NCC Test Report

Equipment	:	**802.11 ac Unified Pro Outdoor Access Point with Sector Smart Antenna**
Model No.	:	**WAC6552D-S**
Brand Name	:	**ZYXEL**
Applicant	:	合勤科技股份有限公司
Address	:	新北市新店區北新路 **3** 段 **223** 號 **11** 樓
Standard	:	**LP0002 Section 3.10.1 (2018-01-10)**
Received Date	:	**Nov. 17, 2017**
Tested Date	:	**Jun. 22 ~ Jul. 10, 2018**

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

Reviewed by:

Along Chen / Assistant Manager

Approved by:

Gary Chang / Manager

Testing Laboratory 2732

Table of Contents

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Local Support Equipment List 9
1.3 Test Setup Chart 9
1.4 The Equipment List 10
1.5 Test Standards 11
1.6 Measurement Uncertainty 11

2 TEST CONFIGURATION 12

2.1 Testing Condition 12
2.2 The Worst Test Modes and Channel Details 12

3 TRANSMITTER TEST RESULTS 13

3.1 Conducted Emissions 13
3.2 6dB and Occupied Bandwidth 16
3.3 RF Output Power 22
3.4 Power Spectral Density 24
3.5 Unwanted Emissions into Restricted Frequency Bands 30
3.6 Emissions in Non-Restricted Frequency Bands 58

4 RECEIVER TEST RESULTS 71

4.1 Conducted Emissions 71
4.2 Radiated Emissions 74

5 TEST LABORATORY INFORMATION 80

Release Record

Report No.	Version	Description	Issued Date
TR7N1701AC	Rev. 01	Initial issue	Jul. 27, 2018

Summary of Test Results

NCC Rules	Test Items	Measured	Result
2.3	Conducted Emissions	[dBuV]: 18.622MHz 40.79 (Margin -9.21dB) - AV	Pass
3.10.1.5 2.8	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz 73.86 (Margin -0.14dB) - PK [dBuV/m at 3m]: 2483.50MHz 53.86 (Margin -0.14dB) - AV	Pass
3.10.1.2(1)(C)	Maximum Output Power	Max Power [dBm]: 28.35	Pass
3.10.1.6(2)(A)	6dB Bandwidth	Meet the requirement of limit	Pass
3.10.1.6(2)(B)	Power Spectral Density	Meet the requirement of limit	Pass
3.10.1.4	Antenna Requirement	Meet the requirement of limit	Pass

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 Conducted (Average) Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)		
				2400~2483.5	**5150~5250**	**5725~5850**
1	SECTX-DB r2.0	Direction	I-PEX	0.8	4.22	5.34

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	55Vdc from POE (for support unit only)

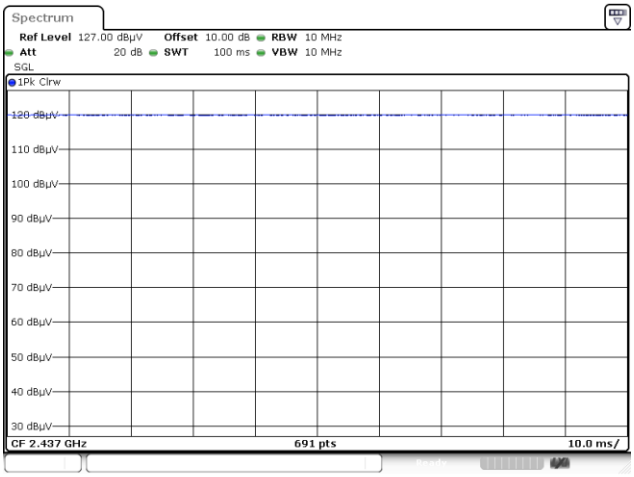
1.1.4 Channel List

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	---	---

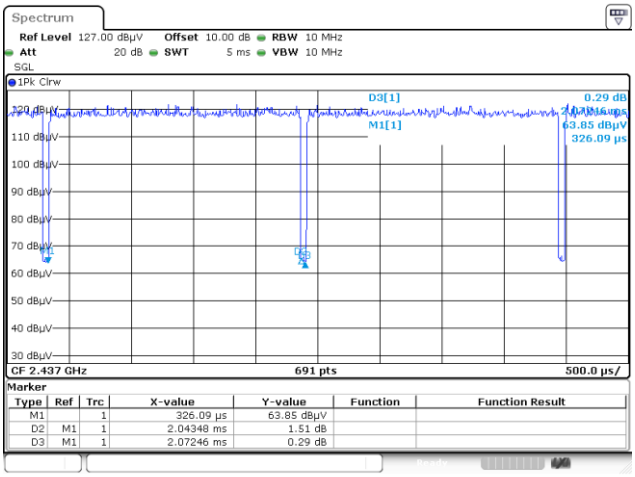
1.1.5 Test Tool and Duty Cycle

Test Tool	cart		
Duty Cycle and Duty Factor	**Mode**	**Duty cycle (%)**	**Duty factor (dB)**
	11b	100.00%	0.00
	11g	98.60%	0.06
	HT20	98.50%	0.07
	HT40	97.02%	0.13

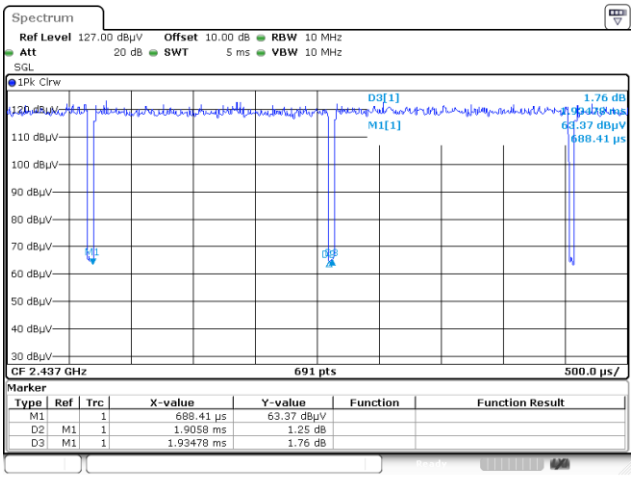
11b



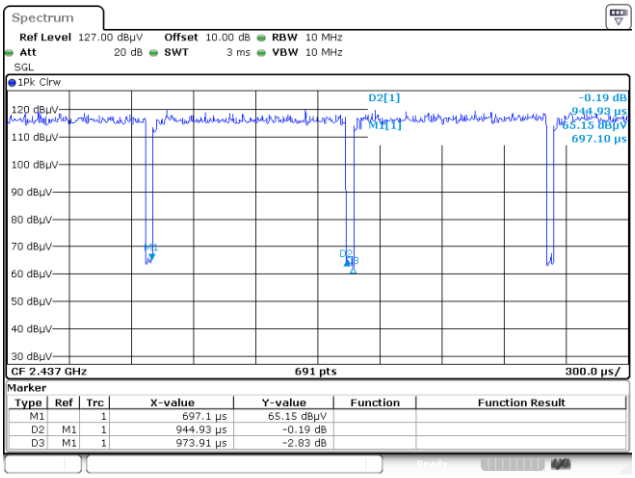
11g



HT20



HT40



1.1.6 Power Setting

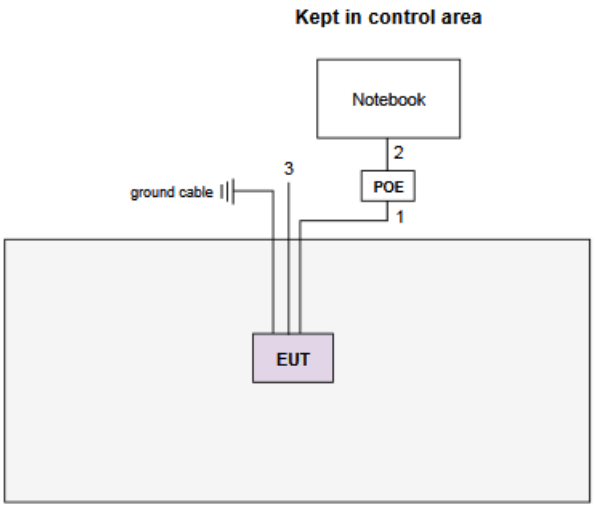
Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	25
11b	2437	25
11b	2462	25
11g	2412	20
11g	2437	25
11g	2462	20
HT20	2412	19.5
HT20	2437	25
HT20	2462	20
HT40	2422	15
HT40	2437	20
HT40	2452	17

1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Notebook	DELL	Latitude E6440	DoC	---
2	POE	Microsemi	PD9001GR/AC	---	Provided by applicant.

1.3 Test Setup Chart

Test Setup Diagram



No.	Signal cable / Length (m)
1	RJ45, 10m non-shielded.
2	RJ45, 1.5m non-shielded.
3	RJ45 to RS232, 1.8m non-shielded. (Provided by applicant.)

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	Agilent	N9038A	MY53290044	Sep. 26, 2017	Sep. 25, 2018
LISN	R&S	ENV216	101579	Feb. 13, 2018	Feb. 12, 2019
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 18, 2017	Dec. 17, 2018
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101499	Jan. 03, 2018	Jan. 02, 2019
Receiver	R&S	ESR3	101658	Nov. 20, 2017	Nov. 19, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 19, 2018	Apr. 18, 2019
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 18, 2018	Jan. 17, 2019
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 23, 2017	Nov. 22, 2018
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2017	Nov. 12, 2018
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 07, 2017	Dec. 06, 2018
Preamplifier	EMC	EMC02325	980187	Sep. 04, 2017	Sep. 03, 2018
Preamplifier	Agilent	83017A	MY53270014	Aug. 21, 2017	Aug. 20, 2018
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Nov. 27, 2017	Nov. 26, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY32487/4	Nov. 27, 2017	Nov. 26, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Nov. 27, 2017	Nov. 26, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Nov. 27, 2017	Nov. 26, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Nov. 27, 2017	Nov. 26, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Nov. 27, 2017	Nov. 26, 2018
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)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Apr. 16, 2018	Apr. 15, 2019
Power Meter	Anritsu	ML2495A	1241002	Oct. 16, 2017	Oct. 15, 2018
Power Sensor	Anritsu	MA2411B	1207366	Oct. 16, 2017	Oct. 15, 2018
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 01, 2017	Nov. 30, 2018
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

LP0002 Section 3.10.1 (2018-01-10)
ANSI C63.10-2013
ANSI C63.4-2014
FCC KDB 558074 D01 DTS Meas Guidance v04
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

1.6 Measurement Uncertainty

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

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.90 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.37 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 55%	Alex Tsai
Radiated Emissions	03CH03-WS	25°C / 60-63%	Aska Huang Akun Chang
RF Conducted	TH01-WS	21°C / 64%	Brad Wu

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

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

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Mode
Conducted Emissions	11g	2437	6 Mbps	RX
Radiated Emissions	11g	2437	6 Mbps	RX

3 Transmitter Test Results

3.1 Conducted Emissions

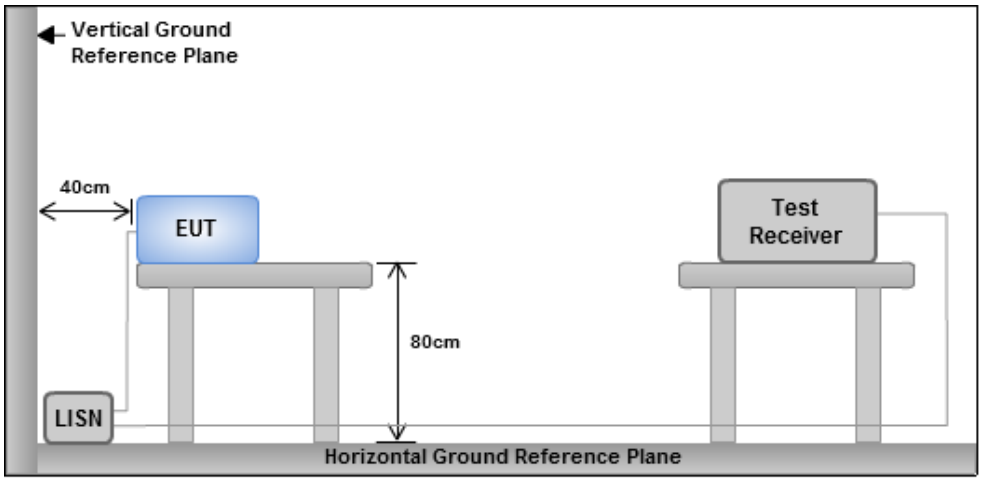
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Test Procedures

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

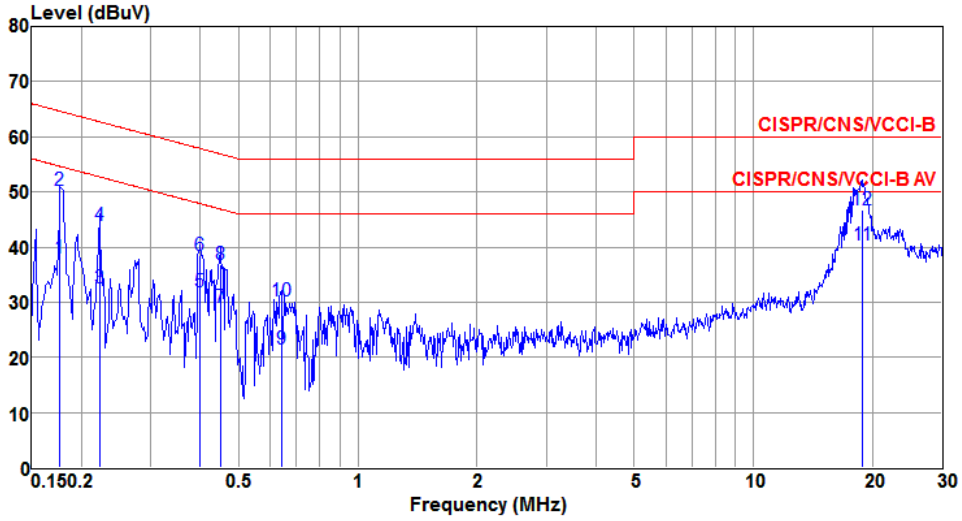
3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

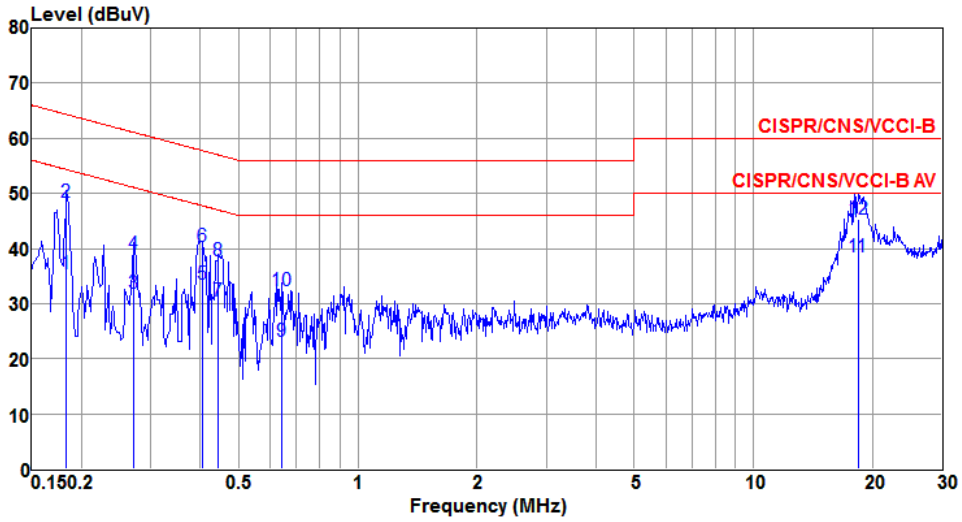
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.177	38.06	54.64	-16.58	28.31	9.73	0.02	Average
2	0.177	50.38	64.64	-14.26	40.63	9.73	0.02	QP
3	0.222	32.55	52.74	-20.19	22.79	9.73	0.03	Average
4	0.222	43.98	62.74	-18.76	34.22	9.73	0.03	QP
5	0.400	31.91	47.86	-15.95	22.16	9.73	0.02	Average
6	0.400	38.44	57.86	-19.42	28.69	9.73	0.02	QP
7	0.449	29.08	46.89	-17.81	19.33	9.73	0.02	Average
8	0.449	36.83	56.89	-20.06	27.08	9.73	0.02	QP
9	0.641	21.47	46.00	-24.53	11.71	9.73	0.03	Average
10	0.641	30.33	56.00	-25.67	20.57	9.73	0.03	QP
11@	18.920	40.34	50.00	-9.66	30.28	9.72	0.34	Average
12	18.920	46.72	60.00	-13.28	36.66	9.72	0.34	QP

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

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



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.183	35.35	54.33	-18.98	25.66	9.67	0.02	Average
2	0.183	48.27	64.33	-16.06	38.58	9.67	0.02	QP
3	0.270	31.92	51.12	-19.20	22.22	9.67	0.03	Average
4	0.270	39.04	61.12	-22.08	29.34	9.67	0.03	QP
5	0.404	33.61	47.77	-14.16	23.92	9.67	0.02	Average
6	0.404	40.26	57.77	-17.51	30.57	9.67	0.02	QP
7	0.444	30.34	46.98	-16.64	20.65	9.67	0.02	Average
8	0.444	37.79	56.98	-19.19	28.10	9.67	0.02	QP
9	0.641	23.24	46.00	-22.76	13.54	9.67	0.03	Average
10	0.641	32.26	56.00	-23.74	22.56	9.67	0.03	QP
11@	18.426	38.52	50.00	-11.48	28.37	9.82	0.33	Average
12	18.426	45.27	60.00	-14.73	35.12	9.82	0.33	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

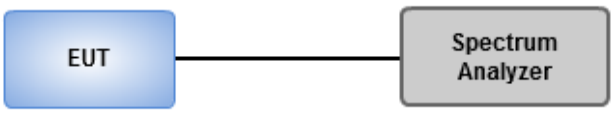
6dB Bandwidth

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)_2TX	7.536M	12.012M	12M0G1D	6.087M	11.867M
802.11g_Nss1,(6Mbps)_2TX	16.377M	16.932M	16M9D1D	16.377M	16.643M
802.11n HT20_Nss1,(MCS0)_2TX	17.609M	18.017M	18M0D1D	17.536M	17.8M
802.11n HT40_Nss1,(MCS0)_2TX	36.377M	36.614M	36M6D1D	35.362M	36.469M

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;

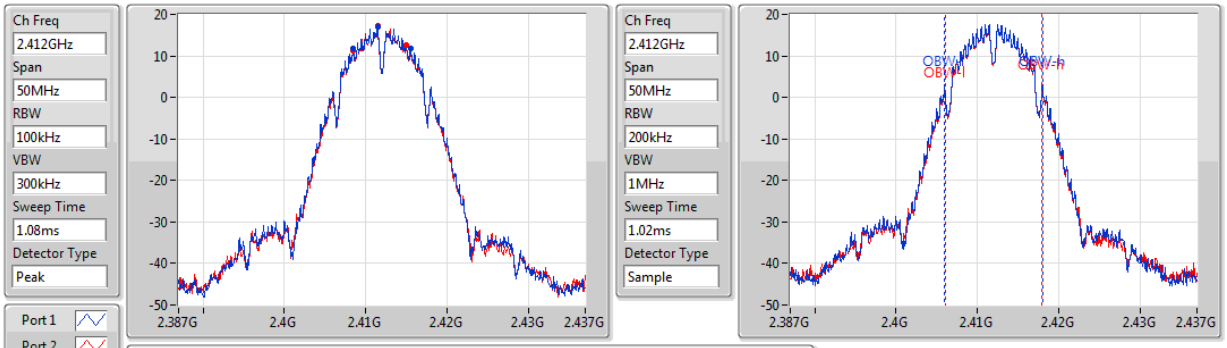
Result

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	7.101M	12.012M	6.594M	11.867M
2437MHz	Pass	500k	7.101M	11.939M	6.594M	11.939M
2462MHz	Pass	500k	7.536M	11.939M	6.087M	11.939M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.377M	16.643M	16.377M	16.787M
2437MHz	Pass	500k	16.377M	16.787M	16.377M	16.932M
2462MHz	Pass	500k	16.377M	16.643M	16.377M	16.715M
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	17.536M	17.873M	17.536M	17.873M
2437MHz	Pass	500k	17.536M	17.945M	17.536M	18.017M
2462MHz	Pass	500k	17.536M	17.8M	17.609M	17.873M
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	36.232M	36.469M	35.797M	36.614M
2437MHz	Pass	500k	35.362M	36.469M	35.942M	36.469M
2452MHz	Pass	500k	35.797M	36.469M	36.377M	36.614M

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

802.11b_Nss1,(1Mbps)_2TX EBW

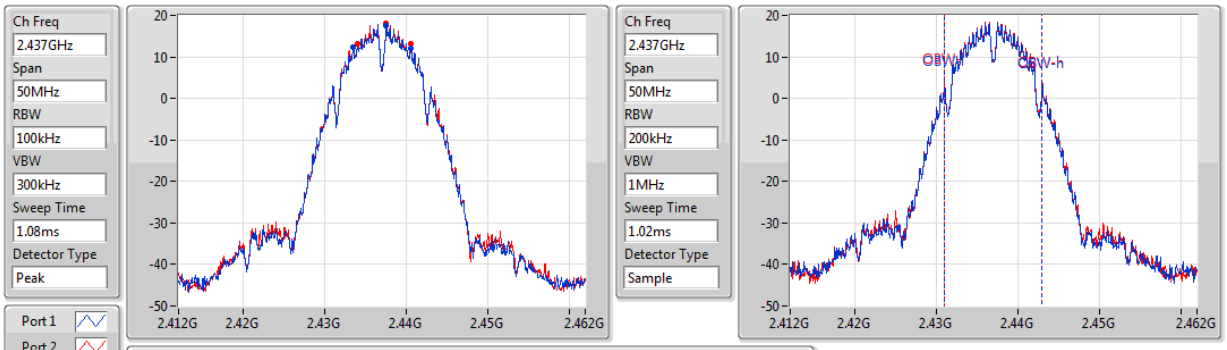
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.101M	2.408449G	2.415551G	12.012M	2.405994G	2.418006G	500k	1
6.594M	2.408449G	2.415043G	11.867M	2.406067G	2.417933G	500k	2

802.11b_Nss1,(1Mbps)_2TX EBW

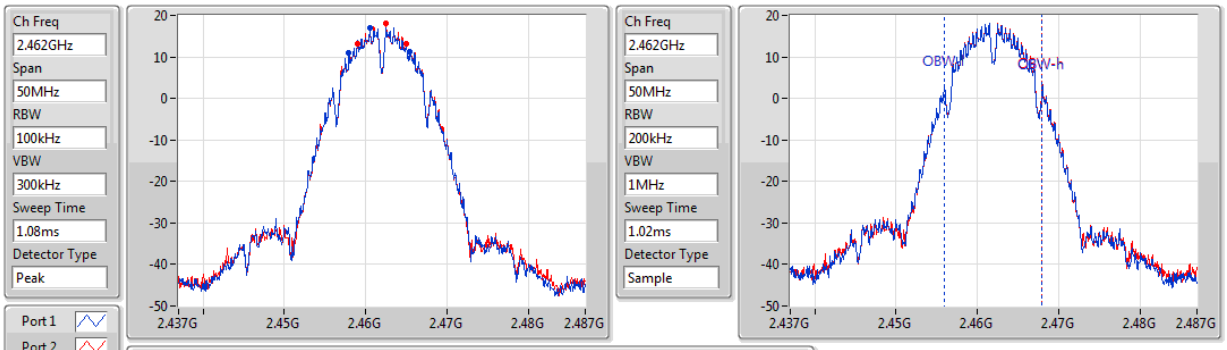
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.101M	2.433449G	2.440551G	11.939M	2.430994G	2.442933G	500k	1
6.594M	2.433957G	2.440551G	11.939M	2.430994G	2.442933G	500k	2

802.11b_Nss1,(1Mbps)_2TX EBW

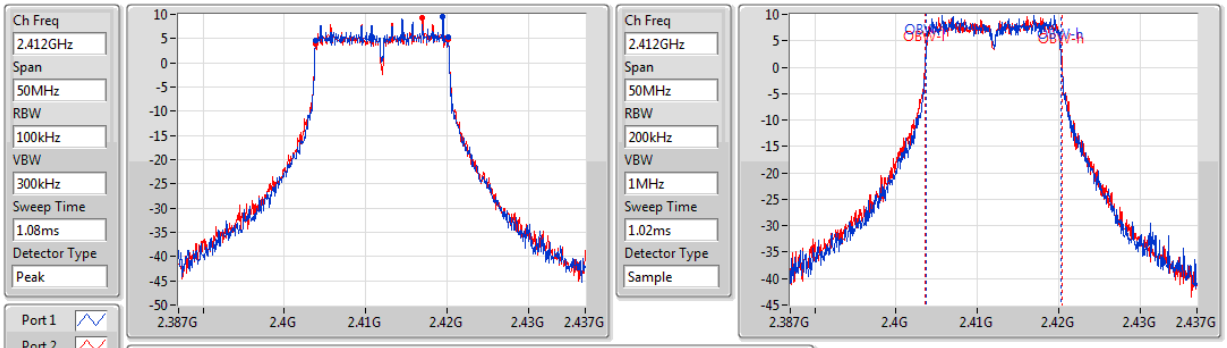
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.536M	2.457942G	2.465478G	11.939M	2.455994G	2.467933G	500k	1
6.087M	2.458957G	2.465043G	11.939M	2.455994G	2.467933G	500k	2

802.11g_Nss1,(6Mbps)_2TX EBW

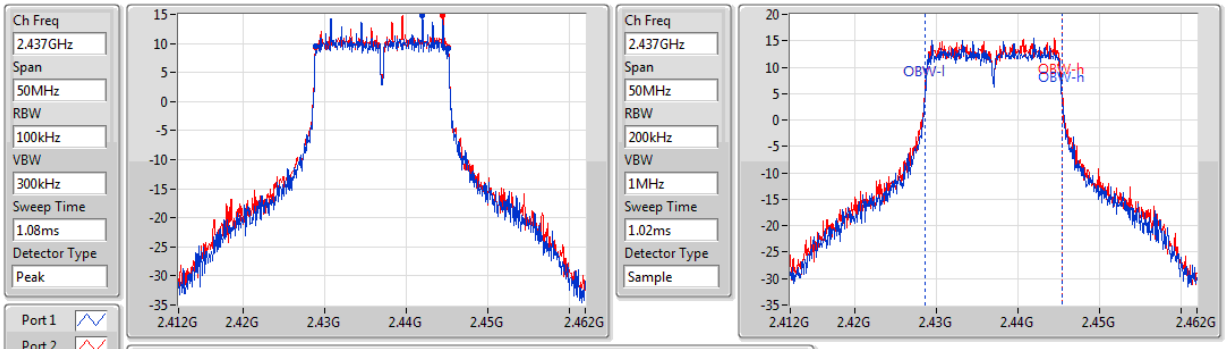
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.377M	2.403812G	2.420188G	16.643M	2.403679G	2.420321G	500k	1
16.377M	2.403812G	2.420188G	16.787M	2.403606G	2.420394G	500k	2

802.11g_Nss1,(6Mbps)_2TX EBW

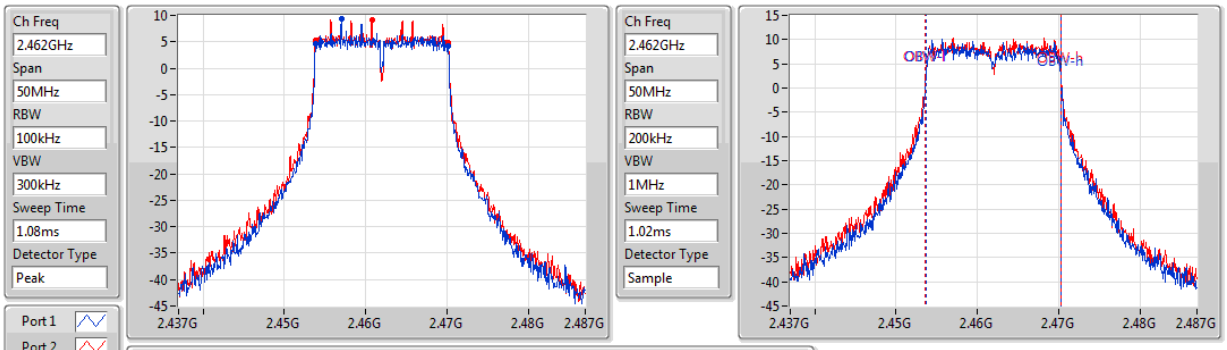
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.377M	2.428812G	2.445188G	16.787M	2.428606G	2.445394G	500k	1
16.377M	2.428812G	2.445188G	16.932M	2.428534G	2.445466G	500k	2

802.11g_Nss1,(6Mbps)_2TX EBW

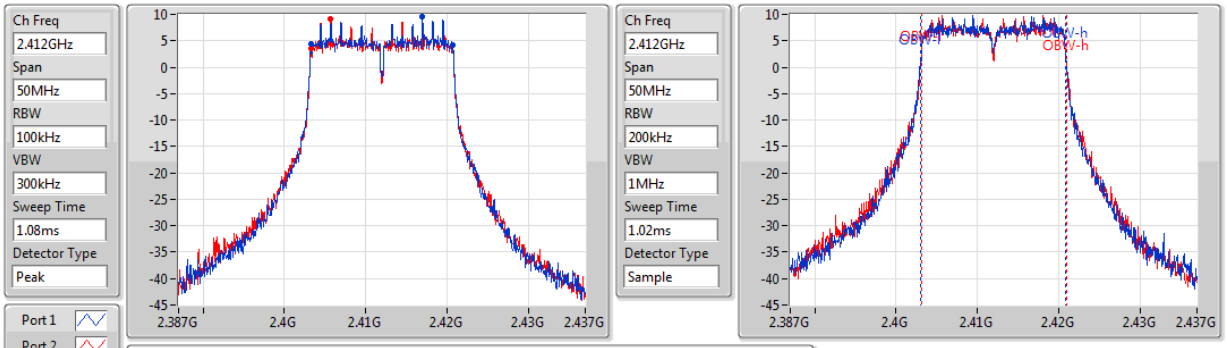
2462MHz



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	16.643M	2.453679G	2.470321G	500k	1
16.377M	2.453812G	2.470188G	16.715M	2.453606G	2.470321G	500k	2

802.11n HT20_Nss1,(MCS0)_2TX EBW

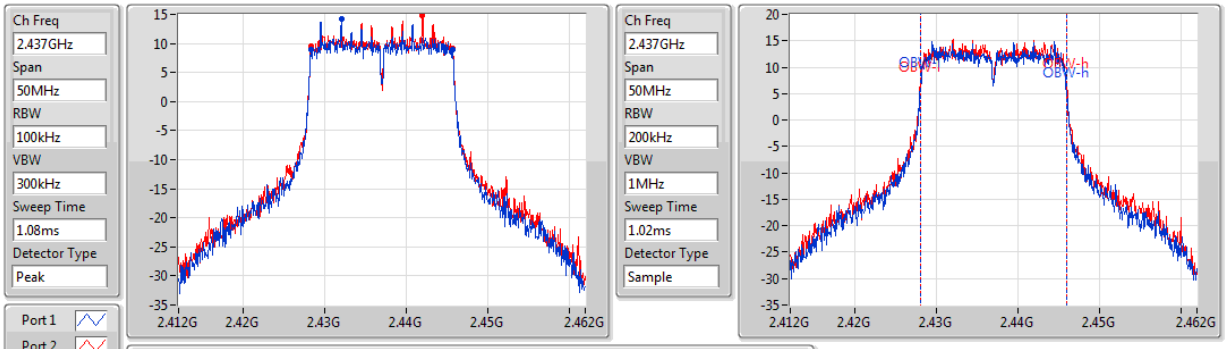
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
17.536M	2.403232G	2.420768G	17.873M	2.403027G	2.4209G	500k	1
17.536M	2.403232G	2.420768G	17.873M	2.4031G	2.420973G	500k	2

802.11n HT20_Nss1,(MCS0)_2TX EBW

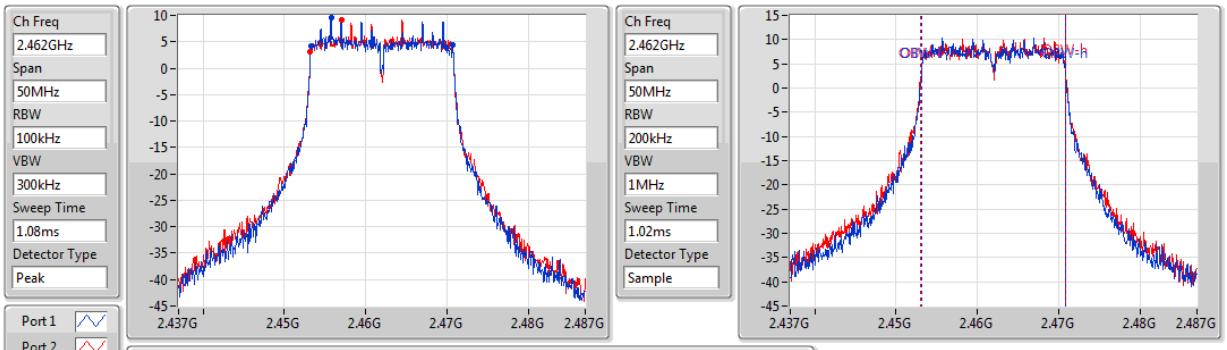
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
17.536M	2.428232G	2.445768G	17.945M	2.428027G	2.445973G	500k	1
17.536M	2.428232G	2.445768G	18.017M	2.427955G	2.445973G	500k	2

802.11n HT20_Nss1,(MCS0)_2TX EBW

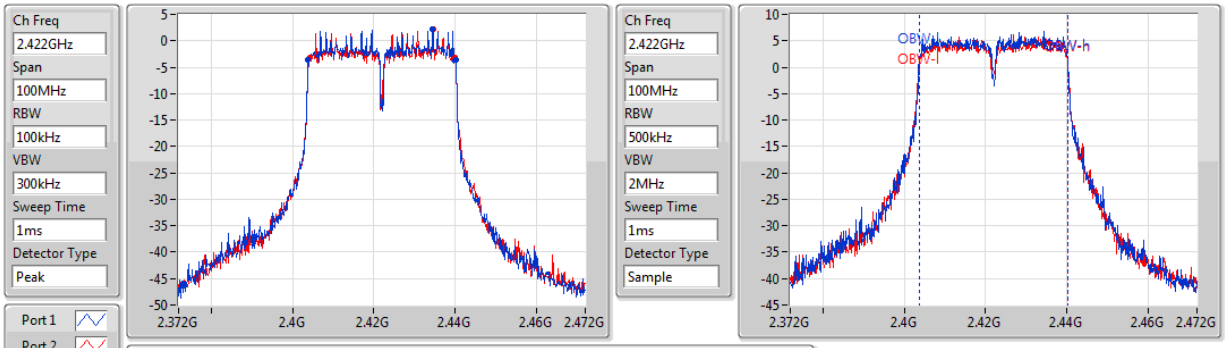
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
17.536M	2.453232G	2.470768G	17.8M	2.4531G	2.4709G	500k	1
17.609M	2.453159G	2.470768G	17.873M	2.453027G	2.4709G	500k	2

802.11n HT40_Nss1,(MCS0)_2TX EBW

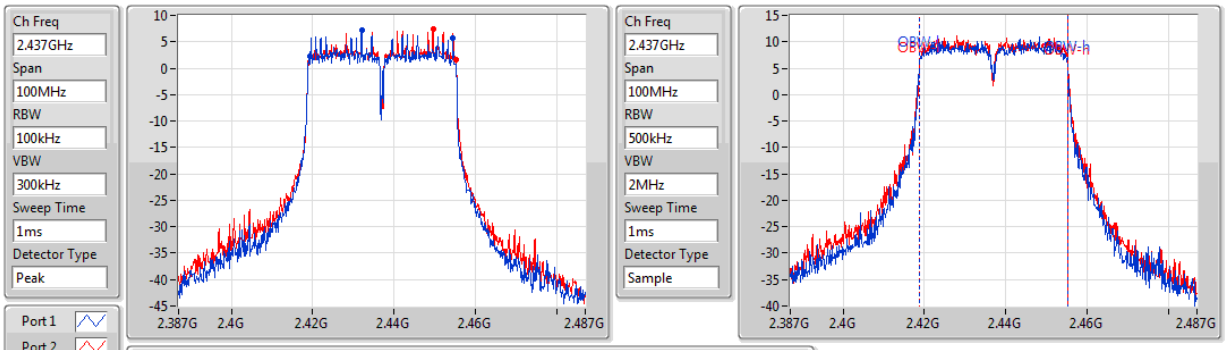
2422MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
36.232M	2.403884G	2.440116G	36.469M	2.403766G	2.440234G	500k	1
35.797M	2.404174G	2.439971G	36.614M	2.403621G	2.440234G	500k	2

802.11n HT40_Nss1,(MCS0)_2TX EBW

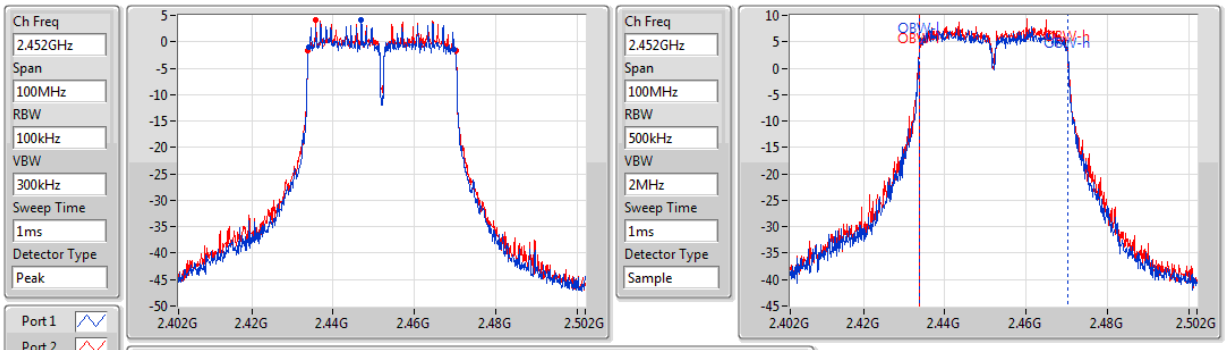
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
35.362M	2.419174G	2.454536G	36.469M	2.418766G	2.455234G	500k	1
35.942M	2.419174G	2.455116G	36.469M	2.418766G	2.455234G	500k	2

802.11n HT40_Nss1,(MCS0)_2TX EBW

2452MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
35.797M	2.434029G	2.469826G	36.469M	2.433766G	2.470234G	500k	1
36.377M	2.433884G	2.470261G	36.614M	2.433621G	2.470234G	500k	2

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.

3.3.2 Test Procedures

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

3.3.3 Test Setup

3.3.4 Test Result of Maximum Output Power

Summary of Conducted (Average) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	28.27	0.67143
802.11g_Nss1,(6Mbps)_2TX	28.35	0.68391
802.11n HT20_Nss1,(MCS0)_2TX	28.30	0.67608
802.11n HT40_Nss1,(MCS0)_2TX	24.58	0.28708

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	0.80	24.97	25.23	28.11	30.00	28.91	36.00
2437MHz	Pass	0.80	25.28	25.24	28.27	30.00	29.07	36.00
2462MHz	Pass	0.80	25.26	25.22	28.25	30.00	29.05	36.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	0.80	20.56	20.37	23.48	30.00	24.28	36.00
2437MHz	Pass	0.80	25.42	25.26	28.35	30.00	29.15	36.00
2462MHz	Pass	0.80	20.63	20.31	23.48	30.00	24.28	36.00
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	0.80	20.28	20.02	23.16	30.00	23.96	36.00
2437MHz	Pass	0.80	25.41	25.16	28.30	30.00	29.10	36.00
2462MHz	Pass	0.80	20.68	20.44	23.57	30.00	24.37	36.00
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	0.80	15.86	15.24	18.57	30.00	19.37	36.00
2437MHz	Pass	0.80	21.61	21.52	24.58	30.00	25.38	36.00
2452MHz	Pass	0.80	17.54	17.42	20.49	30.00	21.29	36.00

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

3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

Peak PSD

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

Average PSD, duty cycle < 98%

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

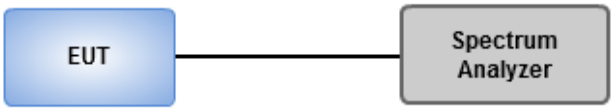
2 Set the sweep time to: ≥ 10 (number of measurement points in sweep) x (total on/off period of the transmitted signal).

3 Perform the measurement over a single sweep.

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

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

3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_2TX	7.69
802.11g_Nss1,(6Mbps)_2TX	3.68
802.11n HT20_Nss1,(MCS0)_2TX	3.40
802.11n HT40_Nss1,(MCS0)_2TX	-4.05

RBW=30kHz.

Result

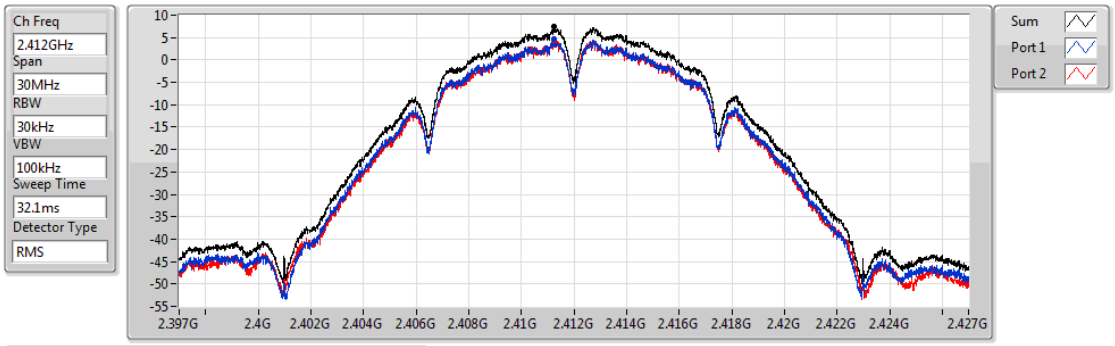
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	3.81	4.55	4.50	7.53	8.00
2437MHz	Pass	3.81	4.97	5.31	7.68	8.00
2462MHz	Pass	3.81	4.84	4.98	7.69	8.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	3.81	-3.43	-3.92	-0.67	8.00
2437MHz	Pass	3.81	0.56	1.23	3.68	8.00
2462MHz	Pass	3.81	-3.14	-3.19	-0.75	8.00
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	3.81	-4.28	-3.83	-1.40	8.00
2437MHz	Pass	3.81	0.70	0.94	3.40	8.00
2462MHz	Pass	3.81	-4.10	-4.05	-1.35	8.00
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	3.81	-11.51	-11.96	-8.78	8.00
2437MHz	Pass	3.81	-6.17	-6.69	-4.05	8.00
2452MHz	Pass	3.81	-10.15	-9.53	-6.94	8.00

DG = Directional Gain; RBW=30kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

Directional gain = 0.8+10* log(2/1) = 3.81 dBi.
Test results of each port are measured value with duty factor

802.11b_Nss1,(1Mbps)_2TX PSD

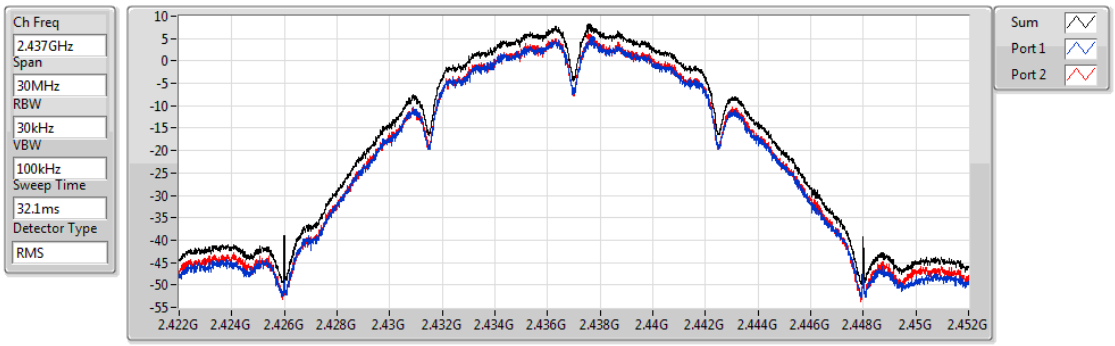
2412MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
7.53	7.53	4.55	4.50

802.11b_Nss1,(1Mbps)_2TX PSD

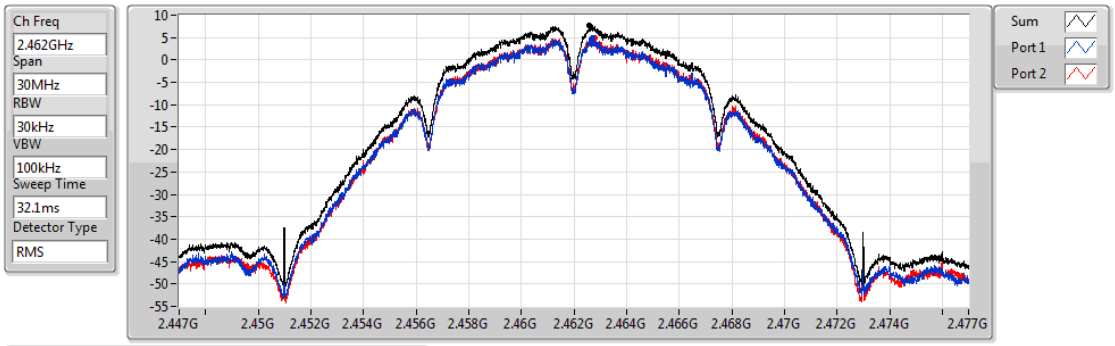
2437MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
7.68	7.68	4.97	5.31

802.11b_Nss1,(1Mbps)_2TX PSD

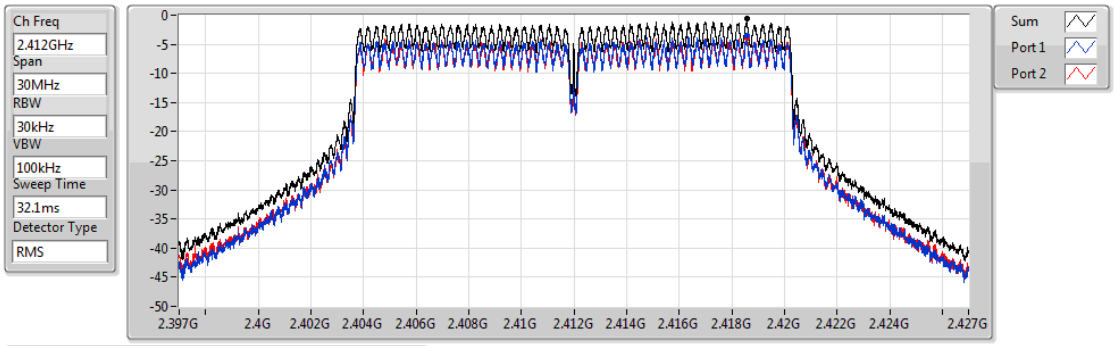
2462MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
7.69	7.69	4.84	4.98

802.11g_Nss1,(6Mbps)_2TX PSD

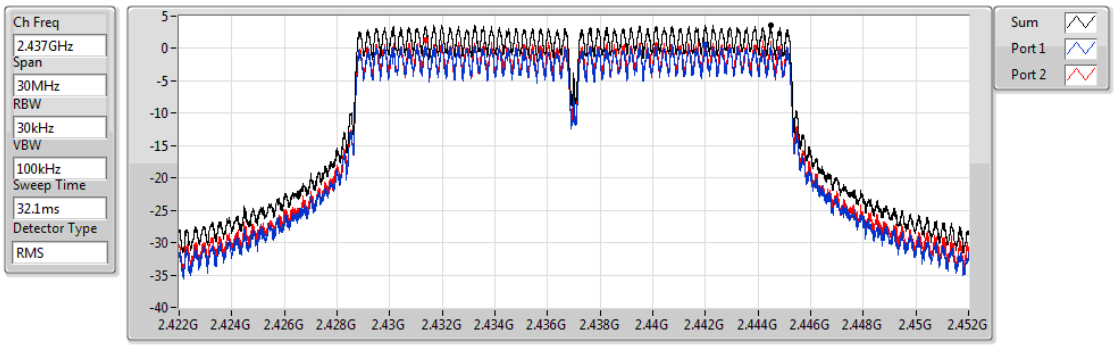
2412MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-0.67	-0.67	-3.43	-3.92

802.11g_Nss1,(6Mbps)_2TX PSD

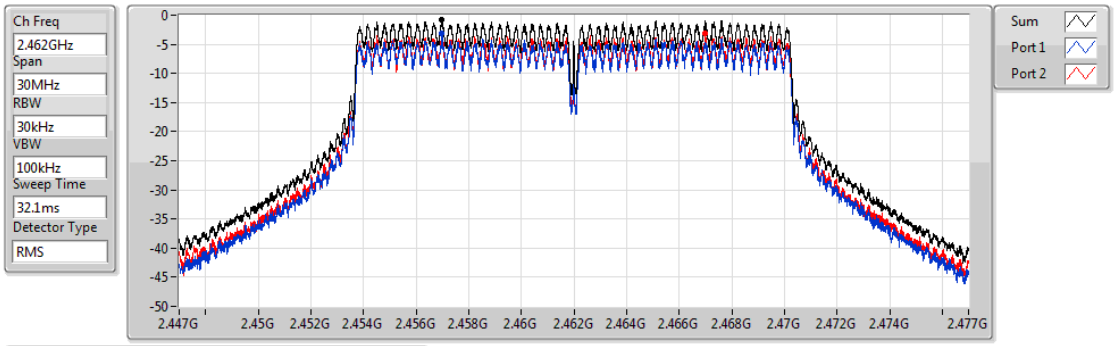
2437MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.68	3.68	0.56	1.23

802.11g_Nss1,(6Mbps)_2TX PSD

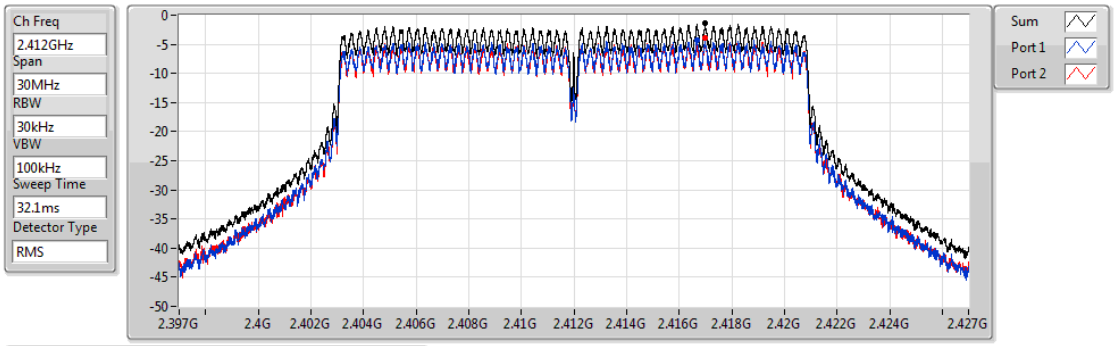
2462MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-0.75	-0.75	-3.14	-3.19

802.11n HT20_Nss1,(MCS0)_2TX PSD

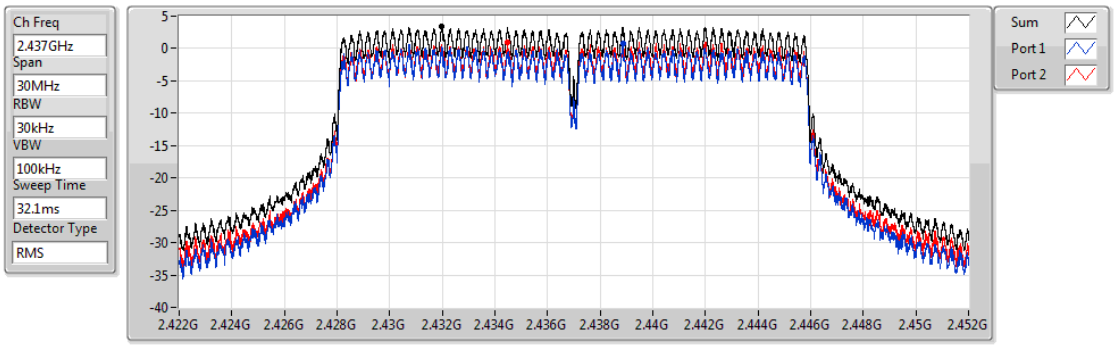
2412MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-1.40	-1.40	-4.28	-3.83

802.11n HT20_Nss1,(MCS0)_2TX PSD

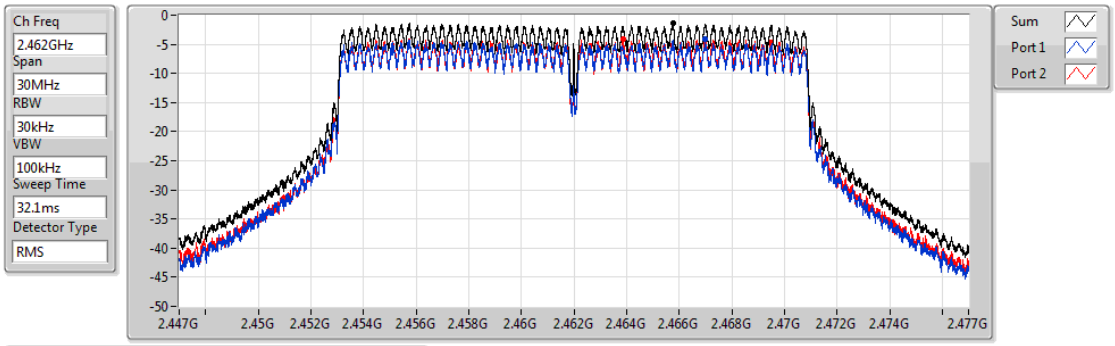
2437MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.40	3.40	0.70	0.94

802.11n HT20_Nss1,(MCS0)_2TX PSD

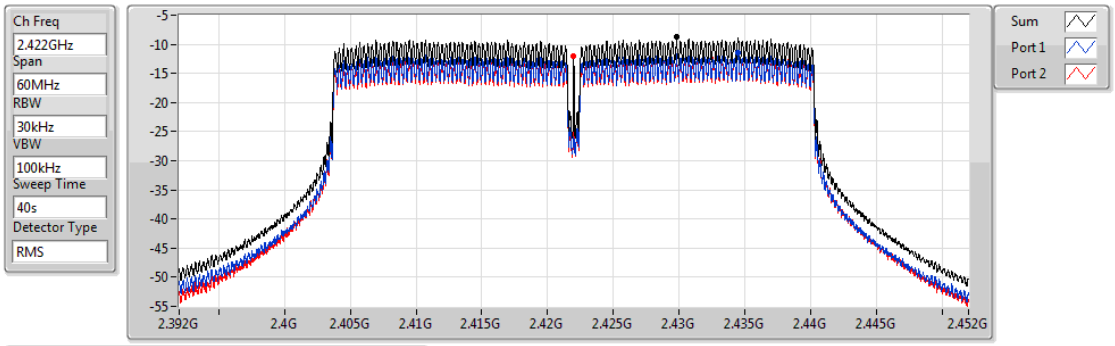
2462MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-1.35	-1.35	-4.10	-4.05

802.11n HT40_Nss1,(MCS0)_2TX PSD

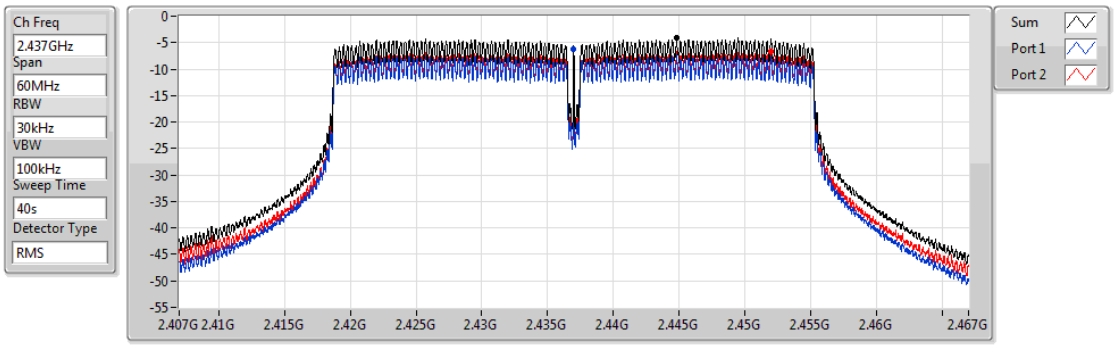
2422MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.78	-8.78	-11.51	-11.96

802.11n HT40_Nss1,(MCS0)_2TX PSD

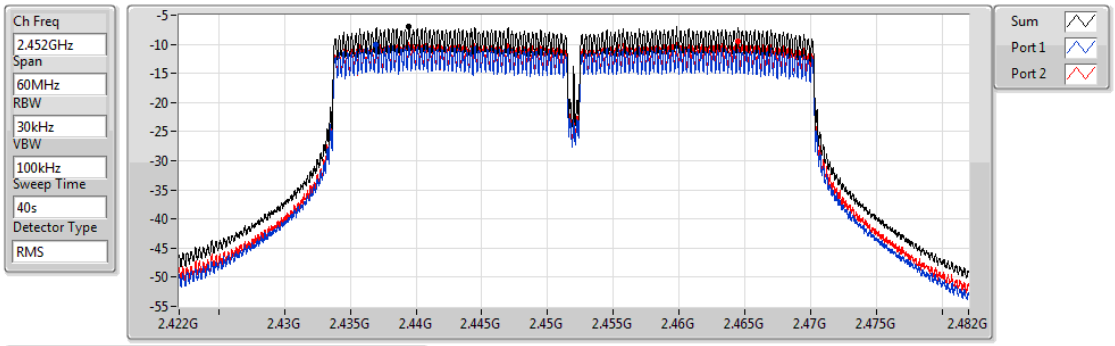
2437MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-4.05	-4.05	-6.17	-6.69

802.11n HT40_Nss1,(MCS0)_2TX PSD

2452MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.94	-6.94	-10.15	-9.53

3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

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

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.5.2 Test Procedures

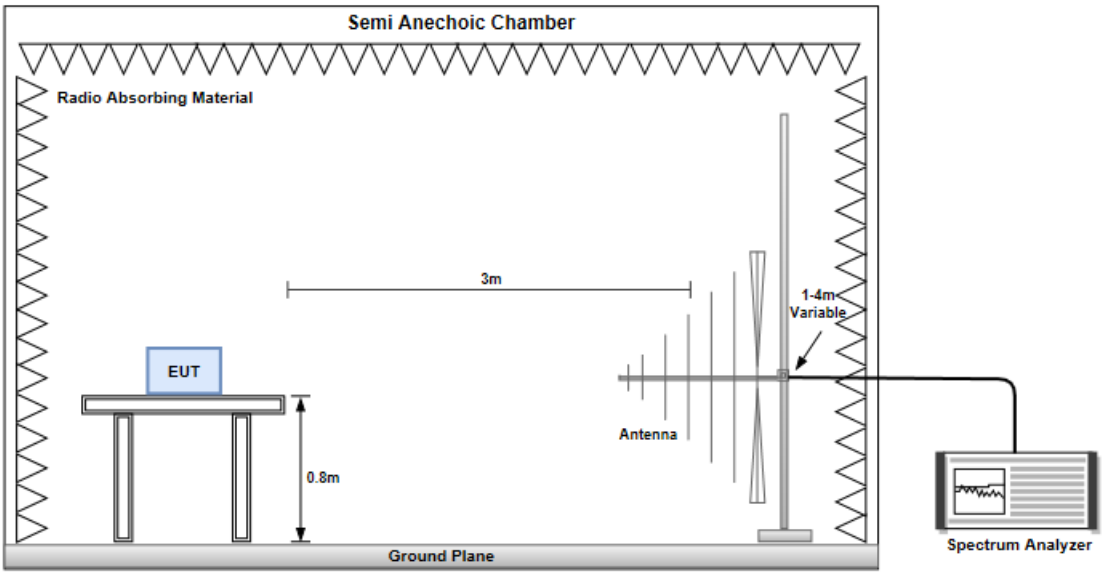
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

Note:

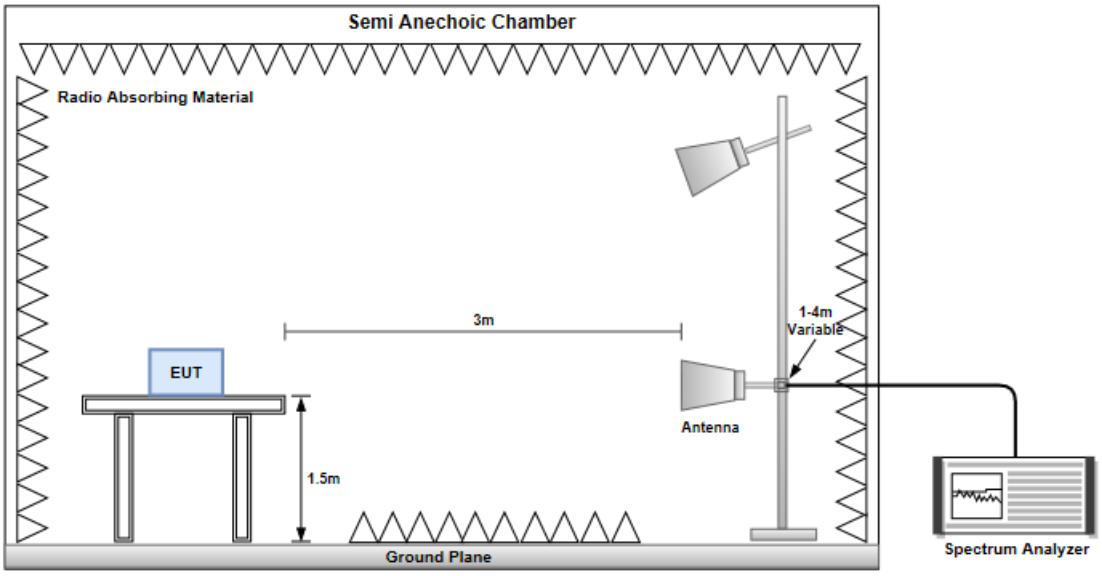
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

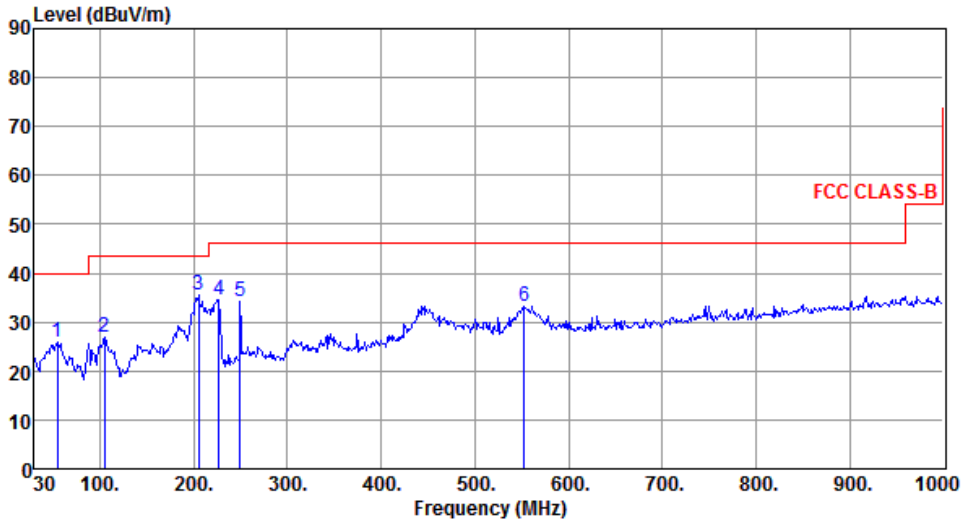


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

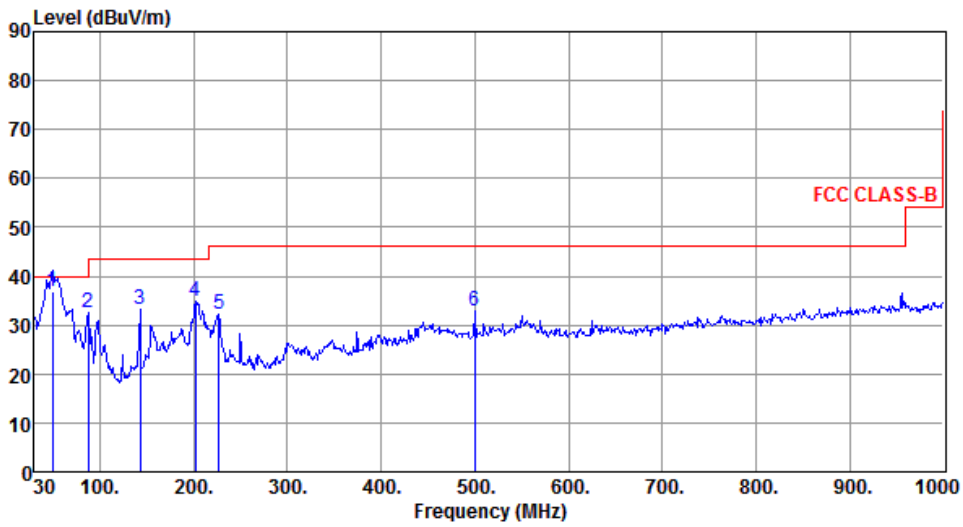
Modulation	11g	**Test Freq. (MHz)**	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	54.25	25.90	40.00	-14.10	34.21	-8.31	Peak	---	---
2	104.69	26.83	43.50	-16.67	39.39	-12.56	Peak	---	---
3	205.57	35.53	43.50	-7.97	46.40	-10.87	Peak	---	---
4	226.91	34.56	46.00	-11.44	44.90	-10.34	Peak	---	---
5	249.22	34.09	46.00	-11.91	43.28	-9.19	Peak	---	---
6	552.83	33.31	46.00	-12.69	35.15	-1.84	Peak	---	---

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

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

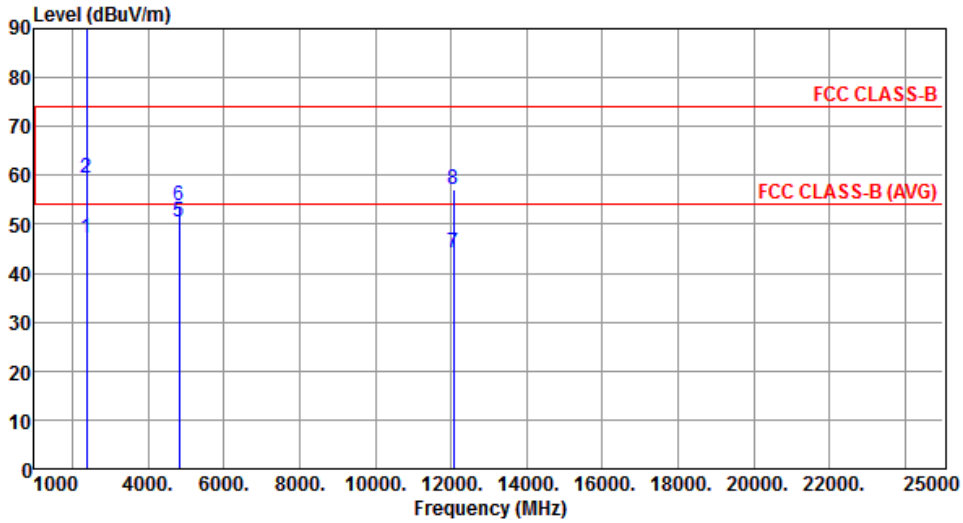


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	49.40	36.74	40.00	-3.26	44.73	-7.99	QP	100	17
2	87.23	32.71	40.00	-7.29	46.69	-13.98	Peak	---	---
3	142.52	33.28	43.50	-10.22	41.72	-8.44	Peak	---	---
4	201.69	34.97	43.50	-8.53	45.85	-10.88	Peak	---	---
5	226.91	32.11	46.00	-13.89	42.45	-10.34	Peak	---	---
6	499.48	32.91	46.00	-13.09	35.91	-3.00	Peak	---	---

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

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

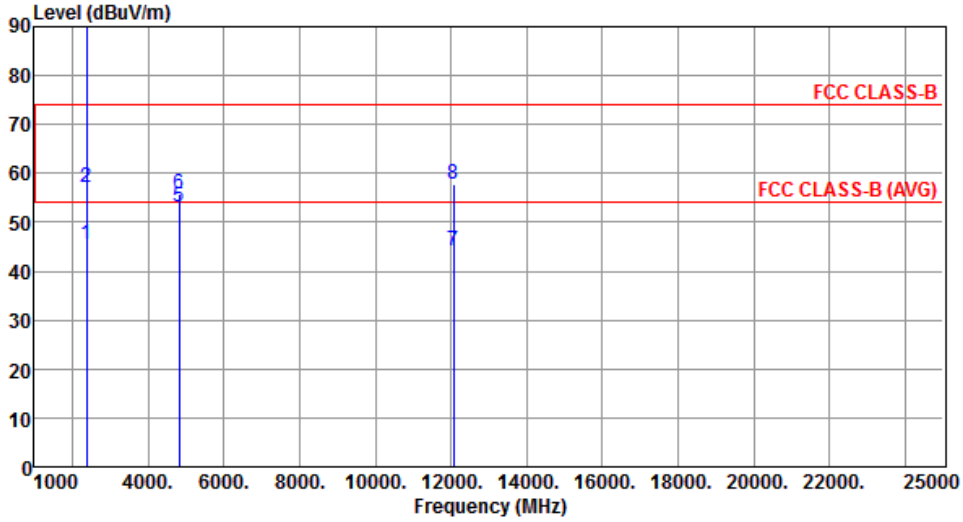
Modulation	11b	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	47.19	54.00	-6.81	48.40	-1.21	Average	117	179
2		2390.00	59.60	74.00	-14.40	60.81	-1.21	Peak	117	179
3	*	2412.00	115.64			116.76	-1.12	Average	117	179
4	*	2412.00	118.61			119.73	-1.12	Peak	117	179
5		4824.00	50.46	54.00	-3.54	44.79	5.67	Average	119	173
6		4824.00	53.86	74.00	-20.14	48.19	5.67	Peak	119	173
7		12060.00	44.22	54.00	-9.78	28.55	15.67	Average	100	175
8		12060.00	57.00	74.00	-17.00	41.33	15.67	Peak	100	175

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:"*" is Peak / Average value of fundamental frequency

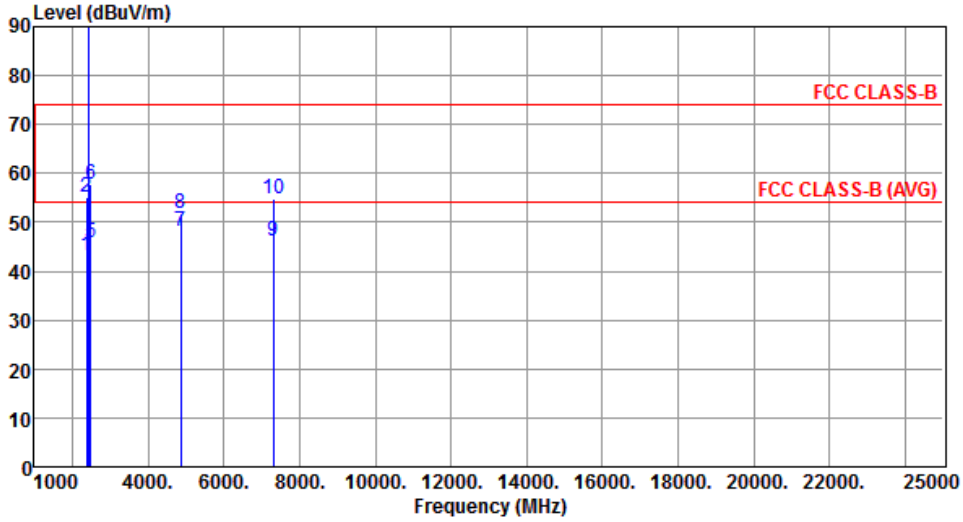
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



		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	45.62	54.00	-8.38	46.83	-1.21	Average	186	183
2		2390.00	57.13	74.00	-16.87	58.34	-1.21	Peak	186	183
3	*	2412.00	112.71			113.83	-1.12	Average	186	183
4	*	2412.00	115.30			116.42	-1.12	Peak	186	183
5		4824.00	53.24	54.00	-0.76	47.57	5.67	Average	100	195
6		4824.00	55.84	74.00	-18.16	50.17	5.67	Peak	100	195
7		12060.00	44.05	54.00	-9.95	28.38	15.67	Average	100	167
8		12060.00	57.88	74.00	-16.12	42.21	15.67	Peak	100	167

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:"*" is Peak / Average value of fundamental frequency

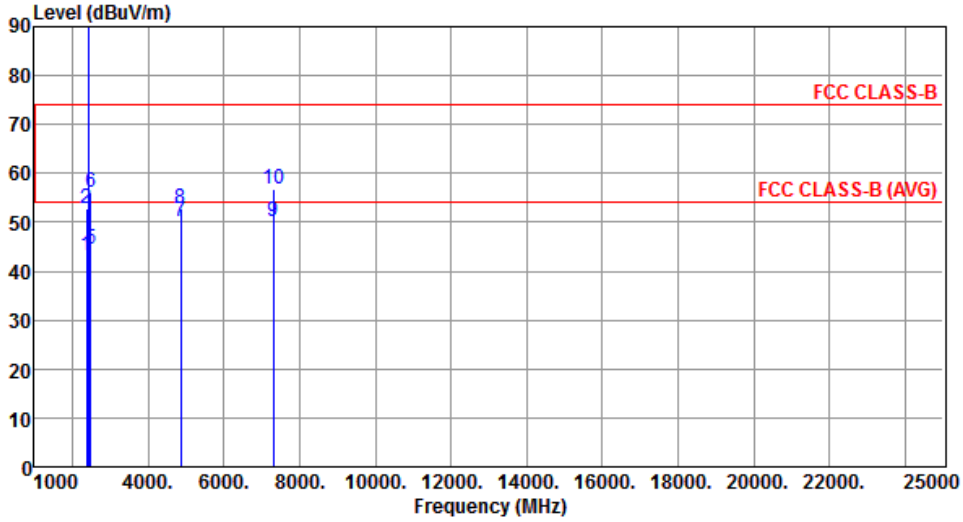
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



		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	43.25	54.00	-10.75	44.46	-1.21	Average	192	180
2		2390.00	55.06	74.00	-18.94	56.27	-1.21	Peak	192	180
3	*	2437.00	115.29			116.31	-1.02	Average	192	180
4	*	2437.00	117.97			118.99	-1.02	Peak	192	180
5		2483.50	45.74	54.00	-8.26	46.60	-0.86	Average	192	180
6		2483.50	57.92	74.00	-16.08	58.78	-0.86	Peak	192	180
7		4874.00	48.18	54.00	-5.82	42.37	5.81	Average	100	45
8		4874.00	51.87	74.00	-22.13	46.06	5.81	Peak	100	45
9		7311.00	46.32	54.00	-7.68	35.37	10.95	Average	197	349
10		7311.00	54.64	74.00	-19.36	43.69	10.95	Peak	197	349

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:"*" is Peak / Average value of fundamental frequency

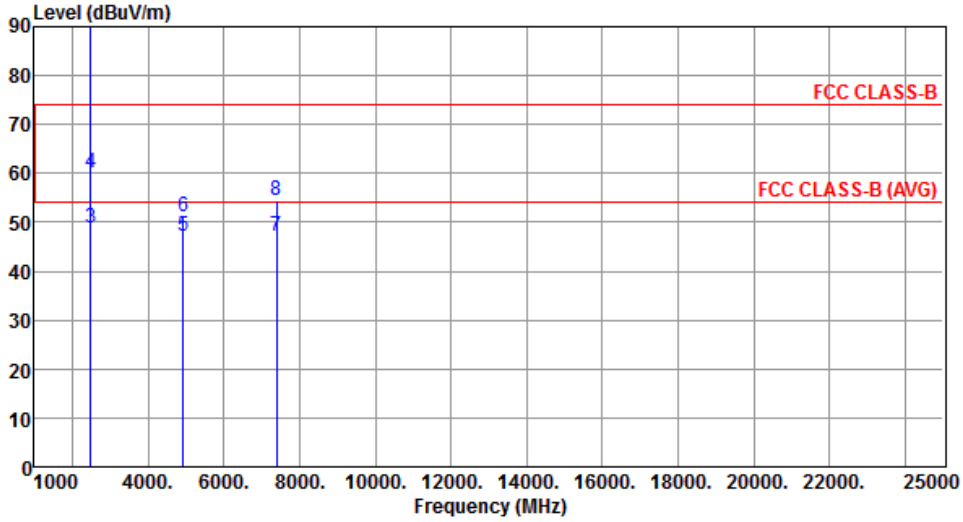
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



		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	43.25	54.00	-10.75	44.46	-1.21	Average	189	180
2		2390.00	52.90	74.00	-21.10	54.11	-1.21	Peak	189	180
3	*	2437.00	112.58			113.60	-1.02	Average	189	180
4	*	2437.00	115.30			116.32	-1.02	Peak	189	180
5		2483.50	44.54	54.00	-9.46	45.40	-0.86	Average	189	180
6		2483.50	56.07	74.00	-17.93	56.93	-0.86	Peak	189	180
7		4874.00	50.22	54.00	-3.78	44.41	5.81	Average	198	44
8		4874.00	52.90	74.00	-21.10	47.09	5.81	Peak	198	44
9		7311.00	50.05	54.00	-3.95	39.10	10.95	Average	198	43
10		7311.00	56.92	74.00	-17.08	45.97	10.95	Peak	198	43

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

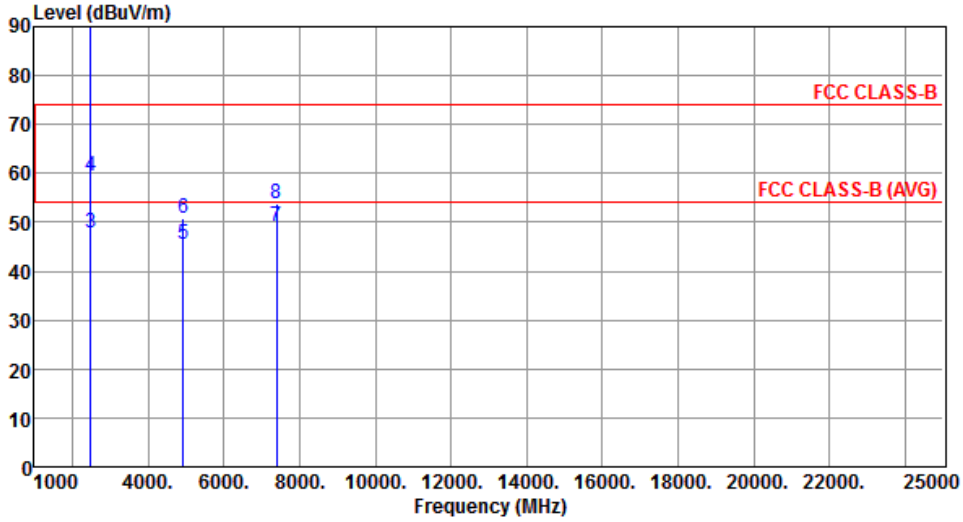
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	116.90			117.83	-0.93	Average	139	176
2	*	2462.00	119.47			120.40	-0.93	Peak	139	176
3		2483.50	48.80	54.00	-5.20	49.66	-0.86	Average	139	176
4		2483.50	60.26	74.00	-13.74	61.12	-0.86	Peak	139	176
5		4924.00	47.19	54.00	-6.81	41.24	5.95	Average	176	140
6		4924.00	51.16	74.00	-22.84	45.21	5.95	Peak	176	140
7		7386.00	47.16	54.00	-6.84	35.89	11.27	Average	100	237
8		7386.00	54.61	74.00	-19.39	43.34	11.27	Peak	100	237

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:"*" is Peak / Average value of fundamental frequency

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

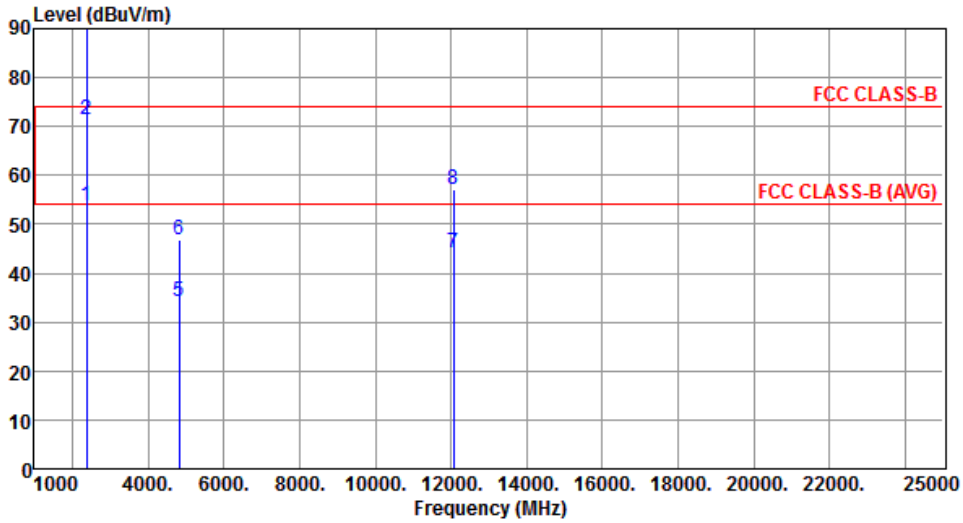


		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	112.92			113.85	-0.93	Average	150	181
2	*	2462.00	115.79			116.72	-0.93	Peak	150	181
3		2483.50	47.69	54.00	-6.31	48.55	-0.86	Average	150	181
4		2483.50	59.42	74.00	-14.58	60.28	-0.86	Peak	150	181
5		4924.00	45.41	54.00	-8.59	39.46	5.95	Average	230	182
6		4924.00	50.79	74.00	-23.21	44.84	5.95	Peak	230	182
7		7386.00	49.19	54.00	-4.81	37.92	11.27	Average	122	185
8		7386.00	53.71	74.00	-20.29	42.44	11.27	Peak	122	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).
Note 3:"*" is Peak / Average value of fundamental frequency

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

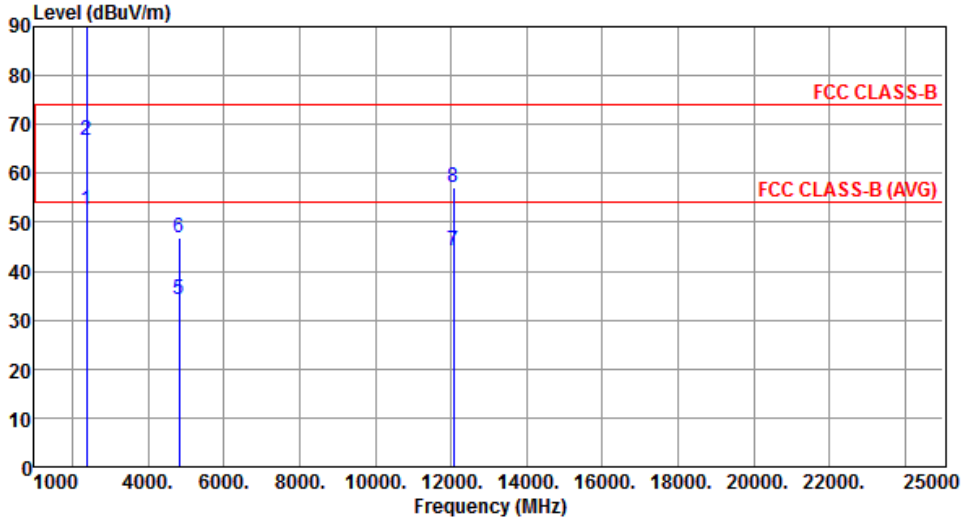
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.64	54.00	-0.36	54.85	-1.21	Average	103	184
2		2390.00	71.41	74.00	-2.59	72.62	-1.21	Peak	103	184
3	*	2412.00	105.19			106.31	-1.12	Average	103	184
4	*	2412.00	118.12			119.24	-1.12	Peak	103	184
5		4824.00	34.22	54.00	-19.78	28.55	5.67	Average	100	165
6		4824.00	46.95	74.00	-27.05	41.28	5.67	Peak	100	165
7		12060.00	44.04	54.00	-9.96	28.37	15.67	Average	100	138
8		12060.00	57.12	74.00	-16.88	41.45	15.67	Peak	100	138

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:"*" is Peak / Average value of fundamental frequency

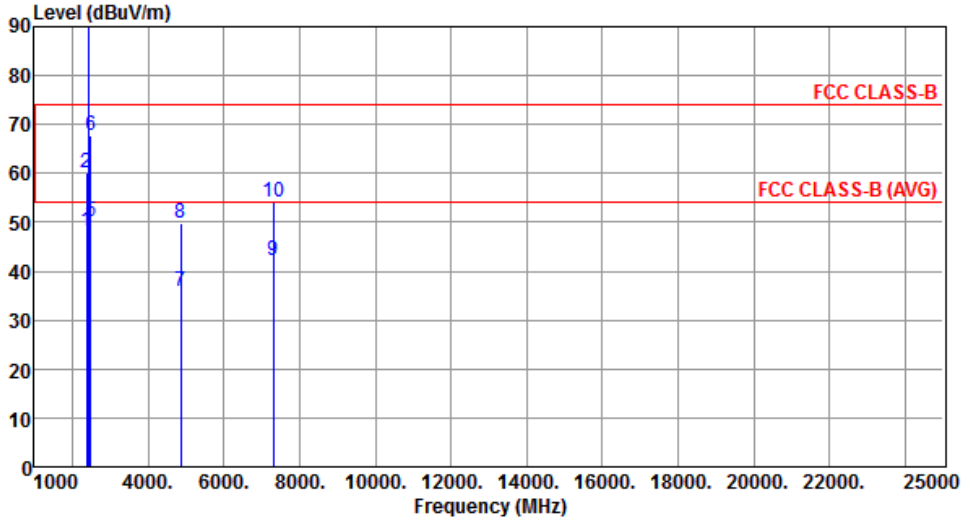
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



		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	52.63	54.00	-1.37	53.84	-1.21	Average	186	182
2		2390.00	66.78	74.00	-7.22	67.99	-1.21	Peak	186	182
3	*	2412.00	102.09			103.21	-1.12	Average	186	182
4	*	2412.00	114.68			115.80	-1.12	Peak	186	182
5		4824.00	34.23	54.00	-19.77	28.56	5.67	Average	100	196
6		4824.00	46.82	74.00	-27.18	41.15	5.67	Peak	100	196
7		12060.00	44.09	54.00	-9.91	28.42	15.67	Average	100	196
8		12060.00	57.12	74.00	-16.88	41.45	15.67	Peak	100	196

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:"*" is Peak / Average value of fundamental frequency

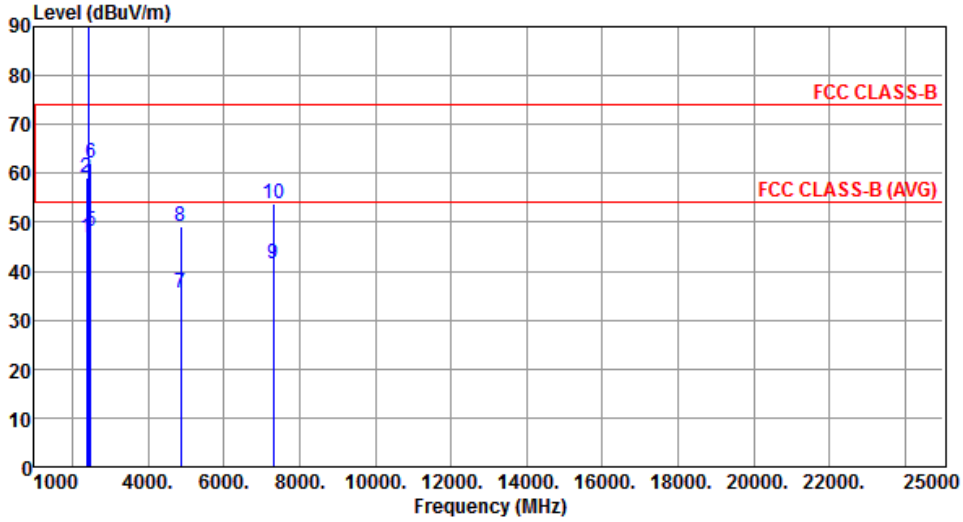
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



		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	48.26	54.00	-5.74	49.47	-1.21	Average	143	181
2		2390.00	60.04	74.00	-13.96	61.25	-1.21	Peak	143	181
3	*	2437.00	107.33			108.35	-1.02	Average	143	181
4	*	2437.00	119.35			120.37	-1.02	Peak	143	181
5		2483.50	50.00	54.00	-4.00	50.86	-0.86	Average	143	181
6		2483.50	67.60	74.00	-6.40	68.46	-0.86	Peak	143	181
7		4874.00	35.88	54.00	-18.12	30.07	5.81	Average	202	187
8		4874.00	49.65	74.00	-24.35	43.84	5.81	Peak	202	187
9		7311.00	42.27	54.00	-11.73	31.32	10.95	Average	106	237
10		7311.00	54.19	74.00	-19.81	43.24	10.95	Peak	106	237

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:"*" is Peak / Average value of fundamental frequency

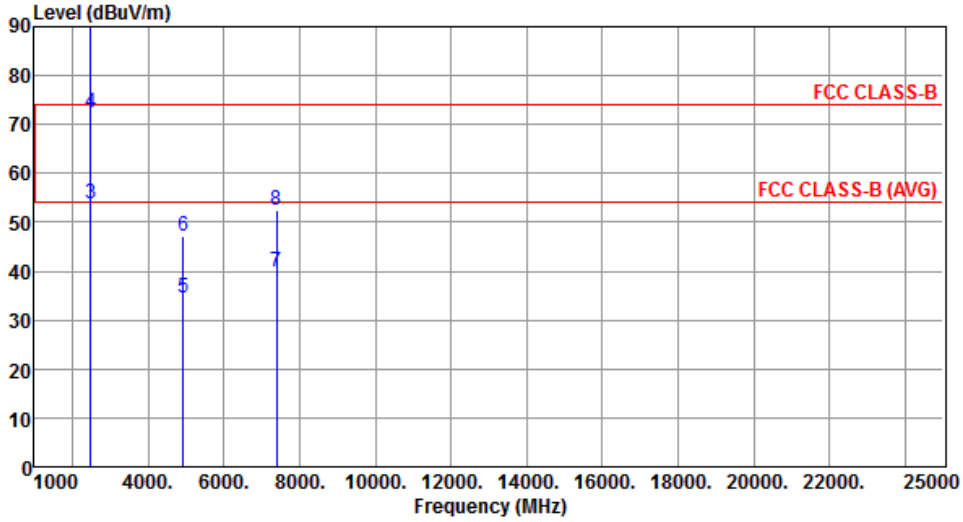
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



		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	46.77	54.00	-7.23	47.98	-1.21	Average	183	181
2		2390.00	59.17	74.00	-14.83	60.38	-1.21	Peak	183	181
3	*	2437.00	105.01			106.03	-1.02	Average	183	181
4	*	2437.00	116.38			117.40	-1.02	Peak	183	181
5		2483.50	48.20	54.00	-5.80	49.06	-0.86	Average	183	181
6		2483.50	62.19	74.00	-11.81	63.05	-0.86	Peak	183	181
7		4874.00	35.37	54.00	-18.63	29.56	5.81	Average	182	182
8		4874.00	49.01	74.00	-24.99	43.20	5.81	Peak	182	182
9		7311.00	41.45	54.00	-12.55	30.50	10.95	Average	122	184
10		7311.00	53.79	74.00	-20.21	42.84	10.95	Peak	122	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).
Note 3:"*" is Peak / Average value of fundamental frequency

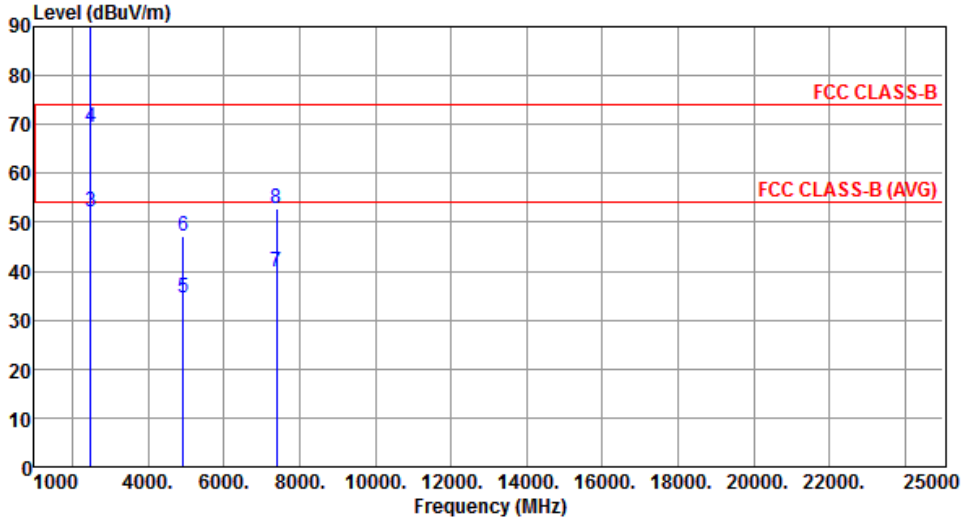
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	105.02			105.95	-0.93	Average	185	179
2	*	2462.00	117.50			118.43	-0.93	Peak	185	179
3		2483.50	53.69	54.00	-0.31	54.55	-0.86	Average	185	179
4		2483.50	72.30	74.00	-1.70	73.16	-0.86	Peak	185	179
5		4924.00	34.46	54.00	-19.54	28.51	5.95	Average	100	166
6		4924.00	47.27	74.00	-26.73	41.32	5.95	Peak	100	166
7		7386.00	39.69	54.00	-14.31	28.42	11.27	Average	100	127
8		7386.00	52.62	74.00	-21.38	41.35	11.27	Peak	100	127

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:"*" is Peak / Average value of fundamental frequency

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

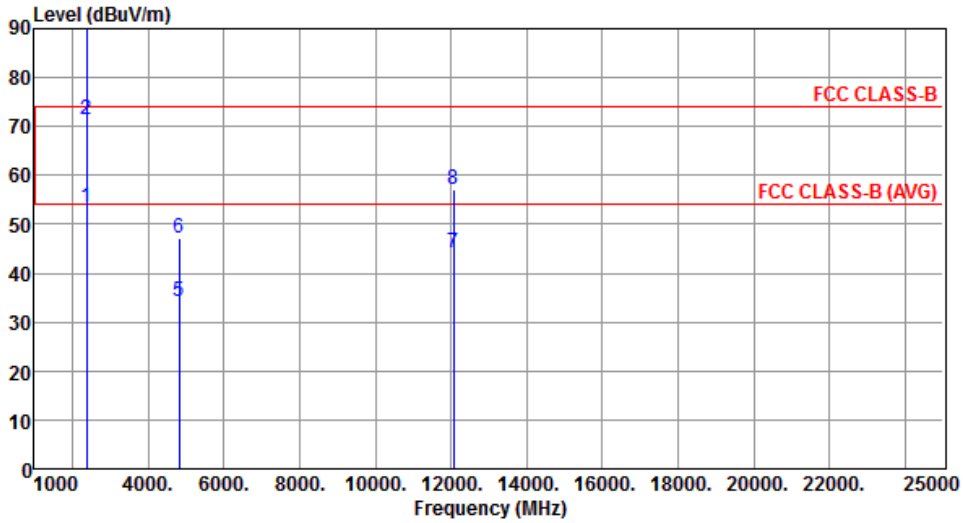


		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	101.75			102.68	-0.93	Average	171	181
2	*	2462.00	113.67			114.60	-0.93	Peak	171	181
3		2483.50	52.16	54.00	-1.84	53.02	-0.86	Average	171	181
4		2483.50	69.42	74.00	-4.58	70.28	-0.86	Peak	171	181
5		4924.00	34.50	54.00	-19.50	28.55	5.95	Average	100	163
6		4924.00	47.26	74.00	-26.74	41.31	5.95	Peak	100	163
7		7386.00	39.79	54.00	-14.21	28.52	11.27	Average	100	193
8		7386.00	52.74	74.00	-21.26	41.47	11.27	Peak	100	193

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:"*" is Peak / Average value of fundamental frequency

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

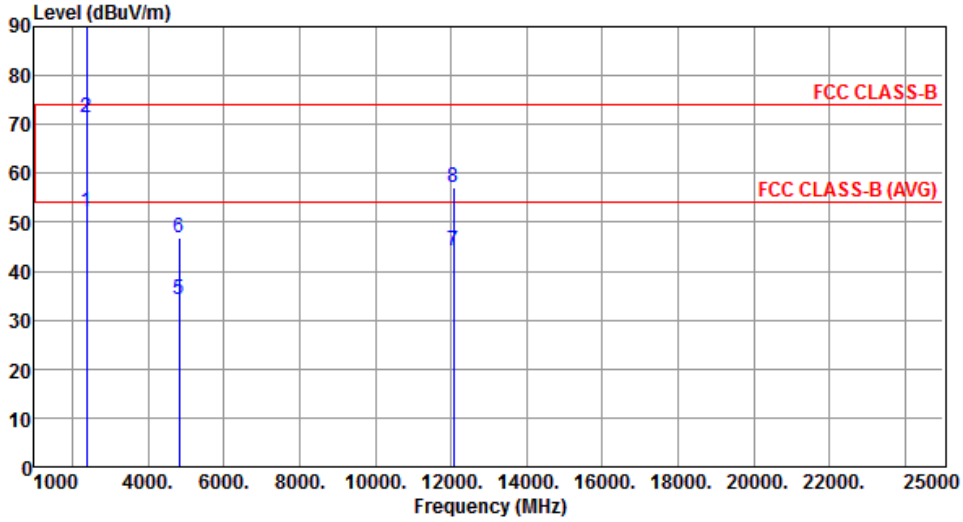
Modulation	HT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



		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	53.58	54.00	-0.42	54.79	-1.21	Average	171	186
2		2390.00	71.32	74.00	-2.68	72.53	-1.21	Peak	171	186
3	*	2412.00	103.70			104.82	-1.12	Average	171	186
4	*	2412.00	116.18			117.30	-1.12	Peak	171	186
5		4824.00	34.09	54.00	-19.91	28.42	5.67	Average	100	193
6		4824.00	47.22	74.00	-26.78	41.55	5.67	Peak	100	193
7		12060.00	44.09	54.00	-9.91	28.42	15.67	Average	100	166
8		12060.00	57.04	74.00	-16.96	41.37	15.67	Peak	100	166

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

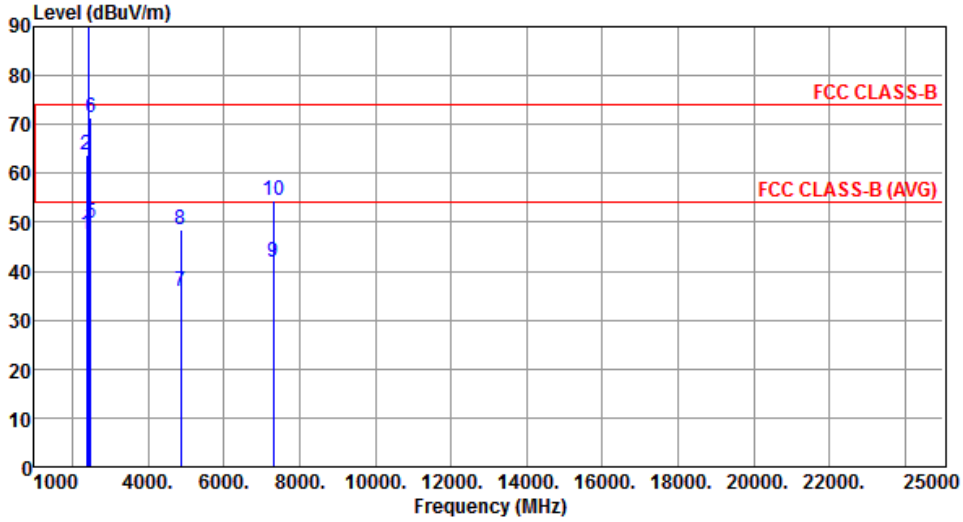
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



		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	52.17	54.00	-1.83	53.38	-1.21	Average	171	178
2		2390.00	71.44	74.00	-2.56	72.65	-1.21	Peak	171	178
3	*	2412.00	99.72			100.84	-1.12	Average	171	178
4	*	2412.00	111.70			112.82	-1.12	Peak	171	178
5		4824.00	34.34	54.00	-19.66	28.67	5.67	Average	100	175
6		4824.00	46.98	74.00	-27.02	41.31	5.67	Peak	100	175
7		12060.00	44.04	54.00	-9.96	28.37	15.67	Average	100	148
8		12060.00	57.23	74.00	-16.77	41.56	15.67	Peak	100	148

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:"*" is Peak / Average value of fundamental frequency

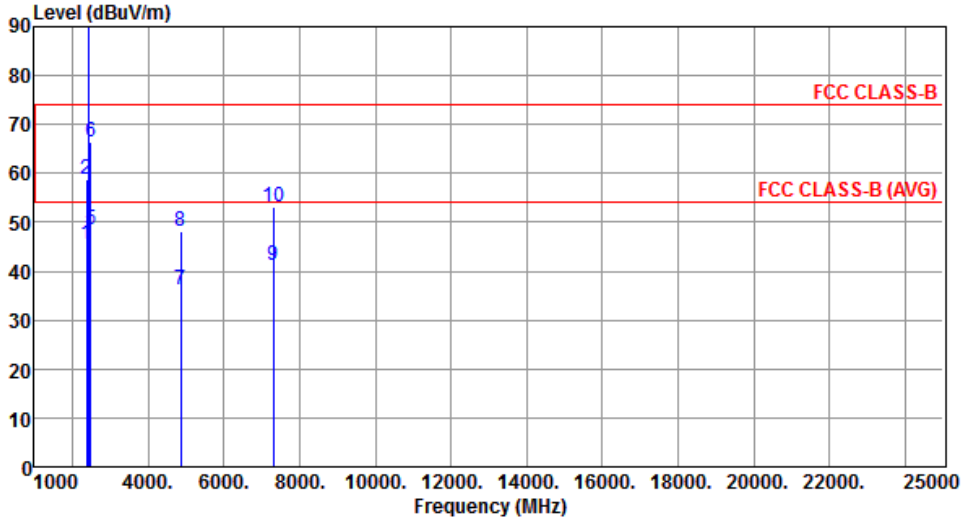
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



		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	47.38	54.00	-6.62	48.59	-1.21	Average	171	182
2		2390.00	63.60	74.00	-10.40	64.81	-1.21	Peak	171	182
3	*	2437.00	107.53			108.55	-1.02	Average	171	182
4	*	2437.00	119.87			120.89	-1.02	Peak	171	182
5		2483.50	49.71	54.00	-4.29	50.57	-0.86	Average	171	182
6		2483.50	71.36	74.00	-2.64	72.22	-0.86	Peak	171	182
7		4874.00	35.93	54.00	-18.07	30.12	5.81	Average	100	165
8		4874.00	48.36	74.00	-25.64	42.55	5.81	Peak	100	165
9		7311.00	41.69	54.00	-12.31	30.74	10.95	Average	100	147
10		7311.00	54.62	74.00	-19.38	43.67	10.95	Peak	100	147

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:"*" is Peak / Average value of fundamental frequency

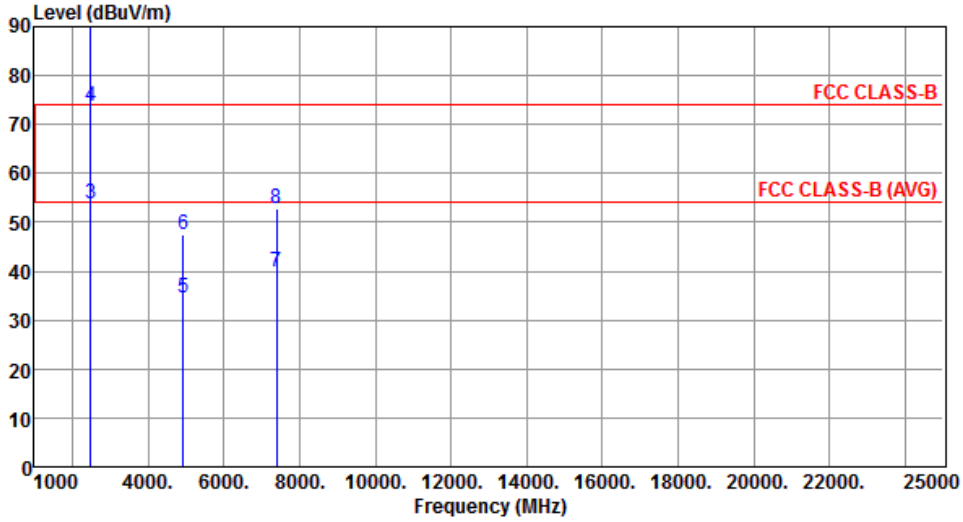
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



		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	45.52	54.00	-8.48	46.73	-1.21	Average	171	182
2		2390.00	58.73	74.00	-15.27	59.94	-1.21	Peak	171	182
3	*	2437.00	103.59			104.61	-1.02	Average	171	182
4	*	2437.00	116.20			117.22	-1.02	Peak	171	182
5		2483.50	48.51	54.00	-5.49	49.37	-0.86	Average	171	182
6		2483.50	66.34	74.00	-7.66	67.20	-0.86	Peak	171	182
7		4874.00	36.14	54.00	-17.86	30.33	5.81	Average	100	196
8		4874.00	48.08	74.00	-25.92	42.27	5.81	Peak	100	196
9		7311.00	41.28	54.00	-12.72	30.33	10.95	Average	100	166
10		7311.00	53.18	74.00	-20.82	42.23	10.95	Peak	100	166

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

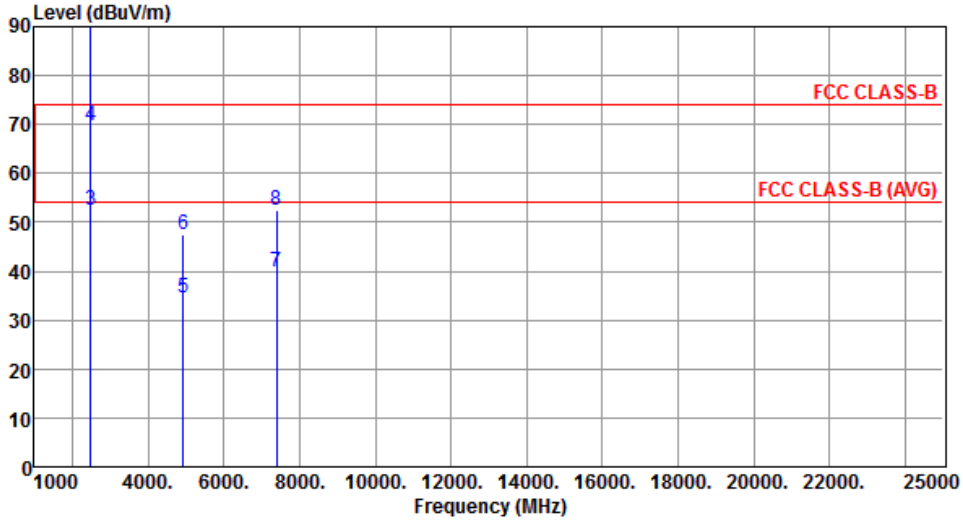
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	104.18			105.11	-0.93	Average	171	181
2	*	2462.00	116.71			117.64	-0.93	Peak	171	181
3		2483.50	53.67	54.00	-0.33	54.53	-0.86	Average	171	181
4		2483.50	73.86	74.00	-0.14	74.72	-0.86	Peak	171	181
5		4924.00	34.57	54.00	-19.43	28.62	5.95	Average	100	167
6		4924.00	47.60	74.00	-26.40	41.65	5.95	Peak	100	167
7		7386.00	39.71	54.00	-14.29	28.44	11.27	Average	100	153
8		7386.00	52.65	74.00	-21.35	41.38	11.27	Peak	100	153

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:"*" is Peak / Average value of fundamental frequency

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

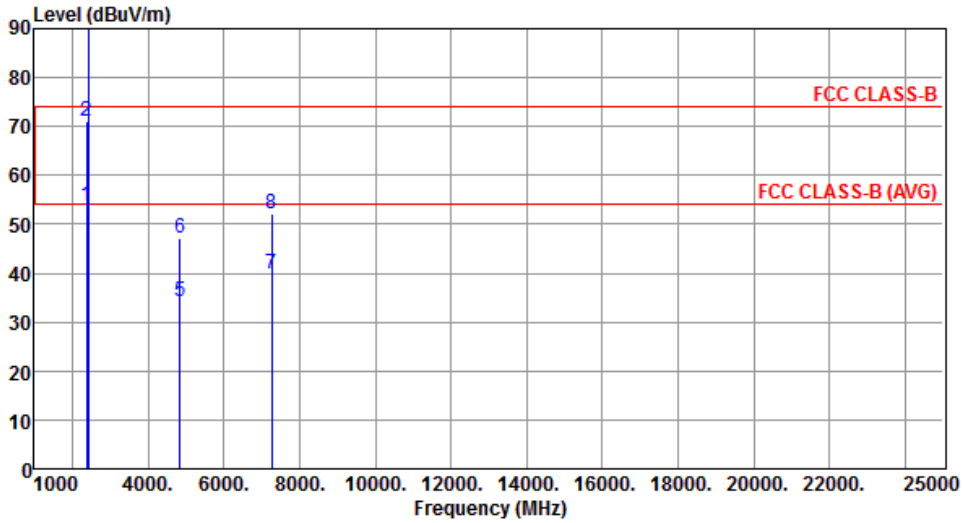


		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2462.00	100.80			101.73	-0.93	Average	177	176
2	*	2462.00	113.33			114.26	-0.93	Peak	177	176
3		2483.50	52.52	54.00	-1.48	53.38	-0.86	Average	177	176
4		2483.50	69.85	74.00	-4.15	70.71	-0.86	Peak	177	176
5		4924.00	34.62	54.00	-19.38	28.67	5.95	Average	100	167
6		4924.00	47.43	74.00	-26.57	41.48	5.95	Peak	100	167
7		7386.00	39.72	54.00	-14.28	28.45	11.27	Average	100	127
8		7386.00	52.59	74.00	-21.41	41.32	11.27	Peak	100	127

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:"*" is Peak / Average value of fundamental frequency

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

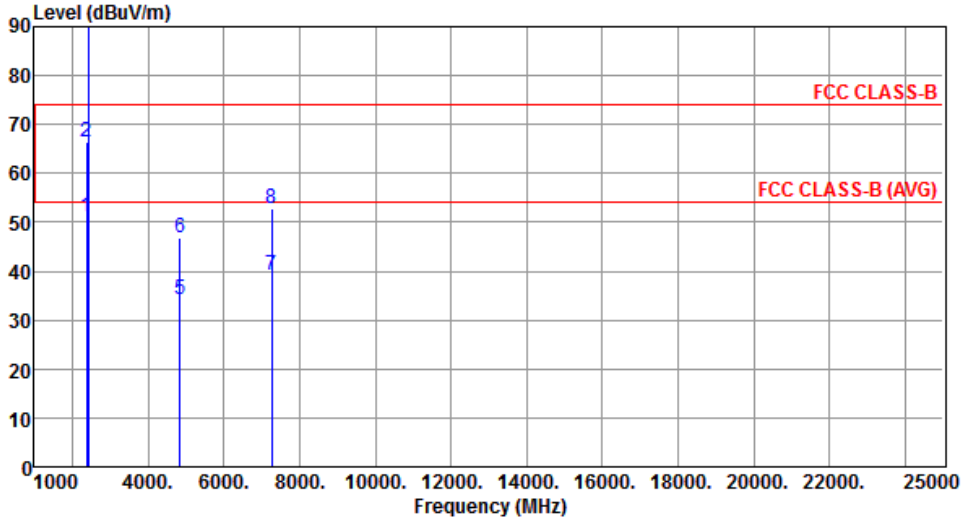
Modulation	HT40	**Test Freq. (MHz)**	2422
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.84	54.00	-0.16	55.05	-1.21	Average	170	181
2		2390.00	71.02	74.00	-2.98	72.23	-1.21	Peak	170	181
3	*	2422.00	98.29			99.37	-1.08	Average	170	181
4	*	2422.00	108.63			109.71	-1.08	Peak	170	181
5		4844.00	34.29	54.00	-19.71	28.56	5.73	Average	100	185
6		4844.00	47.06	74.00	-26.94	41.33	5.73	Peak	100	185
7		7266.00	39.87	54.00	-14.13	29.12	10.75	Average	100	175
8		7266.00	52.13	74.00	-21.87	41.38	10.75	Peak	100	175

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:"*" is Peak / Average value of fundamental frequency

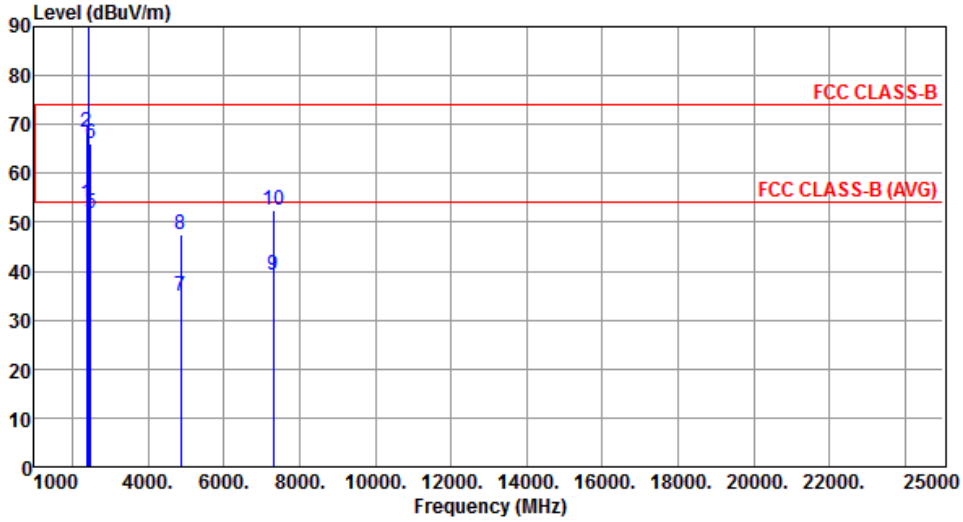
Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	51.07	54.00	-2.93	52.28	-1.21	Average	192	179
2		2390.00	66.56	74.00	-7.44	67.77	-1.21	Peak	192	179
3	*	2422.00	95.07			96.15	-1.08	Average	192	179
4	*	2422.00	104.46			105.54	-1.08	Peak	192	179
5		4844.00	34.27	54.00	-19.73	28.54	5.73	Average	100	192
6		4844.00	46.96	74.00	-27.04	41.23	5.73	Peak	100	192
7		7266.00	39.30	54.00	-14.70	28.55	10.75	Average	100	189
8		7266.00	52.77	74.00	-21.23	42.02	10.75	Peak	100	189

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:"*" is Peak / Average value of fundamental frequency

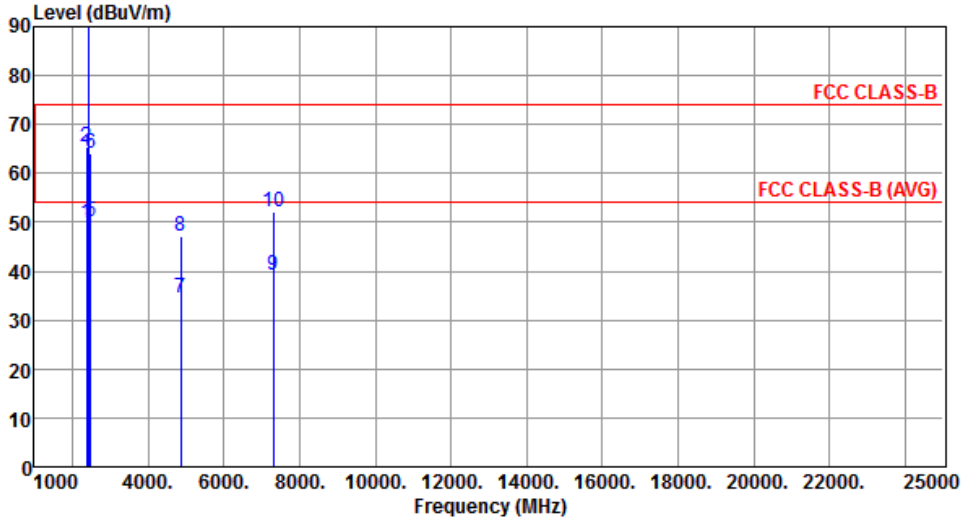
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	53.64	54.00	-0.36	54.85	-1.21	Average	117	185
2		2390.00	68.31	74.00	-5.69	69.52	-1.21	Peak	117	185
3	*	2437.00	102.36			103.38	-1.02	Average	117	185
4	*	2437.00	112.21			113.23	-1.02	Peak	117	185
5		2483.50	51.87	54.00	-2.13	52.73	-0.86	Average	117	185
6		2483.50	66.12	74.00	-7.88	66.98	-0.86	Peak	117	185
7		4874.00	34.77	54.00	-19.23	28.96	5.81	Average	100	173
8		4874.00	47.35	74.00	-26.65	41.54	5.81	Peak	100	173
9		7311.00	39.20	54.00	-14.80	28.25	10.95	Average	100	193
10		7311.00	52.48	74.00	-21.52	41.53	10.95	Peak	100	193

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:"*" is Peak / Average value of fundamental frequency

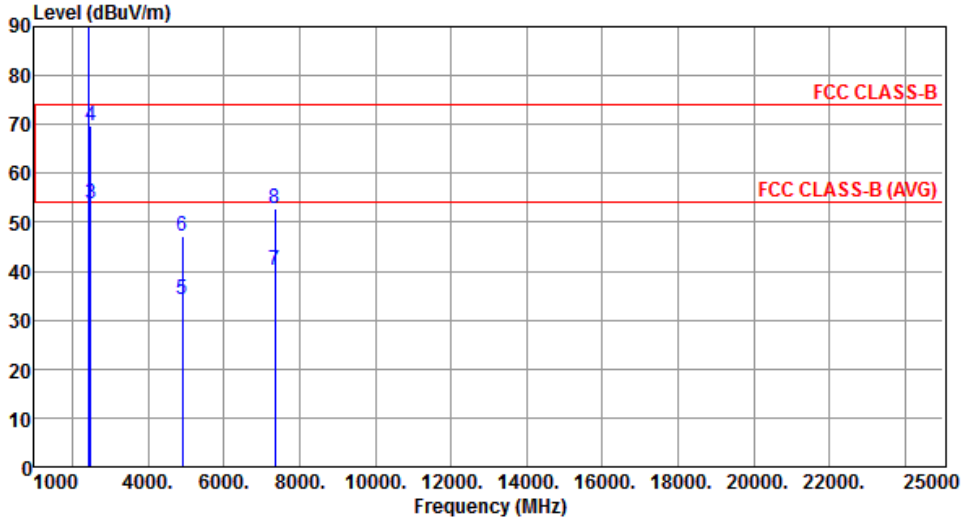
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1		2390.00	49.88	54.00	-4.12	51.09	-1.21	Average	167	182
2		2390.00	65.53	74.00	-8.47	66.74	-1.21	Peak	167	182
3	*	2437.00	100.50			101.52	-1.02	Average	167	182
4	*	2437.00	109.56			110.58	-1.02	Peak	167	182
5		2483.50	50.04	54.00	-3.96	50.90	-0.86	Average	167	182
6		2483.50	64.10	74.00	-9.90	64.96	-0.86	Peak	167	182
7		4874.00	34.42	54.00	-19.58	28.61	5.81	Average	100	176
8		4874.00	47.04	74.00	-26.96	41.23	5.81	Peak	100	176
9		7311.00	39.19	54.00	-14.81	28.24	10.95	Average	100	167
10		7311.00	52.25	74.00	-21.75	41.30	10.95	Peak	100	167

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:"*" is Peak / Average value of fundamental frequency

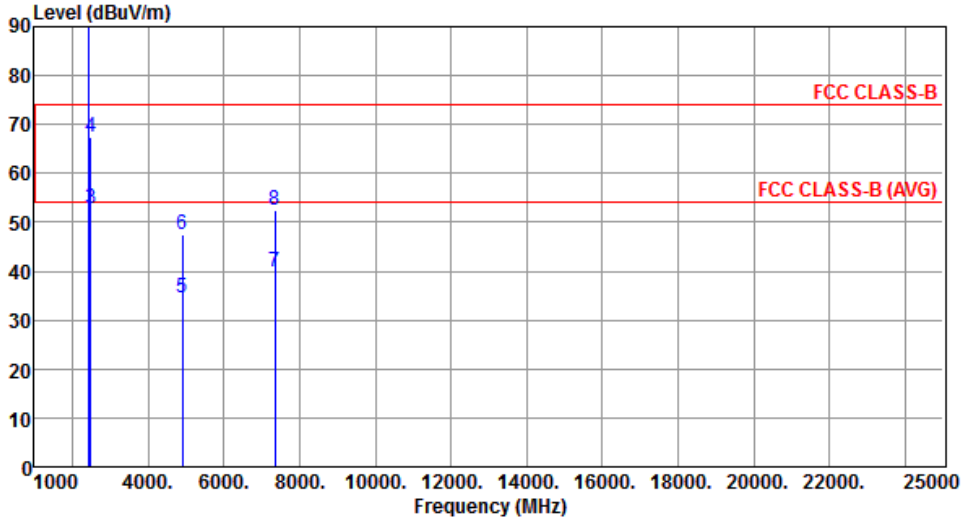
Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2452.00	99.98			100.95	-0.97	Average	179	180
2	*	2452.00	110.33			111.30	-0.97	Peak	179	180
3		2483.50	53.86	54.00	-0.14	54.72	-0.86	Average	179	180
4		2483.50	69.77	74.00	-4.23	70.63	-0.86	Peak	179	180
5		4904.00	34.14	54.00	-19.86	28.24	5.90	Average	100	193
6		4904.00	47.15	74.00	-26.85	41.25	5.90	Peak	100	193
7		7356.00	40.29	54.00	-13.71	29.15	11.14	Average	100	172
8		7356.00	52.91	74.00	-21.09	41.77	11.14	Peak	100	172

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:"*" is Peak / Average value of fundamental frequency

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		



		Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	*	2452.00	97.18			98.15	-0.97	Average	175	178
2	*	2452.00	107.50			108.47	-0.97	Peak	175	178
3		2483.50	52.74	54.00	-1.26	53.60	-0.86	Average	175	178
4		2483.50	67.27	74.00	-6.73	68.13	-0.86	Peak	175	178
5		4904.00	34.46	54.00	-19.54	28.56	5.90	Average	100	184
6		4904.00	47.37	74.00	-26.63	41.47	5.90	Peak	100	184
7		7356.00	39.76	54.00	-14.24	28.62	11.14	Average	100	162
8		7356.00	52.42	74.00	-21.58	41.28	11.14	Peak	100	162

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:"*" is Peak / Average value of fundamental frequency

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

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

3.6.2 Test Procedures

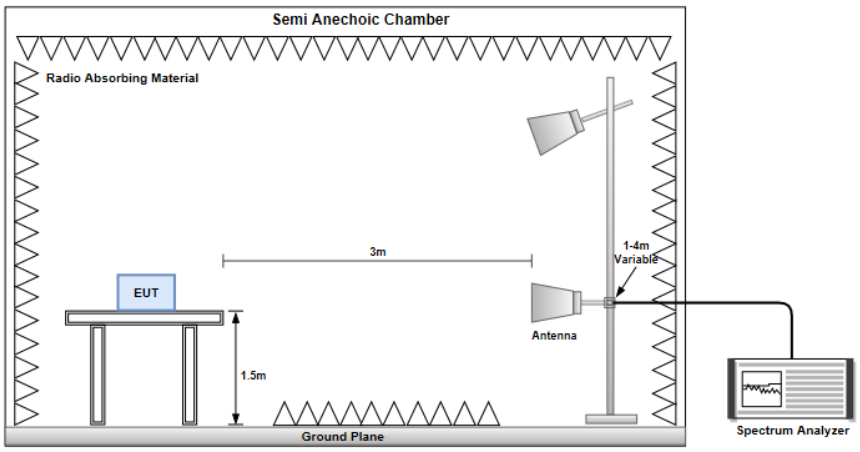
Reference level measurement

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

Emission level measurement

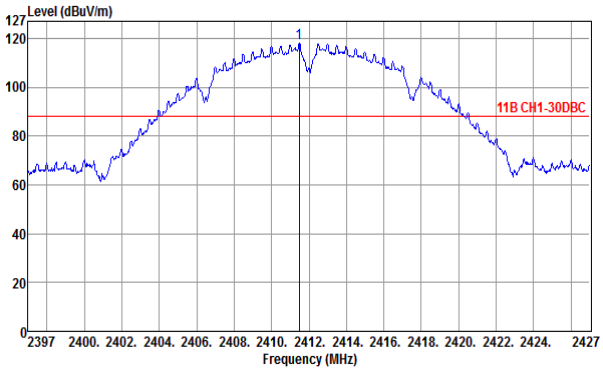
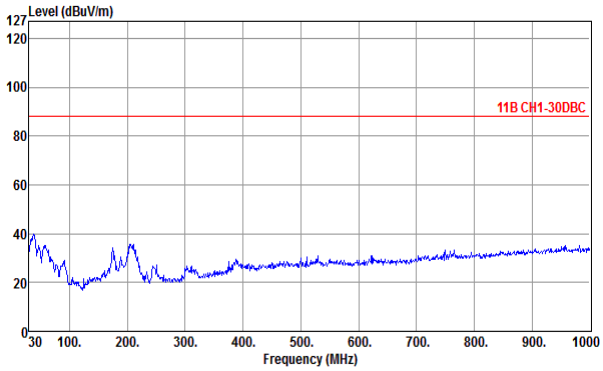
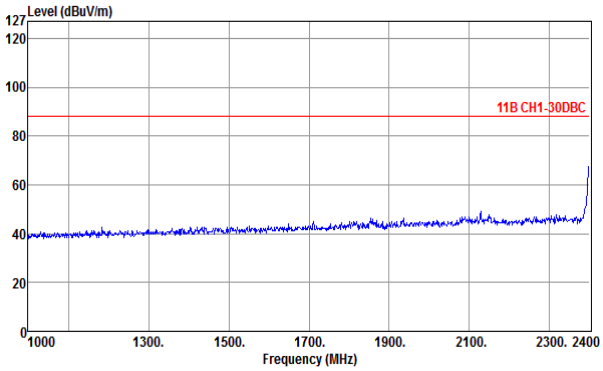
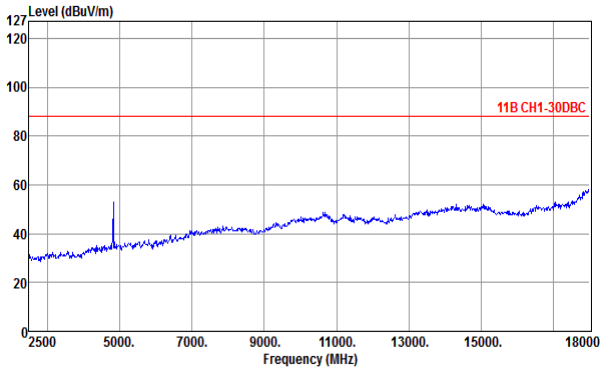
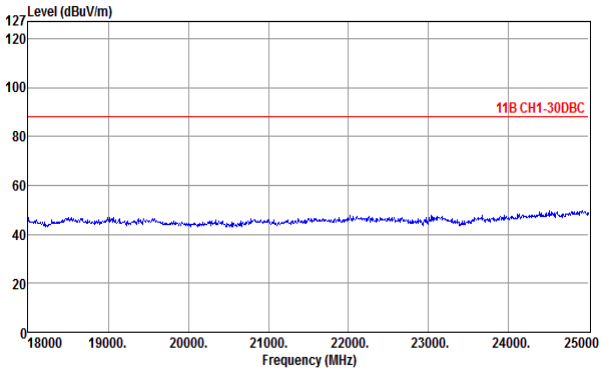
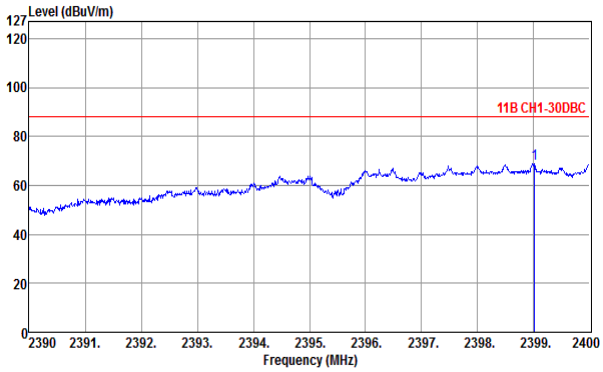
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

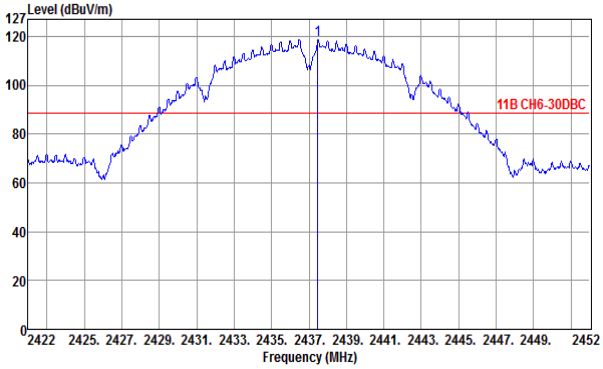
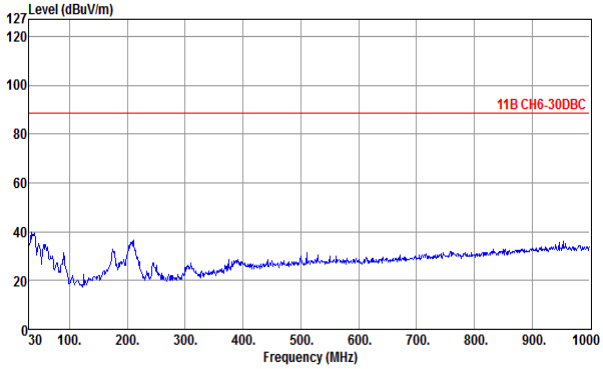
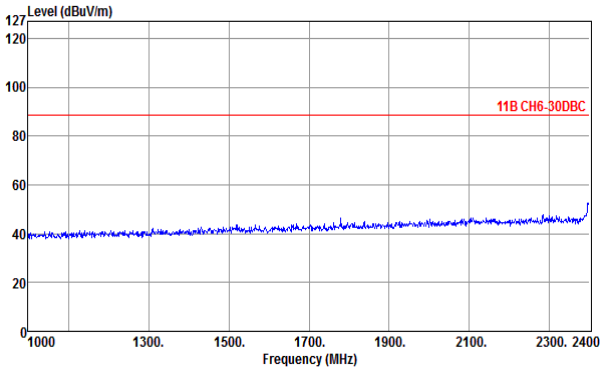
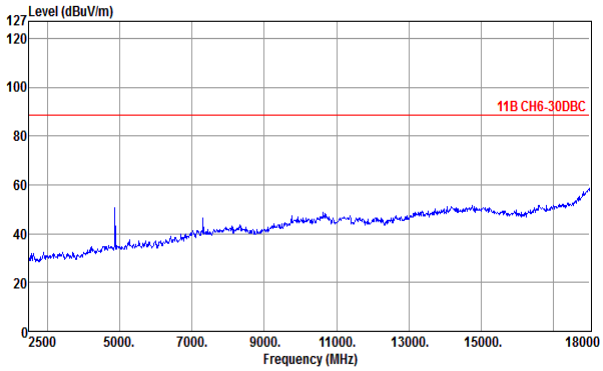
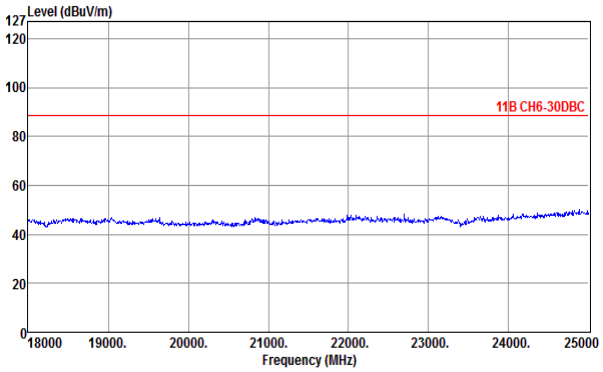
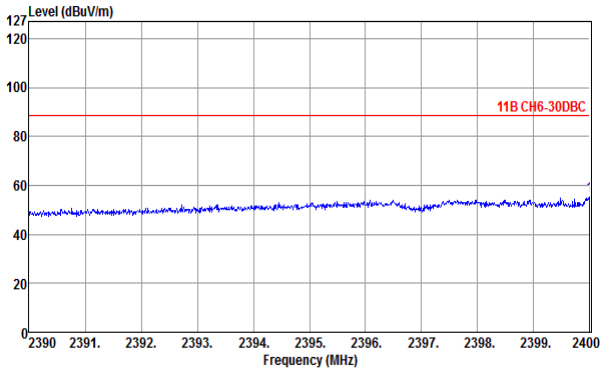
3.6.3 Test Setup

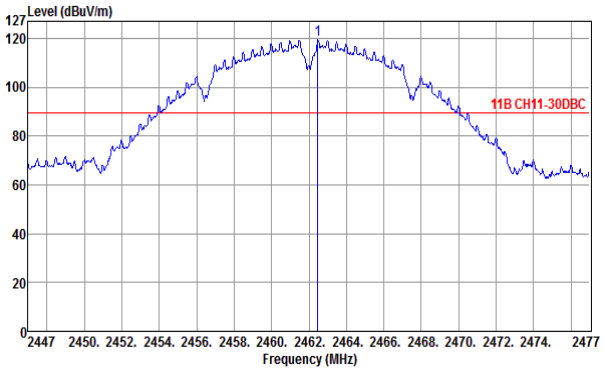
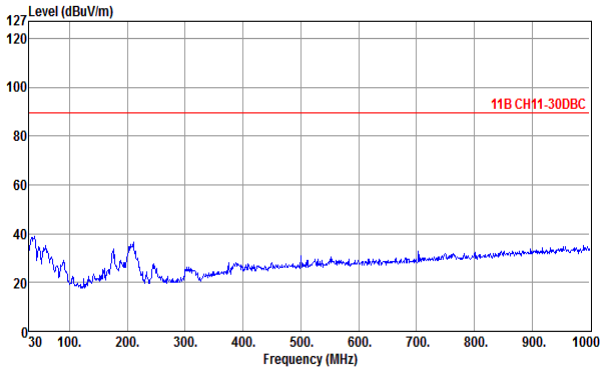
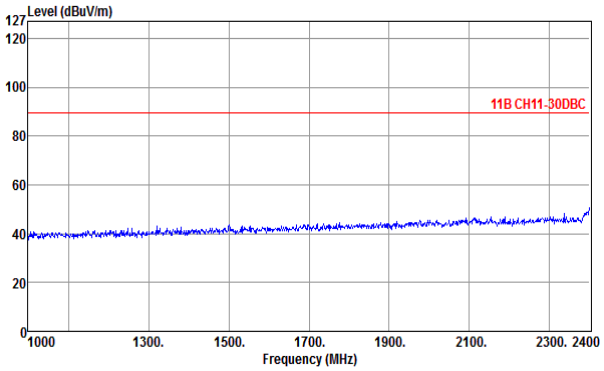
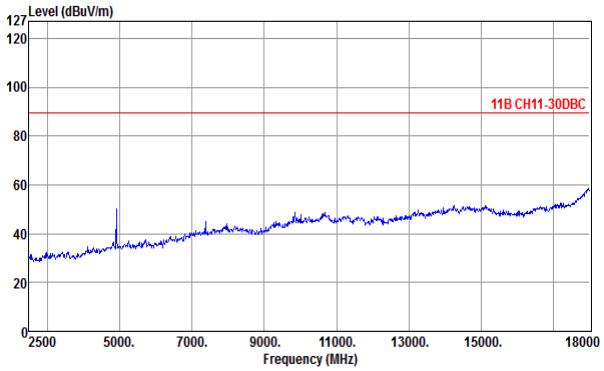
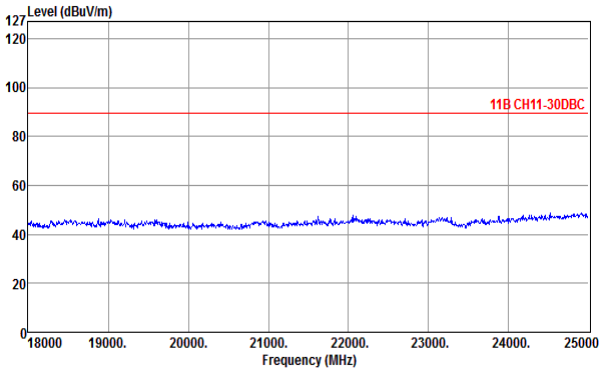
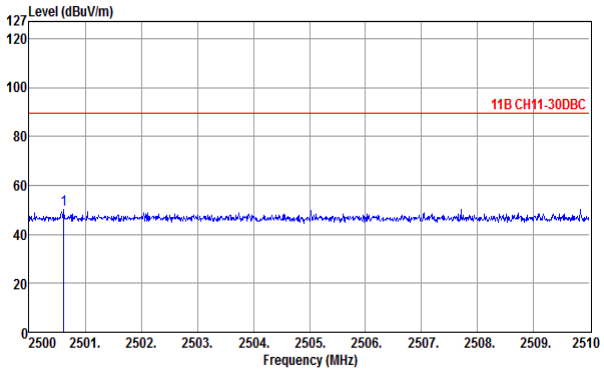


3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

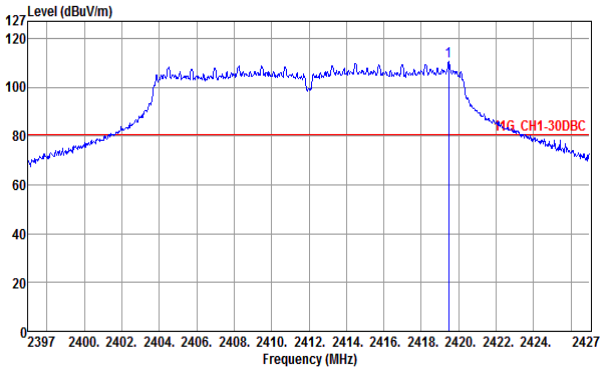
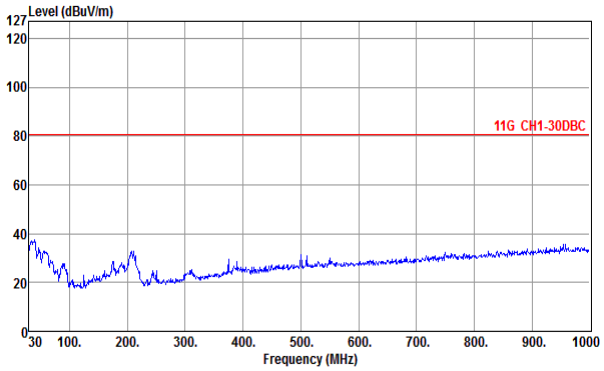
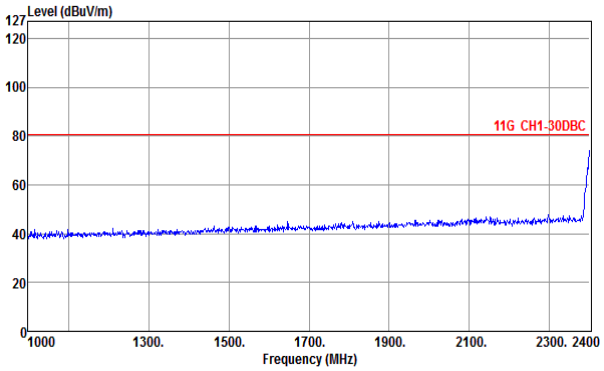
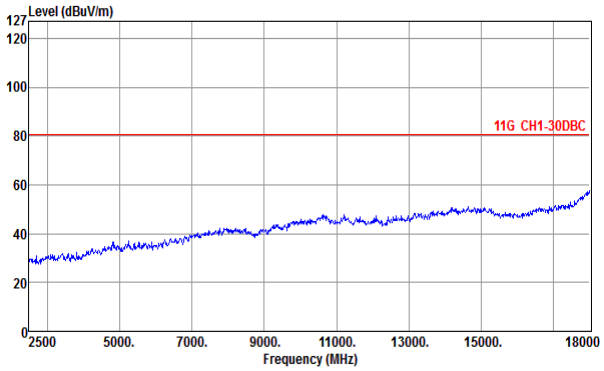
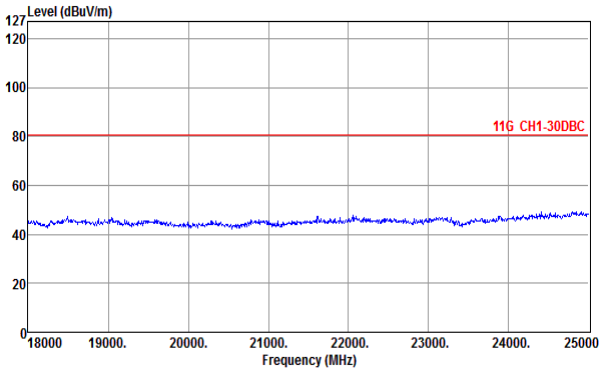
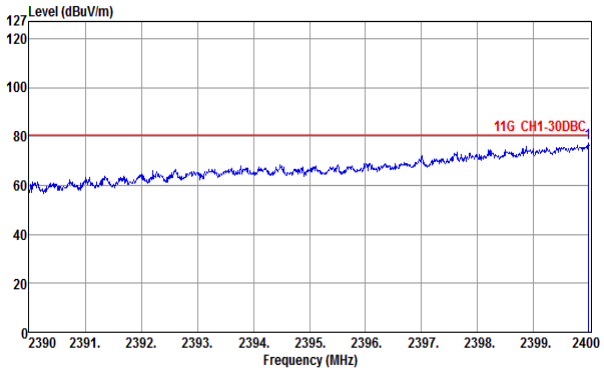
802.11b

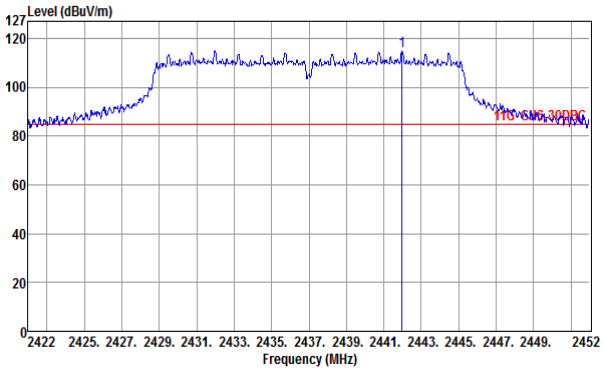
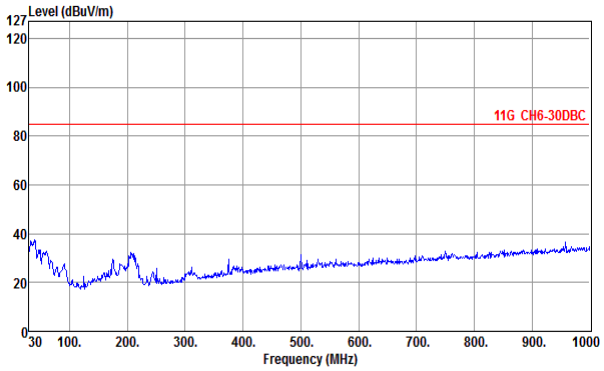
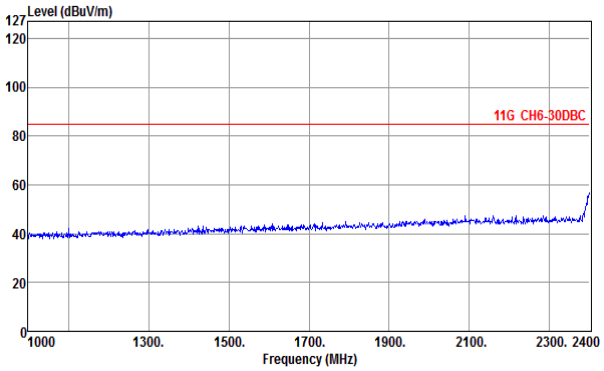
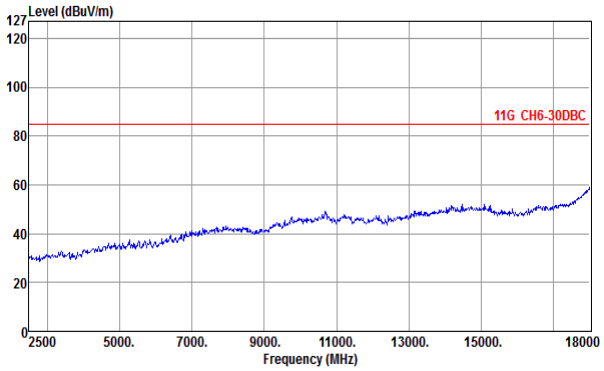
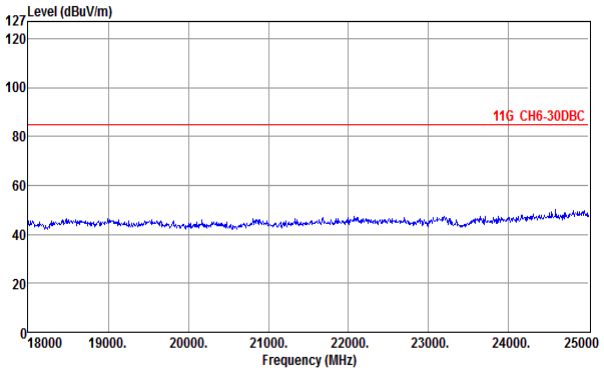
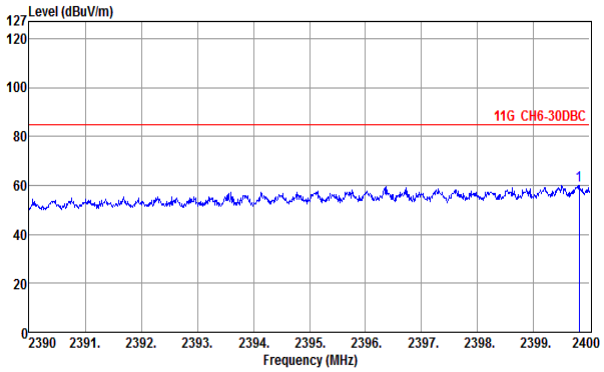
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 30dBc)
	
	
	

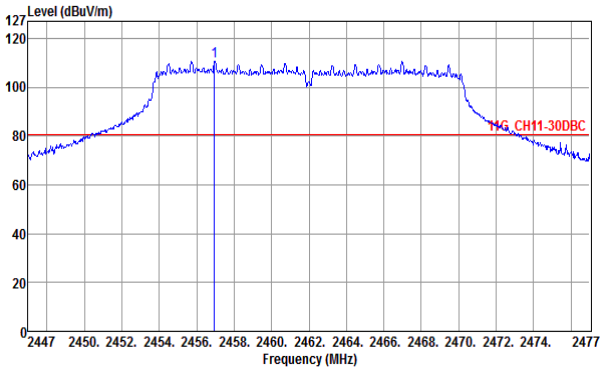
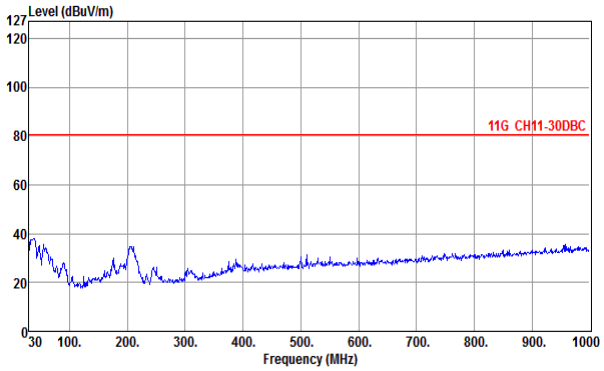
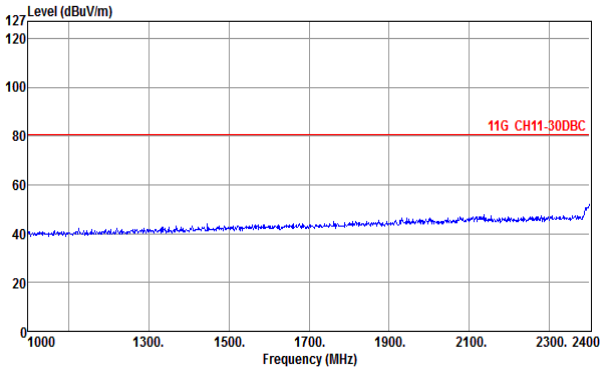
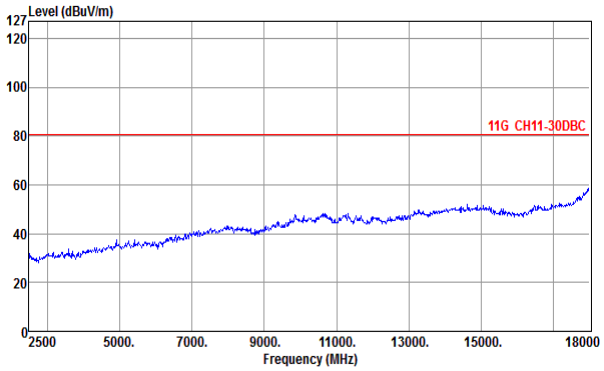
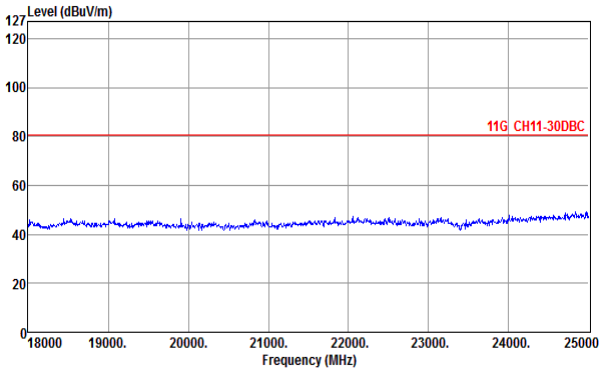
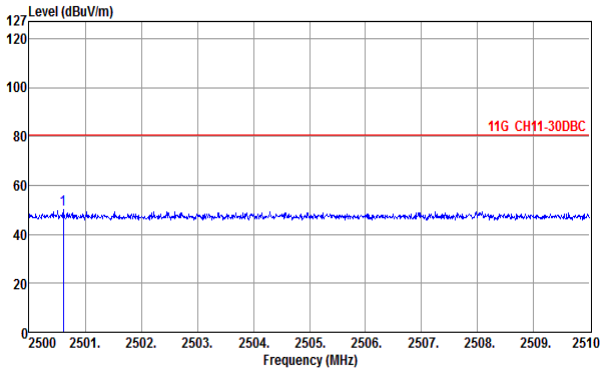
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 30dBc)
	
	
	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 30dBc)
	
	
	

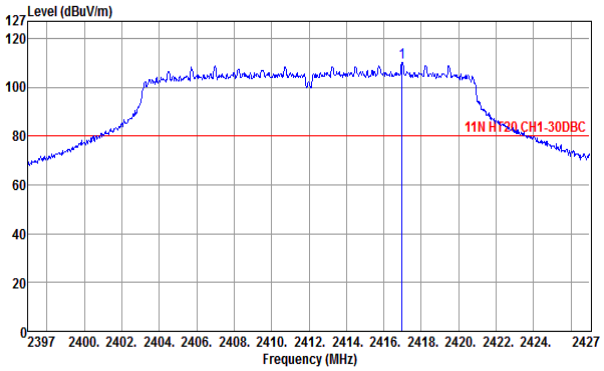
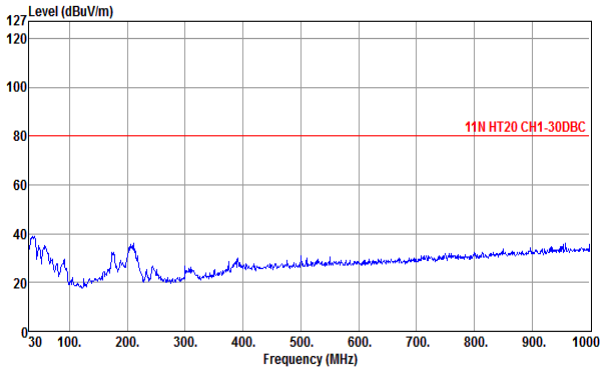
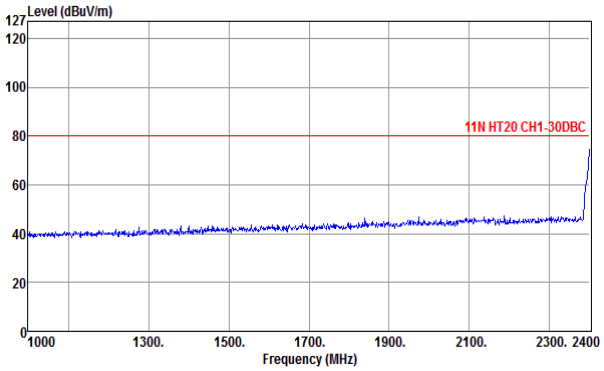
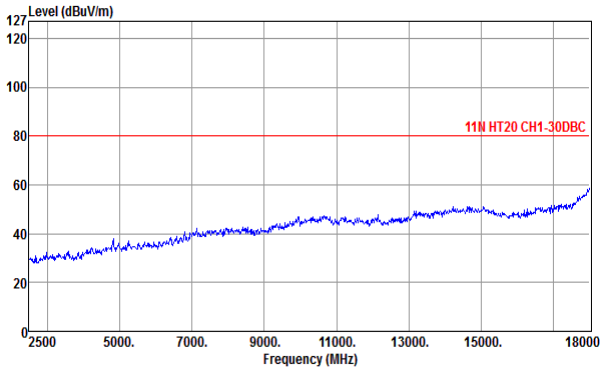
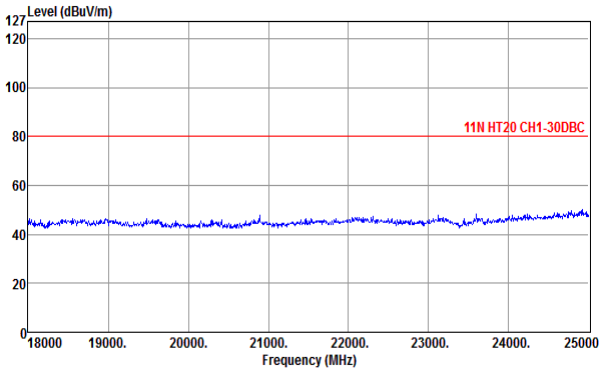
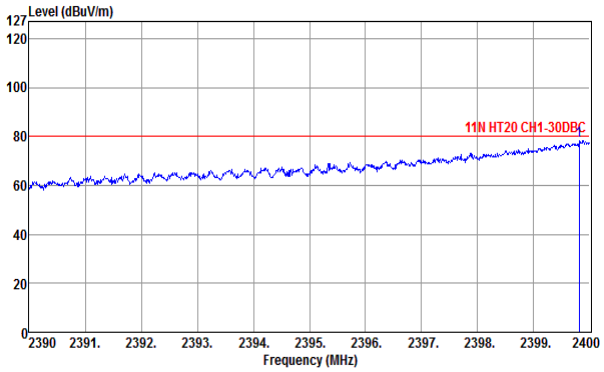
802.11g

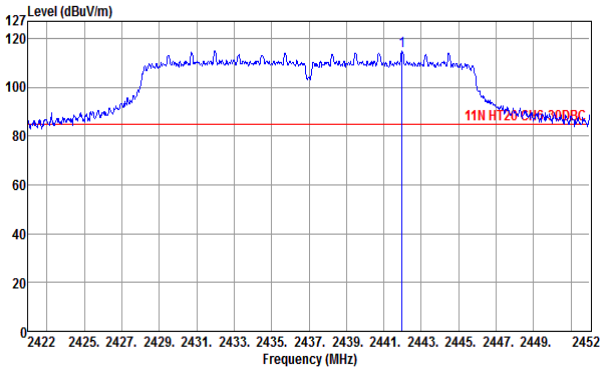
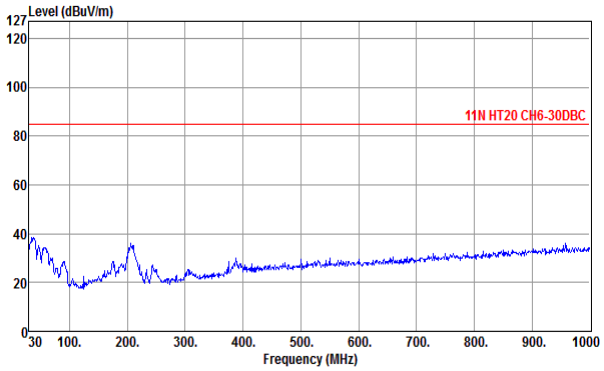
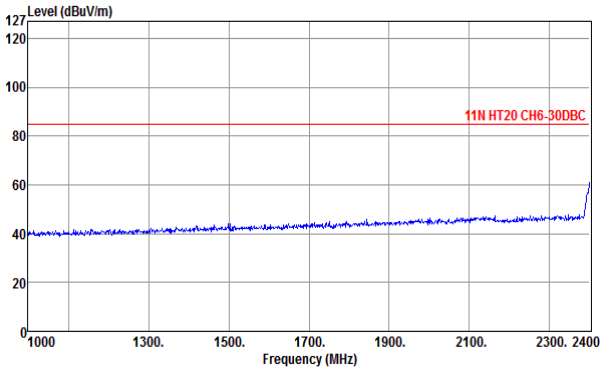
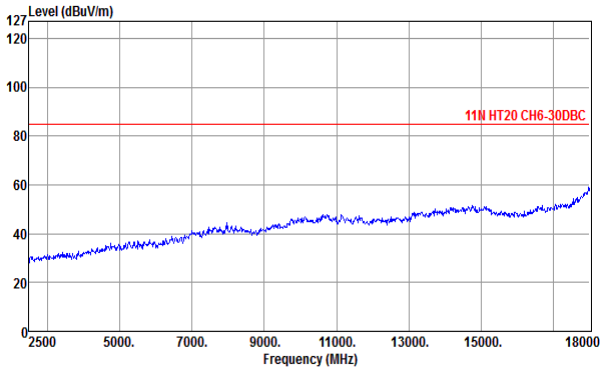
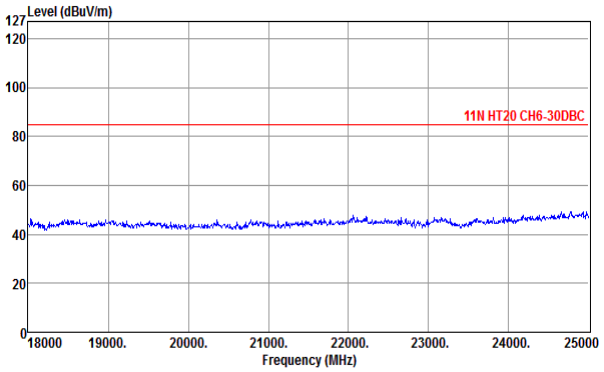
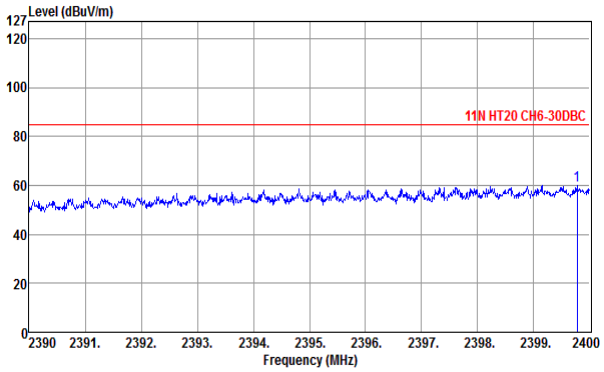
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 30dBc)
	
	
	

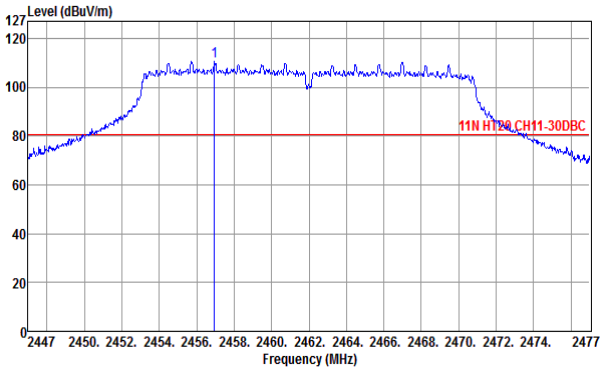
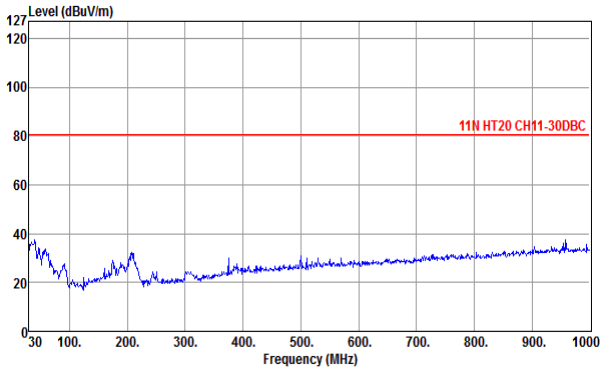
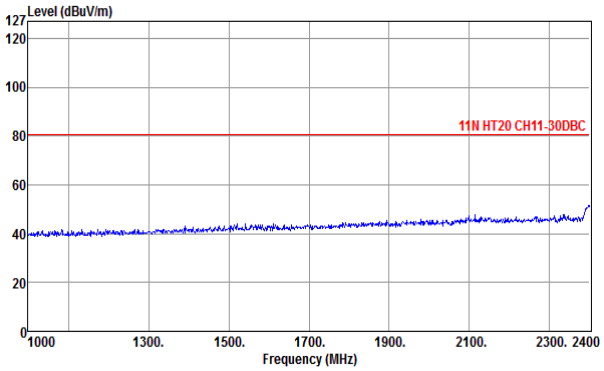
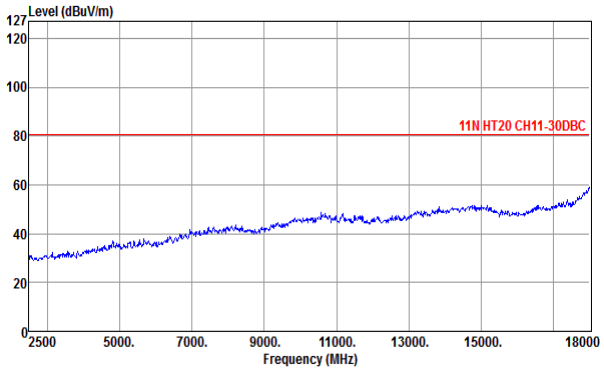
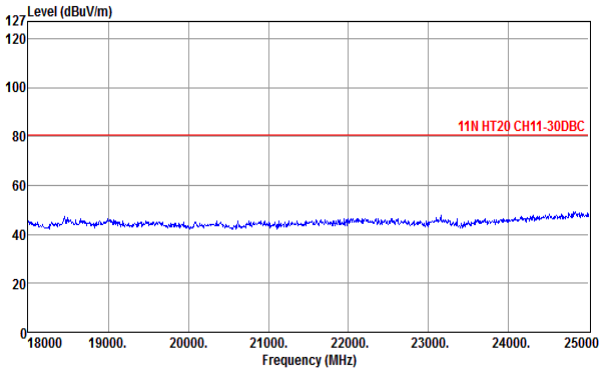
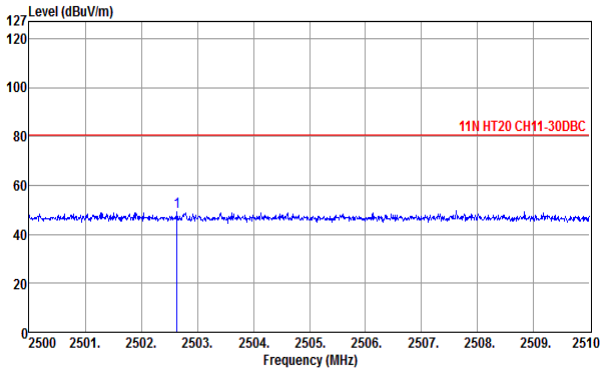
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 30dBc)
	
	
	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 30dBc)
	
	
	

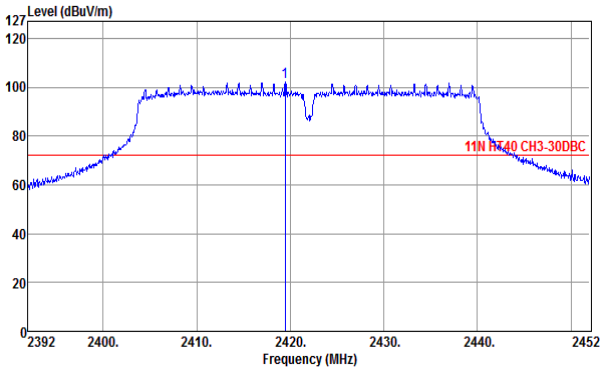
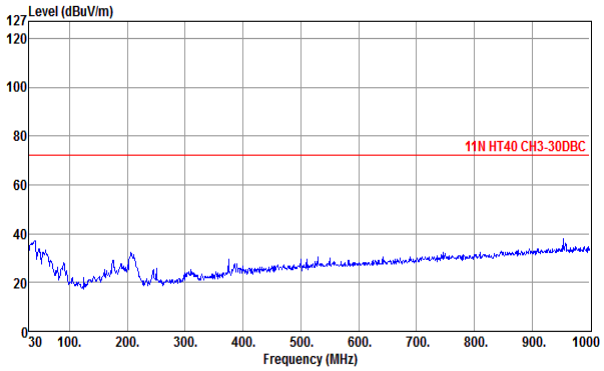
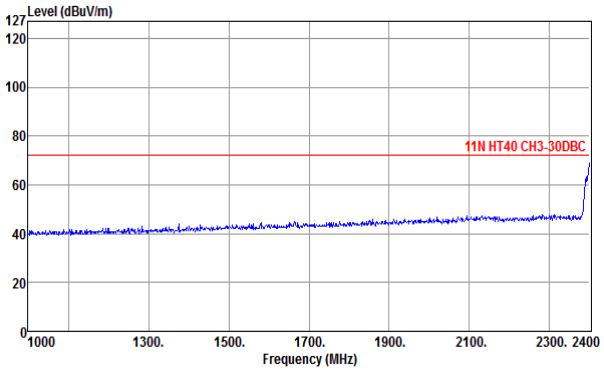
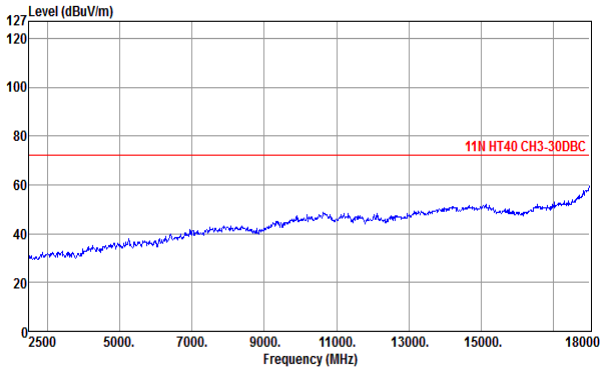
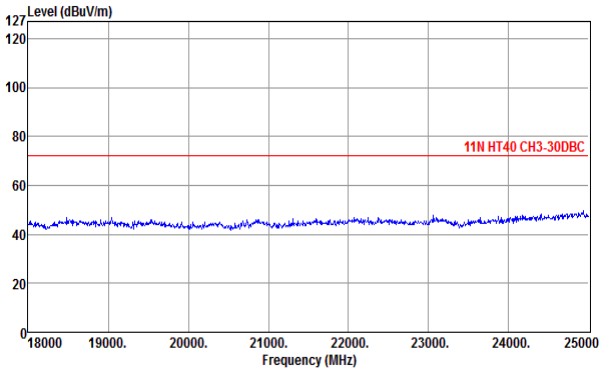
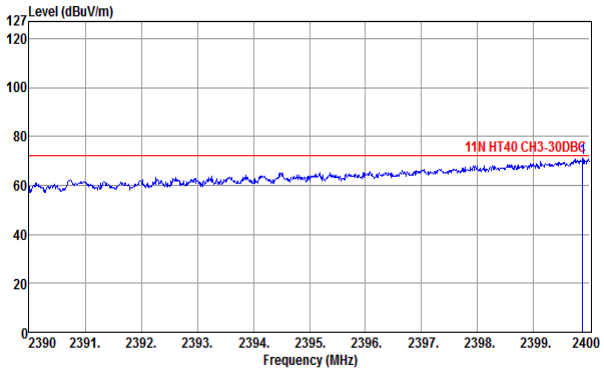
HT20

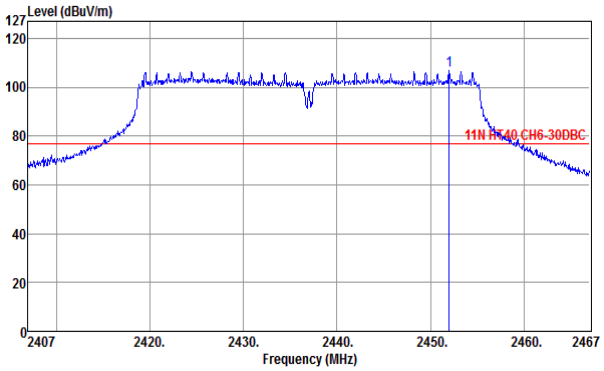
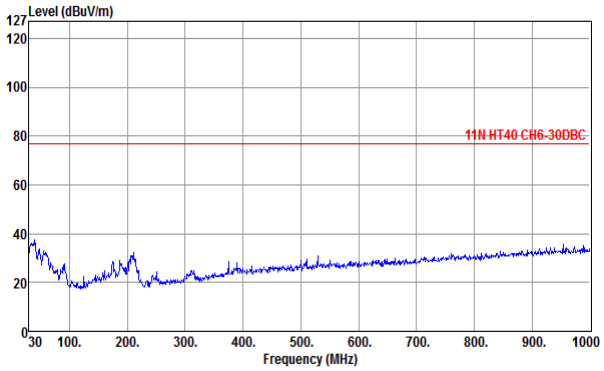
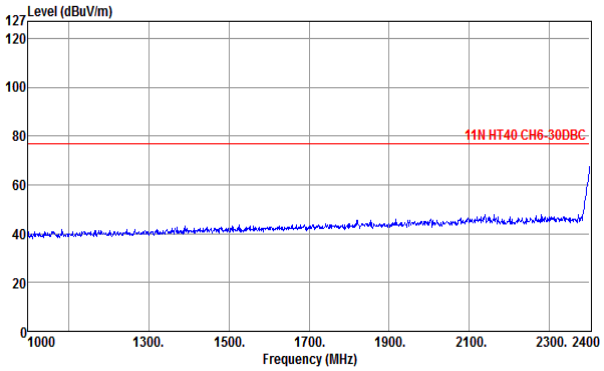
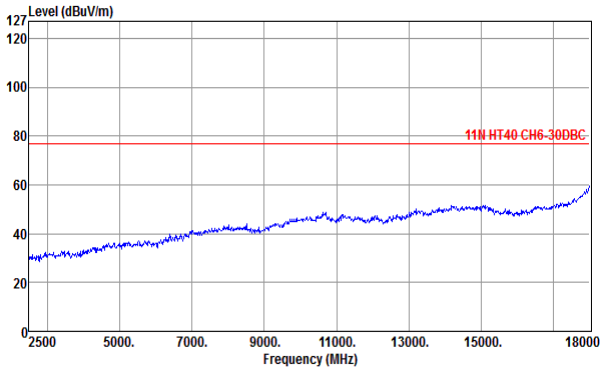
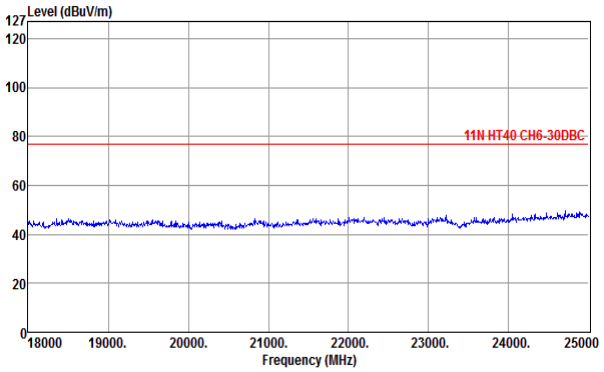
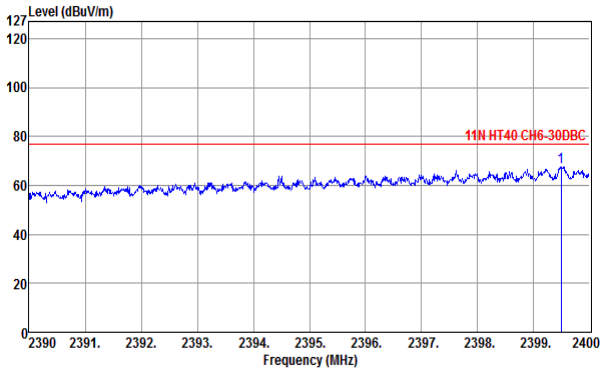
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 30dBc)
	
	
	

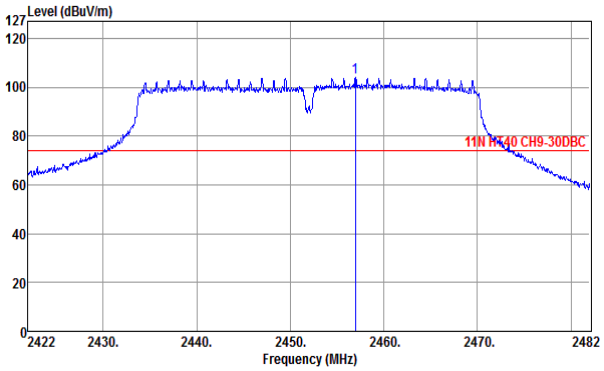
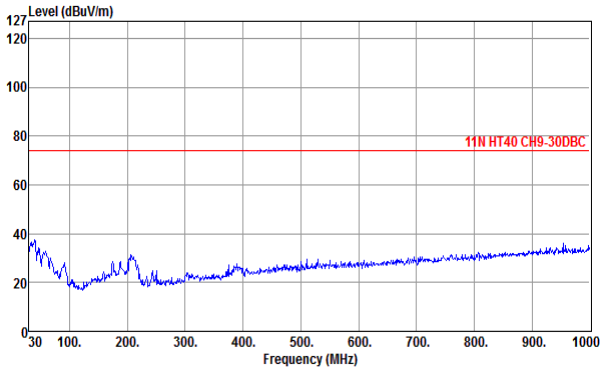
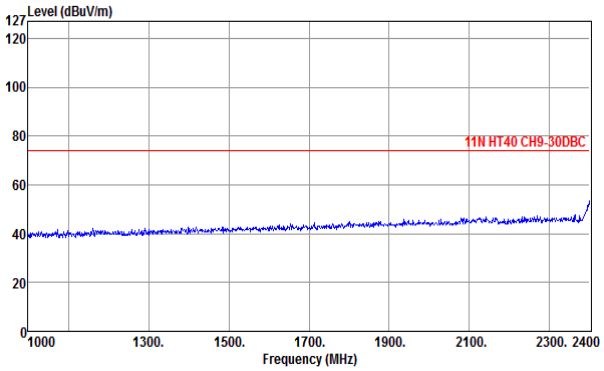
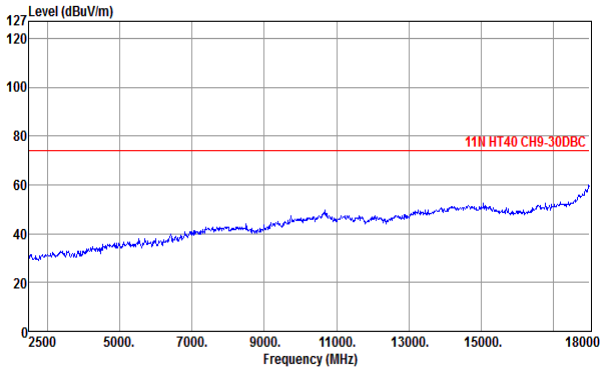
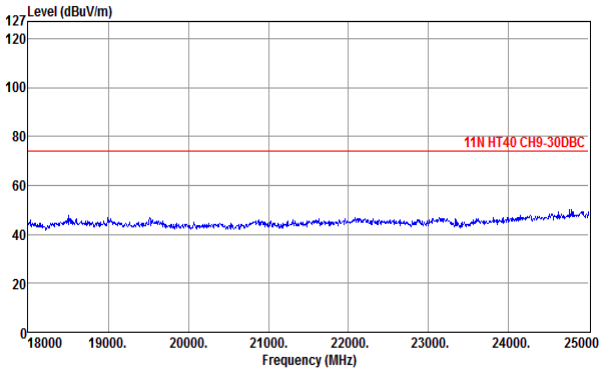
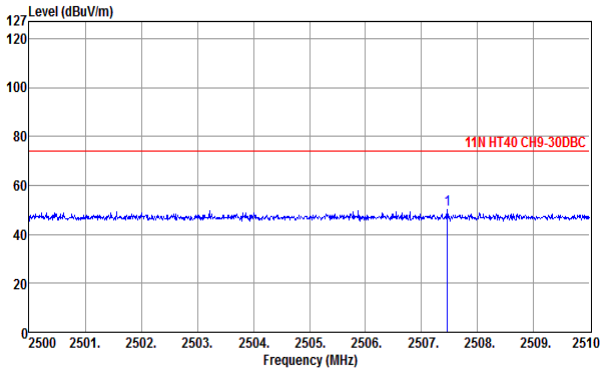
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 30dBc)
	
	
	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 30dBc)
	
	
	

HT40

Reference Level	Tx 2422MHz / 30MHz~25GHz (down 30dBc)
	
	
	

Reference Level	Tx 2437MHz / 30MHz~25GHz (down 30dBc)
	
	
	

Reference Level	Tx 2452MHz / 30MHz~25GHz (down 30dBc)
	
	
	

4 Receiver Test Results

4.1 Conducted Emissions

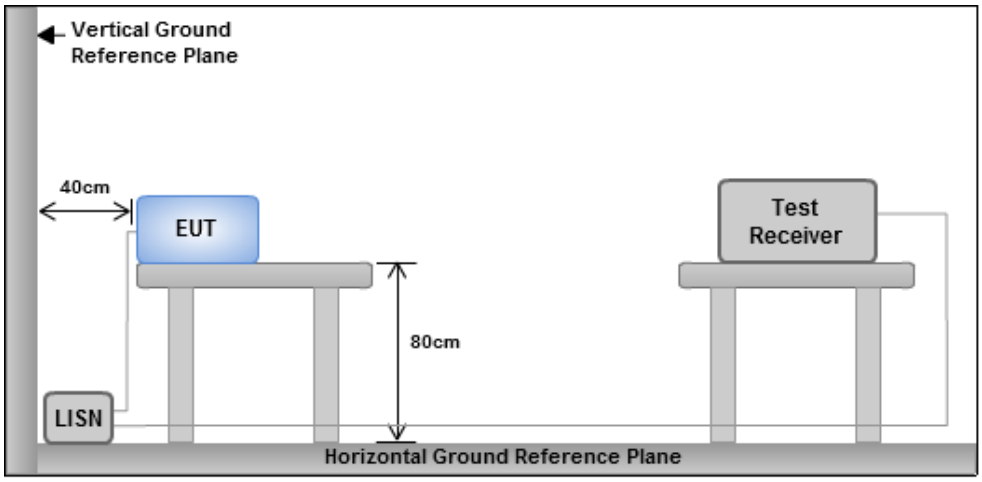
4.1.1 Limit of Conducted Emissions

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.		

4.1.2 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.

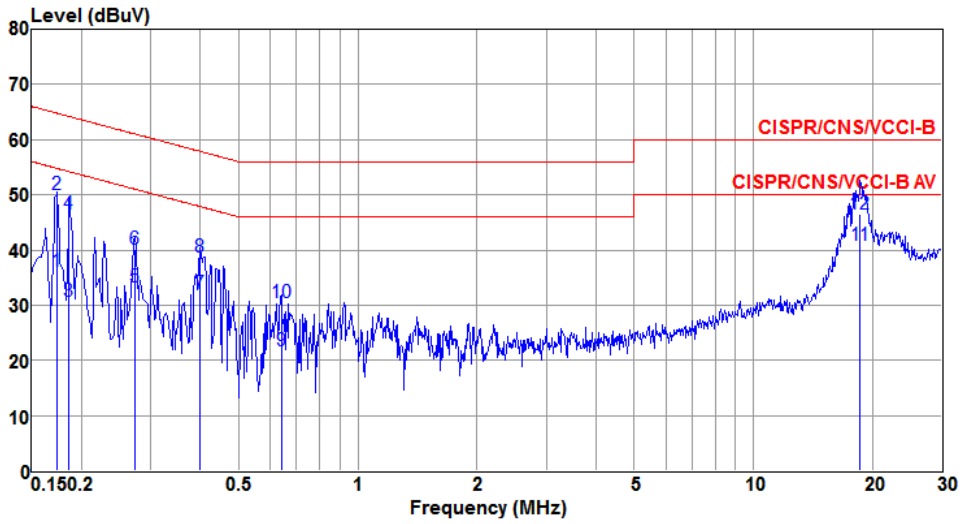
4.1.3 Test Setup



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

4.1.4 Test Result of Conducted Emissions

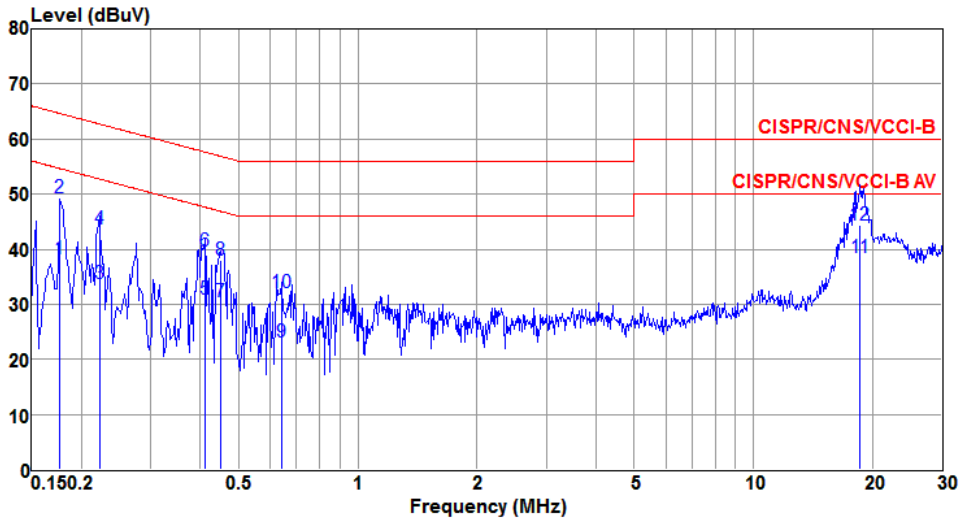
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.174	36.20	54.77	-18.57	26.45	9.73	0.02	Average
2	0.174	50.15	64.77	-14.62	40.40	9.73	0.02	QP
3	0.186	30.57	54.20	-23.63	20.81	9.73	0.03	Average
4	0.186	46.58	64.20	-17.62	36.82	9.73	0.03	QP
5	0.273	33.17	51.03	-17.86	23.41	9.73	0.03	Average
6	0.273	40.04	61.03	-20.99	30.28	9.73	0.03	QP
7	0.400	32.16	47.86	-15.70	22.41	9.73	0.02	Average
8	0.400	38.71	57.86	-19.15	28.96	9.73	0.02	QP
9	0.641	21.61	46.00	-24.39	11.85	9.73	0.03	Average
10	0.641	30.43	56.00	-25.57	20.67	9.73	0.03	QP
11@	18.622	40.79	50.00	-9.21	30.73	9.73	0.33	Average
12	18.622	46.58	60.00	-13.42	36.52	9.73	0.33	QP

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

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



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.177	38.14	54.64	-16.50	28.45	9.67	0.02	Average
2	0.177	49.36	64.64	-15.28	39.67	9.67	0.02	QP
3	0.222	33.68	52.74	-19.06	23.98	9.67	0.03	Average
4	0.222	43.62	62.74	-19.12	33.92	9.67	0.03	QP
5	0.410	31.00	47.64	-16.64	21.31	9.67	0.02	Average
6	0.410	39.64	57.64	-18.00	29.95	9.67	0.02	QP
7	0.449	30.54	46.89	-16.35	20.85	9.67	0.02	Average
8	0.449	37.98	56.89	-18.91	28.29	9.67	0.02	QP
9	0.641	23.12	46.00	-22.88	13.42	9.67	0.03	Average
10	0.641	32.18	56.00	-23.82	22.48	9.67	0.03	QP
11@	18.622	38.50	50.00	-11.50	28.35	9.82	0.33	Average
12	18.622	44.37	60.00	-15.63	34.22	9.82	0.33	QP

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

4.2 Radiated Emissions

4.2.1 Limit of Radiated Emissions

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.

4.2.2 Test Procedures

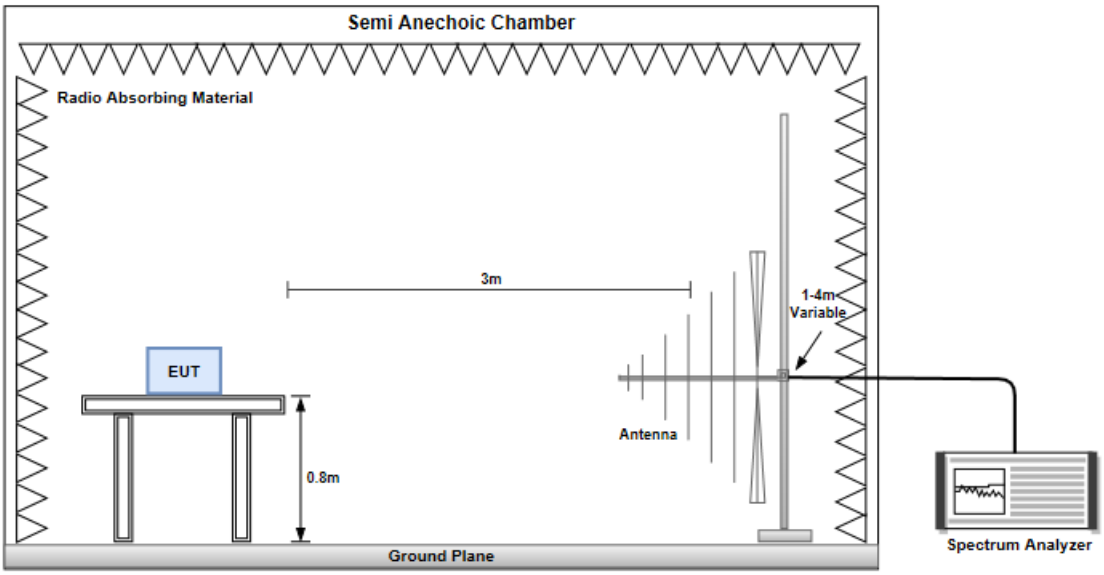
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

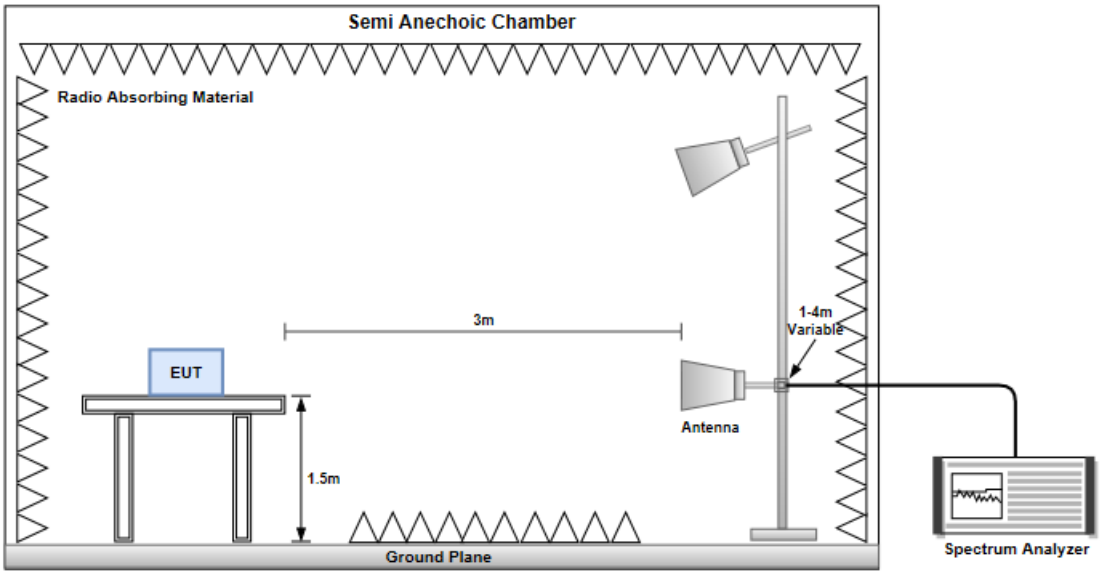
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=3MHz and RMS detector is for average measured value of radiated emission above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

4.2.3 Test Setup

Radiated Emissions below 1 GHz

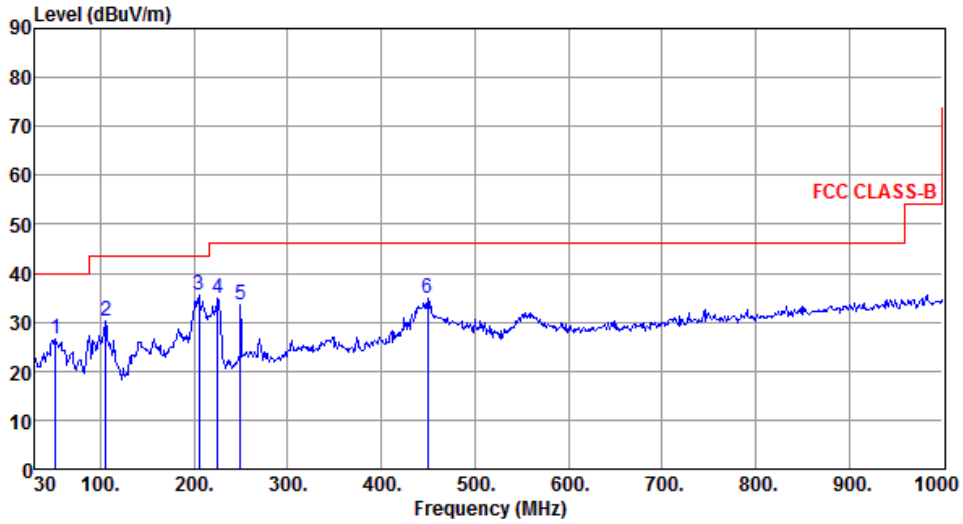


Radiated Emissions above 1 GHz



4.2.4 Receiver Emissions (Below 1GHz)

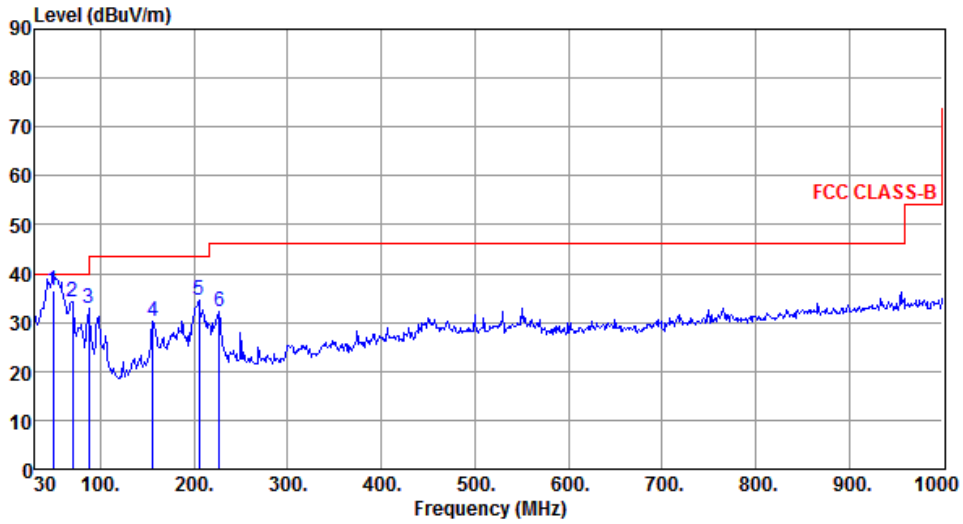
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	52.31	26.42	40.00	-13.58	34.57	-8.15	Peak	---	---
2	105.66	30.31	43.50	-13.19	42.70	-12.39	Peak	---	---
3	205.57	35.66	43.50	-7.84	46.53	-10.87	Peak	---	---
4	224.97	34.71	46.00	-11.29	45.19	-10.48	Peak	---	---
5	249.22	33.51	46.00	-12.49	42.70	-9.19	Peak	---	---
6	450.01	34.89	46.00	-11.11	38.70	-3.81	Peak	---	---

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

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

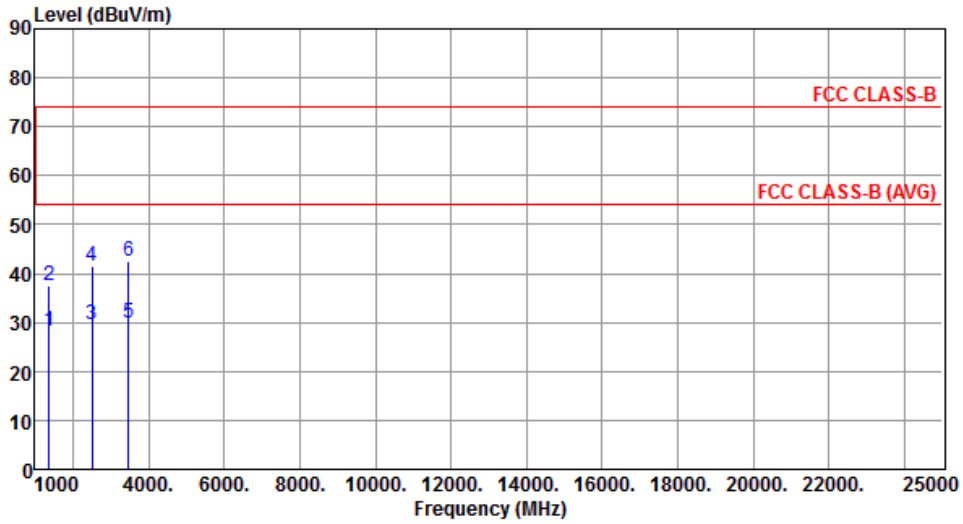


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	49.40	36.57	40.00	-3.43	44.56	-7.99	QP	100	15
2	69.77	34.30	40.00	-5.70	44.81	-10.51	Peak	---	---
3	87.23	32.82	40.00	-7.18	46.80	-13.98	Peak	---	---
4	156.10	30.33	43.50	-13.17	38.43	-8.10	Peak	---	---
5	205.57	34.38	43.50	-9.12	45.25	-10.87	Peak	---	---
6	226.91	32.22	46.00	-13.78	42.56	-10.34	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.

4.2.5 Receiver Emissions (Above 1GHz)

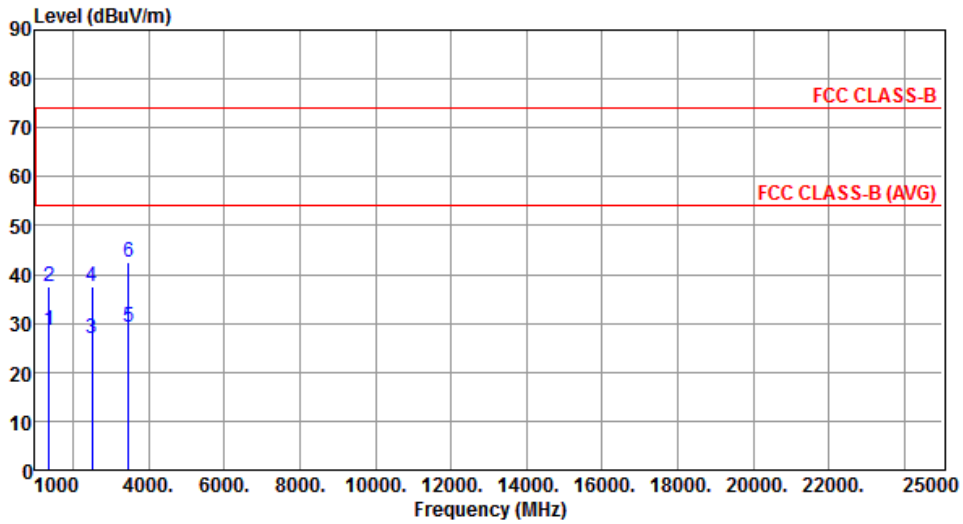
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1375.00	28.32	54.00	-25.68	33.97	-5.65	Average	120	216
2	1375.00	37.59	74.00	-36.41	43.24	-5.65	Peak	120	216
3	2500.00	29.72	54.00	-24.28	30.52	-0.80	Average	100	185
4	2500.00	41.49	74.00	-32.51	42.29	-0.80	Peak	100	185
5	3480.00	29.92	54.00	-24.08	28.37	1.55	Average	100	134
6	3480.00	42.60	74.00	-31.40	41.05	1.55	Peak	100	134

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	1375.00	28.57	54.00	-25.43	34.22	-5.65	Average	150	174
2	1375.00	37.42	74.00	-36.58	43.07	-5.65	Peak	150	174
3	2500.00	26.80	54.00	-27.20	27.60	-0.80	Average	100	186
4	2500.00	37.69	74.00	-36.31	38.49	-0.80	Peak	100	186
5	3480.00	29.08	54.00	-24.92	27.53	1.55	Average	100	175
6	3480.00	42.57	74.00	-31.43	41.02	1.55	Peak	100	175

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).

5 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

═END═