FCC PART 15, SUBPART C
ISED RSS-247, ISSUE 1, MAY 2015

TEST AND MEASUREMENT REPORT

For

GoPro, Inc.

3000 Clearview Way,

San Mateo, CA 94402, USA

FCC ID: CNFHWMR1
IC: 10193A-HWMR1

Report Type:	**Product Type:**
Original Report	Wireless Video Camera

Prepared By:	Jose Martinez Test Engineer
Report Number:	R1606032-247 DTS
Report Date:	2016-08-18
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1606032-247 DTS	Original Report	2016-08-18

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *GoPro, Inc.*, and their product model: *HWMR1,* FCC ID: CNFHWMR1; IC: 10193A-HWMR1or the "EUT" as referred to in this report. It is a Wireless video camera

1.2 Objective

This report is prepared on behalf of *GoPro, Inc.*, in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commission's rules and IC RSS-247 Issue 1, MAY 2015.

The objective is to determine compliance with FCC Part 15.247 and IC RSS-247 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, Power Spectral Density, 100 kHz Bandwidth of Band Edges Measurement, Conducted and Radiated Spurious Emissions.

1.3 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart C, Equipment DSS with FCC ID: CNFHWMR1;
FCC Part 15, Subpart E, Equipment NII with FCC ID: CNFHWMR1;

1.4 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 DTS Meas Guidance v03r05: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

1.5 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 ° C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.6 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

1.7 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3279.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficienct Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.03)*** to certify

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  - 2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  - 1 All Radio Equipment, per KHCA 10XX-series Specifications;
  - 2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  - 3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  - 1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  - 2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Industry Canada - IC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2004/108/EC US-EU EMC & Telecom MRA CAB
  - Radio & Teleterminal Equipment (R&TTE) Directive 1995/5/EC US -EU EMC & Telecom MRA CAB
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Development Authority - IDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
- Vietnam: APEC Tel MRA -Phase I;

American Association for Laboratory Accreditation

Accredited Product Certification Body

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence as a

Product Certification Body

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *General requirements for bodies operating product certification systems*. This accreditation demonstrates technical competence for a defined scope and the operation of a quality management system.

Presented this 8th day of September 2014.

President & CEO
For the Accreditation Council
Certificate Number 3297.03
Valid to September 30, 2016

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2013 and FCC KDB 558074 D01 DTS Meas Guidance v03r05.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The test firmware used was V00:04:02 provided by *GoPro, Inc.*, the software is comply with the standard requirements being tested against.

2.3 Duty Cycle Correction Factor

According to KDB 558074 D01 DTS Meas Guidance v03r05 section 6.0:

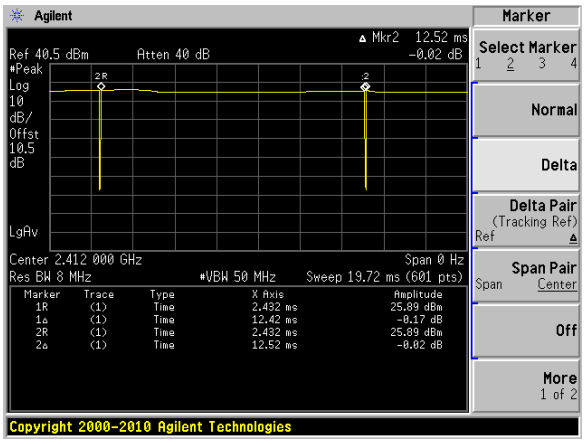
Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be utilized to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data is being acquired (i.e., no transmitter off-time is to be considered).

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11b	12.42	12.52	99.20	0.03
802.11g	2.064	2.156	95.73	0.19
802.11n20	1.92	2.02	95.05	0.22
802.11n40	0.946	1.043	90.70	0.42
BLE	0.4051	0.6241	64.91	1.88

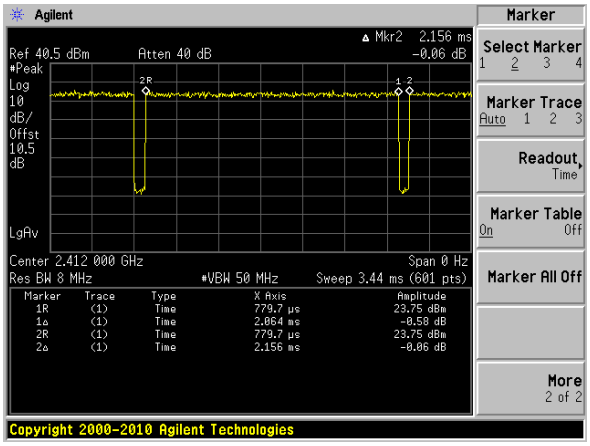
Duty Cycle = On Time (ms)/ Period (ms)
Duty Cycle Correction Factor (dB) = 10*log(1/Duty Cycle)

Please refer to the following plots.

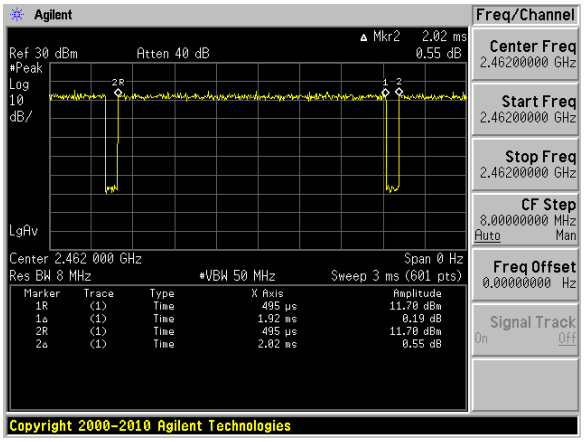
802.11b mode



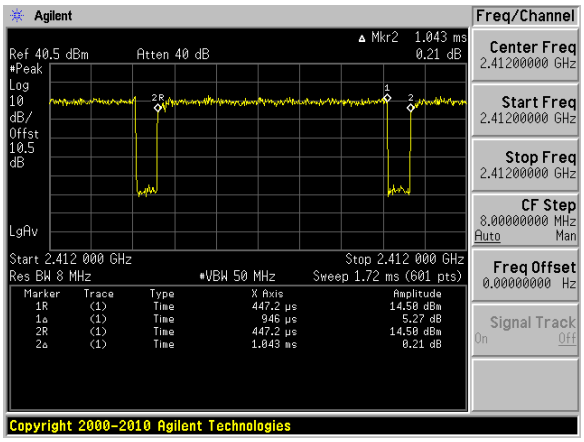
802.11g mode



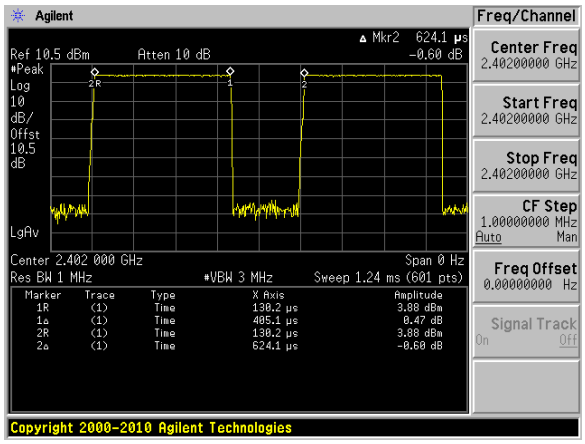
802.11n20 mode



802.11n40 mode



BLE



2.4 Equipment Modifications

A hole was cut in the back of the EUT to access the antenna ports.

2.5 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude D630

2.6 Support Equipment

There was no support equipment included, or intended for use with EUT during these tests.

2.7 Interface Ports and Cabling

Cable Description	Length (m)	To	From
USB Cable	< 1 m	Laptop	EUT
RF Cable	< 1 m	EUT	PSA

3 Summary of Test Results

Results reported relate only to the product tested.

FCC & ISED Rules	Description of Test	Results
FCC §15.203 ISED RSS-Gen §8.3	Antenna Requirement	Compliant
FCC §15.207 ISED RSS-Gen §8.8	AC Line Conducted Emissions	Compliant
FCC §2.1093, §15.247(i) ISED RSS-102	RF Exposure	Compliant [1]
FCC §2.1051, §15.247 (d) ISED RSS-247 §5.5	Spurious Emissions at Antenna Port	Compliant
FCC §2.1053, §15.205, §15.209, §15.247 (d) ISED RSS-247 §5.5 RSS-Gen §8.9 & §8.10	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2) ISED RSS-247 §5.2 (1)	6 dB & 99% Emission Bandwidth	Compliant
FCC §15.247(b)(3) ISED RSS-247 §5.4 (4)	Maximum Peak Output Power	Compliant
FCC §15.247(d) ISED RSS-247 §5.5	100 kHz Bandwidth of Frequency Band Edge	Compliant
FCC §15.247(e) ISED RSS-247 §5.2 (2)	Power Spectral Density	Compliant

Note[1]: RF exposure analysis is covered in a separate report.

4 FCC §15.203 & ISED RSS-Gen §8.3 - Antenna Requirements

4.1 Applicable Standards

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. 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.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to IC RSS-Gen §8.3: Transmitter Antenna

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the license-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

License-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the license-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of license-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. 9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

4.2 Antenna Description

The antennas used by the EUT are permanent attached antennas.

Antenna usage	Frequency Range (MHz)	Maximum Antenna Gain (dBi)
Wi-Fi/Bluetooth	2400-2500	-0.98
Wi-Fi	5100-5600	1.41

5 FCC §2.1093, §15.247(i) & ISED RSS-102 – RF Exposure

5.1 Applicable Standards

FCC §2.1093, §15.247(i), & IC RSS-102

5.2 Test Results

Please refer to the SAR Report: R1606032- SAR.

6 FCC §15.207 & ISED RSS-Gen §8.8 - AC Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §8.8 Conducted limits:

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 or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note1	56 to 46 Note2
0.5-5	56	46
5-30	60	50

Note1: Decreases with the logarithm of the frequency.
Note2: A linear average detector is required

6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.10-2013 measurement procedure. The specification used were FCC §15.207 and IC RSS-Gen §8.8 limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cords of support equipment were connected to LISN-2.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data were recorded in the peak, quasi-peak and average detection mode. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

6.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

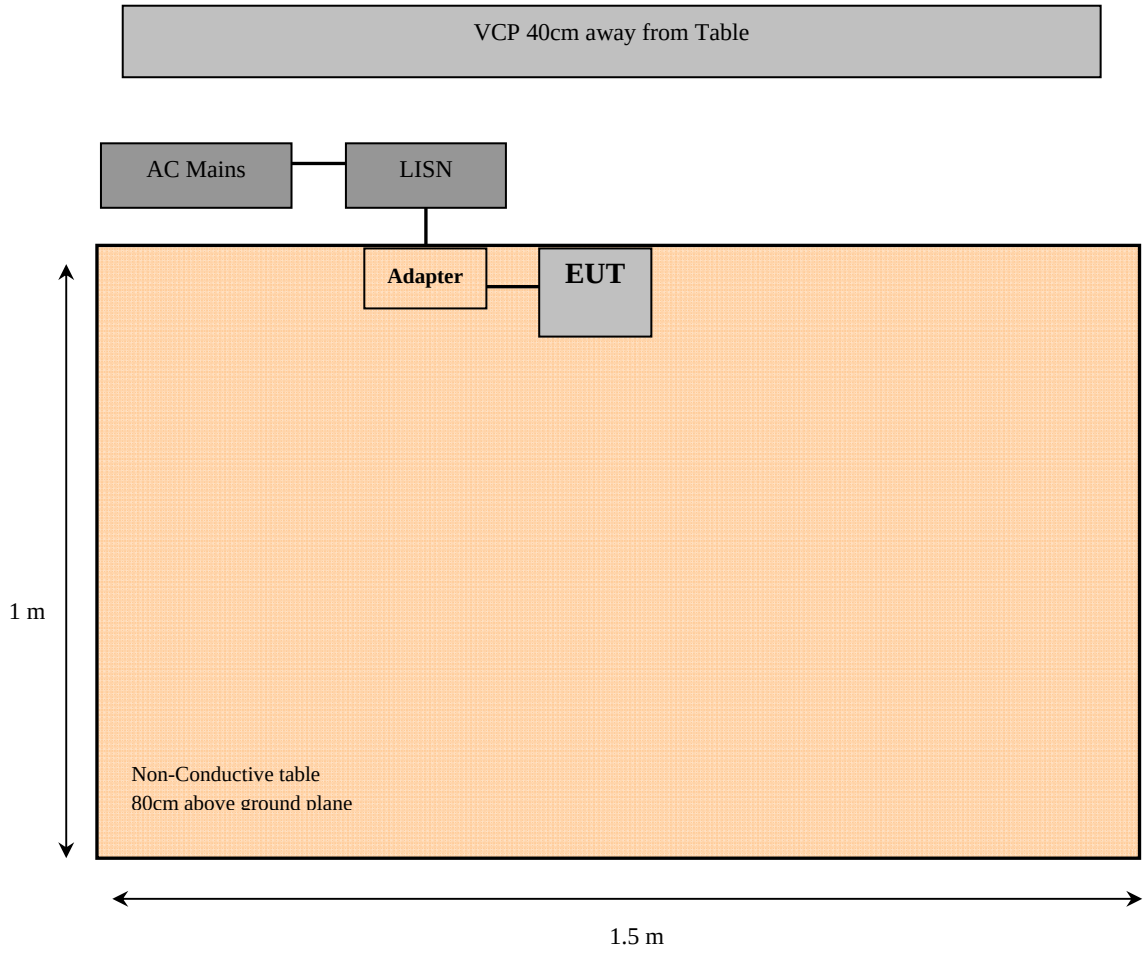
CA = Ai + CL + Atten

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Limit

6.5 Test Setup Block Diagram



6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100338	2016-02-04	2 year
Rohde & Schwarz	Impulse Limiter	ESH3-Z2	101964	2016-07-22	1 year
Keysight Technologies	RF Limiter	11867A	MY42242932	2015-12-15	1 year
Solar Electronics Company	High Pass Filter	Type 7930-100	7930150204	2016-03-09	1 Year
Suirong	30 ft conductive emission cable	LMR 400	-	2016-03-05	1 year
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

6.7 Test Environmental Conditions

Temperature:	18º C
Relative Humidity:	42 %
ATM Pressure:	101.31 kPa

The testing was performed by Jose Martinez on 2016-07-25 in 5 chamber 3.

6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC 15C and IC RSS-Gen standard's conducted emissions limits, with the margin reading of:

2.4 GHz Wi-Fi

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Live/Neutral)**	**Range (MHz)**
-12.63	0.406006	Neutral	0.15-30

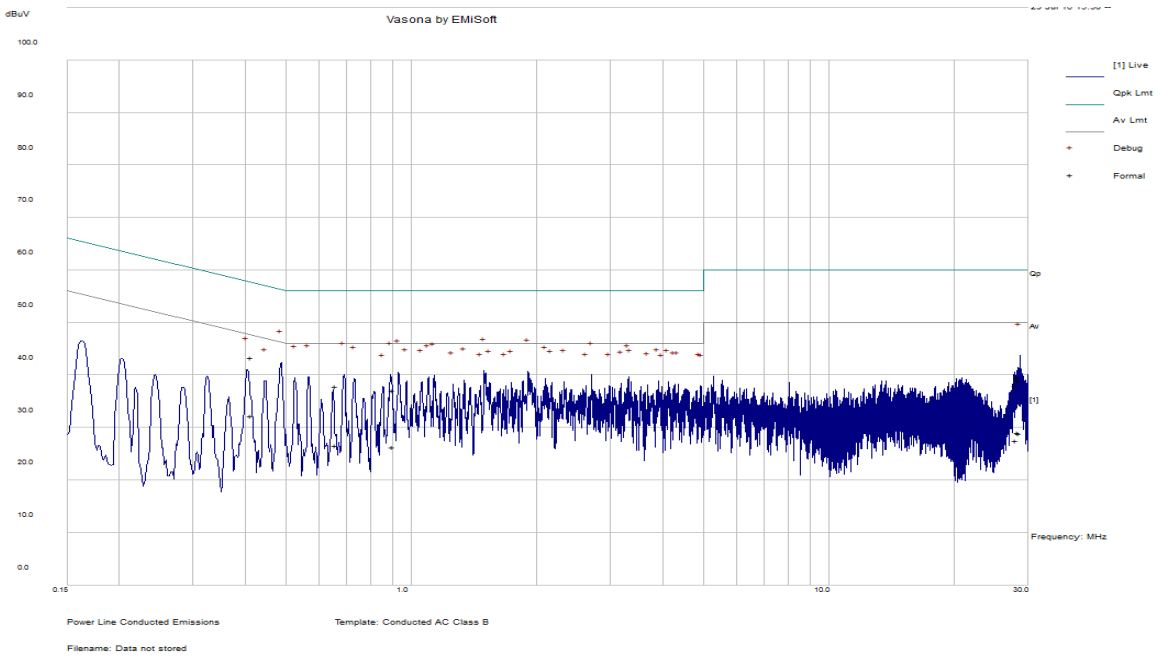
BLE

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Live/Neutral)**	**Range (MHz)**
-12.57	0.405646	Neutral	0.15-30

6.9 Conducted Emissions Test Plots and Data

2.4 GHz Wi-Fi

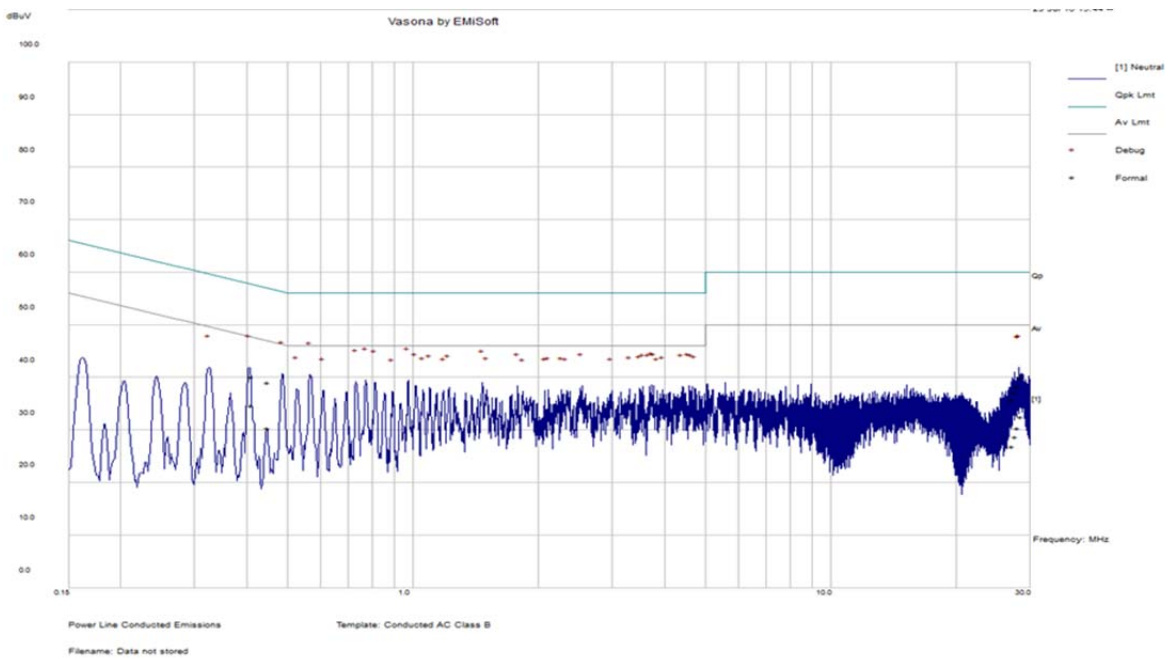
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.486666	41.49	Line	56.22	-14.74	QP
1.503198	36.28	Line	56	-19.72	QP
1.916692	34.76	Line	56	-21.24	QP
0.931897	38.4	Line	56	-17.6	QP
0.687312	37.81	Line	56	-18.19	QP
0.892422	37.93	Line	56	-18.07	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.486666	28.5	Line	46.22	-17.72	Ave.
1.503198	24.68	Line	46	-21.32	Ave.
1.916692	22.07	Line	46	-23.93	Ave.
0.931897	26.63	Line	46	-19.37	Ave.
0.687312	25.17	Line	46	-20.83	Ave.
0.892422	26.69	Line	46	-19.31	Ave.

120 V, 60 Hz – Neutral

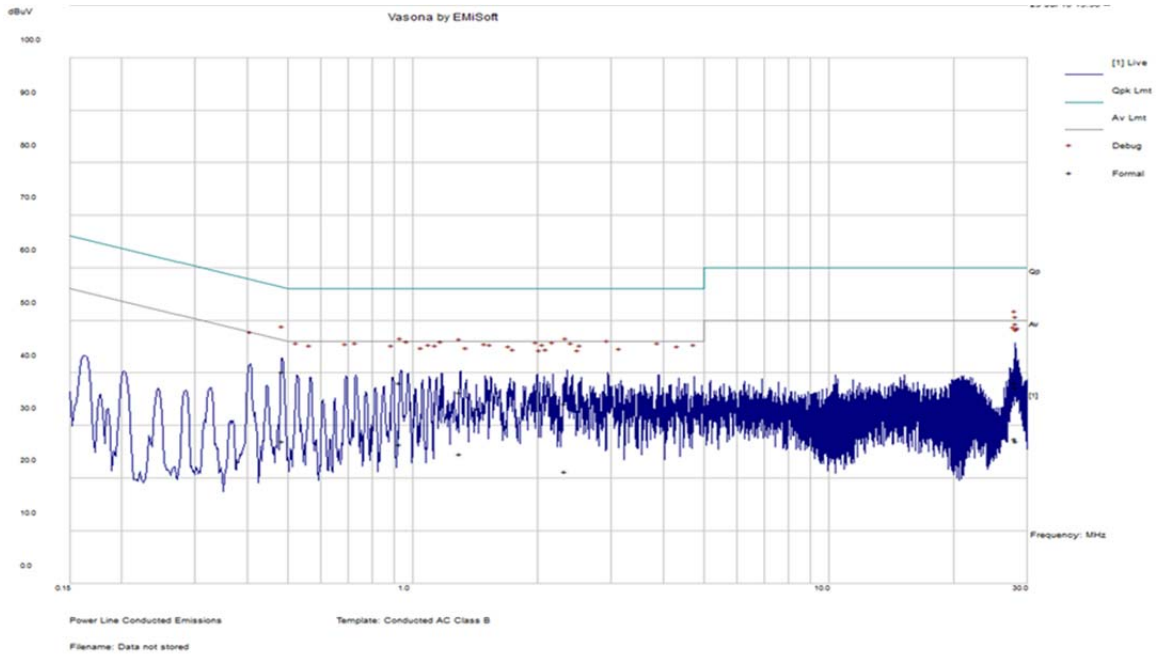


Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.568059	38.95	Neutral	56	-17.05	QP
0.486726	39.49	Neutral	56.22	-16.74	QP
0.406006	41.02	Neutral	57.73	-16.71	QP
0.97427	36.46	Neutral	56	-19.54	QP
0.768944	37.12	Neutral	56	-18.88	QP
0.731665	36.68	Neutral	56	-19.32	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.568059	32.99	Neutral	46	-13.01	Ave.
0.486726	33.16	Neutral	46.22	-13.06	Ave.
0.406006	35.1	Neutral	47.73	**-12.63**	Ave.
0.97427	30.39	Neutral	46	-15.61	Ave.
0.768944	30.4	Neutral	46	-15.6	Ave.
0.731665	30.64	Neutral	46	-15.36	Ave.

BLE

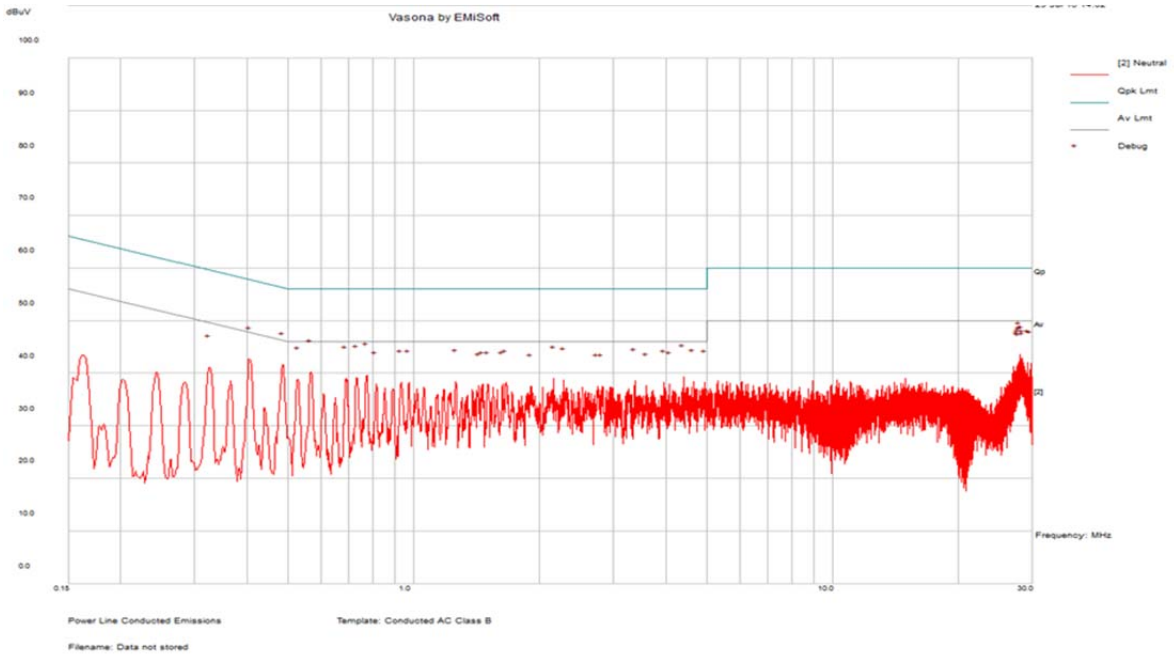
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.485682	40.33	Line	56.24	-15.91	QP
27.982698	38.16	Line	60	-21.84	QP
28.148413	37.25	Line	60	-22.75	QP
0.932111	38.11	Line	56	-17.89	QP
2.330418	34.15	Line	56	-21.85	QP
1.296082	36.41	Line	56	-19.59	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.485682	27.03	Line	46.24	-19.21	Ave.
27.982698	27.54	Line	50	-22.46	Ave.
28.148413	27.06	Line	50	-22.94	Ave.
0.932111	26.45	Line	46	-19.55	Ave.
2.330418	21.25	Line	46	-24.75	Ave.
1.296082	24.58	Line	46	-21.42	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.48642	39.31	Neutral	56.23	-16.92	QP
0.405646	41.12	Neutral	57.74	-16.62	QP
0.567764	39.04	Neutral	56	-16.96	QP
0.769747	37.49	Neutral	56	-18.51	QP
27.919945	37	Neutral	60	-23	QP
4.40486	33.45	Neutral	56	-22.55	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.48642	32.88	Neutral	46.23	-13.35	Ave.
0.405646	35.17	Neutral	47.74	**-12.57**	Ave.
0.567764	33.05	Neutral	46	-12.95	Ave.
0.769747	31.15	Neutral	46	-14.85	Ave.
27.919945	29.02	Neutral	50	-20.98	Ave.
4.40486	22.81	Neutral	46	-23.19	Ave.

7 FCC §15.209, §15.247(d) & ISED RSS-247 §5.5, RSS-Gen §8.9, §8.10 - Spurious Radiated Emissions

7.1 Applicable Standards

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As Per FCC §15.205(a) and RSS-Gen except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC §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 (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247 (d), 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

As per IC RSS-Gen 8.9,

> Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table 4 or Table 5 below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Table 4 – General Field Strength Limits for Licence-Exempt Transmitters at Frequencies Above 30 MHz

Frequency (MHz)	Field Strength (µv/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960*	500

* Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for license-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.

Note: Transmitting devices are not permitted in restricted frequency bands unless stated otherwise in the specific RSS.

As per IC RSS-247 §5.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC 15 Subpart C and IC RSS-247 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

7.3 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT was set 3 meter away from the testing antenna, which was varied from 1-4 meter, and the EUT was placed on a turntable, which was 0.8 meter and 1.5 meter above the ground plane for below and above 1000 MHz measurements, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna's polarity should be changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

7.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

7.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100338	2016-02-04	2 year
Agilent	Analyzer, Spectrum	E4446A	US44300386	2015-10-22	1 year
Sunol Science Corp	System Controller	SC99V	011003-1	N/R	N/R
Sunol Sciences	Antenna, Biconi-Log	JB3	A020106-2	2015-07-11	2 Years
EMCO	Antenna, Horn	3115	9511-4627	2016-01-28	2 years
Agilent	Amplifier, Pre	8447D	2944A10187	2016-03-23	1 year
IW	AOBOR Hi frequency Co AX CabelCable	DC 1531	KPS-1501A3960KPS	2015-08-10	1 Year
-	SMA cable	-	C0002	Each time[1]	N/A
-	N-Type Cable	-	C00013	2016-04-28	1 year
-	N-Type Cable	-	C00014	2016-05-28	1 year
Agilent	Pre-Amplifier	8449B	3008A01978	2015-09-02	1year
Wisewave	Antenna, Horn	ARH-4223-02	10555-02	2013-09-20	3 year
Wisewave	Antenna, Horn	ARH-2823-02	10555-02	2013-09-20	3 year
Wisewave	Amplifier, Low Noise	ALN-33144030-01	11424-01	2016-04-28	1 year
Wisewave	Amplifier, Low Noise	ALN-22093530-01	12263-01	2016-05-16	1 year
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL *attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.*

7.6 Test Environmental Conditions

Temperature:	20-22 ºC
Relative Humidity:	42-50 %
ATM Pressure:	102.7 kPa

The testing was performed by Xiao Lin 2016-07-20 in 5m chamber 3.

7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with FCC Title 47, Part 15C and IC RSS-247 standard's radiated emissions limits, and had the worst margin of:

2.4 GHz Wi-Fi

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, channel**
-0.38	2390	Horizontal	g mode, low channel

BLE

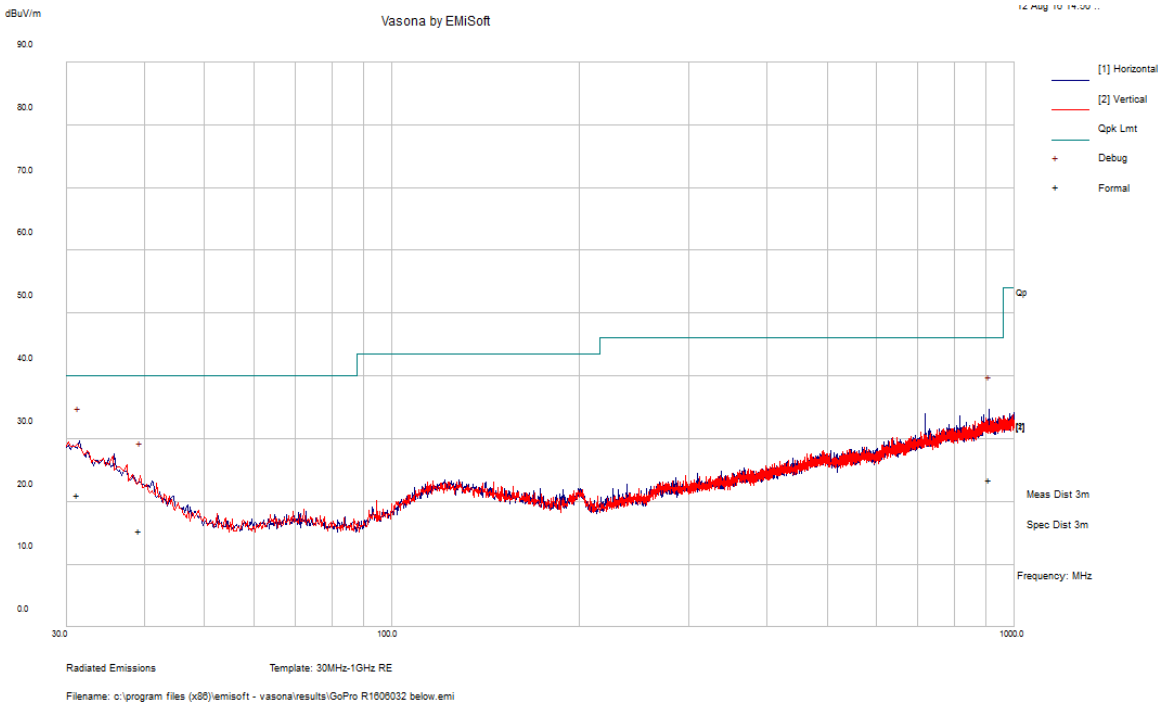
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**channel**
-2.03	2483.5	Horizontal	high channel

Please refer to the following table and plots for specific test result details

7.8 Radiated Emissions Test Results

1) 30 MHz – 1 GHz Worst Case, Measured at 3 meters

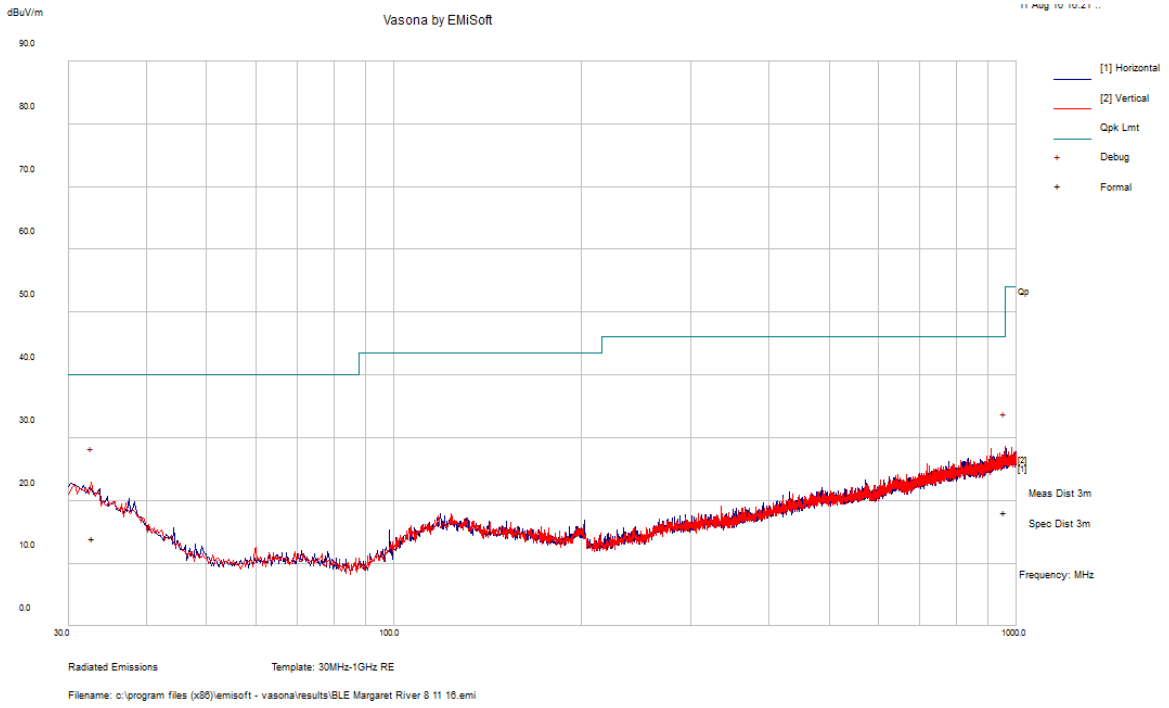
2.4 GHz Wi-Fi



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
31.2725	21.06	187	H	328	40	-18.94	QP
912.0573	23.55	100	H	76	46	-22.45	QP
39.318	15.42	203	V	286	40	-24.58	QP

Note: Only 3 emissions were present because the other emissions were 20 dB below the limit.

BLE



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
32.757	14.04	204	V	275	40	-25.96	QP
957.7543	18.06	208	V	102	46	-27.94	QP

Note: Only 2 emissions were present because the other emissions were 20 dB below the noise floor.

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2) 1–25 GHz Measured at 3 meters

802.11b mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz											
2412	71.73	215	288	H	29.04	5.21	0	105.98	-	-	PK
2412	69.84	215	288	H	29.04	5.21	0	104.09	-	-	AV
2412	65.28	199	279	V	29.04	5.21	0	99.53	-	-	PK
2412	63.38	199	279	V	29.04	5.21	0	97.63	-	-	AV
2390	29.68	215	288	H	29.04	5.21	0	63.93	74.00	-10.07	PK
2390	17.88	215	288	H	29.04	5.21	0	52.13	54.00	-1.87	AV
2390	28.23	199	279	V	29.04	5.21	0	62.48	74.00	-11.52	PK
2390	16.97	199	279	V	29.04	5.21	0	51.22	54.00	-2.78	AV
4824	48.87	92	256	H	32.47	8.85	38.55	51.64	74.00	-22.36	PK
4824	41.79	92	256	H	32.47	8.85	38.55	44.56	54.00	-9.44	AV
7236	47.62	0	100	H	36.69	11.26	37.9	57.67	74.00	-16.33	PK
7236	35.38	0	100	H	36.69	11.26	37.9	45.43	54.00	-8.57	AV
9648	48.19	0	100	H	37.77	12.23	38.29	59.90	74.00	-14.10	PK
9648	36.80	0	100	H	37.77	12.23	38.29	48.51	54.00	-5.49	AV
Middle Channel 2437 MHz											
2437	72.34	241	283	H	29.04	5.21	0.00	106.59	-	-	PK
2437	70.49	241	283	H	29.04	5.21	0.00	104.74	-	-	AV
2437	65.52	198	251	V	29.04	5.21	0.00	99.77	-	-	PK
2437	63.57	198	251	V	29.04	5.21	0.00	97.82	-	-	AV
4874	48.76	111	292	H	32.64	8.90	38.55	51.75	74.00	-22.25	PK
4874	41.31	111	292	H	32.64	8.90	38.55	44.30	54.00	-9.70	AV
7311	45.87	0	100	H	37.15	11.25	37.90	56.37	74.00	-17.63	PK
7311	34.60	0	100	H	37.15	11.25	37.90	45.10	54.00	-8.90	AV
9748	47.12	0	100	H	37.84	11.85	38.30	58.51	74.00	-15.49	PK
9748	35.96	0	100	H	37.84	11.85	38.30	47.35	54.00	-6.65	AV

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2462 MHz											
2462	70.98	205	220	H	29.41	5.21	0.00	105.60	-	-	PK
2462	69.10	205	220	H	29.41	5.21	0.00	103.72	-	-	AV
2462	63.98	199	277	V	29.41	5.21	0.00	98.60	-	-	PK
2462	62.16	199	277	V	29.41	5.21	0.00	96.78	-	-	AV
2483.5	28.29	205	220	H	29.41	5.21	0.00	62.91	74.00	-11.09	PK
2483.5	17.44	205	220	H	29.41	5.21	0.00	52.06	54.00	-1.94	AV
2483.5	27.65	199	277	V	29.41	5.21	0.00	62.27	74.00	-11.73	PK
2483.5	16.67	199	277	V	29.41	5.21	0.00	51.29	54.00	-2.71	AV
4924	53.60	221	202	H	32.64	8.93	38.54	56.63	74.00	-17.37	PK
4924	46.87	221	202	H	32.64	8.93	38.54	49.90	54.00	-4.10	AV
7386	46.23	0	100	H	37.14	11.12	37.89	56.60	74.00	-17.40	PK
7386	34.59	0	100	H	37.14	11.12	37.89	44.96	54.00	-9.04	AV
9848	47.53	0	100	H	37.92	11.69	38.31	58.83	74.00	-15.17	PK
9848	36.33	0	100	H	37.92	11.69	38.31	47.63	54.00	-6.37	AV

802.11g mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz											
2412	73.91	177	100	H	29.042	5.21	0.00	108.16	-	-	PK
2412	65.84	177	100	H	29.042	5.21	0.00	100.09	-	-	AV
2412	69.23	181	290	V	29.042	5.21	0.00	103.48	-	-	PK
2412	61.93	181	290	V	29.042	5.21	0.00	96.18	-	-	AV
2390	30.06	177	100	H	29.042	5.21	0.00	64.31	74.00	-9.69	PK
2390	19.37	177	100	H	29.042	5.21	0.00	53.62	54.00	**-0.38**	AV
2390	28.58	181	290	V	29.042	5.21	0.00	62.83	74.00	-11.17	PK
2390	17.75	181	290	V	29.042	5.21	0.00	52.00	54.00	-2.00	AV
4824	48.64	101	284	H	32.472	8.85	38.55	51.41	74.00	-22.59	PK
4824	37.68	101	284	H	32.472	8.85	38.55	40.45	54.00	-13.55	AV
7236	46.83	0	100	H	36.692	11.26	37.90	56.88	74.00	-17.12	PK
7236	35.67	0	100	H	36.692	11.26	37.90	45.72	54.00	-8.28	AV
9648	47.72	0	100	H	37.771	12.23	38.29	59.43	74.00	-14.57	PK
9648	37.39	0	100	H	37.771	12.23	38.29	49.10	54.00	-4.90	AV
Middle Channel 2437 MHz											
2437	77.02	205	223	H	29.04	5.21	0.00	111.27	-	-	PK
2437	69.70	205	223	H	29.04	5.21	0.00	103.95	-	-	AV
2437	72.91	181	285	V	29.04	5.21	0.00	107.16	-	-	PK
2437	65.70	181	285	V	29.04	5.21	0.00	99.95	-	-	AV
4874	49.78	198	100	H	32.64	8.90	38.55	52.77	74.00	-21.23	PK
4874	37.92	198	100	H	32.64	8.90	38.55	40.91	54.00	-13.09	AV
7311	46.29	0	100	H	37.15	11.25	37.90	56.79	74.00	-17.21	PK
7311	35.01	0	100	H	37.15	11.25	37.90	45.51	54.00	-8.49	AV
9748	46.99	0	100	H	37.84	11.85	38.30	58.38	74.00	-15.62	PK
9748	36.49	0	100	H	37.84	11.85	38.30	47.88	54.00	-6.12	AV

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2472 MHz											
2462	73.33	203	222	H	29.41	5.21	0.00	107.95	-	-	PK
2462	66.30	203	222	H	29.41	5.21	0.00	100.92	-	-	AV
2462	66.01	199	281	V	29.41	5.21	0.00	100.63	-	-	PK
2462	58.67	199	281	V	29.41	5.21	0.00	93.29	-	-	AV
2483.5	29.24	203	222	H	29.41	5.21	0.00	63.86	74.00	-10.14	PK
2483.5	18.74	203	222	H	29.41	5.21	0.00	53.36	54.00	-0.64	AV
2483.5	25.32	199	281	V	29.41	5.21	0.00	59.94	74.00	-14.06	PK
2483.5	14.67	199	281	V	29.41	5.21	0.00	49.29	54.00	-4.71	AV
4924	46.54	0	100	H	32.64	8.93	38.54	49.57	74.00	-24.43	PK
4924	35.59	0	100	H	32.64	8.93	38.54	38.62	54.00	-15.38	AV
7386	46.34	0	100	H	37.14	11.12	37.89	56.71	74.00	-17.29	PK
7386	34.97	0	100	H	37.14	11.12	37.89	45.34	54.00	-8.66	AV
9848	47.48	0	100	H	37.92	11.69	38.31	58.78	74.00	-15.22	PK
9848	36.84	0	100	H	37.92	11.69	38.31	48.14	54.00	-5.86	AV

802.11n20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz											
2412	72.32	175.00	100	H	29.04	5.21	0.00	106.57	-	-	PK
2412	65.14	175.00	100	H	29.04	5.21	0.00	99.39	-	-	AV
2412	65.49	199.00	279	V	29.04	5.21	0.00	99.74	-	-	PK
2412	58.58	199.00	279	V	29.04	5.21	0.00	92.83	-	-	AV
2390	29.97	175.00	100	H	29.04	5.21	0.00	64.22	74.00	-9.78	PK
2390	19.26	175.00	100	H	29.04	5.21	0.00	53.51	54.00	-0.49	AV
2390	28.26	199.00	279	V	29.04	5.21	0.00	62.51	74.00	-11.49	PK
2390	17.42	199.00	279	V	29.04	5.21	0.00	51.67	54.00	-2.33	AV
4824	46.98	0.00	100	H	32.47	8.85	38.55	49.75	74.00	-24.25	PK
4824	35.87	0.00	100	H	32.47	8.85	38.55	38.64	54.00	-15.36	AV
7236	46.74	0.00	100	H	36.69	11.26	37.90	56.79	74.00	-17.21	PK
7236	35.50	0.00	100	H	36.69	11.26	37.90	45.55	54.00	-8.45	AV
9648	47.87	0.00	100	H	37.77	12.23	38.29	59.58	74.00	-14.42	PK
9648	37.27	0.00	100	H	37.77	12.23	38.29	48.98	54.00	-5.02	AV
Middle Channel 2437 MHz											
2437	76.74	206	227	H	29.04	5.21	0.00	110.99	-	-	PK
2437	69.60	206	227	H	29.04	5.21	0.00	103.85	-	-	AV
2437	72.06	180	283	V	29.04	5.21	0.00	106.31	-	-	PK
2437	64.99	180	283	V	29.04	5.21	0.00	99.24	-	-	AV
4874	50.81	97	286	H	32.64	8.90	38.55	53.80	74.00	-20.20	PK
4874	38.74	97	286	H	32.64	8.90	38.55	41.73	54.00	-12.27	AV
7311	45.92	0	100	H	37.15	11.25	37.90	56.42	74.00	-17.58	PK
7311	34.97	0	100	H	37.15	11.25	37.90	45.47	54.00	-8.53	AV
9748	47.38	0	100	H	37.84	11.85	38.30	58.77	74.00	-15.23	PK
9748	36.26	0	100	H	37.84	11.85	38.30	47.65	54.00	-6.35	AV

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2462 MHz											
2462	71.55	63	100	H	29.41	5.21	0.00	106.17	-	-	PK
2462	64.62	63	100	H	29.41	5.21	0.00	99.24	-	-	AV
2462	68.19	58	300	V	29.41	5.21	0.00	102.81	-	-	PK
2462	61.11	58	300	V	29.41	5.21	0.00	95.73	-	-	AV
2483.5	29.10	63	100	H	29.41	5.21	0.00	63.72	74.00	-10.28	PK
2483.5	18.57	63	100	H	29.41	5.21	0.00	53.19	54.00	-0.81	AV
2483.5	27.33	58	300	V	29.41	5.21	0.00	61.95	74.00	-12.05	PK
2483.5	17.84	58	300	V	29.41	5.21	0.00	52.46	54.00	-1.54	AV
4924	46.49	0	100	H	32.64	8.93	38.54	49.52	74.00	-24.48	PK
4924	35.62	0	100	H	32.64	8.93	38.54	38.65	54.00	-15.35	AV
7386	46.02	0	100	H	37.14	11.12	37.89	56.39	74.00	-17.61	PK
7386	34.95	0	100	H	37.14	11.12	37.89	45.32	54.00	-8.68	AV
9848	48.12	0	100	H	37.92	11.69	38.31	59.42	74.00	-14.58	PK
9848	36.77	0	100	H	37.92	11.69	38.31	48.07	54.00	-5.93	AV

802.11n40 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2422 MHz											
2422	66.88	203	226	H	29.04	5.21	0.00	101.13	-	-	PK
2422	59.22	213	232	H	29.04	5.21	0.00	93.47	-	-	AV
2422	61.01	202	290	V	29.04	5.21	0.00	95.26	-	-	PK
2422	53.90	204	285	V	29.04	5.21	0.00	88.15	-	-	AV
2390	34.60	235	300	H	29.04	5.21	0.00	68.85	74.00	-5.15	PK
2390	17.73	239	301	H	29.04	5.21	0.00	51.98	54.00	-2.02	AV
2390	31.24	160	292	V	29.04	5.21	0.00	65.49	74.00	-8.51	PK
2390	16.62	0	300	V	29.04	5.21	0.00	50.87	54.00	-3.13	AV
4844	46.51	0	100	H	32.47	8.88	38.54	49.32	74.00	-24.68	PK
4844	36.09	0	100	H	32.47	8.88	38.54	38.90	54.00	-15.10	AV
7266	46.90	0	100	H	37.15	11.26	37.90	57.41	74.00	-16.59	PK
7266	35.86	0	100	H	37.15	11.26	37.90	46.37	54.00	-7.63	AV
9688	47.40	0	100	H	37.77	12.12	38.29	59.00	74.00	-15.00	PK
9688	37.53	0	100	H	37.77	12.12	38.29	49.13	54.00	-4.87	AV
Middle Channel 2437 MHz											
2437	74.14	49	150	H	29.04	5.21	0.00	108.39	-	-	PK
2437	66.91	49	150	H	29.04	5.21	0.00	101.16	-	-	AV
2437	65.74	45	219	V	29.04	5.21	0.00	99.99	-	-	PK
2437	58.92	45	219	V	29.04	5.21	0.00	93.17	-	-	AV
4874	46.76	196	124	H	32.64	8.90	38.55	49.75	74.00	-24.25	PK
4874	36.68	196	124	H	32.64	8.90	38.55	39.67	54.00	-14.33	AV
7311	45.65	0	100	H	37.15	11.25	37.90	56.15	74.00	-17.85	PK
7311	35.32	0	100	H	37.15	11.25	37.90	45.82	54.00	-8.18	AV
9748	47.58	0	100	H	37.84	11.85	38.30	58.97	74.00	-15.03	PK
9748	37.11	0	100	H	37.84	11.85	38.30	48.50	54.00	-5.50	AV

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2452 MHz											
2452	66.91	202	222	H	29.41	5.21	0.00	101.53	-	-	PK
2452	58.55	200	180	H	29.41	5.21	0.00	93.17	-	-	AV
2452	61.82	185	300	V	29.41	5.21	0.00	96.44	-	-	PK
2452	53.11	204	292	V	29.41	5.21	0.00	87.73	-	-	AV
2483.5	32.32	216	270	H	29.41	5.21	0.00	66.94	74.00	-7.06	PK
2483.5	17.93	196	241	H	29.41	5.21	0.00	52.55	54.00	-1.45	AV
2483.5	27.01	0	100	V	29.41	5.21	0.00	61.63	74.00	-12.37	PK
2483.5	16.90	0	262	V	29.41	5.21	0.00	51.52	54.00	-2.48	AV
4904	46.84	0	100	H	32.64	8.91	38.54	49.85	74.00	-24.15	PK
4904	35.89	0	100	H	32.64	8.91	38.54	38.90	54.00	-15.10	AV
7356	45.30	0	100	H	37.14	11.18	37.90	55.72	74.00	-18.28	PK
7356	35.24	0	100	H	37.14	11.18	37.90	45.66	54.00	-8.34	AV
9808	47.74	0	100	H	37.92	11.63	38.31	58.98	74.00	-15.02	PK
9808	36.96	0	100	H	37.92	11.63	38.31	48.20	54.00	-5.80	AV

BLE

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz											
2402	57.22	184	276	V	29.04	5.21	0.00	91.47	-	-	Peak
2402	60.76	222	150	H	29.04	5.21	0.00	95.01	-	-	Peak
2402	58.43	191	277	V	29.04	5.21	0.00	92.69	-	-	Ave
2402	62.17	220	152	H	29.04	5.21	0.00	96.43	-	-	Ave
2390	36.61	250	100	V	29.04	5.21	0.00	70.86	74.00	-3.14	Peak
2390	36.85	230	100	H	29.04	5.21	0.00	71.10	74.00	-2.90	Peak
2390	42.07	150	100	V	29.04	5.81	37.77	39.16	54.00	-14.84	Ave
2390	41.90	260	100	H	29.04	5.81	37.77	38.99	54.00	-15.01	Ave
4804	48.68	164	100	V	32.47	8.85	38.20	51.80	74.00	-22.20	Peak
4804	48.42	15	100	H	32.47	8.85	38.20	51.54	74.00	-22.46	Peak
4804	33.10	0	100	V	32.47	8.85	38.20	36.22	54.00	-17.78	Ave
4804	34.90	114	200	H	32.47	8.85	38.20	38.02	54.00	-15.98	Ave
7206	48.91	0	100	V	36.69	11.26	37.68	59.18	74.00	-14.82	Peak
7206	48.53	0	100	H	36.69	11.26	37.68	58.80	74.00	-15.20	Peak
7206	32.06	0	300	V	36.69	11.26	37.68	42.33	54.00	-11.67	Ave
7206	32.38	0	100	H	36.69	11.26	37.68	42.65	54.00	-11.35	Ave
9608	48.21	0	100	V	37.77	12.41	38.16	60.23	74.00	-13.77	Peak
9608	48.68	0	100	H	37.77	12.41	38.16	60.70	74.00	-13.30	Peak
9608	33.06	0	100	V	37.77	12.41	38.16	45.08	54.00	-8.92	Ave
9608	33.03	0	100	H	37.77	12.41	38.16	45.05	54.00	-8.95	Ave
Middle Channel 2440 MHz											
2440	58.23	192	300	V	29.35	5.21	0.00	92.79	-	-	Peak
2440	61.59	214	245	H	29.35	5.21	0.00	96.15	-	-	Peak
2440	59.34	192	300	V	29.35	5.21	0.00	93.90	-	-	Ave
2440	62.73	207	166	H	29.35	5.21	0.00	97.29	-	-	Ave
4880	48.71	280	100	H	32.64	9.00	38.16	52.19	74.00	-21.81	Peak
4880	35.26	270	300	H	32.64	9.00	38.16	38.74	54.00	-15.26	Ave
7320	46.69	0	100	H	37.15	11.35	37.68	57.50	74.00	-16.50	Peak
7320	33.74	0	100	H	37.15	11.35	37.68	44.55	54.00	-9.45	Ave
9760	47.88	0	100	H	37.87	11.63	38.31	59.06	74.00	-14.94	Peak
9760	33.54	0	100	H	37.87	11.63	38.31	44.72	54.00	-9.28	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	58.24	175	301	V	29.41	5.21	0.00	92.86	-	-	Peak
2480	62.20	210	149	H	29.41	5.21	0.00	96.82	-	-	Peak
2480	57.95	209	267	V	29.41	5.21	0.00	92.58	-	-	Ave
2480	63.67	203	153	H	29.41	5.21	0.00	98.30	-	-	Ave
2483.5	37.07	210	100	V	29.41	5.21	0.00	71.69	74.00	-2.31	Peak
2483.5	37.35	56	100	H	29.41	5.21	0.00	71.97	74.00	**-2.03**	Peak
2483.5	41.21	130	103	V	29.41	5.81	37.72	38.72	54.00	-15.28	Ave
2483.5	41.64	100	210	H	29.41	5.81	37.72	39.15	54.00	-14.85	Ave
4960	47.41	360	100	H	32.74	8.89	38.14	50.90	74.00	-23.10	Peak
4960	33.25	0	100	H	32.74	8.89	38.14	36.74	54.00	-17.26	Ave
7440	47.42	0	100	H	37.03	11.11	37.73	57.83	74.00	-16.17	Peak
7440	34.09	0	100	H	37.03	11.11	37.73	44.50	54.00	-9.50	Ave
9920	47.12	0	100	H	37.99	11.83	38.36	58.57	74.00	-15.43	Peak
9920	32.69	0	100	H	37.99	11.83	38.36	44.14	54.00	-9.86	Ave

Note: Duty Cycle Correction Factor has been added to the measurements.

8 FCC §15.247(a) (2) & ISED RSS-247 §5.2 -Emission Bandwidth

8.1 Applicable Standards

According to ECFR §15.247(a) (2) and IC RSS-247 §5.2, systems using digital modulation techniques may operate in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz

8.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r05: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8: DTS bandwidth

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2015-11-12	1 year
-	RF cable	-	-	Each time[1]	N/A
-	10dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

8.4 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Jose Martinez on 2016-07-11 in RF site.

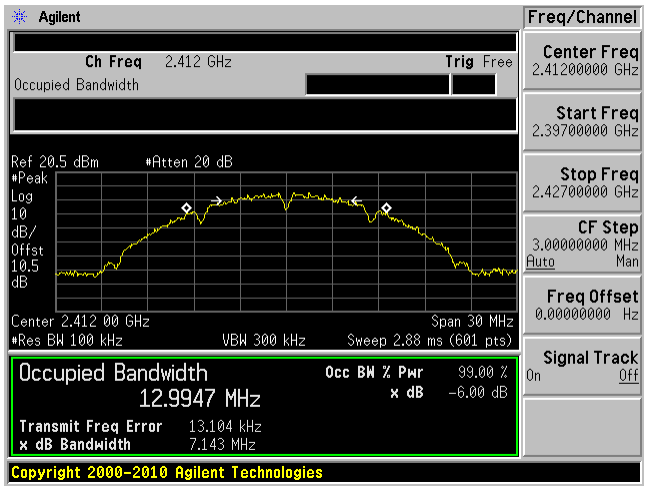
8.5 Test Results

Channel	Frequency (MHz)	99% OBW (kHz)	6 dB OBW (kHz)	6 dB OBW limit (kHz)
802.11b mode				
Low	2412	12994.7	7143	500
Middle	2437	13036.7	7136	500
High	2462	13017.5	7812	500
802.11g mode				
Low	2412	16253.3	14446	500
Middle	2437	16318.6	15333	500
High	2462	16330.2	13812	500
802.11n-HT20 mode				
Low	2412	17440.7	17089	500
Middle	2437	17478.7	15551	500
High	2462	17515.7	15068	500
802.11n-HT40 mode				
Low	2422	35743.3	32787	500
Middle	2437	35932.8	33474	500
High	2452	35726.6	32633	500
BLE				
Low	2402	1098.9	677.993	500
Middle	2440	1095.8	663.806	500
High	2480	1094.3	671.631	500

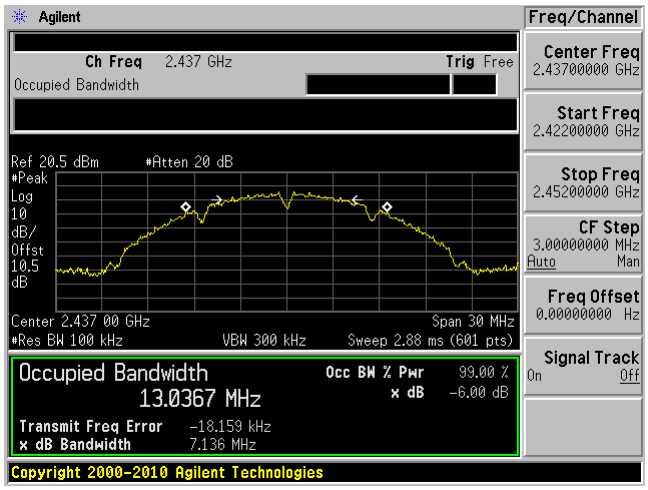
Please refer to the following plots for detailed test results.

802.11b mode

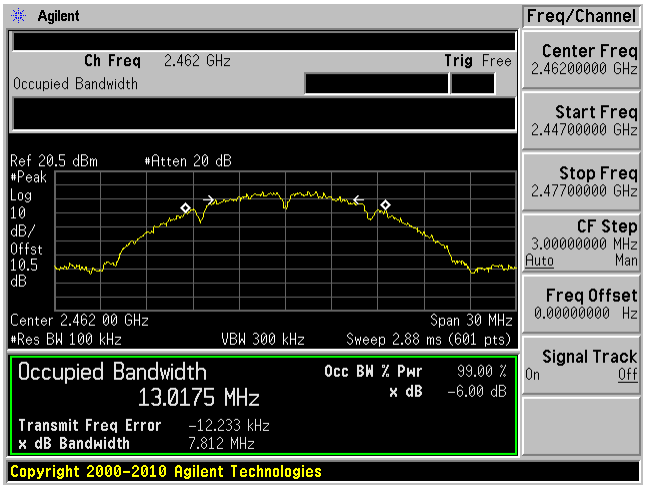
Low Channel 2412 MHz



Middle Channel 2437 MHz

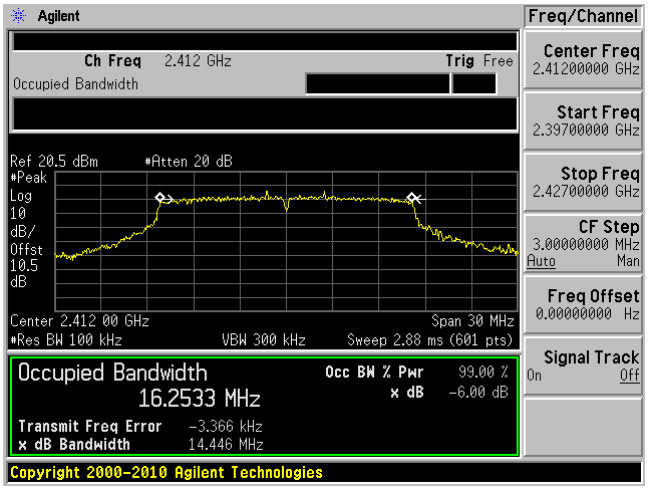


High Channel 2462 MHz

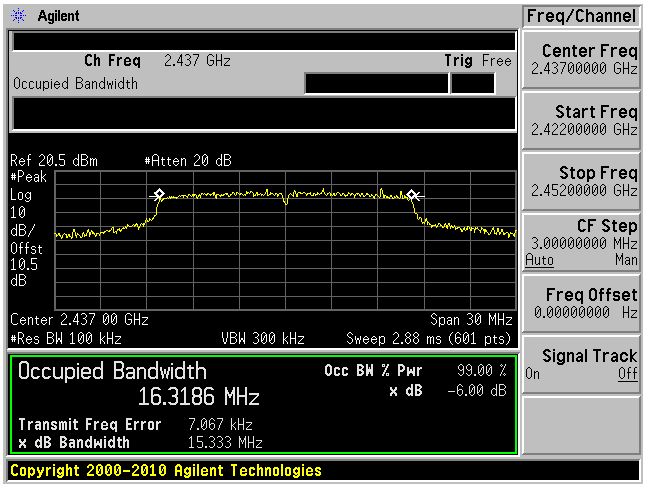


802.11g mode

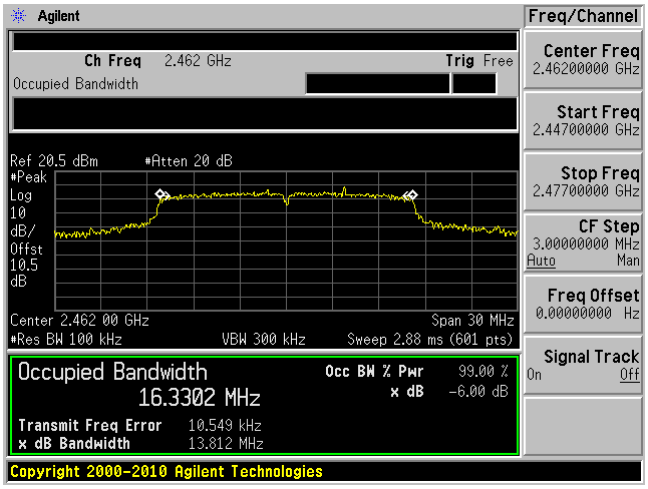
Low Channel 2412 MHz



Middle Channel 2437 MHz

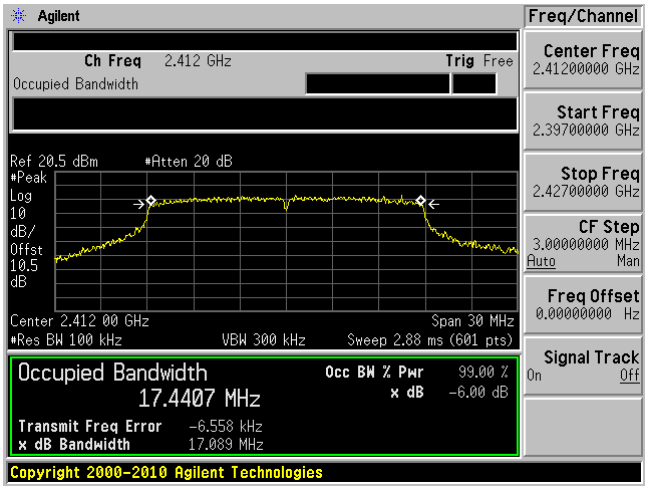


High Channel 2462 MHz

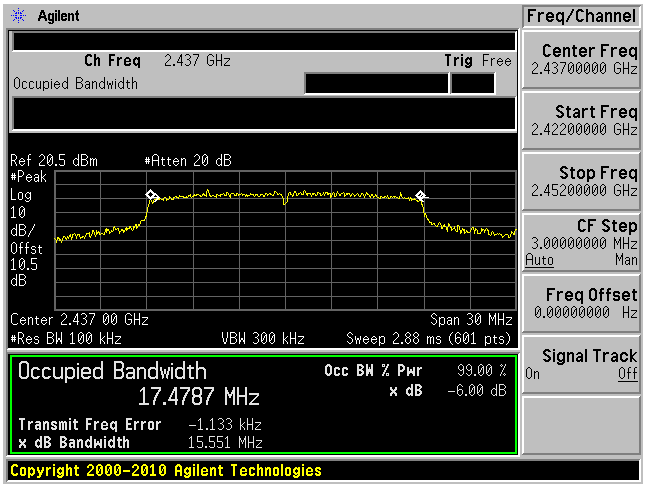


802.11n20 mode

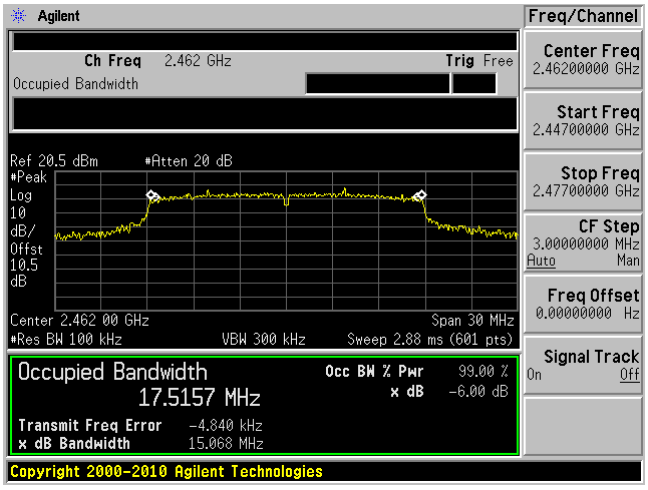
Low Channel 2412 MHz



Middle Channel 2437 MHz

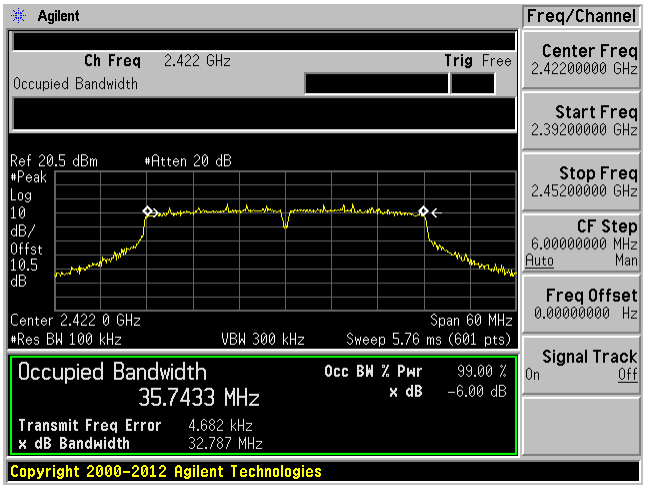


High Channel 2462 MHz

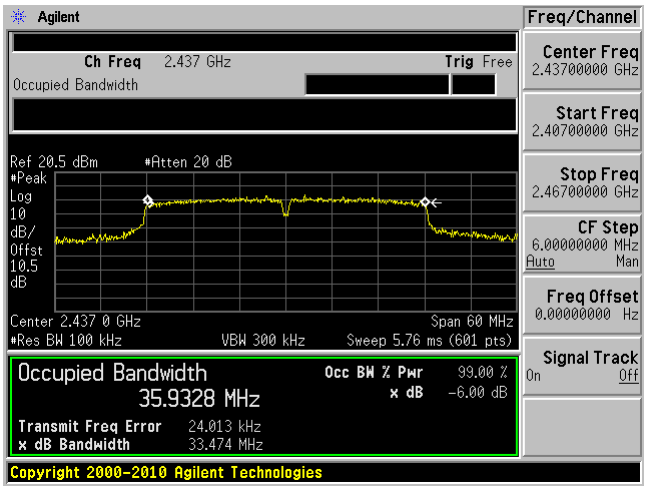


802.11n40 mode

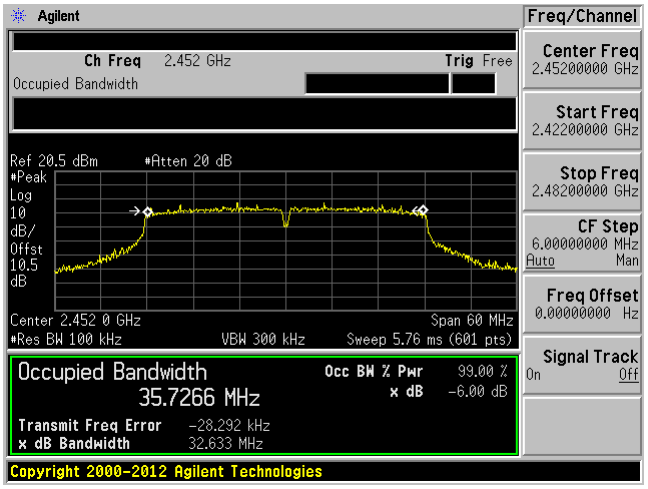
Low Channel 2422 MHz



Middle Channel 2437 MHz

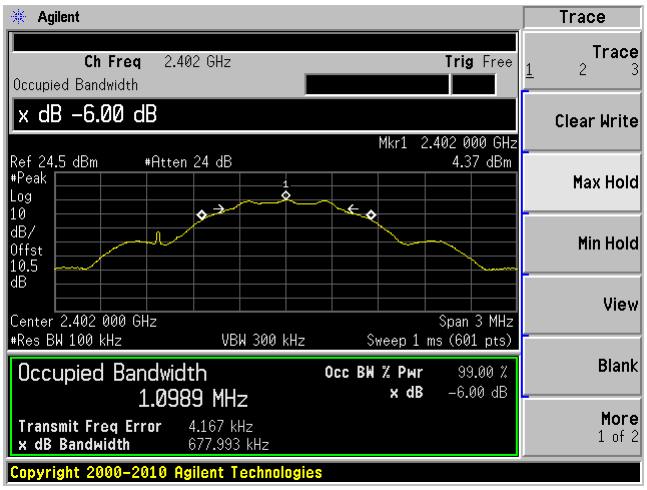


High Channel 2452 MHz

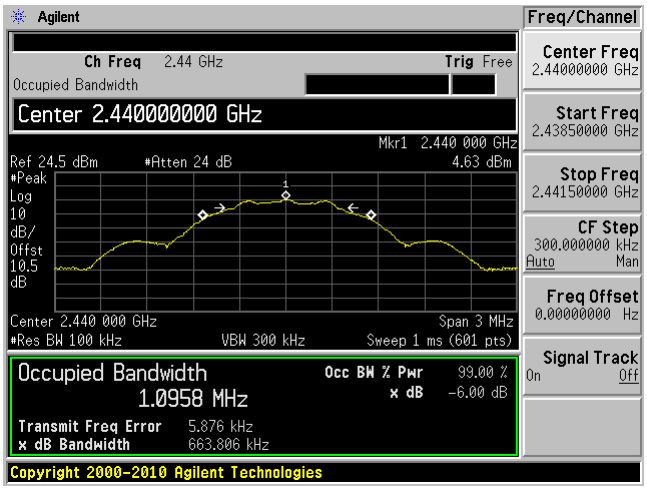


BLE

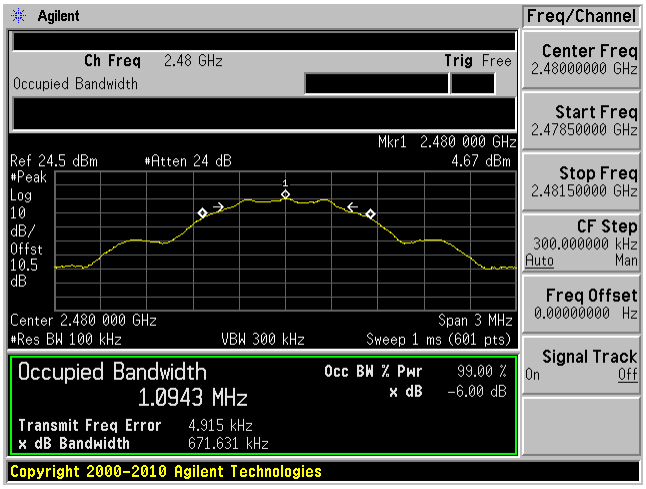
Low Channel 2402 MHz



Middle Channel 2440 MHz



High Channel 2480 MHz



9 FCC §15.247(b) (3) & ISED RSS-247 §5.4 (4) - Output Power Measurement

9.1 Applicable Standards

According to ECFR §15.247(b) (3) and IC 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.

9.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r05: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 9: Fundamental emission output power

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2015-11-12	1 year
ETS- Lingerin	Power Sensor	7002-006	160097	2014-10-21	2 years
-	RF Cable	-	-	Each time[1]	N/A
-	10dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

9.4 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Jose Martinez on 2016-07-11 in RF site.

9.5 Test Results

Wi-Fi Average Output Power

Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
802.11b mode			
1	2412	14.97	30
6	2437	15.26	30
11	2462	15.59	30
802.11g mode			
1	2412	14.4	30
6	2437	18.87	30
11	2462	16.24	30
802.11n-HT20 mode			
1	2412	13.18	30
6	2437	18.62	30
11	2462	15.91	30
802.11n-HT40 mode			
3	2422	11.18	30
6	2437	18.54	30
9	2452	12.92	30

Note: Duty Cycle correction factor has already been added to the measurement.

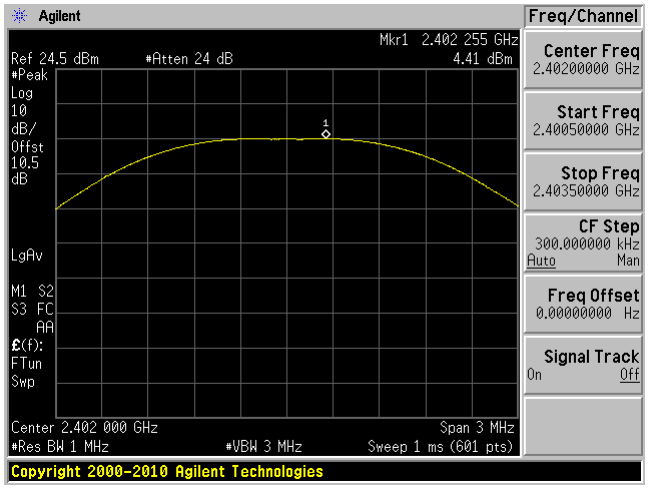
BLE Peak Output Power

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
BLE			
Low	2402	4.41	30
Middle	2440	4.69	30
High	2480	4.73	30

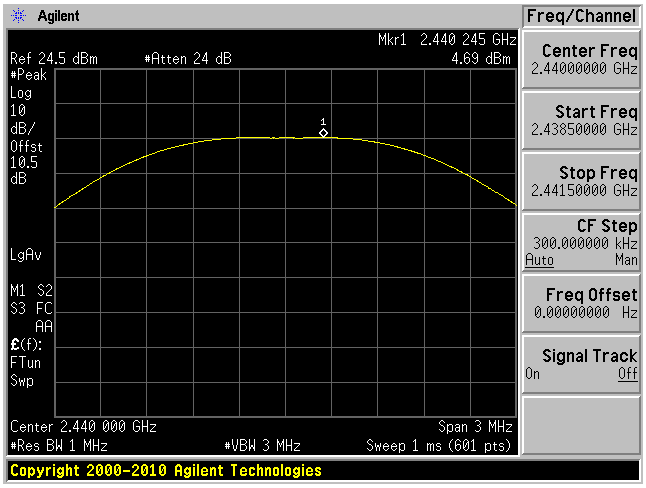
Please refer to the following plots for detailed test results.

BLE

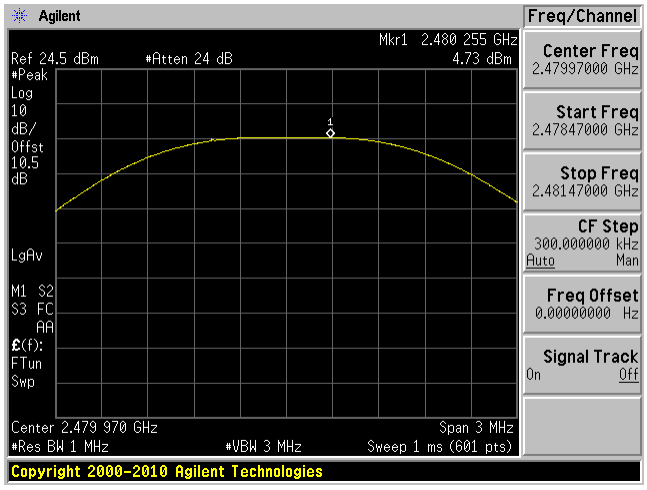
Low Channel 2402 MHz



Middle Channel 2440 MHz



High Channel 2480 MHz



10 FCC §15.247(d) & ISED RSS-247 §5.5 – 100 kHz Bandwidth of Band Edges

10.1 Applicable Standards

According to ECFR §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

According to IC RSS-247 §5.5.In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

10.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r05: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 13: Band-edge measurements

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2015-11-12	1 year
-	RF Cable	-	-	Each time[1]	N/A
-	10dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

10.4 Test Environmental Conditions

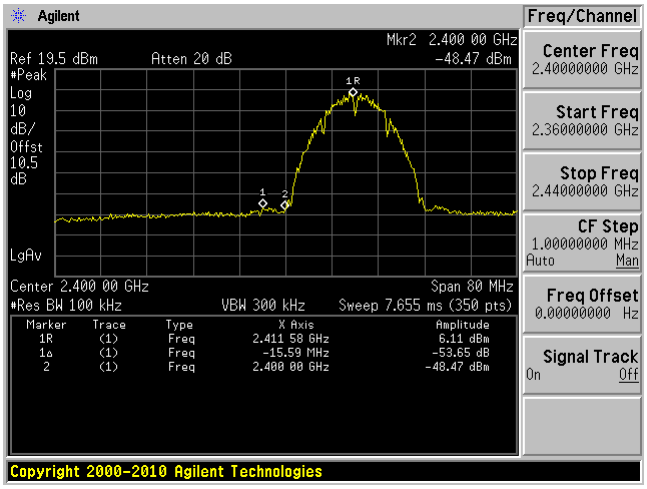
Temperature:	22º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Jose Martinez and Todd Moy on 2016-07-18 in RF site.

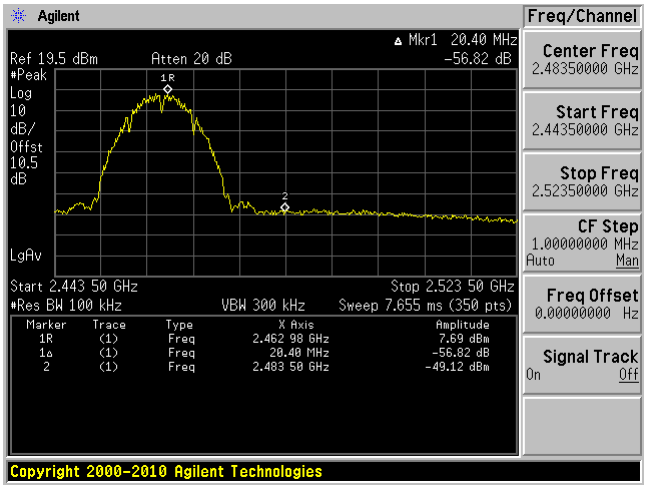
10.5 Test Results

802.11b mode

Low Channel 2412 MHz

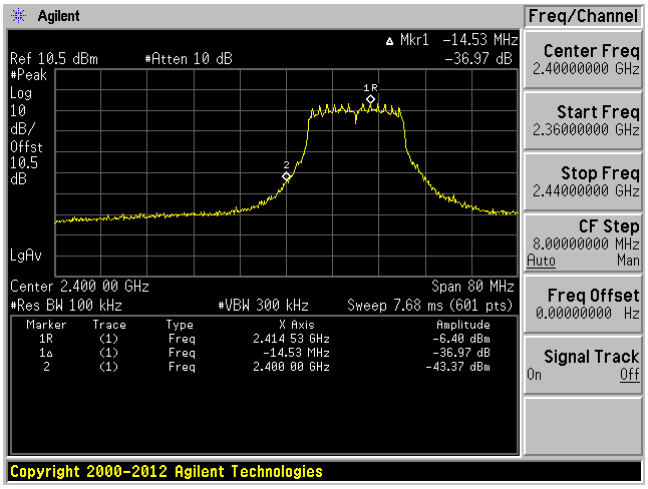


High Channel 2462 MHz

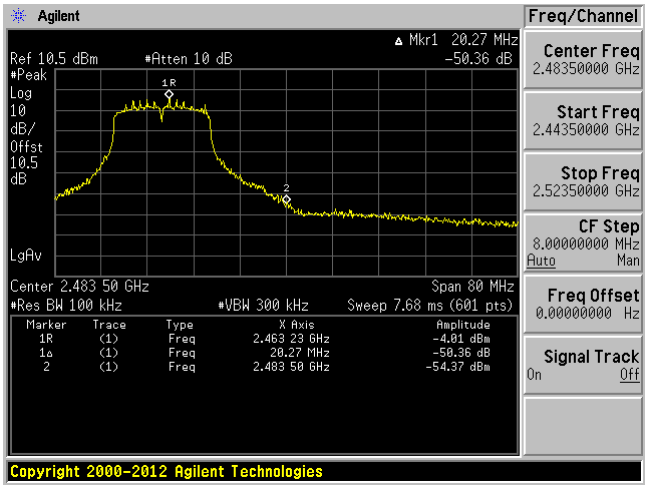


802.11g mode

Low Channel 2412 MHz

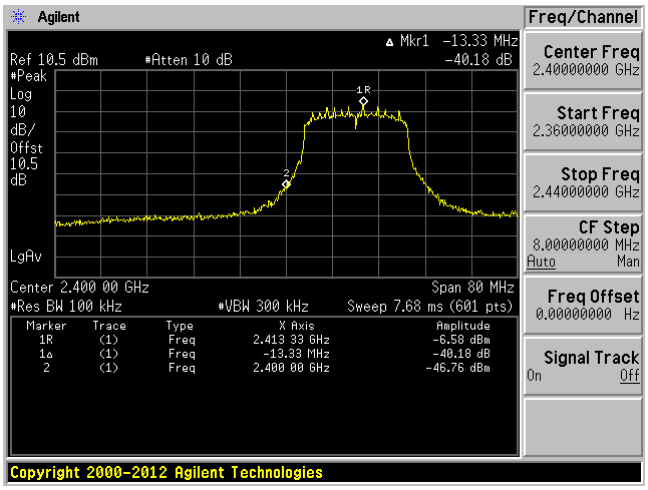


High Channel 2462 MHz

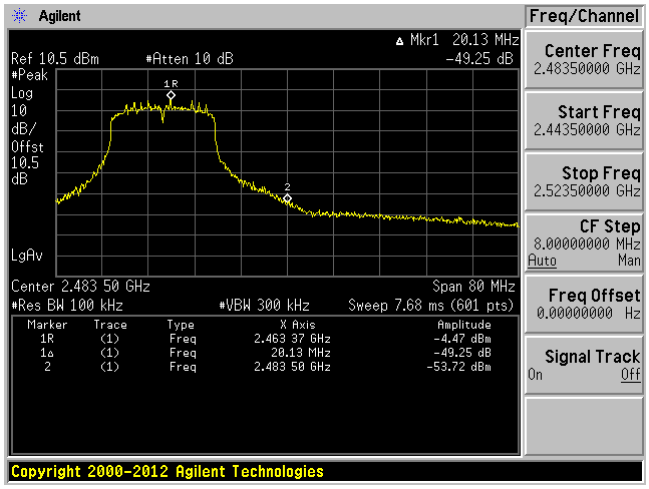


802.11n20 mode

Low Channel 2412 MHz

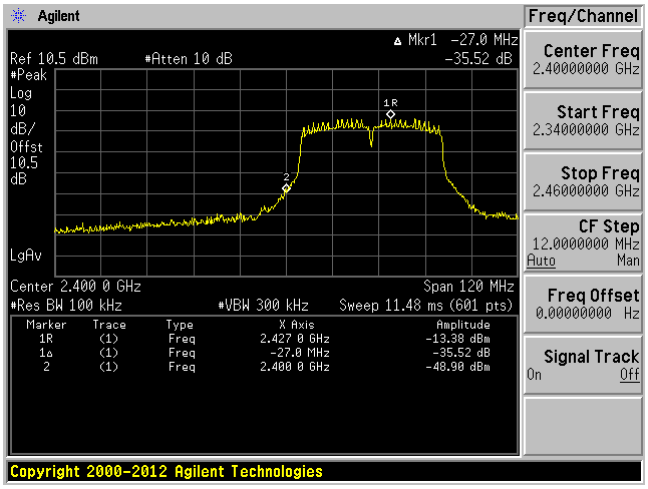


High Channel 2462 MHz

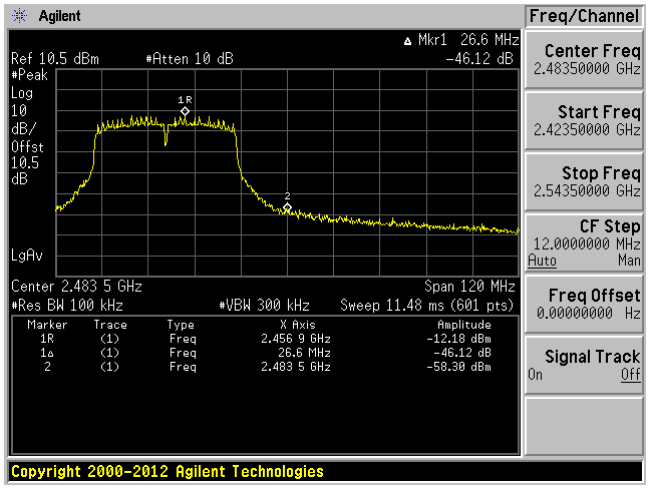


802.11n40 mode

Low Channel 2422 MHz

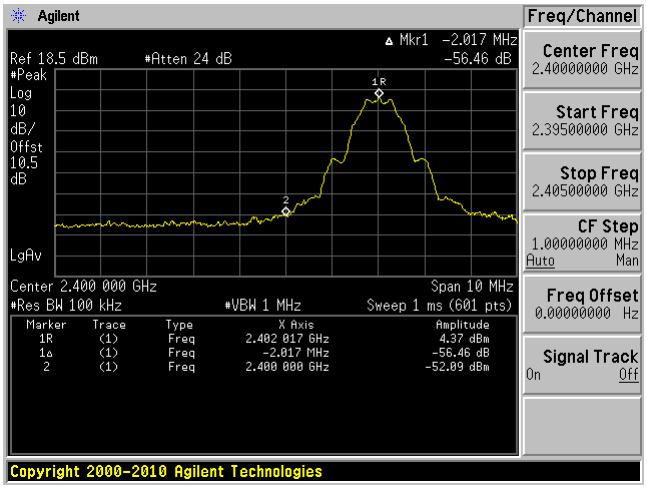


High Channel 2452 MHz

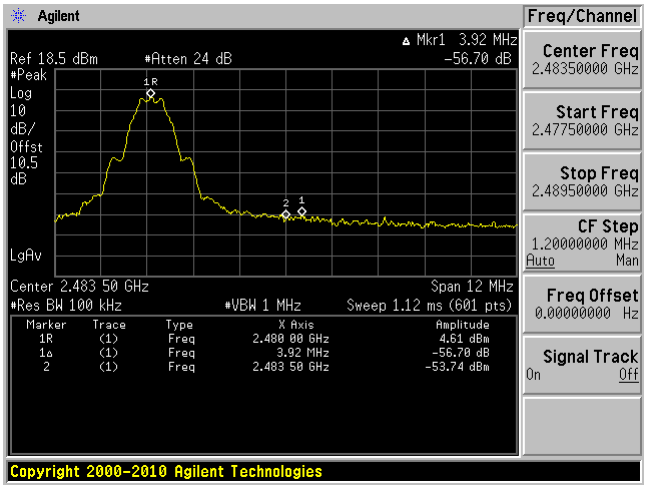


BLE

Low Channel 2402 MHz



High Channel 2480 MHz



11 FCC §15.247(e) & ISED RSS-247 §5.2(2) – Power Spectral Density

11.1 Applicable Standards

According to ECFR §15.247(e) and RSS-247 §5.2 (2) , for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

11.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r05: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10: Maximum power spectral density level in the fundamental emission.

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2015-11-12	1 year
-	RF Cable	-	-	Each time[1]	N/A
-	10dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

11.4 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Todd Moy and Jose Martinez on 2016-07-18 in RF site.

11.5 Test Results

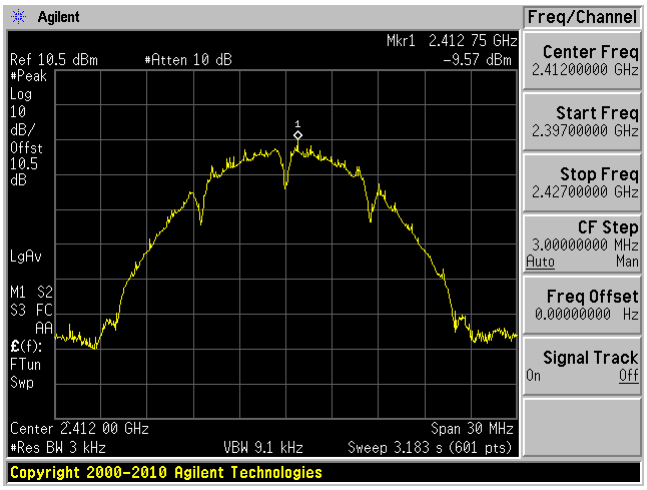
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-9.57	8
Middle	2437	-8.62	8
High	2462	-9.94	8
802.11g mode			
Low	2412	-12.49	8
Middle	2437	-6.91	8
High	2462	-12.66	8
802.11n-HT20 mode			
Low	2412	-11.51	8
Middle	2437	-7.71	8
High	2462	-11.95	8
802.11n-HT40 mode			
Low	2422	-19.02	8
Middle	2437	-11.14	8
High	2452	-18.14	8

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
BLE			
Low	2402	-10.05	8
Middle	2440	-9.79	8
High	2480	-9.75	8

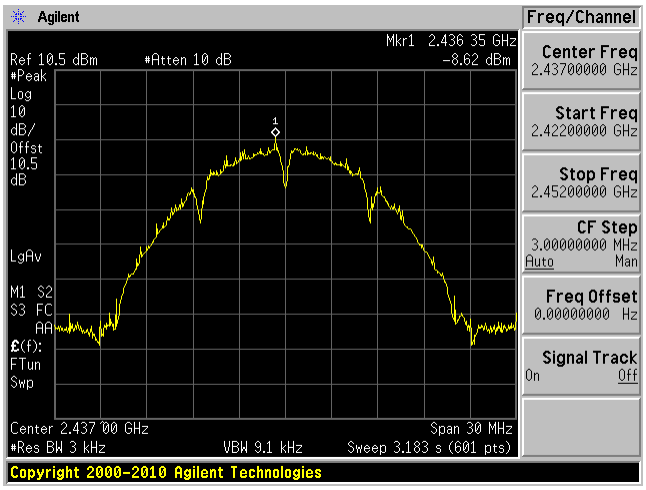
Please refer to the following plots for detailed test results

802.11b mode

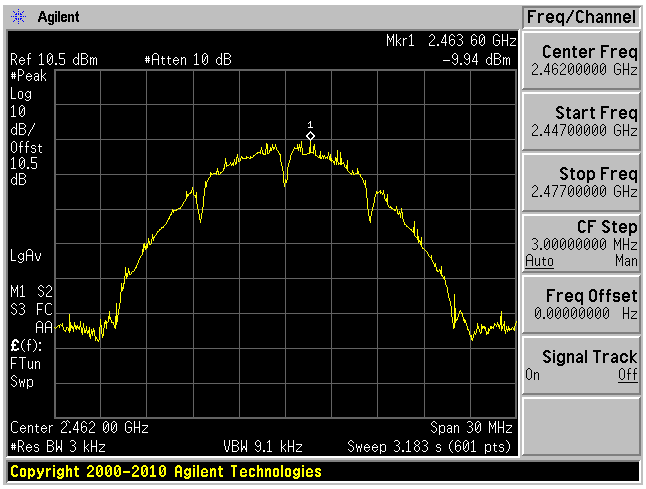
Low Channel 2412 MHz



Middle Channel 2437 MHz

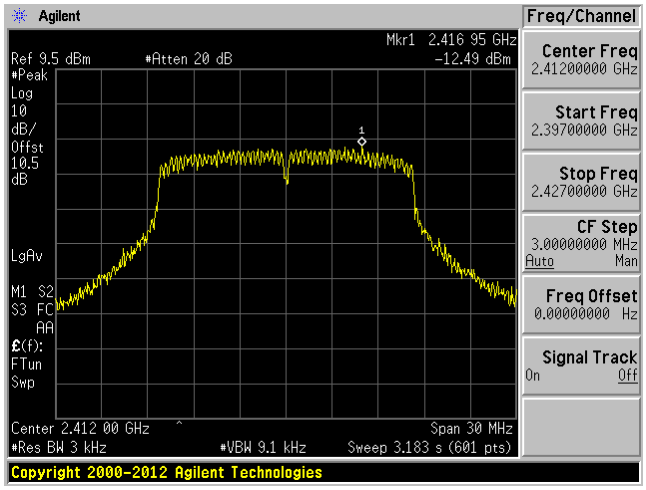


High Channel 2462 MHz

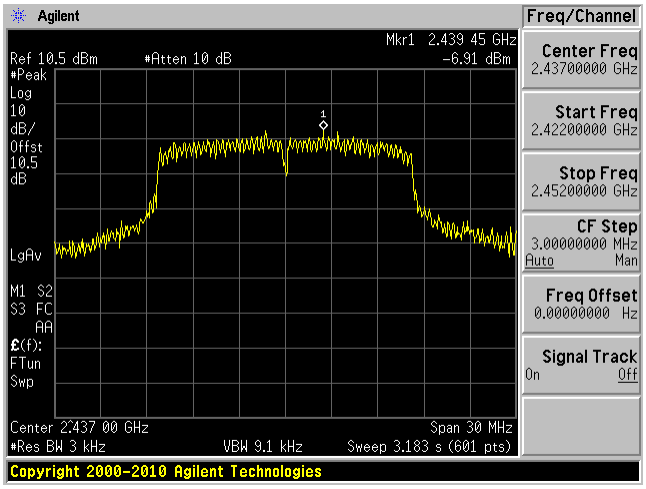


802.11g mode

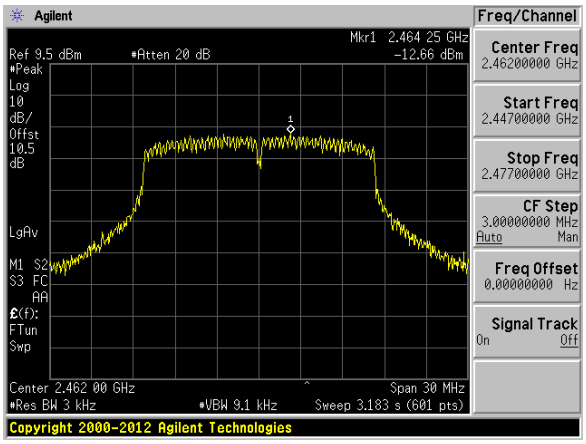
Low Channel 2412 MHz



Middle Channel 2437 MHz

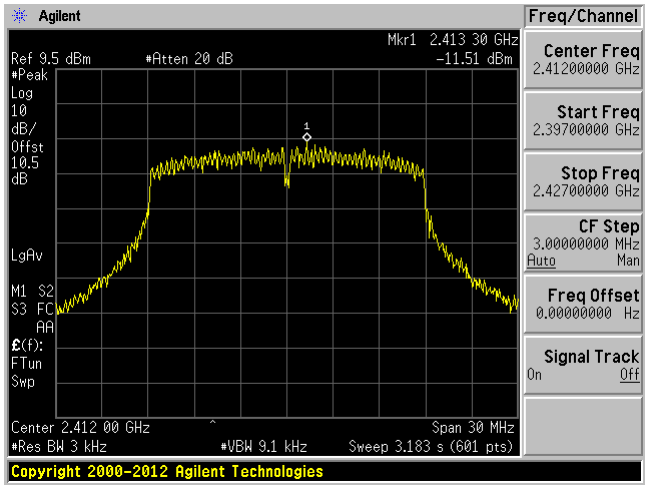


High Channel 2462 MHz

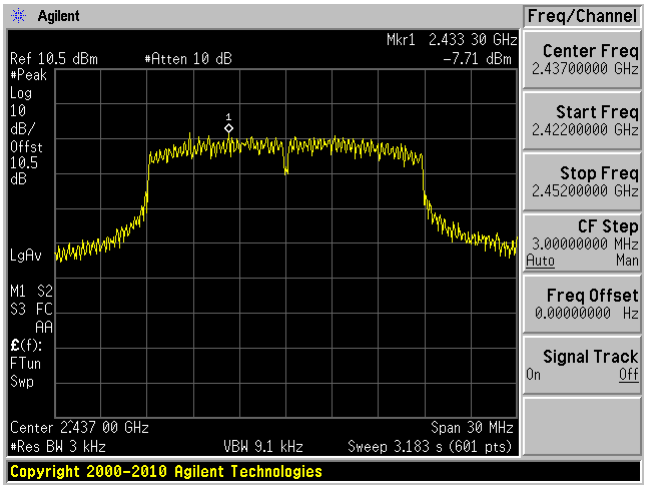


802.11n20 mode

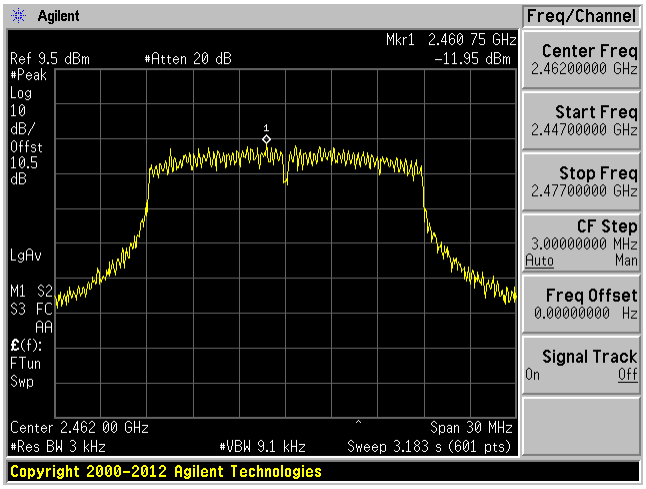
Low Channel 2412 MHz



Middle Channel 2437 MHz

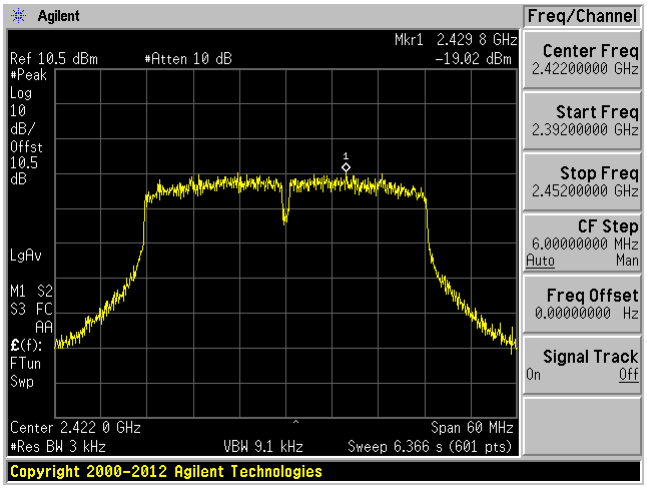


High Channel 2462 MHz

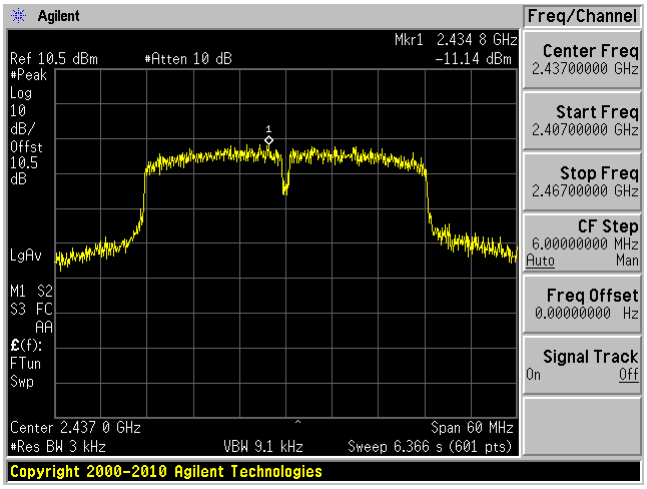


802.11n40 mode

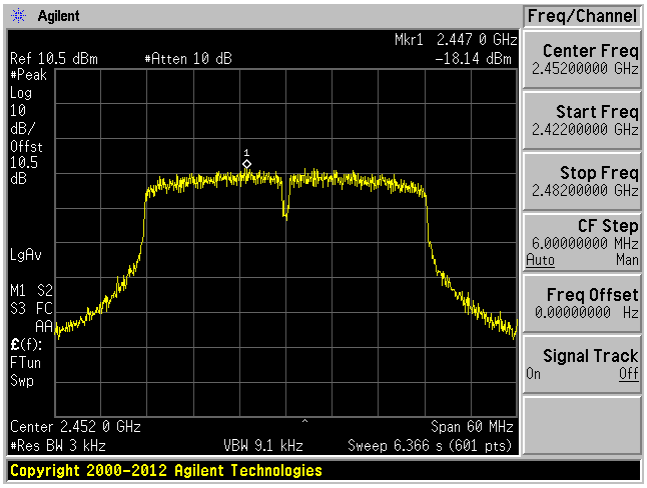
Low Channel 2422 MHz



Middle Channel 2437 MHz

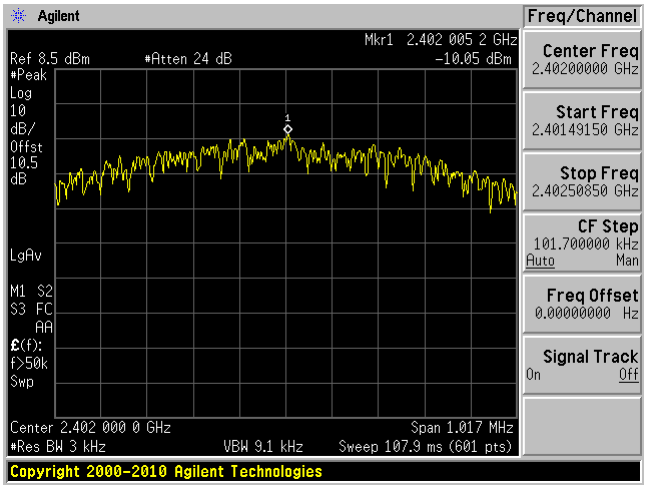


High Channel 2452 MHz

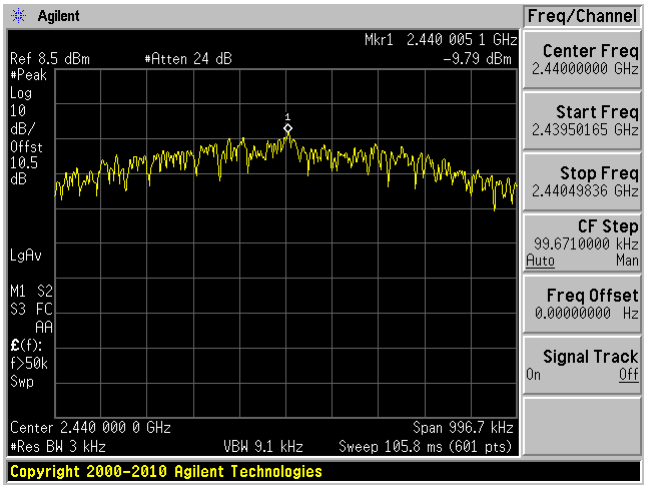


BLE

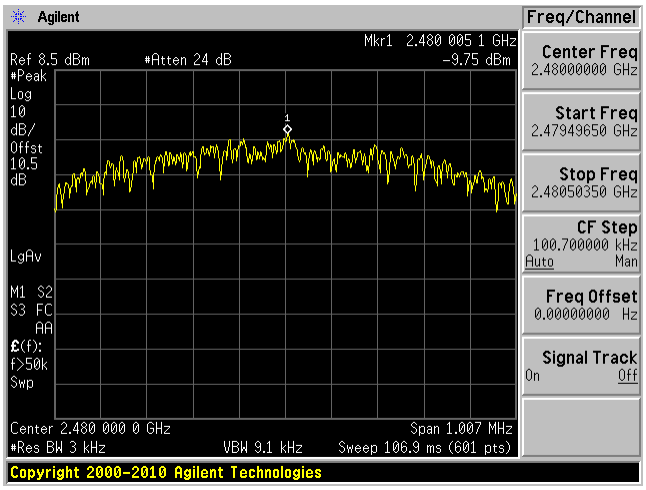
Low Channel 2402 MHz



Middle Channel 2440 MHz



High Channel 2480 MHz



12 FCC §15.247(d) & ISED RSS-247 §5.5 & IC RSS-GEN §8.9 – Spurious Emissions at Antenna Terminals

12.1 Applicable Standards

For ECFR §15.247(d) 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

As per IC RSS-247 §5.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

12.2 Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2015-11-12	1 year
-	U. FL to SMA pigtail	-	-	Each time[1]	N/A
-	10dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

12.4 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

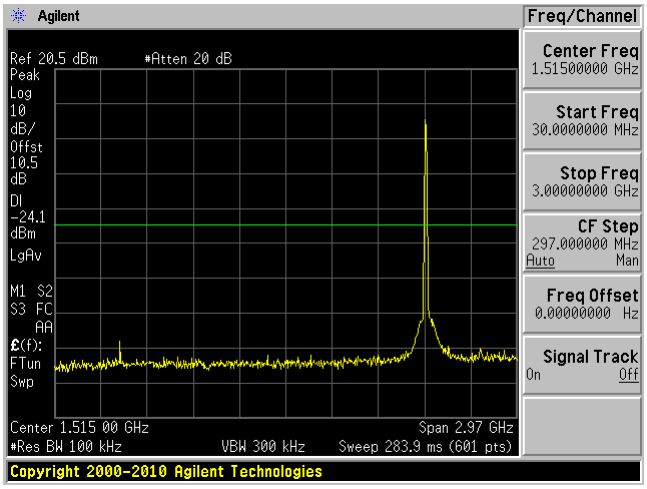
The testing was performed by Jose Martinez on 2016-07-18 in RF site.

12.5 Test Results

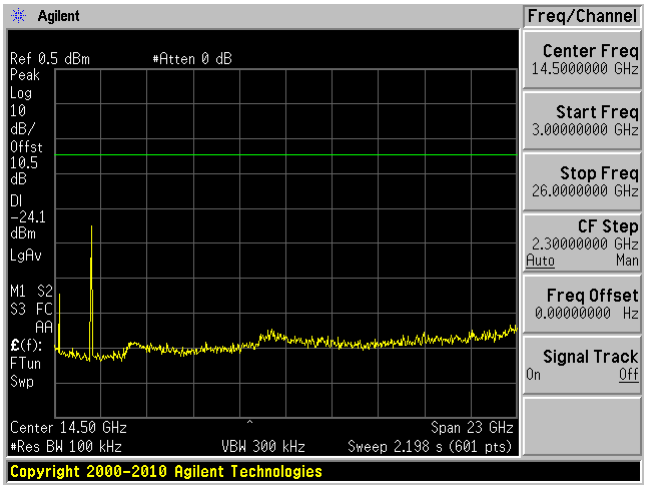
Please refer to following plots.

802.11b mode

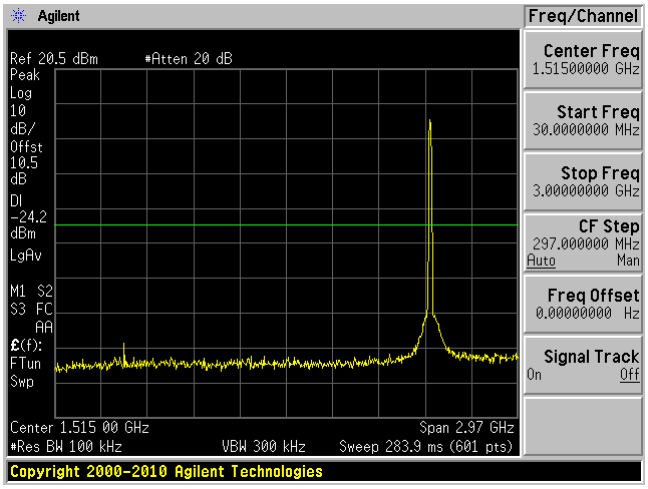
Low Channel 30MHz – 3 GHz



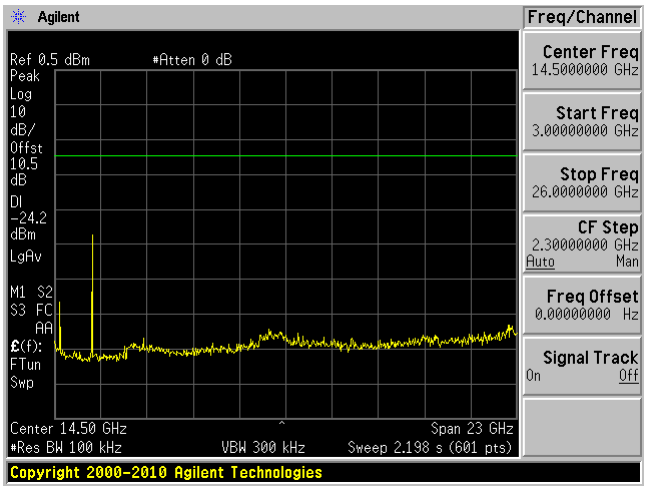
Low Channel 3 GHz – 26 GHz



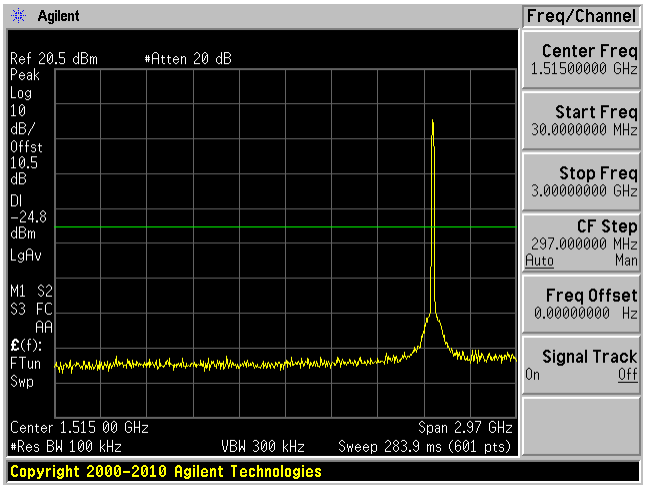
Middle Channel 30 MHz – 3 GHz



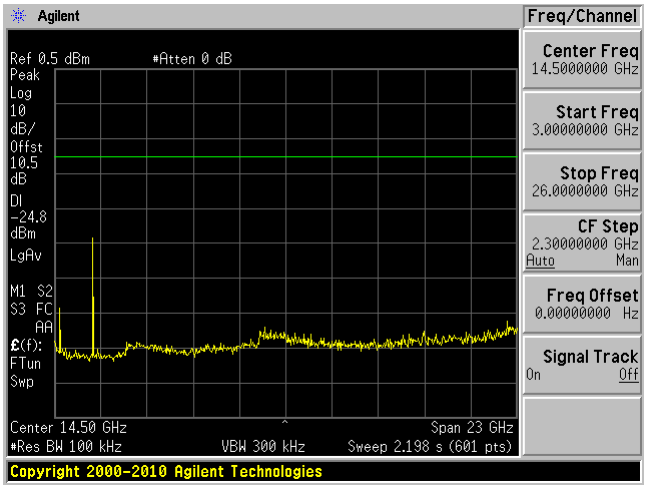
Middle Channel 3 GHz – 26 GHz



High Channel 30 MHz – 3 GHz

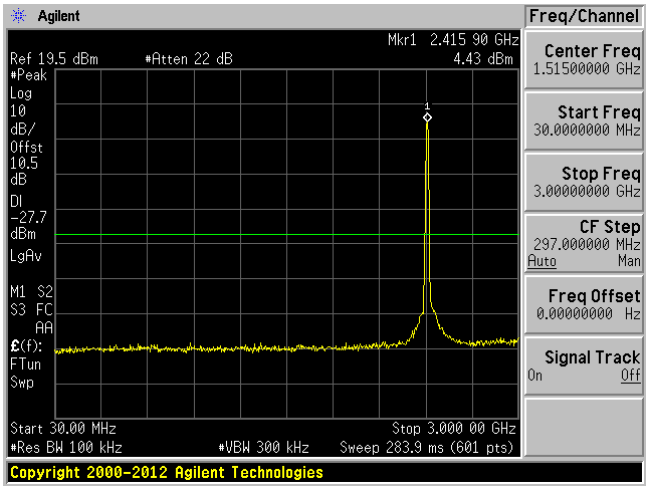


High Channel 3 GHz – 26 GHz

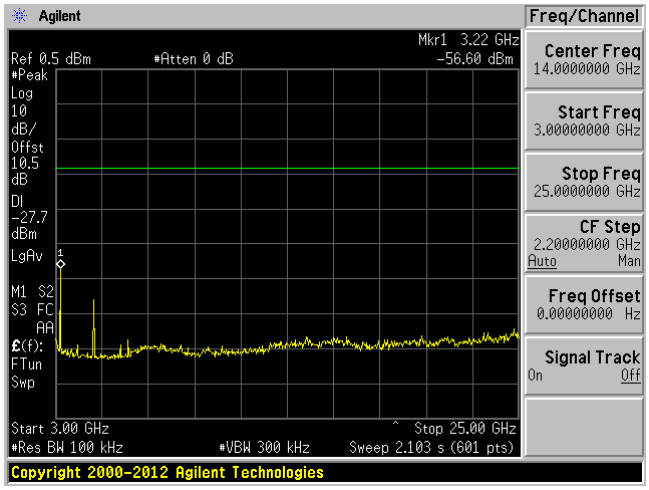


802.11g mode

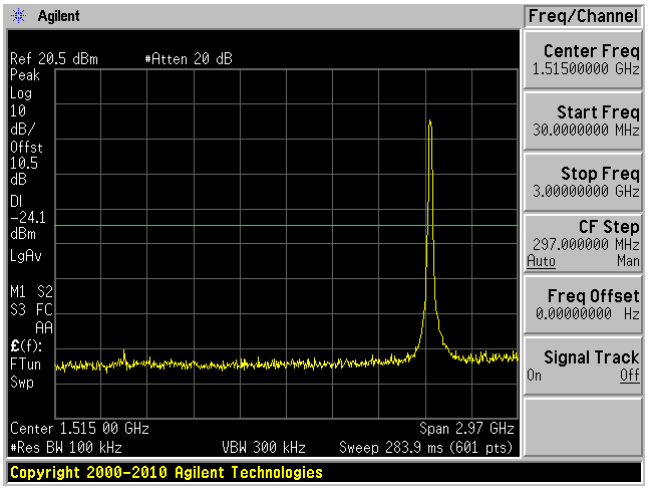
Low Channel 30 MHz – 3 GHz



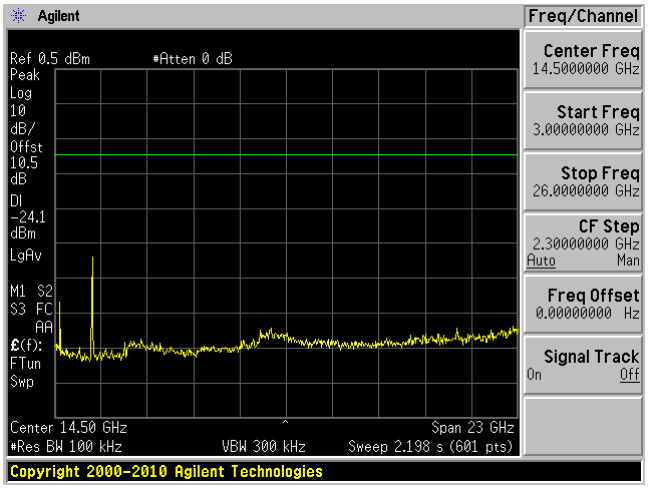
Low Channel 3 GHz – 25 GHz



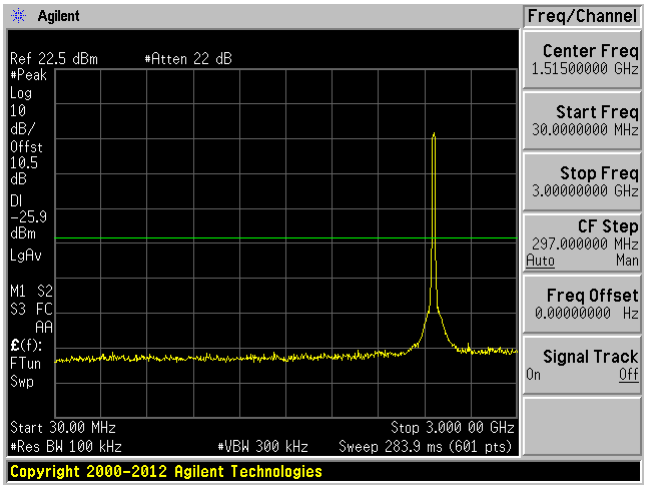
Middle Channel 30 MHz – 3 GHz



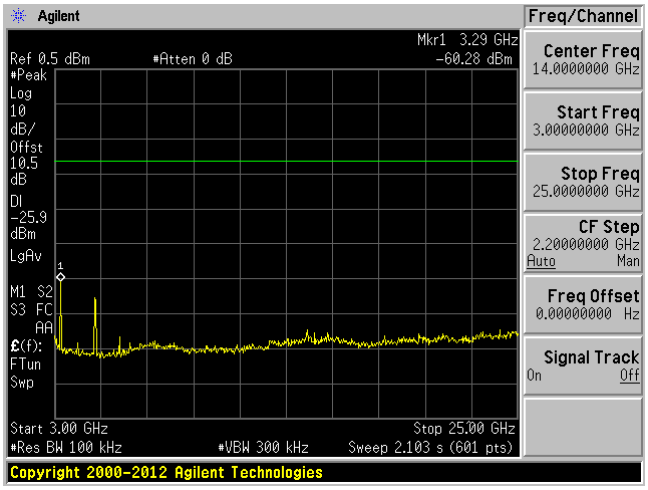
Middle Channel 3 GHz – 26 GHz



High Channel 30 MHz – 3 GHz

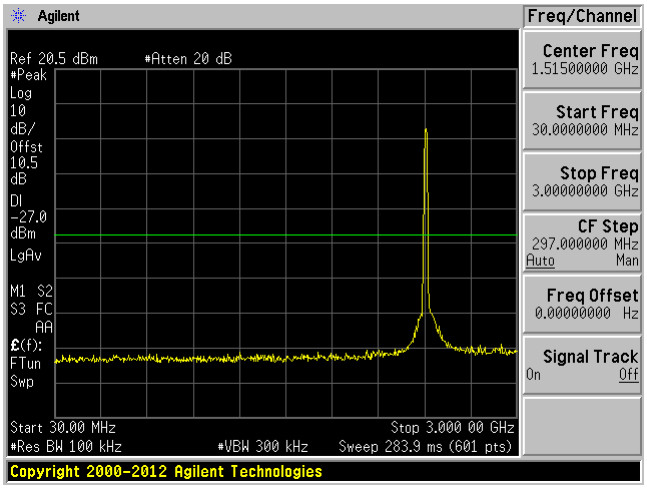


High Channel 3 GHz – 25 GHz

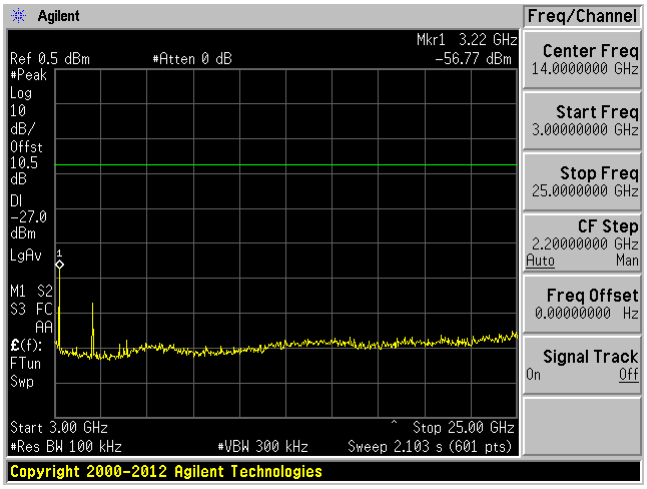


802.11n20 mode

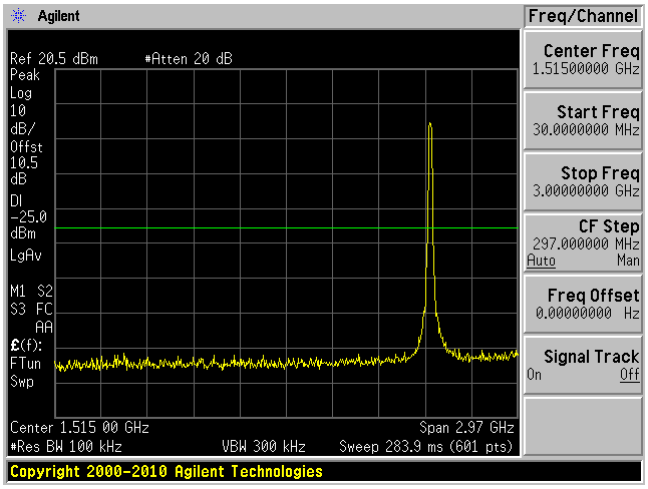
Low Channel 30 MHz – 3 GHz



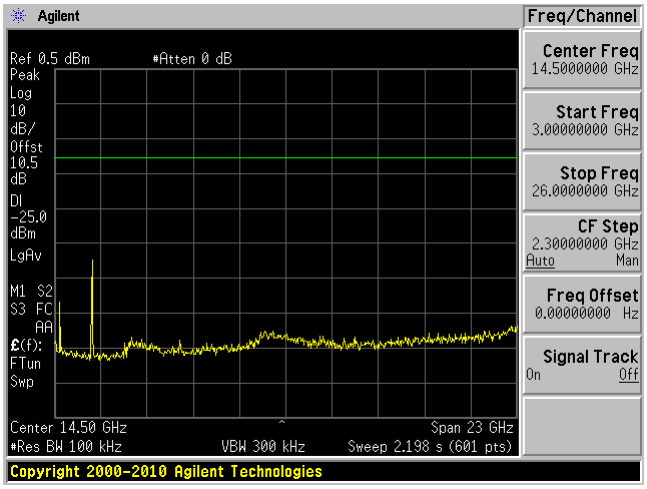
Low Channel 3 GHz – 25 GHz



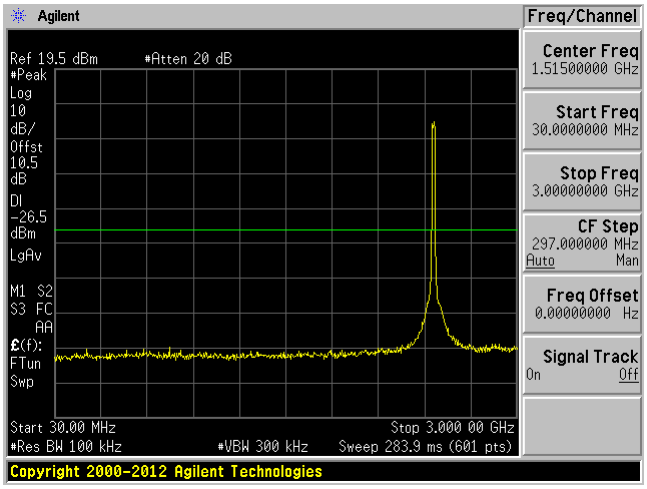
Middle Channel 30 MHz – 3 GHz



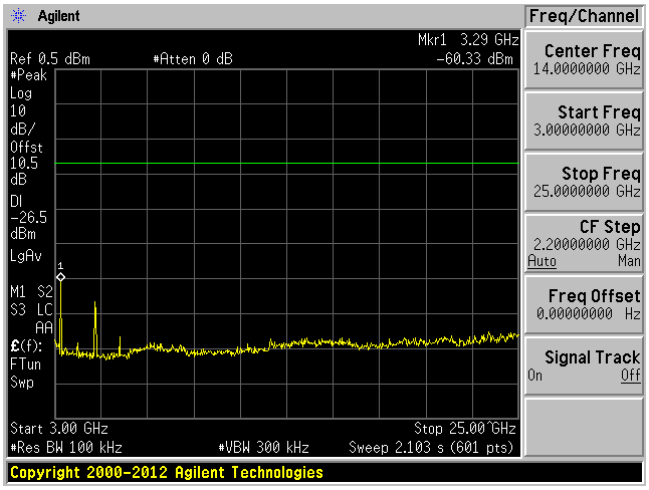
Middle Channel 3 GHz – 26 GHz



High Channel 30 MHz – 3 GHz

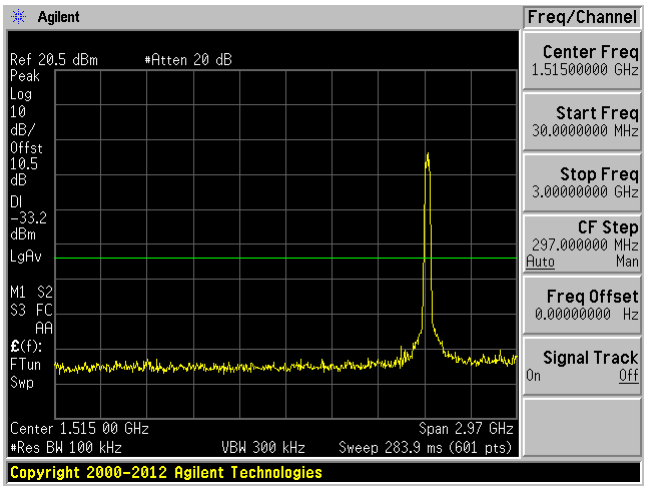


High Channel 3 GHz – 25 GHz

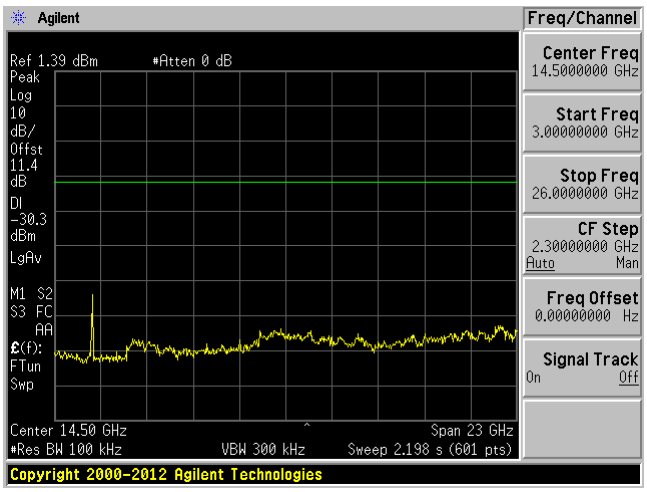


802.11n40 mode

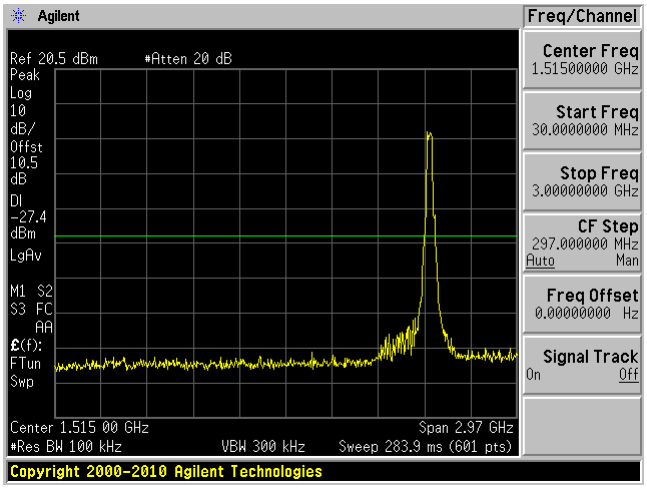
Low Channel 30 MHz – 3 GHz



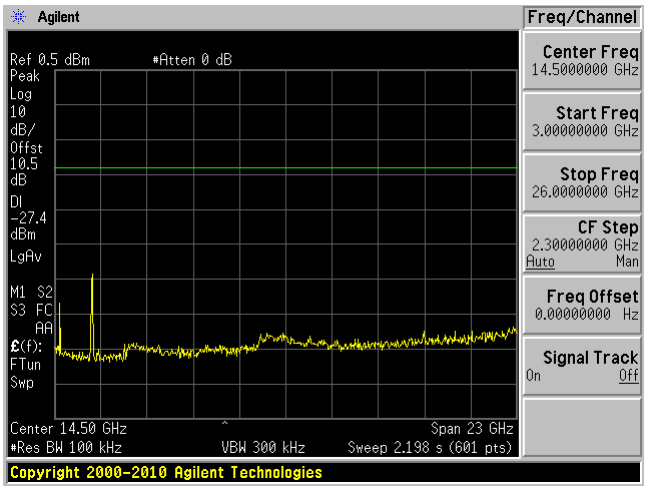
Low Channel 3 GHz – 26 GHz



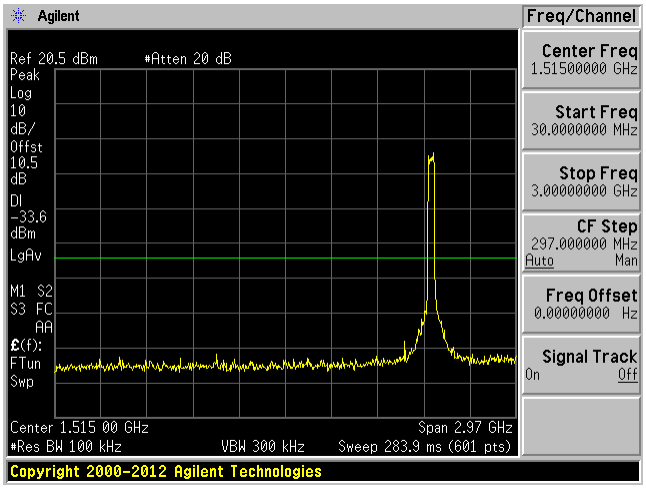
Middle Channel 30 MHz – 3 GHz



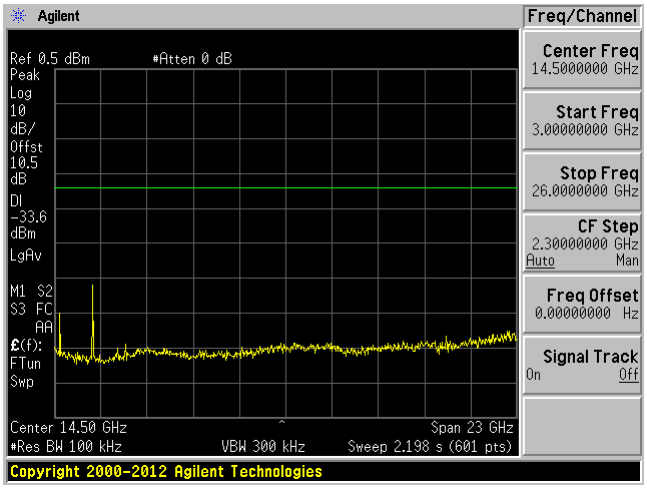
Middle Channel 3 GHz – 26 GHz



High Channel 30 MHz – 3 GHz

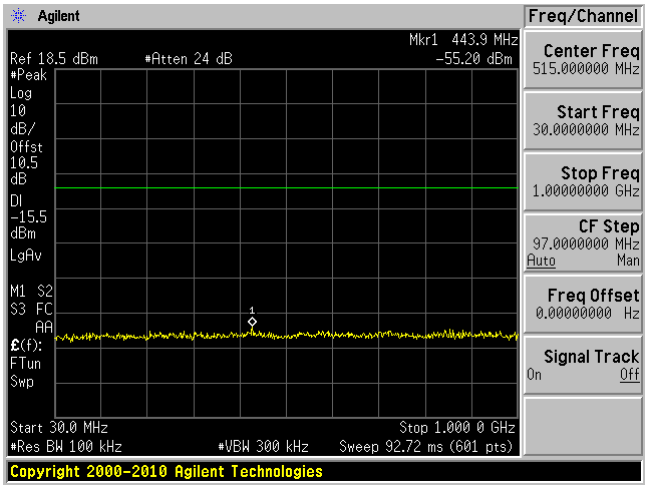


High Channel 3 GHz – 26 GHz

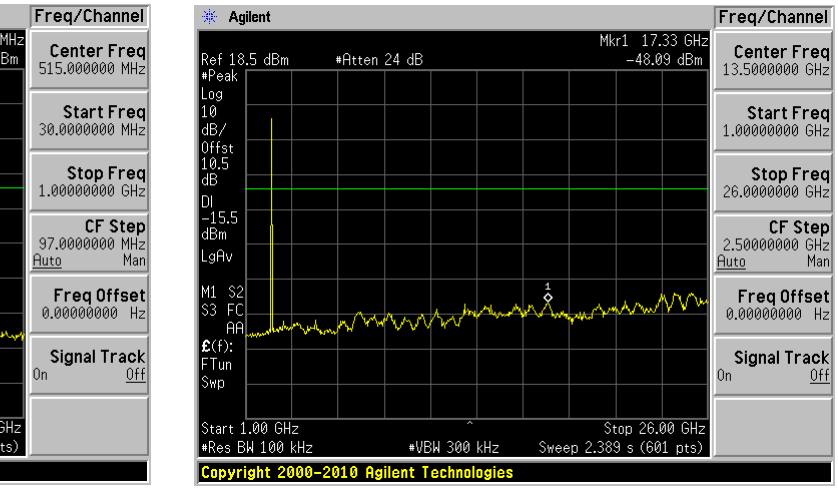


BLE

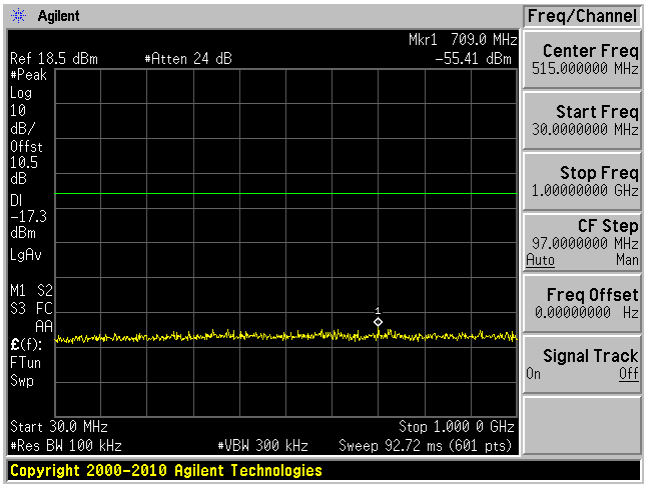
Low Channel 30 MHz – 1 GHz



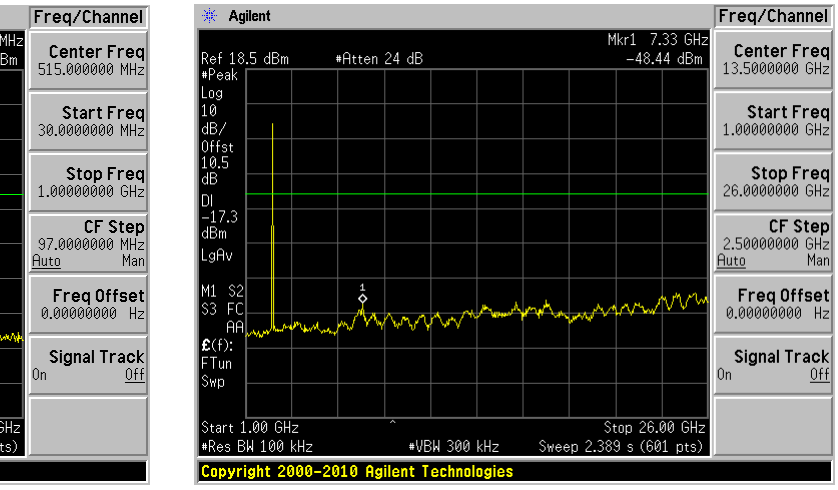
Low Channel 1 GHz – 26 GHz



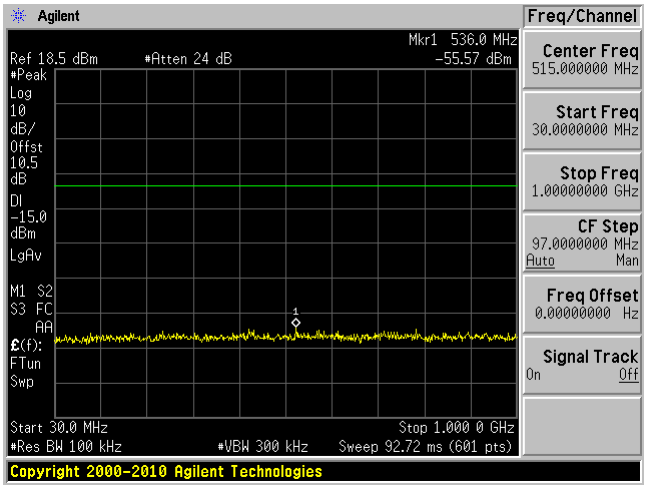
Middle Channel 30 MHz – 1 GHz



Middle Channel 1 GHz – 26 GHz



High Channel 30 MHz – 1 GHz



High Channel 1 GHz – 26 GHz