

# FCC Test Report

**FCC ID** : 2ABLK-814G-1  
**Equipment** : GigaHub  
**Model No.** : 814G-1  
**Brand Name** : Calix Inc.  
**Applicant** : Calix Inc.  
**Address** : 1035 N. McDowell Blvd. Petaluma, CA 94954  
**Standard** : 47 CFR FCC Part 15.247  
**Received Date** : Nov. 30, 2017  
**Tested Date** : Nov. 30, 2017 ~ Jan. 23, 2018

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

Reviewed by:

  
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Along Chen / Assistant Manager

Approved by:

  
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Gary Chang / Manager



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## Release Record

Report No.	Version	Description	Issued Date
FR7N3003AC	Rev. 01	Initial issue	Feb. 05, 2018

## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.371MHz 41.34 (Margin -7.13dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 4824.00MHz 53.72 (Margin -0.28dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 27.35	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]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.  
 Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.  
 Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

### 1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)		
				2400~2483.5	5150~5250	5725~5850
1	PCB antenna	Dipole	IPEX	3.6	---	---
2	PCB antenna	Dipole	IPEX	4.0	---	---
3	PCB antenna	Dipole	IPEX	---	3.6	2.0
4	PCB antenna	Dipole	IPEX	---	4.1	3.8

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

<b>Power Supply Type</b>	12Vdc from AC adapter
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### 1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand: AMIGO Model: AMS157-1202500FU (US) AMS157-1202500FV (EU) I/P: 100-240Vac, 50-60Hz, 1A O/P: 12Vdc, 2.5A Power line: 1.3m non-shielded without core
2	RJ45 cable	1.5m non-shielded without core
3	RJ11 cable	1.5m non-shielded without core

### 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	PUTTY, V0.6		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	100.00%	0.00
	11g	100.00%	0.00
	HT20	100.00%	0.00
	HT40	100.00%	0.00

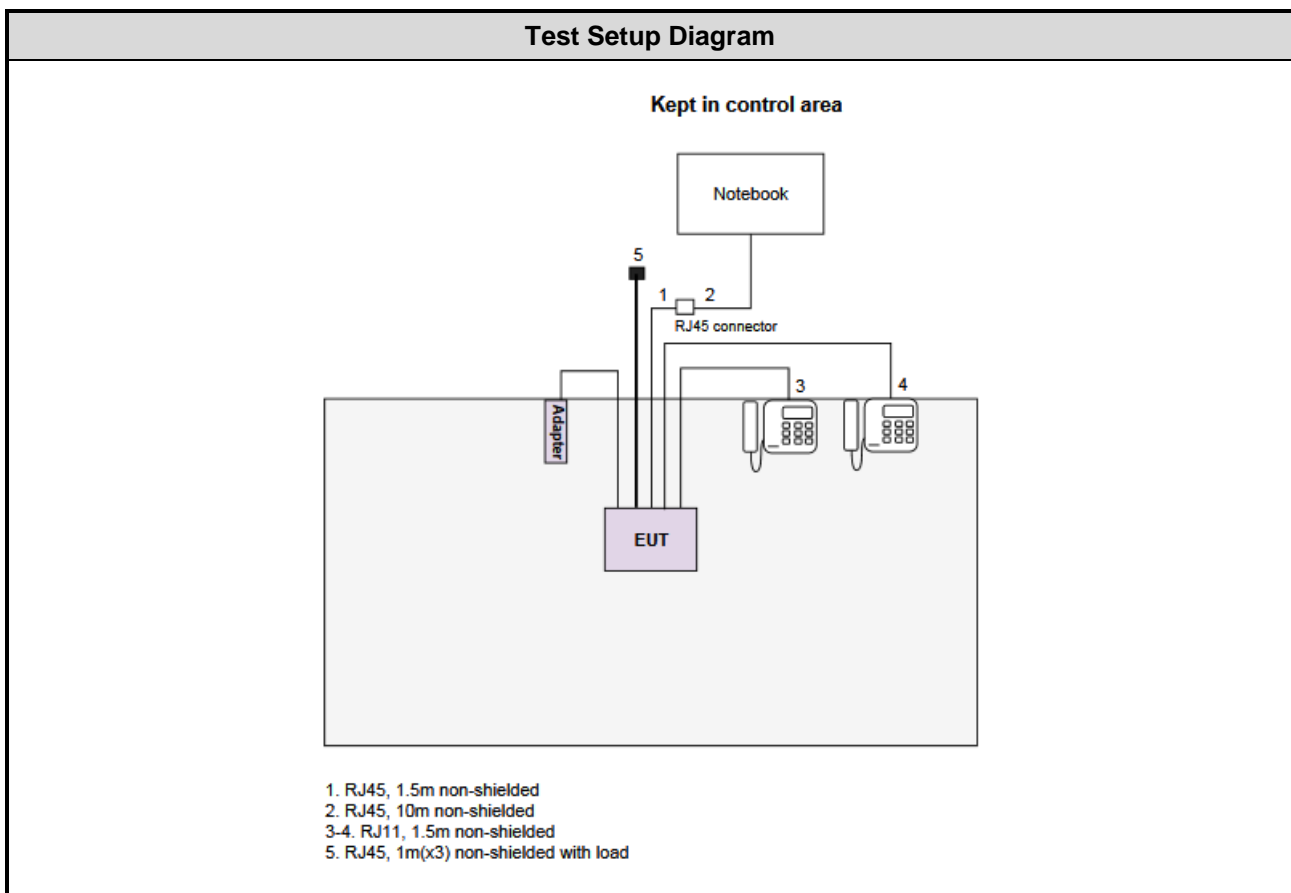
### 1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	36/44
11b	2437	33/43
11b	2462	30/40
11g	2412	43/51
11g	2437	53/59
11g	2462	43/50
HT20	2412	43/50
HT20	2437	53/59
HT20	2462	43/51
HT40	2422	41/49
HT40	2437	47/55
HT40	2452	39/48

## 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	RJ45, 10m non-shielded.
2	Telephone	HTT	HTT-806	---	RJ11, 1.5m non-shielded.
3	Telephone	HTT	HTT-806	---	RJ11, 1.5m non-shielded.

## 1.3 Test Setup Chart





## 1.4 The Equipment List

Test Item	Radiated Emission below 1GHz test				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Nov. 30, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Nov. 20, 2017	Nov. 19, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 25, 2017	Jul. 24, 2018
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2017	Nov. 12, 2018
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980225	Jul. 28, 2017	Jul. 27, 2018
Preamplifier	Agilent	83017A	MY39501308	Oct. 06, 2017	Oct. 05, 2018
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018
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.

Test Item	Radiated Emission above 1GHz test				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Jan. 08 ~ Jan. 09, 2018				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2017	Dec. 03, 2018
Receiver	R&S	ESR3	101658	Nov. 20, 2017	Nov. 19, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 20, 2017	Dec. 19, 2018
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 23, 2017	Nov. 22, 2018
Preamplifier	EMC	EMC02325	980225	Jul. 28, 2017	Jul. 27, 2018
Preamplifier	Agilent	83017A	MY39501308	Oct. 06, 2017	Oct. 05, 2018
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 07, 2017	Dec. 06, 2018
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 07, 2017	Dec. 06, 2018
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 07, 2017	Dec. 06, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA

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

<b>Test Item</b>	Conducted Emission				
<b>Test Site</b>	Conduction room 1 / (CO01-WS)				
<b>Tested Date</b>	Jan. 22, 2018				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Receiver	R&S	ESR3	101657	Jan. 05, 2018	Jan. 04, 2019
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2017	Nov. 12, 2018
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 18, 2017	Dec. 17, 2018
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

<b>Test Item</b>	RF Conducted				
<b>Test Site</b>	(TH01-WS)				
<b>Tested Date</b>	Jan. 22 ~ Jan. 23, 2018				
<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. 16, 2017	Oct. 15, 2018
Power Sensor	Anritsu	MA2411B	1207366	Oct. 16, 2017	Oct. 15, 2018
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 01, 2017	Nov. 30, 2018
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

## 1.5 Test Standards

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

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	21°C / 58%	Alex Tsai
Radiated Emissions	03CH01-WS	22-25°C / 64-66%	Akun Chung Roger Lu
RF Conducted	TH01-WS	20°C / 63%	Brad Wu

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

### 2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	11g	2437	6 Mbps	---
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	---
Radiated Emissions >1GHz	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	

## 3 Transmitter Test Results

### 3.1 Conducted Emissions

#### 3.1.1 Limit of Conducted Emissions

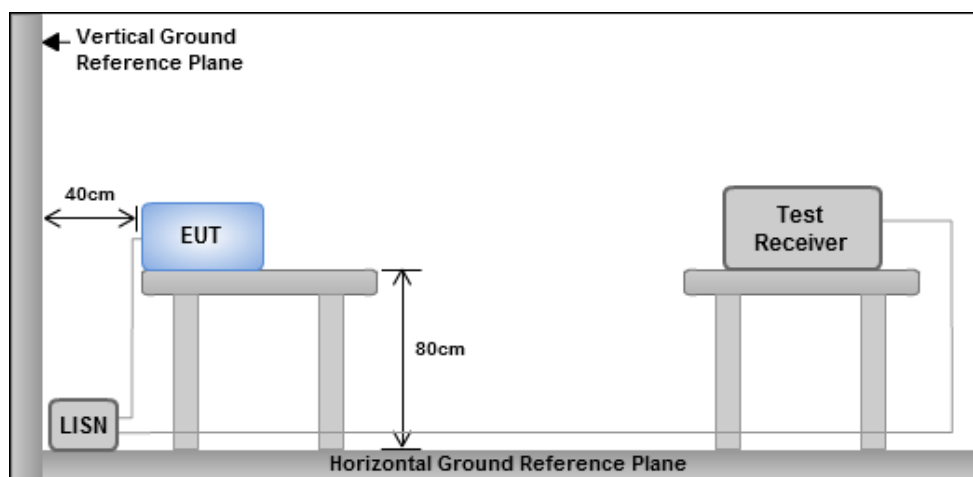
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

#### 3.1.2 Test Procedures

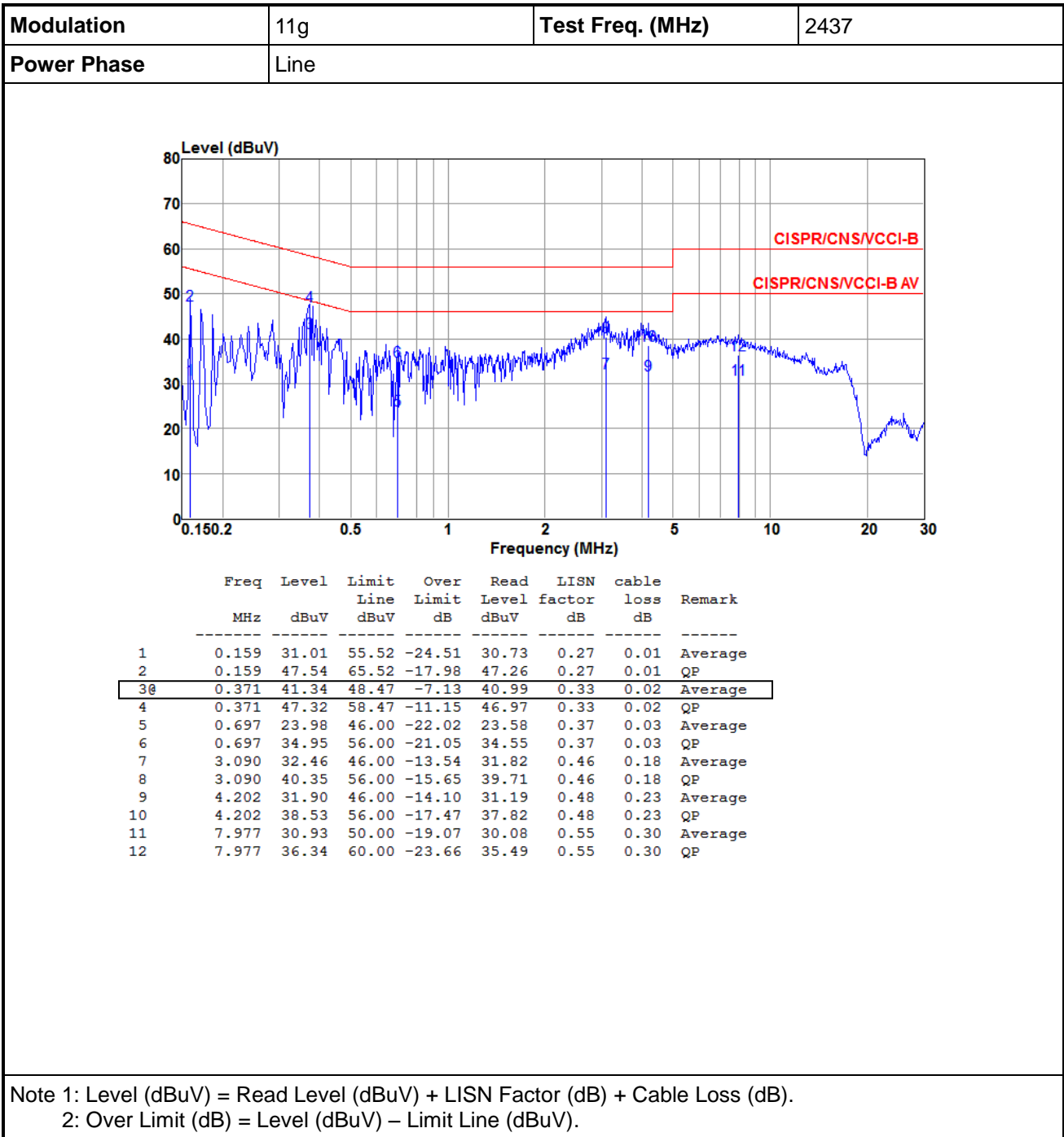
1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels 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

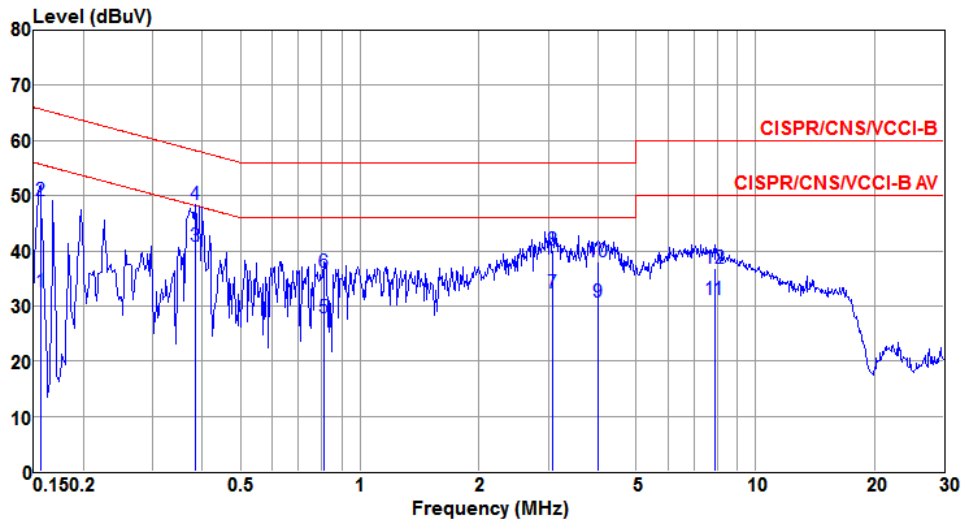


- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.1.4 Test Result of Conducted Emissions



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



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	32.66	55.69	-23.03	32.51	0.14	0.01	Average
2	0.156	49.01	65.69	-16.68	48.86	0.14	0.01	QP
3@	0.383	40.86	48.21	-7.35	40.65	0.19	0.02	Average
4	0.383	48.42	58.21	-9.79	48.21	0.19	0.02	QP
5	0.809	27.81	46.00	-18.19	27.54	0.24	0.03	Average
6	0.809	36.20	56.00	-19.80	35.93	0.24	0.03	QP
7	3.074	32.28	46.00	-13.72	31.78	0.33	0.17	Average
8	3.074	40.09	56.00	-15.91	39.59	0.33	0.17	QP
9	4.006	30.65	46.00	-15.35	30.08	0.35	0.22	Average
10	4.006	37.96	56.00	-18.04	37.39	0.35	0.22	QP
11	7.893	31.17	50.00	-18.83	30.45	0.43	0.29	Average
12	7.893	36.82	60.00	-23.18	36.10	0.43	0.29	QP

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

## 3.2 6dB and Occupied Bandwidth

### 3.2.1 Limit of 6dB Bandwidth

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

### 3.2.2 Test Procedures

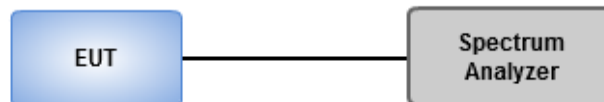
#### 6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

#### Occupied Bandwidth

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

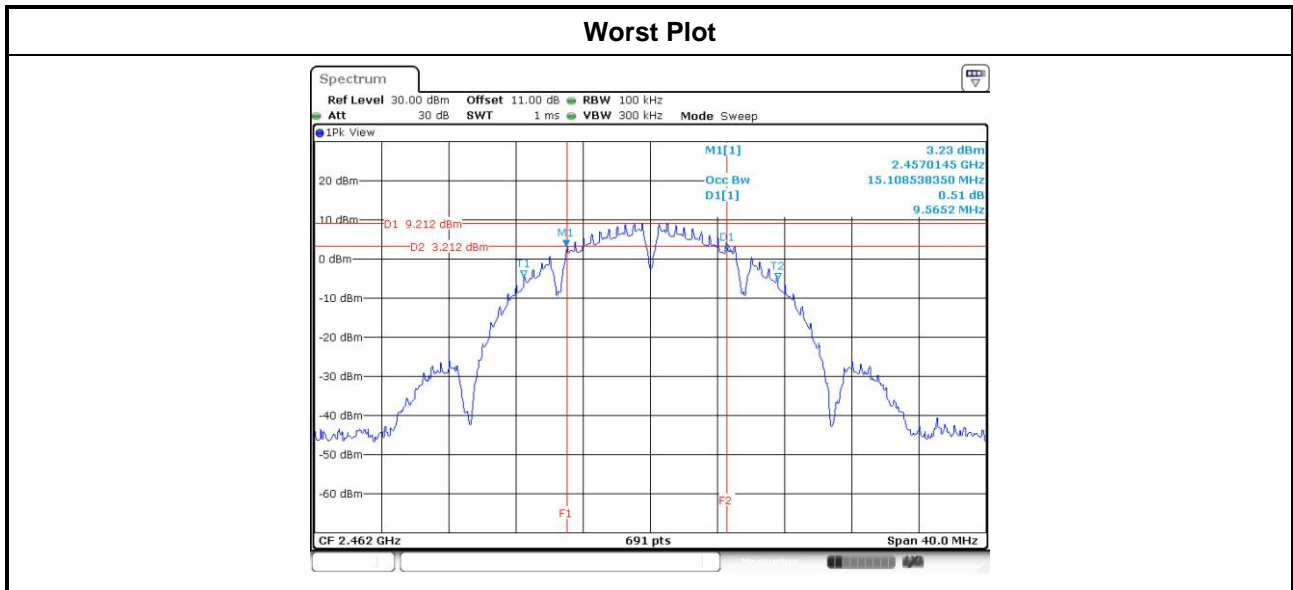
### 3.2.3 Test Setup



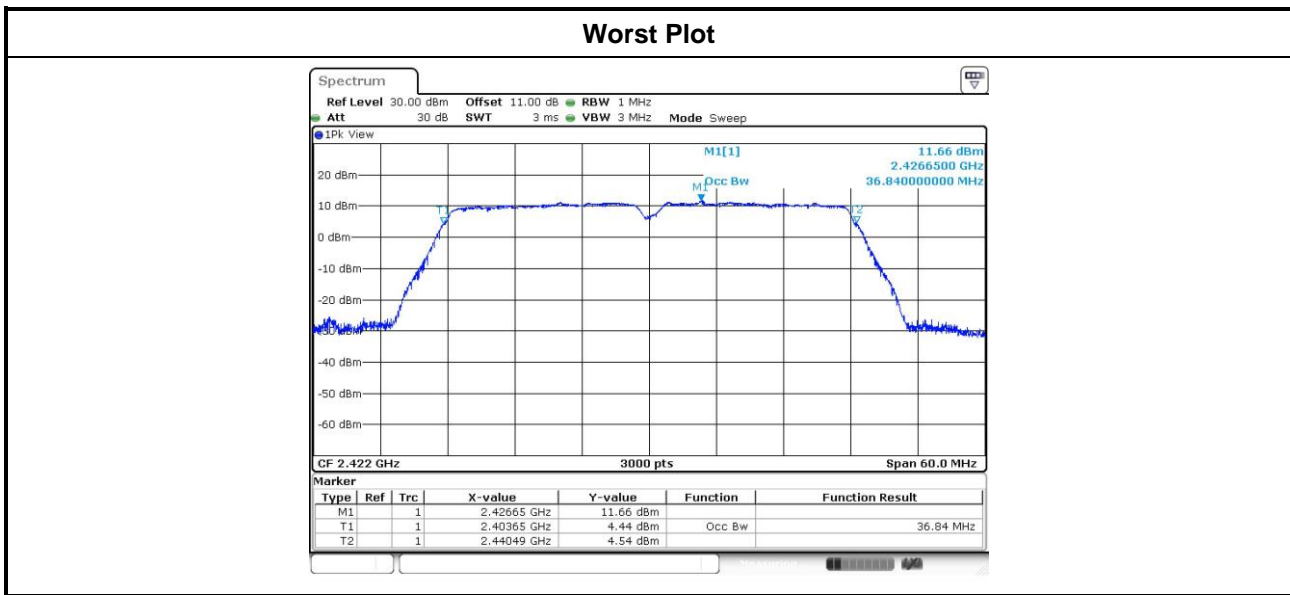


### 3.2.4 Test Result of 6dB and Occupied Bandwidth

Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	2	2412	10.09	10.03	---	---	500
11b	2	2437	10.03	10.03	---	---	500
11b	2	2462	10.03	9.57	---	---	500
11g	2	2412	16.64	16.64	---	---	500
11g	2	2437	16.58	16.58	---	---	500
11g	2	2462	16.58	16.52	---	---	500
HT20	2	2412	17.80	17.86	---	---	500
HT20	2	2437	17.80	17.80	---	---	500
HT20	2	2462	17.86	17.86	---	---	500
HT40	2	2422	36.52	36.52	---	---	500
HT40	2	2437	36.52	36.52	---	---	500
HT40	2	2452	36.52	36.52	---	---	500



Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	2	2412	15.09	15.13	---	---
11b	2	2437	15.10	15.11	---	---
11b	2	2462	15.19	15.13	---	---
11g	2	2412	16.94	16.88	---	---
11g	2	2437	17.02	16.96	---	---
11g	2	2462	17.01	16.98	---	---
HT20	2	2412	18.01	18.03	---	---
HT20	2	2437	18.08	18.14	---	---
HT20	2	2462	18.02	18.02	---	---
HT40	2	2422	36.84	36.76	---	---
HT40	2	2437	36.72	36.80	---	---
HT40	2	2452	36.70	36.82	---	---



### 3.3 RF Output Power

#### 3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

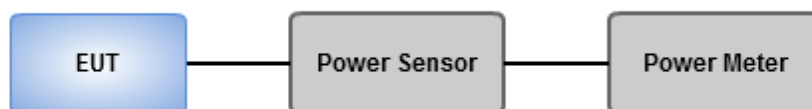
- Antenna gain  $\leq$  6dBi, no any corresponding reduction is in output power limit.
- Antenna gain  $>$  6dBi
  - Non Fixed, point to point operations.  
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 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
  - 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)	Conducted (Average) Output Power (dBm)							Ant. Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3	Total Power (mW)	Total Power (dBm)	Limit (dBm)			
11b	2	2412	21.23	21.19	---	---	264.262	24.22	30.00	4.00	28.22	36.00
11b	2	2437	20.11	20.58	---	---	216.853	23.36	30.00	4.00	27.36	36.00
11b	2	2462	19.05	19.31	---	---	165.663	22.19	30.00	4.00	26.19	36.00
11g	2	2412	19.42	19.51	---	---	176.829	22.48	30.00	4.00	26.48	36.00
11g	2	2437	24.25	24.42	---	---	542.767	27.35	30.00	4.00	31.35	36.00
11g	2	2462	19.62	19.01	---	---	171.238	22.34	30.00	4.00	26.34	36.00
HT20	2	2412	19.51	19.82	---	---	185.271	22.68	30.00	4.00	26.68	36.00
HT20	2	2437	24.02	24.48	---	---	532.891	27.27	30.00	4.00	31.27	36.00
HT20	2	2462	19.56	19.78	---	---	185.425	22.68	30.00	4.00	26.68	36.00
HT40	2	2422	17.76	17.71	---	---	118.724	20.75	30.00	4.00	24.75	36.00
HT40	2	2437	20.41	20.63	---	---	225.512	23.53	30.00	4.00	27.53	36.00
HT40	2	2452	17.21	16.89	---	---	101.467	20.06	30.00	4.00	24.06	36.00

## 3.4 Power Spectral Density

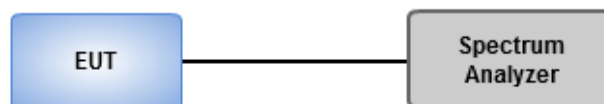
### 3.4.1 Limit of Power Spectral Density

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 = 30kHz, VBW = 100 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.

### 3.4.3 Test Setup

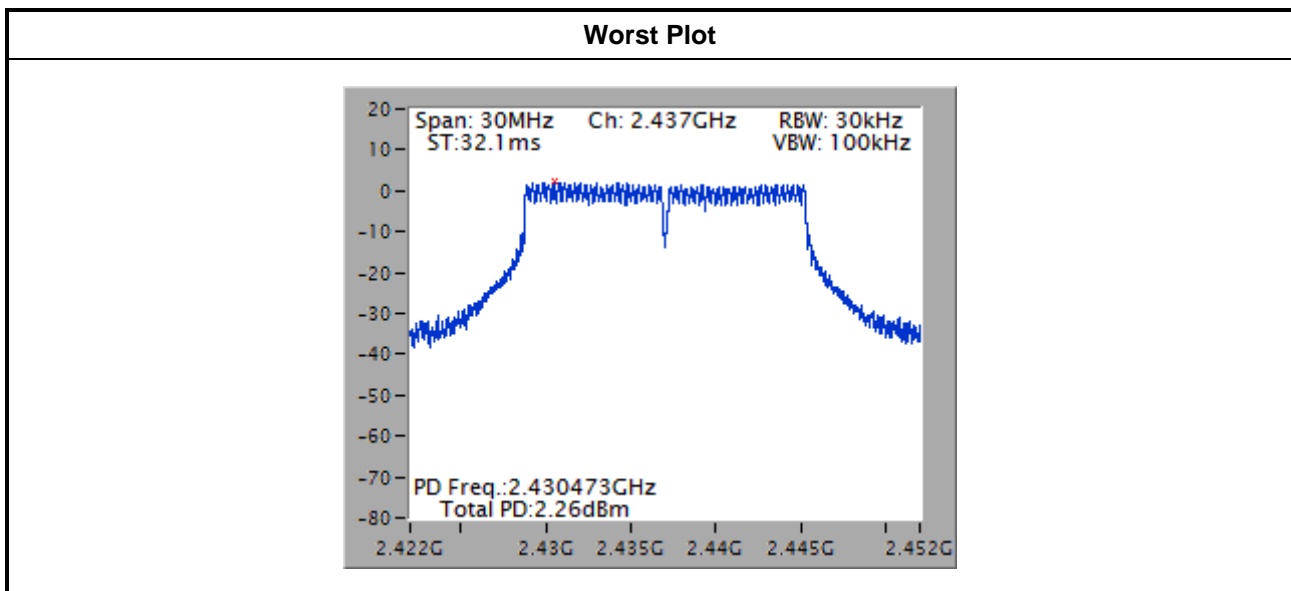


### 3.4.4 Test Result of Power Spectral Density

Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	2	2412	1.05	7.19
11b	2	2437	0.47	7.19
11b	2	2462	-1.23	7.19
11g	2	2412	-2.69	7.19
11g	2	2437	2.26	7.19
11g	2	2462	-2.65	7.19
HT20	2	2412	-3.64	7.19
HT20	2	2437	1.24	7.19
HT20	2	2462	-2.68	7.19
HT40	2	2422	-7.82	7.19
HT40	2	2437	-4.86	7.19
HT40	2	2452	-8.81	7.19

Note:

1. Test result is bin-by-bin summing measured value of each TX port.
2. Directional gain =  $10 * \log((10^{3.6/20} + 10^{4/20})^2 / 2) = 6.81 \text{ dBi} > 6 \text{ dBi}$   
Limit shall be reduced to  $8 \text{ dBm} - (6.81 \text{ dBi} - 6 \text{ dBi}) = 7.19 \text{ dBm}$



## 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

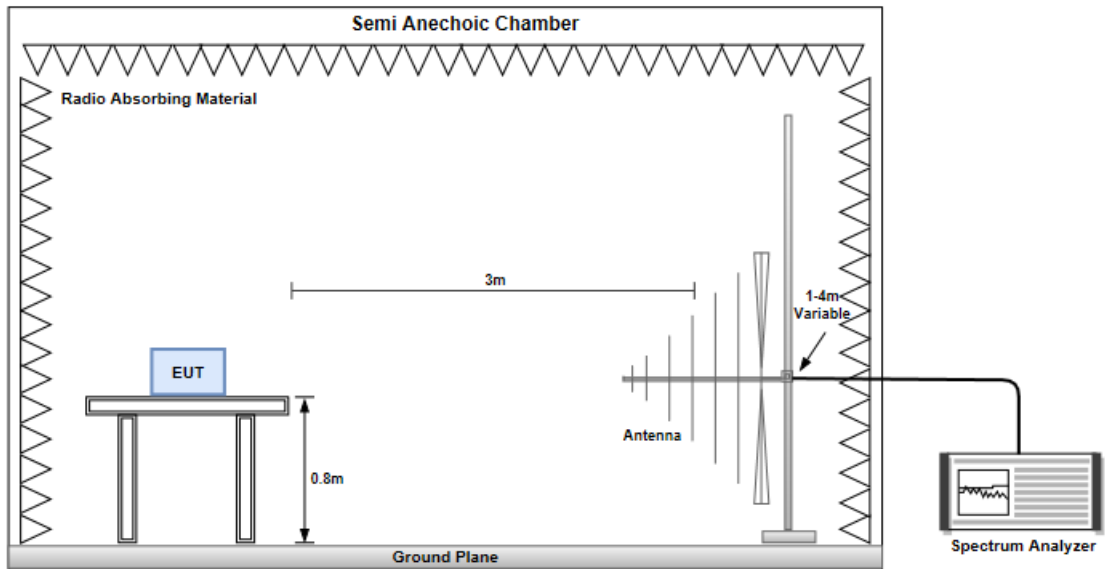
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

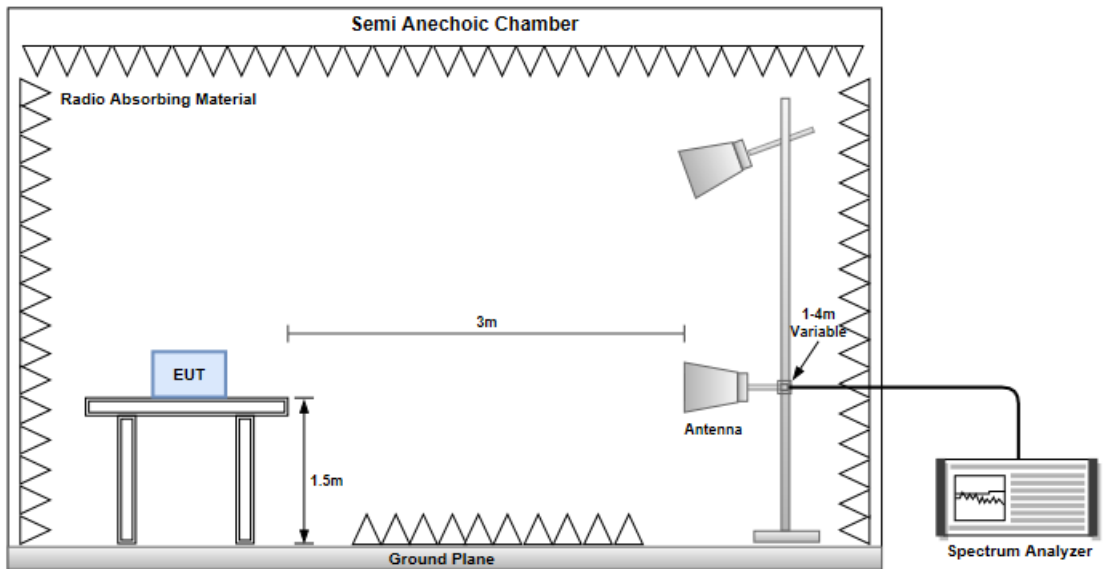
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

### 3.5.3 Test Setup

#### Radiated Emissions below 1 GHz

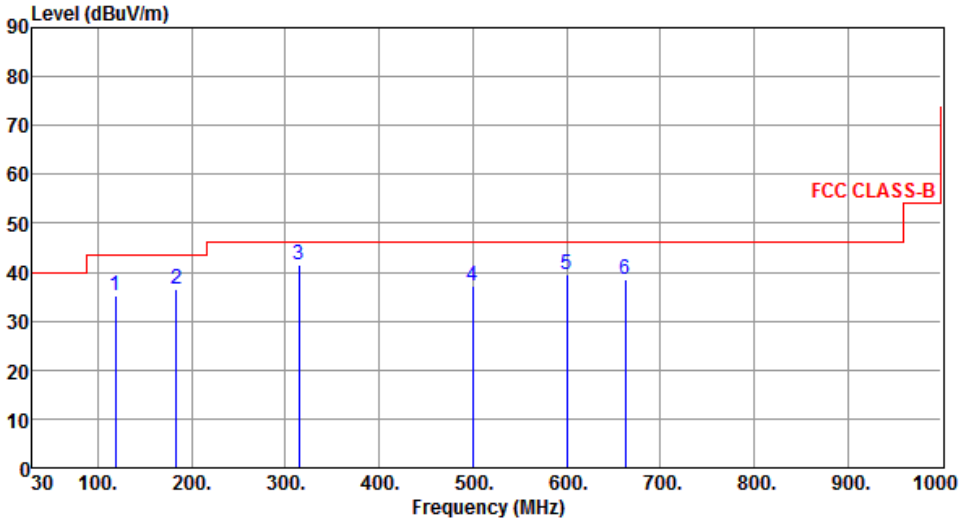


#### Radiated Emissions above 1 GHz

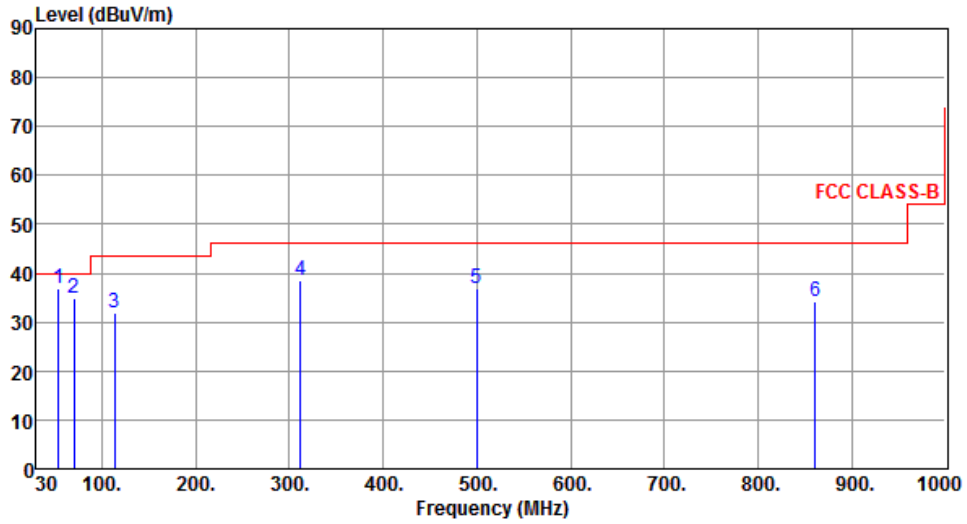




### 3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	2437						
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	118.32	35.21	43.50	-8.29	45.97	-10.76	Peak	---	---
2	183.26	36.64	43.50	-6.86	46.71	-10.07	Peak	---	---
3	314.32	41.56	46.00	-4.44	48.86	-7.30	Peak	---	---
4	499.48	37.35	46.00	-8.65	40.20	-2.85	Peak	---	---
5	600.36	39.67	46.00	-6.33	40.39	-0.72	Peak	---	---
6	662.36	38.55	46.00	-7.45	38.52	0.03	Peak	---	---
<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).            Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.</p>									

<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	53.59	36.98	40.00	-3.02	44.99	-8.01	QP	100	190
2	70.59	34.87	40.00	-5.13	45.77	-10.90	Peak	---	---
3	113.38	31.98	43.50	-11.52	43.20	-11.22	Peak	---	---
4	312.27	38.41	46.00	-7.59	45.77	-7.36	Peak	---	---
5	499.48	36.82	46.00	-9.18	39.67	-2.85	Peak	---	---
6	861.35	34.15	46.00	-11.85	30.77	3.38	Peak	---	---

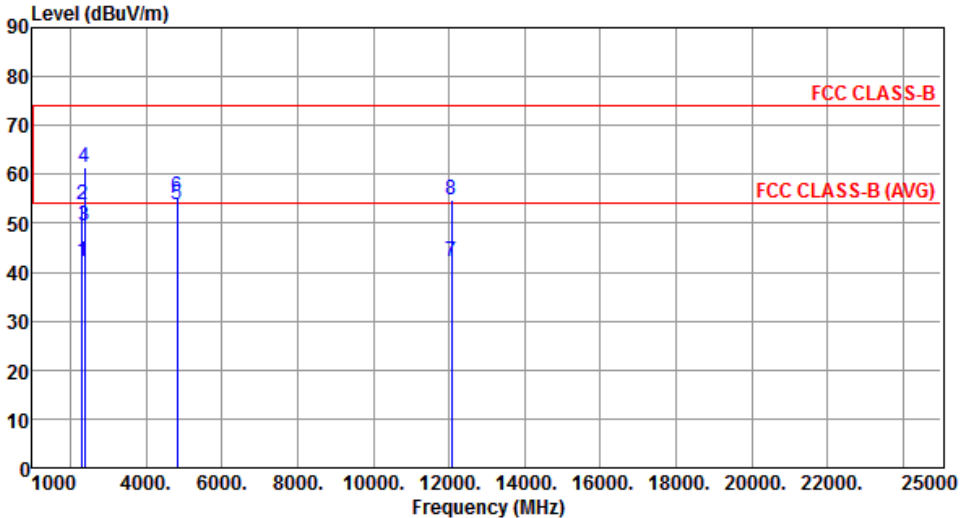
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

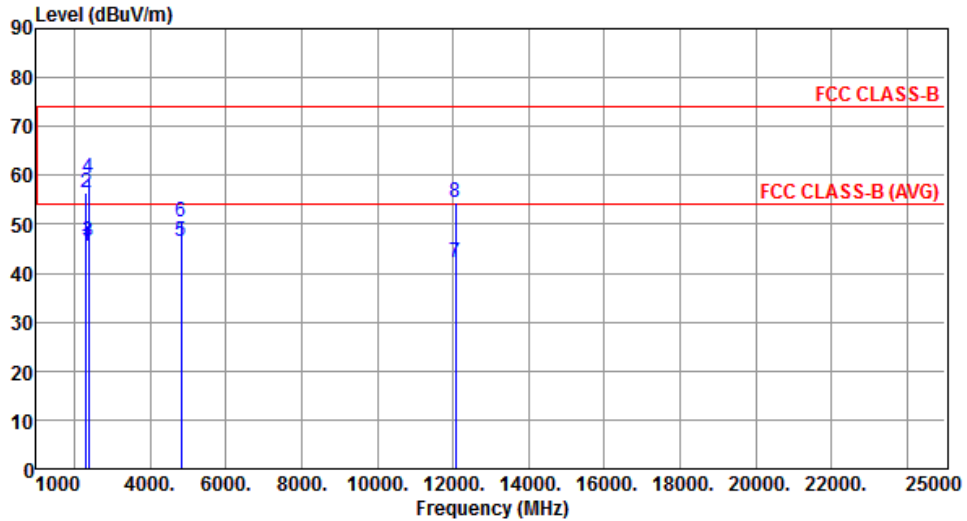
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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

Modulation	11b	Test Freq. (MHz)	2412						
Polarization	Horizontal								
									
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2320.00	42.28	54.00	-11.72	46.18	-3.90	Average	105	318
2	2320.00	53.75	74.00	-20.25	57.65	-3.90	Peak	105	318
3	2390.00	49.52	54.00	-4.48	53.12	-3.60	Average	105	318
4	2390.00	61.45	74.00	-12.55	65.05	-3.60	Peak	105	318
5	4824.00	53.72	54.00	-0.28	50.12	3.60	Average	279	98
6	4824.00	55.54	74.00	-18.46	51.94	3.60	Peak	279	98
7	12060.00	42.25	54.00	-11.75	29.11	13.14	Average	100	151
8	12060.00	54.73	74.00	-19.27	41.59	13.14	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>	11b	<b>Test Freq. (MHz)</b>	2412
<b>Polarization</b>	Vertical		



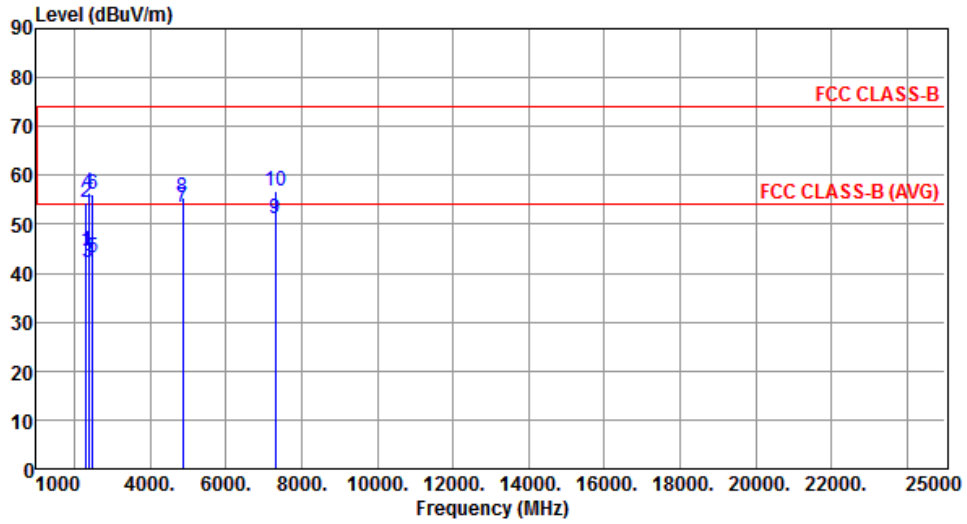
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2320.00	45.64	54.00	-8.36	49.54	-3.90	Average	140	315
2	2320.00	56.31	74.00	-17.69	60.21	-3.90	Peak	140	315
3	2390.00	46.52	54.00	-7.48	50.12	-3.60	Average	140	315
4	2390.00	59.41	74.00	-14.59	63.01	-3.60	Peak	140	315
5	4824.00	46.49	54.00	-7.51	42.89	3.60	Average	169	82
6	4824.00	50.56	74.00	-23.44	46.96	3.60	Peak	169	82
7	12060.00	42.14	54.00	-11.86	29.00	13.14	Average	100	212
8	12060.00	54.42	74.00	-19.58	41.28	13.14	Peak	100	212

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		



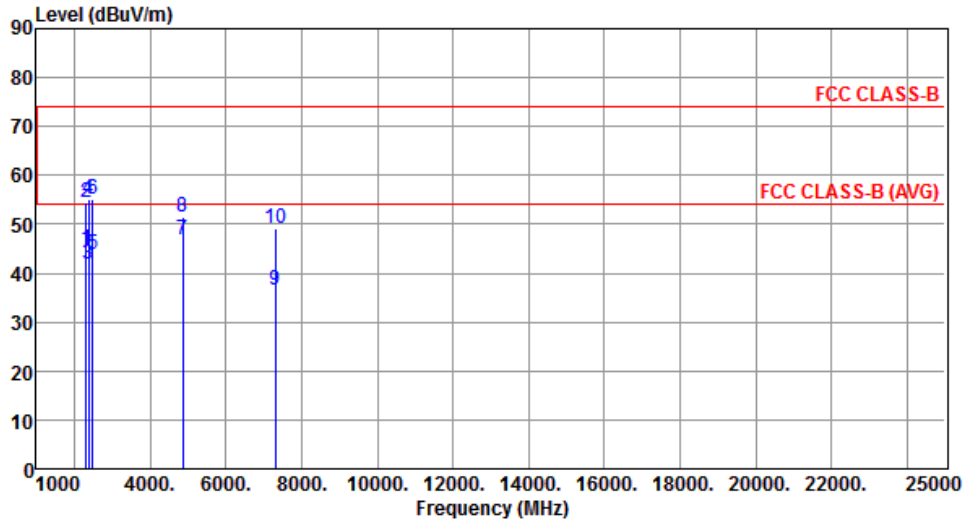
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2320.00	44.60	54.00	-9.40	48.50	-3.90	Average	163	313
2	2320.00	54.30	74.00	-19.70	58.20	-3.90	Peak	163	313
3	2390.00	42.07	54.00	-11.93	45.67	-3.60	Average	163	313
4	2390.00	56.51	74.00	-17.49	60.11	-3.60	Peak	163	313
5	2483.50	43.16	54.00	-10.84	46.35	-3.19	Average	163	313
6	2483.50	56.28	74.00	-17.72	59.47	-3.19	Peak	163	313
7	4874.00	53.38	54.00	-0.62	49.63	3.75	Average	333	100
8	4874.00	55.62	74.00	-18.38	51.87	3.75	Peak	333	100
9	7311.00	51.04	54.00	-2.96	42.91	8.13	Average	181	49
10	7311.00	56.76	74.00	-17.24	48.63	8.13	Peak	181	49

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		



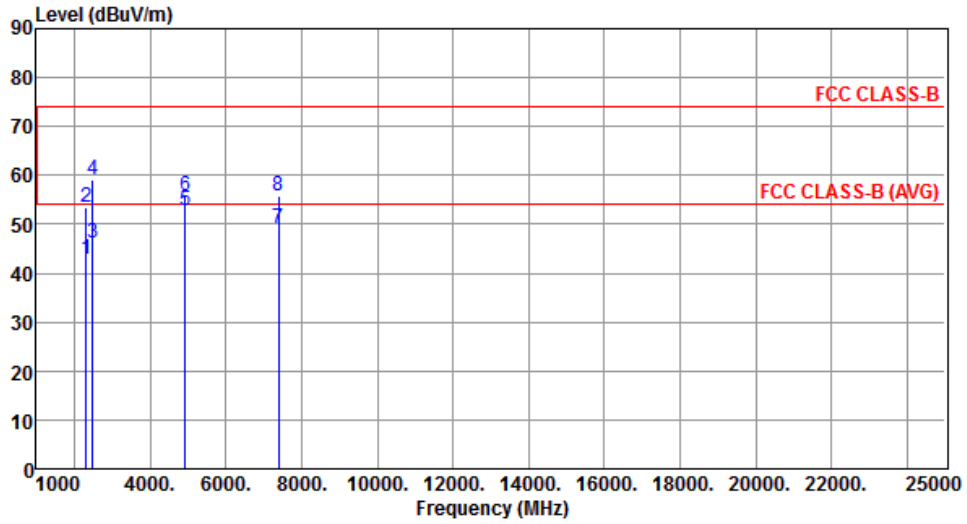
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2320.00	44.74	54.00	-9.26	48.64	-3.90	Average	113	319
2	2320.00	54.31	74.00	-19.69	58.21	-3.90	Peak	113	319
3	2390.00	41.87	54.00	-12.13	45.47	-3.60	Average	113	319
4	2390.00	55.17	74.00	-18.83	58.77	-3.60	Peak	113	319
5	2483.50	43.78	54.00	-10.22	46.97	-3.19	Average	113	319
6	2483.50	55.06	74.00	-18.94	58.25	-3.19	Peak	113	319
7	4874.00	46.72	54.00	-7.28	42.97	3.75	Average	144	63
8	4874.00	51.32	74.00	-22.68	47.57	3.75	Peak	144	63
9	7311.00	36.37	54.00	-17.63	28.24	8.13	Average	100	84
10	7311.00	49.16	74.00	-24.84	41.03	8.13	Peak	100	84

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		



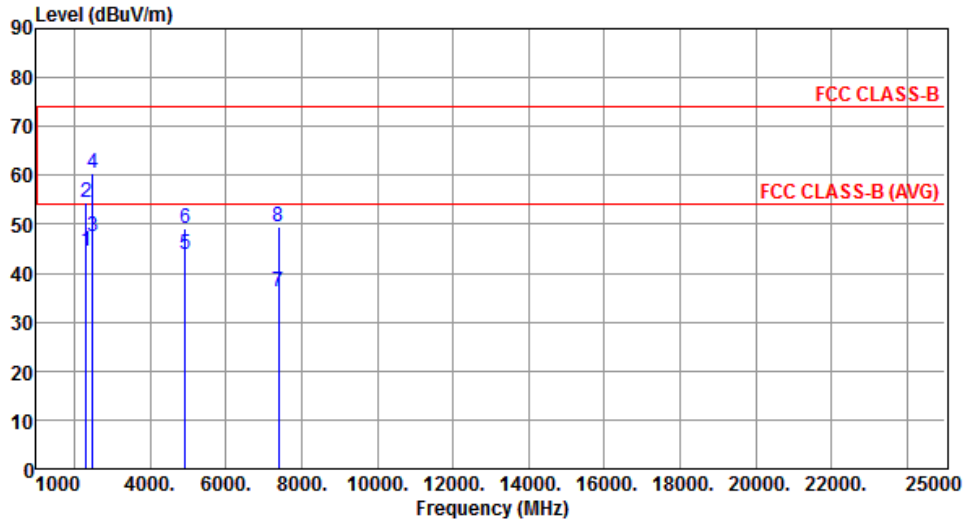
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2320.00	42.78	54.00	-11.22	46.68	-3.90	Average	159	320
2	2320.00	53.63	74.00	-20.37	57.53	-3.90	Peak	159	320
3	2483.50	46.25	54.00	-7.75	49.44	-3.19	Average	159	320
4	2483.50	59.16	74.00	-14.84	62.35	-3.19	Peak	159	320
5	4924.00	52.79	54.00	-1.21	48.87	3.92	Average	296	103
6	4924.00	55.65	74.00	-18.35	51.73	3.92	Peak	296	103
7	7386.00	49.14	54.00	-4.86	40.91	8.23	Average	221	53
8	7386.00	55.78	74.00	-18.22	47.55	8.23	Peak	221	53

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	2320.00	44.42	54.00	-9.58	48.32	-3.90	Average	101	312
2	2320.00	54.56	74.00	-19.44	58.46	-3.90	Peak	101	312
3	2483.50	47.55	54.00	-6.45	50.74	-3.19	Average	101	312
4	2483.50	60.58	74.00	-13.42	63.77	-3.19	Peak	101	312
5	4924.00	43.91	54.00	-10.09	39.99	3.92	Average	168	82
6	4924.00	49.02	74.00	-24.98	45.10	3.92	Peak	168	82
7	7386.00	36.26	54.00	-17.74	28.03	8.23	Average	100	218
8	7386.00	49.44	74.00	-24.56	41.21	8.23	Peak	100	218

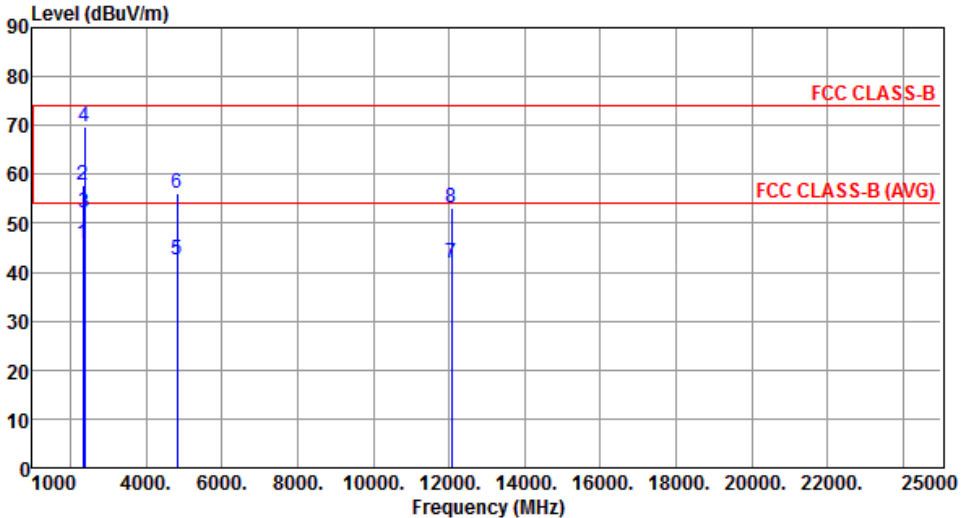
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

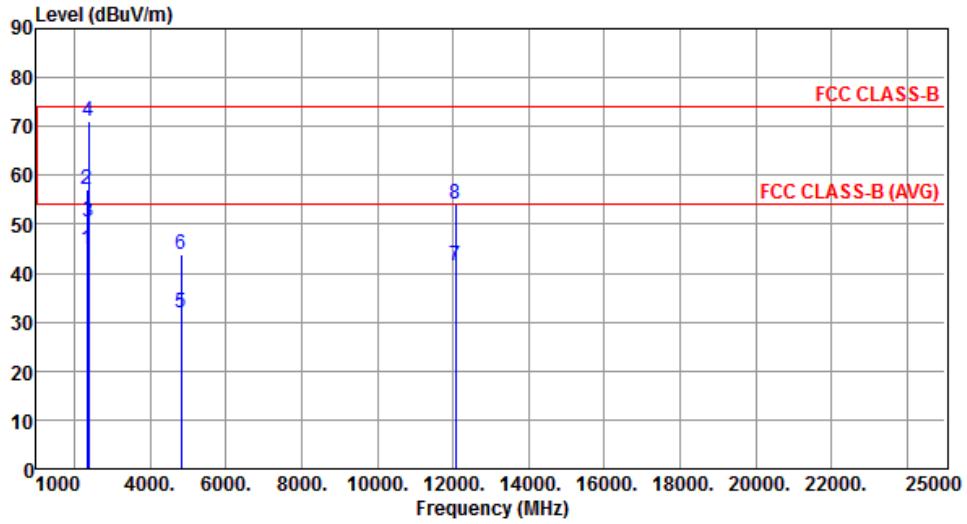


### 3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g

Modulation	11g	Test Freq. (MHz)	2412						
Polarization	Horizontal								
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBUV/m	dBUV/m	dB	dBuV	dB		cm	deg
1	2332.00	45.72	54.00	-8.28	49.58	-3.86	Average	149	300
2	2332.00	57.62	74.00	-16.38	61.48	-3.86	Peak	149	300
3	2390.00	52.17	54.00	-1.83	55.77	-3.60	Average	111	312
4	2390.00	69.72	74.00	-4.28	73.32	-3.60	Peak	111	312
5	4824.00	42.49	54.00	-11.51	38.89	3.60	Average	171	50
6	4824.00	55.97	74.00	-18.03	52.37	3.60	Peak	171	50
7	12060.00	41.85	54.00	-12.15	28.71	13.14	Average	100	75
8	12060.00	53.01	74.00	-20.99	39.87	13.14	Peak	100	75

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		



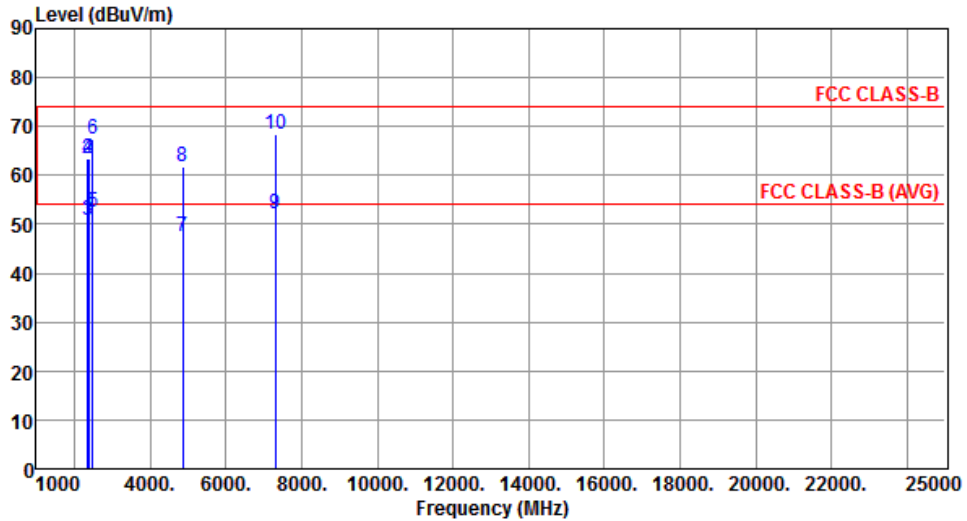
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2332.00	44.89	54.00	-9.11	48.75	-3.86	Average	109	108
2	2332.00	56.98	74.00	-17.02	60.84	-3.86	Peak	109	108
3	2390.00	50.50	54.00	-3.50	54.10	-3.60	Average	154	111
4	2390.00	71.13	74.00	-2.87	74.73	-3.60	Peak	154	111
5	4824.00	31.82	54.00	-22.18	28.22	3.60	Average	100	115
6	4824.00	43.93	74.00	-30.07	40.33	3.60	Peak	100	115
7	12060.00	41.45	54.00	-12.55	28.31	13.14	Average	100	100
8	12060.00	53.99	74.00	-20.01	40.85	13.14	Peak	100	100

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		



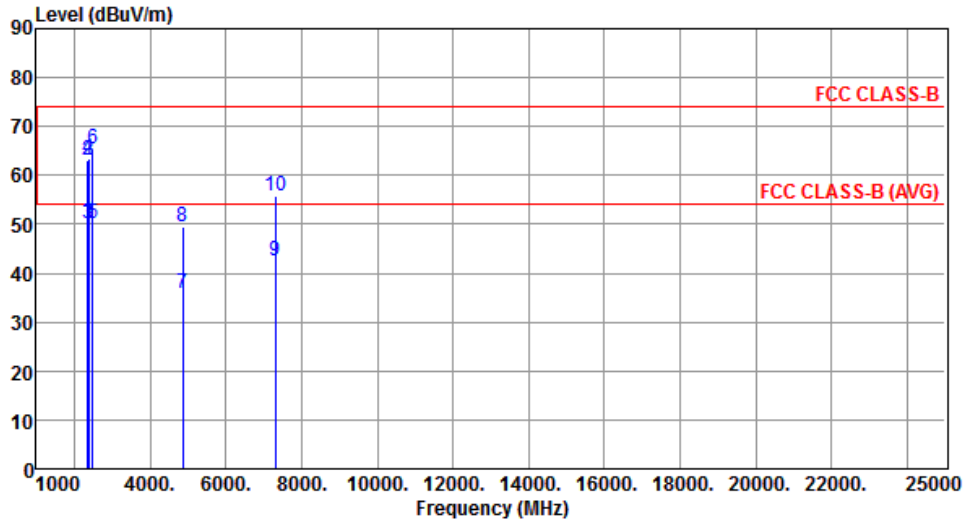
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2359.00	50.76	54.00	-3.24	54.49	-3.73	Average	151	300
2	2359.00	63.54	74.00	-10.46	67.27	-3.73	Peak	151	300
3	2390.00	50.93	54.00	-3.07	54.53	-3.60	Average	216	56
4	2390.00	63.54	74.00	-10.46	67.14	-3.60	Peak	216	56
5	2483.50	52.35	54.00	-1.65	55.54	-3.19	Average	216	56
6	2483.50	67.37	74.00	-6.63	70.56	-3.19	Peak	216	56
7	4874.00	47.61	54.00	-6.39	43.86	3.75	Average	172	48
8	4874.00	61.63	74.00	-12.37	57.88	3.75	Peak	172	48
9	7311.00	52.25	54.00	-1.75	44.12	8.13	Average	205	39
10	7311.00	68.46	74.00	-5.54	60.33	8.13	Peak	205	39

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		



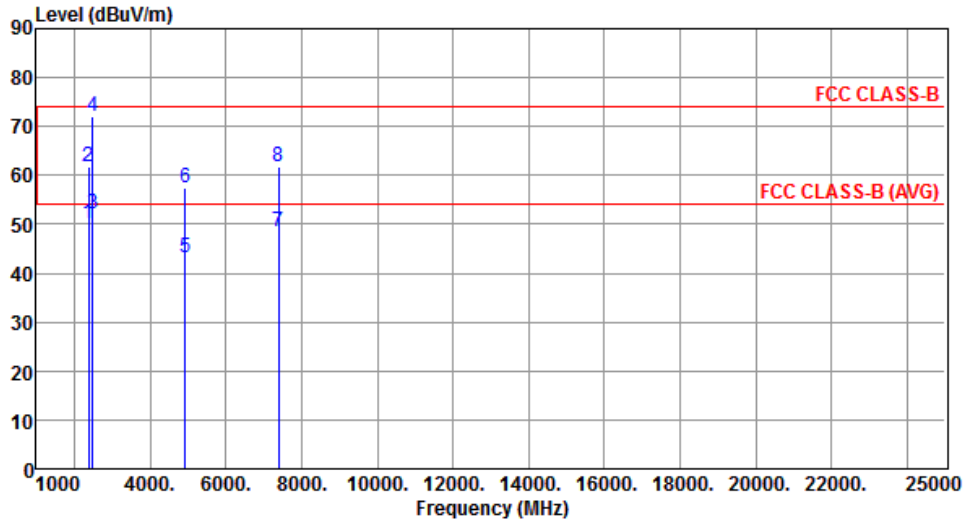
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2359.00	50.44	54.00	-3.56	54.17	-3.73	Average	113	102
2	2359.00	63.00	74.00	-11.00	66.73	-3.73	Peak	113	102
3	2390.00	50.00	54.00	-4.00	53.60	-3.60	Average	169	98
4	2390.00	63.33	74.00	-10.67	66.93	-3.60	Peak	169	98
5	2483.50	50.11	54.00	-3.89	53.30	-3.19	Average	169	98
6	2483.50	65.31	74.00	-8.69	68.50	-3.19	Peak	169	98
7	4874.00	35.80	54.00	-18.20	32.05	3.75	Average	164	68
8	4874.00	49.43	74.00	-24.57	45.68	3.75	Peak	164	68
9	7311.00	42.58	54.00	-11.42	34.45	8.13	Average	101	80
10	7311.00	55.79	74.00	-18.21	47.66	8.13	Peak	101	80

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		



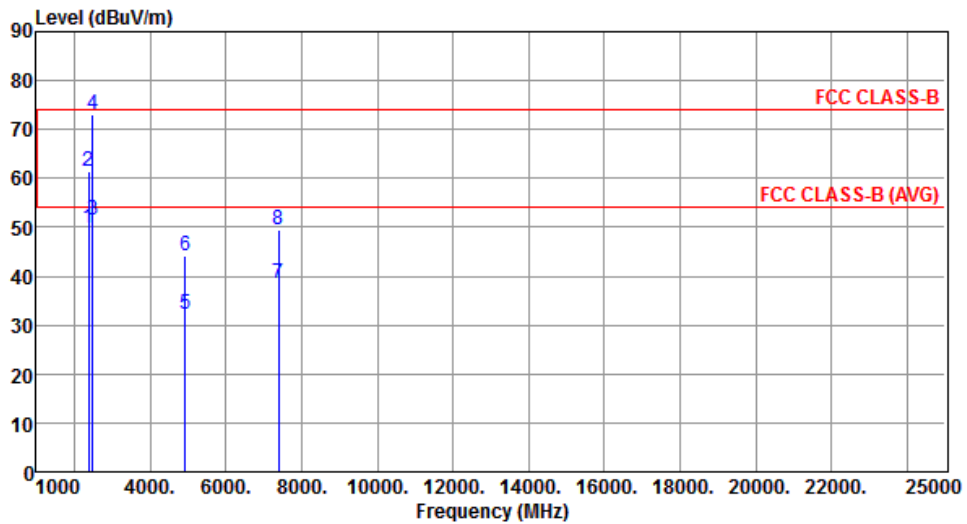
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2382.00	50.02	54.00	-3.98	53.66	-3.64	Average	145	298
2	2382.00	61.91	74.00	-12.09	65.55	-3.64	Peak	145	298
3	2483.50	52.29	54.00	-1.71	55.48	-3.19	Average	156	317
4	2483.50	72.23	74.00	-1.77	75.42	-3.19	Peak	156	317
5	4924.00	43.04	54.00	-10.96	39.12	3.92	Average	173	49
6	4924.00	57.59	74.00	-16.41	53.67	3.92	Peak	173	49
7	7386.00	48.36	54.00	-5.64	40.13	8.23	Average	175	50
8	7386.00	61.88	74.00	-12.12	53.65	8.23	Peak	175	50

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		



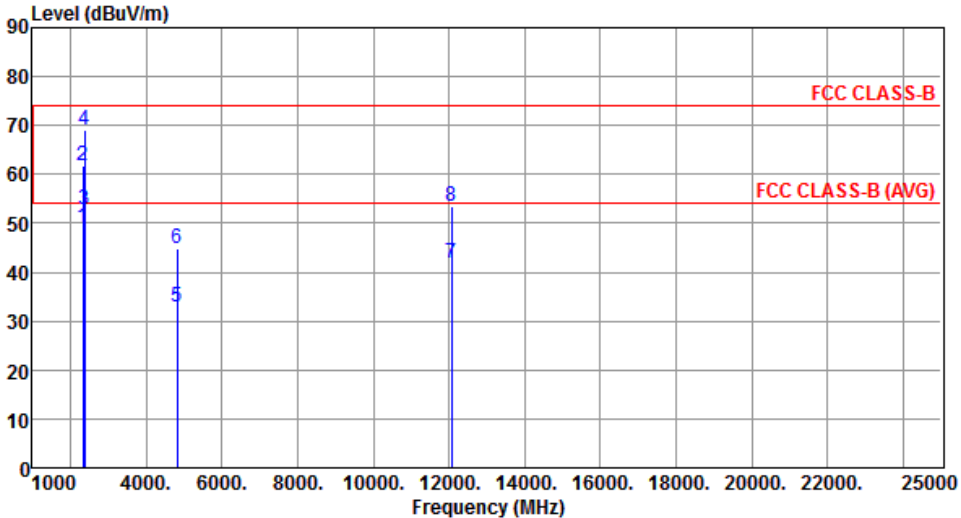
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2382.00	49.90	54.00	-4.10	53.54	-3.64	Average	100	120
2	2382.00	61.58	74.00	-12.42	65.22	-3.64	Peak	100	120
3	2483.50	51.41	54.00	-2.59	54.60	-3.19	Average	100	104
4	2483.50	73.11	74.00	-0.89	76.30	-3.19	Peak	100	104
5	4924.00	32.26	54.00	-21.74	28.34	3.92	Average	100	105
6	4924.00	44.31	74.00	-29.69	40.39	3.92	Peak	100	105
7	7386.00	38.36	54.00	-15.64	30.13	8.23	Average	100	60
8	7386.00	49.50	74.00	-24.50	41.27	8.23	Peak	100	60

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

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

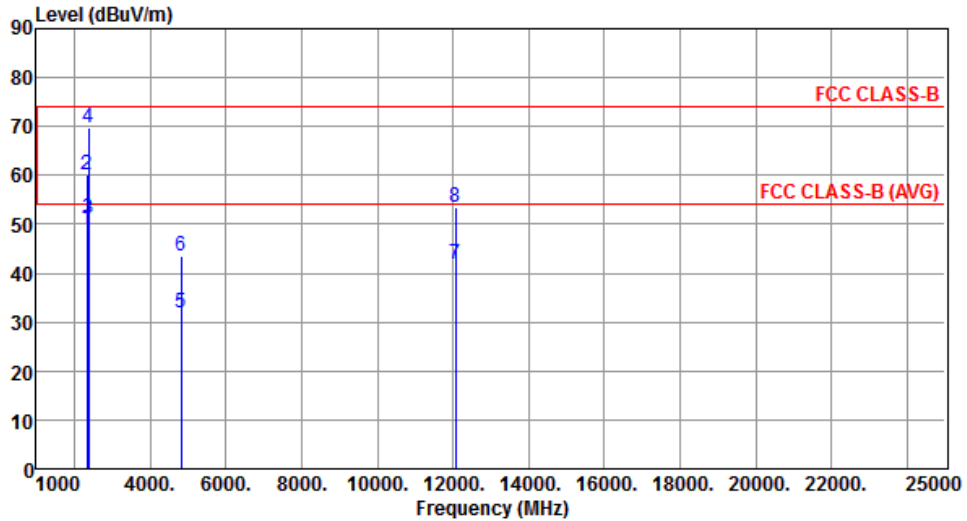
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

### 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	2332.00	49.23	54.00	-4.77	53.09	-3.86	Average	141	301
2	2332.00	61.62	74.00	-12.38	65.48	-3.86	Peak	141	301
3	2390.00	52.86	54.00	-1.14	56.46	-3.60	Average	126	297
4	2390.00	68.92	74.00	-5.08	72.52	-3.60	Peak	126	297
5	4824.00	32.82	54.00	-21.18	29.22	3.60	Average	100	50
6	4824.00	44.87	74.00	-29.13	41.27	3.60	Peak	100	50
7	12060.00	41.80	54.00	-12.20	28.66	13.14	Average	100	60
8	12060.00	53.35	74.00	-20.65	40.21	13.14	Peak	100	60

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>	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	2332.00	49.15	54.00	-4.85	53.01	-3.86	Average	106	123
2	2332.00	60.13	74.00	-13.87	63.99	-3.86	Peak	106	123
3	2390.00	51.03	54.00	-2.97	54.63	-3.60	Average	163	117
4	2390.00	69.90	74.00	-4.10	73.50	-3.60	Peak	163	117
5	4824.00	31.96	54.00	-22.04	28.36	3.60	Average	100	120
6	4824.00	43.48	74.00	-30.52	39.88	3.60	Peak	100	120
7	12060.00	41.70	54.00	-12.30	28.56	13.14	Average	100	160
8	12060.00	53.45	74.00	-20.55	40.31	13.14	Peak	100	160

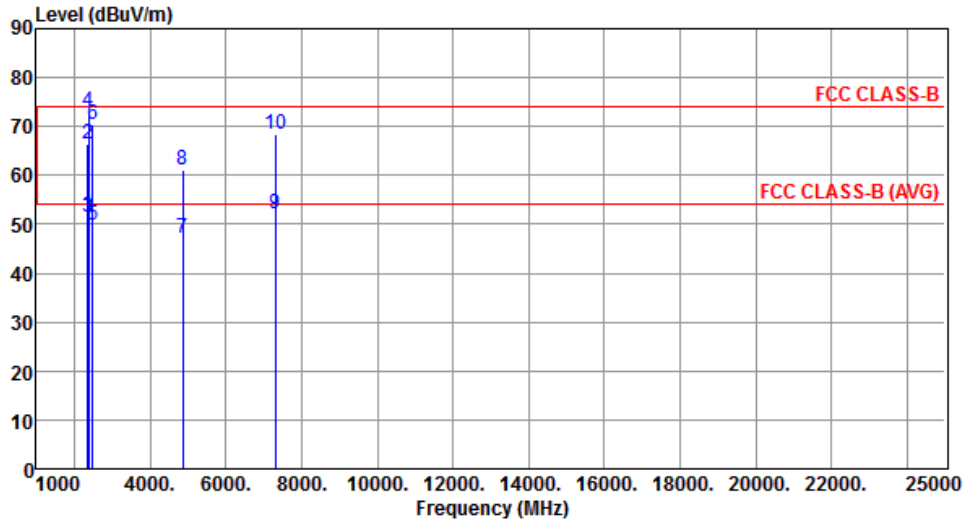
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*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		



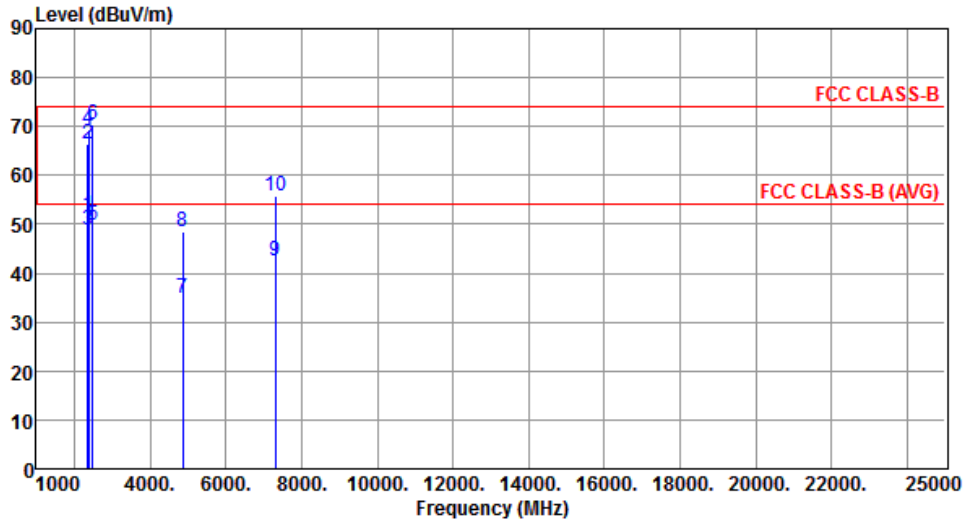
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2359.00	51.84	54.00	-2.16	55.57	-3.73	Average	175	104
2	2359.00	66.39	74.00	-7.61	70.12	-3.73	Peak	175	104
3	2390.00	51.33	54.00	-2.67	54.93	-3.60	Average	140	101
4	2390.00	72.92	74.00	-1.08	76.52	-3.60	Peak	140	101
5	2483.50	49.74	54.00	-4.26	52.93	-3.19	Average	140	101
6	2483.50	70.40	74.00	-3.60	73.59	-3.19	Peak	140	101
7	4874.00	47.02	54.00	-6.98	43.27	3.75	Average	100	20
8	4874.00	61.13	74.00	-12.87	57.38	3.75	Peak	100	20
9	7311.00	52.11	54.00	-1.89	43.98	8.13	Average	103	79
10	7311.00	68.35	74.00	-5.65	60.22	8.13	Peak	103	79

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		



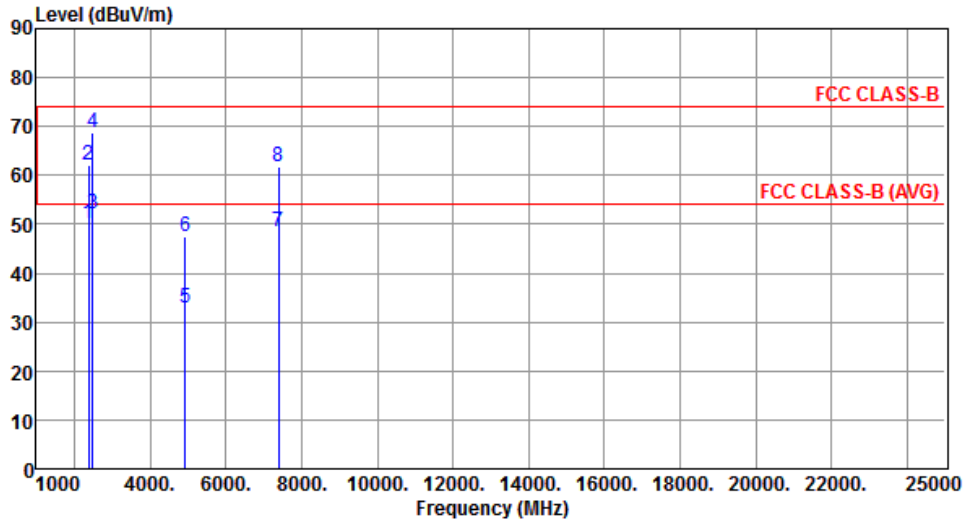
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2359.00	51.72	54.00	-2.28	55.45	-3.73	Average	206	79
2	2359.00	66.27	74.00	-7.73	70.00	-3.73	Peak	206	79
3	2390.00	48.96	54.00	-5.04	52.56	-3.60	Average	146	272
4	2390.00	69.41	74.00	-4.59	73.01	-3.60	Peak	146	272
5	2483.50	49.66	54.00	-4.34	52.85	-3.19	Average	146	272
6	2483.50	70.37	74.00	-3.63	73.56	-3.19	Peak	146	272
7	4874.00	34.75	54.00	-19.25	31.00	3.75	Average	100	50
8	4874.00	48.63	74.00	-25.37	44.88	3.75	Peak	100	50
9	7311.00	42.46	54.00	-11.54	34.33	8.13	Average	211	44
10	7311.00	55.91	74.00	-18.09	47.78	8.13	Peak	211	44

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		



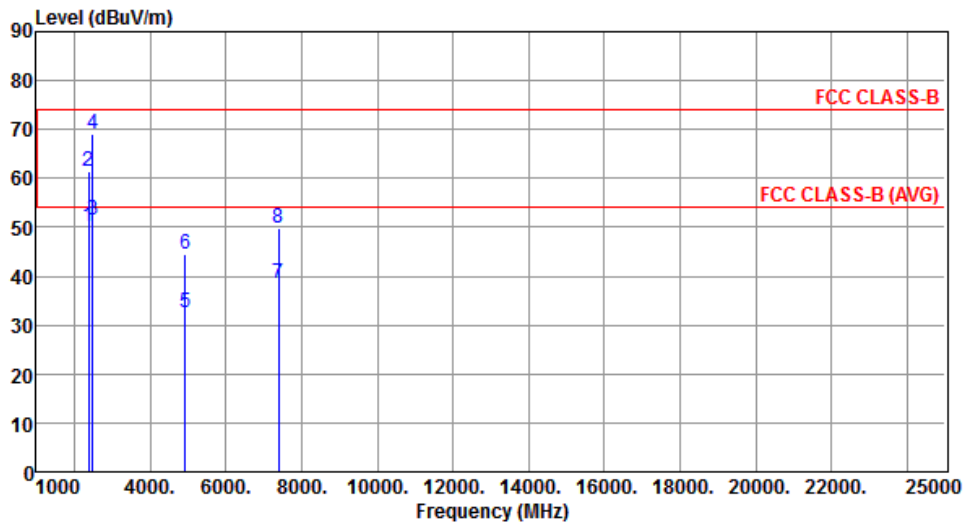
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2382.00	50.24	54.00	-3.76	53.88	-3.64	Average	147	304
2	2382.00	62.03	74.00	-11.97	65.67	-3.64	Peak	147	304
3	2483.50	52.27	54.00	-1.73	55.46	-3.19	Average	166	299
4	2483.50	68.77	74.00	-5.23	71.96	-3.19	Peak	166	299
5	4924.00	33.04	54.00	-20.96	29.12	3.92	Average	100	25
6	4924.00	47.57	74.00	-26.43	43.65	3.92	Peak	100	25
7	7386.00	48.36	54.00	-5.64	40.13	8.23	Average	174	48
8	7386.00	61.79	74.00	-12.21	53.56	8.23	Peak	174	48

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		



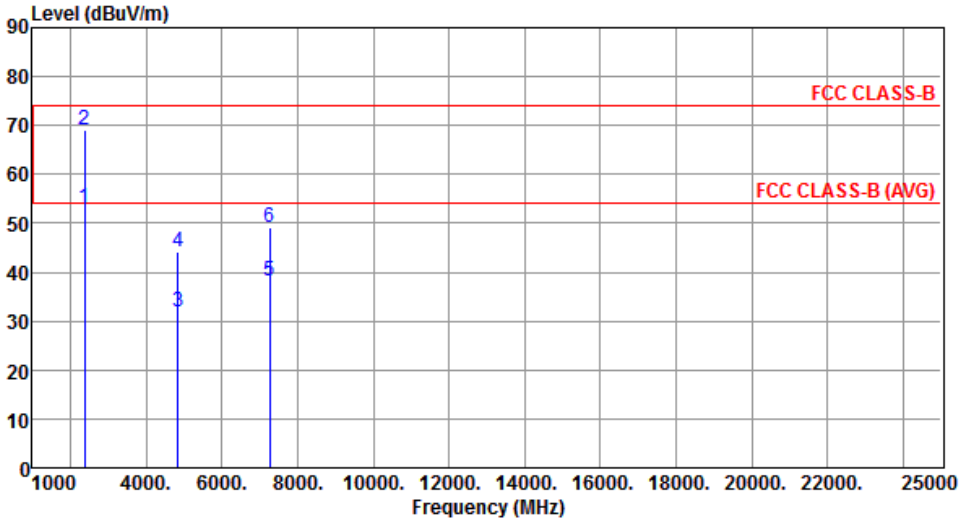
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2382.00	50.21	54.00	-3.79	53.85	-3.64	Average	100	124
2	2382.00	61.47	74.00	-12.53	65.11	-3.64	Peak	100	124
3	2483.50	51.52	54.00	-2.48	54.71	-3.19	Average	181	87
4	2483.50	69.05	74.00	-4.95	72.24	-3.19	Peak	181	87
5	4924.00	32.48	54.00	-21.52	28.56	3.92	Average	100	100
6	4924.00	44.40	74.00	-29.60	40.48	3.92	Peak	100	100
7	7386.00	38.45	54.00	-15.55	30.22	8.23	Average	100	58
8	7386.00	49.79	74.00	-24.21	41.56	8.23	Peak	100	58

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

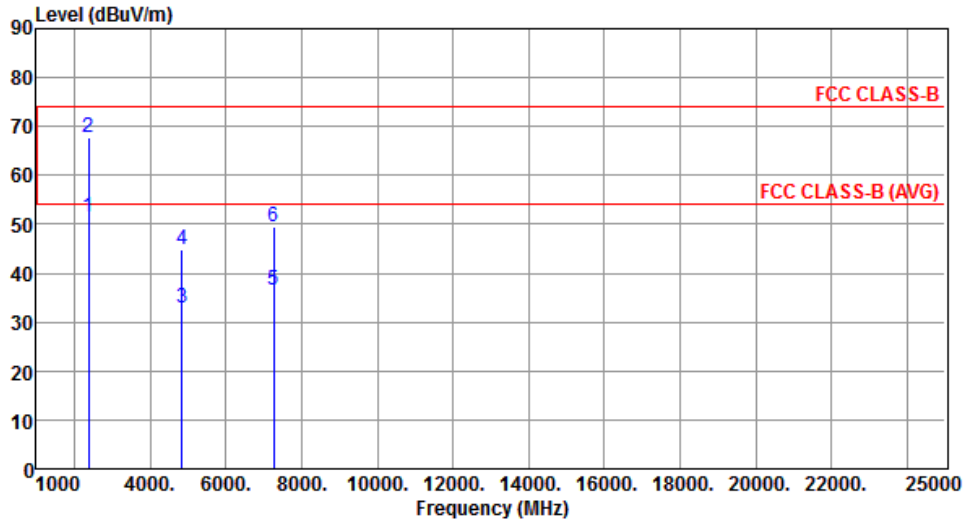
\*Factor includes antenna factor , cable loss and amplifier gain

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																																																																	
 <table border="1"> <thead> <tr> <th>Freq. MHz</th> <th>Emission level dBuV/m</th> <th>Limit dBuV/m</th> <th>Margin dB</th> <th>SA reading dBuV</th> <th>Factor dB</th> <th>Remark</th> <th>ANT High cm</th> <th>Turn Table deg</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>53.00</td> <td>54.00</td> <td>-1.00</td> <td>56.60</td> <td>-3.60</td> <td>Average</td> <td>124</td> <td>295</td> </tr> <tr> <td>2</td> <td>68.95</td> <td>74.00</td> <td>-5.05</td> <td>72.55</td> <td>-3.60</td> <td>Peak</td> <td>124</td> <td>295</td> </tr> <tr> <td>3</td> <td>32.03</td> <td>54.00</td> <td>-21.97</td> <td>28.36</td> <td>3.67</td> <td>Average</td> <td>100</td> <td>150</td> </tr> <tr> <td>4</td> <td>44.02</td> <td>74.00</td> <td>-29.98</td> <td>40.35</td> <td>3.67</td> <td>Peak</td> <td>100</td> <td>150</td> </tr> <tr> <td>5</td> <td>38.18</td> <td>54.00</td> <td>-15.82</td> <td>30.12</td> <td>8.06</td> <td>Average</td> <td>170</td> <td>46</td> </tr> <tr> <td>6</td> <td>49.24</td> <td>74.00</td> <td>-24.76</td> <td>41.18</td> <td>8.06</td> <td>Peak</td> <td>170</td> <td>46</td> </tr> </tbody> </table>				Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg	1	53.00	54.00	-1.00	56.60	-3.60	Average	124	295	2	68.95	74.00	-5.05	72.55	-3.60	Peak	124	295	3	32.03	54.00	-21.97	28.36	3.67	Average	100	150	4	44.02	74.00	-29.98	40.35	3.67	Peak	100	150	5	38.18	54.00	-15.82	30.12	8.06	Average	170	46	6	49.24	74.00	-24.76	41.18	8.06	Peak	170	46
Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg																																																										
1	53.00	54.00	-1.00	56.60	-3.60	Average	124	295																																																										
2	68.95	74.00	-5.05	72.55	-3.60	Peak	124	295																																																										
3	32.03	54.00	-21.97	28.36	3.67	Average	100	150																																																										
4	44.02	74.00	-29.98	40.35	3.67	Peak	100	150																																																										
5	38.18	54.00	-15.82	30.12	8.06	Average	170	46																																																										
6	49.24	74.00	-24.76	41.18	8.06	Peak	170	46																																																										
<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		



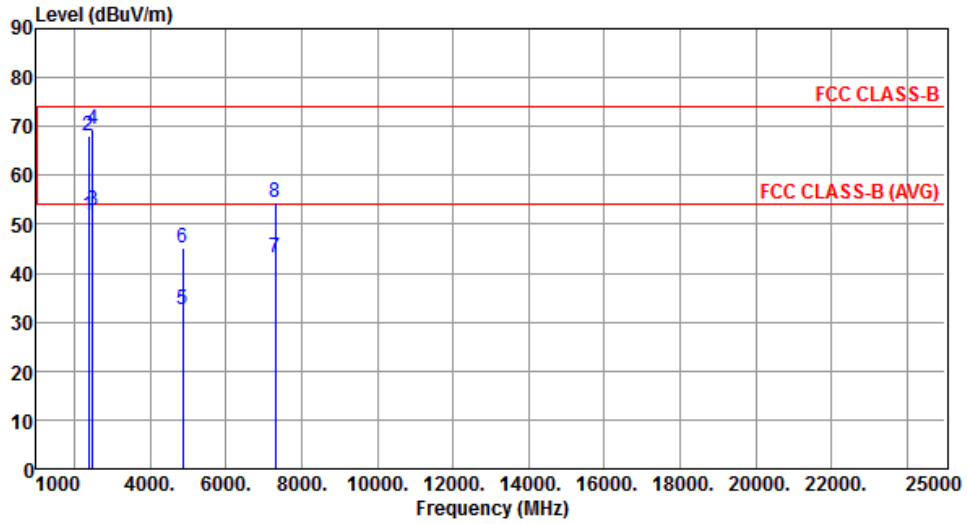
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.57	54.00	-2.43	55.17	-3.60	Average	163	116
2	2390.00	67.67	74.00	-6.33	71.27	-3.60	Peak	163	116
3	4844.00	32.95	54.00	-21.05	29.28	3.67	Average	100	120
4	4844.00	44.90	74.00	-29.10	41.23	3.67	Peak	100	120
5	7266.00	36.68	54.00	-17.32	28.62	8.06	Average	100	150
6	7266.00	49.42	74.00	-24.58	41.36	8.06	Peak	100	150

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		



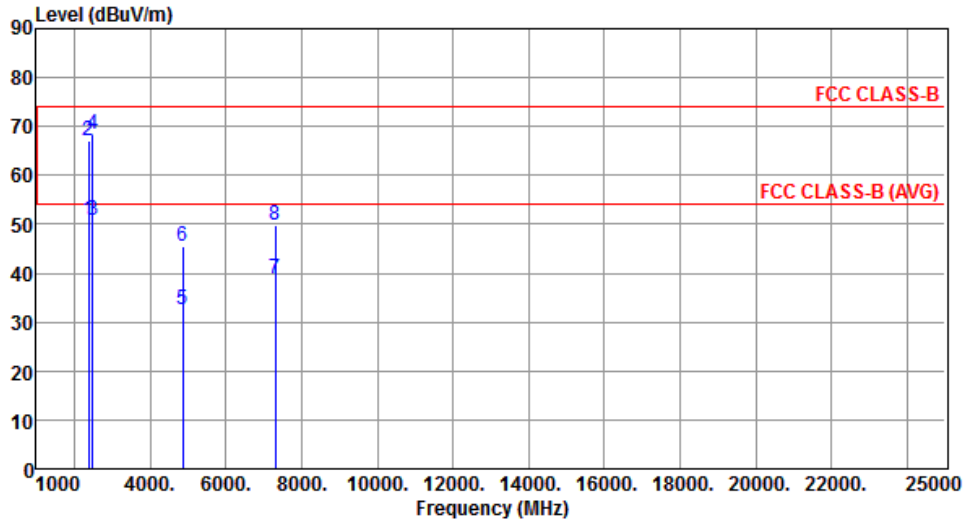
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.86	54.00	-2.14	55.46	-3.60	Average	158	303
2	2390.00	68.06	74.00	-5.94	71.66	-3.60	Peak	158	303
3	2483.50	52.79	54.00	-1.21	55.98	-3.19	Average	158	303
4	2483.50	69.47	74.00	-4.53	72.66	-3.19	Peak	158	303
5	4874.00	32.41	54.00	-21.59	28.66	3.75	Average	100	20
6	4874.00	45.14	74.00	-28.86	41.39	3.75	Peak	100	20
7	7311.00	43.25	54.00	-10.75	35.12	8.13	Average	173	55
8	7311.00	54.51	74.00	-19.49	46.38	8.13	Peak	173	55

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	50.67	54.00	-3.33	54.27	-3.60	Average	146	119
2	2390.00	67.04	74.00	-6.96	70.64	-3.60	Peak	146	119
3	2483.50	50.84	54.00	-3.16	54.03	-3.19	Average	146	119
4	2483.50	68.31	74.00	-5.69	71.50	-3.19	Peak	146	119
5	4874.00	32.39	54.00	-21.61	28.64	3.75	Average	100	160
6	4874.00	45.39	74.00	-28.61	41.64	3.75	Peak	100	160
7	7311.00	38.78	54.00	-15.22	30.65	8.13	Average	100	140
8	7311.00	49.82	74.00	-24.18	41.69	8.13	Peak	100	140

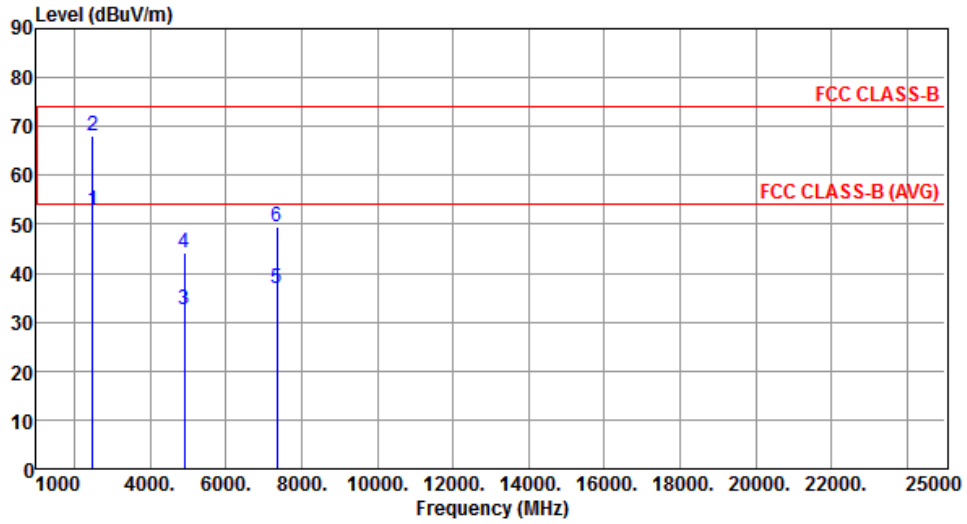
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*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		



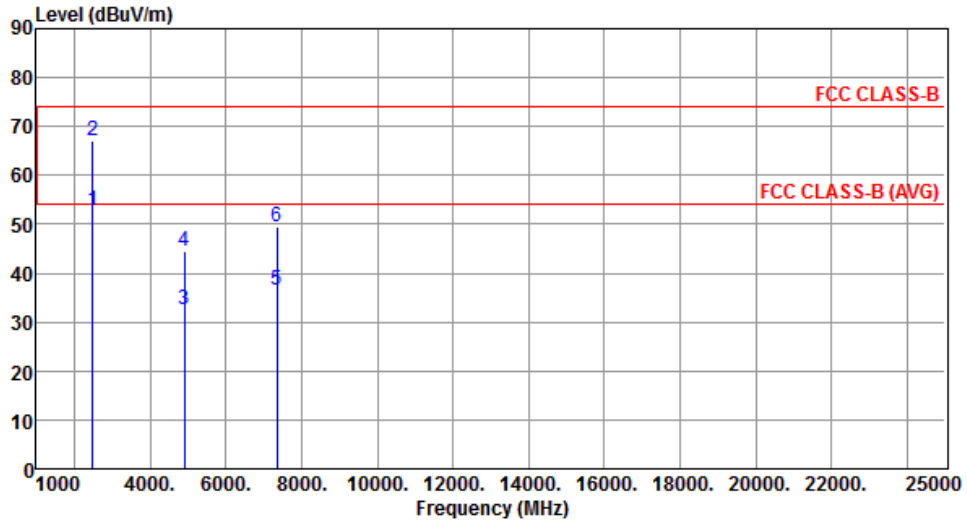
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.84	54.00	-1.16	56.03	-3.19	Average	202	319
2	2483.50	67.92	74.00	-6.08	71.11	-3.19	Peak	202	319
3	4904.00	32.41	54.00	-21.59	28.55	3.86	Average	100	25
4	4904.00	44.11	74.00	-29.89	40.25	3.86	Peak	100	25
5	7356.00	36.71	54.00	-17.29	28.51	8.20	Average	100	60
6	7356.00	49.54	74.00	-24.46	41.34	8.20	Peak	100	60

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	52.83	54.00	-1.17	56.02	-3.19	Average	120	100
2	2483.50	67.06	74.00	-6.94	70.25	-3.19	Peak	120	100
3	4904.00	32.52	54.00	-21.48	28.66	3.86	Average	100	125
4	4904.00	44.50	74.00	-29.50	40.64	3.86	Peak	100	125
5	7356.00	36.69	54.00	-17.31	28.49	8.20	Average	100	190
6	7356.00	49.56	74.00	-24.44	41.36	8.20	Peak	100	190

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 30 dB relative to the maximum in-band peak PSD level in 100 kHz

### 3.6.2 Test Procedures

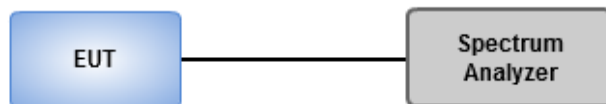
#### Reference level measurement

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

#### Emission level measurement

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

### 3.6.3 Test Setup

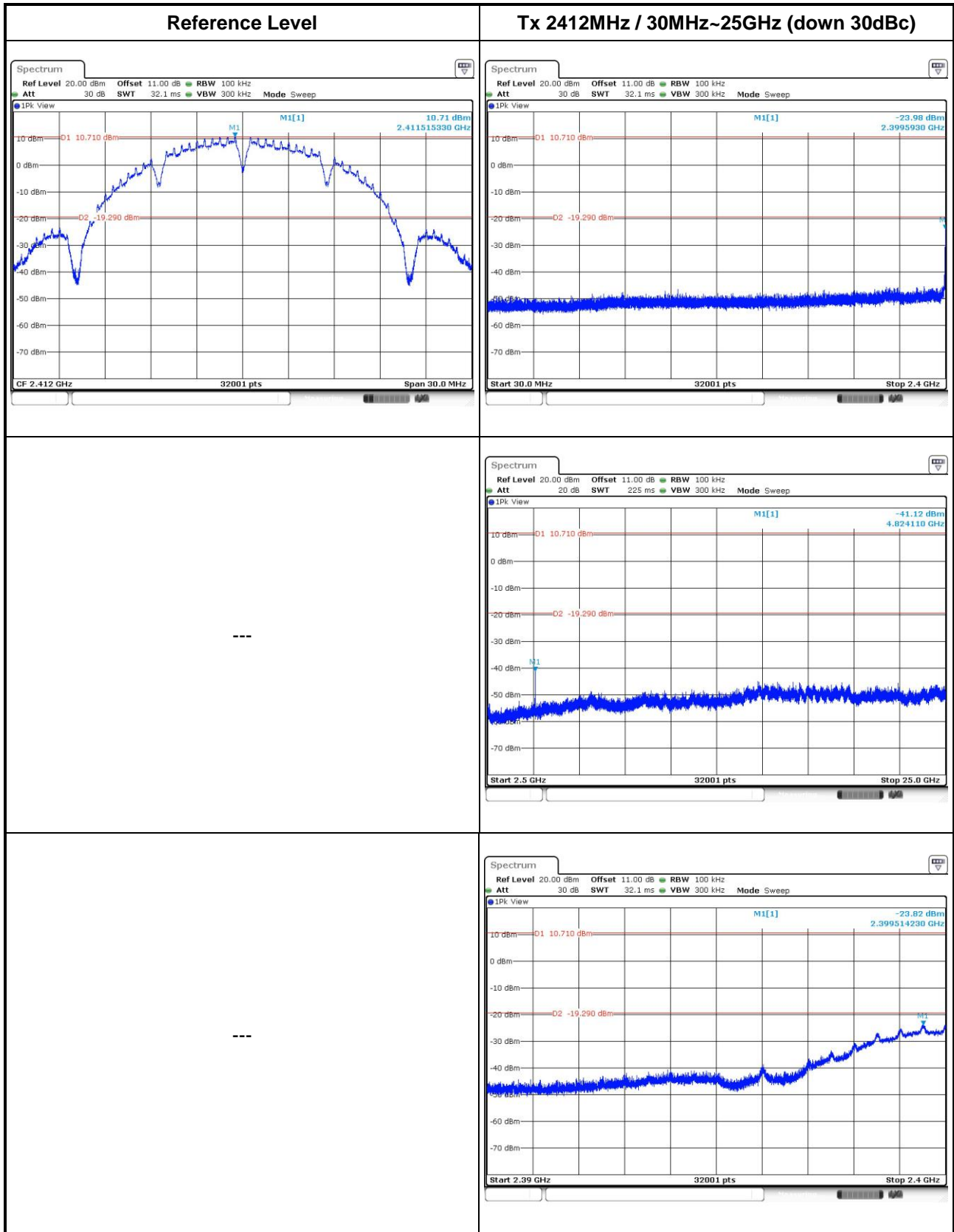


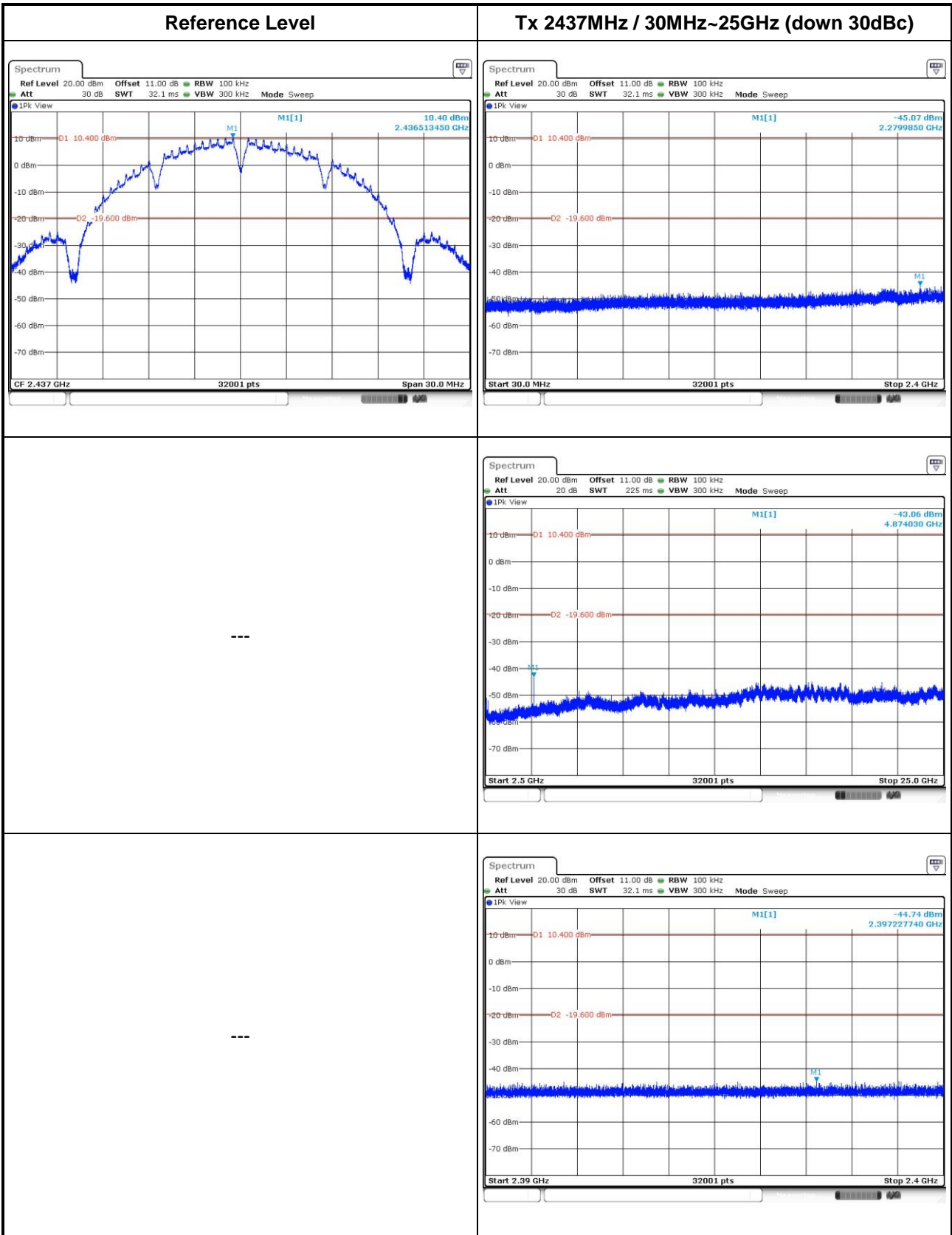
### 3.6.4 Test Result of Emissions in non-restricted frequency bands

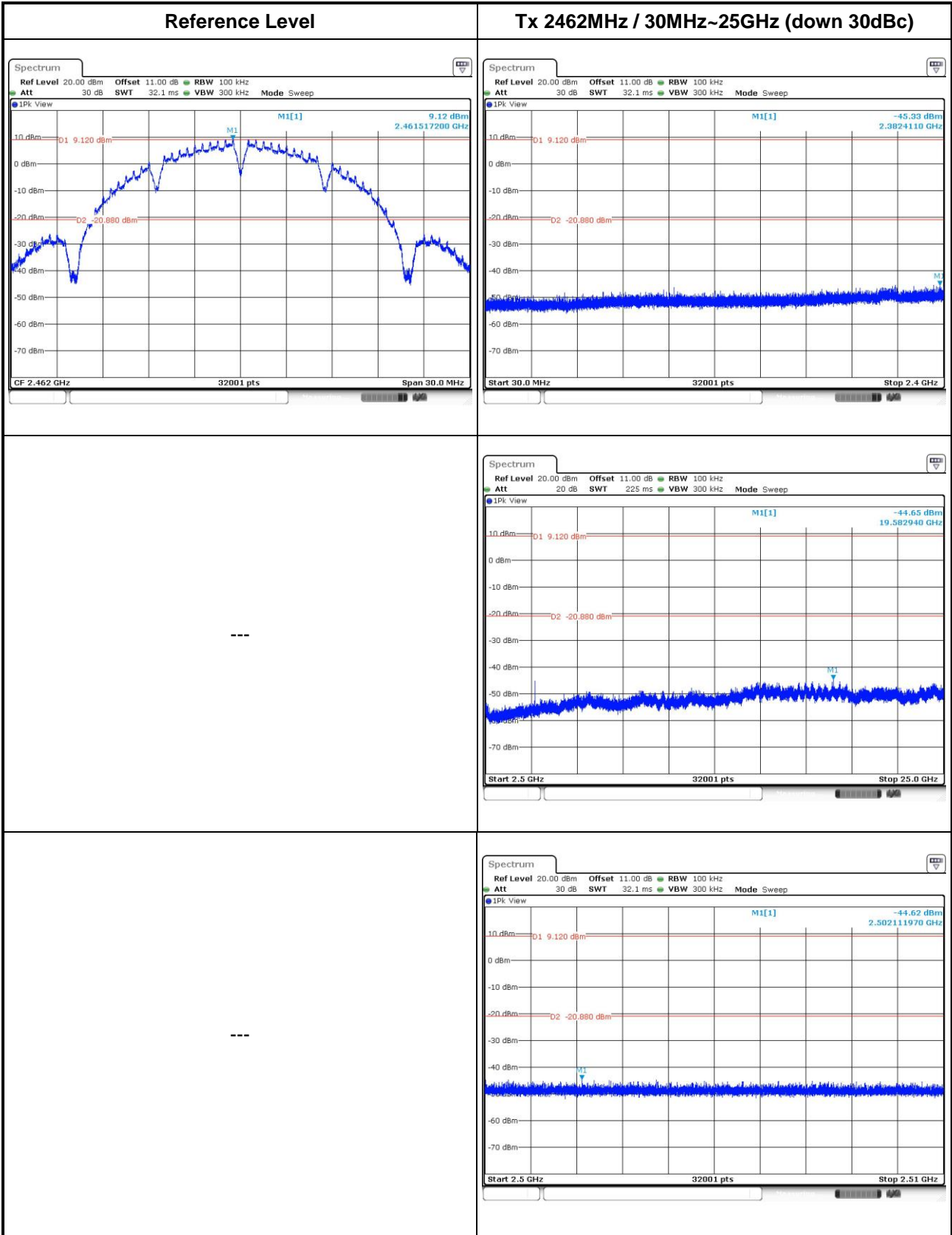
This test item is performed on each TX output individually without summing or adding  $10 \log(N_{ANT})$  since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

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

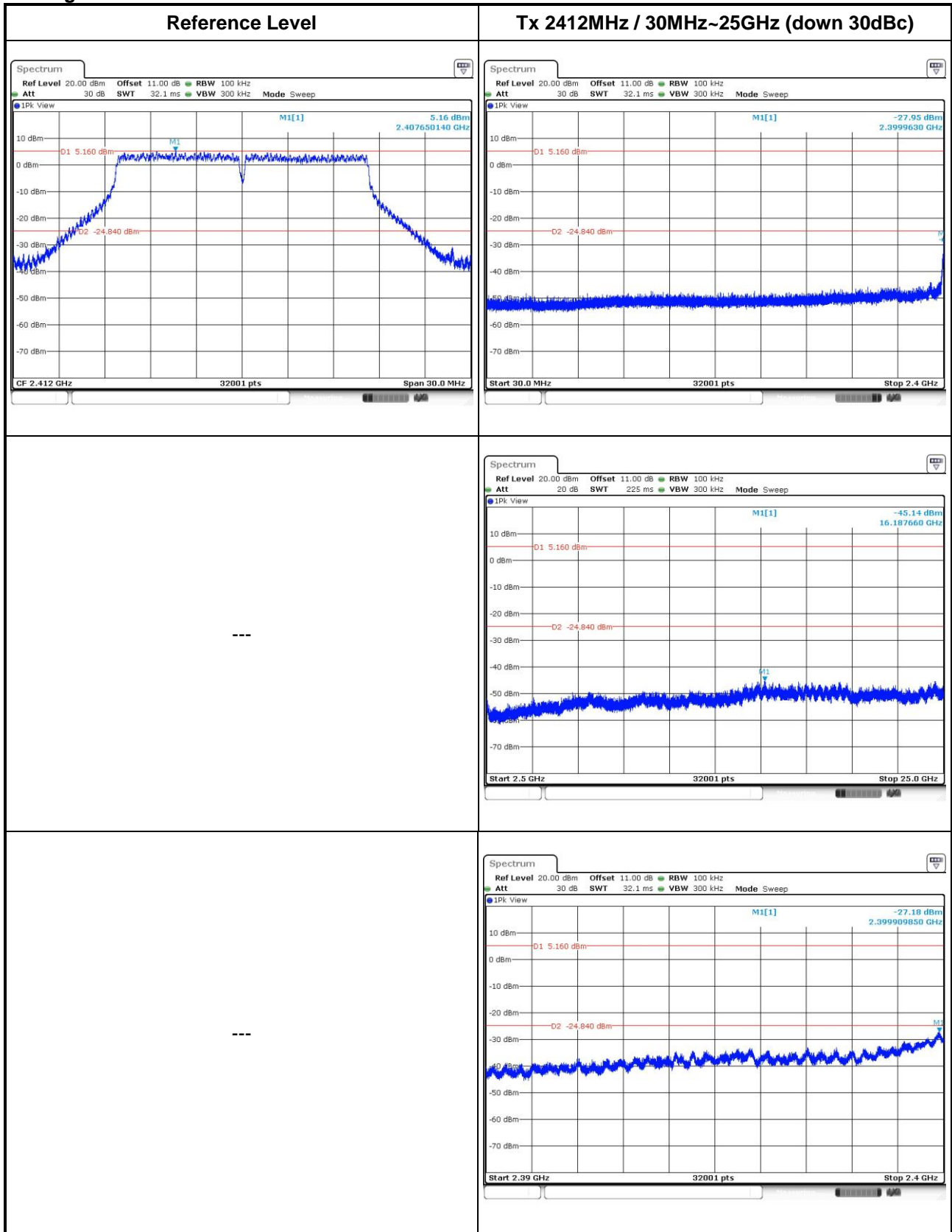
#### 802.11b



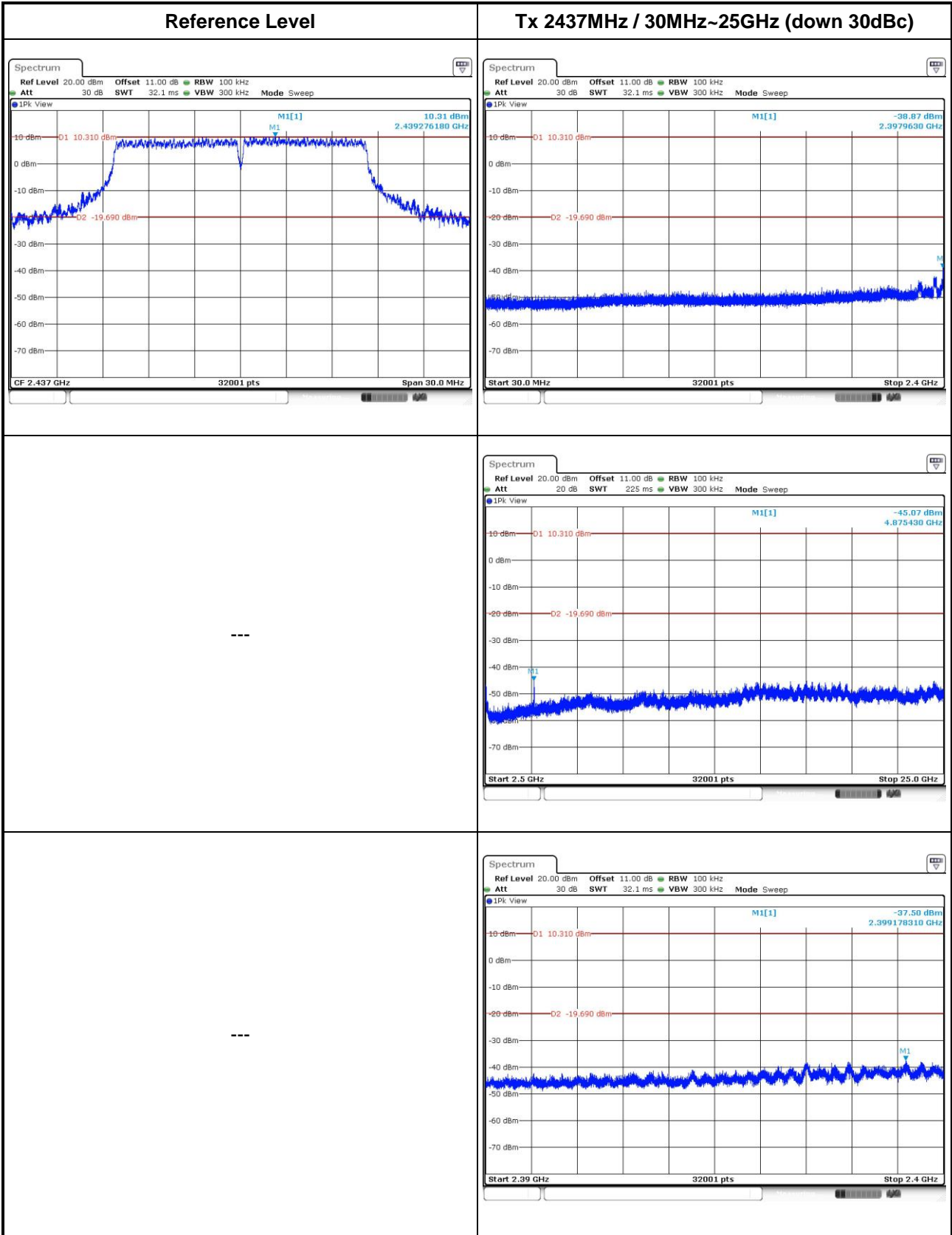




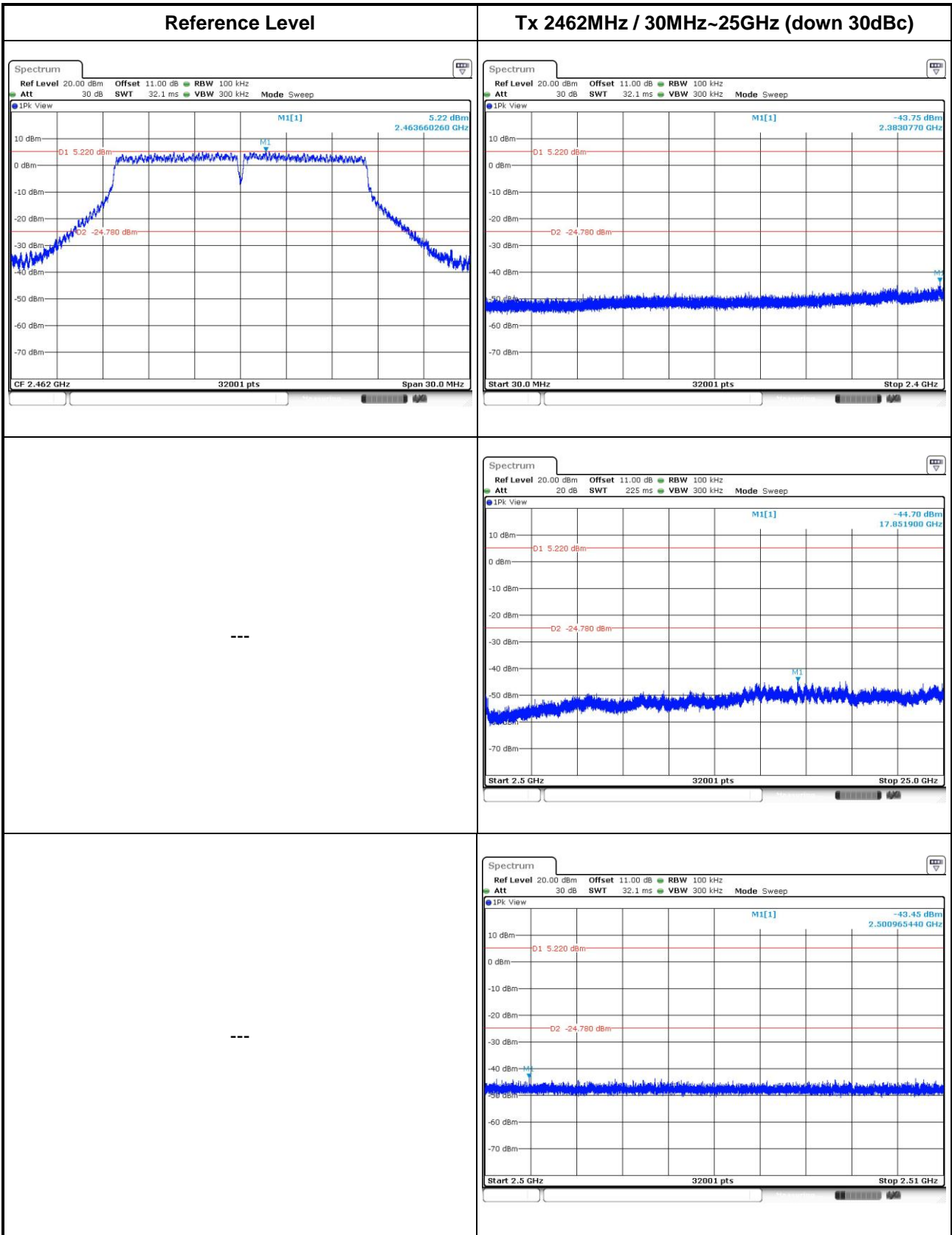
802.11g



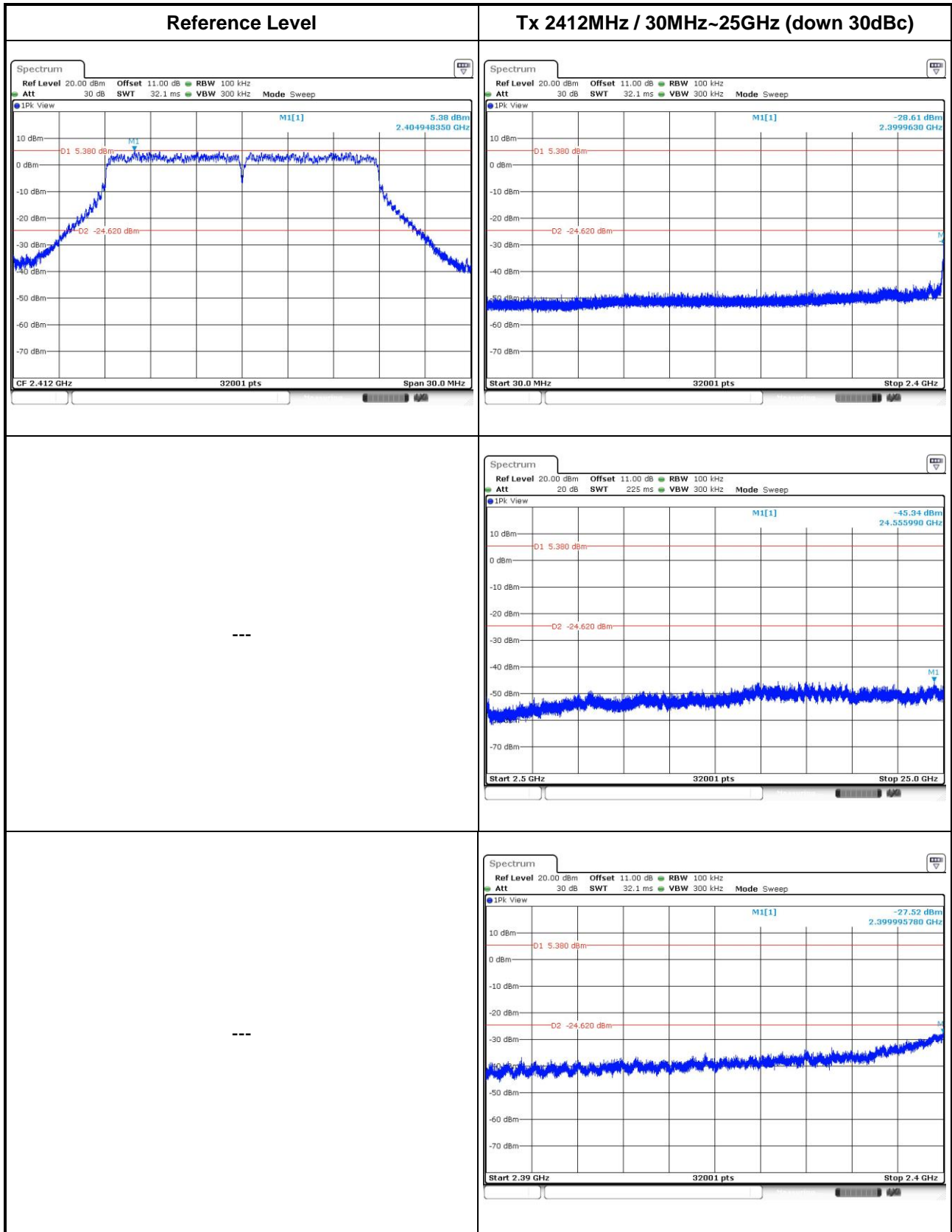


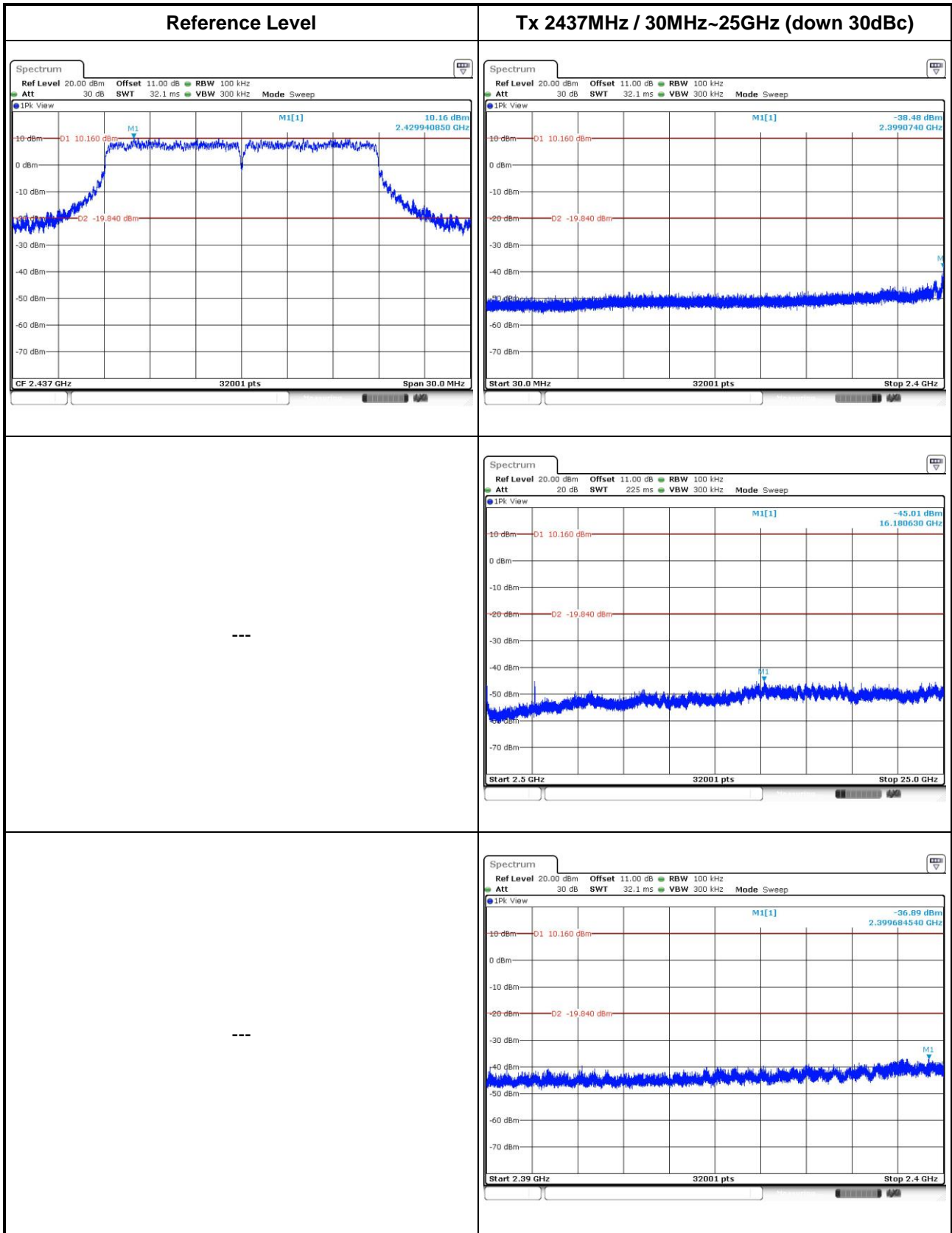


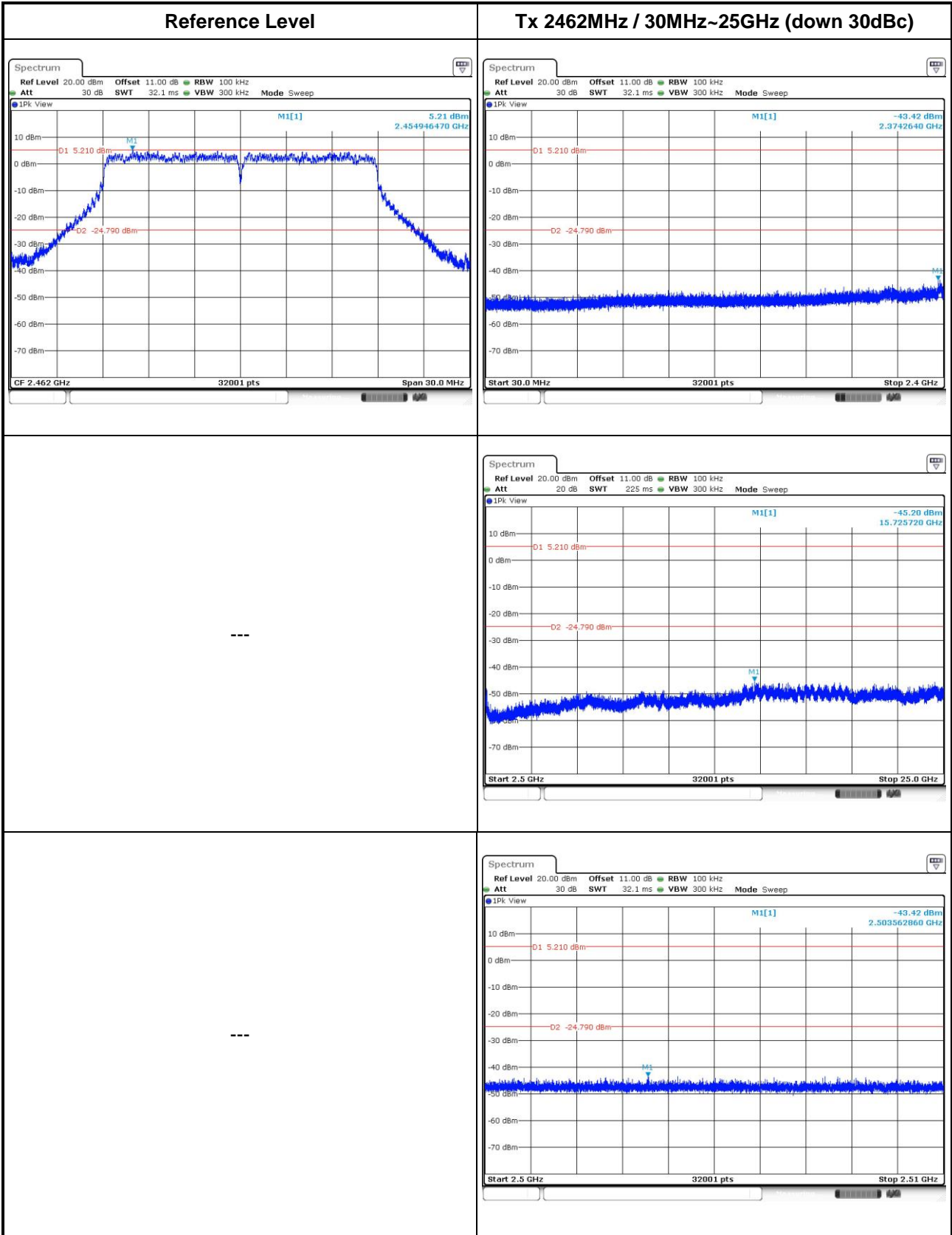




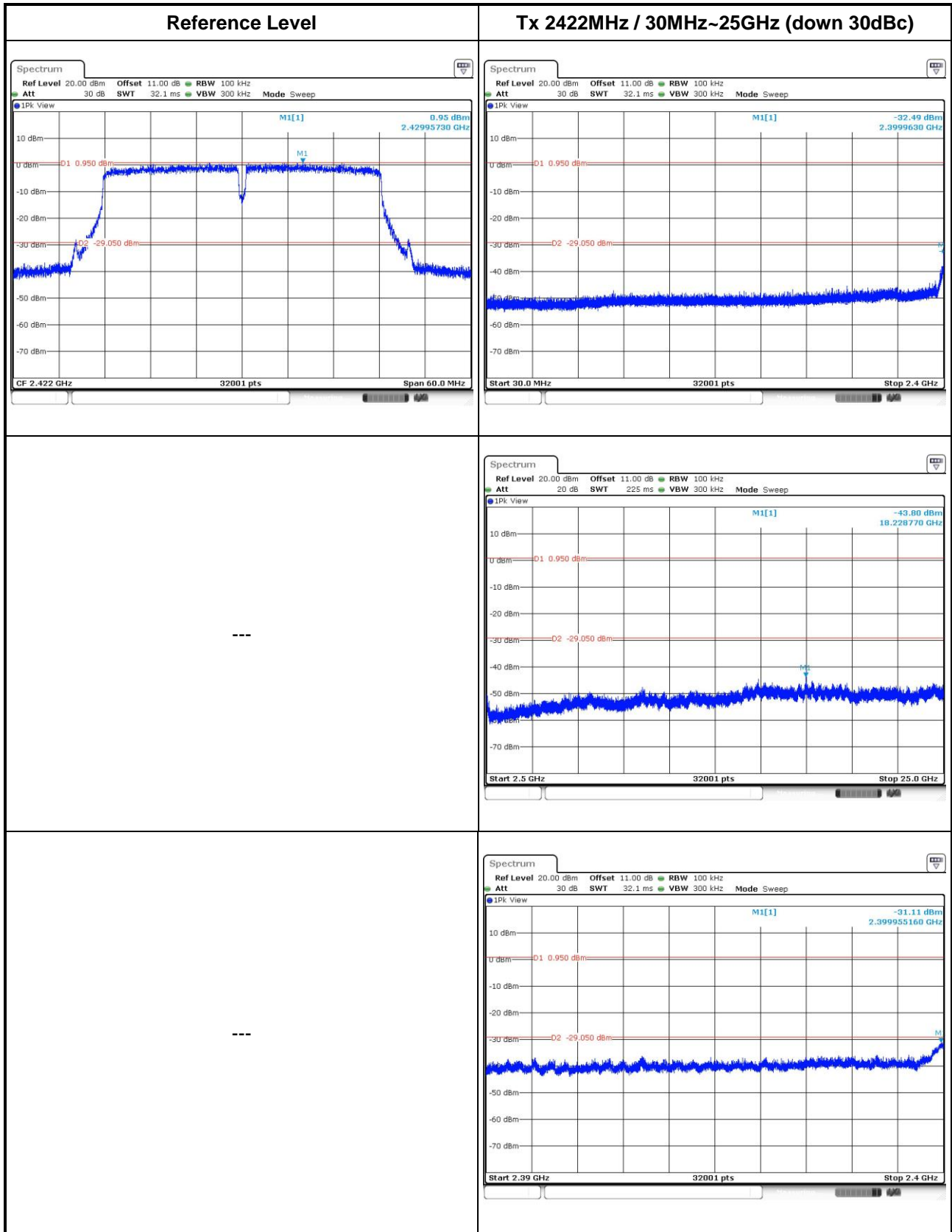
802.11n HT20

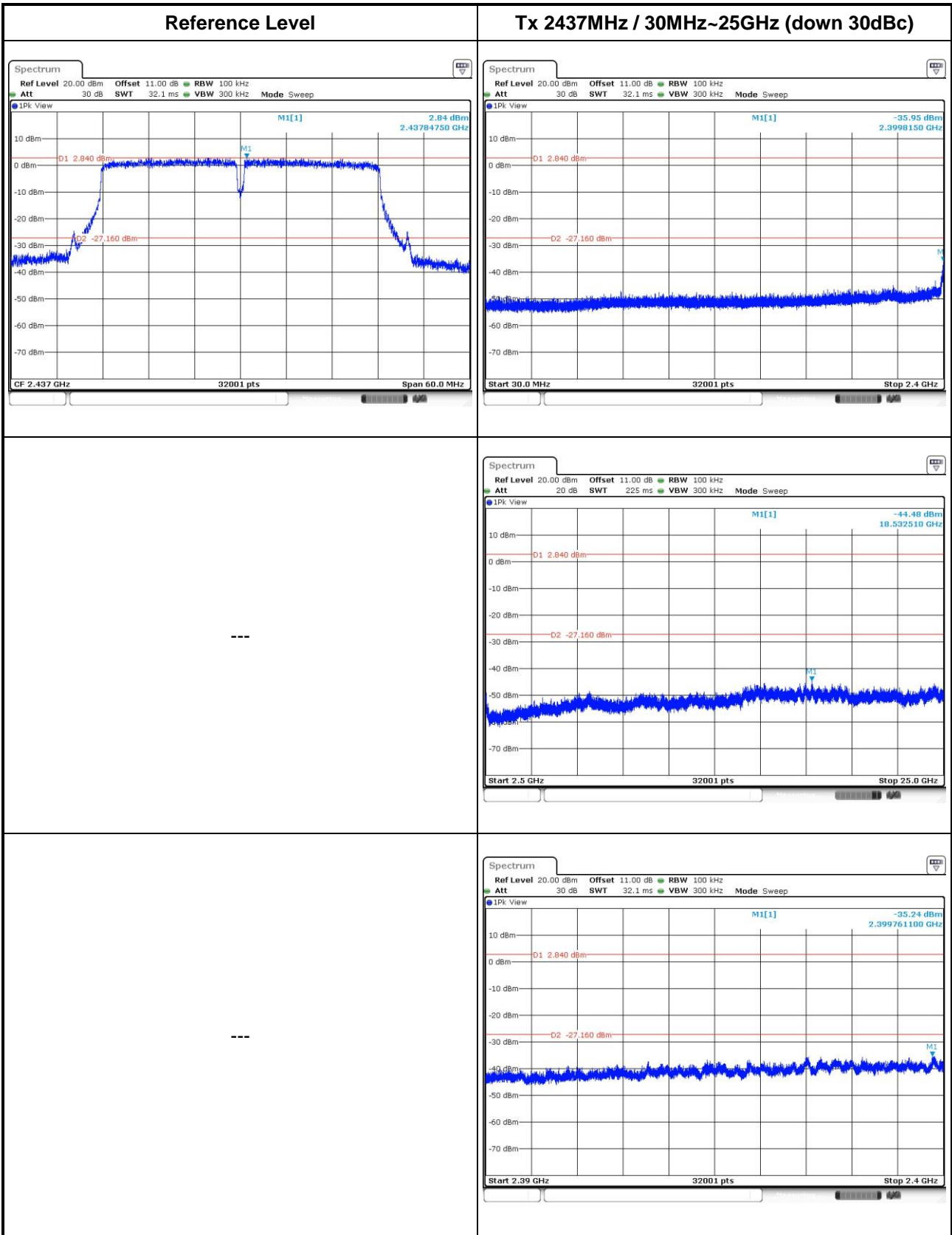




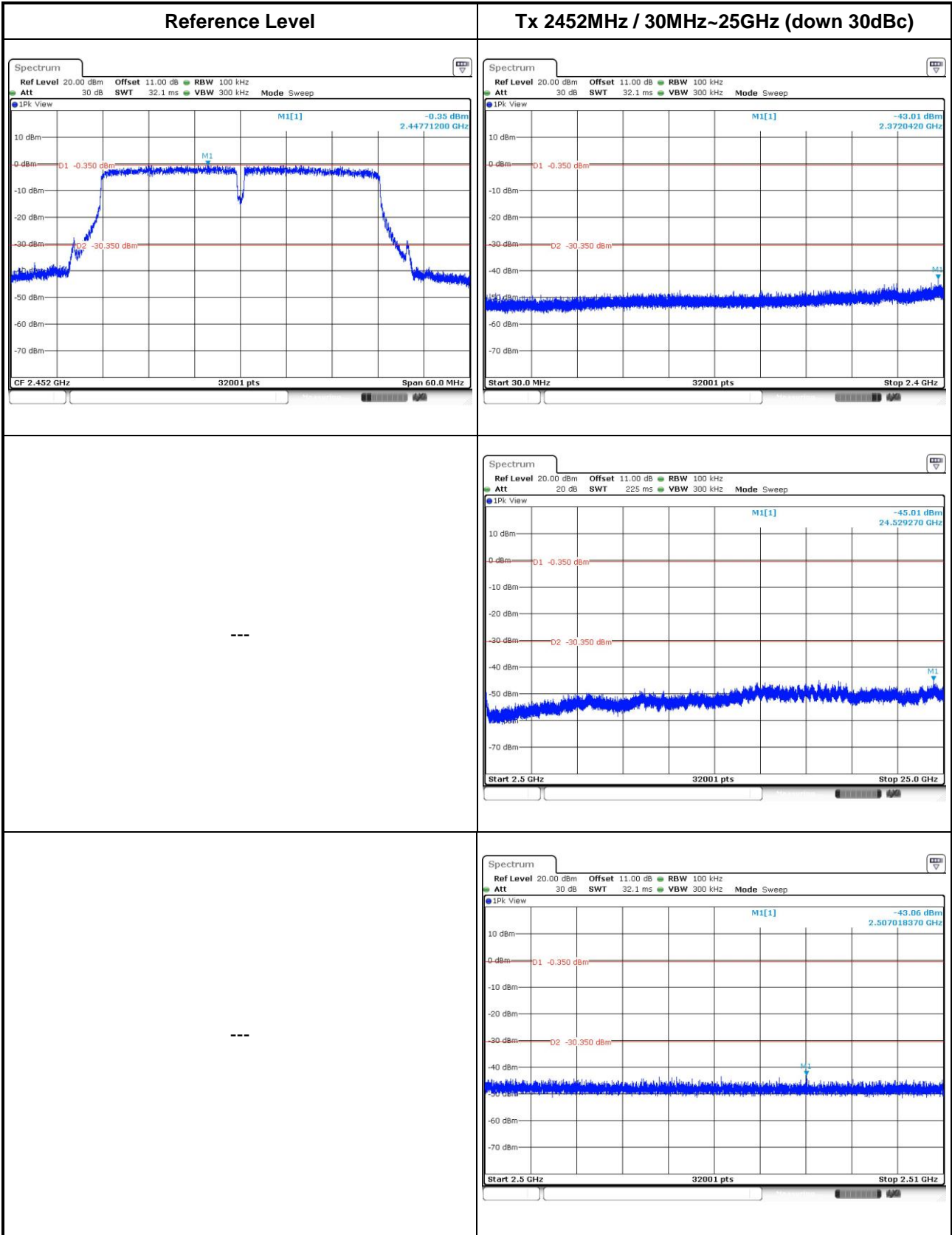


802.11n HT40









## 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>.

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St., Kwei Shan District, Tao Yuan  
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If you have any suggestion, please feel free to contact us as below information.

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