

FCC/IC- TEST REPORT

Report Number : **68.950.15.288.01** Date of Issue: October 28, 2015

Model : **Le Max**

Product Type : TD LTE digital mobile phone

Applicant : Lemobile Information Technology (Beijing) Co., Ltd

Address : WENHUAYING NORTH (No.1, LINKONG 2nd St), GAOLIYING,
SHUNYI DISTRICT, BEIJING, China

Production Facility : MAINTEK COMPUTER (SUZHOU) CO LTD

Address : NO. 233, JIN FENG ROAD, NEW DISTRICT, SUZHOU, CHINA

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including
Appendices : 115

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China

FCC Registration Number: 502708

Telephone: 86 755 8828 6998
Fax: 86 755 828 5299

Test Site 2

Company name: Shenzhen Academy of Metrology and Quality Inspection
National Digital Electronic Product Testing Center
NETC Building, No.4 Tongfa Rd., Xili,
Nanshan, Shenzhen,
China

FCC Registration Number: 97379(open area test site) and
274801(semi anechoic chamber).

Telephone: +86 755 8692 8965
Fax: +86 755 8600 9898-31396

Remark: All test items were performed at Site 2.

3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	TD LTE digital mobile phone
Model no.:	Le Max
FCC ID:	2AFWMLEMAX
Options and accessories:	NIL
Rating:	DC 3.8V by Li-ion Battery or DC 5.0V/2A by adapter Powered by external power supply: Adaptor Input: 100-240VAC, 50/60Hz; 500mA Adaptor Output: 5.0V, 2A
RF Transmission Frequency:	2412-2462MHz for 802.11b/g/n-HT20 2422-2452MHz for 802.11n-HT40
No. of Operated Channel:	11
Modulation:	OFDM, DSSS
Antenna Type:	PIFA Antenna
Antenna Gain:	1.4dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Mobile Phone with WIFI function which operated at 2.4GHz

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2014 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 DTS Meas Guidance v03r03 and ANSI C63.10 (2014).

5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C						
Test Condition		Pages	Test Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	10	Site 2	☒	☐	☐
§15.247 (b) (1)	Conducted peak output power	14	Site 2	☒	☐	☐
§15.247(a)(1)	20dB bandwidth	---	---	☐	☐	☒
§15.247(a)(1)	Carrier frequency separation	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Dwell Time	---	---	☐	☐	☒
§15.247(a)(2)	6dB Bandwidth	21	Site 2	☒	☐	☐
§15.247(e)	Power spectral density	28	Site 2	☒	☐	☐
§15.247(d)	Spurious RF conducted emissions	35	Site 2	☒	☐	☐
§15.247(d)	Band edge	48	Site 2	☒	☐	☐
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	53	Site 2	☒	☐	☐
§15.203	Antenna requirement	See note 1		☒	☐	☐

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses an internal antenna, which gain is 1.4dBi. According to §15.203 and RSSGEN 8.3, it is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AFWMLEMAX complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: September 6, 2015

Testing Start Date: September 7, 2015

Testing End Date: October 27, 2015

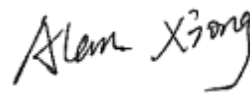
- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

Prepared by:



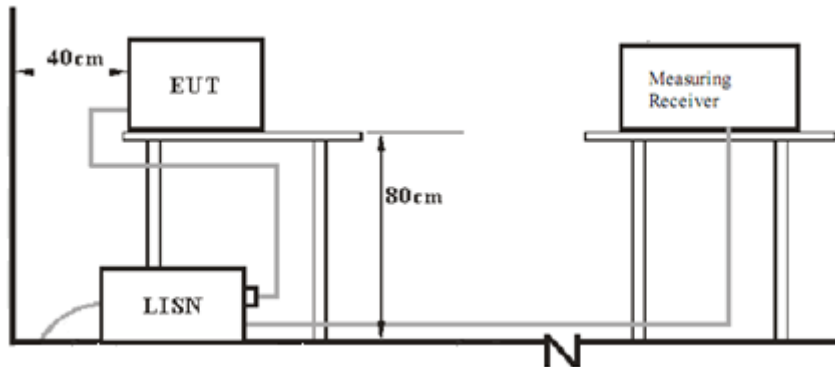
John Zhi
EMC Project Manager



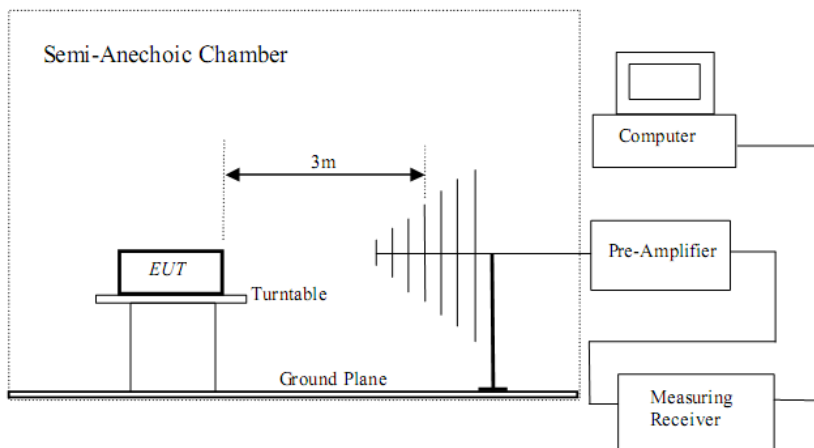
Alan Xiong
EMC Project Engineer

7 Test Setups

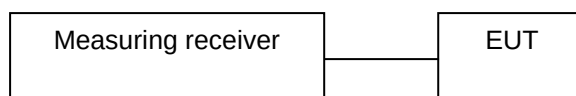
7.1 AC Power Line Conducted Emission test setups



7.1 Radiated test setups



7.2 Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
---	---	---	---

The system was configured to non-hopping mode.

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

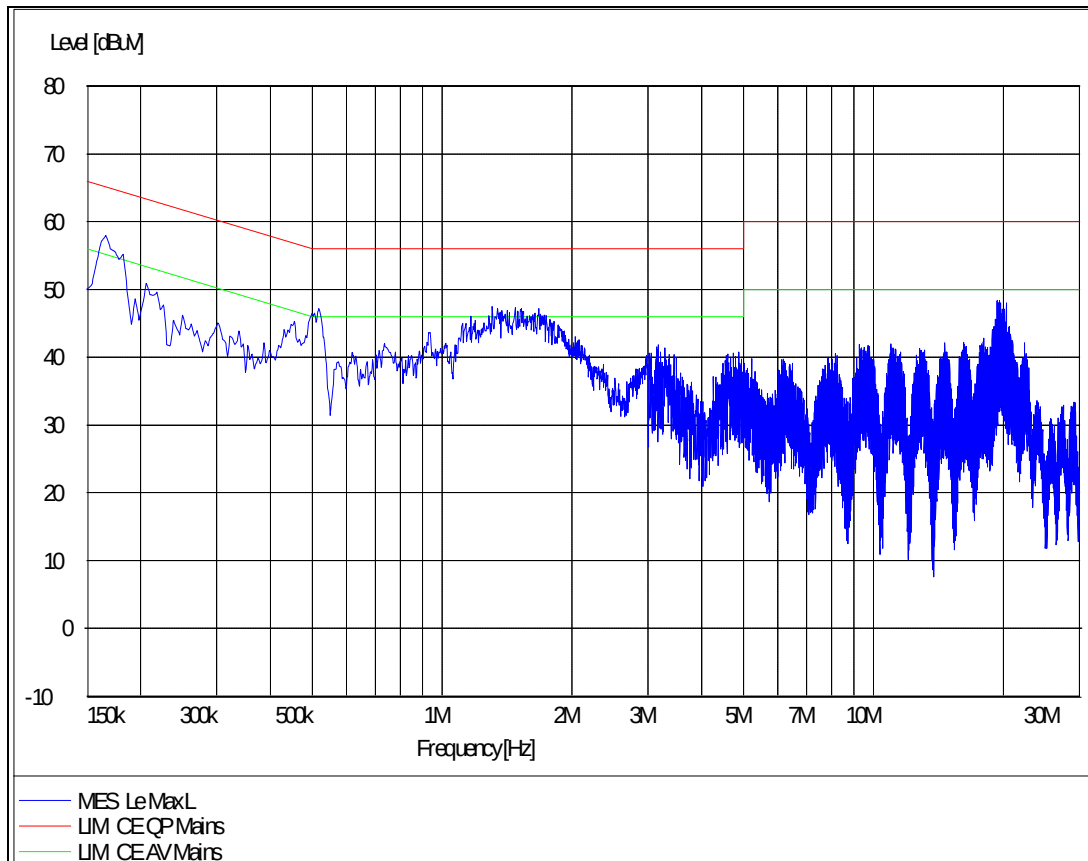
According to §15.207, conducted emissions limit as below:

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

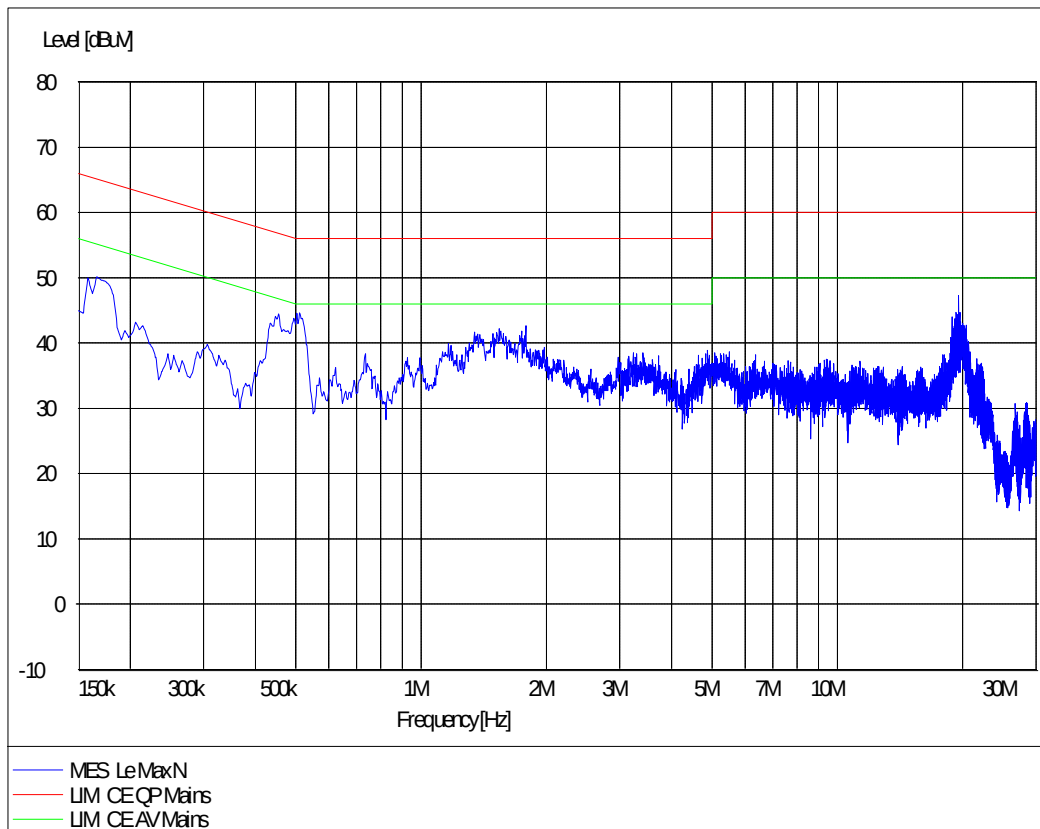
Conducted Emission

Product Type : TD LTE digital mobile phone
M/N : Le Max
Operating Condition : Charging and Transmitting
Test Specification : Line
Comment : AC 120V/60Hz



Conducted Emission

Product Type : TD LTE digital mobile phone
M/N : Le Max
Operating Condition : Charging and Transmitting
Test Specification : Neutral
Comment : AC 120V/60Hz



Conducted Emission

Model No.: Le Max								
Test mode: Charging and transmitter								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
Line	0.166	9.7	38.5	48.2	65.2	22.3	32.0	55.2
	0.518	9.8	32.4	42.2	56.0	22.9	32.7	46.0
	1.342	9.8	31.6	41.4	56.0	21.0	30.8	46.0
	1.498	9.8	31.7	41.5	56.0	21.4	31.2	46.0
	1.670	9.8	30.9	40.7	56.0	20.6	30.4	46.0
	19.384	9.9	32.4	42.3	60.0	22.8	32.7	50.0
Neutral	0.446	9.7	29.7	39.4	56.9	22.9	32.6	46.9
	0.510	9.8	29.7	39.5	56.0	22.2	32.0	46.0
	1.538	9.8	26.8	36.6	56.0	19.4	29.2	46.0
	19.512	9.9	27.6	37.5	60.0	21.7	31.6	50.0
	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)
 3. The other emission levels were very low against the limit.

9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
RBW > the 6 dB bandwidth of the emission being measured, VBW $\geq$ 3RBW, Span $\geq$ 3RBW
Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Use a power meter to measure the conducted peak output power.

Limits

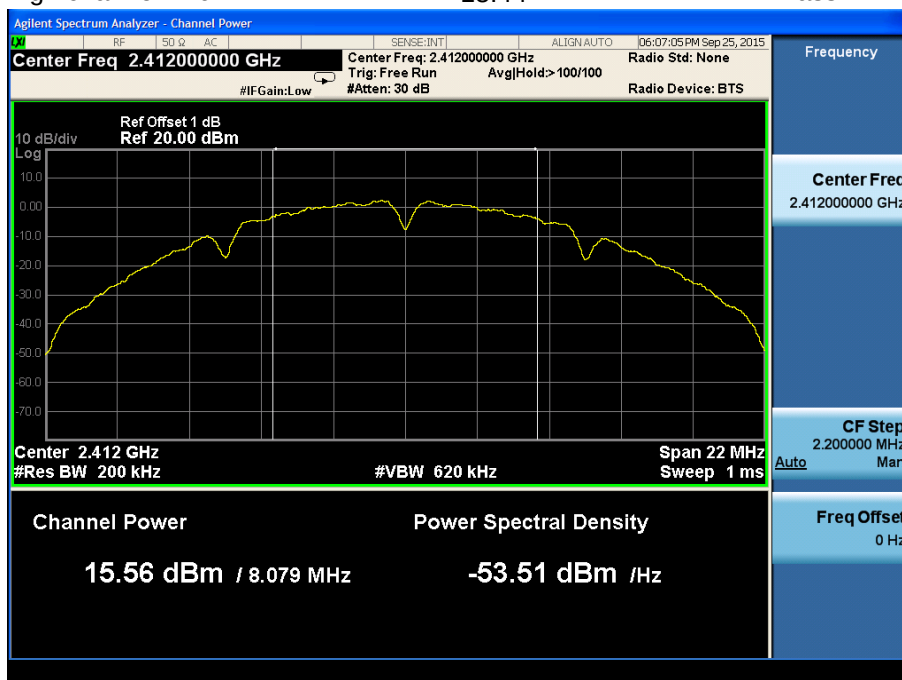
According to §15.247 (b) (1), conducted peak output power limit as below:

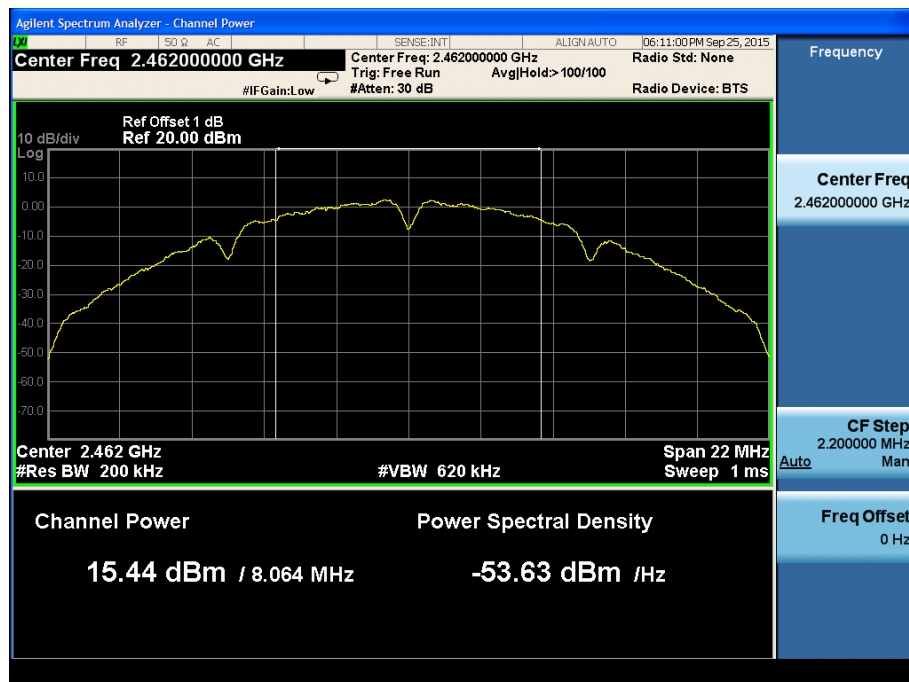
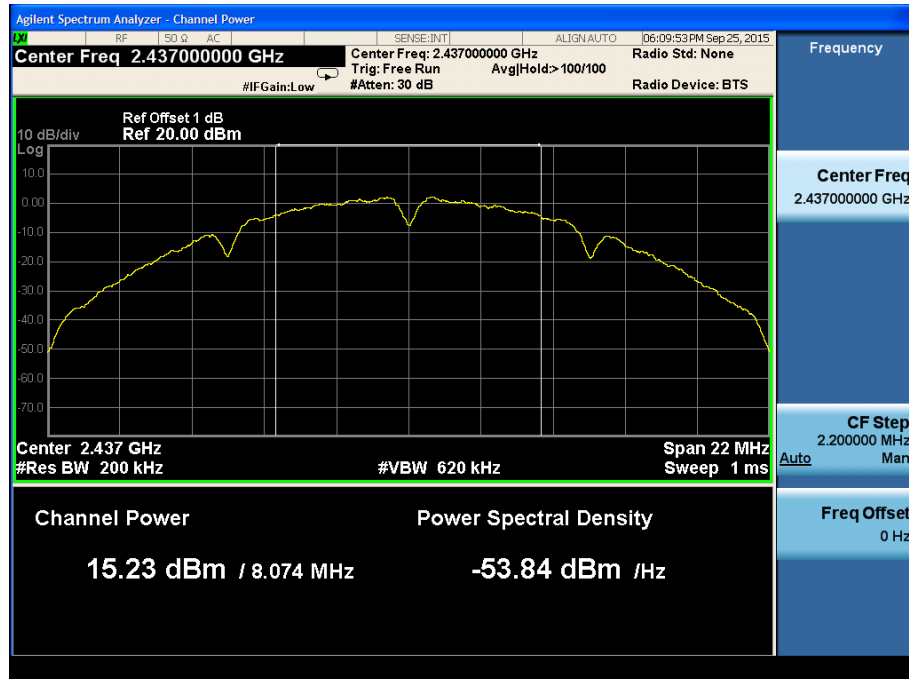
Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

Test result as below table

802.11B

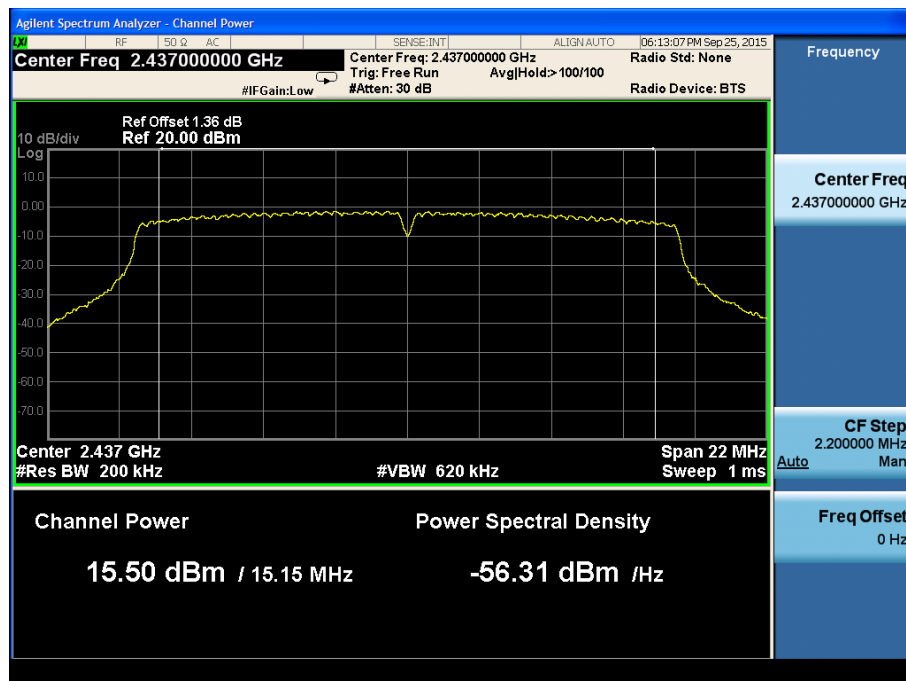
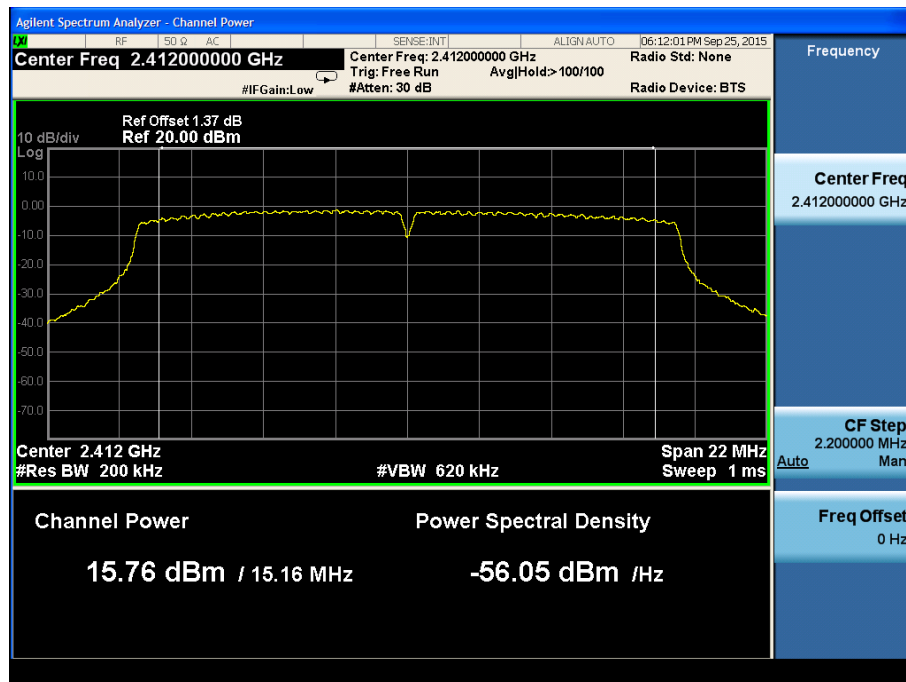
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2412MHz	15.56	Pass
Middle channel 2437MHz	15.23	Pass
High channel 2462MHz	15.44	Pass

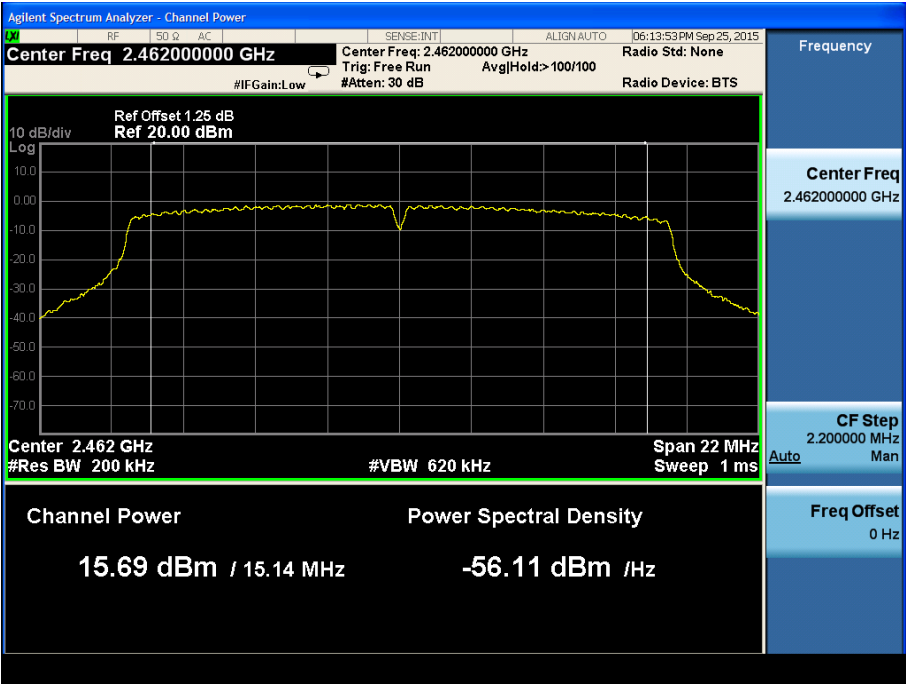




802.11G

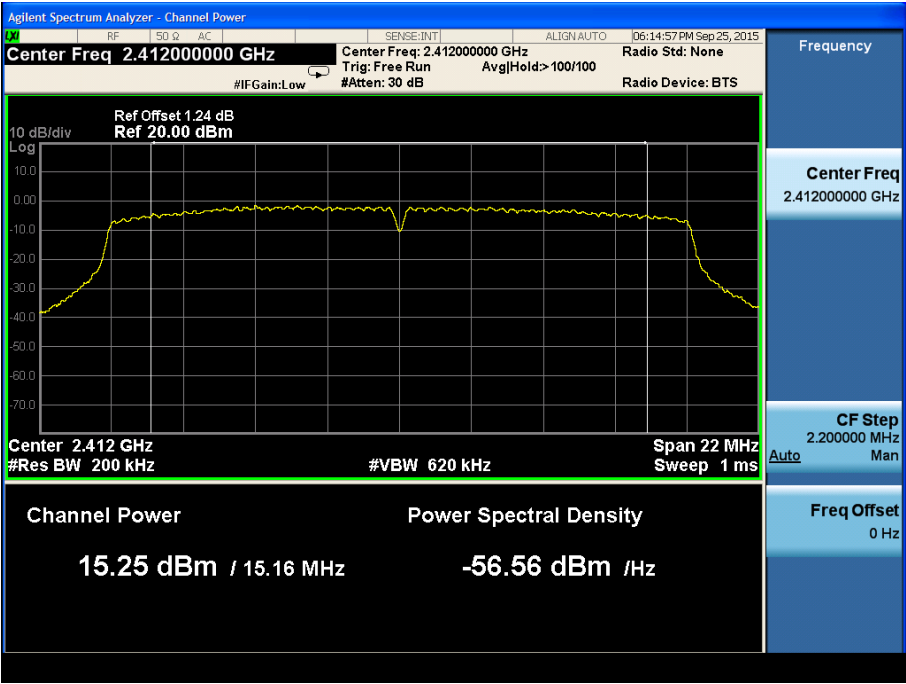
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2412MHz	15.76	Pass
Middle channel 2437MHz	15.50	Pass
High channel 2462MHz	15.69	Pass

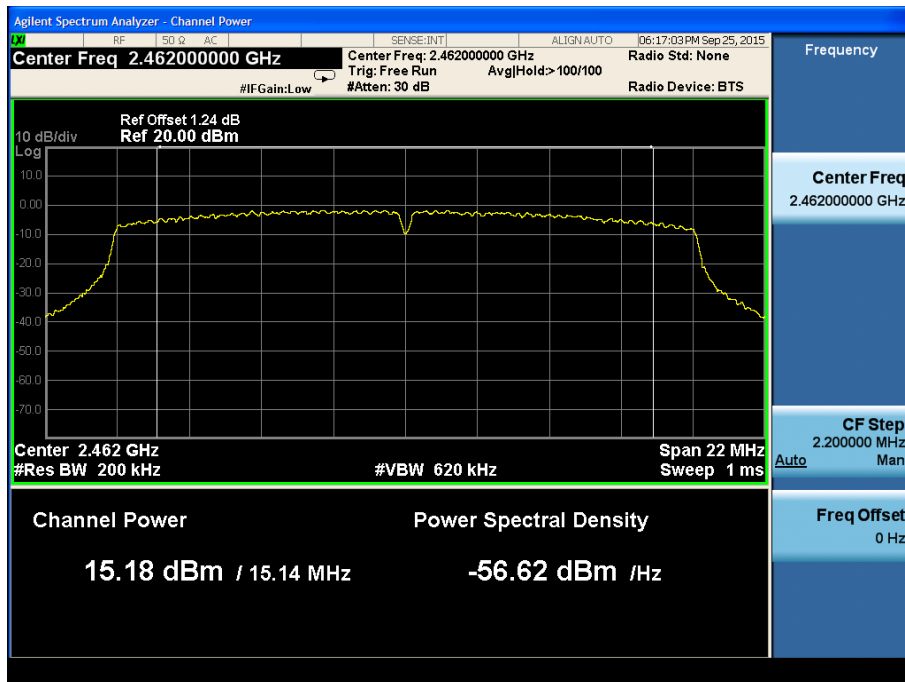
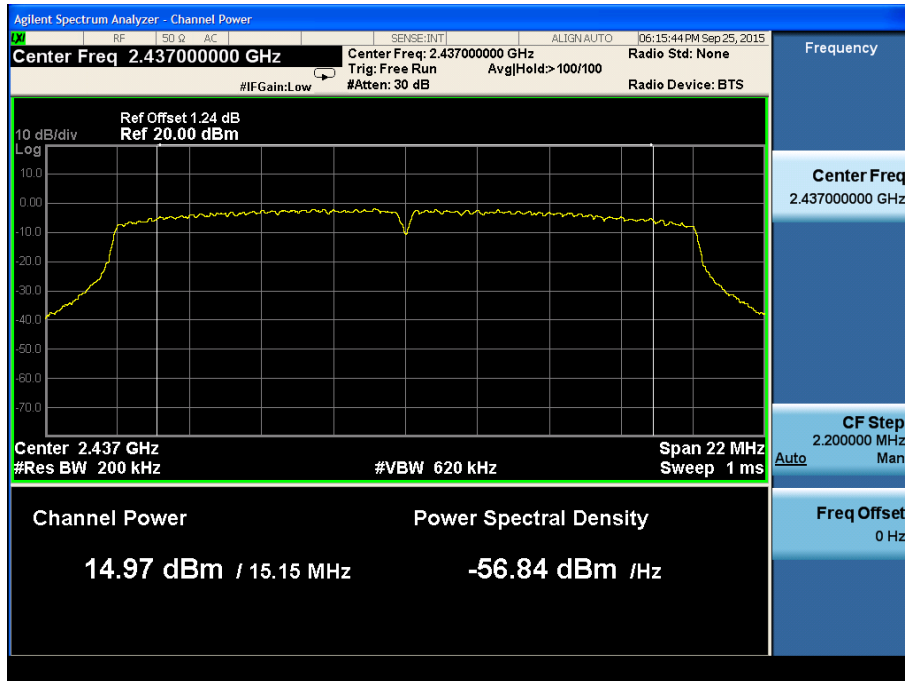




802.11N20

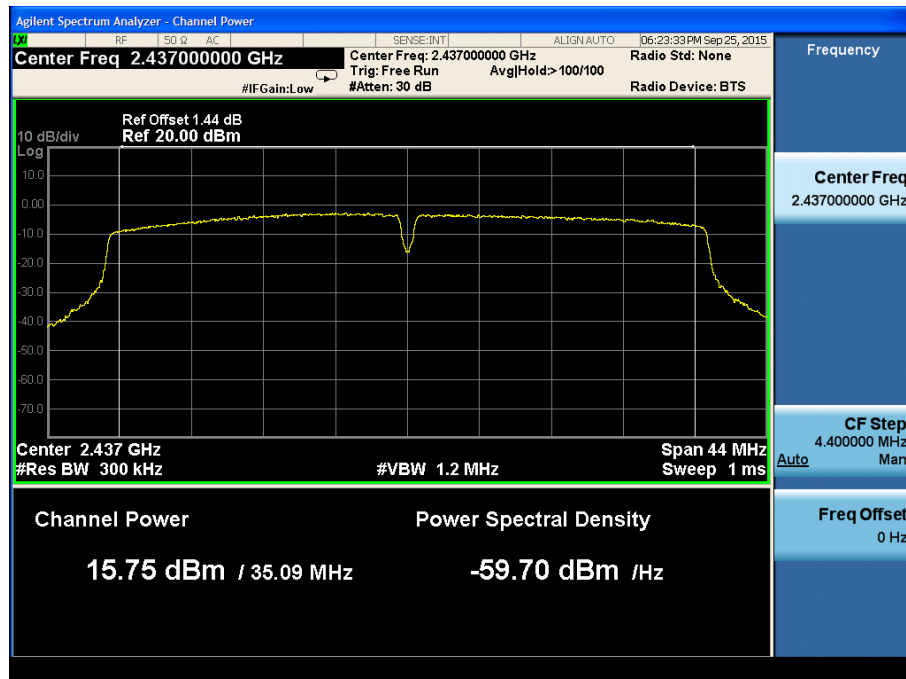
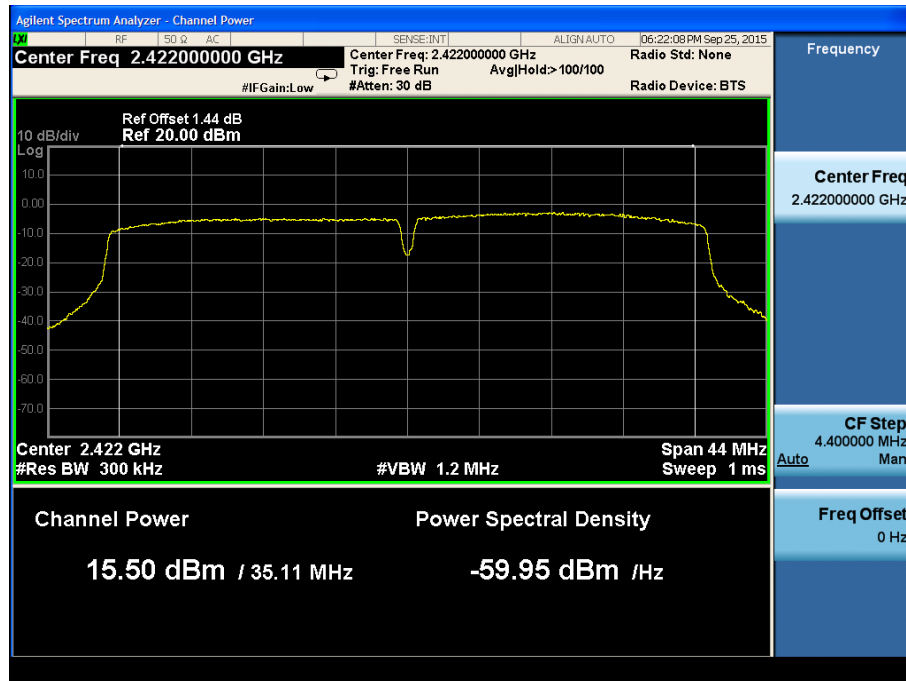
Frequency	Conducted Peak	
MHz	Output Power	Result
Low channel 2412MHz	15.25	Pass
Middle channel 2437MHz	14.97	Pass
High channel 2462MHz	15.18	Pass

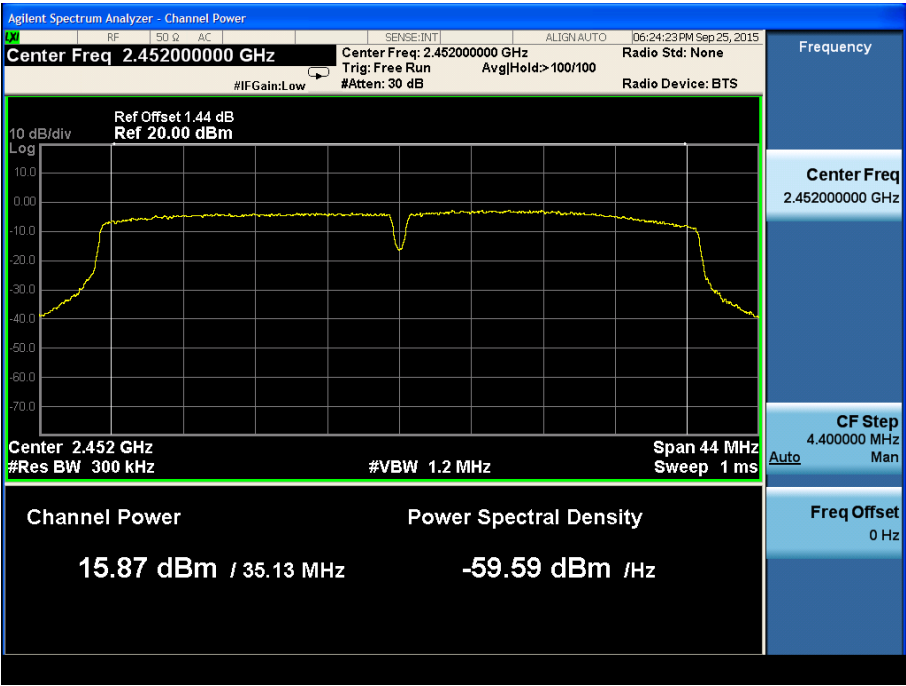




802.11N40

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2422MHz	15.50	Pass
Middle channel 2437MHz	15.75	Pass
High channel 2452MHz	15.87	Pass







9.3 6dB Bandwidth

Test Method

- 1. Use the following spectrum analyzer settings:
RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
- 3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]

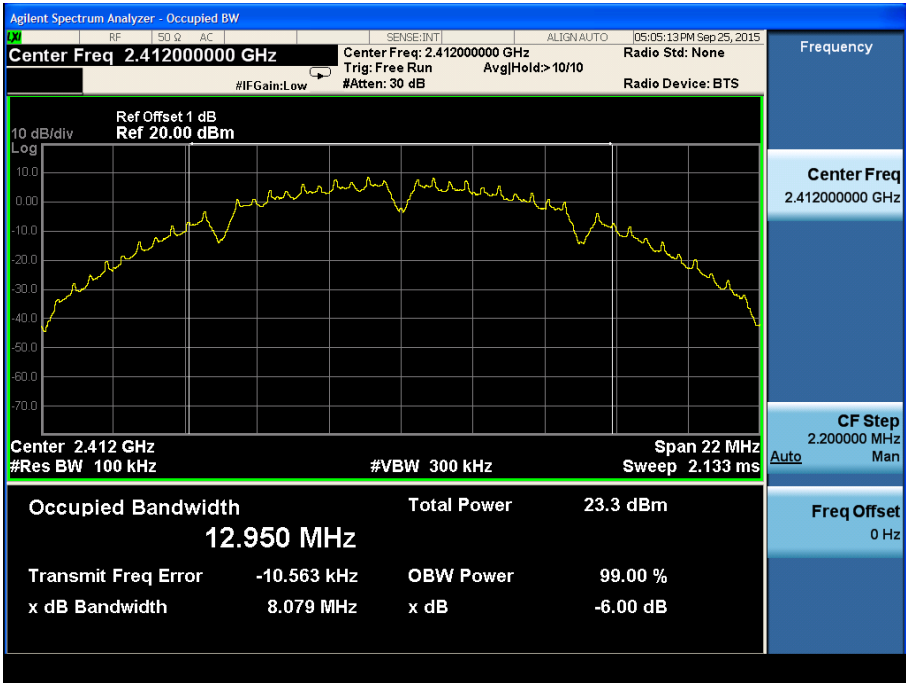
≥500

Test result

802.11B

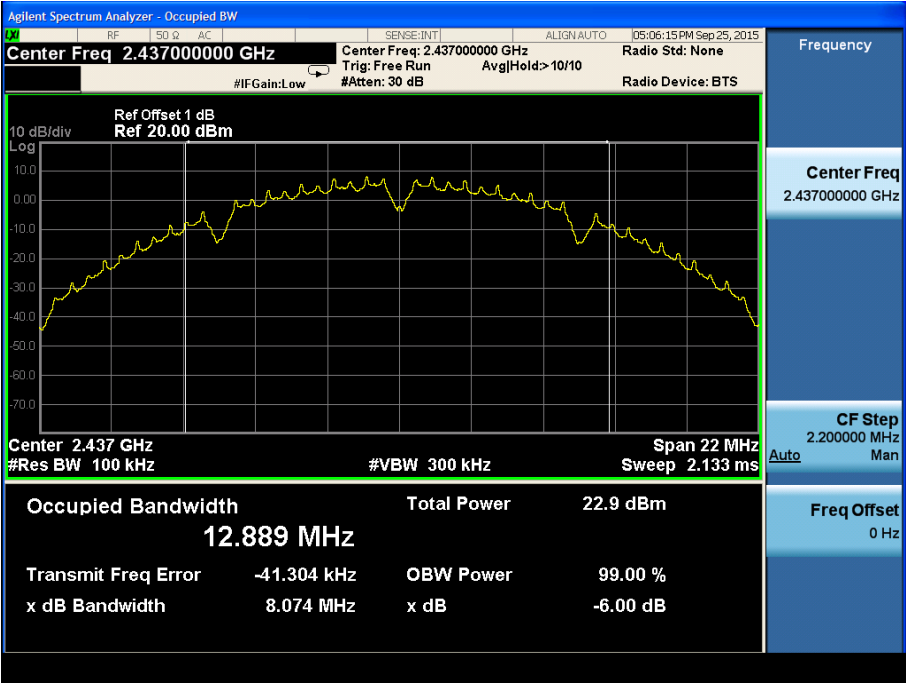
Frequency MHz	6dB bandwidth MHz	Result
Low channel 2412MHz	8.079	Pass
Middle channel 2437MHz	8.074	Pass
High channel 2462MHz	8.064	Pass

2412MHz

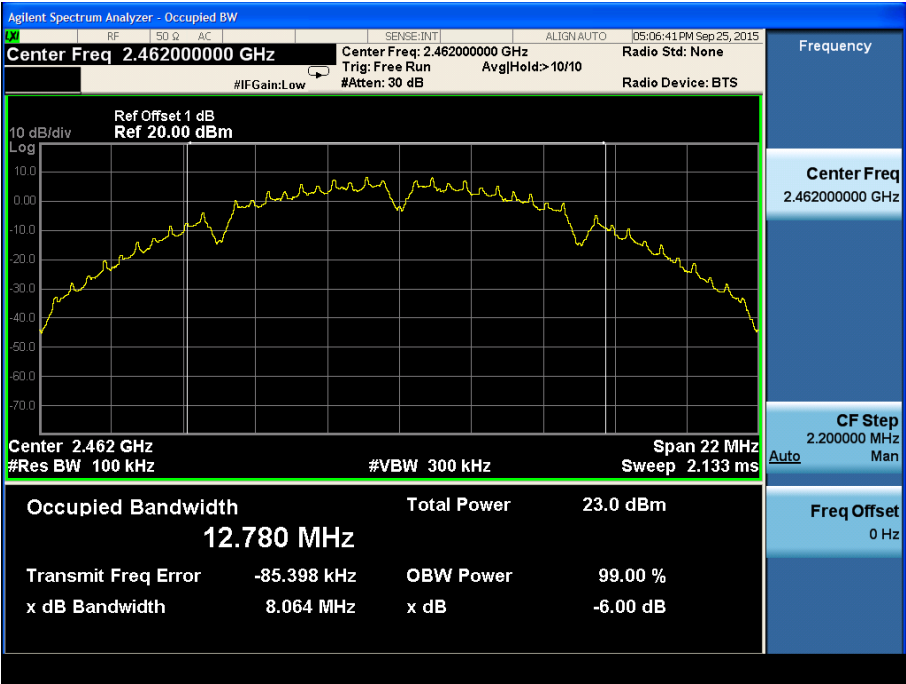




2437MHz



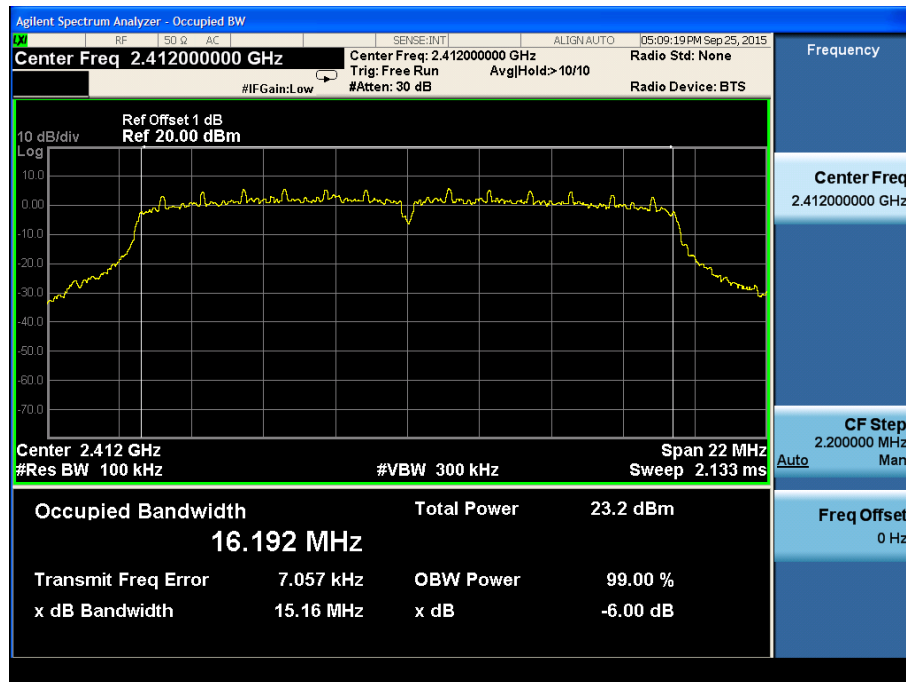
2462MHz



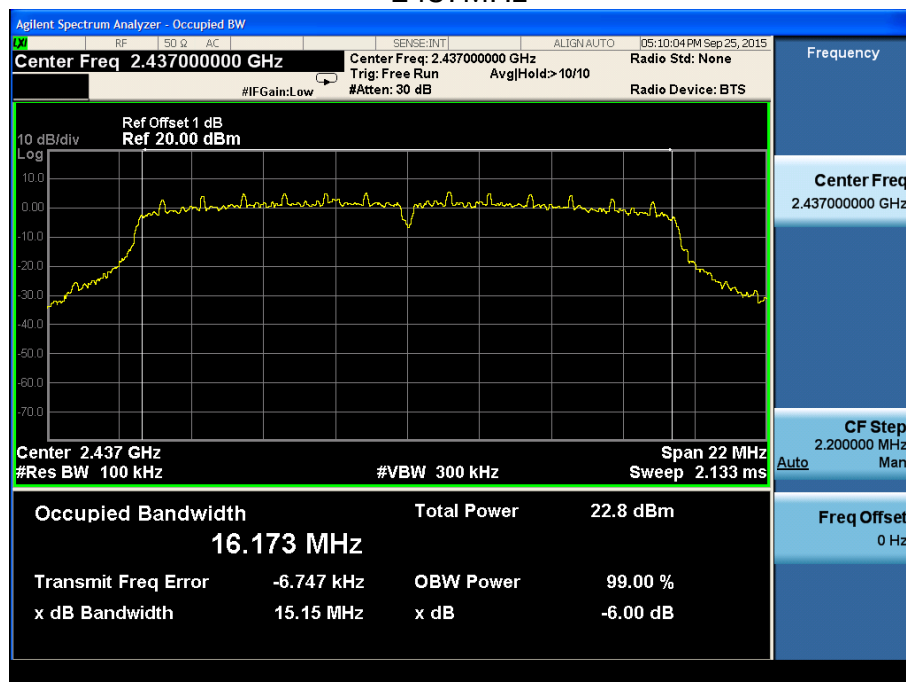
802.11G

Frequency MHz	6dB bandwidth MHz	Result
Low channel 2412MHz	15.16	Pass
Middle channel 2437MHz	15.15	Pass
High channel 2462MHz	15.14	Pass

2412MHz

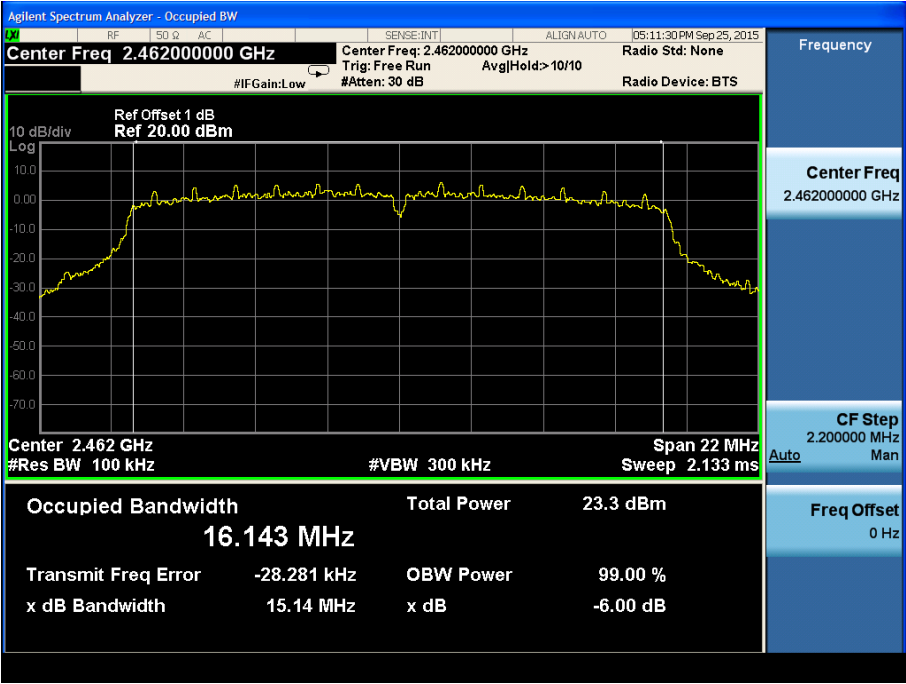


2437MHz





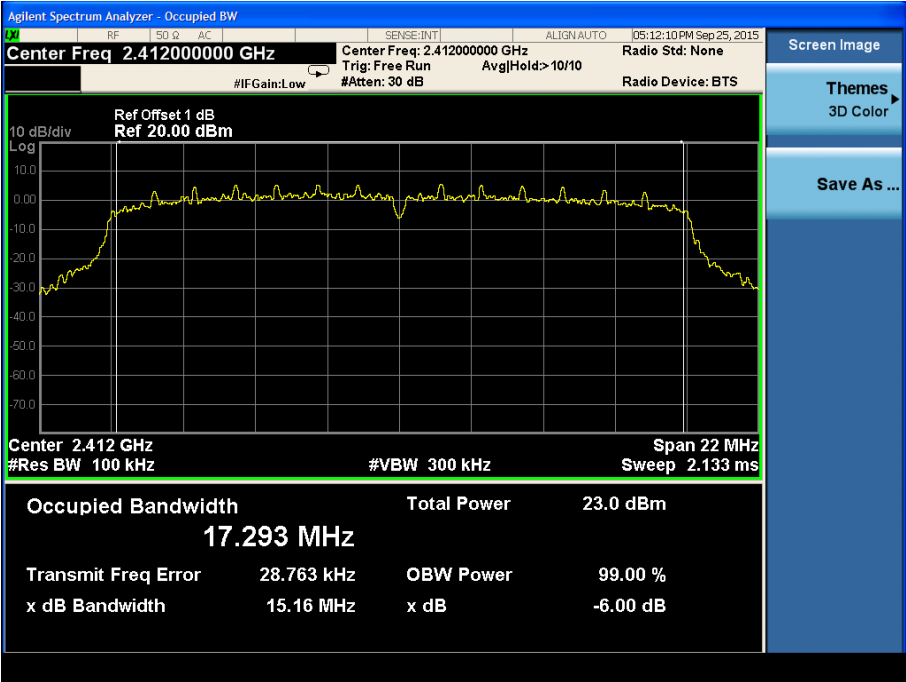
2462MHz



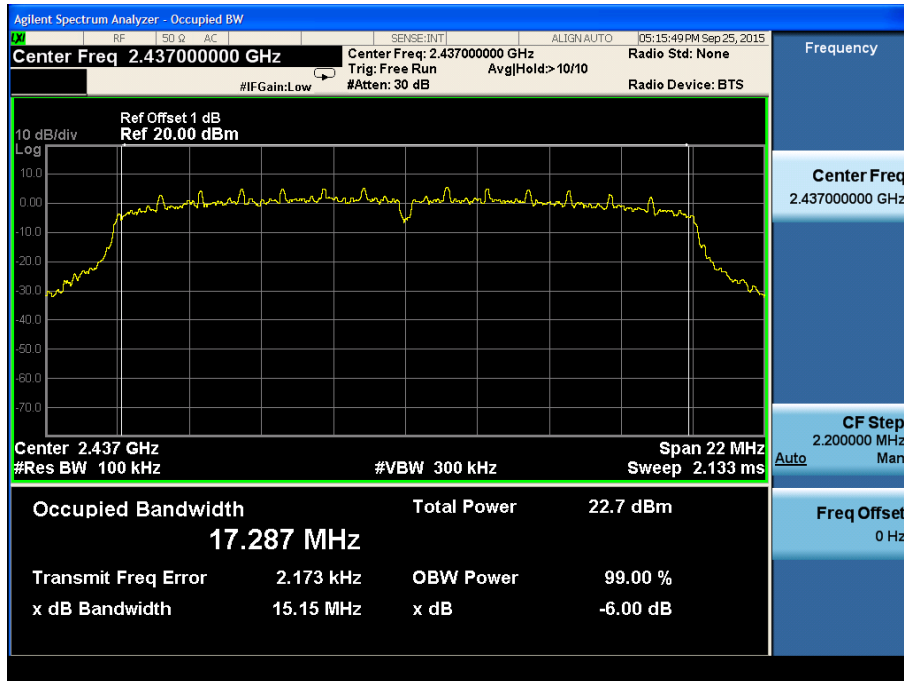
802.11N20

Frequency MHz	6dB bandwidth MHz	Result
Low channel 2412MHz	15.16	Pass
Middle channel 2437MHz	15.15	Pass
High channel 2462MHz	15.14	Pass

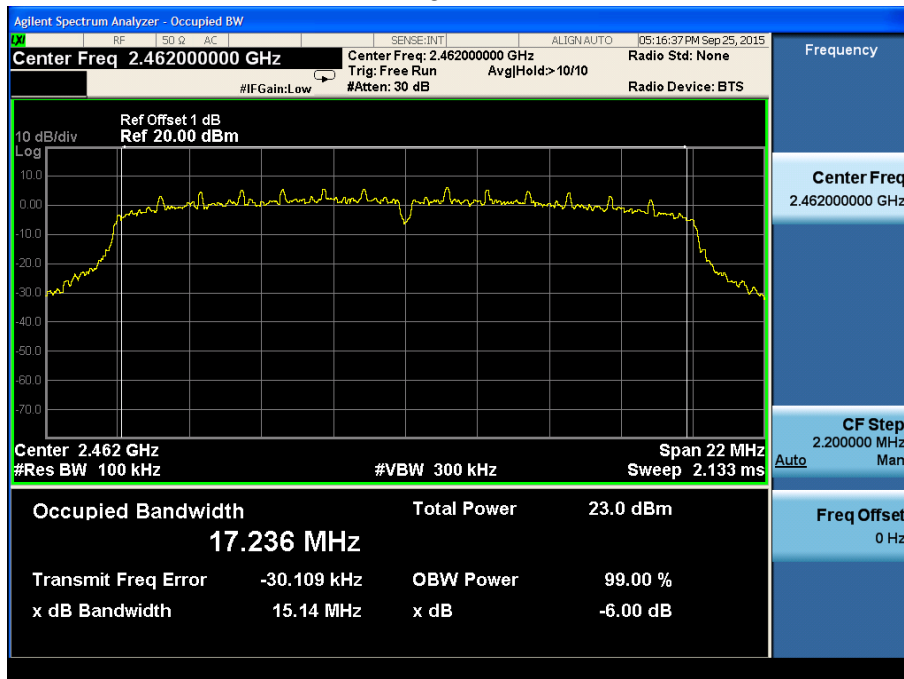
2412MHz



2437MHz



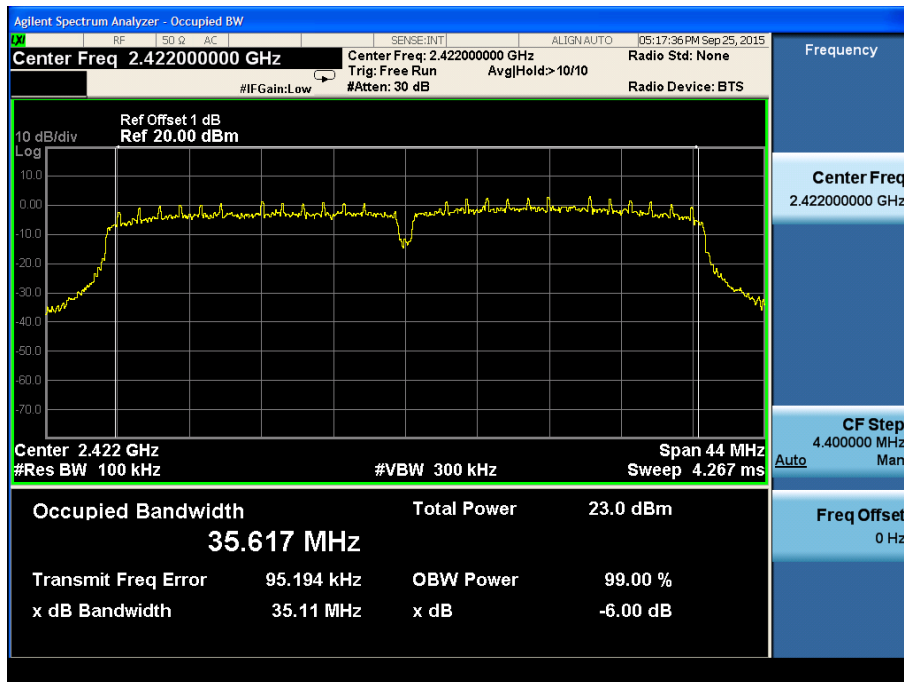
2462MHz



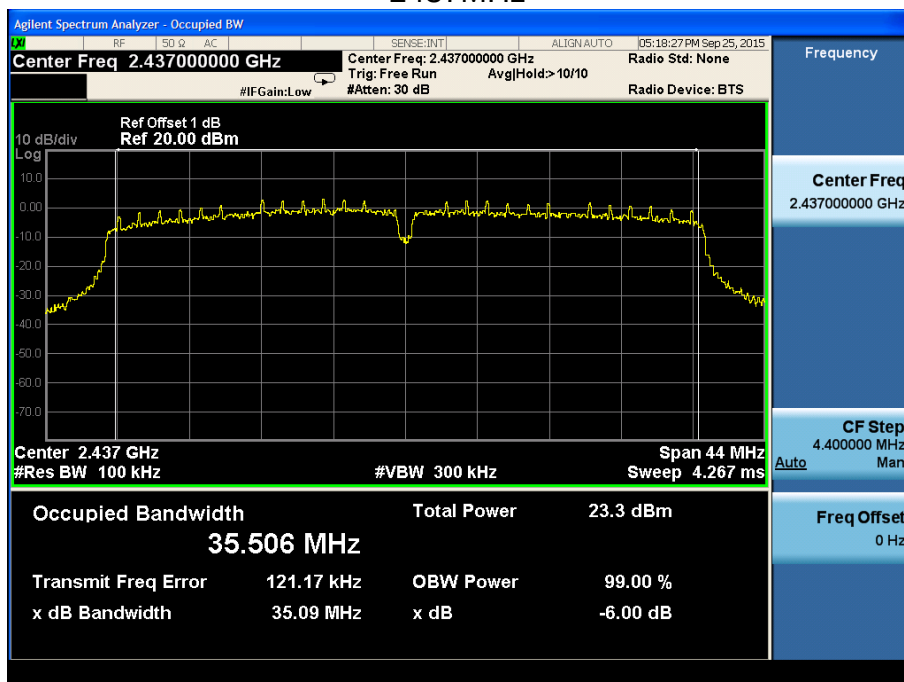
802.11N40

Frequency MHz	6dB bandwidth MHz	Result
Low channel 2422MHz	35.11	Pass
Middle channel 2437MHz	35.09	Pass
High channel 2452MHz	35.13	Pass

2422MHz

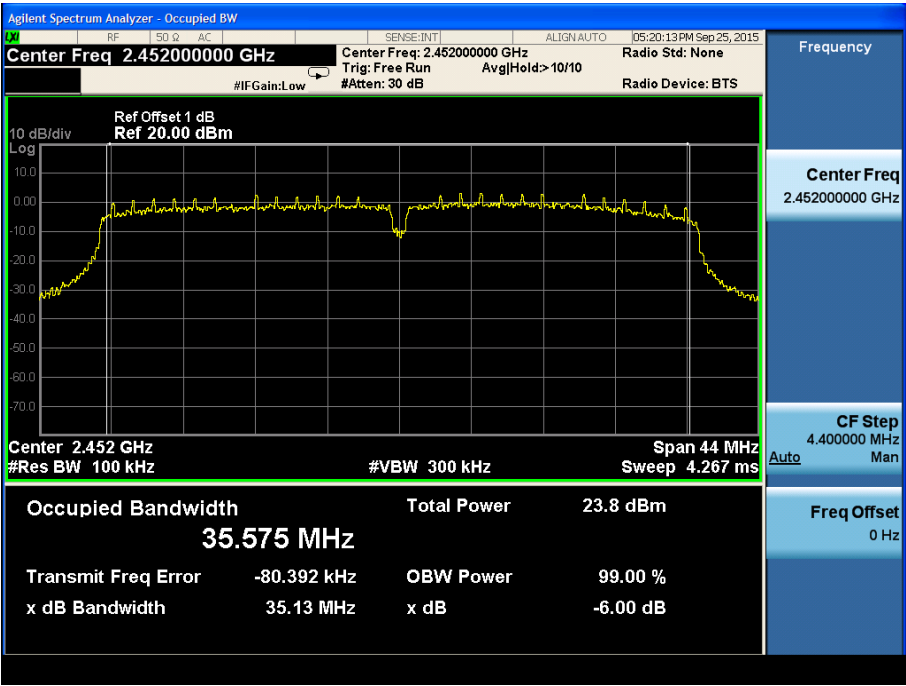


2437MHz





2462MHz



9.4 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency.
RBW=100kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

Limit

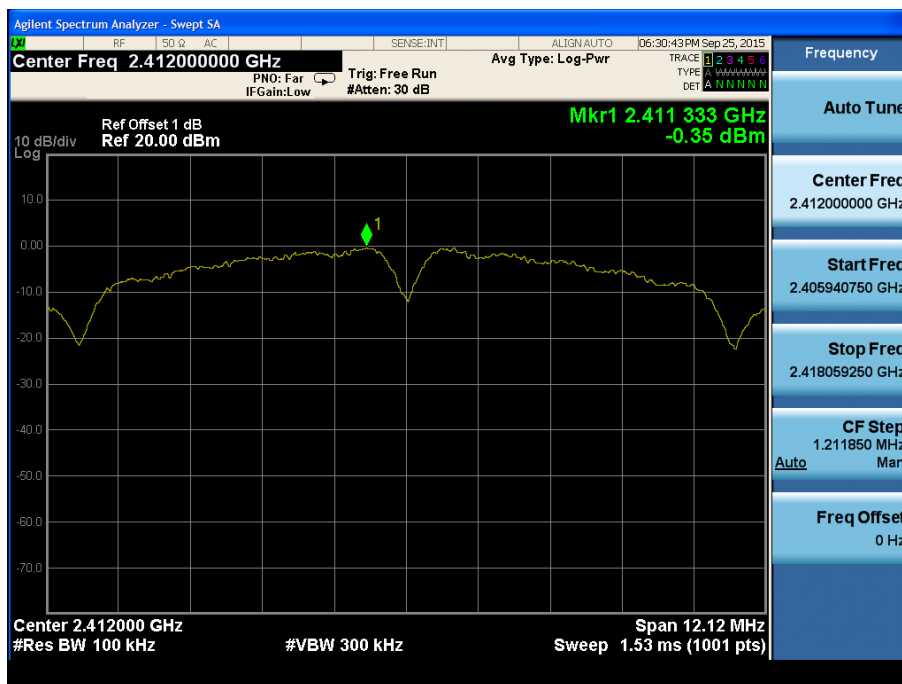
Limit [dBm]

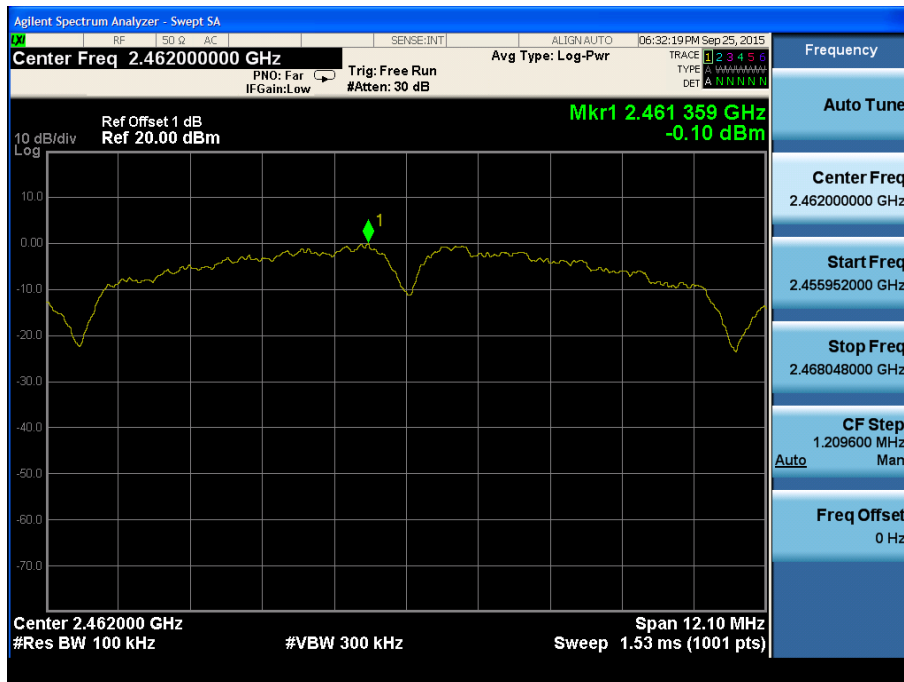
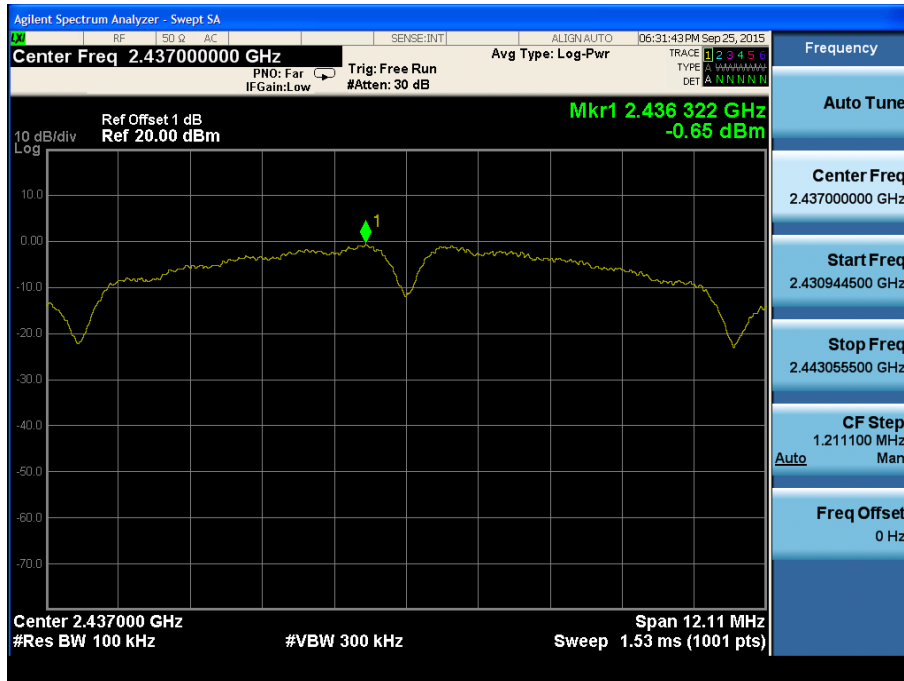
≤8

Test result

802.11 B

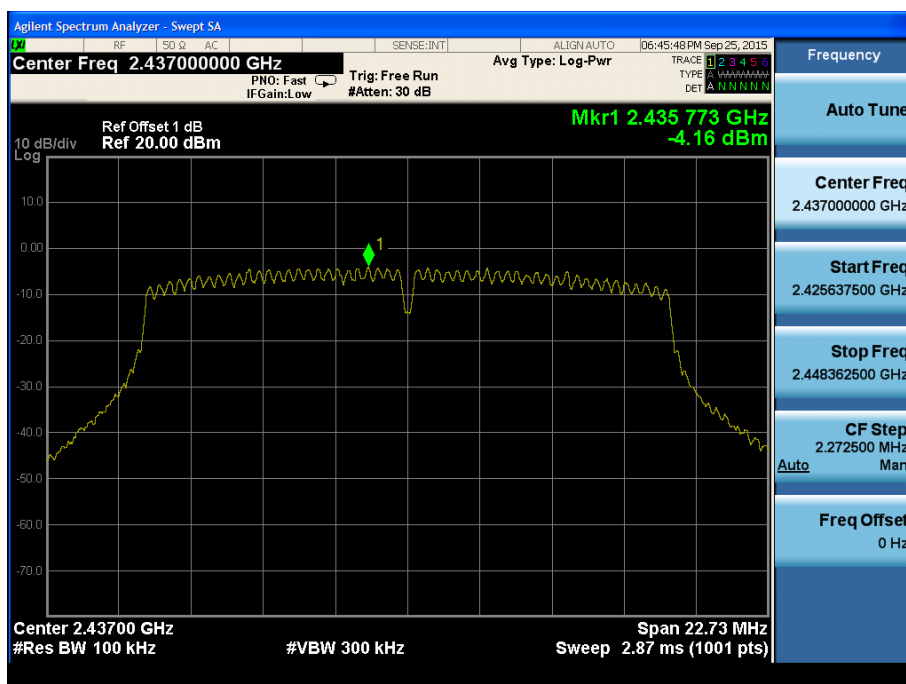
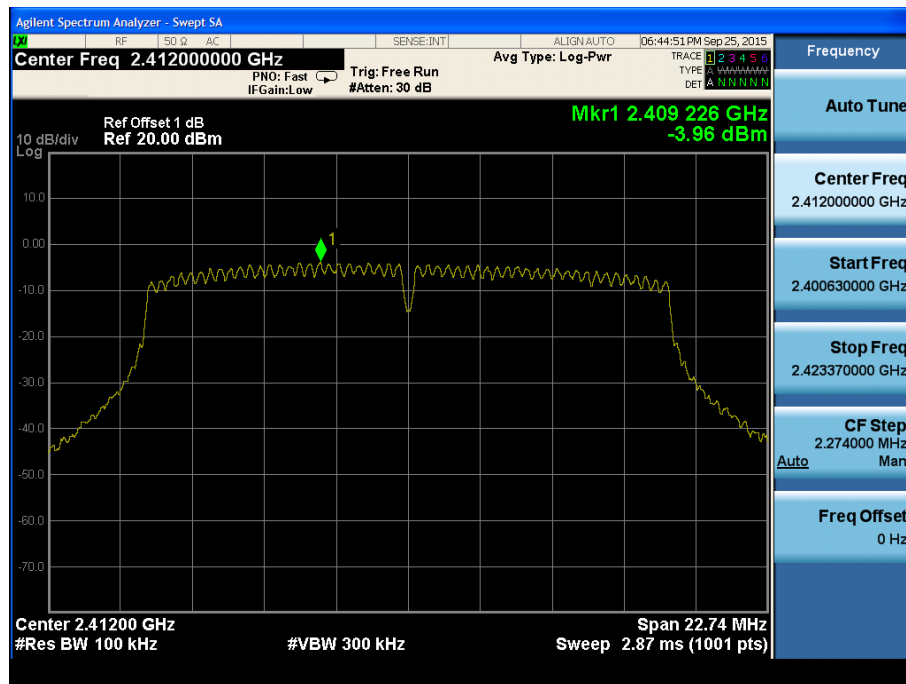
Frequency MHz	Power spectral density dBm	Result
Low channel 2412MHz	-0.35	Pass
Middle channel 2437MHz	-0.65	Pass
High channel 2462MHz	-0.10	Pass

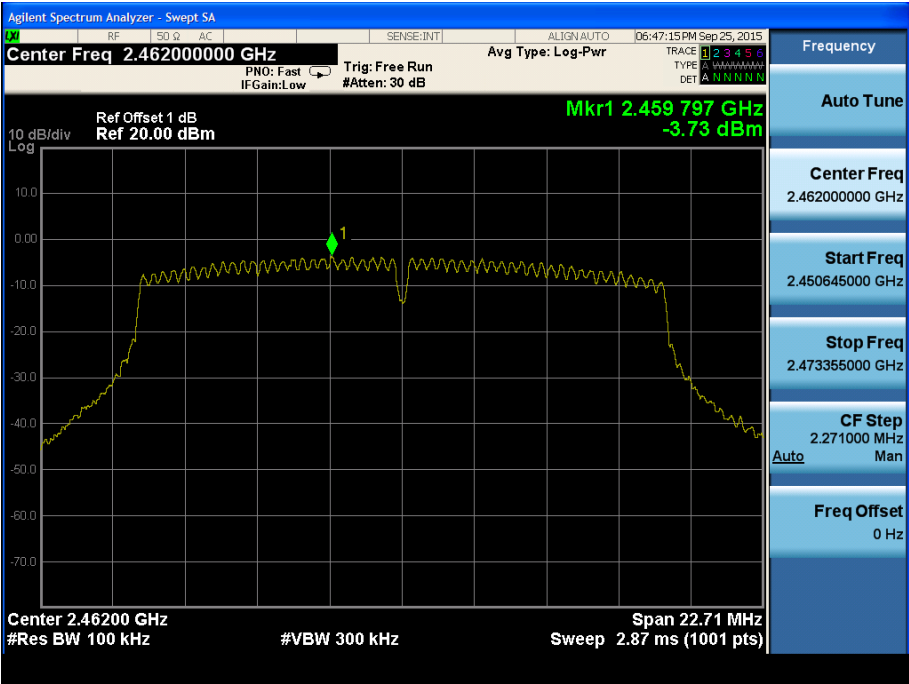




802.11 G

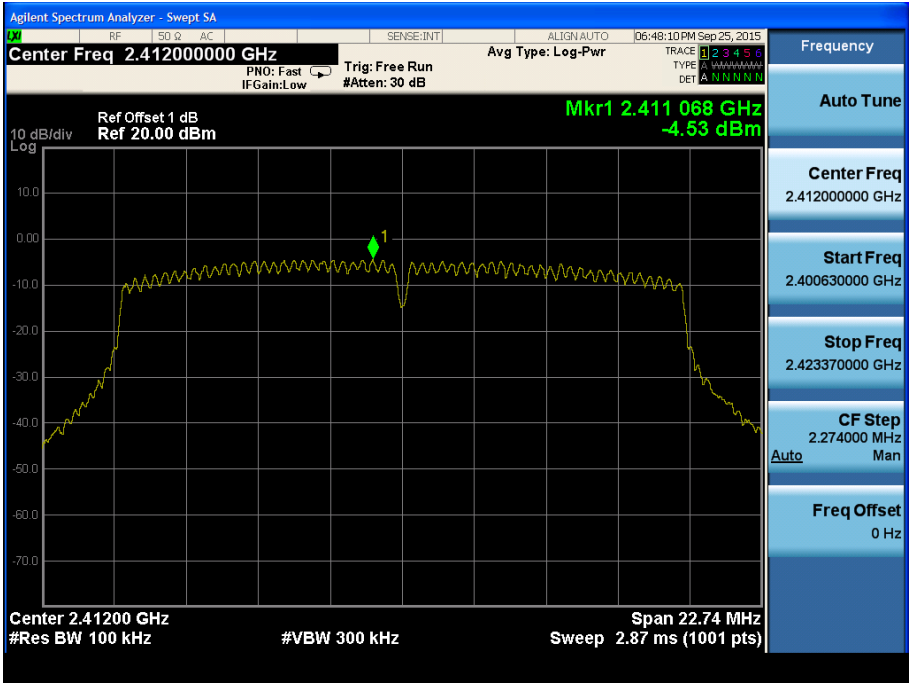
Frequency MHz	Power spectral density dBm	Result
Low channel 2412MHz	-3.96	Pass
Middle channel 2437MHz	-4.16	Pass
High channel 2462MHz	-3.73	Pass

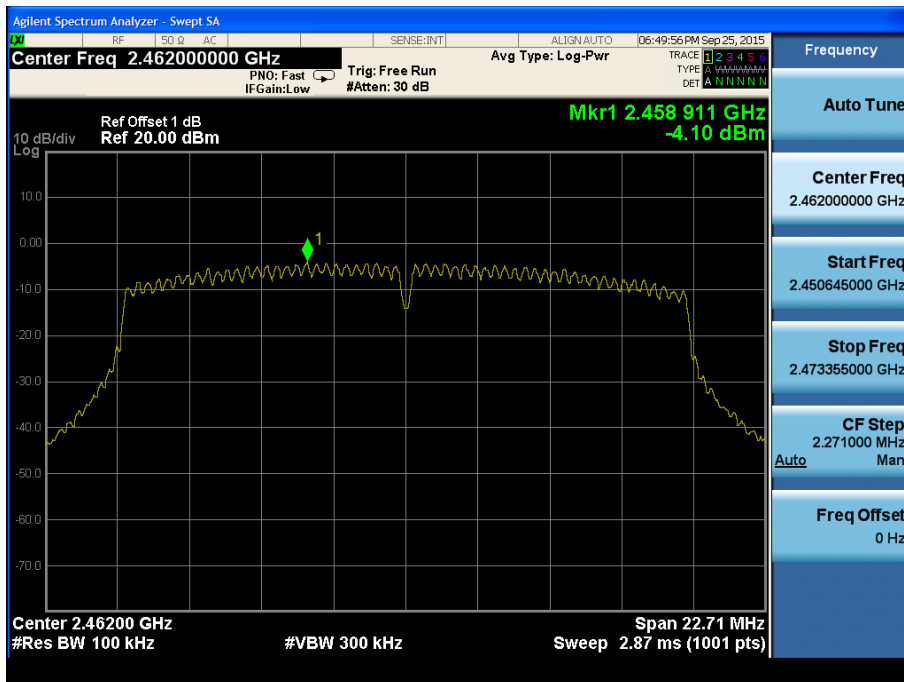
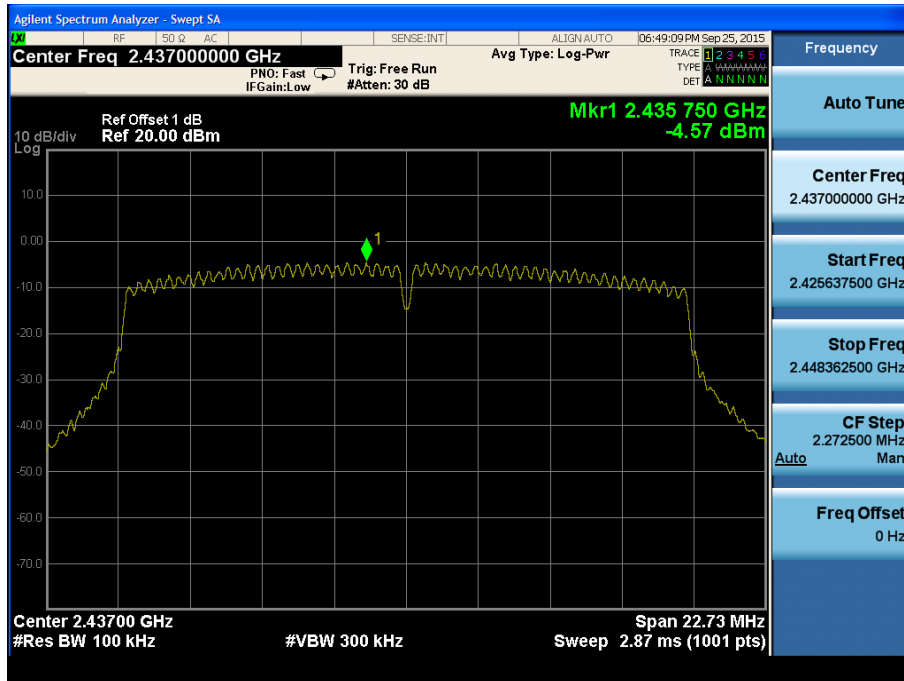




802.11 N20

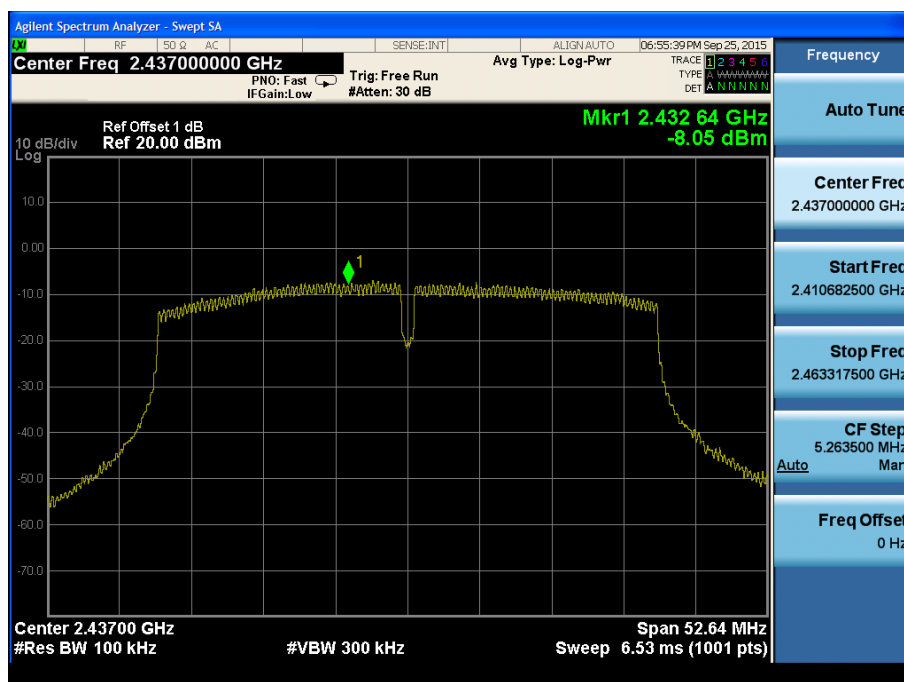
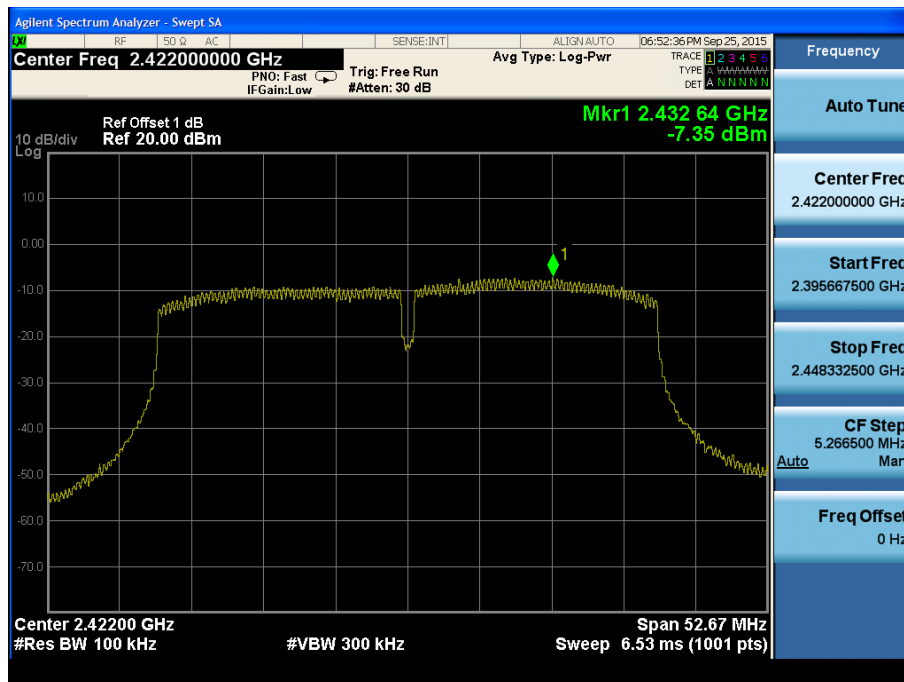
Frequency MHz	Power spectral density dBm	Result
Low channel 2412MHz	-4.53	Pass
Middle channel 2437MHz	-4.57	Pass
High channel 2462MHz	-4.10	Pass

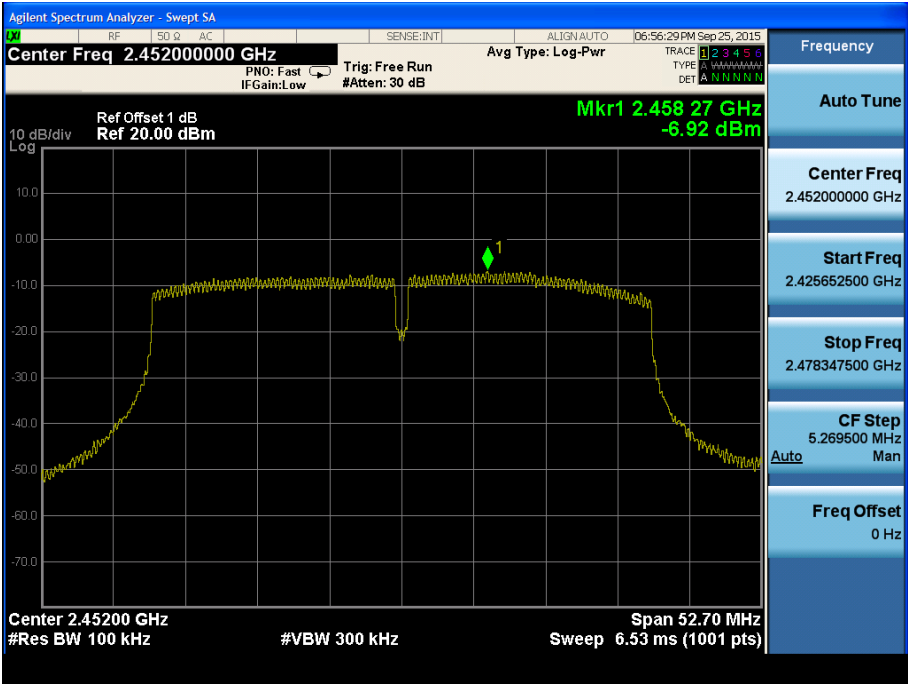




802.11 N40

Frequency MHz	Power spectral density dBm	Result
Low channel 2422MHz	-7.35	Pass
Middle channel 2437MHz	-8.05	Pass
High channel 2452MHz	-6.92	Pass





9.5 Spurious RF conducted emissions

Test Method

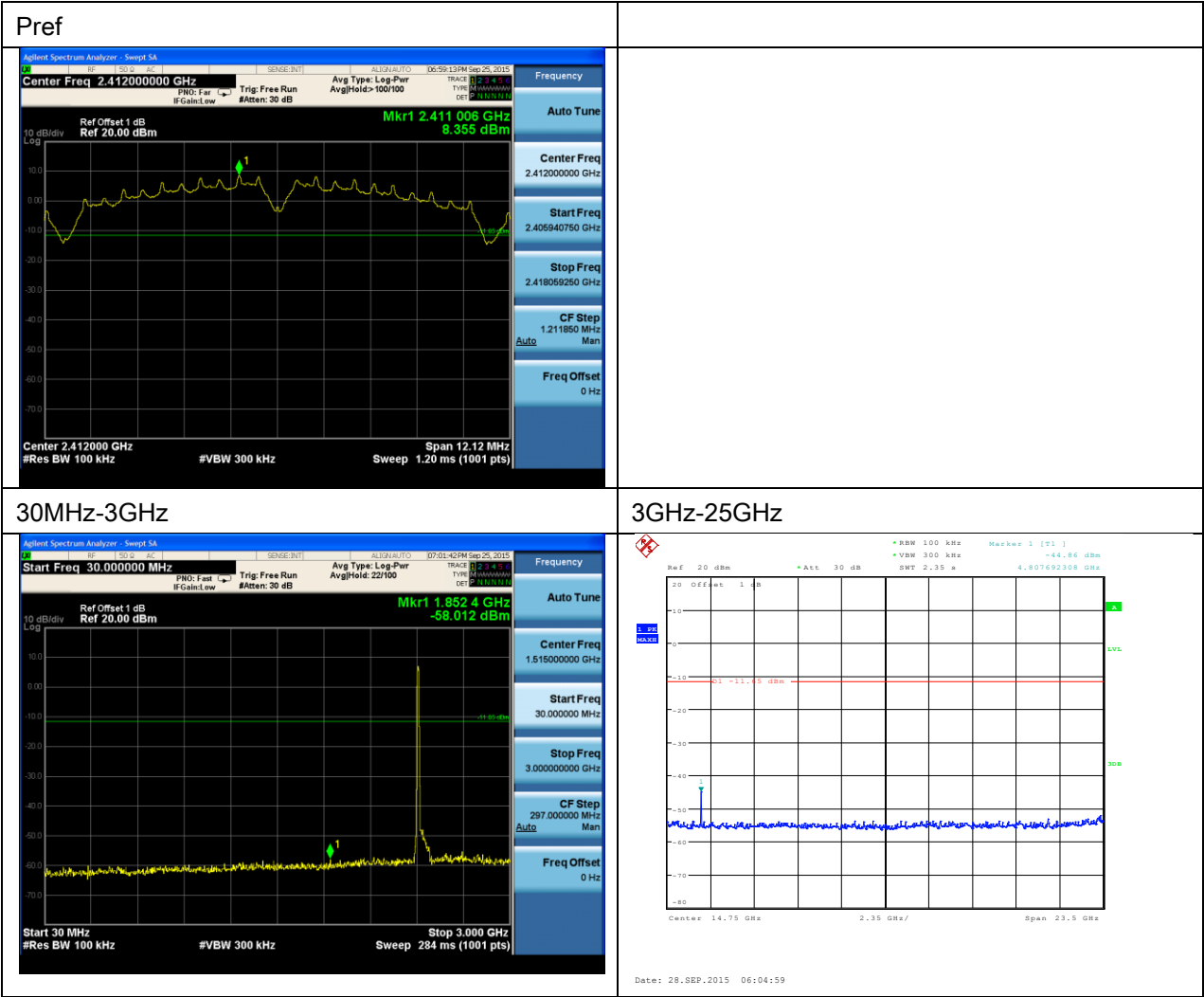
1. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW $\geq$ 3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
 - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
 - a. Set the center frequency and span to encompass frequency range to be measured.
 - b. 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, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

Limit

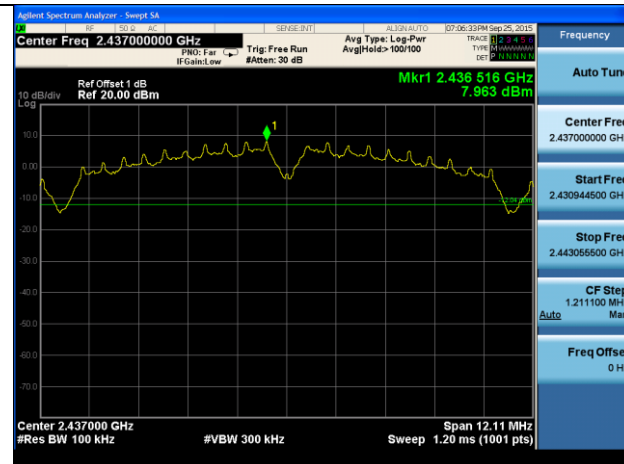
Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result
802.11 B

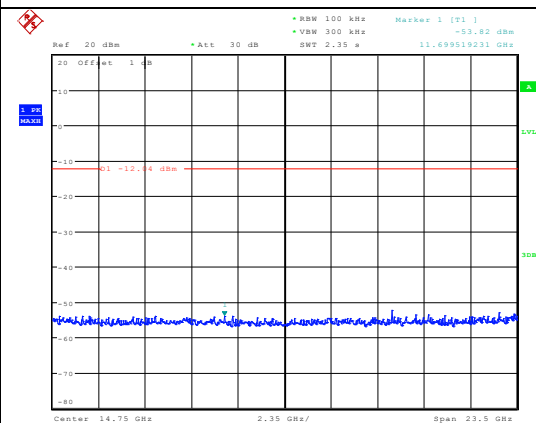
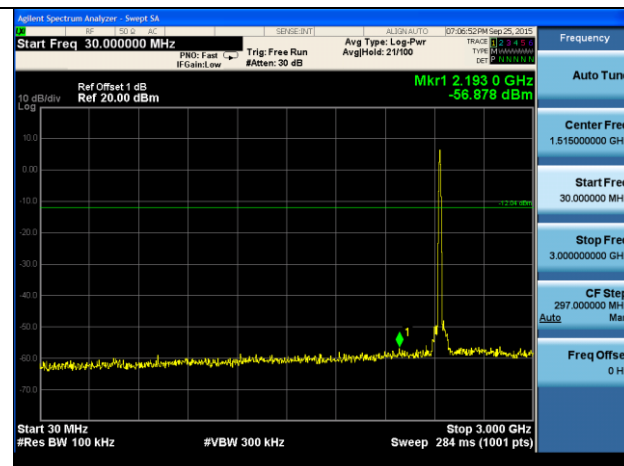
2412MHz



Pref



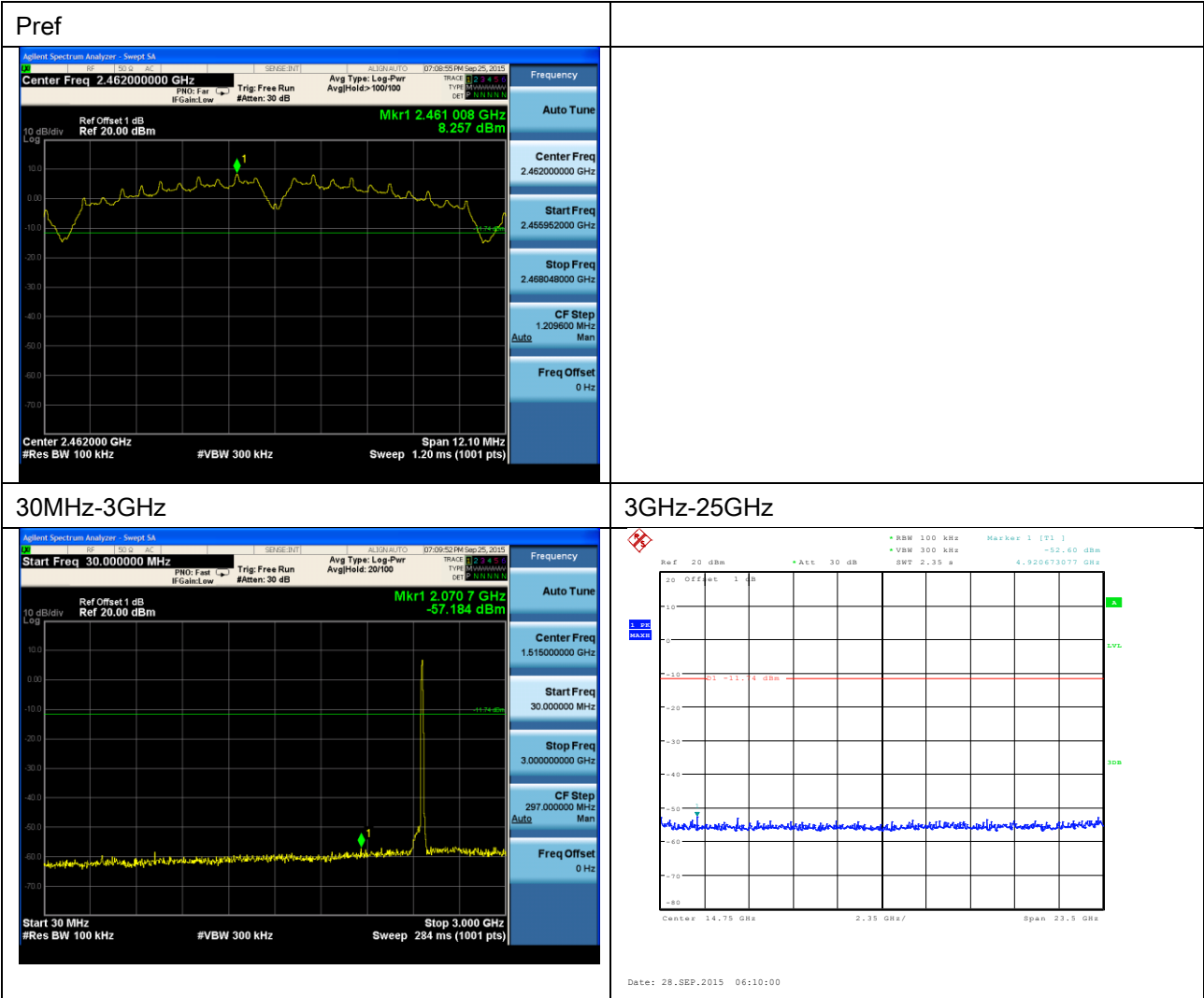
3GHz-25GHz



Date: 28.SEP.2015 06:08:04



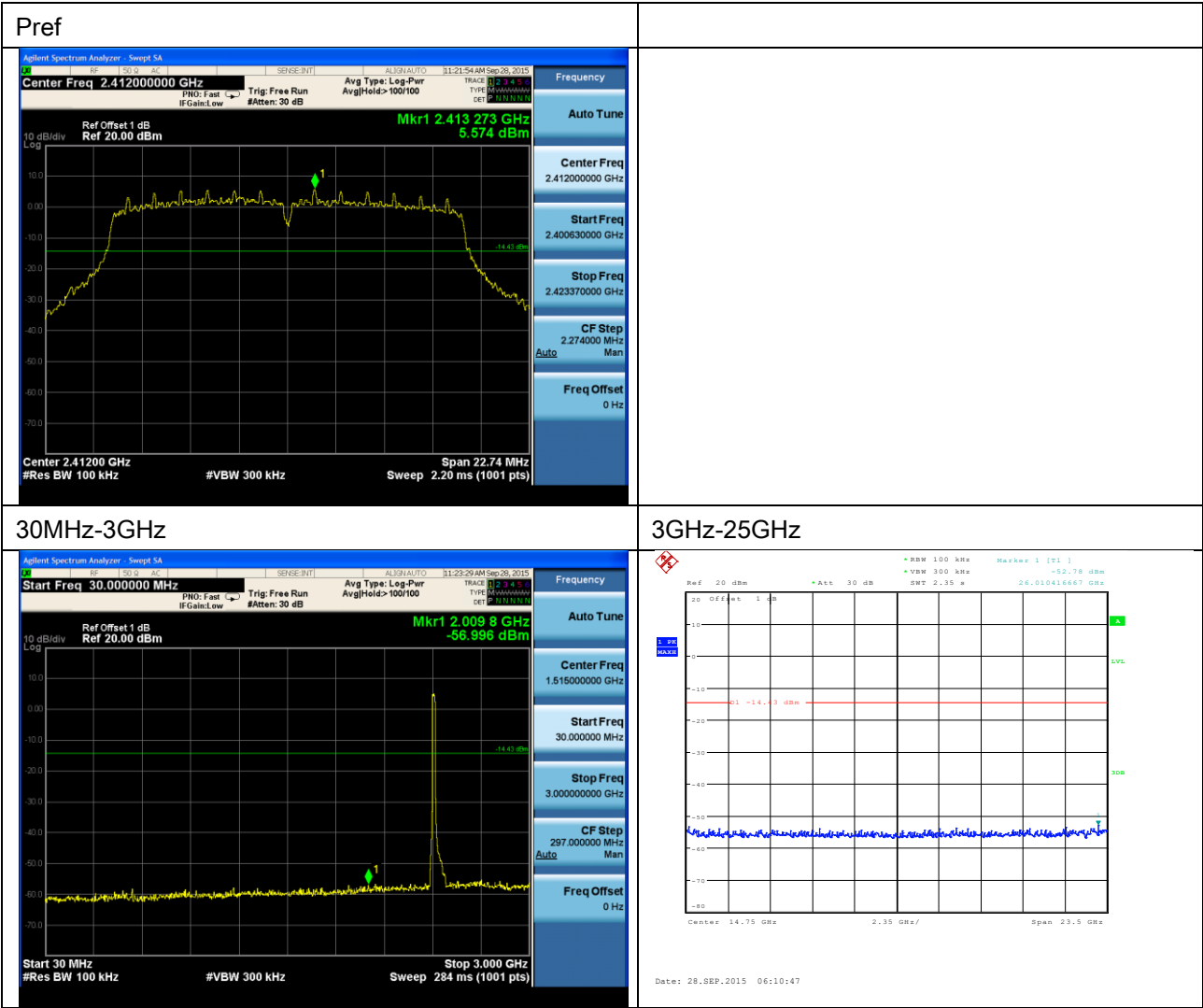
2462MHz





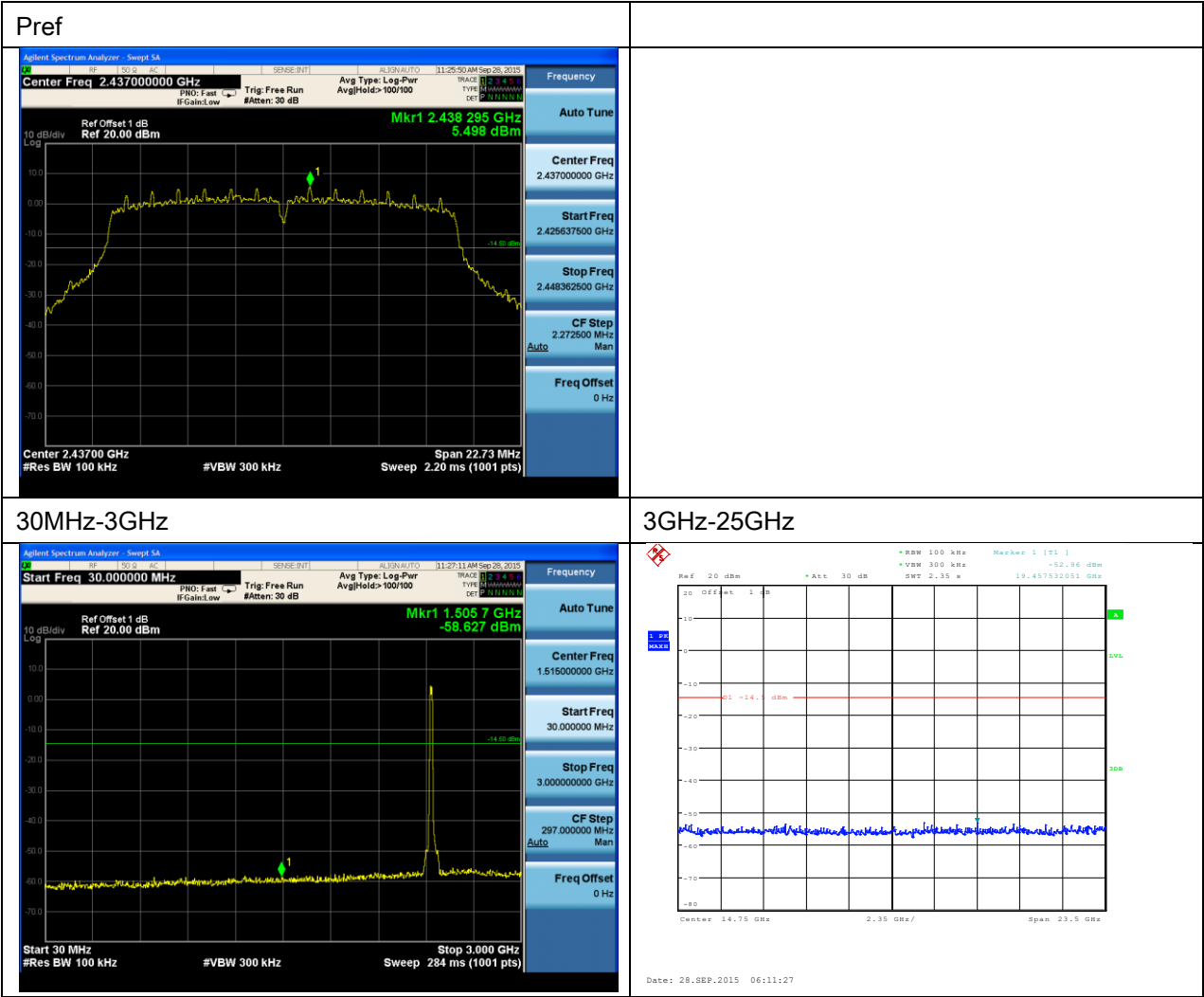
802.11 G

2412MHz



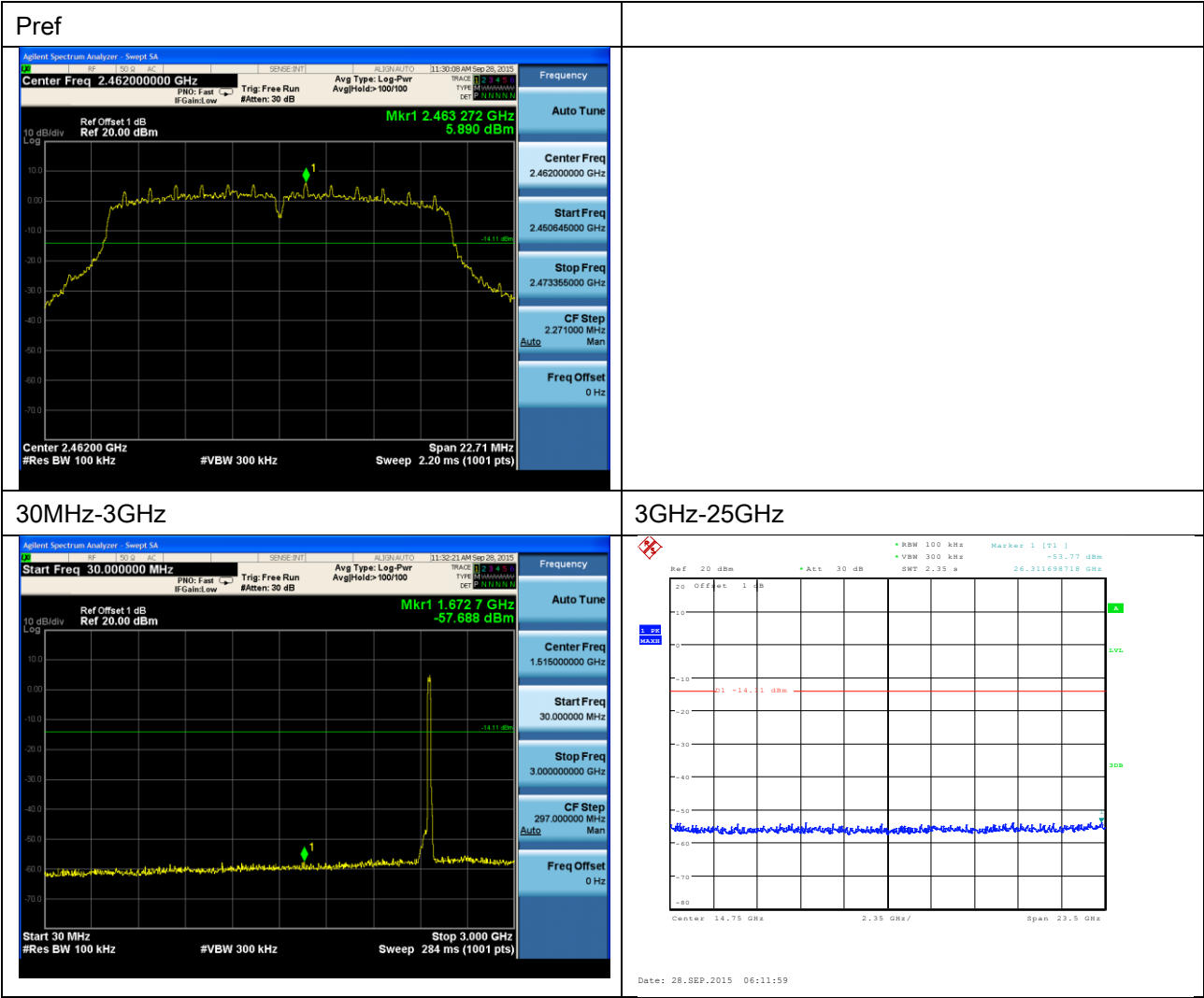


2437MHz





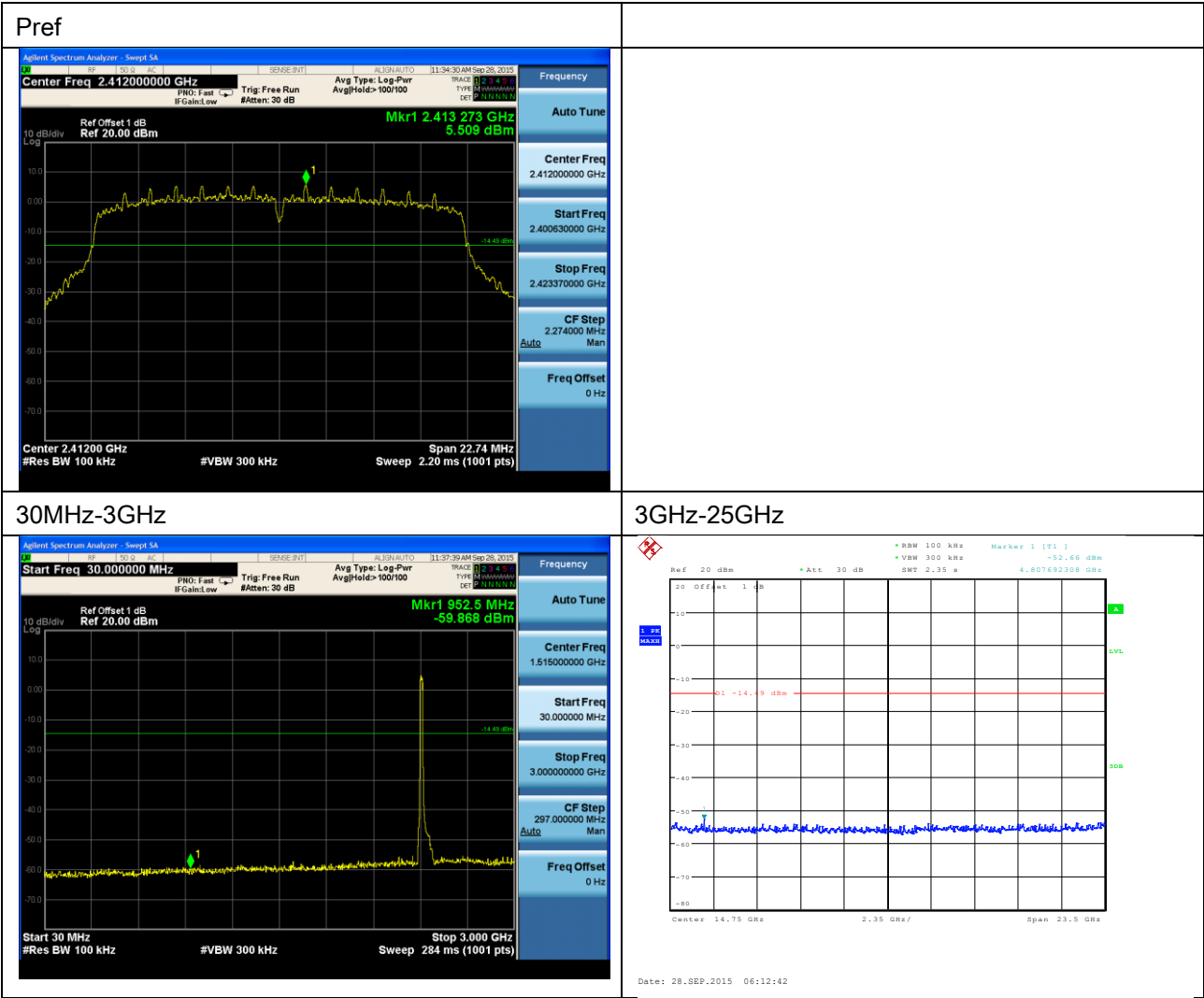
2462MHz





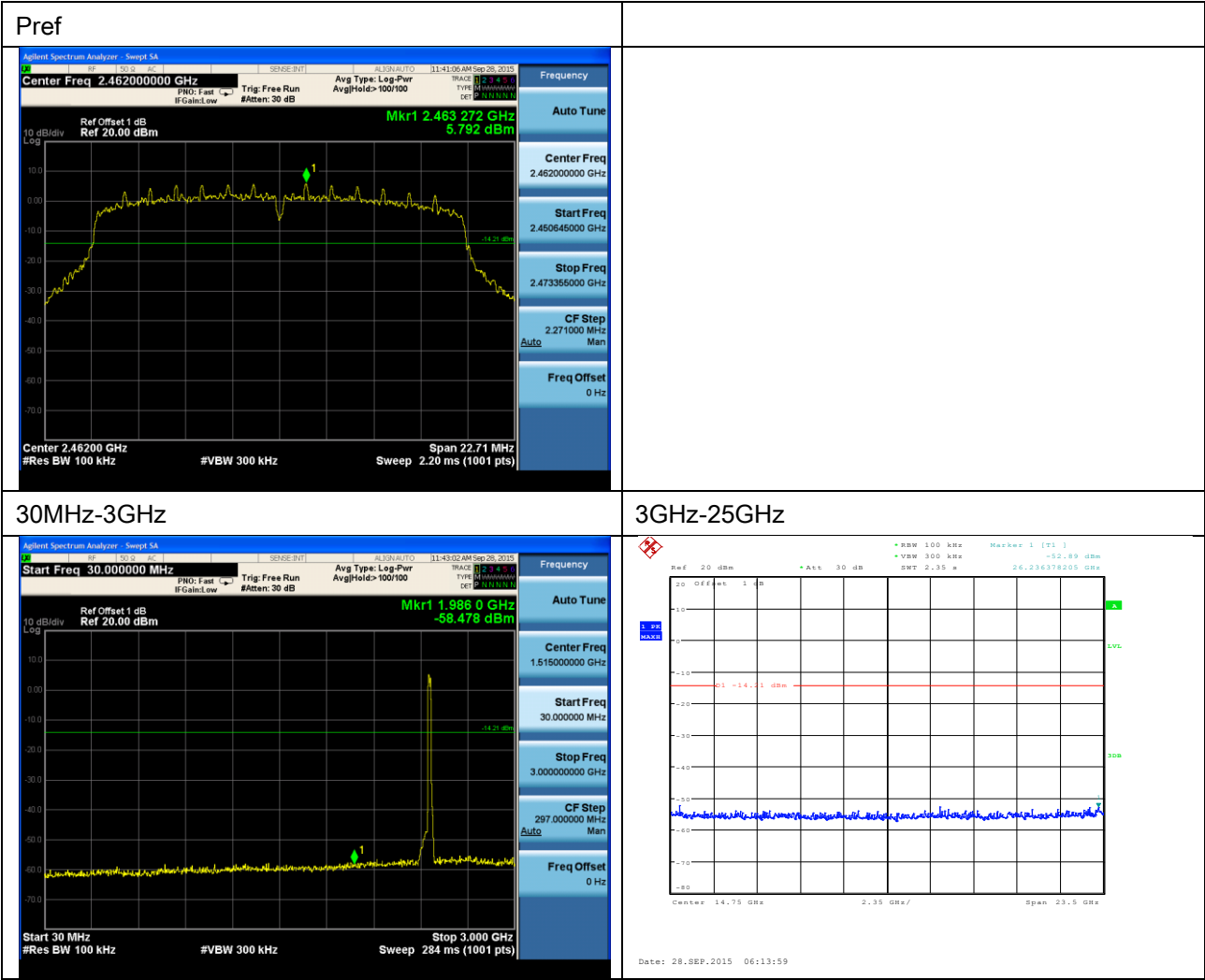
802.11 N20

2412MHz





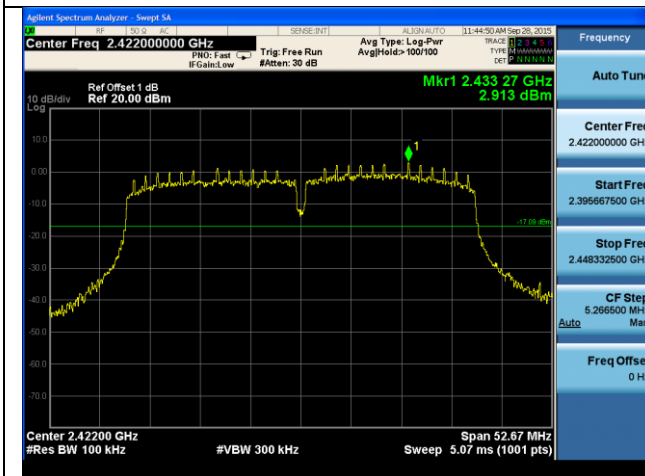
2462MHz



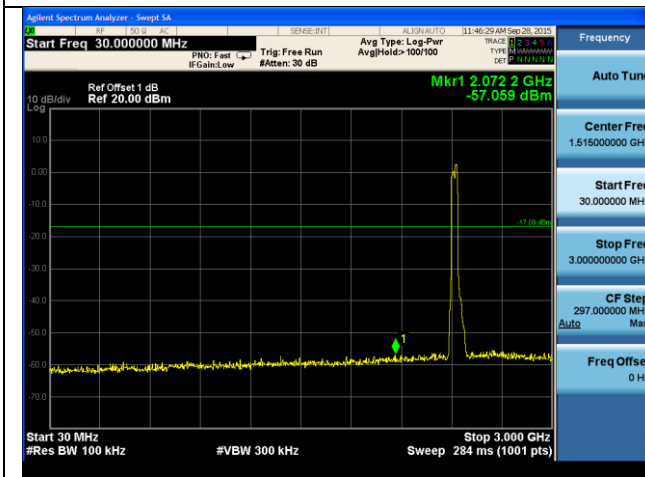
802.11 N40

2422MHz

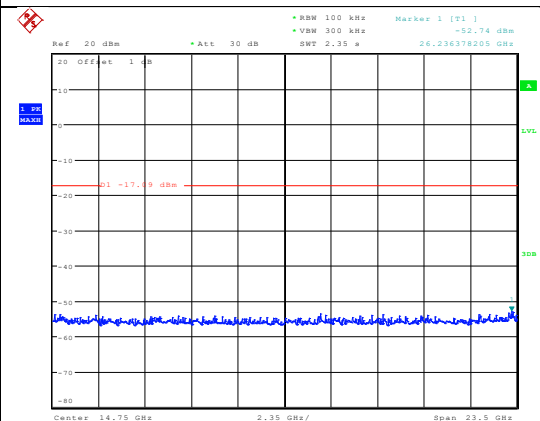
Pref



30MHz-3GHz



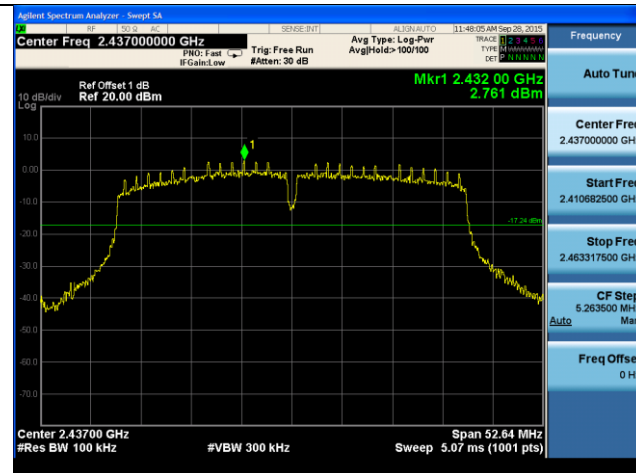
3GHz-25GHz



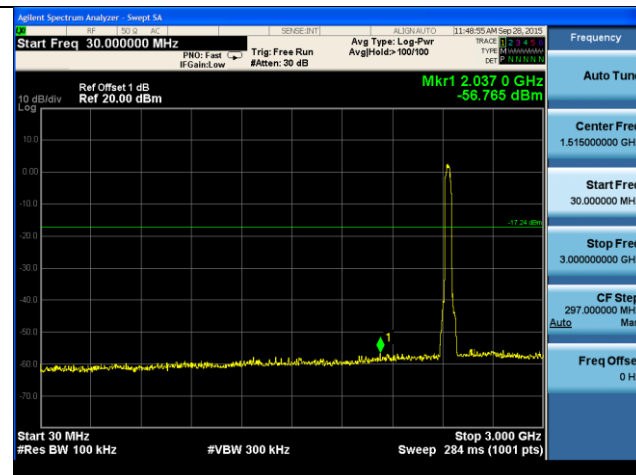
Date: 28.SEP.2015 06:14:47

2437MHz

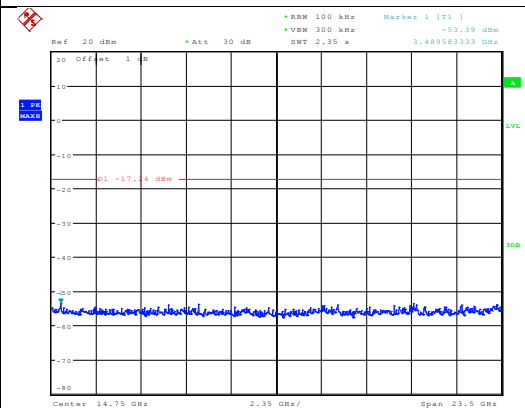
Pref



30MHz-3GHz



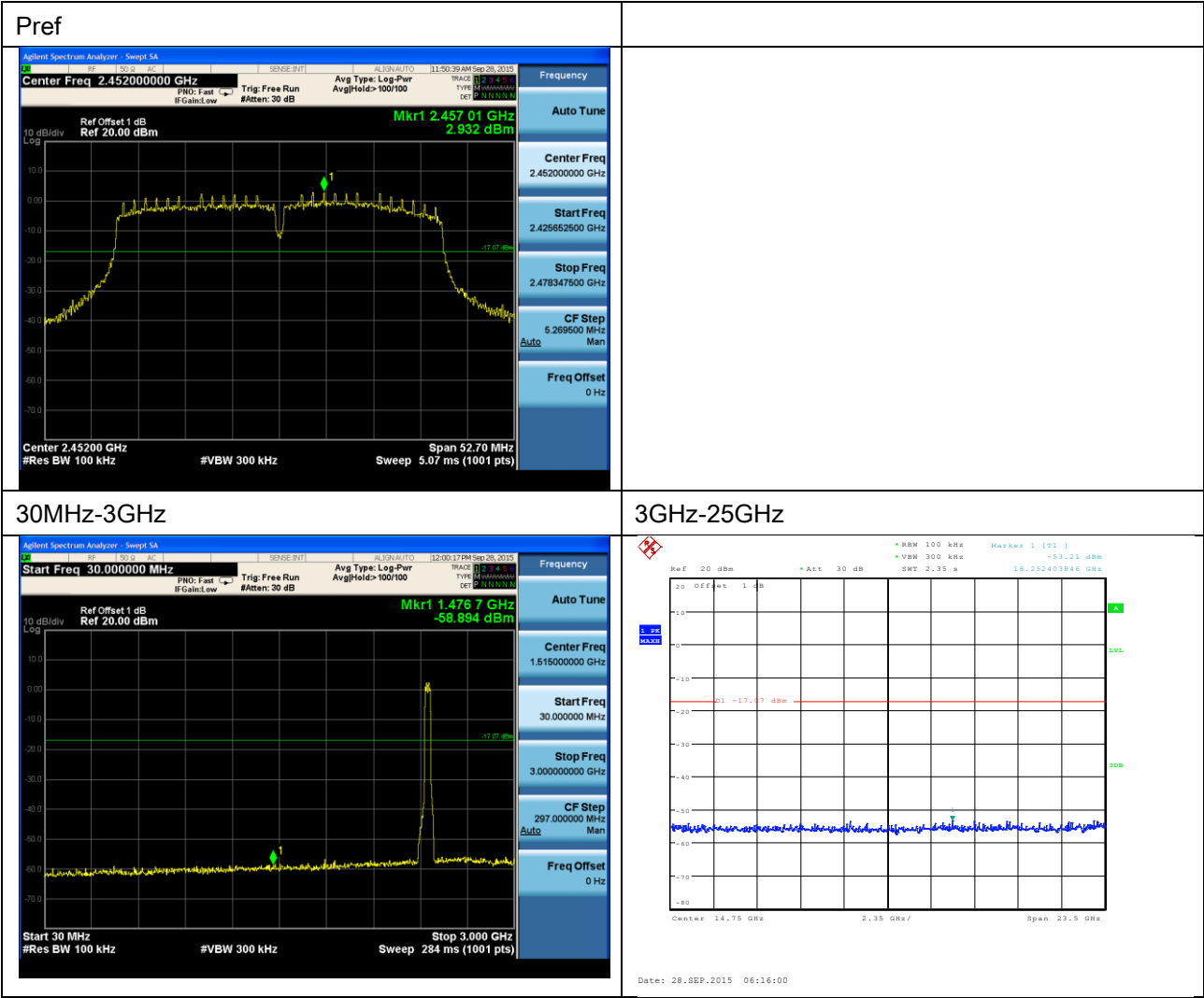
3GHz-25GHz



Date: 28.SEP.2015 06:15:20



2452MHz



9.6 Band edge

Test Method

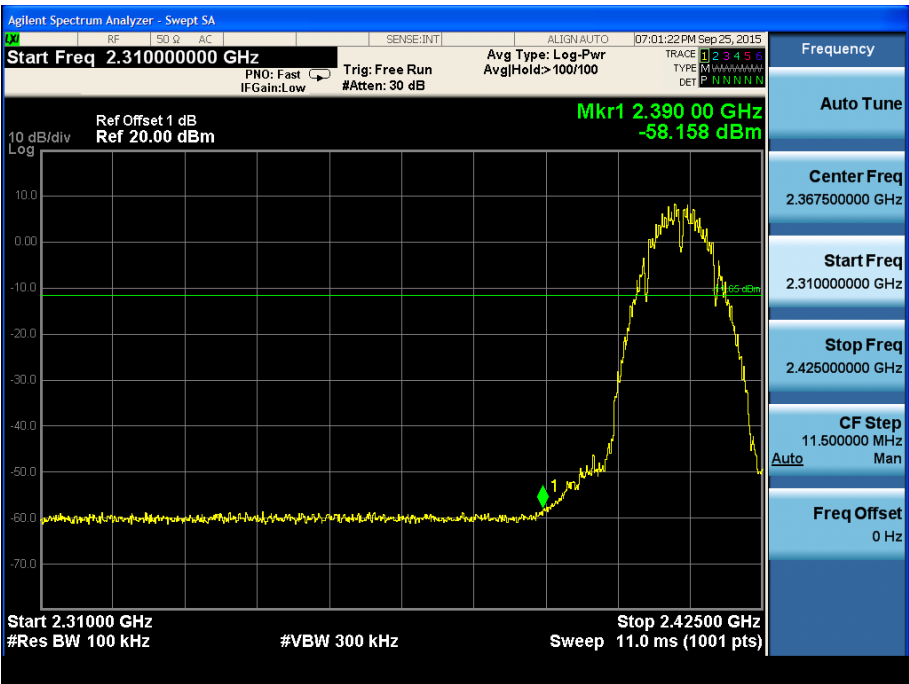
- 1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW $\geq$ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

Limit

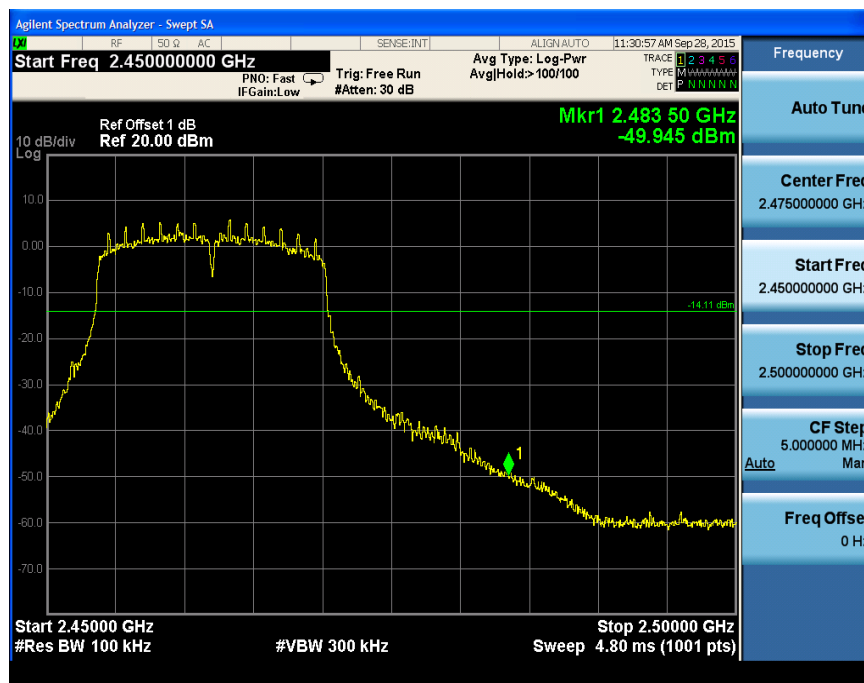
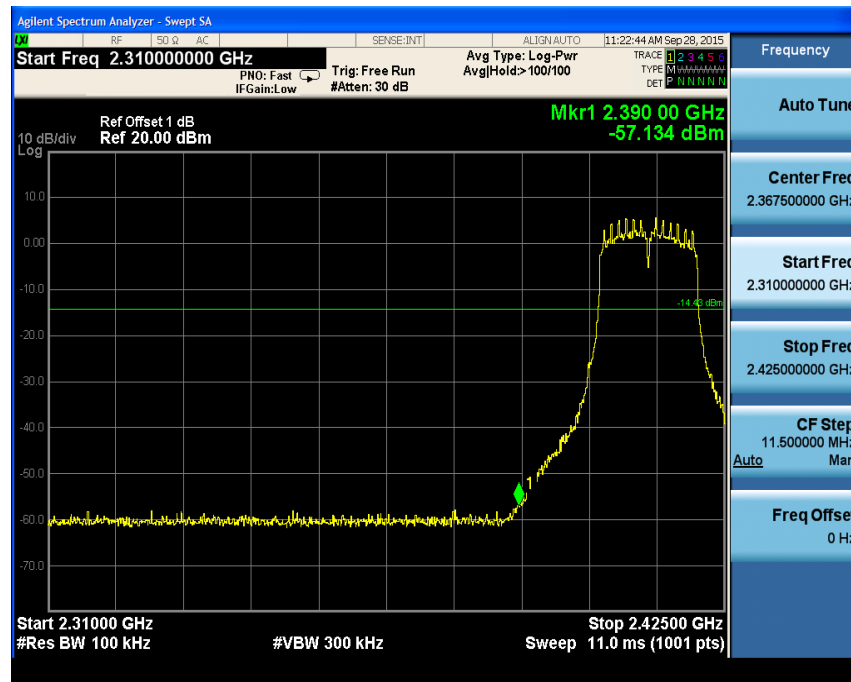
Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result

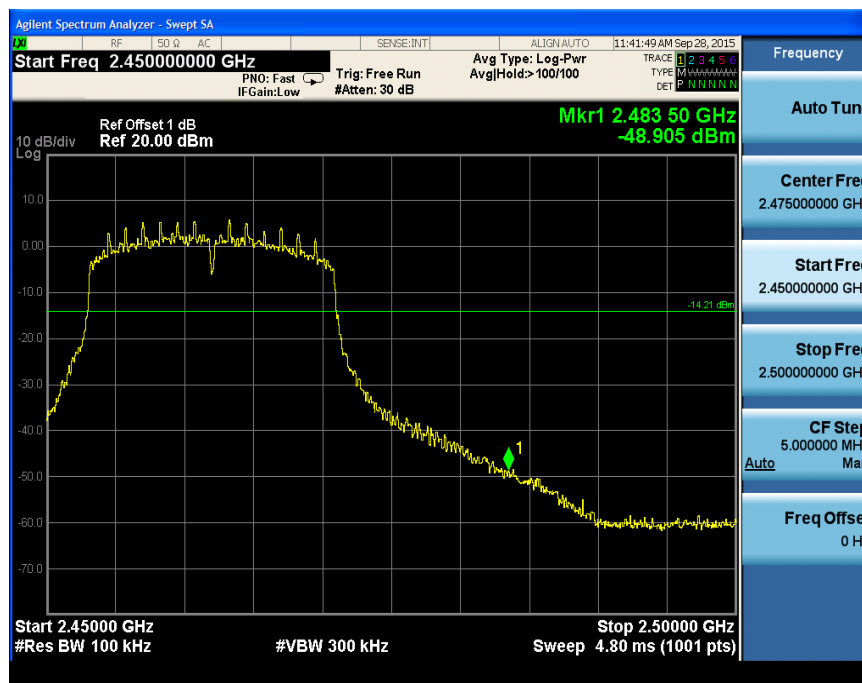
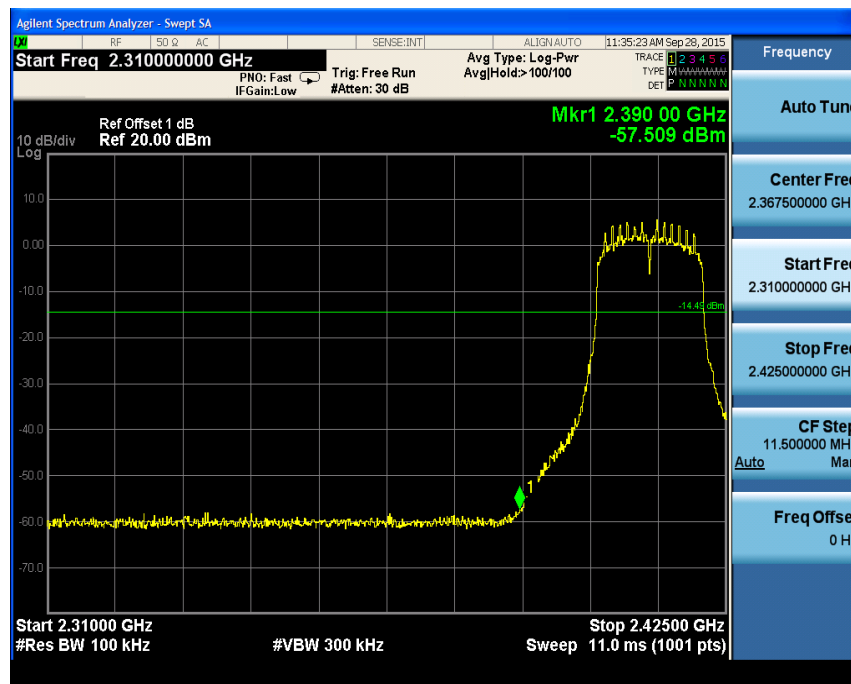
802.11 B



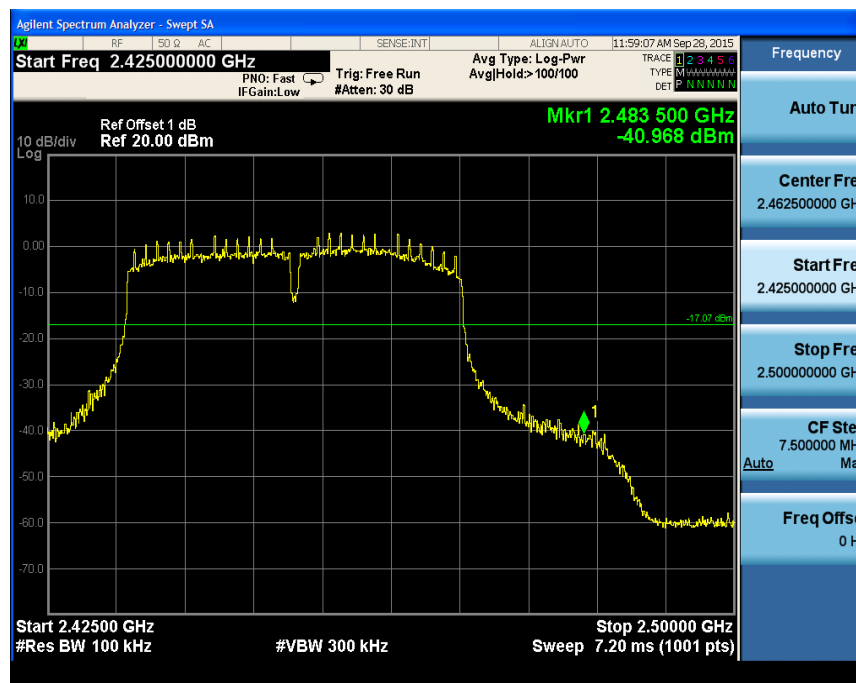
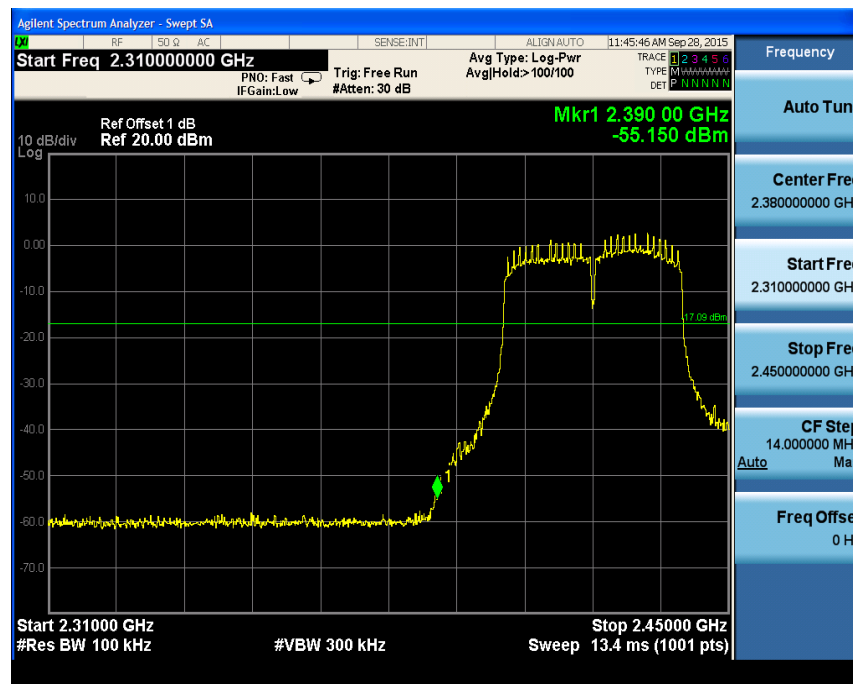
802.11 G



802.11 N20



802.11 N40



9.7 Spurious radiated emissions for transmitter

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for $f \geq 1\text{GHz}$, 100 kHz for $f < 1\text{GHz}$, VBW $\geq$ RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-1992 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{duty cycle}/100\text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

According to part 15.247(d), the radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dB μ V/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

9KHz-30MHz

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.

Radiated Emission Test Data 9k Hz-30MHz

Frequency MHz	Cable Loss(dB)	Antenna Factor(dB)	Readings(dBμV/m)	Level(dBμV/m)	Polarity(H/V)	Turntable Angle(deg)	Antenna Height(m)	Limits(dBμV/m)	Margin(dB)
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

30MHz-1GHz

Worst case is shown below for 30MHz-1GHz only.

The emissions don't show in following result tables are more than 20dB below the limits.

Radiated Emission Test Data 30MHz-1GHz

Frequency MHz	Cable Loss(dB)	Antenna Factor(dB)	Readings(dBμV/m)	Level(dBμV/m)	Polarity(H/V)	Turntable Angle(deg)	Antenna Height(m)	Limits(dBμV/m)	Margin(dB)
74.709	1.0	8.7	12.4	22.1	V	17	2.0	40.0	17.9
179.679	1.6	9.0	13.0	23.6	V	351	2.0	43.5	19.9
187.454	1.5	9.7	13.6	24.8	V	23	2.0	43.5	18.7
201.062	1.6	10.6	11.7	23.9	V	345	2.0	43.5	19.6
251.603	1.9	12.1	10.5	24.5	V	50	2.0	46.0	21.5
290.48	2.0	12.7	10.7	25.4	V	294	2.0	46.0	20.6
31.943	0.6	12.3	16.9	29.8	H	45	3.0	40.0	10.2
37.775	0.7	12.3	18.1	31.1	H	336	2.0	40.0	8.9
72.765	1.0	8.7	13.9	23.6	H	16	2.0	40.0	16.4
78.597	1.0	7.8	15.6	24.4	H	249	2.0	40.0	15.6
154.408	1.4	8.3	20.4	30.1	H	71	1.0	43.5	13.4
171.903	1.5	9.0	17.2	27.7	H	341	1.0	43.5	15.8

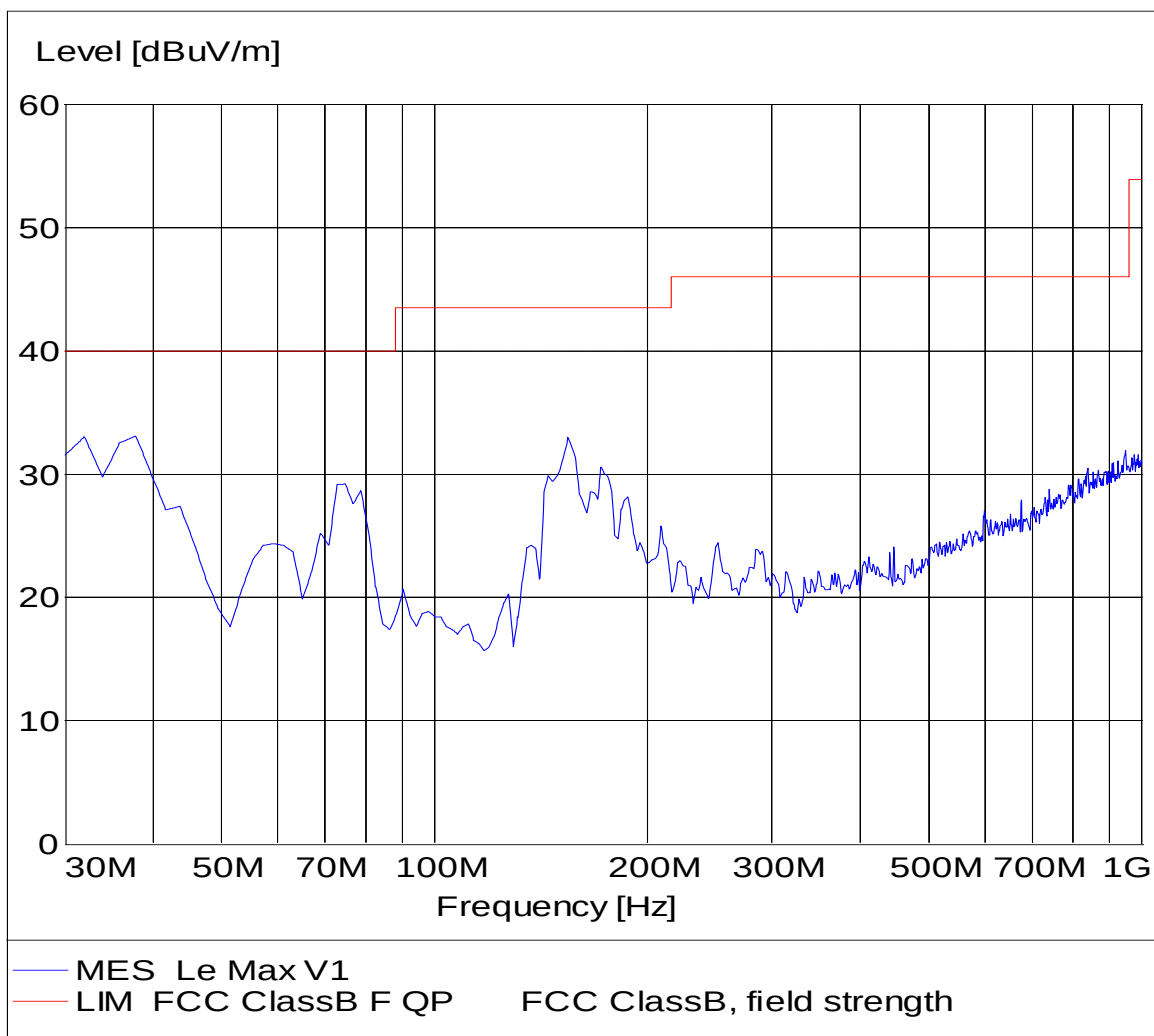
Radiated Emission

EUT Information

EUT Model Name: Le Max
Operation mode: Charging and transmitter
Test Voltage:
Comment:

Common Information

Test Site: SMQ EMC Lab.
Environment Conditions:
Antenna Polarization: Vertical
Operator Name:
Comment:



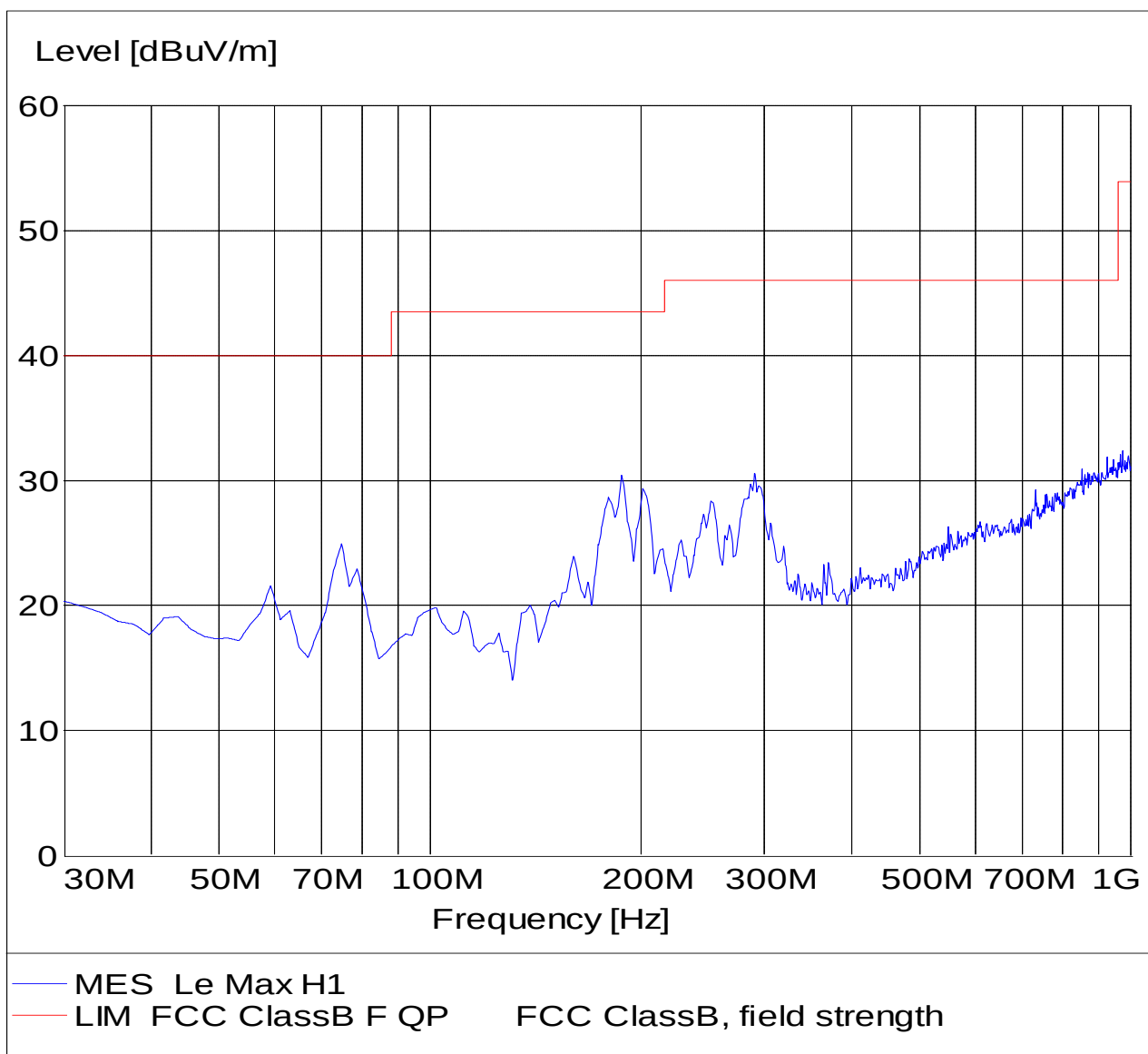
Radiated Emission

EUT Information

EUT Model Name: Le Max
Operation mode: Charging and transmitter
Test Voltage:
Comment:

Common Information

Test Site: SMQ EMC Lab.
Environment Conditions:
Antenna Polarization: Horizontal
Operator Name:
Comment:



1-18G

11b

Ch1

Radiated Emission

EUT Information

EUT Model Name: Le Max
Operation mode: Wifi 11b CH1
Test Voltage:
Comment:

Common Information

Test Site: SMQ EMC Lab.
Environment Conditions:
Antenna Polarization: Horizontal
Operator Name:
Comment:

FCC Electric Field Strength 1-18GHz operate on 2.4GHz

