

FCC Test Report

FCC ID : XNAWBS05
Equipment : Withings Body
Model No. : WBS05
Brand Name : Withings
Applicant : Withings
Address : 2 rue Maurice Hartmann 92130
Issy-les-Moulineaux 92130 France
Standard : 47 CFR FCC Part 15.247
Received Date : Dec. 18, 2015
Tested Date : Dec. 21, 2015 ~ Jan. 04, 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



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Release Record

Report No.	Version	Description	Issued Date
FR5D1801AC	Rev. 01	Initial issue	Jan. 21, 2016

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	Note	N/A
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 4874.00MHz 48.36 (Margin -5.64dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 22.11	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

Note: The EUT consumes DC power from battery, 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
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0-7
Note 1: RF output power specifies that Maximum Peak Conducted Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Model	Brand	Type	Connector	Gain (dBi)
1	BROADCOM	BCM9Fractal64	PCB	NA	2.8

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	6Vdc from battery (1.5Vdc AAA battery (x4))
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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 Test Tool and Duty Cycle

Test Tool	Tere Term, Version: 4.74		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	99.32%	0.03
	11g	94.23%	0.26
	HT20	94.30%	0.25

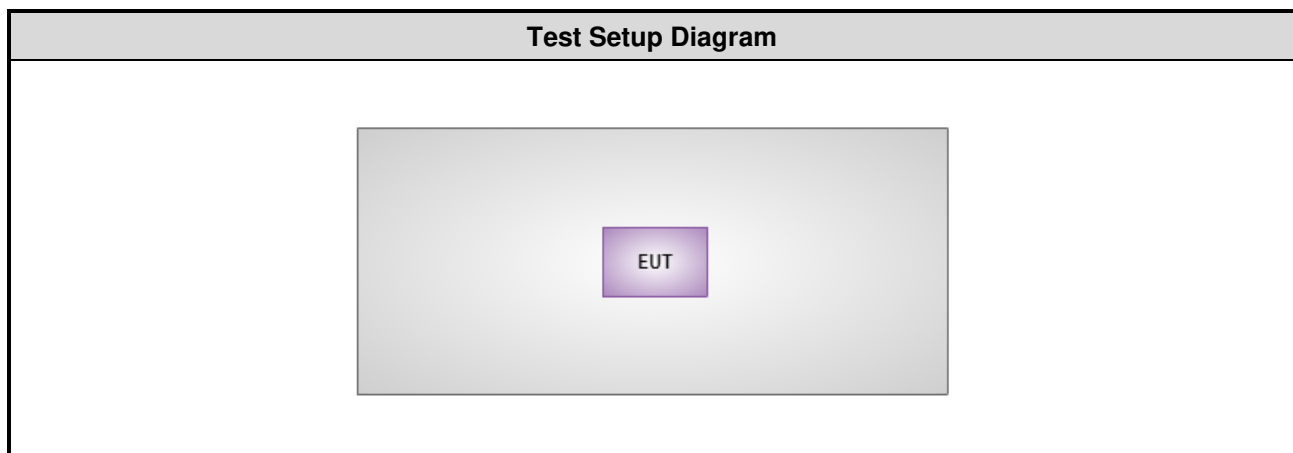
1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	Default
11b	2437	Default
11b	2462	Default
11g	2412	Default
11g	2437	Default
11g	2462	Default
HT20	2412	Default
HT20	2437	Default
HT20	2462	Default

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6440	DoC	---

1.3 Test Setup Chart



Note: The support notebook is disconnected from EUT and removed from test table when EUT is set to transmit continuously.

1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 2 / (03CH02-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Dec. 17, 2015	Dec. 16, 2016
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
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 10, 2015	Dec. 09, 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. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 10, 2015	Dec. 09, 2016
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 10, 2015	Dec. 09, 2016
LF cable 10M	EMCC	CFD400-E	CFD400-001	Dec. 10, 2015	Dec. 09, 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)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
Power Meter	Anritsu	ML2495A	1241002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor	Anritsu	MA2411B	1207366	Sep. 21, 2015	Sep. 20, 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

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
Radiated emission ≤ 1 GHz	± 3.62 dB
Radiated emission > 1 GHz	± 5.60 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH02-WS	21°C / 61-65%	Anderson Hung Morgan Chen
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
Radiated Emissions ≤1GHz	HT20	2462	MCS 0	---
Radiated Emissions >1GHz	11b 11g HT20	2412 / 2437 / 2462	1 Mbps	---
Maximum Output Power		2412 / 2437 / 2462	6 Mbps	
6dB bandwidth		2412 / 2437 / 2462	MCS 0	
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

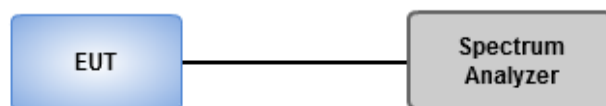
6dB Bandwidth

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) = 300 kHz, Video bandwidth = 1 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.

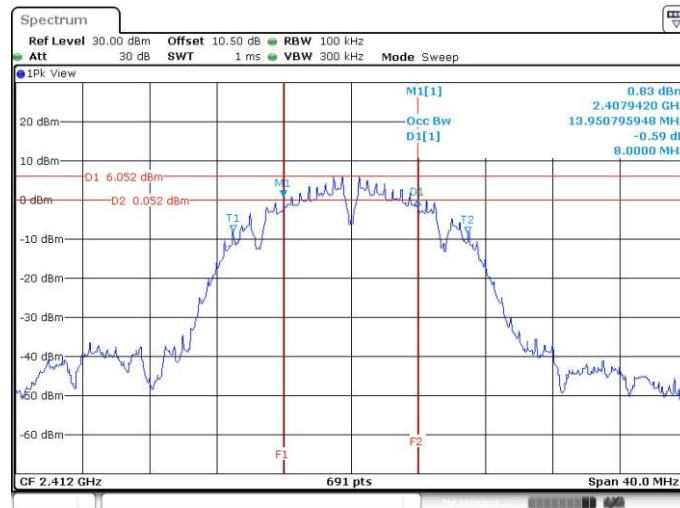
3.1.3 Test Setup



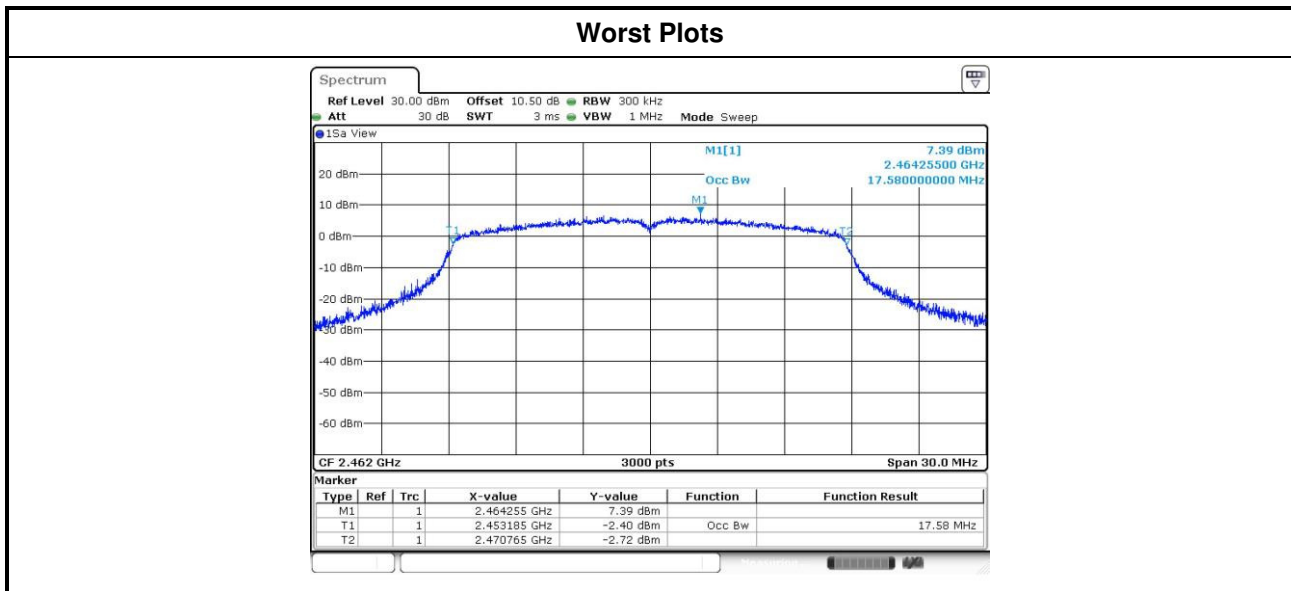
3.1.4 Test Result of 6dB and Occupied Bandwidth

Modulation Mode	N _{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	1	2412	8.00	---	---	---	500
11b	1	2437	8.52	---	---	---	500
11b	1	2462	8.58	---	---	---	500
11g	1	2412	14.20	---	---	---	500
11g	1	2437	15.13	---	---	---	500
11g	1	2462	15.13	---	---	---	500
HT20	1	2412	13.91	---	---	---	500
HT20	1	2437	15.13	---	---	---	500
HT20	1	2462	14.09	---	---	---	500

Worst Plots



Modulation Mode	N _{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	1	2412	13.98	---	---	---
11b	1	2437	13.98	---	---	---
11b	1	2462	13.97	---	---	---
11g	1	2412	16.50	---	---	---
11g	1	2437	16.49	---	---	---
11g	1	2462	16.49	---	---	---
HT20	1	2412	17.58	---	---	---
HT20	1	2437	17.56	---	---	---
HT20	1	2462	17.58	---	---	---



3.2 RF Output Power

3.2.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

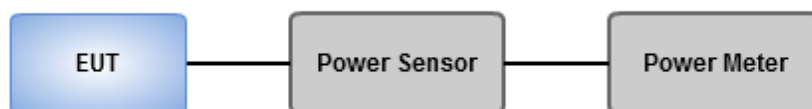
- ☒ Antenna gain $\leq 6\text{dBi}$, no any corresponding reduction is in output power limit.
- ☐ Antenna gain $> 6\text{dBi}$
 - ☐ Non Fixed, point to point operations.
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna 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	16.48	---	---	---	44.463	16.48	30.00	2.80	19.28	36.00
11b	1	2437	16.58	---	---	---	45.499	16.58	30.00	2.80	19.38	36.00
11b	1	2462	16.66	---	---	---	46.345	16.66	30.00	2.80	19.46	36.00
11g	1	2412	21.55	---	---	---	142.889	21.55	30.00	2.80	24.35	36.00
11g	1	2437	21.76	---	---	---	149.968	21.76	30.00	2.80	24.56	36.00
11g	1	2462	21.98	---	---	---	157.761	21.98	30.00	2.80	24.78	36.00
HT20	1	2412	21.74	---	---	---	149.279	21.74	30.00	2.80	24.54	36.00
HT20	1	2437	21.86	---	---	---	153.462	21.86	30.00	2.80	24.66	36.00
HT20	1	2462	22.11	---	---	---	162.555	22.11	30.00	2.80	24.91	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	14.16	---	---	---	26.062	14.16	---
11b	1	2437	14.31	---	---	---	26.977	14.31	---
11b	1	2462	14.44	---	---	---	27.797	14.44	---
11g	1	2412	13.92	---	---	---	24.660	13.92	---
11g	1	2437	13.95	---	---	---	24.831	13.95	---
11g	1	2462	14.14	---	---	---	25.942	14.14	---
HT20	1	2412	13.75	---	---	---	23.714	13.75	---
HT20	1	2437	13.86	---	---	---	24.322	13.86	---
HT20	1	2462	14.11	---	---	---	25.763	14.11	---

Note: Conducted average output power is for reference only.

3.3 Power Spectral Density

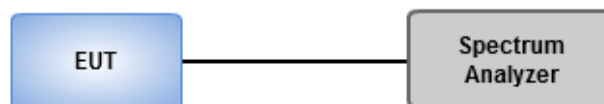
3.3.1 Limit of Power Spectral Density

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.

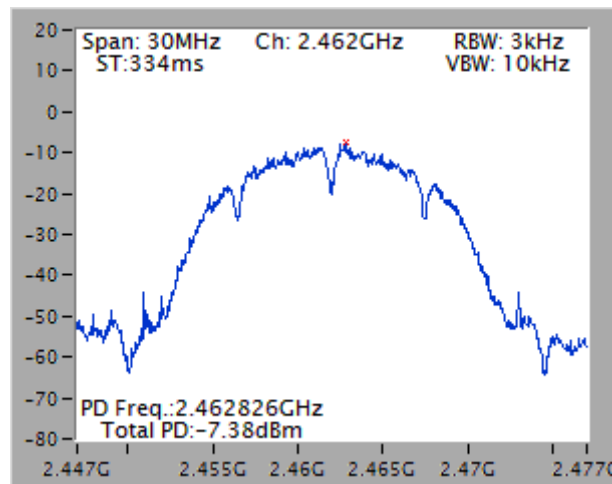
3.3.3 Test Setup



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	-8.20	8.00
11b	1	2437	-7.76	8.00
11b	1	2462	-7.38	8.00
11g	1	2412	-10.71	8.00
11g	1	2437	-9.86	8.00
11g	1	2462	-9.52	8.00
HT20	1	2412	-10.02	8.00
HT20	1	2437	-10.44	8.00
HT20	1	2462	-10.03	8.00

Worst Plots



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:
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.

3.4.2 Test Procedures

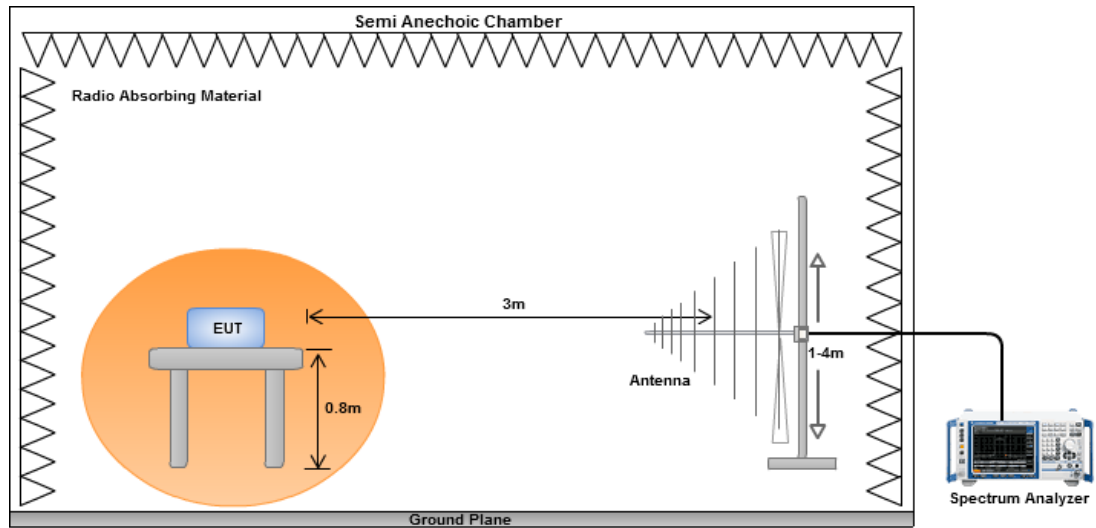
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

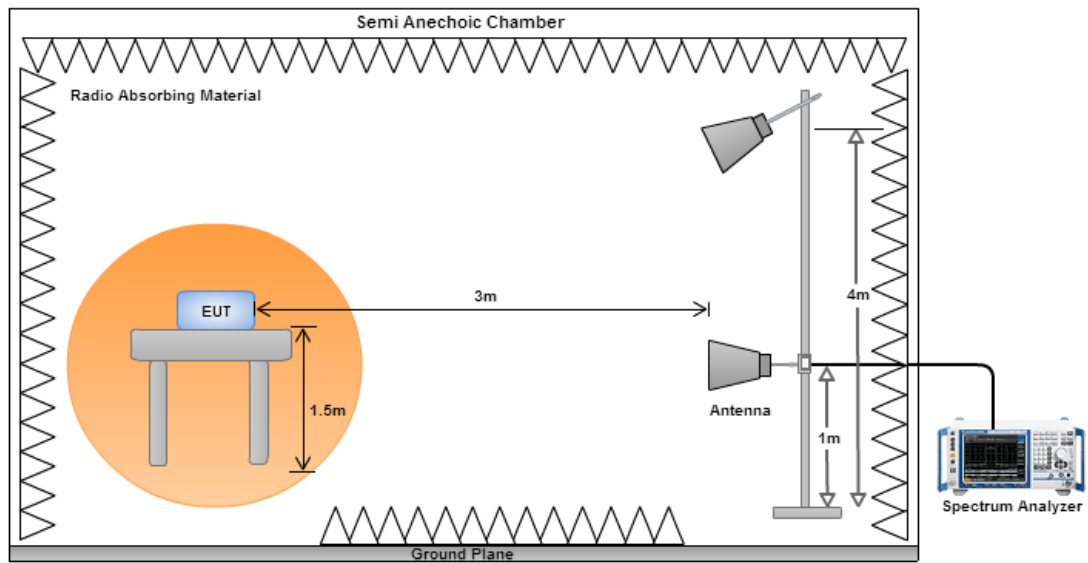
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.4.3 Test Setup

Radiated Emissions below 1 GHz



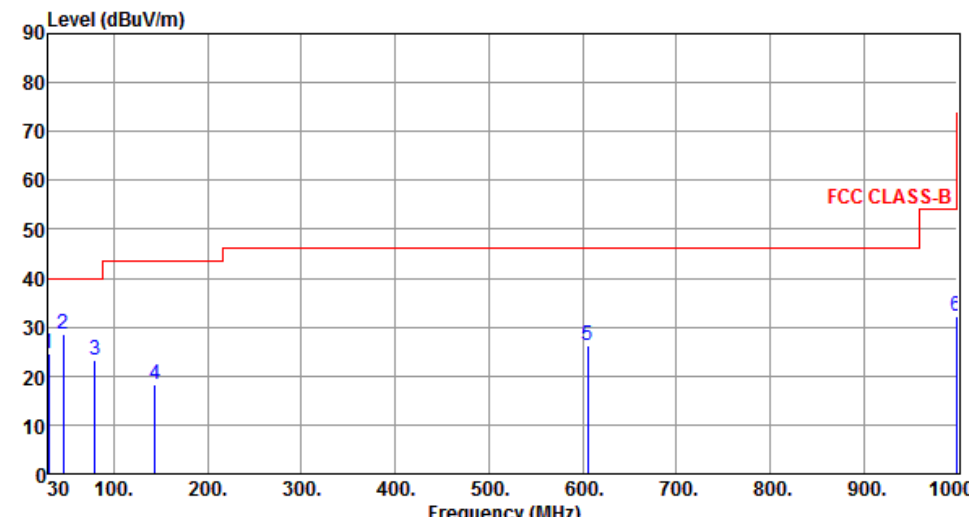
Radiated Emissions above 1 GHz



3.4.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

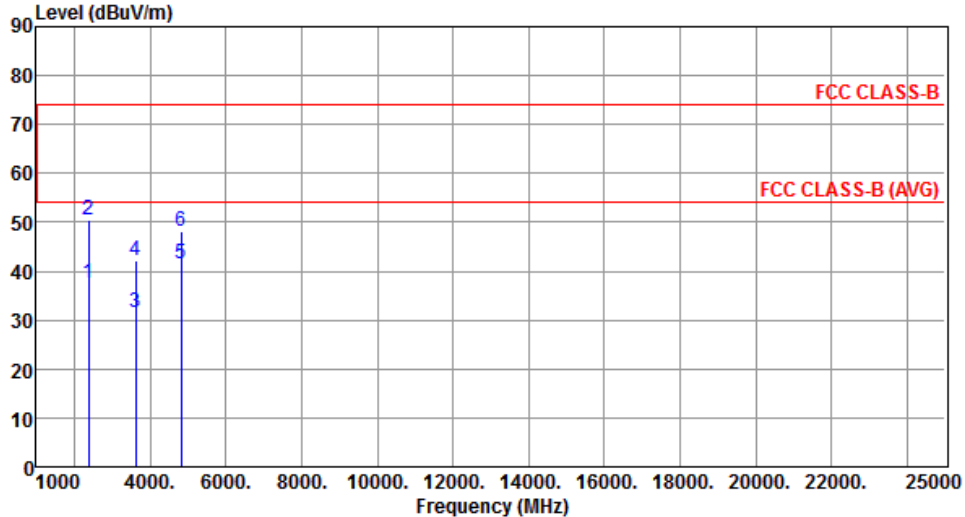


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	30.00	24.72	40.00	-15.28	37.54	-12.82	Peak	---	---
2	45.52	28.44	40.00	-11.56	40.07	-11.63	Peak	---	---
3	79.47	23.27	40.00	-16.73	39.32	-16.05	Peak	---	---
4	143.49	18.35	43.50	-25.15	30.50	-12.15	Peak	---	---
5	605.21	26.35	46.00	-19.65	30.86	-4.51	Peak	---	---
6	999.03	32.11	54.00	-21.89	31.45	0.66	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

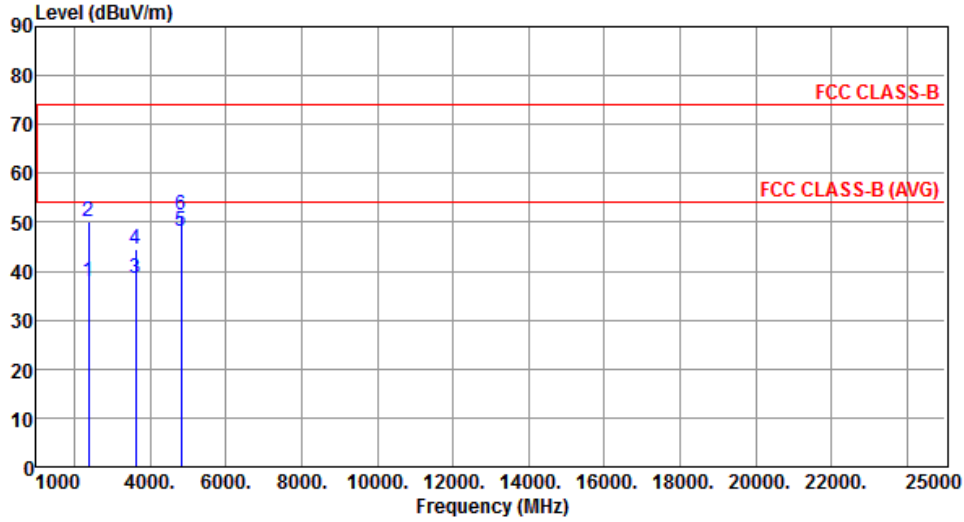
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. 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	37.38	54.00	-16.62	40.44	-3.06	Average	267	66
2	2390.00	50.32	74.00	-23.68	53.38	-3.06	Peak	267	66
3	3617.00	31.64	54.00	-22.36	31.11	0.53	Average	210	239
4	3617.00	42.34	74.00	-31.66	41.81	0.53	Peak	210	239
5	4824.00	41.51	54.00	-12.49	37.25	4.26	Average	153	63
6	4824.00	48.09	74.00	-25.91	43.83	4.26	Peak	153	63

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		

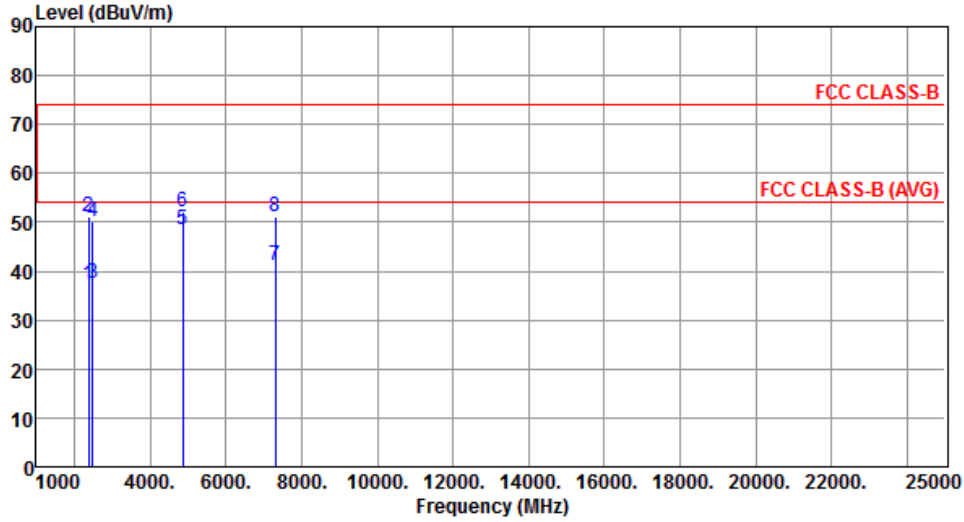


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	37.86	54.00	-16.14	40.92	-3.06	Average	340	329
2	2390.00	50.12	74.00	-23.88	53.18	-3.06	Peak	340	329
3	3617.00	38.46	54.00	-15.54	37.93	0.53	Average	100	323
4	3617.00	44.64	74.00	-29.36	44.11	0.53	Peak	100	323
5	4824.00	48.06	54.00	-5.94	43.80	4.26	Average	110	8
6	4824.00	51.56	74.00	-22.44	47.30	4.26	Peak	110	8

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		
Level (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	37.06	54.00	-16.94	40.12	-3.06	Average	351	324
2	2390.00	51.04	74.00	-22.96	54.10	-3.06	Peak	351	324
3	2483.50	37.54	54.00	-16.46	40.23	-2.69	Average	351	324
4	2483.50	50.19	74.00	-23.81	52.88	-2.69	Peak	351	324
5	4874.00	48.36	54.00	-5.64	43.96	4.40	Average	108	12
6	4874.00	52.28	74.00	-21.72	47.88	4.40	Peak	108	12
7	7311.00	41.14	54.00	-12.86	31.93	9.21	Average	276	43
8	7311.00	51.27	74.00	-22.73	42.06	9.21	Peak	276	43

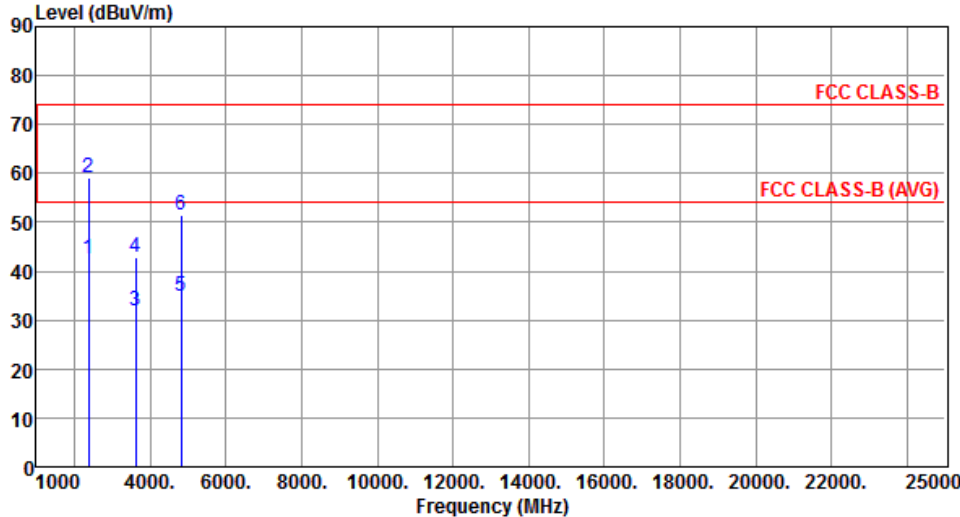
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		
Level (dBUV/m) </			

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		
Level (dBUV/m) <			

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

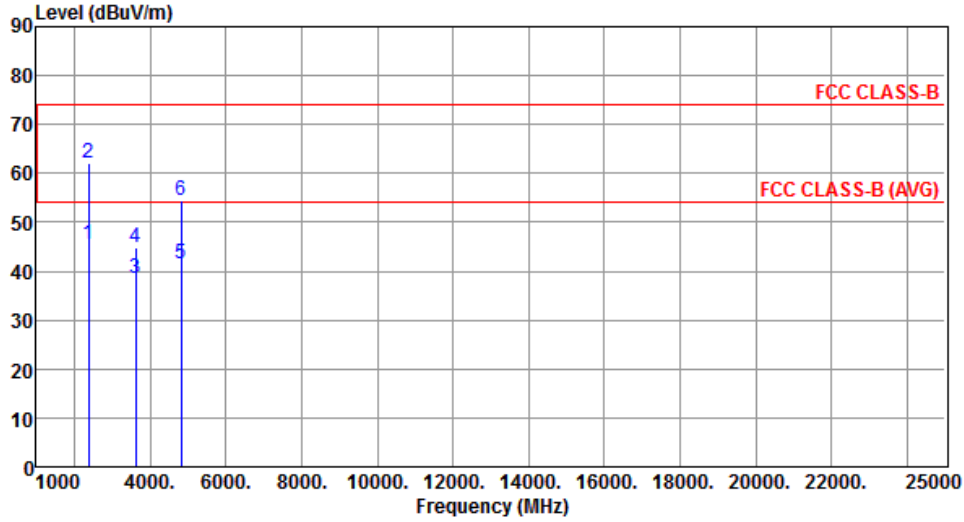
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		



	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	42.59	54.00	-11.41	45.65	-3.06	Average	243	13
2	2390.00	58.96	74.00	-15.04	62.02	-3.06	Peak	243	13
3	3617.00	31.87	54.00	-22.13	31.34	0.53	Average	220	229
4	3617.00	42.97	74.00	-31.03	42.44	0.53	Peak	220	229
5	4824.00	34.81	54.00	-19.19	30.55	4.26	Average	269	255
6	4824.00	51.41	74.00	-22.59	47.15	4.26	Peak	269	255

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).

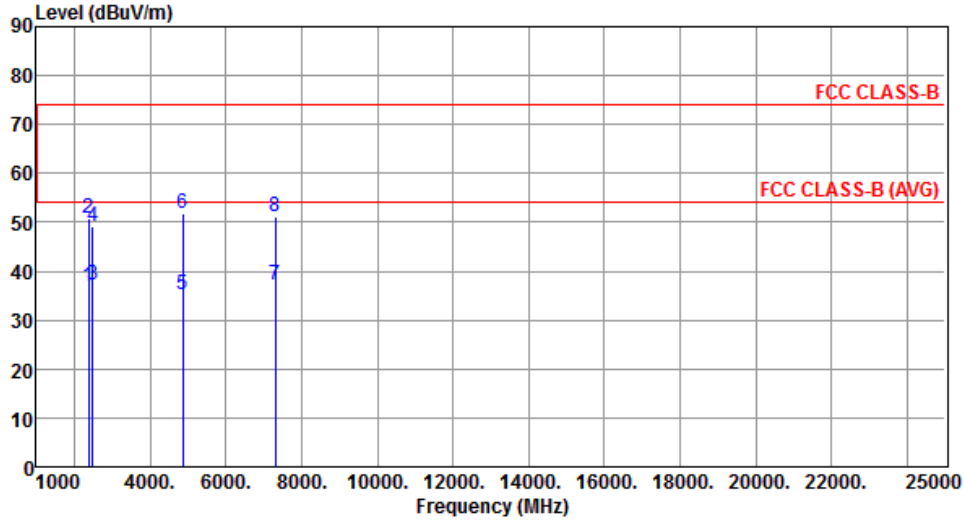
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	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	45.63	54.00	-8.37	48.69	-3.06	Average	383	334
2	2390.00	62.21	74.00	-11.79	65.27	-3.06	Peak	383	334
3	3617.00	38.58	54.00	-15.42	38.05	0.53	Average	266	31
4	3617.00	44.85	74.00	-29.15	44.32	0.53	Peak	266	31
5	4824.00	41.48	54.00	-12.52	37.22	4.26	Average	355	289
6	4824.00	54.58	74.00	-19.42	50.32	4.26	Peak	355	289

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		

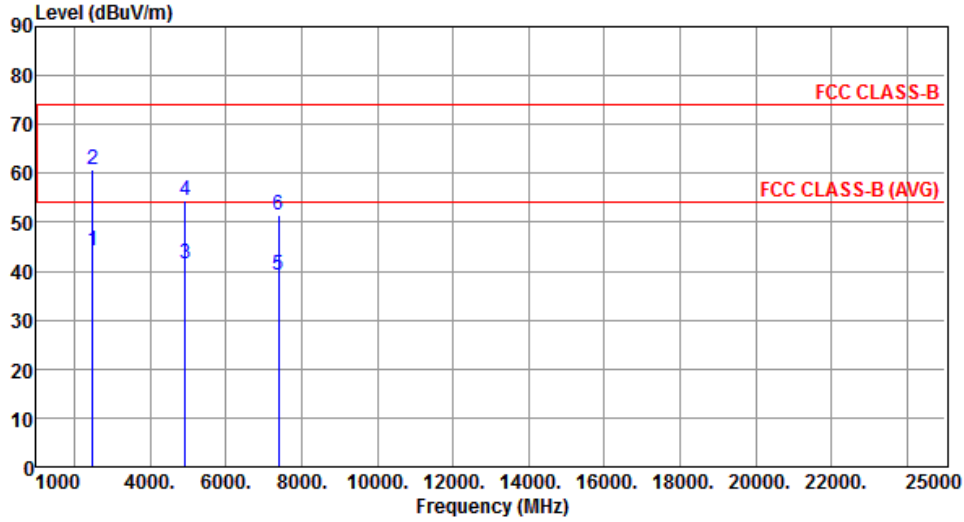


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	36.95	54.00	-17.05	40.01	-3.06	Average	345	355
2	2390.00	50.79	74.00	-23.21	53.85	-3.06	Peak	345	355
3	2483.50	37.35	54.00	-16.65	40.04	-2.69	Average	345	355
4	2483.50	49.13	74.00	-24.87	51.82	-2.69	Peak	345	355
5	4874.00	35.15	54.00	-18.85	30.75	4.40	Average	325	229
6	4874.00	51.85	74.00	-22.15	47.45	4.40	Peak	325	229
7	7311.00	37.33	54.00	-16.67	28.12	9.21	Average	315	258
8	7311.00	51.09	74.00	-22.91	41.88	9.21	Peak	315	258

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		
Level (dBuV/m) </			

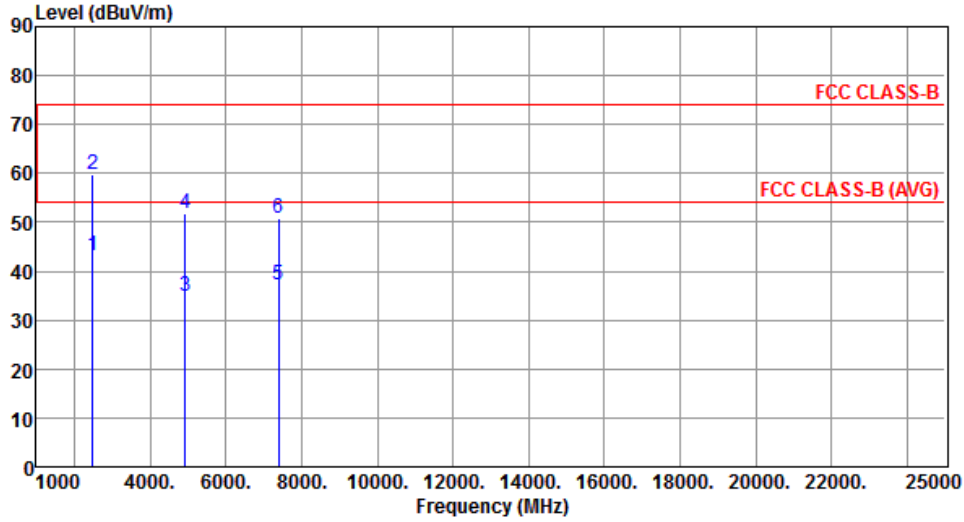
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	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	44.12	54.00	-9.88	46.81	-2.69	Average	368	346
2	2483.50	60.88	74.00	-13.12	63.57	-2.69	Peak	368	346
3	4924.00	41.55	54.00	-12.45	37.02	4.53	Average	341	30
4	4924.00	54.53	74.00	-19.47	50.00	4.53	Peak	341	30
5	7386.00	39.07	54.00	-14.93	29.68	9.39	Average	333	275
6	7386.00	51.40	74.00	-22.60	42.01	9.39	Peak	333	275

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		



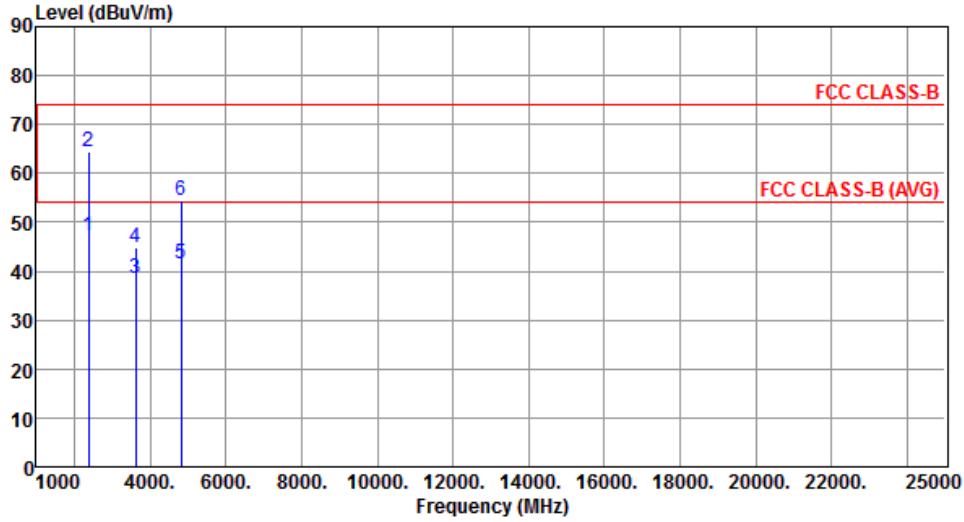
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	43.18	54.00	-10.82	45.87	-2.69	Average	355	349
2	2483.50	59.63	74.00	-14.37	62.32	-2.69	Peak	355	349
3	4924.00	35.02	54.00	-18.98	30.49	4.53	Average	247	210
4	4924.00	51.68	74.00	-22.32	47.15	4.53	Peak	247	210
5	7386.00	37.30	54.00	-16.70	27.91	9.39	Average	306	325
6	7386.00	50.92	74.00	-23.08	41.53	9.39	Peak	306	325

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).

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

Modulation	HT20		Test Freq. (MHz)		2412	
Polarization	Horizontal					
Level (dBUV/m) </						

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		

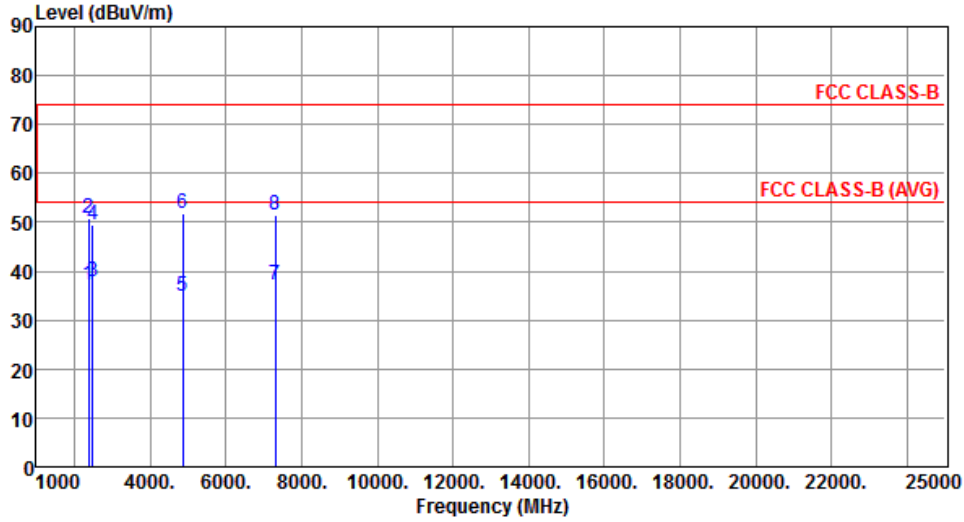


The graph displays the emission level in dBuV/m against frequency in MHz. Two horizontal red lines represent the FCC CLASS-B limit at approximately 74 dBuV/m and the FCC CLASS-B (AVG) limit at approximately 54 dBuV/m. Six data points are plotted as vertical blue lines with labels 1 through 6. Points 1 and 2 are at 2390 MHz, point 3 is at 3617 MHz, point 4 is at 3617 MHz, point 5 is at 4824 MHz, and point 6 is at 4824 MHz. The levels for points 1-6 are 47.22, 64.41, 38.63, 44.79, 41.39, and 54.45 dBuV/m respectively.

	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	47.22	54.00	-6.78	50.28	-3.06	Average	384	337
2	2390.00	64.41	74.00	-9.59	67.47	-3.06	Peak	384	337
3	3617.00	38.63	54.00	-15.37	38.10	0.53	Average	198	330
4	3617.00	44.79	74.00	-29.21	44.26	0.53	Peak	198	330
5	4824.00	41.39	54.00	-12.61	37.13	4.26	Average	335	216
6	4824.00	54.45	74.00	-19.55	50.19	4.26	Peak	335	216

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		

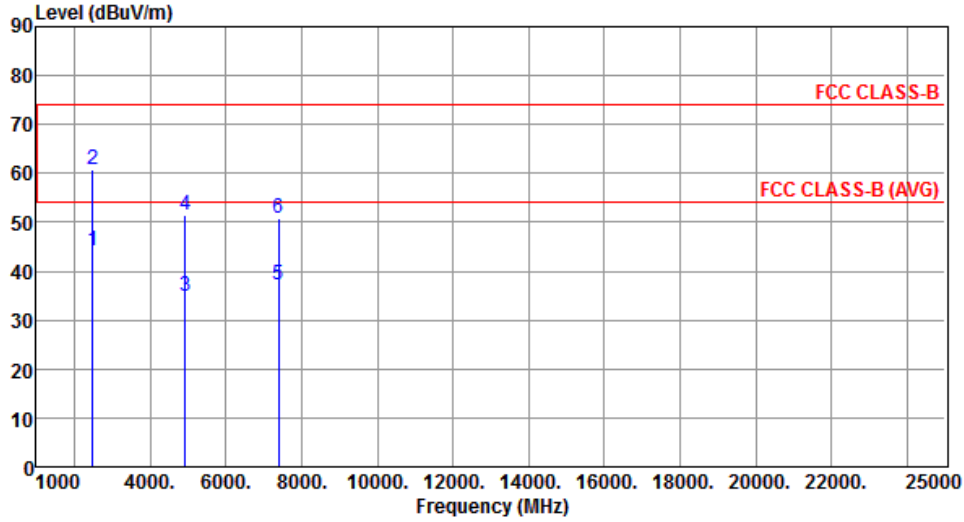


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	37.12	54.00	-16.88	40.18	-3.06	Average	328	349
2	2390.00	50.85	74.00	-23.15	53.91	-3.06	Peak	328	349
3	2483.50	37.86	54.00	-16.14	40.55	-2.69	Average	328	349
4	2483.50	49.52	74.00	-24.48	52.21	-2.69	Peak	328	349
5	4874.00	35.02	54.00	-18.98	30.62	4.40	Average	310	229
6	4874.00	51.76	74.00	-22.24	47.36	4.40	Peak	310	229
7	7311.00	37.21	54.00	-16.79	28.00	9.21	Average	305	208
8	7311.00	51.33	74.00	-22.67	42.12	9.21	Peak	305	208

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		
Level (dBuV/m)			

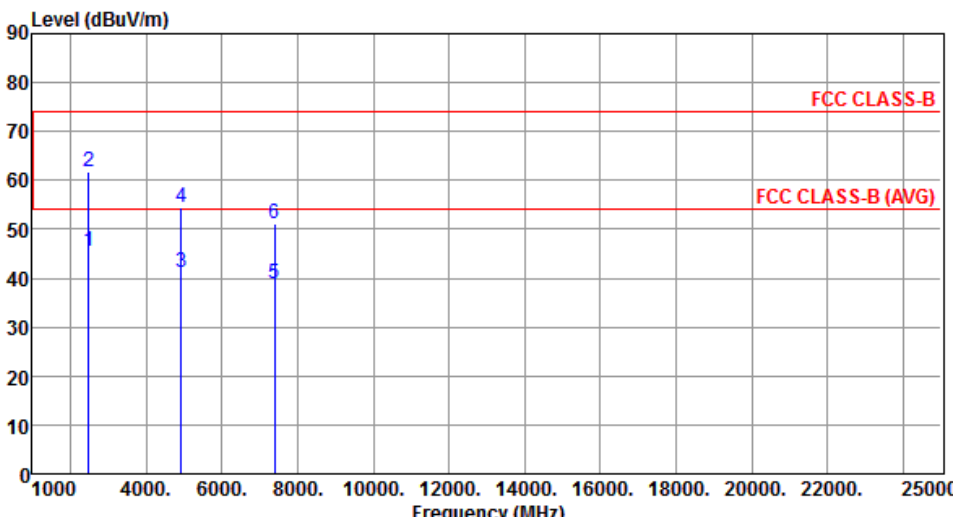
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	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	44.25	54.00	-9.75	46.94	-2.69	Average	350	346
2	2483.50	60.85	74.00	-13.15	63.54	-2.69	Peak	350	346
3	4924.00	34.88	54.00	-19.12	30.35	4.53	Average	319	322
4	4924.00	51.47	74.00	-22.53	46.94	4.53	Peak	319	322
5	7386.00	37.25	54.00	-16.75	27.86	9.39	Average	319	322
6	7386.00	50.81	74.00	-23.19	41.42	9.39	Peak	319	322

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	45.42	54.00	-8.58	48.11	-2.69	Average	328	338
2	2483.50	61.63	74.00	-12.37	64.32	-2.69	Peak	328	338
3	4924.00	41.32	54.00	-12.68	36.79	4.53	Average	307	288
4	4924.00	54.63	74.00	-19.37	50.10	4.53	Peak	307	288
5	7386.00	38.89	54.00	-15.11	29.50	9.39	Average	211	208
6	7386.00	51.28	74.00	-22.72	51.28	0.00	Peak	211	208

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 Measuring Instruments

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

3.5.3 Test Procedures

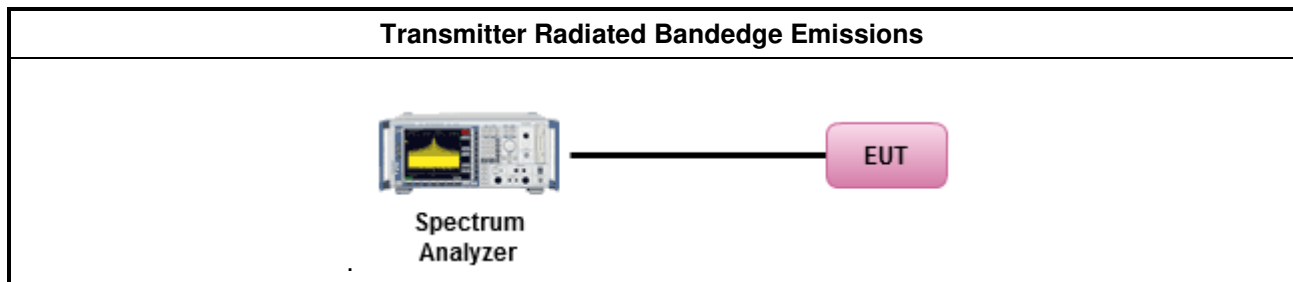
Reference level measurement

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

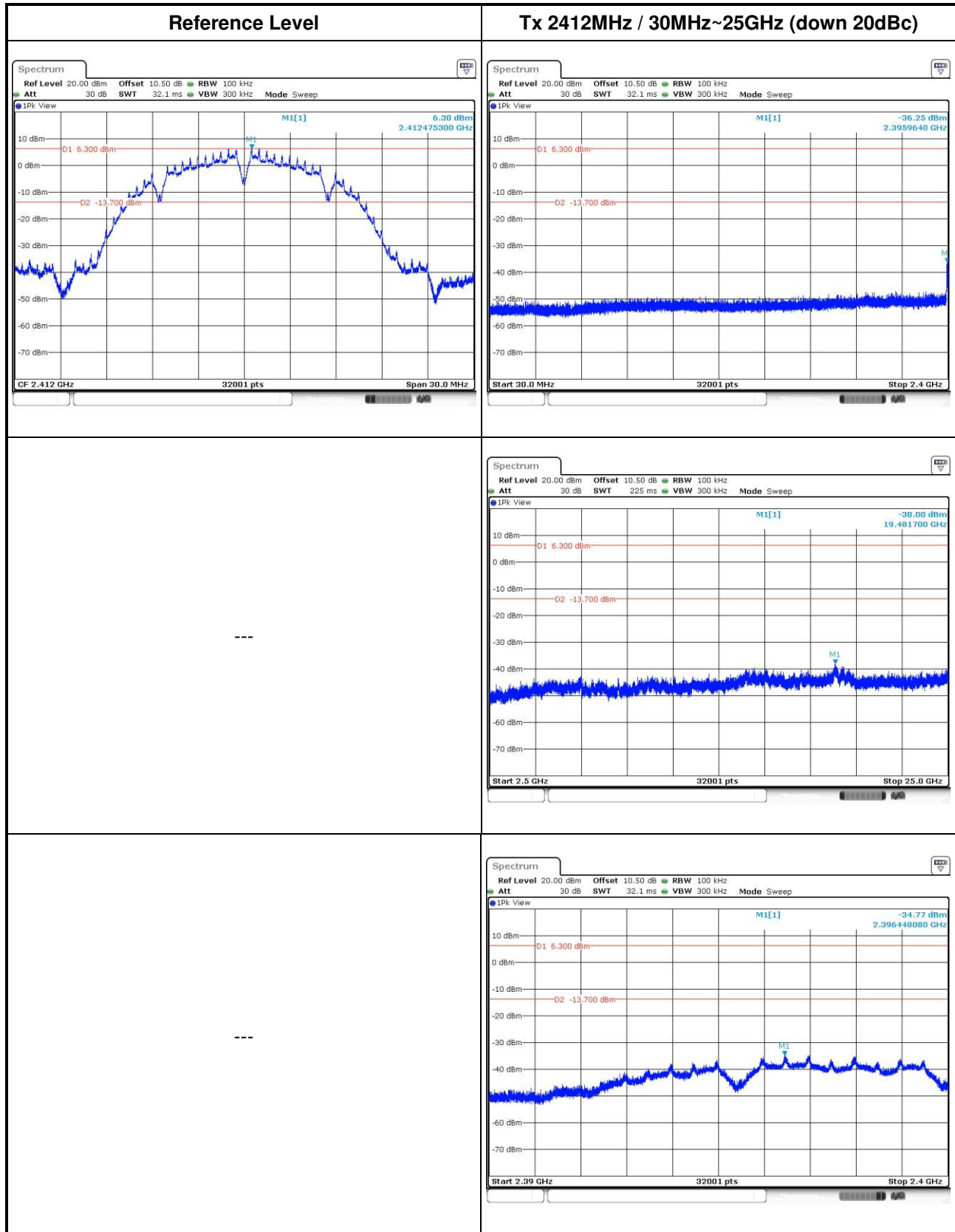
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.5.4 Test Setup

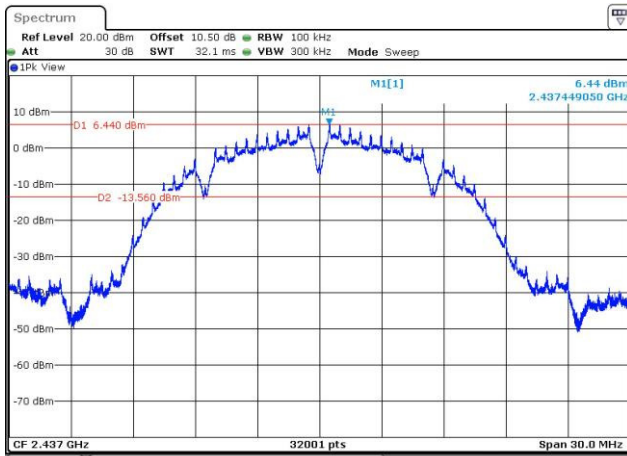


3.5.5 Unwanted Emissions into Non-Restricted Frequency Bands

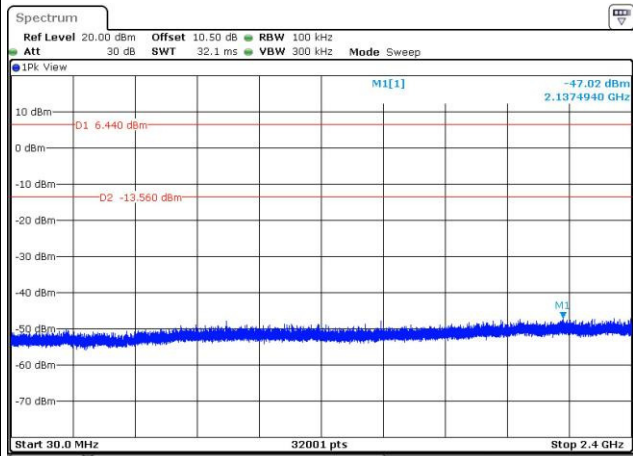
802.11b

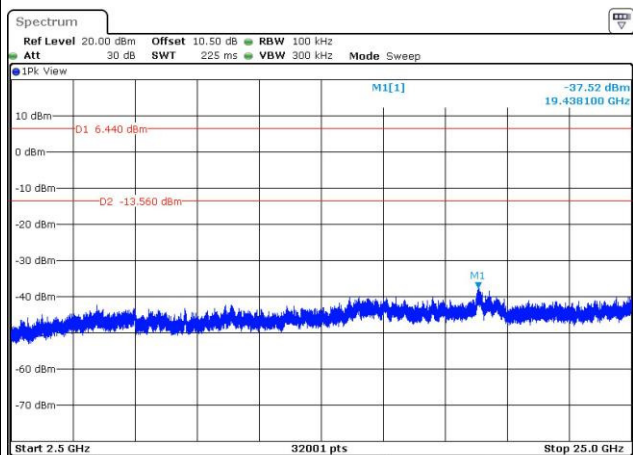


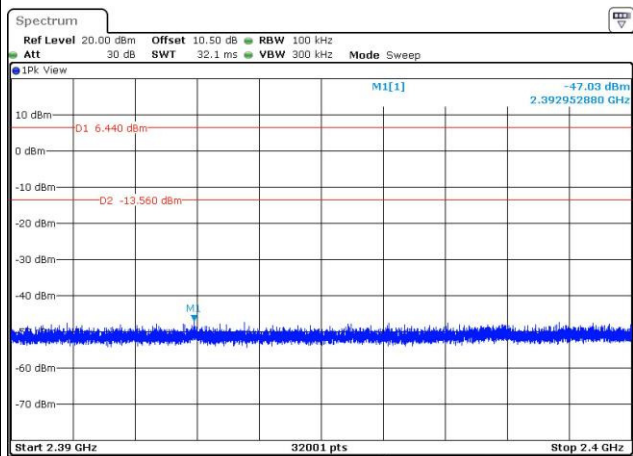
Reference Level



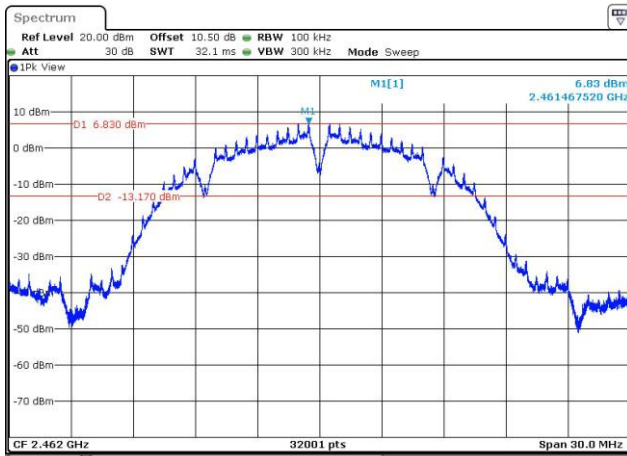
Tx 2437MHz / 30MHz~25GHz (down 20dBc)



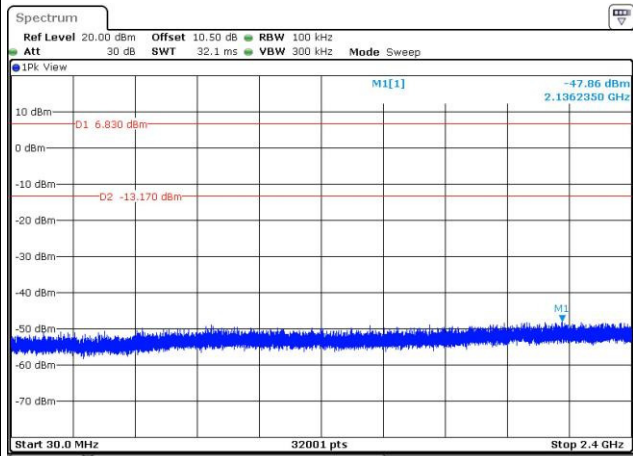


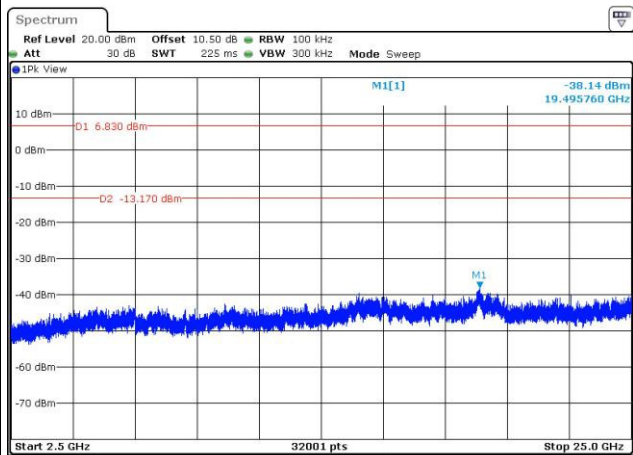


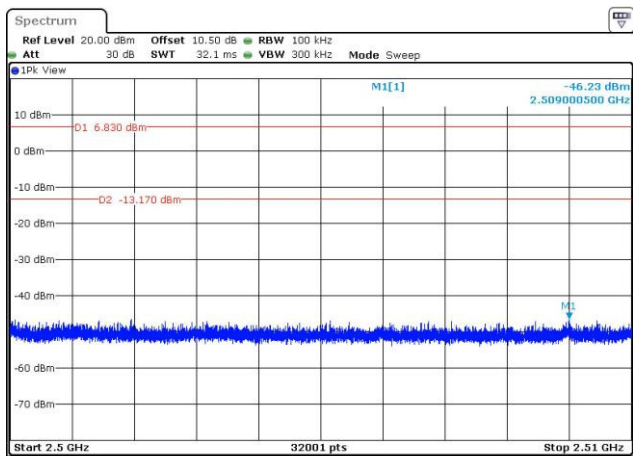
Reference Level



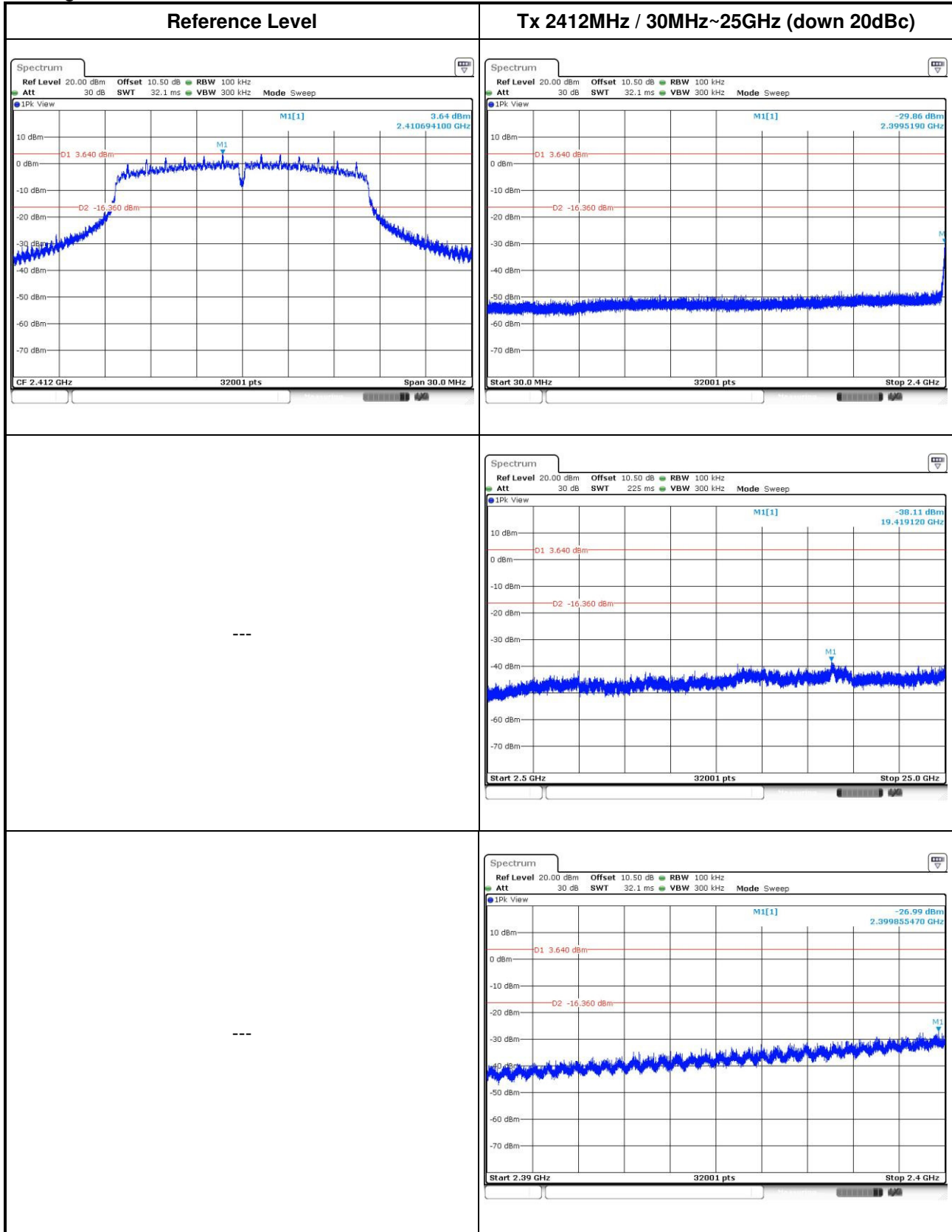
Tx 2462MHz / 30MHz~25GHz (down 20dBc)

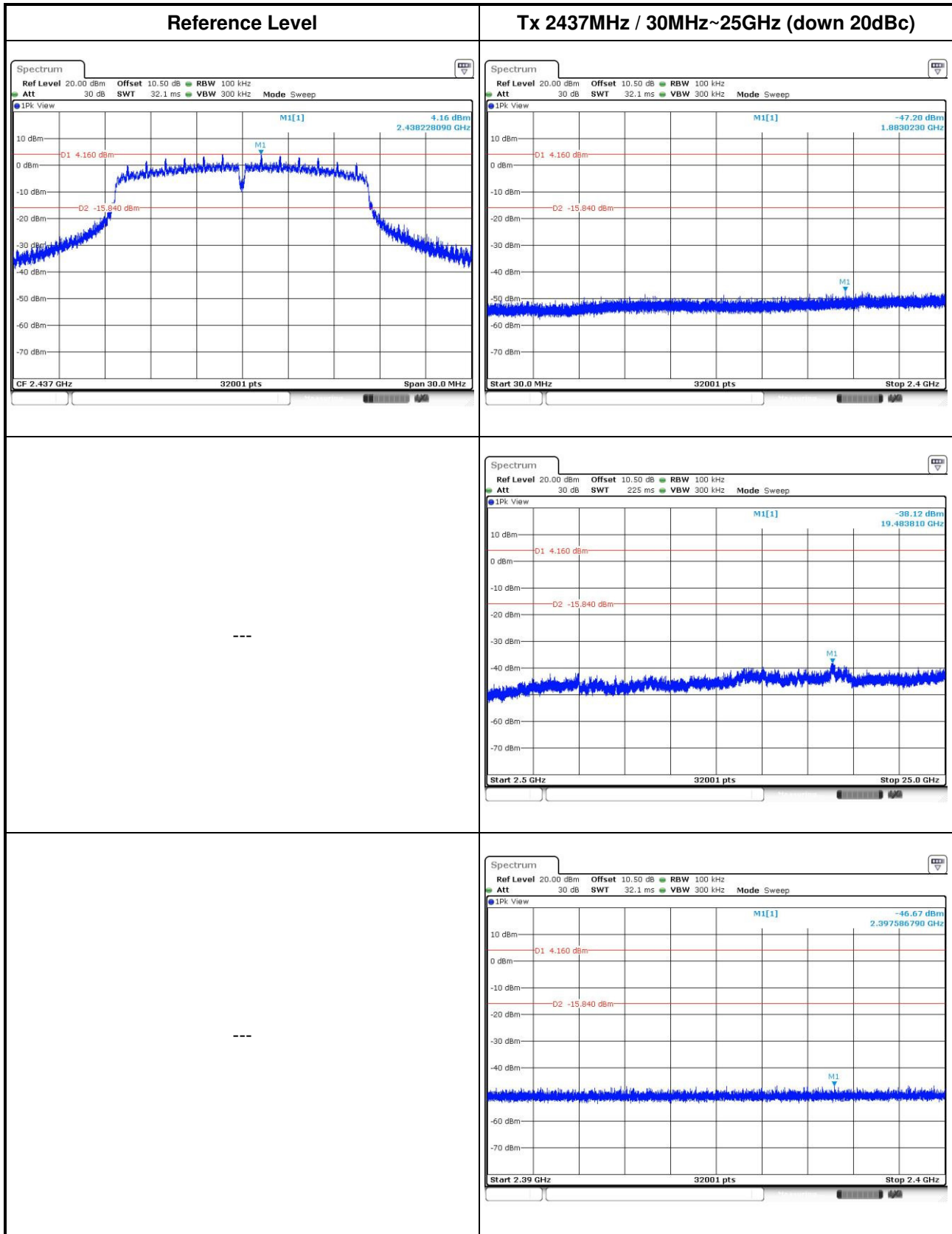




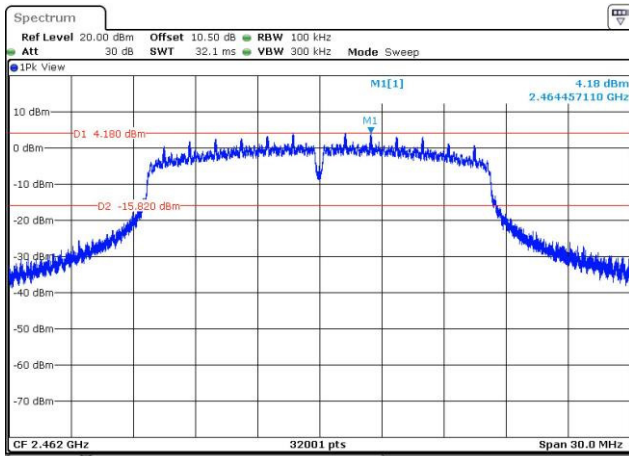


802.11g

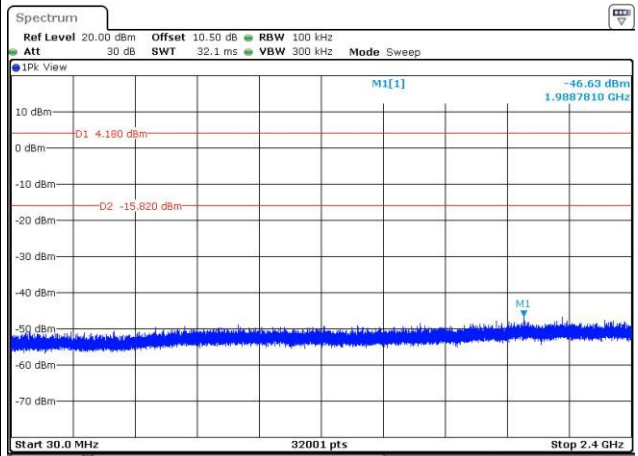


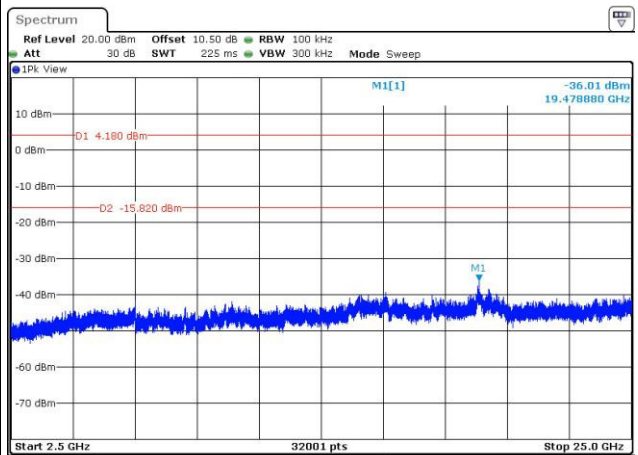


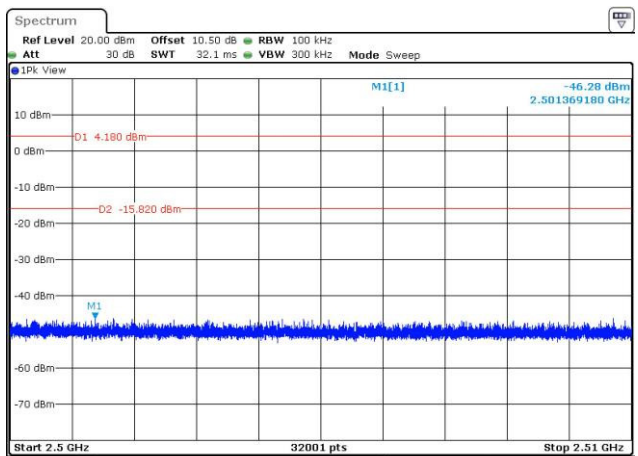
Reference Level



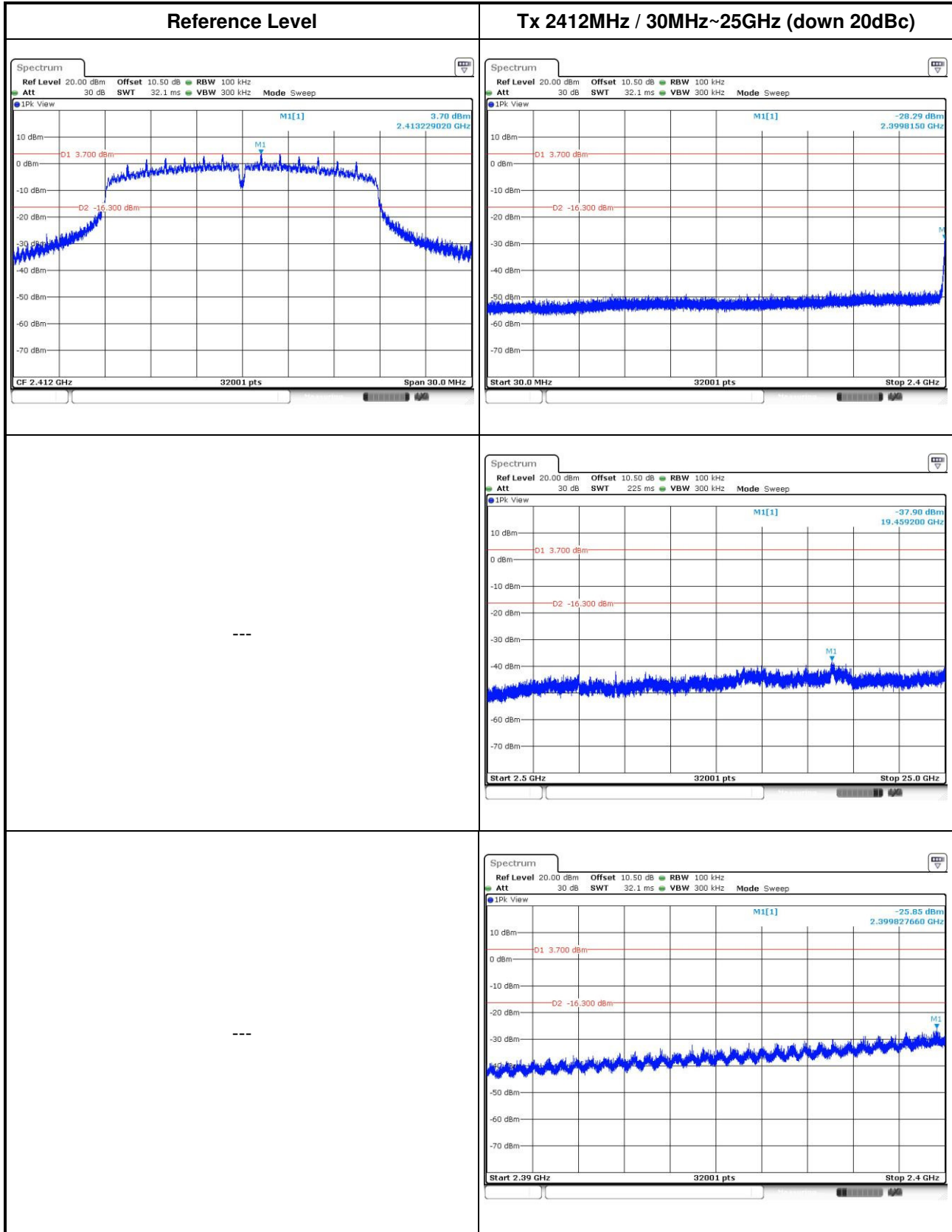
Tx 2462MHz / 30MHz~25GHz (down 20dBc)



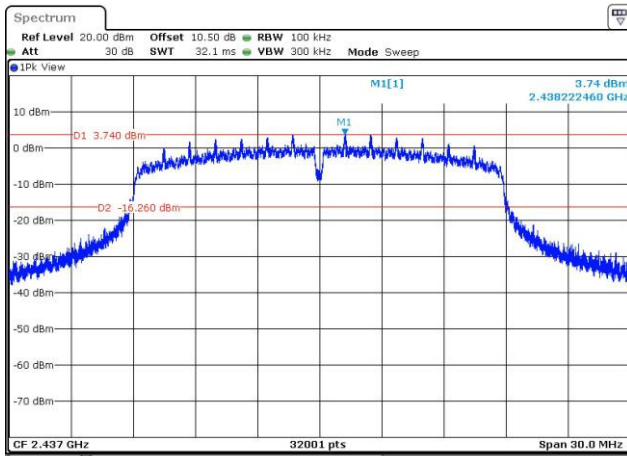




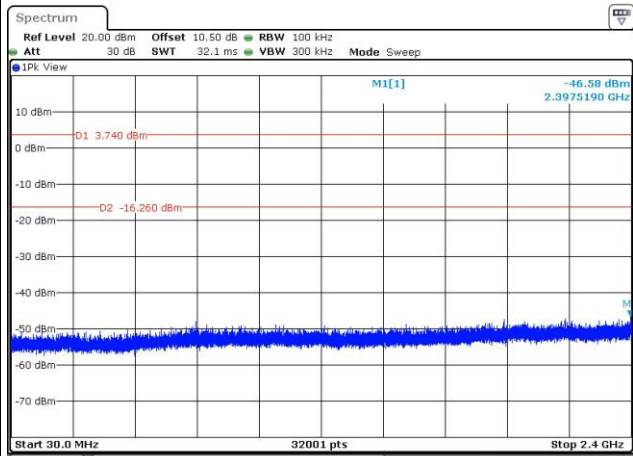
802.11n HT20

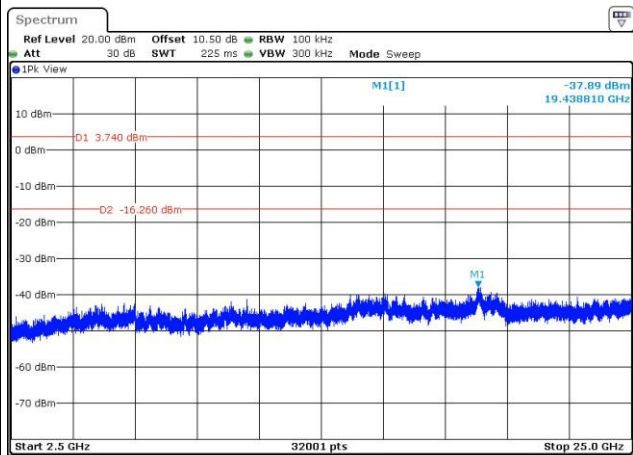


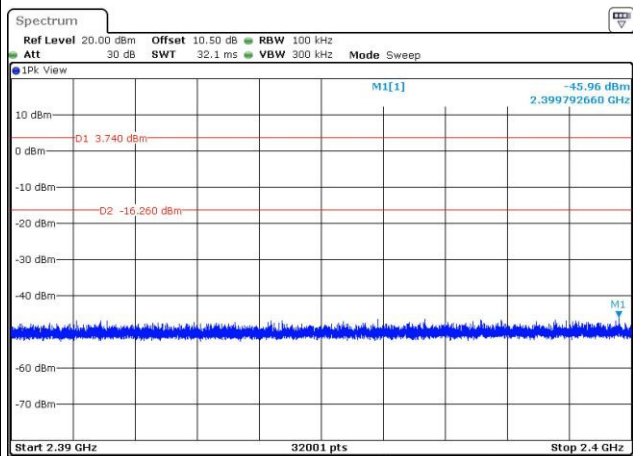
Reference Level



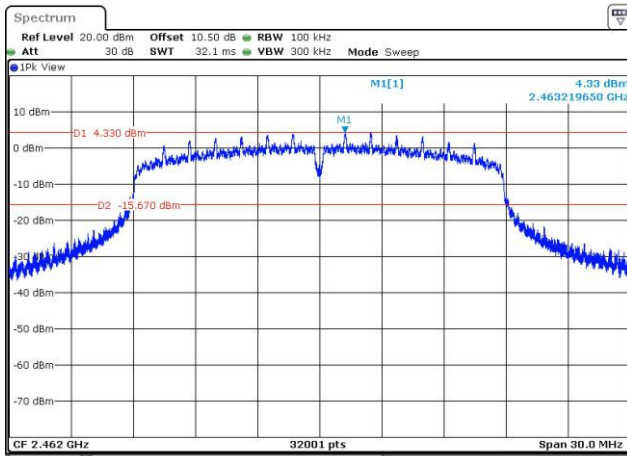
Tx 2437MHz / 30MHz~25GHz (down 20dBc)



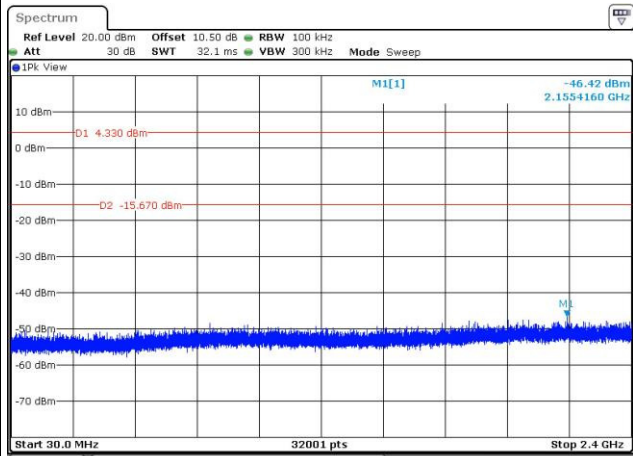


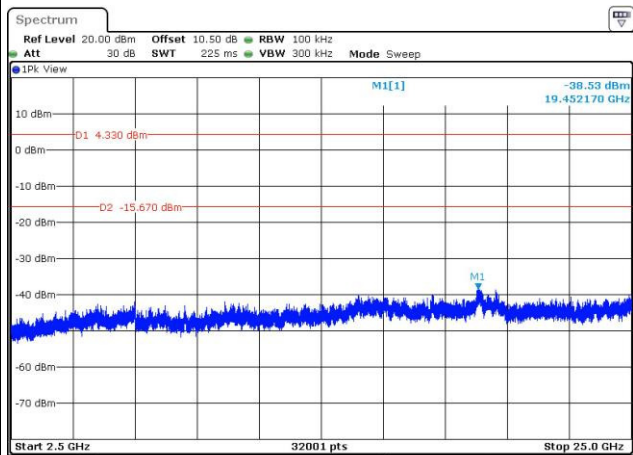


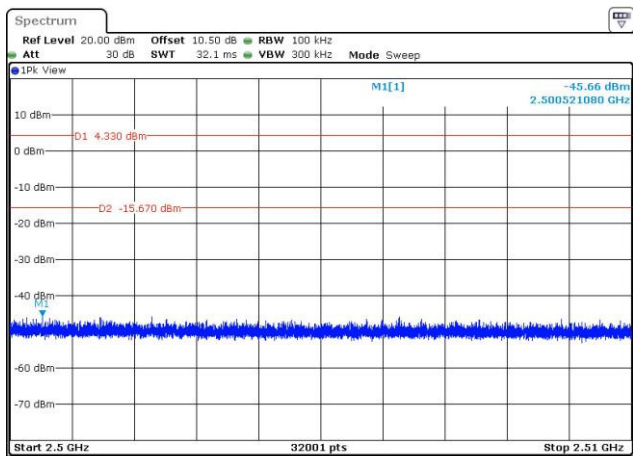
Reference Level



Tx 2462MHz / 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

Tel: 886-2-2601-1640

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R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd
St., Kwei Shan Hsiang, Tao Yuan
Hsien 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 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

==END==