RF TEST REPORT

Report No.: SET2018-13568

Product Name: FLX Display Module

FCC ID: 2AGVM-RY0603

IC: 20966-RY0603

Model No. : RY0603

Applicant: Royole Corporation

Address: 48025 Fremont Boulevard, Fremont, California 94538

Dates of Testing: 10/28/2018 — 11/08/2018

Issued by: CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

Lab Location: Building 28/29, East of Shigu, Xili Industrial Zone, Xili Road, Nanshan District, Shenzhen, Guangdong, China

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Test Report

Product Name.....: FLX Display Module

Brand Name.....: N.A

Trade Name.....: ROYOLE

Applicant.....: Royole Corporation

Applicant Address.....: 48025 Fremont Boulevard, Fremont, California 94538

Manufacturer .....: Royole Corporation

Manufacturer Address .....: 48025 Fremont Boulevard, Fremont, California 94538

Test Standards.....: 47 CFR Part 15 Subpart C
IC RSS-Gen(Issue 5, April 2018)
IC RSS-247(Issue 2, Feb. 2017)

Test Result.....: PASS

Tested by .....: Shallwe Yang 2018.11.20

Shallwe Yang, Test Engineer

Reviewed by .....: Chris You 2018.11.20

Chris You, Senior Engineer

Approved by .....: Zhu Qi 2018.11.20

Zhu Qi, Manager

TABLE OF CONTENTS

RF TEST REPORT **1**

1. GENERAL INFORMATION **4**

1.1. EUT Description 4

1.2. Test Standards and Results 5

1.3. Table for Supporting Units 6

1.4. Facilities and Accreditations 7

2. 47 CFR PART 15C REQUIREMENTS **8**

2.1. Antenna requirement 8

2.2. Maximum Conducted Output Power 9

2.3. 6dB and 99% Occupy Bandwidth 11

2.4. Conducted Band Edges and Spurious Emissions 13

2.5. Power spectral density (PSD) 15

2.6. Radiated Band Edge and Spurious Emission 17

2.7. Conducted Emission 35

3. LIST OF MEASURING EQUIPMENT **39**

APPENDIX A **40**

Change History		
Issue	Date	Reason for change
1.0	2018.11.20	First edition

1. General Information

1.1. EUT Description

EUT Type	FLX Display Module
Hardware Version	V01
Software Version	V01
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n (HT20/HT40)
Frequency Range	802.11b/g/n-20MHz: 2.412GHz - 2.462GHz 802.11n-40MHz: 2.422GHz - 2.452GHz
Channel Number	802.11b/g/n-20MHz: 11 802.11n-40MHz: 7
Bit Rate of Transmitter	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n : up to 135 Mbps
Modulation Type	DSSS (802.11b), OFDM (802.11g/n)
MIMO	Not support
Antenna Type	Internal
Antenna Gain	2dBi

Note 1: The EUT is a FLX Display Module, it contain WIFI operating at 2.4GHz ISM band; it supports 802.11b, 802.11g, 802.11n and they are all tested in this report.

Note 2: The frequencies allocated is F (MHz) =2412+5*(n-1) (1<=n<=11). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1ch (2412MHz), 6ch(2437MHz), 11ch(2462MHz) for 802.11b/g/n-20MHz., and 3ch(2422MHz), 6ch(2437MHz), 9ch(2452MHz) for 802.11n-40MHz.

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 4: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (WiFi, 2.4GHz ISM band radiators) for the EUT FCC Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2017	Radio Frequency Devices
2	ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices
3	RSS-Gen (Issue 5, April 2018)	General Requirements for Compliance of Radio Apparatus
4	RSS-247 (Issue 2, Feb. 2017)	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	IC Rules	Description	Result
1	15.203	RSS-247, 5.4	Antenna Requirement	PASS
2	15.247(b)	RSS-247, 5.4	Peak Output Power	PASS
3	15.247(a)	RSS-GEN, 6.7 RSS-247, 5.2	6dB and 99% Occupy Bandwidth	PASS
4	15.247(d)	RSS-247, 5.5	Conducted Band Edges and Spurious Emission	PASS
5	15.247(e)	RSS-247, 5.2	Power spectral density (PSD)	PASS
6	15.207	RSS-GEN, 8.8	Conducted Emission	PASS
7	15.209 15.247(d)	RSS-247, 5.5	Radiated Band Edges and Spurious Emission	PASS

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10-2013.

These RF tests were performed according to the method of measurements prescribed in KDB558074 D01 v05.

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

There are two bandwidth systems:

For 20MHz bandwidth systems, use Channel 1~ Channel 11

For 40MHz bandwidth systems, use Channel 3~ Channel 9

Channel No.	Frequency	Channel No.	Frequency	Channel No.	Frequency
1	2412MHz	5	2432MHz	9	2452MHz
2	2417MHz	6	2437MHz	10	2457MHz
3	2422MHz	7	2442MHz	11	2462MHz
4	2427MHz	8	2447MHz		

Test Items	Mode	Data Rate	Channel
Peak Conducted Output Power Power Spectral Density 6dB Bandwidth Conducted and Spurious Emission Radiated and Spurious Emission	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	MCS 0	1/6/11
	11n(40MHz)/OFDM	MCS 0	3/6/9
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	MCS 0	1/11
	11n(40MHz)/OFDM	MCS 0	3/9

1.3. Table for Supporting Units

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	Note
1	Notebook	DELL	PP11L	DELL	H5914A03	FCC DOC

1.4. Facilities and Accreditations

1.4.1. Facilities

FCC-Registration No.: CN5031

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN5031, valid time is until December 31, 2018.

ISED Registration: 11185A-1

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Aug. 03, 2019.

NVLAP Lab Code: 201008-0

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

1.4.2. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15°C - 35°C
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, 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.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2.1.2. Antenna Information

Antenna Category: Internal Antenna

A internal Antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

Antenna General Information:

No.	EUT	Ant. Type	Gain(dBi)
1	FLX Display Module	Internal	2

2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Maximum Conducted Output Power

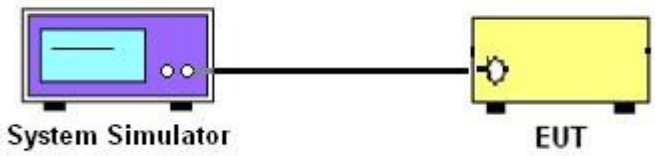
2.2.1. Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10:2013.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

2.2.5. Test Result

Please refer to Appendix A for detail

2.3. 6dB and 99% Occupy Bandwidth

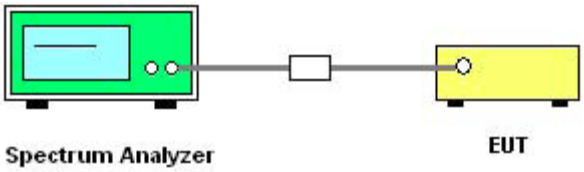
2.3.1. Limit of 6dB Bandwidth

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

2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows FCC KDB558074 D01 v05.

2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.

4. For 6dB bandwidth, make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz.Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.

5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 30 kHz and set the Video bandwidth (VBW) = 100 kHz.

6. Measure and record the results in the test report.

2.3.5. Test Results of 6dB Bandwidth

Please refer to Appendix A for detail

2.4. Conducted Band Edges and Spurious Emissions

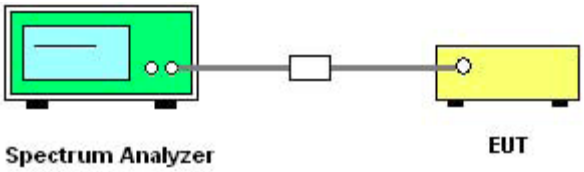
2.4.1. Limit of Conducted Band Edges and Spurious Emissions

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedure

1. The testing follows FCC KDB558074 D01 v05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

2.4.5. Test Results of Conducted Band Edges

Please refer to Appendix A for detail

2.5. Power spectral density (PSD)

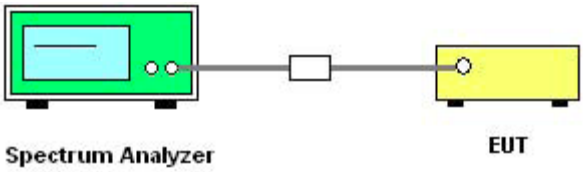
2.5.1. Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup



2.5.4. Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB558074 D01 v05.

2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.

4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)

5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.

6. Measure and record the results in the test report.

7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

2.5.5. Test Results of Power spectral density

Please refer to Appendix A for detail

2.6. Radiated Band Edge and Spurious Emission

2.6.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Note: Wireless charger configuration was evaluated.

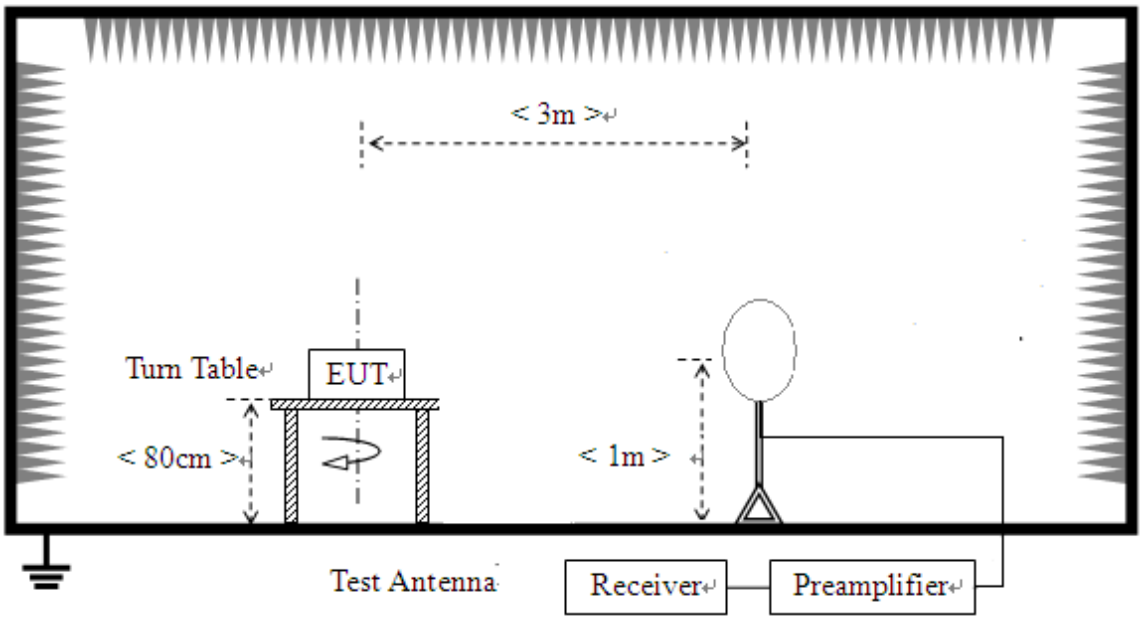
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

2.6.2. Measuring Instruments

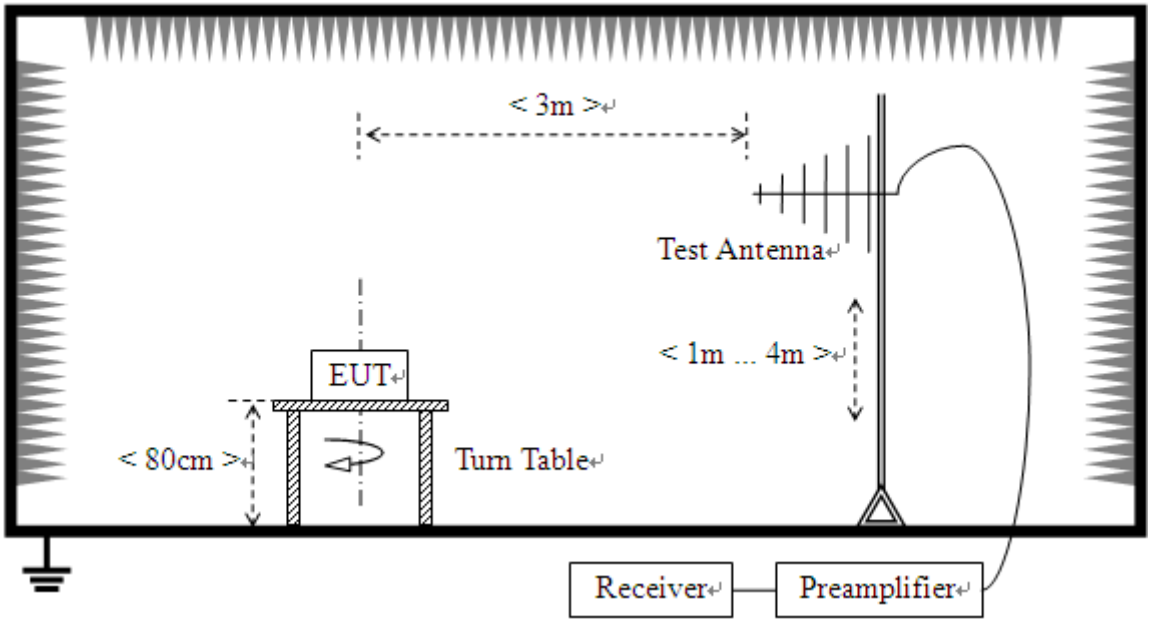
The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup

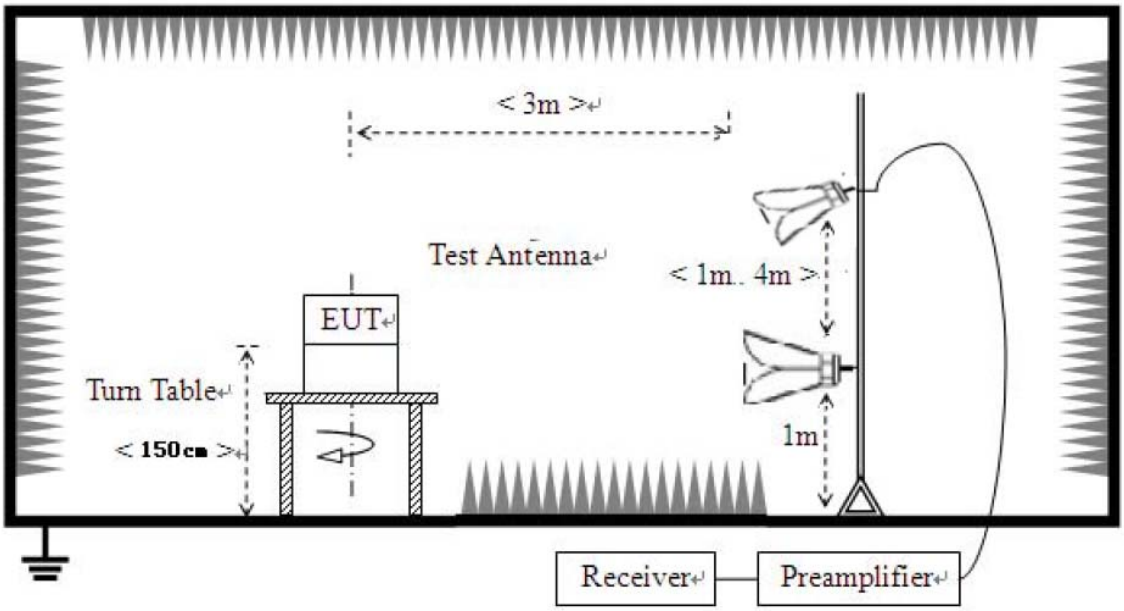
For radiated emissions from 9 KHz to 30 MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.6.4. Test Procedures

1. The EUT was placed on the top of a rotating table 0.8m for below 1GHz/1.5m for above 1GHz above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. Height of receiving 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.
4. 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.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported.
   Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
7. For the radiated emission test above 1GHz:
   Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

NOTE:

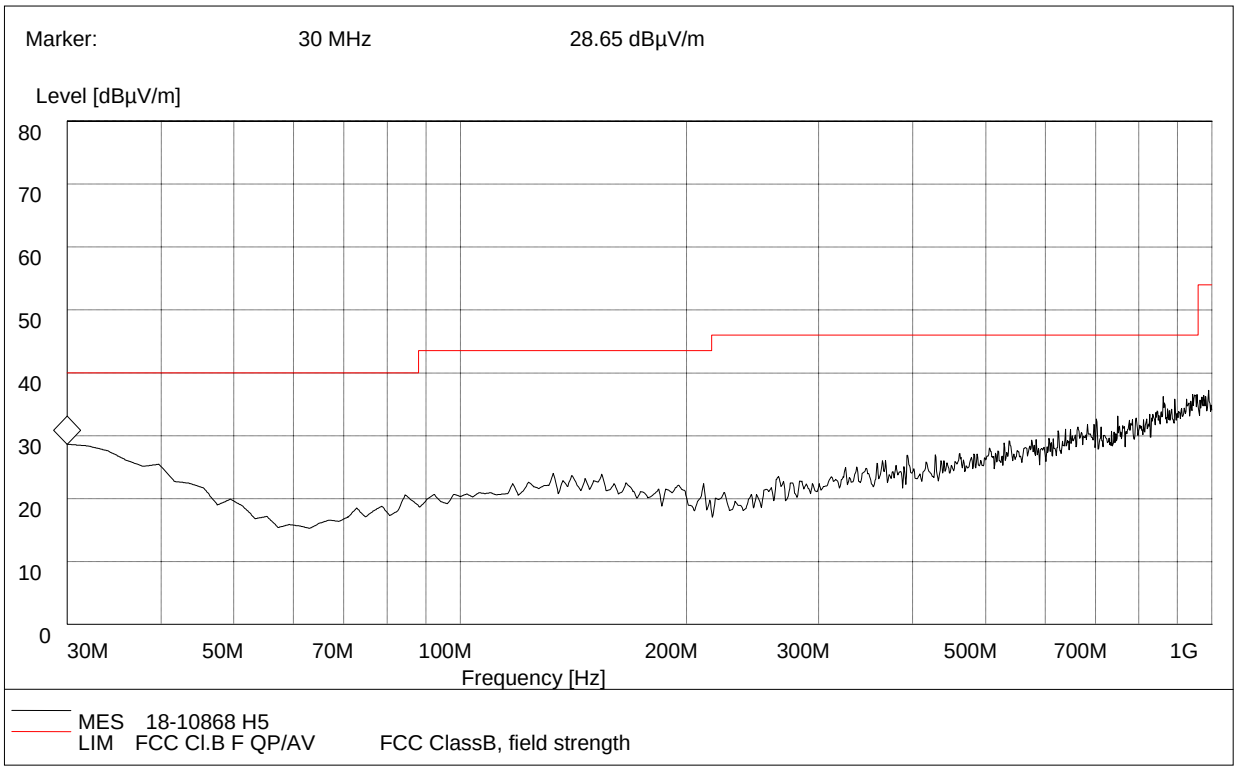
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is≥ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

2.6.5. Test Results of Radiated Band Edge and Spurious Emission

For 9 kHz to 30MHz

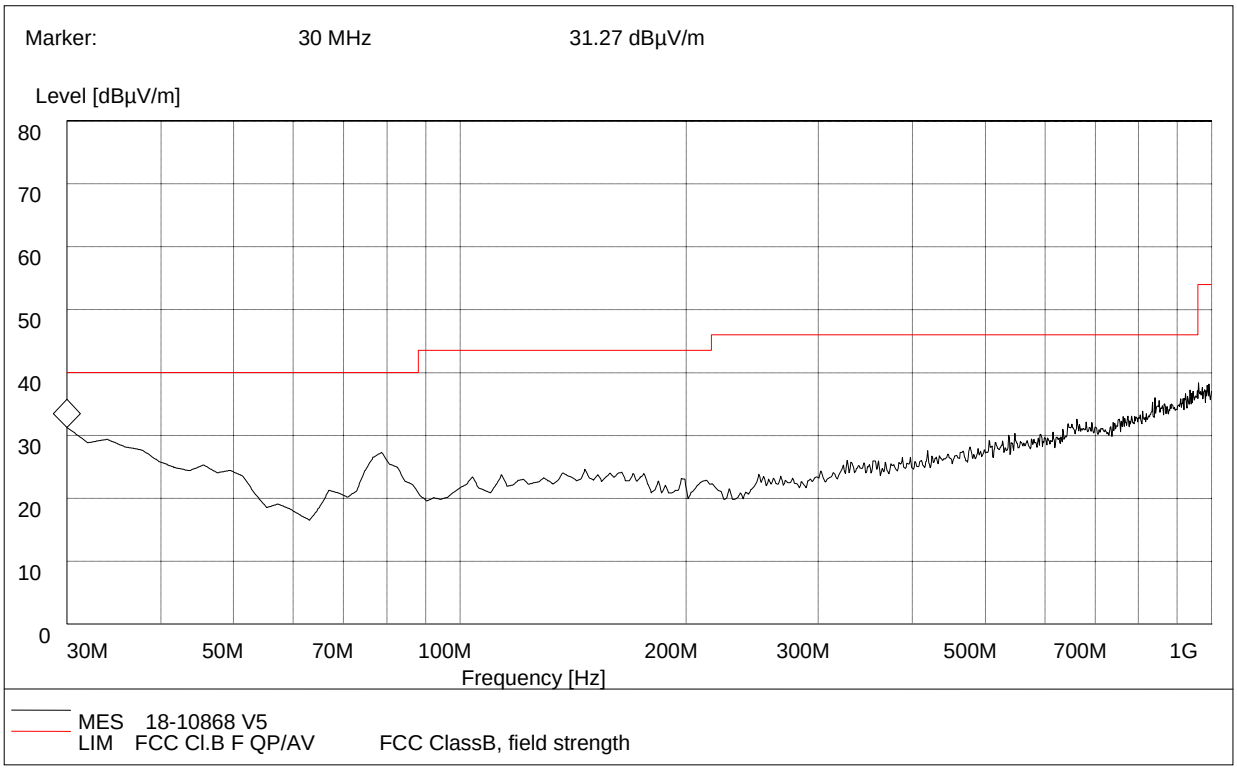
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1000 MHz



30MHz to 1GHz, Antenna Vertical

Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Cor. Factor	Antenna height (cm)	Limit (dB µ V/m)	Antenna	Verdict
30	28.65	120.000	28.87	150.0	40.0	Vertical	Pass
50.08	20.18	120.000	28.89	150.0	40.0	Vertical	Pass
78.09	19.98	120.000	29.00	150.0	40.0	Vertical	Pass
150.36	22.68	120.000	29.20	150.0	43.5	Vertical	Pass
502.08	28.58	120.000	29.8	150.0	46.0	Vertical	Pass
948.29	35.48	120.000	30.2	150.0	46.0	Vertical	Pass



30MHz to 1GHz, Antenna Horizontal

Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Cor. Factor	Antenna height (cm)	Limit (dB µ V/m)	Antenna	Verdict
30.00	31.27	120.000	28.87	150.0	40.0	Horizontal	Pass
51.25	24.35	120.000	28.89	150.0	40.0	Horizontal	Pass
78.84	26.98	120.000	29.00	150.0	43.5	Horizontal	Pass
150.05	25.87	120.000	29.20	150.0	43.5	Horizontal	Pass
565.58	30.52	120.000	29.8	150.0	46.0	Horizontal	Pass
950.38	36.84	120.000	30.2	150.0	46.0	Horizontal	Pass

For 1GHz to 25 GHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11b_2412MHz）												
No.	Fre. (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	50.26	PK	74.00	-23.74	1.50	0.00	48.96	5.20	28.60	32.50	1.30
2	2390.00	40.20	AV	54.00	-13.80	1.50	0.00	38.90	5.20	28.60	32.50	1.30
3	4824.00	49.36	PK	74.00	-24.64	2.00	180.00	42.96	7.40	30.40	31.40	6.40
4	4824.00	39.22	AV	54.00	-14.78	2.00	180.00	32.82	7.40	30.40	31.40	6.40
5	7236.00	48.79	PK	74.00	-25.21	1.80	360.00	38.29	11.50	31.20	32.20	10.50
6	7236.00	38.25	AV	54.00	-15.75	1.80	360.00	27.75	11.50	31.20	32.20	10.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11b_2412MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	49.98	PK	74.00	-24.02	1.50	0.00	48.68	5.20	28.60	32.50	1.30
2	2390.00	40.72	AV	54.00	-13.28	1.50	0.00	39.42	5.20	28.60	32.50	1.30
3	4824.00	48.77	PK	74.00	-25.23	1.20	360.00	42.37	7.40	30.40	31.40	6.40
4	4824.00	38.92	AV	54.00	-15.08	1.20	360.00	32.52	7.40	30.40	31.40	6.40
5	7236.00	50.36	PK	74.00	-23.64	1.50	0.00	39.86	11.50	31.20	32.20	10.50
6	7236.00	40.24	AV	54.00	-13.76	1.50	0.00	29.74	11.50	31.20	32.20	10.50

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11b_2437MHz）												
No.	Fre. (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	50.14	PK	74.00	-23.86	2.00	180.00	43.74	6.70	30.40	31.30	6.40
2	4874.00	40.09	AV	54.00	-13.91	1.50	180.00	33.69	6.70	30.40	31.30	6.40
3	7311.00	49.36	PK	74.00	-24.64	1.50	90.00	38.56	11.80	31.20	32.20	10.80
4	7311.00	39.66	AV	54.00	-14.34	1.50	90.00	28.86	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11b_2437MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	49.97	PK	74.00	-24.03	1.50	40.00	43.57	6.70	30.40	31.30	6.40
2	4874.00	40.27	AV	54.00	-13.73	1.50	40.00	33.87	6.70	30.40	31.30	6.40
3	7311.00	48.68	PK	74.00	-25.32	1.00	50.00	37.88	11.80	31.20	32.20	10.80
4	7311.00	38.88	AV	54.00	-15.12	1.00	50.00	28.08	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11b_2462MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	51.20	PK	74.00	-22.80	1.50	100.00	49.60	5.30	28.70	32.40	1.60
2	2483.50	41.50	AV	54.00	-12.50	1.50	100.00	39.90	5.30	28.70	32.40	1.60
3	4924.00	49.96	PK	74.00	-24.04	1.50	180.00	44.26	6.70	30.50	31.50	5.70
4	4924.00	40.14	AV	54.00	-13.86	1.50	180.00	34.44	6.70	30.50	31.50	5.70
5	7386.00	50.24	PK	74.00	-23.76	1.50	360.00	39.44	11.80	31.20	32.20	10.80
6	7386.00	40.29	AV	54.00	-13.71	1.50	360.00	29.49	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11b_2462MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	51.36	PK	74.00	-21.54	1.20	320.00	49.76	5.30	28.70	32.40	1.60
2	2483.50	41.57	AV	54.00	-11.60	1.20	320.00	39.97	5.30	28.70	32.40	1.60
3	4924.00	49.37	PK	74.00	-24.63	1.50	200.00	43.67	6.70	30.50	31.50	5.70
4	4924.00	39.57	AV	54.00	-14.43	1.50	200.00	33.87	6.70	30.50	31.50	5.70
5	7386.00	48.58	PK	74.00	-25.42	2.00	200.00	37.78	11.80	31.20	32.20	10.80
6	7386.00	38.80	AV	54.00	-15.20	2.00	200.00	28.00	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11g_2412MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	49.36	PK	74.00	-24.64	1.50	36.00	48.06	5.20	28.60	32.50	1.30
2	2390.00	39.71	AV	54.00	-14.29	1.50	36.00	38.41	5.20	28.60	32.50	1.30
3	4824.00	48.87	PK	74.00	-25.13	1.50	50.00	42.47	7.40	30.40	31.40	6.40
4	4824.00	39.12	AV	54.00	-14.88	1.50	50.00	32.72	7.40	30.40	31.40	6.40
5	7236.00	50.21	PK	74.00	-23.79	1.20	120.00	39.71	11.50	31.20	32.20	10.50
6	7236.00	40.39	AV	54.00	-13.61	1.20	120.00	29.89	11.50	31.20	32.20	10.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11g_2412MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	51.33	PK	74.00	-22.67	2.00	120.00	50.03	5.20	28.60	32.50	1.30
2	2390.00	41.67	AV	54.00	-12.33	2.00	120.00	40.37	5.20	28.60	32.50	1.30
3	4824.00	50.14	PK	74.00	-23.86	2.00	160.00	43.74	7.40	30.40	31.40	6.40
4	4824.00	40.50	AV	54.00	-13.50	2.00	160.00	34.10	7.40	30.40	31.40	6.40
5	7236.00	51.36	PK	74.00	-22.64	1.50	320.00	41.16	11.50	31.20	32.20	10.20
6	7236.00	41.94	AV	54.00	-12.06	1.50	320.00	31.74	11.50	31.20	32.20	10.20

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11g_2437MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	51.36	PK	74.00	-22.64	1.80	180.00	45.56	6.70	30.40	31.30	5.80
2	4874.00	42.29	AV	54.00	-11.71	1.80	180.00	36.49	6.70	30.40	31.30	5.80
3	7311.00	52.36	PK	74.00	-21.64	2.00	0.00	41.56	11.80	31.20	32.20	10.80
4	7311.00	43.19	AV	54.00	-10.81	2.00	0.00	32.39	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11g_2437MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	49.68	PK	74.00	-24.32	2.00	0.00	43.88	6.70	30.40	31.30	5.80
2	4874.00	41.53	AV	54.00	-12.47	2.00	0.00	35.73	6.70	30.40	31.30	5.80
3	7311.00	51.47	PK	74.00	-22.53	2.00	0.00	40.67	11.80	31.20	32.20	10.80
4	7311.00	42.22	AV	54.00	-11.78	2.00	0.00	31.42	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11g_2462MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	52.36	PK	74.00	-21.64	2.50	160.00	50.76	5.30	28.70	32.40	1.60
2	2483.50	44.22	AV	54.00	-9.78	2.50	160.00	42.62	5.30	28.70	32.40	1.60
3	4924.00	50.77	PK	74.00	-23.23	1.00	270.00	45.07	6.70	30.50	31.50	5.70
4	4924.00	42.62	AV	54.00	-11.38	1.00	270.00	36.92	6.70	30.50	31.50	5.70
5	7386.00	50.39	PK	74.00	-23.61	1.50	180.00	39.59	11.80	31.20	32.20	10.80
6	7386.00	41.94	AV	54.00	-12.06	1.50	180.00	31.14	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11g_2462MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	51.36	PK	74.00	-22.64	2.00	90.00	49.76	5.30	28.70	32.40	1.60
2	2483.50	42.22	AV	54.00	-11.78	2.00	90.00	40.62	5.30	28.70	32.40	1.60
3	4924.00	50.49	PK	74.00	-23.51	1.50	0.00	44.79	6.70	30.50	31.50	5.70
4	4924.00	41.41	AV	54.00	-12.59	1.50	0.00	35.71	6.70	30.50	31.50	5.70
5	7386.00	49.78	PK	74.00	-24.22	1.80	360.00	38.98	11.80	31.20	32.20	10.80
6	7386.00	40.58	AV	54.00	-13.42	1.80	360.00	29.78	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n20_2412MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	51.26	PK	74.00	-22.74	1.80	100.00	49.96	5.20	28.60	32.50	1.30
2	2390.00	42.61	AV	54.00	-11.39	1.80	100.00	41.31	5.20	28.60	32.50	1.30
3	4824.00	50.77	PK	74.00	-23.23	1.50	180.00	44.37	7.40	30.40	31.40	6.40
4	4824.00	42.52	AV	54.00	-11.48	1.50	180.00	36.12	7.40	30.40	31.40	6.40
5	7236.00	49.69	PK	74.00	-24.31	1.20	250.00	39.19	11.50	31.20	32.20	10.50
6	7236.00	41.57	AV	54.00	-12.43	1.20	250.00	31.07	11.50	31.20	32.20	10.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n20_2412MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	50.24	PK	74.00	-23.76	1.60	200.00	48.94	5.20	28.60	32.50	1.30
2	2390.00	41.90	AV	54.00	-12.10	1.60	200.00	40.60	5.20	28.60	32.50	1.30
3	4824.00	50.11	PK	74.00	-23.89	2.00	180.00	43.71	7.40	30.40	31.40	6.40
4	4824.00	41.76	AV	54.00	-12.24	2.00	180.00	35.36	7.40	30.40	31.40	6.40
5	7236.00	49.78	PK	74.00	-24.22	3.00	250.00	39.28	11.50	31.20	32.20	10.50
6	7236.00	41.31	AV	54.00	-12.69	3.00	250.00	30.81	11.50	31.20	32.20	10.50

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n20_2437MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	47.79	PK	74.00	-26.21	2.00	360.00	41.99	6.70	30.40	31.30	5.80
2	4874.00	39.84	AV	54.00	-14.16	2.00	360.00	34.04	6.70	30.40	31.30	5.80
3	7311.00	50.32	PK	74.00	-23.68	3.00	180.00	39.52	11.80	31.20	32.20	10.80
4	7311.00	41.96	AV	54.00	-12.04	3.00	180.00	31.16	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n20_2437MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	50.17	PK	74.00	-23.83	1.50	0.00	43.77	6.70	31.20	31.50	6.40
2	4874.00	41.90	AV	54.00	-12.10	1.50	0.00	35.50	6.70	31.20	31.50	6.40
3	7311.00	49.58	PK	74.00	-24.42	1.00	0.00	38.78	11.80	31.20	32.20	10.80
4	7311.00	41.23	AV	54.00	-12.77	1.00	0.00	30.43	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n20_2462MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	51.79	PK	74.00	-22.21	1.50	150.00	50.19	5.30	28.70	32.40	1.60
2	2483.50	43.43	AV	54.00	-10.57	1.50	150.00	41.83	5.30	28.70	32.40	1.60
3	4924.00	49.58	PK	74.00	-24.42	1.00	250.00	43.88	6.70	30.50	31.50	5.70
4	4924.00	41.23	AV	54.00	-12.77	1.00	250.00	35.53	6.70	30.50	31.50	5.70
5	7386.00	49.69	PK	74.00	-24.31	1.50	0.00	38.89	11.80	31.20	32.20	10.80
6	7386.00	41.44	AV	54.00	-12.56	1.50	0.00	30.64	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n20_2462MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	49.57	PK	74.00	-24.43	2.00	360.00	47.97	5.30	28.70	32.40	1.60
2	2483.50	41.33	AV	54.00	-12.67	2.00	360.00	39.73	5.30	28.70	32.40	1.60
3	4924.00	50.14	PK	74.00	-23.86	1.50	200.00	44.44	6.70	30.50	31.50	5.70
4	4924.00	41.75	AV	54.00	-12.25	1.50	200.00	36.05	6.70	30.50	31.50	5.70
5	7386.00	49.25	PK	74.00	-24.75	1.50	90.00	38.45	11.80	31.20	32.20	10.80
6	7386.00	40.43	AV	54.00	-13.57	1.80	90.00	29.63	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n40_2422MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	52.18	PK	74.00	-21.82	2.00	0.00	50.88	5.20	28.60	32.50	1.30
2	2390.00	43.93	AV	54.00	-10.07	2.00	0.00	42.63	5.20	28.60	32.50	1.30
3	4844.00	50.74	PK	74.00	-23.26	1.50	200.00	44.34	7.40	30.40	31.40	6.40
4	4844.00	42.60	AV	54.00	-11.40	1.50	200.00	36.20	7.40	30.40	31.40	6.40
5	7266.00	49.68	PK	74.00	-24.32	1.80	360.00	39.18	11.50	31.20	32.20	10.50
6	7266.00	40.14	AV	54.00	-13.86	1.80	360.00	29.64	11.50	31.20	32.20	10.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n40_2422MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390.00	52.47	PK	74.00	-21.53	1.50	90.00	51.17	5.20	28.60	32.50	1.30
2	2390.00	44.24	AV	54.00	-9.76	1.50	90.00	42.94	5.20	28.60	32.50	1.30
3	4824.00	49.25	PK	74.00	-24.75	2.00	360.00	42.85	7.40	30.40	31.40	6.40
4	4824.00	40.96	AV	54.00	-13.04	2.00	360.00	34.56	7.40	30.40	31.40	6.40
5	7266.00	50.11	PK	74.00	-23.89	1.50	320.00	39.61	11.50	31.20	32.20	10.50
6	7266.00	41.76	AV	54.00	-12.24	1.50	320.00	31.26	11.50	31.20	32.20	10.50

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n40_2437MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	50.14	PK	74.00	-23.86	2.00	160.00	43.74	6.70	31.20	31.50	6.40
2	4874.00	41.71	AV	54.00	-12.29	2.00	160.00	35.31	6.70	31.20	31.50	6.40
3	7311.00	49.87	PK	74.00	-24.13	1.60	360.00	39.07	11.80	31.20	32.20	10.80
4	7311.00	41.67	AV	54.00	-12.33	1.60	360.00	30.87	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n40_2437MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4874.00	50.18	PK	74.00	-23.82	1.80	270.00	43.78	6.70	31.20	31.50	6.40
2	4874.00	41.95	AV	54.00	-12.05	1.80	270.00	35.55	6.70	31.20	31.50	6.40
3	7311.00	49.35	PK	74.00	-24.65	1.00	0.00	38.55	11.80	31.20	32.20	10.80
4	7311.00	41.27	AV	54.00	-12.73	1.00	0.00	30.47	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n40_2452MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	52.14	PK	74.00	-21.86	1.00	180.00	50.54	5.30	28.70	32.40	1.60
2	2483.50	43.80	AV	54.00	-10.20	1.00	180.00	42.20	5.30	28.70	32.40	1.60
3	4904.00	49.57	PK	74.00	-24.43	1.50	120.00	43.87	6.70	30.50	31.50	5.70
4	4904.00	41.45	AV	54.00	-12.55	1.50	120.00	35.75	6.70	30.50	31.50	5.70
5	7356.00	50.36	PK	74.00	-23.64	1.50	360.00	39.56	11.80	31.20	32.20	10.80
6	7356.00	42.06	AV	54.00	-11.94	1.50	360.00	31.26	11.80	31.20	32.20	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n40_2452MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.50	51.17	PK	74.00	-22.83	2.00	150.00	49.57	5.30	28.70	32.40	1.60
2	2483.50	43.19	AV	54.00	-10.81	2.00	150.00	41.59	5.30	28.70	32.40	1.60
3	4904.00	50.33	PK	74.00	-23.67	1.00	150.00	44.63	6.70	30.50	31.50	5.70
4	4904.00	41.98	AV	54.00	-12.02	1.00	150.00	36.28	6.70	30.50	31.50	5.70
5	7356.00	51.06	PK	74.00	-22.94	1.50	360.00	40.26	11.80	31.20	32.20	10.80
6	7356.00	43.07	AV	54.00	-10.93	1.50	360.00	32.27	11.80	31.20	32.20	10.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) − Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level − Limit value
5. " * ": Fundamental frequency.

2.7. Conducted Emission

2.7.1. Limit of Conducted Emission

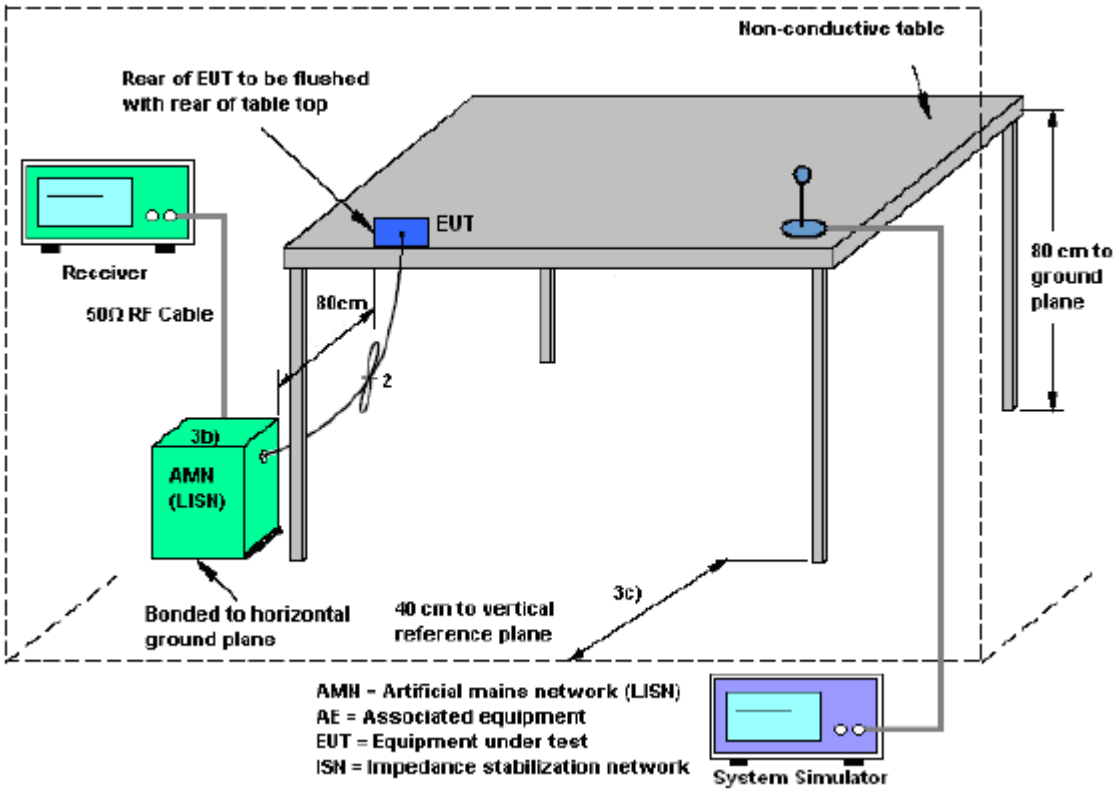
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3. Test Setup

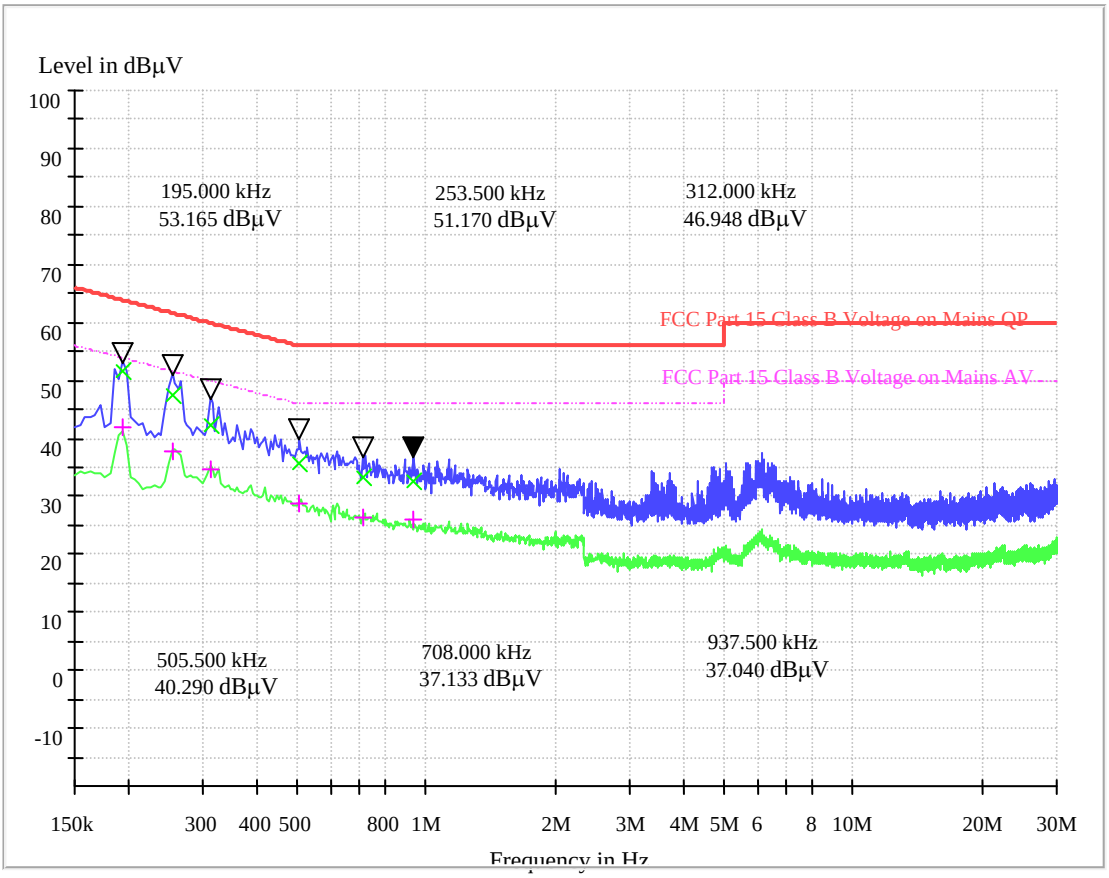


2.7.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

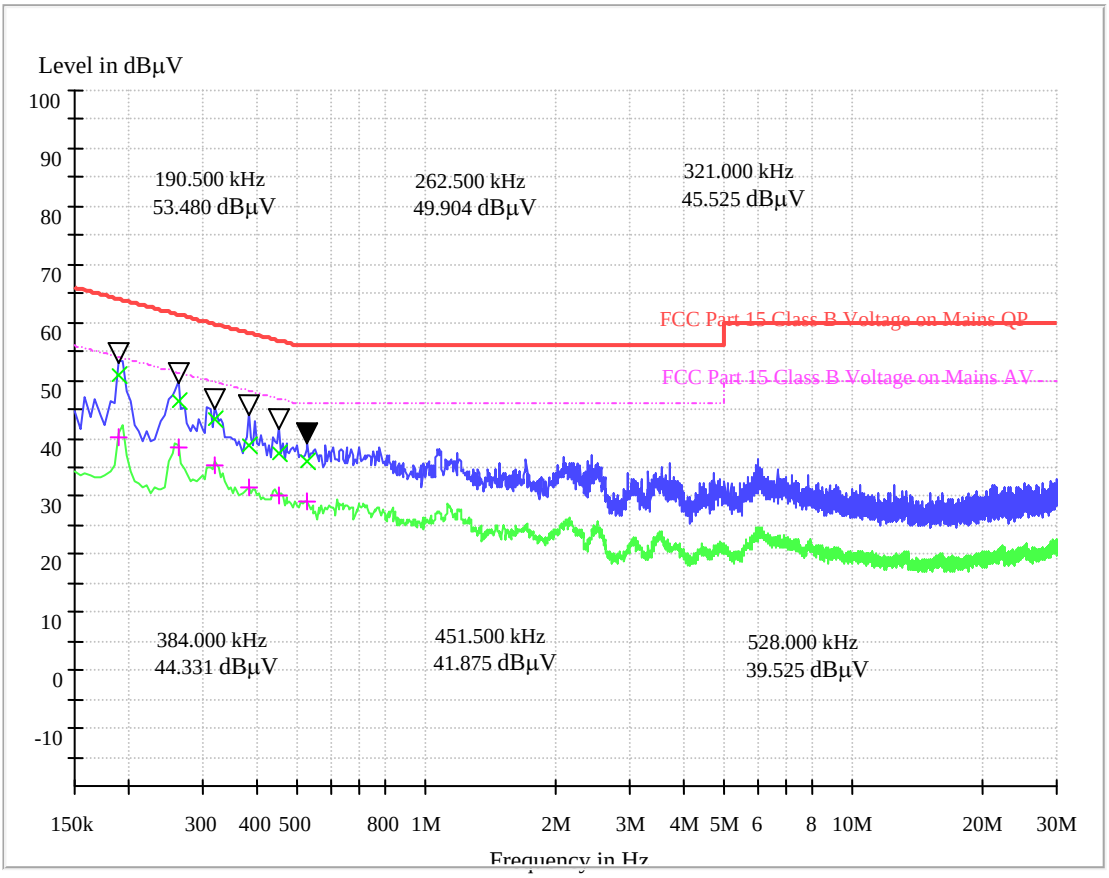
2.7.5. Test Results of Conducted Emission

1. The EUT configuration of the emission tests is WLAN Link + USB Cable (Charging from Adapter)



(Plot A: L Phase)

Conducted Disturbance at Mains Terminals							
L Test Data							
QP					AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Cable Loss (dB)	Cor. Factor (dB)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.195000	63.8	51.51	0.1	20.1	0.195000	53.8	42.07
0.253500	61.6	47.53	0.2	20.2	0.253500	51.6	37.85
0.312000	59.9	42.12	0.5	20.5	0.312000	49.9	34.62
0.505500	56.0	35.70	0.5	20.5	0.505500	46.0	28.65
0.708000	56.0	33.36	0.2	20.2	0.708000	46.0	26.42
0.937500	56.0	32.65	0.1	20.1	0.937500	46.0	25.94



(Plot B: N Phase)

Conducted Disturbance at Mains Terminals							
N Test Data							
QP					AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Cable Loss (dB)	Cor. Factor (dB)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.190500	64.0	51.06	0.10	20.1	0.190500	54.0	40.24
0.262500	61.4	46.38	0.2	20.2	0.262500	51.4	38.44
0.321000	59.7	43.28	0.5	20.5	0.321000	49.7	35.37
0.384000	58.2	38.92	0.5	20.5	0.384000	48.2	31.53
0.451500	56.8	37.31	0.2	20.2	0.451500	46.8	30.22
0.528000	56.0	36.08	0.2	20.2	0.528000	46.0	29.24

Test Result: PASS

3. List of measuring equipment

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	11/12/2017
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	11/12/2017
3	EMI TEST Software	Audix	E3	N/A	N/A
4	TURNTABLE	ETS	2088	2149	N/A
5	ANTENNA MAST	ETS	2075	2346	N/A
6	EMI TEST Software	Rohde&Schwarz	ESK1	N/A	N/A
7	HORNANTENNA	ShwarzBeck	9120D	1011	11/12/2017
8	Amplifer	Sonoma	310N	E009-13	11/12/2017
9	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	11/12/2017
10	High pass filter	Compliance Direction systems	BSU-6	34202	11/12/2017
11	HORNANTENNA	ShwarzBeck	9120D	1012	11/12/2017
12	Amplifer	Compliance Direction systems	PAP1-4060	120	11/12/2017
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	11/12/2017
14	TURNTABLE	MATURO	TT2.0	----	N/A
15	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
16	Horn Antenna	SCHWARZBECK	BBHA9170	25841	11/12/2017
17	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	11/12/2017

Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	11/12/2017
2	Spectrum Analyzer	Keysight	N9030A	ATO-67098	10/08/2018
3	Power Meter	Anritsu	ML2480B	100798	11/12/2017
4	Power Sensor	Anritsu	MA2411B	100258	11/12/2017

The calibration interval was one year.

Appendix A

RF Output Power

Test Result and Data

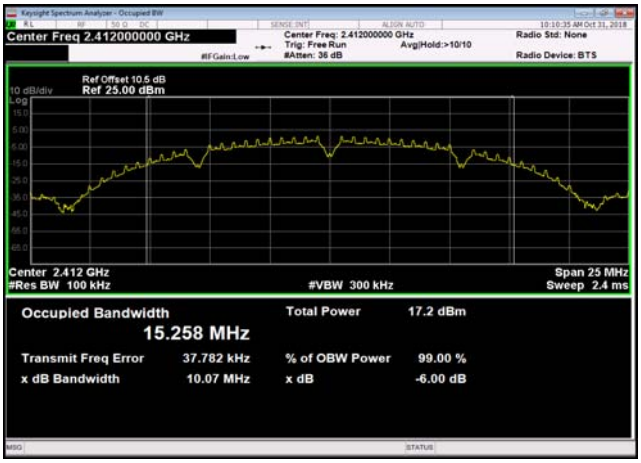
Conducted Output Peak Power				
Mode	Test Frequency (MHz)	Max Conducted Output Power (dBm)	Limit (dBm)	Result
802.11b	2412	11.69	30	Pass
802.11b	2437	11.85	30	Pass
802.11b	2462	11.97	30	Pass
802.11g	2412	9.57	30	Pass
802.11g	2437	9.71	30	Pass
802.11g	2462	9.88	30	Pass
802.11n (HT20)	2412	10.09	30	Pass
802.11n (HT20)	2437	11.22	30	Pass
802.11n (HT20)	2462	10.92	30	Pass
802.11n (HT40)	2422	10.08	30	Pass
802.11n (HT40)	2437	9.78	30	Pass
802.11n (HT40)	2452	10.88	30	Pass

6dB Bandwidth

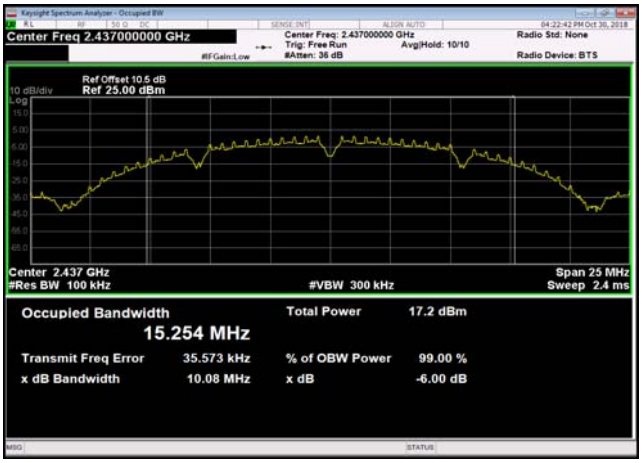
Test Result and Data

	WLAN Occupied 6dB Bandwidth			
Mode	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Limit (KHz)	Result
802.11b	2412	10.07	500	Pass
802.11b	2437	10.08	500	Pass
802.11b	2462	10.08	500	Pass
802.11g	2412	16.37	500	Pass
802.11g	2437	16.37	500	Pass
802.11g	2462	16.38	500	Pass
802.11n (HT20)	2412	17.60	500	Pass
802.11n (HT20)	2437	17.59	500	Pass
802.11n (HT20)	2462	17.59	500	Pass
802.11n (HT40)	2422	35.19	500	Pass
802.11n (HT40)	2437	35.71	500	Pass
802.11n (HT40)	2452	35.19	500	Pass

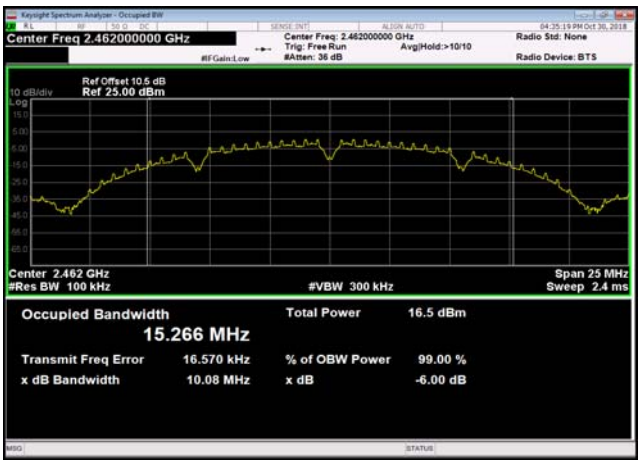
6dB Bandwidth-802.11b,2412MHz



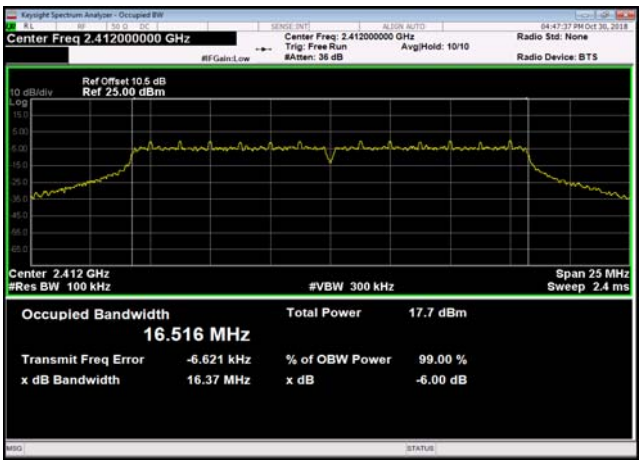
6dB Bandwidth-802.11b,2437MHz



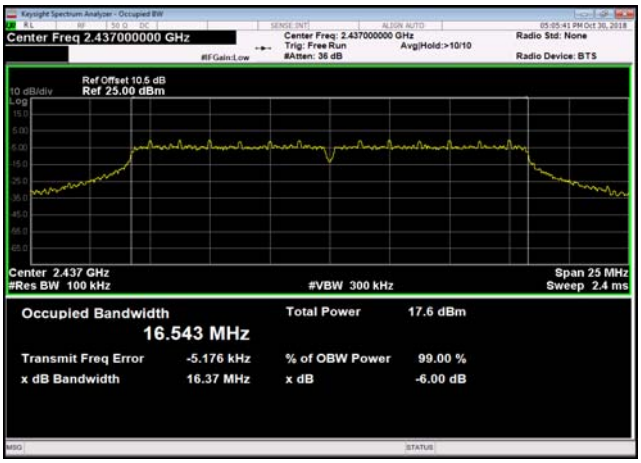
6dB Bandwidth-802.11b,2462MHz



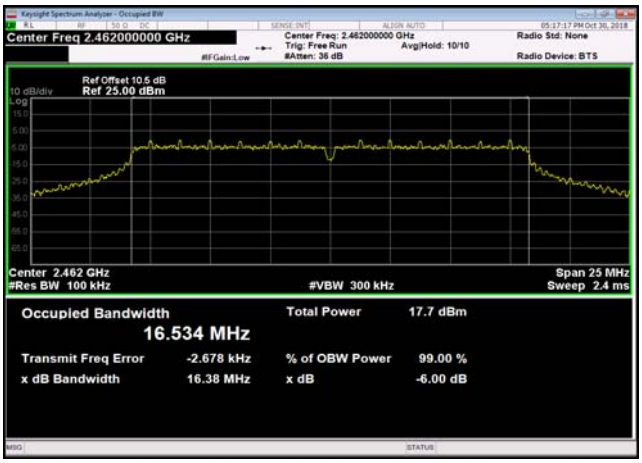
6dB Bandwidth-802.11g,2412MHz



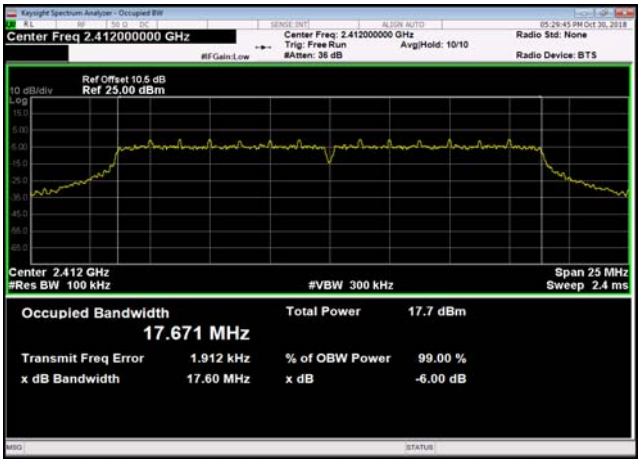
6dB Bandwidth-802.11g,2437MHz



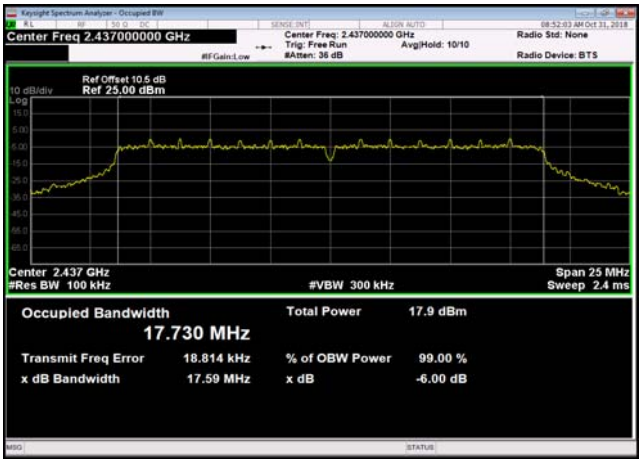
6dB Bandwidth-802.11g,2462MHz



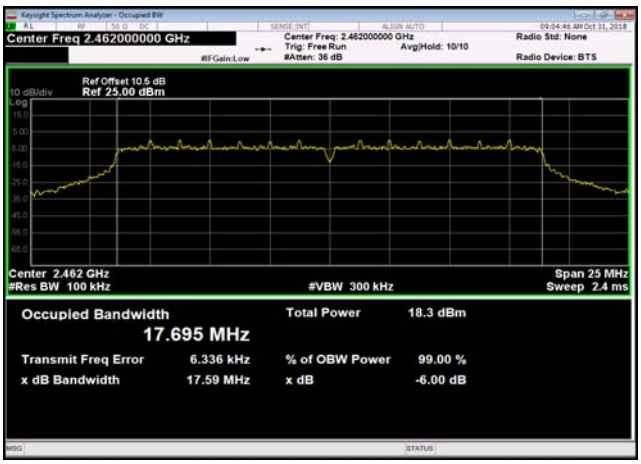
6dB Bandwidth-802.11n(HT20),2412MHz



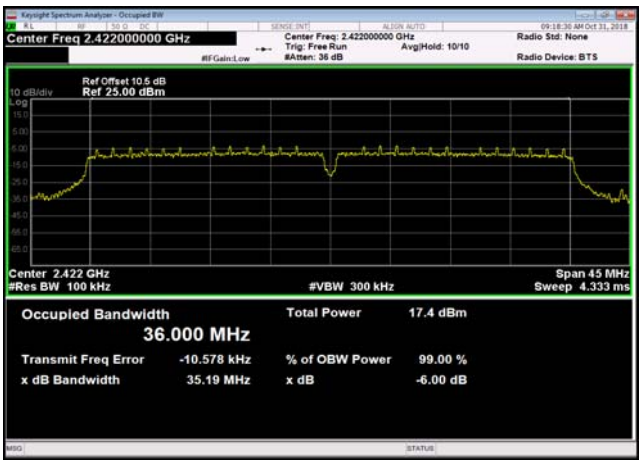
6dB Bandwidth-802.11n(HT20),2437MHz



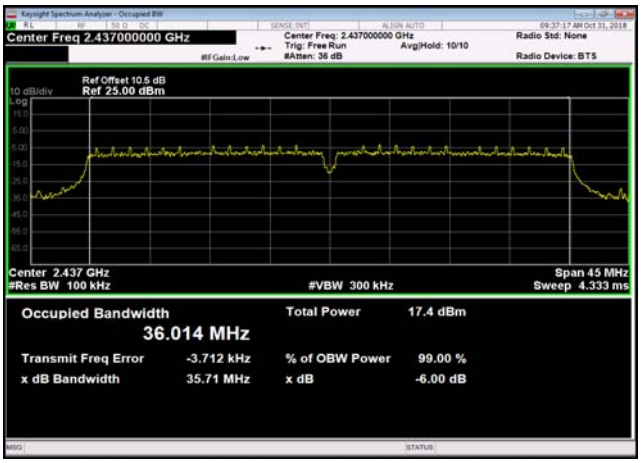
6dB Bandwidth-802.11n(HT20),2462MHz



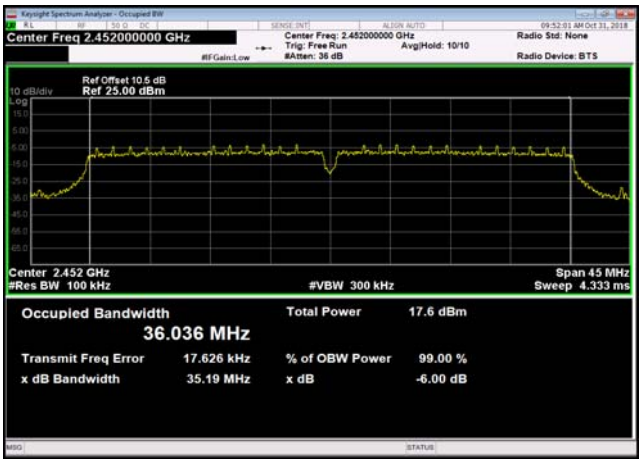
6dB Bandwidth-802.11n(HT40),2422MHz



6dB Bandwidth-802.11n(HT40),2437MHz



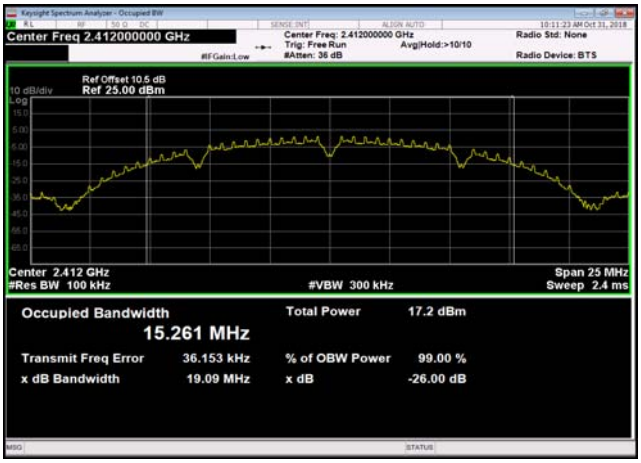
6dB Bandwidth-802.11n(HT40),2452MHz



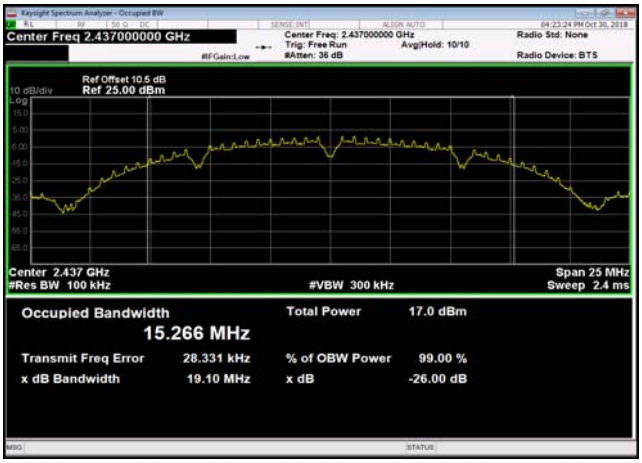
99% BandWidth
Test Result and Data

WLAN 99% Occupied Bandwidth			
Mode	Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	Result
802.11b	2412	15.261	Reported Only
802.11b	2437	15.266	
802.11b	2462	15.257	
802.11g	2412	16.516	
802.11g	2437	16.543	
802.11g	2462	16.533	
802.11n (HT20)	2412	17.672	
802.11n (HT20)	2437	17.729	
802.11n (HT20)	2462	17.698	
802.11n (HT40)	2422	36.004	
802.11n (HT40)	2437	36.012	
802.11n (HT40)	2452	36.035	

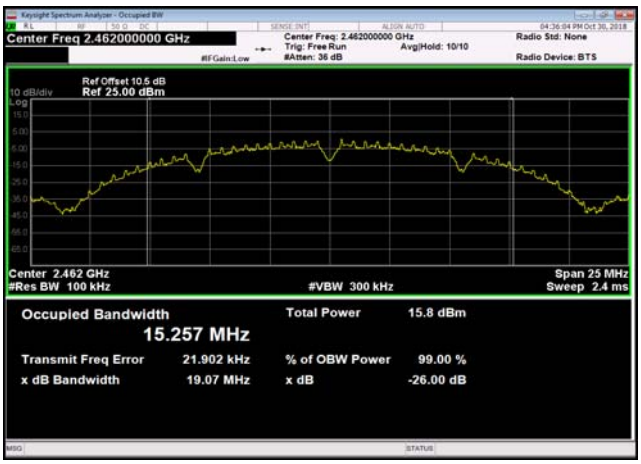
99% Bandwidth-802.11b,2412MHz



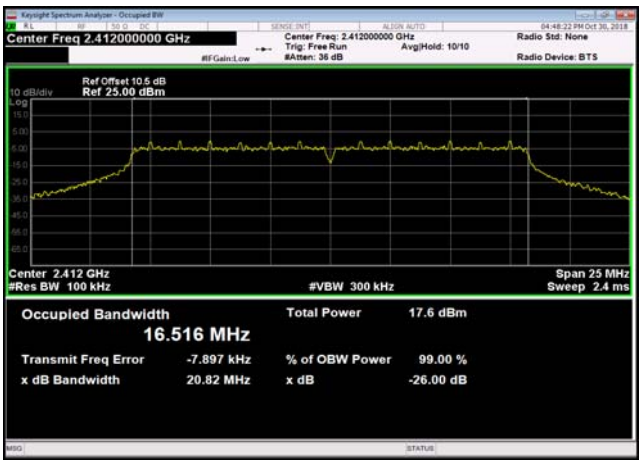
99% Bandwidth-802.11b,2437MHz



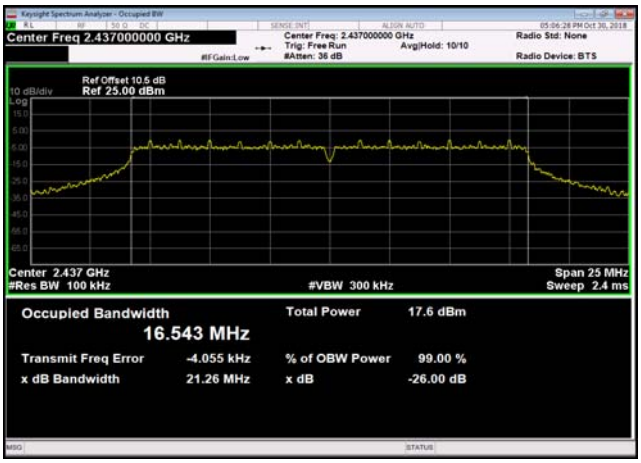
99% Bandwidth-802.11b,2462MHz



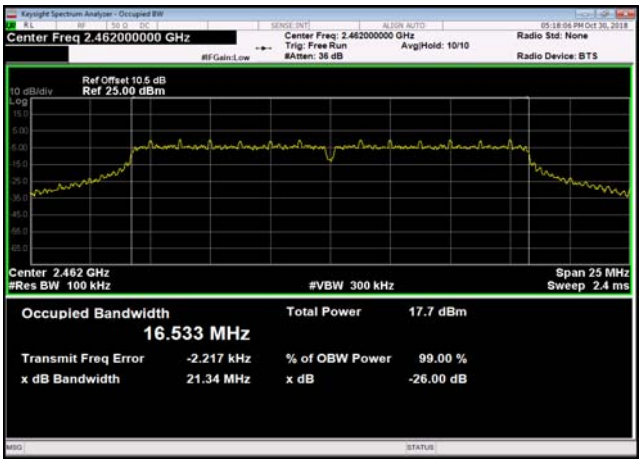
99% Bandwidth-802.11g,2412MHz



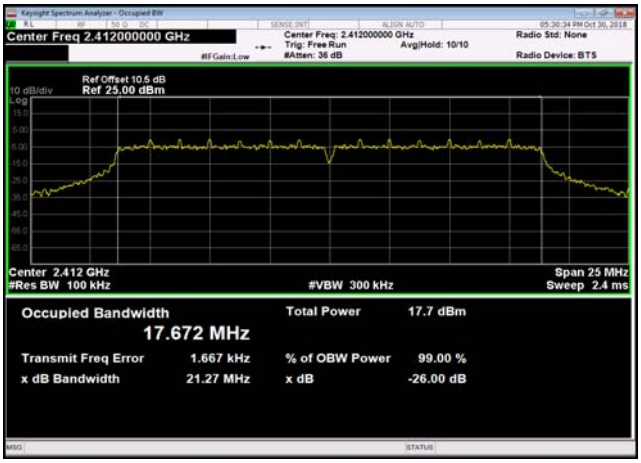
99% Bandwidth-802.11g,2437MHz



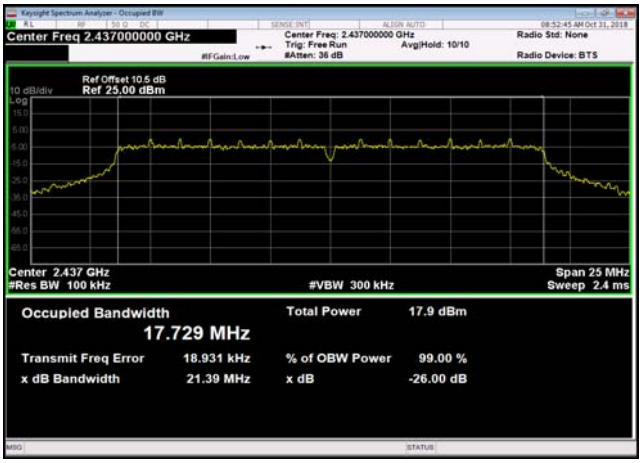
99% Bandwidth-802.11g,2462MHz



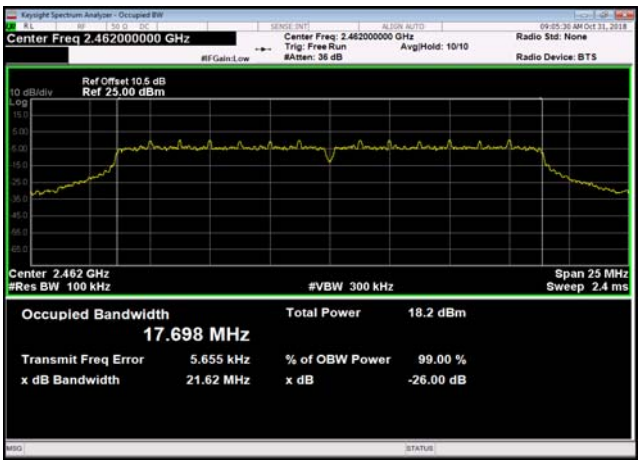
99% Bandwidth-802.11n(HT20),2412MHz



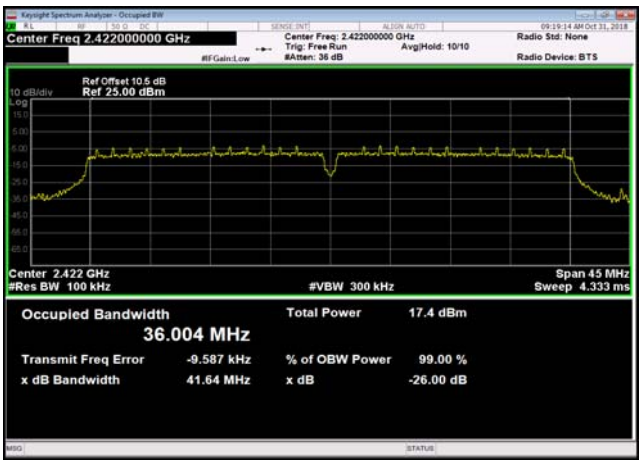
99% Bandwidth-802.11n(HT20),2437MHz



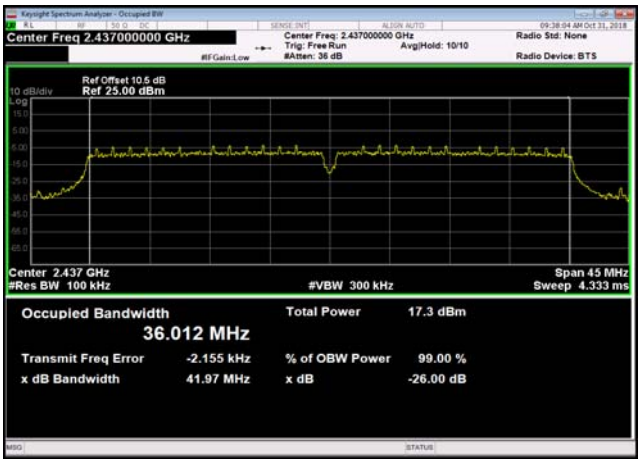
99% Bandwidth-802.11n(HT20),2462MHz



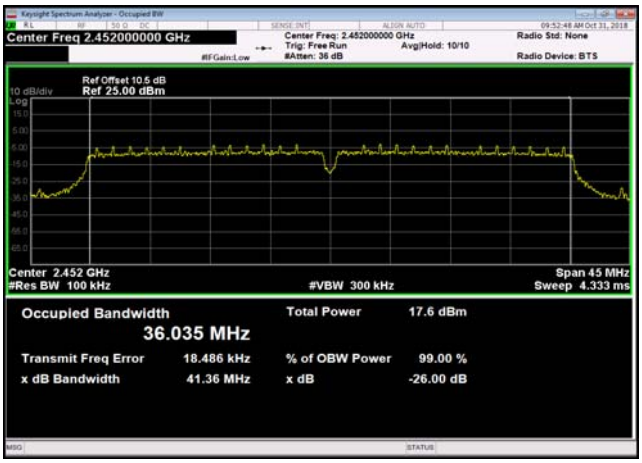
99% Bandwidth-802.11n(HT40),2422MHz



99% Bandwidth-802.11n(HT40),2437MHz



99% Bandwidth-802.11n(HT40),2452MHz

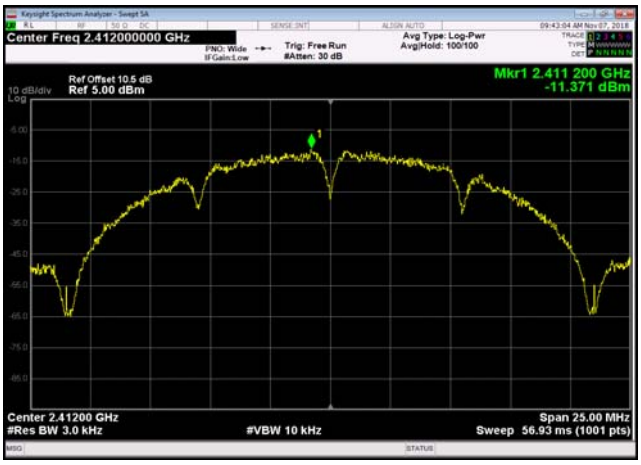


Power Spectral Density

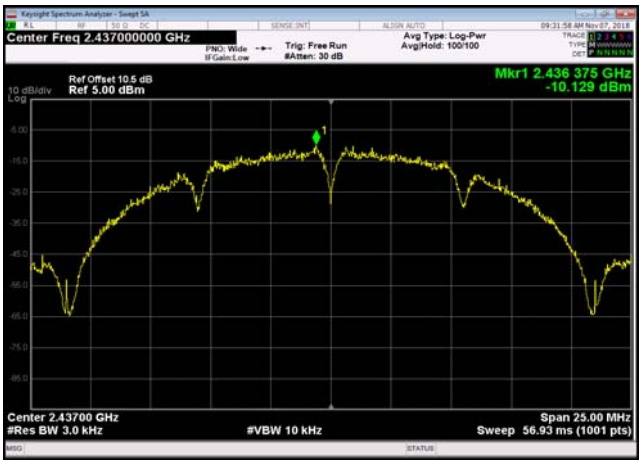
Test Result and Data

Power Spectral Density					
Mode	Test Frequency (MHz)	PSD (dBm/3KHz)	RBW (kHz)	Limit (dBm/3KHz)	Result
802.11b	2412	-11.371	3	8	Pass
802.11b	2437	-10.129	3	8	Pass
802.11b	2462	-9.630	3	8	Pass
802.11g	2412	-14.831	3	8	Pass
802.11g	2437	-14.686	3	8	Pass
802.11g	2462	-15.087	3	8	Pass
802.11n (HT20)	2412	-16.141	3	8	Pass
802.11n (HT20)	2437	-16.230	3	8	Pass
802.11n (HT20)	2462	-17.039	3	8	Pass
802.11n (HT40)	2422	-15.988	3	8	Pass
802.11n (HT40)	2437	-17.744	3	8	Pass
802.11n (HT40)	2452	-16.315	3	8	Pass

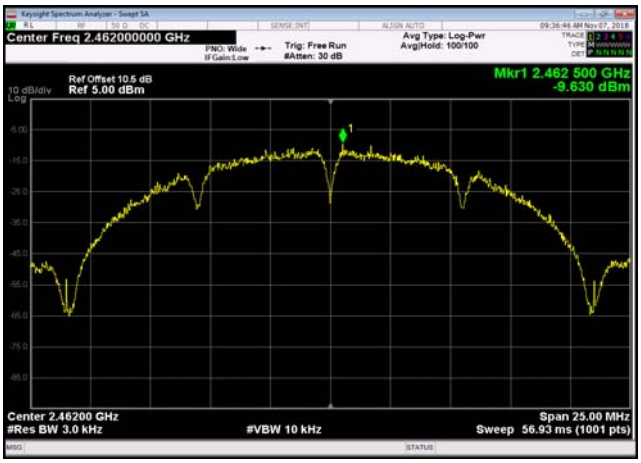
Power spectral density-802.11b ,2412MHz



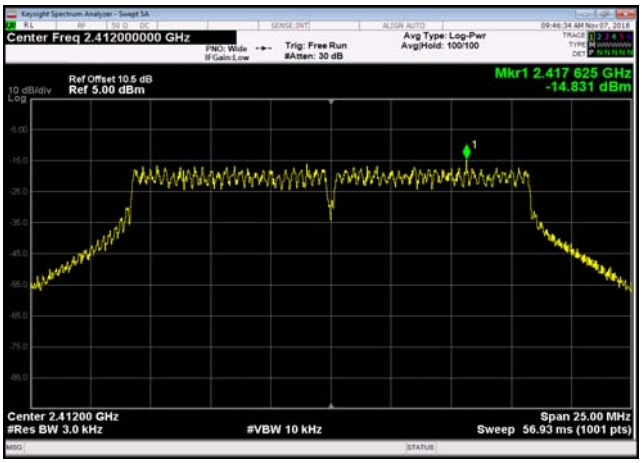
Power spectral density-802.11b ,2437MHz



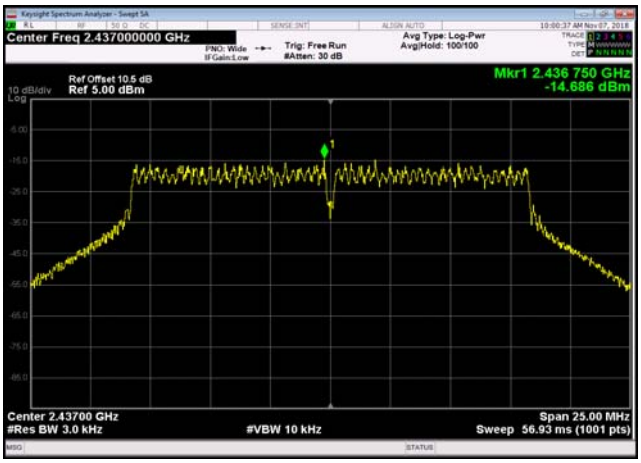
Power spectral density-802.11b ,2462MHz



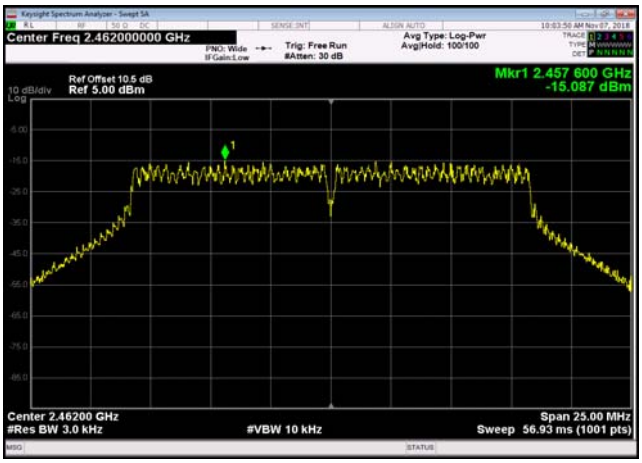
Power spectral density-802.11g ,2412MHz



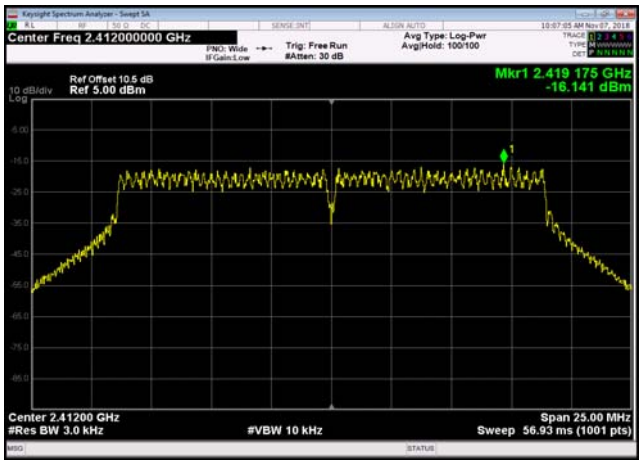
Power spectral density-802.11g ,2437MHz



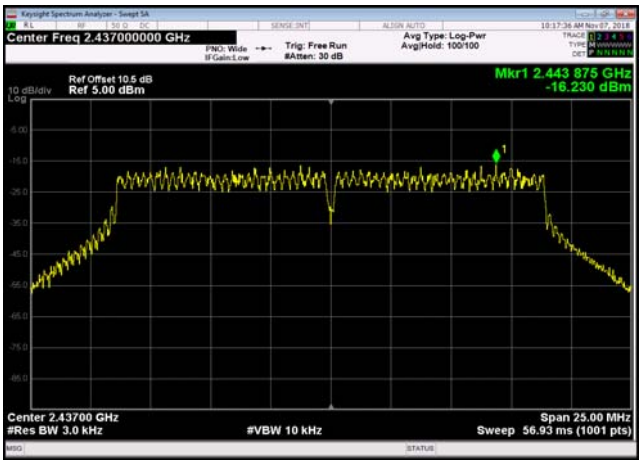
Power spectral density-802.11g ,2462MHz



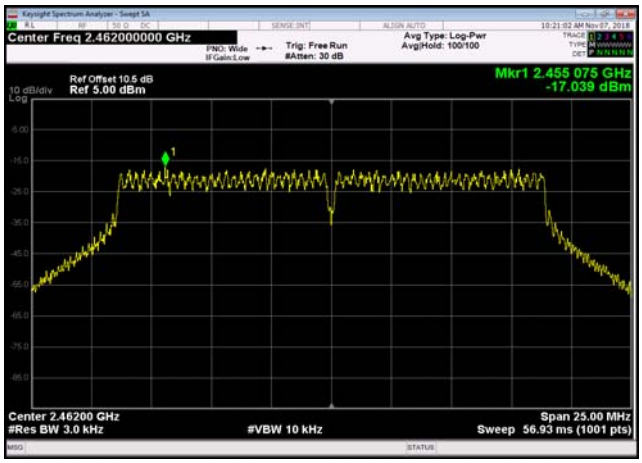
Power spectral density-802.11n(HT20) ,2412MHz



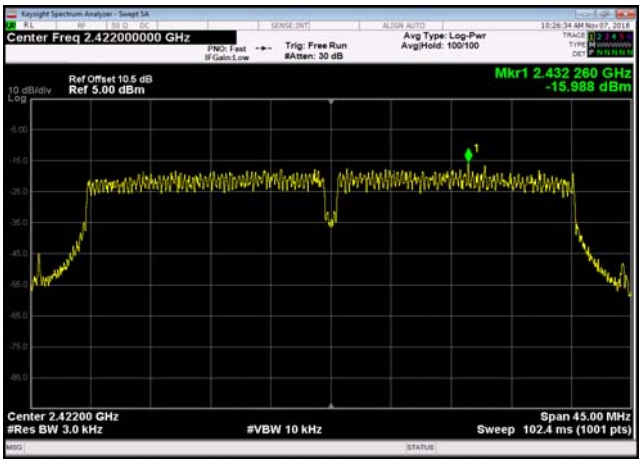
Power spectral density-802.11n(HT20) ,2437MHz



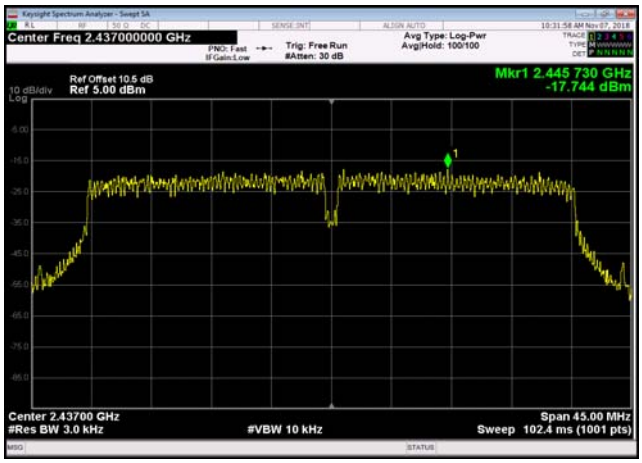
Power spectral density-802.11n(HT20) ,2462MHz



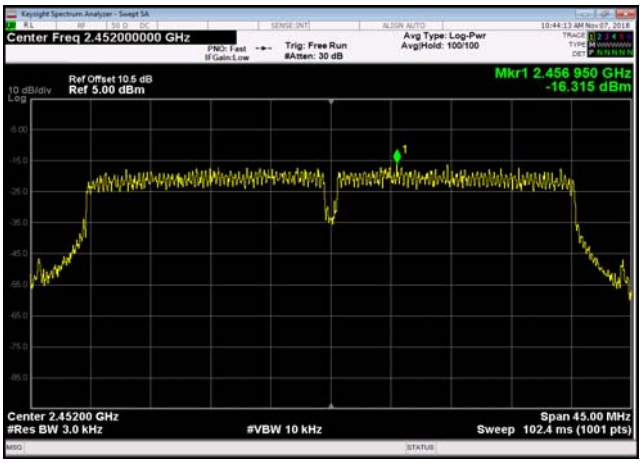
Power spectral density-802.11n(HT40) ,2422MHz



Power spectral density-802.11n(HT40) ,2437MHz



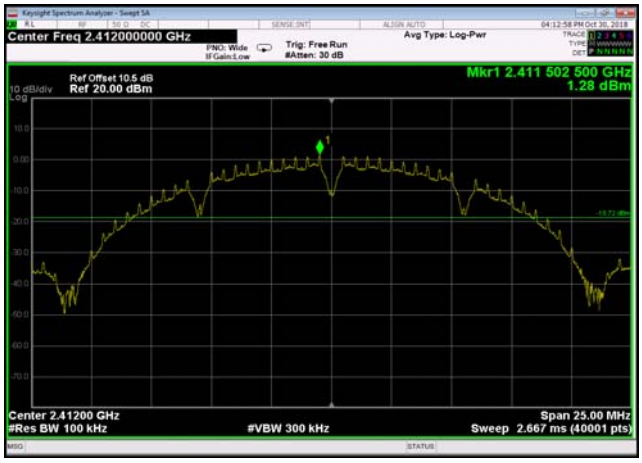
Power spectral density-802.11n(HT40) ,2452MHz



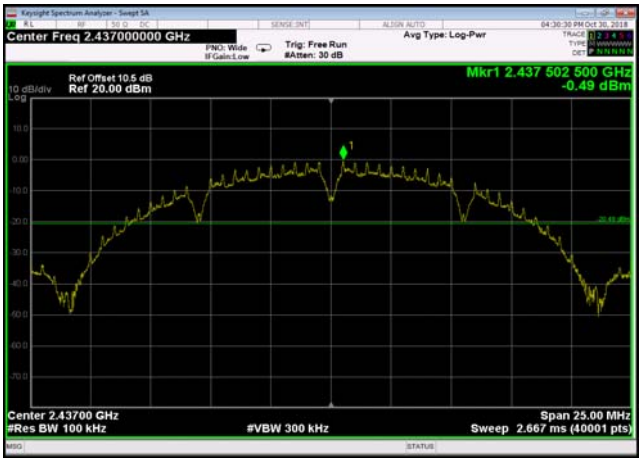
Conducted Band Edges and Spurious Emissions

Test Result and Data

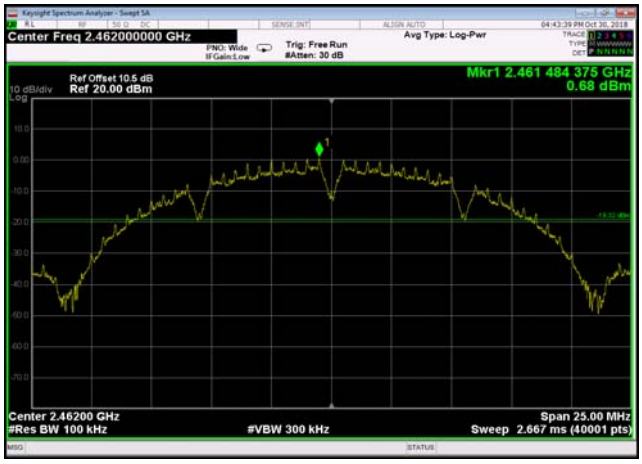
,Plot 1,Reference Level-802.11b ,2412MHz



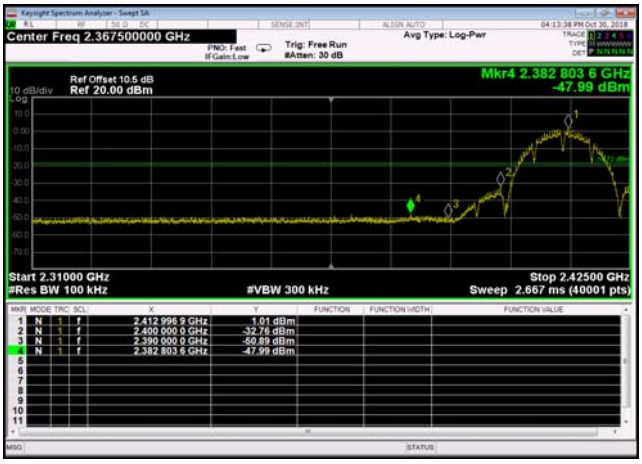
,Plot 1,Reference Level-802.11b ,2437MHz



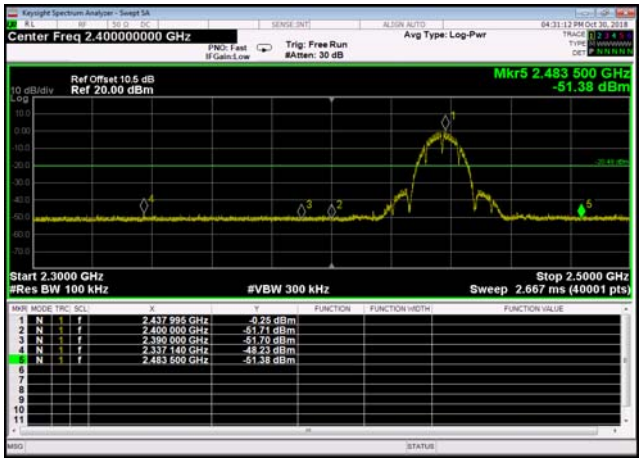
,Plot 1,Reference Level-802.11b ,2462MHz



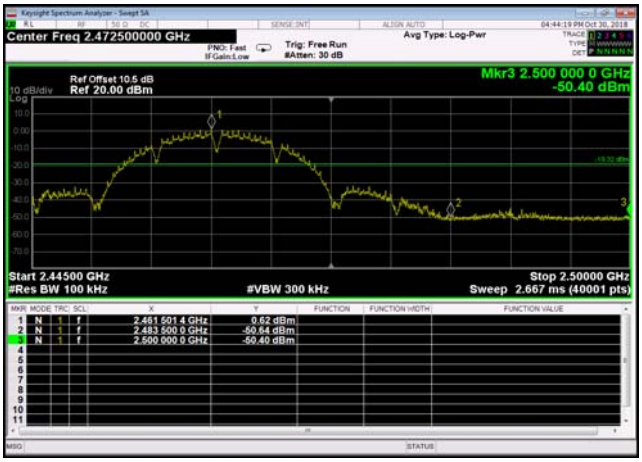
,Plot 2,Band Edge-802.11b,2412MHz



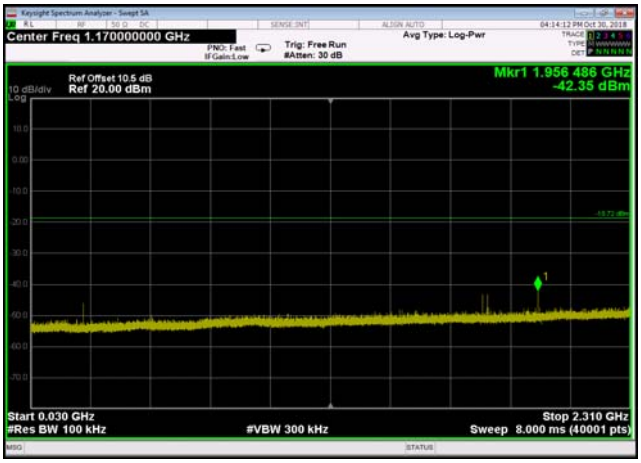
,Plot 2,Band Edge-802.11b,2437MHz



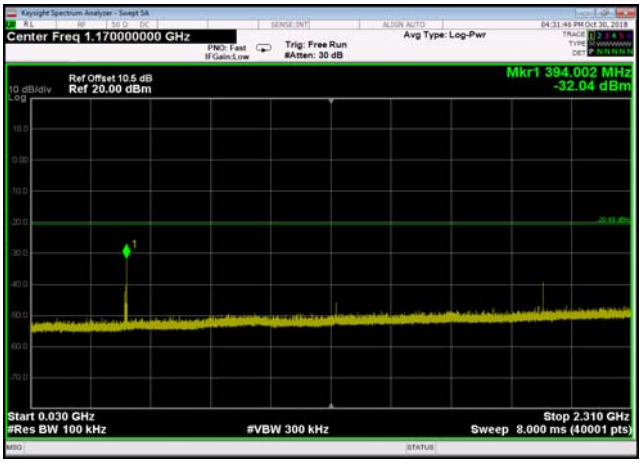
,Plot 2,Band Edge-802.11b,2462MHz



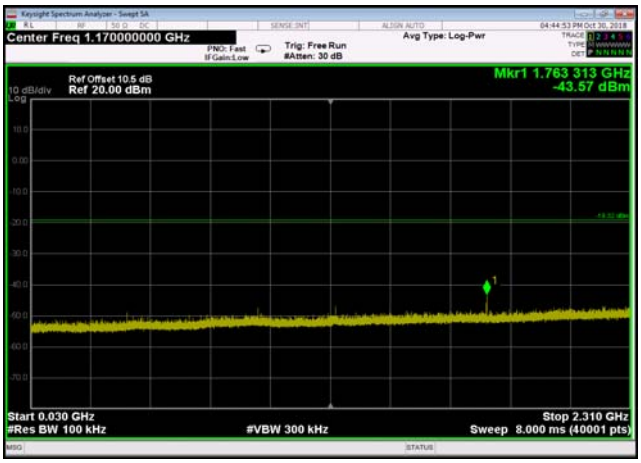
,Plot 3,30MHz~2310MHz-802.11b,2412MHz



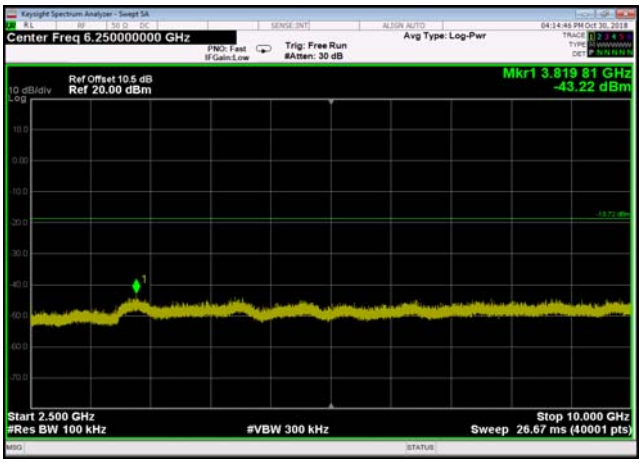
,Plot 3,30MHz~2310MHz-802.11b,2437MHz



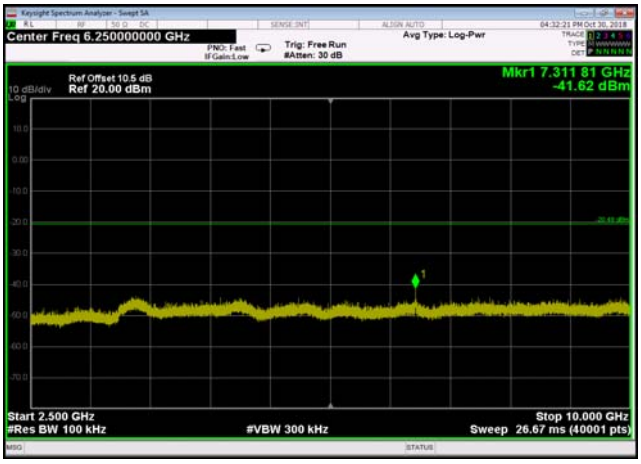
,Plot 3,30MHz~2310MHz-802.11b,2462MHz



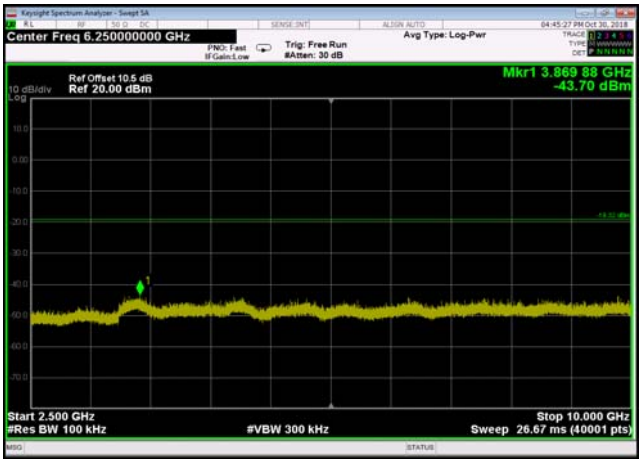
,Plot 4,2500MHz~10000MHz-802.11b ,2412MHz



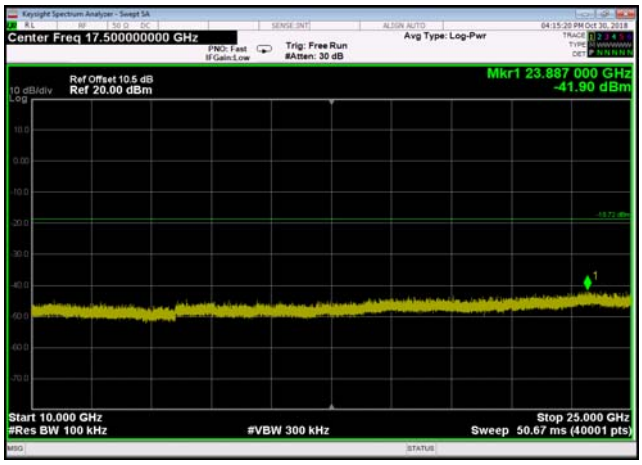
,Plot 4,2500MHz~10000MHz-802.11b ,2437MHz



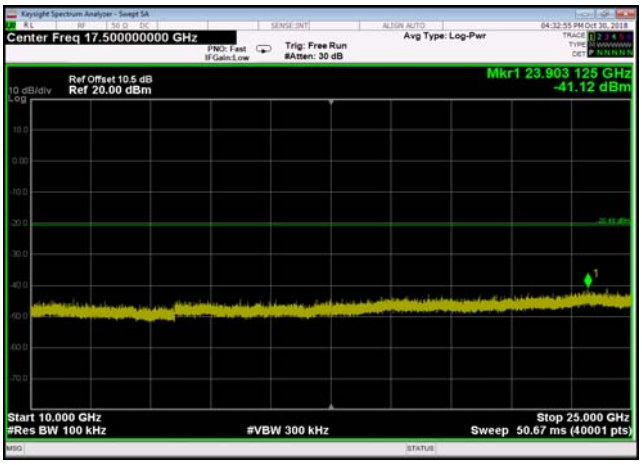
,Plot 4,2500MHz~10000MHz-802.11b ,2462MHz



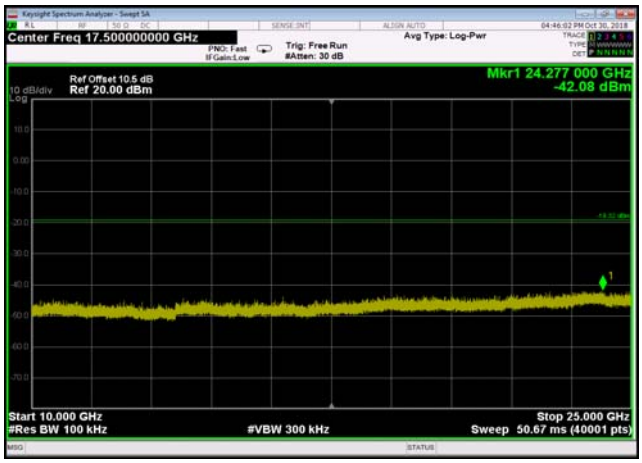
,Plot 5,10000MHz~25000MHz-802.11b ,2412MHz



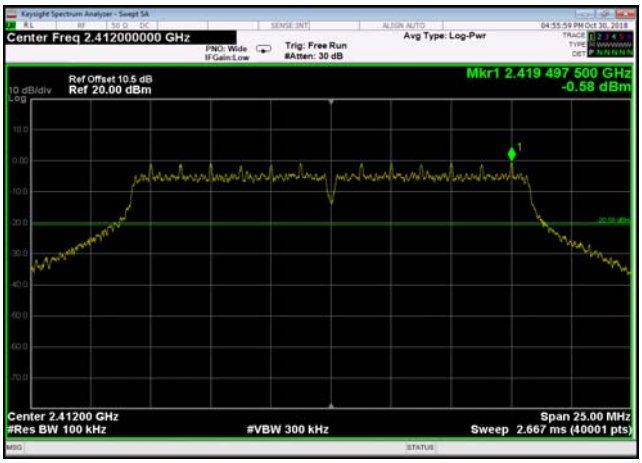
,Plot 5,10000MHz~25000MHz-802.11b ,2437MHz



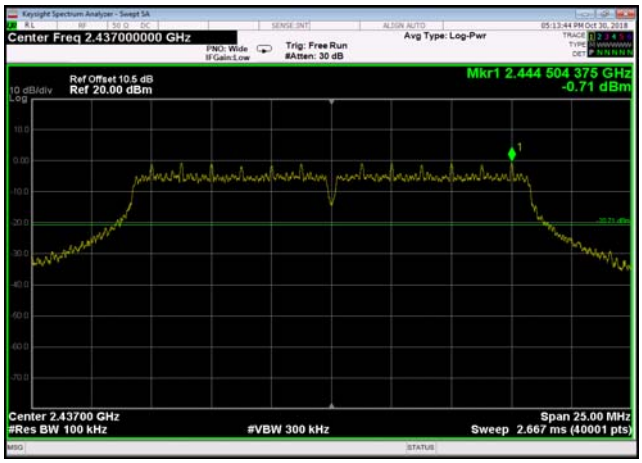
,Plot 5,10000MHz~25000MHz-802.11b ,2462MHz



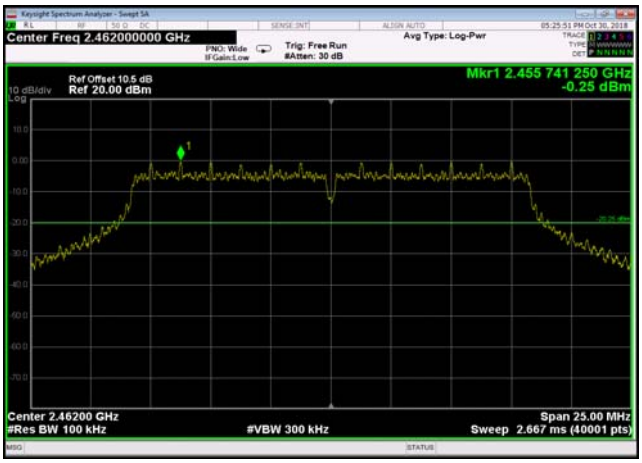
,Plot 1,Reference Level-802.11g ,2412MHz



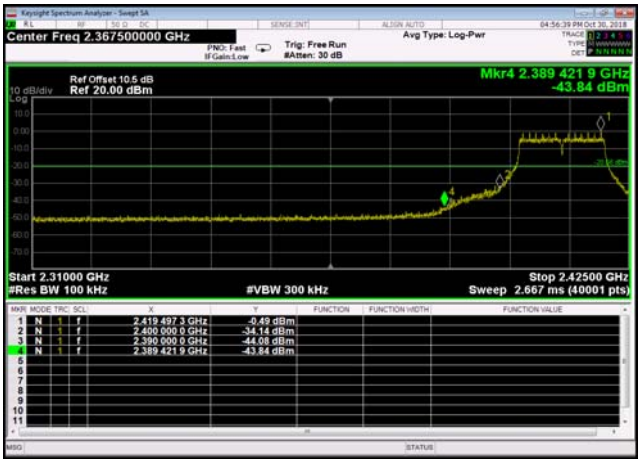
,Plot 1,Reference Level-802.11g ,2437MHz



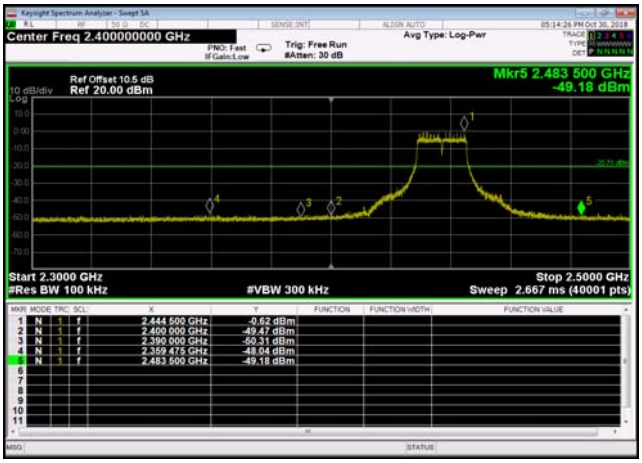
,Plot 1,Reference Level-802.11g ,2462MHz



,Plot 2,Band Edge-802.11g,2412MHz

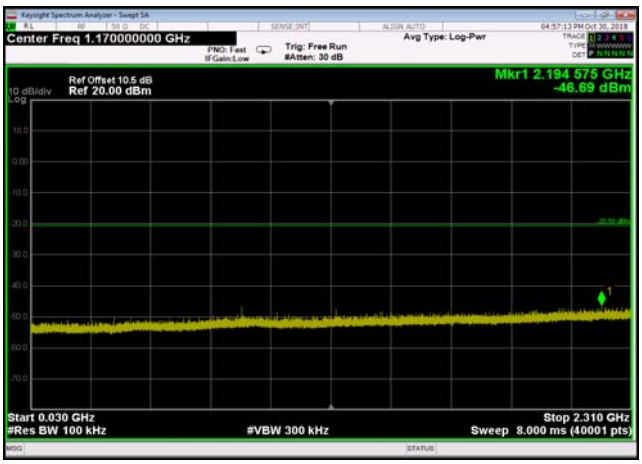


,Plot 2,Band Edge-802.11g,2437MHz

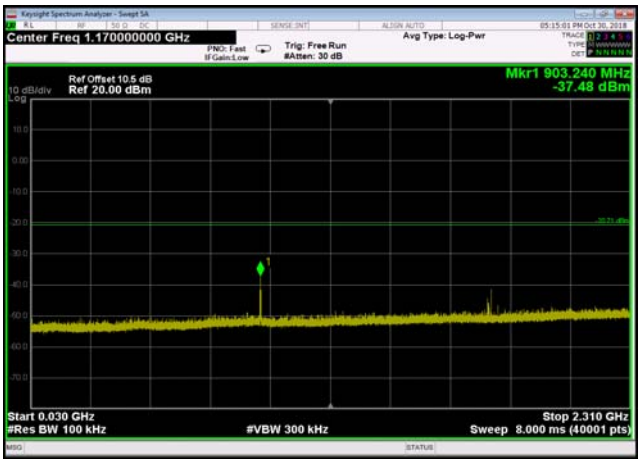


,Plot 2,Band Edge-802.11g,2462MHz

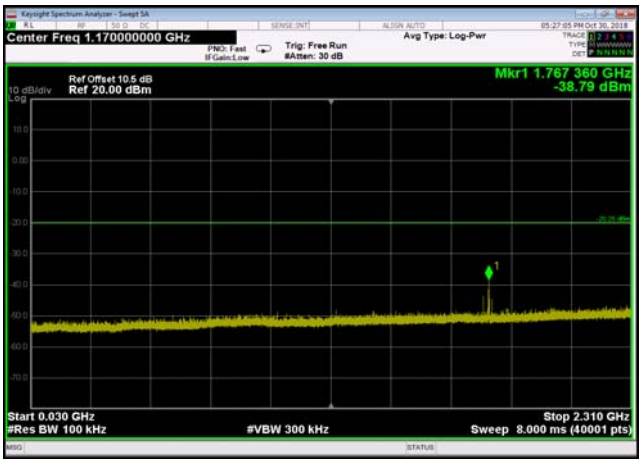
,Plot 3,30MHz~2310MHz-802.11g,2412MHz

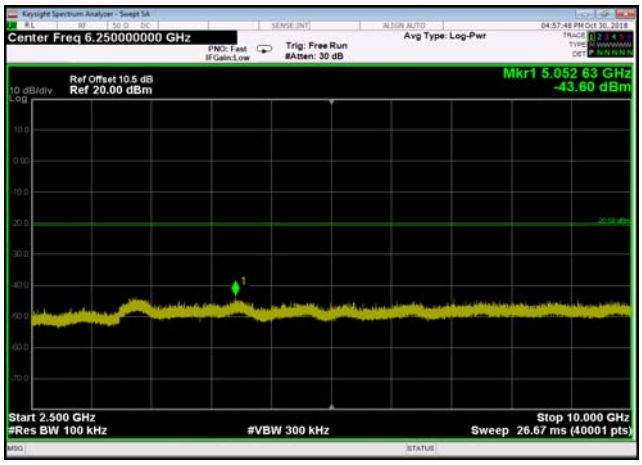
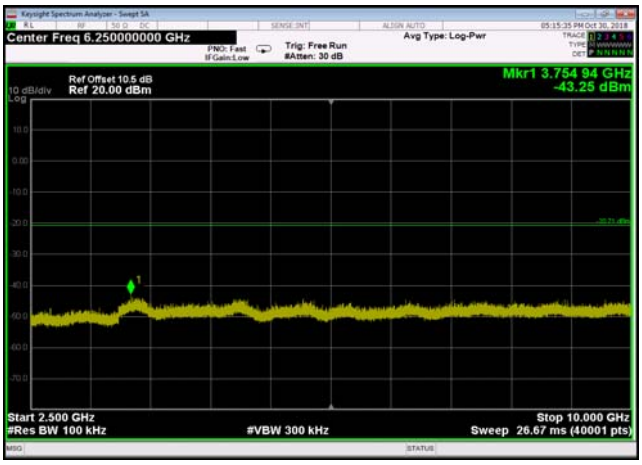
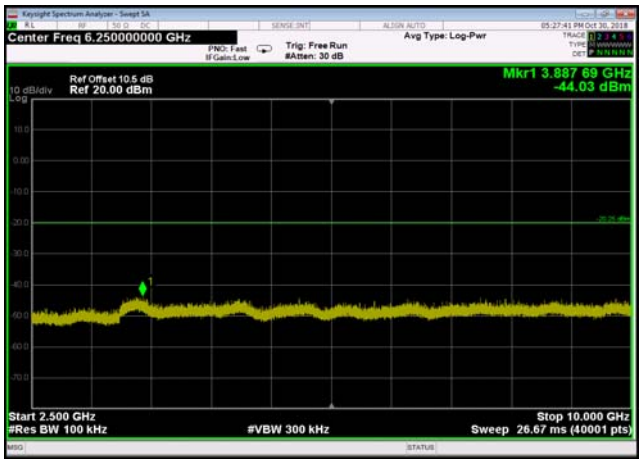
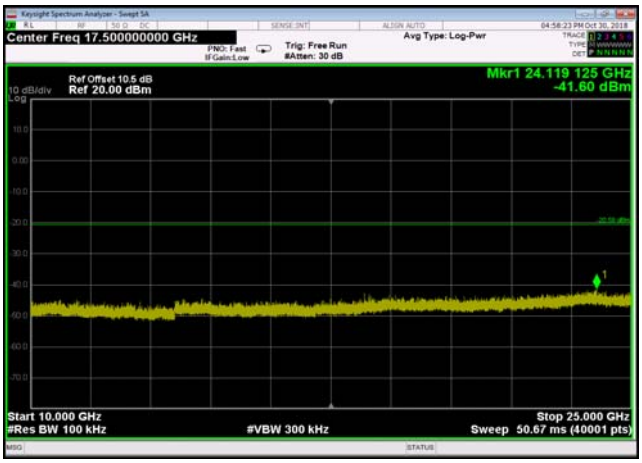
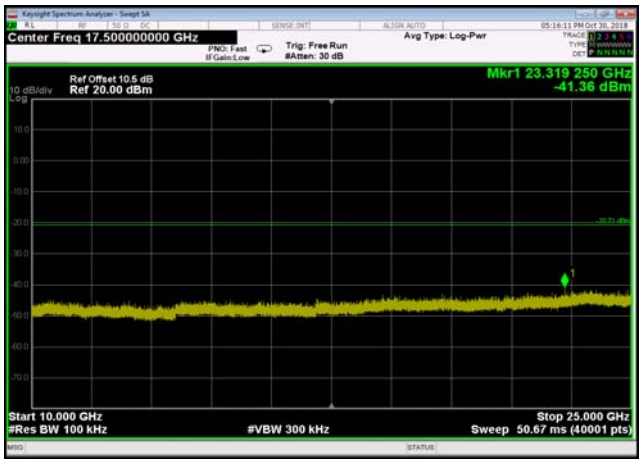
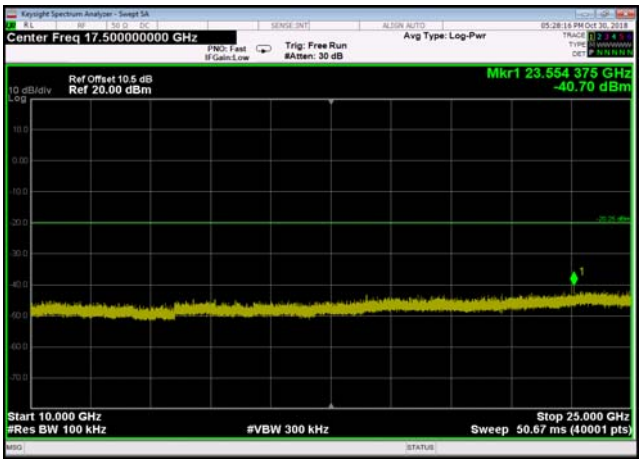


,Plot 3,30MHz~2310MHz-802.11g,2437MHz

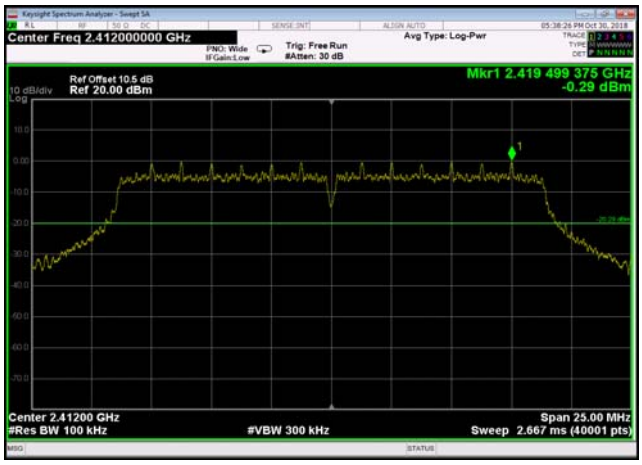


,Plot 3,30MHz~2310MHz-802.11g,2462MHz

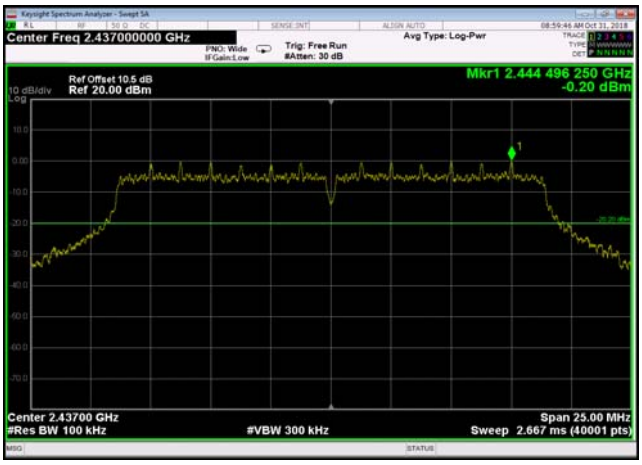


,Plot 4,2500MHz~10000MHz-802.11g ,2412MHz	,Plot 4,2500MHz~10000MHz-802.11g ,2437MHz
	
,Plot 4,2500MHz~10000MHz-802.11g ,2462MHz	,Plot 5,10000MHz~25000MHz-802.11g ,2412MHz
	
,Plot 5,10000MHz~25000MHz-802.11g ,2437MHz	,Plot 5,10000MHz~25000MHz-802.11g ,2462MHz
	

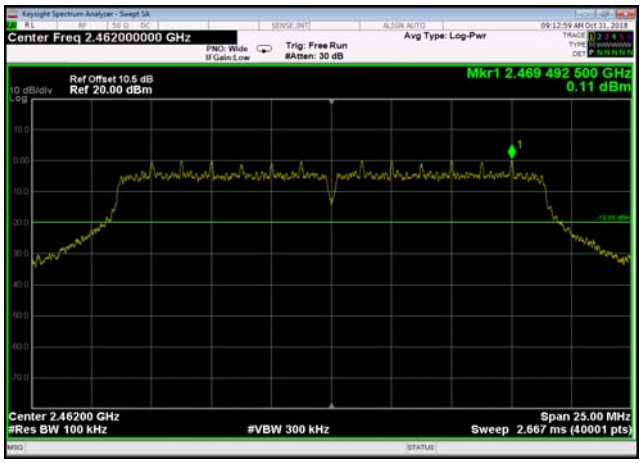
,Plot 1,Reference Level-802.11n(HT20) ,2412MHz



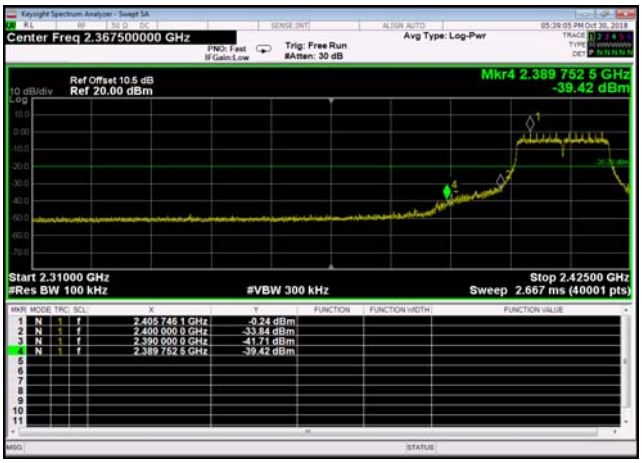
,Plot 1,Reference Level-802.11n(HT20) ,2437MHz



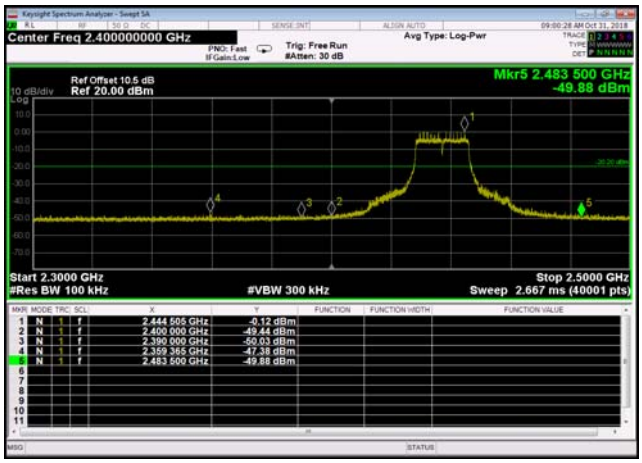
,Plot 1,Reference Level-802.11n(HT20) ,2462MHz



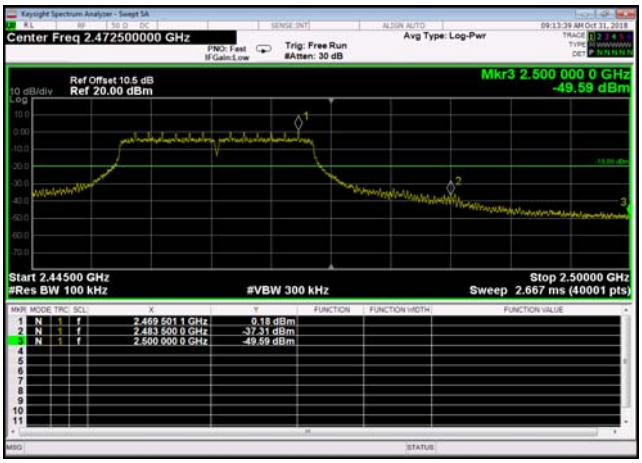
,Plot 2,Band Edge-802.11n(HT20) ,2412MHz



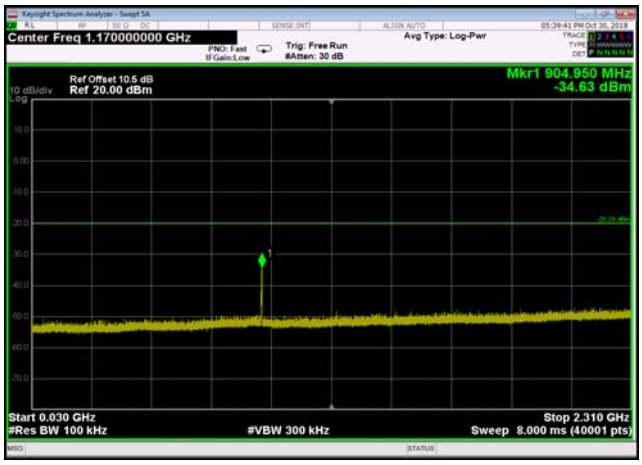
,Plot 2,Band Edge-802.11n(HT20) ,2437MHz



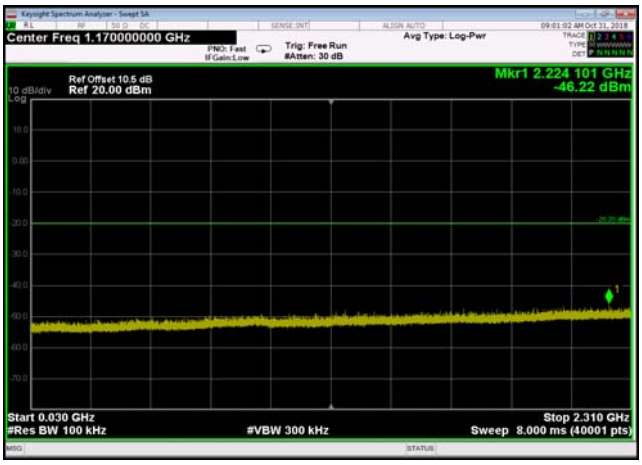
,Plot 2,Band Edge-802.11n(HT20) ,2462MHz



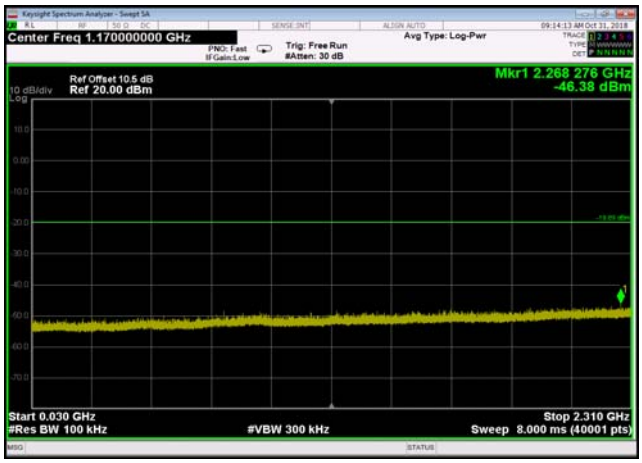
,Plot 3,30MHz~2310MHz-802.11n(HT20) ,2412MHz



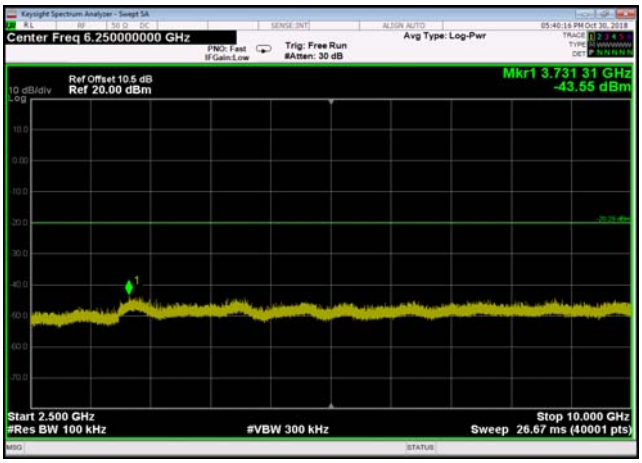
,Plot 3,30MHz~2310MHz-802.11n(HT20) ,2437MHz



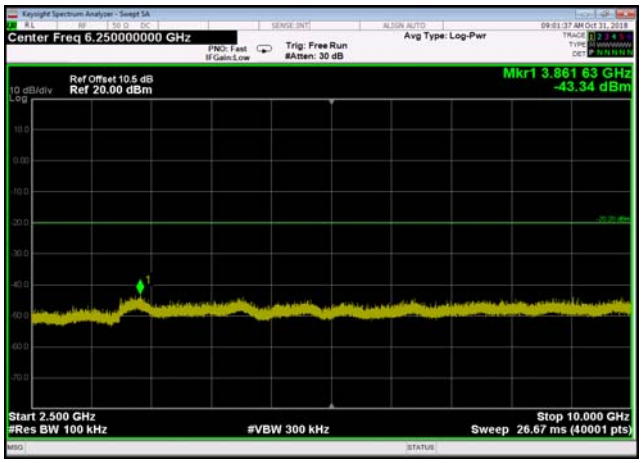
,Plot 3,30MHz~2310MHz-802.11n(HT20) ,2462MHz



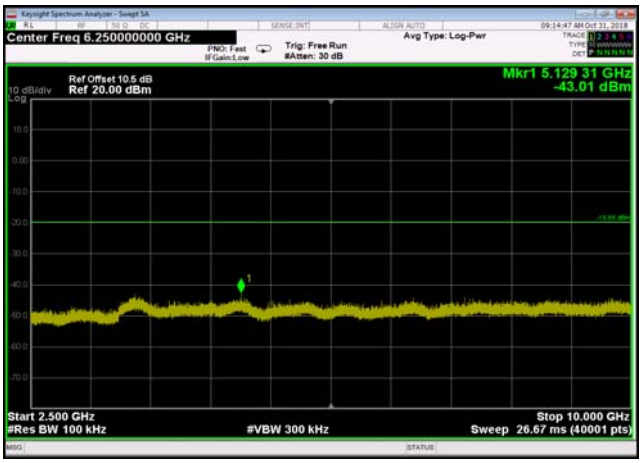
,Plot 4,2500MHz~10000MHz-802.11n(HT20),2412MHz



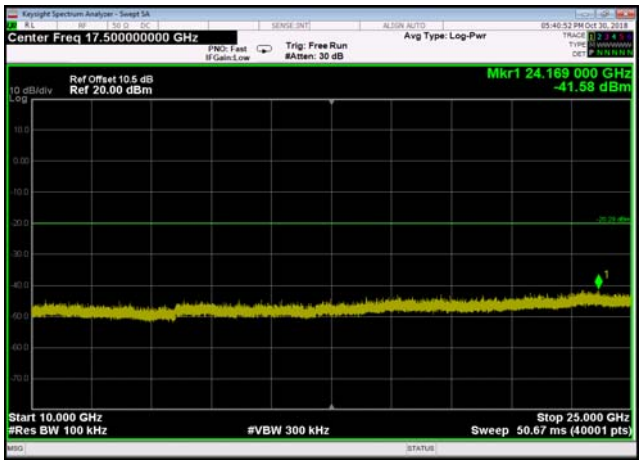
,Plot 4,2500MHz~10000MHz-802.11n(HT20),2437MHz



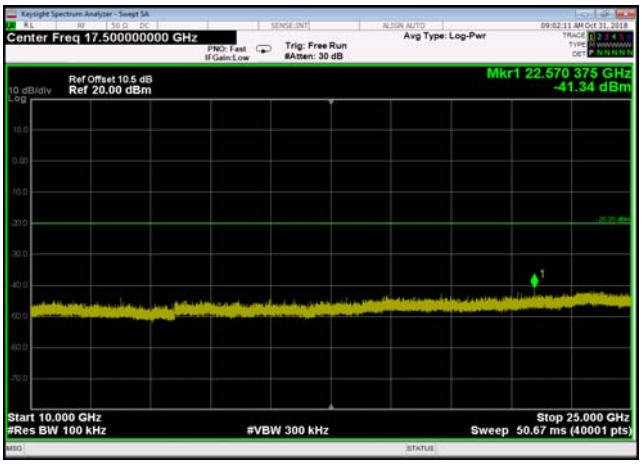
,Plot 4,2500MHz~10000MHz-802.11n(HT20),2462MHz



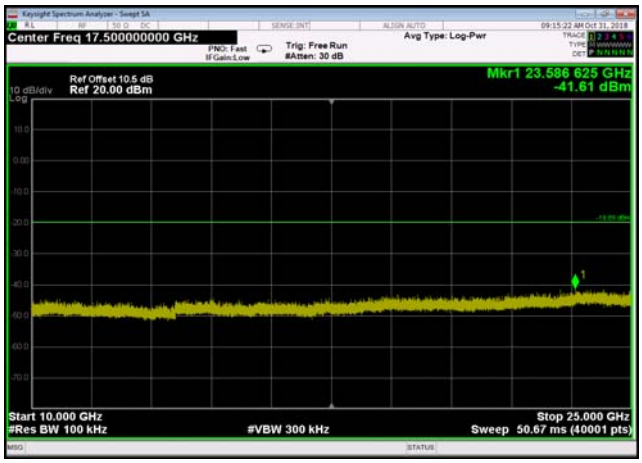
,Plot 5,10000MHz~25000MHz-802.11n(HT20),2412MHz



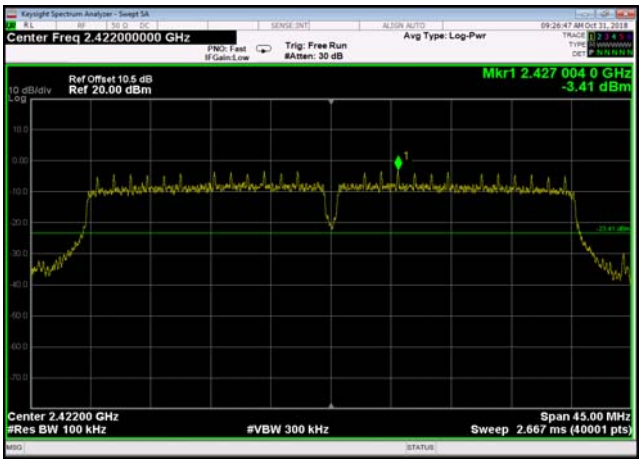
,Plot 5,10000MHz~25000MHz-802.11n(HT20),2437MHz



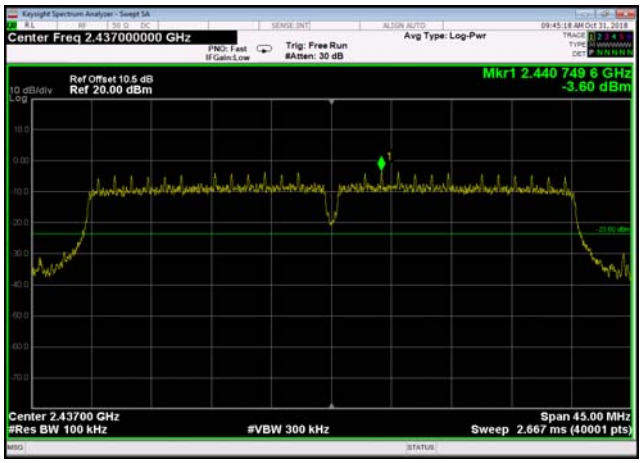
,Plot 5,10000MHz~25000MHz-802.11n(HT20),2462MHz



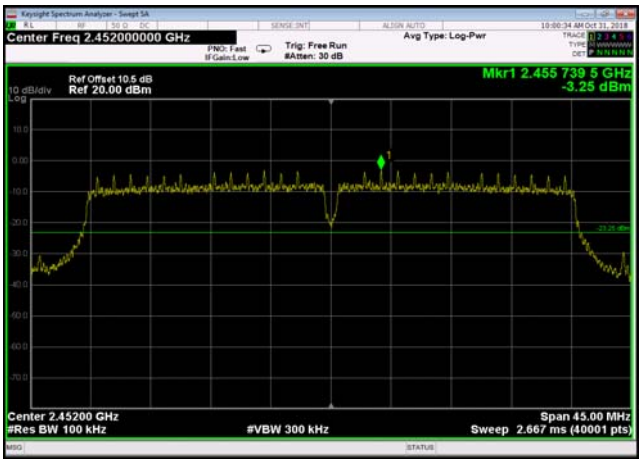
,Plot 1,Reference Level-802.11n(HT40),2422MHz



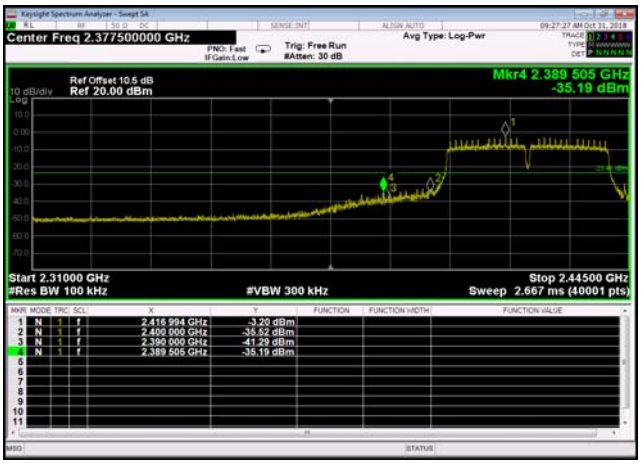
,Plot 1,Reference Level-802.11n(HT40),2437MHz



,Plot 1,Reference Level-802.11n(HT40),2452MHz

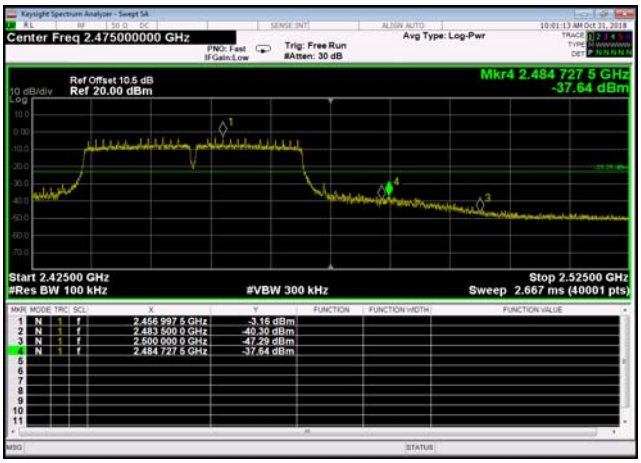


,Plot 2,Band Edge-802.11n(HT40)
,2422MHz

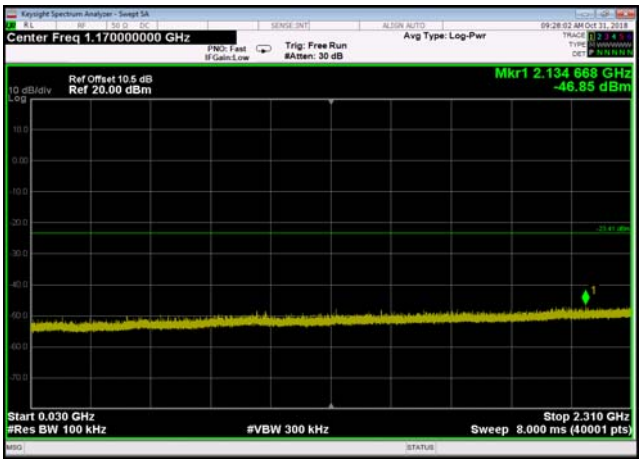


,Plot 2,Band Edge-802.11n(HT40)
,2437MHz

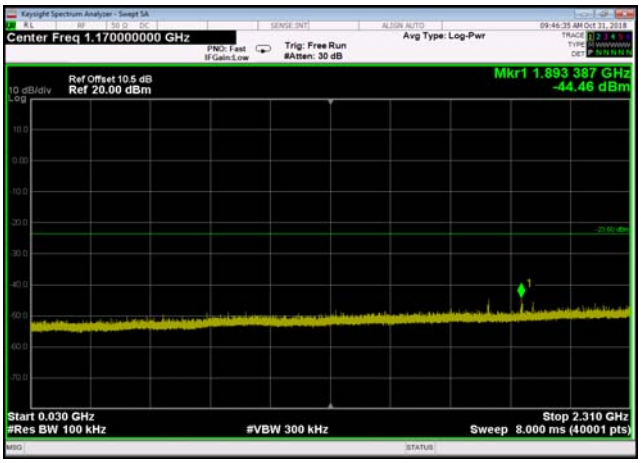
,Plot 2,Band Edge-802.11n(HT40)
,2452MHz



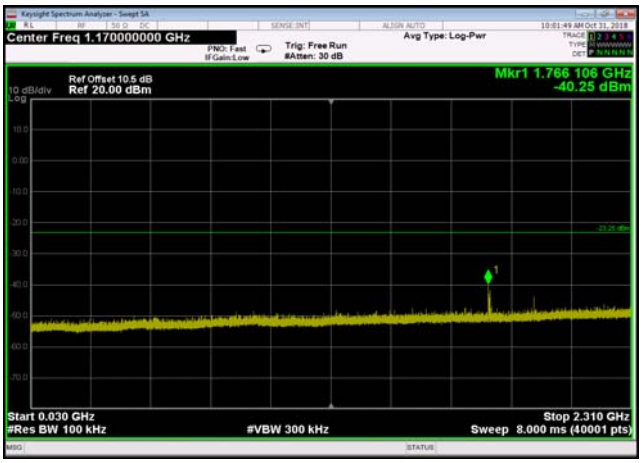
,Plot 3,30MHz~2310MHz-802.11n(HT40)
,2422MHz

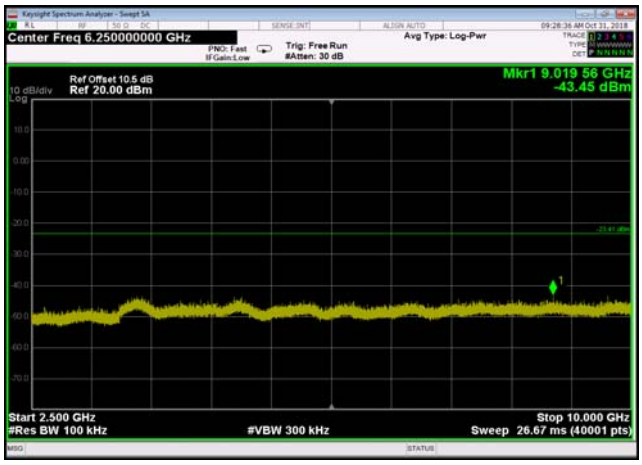
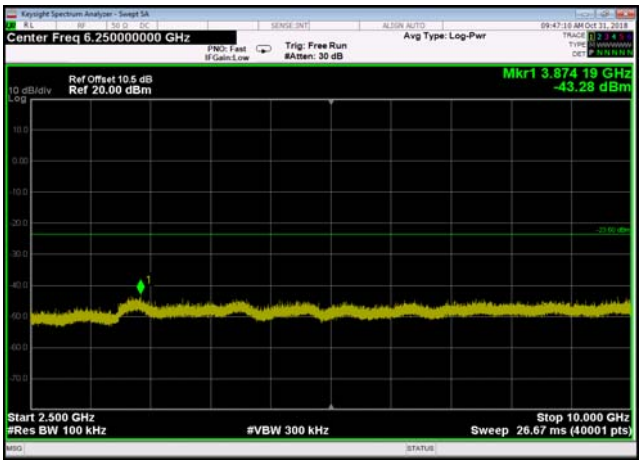
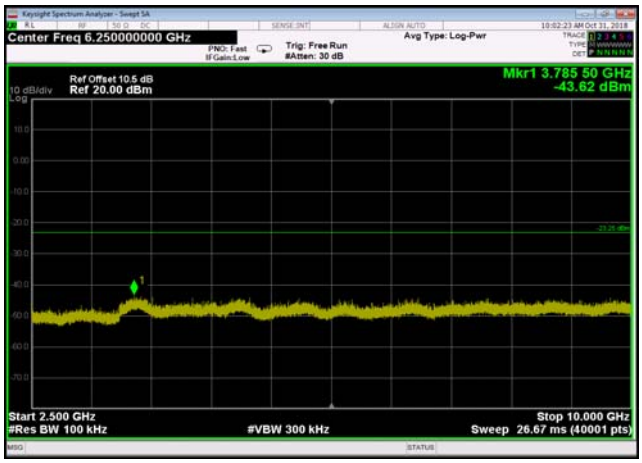
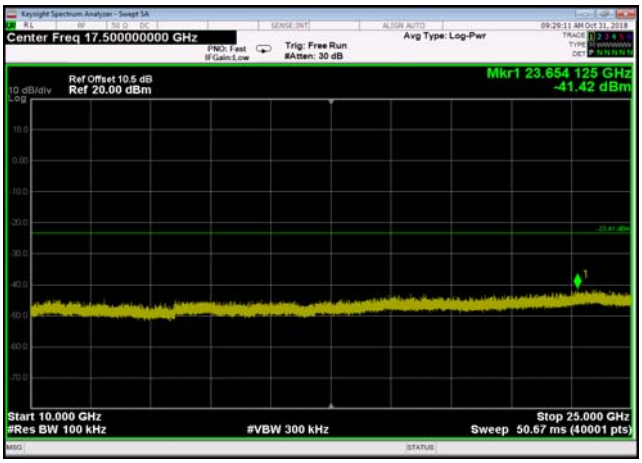
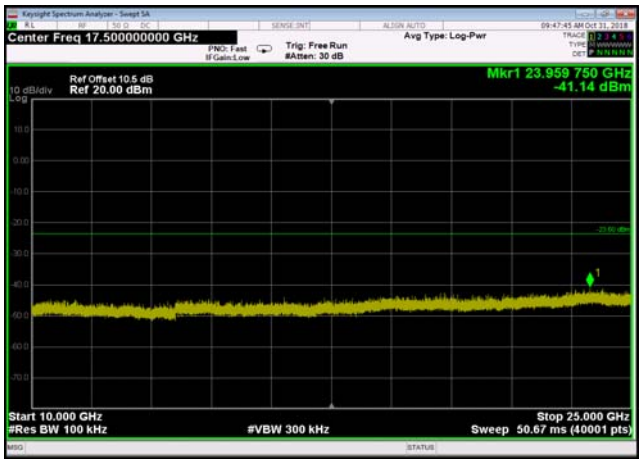
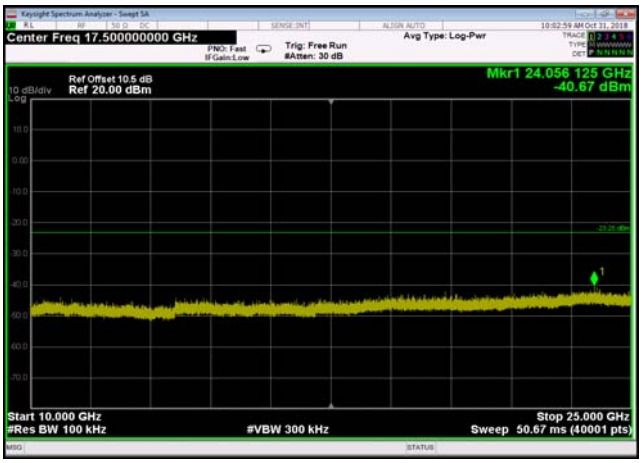


,Plot 3,30MHz~2310MHz-802.11n(HT40)
,2437MHz



,Plot 3,30MHz~2310MHz-802.11n(HT40)
,2452MHz



,Plot 4,2500MHz~10000MHz-802.11n(HT40),2422MHz	,Plot 4,2500MHz~10000MHz-802.11n(HT40),2437MHz
	
,Plot 4,2500MHz~10000MHz-802.11n(HT40),2452MHz	,Plot 5,10000MHz~25000MHz-802.11n(HT4 0),2422MHz
	
,Plot 5,10000MHz~25000MHz-802.11n(HT4 0),2437MHz	,Plot 5,10000MHz~25000MHz-802.11n(HT4 0),2452MHz
	

****END OF REPORT****