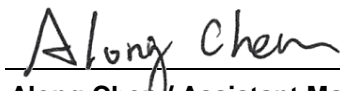


FCC Test Report

FCC ID : SWX-AFT
Equipment : AMPLIFI Teleport
Model No. : AFi-T
Brand Name : ULABS
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. 19, 2017
Tested Date : Jul. 24 ~ Aug. 15, 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
FR761901AC	Rev. 01	Initial issue	Oct. 27, 2017

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.494MHz 22.31 (Margin -23.80dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 4824.00MHz 53.89 (Margin -0.11dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 27.30	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
2400-2483.5	b	2412-2462	1-11 [11]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15

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

1.1.2 Antenna Details

Ant. No.	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)		
			2400~2483.5	5150~5250	5725~5850
1	internal	N/A	1	2	2

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	100 ~ 240 Vac
--------------------------	---------------

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	Putty, V0.6		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	100.00%	0.00
	11g	97.53%	0.11
	HT20	96.94%	0.13
	HT40	95.24%	0.21

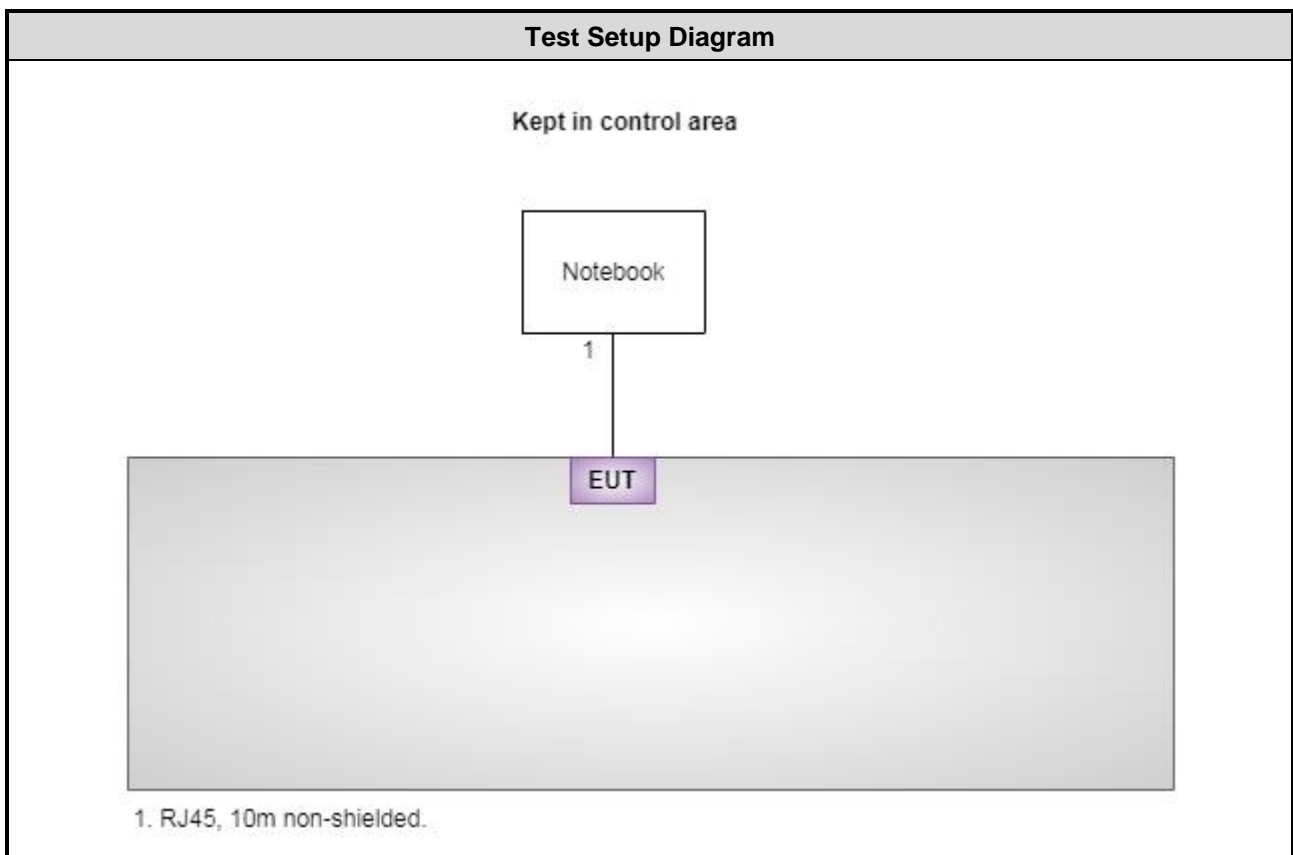
1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	14
11b	2437	14
11b	2462	13
11g	2412	16
11g	2437	17
11g	2462	16
HT20	2412	16
HT20	2437	17
HT20	2462	16
HT40	2422	16
HT40	2437	17
HT40	2452	16.5

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.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Aug. 15, 2017				
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-B M-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)				
Tested Date	Aug. 11, 2017				
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	Jul. 25, 2017	Jul. 24, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 21, 2016	Dec. 20, 2017
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	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	Jul. 28, 2017	Jul. 27, 2018
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.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Jul. 24, 2017				
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.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Aug. 07 ~ Aug. 09, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017
DC POWER SOURCE	GW INSTRUK	GPC-6030D	EM892433	Oct. 20, 2016	Oct. 19, 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 / 57%	Alex Huang
Radiated Emissions	03CH01-WS	23-24°C / 62-63%	Vincent Yeh
RF Conducted	TH01-WS	22°C / 63%	Felix Sung

- 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	2412	6 Mbps	---
Radiated Emissions ≤1GHz	11g	2412	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 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

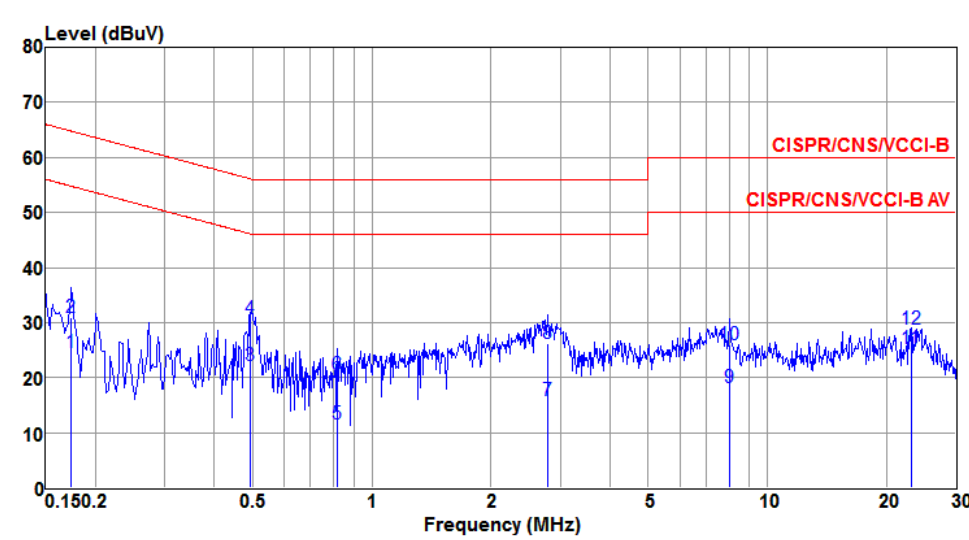
3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

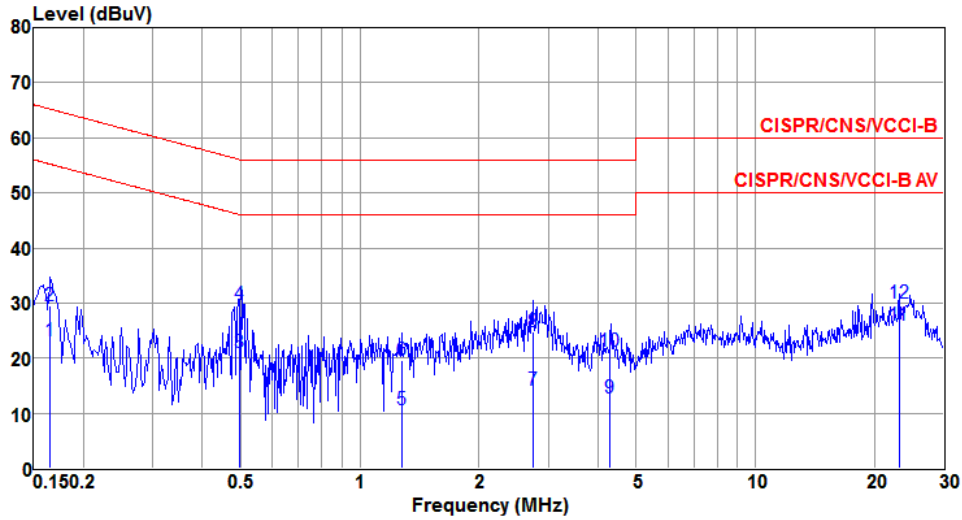
Modulation	11g	Test Freq. (MHz)	2412
Power Phase	Line		



	Freq	Level	Limit	Over	Read	LISN	cable	Remark
	MHz	dBuV	dBuV	dB	dBuV	factor	loss	
						dB	dB	
1	0.174	24.55	54.77	-30.22	24.12	0.39	0.04	Average
2	0.174	30.99	64.77	-33.78	30.56	0.39	0.04	QP
3	0.494	22.31	46.11	-23.80	21.93	0.34	0.04	Average
4	0.494	30.75	56.11	-25.36	30.37	0.34	0.04	QP
5	0.817	11.61	46.00	-34.39	11.24	0.33	0.04	Average
6	0.817	20.60	56.00	-35.40	20.23	0.33	0.04	QP
7	2.787	15.90	46.00	-30.10	15.28	0.52	0.10	Average
8	2.787	26.13	56.00	-29.87	25.51	0.52	0.10	QP
9	8.043	18.11	50.00	-31.89	16.95	0.95	0.21	Average
10	8.043	26.02	60.00	-33.98	24.86	0.95	0.21	QP
11	23.128	25.29	50.00	-24.71	24.70	0.31	0.28	Average
12	23.128	28.80	60.00	-31.20	28.21	0.31	0.28	QP

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

Modulation	11g	Test Freq. (MHz)	2412
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.165	23.22	55.21	-31.99	22.84	0.34	0.04	Average
2	0.165	29.42	65.21	-35.79	29.04	0.34	0.04	QP
3	0.498	21.13	46.04	-24.91	20.71	0.38	0.04	Average
4	0.498	29.82	56.04	-26.22	29.40	0.38	0.04	QP
5	1.276	10.56	46.00	-35.44	10.12	0.40	0.04	Average
6	1.276	19.67	56.00	-36.33	19.23	0.40	0.04	QP
7	2.735	14.25	46.00	-31.75	13.65	0.51	0.09	Average
8	2.735	24.81	56.00	-31.19	24.21	0.51	0.09	QP
9	4.280	12.74	46.00	-33.26	12.01	0.57	0.16	Average
10	4.280	21.21	56.00	-34.79	20.48	0.57	0.16	QP
11@	23.128	25.88	50.00	-24.12	25.25	0.35	0.28	Average
12	23.128	30.09	60.00	-29.91	29.46	0.35	0.28	QP

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

3.2 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

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

3.2.2 Test Procedures

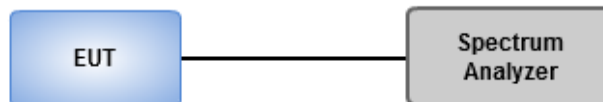
6dB Bandwidth

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

Occupied Bandwidth

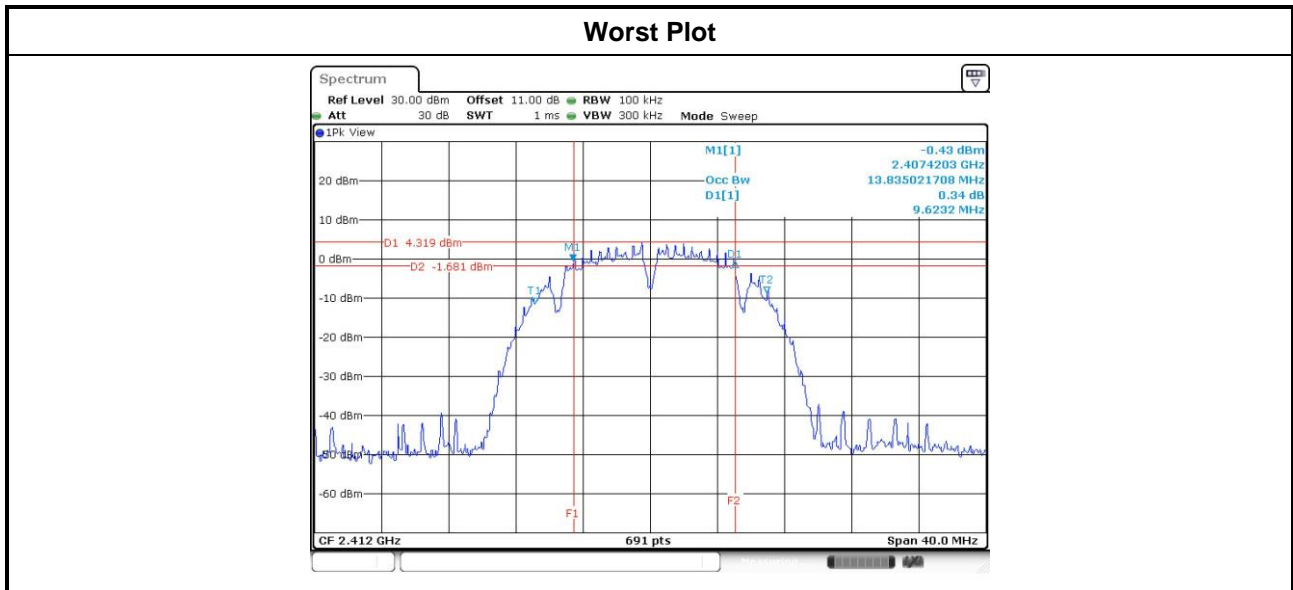
1. Set resolution bandwidth (RBW) = 1 MHz, Video bandwidth = 3 MHz.
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.2.3 Test Setup

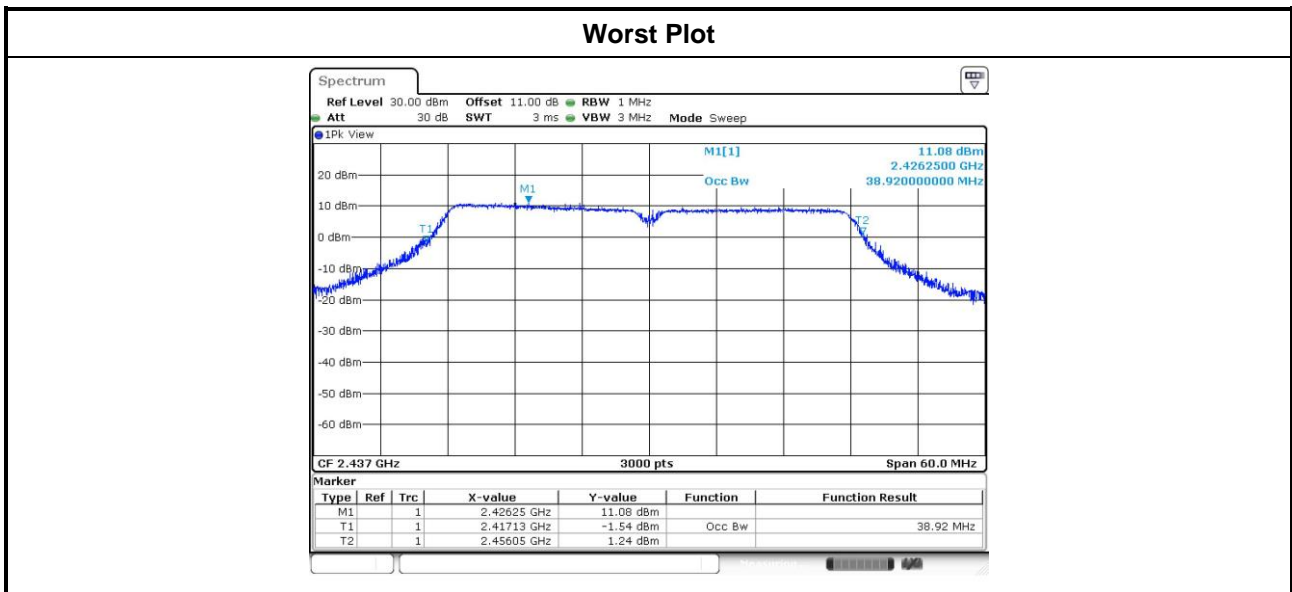


3.2.4 Test Result of 6dB and Occupied Bandwidth

Modulation Mode	N _{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	2	2412	10.09	9.62	---	---	500
11b	2	2437	9.80	10.09	---	---	500
11b	2	2462	10.09	10.09	---	---	500
11g	2	2412	16.29	16.35	---	---	500
11g	2	2437	16.29	16.35	---	---	500
11g	2	2462	16.35	16.35	---	---	500
HT20	2	2412	17.22	17.22	---	---	500
HT20	2	2437	17.57	17.57	---	---	500
HT20	2	2462	17.33	17.33	---	---	500
HT40	2	2422	35.83	36.06	---	---	500
HT40	2	2437	35.94	36.41	---	---	500
HT40	2	2452	35.94	36.17	---	---	500



Modulation Mode	N _{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	2	2412	13.97	13.91	---	---
11b	2	2437	13.94	13.91	---	---
11b	2	2462	13.98	13.85	---	---
11g	2	2412	17.11	16.87	---	---
11g	2	2437	17.12	16.84	---	---
11g	2	2462	17.09	16.84	---	---
HT20	2	2412	18.14	18.06	---	---
HT20	2	2437	18.15	18.04	---	---
HT20	2	2462	18.11	18.03	---	---
HT40	2	2422	38.70	38.24	---	---
HT40	2	2437	38.92	38.02	---	---
HT40	2	2452	38.66	38.14	---	---



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

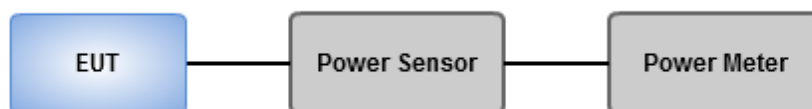
- Antenna gain \leq 6dBi, no any corresponding reduction is in output power limit.
- Antenna gain $>$ 6dBi
 - Non Fixed, point to point operations.
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB
 - Fixed, 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 _{TX}	Freq. (MHz)	Peak conducted Output Power (dBm)							Ant. Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3	Total Power (mW)	Total Power (dBm)	Limit (dBm)			
11b	2	2412	16.48	16.11	---	---	85.295	19.31	30.00	1.00	20.31	36.00
11b	2	2437	15.86	16.15	---	---	79.758	19.02	30.00	1.00	20.02	36.00
11b	2	2462	15.31	15.45	---	---	69.038	18.39	30.00	1.00	19.39	36.00
11g	2	2412	24.26	24.32	---	---	537.082	27.30	30.00	1.00	28.30	36.00
11g	2	2437	24.31	24.25	---	---	535.846	27.29	30.00	1.00	28.29	36.00
11g	2	2462	24.27	24.31	---	---	537.075	27.30	30.00	1.00	28.30	36.00
HT20	2	2412	24.25	24.16	---	---	526.688	27.22	30.00	1.00	28.22	36.00
HT20	2	2437	24.21	24.26	---	---	530.319	27.25	30.00	1.00	28.25	36.00
HT20	2	2462	24.16	24.31	---	---	530.389	27.25	30.00	1.00	28.25	36.00
HT40	2	2422	23.83	23.75	---	---	478.683	26.80	30.00	1.00	27.80	36.00
HT40	2	2437	24.21	24.35	---	---	535.903	27.29	30.00	1.00	28.29	36.00
HT40	2	2452	24.05	24.13	---	---	512.919	27.10	30.00	1.00	28.10	36.00

Modulation Mode	N _{TX}	Freq. (MHz)	Conducted (Average) Output Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11b	2	2412	14.16	13.65	---	---	49.235	16.92	---
11b	2	2437	13.45	13.68	---	---	45.466	16.58	---
11b	2	2462	13.02	13.14	---	---	40.651	16.09	---
11g	2	2412	16.75	16.23	---	---	89.291	19.51	---
11g	2	2437	16.81	16.35	---	---	91.125	19.60	---
11g	2	2462	16.41	16.35	---	---	86.904	19.39	---
HT20	2	2412	16.71	16.25	---	---	89.051	19.50	---
HT20	2	2437	16.61	16.38	---	---	89.265	19.51	---
HT20	2	2462	16.38	16.28	---	---	85.913	19.34	---
HT40	2	2422	17.42	15.73	---	---	92.619	19.67	---
HT40	2	2437	17.51	16.23	---	---	98.340	19.93	---
HT40	2	2452	16.11	16.96	---	---	90.491	19.57	---

Note: Conducted average output power is for reference only.

3.4 Power Spectral Density

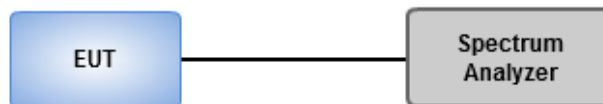
3.4.1 Limit of Power Spectral Density

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.

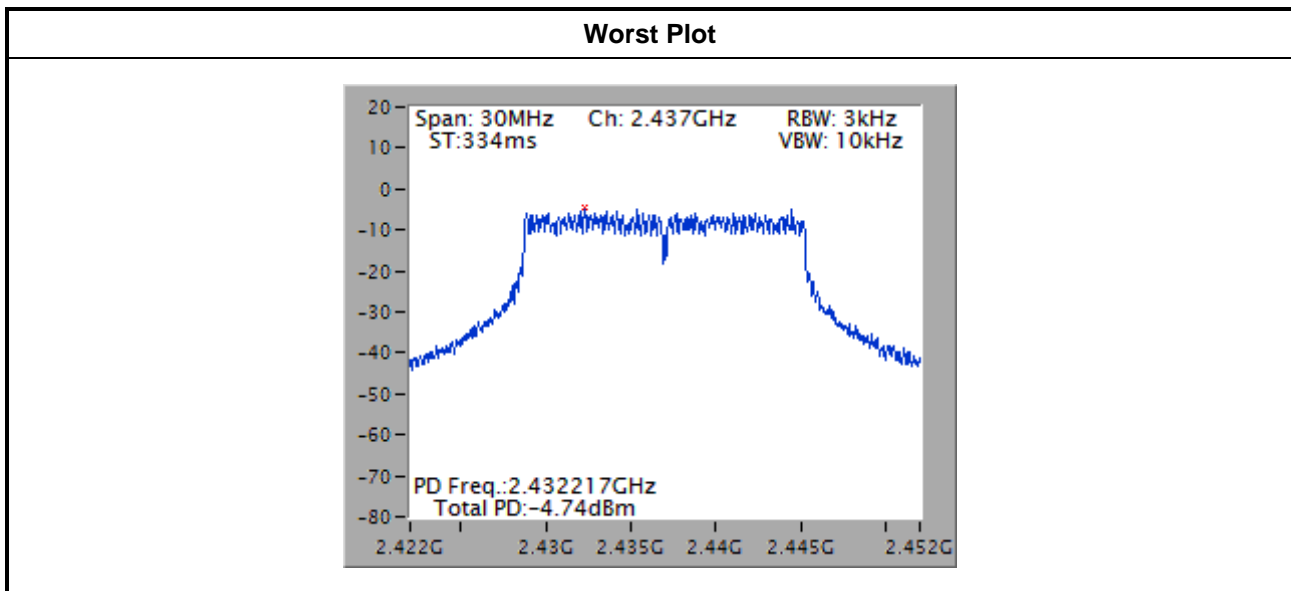
3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

Modulation Mode	N _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	2	2412	-8.84	8.00
11b	2	2437	-7.86	8.00
11b	2	2462	-8.08	8.00
11g	2	2412	-6.75	8.00
11g	2	2437	-4.74	8.00
11g	2	2462	-5.16	8.00
HT20	2	2412	-6.57	8.00
HT20	2	2437	-5.76	8.00
HT20	2	2462	-6.46	8.00
HT40	2	2422	-8.90	8.00
HT40	2	2437	-8.90	8.00
HT40	2	2452	-7.68	8.00

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



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

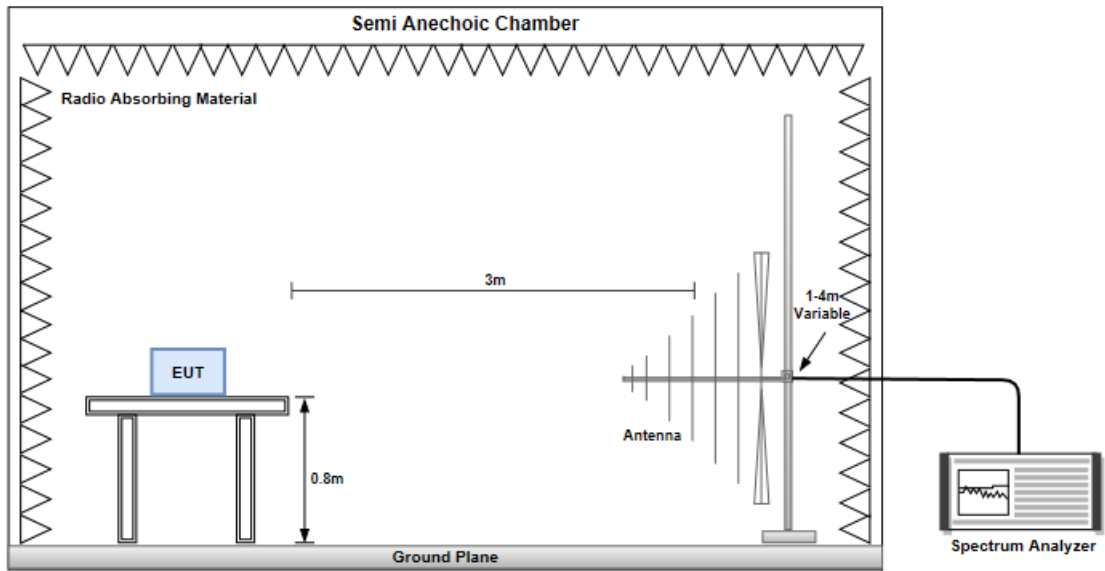
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

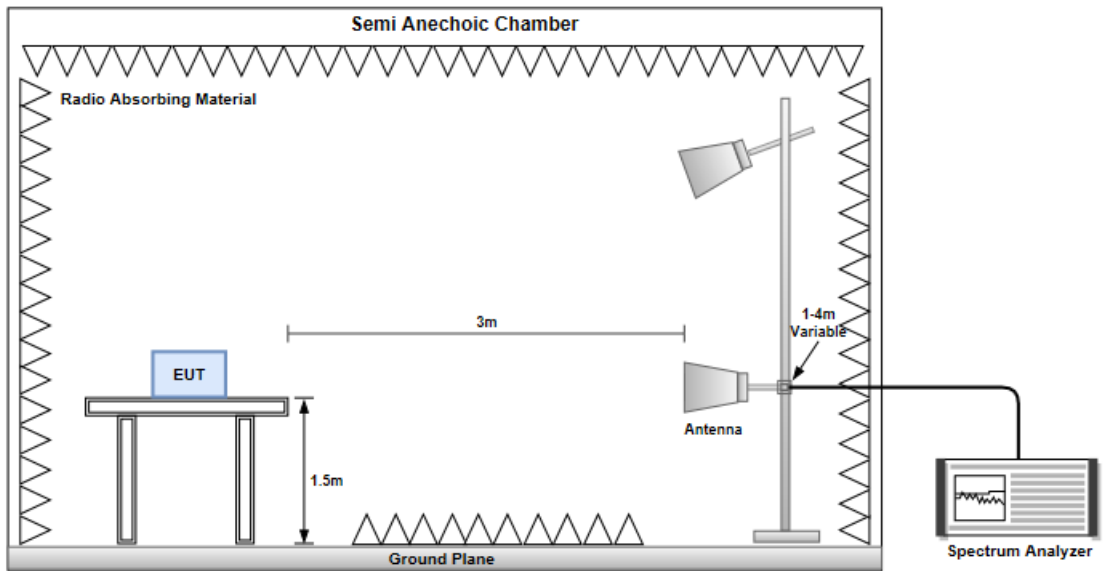
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

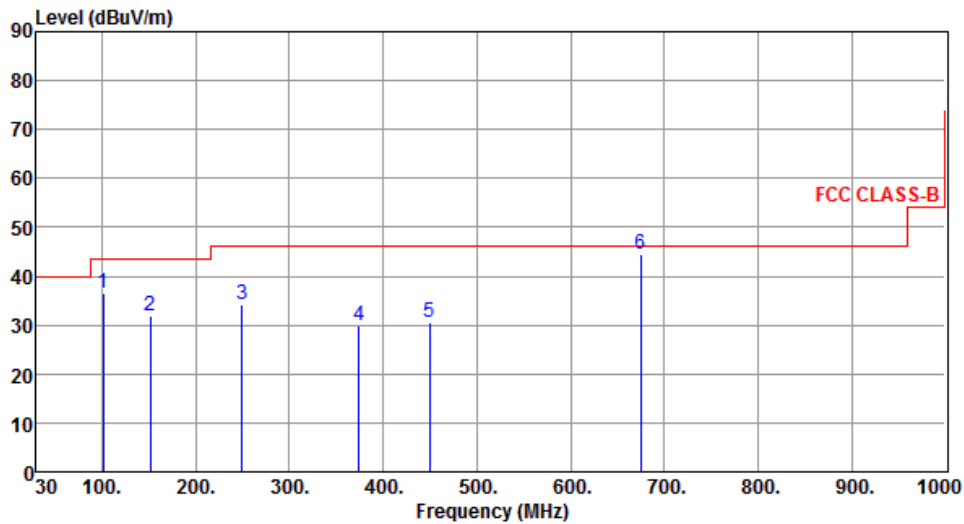


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	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	101.78	36.47	43.50	-7.03	49.16	-12.69	Peak	---	---
2	151.25	31.85	43.50	-11.65	40.18	-8.33	Peak	---	---
3	249.22	34.25	46.00	-11.75	43.63	-9.38	Peak	---	---
4	374.35	30.04	46.00	-15.96	35.74	-5.70	Peak	---	---
5	450.01	30.72	46.00	-15.28	34.50	-3.78	Peak	---	---
6	675.05	44.60	46.00	-1.40	44.37	0.23	QP	116	115

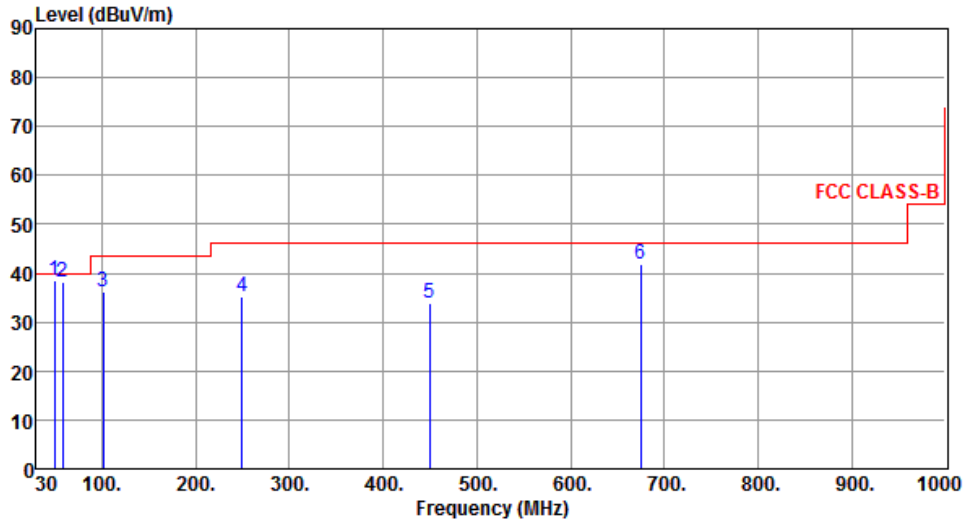
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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

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



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	49.40	38.69	40.00	-1.31	46.42	-7.73	QP	100	337
2	58.13	38.07	40.00	-1.93	46.42	-8.35	QP	100	82
3	101.78	36.19	43.50	-7.31	48.88	-12.69	Peak	---	---
4	249.22	35.10	46.00	-10.90	44.48	-9.38	Peak	---	---
5	450.01	33.84	46.00	-12.16	37.62	-3.78	Peak	---	---
6	675.05	41.69	46.00	-4.31	41.46	0.23	Peak	---	---

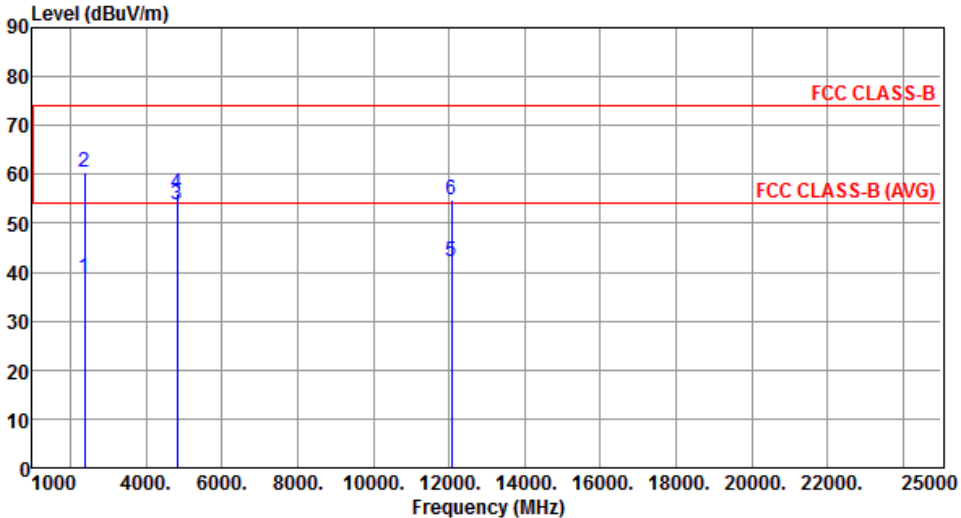
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

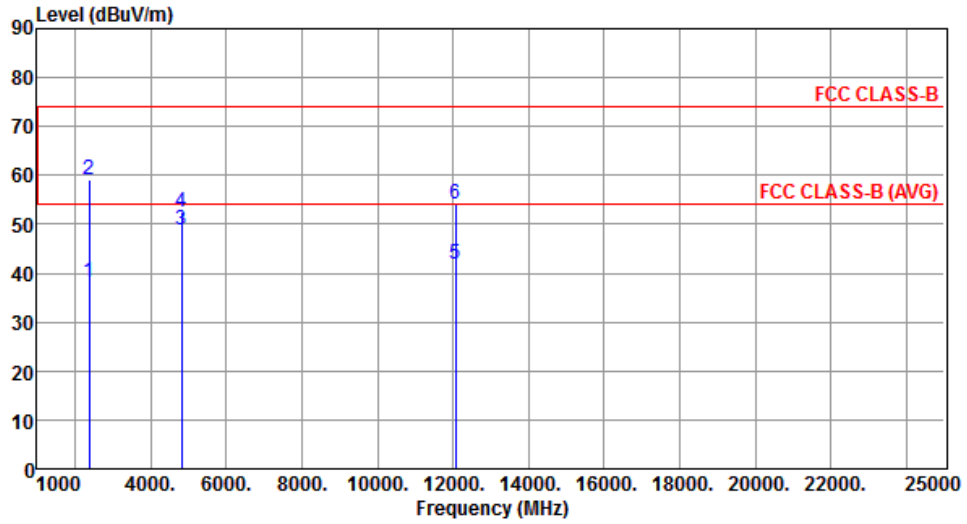
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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

Modulation	11b	Test Freq. (MHz)	2412						
Polarization	Horizontal								
									
Freq.	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	38.72	54.00	-15.28	41.90	-3.18	Average	295	1
2	2390.00	60.57	74.00	-13.43	63.75	-3.18	Peak	295	1
3	4824.00	53.89	54.00	-0.11	50.11	3.78	Average	205	320
4	4824.00	56.02	74.00	-17.98	52.24	3.78	Peak	205	320
5	12060.00	42.27	54.00	-11.73	28.69	13.58	Average	100	215
6	12060.00	54.80	74.00	-19.20	41.22	13.58	Peak	100	215

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

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



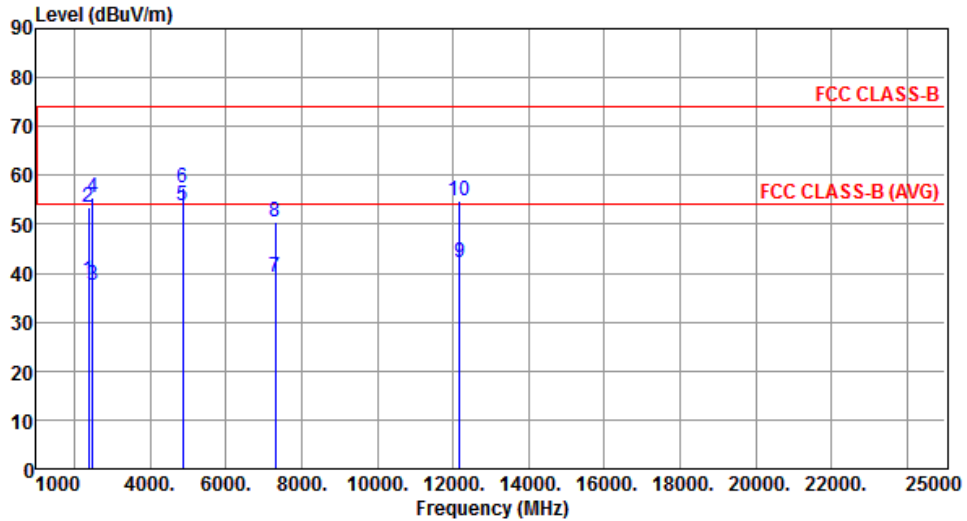
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	38.17	54.00	-15.83	41.35	-3.18	Average	100	300
2	2390.00	59.27	74.00	-14.73	62.45	-3.18	Peak	100	300
3	4824.00	48.93	54.00	-5.07	45.15	3.78	Average	188	295
4	4824.00	52.34	74.00	-21.66	48.56	3.78	Peak	188	295
5	12060.00	41.80	54.00	-12.20	28.22	13.58	Average	100	253
6	12060.00	54.09	74.00	-19.91	40.51	13.58	Peak	100	253

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



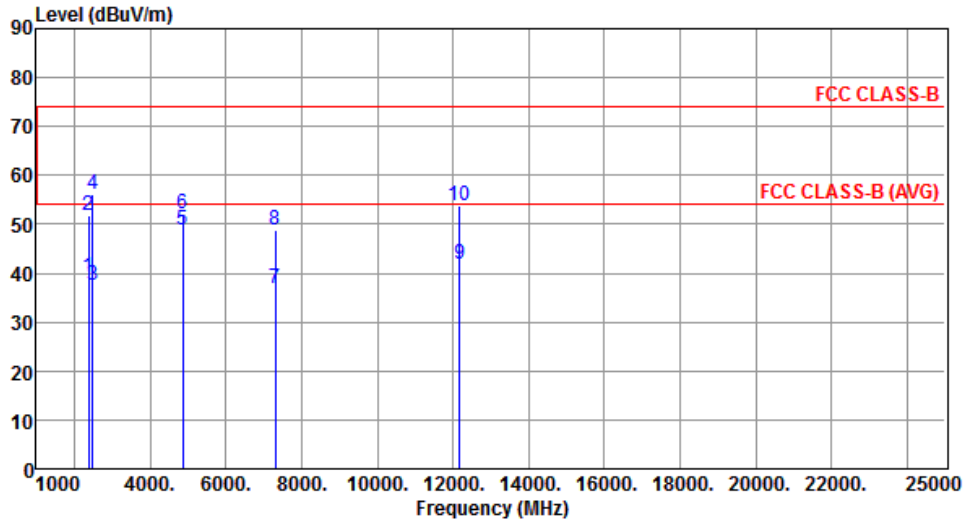
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	38.42	54.00	-15.58	41.60	-3.18	Average	287	2
2	2390.00	53.30	74.00	-20.70	56.48	-3.18	Peak	287	2
3	2483.50	37.44	54.00	-16.56	40.24	-2.80	Average	287	2
4	2483.50	55.48	74.00	-18.52	58.28	-2.80	Peak	287	2
5	4874.00	53.86	54.00	-0.14	49.92	3.94	Average	210	323
6	4874.00	57.56	74.00	-16.44	53.62	3.94	Peak	210	323
7	7311.00	39.31	54.00	-14.69	30.90	8.41	Average	201	16
8	7311.00	50.49	74.00	-23.51	42.08	8.41	Peak	201	16
9	12185.00	42.34	54.00	-11.66	28.67	13.67	Average	100	211
10	12185.00	54.93	74.00	-19.07	41.26	13.67	Peak	100	211

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



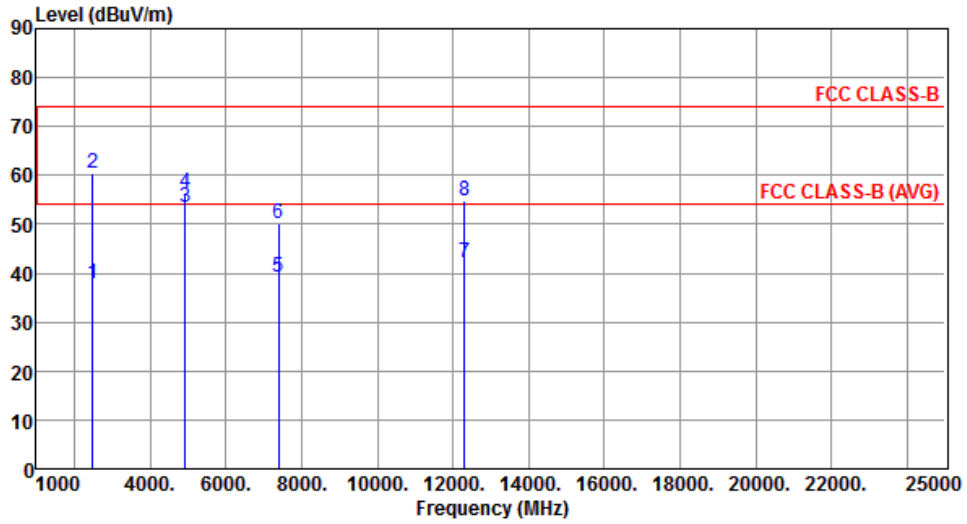
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.10	54.00	-14.90	42.28	-3.18	Average	100	285
2	2390.00	51.92	74.00	-22.08	55.10	-3.18	Peak	100	285
3	2483.50	37.40	54.00	-16.60	40.20	-2.80	Average	100	285
4	2483.50	56.09	74.00	-17.91	58.89	-2.80	Peak	100	285
5	4874.00	48.88	54.00	-5.12	44.94	3.94	Average	191	296
6	4874.00	52.18	74.00	-21.82	48.24	3.94	Peak	191	296
7	7311.00	36.73	54.00	-17.27	28.32	8.41	Average	100	63
8	7311.00	48.91	74.00	-25.09	40.50	8.41	Peak	100	63
9	12185.00	41.73	54.00	-12.27	28.06	13.67	Average	100	246
10	12185.00	53.89	74.00	-20.11	40.22	13.67	Peak	100	246

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



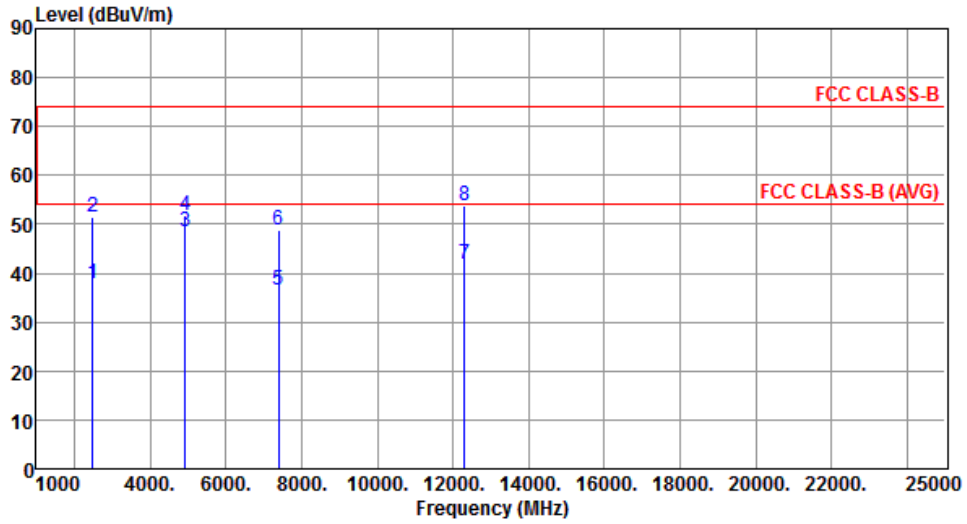
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	37.73	54.00	-16.27	40.53	-2.80	Average	251	353
2	2483.50	60.33	74.00	-13.67	63.13	-2.80	Peak	251	353
3	4924.00	53.55	54.00	-0.45	49.45	4.10	Average	201	324
4	4924.00	56.55	74.00	-17.45	52.45	4.10	Peak	201	324
5	7386.00	39.15	54.00	-14.85	30.71	8.44	Average	192	26
6	7386.00	50.30	74.00	-23.70	41.86	8.44	Peak	192	26
7	12310.00	42.21	54.00	-11.79	28.45	13.76	Average	100	206
8	12310.00	54.75	74.00	-19.25	40.99	13.76	Peak	100	206

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	37.73	54.00	-16.27	40.53	-2.80	Average	100	300
2	2483.50	51.51	74.00	-22.49	54.31	-2.80	Peak	100	300
3	4924.00	48.52	54.00	-5.48	44.42	4.10	Average	193	304
4	4924.00	51.90	74.00	-22.10	47.80	4.10	Peak	193	304
5	7386.00	36.48	54.00	-17.52	28.04	8.44	Average	100	85
6	7386.00	48.73	74.00	-25.27	40.29	8.44	Peak	100	85
7	12310.00	41.69	54.00	-12.31	27.93	13.76	Average	100	226
8	12310.00	53.78	74.00	-20.22	40.02	13.76	Peak	100	226

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

*Factor includes antenna factor , cable loss and amplifier gain

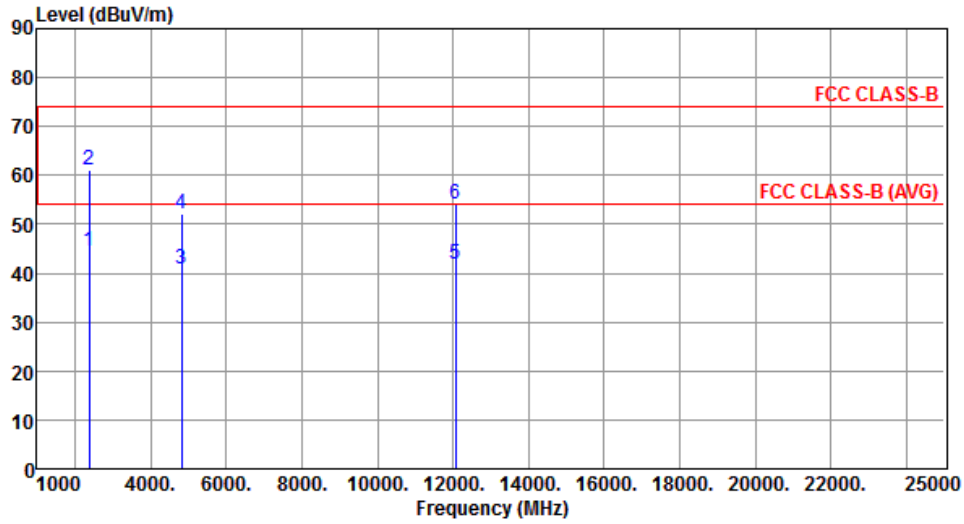
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

Modulation	11g	Test Freq. (MHz)	2412						
Polarization	Horizontal								
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.07	54.00	-3.93	53.25	-3.18	Average	260	0
2	2390.00	67.27	74.00	-6.73	70.45	-3.18	Peak	260	0
3	4824.00	46.20	54.00	-7.80	42.42	3.78	Average	202	316
4	4824.00	58.64	74.00	-15.36	54.86	3.78	Peak	202	316
5	12060.00	41.63	54.00	-12.37	28.05	13.58	Average	100	205
6	12060.00	53.96	74.00	-20.04	40.38	13.58	Peak	100	205

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

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



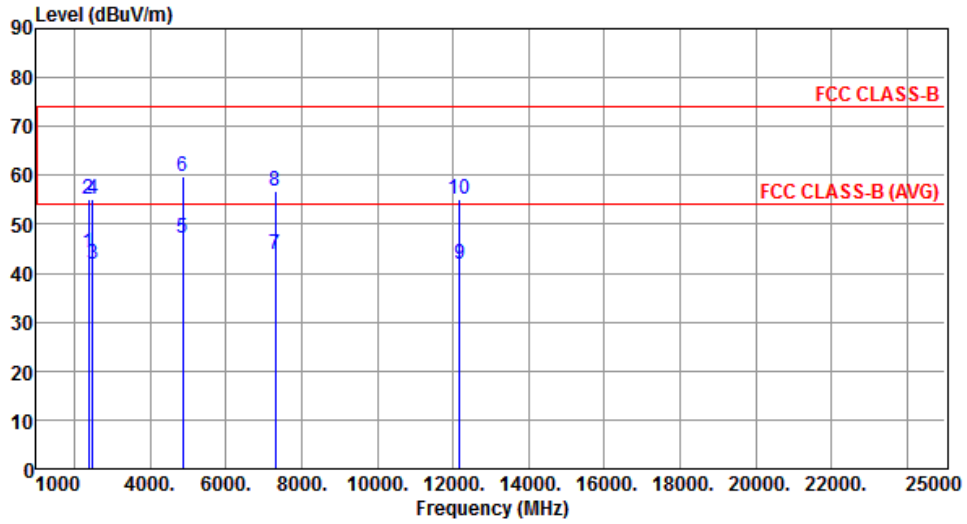
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.61	54.00	-9.39	47.79	-3.18	Average	100	297
2	2390.00	61.04	74.00	-12.96	64.22	-3.18	Peak	100	297
3	4824.00	41.00	54.00	-13.00	37.22	3.78	Average	302	331
4	4824.00	51.98	74.00	-22.02	48.20	3.78	Peak	302	331
5	12060.00	41.81	54.00	-12.19	28.23	13.58	Average	100	303
6	12060.00	54.04	74.00	-19.96	40.46	13.58	Peak	100	303

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



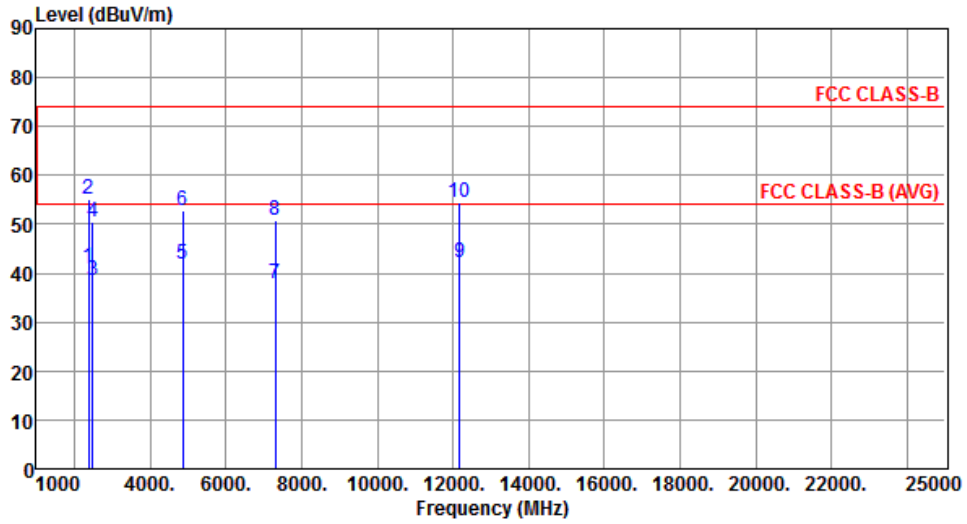
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.28	54.00	-9.72	47.46	-3.18	Average	256	0
2	2390.00	55.12	74.00	-18.88	58.30	-3.18	Peak	256	0
3	2483.50	41.76	54.00	-12.24	44.56	-2.80	Average	256	0
4	2483.50	55.28	74.00	-18.72	58.08	-2.80	Peak	256	0
5	4874.00	47.30	54.00	-6.70	43.36	3.94	Average	216	317
6	4874.00	59.70	74.00	-14.30	55.76	3.94	Peak	216	317
7	7311.00	43.96	54.00	-10.04	35.55	8.41	Average	190	8
8	7311.00	56.63	74.00	-17.37	48.22	8.41	Peak	190	8
9	12185.00	41.97	54.00	-12.03	28.30	13.67	Average	100	222
10	12185.00	55.19	74.00	-18.81	41.52	13.67	Peak	100	222

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



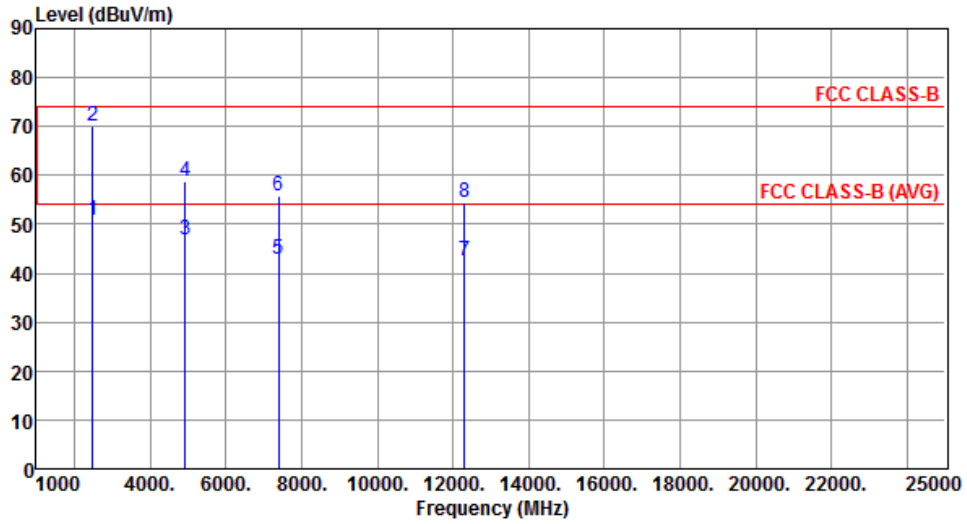
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	41.15	54.00	-12.85	44.33	-3.18	Average	100	306
2	2390.00	55.06	74.00	-18.94	58.24	-3.18	Peak	100	306
3	2483.50	38.66	54.00	-15.34	41.46	-2.80	Average	100	306
4	2483.50	50.57	74.00	-23.43	53.37	-2.80	Peak	100	306
5	4874.00	41.72	54.00	-12.28	37.78	3.94	Average	315	332
6	4874.00	52.93	74.00	-21.07	48.99	3.94	Peak	315	332
7	7311.00	37.73	54.00	-16.27	29.32	8.41	Average	100	14
8	7311.00	50.68	74.00	-23.32	42.27	8.41	Peak	100	14
9	12185.00	42.13	54.00	-11.87	28.46	13.67	Average	100	229
10	12185.00	54.59	74.00	-19.41	40.92	13.67	Peak	100	229

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



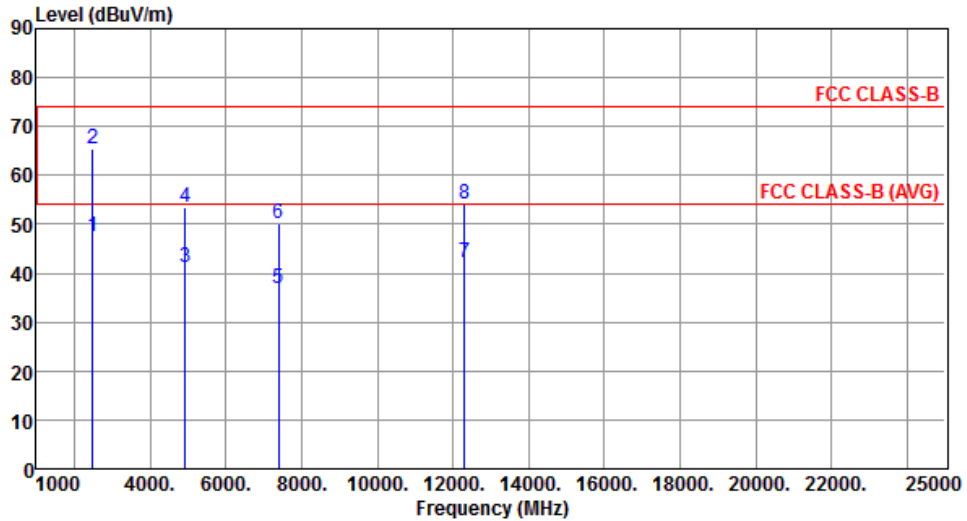
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	50.88	54.00	-3.12	53.68	-2.80	Average	280	1
2	2483.50	70.05	74.00	-3.95	72.85	-2.80	Peak	280	1
3	4924.00	46.68	54.00	-7.32	42.58	4.10	Average	211	307
4	4924.00	58.72	74.00	-15.28	54.62	4.10	Peak	211	307
5	7386.00	42.83	54.00	-11.17	34.39	8.44	Average	186	5
6	7386.00	55.85	74.00	-18.15	47.41	8.44	Peak	186	5
7	12310.00	42.62	54.00	-11.38	28.86	13.76	Average	100	196
8	12310.00	54.60	74.00	-19.40	40.84	13.76	Peak	100	196

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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



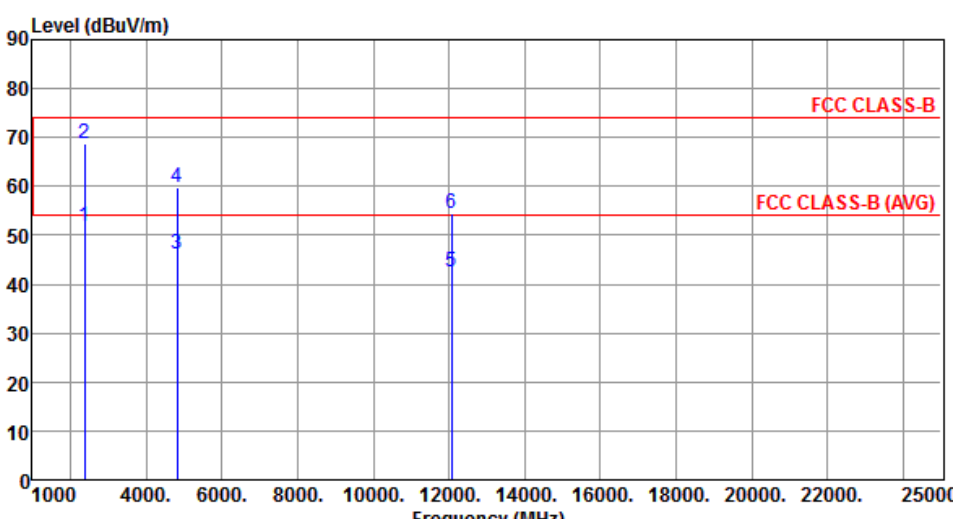
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	47.43	54.00	-6.57	50.23	-2.80	Average	106	292
2	2483.50	65.28	74.00	-8.72	68.08	-2.80	Peak	106	292
3	4924.00	41.31	54.00	-12.69	37.21	4.10	Average	265	300
4	4924.00	53.58	74.00	-20.42	49.48	4.10	Peak	265	300
5	7386.00	36.93	54.00	-17.07	28.49	8.44	Average	100	22
6	7386.00	50.09	74.00	-23.91	41.65	8.44	Peak	100	22
7	12310.00	42.22	54.00	-11.78	28.46	13.76	Average	100	287
8	12310.00	54.00	74.00	-20.00	40.24	13.76	Peak	100	287

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

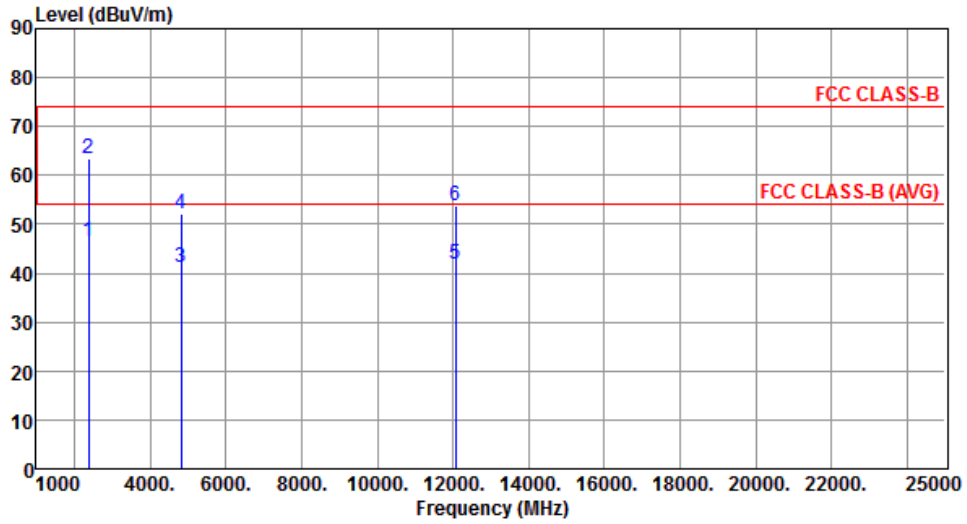
*Factor includes antenna factor , cable loss and amplifier gain

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

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

Modulation	HT20	Test Freq. (MHz)	2412																																																																							
Polarization	Horizontal																																																																									
 <p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (1000 to 25000). Two horizontal red lines represent the FCC CLASS-B limit at approximately 74 dBuV/m and the FCC CLASS-B (AVG) limit at approximately 54 dBuV/m. Six vertical blue lines represent individual emission measurements at various frequencies, labeled 1 through 6. The emission levels are: 1 (51.64 dBuV/m), 2 (68.68 dBuV/m), 3 (46.02 dBuV/m), 4 (59.66 dBuV/m), 5 (42.43 dBuV/m), and 6 (54.40 dBuV/m). Margins are calculated as Emission Level minus Limit.</p>																																																																										
	<table border="1"> <thead> <tr> <th></th> <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>2390.00</td> <td>51.64</td> <td>54.00</td> <td>-2.36</td> <td>54.82</td> <td>-3.18</td> <td>Average</td> <td>261</td> <td>0</td> </tr> <tr> <td>2</td> <td>2390.00</td> <td>68.68</td> <td>74.00</td> <td>-5.32</td> <td>71.86</td> <td>-3.18</td> <td>Peak</td> <td>261</td> <td>0</td> </tr> <tr> <td>3</td> <td>4824.00</td> <td>46.02</td> <td>54.00</td> <td>-7.98</td> <td>42.24</td> <td>3.78</td> <td>Average</td> <td>209</td> <td>320</td> </tr> <tr> <td>4</td> <td>4824.00</td> <td>59.66</td> <td>74.00</td> <td>-14.34</td> <td>55.88</td> <td>3.78</td> <td>Peak</td> <td>209</td> <td>320</td> </tr> <tr> <td>5</td> <td>12060.00</td> <td>42.43</td> <td>54.00</td> <td>-11.57</td> <td>28.85</td> <td>13.58</td> <td>Average</td> <td>100</td> <td>214</td> </tr> <tr> <td>6</td> <td>12060.00</td> <td>54.40</td> <td>74.00</td> <td>-19.60</td> <td>40.82</td> <td>13.58</td> <td>Peak</td> <td>100</td> <td>214</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	2390.00	51.64	54.00	-2.36	54.82	-3.18	Average	261	0	2	2390.00	68.68	74.00	-5.32	71.86	-3.18	Peak	261	0	3	4824.00	46.02	54.00	-7.98	42.24	3.78	Average	209	320	4	4824.00	59.66	74.00	-14.34	55.88	3.78	Peak	209	320	5	12060.00	42.43	54.00	-11.57	28.85	13.58	Average	100	214	6	12060.00	54.40	74.00	-19.60	40.82	13.58	Peak	100	214			
	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	51.64	54.00	-2.36	54.82	-3.18	Average	261	0																																																																	
2	2390.00	68.68	74.00	-5.32	71.86	-3.18	Peak	261	0																																																																	
3	4824.00	46.02	54.00	-7.98	42.24	3.78	Average	209	320																																																																	
4	4824.00	59.66	74.00	-14.34	55.88	3.78	Peak	209	320																																																																	
5	12060.00	42.43	54.00	-11.57	28.85	13.58	Average	100	214																																																																	
6	12060.00	54.40	74.00	-19.60	40.82	13.58	Peak	100	214																																																																	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>																																																																										

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



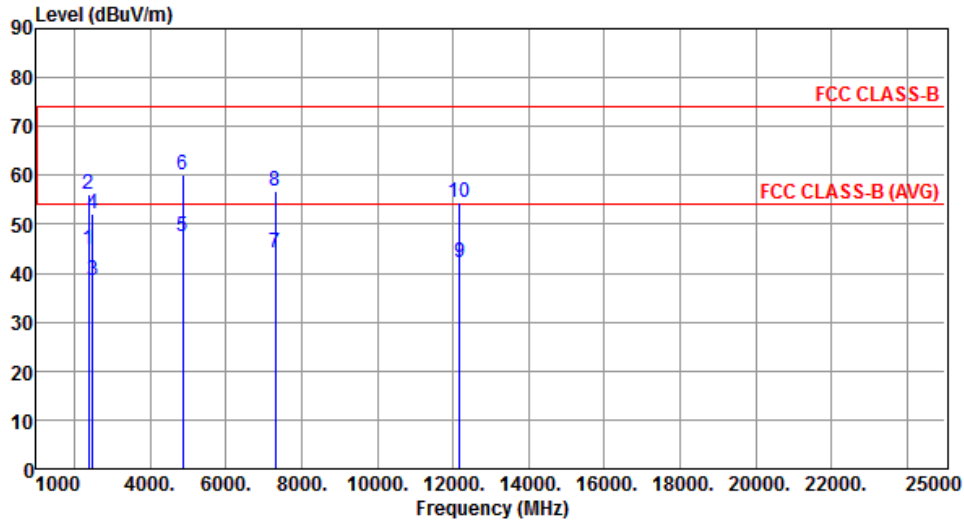
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.37	54.00	-7.63	49.55	-3.18	Average	100	111
2	2390.00	63.46	74.00	-10.54	66.64	-3.18	Peak	100	111
3	4824.00	41.21	54.00	-12.79	37.43	3.78	Average	296	321
4	4824.00	52.25	74.00	-21.75	48.47	3.78	Peak	296	321
5	12060.00	41.96	54.00	-12.04	28.38	13.58	Average	100	314
6	12060.00	53.90	74.00	-20.10	40.32	13.58	Peak	100	314

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



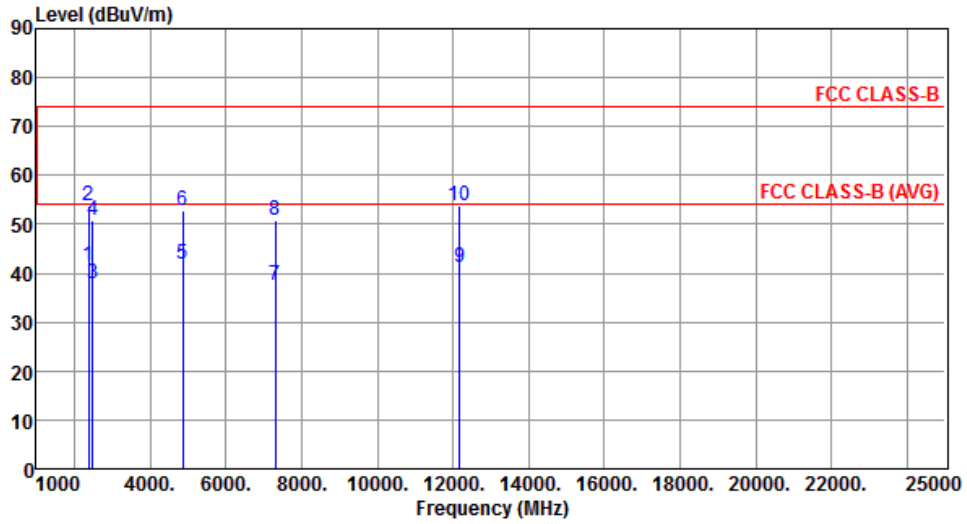
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.67	54.00	-9.33	47.85	-3.18	Average	261	7
2	2390.00	56.27	74.00	-17.73	59.45	-3.18	Peak	261	7
3	2483.50	38.40	54.00	-15.60	41.20	-2.80	Average	261	7
4	2483.50	52.10	74.00	-21.90	54.90	-2.80	Peak	261	7
5	4874.00	47.57	54.00	-6.43	43.63	3.94	Average	210	325
6	4874.00	60.00	74.00	-14.00	56.06	3.94	Peak	210	325
7	7311.00	44.11	54.00	-9.89	35.70	8.41	Average	193	5
8	7311.00	56.72	74.00	-17.28	48.31	8.41	Peak	193	5
9	12185.00	42.06	54.00	-11.94	28.39	13.67	Average	100	206
10	12185.00	54.31	74.00	-19.69	40.64	13.67	Peak	100	206

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



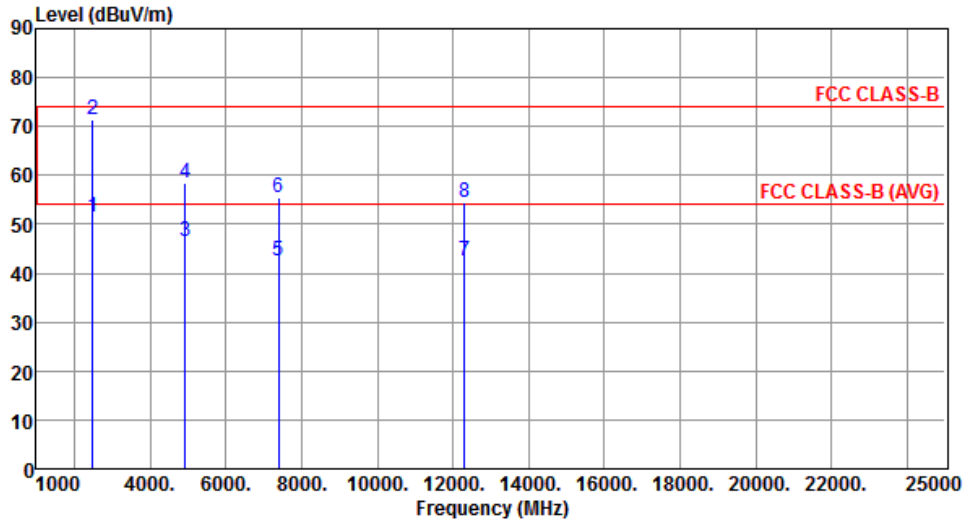
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	41.38	54.00	-12.62	44.56	-3.18	Average	100	311
2	2390.00	53.72	74.00	-20.28	56.90	-3.18	Peak	100	311
3	2483.50	37.76	54.00	-16.24	40.56	-2.80	Average	100	311
4	2483.50	50.92	74.00	-23.08	53.72	-2.80	Peak	100	311
5	4874.00	41.69	54.00	-12.31	37.75	3.94	Average	306	326
6	4874.00	52.82	74.00	-21.18	48.88	3.94	Peak	306	326
7	7311.00	37.61	54.00	-16.39	29.20	8.41	Average	100	6
8	7311.00	50.80	74.00	-23.20	42.39	8.41	Peak	100	6
9	12185.00	41.26	54.00	-12.74	27.59	13.67	Average	100	311
10	12185.00	53.78	74.00	-20.22	40.11	13.67	Peak	100	311

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



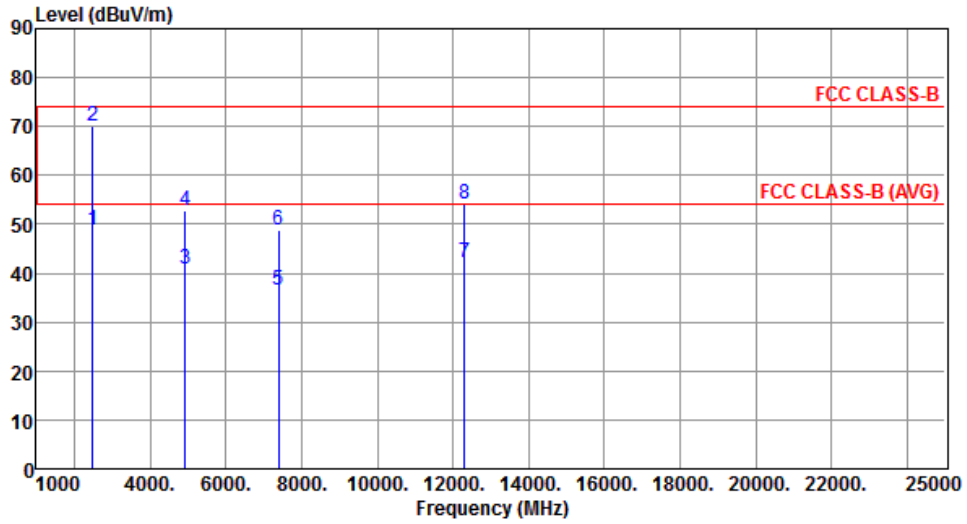
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.40	54.00	-2.60	54.20	-2.80	Average	280	3
2	2483.50	71.36	74.00	-2.64	74.16	-2.80	Peak	280	3
3	4924.00	46.35	54.00	-7.65	42.25	4.10	Average	205	303
4	4924.00	58.58	74.00	-15.42	54.48	4.10	Peak	205	303
5	7386.00	42.48	54.00	-11.52	34.04	8.44	Average	179	2
6	7386.00	55.39	74.00	-18.61	46.95	8.44	Peak	179	2
7	12310.00	42.42	54.00	-11.58	28.66	13.76	Average	100	211
8	12310.00	54.49	74.00	-19.51	40.73	13.76	Peak	100	211

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		



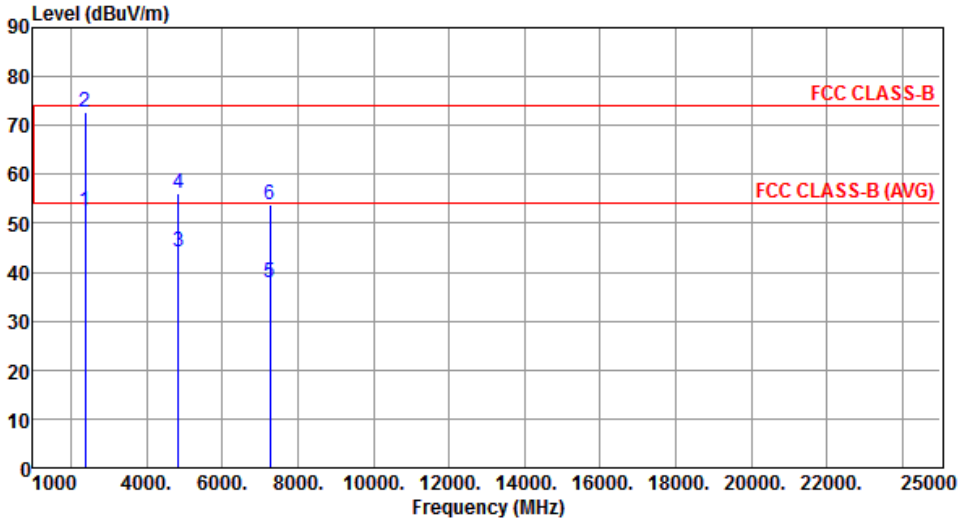
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	48.70	54.00	-5.30	51.50	-2.80	Average	105	287
2	2483.50	70.02	74.00	-3.98	72.82	-2.80	Peak	105	287
3	4924.00	40.84	54.00	-13.16	36.74	4.10	Average	261	306
4	4924.00	52.75	74.00	-21.25	48.65	4.10	Peak	261	306
5	7386.00	36.55	54.00	-17.45	28.11	8.44	Average	100	16
6	7386.00	48.87	74.00	-25.13	40.43	8.44	Peak	100	16
7	12310.00	42.12	54.00	-11.88	28.36	13.76	Average	100	268
8	12310.00	54.28	74.00	-19.72	40.52	13.76	Peak	100	268

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

*Factor includes antenna factor , cable loss and amplifier gain

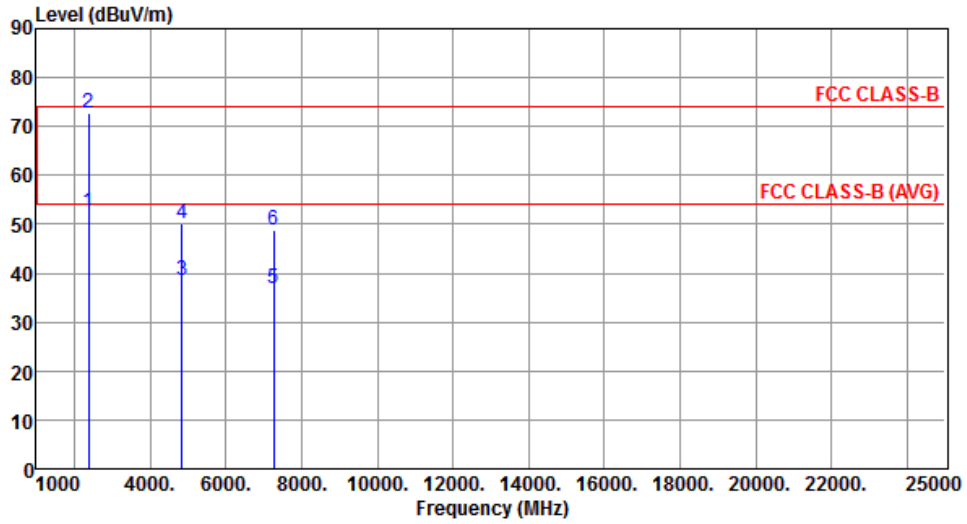
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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	52.38	54.00	-1.62	55.56	-3.18	Average	262	1
2	2390.00	72.68	74.00	-1.32	75.86	-3.18	Peak	262	1
3	4844.00	44.16	54.00	-9.84	40.31	3.85	Average	195	322
4	4844.00	55.97	74.00	-18.03	52.12	3.85	Peak	195	322
5	7266.00	37.90	54.00	-16.10	29.51	8.39	Average	200	12
6	7266.00	53.95	74.00	-20.05	45.56	8.39	Peak	200	12

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

Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		



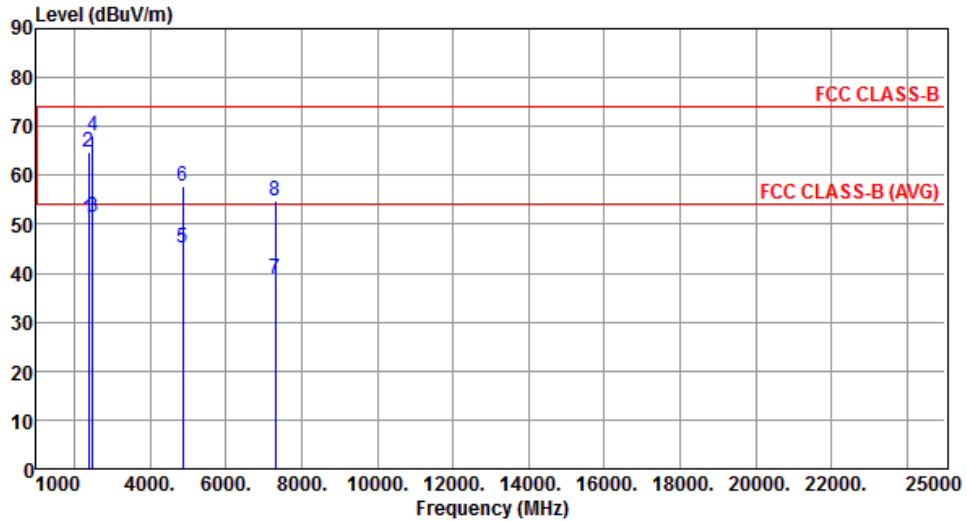
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.58	54.00	-1.42	55.76	-3.18	Average	100	303
2	2390.00	72.62	74.00	-1.38	75.80	-3.18	Peak	100	303
3	4844.00	38.56	54.00	-15.44	34.71	3.85	Average	298	312
4	4844.00	50.06	74.00	-23.94	46.21	3.85	Peak	298	312
5	7266.00	36.95	54.00	-17.05	28.56	8.39	Average	100	15
6	7266.00	48.77	74.00	-25.23	40.38	8.39	Peak	100	15

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



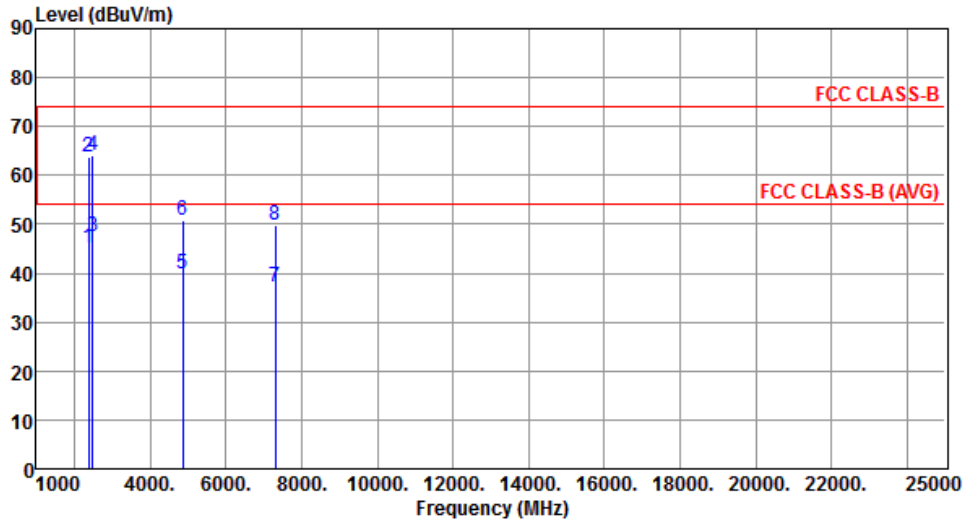
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.05	54.00	-2.95	54.23	-3.18	Average	260	0
2	2390.00	64.62	74.00	-9.38	67.80	-3.18	Peak	260	0
3	2483.50	51.55	54.00	-2.45	54.35	-2.80	Average	260	0
4	2483.50	68.16	74.00	-5.84	70.96	-2.80	Peak	260	0
5	4874.00	45.31	54.00	-8.69	41.37	3.94	Average	199	324
6	4874.00	57.70	74.00	-16.30	53.76	3.94	Peak	199	324
7	7311.00	38.97	54.00	-15.03	30.56	8.41	Average	203	8
8	7311.00	54.94	74.00	-19.06	46.53	8.41	Peak	203	8

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



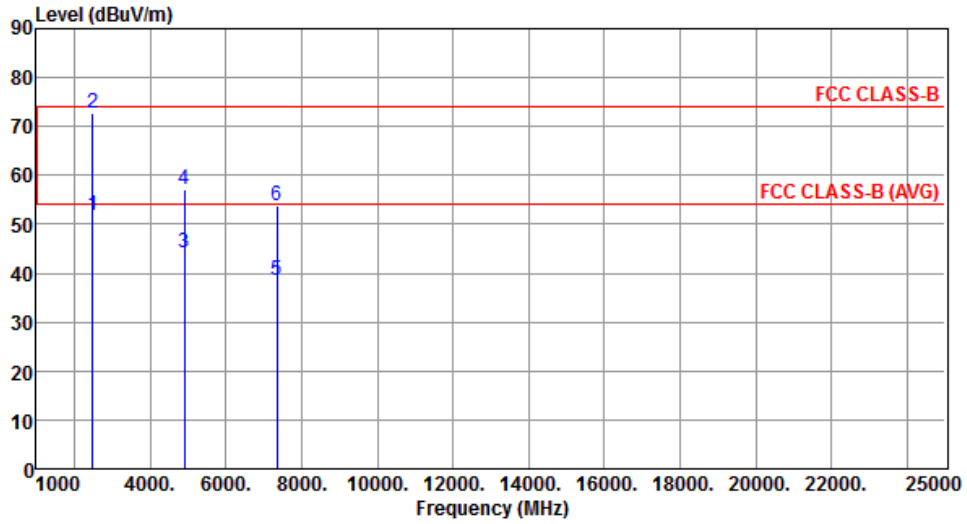
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.15	54.00	-8.85	48.33	-3.18	Average	100	292
2	2390.00	63.71	74.00	-10.29	66.89	-3.18	Peak	100	292
3	2483.50	47.42	54.00	-6.58	50.22	-2.80	Average	100	292
4	2483.50	64.10	74.00	-9.90	66.90	-2.80	Peak	100	292
5	4874.00	39.81	54.00	-14.19	35.87	3.94	Average	302	314
6	4874.00	50.67	74.00	-23.33	46.73	3.94	Peak	302	314
7	7311.00	37.29	54.00	-16.71	28.88	8.41	Average	100	13
8	7311.00	49.77	74.00	-24.23	41.36	8.41	Peak	100	13

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



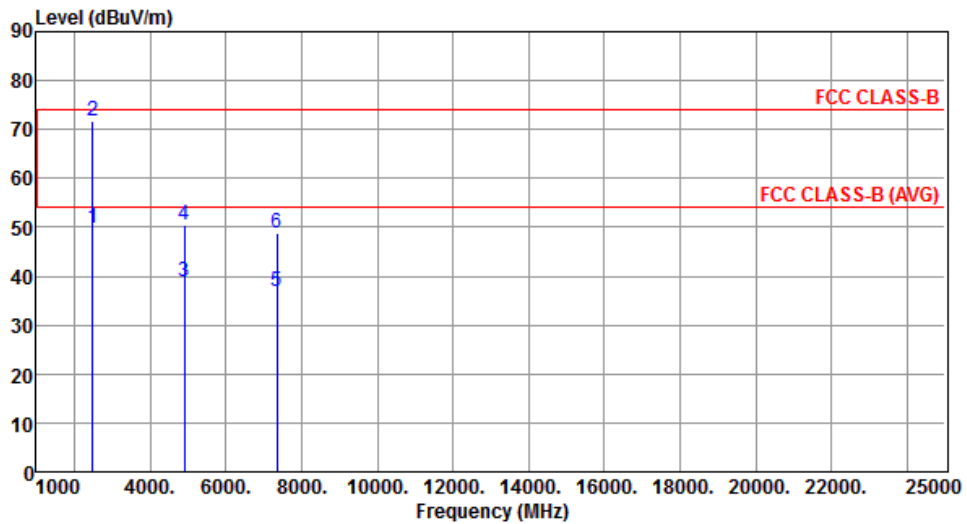
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.65	54.00	-2.35	54.45	-2.80	Average	225	2
2	2483.50	72.65	74.00	-1.35	75.45	-2.80	Peak	225	2
3	4904.00	44.20	54.00	-9.80	40.15	4.05	Average	195	318
4	4904.00	57.16	74.00	-16.84	53.11	4.05	Peak	195	318
5	7356.00	38.48	54.00	-15.52	30.05	8.43	Average	200	12
6	7356.00	53.81	74.00	-20.19	45.38	8.43	Peak	200	12

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	49.82	54.00	-4.18	52.62	-2.80	Average	100	301
2	2483.50	71.65	74.00	-2.35	74.45	-2.80	Peak	100	301
3	4904.00	38.70	54.00	-15.30	34.65	4.05	Average	299	313
4	4904.00	50.60	74.00	-23.40	46.55	4.05	Peak	299	313
5	7356.00	36.99	54.00	-17.01	28.56	8.43	Average	100	5
6	7356.00	48.86	74.00	-25.14	40.43	8.43	Peak	100	5

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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

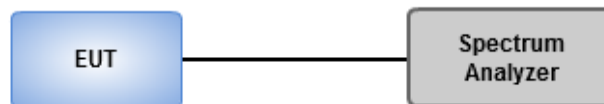
Reference level measurement

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

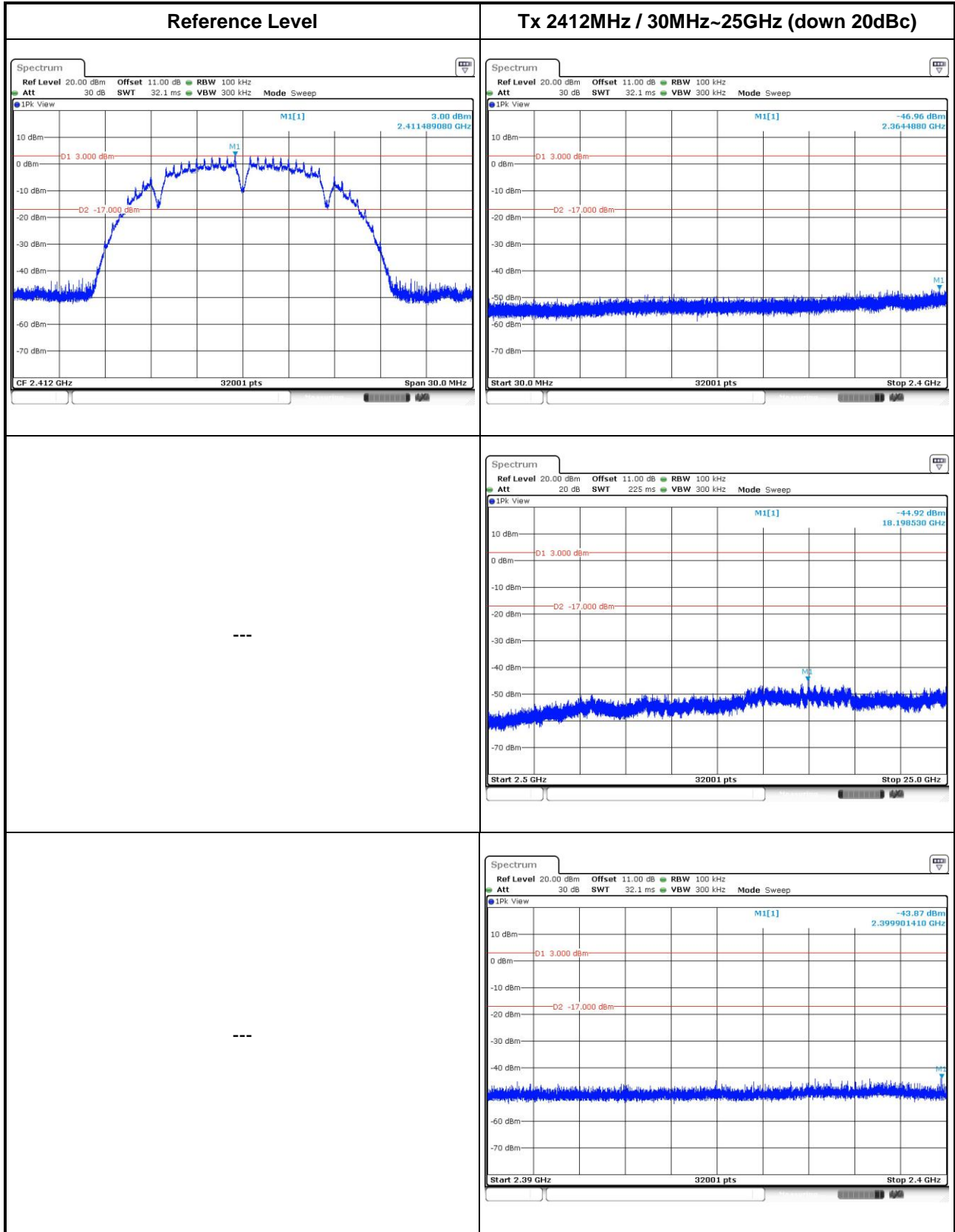


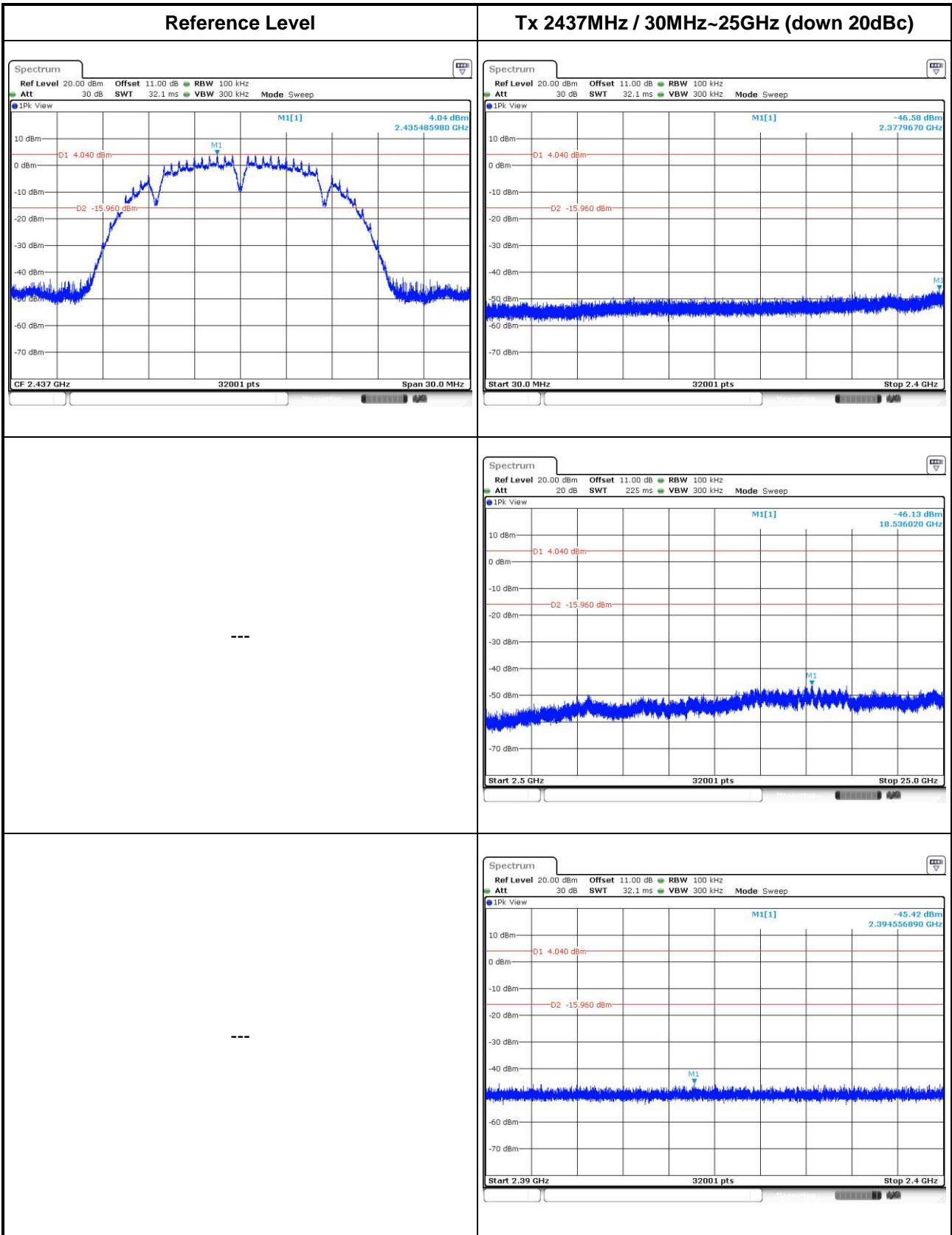
3.6.4 Test Result of Emissions in non-restricted frequency bands

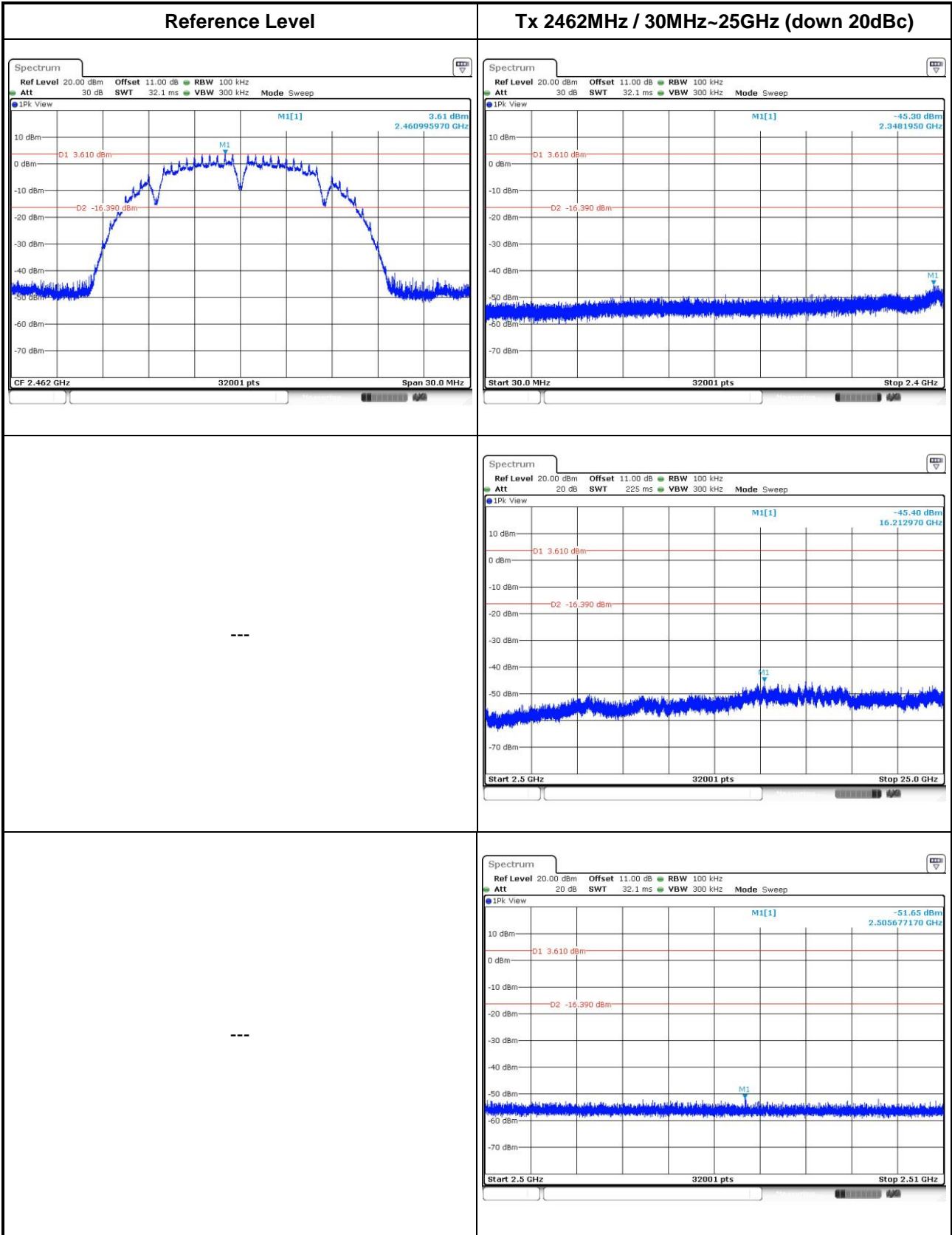
This test item is performed on each TX output individually without summing or adding $10 \log(N_{ANT})$ since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands

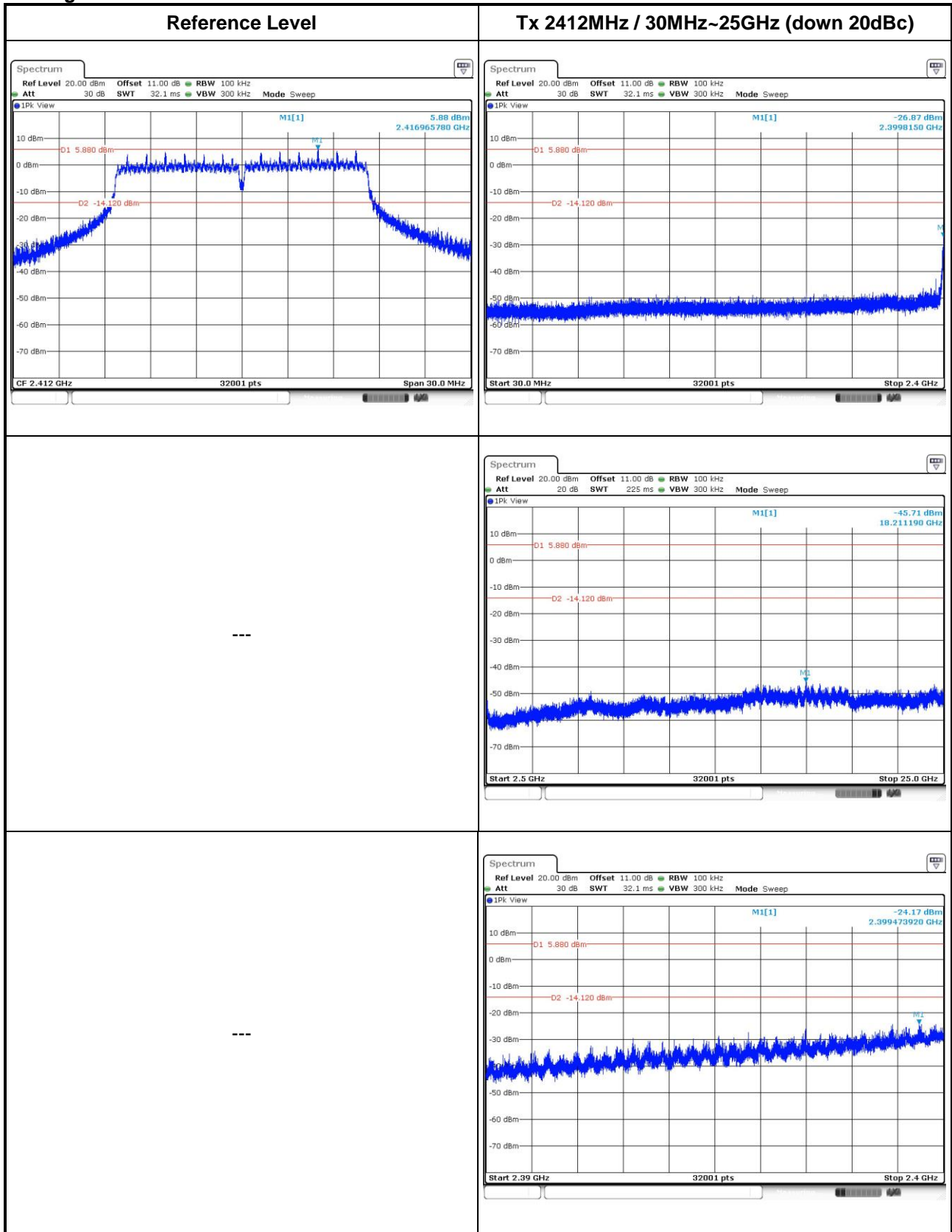
802.11b

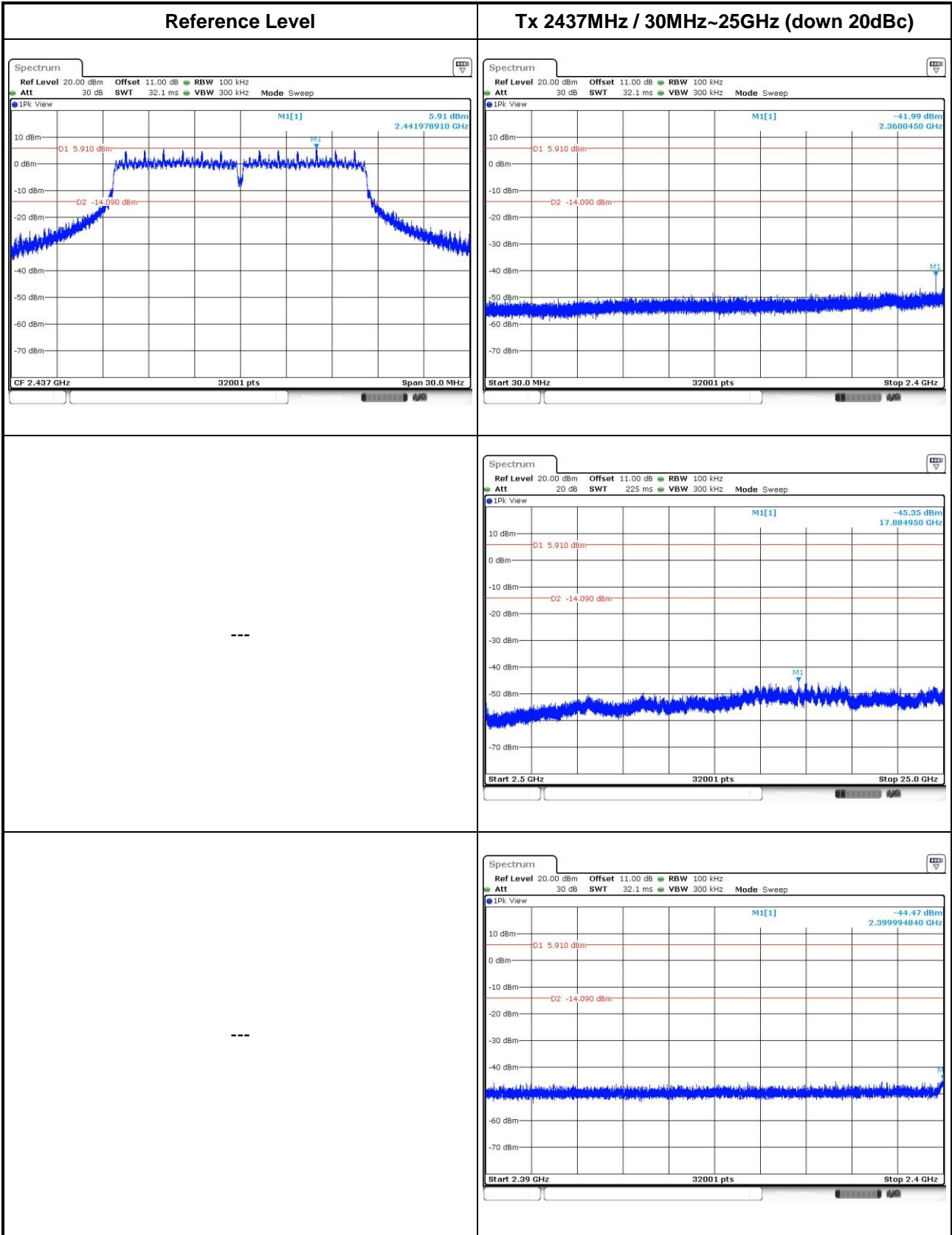


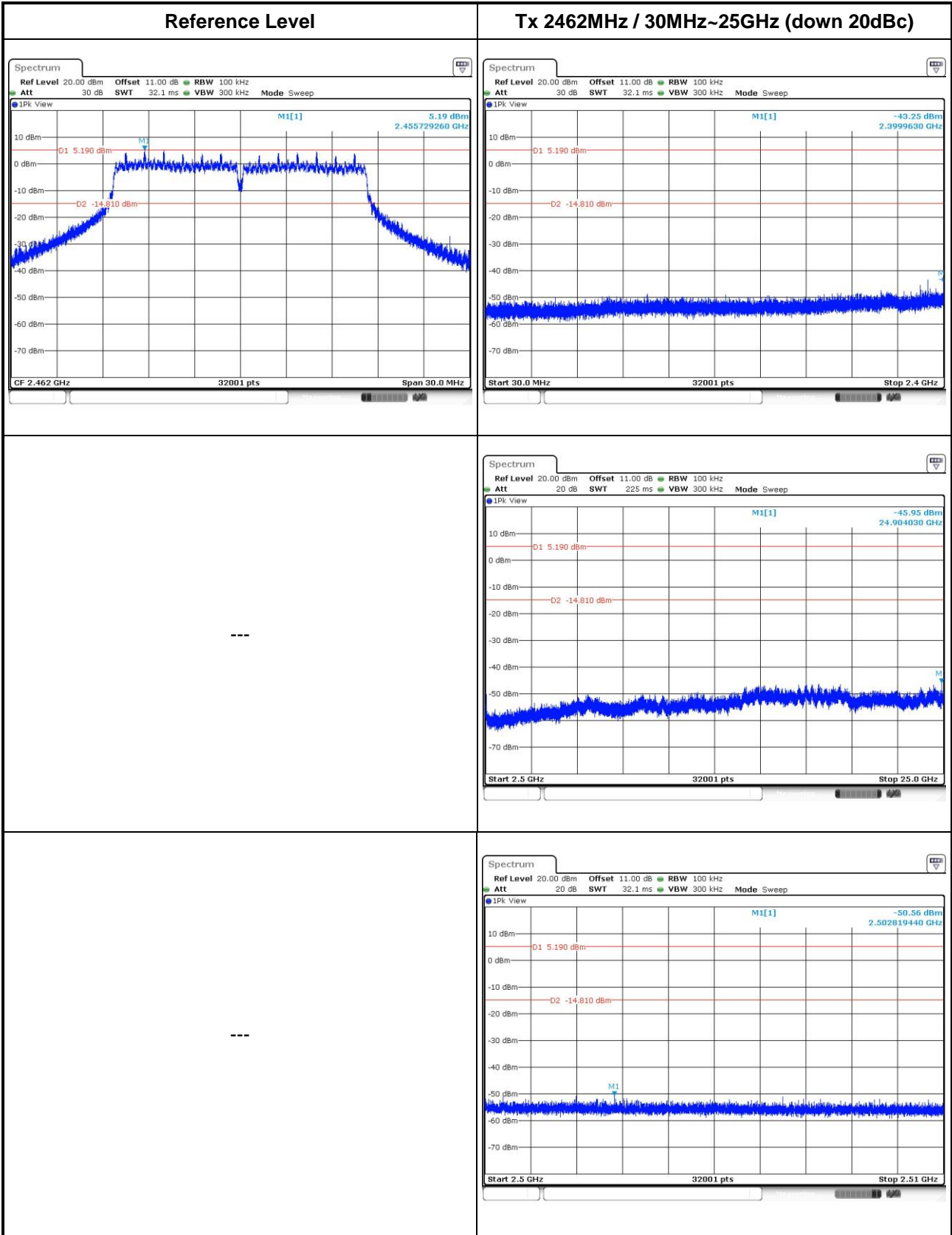




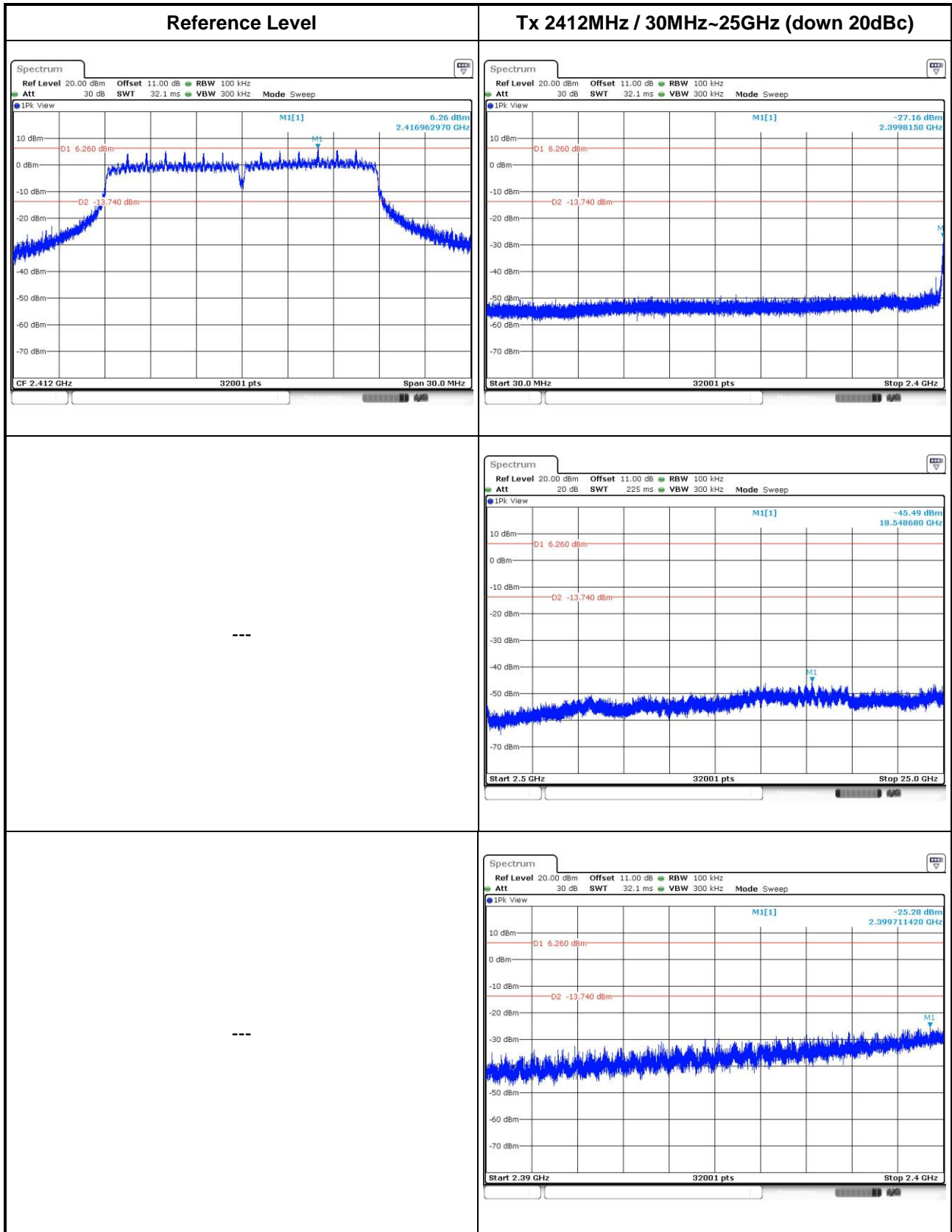
802.11g

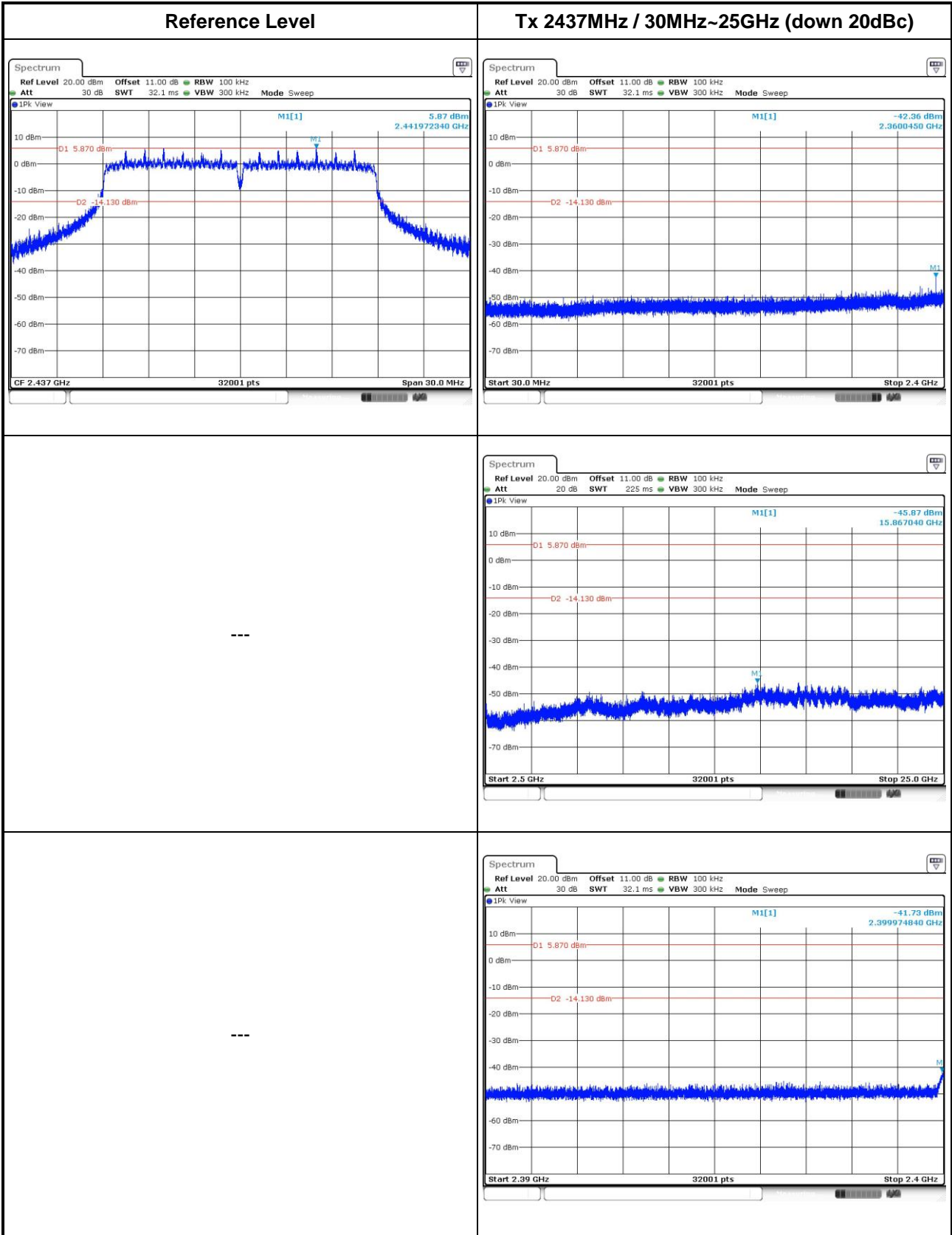


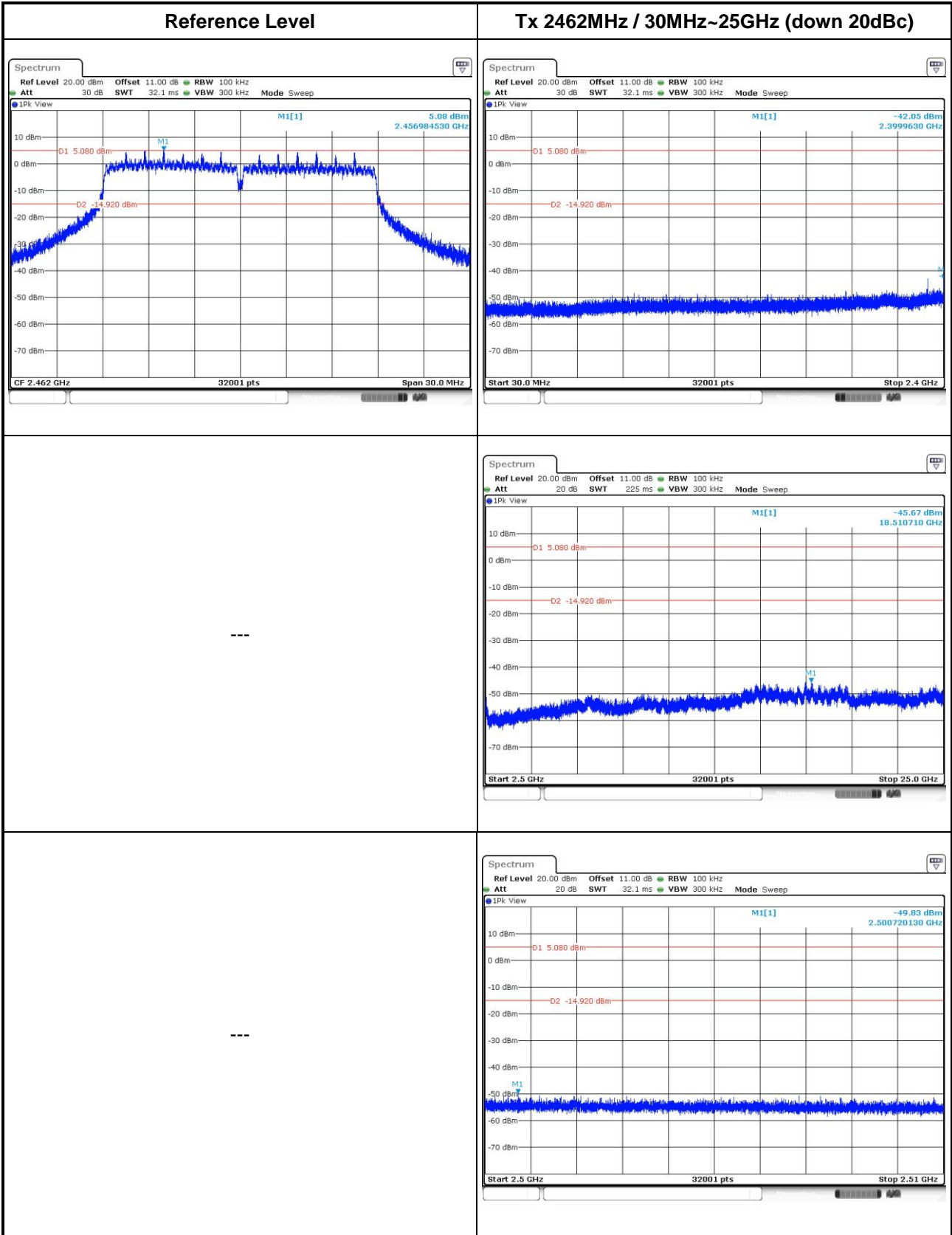




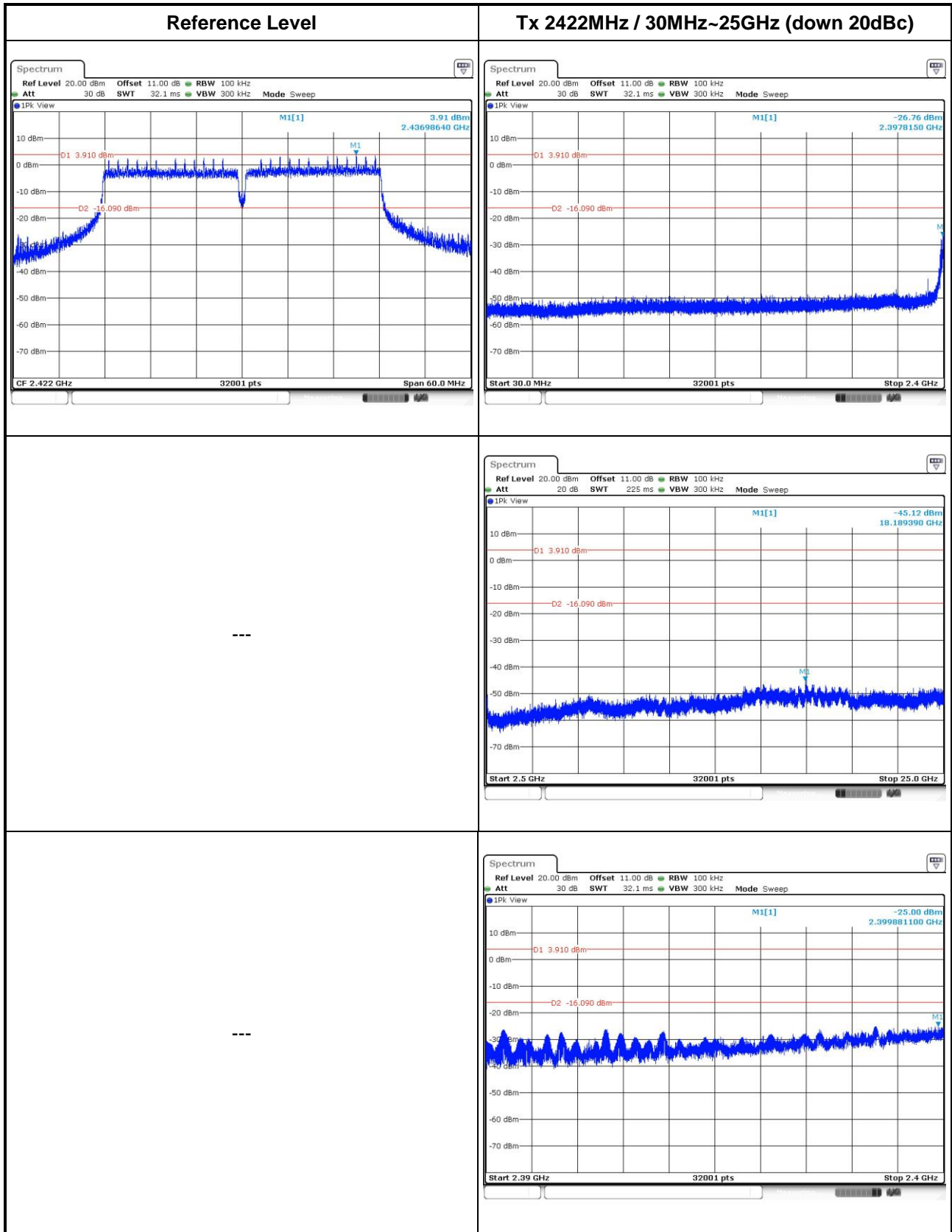
802.11n HT20

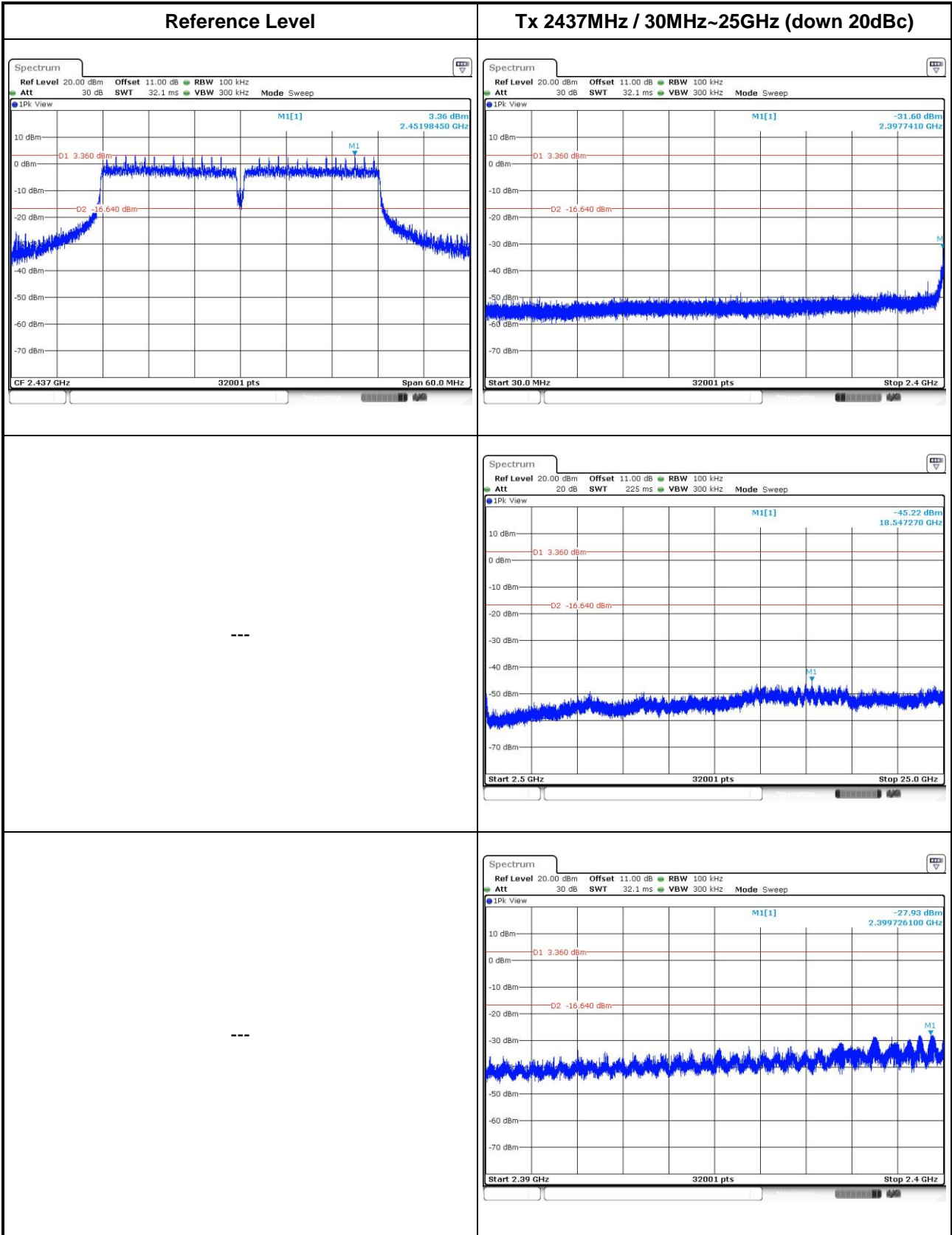


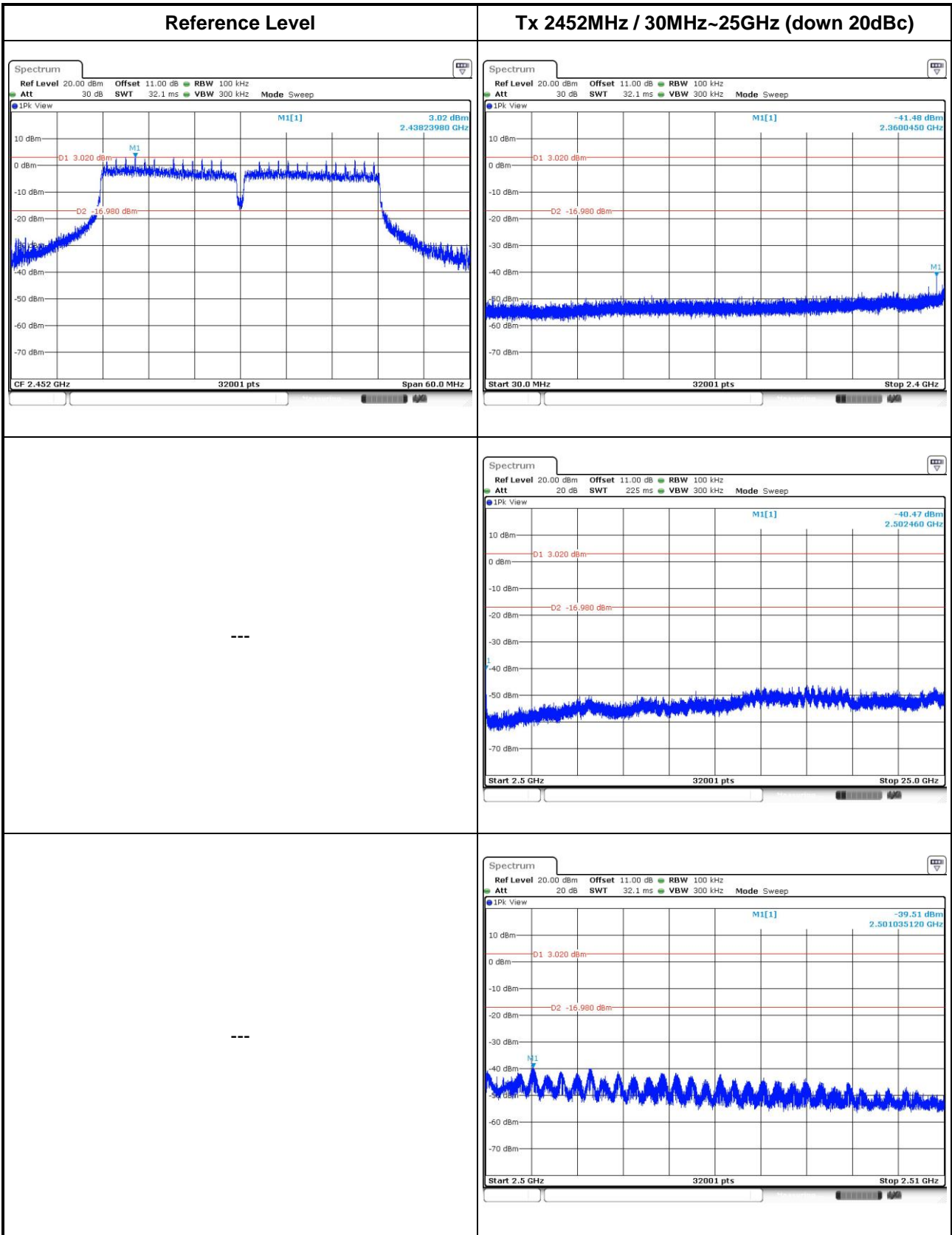




802.11n HT40







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

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No. 30-2, Ding Fwu Tsuen, Lin
Kou District, New Taipei City,
Taiwan, R.O.C.

Kwei Shan

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

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd
St., Kwei Shan District, Tao Yuan
City 333, Taiwan, R.O.C.

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

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Email: ICC_Service@icertifi.com.tw

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