FCC/ISED RF TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

K2 Dual Core System

ISSUED TO
System Level Solutions Inc.

14100 Murphy Ave., San Martin, CA - 95046, United States.

Report No.:	BL-SZ1680264-603
EUT Type:	K2 Dual Core System
Model Name:	PI1WLDD000101
Brand Name:	K2DC
Test Standard:	47 CFR Part 15 Subpart C
	RSS-Gen (Issue 4, November 2014)
	RSS-247 (Issue 1, May 2015)
FCC ID:	2AHK5-PI1WLD101
ISED Number:	21180-PI1WLD101
Test conclusion:	Pass
Test Date:	Aug. 31, 2016 ~ Jan. 17, 2017
Date of Issue:	Mar. 13, 2017

Tested by: Cao Shaodong (Engineer)
Date: Mar. 13, 2017

Approved by: Wei Yanquan (Chief Engineer)
Date: Mar. 13, 2017

Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100, FAX: +86-755-61824271
Email: info@baluntek.com
www.baluntek.com

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Mar. 03, 2017	Initial Issue
Rev. 02	Mar. 13, 2017	Change the antenna connector photo.

TABLE OF CONTENTS

1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20 to 25℃
Ambient Relative Humidity	45% - 55%
Ambient Pressure	100 kPa - 102 kPa

1.4 Announce

(1) The test report reference to the report template version v5.3.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	System Level Solutions Inc.
Address	14100 Murphy Ave., San Martin, CA - 95046, United States.

2.2 Manufacturer Information

Manufacturer	System Level Solutions (India) Pvt. Ltd
Address	Plot#32, Zone-D/4, Phase-1, GIDC Estate, V.U. Nagar - 388 121, Gujarat, India.

2.3 Factory Information

Factory	Pronology Services (China) Inc.
Address	The Second Industrial Zone, Lou Village, Gongming Town, Guangming Dist., 518106, Shenzhen, Guangdong, China.

2.4 General Description for Equipment under Test (EUT)

EUT Type	K2 Dual Core System
Model Name Under Test	PI1WLDD000101
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	1B-01
Software Version	2.3.0
Dimensions (Approx.)	144mm x 55mm x 23 mm
Weight (Approx.)	0.098Kg
Network and Wireless connectivity	Bluetooth 3.0, Bluetooth 4.0 Low Energy (BLE), WIFI 802.11b, 802.11g and 802.11n (HT20)

2.5 Ancillary Equipment

Ancillary Equipment 1	HDMI Cable	
	Length (Approx.)	30 cm
Ancillary Equipment 2	USB Cable	
	Length (Approx.)	103 cm
Ancillary Equipment 3	Ycable	
	Length (Approx.)	104 cm

2.6 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

TX/ RX Operating Range	802.11b/g/n(20 MHz): 2.412 GHz - 2.462 GHz f_c = 2412 MHz + (N-1)*5 MHz, where - f_c = “Operating Frequency” in MHz, - N = “Channel Number” with the range from 1 to 11.
Modulation Type	DSSS, OFDM
Product Type	Mobile and portable
Antenna System (eg., MIMO, Smart Antenna)	N/A
Categorization as Correlated or Completely Uncorrelated	N/A
Antenna Type	Dipole Antenna
Antenna Gain	3 dBi(All involve the antenna gain test item, has been included in the final results)
Antenna System(MIMO Smart Antenna)	N/A
About the Product	The equipment is K2 Dual Core System, it contains WIFI and Bluetooth Modules operating at 2.4 GHz ISM band.

Modulation technology	Modulation Type	Transfer Rate (Mbps)
DSSS (802.11b)	DBPSK	1
	DQPSK	2
	CCK	5.5/ 11
OFDM (802.11g)	BPSK	6 / 9
	QPSK	12 / 18
	16QAM	24 / 36
	64QAM	48 / 54
OFDM (802.11n-20MHz)	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65

Note: Preliminary tests were performed in different data rate in above table 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.

Test Items	Mode	Data Rate	Channel
Output Power	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11
6dB Bandwidth	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11
Conducted Spurious Emission	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11
Conducted Emission	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11
Radiated Spurious Emission	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11
Band Edge	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11
Power spectral density (PSD)	11b/11g/11n20	1/6/6.5/13.5 Mbps	1/6/11

Note: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.7 Additional Instructions

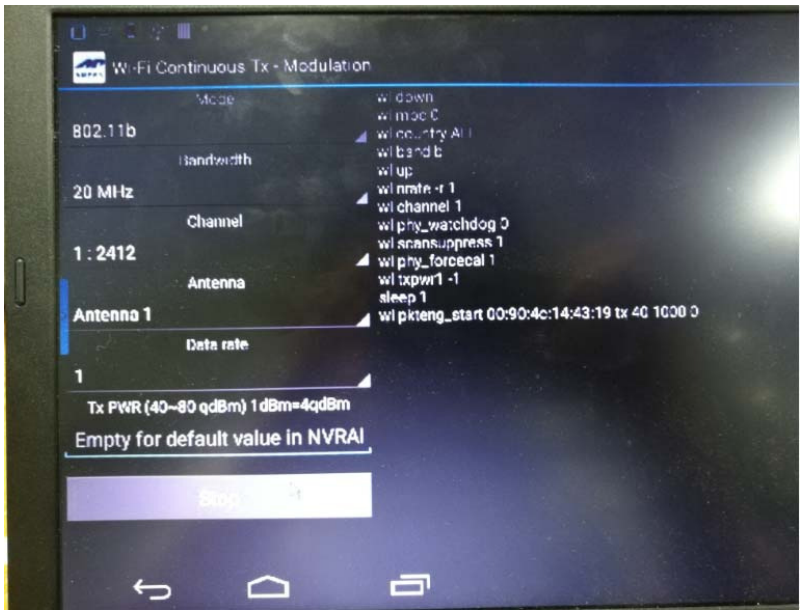
EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

During testing. Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power level setup in software		
Test Software Version	Total control	
Mode	Channel	Soft Set
802.11 b	All	53
802.11 g	All	53
802.11 n20	All	53

Run software:



3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (10-1-15 Edition)	Miscellaneous Wireless Communications Services
2	KDB Publication 558074 D01v03r05	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
3	RSS-Gen (Issue 4, Nov. 2014)	General Requirements for Compliance of Radio Apparatus
4	RSS-247 (Issue 1, May 2015)	Digital Transmission Systems (DTSs), Frequency Hopping Systems(FHSs) and Licence-Exemp Local Area Network (LE-LAN) Devices
5	ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC PART No.	ISED Part No.	Test Result	Verdict
1	Antenna Requirement	15.203; 15.247(b)	RSS-247, 5.4 (6)	N/A	Pass Note 1
2	Output Power	15.247(b)	RSS-247, 5.4 (4)	ANNEX A.1	Pass
3	6dB Bandwidth	15.247(a)	RSS-GEN, 6.6; RSS-247, 5.2 (1)	ANNEX A.2	Pass
4	Conducted Spurious Emission	15.247(d)	RSS-247, 5.5	ANNEX A.3	Pass
5	Band Edge(Authorized-band band-edge)	5.209; 15.247(d)	RSS-GEN, 8.9; RSS-247, 5.5	ANNEX A.4	Pass
6	Conducted Emission	15.207	RSS-GEN, 8.8	ANNEX A.5	Pass
7	Radiated Spurious Emission	15.209; 15.247(d)	RSS-247, 5.5	ANNEX A.6	Pass
8	Band Edge(Restricted-band band-edge)	15.209; 15.247(d)	RSS-247, 5.5	ANNEX A.7	Pass
9	Power spectral density (PSD)	15.247(e)	RSS-247, 5.2 (2)	ANNEX A.8	Pass
10	Receiver Spurious Emissions	N/A	RSS-Gen, 7.1.2	N/A	N/A Note 2
Note 1: Please refer to section 5.1 Note 2: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.					

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	45% - 55%	
Atmospheric Pressure	100 kPa - 102 kPa	
Temperature	NT (Normal Temperature)	+22℃ to +25℃
Working Voltage of the EUT	NV (Normal Voltage)	5 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2016.07.13	2017.07.12
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2016.07.13	2017.07.12
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2016.09.09	2017.09.08
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04
LISN	SCHWARZBECK	NSLK 8127	8127-687	2016.07.05	2017.07.04
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2016.07.13	2017.07.12
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2016.07.13	2017.07.12
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2016.07.13	2017.07.12
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2016.07.13	2017.07.12
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2015.07.22	2017.07.21
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21
Test Antenna-Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2015.07.22	2017.07.21
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2015.02.28	2017.02.27
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2016.08.09	2018.08.08
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Power Amplifier	OPHIR RF	5225F	1037	2017.02.17	2018.02.16
Power Amplifier	OPHIR RF	5273F	1016	2017.02.17	2018.02.16

4.3 MEASUREMENT UNCERTAINTY

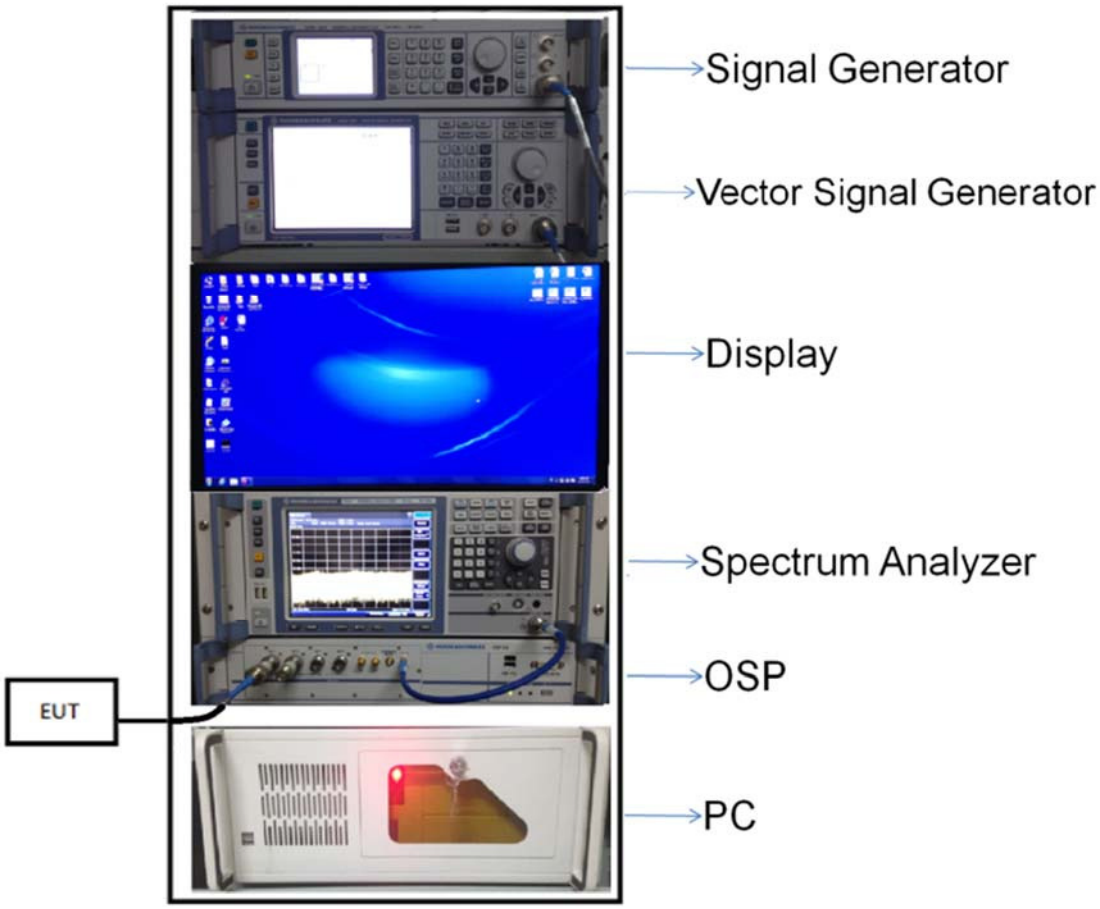
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

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

Measurement	Value
Occupied Channel Bandwidth	±4%
RF output power, conducted	±1.4 dB
Power Spectral Density, conducted	±2.5 dB
Unwanted Emissions, conducted	±2.8 dB
All emissions, radiated	±5.4 dB
Temperature	±1°C
Humidity	±4%

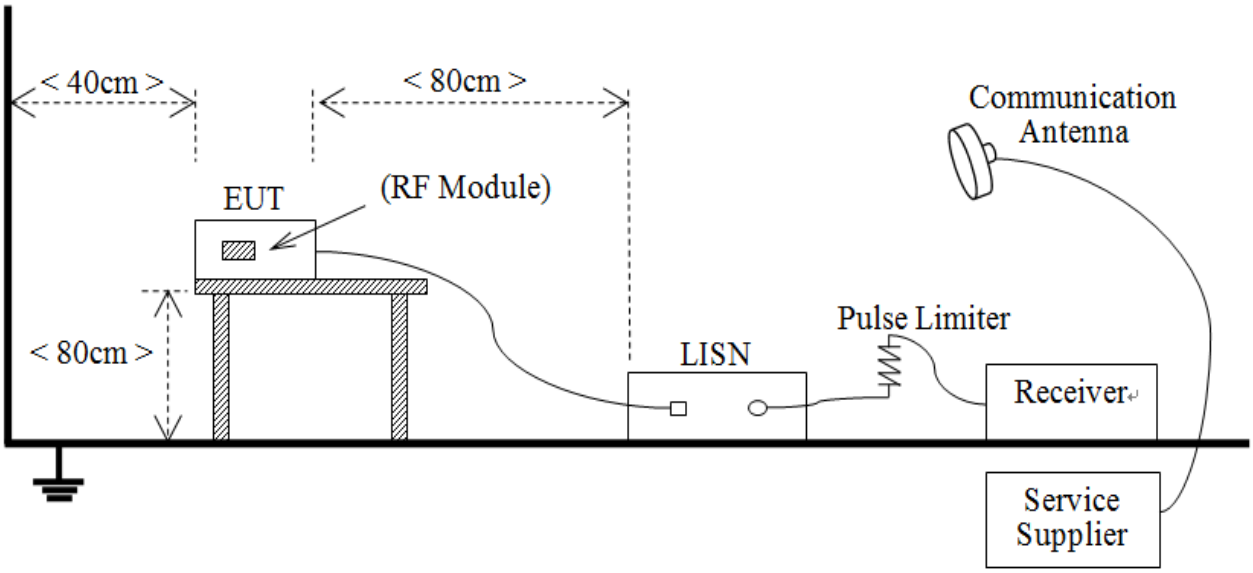
4.4 Description of Test Setup

4.4.1 For Antenna Port Test



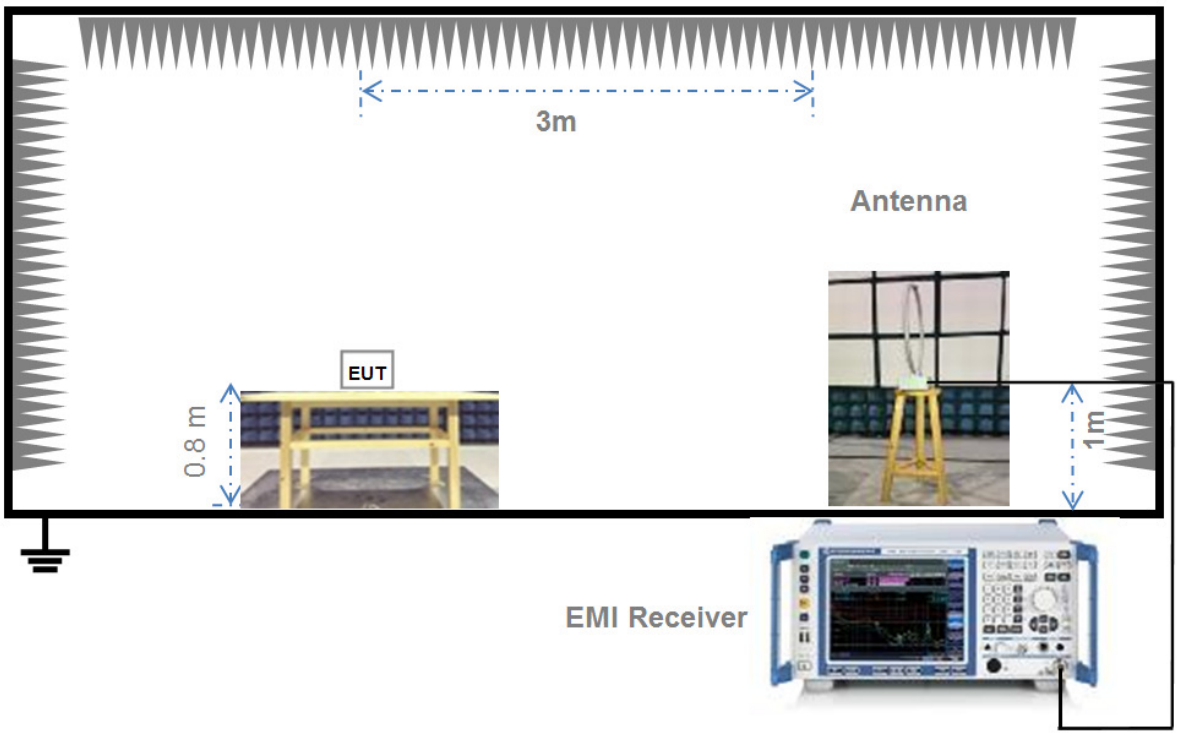
(Diagram 1)

4.4.2 For AC Power Supply Port Test



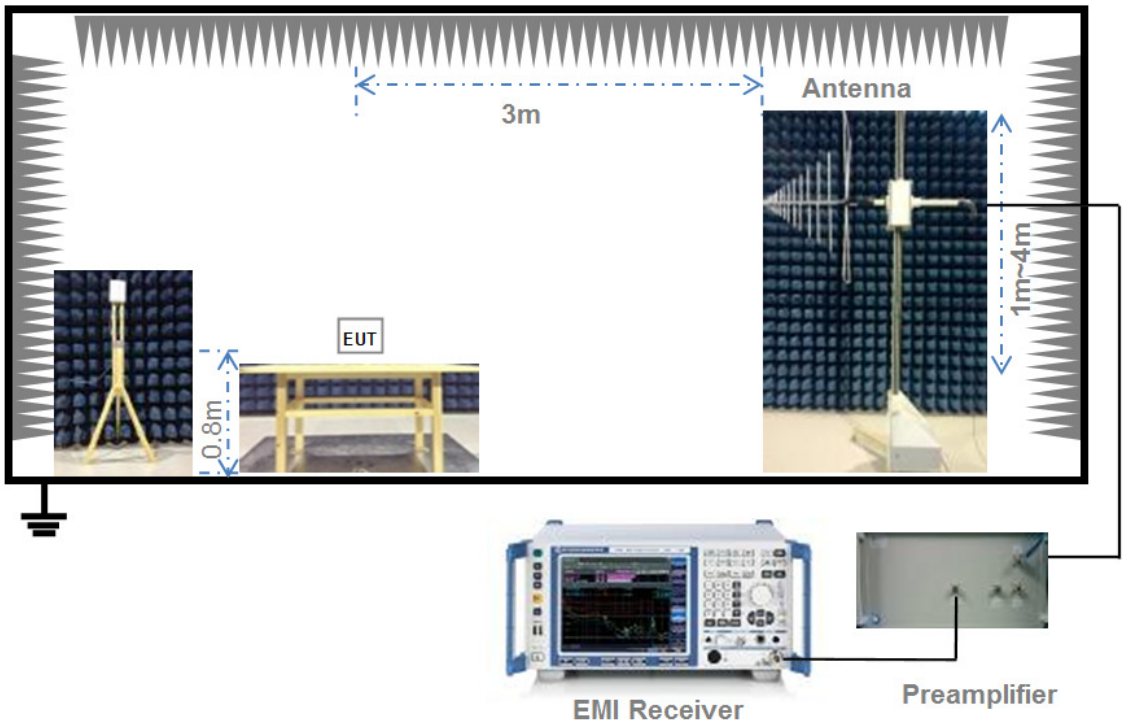
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



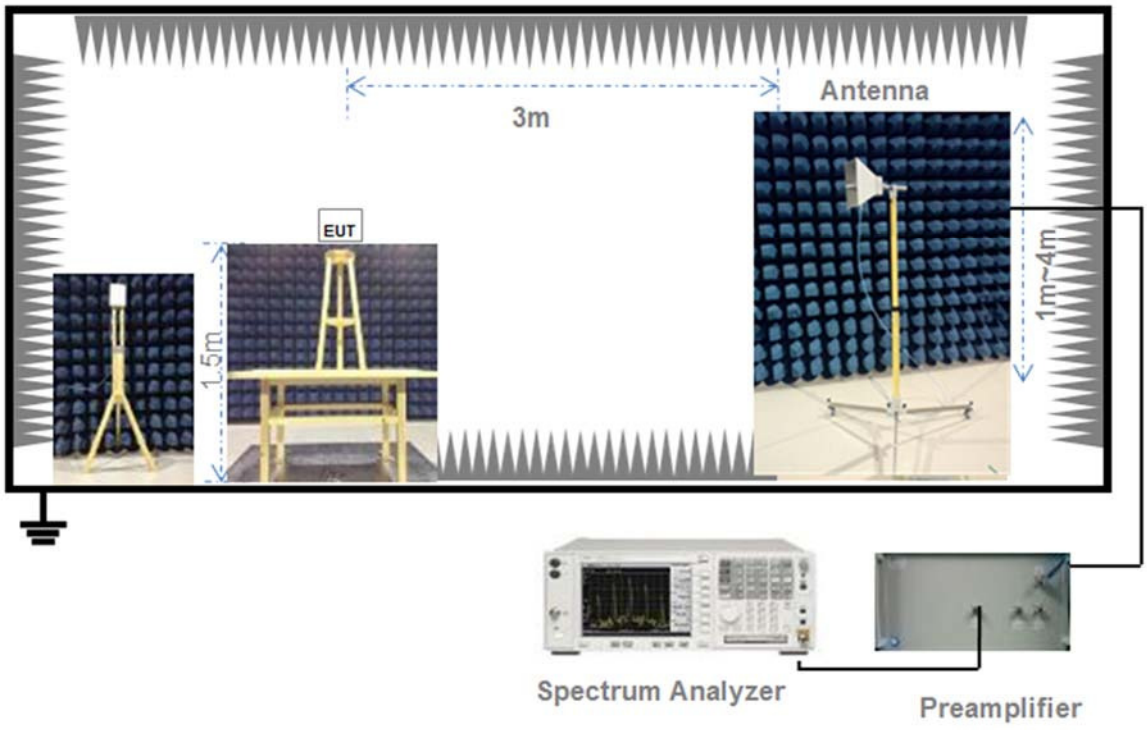
(Diagram 3)

4.4.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.4.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.5 Measurement Results Explanation Example

4.5.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.

4.5.2 For radiated band edges and spurious emission test:

E = EIRP – 20log D + 104.8

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

EIRP= Measure Conducted output power Value (dBm) + Maximum transmit antenna gain (dBi) + the appropriate maximum ground reflection factor (dB)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Standard Applicable

FCC §15.203 & 15.247(b); RSS-247, 5.4 (6)

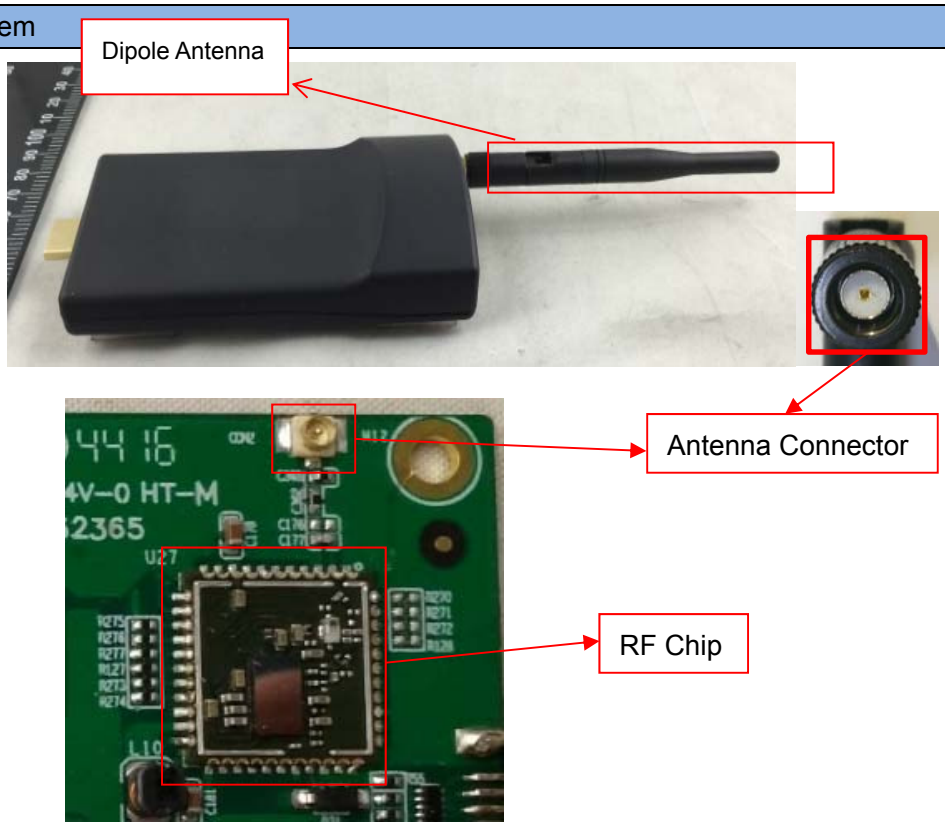
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
Compliance with 15.203, use of a standard antenna jack or electrical connector is prohibited.	The antenna is the unique connector with a dipole antenna.

Reference Documents	Item
Photo	

5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Output Power

5.2.1 Test Limit

FCC § 15.247(b); RSS-247, 5.4 (4)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements.

5.2.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Maximum peak conducted output power

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 and shall utilize a fast-responding diode detector.

Maximum conducted (average) output power (Reporting Only)

a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed

using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

1) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.

2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.

3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a

factor of five.

b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as

described in Section 6.0.

c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

d) Adjust the measurement in dBm by adding 10log (1/x), where x is the duty cycle to the measurement result.

Measurements of duty cycle

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.

Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.

Set VBW ≥ RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 6dB Bandwidth

5.3.1 Limit

FCC §15.247(a); RSS-GEN, 6.6

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.

5.3.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Use the following spectrum analyzer settings:

Set RBW = 100 kHz.

Set the video bandwidth (VBW) ≥ 3 RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

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.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Conducted Spurious Emission

5.4.1 Limit

FCC §15.247(d); RSS-247, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, based on either an RF conducted or a radiated measurement.

5.4.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required.

The following procedures shall be used to demonstrate compliance to these limits. Note that these procedures can be used in either an antenna-port conducted or radiated test set-up. Radiated tests must conform to the test site requirements and utilize maximization procedures defined herein.

Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to ≥ 1.5 times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW ≥ 3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.

Emission level measurement

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

Set the RBW = 100 kHz.

Set the VBW ⩾ 3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

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.

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Band Edge (Authorized-band band-edge)

5.5.1 Limit

FCC §15.247(d); RSS-GEN, 8.9, RSS-247, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, based on either an RF conducted or a radiated measurement.

5.5.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The following procedures may be used to determine the peak or average field strength or power of an unwanted emission that is within 2 MHz of the authorized band edge. If a peak detector is utilized, use the procedure described in 13.2.1. Use the procedure described in 13.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., duty cycle $\geqslant$ 98%). Use the procedure described in 13.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent). Use the procedure described in 13.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2 percent).

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used.

Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

Set span to 2 MHz

RBW = 100 kHz.

VBW $\geqslant$ 3 x RBW.

Detector = peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweep to continue until the trace stabilizes (required measurement time may increase for low duty cycle applications)

Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission ± 0.5 MHz.

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Conducted Emission

5.6.1 Limit

FCC §15.207; RSS-GEN, 8.8

For an intentional radiator 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 within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

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

5.6.2 Test Setup

See section 4.4.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.
Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.6.4 Test Result

Please refer to ANNEX A.5.

5.7 Radiated Spurious Emission

5.7.1 Limit

FCC §15.209&15.247(c); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

Note:

1. Field Strength (dBμV/m) = 20*log[Field Strength (μV/m)].
2. In the emission tables above, the tighter limit applies at the band edges.
3. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
4. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.7.2 Test Setup

See section 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz

VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Band Edge (Restricted-band band-edge)

5.8.1 Limit

FCC §15.209&15.247(c); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

5.8.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.8.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Power Spectral density (PSD)

5.9.1 Limit

FCC §15.247(d); RSS-247, 5.2 (2)

The same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

5.9.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz $\leqslant$ RBW $\leqslant$ 100 kHz.

Set the VBW $\geqslant$ 3 RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.9.4 Test Result

Please refer to ANNEX A.8.

ANNEX A TEST RESULT

A.1 Output Power

Duty Cycle

Test Mode	Duty Cycle	T (ms)	1/T(kHz)
802.11b	1.000	0.640	1.563
802.11g	0.948	1.358	0.736
802.11n-20 MHz	0.842	1.293	0.773

Peak Power Test Data

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.19	41.59	30	1000	Pass
Middle	16.11	40.83			Pass
High	16.54	45.08			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	15.54	35.81	30	1000	Pass
Middle	15.76	37.67			Pass
High	15.39	34.59			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.16	26.06	30	1000	Pass
Middle	14.49	28.12			Pass
High	14.26	26.67			Pass

A.2 Bandwidth

Test Data

802.11b Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	8.589	13.955	⩾500
Middle	9.045	13.942	⩾500
High	8.562	13.937	⩾500

802.11g Mode:

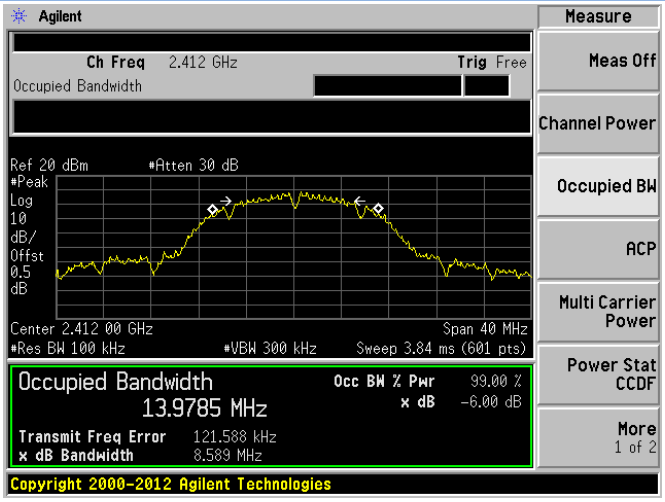
Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	16.077	17.451	⩾500
Middle	15.867	17.408	⩾500
High	15.600	17.307	⩾500

802.11n-20MHz Mode:

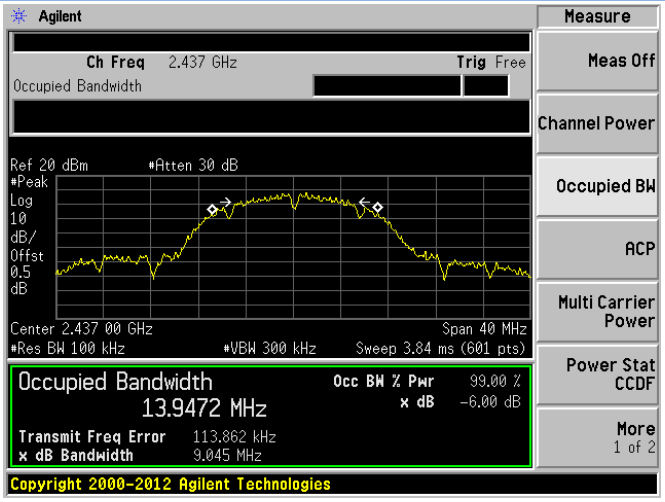
Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	15.971	18.381	⩾500
Middle	17.575	18.247	⩾500
High	15.527	18.338	⩾500

Test plots (6dB Bandwidth)

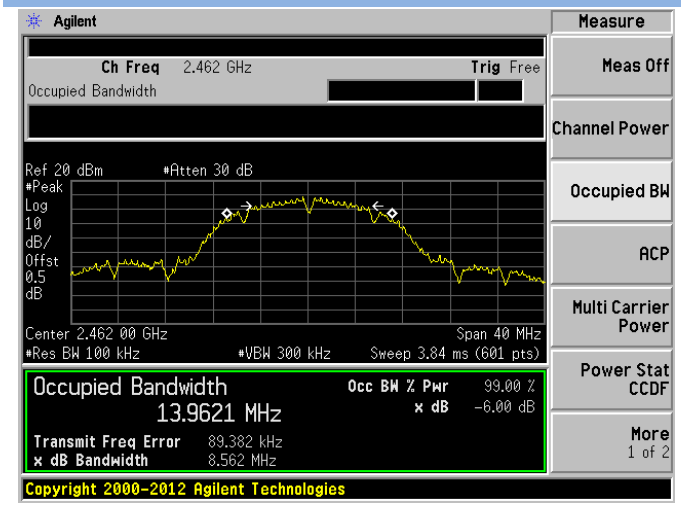
802.11b LOW CHANNEL



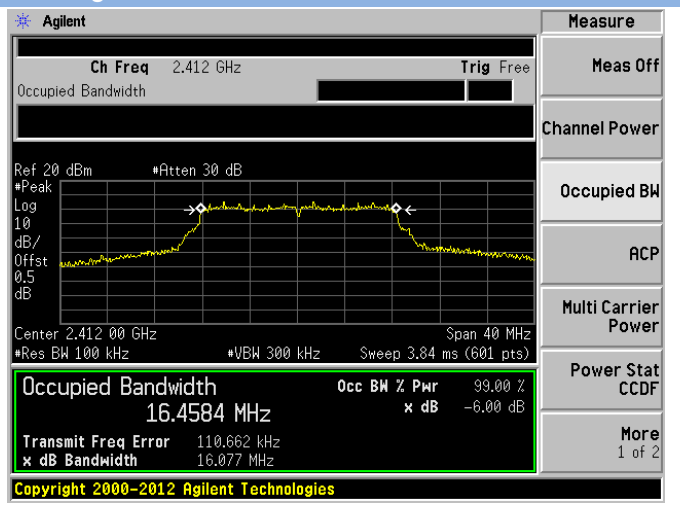
802.11b MIDDLE CHANNEL



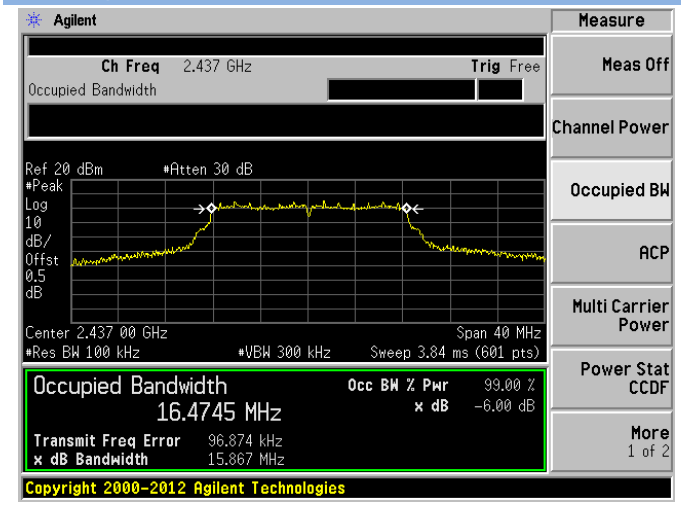
802.11b HIGH CHANNEL



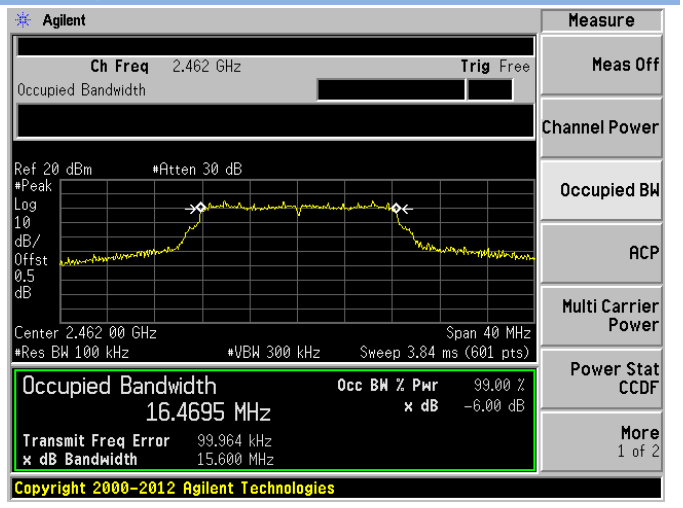
802.11g LOW CHANNEL



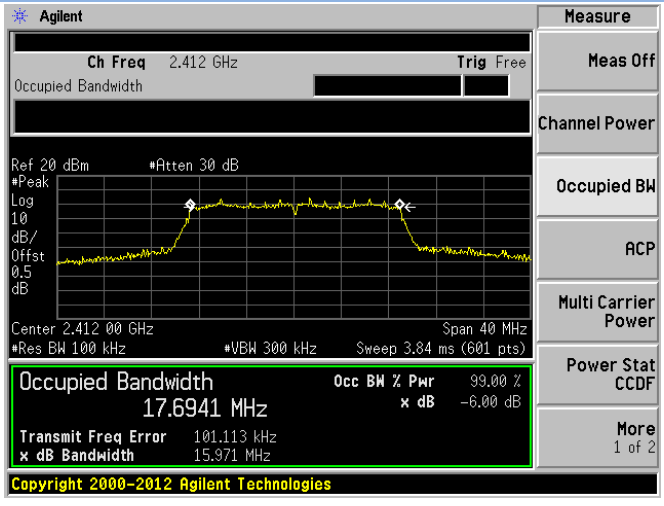
802.11g MIDDLE CHANNEL



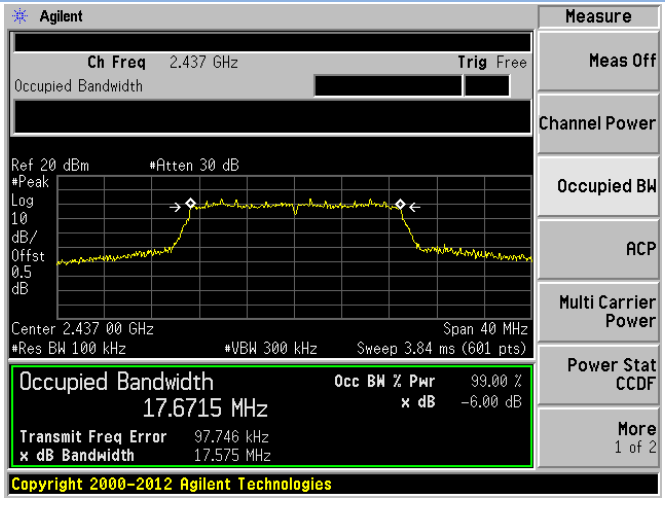
802.11g HIGH CHANNEL



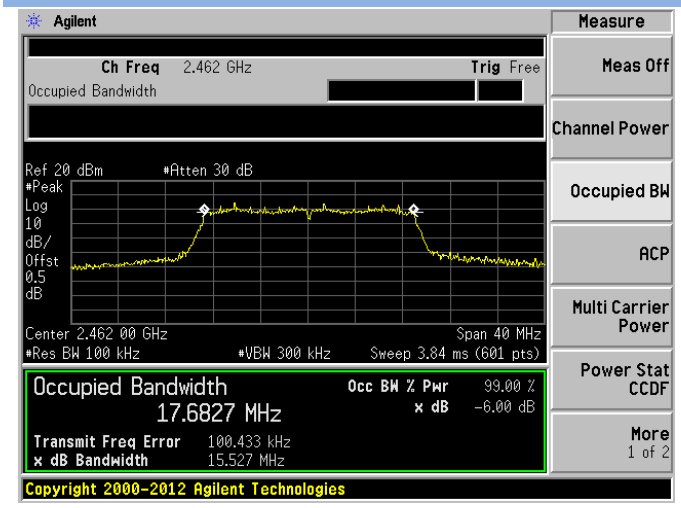
802.11n-20 MHz LOW CHANNEL



802.11 n-20 MHz MIDDLE CHANNEL

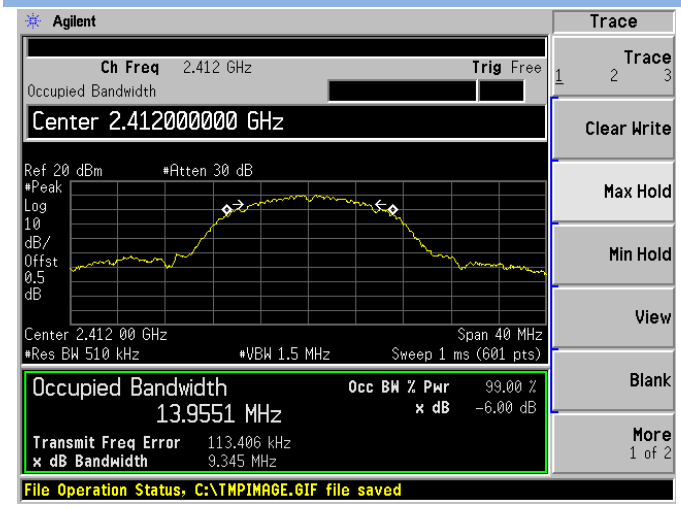


802.11n-20 MHz HIGH CHANNEL

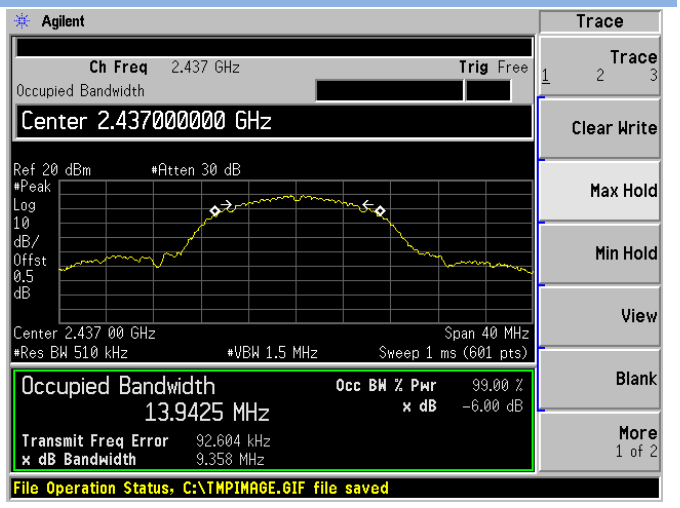


Test plots (99% Bandwidth)

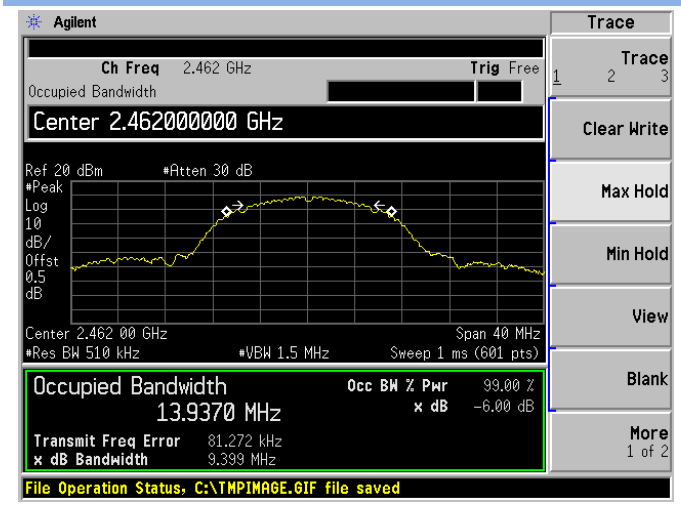
802.11b LOW CHANNEL



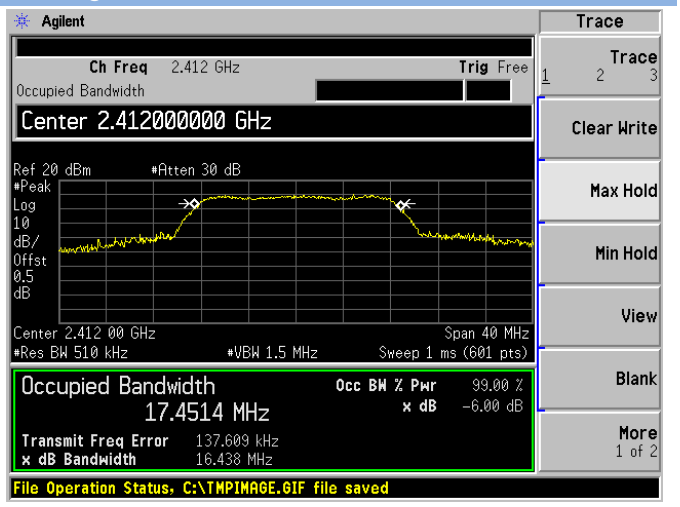
802.11b MIDDLE CHANNEL



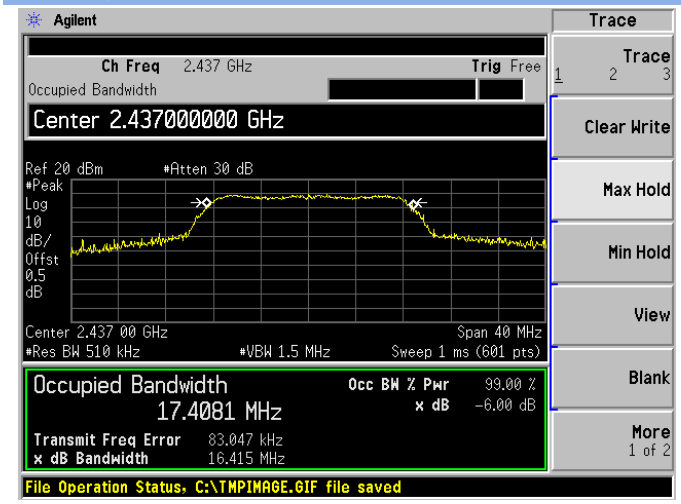
802.11b HIGH CHANNEL



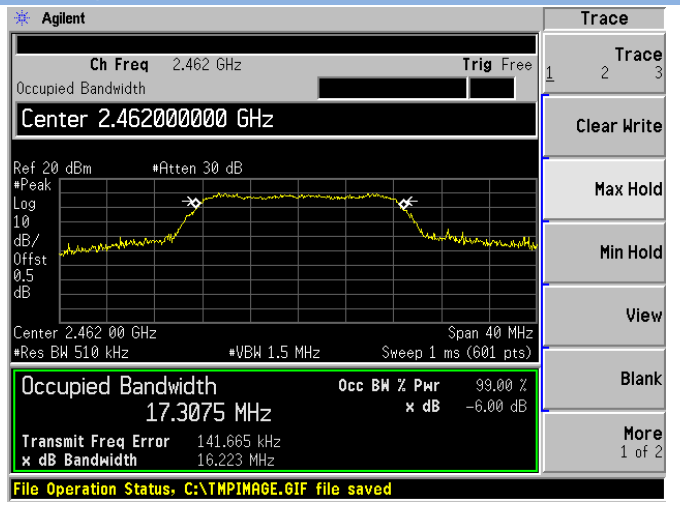
802.11g LOW CHANNEL



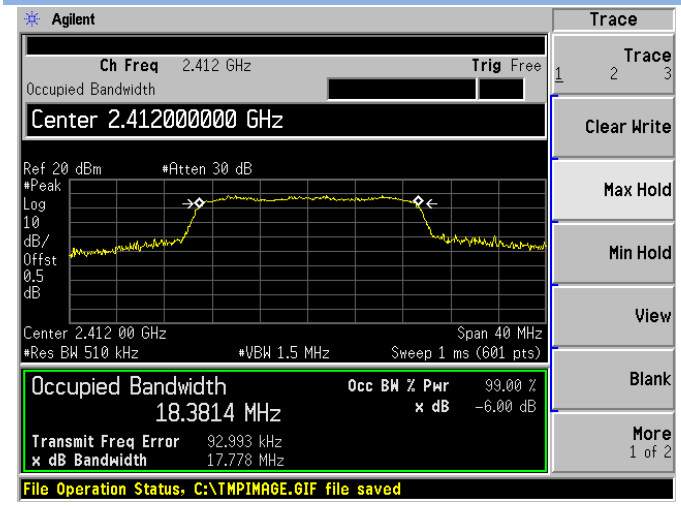
802.11g MIDDLE CHANNEL



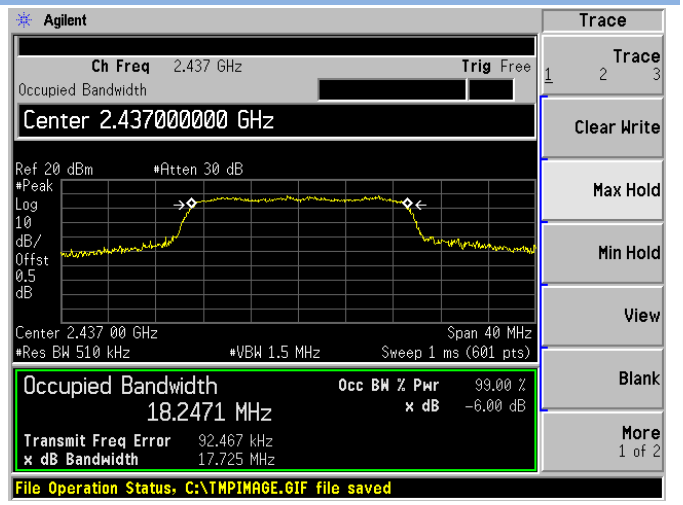
802.11g HIGH CHANNEL



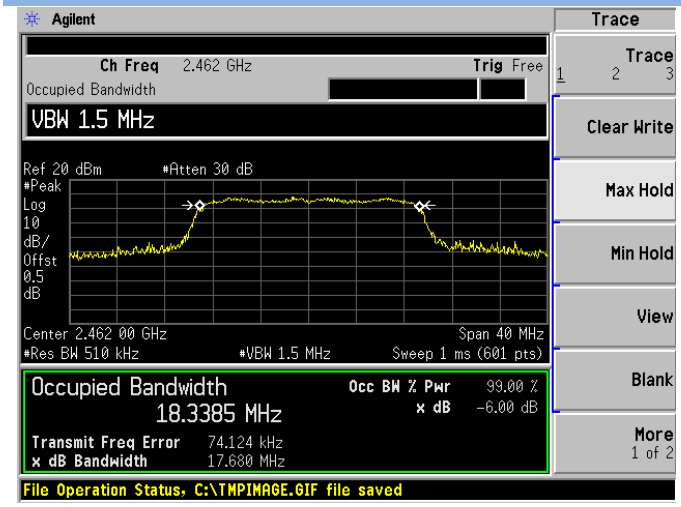
802.11n-20 MHz LOW CHANNEL



802.11 n-20 MHz MIDDLE CHANNEL



802.11n-20 MHz HIGH CHANNEL



A.3 Conducted Spurious Emissions

Test Data

802.11b Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-54.72	8.15	-11.85	Pass
Middle	-53.90	8.67	-11.33	Pass
High	-55.27	8.00	-12.00	Pass

802.11g Mode:

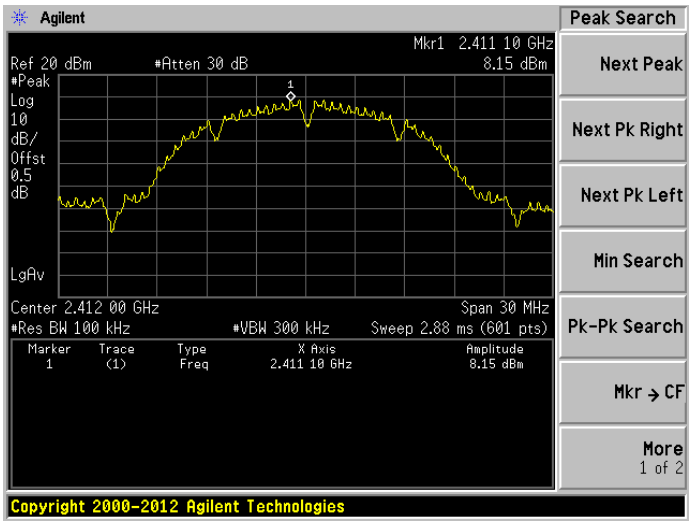
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-55.05	5.35	-14.65	Pass
Middle	-54.74	5.43	-14.57	Pass
High	-55.04	5.17	-14.83	Pass

802.11n-20MHz Mode:

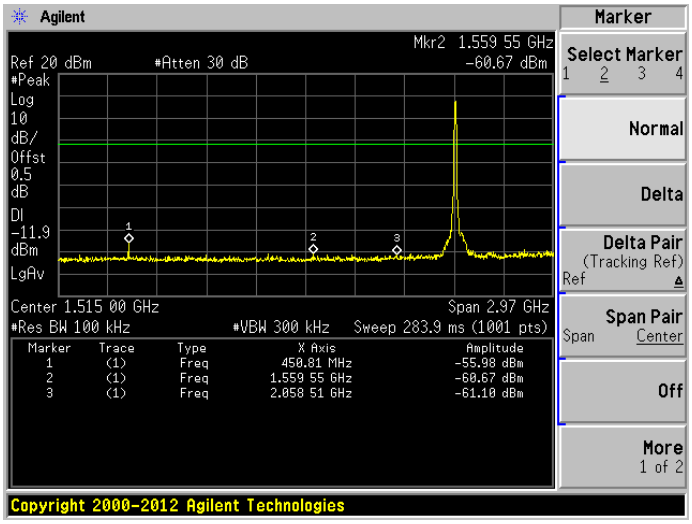
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-55.52	3.96	-16.04	Pass
Middle	-55.31	4.25	-15.75	Pass
High	-55.61	3.93	-16.07	Pass

Test Plots

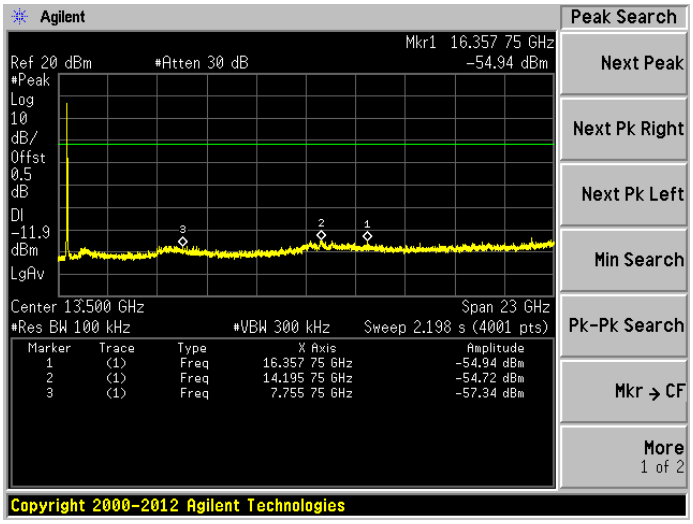
802.11b LOW CHANNEL CARRIER LEVEL



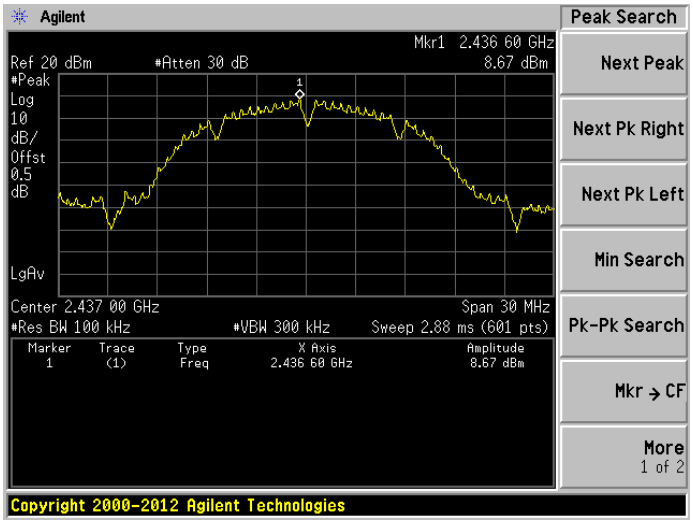
802.11b LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



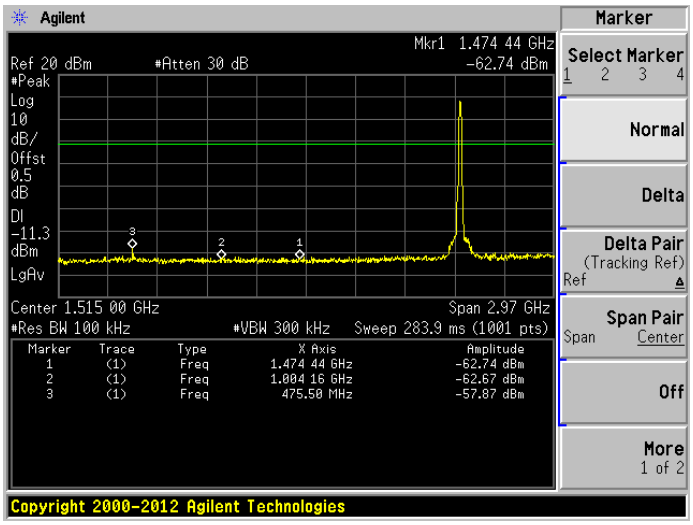
802.11b LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



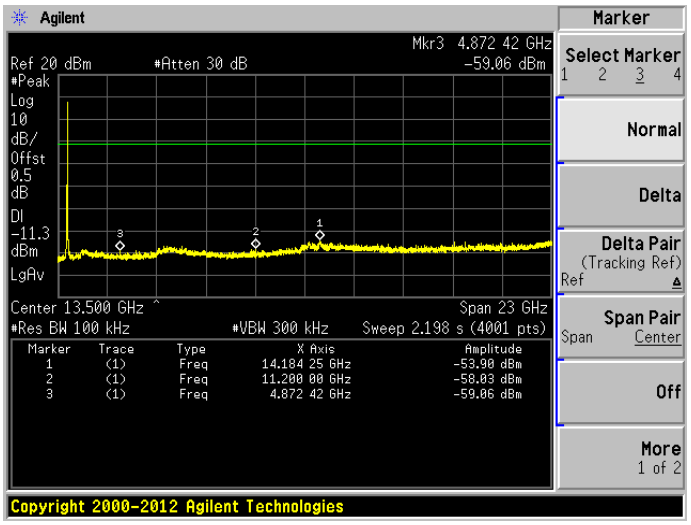
802.11b MIDDLE CHANNEL CARRIER LEVEL



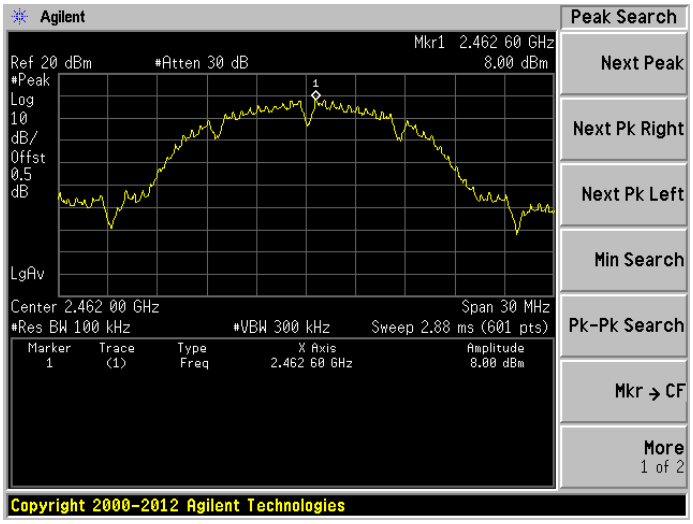
802.11b MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



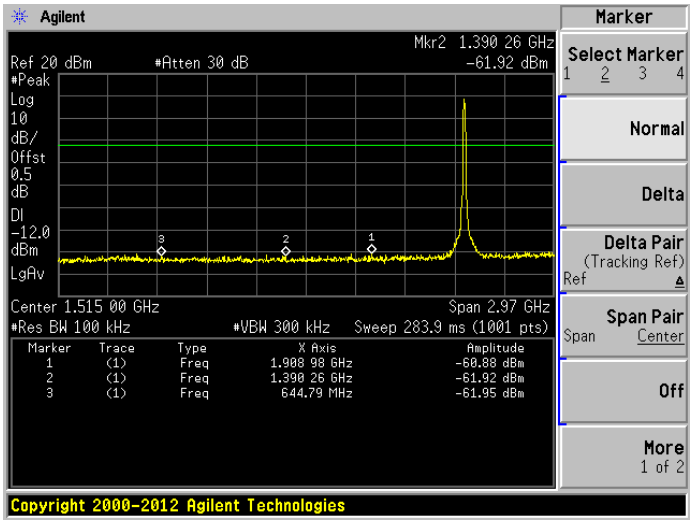
802.11b MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



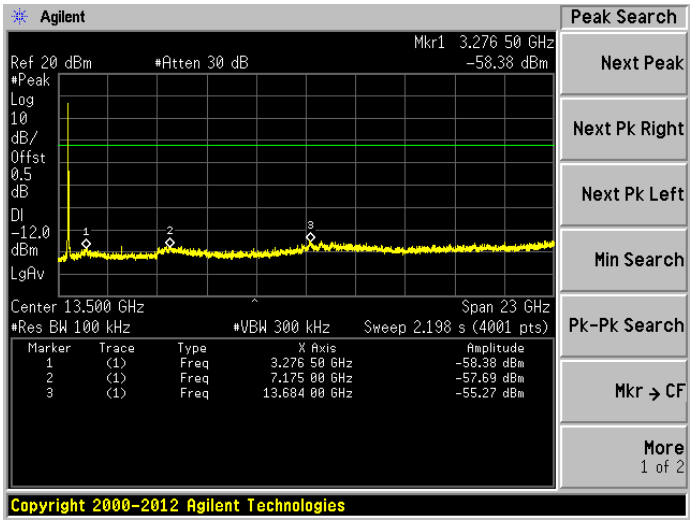
802.11b HIGH CHANNEL CARRIER LEVEL



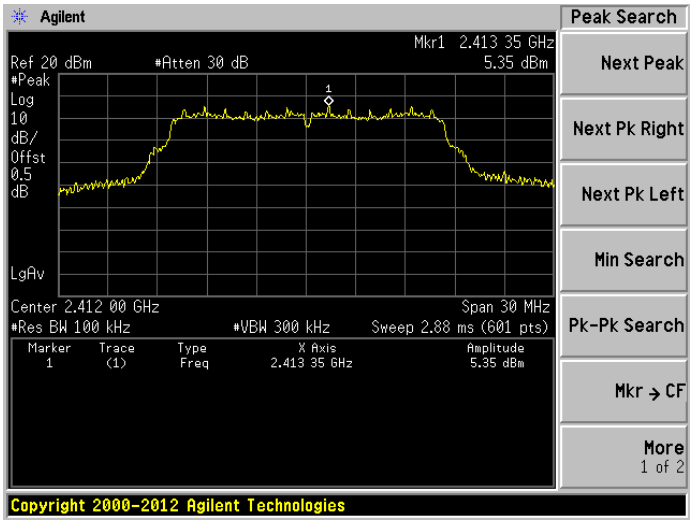
802.11b HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



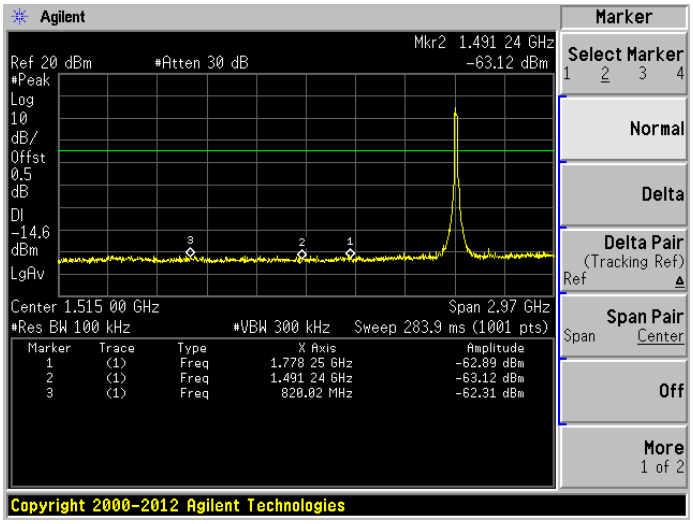
802.11b HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



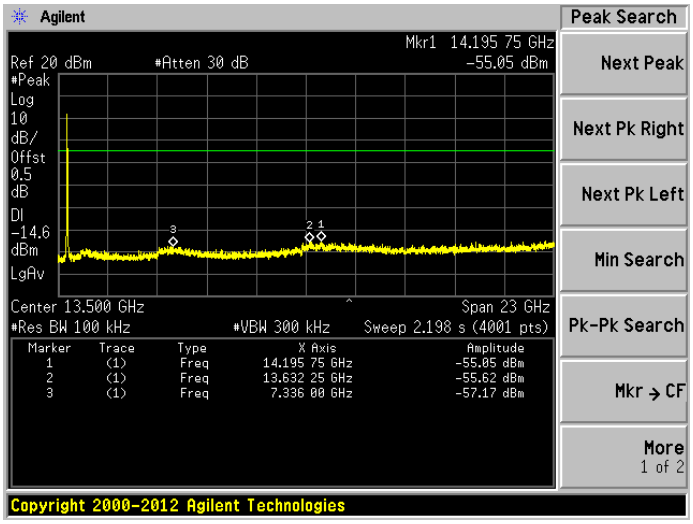
802.11g LOW CHANNEL CARRIER LEVEL



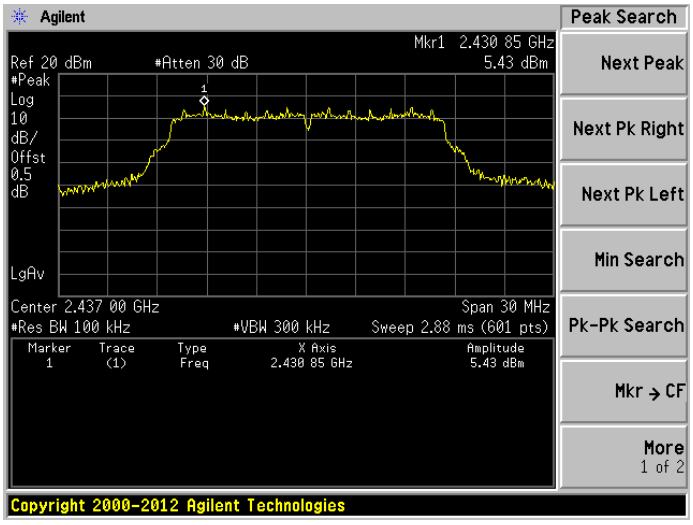
802.11g LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



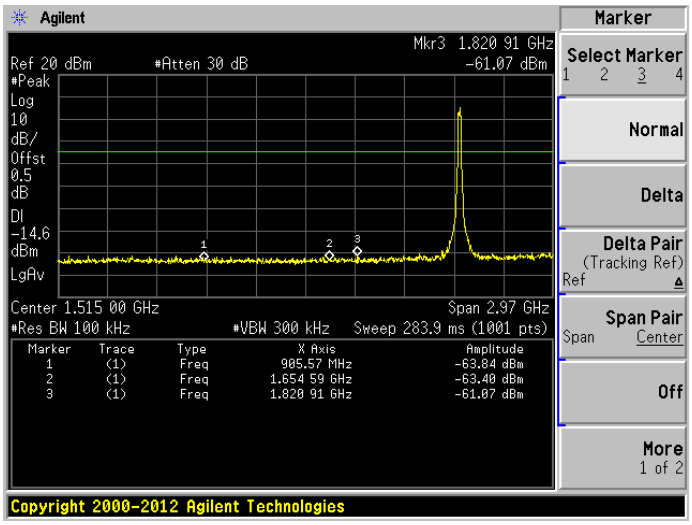
802.11g LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



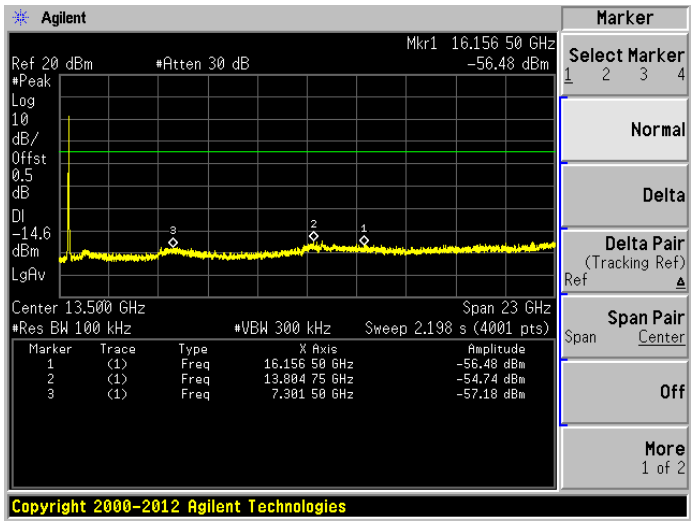
802.11g MIDDLE CHANNEL CARRIER LEVEL



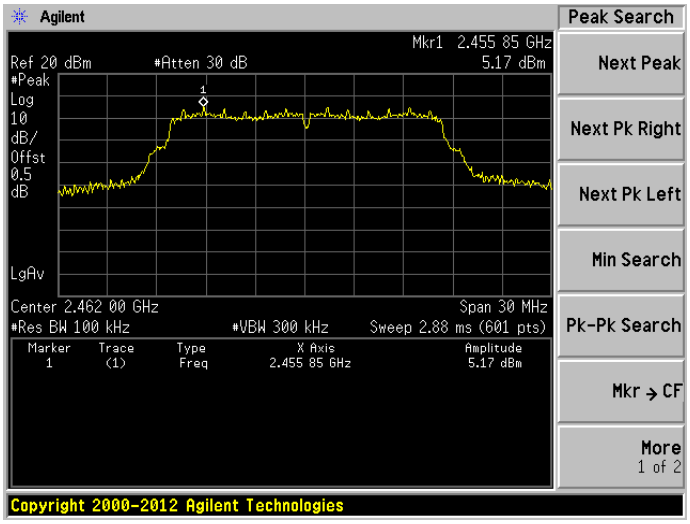
802.11g MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



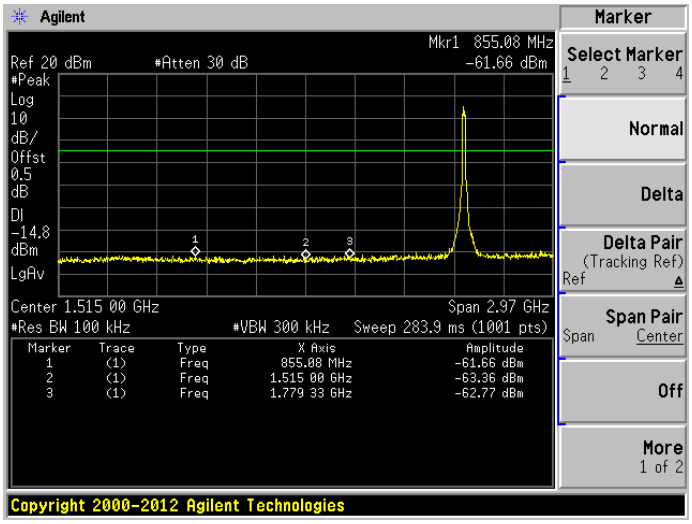
802.11g MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



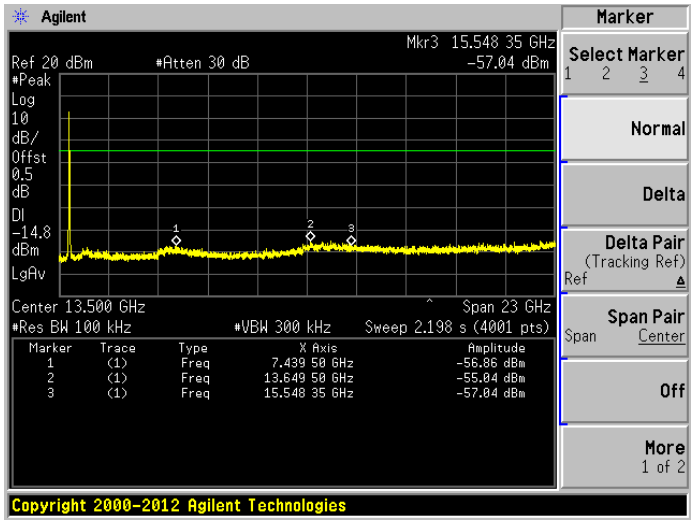
802.11g HIGH CHANNEL CARRIER LEVEL



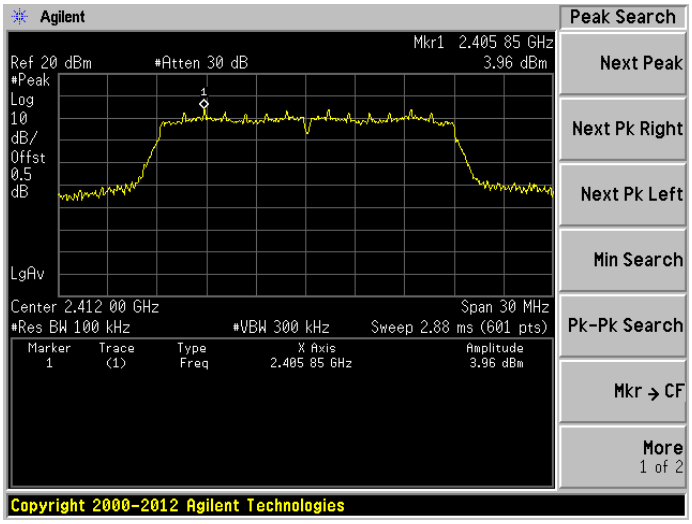
802.11g HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



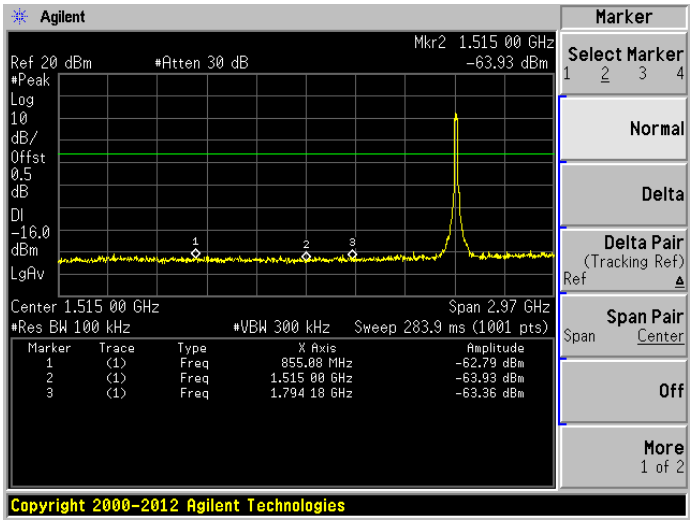
802.11g HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



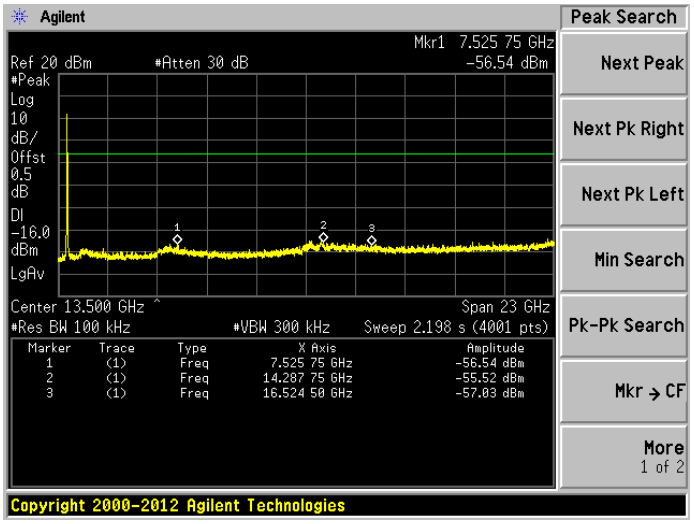
802.11n-20 MHz LOW CHANNEL CARRIER LEVEL



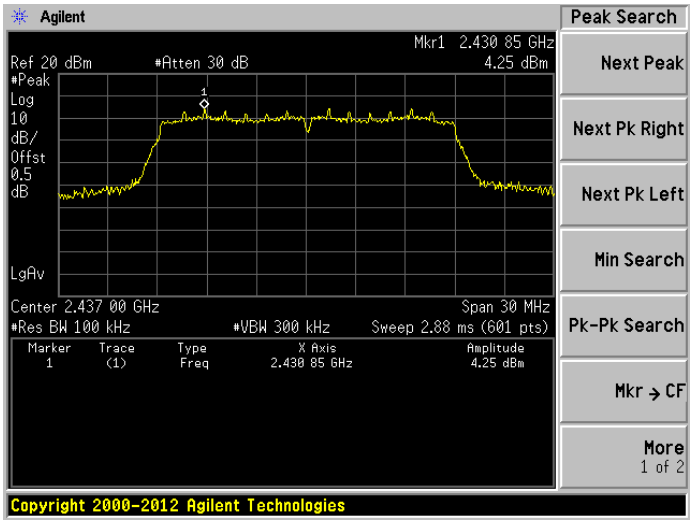
802.11n-20 MHz LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



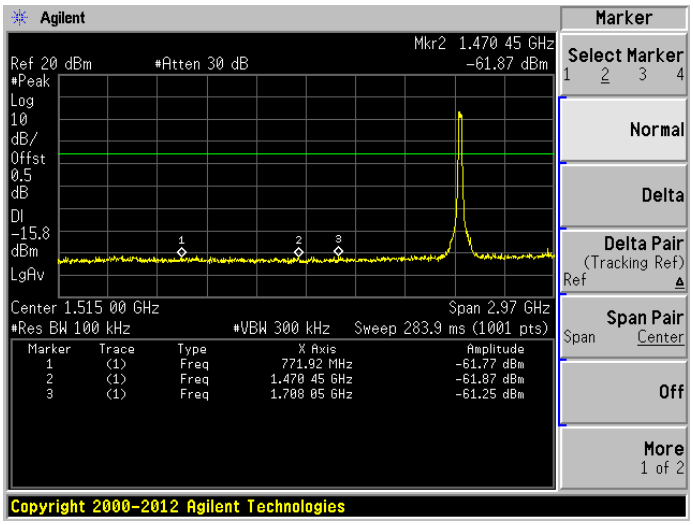
802.11n-20 MHz LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



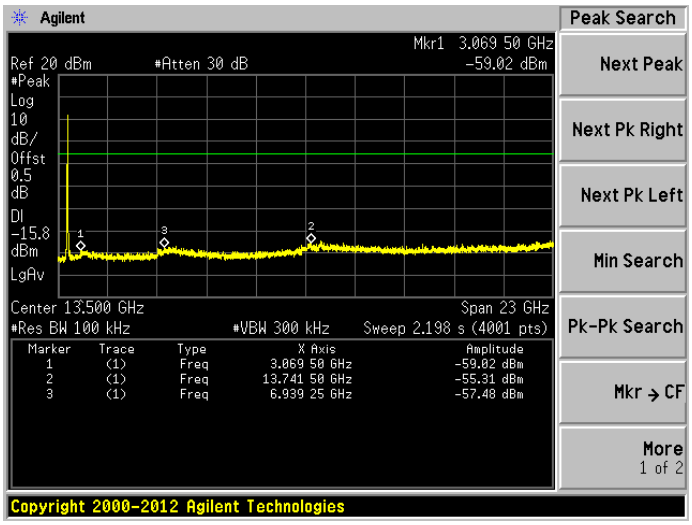
802.11n-20 MHz MIDDLE CHANNEL CARRIER LEVEL



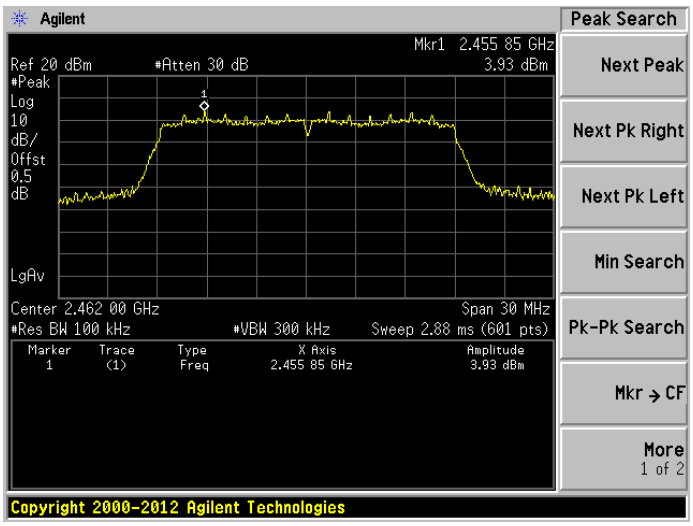
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



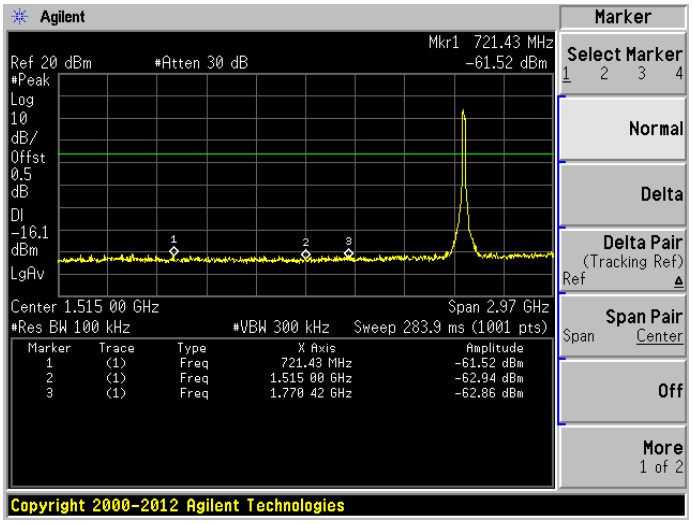
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



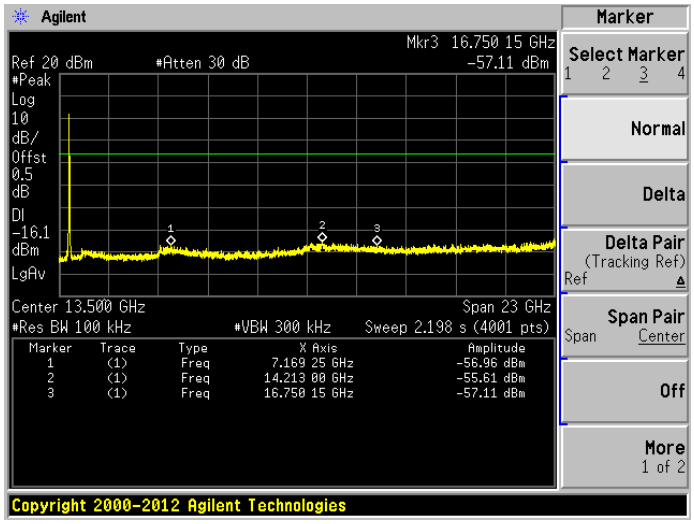
802.11n-20 MHz HIGH CHANNEL CARRIER LEVEL



802.11n-20 MHz HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



802.11n-20 MHz HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



A.4 Band Edge (Authorized-band band-edge)

Test Data

The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

802.11b Mode：

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-44.61	8.15	-11.85	Pass
High Channel	-55.82	8.00	-12.00	Pass

802.11g Mode：

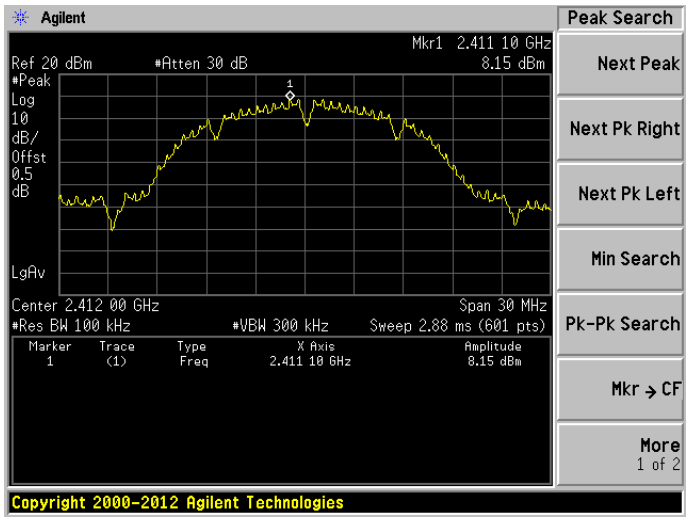
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-32.36	5.35	-14.65	Pass
High Channel	-40.21	5.17	-14.83	Pass

802.11n-20 MHz Mode:

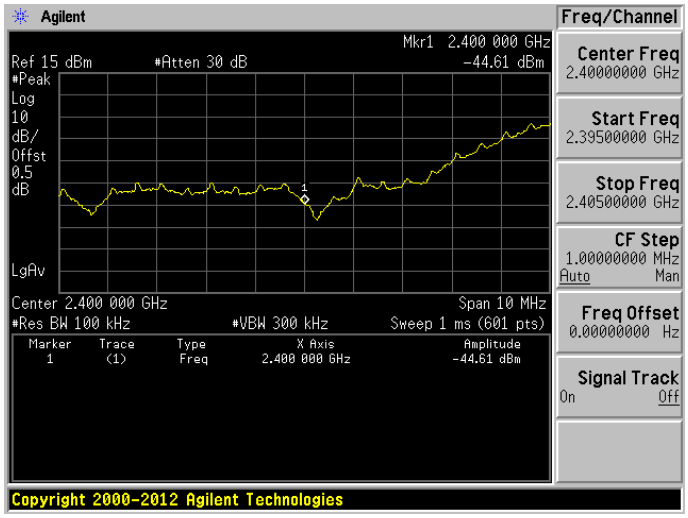
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-34.15	3.96	-16.04	Pass
High Channel	-39.93	3.93	-16.07	Pass

Test Plots

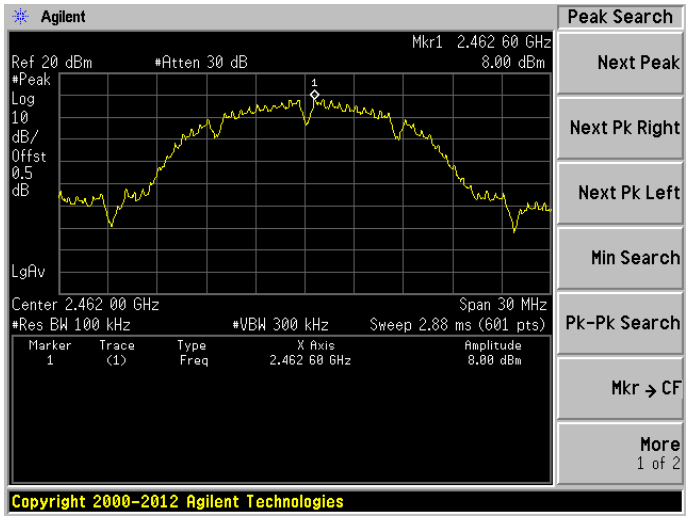
802.11b LOW CHANNEL, Carrier level



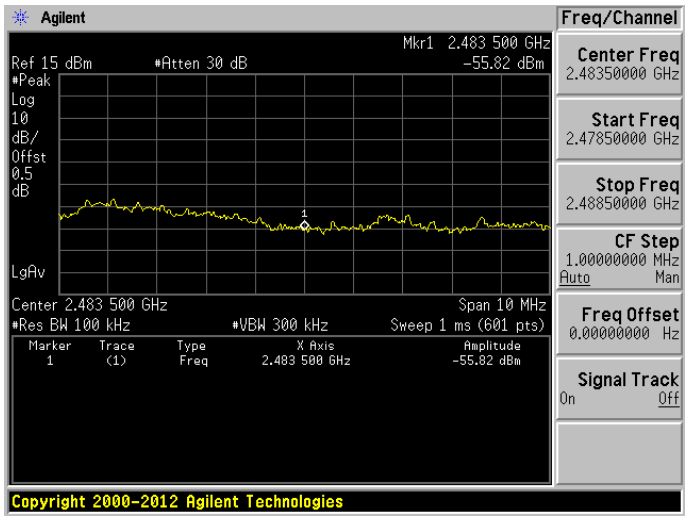
802.11b LOW CHANNEL, Band Edge



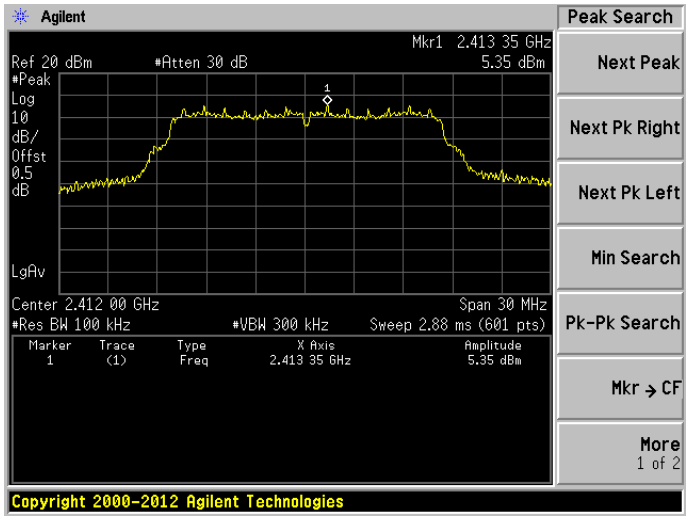
802.11b HIGH CHANNEL, Carrier level



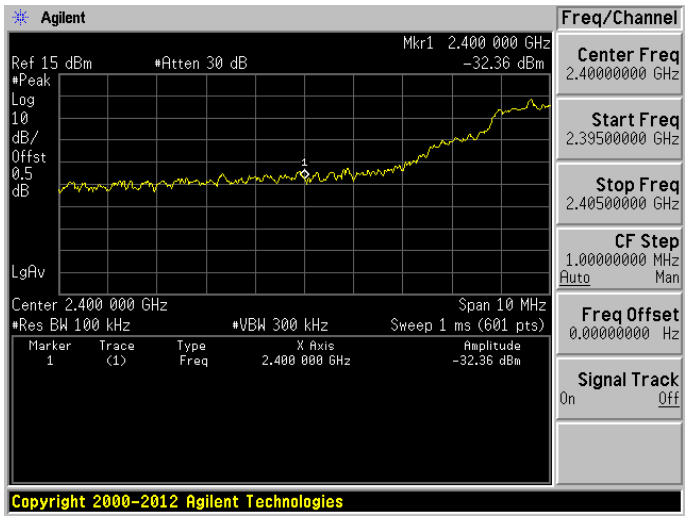
802.11b HIGH CHANNEL, Band Edge



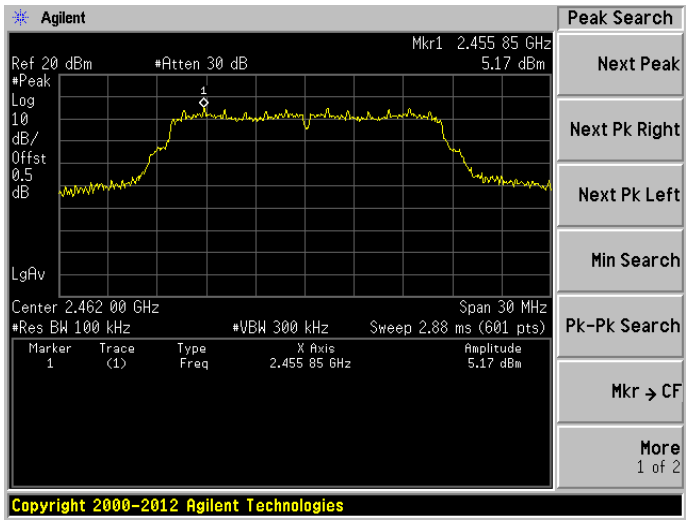
802.11g LOW CHANNEL, Carrier level



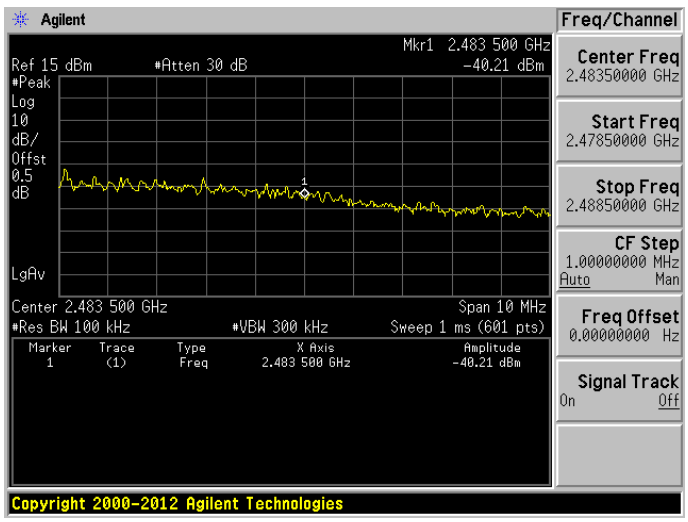
802.11g LOW CHANNEL, Band Edge



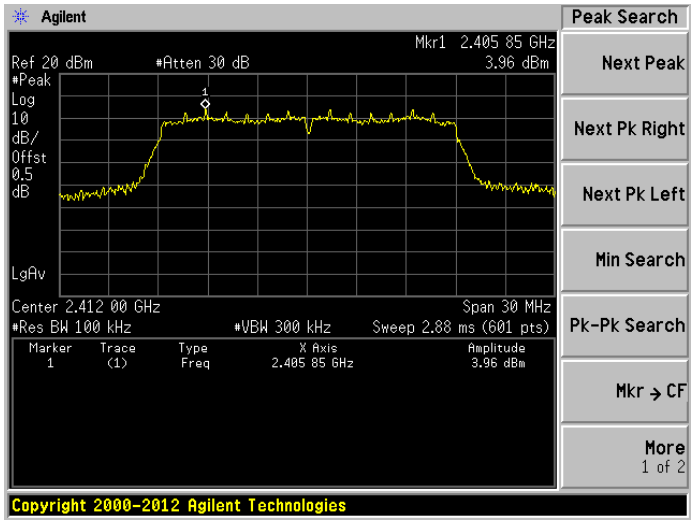
802.11g HIGH CHANNEL, Carrier level



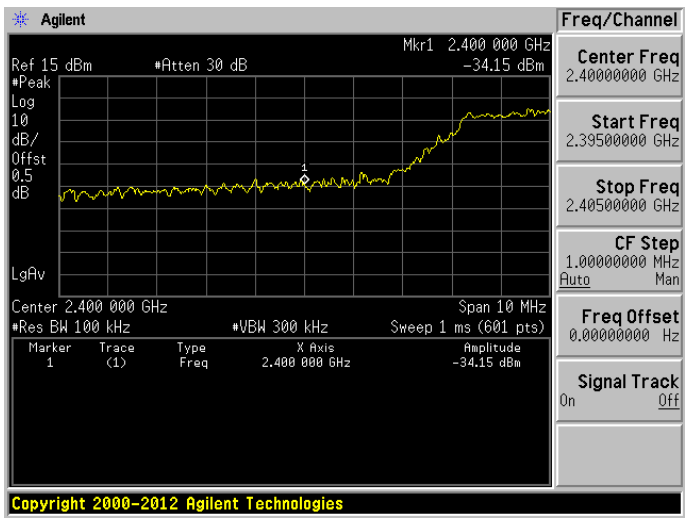
802.11g HIGH CHANNEL, Band Edge



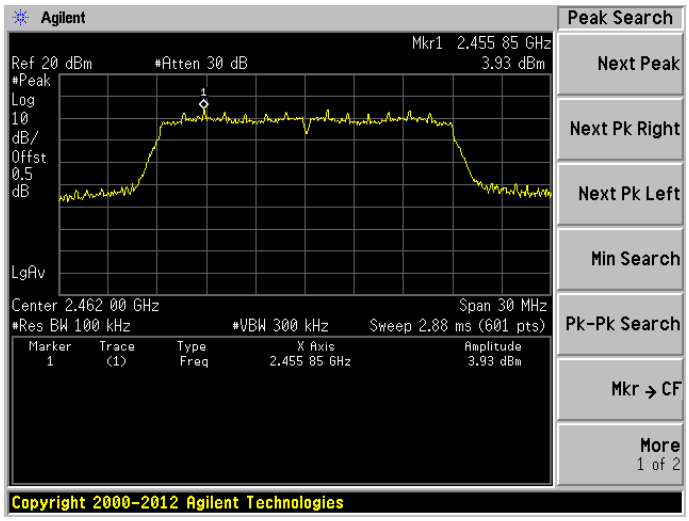
802.11n-20 MHz LOW CHANNEL, Carrier level



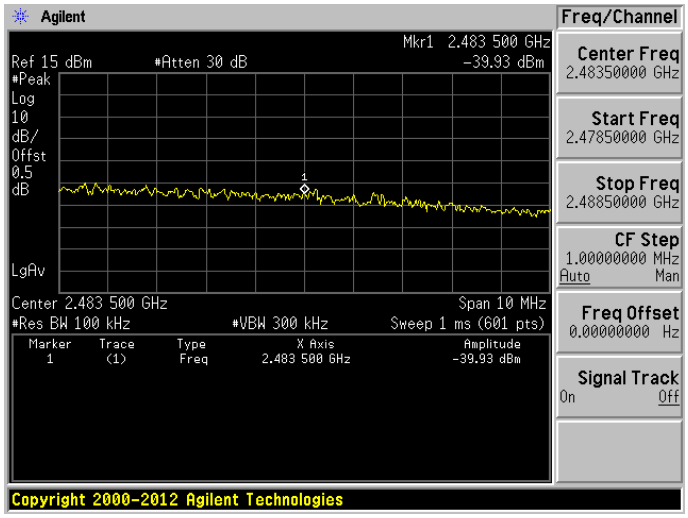
802.11n-20 MHz LOW CHANNEL, Band Edge



802.11n-20 MHz HIGH CHANNEL, Carrier level



802.11n-20 MHz HIGH CHANNEL, Band Edge

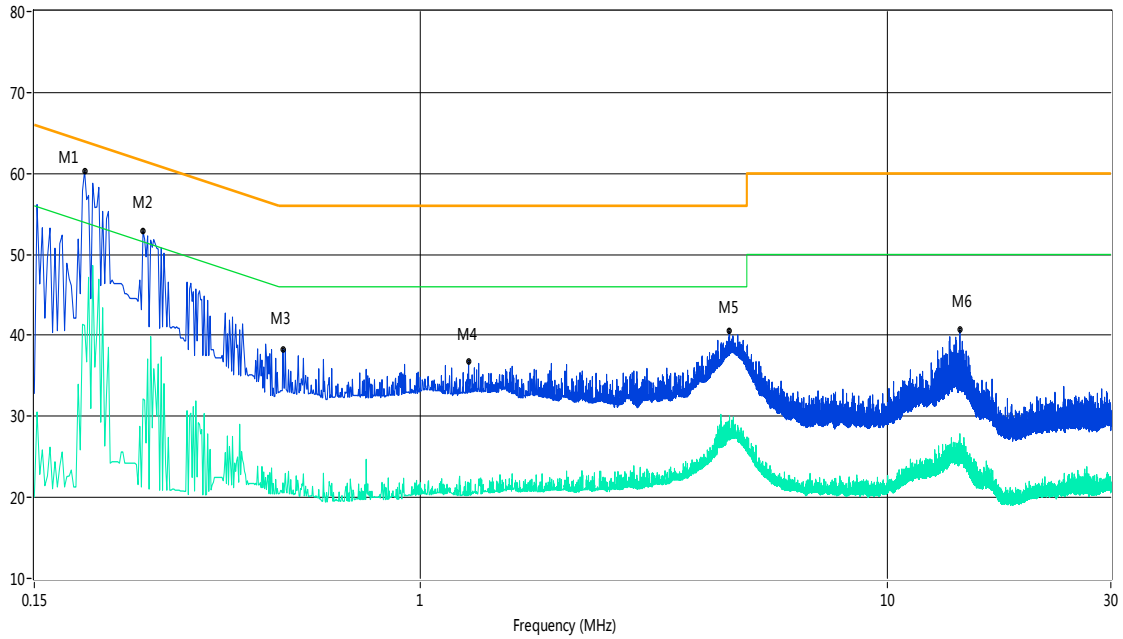


A.5 Conducted Emissions

Note: The EUT is working in the Normal link mode.

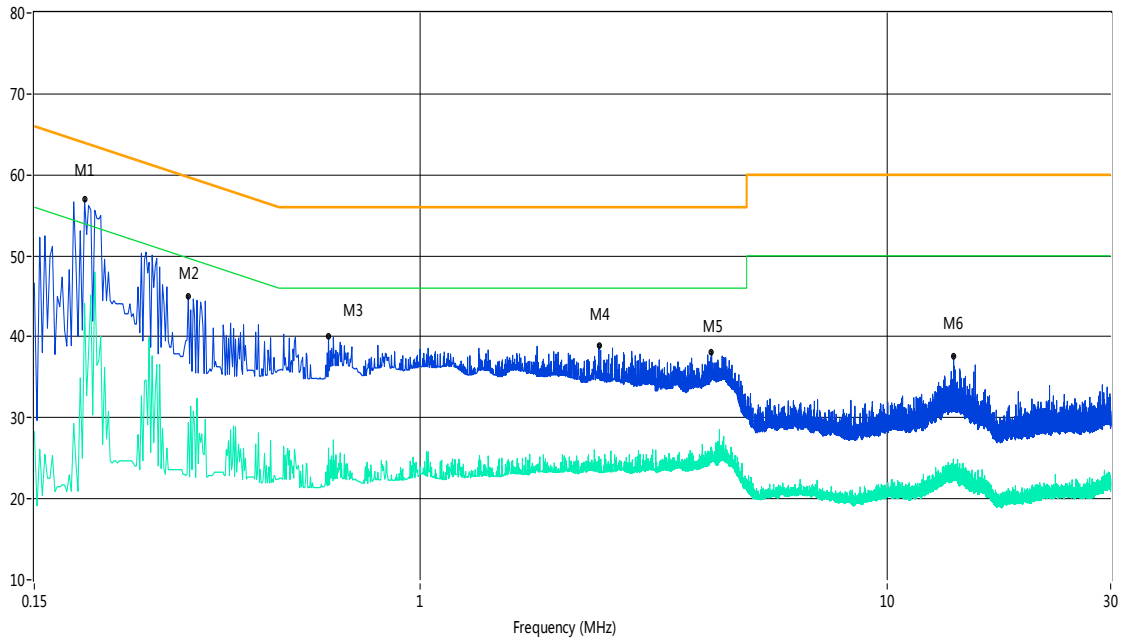
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.19	60.3	11.00	64.8	4.50	Peak	L Line	Pass
1**	0.19	41.2	11.00	54.8	13.60	AV	L Line	Pass
2	0.26	52.8	11.00	63.0	10.20	Peak	L Line	Pass
2**	0.26	32.2	11.00	53.0	20.80	AV	L Line	Pass
3	0.51	38.3	11.00	56.0	17.70	Peak	L Line	Pass
3**	0.51	21.8	11.00	46.0	24.20	AV	L Line	Pass
4	1.27	36.8	11.00	56.0	19.20	Peak	L Line	Pass
4**	1.27	21.0	11.00	46.0	25.00	AV	L Line	Pass
5	4.59	40.5	11.00	56.0	15.50	Peak	L Line	Pass
5**	4.59	28.7	11.00	46.0	17.30	AV	L Line	Pass
6	14.28	40.7	11.00	60.0	19.30	Peak	L Line	Pass
6**	14.28	27.8	11.00	50.0	22.20	AV	L Line	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.19	56.9	11.00	64.8	7.90	Peak	N Line	Pass
1**	0.19	44.1	11.00	54.8	10.70	AV	N Line	Pass
2	0.32	45.0	11.00	61.1	16.10	Peak	N Line	Pass
2**	0.32	29.4	11.00	51.1	21.70	AV	N Line	Pass
3	0.64	40.0	11.00	56.0	16.00	Peak	N Line	Pass
3**	0.64	26.2	11.00	46.0	19.80	AV	N Line	Pass
4	2.42	38.9	11.00	56.0	17.10	Peak	N Line	Pass
4**	2.42	25.2	11.00	46.0	20.80	AV	N Line	Pass
5	4.21	38.1	11.00	56.0	17.90	Peak	N Line	Pass
5**	4.21	25.1	11.00	46.0	20.90	AV	N Line	Pass
6	13.85	37.7	11.00	60.0	22.30	Peak	N Line	Pass
6**	13.85	21.6	11.00	50.0	28.40	AV	N Line	Pass

A.6 Radiated Emission

Note 1: The symbol of “--” in the table which means not application.

Note 2: For the test data above 1 GHz，According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

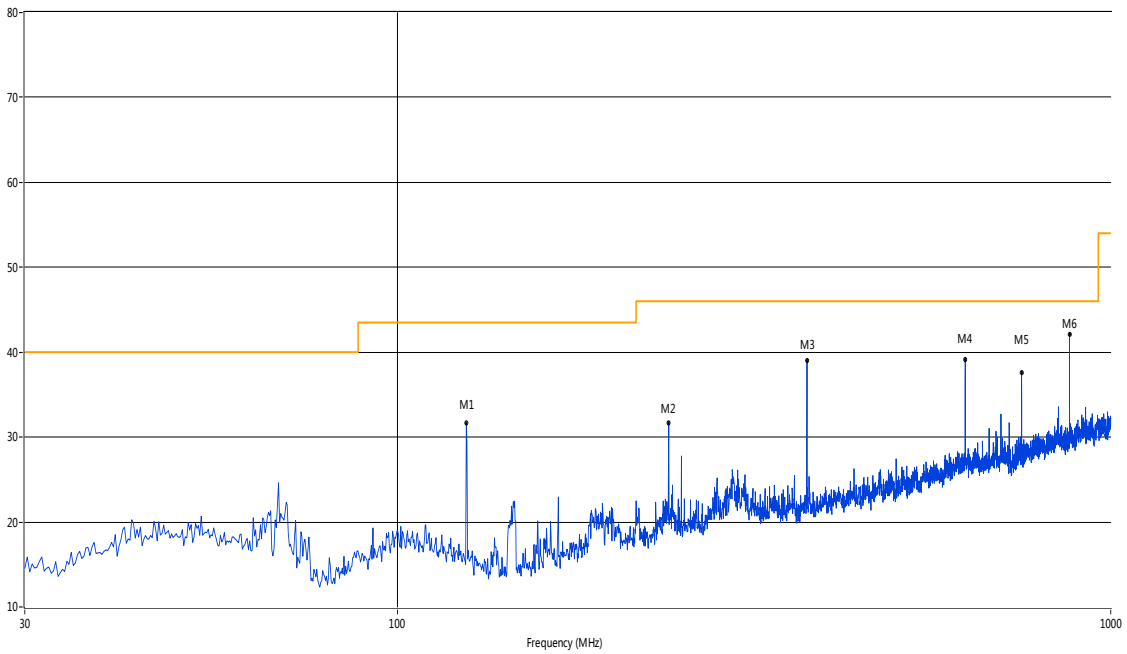
Note 3: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note 4: The EUT is working in the Normal link mode below 1 GHz.

Note 5: Above 1GHz the marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal and test highest frequency is (1 GHz ~ 10th Harmonic).

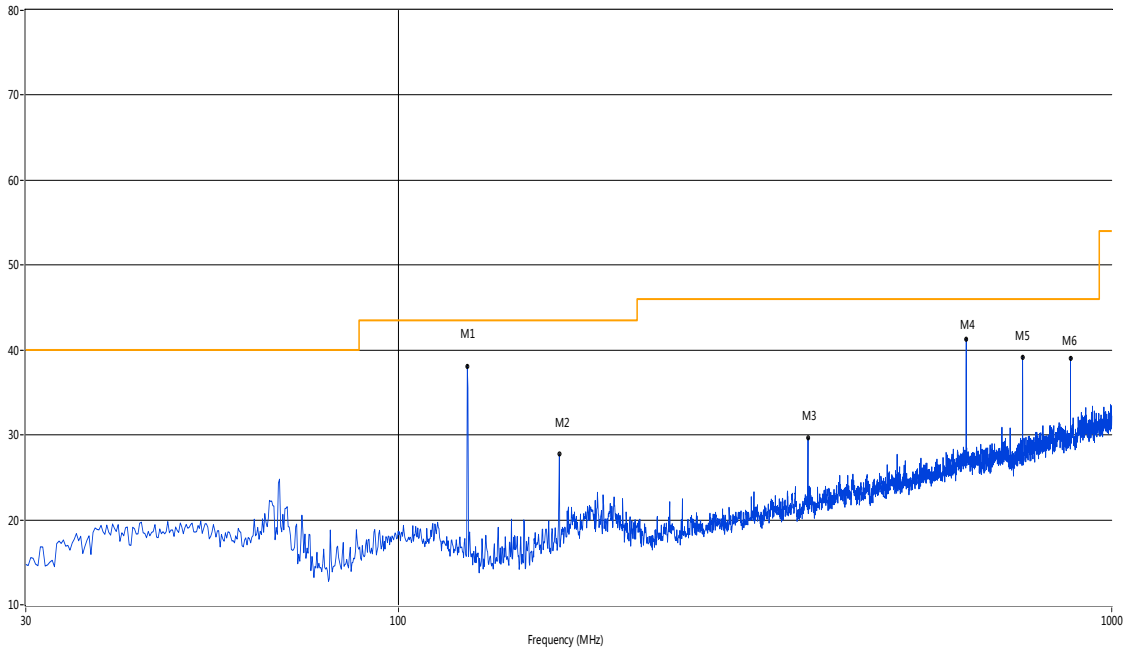
Test Data and Plots

30 MHz to 1 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	124.79	31.68	-22.47	43.5	11.82	Peak	57.70	100	Horizontal	Pass
2	239.95	31.72	-19.10	46.0	14.28	Peak	37.10	100	Horizontal	Pass
3	374.75	39.02	-15.82	46.0	6.98	Peak	191.00	100	Horizontal	Pass
4	624.95	39.17	-10.27	46.0	6.83	Peak	37.10	100	Horizontal	Pass
5	749.80	37.64	-8.59	46.0	8.36	Peak	195.30	100	Horizontal	Pass
6	874.90	42.08	-6.24	46.0	3.92	Peak	53.70	100	Horizontal	Pass

30 MHz to 1 GHz, ANT V



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	124.79	38.11	-22.47	43.5	5.39	Peak	143.80	100	Vertical	N/A
2	167.95	27.75	-22.82	43.5	15.75	Peak	280.20	100	Vertical	Pass
3	374.99	29.60	-15.79	46.0	16.40	Peak	123.10	100	Vertical	N/A
4	624.95	41.30	-10.27	46.0	4.70	Peak	334.70	100	Vertical	Pass
5	749.80	39.14	-8.59	46.0	6.86	Peak	276.20	100	Vertical	Pass
6	874.90	39.05	-6.24	46.0	6.95	Peak	69.50	100	Vertical	Pass

1 GHz to 25 GHz, ANT V 802.11b Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1997.25	50.06	-0.02	74	23.94	Peak	48.10	150	Vertical	Pass
2	2412.17	87.75	1.51	74	-13.75	Peak	165.7	150	Vertical	N/A
3	2885.03	52.62	6.48	74.0	21.38	Peak	202.00	150	Vertical	Pass
4	9403.08	47.02	15.07	74	26.98	Peak	70.3	150	Vertical	Pass
5	12491.68	47.49	9.96	74	26.51	Peak	18.8	150	Vertical	Pass
6	18500.83	48.72	12.09	74	25.28	Peak	112.2	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11b Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1997.57	50.99	-0.10	74	23.01	Peak	224.2	150	Horizontal	Pass
2	2412.14	80.80	1.55	74	-6.80	Peak	116.1	150	Horizontal	N/A
3	3319.42	50.15	8.90	74.0	23.85	Peak	77.00	150	Horizontal	Pass
4	10750.83	44.26	14.96	74	29.74	Peak	223.3	150	Horizontal	Pass
5	13748.34	47.07	10.89	74	26.93	Peak	217.9	150	Horizontal	Pass
6	20128.12	45.11	13.20	74	28.89	Peak	275.1	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11b Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1349.41	44.67	-4.58	74.0	29.33	Peak	206.30	150	Vertical	Pass
2	2184.70	87.09	1.59	74	-13.09	Peak	99.1	150	Vertical	N/A
3	2483.29	52.11	1.95	74	21.89	Peak	342.4	150	Vertical	Pass
4	8863.98	47.12	17.01	74	26.88	Peak	84.5	150	Vertical	Pass
5	16545.76	42.71	20.65	74	31.29	Peak	289.4	150	Vertical	Pass
6	24041.60	46.14	10.43	74	27.86	Peak	116.9	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11b Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1997.45	49.36	-0.10	74	24.64	Peak	274.4	150	Horizontal	Pass
2	2431.14	81.46	1.63	74	-7.46	Peak	158.2	150	Horizontal	N/A
3	2886.99	52.16	6.35	74	21.84	Peak	226.3	150	Horizontal	Pass
4	10930.53	44.75	16.77	74	29.25	Peak	193	150	Horizontal	Pass
5	12947.59	45.27	20.64	74	28.73	Peak	269.2	150	Horizontal	Pass
6	23452.58	44.23	13.53	74	29.77	Peak	118.9	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11b High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1440.39	44.05	-4.55	74.0	29.95	Peak	254.40	150	Vertical	Pass
2	2468.63	86.02	1.58	74	-12.02	Peak	355.5	150	Vertical	N/A
3	3814.30	51.97	1.96	74	22.03	Peak	306.8	150	Vertical	Pass
4	6685.11	45.51	20.15	74	28.49	Peak	245.9	150	Vertical	Pass
5	12885.19	44.48	11.48	74	29.52	Peak	63.5	150	Vertical	Pass
6	24480.87	47.52	8.31	74	26.48	Peak	336.3	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11b High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1999.51	50.73	-0.06	74	23.27	Peak	72.6	150	Horizontal	Pass
2	2468.13	81.09	1.59	74	-7.09	Peak	229.1	150	Horizontal	N/A
3	3656.09	48.99	10.19	74.0	25.01	Peak	7.30	150	Horizontal	Pass
4	8291.18	45.94	18.79	74	28.06	Peak	268.6	150	Horizontal	Pass
5	13342.76	45.36	9.34	74	28.64	Peak	2.2	150	Horizontal	Pass
6	23722.13	46.17	11.88	74	27.83	Peak	23.5	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11g Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1744.81	50.98	-3.84	74.0	23.02	Peak	64.20	150	Vertical	Pass
2	2412.16	87.22	1.63	74	-13.22	Peak	353.7	150	Vertical	N/A
3	2484.95	52.47	1.91	74	21.53	Peak	27.2	150	Vertical	Pass
4	10975.46	42.82	19.07	74	31.18	Peak	47.7	150	Vertical	Pass
5	17128.12	49.12	9.46	74	24.88	Peak	310.2	150	Vertical	Pass
6	21985.03	45.92	11.98	74	28.08	Peak	50.5	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11g Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1998.50	50.61	-0.06	74	23.39	Peak	291.6	150	Horizontal	Pass
2	2412.21	80.71	1.65	74	-6.71	Peak	5.6	150	Horizontal	N/A
3	2884.97	52.27	6.27	74	21.73	Peak	71.3	150	Horizontal	Pass
4	10380.20	42.74	20.55	74	31.26	Peak	348.9	150	Horizontal	Pass
5	16067.39	46.93	11.76	74	27.07	Peak	170.3	150	Horizontal	Pass
6	24101.50	45.98	8.69	74	28.02	Peak	162.5	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11g Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1579.36	46.16	-4.23	74.0	27.84	Peak	359.00	150	Vertical	Pass
2	2431.14	87.07	1.59	74	-13.07	Peak	205.3	150	Vertical	N/A
3	2481.28	51.82	1.91	74	22.18	Peak	1.8	150	Vertical	Pass
4	9987.11	48.62	19.21	74	25.38	Peak	152.3	150	Vertical	Pass
5	15235.44	44.26	20.65	74	29.74	Peak	115.2	150	Vertical	Pass
6	18230.45	42.46	10.83	74	31.54	Peak	29.1	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11g Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1996.56	49.46	-0.02	74	24.54	Peak	74.3	150	Horizontal	Pass
2	2436.14	81.91	1.63	74	-7.91	Peak	212.2	150	Horizontal	N/A
3	3656.09	49.71	10.19	74.0	24.29	Peak	19.60	150	Horizontal	Pass
4	10054.49	42.72	15.37	74	31.28	Peak	65.4	150	Horizontal	Pass
5	14965.06	45.36	11.73	74	28.64	Peak	299.8	150	Horizontal	Pass
6	20018.30	43.06	11.69	74	30.94	Peak	239	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11g High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1894.78	51.07	-2.92	74.0	22.93	Peak	58.60	150	Vertical	Pass
2	2463.43	86.06	1.59	74	-12.06	Peak	106.1	150	Vertical	N/A
3	2485.47	52.82	1.95	74	21.18	Peak	192.8	150	Vertical	Pass
4	6056.16	44.94	19.04	74	29.06	Peak	184.9	150	Vertical	Pass
5	12356.91	46.47	9.71	74	27.53	Peak	156.7	150	Vertical	Pass
6	24450.92	44.83	12.91	74	29.17	Peak	143.2	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11g High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1998.26	50.50	-0.02	74	23.50	Peak	42.3	150	Horizontal	Pass
2	2456.14	80.68	1.62	74	-6.68	Peak	246	150	Horizontal	N/A
3	2883.64	52.87	6.48	74	21.13	Peak	248.7	150	Horizontal	Pass
4	7651.00	43.47	13.59	74	30.53	Peak	117.3	150	Horizontal	Pass
5	13945.92	45.48	20.64	74	28.52	Peak	87.6	150	Horizontal	Pass
6	19798.67	46.63	10.45	74	27.38	Peak	262.1	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11n20 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1511.37	43.87	-4.36	74.0	30.13	Peak	322.90	150	Vertical	Pass
2	2413.13	86.92	1.51	74	-12.92	Peak	100.9	150	Vertical	N/A
3	2486.31	52.86	2.00	74	21.14	Peak	255.1	150	Vertical	Pass
4	11447.17	46.05	14.34	74	27.95	Peak	33.5	150	Vertical	Pass
5	15651.41	46.56	9.03	74	27.44	Peak	58.9	150	Vertical	Pass
6	24740.43	45.78	11.29	74	28.22	Peak	188.8	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11n20 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1996.89	49.87	0.00	74	24.13	Peak	57.7	150	Horizontal	Pass
2	2418.22	80.67	1.56	74	-6.67	Peak	119.9	150	Horizontal	N/A
3	4686.33	51.72	13.20	74.0	22.28	Peak	199.70	150	Horizontal	Pass
4	10919.30	46.37	18.99	74	27.63	Peak	159.1	150	Horizontal	Pass
5	17700.08	45.83	10.18	74	28.17	Peak	237.4	150	Horizontal	Pass
6	24101.50	45.01	12.35	74	29.00	Peak	66.5	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11n20 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1894.78	51.07	-2.92	74.0	22.93	Peak	58.60	150	Vertical	Pass
2	2431.53	87.79	1.58	74	-13.79	Peak	155.5	150	Vertical	N/A
3	2486.89	52.16	1.97	74	21.84	Peak	167.3	150	Vertical	Pass
4	9369.38	42.34	14.82	74	31.66	Peak	251.9	150	Vertical	Pass
5	14632.28	49.04	9.18	74	24.96	Peak	268	150	Vertical	Pass
6	21865.23	49.73	11.15	74	24.27	Peak	132.2	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11n20 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1997.40	50.78	-0.02	74	23.22	Peak	197.4	150	Horizontal	Pass
2	2437.95	81.87	1.65	74	-7.87	Peak	143.3	150	Horizontal	N/A
3	2885.67	52.01	6.48	74	21.99	Peak	211.8	150	Horizontal	Pass
4	8650.58	44.00	15.32	74	30.00	Peak	172.2	150	Horizontal	Pass
5	15797.01	50.01	9.03	74	23.99	Peak	64.9	150	Horizontal	Pass
6	18615.23	44.79	12.30	74	29.21	Peak	132	150	Horizontal	Pass

1 GHz to 25 GHz, ANT V 802.11n20 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1993.75	51.48	0.03	74.0	22.52	Peak	83.40	150	Vertical	Pass
2	2460.30	86.31	1.58	74	-12.31	Peak	265.2	150	Vertical	N/A
3	2483.41	52.52	2.00	74	21.48	Peak	255.9	150	Vertical	Pass
4	8414.73	44.99	15.70	74	29.01	Peak	341	150	Vertical	Pass
5	14122.71	45.06	9.79	74	28.94	Peak	288.9	150	Vertical	Pass
6	23372.71	46.65	11.75	74	27.35	Peak	220.5	150	Vertical	Pass

1 GHz to 25 GHz, ANT H 802.11n20 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1995.48	50.54	0.00	74	23.46	Peak	156.6	150	Horizontal	Pass
2	2468.64	81.03	1.59	74	-7.03	Peak	31.5	150	Horizontal	N/A
3	2883.13	52.38	6.27	74	21.62	Peak	299.1	150	Horizontal	Pass
4	6887.27	45.97	14.03	74	28.03	Peak	24.7	150	Horizontal	Pass
5	17512.90	44.70	19.96	74	29.30	Peak	260.8	150	Horizontal	Pass
6	22713.81	48.23	9.39	74	25.77	Peak	192.5	150	Horizontal	Pass

A.7 Band Edge (Restricted-band band-edge)

Test Data

Note 1: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

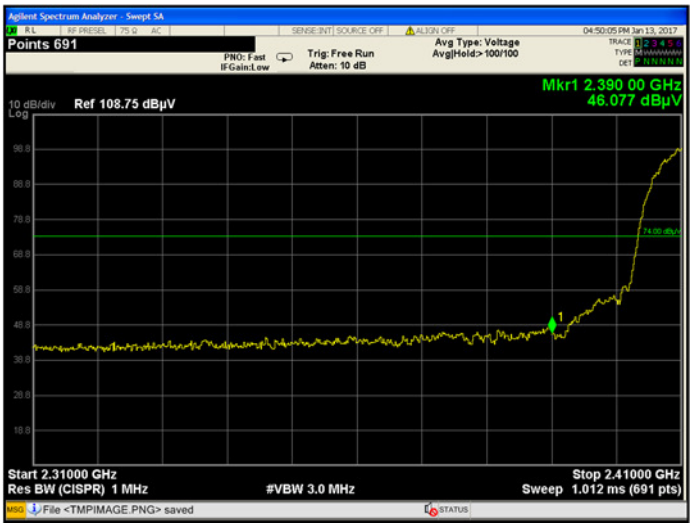
Note 2: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

Note 3: According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

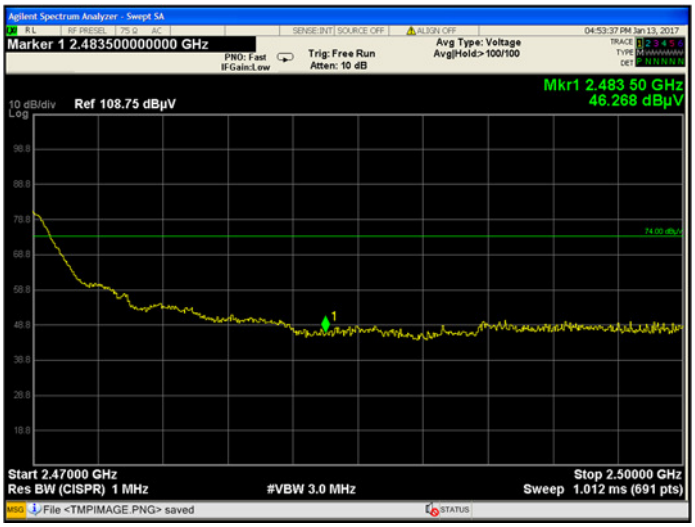
Test Mode	Test Channel	Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Remark	Verdict
802.11b	Low	2390	46.08	74	27.92	PEAK	Pass
		2390	N/A	54	N/A	AVERAGE	Pass
	HIGH	2483.5	46.27	74	27.73	PEAK	Pass
		2483.5	N/A	54	N/A	AVERAGE	Pass
802.11g	Low	2390	48.43	74	25.57	PEAK	Pass
		2390	N/A	54	N/A	AVERAGE	Pass
	HIGH	2483.5	66.94	74	7.06	PEAK	Pass
		2483.5	51.89	54	2.11	AVERAGE	Pass
802.11n20	Low	2390	64.58	74	9.42	PEAK	Pass
		2390	N/A	54	N/A	AVERAGE	Pass
	HIGH	2483.5	66.03	74	7.97	PEAK	Pass
		2483.5	51.39	54	2.61	AVERAGE	Pass

802.11b Mode:

LOW CHANNEL, PEAK

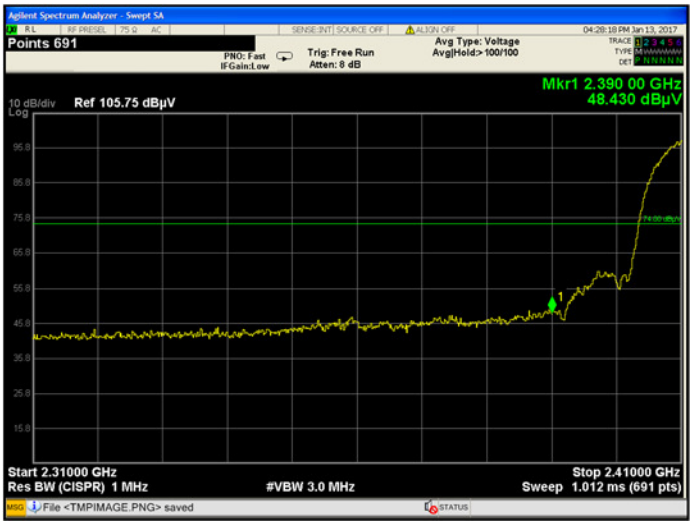


HIGH CHANNEL, PEAK

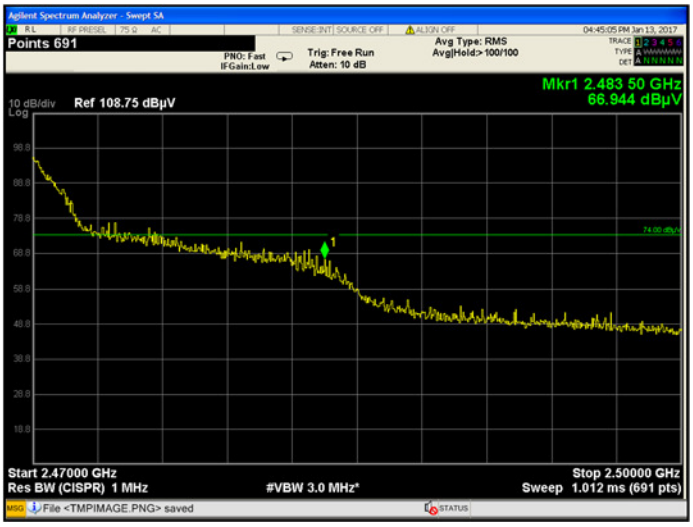


802.11g Mode：

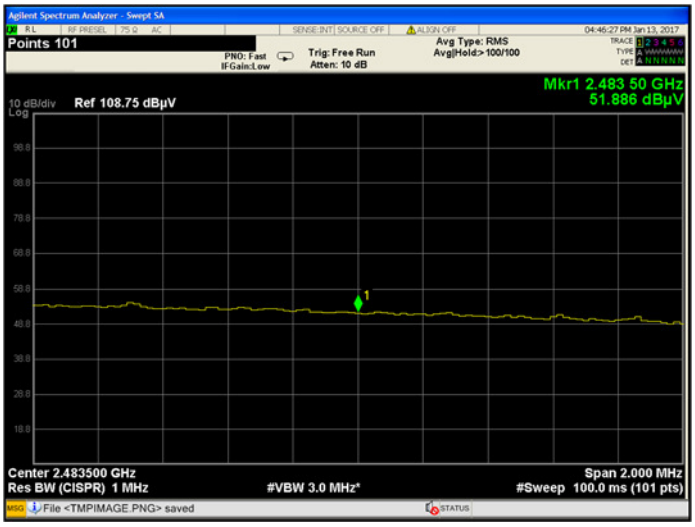
LOW CHANNEL, PEAK



HIGH CHANNEL, PEAK

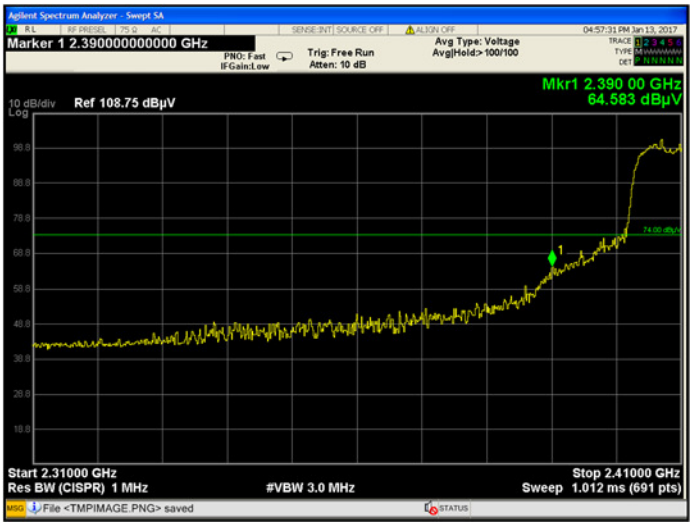


HIGH CHANNEL, AV

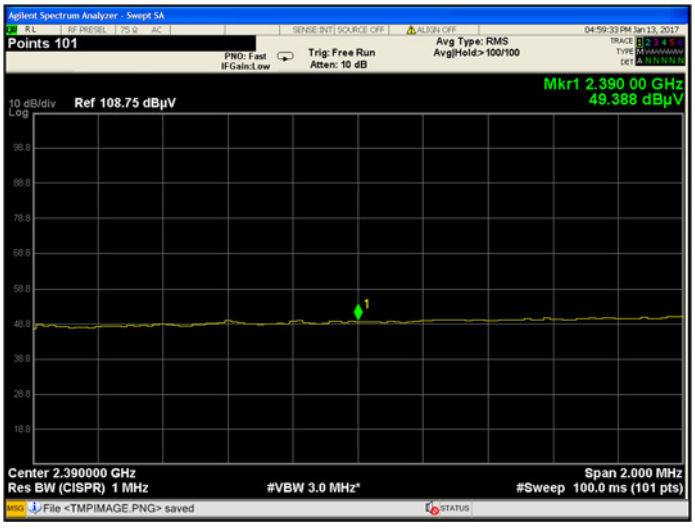


802.11n-20 MHz Mode：

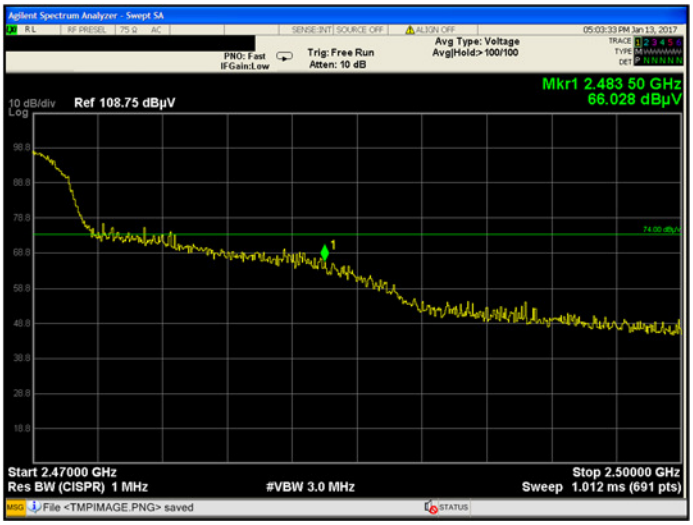
LOW CHANNEL, PEAK



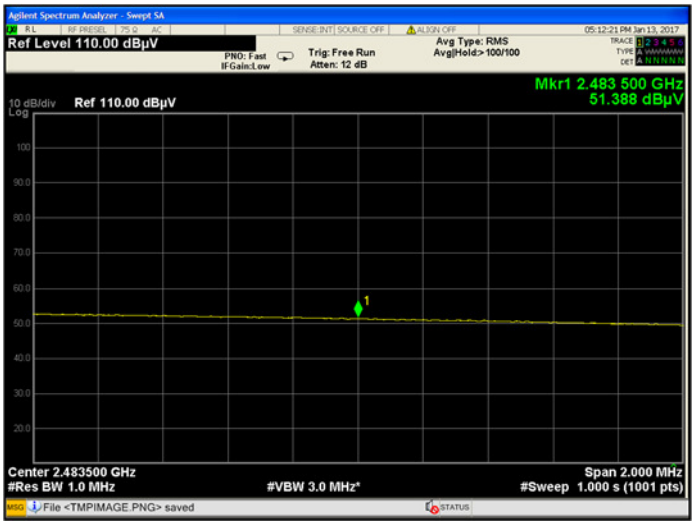
LOW CHANNEL, AV



HIGH CHANNEL, PEAK



HIGH CHANNEL, AV



A.8 Power Spectral Density (PSD)

Test Data

802.11b Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-16.75	8
Middle	-16.09	8
High	-14.87	8

802.11g Mode:

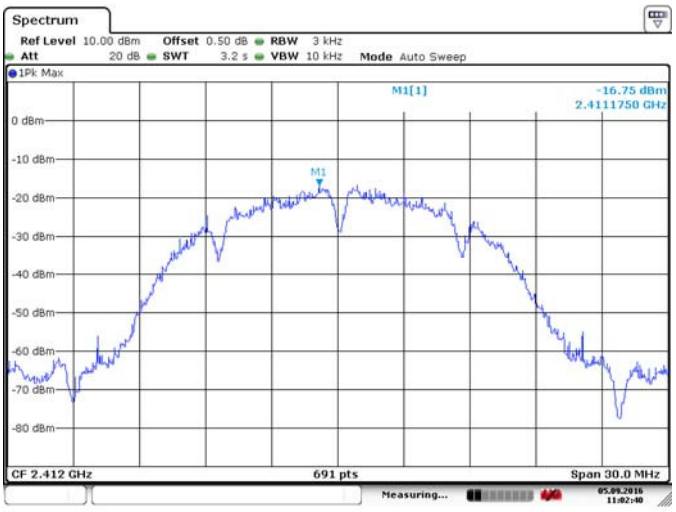
Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-18.62	8
Middle	-18.04	8
High	-17.75	8

802.11n-20 MHz Mode:

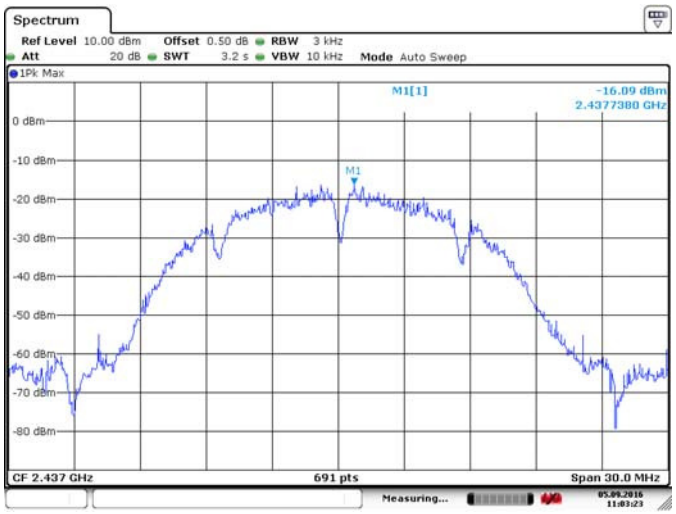
Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-18.52	8
Middle	-18.12	8
High	-18.25	8

Test plots

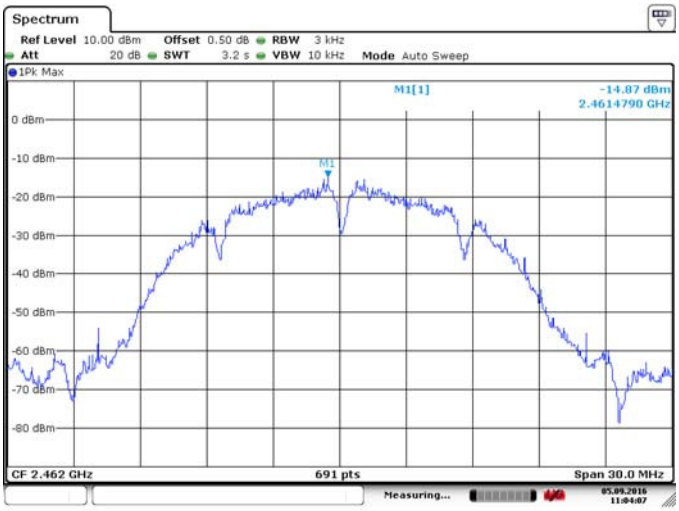
802.11b LOW CHANNEL



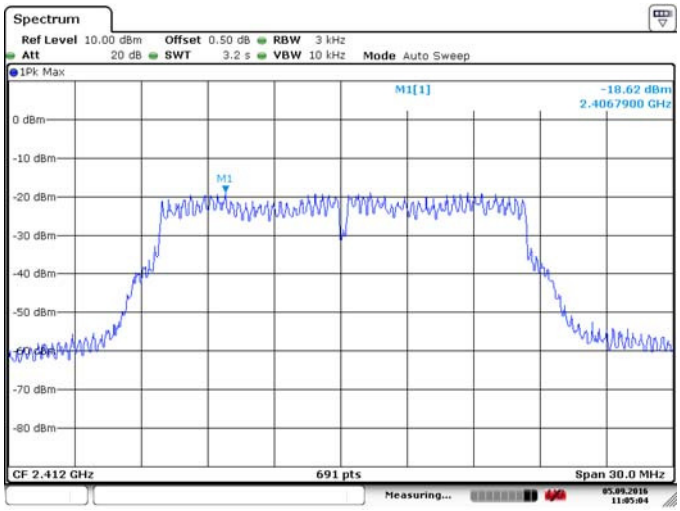
802.11b MIDDLE CHANNEL



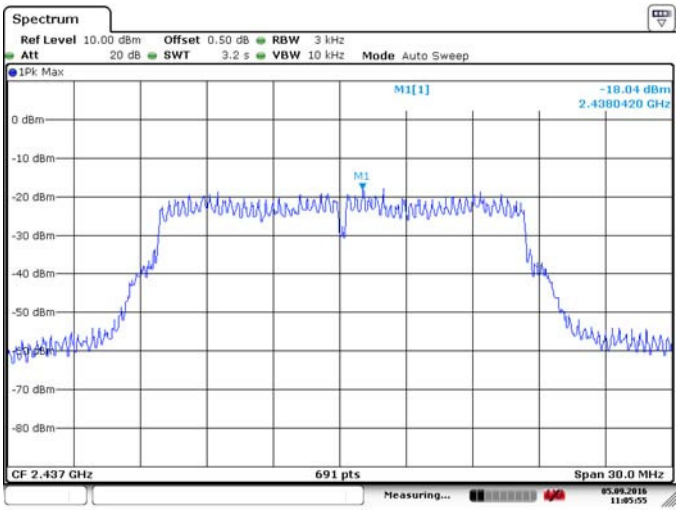
802.11b HIGH CHANNEL



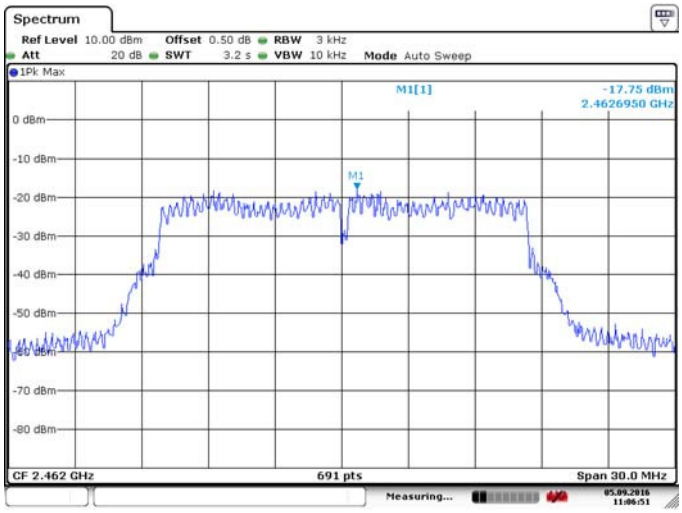
802.11g LOW CHANNEL



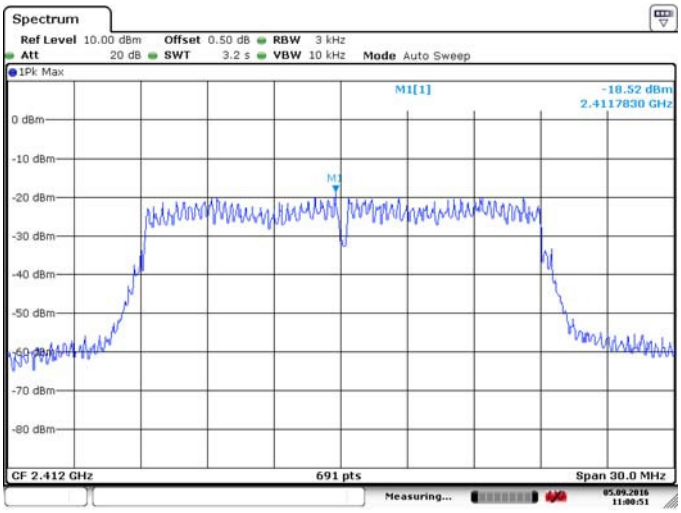
802.11g MIDDLE CHANNEL



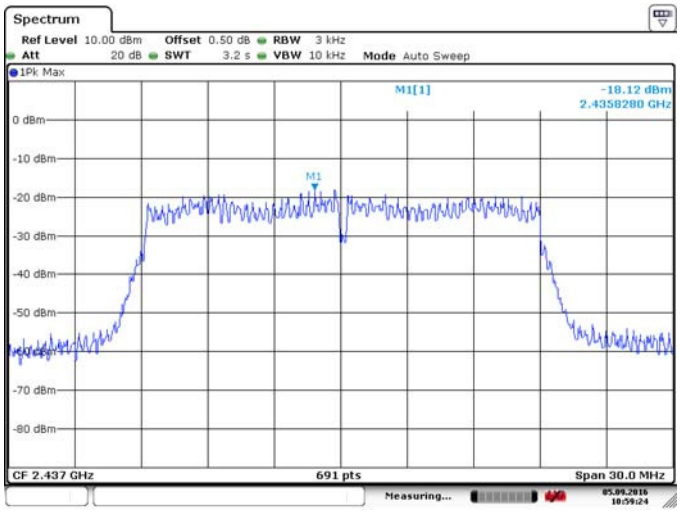
802.11g HIGH CHANNEL



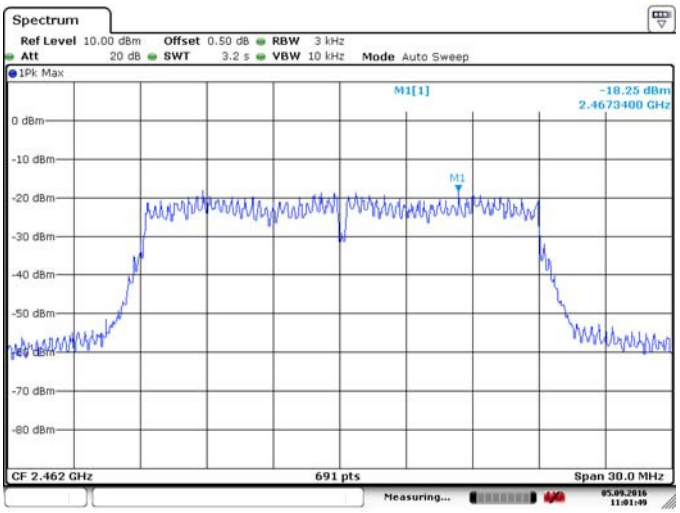
802.11n-20 MHz LOW CHANNEL



802.11 n-20 MHz MIDDLE CHANNEL



802.11n-20 MHz HIGH CHANNEL



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ1680264-AR.pdf”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ1680264-AW.pdf”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ1680264-AI.pdf”.

--END OF REPORT--