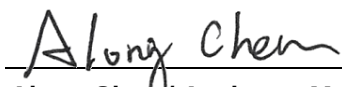


FCC Test Report

FCC ID : 2ARUV-MWF86S01
Equipment : 802.11bgn module
Model No. : PT7686W-SAOPTC0
Brand Name : PTCOM
Applicant : PTCOM Technology CO.,LTD.
Address : 8F., No.89, Sec. 4, Chongxin Rd., Sanchong
Dist., New Taipei City 24161, Taiwan
Standard : 47 CFR FCC Part 15.247
Received Date : Oct. 31, 2018
Tested Date : Nov. 04 ~ Dec. 04, 2018

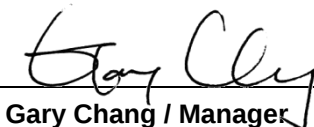
We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval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

Reviewed by:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR8O3103	Rev. 01	Initial issue	Jan. 15, 2019
FR8O3103	Rev. 02	Modified model name and applicant.	Jan. 24, 2019

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.150MHz 48.29 (Margin -17.71dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2930.00MHz 53.25 (Margin -0.75dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 25.02	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 values of gain for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of the gain.

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	ACX AT3216-B2R7HAA_	Chip	0.5	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host
-------------------	------------------

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	USB cable	0.93m 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	QA_Tool, V3.1.2		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	100.00%	0.00
	11g	100.00%	0.00
	HT20	100.00%	0.00
	HT40	100.00%	0.00

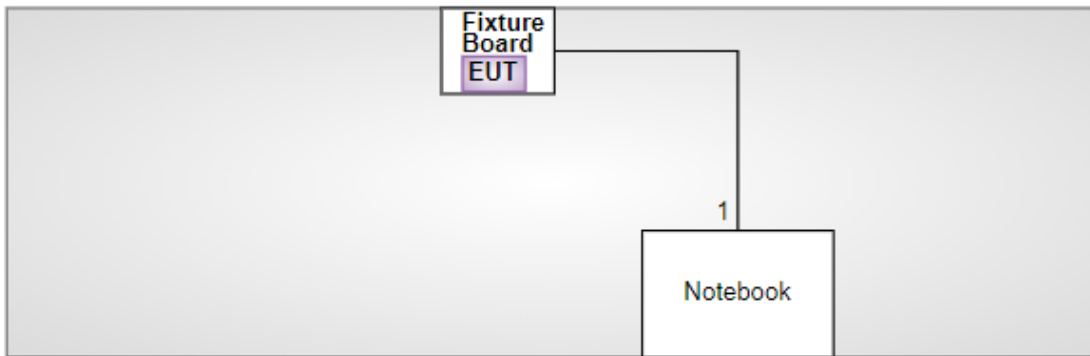
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	23
11b	2437	23
11b	2462	23
11g	2412	21
11g	2437	2A
11g	2462	2A
HT20	2412	20
HT20	2437	2A
HT20	2462	28
HT40	2422	20
HT40	2437	2A
HT40	2452	27

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E6430	DoC	---
2	Fixture Board	---	---	---	Provided by applicant.

1.3 Test Setup Chart

Test Setup Diagram	
 The diagram shows a large rectangular area representing the test setup. Inside this area, there is a box labeled 'Fixture Board EUT' at the top left and a box labeled 'Notebook' at the bottom right. A line connects the two boxes, with the number '1' placed near the connection point.	
No.	Signal cable / Length (m)
1	USB, 0.93m non-shielded without core

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Dec. 04, 2018				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Jan. 05, 2018	Jan. 04, 2019
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 05, 2018	Nov. 04, 2019
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 18, 2017	Dec. 17, 2018
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 1 / (03CH01-WS)				
Tested Date	Nov. 09 ~ Nov. 19, 2018				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2017	Dec. 03, 2018
Receiver	Agilent	N9038A	MY53290044	Sep. 17, 2018	Sep. 16, 2019
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 18, 2018	Jul. 17, 2019
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 20, 2017	Dec. 19, 2018
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	980225	Jul. 20, 2018	Jul. 19, 2019
Preamplifier	Agilent	83017A	MY39501308	Oct. 04, 2018	Oct. 03, 2019
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019
RF Cable	EMC	EMC104-SM-SM-8000	181106	Oct. 08, 2018	Oct. 07, 2019
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 08, 2018	Oct. 07, 2019
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 08, 2018	Oct. 07, 2019
LF cable 1M	EMC	EMCCFD400-NM-NM-1000	16052	Oct. 08, 2018	Oct. 07, 2019
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 08, 2018	Oct. 07, 2019
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Oct. 08, 2018	Oct. 07, 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)				
Tested Date	Dec. 01 ~ Dec. 04, 2018				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Apr. 16, 2018	Apr. 15, 2019
Power Meter	Anritsu	ML2495A	1241002	Oct. 09, 2018	Oct. 08, 2019
Power Sensor	Anritsu	MA2411B	1207366	Oct. 09, 2018	Oct. 08, 2019
DC POWER SOURCE	GW INSTEK	GPC-6030D	EM892433	Oct. 25, 2018	Oct. 24, 2019
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 v05

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	± 34.134 Hz
Conducted power	± 0.808 dB
Power density	± 0.463 dB
Conducted emission	± 2.670 dB
AC conducted emission	± 2.90 dB
Radiated emission ≤ 1 GHz	± 3.66 dB
Radiated emission > 1 GHz	± 5.63 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 59%	Steve QIN
Radiated Emissions	03CH01-WS	23-24°C / 64-66%	Akun Chung Aska Huang
RF Conducted	TH01-WS	23°C / 64%	Felix Sung

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

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	HT20	2437	MCS 0	---
Radiated Emissions ≤1GHz	HT20	2437	MCS 0	---
Radiated Emissions >1GHz				---
Maximum Output Power	11b 11g	2412 / 2437 / 2462 2412 / 2437 / 2462	1 Mbps 6 Mbps	
6dB bandwidth	HT20	2412 / 2437 / 2462	MCS 0	
Power spectral density	HT40	2422 / 2437 / 2452	MCS 0	
NOTE: The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The X-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.

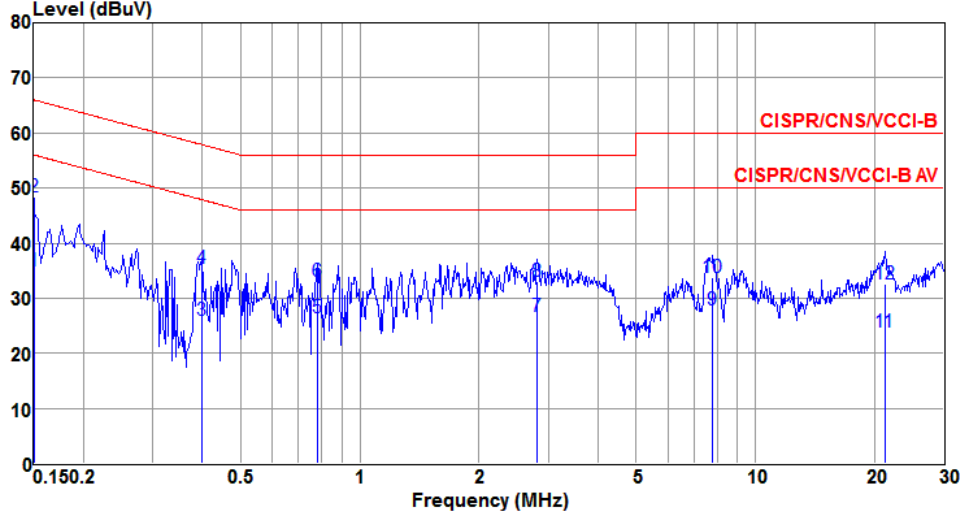
3.1.3 Test Setup



- 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

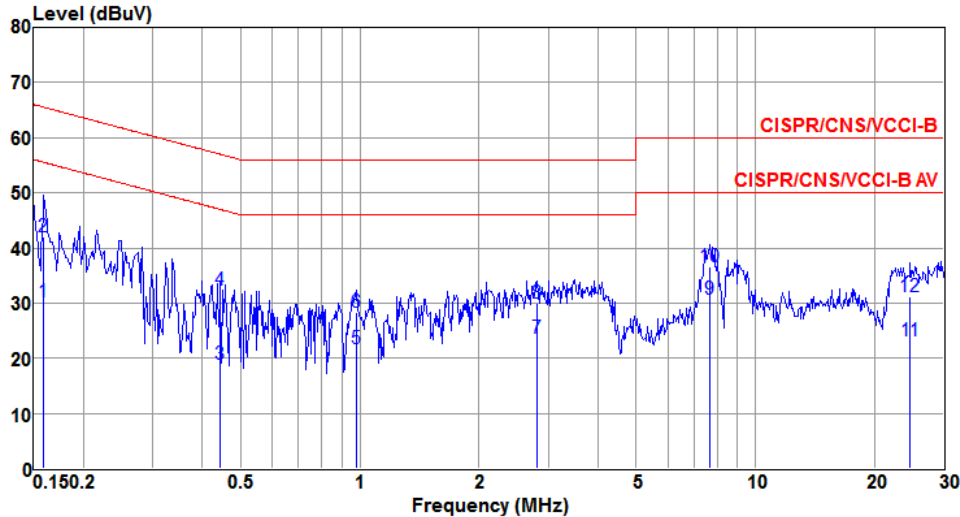
Modulation	HT20	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.150	35.03	56.00	-20.97	34.95	0.07	0.01	Average
2*	0.150	48.29	66.00	-17.71	48.21	0.07	0.01	QP
3	0.400	26.07	47.86	-21.79	25.99	0.06	0.02	Average
4	0.400	35.46	57.86	-22.40	35.38	0.06	0.02	QP
5	0.779	26.35	46.00	-19.65	26.25	0.07	0.03	Average
6	0.779	33.14	56.00	-22.86	33.04	0.07	0.03	QP
7	2.809	26.72	46.00	-19.28	26.46	0.10	0.16	Average
8	2.809	32.97	56.00	-23.03	32.71	0.10	0.16	QP
9	7.810	27.93	50.00	-22.07	27.48	0.16	0.29	Average
10	7.810	33.76	60.00	-26.24	33.31	0.16	0.29	QP
11	21.260	23.81	50.00	-26.19	23.21	0.25	0.35	Average
12	21.260	32.54	60.00	-27.46	31.94	0.25	0.35	QP

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

Modulation	HT20	Test Freq. (MHz)	2437
Power Phase	Neutral		



The graph displays the measured electromagnetic interference level in dBuV across a frequency range from 0.15 to 30 MHz. Two red lines represent the CISPR/CNS/VCCI-B and CISPR/CNS/VCCI-B AV limits. The blue line shows the measured level, which generally stays below the limits, with some peaks around 0.15 MHz, 0.44 MHz, 0.98 MHz, 2.8 MHz, 7.7 MHz, and 24.7 MHz.

	Freq	Level	Limit	Over	Read	LISN	cable	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.159	30.25	55.52	-25.27	30.19	0.05	0.01	Average
2	0.159	42.09	65.52	-23.43	42.03	0.05	0.01	QP
3	0.444	18.77	46.98	-28.21	18.70	0.05	0.02	Average
4	0.444	32.45	56.98	-24.53	32.38	0.05	0.02	QP
5	0.984	21.65	46.00	-24.35	21.56	0.06	0.03	Average
6	0.984	28.27	56.00	-27.73	28.18	0.06	0.03	QP
7	2.809	23.56	46.00	-22.44	23.32	0.08	0.16	Average
8	2.809	29.88	56.00	-26.12	29.64	0.08	0.16	QP
9*	7.687	30.63	50.00	-19.37	30.19	0.15	0.29	Average
10	7.687	36.69	60.00	-23.31	36.25	0.15	0.29	QP
11	24.659	23.10	50.00	-26.90	22.41	0.30	0.39	Average
12	24.659	31.21	60.00	-28.79	30.52	0.30	0.39	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
 Note 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	10M	14.544M	14M5G1D	8.551M	14.472M
802.11g_Nss1,(6Mbps)_1TX	16.377M	16.57M	16M6D1D	16.304M	16.498M
802.11n HT20_Nss1,(MCS0)_1TX	17.536M	17.728M	17M7D1D	16.667M	17.583M
802.11n HT40_Nss1,(MCS0)_1TX	35.942M	36.179M	36M2D1D	35.217M	36.035M

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

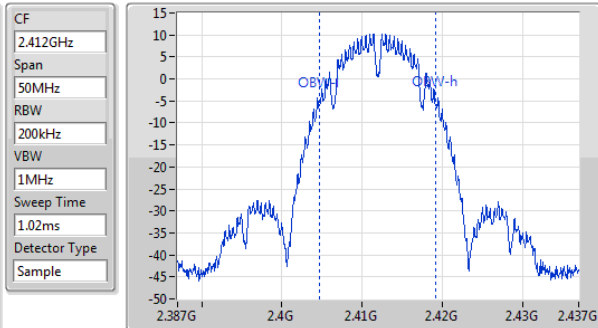
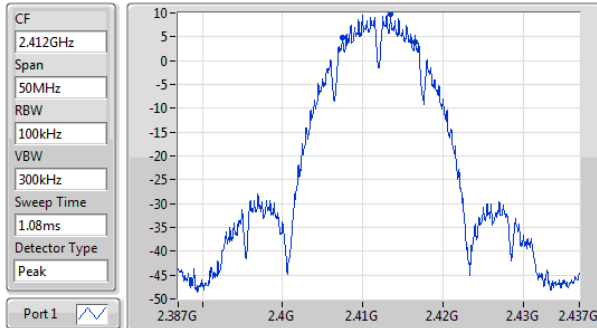
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	9.13M	14.544M
2437MHz	Pass	500k	10M	14.472M
2462MHz	Pass	500k	8.551M	14.472M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	16.377M	16.498M
2437MHz	Pass	500k	16.304M	16.57M
2462MHz	Pass	500k	16.304M	16.57M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	17.536M	17.583M
2437MHz	Pass	500k	17.536M	17.728M
2462MHz	Pass	500k	16.667M	17.656M
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-
2422MHz	Pass	500k	35.797M	36.035M
2437MHz	Pass	500k	35.217M	36.179M
2452MHz	Pass	500k	35.942M	36.035M

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

802.11b_Nss1,(1Mbps)_1TX

EBW

2412MHz

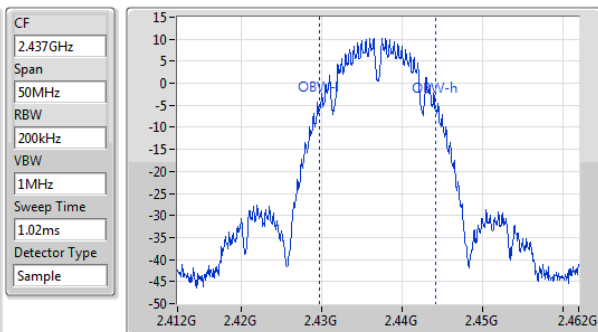
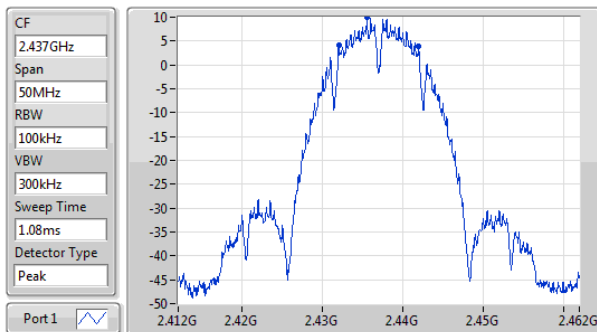


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
9.13M	2.407435G	2.416565G	14.544M	2.404692G	2.419236G	500k	1

802.11b_Nss1,(1Mbps)_1TX

EBW

2437MHz

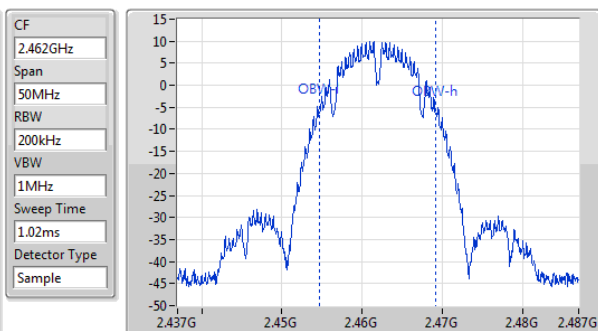
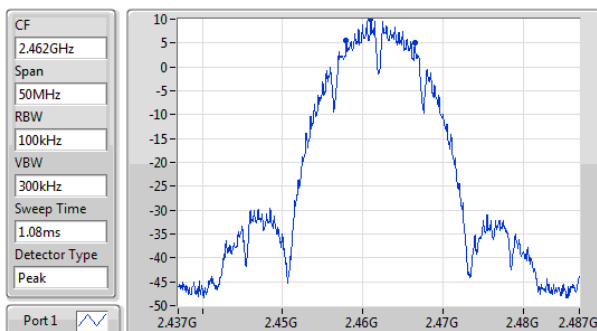


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
10M	2.432G	2.442G	14.472M	2.429692G	2.444164G	500k	1

802.11b_Nss1,(1Mbps)_1TX

EBW

2462MHz

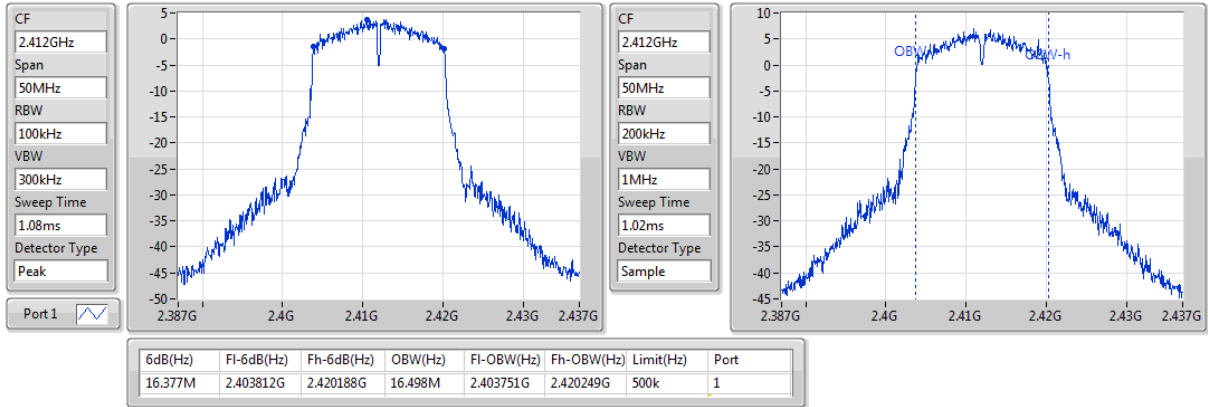


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.551M	2.457942G	2.466493G	14.472M	2.454692G	2.469164G	500k	1

802.11g_Nss1,(6Mbps)_1TX

EBW

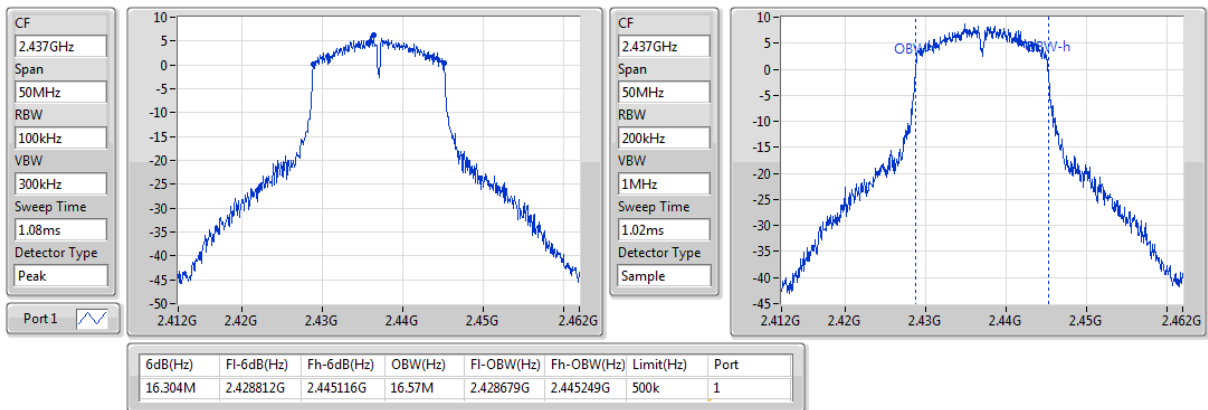
2412MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

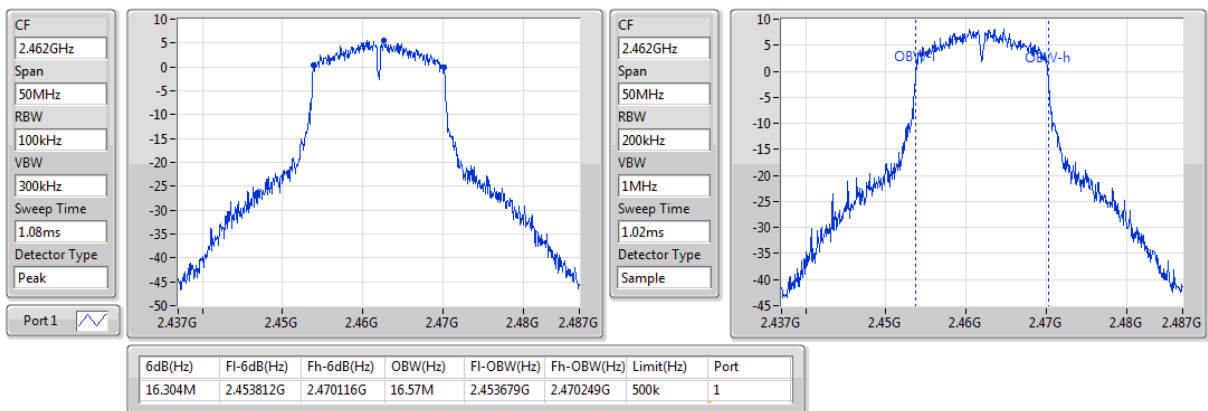
2437MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

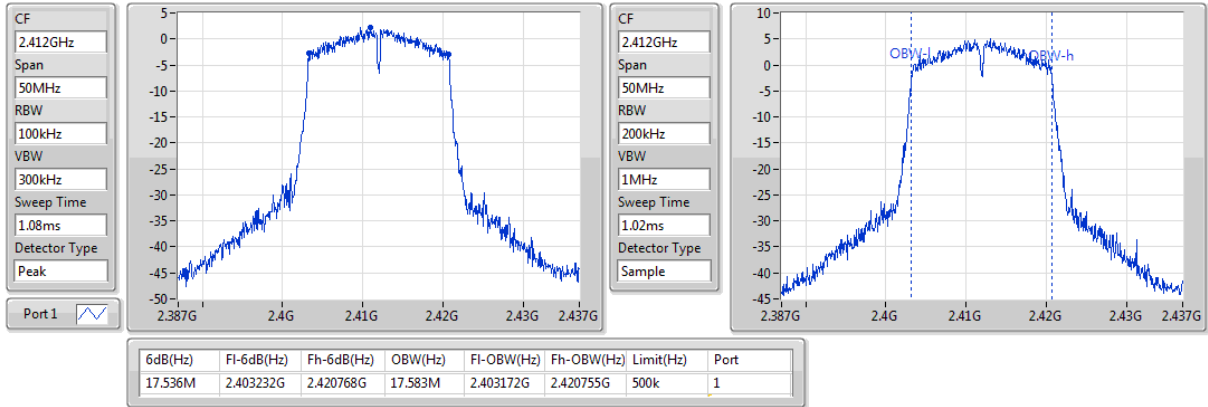
2462MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

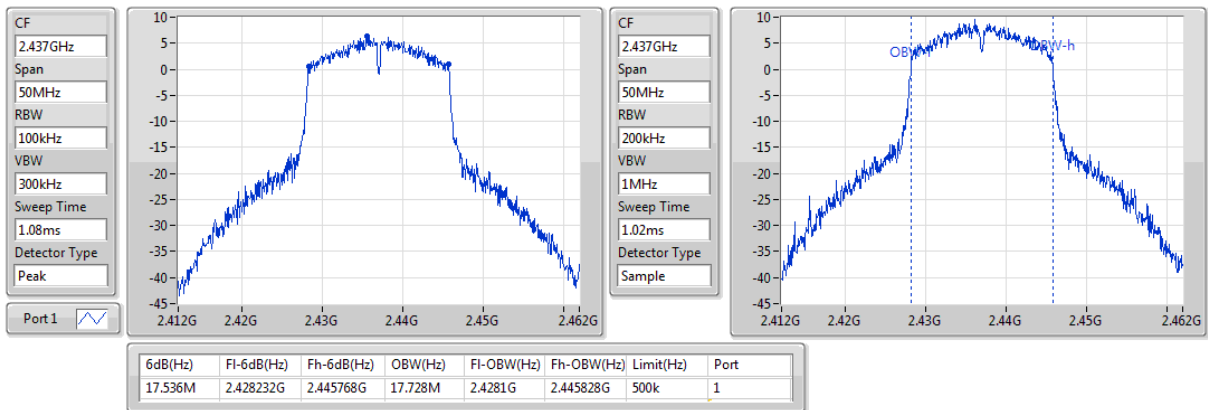
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

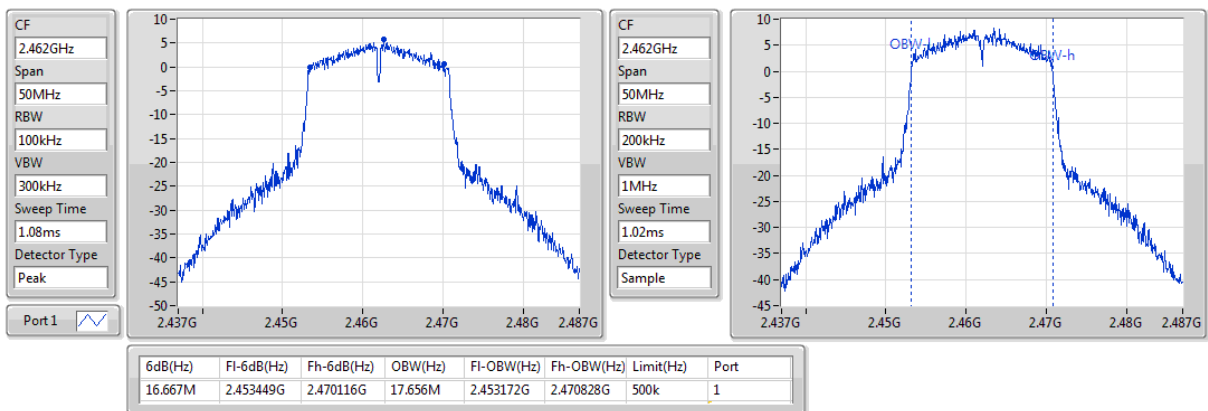
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

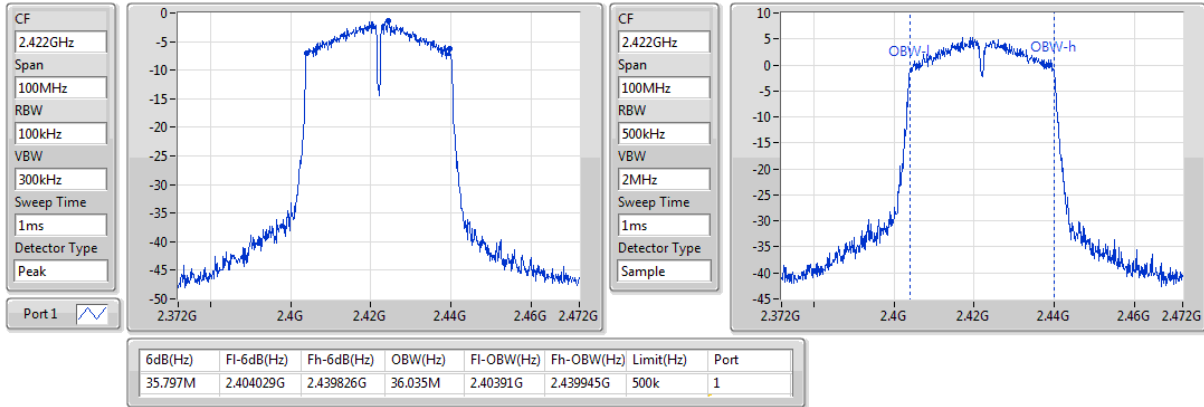
2462MHz



802.11n HT40_Nss1,(MCS0)_1TX

EBW

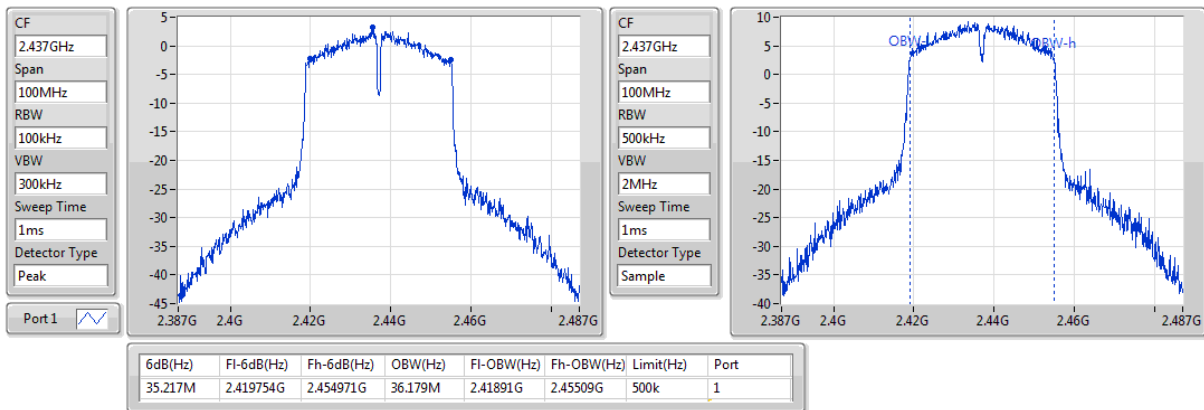
2422MHz



802.11n HT40_Nss1,(MCS0)_1TX

EBW

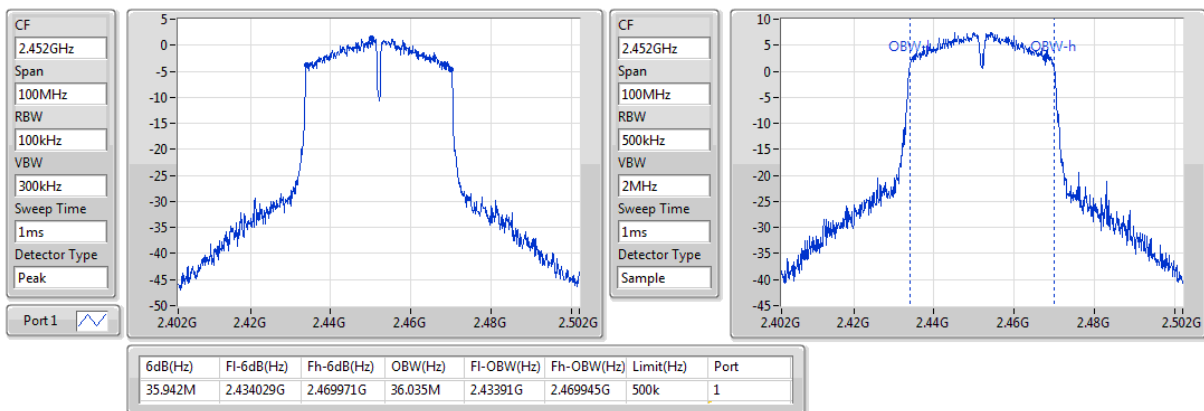
2437MHz



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.

Antenna gain $> 6\text{dBi}$

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

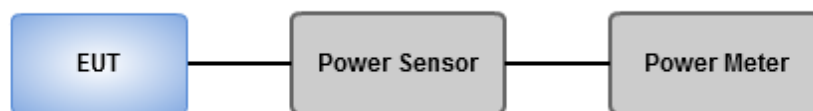
Fixed, point to point operations

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

Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	20.88	0.12246
802.11g_Nss1,(6Mbps)_1TX	24.82	0.30339
802.11n HT20_Nss1,(MCS0)_1TX	25.02	0.31769
802.11n HT40_Nss1,(MCS0)_1TX	24.46	0.27925

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	0.50	20.88	20.88	30.00	21.38	36.00
2437MHz	Pass	0.50	20.80	20.80	30.00	21.30	36.00
2462MHz	Pass	0.50	20.51	20.51	30.00	21.01	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	0.50	23.74	23.74	30.00	24.24	36.00
2437MHz	Pass	0.50	24.82	24.82	30.00	25.32	36.00
2462MHz	Pass	0.50	24.73	24.73	30.00	25.23	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	0.50	23.49	23.49	30.00	23.99	36.00
2437MHz	Pass	0.50	25.02	25.02	30.00	25.52	36.00
2462MHz	Pass	0.50	24.81	24.81	30.00	25.31	36.00
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2422MHz	Pass	0.50	22.91	22.91	30.00	23.41	36.00
2437MHz	Pass	0.50	24.46	24.46	30.00	24.96	36.00
2452MHz	Pass	0.50	24.01	24.01	30.00	24.51	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	18.95	0.07852
802.11g_Nss1,(6Mbps)_1TX	18.77	0.07534
802.11n HT20_Nss1,(MCS0)_1TX	18.93	0.07816
802.11n HT40_Nss1,(MCS0)_1TX	18.53	0.07129

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	0.50	18.95	18.95	-	19.45	-
2437MHz	Pass	0.50	18.94	18.94	-	19.44	-
2462MHz	Pass	0.50	18.54	18.54	-	19.04	-
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	0.50	15.63	15.63	-	16.13	-
2437MHz	Pass	0.50	18.77	18.77	-	19.27	-
2462MHz	Pass	0.50	18.41	18.41	-	18.91	-
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	0.50	15.11	15.11	-	15.61	-
2437MHz	Pass	0.50	18.93	18.93	-	19.43	-
2462MHz	Pass	0.50	18.69	18.69	-	19.19	-
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2422MHz	Pass	0.50	14.60	14.60	-	15.10	-
2437MHz	Pass	0.50	18.53	18.53	-	19.03	-
2452MHz	Pass	0.50	17.03	17.03	-	17.53	-

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.

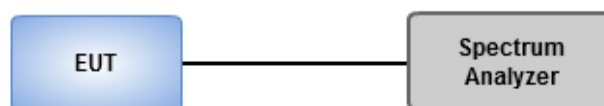
Average PSD, duty cycle $\geq 98\%$

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	-3.46
802.11g_Nss1,(6Mbps)_1TX	-5.00
802.11n HT20_Nss1,(MCS0)_1TX	-4.87
802.11n HT40_Nss1,(MCS0)_1TX	-7.77

Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	0.50	-3.46	-3.46	8.00
2437MHz	Pass	0.50	-4.13	-4.13	8.00
2462MHz	Pass	0.50	-4.90	-4.90	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	0.50	-6.85	-6.85	8.00
2437MHz	Pass	0.50	-5.33	-5.33	8.00
2462MHz	Pass	0.50	-5.00	-5.00	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	0.50	-9.21	-9.21	8.00
2437MHz	Pass	0.50	-5.23	-5.23	8.00
2462MHz	Pass	0.50	-4.87	-4.87	8.00
802.11n HT40_Nss1,(MCS0)_1TX	-	-	-	-	-
2422MHz	Pass	0.50	-12.62	-12.62	8.00
2437MHz	Pass	0.50	-7.77	-7.77	8.00
2452MHz	Pass	0.50	-10.42	-10.42	8.00

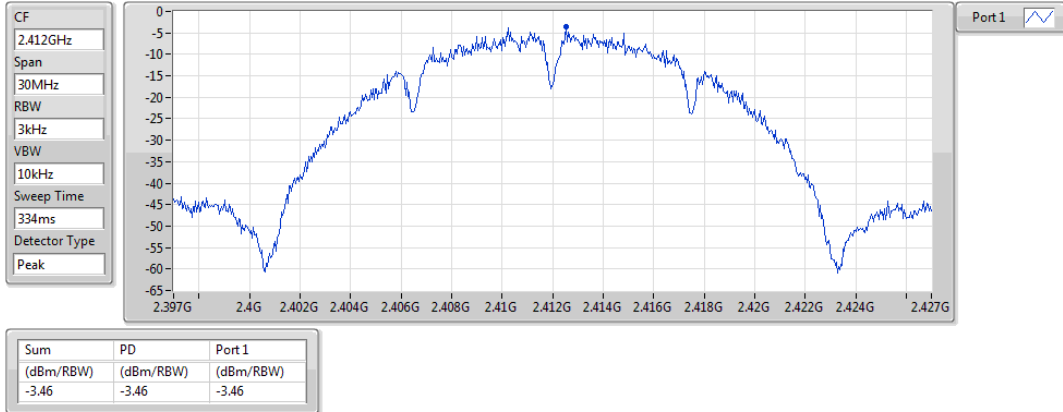
DG = Directional Gain;

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

802.11b_Nss1,(1Mbps)_1TX

PSD

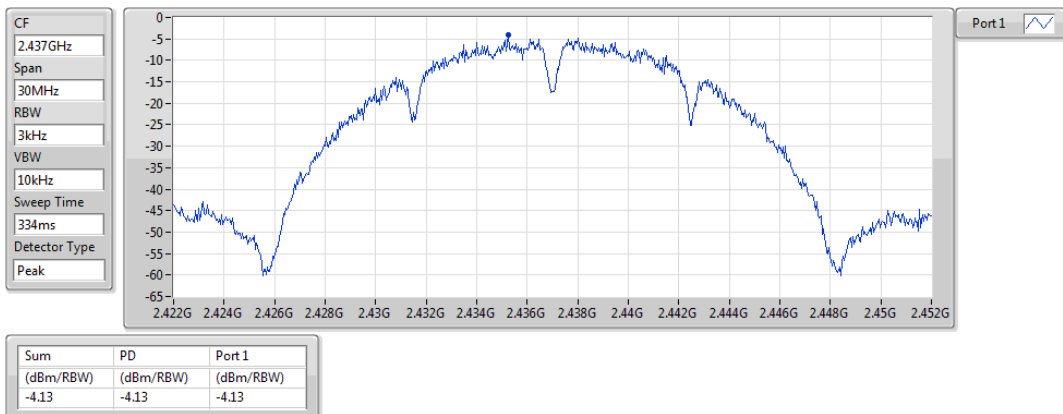
2412MHz



802.11b_Nss1,(1Mbps)_1TX

PSD

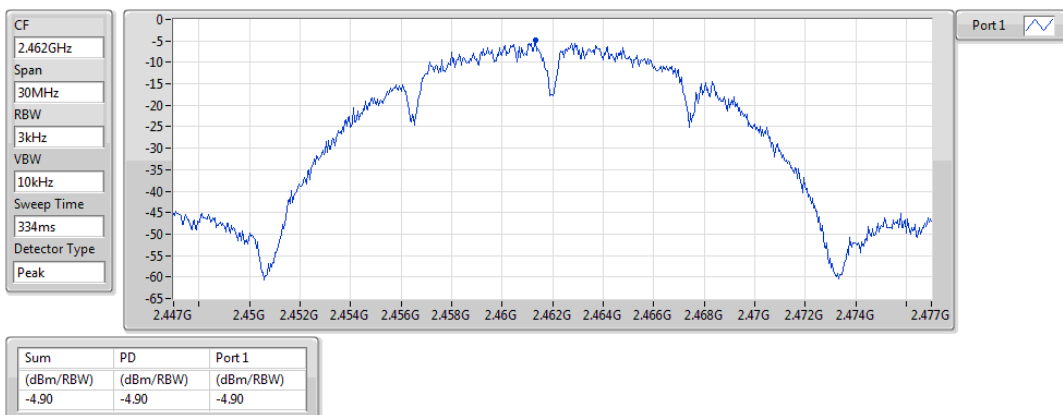
2437MHz



802.11b_Nss1,(1Mbps)_1TX

PSD

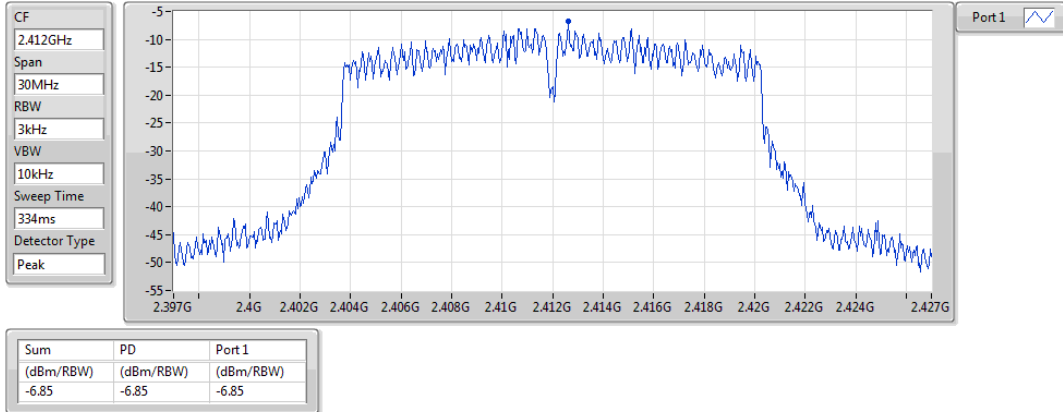
2462MHz



802.11g_Nss1,(6Mbps)_1TX

PSD

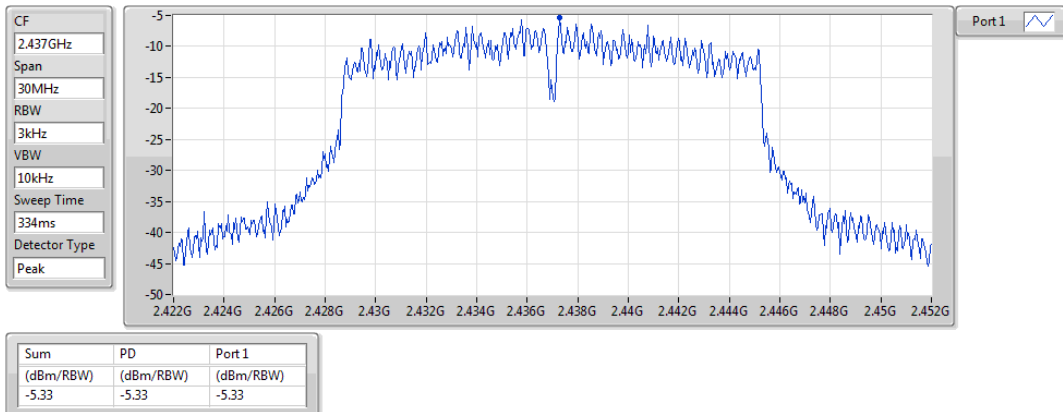
2412MHz



802.11g_Nss1,(6Mbps)_1TX

PSD

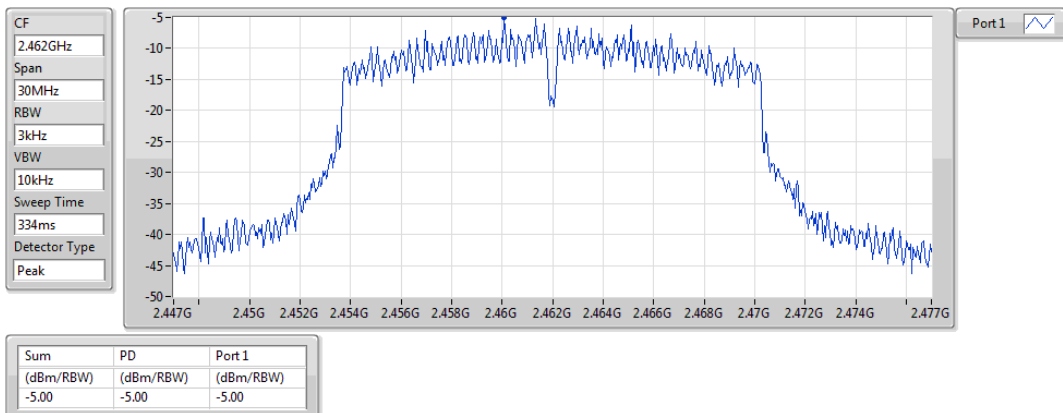
2437MHz



802.11g_Nss1,(6Mbps)_1TX

PSD

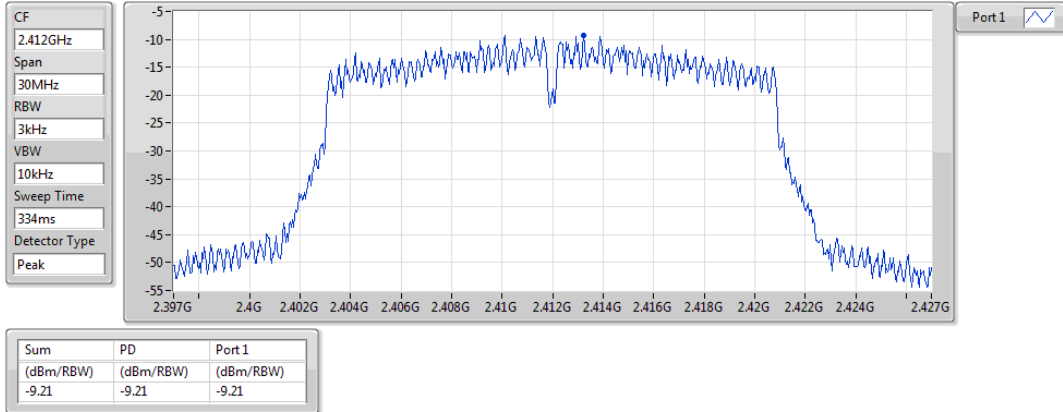
2462MHz



802.11n HT20_Nss1,(MCS0)_1TX

PSD

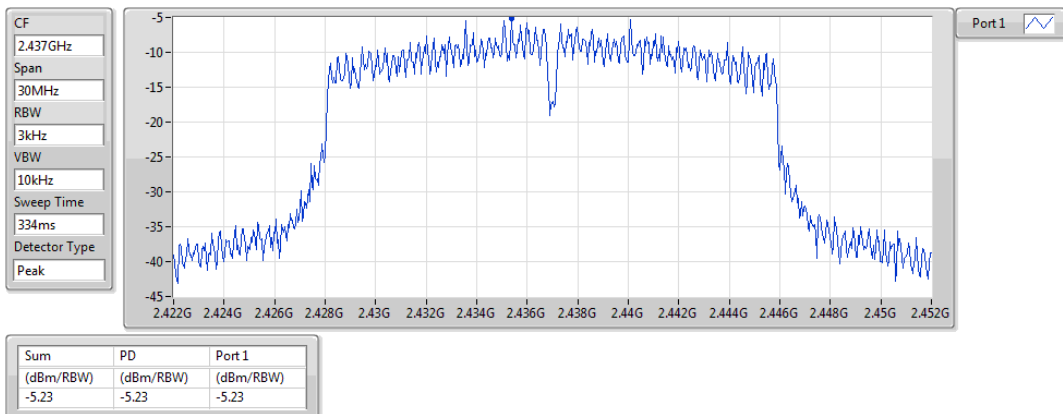
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

PSD

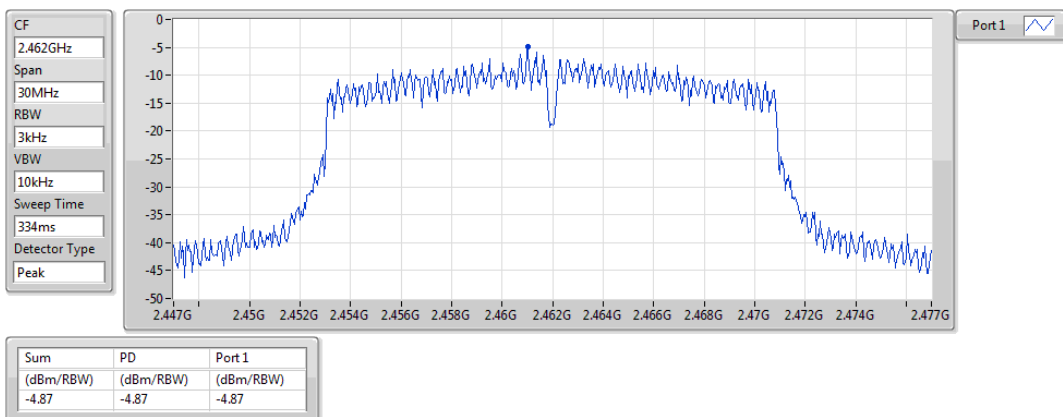
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

PSD

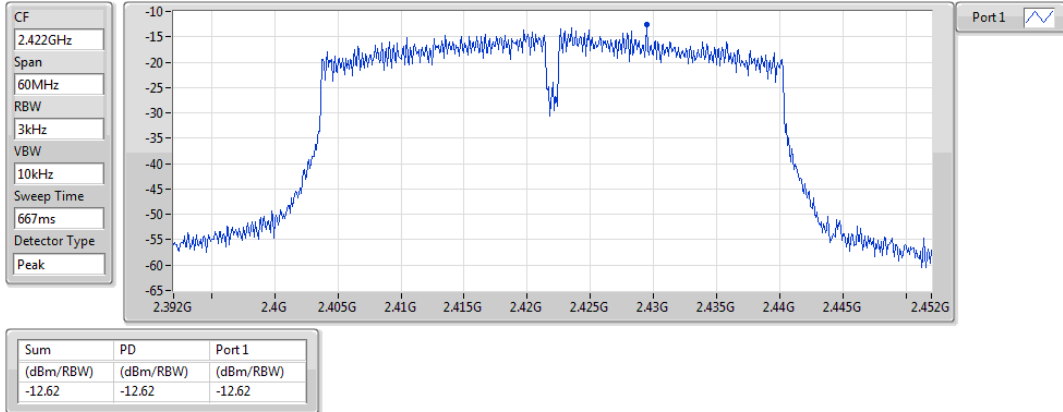
2462MHz



802.11n HT40_Nss1,(MCS0)_1TX

PSD

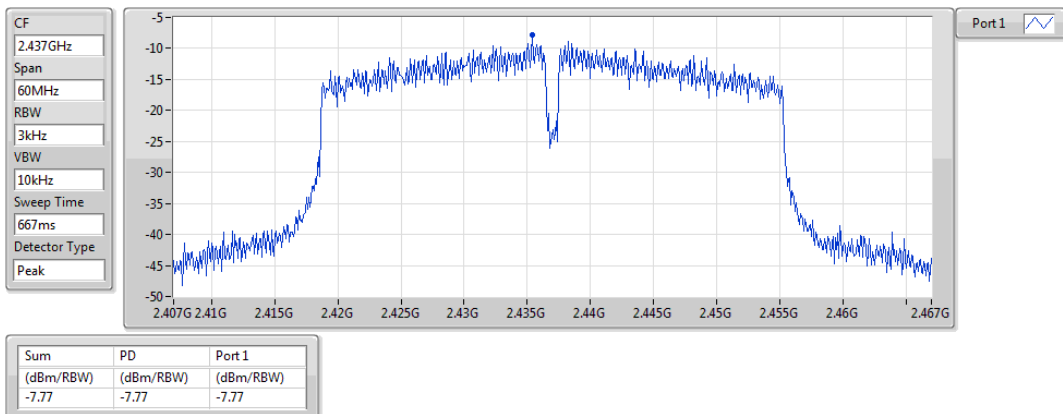
2422MHz



802.11n HT40_Nss1,(MCS0)_1TX

PSD

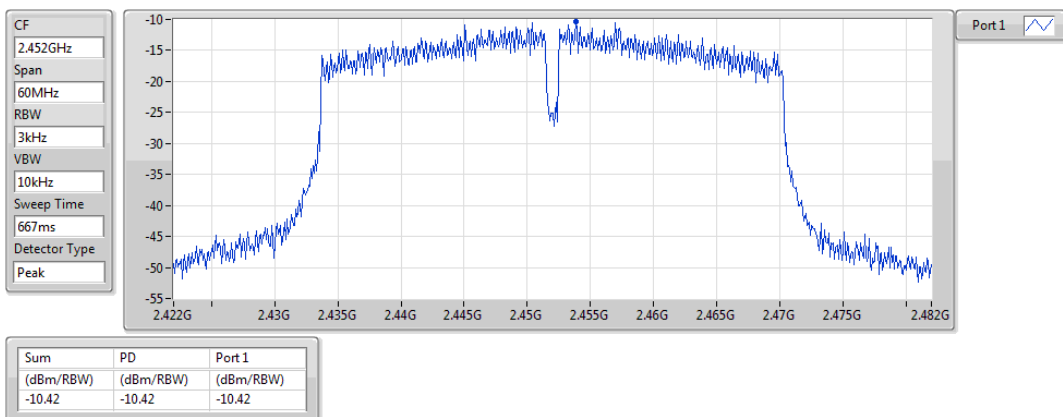
2437MHz



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:
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

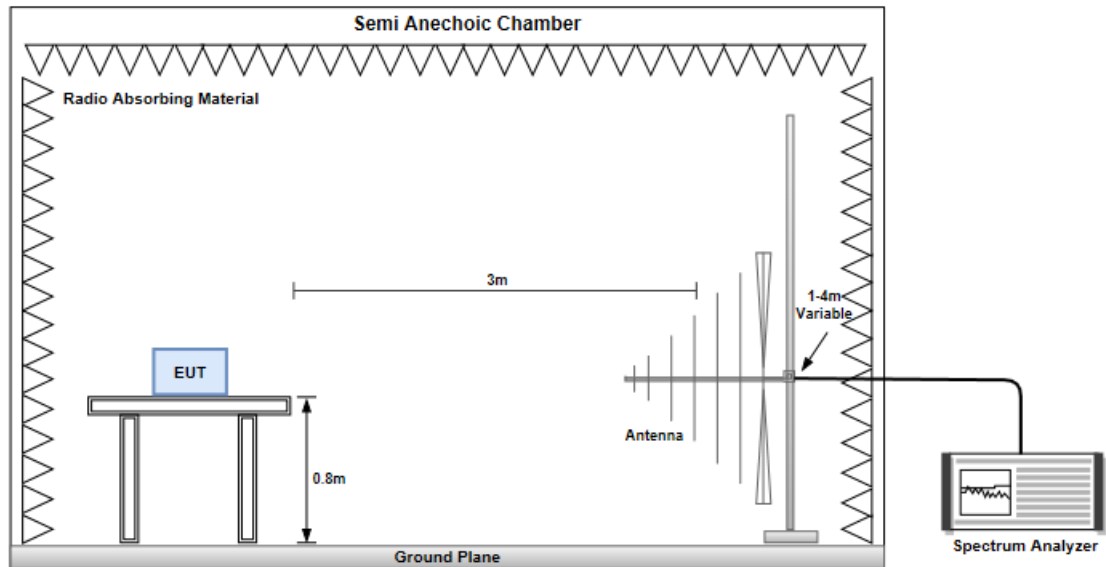
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

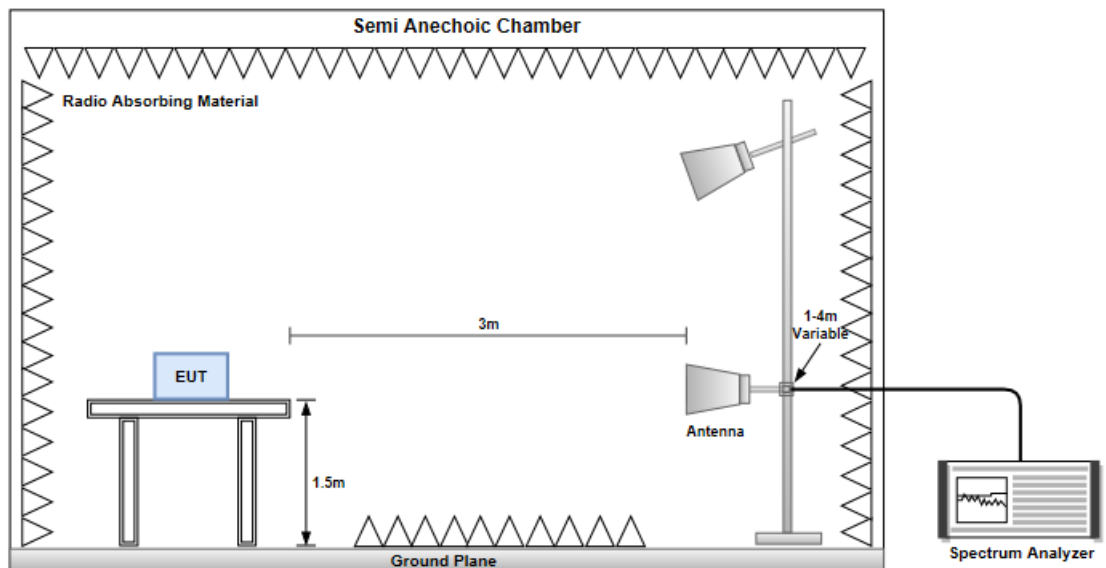
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

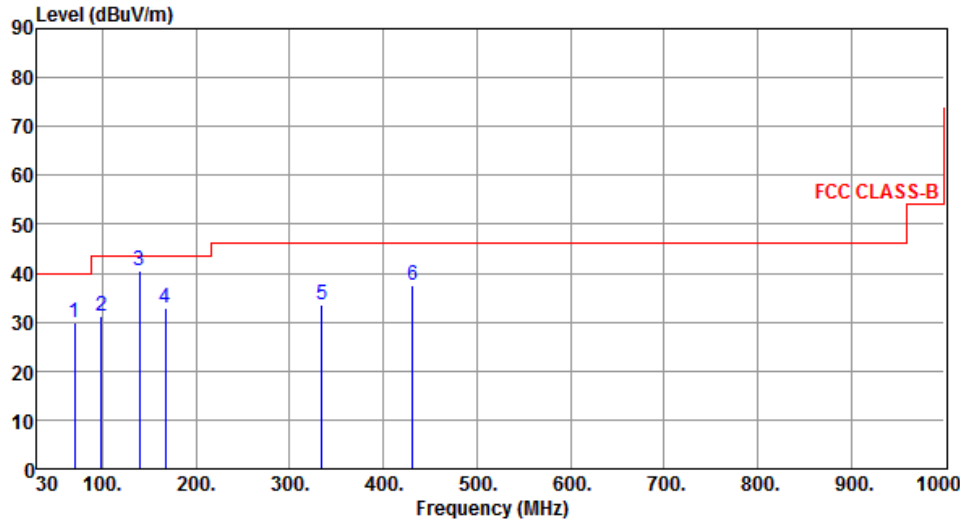


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

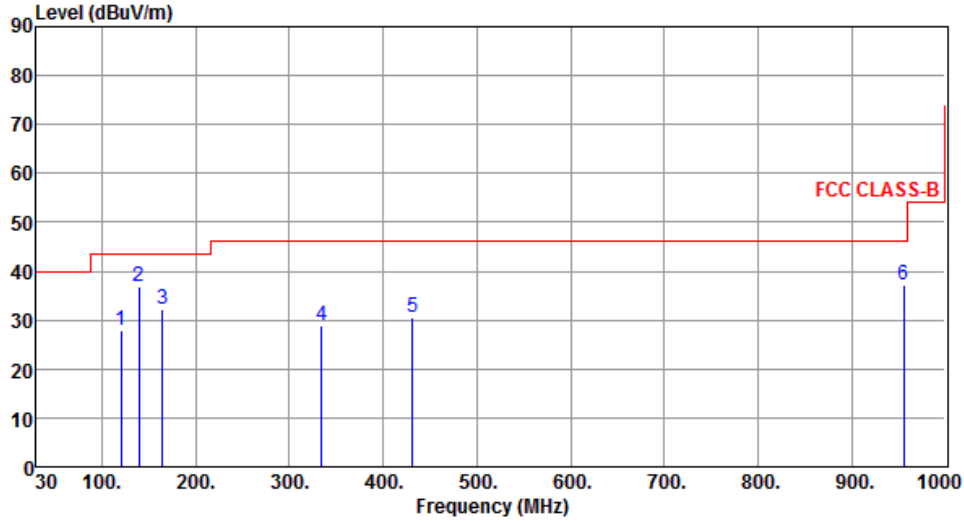


The graph displays the radiated unwanted emissions for a transmitter. The y-axis represents the Level in dBuV/m, ranging from 0 to 90. The x-axis represents the Frequency in MHz, ranging from 30 to 1000. A red line indicates the FCC CLASS-B limit, which is 40 dBuV/m from 30 MHz to 100 MHz, 45 dBuV/m from 100 MHz to 1000 MHz, and 55 dBuV/m from 1000 MHz to 10000 MHz. Six measured peaks are labeled with numbers 1 through 6, corresponding to the data in the table below.

	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	69.77	30.04	40.00	-9.96	40.85	-10.81	Peak	---	---
2	98.87	31.14	43.50	-12.36	44.48	-13.34	Peak	---	---
3	139.61	40.43	43.50	-3.07	49.19	-8.76	Peak	---	---
4	166.77	32.84	43.50	-10.66	41.27	-8.43	Peak	---	---
5	334.58	33.42	46.00	-12.58	40.41	-6.99	Peak	---	---
6	431.58	37.38	46.00	-8.62	41.91	-4.53	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		

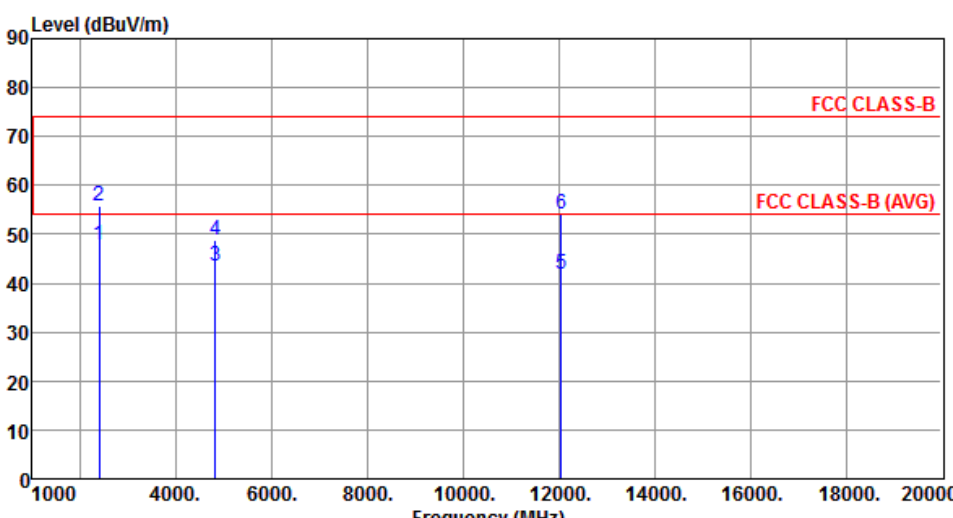


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	120.21	27.80	43.50	-15.70	38.53	-10.73	Peak	---	---
2	139.61	36.84	43.50	-6.66	45.60	-8.76	Peak	---	---
3	164.83	32.14	43.50	-11.36	40.56	-8.42	Peak	---	---
4	334.58	28.96	46.00	-17.04	35.95	-6.99	Peak	---	---
5	431.58	30.52	46.00	-15.48	35.05	-4.53	Peak	---	---
6	955.38	37.24	46.00	-8.76	33.15	4.09	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		



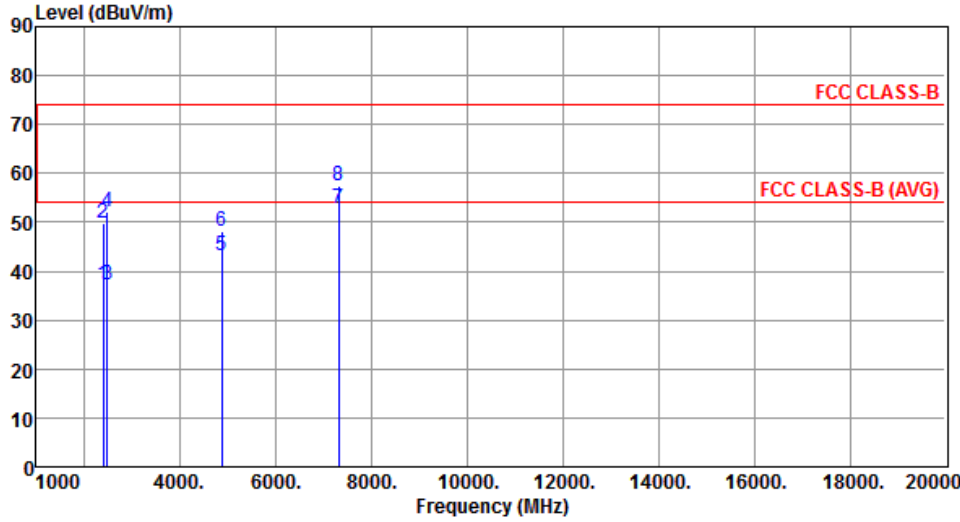
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	47.92	54.00	-6.08	51.29	-3.37	Average	123	144
2	2390.00	55.86	74.00	-18.14	59.23	-3.37	Peak	123	144
3	4824.00	43.61	54.00	-10.39	39.66	3.95	Average	100	237
4	4824.00	48.69	74.00	-25.31	44.74	3.95	Peak	100	237
5	12060.00	41.81	54.00	-12.19	28.45	13.36	Average	100	166
6	12060.00	54.12	74.00	-19.88	40.76	13.36	Peak	100	166

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

Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		
Level (dBuV/m)			

Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		
Level (dBuV/m) </			

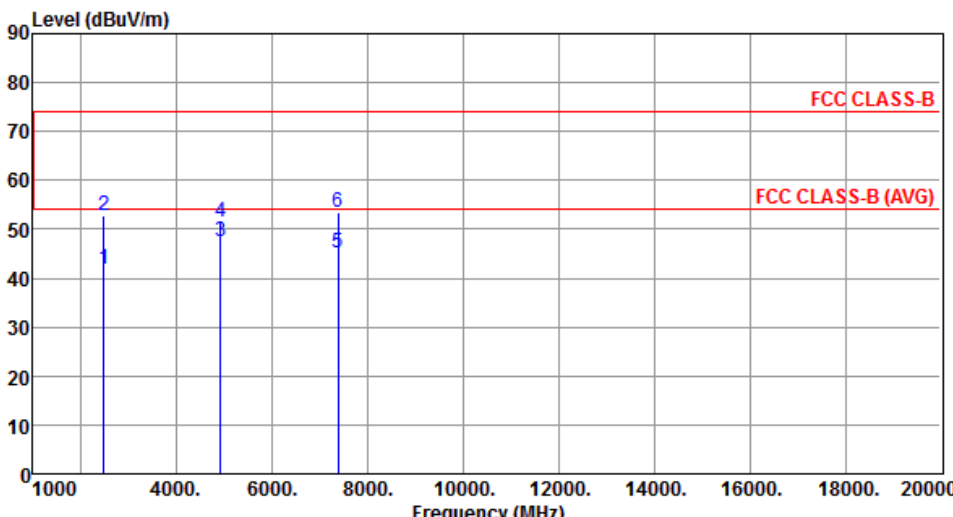
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	37.36	54.00	-16.64	40.73	-3.37	Average	118	177
2	2390.00	49.89	74.00	-24.11	53.26	-3.37	Peak	118	177
3	2483.50	37.20	54.00	-16.80	40.16	-2.96	Average	118	177
4	2483.50	52.24	74.00	-21.76	55.20	-2.96	Peak	118	177
5	4874.00	43.15	54.00	-10.85	39.05	4.10	Average	100	30
6	4874.00	48.28	74.00	-25.72	44.18	4.10	Peak	100	30
7	7311.00	52.68	54.00	-1.32	44.05	8.63	Average	100	156
8	7311.00	57.43	74.00	-16.57	48.80	8.63	Peak	100	156

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		



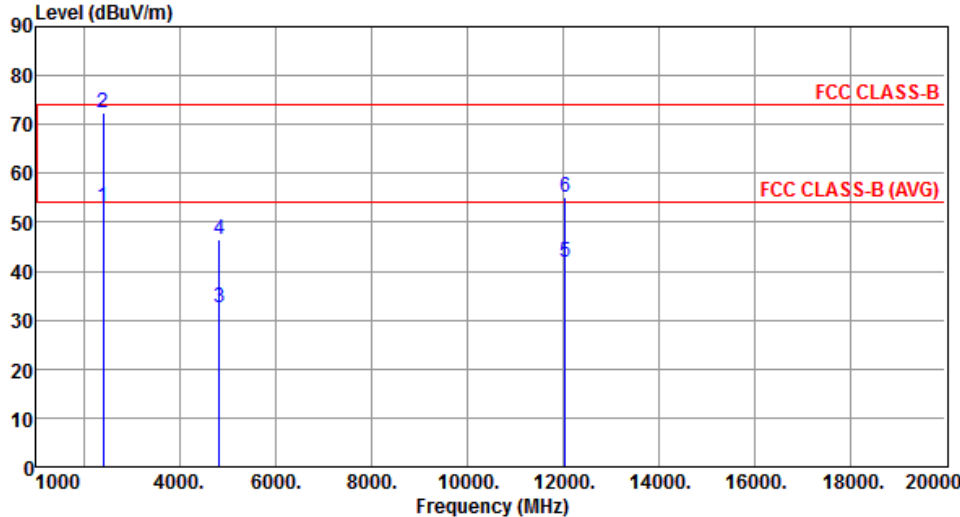
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	41.72	54.00	-12.28	44.68	-2.96	Average	137	140
2	2483.50	52.81	74.00	-21.19	55.77	-2.96	Peak	137	140
3	4924.00	47.65	54.00	-6.35	43.40	4.25	Average	242	105
4	4924.00	51.45	74.00	-22.55	47.20	4.25	Peak	242	105
5	7386.00	45.18	54.00	-8.82	36.42	8.76	Average	114	34
6	7386.00	53.39	74.00	-20.61	44.63	8.76	Peak	114	34

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		
Level (dBuV/m)			

3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g

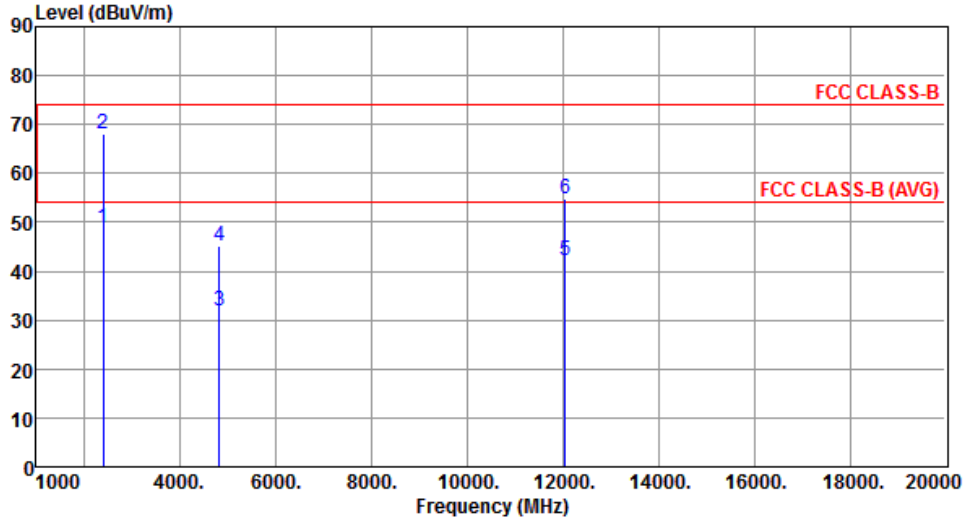
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		



	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	53.25	54.00	-0.75	56.62	-3.37	Average	124	145
2	2390.00	72.50	74.00	-1.50	75.87	-3.37	Peak	124	145
3	4824.00	32.52	54.00	-21.48	28.57	3.95	Average	100	236
4	4824.00	46.49	74.00	-27.51	42.54	3.95	Peak	100	236
5	12060.00	41.89	54.00	-12.11	28.53	13.36	Average	100	240
6	12060.00	55.22	74.00	-18.78	41.86	13.36	Peak	100	240

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

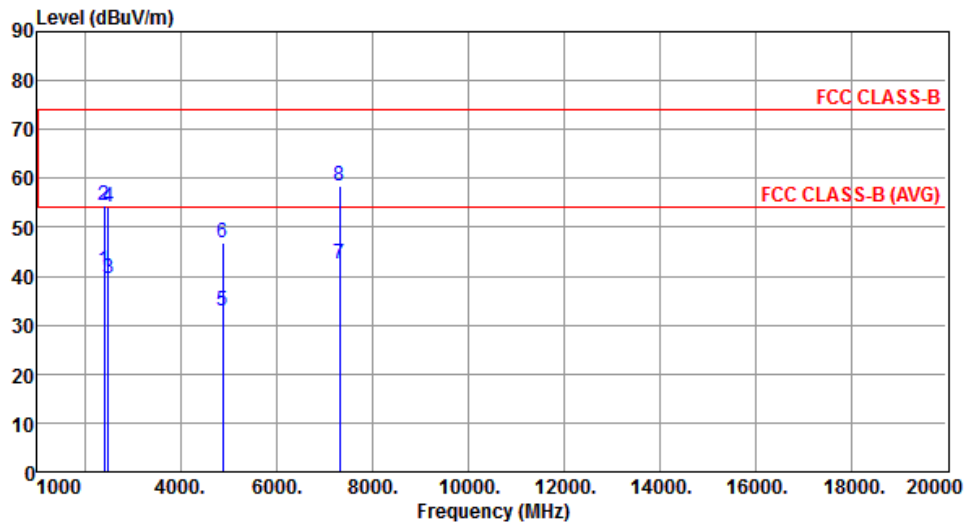
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	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	48.92	54.00	-5.08	52.29	-3.37	Average	116	177
2	2390.00	68.19	74.00	-5.81	71.56	-3.37	Peak	116	177
3	4824.00	31.93	54.00	-22.07	27.98	3.95	Average	100	34
4	4824.00	45.05	74.00	-28.95	41.10	3.95	Peak	100	34
5	12060.00	42.02	54.00	-11.98	28.66	13.36	Average	100	38
6	12060.00	54.64	74.00	-19.36	41.28	13.36	Peak	100	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	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



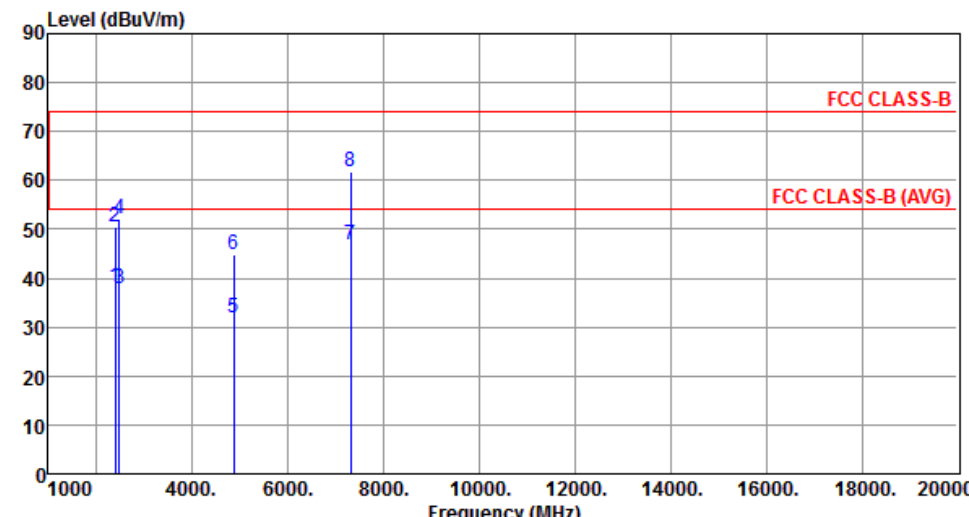
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	41.10	54.00	-12.90	44.47	-3.37	Average	100	235
2	2390.00	54.44	74.00	-19.56	57.81	-3.37	Peak	100	235
3	2483.50	39.40	54.00	-14.60	42.36	-2.96	Average	100	235
4	2483.50	54.27	74.00	-19.73	57.23	-2.96	Peak	100	235
5	4874.00	32.98	54.00	-21.02	28.88	4.10	Average	100	233
6	4874.00	46.95	74.00	-27.05	42.85	4.10	Peak	100	233
7	7311.00	42.52	54.00	-11.48	33.89	8.63	Average	100	45
8	7311.00	58.41	74.00	-15.59	49.78	8.63	Peak	100	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).

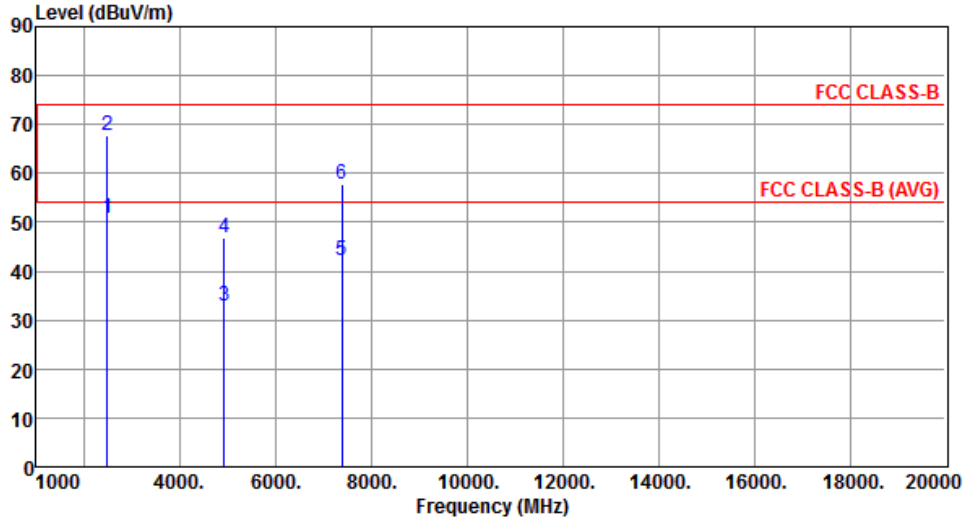
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	38.11	54.00	-15.89	41.48	-3.37	Average	111	179
2	2390.00	50.55	74.00	-23.45	53.92	-3.37	Peak	111	179
3	2483.50	37.81	54.00	-16.19	40.77	-2.96	Average	111	179
4	2483.50	52.07	74.00	-21.93	55.03	-2.96	Peak	111	179
5	4874.00	31.95	54.00	-22.05	27.85	4.10	Average	100	35
6	4874.00	44.90	74.00	-29.10	40.80	4.10	Peak	100	35
7	7311.00	46.85	54.00	-7.15	38.22	8.63	Average	100	6
8	7311.00	61.62	74.00	-12.38	52.99	8.63	Peak	100	6

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

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	50.84	54.00	-3.16	53.80	-2.96	Average	136	139
2	2483.50	67.74	74.00	-6.26	70.70	-2.96	Peak	136	139
3	4924.00	32.79	54.00	-21.21	28.54	4.25	Average	100	231
4	4924.00	46.81	74.00	-27.19	42.56	4.25	Peak	100	231
5	7386.00	42.34	54.00	-11.66	33.58	8.76	Average	100	43
6	7386.00	57.87	74.00	-16.13	49.11	8.76	Peak	100	43

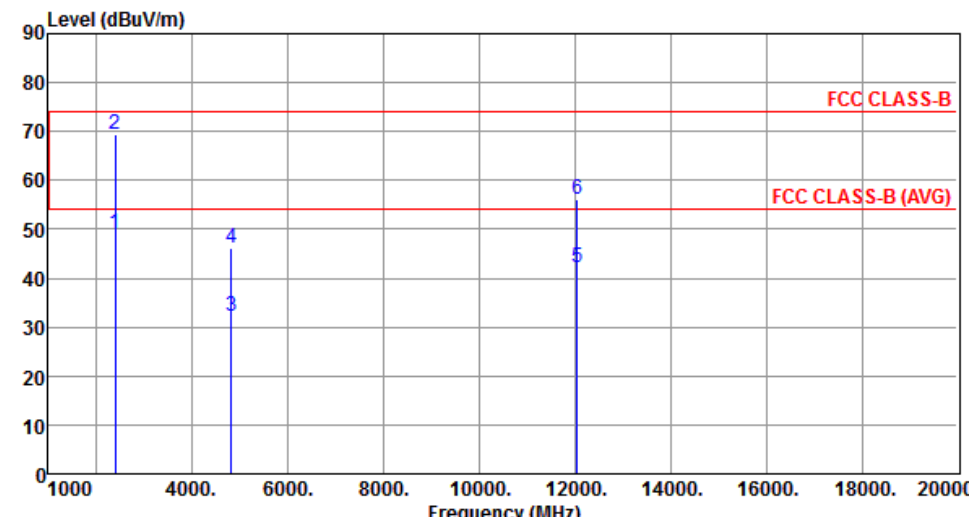
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical		
Level (dBuV/m) </			

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

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		

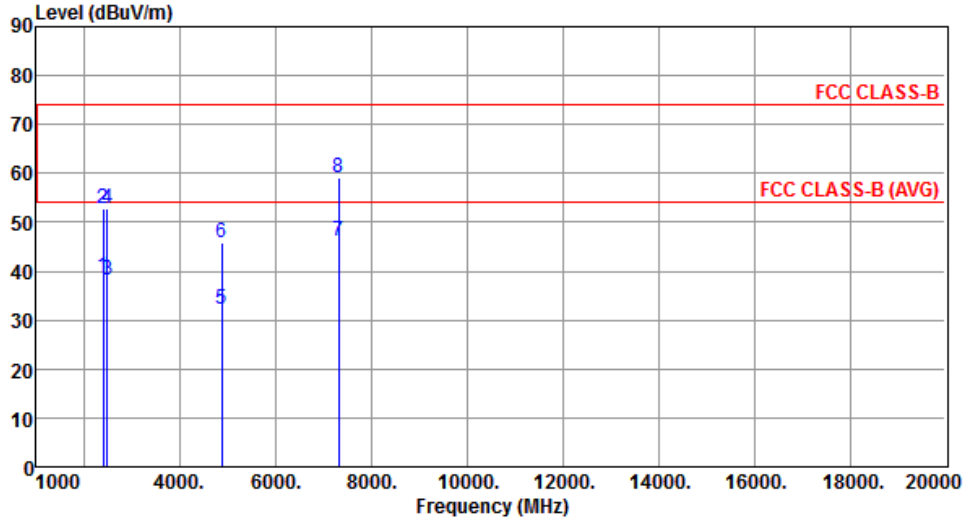


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.00	54.00	-5.00	52.37	-3.37	Average	100	180
2	2390.00	69.47	74.00	-4.53	72.84	-3.37	Peak	100	180
3	4824.00	32.35	54.00	-21.65	28.40	3.95	Average	100	46
4	4824.00	46.26	74.00	-27.74	42.31	3.95	Peak	100	46
5	12060.00	42.05	54.00	-11.95	28.69	13.36	Average	100	51
6	12060.00	55.96	74.00	-18.04	42.60	13.36	Peak	100	51

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

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		
Level (dBUV/m) </			

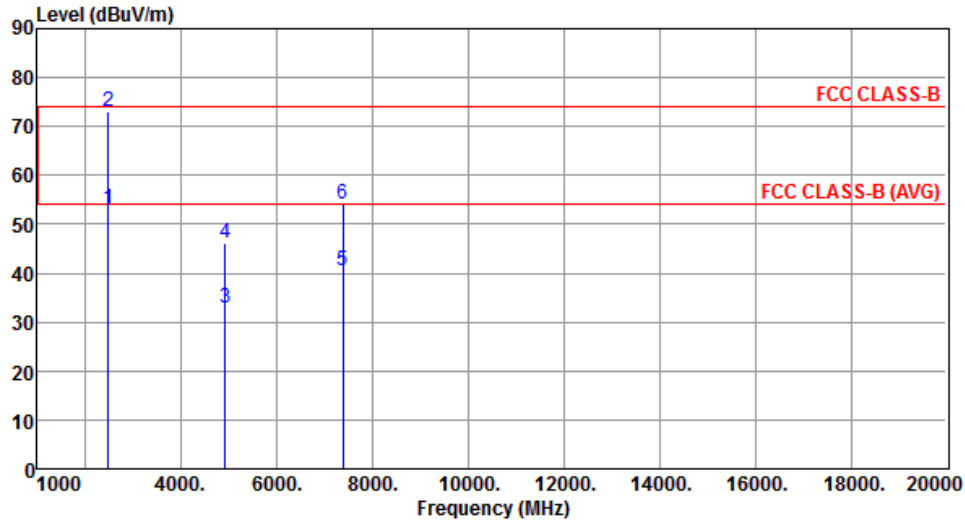
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	38.93	54.00	-15.07	42.30	-3.37	Average	100	182
2	2390.00	52.83	74.00	-21.17	56.20	-3.37	Peak	100	182
3	2483.50	38.13	54.00	-15.87	41.09	-2.96	Average	100	182
4	2483.50	52.77	74.00	-21.23	55.73	-2.96	Peak	100	182
5	4874.00	32.05	54.00	-21.95	27.95	4.10	Average	100	42
6	4874.00	45.79	74.00	-28.21	41.69	4.10	Peak	100	42
7	7311.00	46.04	54.00	-7.96	37.41	8.63	Average	100	5
8	7311.00	58.98	74.00	-15.02	50.35	8.63	Peak	100	5

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	53.00	54.00	-1.00	55.96	-2.96	Average	100	234
2	2483.50	72.93	74.00	-1.07	75.89	-2.96	Peak	100	234
3	4924.00	32.94	54.00	-21.06	28.69	4.25	Average	100	236
4	4924.00	46.13	74.00	-27.87	41.88	4.25	Peak	100	236
5	7386.00	40.52	54.00	-13.48	31.76	8.76	Average	100	238
6	7386.00	54.17	74.00	-19.83	45.41	8.76	Peak	100	238

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

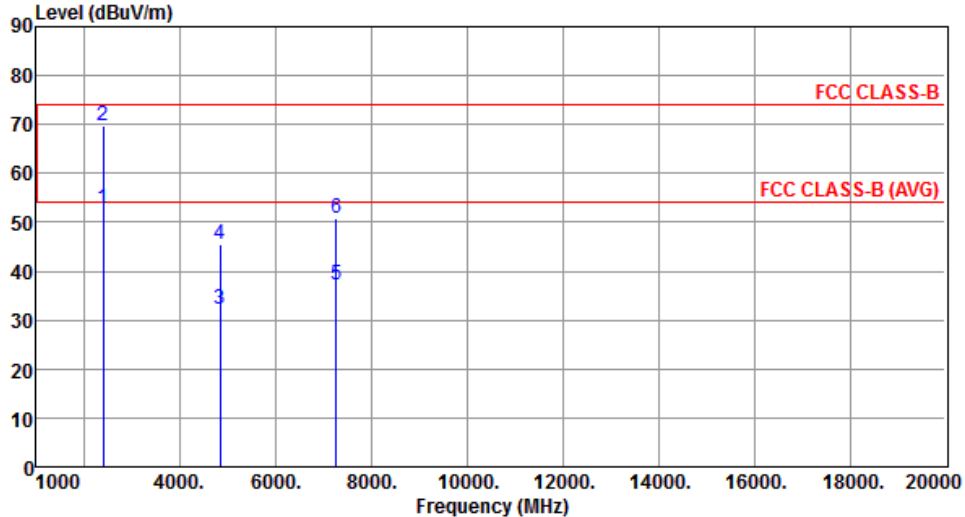
*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT20		Test Freq. (MHz)		2462	
Polarization	Vertical					
Level (dBuV/m)						

3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40

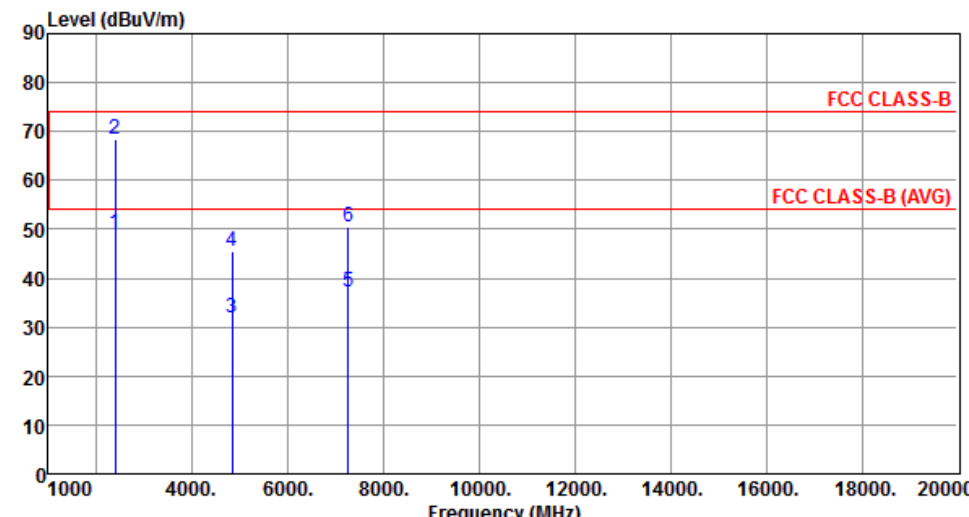
Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Horizontal		



	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	52.84	54.00	-1.16	56.21	-3.37	Average	100	144
2	2390.00	69.68	74.00	-4.32	73.05	-3.37	Peak	100	144
3	4844.00	32.12	54.00	-21.88	28.10	4.02	Average	100	248
4	4844.00	45.55	74.00	-28.45	41.53	4.02	Peak	100	248
5	7266.00	37.12	54.00	-16.88	28.58	8.54	Average	100	39
6	7266.00	50.88	74.00	-23.12	42.34	8.54	Peak	100	39

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).

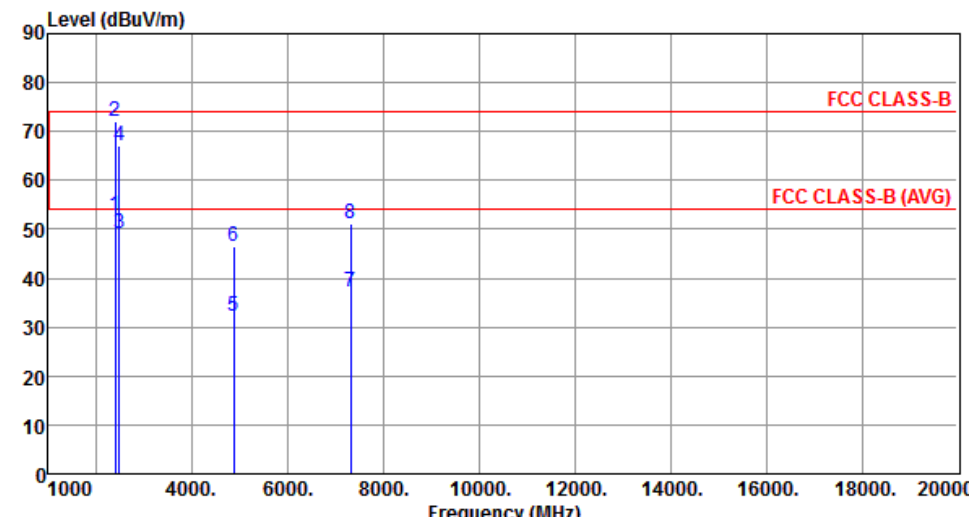
Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		



	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	49.24	54.00	-4.76	52.61	-3.37	Average	100	179
2	2390.00	68.57	74.00	-5.43	71.94	-3.37	Peak	100	179
3	4844.00	31.97	54.00	-22.03	27.95	4.02	Average	100	39
4	4844.00	45.36	74.00	-28.64	41.34	4.02	Peak	100	39
5	7266.00	37.22	54.00	-16.78	28.68	8.54	Average	100	6
6	7266.00	50.64	74.00	-23.36	42.10	8.54	Peak	100	6

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

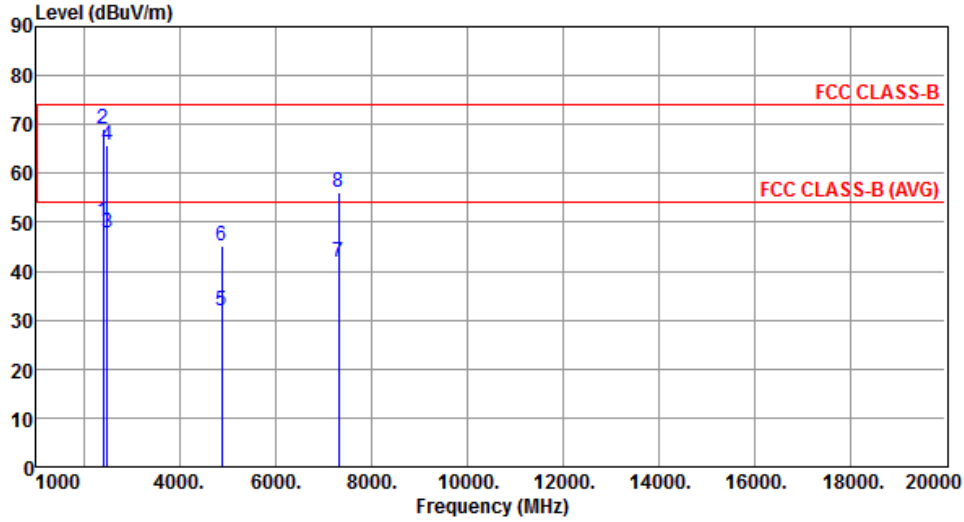
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



	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	52.71	54.00	-1.29	56.08	-3.37	Average	100	143
2	2390.00	72.18	74.00	-1.82	75.55	-3.37	Peak	100	143
3	2483.50	49.24	54.00	-4.76	52.20	-2.96	Average	100	143
4	2483.50	66.98	74.00	-7.02	69.94	-2.96	Peak	100	143
5	4874.00	32.14	54.00	-21.86	28.04	4.10	Average	100	241
6	4874.00	46.64	74.00	-27.36	42.54	4.10	Peak	100	241
7	7311.00	37.27	54.00	-16.73	28.64	8.63	Average	100	44
8	7311.00	51.21	74.00	-22.79	42.58	8.63	Peak	100	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).

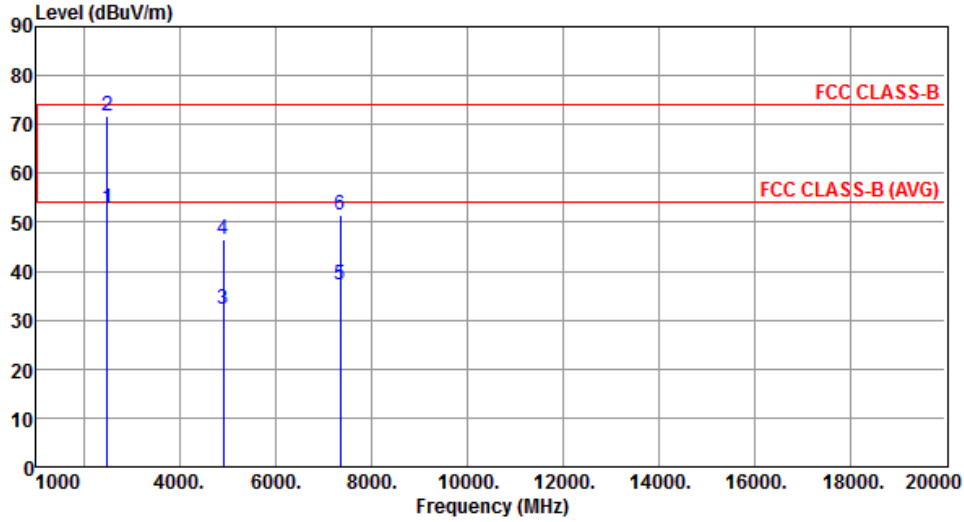
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	50.17	54.00	-3.83	53.54	-3.37	Average	100	180
2	2390.00	68.99	74.00	-5.01	72.36	-3.37	Peak	100	180
3	2483.50	47.82	54.00	-6.18	50.78	-2.96	Average	100	180
4	2483.50	65.77	74.00	-8.23	68.73	-2.96	Peak	100	180
5	4874.00	31.96	54.00	-22.04	27.86	4.10	Average	100	34
6	4874.00	45.31	74.00	-28.69	41.21	4.10	Peak	100	34
7	7311.00	41.73	54.00	-12.27	33.10	8.63	Average	100	1
8	7311.00	56.17	74.00	-17.83	47.54	8.63	Peak	100	1

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).

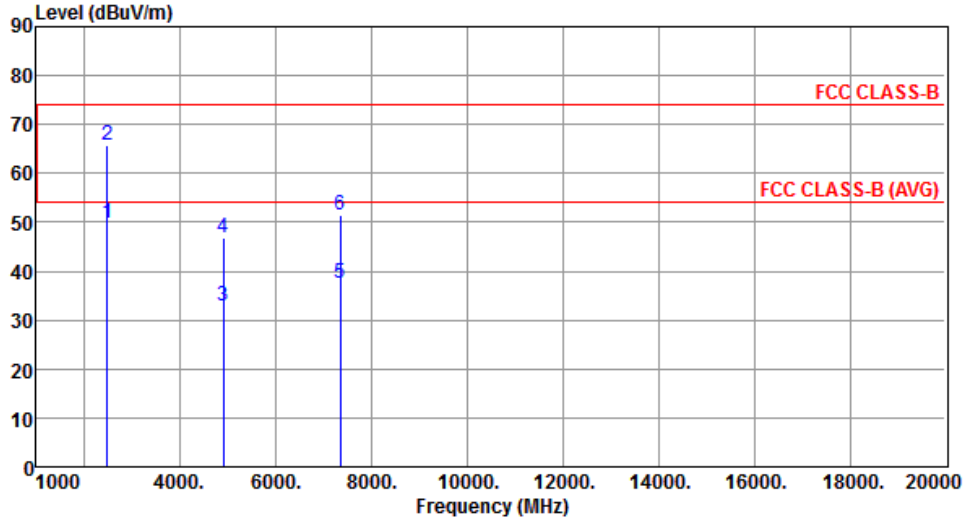
Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



	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	52.92	54.00	-1.08	55.88	-2.96	Average	124	145
2	2483.50	71.73	74.00	-2.27	74.69	-2.96	Peak	124	145
3	4904.00	32.08	54.00	-21.92	27.88	4.20	Average	100	243
4	4904.00	46.33	74.00	-27.67	42.13	4.20	Peak	100	243
5	7356.00	37.15	54.00	-16.85	28.43	8.72	Average	100	42
6	7356.00	51.31	74.00	-22.69	42.59	8.72	Peak	100	42

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	49.79	54.00	-4.21	52.75	-2.96	Average	100	177
2	2483.50	65.72	74.00	-8.28	68.68	-2.96	Peak	100	177
3	4904.00	32.83	54.00	-21.17	28.63	4.20	Average	100	38
4	4904.00	46.69	74.00	-27.31	42.49	4.20	Peak	100	38
5	7356.00	37.41	54.00	-16.59	28.69	8.72	Average	100	5
6	7356.00	51.45	74.00	-22.55	42.73	8.72	Peak	100	5

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

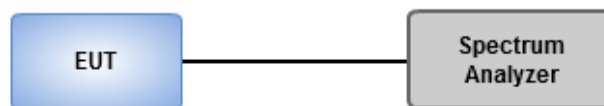
Reference level measurement

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

Summary

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1 (1Mbps)_1TX	Pass	2.4113 6G	9.84	-10.16	2.1852 5G	-35.63	2.3970 4G	-27.04	2.5185 4G	-33.61	24.921 33G	-35.64	1
802.11g_Nss1 (6Mbps)_1TX	Pass	2.4108 6G	3.97	-16.03	2.1351 6G	-35.20	2.3992 G	-25.11	2.5158 2G	-34.05	24.845 47G	-36.31	1
802.11n HT20_Nss1 (MCS0)_1TX	Pass	2.4108 6G	2.15	-17.85	1.9790 5G	-35.12	2.3997 6G	-28.10	2.5220 6G	-34.36	24.699 38G	-34.93	1
802.11n HT40_Nss1 (MCS0)_1TX	Pass	2.4242 2G	-1.60	-21.60	2.0955 8G	-35.37	2.3995 2G	-31.23	2.5129 4G	-35.39	15.315 85G	-35.98	1

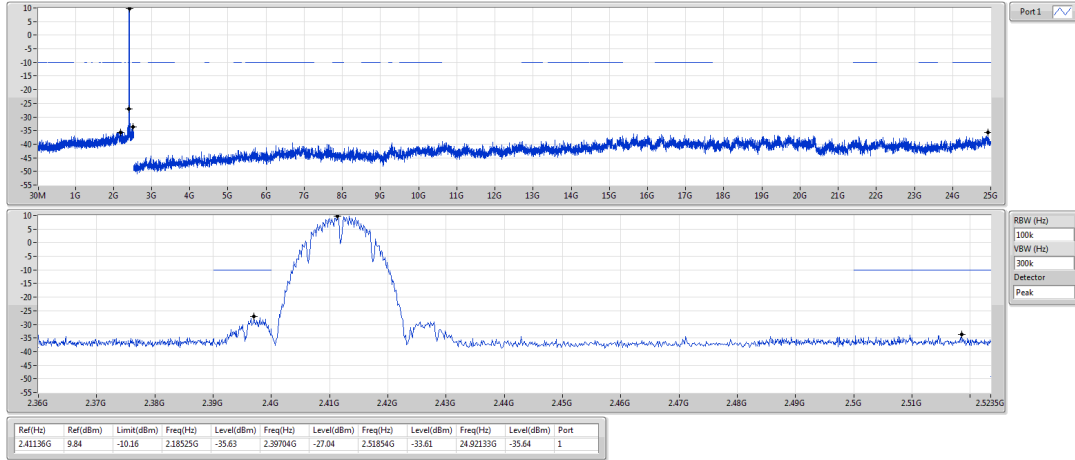
Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
802.11b_Nss1 (1Mbps)_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.4113 6G	9.84	-10.16	2.1852 5G	-35.63	2.3970 4G	-27.04	2.5185 4G	-33.61	24.921 33G	-35.64	1
2437MHz	Pass	2.4364 1G	10.33	-9.67	2.1235 1G	-34.62	2.3975 2G	-35.00	2.5190 2G	-34.02	16.950 6G	-35.44	1
2462MHz	Pass	2.4624 6G	9.94	-10.06	2.0897 2G	-34.31	2.3966 4G	-33.93	2.5020 6G	-34.34	16.742 7G	-36.33	1
802.11g_Nss1 (6Mbps)_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.4108 6G	3.97	-16.03	2.1351 6G	-35.20	2.3992 G	-25.11	2.5158 2G	-34.05	24.845 47G	-36.31	1
2437MHz	Pass	2.4357 4G	5.59	-14.41	1.9976 9G	-35.68	2.3982 4G	-34.73	2.5077 4G	-32.88	16.371 83G	-35.90	1
2462MHz	Pass	2.4609 6G	6.18	-13.82	2.0967 1G	-34.81	2.3986 4G	-35.39	2.5009 4G	-34.55	16.357 79G	-35.54	1
802.11n HT20_Nss1 (MCS0)_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.4108 6G	2.15	-17.85	1.9790 5G	-35.12	2.3997 6G	-28.10	2.5220 6G	-34.36	24.699 38G	-34.93	1
2437MHz	Pass	2.4394 1G	6.21	-13.79	2.1072 G	-35.54	2.3962 4G	-34.32	2.5219 8G	-34.44	24.783 66G	-36.25	1
2462MHz	Pass	2.4604 5G	5.60	-14.40	2.1223 4G	-35.45	2.3952 G	-34.56	2.5181 4G	-34.49	15.239 58G	-35.28	1
802.11n HT40 Nss1(MCS0)_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.4242 2G	-1.60	-21.60	2.0955 8G	-35.37	2.3995 2G	-31.23	2.5129 4G	-35.39	15.315 85G	-35.98	1
2437MHz	Pass	2.4354 G	2.84	-17.16	2.1150 5G	-34.87	2.3993 6G	-30.99	2.5025 4G	-34.63	16.676 06G	-36.08	1
2452MHz	Pass	2.4509 4G	1.40	-18.60	2.1425 3G	-35.80	2.3913 6G	-36.03	2.5001 4G	-35.04	16.336 71G	-35.72	1

802.11b_Nss1,(1Mbps)_1TX

CSE NdB

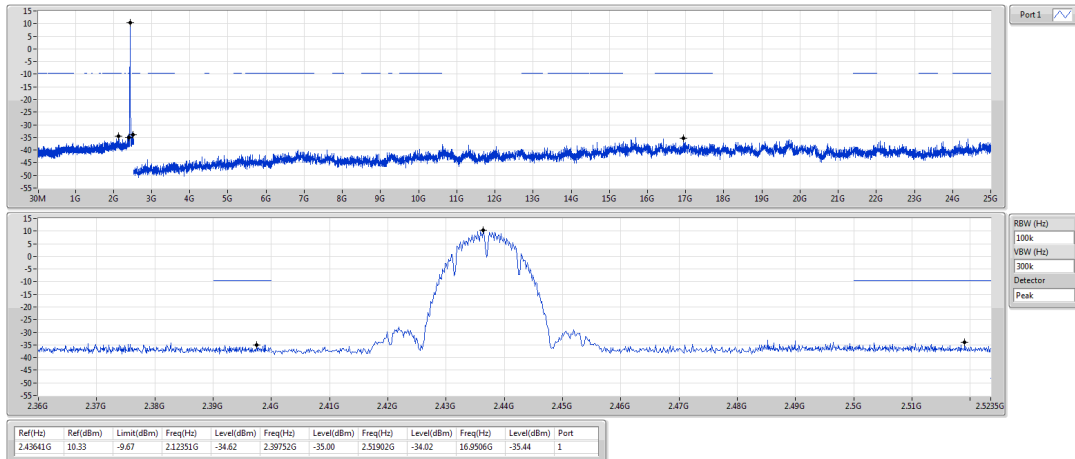
2412MHz



802.11b_Nss1,(1Mbps)_1TX

CSE NdB

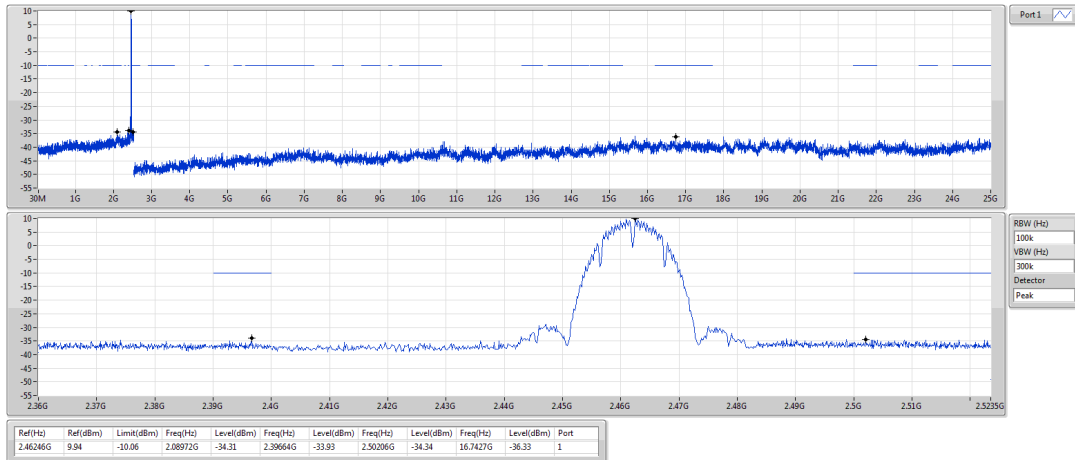
2437MHz



802.11b_Nss1,(1Mbps)_1TX

CSE NdB

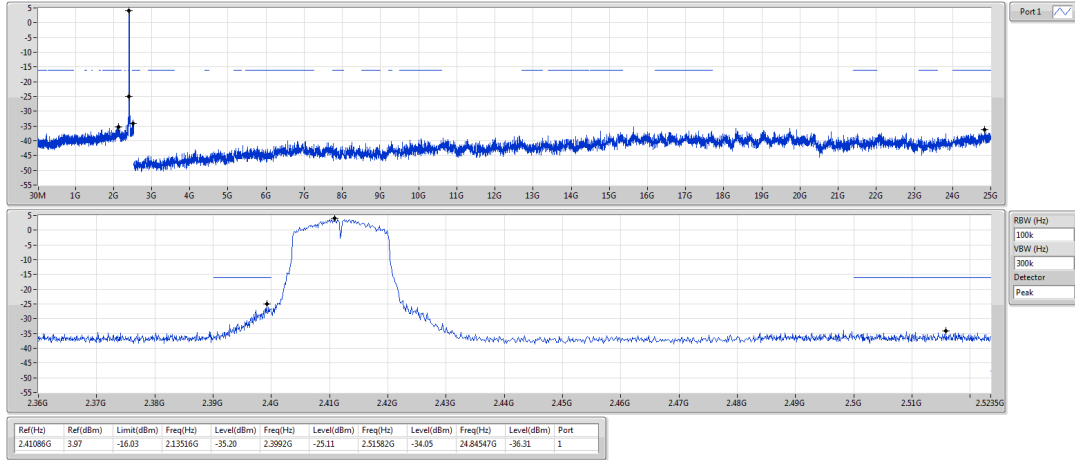
2462MHz



802.11g_Nss1,(6Mbps)_1TX

CSE NdB

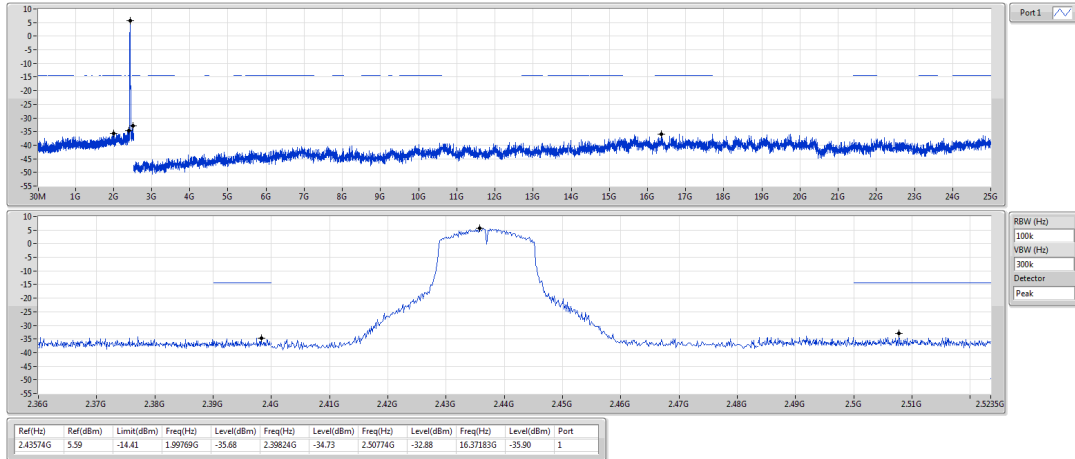
2412MHz



802.11g_Nss1,(6Mbps)_1TX

CSE NdB

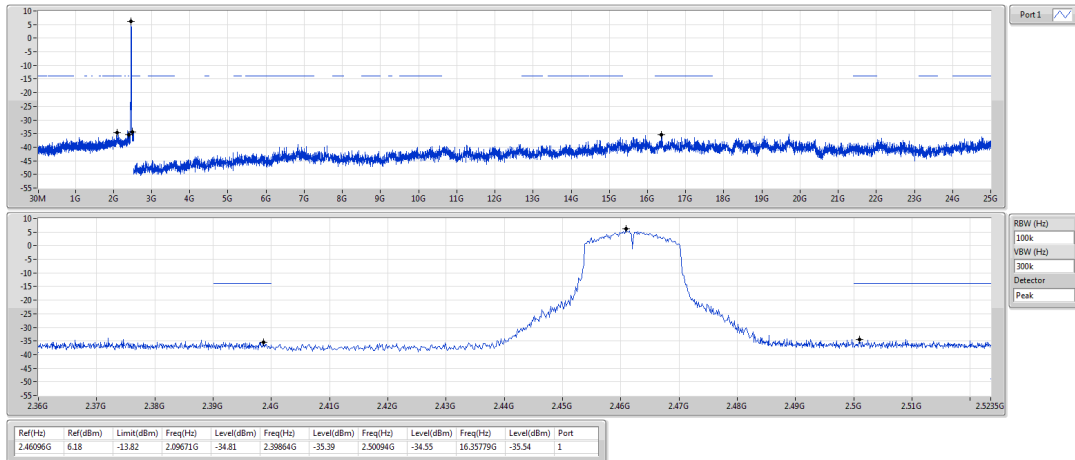
2437MHz



802.11g_Nss1,(6Mbps)_1TX

CSE NdB

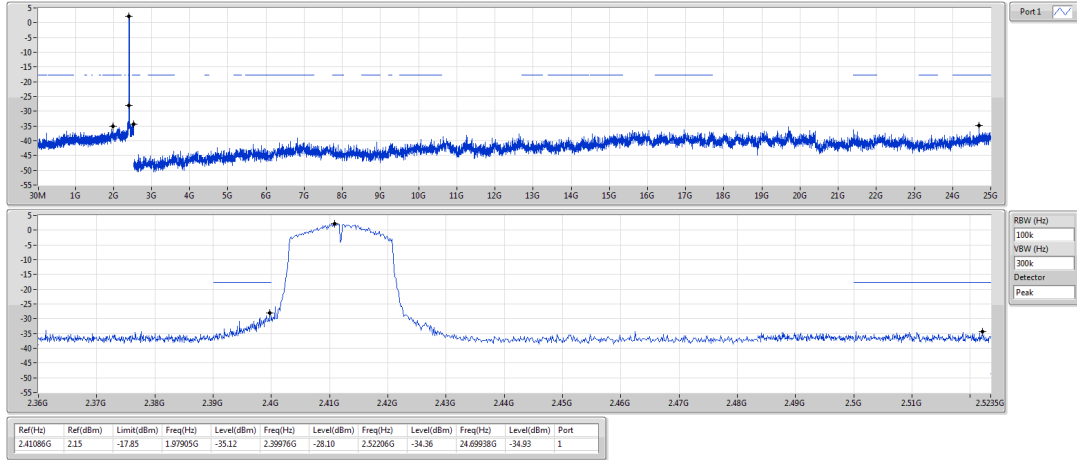
2462MHz



802.11n HT20_Nss1,(MCS0)_1TX

CSE NdB

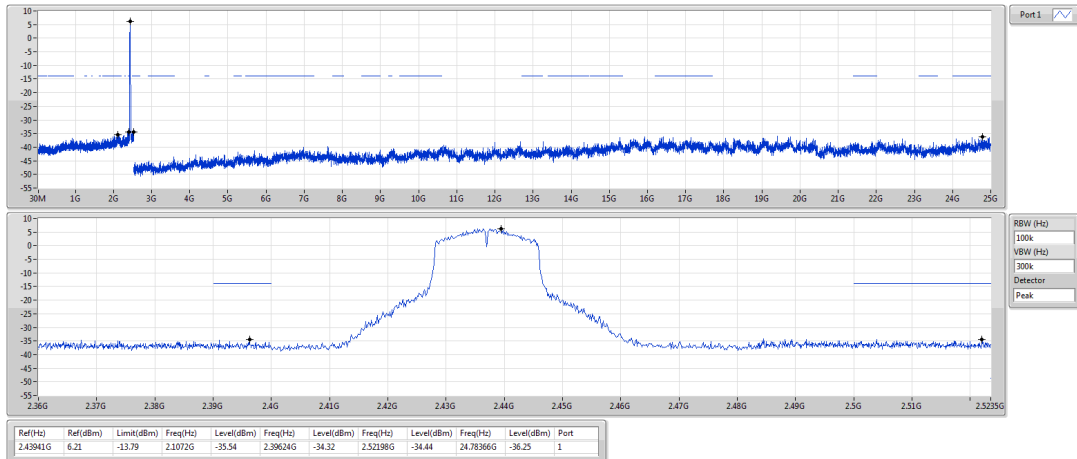
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

CSE NdB

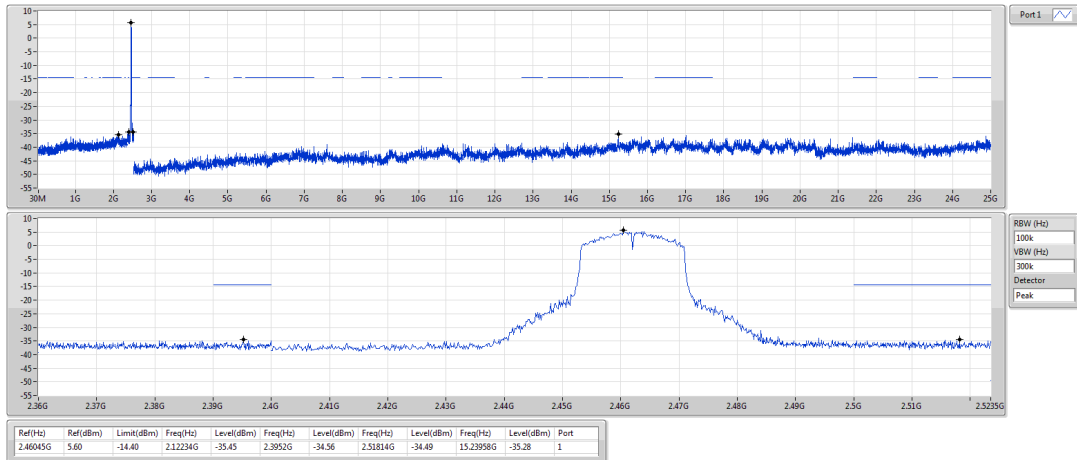
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

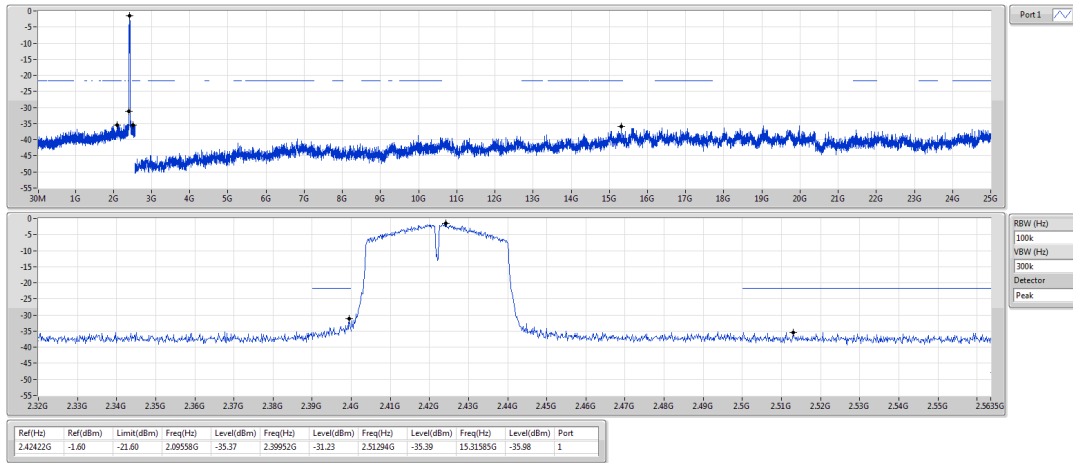
CSE NdB

2462MHz



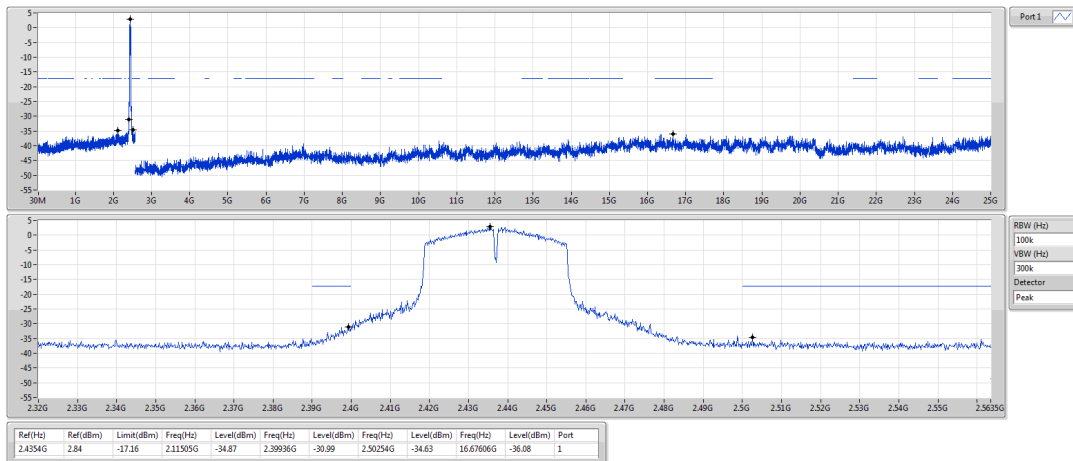
802.11n HT40_Nss1,(MCS0)_1TX
2422MHz

CSE NdB



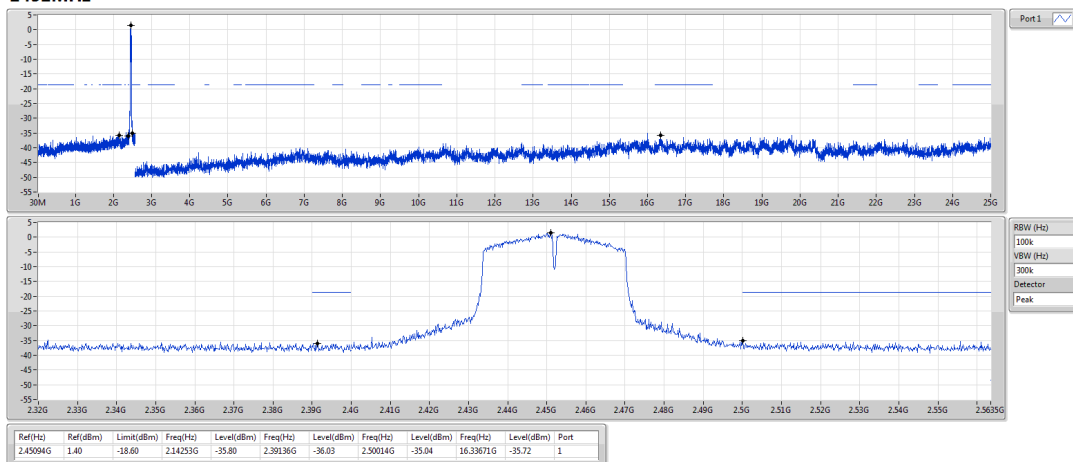
802.11n HT40_Nss1,(MCS0)_1TX
2437MHz

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.

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Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

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