

FCC Test Report

FCC ID : P27-IG502L
Equipment : Monitor Gateway
Model No. : IG-502L
Brand Name : OxTech, LLC
Applicant : Sercomm Corporation
Address : 8F, No. 3-1, YuanQu St., NanKang, Taipei 115,
Taiwan, R.O.C.
Standard : 47 CFR FCC Part 15.247
Received Date : Dec. 21, 2021
Tested Date : Dec. 28, 2021 ~ Jan. 24, 2022

We, International Certification Corporation, 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 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

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Release Record

Report No.	Version	Description	Issued Date
FR1D2104AC	Rev. 01	Initial issue	Feb. 17, 2022

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.428MHz 37.91 (Margin -9.38dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 4874.00MHz 52.98 (Margin -1.02dB) – AV 2483.50MHz 52.98 (Margin -1.02dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 29.41	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]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.
 Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
 Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Gain (dBi)
1	ANT1	PIFA	UFL	3.9
2	ANT2	PIFA	UFL	3.6

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter
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1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC Adapter	Brand: Leader Model: MU18D1120150-A1 Power Rating: I/P: 100-240Vac, 50/60Hz, 0.6A O/P:12Vdc, 1.5A Power Line: 1.45m non-shielded without core
2	AC Adapter	Brand: Sercomm Model: PU18W120ULB15-DPX-00 Power Rating: I/P: 100-240Vac, 50/60Hz, 0.7A O/P:12Vdc, 1.5A, 18.0W
3	RJ45	1.45m non-shielded without core

1.1.5 Channel List

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

1.1.6 Test Tool and Duty Cycle

Test Tool	Putty, Version:0.60.0.0		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	98.30%	0.07
	11g	93.24%	0.30
	HT20	94.58%	0.24
	HT40	87.97%	0.56

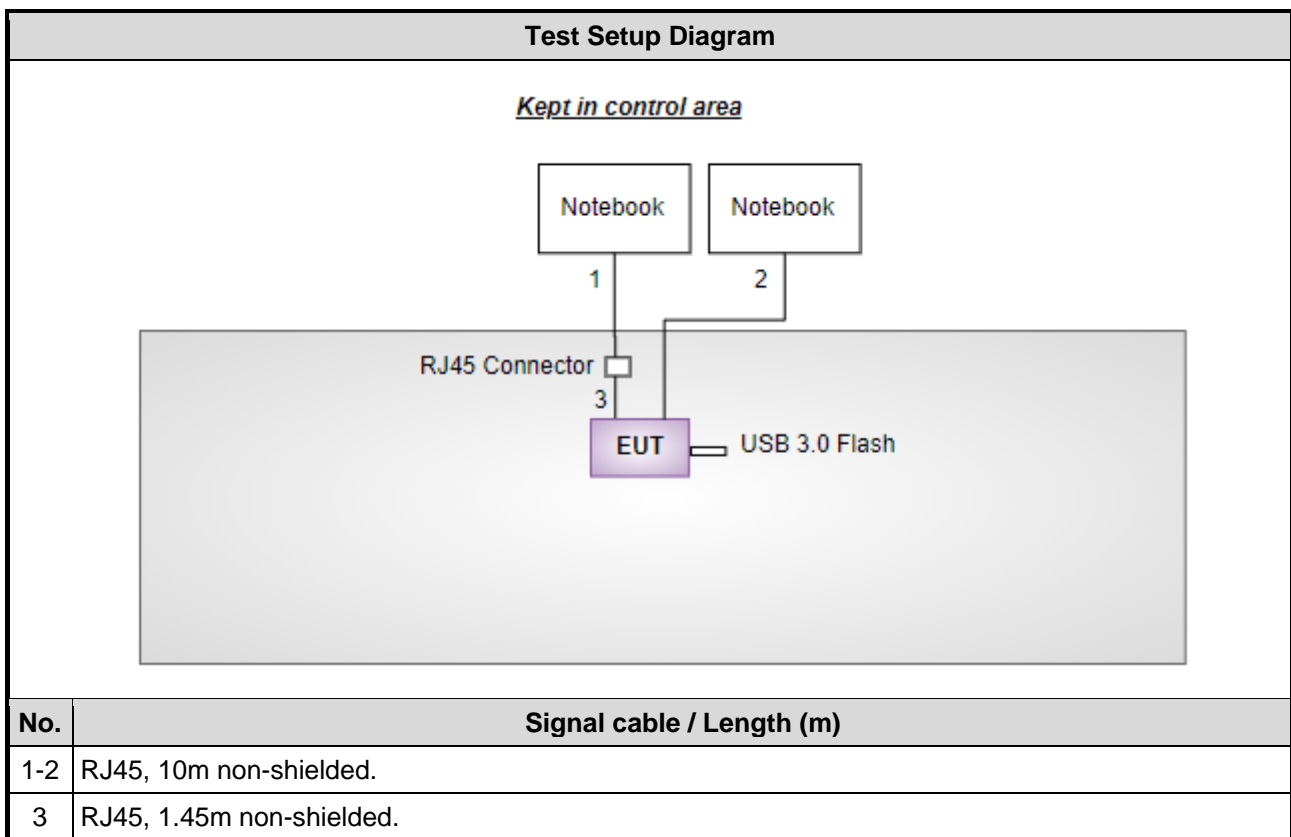
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	82/97
11b	2437	85/99
11b	2462	88/103
11g	2412	57/71
11g	2437	90/104
11g	2462	60/74
HT20	2412	55/68
HT20	2437	86/100
HT20	2462	56/70
HT40	2422	51/62
HT40	2437	61/72
HT40	2452	52/63

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E5470	DoC	---
2	Notebook	DELL	Latitude E5470	DoC	---
3	USB 3.0 Flash	Transcend	JetFlash 700	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Jan. 24, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
LISN	R&S	ENV216	101579	Mar. 17, 2021	Mar. 16, 2022
LISN (Support Unit)	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127477	Feb. 25, 2021	Feb. 24, 2022
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 19, 2021	Oct. 18, 2022
50 ohm terminal (Support Unit)	NA	50	04	May 25, 2021	May 24, 2022
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)				
Tested Date	Dec. 28, 2021 ~ Jan. 08, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 12, 2021	Mar. 11, 2022
Spectrum Analyzer	R&S	FSV40	101063	Apr. 19, 2021	Apr. 18, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 08, 2021	Nov. 07, 2022
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 03, 2021	Dec. 02, 2022
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 04, 2021	Nov. 03, 2022
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Preamplifier	Agilent	83017A	MY39501308	Sep. 28, 2021	Sep. 27, 2022
Preamplifier	EMC	EMC184045B	980192	Jul. 14, 2021	Jul. 13, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 05, 2021	Oct. 04, 2022
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 05, 2021	Oct. 04, 2022
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 05, 2021	Oct. 04, 2022
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 05, 2021	Oct. 04, 2022
RF Cable	EMC	EMC104-35M-35M- 8000	210920	Oct. 05, 2021	Oct. 04, 2022
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 05, 2021	Oct. 04, 2022
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	Jan. 22, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Nov. 29, 2021	Nov. 28, 2022
Power Meter	Anritsu	ML2495A	1241002	Nov. 07, 2021	Nov. 06, 2022
Power Sensor	Anritsu	MA2411B	1207366	Nov. 07, 2021	Nov. 06, 2022
Measurement Software	Sporton	SENSE-15247_FS	V5.10.7.11	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 15.247

ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

1.7 Deviation from Test Standard and Measurement Procedure

None

1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.130 Hz
Conducted power	±0.808 dB
Power density	±0.583 dB
Conducted emission	±2.715 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.41 dB
Radiated emission > 1GHz	±4.59 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- 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	2437	MCS 0	2
Radiated Emissions ≤1GHz	HT20	2437	MCS 0	1
Radiated Emissions >1GHz	11b	2412 / 2437 / 2462	1 Mbps	1
Maximum Output Power	11g	2412 / 2437 / 2462	6 Mbps	
6dB bandwidth	HT20	2412 / 2437 / 2462	MCS 0	
Power spectral density	HT40	2422 / 2437 / 2452	MCS 0	

NOTE:

1. Two adapters (Leader and Sercomm) had been covered during the pretest, and found that **Sercomm adapter** was the worst case of AC Power line conducted emission test item and **Leader adapter** was the worst case of Radiated Spurious emission test item.
2. Test configurations are as below
 Configuration 1: Leader adapter for Radiated emission and antenna port conducted test
 Configuration 2: Sercomm adapter for AC Power Line Conducted Emissions

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

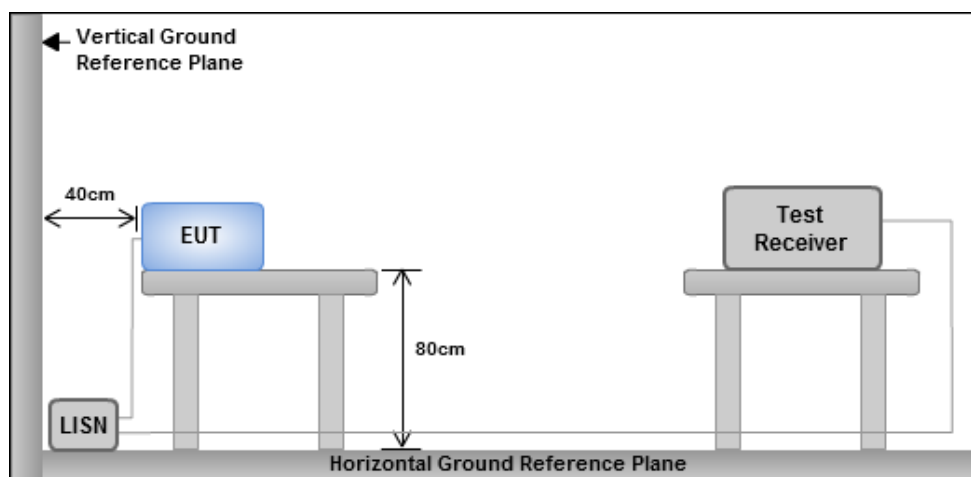
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

3.1.2 Test Procedures

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

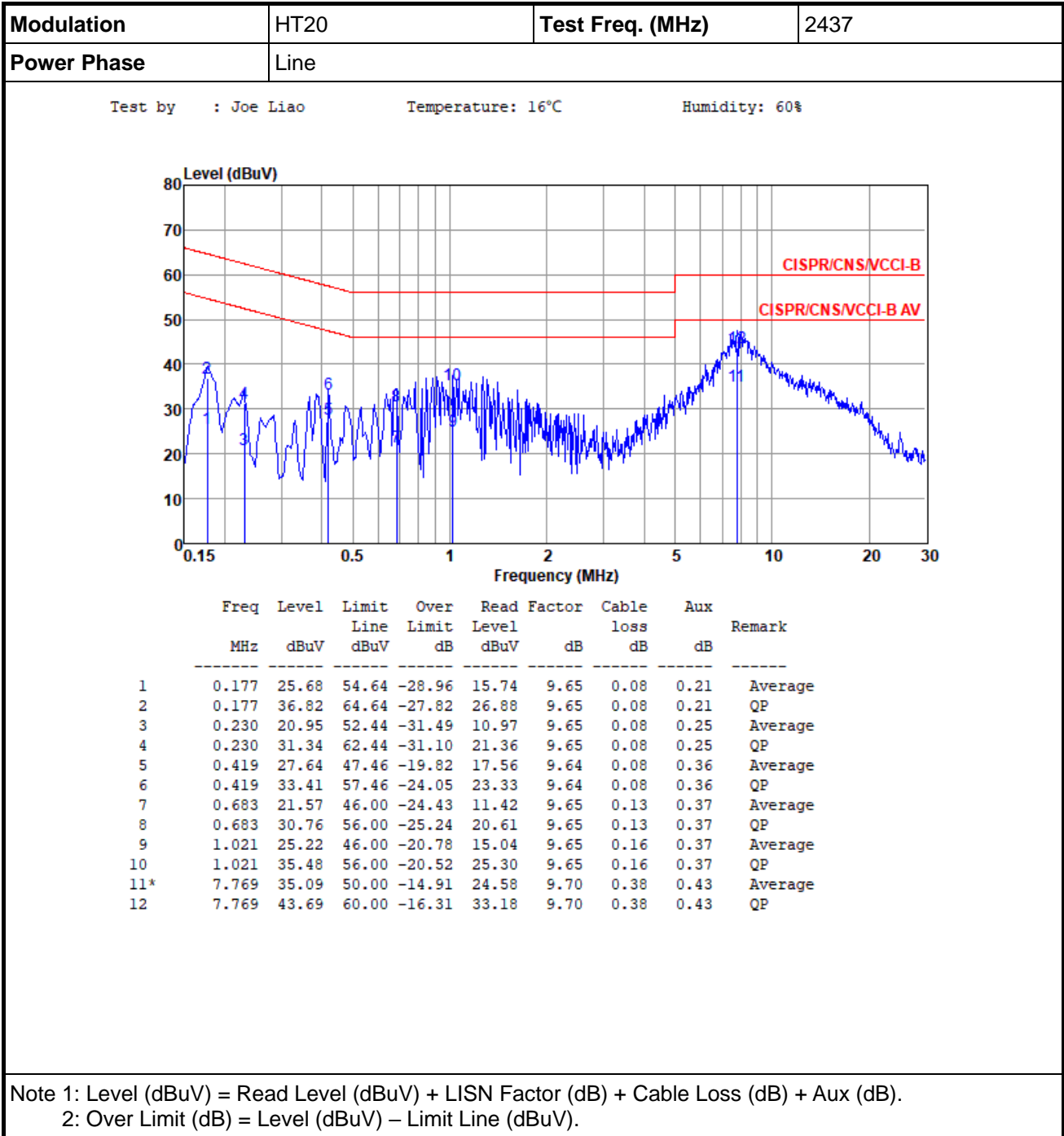
3.1.3 Test Setup



Note: 1. Support units were connected to second LISN.

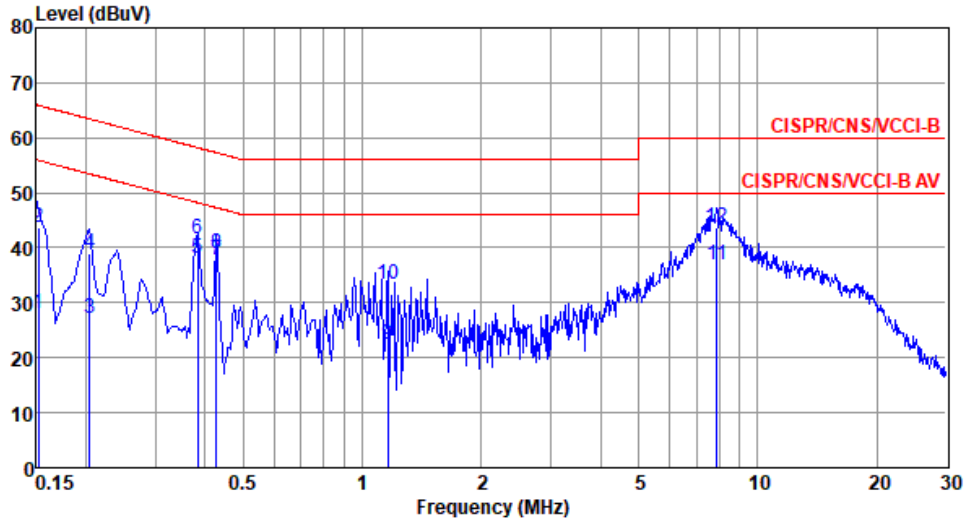
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions



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

Test by : Joe Liao Temperature: 16°C Humidity: 60%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.152	28.01	55.91	-27.90	18.08	9.69	0.08	0.16	Average
2	0.152	43.83	65.91	-22.08	33.90	9.69	0.08	0.16	QP
3	0.204	27.03	53.45	-26.42	17.09	9.68	0.08	0.18	Average
4	0.204	38.98	63.45	-24.47	29.04	9.68	0.08	0.18	QP
5	0.383	38.17	48.21	-10.04	28.23	9.67	0.08	0.19	Average
6	0.383	41.52	58.21	-16.69	31.58	9.67	0.08	0.19	QP
7*	0.428	37.91	47.29	-9.38	27.95	9.67	0.09	0.20	Average
8	0.428	38.99	57.29	-18.30	29.03	9.67	0.09	0.20	QP
9	1.160	22.52	46.00	-23.48	12.39	9.68	0.17	0.28	Average
10	1.160	33.31	56.00	-22.69	23.18	9.68	0.17	0.28	QP
11	7.893	36.79	50.00	-13.21	26.30	9.74	0.39	0.36	Average
12	7.893	43.80	60.00	-16.20	33.31	9.74	0.39	0.36	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (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

Ambient Condition	22°C / 67%	Tested By	Brad Wu
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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)_2TX	10.145M	14.906M	14M9G1D	10M	14.544M
802.11g_Nss1,(6Mbps)_2TX	16.377M	24.747M	24M7D1D	16.014M	16.353M
802.11n HT20_Nss1,(MCS0)_2TX	17.536M	23.082M	23M1D1D	16.014M	17.583M
802.11n HT40_Nss1,(MCS0)_2TX	35.652M	36.324M	36M3D1D	33.913M	36.035M

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

Result

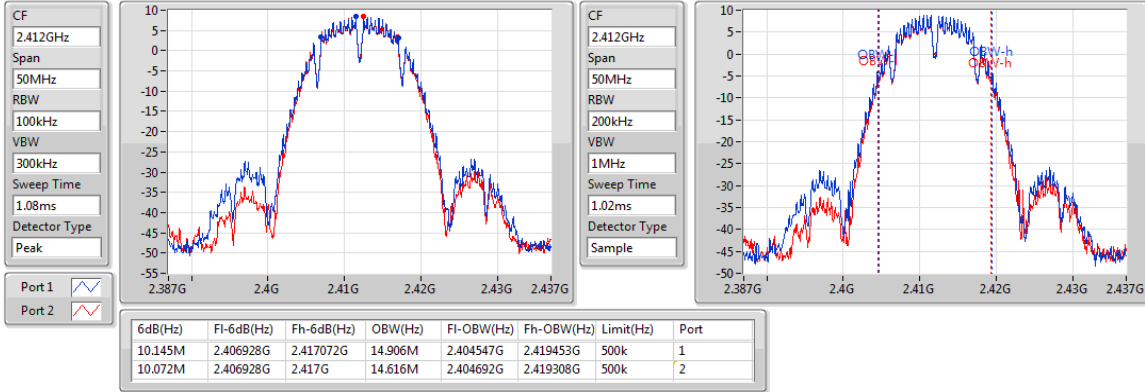
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	10.145M	14.906M	10.072M	14.616M
2437MHz	Pass	500k	10M	14.906M	10.072M	14.544M
2462MHz	Pass	500k	10.072M	14.834M	10.072M	14.616M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.304M	16.425M	16.377M	16.425M
2437MHz	Pass	500k	16.304M	21.418M	16.377M	24.747M
2462MHz	Pass	500k	16.014M	16.425M	16.087M	16.353M
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	17.174M	17.583M	17.029M	17.583M
2437MHz	Pass	500k	17.101M	18.524M	16.014M	23.082M
2462MHz	Pass	500k	16.957M	17.583M	17.536M	17.583M
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	33.913M	36.179M	35.652M	36.179M
2437MHz	Pass	500k	35.072M	36.035M	35.072M	36.324M
2452MHz	Pass	500k	35.072M	36.179M	35.072M	36.035M

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

802.11b_Nss1,(1Mbps)_2TX

EBW

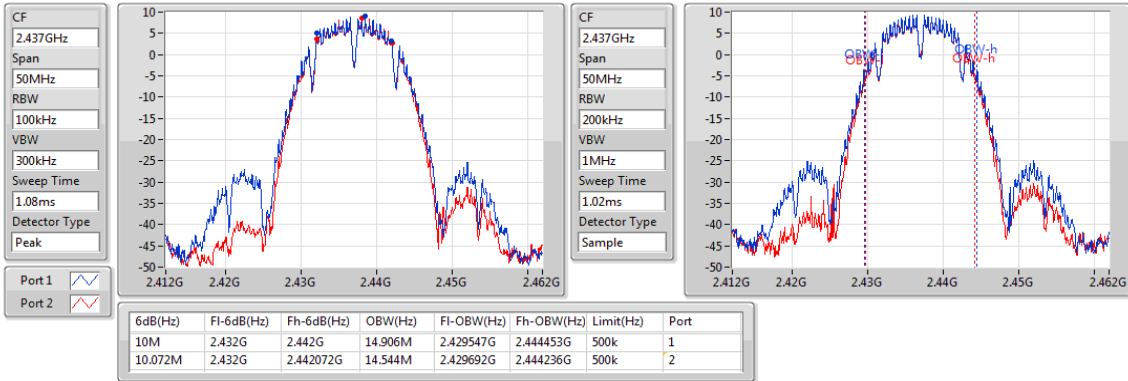
2412MHz



802.11b_Nss1,(1Mbps)_2TX

EBW

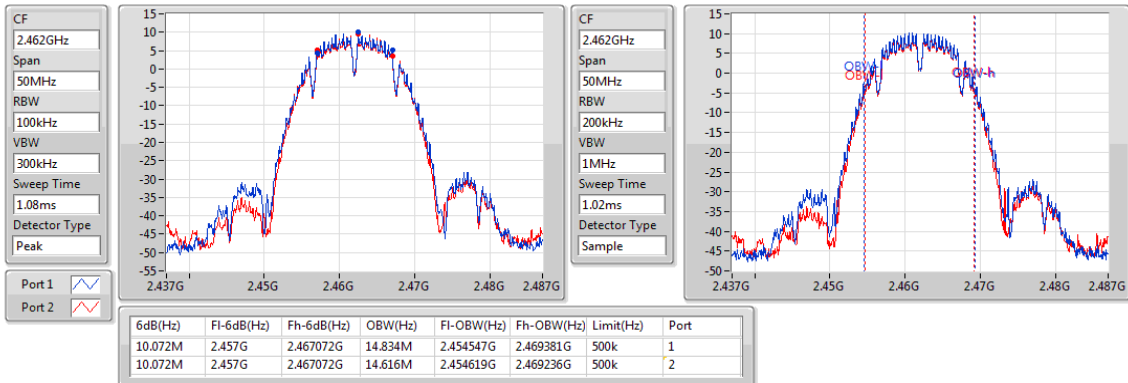
2437MHz



802.11b_Nss1,(1Mbps)_2TX

EBW

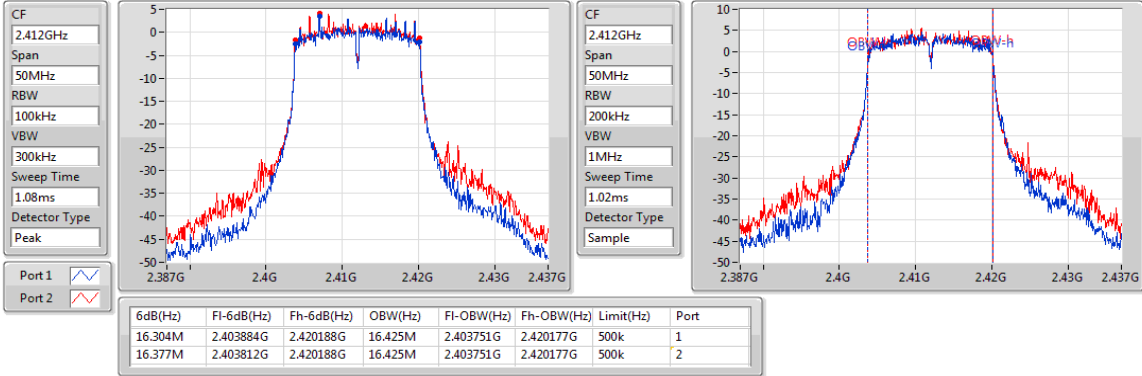
2462MHz



802.11g_Nss1,(6Mbps)_2TX

EBW

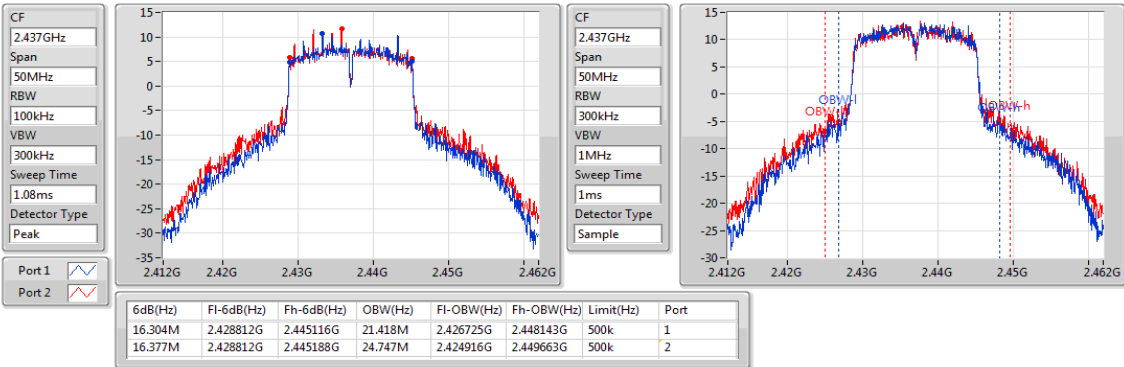
2412MHz



802.11g_Nss1,(6Mbps)_2TX

EBW

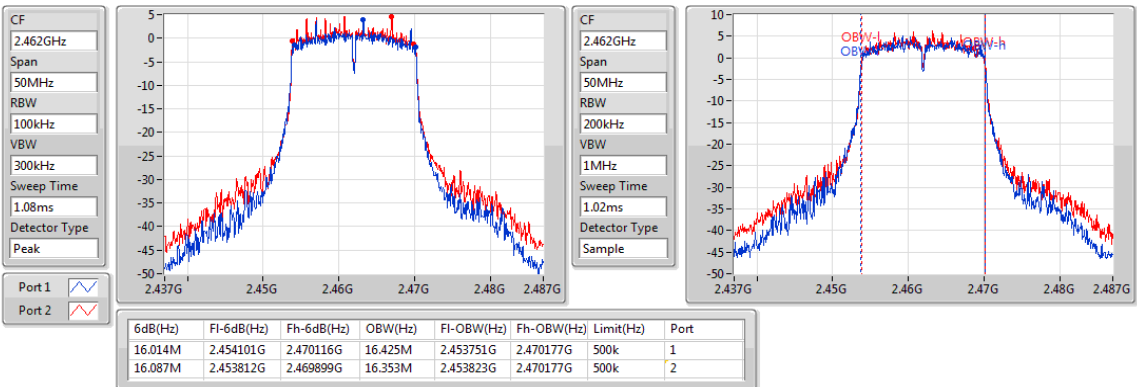
2437MHz



802.11g_Nss1,(6Mbps)_2TX

EBW

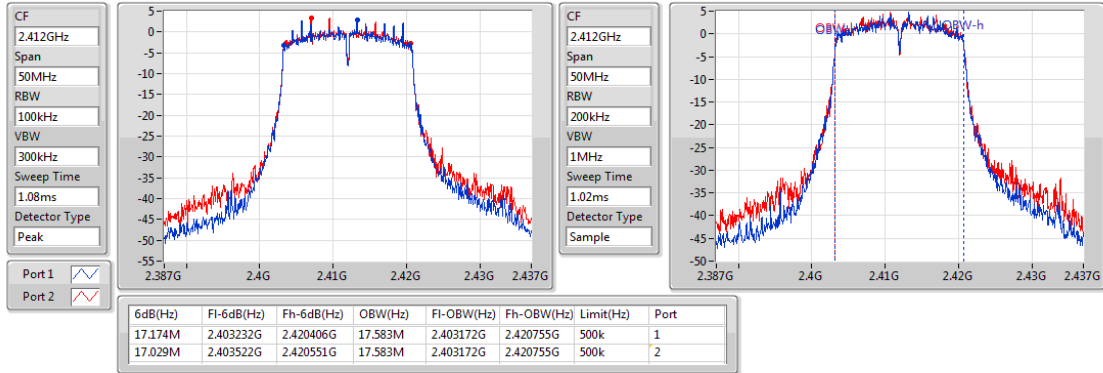
2462MHz



802.11n HT20_Nss1,(MCS0)_2TX

EBW

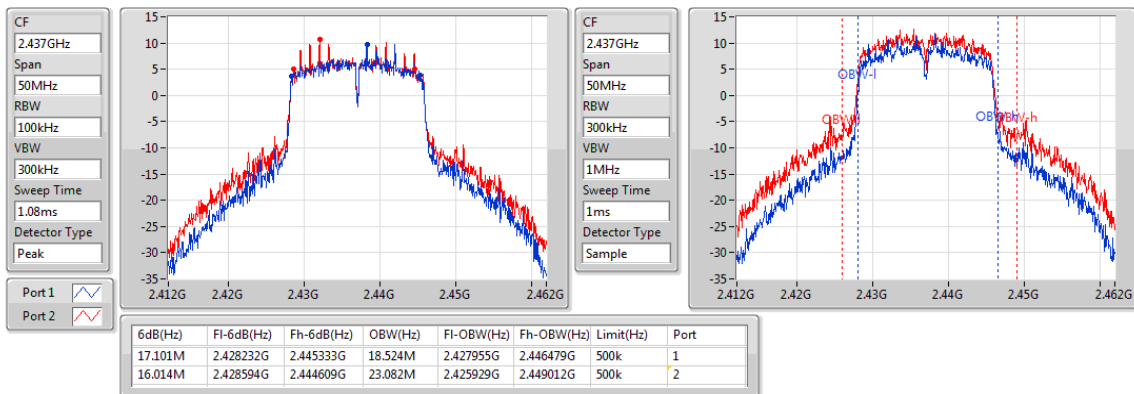
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802.11n HT20_Nss1,(MCS0)_2TX

EBW

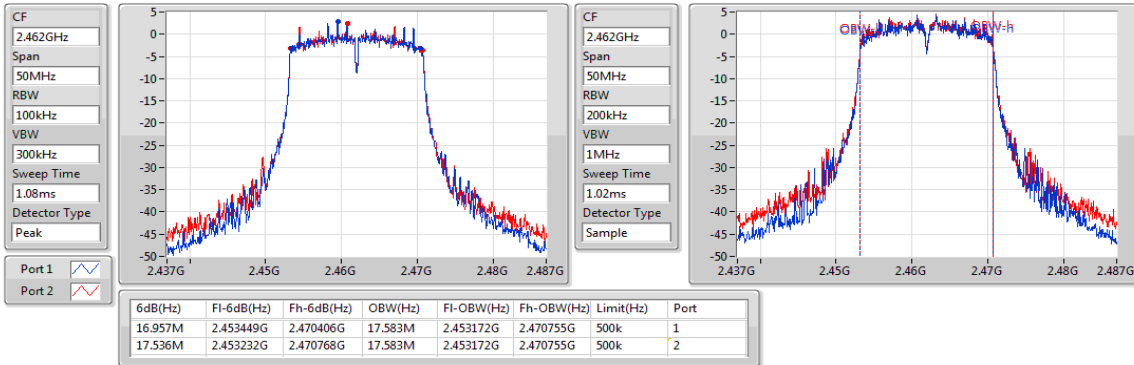
2437MHz



802.11n HT20_Nss1,(MCS0)_2TX

EBW

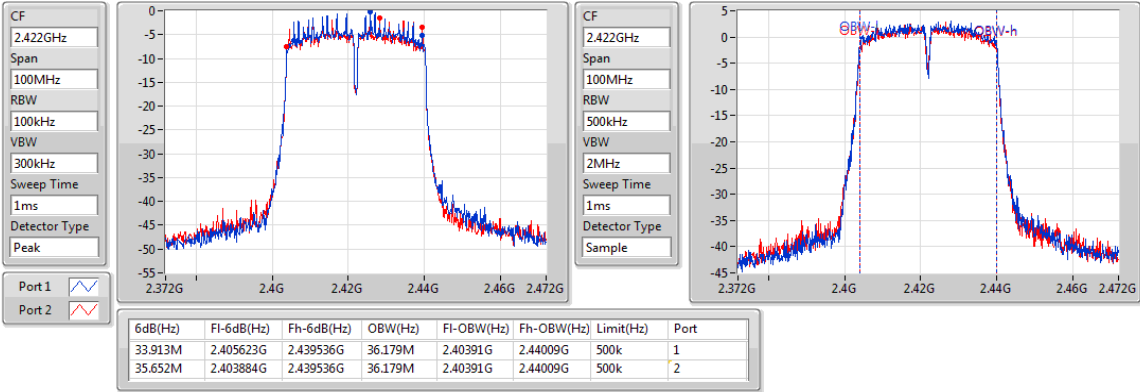
2462MHz



802.11n HT40_Nss1,(MCS0)_2TX

EBW

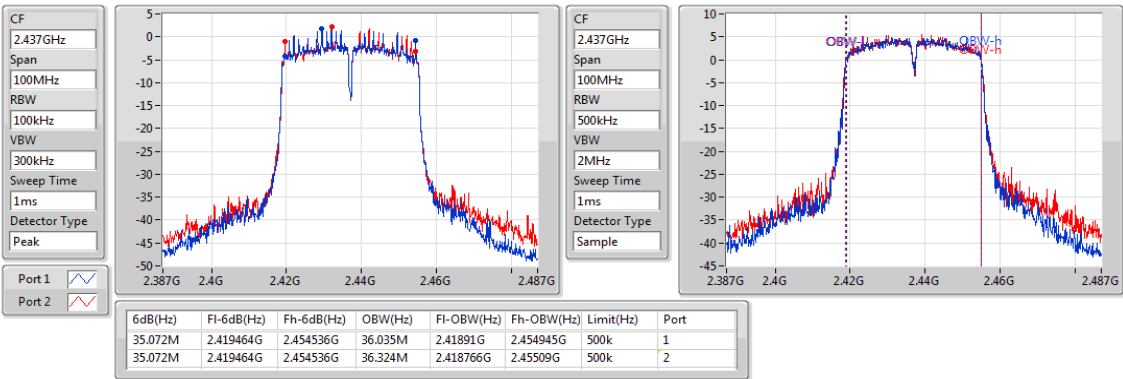
2422MHz



802.11n HT40_Nss1,(MCS0)_2TX

EBW

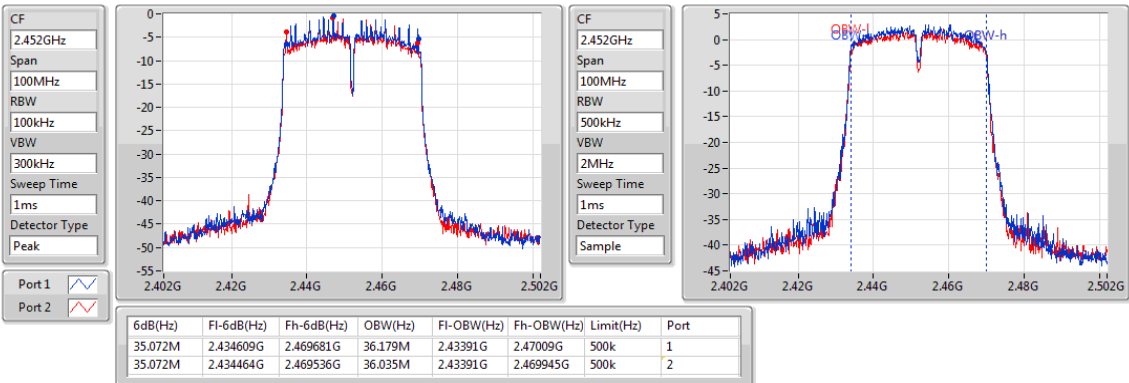
2437MHz



802.11n HT40_Nss1,(MCS0)_2TX

EBW

2452MHz



3.3 RF Output Power

3.3.1 Limit of RF Output Power

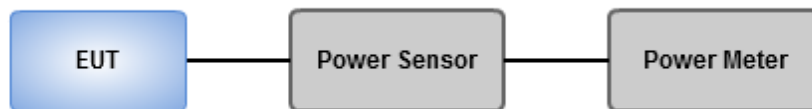
Conducted power shall not exceed 1Watt.

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

3.3.2 Test Procedures

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

3.3.3 Test Setup



3.3.4 Test Result of Maximum Output Power

Ambient Condition	22°C / 67%	Tested By	Brad Wu
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Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	25.24	0.33420
802.11g_Nss1,(6Mbps)_2TX	29.35	0.86099
802.11n HT20_Nss1,(MCS0)_2TX	29.41	0.87297
802.11n HT40_Nss1,(MCS0)_2TX	27.98	0.62806

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.90	21.24	21.54	24.40	30.00	28.30	36.00
2437MHz	Pass	3.90	21.75	22.21	25.00	30.00	28.90	36.00
2462MHz	Pass	3.90	22.26	22.19	25.24	30.00	29.14	36.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.90	25.27	25.28	28.29	30.00	32.19	36.00
2437MHz	Pass	3.90	26.35	26.33	29.35	30.00	33.25	36.00
2462MHz	Pass	3.90	24.77	24.95	27.87	30.00	31.77	36.00
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.90	24.63	24.86	27.76	30.00	31.66	36.00
2437MHz	Pass	3.90	26.41	26.38	29.41	30.00	33.31	36.00
2462MHz	Pass	3.90	24.44	24.51	27.49	30.00	31.39	36.00
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	3.90	23.25	22.97	26.12	30.00	30.02	36.00
2437MHz	Pass	3.90	25.08	24.85	27.98	30.00	31.88	36.00
2452MHz	Pass	3.90	23.48	23.26	26.38	30.00	30.28	36.00

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

Summary of Conducted (Average) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	23.27	0.21232
802.11g_Nss1,(6Mbps)_2TX	26.05	0.40272
802.11n HT20_Nss1,(MCS0)_2TX	25.46	0.35156
802.11n HT40_Nss1,(MCS0)_2TX	19.62	0.09162

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.90	19.36	19.39	22.39	-	26.29	-
2437MHz	Pass	3.90	19.97	20.13	23.06	-	26.96	-
2462MHz	Pass	3.90	20.31	20.20	23.27	-	27.17	-
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.90	16.31	16.77	19.56	-	23.46	-
2437MHz	Pass	3.90	23.07	23.01	26.05	-	29.95	-
2462MHz	Pass	3.90	16.30	16.78	19.56	-	23.46	-
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.90	15.55	15.92	18.75	-	22.65	-
2437MHz	Pass	3.90	22.49	22.40	25.46	-	29.36	-
2462MHz	Pass	3.90	15.53	15.65	18.60	-	22.50	-
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	3.90	14.19	13.94	17.08	-	20.98	-
2437MHz	Pass	3.90	16.47	16.74	19.62	-	23.52	-
2452MHz	Pass	3.90	14.28	14.14	17.22	-	21.12	-

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

Note : Conducted average output power is for reference only

3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

Peak PSD

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

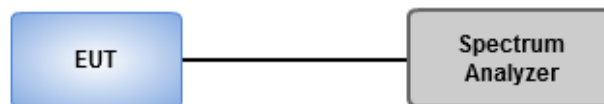
Average PSD, duty cycle $\geq 98\%$

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

Average PSD, duty cycle $< 98\%$

1. Set the RBW = 30 kHz, VBW = 100 kHz. Detector = RMS.
2. Set the Sweep time = auto couple
3. Employ trace averaging (rms) mode over a minimum of 100 traces
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

Ambient Condition	22°C / 67%	Tested By	Brad Wu
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Summary

Mode	PD (dBm/3kHz)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_2TX	-2.27
802.11g_Nss1,(6Mbps)_2TX	-0.92
802.11n HT20_Nss1,(MCS0)_2TX	-0.98
802.11n HT40_Nss1,(MCS0)_2TX	-9.39

RBW= 3 kHz

Result

Mode	Result	DG (dBi)	Port 1 (dBm/3kHz)	Port 2 (dBm/3kHz)	PD (dBm/3kHz)	PD Limit (dBm/3kHz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.76	-5.40	-6.59	-3.07	7.24
2437MHz	Pass	6.76	-6.04	-5.91	-3.11	7.24
2462MHz	Pass	6.76	-4.42	-4.96	-2.27	7.24
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.76	-9.44	-9.60	-6.71	7.24
2437MHz	Pass	6.76	-3.50	-2.79	-0.92	7.24
2462MHz	Pass	6.76	-9.76	-9.25	-6.51	7.24
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.76	-10.75	-8.26	-6.32	7.24
2437MHz	Pass	6.76	-3.24	-3.41	-0.98	7.24
2462MHz	Pass	6.76	-10.79	-11.27	-8.56	7.24
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	6.76	-14.70	-15.18	-11.92	7.24
2437MHz	Pass	6.76	-12.48	-12.32	-9.39	7.24
2452MHz	Pass	6.76	-15.33	-15.86	-12.58	7.24

DG = Directional Gain= $10 * \log((10^{3.9/20} + 10^{3.6/20})^2 / 2) = 6.76\text{dBi} > 6 \text{ dBi}$, Limit shall be reduced to 8 dBm – (6.76 dBi – 6 dBi) = 7.24 dBm

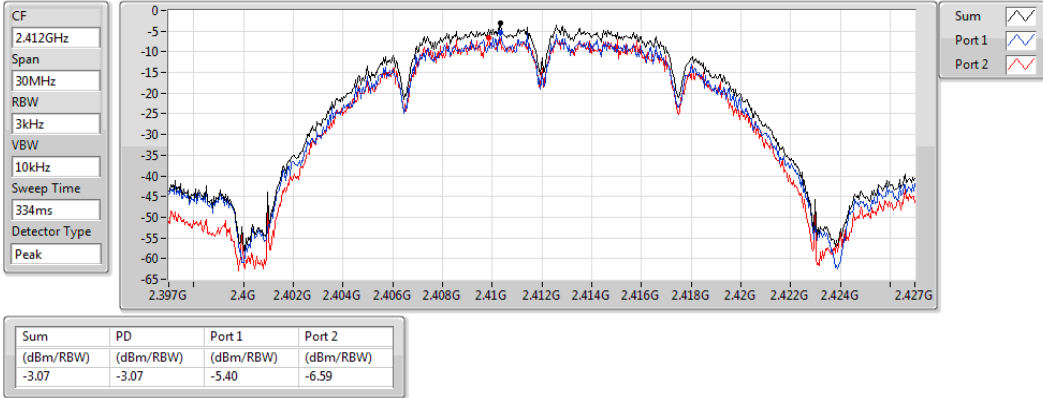
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density;

Port X = Port X power density;

802.11b_Nss1,(1Mbps)_2TX

PSD

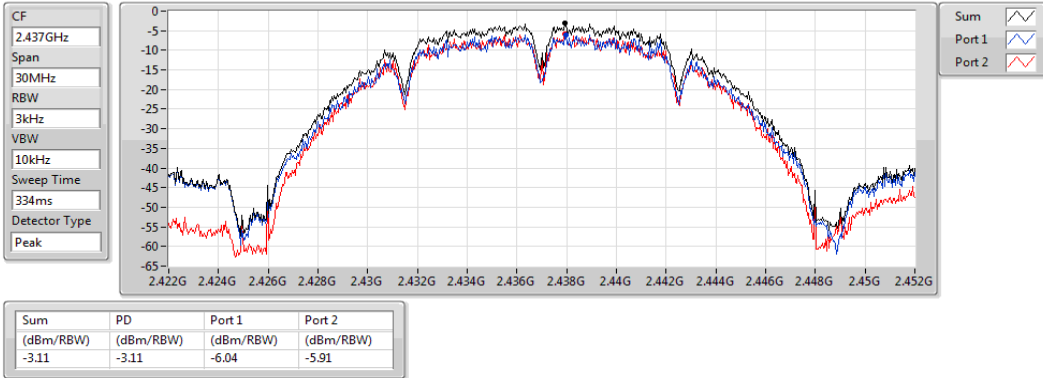
2412MHz



802.11b_Nss1,(1Mbps)_2TX

PSD

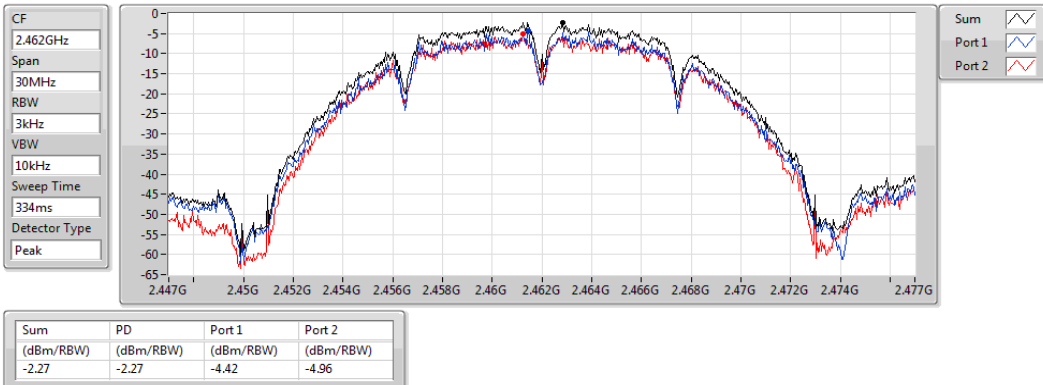
2437MHz



802.11b_Nss1,(1Mbps)_2TX

PSD

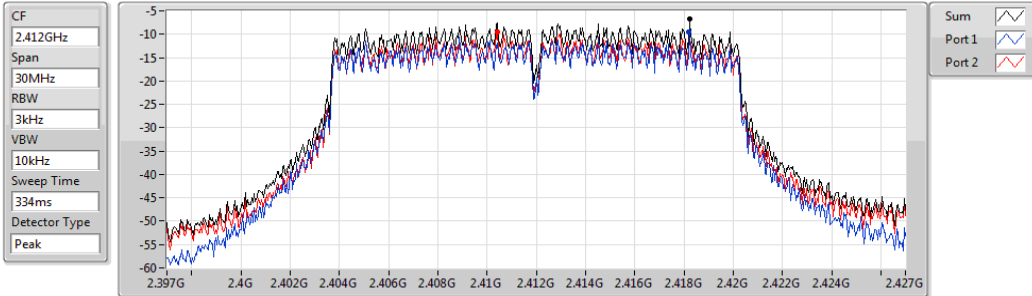
2462MHz



802.11g_Nss1,(6Mbps)_2TX

PSD

2412MHz

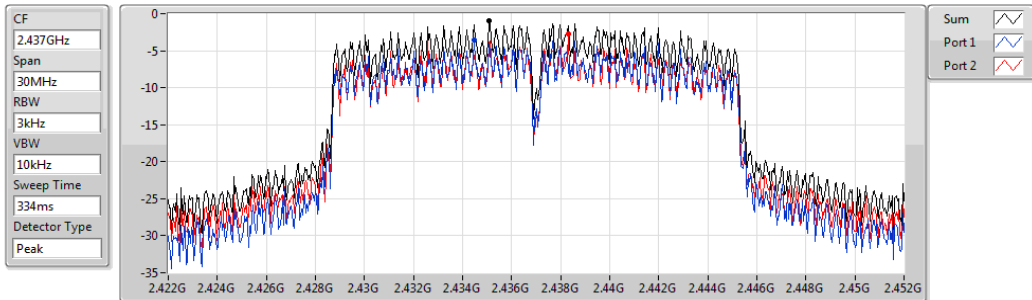


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.71	-6.71	-9.44	-9.60

802.11g_Nss1,(6Mbps)_2TX

PSD

2437MHz

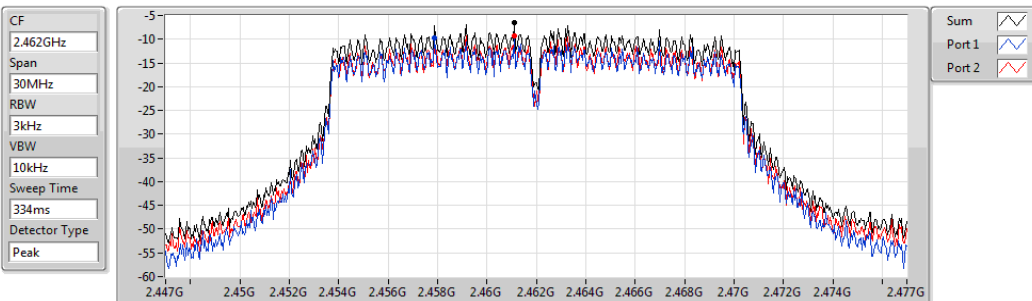


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-0.92	-0.92	-3.50	-2.79

802.11g_Nss1,(6Mbps)_2TX

PSD

2462MHz



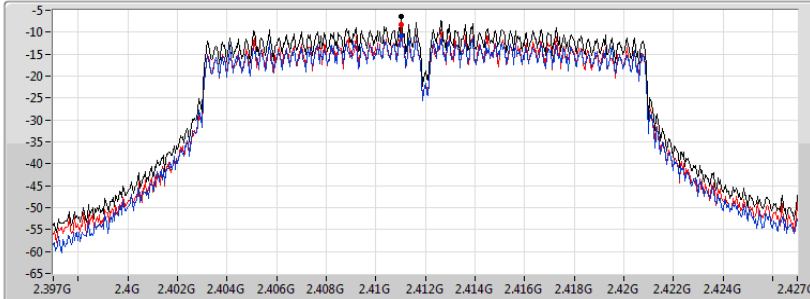
Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.51	-6.51	-9.76	-9.25

802.11n HT20_Nss1,(MCS0)_2TX

PSD

2412MHz

CF
2.412GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
334ms
Detector Type
Peak



Sum
Port 1
Port 2

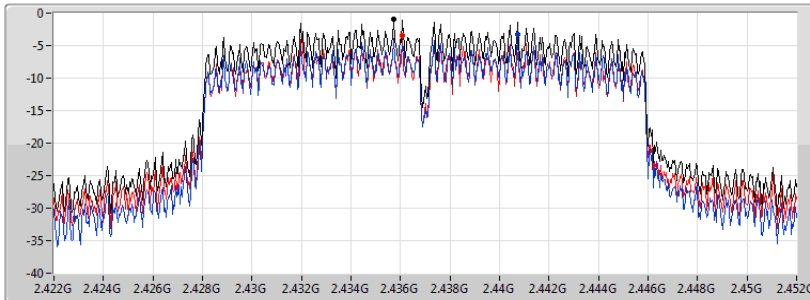
Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.32	-6.32	-10.75	-8.26

802.11n HT20_Nss1,(MCS0)_2TX

PSD

2437MHz

CF
2.437GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
334ms
Detector Type
Peak



Sum
Port 1
Port 2

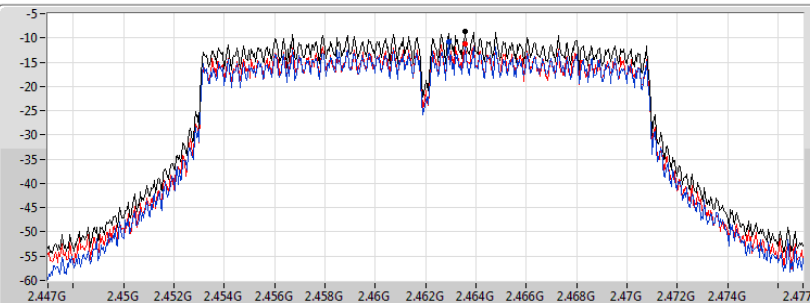
Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-0.98	-0.98	-3.24	-3.41

802.11n HT20_Nss1,(MCS0)_2TX

PSD

2462MHz

CF
2.462GHz
Span
30MHz
RBW
3kHz
VBW
10kHz
Sweep Time
334ms
Detector Type
Peak



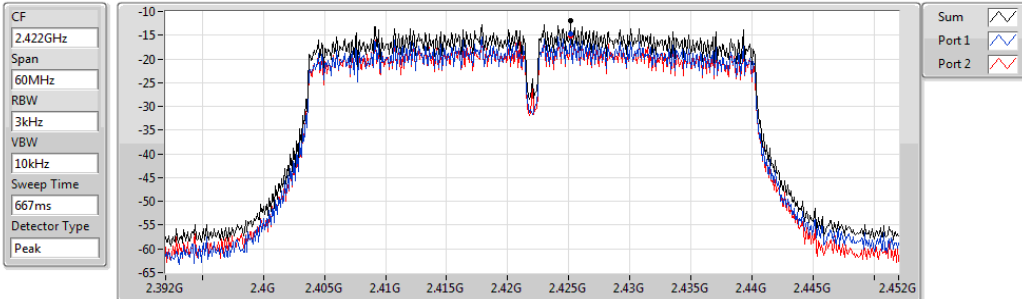
Sum
Port 1
Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.56	-8.56	-10.79	-11.27

802.11n HT40_Nss1,(MCS0)_2TX

PSD

2422MHz

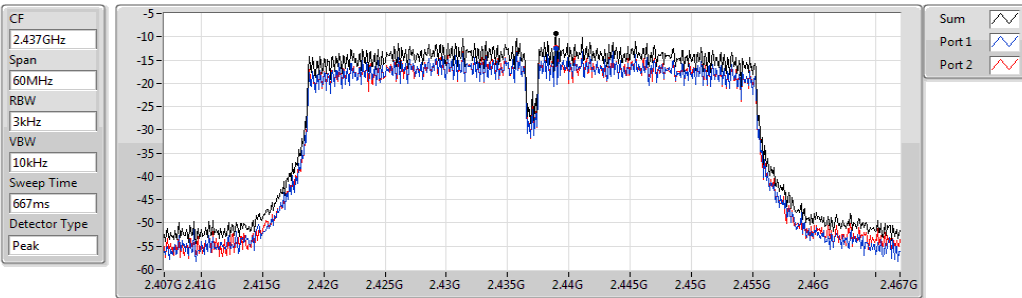


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.92	-11.92	-14.70	-15.18

802.11n HT40_Nss1,(MCS0)_2TX

PSD

2437MHz

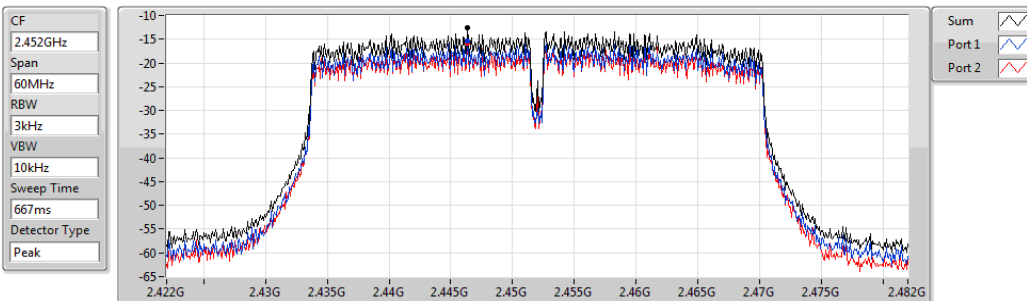


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.39	-9.39	-12.48	-12.32

802.11n HT40_Nss1,(MCS0)_2TX

PSD

2452MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.58	-12.58	-15.33	-15.86

3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Quasi-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.5.2 Test Procedures

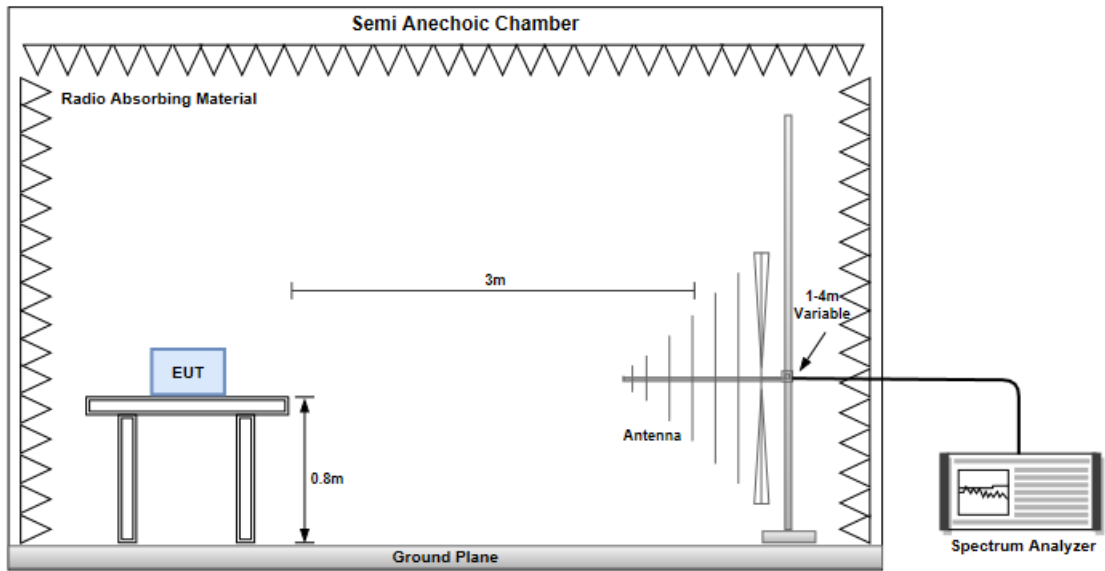
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

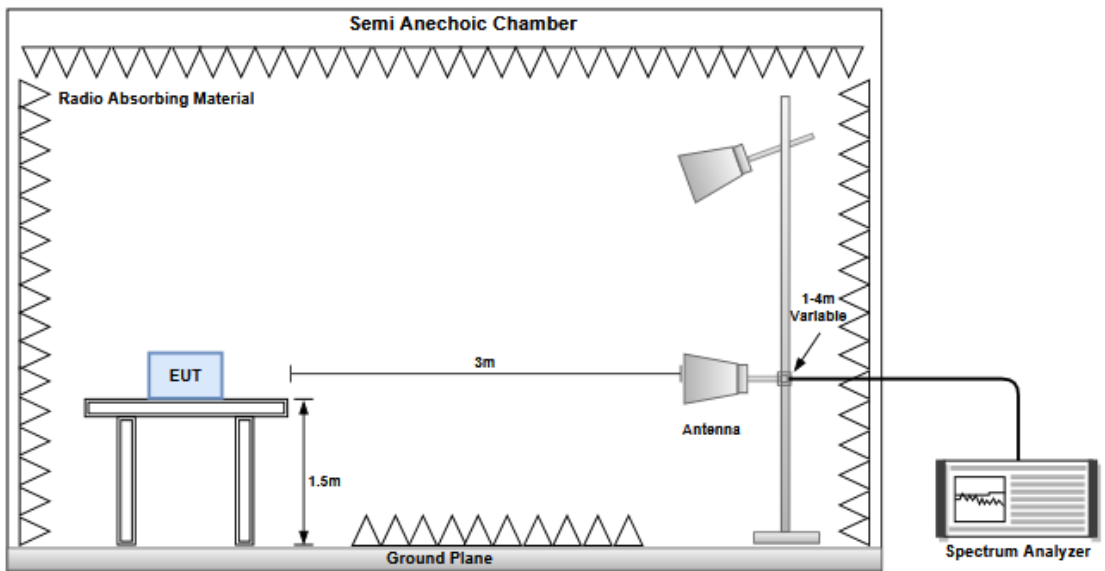
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

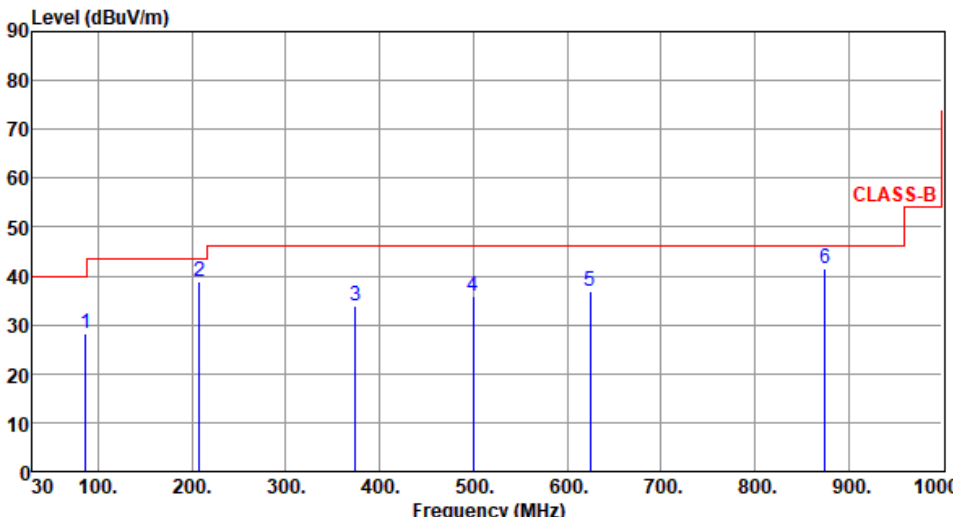
Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



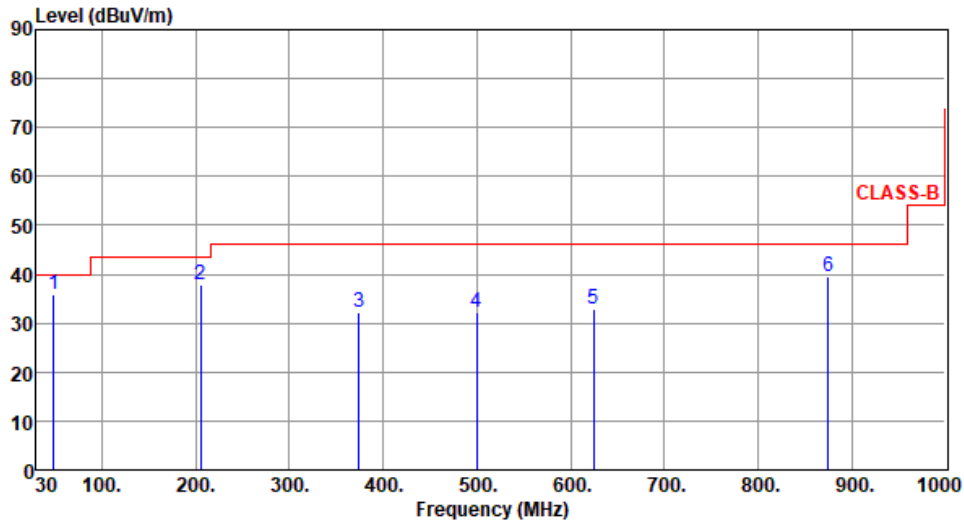
3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	HT20	Test Freq. (MHz)	2437						
Polarization	Horizontal								
Test By : Roger Lu Temperature(°C):23 Humidity(%):67									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	86.26	28.33	40.00	-11.67	42.89	-14.56	Peak	---	---
2	207.51	38.92	43.50	-4.58	50.88	-11.96	Peak	---	---
3	374.35	33.85	46.00	-12.15	40.19	-6.34	Peak	---	---
4	499.48	35.76	46.00	-10.24	39.06	-3.30	Peak	---	---
5	624.61	36.73	46.00	-9.27	37.20	-0.47	Peak	---	---
6	874.87	41.45	46.00	-4.55	38.32	3.13	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
*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)	2437
Polarization	Vertical		

Test By :Roger Lu Temperature(°C):23 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	48.68	35.81	40.00	-4.19	44.40	-8.59	QP	100	157
2	205.57	37.80	43.50	-5.70	49.77	-11.97	Peak	---	---
3	374.35	32.11	46.00	-13.89	38.45	-6.34	Peak	---	---
4	499.48	32.35	46.00	-13.65	35.65	-3.30	Peak	---	---
5	624.61	32.90	46.00	-13.10	33.37	-0.47	Peak	---	---
6	874.87	39.37	46.00	-6.63	36.24	3.13	Peak	---	---

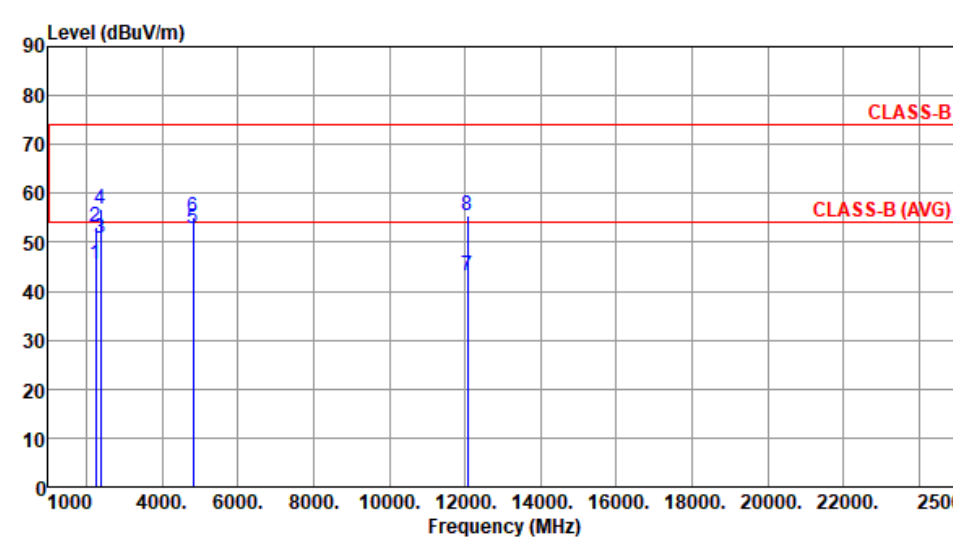
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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.

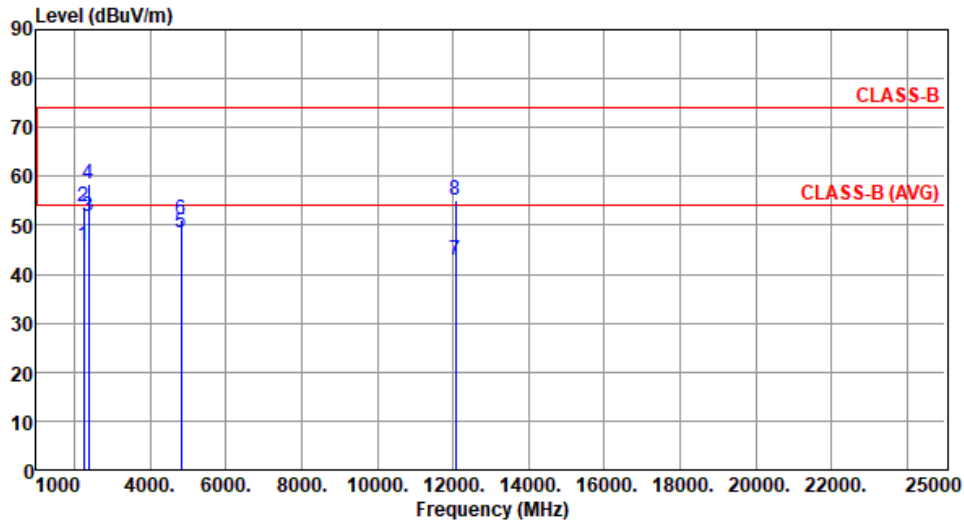
3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b

Modulation	11b	Test Freq. (MHz)	2412						
Polarization	Horizontal								
Test By : Roger Lu Temperature(°C):23 Humidity(%):68									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	2252.00	45.35	54.00	-8.65	47.56	-2.21	Average	105	306
2	2252.00	53.28	74.00	-20.72	55.49	-2.21	Peak	105	306
3	2390.00	50.96	54.00	-3.04	53.71	-2.75	Average	135	349
4	2390.00	56.84	74.00	-17.16	59.59	-2.75	Peak	135	349
5	4824.00	52.93	54.00	-1.07	48.79	4.14	Average	322	344
6	4824.00	55.09	74.00	-18.91	50.95	4.14	Peak	322	344
7	12060.00	43.23	54.00	-10.77	29.44	13.79	Average	100	60
8	12060.00	55.33	74.00	-18.67	41.54	13.79	Peak	100	60

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

Test By :Roger Lu Temperature(°C):23 Humidity(%):68



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2252.00	45.89	54.00	-8.11	48.10	-2.21	Average	291	267
2	2252.00	53.81	74.00	-20.19	56.02	-2.21	Peak	291	267
3	2390.00	51.89	54.00	-2.11	54.64	-2.75	Average	291	263
4	2390.00	58.39	74.00	-15.61	61.14	-2.75	Peak	291	263
5	4824.00	48.39	54.00	-5.61	44.25	4.14	Average	155	264
6	4824.00	51.23	74.00	-22.77	47.09	4.14	Peak	155	264
7	12060.00	42.73	54.00	-11.27	28.94	13.79	Average	106	112
8	12060.00	55.06	74.00	-18.94	41.27	13.79	Peak	106	112

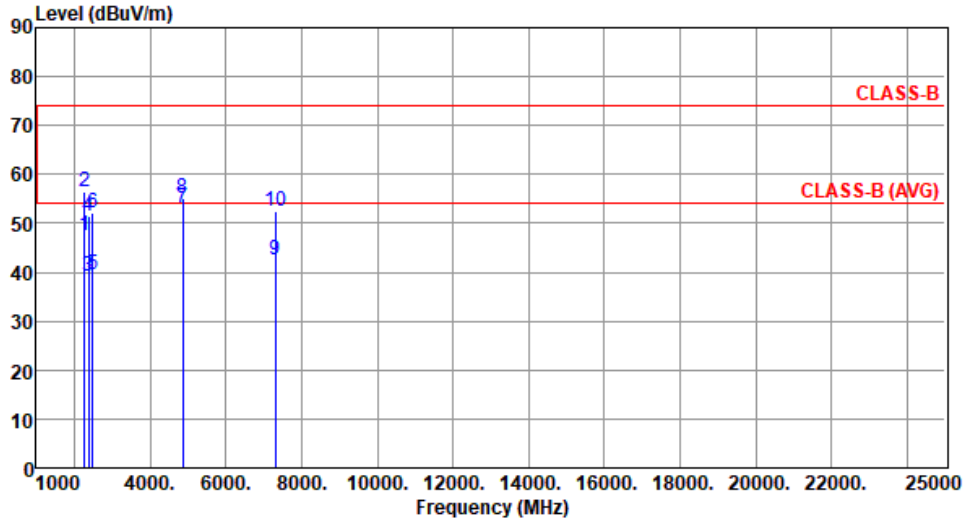
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):23 Humidity(%):68



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2277.00	47.44	54.00	-6.56	49.71	-2.27	Average	100	303
2	2277.00	56.37	74.00	-17.63	58.64	-2.27	Peak	100	303
3	2390.00	39.29	54.00	-14.71	42.04	-2.75	Average	138	355
4	2390.00	51.40	74.00	-22.60	54.15	-2.75	Peak	138	355
5	2483.50	39.47	54.00	-14.53	42.17	-2.70	Average	138	355
6	2483.50	52.15	74.00	-21.85	54.85	-2.70	Peak	138	355
7	4874.00	52.98	54.00	-1.02	48.85	4.13	Average	337	344
8	4874.00	55.29	74.00	-18.71	51.16	4.13	Peak	337	344
9	7311.00	42.49	54.00	-11.51	33.21	9.28	Average	100	107
10	7311.00	52.63	74.00	-21.37	43.35	9.28	Peak	100	107

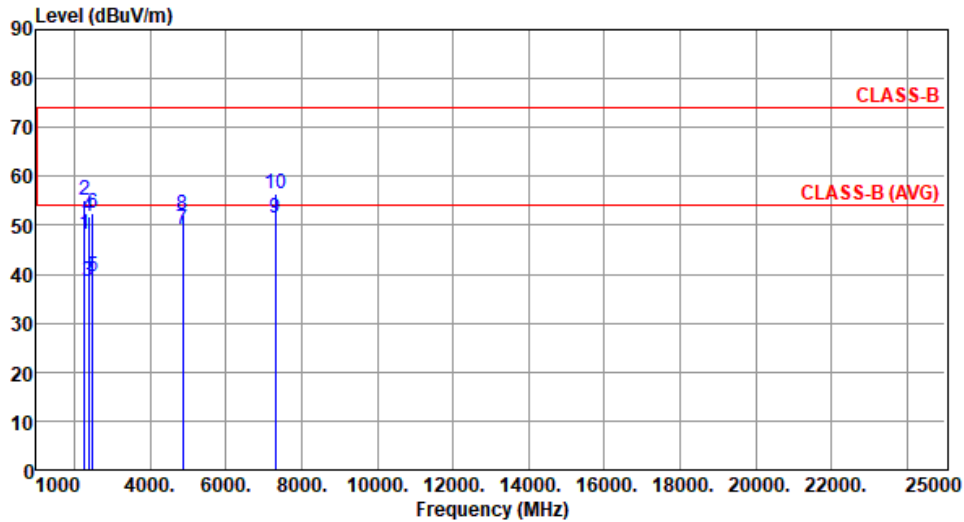
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):23 Humidity(%):68



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2277.00	48.02	54.00	-5.98	50.29	-2.27	Average	324	271
2	2277.00	55.27	74.00	-18.73	57.54	-2.27	Peak	324	271
3	2390.00	38.56	54.00	-15.44	41.31	-2.75	Average	329	257
4	2390.00	51.81	74.00	-22.19	54.56	-2.75	Peak	329	257
5	2483.50	39.60	54.00	-14.40	42.30	-2.70	Average	329	257
6	2483.50	52.56	74.00	-21.44	55.26	-2.70	Peak	329	257
7	4874.00	49.01	54.00	-4.99	44.88	4.13	Average	151	261
8	4874.00	52.03	74.00	-21.97	47.90	4.13	Peak	151	261
9	7311.00	51.49	54.00	-2.51	42.21	9.28	Average	100	142
10	7311.00	56.60	74.00	-17.40	47.32	9.28	Peak	100	142

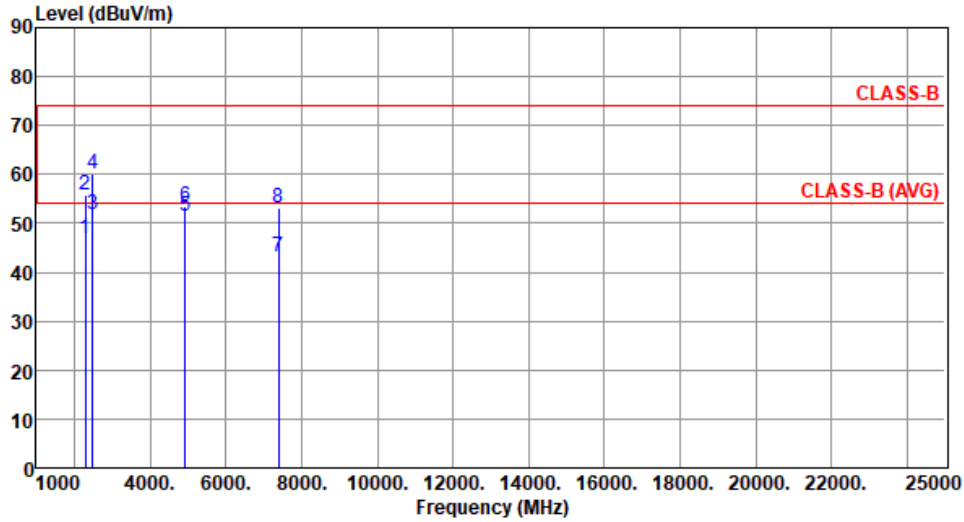
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):23 Humidity(%):68



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2302.00	46.88	54.00	-7.12	49.22	-2.34	Average	106	306
2	2302.00	55.87	74.00	-18.13	58.21	-2.34	Peak	106	306
3	2483.50	51.65	54.00	-2.35	54.35	-2.70	Average	129	347
4	2483.50	59.98	74.00	-14.02	62.68	-2.70	Peak	129	347
5	4924.00	51.42	54.00	-2.58	47.36	4.06	Average	327	341
6	4924.00	53.51	74.00	-20.49	49.45	4.06	Peak	327	341
7	7386.00	43.17	54.00	-10.83	33.92	9.25	Average	100	100
8	7386.00	53.25	74.00	-20.75	44.00	9.25	Peak	100	100

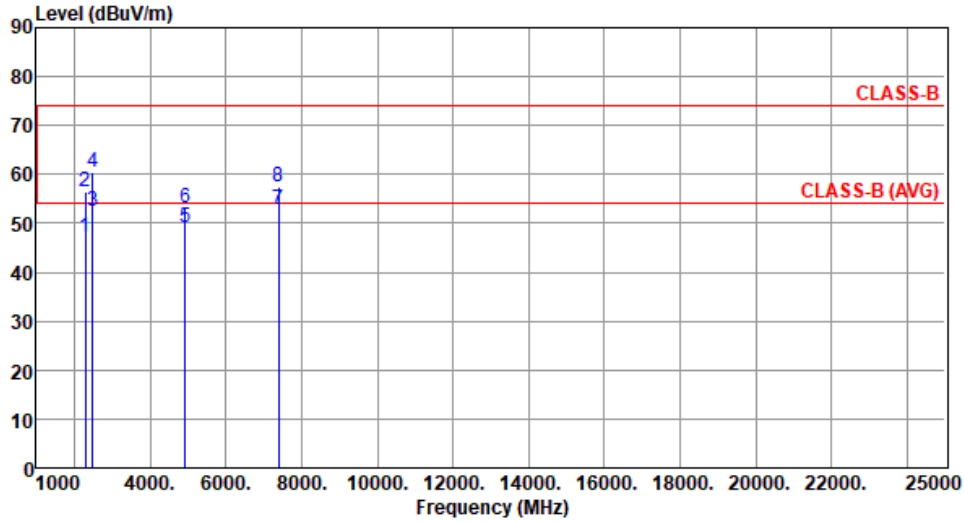
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):23 Humidity(%):68



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2302.00	47.27	54.00	-6.73	49.61	-2.34	Average	274	267
2	2302.00	56.32	74.00	-17.68	58.66	-2.34	Peak	274	267
3	2483.50	52.32	54.00	-1.68	55.02	-2.70	Average	291	258
4	2483.50	60.44	74.00	-13.56	63.14	-2.70	Peak	291	258
5	4924.00	49.26	54.00	-4.74	45.20	4.06	Average	155	259
6	4924.00	53.25	74.00	-20.75	49.19	4.06	Peak	155	259
7	7386.00	52.92	54.00	-1.08	43.67	9.25	Average	100	139
8	7386.00	57.58	74.00	-16.42	48.33	9.25	Peak	100	139

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

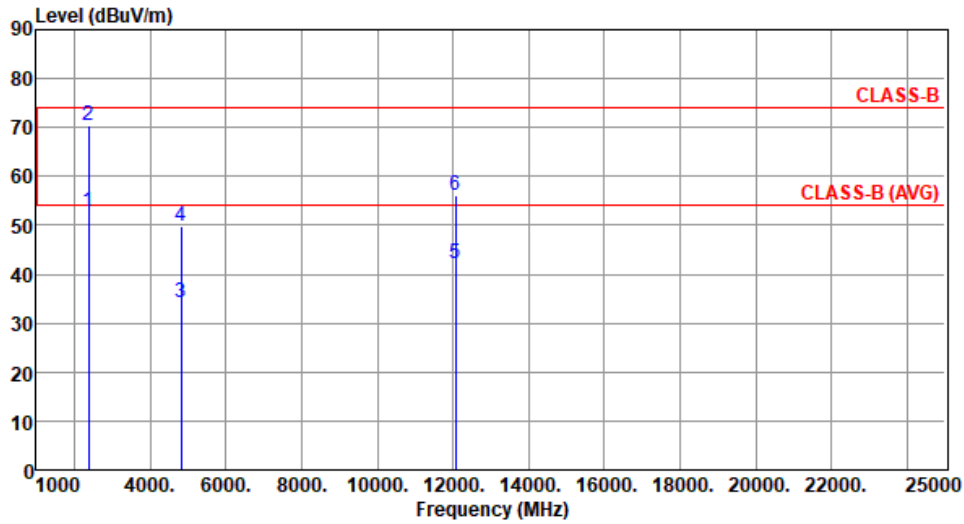
3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g

Modulation	11g	Test Freq. (MHz)	2412						
Polarization	Horizontal								
Test By : Roger Lu Temperature(°C):22 Humidity(%):67									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	2390.00	52.28	54.00	-1.72	55.03	-2.75	Average	136	358
2	2390.00	69.44	74.00	-4.56	72.19	-2.75	Peak	136	358
3	4824.00	37.30	54.00	-16.70	33.16	4.14	Average	309	332
4	4824.00	48.42	74.00	-25.58	44.28	4.14	Peak	309	332
5	12060.00	42.57	54.00	-11.43	28.78	13.79	Average	100	123
6	12060.00	56.37	74.00	-17.63	42.58	13.79	Peak	100	123

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

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	52.89	54.00	-1.11	55.64	-2.75	Average	335	268
2	2390.00	70.29	74.00	-3.71	73.04	-2.75	Peak	335	268
3	4824.00	34.07	54.00	-19.93	29.93	4.14	Average	144	255
4	4824.00	49.92	74.00	-24.08	45.78	4.14	Peak	144	255
5	12060.00	42.33	54.00	-11.67	28.54	13.79	Average	106	113
6	12060.00	56.11	74.00	-17.89	42.32	13.79	Peak	106	113

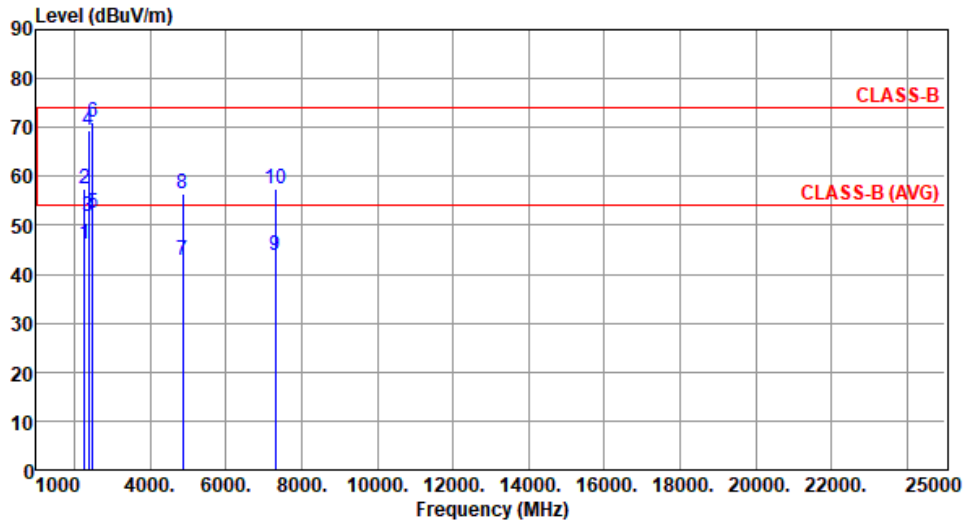
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2277.00	46.10	54.00	-7.90	48.37	-2.27	Average	105	309
2	2277.00	57.61	74.00	-16.39	59.88	-2.27	Peak	105	309
3	2390.00	51.75	54.00	-2.25	54.50	-2.75	Average	135	349
4	2390.00	69.51	74.00	-4.49	72.26	-2.75	Peak	135	349
5	2483.50	52.32	54.00	-1.68	55.02	-2.70	Average	135	349
6	2483.50	70.94	74.00	-3.06	73.64	-2.70	Peak	135	349
7	4874.00	42.71	54.00	-11.29	38.58	4.13	Average	315	337
8	4874.00	56.42	74.00	-17.58	52.29	4.13	Peak	315	337
9	7311.00	43.84	54.00	-10.16	34.56	9.28	Average	100	110
10	7311.00	57.49	74.00	-16.51	48.21	9.28	Peak	100	110

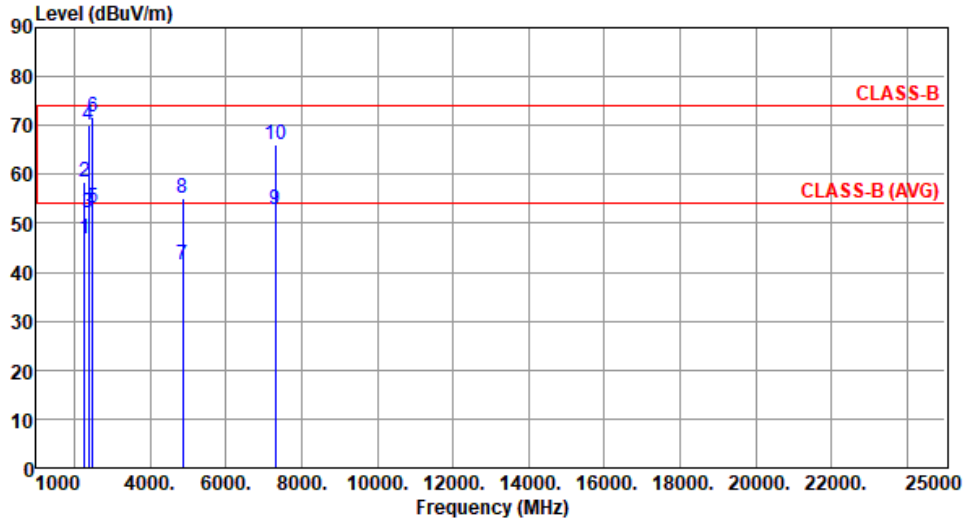
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2277.00	46.84	54.00	-7.16	49.11	-2.27	Average	332	267
2	2277.00	58.42	74.00	-15.58	60.69	-2.27	Peak	332	267
3	2390.00	52.27	54.00	-1.73	55.02	-2.75	Average	337	262
4	2390.00	69.99	74.00	-4.01	72.74	-2.75	Peak	337	262
5	2483.50	52.97	54.00	-1.03	55.67	-2.70	Average	337	262
6	2483.50	71.57	74.00	-2.43	74.27	-2.70	Peak	337	262
7	4874.00	41.42	54.00	-12.58	37.29	4.13	Average	142	257
8	4874.00	55.11	74.00	-18.89	50.98	4.13	Peak	142	257
9	7311.00	52.86	54.00	-1.14	43.58	9.28	Average	100	142
10	7311.00	66.24	74.00	-7.76	56.96	9.28	Peak	100	142

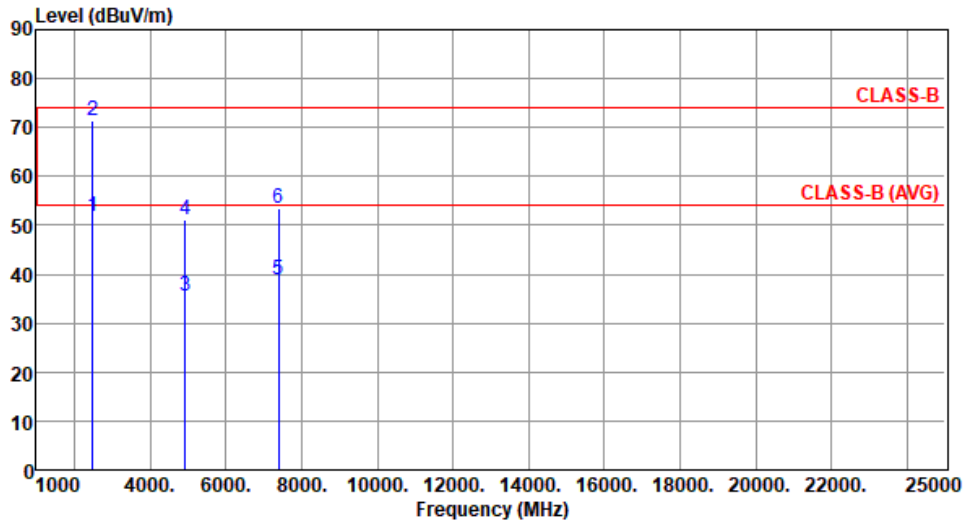
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	51.96	54.00	-2.04	54.66	-2.70	Average	132	354
2	2483.50	71.33	74.00	-2.67	74.03	-2.70	Peak	132	354
3	4924.00	35.39	54.00	-18.61	31.33	4.06	Average	314	320
4	4924.00	51.31	74.00	-22.69	47.25	4.06	Peak	314	320
5	7386.00	38.78	54.00	-15.22	29.53	9.25	Average	100	105
6	7386.00	53.53	74.00	-20.47	44.28	9.25	Peak	100	105

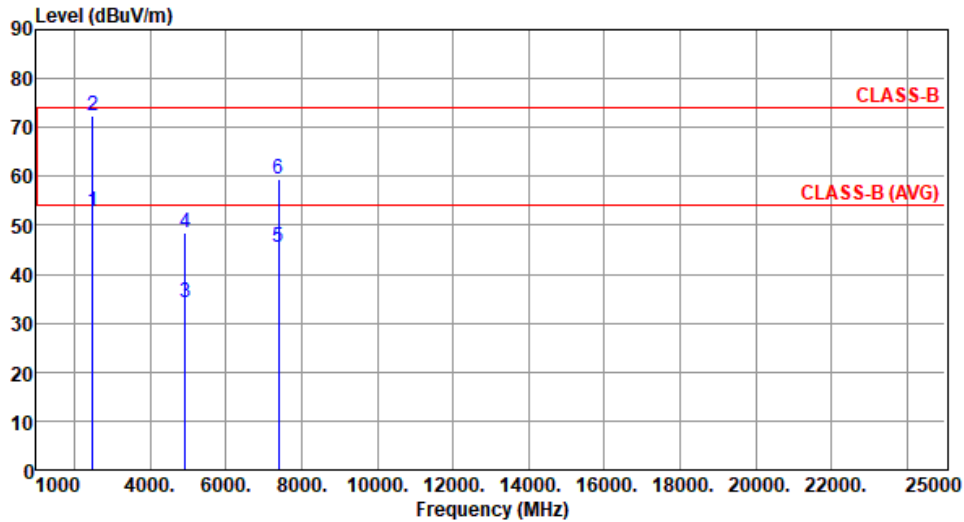
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



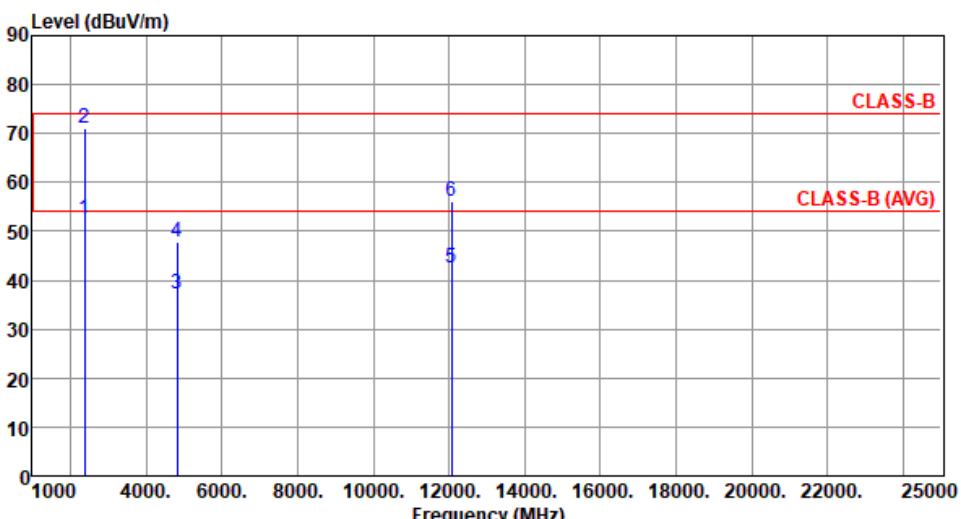
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	52.88	54.00	-1.12	55.58	-2.70	Average	307	276
2	2483.50	72.45	74.00	-1.55	75.15	-2.70	Peak	307	276
3	4924.00	34.24	54.00	-19.76	30.18	4.06	Average	145	261
4	4924.00	48.43	74.00	-25.57	44.37	4.06	Peak	145	261
5	7386.00	45.47	54.00	-8.53	36.22	9.25	Average	100	153
6	7386.00	59.31	74.00	-14.69	50.06	9.25	Peak	100	153

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

*Factor includes antenna factor , cable loss and amplifier gain

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

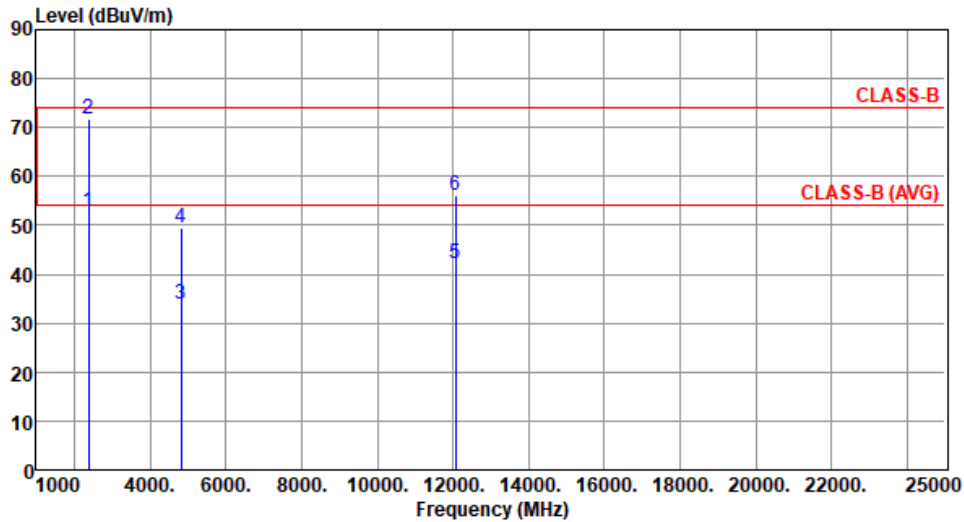
3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

Modulation	HT20		Test Freq. (MHz)	2412					
Polarization	Horizontal								
Test By : Roger Lu		Temperature(°C): 22		Humidity(%): 67					
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	2390.00	52.38	54.00	-1.62	55.13	-2.75	Average	132	351
2	2390.00	71.14	74.00	-2.86	73.89	-2.75	Peak	132	351
3	4824.00	37.25	54.00	-16.75	33.11	4.14	Average	306	333
4	4824.00	47.98	74.00	-26.02	43.84	4.14	Peak	306	333
5	12060.00	42.41	54.00	-11.59	28.62	13.79	Average	100	111
6	12060.00	56.29	74.00	-17.71	42.50	13.79	Peak	100	111

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

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	52.92	54.00	-1.08	55.67	-2.75	Average	301	253
2	2390.00	71.86	74.00	-2.14	74.61	-2.75	Peak	301	253
3	4824.00	33.87	54.00	-20.13	29.73	4.14	Average	149	256
4	4824.00	49.62	74.00	-24.38	45.48	4.14	Peak	149	256
5	12060.00	42.27	54.00	-11.73	28.48	13.79	Average	105	121
6	12060.00	55.98	74.00	-18.02	42.19	13.79	Peak	105	121

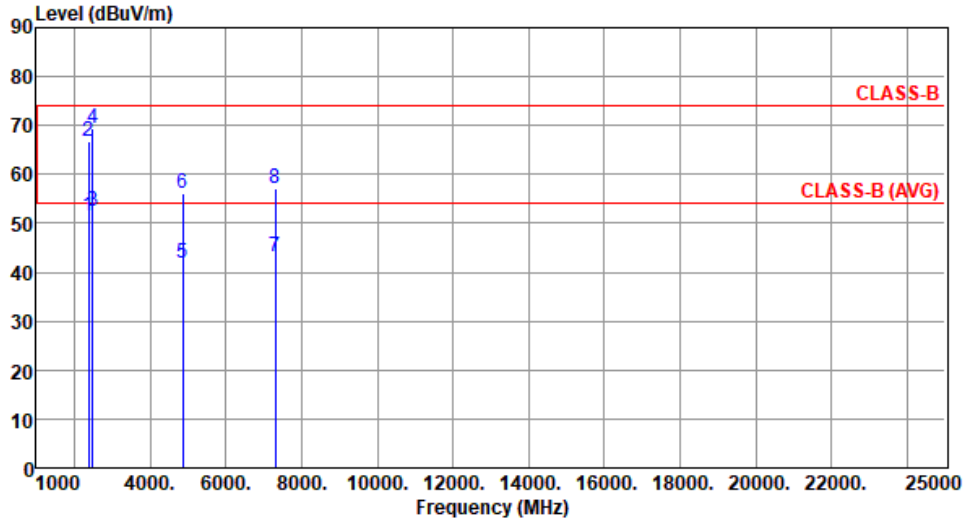
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67

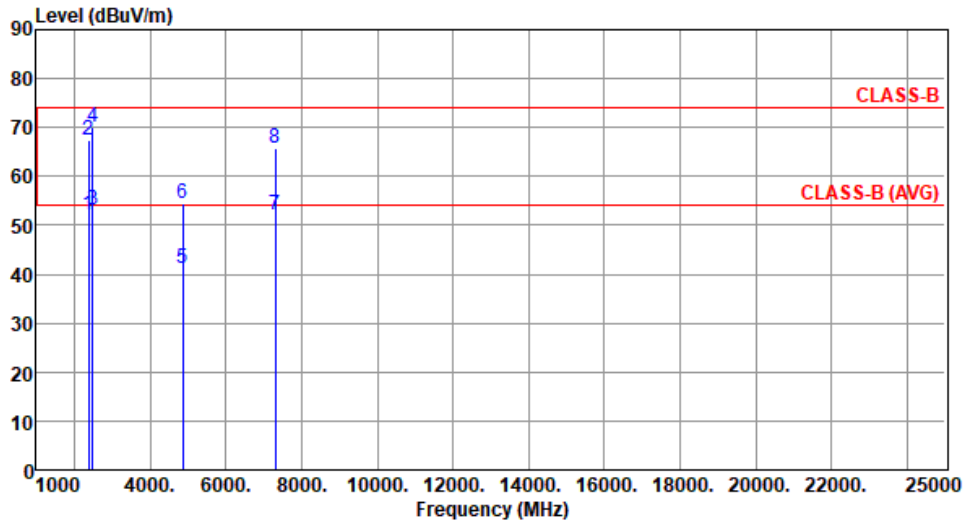


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	51.60	54.00	-2.40	54.35	-2.75	Average	136	352
2	2390.00	66.70	74.00	-7.30	69.45	-2.75	Peak	136	352
3	2483.50	52.41	54.00	-1.59	55.11	-2.70	Average	136	352
4	2483.50	69.42	74.00	-4.58	72.12	-2.70	Peak	136	352
5	4874.00	41.81	54.00	-12.19	37.68	4.13	Average	311	339
6	4874.00	56.16	74.00	-17.84	52.03	4.13	Peak	311	339
7	7311.00	43.21	54.00	-10.79	33.93	9.28	Average	100	119
8	7311.00	57.18	74.00	-16.82	47.90	9.28	Peak	100	119

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

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	52.28	54.00	-1.72	55.03	-2.75	Average	306	253
2	2390.00	67.53	74.00	-6.47	70.28	-2.75	Peak	306	253
3	2483.50	52.98	54.00	-1.02	55.68	-2.70	Average	306	253
4	2483.50	69.94	74.00	-4.06	72.64	-2.70	Peak	306	253
5	4874.00	41.11	54.00	-12.89	36.98	4.13	Average	145	259
6	4874.00	54.48	74.00	-19.52	50.35	4.13	Peak	145	259
7	7311.00	52.17	54.00	-1.83	42.89	9.28	Average	100	145
8	7311.00	65.77	74.00	-8.23	56.49	9.28	Peak	100	145

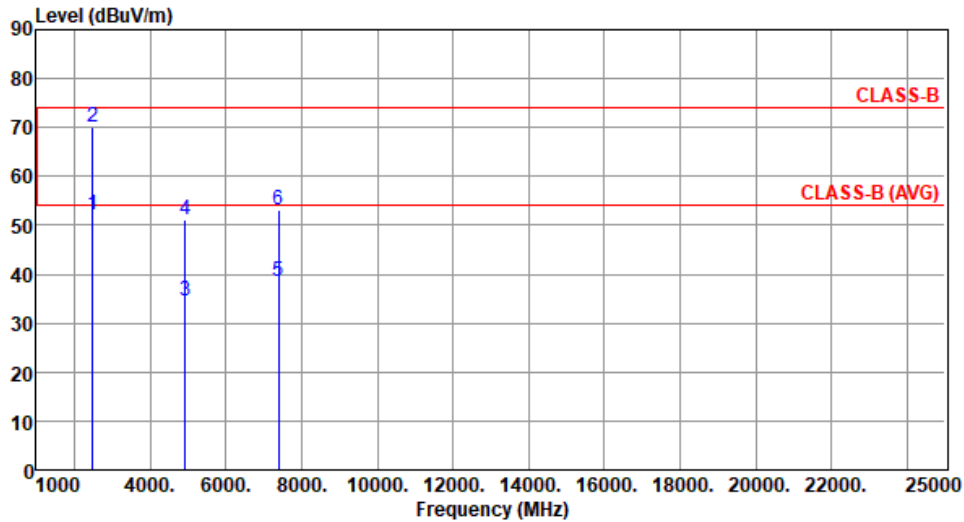
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	52.15	54.00	-1.85	54.85	-2.70	Average	130	354
2	2483.50	70.18	74.00	-3.82	72.88	-2.70	Peak	130	354
3	4924.00	34.67	54.00	-19.33	30.61	4.06	Average	311	316
4	4924.00	51.18	74.00	-22.82	47.12	4.06	Peak	311	316
5	7386.00	38.43	54.00	-15.57	29.18	9.25	Average	100	102
6	7386.00	53.17	74.00	-20.83	43.92	9.25	Peak	100	102

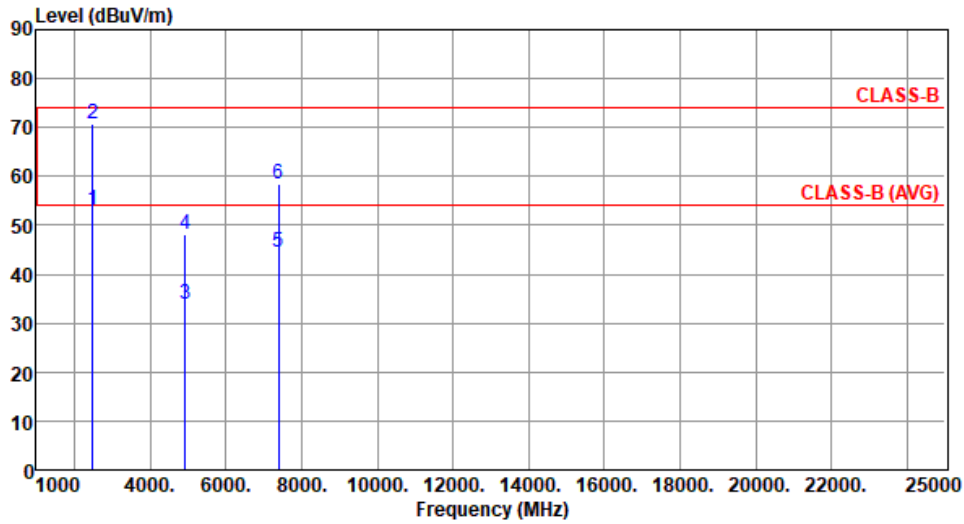
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*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		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



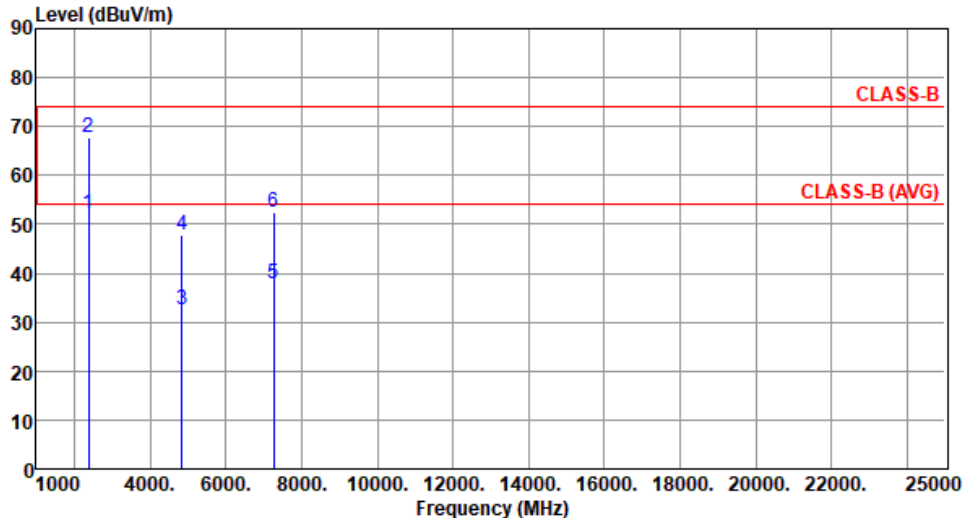
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	52.98	54.00	-1.02	55.68	-2.70	Average	316	258
2	2483.50	70.86	74.00	-3.14	73.56	-2.70	Peak	316	258
3	4924.00	33.71	54.00	-20.29	29.65	4.06	Average	150	256
4	4924.00	48.09	74.00	-25.91	44.03	4.06	Peak	150	256
5	7386.00	44.37	54.00	-9.63	35.12	9.25	Average	100	144
6	7386.00	58.44	74.00	-15.56	49.19	9.25	Peak	100	144

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

*Factor includes antenna factor , cable loss and amplifier gain

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

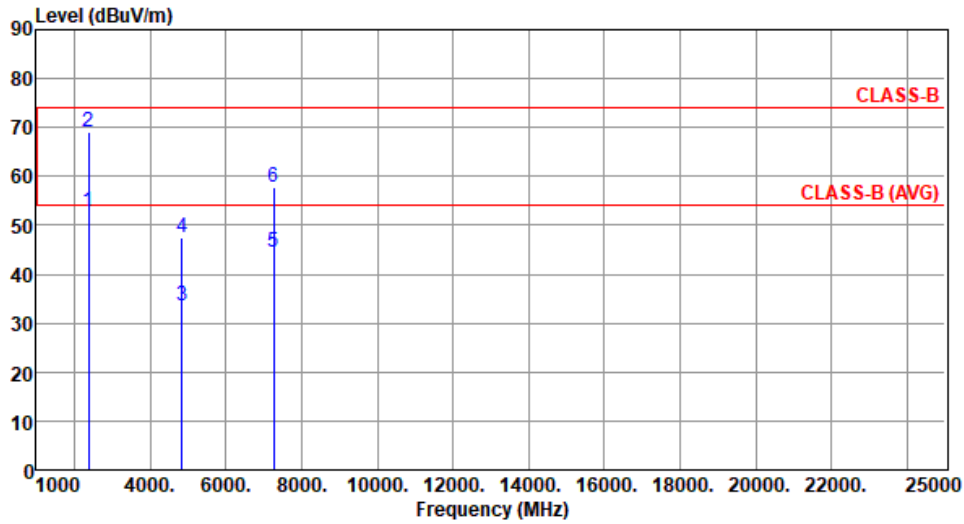
3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40

Modulation	HT40	Test Freq. (MHz)	2422						
Polarization	Horizontal								
Test By : Roger Lu Temperature(°C):22 Humidity(%):67									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	2390.00	52.02	54.00	-1.98	54.77	-2.75	Average	142	350
2	2390.00	67.90	74.00	-6.10	70.65	-2.75	Peak	142	350
3	4844.00	32.69	54.00	-21.31	28.53	4.16	Average	109	222
4	4844.00	47.78	74.00	-26.22	43.62	4.16	Peak	109	222
5	7266.00	37.76	54.00	-16.24	28.53	9.23	Average	300	309
6	7266.00	52.51	74.00	-21.49	43.28	9.23	Peak	300	309

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

Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	52.92	54.00	-1.08	55.67	-2.75	Average	347	261
2	2390.00	69.05	74.00	-4.95	71.80	-2.75	Peak	347	261
3	4844.00	33.60	54.00	-20.40	29.44	4.16	Average	300	301
4	4844.00	47.43	74.00	-26.57	43.27	4.16	Peak	300	301
5	7266.00	44.57	54.00	-9.43	35.34	9.23	Average	100	159
6	7266.00	57.85	74.00	-16.15	48.62	9.23	Peak	100	159

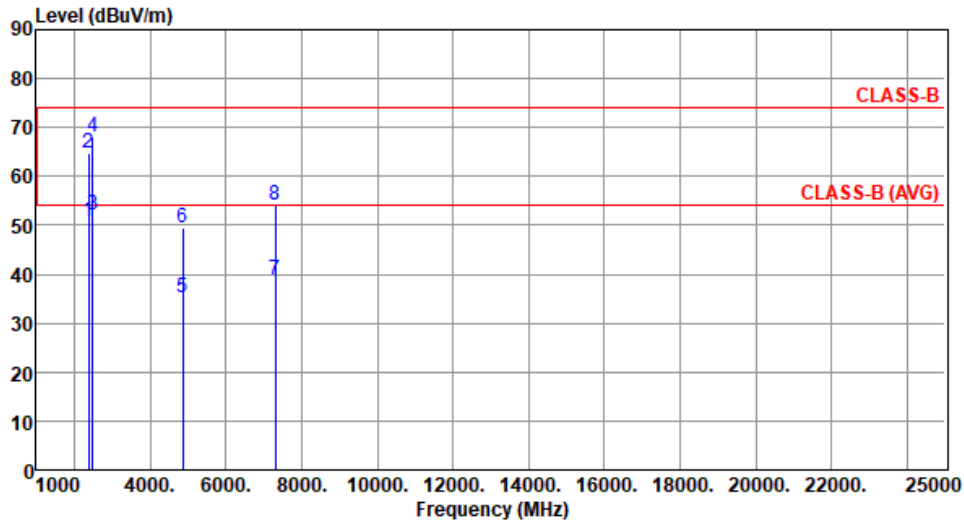
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	50.80	54.00	-3.20	53.55	-2.75	Average	142	355
2	2390.00	64.74	74.00	-9.26	67.49	-2.75	Peak	142	355
3	2483.50	52.05	54.00	-1.95	54.75	-2.70	Average	142	355
4	2483.50	67.95	74.00	-6.05	70.65	-2.70	Peak	142	355
5	4874.00	35.34	54.00	-18.66	31.21	4.13	Average	300	306
6	4874.00	49.41	74.00	-24.59	45.28	4.13	Peak	300	306
7	7311.00	38.87	54.00	-15.13	29.59	9.28	Average	100	111
8	7311.00	54.26	74.00	-19.74	44.98	9.28	Peak	100	111

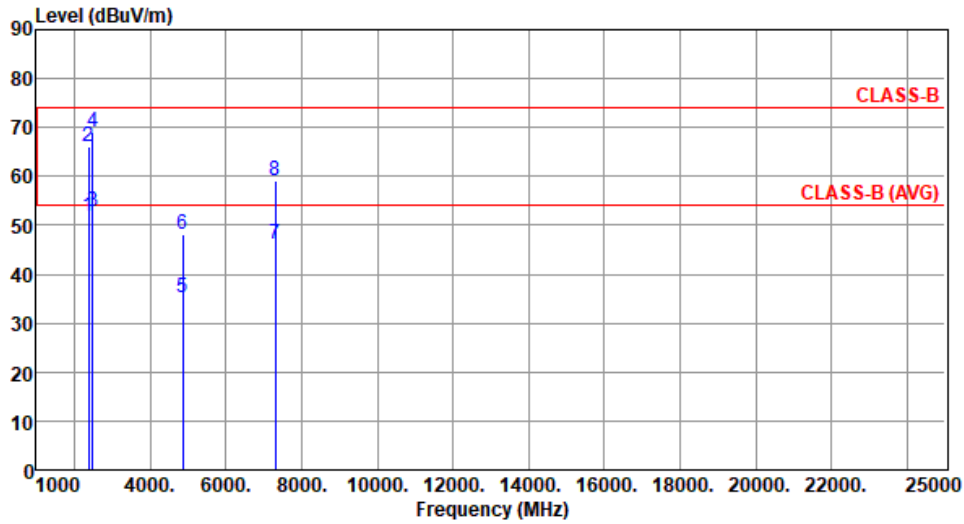
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67

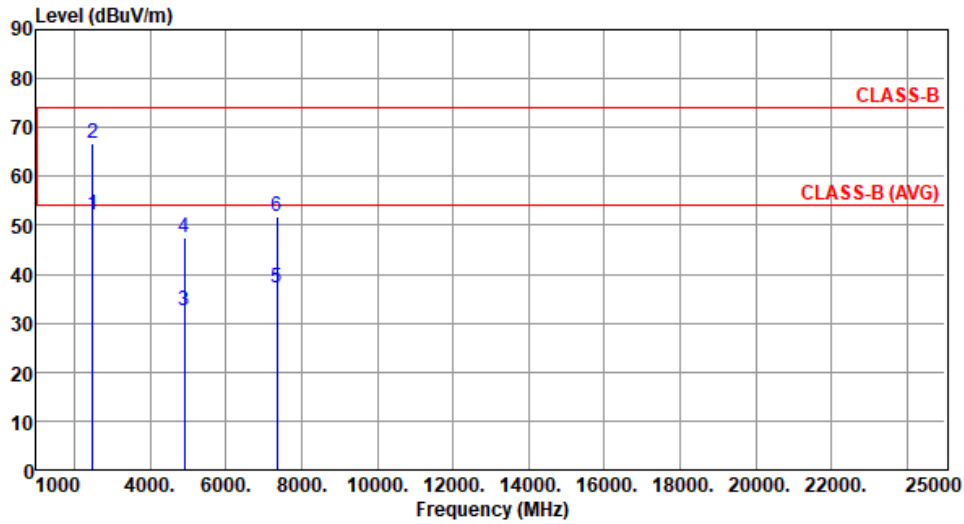


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	51.86	54.00	-2.14	54.61	-2.75	Average	354	256
2	2390.00	66.10	74.00	-7.90	68.85	-2.75	Peak	354	256
3	2483.50	52.94	54.00	-1.06	55.64	-2.70	Average	318	256
4	2483.50	69.10	74.00	-4.90	71.80	-2.70	Peak	318	256
5	4874.00	35.25	54.00	-18.75	31.12	4.13	Average	300	298
6	4874.00	48.17	74.00	-25.83	44.04	4.13	Peak	300	298
7	7311.00	46.03	54.00	-7.97	36.75	9.28	Average	100	143
8	7311.00	59.28	74.00	-14.72	50.00	9.28	Peak	100	143

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

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	52.15	54.00	-1.85	54.85	-2.70	Average	135	351
2	2483.50	66.78	74.00	-7.22	69.48	-2.70	Peak	135	351
3	4904.00	32.43	54.00	-21.57	28.34	4.09	Average	110	212
4	4904.00	47.44	74.00	-26.56	43.35	4.09	Peak	110	212
5	7356.00	37.15	54.00	-16.85	27.89	9.26	Average	300	315
6	7356.00	51.84	74.00	-22.16	42.58	9.26	Peak	300	315

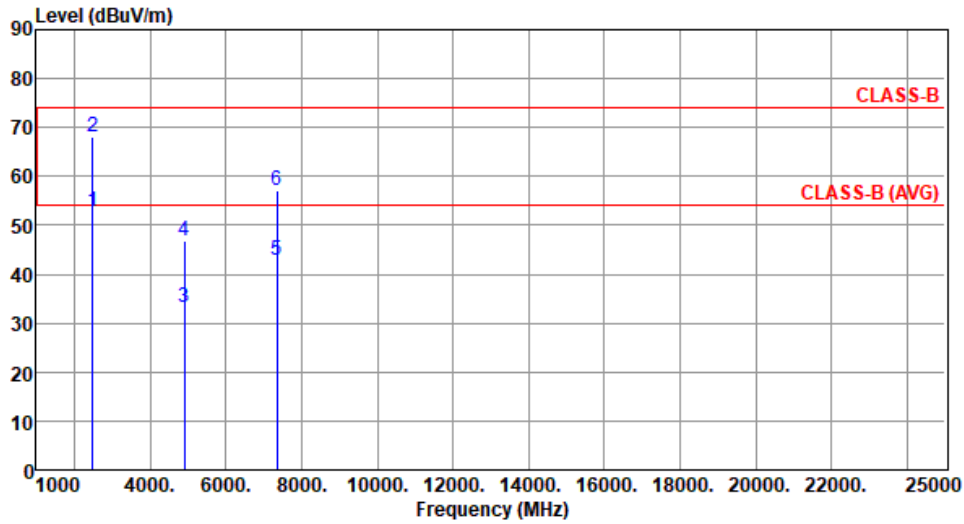
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		

Test By :Roger Lu Temperature(°C):22 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	52.92	54.00	-1.08	55.62	-2.70	Average	318	257
2	2483.50	68.01	74.00	-5.99	70.71	-2.70	Peak	318	257
3	4904.00	33.21	54.00	-20.79	29.12	4.09	Average	300	294
4	4904.00	46.75	74.00	-27.25	42.66	4.09	Peak	300	294
5	7356.00	42.95	54.00	-11.05	33.69	9.26	Average	100	142
6	7356.00	57.03	74.00	-16.97	47.77	9.26	Peak	100	142

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

*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

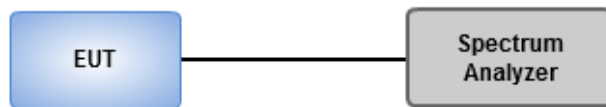
Reference level measurement

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

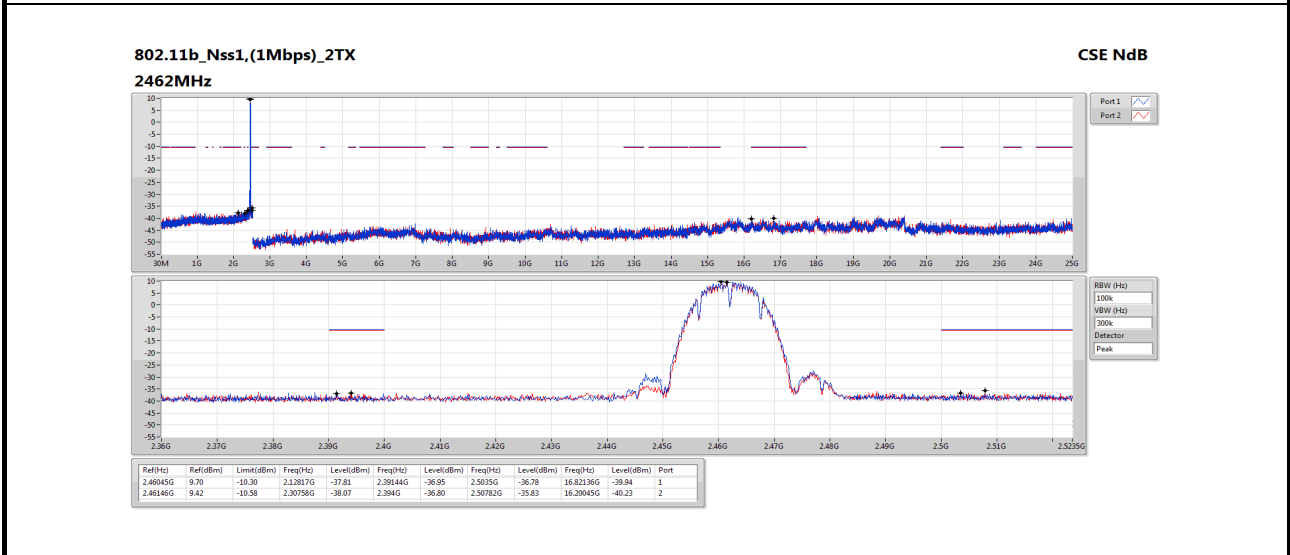
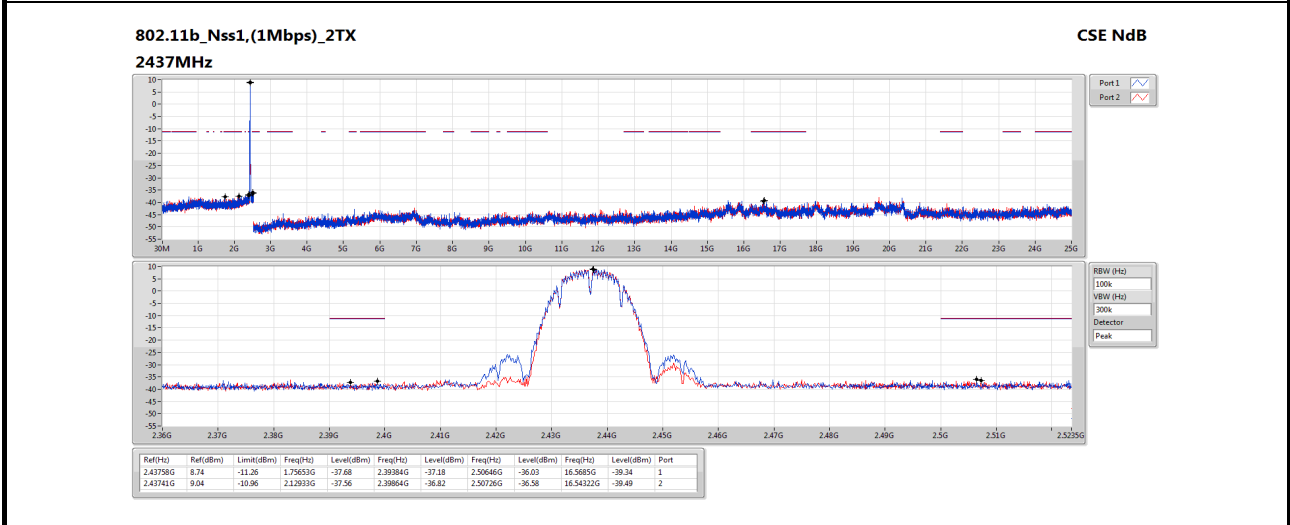
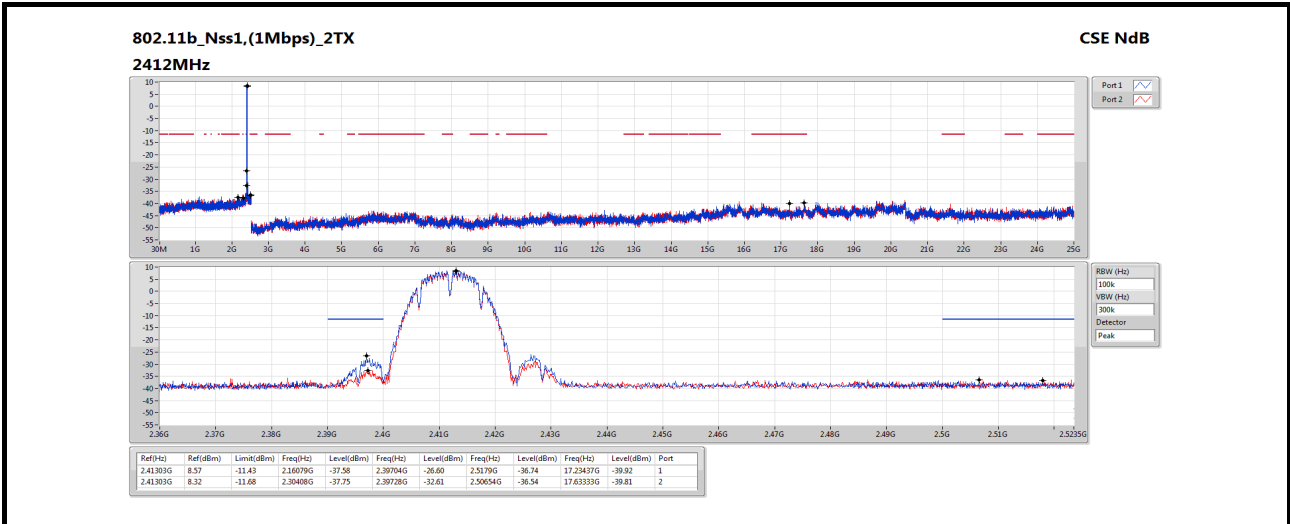
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

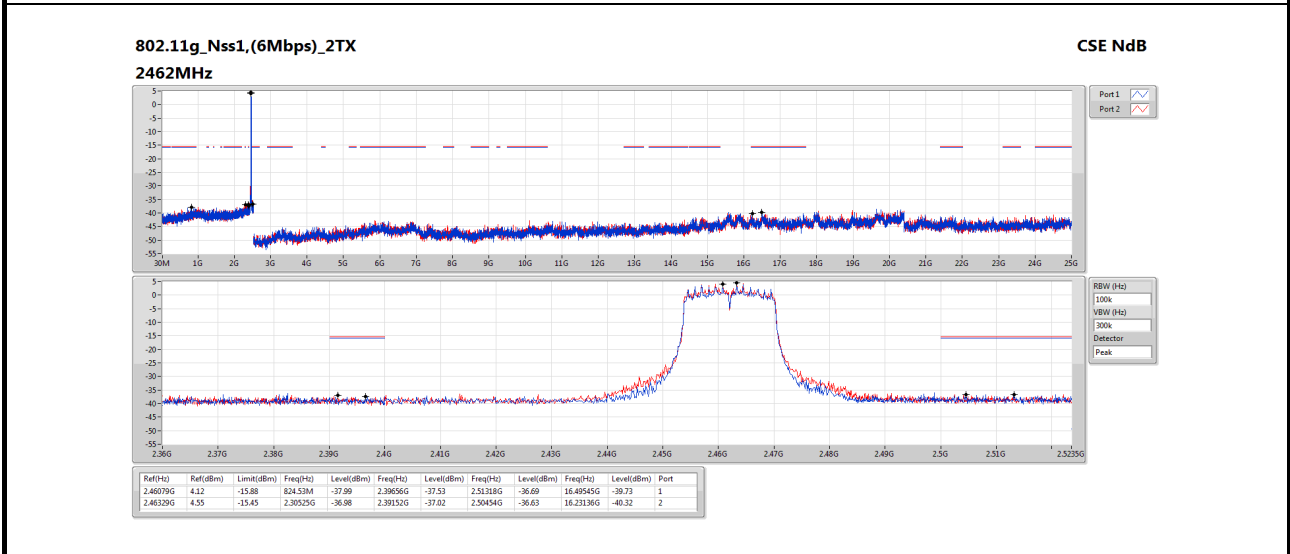
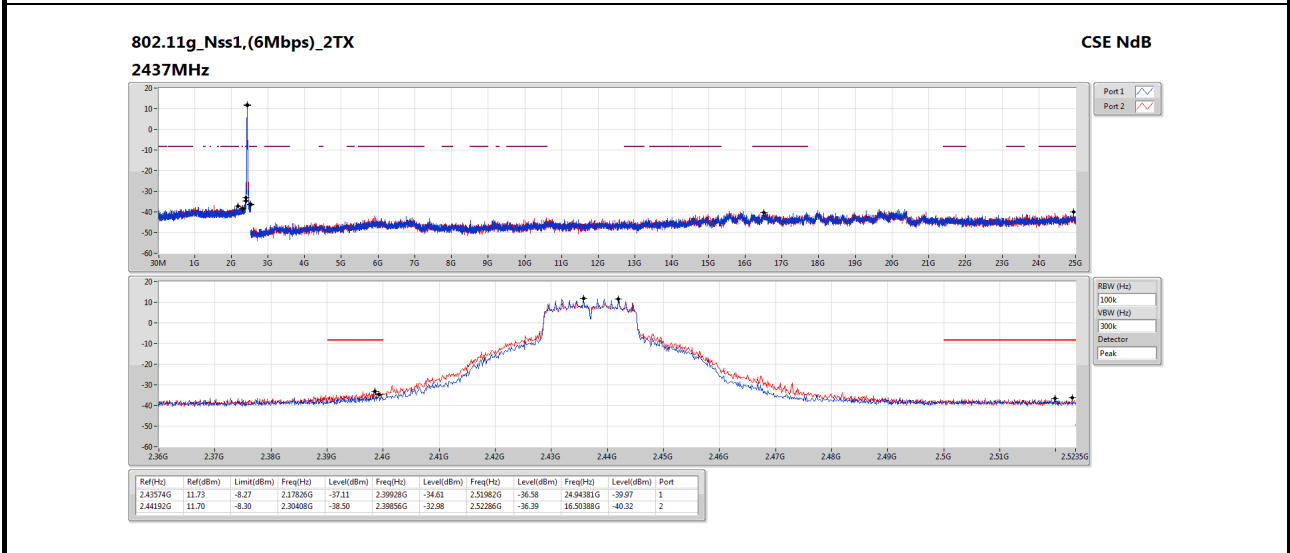
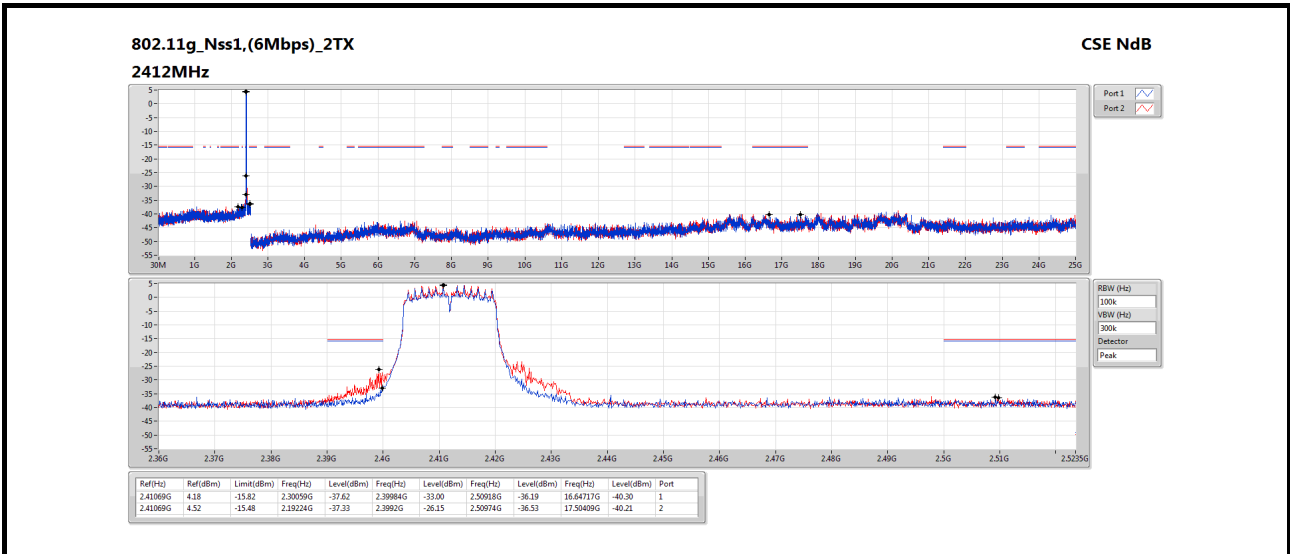
3.6.3 Test Setup



3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

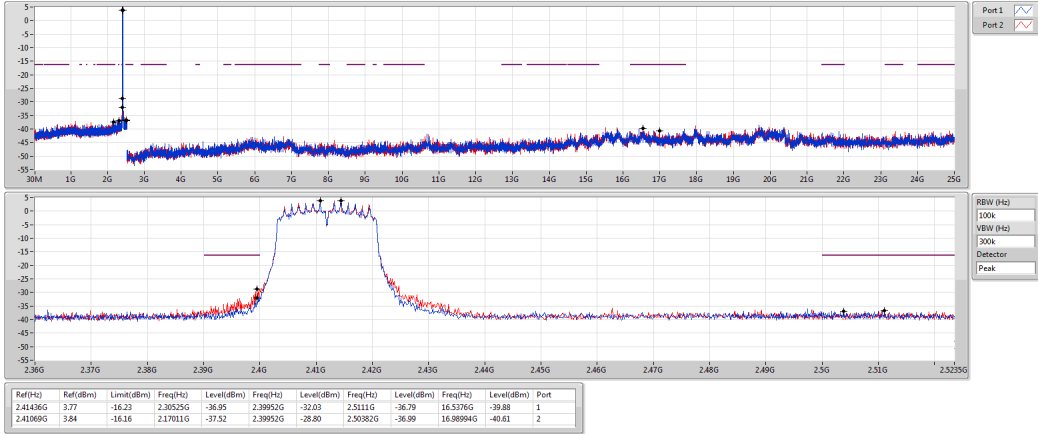
Ambient Condition	22°C / 67%	Tested By	Brad Wu
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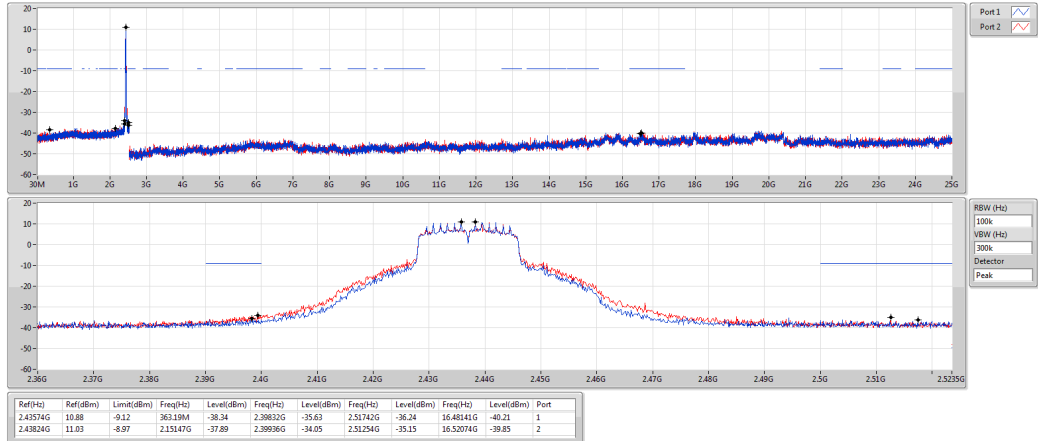
802.11n HT20_Nss1,(MCS0)_2TX
2412MHz

CSE NdB



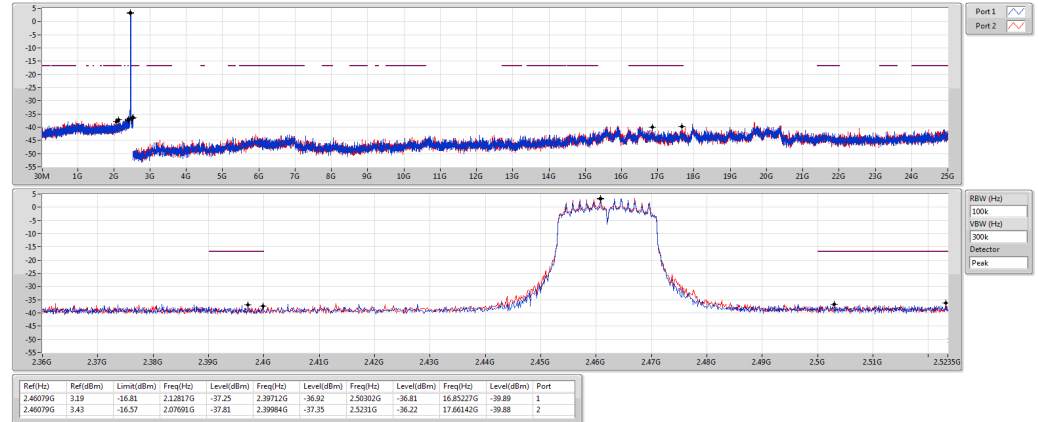
802.11n HT20_Nss1,(MCS0)_2TX
2437MHz

CSE NdB



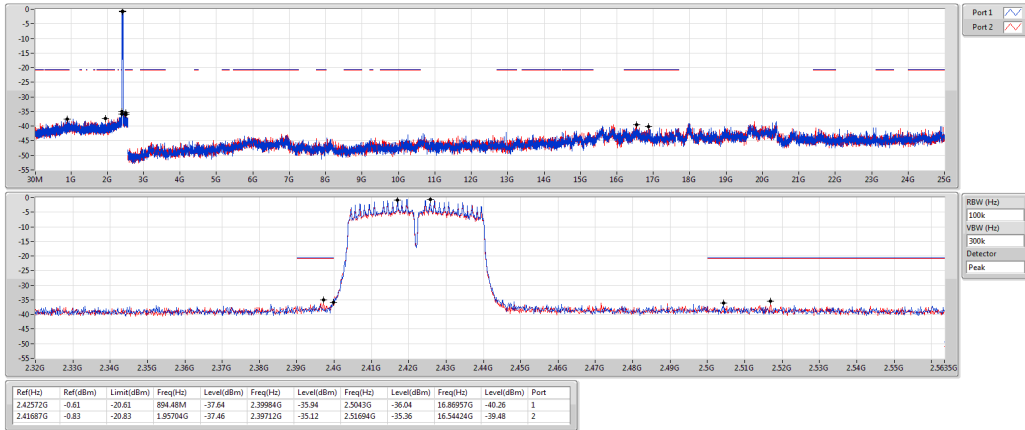
802.11n HT20_Nss1,(MCS0)_2TX
2462MHz

CSE NdB



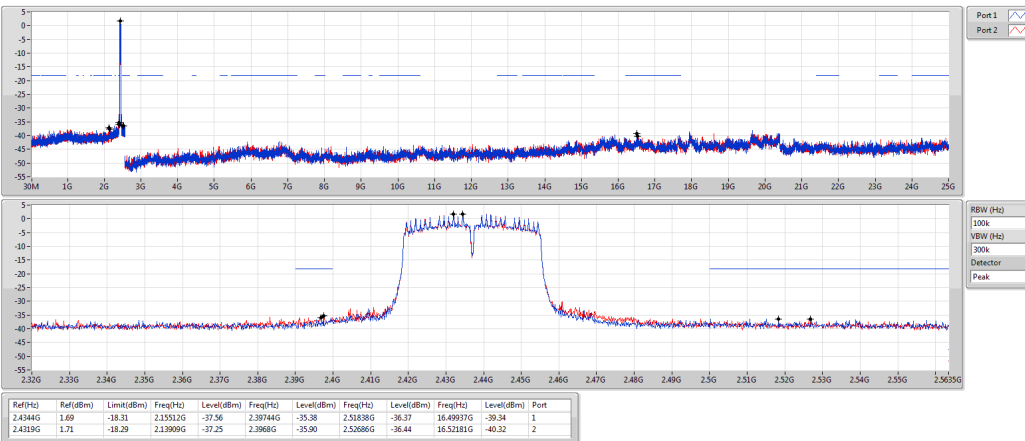
802.11n HT40_Nss1,(MCS0)_2TX
2422MHz

CSE NdB



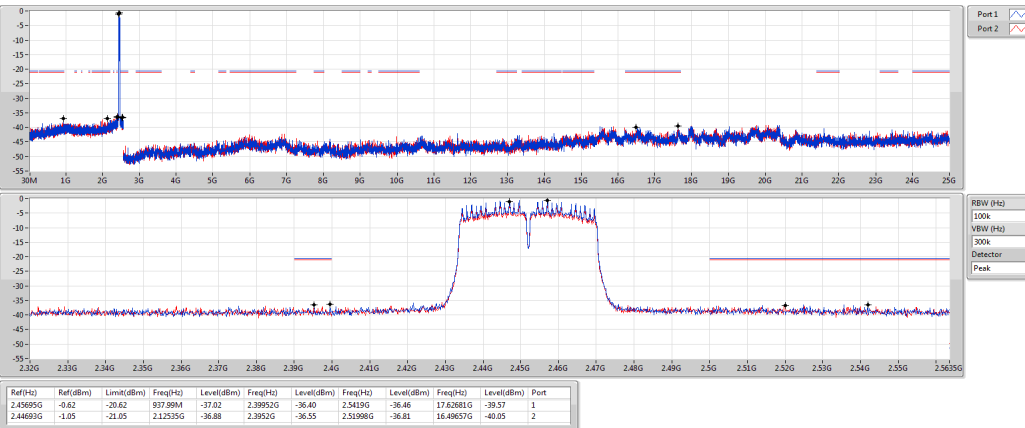
802.11n HT40_Nss1,(MCS0)_2TX
2437MHz

CSE NdB



802.11n HT40_Nss1,(MCS0)_2TX
2452MHz

CSE NdB



4 Test laboratory information

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

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

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

Linkou

Tel: 886-2-2601-1640

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

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., 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: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

==END==