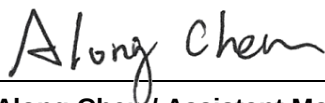


FCC Test Report

FCC ID : PZK-956T
Equipment : on-the-go video monitor
Model No. : 29560
Brand Name : Summer Infant
Applicant : Summer Infant, Inc.
Address : 1275 Park East Drive Woonsocket Rhode
Island United States
Standard : 47 CFR FCC Part 15.247
Received Date : Dec. 21, 2015
Tested Date : Dec. 21 ~ Dec. 28, 2015
Mar. 17 ~ Mar. 18, 2016

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

Approved & Reviewed by:



Along Chen / Assistant Manager



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Release Record

Report No.	Version	Description	Issued Date
FR5D2101	Rev. 01	Initial issue	Mar. 09, 2016
FR5D2101	Rev. 02	Revised model name and version of KDB 558074	Mar. 14, 2016
FR5D2101	Rev. 03	Adding test results of sample 02	Mar. 21, 2016

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.156MHz 44.76 (Margin -20.89dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 4924.00MHz 52.98 (Margin -1.02dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 24.60	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 Product Details

The mainboard of EUT comes in two versions, Sample 01 & Sample 02. The difference between both versions is only Inductor / Capacitors / grounding of non-RF part. RF part is completely identical. Please refer to Photographs of EUT for more details.

1.1.2 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
2400-2483.5	b	2412-2462	1-11 [11]	1	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0-7
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	1	MCS 0-7
Note 1: RF output power specifies that Maximum Peak Conducted Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.3 Antenna Details

Ant. No.	Model	Type	Gain (dBi)	Connector	Remark
1	Ameba-AM0001	Printed	2	N/A	---

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from AC adapter 3.6Vdc from battery
-------------------	--

1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand Name: DVE Model Name: DSA-6PFG-12 Power Rating: I/P: 100-240Vac, 50-60Hz, 0.2A O/P: 12Vdc, 0.5A DC 2m non-shielded cable w/o core
2	Lithium-ion rechargeable polymer battery pack	Brand Name: GP Batteries Model Name: GPRHC103C139 Power Rating: 3.6Vdc, 950mAh

1.1.6 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	---	---

1.1.7 Test Tool and Duty Cycle

Test Tool	UI_mptool, V.1.0.0.1		
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

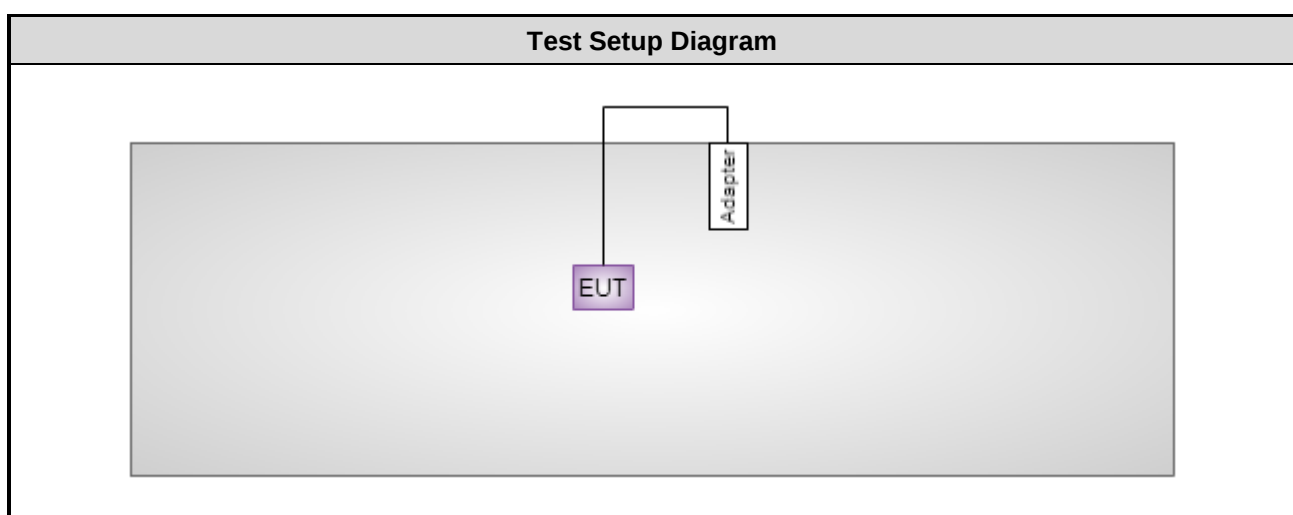
1.1.8 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	43
11b	2437	43
11b	2462	44
11g	2412	48
11g	2437	53
11g	2462	51
HT20	2412	46
HT20	2437	53
HT20	2462	48
HT40	2422	45
HT40	2437	46
HT40	2452	47

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
---	---	---	---	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
EMC Receiver	R&S	ESCS 30	100169	Oct. 21, 2015	Oct. 20, 2016
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 13, 2015	Nov. 12, 2016
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 31, 2014	Dec. 30, 2015
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Dec. 13, 2015	Dec. 12, 2016
Receiver	R&S	ESR3	101658	Nov. 04, 2015	Nov. 03, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 20, 2015	Aug. 19, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 16, 2015	Dec. 15, 2016
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 04, 2015	Nov. 03, 2016
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 16, 2015	Nov. 15, 2016
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 10, 2015	Dec. 09, 2016
Preamplifier	Burgeon	BPA-530	SN:100219	Sep. 10, 2015	Sep. 09, 2016
Preamplifier	Agilent	83017A	MY39501308	Oct. 02, 2015	Oct. 01, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 10, 2015	Dec. 09, 2016
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 10, 2015	Dec. 09, 2016
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 10, 2015	Dec. 09, 2016
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
Power Meter	Anritsu	ML2495A	1241002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor	Anritsu	MA2411B	1207366	Sep. 21, 2015	Sep. 20, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

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

47 CFR FCC Part 15.247

ANSI C63.10-2013

FCC KDB 558074 D01 DTS Meas Guidance v03r04

1.6 Measurement Uncertainty

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

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	± 34.134 Hz
Conducted power	± 0.808 dB
Power density	± 0.463 dB
Conducted emission	± 2.670 dB
AC conducted emission	± 2.90 dB
Radiated emission ≤ 1 GHz	± 3.72 dB
Radiated emission > 1 GHz	± 5.65 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	21°C / 55-60%	Peter Lin
Radiated Emissions	03CH01-WS	21-23°C / 62-65%	Vincent Yeh Morgan Chen
RF Conducted	TH01-WS	21°C / 64%	Alex Huang

➤ FCC site registration No.: 657002

➤ 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	1, 2
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	1, 2
Radiated Emissions >1GHz	11b	2412 / 2437 / 2462	1 Mbps	1
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:

- 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.
- The mainboard of EUT comes in two versions, Sample 01 & Sample 02. Both options had been tested by following test configurations.
 - Configuration 1: Sample 01
 - Configuration 2: Sample 02

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

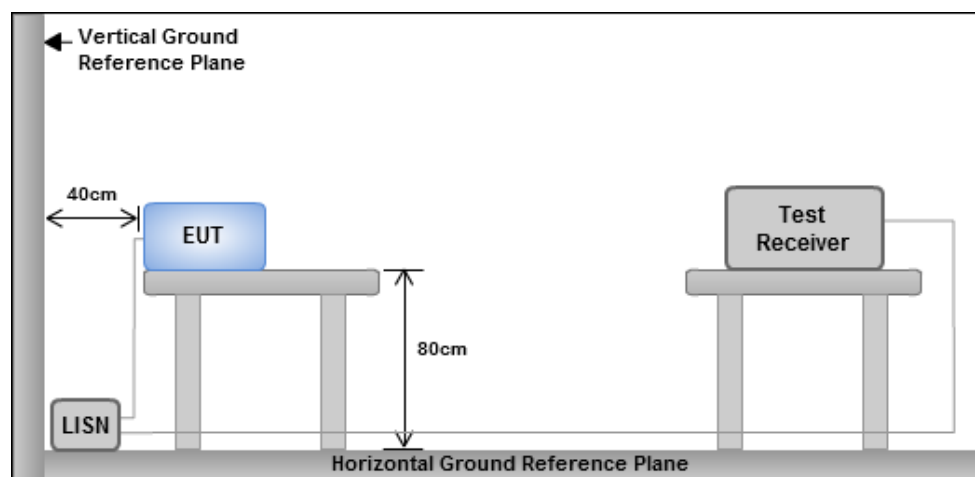
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

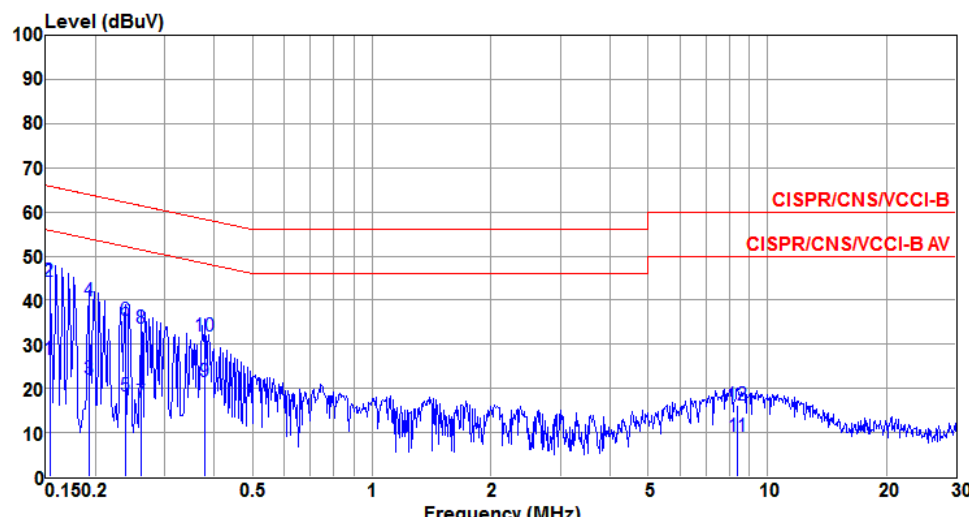


- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Configuration 1: Sample 01

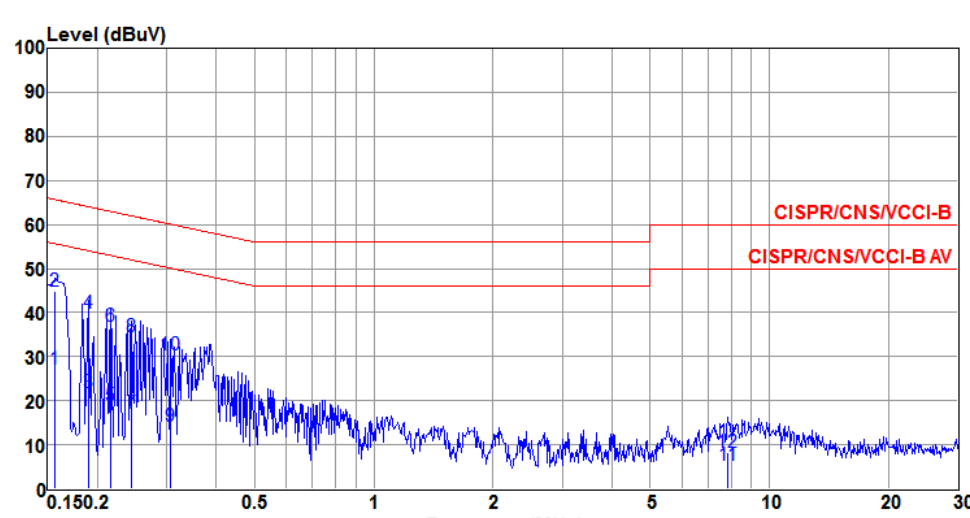
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.153	26.54	55.82	-29.28	25.64	0.88	0.02	Average
2@	0.153	44.39	65.82	-21.43	43.49	0.88	0.02	QP
3	0.192	22.03	53.93	-31.90	21.68	0.33	0.02	Average
4	0.192	39.75	63.93	-24.18	39.40	0.33	0.02	QP
5	0.238	18.18	52.17	-33.99	17.93	0.23	0.02	Average
6	0.238	35.46	62.17	-26.71	35.21	0.23	0.02	QP
7	0.262	16.71	51.38	-34.67	16.47	0.22	0.02	Average
8	0.262	33.63	61.38	-27.75	33.39	0.22	0.02	QP
9	0.379	21.46	48.30	-26.84	21.24	0.19	0.03	Average
10	0.379	31.82	58.30	-26.48	31.60	0.19	0.03	QP
11	8.412	9.21	50.00	-40.79	8.47	0.59	0.15	Average
12	8.412	16.13	60.00	-43.87	15.39	0.59	0.15	QP

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

Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Neutral		



The graph displays the measured level (blue line) against frequency (MHz) on a logarithmic scale. Two red lines represent the CISPR/CNS/VCCI-B and CISPR/CNS/VCCI-B AV limits. The measured level is generally below the limits, with some peaks at lower frequencies.

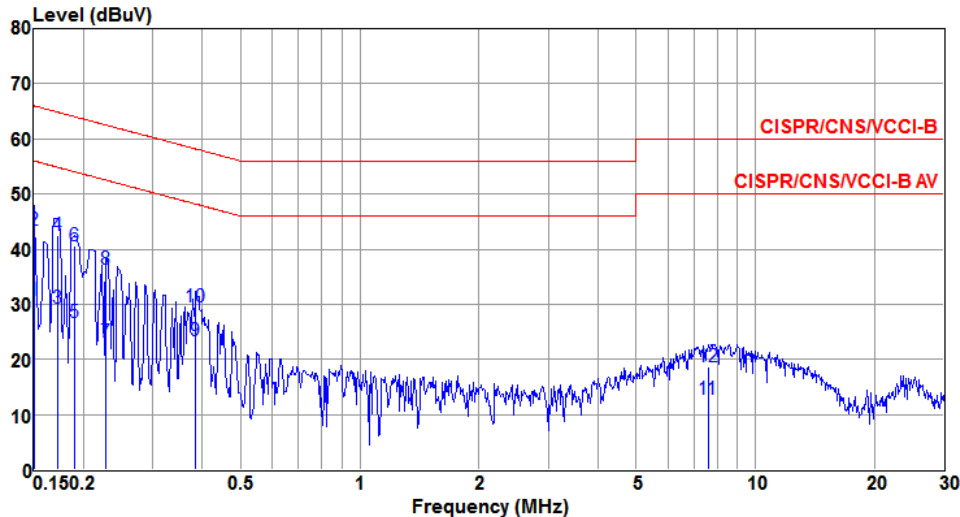
	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.156	27.09	55.65	-28.56	26.31	0.76	0.02	Average
2	0.156	44.76	65.65	-20.89	43.98	0.76	0.02	QP
3	0.189	21.83	54.06	-32.23	21.47	0.34	0.02	Average
4	0.189	39.77	64.06	-24.29	39.41	0.34	0.02	QP
5	0.216	18.77	52.96	-34.19	18.52	0.23	0.02	Average
6	0.216	37.00	62.96	-25.96	36.75	0.23	0.02	QP
7	0.244	17.06	51.95	-34.89	16.83	0.21	0.02	Average
8	0.244	34.46	61.95	-27.49	34.23	0.21	0.02	QP
9	0.307	14.17	50.06	-35.89	13.97	0.17	0.03	Average
10	0.307	30.26	60.06	-29.80	30.06	0.17	0.03	QP
11	7.852	5.32	50.00	-44.68	4.59	0.58	0.15	Average
12	7.852	8.41	60.00	-51.59	7.68	0.58	0.15	QP

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

2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Configuration 2: Sample 02

Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		

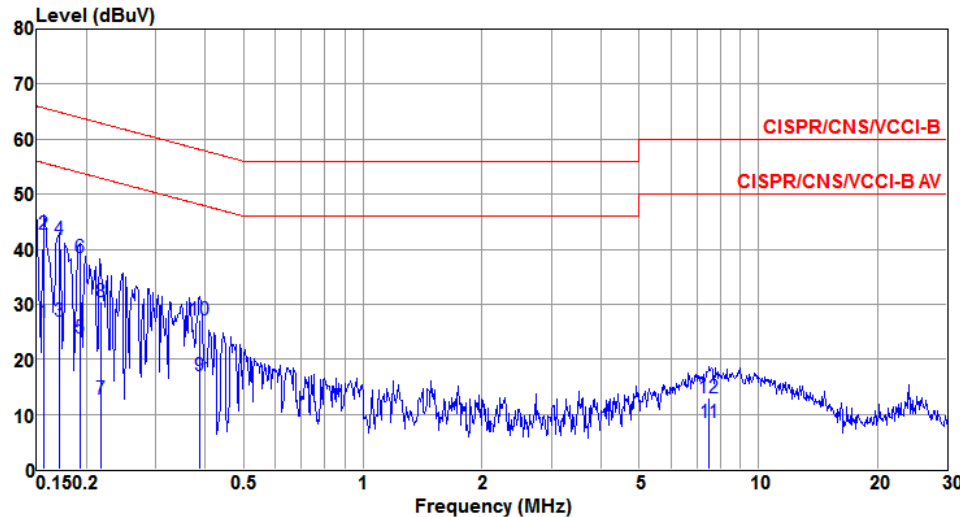


The graph displays the measured signal level in dBuV against frequency in MHz. Two red limit lines are shown: CISPR/CNS/VCCI-B (upper) and CISPR/CNS/VCCI-B AV (lower). The blue trace represents the measured signal, which is mostly below the limits, with some peaks near 0.15 MHz and 7.6 MHz.

	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.150	30.73	56.00	-25.27	29.79	0.92	0.02	Average
2	0.150	43.36	66.00	-22.64	42.42	0.92	0.02	QP
3	0.172	29.18	54.86	-25.68	28.57	0.59	0.02	Average
4@	0.172	42.39	64.86	-22.47	41.78	0.59	0.02	QP
5	0.189	26.61	54.06	-27.45	26.23	0.36	0.02	Average
6	0.189	40.48	64.06	-23.58	40.10	0.36	0.02	QP
7	0.228	23.11	52.52	-29.41	22.85	0.24	0.02	Average
8	0.228	36.39	62.52	-26.13	36.13	0.24	0.02	QP
9	0.385	23.47	48.17	-24.70	23.26	0.18	0.03	Average
10	0.385	29.44	58.17	-28.73	29.23	0.18	0.03	QP
11	7.606	12.72	50.00	-37.28	12.02	0.55	0.15	Average
12	7.606	18.69	60.00	-41.31	17.99	0.55	0.15	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)	2437
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	26.76	55.65	-28.89	25.98	0.76	0.02	Average
2@	0.156	42.64	65.65	-23.01	41.86	0.76	0.02	QP
3	0.171	26.92	54.90	-27.98	26.33	0.57	0.02	Average
4	0.171	41.83	64.90	-23.07	41.24	0.57	0.02	QP
5	0.192	23.96	53.93	-29.97	23.63	0.31	0.02	Average
6	0.192	38.37	63.93	-25.56	38.04	0.31	0.02	QP
7	0.217	12.74	52.92	-40.18	12.49	0.23	0.02	Average
8	0.217	30.45	62.92	-32.47	30.20	0.23	0.02	QP
9	0.387	16.90	48.12	-31.22	16.73	0.14	0.03	Average
10	0.387	27.03	58.12	-31.09	26.86	0.14	0.03	QP
11	7.526	8.53	50.00	-41.47	7.79	0.59	0.15	Average
12	7.526	13.05	60.00	-46.95	12.31	0.59	0.15	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

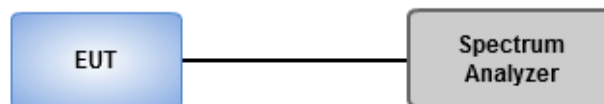
6dB Bandwidth

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.

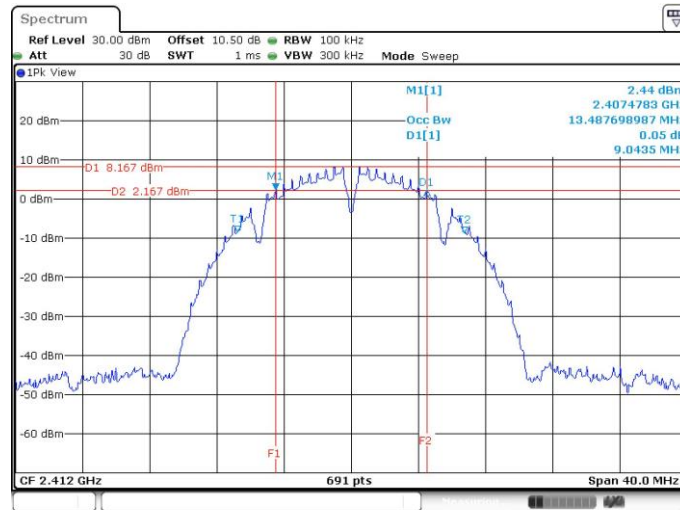
3.2.3 Test Setup



3.2.4 Test Result of 6dB and Occupied Bandwidth

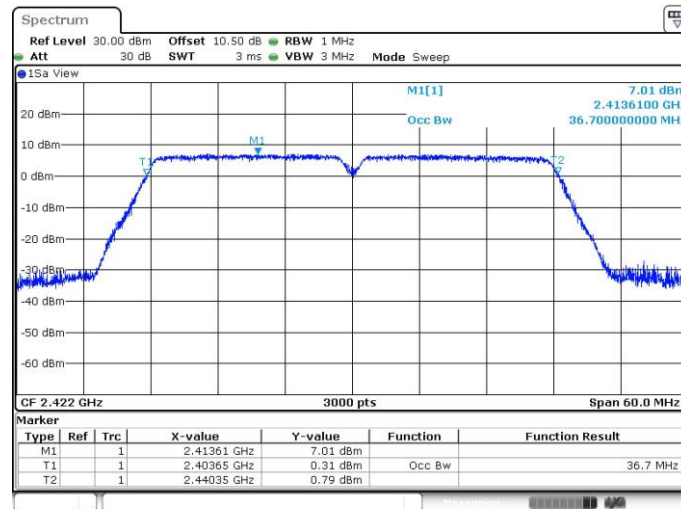
Modulation Mode	N _{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	1	2412	9.04	---	---	---	500
11b	1	2437	9.04	---	---	---	500
11b	1	2462	9.04	---	---	---	500
11g	1	2412	16.58	---	---	---	500
11g	1	2437	16.52	---	---	---	500
11g	1	2462	16.58	---	---	---	500
HT20	1	2412	17.80	---	---	---	500
HT20	1	2437	17.80	---	---	---	500
HT20	1	2462	17.80	---	---	---	500
HT40	1	2422	36.52	---	---	---	500
HT40	1	2437	36.52	---	---	---	500
HT40	1	2452	36.52	---	---	---	500

Worst Plot



Modulation Mode	N _{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	1	2412	13.40	---	---	---
11b	1	2437	13.39	---	---	---
11b	1	2462	13.38	---	---	---
11g	1	2412	16.83	---	---	---
11g	1	2437	16.87	---	---	---
11g	1	2462	16.84	---	---	---
HT20	1	2412	17.86	---	---	---
HT20	1	2437	17.87	---	---	---
HT20	1	2462	17.85	---	---	---
HT40	1	2422	36.70	---	---	---
HT40	1	2437	36.70	---	---	---
HT40	1	2452	36.70	---	---	---

Worst Plot



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

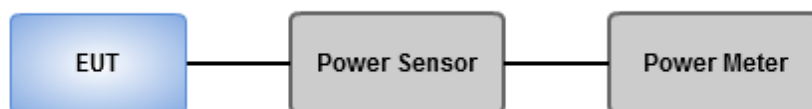
- ☒ Antenna gain $\leq 6\text{dBi}$, no any corresponding reduction is in output power limit.
- ☐ Antenna gain $> 6\text{dBi}$
 - ☐ Non Fixed, point to point operations.
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB
 - ☐ Fixed, point to point operations
Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point Operations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations ,no any corresponding reduction is in transmitter peak output power

3.3.2 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	1	2412	20.15	---	---	---	103.514	20.15	30.00	2.00	22.15	36.00
11b	1	2437	20.21	---	---	---	104.954	20.21	30.00	2.00	22.21	36.00
11b	1	2462	19.84	---	---	---	96.383	19.84	30.00	2.00	21.84	36.00
11g	1	2412	23.60	---	---	---	229.087	23.60	30.00	2.00	25.60	36.00
11g	1	2437	24.60	---	---	---	288.403	24.60	30.00	2.00	26.60	36.00
11g	1	2462	23.63	---	---	---	230.675	23.63	30.00	2.00	25.63	36.00
HT20	1	2412	22.70	---	---	---	186.209	22.70	30.00	2.00	24.70	36.00
HT20	1	2437	24.43	---	---	---	277.332	24.43	30.00	2.00	26.43	36.00
HT20	1	2462	22.39	---	---	---	173.380	22.39	30.00	2.00	24.39	36.00
HT40	1	2422	22.30	---	---	---	169.824	22.30	30.00	2.00	24.30	36.00
HT40	1	2437	22.96	---	---	---	197.697	22.96	30.00	2.00	24.96	36.00
HT40	1	2452	22.63	---	---	---	183.231	22.63	30.00	2.00	24.63	36.00

Modulation Mode	N _{TX}	Freq. (MHz)	Conducted (Average) Output Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11b	1	2412	17.40	---	---	---	54.954	17.40	---
11b	1	2437	17.43	---	---	---	55.335	17.43	---
11b	1	2462	17.04	---	---	---	50.582	17.04	---
11g	1	2412	14.20	---	---	---	26.303	14.20	---
11g	1	2437	16.24	---	---	---	42.073	16.24	---
11g	1	2462	14.46	---	---	---	27.925	14.46	---
HT20	1	2412	13.45	---	---	---	22.131	13.45	---
HT20	1	2437	16.28	---	---	---	42.462	16.28	---
HT20	1	2462	13.15	---	---	---	20.654	13.15	---
HT40	1	2422	13.15	---	---	---	20.654	13.15	---
HT40	1	2437	13.27	---	---	---	21.232	13.27	---
HT40	1	2452	13.05	---	---	---	20.184	13.05	---

Note: Conducted average output power is for reference only.

3.4 Power Spectral Density

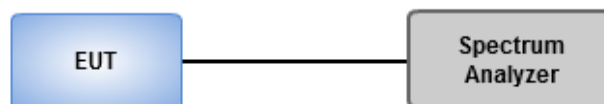
3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

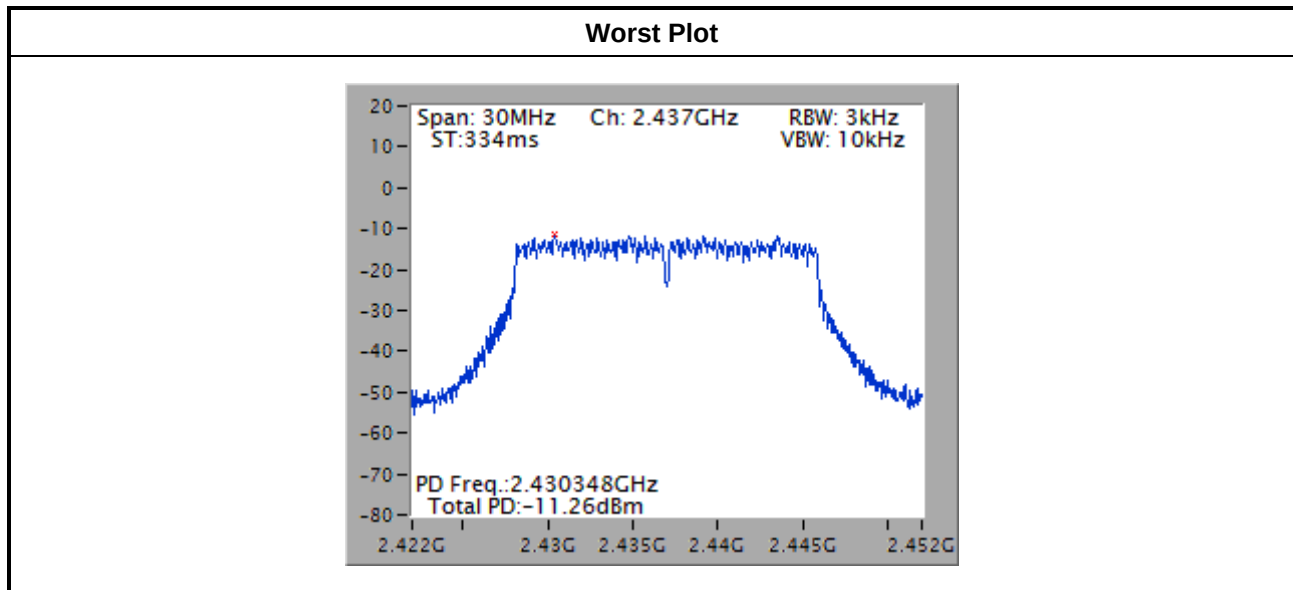
- ☒ Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.
 1. Set the RBW = 3kHz, VBW = 10kHz.
 2. Detector = Peak, Sweep time = auto couple.
 3. Trace mode = max hold, allow trace to fully stabilize.
 4. Use the peak marker function to determine 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: $\geq 10 \times (\text{number of measurement points in sweep}) \times (\text{maximum data rate per stream})$.
 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 _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	1	2412	-11.54	8.00
11b	1	2437	-11.91	8.00
11b	1	2462	-11.95	8.00
11g	1	2412	-14.02	8.00
11g	1	2437	-11.96	8.00
11g	1	2462	-13.51	8.00
HT20	1	2412	-13.98	8.00
HT20	1	2437	-11.26	8.00
HT20	1	2462	-14.23	8.00
HT40	1	2422	-14.93	8.00
HT40	1	2437	-16.82	8.00
HT40	1	2452	-14.75	8.00



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

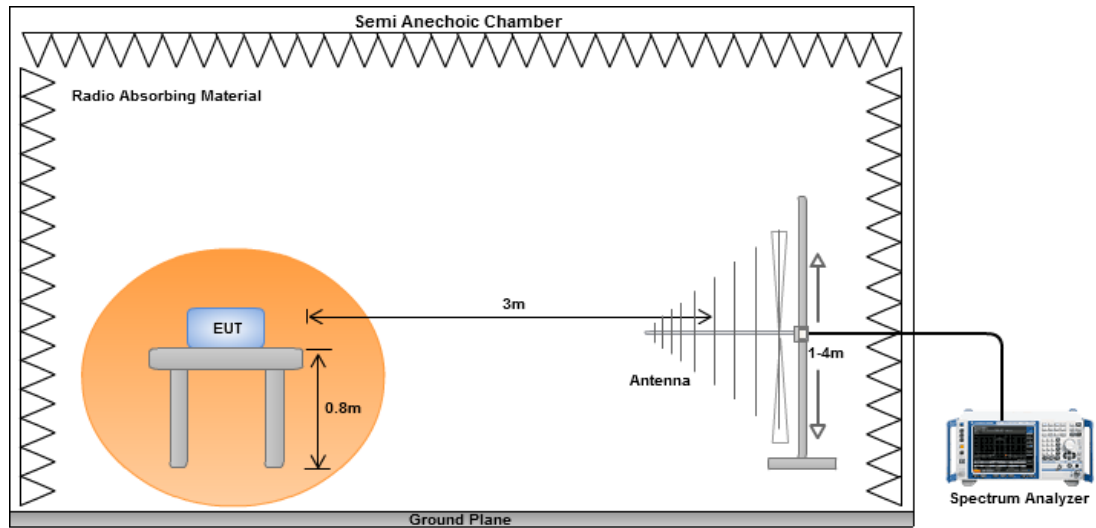
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

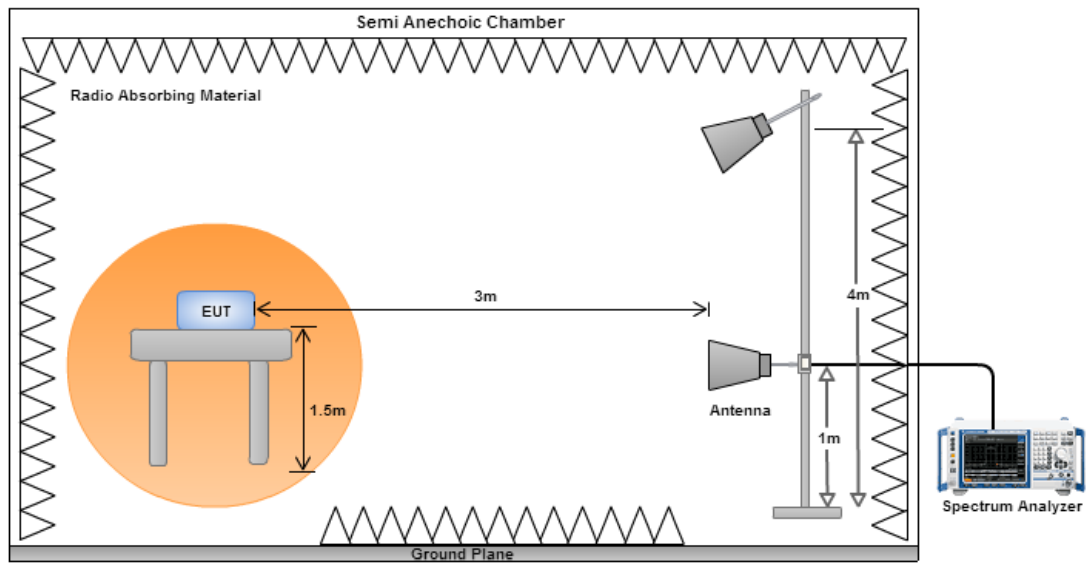
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



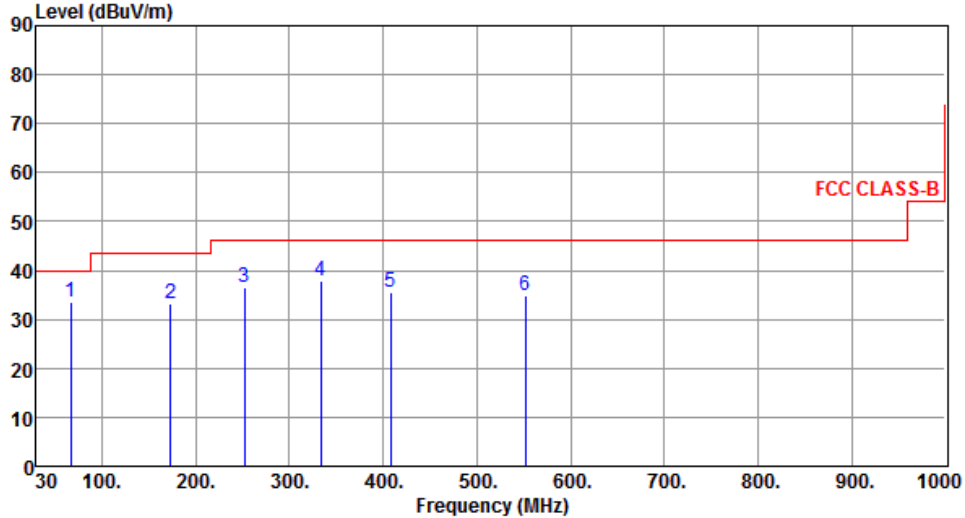
Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Configuration 1: Sample 01

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



The graph displays the radiated unwanted emissions for a transmitter. The y-axis represents the Level in dBUV/m, ranging from 0 to 90. The x-axis represents the Frequency in MHz, ranging from 30 to 1000. A red line indicates the FCC CLASS-B limit, which is 40 dBUV/m from 30 to 100 MHz, 45 dBUV/m from 100 to 1000 MHz. Six emission peaks are identified and labeled 1 through 6. The data for these peaks is summarized in the table below:

	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	66.86	33.44	40.00	-6.56	52.20	-18.76	Peak	---	---
2	173.56	33.23	43.50	-10.27	50.65	-17.42	Peak	---	---
3	252.13	36.48	46.00	-9.52	54.14	-17.66	Peak	---	---
4	333.61	37.81	46.00	-8.19	52.94	-15.13	Peak	---	---
5	408.30	35.59	46.00	-10.41	48.80	-13.21	Peak	---	---
6	551.86	35.01	46.00	-10.99	45.46	-10.45	Peak	---	---

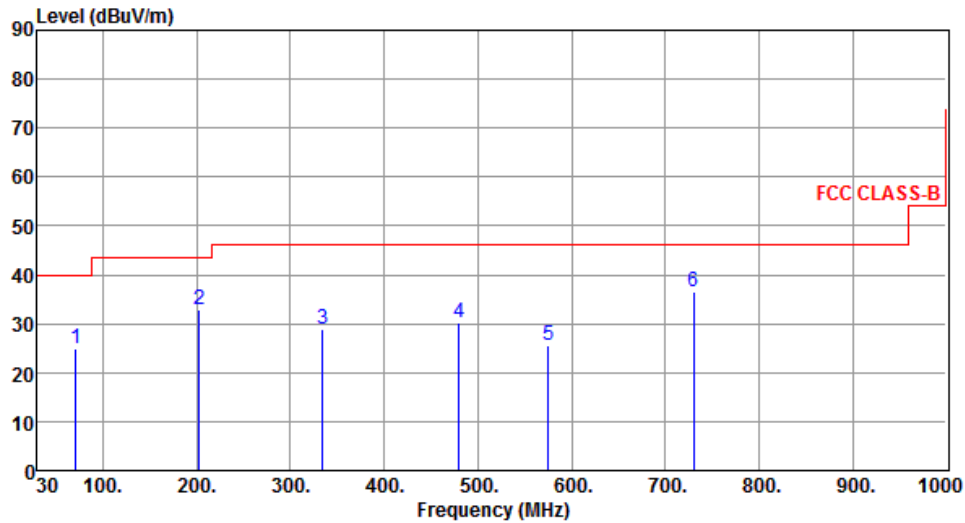
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).
 Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Level (dBuV/m) </			

Configuration 2: Sample 02

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		
Level (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	70.74	24.87	40.00	-15.13	44.36	-19.49	Peak	---	---
2	202.66	33.01	43.50	-10.49	52.31	-19.30	Peak	---	---
3	334.58	28.89	46.00	-17.11	44.00	-15.11	Peak	---	---
4	480.08	30.38	46.00	-15.62	41.92	-11.54	Peak	---	---
5	575.14	25.71	46.00	-20.29	35.70	-9.99	Peak	---	---
6	730.34	36.57	46.00	-9.43	43.95	-7.38	Peak	---	---

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

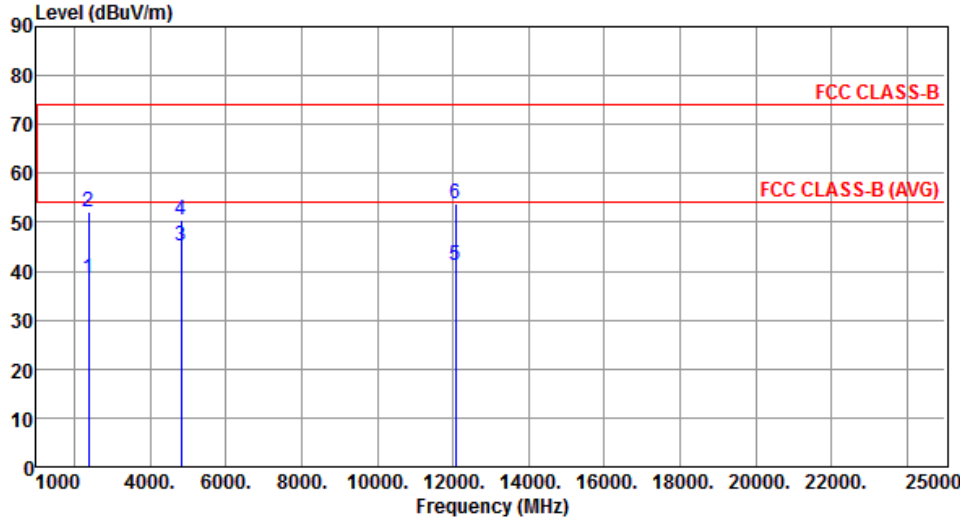
*Factor includes antenna factor , cable loss and amplifier gain

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	2390.00	38.59	54.00	-15.41	40.97	-2.38	Average	295	191
2	2390.00	52.25	74.00	-21.75	54.63	-2.38	Peak	295	191
3	4824.00	45.31	54.00	-8.69	40.22	5.09	Average	262	0
4	4824.00	50.46	74.00	-23.54	45.37	5.09	Peak	262	0
5	12060.00	41.22	54.00	-12.78	27.43	13.79	Average	100	159
6	12060.00	53.95	74.00	-20.05	40.16	13.79	Peak	100	159

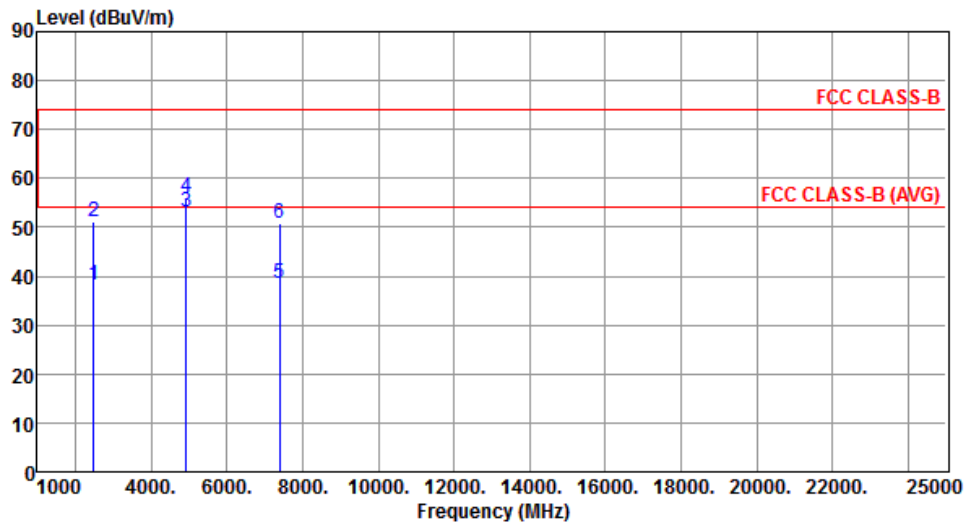
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		
Level (dBuV/m) </			

Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		
Level (dBUV/m) <			

Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		
Level (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	38.20	54.00	-15.80	40.56	-2.36	Average	315	183
2	2483.50	50.99	74.00	-23.01	53.35	-2.36	Peak	315	183
3	4924.00	52.98	54.00	-1.02	47.51	5.47	Average	305	8
4	4924.00	56.16	74.00	-17.84	50.69	5.47	Peak	305	8
5	7386.00	38.60	54.00	-15.40	29.00	9.60	Average	233	208
6	7386.00	50.84	74.00	-23.16	41.24	9.60	Peak	233	208

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

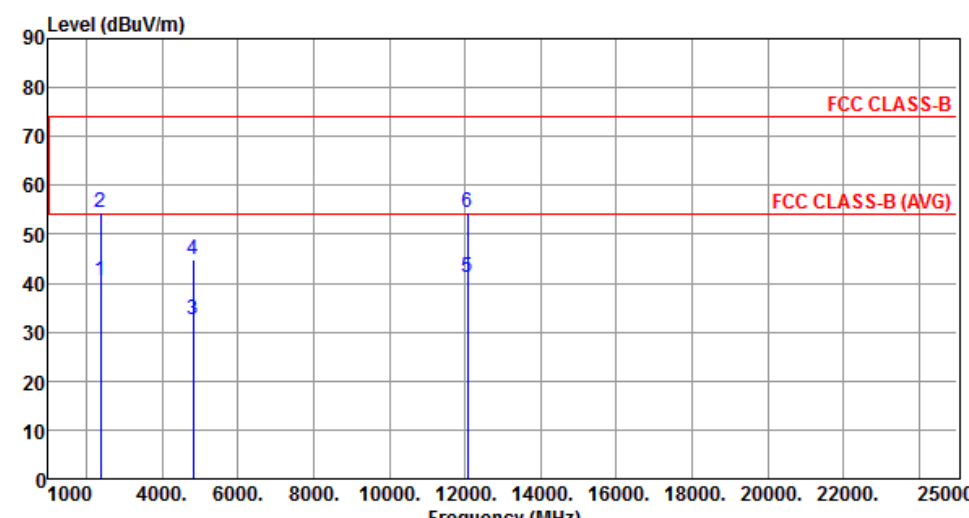
*Factor includes antenna factor , cable loss and amplifier gain

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

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

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

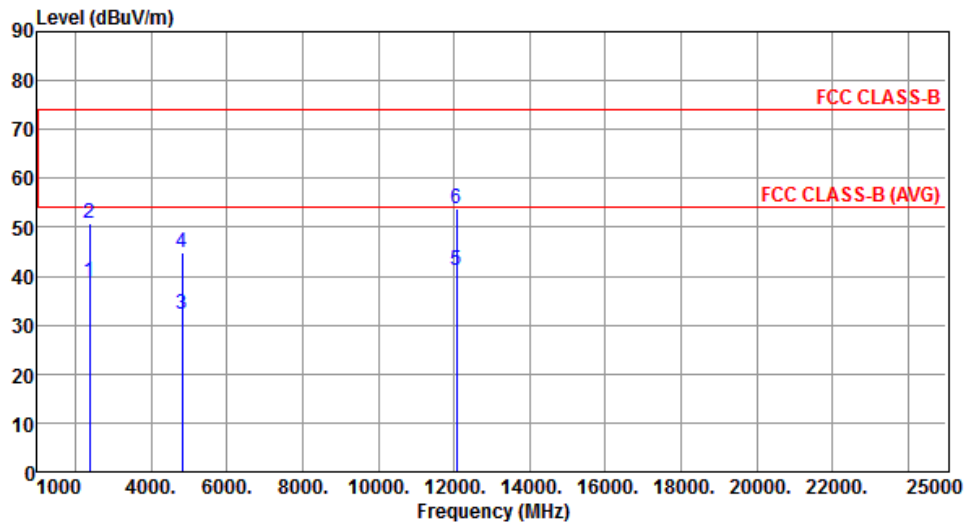
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		



	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	40.51	54.00	-13.49	42.89	-2.38	Average	328	188
2	2390.00	54.30	74.00	-19.70	56.68	-2.38	Peak	328	188
3	4824.00	32.49	54.00	-21.51	27.40	5.09	Average	100	248
4	4824.00	44.97	74.00	-29.03	39.88	5.09	Peak	100	248
5	12060.00	41.32	54.00	-12.68	27.53	13.79	Average	100	140
6	12060.00	54.63	74.00	-19.37	40.84	13.79	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).

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	38.69	54.00	-15.31	41.07	-2.38	Average	259	82
2	2390.00	50.68	74.00	-23.32	53.06	-2.38	Peak	259	82
3	4824.00	32.23	54.00	-21.77	27.14	5.09	Average	100	51
4	4824.00	44.94	74.00	-29.06	39.85	5.09	Peak	100	51
5	12060.00	41.31	54.00	-12.69	27.52	13.79	Average	100	86
6	12060.00	53.92	74.00	-20.08	40.13	13.79	Peak	100	86

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		
Level (dBUV/m) </			

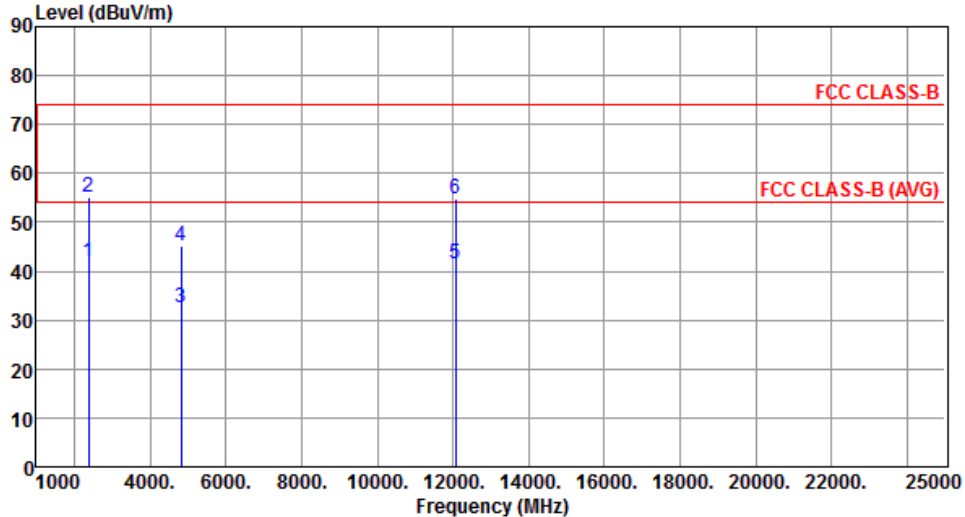
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Level (dBUV/m)			

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

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

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

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Horizontal		



The graph shows the emission level (dBuV/m) on the y-axis (0 to 90) versus 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 data points are plotted with vertical lines: 1 (2390 MHz, 41.91 dBuV/m), 2 (2390 MHz, 55.14 dBuV/m), 3 (4824 MHz, 32.58 dBuV/m), 4 (4824 MHz, 45.06 dBuV/m), 5 (12060 MHz, 41.60 dBuV/m), and 6 (12060 MHz, 54.88 dBuV/m). The margins are indicated by the difference between the emission level and the limit.

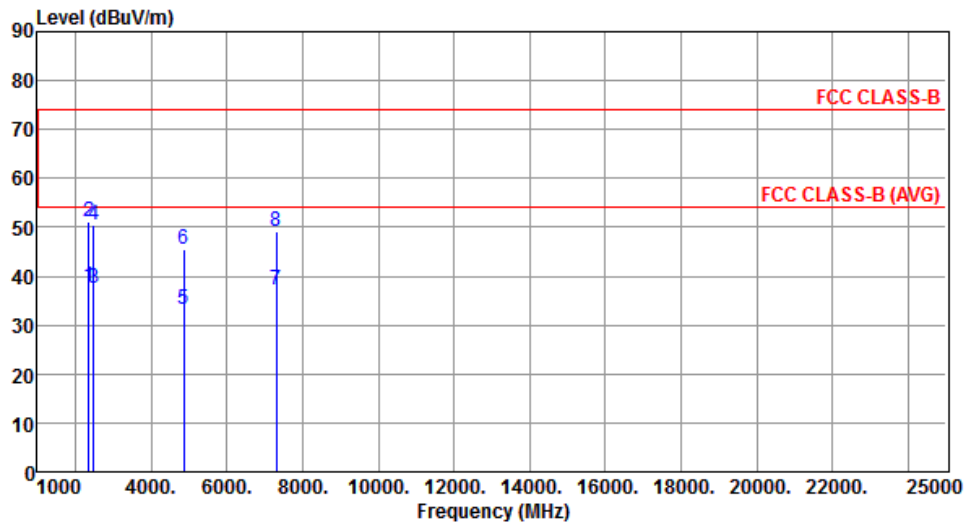
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	41.91	54.00	-12.09	44.29	-2.38	Average	328	189
2	2390.00	55.14	74.00	-18.86	57.52	-2.38	Peak	328	189
3	4824.00	32.58	54.00	-21.42	27.49	5.09	Average	102	244
4	4824.00	45.06	74.00	-28.94	39.97	5.09	Peak	102	244
5	12060.00	41.60	54.00	-12.40	27.81	13.79	Average	103	147
6	12060.00	54.88	74.00	-19.12	41.09	13.79	Peak	103	147

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

Modulation	HT20		Test Freq. (MHz)		2412	
Polarization	Vertical					
Level (dBuV/m)						

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		
Level (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	2357.70	37.72	54.00	-16.28	40.09	-2.37	Average	354	91
2	2357.70	51.22	74.00	-22.78	53.59	-2.37	Peak	354	91
3	2483.50	37.57	54.00	-16.43	39.93	-2.36	Average	354	91
4	2483.50	50.52	74.00	-23.48	52.88	-2.36	Peak	354	91
5	4874.00	33.12	54.00	-20.88	27.84	5.28	Average	105	52
6	4874.00	45.63	74.00	-28.37	40.35	5.28	Peak	105	52
7	7311.00	37.11	54.00	-16.89	27.51	9.60	Average	109	84
8	7311.00	49.30	74.00	-24.70	39.70	9.60	Peak	109	84

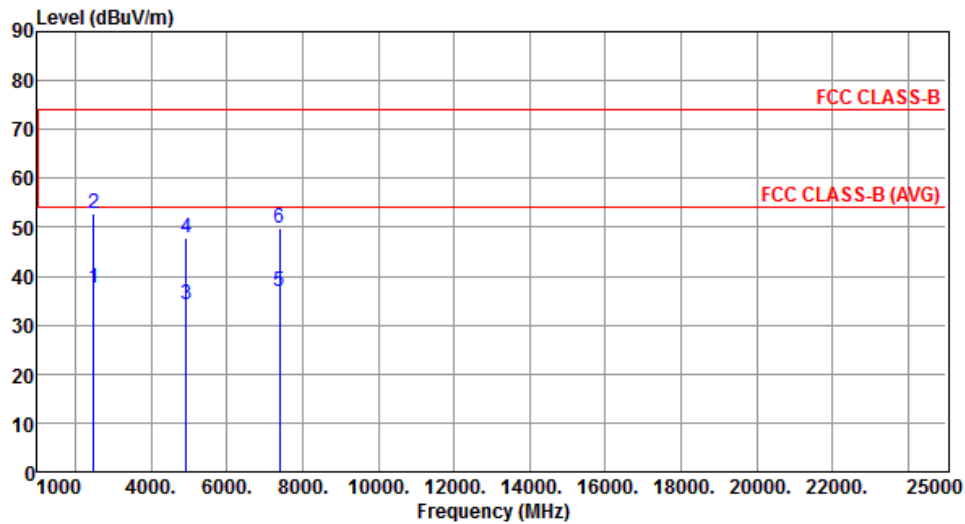
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

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

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	37.60	54.00	-16.40	39.96	-2.36	Average	341	86
2	2483.50	52.78	74.00	-21.22	55.14	-2.36	Peak	341	86
3	4924.00	34.05	54.00	-19.95	28.58	5.47	Average	108	264
4	4924.00	47.66	74.00	-26.34	42.19	5.47	Peak	108	264
5	7386.00	36.86	54.00	-17.14	27.26	9.60	Average	105	176
6	7386.00	49.72	74.00	-24.28	40.12	9.60	Peak	105	176

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					
Level (dBuV/m) <						

Modulation	HT40		Test Freq. (MHz)		2422	
Polarization	Vertical					
Level (dBUV/m)						

Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		
Level (dBUV/m)			

Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		
Level (dBUV/m)			

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		
Level (dBUV/m) </			

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		
Level (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 Measuring Instruments

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

3.6.3 Test Procedures

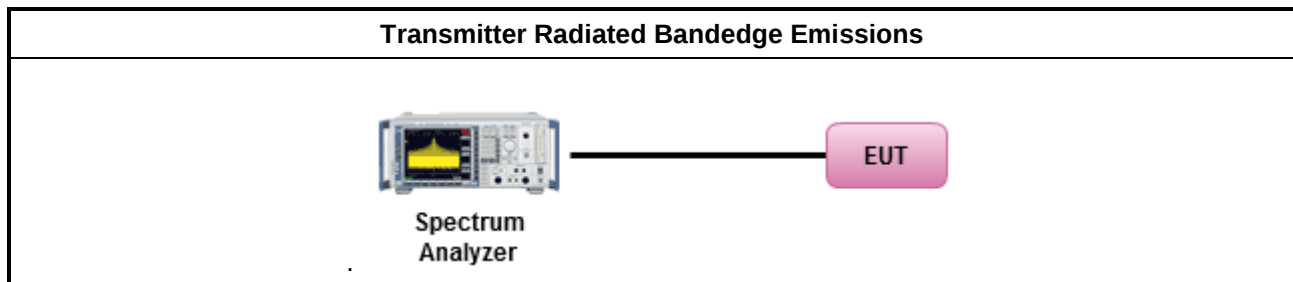
Reference level measurement

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

Emission level measurement

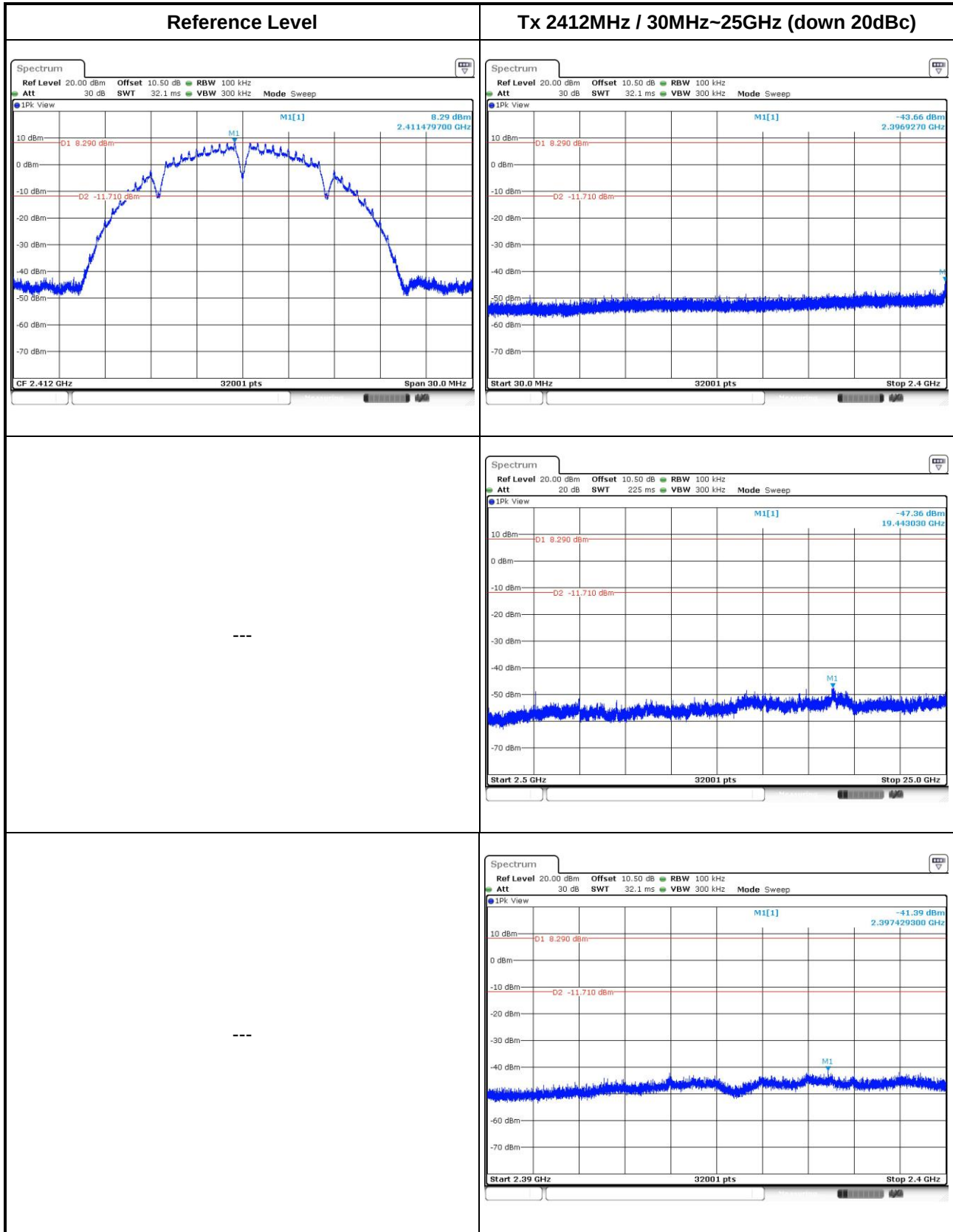
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.6.4 Test Setup

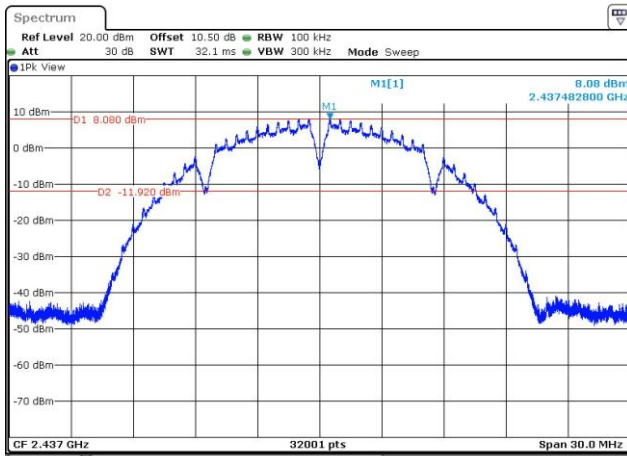


3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands

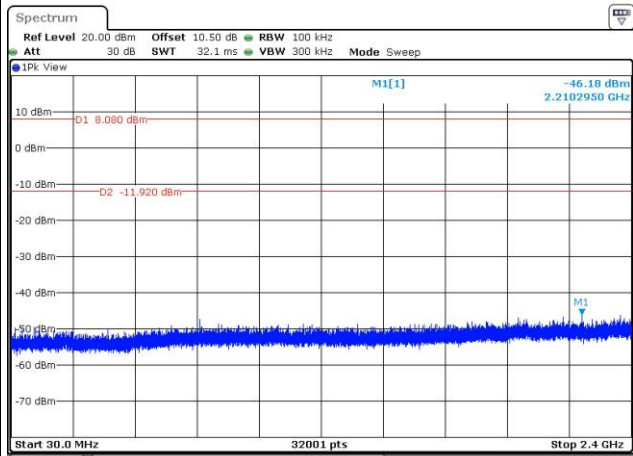
802.11b

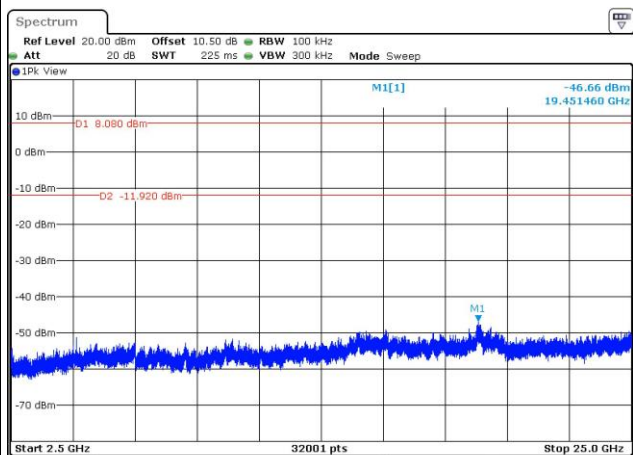


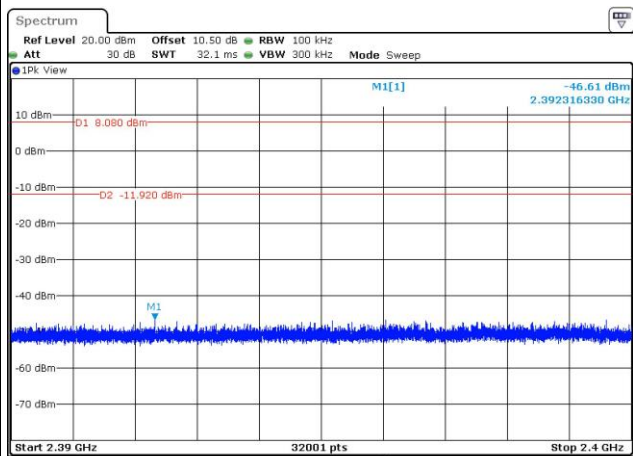
Reference Level



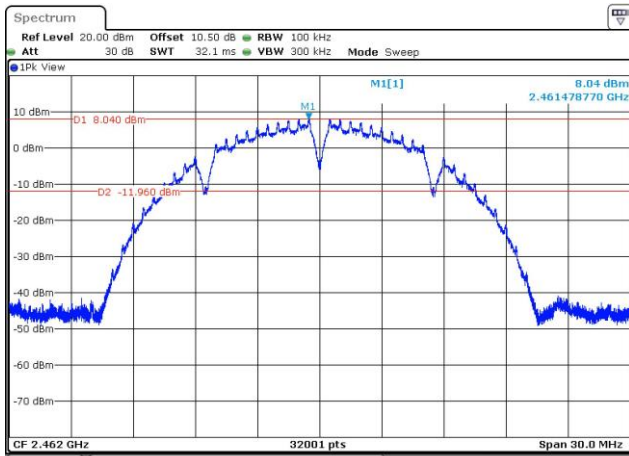
Tx 2437MHz / 30MHz~25GHz (down 20dBc)



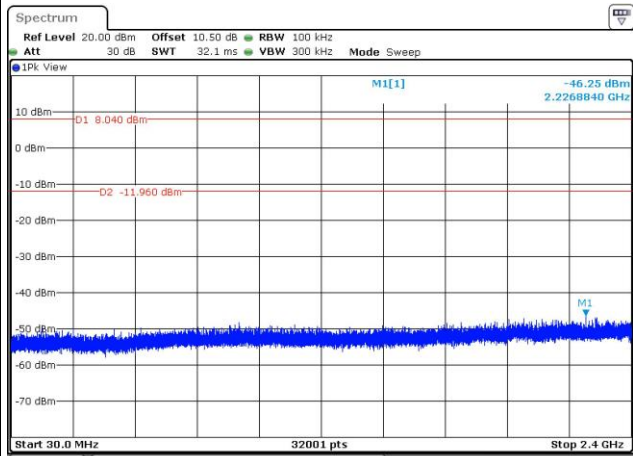


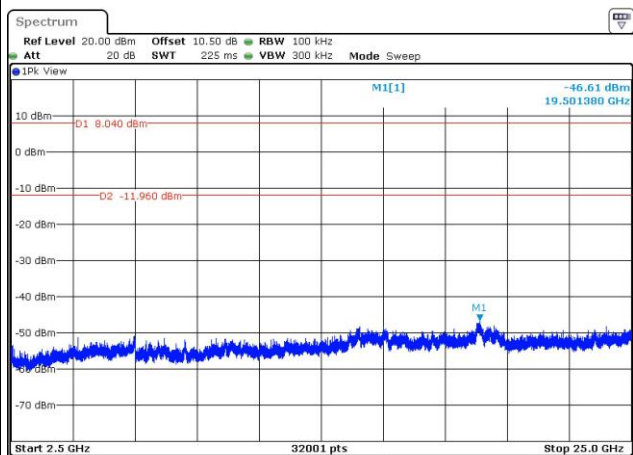


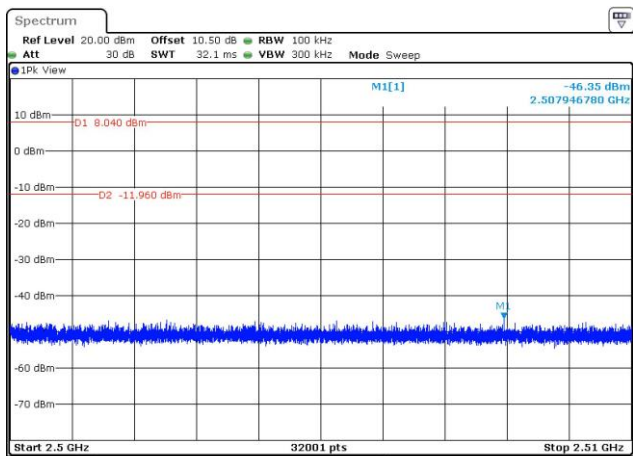
Reference Level



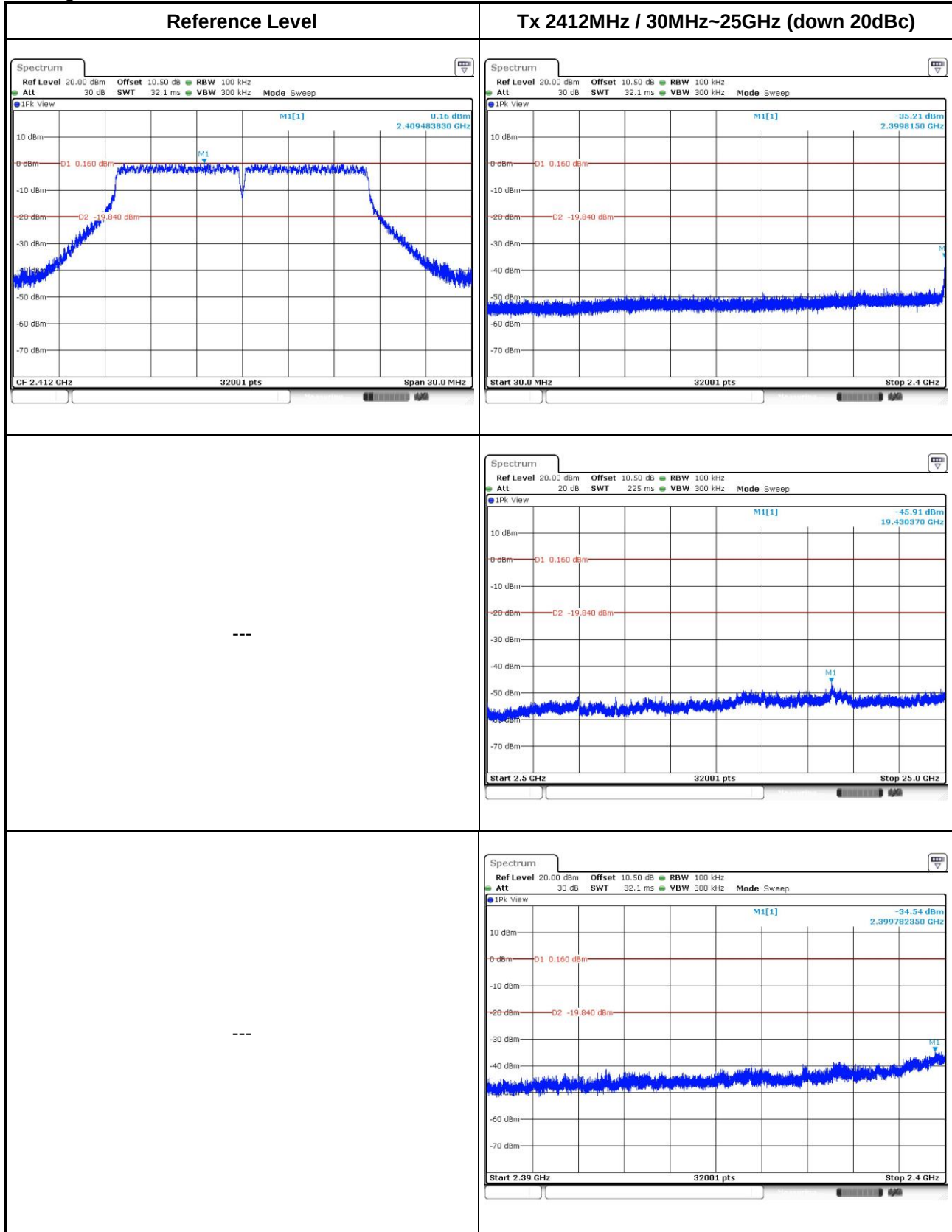
Tx 2462MHz / 30MHz~25GHz (down 20dBc)



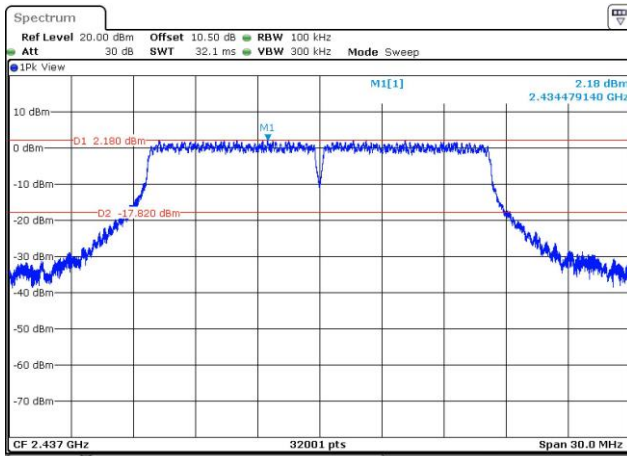




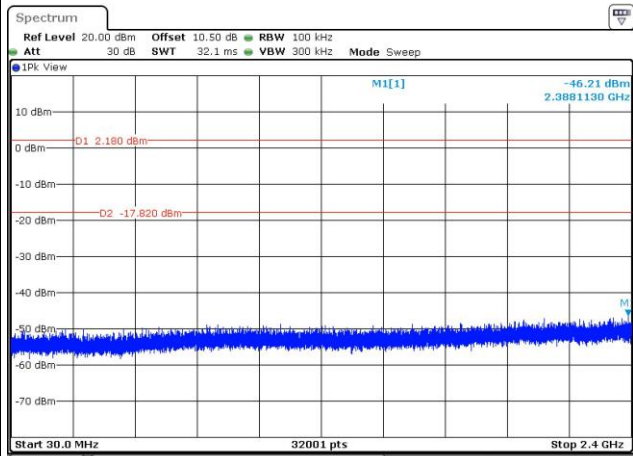
802.11g

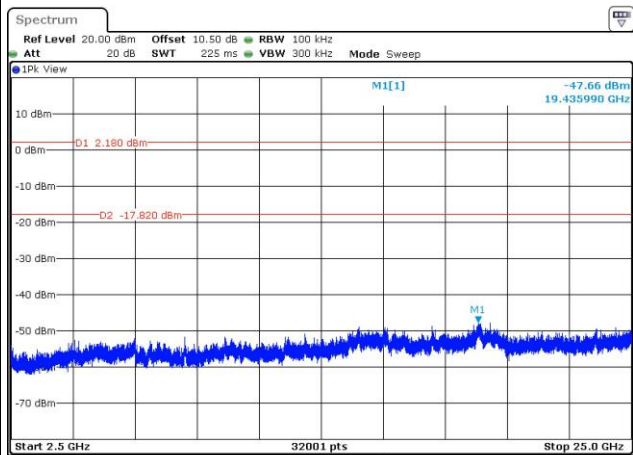


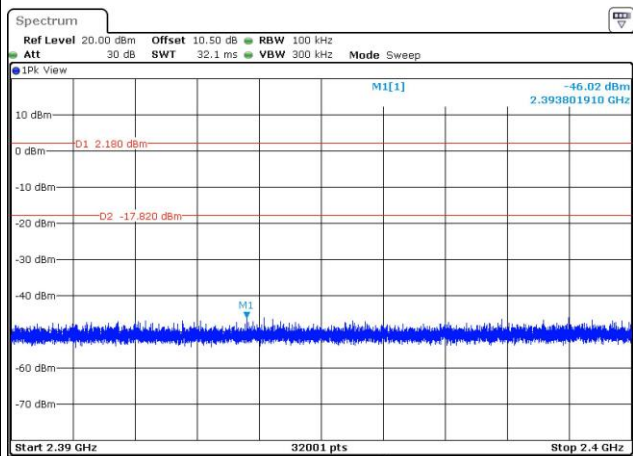
Reference Level



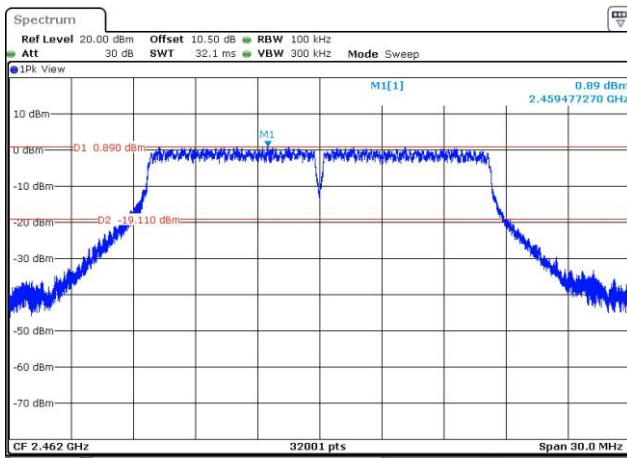
Tx 2437MHz / 30MHz~25GHz (down 20dBc)



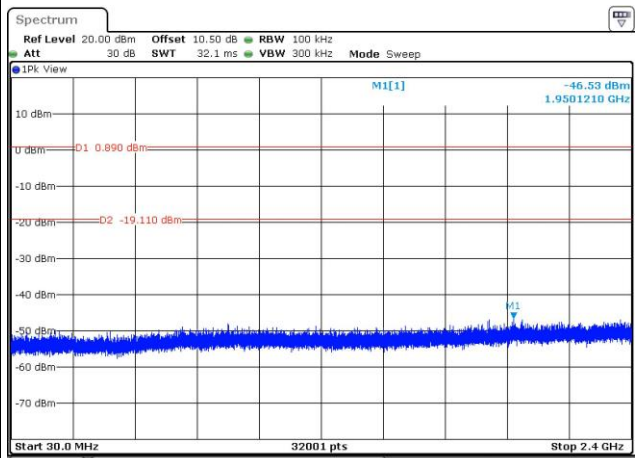


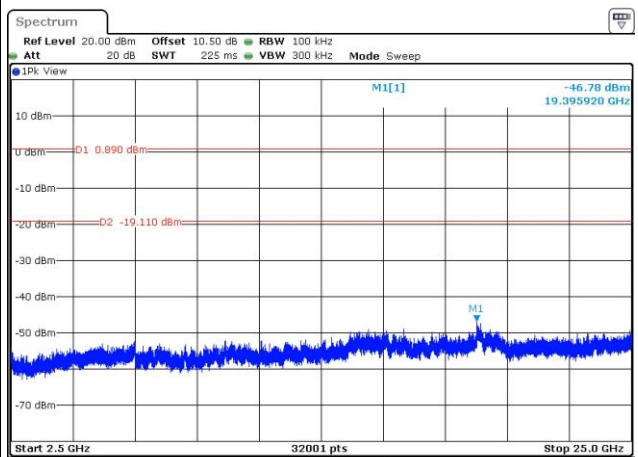


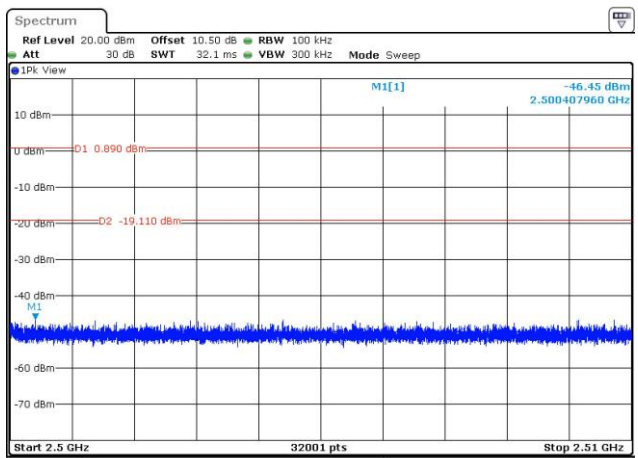
Reference Level



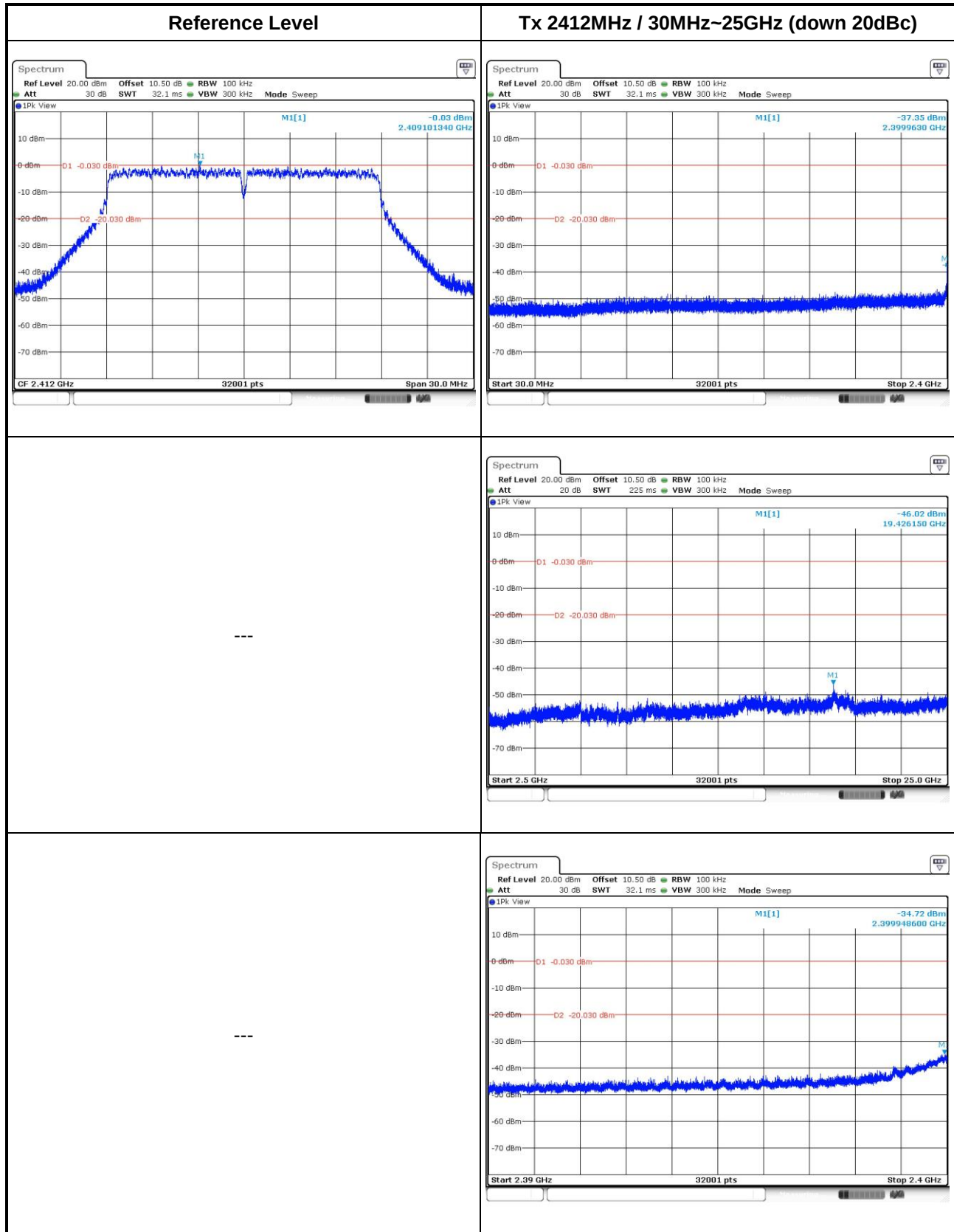
Tx 2462MHz / 30MHz~25GHz (down 20dBc)



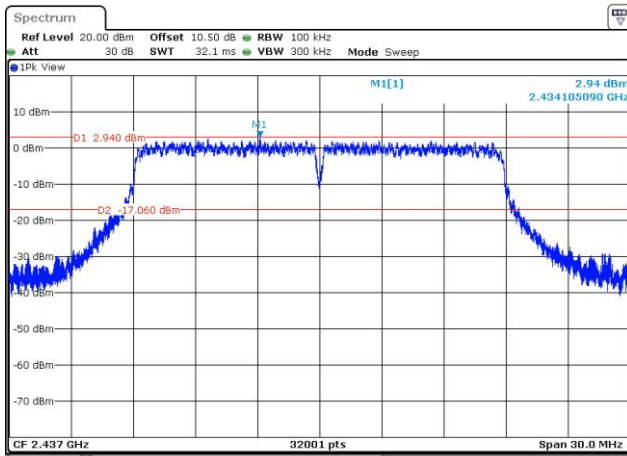




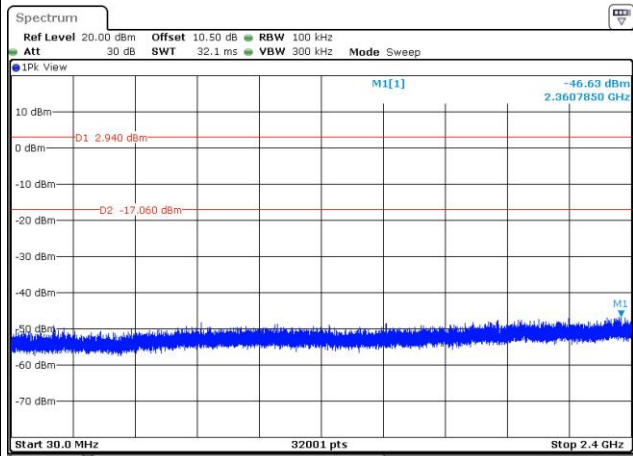
802.11n HT20

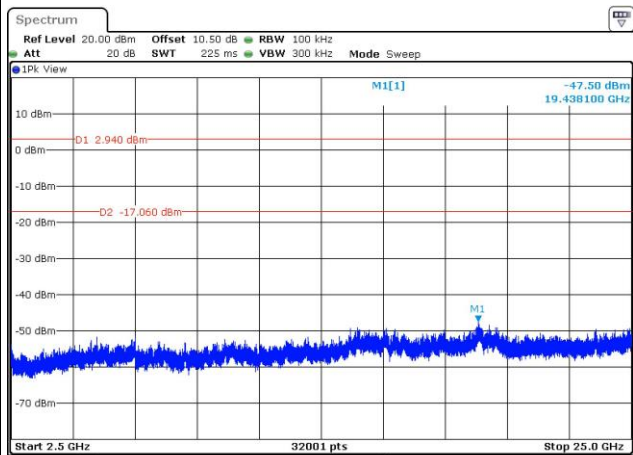


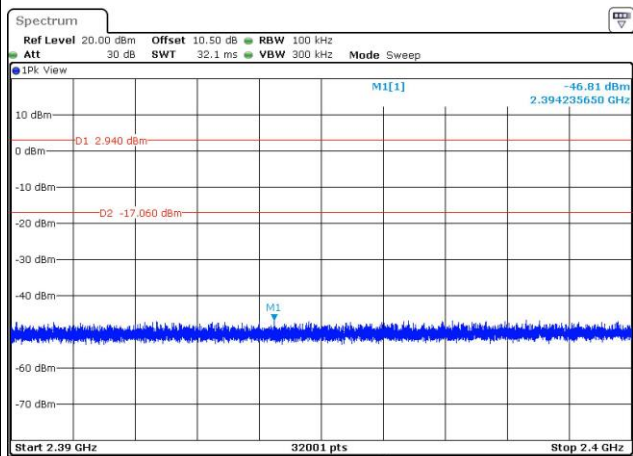
Reference Level



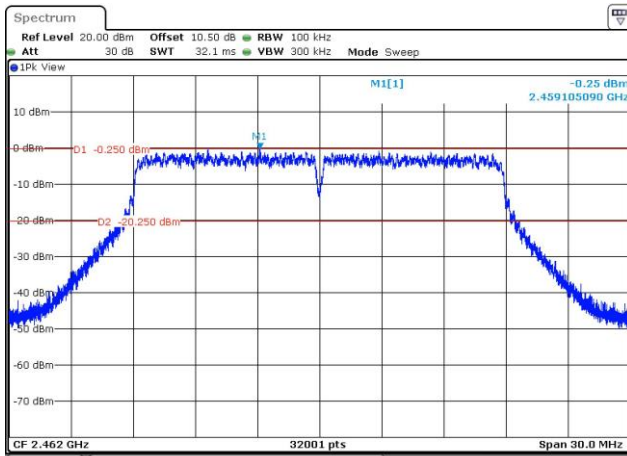
Tx 2437MHz / 30MHz~25GHz (down 20dBc)



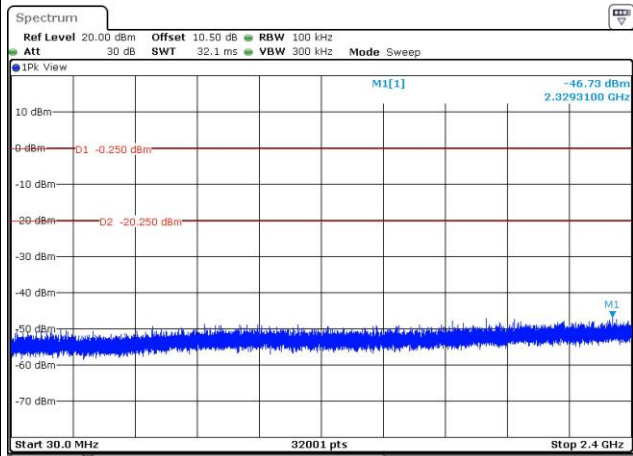


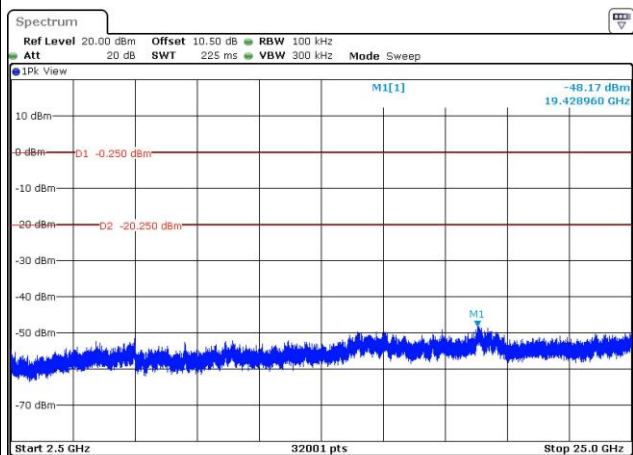


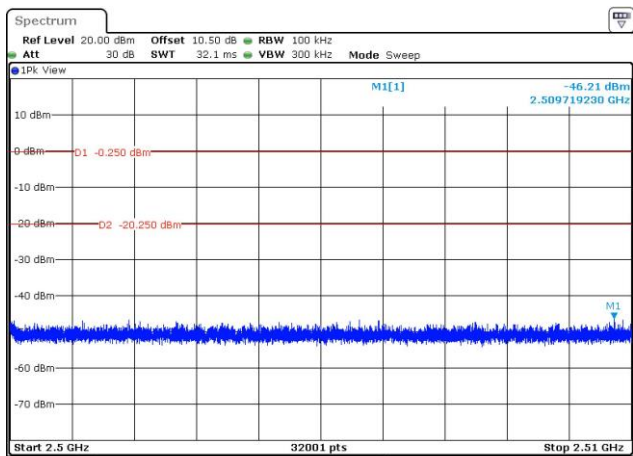
Reference Level



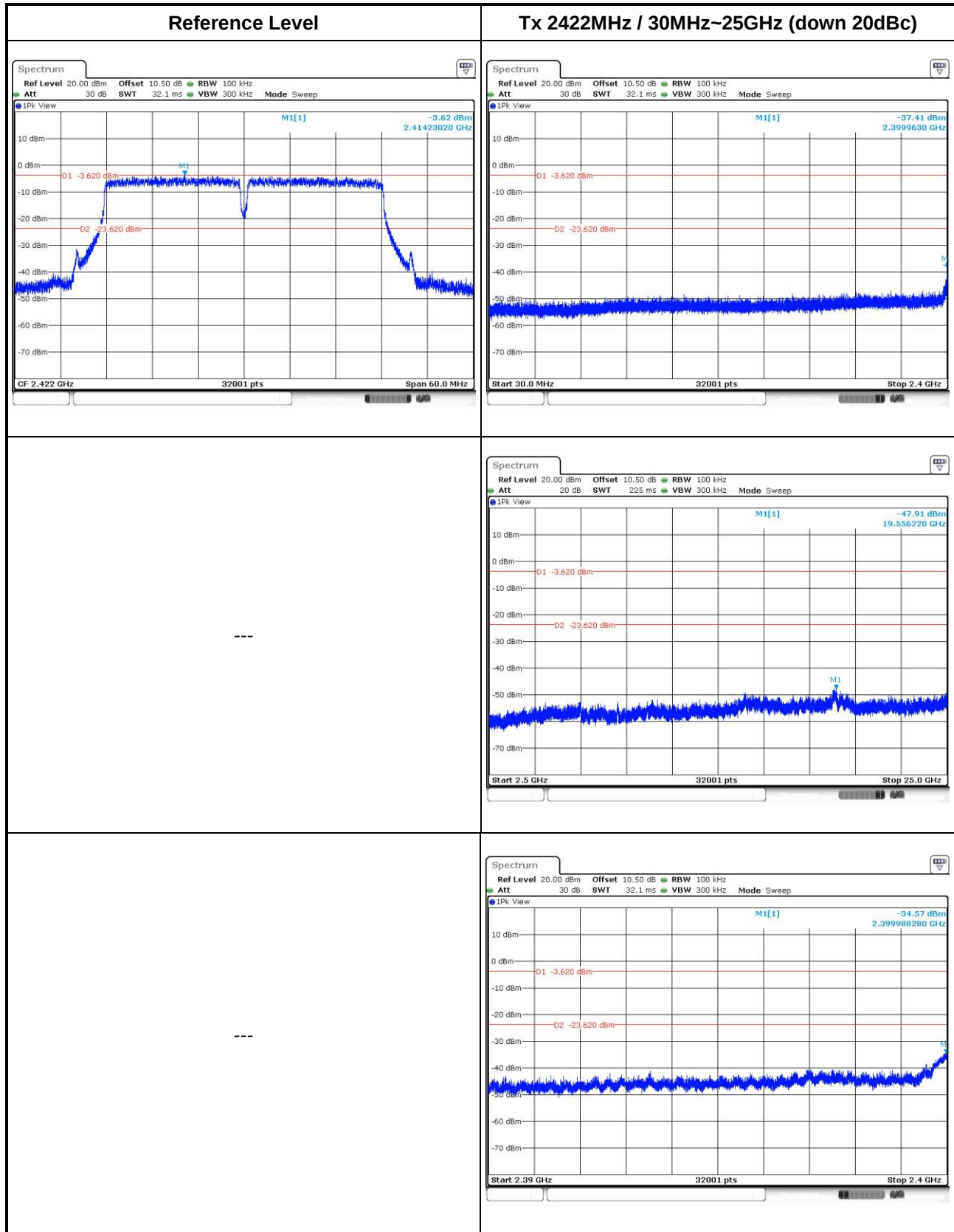
Tx 2462MHz / 30MHz~25GHz (down 20dBc)

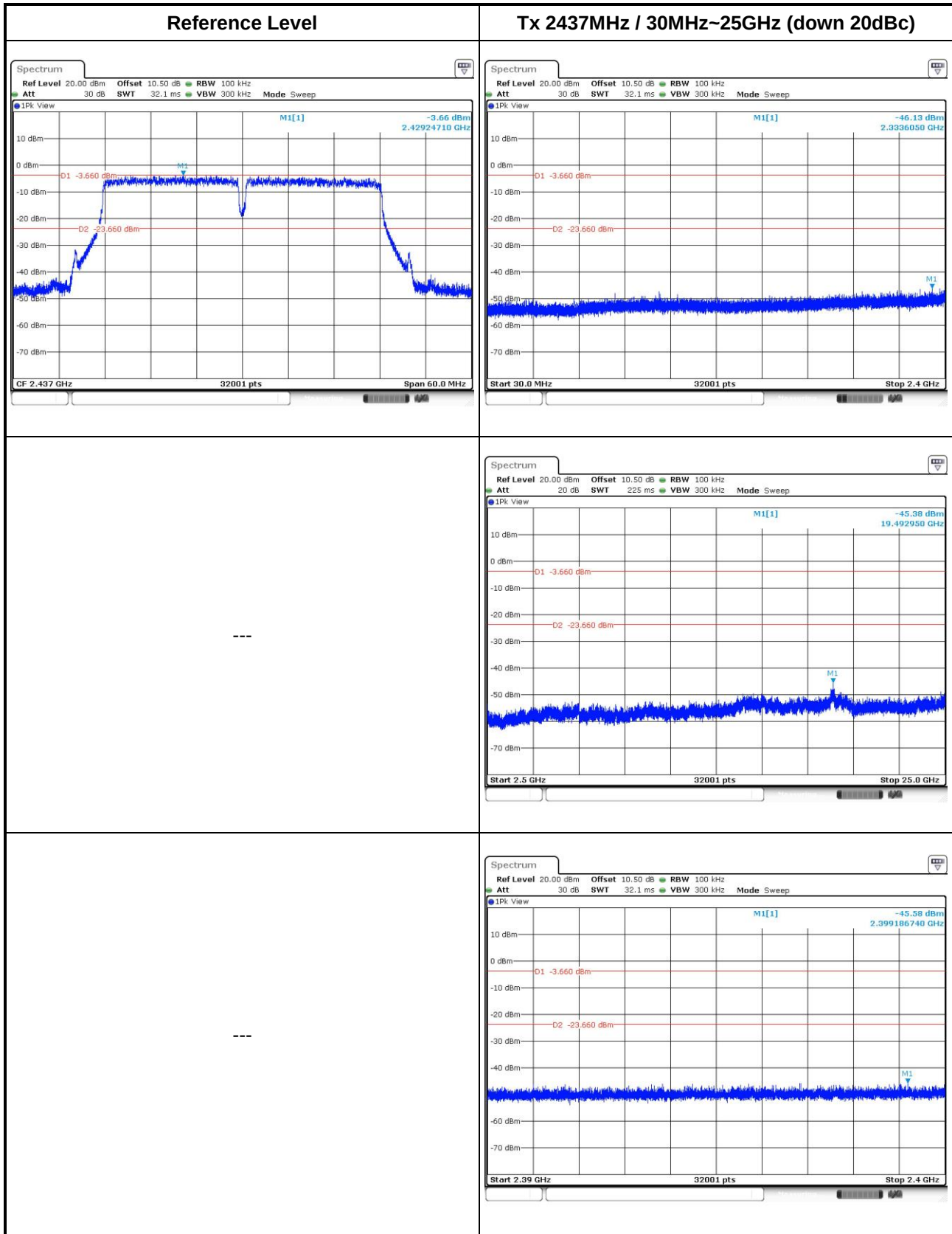


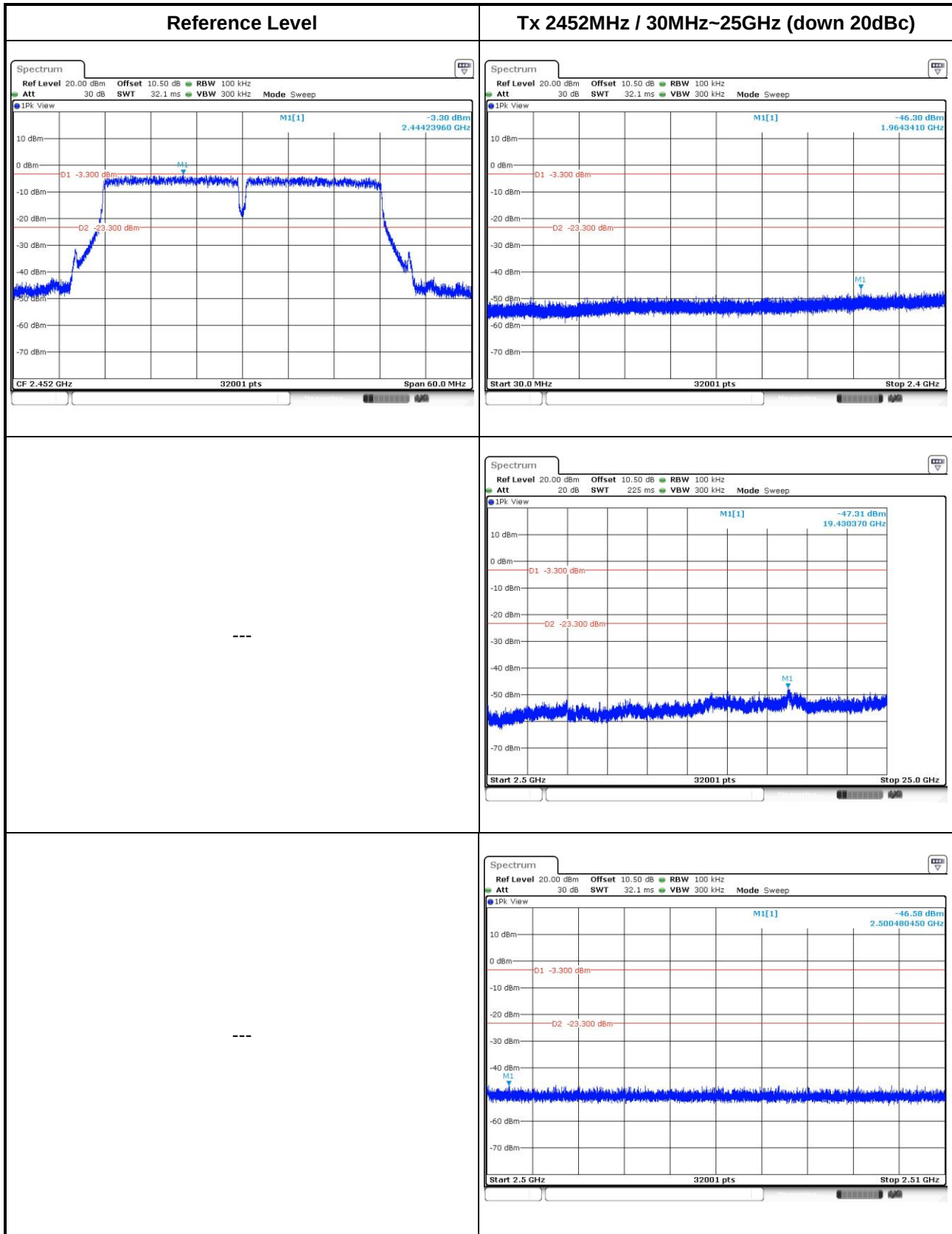




802.11n HT40







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

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

Linkou

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

Kwei Shan

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No. 3-1, Lane 6, Wen San 3rd
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Hsien 333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

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

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

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Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==