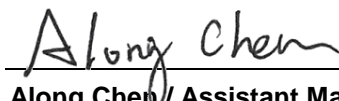


# FCC Test Report

**FCC ID** : SWX-UAPACIWP  
**Equipment** : UniFi AC In-Wall Pro Wi-Fi Access Point  
**Model No.** : UAP-AC-IW-PRO  
**Brand Name** : UBIQUITI  
**Applicant** : Ubiquiti Networks, Inc.  
**Address** : 685 Third Avenue, 27th Floor New York, New York 10017 USA  
**Standard** : 47 CFR FCC Part 15.247  
**Received Date** : Jun. 01, 2017  
**Tested Date** : Jun. 13 ~ Jun. 27, 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



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## Release Record

Report No.	Version	Description	Issued Date
FR761701AC	Rev. 01	Initial issue	Jul. 04, 2017

## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.476MHz 48.55 (Margin -7.86dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2390.00MHz 53.79 (Margin -0.21dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 28.33	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 <sub>TX</sub> )	Data Rate / MCS
2400-2483.5	b	2412-2462	1-11 [11]	3	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	3	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	3	MCS 0-23
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	3	MCS 0-23

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.	Type	Gain (dBi)	Connector	Remark
1	internal antenna	5	I-Pex	---

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

<b>Power Supply Type</b>	48Vdc from POE
--------------------------	----------------

### 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	Cart		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	99.67%	0.01
	11g	98.45%	0.07
	HT20	98.07%	0.08
	HT40	95.24%	0.21

### 1.1.7 Power Setting

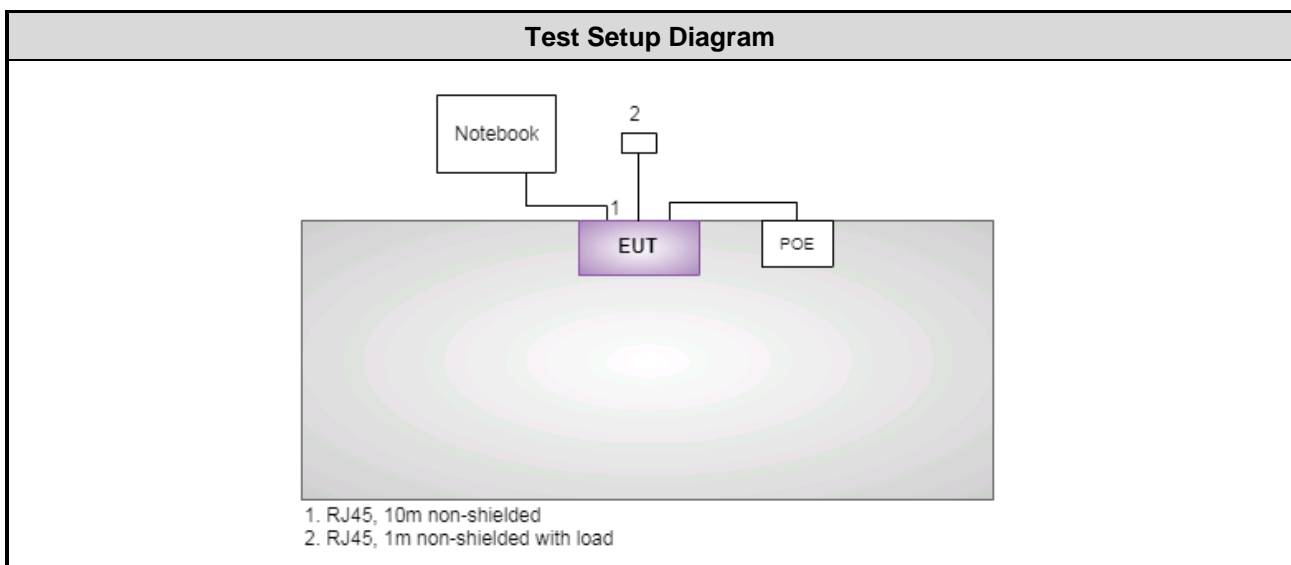
Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	17.5
11b	2437	18
11b	2462	15
11g	2412	16
11g	2437	18.5
11g	2462	11
HT20	2412	16
HT20	2437	18.5
HT20	2462	11
HT40	2422	17
HT40	2437	17
HT40	2452	12

## 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	RJ45, 10m non-shielded.
2	POE	UBIQUITI	GP-B480-050	---	----

Note: No. 2 was provided by applicant.

## 1.3 Test Setup Chart



## 1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 20, 2016	Dec. 19, 2017
Measurement Software	AUDIX	e3	6.120210k	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Nov. 25, 2016	Nov. 24, 2017
Receiver	R&S	ESR3	101658	Nov. 24, 2016	Nov. 23, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 04, 2016	Aug. 03, 2017
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	Oct. 25, 2016	Oct. 24, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980225	Aug. 05, 2016	Aug. 04, 2017
Preamplifier	Agilent	83017A	MY39501308	Oct. 06, 2016	Oct. 05, 2017
Preamplifier	EMC	EMC184045B	980192	Aug. 24, 2016	Aug. 23, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 09, 2016	Dec. 08, 2017
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	16052	Dec. 09, 2016	Dec. 08, 2017
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 09, 2016	Dec. 08, 2017
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 09, 2016	Dec. 08, 2017
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.



<b>Test Item</b>	RF Conducted				
<b>Test Site</b>	(TH01-WS)				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017
AC POWER SOURCE	APC	AFC-500W	F312060012	Oct. 28, 2016	Oct. 27, 2017
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

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

## 1.6 Measurement Uncertainty

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

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.90 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.63 dB

## 2 Test Configuration

### 2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 55%	Alex Huang
Radiated Emissions	03CH01-WS	24°C / 64%	Vincent Yeh
RF Conducted	TH01-WS	23°C / 65%	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	11b	2412 / 2437 / 2462	1 Mbps	---
Maximum Output Power	11g	2412 / 2437 / 2462	6 Mbps	
6dB bandwidth	HT20	2412 / 2437 / 2462	MCS 0	
Power spectral density	HT40	2422 / 2437 / 2452	MCS 0	

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.

## 3 Transmitter Test Results

### 3.1 Conducted Emissions

#### 3.1.1 Limit of Conducted Emissions

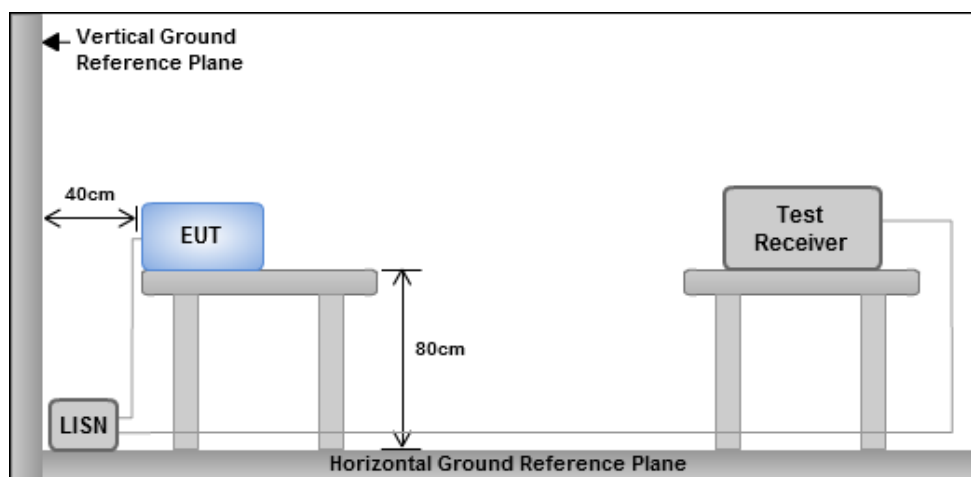
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

#### 3.1.2 Test Procedures

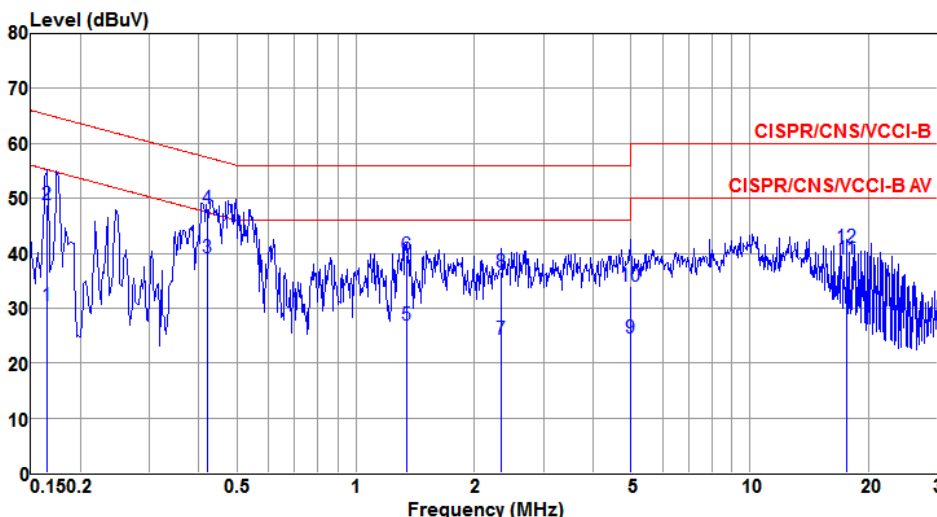
1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels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

#### 3.1.3 Test Setup

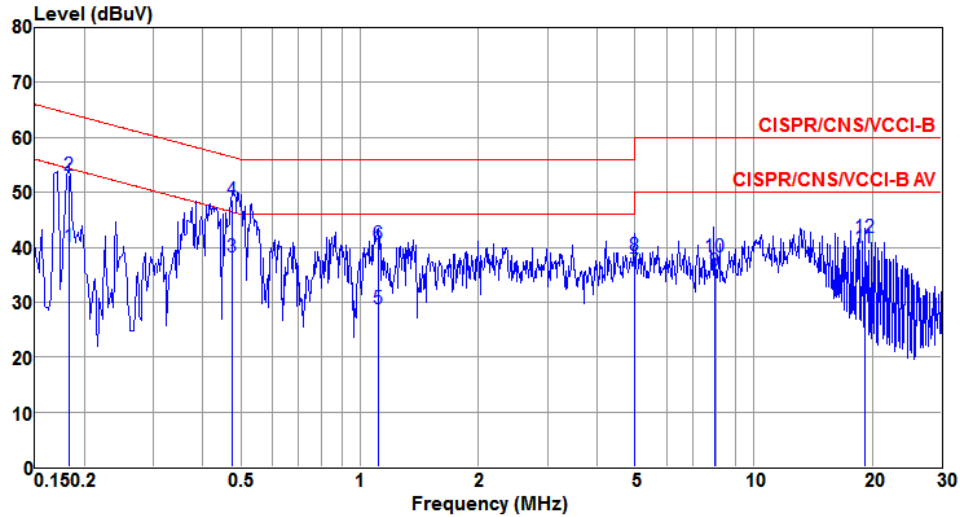


- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.1.4 Test Result of Conducted Emissions

Modulation	11g	Test Freq. (MHz)	2437																																																																																																																																							
Power Phase	Line																																																																																																																																									
 <p>The plot shows the conducted emission level in dBuV versus frequency in MHz. The y-axis ranges from 0 to 80 dBuV, and the x-axis ranges from 0.1502 to 30 MHz. Two red limit lines are shown: 'CISPR/CNS/VCCI-B' (upper) and 'CISPR/CNS/VCCI-B AV' (lower). A blue waveform represents the measured emission, with several peaks labeled 1 through 12. The measured levels are generally below the limit lines, with some peaks (1, 2, 3, 4, 11, 12) exceeding the 'CISPR/CNS/VCCI-B AV' limit.</p>																																																																																																																																										
<table border="1"> <thead> <tr> <th></th> <th>Freq</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>LISN</th> <th>cable</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV</th> <th>Line</th> <th>Limit</th> <th>Level</th> <th>factor</th> <th>loss</th> <th></th> </tr> <tr> <th></th> <th></th> <th></th> <th>dBuV</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr><td>1</td><td>0.165</td><td>30.56</td><td>55.21</td><td>-24.65</td><td>30.44</td><td>0.08</td><td>0.04</td><td>Average</td></tr> <tr><td>2</td><td>0.165</td><td>48.94</td><td>65.21</td><td>-16.27</td><td>48.82</td><td>0.08</td><td>0.04</td><td>QP</td></tr> <tr><td>3①</td><td>0.419</td><td>39.24</td><td>47.46</td><td>-8.22</td><td>39.14</td><td>0.06</td><td>0.04</td><td>Average</td></tr> <tr><td>4</td><td>0.419</td><td>48.13</td><td>57.46</td><td>-9.33</td><td>48.03</td><td>0.06</td><td>0.04</td><td>QP</td></tr> <tr><td>5</td><td>1.352</td><td>26.99</td><td>46.00</td><td>-19.01</td><td>26.85</td><td>0.10</td><td>0.04</td><td>Average</td></tr> <tr><td>6</td><td>1.352</td><td>39.64</td><td>56.00</td><td>-16.36</td><td>39.50</td><td>0.10</td><td>0.04</td><td>QP</td></tr> <tr><td>7</td><td>2.346</td><td>24.37</td><td>46.00</td><td>-21.63</td><td>24.16</td><td>0.14</td><td>0.07</td><td>Average</td></tr> <tr><td>8</td><td>2.346</td><td>36.54</td><td>56.00</td><td>-19.46</td><td>36.33</td><td>0.14</td><td>0.07</td><td>QP</td></tr> <tr><td>9</td><td>4.978</td><td>24.49</td><td>46.00</td><td>-21.51</td><td>24.14</td><td>0.18</td><td>0.17</td><td>Average</td></tr> <tr><td>10</td><td>4.978</td><td>33.94</td><td>56.00</td><td>-22.06</td><td>33.59</td><td>0.18</td><td>0.17</td><td>QP</td></tr> <tr><td>11</td><td>17.632</td><td>39.06</td><td>50.00</td><td>-10.94</td><td>38.45</td><td>0.36</td><td>0.25</td><td>Average</td></tr> <tr><td>12</td><td>17.632</td><td>41.17</td><td>60.00</td><td>-18.83</td><td>40.56</td><td>0.36</td><td>0.25</td><td>QP</td></tr> </tbody> </table>					Freq	Level	Limit	Over	Read	LISN	cable	Remark		MHz	dBuV	Line	Limit	Level	factor	loss					dBuV	dB	dBuV	dB	dB		1	0.165	30.56	55.21	-24.65	30.44	0.08	0.04	Average	2	0.165	48.94	65.21	-16.27	48.82	0.08	0.04	QP	3①	0.419	39.24	47.46	-8.22	39.14	0.06	0.04	Average	4	0.419	48.13	57.46	-9.33	48.03	0.06	0.04	QP	5	1.352	26.99	46.00	-19.01	26.85	0.10	0.04	Average	6	1.352	39.64	56.00	-16.36	39.50	0.10	0.04	QP	7	2.346	24.37	46.00	-21.63	24.16	0.14	0.07	Average	8	2.346	36.54	56.00	-19.46	36.33	0.14	0.07	QP	9	4.978	24.49	46.00	-21.51	24.14	0.18	0.17	Average	10	4.978	33.94	56.00	-22.06	33.59	0.18	0.17	QP	11	17.632	39.06	50.00	-10.94	38.45	0.36	0.25	Average	12	17.632	41.17	60.00	-18.83	40.56	0.36	0.25	QP
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<p>Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).            Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).</p>																																																																																																																																										

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Power Phase</b>	Neutral		



	Freq	Level	Limit	Over	Read	LISN	cable	Remark
	MHz	dBuV	Line	Limit	Level	factor	loss	
			dBuV	dB	dBuV	dB	dB	
1	0.183	40.11	54.33	-14.22	39.98	0.09	0.04	Average
2	0.183	53.00	64.33	-11.33	52.87	0.09	0.04	QP
3	0.476	38.19	46.41	-8.22	38.03	0.12	0.04	Average
4@	0.476	48.55	56.41	-7.86	48.39	0.12	0.04	QP
5	1.111	28.74	46.00	-17.26	28.60	0.10	0.04	Average
6	1.111	40.61	56.00	-15.39	40.47	0.10	0.04	QP
7	4.966	35.75	46.00	-10.25	35.40	0.18	0.17	Average
8	4.966	38.40	56.00	-17.60	38.05	0.18	0.17	QP
9	7.949	35.54	50.00	-14.46	35.07	0.27	0.20	Average
10	7.949	38.29	60.00	-21.71	37.82	0.27	0.20	QP
11	19.121	39.96	50.00	-10.04	39.31	0.40	0.25	Average
12	19.121	41.89	60.00	-18.11	41.24	0.40	0.25	QP

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

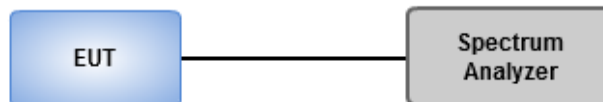
#### 6dB Bandwidth

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

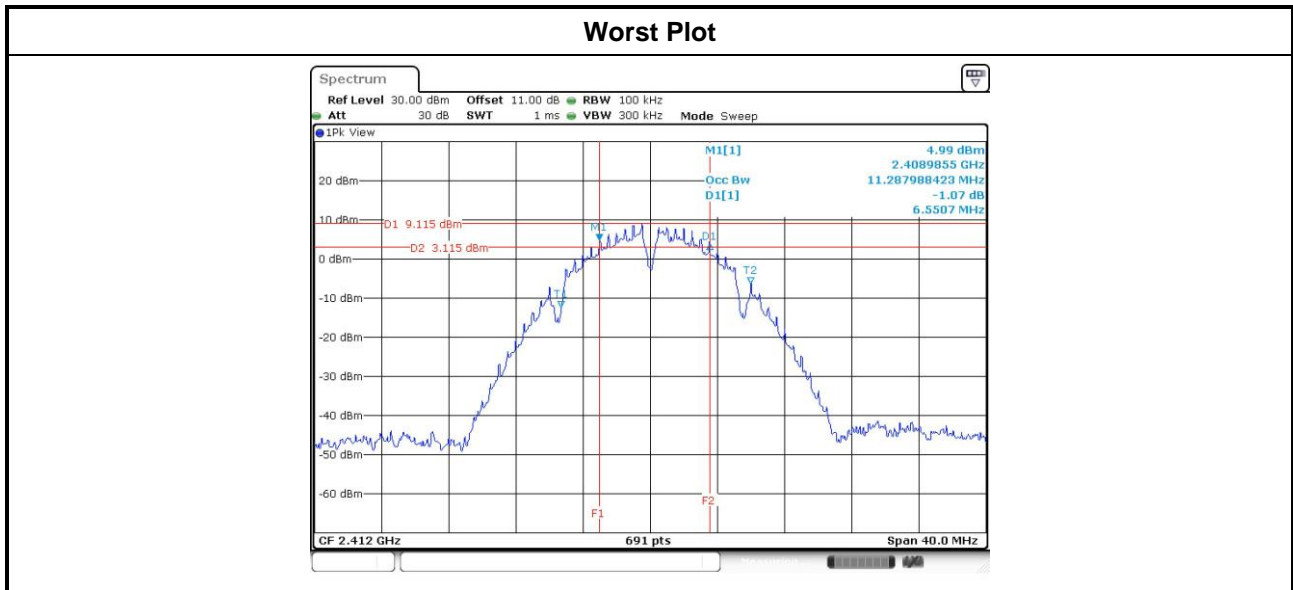
1. Set resolution bandwidth (RBW) = 1 MHz, Video bandwidth = 3 MHz.
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

### 3.2.3 Test Setup

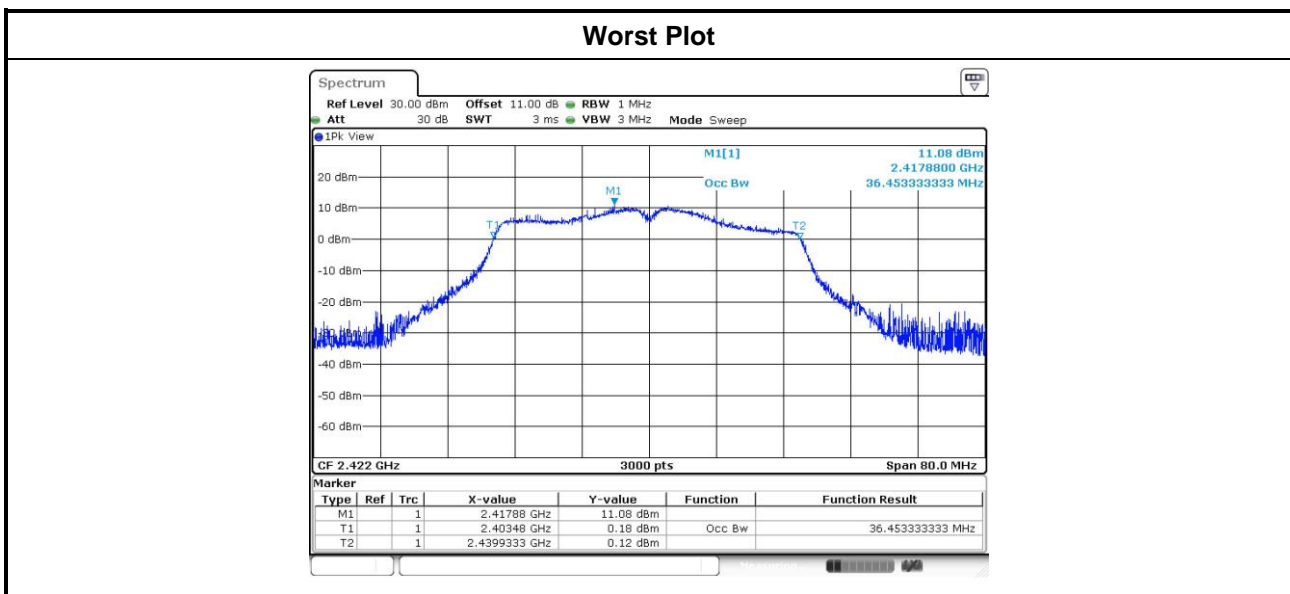


### 3.2.4 Test Result of 6dB and Occupied Bandwidth

Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	3	2412	6.55	7.07	6.55	---	500
11b	3	2437	6.55	7.07	7.07	---	500
11b	3	2462	7.07	7.01	7.07	---	500
11g	3	2412	15.13	15.07	15.07	---	500
11g	3	2437	13.22	15.07	15.01	---	500
11g	3	2462	12.81	14.43	15.07	---	500
HT20	3	2412	13.91	15.07	15.13	---	500
HT20	3	2437	15.13	15.13	14.43	---	500
HT20	3	2462	15.13	13.86	15.07	---	500
HT40	3	2422	26.32	32.58	30.03	---	500
HT40	3	2437	28.87	33.74	32.58	---	500
HT40	3	2452	30.03	32.70	32.58	---	500



Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	3	2412	11.56	11.43	12.11	---
11b	3	2437	11.45	10.99	10.56	---
11b	3	2462	11.60	11.87	12.01	---
11g	3	2412	16.17	16.16	16.09	---
11g	3	2437	16.31	16.27	16.23	---
11g	3	2462	16.19	16.20	16.19	---
HT20	3	2412	17.28	17.33	17.27	---
HT20	3	2437	17.40	17.39	17.31	---
HT20	3	2462	17.31	17.40	17.41	---
HT40	3	2422	35.63	36.21	36.45	---
HT40	3	2437	35.84	36.13	35.95	---
HT40	3	2452	36.27	36.24	35.92	---





## 3.3 RF Output Power

### 3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

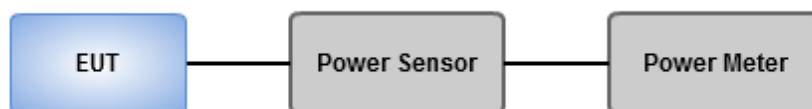
- Antenna gain  $\leq$  6dBi, no any corresponding reduction is in output power limit.
- Antenna gain  $>$  6dBi
  - Non Fixed, point to point operations.  
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6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

### 3.3.2 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 <sub>TX</sub>	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	3	2412	20.31	19.62	19.58	---	289.803	24.62	30.00	5.00	29.62	36.00
11b	3	2437	20.42	20.63	20.36	---	334.408	25.24	30.00	5.00	30.24	36.00
11b	3	2462	18.02	17.45	17.22	---	171.700	22.35	30.00	5.00	27.35	36.00
11g	3	2412	23.47	23.68	23.34	---	671.451	28.27	30.00	5.00	33.27	36.00
11g	3	2437	23.33	23.9	23.44	---	681.550	<b>28.33</b>	30.00	5.00	33.33	36.00
11g	3	2462	19.23	19.34	18.34	---	237.888	23.76	30.00	5.00	28.76	36.00
HT20	3	2412	23.36	23.16	23.02	---	624.232	27.95	30.00	5.00	32.95	36.00
HT20	3	2437	23.18	23.59	23.21	---	645.941	28.10	30.00	5.00	33.10	36.00
HT20	3	2462	18.81	19.28	18.36	---	229.304	23.60	30.00	5.00	28.60	36.00
HT40	3	2422	23.29	22.79	22.28	---	572.456	27.58	30.00	5.00	32.58	36.00
HT40	3	2437	22.78	22.53	22.42	---	543.313	27.35	30.00	5.00	32.35	36.00
HT40	3	2452	16.93	18.73	16.72	---	170.952	22.33	30.00	5.00	27.33	36.00

Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Conducted (Average) Output Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11b	3	2412	17.16	16.75	16.53	---	144.293	21.59	---
11b	3	2437	17.39	17.41	17.25	---	162.997	22.12	---
11b	3	2462	14.89	14.42	14.31	---	85.479	19.32	---
11g	3	2412	15.68	15.61	15.27	---	107.025	20.29	---
11g	3	2437	17.34	17.53	16.86	---	159.353	22.02	---
11g	3	2462	10.76	10.95	10.34	---	35.172	15.46	---
HT20	3	2412	15.74	15.21	14.91	---	101.661	20.07	---
HT20	3	2437	17.44	17.46	16.8	---	159.044	22.02	---
HT20	3	2462	10.53	10.83	10.11	---	33.660	15.27	---
HT40	3	2422	16.27	15.31	14.68	---	105.703	20.24	---
HT40	3	2437	15.1	15.05	14.36	---	91.638	19.62	---
HT40	3	2452	9.8	11.12	9.68	---	31.782	15.02	---

Note: Conducted average output power is for reference only.

## 3.4 Power Spectral Density

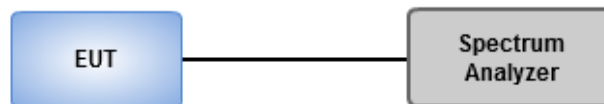
### 3.4.1 Limit of Power Spectral Density

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:  $\geq 10 \times$  (number of measurement points in sweep)  $\times$  (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





## 3.5 Unwanted Emissions into Restricted Frequency Bands

### 3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

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

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

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

### 3.5.2 Test Procedures

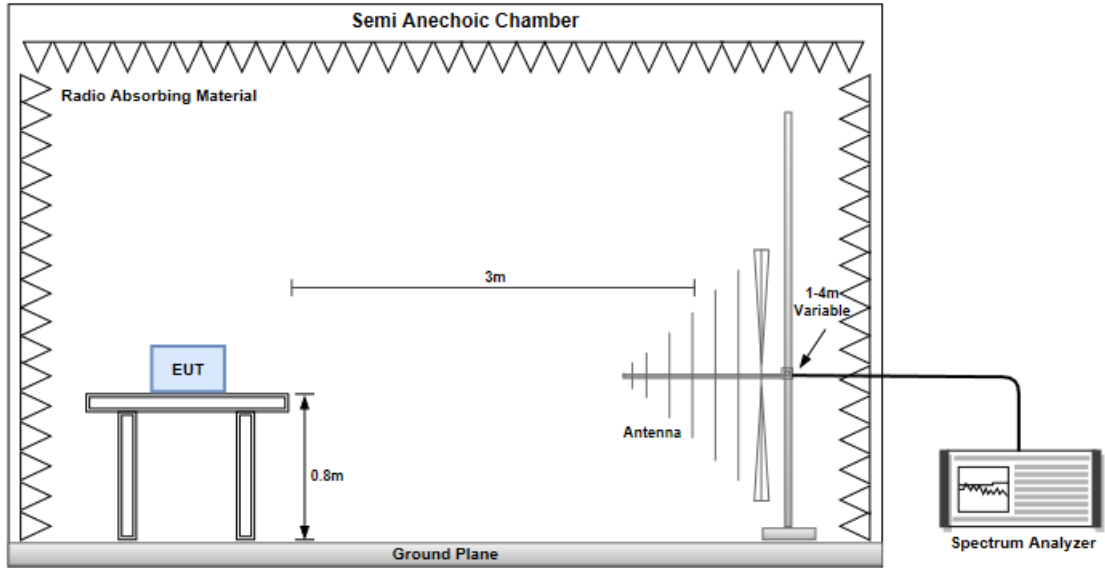
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

**Note:**

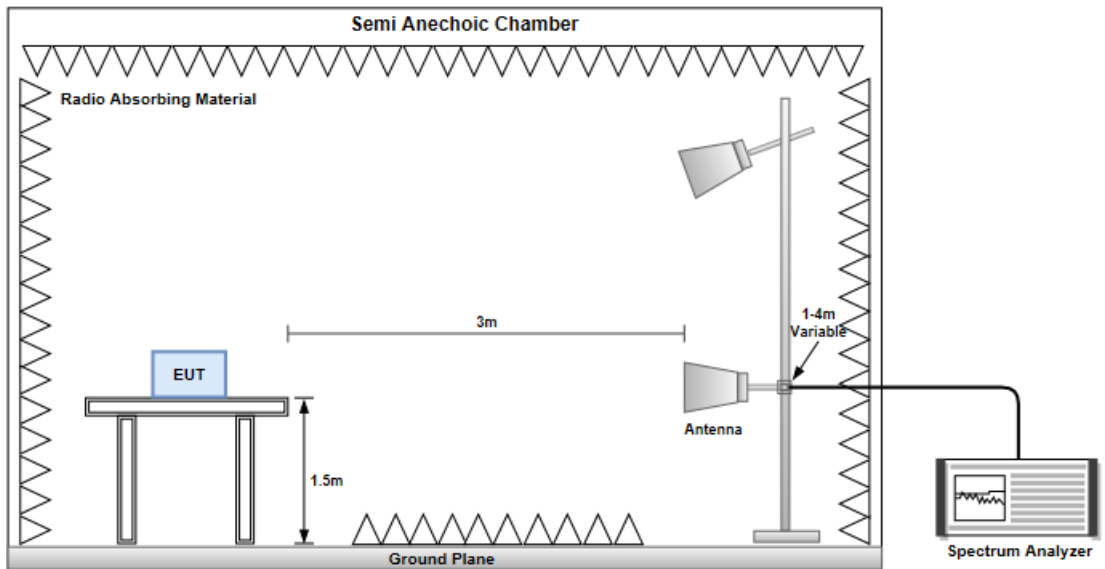
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

### 3.5.3 Test Setup

#### Radiated Emissions below 1 GHz

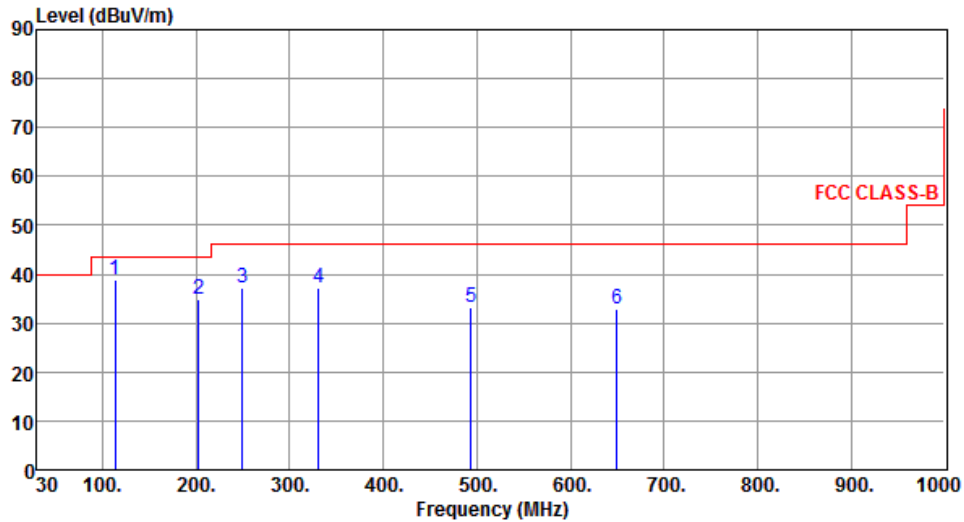


#### Radiated Emissions above 1 GHz



### 3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	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	113.24	38.77	43.50	-4.73	49.60	-10.83	QP	160	176
2	202.66	34.90	43.50	-8.60	45.91	-11.01	Peak	---	---
3	249.22	37.10	46.00	-8.90	46.33	-9.23	Peak	---	---
4	330.70	37.36	46.00	-8.64	44.09	-6.73	Peak	---	---
5	493.66	33.27	46.00	-12.73	36.19	-2.92	Peak	---	---
6	649.83	32.97	46.00	-13.03	33.01	-0.04	Peak	---	---

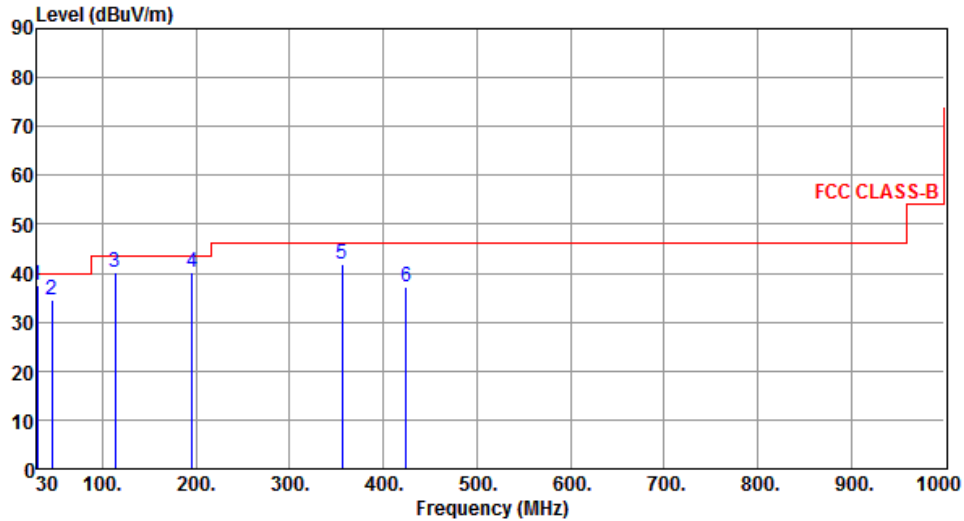
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor\* (dB)

\*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.

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	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	30.45	37.55	40.00	-2.45	46.40	-8.85	QP	100	246
2	45.97	34.62	40.00	-5.38	42.20	-7.58	QP	100	138
3	113.42	40.28	43.50	-3.22	51.09	-10.81	Peak	---	---
4	195.87	40.04	43.50	-3.46	51.09	-11.05	Peak	---	---
5	355.92	41.77	46.00	-4.23	47.87	-6.10	Peak	---	---
6	424.79	37.15	46.00	-8.85	41.52	-4.37	Peak	---	---

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

\*Factor includes antenna factor , cable loss and amplifier gain

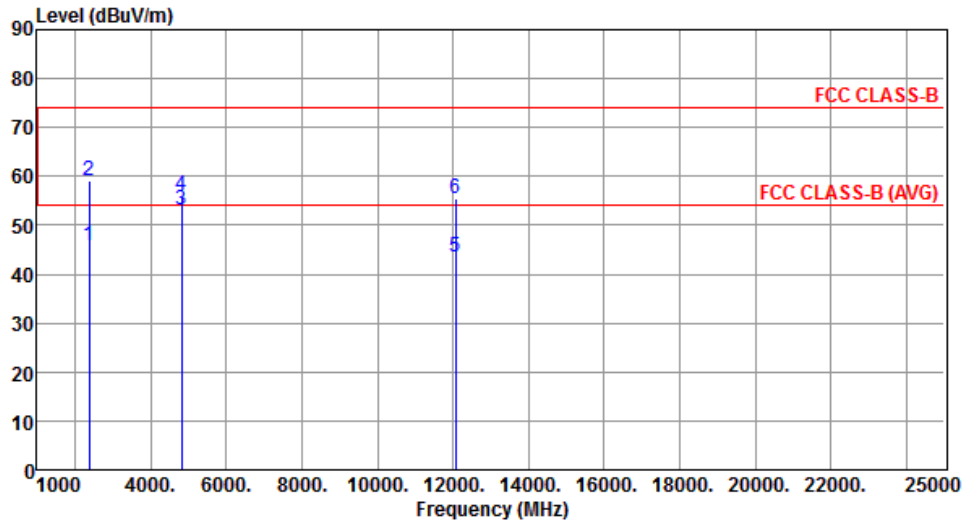
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

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



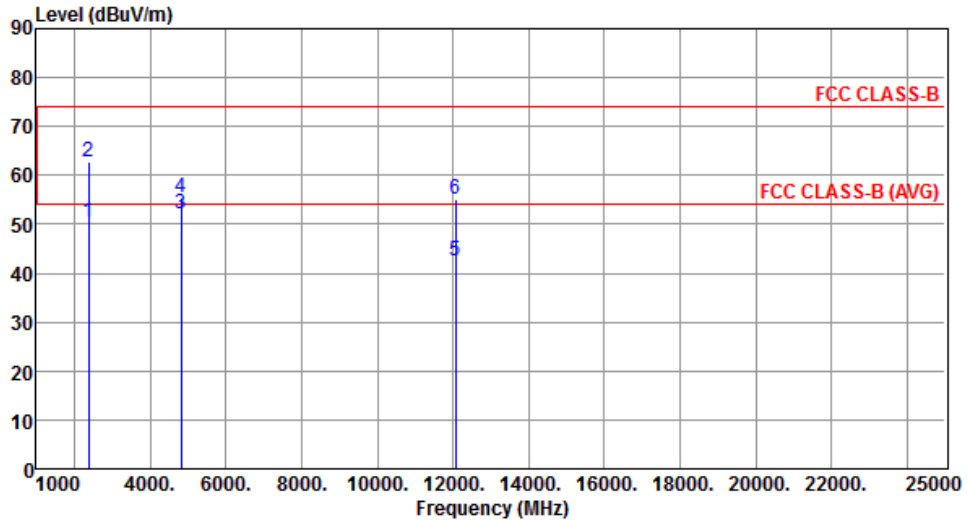
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.97	54.00	-8.03	49.15	-3.18	Average	120	317
2	2390.00	59.06	74.00	-14.94	62.24	-3.18	Peak	120	317
3	4824.00	53.28	54.00	-0.72	49.50	3.78	Average	143	307
4	4824.00	56.23	74.00	-17.77	52.45	3.78	Peak	143	307
5	12060.00	43.45	54.00	-10.55	29.87	13.58	Average	114	358
6	12060.00	55.58	74.00	-18.42	42.00	13.58	Peak	114	358

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).

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



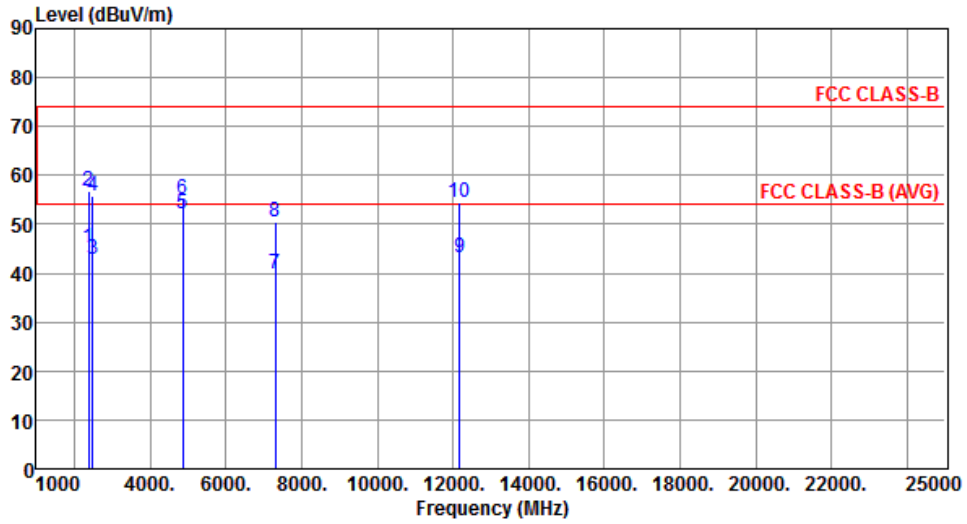
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.54	54.00	-3.46	53.72	-3.18	Average	266	358
2	2390.00	62.83	74.00	-11.17	66.01	-3.18	Peak	266	358
3	4824.00	52.23	54.00	-1.77	48.45	3.78	Average	118	17
4	4824.00	55.36	74.00	-18.64	51.58	3.78	Peak	118	17
5	12060.00	42.48	54.00	-11.52	28.90	13.58	Average	100	348
6	12060.00	55.08	74.00	-18.92	41.50	13.58	Peak	100	348

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).

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



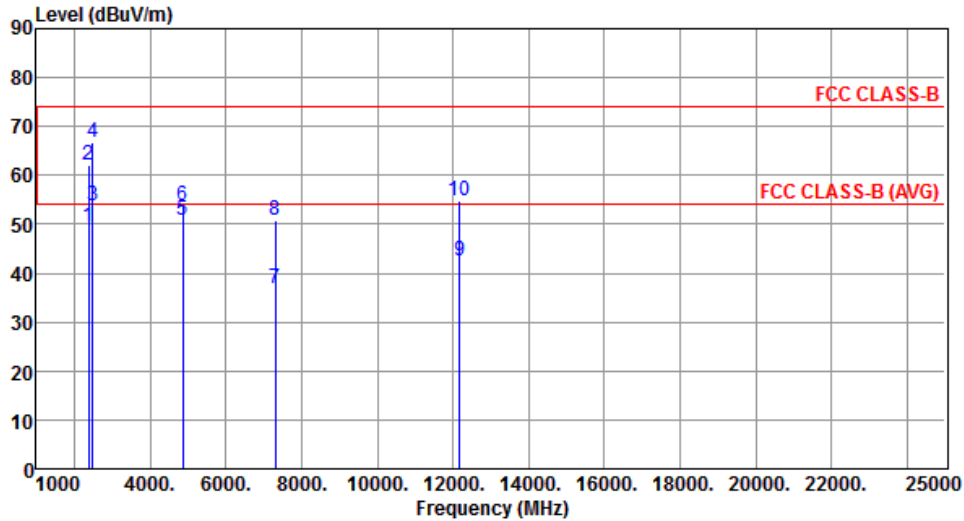
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.09	54.00	-8.91	48.27	-3.18	Average	232	32
2	2390.00	56.85	74.00	-17.15	60.03	-3.18	Peak	232	32
3	2483.50	42.98	54.00	-11.02	45.78	-2.80	Average	232	32
4	2483.50	55.72	74.00	-18.28	58.52	-2.80	Peak	232	32
5	4874.00	52.30	54.00	-1.70	48.36	3.94	Average	239	15
6	4874.00	54.97	74.00	-19.03	51.03	3.94	Peak	239	15
7	7311.00	39.78	54.00	-14.22	31.37	8.41	Average	100	2
8	7311.00	50.63	74.00	-23.37	42.22	8.41	Peak	100	2
9	12185.00	43.10	54.00	-10.90	29.43	13.67	Average	100	355
10	12185.00	54.53	74.00	-19.47	40.86	13.67	Peak	100	355

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).

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



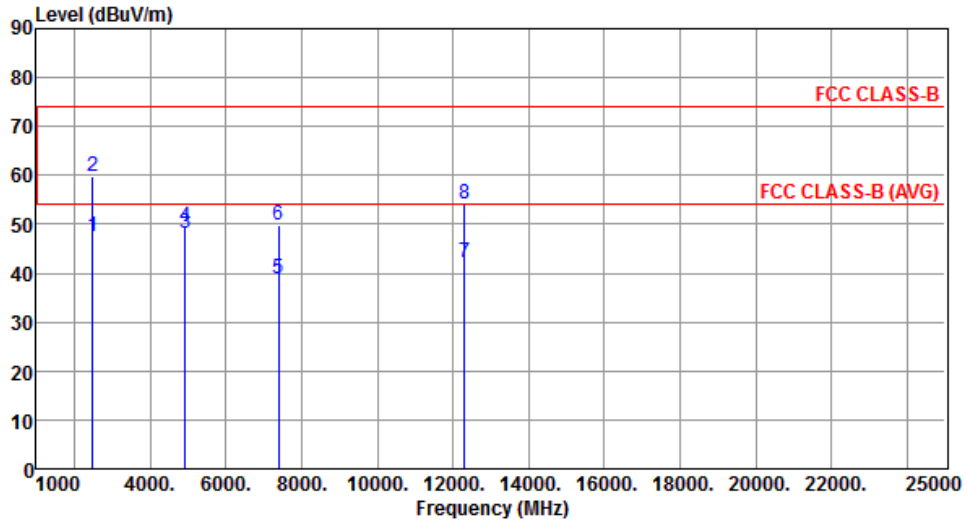
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.45	54.00	-4.55	52.63	-3.18	Average	158	353
2	2390.00	62.00	74.00	-12.00	65.18	-3.18	Peak	158	353
3	2483.50	53.66	54.00	-0.34	56.46	-2.80	Average	158	353
4	2483.50	66.64	74.00	-7.36	69.44	-2.80	Peak	158	353
5	4874.00	50.79	54.00	-3.21	46.85	3.94	Average	100	13
6	4874.00	53.76	74.00	-20.24	49.82	3.94	Peak	100	13
7	7311.00	36.88	54.00	-17.12	28.47	8.41	Average	100	182
8	7311.00	50.82	74.00	-23.18	42.41	8.41	Peak	100	182
9	12185.00	42.52	54.00	-11.48	28.85	13.67	Average	100	263
10	12185.00	54.74	74.00	-19.26	41.07	13.67	Peak	100	263

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).

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



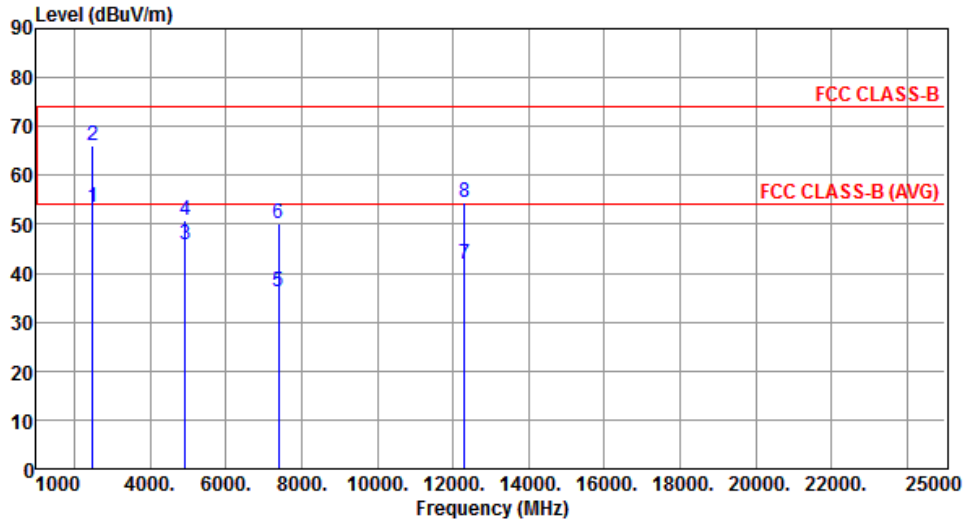
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	47.64	54.00	-6.36	50.44	-2.80	Average	195	20
2	2483.50	59.72	74.00	-14.28	62.52	-2.80	Peak	195	20
3	4924.00	48.09	54.00	-5.91	43.99	4.10	Average	279	45
4	4924.00	49.37	74.00	-24.63	45.27	4.10	Peak	279	45
5	7386.00	38.70	54.00	-15.30	30.26	8.44	Average	100	26
6	7386.00	49.87	74.00	-24.13	41.43	8.44	Peak	100	26
7	12310.00	42.32	54.00	-11.68	28.56	13.76	Average	100	346
8	12310.00	54.13	74.00	-19.87	40.37	13.76	Peak	100	346

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).

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



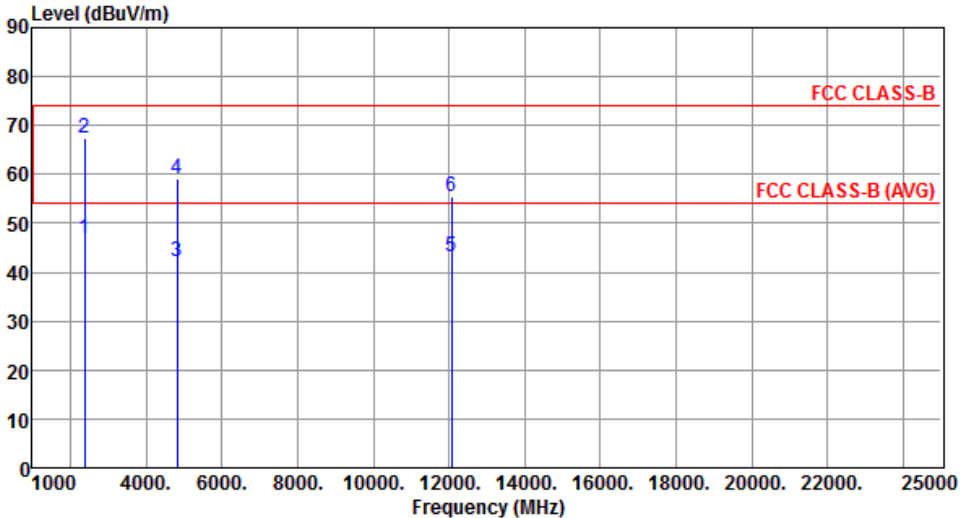
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.40	54.00	-0.60	56.20	-2.80	Average	100	355
2	2483.50	66.02	74.00	-7.98	68.82	-2.80	Peak	100	355
3	4924.00	45.67	54.00	-8.33	41.57	4.10	Average	113	3
4	4924.00	50.80	74.00	-23.20	46.70	4.10	Peak	113	3
5	7386.00	36.26	54.00	-17.74	27.82	8.44	Average	100	173
6	7386.00	50.19	74.00	-23.81	41.75	8.44	Peak	100	173
7	12310.00	41.69	54.00	-12.31	27.93	13.76	Average	100	242
8	12310.00	54.35	74.00	-19.65	40.59	13.76	Peak	100	242

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

\*Factor includes antenna factor , cable loss and amplifier gain

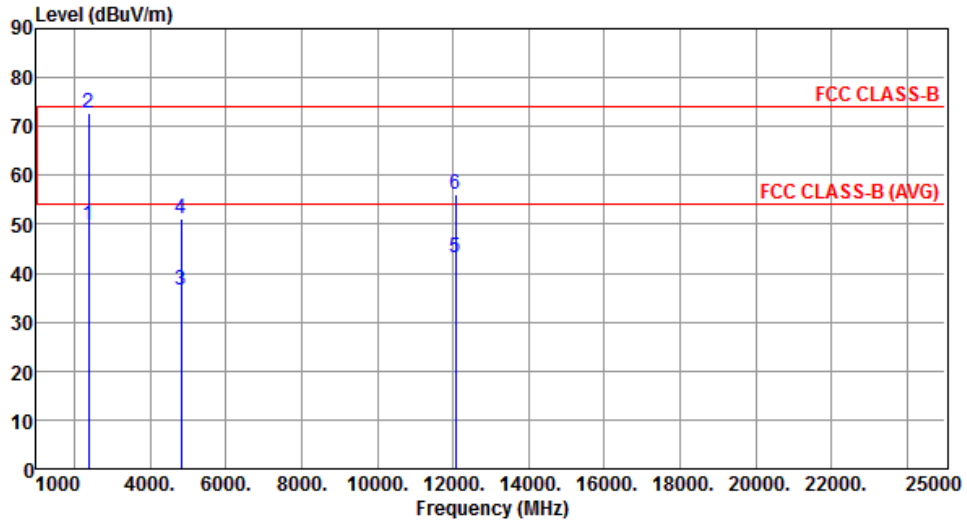
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

### 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	46.96	54.00	-7.04	50.14	-3.18	Average	209	0
2	2390.00	67.31	74.00	-6.69	70.49	-3.18	Peak	209	0
3	4824.00	42.09	54.00	-11.91	38.31	3.78	Average	264	50
4	4824.00	59.24	74.00	-14.76	55.46	3.78	Peak	264	50
5	12060.00	43.12	54.00	-10.88	29.54	13.58	Average	100	132
6	12060.00	55.37	74.00	-18.63	41.79	13.58	Peak	100	132

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).

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2412
<b>Polarization</b>	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.88	54.00	-4.12	53.06	-3.18	Average	100	18
2	2390.00	72.85	74.00	-1.15	76.03	-3.18	Peak	100	18
3	4824.00	36.39	54.00	-17.61	32.61	3.78	Average	100	148
4	4824.00	51.03	74.00	-22.97	47.25	3.78	Peak	100	148
5	12060.00	43.01	54.00	-10.99	29.43	13.58	Average	112	71
6	12060.00	56.06	74.00	-17.94	42.48	13.58	Peak	112	71

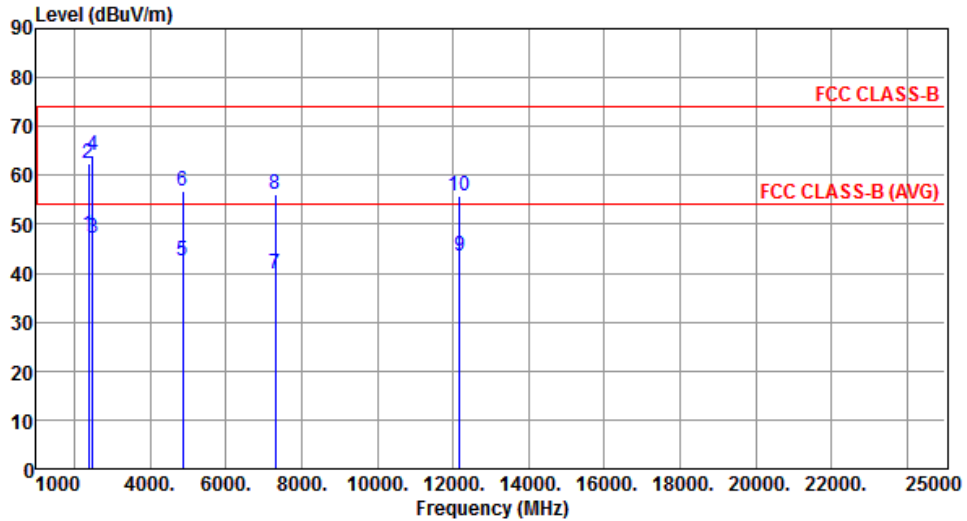
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

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



<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Horizontal		



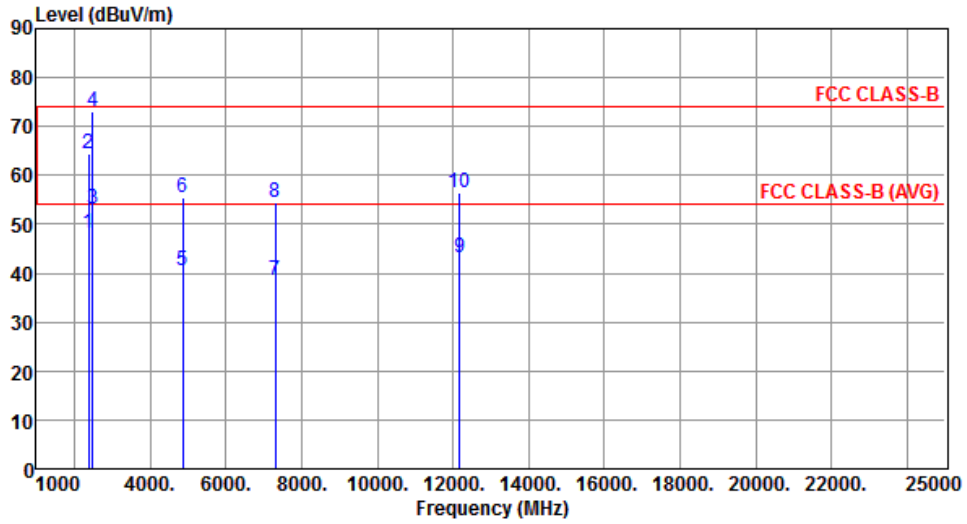
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	47.68	54.00	-6.32	50.86	-3.18	Average	219	352
2	2390.00	62.27	74.00	-11.73	65.45	-3.18	Peak	219	352
3	2483.50	47.25	54.00	-6.75	50.05	-2.80	Average	219	352
4	2483.50	64.12	74.00	-9.88	66.92	-2.80	Peak	219	352
5	4874.00	42.36	54.00	-11.64	38.42	3.94	Average	100	313
6	4874.00	56.84	74.00	-17.16	52.90	3.94	Peak	100	313
7	7311.00	39.79	54.00	-14.21	31.38	8.41	Average	160	342
8	7311.00	55.98	74.00	-18.02	47.57	8.41	Peak	160	342
9	12185.00	43.38	54.00	-10.62	29.71	13.67	Average	100	124
10	12185.00	55.70	74.00	-18.30	42.03	13.67	Peak	100	124

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).

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Vertical		



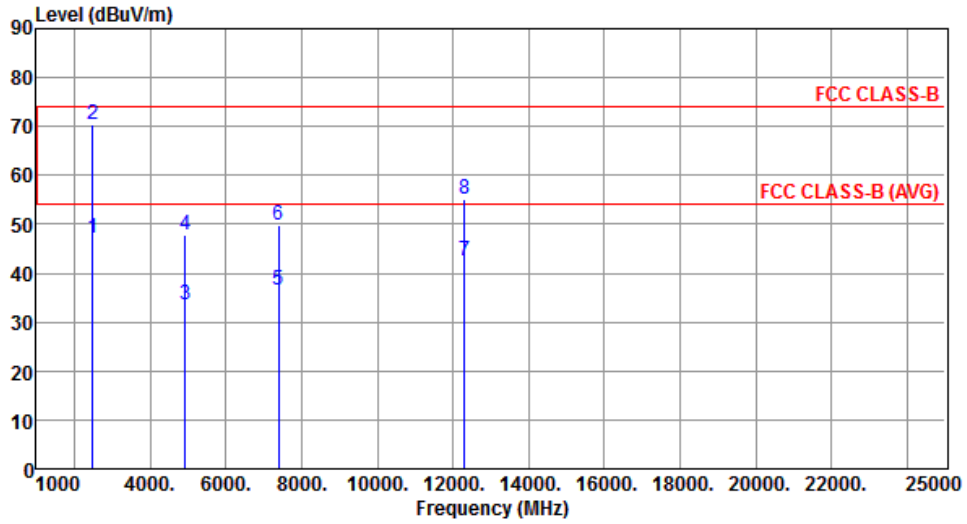
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	48.18	54.00	-5.82	51.36	-3.18	Average	221	4
2	2390.00	64.54	74.00	-9.46	67.72	-3.18	Peak	221	4
3	2483.50	53.16	54.00	-0.84	55.96	-2.80	Average	142	7
4	2483.50	73.01	74.00	-0.99	75.81	-2.80	Peak	142	7
5	4874.00	40.60	54.00	-13.40	36.66	3.94	Average	104	25
6	4874.00	55.36	74.00	-18.64	51.42	3.94	Peak	104	25
7	7311.00	38.68	54.00	-15.32	30.27	8.41	Average	100	261
8	7311.00	54.37	74.00	-19.63	45.96	8.41	Peak	100	261
9	12185.00	43.29	54.00	-10.71	29.62	13.67	Average	130	64
10	12185.00	56.50	74.00	-17.50	42.83	13.67	Peak	130	64

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).

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Horizontal		



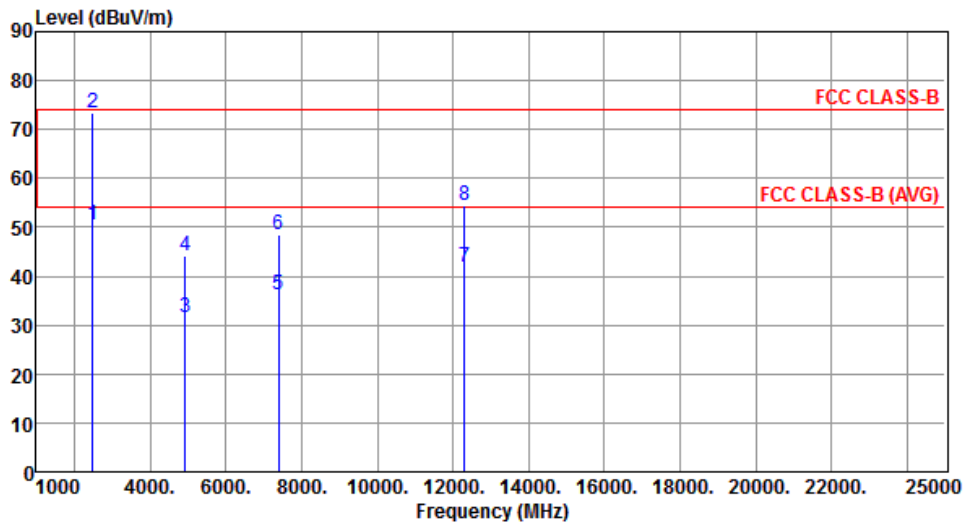
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	47.01	54.00	-6.99	49.81	-2.80	Average	228	4
2	2483.50	70.30	74.00	-3.70	73.10	-2.80	Peak	228	4
3	4924.00	33.40	54.00	-20.60	29.30	4.10	Average	250	30
4	4924.00	47.94	74.00	-26.06	43.84	4.10	Peak	250	30
5	7386.00	36.54	54.00	-17.46	28.10	8.44	Average	126	314
6	7386.00	49.74	74.00	-24.26	41.30	8.44	Peak	126	314
7	12310.00	42.61	54.00	-11.39	28.85	13.76	Average	100	154
8	12310.00	55.11	74.00	-18.89	41.35	13.76	Peak	100	154

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).

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Vertical		



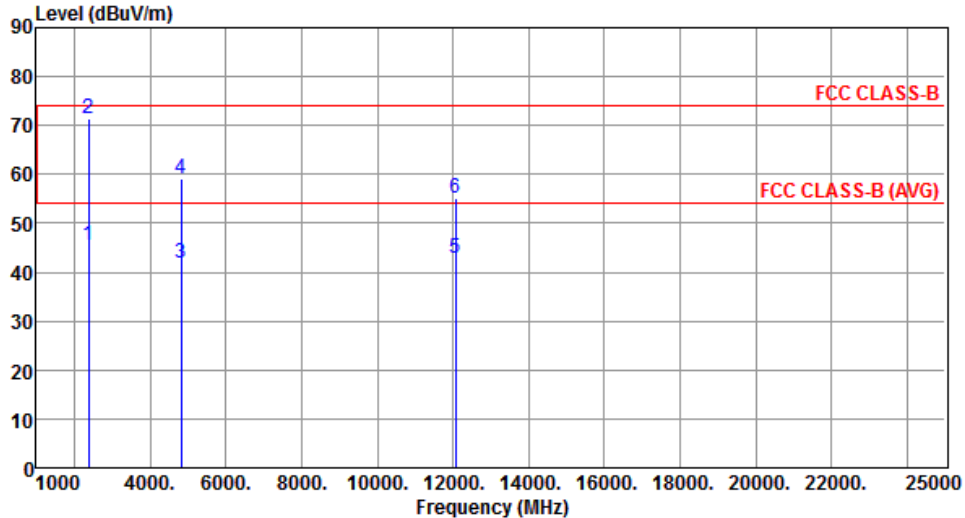
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	50.57	54.00	-3.43	53.37	-2.80	Average	100	13
2	2483.50	73.25	74.00	-0.75	76.05	-2.80	Peak	100	13
3	4924.00	31.50	54.00	-22.50	27.40	4.10	Average	100	61
4	4924.00	44.30	74.00	-29.70	40.20	4.10	Peak	100	61
5	7386.00	36.14	54.00	-17.86	27.70	8.44	Average	100	256
6	7386.00	48.64	74.00	-25.36	40.20	8.44	Peak	100	256
7	12310.00	41.89	54.00	-12.11	28.13	13.76	Average	100	78
8	12310.00	54.30	74.00	-19.70	40.54	13.76	Peak	100	78

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

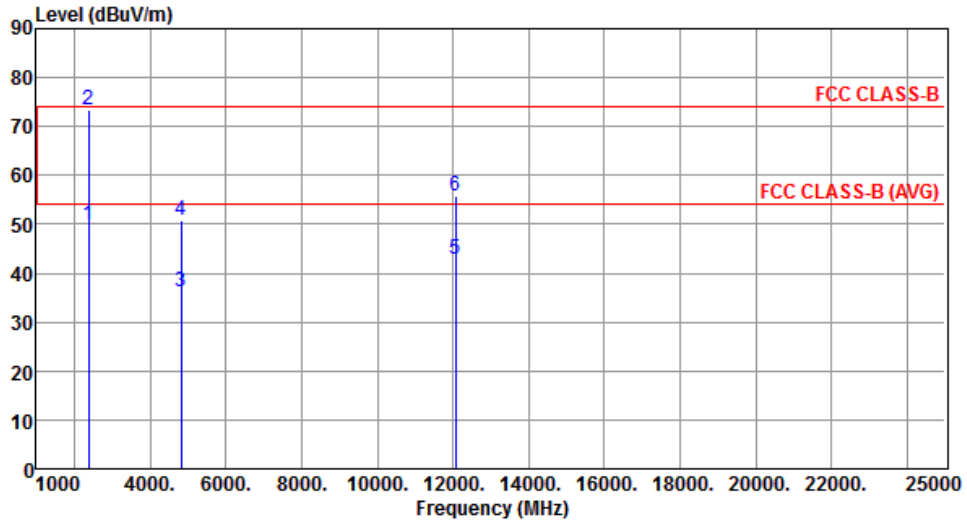
\*Factor includes antenna factor , cable loss and amplifier gain

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.	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	45.50	54.00	-8.50	48.68	-3.18	Average	210	0
2	2390.00	71.24	74.00	-2.76	74.42	-3.18	Peak	210	0
3	4824.00	41.86	54.00	-12.14	38.08	3.78	Average	261	46
4	4824.00	59.06	74.00	-14.94	55.28	3.78	Peak	261	46
5	12060.00	42.91	54.00	-11.09	29.33	13.58	Average	100	140
6	12060.00	55.16	74.00	-18.84	41.58	13.58	Peak	100	140
<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>									

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2412
<b>Polarization</b>	Vertical		



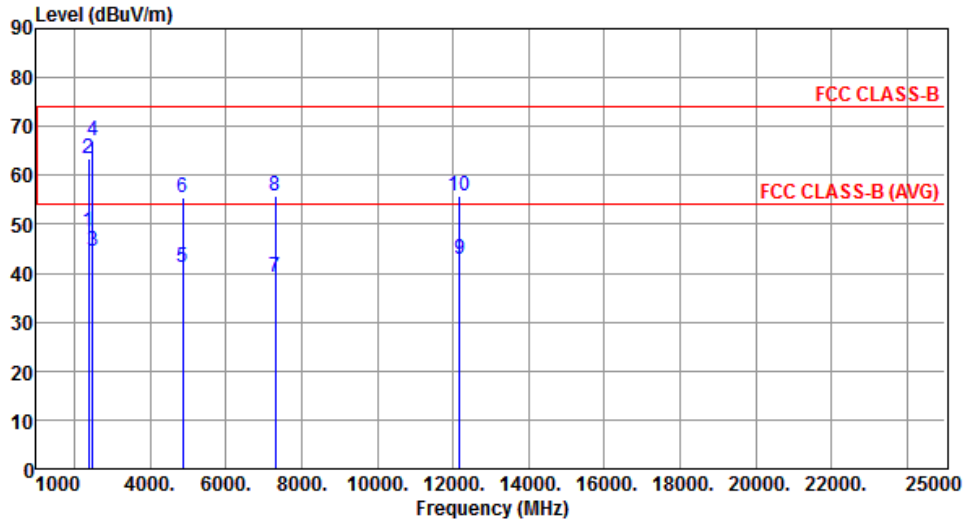
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.84	54.00	-4.16	53.02	-3.18	Average	178	335
2	2390.00	73.24	74.00	-0.76	76.42	-3.18	Peak	178	335
3	4824.00	36.31	54.00	-17.69	32.53	3.78	Average	100	175
4	4824.00	50.82	74.00	-23.18	47.04	3.78	Peak	100	175
5	12060.00	42.93	54.00	-11.07	29.35	13.58	Average	100	82
6	12060.00	55.88	74.00	-18.12	42.30	13.58	Peak	100	82

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).

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Horizontal		



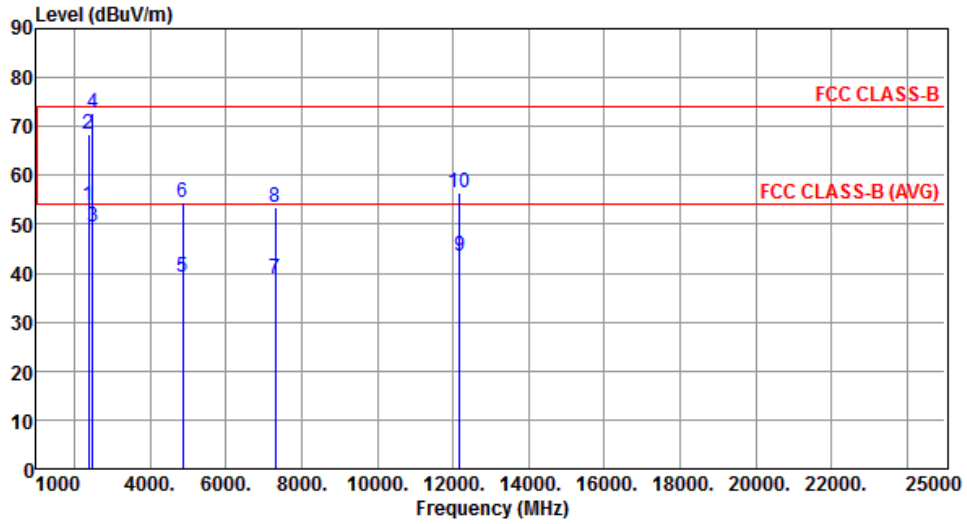
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	48.38	54.00	-5.62	51.56	-3.18	Average	100	187
2	2390.00	63.44	74.00	-10.56	66.62	-3.18	Peak	100	187
3	2483.50	44.49	54.00	-9.51	47.29	-2.80	Average	100	187
4	2483.50	67.01	74.00	-6.99	69.81	-2.80	Peak	100	187
5	4874.00	41.03	54.00	-12.97	37.09	3.94	Average	100	312
6	4874.00	55.58	74.00	-18.42	51.64	3.94	Peak	100	312
7	7311.00	39.33	54.00	-14.67	30.92	8.41	Average	100	293
8	7311.00	55.66	74.00	-18.34	47.25	8.41	Peak	100	293
9	12185.00	42.95	54.00	-11.05	29.28	13.67	Average	100	151
10	12185.00	55.73	74.00	-18.27	42.06	13.67	Peak	100	151

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).

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	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	53.79	54.00	-0.21	56.97	-3.18	Average	100	19
2	2390.00	68.45	74.00	-5.55	71.63	-3.18	Peak	100	19
3	2483.50	49.49	54.00	-4.51	52.29	-2.80	Average	100	19
4	2483.50	72.87	74.00	-1.13	75.67	-2.80	Peak	100	19
5	4874.00	39.13	54.00	-14.87	35.19	3.94	Average	100	19
6	4874.00	54.53	74.00	-19.47	50.59	3.94	Peak	100	19
7	7311.00	38.77	54.00	-15.23	30.36	8.41	Average	128	273
8	7311.00	53.38	74.00	-20.62	44.97	8.41	Peak	128	273
9	12185.00	43.56	54.00	-10.44	29.89	13.67	Average	100	172
10	12185.00	56.41	74.00	-17.59	42.74	13.67	Peak	100	172

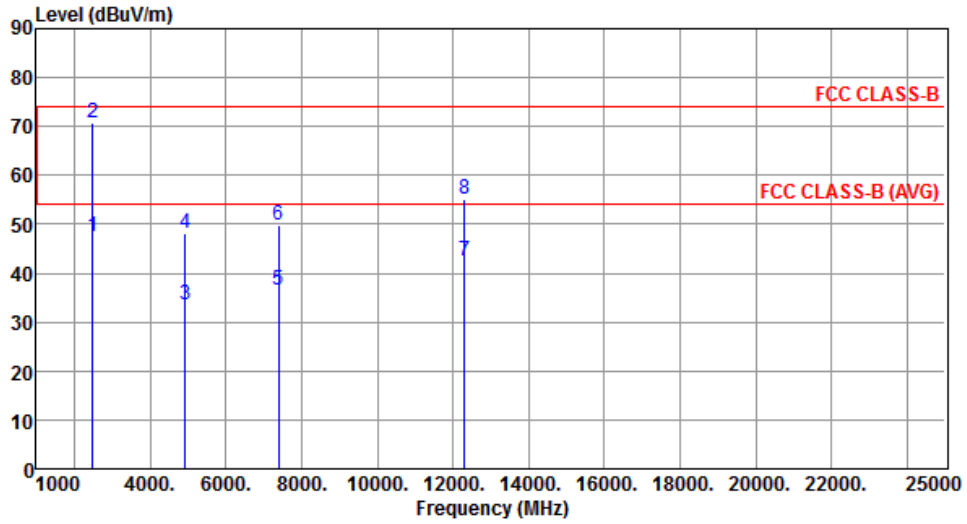
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

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



<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Horizontal		



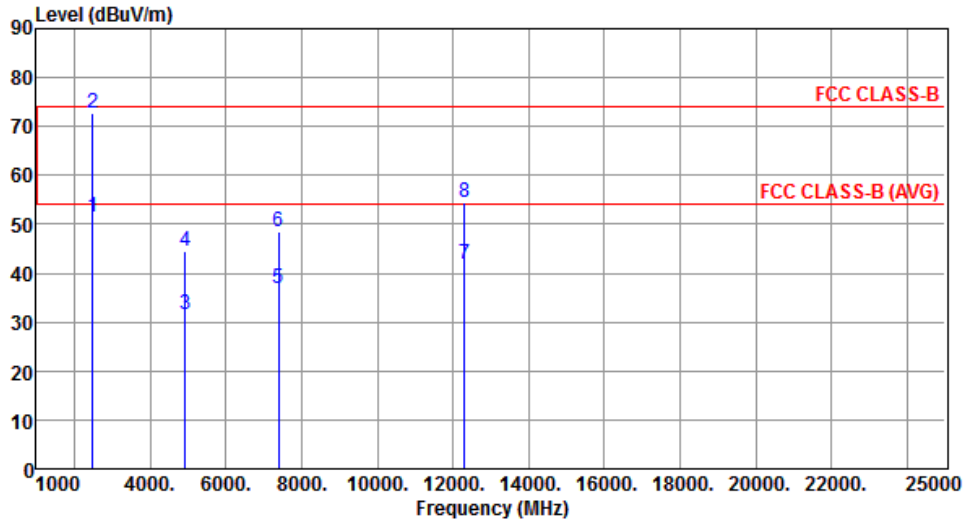
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	47.53	54.00	-6.47	50.33	-2.80	Average	209	0
2	2483.50	70.82	74.00	-3.18	73.62	-2.80	Peak	209	0
3	4924.00	33.52	54.00	-20.48	29.42	4.10	Average	242	24
4	4924.00	48.16	74.00	-25.84	44.06	4.10	Peak	242	24
5	7386.00	36.62	54.00	-17.38	28.18	8.44	Average	120	306
6	7386.00	49.82	74.00	-24.18	41.38	8.44	Peak	120	306
7	12310.00	42.53	54.00	-11.47	28.77	13.76	Average	100	163
8	12310.00	55.23	74.00	-18.77	41.47	13.76	Peak	100	163

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).

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Vertical		



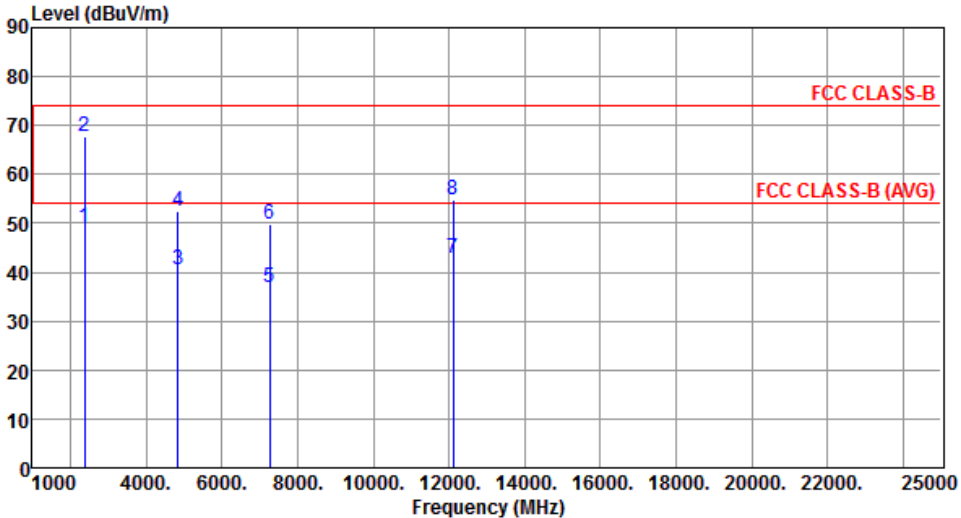
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.50	54.00	-2.50	54.30	-2.80	Average	220	358
2	2483.50	72.86	74.00	-1.14	75.66	-2.80	Peak	220	358
3	4924.00	31.46	54.00	-22.54	27.36	4.10	Average	100	84
4	4924.00	44.41	74.00	-29.59	40.31	4.10	Peak	100	84
5	7386.00	36.80	54.00	-17.20	28.36	8.44	Average	100	247
6	7386.00	48.52	74.00	-25.48	40.08	8.44	Peak	100	247
7	12310.00	41.98	54.00	-12.02	28.22	13.76	Average	100	95
8	12310.00	54.47	74.00	-19.53	40.71	13.76	Peak	100	95

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

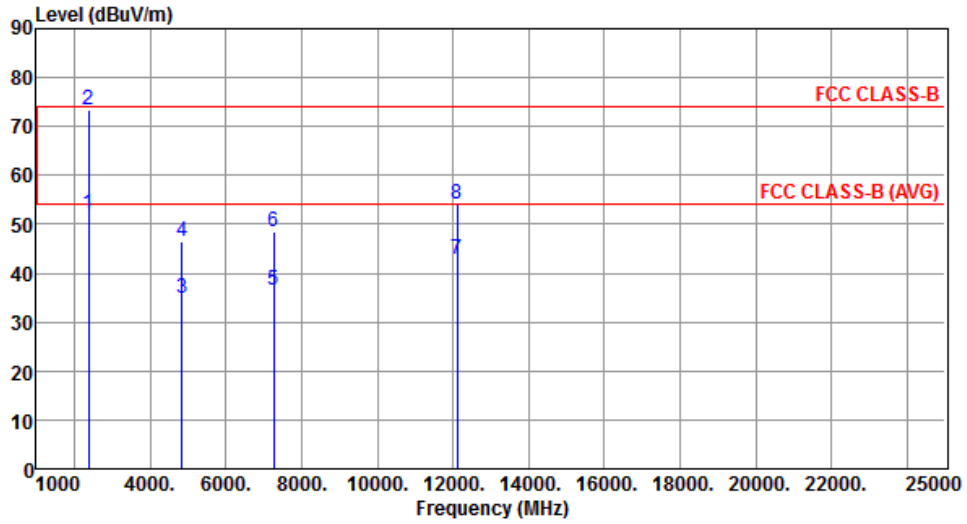
\*Factor includes antenna factor , cable loss and amplifier gain

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.	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	49.22	54.00	-4.78	52.40	-3.18	Average	242	0
2	2390.00	67.77	74.00	-6.23	70.95	-3.18	Peak	242	0
3	4844.00	40.48	54.00	-13.52	36.63	3.85	Average	321	37
4	4844.00	52.32	74.00	-21.68	48.47	3.85	Peak	321	37
5	7266.00	36.81	54.00	-17.19	28.42	8.39	Average	100	310
6	7266.00	49.69	74.00	-24.31	41.30	8.39	Peak	100	310
7	12110.00	42.82	54.00	-11.18	29.20	13.62	Average	100	139
8	12110.00	54.83	74.00	-19.17	41.21	13.62	Peak	100	139
<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>									

<b>Modulation</b>	HT40	<b>Test Freq. (MHz)</b>	2422
<b>Polarization</b>	Vertical		



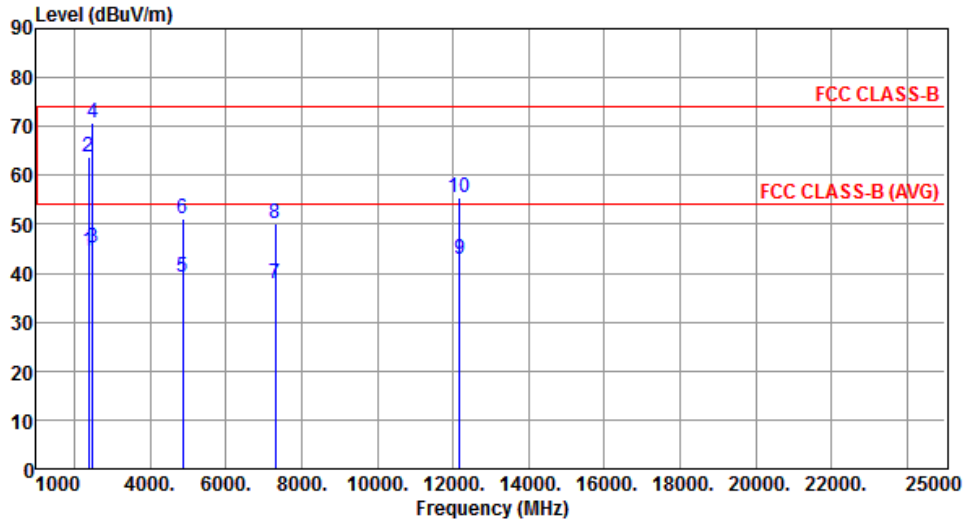
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.04	54.00	-1.96	55.22	-3.18	Average	205	341
2	2390.00	73.28	74.00	-0.72	76.46	-3.18	Peak	205	341
3	4844.00	34.91	54.00	-19.09	31.06	3.85	Average	100	31
4	4844.00	46.65	74.00	-27.35	42.80	3.85	Peak	100	31
5	7266.00	36.68	54.00	-17.32	28.29	8.39	Average	100	115
6	7266.00	48.45	74.00	-25.55	40.06	8.39	Peak	100	115
7	12110.00	42.69	54.00	-11.31	29.07	13.62	Average	100	91
8	12110.00	54.06	74.00	-19.94	40.44	13.62	Peak	100	91

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).

<b>Modulation</b>	HT40	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Horizontal		



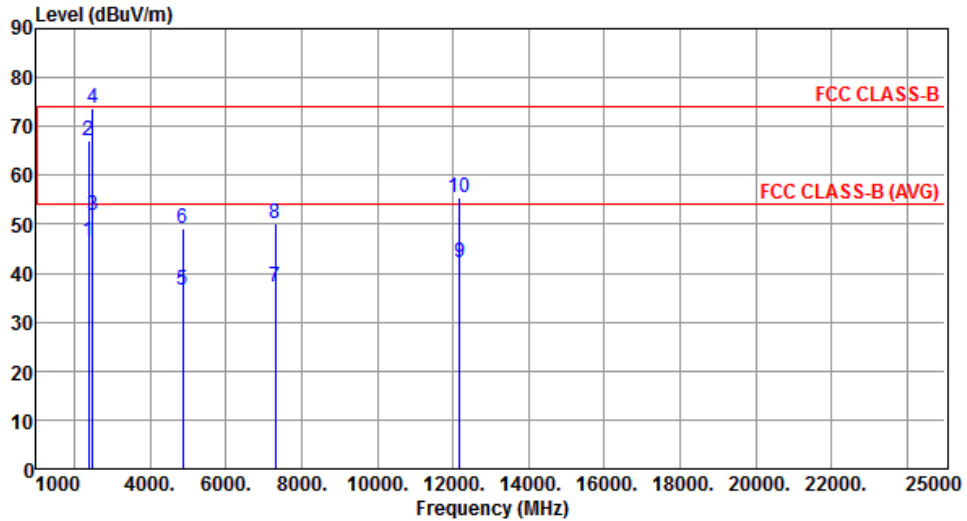
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.64	54.00	-9.36	47.82	-3.18	Average	142	350
2	2390.00	63.66	74.00	-10.34	66.84	-3.18	Peak	142	350
3	2483.50	45.05	54.00	-8.95	47.85	-2.80	Average	142	350
4	2483.50	70.80	74.00	-3.20	73.60	-2.80	Peak	142	350
5	4874.00	39.11	54.00	-14.89	35.17	3.94	Average	100	307
6	4874.00	51.21	74.00	-22.79	47.27	3.94	Peak	100	307
7	7311.00	37.94	54.00	-16.06	29.53	8.41	Average	100	143
8	7311.00	50.10	74.00	-23.90	41.69	8.41	Peak	100	143
9	12185.00	42.69	54.00	-11.31	29.02	13.67	Average	100	67
10	12185.00	55.40	74.00	-18.60	41.73	13.67	Peak	100	67

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).

<b>Modulation</b>	HT40	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Vertical		



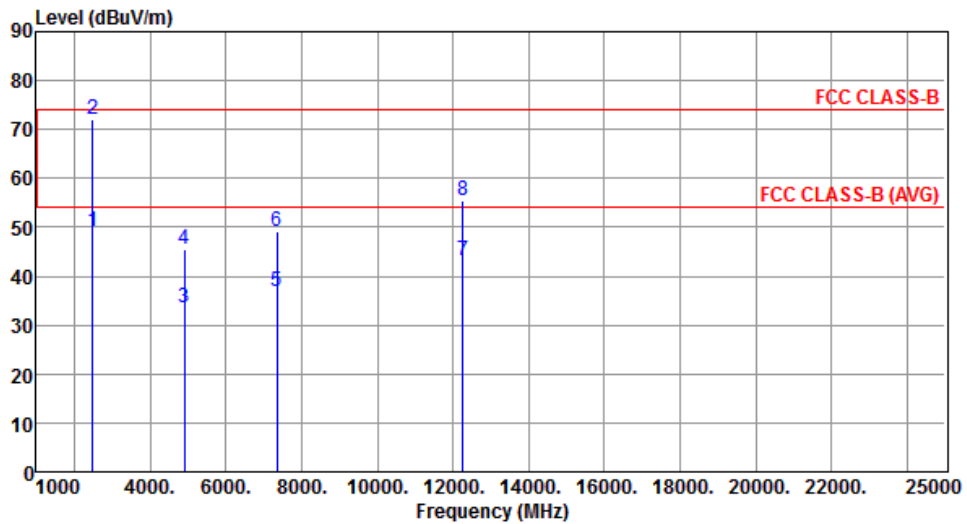
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.53	54.00	-7.47	49.71	-3.18	Average	250	5
2	2390.00	67.10	74.00	-6.90	70.28	-3.18	Peak	250	5
3	2483.50	51.94	54.00	-2.06	54.74	-2.80	Average	146	18
4	2483.50	73.72	74.00	-0.28	76.52	-2.80	Peak	146	18
5	4874.00	36.39	54.00	-17.61	32.45	3.94	Average	125	27
6	4874.00	49.27	74.00	-24.73	45.33	3.94	Peak	125	27
7	7311.00	37.26	54.00	-16.74	28.85	8.41	Average	100	73
8	7311.00	50.23	74.00	-23.77	41.82	8.41	Peak	100	73
9	12185.00	42.26	54.00	-11.74	28.59	13.67	Average	100	17
10	12185.00	55.46	74.00	-18.54	41.79	13.67	Peak	100	17

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).

<b>Modulation</b>	HT40	<b>Test Freq. (MHz)</b>	2452
<b>Polarization</b>	Horizontal		



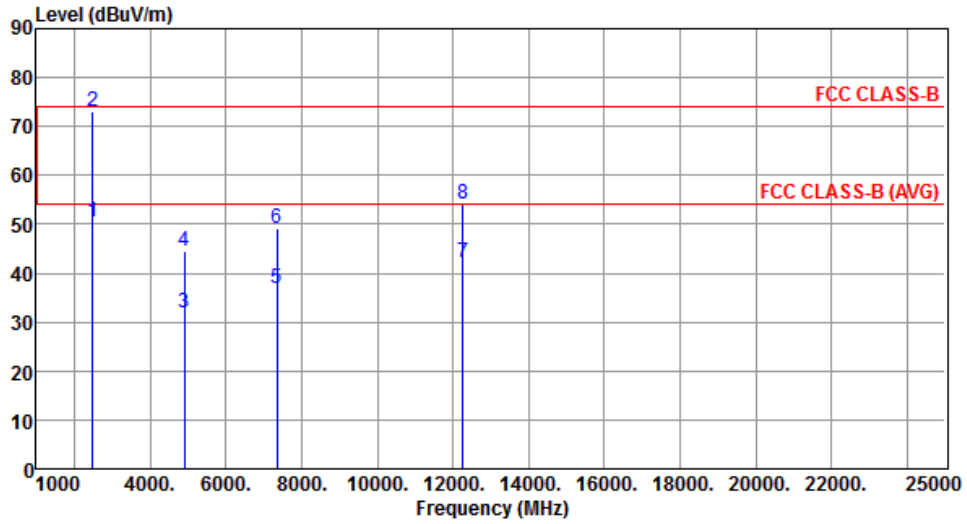
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	49.10	54.00	-4.90	51.90	-2.80	Average	167	1
2	2483.50	71.92	74.00	-2.08	74.72	-2.80	Peak	167	1
3	4904.00	33.44	54.00	-20.56	29.39	4.05	Average	269	32
4	4904.00	45.52	74.00	-28.48	41.47	4.05	Peak	269	32
5	7356.00	36.98	54.00	-17.02	28.55	8.43	Average	158	346
6	7356.00	49.13	74.00	-24.87	40.70	8.43	Peak	158	346
7	12260.00	43.10	54.00	-10.90	29.37	13.73	Average	100	131
8	12260.00	55.38	74.00	-18.62	41.65	13.73	Peak	100	131

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).

<b>Modulation</b>	HT40	<b>Test Freq. (MHz)</b>	2452
<b>Polarization</b>	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	50.54	54.00	-3.46	53.34	-2.80	Average	205	0
2	2483.50	73.09	74.00	-0.91	75.89	-2.80	Peak	205	0
3	4904.00	32.00	54.00	-22.00	27.95	4.05	Average	100	38
4	4904.00	44.54	74.00	-29.46	40.49	4.05	Peak	100	38
5	7356.00	36.73	54.00	-17.27	28.30	8.43	Average	100	256
6	7356.00	49.29	74.00	-24.71	40.86	8.43	Peak	100	256
7	12260.00	42.10	54.00	-11.90	28.37	13.73	Average	100	76
8	12260.00	54.27	74.00	-19.73	40.54	13.73	Peak	100	76

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 Test Procedures

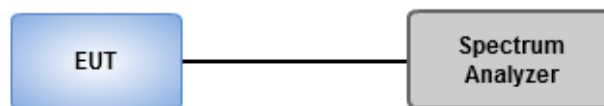
#### Reference level measurement

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

#### Emission level measurement

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

### 3.6.3 Test Setup

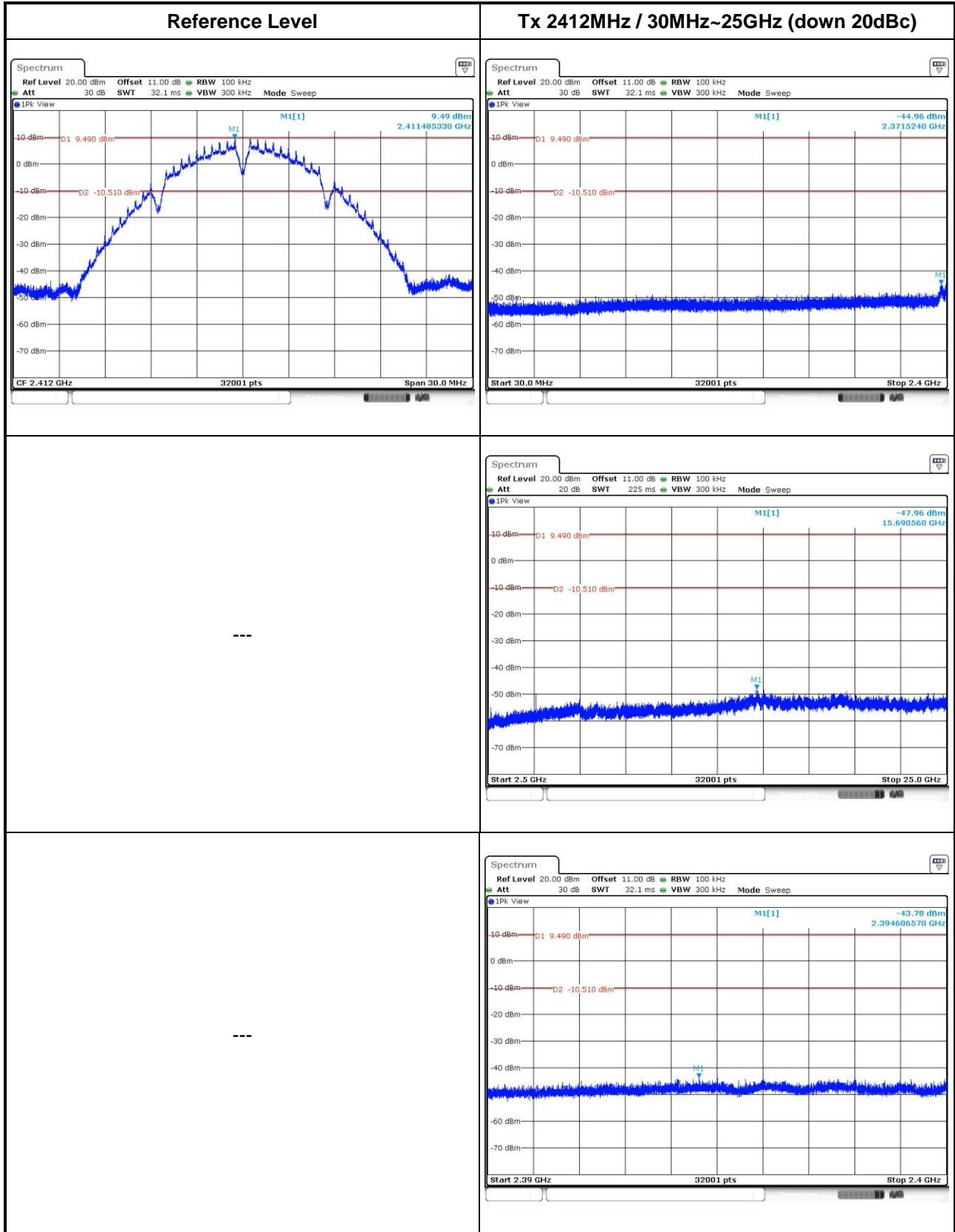


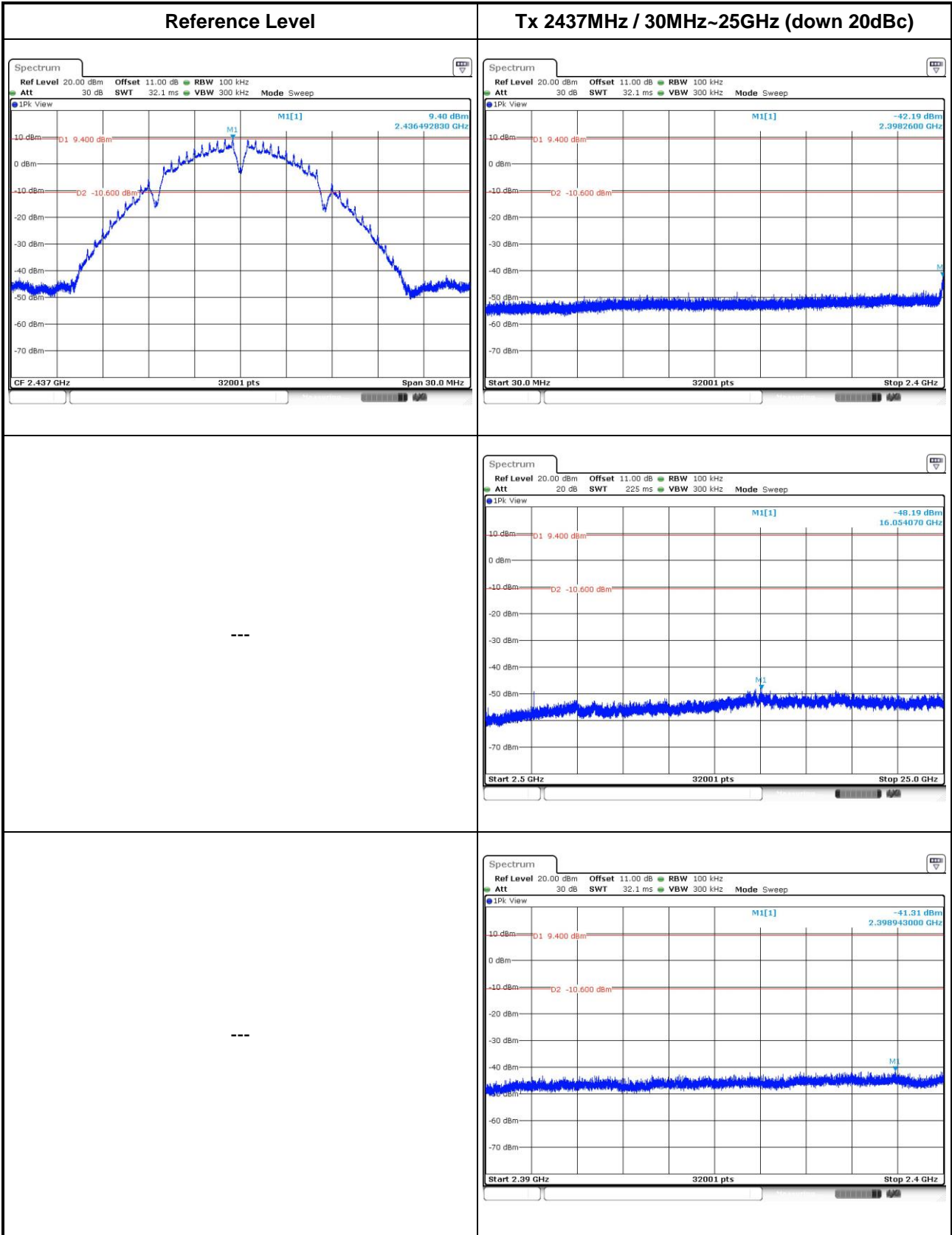
### 3.6.4 Test Result of Emissions in non-restricted frequency bands

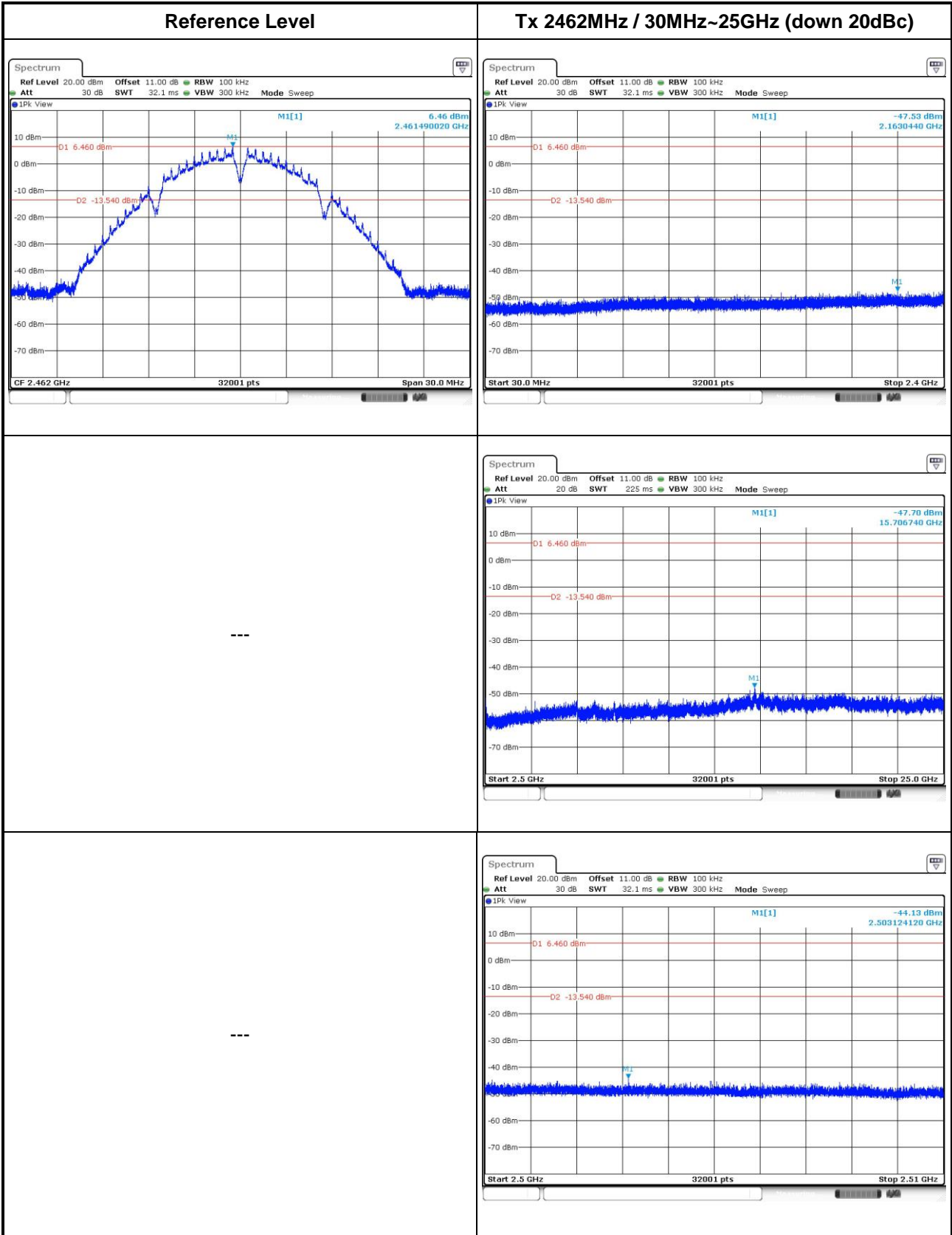
This test item is performed on each TX output individually without summing or adding  $10 \log(N_{ANT})$  since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

### 3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands

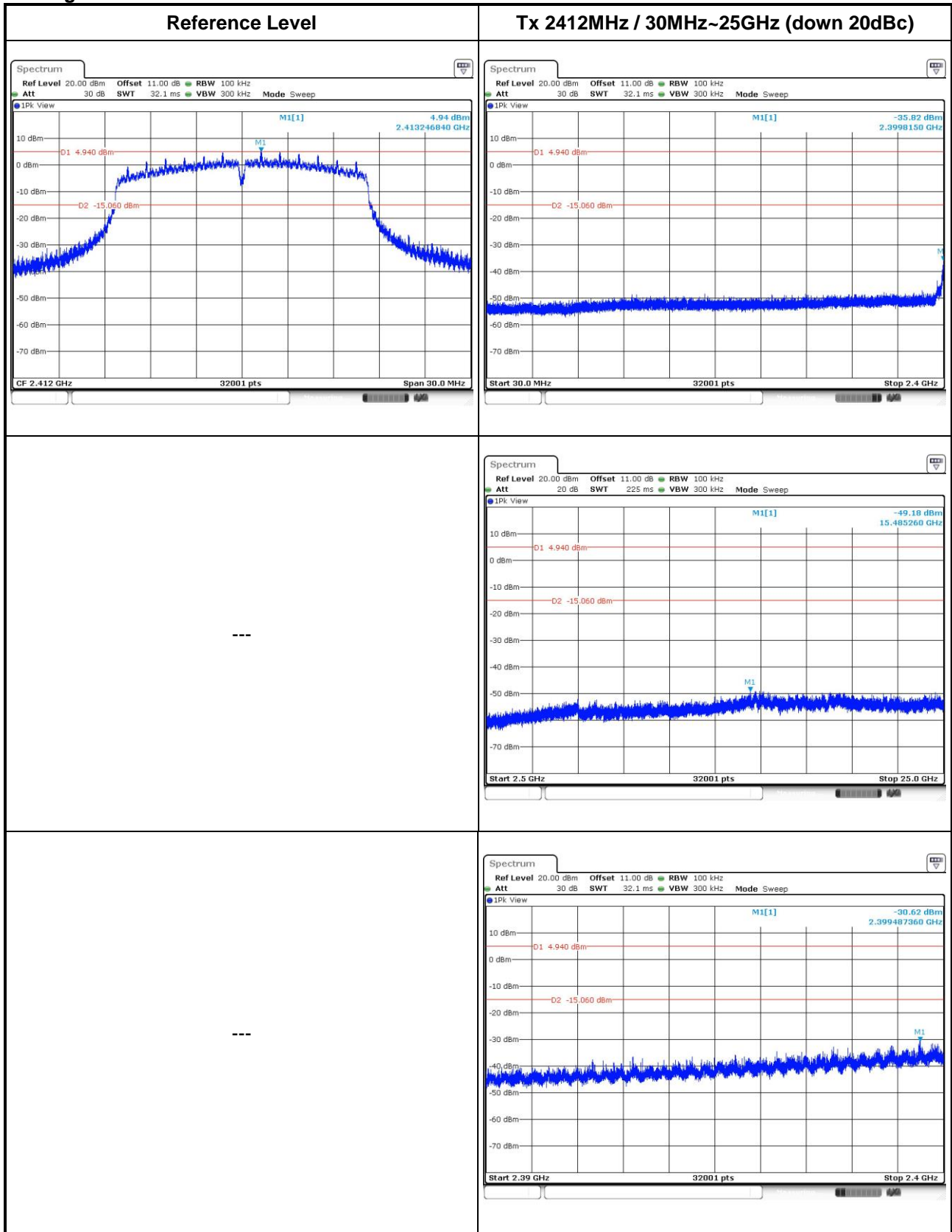
#### 802.11b

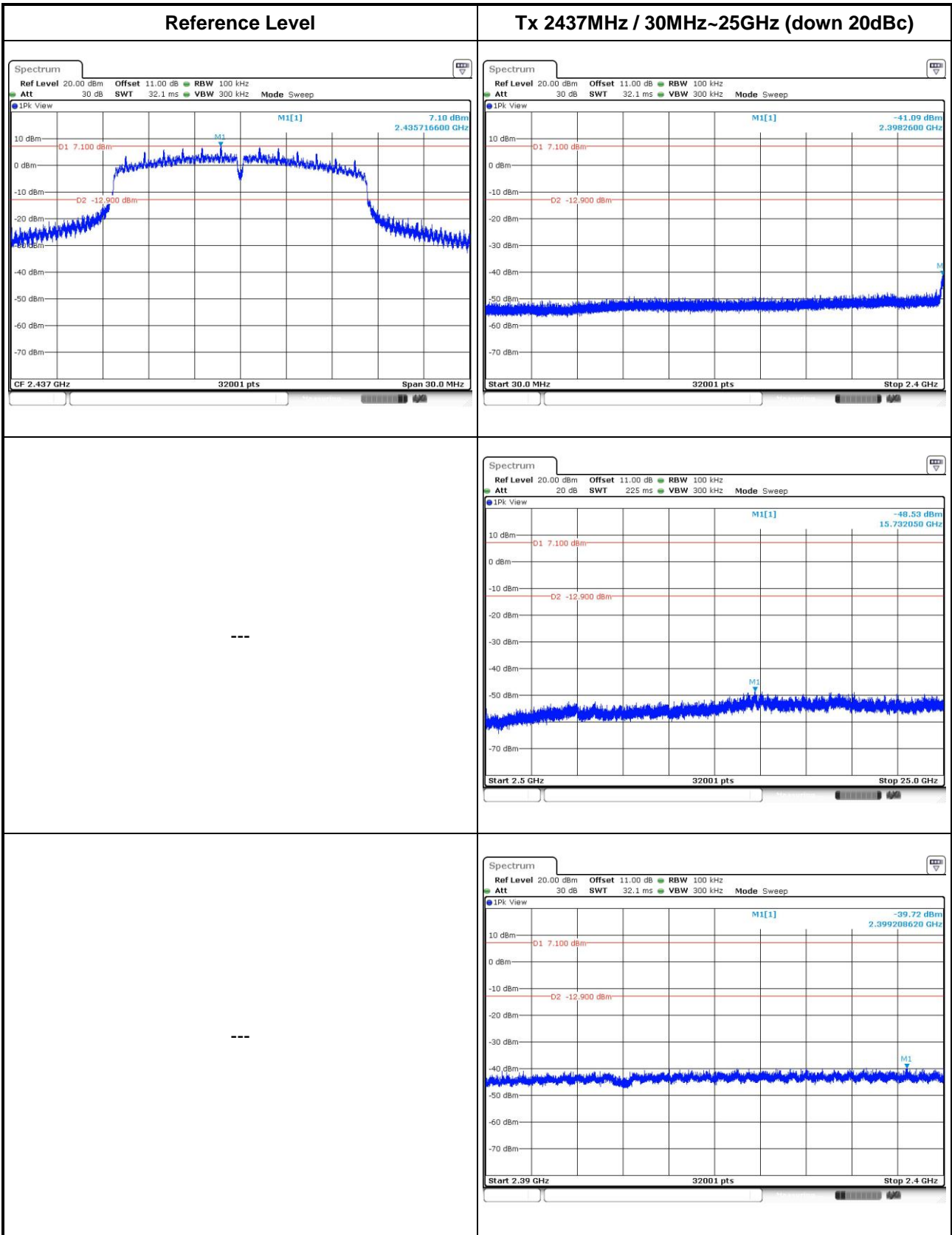


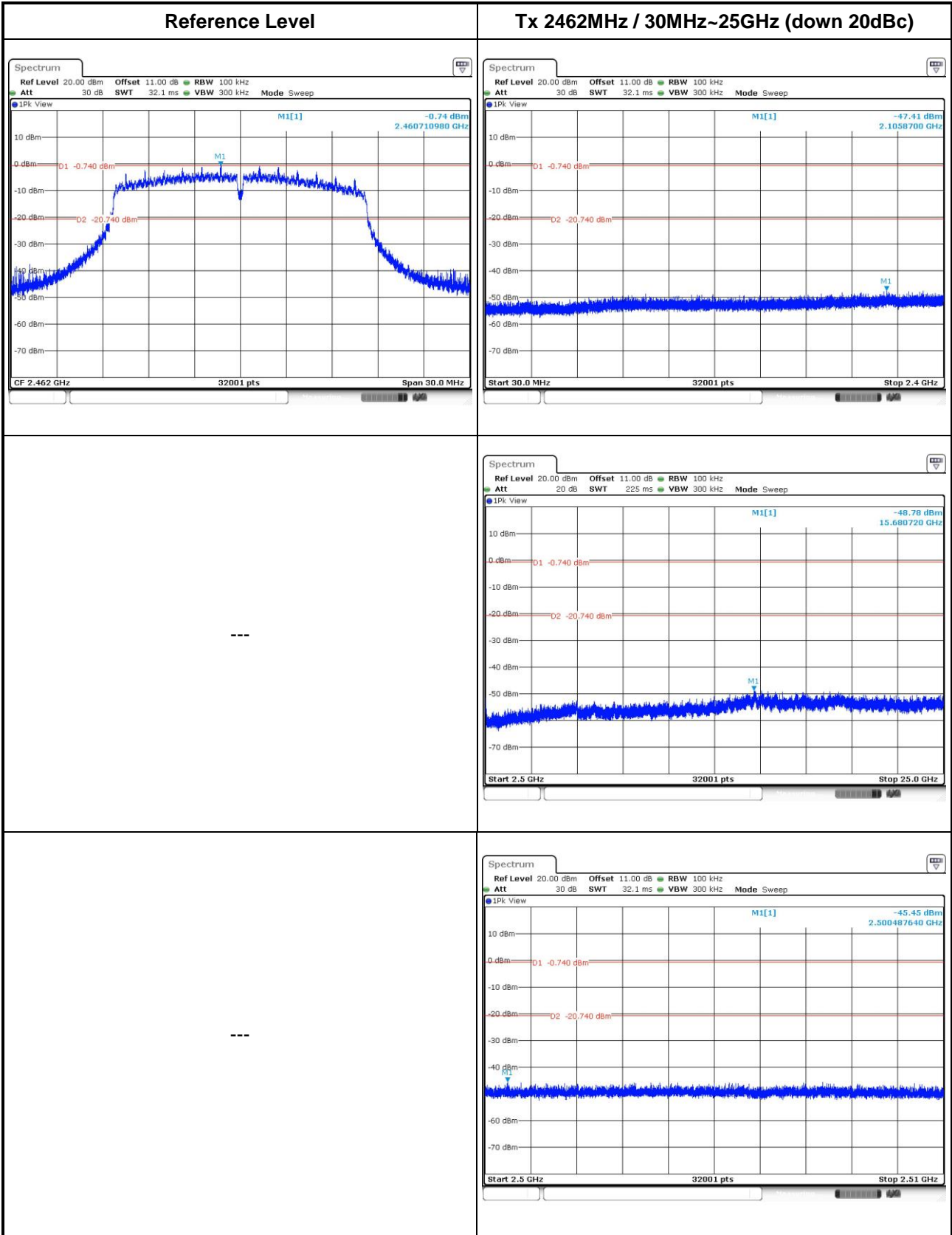




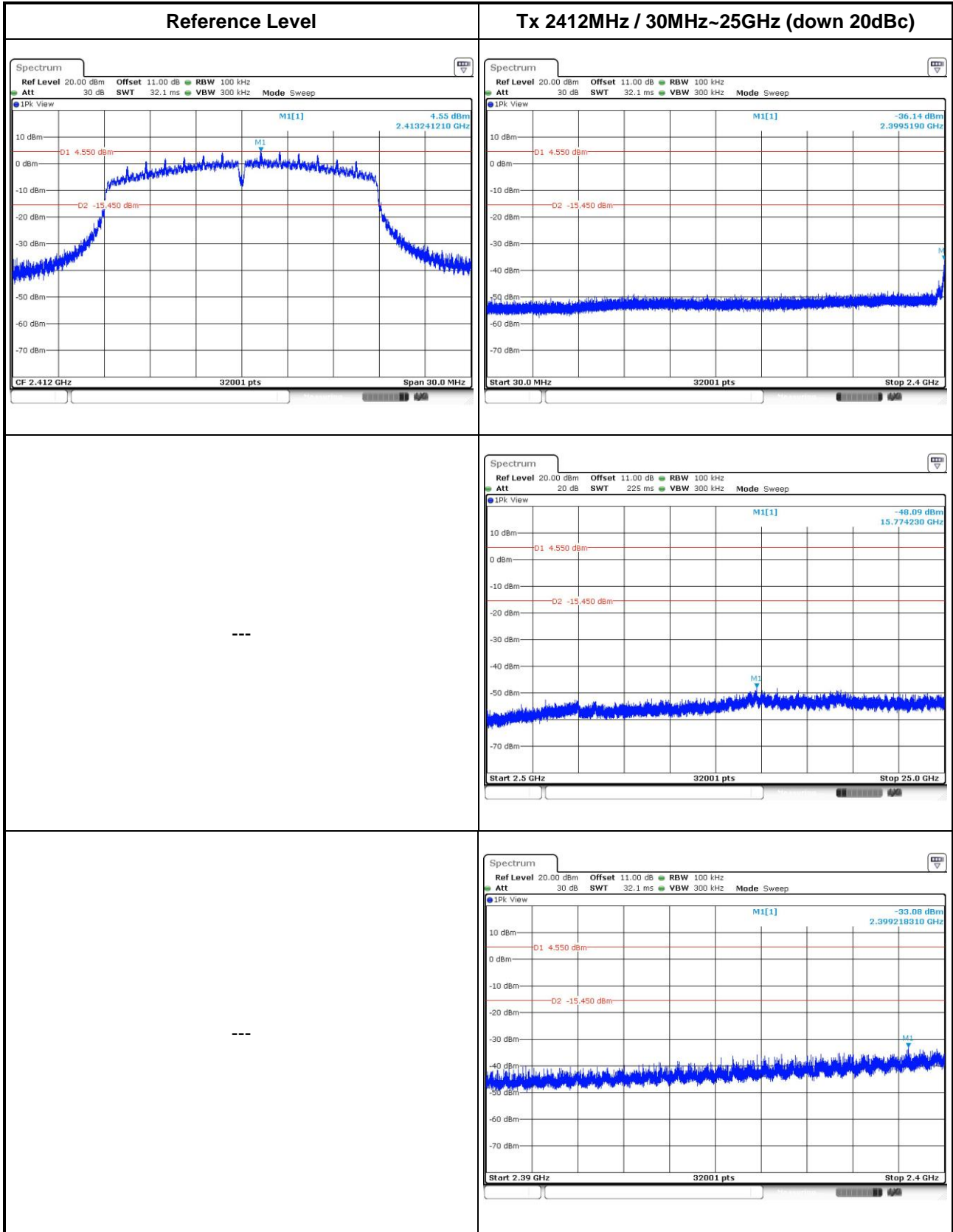
802.11g



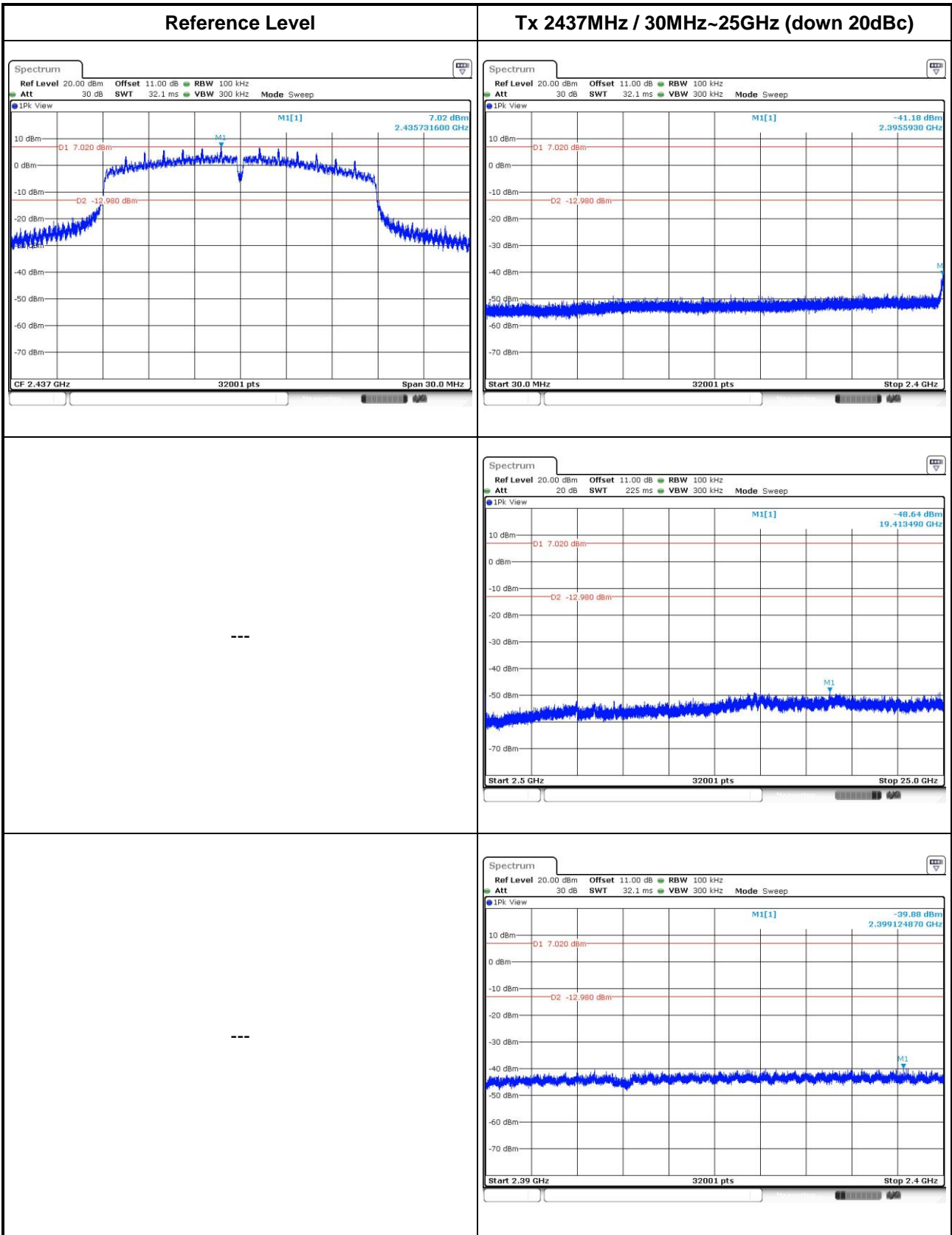


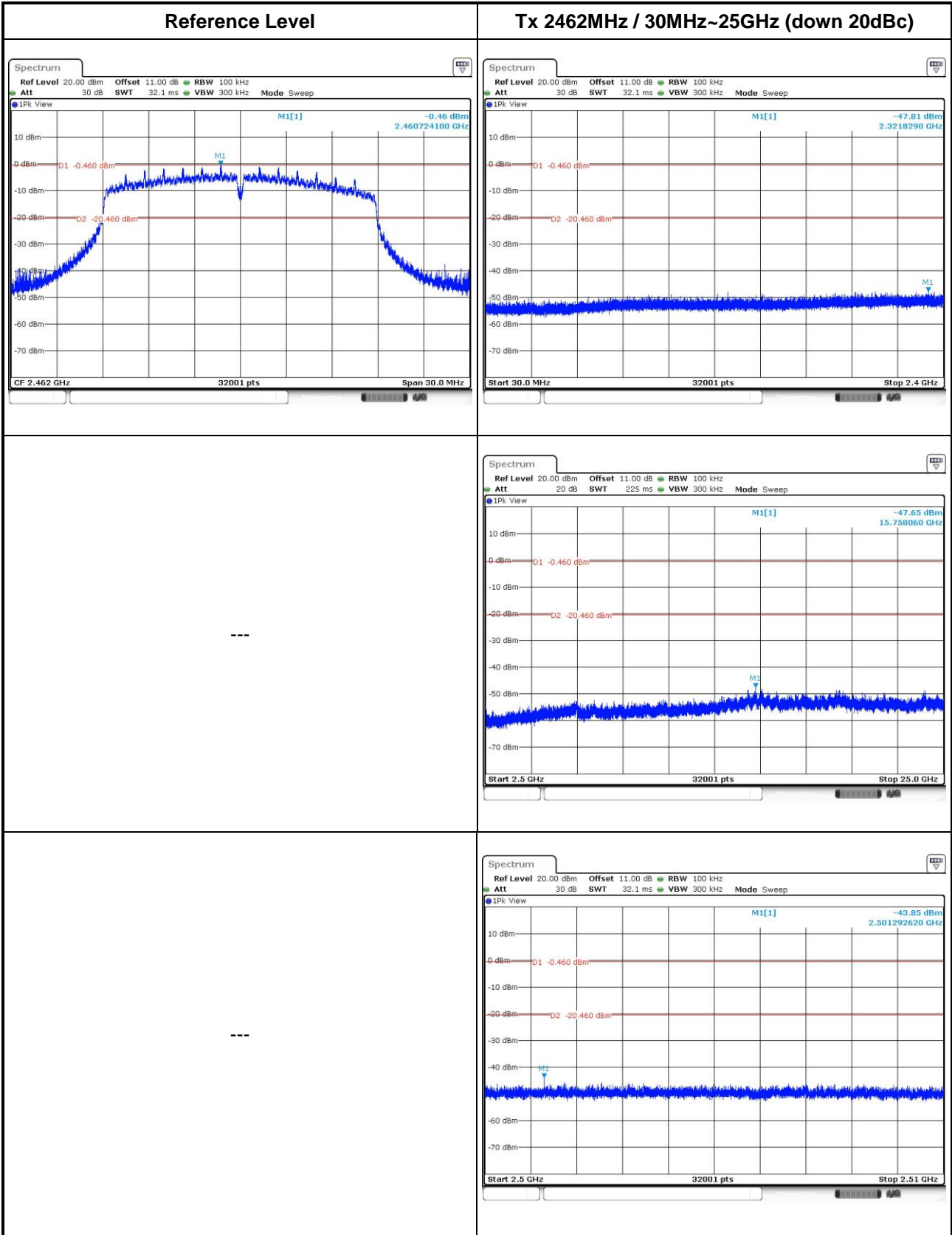


802.11n HT20

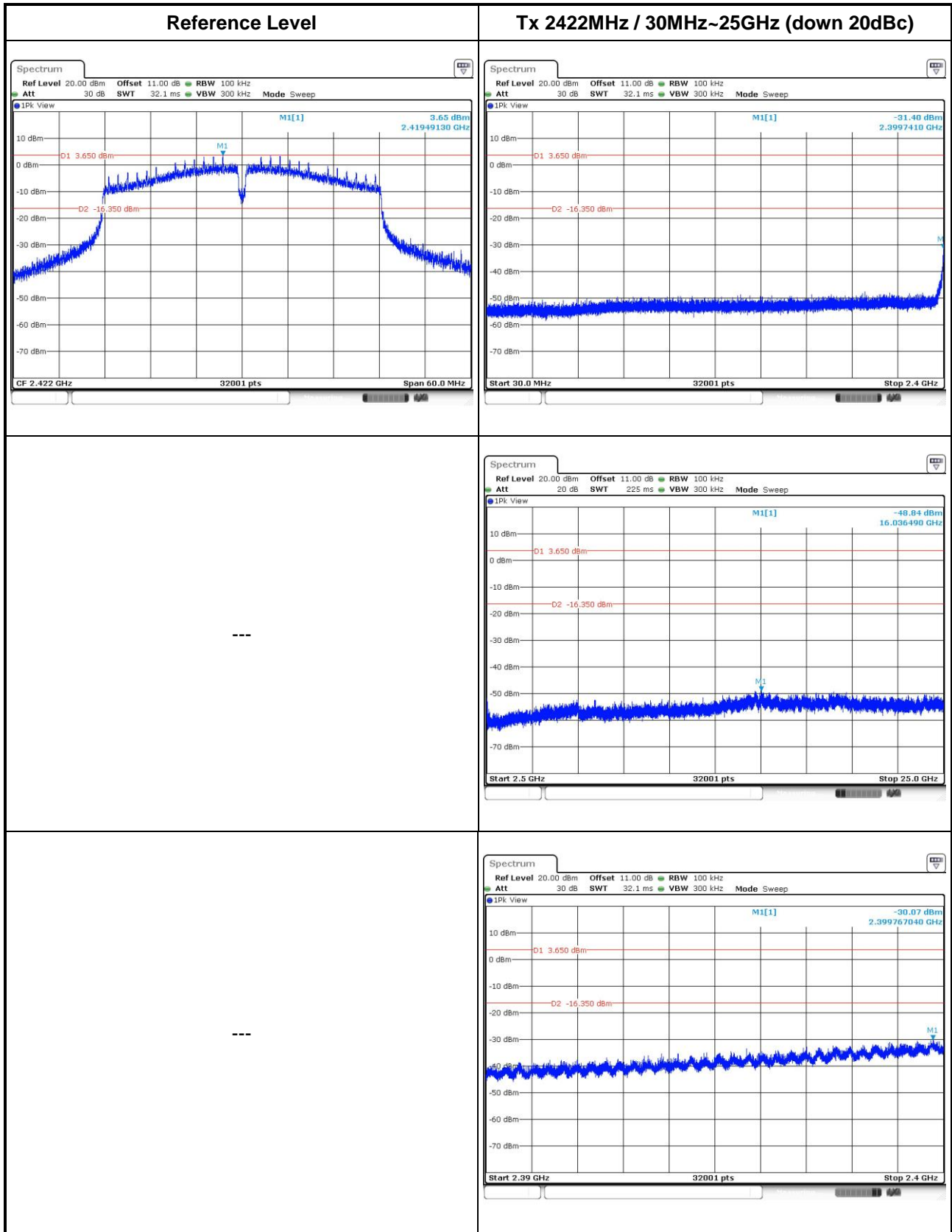


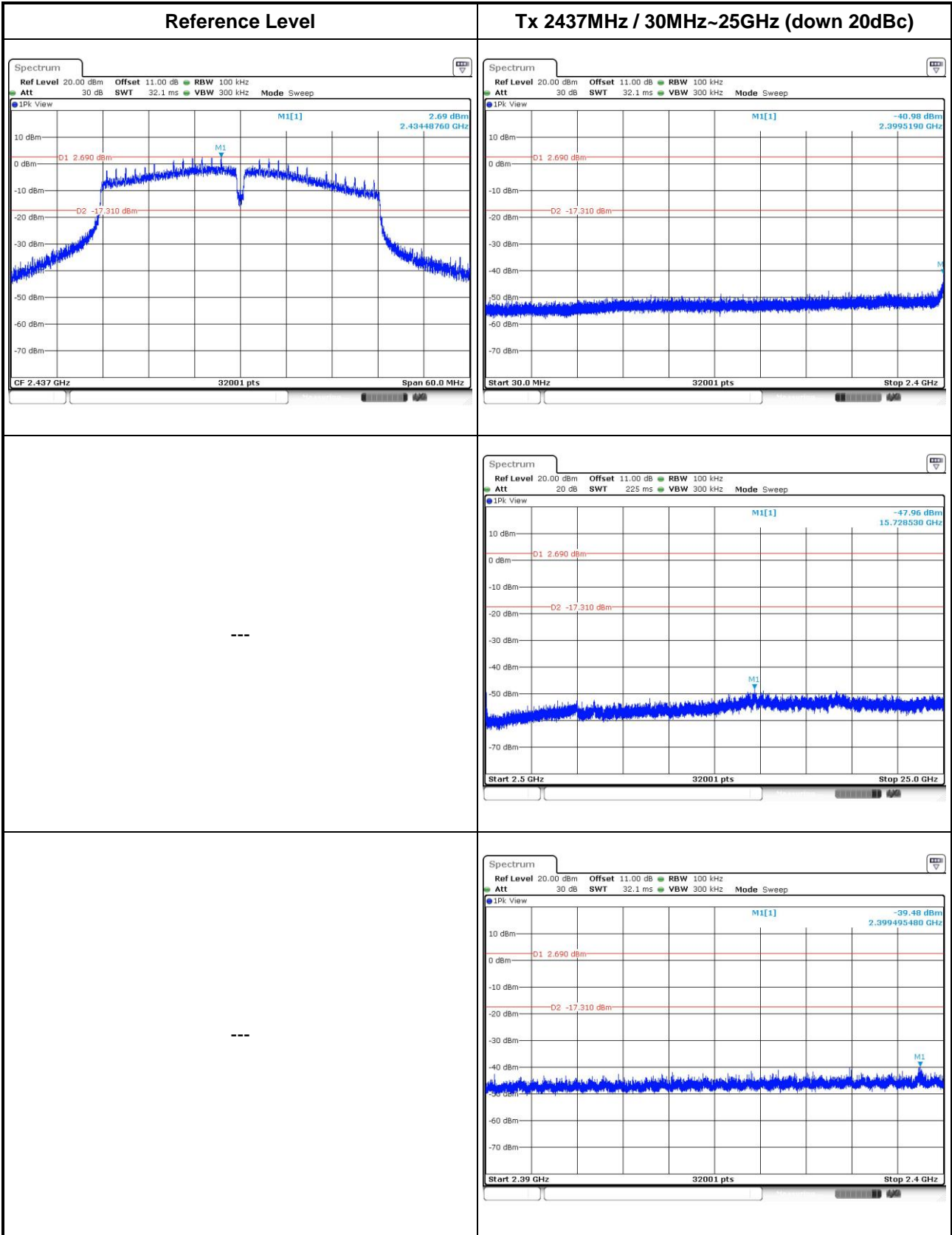


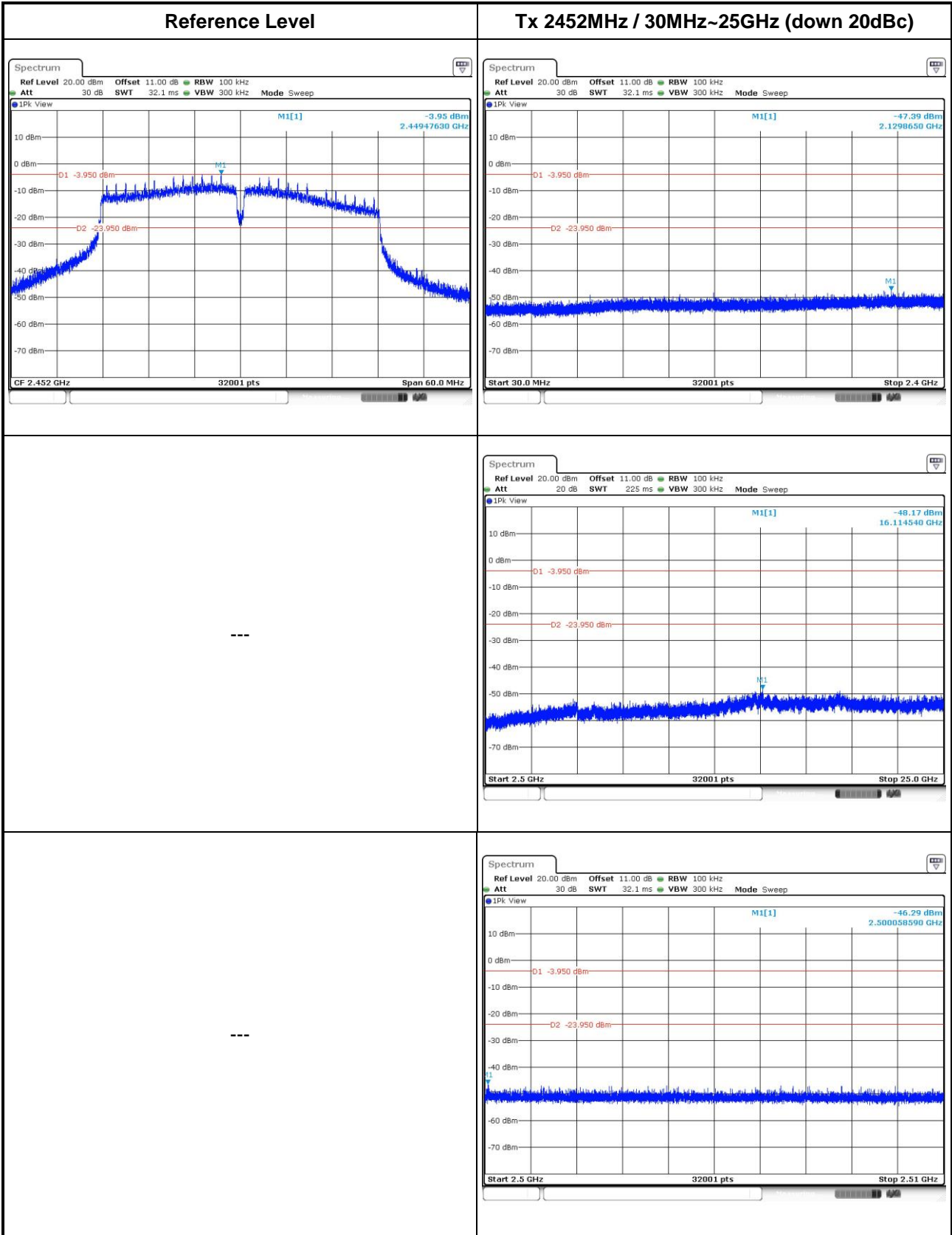




802.11n HT40







## 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**

Tel: 886-2-2601-1640

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Kou District, New Taipei City,  
Taiwan, R.O.C.

### **Kwei Shan**

Tel: 886-3-271-8666

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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.

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Email: ICC\_Service@icertifi.com.tw

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