FCC Test Report

FCC ID	:	**RYK-WPEQ256ACNI**
Equipment	:	**802.11ac/b/g/n Mini PCIe Module**
Model No.	:	**WPEQ-256ACNI**
Brand Name	:	**SparkLAN**
Applicant	:	**SparkLAN Communications, Inc.**
Address	:	**8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan.**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Nov. 20, 2015**
Tested Date	:	**Nov. 27, 2015 ~ Jan. 15, 2016**

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.

Approved & Reviewed by:

Gary Chang / Manager

Testing Laboratory
2732

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Release Record

Report No.	Version	Description	Issued Date
FR610401AC	Rev. 01	Initial issue	Mar. 15, 2016
FR610401AC	Rev. 02	Revised model name of antenna (page 5.)	Mar. 25, 2016

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.150MHz 50.77 (Margin -15.23dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz 53.66 (Margin -0.34dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 26.68	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	**IEEE Std. 802.11**	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**Data Rate / MCS**
2400-2483.5	b	2412-2462	1-11 [11]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15
Note 1: RF output power specifies that Maximum Peak Conducted Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Antenna Gain (dBi)		
					2400~2483.5MHz	5150~5250MHz	5725~5850MHz
1	Long Cheng Tech. Int'l Co., Ltd.	DB B-SMA THIN PADDLE Ant. GEC6200	Dipole	RP-SMA	3	5	5
2	Wanshih Electronic Co., Ltd.	WSS003	Dipole	RP-SMA	2	2	2
3	Long Cheng Tech. Int'l Co., Ltd.	FDBX_F41150-I3B	Dipole	IPEX	2	2.5	2.5

Note: Antenna 1 with highest gain was chosen for final test

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host

1.1.4 Accessories

N/A

1.1.5 Channel List

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

1.1.6 Test Tool and Duty Cycle

Test Tool	ART2-GUI, V2.3		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	100.00%	0.00
	11g	98.03%	0.09
	HT20	100.00%	0.00
	HT40	100.00%	0.00

1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	23
11b	2437	19
11b	2462	18.5
11g	2412	16.5
11g	2437	22.5
11g	2462	15.5
HT20	2412	15
HT20	2437	21.5
HT20	2462	15
HT40	2422	13
HT40	2437	16.5
HT40	2452	14

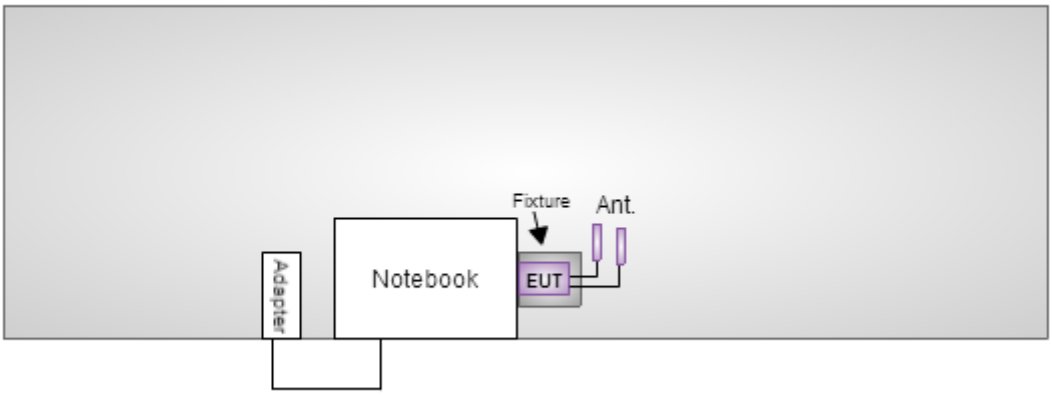
1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6430	DoC	---
2	Fixture	---	---	---	---

Note: Fixture was provided by applicant.

1.3 Test Setup Chart

Test Setup Diagram



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Jan.14, 2016				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
EMC Receiver	R&S	ESCS 30	100169	Oct. 21, 2015	Oct. 20, 2016
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2015	Nov. 12, 2016
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 26, 2015	Nov. 25, 2016
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 21, 2015	Dec. 20, 2016
50 ohm terminal (Support Unit)	NA	50	04	Apr. 15, 2015	Apr. 14, 2016
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 2 / (03CH02-WS)				
Tested Date	Nov. 27 ~ Dec. 08, 2015				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101499	Dec. 31, 2014	Dec. 30, 2015
Receiver	R&S	ESR3	101657	Jan. 15, 2015	Jan. 14, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-523	Nov. 09, 2015	Nov. 08, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Oct. 07, 2015	Oct. 06, 2016
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 04, 2015	Nov. 03, 2016
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 16, 2015	Nov. 15, 2016
Preamplifier	Burgeon	BPA-530	100218	Nov. 03, 2015	Nov. 02, 2016
Preamplifier	Agilent	83017A	MY39501309	Sep. 22, 2015	Sep. 21, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 16, 2014	Dec. 15, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 16, 2014	Dec. 15, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 16, 2014	Dec. 15, 2015
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 16, 2014	Dec. 15, 2015
LF cable 10M	EMCC	CFD400-E	CFD400-001	Jun. 17, 2015	Jun. 16, 2016
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Jan. 15, 2016				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 14, 2015	Sep. 13, 2016
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 27, 2015	Nov. 26, 2016
Power Meter	Anritsu	ML2495A	1241002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor	Anritsu	MA2411B	1207366	Sep. 21, 2015	Sep. 20, 2016
Signal Generator	R&S	SMB100A	175727	Oct. 05, 2015	Oct. 04, 2016
DC POWER SOURCE	GW INSTEK	GPC-3060D	EM884797	Oct. 20, 2015	Oct. 19, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

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

47 CFR FCC Part 15.247
ANSI C63.10-2013
FCC KDB 558074 D01 DTS Meas Guidance v03r04
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	±3.87 dB
Radiated emission > 1GHz	±5.60 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	17°C / 61%	Sky Huang
Radiated Emissions	03CH02-WS	21°C / 60-61%	Warren Lee Vincent Yeh Anderson Hung
RF Conducted	TH01-WS	21°C / 64%	Alex Huang

- FCC site registration No.: 657002
- IC site registration No.: 10807A-2

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	HT20	2437	MCS 0	---
Radiated Emissions ≤1GHz	HT20	2437	MCS 0	---
Radiated Emissions >1GHz Maximum Output Power 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	---

3 Transmitter Test Results

3.1 Conducted Emissions

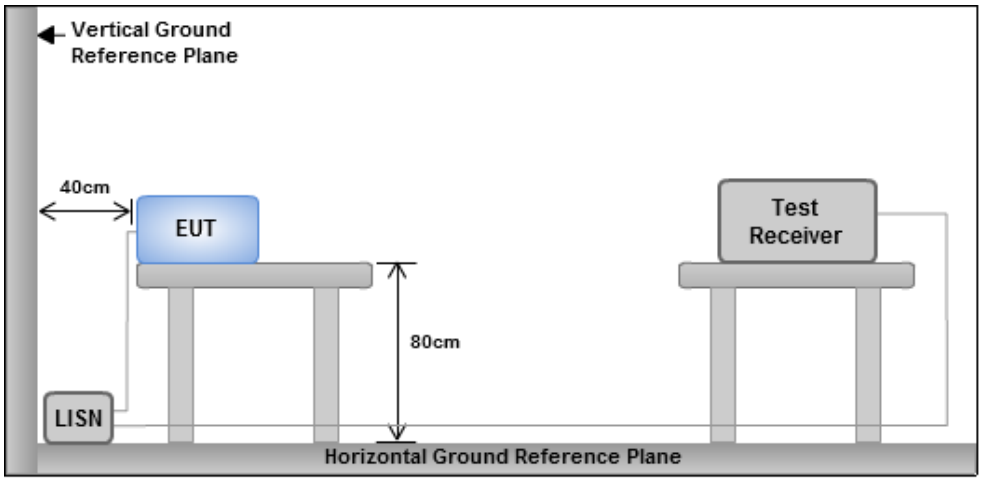
3.1.1 Limit of Conducted Emissions

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

3.1.2 Test Procedures

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

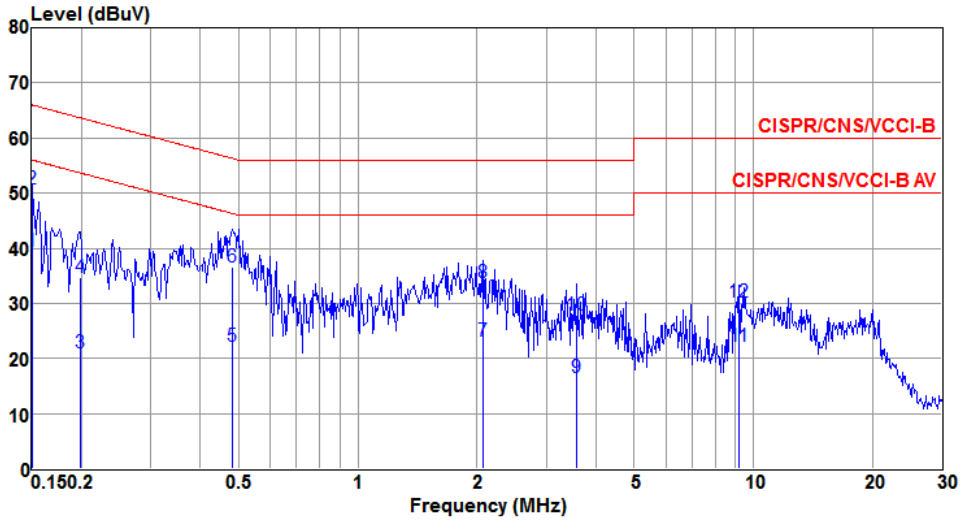
3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

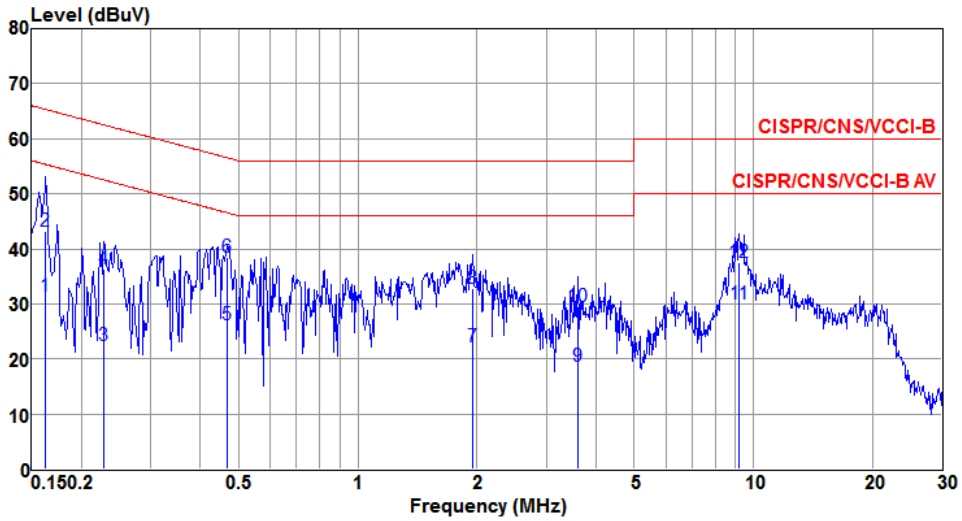
Modulation	HT20	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.150	39.41	56.00	-16.59	39.28	0.11	0.02	Average
2@	0.150	50.77	66.00	-15.23	50.64	0.11	0.02	QP
3	0.199	21.07	53.67	-32.60	20.94	0.11	0.02	Average
4	0.199	34.76	63.67	-28.91	34.63	0.11	0.02	QP
5	0.481	22.16	46.32	-24.16	21.99	0.13	0.04	Average
6	0.481	36.51	56.32	-19.81	36.34	0.13	0.04	QP
7	2.077	23.07	46.00	-22.93	22.83	0.16	0.08	Average
8	2.077	33.85	56.00	-22.15	33.61	0.16	0.08	QP
9	3.565	16.44	46.00	-29.56	16.15	0.18	0.11	Average
10	3.565	27.88	56.00	-28.12	27.59	0.18	0.11	QP
11	9.204	22.19	50.00	-27.81	21.79	0.24	0.16	Average
12	9.204	30.24	60.00	-29.76	29.84	0.24	0.16	QP

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

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



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.162	31.43	55.34	-23.91	31.29	0.12	0.02	Average
2	0.162	43.10	65.34	-22.24	42.96	0.12	0.02	QP
3	0.228	22.42	52.52	-30.10	22.29	0.11	0.02	Average
4	0.228	36.26	62.52	-26.26	36.13	0.11	0.02	QP
5	0.469	26.28	46.54	-20.26	26.10	0.14	0.04	Average
6@	0.469	38.48	56.54	-18.06	38.30	0.14	0.04	QP
7	1.949	22.19	46.00	-23.81	21.94	0.17	0.08	Average
8	1.949	32.86	56.00	-23.14	32.61	0.17	0.08	QP
9	3.603	18.61	46.00	-27.39	18.33	0.17	0.11	Average
10	3.603	29.47	56.00	-26.53	29.19	0.17	0.11	QP
11	9.204	30.06	50.00	-19.94	29.64	0.26	0.16	Average
12	9.204	37.51	60.00	-22.49	37.09	0.26	0.16	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

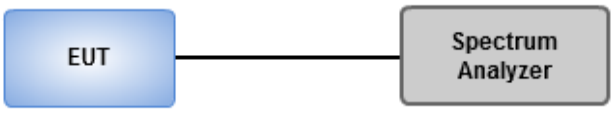
6dB Bandwidth

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 MHz, Video bandwidth = 3 MHz.
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.

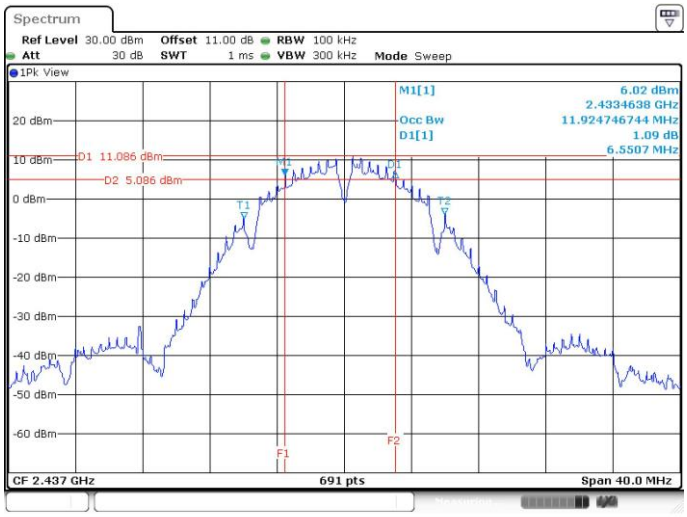
3.2.3 Test Setup



3.2.4 Test Result of 6dB and Occupied Bandwidth

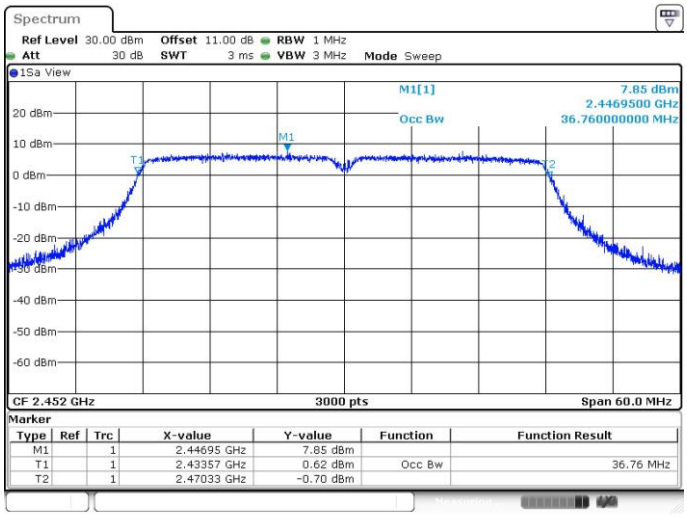
Modulation Mode	N_{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	2	2412	7.07	7.07	---	---	500
11b	2	2437	6.61	6.55	---	---	500
11b	2	2462	7.07	7.07	---	---	500
11g	2	2412	16.52	16.35	---	---	500
11g	2	2437	16.46	16.35	---	---	500
11g	2	2462	16.35	16.35	---	---	500
HT20	2	2412	17.57	17.57	---	---	500
HT20	2	2437	17.62	17.62	---	---	500
HT20	2	2462	17.62	17.62	---	---	500
HT40	2	2422	36.17	36.41	---	---	500
HT40	2	2437	36.06	35.48	---	---	500
HT40	2	2452	36.06	36.29	---	---	500

Worst Plot



Modulation Mode	N_{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	2	2412	13.44	13.75	---	---
11b	2	2437	11.90	11.90	---	---
11b	2	2462	11.84	11.87	---	---
11g	2	2412	16.71	16.60	---	---
11g	2	2437	20.39	20.57	---	---
11g	2	2462	16.69	16.58	---	---
HT20	2	2412	17.78	17.74	---	---
HT20	2	2437	18.99	18.80	---	---
HT20	2	2462	17.79	17.74	---	---
HT40	2	2422	36.68	36.68	---	---
HT40	2	2437	36.64	36.56	---	---
HT40	2	2452	36.64	36.76	---	---

Worst Plot



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

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

☐ Antenna gain > 6dBi

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

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

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

3.3.2 Test Procedures

☒ Maximum Peak Conducted Output Power

☐ **Spectrum analyzer**

1. Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.
2. Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.
3. Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.

☒ **Power meter**

1. A broadband Peak 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.

☒ Maximum Conducted Output Power (For reference only)

☒ **Power meter**

1. A broadband Average 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

Modulation Mode	N_{TX}	Freq. (MHz)	Peak conducted Output Power (dBm)							Ant. Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3	Total Power (mW)	Total Power (dBm)	Limit (dBm)			
11b	2	2412	23.38	23.13	---	---	423.360	26.27	30.00	3.00	29.27	36.00
11b	2	2437	21.75	21.49	---	---	290.552	24.63	30.00	3.00	27.63	36.00
11b	2	2462	21.41	21.09	---	---	266.885	24.26	30.00	3.00	27.26	36.00
11g	2	2412	21.92	21.79	---	---	306.605	24.87	30.00	3.00	27.87	36.00
11g	2	2437	20.81	20.61	---	---	235.584	23.72	30.00	3.00	26.72	36.00
11g	2	2462	15.46	15.13	---	---	67.740	18.31	30.00	3.00	21.31	36.00
HT20	2	2412	20.67	20.72	---	---	234.713	23.71	30.00	3.00	26.71	36.00
HT20	2	2437	23.78	23.55	---	---	465.246	**26.68**	30.00	3.00	29.68	36.00
HT20	2	2462	20.92	20.63	---	---	239.206	23.79	30.00	3.00	26.79	36.00
HT40	2	2422	18.38	18.31	---	---	136.629	21.36	30.00	3.00	24.36	36.00
HT40	2	2437	21.63	21.62	---	---	290.757	24.64	30.00	3.00	27.64	36.00
HT40	2	2452	19.31	19.29	---	---	170.228	22.31	30.00	3.00	25.31	36.00

Modulation Mode	N_{TX}	Freq. (MHz)	Conducted (Average) Output Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11b	2	2412	21.13	20.98	---	---	255.032	**24.07**	---
11b	2	2437	19.11	18.63	---	---	154.416	21.89	---
11b	2	2462	18.47	18.19	---	---	136.225	21.34	---
11g	2	2412	16.22	16.14	---	---	82.994	19.19	---
11g	2	2437	20.81	20.61	---	---	235.584	23.72	---
11g	2	2462	15.46	15.13	---	---	67.740	18.31	---
HT20	2	2412	14.62	14.82	---	---	59.312	17.73	---
HT20	2	2437	20.35	20.15	---	---	211.907	23.26	---
HT20	2	2462	14.78	14.71	---	---	59.641	17.76	---
HT40	2	2422	12.13	12.16	---	---	32.774	15.16	---
HT40	2	2437	15.82	15.47	---	---	73.432	18.66	---
HT40	2	2452	13.17	13.08	---	---	41.073	16.14	---

Note: Conducted average output power is for reference only.

3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

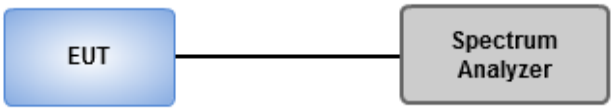
☒ Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.

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

☐ Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.

1. Set the RBW = 100kHz, VBW = 300 kHz.
2. Detector = RMS, Sweep time = auto couple.
3. Set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
4. Perform the measurement over a single sweep.
5. Use the peak marker function to determine the maximum amplitude level.

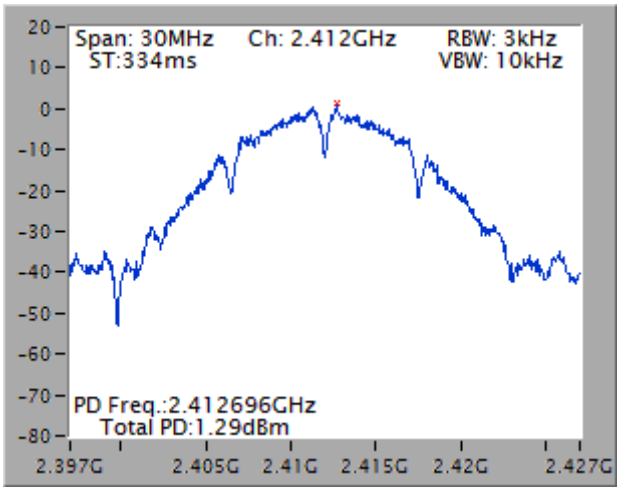
3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

Modulation Mode	N_{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	2	2412	1.29	8.00
11b	2	2437	-0.12	8.00
11b	2	2462	-0.42	8.00
11g	2	2412	-6.18	8.00
11g	2	2437	-2.21	8.00
11g	2	2462	-7.54	8.00
HT20	2	2412	-7.97	8.00
HT20	2	2437	-2.23	8.00
HT20	2	2462	-8.33	8.00
HT40	2	2422	-13.43	8.00
HT40	2	2437	-9.50	8.00
HT40	2	2452	-12.93	8.00

Note: Test result is bin-by-bin summing measured value of each TX port.

Worst Plots


3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

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

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

3.5.2 Test Procedures

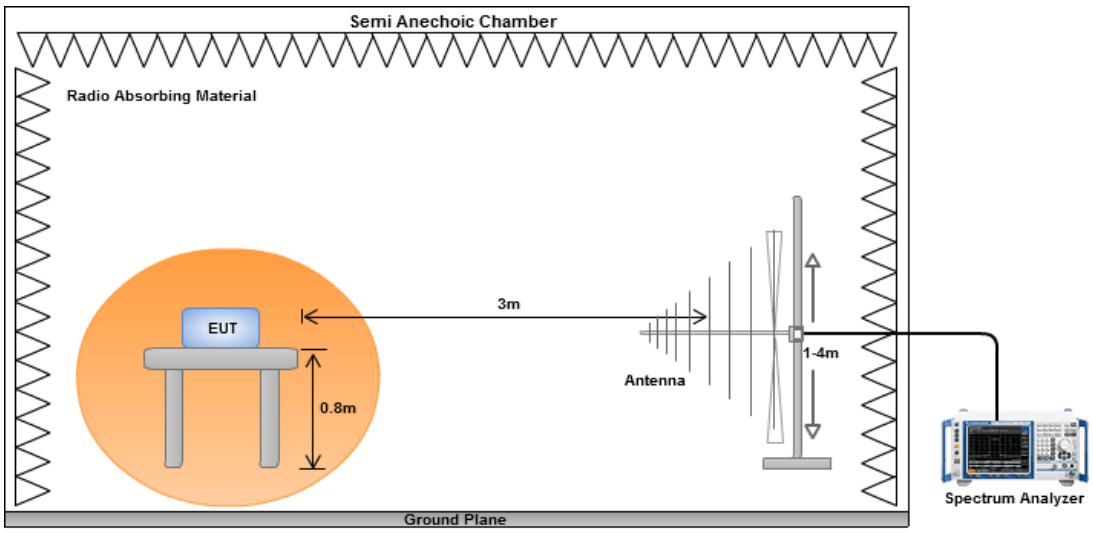
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

Note:

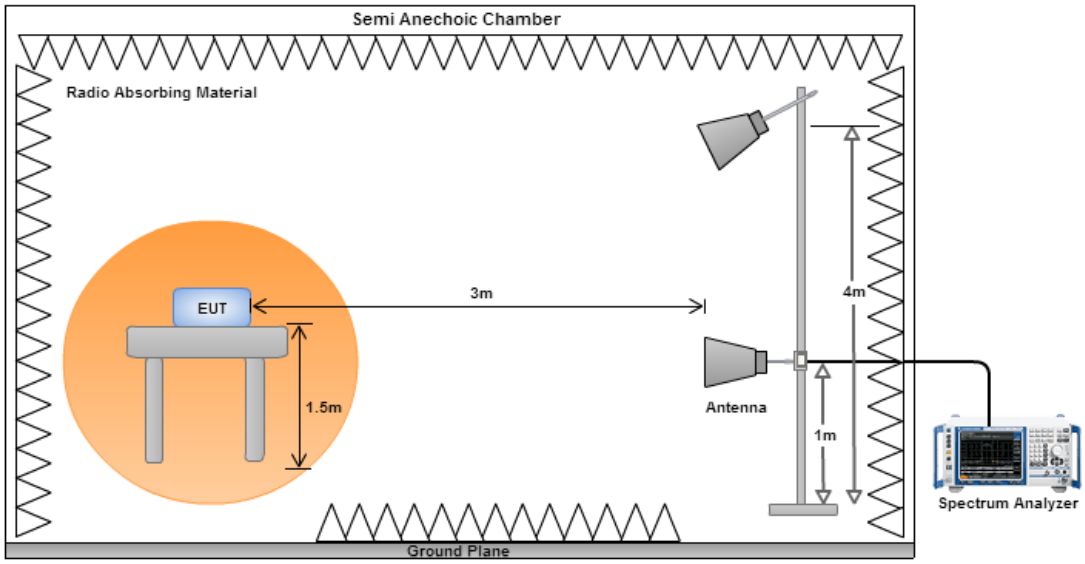
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

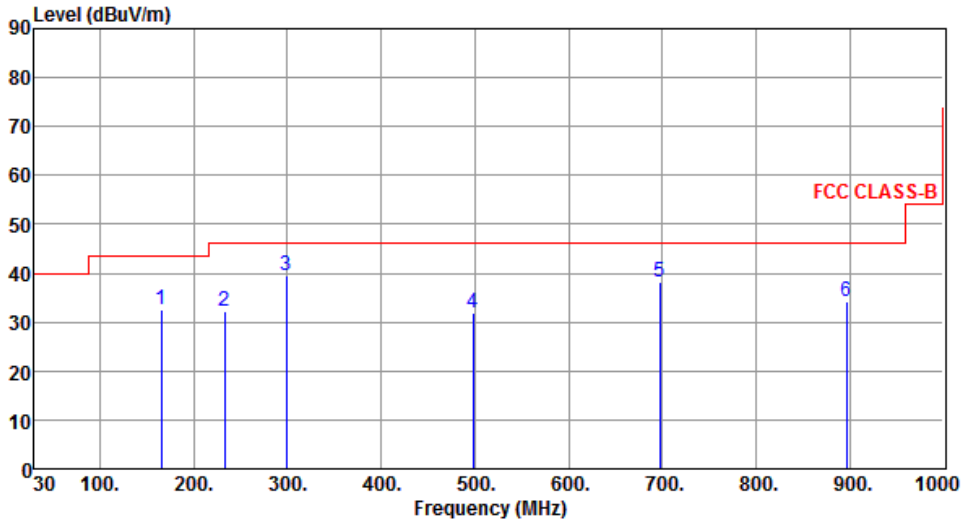


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

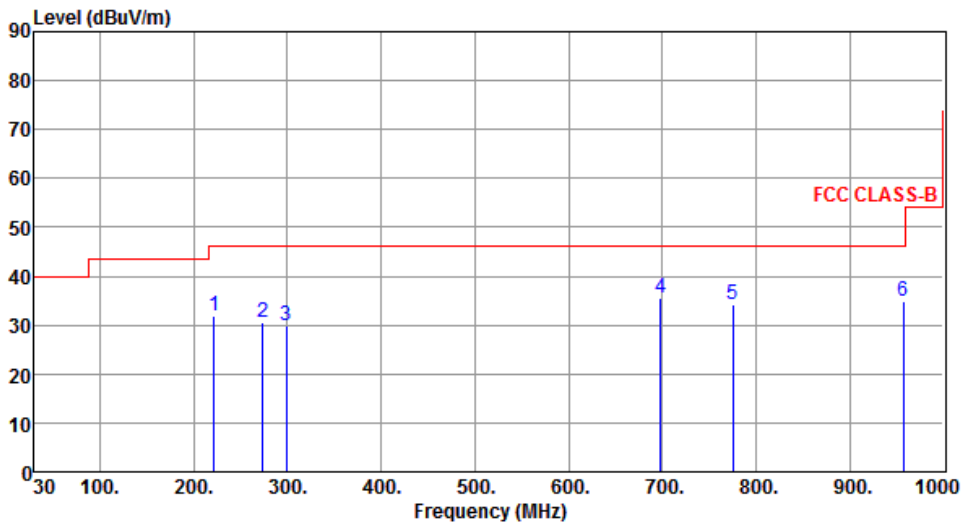
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	165.80	32.47	43.50	-11.03	44.32	-11.85	Peak	---	---
2	232.73	32.13	46.00	-13.87	45.74	-13.61	Peak	---	---
3	298.69	39.40	46.00	-6.60	50.54	-11.14	Peak	---	---
4	498.51	31.87	46.00	-14.13	38.41	-6.54	Peak	---	---
5	697.36	38.32	46.00	-7.68	41.57	-3.25	Peak	---	---
6	896.21	34.07	46.00	-11.93	34.70	-0.63	Peak	---	---

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

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		

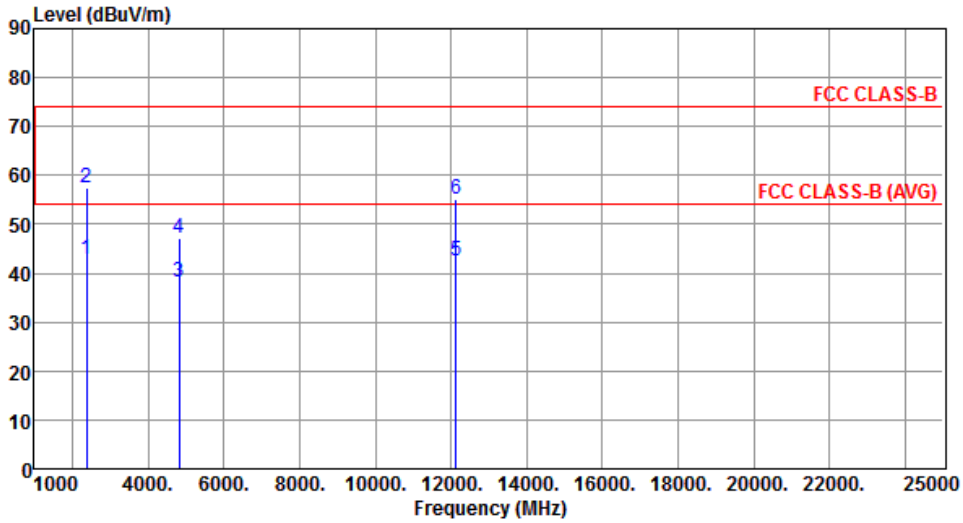


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	222.06	31.82	46.00	-14.18	46.02	-14.20	Peak	---	---
2	273.47	30.41	46.00	-15.59	42.26	-11.85	Peak	---	---
3	298.69	29.87	46.00	-16.13	41.01	-11.14	Peak	---	---
4	698.33	35.70	46.00	-10.30	38.92	-3.22	Peak	---	---
5	774.96	34.06	46.00	-11.94	36.19	-2.13	Peak	---	---
6	957.32	34.92	46.00	-11.08	34.78	0.14	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

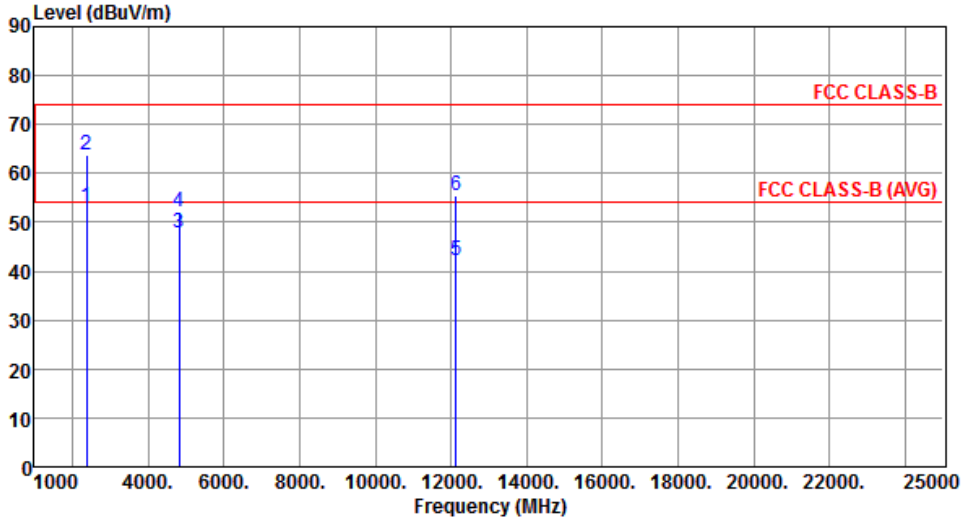
Modulation	11b	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	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	42.68	54.00	-11.32	45.38	-2.70	Average	173	0
2	2390.00	57.36	74.00	-16.64	60.06	-2.70	Peak	173	0
3	4824.00	38.25	54.00	-15.75	33.28	4.97	Average	100	356
4	4824.00	47.22	74.00	-26.78	42.25	4.97	Peak	100	356
5	12135.00	42.46	54.00	-11.54	27.26	15.20	Average	188	241
6	12135.00	55.14	74.00	-18.86	39.94	15.20	Peak	188	241

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

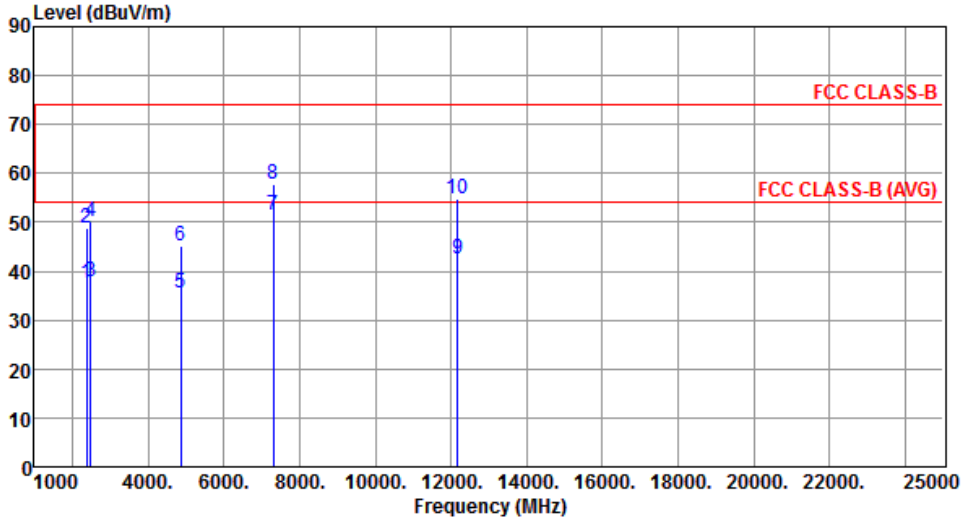
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.10	54.00	-0.90	55.80	-2.70	Average	100	349
2	2390.00	63.60	74.00	-10.40	66.30	-2.70	Peak	100	349
3	4824.00	47.92	54.00	-6.08	42.95	4.97	Average	100	347
4	4824.00	52.03	74.00	-21.97	47.06	4.97	Peak	100	347
5	12135.00	42.15	54.00	-11.85	26.95	15.20	Average	177	267
6	12135.00	55.46	74.00	-18.54	40.26	15.20	Peak	177	267

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

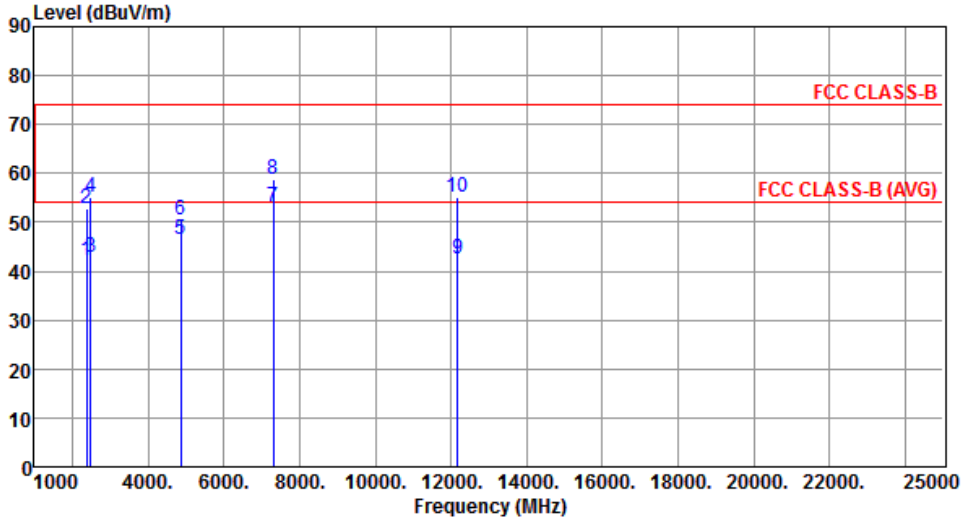
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	37.36	54.00	-16.64	40.06	-2.70	Average	294	27
2	2390.00	48.86	74.00	-25.14	51.56	-2.70	Peak	294	27
3	2483.50	37.79	54.00	-16.21	40.16	-2.37	Average	294	27
4	2483.50	50.01	74.00	-23.99	52.38	-2.37	Peak	294	27
5	4874.00	35.58	54.00	-18.42	30.50	5.08	Average	100	282
6	4874.00	45.04	74.00	-28.96	39.96	5.08	Peak	100	282
7	7311.00	51.44	54.00	-2.56	41.55	9.89	Average	265	342
8	7311.00	57.77	74.00	-16.23	47.88	9.89	Peak	265	342
9	12185.00	42.45	54.00	-11.55	27.28	15.17	Average	294	27
10	12185.00	54.80	74.00	-19.20	39.63	15.17	Peak	294	27

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

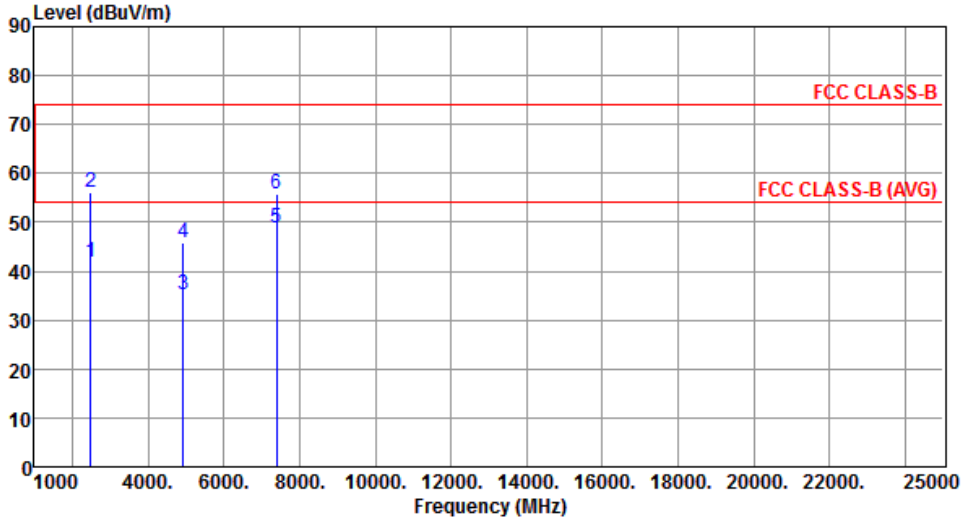
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.06	54.00	-11.94	44.76	-2.70	Average	192	218
2	2390.00	52.74	74.00	-21.26	55.44	-2.70	Peak	192	218
3	2483.50	42.70	54.00	-11.30	45.07	-2.37	Average	192	218
4	2483.50	55.17	74.00	-18.83	57.54	-2.37	Peak	192	218
5	4874.00	46.64	54.00	-7.36	41.56	5.08	Average	100	350
6	4874.00	50.43	74.00	-23.57	45.35	5.08	Peak	100	350
7	7311.00	53.03	54.00	-0.97	43.14	9.89	Average	100	158
8	7311.00	58.82	74.00	-15.18	48.93	9.89	Peak	100	158
9	12185.00	42.38	54.00	-11.62	27.21	15.17	Average	175	264
10	12185.00	55.00	74.00	-19.00	39.83	15.17	Peak	175	264

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

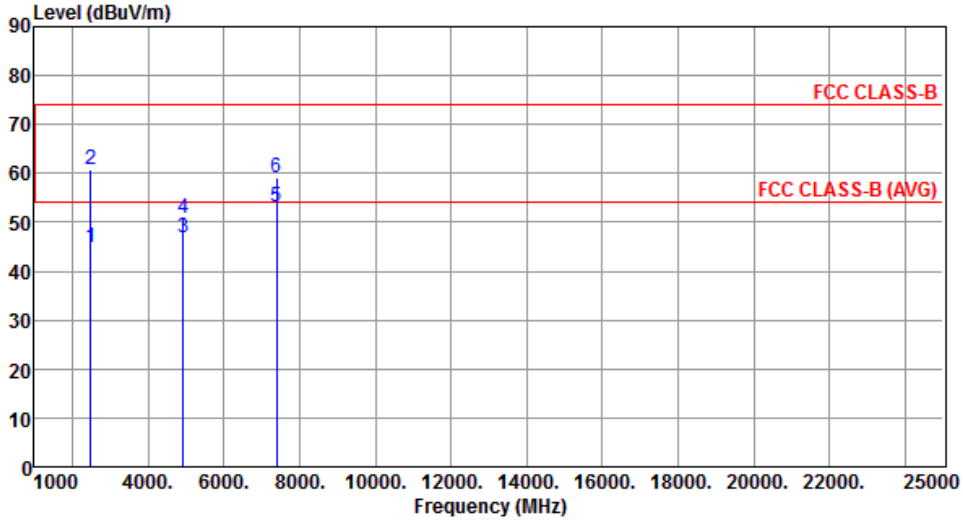
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	41.81	54.00	-12.19	44.18	-2.37	Average	100	187
2	2483.50	55.99	74.00	-18.01	58.36	-2.37	Peak	100	187
3	4924.00	35.23	54.00	-18.77	30.03	5.20	Average	268	0
4	4924.00	45.96	74.00	-28.04	40.76	5.20	Peak	268	0
5	7386.00	48.73	54.00	-5.27	38.67	10.06	Average	286	5
6	7386.00	55.90	74.00	-18.10	45.84	10.06	Peak	286	5

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

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

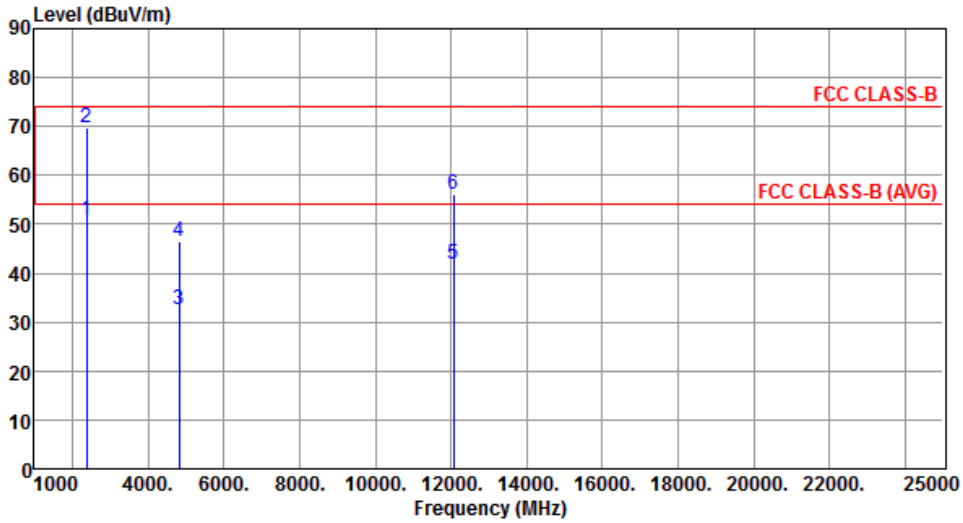


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	44.92	54.00	-9.08	47.29	-2.37	Average	100	89
2	2483.50	60.90	74.00	-13.10	63.27	-2.37	Peak	100	89
3	4924.00	46.88	54.00	-7.12	41.68	5.20	Average	100	351
4	4924.00	50.78	74.00	-23.22	45.58	5.20	Peak	248	350
5	7386.00	52.97	54.00	-1.03	42.91	10.06	Average	286	20
6	7386.00	59.21	74.00	-14.79	49.15	10.06	Peak	286	20

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

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

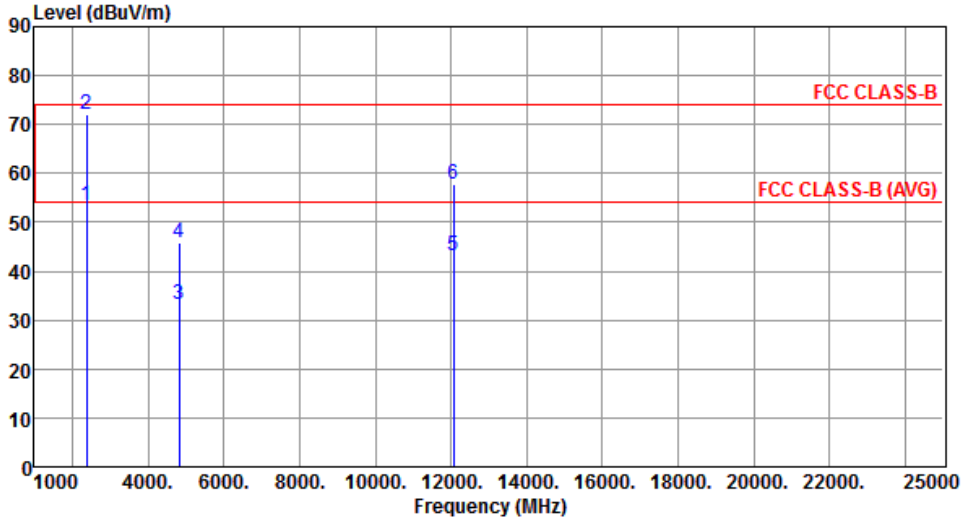
Modulation	11g	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.73	54.00	-3.27	53.43	-2.70	Average	118	5
2	2390.00	69.80	74.00	-4.20	72.50	-2.70	Peak	118	5
3	4824.00	32.62	54.00	-21.38	27.65	4.97	Average	117	20
4	4824.00	46.53	74.00	-27.47	41.56	4.97	Peak	117	20
5	12060.00	41.99	54.00	-12.01	26.77	15.22	Average	120	267
6	12060.00	56.18	74.00	-17.82	40.96	15.22	Peak	120	267

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

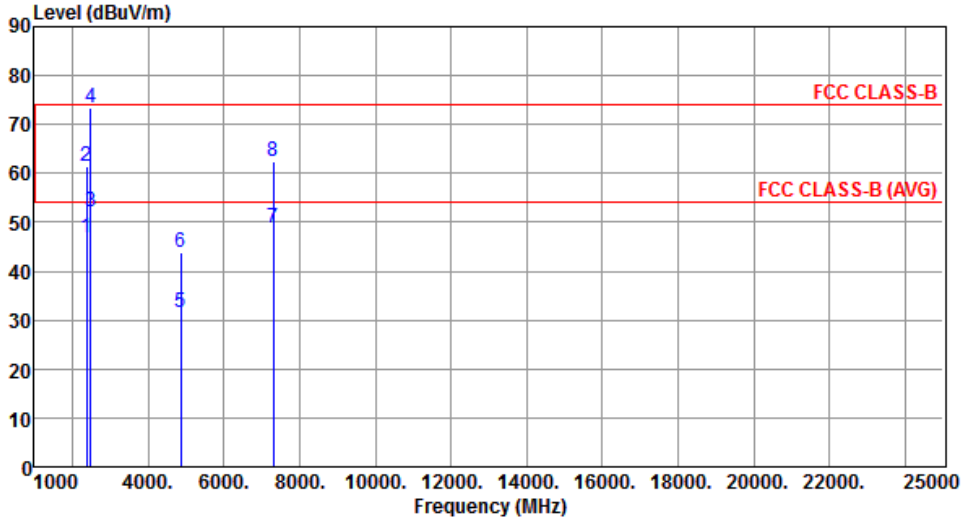
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.49	54.00	-0.51	56.19	-2.70	Average	337	68
2	2390.00	71.96	74.00	-2.04	74.66	-2.70	Peak	337	68
3	4824.00	33.36	54.00	-20.64	28.39	4.97	Average	150	144
4	4824.00	45.93	74.00	-28.07	40.96	4.97	Peak	150	144
5	12060.00	43.22	54.00	-10.78	28.00	15.22	Average	105	344
6	12060.00	57.90	74.00	-16.10	42.68	15.22	Peak	105	344

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

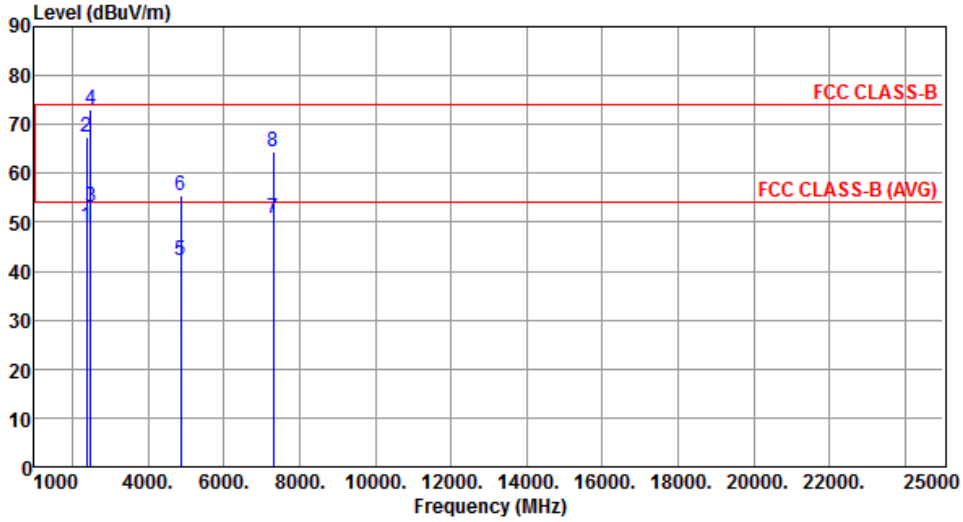
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.67	54.00	-7.33	49.37	-2.70	Average	224	14
2	2390.00	61.41	74.00	-12.59	64.11	-2.70	Peak	224	14
3	2483.50	52.01	54.00	-1.99	54.38	-2.37	Average	109	15
4	2483.50	73.25	74.00	-0.75	75.62	-2.37	Peak	109	15
5	4874.00	31.70	54.00	-22.30	26.62	5.08	Average	100	20
6	4874.00	43.93	74.00	-30.07	38.85	5.08	Peak	100	20
7	7311.00	48.77	54.00	-5.23	38.88	9.89	Average	100	19
8	7311.00	62.32	74.00	-11.68	52.43	9.89	Peak	100	19

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

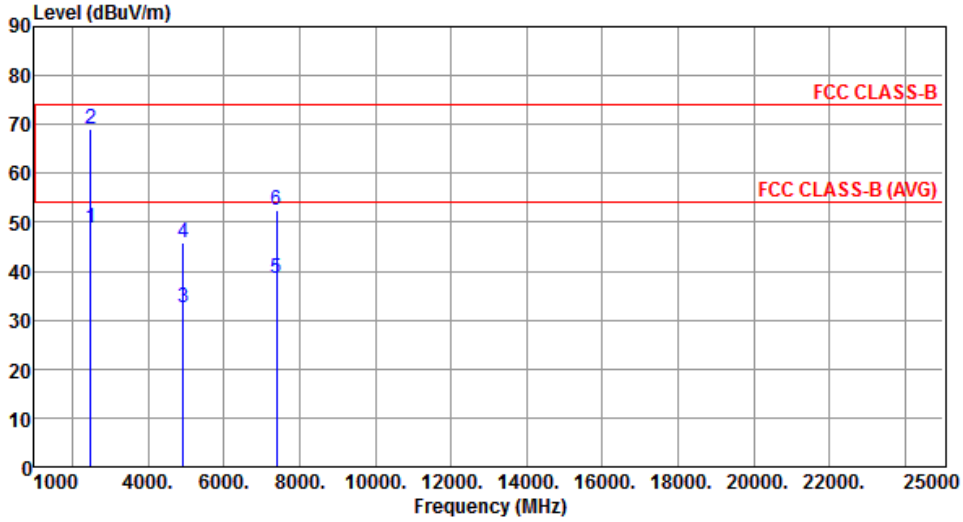
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	49.11	54.00	-4.89	51.81	-2.70	Average	100	206
2	2390.00	67.31	74.00	-6.69	70.01	-2.70	Peak	100	206
3	2483.50	53.24	54.00	-0.76	55.61	-2.37	Average	100	206
4	2483.50	73.15	74.00	-0.85	75.52	-2.37	Peak	100	206
5	4874.00	42.15	54.00	-11.85	37.07	5.08	Average	100	10
6	4874.00	55.33	74.00	-18.67	50.25	5.08	Peak	100	10
7	7311.00	50.69	54.00	-3.31	40.80	9.89	Average	100	156
8	7311.00	64.32	74.00	-9.68	54.43	9.89	Peak	100	156

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

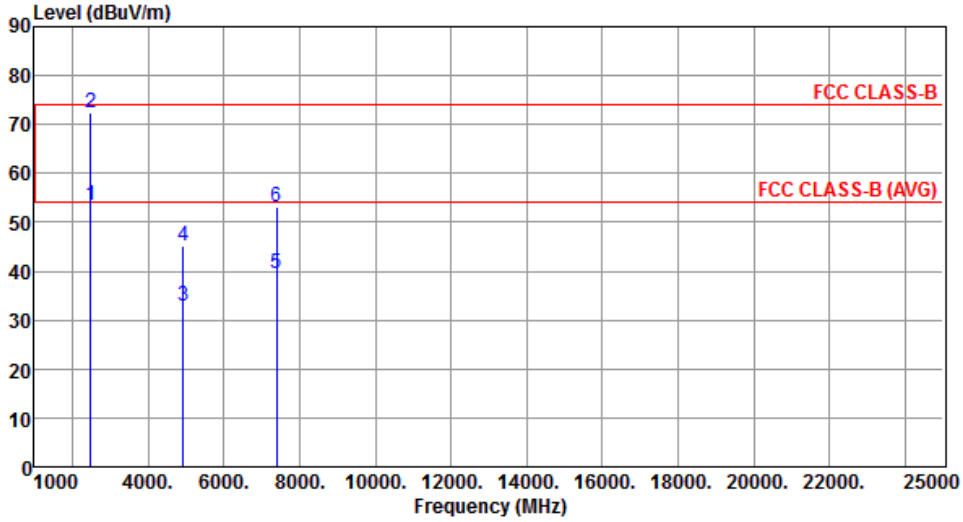
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	48.84	54.00	-5.16	51.21	-2.37	Average	108	6
2	2483.50	69.10	74.00	-4.90	71.47	-2.37	Peak	108	6
3	4924.00	32.50	54.00	-21.50	27.30	5.20	Average	100	144
4	4924.00	45.69	74.00	-28.31	40.49	5.20	Peak	100	144
5	7386.00	38.47	54.00	-15.53	28.41	10.06	Average	267	235
6	7386.00	52.62	74.00	-21.38	42.56	10.06	Peak	267	235

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

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

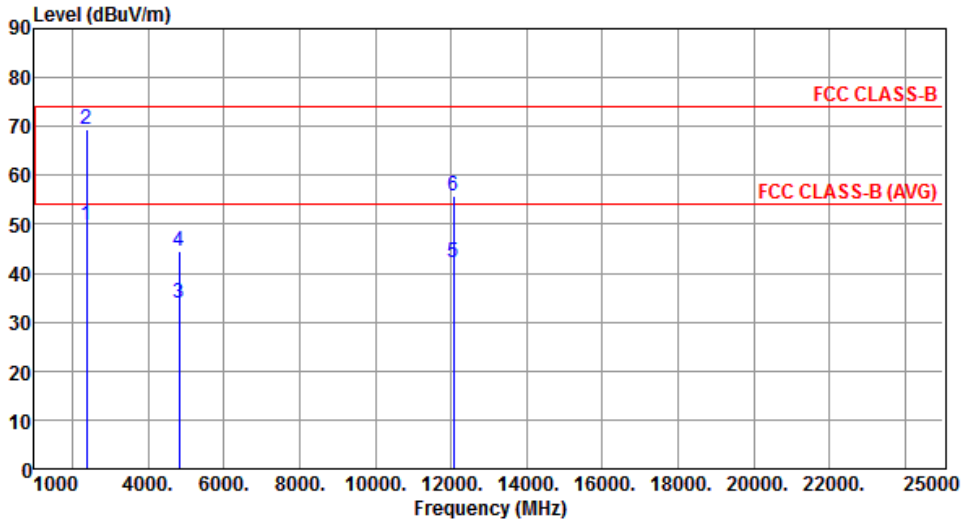


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.53	54.00	-0.47	55.90	-2.37	Average	100	204
2	2483.50	72.50	74.00	-1.50	74.87	-2.37	Peak	100	204
3	4924.00	32.75	54.00	-21.25	27.55	5.20	Average	100	22
4	4924.00	45.18	74.00	-28.82	39.98	5.20	Peak	100	22
5	7386.00	39.60	54.00	-14.40	29.54	10.06	Average	100	321
6	7386.00	53.10	74.00	-20.90	43.04	10.06	Peak	100	321

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

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

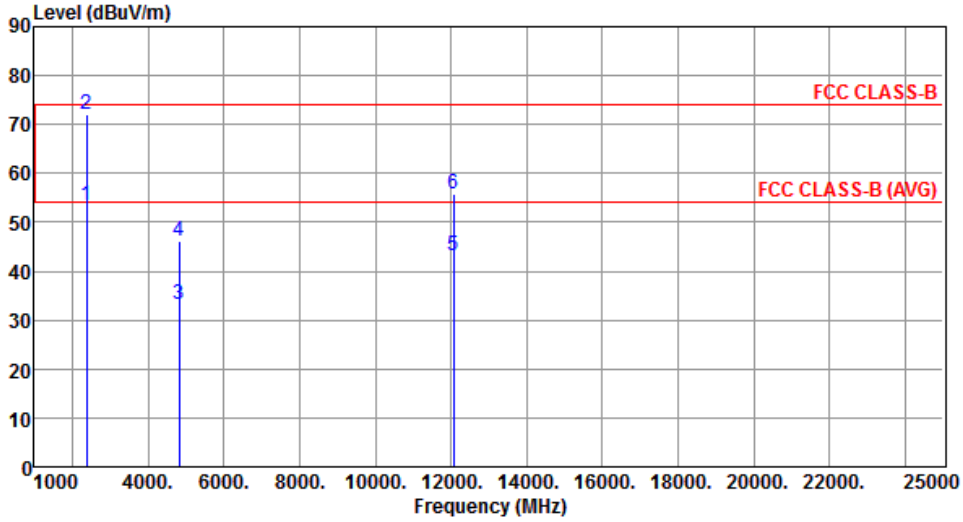
Modulation	HT20	**Test Freq. (MHz)**	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.88	54.00	-4.12	52.58	-2.70	Average	233	9
2	2390.00	69.28	74.00	-4.72	71.98	-2.70	Peak	233	9
3	4824.00	34.01	54.00	-19.99	29.04	4.97	Average	107	214
4	4824.00	44.63	74.00	-29.37	39.66	4.97	Peak	107	214
5	12060.00	42.27	54.00	-11.73	27.05	15.22	Average	274	121
6	12060.00	55.94	74.00	-18.06	40.72	15.22	Peak	274	121

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

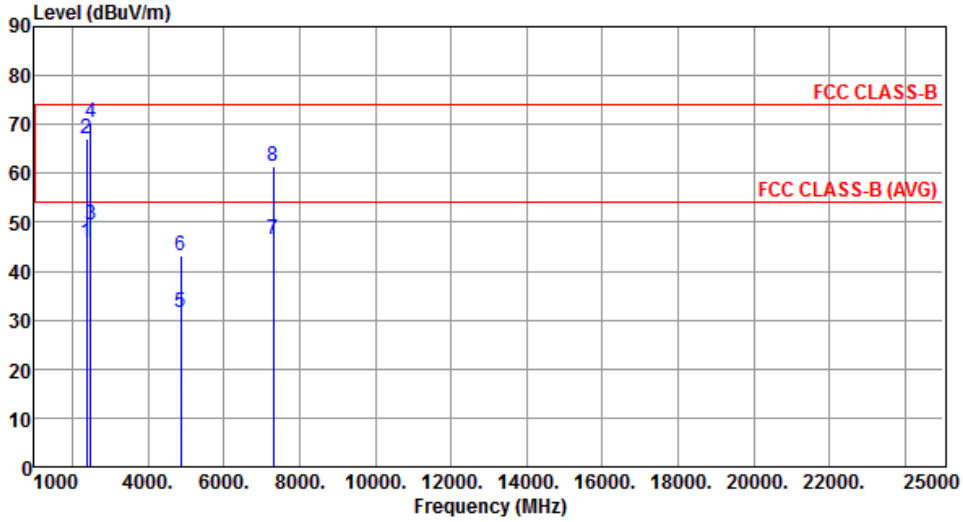
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.38	54.00	-0.62	56.08	-2.70	Average	359	265
2	2390.00	71.99	74.00	-2.01	74.69	-2.70	Peak	359	265
3	4824.00	33.13	54.00	-20.87	28.16	4.97	Average	120	315
4	4824.00	46.23	74.00	-27.77	41.26	4.97	Peak	120	315
5	12060.00	43.34	54.00	-10.66	28.12	15.22	Average	175	287
6	12060.00	55.65	74.00	-18.35	40.43	15.22	Peak	175	287

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

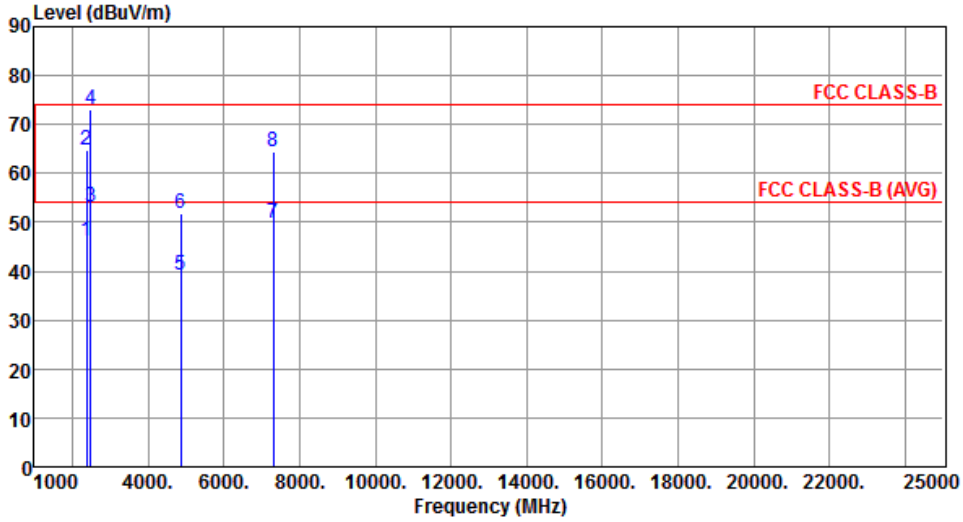
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.78	54.00	-8.22	48.48	-2.70	Average	224	14
2	2390.00	67.12	74.00	-6.88	69.82	-2.70	Peak	115	14
3	2483.50	49.36	54.00	-4.64	51.73	-2.37	Average	145	11
4	2483.50	70.47	74.00	-3.53	72.84	-2.37	Peak	145	11
5	4874.00	31.60	54.00	-22.40	26.52	5.08	Average	100	21
6	4874.00	43.21	74.00	-30.79	38.13	5.08	Peak	100	21
7	7311.00	46.37	54.00	-7.63	36.48	9.89	Average	100	16
8	7311.00	61.50	74.00	-12.50	51.61	9.89	Peak	100	16

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

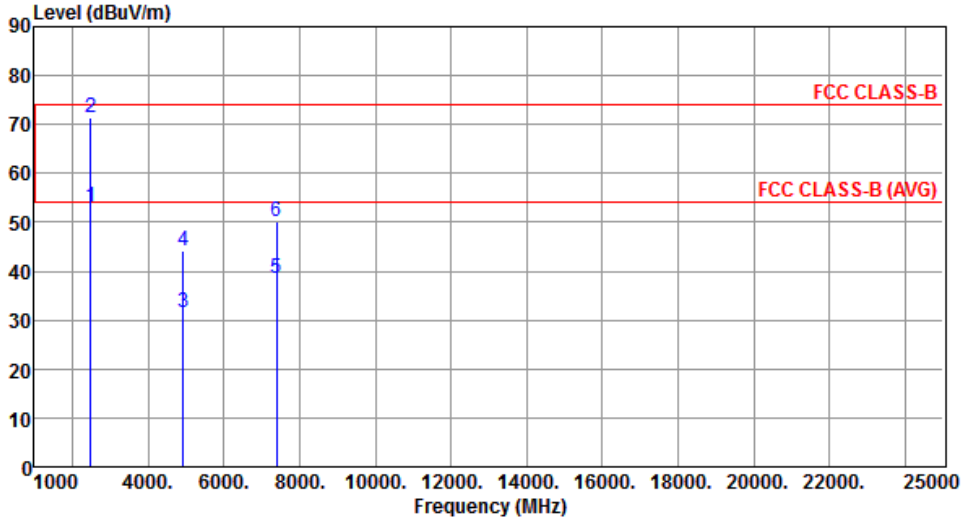
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	46.32	54.00	-7.68	49.02	-2.70	Average	100	339
2	2390.00	64.68	74.00	-9.32	67.38	-2.70	Peak	100	339
3	2483.50	53.24	54.00	-0.76	55.61	-2.37	Average	100	206
4	2483.50	73.21	74.00	-0.79	75.58	-2.37	Peak	100	205
5	4874.00	39.10	54.00	-14.90	34.02	5.08	Average	100	11
6	4874.00	51.93	74.00	-22.07	46.85	5.08	Peak	100	11
7	7311.00	49.96	54.00	-4.04	40.07	9.89	Average	100	156
8	7311.00	64.45	74.00	-9.55	54.56	9.89	Peak	100	156

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

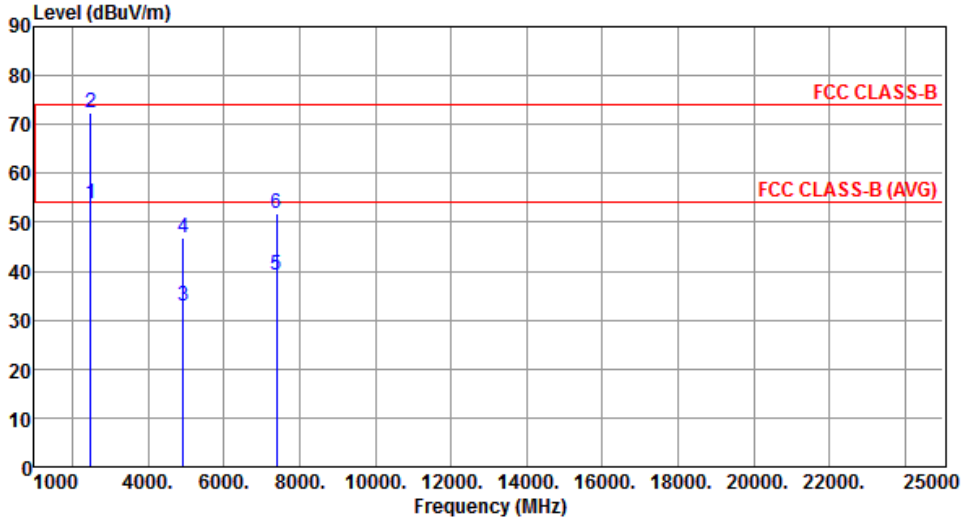
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.17	54.00	-0.83	55.54	-2.37	Average	112	18
2	2483.50	71.43	74.00	-2.57	73.80	-2.37	Peak	112	268
3	4924.00	31.49	54.00	-22.51	26.29	5.20	Average	127	225
4	4924.00	44.26	74.00	-29.74	39.06	5.20	Peak	127	225
5	7386.00	38.60	54.00	-15.40	28.54	10.06	Average	175	242
6	7386.00	50.30	74.00	-23.70	40.24	10.06	Peak	175	242

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

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

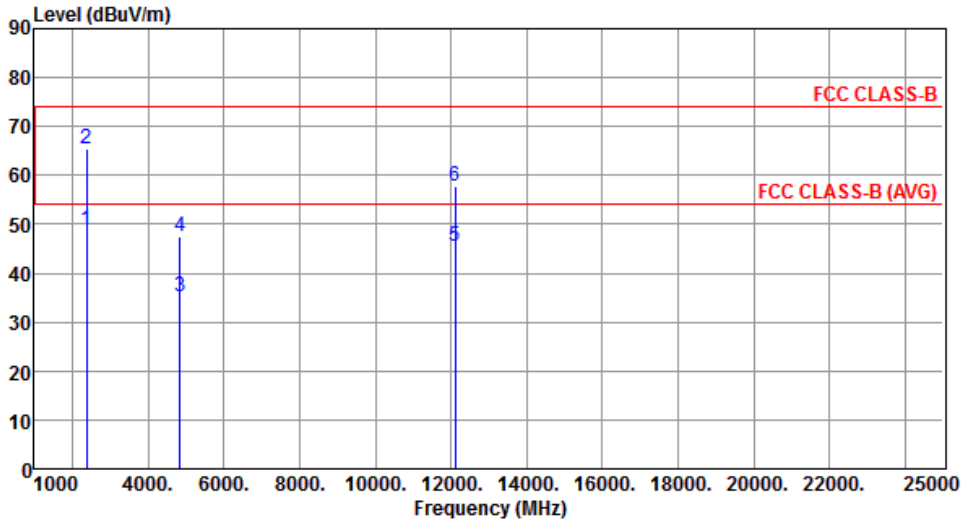


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.66	54.00	-0.34	56.03	-2.37	Average	247	64
2	2483.50	72.27	74.00	-1.73	74.64	-2.37	Peak	247	64
3	4924.00	32.83	54.00	-21.17	27.63	5.20	Average	108	150
4	4924.00	46.95	74.00	-27.05	41.75	5.20	Peak	108	150
5	7386.00	39.30	54.00	-14.70	29.24	10.06	Average	100	20
6	7386.00	51.75	74.00	-22.25	41.69	10.06	Peak	100	20

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

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

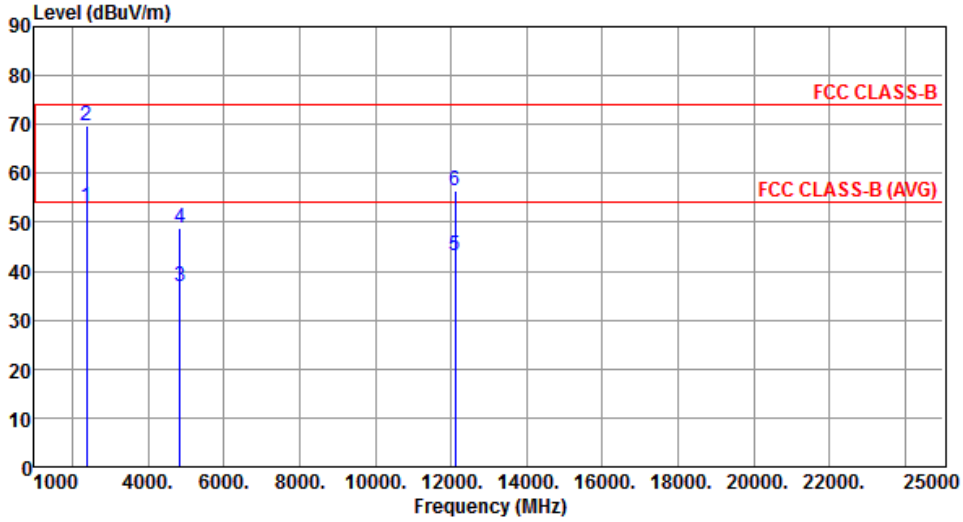
Modulation	HT40	**Test Freq. (MHz)**	2422
Polarization	Horizontal		



	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	48.86	54.00	-5.14	51.56	-2.70	Average	379	188
2	2390.00	65.26	74.00	-8.74	67.96	-2.70	Peak	379	188
3	4844.00	35.23	54.00	-18.77	30.21	5.02	Average	135	105
4	4844.00	47.58	74.00	-26.42	42.56	5.02	Peak	135	105
5	12110.00	45.47	54.00	-8.53	30.26	15.21	Average	201	197
6	12110.00	57.80	74.00	-16.20	42.59	15.21	Peak	201	197

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

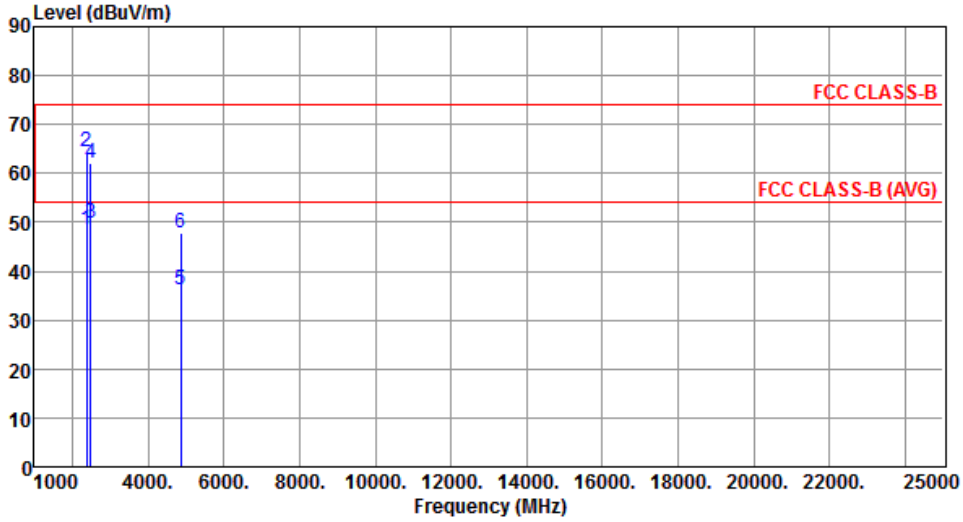
Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.09	54.00	-0.91	55.79	-2.70	Average	381	97
2	2390.00	69.64	74.00	-4.36	72.34	-2.70	Peak	381	97
3	4844.00	36.73	54.00	-17.27	31.71	5.02	Average	145	271
4	4844.00	48.80	74.00	-25.20	43.78	5.02	Peak	145	271
5	12110.00	43.23	54.00	-10.77	28.02	15.21	Average	267	115
6	12110.00	56.57	74.00	-17.43	41.36	15.21	Peak	267	115

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

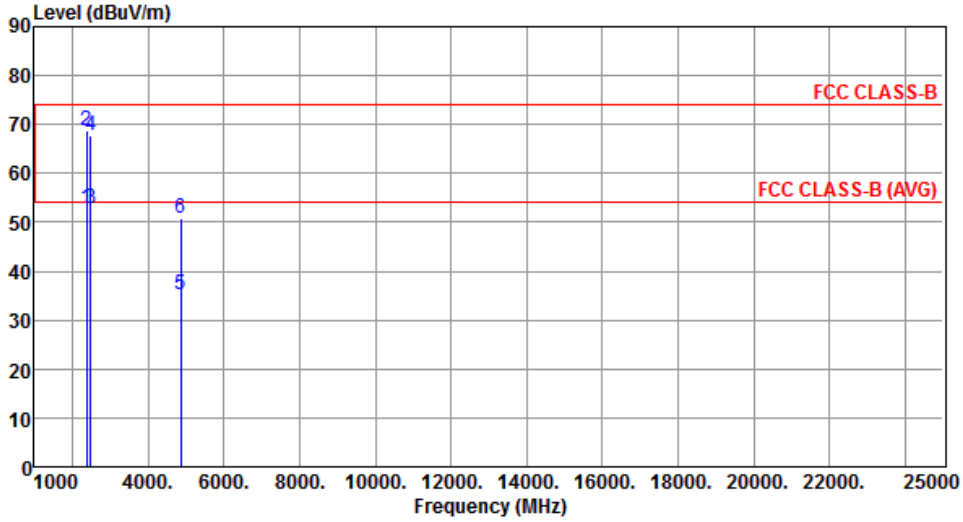
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	48.32	54.00	-5.68	51.02	-2.70	Average	381	342
2	2390.00	64.40	74.00	-9.60	67.10	-2.70	Peak	381	342
3	2483.50	49.73	54.00	-4.27	52.10	-2.37	Average	352	185
4	2483.50	62.18	74.00	-11.82	64.55	-2.37	Peak	352	185
5	4874.00	36.35	54.00	-17.65	31.27	5.08	Average	241	203
6	4874.00	47.75	74.00	-26.25	42.67	5.08	Peak	241	203

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

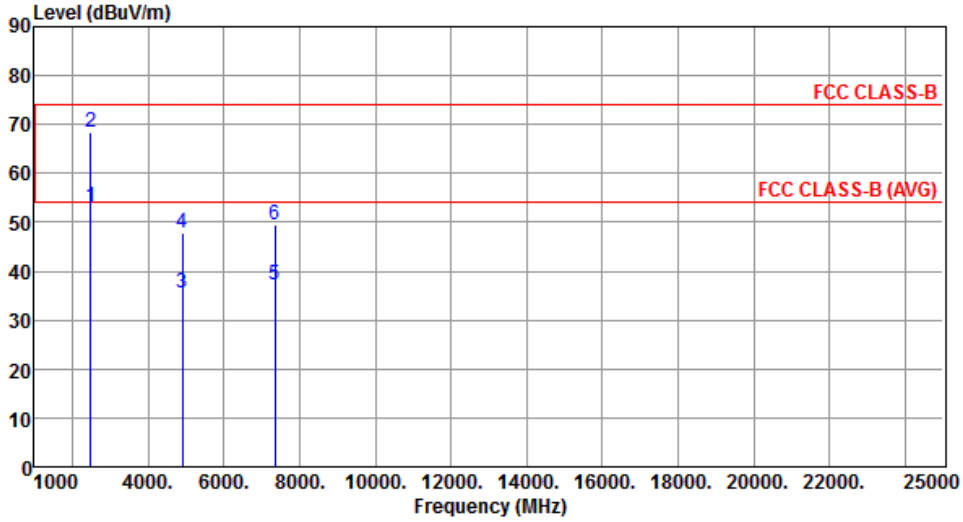
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



	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	52.82	54.00	-1.18	55.52	-2.70	Average	356	53
2	2390.00	68.65	74.00	-5.35	71.35	-2.70	Peak	356	53
3	2483.50	52.74	54.00	-1.26	55.11	-2.37	Average	400	100
4	2483.50	67.88	74.00	-6.12	70.25	-2.37	Peak	400	100
5	4874.00	35.35	54.00	-18.65	30.27	5.08	Average	274	206
6	4874.00	50.77	74.00	-23.23	45.69	5.08	Peak	274	206

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

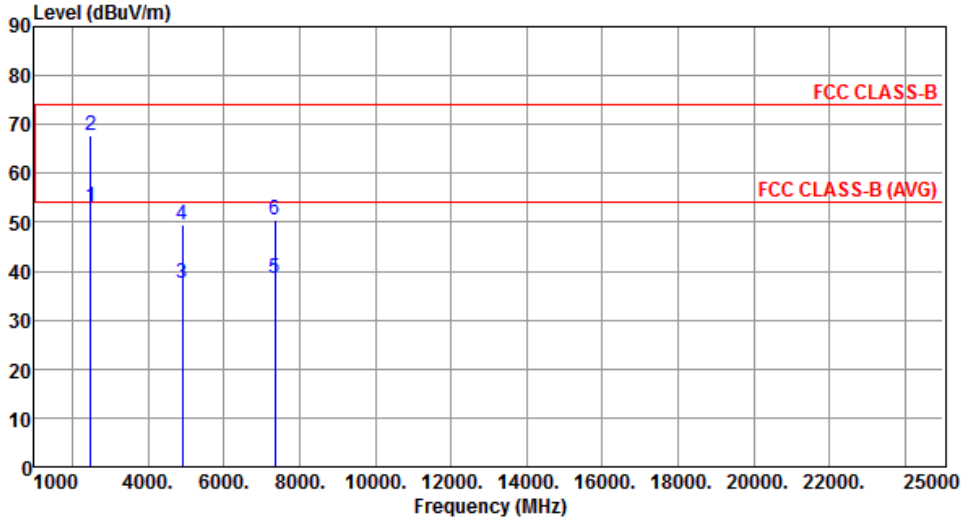
Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.20	54.00	-0.80	55.57	-2.37	Average	422	200
2	2483.50	68.33	74.00	-5.67	70.70	-2.37	Peak	400	200
3	4904.00	35.41	54.00	-18.59	30.25	5.16	Average	157	267
4	4904.00	47.81	74.00	-26.19	42.65	5.16	Peak	157	267
5	7356.00	37.25	54.00	-16.75	27.27	9.98	Average	175	105
6	7356.00	49.62	74.00	-24.38	39.64	9.98	Peak	175	105

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

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.28	54.00	-0.72	55.65	-2.37	Average	306	238
2	2483.50	67.75	74.00	-6.25	70.12	-2.37	Peak	306	238
3	4904.00	37.41	54.00	-16.59	32.25	5.16	Average	210	320
4	4904.00	49.41	74.00	-24.59	44.25	5.16	Peak	210	320
5	7356.00	38.68	54.00	-15.32	28.70	9.98	Average	104	271
6	7356.00	50.35	74.00	-23.65	40.37	9.98	Peak	104	271

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

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

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

3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Reference level measurement

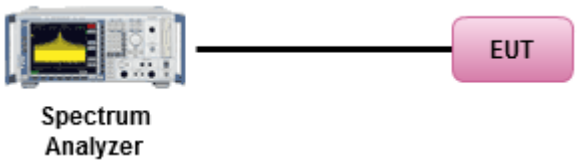
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

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

3.6.4 Test Setup

Transmitter Radiated Bandedge Emissions

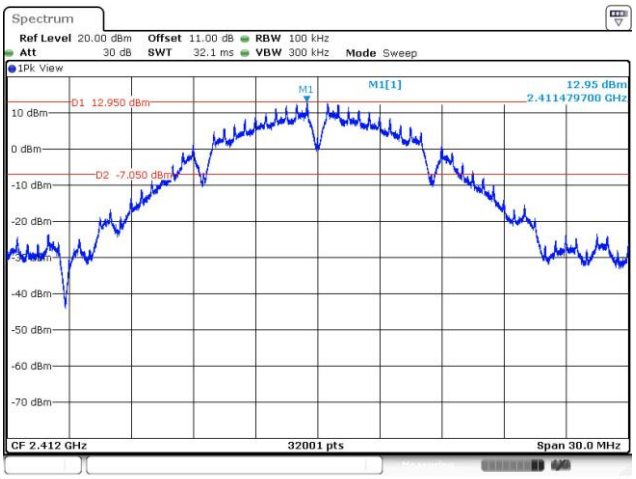
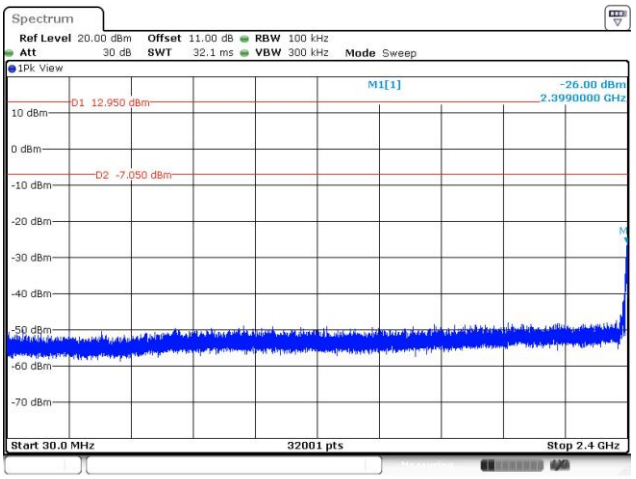
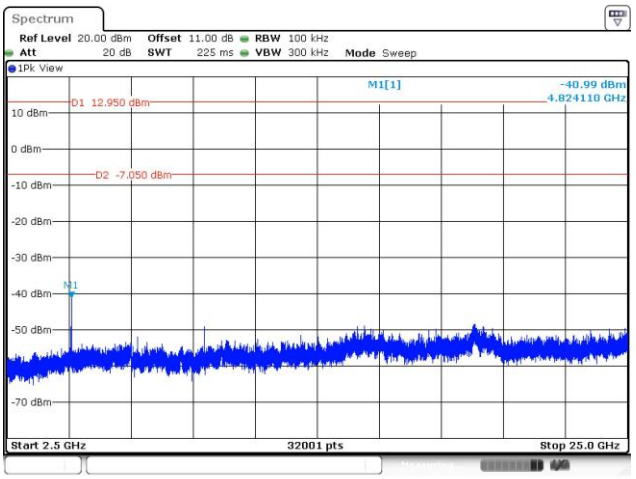
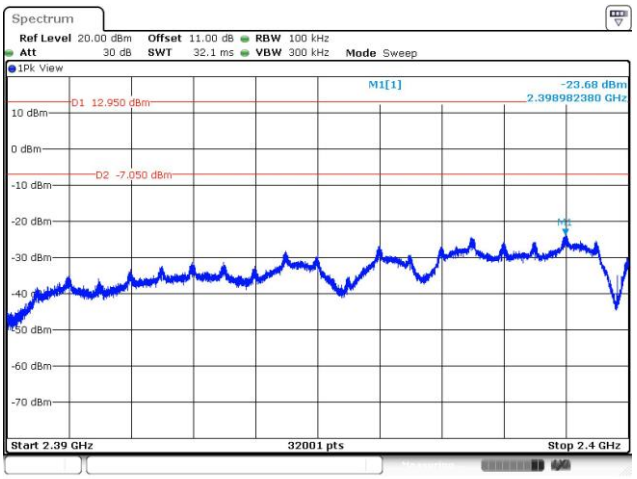


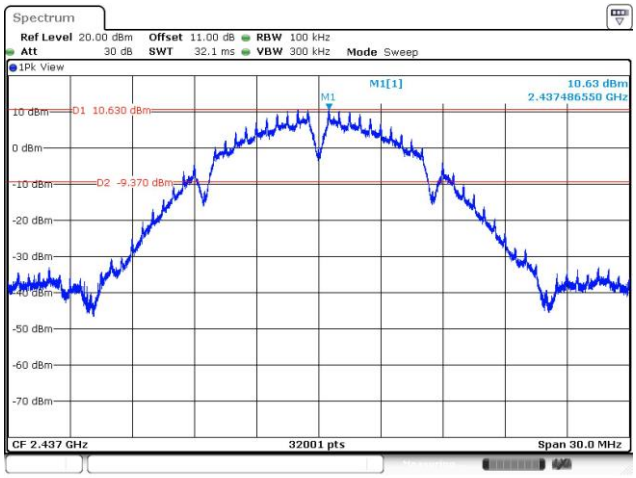
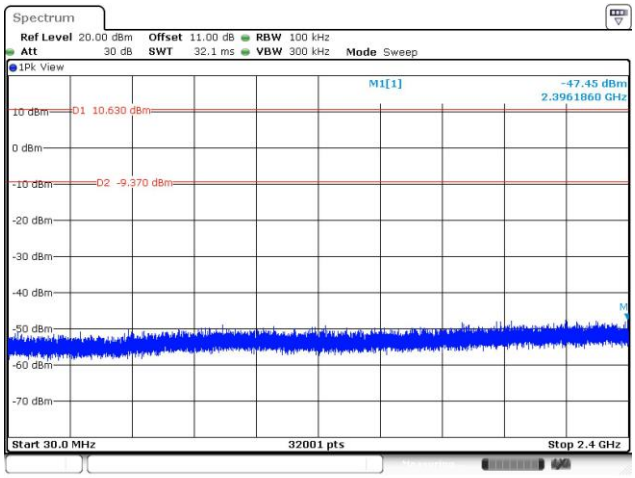
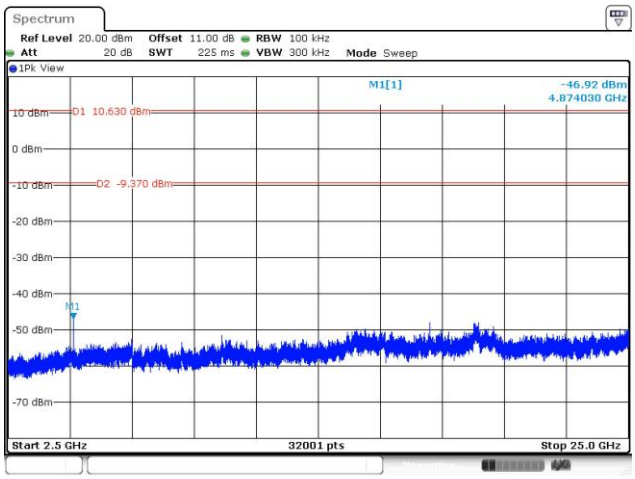
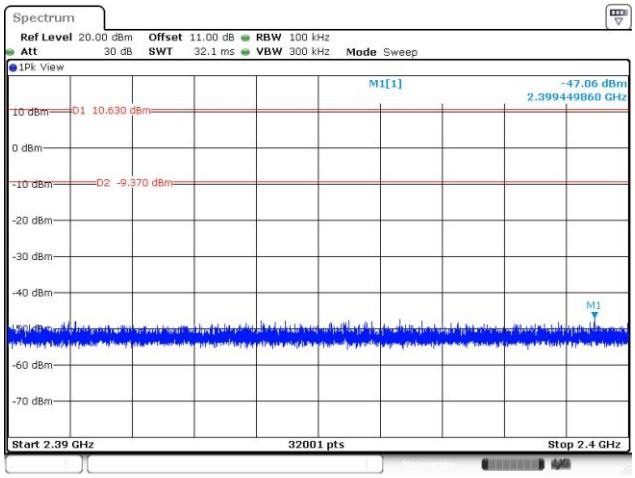
3.6.5 Test Result of Emissions in non-restricted frequency bands

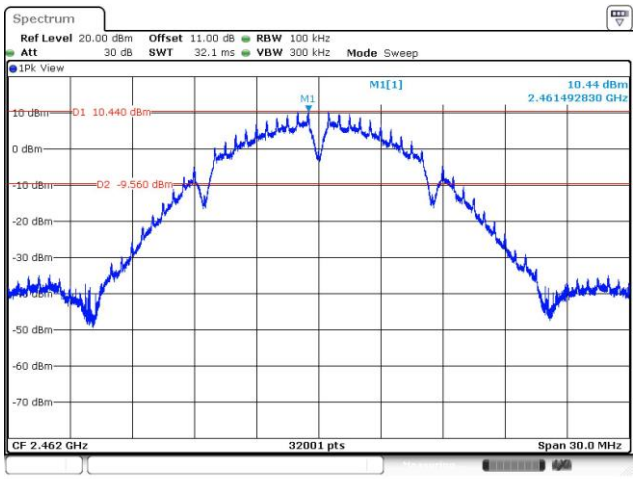
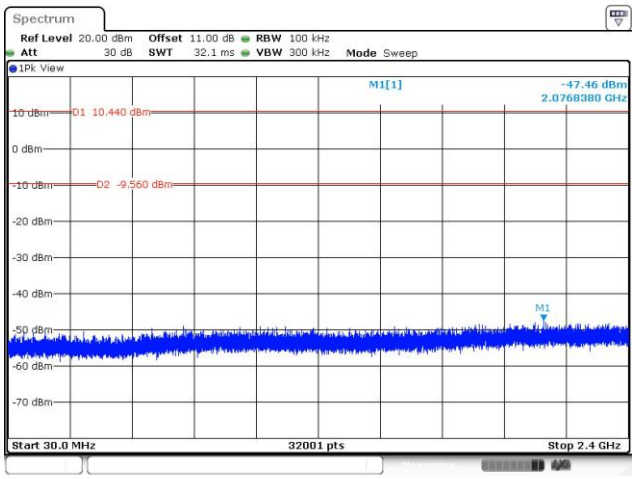
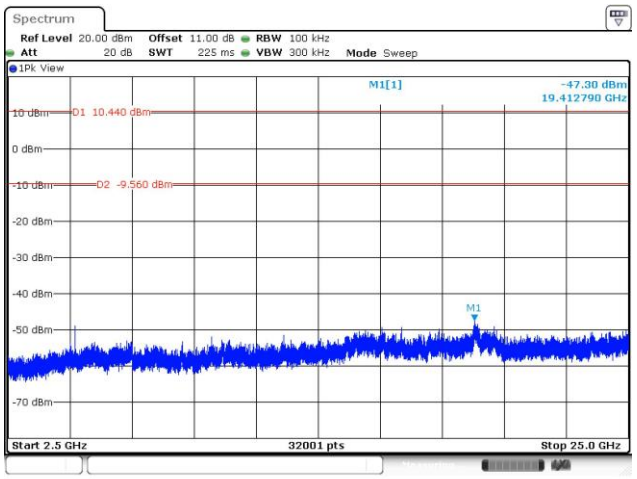
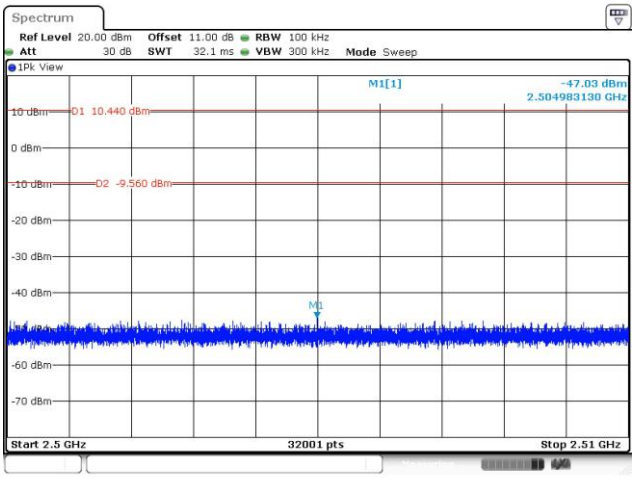
This test item is performed on each TX output individually without summing or adding 10 log(N_{ANT}) since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

3.6.6 Unwanted Emissions into Non-Restricted Frequency Bands

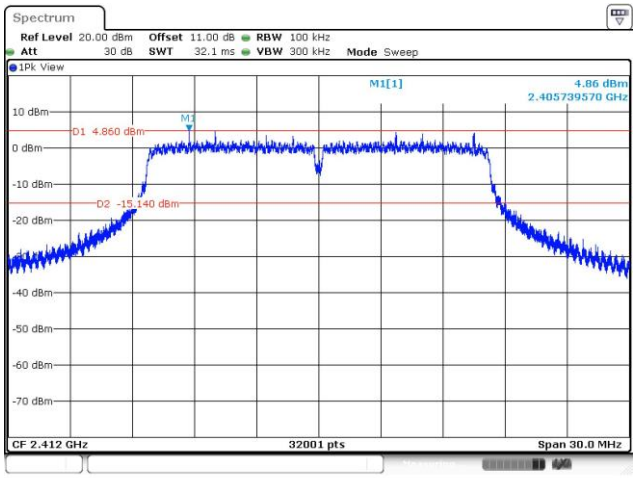
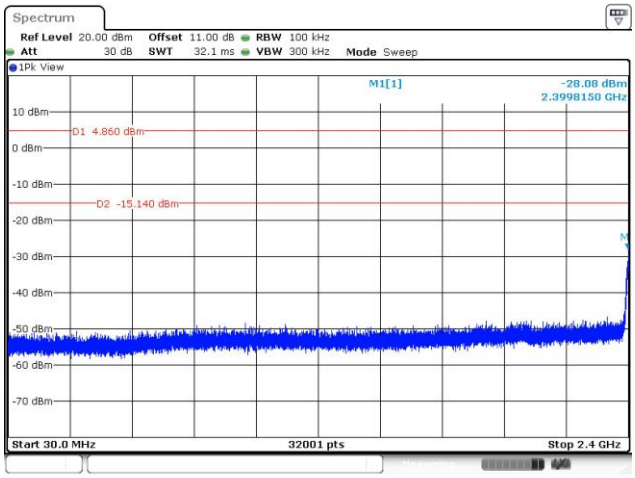
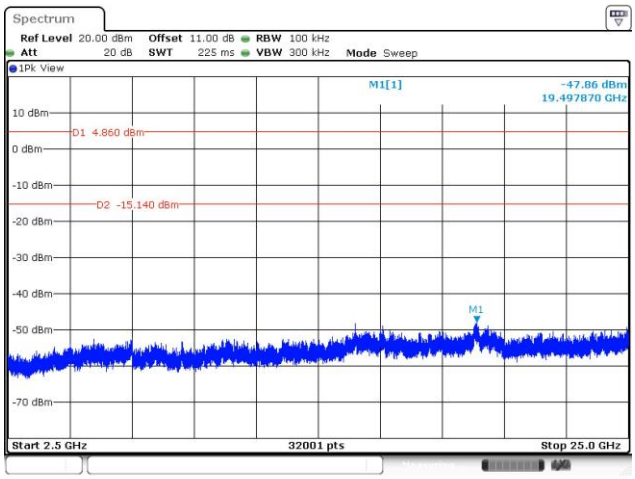
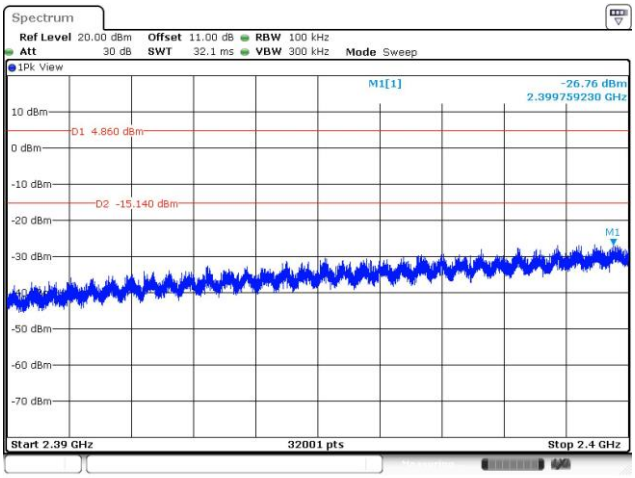
802.11b

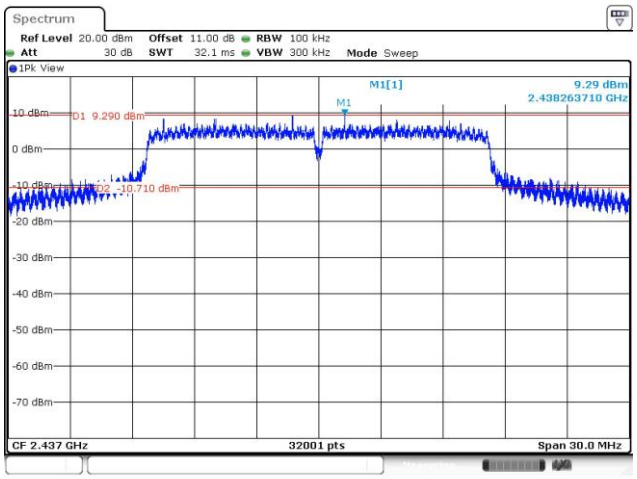
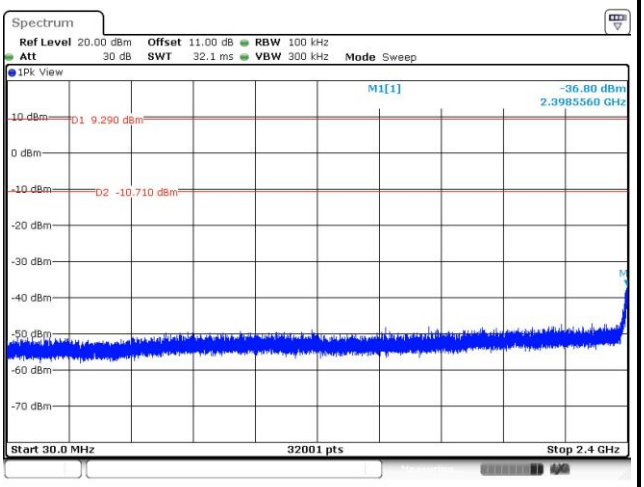
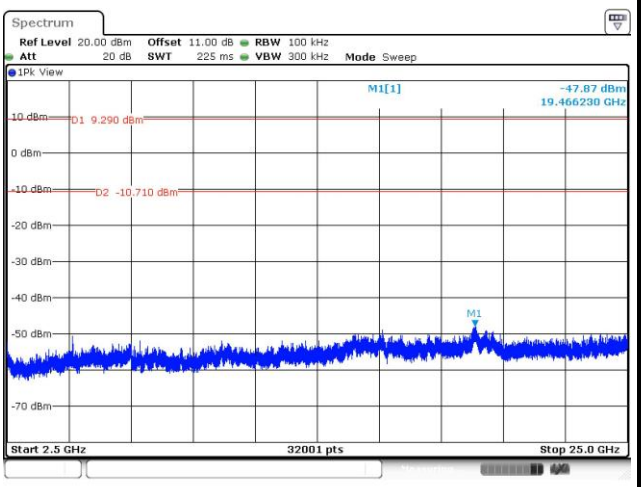
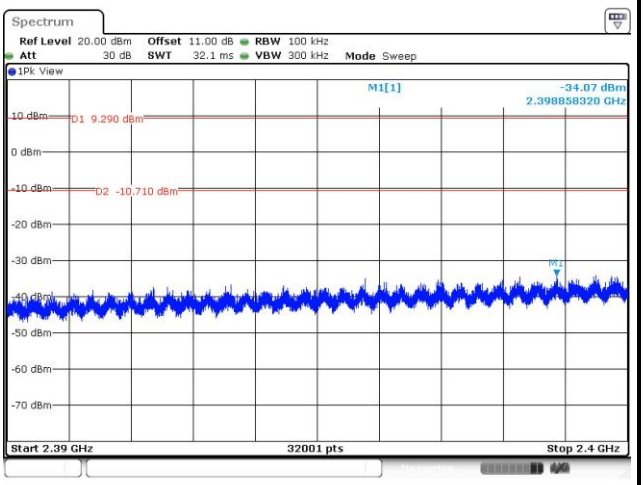
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

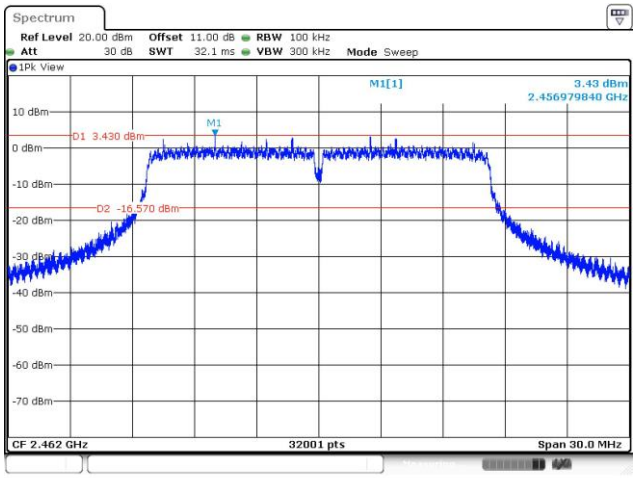
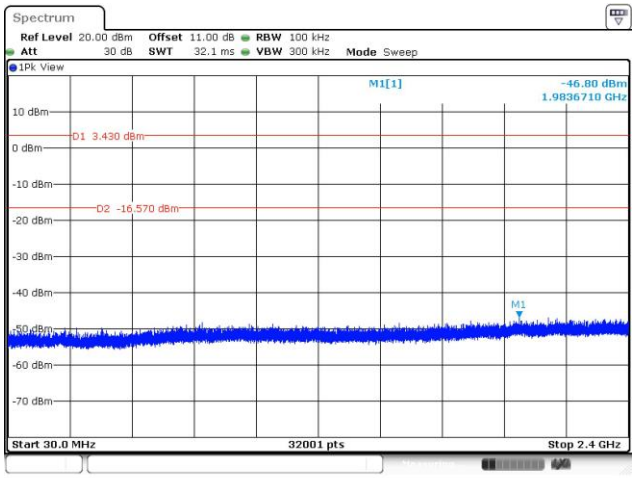
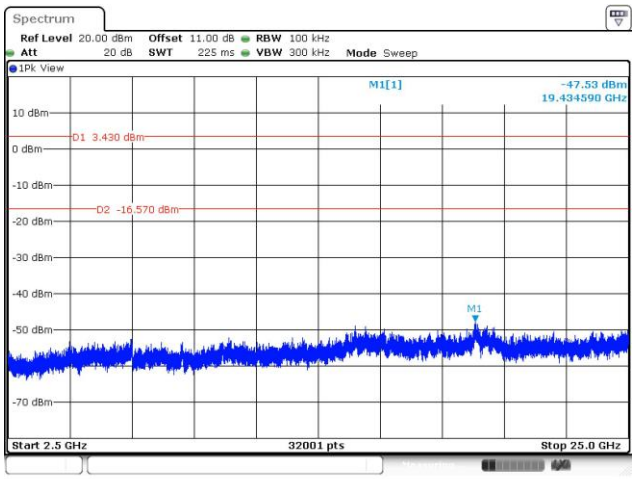
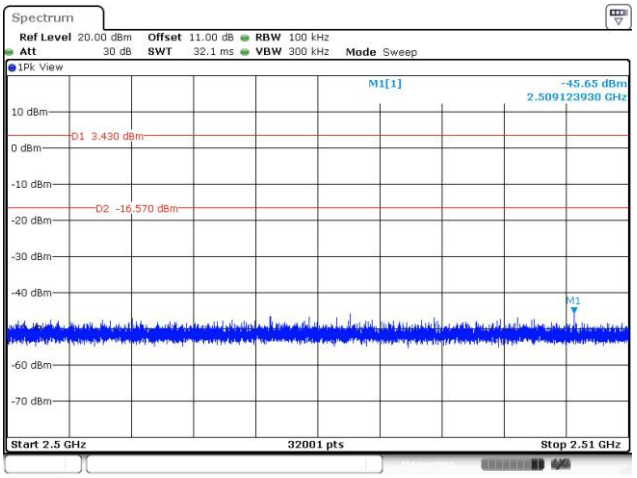
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

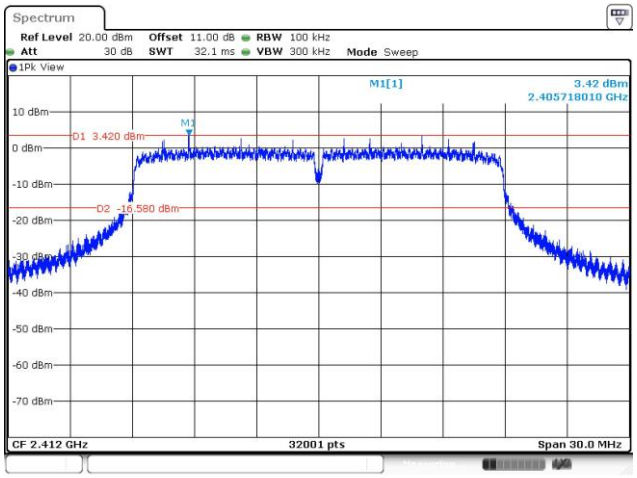
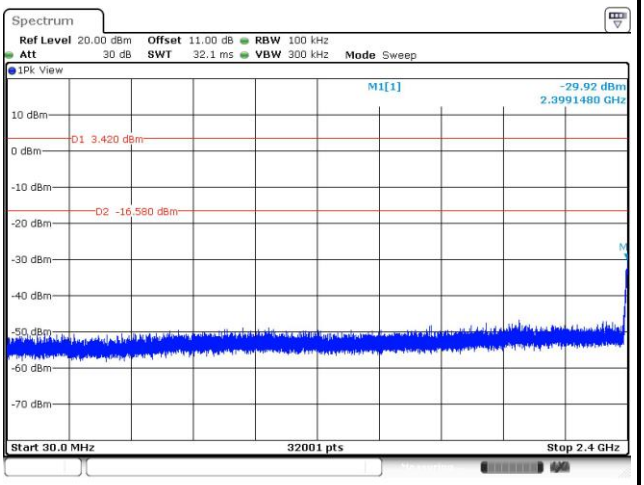
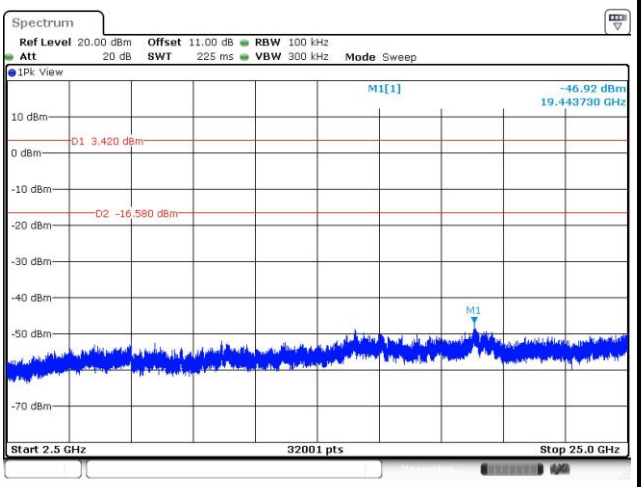
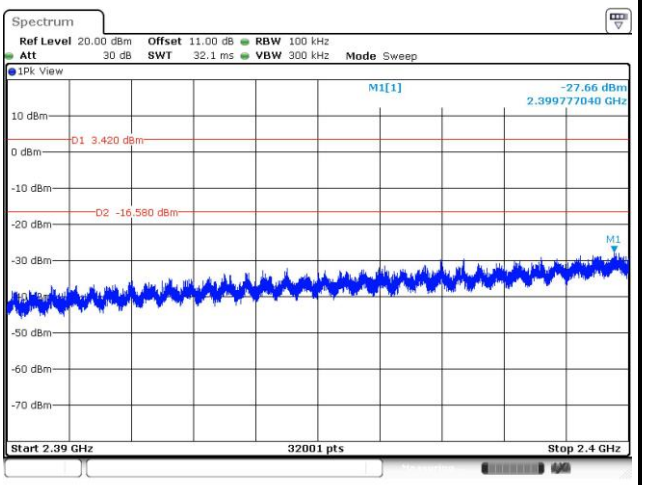
802.11g

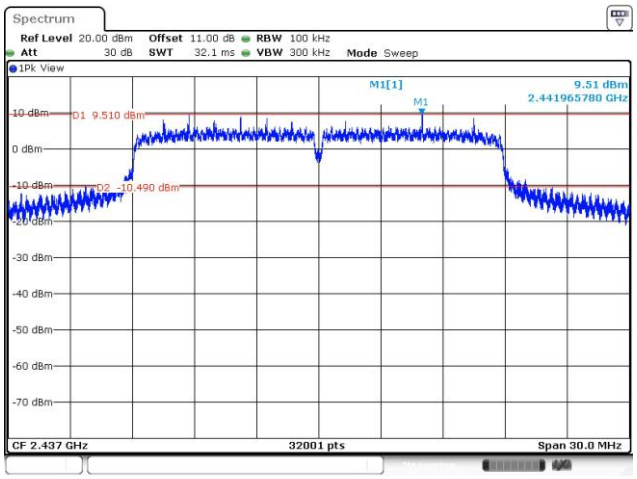
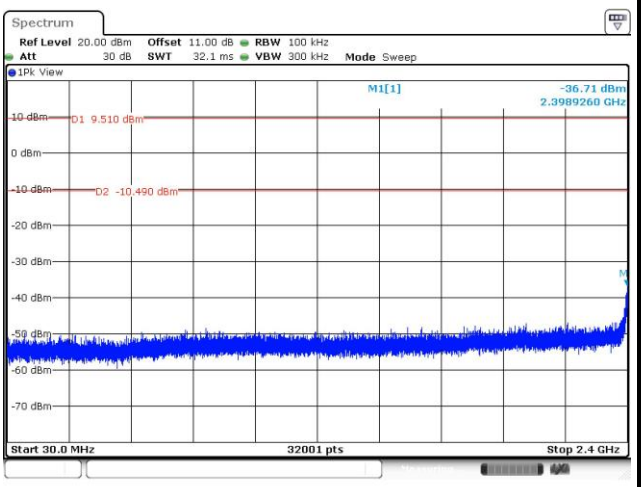
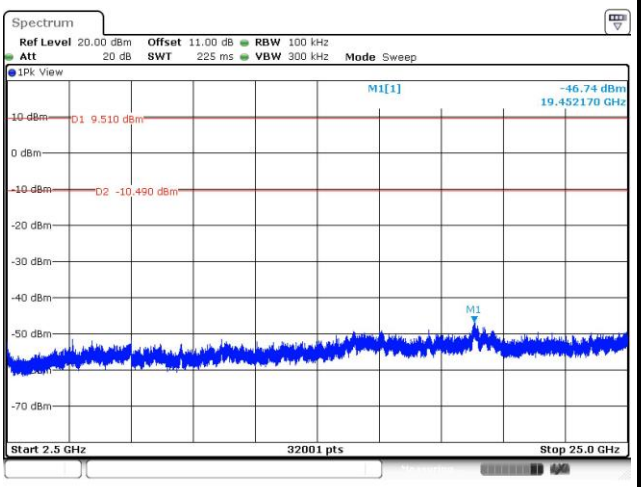
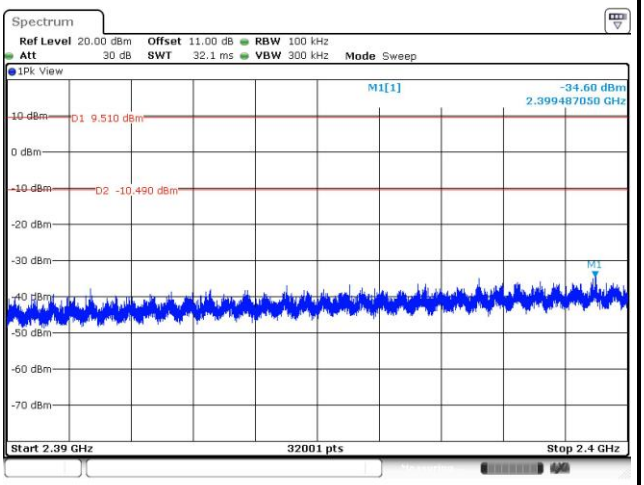
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

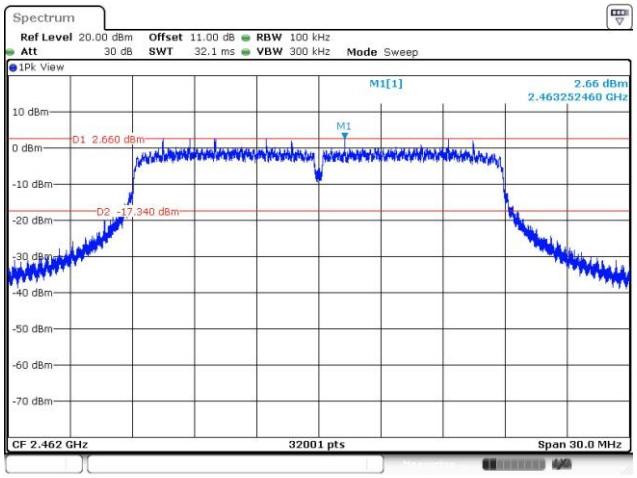
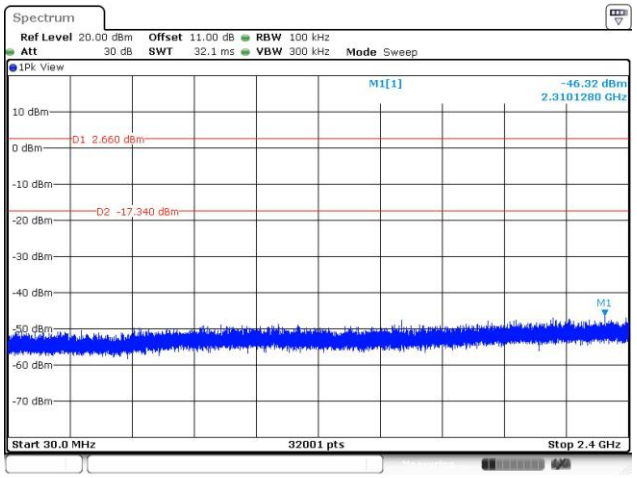
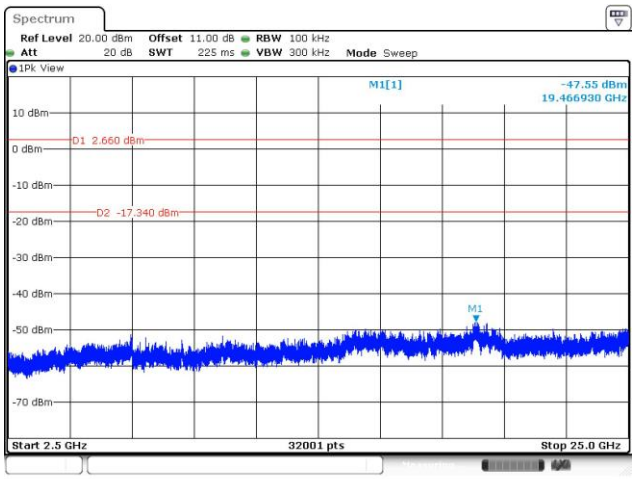
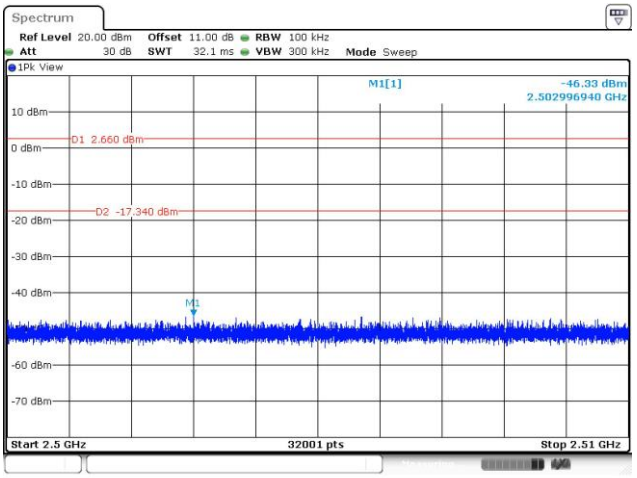
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

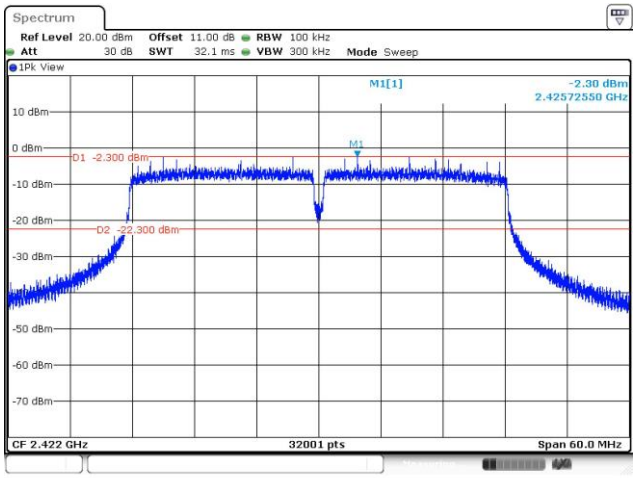
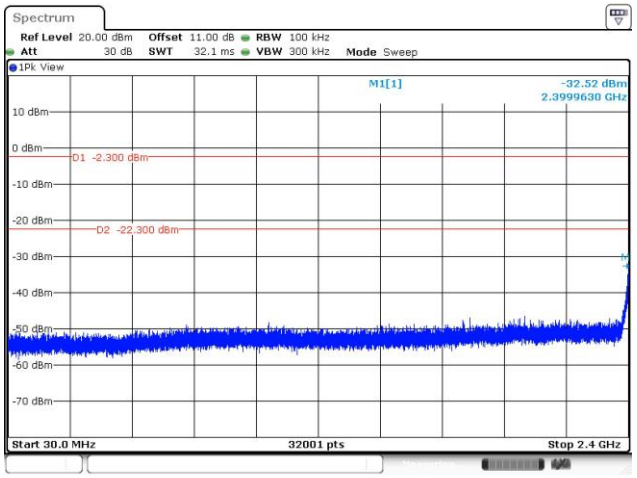
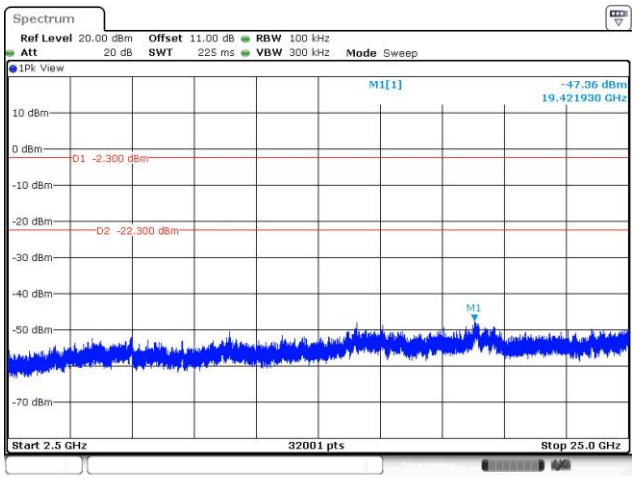
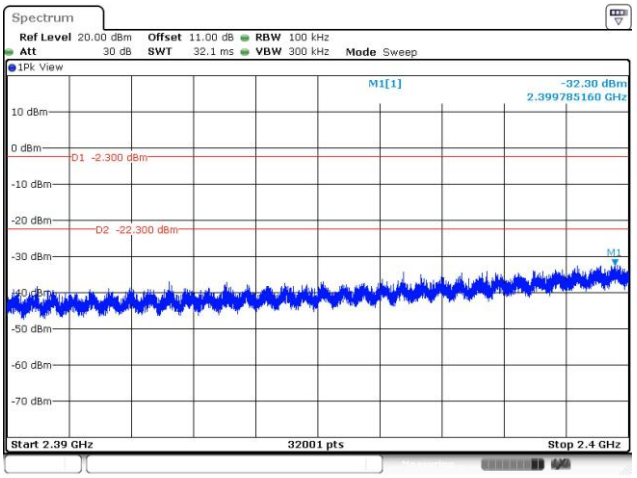
802.11n HT20

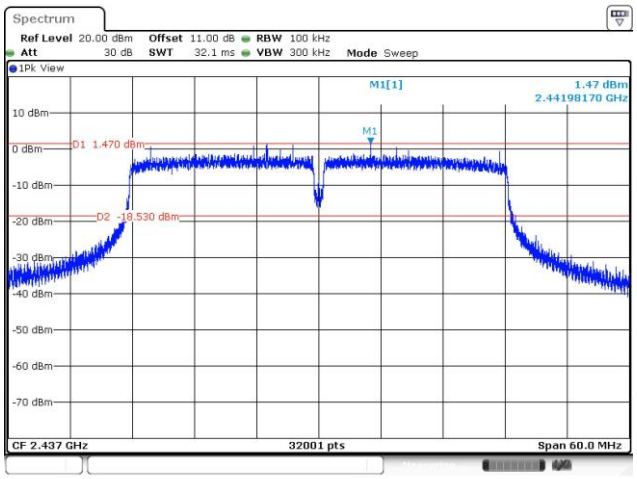
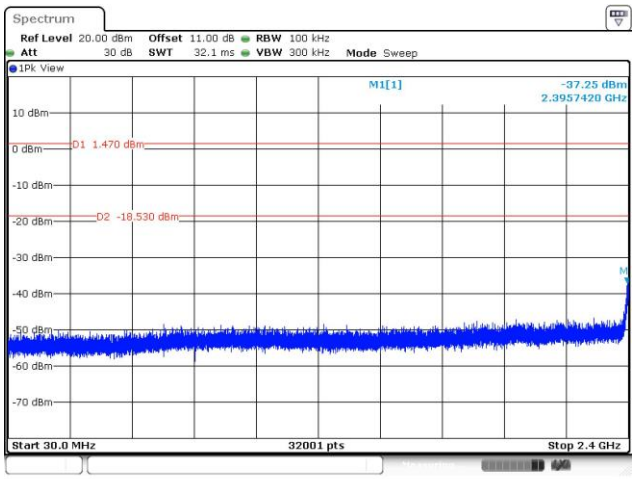
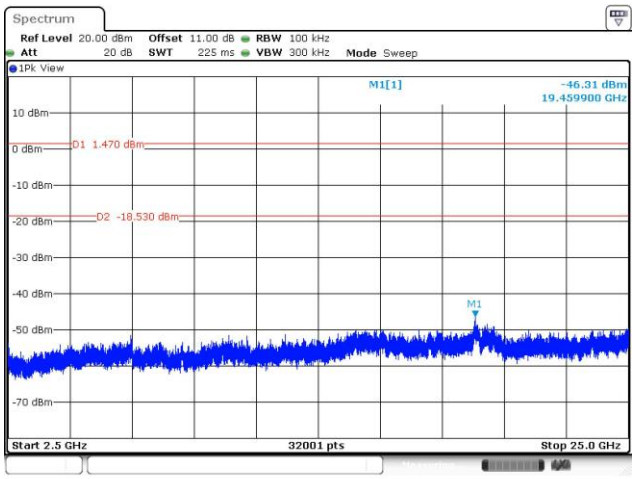
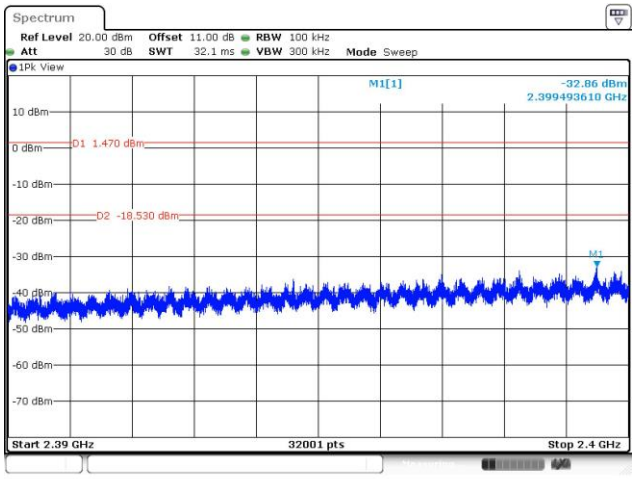
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

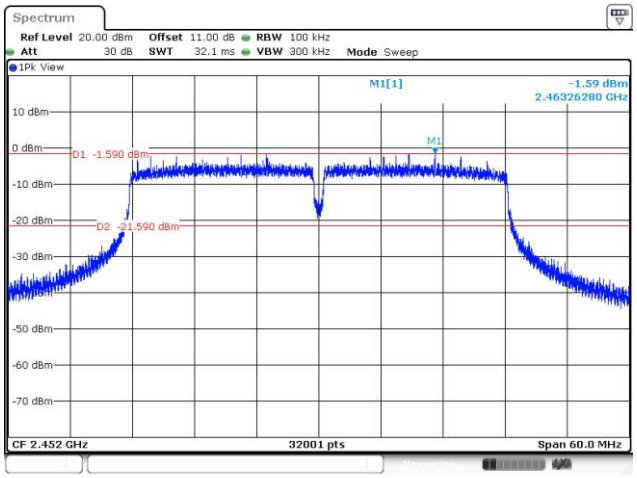
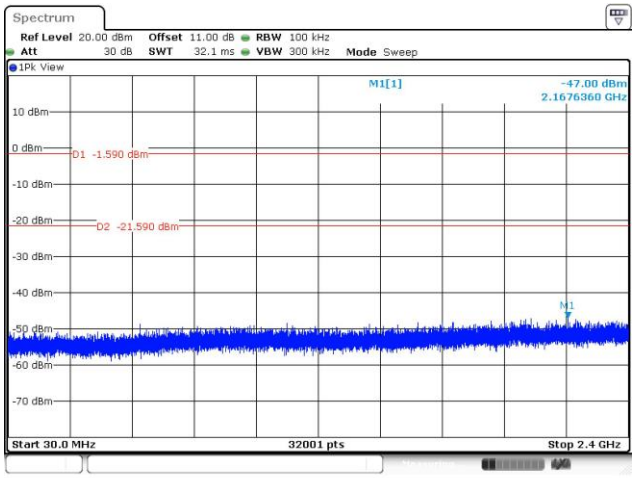
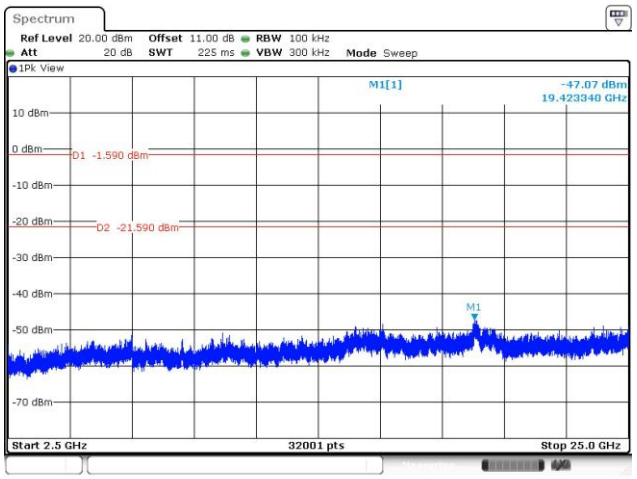
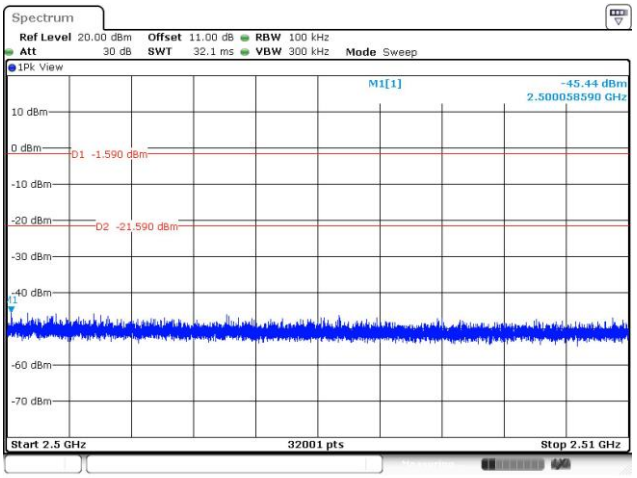
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

802.11n HT40

Reference Level	Tx 2422MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2452MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

4 Test laboratory information

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

International Certification Corp, 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 Hsiang. 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 Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

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

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

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