EMC TEST REPORT
No. 150900650SHA-001

Applicant	:	Jining Zhongke SmartCity Electronic Technology Co., Ltd Technology Center, Rencheng District, Jining City, Shandong China
Manufacturer	:	Jining Zhongke SmartCity Electronic Technology Co., Ltd Technology Center, Rencheng District, Jining City, Shandong China
Product Name	:	MACHTALK Wi-Fi module
Type/Model	:	CLOUD-ESP-01-3V
TEST RESULT	**:**	**PASS**

SUMMARY

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

47CFR Part 15 (2014): Radio Frequency Devices (Subpart C)

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

Date of issue: October 22, 2015

Prepared by: Reviewed by:

Nemo Li (*Project Engineer*) Daniel Zhao (*Reviewer*)

Description of Test Facility

Name: Intertek Testing Service Limited Shanghai
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FCC Registration Number: 236597
IC Assigned Code: 2402B-1

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Tel: 86 21 61278271
Fax: 86 21 54262353

Content

1 GENERAL INFORMATION

1.1 Description of Client

Applicant	:	Jining Zhongke SmartCity Electronic Technology Co., Ltd Technology Center, Rencheng District, Jining City, Shandong China
Name of contact	:	Mingen Sun
Tel	:	86 537 5661518
Fax	:	86 537 5661518
Email	:	sunme@iiot.ac.cn
Manufacturer	:	Jining Zhongke SmartCity Electronic Technology Co., Ltd Technology Center, Rencheng District, Jining City, Shandong China

1.2 Identification of the EUT

Product Name	:	MACHTALK Wi-Fi module
Type/model	:	CLOUD-ESP-01-3V
FCC ID	:	2AFXZ-GC938263

1.3 Technical Specification

Operation Frequency Band	:	2400~2483.5 MHz;
Type of Modulation	:	CCK,BPSK,QPSK,DSSS,OFDM
EUT Modes of Modulation	:	802.11b/g; 802.11n HT20
Channel Number	:	11Channels for 2412MHz~2462MHz
Description of EUT	:	The EUT is a Wi-Fi module and has only one model.
Antenna	:	PCB antenna, 1.3dBi
Rating	:	DC 3.3V
Category of EUT	:	Class B
EUT type	:	☒ Table top ☐ Floor standing
Sample received date	:	October 12, 2015
Date of test	:	October 12, 2015 – October 22, 2015

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2014)
ANSI C63.10 (2013)
KDB 558074 (v03r03)

2.2 Mode of operation during the test

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

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

Freq. Band	Modulation	Lowest(MHz)	Middle(MHz)	Highest(MHz)
2400-2483.5 MHz	802.11b	2412	2437	2462
	802.11g	2412	2437	2462
	802.11n(HT20)	2412	2437	2462

Data rate VS Power

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 rata as the worst case.

Freq. Band	Modulation	Worst case data rate
2400-2483.5MHz	802.11b	11Mbps
	802.11g	6Mbps
	802.11n(HT20)	MCS0

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	HP ProBook 6470b	-

2.5 Instrument list

Selected	Instrument	EC no.	Model	Valid until date
☐	Shielded room	EC 2838	GB88	2016-1-8
☐	EMI test receiver	EC 2107	ESCS 30	2016-10-19
☐	A.M.N.	EC 3119	ESH2-Z5	2015-12-16
☐	A.M.N.	EC 3394	ENV 216	2016-8-1
☒	Semi anechoic chamber	EC 3048	-	2016-5-11
☒	EMI test receiver	EC 3045	ESIB26	2016-10-19
☒	Broadband antenna	EC 4206	CBL 6112D	2016-4-27
☒	Horn antenna	EC 3049	HF906	2016-4-27
☐	Horn antenna	EC 4792-1	3117	2016-4-21
☒	Horn antenna	EC 4792-3	HAP18-26W	2016-6-11
☐	Pre-amplifier	EC 5262	pre-amp 18	2016-5-25
☒	Pre-amplifier	EC 4792-2	TPA0118-40	2016-4-10
☐	High Pass Filter	EC 4797-1	WHKX 1.0/15G-10SS	2016-1-8
☒	High Pass Filter	EC 4797-2	WHKX 2.8/18G-12SS	2016-1-8
☐	High Pass Filter	EC 4797-3	WHKX 7.0/1.8G-8SS	2016-1-8
☒	Band Reject Filter	EC 4797-4	WRCGV2400/2483/10SS	2016-1-8
☐	Test Receiver	EC 4501	ESCI 7	2016-1-13
☒	PXA Signal Analyzer	EC5338	N9030A	2016-5-14
☒	Power sensor/Power meter	EC4318	N1911A/N1921A	2016-4-8
☐	Power sensor	EC5338-1	U2021XA	2016-3-5
☐	MXG Analog Signal Generator	EC5338-2	N5181A	2016-3-5
☐	MXG Vector Signal Generator	EC5175	N51812B	2016-1-8

2.6 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	Pass
Maximum peak output power	15.247(b)	Pass
Power spectrum density	15.247(e)	Pass
Radiated Emissions in restricted frequency bands	15.205 & 15.209	Pass
Emission outside the frequency band	15.247(d)	Pass
Power line conducted emission	15.207	NA

Notes: 1: NA =Not Applicable

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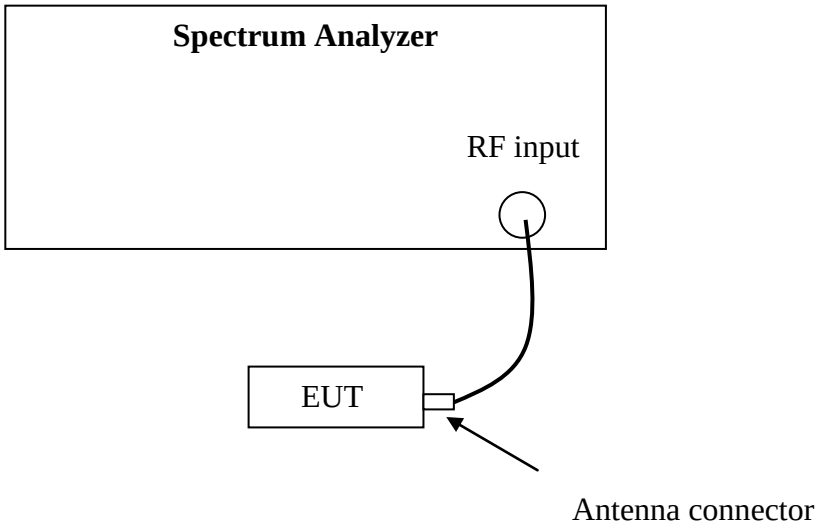
3 Minimum 6dB Bandwidth

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 Test Configuration



3.3 Test Procedure and test setup

The minimum 6dB bandwidth per FCC §15.247(a)(2) is measured using the Spectrum Analyzer according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements(clause 8.2).

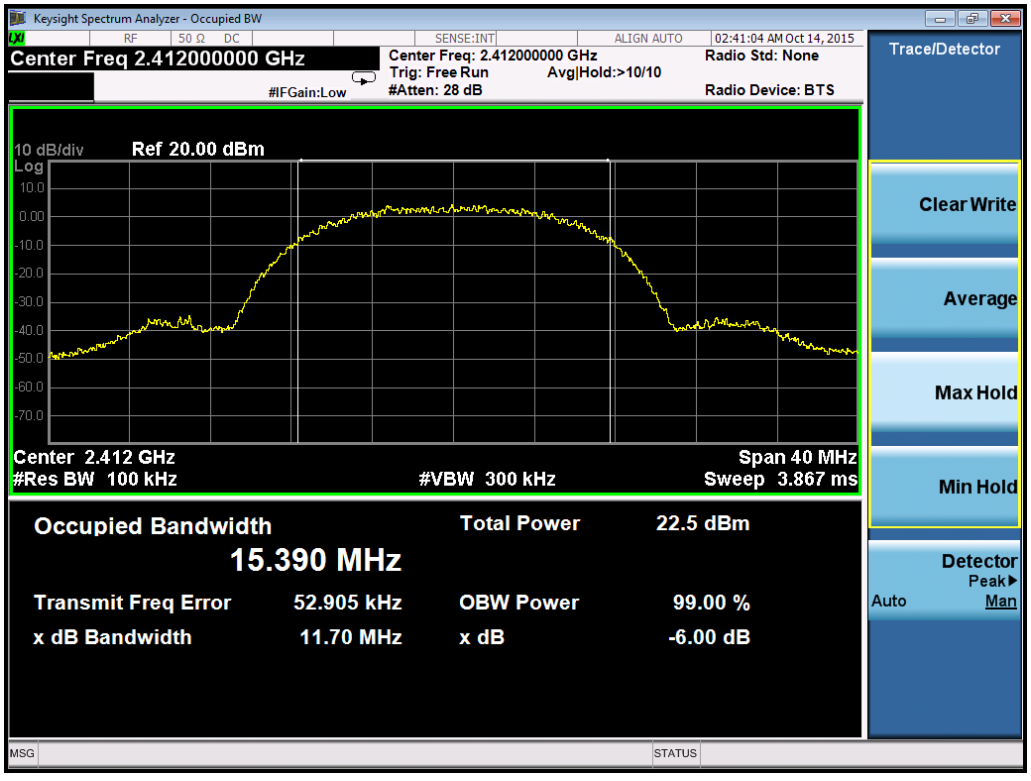
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points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

3.4 Test Protocol

Temperature: 25 °C
Relative Humidity: 55 %

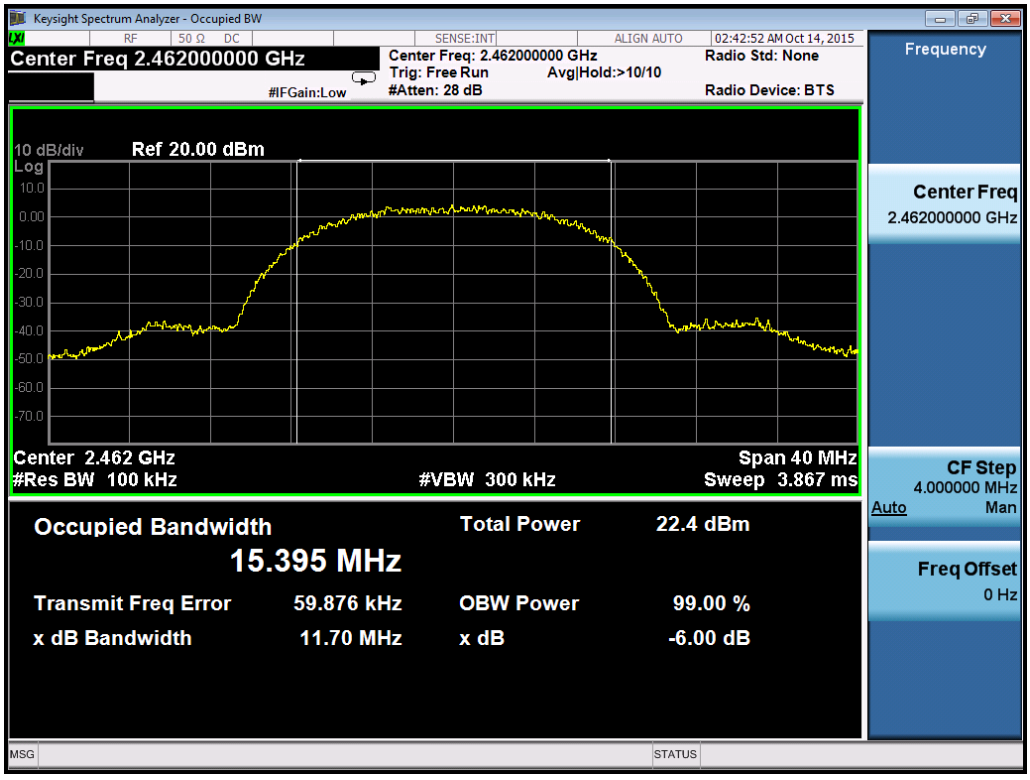
Mode	Channel	Minimum 6dB Bandwidth (MHz)			Limits (MHz)
		Port0	Port 1	Port 2	
802.11b	L	11.70	-	-	≥ 0.5
	M	11.71	-	-	≥ 0.5
	H	11.70	-	-	≥ 0.5

Channel L



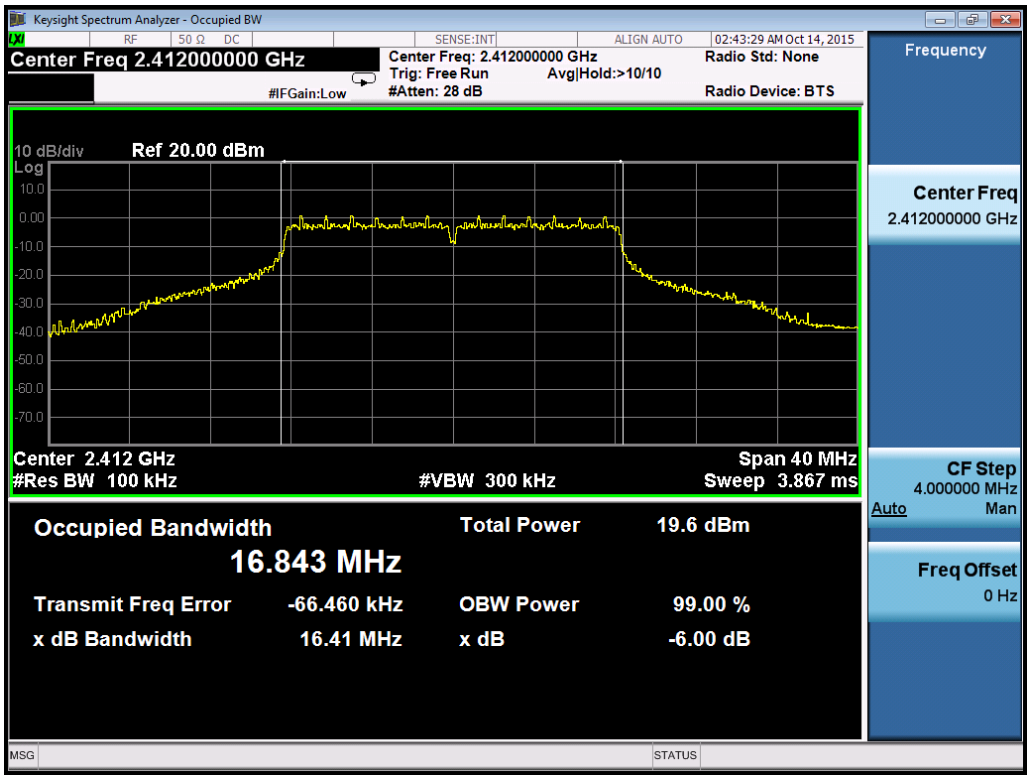
Channel M

Channel H

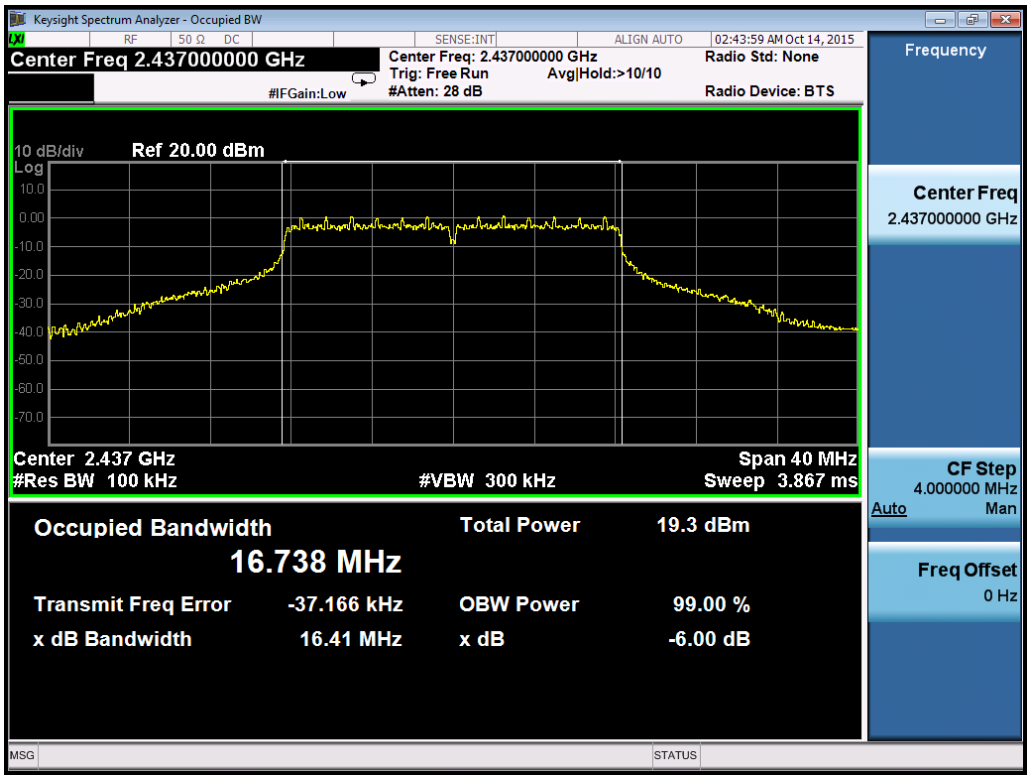


Mode	Channel	Minimum 6dB Bandwidth (MHz)			Limits (MHz)
		Port0	Port 1	Port 2	
802.11g	L	16.41	-	-	≥ 0.5
	M	16.41	-	-	≥ 0.5
	H	16.41	-	-	≥ 0.5

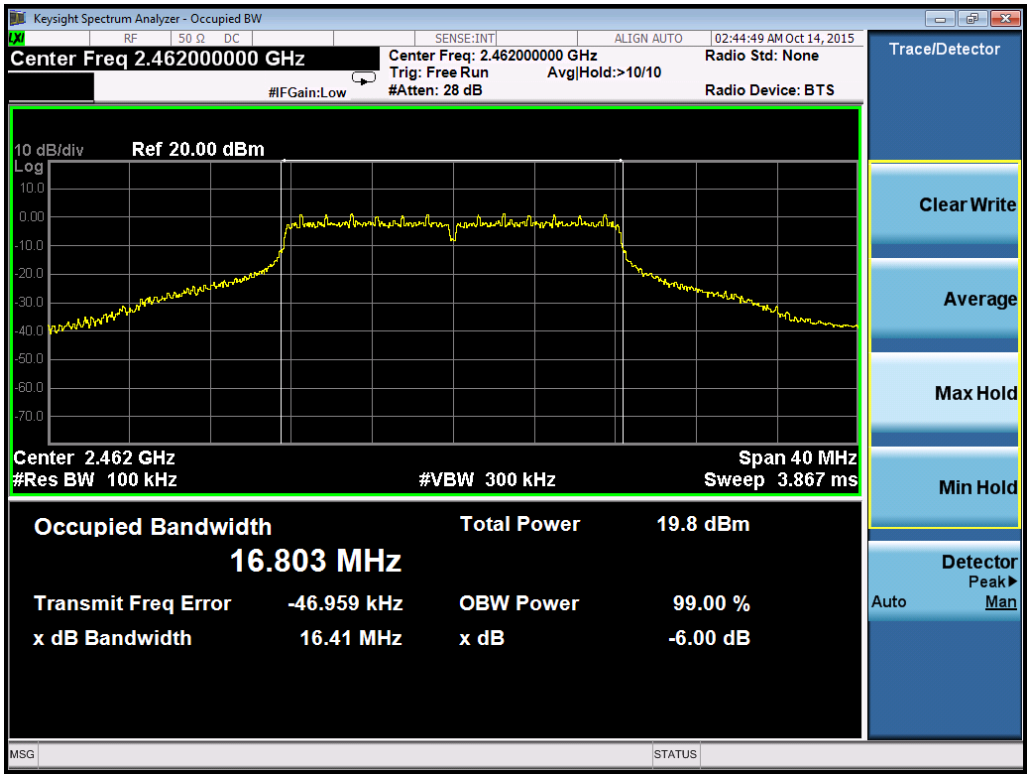
Channel L



Channel M

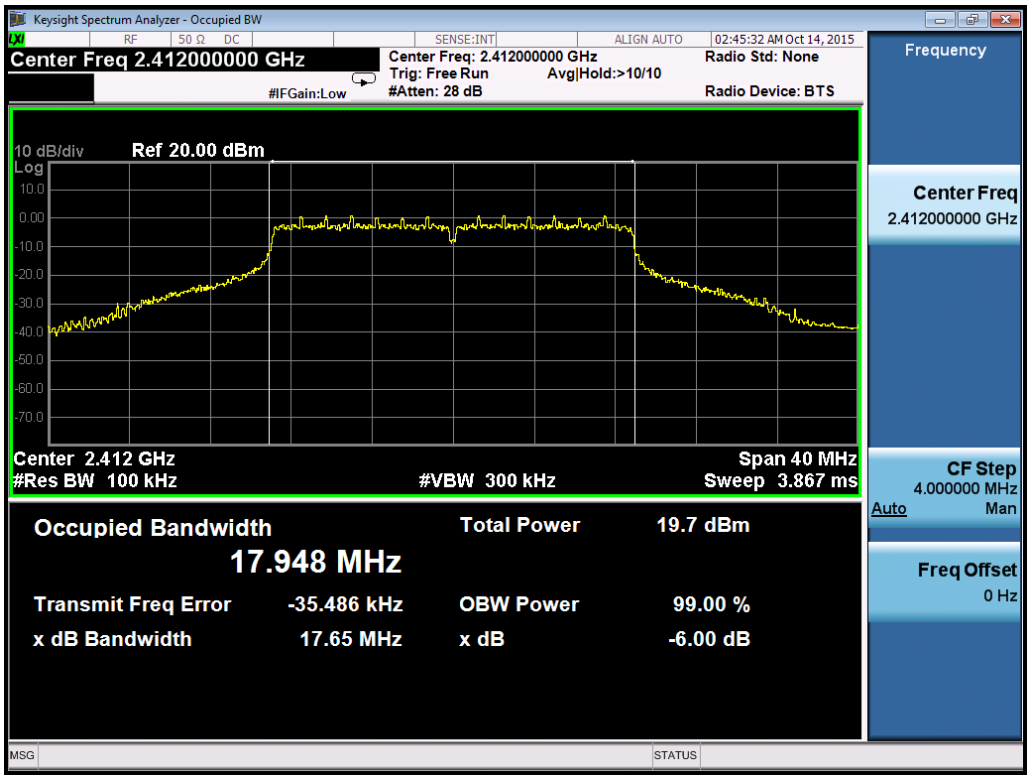


Channel H

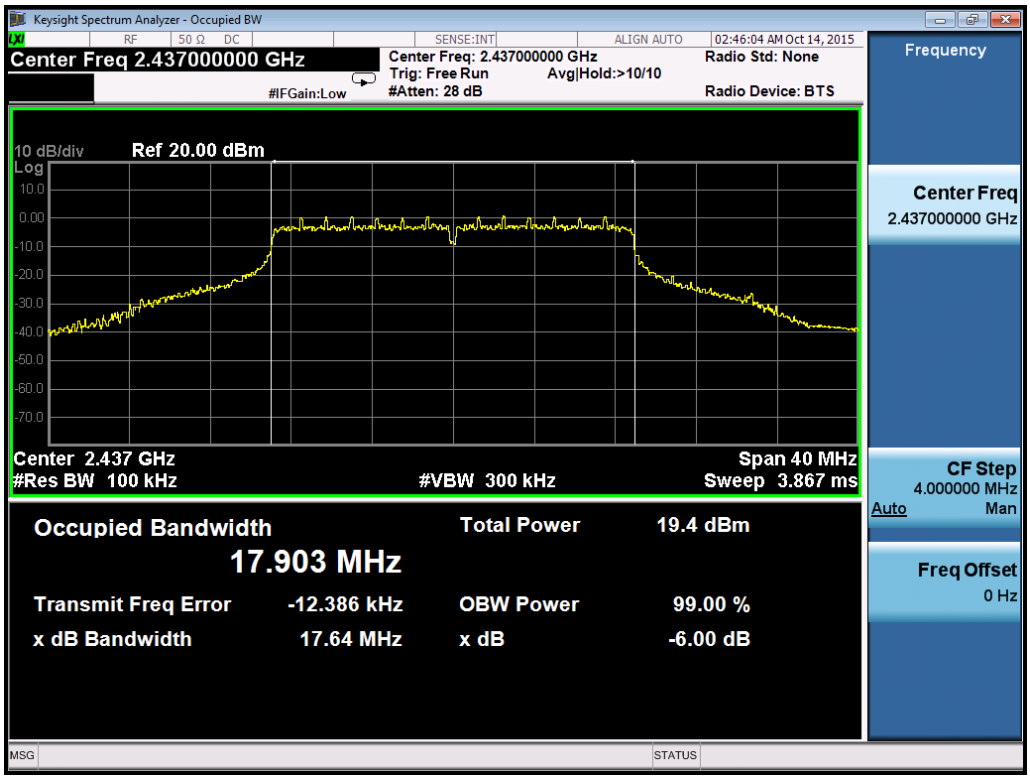


Mode	Channel	Minimum 6dB Bandwidth (MHz)			Limits (MHz)
		Port0	Port 1	Port 2	
802.11n(HT20)	L	17.65	-	-	≥ 0.5
	M	17.64	-	-	≥ 0.5
	H	17.64	-	-	≥ 0.5

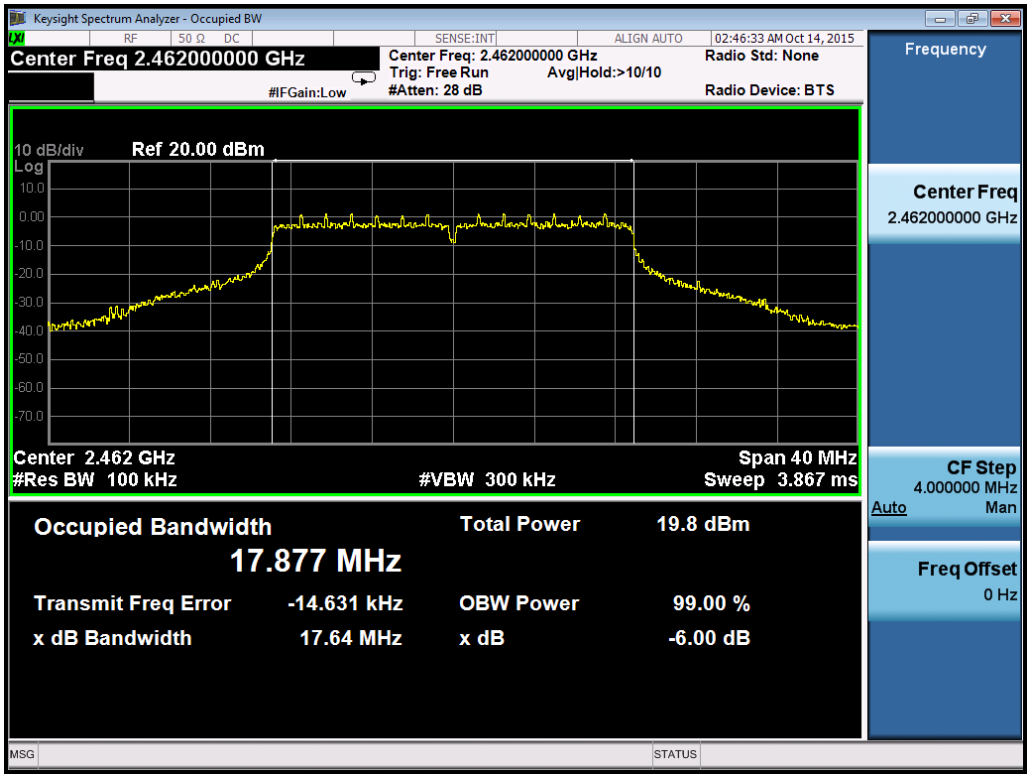
Channel L



Channel M



Channel H



4 Maximum Conducted Output power

Test result: Pass

4.1 Test limit

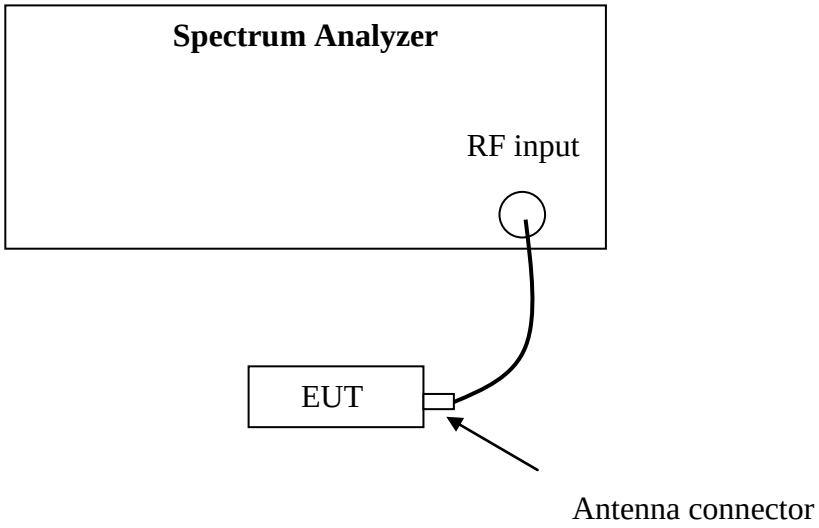
☐ For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt

☐ For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

☒ For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt

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 Test Configuration



4.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements (clause 9.1.2).

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth andshall utilize a fast-responding diode detector.

4.4 Test protocol

Temperature: 25 °C
Relative Humidity: 55 %

Mode	Channel	Reading (dBm)			Total Power (dBm)	Limit (dBm)
		Port0	Port 1	Port 2		
802.11b	L	18.60	-	-	18.60	30
	M	17.62	-	-	17.62	30
	H	18.43	-	-	18.43	30

Mode	Channel	Reading (dBm)			Total Power (dBm)	Limit (dBm)
		Port0	Port 1	Port 2		
802.11g	L	23.24	-	-	23.24	30
	M	22.93	-	-	22.93	30
	H	23.23	-	-	23.23	30

Mode	Channel	Reading (dBm)			Total Power (dBm)	Limit (dBm)
		Port0	Port 1	Port 2		
802.11n (HT20)	L	23.20	-	-	23.20	30
	M	22.79	-	-	22.79	30
	H	23.28	-	-	23.28	30

Note:

Reading port x (mW) = 10 ^ (reading port x (dBm)/10
x = 0, 1, 2.
Total Power (mW) = reading port 0 (mW) + reading port 1 (mW) + reading port 2 (mW)
Total power (dBm) = 10 * log (Total power (mW))

5 Power spectrum density

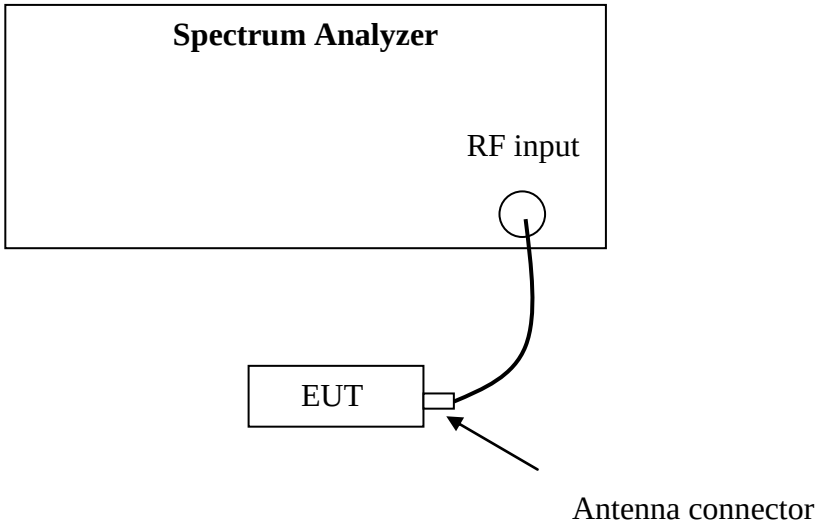
Test result: Pass

5.1 Test 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 –antenna gain-beam forming gain).

5.2 Test Configuration



5.3 Test procedure and test setup

The power output per FCC §15.247(e) was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" (clause 10.2) for compliance to FCC 47CFR 15.247 requirements.

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the *DTS bandwidth*.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 × 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 amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

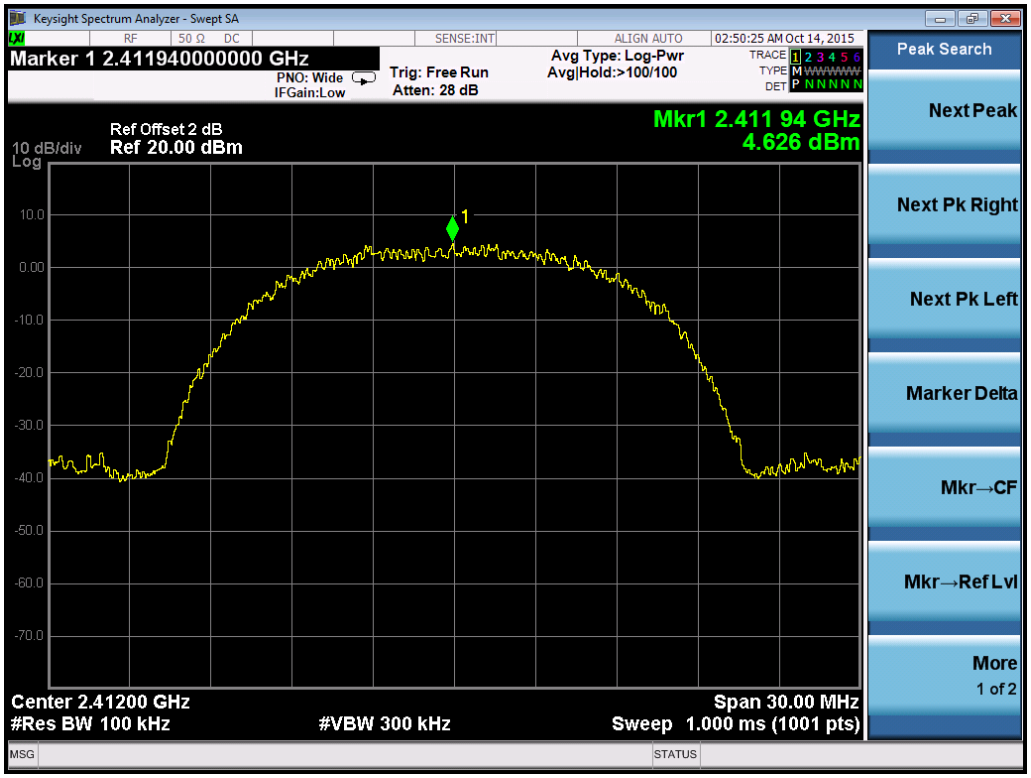
5.4 Test Protocol

Temperature: 25 °C
Relative Humidity: 55 %

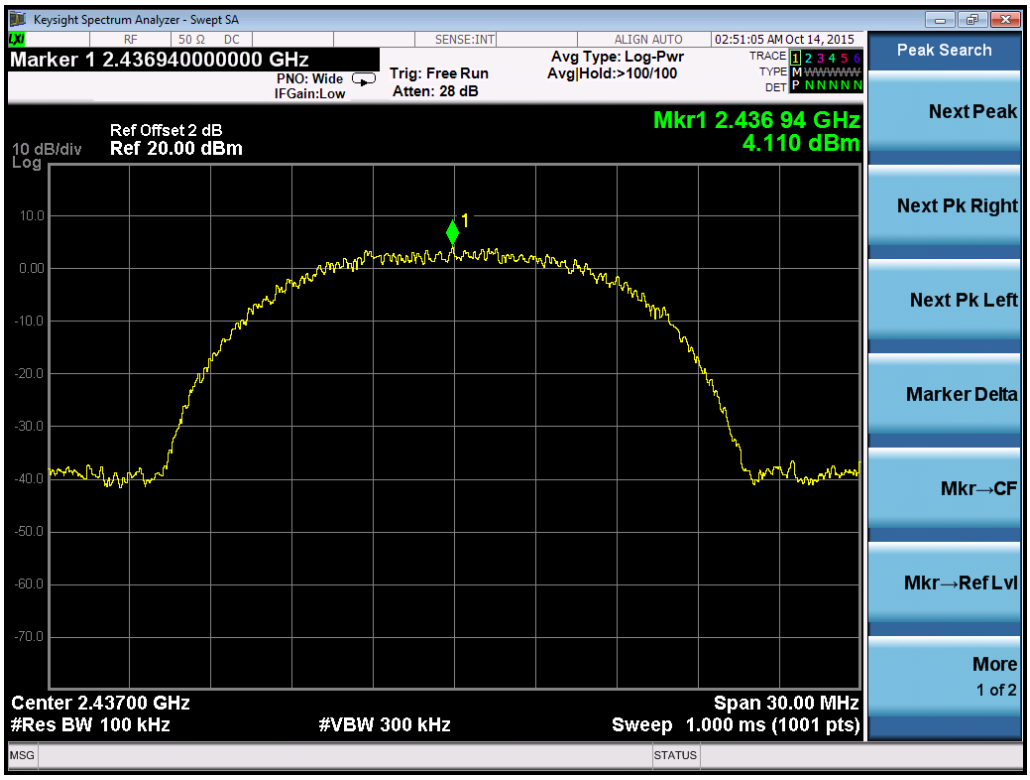
Mode	Channel	PSD (dBm)			Total PSD (dBm)	Limit (dBm)
		Port 0	Port 1	Port 2		
802.11b	L	4.626	-	-	4.626	8
	M	4.110	-	-	4.110	8
	H	4.438	-	-	4.438	8

Note 1:
PSD port x (mW) = 10 ^ (PSD port x (dBm)/10; x = 0, 1, 2.
Total PSD (mW) = PSD port 0 (mW) + PSD port 1 (mW) + PSD port 2 (mW)
Total PSD (dBm) = 10 * log (Total PSD (mW))

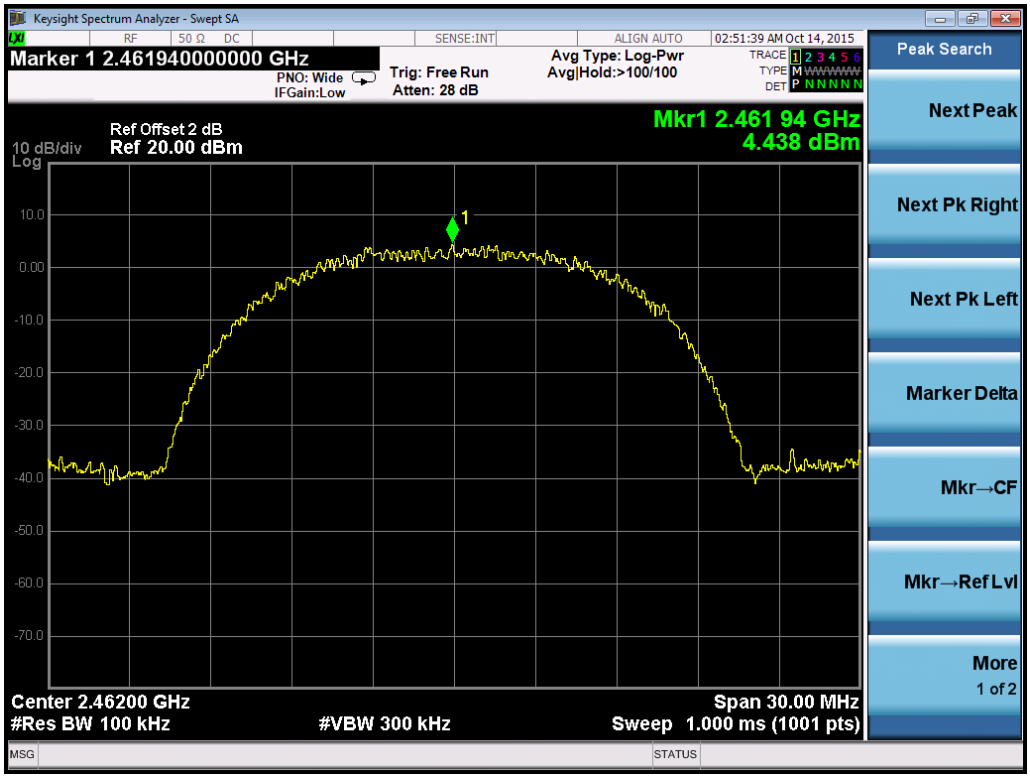
Channel L



Channel M



Channel H

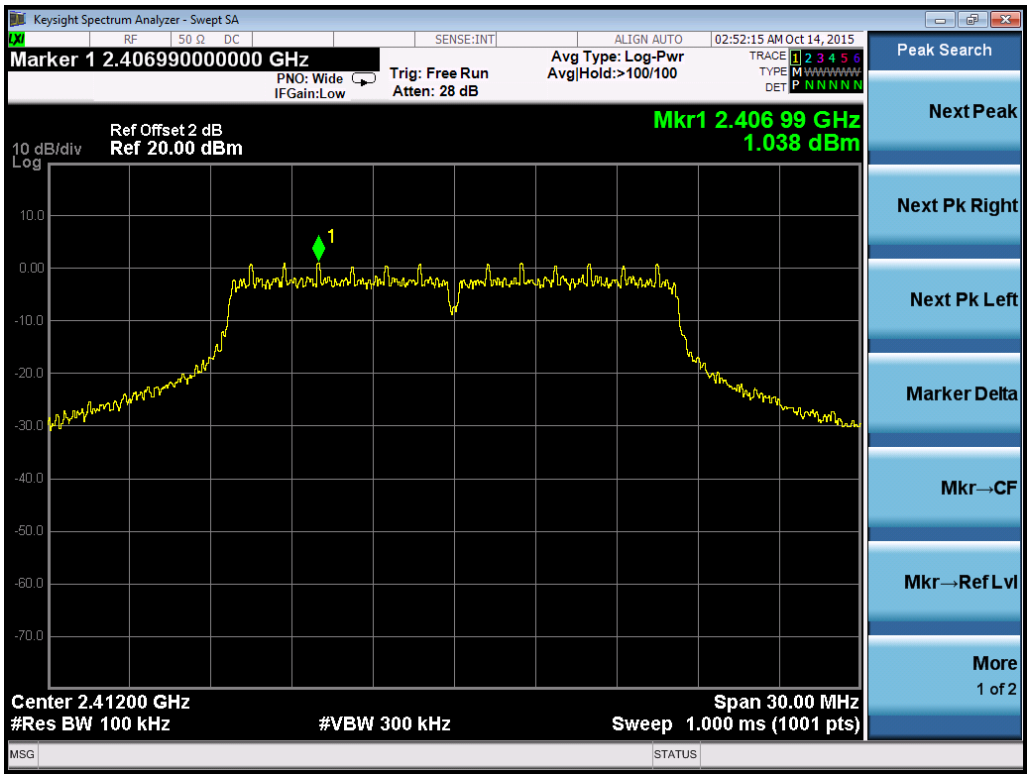


Mode	Channel	PSD (dBm)			Total PSD (dBm)	Limit (dBm)
		Port 0	Port 1	Port 2		
802.11g	L	1.038	-	-	1.038	8
	M	0.791	-	-	0.791	8
	H	1.220	-	-	1.220	8

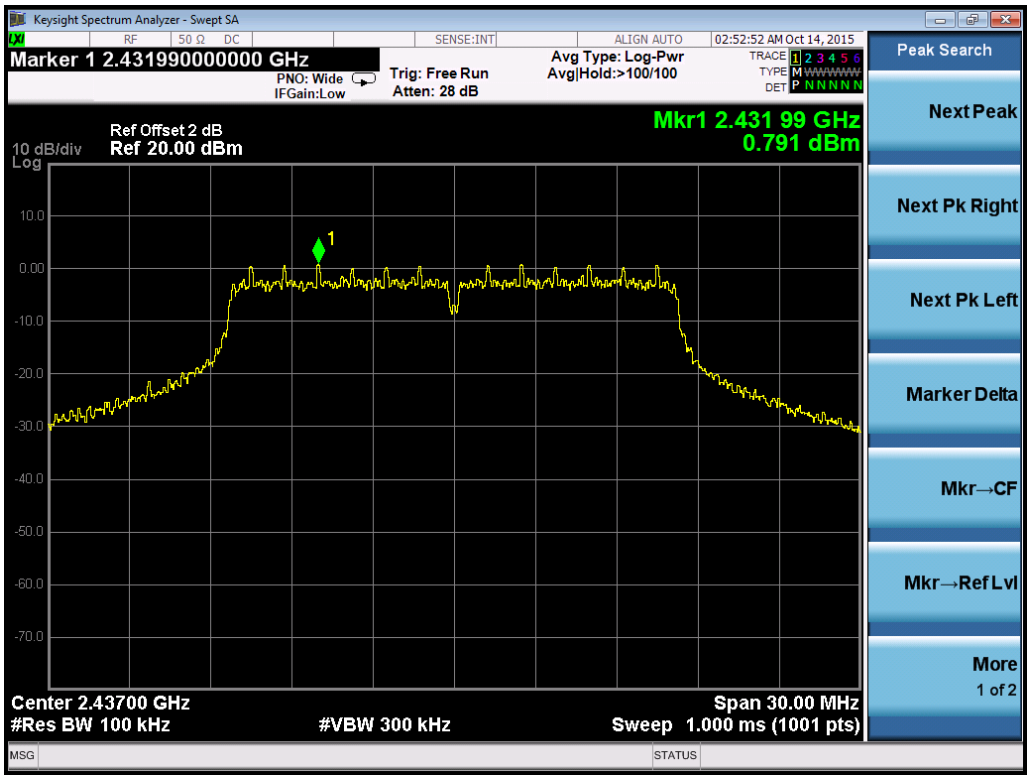
Note 1:

PSD port x (mW) = 10 ^ (PSD port x (dBm)/10; x = 0, 1, 2.
Total PSD (mW) = PSD port 0 (mW) + PSD port 1 (mW) + PSD port 2 (mW)
Total PSD (dBm) = 10 * log (Total PSD (mW))

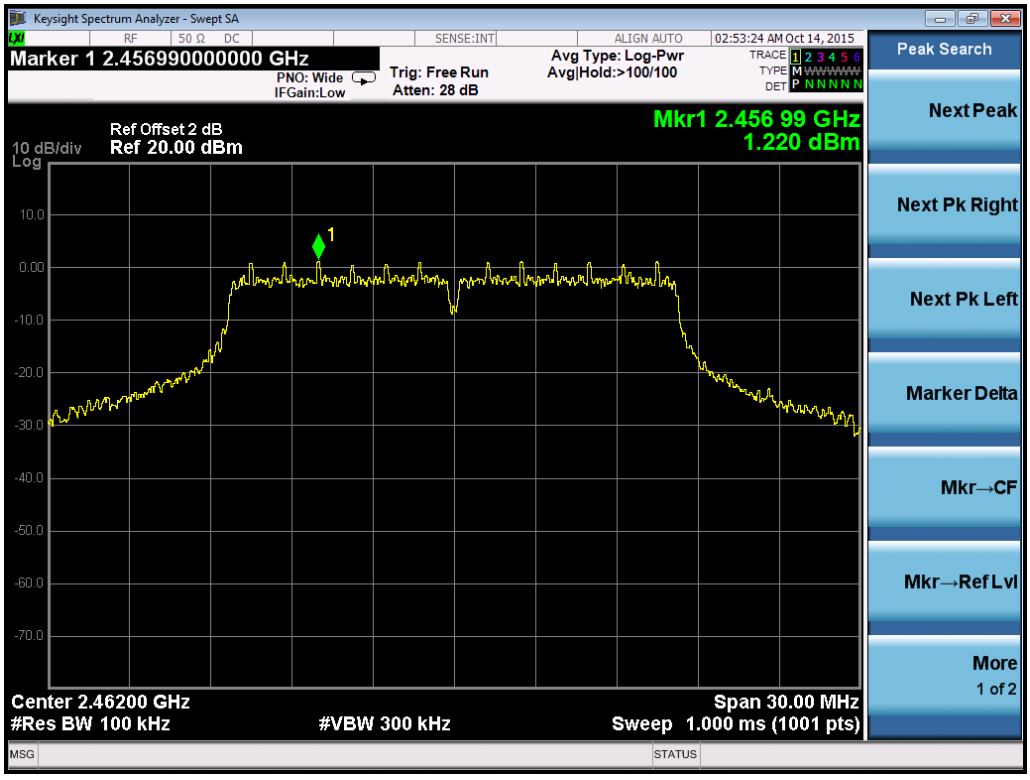
Channel L



Channel M



Channel H

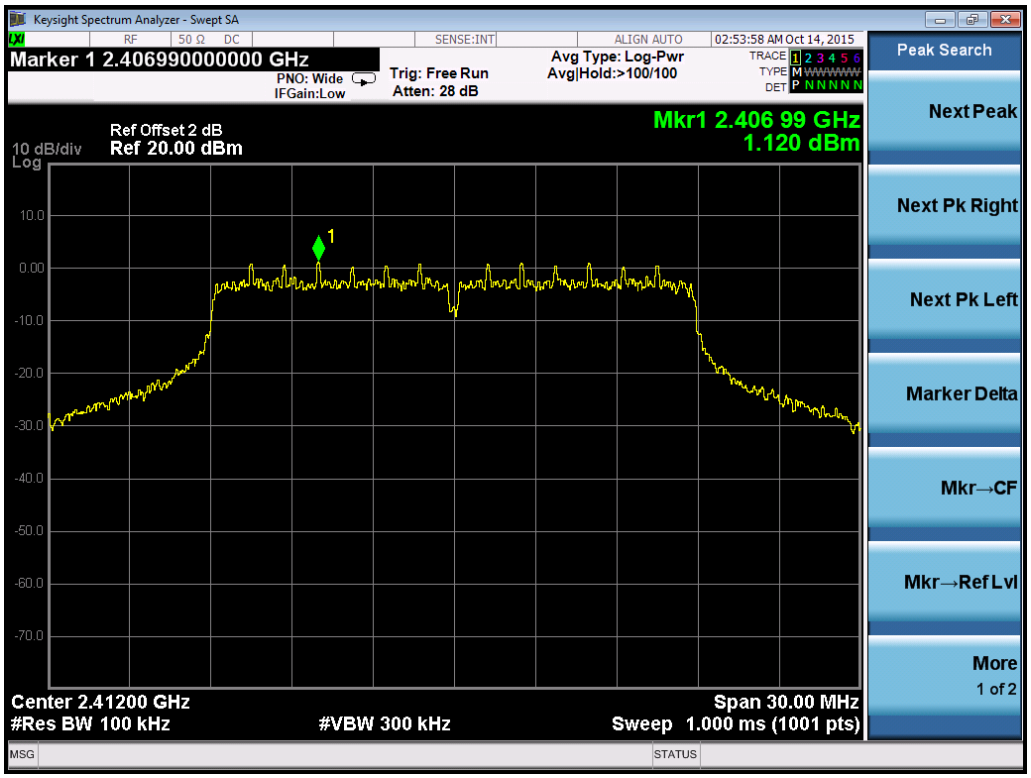


Mode	Channel	PSD (dBm)			Total PSD (dBm)	Limit (dBm)
		Port 0	Port 1	Port 2		
802.11n (HT20)	L	1.120	-	-	1.120	8
	M	0.682	-	-	0.682	8
	H	1.273	-	-	1.273	8

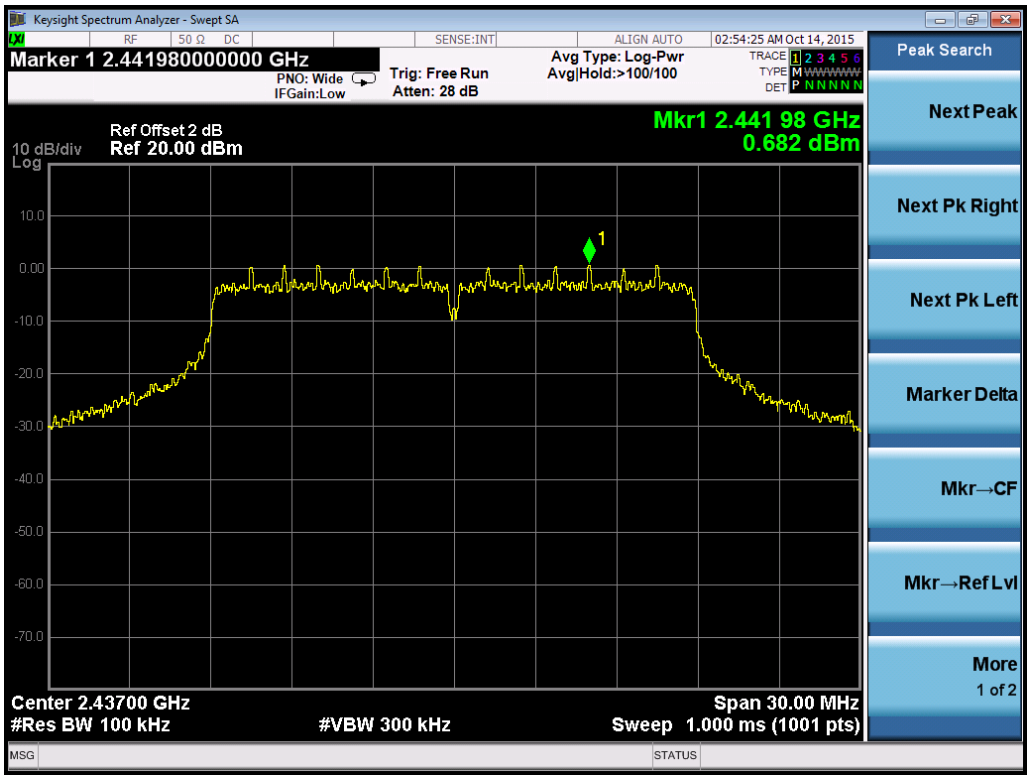
Note 1:

PSD port x (mW) = 10 ^ (PSD port x (dBm)/10; x = 0, 1, 2.
Total PSD (mW) = PSD port 0 (mW) + PSD port 1 (mW) + PSD port 2 (mW)
Total PSD (dBm) = 10 * log (Total PSD (mW))

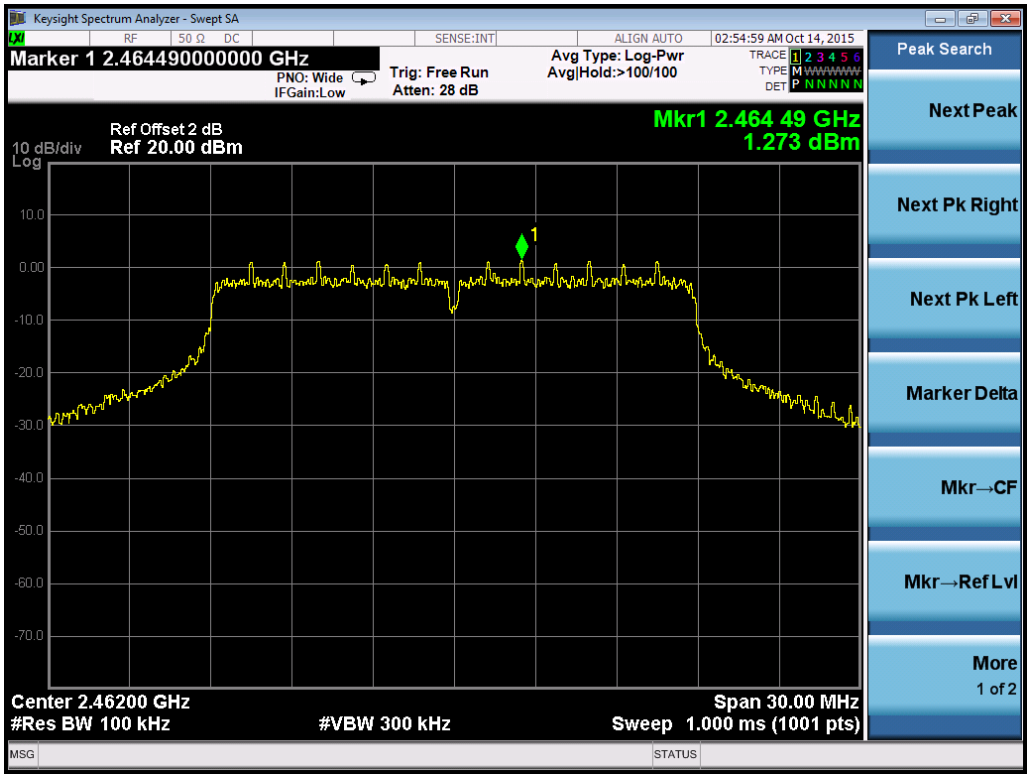
Channel L



Channel M



Channel H



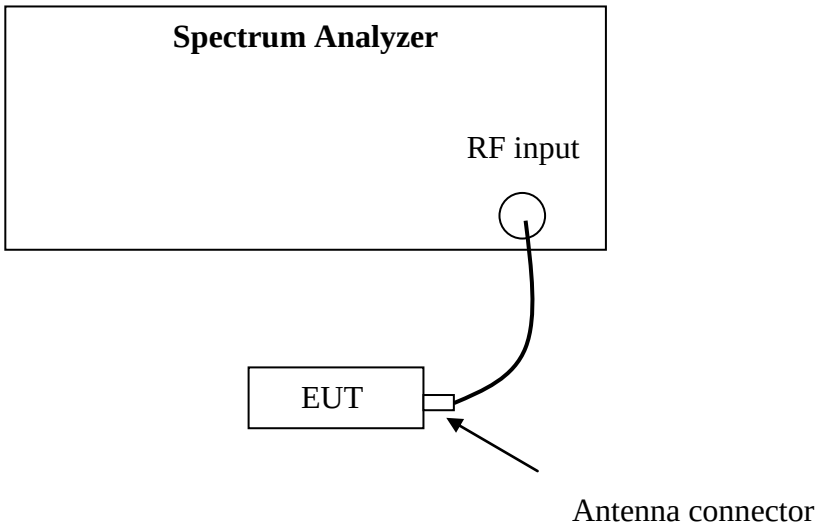
6 Emission outside the frequency band

Test result: **Pass**

6.1 Test 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

6.2 Test Configuration



6.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

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 ≥ 3 x 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.

Note that the channel found to contain the maximum PSD level can be used to establish the reference 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 ≥ 3 x 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.

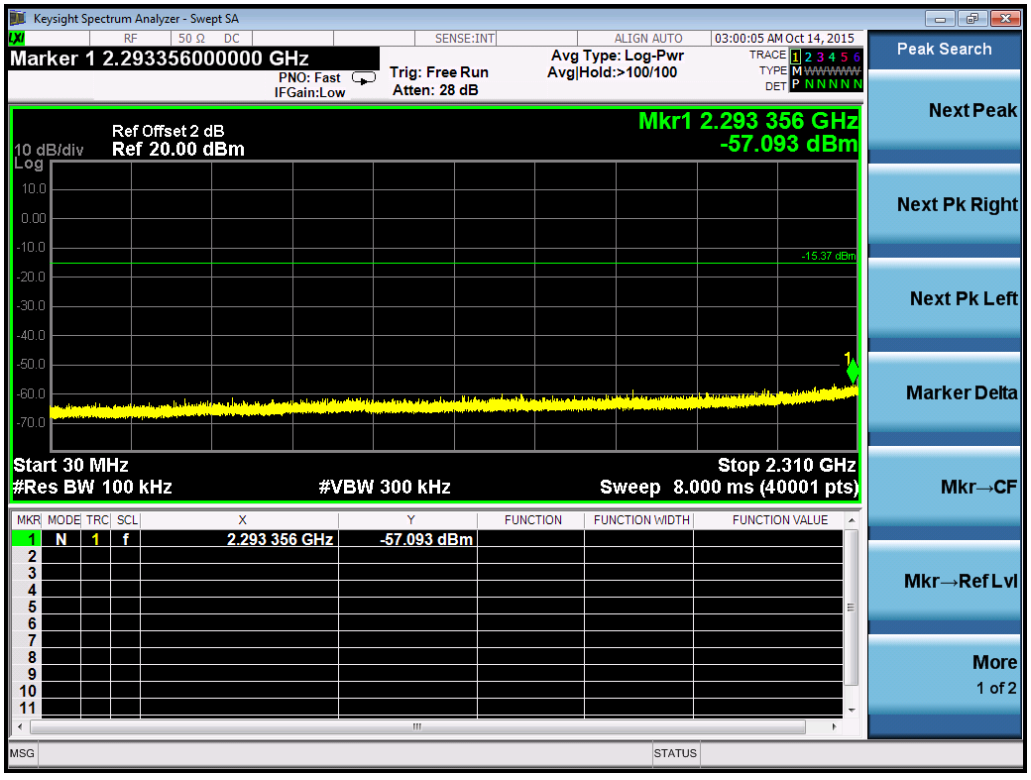
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

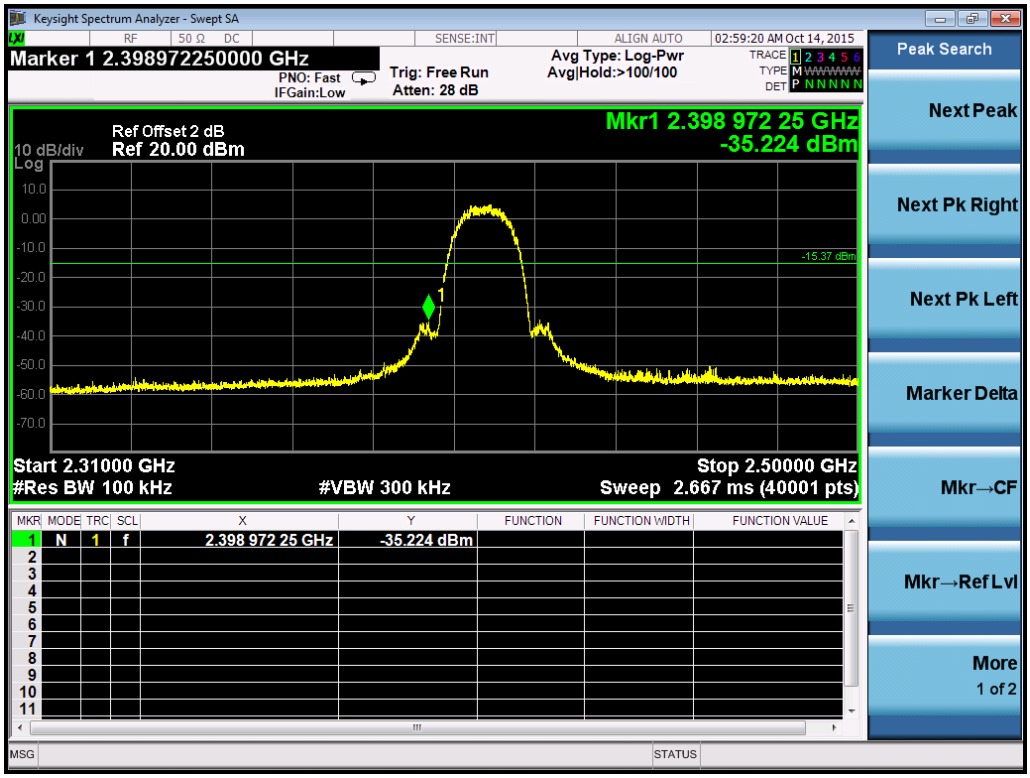
6.4 Test Protocol

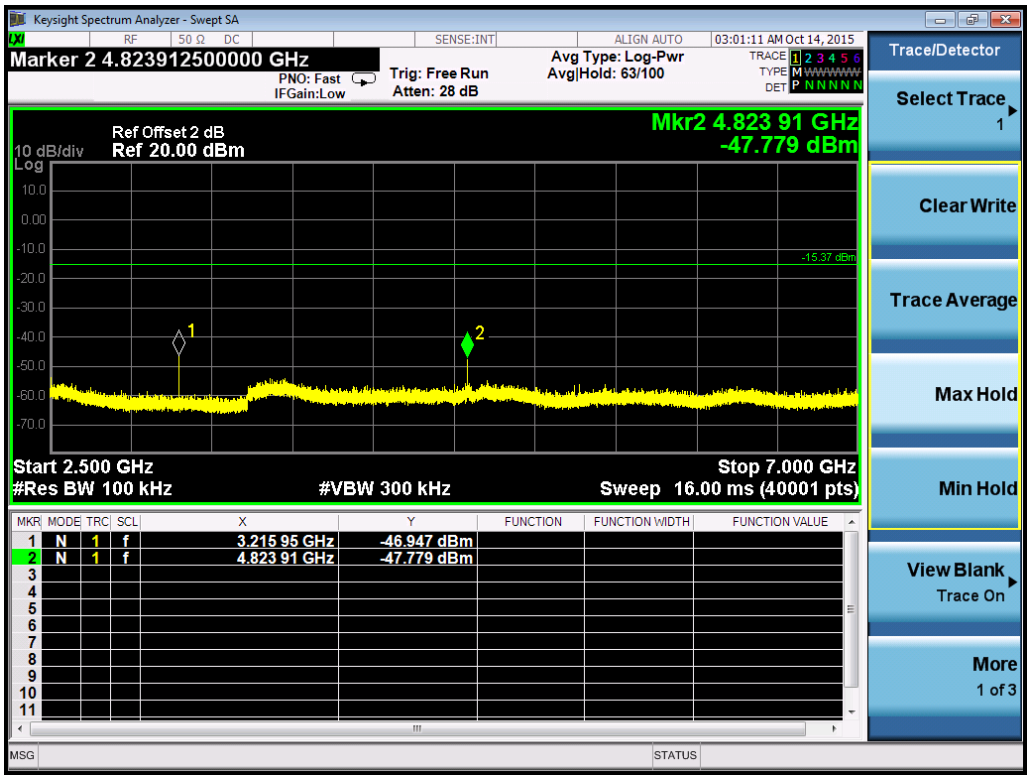
Temperature: 25 °C
Relative Humidity: 55 %

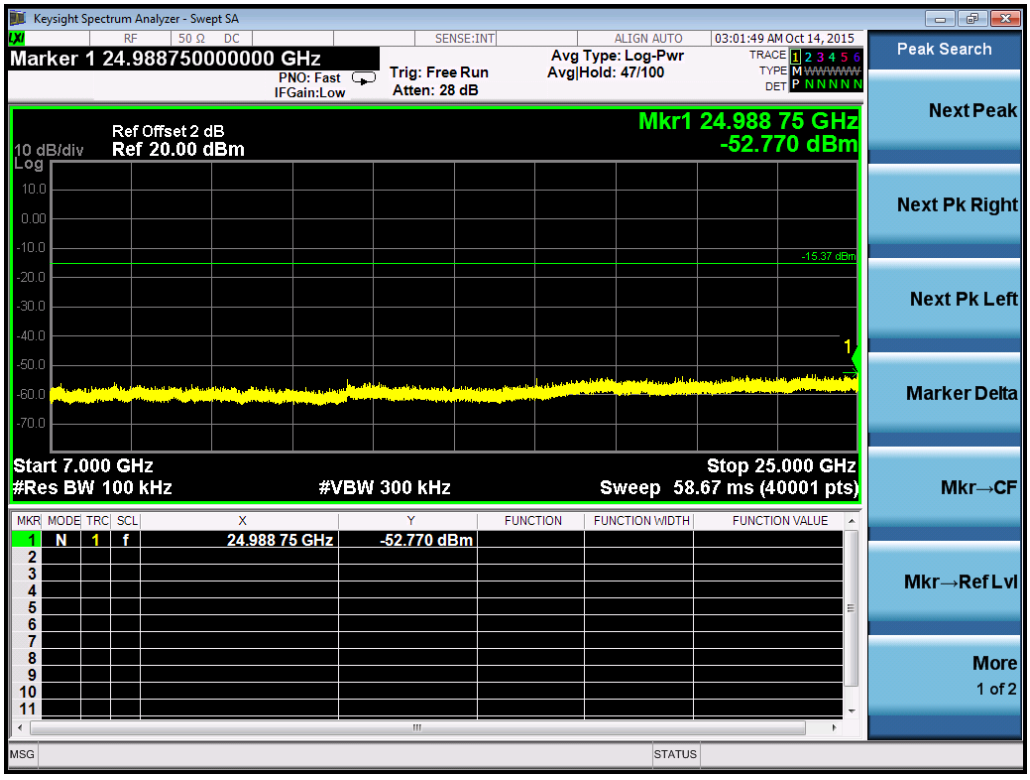
Mode	Channel	Results (dB)			Limits (dB)
		Port0	Port 1	Port 2	
802.11b	L	39.850	-	-	≥20
	M	51.863	-	-	≥20
	H	51.361	-	-	≥20

Channel L

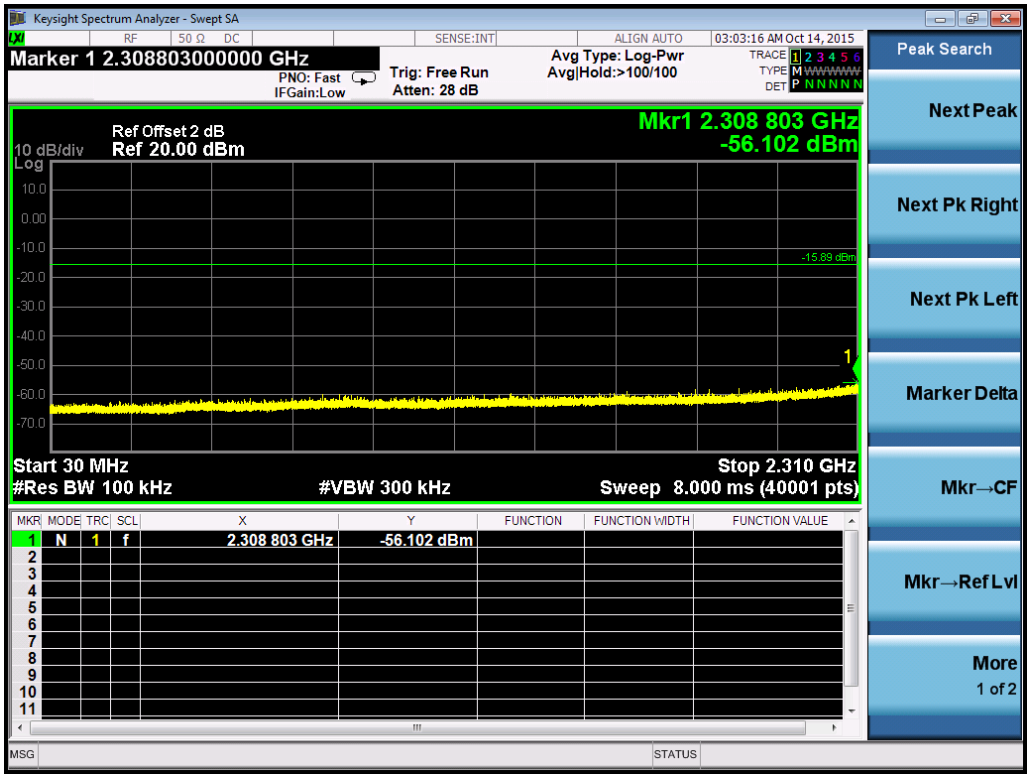


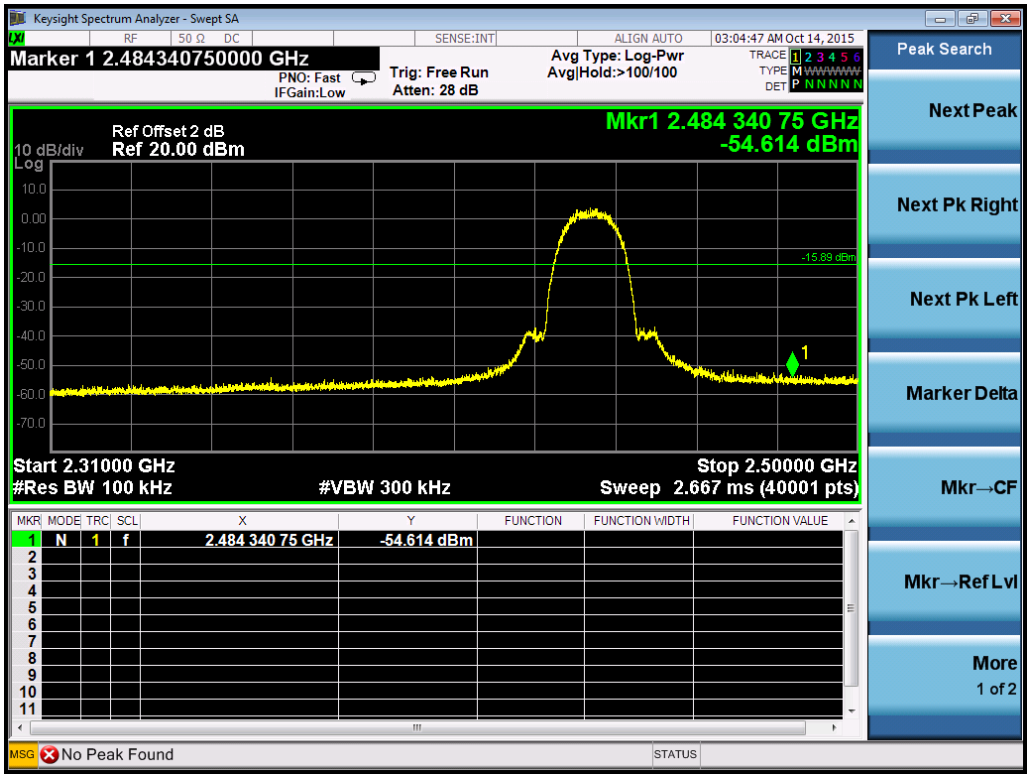

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.398972250000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
02:59:20 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.398 972 25 GHz
-35.224 dBm
-15.37 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.398 972 25 GHz -35.224 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

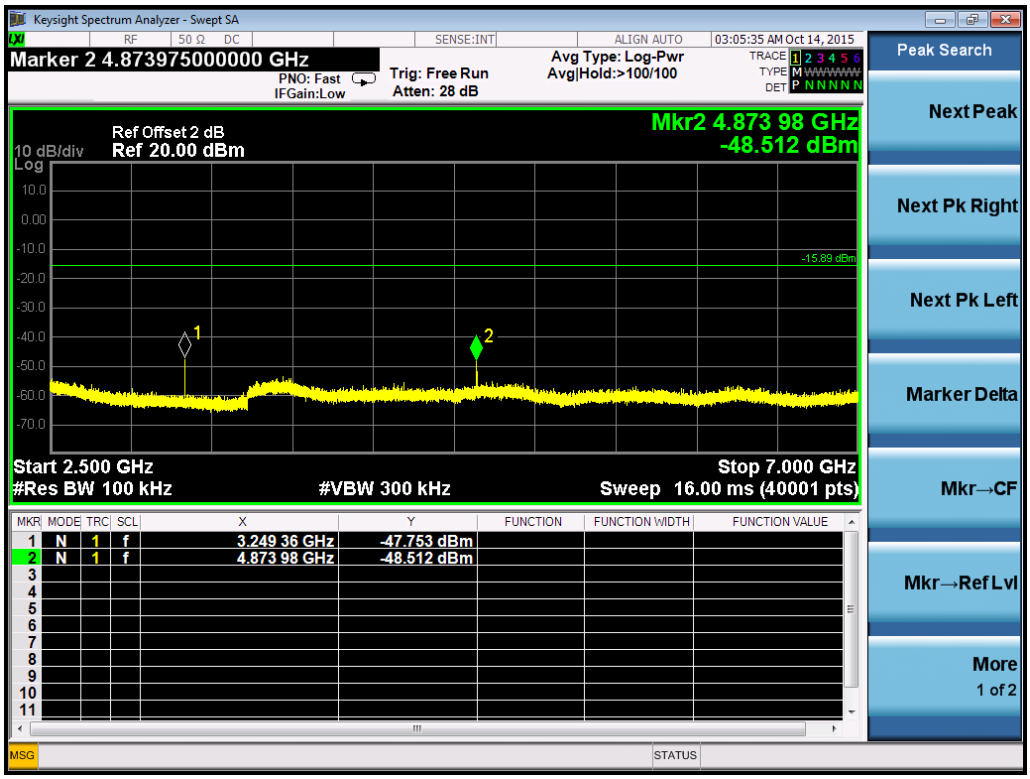

Keysight Spectrum Analyzer - Swept SA
Marker 2 4.823912500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 63/100
03:01:11 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 4.823 91 GHz
-47.779 dBm
-15.37 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 3.215 95 GHz -46.947 dBm
2 N 1 f 4.823 91 GHz -47.779 dBm
Trace/Detector
Select Trace
1
Clear Write
Trace Average
Max Hold
Min Hold
View Blank
Trace On
More
1 of 3

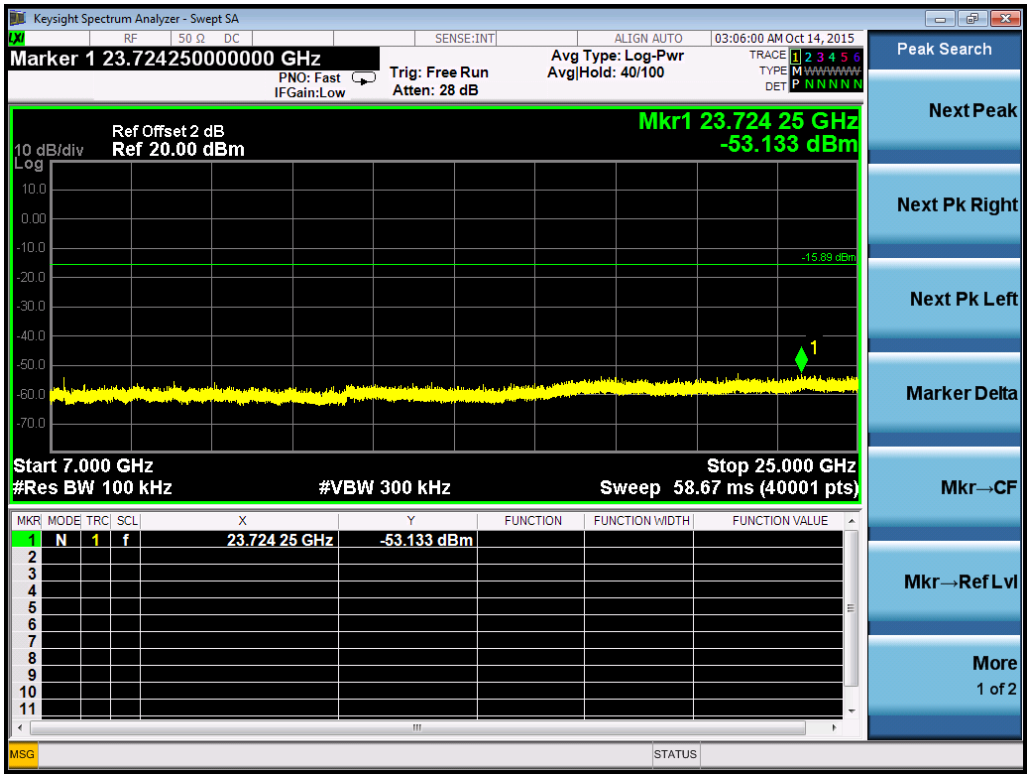

Keysight Spectrum Analyzer - Swept SA
Marker 1 24.988750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 47/100
03:01:49 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 24.988 75 GHz
-52.770 dBm
-15.37 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
1 N 1 f 24.988 75 GHz -52.770 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

Channel M

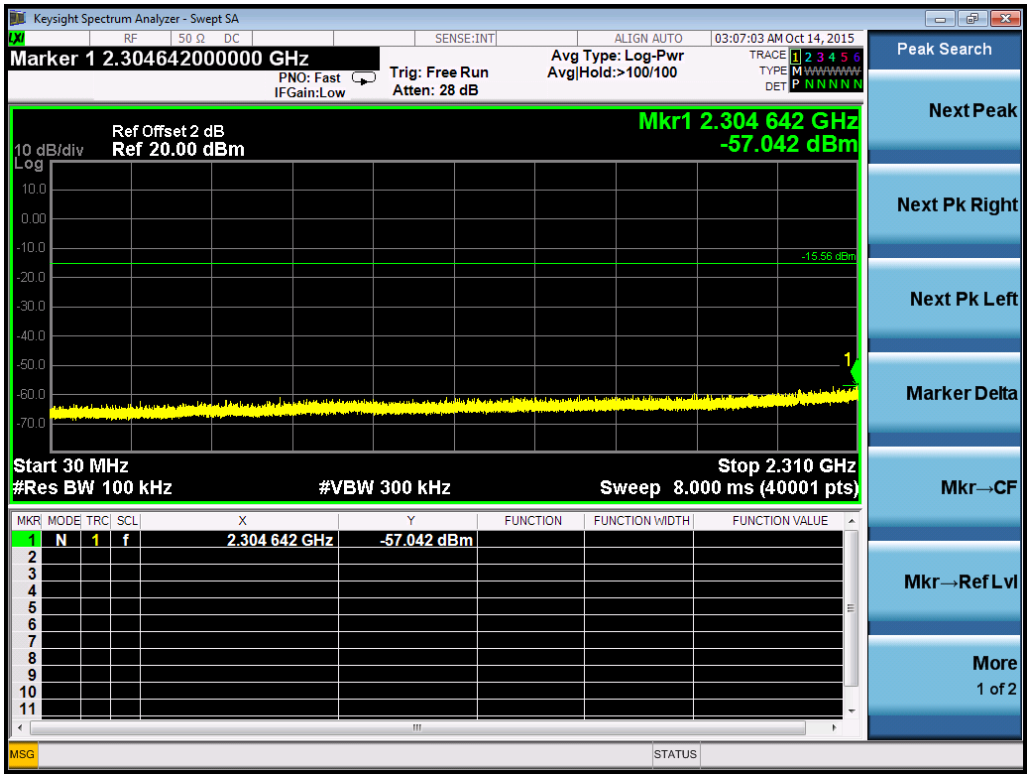

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.308803000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:03:16 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.308 803 GHz
-56.102 dBm
-15.89 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 8.000 ms (40001 pts)
1 N 1 f 2.308 803 GHz -56.102 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

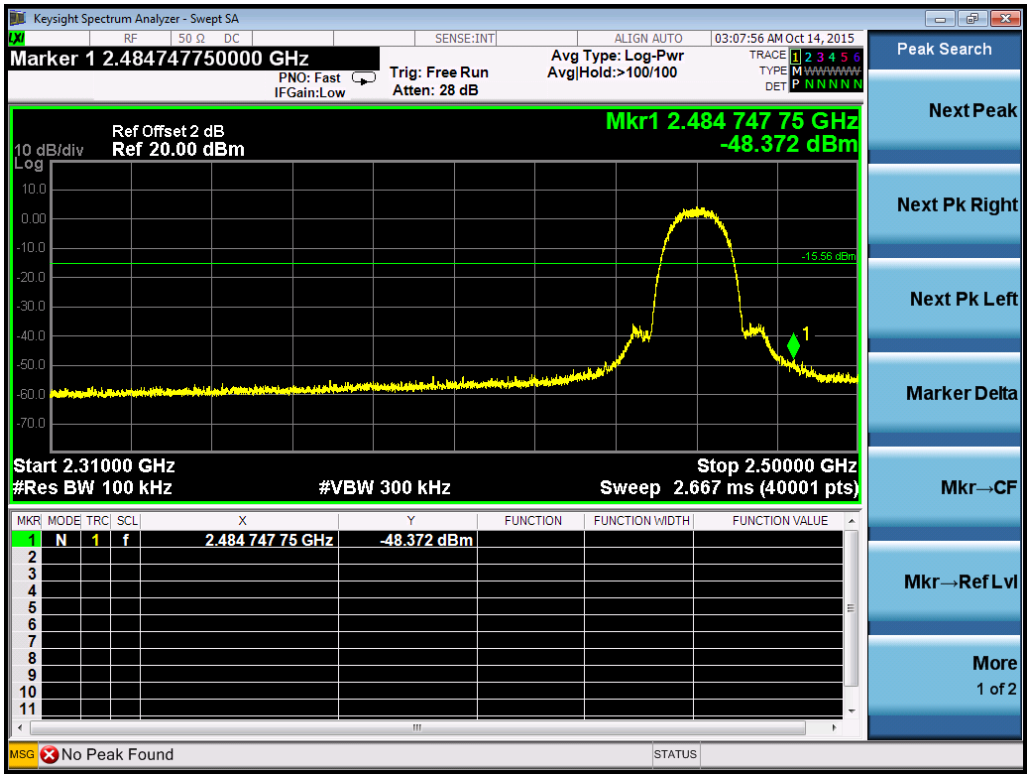

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.484340750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:04:47 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.484 340 75 GHz
-54.614 dBm
-15.89 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.484 340 75 GHz -54.614 dBm
No Peak Found
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

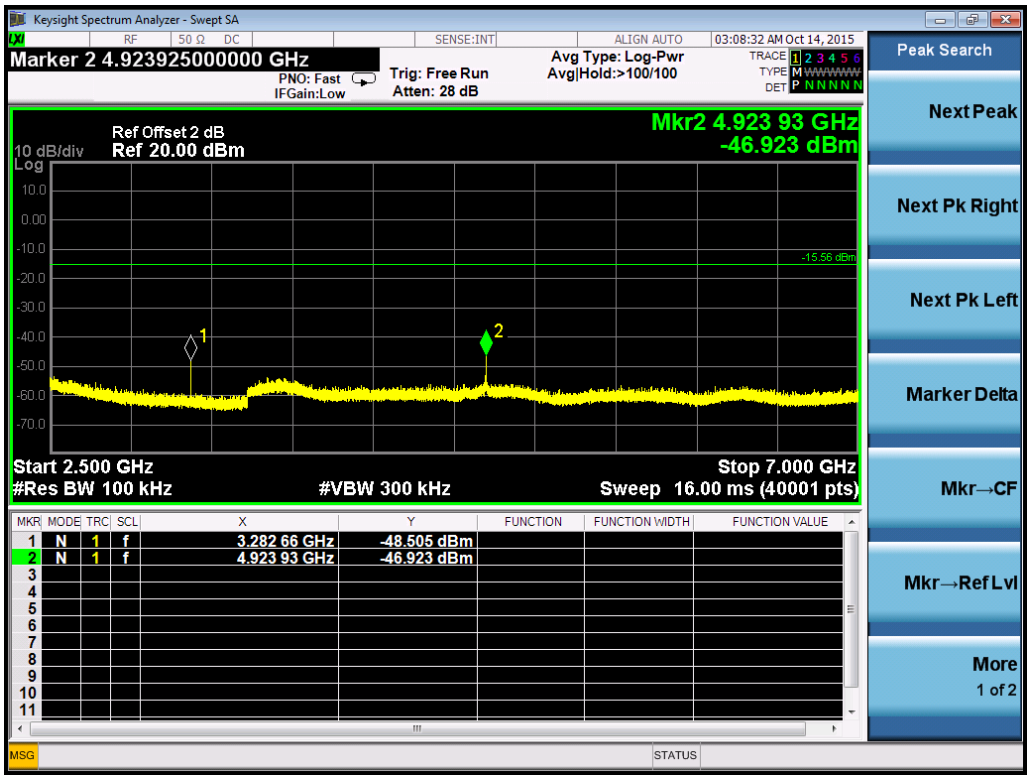

Keysight Spectrum Analyzer - Swept SA
Marker 2 4.873975000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:05:35 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr2 4.873 98 GHz
-48.512 dBm
-15.89 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 3.249 36 GHz -47.753 dBm
2 N 1 f 4.873 98 GHz -48.512 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

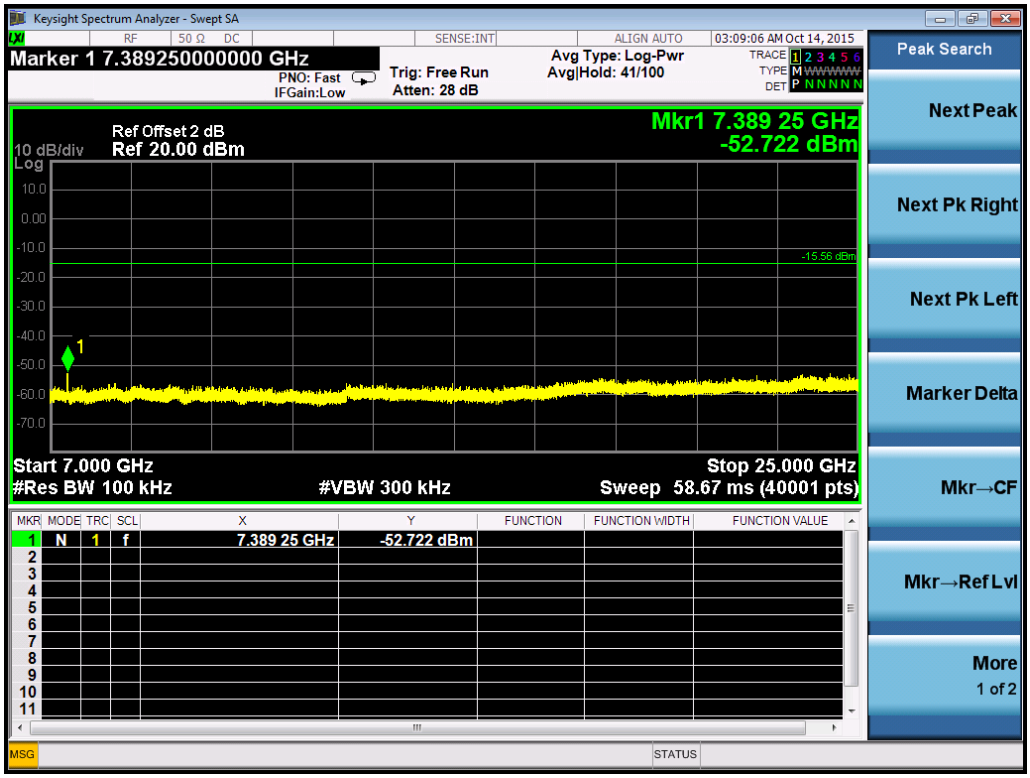

Keysight Spectrum Analyzer - Swept SA
Marker 1 23.724250000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 40/100
03:06:00 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 23.724 25 GHz
-53.133 dBm
-15.89 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
1 N 1 f 23.724 25 GHz -53.133 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

Channel H


Keysight Spectrum Analyzer - Swept SA
Marker 1 2.304642000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:07:03 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.304 642 GHz
-57.042 dBm
-15.56 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 8.000 ms (40001 pts)
1 N 1 f 2.304 642 GHz -57.042 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

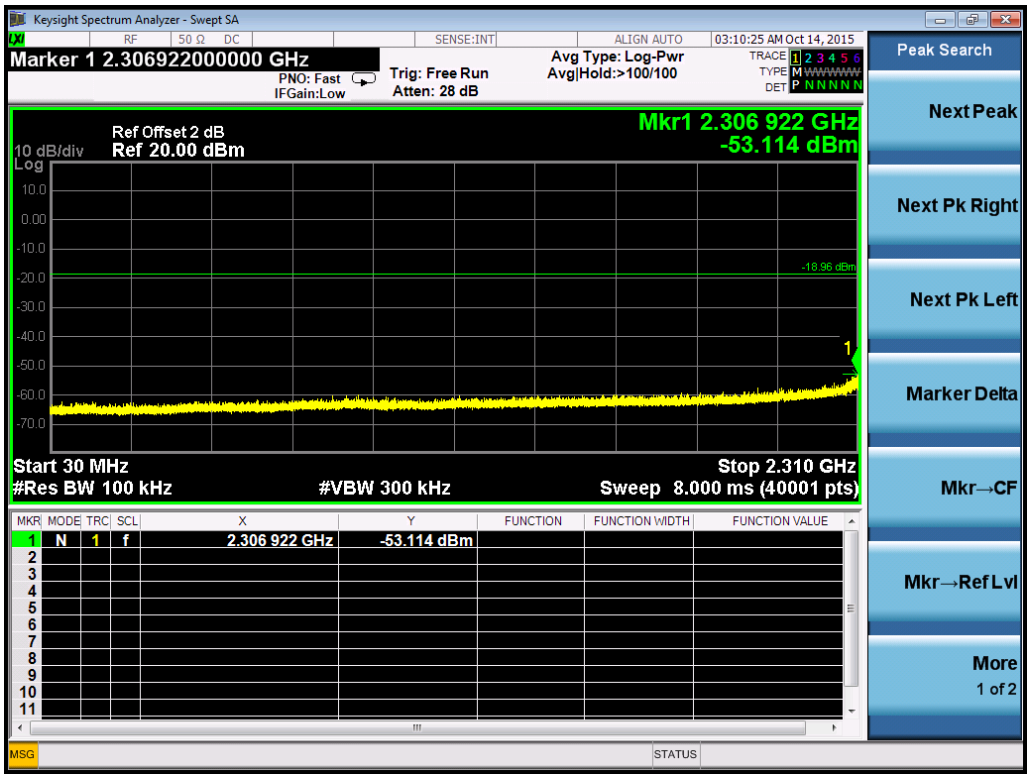

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.484747750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:07:56 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.484 747 75 GHz
-48.372 dBm
-15.56 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.484 747 75 GHz -48.372 dBm
No Peak Found
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

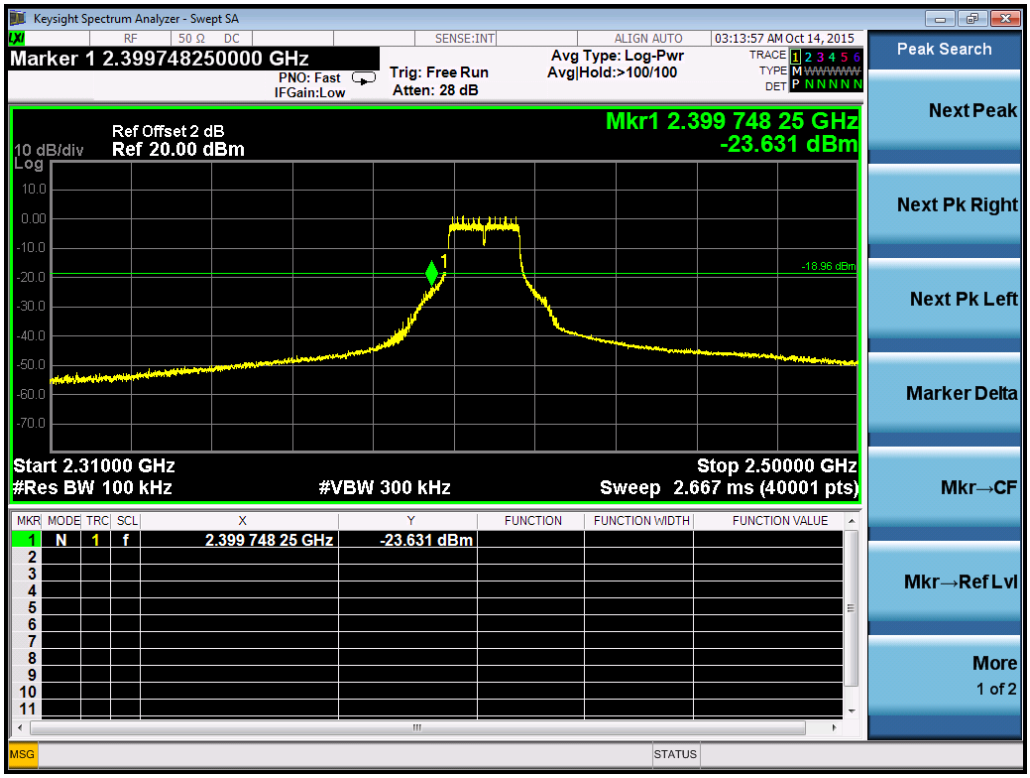

Keysight Spectrum Analyzer - Swept SA
Marker 2 4.923925000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:08:32 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr2 4.923 93 GHz
-46.923 dBm
-15.56 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 3.282 66 GHz -48.505 dBm
2 N 1 f 4.923 93 GHz -46.923 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

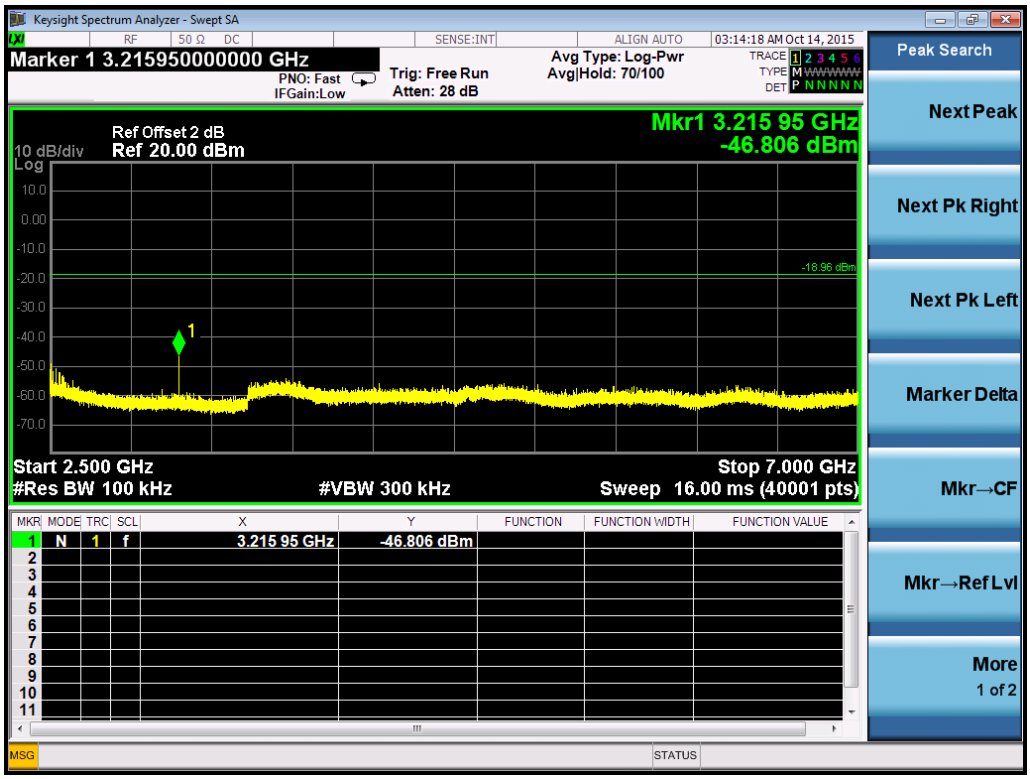

Keysight Spectrum Analyzer - Swept SA
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
03:09:06 AM Oct 14, 2015
Marker 1 7.389250000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 41/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 7.389 25 GHz
-52.722 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-15.56 dBm
1
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 7.389 25 GHz -52.722 dBm
2
3
4
5
6
7
8
9
10
11
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

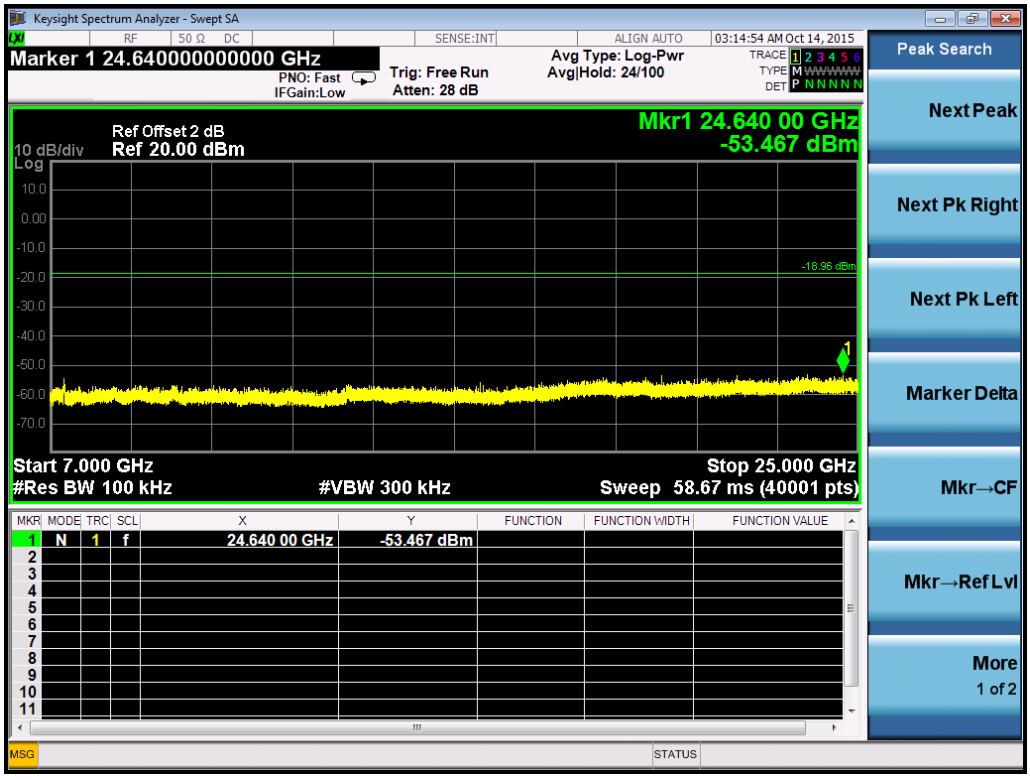
Mode	Channel	Results (dB)			Limits (dB)
		Port0	Port 1	Port 2	
802.11g	L	24.669	-	-	≥20
	M	46.302	-	-	≥20
	H	40.638	-	-	≥20

Channel L

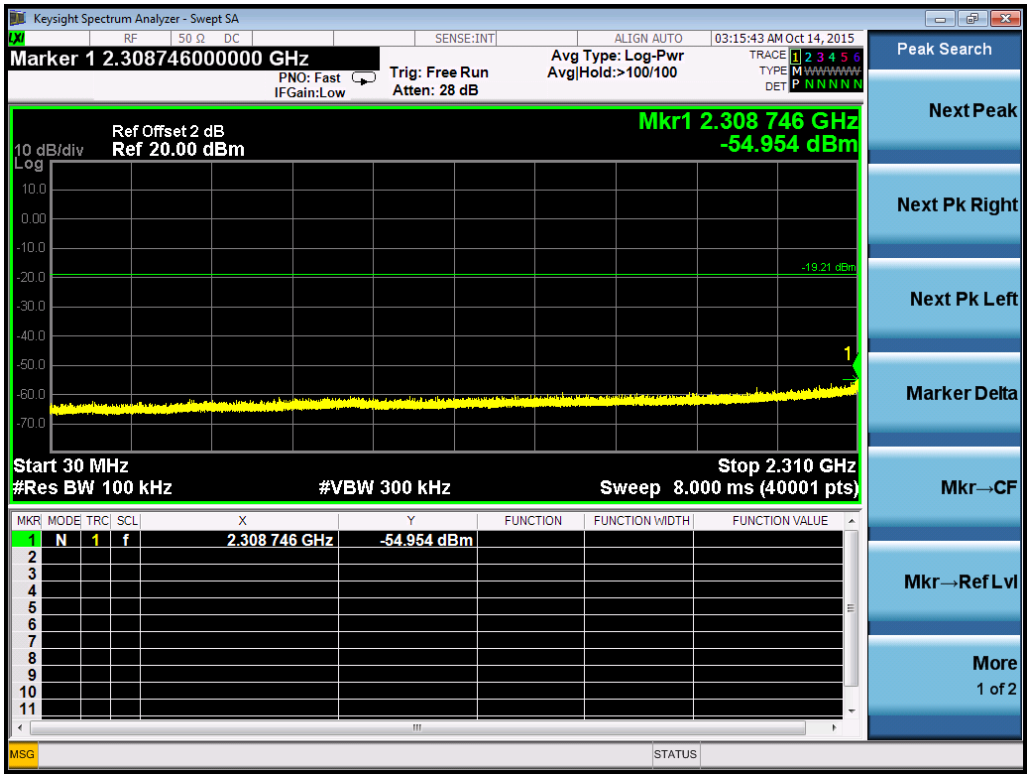


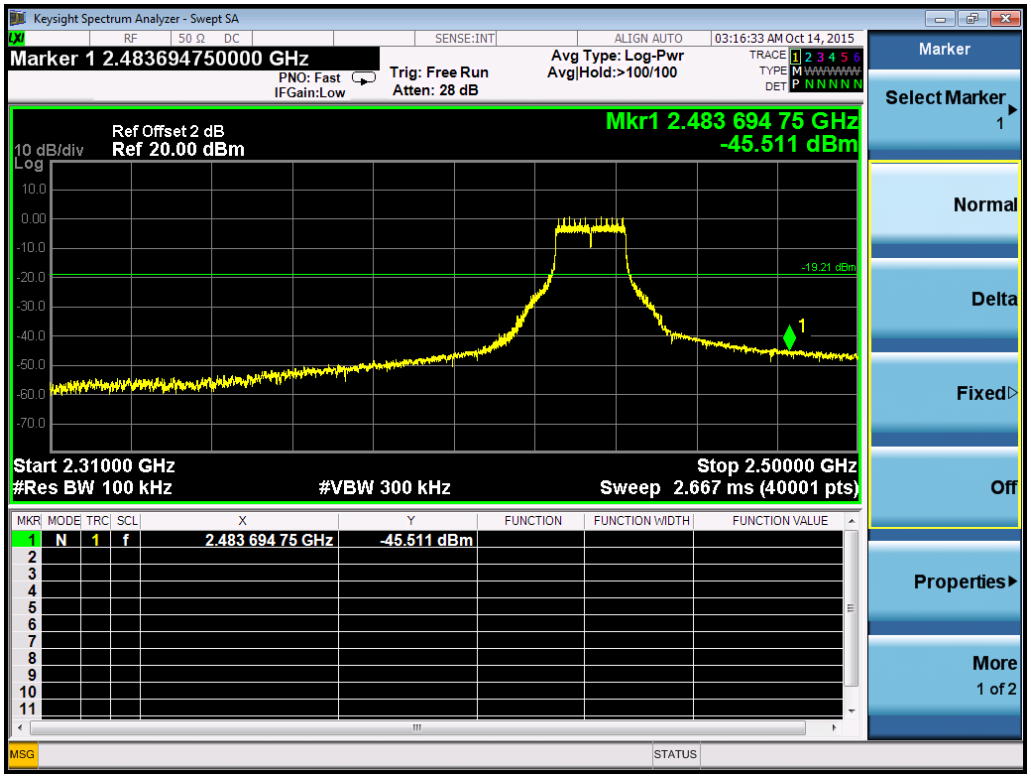

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.399748250000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:13:57 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.399 748 25 GHz
-23.631 dBm
-18.96 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.399 748 25 GHz -23.631 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

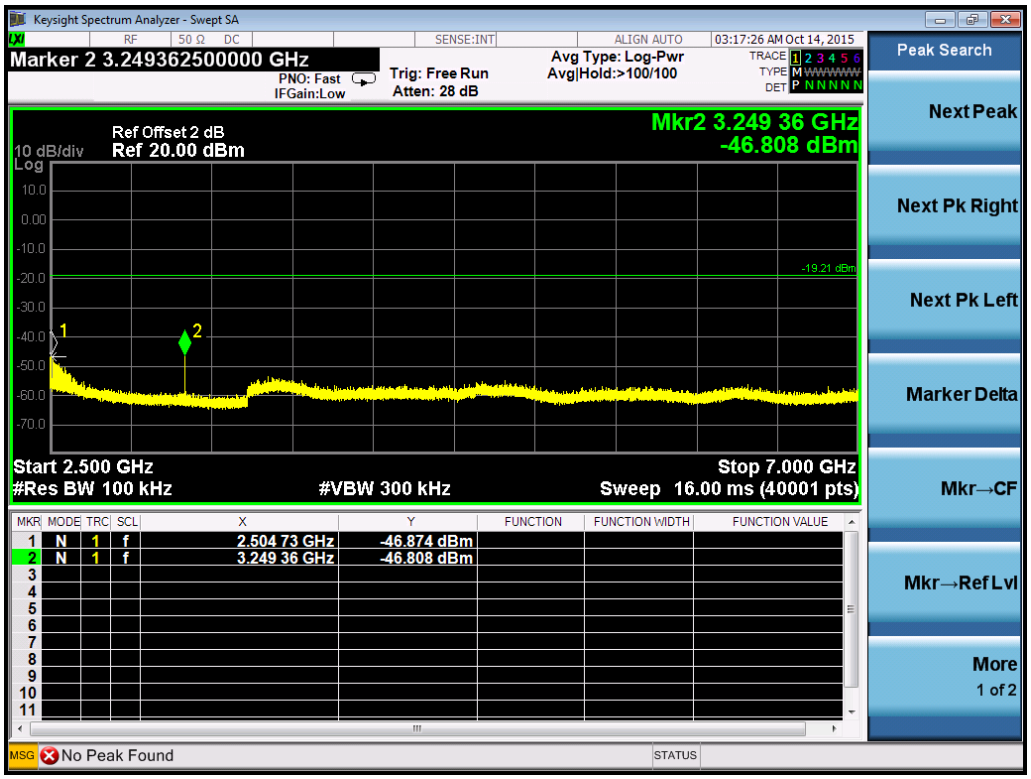

Keysight Spectrum Analyzer - Swept SA
Marker 1 3.215950000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 70/100
03:14:18 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 3.215 95 GHz
-46.806 dBm
-18.96 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 3.215 95 GHz -46.806 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

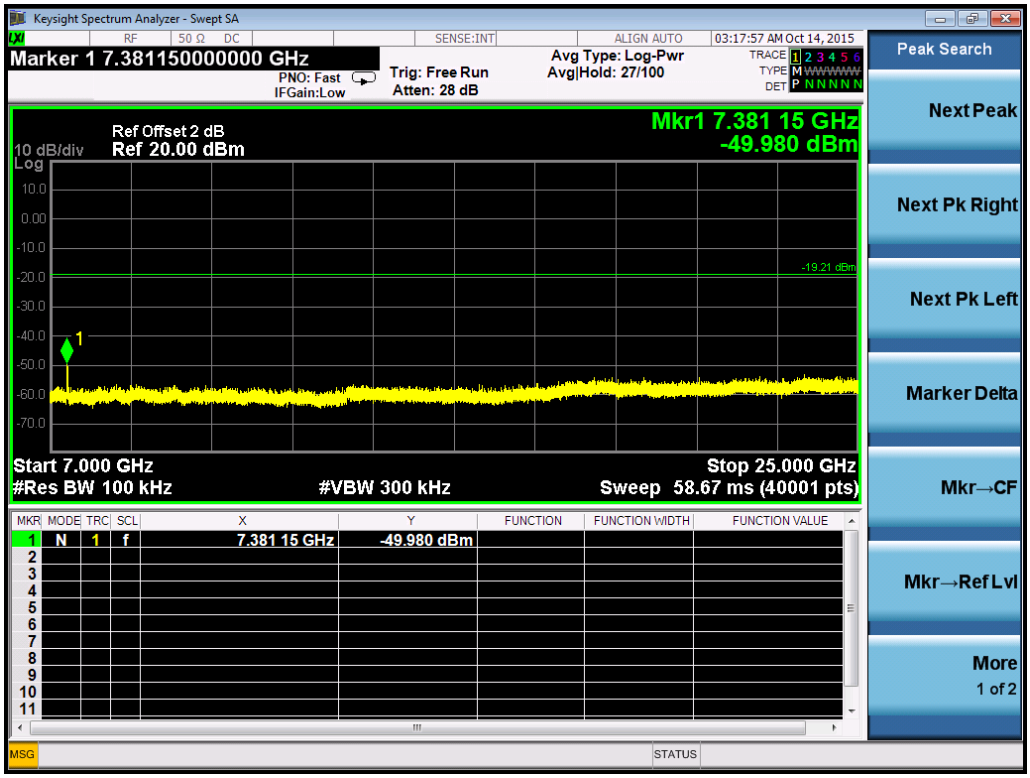

Keysight Spectrum Analyzer - Swept SA
Marker 1 24.640000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 24/100
03:14:54 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 24.640 00 GHz
-53.467 dBm
-18.96 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
1 N 1 f 24.640 00 GHz -53.467 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

Channel M

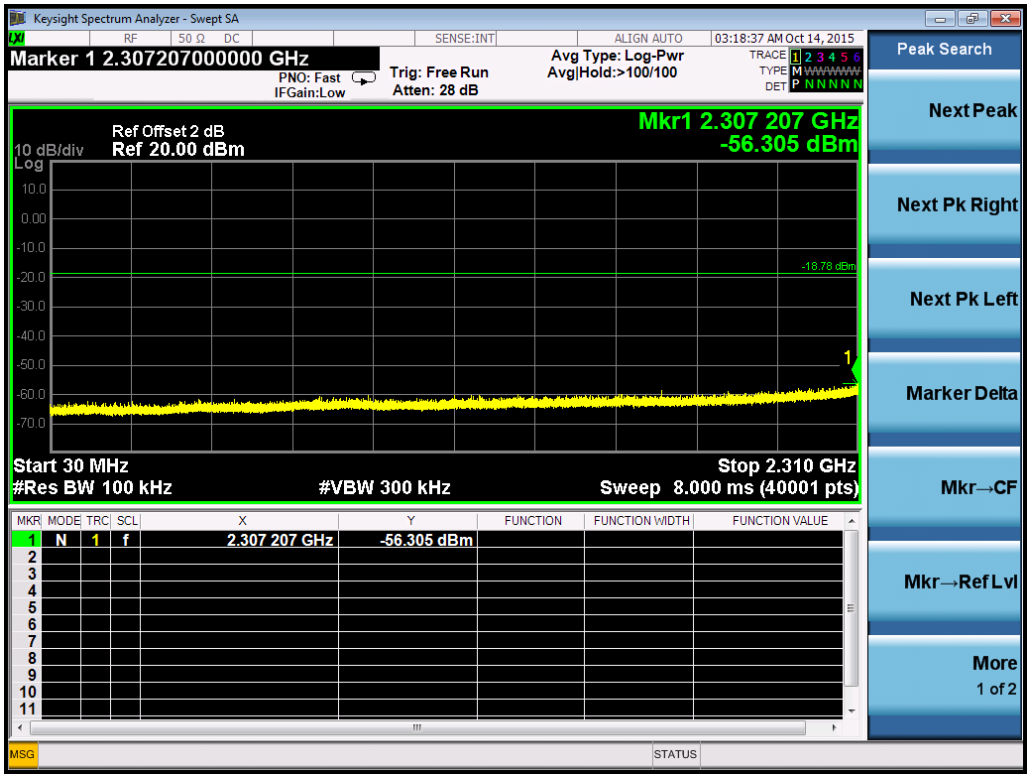

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.308746000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:15:43 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.308 746 GHz
-54.954 dBm
-19.21 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 8.000 ms (40001 pts)
1 N 1 f 2.308 746 GHz -54.954 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

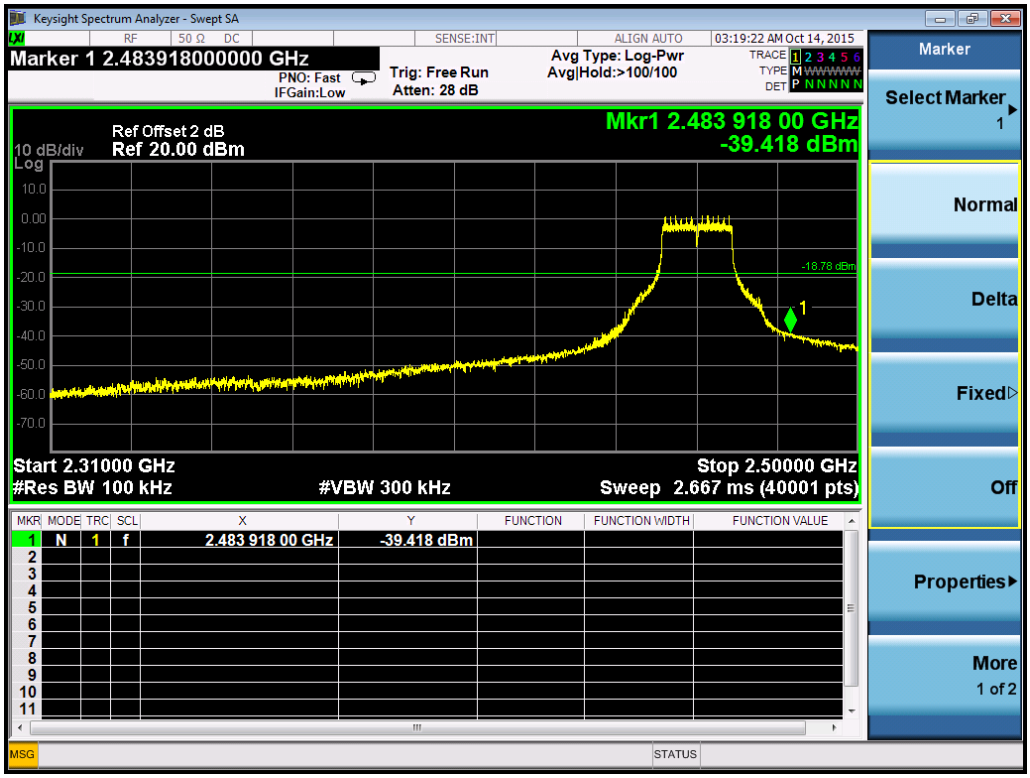

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.483694750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:16:33 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.483 694 75 GHz
-45.511 dBm
-19.21 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.483 694 75 GHz -45.511 dBm
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

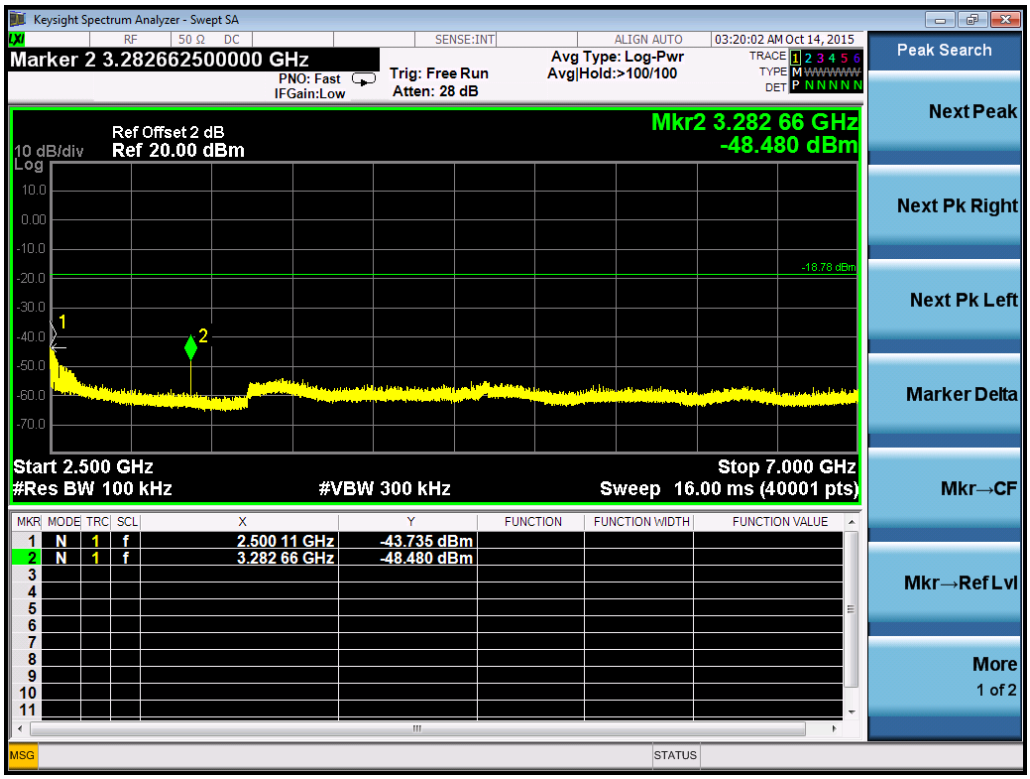

Keysight Spectrum Analyzer - Swept SA
Marker 2 3.249362500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:17:26 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 3.249 36 GHz
-46.808 dBm
-19.21 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 2.504 73 GHz -46.874 dBm
2 N 1 f 3.249 36 GHz -46.808 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
No Peak Found
STATUS

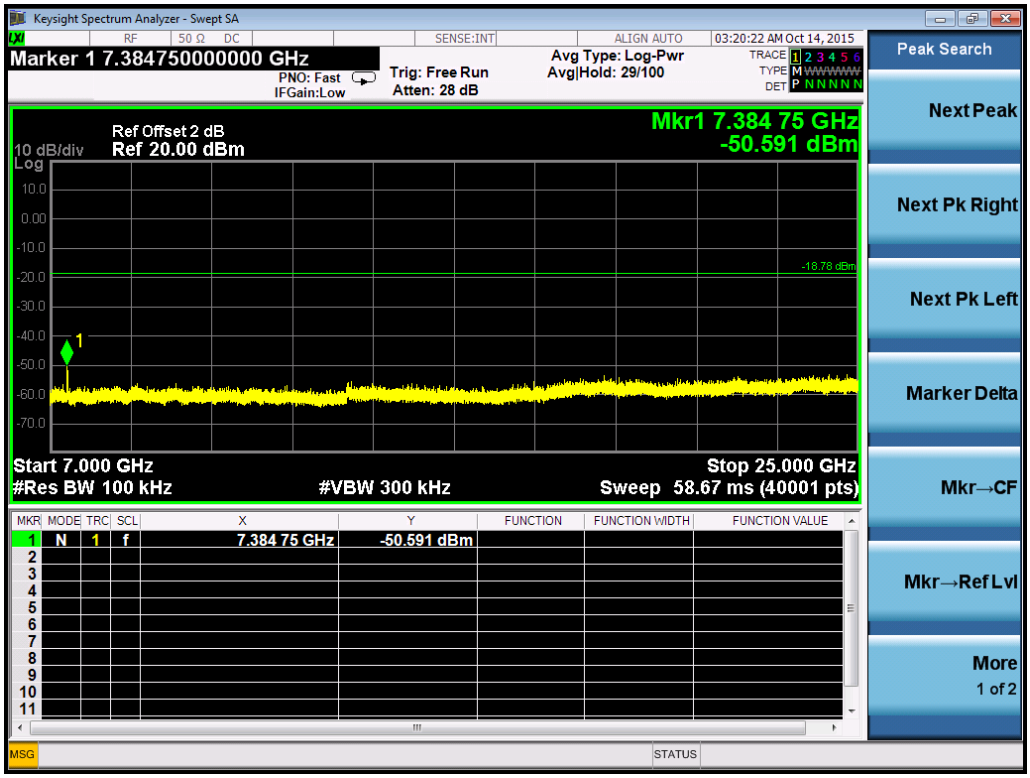

Keysight Spectrum Analyzer - Swept SA
Marker 1 7.381150000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 27/100
03:17:57 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 7.381 15 GHz
-49.980 dBm
-19.21 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
1 N 1 f 7.381 15 GHz -49.980 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

Channel H


Keysight Spectrum Analyzer - Swept SA
Marker 1 2.307207000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:18:37 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.307 207 GHz
-56.305 dBm
-18.78 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 8.000 ms (40001 pts)
1 N 1 f 2.307 207 GHz -56.305 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

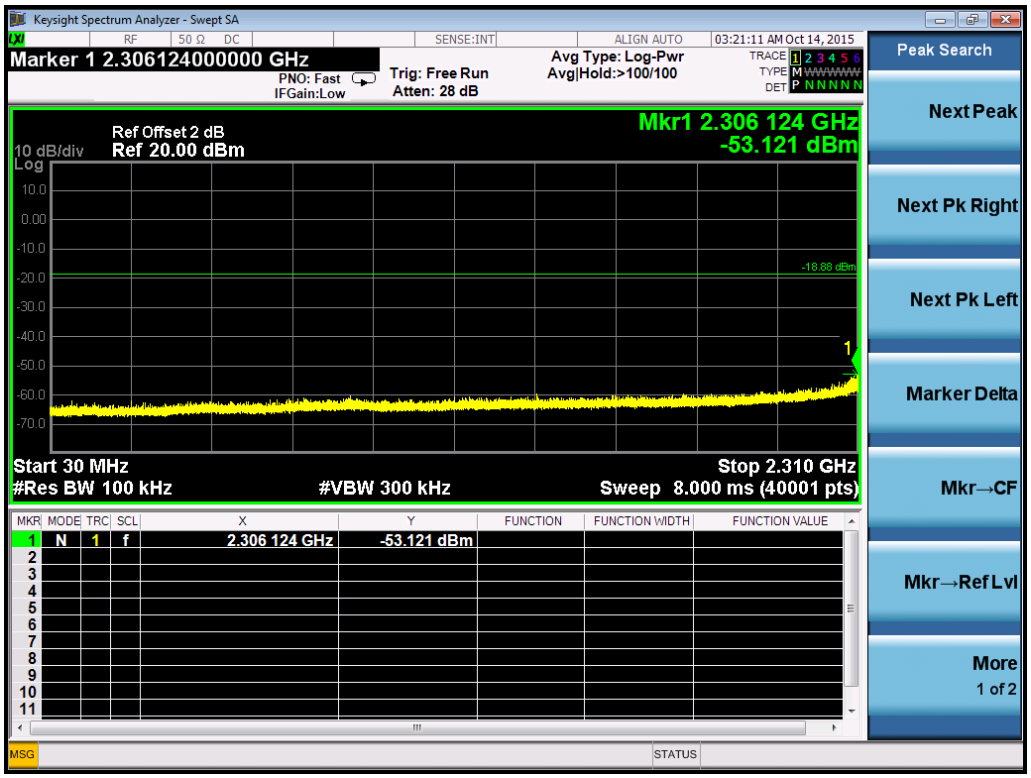

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.483918000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:19:22 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.483 918 00 GHz
-39.418 dBm
-18.78 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.483 918 00 GHz -39.418 dBm
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

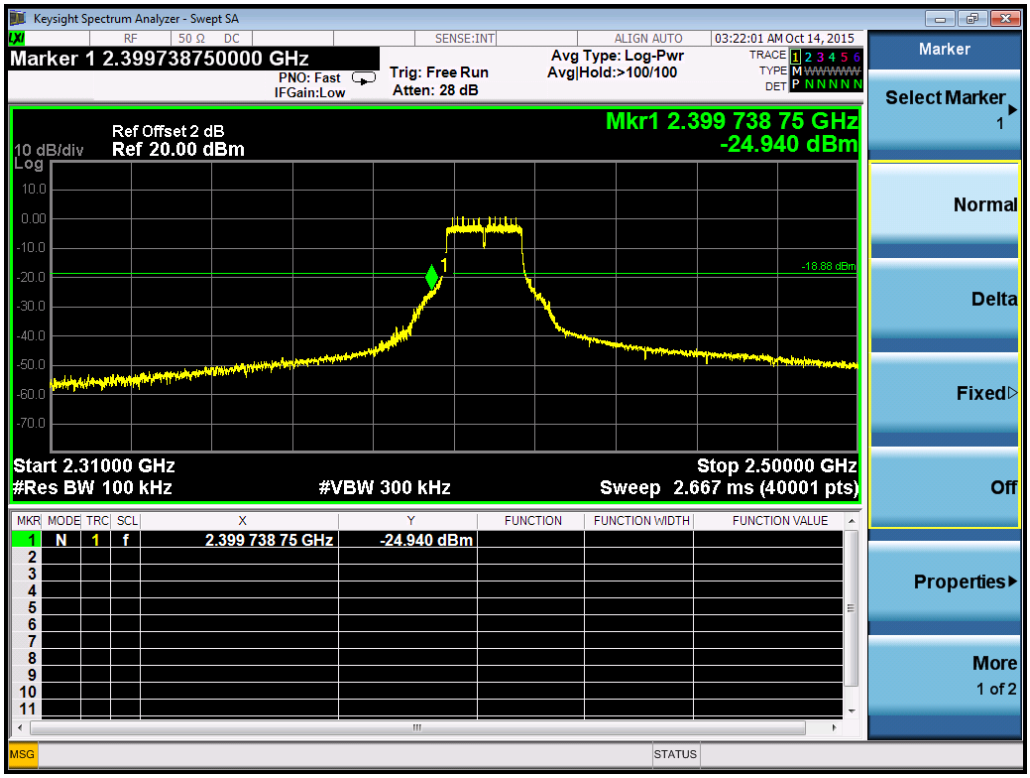

Keysight Spectrum Analyzer - Swept SA
Marker 2 3.282662500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:20:02 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 3.282 66 GHz
-48.480 dBm
-18.78 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 2.500 11 GHz -43.735 dBm
2 N 1 f 3.282 66 GHz -48.480 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

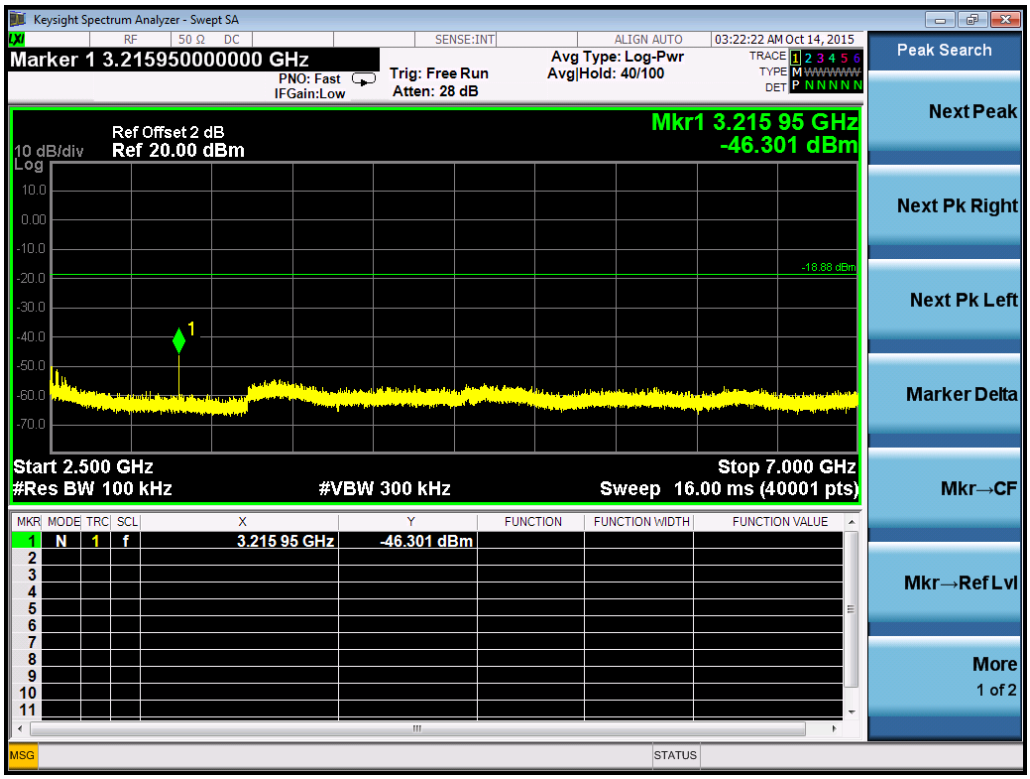

Keysight Spectrum Analyzer - Swept SA
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
03:20:22 AM Oct 14, 2015
Marker 1 7.384750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 29/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 7.384 75 GHz
-50.591 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-18.78 dBm
1
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 7.384 75 GHz -50.591 dBm
2
3
4
5
6
7
8
9
10
11
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

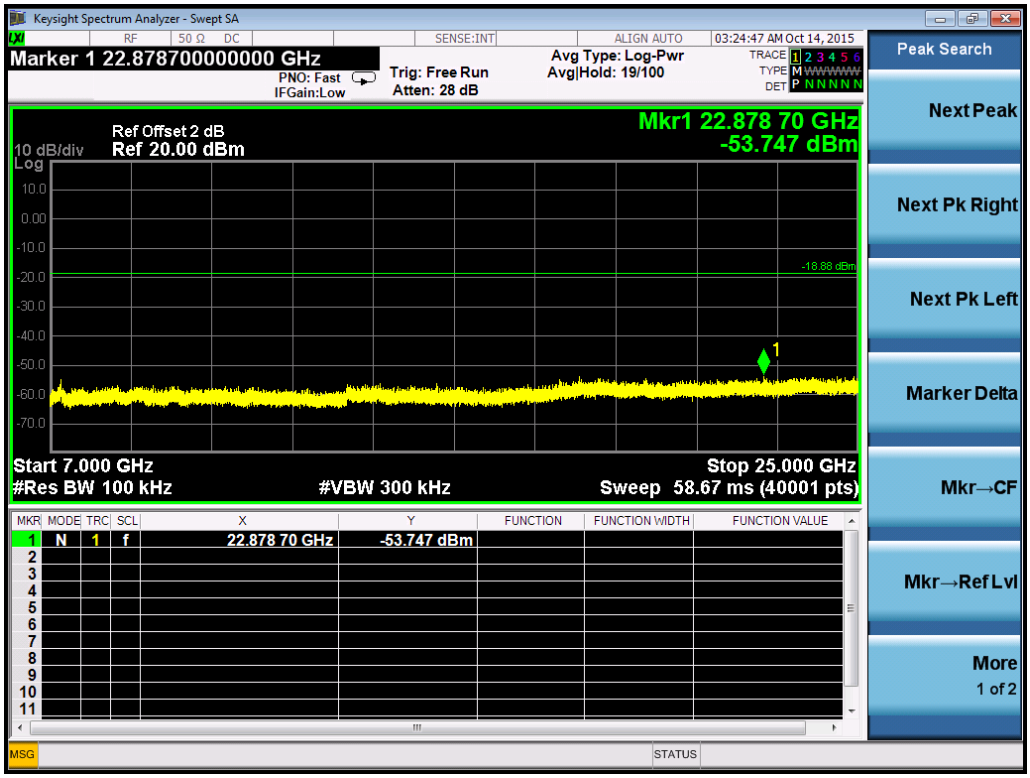
Mode	Channel	Results (dB)			Limits (dB)
		Port0	Port 1	Port 2	
802.11n (HT20)	L	26.060	-	-	≥20
	M	46.098	-	-	≥20
	H	40.687	-	-	≥20

Channel L

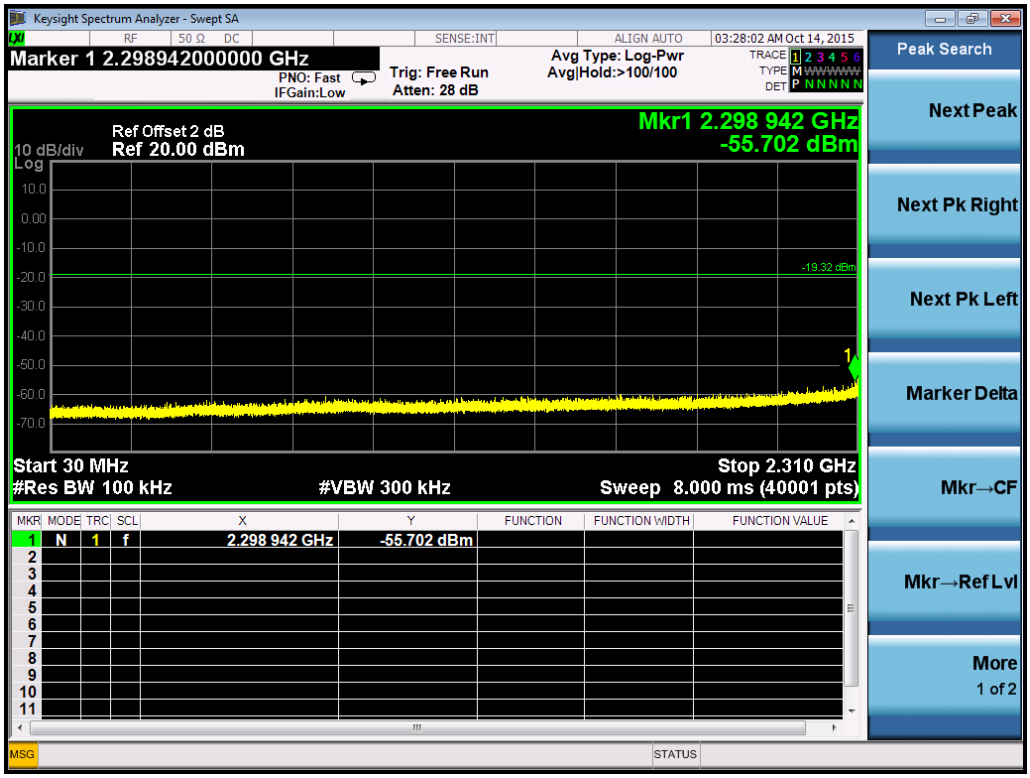


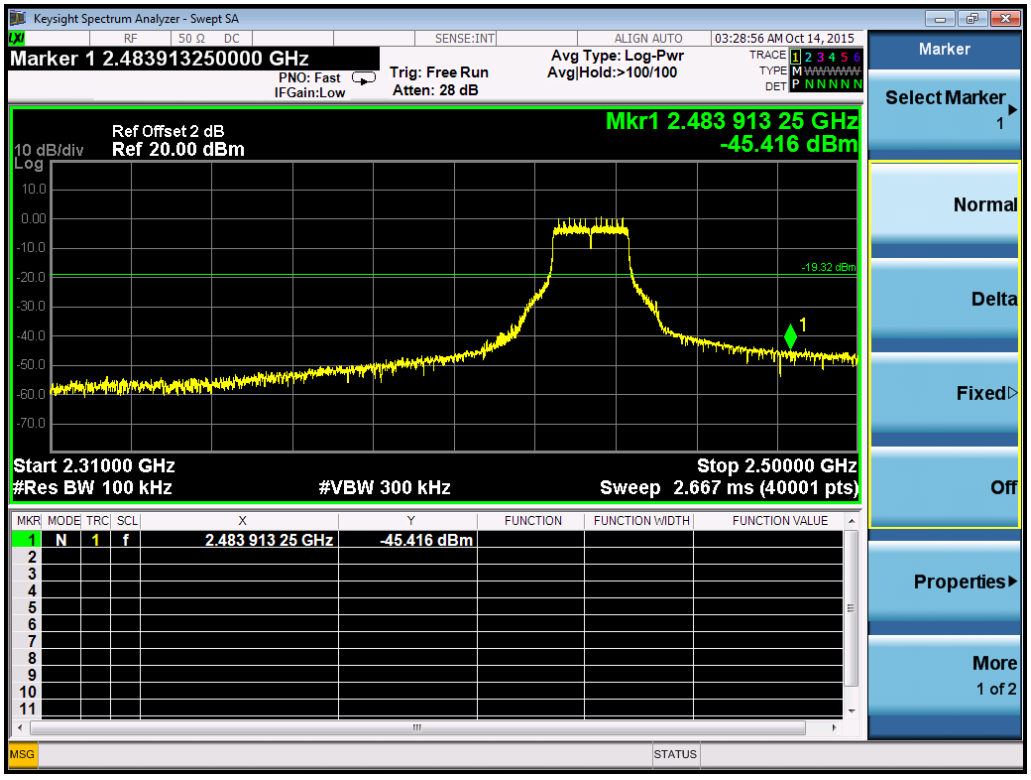

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.399738750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:22:01 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.399 738 75 GHz
-24.940 dBm
-18.88 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.399 738 75 GHz -24.940 dBm
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

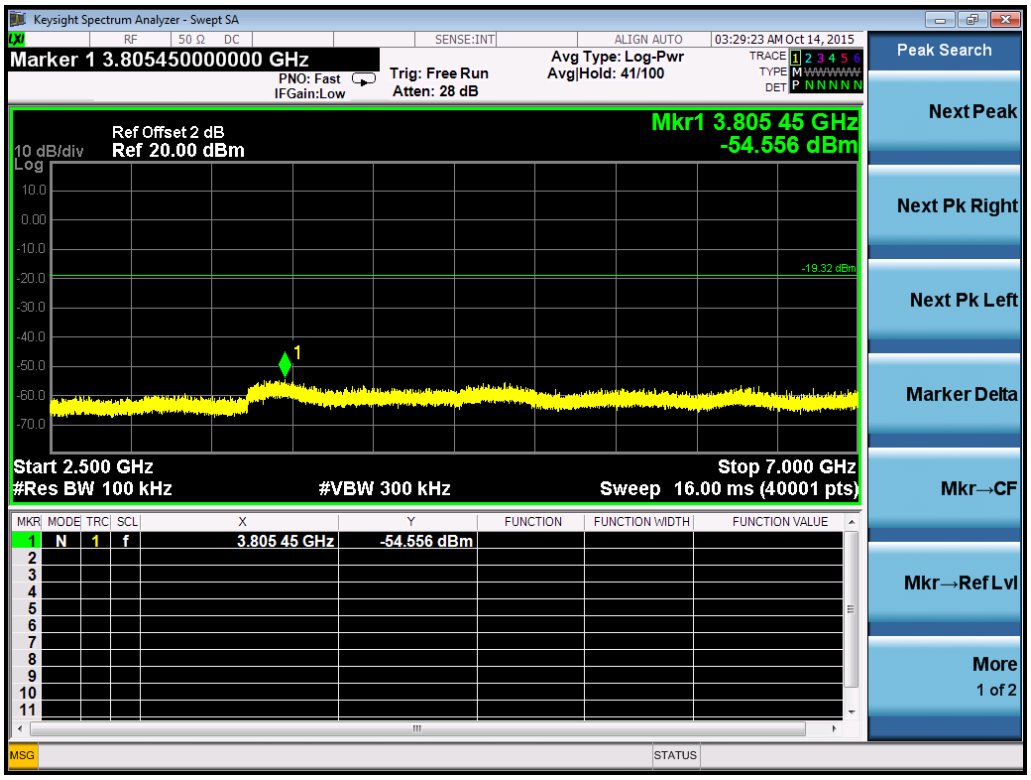

Keysight Spectrum Analyzer - Swept SA
Marker 1 3.215950000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 40/100
03:22:22 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 3.215 95 GHz
-46.301 dBm
-18.88 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 3.215 95 GHz -46.301 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

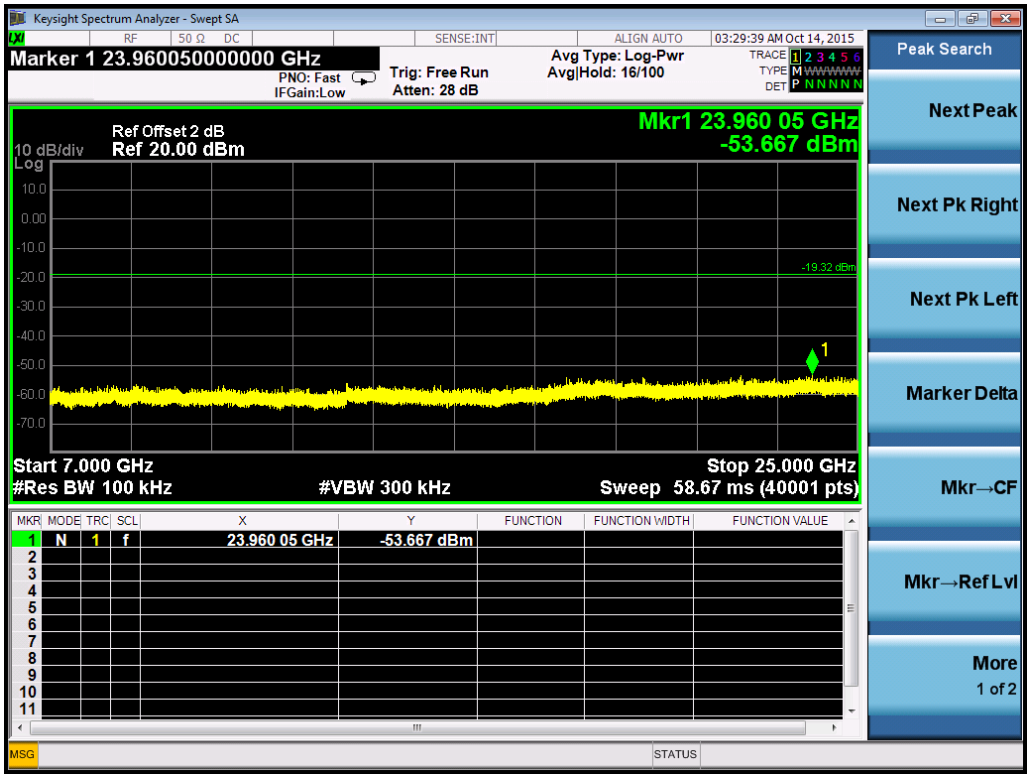

Keysight Spectrum Analyzer - Swept SA
Marker 1 22.878700000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 19/100
03:24:47 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 22.878 70 GHz
-53.747 dBm
-18.88 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
1 N 1 f 22.878 70 GHz -53.747 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

Channel M


Keysight Spectrum Analyzer - Swept SA
Marker 1 2.298942000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:28:02 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.298 942 GHz
-55.702 dBm
-19.32 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 8.000 ms (40001 pts)
1 N 1 f 2.298 942 GHz -55.702 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

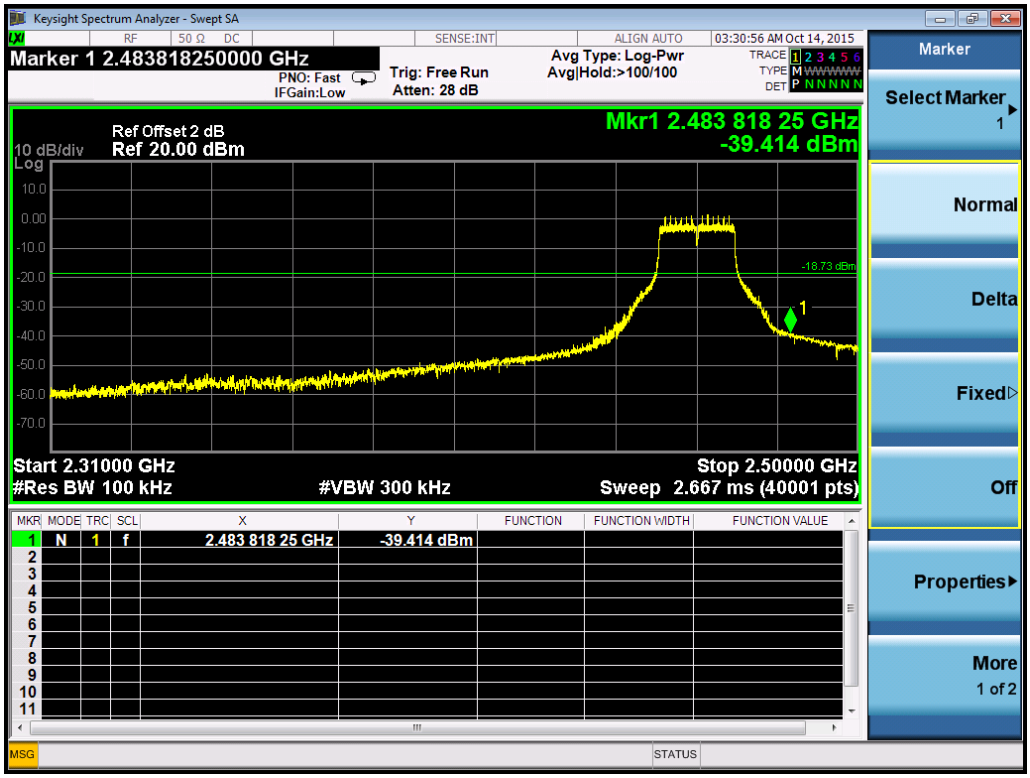

Keysight Spectrum Analyzer - Swept SA
RF 50 Ω DC
SENSE:INT
ALIGN AUTO
03:28:56 AM Oct 14, 2015
Marker 1 2.483913250000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.483 913 25 GHz
-45.416 dBm
-19.32 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.483 913 25 GHz -45.416 dBm
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

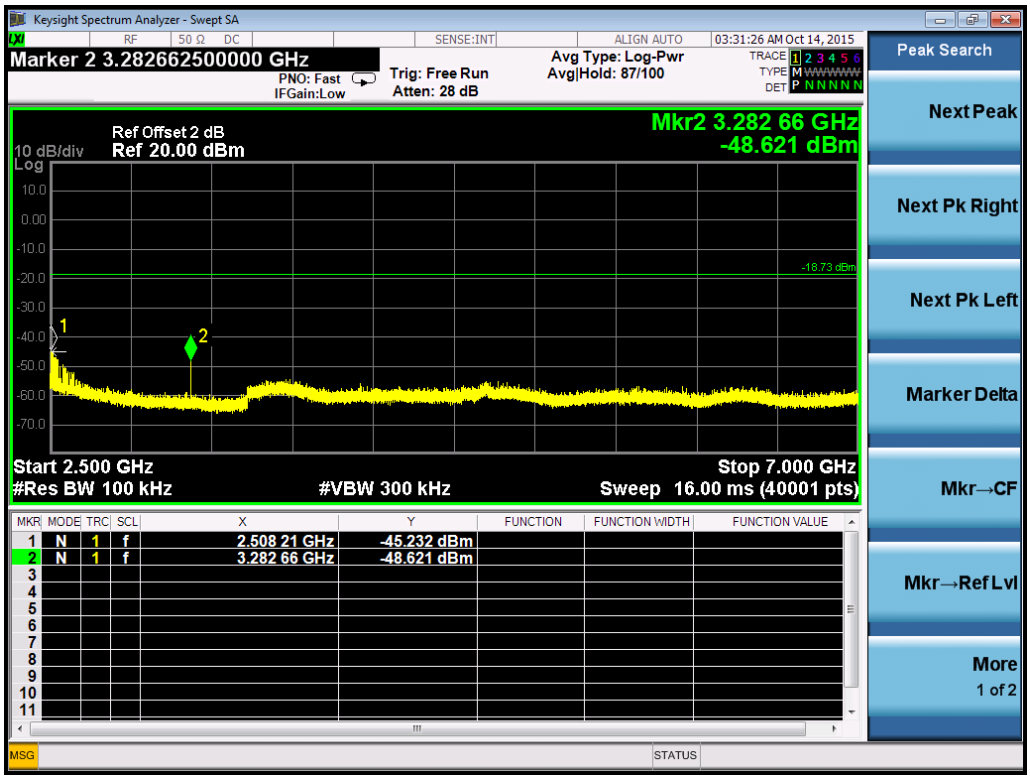

Keysight Spectrum Analyzer - Swept SA
RF 50 Ω DC
SENSE:INT
ALIGN AUTO
03:29:23 AM Oct 14, 2015
Marker 1 3.805450000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 41/100
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 3.805 45 GHz
-54.556 dBm
-19.32 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 3.805 45 GHz -54.556 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

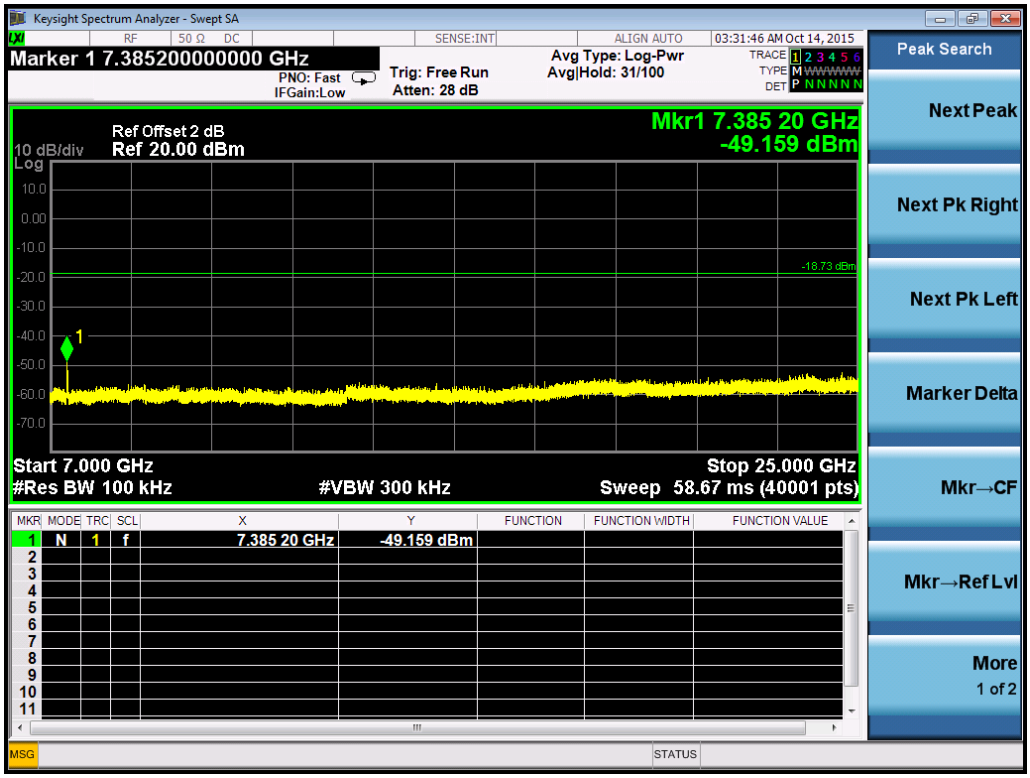

Keysight Spectrum Analyzer - Swept SA
Marker 1 23.960050000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 16/100
03:29:39 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 23.960 05 GHz
-53.667 dBm
-19.32 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
1 N 1 f 23.960 05 GHz -53.667 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

Channel H


Keysight Spectrum Analyzer - Swept SA
Marker 1 2.299512000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:30:22 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.299 512 GHz
-56.784 dBm
-18.73 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 8.000 ms (40001 pts)
1 N 1 f 2.299 512 GHz -56.784 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Marker 1 2.483818250000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
03:30:56 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.483 818 25 GHz
-39.414 dBm
-18.73 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40001 pts)
1 N 1 f 2.483 818 25 GHz -39.414 dBm
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Keysight Spectrum Analyzer - Swept SA
Marker 2 3.282662500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 87/100
03:31:26 AM Oct 14, 2015
Ref Offset 2 dB
10 dB/div
Ref 20.00 dBm
Mkr2 3.282 66 GHz
-48.621 dBm
-18.73 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 16.00 ms (40001 pts)
1 N 1 f 2.508 21 GHz -45.232 dBm
2 N 1 f 3.282 66 GHz -48.621 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Keysight Spectrum Analyzer - Swept SA
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
03:31:46 AM Oct 14, 2015
Marker 1 7.385200000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
Avg Type: Log-Pwr
Avg|Hold: 31/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 2 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 7.385 20 GHz
-49.159 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-18.73 dBm
1
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.67 ms (40001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 7.385 20 GHz -49.159 dBm
2
3
4
5
6
7
8
9
10
11
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

7 Radiated Emissions in restricted frequency bands

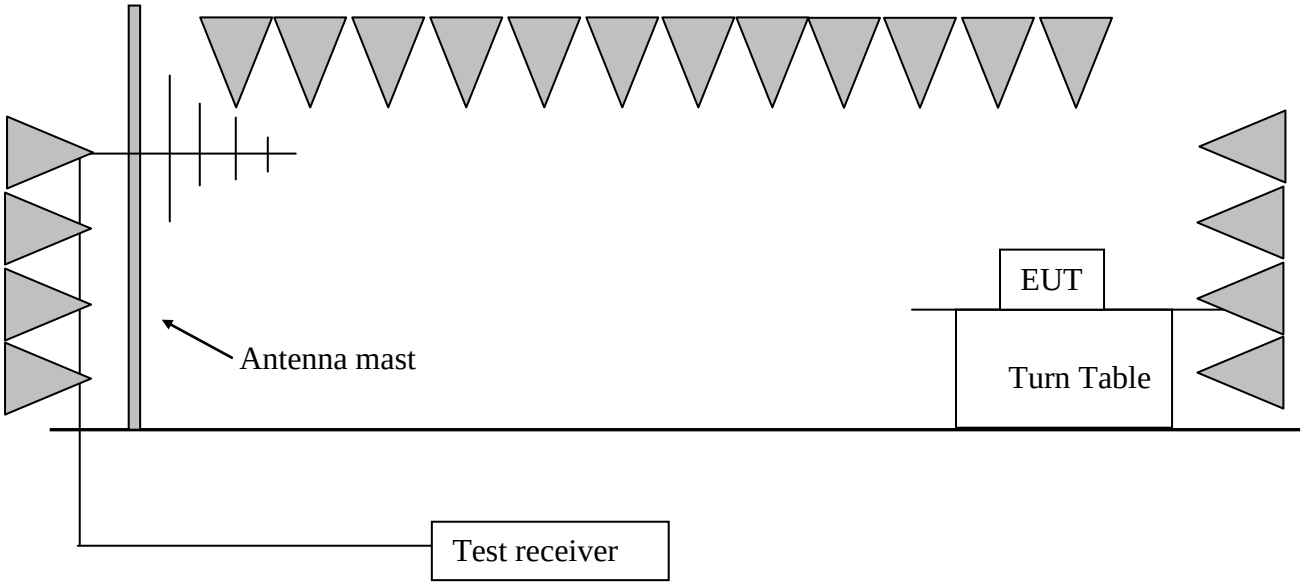
Test result: Pass

7.1 Test limit

The radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) 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 Test Configuration



7.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The EUT was tested according to DTS test procedure of KDB558074 D01 DTS "Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 300 Hz, VBW = 1 kHz (9 kHz~150 kHz);
RBW = 10 kHz, VBW = 30 kHz (150 kHz~30MHz);
RBW = 100 kHz, VBW = 300 kHz (30MHz~1GHz for PK)
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);
RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

Remark:
1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. If the PK measured level 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 = 10dBuV.
Then Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Measured level = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m,
Measured level = 10.20dBuV/m, then Margin = 54 - 10.20 = 43.80dBuV/m.

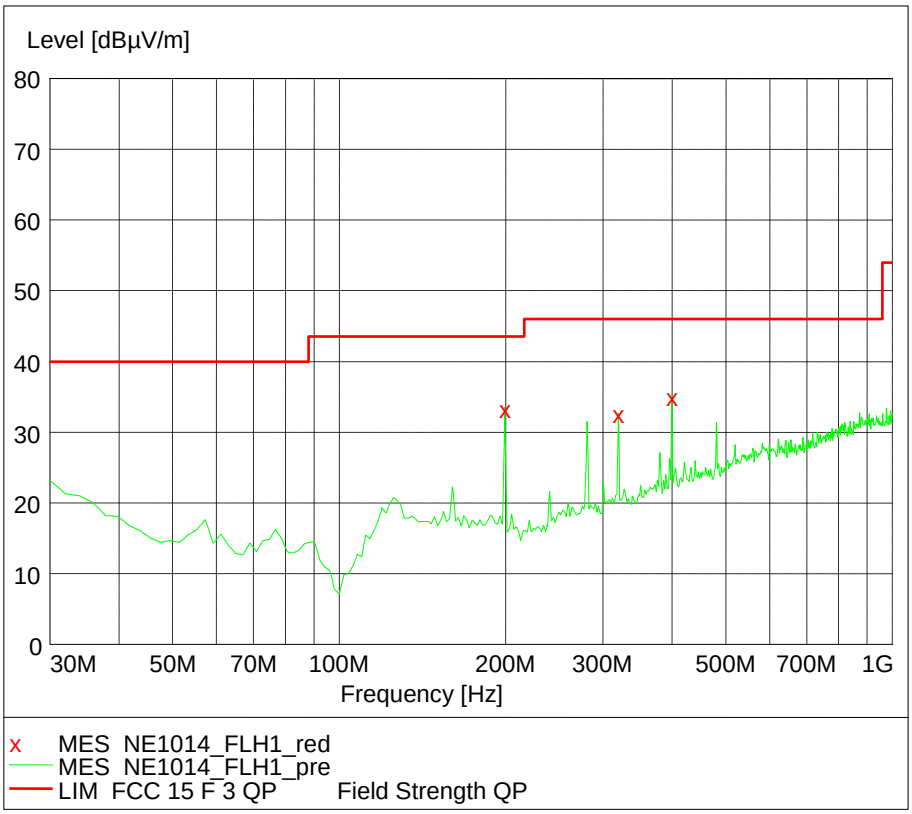
7.4 Test Protocol

Temperature: 25 °C
Relative Humidity: 55 %

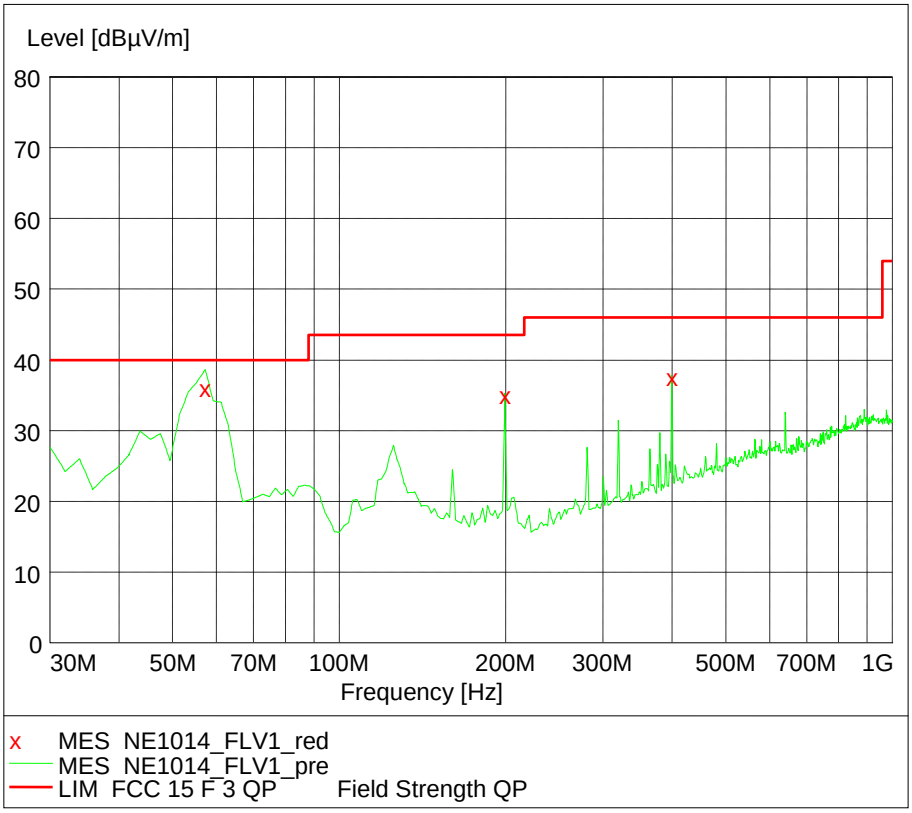
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst waveform from 30MHz to 1000MHz is listed as below:

Horizontal



Vertical


Level [dBµV/m]
80
70
60
50
40
30
20
10
0
30M
50M
70M
100M
200M
300M
500M
700M
1G
Frequency [Hz]
MES NE1014_FLV1_red
MES NE1014_FLV1_pre
LIM FCC 15 F 3 QP
Field Strength QP

Test data:

802.11b

Channel	Antenna polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2411.66	102.49	34.10	Fundamental	/	PK
	H	199.12	33.50	12.40	43.50	10.00	PK
	H	399.34	35.20	19.30	46.00	10.80	PK
	V	57.21	36.20	8.40	40.00	3.80	QP
	V	199.12	35.30	12.40	43.50	8.20	PK
	V	399.34	37.80	19.30	46.00	8.20	PK
	V	2389.96	52.92	34.20	74.00	21.08	PK
	V	4823.65	65.50	-3.60	74.00	8.50	PK
	V	4823.65	51.50	-3.60	54.00	2.50	AV
M	V	2437.94	102.30	34.20	Fundamental	/	PK
	H	199.21	33.40	12.40	43.50	10.10	PK
	H	399.55	35.10	19.30	46.00	10.90	PK
	V	57.55	36.10	8.40	40.00	3.90	QP
	V	199.52	35.10	12.40	43.50	8.40	PK
	V	399.68	37.60	19.30	46.00	8.40	PK
	V	4873.75	65.90	-3.50	74.00	8.10	PK
	V	4873.75	51.50	-3.50	54.00	2.50	AV
H	V	2461.92	102.40	34.40	Fundamental	/	PK
	H	199.28	33.70	12.40	43.50	9.80	PK
	H	399.56	35.40	19.30	46.00	10.60	PK
	V	57.45	36.00	8.40	40.00	4.00	QP
	V	199.85	35.10	12.40	43.50	8.40	PK
	V	399.68	37.50	19.30	46.00	8.50	PK
	V	2486.29	52.84	34.80	74.00	21.16	PK
	V	4924.10	65.40	-3.30	74.00	8.60	PK
	V	4924.10	51.00	-3.30	54.00	3.00	AV

802.11g

Channel	Antenna polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2409.76	101.50	34.10	Fundamental	/	PK
	H	199.12	33.50	12.40	43.50	10.00	PK
	H	399.34	35.20	19.30	46.00	10.80	PK
	V	57.21	36.20	8.40	40.00	3.80	QP
	V	199.12	35.30	12.40	43.50	8.20	PK
	V	399.34	37.80	19.30	46.00	8.20	PK
	V	2389.96	59.50	34.20	74.00	14.50	PK
	V	2389.96	41.20	34.20	54.00	12.80	AV
	V	4824.25	63.20	-3.60	74.00	10.80	PK
	V	4824.25	50.00	-3.60	54.00	4.00	AV
M	V	2433.75	101.80	34.20	Fundamental	/	PK
	H	199.21	33.40	12.40	43.50	10.10	PK
	H	399.55	35.10	19.30	46.00	10.90	PK
	V	57.55	36.10	8.40	40.00	3.90	QP
	V	199.52	35.10	12.40	43.50	8.40	PK
	V	399.68	37.60	19.30	46.00	8.40	PK
	V	4873.73	63.50	-3.50	74.00	10.50	PK
	V	4873.73	50.00	-3.50	54.00	4.00	AV
H	V	2459.63	101.70	34.40	Fundamental	/	PK
	H	199.28	33.70	12.40	43.50	9.80	PK
	H	399.56	35.40	19.30	46.00	10.60	PK
	V	57.45	36.00	8.40	40.00	4.00	QP
	V	199.85	35.10	12.40	43.50	8.40	PK
	V	399.68	37.50	19.30	46.00	8.50	PK
	V	2483.63	56.20	34.80	74.00	17.80	PK
	V	2483.63	40.00	34.80	54.00	14.00	AV
	V	4923.85	63.20	-3.30	74.00	10.80	PK
	V	4923.85	49.00	-3.30	54.00	5.00	AV

802.11n(HT20)

Channel	Antenna polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2414.71	101.90	34.10	Fundamental	/	PK
	H	199.12	33.50	12.40	43.50	10.00	PK
	H	399.34	35.20	19.30	46.00	10.80	PK
	V	57.21	36.20	8.40	40.00	3.80	QP
	V	199.12	35.30	12.40	43.50	8.20	PK
	V	399.34	37.80	19.30	46.00	8.20	PK
	V	2389.20	60.60	34.20	74.00	13.40	PK
	V	2389.20	41.00	34.20	54.00	13.00	AV
	V	4823.65	62.70	-3.60	74.00	11.30	PK
	V	4823.65	49.50	-3.60	54.00	4.50	AV
M	V	2430.32	101.00	34.20	Fundamental	/	PK
	H	199.21	33.40	12.40	43.50	10.10	PK
	H	399.55	35.10	19.30	46.00	10.90	PK
	V	57.55	36.10	8.40	40.00	3.90	QP
	V	199.52	35.10	12.40	43.50	8.40	PK
	V	399.68	37.60	19.30	46.00	8.40	PK
	V	4873.75	63.00	-3.50	74.00	11.00	PK
	V	4873.75	49.50	-3.50	54.00	4.50	AV
H	V	2464.59	100.80	34.40	Fundamental	/	PK
	H	199.28	33.70	12.40	43.50	9.80	PK
	H	399.56	35.40	19.30	46.00	10.60	PK
	V	57.45	36.00	8.40	40.00	4.00	QP
	V	199.85	35.10	12.40	43.50	8.40	PK
	V	399.68	37.50	19.30	46.00	8.50	PK
	V	2483.65	58.90	34.80	74.00	15.10	PK
	V	2483.65	40.20	34.80	54.00	13.80	AV
	V	4923.85	62.90	-3.30	74.00	11.10	PK
	V	4923.85	49.00	-3.30	54.00	5.00	AV

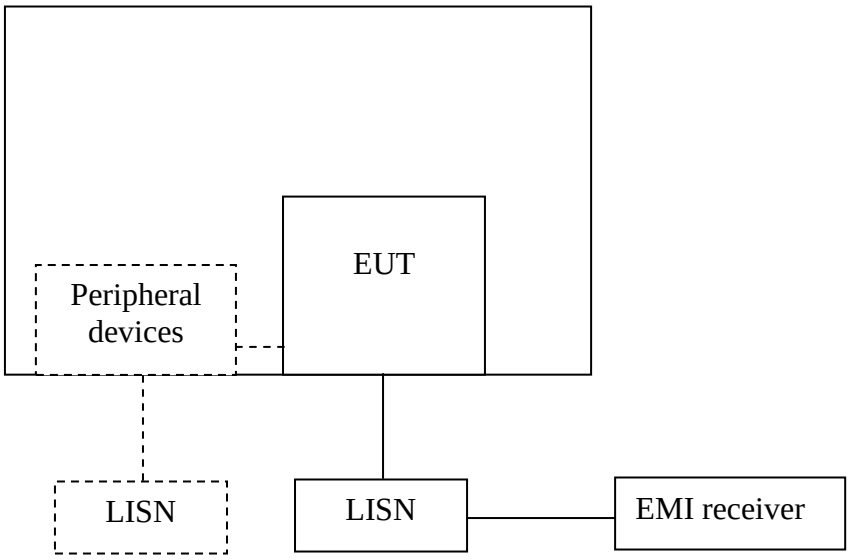
8 Power line conducted emission

Test result: **NA**

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



☐ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

8.3 Test procedure and test set up

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.

8.4 Test protocol

Temperature: °C
Relative Humidity: %

L Line

Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)

N Line

Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)