

CIXI ZHONGBANG ELECTRIC APPLIANCE CO., LTD.

RF TEST REPORT

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FCC Part 15.247 RF report

Model:

AT1677

REPORT NUMBER:

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FCC ID: 2A63W-AT1677

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2019): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY:**REVIEWED BY:**

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Reviewer
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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
220301798SHA-002	Rev. 01	Initial issue of report	Aug 1, 2022

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Measurement result summary

TEST ITEM	FCC REFERENCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	Pass
Maximum conducted output power and e.i.r.p.	15.247(b)(3)	Pass
Power spectrum density	15.247(e)	Pass
Emission outside the frequency band	15.247(d)	Pass
Radiated Emissions in restricted frequency bands	15.247(d), 15.205&15.209	Pass
Power line conducted emission	15.207(a)	Pass
Antenna requirement	15.203	Pass

Notes: 1: NA =Not Applicable

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Fan Heater (Smart Heater)
Type/Model/PMN/HVIN:	AT1677
Add. Model No.: (See Note 1)	AT1635, AT1679, AT1632, AT1676, AT1678, AT1366, AT1513, AT1514, AT1520, AT1521, AT1323, AT1481, AT1482, AT1520, AT1521
Trade Mark:	atomi smart, 
Description of EUT:	The EUT is fan heater, it supports Wi-Fi function, there are series models. We test AT1677 and list the worst results in this report.
Rating:	120V~,60Hz, 1500W
EUT type:	☒ Table top ☐ Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	2022.05.06
Date of test:	2022.05.14-2022.06.07
Note 1: The additional models are identical with the test model AT1677 except the model number for marketing purpose.	

1.2 Technical Specification

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n(HT20)
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n(HT20): OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Operating Frequency:	2412MHz to 2462MHz for IEEE 802.11b/g/n(HT20)
Channel Number:	11 Channels for 802.11b, 802.11g and 802.11n(HT20)
Channel Separation:	5 MHz
Antenna:	PCB Antenna, 2.5dBi

1.3 Antenna information

Mode	Tx/Rx Function	Beamforming function	CDD function	Directional gain (dBi)
802.11b	1Tx/1Rx	NO	NO	-
802.11g	1Tx/1Rx	NO	NO	-
802.11n(HT20)	1Tx/1Rx	NO	NO	-

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1.4 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN1175
	IC Registration Lab CAB identifier.: CN0051
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

Tests were sub-contracted.

Name:	Shenzhen UnionTrust Quality and Technology Co., Ltd.
Address:	Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng Science and Technology Park, Longhua District, Shenzhen, China
Telephone:	+86 (0) 755 2823 0888
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The test facility is recognized, certified, or accredited by these organizations:	Shenzhen UnionTrust Quality and Technology Co., Ltd.
	CNAS Accreditation Lab
	Registration No. CNAS L9069

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2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2019)

ANSI C63.10 (2013)

KDB 558074 (v05r02)

2.2 Mode of operation during the test

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

Software name	Manufacturer	Version	Supplied by
UI_mptool.exe	-	mptool_1V3	Client

The lowest, middle and highest channel were tested as representatives.

Frequency Band (MHz)	Mode	Lowest (MHz)	Middle (MHz)	Highest (MHz)
2400-2483.5	802.11b	2412	2437	2462
	802.11g	2412	2437	2462
	802.11n(HT20)	2412	2437	2462

Data rate and Power setting:

The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases. After this pre-scan, we choose the following table of the data rate as the worst case.

Frequency Band (MHz)	Mode	Worst case data rate
2400-2483.5	802.11b	1Mbps
	802.11g	6Mbps
	802.11n(HT20)	MCS0

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2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	E3	Audix	9.160323
Radiated emission	E3	Audix	9.160323

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	DELL Latitude 3400	-

2.5 Test environment condition:

Test items	Temperature	Humidity
Minimum 6dB Bandwidth	25.3°C	53%RH
Maximum conducted output power and e.i.r.p.		
Power spectrum density		
Emission outside the frequency band		
Radiated Emissions in restricted frequency bands	25.2°C	50%RH
Power line conducted emission	24.3°C	51%RH

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2.6 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESR7	UTTTL-E005	4-Nov-2022
☒	A.M.N.	R&S	ESH2-Z5	UTTTL-E003	4-Nov-2022
☒	A.M.N.	ETS-Lindgren	3816/2SH	UTTTL-E004	4-Nov-2022
☒	Shielding room	ETS-Lindgren	843	UTTTL-E076	4-Nov-2024
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	UTTTL-E026	4-Nov-2022
☒	Loop antenna	ETS-Lindgren	6502	UTTTL-E013	10-Nov-2023
☒	Broadband Antenna	ETS-Lindgren	3142E	UTTTL-E014	10-Nov-2023
☒	Pre-amplifier	ETS-Lindgren	118490	UTTTL-E015	5-Nov-2022
☒	Horn antenna	ETS-Lindgren	3117	UTTTL-E017	10-Nov-2023
☒	Pre-amplifier	ETS-Lindgren	118385	UTTTL-E017	5-Nov-2022
☒	Horn antenna	ETS-Lindgren	3116C	UTTTL-E019	18-Jun-2022
☒	Pre-amplifier	ETS-Lindgren	118384	UTTTL-E019	16-Nov-2022
☒	6dB Attenuator	Talent	RA6A5-N-18	UTTTL-E056	10-Nov-2023
☒	Multi device Controller	ETS-Lindgren	7006-001	----	----
☒	3m Chamber & Accessory Equipment	ETS-Lindgren	3m	UTTTL-E010	21-Jan-2024
RF Conducted Test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	UTTTL-E032	14-Apr-2023
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	UTTTL-E033	4-Nov-2022

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2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Maximum peak output power	± 0.68 dB
Radiated Emissions in restricted frequency bands below 1GHz	± 4.90 dB
Radiated Emissions in restricted frequency bands above 1GHz	± 5.1 dB
Emission outside the frequency band	± 2.7 dB
Power line conducted emission	± 2.7 dB

TEST REPORT

3 Minimum 6dB bandwidth

Test result: Pass

3.1 Limit

For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Measurement Procedure

The EUT was tested according to Subclause 11.8 of ANSI C63.10.

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3 Test Configuration



3.4 Test Results of Minimum 6dB bandwidth

Please refer to Appendix A

TEST REPORT

4 Maximum conducted output power

Test result: Pass

4.1 Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 W. (The e.i.r.p. shall not exceed 4 W)

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 30dBm and 30+ (6 –antenna gain-beam forming gain).

4.2 Measurement Procedure

The EUT was tested according to Subclause 11.9.1.3 of ANSI C63.10.

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.
2. Measure out each test modes' peak or average output power, record the power level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

4.3 Test Configuration



4.4 Test Results of Maximum conducted output power

Please refer to Appendix A

TEST REPORT**5 Power spectrum density****Test result: Pass****5.1 Limit**

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

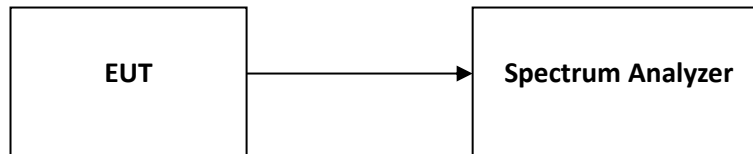
If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 8dBm/MHz and $8 + (6 - \text{antenna gain} - \text{beam forming gain})$.

5.2 Measurement Procedure

The EUT was tested according to Subclause 11.10 of ANSI C63.10.

This procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., duty cycle < 98 %), and when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than $\pm 2\%$):

- a) Measure the duty cycle (x) of the transmitter output signal as described in Section 6.0.
- b) Set instrument center frequency to DTS channel center frequency.
- c) Set span to at least $1.5 \times \text{OBW}$.
- d) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- e) Set VBW $\geq 3 \times \text{RBW}$.
- f) Detector = peak.
- g) Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- h) Sweep time = auto couple.
- i) Do not use sweep triggering. Allow sweep to "free run".
- j) Employ trace mode over a minimum of 100 traces.
- k) Use the peak marker function to determine the maximum amplitude level.
- l) Add $10 \log(1/x)$, where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.
- m) If resultant value exceeds the limit, then reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

TEST REPORT**5.3 Test Configuration****5.4 Test Results of Power spectrum density**

Please refer to Appendix A

TEST REPORT**6 Emission outside the frequency band****Test result: Pass****6.1 Limit**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

6.2 Measurement Procedure

The EUT was tested according to Subclause 11.11 of ANSI C63.10.

Reference level measurement

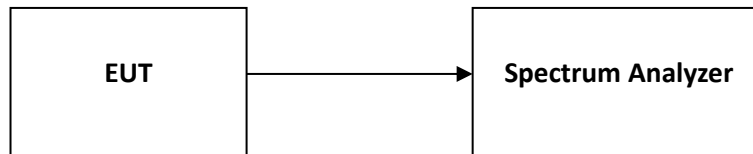
Establish a reference level by using the following procedure:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to ≥ 1.5 times the DTS bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq 3 \times$ RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.

Emission level measurement

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW $\geq 3 \times$ RBW.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

TEST REPORT**6.3 Test Configuration****6.4 The results of Emission outside the frequency band**

Please refer to Appendix A

TEST REPORT

7 Radiated Emissions in restricted frequency bands

Test result: Pass

7.1 Limit

The radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified showed as below:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

7.2 Measurement Procedure

The EUT was tested according to Subclause 11.12 of ANSI C63.10.

For Radiated emission below 30MHz:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

TEST REPORT**For Radiated emission above 30MHz:**

- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detector function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

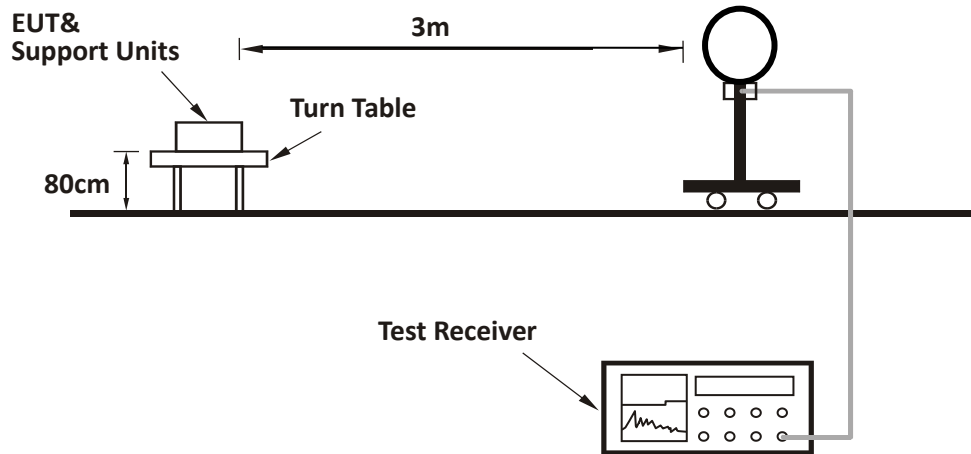
Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 3 x RBW (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions were reported.

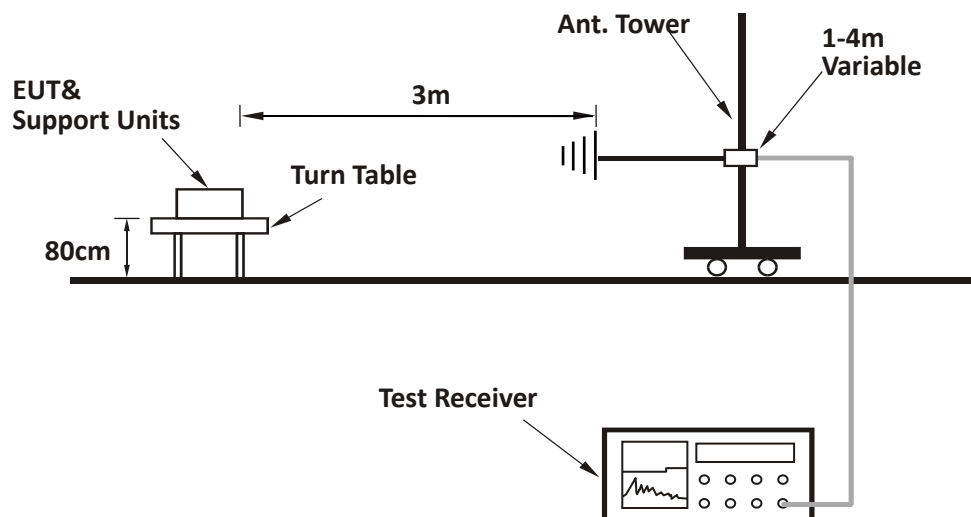
TEST REPORT

7.3 Test Configuration

For Radiated emission below 30MHz:

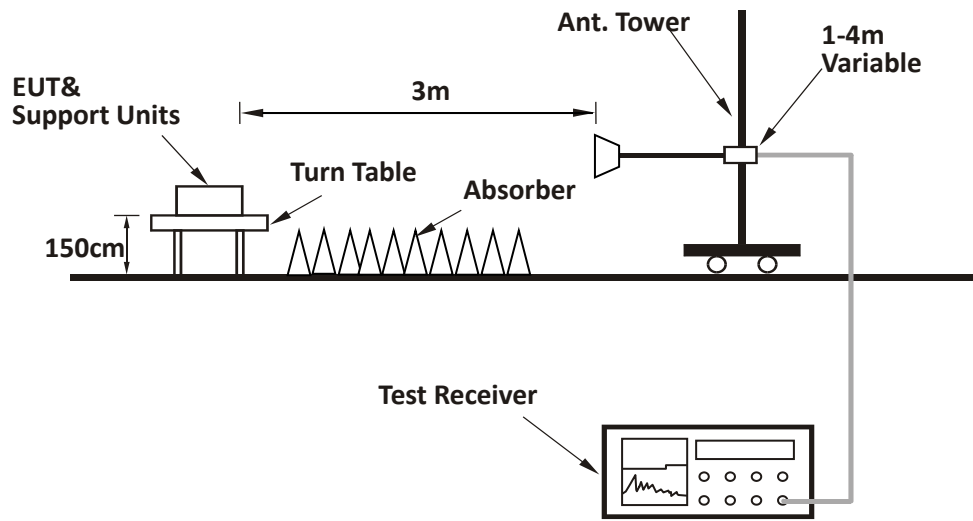


For Radiated emission 30MHz to 1GHz:



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For Radiated emission above 1GHz:

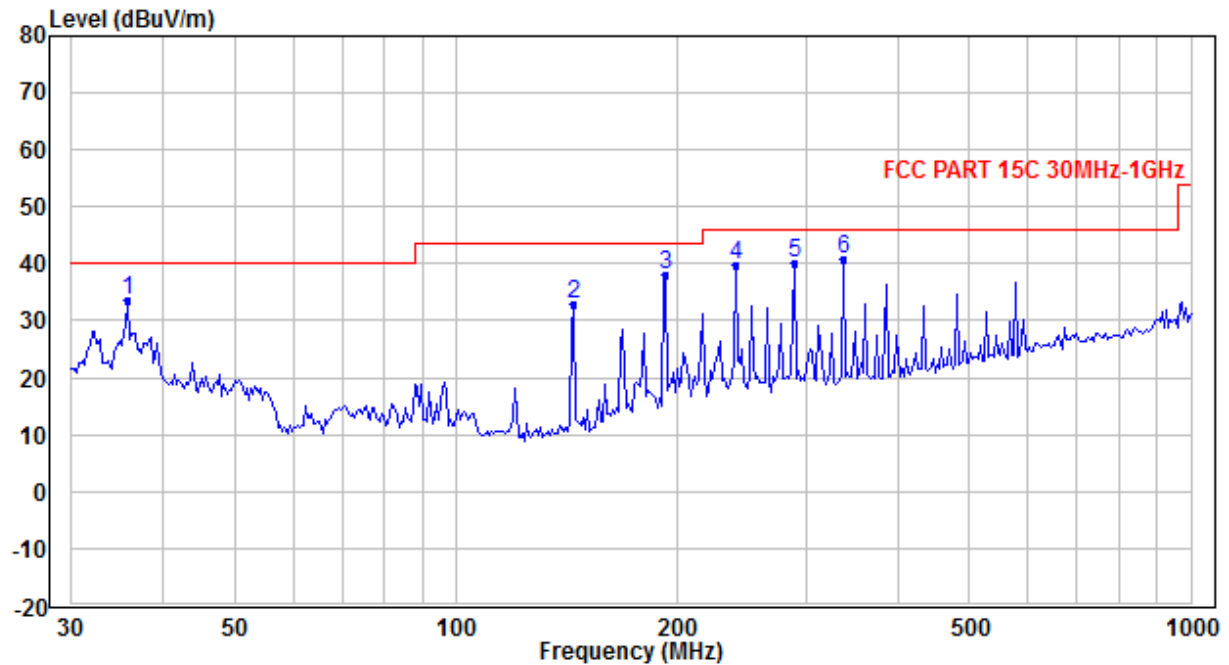


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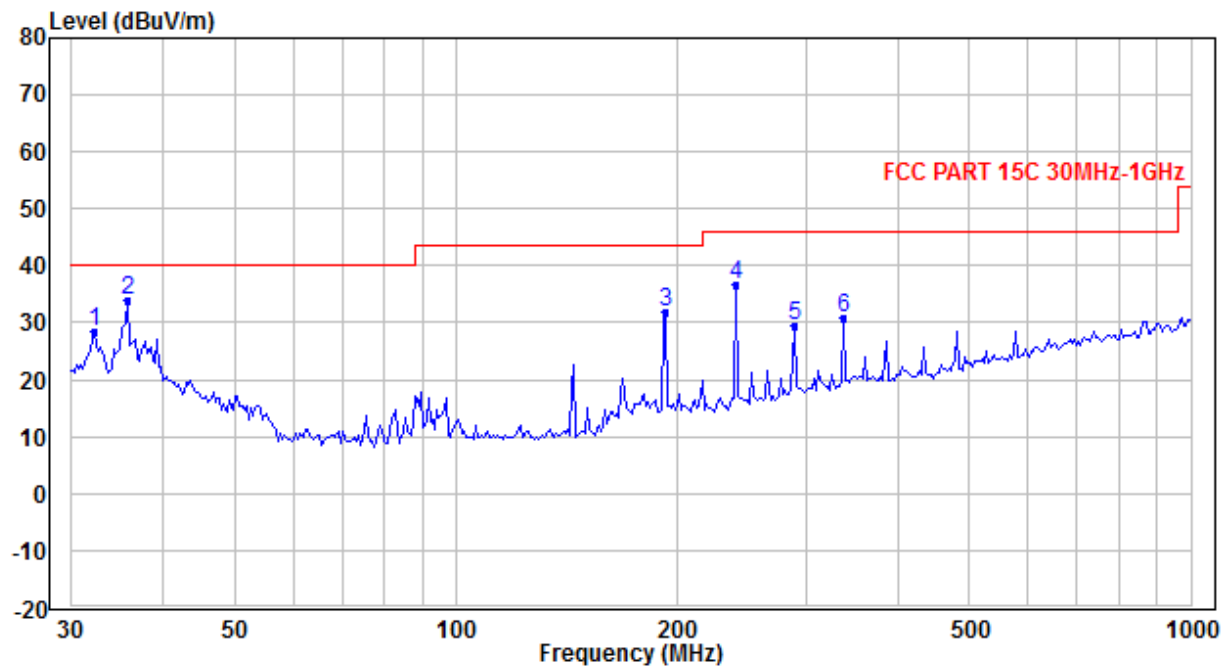
7.4 Test Results of Radiated Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Horizontal



Vertical



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Test data below 1GHz

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	35.762	33.44	40.00	-6.56	PK
H	144.790	33.06	43.50	-10.44	PK
H	193.137	38.01	43.50	-5.49	PK
H	240.144	39.68	46.00	-6.32	PK
H	288.284	40.27	46.00	-5.73	PK
V	32.184	28.63	40.00	-11.37	PK
V	35.762	33.87	40.00	-6.13	PK
V	193.137	31.73	43.50	-11.77	PK
V	240.144	36.73	46.00	-9.27	PK
V	288.284	29.47	46.00	-16.53	PK

Test result above 1GHz:

The emission was conducted from 1GHz to 25GHz

802.11b

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2390	46.08	74.00	-27.92	PK
	V	2390	50.91	74.00	-23.09	PK
	V	4824	41.07	74.00	-32.93	PK
M	V	4874	40.05	74.00	-33.95	PK
H	H	2483.5	44.97	74.00	-29.03	PK
	V	2483.5	49.70	74.00	-24.30	PK
	V	2487.275	51.68	74.00	-22.32	PK
	V	7386	41.30	74.00	-32.70	PK

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802.11g

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2390	48.73	74.00	-25.27	PK
	H	2390	30.71	54.00	-23.29	AV
	V	2390	65.52	74.00	-8.48	PK
	V	2390	41.80	54.00	-12.20	AV
	V	4824	40.30	74.00	-26.45	PK
M	V	4874	39.00	74.00	-35.00	PK
H	H	2483.5	54.55	74.00	-19.45	PK
	H	2483.5	32.59	54.00	-21.41	AV
	V	2483.5	69.16	74.00	-4.84	PK
	V	2483.5	47.19	54.00	-6.81	AV
	V	4924	40.01	74.00	-25.09	PK

802.11n(HT20)

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2390	46.07	74.00	-27.93	PK
	H	2390	30.38	54.00	-23.62	AV
	V	2390	65.28	74.00	-8.72	PK
	V	2390	41.70	54.00	-12.30	AV
	V	7236	42.85	74.00	-31.15	PK
M	V	7311	41.68	74.00	-32.32	PK
H	H	2483.5	50.98	74.00	-23.02	PK
	H	2483.5	30.74	54.00	-23.26	AV
	V	2483.5	58.74	74.00	-15.26	PK
	V	2483.5	35.59	54.00	-18.41	AV
	V	4924	40.40	74.00	-33.60	PK

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Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Corrected Reading - Limit
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = $30.20 + 2.00 - 32.00 = 0.20\text{dB/m}$;
Corrected Reading = $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$;
Margin = $10.20\text{dBuV/m} - 40.00\text{dBuV/m} = -29.80\text{dB}$.

TEST REPORT

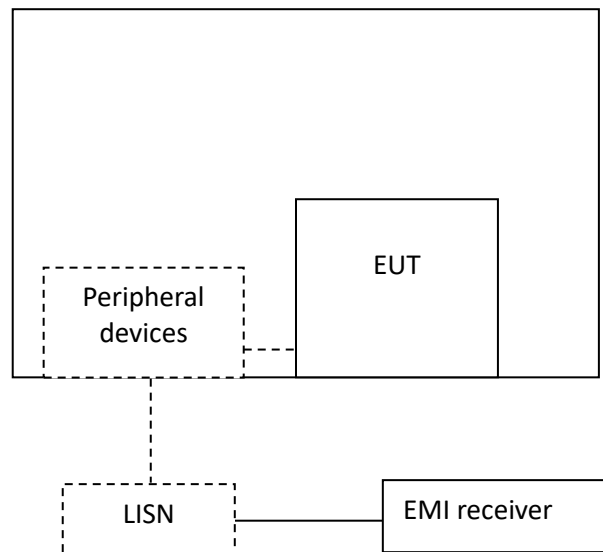
8 Power line conducted emission

Test result: Pass

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

8.2 Test Configuration



TEST REPORT**8.3 Measurement Procedure**

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

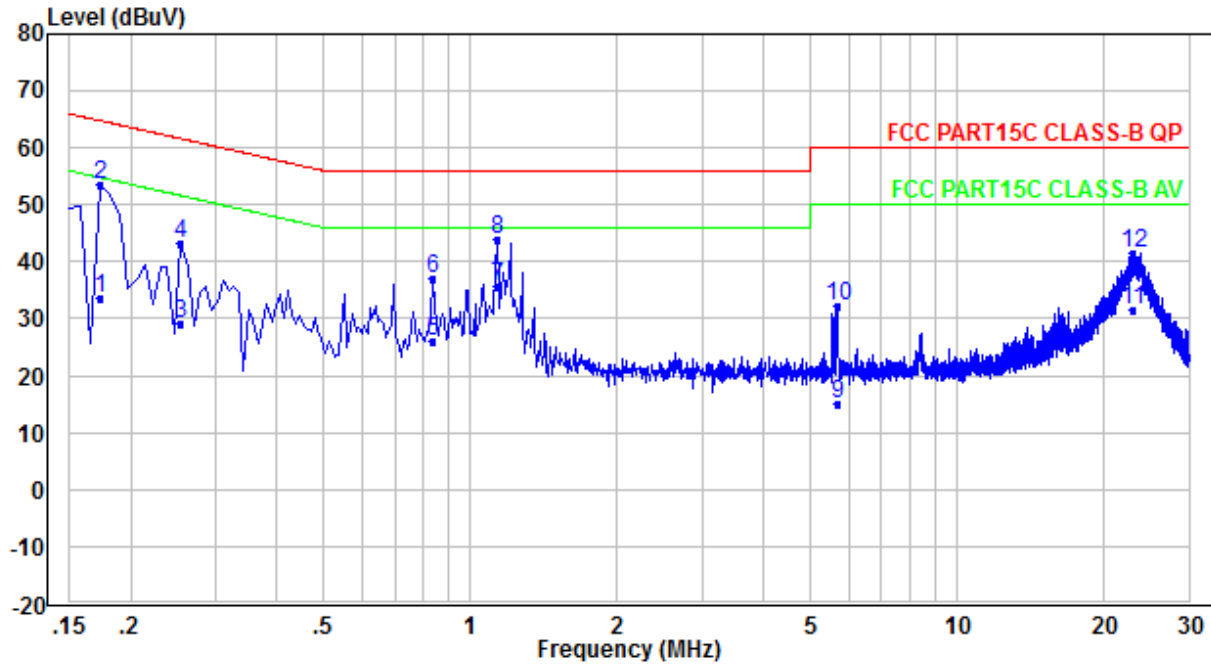
The bandwidth of the test receiver is set at 9 kHz.

TEST REPORT

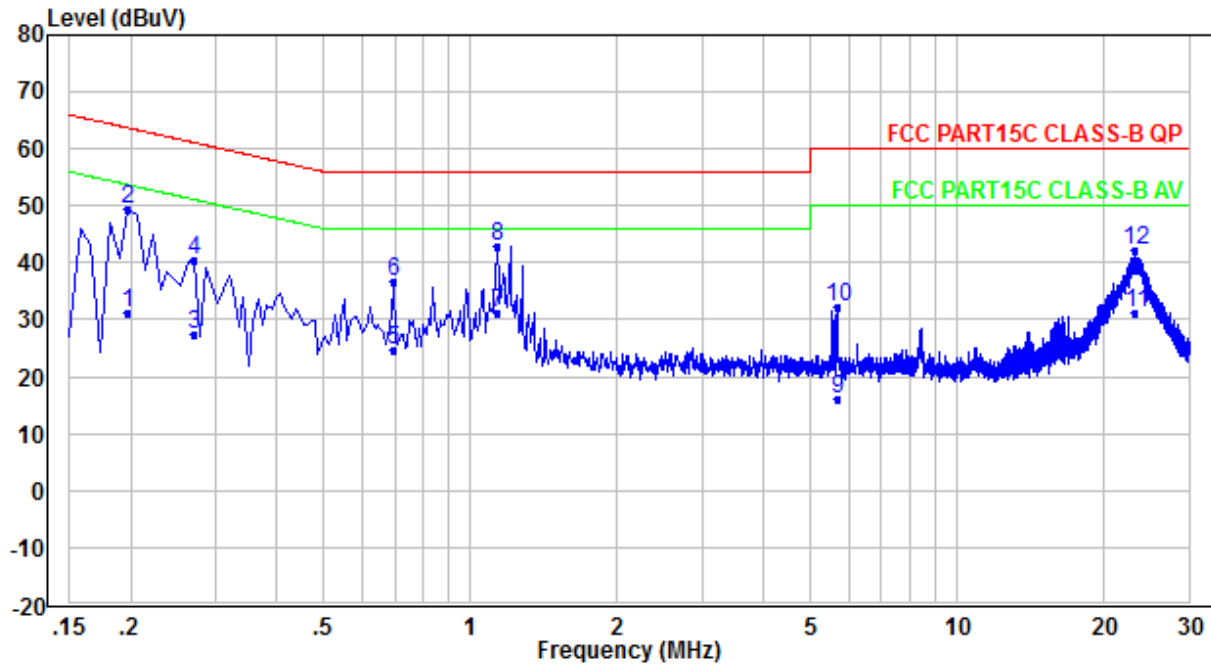
8.4 Test Results of Power line conducted emission

Test Curve:

Live Line



Neutral Line



TEST REPORT

Test Data:

Live Line

No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.174	23.42	10.13	33.55	54.77	-21.22	Average
2	0.174	43.42	10.13	53.55	64.77	-11.22	QP
3	0.254	19.05	10.13	29.18	51.63	-22.45	Average
4	0.254	33.05	10.13	43.18	61.63	-18.45	QP
5	0.838	15.82	10.20	26.02	46.00	-19.98	Average
6	0.838	26.82	10.20	37.02	56.00	-18.98	QP
7	1.134	25.57	10.22	35.79	46.00	-10.21	Average
8	1.134	33.57	10.22	43.79	56.00	-12.21	QP
9	5.669	4.85	10.37	15.22	50.00	-34.78	Average
10	5.669	21.85	10.37	32.22	60.00	-27.78	QP
11	22.953	20.62	10.95	31.57	50.00	-18.43	Average
12	22.953	30.62	10.95	41.57	60.00	-18.43	QP

Neutral Line

No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.198	21.15	10.11	31.26	53.69	-22.43	Average
2	0.198	39.15	10.11	49.26	63.69	-14.43	QP
3	0.270	17.25	10.11	27.36	51.12	-23.76	Average
4	0.270	30.25	10.11	40.36	61.12	-20.76	QP
5	0.694	14.39	10.14	24.53	46.00	-21.47	Average
6	0.694	26.39	10.14	36.53	56.00	-19.47	QP
7	1.134	20.89	10.15	31.04	46.00	-14.96	Average
8	1.134	32.89	10.15	43.04	56.00	-12.96	QP
9	5.669	5.76	10.40	16.16	50.00	-33.84	Average
10	5.669	21.76	10.40	32.16	60.00	-27.84	QP
11	23.321	20.09	10.94	31.03	50.00	-18.97	Average
12	23.321	31.09	10.94	42.03	60.00	-17.97	QP

Remark: 1. Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.

2. Result = Original Receiver Reading + Correct Factor

3. Margin = Result - Limit

4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

TEST REPORT

9 Occupied Bandwidth

Test result: N/A

9.1 Limit

None

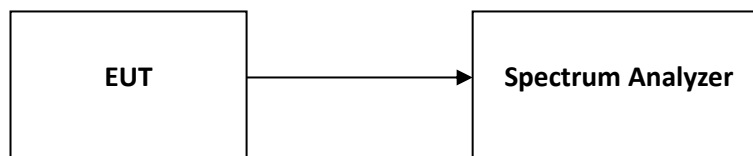
9.2 Measurement Procedure

The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

9.3 Test Configuration



9.4 The results of Occupied Bandwidth

N/A

TEST REPORT

10 Antenna requirement

Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Result:

EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

TEST REPORT

Appendix A: Test results

1. Duty Cycle

1.1 Test Data

WLAN Duty Cycle				
Mode	Test Frequency (MHz)	Ant	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11b	2412	Ant0	98.01	0.00
802.11g	2412	Ant0	93.61	0.29
802.11n (HT20)	2412	Ant0	92.68	0.33

1.2 Test Plots



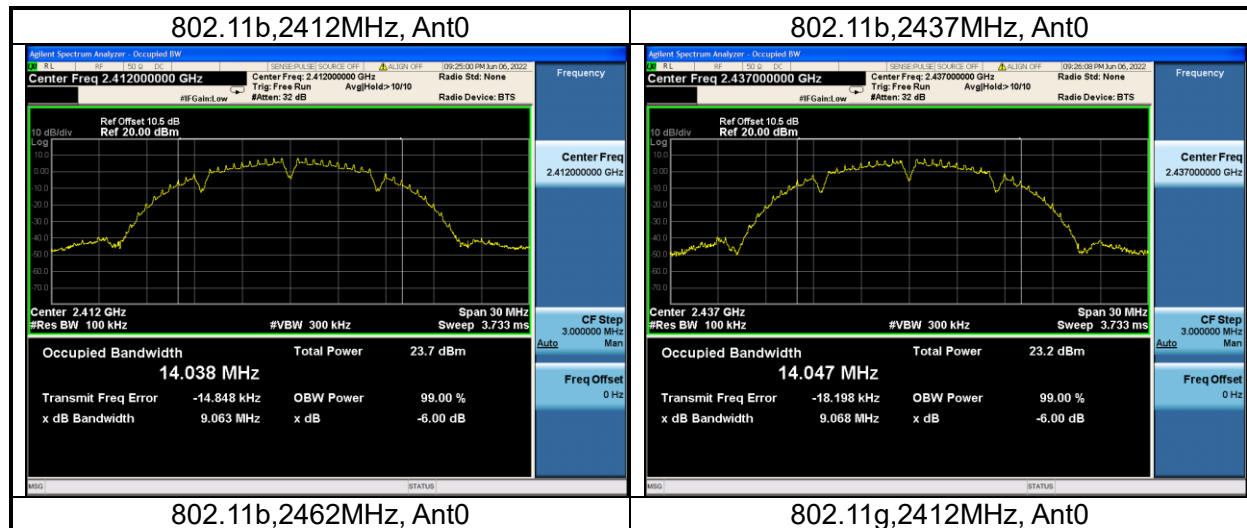
TEST REPORT

2. Minimum 6dB bandwidth

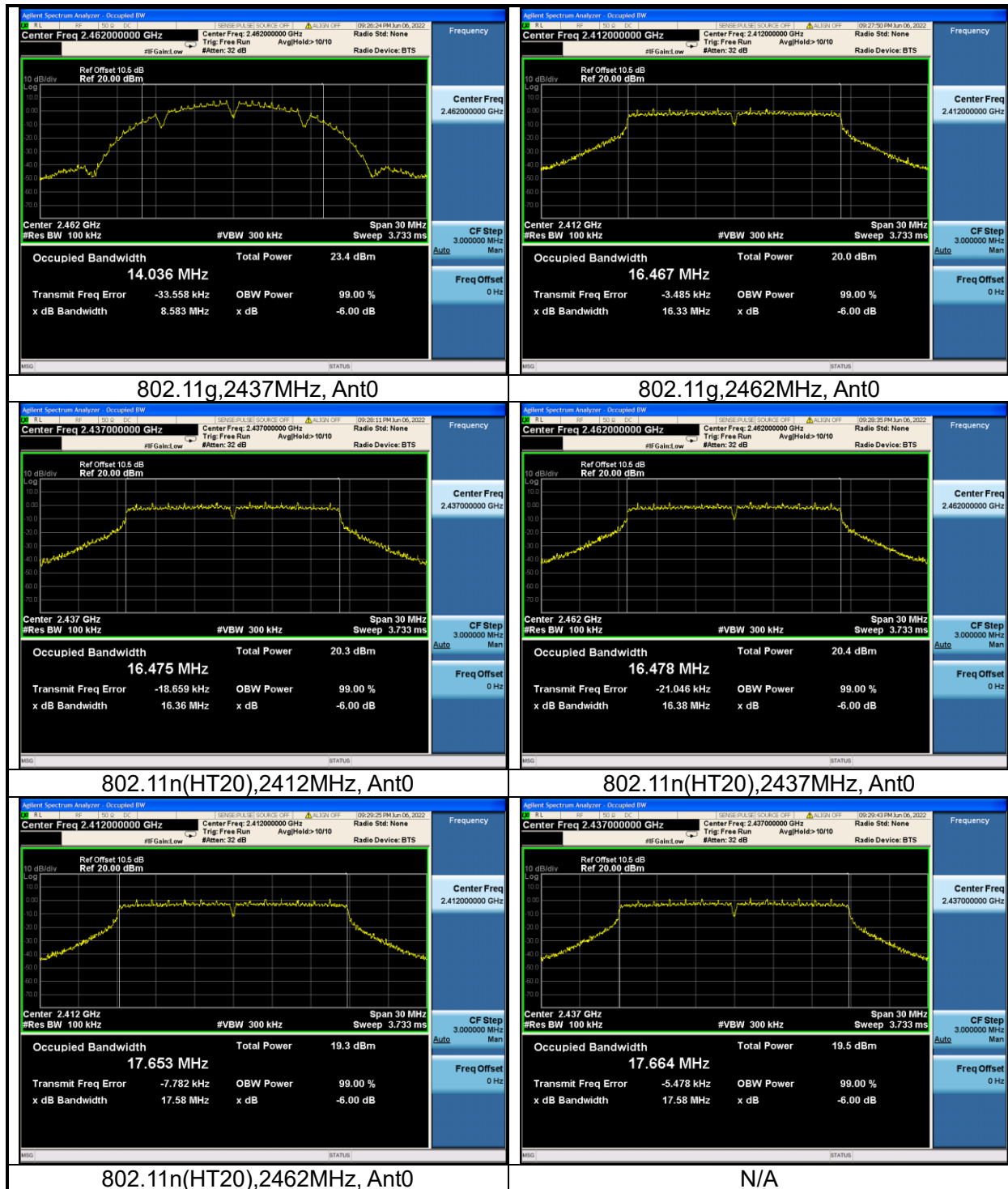
2.1 Test Data

WLAN Occupied 6dB Bandwidth				
Mode	Test Frequency (MHz)	Ant	Occupied Bandwidth (MHz)	Result
802.11b	2412	Ant0	9.063	Pass
802.11b	2437	Ant0	9.068	Pass
802.11b	2462	Ant0	8.583	Pass
802.11g	2412	Ant0	16.33	Pass
802.11g	2437	Ant0	16.36	Pass
802.11g	2462	Ant0	16.38	Pass
802.11n (HT20)	2412	Ant0	17.58	Pass
802.11n (HT20)	2437	Ant0	17.58	Pass
802.11n (HT20)	2462	Ant0	17.56	Pass

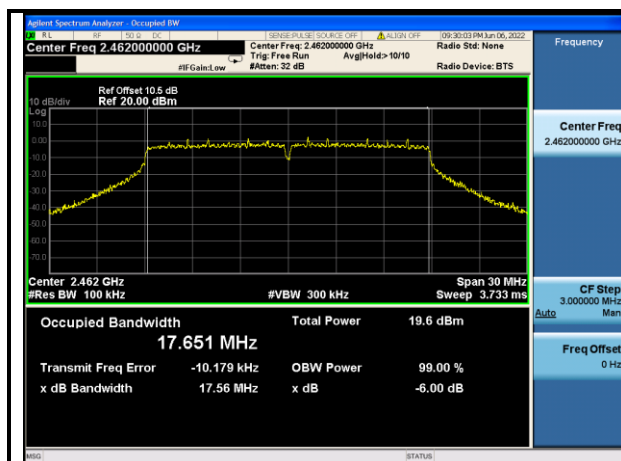
2.2 Test Plots



TEST REPORT



TEST REPORT



N/A

3. Occupied Bandwidth

3.1 Test Data

N/A

3.2 Test Plots

N/A

TEST REPORT

4. Maximum conducted output power

4.1 Test Data

	WLAN Output Power						
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	Max AVG Power (dBm)	Max Peak Power (dBm)	Limit (dBm)	Result
802.11b	2412	Ant0	0.00	17.42	20.10	30	Pass
802.11b	2437	Ant0	0.00	17.49	20.33	30	Pass
802.11b	2462	Ant0	0.00	17.60	20.39	30	Pass
802.11g	2412	Ant0	0.29	14.40	23.60	30	Pass
802.11g	2437	Ant0	0.29	14.61	23.77	30	Pass
802.11g	2462	Ant0	0.29	14.75	23.97	30	Pass
802.11n (HT20)	2412	Ant0	0.33	13.51	22.78	30	Pass
802.11n (HT20)	2437	Ant0	0.33	13.75	23.02	30	Pass
802.11n (HT20)	2462	Ant0	0.33	14.00	23.21	30	Pass

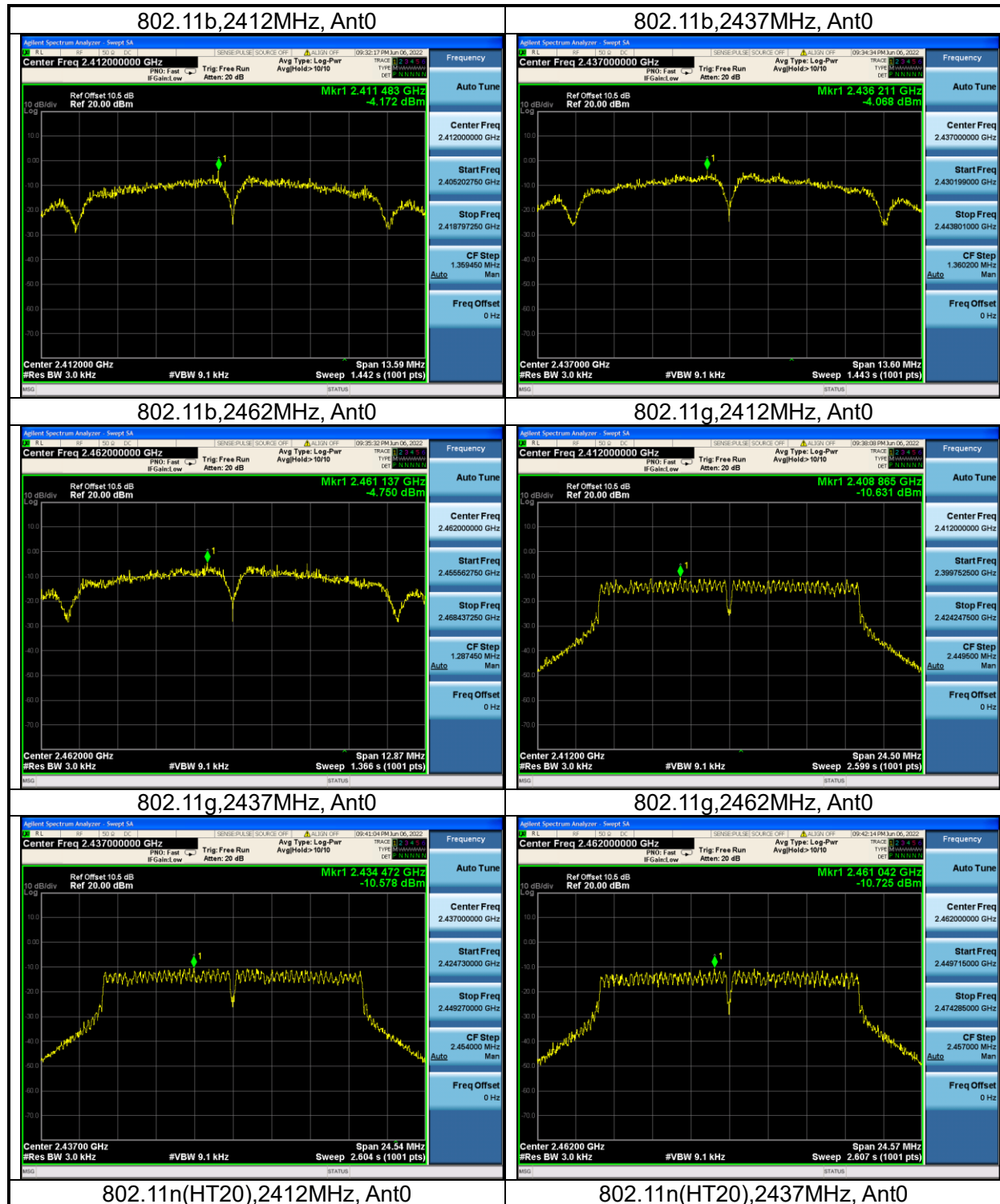
TEST REPORT

5. Power spectrum density

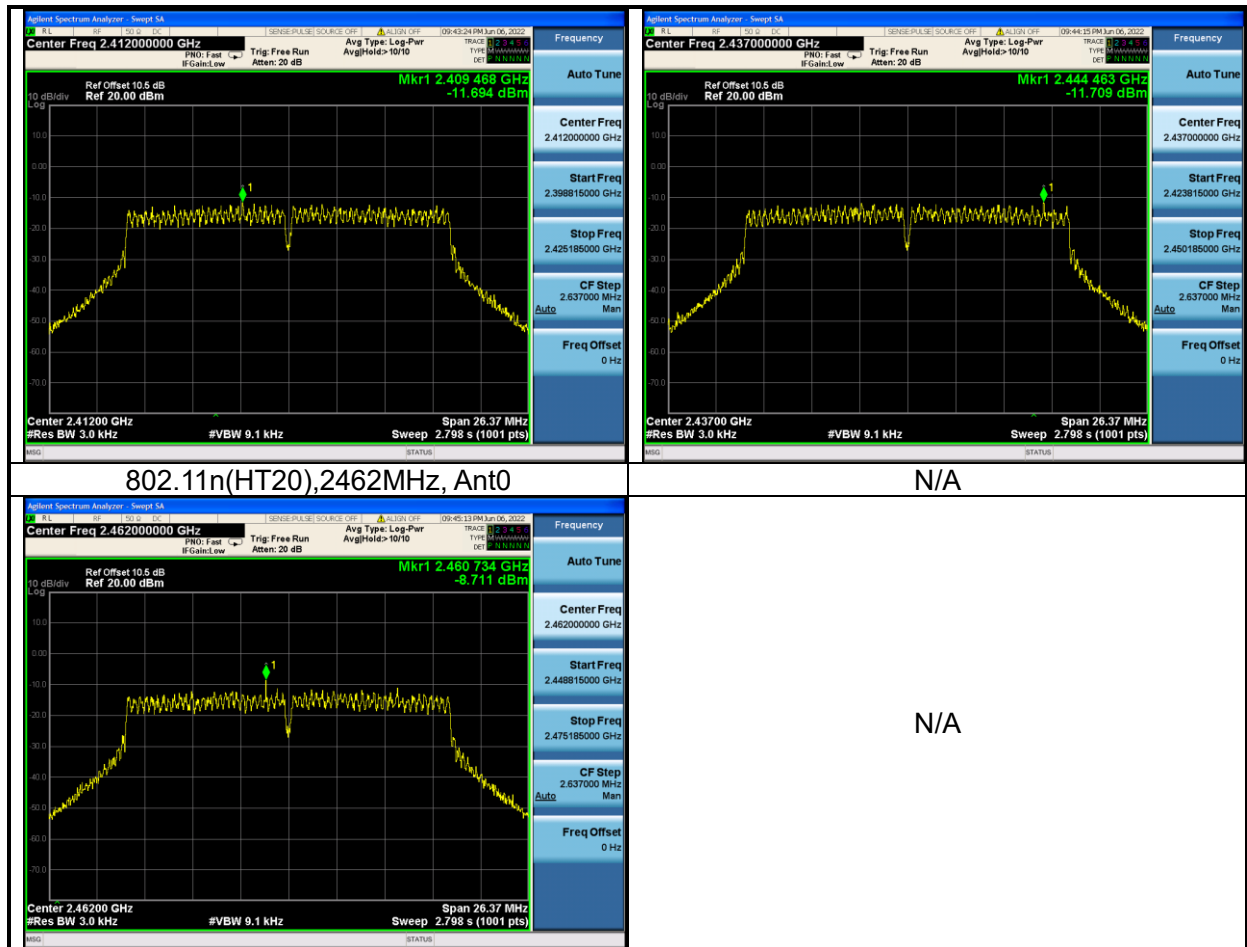
5.1 Test Data

WLAN Peak Power Spectral Density							
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	PSD (dBm)	RBW (kHz)	Limit (dBm)	Result
802.11b	2412	Ant0	0.00	-4.172	3	8	Pass
802.11b	2437	Ant0	0.00	-4.068	3	8	Pass
802.11b	2462	Ant0	0.00	-4.750	3	8	Pass
802.11g	2412	Ant0	0.29	-10.631	3	8	Pass
802.11g	2437	Ant0	0.29	-10.578	3	8	Pass
802.11g	2462	Ant0	0.29	-10.725	3	8	Pass
802.11n (HT20)	2412	Ant0	0.33	-11.694	3	8	Pass
802.11n (HT20)	2437	Ant0	0.33	-11.709	3	8	Pass
802.11n (HT20)	2462	Ant0	0.33	-8.711	3	8	Pass

5.2 Test Plots



TEST REPORT



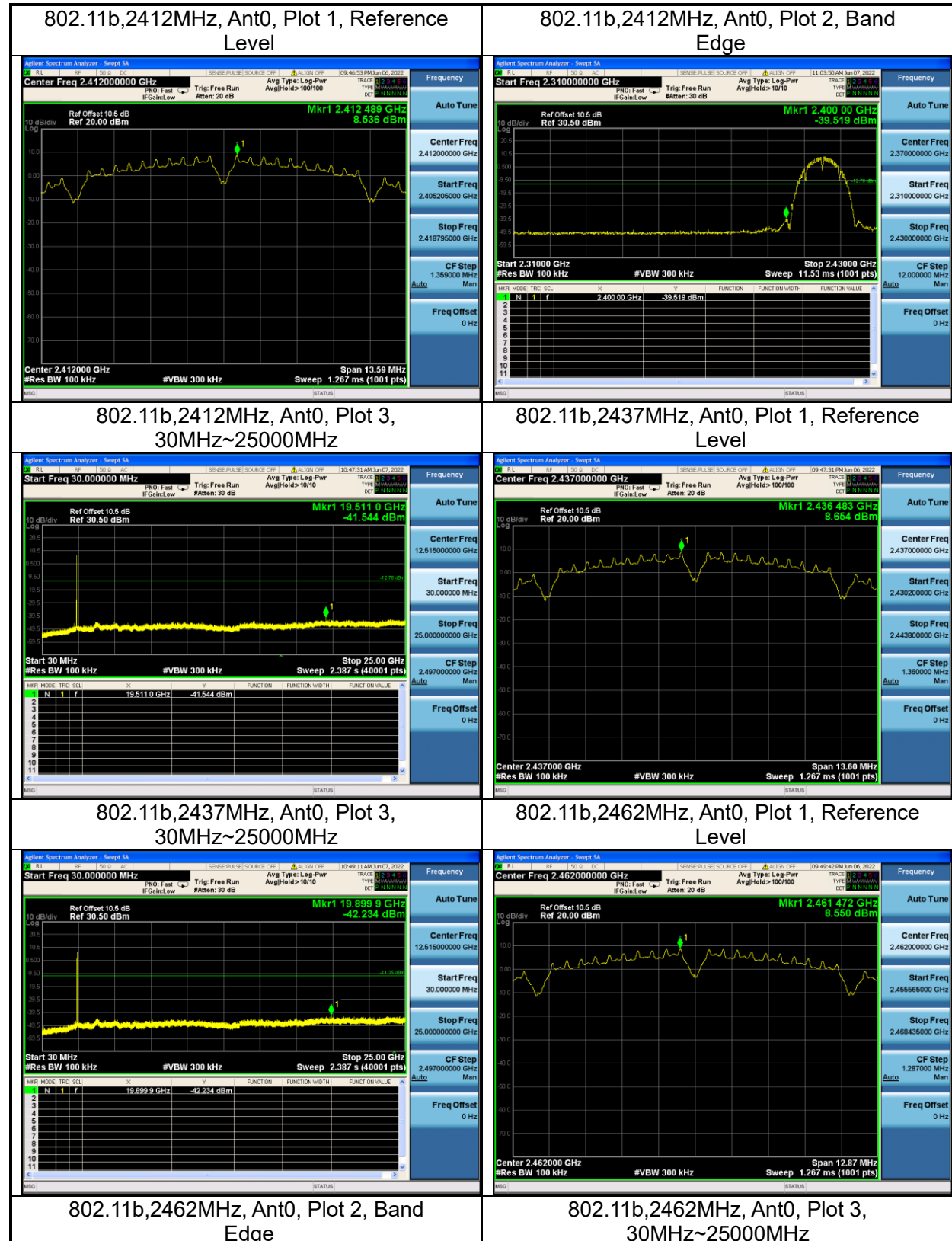
TEST REPORT

6. Emission outside the frequency band

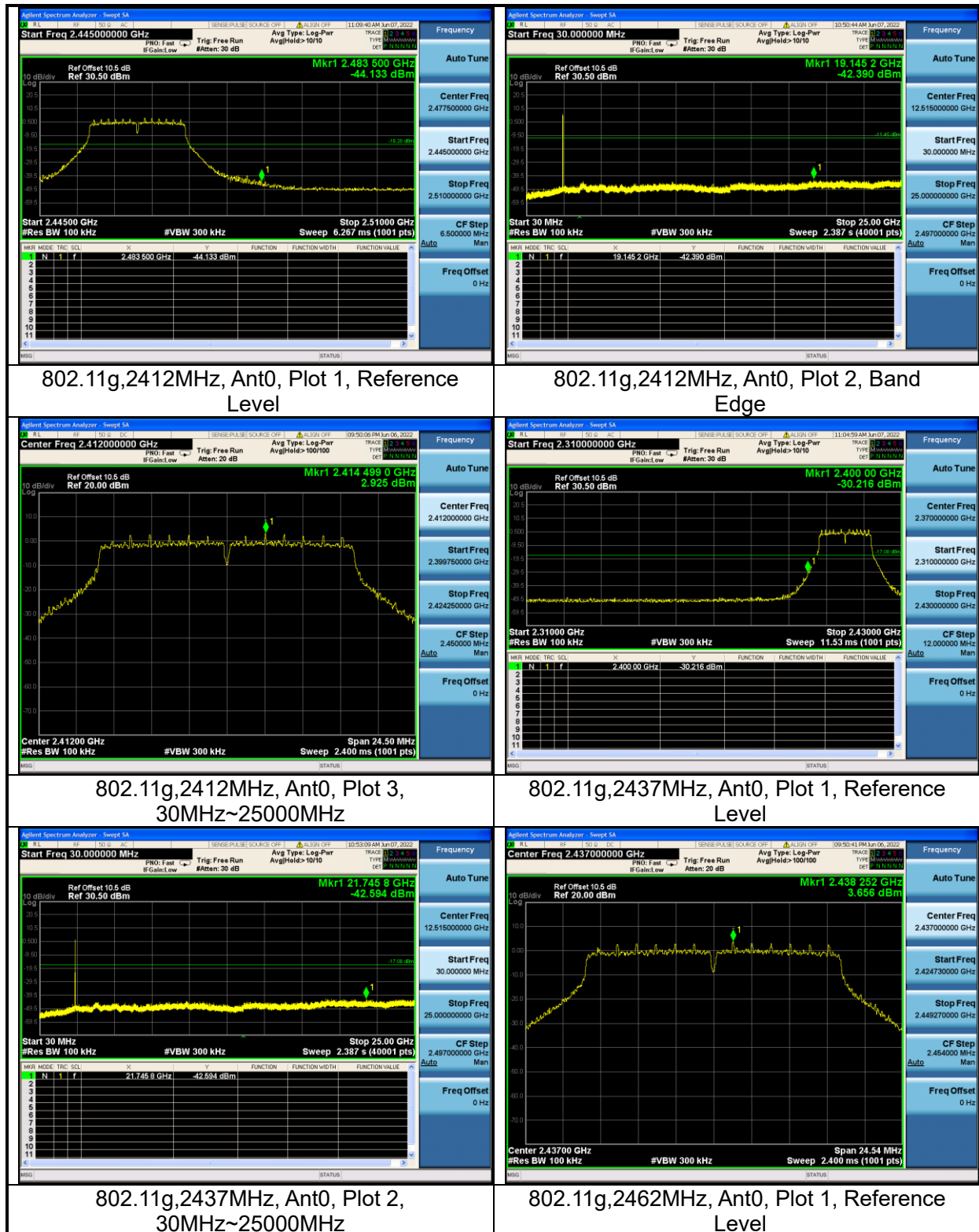
6.1 Test Data

WLAN Transmitter Spurious Emission						
Mode	Test Frequency (MHz)	Ant	Plot No.	Frequency Range	Emission (dBm)	Result
802.11b	2412	Ant0	1	Reference Level	8.536	Pass
802.11b	2412	Ant0	2	Band Edge	-39.519	Pass
802.11b	2412	Ant0	3	30MHz~25000MHz	-41.544	Pass
802.11b	2437	Ant0	1	Reference Level	8.654	Pass
802.11b	2437	Ant0	2	30MHz~25000MHz	-42.234	Pass
802.11b	2462	Ant0	1	Reference Level	8.550	Pass
802.11b	2462	Ant0	2	Band Edge	-44.133	Pass
802.11b	2462	Ant0	3	30MHz~25000MHz	-42.390	Pass
802.11g	2412	Ant0	1	Reference Level	2.925	Pass
802.11g	2412	Ant0	2	Band Edge	-30.216	Pass
802.11g	2412	Ant0	3	30MHz~25000MHz	-42.594	Pass
802.11g	2437	Ant0	1	Reference Level	3.656	Pass
802.11g	2437	Ant0	2	30MHz~25000MHz	-42.082	Pass
802.11g	2462	Ant0	1	Reference Level	3.802	Pass
802.11g	2462	Ant0	2	Band Edge	-44.133	Pass
802.11g	2462	Ant0	3	30MHz~25000MHz	-41.873	Pass
802.11n (HT20)	2412	Ant0	1	Reference Level	1.873	Pass
802.11n (HT20)	2412	Ant0	2	Band Edge	-32.393	Pass
802.11n (HT20)	2412	Ant0	3	30MHz~25000MHz	-41.866	Pass
802.11n (HT20)	2437	Ant0	1	Reference Level	2.822	Pass
802.11n (HT20)	2437	Ant0	2	30MHz~25000MHz	-41.957	Pass
802.11n (HT20)	2462	Ant0	1	Reference Level	3.007	Pass
802.11n (HT20)	2462	Ant0	2	Band Edge	-45.963	Pass
802.11n (HT20)	2462	Ant0	3	30MHz~25000MHz	-41.957	Pass

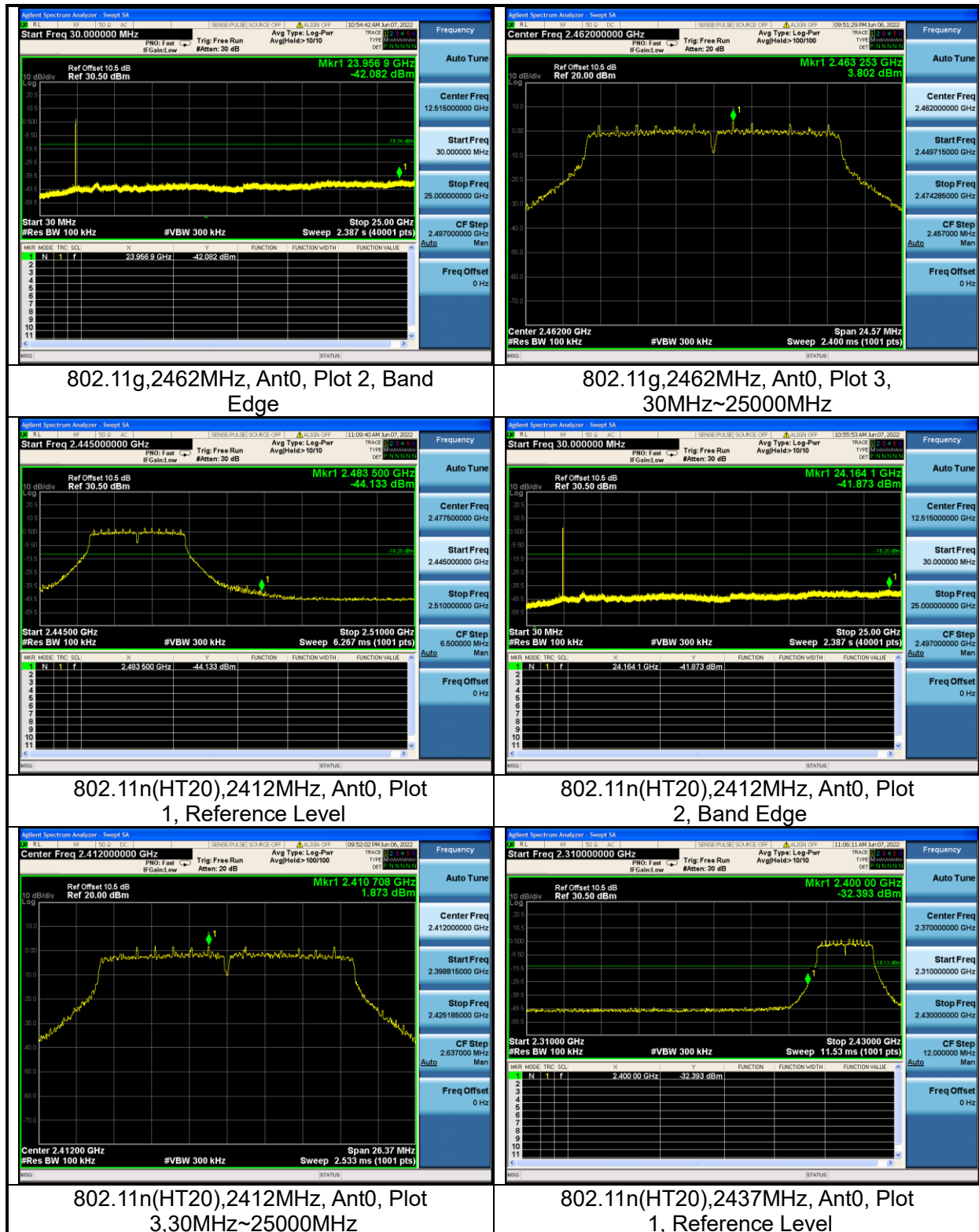
9.2 Test Plots



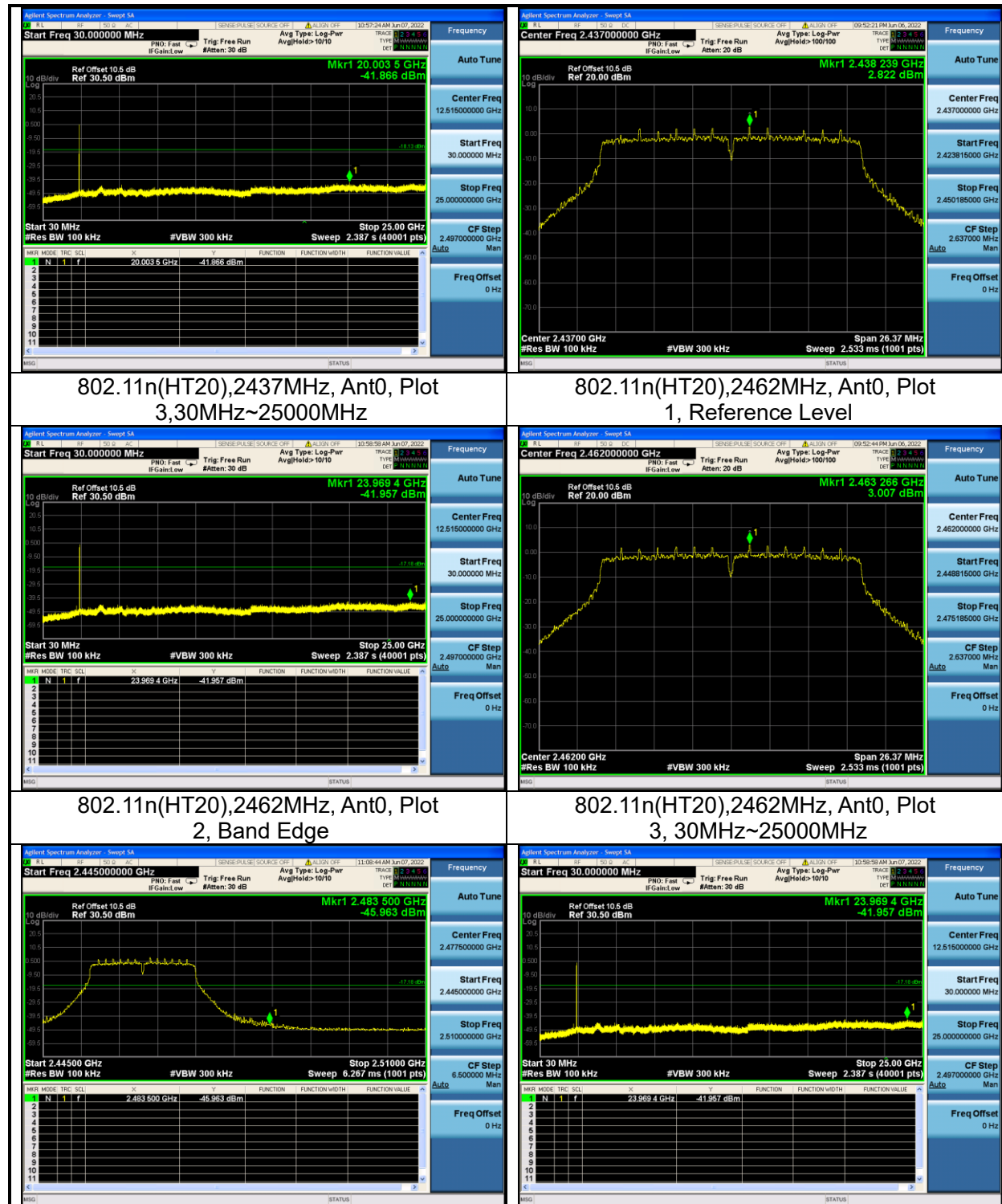
TEST REPORT



TEST REPORT



TEST REPORT



***** END *****