FCC Test Report

FCC ID	:	**E52-K777**
Equipment	:	**WLAN (11ac/a/b/g/n 1x1) USB module**
Model No.	:	**DHUA-K77-7**
Brand Name	:	**KYOCERA**
Applicant	:	**KYOCERA Document Solutions Inc.**
Address	:	**2-28, 1-chome, Tamatsukuri, Chuo-Ku, Osaka, 540-8585 JAPAN**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Oct. 03, 2019**
Tested Date	:	**Oct. 16 ~ Oct. 31, 2019**

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

Reviewed by: **Approved by:**

Along Chen / Assistant Manager **Gary Chang / Manager**

Testing Laboratory 2732

Table of Contents

Release Record

Report No.	Version	Description	Issued Date
FR9O0201AC	Rev. 01	Initial issue	Dec. 06, 2019

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.476MHz 37.51 (Margin -18.90dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2341.00MHz 53.65 (Margin -0.35dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 23.21	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
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Gain (dBi)	Remarks
1	ANT-0	PCB printed ANT	N/A	2.69	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from host

1.1.4 Accessories

N/A

1.1.5 Channel List

Channel	Frequency(MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

1.1.6 Test Tool and Duty Cycle

Test Tool	QRCT, Version: 3.0.187.0		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	100.00	0.00
	11g	96.78	0.14
	HT20	97.13	0.13

1.1.7 Power Index of Test Tool

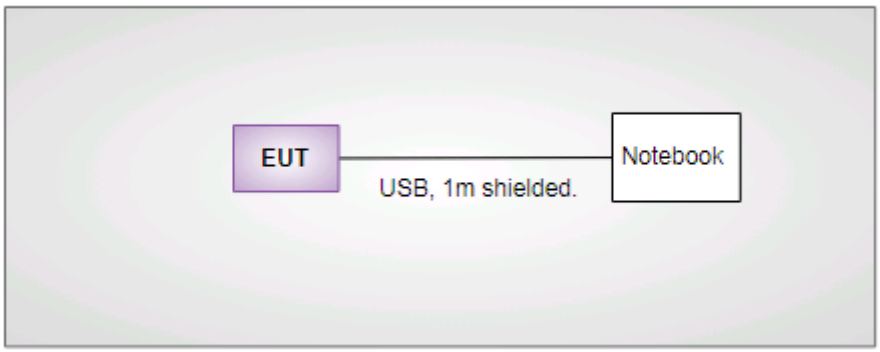
Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	23
11b	2437	23
11b	2462	21
11g	2412	18
11g	2437	23
11g	2462	14
HT20	2412	16
HT20	2437	23
HT20	2462	15

1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Notebook	DELL	Latitude E6430	DoC	---

1.3 Test Setup Chart

Test Setup Diagram



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Oct. 31, 2019				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101657	Jan. 08, 2019	Jan. 07, 2020
LISN	R&S	ENV216	101579	Mar. 08, 2019	Mar. 07, 2020
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 22, 2019	Oct. 21, 2020
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Oct. 16, 2019				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101499	Jan. 07, 2019	Jan. 06, 2020
Receiver	R&S	ESR3	101658	Dec. 11, 2018	Dec. 10, 2019
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 17, 2019	Apr. 16, 2020
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 07, 2019	Jan. 06, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 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-800	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	Oct. 30, 2019				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Apr. 17, 2019	Apr. 16, 2020
Power Meter	Anritsu	ML2495A	1241001	Aug. 01, 2019	Jul. 31, 2020
Power Sensor	Anritsu	MA2411B	1207362	Aug. 01, 2019	Jul. 31, 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

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.130 Hz
Conducted power	±0.808 dB
Power density	±0.583 dB
Conducted emission	±2.715 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.96 dB
Radiated emission > 1GHz	±4.51 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C / 58%	Akun Chung
Radiated Emissions	03CH03-WS	25°C / 66%	Akun Chung Roger Lu
RF Conducted	TH01-WS	21°C / 63%	Brad Wu

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- ISED#: 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	11b	2412	1 Mbps	---
Radiated Emissions ≤1GHz	11b	2412	1 Mbps	---
Radiated Emissions >1GHz Maximum Output Power 6dB bandwidth Power spectral density	11b 11g HT20	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462	1 Mbps 6 Mbps 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 **X-plane** results were found as the worst case and were shown in this report.

3 Transmitter Test Results

3.1 Conducted Emissions

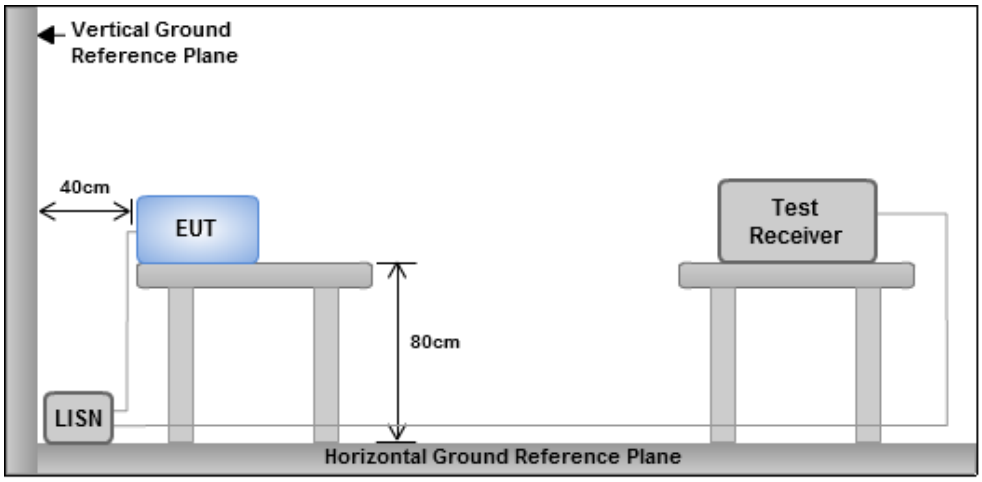
3.1.1 Limit of Conducted Emissions

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.

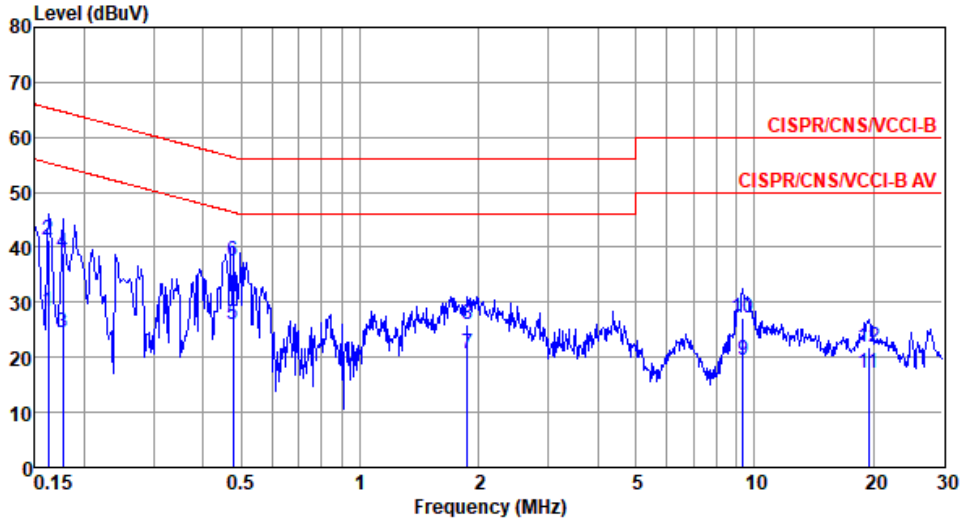
3.1.3 Test Setup



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

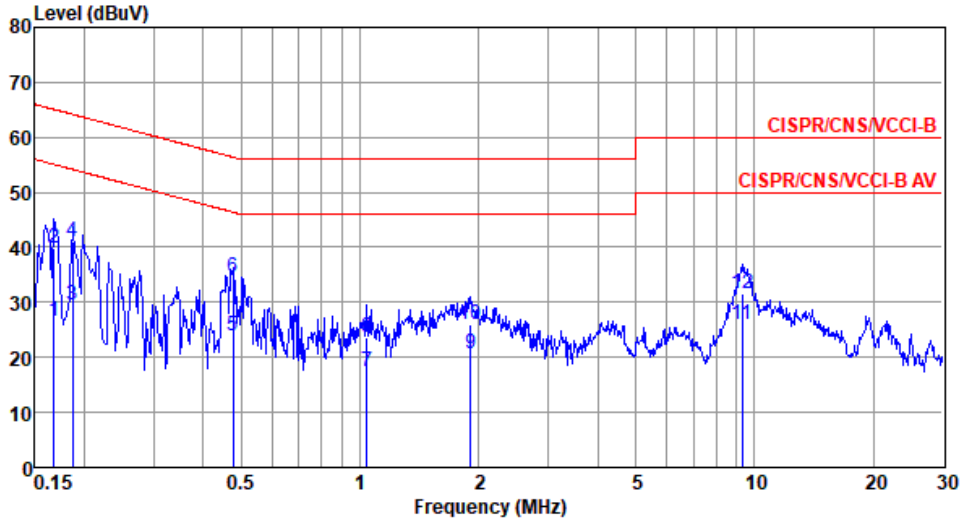
Modulation	11b	Test Freq. (MHz)	2412
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.162	28.31	55.34	-27.03	18.73	9.53	0.05	Average
2	0.162	41.43	65.34	-23.91	31.85	9.53	0.05	QP
3	0.177	24.41	54.64	-30.23	14.81	9.54	0.06	Average
4	0.177	39.06	64.64	-25.58	29.46	9.54	0.06	QP
5	0.476	25.86	46.41	-20.55	16.19	9.58	0.09	Average
6*	0.476	37.51	56.41	-18.90	27.84	9.58	0.09	QP
7	1.868	20.67	46.00	-25.33	10.90	9.60	0.17	Average
8	1.868	26.04	56.00	-29.96	16.27	9.60	0.17	QP
9	9.352	19.48	50.00	-30.52	9.45	9.65	0.38	Average
10	9.352	27.02	60.00	-32.98	16.99	9.65	0.38	QP
11	19.428	17.16	50.00	-32.84	6.85	9.66	0.65	Average
12	19.428	21.89	60.00	-38.11	11.58	9.66	0.65	QP

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

Modulation	11b	Test Freq. (MHz)	2412
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.168	26.57	55.08	-28.51	16.95	9.57	0.05	Average
2	0.168	39.78	65.08	-25.30	30.16	9.57	0.05	QP
3	0.186	29.38	54.20	-24.82	19.74	9.58	0.06	Average
4	0.186	40.92	64.20	-23.28	31.28	9.58	0.06	QP
5	0.476	23.89	46.41	-22.52	14.18	9.62	0.09	Average
6*	0.476	34.47	56.41	-21.94	24.76	9.62	0.09	QP
7	1.043	17.30	46.00	-28.70	7.54	9.64	0.12	Average
8	1.043	23.64	56.00	-32.36	13.88	9.64	0.12	QP
9	1.908	20.57	46.00	-25.43	10.74	9.65	0.18	Average
10	1.908	26.07	56.00	-29.93	16.24	9.65	0.18	QP
11	9.302	26.06	50.00	-23.94	15.97	9.71	0.38	Average
12	9.302	31.70	60.00	-28.30	21.61	9.71	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

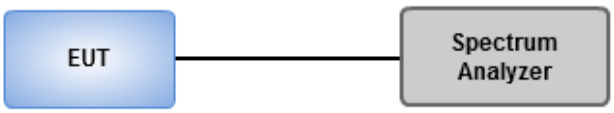
6dB Bandwidth

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	8.116M	14.472M	14M5G1D	7.609M	13.531M
802.11g_Nss1,(6Mbps)_1TX	15.507M	19.899M	19M9D1D	14.783M	16.281M
802.11n HT20_Nss1,(MCS0)_1TX	15.145M	19.682M	19M7D1D	14.058M	17.366M

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;

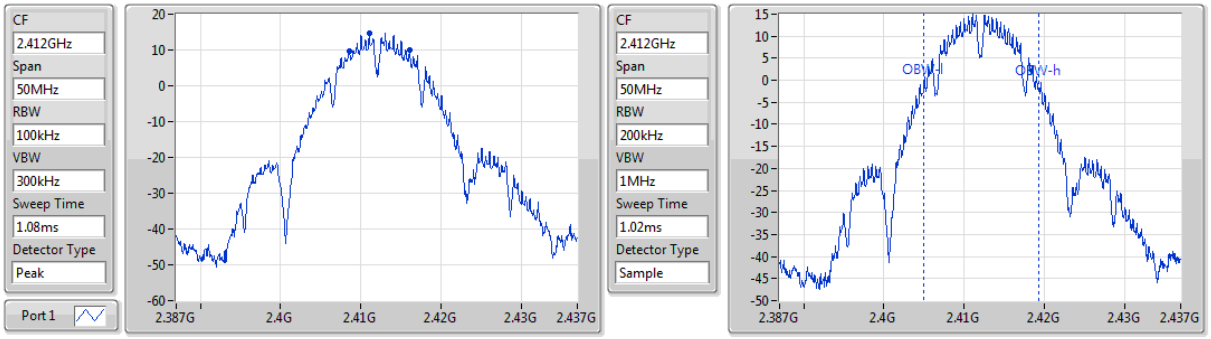
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	7.609M	14.472M
2437MHz	Pass	500k	8.116M	14.255M
2462MHz	Pass	500k	8.116M	13.531M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	14.783M	16.281M
2437MHz	Pass	500k	15.507M	19.899M
2462MHz	Pass	500k	15.507M	16.281M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	14.058M	17.366M
2437MHz	Pass	500k	15.145M	19.682M
2462MHz	Pass	500k	15.145M	17.438M

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

802.11b_Nss1,(1Mbps)_1TX EBW

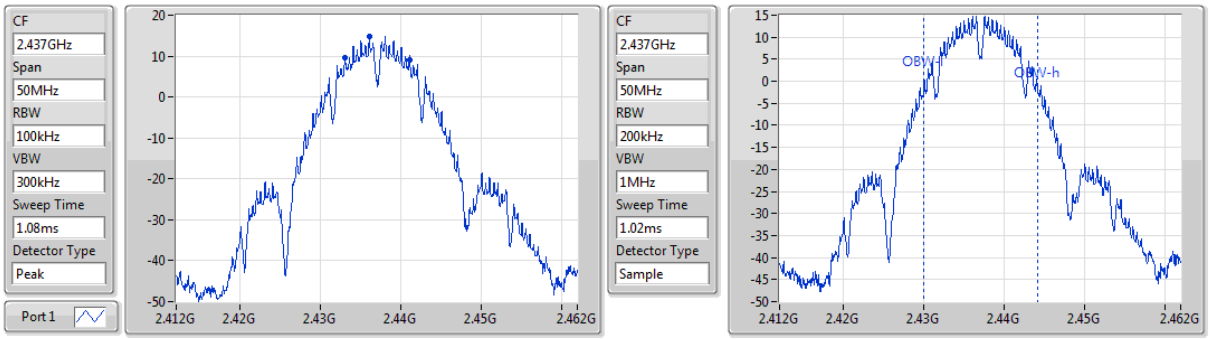
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.609M	2.408522G	2.41613G	14.472M	2.404909G	2.419381G	500k	1

802.11b_Nss1,(1Mbps)_1TX EBW

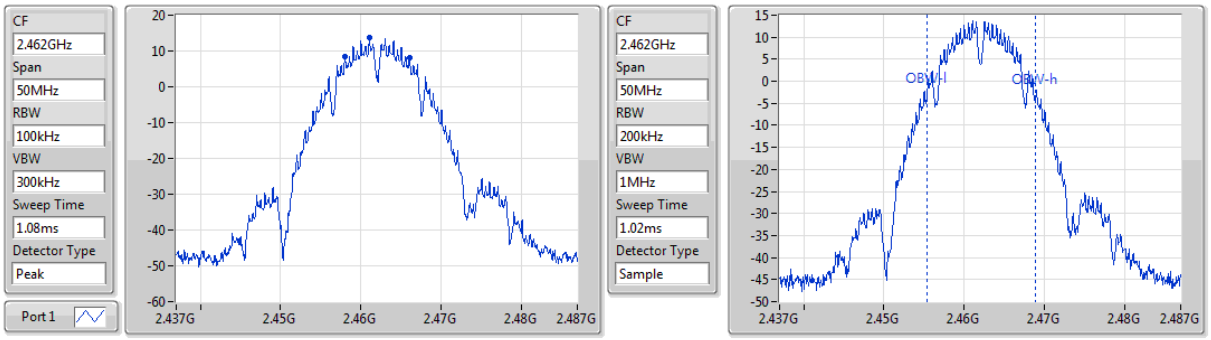
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.116M	2.433014G	2.44113G	14.255M	2.429981G	2.444236G	500k	1

802.11b_Nss1,(1Mbps)_1TX EBW

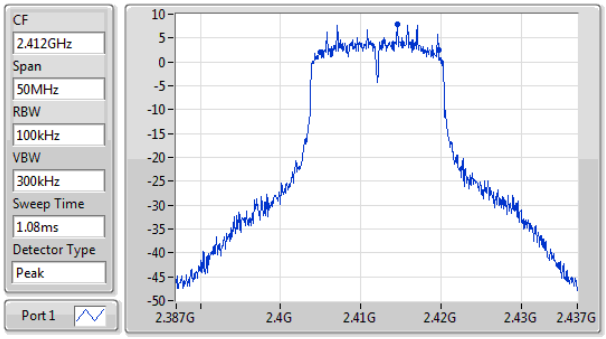
2462MHz

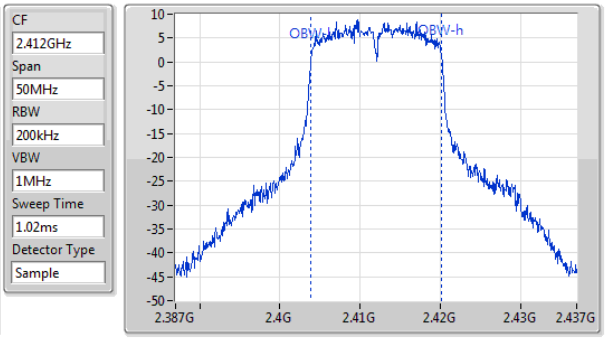


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.116M	2.458014G	2.46613G	13.531M	2.455343G	2.468874G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

2412MHz

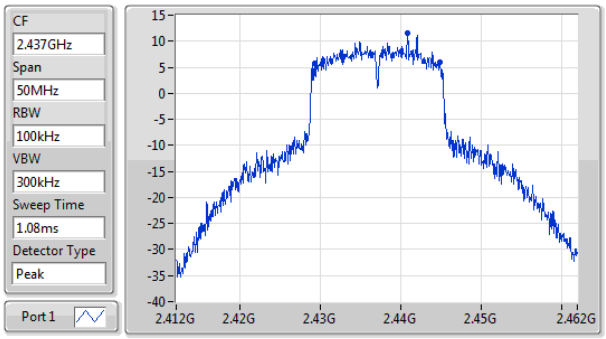


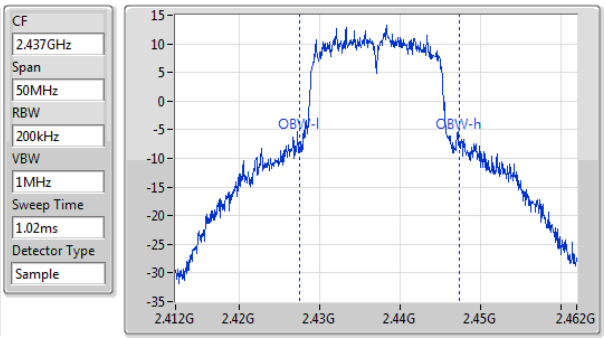


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
14.783M	2.404899G	2.419681G	16.281M	2.403896G	2.420177G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

2437MHz

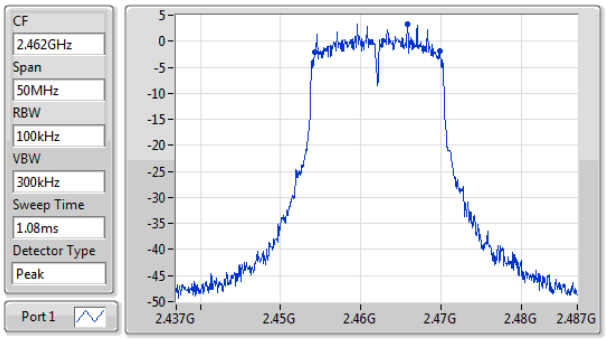


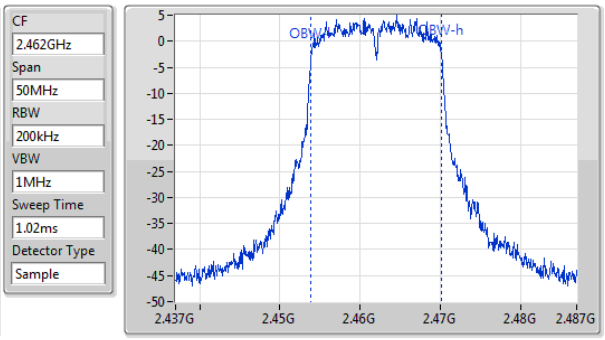


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.507M	2.429319G	2.444826G	19.899M	2.427449G	2.447347G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

2462MHz

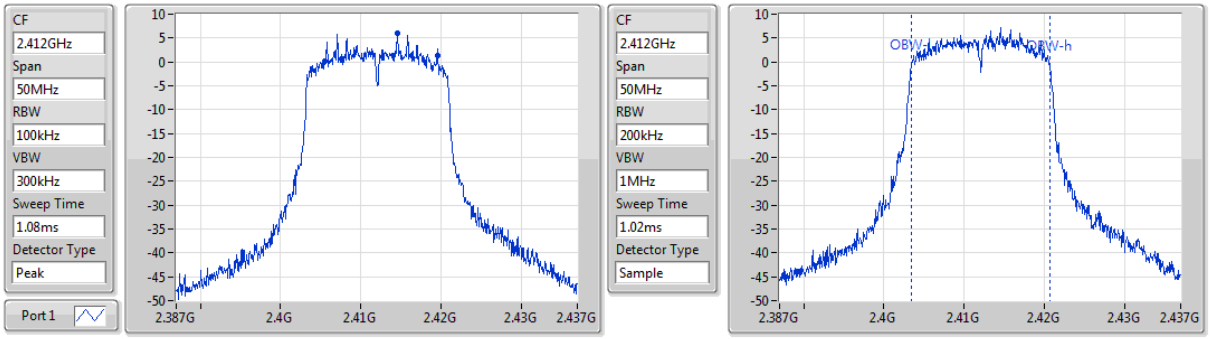




6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.507M	2.454319G	2.469826G	16.281M	2.453896G	2.470177G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

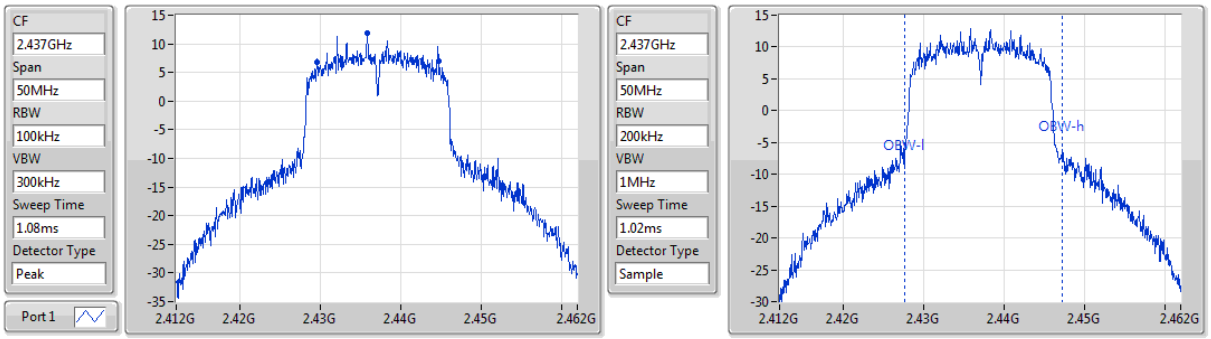
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
14.058M	2.405551G	2.419609G	17.366M	2.403389G	2.420755G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

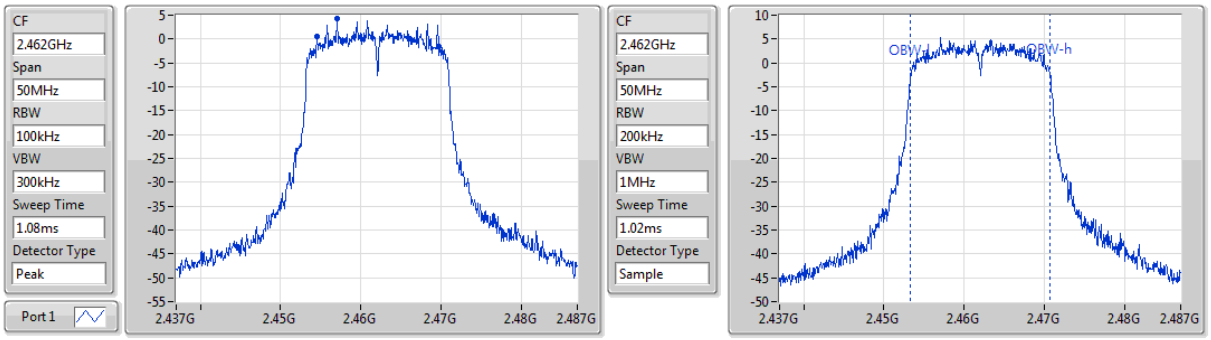
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.145M	2.429536G	2.444681G	19.682M	2.427593G	2.447275G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.145M	2.454536G	2.469681G	17.438M	2.453317G	2.470755G	500k	1

3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

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

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

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	**23.21**	0.20941
802.11g_Nss1,(6Mbps)_1TX	22.51	0.17824
802.11n HT20_Nss1,(MCS0)_1TX	22.42	0.17458

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	2.69	23.21	23.21	30.00	25.90	36.00
2437MHz	Pass	2.69	22.88	22.88	30.00	25.57	36.00
2462MHz	Pass	2.69	21.66	21.66	30.00	24.35	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.69	18.63	18.63	30.00	21.32	36.00
2437MHz	Pass	2.69	22.51	22.51	30.00	25.20	36.00
2462MHz	Pass	2.69	14.81	14.81	30.00	17.50	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.69	16.64	16.64	30.00	19.33	36.00
2437MHz	Pass	2.69	22.42	22.42	30.00	25.11	36.00
2462MHz	Pass	2.69	15.58	15.58	30.00	18.27	36.00

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

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 = 30 kHz, VBW = 100 kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

Average PSD, duty cycle ≥ 98%

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

Average PSD, duty cycle < 98%

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

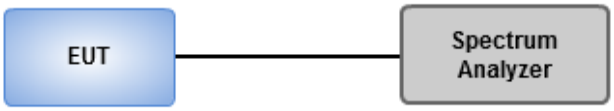
2 Set the sweep time to: ≥ 10 (number of measurement points in sweep) x (total on/off period of the transmitted signal).

3 Perform the measurement over a single sweep.

4 Use the peak marker function to determine the maximum amplitude level.

5 Add 10 log (1/x), where x is the duty cycle.

3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_1TX	1.86
802.11g_Nss1,(6Mbps)_1TX	-2.03
802.11n HT20_Nss1,(MCS0)_1TX	-2.17

RBW=30 kHz

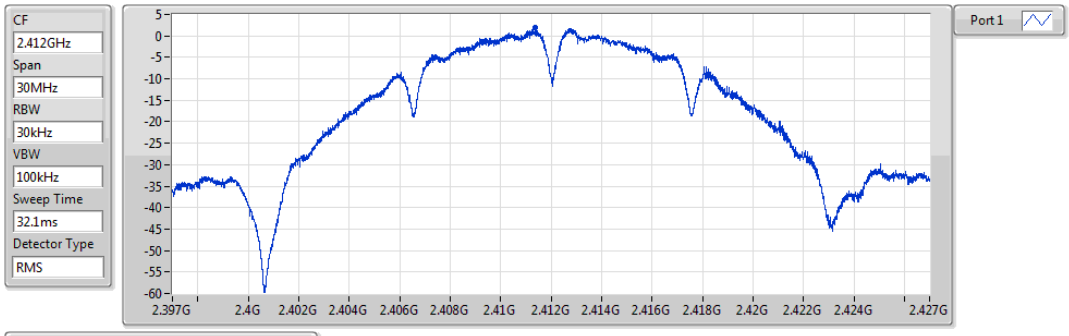
Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.69	1.86	1.86	8.00
2437MHz	Pass	2.69	1.65	1.65	8.00
2462MHz	Pass	2.69	0.69	0.69	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.69	-5.94	-5.94	8.00
2437MHz	Pass	2.69	-2.03	-2.03	8.00
2462MHz	Pass	2.69	-9.99	-9.99	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	2.69	-8.07	-8.07	8.00
2437MHz	Pass	2.69	-2.17	-2.17	8.00
2462MHz	Pass	2.69	-9.20	-9.20	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**

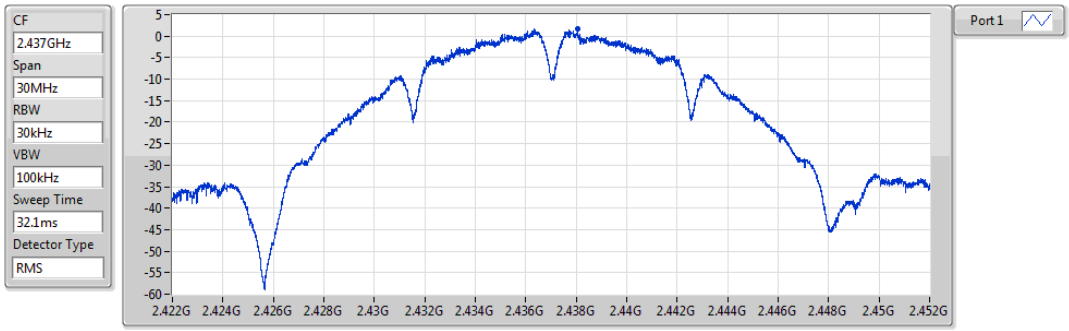
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.86	1.86	1.86

802.11b_Nss1,(1Mbps)_1TX **PSD**

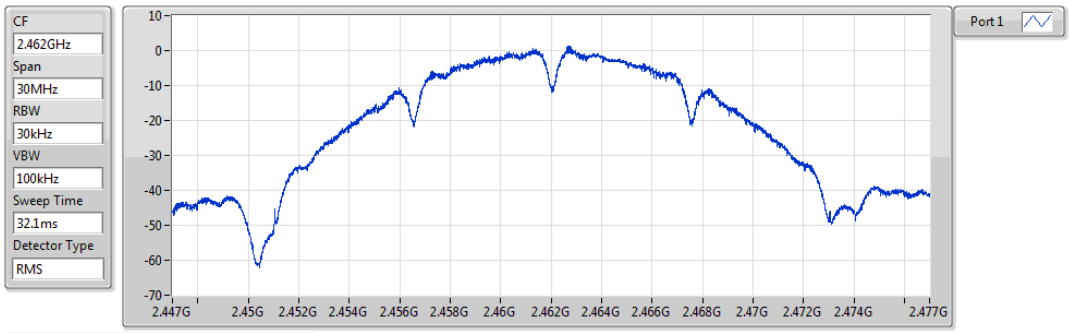
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.65	1.65	1.65

802.11b_Nss1,(1Mbps)_1TX **PSD**

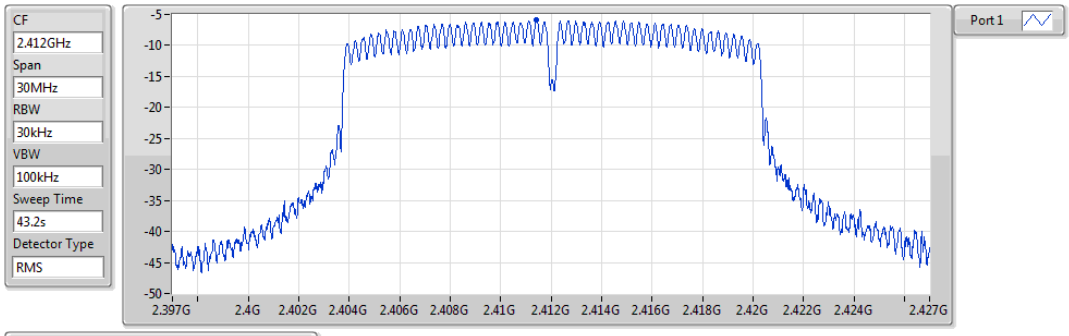
2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.69	0.69	0.69

802.11g_Nss1,(6Mbps)_1TX **PSD**

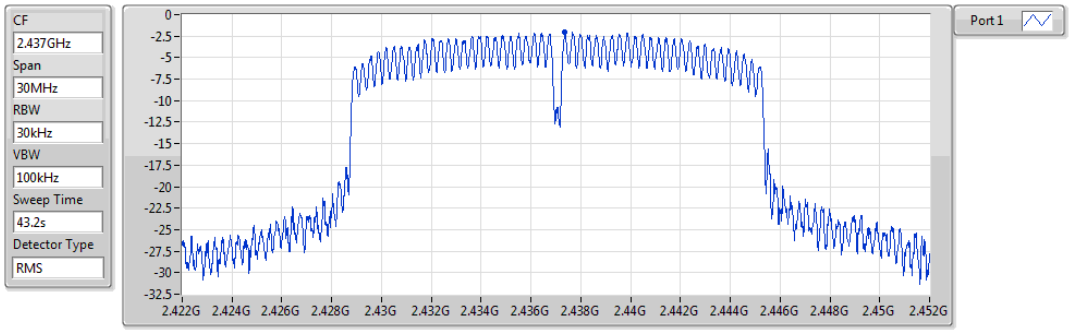
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-5.94	-5.94	-5.94

802.11g_Nss1,(6Mbps)_1TX **PSD**

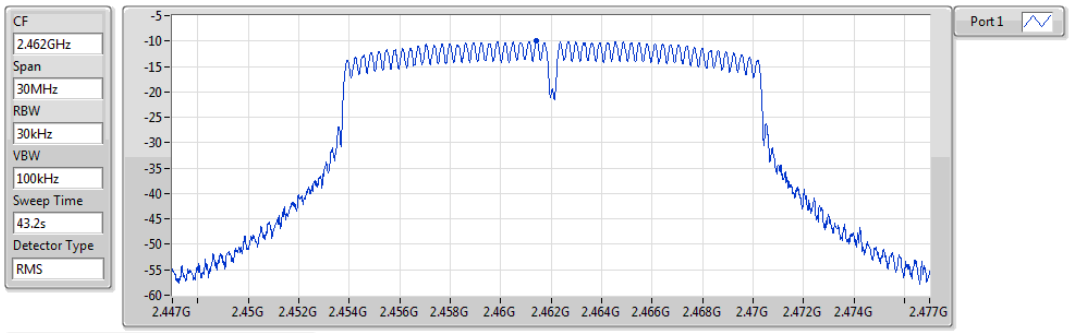
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-2.03	-2.03	-2.03

802.11g_Nss1,(6Mbps)_1TX **PSD**

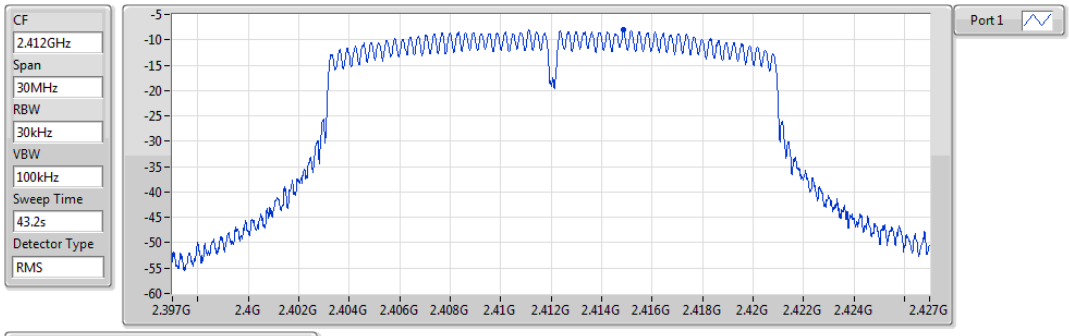
2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.99	-9.99	-9.99

802.11n HT20_Nss1,(MCS0)_1TX **PSD**

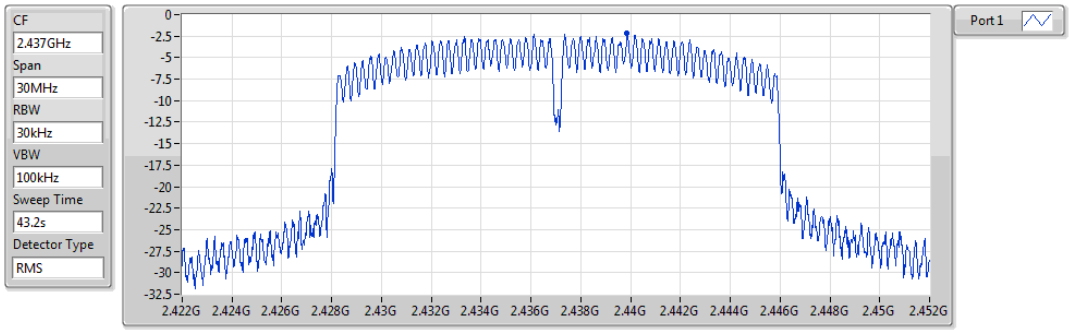
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.07	-8.07	-8.07

802.11n HT20_Nss1,(MCS0)_1TX **PSD**

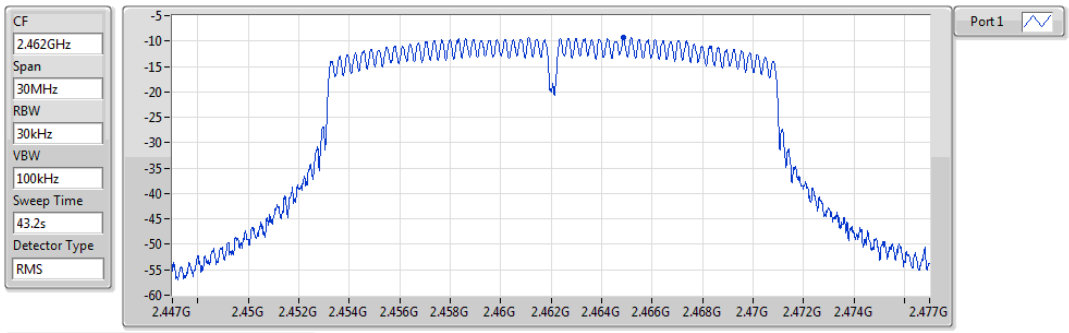
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-2.17	-2.17	-2.17

802.11n HT20_Nss1,(MCS0)_1TX **PSD**

2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.20	-9.20	-9.20

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

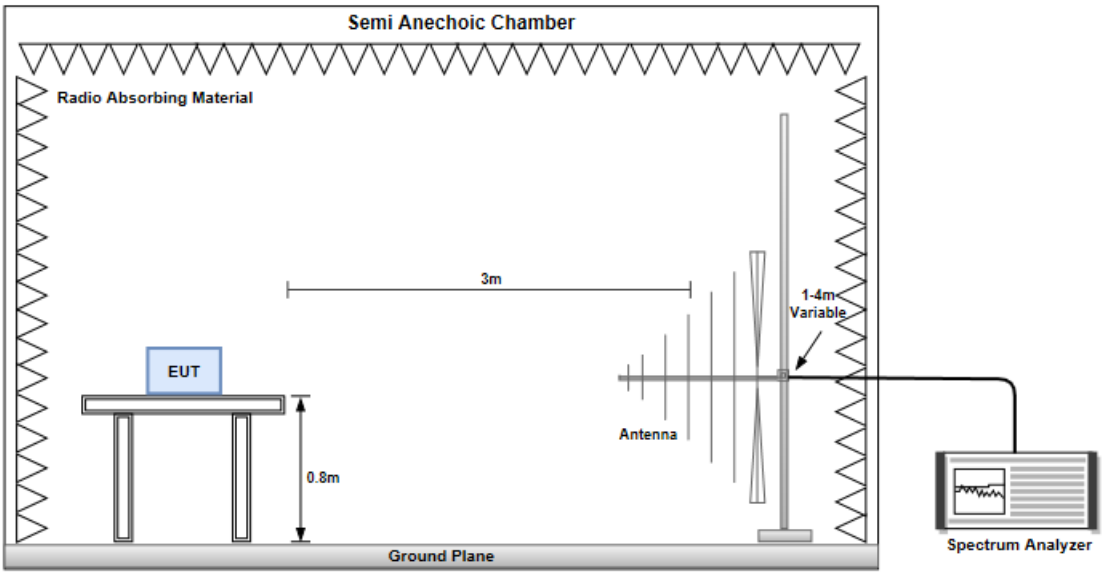
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

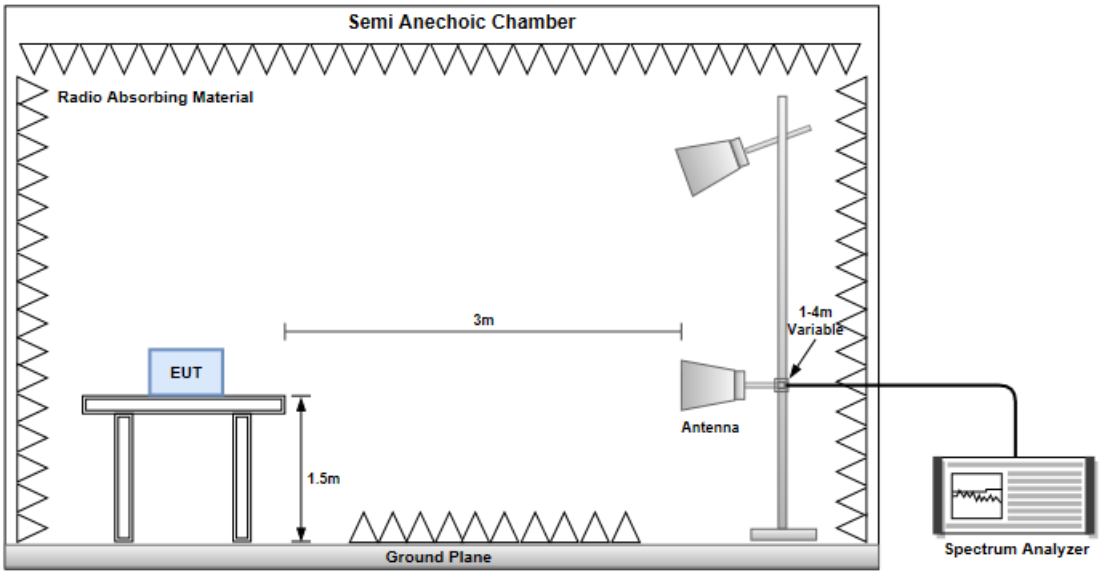
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

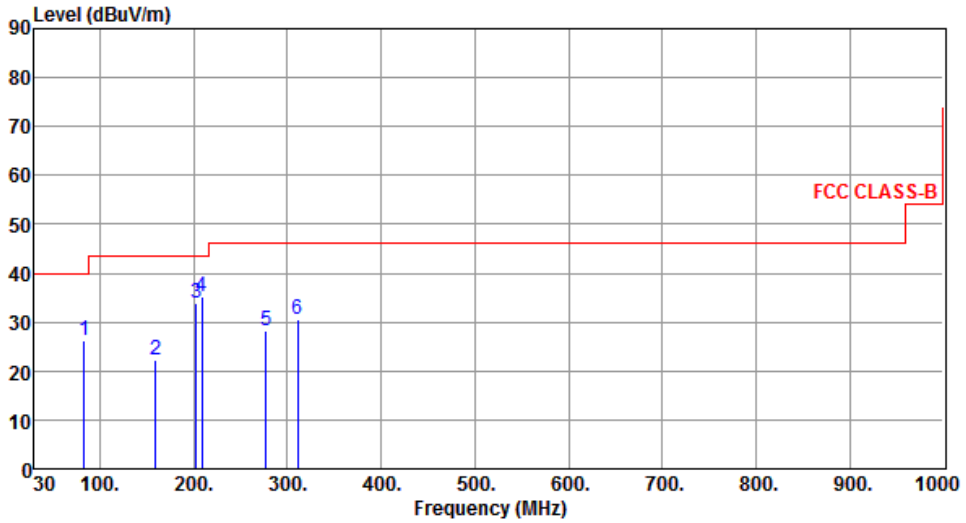


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

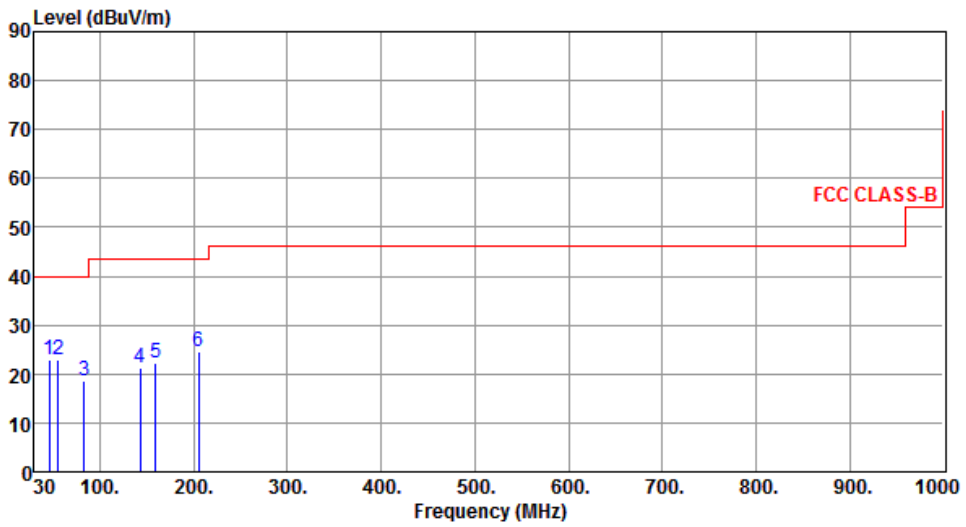
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	83.35	26.39	40.00	-13.61	40.52	-14.13	Peak	---	---
2	159.01	22.29	43.50	-21.21	30.81	-8.52	Peak	---	---
3	202.66	33.82	43.50	-9.68	45.85	-12.03	Peak	---	---
4	208.48	35.07	43.50	-8.43	47.12	-12.05	Peak	---	---
5	277.35	28.33	46.00	-17.67	37.27	-8.94	Peak	---	---
6	311.30	30.70	46.00	-15.30	38.62	-7.92	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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

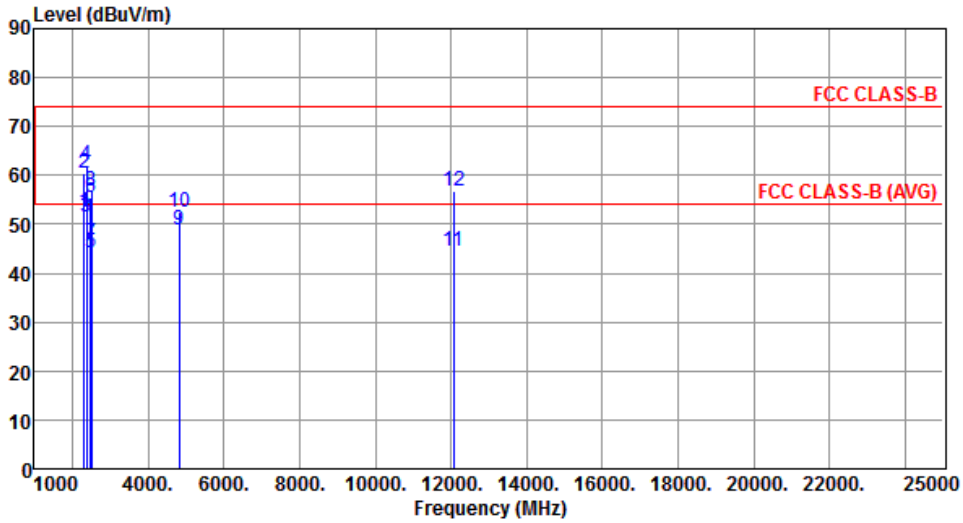


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	45.52	22.96	40.00	-17.04	31.62	-8.66	Peak	---	---
2	55.22	22.77	40.00	-17.23	31.68	-8.91	Peak	---	---
3	83.35	18.69	40.00	-21.31	32.82	-14.13	Peak	---	---
4	142.52	21.26	43.50	-22.24	30.27	-9.01	Peak	---	---
5	159.01	22.33	43.50	-21.17	30.85	-8.52	Peak	---	---
6	205.57	24.45	43.50	-19.05	36.51	-12.06	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

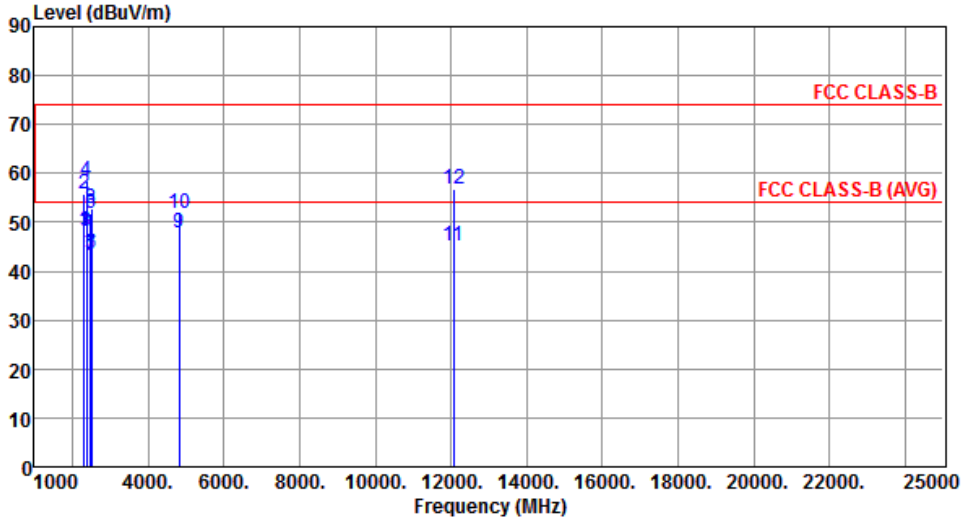
Modulation	11b	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2316.00	52.34	54.00	-1.66	51.71	0.63	Average	146	137
2	2316.00	60.41	74.00	-13.59	59.78	0.63	Peak	146	137
3	2390.00	51.45	54.00	-2.55	51.01	0.44	Average	146	137
4	2390.00	62.02	74.00	-11.98	61.58	0.44	Peak	146	137
5	2483.50	44.20	54.00	-9.80	43.91	0.29	Average	146	137
6	2483.50	55.58	74.00	-18.42	55.29	0.29	Peak	146	137
7	2500.00	46.10	54.00	-7.90	45.86	0.24	Average	146	137
8	2500.00	56.85	74.00	-17.15	56.61	0.24	Peak	146	137
9	4824.00	48.68	54.00	-5.32	42.28	6.40	Average	243	202
10	4824.00	52.62	74.00	-21.38	46.22	6.40	Peak	243	202
11	12060.00	44.58	54.00	-9.42	28.20	16.38	Average	100	55
12	12060.00	56.90	74.00	-17.10	40.52	16.38	Peak	100	55

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).

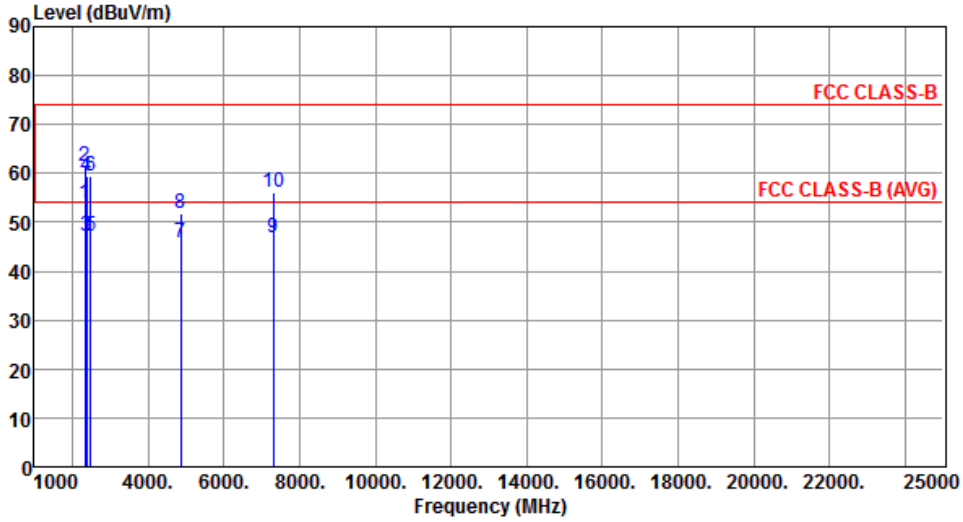
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2316.00	48.15	54.00	-5.85	47.52	0.63	Average	203	117
2	2316.00	55.88	74.00	-18.12	55.25	0.63	Peak	203	117
3	2390.00	48.29	54.00	-5.71	47.85	0.44	Average	203	117
4	2390.00	58.29	74.00	-15.71	57.85	0.44	Peak	203	117
5	2483.50	43.51	54.00	-10.49	43.22	0.29	Average	203	117
6	2483.50	51.84	74.00	-22.16	51.55	0.29	Peak	203	117
7	2500.00	43.08	54.00	-10.92	42.84	0.24	Average	203	117
8	2500.00	52.76	74.00	-21.24	52.52	0.24	Peak	203	117
9	4824.00	47.91	54.00	-6.09	41.51	6.40	Average	277	174
10	4824.00	51.91	74.00	-22.09	45.51	6.40	Peak	277	174
11	12060.00	45.01	54.00	-8.99	28.63	16.38	Average	100	50
12	12060.00	56.93	74.00	-17.07	40.55	16.38	Peak	100	50

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

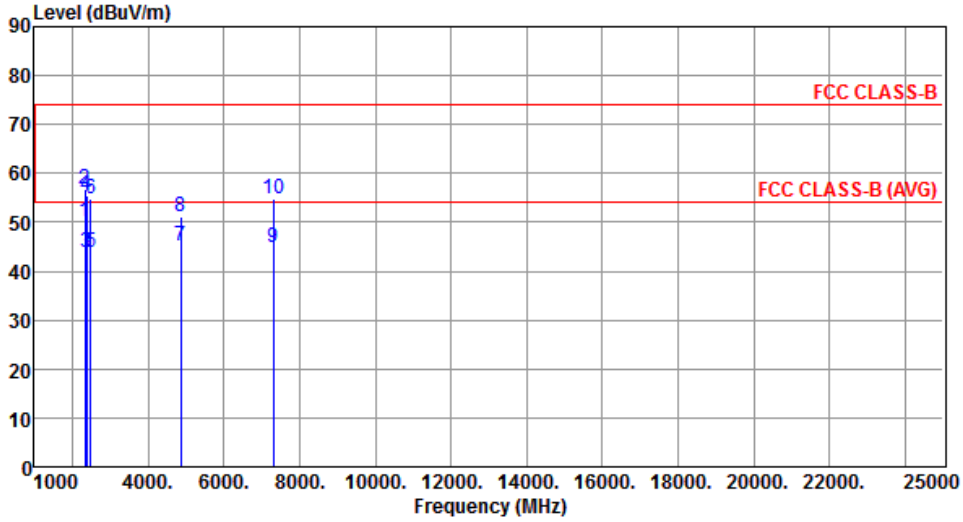
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2341.00	53.65	54.00	-0.35	53.08	0.57	Average	173	130
2	2341.00	61.56	74.00	-12.44	60.99	0.57	Peak	173	130
3	2390.00	47.24	54.00	-6.76	46.80	0.44	Average	173	130
4	2390.00	59.28	74.00	-14.72	58.84	0.44	Peak	173	130
5	2483.50	47.19	54.00	-6.81	46.90	0.29	Average	173	130
6	2483.50	59.36	74.00	-14.64	59.07	0.29	Peak	173	130
7	4874.00	45.86	54.00	-8.14	39.43	6.43	Average	256	206
8	4874.00	51.82	74.00	-22.18	45.39	6.43	Peak	256	206
9	7311.00	46.89	54.00	-7.11	34.97	11.92	Average	216	205
10	7311.00	56.04	74.00	-17.96	44.12	11.92	Peak	216	205

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).

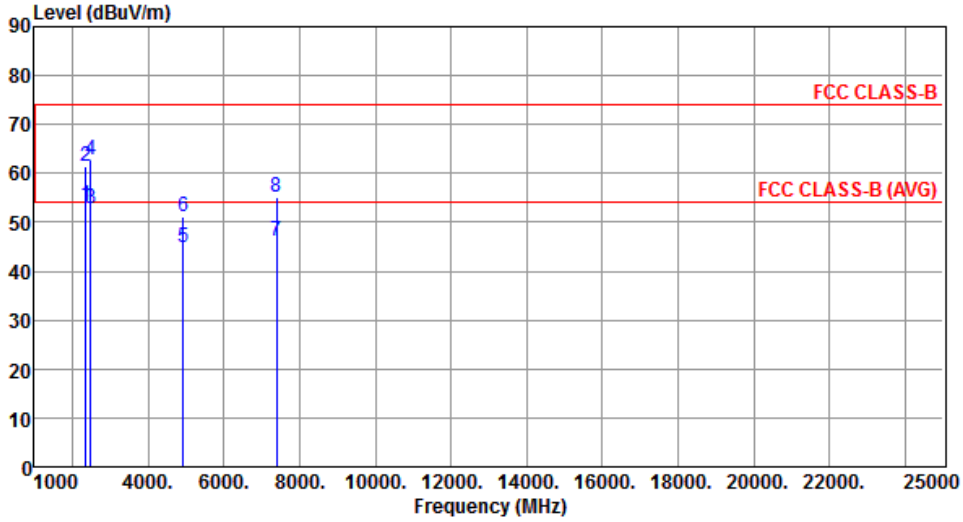
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2341.00	50.09	54.00	-3.91	49.52	0.57	Average	204	108
2	2341.00	56.82	74.00	-17.18	56.25	0.57	Peak	204	108
3	2390.00	43.96	54.00	-10.04	43.52	0.44	Average	204	108
4	2390.00	55.32	74.00	-18.68	54.88	0.44	Peak	204	108
5	2483.50	43.81	54.00	-10.19	43.52	0.29	Average	204	108
6	2483.50	54.85	74.00	-19.15	54.56	0.29	Peak	204	108
7	4874.00	45.28	54.00	-8.72	38.85	6.43	Average	275	178
8	4874.00	51.30	74.00	-22.70	44.87	6.43	Peak	275	178
9	7311.00	45.00	54.00	-9.00	33.08	11.92	Average	100	128
10	7311.00	54.71	74.00	-19.29	42.79	11.92	Peak	100	128

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).

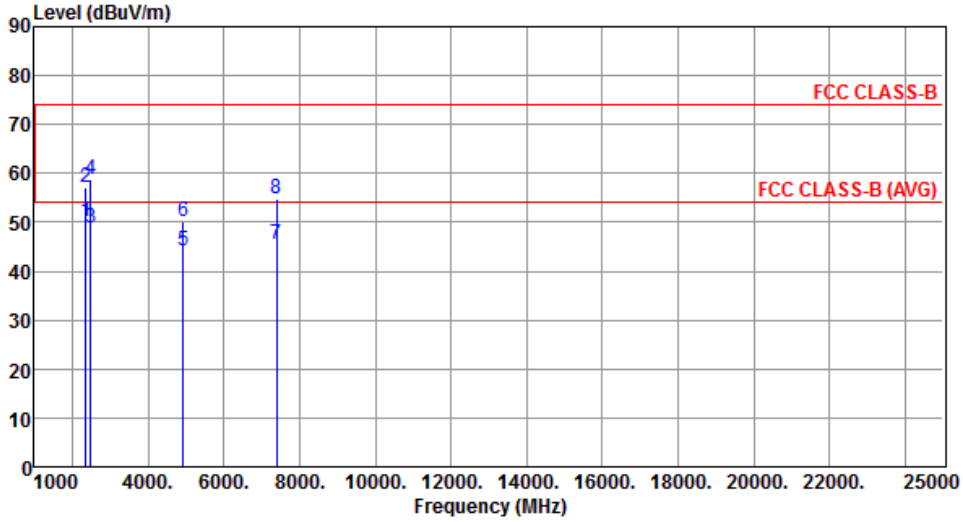
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2366.00	53.62	54.00	-0.38	53.12	0.50	Average	241	129
2	2366.00	61.35	74.00	-12.65	60.85	0.50	Peak	241	129
3	2483.50	52.68	54.00	-1.32	52.39	0.29	Average	241	129
4	2483.50	62.81	74.00	-11.19	62.52	0.29	Peak	241	129
5	4924.00	44.96	54.00	-9.04	38.45	6.51	Average	255	212
6	4924.00	51.12	74.00	-22.88	44.61	6.51	Peak	255	212
7	7386.00	46.30	54.00	-7.70	34.56	11.74	Average	211	207
8	7386.00	55.27	74.00	-18.73	43.53	11.74	Peak	211	207

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		

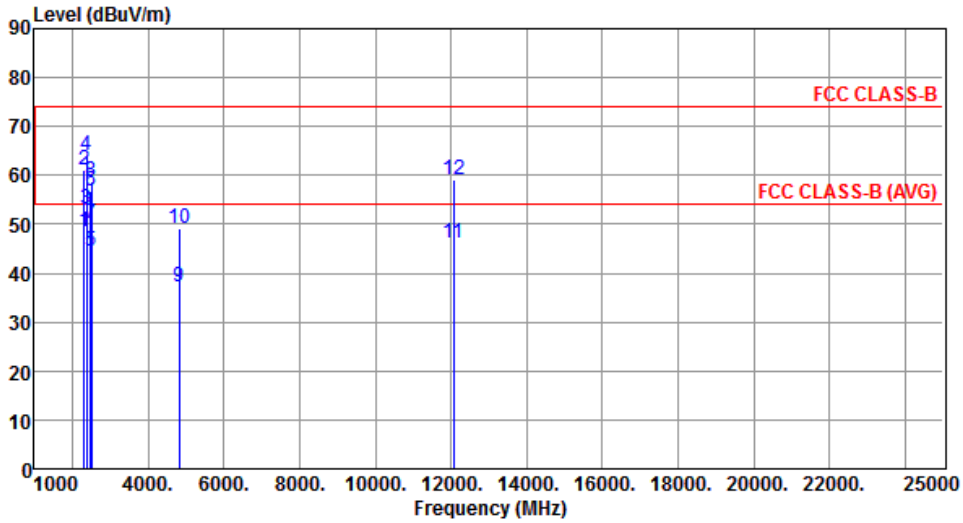


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2366.00	50.03	54.00	-3.97	49.53	0.50	Average	206	115
2	2366.00	57.08	74.00	-16.92	56.58	0.50	Peak	206	115
3	2483.50	48.70	54.00	-5.30	48.41	0.29	Average	206	115
4	2483.50	58.80	74.00	-15.20	58.51	0.29	Peak	206	115
5	4924.00	44.03	54.00	-9.97	37.52	6.51	Average	271	175
6	4924.00	50.09	74.00	-23.91	43.58	6.51	Peak	271	175
7	7386.00	45.45	54.00	-8.55	33.71	11.74	Average	212	205
8	7386.00	54.72	74.00	-19.28	42.98	11.74	Peak	212	205

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

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

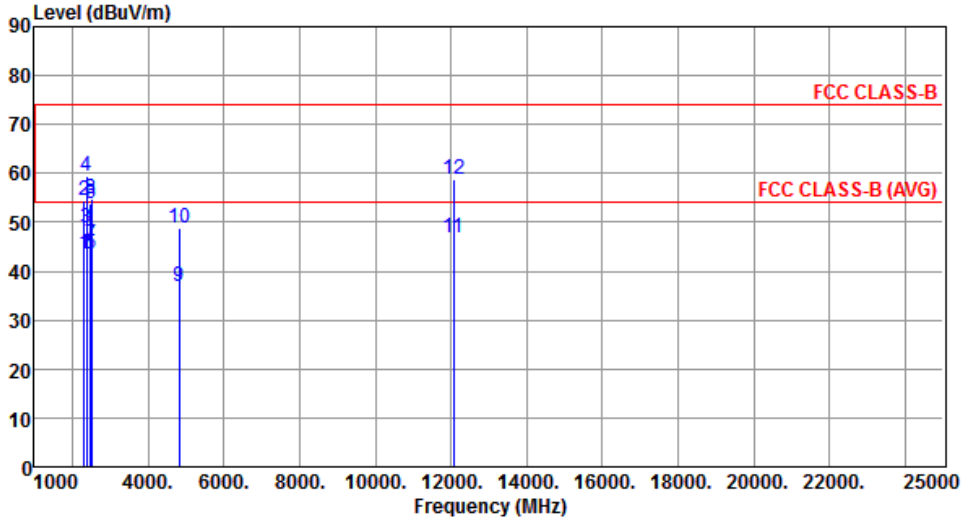
Modulation	11g	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2316.00	48.45	54.00	-5.55	47.82	0.63	Average	125	132
2	2316.00	61.15	74.00	-12.85	60.52	0.63	Peak	125	132
3	2390.00	53.00	54.00	-1.00	52.56	0.44	Average	125	132
4	2390.00	64.12	74.00	-9.88	63.68	0.44	Peak	125	132
5	2483.50	44.41	54.00	-9.59	44.12	0.29	Average	125	132
6	2483.50	56.74	74.00	-17.26	56.45	0.29	Peak	125	132
7	2500.00	49.99	54.00	-4.01	49.75	0.24	Average	125	132
8	2500.00	58.62	74.00	-15.38	58.38	0.24	Peak	125	132
9	4824.00	37.23	54.00	-16.77	30.83	6.40	Average	100	208
10	4824.00	49.23	74.00	-24.77	42.83	6.40	Peak	100	208
11	12060.00	46.04	54.00	-7.96	29.66	16.38	Average	100	52
12	12060.00	59.08	74.00	-14.92	42.70	16.38	Peak	100	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).

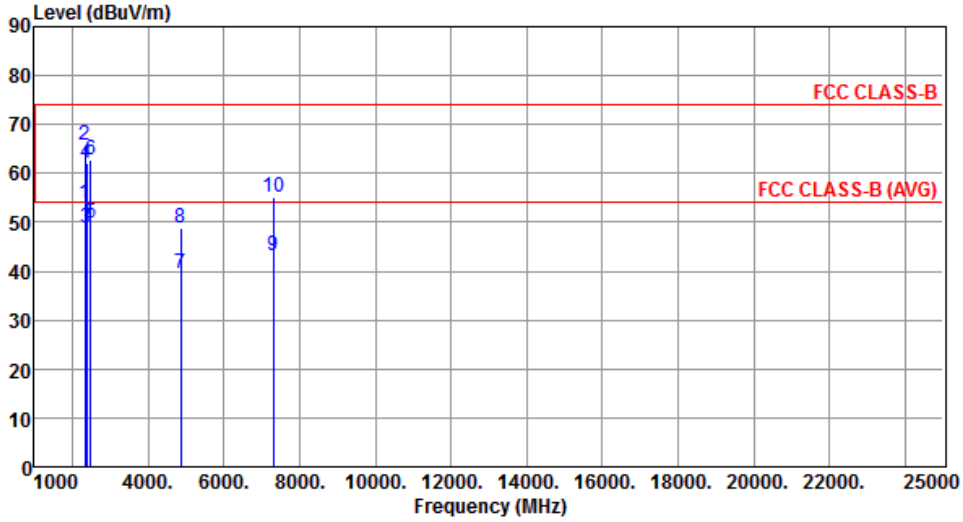
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2316.00	43.52	54.00	-10.48	42.89	0.63	Average	227	110
2	2316.00	54.51	74.00	-19.49	53.88	0.63	Peak	227	110
3	2390.00	48.84	54.00	-5.16	48.40	0.44	Average	227	110
4	2390.00	59.29	74.00	-14.71	58.85	0.44	Peak	227	110
5	2483.50	43.58	54.00	-10.42	43.29	0.29	Average	227	110
6	2483.50	53.87	74.00	-20.13	53.58	0.29	Peak	227	110
7	2500.00	45.44	54.00	-8.56	45.20	0.24	Average	227	110
8	2500.00	54.76	74.00	-19.24	54.52	0.24	Peak	227	110
9	4824.00	36.81	54.00	-17.19	30.41	6.40	Average	100	180
10	4824.00	48.82	74.00	-25.18	42.42	6.40	Peak	100	180
11	12060.00	46.90	54.00	-7.10	30.52	16.38	Average	100	53
12	12060.00	58.79	74.00	-15.21	42.41	16.38	Peak	100	53

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).

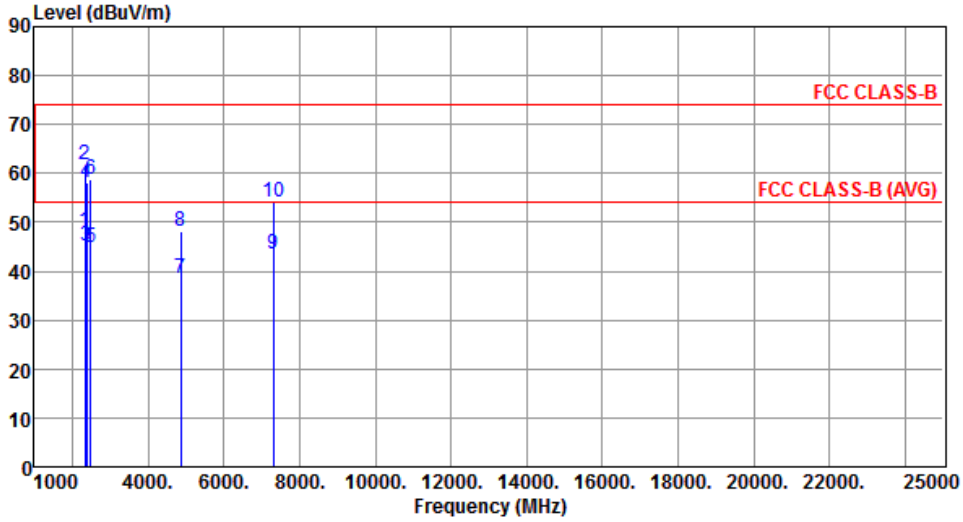
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2341.00	53.65	54.00	-0.35	53.08	0.57	Average	100	128
2	2341.00	65.73	74.00	-8.27	65.16	0.57	Peak	100	128
3	2390.00	48.76	54.00	-5.24	48.32	0.44	Average	100	128
4	2390.00	62.11	74.00	-11.89	61.67	0.44	Peak	100	128
5	2483.50	49.68	54.00	-4.32	49.39	0.29	Average	100	128
6	2483.50	62.90	74.00	-11.10	62.61	0.29	Peak	100	128
7	4874.00	39.64	54.00	-14.36	33.21	6.43	Average	241	209
8	4874.00	48.84	74.00	-25.16	42.41	6.43	Peak	241	209
9	7311.00	43.16	54.00	-10.84	31.24	11.92	Average	100	201
10	7311.00	55.16	74.00	-18.84	43.24	11.92	Peak	100	201

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).

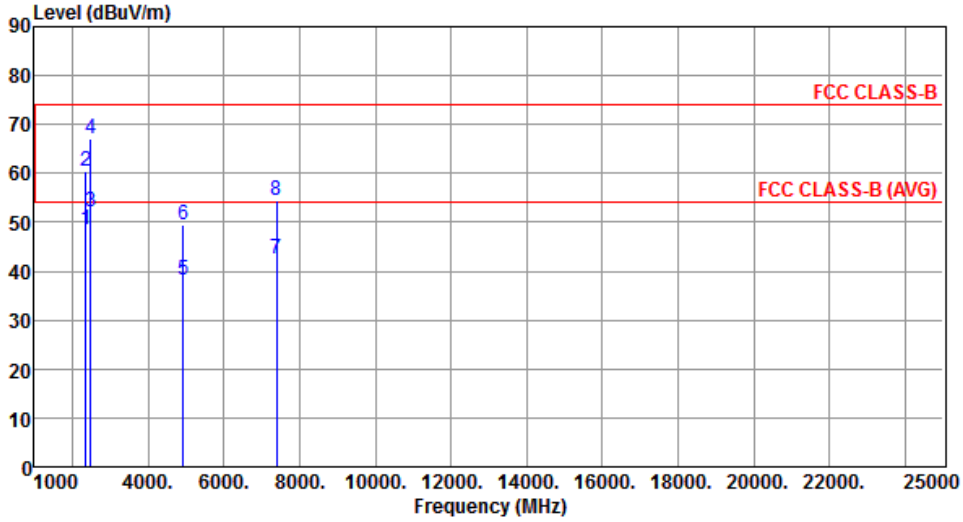
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2341.00	48.09	54.00	-5.91	47.52	0.57	Average	224	112
2	2341.00	61.79	74.00	-12.21	61.22	0.57	Peak	224	112
3	2390.00	45.31	54.00	-8.69	44.87	0.44	Average	224	112
4	2390.00	58.24	74.00	-15.76	57.80	0.44	Peak	224	112
5	2483.50	44.81	54.00	-9.19	44.52	0.29	Average	224	112
6	2483.50	58.83	74.00	-15.17	58.54	0.29	Peak	224	112
7	4874.00	38.68	54.00	-15.32	32.25	6.43	Average	271	177
8	4874.00	48.01	74.00	-25.99	41.58	6.43	Peak	271	177
9	7311.00	43.43	54.00	-10.57	31.51	11.92	Average	100	132
10	7311.00	54.16	74.00	-19.84	42.24	11.92	Peak	100	132

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).

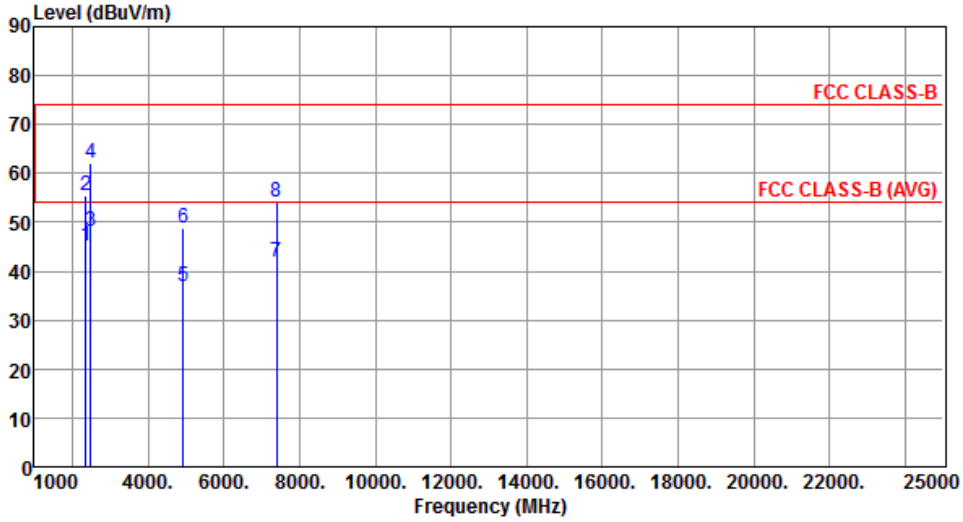
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2366.00	48.59	54.00	-5.41	48.09	0.50	Average	178	124
2	2366.00	60.45	74.00	-13.55	59.95	0.50	Peak	178	124
3	2483.50	52.04	54.00	-1.96	51.75	0.29	Average	178	124
4	2483.50	67.19	74.00	-6.81	66.90	0.29	Peak	178	124
5	4924.00	38.26	54.00	-15.74	31.75	6.51	Average	100	201
6	4924.00	49.39	74.00	-24.61	42.88	6.51	Peak	100	201
7	7386.00	42.52	54.00	-11.48	30.78	11.74	Average	100	203
8	7386.00	54.50	74.00	-19.50	42.76	11.74	Peak	100	203

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		

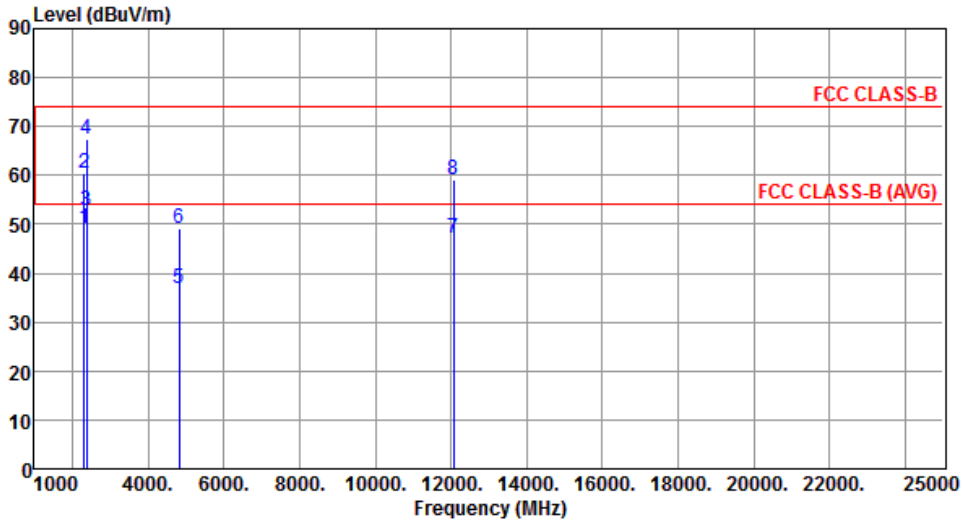


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2366.00	45.05	54.00	-8.95	44.55	0.50	Average	241	108
2	2366.00	55.61	74.00	-18.39	55.11	0.50	Peak	241	108
3	2483.50	48.14	54.00	-5.86	47.85	0.29	Average	241	108
4	2483.50	62.14	74.00	-11.86	61.85	0.29	Peak	241	108
5	4924.00	36.73	54.00	-17.27	30.22	6.51	Average	100	172
6	4924.00	48.91	74.00	-25.09	42.40	6.51	Peak	100	172
7	7386.00	41.99	54.00	-12.01	30.25	11.74	Average	100	131
8	7386.00	54.15	74.00	-19.85	42.41	11.74	Peak	100	131

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

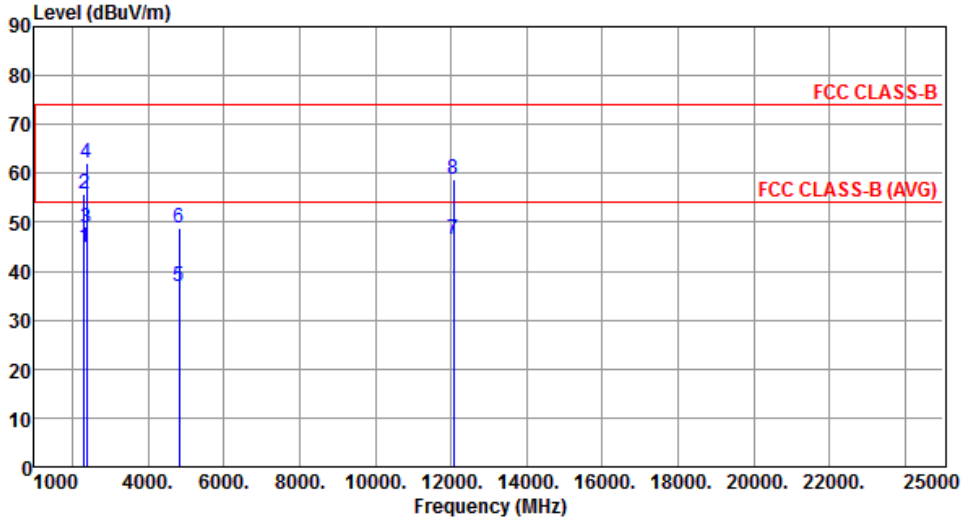
Modulation	HT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2316.00	49.20	54.00	-4.80	48.57	0.63	Average	100	129
2	2316.00	60.32	74.00	-13.68	59.69	0.63	Peak	100	129
3	2390.00	52.71	54.00	-1.29	52.27	0.44	Average	100	129
4	2390.00	67.25	74.00	-6.75	66.81	0.44	Peak	100	129
5	4824.00	36.97	54.00	-17.03	30.57	6.40	Average	100	209
6	4824.00	49.25	74.00	-24.75	42.85	6.40	Peak	100	209
7	12060.00	47.08	54.00	-6.92	30.70	16.38	Average	100	52
8	12060.00	59.04	74.00	-14.96	42.66	16.38	Peak	100	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).

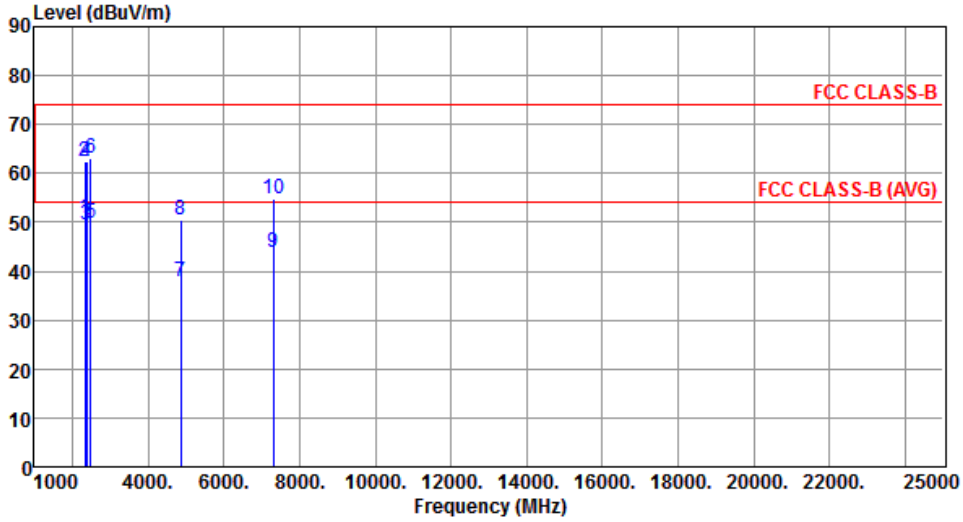
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2316.00	44.86	54.00	-9.14	44.23	0.63	Average	228	110
2	2316.00	55.83	74.00	-18.17	55.20	0.63	Peak	228	110
3	2390.00	48.75	54.00	-5.25	48.31	0.44	Average	228	110
4	2390.00	62.00	74.00	-12.00	61.56	0.44	Peak	228	110
5	4824.00	36.81	54.00	-17.19	30.41	6.40	Average	100	178
6	4824.00	48.80	74.00	-25.20	42.40	6.40	Peak	100	178
7	12060.00	46.49	54.00	-7.51	30.11	16.38	Average	100	56
8	12060.00	58.94	74.00	-15.06	42.56	16.38	Peak	100	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).

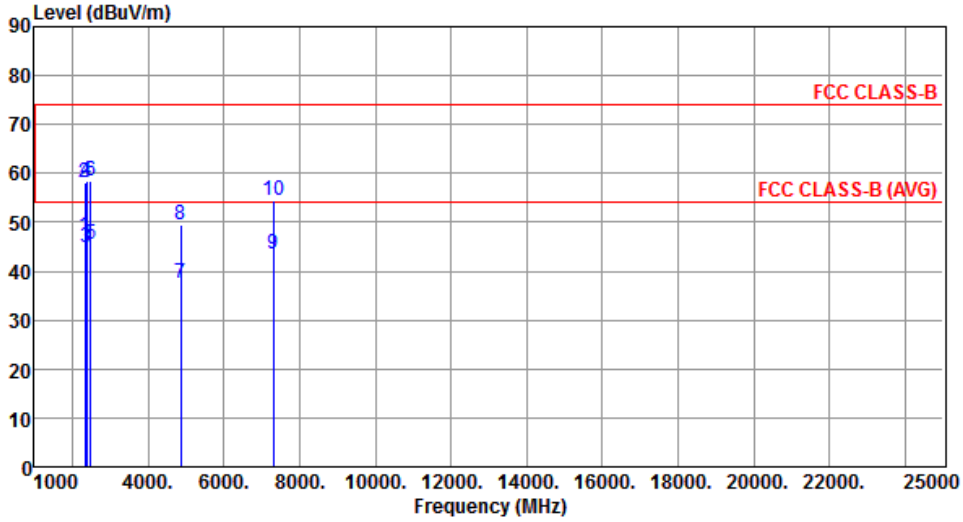
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2341.00	50.97	54.00	-3.03	50.40	0.57	Average	100	127
2	2341.00	62.52	74.00	-11.48	61.95	0.57	Peak	100	127
3	2390.00	49.40	54.00	-4.60	48.96	0.44	Average	100	127
4	2390.00	62.48	74.00	-11.52	62.04	0.44	Peak	100	127
5	2483.50	49.88	54.00	-4.12	49.59	0.29	Average	100	127
6	2483.50	63.04	74.00	-10.96	62.75	0.29	Peak	100	127
7	4874.00	37.95	54.00	-16.05	31.52	6.43	Average	100	207
8	4874.00	50.38	74.00	-23.62	43.95	6.43	Peak	100	207
9	7311.00	43.79	54.00	-10.21	31.87	11.92	Average	100	202
10	7311.00	54.77	74.00	-19.23	42.85	11.92	Peak	100	202

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).

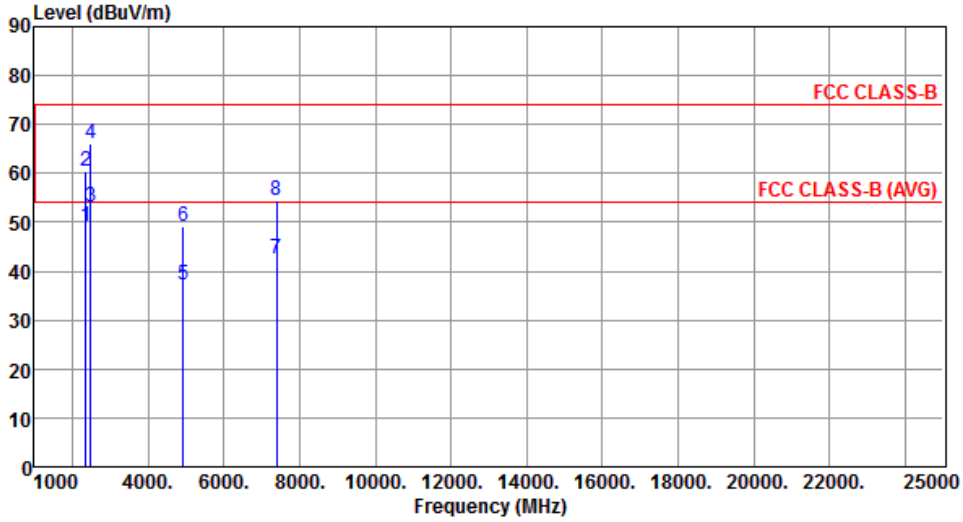
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2341.00	47.12	54.00	-6.88	46.55	0.57	Average	229	111
2	2341.00	58.09	74.00	-15.91	57.52	0.57	Peak	229	111
3	2390.00	44.69	54.00	-9.31	44.25	0.44	Average	229	111
4	2390.00	58.30	74.00	-15.70	57.86	0.44	Peak	229	111
5	2483.50	45.54	54.00	-8.46	45.25	0.29	Average	229	111
6	2483.50	58.59	74.00	-15.41	58.30	0.29	Peak	229	111
7	4874.00	37.68	54.00	-16.32	31.25	6.43	Average	100	180
8	4874.00	49.63	74.00	-24.37	43.20	6.43	Peak	100	180
9	7311.00	43.43	54.00	-10.57	31.51	11.92	Average	100	136
10	7311.00	54.43	74.00	-19.57	42.51	11.92	Peak	100	136

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).

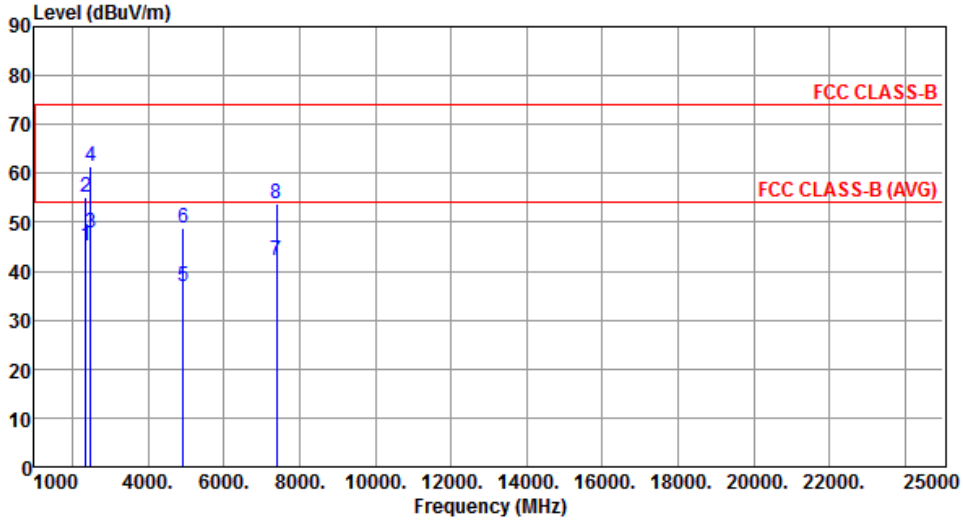
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2366.00	49.06	54.00	-4.94	48.56	0.50	Average	100	126
2	2366.00	60.40	74.00	-13.60	59.90	0.50	Peak	100	126
3	2483.50	52.99	54.00	-1.01	52.70	0.29	Average	100	128
4	2483.50	66.15	74.00	-7.85	65.86	0.29	Peak	100	128
5	4924.00	37.08	54.00	-16.92	30.57	6.51	Average	100	208
6	4924.00	49.14	74.00	-24.86	42.63	6.51	Peak	100	208
7	7386.00	42.58	54.00	-11.42	30.84	11.74	Average	100	204
8	7386.00	54.53	74.00	-19.47	42.79	11.74	Peak	100	204

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

Modulation	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	2366.00	45.02	54.00	-8.98	44.52	0.50	Average	229	109
2	2366.00	55.08	74.00	-18.92	54.58	0.50	Peak	229	109
3	2483.50	47.81	54.00	-6.19	47.52	0.29	Average	229	109
4	2483.50	61.49	74.00	-12.51	61.20	0.29	Peak	229	109
5	4924.00	36.77	54.00	-17.23	30.26	6.51	Average	100	175
6	4924.00	48.93	74.00	-25.07	42.42	6.51	Peak	100	175
7	7386.00	42.07	54.00	-11.93	30.33	11.74	Average	100	136
8	7386.00	53.88	74.00	-20.12	42.14	11.74	Peak	100	136

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

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

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

3.6.2 Test Procedures

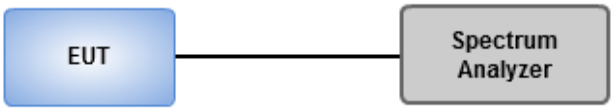
Reference level measurement

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

Emission level measurement

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

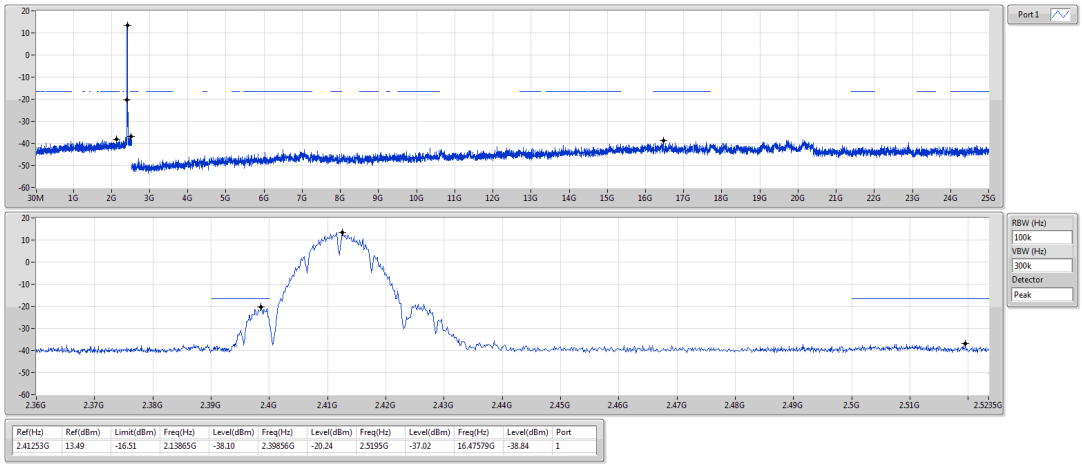
3.6.3 Test Setup



3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

802.11b_Nss1,(1Mbps)_1TX **CSE NdB**

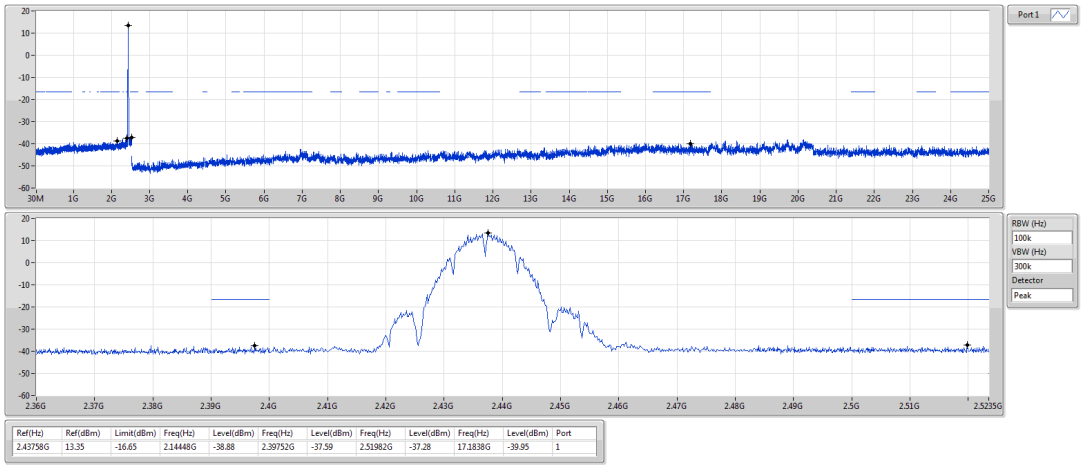
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41253G	13.49	-16.51	2.13865G	-38.10	2.39856G	-20.24	2.5195G	-37.02	16.47579G	-38.84	1

802.11b_Nss1,(1Mbps)_1TX **CSE NdB**

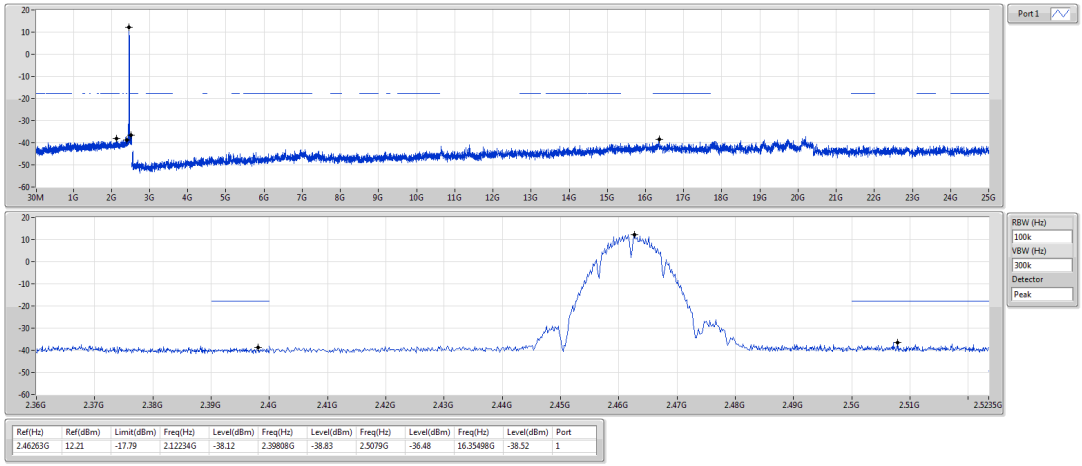
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43758G	13.35	-16.65	2.14448G	-38.88	2.39752G	-37.59	2.51982G	-37.28	17.1838G	-39.95	1

802.11b_Nss1,(1Mbps)_1TX **CSE NdB**

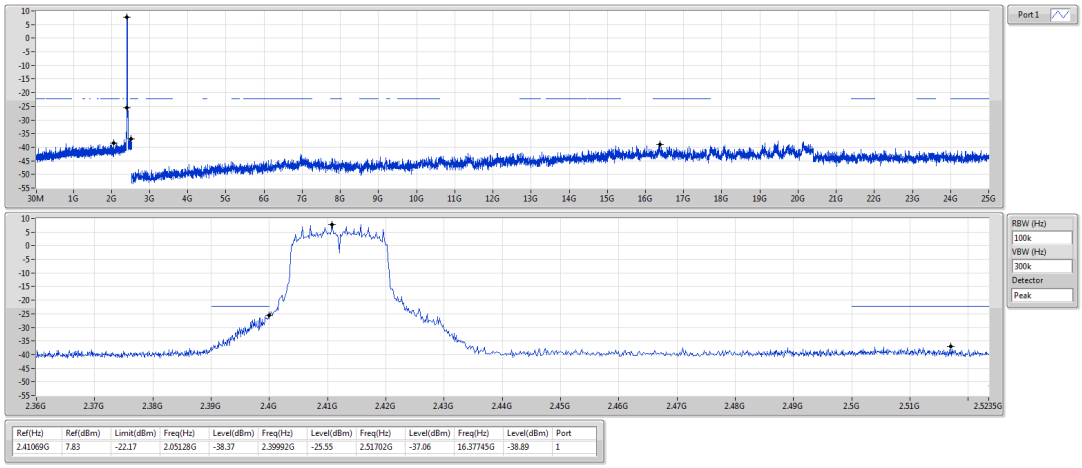
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46263G	12.21	-17.79	2.12234G	-38.12	2.39808G	-38.83	2.5079G	-36.48	16.35498G	-38.52	1

802.11g_Nss1,(6Mbps)_1TX **CSE NdB**

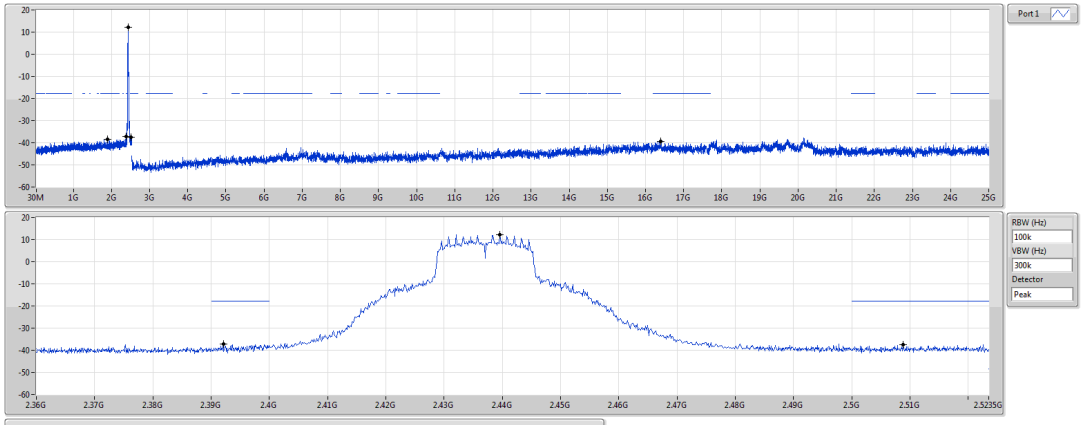
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41069G	7.83	-22.17	2.05128G	-38.37	2.39992G	-25.55	2.51702G	-37.06	16.37745G	-38.89	1

802.11g_Nss1,(6Mbps)_1TX **CSE NdB**

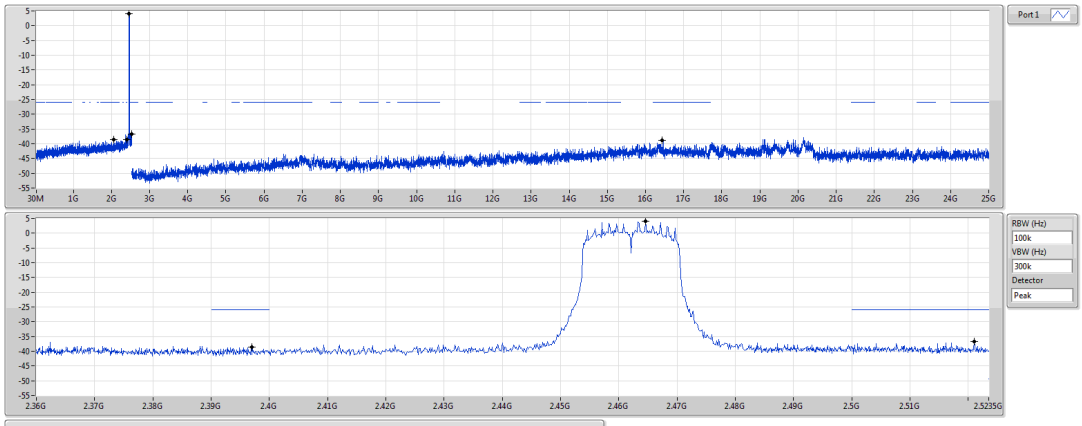
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43958G	12.14	-17.86	1.89284G	-38.58	2.39208G	-37.08	2.50878G	-37.46	16.39993G	-39.27	1

802.11g_Nss1,(6Mbps)_1TX **CSE NdB**

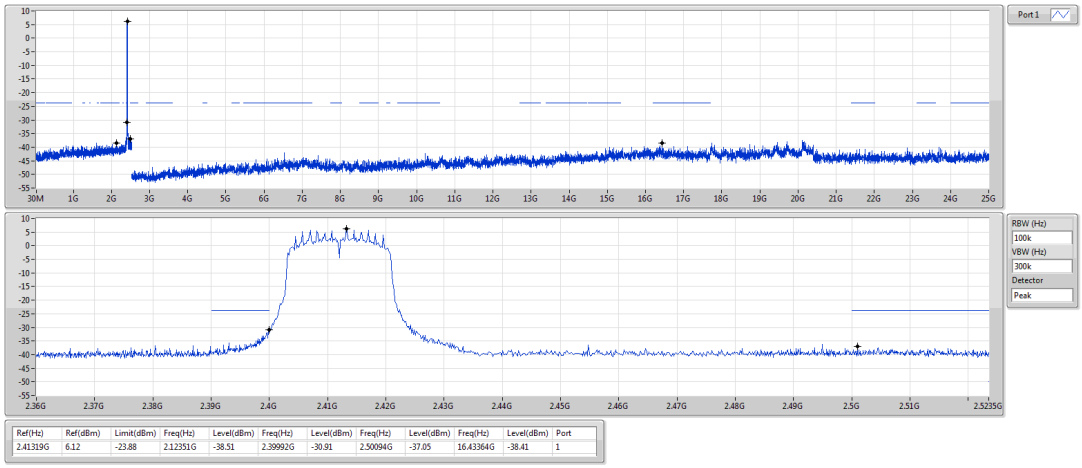
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46463G	4.01	-25.99	2.05477G	-38.57	2.39696G	-38.53	2.52102G	-36.71	16.43364G	-38.77	1

802.11n HT20_Nss1,(MCS0)_1TX **CSE NdB**

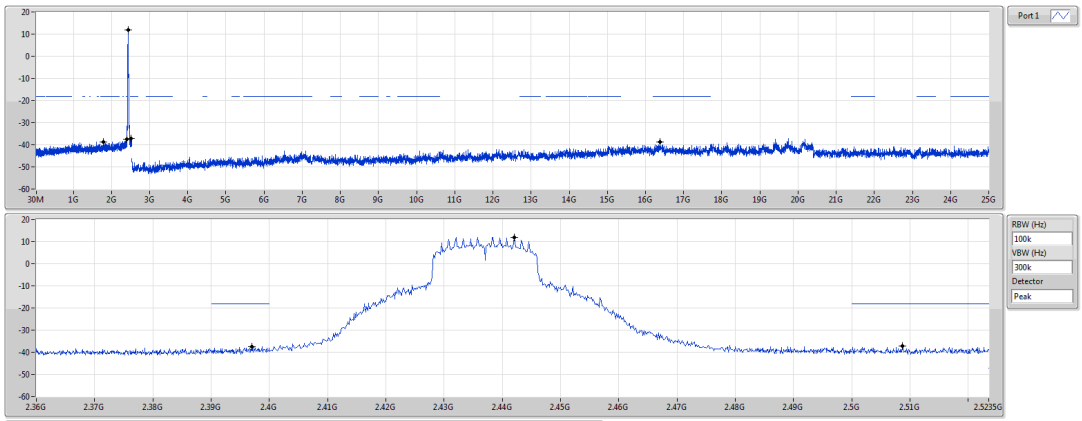
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41319G	6.12	-23.88	2.12351G	-38.51	2.39992G	-30.91	2.50094G	-37.05	16.43364G	-38.41	1

802.11n HT20_Nss1,(MCS0)_1TX **CSE NdB**

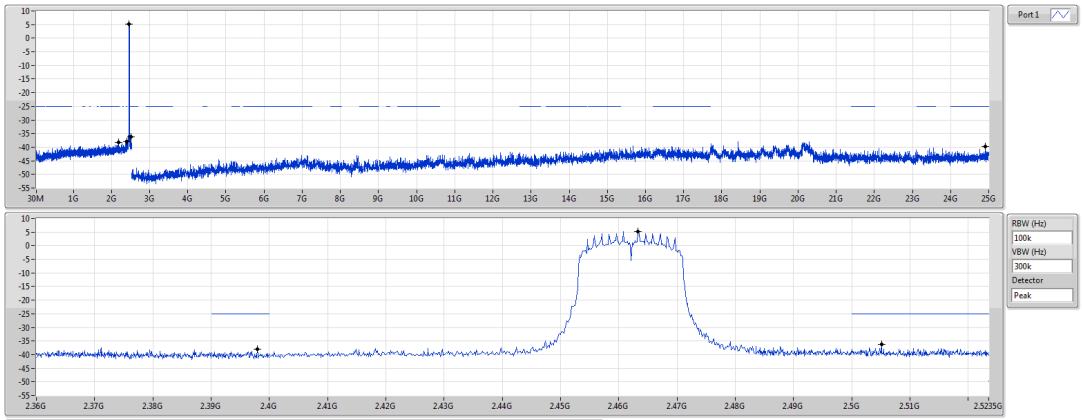
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44208G	12.00	-18.00	1.78799G	-38.73	2.39704G	-37.56	2.5087G	-37.31	16.38869G	-38.87	1

802.11n HT20_Nss1,(MCS0)_1TX **CSE NdB**

2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46329G	5.07	-24.93	2.17593G	-38.23	2.39792G	-38.07	2.5051G	-36.27	24.9129G	-39.74	1

4 Test laboratory information

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

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

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

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

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

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Email: ICC_Service@icertifi.com.tw

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