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

TEST AND MEASUREMENT REPORT

For

Next Thing Company

1940 Union Street, Ste. 32,

Oakland, CA 94607, USA

FCC ID: 2AF9F-HELLA1337
IC: 20863-HELLA1337

Report Type:	**Product Type:**
Original Report	Linux Computer

Prepared By:	Jin Yang Test Engineer
Report Number:	R15101413-247 DSS
Report Date:	2015-12-08
Reviewed By:	Bo Li RF Supervisor

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* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*"

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R15101413-247-DSS	Original Report	2015-12-08

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Next Thing Company*, and their product model: HELLA1337, FCC ID: 2AF9F-HELLA1337; IC: 20863-HELLA1337 or the "EUT" as referred to in this report. It is a module which contains 2.4 GHz 802.11b/g/n and Bluetooth, BLE capability.

1.2 Mechanical Description of EUT

The EUT measures approximately 60 mm (L) x 41 mm (W) x 10 mm (H) and weighs 23.5 g.

The test data gathered are from typical production sample, serial number: R15101413-01 assigned by BACL.

1.3 Objective

This report is prepared on behalf of *Next Thing Company,* 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, 20 dB Bandwidth, 100 kHz Bandwidth of Band Edges Measurement, Conducted and Radiated Spurious Emissions, number of hopping channels, dwell time and hopping channel separation.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart C, Equipment DTS with FCC ID: 2AF9F-HELLA1337

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz, DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

1.6 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.

Based on CISPR16-4-2:2011, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

1.7 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:
1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminares and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s),Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.10-2013, ANSI C63.4-2014, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

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, peak power across all data rates and modulations.

2.2 EUT Exercise Software

The test utility used is *UART Terminal (RS-232)* provided by *Next Thing, Co.*, the software was verified by *Jin Yang* to comply with the standard requirements being tested against.

2.3 Equipment Modifications

A SMA port was attached to the output signal before the antenna of the EUT to perform conducted measurements.

2.4 Local Support Equipment

Manufacturer	Description	Model
Acer	Laptop	ZHK

2.5 EUT Internal Configuration Details

Manufacturer	Description	Model
Realtek Semiconductor Corp	WIFI/BT Module	RTL8723BS
Allwinner Technology	Soc	R8

2.6 Support Equipment

Manufacturer	Description	Model
Apple	USB Power Adapter	A1357
Asian Power Devices, Inc	AC Adapter	WB-10E05FU

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 & IC Rules	Description of Test	Results
FCC §15.203 IC RSS-Gen §8.3	Antenna Requirement	Compliant
FCC §15.207 IC RSS-Gen §8.8	AC Line Conducted Emissions	Compliant
FCC §15.247(i) IC RSS-102	RF Exposure	Compliant
FCC §15.247 (d) IC RSS-247 §5.5	Spurious Emissions at Antenna Port	Compliant
FCC §15.205 IC RSS-Gen §8.10	Restricted Bands	Compliant
FCC §15.209, §15.247 IC RSS-247 §5.5; RSS-Gen §8.9	Radiated Spurious Emissions	Compliant
FCC §15.247(a) IC RSS-247 §5.1	20 dB & 99% Emission Bandwidth	Compliant
FCC §15.247(a) IC RSS-247 §5.1	Maximum Peak Output Power	Compliant
FCC §15.247(d) IC RSS-247 §5.5	100 kHz Bandwidth of Frequency Band Edge	Compliant
FCC §15.247(a) IC RSS-247 §5.1	Number of Hopping Channels	Compliant
FCC §15.247(a) IC RSS-247 §5.1	Hopping Channel Separation	Compliant
FCC §15.247(a) IC RSS-247 §5.1	Dwell Time	Compliant

4 FCC §15.203 & IC 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 licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-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 licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-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

Antenna Type	Antenna Gain (dBi) @ 2.4 GHz
Chip Antenna	2.5

5 FCC §15.247(i) & IC RSS-102 – RF Exposure

5.1 Applicable Standards

According to FCC §15.247(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* ($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF field

According to IC RSS-102 Issue 5:

2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz[6] and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

5.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

5.3 MPE Results

Maximum peak output power at antenna input terminal (dBm):	7.54
Maximum peak output power at antenna input terminal (mW):	5.675
Prediction distance (cm):	20
Prediction frequency (MHz):	2441
Maximum Antenna Gain, typical (dBi):	2.5
Maximum Antenna Gain (numeric):	1.778
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.002
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.002 mW/cm^2. Limit is 1.0 mW/cm^2.

RF exposure evaluation exemption for IC

7.54 + 2.5 dBi = 10.04 dBm < $1.31\times10^{-2}f^{0.6834}$ = 2.7060 W = 34.3234 dBm

Therefore the RF exposure is not required.

6 FCC §15.207 & IC 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 C63.4-2014 measurement procedure. The specification used was 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 cord of the support equipment was connected to LISN-2.

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

All data was recorded in the peak detection mode, quasi-peak and average. 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:

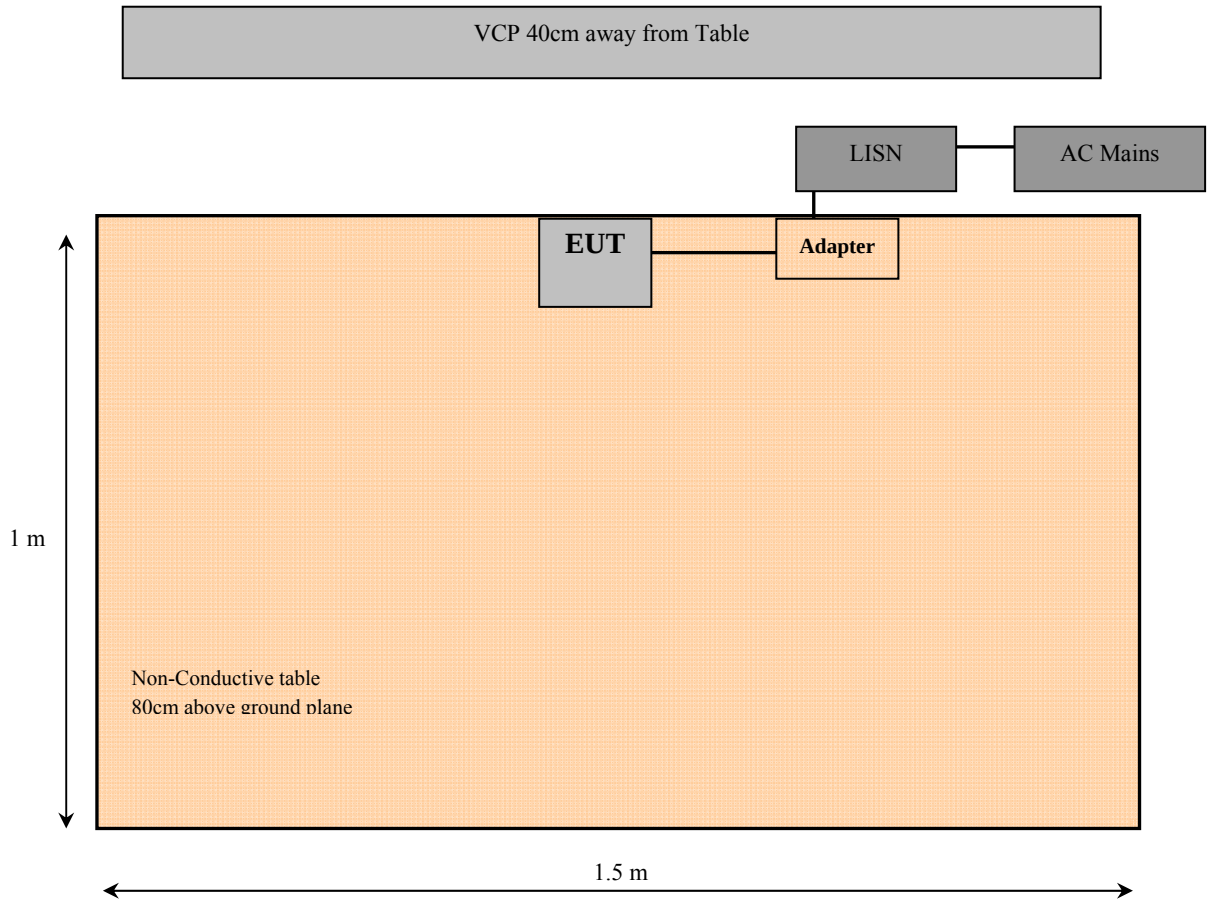
CA = Ai + CL + Atten

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	100337	2015-06-18	1 year
FCC	LISN	FCC-LISN-50-2-10-CISPR16 1PA ANSI 14	160130	2015-04-07	1 year
TTE INCORPORATED	High Pass Filter	H985-150k-50-720N	H 886	2015-01-09	1 year
Ericsson	Pulse Limiter	ESH 3-Z2	101964	N/A	N/A
Suirong	30 ft conductive emission cable	LMR 400	-	2015-03-05	1 year
Hewlett-Packard	5 ft N-type RF cable	-	1268	2015-05-15	1 year

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:	15º C
Relative Humidity:	42%
ATM Pressure:	101.31kPa

The testing was performed by Jin Yang on 2015-10-25 in 5 chamber3

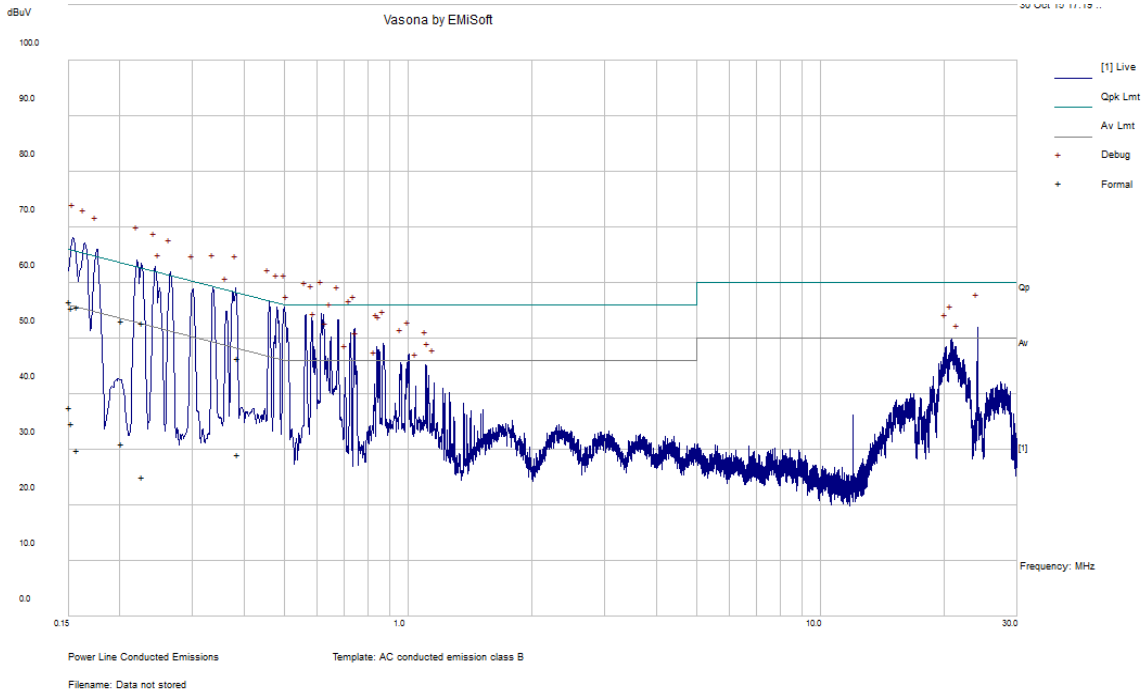
6.8 Summary of Test Results

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:

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Live/Neutral)**	**Range (MHz)**
-9.11	0.186588	Neutral	0.15-30

6.9 Conducted Emissions Test Plots and Data

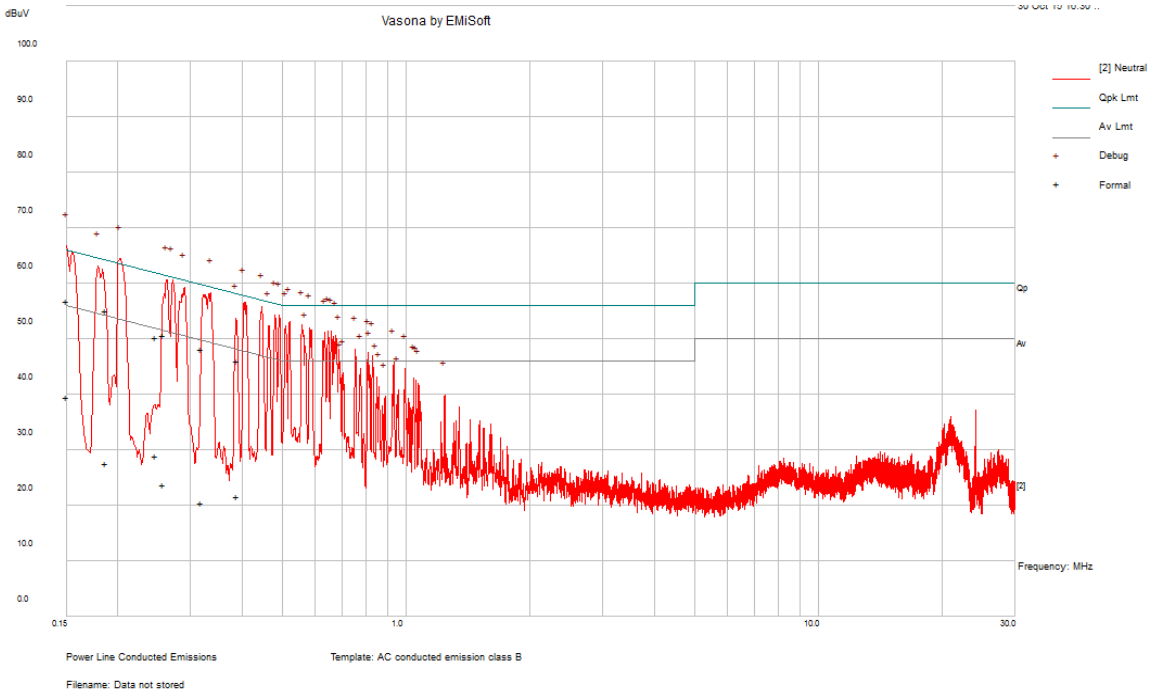
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
0.15105	56.57	Line	65.94	-9.37	QP
0.153069	55.41	Line	65.83	-10.42	QP
0.202803	53.19	Line	63.49	-10.3	QP
0.157731	55.62	Line	65.58	-9.96	QP
0.226632	52.86	Line	62.57	-9.71	QP
0.38664	46.5	Line	58.14	-11.64	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
0.15105	37.66	Line	55.94	-18.28	Ave.
0.153069	34.66	Line	55.83	-21.17	Ave.
0.202803	31.13	Line	53.49	-22.36	Ave.
0.157731	29.97	Line	55.58	-25.61	Ave.
0.226632	25.04	Line	52.57	-27.53	Ave.
0.38664	29.08	Line	48.14	-19.06	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
0.186588	55.08	Neutral	64.19	**-9.11**	QP
0.150002	56.88	Neutral	66	-9.12	QP
0.258204	50.63	Neutral	61.49	-10.85	QP
0.247596	50.31	Neutral	61.84	-11.53	QP
0.317703	48.23	Neutral	59.77	-11.54	QP
0.390111	46.05	Neutral	58.06	-12.01	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave)
0.186588	27.64	Neutral	54.19	-26.54	Ave.
0.150002	39.58	Neutral	56	-16.42	Ave.
0.258204	23.7	Neutral	51.49	-27.79	Ave.
0.247596	29.01	Neutral	51.84	-22.83	Ave.
0.317703	20.56	Neutral	49.77	-29.2	Ave.
0.390111	21.59	Neutral	48.06	-26.47	Ave.

7 FCC §15.209, §15.247(d) & IC RSS-247 §5.5, RSS-GEN §8.9 – 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 §15.209(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 §15.205(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 §15.247 (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 licence-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 was 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 is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is 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	EMI Test Receiver	ESCI 1166.5950K03	100337	2015-06-18	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
Sunol Science Corp	System Controller	SC99V	011003-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2015-07-11	1 year
EMCO	Horn Antenna	3115	9511-4627	2015-01-15	1 year
Agilent	Pre-amplifier	8447D	2944A10187	2015-03-20	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	2015-03-05	1 year
-	SMA cable	-	C0002	Each time[1]	N/A
IW Microwave	High Frequency Cable	DC-1438	SPS-2303-3840-SPS	2015-09-23	1 year
Hewlett-Packard	5 ft N-type RF cable	-	1268	2015-05-15	1 year
Hewlett	Pre-Amplifier	8449B	3008A01978	2015-03-11	1year
BK Precision	Source, DC	1740	26502000233	N/A	N/A
Fluke Corp	Multimeter, Digital	233	23790031	2015-07-06	1 year

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:	22º C
Relative Humidity:	42 %
ATM Pressure:	102.7 kPa

The testing was performed by Jin Yang on 2015-10-29 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:

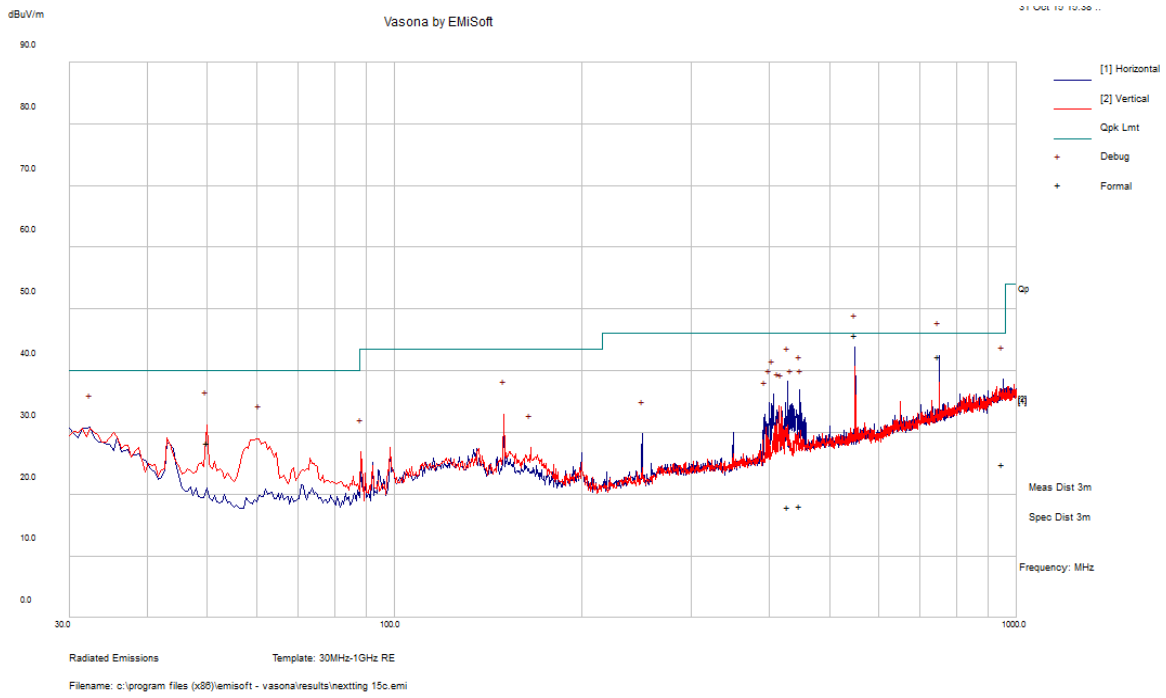
30 MHz – 25 GHz:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel**
-2.19	549.9863	Horizontal	Middle

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



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (PK/QP/Ave)
549.9863	43.81	155	H	128	46	-2.19	QP
749.9958	42.26	113	H	204	46	-3.74	QP
950.3623	24.95	106	H	144	46	-21.05	QP
428.6575	17.94	240	H	90	46	-28.06	QP
49.9935	28.32	145	V	41	40	-11.68	QP
448.21	18.05	194	H	193	46	-27.95	QP

2) 1–25 GHz Measured at 3 meters

GFSK

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, measured at 3 meters											
2402	56.59	215	100	V	28.174	3.43	-	88.194	-	-	Peak
2402	65.27	58	140	H	28.197	3.43	-	96.897	-	-	Peak
2402	55.96	215	100	V	28.174	3.43	-	87.564	-	-	Ave
2402	64.85	58	140	H	28.197	3.43	-	96.477	-	-	Ave
2390	26.37	215	100	V	28.174	3.43	-	57.974	74	-16.026	Peak
2390	26.1	58	140	H	28.197	3.43	-	57.727	74	-16.273	Peak
2390	11.94	215	100	V	28.174	3.43	-	43.544	54	-10.456	Ave
2390	12.67	58	140	H	28.197	3.43	-	44.297	54	-9.703	Ave
4804	46.39	0	100	V	33.119	5.34	33.72	51.129	74	-22.871	Peak
4804	44.89	0	100	H	33.182	5.34	33.72	49.692	74	-24.308	Peak
4804	30.09	0	100	V	33.119	5.34	33.72	34.829	54	-19.171	Ave
4804	30.35	0	100	H	33.182	5.34	33.72	35.152	54	-18.848	Ave
7206	44.7	0	100	V	37.444	6.33	33.93	54.544	74	-19.456	Peak
7206	44.24	0	100	H	37.442	6.33	33.93	54.082	74	-19.918	Peak
7206	29.59	0	100	V	37.444	6.33	33.93	39.434	54	-14.566	Ave
7206	29.6	0	100	H	37.442	6.33	33.93	39.442	54	-14.558	Ave
9608	43.58	0	100	V	38.83	9.57	34.2	57.78	74	-16.22	Peak
9608	44.88	0	100	H	38.834	9.57	34.2	59.084	74	-14.916	Peak
9608	29	0	100	V	38.83	9.57	34.2	43.2	54	-10.8	Ave
9608	28.84	0	100	H	38.834	9.57	34.2	43.044	54	-10.956	Ave
Middle Channel 2441 MHz, measured at 3 meters											
2441	55.64	212	100	V	28.174	3.43	-	87.244	-	-	Peak
2441	63.46	62	154	H	28.197	3.43	-	95.087	-	-	Peak
2441	54.77	212	100	V	28.174	3.43	-	86.374	-	-	Ave
2441	62.87	62	154	H	28.197	3.43	-	94.497	-	-	Ave
4882	45.73	0	100	V	33.321	5.34	33.75	50.64	74	-23.36	Peak
4882	46.11	62	154	H	33.354	5.34	33.75	51.05	74	-22.95	Peak
4882	30.17	0	100	V	33.321	5.34	33.75	35.08	54	-18.92	Ave
4882	33.50	62	154	H	33.354	5.34	33.75	38.44	54	-15.56	Ave
7323	43.71	0	100	V	37.324	6.27	33.93	53.37	74	-20.63	Peak
7323	44.27	0	100	H	37.356	6.27	33.93	53.97	74	-20.03	Peak
7323	29.16	0	100	V	37.324	6.27	33.93	38.82	54	-15.18	Ave
7323	29.21	0	100	H	37.356	6.27	33.93	38.91	54	-15.09	Ave
9764	43.91	0	100	V	38.922	9.44	34.31	57.96	74	-16.04	Peak
9764	44.30	0	100	H	38.913	9.44	34.31	58.34	74	-15.66	Peak
9764	29.43	0	100	V	38.922	9.44	34.31	43.48	54	-10.52	Ave
9764	29.51	0	100	H	38.913	9.44	34.31	43.55	54	-10.45	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, measured at 3 meters											
2480	56.78	225	100	V	29.009	3.43	-	89.219	-	-	Peak
2480	63.04	31	184	H	28.999	3.43	-	95.469	-	-	Peak
2480	56.07	225	100	V	29.009	3.43	-	88.509	-	-	Ave
2480	62.26	31	184	H	28.999	3.43	-	94.689	-	-	Ave
2483.5	27.08	225	100	V	29.009	3.43	-	59.519	74	-14.481	Peak
2483.5	26.91	31	184	H	28.999	3.43	-	59.339	74	-14.661	Peak
2483.5	12.68	225	100	V	29.009	3.43	-	45.119	54	-8.881	Ave
2483.5	12.67	31	184	H	28.999	3.43	-	45.099	54	-8.901	Ave
4960	45.41	0	100	V	33.531	5.25	33.73	50.46	74	-23.54	Peak
4960	46.41	31	184	H	33.556	5.25	33.73	51.49	74	-22.51	Peak
4960	30.66	0	100	V	33.531	5.25	33.73	35.71	54	-18.29	Ave
4960	35.56	31	184	H	33.556	5.25	33.73	40.64	54	-13.36	Ave
7440	44.57	0	100	V	37.242	6.27	33.99	54.09	74	-19.91	Peak
7440	44.32	0	100	H	37.238	6.27	33.99	53.84	74	-20.16	Peak
7440	29.90	0	100	V	37.242	6.27	33.99	39.42	54	-14.58	Ave
7440	29.88	0	100	H	37.238	6.27	33.99	39.40	54	-14.60	Ave
9920	45.05	0	100	V	39.036	9.71	34.39	59.41	74	-14.59	Peak
9920	44.52	0	100	H	39.052	9.71	34.39	58.89	74	-15.11	Peak
9920	30.57	0	100	V	39.036	9.71	34.39	44.93	54	-9.07	Ave
9920	30.69	0	100	H	39.052	9.71	34.39	45.06	54	-8.94	Ave

DQPSK

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, measured at 3 meters											
2402	59.17	213	100	V	28.174	3.43	-	90.774	-	-	Peak
2402	65.87	59	153	H	28.197	3.43	-	97.497	-	-	Peak
2402	56.18	213	100	V	28.174	3.43	-	87.784	-	-	Ave
2402	62.28	59	153	H	28.197	3.43	-	93.907	-	-	Ave
2390	25.95	213	100	V	28.174	3.43	-	57.554	74	-16.446	Peak
2390	26.42	59	153	H	28.197	3.43	-	58.047	74	-15.953	Peak
2390	12.2	213	100	V	28.174	3.43	-	43.804	54	-10.196	Ave
2390	12.43	59	153	H	28.197	3.43	-	44.057	54	-9.943	Ave
4804	45.10	0	100	V	33.119	5.34	33.72	49.839	74	-24.161	Peak
4804	45.60	0	100	H	33.182	5.34	33.72	50.402	74	-23.598	Peak
4804	30.93	0	100	V	33.119	5.34	33.72	35.669	54	-18.331	Ave
4804	31.85	0	100	H	33.182	5.34	33.72	36.652	54	-17.348	Ave
7206	44.38	0	100	V	37.444	6.33	33.93	54.224	74	-19.776	Peak
7206	44.14	0	100	H	37.442	6.33	33.93	53.982	74	-20.018	Peak
7206	30.12	0	100	V	37.444	6.33	33.93	39.964	54	-14.036	Ave
7206	30.14	0	100	H	37.442	6.33	33.93	39.982	54	-14.018	Ave
9608	42.94	0	100	V	38.83	9.57	34.2	57.14	74	-16.86	Peak
9608	42.85	0	100	H	38.834	9.57	34.2	57.054	74	-16.946	Peak
9608	28.84	0	100	V	38.83	9.57	34.2	43.04	54	-10.96	Ave
9608	28.97	0	100	H	38.834	9.57	34.2	43.174	54	-10.826	Ave
Middle Channel 2441 MHz, measured at 3 meters											
2441	57.19	213	100	V	28.174	3.43	-	88.794	-	-	Peak
2441	64.87	60	133	H	28.197	3.43	-	96.497	-	-	Peak
2441	53.47	213	100	V	28.174	3.43	-	85.074	-	-	Ave
2441	61.21	60	133	H	28.197	3.43	-	92.837	-	-	Ave
4882	45.28	0	100	V	33.321	5.34	33.75	50.19	74	-23.81	Peak
4882	45.42	60	154	H	33.354	5.34	33.75	50.36	74	-23.64	Peak
4882	30.78	0	100	V	33.321	5.34	33.75	35.69	54	-18.31	Ave
4882	32.13	60	154	H	33.354	5.34	33.75	37.07	54	-16.93	Ave
7323	44.20	0	100	V	37.324	6.27	33.93	53.86	74	-20.14	Peak
7323	43.63	0	100	H	37.356	6.27	33.93	53.33	74	-20.67	Peak
7323	29.66	0	100	V	37.324	6.27	33.93	39.32	54	-14.68	Ave
7323	29.80	0	100	H	37.356	6.27	33.93	39.50	54	-14.50	Ave
9764	44.44	0	100	V	38.922	9.44	34.31	58.49	74	-15.51	Peak
9764	44.38	0	100	H	38.913	9.44	34.31	58.42	74	-15.58	Peak
9764	30.31	0	100	V	38.922	9.44	34.31	44.36	54	-9.64	Ave
9764	30.54	0	100	H	38.913	9.44	34.31	44.58	54	-9.42	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, measured at 3 meters											
2480	57.72	225	100	V	29.009	3.43	-	90.159	-	-	Peak
2480	64.38	29	132	H	28.999	3.43	-	96.809	-	-	Peak
2480	54.1	225	100	V	29.009	3.43	-	86.539	-	-	Ave
2480	60.29	29	132	H	28.999	3.43	-	92.719	-	-	Ave
2483.5	26.43	225	100	V	29.009	3.43	-	58.869	74	-15.131	Peak
2483.5	26.72	29	132	H	28.999	3.43	-	59.149	74	-14.851	Peak
2483.5	12.69	225	100	V	29.009	3.43	-	45.129	54	-8.871	Ave
2483.5	12.8	29	132	H	28.999	3.43	-	45.229	54	-8.771	Ave
4960	44.20	0	100	V	33.531	5.25	33.73	49.25	74	-24.75	Peak
4960	45.90	0	100	H	33.556	5.25	33.73	50.98	74	-23.02	Peak
4960	30.52	0	100	V	33.531	5.25	33.73	35.57	54	-18.43	Ave
4960	33.72	0	100	H	33.556	5.25	33.73	38.80	54	-15.20	Ave
7440	43.92	0	100	V	37.242	6.27	33.99	53.44	74	-20.56	Peak
7440	43.77	0	100	H	37.238	6.27	33.99	53.29	74	-20.71	Peak
7440	30.06	0	100	V	37.242	6.27	33.99	39.58	54	-14.42	Ave
7440	29.96	0	100	H	37.238	6.27	33.99	39.48	54	-14.52	Ave
9920	44.75	0	100	V	39.036	9.71	34.39	59.11	74	-14.89	Peak
9920	44.84	0	100	H	39.052	9.71	34.39	59.21	74	-14.79	Peak
9920	30.44	0	100	V	39.036	9.71	34.39	44.80	54	-9.20	Ave
9920	30.02	0	100	H	39.052	9.71	34.39	44.39	54	-9.61	Ave

8PSK

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, measured at 3 meters											
2402	59.98	212	100	V	28.174	3.43	-	91.584	-	-	Peak
2402	65.84	60	154	H	28.197	3.43	-	97.467	-	-	Peak
2402	56.2	212	100	V	28.174	3.43	-	87.804	-	-	Ave
2402	62.05	60	154	H	28.197	3.43	-	93.677	-	-	Ave
2390	26.28	212	100	V	28.174	3.43	-	57.884	74	-16.116	Peak
2390	26.21	60	154	H	28.197	3.43	-	57.837	74	-16.163	Peak
2390	12.19	212	100	V	28.174	3.43	-	43.794	54	-10.206	Ave
2390	12.44	60	154	H	28.197	3.43	-	44.067	54	-9.933	Ave
4804	44.30	0	100	V	33.119	5.34	33.72	49.039	74	-24.961	Peak
4804	44.93	60	154	H	33.182	5.34	33.72	49.732	74	-24.268	Peak
4804	30.70	0	100	V	33.119	5.34	33.72	35.439	54	-18.561	Ave
4804	31.71	60	154	H	33.182	5.34	33.72	36.512	54	-17.488	Ave
7206	44	0	100	V	37.444	6.33	33.93	53.844	74	-20.156	Peak
7206	44.67	0	100	H	37.442	6.33	33.93	54.512	74	-19.488	Peak
7206	30.09	0	100	V	37.444	6.33	33.93	39.934	54	-14.066	Ave
7206	29.96	0	100	H	37.442	6.33	33.93	39.802	54	-14.198	Ave
9608	44.74	0	100	V	38.83	9.57	34.2	58.94	74	-15.06	Peak
9608	43.92	0	100	H	38.834	9.57	34.2	58.124	74	-15.876	Peak
9608	29.88	0	100	V	38.83	9.57	34.2	44.08	54	-9.92	Ave
9608	29.91	0	100	H	38.834	9.57	34.2	44.114	54	-9.886	Ave
Middle Channel 2441 MHz, measured at 3 meters											
2441	57.04	215	100	V	28.174	3.43	-	88.644	-	-	Peak
2441	64.79	60	133	H	28.197	3.43	-	96.417	-	-	Peak
2441	53	215	100	V	28.174	3.43	-	84.604	-	-	Ave
2441	59.91	60	133	H	28.197	3.43	-	91.537	-	-	Ave
4882	45.00	0	100	V	33.321	5.34	33.75	49.91	74	-24.09	Peak
4882	45.56	60	133	H	33.354	5.34	33.75	50.50	74	-23.50	Peak
4882	30.80	0	100	V	33.321	5.34	33.75	35.71	54	-18.29	Ave
4882	33.60	60	133	H	33.354	5.34	33.75	38.54	54	-15.46	Ave
7323	43.62	0	100	V	37.324	6.27	33.93	53.28	74	-20.72	Peak
7323	43.87	0	100	H	37.356	6.27	33.93	53.57	74	-20.43	Peak
7323	29.68	0	100	V	37.324	6.27	33.93	39.34	54	-14.66	Ave
7323	29.66	0	100	H	37.356	6.27	33.93	39.36	54	-14.64	Ave
9764	43.98	0	100	V	38.922	9.44	34.31	58.03	74	-15.97	Peak
9764	44.29	0	100	H	38.913	9.44	34.31	58.33	74	-15.67	Peak
9764	30.28	0	100	V	38.922	9.44	34.31	44.33	54	-9.67	Ave
9764	30.31	0	100	H	38.913	9.44	34.31	44.35	54	-9.65	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, measured at 3 meters											
2480	57.81	226	100	V	29.009	3.43	-	90.249	-	-	Peak
2480	64.52	31	186	H	28.999	3.43	-	96.949	-	-	Peak
2480	53.71	226	100	V	29.009	3.43	-	86.149	-	-	Ave
2480	60.59	31	186	H	28.999	3.43	-	93.019	-	-	Ave
2483.5	26.97	226	100	V	29.009	3.43	-	59.409	74	-14.591	Peak
2483.5	27.12	31	186	H	28.999	3.43	-	59.549	74	-14.451	Peak
2483.5	12.66	226	100	V	29.009	3.43	-	45.099	54	-8.901	Ave
2483.5	12.77	31	186	H	28.999	3.43	-	45.199	54	-8.801	Ave
4960	44.22	0	100	V	33.531	5.25	33.73	49.27	74	-24.73	Peak
4960	46.55	31	186	H	33.556	5.25	33.73	51.63	74	-22.37	Peak
4960	30.74	0	100	V	33.531	5.25	33.73	35.79	54	-18.21	Ave
4960	34.31	31	186	H	33.556	5.25	33.73	39.39	54	-14.61	Ave
7440	44.02	0	100	V	37.242	6.27	33.99	53.54	74	-20.46	Peak
7440	43.69	0	100	H	37.238	6.27	33.99	53.21	74	-20.79	Peak
7440	29.88	0	100	V	37.242	6.27	33.99	39.40	54	-14.60	Ave
7440	29.81	0	100	H	37.238	6.27	33.99	39.33	54	-14.67	Ave
9920	45.08	0	100	V	39.036	9.71	34.39	59.44	74	-14.56	Peak
9920	44.58	0	100	H	39.052	9.71	34.39	58.95	74	-15.05	Peak
9920	31.20	0	100	V	39.036	9.71	34.39	45.56	54	-8.44	Ave
9920	31.02	0	100	H	39.052	9.71	34.39	45.39	54	-8.61	Ave

8 FCC §15.247(a)(1) & IC RSS-247 §5.1, RSS-Gen §6.6– 20 dB & 99% Emission Bandwidth

8.1 Applicable Standards

According to FCC §15.247(a)(1) and IC RSS-247 §5.2: the maximum 20 dB bandwidth of the hopping channel shall be presented.

8.2 Measurement Procedure

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW ≥ 1% of the 20 dB bandwidth

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
-	SMA cable	-	C0002	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:	22º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Jin Yang on 2015-10-23 in RF site.

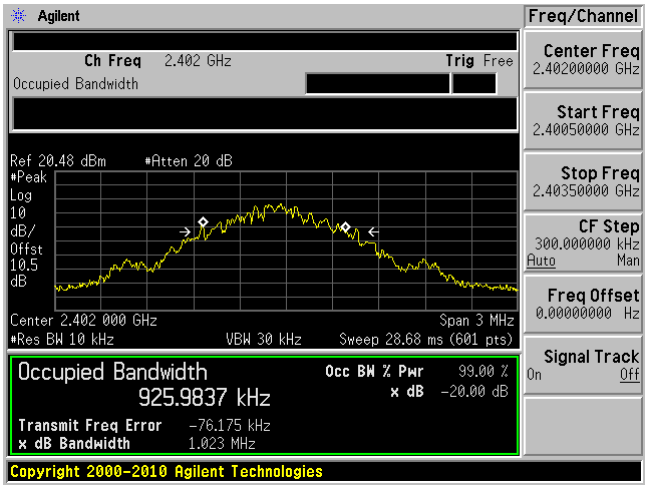
8.5 Test Results

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	20 dB Emission Bandwidth (MHz)
1-DH1			
Low	2402	925.9837	1.023
Middle	2441	926.2889	1.022
High	2480	927.8573	1.023
2-DH1			
Low	2402	1203.3	1.323
Middle	2441	1205.9	1.322
High	2480	1205.7	1.323
3-DH1			
Low	2402	1196.4	1.293
Middle	2441	1196.9	1.290
High	2480	1198.8	1.291
1-DH3			
Low	2402	923.3444	1.022
Middle	2441	924.6681	1.022
High	2480	928.0249	1.023
2-DH3			
Low	2402	1201.9	1.323
Middle	2441	1205.8	1.324
High	2480	1206.6	1.322
3-DH3			
Low	2402	1194.6	1.285
Middle	2441	1195.8	1.294
High	2480	1197.9	1.293
1-DH5			
Low	2402	923.8621	1.022
Middle	2441	925.7038	1.022
High	2480	927.1218	1.022
2-DH5			
Low	2402	1201.7	1.321
Middle	2441	1206.5	1.323
High	2480	1205.0	1.324
3-DH5			
Low	2402	1194.9	1.292
Middle	2441	1196.5	1.291
High	2480	1197.0	1.288

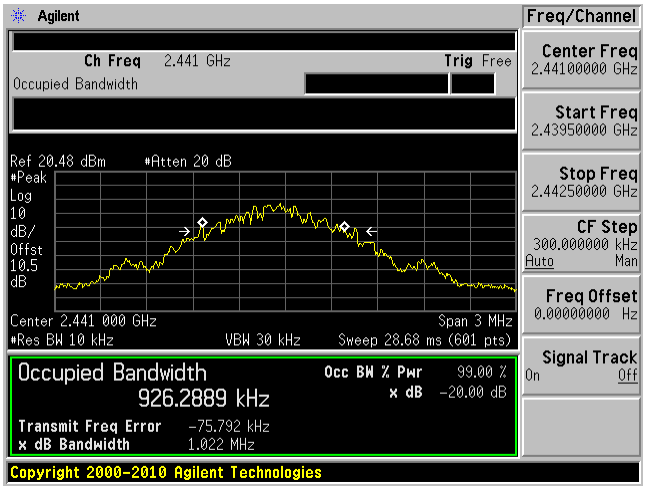
Please refer to the following plots for detailed test results

1-DH1

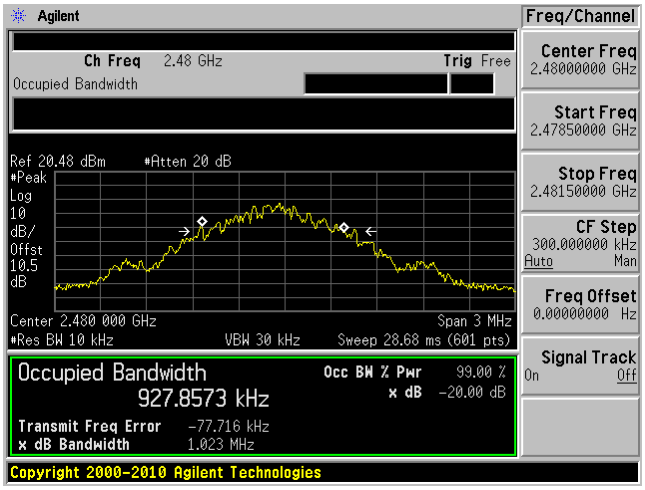
Low Channel 2402 MHz



Middle Channel 2441 MHz

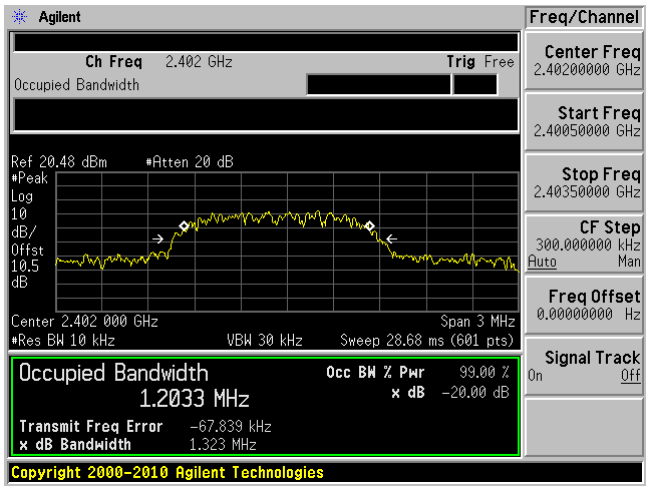


High Channel 2480 MHz

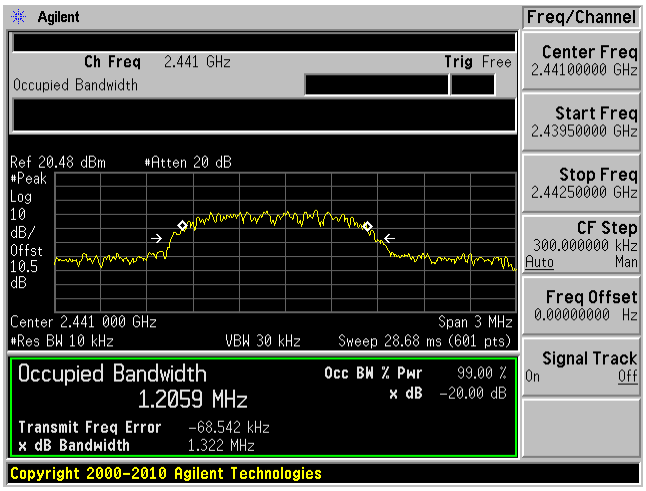


2-DH1

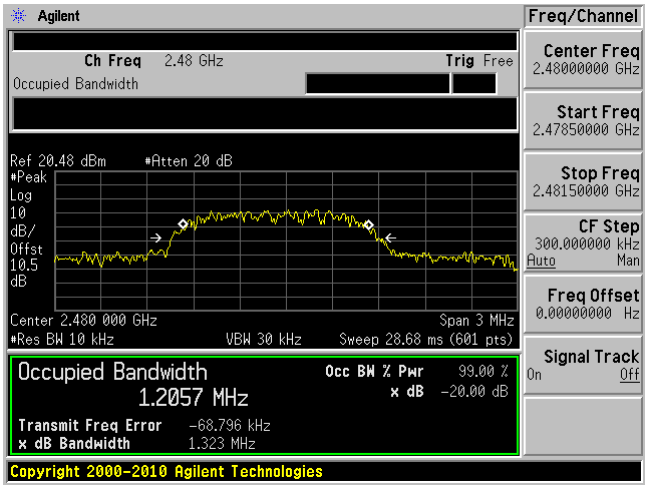
Low Channel 2402 MHz



Middle Channel 2441 MHz

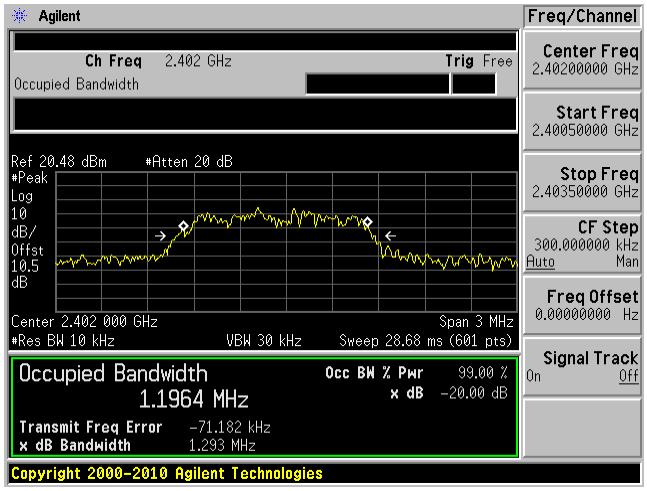


High Channel 2480 MHz

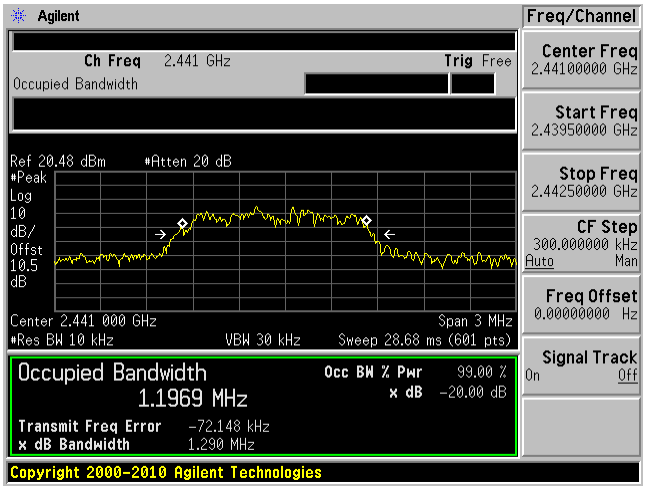


3-DH1

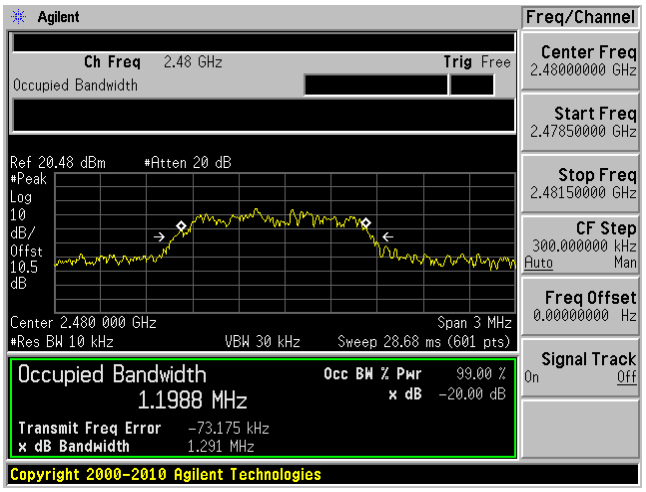
Low Channel 2402 MHz



Middle Channel 2441 MHz

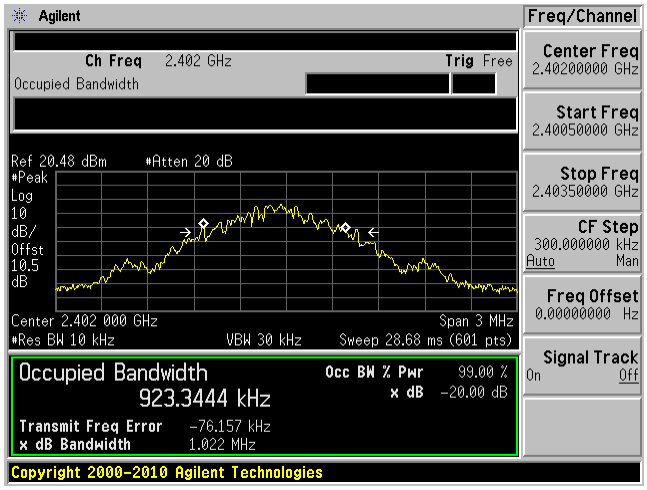


High Channel 2480 MHz

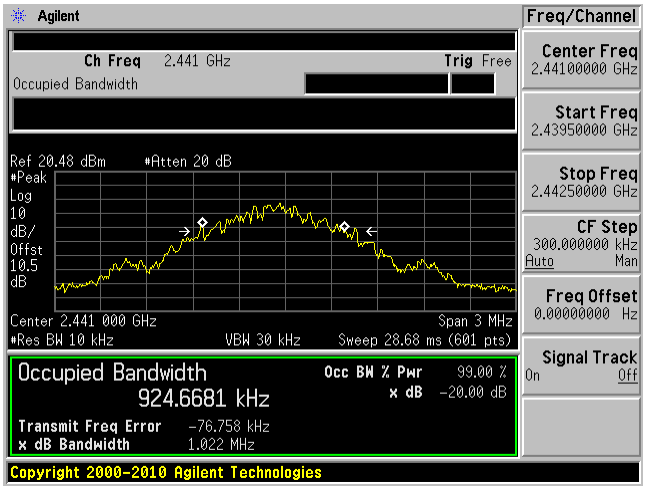


1-DH3

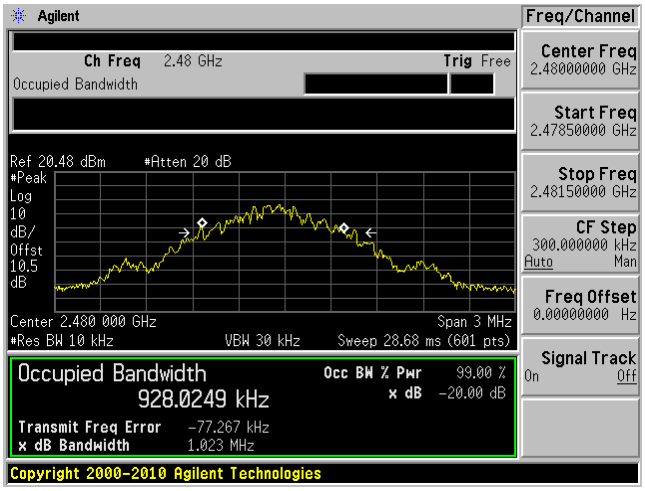
Low Channel 2402 MHz



Middle Channel 2441 MHz

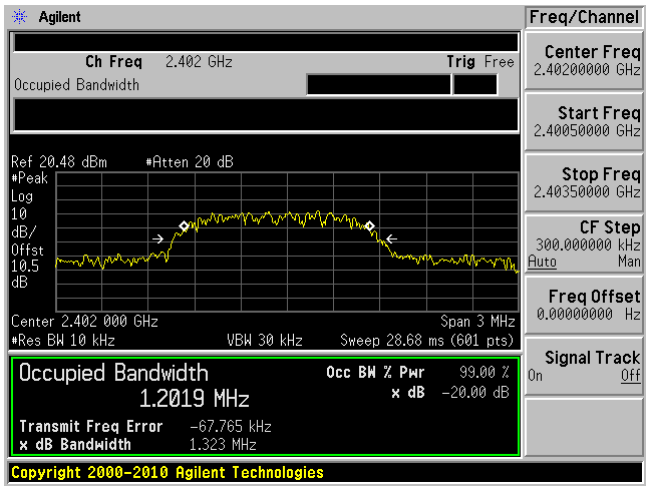


High Channel 2480 MHz

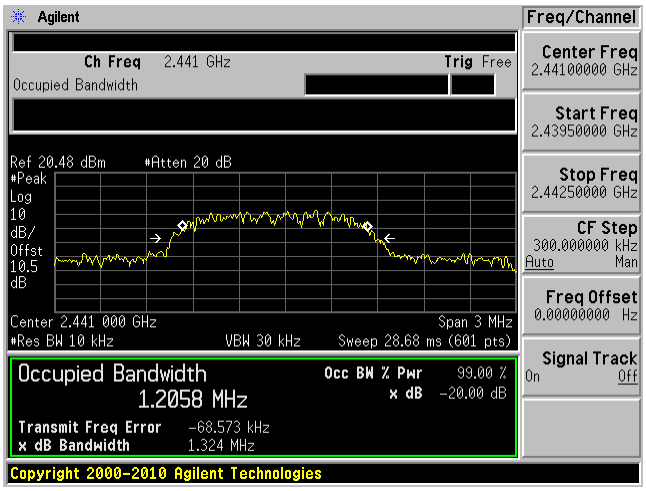


2-DH3

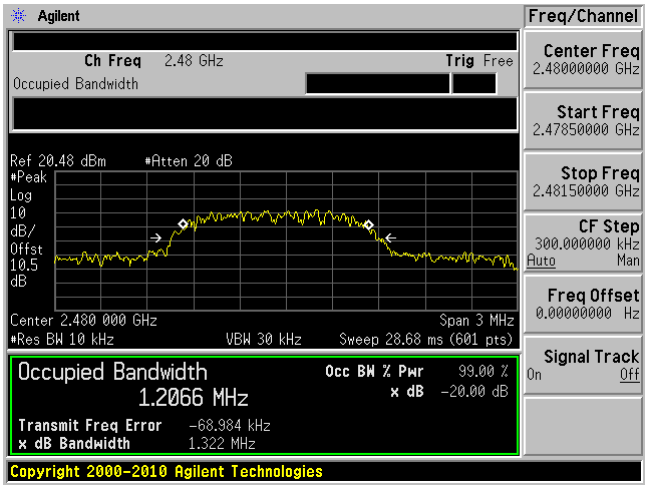
Low Channel 2402 MHz



Middle Channel 2441 MHz

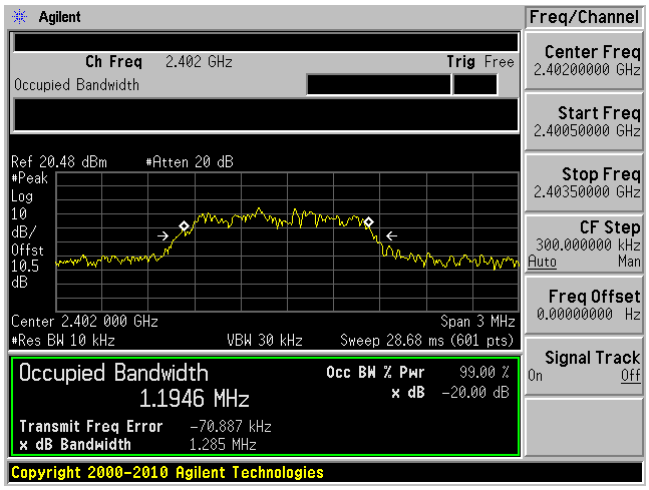


High Channel 2480 MHz

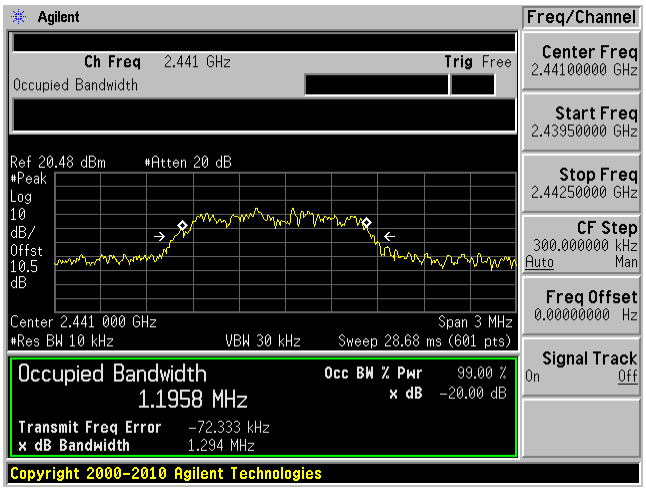


3-DH3

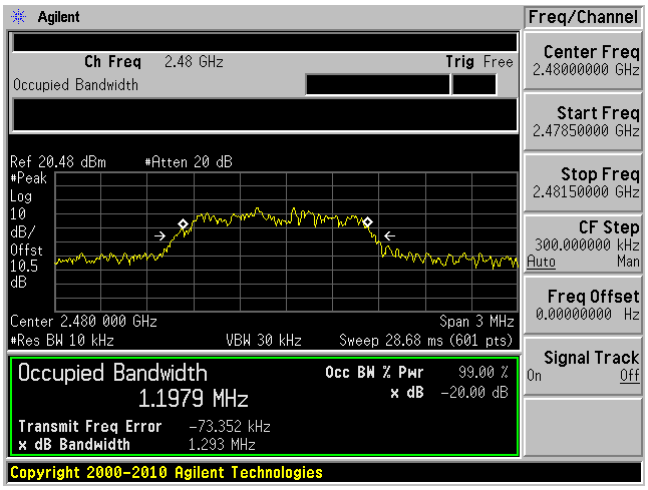
Low Channel 2402 MHz



Middle Channel 2441 MHz

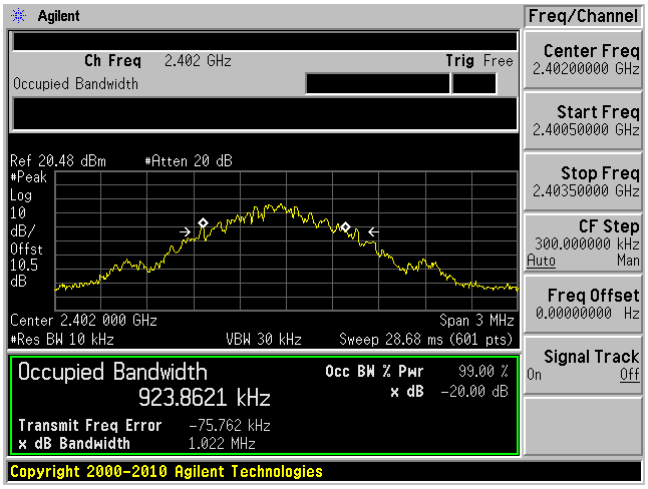


High Channel 2480 MHz

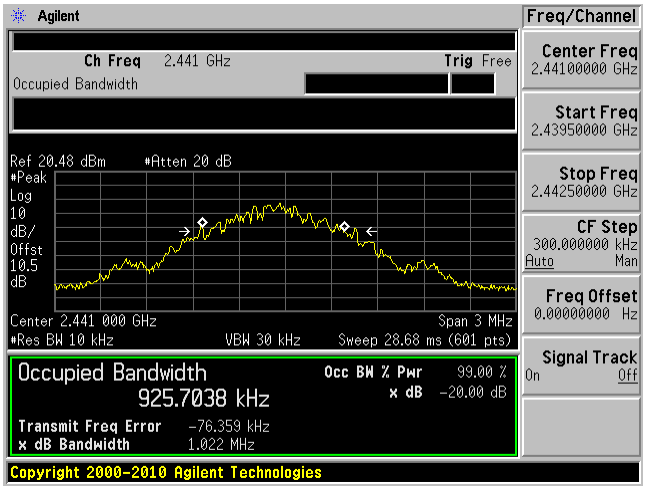


1-DH5

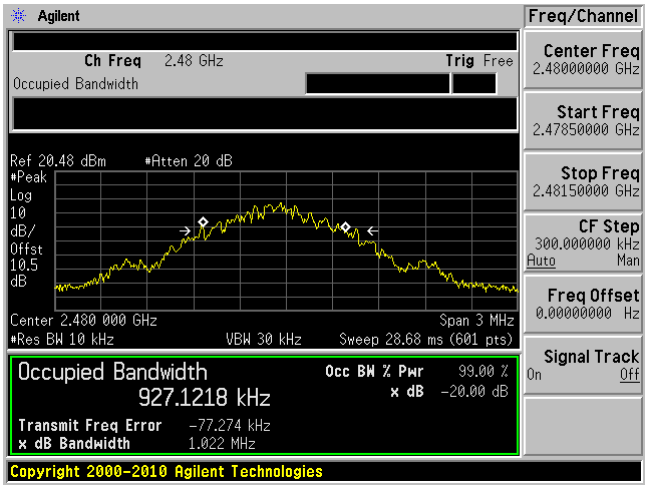
Low Channel 2402 MHz



Middle Channel 2441 MHz

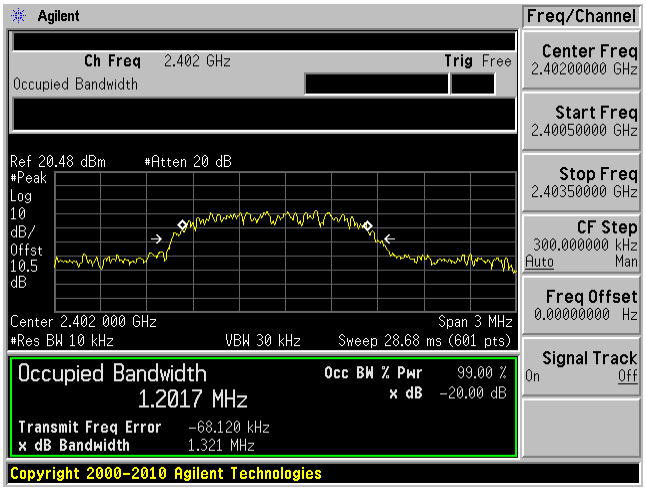


High Channel 2480 MHz

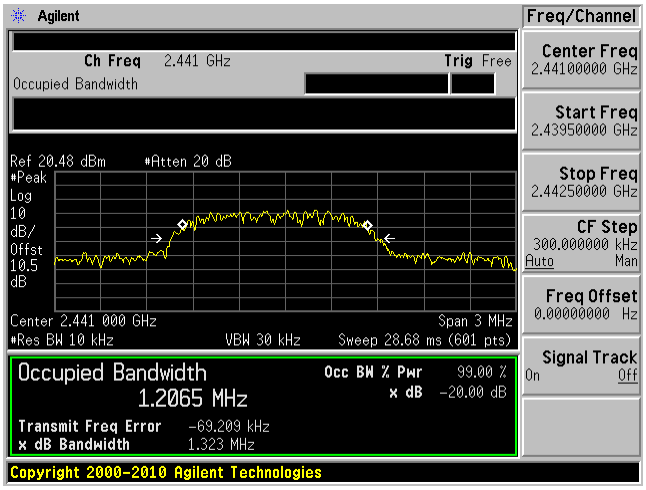


2-DH5

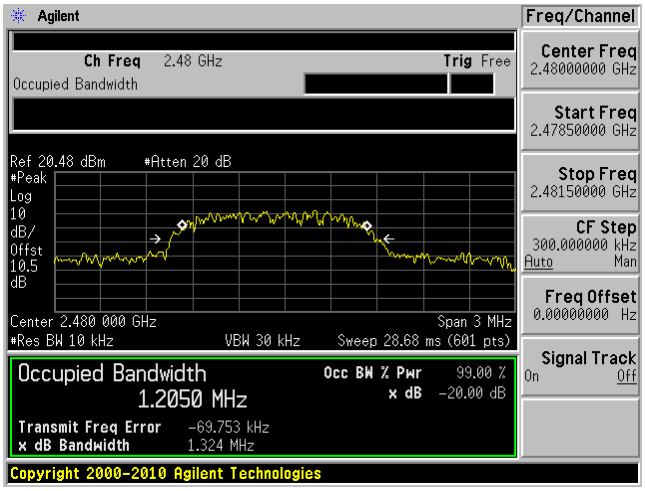
Low Channel 2402 MHz



Middle Channel 2441 MHz

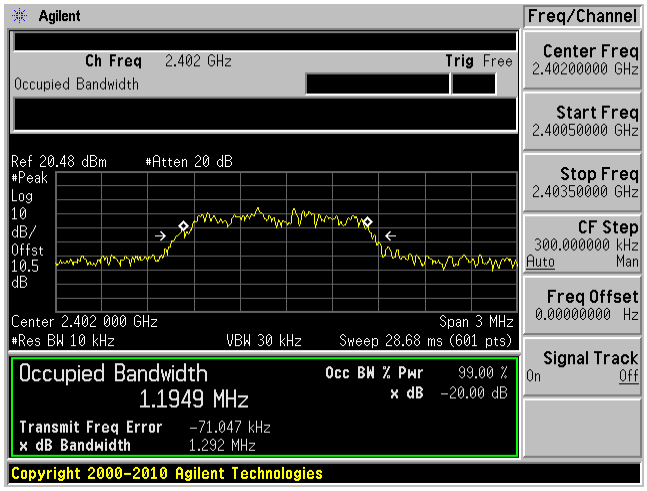


High Channel 2480 MHz

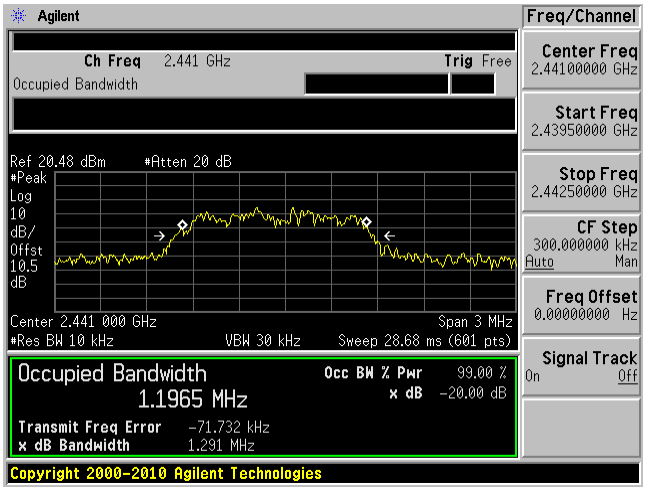


3-DH5

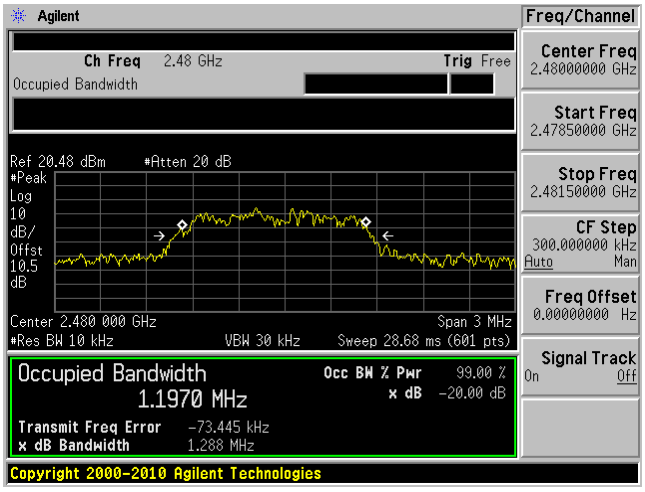
Low Channel 2402 MHz



Middle Channel 2441 MHz



High Channel 2480 MHz



9 FCC §15.247(a)(1) & IC RSS-247 §5.1 – Output Power Measurement

9.1 Applicable Standards

According to FCC §15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to RSS-247 §5.1: FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the -20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

9.2 Measurement Procedure

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured
VBW≥RBW
Sweep = auto
Detector function = peak
Trace = max hold

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
-	SMA cable	-	C0002	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:	22º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Jin Yang on 2015-10-23 at RF site.

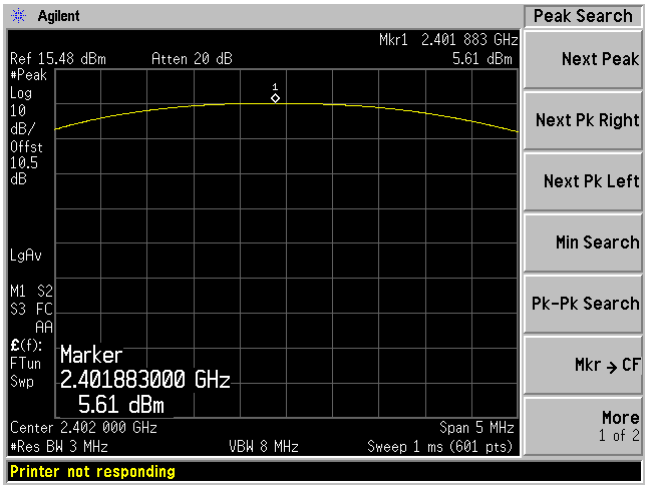
9.5 Test Results

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
1-DH1			
2402	5.61	21	Pass
2441	6.15	21	Pass
2480	6.08	21	Pass
2-DH1			
2402	6.87	21	Pass
2441	7.33	21	Pass
2480	7.31	21	Pass
3-DH1			
2402	7.01	21	Pass
2441	7.54	21	Pass
2480	7.48	21	Pass
1-DH3			
2402	5.65	21	Pass
2441	6.2	21	Pass
2480	5.99	21	Pass
2-DH3			
2402	6.83	21	Pass
2441	7.27	21	Pass
2480	7.22	21	Pass
3-DH3			
2402	6.95	21	Pass
2441	7.48	21	Pass
2480	7.35	21	Pass
1-DH5			
2402	5.66	21	Pass
2441	6.01	21	Pass
2480	6.03	21	Pass
2-DH5			
2402	6.71	21	Pass
2441	7.34	21	Pass
2480	7.15	21	Pass
3-DH5			
2402	6.99	21	Pass
2441	7.4	21	Pass
2480	7.34	21	Pass

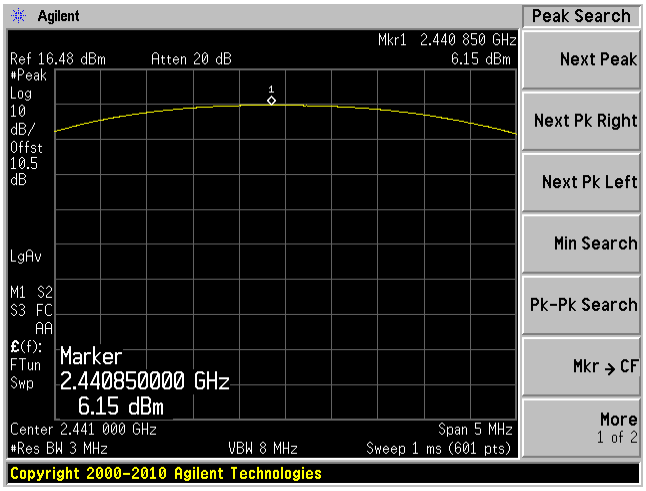
Please refer to the following plots for detailed test results

1-DH1

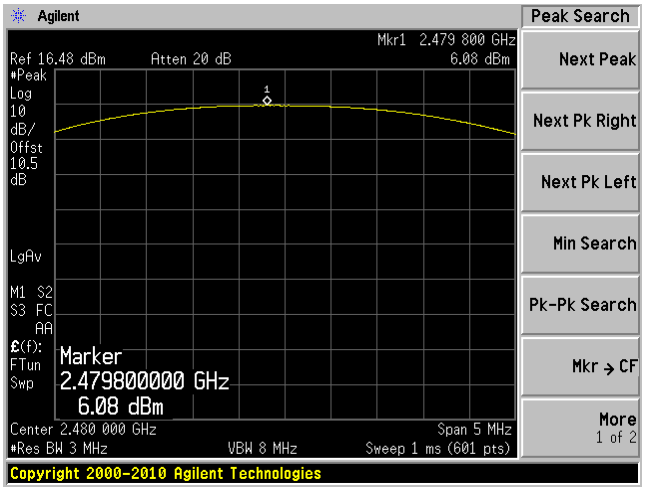
Low Channel 2402 MHz



Middle Channel 2441 MHz

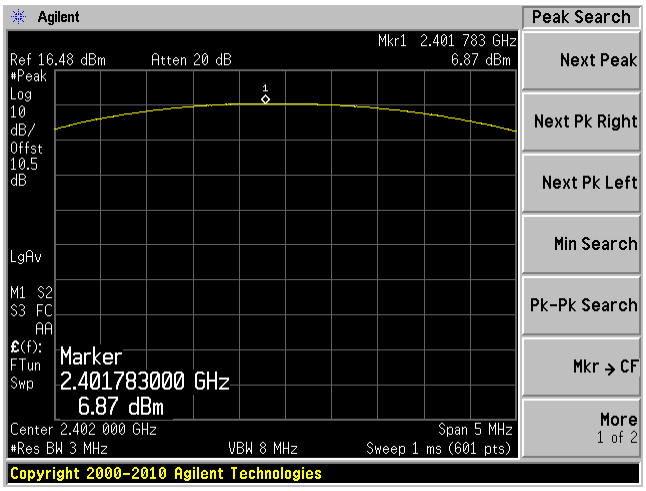


High Channel 2480 MHz

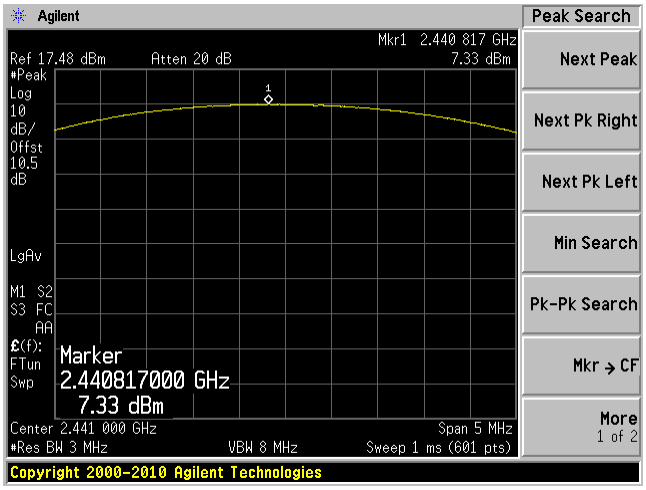


2-DH1

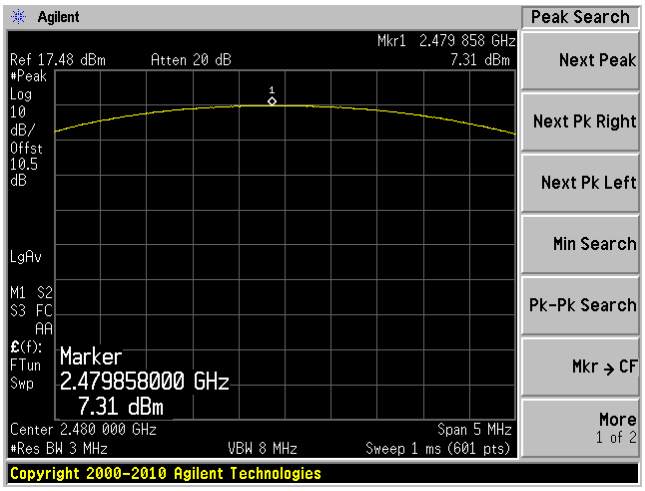
Low Channel 2402 MHz



Middle Channel 2441 MHz

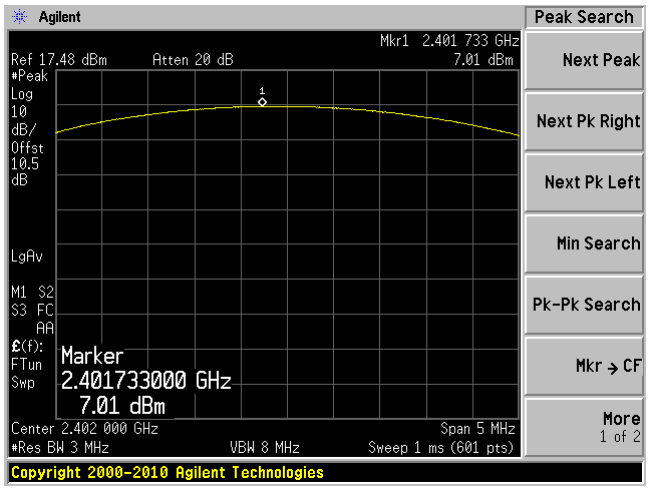


High Channel 2480 MHz

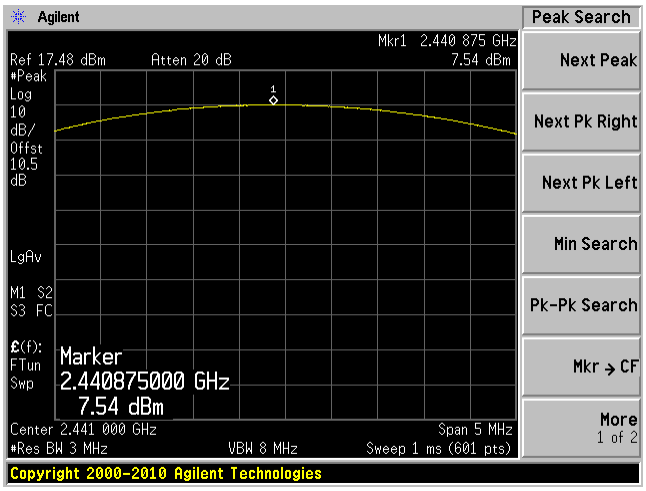


3-DH1

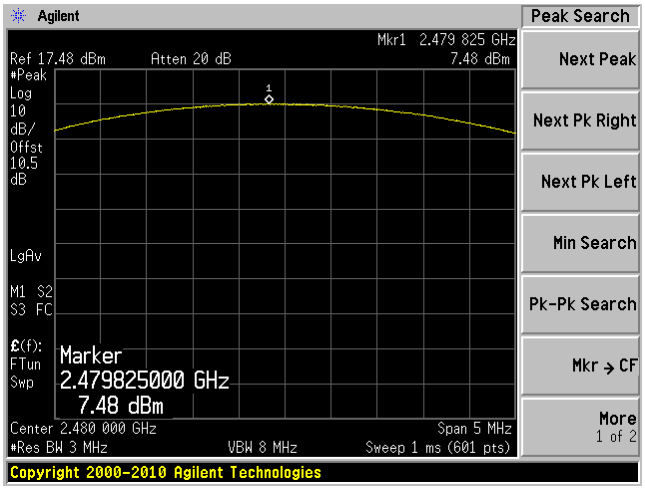
Low Channel 2402 MHz



Middle Channel 2441 MHz

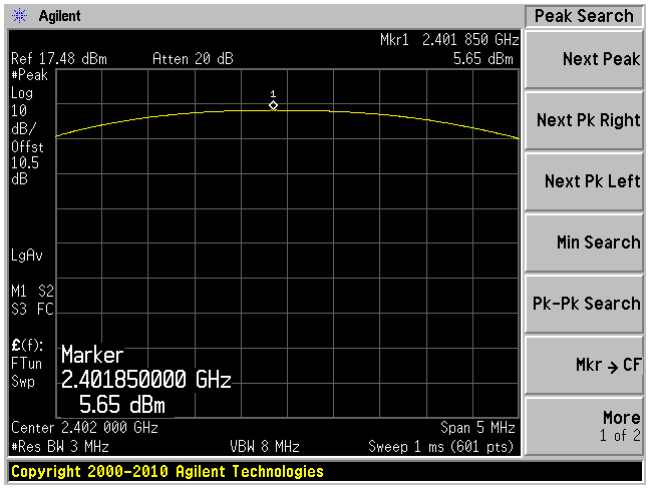


High Channel 2480 MHz

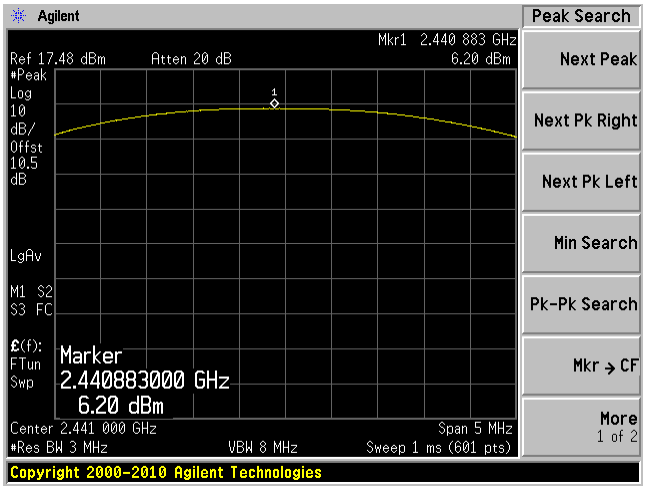


1-DH3

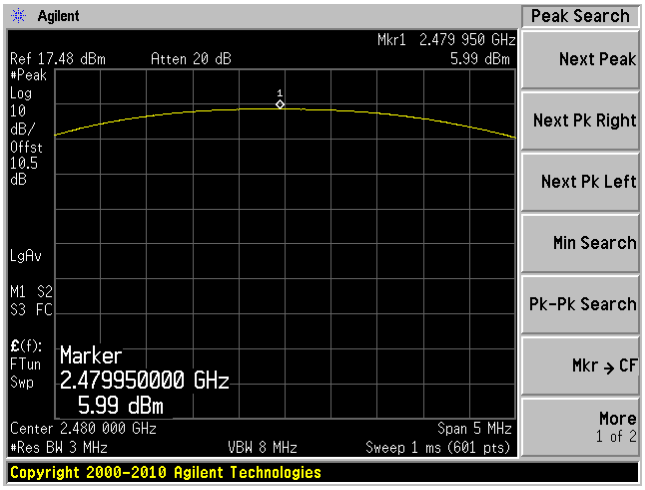
Low Channel 2402 MHz



Middle Channel 2441 MHz

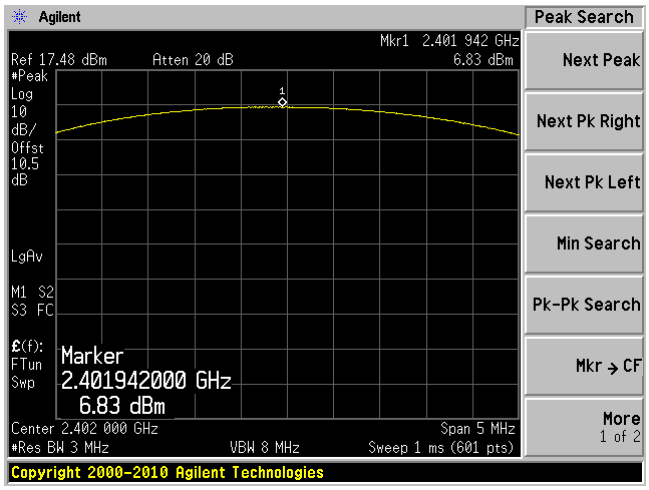


High Channel 2480 MHz

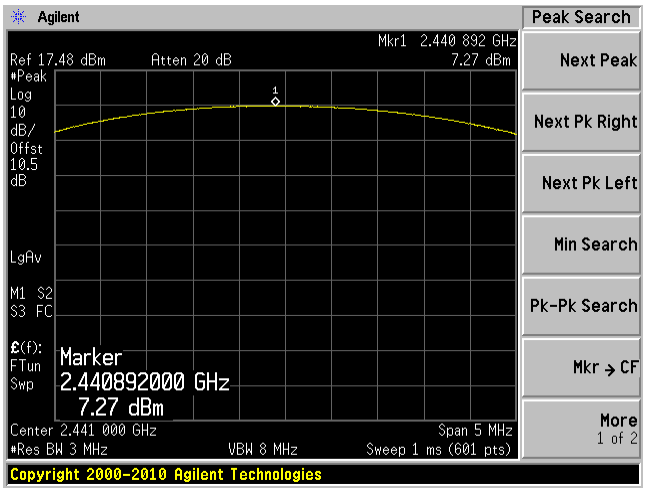


2-DH3

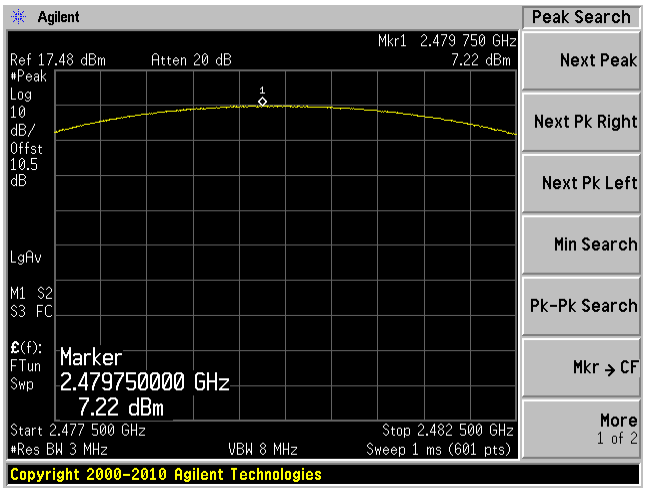
Low Channel 2402 MHz



Middle Channel 2441 MHz

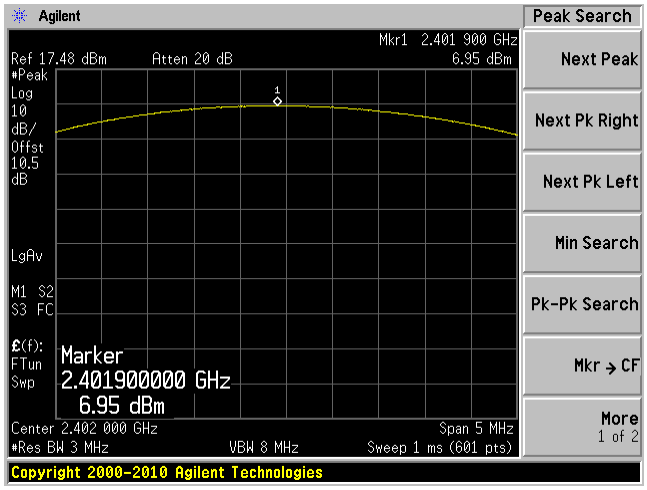


High Channel 2480 MHz

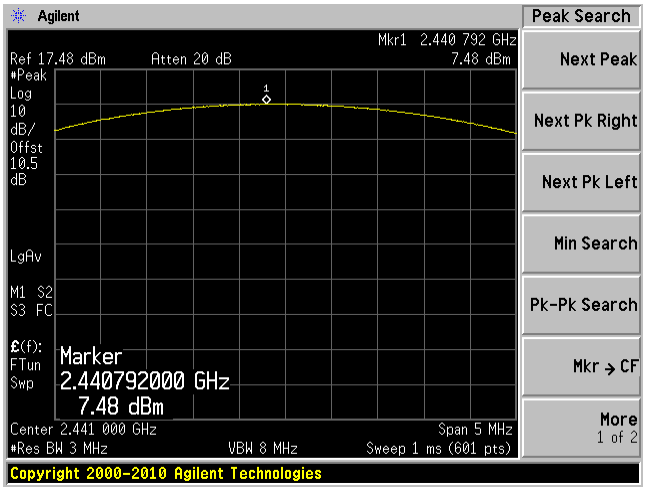


3-DH3

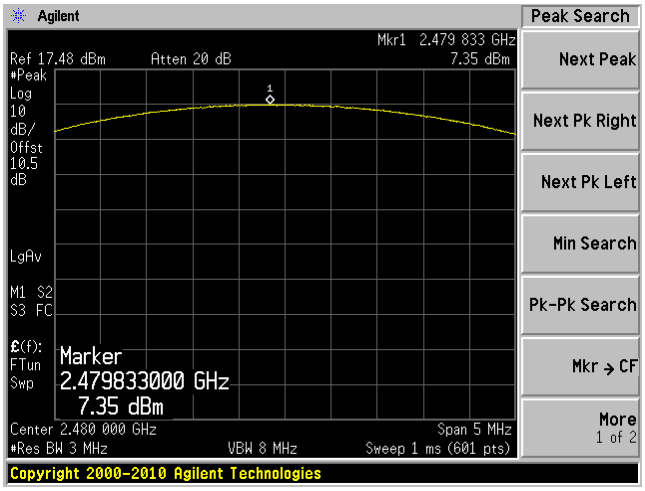
Low Channel 2402 MHz



Middle Channel 2441 MHz

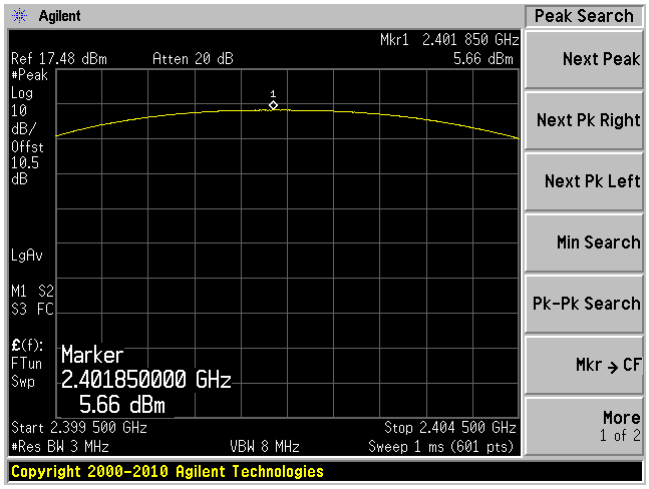


High Channel 2480 MHz

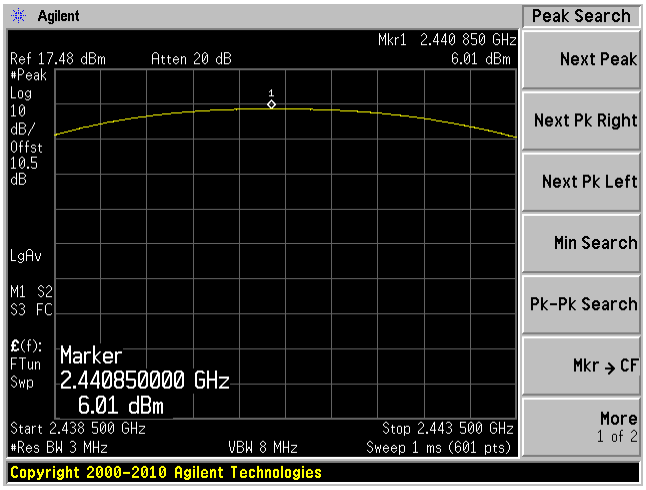


1-DH5

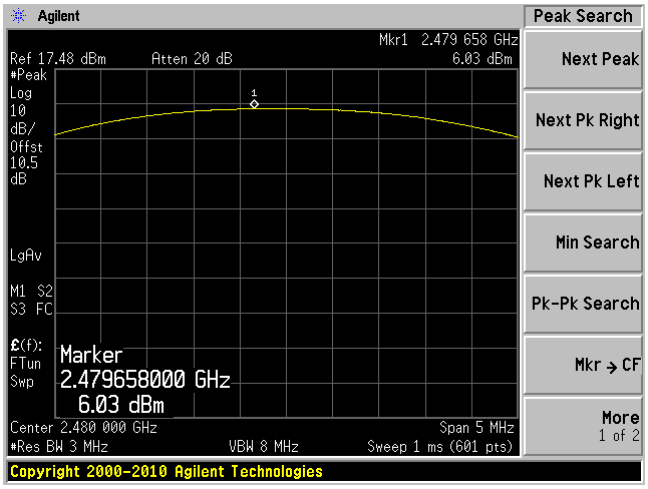
Low Channel 2402 MHz



Middle Channel 2441 MHz

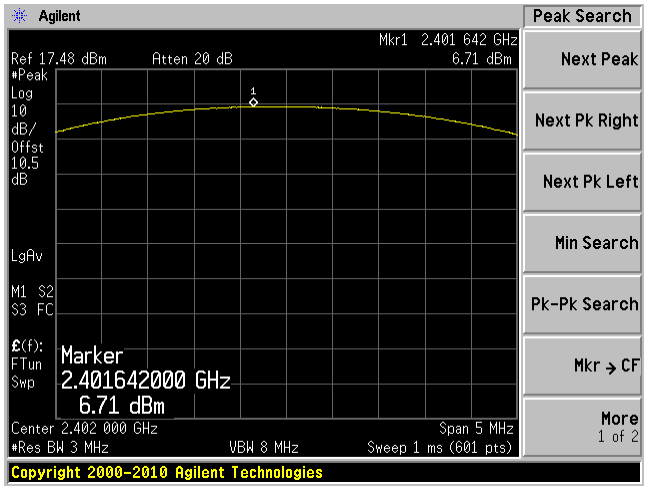


High Channel 2480 MHz

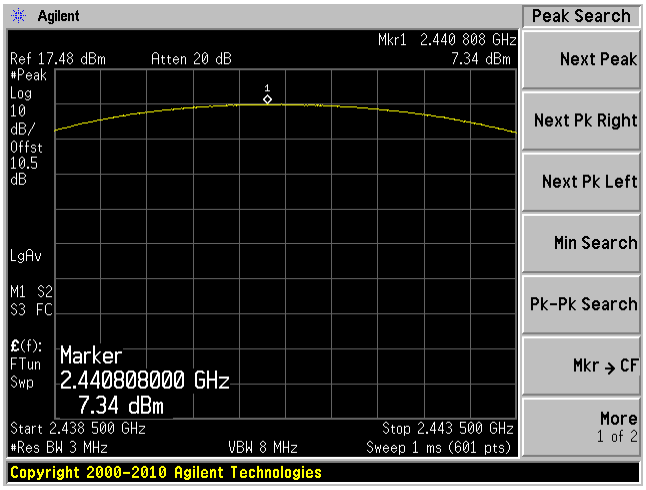


2-DH5

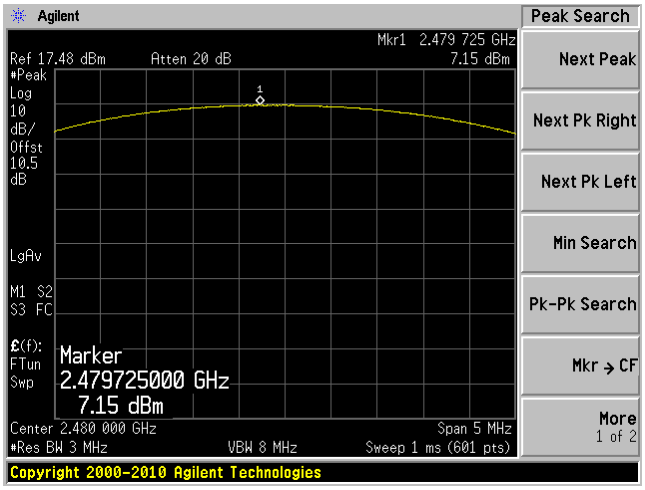
Low Channel 2402 MHz



Middle Channel 2441 MHz

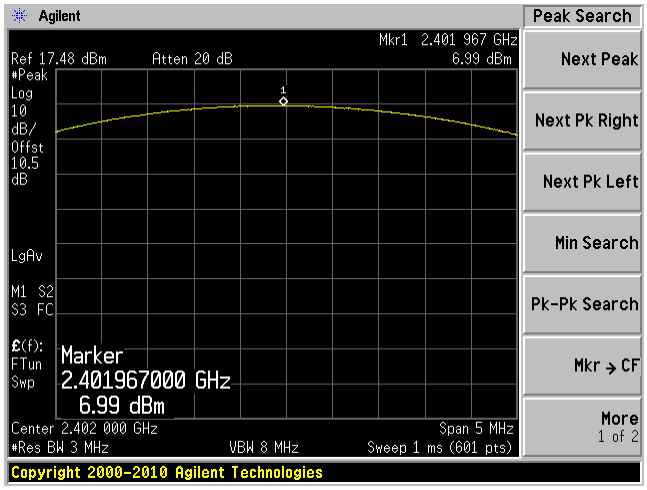


High Channel 2480 MHz

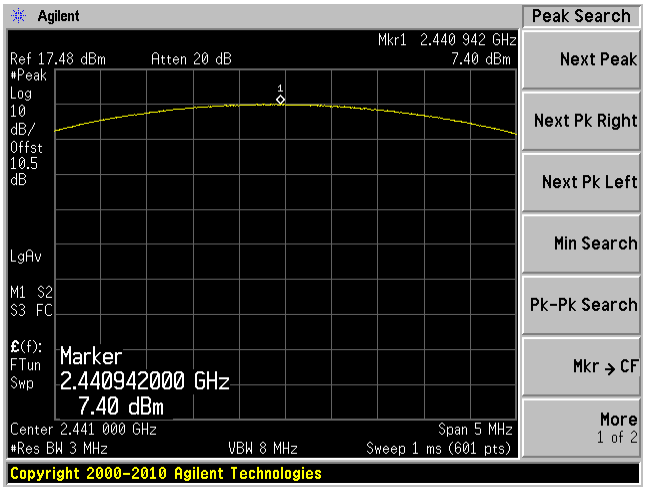


3-DH5

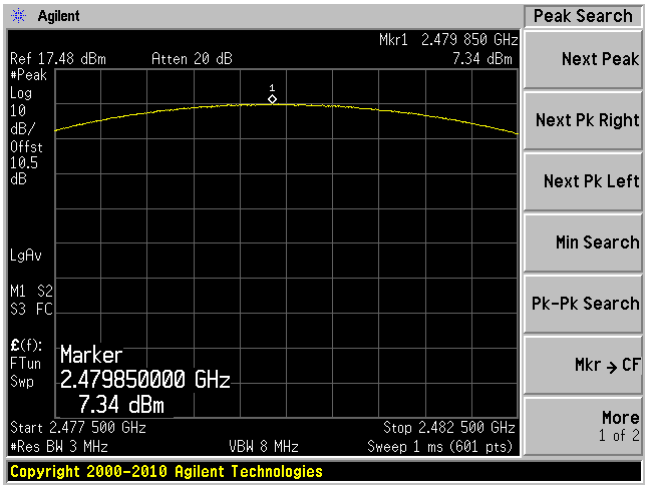
Low Channel 2402 MHz



Middle Channel 2441 MHz



High Channel 2480 MHz



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

10.1 Applicable Standards

According to FCC §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

Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation

RBW ≥1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
-	SMA cable	-	C0002	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

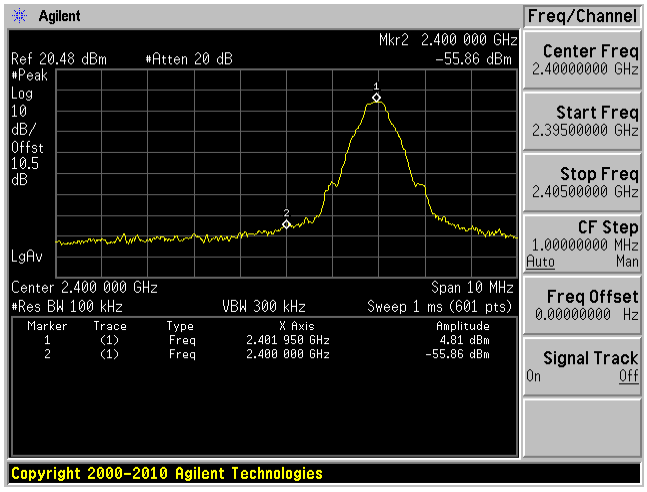
The testing was performed by Jin Yang on 2015-10-23 at RF site.

10.5 Test Results

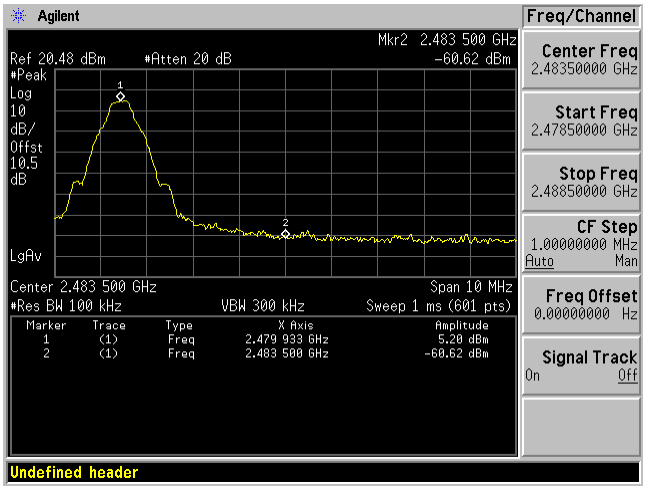
Band Edge

1-DH1

Low Channel 2402 MHz

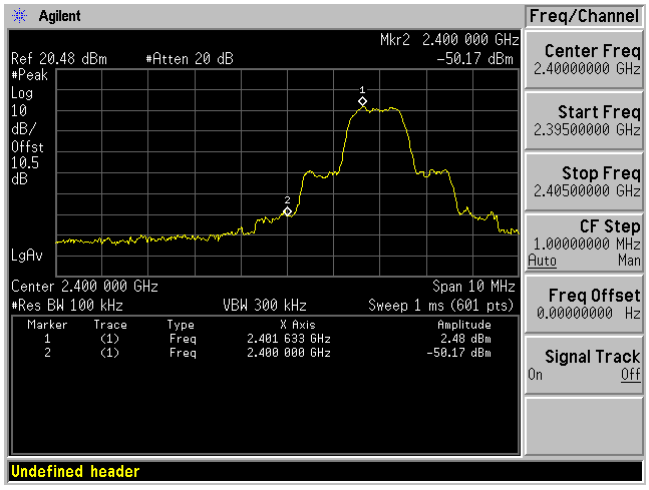


High Channel 2480 MHz

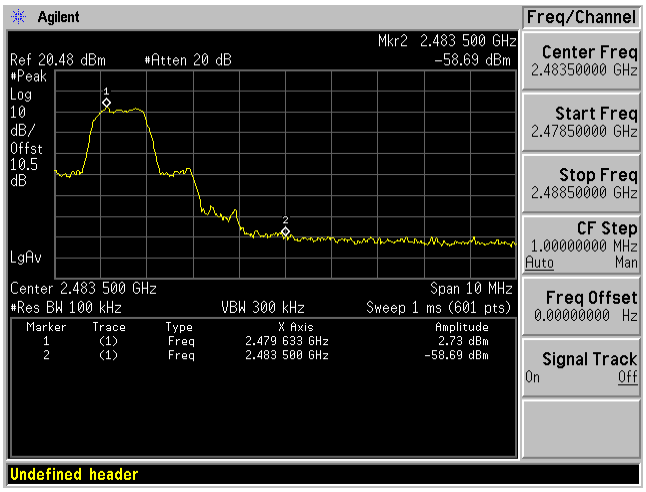


2-DH1

Low Channel 2402 MHz

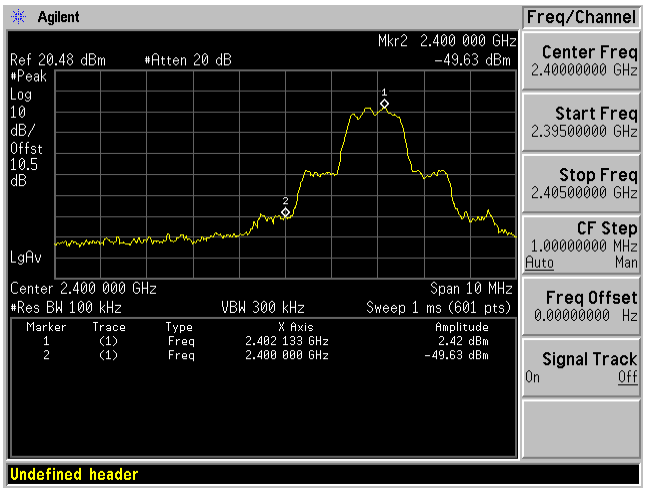


High Channel 2480 MHz

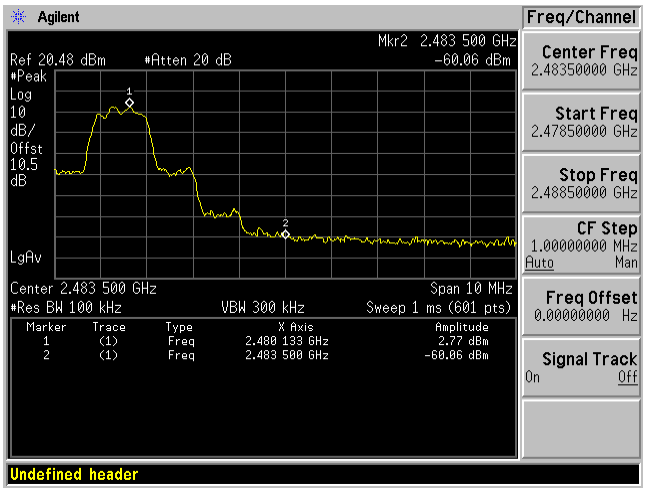


3-DH1

Low Channel 2402 MHz

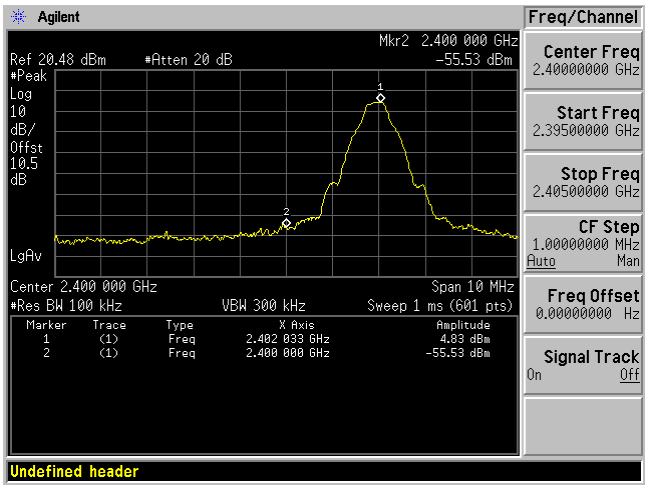


High Channel 2480 MHz

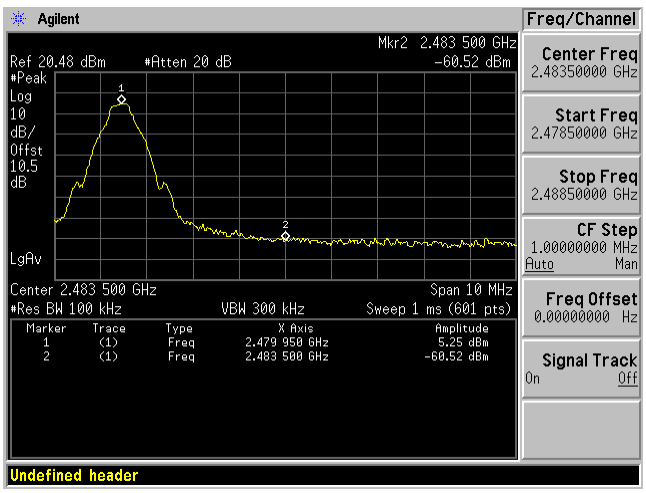


1-DH3

Low Channel 2402 MHz

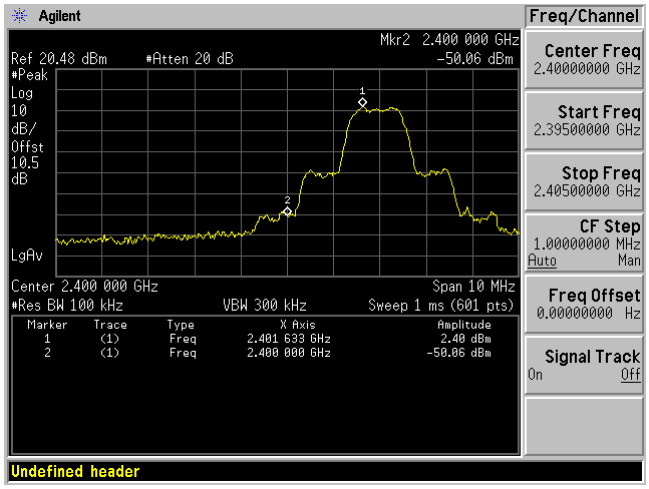


High Channel 2480 MHz

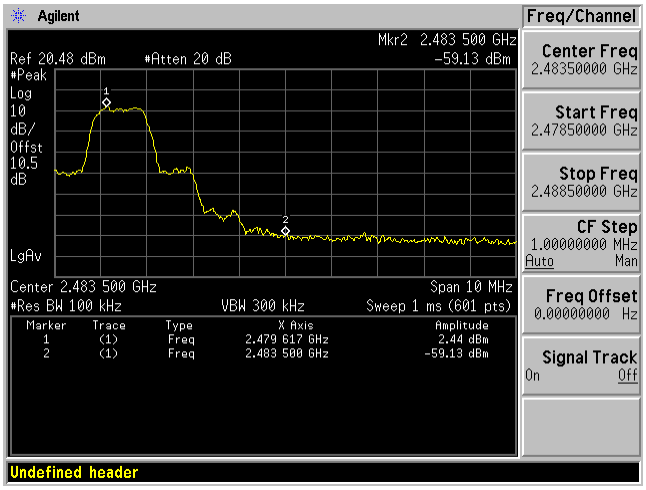


2-DH3

Low Channel 2402 MHz

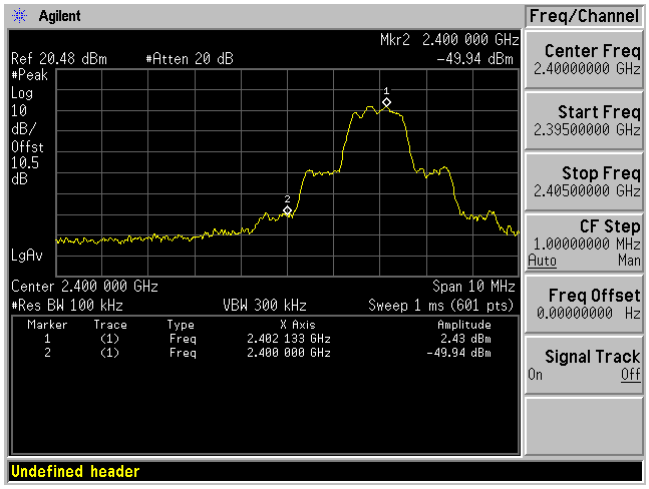


High Channel 2480 MHz

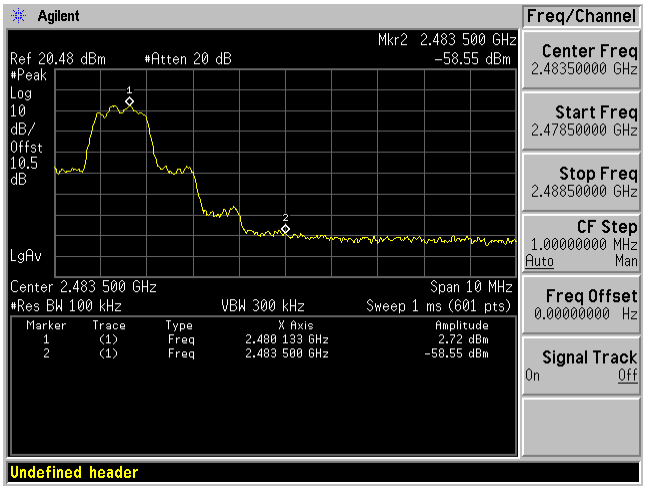


3-DH3

Low Channel 2402 MHz

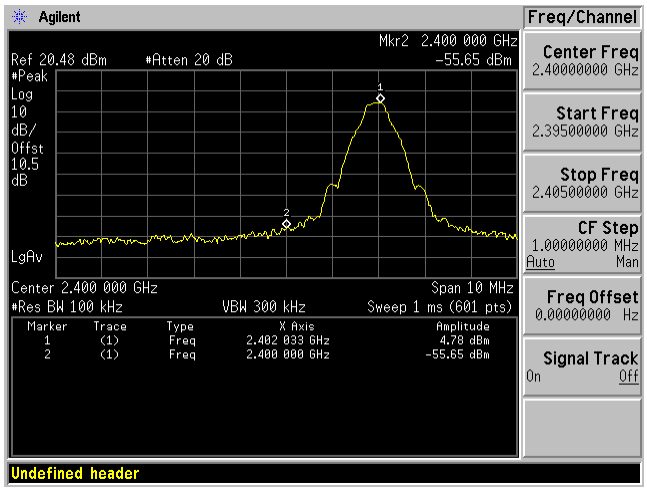


High Channel 2480 MHz

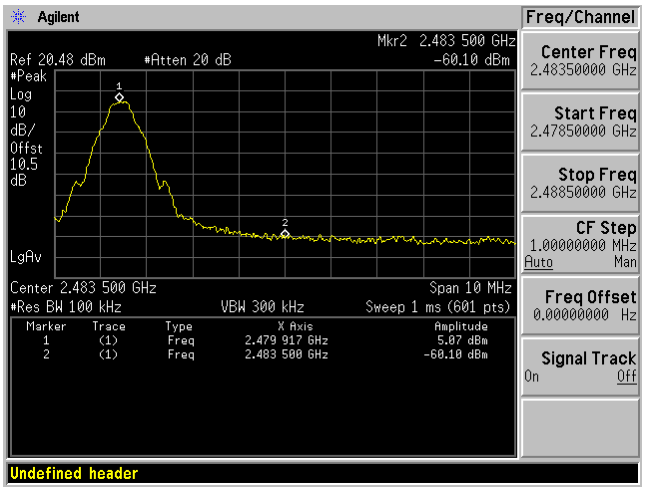


1-DH5

Low Channel 2402 MHz

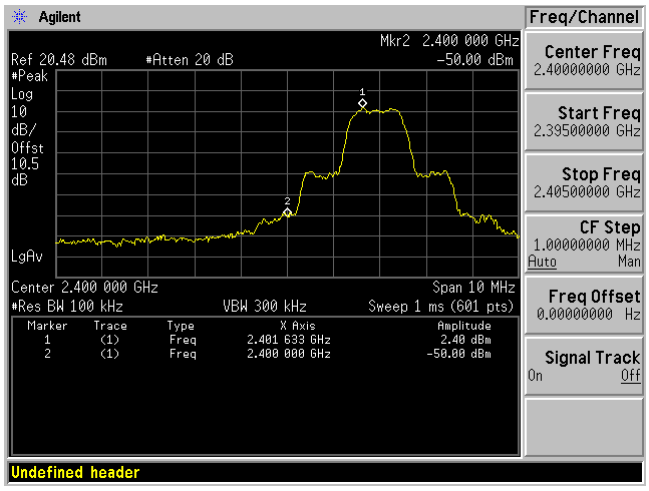


High Channel 2480 MHz

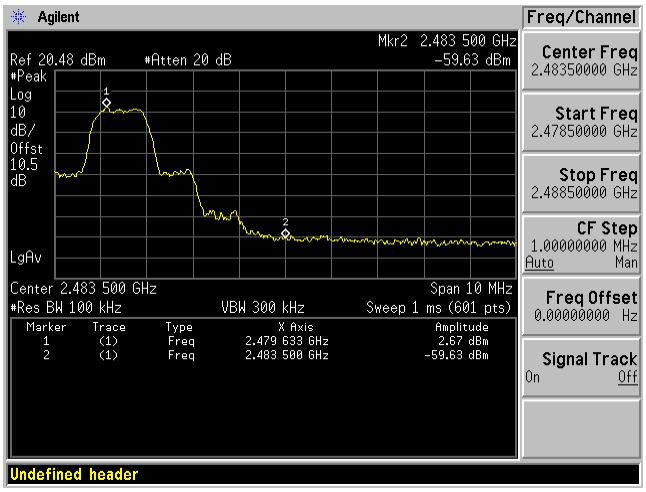


2-DH5

Low Channel 2402 MHz

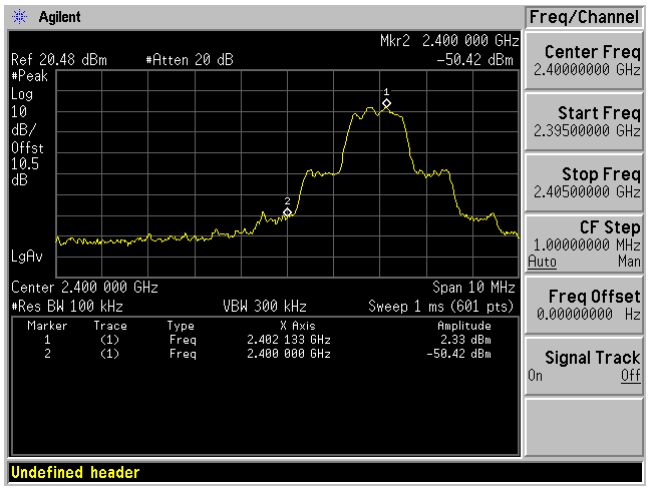


High Channel 2480 MHz

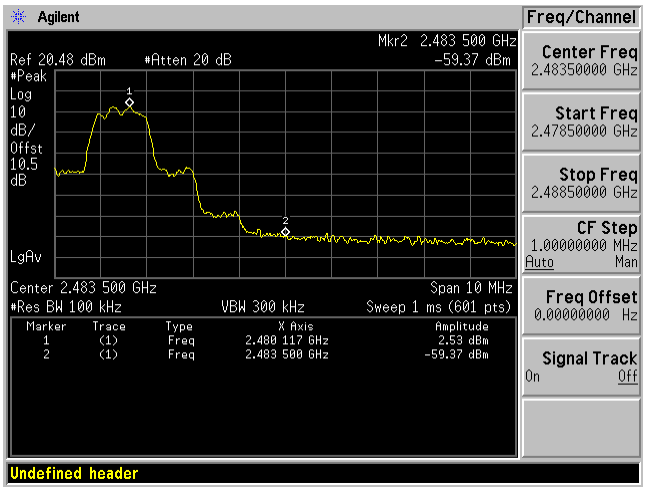


3-DH5

Low Channel 2402 MHz



High Channel 2480 MHz



11 FCC §15.247(a) & IC RSS-247 §5.1 (4) – Dwell Time

11.1 Applicable Standards

According to FCC §15.247(a) and RSS-247 §5.1(4), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

11.2 Measurement Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel
RBW = 1 MHz
VBW ~ 3RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
-	SMA cable	-	C0002	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:	22º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Jin Yang on 2015-10-23 at RF site.

11.5 Test Results

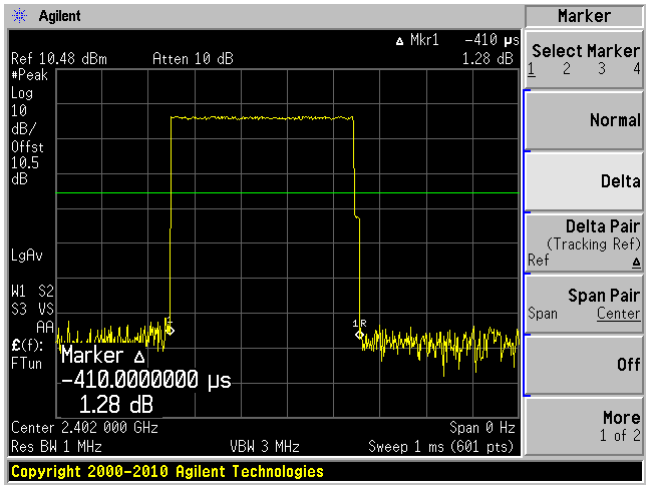
Channel	Pulse Width (ms)	Dwell time (sec)	Limit (sec)	Results
1-DH1				
Low	0.410	0.13	0.4	Pass
Mid	0.4117	0.13	0.4	Pass
High	0.4117	0.13	0.4	Pass
2-DH1				
Low	0.420	0.13	0.4	Pass
Mid	0.420	0.13	0.4	Pass
High	0.420	0.13	0.4	Pass
3-DH1				
Low	0.420	0.13	0.4	Pass
Mid	0.420	0.13	0.4	Pass
High	0.420	0.13	0.4	Pass
1-DH3				
Low	1.675	0.27	0.4	Pass
Mid	1.675	0.27	0.4	Pass
High	1.680	0.27	0.4	Pass
2-DH3				
Low	1.685	0.27	0.4	Pass
Mid	1.685	0.27	0.4	Pass
High	1.685	0.27	0.4	Pass
3-DH3				
Low	1.685	0.27	0.4	Pass
Mid	1.685	0.27	0.4	Pass
High	1.685	0.27	0.4	Pass
1-DH5				
Low	2.925	0.31	0.4	Pass
Mid	2.925	0.31	0.4	Pass
High	2.925	0.31	0.4	Pass
2-DH5				
Low	2.933	0.31	0.4	Pass
Mid	2.933	0.31	0.4	Pass
High	2.933	0.31	0.4	Pass
3-DH5				
Low	2.933	0.31	0.4	Pass
Mid	2.933	0.31	0.4	Pass
High	2.933	0.31	0.4	Pass

Note: DH1: Dwell time = Pulse time*(1600/2/79)*31.6S
DH3: Dwell time = Pulse time*(1600/4/79)*31.6S
DH5: Dwell time = Pulse time*(1600/6/79)*31.6S

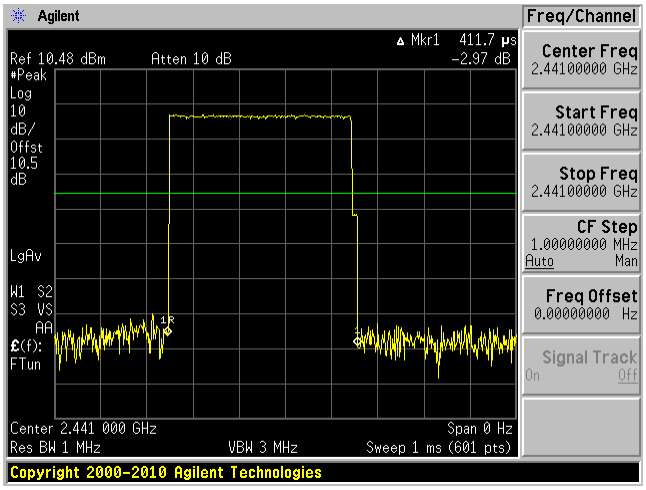
Please refer to the following plots for detailed test results

1-DH1

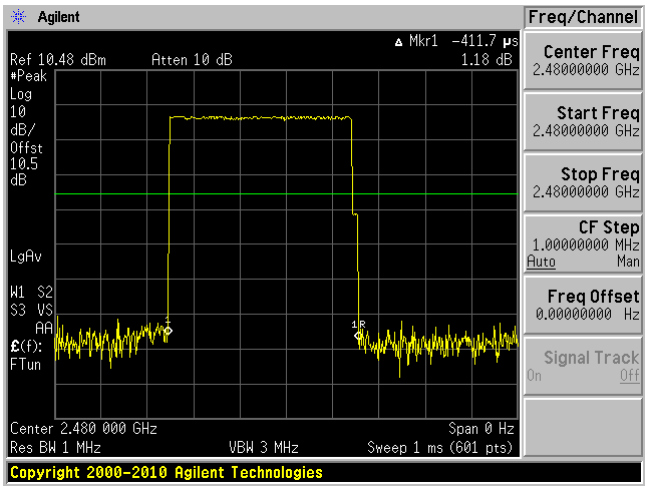
Low Channel 2402 MHz



Middle Channel 2441 MHz

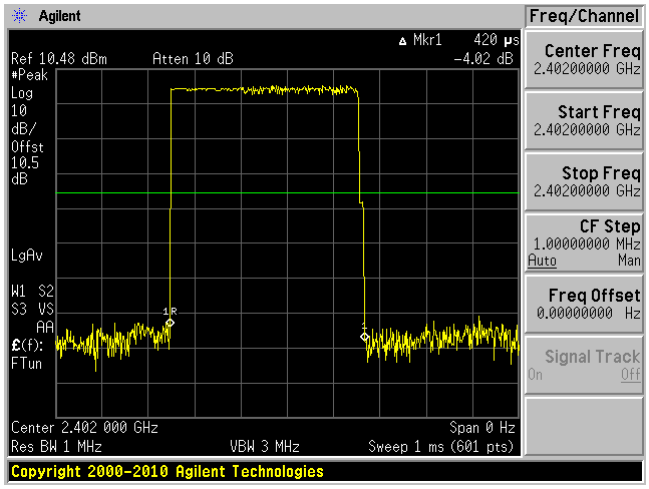


High Channel 2480 MHz

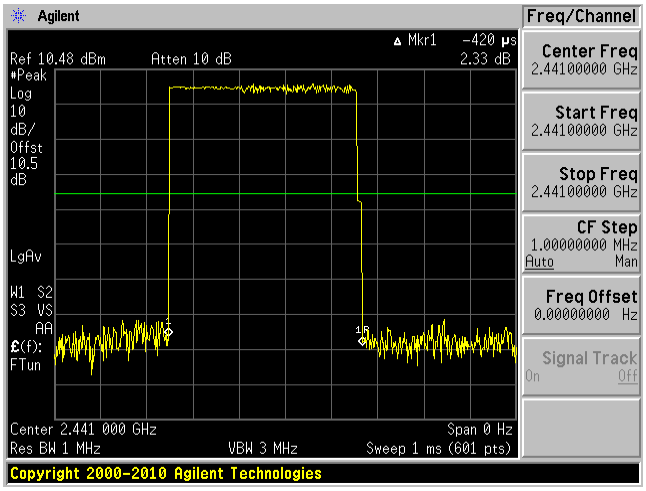


2-DH1

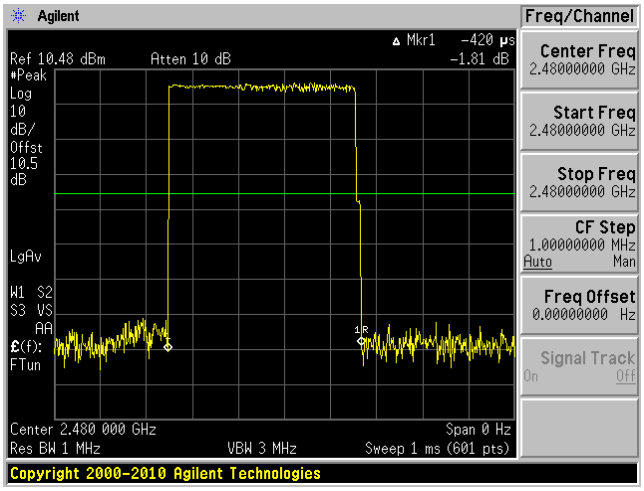
Low Channel 2402 MHz



Middle Channel 2441 MHz

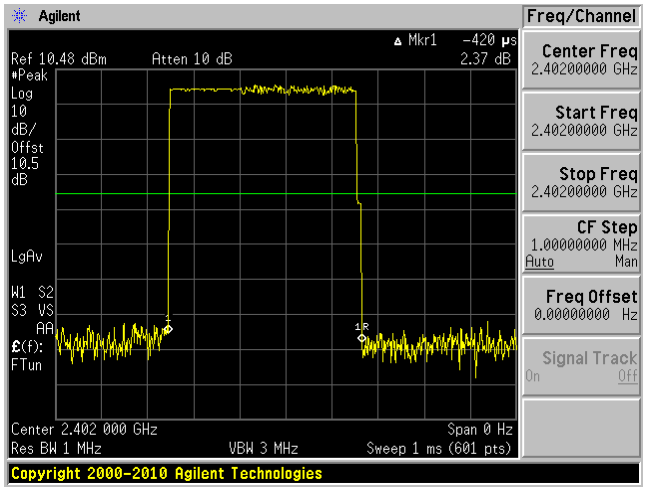


High Channel 2480 MHz

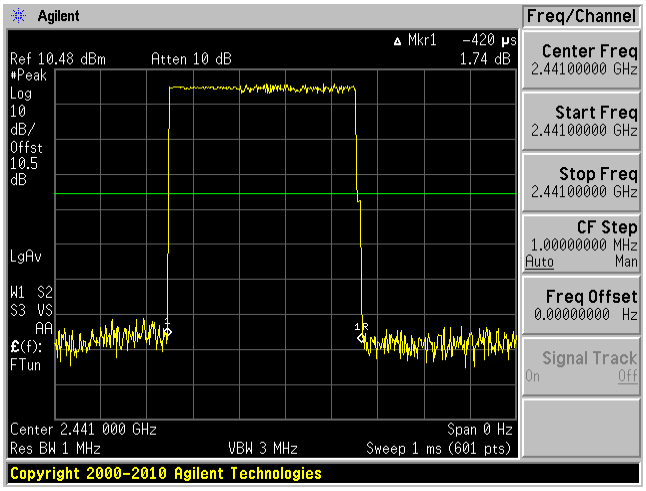


3-DH1

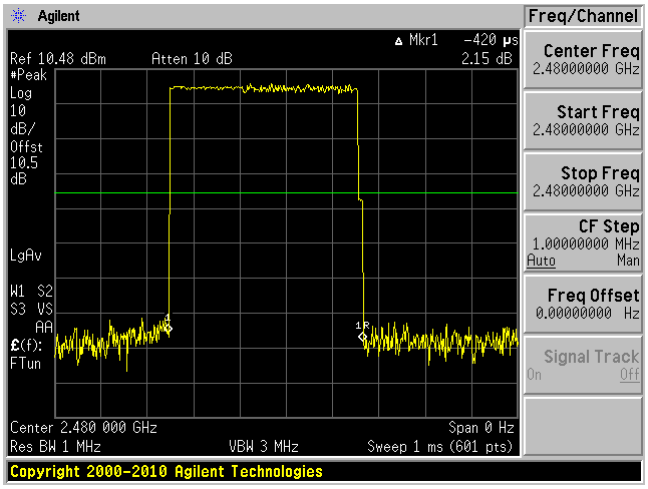
Low Channel 2402 MHz



Middle Channel 2441 MHz

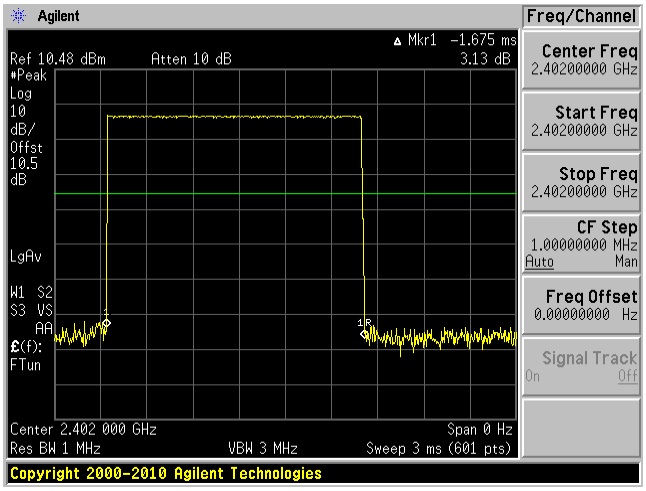


High Channel 2480 MHz

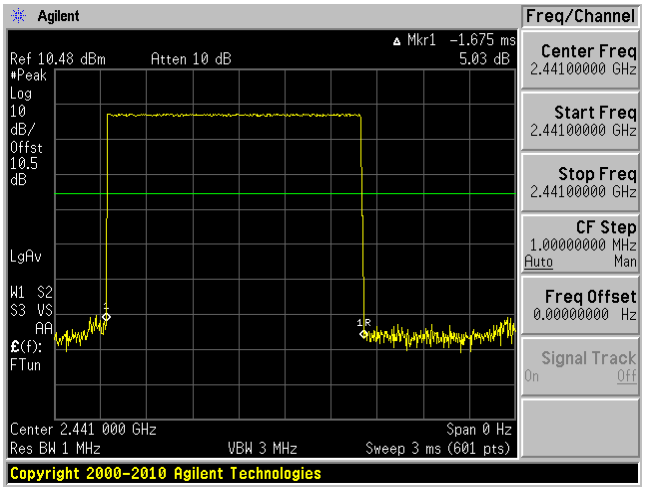


1-DH3

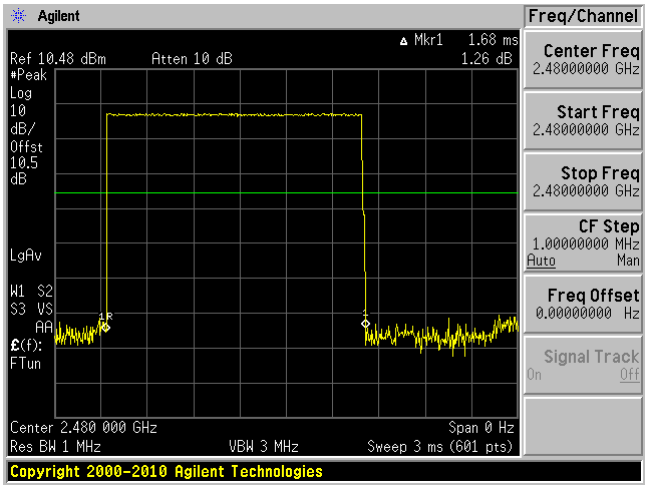
Low Channel 2402 MHz



Middle Channel 2441 MHz

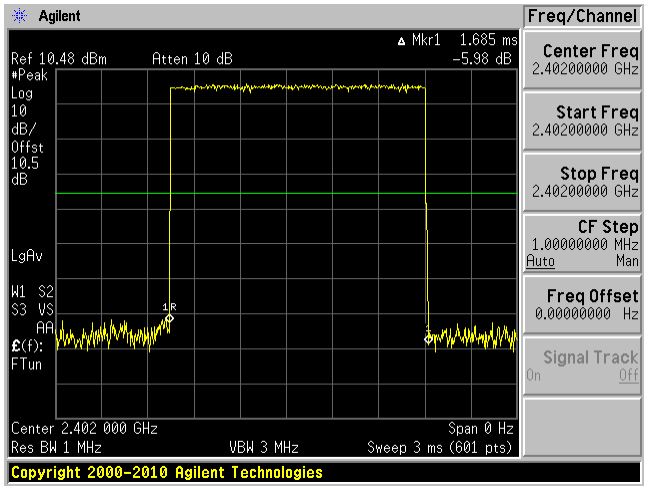


High Channel 2480 MHz

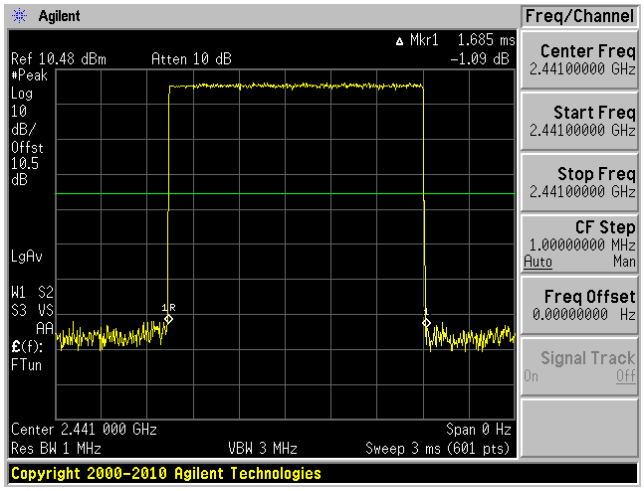


2-DH3

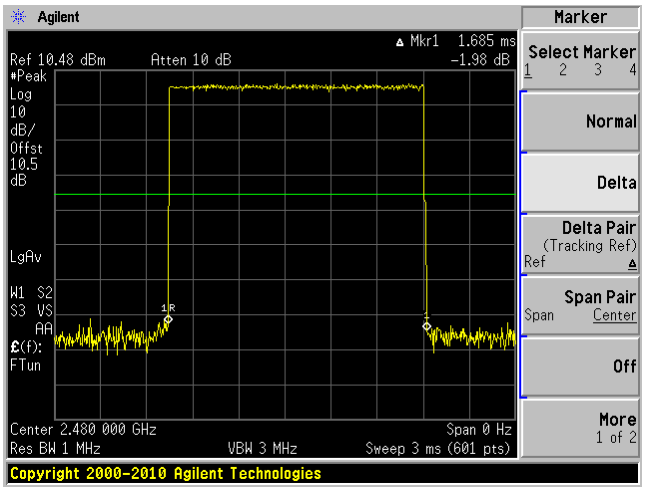
Low Channel 2402 MHz



Middle Channel 2441 MHz

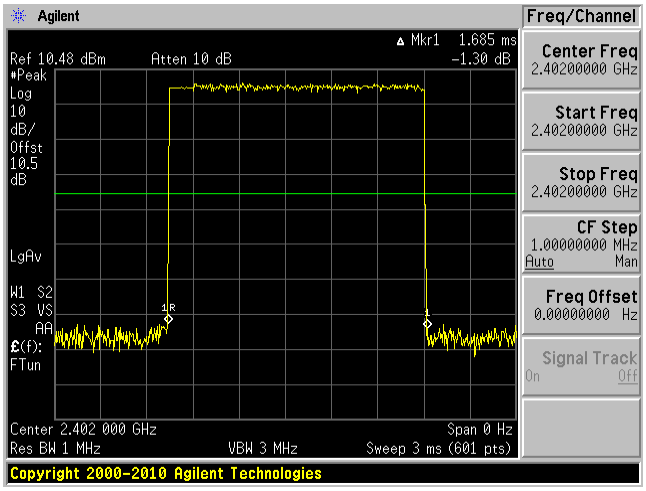


High Channel 2480 MHz

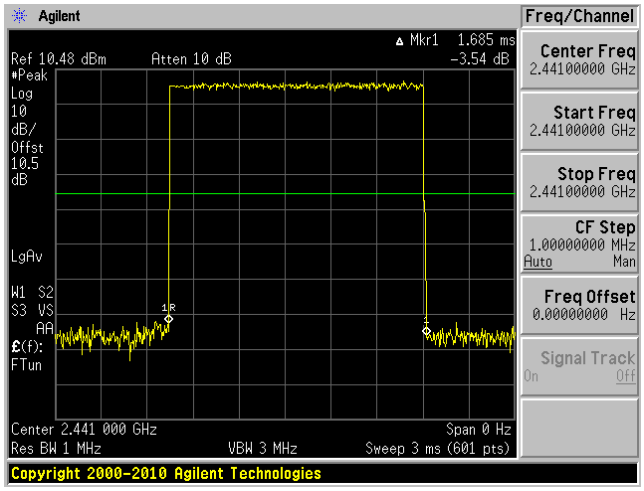


3-DH3

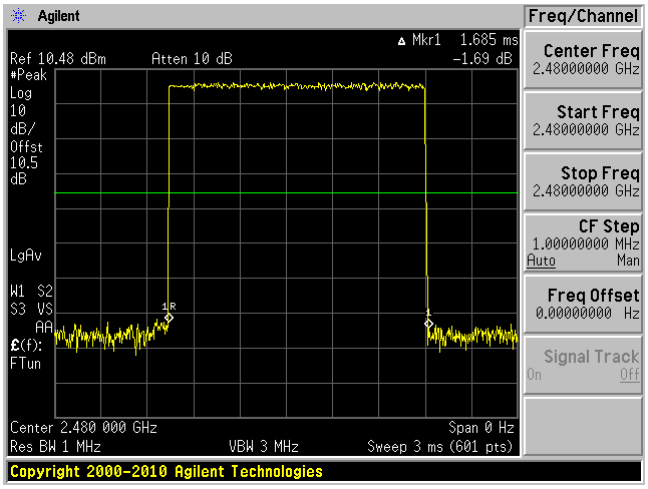
Low Channel 2402 MHz



Middle Channel 2441 MHz

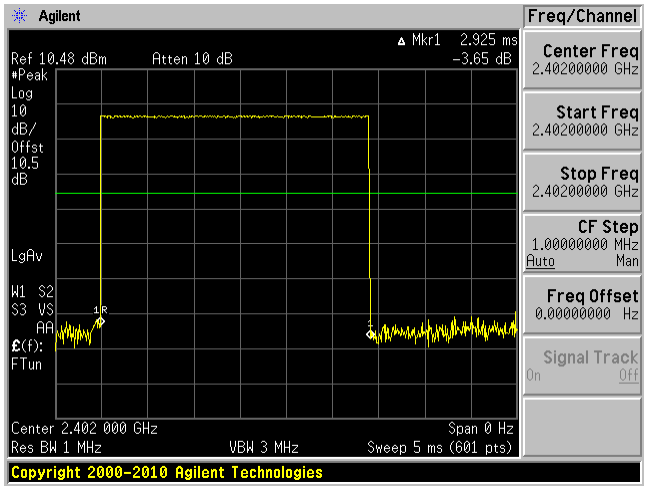


High Channel 2480 MHz

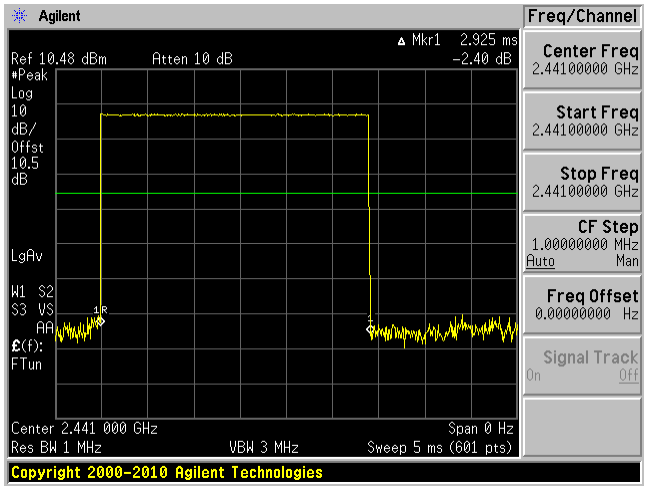


1-DH5

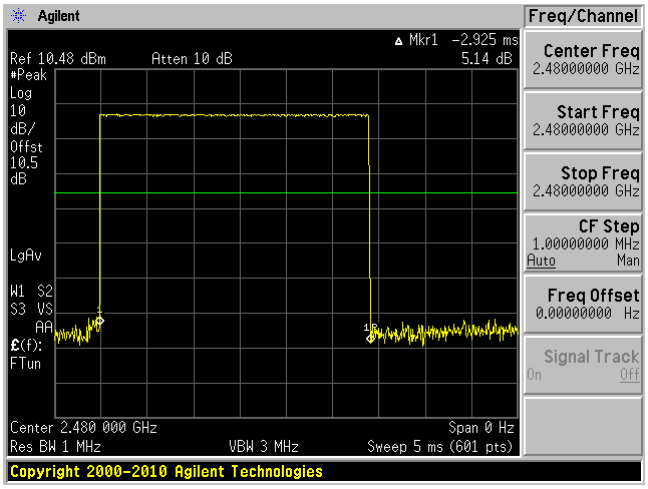
Low Channel 2402 MHz



Middle Channel 2441 MHz

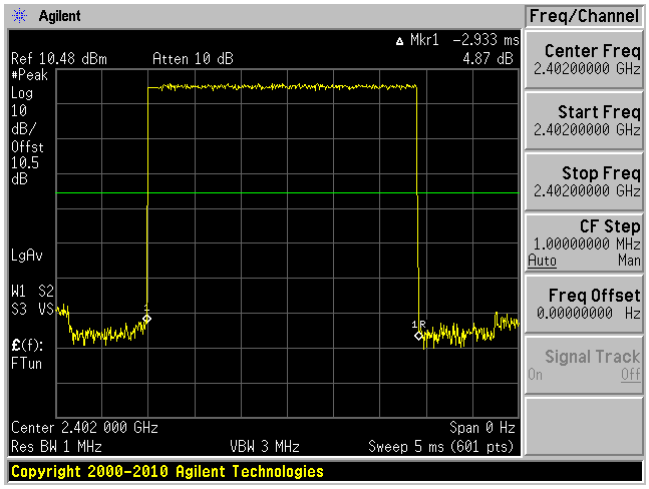


High Channel 2480 MHz

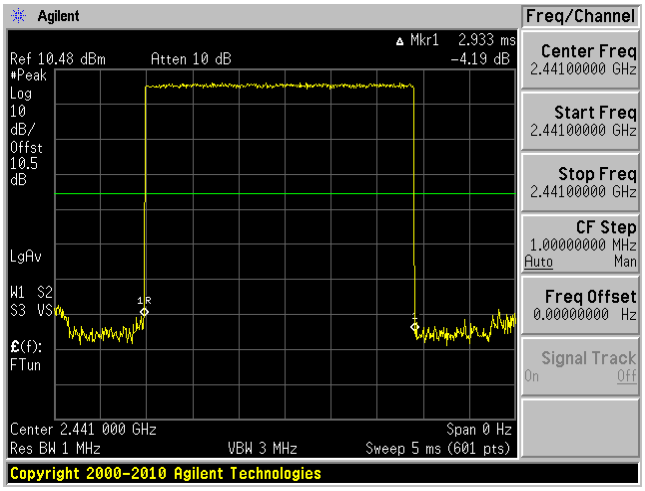


2-DH5

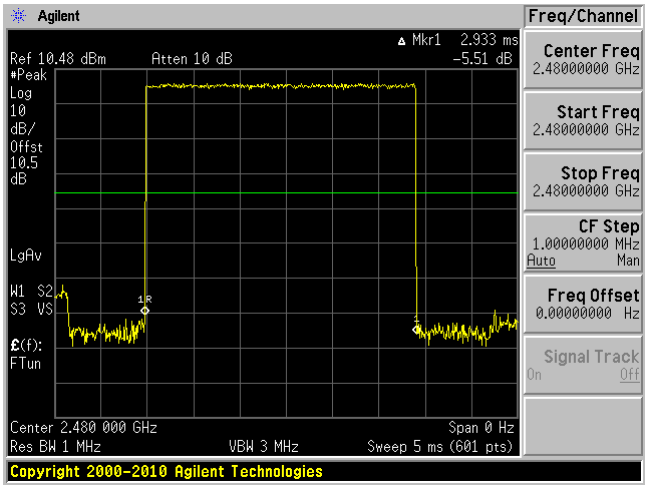
Low Channel 2402 MHz



Middle Channel 2441 MHz

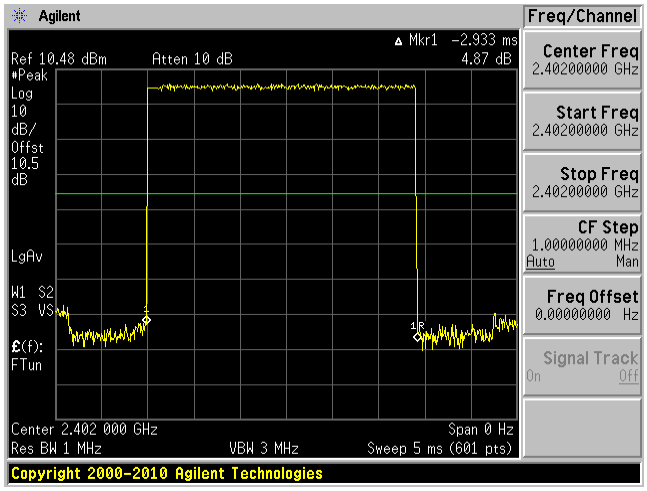


High Channel 2480 MHz

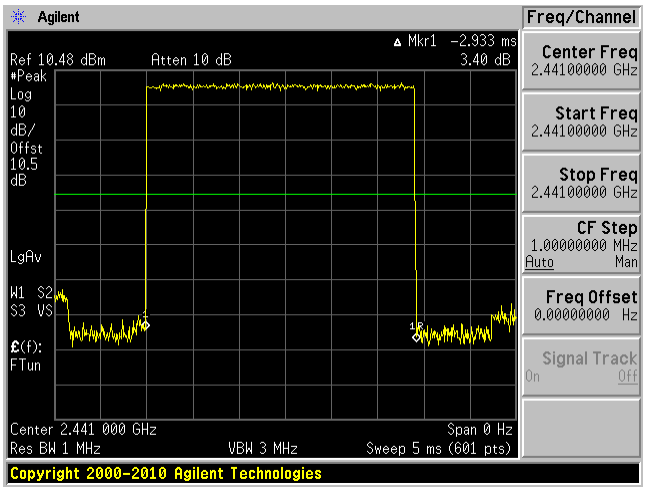


3-DH5

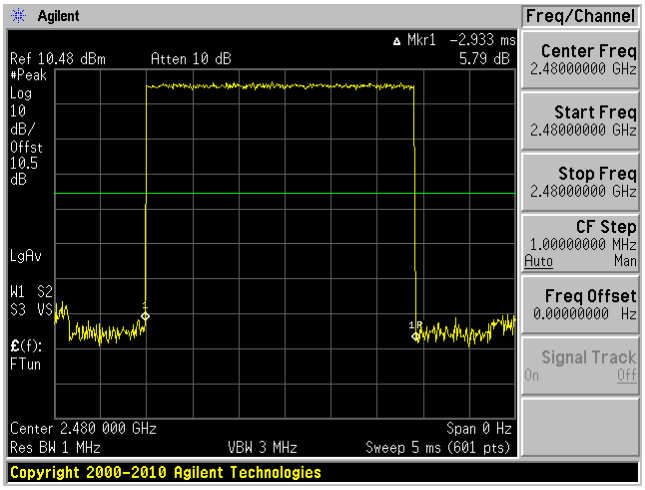
Low Channel 2402 MHz



Middle Channel 2441 MHz



High Channel 2480 MHz



12 FCC §15.247(a) & IC RSS-247 §5.1 - Number of Hopping Channels

12.1 Applicable Standards

According to FCC §15.247(a) and RSS-247 §5.1(4) , Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

12.2 Test Procedure

Span = the frequency band of operation
RBW ≥ 1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
-	SMA cable	-	C0002	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

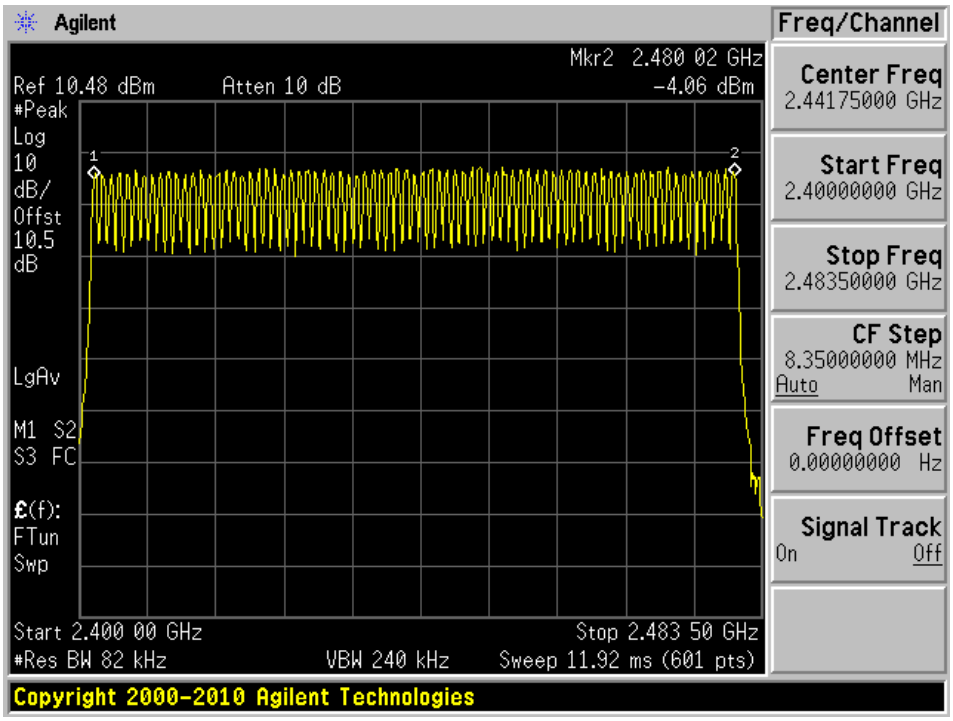
Temperature:	22º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Jin Yang on 2015-10-23 at RF site.

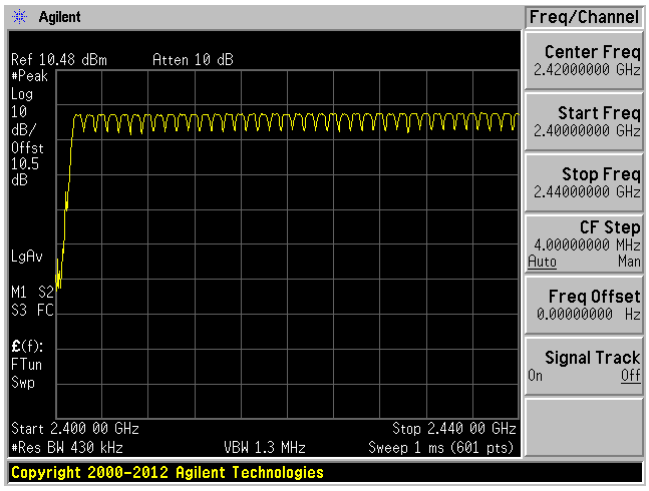
12.5 Test Results

Total 79 channels; please refer to the plots hereinafter.

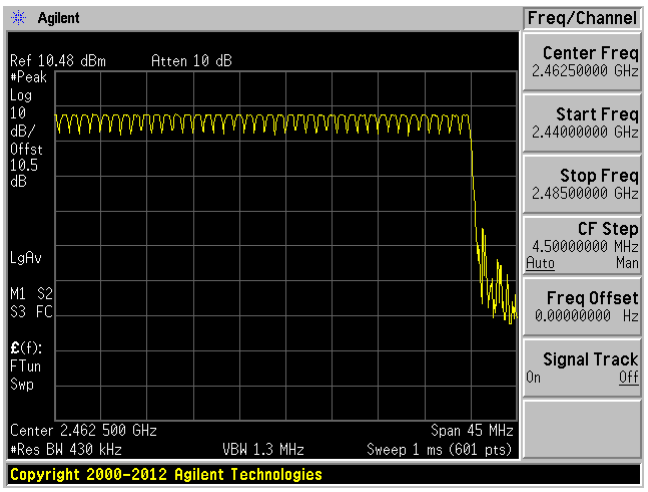
Hopping Channel Number: Total 79 Channels



39 Channels between 2400 to 2440.5 MHz



40 Channels between 2440.5 to 2483.5 MHz



13 FCC §15.247(a) & IC RSS-247 §5.1 – Hopping Channel Separation

13.1 Applicable Standards

According to FCC §15.247(a) and RSS-247 §5.1(2): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

13.2 Test Procedure

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span

Video (or Average) Bandwidth (VBW) ≥RBW

Sweep = auto

Detector function = peak

Trace = max hold

13.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
-	SMA cable	-	C0002	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.*

13.4 Test Environmental Conditions

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

The testing was performed by Jin Yang on 2015-10-23 at RF site.

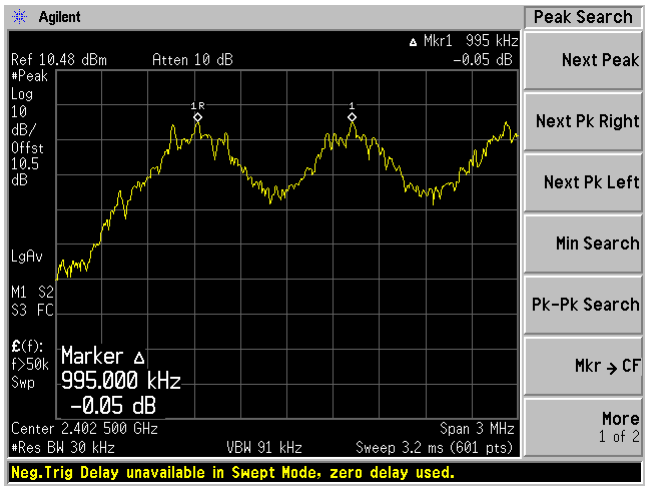
13.5 Test Results

Channel	Frequency (MHz)	Channel Separation (kHz)	Limit > 2/3 20 dB OBW (kHz)
GFSK			
Low	2402	995	682
Middle	2441	1000	681
High	2480	995	682
DQPSK			
Low	2402	1010	882
Middle	2441	995	881
High	2480	1010	882
8PSK			
Low	2402	1000	862
Middle	2441	1000	860
High	2480	1000	861

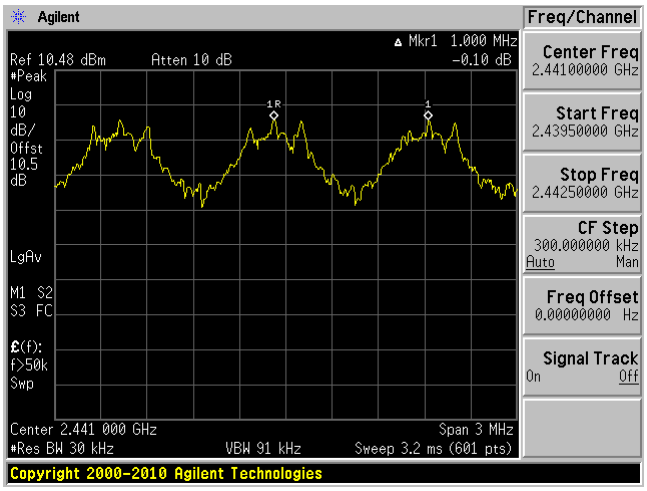
Please refer to following plots.

GFSK

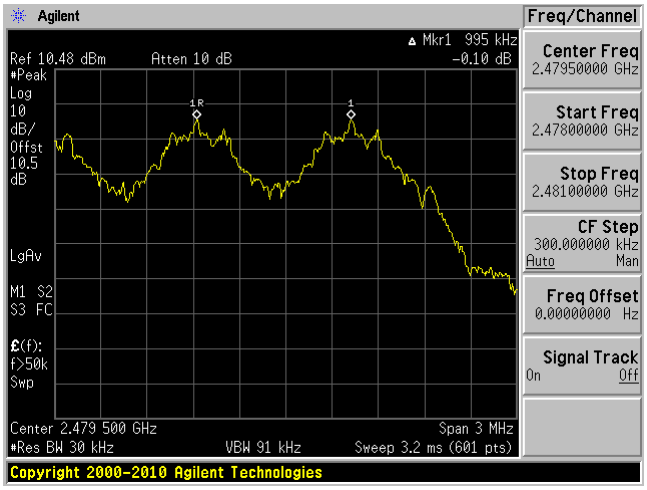
Low Channel 2402 MHz



Middle Channel 2441 MHz

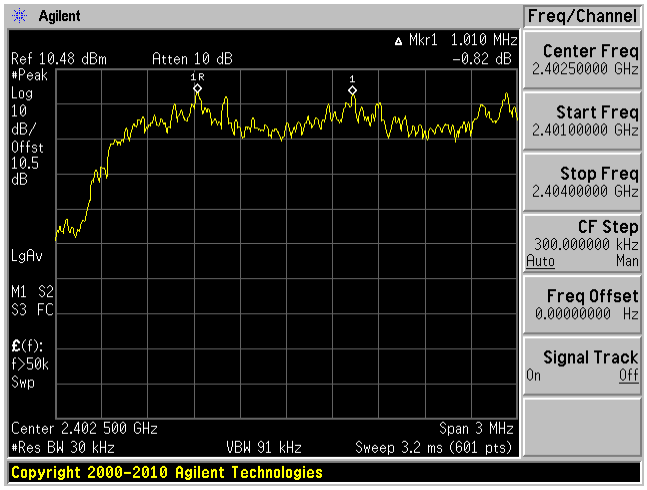


High Channel 2480 MHz

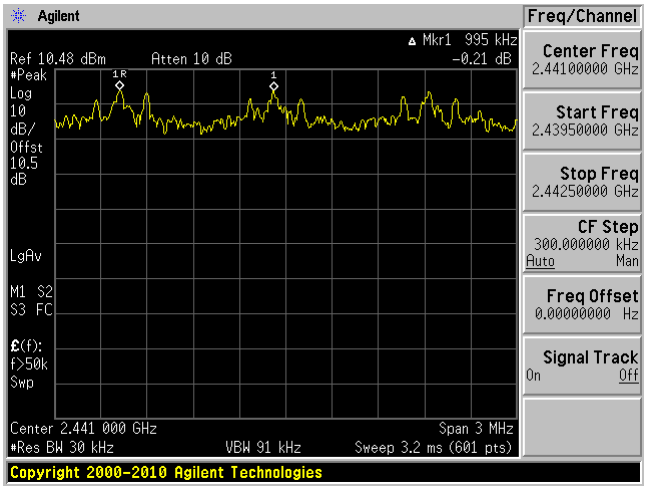


DQPSK

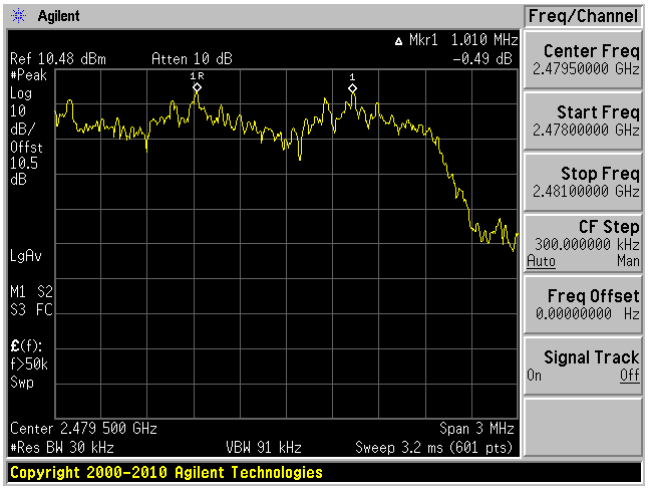
Low Channel 2402 MHz



Middle Channel 2441 MHz

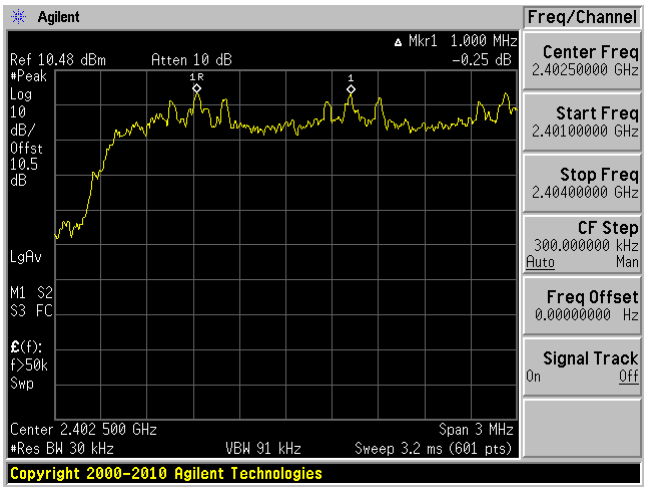


High Channel 2480 MHz

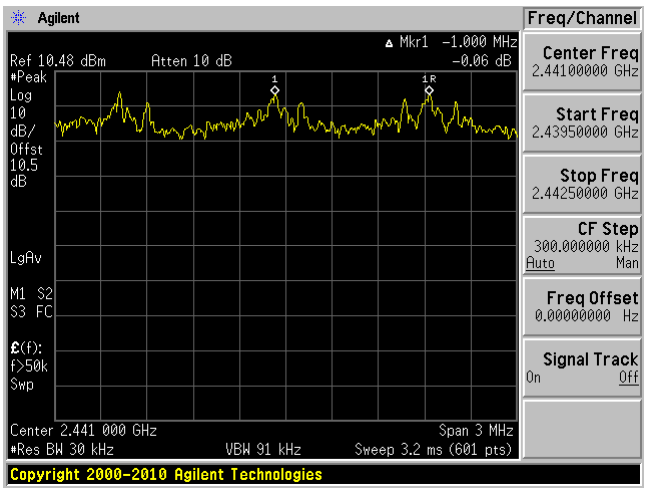


8PSK

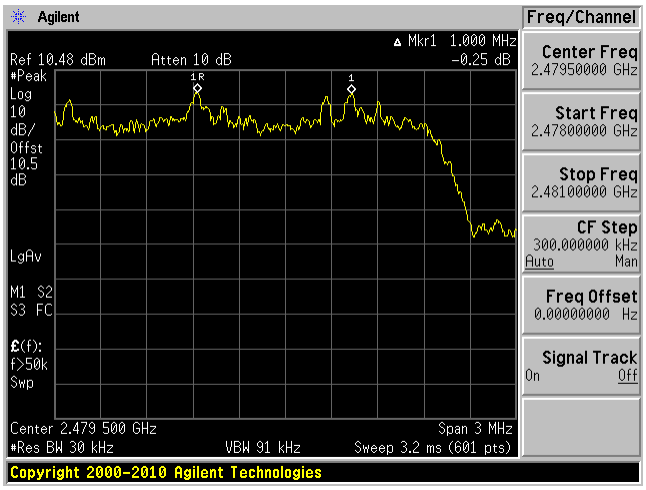
Low Channel 2402 MHz



Middle Channel 2441 MHz



High Channel 2480 MHz



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

14.1 Applicable Standards

For 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-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.

14.2 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.

14.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
-	SMA cable	-	C0002	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.*

14.4 Test Environmental Conditions

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

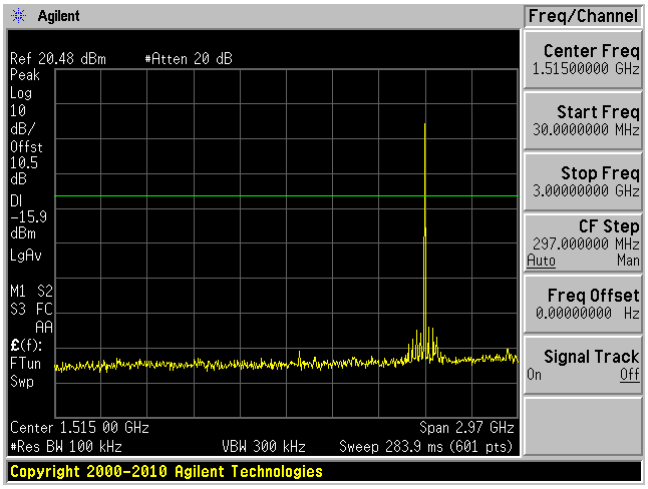
The testing was performed by Jin Yang on 2015-10-23 at RF site.

14.5 Test Results

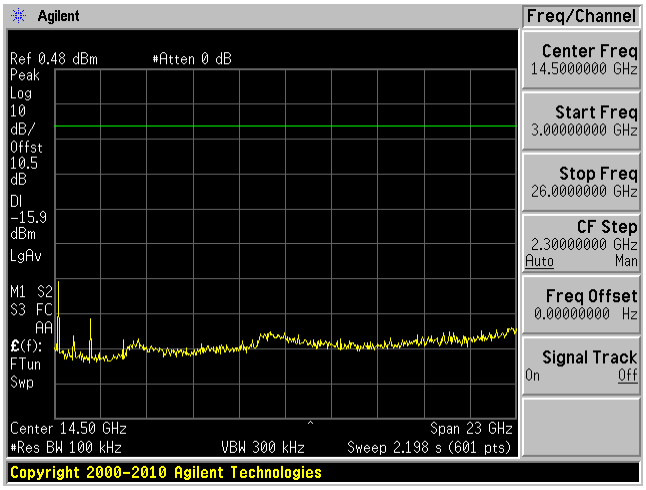
Please refer to following plots.

GFSK

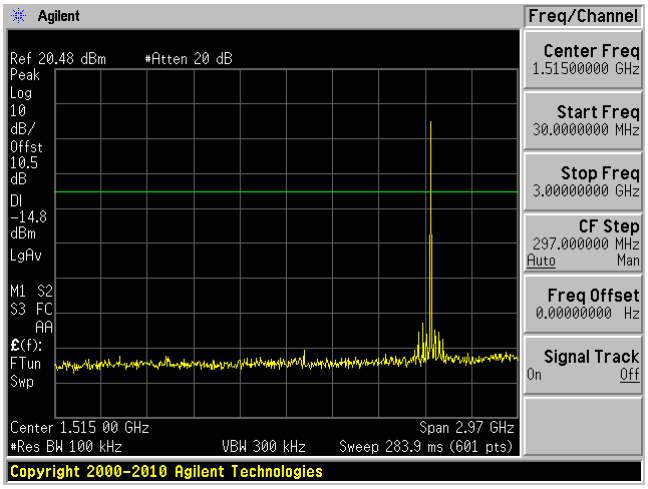
Low Channel 30MHz – 3 GHz



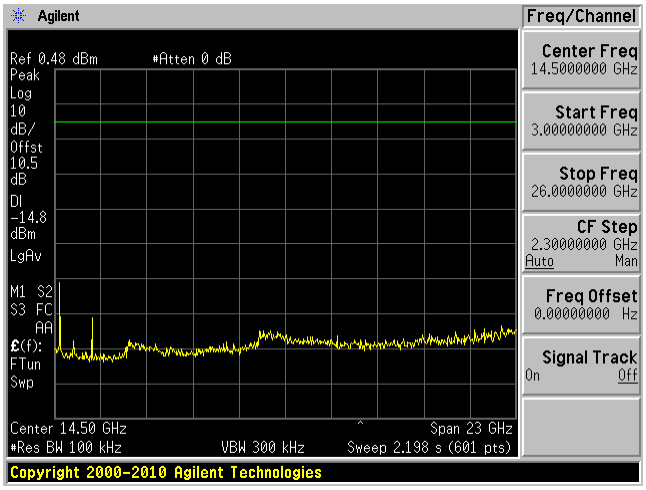
Low Channels 3GHz – 26GHz



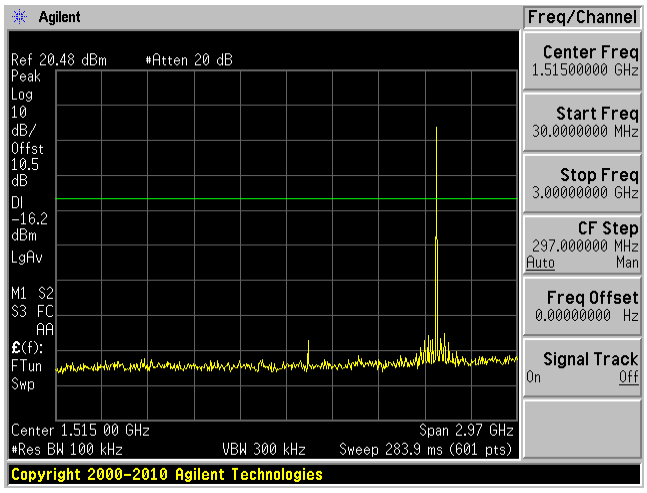
Middle Channel 30MHz – 3 GHz



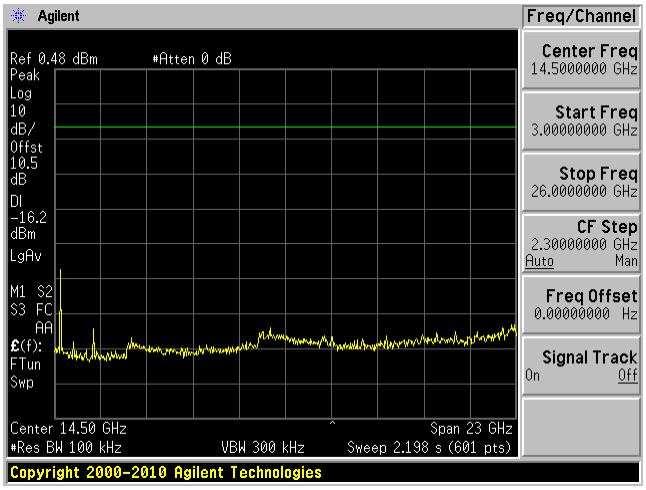
Middle Channels 3GHz – 26GHz



High Channel 30MHz – 3 GHz

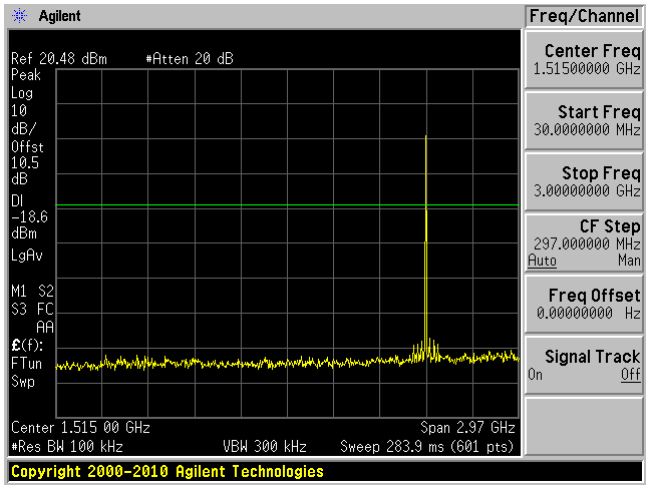


High Channels 3GHz – 26GHz

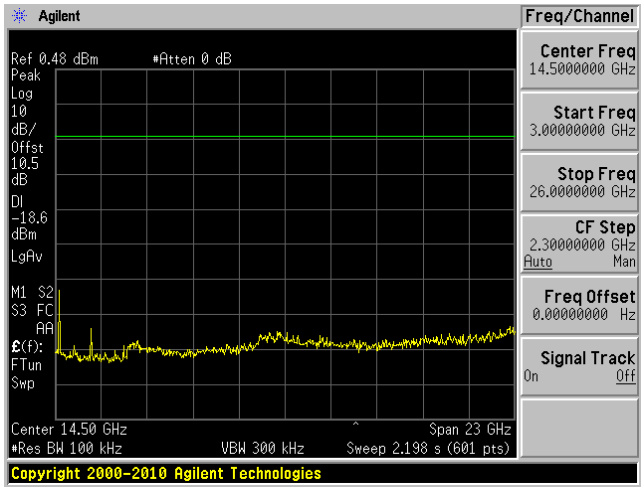


DQPSK

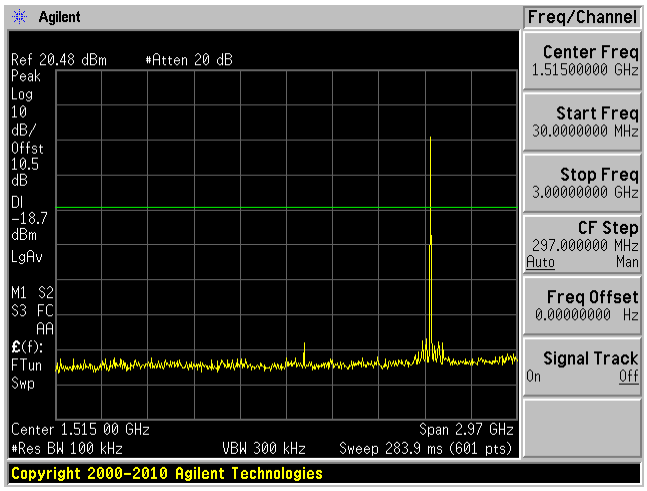
Low Channel 30MHz – 3 GHz



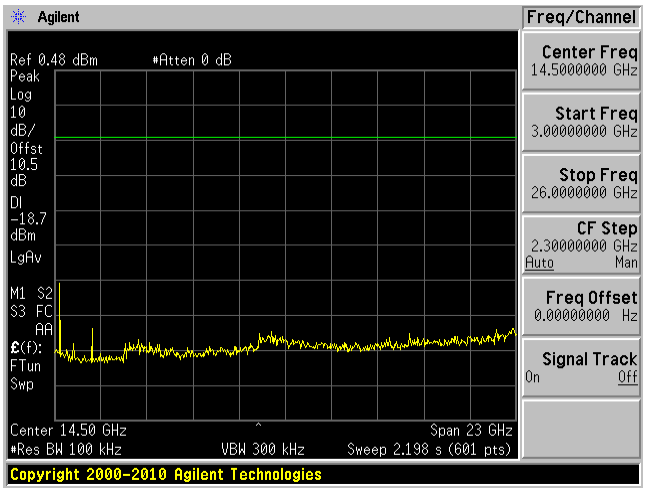
Low Channels 3GHz – 26GHz



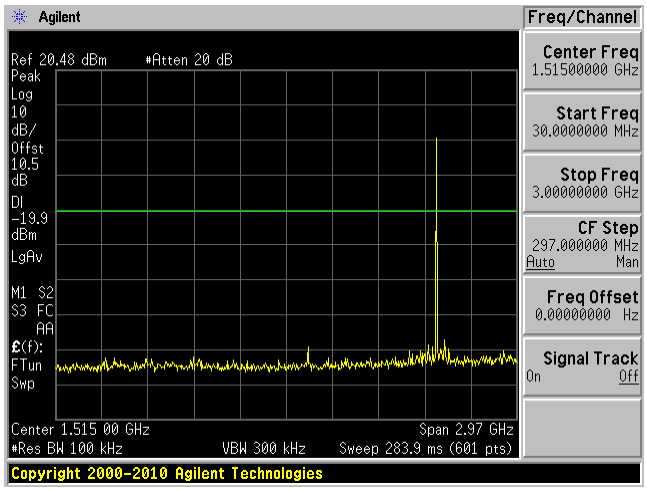
Middle Channel 30MHz – 3 GHz



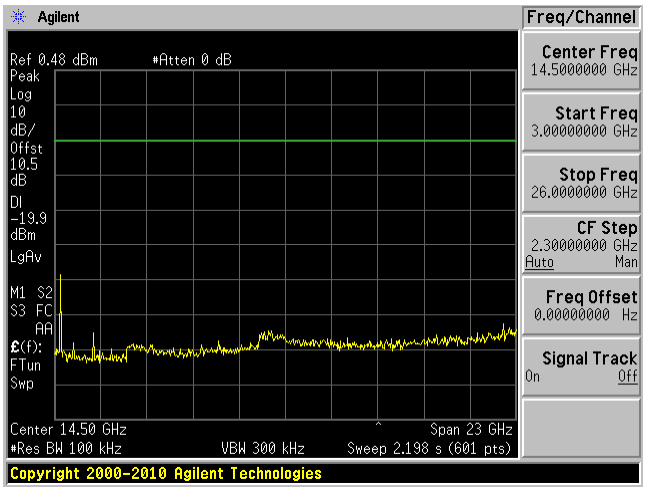
Middle Channels 3GHz – 26GHz



High Channel 30MHz – 3 GHz

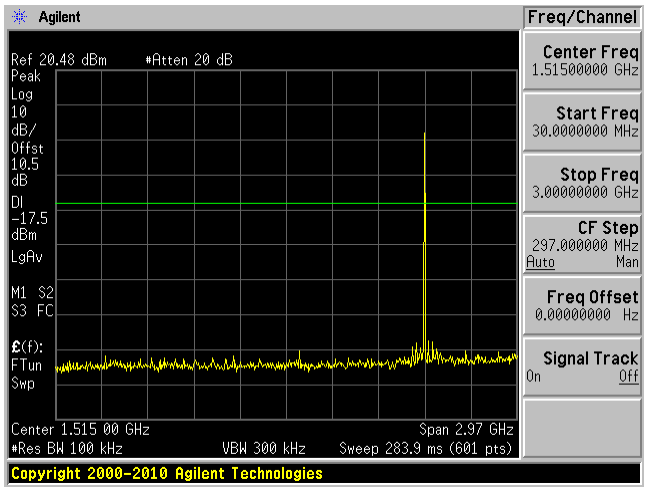


High Channels 3GHz – 26GHz

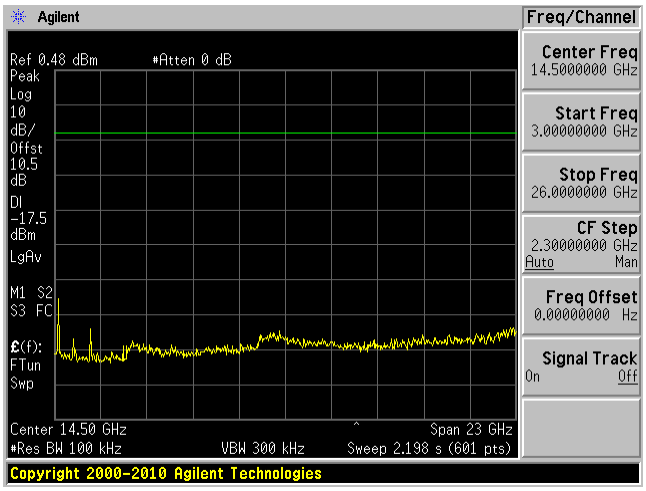


8PSK

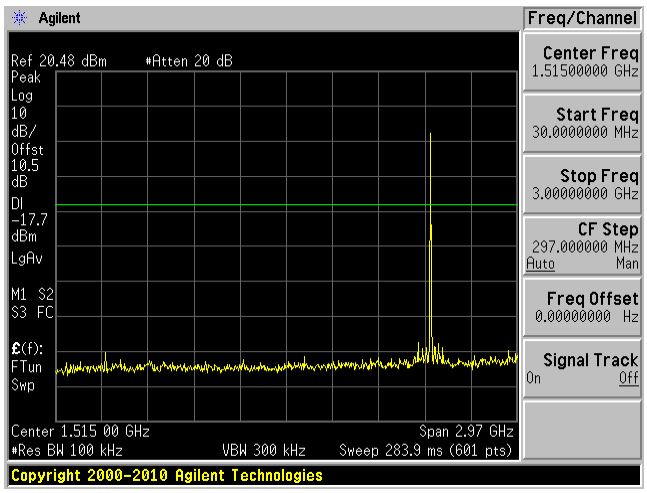
Low Channel 30MHz – 3 GHz



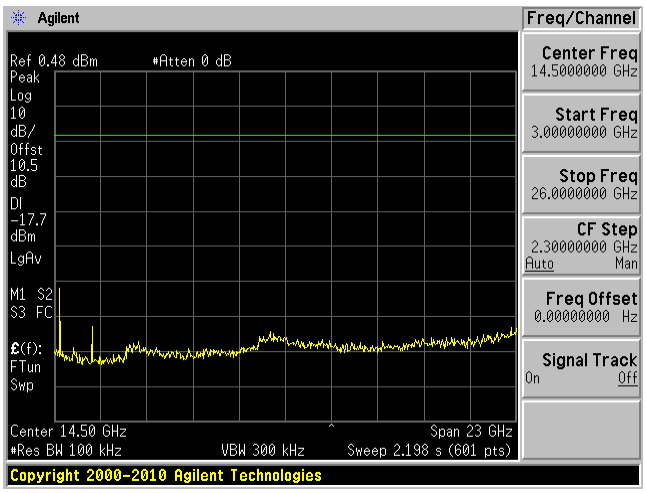
Low Channels 3GHz – 26GHz



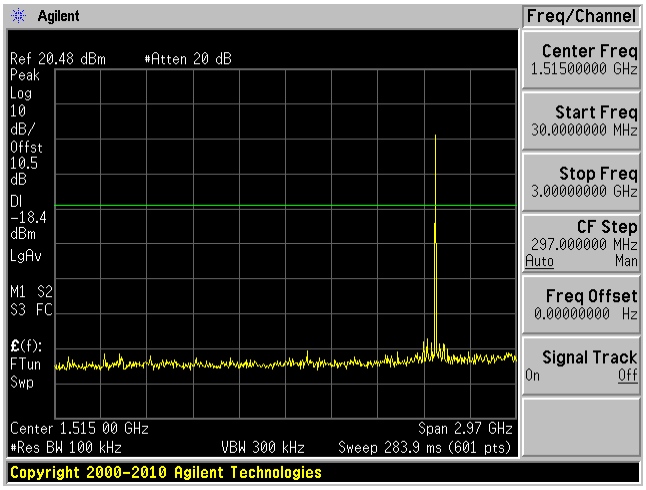
Middle Channel 30MHz – 3 GHz



Middle Channels 3GHz – 26GHz



High Channel 30MHz – 3 GHz



High Channels 3GHz – 26GHz