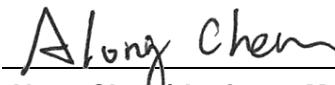


FCC Test Report

FCC ID : IPH-03408
Equipment : Marine Stereo
Model No. : MS-RA770
Brand Name : FUSION
Applicant : Garmin International, Inc.
Address : 1200 E. 151st Street Olathe, KS 66062 United States
Standard : 47 CFR FCC Part 15.247
Received Date : Nov. 30, 2017
Tested Date : Dec. 11 ~ Dec. 28, 2017

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



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Local Support Equipment List	7
1.3	Test Setup Chart	8
1.4	The Equipment List	9
1.5	Test Standards	10
1.6	Measurement Uncertainty	10
2	TEST CONFIGURATION	11
2.1	Testing Condition	11
2.2	The Worst Test Modes and Channel Details	11
3	TRANSMITTER TEST RESULTS.....	12
3.1	6dB and Occupied Bandwidth	12
3.2	RF Output Power.....	15
3.3	Power Spectral Density	17
3.4	Unwanted Emissions into Restricted Frequency Bands	19
3.5	Emissions in Non-Restricted Frequency Bands.....	35
4	TEST LABORATORY INFORMATION	42

Release Record

Report No.	Version	Description	Issued Date
FR7N3001AC	Rev. 01	Initial issue	Mar. 27, 2018

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	Note ¹	N/A
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 33.85MHz 38.87 (Margin -1.13dB) - QP	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 19.02	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

N/A means Not Applicable.

Note¹: The EUT consumes DC power, so the test is not required.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
2400-2483.5	b	2412-2462	1-11 [11]	1	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps

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 uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

1.1.2 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector	Remarks
1	PIFA	5.13	N/A	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc
-------------------	-------

1.1.4 Accessories

N/A

1.1.5 Channel List

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

1.1.6 EUT mode and Duty Cycle

EUT mode	WiFi Test		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	89.83%	0.47
	11g	59.05%	2.29

1.1.7 Power Setting

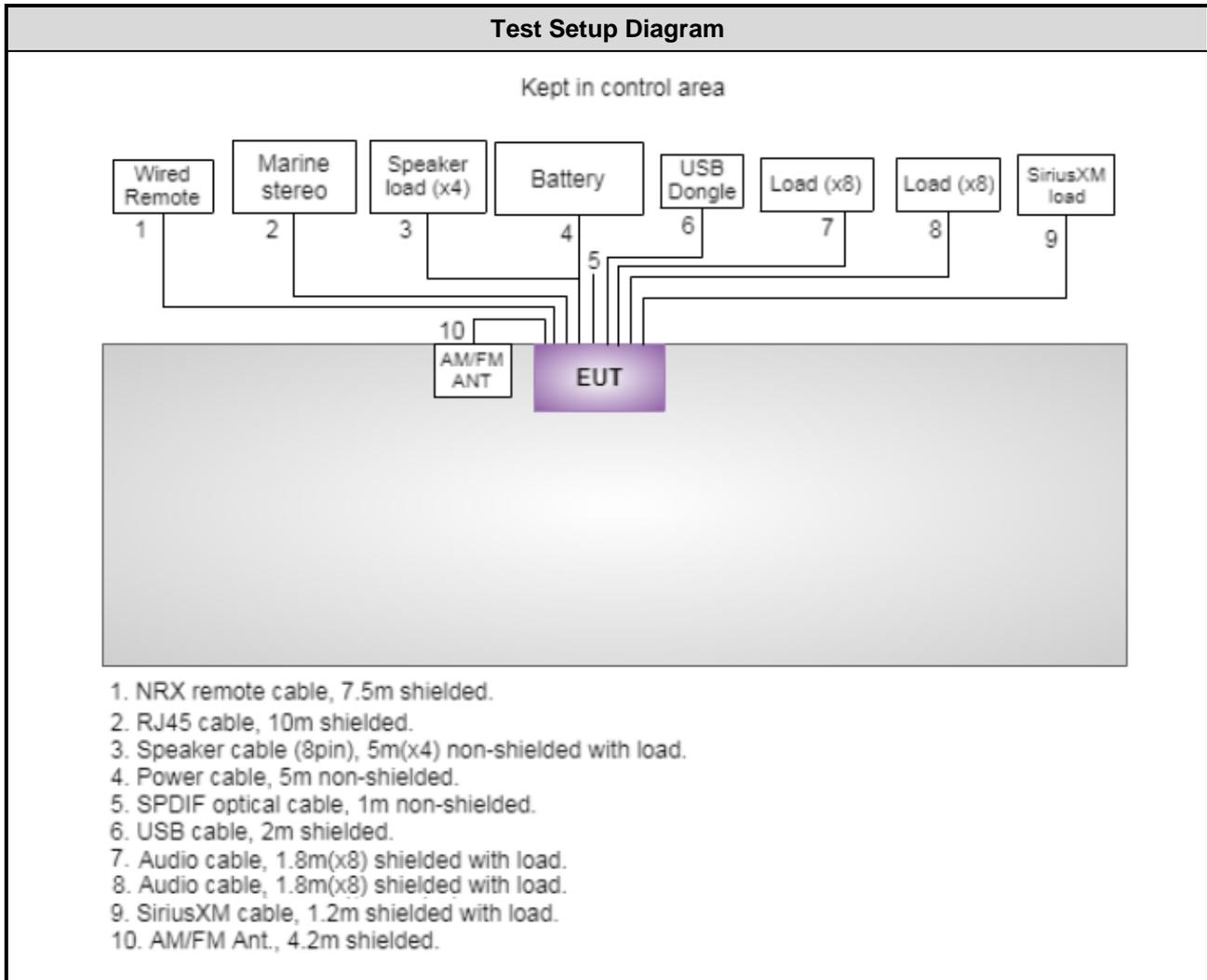
Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	16
11b	2437	16
11b	2462	16
11g	2412	14
11g	2437	17
11g	2462	14

1.2 Local Support Equipment List

Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)
1	Battery	YUASA	36B20R(S)	---	---	Power cable, 5m non-shielded.
2	SiriusXM	---	---	---	---	SiriusXM cable, 1.2m shielded.
3	Load (x16)	---	---	---	---	Audio cable, 1.8m(x8) shielded. Audio cable, 1.8m(x8) shielded.
4	USB Dongle	Strontium	Pollex 4 G	---	---	USB cable, 2m shielded.
5	AM/FM ANT	---	---	---	---	AM/FM Ant., 4.2m shielded.
6	Speaker load (x4)	---	---	---	---	Speaker cable (8pin), 5m(x4) non-shielded.
7	Wired Remote	Fusion	MS-NRX30 0	---	---	NRX remote cable, 7.5m shielded.
8	Marine stereo	FUSION	MS-RA770	---	---	RJ45 cable, 10m shielded.

Note: No. 2 ~ No. 8 were supplied by applicant.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Dec. 11, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Dec. 16, 2016	Dec. 15, 2017
Receiver	R&S	ESR3	101658	Nov. 20, 2017	Nov. 19, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 25, 2017	Jul. 24, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 21, 2016	Dec. 20, 2017
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	980225	Jul. 28, 2017	Jul. 27, 2018
Preamplifier	Agilent	83017A	MY39501308	Oct. 06, 2017	Oct. 05, 2018
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 07, 2017	Dec. 06, 2018
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 07, 2017	Dec. 06, 2018
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 07, 2017	Dec. 06, 2018
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	16052	Dec. 07, 2017	Dec. 06, 2018
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 07, 2017	Dec. 06, 2018
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 07, 2017	Dec. 06, 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)				
Tested Date	Dec. 28, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018
Power Meter	Anritsu	ML2495A	1241002	Oct. 16, 2017	Oct. 15, 2018
Power Sensor	Anritsu	MA2411B	1207366	Oct. 16, 2017	Oct. 15, 2018
DC POWER SOURCE	GW INSTEK	GPC-6030D	EM892433	Oct. 26, 2017	Oct. 25, 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.

47 CFR FCC Part 15.247

ANSI C63.10-2013

FCC KDB 558074 D01 DTS Meas Guidance v04

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
Radiated emission ≤ 1 GHz	± 3.66 dB
Radiated emission > 1 GHz	± 5.63 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH01-WS	23°C / 64%	Roger Lu Akun Chung
RF Conducted	TH01-WS	20°C / 63%	Brad Wu

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	11g	2437	6 Mbps	---
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	---
Radiated Emissions >1GHz				
Maximum Output Power	11b	2412 / 2437 / 2462	1 Mbps	---
6dB bandwidth	11g	2412 / 2437 / 2462	6 Mbps	
Power spectral density				

3 Transmitter Test Results

3.1 6dB and Occupied Bandwidth

3.1.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.1.2 Test Procedures

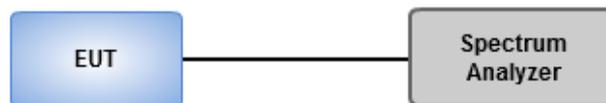
6dB Bandwidth

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

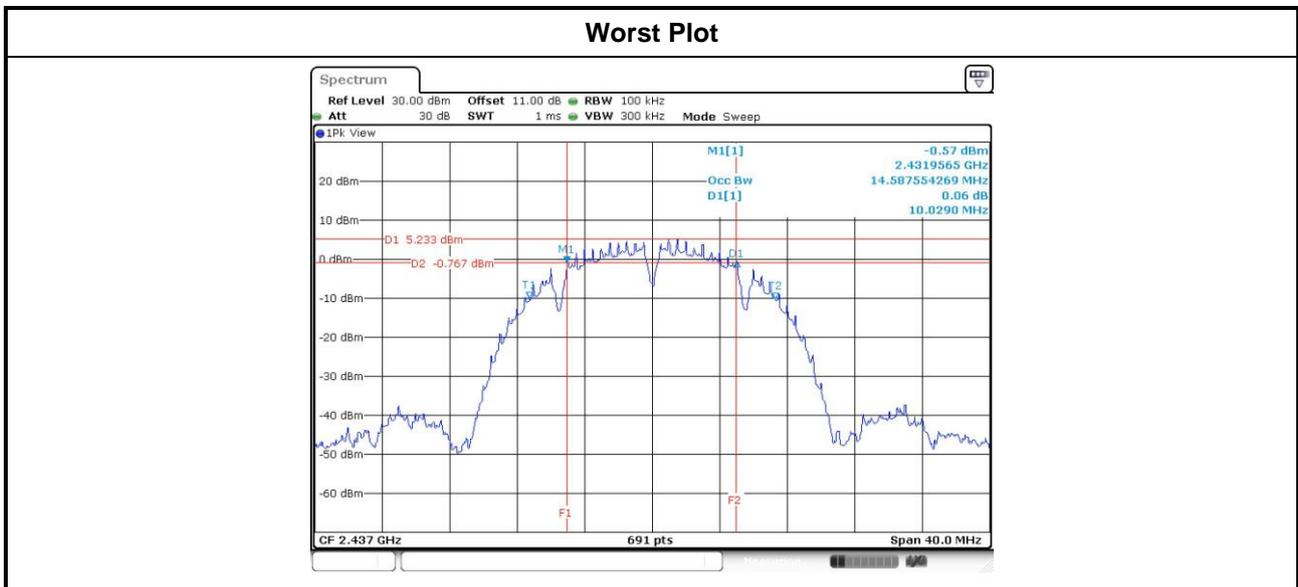
1. Set resolution bandwidth (RBW) = 1 MHz, Video bandwidth = 3 MHz.
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.1.3 Test Setup

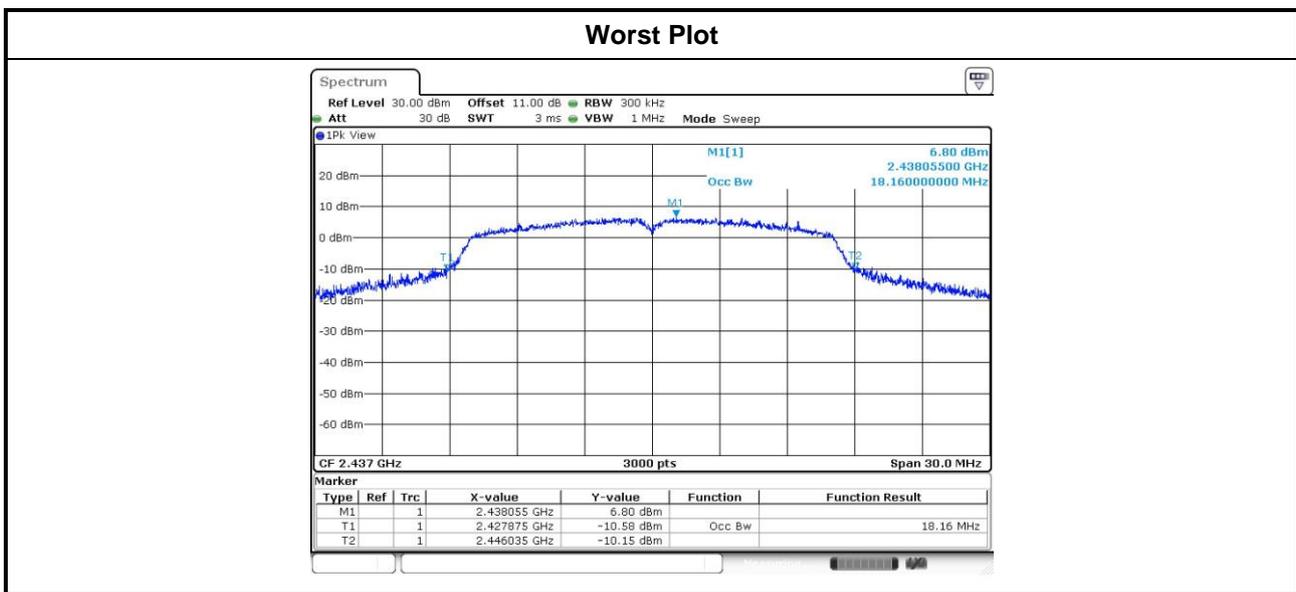


3.1.4 Test Result of 6dB and Occupied Bandwidth

Modulation Mode	N _{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	1	2412	10.09	---	---	---	500
11b	1	2437	10.03	---	---	---	500
11b	1	2462	10.03	---	---	---	500
11g	1	2412	13.57	---	---	---	500
11g	1	2437	14.67	---	---	---	500
11g	1	2462	14.20	---	---	---	500



Modulation Mode	N _{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	1	2412	14.66	---	---	---
11b	1	2437	14.67	---	---	---
11b	1	2462	14.68	---	---	---
11g	1	2412	16.44	---	---	---
11g	1	2437	18.16	---	---	---
11g	1	2462	16.46	---	---	---



3.2 RF Output Power

3.2.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

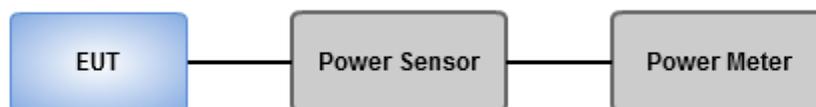
- Antenna gain \leq 6dBi, no any corresponding reduction is in output power limit.
- Antenna gain $>$ 6dBi
 - Non Fixed, point to point operations.
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB
 - Fixed, 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

3.2.2 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.

3.2.3 Test Setup



3.2.4 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	1	2412	16.37	---	---	---	43.351	16.37	30.00	5.13	21.50	36.00
11b	1	2437	16.52	---	---	---	44.875	16.52	30.00	5.13	21.65	36.00
11b	1	2462	16.88	---	---	---	48.753	16.88	30.00	5.13	22.01	36.00
11g	1	2412	18.85	---	---	---	76.736	18.85	30.00	5.13	23.98	36.00
11g	1	2437	19.02	---	---	---	79.799	19.02	30.00	5.13	24.15	36.00
11g	1	2462	18.99	---	---	---	79.250	18.99	30.00	5.13	24.12	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	1	2412	14.51	---	---	---	28.249	14.51	---
11b	1	2437	14.62	---	---	---	28.973	14.62	---
11b	1	2462	14.98	---	---	---	31.477	14.98	---
11g	1	2412	12.01	---	---	---	15.885	12.01	---
11g	1	2437	14.53	---	---	---	28.379	14.53	---
11g	1	2462	12.32	---	---	---	17.061	12.32	---

Note: Conducted average output power is for reference only.

3.3 Power Spectral Density

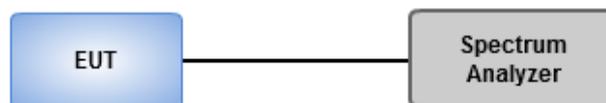
3.3.1 Limit of Power Spectral Density

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

3.3.2 Test Procedures

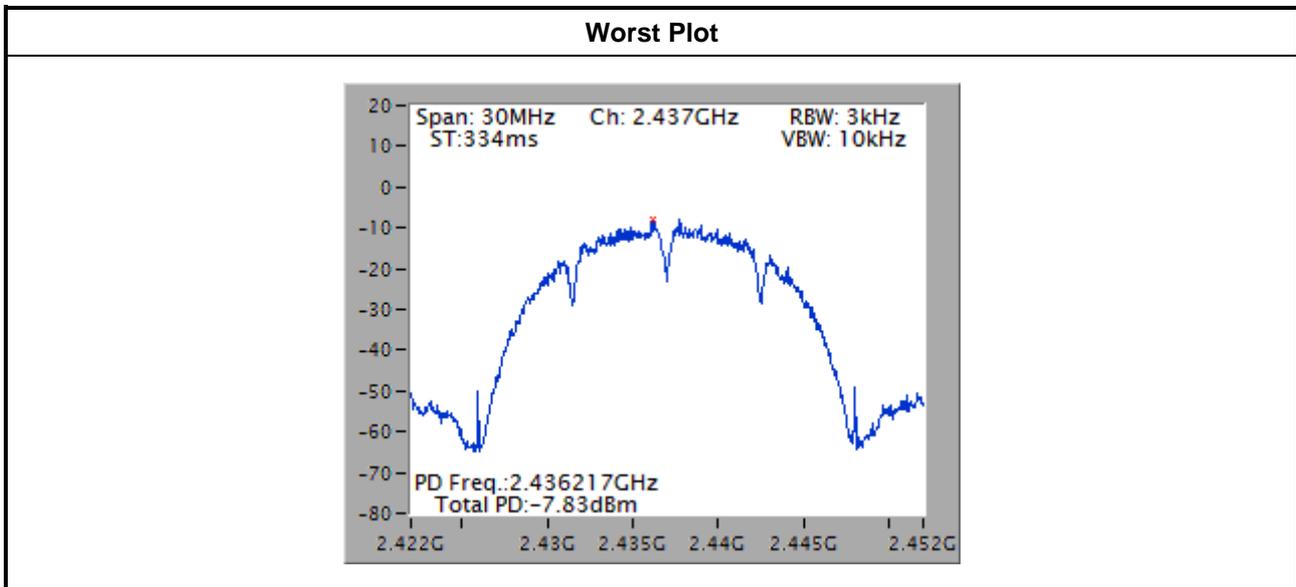
- Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.
 1. Set the RBW = 3kHz, VBW = 10kHz.
 2. Detector = Peak, Sweep time = auto couple.
 3. Trace mode = max hold, allow trace to fully stabilize.
 4. Use the peak marker function to determine 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: $\geq 10 \times (\text{number of measurement points in sweep}) \times (\text{maximum data rate per stream})$.
 4. Perform the measurement over a single sweep.
 5. Use the peak marker function to determine the maximum amplitude level.

3.3.3 Test Setup



3.3.4 Test Result of Power Spectral Density

Modulation Mode	N _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	1	2412	-9.17	8.00
11b	1	2437	-7.83	8.00
11b	1	2462	-8.22	8.00
11g	1	2412	-13.90	8.00
11g	1	2437	-10.72	8.00
11g	1	2462	-12.47	8.00



3.4 Unwanted Emissions into Restricted Frequency Bands

3.4.1 Limit of Unwanted Emissions into Restricted Frequency Bands

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

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

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

3.4.2 Test Procedures

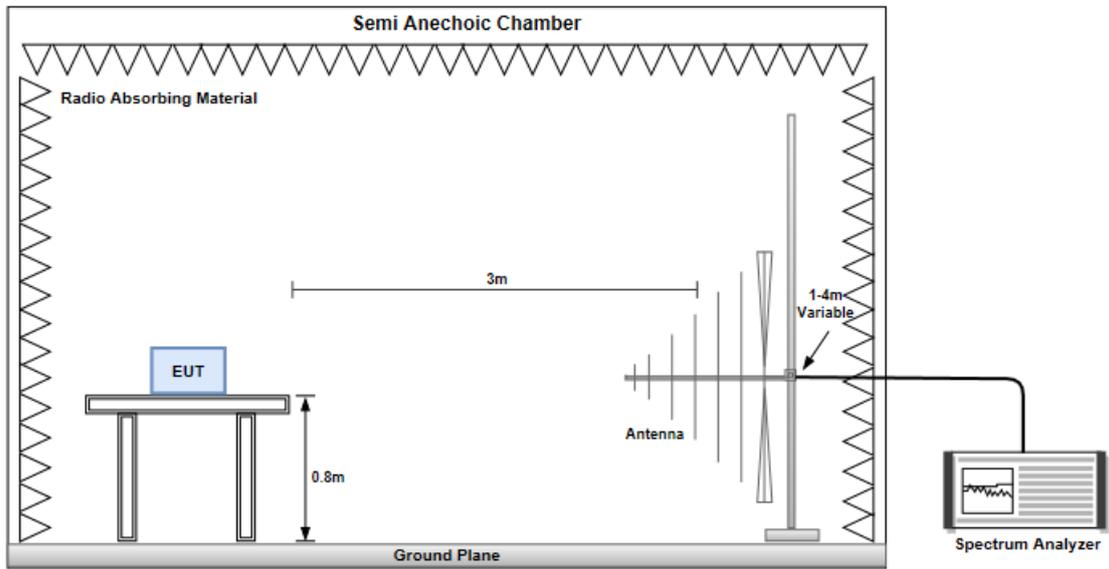
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

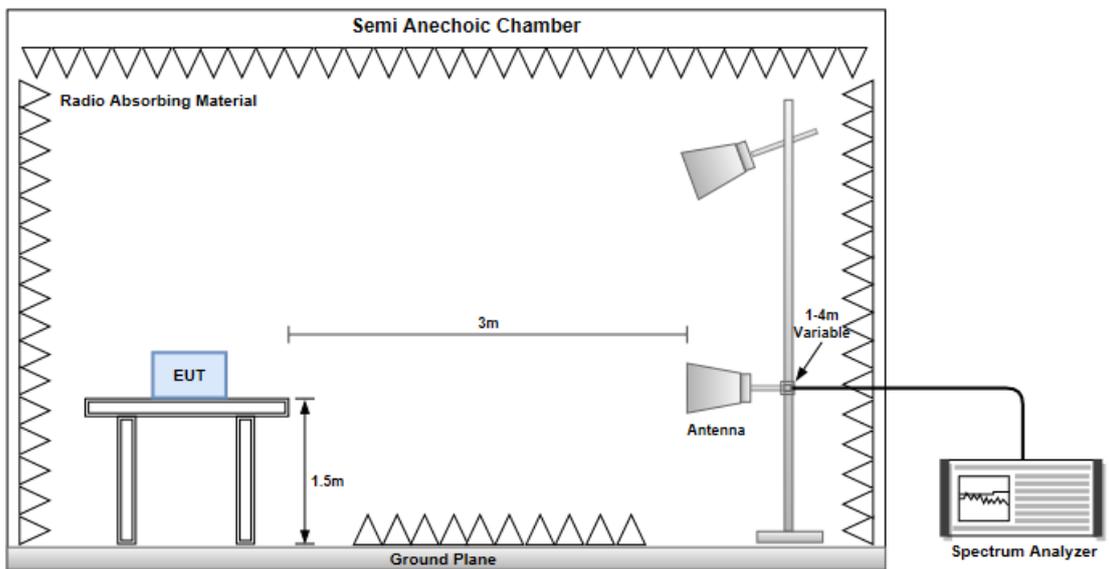
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.4.3 Test Setup

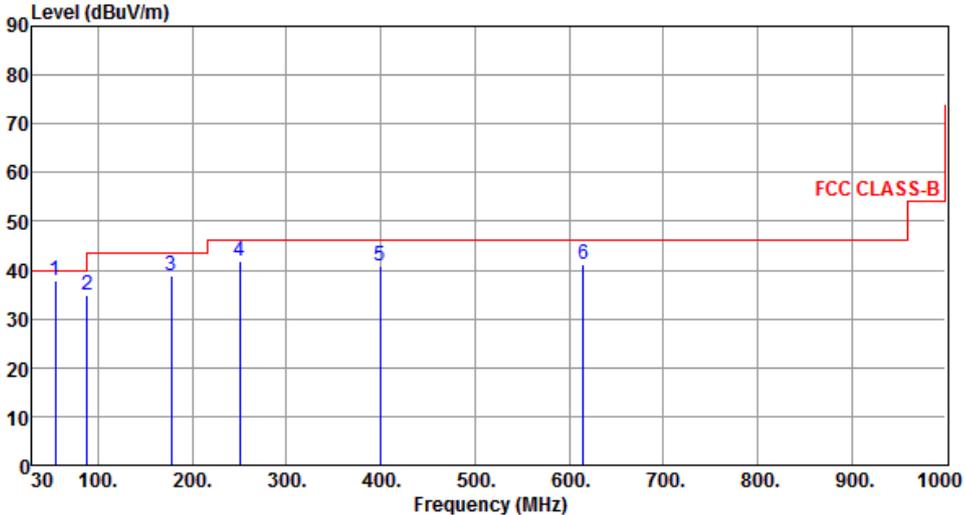
Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

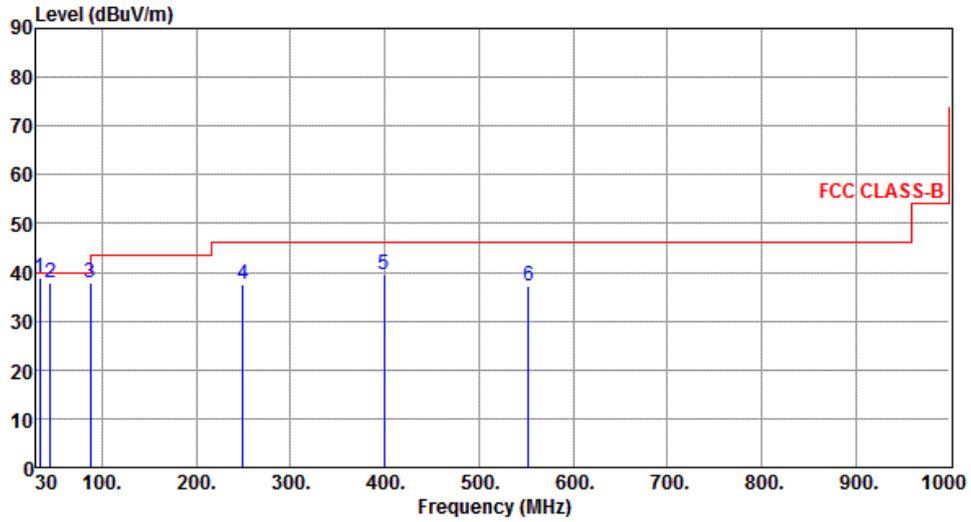


3.4.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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	54.36	37.84	40.00	-2.16	45.85	-8.01	Peak	---	---
2	88.41	34.98	43.50	-8.52	49.22	-14.24	QP	176	102
3	177.38	38.82	43.50	-4.68	48.25	-9.43	Peak	---	---
4	250.14	42.01	46.00	-3.99	51.35	-9.34	QP	100	240
5	399.49	40.80	46.00	-5.20	45.75	-4.95	Peak	---	---
6	614.88	41.17	46.00	-4.83	41.68	-0.51	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	33.85	38.87	40.00	-1.13	47.39	-8.52	QP	100	209
2	44.75	37.96	40.00	-2.04	45.75	-7.79	QP	100	275
3	87.32	37.83	40.00	-2.17	51.88	-14.05	Peak	---	---
4	249.23	37.63	46.00	-8.37	46.98	-9.35	Peak	---	---
5	399.47	39.35	46.00	-6.65	44.30	-4.95	Peak	---	---
6	552.76	37.31	46.00	-8.69	38.98	-1.67	Peak	---	---

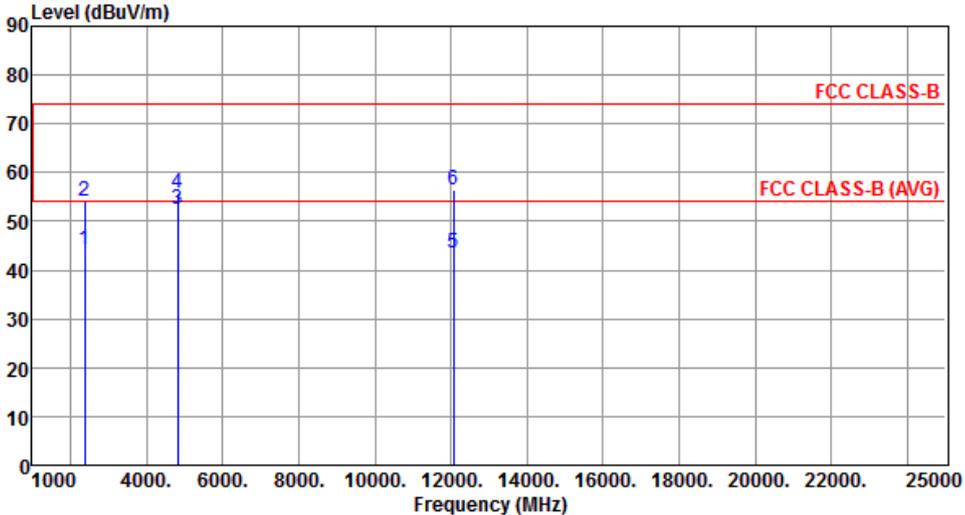
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

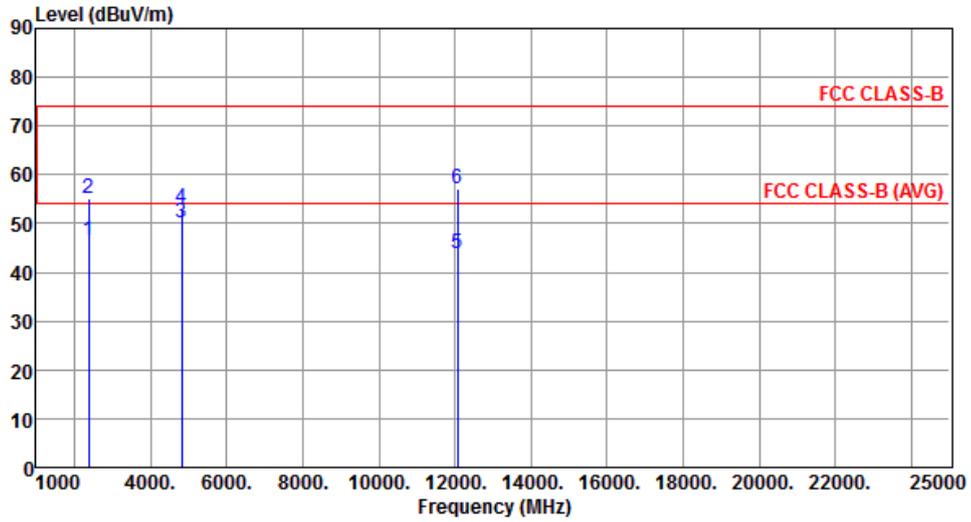
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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

Modulation	11b	Test Freq. (MHz)	2412						
Polarization	Horizontal								
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	44.11	54.00	-9.89	47.69	-3.58	Average	204	49
2	2390.00	54.14	74.00	-19.86	57.72	-3.58	Peak	204	49
3	4824.00	52.37	54.00	-1.63	48.70	3.67	Average	100	186
4	4824.00	55.67	74.00	-18.33	52.00	3.67	Peak	100	186
5	12060.00	43.61	54.00	-10.39	30.30	13.31	Average	100	162
6	12060.00	56.45	74.00	-17.55	43.14	13.31	Peak	100	162
<p>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).</p>									

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



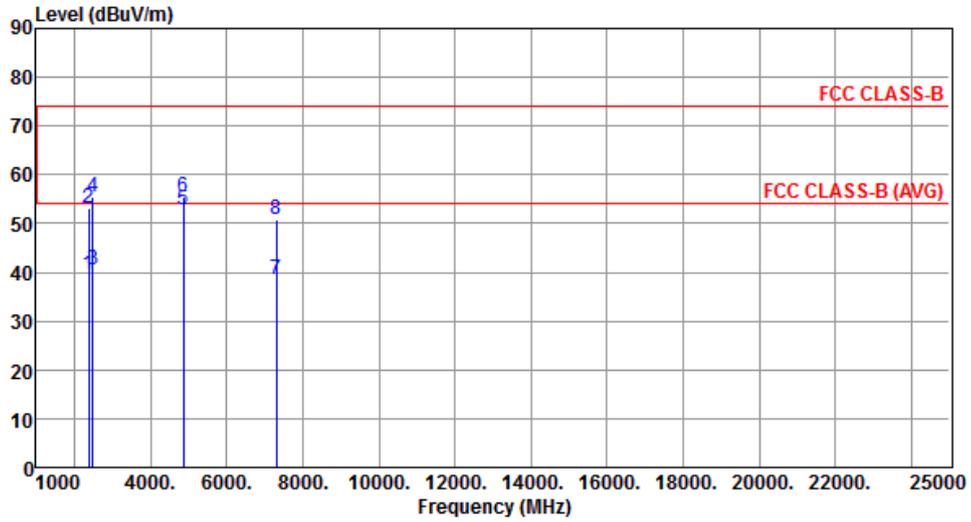
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.46	54.00	-7.54	50.04	-3.58	Average	118	106
2	2390.00	55.07	74.00	-18.93	58.65	-3.58	Peak	118	106
3	4824.00	49.99	54.00	-4.01	46.32	3.67	Average	100	144
4	4824.00	53.21	74.00	-20.79	49.54	3.67	Peak	100	144
5	12060.00	43.70	54.00	-10.30	30.39	13.31	Average	100	169
6	12060.00	57.05	74.00	-16.95	43.74	13.31	Peak	100	169

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



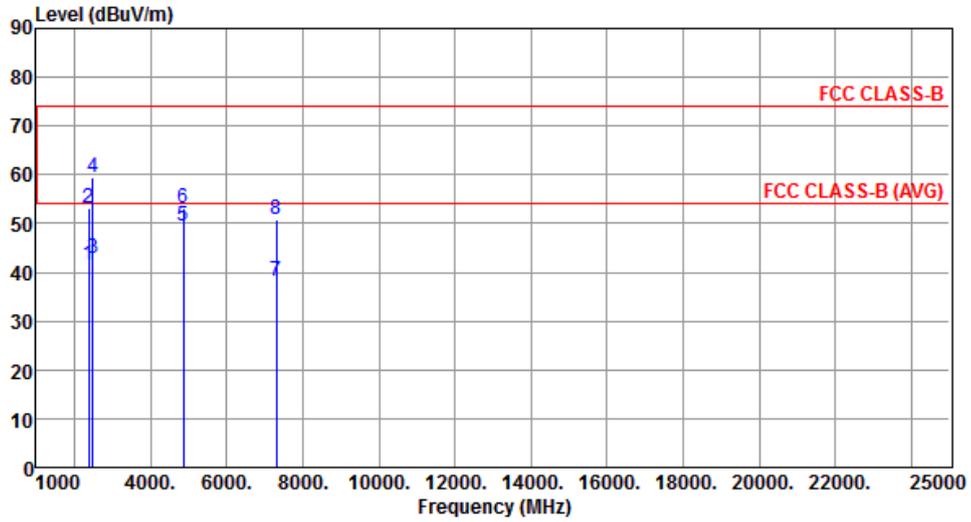
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.51	54.00	-14.49	43.09	-3.58	Average	176	50
2	2390.00	53.15	74.00	-20.85	56.73	-3.58	Peak	176	50
3	2483.50	40.50	54.00	-13.50	43.68	-3.18	Average	176	50
4	2483.50	55.48	74.00	-18.52	58.66	-3.18	Peak	176	50
5	4874.00	52.70	54.00	-1.30	48.90	3.80	Average	100	211
6	4874.00	55.33	74.00	-18.67	51.53	3.80	Peak	100	211
7	7311.00	38.65	54.00	-15.35	30.56	8.09	Average	100	184
8	7311.00	50.77	74.00	-23.23	42.68	8.09	Peak	100	184

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



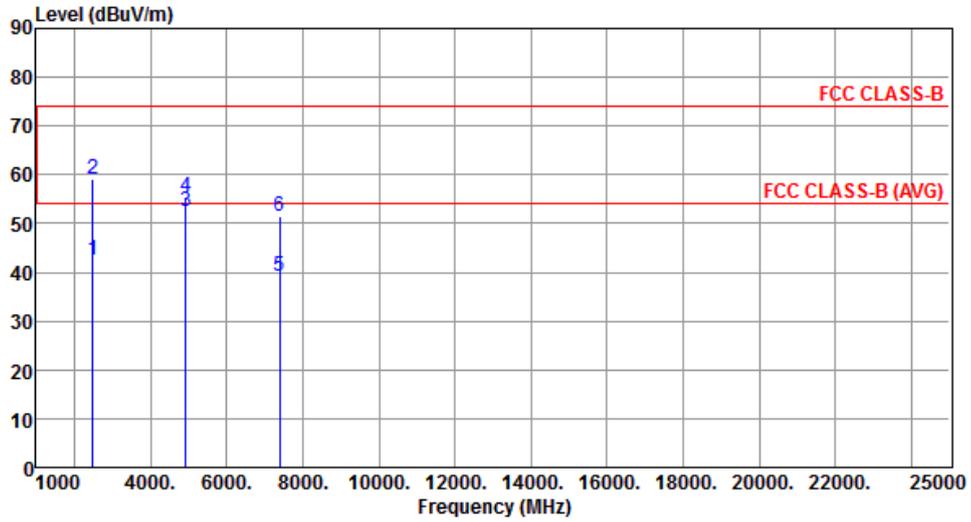
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	41.62	54.00	-12.38	45.20	-3.58	Average	100	102
2	2390.00	53.26	74.00	-20.74	56.84	-3.58	Peak	100	102
3	2483.50	42.92	54.00	-11.08	46.10	-3.18	Average	100	102
4	2483.50	59.37	74.00	-14.63	62.55	-3.18	Peak	100	102
5	4874.00	49.57	54.00	-4.43	45.77	3.80	Average	111	146
6	4874.00	53.15	74.00	-20.85	49.35	3.80	Peak	111	146
7	7311.00	38.29	54.00	-15.71	30.20	8.09	Average	100	158
8	7311.00	50.65	74.00	-23.35	42.56	8.09	Peak	100	158

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		



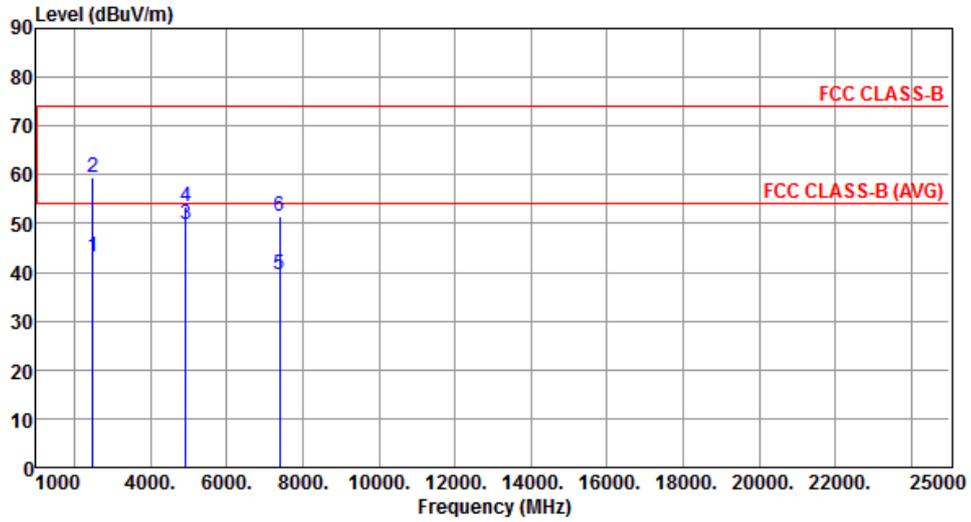
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	42.49	54.00	-11.51	45.67	-3.18	Average	200	44
2	2483.50	59.06	74.00	-14.94	62.24	-3.18	Peak	200	44
3	4924.00	52.36	54.00	-1.64	48.41	3.95	Average	101	187
4	4924.00	55.57	74.00	-18.43	51.62	3.95	Peak	101	187
5	7386.00	39.28	54.00	-14.72	31.07	8.21	Average	100	195
6	7386.00	51.38	74.00	-22.62	43.17	8.21	Peak	100	195

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	43.23	54.00	-10.77	46.41	-3.18	Average	113	105
2	2483.50	59.39	74.00	-14.61	62.57	-3.18	Peak	113	105
3	4924.00	49.81	54.00	-4.19	45.86	3.95	Average	100	172
4	4924.00	53.34	74.00	-20.66	49.39	3.95	Peak	100	172
5	7386.00	39.48	54.00	-14.52	31.27	8.21	Average	100	177
6	7386.00	51.53	74.00	-22.47	43.32	8.21	Peak	100	177

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

*Factor includes antenna factor , cable loss and amplifier gain

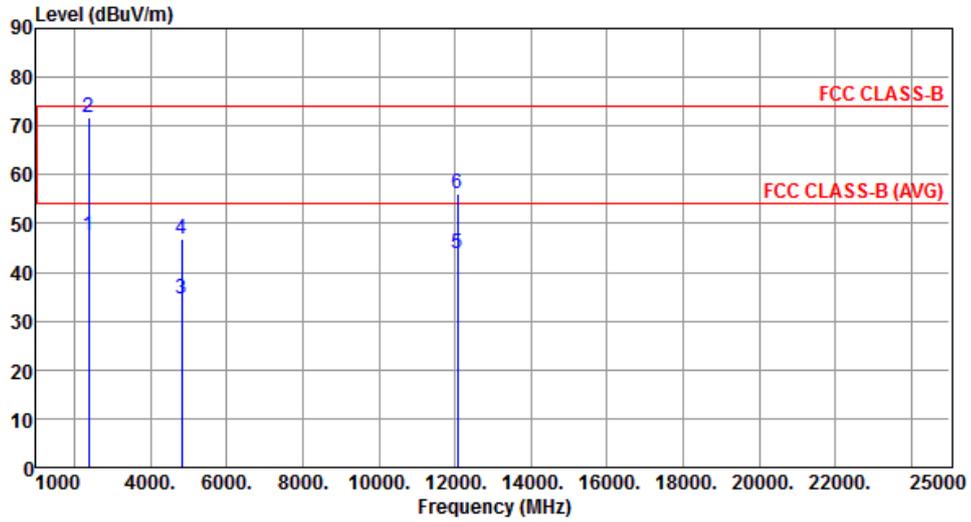
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

Modulation	11g	Test Freq. (MHz)	2412						
Polarization	Horizontal								
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.78	54.00	-9.22	48.36	-3.58	Average	202	51
2	2390.00	64.84	74.00	-9.16	68.42	-3.58	Peak	202	51
3	4824.00	34.42	54.00	-19.58	30.75	3.67	Average	100	209
4	4824.00	47.16	74.00	-26.84	43.49	3.67	Peak	100	209
5	12060.00	43.64	54.00	-10.36	30.33	13.31	Average	100	155
6	12060.00	56.04	74.00	-17.96	42.73	13.31	Peak	100	155

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		



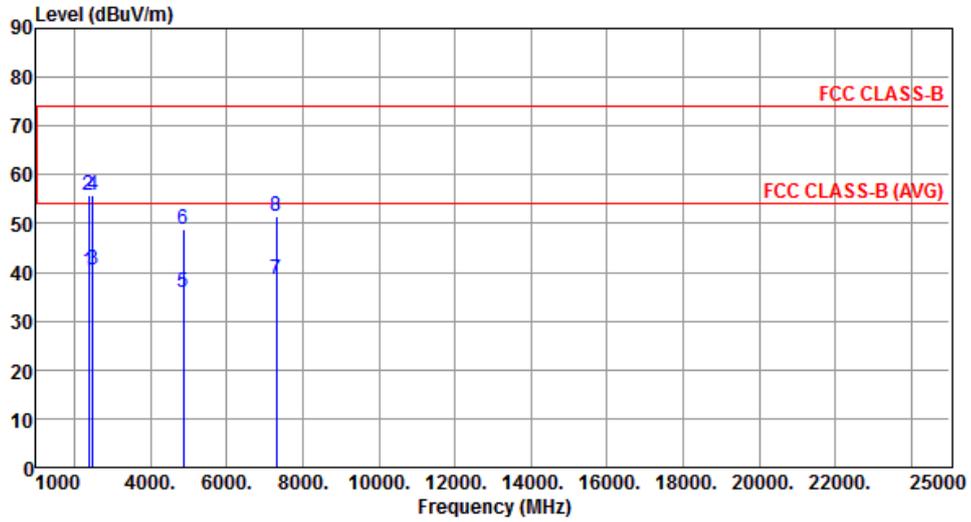
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	47.50	54.00	-6.50	51.08	-3.58	Average	117	117
2	2390.00	71.90	74.00	-2.10	75.48	-3.58	Peak	117	117
3	4824.00	34.70	54.00	-19.30	31.03	3.67	Average	100	134
4	4824.00	46.79	74.00	-27.21	43.12	3.67	Peak	100	134
5	12060.00	43.70	54.00	-10.30	30.39	13.31	Average	100	193
6	12060.00	56.02	74.00	-17.98	42.71	13.31	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).

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



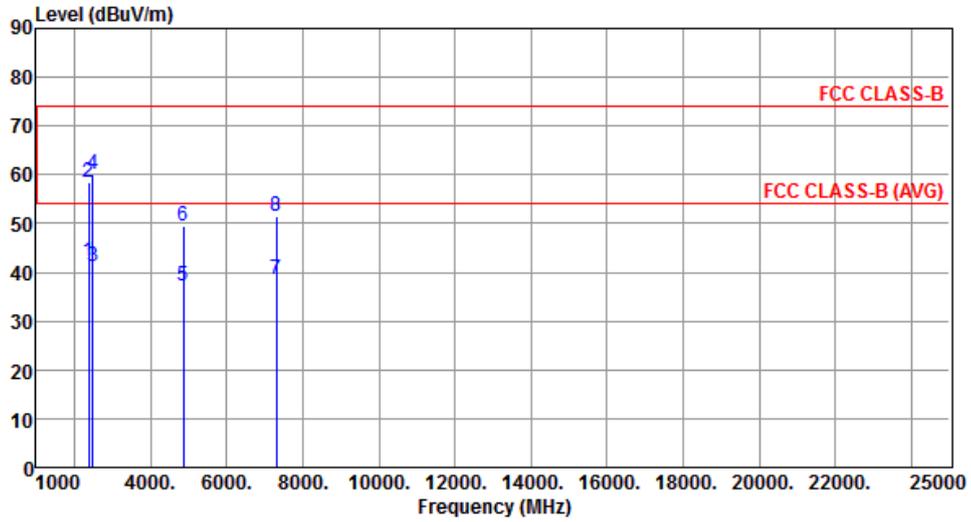
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	40.27	54.00	-13.73	43.85	-3.58	Average	203	51
2	2390.00	55.73	74.00	-18.27	59.31	-3.58	Peak	203	51
3	2483.50	40.67	54.00	-13.33	43.85	-3.18	Average	203	51
4	2483.50	55.94	74.00	-18.06	59.12	-3.18	Peak	203	51
5	4874.00	35.85	54.00	-18.15	32.05	3.80	Average	100	229
6	4874.00	48.68	74.00	-25.32	44.88	3.80	Peak	100	229
7	7311.00	38.53	54.00	-15.47	30.44	8.09	Average	100	201
8	7311.00	51.46	74.00	-22.54	43.37	8.09	Peak	100	201

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



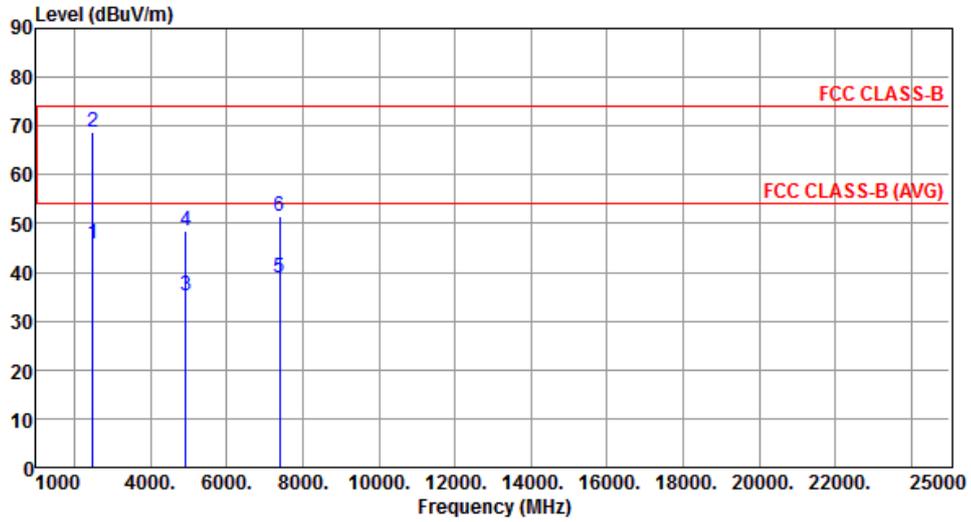
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.33	54.00	-11.67	45.91	-3.58	Average	121	105
2	2390.00	58.53	74.00	-15.47	62.11	-3.58	Peak	121	105
3	2483.50	41.19	54.00	-12.81	44.37	-3.18	Average	121	105
4	2483.50	60.22	74.00	-13.78	63.40	-3.18	Peak	121	105
5	4874.00	37.13	54.00	-16.87	33.33	3.80	Average	100	158
6	4874.00	49.59	74.00	-24.41	45.79	3.80	Peak	100	158
7	7311.00	38.61	54.00	-15.39	30.52	8.09	Average	100	147
8	7311.00	51.46	74.00	-22.54	43.37	8.09	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).

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



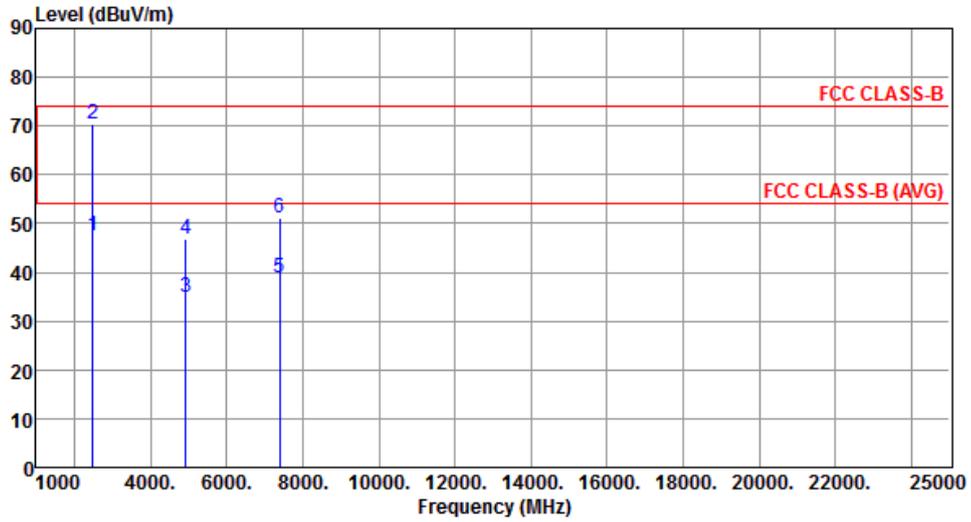
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	45.89	54.00	-8.11	49.07	-3.18	Average	201	52
2	2483.50	68.62	74.00	-5.38	71.80	-3.18	Peak	201	52
3	4924.00	35.07	54.00	-18.93	31.12	3.95	Average	100	223
4	4924.00	48.33	74.00	-25.67	44.38	3.95	Peak	100	223
5	7386.00	38.92	54.00	-15.08	30.71	8.21	Average	100	198
6	7386.00	51.36	74.00	-22.64	43.15	8.21	Peak	100	198

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	47.45	54.00	-6.55	50.63	-3.18	Average	113	107
2	2483.50	70.24	74.00	-3.76	73.42	-3.18	Peak	113	107
3	4924.00	34.71	54.00	-19.29	30.76	3.95	Average	101	174
4	4924.00	46.98	74.00	-27.02	43.03	3.95	Peak	101	174
5	7386.00	38.79	54.00	-15.21	30.58	8.21	Average	100	178
6	7386.00	51.17	74.00	-22.83	42.96	8.21	Peak	100	178

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 Emissions in Non-Restricted Frequency Bands

3.5.1 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

3.5.2 Test Procedures

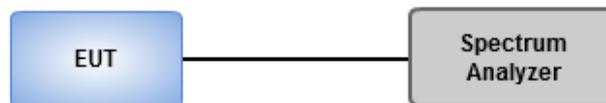
Reference level measurement

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

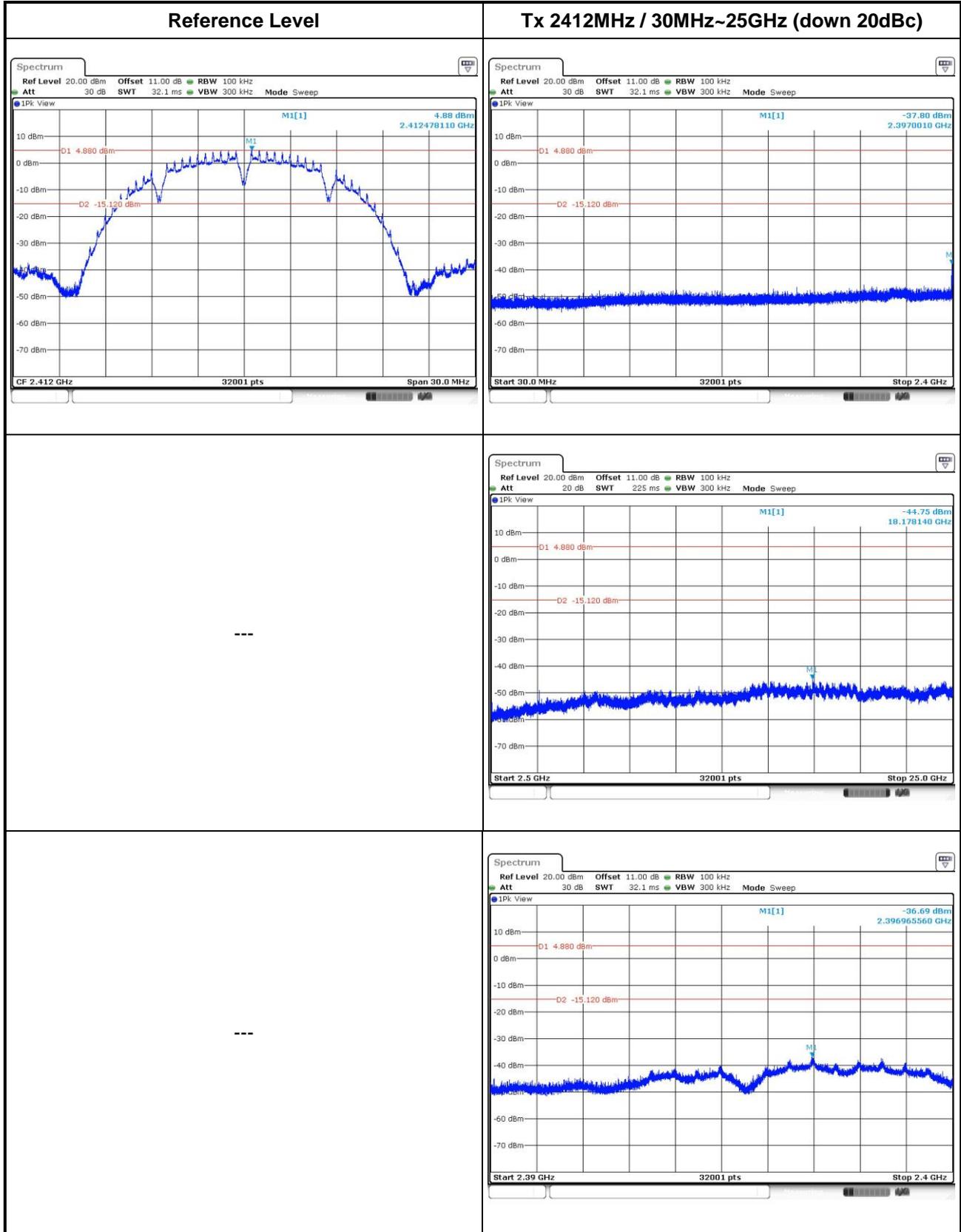
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

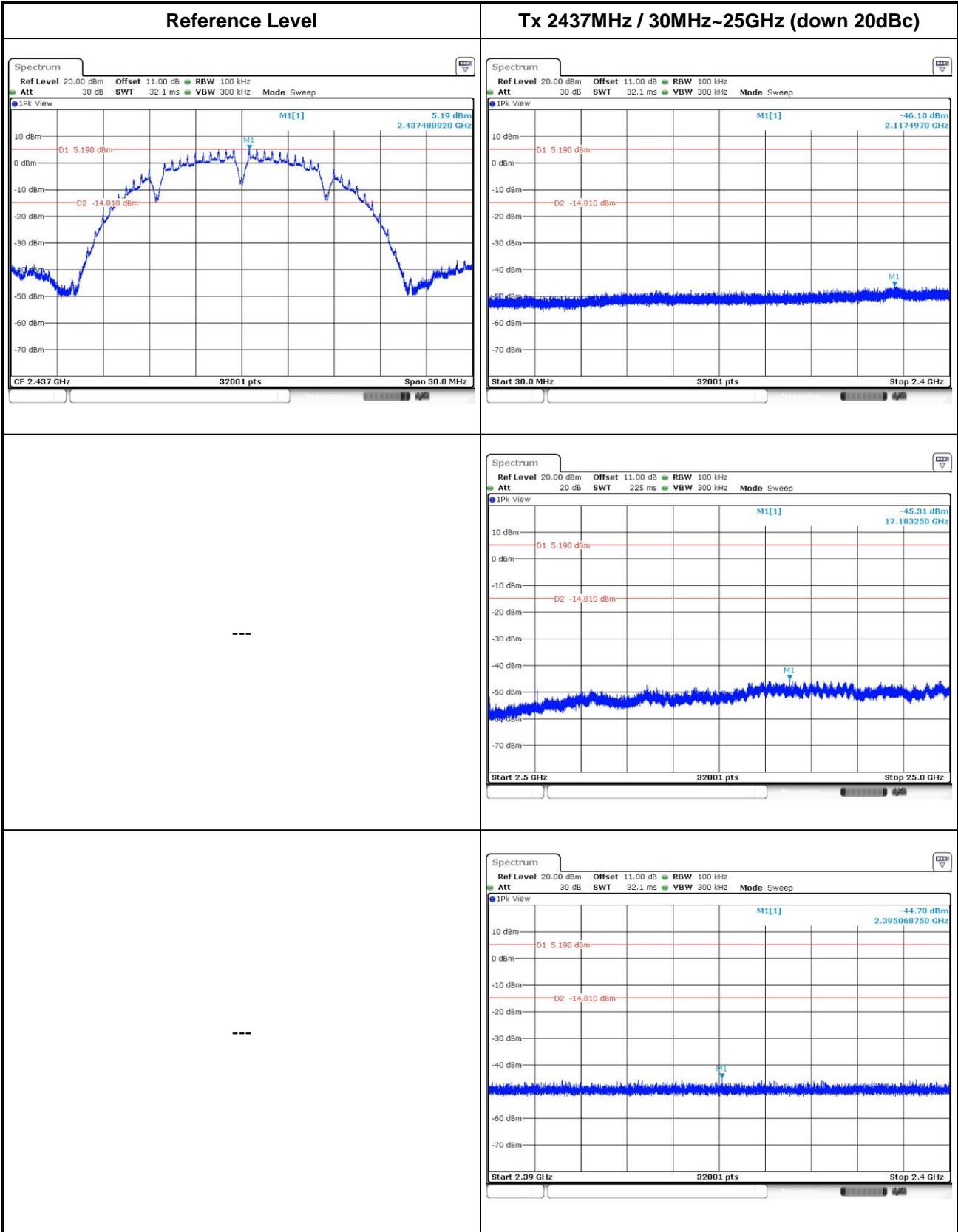
3.5.3 Test Setup

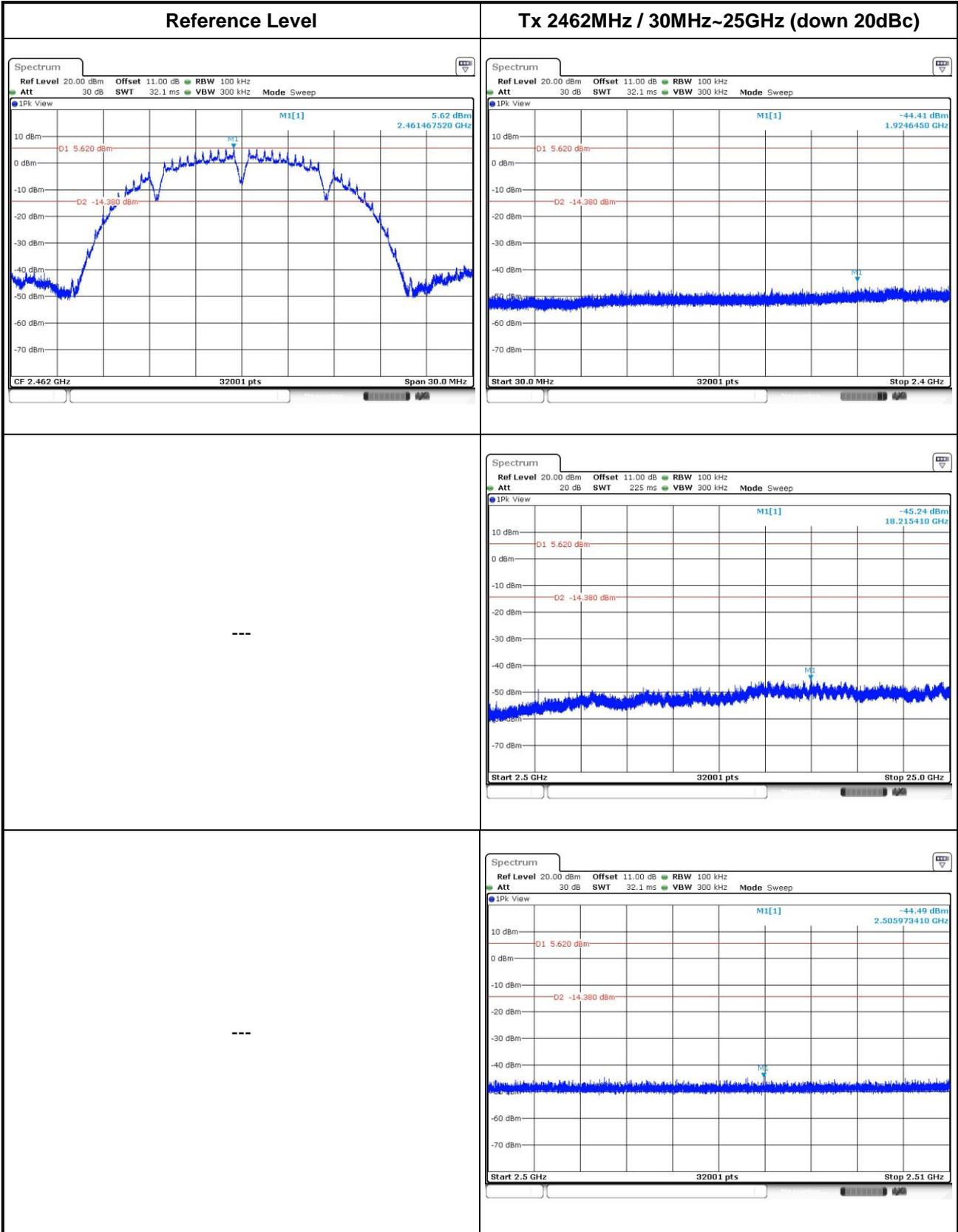


3.5.4 Unwanted Emissions into Non-Restricted Frequency Bands

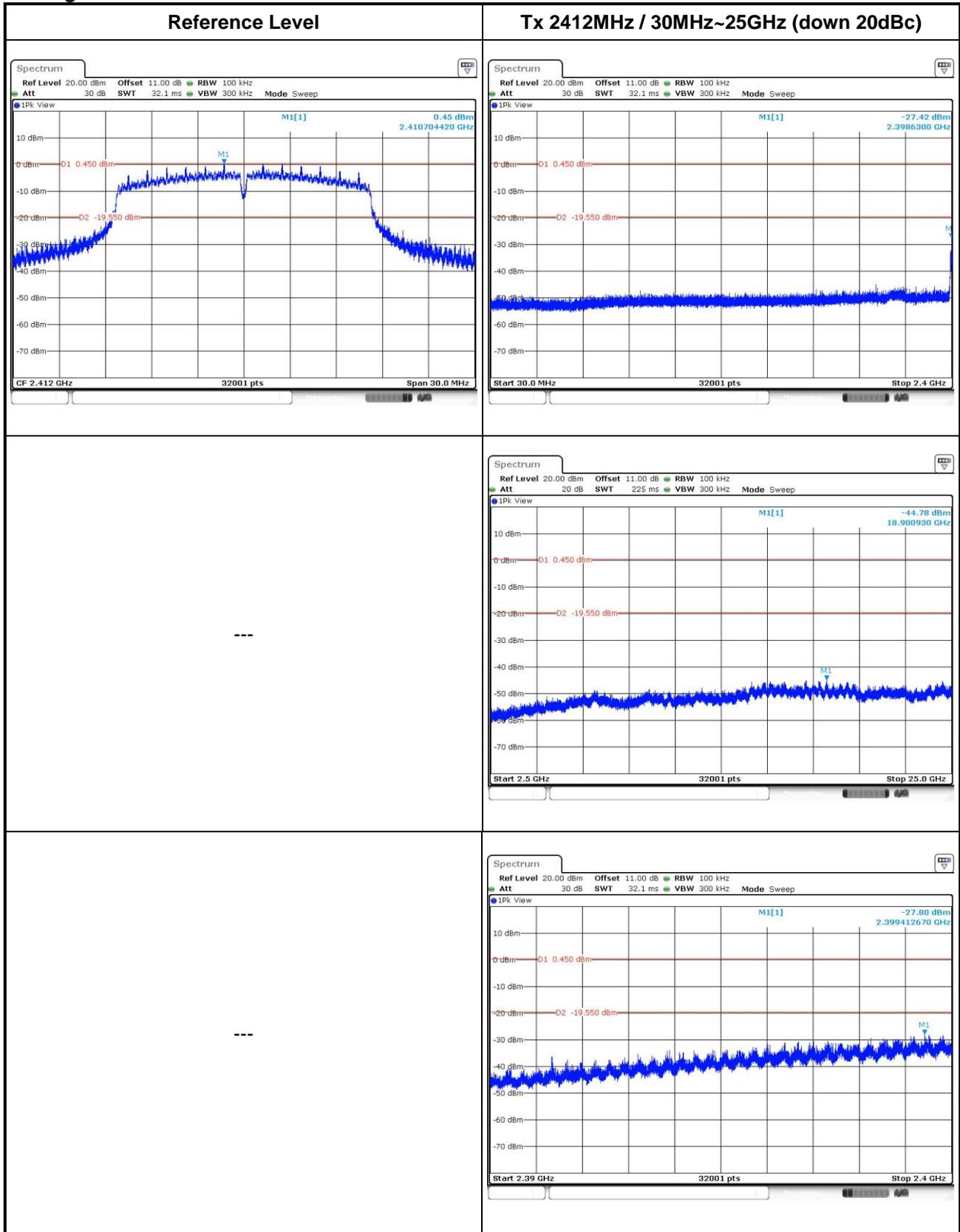
802.11b

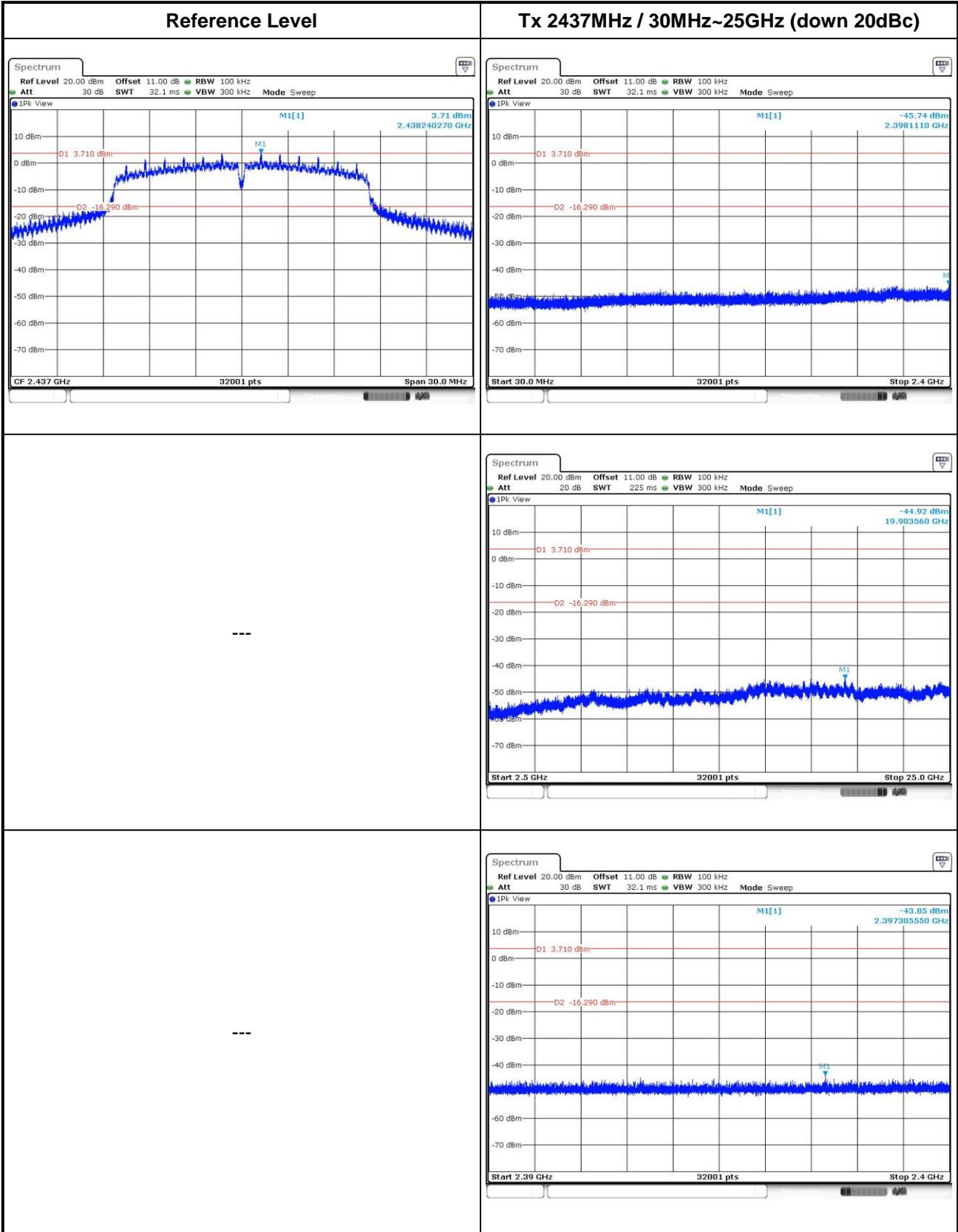


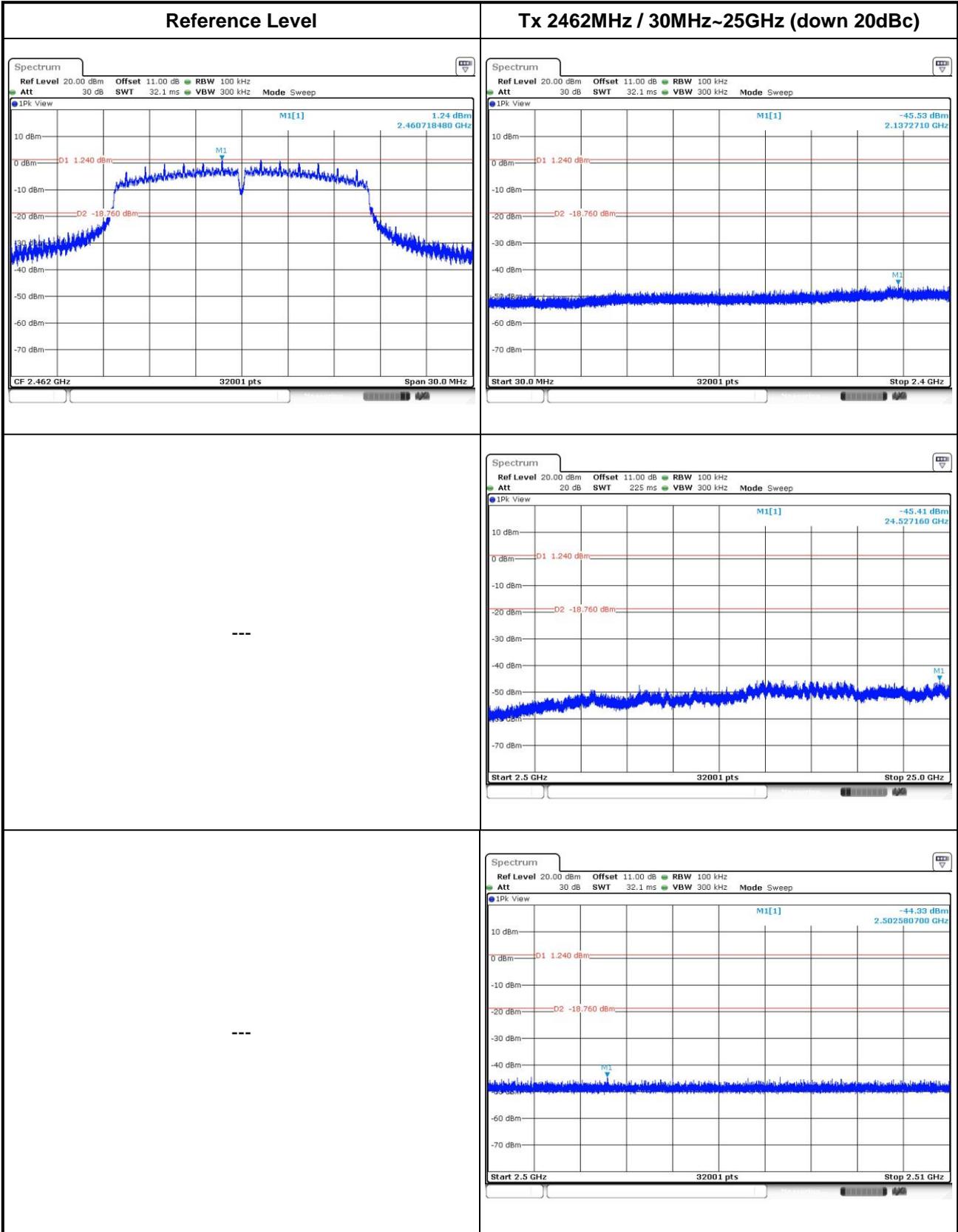




802.11g







4 Test laboratory information

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

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

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

Linkou

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Taiwan, R.O.C.

Kwei Shan

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No. 3-1, Lane 6, Wen San 3rd St.,
Kwei Shan District, Tao Yuan City
333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

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==