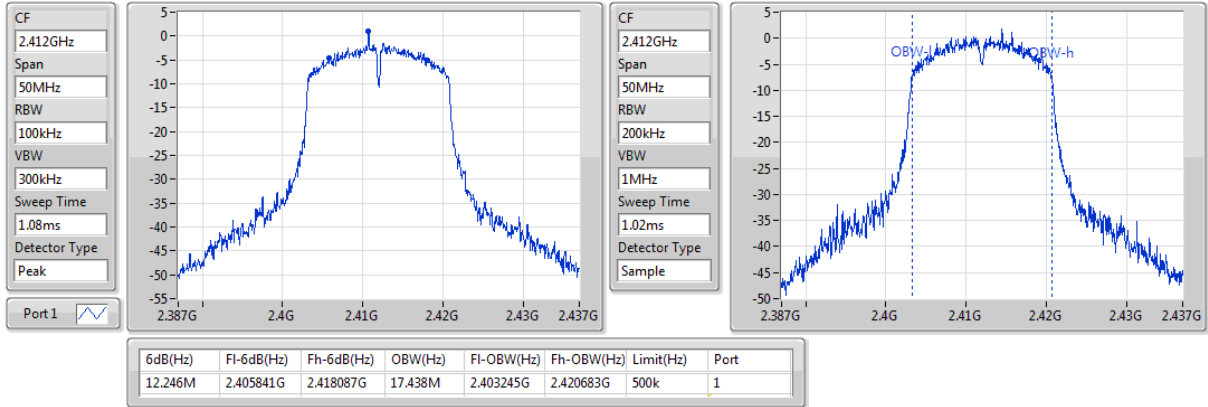
2462MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

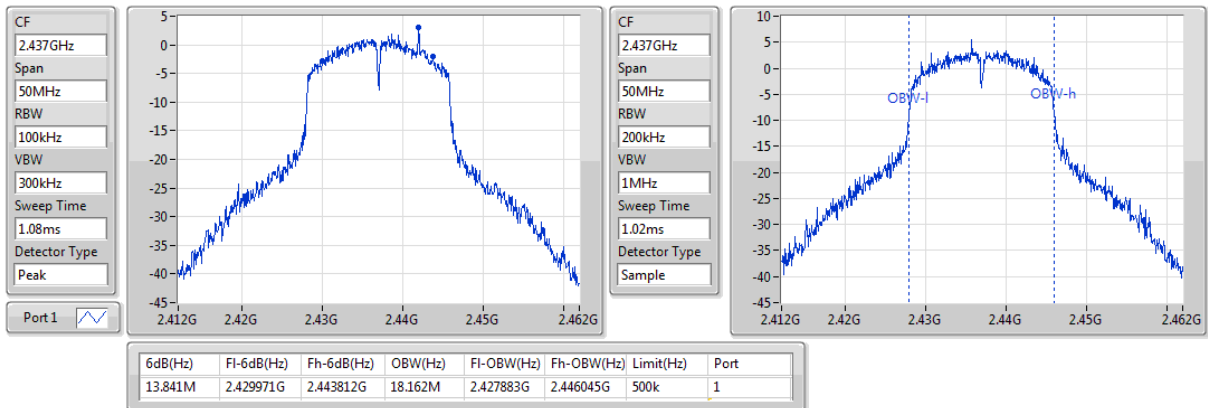
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

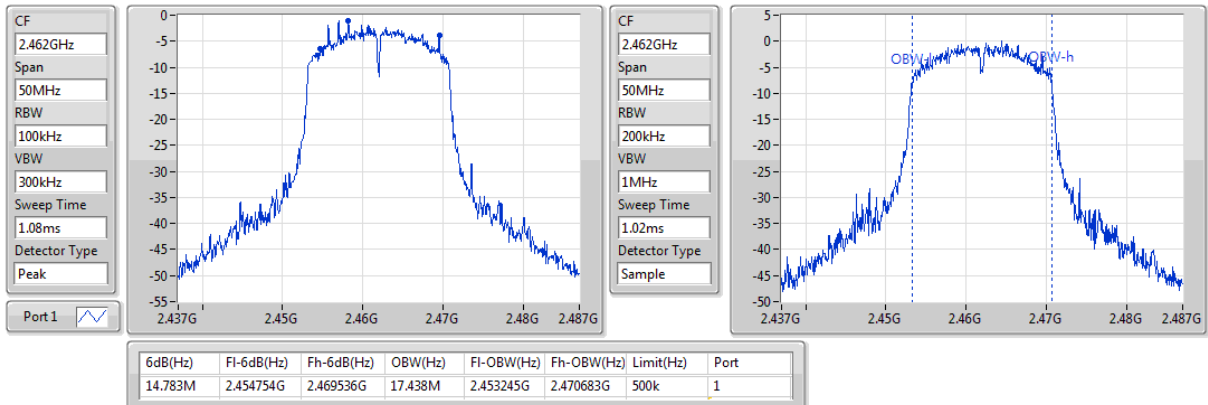
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

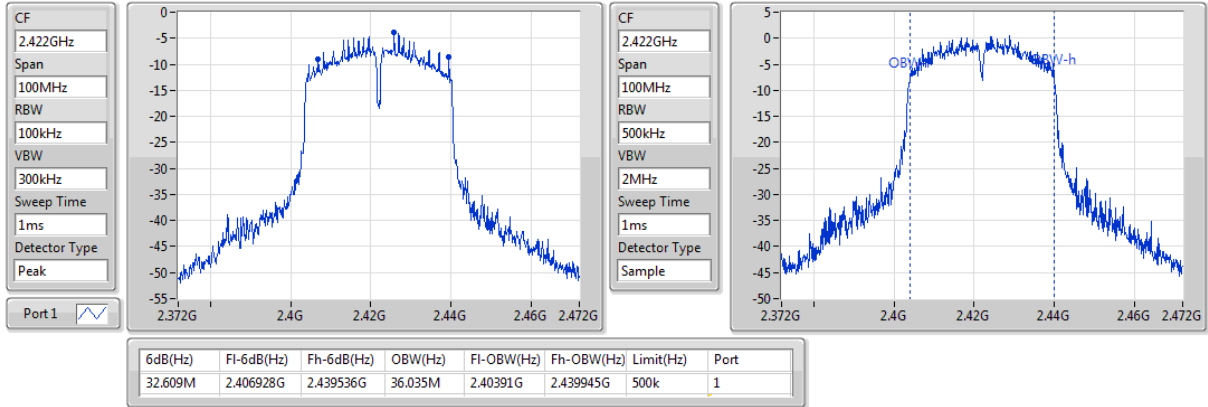
2462MHz



802.11n HT40_Nss1,(MCS0)_1TX

EBW

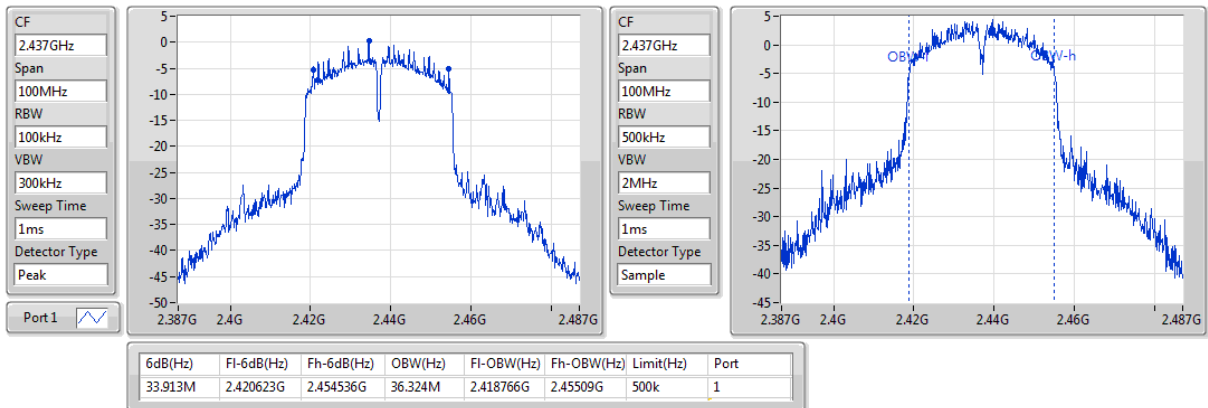
2422MHz



802.11n HT40_Nss1,(MCS0)_1TX

EBW

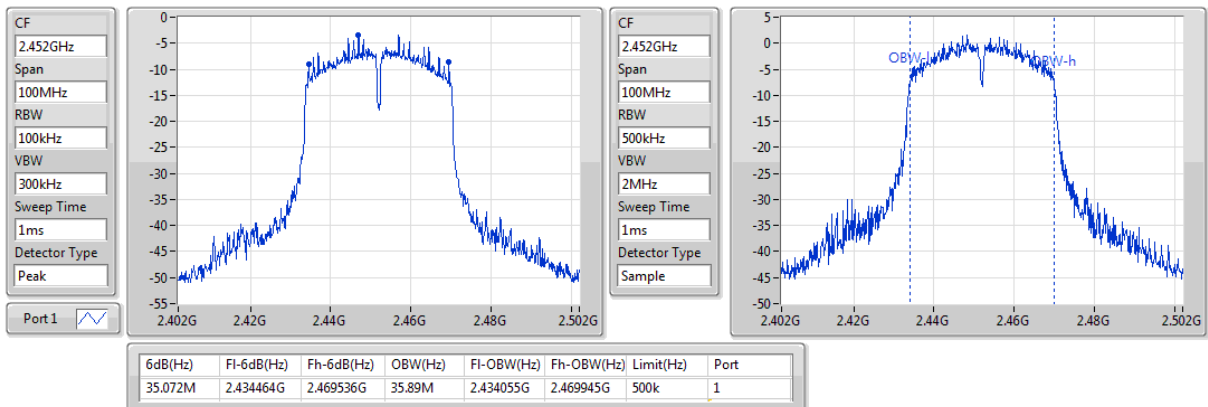
2437MHz



802.11n HT40_Nss1,(MCS0)_1TX

EBW

2452MHz



3.3 RF Output Power

3.3.1 Limit of RF Output Power

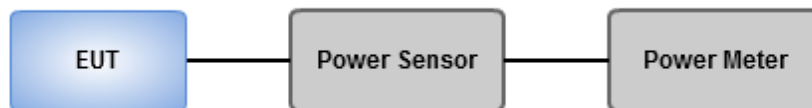
Conducted power shall not exceed 1Watt.

Antenna gain $\leq 6\text{dBi}$, no any corresponding reduction is in output power limit.

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

Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	18.16	0.06546
802.11g_Nss1,(6Mbps)_1TX	20.06	0.10139
802.11n HT20_Nss1,(MCS0)_1TX	20.04	0.10093
802.11n HT40_Nss1,(MCS0)_1TX	19.45	0.08810

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.51	18.16	18.16	30.00	21.67	36.00
2437MHz	Pass	3.51	17.89	17.89	30.00	21.40	36.00
2462MHz	Pass	3.51	17.62	17.62	30.00	21.13	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.51	19.88	19.88	30.00	23.39	36.00
2437MHz	Pass	3.51	20.06	20.06	30.00	23.57	36.00
2462MHz	Pass	3.51	19.39	19.39	30.00	22.90	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.51	19.72	19.72	30.00	23.23	36.00
2437MHz	Pass	3.51	20.04	20.04	30.00	23.55	36.00
2462MHz	Pass	3.51	19.22	19.22	30.00	22.73	36.00
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2422MHz	Pass	3.51	17.21	17.21	30.00	20.72	36.00
2437MHz	Pass	3.51	19.45	19.45	30.00	22.96	36.00
2452MHz	Pass	3.51	18.36	18.36	30.00	21.87	36.00

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

Summary of Conducted (Average) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	16.36	0.04325
802.11g_Nss1,(6Mbps)_1TX	15.15	0.03273
802.11n HT20_Nss1,(MCS0)_1TX	14.81	0.03027
802.11n HT40_Nss1,(MCS0)_1TX	13.43	0.02203

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.51	16.36	16.36	-	19.87	-
2437MHz	Pass	3.51	16.08	16.08	-	19.59	-
2462MHz	Pass	3.51	15.81	15.81	-	19.32	-
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.51	13.08	13.08	-	16.59	-
2437MHz	Pass	3.51	15.15	15.15	-	18.66	-
2462MHz	Pass	3.51	12.51	12.51	-	16.02	-
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.51	11.63	11.63	-	15.14	-
2437MHz	Pass	3.51	14.81	14.81	-	18.32	-
2462MHz	Pass	3.51	11.02	11.02	-	14.53	-
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2422MHz	Pass	3.51	10.01	10.01	-	13.52	-
2437MHz	Pass	3.51	13.43	13.43	-	16.94	-
2452MHz	Pass	3.51	10.35	10.35	-	13.86	-

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

Note : Conducted average output power is for reference only

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.

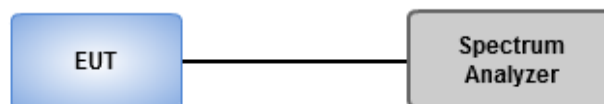
Average PSD, duty cycle $\geq 98\%$

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) $\times$ (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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_1TX	-7.21
802.11g_Nss1,(6Mbps)_1TX	-9.62
802.11n HT20_Nss1,(MCS0)_1TX	-10.79
802.11n HT40_Nss1,(MCS0)_1TX	-15.35

Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	3.51	-7.21	-7.21	8.00
2437MHz	Pass	3.51	-8.26	-8.26	8.00
2462MHz	Pass	3.51	-8.49	-8.49	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	3.51	-11.24	-11.24	8.00
2437MHz	Pass	3.51	-9.62	-9.62	8.00
2462MHz	Pass	3.51	-12.52	-12.52	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	3.51	-14.20	-14.20	8.00
2437MHz	Pass	3.51	-10.79	-10.79	8.00
2462MHz	Pass	3.51	-14.37	-14.37	8.00
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-	-
2422MHz	Pass	3.51	-18.03	-18.03	8.00
2437MHz	Pass	3.51	-15.35	-15.35	8.00
2452MHz	Pass	3.51	-17.71	-17.71	8.00

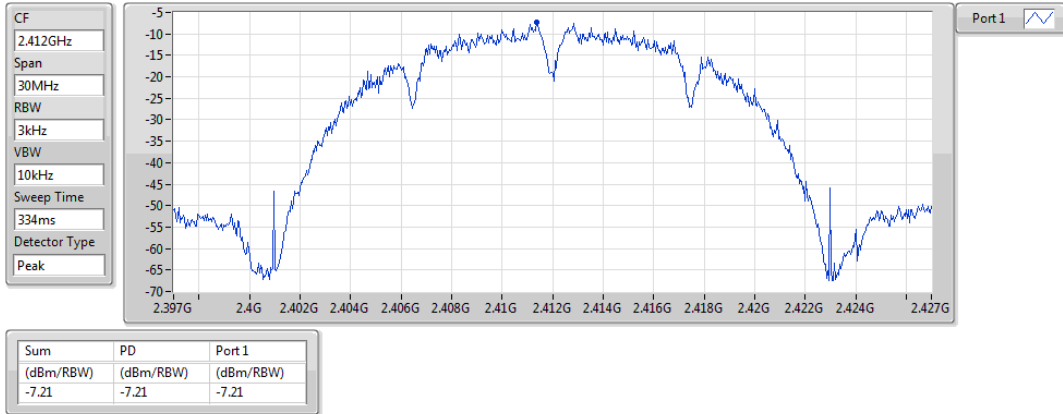
DG = Directional Gain;

PD = Power density; **Port X** = Port X power density;

802.11b_Nss1,(1Mbps)_1TX

PSD

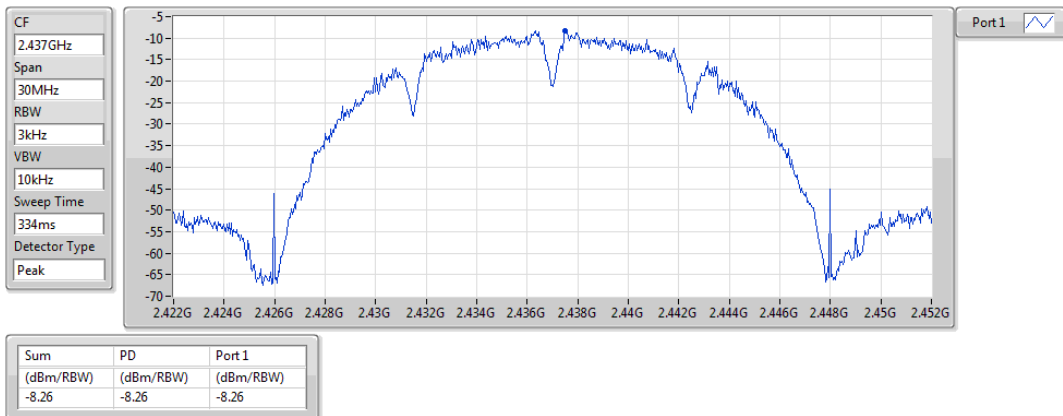
2412MHz



802.11b_Nss1,(1Mbps)_1TX

PSD

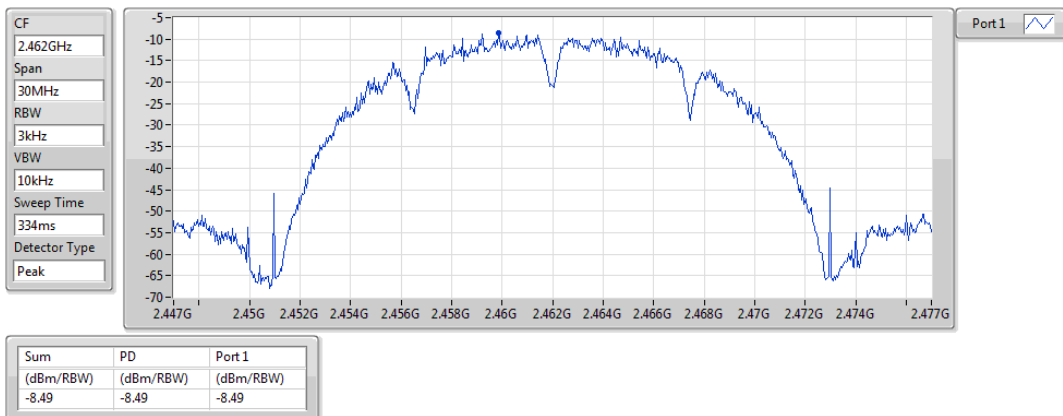
2437MHz



802.11b_Nss1,(1Mbps)_1TX

PSD

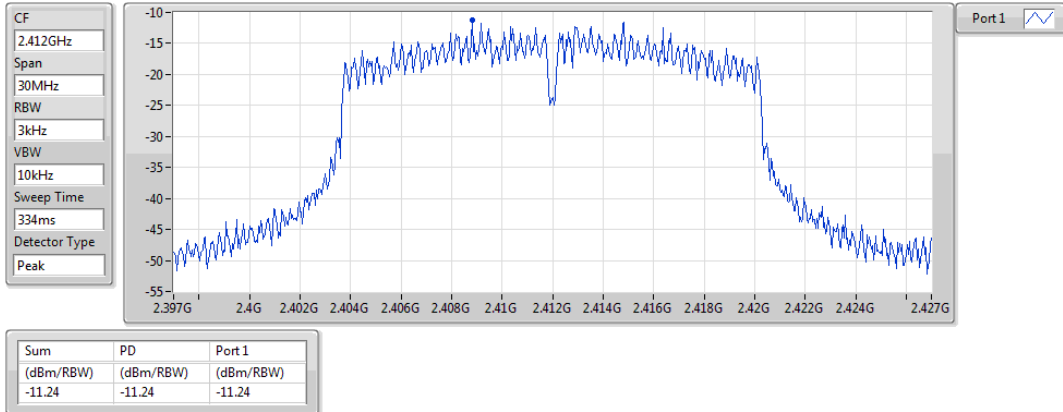
2462MHz



802.11g_Nss1,(6Mbps)_1TX

PSD

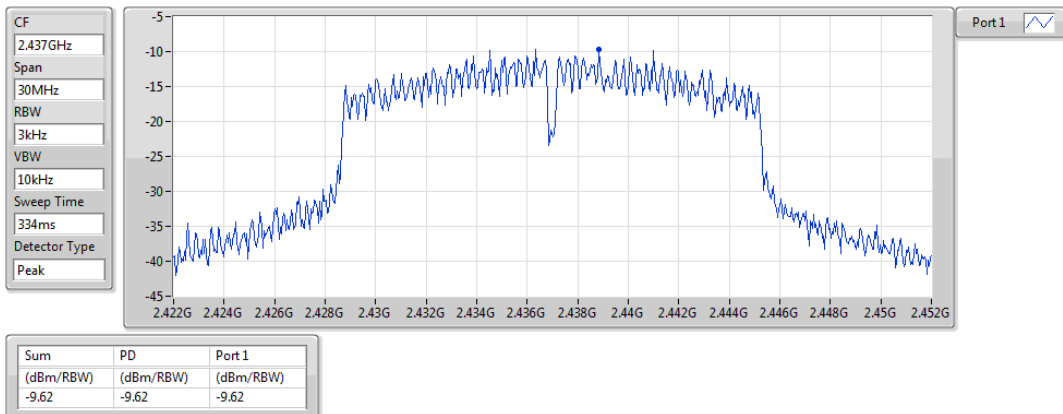
2412MHz



802.11g_Nss1,(6Mbps)_1TX

PSD

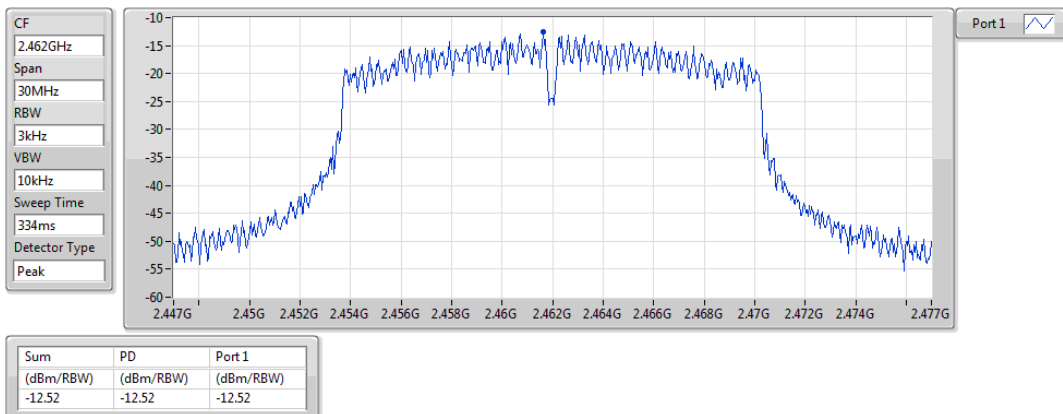
2437MHz



802.11g_Nss1,(6Mbps)_1TX

PSD

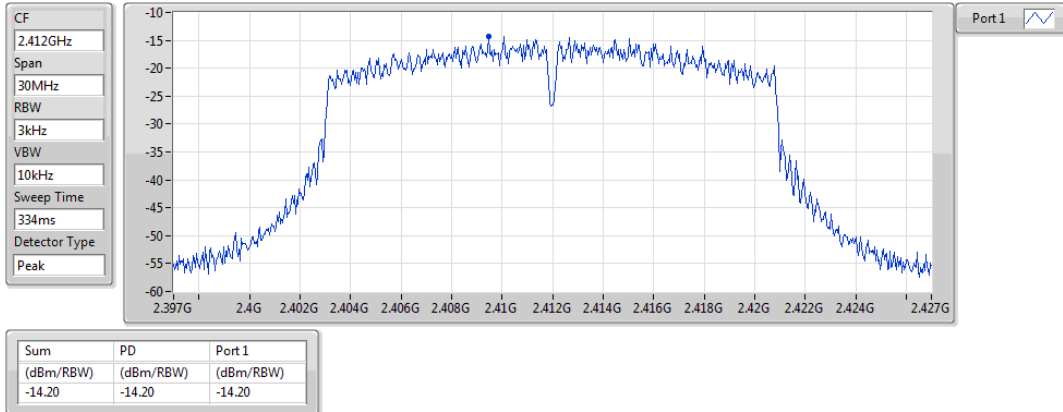
2462MHz



802.11n HT20_Nss1,(MCS0)_1TX

PSD

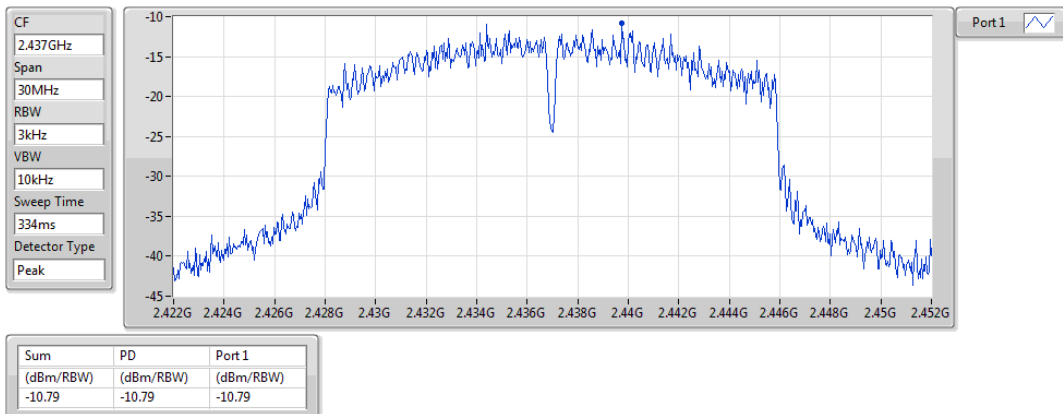
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

PSD

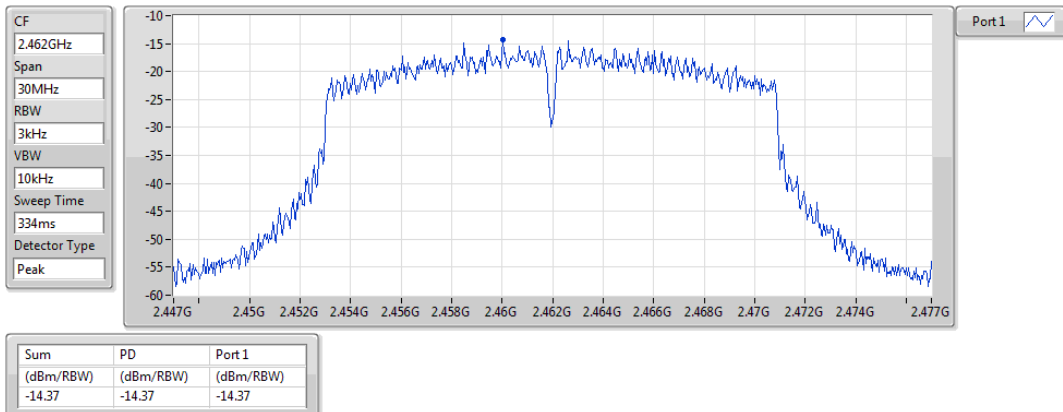
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

PSD

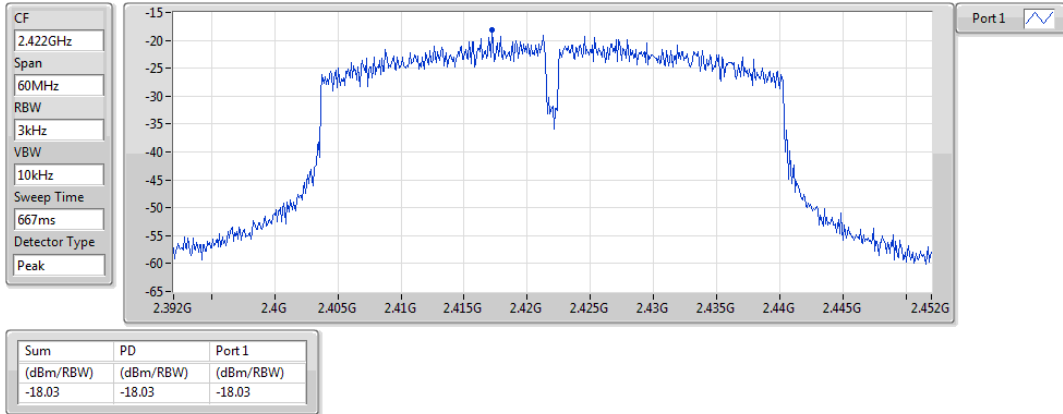
2462MHz



802.11n HT40_Nss1,(MCS0)_1TX

PSD

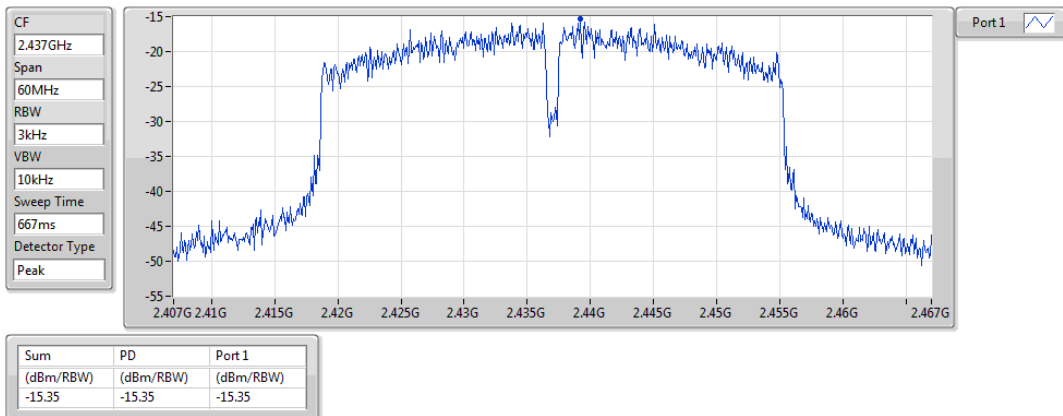
2422MHz



802.11n HT40_Nss1,(MCS0)_1TX

PSD

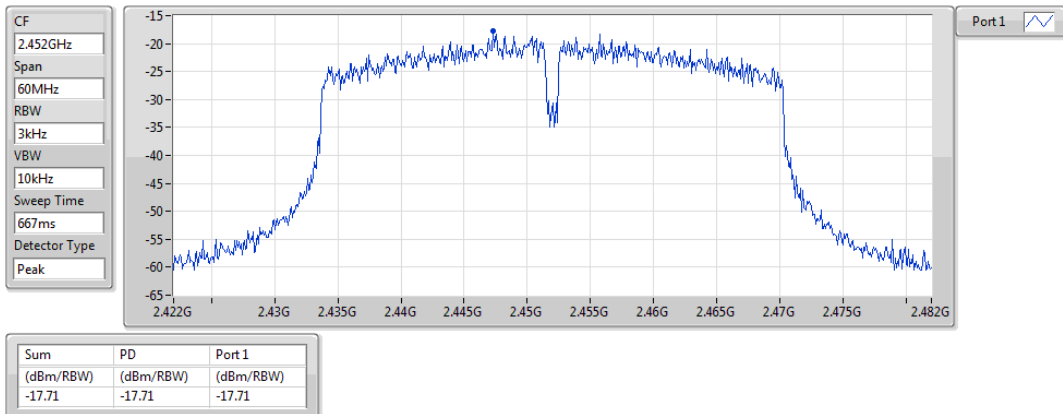
2437MHz



802.11n HT40_Nss1,(MCS0)_1TX

PSD

2452MHz



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:
Quasi-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

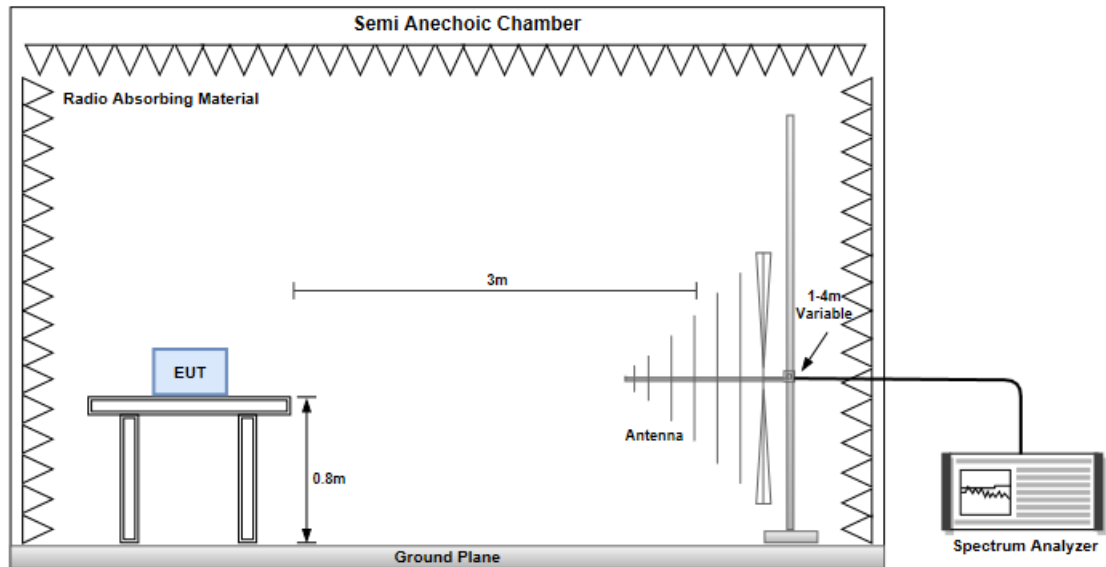
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

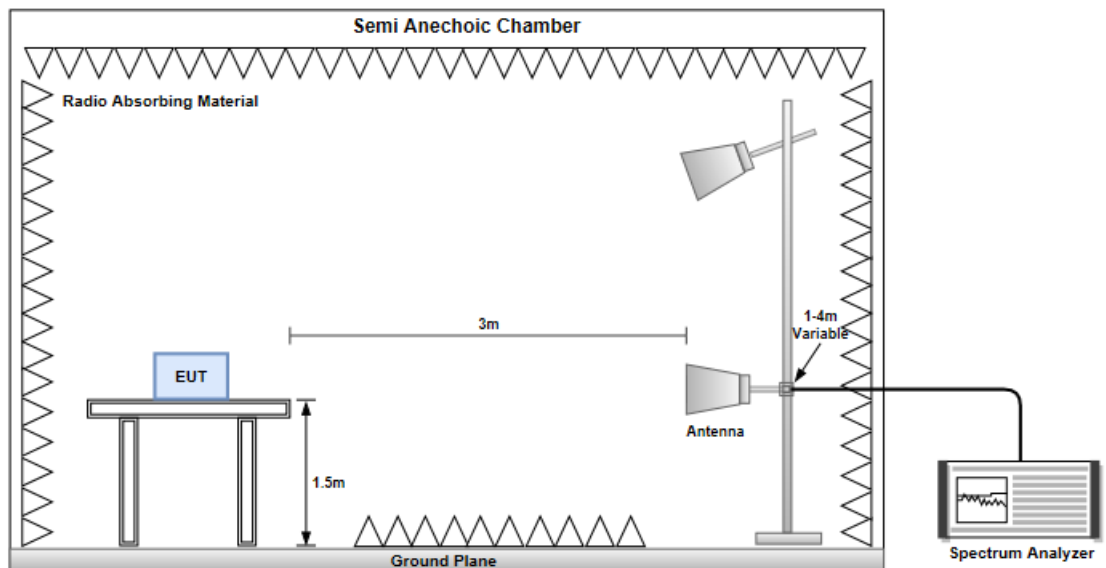
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

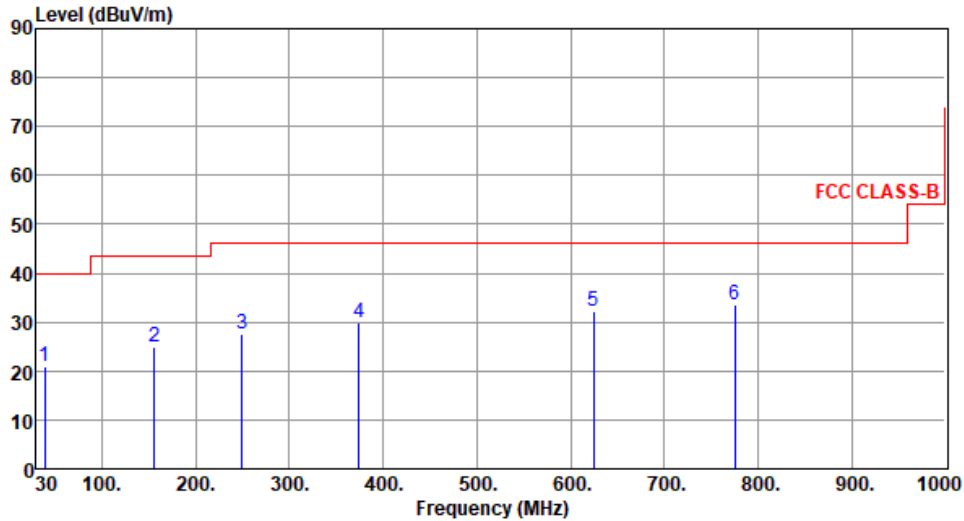


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

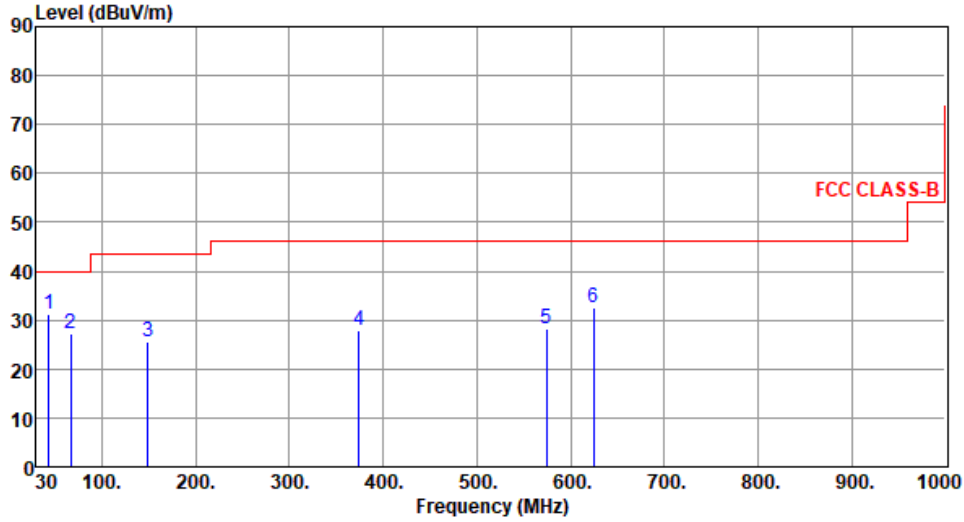


The graph displays the radiated unwanted emissions for a transmitter. The y-axis represents the Level in dBUV/m, ranging from 0 to 90. The x-axis represents the Frequency in MHz, ranging from 30 to 1000. A red line indicates the FCC CLASS-B limit, which is 40 dBUV/m from 30 to 100 MHz, 45 dBUV/m from 100 to 900 MHz, and 55 dBUV/m from 900 to 1000 MHz. Six emission peaks are identified and labeled with numbers 1 through 6. The data for these peaks is provided in the table below.

	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	38.73	20.95	40.00	-19.05	29.78	-8.83	Peak	---	---
2	156.10	24.86	43.50	-18.64	33.20	-8.34	Peak	---	---
3	249.22	27.54	46.00	-18.46	37.29	-9.75	Peak	---	---
4	374.35	29.78	46.00	-16.22	35.53	-5.75	Peak	---	---
5	624.61	32.29	46.00	-13.71	31.94	0.35	Peak	---	---
6	774.96	33.58	46.00	-12.42	30.41	3.17	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	11g	Test Freq. (MHz)	2437
Polarization	Vertical		

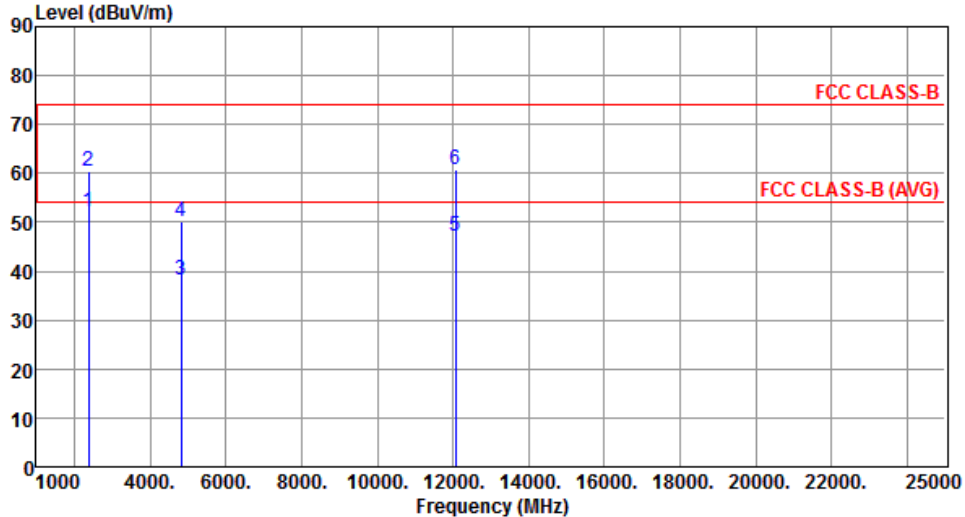


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	43.58	31.10	40.00	-8.90	39.38	-8.28	Peak	---	---
2	66.86	27.26	40.00	-12.74	37.26	-10.00	Peak	---	---
3	149.31	25.60	43.50	-17.90	34.08	-8.48	Peak	---	---
4	374.35	27.95	46.00	-18.05	33.70	-5.75	Peak	---	---
5	574.17	28.34	46.00	-17.66	29.35	-1.01	Peak	---	---
6	624.61	32.53	46.00	-13.47	32.18	0.35	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

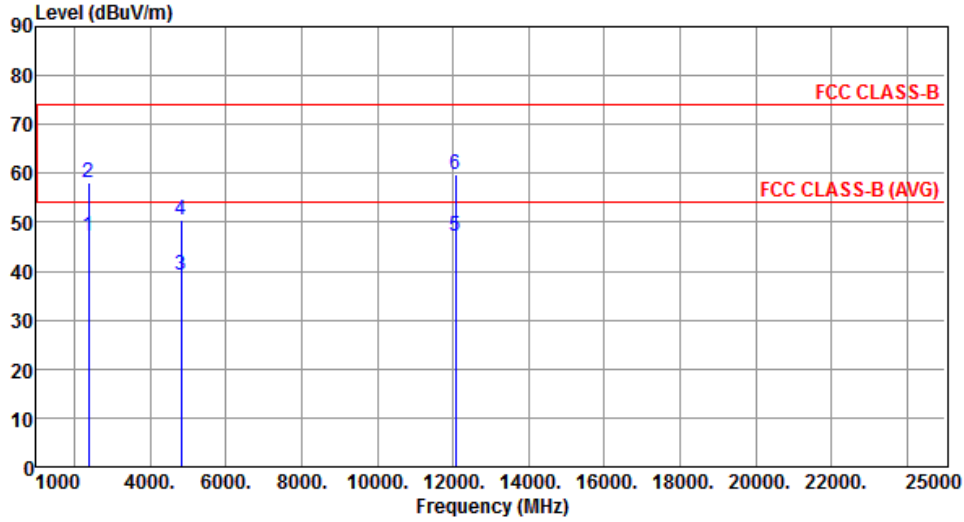
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		



	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	52.25	54.00	-1.75	52.01	0.24	Average	114	231
2	2390.00	60.40	74.00	-13.60	60.16	0.24	Peak	114	231
3	4824.00	38.15	54.00	-15.85	31.65	6.50	Average	100	226
4	4824.00	50.06	74.00	-23.94	43.56	6.50	Peak	100	226
5	12060.00	47.19	54.00	-6.81	30.95	16.24	Average	112	18
6	12060.00	60.73	74.00	-13.27	44.49	16.24	Peak	112	18

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).

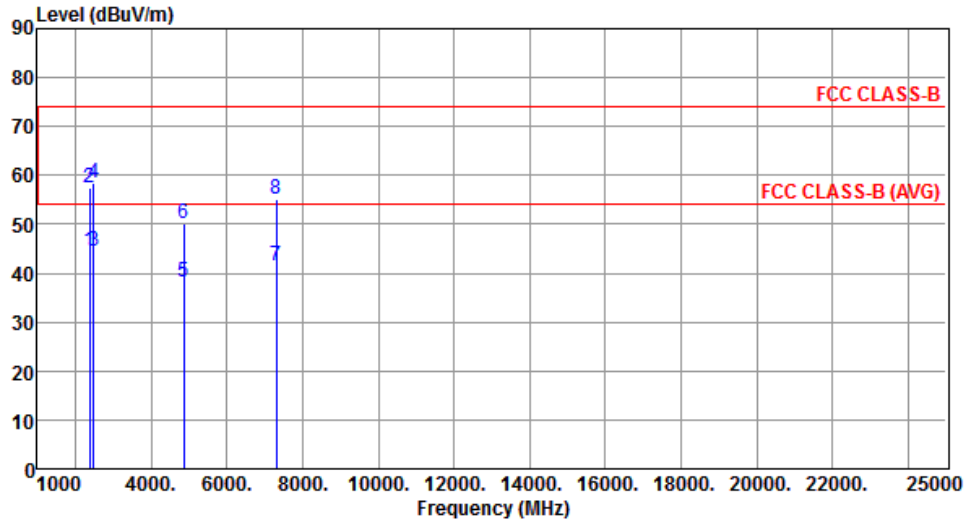
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



	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	47.15	54.00	-6.85	46.91	0.24	Average	131	359
2	2390.00	58.17	74.00	-15.83	57.93	0.24	Peak	131	359
3	4824.00	39.25	54.00	-14.75	32.75	6.50	Average	121	119
4	4824.00	50.54	74.00	-23.46	44.04	6.50	Peak	121	119
5	12060.00	47.26	54.00	-6.74	31.02	16.24	Average	116	15
6	12060.00	59.89	74.00	-14.11	43.65	16.24	Peak	116	15

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		



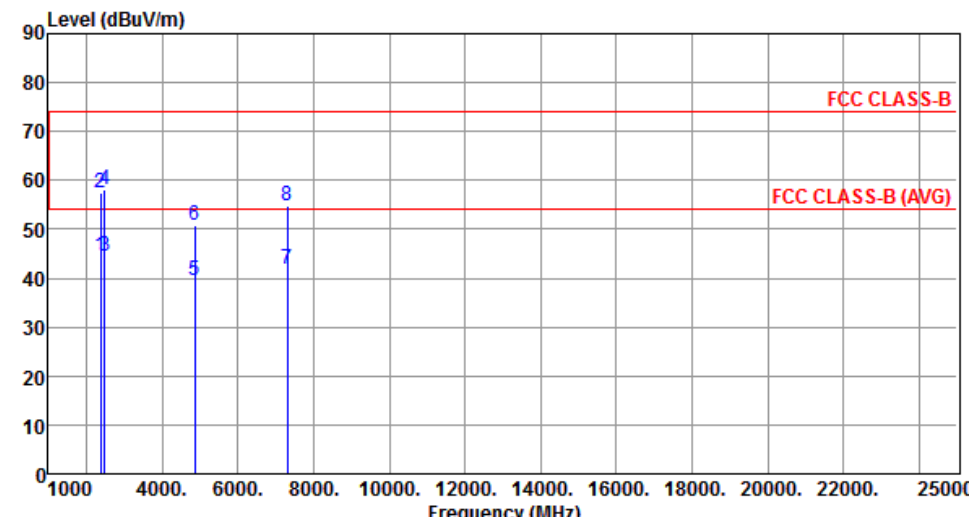
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.48	54.00	-9.52	44.24	0.24	Average	105	231
2	2390.00	57.46	74.00	-16.54	57.22	0.24	Peak	105	231
3	2483.50	44.67	54.00	-9.33	44.42	0.25	Average	105	231
4	2483.50	58.35	74.00	-15.65	58.10	0.25	Peak	105	231
5	4874.00	38.32	54.00	-15.68	31.84	6.48	Average	100	223
6	4874.00	50.14	74.00	-23.86	43.66	6.48	Peak	100	223
7	7311.00	41.43	54.00	-12.57	29.67	11.76	Average	151	24
8	7311.00	55.00	74.00	-19.00	43.24	11.76	Peak	151	24

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).

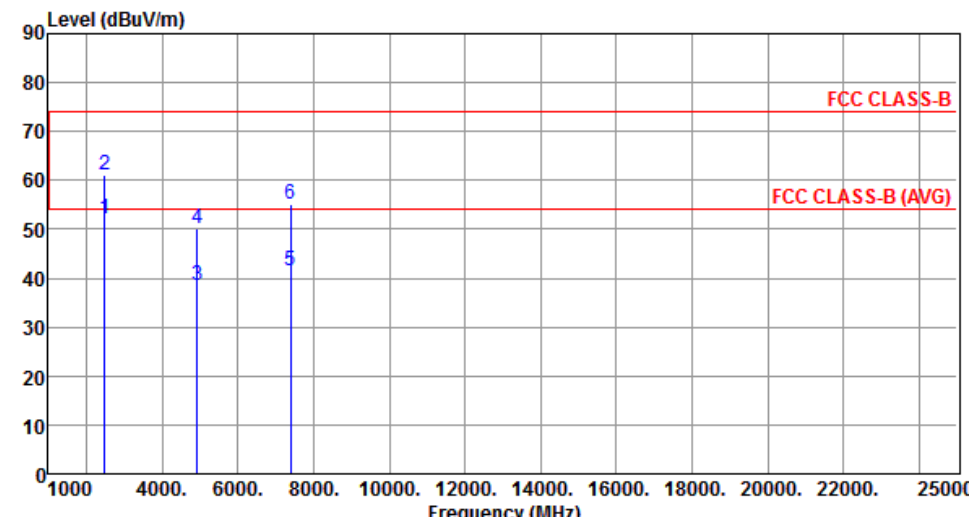
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	44.35	54.00	-9.65	44.11	0.24	Average	126	349
2	2390.00	57.29	74.00	-16.71	57.05	0.24	Peak	126	349
3	2483.50	44.52	54.00	-9.48	44.27	0.25	Average	126	349
4	2483.50	58.21	74.00	-15.79	57.96	0.25	Peak	126	349
5	4874.00	39.50	54.00	-14.50	33.02	6.48	Average	122	114
6	4874.00	50.79	74.00	-23.21	44.31	6.48	Peak	122	114
7	7311.00	41.79	54.00	-12.21	30.03	11.76	Average	185	16
8	7311.00	54.89	74.00	-19.11	43.13	11.76	Peak	185	16

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	52.06	54.00	-1.94	51.81	0.25	Average	111	229
2	2483.50	61.21	74.00	-12.79	60.96	0.25	Peak	111	229
3	4924.00	38.45	54.00	-15.55	31.94	6.51	Average	100	226
4	4924.00	50.26	74.00	-23.74	43.75	6.51	Peak	100	226
5	7386.00	41.48	54.00	-12.52	29.67	11.81	Average	151	29
6	7386.00	55.13	74.00	-18.87	43.32	11.81	Peak	151	29

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	46.56	54.00	-7.44	46.31	0.25	Average	126	345
2	2483.50	58.14	74.00	-15.86	57.89	0.25	Peak	126	345
3	4924.00	39.62	54.00	-14.38	33.11	6.51	Average	121	119
4	4924.00	50.85	74.00	-23.15	44.34	6.51	Peak	121	119
5	7386.00	41.69	54.00	-12.31	29.88	11.81	Average	185	21
6	7386.00	54.82	74.00	-19.18	43.01	11.81	Peak	185	21

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								

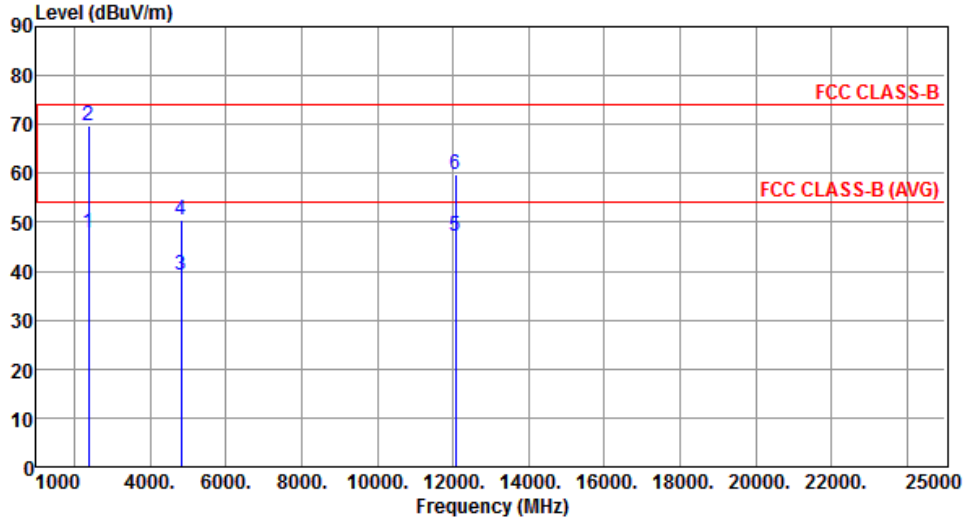
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level			reading			High	Table
		dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	50.45	54.00	-3.55	50.21	0.24	Average	109	231
2	2390.00	72.90	74.00	-1.10	72.66	0.24	Peak	109	231
3	4824.00	38.04	54.00	-15.96	31.54	6.50	Average	100	221
4	4824.00	49.95	74.00	-24.05	43.45	6.50	Peak	100	221
5	12060.00	47.02	54.00	-6.98	30.78	16.24	Average	110	15
6	12060.00	60.65	74.00	-13.35	44.41	16.24	Peak	110	15

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).

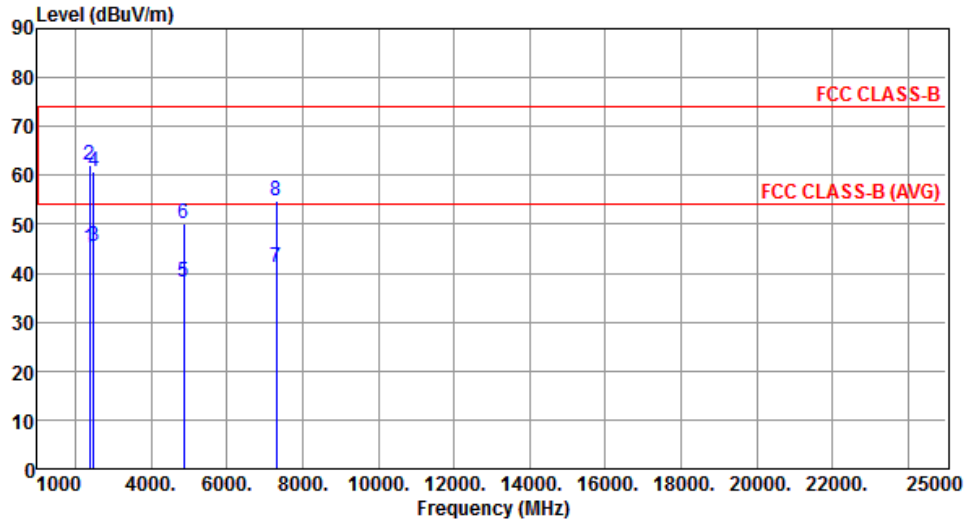
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	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	47.83	54.00	-6.17	47.59	0.24	Average	126	356
2	2390.00	69.82	74.00	-4.18	69.58	0.24	Peak	126	356
3	4824.00	39.16	54.00	-14.84	32.66	6.50	Average	121	115
4	4824.00	50.42	74.00	-23.58	43.92	6.50	Peak	121	115
5	12060.00	47.14	54.00	-6.86	30.90	16.24	Average	112	13
6	12060.00	59.82	74.00	-14.18	43.58	16.24	Peak	112	13

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		



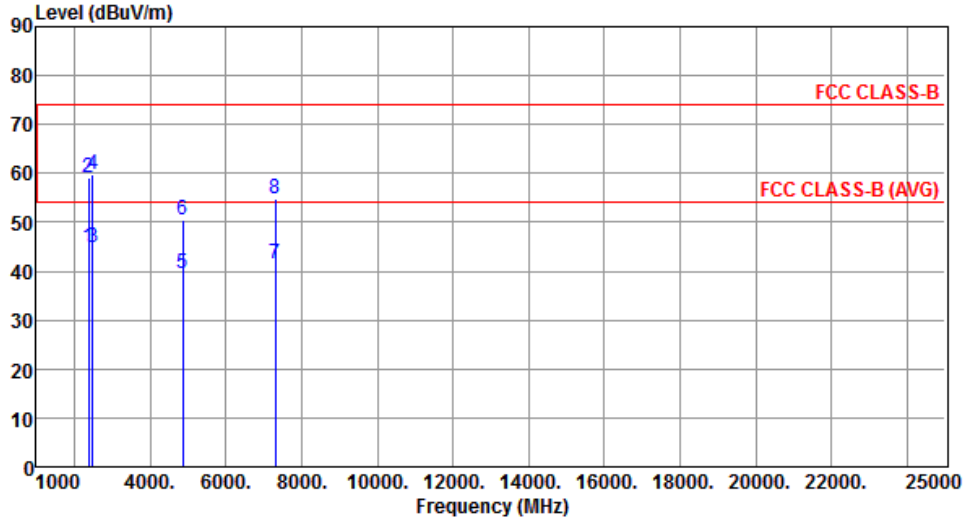
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.28	54.00	-8.72	45.04	0.24	Average	105	228
2	2390.00	62.09	74.00	-11.91	61.85	0.24	Peak	105	228
3	2483.50	45.46	54.00	-8.54	45.21	0.25	Average	105	228
4	2483.50	60.69	74.00	-13.31	60.44	0.25	Peak	105	228
5	4874.00	38.19	54.00	-15.81	31.71	6.48	Average	105	21
6	4874.00	50.02	74.00	-23.98	43.54	6.48	Peak	105	21
7	7311.00	41.29	54.00	-12.71	29.53	11.76	Average	110	13
8	7311.00	54.86	74.00	-19.14	43.10	11.76	Peak	110	13

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).

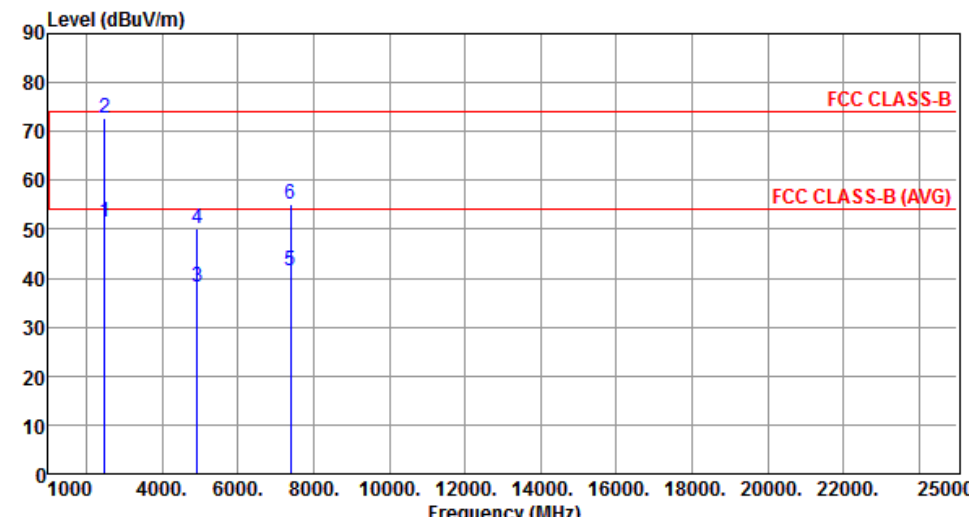
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.69	54.00	-9.31	44.45	0.24	Average	125	355
2	2390.00	59.26	74.00	-14.74	59.02	0.24	Peak	125	355
3	2483.50	44.98	54.00	-9.02	44.73	0.25	Average	125	355
4	2483.50	59.69	74.00	-14.31	59.44	0.25	Peak	125	355
5	4874.00	39.42	54.00	-14.58	32.94	6.48	Average	114	25
6	4874.00	50.61	74.00	-23.39	44.13	6.48	Peak	114	25
7	7311.00	41.62	54.00	-12.38	29.86	11.76	Average	105	66
8	7311.00	54.82	74.00	-19.18	43.06	11.76	Peak	105	66

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

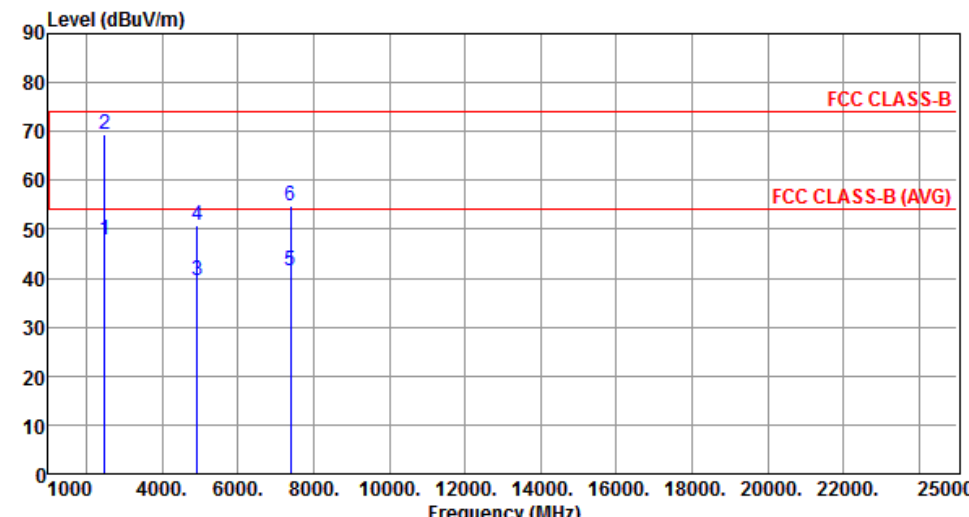
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	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	51.64	54.00	-2.36	51.39	0.25	Average	108	228
2	2483.50	72.66	74.00	-1.34	72.41	0.25	Peak	108	228
3	4924.00	38.26	54.00	-15.74	31.75	6.51	Average	111	44
4	4924.00	50.19	74.00	-23.81	43.68	6.51	Peak	111	44
5	7386.00	41.36	54.00	-12.64	29.55	11.81	Average	104	23
6	7386.00	55.11	74.00	-18.89	43.30	11.81	Peak	104	23

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		

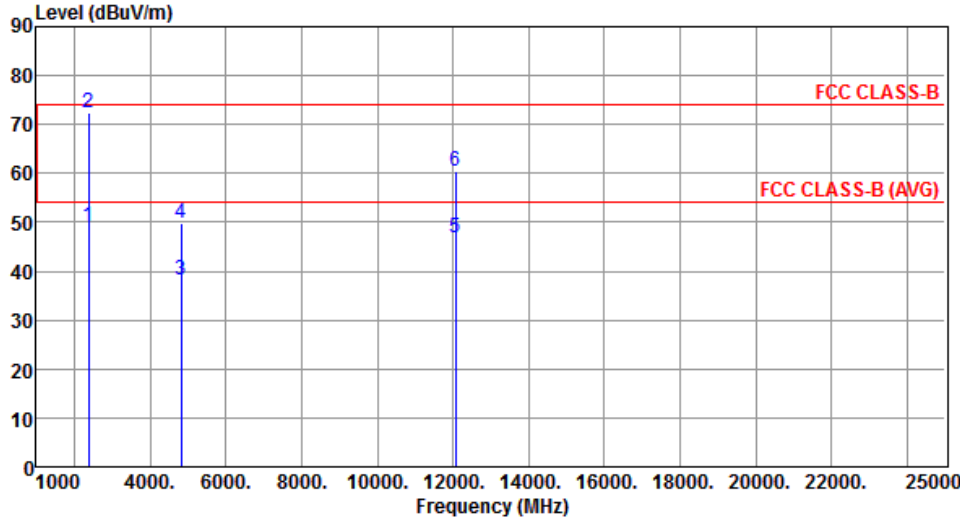


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	47.81	54.00	-6.19	47.56	0.25	Average	126	354
2	2483.50	69.56	74.00	-4.44	69.31	0.25	Peak	126	354
3	4924.00	39.53	54.00	-14.47	33.02	6.51	Average	107	28
4	4924.00	50.71	74.00	-23.29	44.20	6.51	Peak	107	28
5	7386.00	41.58	54.00	-12.42	29.77	11.81	Average	121	33
6	7386.00	54.69	74.00	-19.31	42.88	11.81	Peak	121	33

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

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

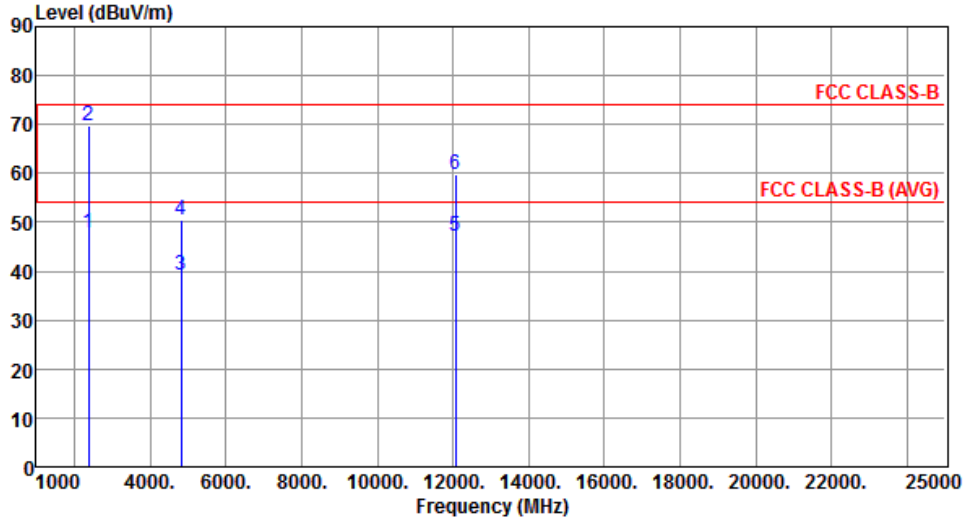
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Horizontal		



	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	49.18	54.00	-4.82	48.94	0.24	Average	109	230
2	2390.00	72.33	74.00	-1.67	72.09	0.24	Peak	109	230
3	4824.00	38.16	54.00	-15.84	31.66	6.50	Average	114	65
4	4824.00	49.82	74.00	-24.18	43.32	6.50	Peak	114	65
5	12060.00	46.94	54.00	-7.06	30.70	16.24	Average	111	49
6	12060.00	60.58	74.00	-13.42	44.34	16.24	Peak	111	49

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

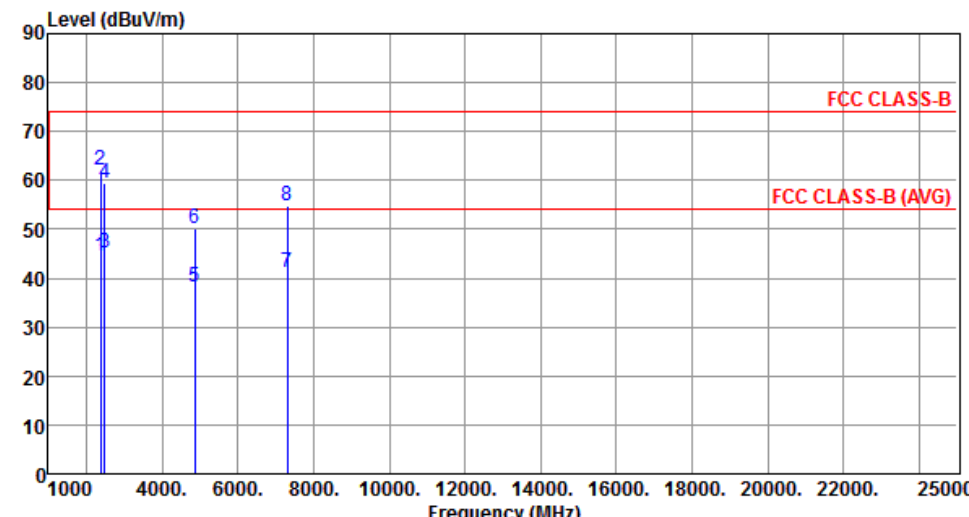
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



	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	47.69	54.00	-6.31	47.45	0.24	Average	124	351
2	2390.00	69.58	74.00	-4.42	69.34	0.24	Peak	124	351
3	4824.00	39.05	54.00	-14.95	32.55	6.50	Average	100	27
4	4824.00	50.33	74.00	-23.67	43.83	6.50	Peak	100	27
5	12060.00	47.08	54.00	-6.92	30.84	16.24	Average	104	52
6	12060.00	59.71	74.00	-14.29	43.47	16.24	Peak	104	52

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

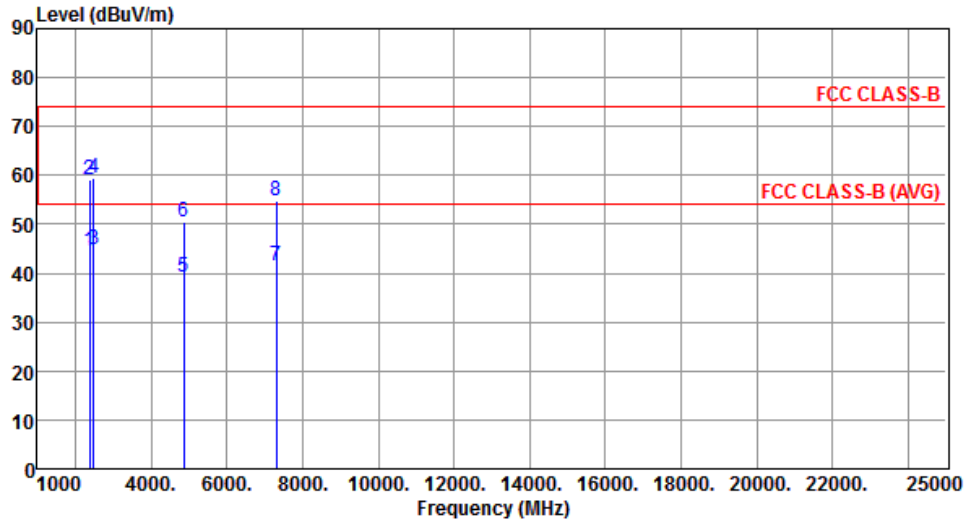
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	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	44.66	54.00	-9.34	44.42	0.24	Average	105	229
2	2390.00	62.25	74.00	-11.75	62.01	0.24	Peak	105	229
3	2483.50	45.12	54.00	-8.88	44.87	0.25	Average	105	229
4	2483.50	59.49	74.00	-14.51	59.24	0.25	Peak	105	229
5	4874.00	38.21	54.00	-15.79	31.73	6.48	Average	106	17
6	4874.00	50.15	74.00	-23.85	43.67	6.48	Peak	106	17
7	7311.00	41.18	54.00	-12.82	29.42	11.76	Average	115	22
8	7311.00	54.65	74.00	-19.35	42.89	11.76	Peak	115	22

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

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



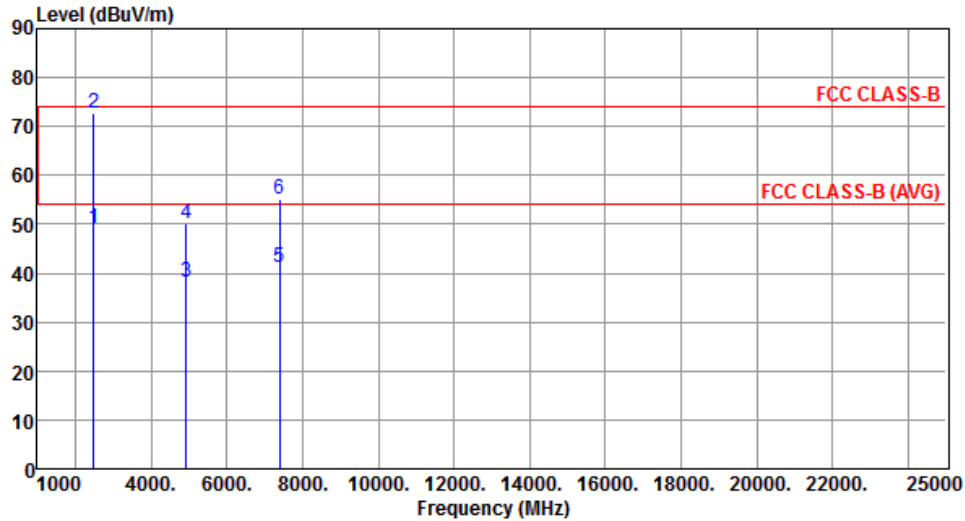
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.61	54.00	-9.39	44.37	0.24	Average	125	356
2	2390.00	59.18	74.00	-14.82	58.94	0.24	Peak	125	356
3	2483.50	44.85	54.00	-9.15	44.60	0.25	Average	125	356
4	2483.50	59.51	74.00	-14.49	59.26	0.25	Peak	125	356
5	4874.00	39.31	54.00	-14.69	32.83	6.48	Average	102	9
6	4874.00	50.36	74.00	-23.64	43.88	6.48	Peak	102	9
7	7311.00	41.55	54.00	-12.45	29.79	11.76	Average	112	38
8	7311.00	54.76	74.00	-19.24	43.00	11.76	Peak	112	38

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



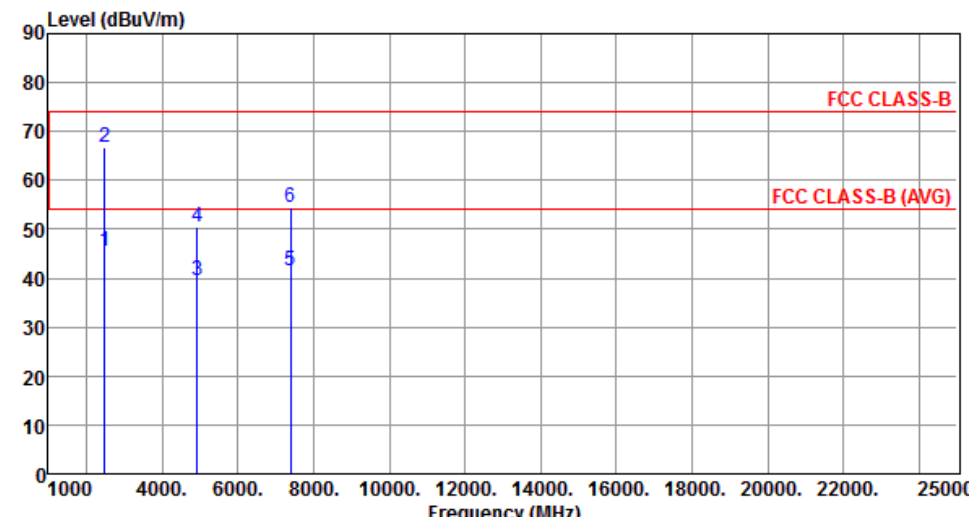
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	49.01	54.00	-4.99	48.76	0.25	Average	108	228
2	2483.50	72.82	74.00	-1.18	72.57	0.25	Peak	108	228
3	4924.00	38.21	54.00	-15.79	31.70	6.51	Average	105	26
4	4924.00	50.16	74.00	-23.84	43.65	6.51	Peak	105	26
5	7386.00	41.29	54.00	-12.71	29.48	11.81	Average	104	56
6	7386.00	55.08	74.00	-18.92	43.27	11.81	Peak	104	56

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

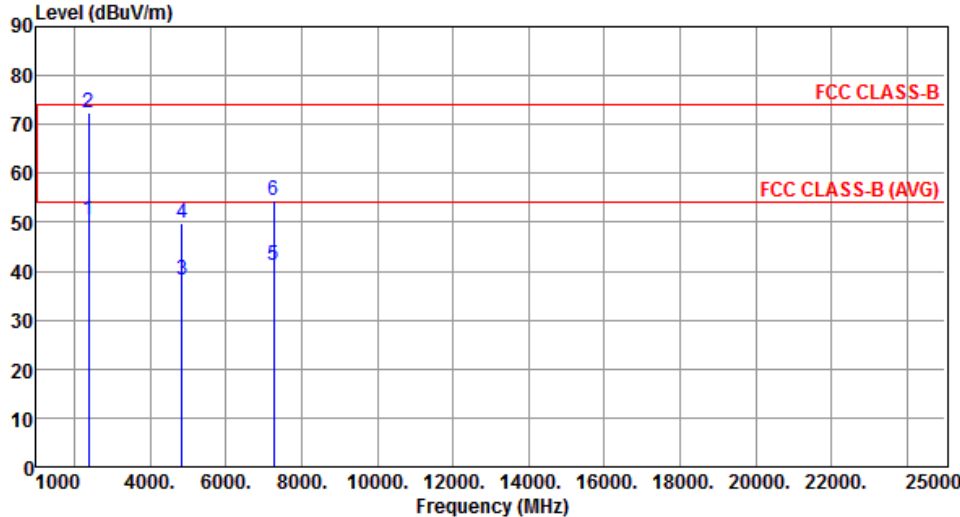


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	45.56	54.00	-8.44	45.31	0.25	Average	125	353
2	2483.50	66.78	74.00	-7.22	66.53	0.25	Peak	125	353
3	4924.00	39.48	54.00	-14.52	32.97	6.51	Average	105	19
4	4924.00	50.62	74.00	-23.38	44.11	6.51	Peak	105	19
5	7386.00	41.44	54.00	-12.56	29.63	11.81	Average	118	31
6	7386.00	54.58	74.00	-19.42	42.77	11.81	Peak	118	31

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 HT40

Modulation	HT40	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	50.53	54.00	-3.47	50.29	0.24	Average	108	230
2	2390.00	72.50	74.00	-1.50	72.26	0.24	Peak	108	230
3	4844.00	38.12	54.00	-15.88	31.57	6.55	Average	105	12
4	4844.00	49.69	74.00	-24.31	43.14	6.55	Peak	105	12
5	7266.00	41.05	54.00	-12.95	29.44	11.61	Average	101	23
6	7266.00	54.59	74.00	-19.41	42.98	11.61	Peak	101	23

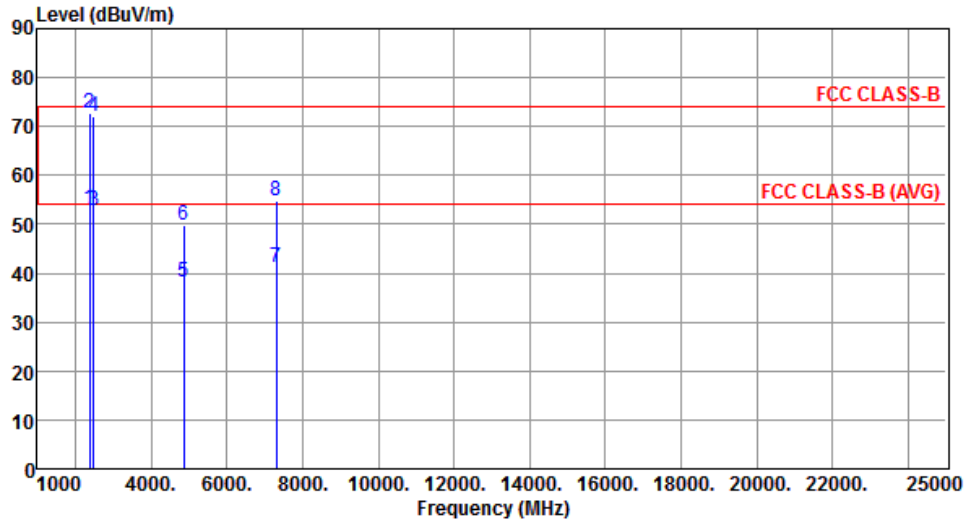
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Modulation	HT40	Test Freq. (MHz)	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	47.65	54.00	-6.35	47.41	0.24	Average	125	352
2	2390.00	69.62	74.00	-4.38	69.38	0.24	Peak	125	352
3	4844.00	38.04	54.00	-15.96	31.49	6.55	Average	103	25
4	4844.00	49.75	74.00	-24.25	43.20	6.55	Peak	103	25
5	7266.00	41.31	54.00	-12.69	29.70	11.61	Average	108	59
6	7266.00	54.68	74.00	-19.32	43.07	11.61	Peak	108	59

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

Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



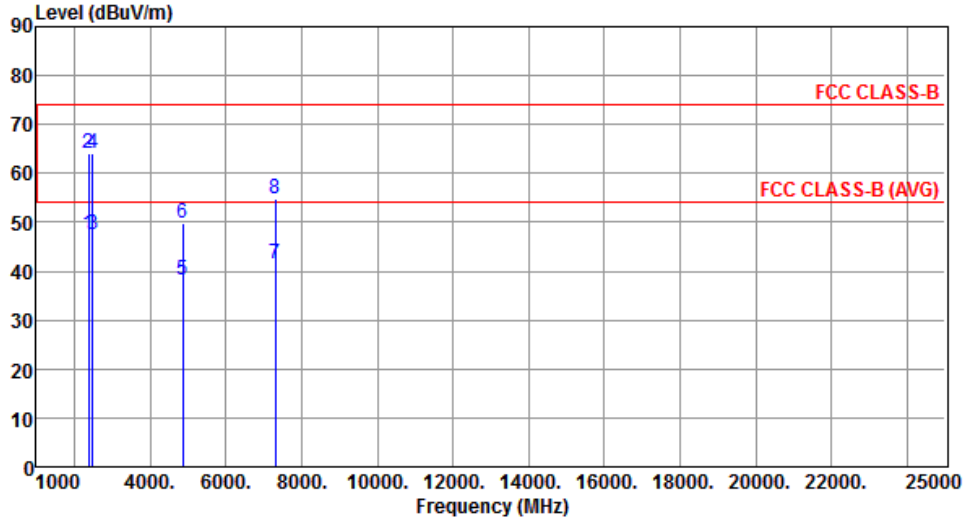
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.98	54.00	-1.02	52.74	0.24	Average	108	231
2	2390.00	72.82	74.00	-1.18	72.58	0.24	Peak	108	231
3	2483.50	52.78	54.00	-1.22	52.53	0.25	Average	108	231
4	2483.50	72.10	74.00	-1.90	71.85	0.25	Peak	108	231
5	4874.00	38.25	54.00	-15.75	31.77	6.48	Average	103	24
6	4874.00	49.86	74.00	-24.14	43.38	6.48	Peak	103	24
7	7311.00	41.21	54.00	-12.79	29.45	11.76	Average	107	45
8	7311.00	54.66	74.00	-19.34	42.90	11.76	Peak	107	45

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

*Factor includes antenna factor , cable loss and amplifier gain

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

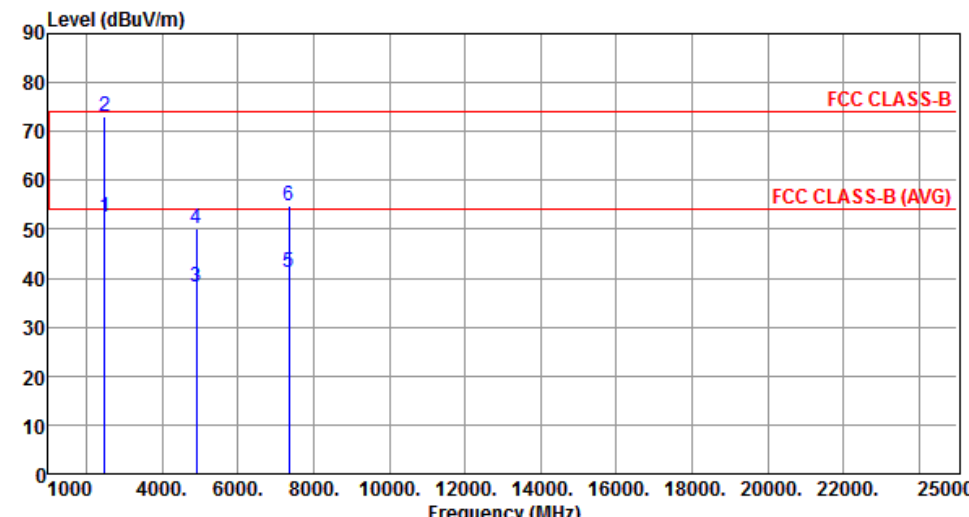
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	47.58	54.00	-6.42	47.34	0.24	Average	125	351
2	2390.00	64.24	74.00	-9.76	64.00	0.24	Peak	125	351
3	2483.50	47.45	54.00	-6.55	47.20	0.25	Average	125	351
4	2483.50	64.19	74.00	-9.81	63.94	0.25	Peak	125	351
5	4874.00	38.12	54.00	-15.88	31.64	6.48	Average	101	15
6	4874.00	49.83	74.00	-24.17	43.35	6.48	Peak	101	15
7	7311.00	41.56	54.00	-12.44	29.80	11.76	Average	103	62
8	7311.00	54.82	74.00	-19.18	43.06	11.76	Peak	103	62

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

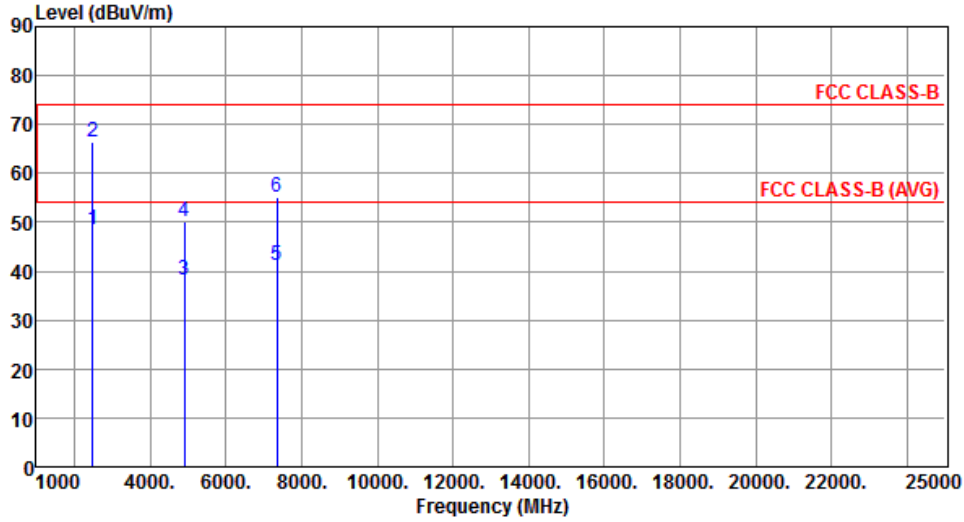
Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



	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	52.51	54.00	-1.49	52.26	0.25	Average	106	229
2	2483.50	72.96	74.00	-1.04	72.71	0.25	Peak	106	229
3	4904.00	38.16	54.00	-15.84	31.74	6.42	Average	101	61
4	4904.00	50.14	74.00	-23.86	43.72	6.42	Peak	101	61
5	7356.00	41.18	54.00	-12.82	29.36	11.82	Average	104	38
6	7356.00	54.93	74.00	-19.07	43.11	11.82	Peak	104	38

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

Modulation	HT40	Test Freq. (MHz)	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	48.46	54.00	-5.54	48.21	0.25	Average	126	356
2	2483.50	66.42	74.00	-7.58	66.17	0.25	Peak	126	356
3	4904.00	38.22	54.00	-15.78	31.80	6.42	Average	105	66
4	4904.00	50.25	74.00	-23.75	43.83	6.42	Peak	105	66
5	7356.00	41.29	54.00	-12.71	29.47	11.82	Average	101	44
6	7356.00	55.16	74.00	-18.84	43.34	11.82	Peak	101	44

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 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.6.2 Test Procedures

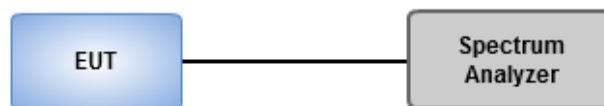
Reference level measurement

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

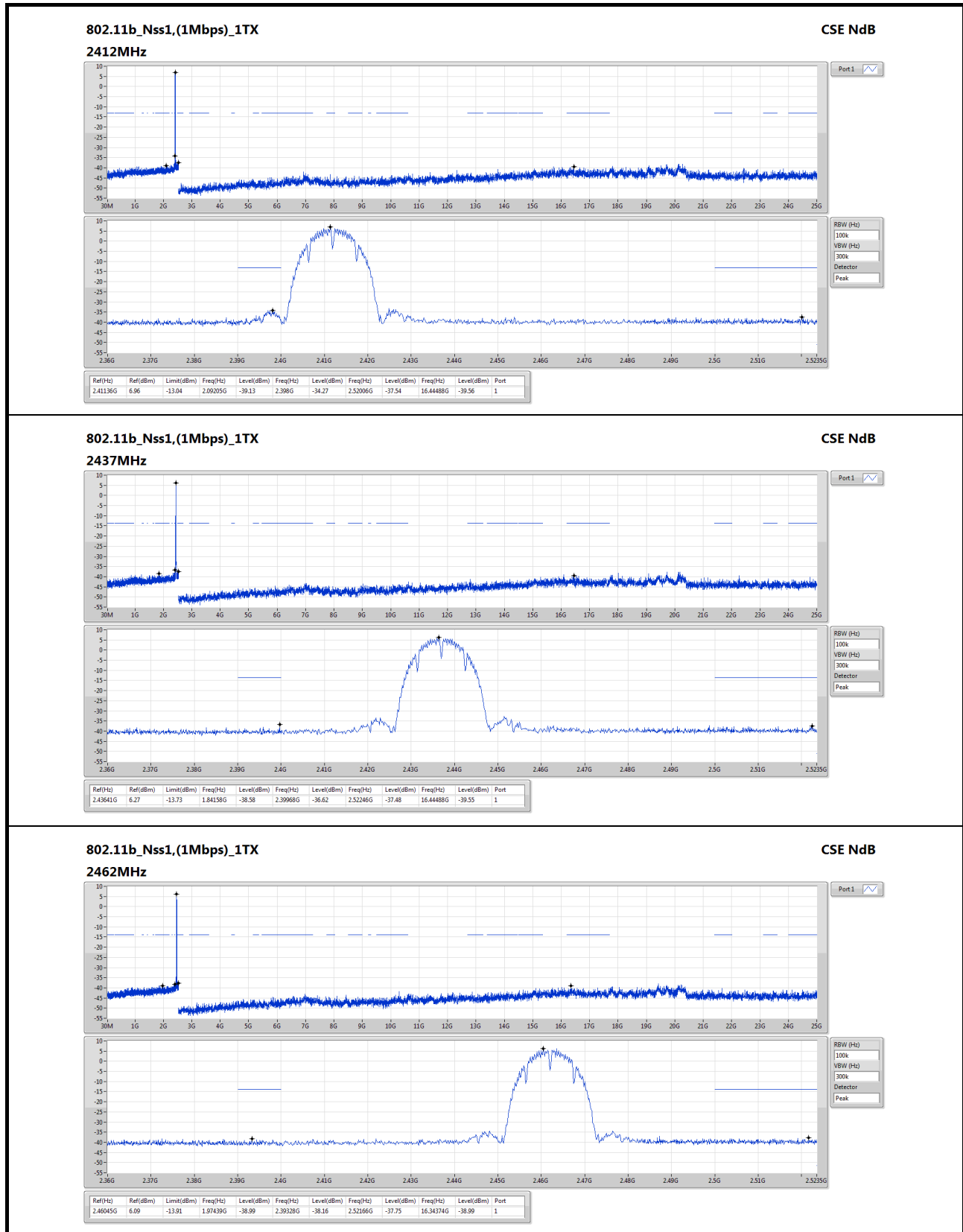
Emission level measurement

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



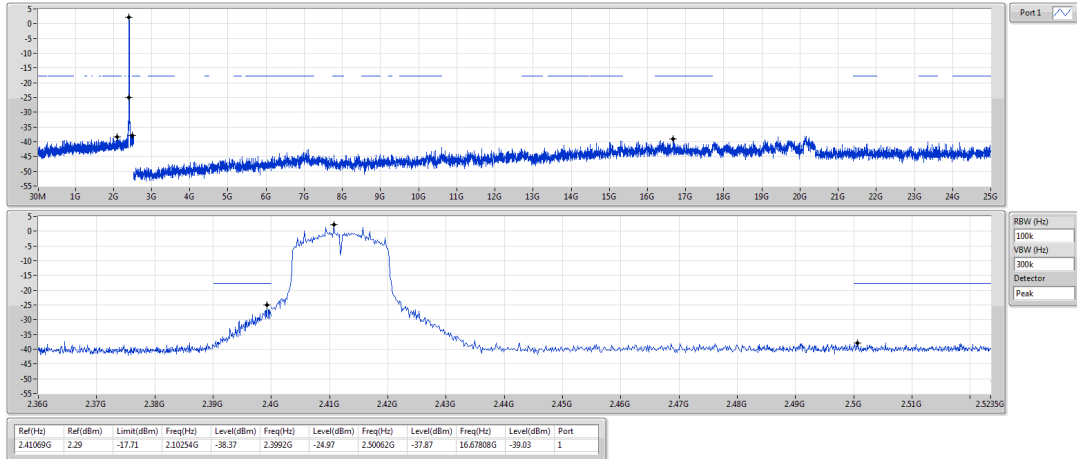
3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands



802.11g_Nss1,(6Mbps)_1TX

CSE NdB

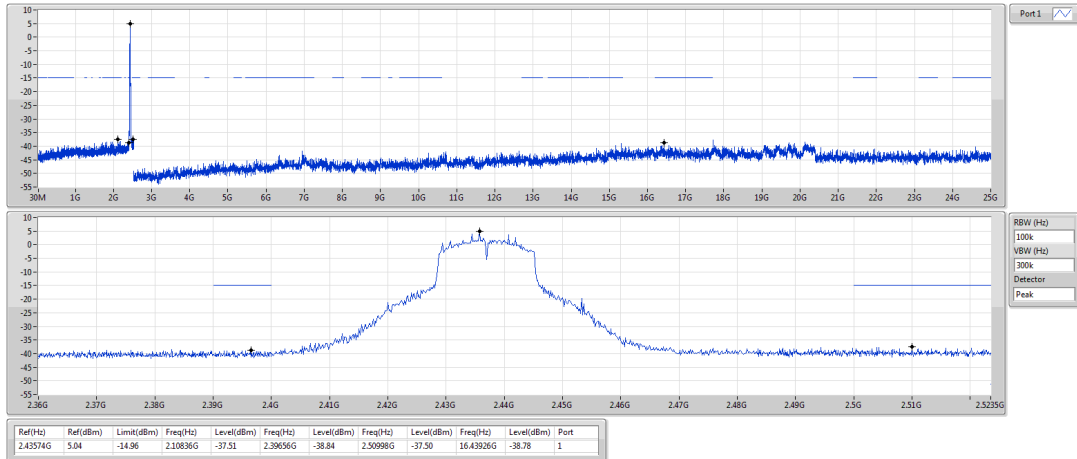
2412MHz



802.11g_Nss1,(6Mbps)_1TX

CSE NdB

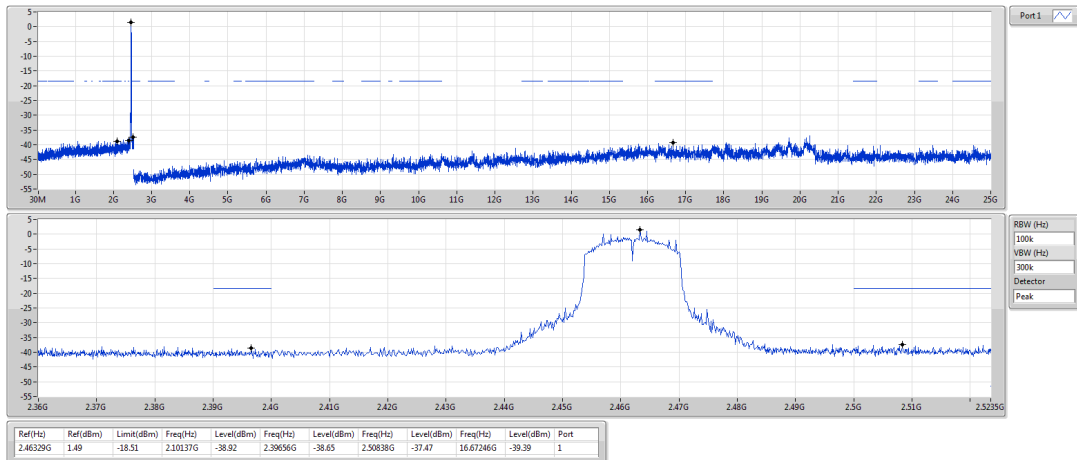
2437MHz



802.11g_Nss1,(6Mbps)_1TX

CSE NdB

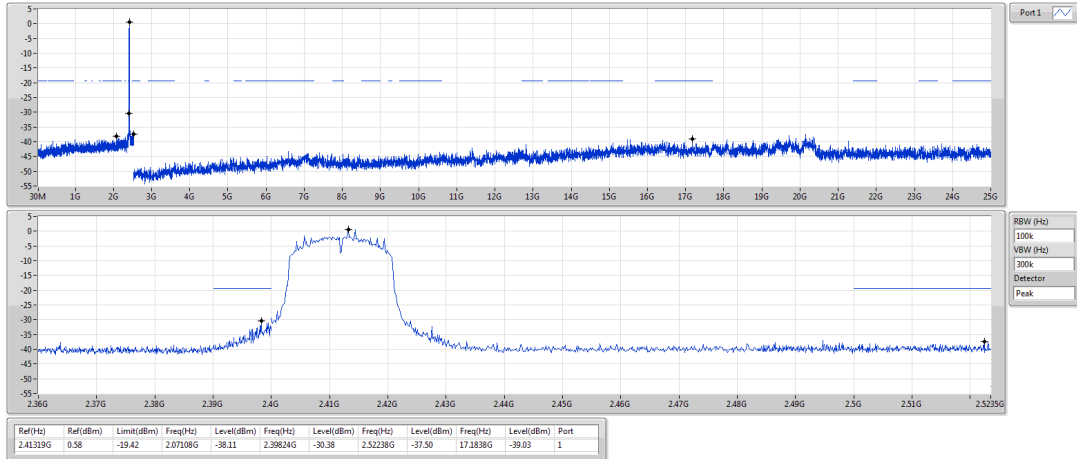
2462MHz



802.11n HT20_Nss1,(MCS0)_1TX

CSE NdB

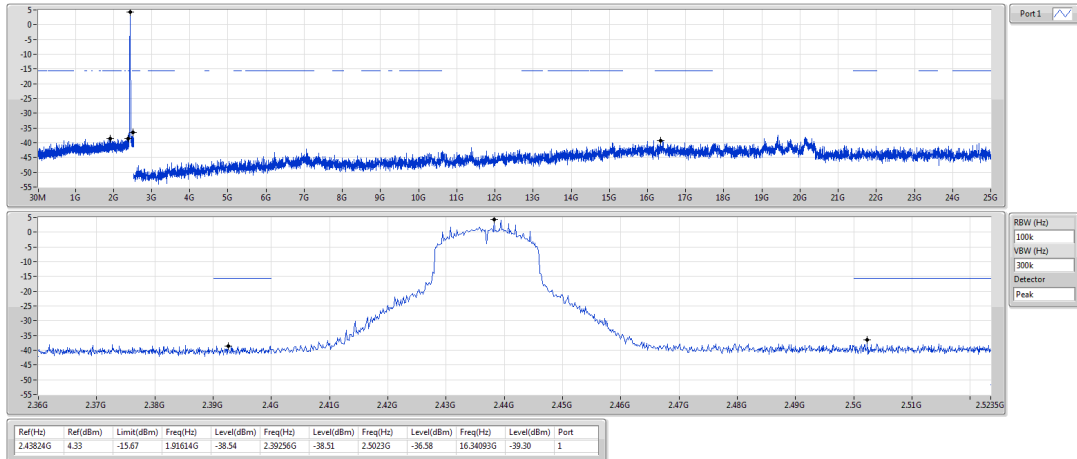
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

CSE NdB

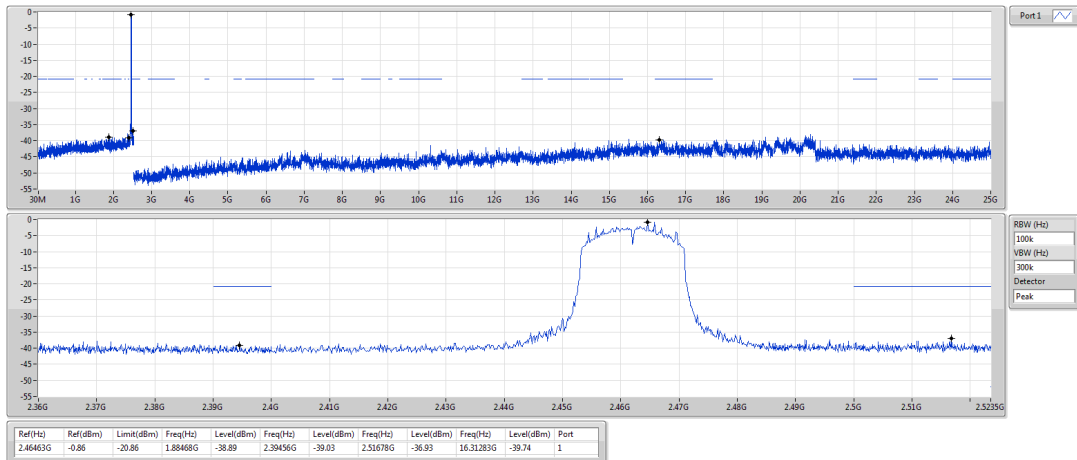
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

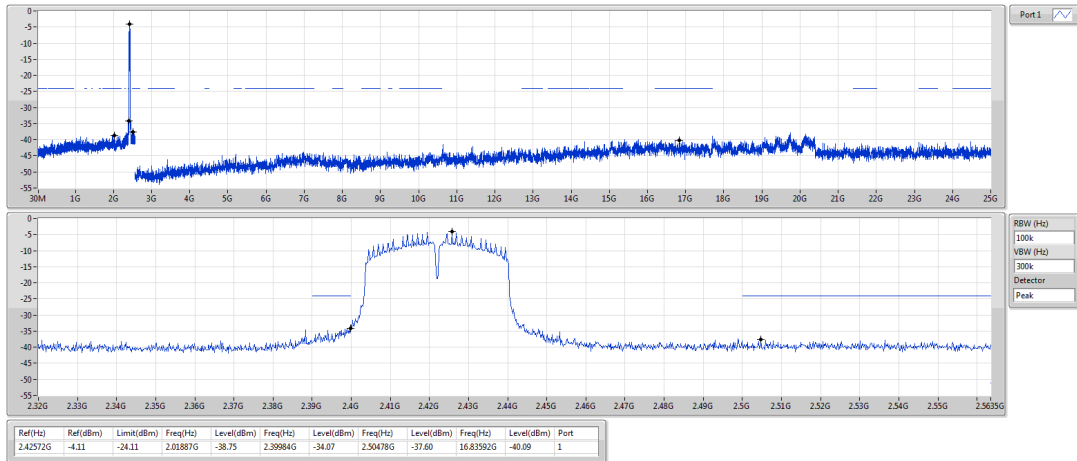
CSE NdB

2462MHz



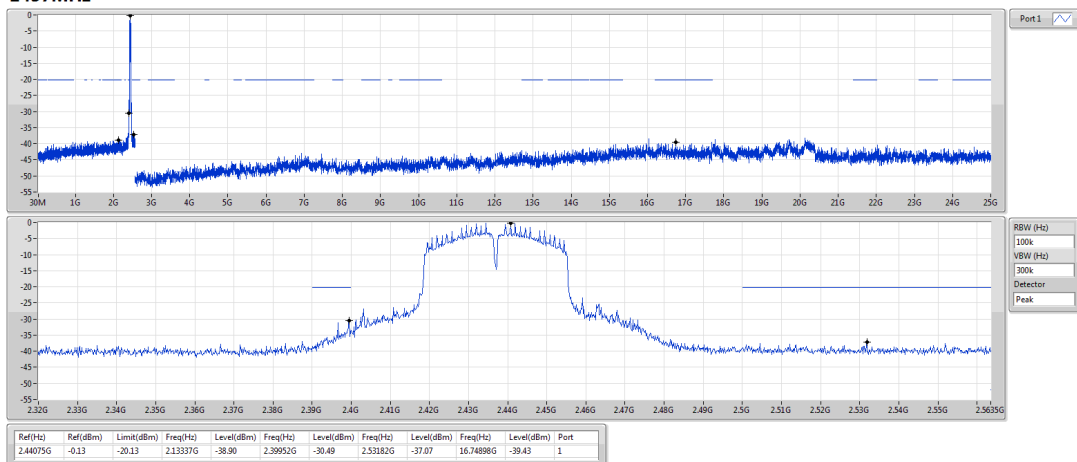
802.11n HT40_Nss1,(MCS0)_1TX
2422MHz

CSE NdB



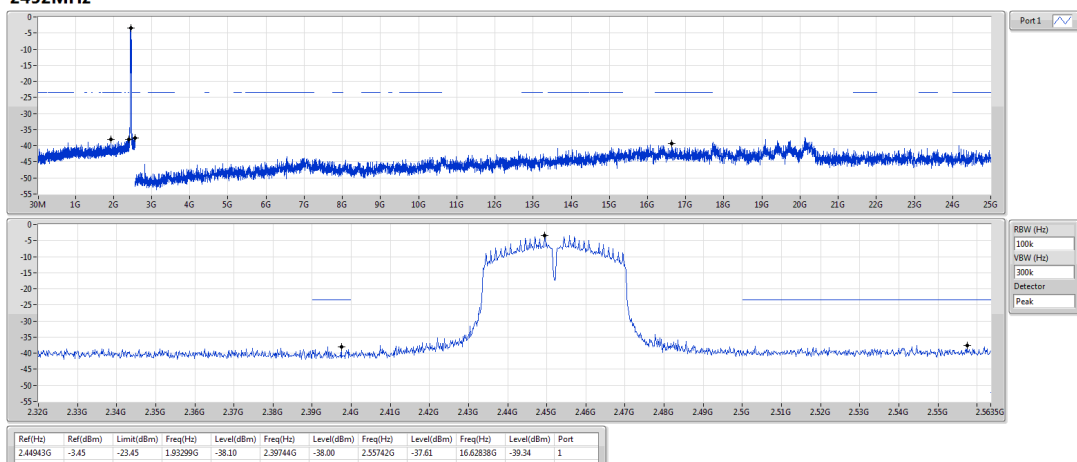
802.11n HT40_Nss1,(MCS0)_1TX
2437MHz

CSE NdB



802.11n HT40_Nss1,(MCS0)_1TX
2452MHz

CSE NdB



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

Tel: 886-2-2601-1640

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

Kwei Shan

Tel: 886-3-271-8666

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

Kwei Shan Site II

Tel: 886-3-271-8640

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

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

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==