FCC Test Report

FCC ID	:	**2AVKXHCI20200116**
Equipment	:	**Gen-Star AI Wall Socket**
Model No.	:	**HCI-SP101A**
Brand Name	:	**HCI**
Applicant	:	**HAN CHUANG INTERNATIONAL CO.LTD**
Address	:	**3F., No. 95, Guangfu N. Rd., Songshan Dist., Taipei City 105, Taiwan (R.O.C.)**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Aug. 29, 2019**
Tested Date	:	**Dec. 24, 2019 ~ Jan. 02, 2020**

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

Reviewed by: **Approved by:**

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

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR982902-01AC	Rev. 01	Initial issue	Feb. 26, 2020

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.433MHz 37.38(Margin -9.82dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 4824.00MHz 52.85 (Margin -1.15dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 23.83	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 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.	Type	Connector	Gain (dBi)	Remarks
1	PCB	Fixed	3.71	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	110V, 60Hz , 15A

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	Power cable	Brand: Wu Li Electric Wire Model: ZJCZ.E94163 0.9m shielded without core

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	EspRFtestTool_2.0, Version: v2.0		
Duty Cycle and Duty Factor	**Mode**	**Duty Cycle (%)**	**Duty Factor (dB)**
	11b	89.86%	0.46
	11g	88.53%	0.53
	HT20	87.43%	0.58

1.1.7 Power Index of Test Tool

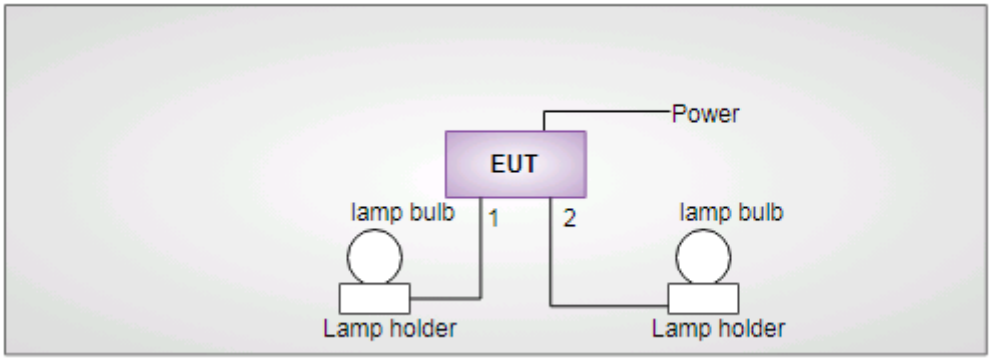
Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	10
11b	2437	10
11b	2462	10
11g	2412	0
11g	2437	0
11g	2462	0
HT20	2412	0
HT20	2437	0
HT20	2462	0

1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Power cord Line	I-SHENG	SP-305	---	---
2	Power cord Line	I-SHENG	SP-305	---	---
3	lamp holder	ICC	ICC	---	---
4	lamp holder	ICC	ICC	---	---
5	lamp bulb	TFC	PS75	---	---
6	lamp bulb	TFC	PS75	---	---

1.3 Test Setup Chart

Test Setup Diagram



No.	Signal cable / Length (m)
1	Power cord Line, 1.7m non-shielded.
2	Power cord Line, 1.7m non-shielded.

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Test Date	Jan. 02, 2020				
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 chamber1 / (03CH01-WS)				
Test Date	Dec. 24 ~ Dec .27, 2019				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101498	Dec. 17, 2019	Dec. 16, 2020
Receiver	R&S	ESR3	101658	Dec. 12, 2019	Dec. 11, 2020
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 12, 2019	Jul. 11, 2020
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 12, 2019	Dec. 11, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2019	Nov. 14, 2020
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2019	Nov. 12, 2020
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 07, 2019	Oct. 06, 2020
Preamplifier	EMC	EMC02325	980225	Jul. 09, 2019	Jul. 08, 2020
Preamplifier	Agilent	83017A	MY39501308	Oct. 08, 2019	Oct. 07, 2020
Preamplifier	EMC	EMC184045B	980192	Aug. 01, 2019	Jul. 31, 2020
RF Cable	EMC	EMC104-SM-SM-8000	181106	Oct. 07, 2019	Oct. 06, 2020
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 07, 2019	Oct. 06, 2020
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 07, 2019	Oct. 06, 2020
LF cable 1M	EMC	EMCCFD400-NM-NM-1000	160502	Oct. 07, 2019	Oct. 06, 2020
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 07, 2019	Oct. 06, 2020
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Oct. 07, 2019	Oct. 06, 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)				
Test Date	Jan. 02, 2020				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Apr. 17, 2019	Apr. 16, 2020
Power Meter	Anritsu	ML2495A	1241002	Oct. 23, 2019	Oct. 22, 2020
Power Sensor	Anritsu	MA2411B	1207366	Oct. 23, 2019	Oct. 22, 2020
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 02, 2019	Dec. 01, 2020
Measurement Software	--	SENSE-15247_DTS	V5.10	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
Radiated emission ≤ 1GHz	±3.41 dB
Radiated emission > 1GHz	±4.59 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C / 69%	Akun Chung
Radiated Emissions	03CH01-WS	22°C / 68%	Akun Chung
RF Conducted	TH01-WS	22°C / 63%	Brad Wu

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- 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	HT20	2462	MCS 0	---
Radiated Emissions ≤1GHz	HT20	2462	MCS 0	---
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 **Z-plane** results were found as the worst case and were shown in this report.

3 Transmitter Test Results

3.1 Conducted Emissions

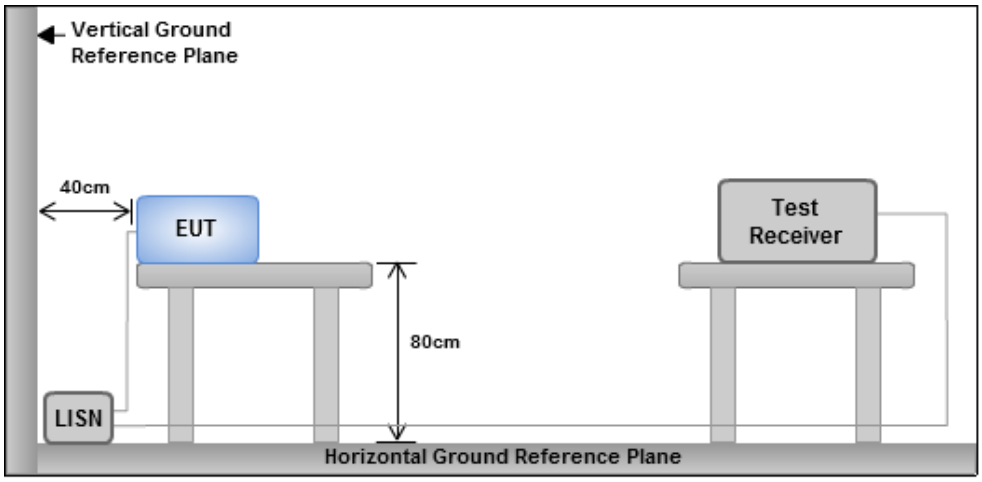
3.1.1 Limit of Conducted Emissions

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.

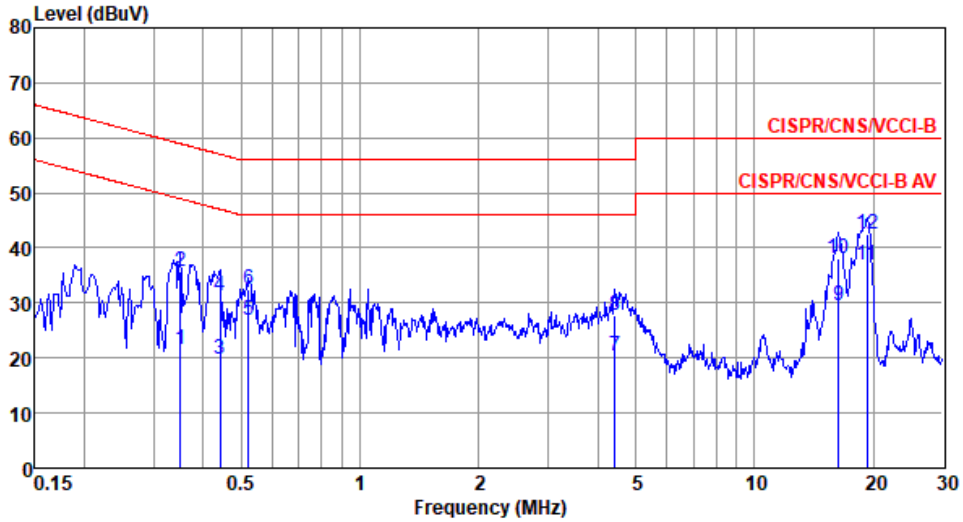
3.1.3 Test Setup



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

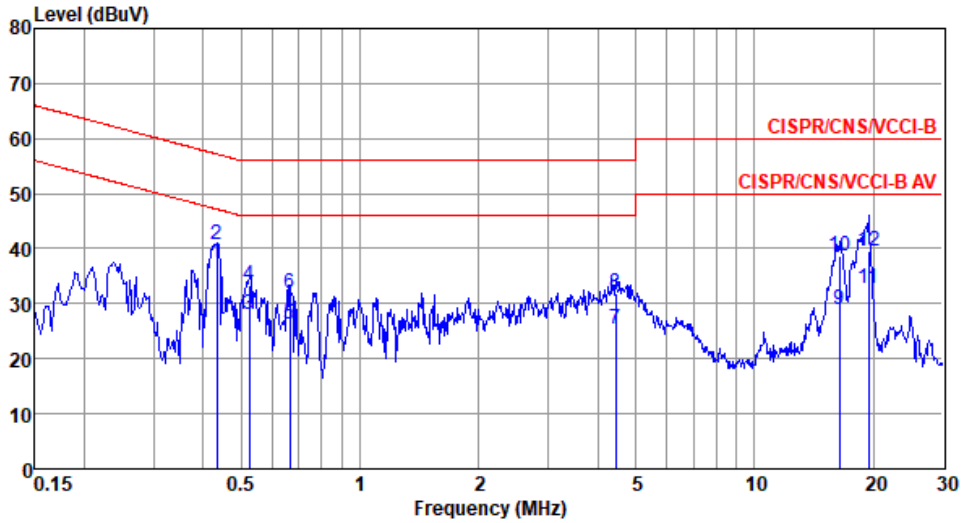
Modulation	HT20	Test Freq. (MHz)	2462
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.350	21.54	48.96	-27.42	11.66	9.56	0.08	Average
2	0.350	35.71	58.96	-23.25	25.83	9.56	0.08	QP
3	0.442	19.64	47.02	-27.38	9.73	9.57	0.08	Average
4	0.442	31.24	57.02	-25.78	21.33	9.57	0.08	QP
5	0.521	26.82	46.00	-19.18	16.88	9.58	0.09	Average
6	0.521	32.38	56.00	-23.62	22.44	9.58	0.09	QP
7	4.430	20.27	46.00	-25.73	9.99	9.61	0.30	Average
8	4.430	27.81	56.00	-28.19	17.53	9.61	0.30	QP
9	16.312	29.41	50.00	-20.59	18.61	9.66	0.62	Average
10	16.312	37.99	60.00	-22.01	27.19	9.66	0.62	QP
11*	19.326	36.95	50.00	-13.05	26.05	9.66	0.65	Average
12	19.326	42.43	60.00	-17.57	31.53	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	HT20	Test Freq. (MHz)	2462
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1*	0.433	37.38	47.20	-9.82	27.52	9.61	0.08	Average
2	0.433	40.88	57.20	-16.32	31.02	9.61	0.08	QP
3	0.524	27.93	46.00	-18.07	18.04	9.62	0.09	Average
4	0.524	33.40	56.00	-22.60	23.51	9.62	0.09	QP
5	0.665	26.17	46.00	-19.83	16.25	9.63	0.10	Average
6	0.665	31.82	56.00	-24.18	21.90	9.63	0.10	QP
7	4.454	25.47	46.00	-20.53	15.23	9.67	0.30	Average
8	4.454	31.86	56.00	-24.14	21.62	9.67	0.30	QP
9	16.398	29.01	50.00	-20.99	18.19	9.78	0.62	Average
10	16.398	38.60	60.00	-21.40	27.78	9.78	0.62	QP
11	19.428	32.64	50.00	-17.36	21.67	9.81	0.65	Average
12	19.428	39.61	60.00	-20.39	28.64	9.81	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).

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

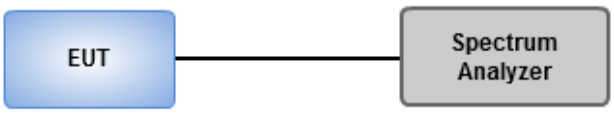
6dB Bandwidth

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	8.551M	10.492M	10M5G1D	8.116M	10.42M
802.11g_Nss1,(6Mbps)_1TX	16.377M	16.425M	16M4D1D	16.014M	16.353M
802.11n HT20_Nss1,(MCS0)_1TX	16.594M	17.438M	17M4D1D	16.087M	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;

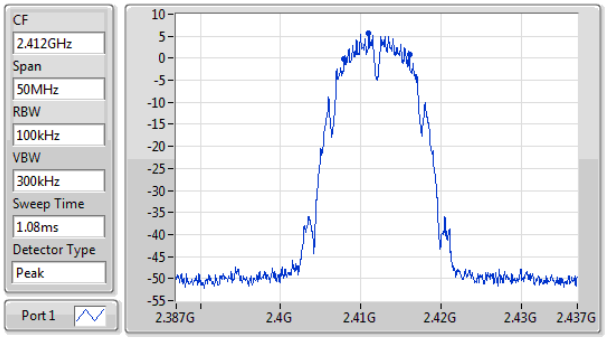
Result

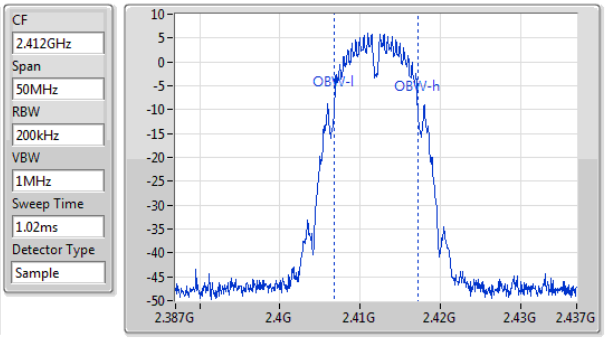
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	8.116M	10.42M
2437MHz	Pass	500k	8.551M	10.492M
2462MHz	Pass	500k	8.116M	10.492M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	16.014M	16.353M
2437MHz	Pass	500k	16.232M	16.353M
2462MHz	Pass	500k	16.377M	16.425M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	16.304M	17.438M
2437MHz	Pass	500k	16.594M	17.366M
2462MHz	Pass	500k	16.087M	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

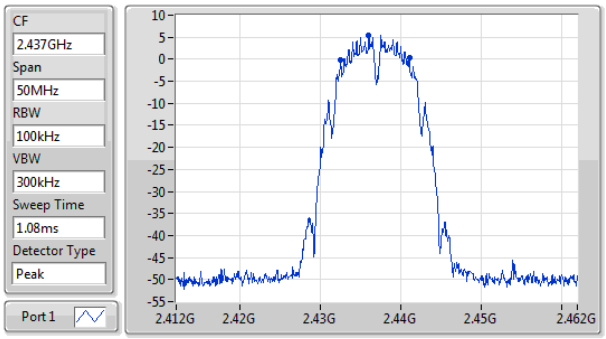


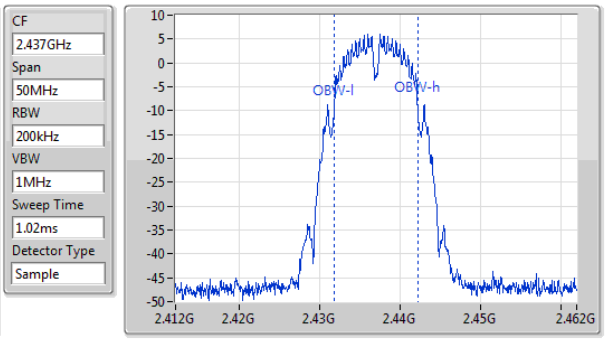


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.116M	2.407942G	2.416058G	10.42M	2.40679G	2.41721G	500k	1

802.11b_Nss1,(1Mbps)_1TX EBW

2437MHz

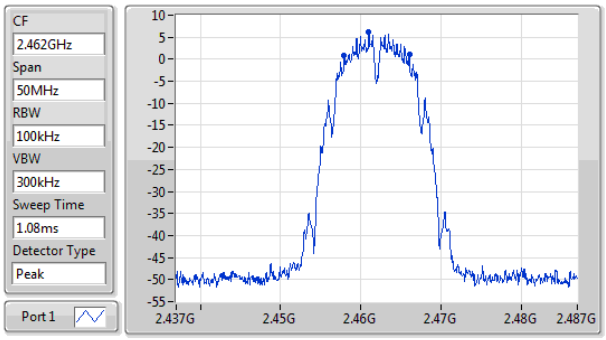


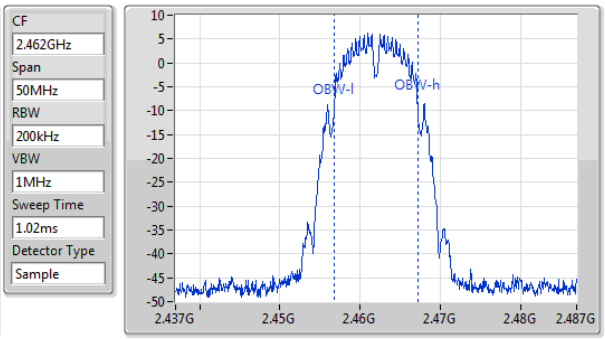


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.551M	2.432507G	2.441058G	10.492M	2.431718G	2.44221G	500k	1

802.11b_Nss1,(1Mbps)_1TX EBW

2462MHz

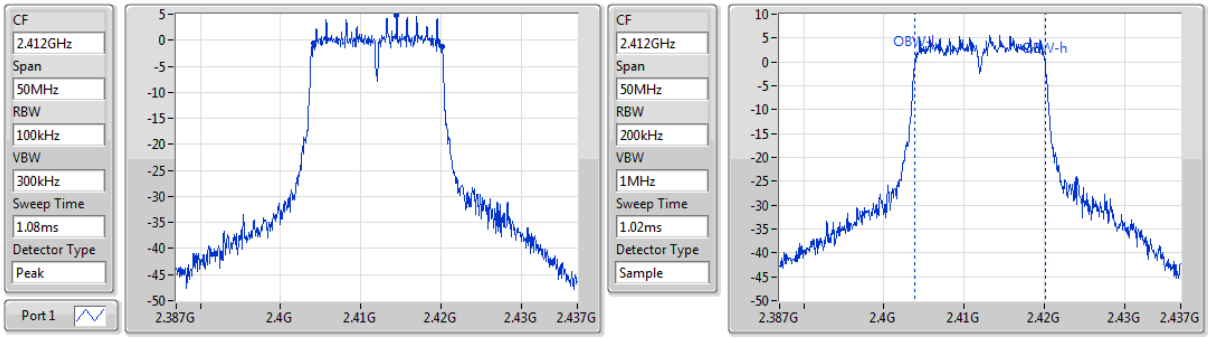




6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.116M	2.457942G	2.466058G	10.492M	2.456718G	2.46721G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

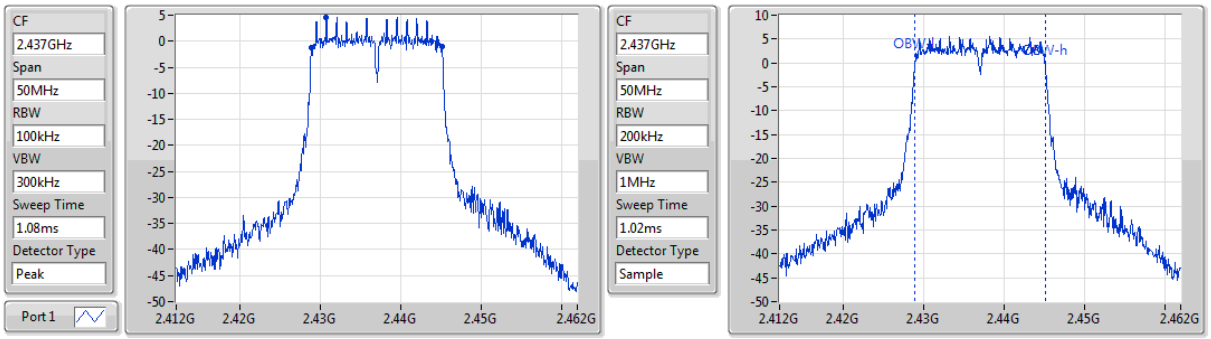
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.014M	2.404101G	2.420116G	16.353M	2.403823G	2.420177G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

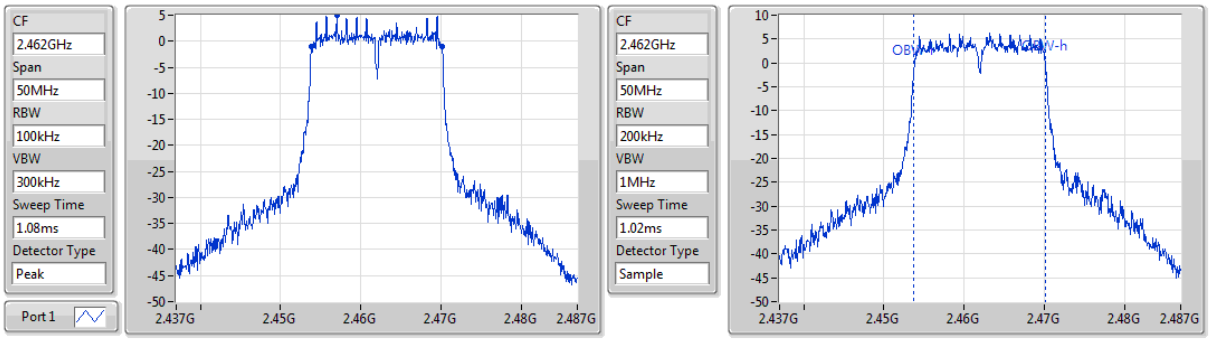
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.232M	2.428884G	2.445116G	16.353M	2.428823G	2.445177G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

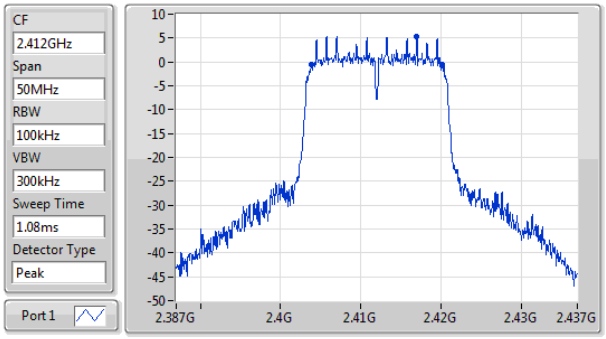
2462MHz

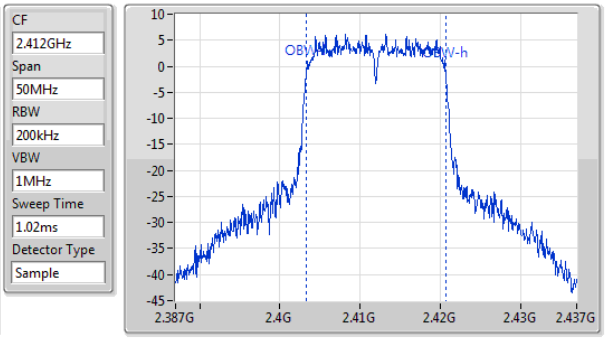


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.377M	2.453812G	2.470188G	16.425M	2.453751G	2.470177G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

2412MHz

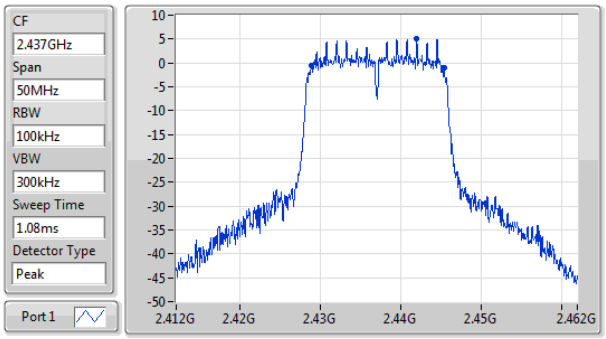


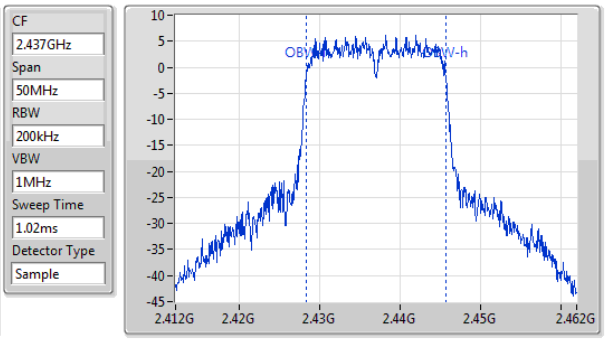


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.304M	2.403812G	2.420116G	17.438M	2.403245G	2.420683G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

2437MHz

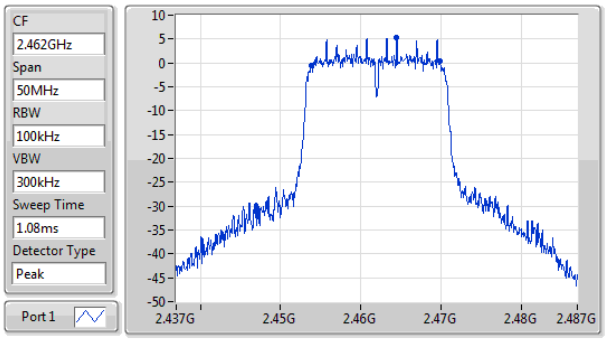


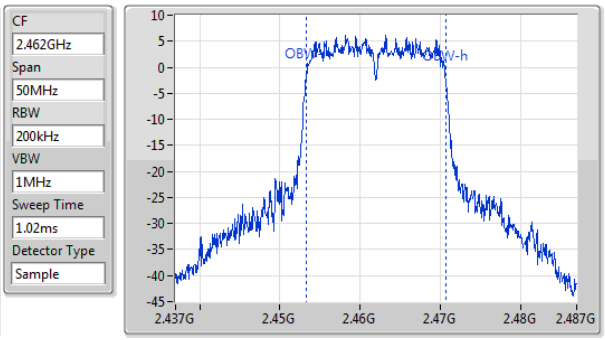


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.594M	2.428812G	2.445406G	17.366M	2.428317G	2.445683G	500k	1

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
16.087M	2.453812G	2.469899G	17.438M	2.453245G	2.470683G	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.

Antenna gain > 6dBi

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

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

Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations ,no any corresponding reduction is in transmitter peak output power

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

Peak Power

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	18.66	0.07345
802.11g_Nss1,(6Mbps)_1TX	23.74	0.23659
802.11n HT20_Nss1,(MCS0)_1TX	**23.83**	0.24155

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	1.00	18.42	18.42	30.00	19.42	36.00
2437MHz	Pass	1.00	18.29	18.29	30.00	19.29	36.00
2462MHz	Pass	1.00	18.66	18.66	30.00	19.66	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	1.00	23.68	23.68	30.00	24.68	36.00
2437MHz	Pass	1.00	23.68	23.68	30.00	24.68	36.00
2462MHz	Pass	1.00	23.74	23.74	30.00	24.74	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	1.00	23.74	23.74	30.00	24.74	36.00
2437MHz	Pass	1.00	23.77	23.77	30.00	24.77	36.00
2462MHz	Pass	1.00	23.83	23.83	30.00	24.83	36.00

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

Average Power

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	15.31	0.03396
802.11g_Nss1,(6Mbps)_1TX	17.24	0.05297
802.11n HT20_Nss1,(MCS0)_1TX	16.99	0.05000

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	1.00	15.12	15.12	-	16.12	-
2437MHz	Pass	1.00	14.93	14.93	-	15.93	-
2462MHz	Pass	1.00	15.31	15.31	-	16.31	-
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	1.00	16.91	16.91	-	17.91	-
2437MHz	Pass	1.00	16.84	16.84	-	17.84	-
2462MHz	Pass	1.00	17.24	17.24	-	18.24	-
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	1.00	16.71	16.71	-	17.71	-
2437MHz	Pass	1.00	16.60	16.60	-	17.60	-
2462MHz	Pass	1.00	16.99	16.99	-	17.99	-

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 ≥ 98%

1. Set the RBW = 3 kHz, VBW = 10 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 = 3 kHz, VBW = 10 kHz. Detector = RMS.

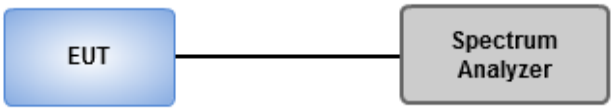
2 Set the sweep time to: ≥ 10 (number of measurement points in sweep) x (total on/off period of the transmitted signal).

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	-8.77
802.11g_Nss1,(6Mbps)_1TX	-8.87
802.11n HT20_Nss1,(MCS0)_1TX	-9.21

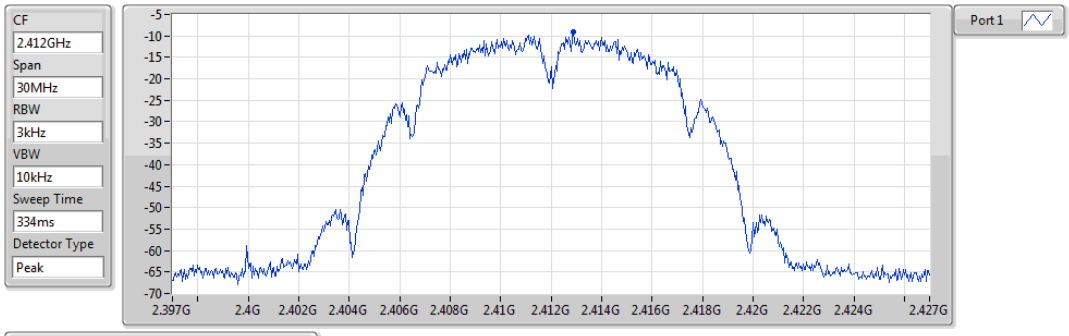
Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	1.00	-9.13	-9.13	8.00
2437MHz	Pass	1.00	-9.40	-9.40	8.00
2462MHz	Pass	1.00	-8.77	-8.77	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	1.00	-9.28	-9.28	8.00
2437MHz	Pass	1.00	-9.41	-9.41	8.00
2462MHz	Pass	1.00	-8.87	-8.87	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	1.00	-9.56	-9.56	8.00
2437MHz	Pass	1.00	-9.24	-9.24	8.00
2462MHz	Pass	1.00	-9.21	-9.21	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**

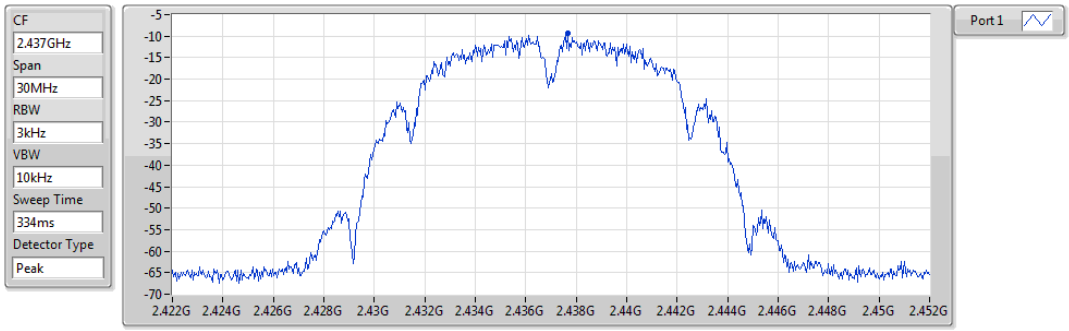
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.13	-9.13	-9.13

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

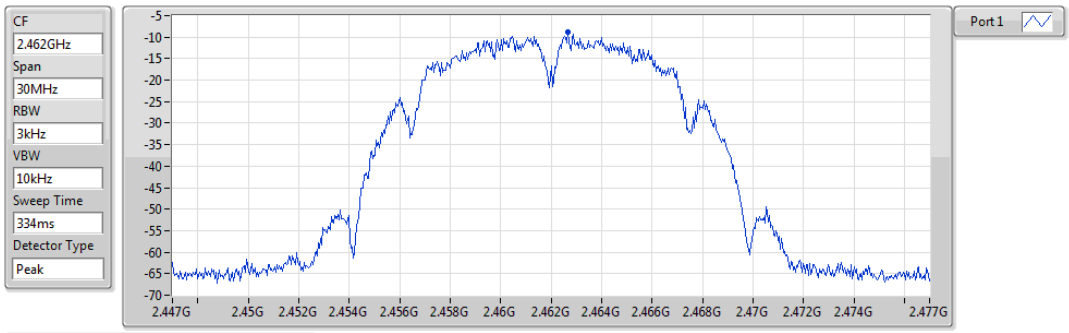
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.40	-9.40	-9.40

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

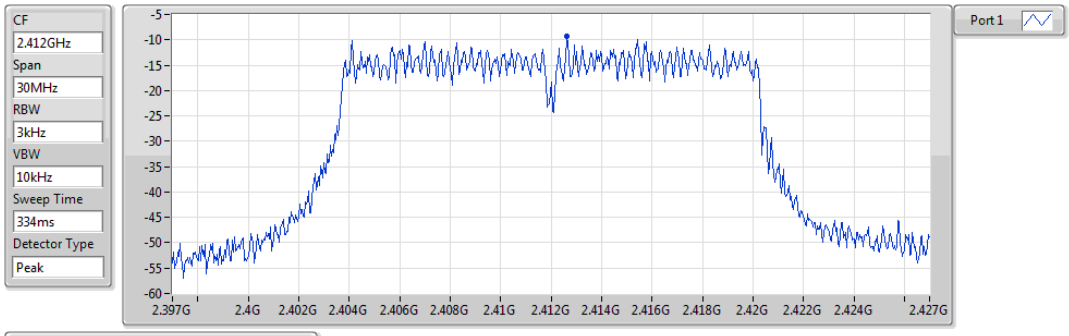
2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.77	-8.77	-8.77

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

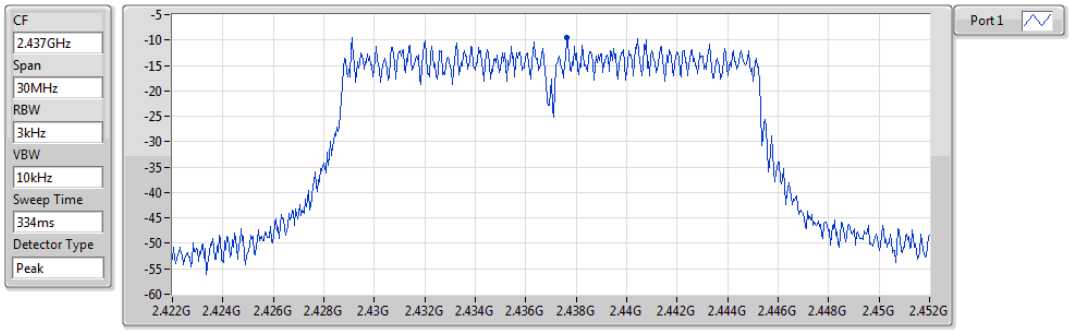
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.28	-9.28	-9.28

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

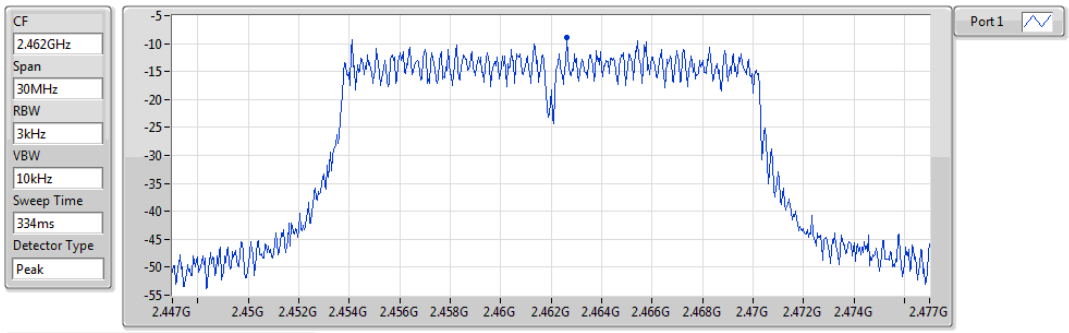
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.41	-9.41	-9.41

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

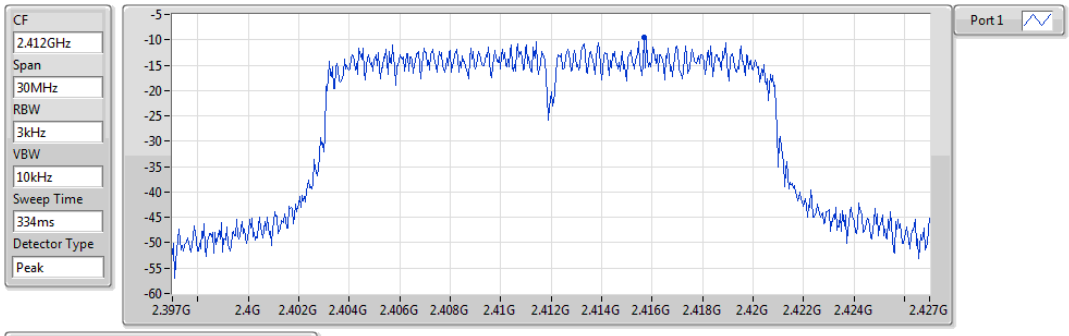
2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.87	-8.87	-8.87

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

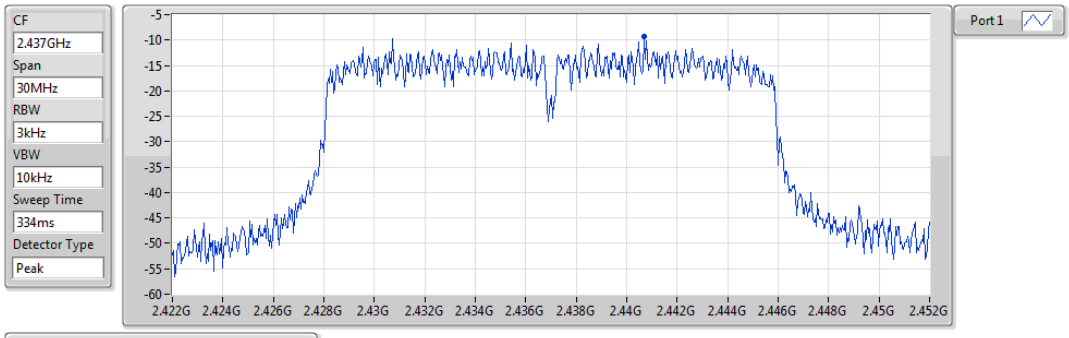
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.56	-9.56	-9.56

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

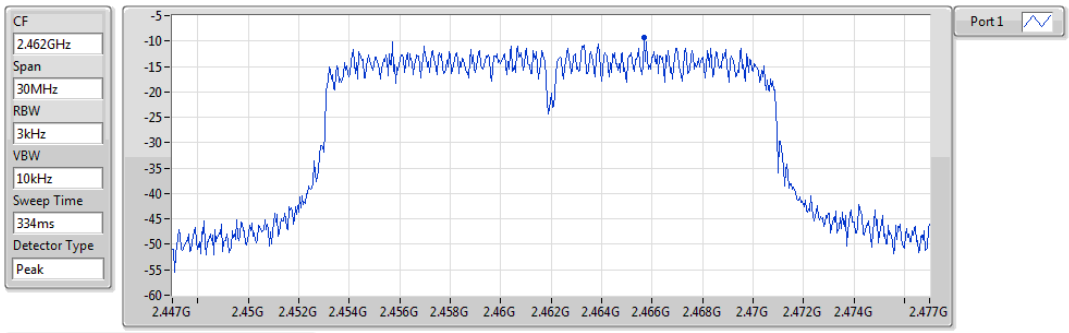
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.24	-9.24	-9.24

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

2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.21	-9.21	-9.21

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

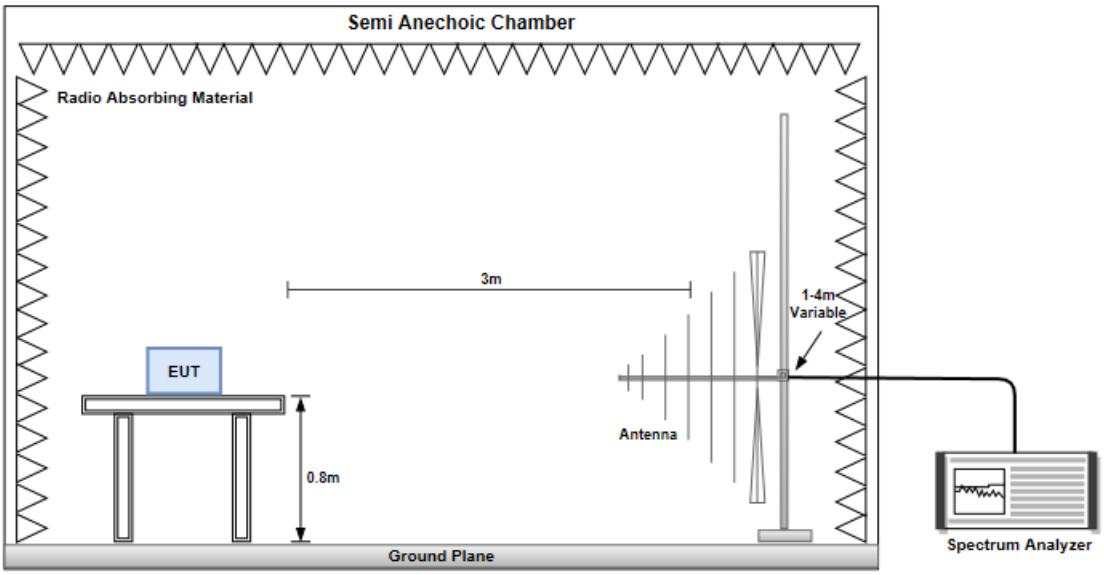
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

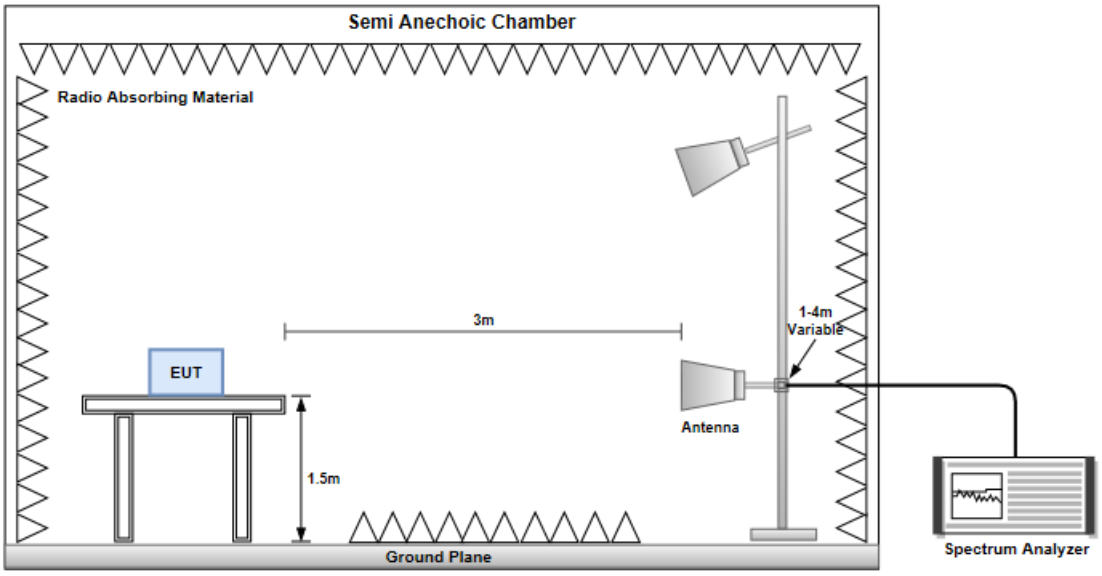
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

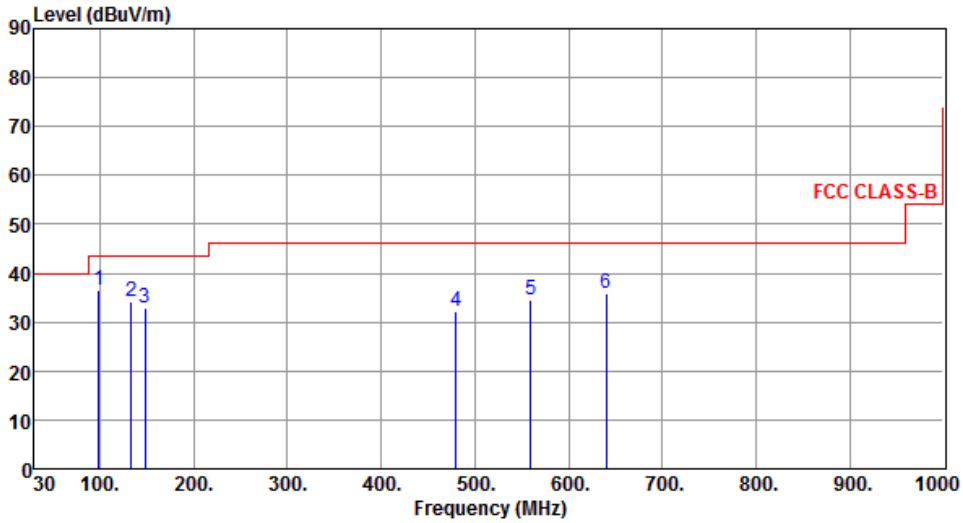


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

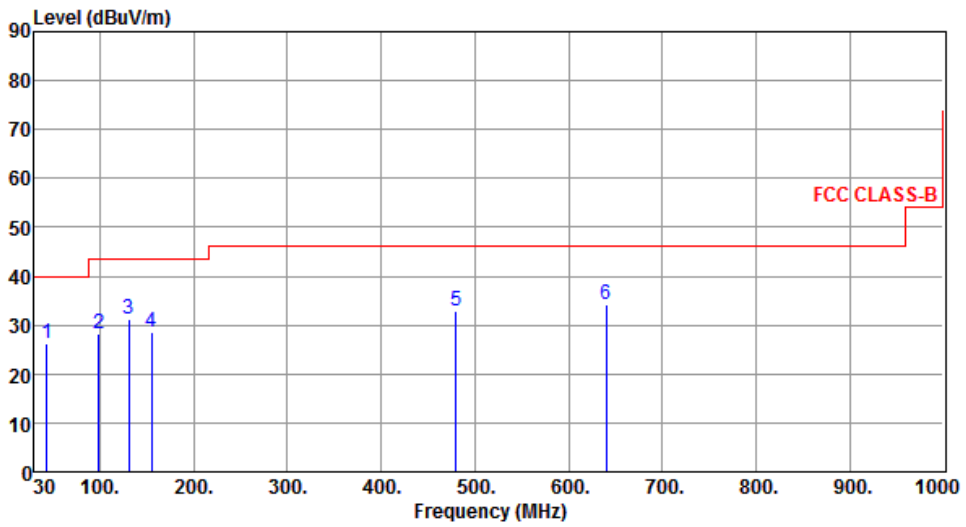
Modulation	HT20	**Test Freq. (MHz)**	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	98.87	36.56	43.50	-6.94	49.78	-13.22	Peak	---	---
2	133.79	34.33	43.50	-9.17	43.64	-9.31	Peak	---	---
3	148.34	32.94	43.50	-10.56	41.38	-8.44	Peak	---	---
4	480.08	32.09	46.00	-13.91	35.59	-3.50	Peak	---	---
5	559.62	34.39	46.00	-11.61	36.63	-2.24	Peak	---	---
6	640.13	36.02	46.00	-9.98	36.25	-0.23	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	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

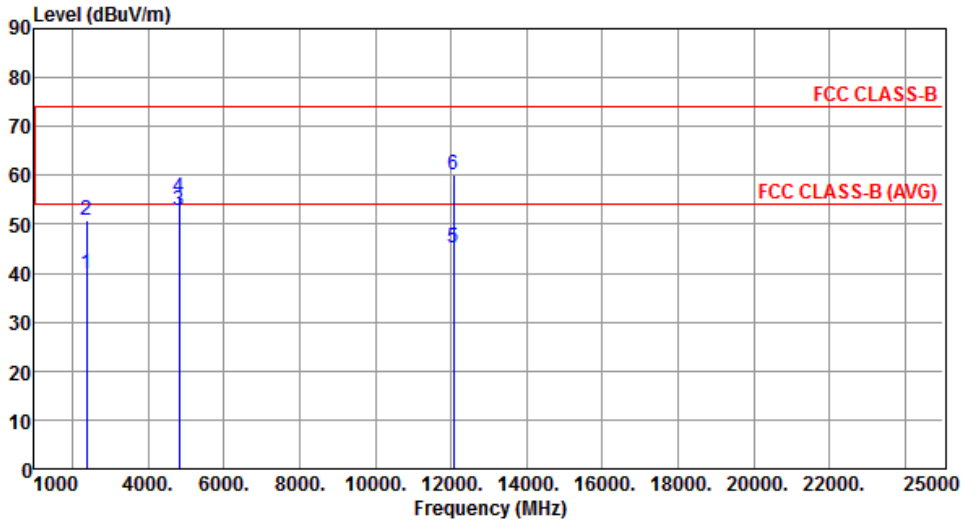


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	43.58	26.32	40.00	-13.68	34.54	-8.22	Peak	---	---
2	98.87	28.22	43.50	-15.28	41.44	-13.22	Peak	---	---
3	130.88	31.13	43.50	-12.37	40.71	-9.58	Peak	---	---
4	155.13	28.64	43.50	-14.86	36.97	-8.33	Peak	---	---
5	480.08	33.03	46.00	-12.97	36.53	-3.50	Peak	---	---
6	640.13	34.20	46.00	-11.80	34.43	-0.23	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

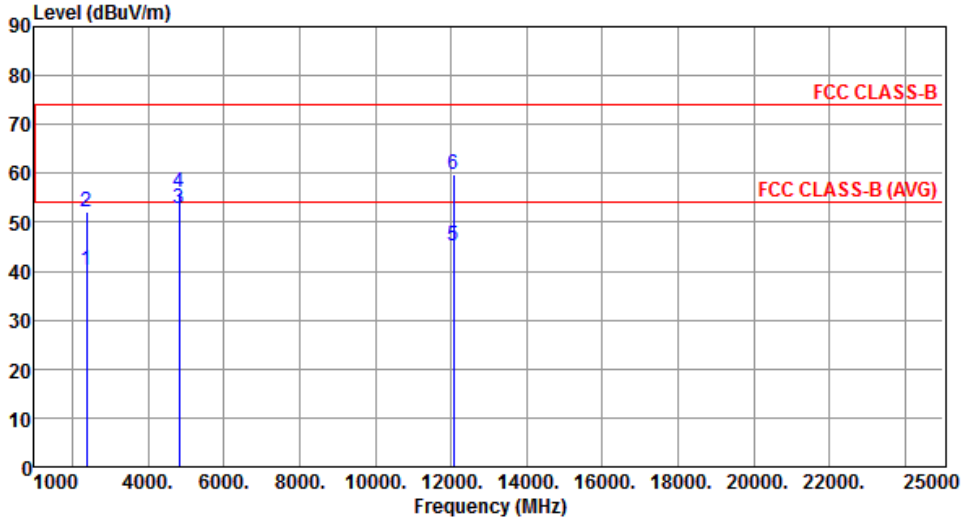
Modulation	11b	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	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	39.91	54.00	-14.09	42.71	-2.80	Average	104	355
2	2390.00	50.74	74.00	-23.26	53.54	-2.80	Peak	104	355
3	4824.00	52.85	54.00	-1.15	49.25	3.60	Average	259	344
4	4824.00	55.39	74.00	-18.61	51.79	3.60	Peak	259	344
5	12060.00	45.19	54.00	-8.81	31.34	13.85	Average	165	224
6	12060.00	60.21	74.00	-13.79	46.36	13.85	Peak	165	224

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

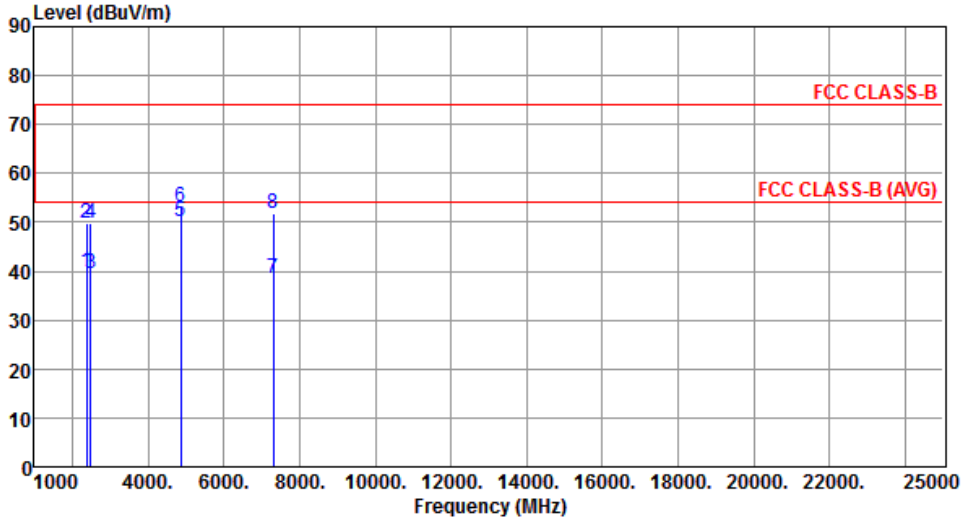
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	40.30	54.00	-13.70	43.10	-2.80	Average	252	306
2	2390.00	52.08	74.00	-21.92	54.88	-2.80	Peak	252	306
3	4824.00	52.71	54.00	-1.29	49.11	3.60	Average	298	187
4	4824.00	56.28	74.00	-17.72	52.68	3.60	Peak	298	187
5	12060.00	45.09	54.00	-8.91	31.24	13.85	Average	295	146
6	12060.00	59.81	74.00	-14.19	45.96	13.85	Peak	295	146

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

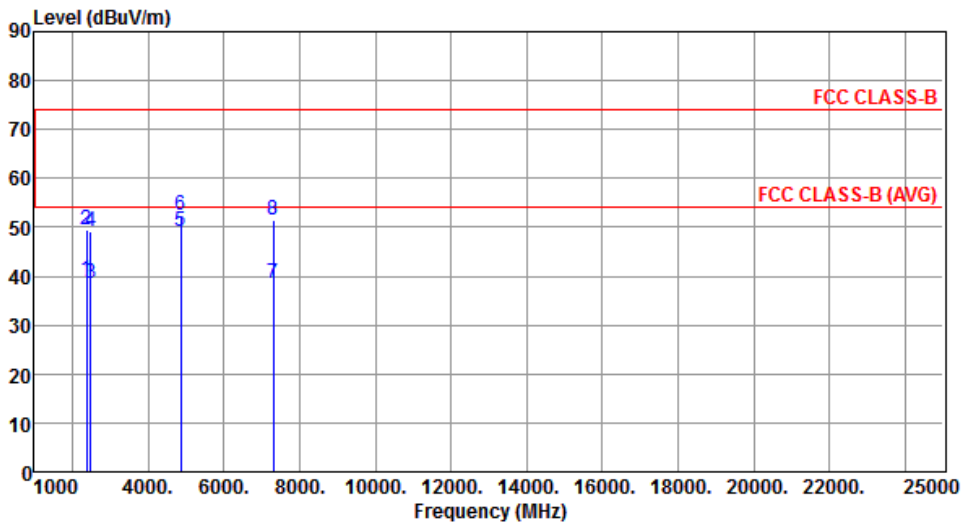
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.95	54.00	-14.05	42.75	-2.80	Average	108	356
2	2390.00	49.86	74.00	-24.14	52.66	-2.80	Peak	108	356
3	2483.50	39.63	54.00	-14.37	42.66	-3.03	Average	108	356
4	2483.50	49.68	74.00	-24.32	52.71	-3.03	Peak	108	356
5	4874.00	50.22	54.00	-3.78	46.58	3.64	Average	268	353
6	4874.00	53.10	74.00	-20.90	49.46	3.64	Peak	268	353
7	7311.00	38.49	54.00	-15.51	29.22	9.27	Average	262	304
8	7311.00	51.91	74.00	-22.09	42.64	9.27	Peak	262	304

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

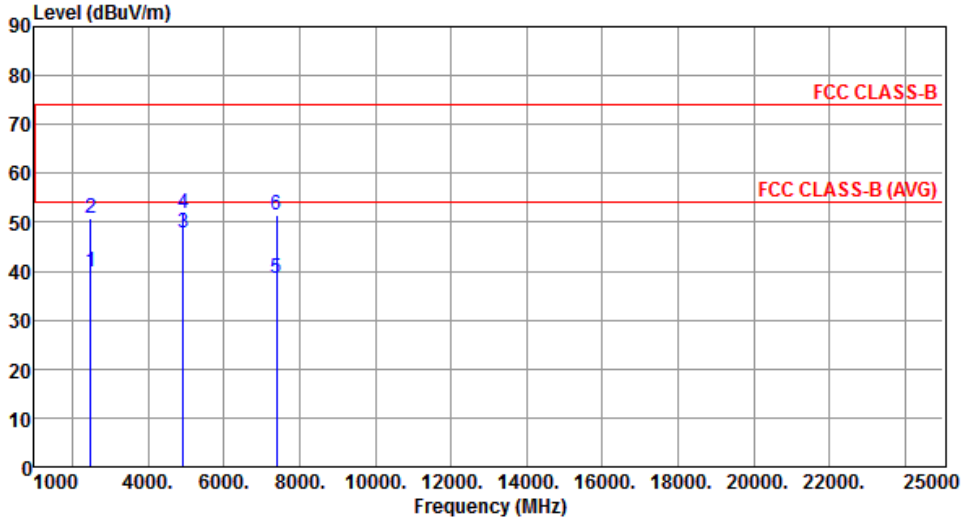
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.19	54.00	-14.81	41.99	-2.80	Average	241	300
2	2390.00	49.40	74.00	-24.60	52.20	-2.80	Peak	241	300
3	2483.50	38.47	54.00	-15.53	41.50	-3.03	Average	241	300
4	2483.50	49.07	74.00	-24.93	52.10	-3.03	Peak	241	300
5	4874.00	49.29	54.00	-4.71	45.65	3.64	Average	291	217
6	4874.00	52.59	74.00	-21.41	48.95	3.64	Peak	291	217
7	7311.00	38.42	54.00	-15.58	29.15	9.27	Average	295	201
8	7311.00	51.40	74.00	-22.60	42.13	9.27	Peak	295	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).

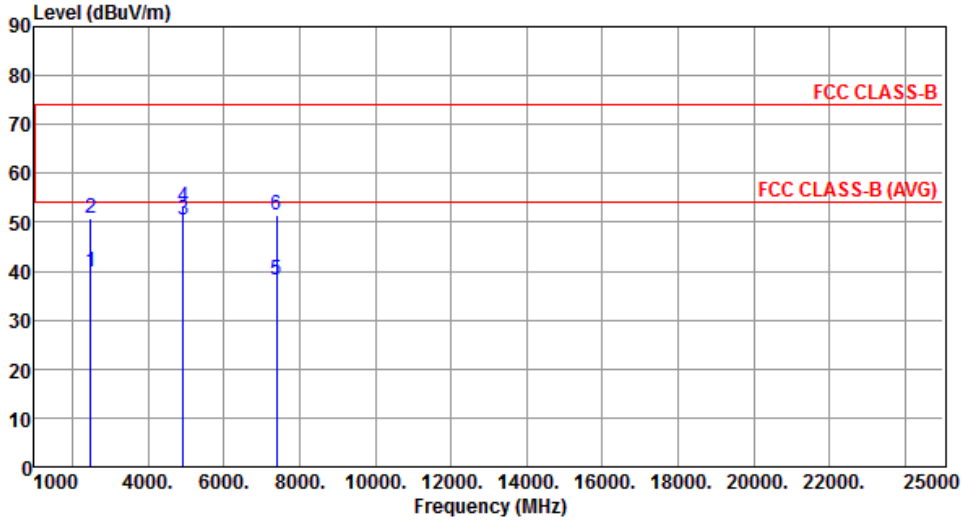
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		



	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	39.71	54.00	-14.29	42.74	-3.03	Average	105	353
2	2483.50	50.72	74.00	-23.28	53.75	-3.03	Peak	105	353
3	4924.00	47.95	54.00	-6.05	44.26	3.69	Average	292	18
4	4924.00	51.83	74.00	-22.17	48.14	3.69	Peak	292	18
5	7386.00	38.53	54.00	-15.47	29.46	9.07	Average	293	24
6	7386.00	51.40	74.00	-22.60	42.33	9.07	Peak	293	24

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

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

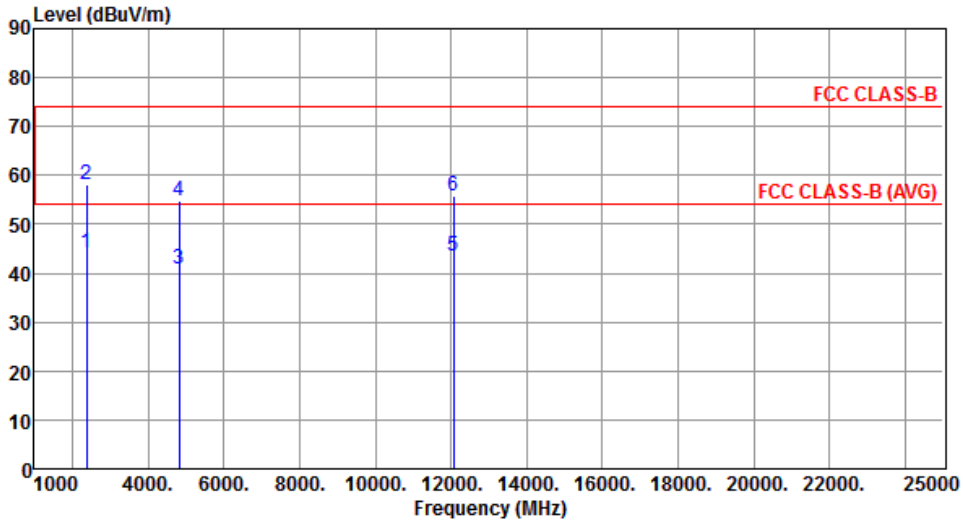


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	39.74	54.00	-14.26	42.77	-3.03	Average	253	309
2	2483.50	50.82	74.00	-23.18	53.85	-3.03	Peak	253	309
3	4924.00	50.38	54.00	-3.62	46.69	3.69	Average	281	218
4	4924.00	53.02	74.00	-20.98	49.33	3.69	Peak	281	218
5	7386.00	38.31	54.00	-15.69	29.24	9.07	Average	300	204
6	7386.00	51.52	74.00	-22.48	42.45	9.07	Peak	300	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).

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

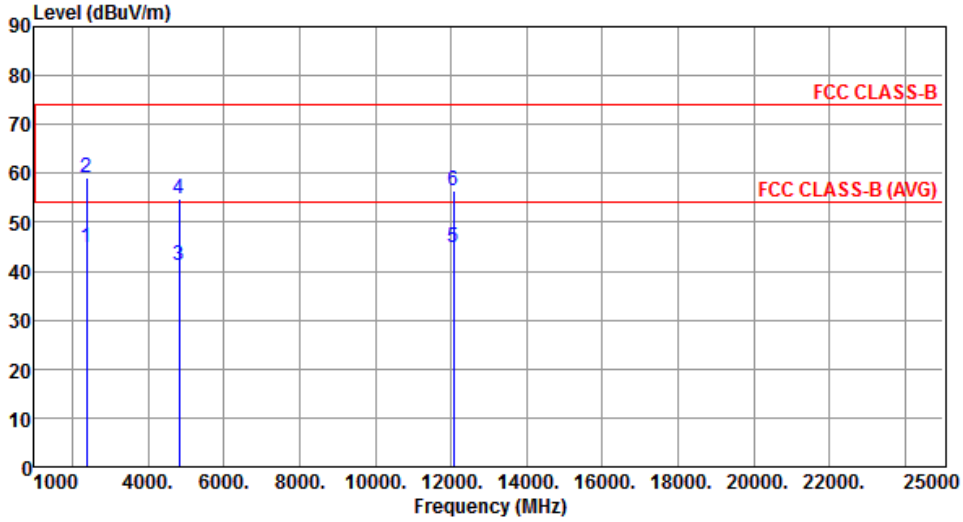
Modulation	11g	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	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	44.07	54.00	-9.93	46.87	-2.80	Average	147	5
2	2390.00	58.26	74.00	-15.74	61.06	-2.80	Peak	147	5
3	4824.00	40.81	54.00	-13.19	37.21	3.60	Average	299	20
4	4824.00	54.64	74.00	-19.36	51.04	3.60	Peak	299	20
5	12060.00	43.51	54.00	-10.49	29.66	13.85	Average	100	21
6	12060.00	55.93	74.00	-18.07	42.08	13.85	Peak	100	21

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

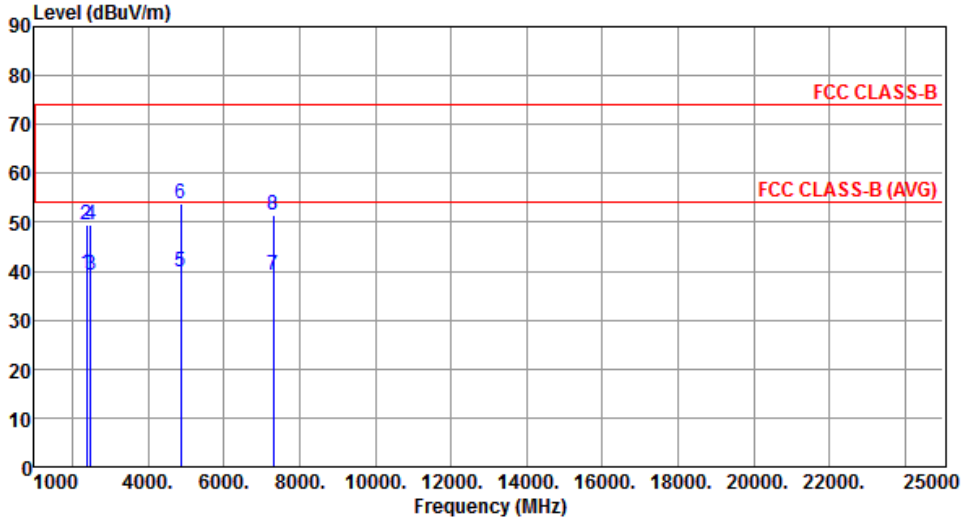
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	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	44.81	54.00	-9.19	47.61	-2.80	Average	248	303
2	2390.00	59.13	74.00	-14.87	61.93	-2.80	Peak	248	303
3	4824.00	41.18	54.00	-12.82	37.58	3.60	Average	305	188
4	4824.00	54.81	74.00	-19.19	51.21	3.60	Peak	305	188
5	12060.00	44.67	54.00	-9.33	30.82	13.85	Average	100	185
6	12060.00	56.40	74.00	-17.60	42.55	13.85	Peak	100	185

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).

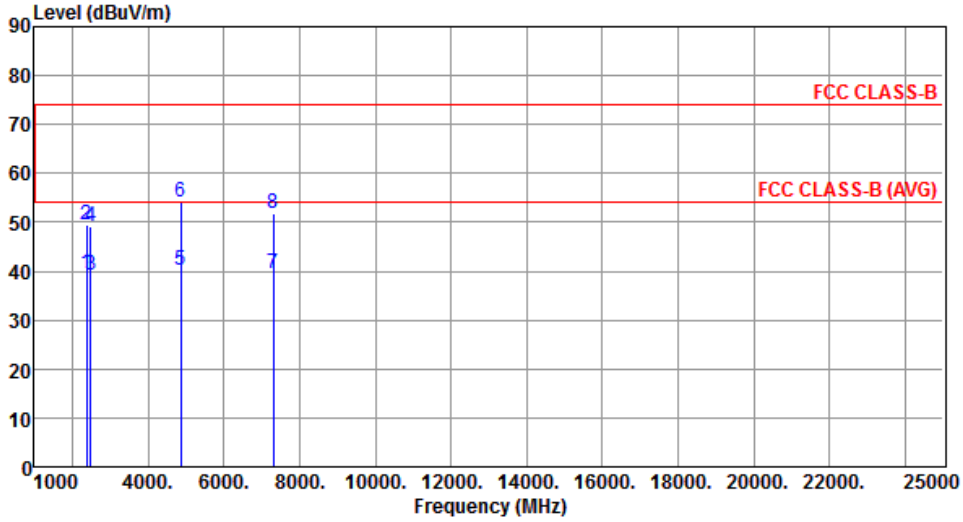
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	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	39.61	54.00	-14.39	42.41	-2.80	Average	102	354
2	2390.00	49.56	74.00	-24.44	52.36	-2.80	Peak	102	354
3	2483.50	39.27	54.00	-14.73	42.30	-3.03	Average	102	354
4	2483.50	49.48	74.00	-24.52	52.51	-3.03	Peak	102	354
5	4874.00	39.85	54.00	-14.15	36.21	3.64	Average	301	17
6	4874.00	53.78	74.00	-20.22	50.14	3.64	Peak	301	17
7	7311.00	39.28	54.00	-14.72	30.01	9.27	Average	100	16
8	7311.00	51.40	74.00	-22.60	42.13	9.27	Peak	100	16

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

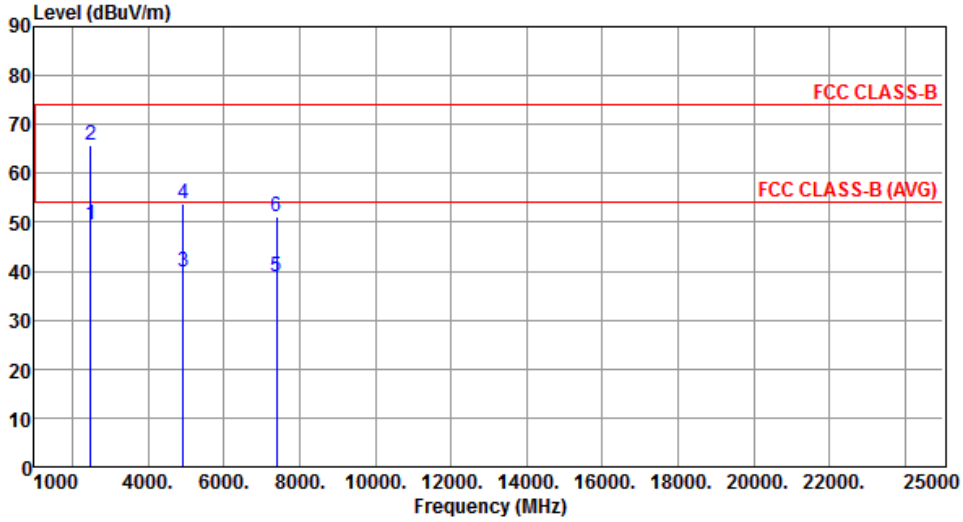
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	39.48	54.00	-14.52	42.28	-2.80	Average	274	305
2	2390.00	49.56	74.00	-24.44	52.36	-2.80	Peak	274	305
3	2483.50	39.08	54.00	-14.92	42.11	-3.03	Average	274	305
4	2483.50	49.14	74.00	-24.86	52.17	-3.03	Peak	274	305
5	4874.00	40.16	54.00	-13.84	36.52	3.64	Average	287	183
6	4874.00	54.05	74.00	-19.95	50.41	3.64	Peak	287	183
7	7311.00	39.67	54.00	-14.33	30.40	9.27	Average	287	183
8	7311.00	51.89	74.00	-22.11	42.62	9.27	Peak	287	183

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).

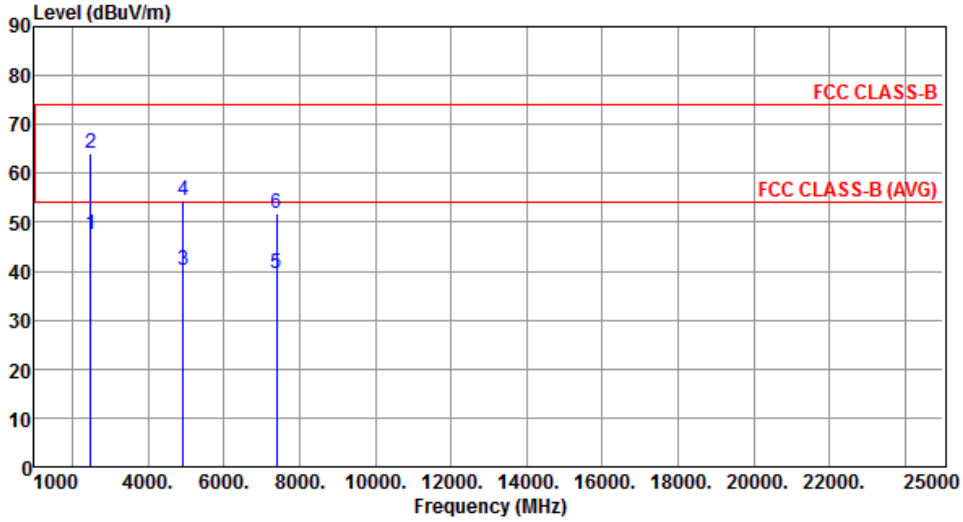
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	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	49.45	54.00	-4.55	52.48	-3.03	Average	108	358
2	2483.50	65.91	74.00	-8.09	68.94	-3.03	Peak	108	358
3	4924.00	39.80	54.00	-14.20	36.11	3.69	Average	290	14
4	4924.00	53.72	74.00	-20.28	50.03	3.69	Peak	290	14
5	7386.00	38.95	54.00	-15.05	29.88	9.07	Average	100	15
6	7386.00	51.03	74.00	-22.97	41.96	9.07	Peak	100	15

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

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

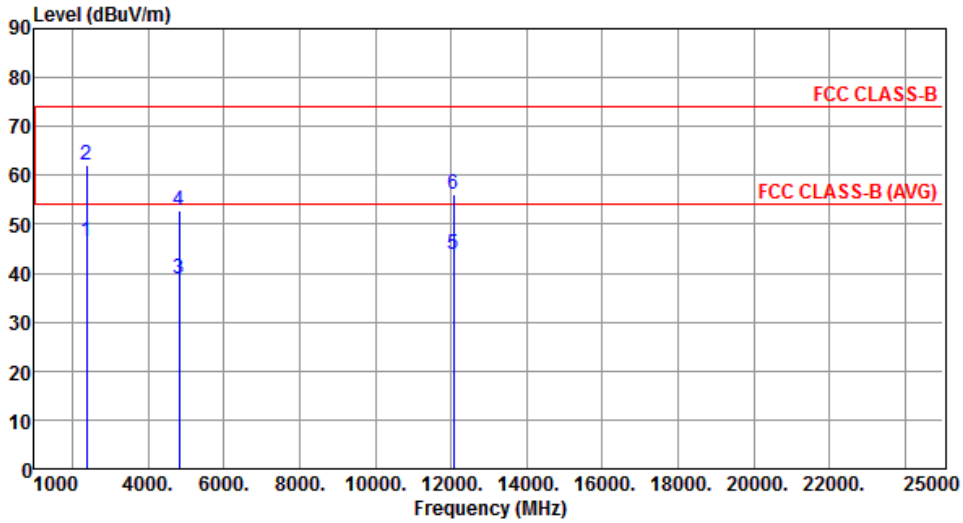


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	47.47	54.00	-6.53	50.50	-3.03	Average	275	309
2	2483.50	64.26	74.00	-9.74	67.29	-3.03	Peak	275	309
3	4924.00	40.21	54.00	-13.79	36.52	3.69	Average	297	185
4	4924.00	54.32	74.00	-19.68	50.63	3.69	Peak	297	185
5	7386.00	39.59	54.00	-14.41	30.52	9.07	Average	100	186
6	7386.00	51.97	74.00	-22.03	42.90	9.07	Peak	100	186

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

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

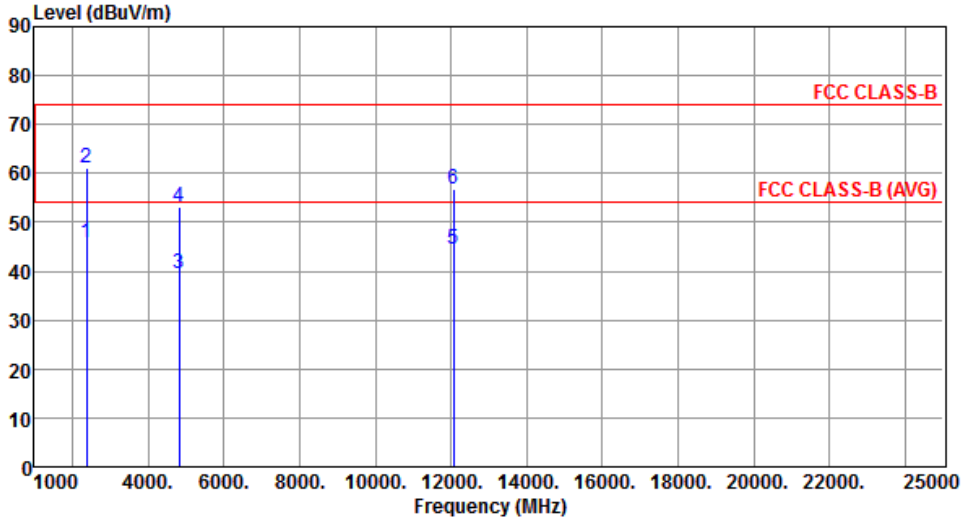
Modulation	HT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.53	54.00	-7.47	49.33	-2.80	Average	108	3
2	2390.00	62.15	74.00	-11.85	64.95	-2.80	Peak	108	3
3	4824.00	38.73	54.00	-15.27	35.13	3.60	Average	301	16
4	4824.00	52.76	74.00	-21.24	49.16	3.60	Peak	301	16
5	12060.00	43.83	54.00	-10.17	29.98	13.85	Average	100	19
6	12060.00	56.02	74.00	-17.98	42.17	13.85	Peak	100	19

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

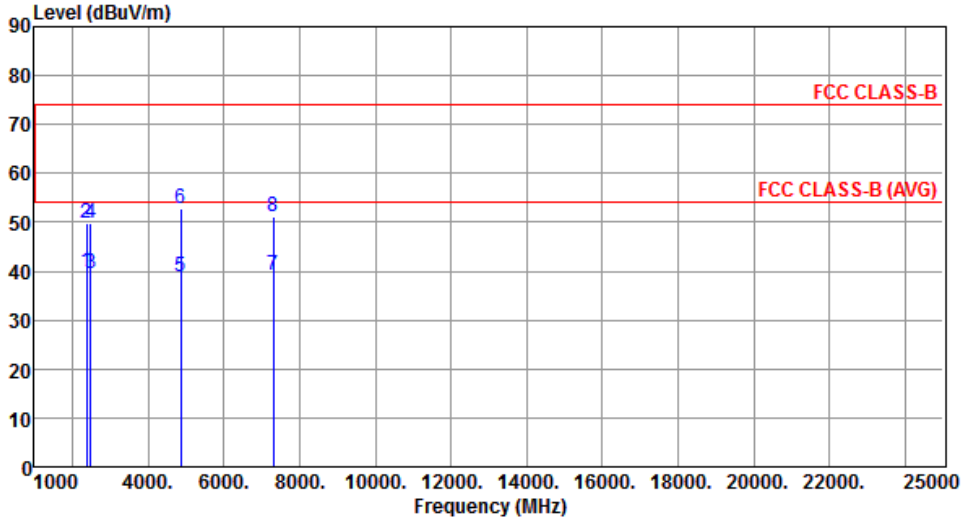
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.72	54.00	-8.28	48.52	-2.80	Average	250	308
2	2390.00	61.08	74.00	-12.92	63.88	-2.80	Peak	250	308
3	4824.00	39.47	54.00	-14.53	35.87	3.60	Average	305	186
4	4824.00	53.28	74.00	-20.72	49.68	3.60	Peak	305	186
5	12060.00	44.59	54.00	-9.41	30.74	13.85	Average	100	184
6	12060.00	56.70	74.00	-17.30	42.85	13.85	Peak	100	184

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

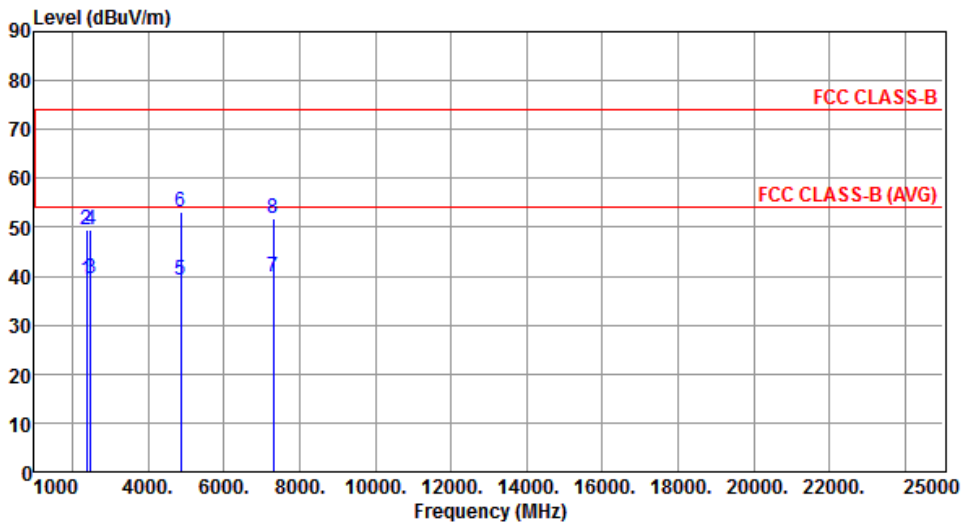
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.75	54.00	-14.25	42.55	-2.80	Average	102	357
2	2390.00	49.83	74.00	-24.17	52.63	-2.80	Peak	102	357
3	2483.50	39.46	54.00	-14.54	42.49	-3.03	Average	102	357
4	2483.50	49.67	74.00	-24.33	52.70	-3.03	Peak	102	357
5	4874.00	38.78	54.00	-15.22	35.14	3.64	Average	290	15
6	4874.00	52.86	74.00	-21.14	49.22	3.64	Peak	290	15
7	7311.00	39.11	54.00	-14.89	29.84	9.27	Average	100	21
8	7311.00	51.28	74.00	-22.72	42.01	9.27	Peak	100	21

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

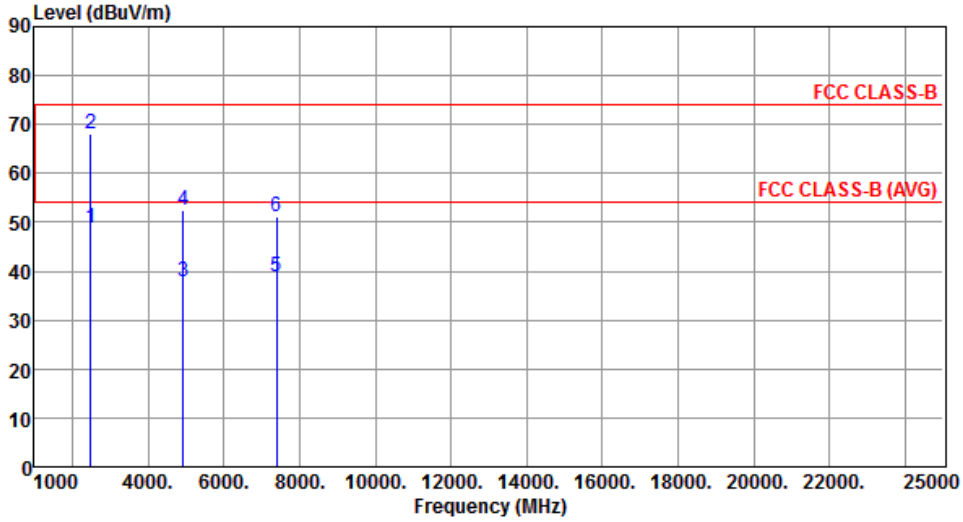
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	39.34	54.00	-14.66	42.14	-2.80	Average	244	302
2	2390.00	49.61	74.00	-24.39	52.41	-2.80	Peak	244	302
3	2483.50	39.36	54.00	-14.64	42.39	-3.03	Average	244	302
4	2483.50	49.57	74.00	-24.43	52.60	-3.03	Peak	244	302
5	4874.00	39.05	54.00	-14.95	35.41	3.64	Average	304	182
6	4874.00	53.27	74.00	-20.73	49.63	3.64	Peak	304	182
7	7311.00	39.86	54.00	-14.14	30.59	9.27	Average	100	181
8	7311.00	51.86	74.00	-22.14	42.59	9.27	Peak	100	181

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).

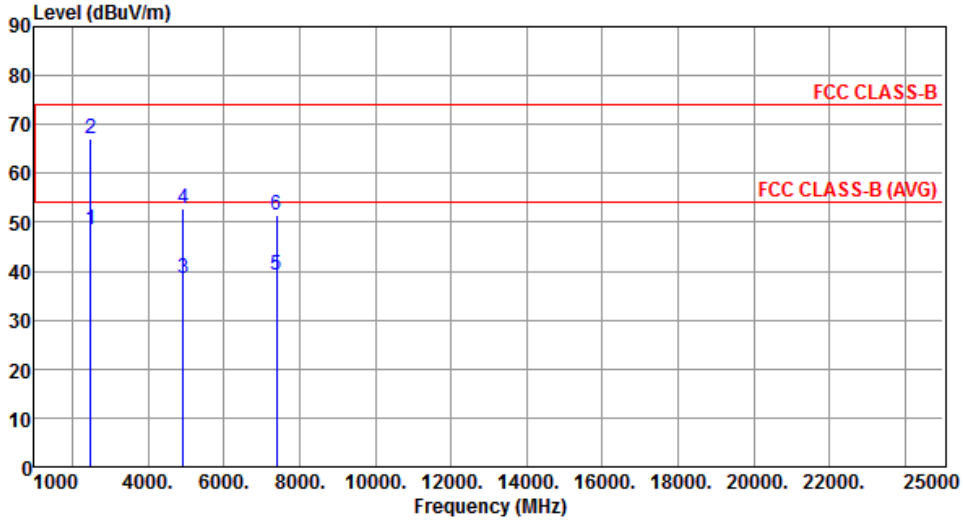
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	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	48.95	54.00	-5.05	51.98	-3.03	Average	103	359
2	2483.50	67.99	74.00	-6.01	71.02	-3.03	Peak	103	359
3	4924.00	37.94	54.00	-16.06	34.25	3.69	Average	295	18
4	4924.00	52.44	74.00	-21.56	48.75	3.69	Peak	295	18
5	7386.00	38.92	54.00	-15.08	29.85	9.07	Average	100	23
6	7386.00	51.03	74.00	-22.97	41.96	9.07	Peak	100	23

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

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	48.38	54.00	-5.62	51.41	-3.03	Average	248	301
2	2483.50	66.95	74.00	-7.05	69.98	-3.03	Peak	248	301
3	4924.00	38.58	54.00	-15.42	34.89	3.69	Average	307	182
4	4924.00	52.86	74.00	-21.14	49.17	3.69	Peak	307	182
5	7386.00	39.24	54.00	-14.76	30.17	9.07	Average	100	186
6	7386.00	51.58	74.00	-22.42	42.51	9.07	Peak	100	186

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

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.6.2 Test Procedures

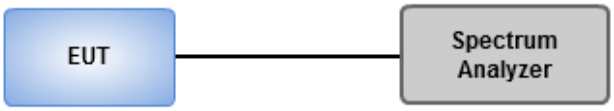
Reference level measurement

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

Emission level measurement

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

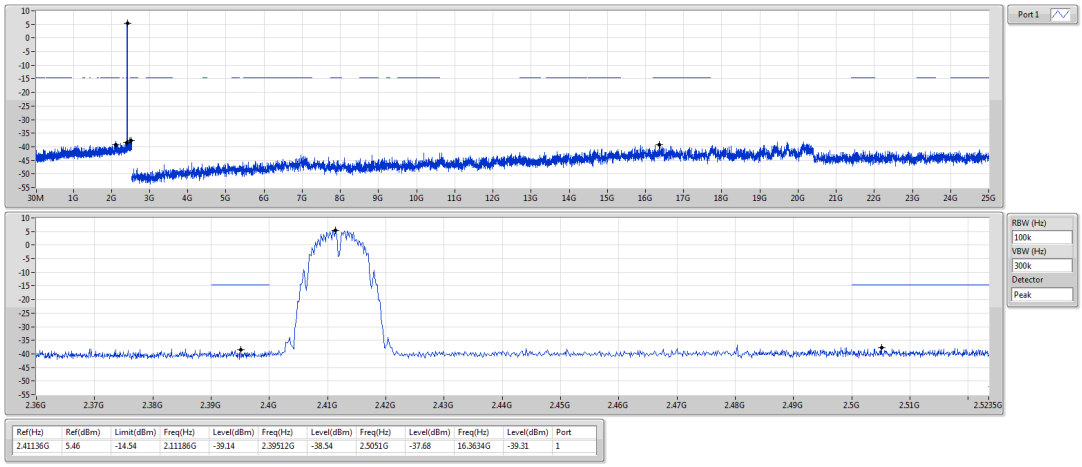
3.6.3 Test Setup



3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

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

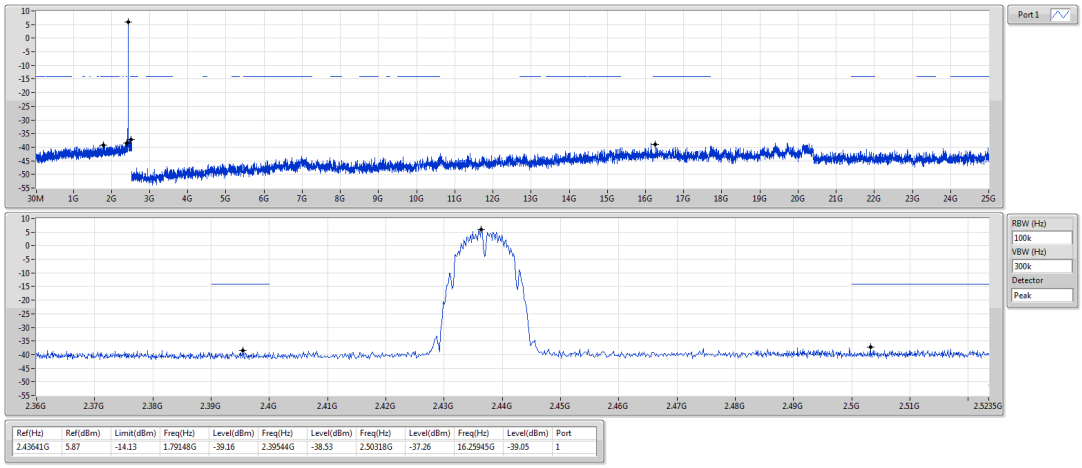
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41136G	5.46	-14.54	2.11186G	-39.14	2.39512G	-38.54	2.5051G	-37.68	16.3634G	-39.31	1

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

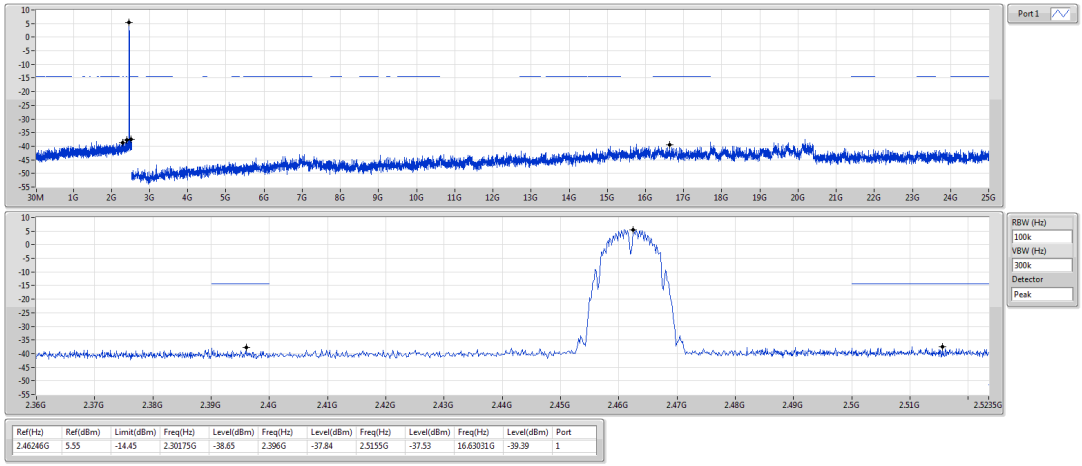
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43641G	5.87	-14.13	1.79148G	-39.16	2.39544G	-38.53	2.50318G	-37.26	16.25945G	-39.05	1

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

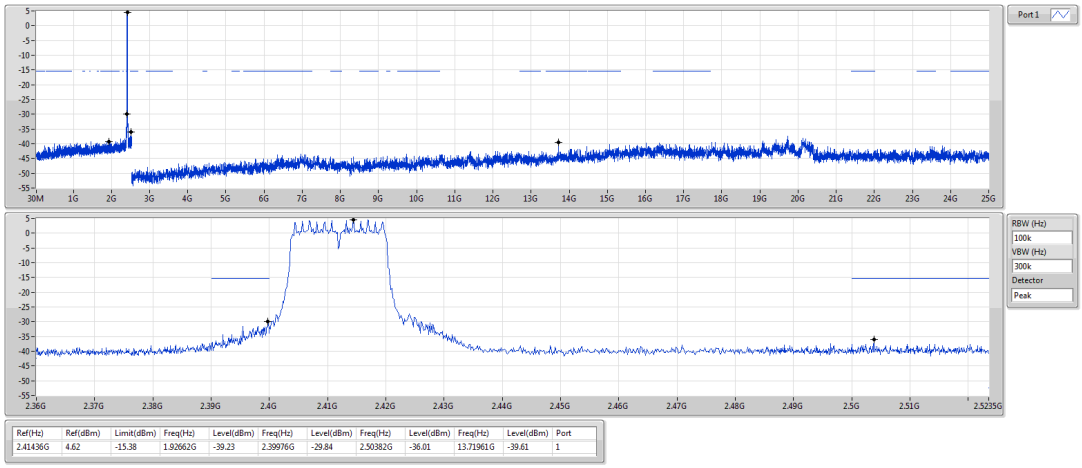
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46246G	5.55	-14.45	2.30175G	-38.65	2.396G	-37.84	2.5155G	-37.53	16.63031G	-39.39	1

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

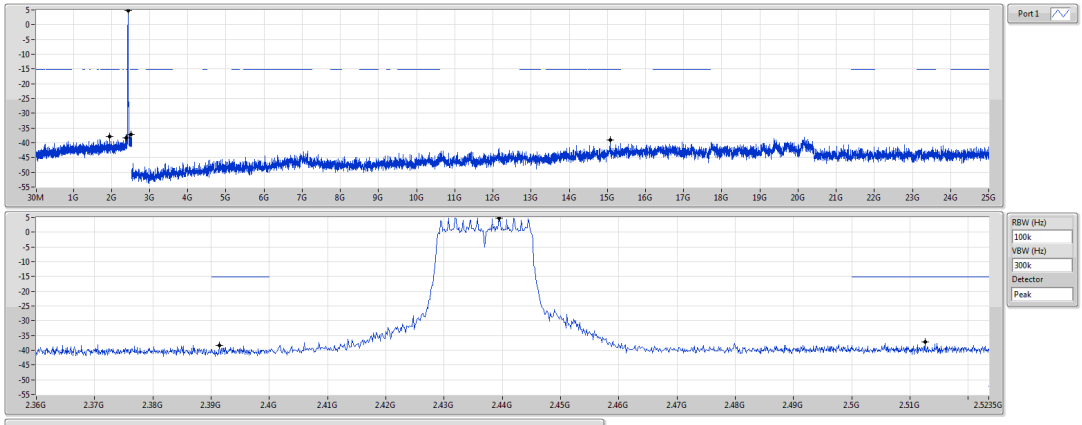
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41436G	4.62	-15.38	1.92662G	-39.23	2.39976G	-29.84	2.50382G	-36.01	13.71961G	-39.61	1

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

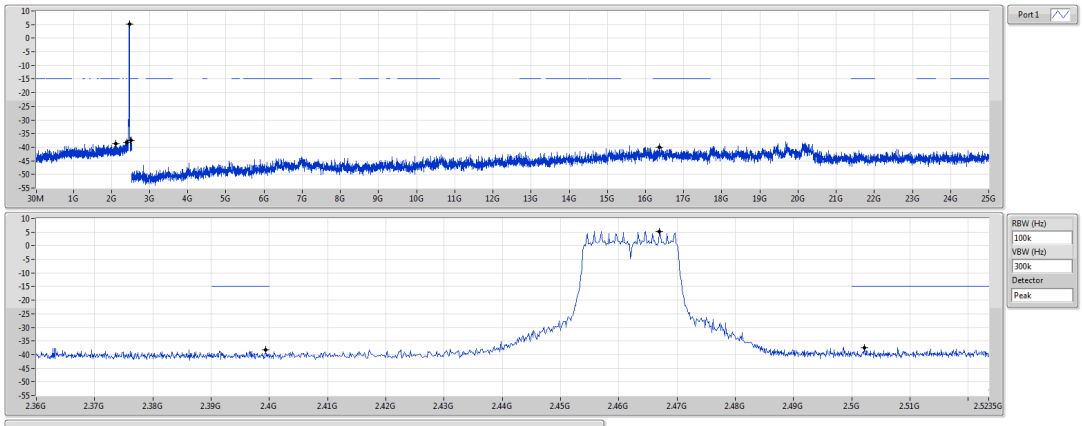
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43941G	4.88	-15.12	1.94526G	-37.89	2.39144G	-38.38	2.51254G	-37.13	15.0682G	-39.11	1

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

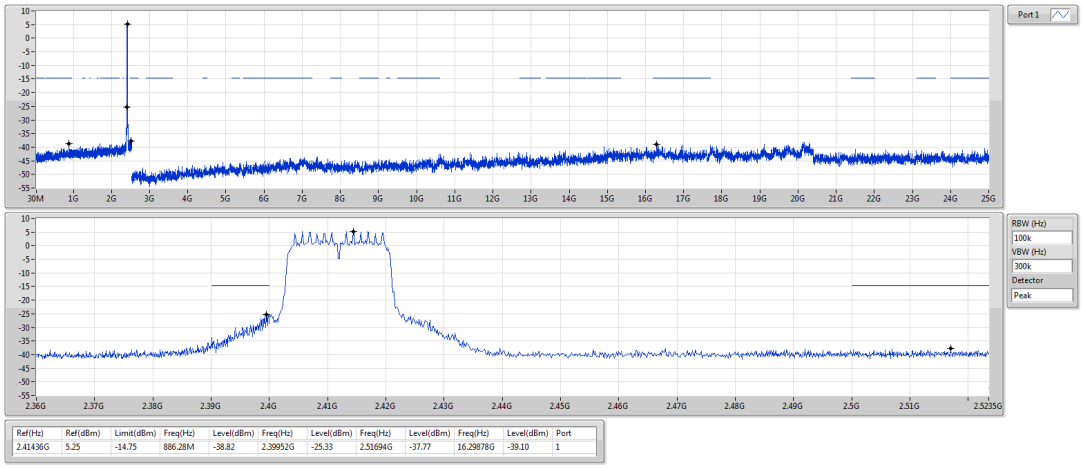
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46697G	5.16	-14.84	2.10836G	-38.63	2.39936G	-38.36	2.50214G	-37.54	16.35498G	-39.91	1

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

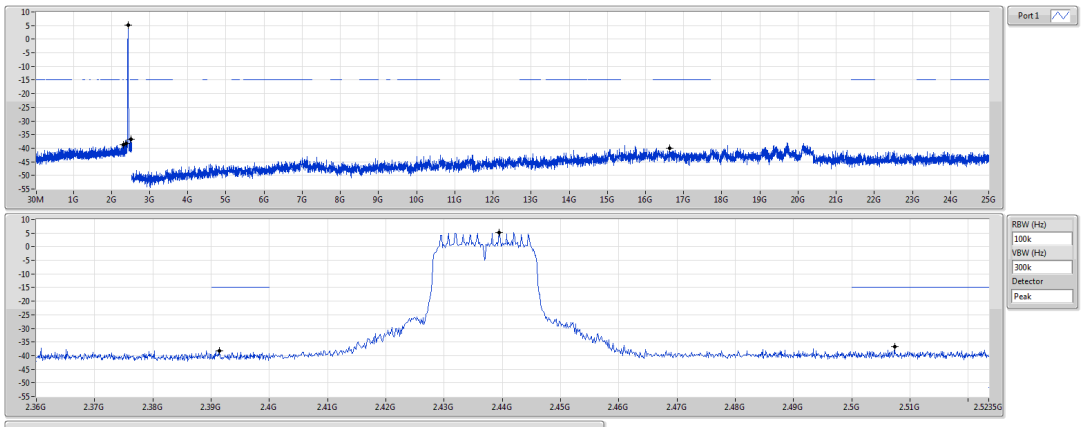
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41436G	5.25	-14.75	886.28M	-38.82	2.39952G	-25.33	2.51694G	-37.77	16.29878G	-39.10	1

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

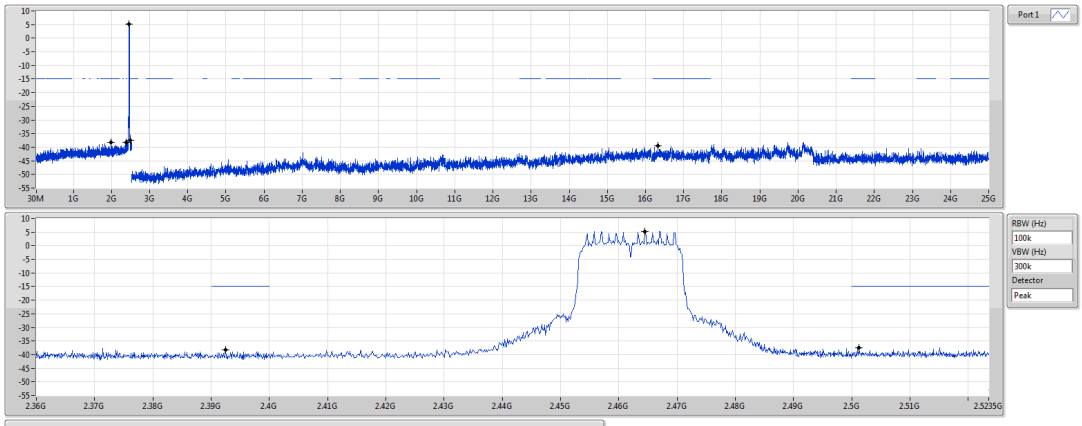
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43941G	5.13	-14.87	2.30525G	-38.80	2.39144G	-38.33	2.50734G	-36.79	16.63874G	-39.90	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
2.46446G	5.21	-14.79	1.98254G	-38.26	2.39248G	-38.27	2.50126G	-37.47	16.3325G	-39.45	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.

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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