FCC PART 15 SUBPART C
IC RSS-210, ISSUE 8, DEC 2010

TEST AND MEASUREMENT REPORT

For

Trimble Navigation Ltd.

935 Stewart Drive,

Sunnyvale, CA 94085, USA

FCC ID: JUP-95807WFBT
IC: 1756A-95807WFBT

Report Type:	**Product Type:**
Original Report	Wi-Fi and BT Combo Module

Prepared By:	Chen Ge
Report Number:	R1406117-247 DSS
Report Date:	2014-09-23
Reviewed By:	Ivan Cao RF Leader

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1406117-247DSS	Original Report	2014-08-18
A	R1406117-247DSS	Updated model names of host units	2014-09-23

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Trimble Navigation Ltd.* and their product, *FCC ID: JUP-95807WFBT, IC: 1756A-95807WFBT,* model: *LBEE1DARRC-519* or the "EUT" as referred to this report. The EUT is Bluetooth and 802.11b/g Wi-Fi combo module, and it will be integrated into Trimble three hosts (R10, Trimble P/N 9058X-XX and Trimble P/N 100070-XX).

1.2 Mechanical Description of EUT

The EUT measures approximately 8.0 mm (L) x 7.3 mm (W) x 1.1 mm (H) and weighs approximately 0.2 g.

1.3 Objective

This report is prepared on behalf of Trimble Navigation Ltd. in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules and IC RSS-210 Issue 8, Dec 2010.

The objective is to determine compliance with FCC Part 15.247 and IC RSS-210 rules.

1.4 Related Submittal(s)/Grant(s)

FCC part 15.247 DTS, RSS-210 submissions with FCC ID: JUP-95807WFBT, IC: 1756A-95807WFBT

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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:
1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.
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 C63.4-2009, ANSI C63.4-2009, 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 ANSI C63.4-2009.

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

2.2 EUT Exercise Software

The test utility used was CommSet, version 1.26, was provided by Trimble Navigation Ldt. And was verified by Chen Ge to comply with the standard requirements being tested against.

2.3 Special Accessories

N/A

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment List

Manufacturer	Description	Model	Serial Number
Murata	Wi-Fi/BT combo module	LBEE1DARRC-519	-
Trimble	Main board	93164-B	-

2.6 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
Murata	Wi-Fi/BT combo module	LBEE1DARRC-519	-

2.7 External I/O Cabling List and Details

Cable Description	Length (m)	To	From
RF Cable	<1.0	PSA	EUT
USB cable	<1.0	Laptop	EUT

3 Summary of Test Results

FCC & IC Rules	Description of Test	Result (s)
FCC §15.247 (i), §2.1091 IC RSS-102	RF Exposure	Compliant
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirements	Compliant
FCC §15.207 (a) IC RSS-Gen §7.2.4	AC Line Conducted Emissions	Compliant
FCC §15.247(d) IC RSS-210 §A8.5	Spurious Emissions at Antenna Port	Compliant
FCC §15.205, §15.209, §15.247(d) IC RSS-210 §2.2, §A8.5	Restricted Bands, Spurious Radiated Emissions	Compliant
FCC §15.247 (a)(1) IC RSS-210 §A8.1	20 dB Channel Bandwidth	Compliant
FCC §15.247(a) IC RSS-210 §A8.4	Maximum Peak Output Power	Compliant
FCC §15.247(d) IC RSS-210 §A8.5	Band Edge	Compliant
FCC §15.247 (a)(1) IC RSS-210 §A8.1(b)	Hopping Channel Separation	Compliant
FCC §15.247 (a)(1) IC RSS-210 §A8.1(d)	Dwell Time	Compliant
FCC §15.247(b)(1) IC RSS-210 §A8.1	Number of Hopping Channels	Compliant

4 FCC §15.247 (i), §2.1091 & IC RSS-102 - RF Exposure

4.1 Applicable Standard

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 fields.

According to IC RSS-102 Issue 4 section 4.2, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m2)	Time Averaging (min)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 – 300	28	0.073	2*	6
300 – 1 500	$1.585\ f^{0.5}$	$0.0042\ f^{0.5}$	f / 150	6
1 500 – 15 000	61.4	0.163	10	6
15 000 – 150 000	61.4	0.163	10	$616000 / f^{1.2}$
150 000- 300 000	$0.158\ f^{0.5}$	$4.21 \times 10\ -4\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000 / f^{1.2}$

Note: *f* is frequency in MHz
* = Power density limit is applicable at frequencies greater than 100 MHz

4.2 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

4.3 MPE Results

Maximum peak output power at antenna input terminal (dBm):	2.16
Maximum peak output power at antenna input terminal (mW):	1.644
Prediction distance (cm):	20
Prediction frequency (MHz):	2402
Maximum Antenna Gain, typical (dBi):	4.0
Maximum Antenna Gain (numeric):	2.042
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.000822
Power density of prediction frequency at 20.0 cm (W/m^2):	0.00822
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

The device is compliant with the requirement MPE limit for uncontrolled exposure at 20 cm distance.

5 FCC §15.203 & IC RSS-Gen §7.1.2 – Antenna Description

5.1 Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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 §7.1.2: A transmitter can only be sold or operated with antennas with which it was approved. Transmitter may be approved with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest gain antenna of each combination of transmitter and antenna type for which approval is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type having equal or lesser gain as an antenna that had been successfully tested with the transmitter, will also be considered approved with the transmitter, and may be used and marketed with the transmitter. For Category I transmitters, the manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

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 measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power limits.

5.2 Antenna Connector Construction

This EUT has different internal antenna for the 3 hosts, that considered sufficient to comply with sections FCC Part 15.203 and IC RSS-Gen §7.1.2, Please refer to the EUT photos. The antenna gain for R10 is 2.0 dBi, for Trimble P/N 9058X-XX is 4.0 dBi, for Trimble P/N 100070-XX is 3.15 dBi.

6 FCC §15.207 & IC RSS-Gen §7.2.4 – AC Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §7.2.4 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 Note 1	56 to 46 Note 1
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.

6.2 Test Setup

The measurement was performed in a shielded room. The test setup and measurement procedure was per ANSI C63.4-2009. The specification limits were in accordance with FCC §15.207 and IC RSS-Gen §7.2.4.

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

R10 and Trimble P/N 9058X-XX:

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

Trimble P/N 100070-XX:

The EUT was powered by the laptop and connected with LISN-1 which provided 120 V / 60 Hz AC power.

6.3 Test Procedure

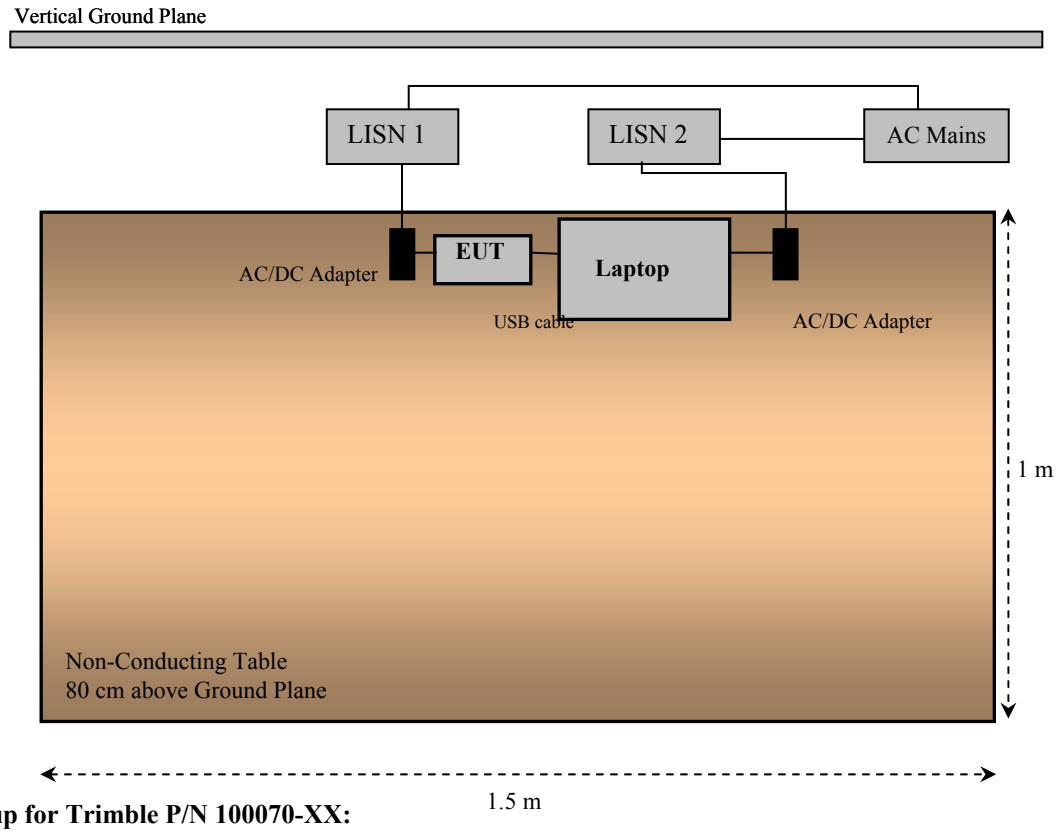
During the conducted emissions test, the support equipment was connected to the mains outlet of the LISN-2 and the LISN-2 was terminated.

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

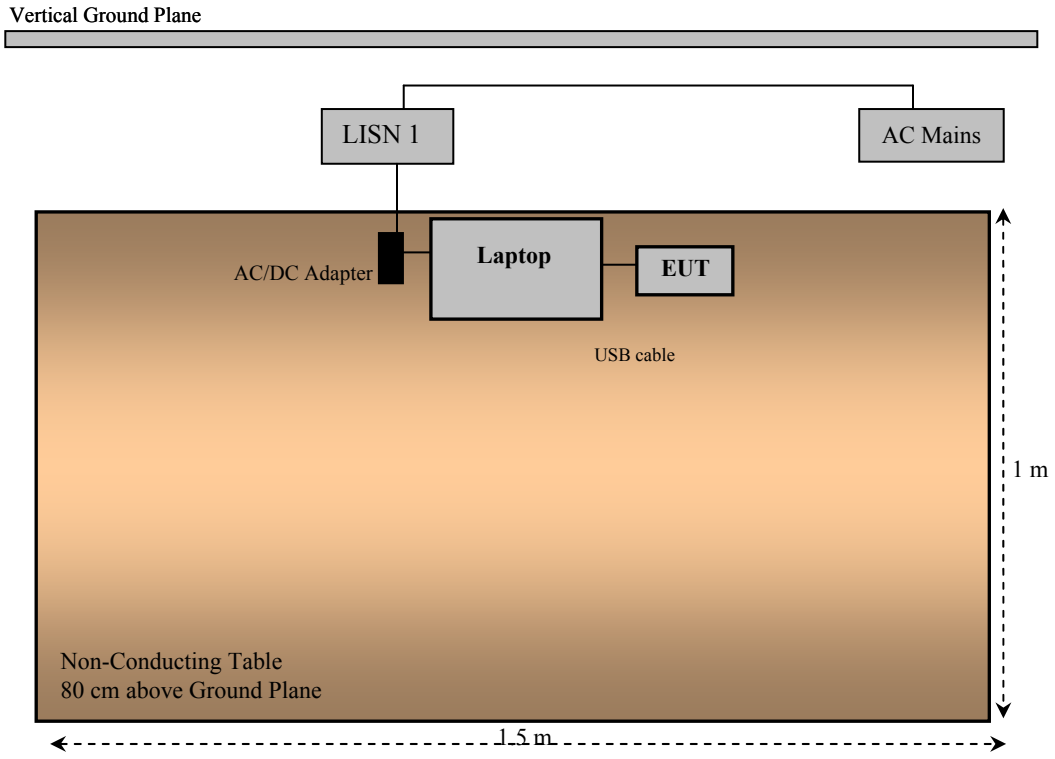
All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

6.4 Test Setup Block Diagram

The set up for R10 and Trimble P/N 9058X-XX:



The set up for Trimble P/N 100070-XX:



6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL) plus the High Pass Filter/Attenuator value (HA) and subtracting the Amplifier Gain (Ga) to the indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + CL + HA – Ga

For example, a corrected amplitude (CA) of 36 dBuV = Indicated Amplitude reading (Ai) of 50.0 dBuV + Cable Loss (CL) 1.0 dB + High Pass Filter/Attenuator (IA) 5 dB - Amplifier Gain (Ga) 20 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 (dB) = Corrected Amplitude (dBuV) - Limit (dBuV)

6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2014-04-18	1 year
Solar Electronics	LISN	9252-R-24-BNC	511205	2014-06-25	1 year
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2014-05-30	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:	23° C
Relative Humidity:	46 %
ATM Pressure:	101.25 kPa

The testing was performed by Chen Ge on 2014-07-24 in 5 meter chamber 3.

6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC and IC standard's conducted emissions limits, with a worst case margin of:

Test Mode: Transmitting

R10:

Connection: 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor (Line/Neutral)**	**Range (MHz)**
-18.55	0.162609	Line	0.15-30

Trimble P/N 9058X-XX:

Connection: 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor (Line/Neutral)**	**Range (MHz)**
-12.19	0.158289	Neutral	0.15-30

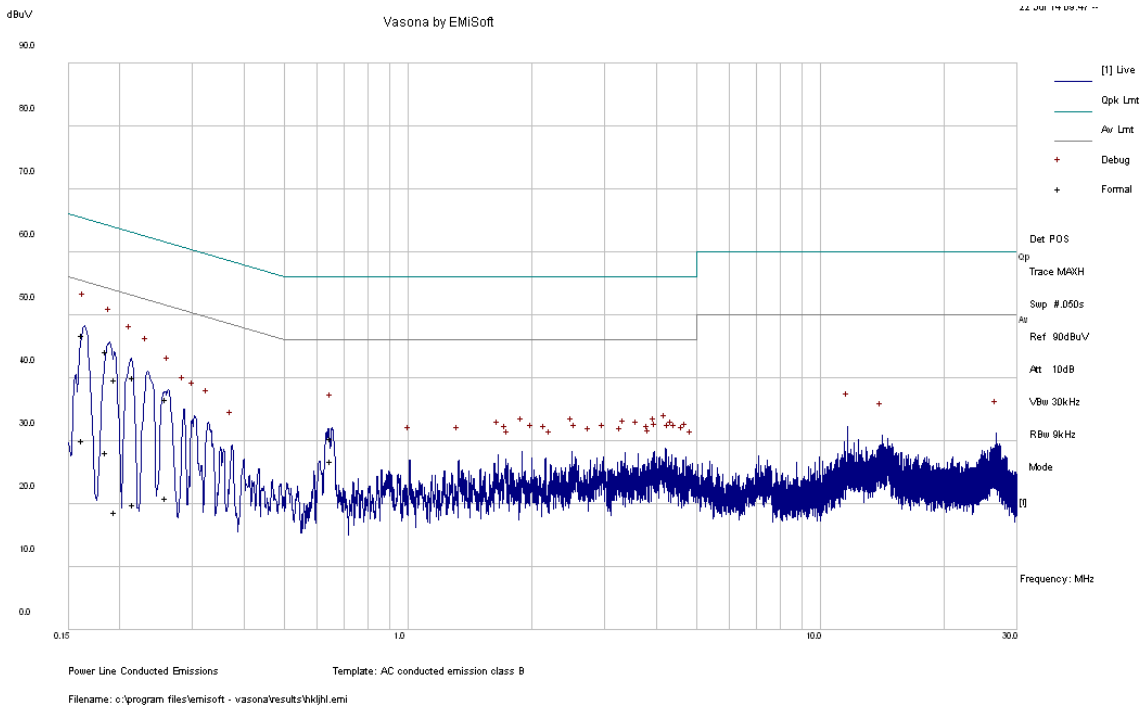
Trimble P/N 100070-XX:

Connection: 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor (Line/Neutral)**	**Range (MHz)**
-9.98	0.49938	Line	0.15-30

6.9 Conducted Emissions Test Plots and Data

R10:

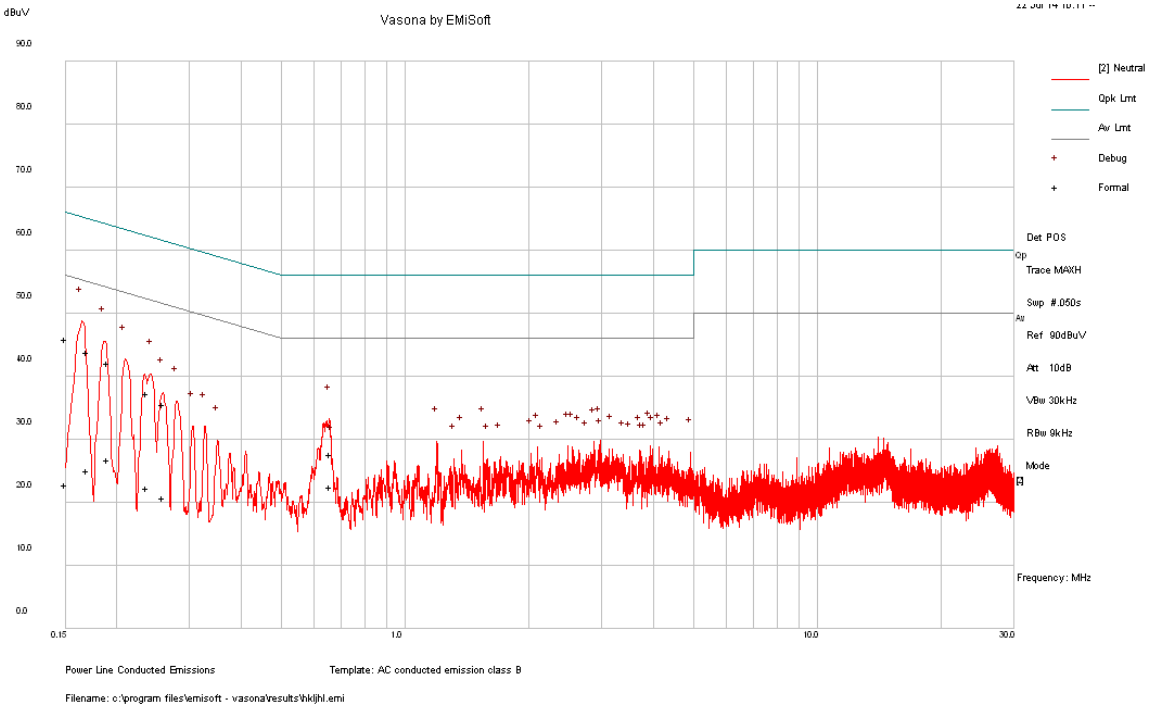
120 V, 60 Hz Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.162609	46.78	L	65.33	**-18.55**	QP
0.186216	44.3	L	64.2	-19.9	QP
0.194601	39.69	L	63.84	-24.15	QP
0.216225	40.16	L	62.96	-22.81	QP
0.25899	36.66	L	61.46	-24.8	QP
0.651108	30.37	L	56	-25.63	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.162609	30.09	L	55.33	-25.24	Ave.
0.186216	28.26	L	54.2	-25.94	Ave.
0.194601	18.78	L	53.84	-35.06	Ave.
0.216225	20	L	52.96	-32.97	Ave.
0.25899	21.03	L	51.46	-30.43	Ave.
0.651108	26.82	L	46	-19.18	Ave.

120 V, 60 Hz Neutral

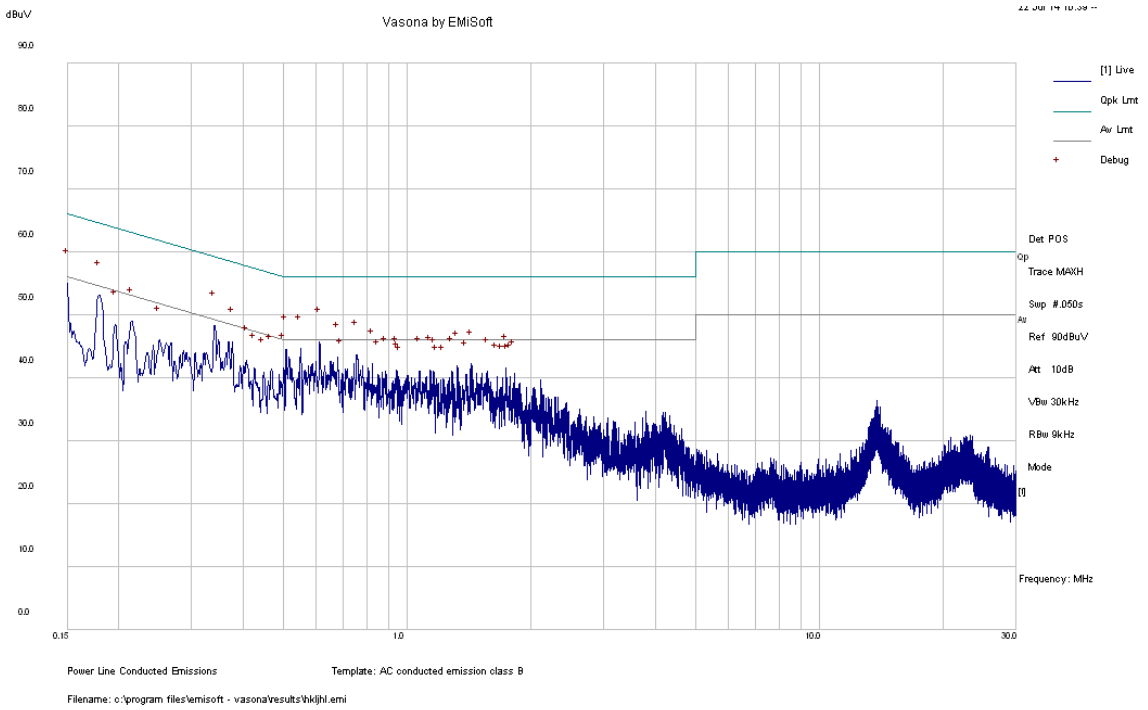


Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150027	46.04	N	66	-19.96	QP
0.169863	43.81	N	64.97	-21.16	QP
0.190779	42.23	N	64	-21.78	QP
0.236463	37.26	N	62.22	-24.96	QP
0.659469	27.73	N	56	-28.27	QP
0.258624	35.53	N	61.48	-25.94	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150027	22.93	N	56	-33.07	Ave.
0.169863	25.02	N	54.97	-29.94	Ave.
0.190779	26.89	N	54	-27.11	Ave.
0.236463	22.34	N	52.22	-29.88	Ave.
0.659469	22.46	N	46	-23.54	Ave.
0.258624	20.85	N	51.48	-30.62	Ave.

Trimble P/N 9058X-XX :

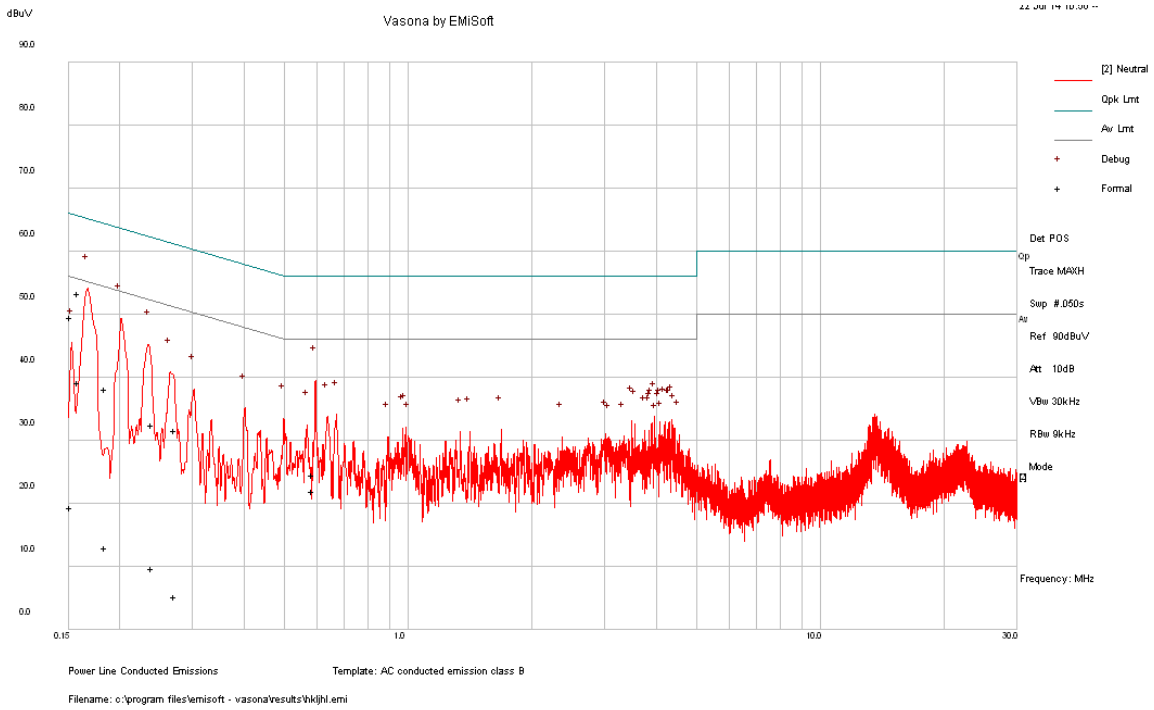
120 V, 60 Hz Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.622632	24.76	L	56	-31.24	QP
0.326343	26.66	L	59.54	-32.88	QP
0.150088	45.73	L	66	-20.26	QP
0.535908	20.9	L	56	-35.1	QP
0.162075	44.2	L	65.36	-21.16	QP
0.496302	14.57	L	56.06	-41.5	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.622632	18.87	L	46	-27.13	Ave.
0.326343	5.08	L	49.54	-44.46	Ave.
0.150088	21.68	L	56	-34.32	Ave.
0.535908	5.55	L	46	-40.45	Ave.
0.162075	25.22	L	55.36	-30.14	Ave.
0.496302	7.14	L	46.06	-38.92	Ave.

120 V, 60 Hz Neutral

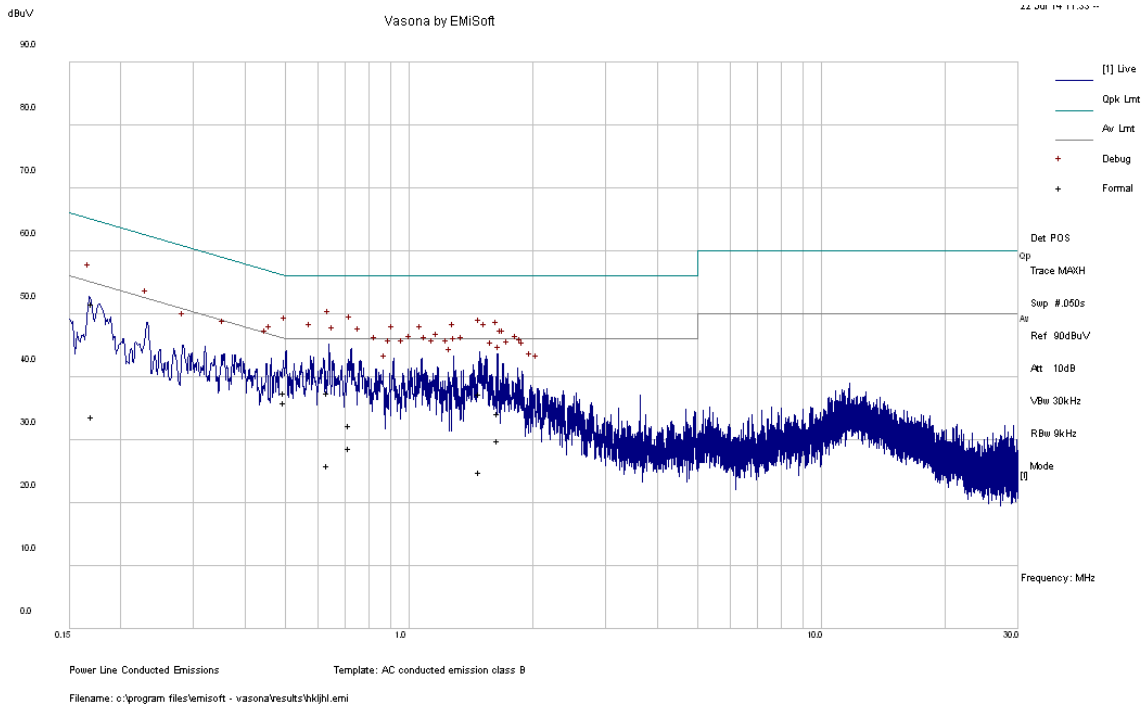


Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.152232	49.57	N	65.88	-16.31	QP
0.18501	38.16	N	64.26	-26.09	QP
0.586668	24.51	N	56	-31.49	QP
0.239079	32.45	N	62.13	-29.68	QP
0.158289	53.36	N	65.55	**-12.19**	QP
0.272265	31.59	N	61.05	-29.46	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.152232	19.34	N	55.88	-36.54	Ave.
0.18501	13.08	N	54.26	-41.18	Ave.
0.586668	21.98	N	46	-24.02	Ave.
0.239079	9.77	N	52.13	-42.36	Ave.
0.158289	39.19	N	55.55	-16.36	Ave.
0.272265	5.31	N	51.05	-45.73	Ave.

Trimble P/N 100070-XX:

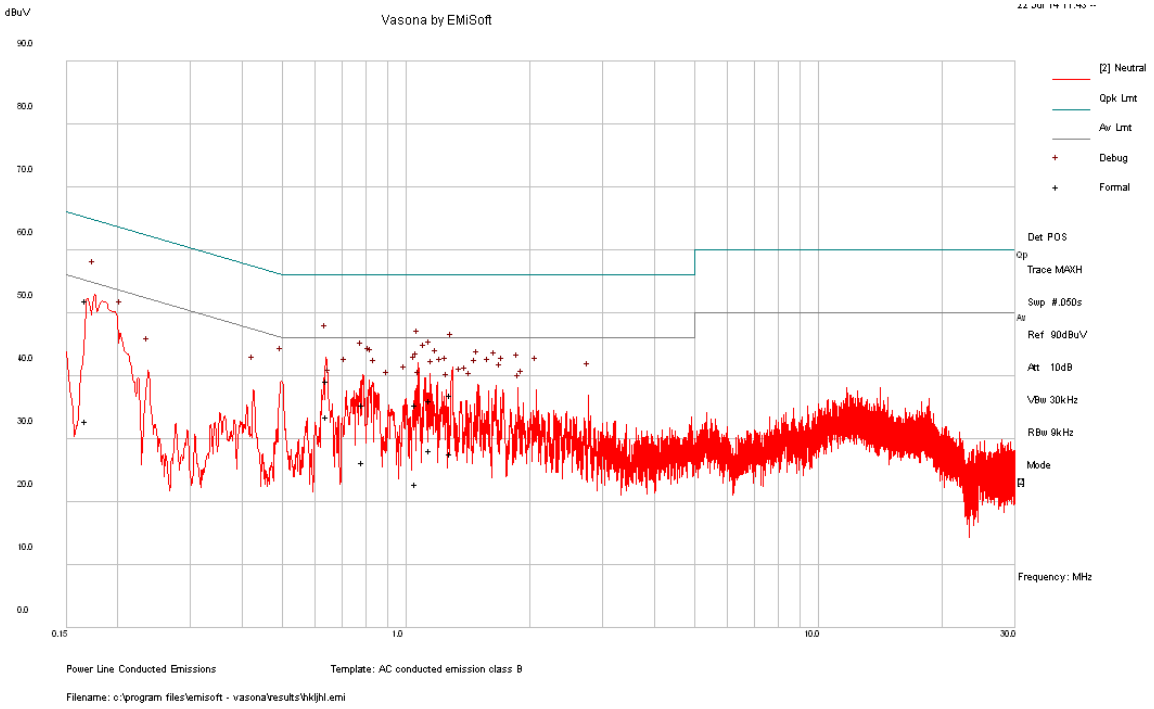
120 V, 60 Hz Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.636606	37.57	L	56	-18.43	QP
0.7182	32.39	L	56	-23.61	QP
0.49938	37.43	L	56.01	-18.58	QP
1.48515	37.39	L	56	-18.61	QP
0.171111	51.61	L	64.91	-13.29	QP
1.642566	34.22	L	56	-21.78	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.636606	25.93	L	46	-20.07	Ave.
0.7182	28.72	L	46	-17.28	Ave.
0.49938	36.03	L	46.01	**-9.98**	Ave.
1.48515	24.94	L	46	-21.06	Ave.
0.171111	33.75	L	54.91	-21.15	Ave.
1.642566	29.88	L	46	-16.12	Ave.

120 V, 60 Hz Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.168081	51.93	N	65.05	-13.13	QP
0.64503	39.18	N	56	-16.82	QP
1.056402	35.41	N	56	-20.59	QP
1.283271	36.95	N	56	-19.05	QP
1.142565	36.15	N	56	-19.85	QP
0.786099	35.43	N	56	-20.57	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (L/N)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.168081	32.88	N	55.05	-22.17	Ave.
0.64503	33.59	N	46	-12.41	Ave.
1.056402	22.92	N	46	-23.08	Ave.
1.283271	27.65	N	46	-18.35	Ave.
1.142565	28.16	N	46	-17.84	Ave.
0.786099	26.38	N	46	-19.62	Ave.

7 FCC §15.247(d) & IC RSS-210 §A8.5 - Spurious Emissions at Antenna Terminals

7.1 Applicable Standard

For FCC §15.247(d) and IC RSS-210 §A8.5 in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

7.2 Measurement 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.

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2013-10-16	1 year

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

7.4 Test Environmental Conditions

Temperature:	21° C
Relative Humidity:	29 %
ATM Pressure:	102.4 kPa

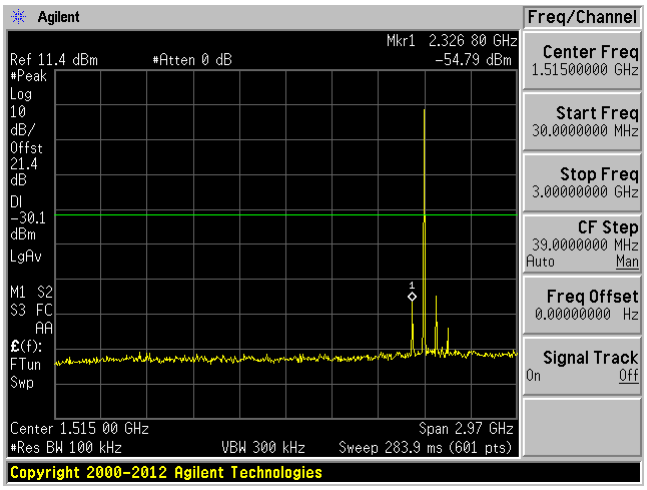
The testing was performed by Chen Ge on 2014-07-03 at RF test site.

7.5 Test Results

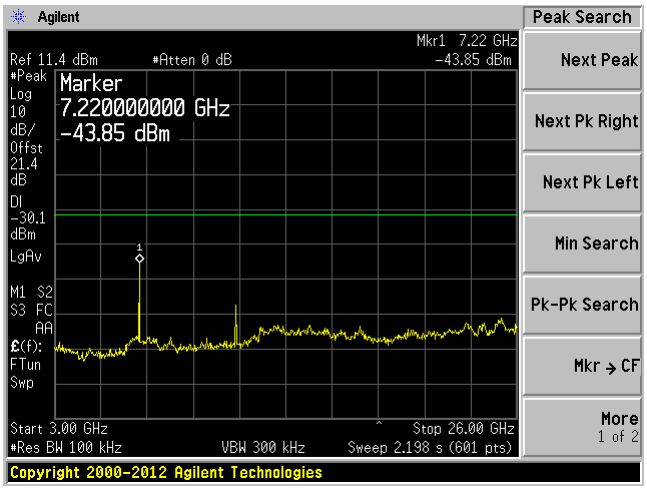
Please refer to following plots.

GFSK Low Channel 2402 MHz

30 MHz – 3 GHz

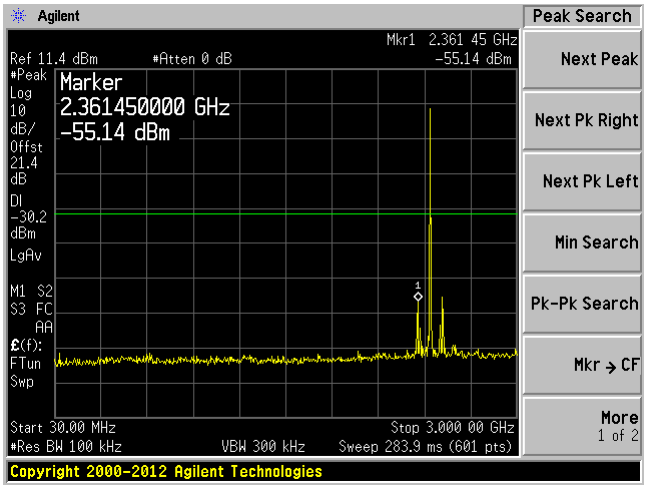


3 GHz – 26 GHz

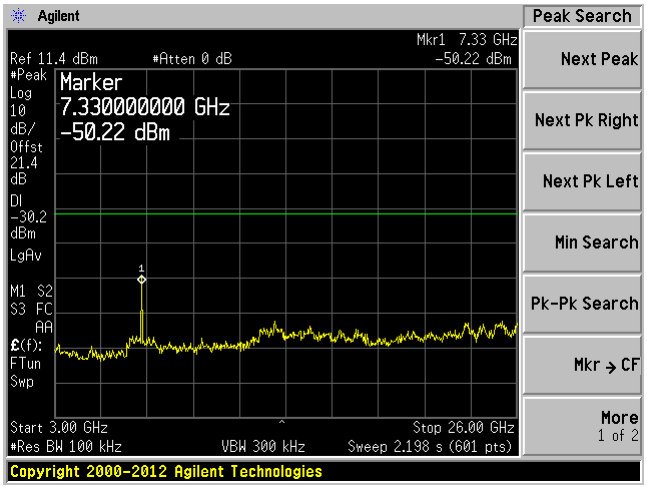


GFSK Middle Channel 2441 MHz

30 MHz – 3 GHz

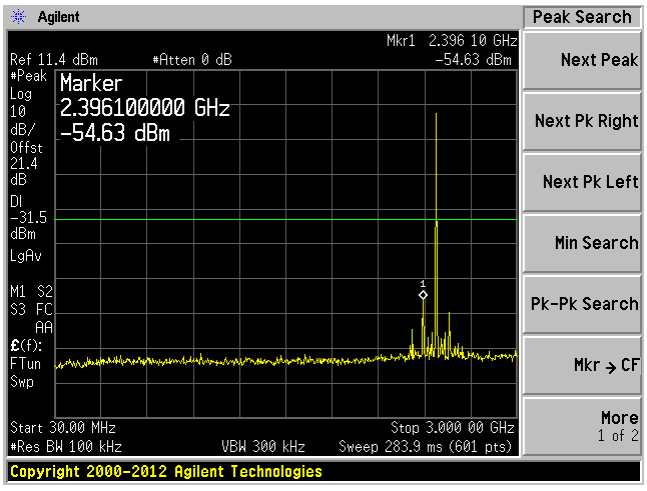


3 GHz – 26 GHz

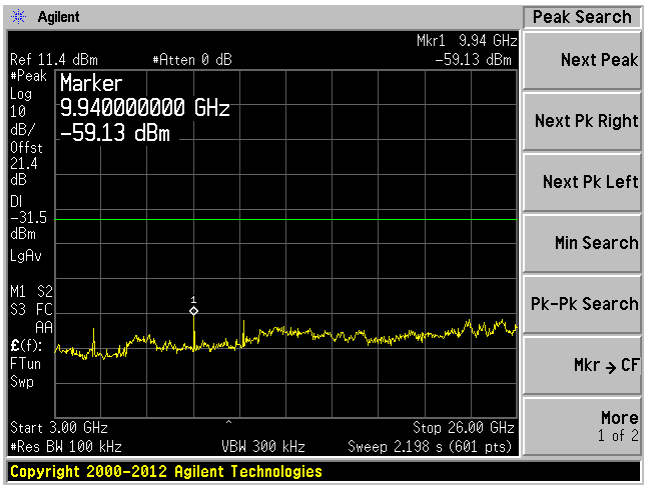


GFSK High Channel 2480 MHz

30 MHz – 3 GHz

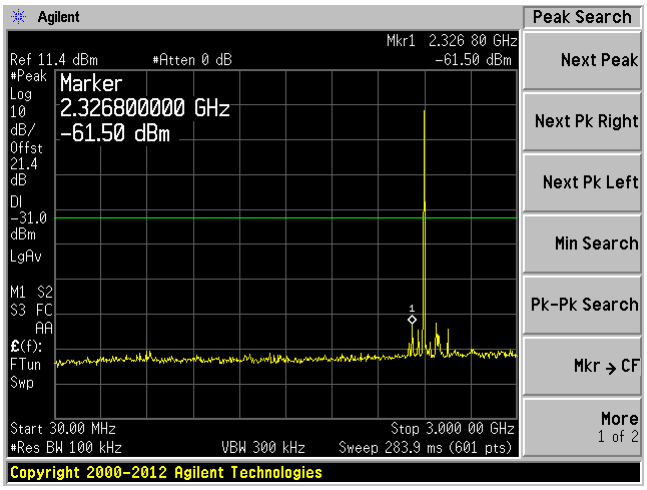


3 GHz – 25 GHz

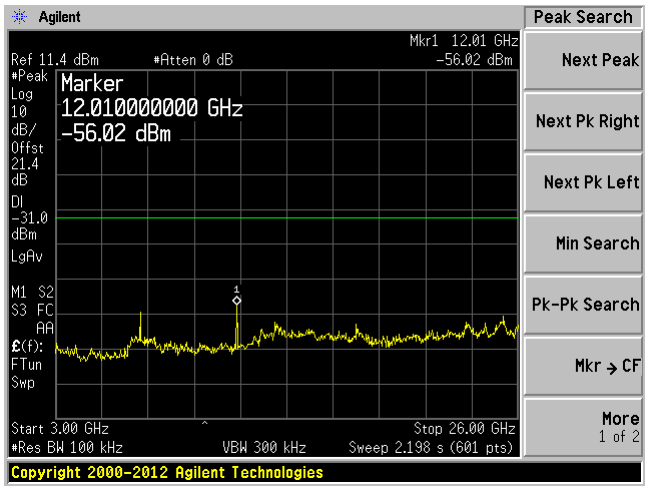


Π/4-DQPSK Low Channel 2402 MHz

30 MHz – 3 GHz

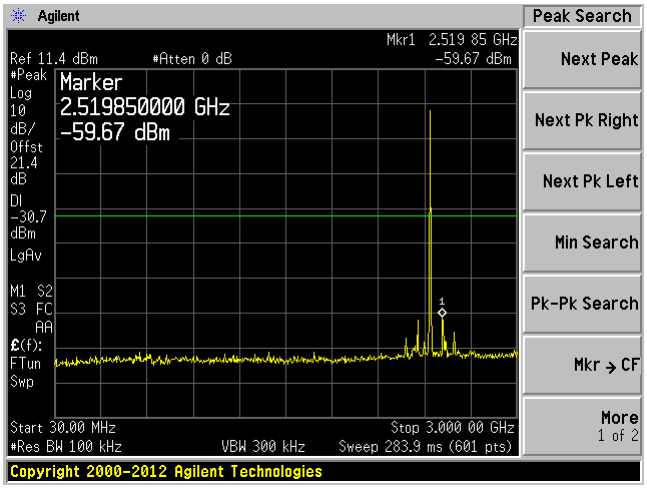


3 GHz – 25 GHz

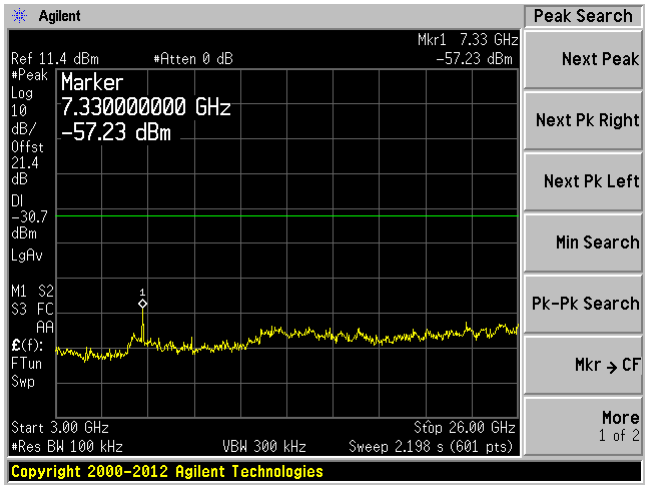


Π/4-DQPSK Middle Channel 2441 MHz

30 MHz – 3 GHz

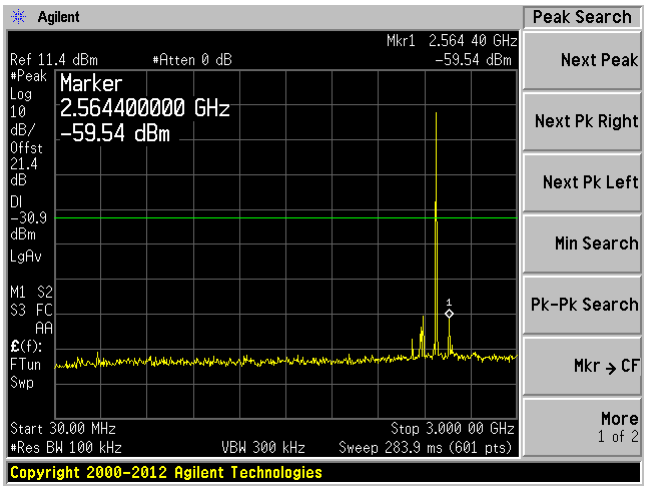


3 GHz – 25 GHz

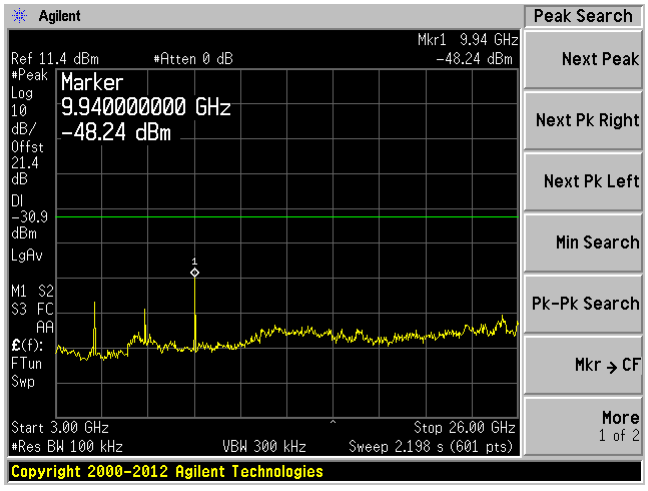


Π/4-DQPSK High Channel 2480 MHz

30 MHz – 3 GHz

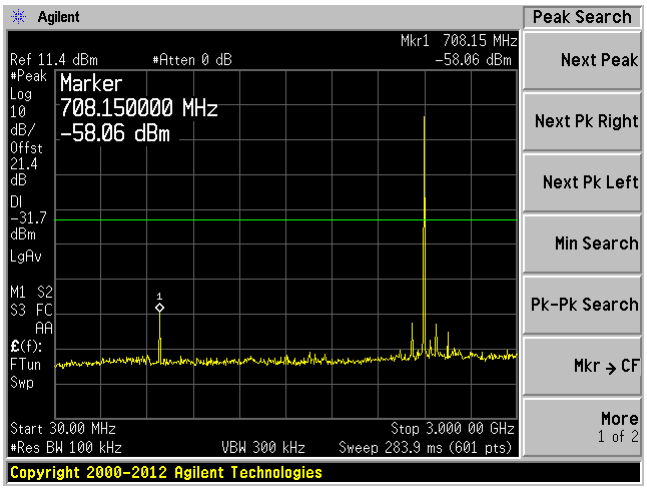


3 GHz – 25 GHz

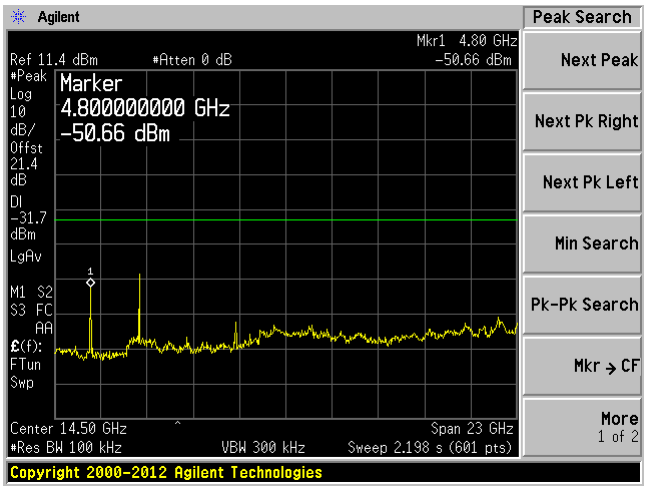


8DPSK Low Channel 2402 MHz

30 MHz – 3 GHz

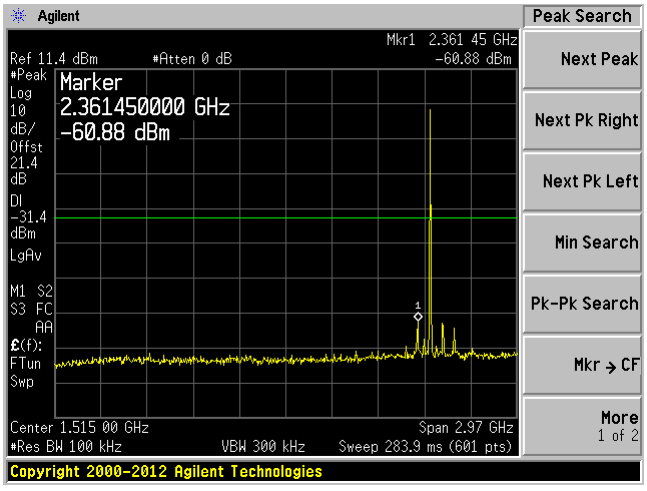


3 GHz – 25 GHz

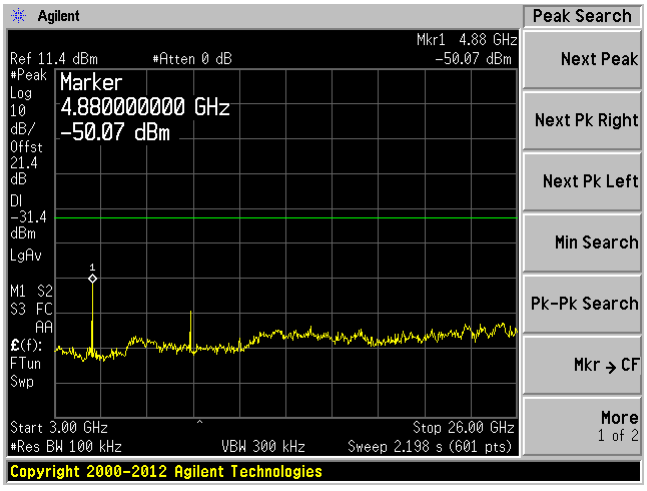


8DPSK Middle Channel 2441 MHz

30 MHz – 3 GHz

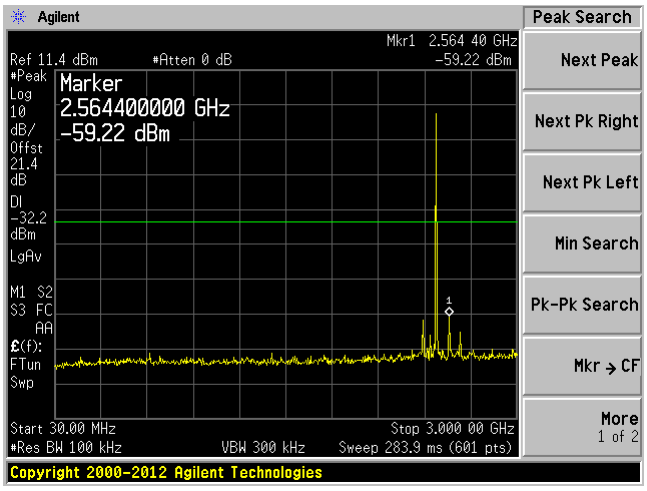


3 GHz – 25 GHz

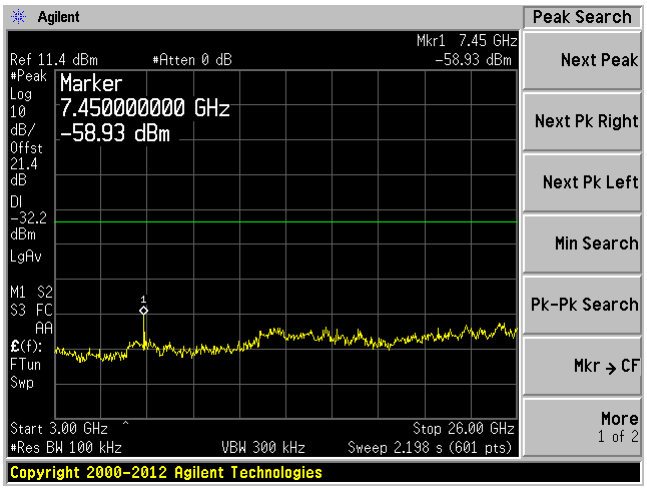


8DPSK High Channel 2480 MHz

30 MHz – 3 GHz



3 GHz – 25 GHz



8 FCC §15.205, §15.209 & §15.247(d) & IC RSS-210 §A8.5 - Spurious Radiated Emissions

8.1 Applicable Standard

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) and RSS-210: 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 Note 2	3
88 - 216	150 Note 2	3
216 - 960	200 Note 2	3
Above 960	500	3

Note 2: 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) 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	16.42 – 16.423	960 – 1240	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5. 35 – 5. 46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 –167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3 3458 – 3 358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

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-210 §A8.5, 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 A8.4 (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.

8.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15C and IC RSS-210 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.

8.3 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

8.4 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 the indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, the Corrected Amplitude (CA) of 40.3 dBuV/m = indicated Amplitude reading (Ai) 32.5 dBuV + Antenna Factor (AF) 23.5dB + Cable Loss (CL) 3.7 dB + Attenuator (Atten) 10 dB - Amplifier Gain (Ga) 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 (dB) = Corrected Amplitude (dBuV/m) - Limit (dBuV/m)

8.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100338	2013-09-19	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-05-10	1 year
Sunol Science	System Controller	SC99V	011003-1	N/R	N/R
WiseWave	Horn Antenna	ARH-4223-02	10555-01	2012-08-09	3 years
Sunol Science	Combination Antenna	JB3	A020106-3	2014-06-18	1 year
EMCO	Horn Antenna	3115	9511-4627	2013-10-17	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A10187	2014-03-08	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2014-05-09	1 year

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

8.6 Test Environmental Conditions

Temperature:	22° C
Relative Humidity:	47 %
ATM Pressure:	101.68 kPa

The testing was performed by Chen Ge on 2014-07-16 in 5 meter chamber 3.

8.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15C and IC RSS-210 standard's radiated emissions limits, and had a worst case margin of:

R10:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Worst Channel, Range**
-9.61	233.1205	Horizontal	8QPSK, middle 30 MHz–25 GHz

Trimble P/N 9058X-XX:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Worst Channel, Range**
-0.272	9608	Vertical	Π/4-DQPSK, middle 30 MHz–25 GHz

Trimble 100070-XX:

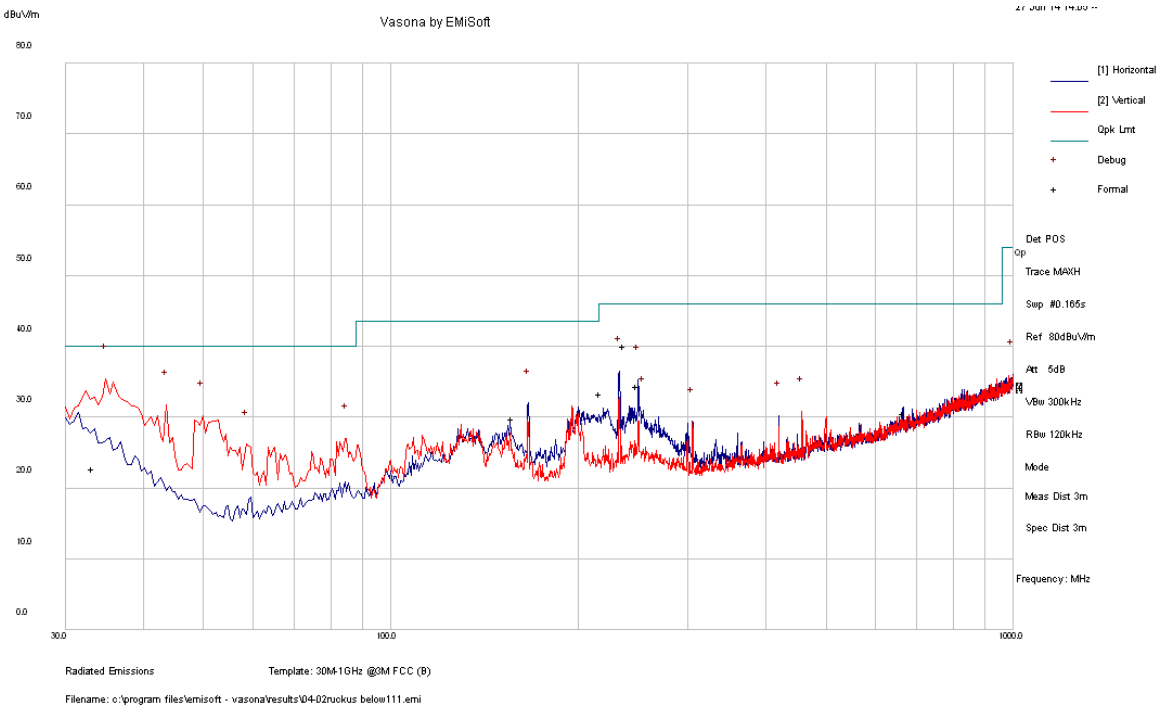
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Worst Channel, Range**
-5.92	237.33	Horizontal	8QPSK, middle 30 MHz–25 GHz

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

8.8 Radiated Emissions Test Data

Host: R10

30 MHz – 1 GHz, Measured at 3 meters



2.4 GHz Band, Quasi-Peak Measurements, worst case

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
34.8745	27.11	101	V	94	40	-12.89
43.77525	20.21	102	V	102	40	-19.79
233.1205	36.39	120	H	119	46	-9.61
49.828	19.05	102	V	215	40	-20.95
249.6005	22.94	172	H	261	46	-23.06
166.5335	28.62	149	H	174	43.5	-14.88

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											
2402	66.41	351	105	H	28.956	3.12	-	98.486	-	-	Peak
2402	61.06	2	131	V	28.956	3.12	-	93.136	-	-	Peak
2402	49.94	351	105	H	28.956	3.12	-	82.016	-	-	Ave
2402	44.59	2	131	V	28.956	3.12	-	76.666	-	-	Ave
2390	27.06	0	100	V	28.192	3.12	-	58.372	74	-15.628	Peak
2390	27.51	0	100	H	28.192	3.12	-	58.822	74	-15.178	Peak
2390	10.59	0	100	V	28.192	3.12	-	41.902	54	-12.098	Ave
2390	11.04	0	100	H	28.192	3.12	-	42.352	54	-11.648	Ave
4804	44.39	0	100	V	33.097	4.56	34.29	47.757	74	-26.243	Peak
4804	44.69	0	100	H	33.097	4.56	34.29	48.057	74	-25.943	Peak
4804	27.92	0	100	V	33.097	4.56	34.29	31.287	54	-22.713	Ave
4804	28.22	0	100	H	33.097	4.56	34.29	31.587	54	-22.413	Ave
7206	44.68	0	100	V	35.928	5.49	34.39	51.708	78.486	-26.778	Peak
7206	44.85	0	100	H	35.928	5.49	34.39	51.878	73.136	-21.258	Peak
7206	28.21	0	100	V	35.928	5.49	34.39	35.238	62.016	-26.778	Ave
7206	28.38	0	100	H	35.928	5.49	34.39	35.408	56.666	-21.258	Ave
9608	45.68	0	100	V	37.954	6.54	34.95	55.224	78.486	-23.262	Peak
9608	45.29	0	100	H	37.954	6.54	34.95	54.834	73.136	-18.302	Peak
9608	29.21	0	100	V	37.954	6.54	34.95	38.754	62.016	-23.262	Ave
9608	28.82	0	100	H	37.954	6.54	34.95	38.364	56.666	-18.302	Ave
Middle Channel 2441 MHz											
2441	60.33	21	100	V	28.956	3.12	-	92.406	-	-	Peak
2441	68.47	351	105	H	28.956	3.12	-	100.546	-	-	Peak
2441	43.86	21	100	V	28.956	3.12	-	75.936	-	-	Ave
2441	52	351	105	H	28.956	3.12	-	84.076	-	-	Ave
4882	45.51	0	100	V	33.327	4.54	34.29	49.087	74	-24.913	Peak
4882	45.62	0	100	H	33.327	4.54	34.29	49.197	74	-24.803	Peak
4882	29.04	0	100	V	33.327	4.54	34.29	32.617	54	-21.383	Ave
4882	29.15	0	100	H	33.327	4.54	34.29	32.727	54	-21.273	Ave
7323	46.08	0	100	V	36.369	5.57	34.39	53.629	74	-20.371	Peak
7323	45.69	0	100	H	36.369	5.57	34.39	53.239	74	-20.761	Peak
7323	29.61	0	100	V	36.369	5.57	34.39	37.159	54	-16.841	Ave
7323	29.22	0	100	H	36.369	5.57	34.39	36.769	54	-17.231	Ave
9764	45.85	0	100	V	38.287	6.62	34.95	55.807	72.406	-16.599	Peak
9764	45.66	0	100	H	38.287	6.62	34.95	55.617	80.546	-24.929	Peak
9764	29.38	0	100	V	38.287	6.62	34.95	39.337	55.936	-16.599	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	57.17	53	102	V	29.155	3.25	-	89.575	-	-	Peak
2480	68.95	0	105	H	29.155	3.25	-	101.355	-	-	Peak
2480	40.7	53	102	V	29.155	3.25	-	73.105	-	-	Ave
2480	52.48	0	105	H	29.155	3.25	-	84.885	-	-	Ave
2483.5	26.54	0	100	V	29.155	3.25	-	58.945	74	-15.055	Peak
2483.5	26.74	0	100	H	29.155	3.25	-	59.145	74	-14.855	Peak
2483.5	10.07	0	100	V	29.155	3.25	-	42.475	54	-11.525	Ave
2483.5	10.27	0	100	H	29.155	3.25	-	42.675	54	-11.325	Ave
4960	46.53	0	100	V	33.327	4.52	34.29	50.087	74	-23.913	Peak
4960	45.62	0	100	H	33.327	4.52	34.29	49.177	74	-24.823	Peak
4960	30.06	0	100	V	33.327	4.52	34.29	33.617	54	-20.383	Ave
4960	29.15	0	100	H	33.327	4.52	34.29	32.707	54	-21.293	Ave
7440	44.98	0	100	V	36.565	5.62	34.39	52.775	74	-21.225	Peak
7440	45.67	0	100	H	36.565	5.62	34.39	53.465	74	-20.535	Peak
7440	28.51	0	100	V	36.565	5.62	34.39	36.305	54	-17.695	Ave
7440	29.2	0	100	H	36.565	5.62	34.39	36.995	54	-17.005	Ave
9920	45.58	0	100	V	38.287	6.55	34.95	55.467	69.575	-14.108	Peak
9920	45.68	0	100	H	38.287	6.55	34.95	55.567	81.355	-25.788	Peak
9920	29.11	0	100	V	38.287	6.55	34.95	38.997	53.105	-14.108	Ave
9920	29.21	0	100	H	38.287	6.55	34.95	39.097	64.885	-25.788	Ave

Π/4-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											
2402	64.21	5	113	H	28.956	3.12	-	96.286	-	-	Peak
2402	62.26	337	106	V	28.956	3.12	-	94.336	-	-	Peak
2402	47.74	5	113	H	28.956	3.12	-	79.816	-	-	Ave
2402	45.79	337	106	V	28.956	3.12	-	77.866	-	-	Ave
2390	27.58	0	100	V	28.192	3.12	-	58.892	74	-15.108	Peak
2390	27.54	0	100	H	28.192	3.12	-	58.852	74	-15.148	Peak
2390	11.11	0	100	V	28.192	3.12	-	42.422	54	-11.578	Ave
2390	11.07	0	100	H	28.192	3.12	-	42.382	54	-11.618	Ave
4804	44.45	0	100	V	33.097	4.56	34.29	47.817	74	-26.183	Peak
4804	44.58	0	100	H	33.097	4.56	34.29	47.947	74	-26.053	Peak
4804	27.98	0	100	V	33.097	4.56	34.29	31.347	54	-22.653	Ave
4804	28.11	0	100	H	33.097	4.56	34.29	31.477	54	-22.523	Ave
7206	45.68	0	100	V	35.928	5.49	34.39	52.708	76.286	-23.578	Peak
7206	44.87	0	100	H	35.928	5.49	34.39	51.898	74.336	-22.438	Peak
7206	29.21	0	100	V	35.928	5.49	34.39	36.238	59.816	-23.578	Ave
7206	28.4	0	100	H	35.928	5.49	34.39	35.428	57.866	-22.438	Ave
9608	45.25	0	100	V	37.954	6.54	34.95	54.794	76.286	-21.492	Peak
9608	45.62	0	100	H	37.954	6.54	34.95	55.164	74.336	-19.172	Peak
9608	28.78	0	100	V	37.954	6.54	34.95	38.324	59.816	-21.492	Ave
9608	29.15	0	100	H	37.954	6.54	34.95	38.694	57.866	-19.172	Ave
Middle Channel 2441 MHz											
2441	60.54	357	105	V	28.956	3.12	-	92.616	-	-	Peak
2441	67.72	307	100	H	28.956	3.12	-	99.796	-	-	Peak
2441	44.07	357	105	V	28.956	3.12	-	76.146	-	-	Ave
2441	51.25	307	100	H	28.956	3.12	-	83.326	-	-	Ave
4882	45.74	0	100	V	33.327	4.54	34.29	49.317	74	-24.683	Peak
4882	45.65	0	100	H	33.327	4.54	34.29	49.227	74	-24.773	Peak
4882	29.27	0	100	V	33.327	4.54	34.29	32.847	54	-21.153	Ave
4882	29.18	0	100	H	33.327	4.54	34.29	32.757	54	-21.243	Ave
7323	45.28	0	100	V	36.369	5.57	34.39	52.829	74	-21.171	Peak
7323	45.87	0	100	H	36.369	5.57	34.39	53.419	74	-20.581	Peak
7323	28.81	0	100	V	36.369	5.57	34.39	36.359	54	-17.641	Ave
7323	29.4	0	100	H	36.369	5.57	34.39	36.949	54	-17.051	Ave
9764	45.53	0	100	V	38.287	6.62	34.95	55.487	72.616	-17.129	Peak
9764	45.49	0	100	H	38.287	6.62	34.95	55.447	79.796	-24.349	Peak
9764	29.06	0	100	V	38.287	6.62	34.95	39.017	56.146	-17.129	Ave
9764	29.02	0	100	H	38.287	6.62	34.95	38.977	63.326	-24.349	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	58.52	78	103	V	29.155	3.25	-	90.925	-	-	Peak
2480	68.86	320	100	H	29.155	3.25	-	101.265	-	-	Peak
2480	42.05	78	103	V	29.155	3.25	-	74.455	-	-	Ave
2480	52.39	320	100	H	29.155	3.25	-	84.795	-	-	Ave
2483.5	27.52	0	100	V	29.155	3.25	-	59.925	74	-14.075	Peak
2483.5	27.41	0	100	H	29.155	3.25	-	59.815	74	-14.185	Peak
2483.5	11.05	0	100	V	29.155	3.25	-	43.455	54	-10.545	Ave
2483.5	10.94	0	100	H	29.155	3.25	-	43.345	54	-10.655	Ave
4960	45.65	0	100	V	33.327	4.52	34.29	49.207	74	-24.793	Peak
4960	45.41	0	100	H	33.327	4.52	34.29	48.967	74	-25.033	Peak
4960	29.18	0	100	V	33.327	4.52	34.29	32.737	54	-21.263	Ave
4960	28.94	0	100	H	33.327	4.52	34.29	32.497	54	-21.503	Ave
7440	45.36	0	100	V	36.565	5.62	34.39	53.155	74	-20.845	Peak
7440	45.87	0	100	H	36.565	5.62	34.39	53.665	74	-20.335	Peak
7440	28.89	0	100	V	36.565	5.62	34.39	36.685	54	-17.315	Ave
7440	29.4	0	100	H	36.565	5.62	34.39	37.195	54	-16.805	Ave
9920	45.33	0	100	V	38.287	6.55	34.95	55.217	70.925	-15.708	Peak
9920	45.24	0	100	H	38.287	6.55	34.95	55.127	81.265	-26.138	Peak
9920	28.86	0	100	V	38.287	6.55	34.95	38.747	54.455	-15.708	Ave
9920	28.77	0	100	H	38.287	6.55	34.95	38.657	64.795	-26.138	Ave

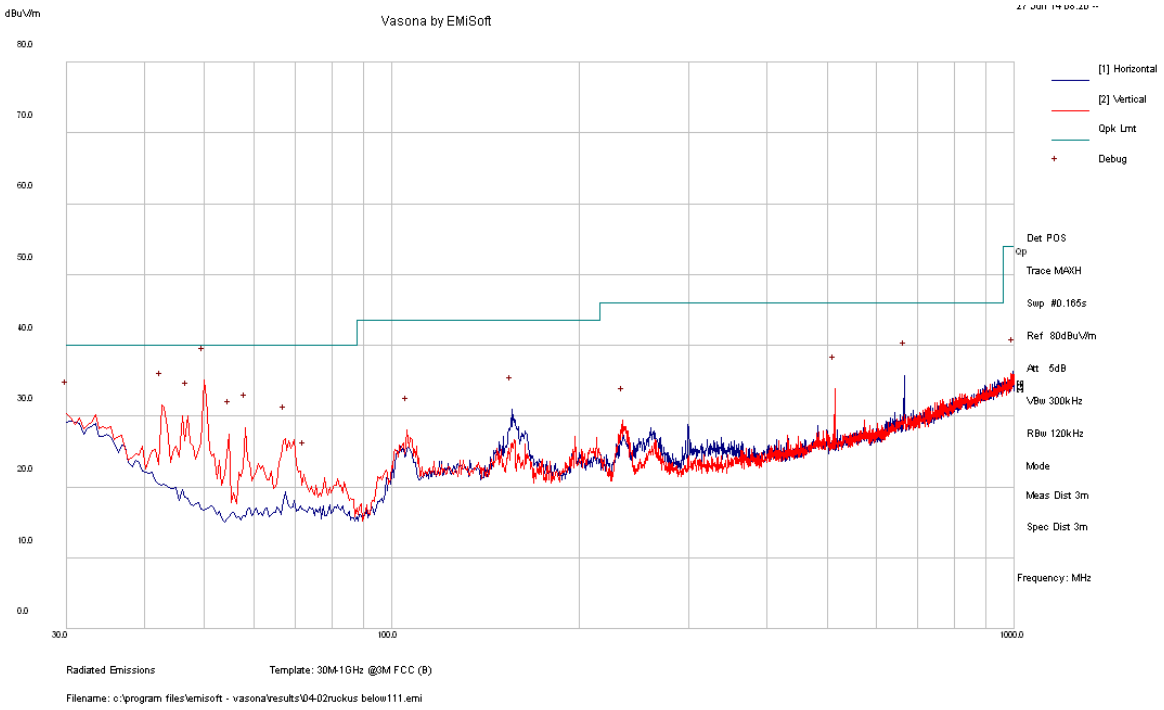
8DPSK:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz											
2402	65.61	327	118	H	28.956	3.12	-	97.686	-	-	Peak
2402	62.93	344	128	V	28.956	3.12	-	95.006	-	-	Peak
2402	49.14	327	118	H	28.956	3.12	-	81.216	-	-	Ave
2402	46.46	344	128	V	28.956	3.12	-	78.536	-	-	Ave
2390	27.23	0	100	V	28.192	3.12	-	58.542	74	-15.458	Peak
2390	27.08	0	100	H	28.192	3.12	-	58.392	74	-15.608	Peak
2390	10.76	0	100	V	28.192	3.12	-	42.072	54	-11.928	Ave
2390	10.61	0	100	H	28.192	3.12	-	41.922	54	-12.078	Ave
4804	44.64	0	100	V	33.097	4.56	34.29	48.007	74	-25.993	Peak
4804	44.01	0	100	H	33.097	4.56	34.29	47.377	74	-26.623	Peak
4804	28.17	0	100	V	33.097	4.56	34.29	31.537	54	-22.463	Ave
4804	27.54	0	100	H	33.097	4.56	34.29	30.907	54	-23.093	Ave
7206	44.41	0	100	V	35.928	5.49	34.39	51.438	77.686	-26.248	Peak
7206	45.04	0	100	H	35.928	5.49	34.39	52.068	75.006	-22.938	Peak
7206	27.94	0	100	V	35.928	5.49	34.39	34.968	61.216	-26.248	Ave
7206	28.57	0	100	H	35.928	5.49	34.39	35.598	58.536	-22.938	Ave
9608	45.23	0	100	V	37.954	6.54	34.95	54.774	77.686	-22.912	Peak
9608	45.16	0	100	H	37.954	6.54	34.95	54.704	75.006	-20.302	Peak
9608	28.76	0	100	V	37.954	6.54	34.95	38.304	61.216	-22.912	Ave
9608	28.69	0	100	H	37.954	6.54	34.95	38.234	58.536	-20.302	Ave
Middle Channel 2441 MHz											
2441	61.57	341	100	V	28.956	3.12	-	93.646	-	-	Peak
2441	69.12	3	100	H	28.956	3.12	-	101.196	-	-	Peak
2441	45.1	341	100	V	28.956	3.12	-	77.176	-	-	Ave
2441	52.65	3	100	H	28.956	3.12	-	84.726	-	-	Ave
4882	44.52	0	100	V	33.327	4.54	34.29	48.097	74	-25.903	Peak
4882	45.02	0	100	H	33.327	4.54	34.29	48.597	74	-25.403	Peak
4882	28.05	0	100	V	33.327	4.54	34.29	31.627	54	-22.373	Ave
4882	28.55	0	100	H	33.327	4.54	34.29	32.127	54	-21.873	Ave
7323	45.02	0	100	V	36.369	5.57	34.39	52.569	74	-21.431	Peak
7323	45.3	0	100	H	36.369	5.57	34.39	52.849	74	-21.151	Peak
7323	28.55	0	100	V	36.369	5.57	34.39	36.099	54	-17.901	Ave
7323	28.83	0	100	H	36.369	5.57	34.39	36.379	54	-17.621	Ave
9764	45.02	0	100	V	38.287	6.62	34.95	54.977	73.646	-18.669	Peak
9764	45.12	0	100	H	38.287	6.62	34.95	55.077	81.196	-26.119	Peak
9764	28.55	0	100	V	38.287	6.62	34.95	38.507	57.176	-18.669	Ave
9764	28.65	0	100	H	38.287	6.62	34.95	38.607	64.726	-26.119	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	56.88	57	111	V	29.155	3.25	-	89.285	-	-	Peak
2480	69.69	8	100	H	29.155	3.25	-	102.095	-	-	Peak
2480	40.41	57	111	V	29.155	3.25	-	72.815	-	-	Ave
2480	53.22	8	100	H	29.155	3.25	-	85.625	-	-	Ave
2483.5	26.51	0	100	V	29.155	3.25	-	58.915	74	-15.085	Peak
2483.5	27.24	0	100	H	29.155	3.25	-	59.645	74	-14.355	Peak
2483.5	10.04	0	100	V	29.155	3.25	-	42.445	54	-11.555	Ave
2483.5	10.77	0	100	H	29.155	3.25	-	43.175	54	-10.825	Ave
4960	45.05	0	100	V	33.327	4.52	34.29	48.607	74	-25.393	Peak
4960	45.52	0	100	H	33.327	4.52	34.29	49.077	74	-24.923	Peak
4960	28.58	0	100	V	33.327	4.52	34.29	32.137	54	-21.863	Ave
4960	29.05	0	100	H	33.327	4.52	34.29	32.607	54	-21.393	Ave
7440	45.32	0	100	V	36.565	5.62	34.39	53.115	74	-20.885	Peak
7440	45.41	0	100	H	36.565	5.62	34.39	53.205	74	-20.795	Peak
7440	28.85	0	100	V	36.565	5.62	34.39	36.645	54	-17.355	Ave
7440	28.94	0	100	H	36.565	5.62	34.39	36.735	54	-17.265	Ave
9920	46.21	0	100	V	38.287	6.55	34.95	56.097	69.285	-13.188	Peak
9920	45.87	0	100	H	38.287	6.55	34.95	55.757	82.095	-26.338	Peak
9920	29.74	0	100	V	38.287	6.55	34.95	39.627	52.815	-13.188	Ave
9920	29.4	0	100	H	38.287	6.55	34.95	39.287	65.625	-26.338	Ave

Host: Trimble P/N 9058X-XX

30 MHz – 1 GHz, Measured at 3 meters



2.4 GHz Band, Quasi-Peak Measurements, worst case

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
49.9105	19.08	100	V	55	40	-20.92
42.388	17.22	100	V	150	40	-22.78
30.00864	20.27	118	V	360	40	-19.73
46.8195	24.14	105	V	57	40	-15.86
665.6983	25.19	103	H	148	46	-20.81
57.97125	15.11	126	V	119	40	-24.89

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											
2402	47.28	89	121	V	28.956	3.12	-	79.356	-	-	Peak
2402	48.73	183	110	H	28.956	3.12	-	80.806	-	-	Peak
2402	30.81	89	121	V	28.956	3.12	-	62.886	-	-	Ave
2402	32.26	183	110	H	28.956	3.12	-	64.336	-	-	Ave
2390	27.25	0	100	V	28.192	3.12	-	58.562	74	-15.438	Peak
2390	27.58	0	100	H	28.192	3.12	-	58.892	74	-15.108	Peak
2390	10.78	0	100	V	28.192	3.12	-	42.092	54	-11.908	Ave
2390	11.11	0	100	H	28.192	3.12	-	42.422	54	-11.578	Ave
4804	44.94	0	100	V	33.097	4.56	34.29	48.307	74	-25.693	Peak
4804	44.68	0	100	H	33.097	4.56	34.29	48.047	74	-25.953	Peak
4804	28.47	0	100	V	33.097	4.56	34.29	31.837	54	-22.163	Ave
4804	28.21	0	100	H	33.097	4.56	34.29	31.577	54	-22.423	Ave
7206	44.68	0	100	V	35.928	5.49	34.39	51.708	59.356	-7.648	Peak
7206	45.03	0	100	H	35.928	5.49	34.39	52.058	60.806	-8.748	Peak
7206	28.21	0	100	V	35.928	5.49	34.39	35.238	42.886	-7.648	Ave
7206	28.56	0	100	H	35.928	5.49	34.39	35.588	44.336	-8.748	Ave
9608	44.39	0	100	V	37.954	6.54	34.95	53.934	59.356	-5.422	Peak
9608	44.52	0	100	H	37.954	6.54	34.95	54.064	60.806	-6.742	Peak
9608	27.92	0	100	V	37.954	6.54	34.95	37.464	42.886	-5.422	Ave
9608	28.05	0	100	H	37.954	6.54	34.95	37.594	44.336	-6.742	Ave
Middle Channel 2441 MHz											
2441	48.34	87	105	V	28.956	3.12	-	80.416	-	-	Peak
2441	43.55	189	100	H	28.956	3.12	-	75.626	-	-	Peak
2441	31.87	87	105	V	28.956	3.12	-	63.946	-	-	Ave
2441	27.08	189	100	H	28.956	3.12	-	59.156	-	-	Ave
4882	43.2	0	100	V	33.327	4.54	34.29	46.777	74	-27.223	Peak
4882	44.62	0	100	H	33.327	4.54	34.29	48.197	74	-25.803	Peak
4882	26.73	0	100	V	33.327	4.54	34.29	30.307	54	-23.693	Ave
4882	28.15	0	100	H	33.327	4.54	34.29	31.727	54	-22.273	Ave
7323	44.36	0	100	V	36.369	5.57	34.39	51.909	74	-22.091	Peak
7323	44.69	0	100	H	36.369	5.57	34.39	52.239	74	-21.761	Peak
7323	27.89	0	100	V	36.369	5.57	34.39	35.439	54	-18.561	Ave
7323	28.22	0	100	H	36.369	5.57	34.39	35.769	54	-18.231	Ave
9764	45.02	0	100	V	38.287	6.62	34.95	54.977	60.416	-5.439	Peak
9764	45.36	0	100	H	38.287	6.62	34.95	55.317	55.626	-0.309	Peak
9764	28.55	0	100	V	38.287	6.62	34.95	38.507	43.946	-5.439	Ave
9764	28.89	0	100	H	38.287	6.62	34.95	38.847	39.156	-0.309	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	44.67	343	100	V	29.155	3.25	-	77.075	-	-	Peak
2480	48.39	27	100	H	29.155	3.25	-	80.795	-	-	Peak
2480	28.2	343	100	V	29.155	3.25	-	60.605	-	-	Ave
2480	31.92	27	100	H	29.155	3.25	-	64.325	-	-	Ave
2483.5	27.43	0	100	V	29.155	3.25	-	59.835	74	-14.165	Peak
2483.5	27.21	0	100	H	29.155	3.25	-	59.615	74	-14.385	Peak
2483.5	10.96	0	100	V	29.155	3.25	-	43.365	54	-10.635	Ave
2483.5	10.74	0	100	H	29.155	3.25	-	43.145	54	-10.855	Ave
4960	44.32	0	100	V	33.327	4.52	34.29	47.877	74	-26.123	Peak
4960	44.82	0	100	H	33.327	4.52	34.29	48.377	74	-25.623	Peak
4960	27.85	0	100	V	33.327	4.52	34.29	31.407	54	-22.593	Ave
4960	28.35	0	100	H	33.327	4.52	34.29	31.907	54	-22.093	Ave
7440	43.87	0	100	V	36.565	5.62	34.39	51.665	74	-22.335	Peak
7440	43.68	0	100	H	36.565	5.62	34.39	51.475	74	-22.525	Peak
7440	27.4	0	100	V	36.565	5.62	34.39	35.195	54	-18.805	Ave
7440	27.21	0	100	H	36.565	5.62	34.39	35.005	54	-18.995	Ave
9920	44.32	0	100	V	38.287	6.55	34.95	54.207	57.075	-2.868	Peak
9920	44.74	0	100	H	38.287	6.55	34.95	54.627	60.795	-6.168	Peak
9920	27.85	0	100	V	38.287	6.55	34.95	37.737	40.605	-2.868	Ave
9920	28.27	0	100	H	38.287	6.55	34.95	38.157	44.325	-6.168	Ave

Π/4-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											
2402	42.36	132	105	V	28.956	3.12	-	74.436	-	-	Peak
2402	49.85	177	121	H	28.956	3.12	-	81.926	-	-	Peak
2402	25.89	132	105	V	28.956	3.12	-	57.966	-	-	Ave
2402	33.38	177	121	H	28.956	3.12	-	65.456	-	-	Ave
2390	27.25	0	100	V	28.192	3.12	-	58.562	74	-15.438	Peak
2390	27.36	0	100	H	28.192	3.12	-	58.672	74	-15.328	Peak
2390	10.78	0	100	V	28.192	3.12	-	42.092	54	-11.908	Ave
2390	10.89	0	100	H	28.192	3.12	-	42.202	54	-11.798	Ave
4804	43.13	0	100	V	33.097	4.56	34.29	46.497	74	-27.503	Peak
4804	43.25	0	100	H	33.097	4.56	34.29	46.617	74	-27.383	Peak
4804	26.66	0	100	V	33.097	4.56	34.29	30.027	54	-23.973	Ave
4804	26.78	0	100	H	33.097	4.56	34.29	30.147	54	-23.853	Ave
7206	43.12	0	100	V	35.928	5.49	34.39	50.148	54.436	-4.288	Peak
7206	44.84	0	100	H	35.928	5.49	34.39	51.868	61.926	-10.058	Peak
7206	26.65	0	100	V	35.928	5.49	34.39	33.678	37.966	-4.288	Ave
7206	28.37	0	100	H	35.928	5.49	34.39	35.398	45.456	-10.058	Ave
9608	44.62	0	100	V	37.954	6.54	34.95	54.164	54.436	-0.272	Peak
9608	44.35	0	100	H	37.954	6.54	34.95	53.894	61.926	-8.032	Peak
9608	28.15	0	100	V	37.954	6.54	34.95	37.694	37.966	-0.272	Ave
9608	27.88	0	100	H	37.954	6.54	34.95	37.424	45.456	-8.032	Ave
Middle Channel 2441 MHz											
2441	44.29	121	103	V	28.956	3.12	-	76.366	-	-	Peak
2441	48.92	153	100	H	28.956	3.12	-	80.996	-	-	Peak
2441	27.82	121	103	V	28.956	3.12	-	59.896	-	-	Ave
2441	32.45	153	100	H	28.956	3.12	-	64.526	-	-	Ave
4882	44.27	0	100	V	33.327	4.54	34.29	47.847	74	-26.153	Peak
4882	44.69	0	100	H	33.327	4.54	34.29	48.267	74	-25.733	Peak
4882	27.8	0	100	V	33.327	4.54	34.29	31.377	54	-22.623	Ave
4882	28.22	0	100	H	33.327	4.54	34.29	31.797	54	-22.203	Ave
7323	45.19	0	100	V	36.369	5.57	34.39	52.739	74	-21.261	Peak
7323	45.81	0	100	H	36.369	5.57	34.39	53.359	74	-20.641	Peak
7323	28.72	0	100	V	36.369	5.57	34.39	36.269	54	-17.731	Ave
7323	29.34	0	100	H	36.369	5.57	34.39	36.889	54	-17.111	Ave
9764	45.83	0	100	V	38.287	6.62	34.95	55.787	56.366	-0.579	Peak
9764	45.36	0	100	H	38.287	6.62	34.95	55.317	60.996	-5.679	Peak
9764	29.36	0	100	V	38.287	6.62	34.95	39.317	39.896	-0.579	Ave
9764	28.89	0	100	H	38.287	6.62	34.95	38.847	44.526	-5.679	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	43.82	112	106	V	29.155	3.25	-	76.225	-	-	Peak
2480	48.05	109	100	H	29.155	3.25	-	80.455	-	-	Peak
2480	27.35	112	106	V	29.155	3.25	-	59.755	-	-	Ave
2480	31.58	109	100	H	29.155	3.25	-	63.985	-	-	Ave
2483.5	27.35	0	100	V	29.155	3.25	-	59.755	74	-14.245	Peak
2483.5	27.28	0	100	H	29.155	3.25	-	59.685	74	-14.315	Peak
2483.5	10.88	0	100	V	29.155	3.25	-	43.285	54	-10.715	Ave
2483.5	10.81	0	100	H	29.155	3.25	-	43.215	54	-10.785	Ave
4960	44.75	0	100	V	33.327	4.52	34.29	48.307	74	-25.693	Peak
4960	44.52	0	100	H	33.327	4.52	34.29	48.077	74	-25.923	Peak
4960	28.28	0	100	V	33.327	4.52	34.29	31.837	54	-22.163	Ave
4960	28.05	0	100	H	33.327	4.52	34.29	31.607	54	-22.393	Ave
7440	44.79	0	100	V	36.565	5.62	34.39	52.585	74	-21.415	Peak
7440	44.36	0	100	H	36.565	5.62	34.39	52.155	74	-21.845	Peak
7440	28.32	0	100	V	36.565	5.62	34.39	36.115	54	-17.885	Ave
7440	27.89	0	100	H	36.565	5.62	34.39	35.685	54	-18.315	Ave
9920	44.51	0	100	V	38.287	6.55	34.95	54.397	56.225	-1.828	Peak
9920	44.36	0	100	H	38.287	6.55	34.95	54.247	60.455	-6.208	Peak
9920	28.04	0	100	V	38.287	6.55	34.95	37.927	39.755	-1.828	Ave
9920	27.89	0	100	H	38.287	6.55	34.95	37.777	43.985	-6.208	Ave

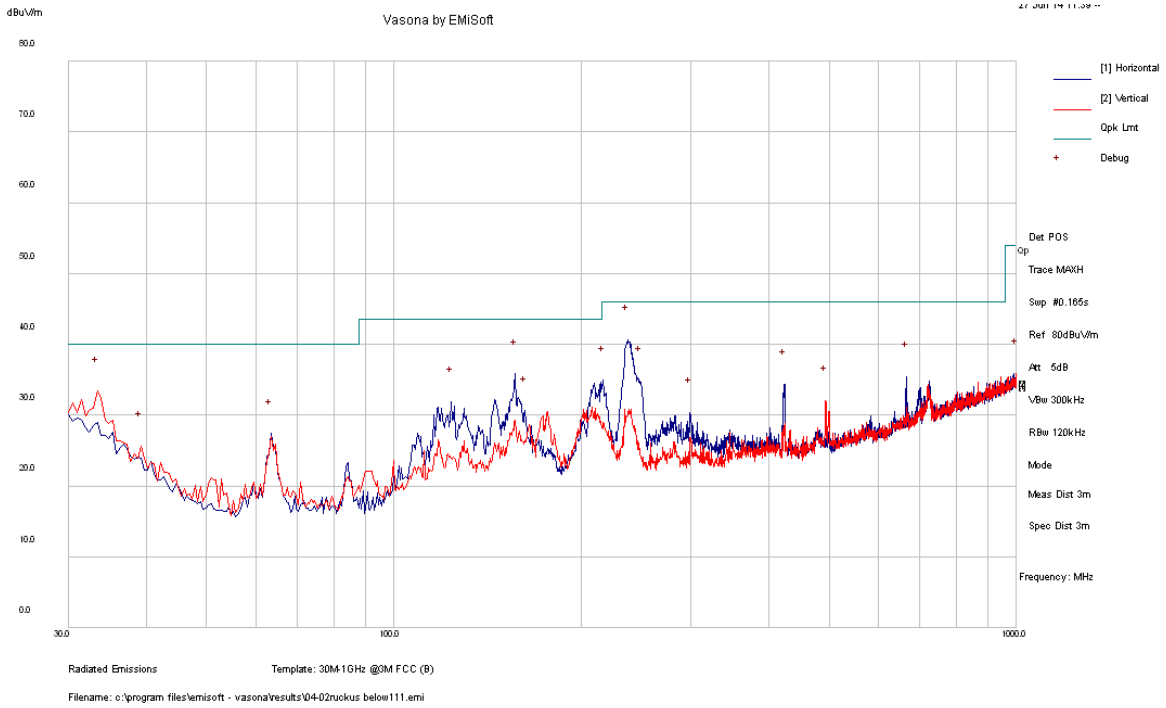
8DPSK:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz											
2402	44.03	141	132	V	28.956	3.12	-	76.106	-	-	Peak
2402	48.35	156	100	H	28.956	3.12	-	80.426	-	-	Peak
2402	27.56	141	132	V	28.956	3.12	-	59.636	-	-	Ave
2402	31.88	156	100	H	28.956	3.12	-	63.956	-	-	Ave
2390	27.32	0	100	V	28.192	3.12	-	58.632	74	-15.368	Peak
2390	27.36	0	100	H	28.192	3.12	-	58.672	74	-15.328	Peak
2390	10.85	0	100	V	28.192	3.12	-	42.162	54	-11.838	Ave
2390	10.89	0	100	H	28.192	3.12	-	42.202	54	-11.798	Ave
4804	43.58	0	100	V	33.097	4.56	34.29	46.947	74	-27.053	Peak
4804	43.78	0	100	H	33.097	4.56	34.29	47.147	74	-26.853	Peak
4804	27.11	0	100	V	33.097	4.56	34.29	30.477	54	-23.523	Ave
4804	27.31	0	100	H	33.097	4.56	34.29	30.677	54	-23.323	Ave
7206	45.25	0	100	V	35.928	5.49	34.39	52.278	56.106	-3.828	Peak
7206	45.3	0	100	H	35.928	5.49	34.39	52.328	60.426	-8.098	Peak
7206	28.78	0	100	V	35.928	5.49	34.39	35.808	39.636	-3.828	Ave
7206	28.83	0	100	H	35.928	5.49	34.39	35.858	43.956	-8.098	Ave
9608	44.45	0	100	V	37.954	6.54	34.95	53.994	56.106	-2.112	Peak
9608	44.07	0	100	H	37.954	6.54	34.95	53.614	60.426	-6.812	Peak
9608	27.98	0	100	V	37.954	6.54	34.95	37.524	39.636	-2.112	Ave
9608	27.6	0	100	H	37.954	6.54	34.95	37.144	43.956	-6.812	Ave
Middle Channel 2441 MHz											
2441	50.02	147	107	V	28.956	3.12	-	82.096	-	-	Peak
2441	48.97	114	105	H	28.956	3.12	-	81.046	-	-	Peak
2441	33.55	147	107	V	28.956	3.12	-	65.626	-	-	Ave
2441	32.5	114	105	H	28.956	3.12	-	64.576	-	-	Ave
4882	44.69	0	100	V	33.327	4.54	34.29	48.267	74	-25.733	Peak
4882	44.58	0	100	H	33.327	4.54	34.29	48.157	74	-25.843	Peak
4882	28.22	0	100	V	33.327	4.54	34.29	31.797	54	-22.203	Ave
4882	28.11	0	100	H	33.327	4.54	34.29	31.687	54	-22.313	Ave
7323	44.45	0	100	V	36.369	5.57	34.39	51.999	74	-22.001	Peak
7323	44.54	0	100	H	36.369	5.57	34.39	52.089	74	-21.911	Peak
7323	27.98	0	100	V	36.369	5.57	34.39	35.529	54	-18.471	Ave
7323	28.07	0	100	H	36.369	5.57	34.39	35.619	54	-18.381	Ave
9764	45.18	0	100	V	38.287	6.62	34.95	55.137	62.096	-6.959	Peak
9764	45.36	0	100	H	38.287	6.62	34.95	55.317	61.046	-5.729	Peak
9764	28.71	0	100	V	38.287	6.62	34.95	38.667	45.626	-6.959	Ave
9764	28.89	0	100	H	38.287	6.62	34.95	38.847	44.576	-5.729	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	48.35	237	105	V	29.155	3.25	-	80.755	-	-	Peak
2480	45.68	131	100	H	29.155	3.25	-	78.085	-	-	Peak
2480	31.88	237	105	V	29.155	3.25	-	64.285	-	-	Ave
2480	29.21	131	100	H	29.155	3.25	-	61.615	-	-	Ave
2483.5	27.32	0	100	V	29.155	3.25	-	59.725	74	-14.275	Peak
2483.5	27.36	0	100	H	29.155	3.25	-	59.765	74	-14.235	Peak
2483.5	10.85	0	100	V	29.155	3.25	-	43.255	54	-10.745	Ave
2483.5	10.89	0	100	H	29.155	3.25	-	43.295	54	-10.705	Ave
4960	45.36	0	100	V	33.327	4.52	34.29	48.917	74	-25.083	Peak
4960	45.69	0	100	H	33.327	4.52	34.29	49.247	74	-24.753	Peak
4960	28.89	0	100	V	33.327	4.52	34.29	32.447	54	-21.553	Ave
4960	29.22	0	100	H	33.327	4.52	34.29	32.777	54	-21.223	Ave
7440	44.94	0	100	V	36.565	5.62	34.39	52.735	74	-21.265	Peak
7440	44.87	0	100	H	36.565	5.62	34.39	52.665	74	-21.335	Peak
7440	28.47	0	100	V	36.565	5.62	34.39	36.265	54	-17.735	Ave
7440	28.4	0	100	H	36.565	5.62	34.39	36.195	54	-17.805	Ave
9920	45.7	0	100	V	38.287	6.55	34.95	55.587	60.755	-5.168	Peak
9920	45.44	0	100	H	38.287	6.55	34.95	55.327	58.085	-2.758	Peak
9920	29.23	0	100	V	38.287	6.55	34.95	39.117	44.285	-5.168	Ave
9920	28.97	0	100	H	38.287	6.55	34.95	38.857	41.615	-2.758	Ave

Host: Trimble P/N 100070-XX

30 MHz – 1 GHz, Measured at 3 meters



2.4 GHz Band, Quasi-Peak Measurements, worst case

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
237.33	40.08	100	H	273	46	-5.92
33.23425	22.7	100	V	242	40	-17.3
156.5978	29.83	142	H	341	43.5	-13.67
666.4868	30.59	119	H	104	46	-15.41
216.6035	33.3	100	H	360	46	-12.7
248.295	34.43	100	H	360	46	-11.57

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											
2402	61.25	231	112	V	28.956	3.12	-	93.326	-	-	Peak
2402	69.15	174	108	H	28.956	3.12	-	101.226	-	-	Peak
2402	44.78	231	112	V	28.956	3.12	-	76.856	-	-	Ave
2402	52.68	174	108	H	28.956	3.12	-	84.756	-	-	Ave
2390	27.32	0	100	V	28.192	3.12	-	58.632	74	-15.368	Peak
2390	27.62	0	100	H	28.192	3.12	-	58.932	74	-15.068	Peak
2390	10.85	0	100	V	28.192	3.12	-	42.162	54	-11.838	Ave
2390	11.15	0	100	H	28.192	3.12	-	42.462	54	-11.538	Ave
4804	44.35	0	100	V	33.097	4.56	34.29	47.717	74	-26.283	Peak
4804	44.62	0	100	H	33.097	4.56	34.29	47.987	74	-26.013	Peak
4804	27.88	0	100	V	33.097	4.56	34.29	31.247	54	-22.753	Ave
4804	28.15	0	100	H	33.097	4.56	34.29	31.517	54	-22.483	Ave
7206	44.23	0	100	V	35.928	5.49	34.39	51.258	73.326	-22.068	Peak
7206	44.36	0	100	H	35.928	5.49	34.39	51.388	81.226	-29.838	Peak
7206	27.76	0	100	V	35.928	5.49	34.39	34.788	56.856	-22.068	Ave
7206	27.89	0	100	H	35.928	5.49	34.39	34.918	64.756	-29.838	Ave
9608	45.21	0	100	V	37.954	6.54	34.95	54.754	73.326	-18.572	Peak
9608	45.74	0	100	H	37.954	6.54	34.95	55.284	81.226	-25.942	Peak
9608	28.74	0	100	V	37.954	6.54	34.95	38.284	56.856	-18.572	Ave
9608	29.27	0	100	H	37.954	6.54	34.95	38.814	64.756	-25.942	Ave
Middle Channel 2441 MHz											
2441	58.42	172	106	V	28.956	3.12	-	90.496	-	-	Peak
2441	68.35	153	105	H	28.956	3.12	-	100.426	-	-	Peak
2441	41.95	172	106	V	28.956	3.12	-	74.026	-	-	Ave
2441	51.88	153	105	H	28.956	3.12	-	83.956	-	-	Ave
4882	48.45	31	100	V	33.327	4.54	34.29	52.027	74	-21.973	Peak
4882	47.54	52	100	H	33.327	4.54	34.29	51.117	74	-22.883	Peak
4882	31.98	31	100	V	33.327	4.54	34.29	35.557	54	-18.443	Ave
4882	31.07	52	100	H	33.327	4.54	34.29	34.647	54	-19.353	Ave
7323	49.54	155	100	V	36.369	5.57	34.39	57.089	74	-16.911	Peak
7323	49.22	323	100	H	36.369	5.57	34.39	56.769	74	-17.231	Peak
7323	33.07	155	100	V	36.369	5.57	34.39	40.619	54	-13.381	Ave
7323	32.75	323	100	H	36.369	5.57	34.39	40.299	54	-13.701	Ave
9764	45.12	0	100	V	38.287	6.62	34.95	55.077	70.496	-15.419	Peak
9764	45.33	0	100	H	38.287	6.62	34.95	55.287	80.426	-25.139	Peak
9764	28.65	0	100	V	38.287	6.62	34.95	38.607	54.026	-15.419	Ave
9764	28.86	0	100	H	38.287	6.62	34.95	38.817	63.956	-25.139	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	58.35	135	102	V	29.155	3.25	-	90.755	-	-	Peak
2480	67.99	151	121	H	29.155	3.25	-	100.395	-	-	Peak
2480	41.88	135	102	V	29.155	3.25	-	74.285	-	-	Ave
2480	51.52	151	121	H	29.155	3.25	-	83.925	-	-	Ave
2483.5	27.52	0	100	V	29.155	3.25	-	59.925	74	-14.075	Peak
2483.5	27.32	0	100	H	29.155	3.25	-	59.725	74	-14.275	Peak
2483.5	11.05	0	100	V	29.155	3.25	-	43.455	54	-10.545	Ave
2483.5	10.85	0	100	H	29.155	3.25	-	43.255	54	-10.745	Ave
4960	48.25	27	100	V	33.327	4.52	34.29	51.807	74	-22.193	Peak
4960	49.35	63	100	H	33.327	4.52	34.29	52.907	74	-21.093	Peak
4960	31.78	27	100	V	33.327	4.52	34.29	35.337	54	-18.663	Ave
4960	32.88	63	100	H	33.327	4.52	34.29	36.437	54	-17.563	Ave
7440	49.09	125	100	V	36.565	5.62	34.39	56.885	74	-17.115	Peak
7440	48.51	0	100	H	36.565	5.62	34.39	56.305	74	-17.695	Peak
7440	32.62	125	100	V	36.565	5.62	34.39	40.415	54	-13.585	Ave
7440	32.04	0	100	H	36.565	5.62	34.39	39.835	54	-14.165	Ave
9920	45.41	0	100	V	38.287	6.55	34.95	55.297	70.755	-15.458	Peak
9920	45.32	0	100	H	38.287	6.55	34.95	55.207	80.395	-25.188	Peak
9920	28.94	0	100	V	38.287	6.55	34.95	38.827	54.285	-15.458	Ave
9920	28.85	0	100	H	38.287	6.55	34.95	38.737	63.925	-25.188	Ave

Π/4-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											
2402	60.75	121	100	V	28.956	3.12	-	92.826	-	-	Peak
2402	67.82	163	100	H	28.956	3.12	-	99.896	-	-	Peak
2402	44.28	121	100	V	28.956	3.12	-	76.356	-	-	Ave
2402	51.35	163	100	H	28.956	3.12	-	83.426	-	-	Ave
2390	27.05	0	100	V	28.192	3.12	-	58.362	74	-15.638	Peak
2390	27.52	0	100	H	28.192	3.12	-	58.832	74	-15.168	Peak
2390	10.58	0	100	V	28.192	3.12	-	41.892	54	-12.108	Ave
2390	11.05	0	100	H	28.192	3.12	-	42.362	54	-11.638	Ave
4804	49.34	21	100	V	33.097	4.56	34.29	52.707	74	-21.293	Peak
4804	50.62	127	100	H	33.097	4.56	34.29	53.987	74	-20.013	Peak
4804	32.87	21	100	V	33.097	4.56	34.29	36.237	54	-17.763	Ave
4804	34.15	127	100	H	33.097	4.56	34.29	37.517	54	-16.483	Ave
7206	50.24	56	100	V	35.928	5.49	34.39	57.268	72.826	-15.558	Peak
7206	48.41	77	100	H	35.928	5.49	34.39	55.438	79.896	-24.458	Peak
7206	33.77	56	100	V	35.928	5.49	34.39	40.798	56.356	-15.558	Ave
7206	31.94	77	100	H	35.928	5.49	34.39	38.968	63.426	-24.458	Ave
9608	45.74	0	100	V	37.954	6.54	34.95	55.284	72.826	-17.542	Peak
9608	45.32	0	100	H	37.954	6.54	34.95	54.864	79.896	-25.032	Peak
9608	29.27	0	100	V	37.954	6.54	34.95	38.814	56.356	-17.542	Ave
9608	28.85	0	100	H	37.954	6.54	34.95	38.394	63.426	-25.032	Ave
Middle Channel 2441 MHz											
2441	60.21	113	109	V	28.956	3.12	-	92.286	-	-	Peak
2441	68.25	125	100	H	28.956	3.12	-	100.326	-	-	Peak
2441	43.74	113	109	V	28.956	3.12	-	75.816	-	-	Ave
2441	51.78	125	100	H	28.956	3.12	-	83.856	-	-	Ave
4882	44.21	0	100	V	33.327	4.54	34.29	47.787	74	-26.213	Peak
4882	44.57	0	100	H	33.327	4.54	34.29	48.147	74	-25.853	Peak
4882	27.74	0	100	V	33.327	4.54	34.29	31.317	54	-22.683	Ave
4882	28.1	0	100	H	33.327	4.54	34.29	31.677	54	-22.323	Ave
7323	45.27	0	100	V	36.369	5.57	34.39	52.819	74	-21.181	Peak
7323	45.65	0	100	H	36.369	5.57	34.39	53.199	74	-20.801	Peak
7323	28.8	0	100	V	36.369	5.57	34.39	36.349	54	-17.651	Ave
7323	29.18	0	100	H	36.369	5.57	34.39	36.729	54	-17.271	Ave
9764	45.62	0	100	V	38.287	6.62	34.95	55.577	72.286	-16.709	Peak
9764	45.33	0	100	H	38.287	6.62	34.95	55.287	80.326	-25.039	Peak
9764	29.15	0	100	V	38.287	6.62	34.95	39.107	55.816	-16.709	Ave
9764	28.86	0	100	H	38.287	6.62	34.95	38.817	63.856	-25.039	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	61.25	125	112	V	29.155	3.25	-	93.655	-	-	Peak
2480	67.25	174	131	H	29.155	3.25	-	99.655	-	-	Peak
2480	44.78	125	112	V	29.155	3.25	-	77.185	-	-	Ave
2480	50.78	174	131	H	29.155	3.25	-	83.185	-	-	Ave
2483.5	27.32	0	100	V	29.155	3.25	-	59.725	74	-14.275	Peak
2483.5	27.36	0	100	H	29.155	3.25	-	59.765	74	-14.235	Peak
2483.5	10.85	0	100	V	29.155	3.25	-	43.255	54	-10.745	Ave
2483.5	10.89	0	100	H	29.155	3.25	-	43.295	54	-10.705	Ave
4960	48.77	22	100	V	33.327	4.52	34.29	52.327	74	-21.673	Peak
4960	47.62	58	100	H	33.327	4.52	34.29	51.177	74	-22.823	Peak
4960	32.3	22	100	V	33.327	4.52	34.29	35.857	54	-18.143	Ave
4960	31.15	58	100	H	33.327	4.52	34.29	34.707	54	-19.293	Ave
7440	47.05	0	100	V	36.565	5.62	34.39	54.845	74	-19.155	Peak
7440	48.32	0	100	H	36.565	5.62	34.39	56.115	74	-17.885	Peak
7440	30.58	0	100	V	36.565	5.62	34.39	38.375	54	-15.625	Ave
7440	31.85	0	100	H	36.565	5.62	34.39	39.645	54	-14.355	Ave
9920	44.78	0	100	V	38.287	6.55	34.95	54.667	73.655	-18.988	Peak
9920	44.62	0	100	H	38.287	6.55	34.95	54.507	79.655	-25.148	Peak
9920	28.31	0	100	V	38.287	6.55	34.95	38.197	57.185	-18.988	Ave
9920	28.15	0	100	H	38.287	6.55	34.95	38.037	63.185	-25.148	Ave

8DPSK:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz											
2402	61.21	103	116	V	28.956	3.12	-	93.286	-	-	Peak
2402	69.72	214	100	H	28.956	3.12	-	101.796	-	-	Peak
2402	44.74	103	116	V	28.956	3.12	-	76.816	-	-	Ave
2402	53.25	214	100	H	28.956	3.12	-	85.326	-	-	Ave
2390	27.36	0	100	V	28.192	3.12	-	58.672	74	-15.328	Peak
2390	27.59	0	100	H	28.192	3.12	-	58.902	74	-15.098	Peak
2390	10.89	0	100	V	28.192	3.12	-	42.202	54	-11.798	Ave
2390	11.12	0	100	H	28.192	3.12	-	42.432	54	-11.568	Ave
4804	46.9	0	100	V	33.097	4.56	34.29	50.267	74	-23.733	Peak
4804	47.31	0	100	H	33.097	4.56	34.29	50.677	74	-23.323	Peak
4804	30.43	0	100	V	33.097	4.56	34.29	33.797	54	-20.203	Ave
4804	30.84	0	100	H	33.097	4.56	34.29	34.207	54	-19.793	Ave
7206	50.37	23	100	V	35.928	5.49	34.39	57.398	73.286	-15.888	Peak
7206	49.52	34	100	H	35.928	5.49	34.39	56.548	81.796	-25.248	Peak
7206	33.9	23	100	V	35.928	5.49	34.39	40.928	56.816	-15.888	Ave
7206	33.05	34	100	H	35.928	5.49	34.39	40.078	65.326	-25.248	Ave
9608	45.25	0	100	V	37.954	6.54	34.95	54.794	73.286	-18.492	Peak
9608	45.32	0	100	H	37.954	6.54	34.95	54.864	81.796	-26.932	Peak
9608	28.78	0	100	V	37.954	6.54	34.95	38.324	56.816	-18.492	Ave
9608	28.85	0	100	H	37.954	6.54	34.95	38.394	65.326	-26.932	Ave
Middle Channel 2441 MHz											
2441	58.91	0	100	V	28.956	3.12	-	90.986	-	-	Peak
2441	67.18	171	115	H	28.956	3.12	-	99.256	-	-	Peak
2441	42.44	0	100	V	28.956	3.12	-	74.516	-	-	Ave
2441	50.71	171	115	H	28.956	3.12	-	82.786	-	-	Ave
4882	47.81	126	100	V	33.327	4.54	34.29	51.387	74	-22.613	Peak
4882	47.58	132	100	H	33.327	4.54	34.29	51.157	74	-22.843	Peak
4882	31.34	126	100	V	33.327	4.54	34.29	34.917	54	-19.083	Ave
4882	31.11	132	100	H	33.327	4.54	34.29	34.687	54	-19.313	Ave
7323	51.24	31	100	V	36.369	5.57	34.39	58.789	74	-15.211	Peak
7323	48.48	21	100	H	36.369	5.57	34.39	56.029	74	-17.971	Peak
7323	34.77	31	100	V	36.369	5.57	34.39	42.319	54	-11.681	Ave
7323	32.01	21	100	H	36.369	5.57	34.39	39.559	54	-14.441	Ave
9764	44.91	0	100	V	38.287	6.62	34.95	54.867	70.986	-16.119	Peak
9764	44.52	0	100	H	38.287	6.62	34.95	54.477	79.256	-24.779	Peak
9764	28.44	0	100	V	38.287	6.62	34.95	38.397	54.516	-16.119	Ave
9764	28.05	0	100	H	38.287	6.62	34.95	38.007	62.786	-24.779	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz											
2480	58.69	112	102	V	29.155	3.25	-	91.095	-	-	Peak
2480	66.34	172	131	H	29.155	3.25	-	98.745	-	-	Peak
2480	42.22	112	102	V	29.155	3.25	-	74.625	-	-	Ave
2480	49.87	172	131	H	29.155	3.25	-	82.275	-	-	Ave
2483.5	27.36	0	100	V	29.155	3.25	-	59.765	74	-14.235	Peak
2483.5	27.65	0	100	H	29.155	3.25	-	60.055	74	-13.945	Peak
2483.5	10.89	0	100	V	29.155	3.25	-	43.295	54	-10.705	Ave
2483.5	11.18	0	100	H	29.155	3.25	-	43.585	54	-10.415	Ave
4960	46.79	0	100	V	33.327	4.52	34.29	50.347	74	-23.653	Peak
4960	47.76	0	100	H	33.327	4.52	34.29	51.317	74	-22.683	Peak
4960	30.32	0	100	V	33.327	4.52	34.29	33.877	54	-20.123	Ave
4960	31.29	0	100	H	33.327	4.52	34.29	34.847	54	-19.153	Ave
7440	46.12	127	100	V	36.565	5.62	34.39	53.915	74	-20.085	Peak
7440	48.46	115	100	H	36.565	5.62	34.39	56.255	74	-17.745	Peak
7440	29.65	127	100	V	36.565	5.62	34.39	37.445	54	-16.555	Ave
7440	31.99	115	100	H	36.565	5.62	34.39	39.785	54	-14.215	Ave
9920	45.26	0	100	V	38.287	6.55	34.95	55.147	71.095	-15.948	Peak
9920	45.36	0	100	H	38.287	6.55	34.95	55.247	78.745	-23.498	Peak
9920	28.79	0	100	V	38.287	6.55	34.95	38.677	54.625	-15.948	Ave
9920	28.89	0	100	H	38.287	6.55	34.95	38.777	62.275	-23.498	Ave

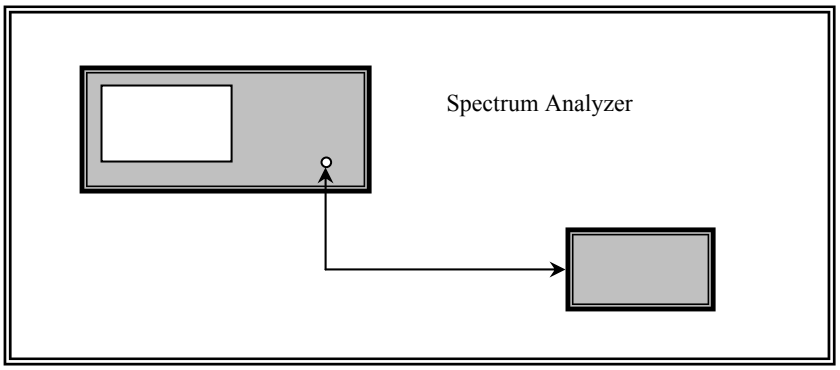
9 FCC §15.247(b) & IC RSS-210 §A8.4 - Peak Output Power Measurement

9.1 Applicable Standard

According to FCC §15.247(b) and IC RSS-210 §A8.4 (4) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

9.2 Measurement Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.
3. Add a correction factor to the display.



9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2013-10-16	1 year

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

9.4 Test Environmental Conditions

Temperature:	21° C
Relative Humidity:	29 %
ATM Pressure:	102.4 kPa

The testing was performed by Chen Ge on 2014-07-03 at RF test site.

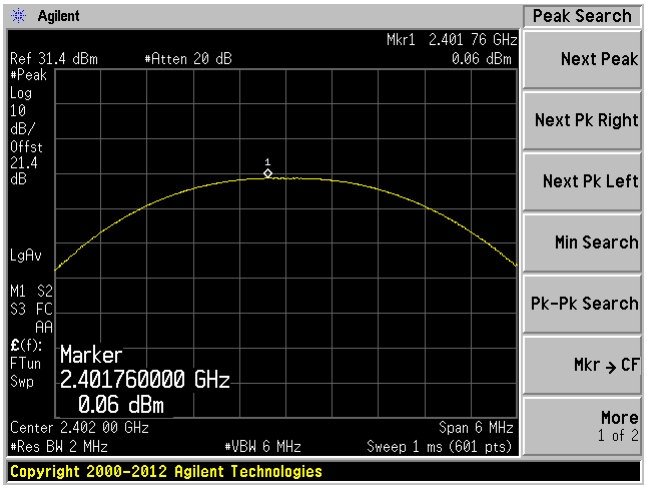
9.5 Test Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
GFSK				
Low	2402	0.06	30	-29.94
Middle	2441	0.33	30	-29.67
High	2480	-0.05	30	-30.05
Π/4-DQPSK				
Low	2402	1.79	30	-28.21
Middle	2441	1.74	30	-28.26
High	2480	1.1	30	-28.9
8DPSK				
Low	2402	2.16	30	-27.84
Middle	2441	2.1	30	-27.9
High	2480	1.47	30	-28.53

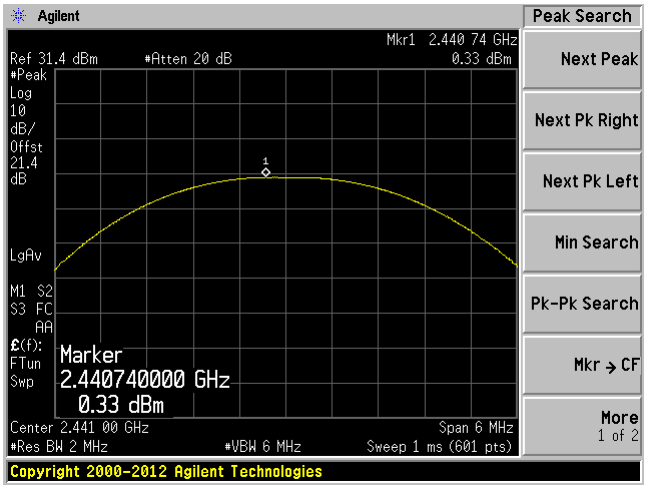
Please refer to the following plots.

GFSK

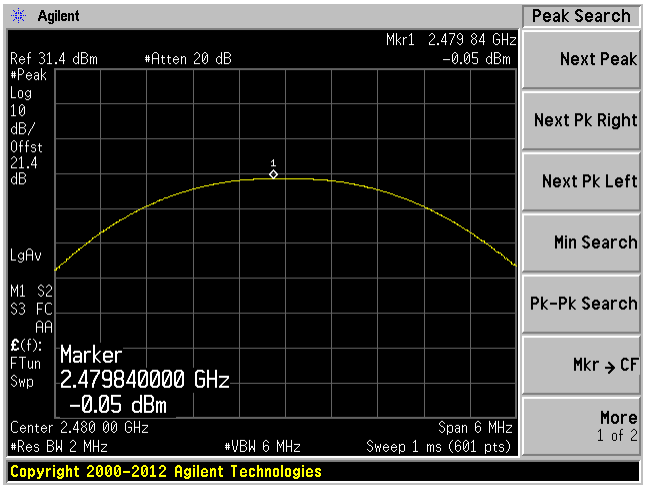
Low channel: 2402 MHz



Middle Channel: 2441 MHz

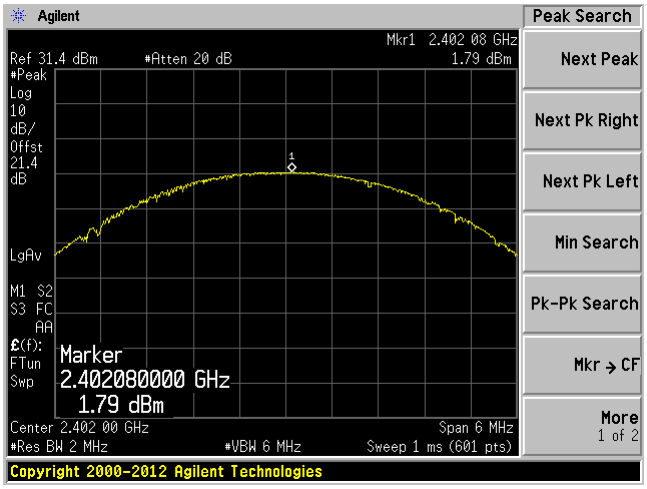


High Channel: 2480 MHz

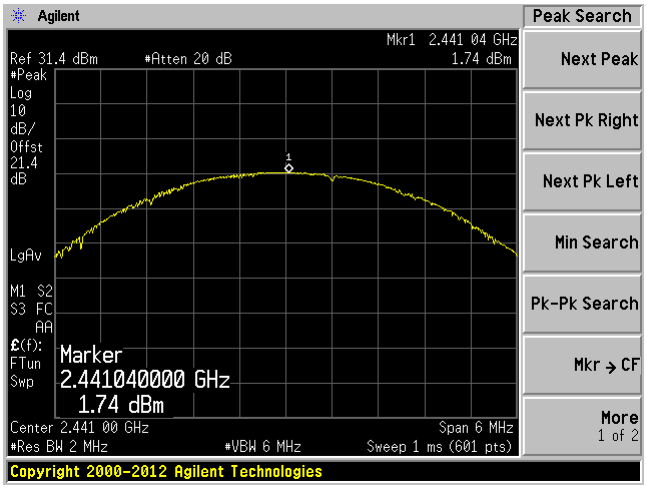


Π/4-DQPSK

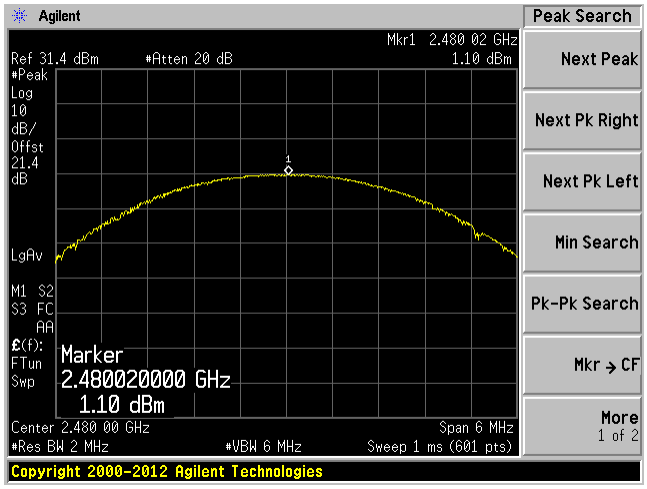
Low channel: 2402 MHz



Middle Channel: 2441 MHz

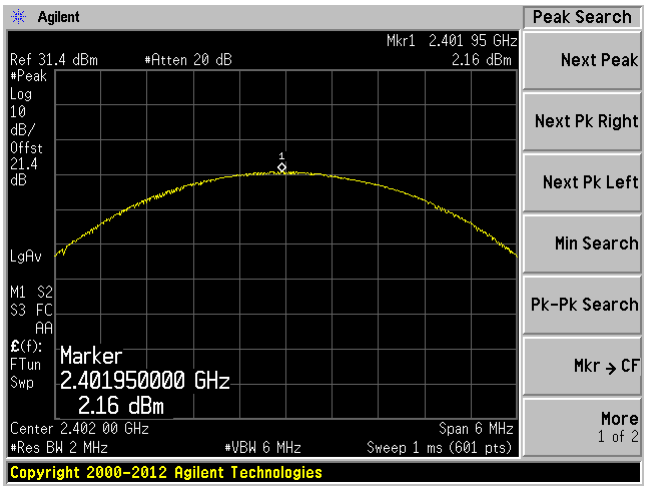


High Channel: 2480 MHz

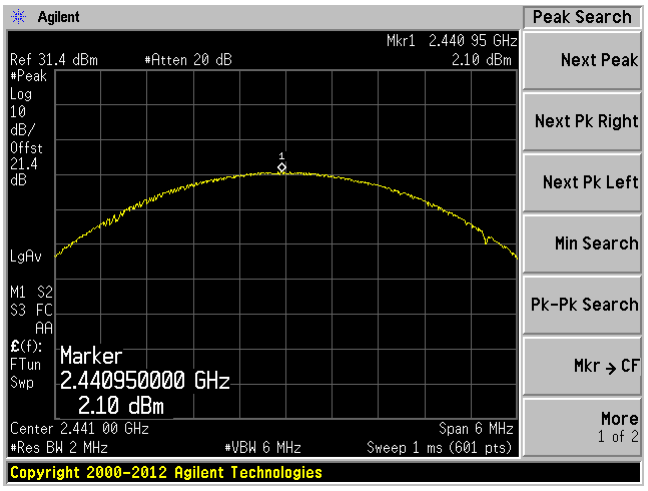


8DPSK

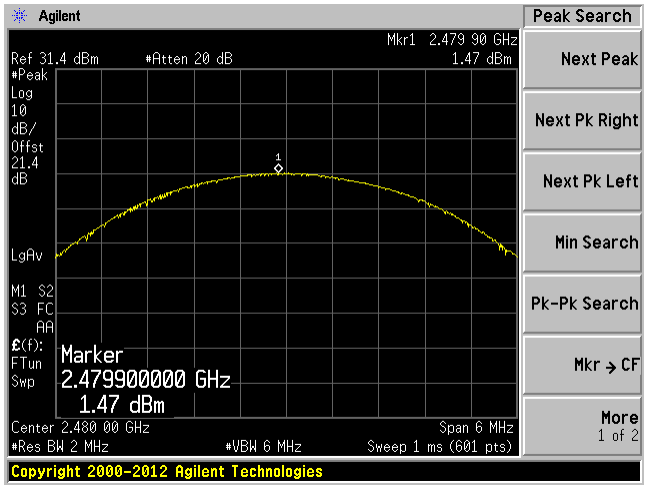
Low channel: 2402 MHz



Middle Channel: 2441 MHz



High Channel: 2480 MHz



10 FCC §15.247(d) & IC RSS-210§A8.5 - 100 kHz Bandwidth of Band Edges

10.1 Applicable Standard

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-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency 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 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 section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

10.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2013-10-16	1 year

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

10.4 Test Environmental Conditions

Temperature:	21° C
Relative Humidity:	29 %
ATM Pressure:	102.4 kPa

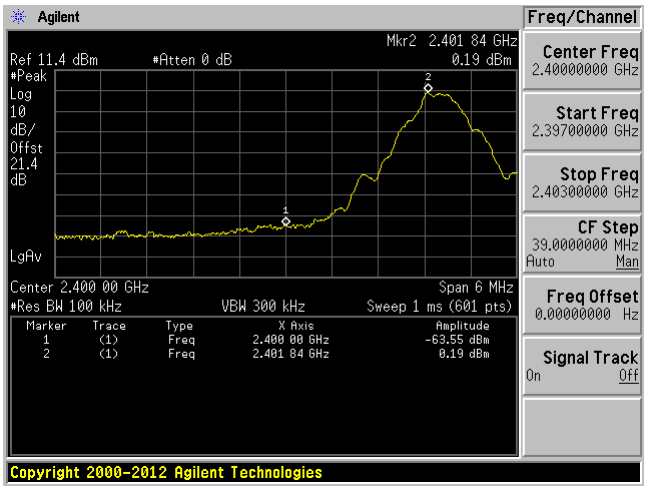
The testing was performed by Chen Ge on 2014-07-03 at RF test site.

10.5 Test Results

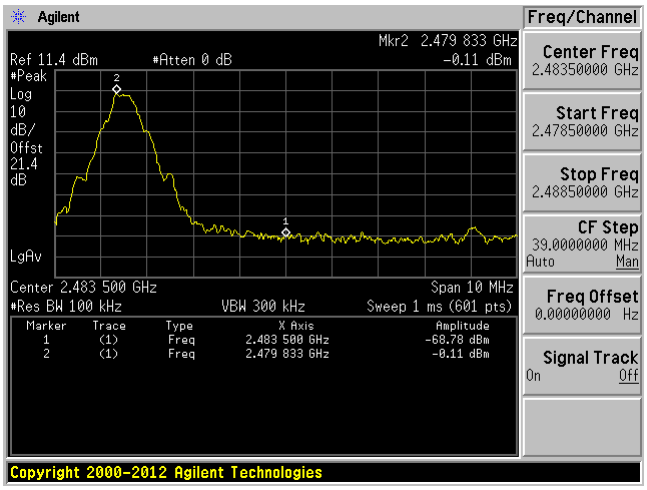
Please refer to following pages for plots of band edge.

GFSK

Low Band Edge

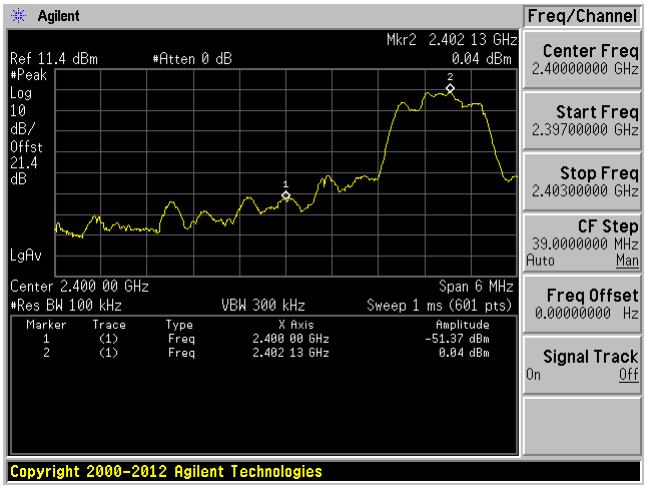


High Band Edge

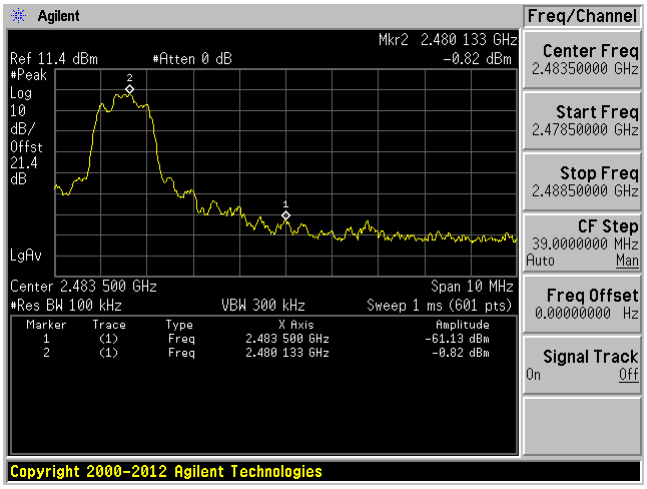


Π/4-DQPSK

Low Band Edge

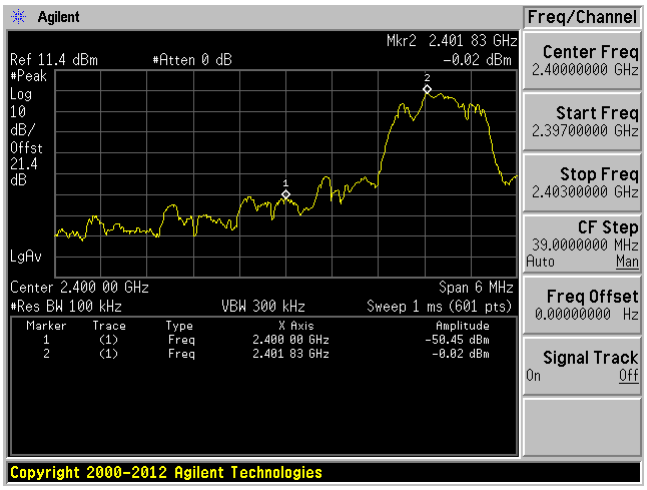


High Band Edge

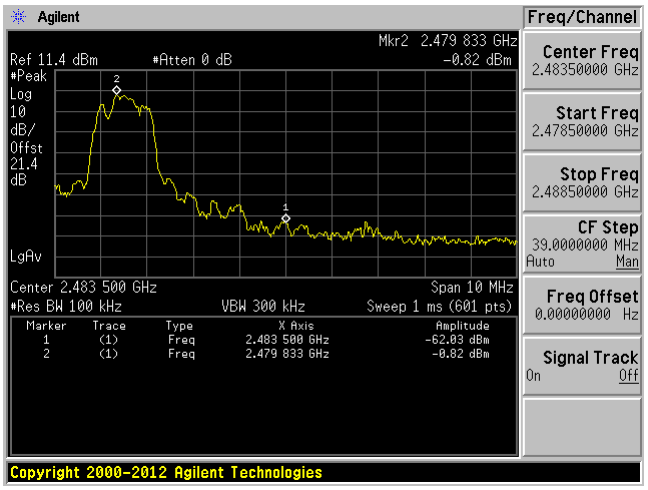


8DPSK

Low Band Edge



High Band Edge



11 FCC §15.247(a) & IC RSS-210 §A8.1 – Hopping Channel Bandwidth

11.1 Applicable Standard

According to FCC§15.247(a) (l) & RSS-210 §A8.1 (a), the maximum 20 dB bandwidth of the hopping channel shall be presented.

11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emissions bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

11.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2013-10-16	1 year

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

11.4 Test Environmental Conditions

Temperature:	21° C
Relative Humidity:	29 %
ATM Pressure:	102.4 kPa

The testing was performed by Chen Ge on 2014-07-03 at RF test site.

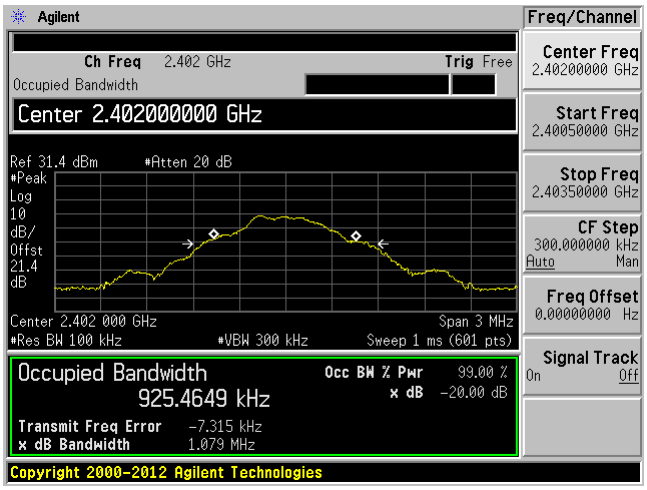
11.5 Test Results

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	20 dB Emission Bandwidth (kHz)
GFSK			
Low	2402	925.4649	1079
Middle	2441	929.6274	1074
High	2480	918.3714	1068
Π/4-DQPSK			
Low	2402	1164.1	1301
Middle	2441	1160.2	1271
High	2480	1170.0	1299
8DPSK			
Low	2402	1172.4	1291
Middle	2441	1172.2	1309
High	2480	1175.6	1309

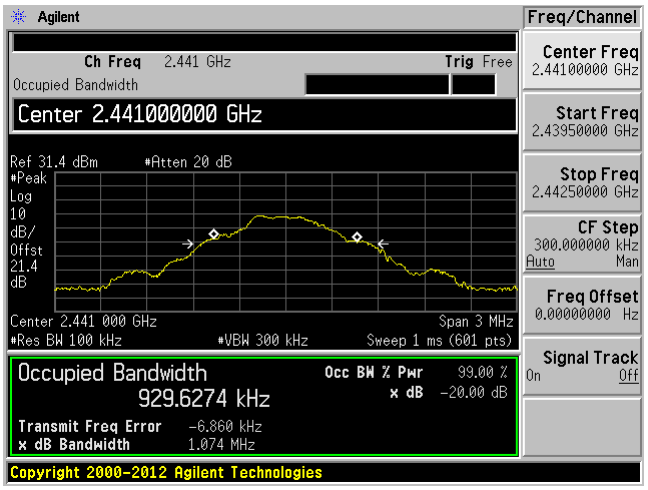
Please refer to the following plots.

GFSK

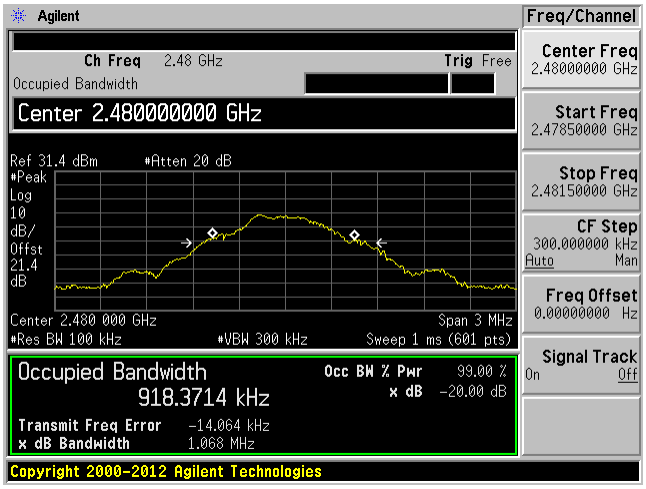
Low channel: 2402 MHz



Middle Channel: 2441 MHz

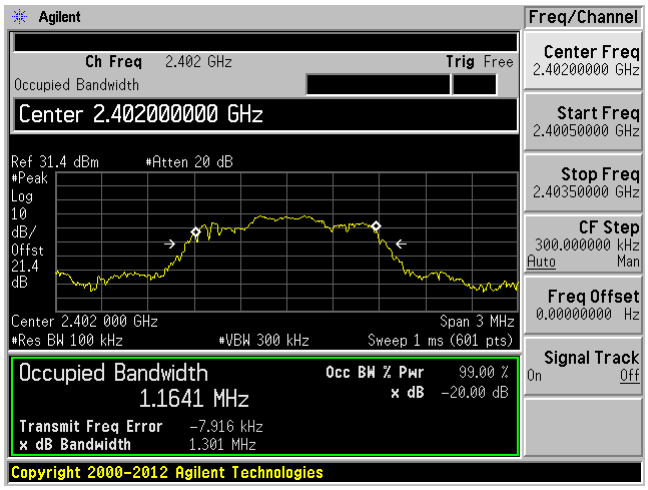


High Channel: 2480 MHz

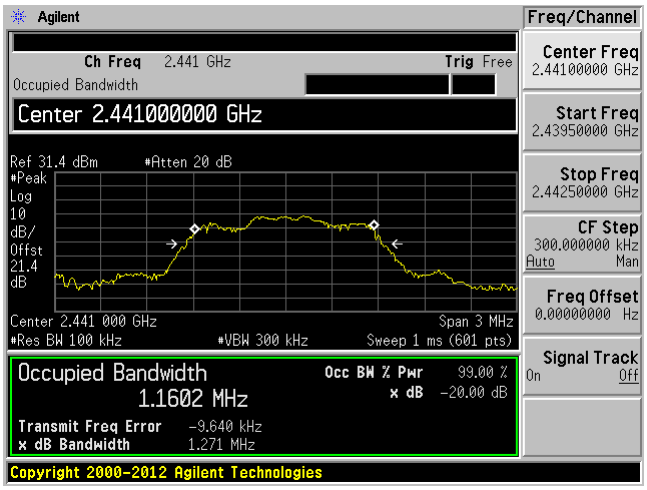


Π/4-DQPSK

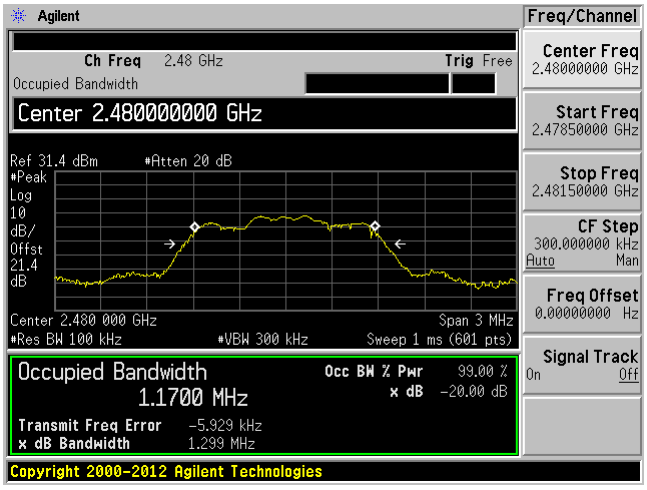
Low channel: 2402 MHz



Middle Channel: 2441 MHz

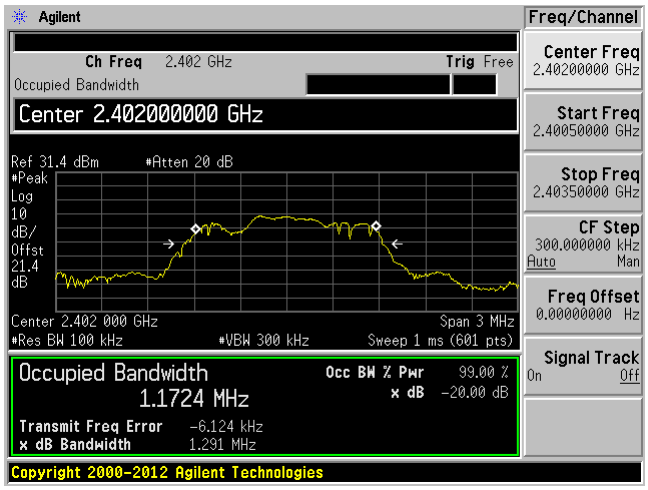


High Channel: 2480 MHz

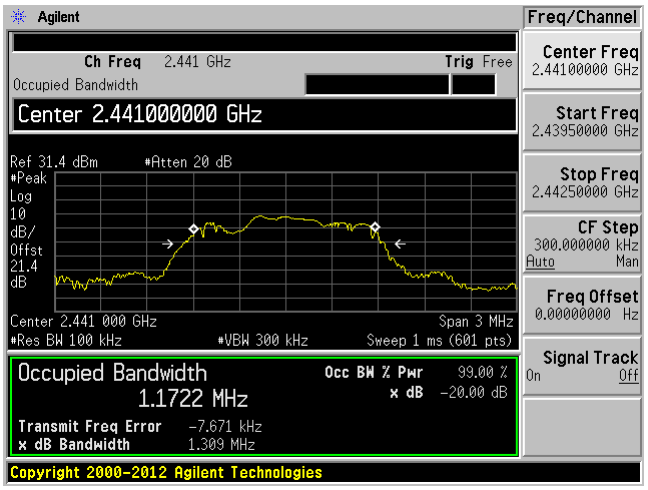


8DPSK

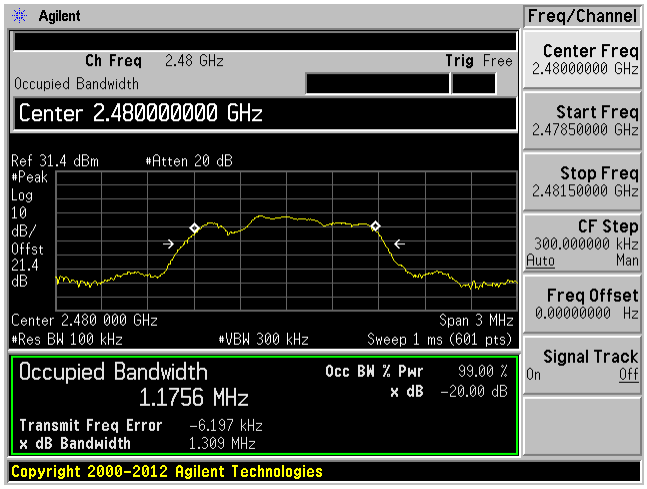
Low channel: 2402 MHz



Middle Channel: 2441 MHz



High Channel: 2480 MHz



12 FCC §15.247(a) & IC RSS-210 §A8.1 – Hopping Channel Separation

12.1 Applicable Standard

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 IC RSS-210 §A8.1(b)(1)Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB 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 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW. 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.

12.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on a bench without connection to measurement instrument Turn on the EUT and set it to any one convenient frequency within its operating range.
3. By using the Max-Hold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function, and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

12.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-10-16	1 year

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

12.4 Test Environmental Conditions

Temperature:	21° C
Relative Humidity:	29 %
ATM Pressure:	102.4 kPa

The testing was performed by Chen Ge on 2014-07-03 at RF test site.

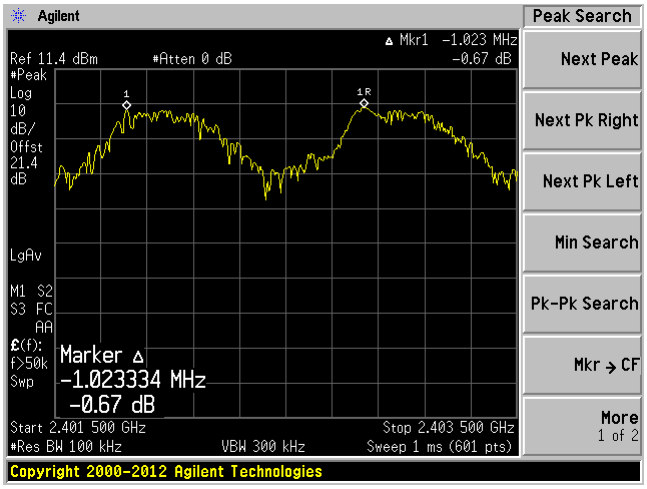
12.5 Test Results

Channel	Frequency (MHz)	Channel Separation (kHz)	Limit > 2/3 20 dB Bandwidth (kHz)
GFSK			
Low	2402	1023.3	719.3333
Middle	2441	1007.0	716
High	2480	997.0	712
Π/4-DQPSK			
Low	2402	1286.6	867.3333
Middle	2441	1027.0	847.3333
High	2480	1000.0	866
8DPSK			
Low	2402	996.6	860.6667
Middle	2441	1190.0	872.6667
High	2480	996.6	872.6667

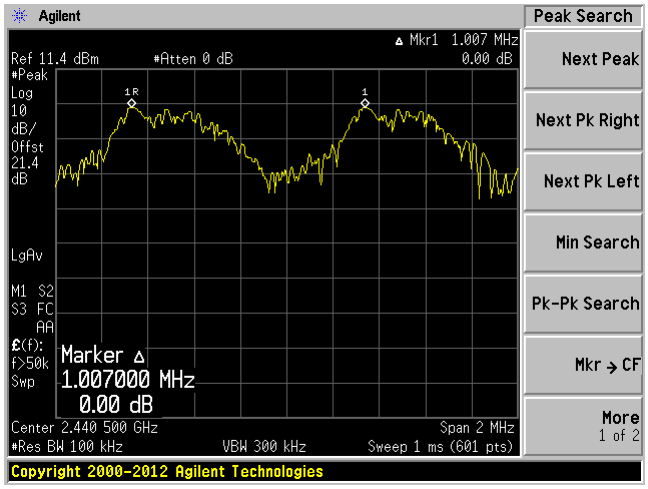
Please refer to the following plots.

GFSK

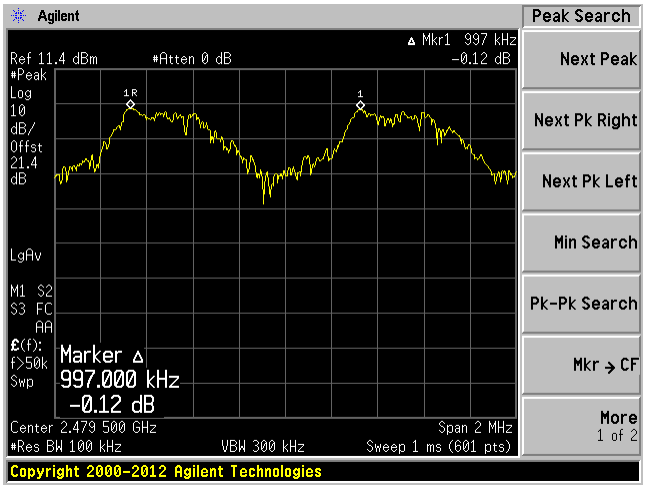
Low channel: 2402 MHz



Middle Channel: 2441 MHz

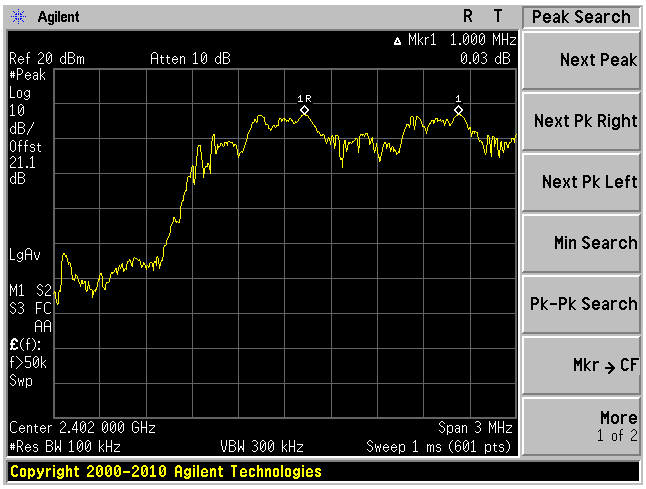


High Channel: 2480 MHz

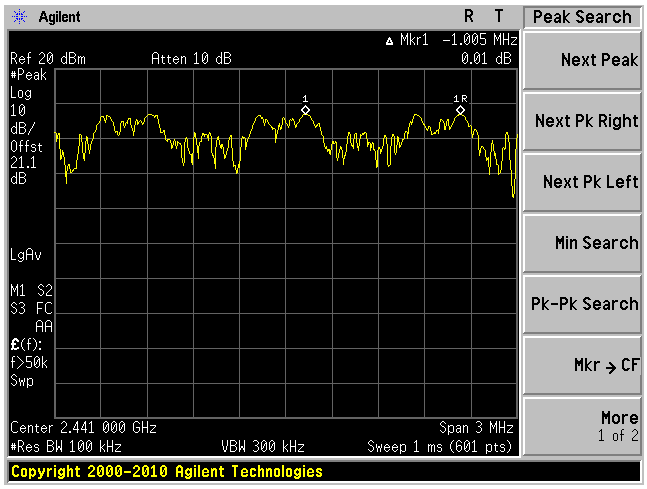


Π/4-DQPSK

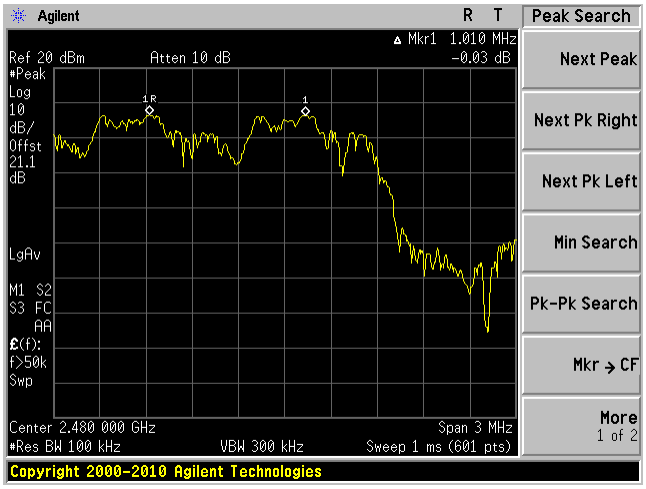
Low channel: 2402 MHz



Middle Channel: 2441 MHz

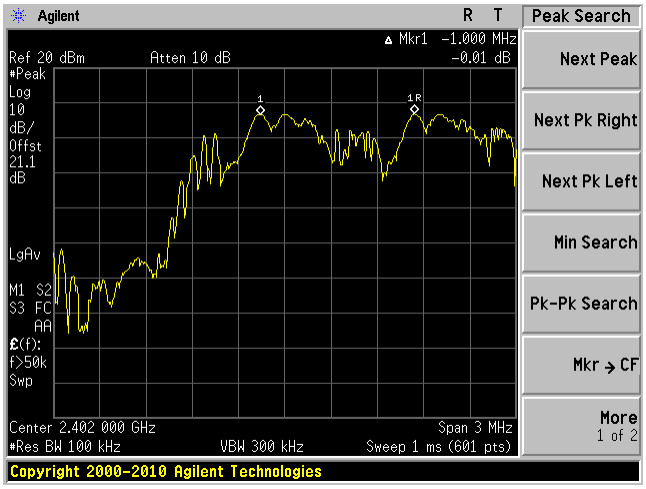


High Channel: 2480 MHz

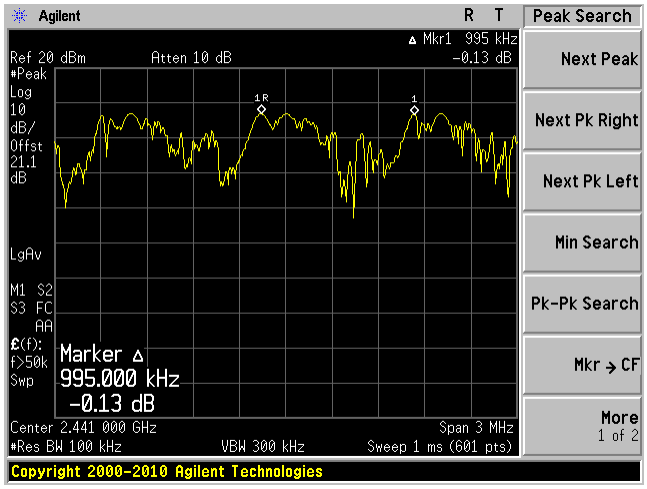


8DPSK

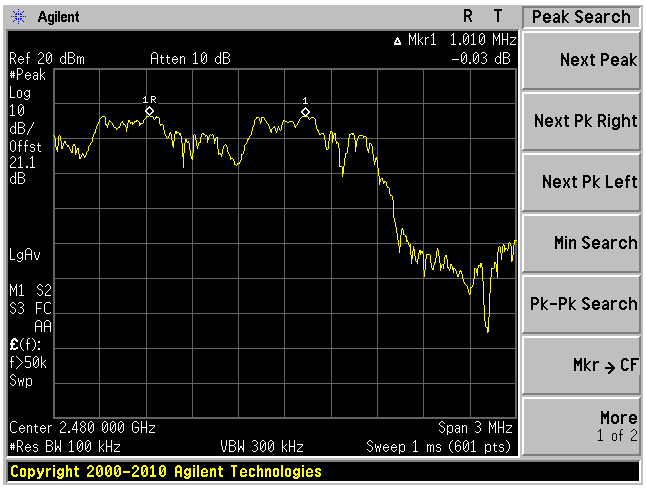
Low channel: 2402 MHz



Middle Channel: 2441 MHz



High Channel: 2480 MHz



13 FCC §15.247(a) & IC RSS-210 §A8.1 - Number of Hopping Channels

13.1 Applicable Standard

According to FCC §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

According to IC RSS-210 §A8.1 (d), 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

13.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the bench without connection to measurement instrument. Turn on the EUT and set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

13.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2013-10-16	1 year

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

13.4 Test Environmental Conditions

Temperature:	21° C
Relative Humidity:	29 %
ATM Pressure:	102.4 kPa

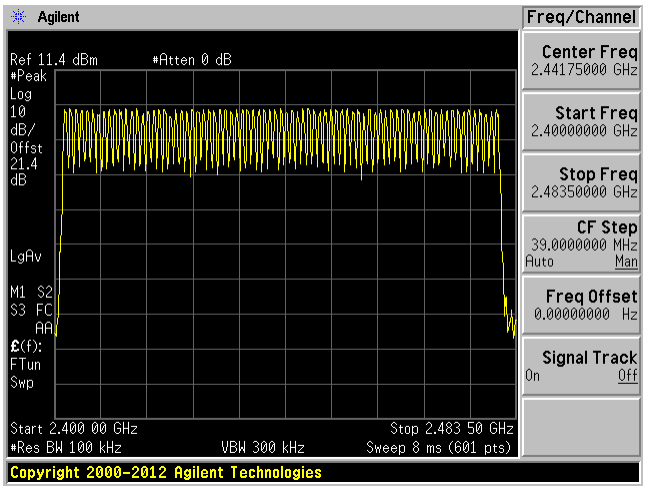
The testing was performed by Chen Ge on 2014-07-03 at RF test site.

13.5 Test Results

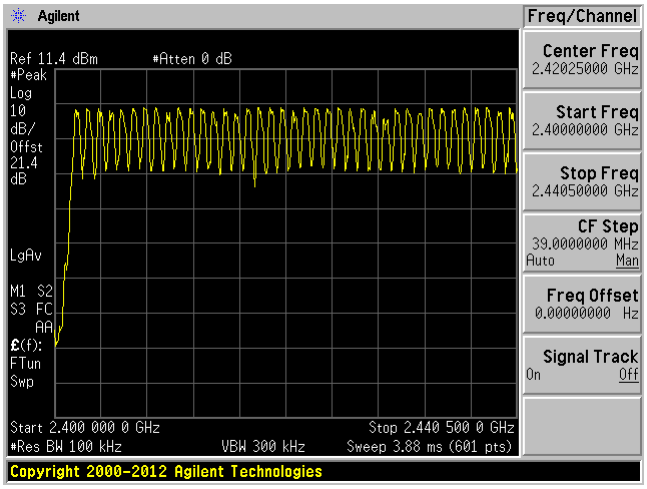
Total 79 channels; please refer to the plots hereinafter.

GFSK

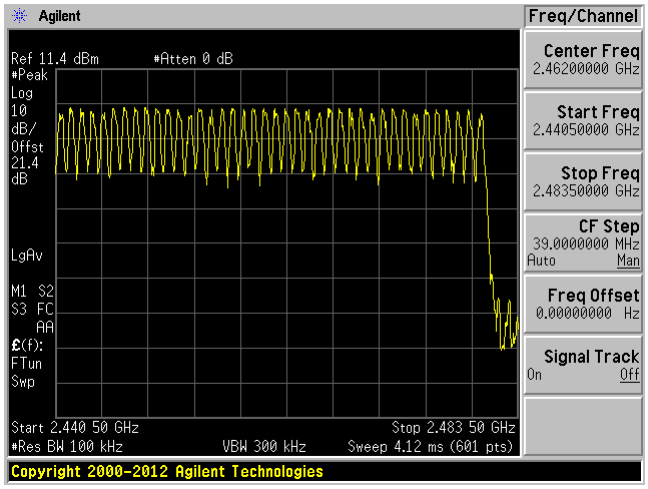
Hopping Channel Number: Total 79 Channels



39 Channels between 2400 to 2440.5 MHz

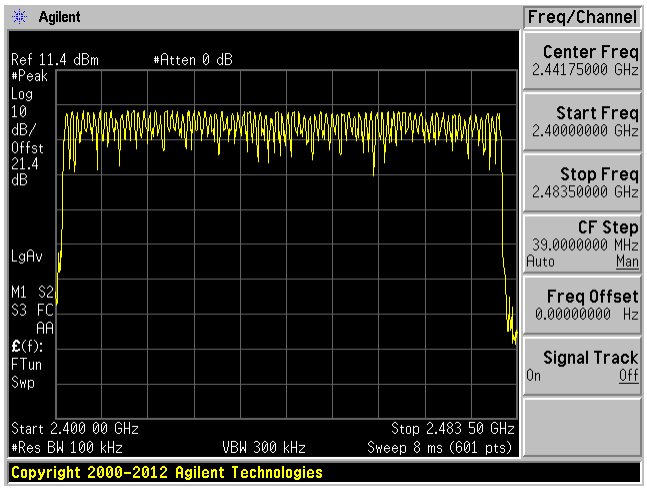


40 Channels between 2440.5 to 2483.5 MHz

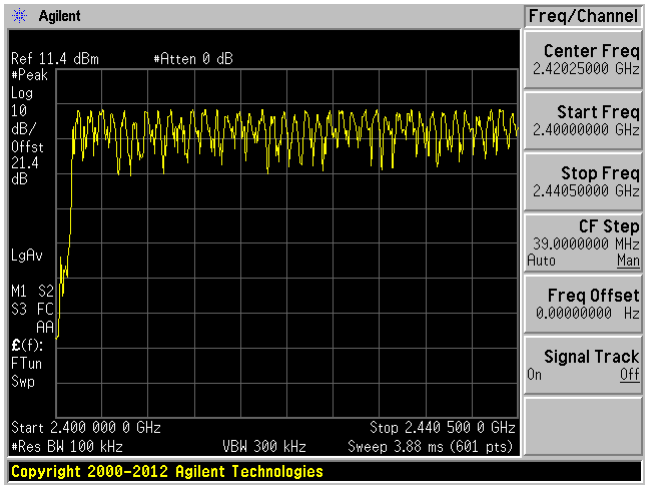


Π/4-DQPSK

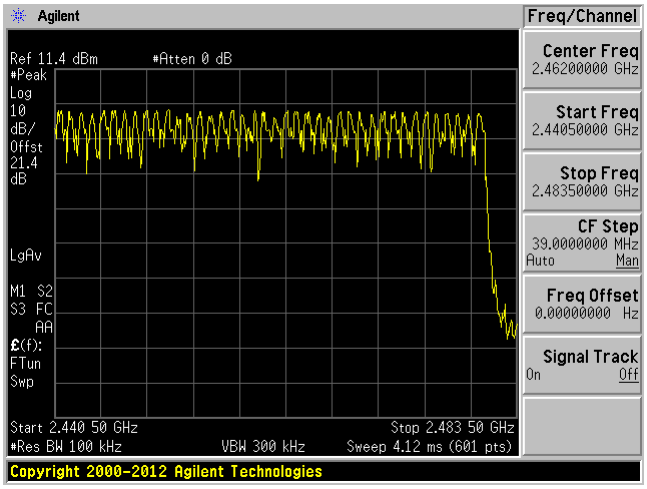
Hopping Channel Number: Total 79 Channels



39 Channels between 2400 to 2440.5 MHz

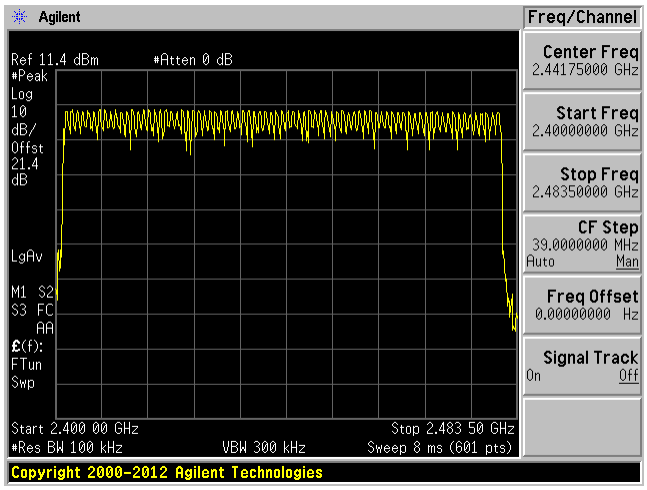


40 Channels between 2440.5 to 2483.5 MHz

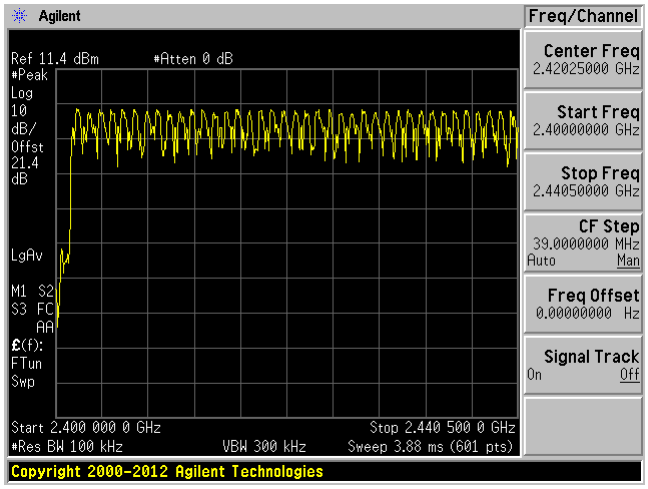


8DPSK

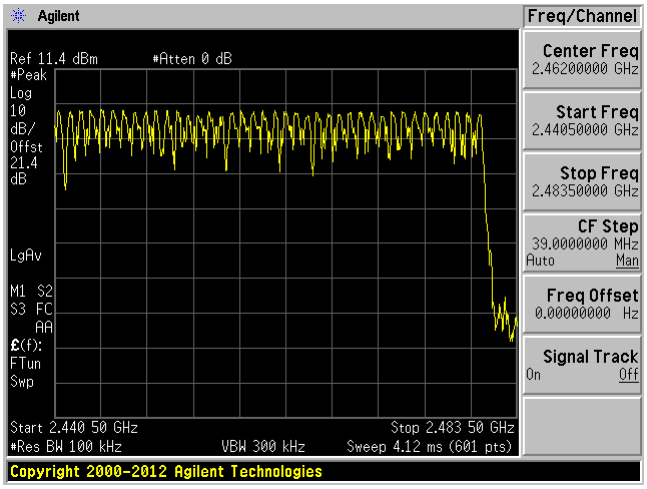
Hopping Channel Number: Total 79 Channels



39 Channels between 2400 to 2440.5 MHz



40 Channels between 2440.5 to 2483.5 MHz



14 FCC §15.247(a) & IC RSS-210 §A8.1 - Dwell Time

14.1 Applicable Standard

According to FCC §15.247 (a)(1)(iii), 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.

According to IC RSS-210 §A8.1 (d) ,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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

14.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

14.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2013-10-16	1 year

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

14.4 Test Environmental Conditions

Temperature:	21° C
Relative Humidity:	29 %
ATM Pressure:	102.4 kPa

The testing was performed by Chen Ge on 2014-07-03 at RF test site.

14.5 Test Results

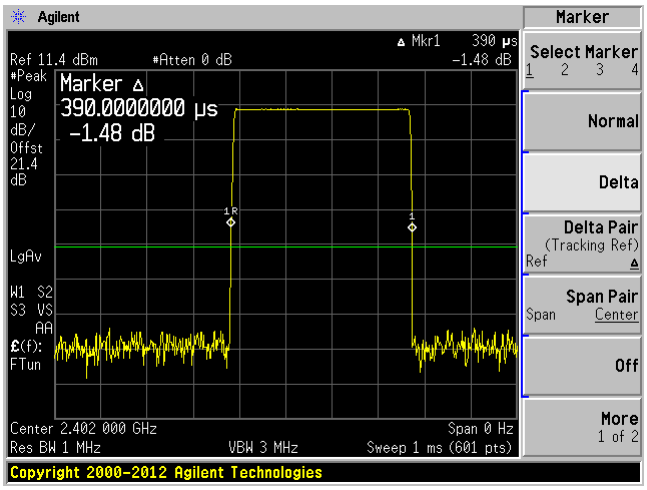
Channel	Pulse Width (ms)	Dwell time (sec)	Limit (sec)	Results
GFSK, DH1: Packet Size = 27 byte				
Low	0.39	0.12	0.4	Pass
Mid	0.39	0.12	0.4	Pass
High	0.39	0.12	0.4	Pass
GFSK, DH3: Packet Size = 183 bytes				
Low	1.645	0.26	0.4	Pass
Mid	1.65	0.26	0.4	Pass
High	1.65	0.26	0.4	Pass
GFSK, DH5: Packet Size = 339 bytes				
Low	2.22	0.24	0.4	Pass
Mid	2.22	0.24	0.4	Pass
High	2.22	0.24	0.4	Pass
Π/4-DQPSK, DH1: Packet Size = 27 byte				
Low	0.39	0.12	0.4	Pass
Mid	0.39	0.12	0.4	Pass
High	0.39	0.12	0.4	Pass
Π/4-DQPSK, DH3: Packet Size = 183 bytes				
Low	1.197	0.19	0.4	Pass
Mid	1.197	0.19	0.4	Pass
High	1.197	0.19	0.4	Pass
Π/4-DQPSK, DH5: Packet Size = 339 bytes				
Low	1.196	0.13	0.4	Pass
Mid	1.196	0.13	0.4	Pass
High	1.196	0.13	0.4	Pass
8DPSK, DH1: Packet Size = 27 byte				
Low	0.39	0.12	0.4	Pass
Mid	0.39	0.12	0.4	Pass
High	0.39	0.12	0.4	Pass
8DPSK, DH3: Packet Size = 183 bytes				
Low	1.64	0.26	0.4	Pass
Mid	1.64	0.26	0.4	Pass
High	1.64	0.26	0.4	Pass
8DPSK, DH5: Packet Size = 339 bytes				
Low	0.85	0.09	0.4	Pass
Mid	0.85	0.09	0.4	Pass
High	0.85	0.09	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

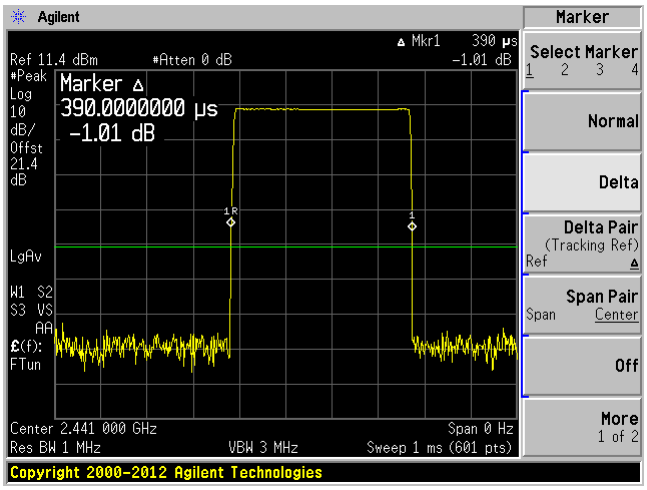
Please refer to following plots.

GFSK – DH1

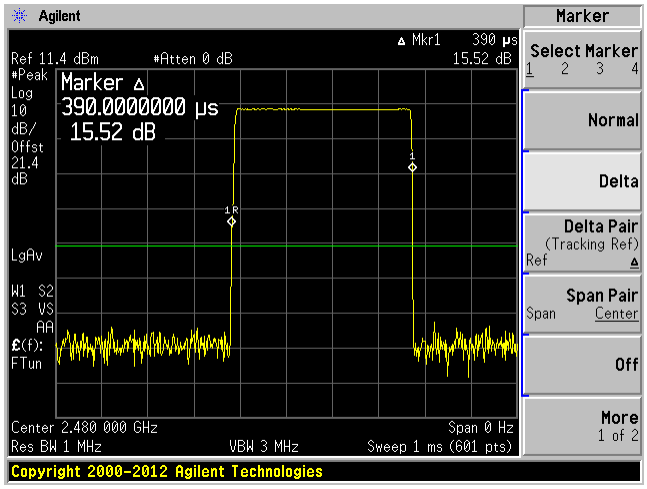
Low channel: 2402 MHz



Middle Channel: 2441 MHz

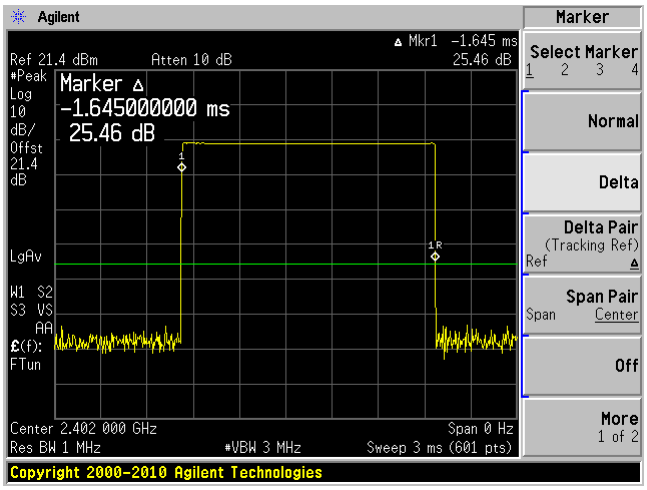


High Channel: 2480 MHz

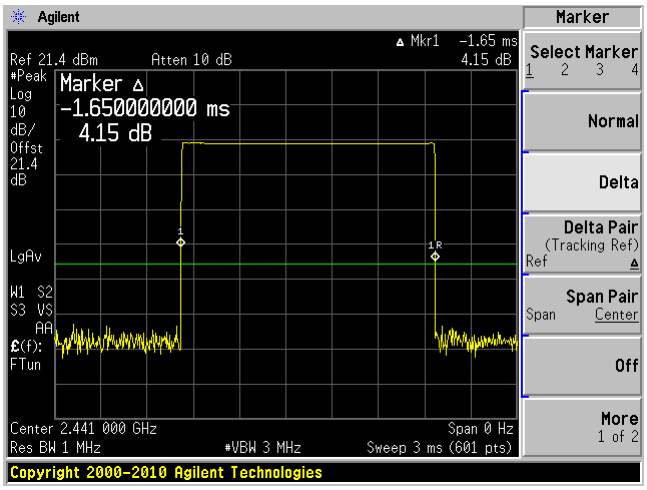


GFSK – DH3

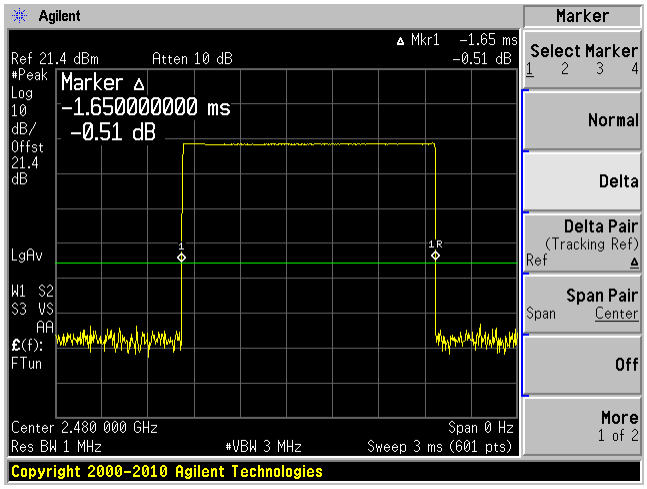
Low channel: 2402 MHz



Middle Channel: 2441 MHz

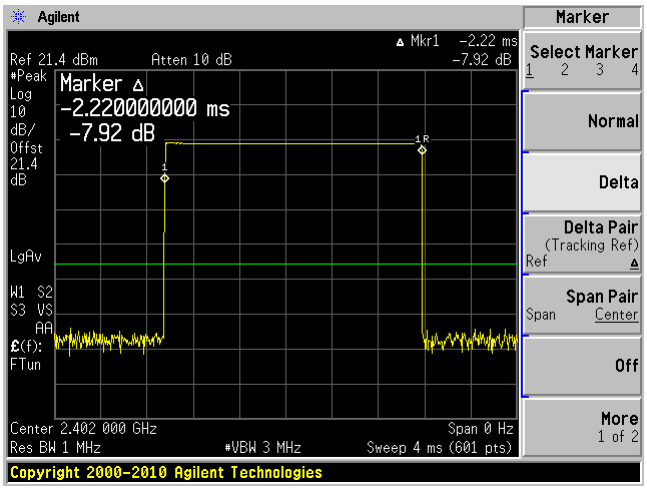


High Channel: 2480 MHz

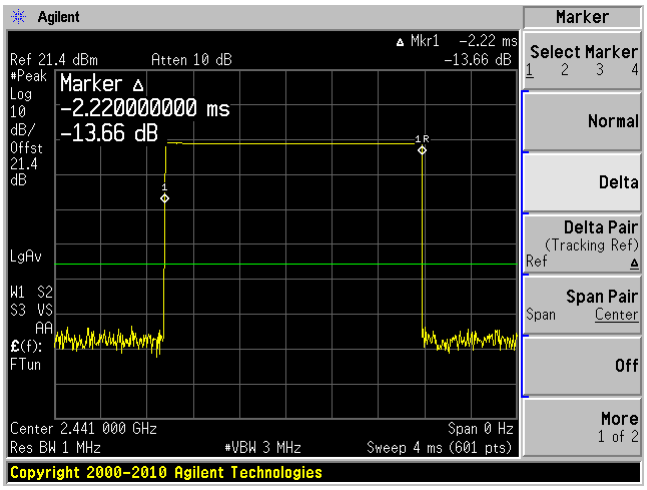


GFSK – DH5

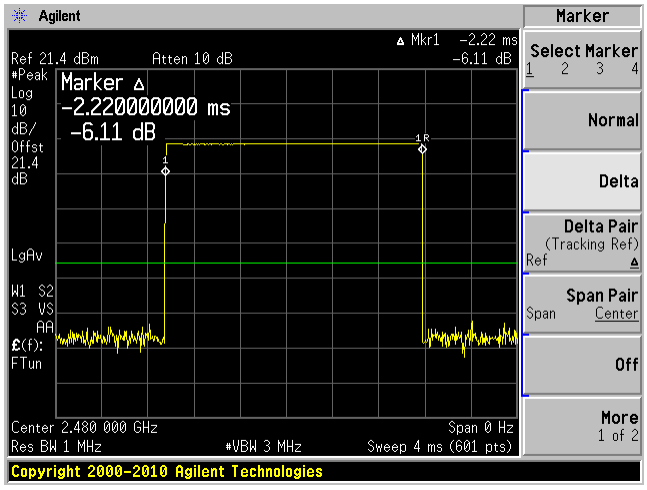
Low channel: 2402 MHz



Middle Channel: 2441 MHz

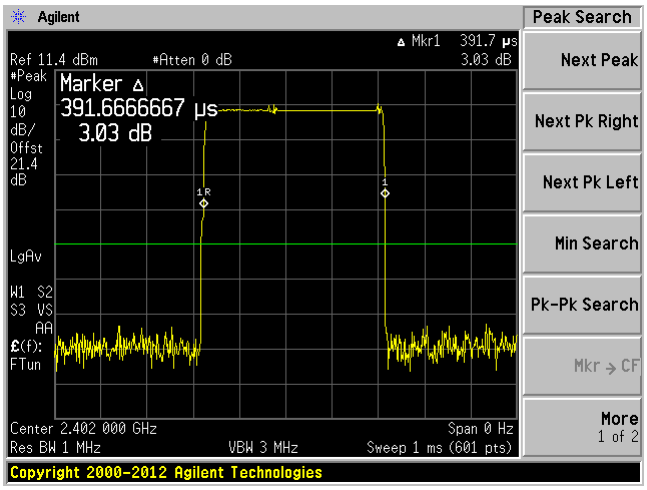


High Channel: 2480 MHz

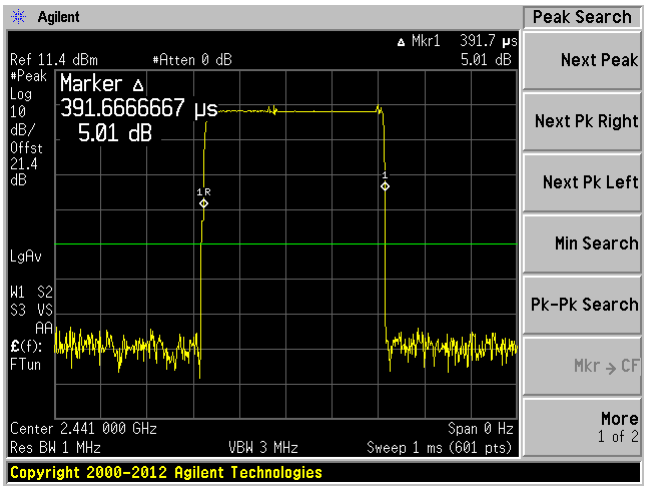


Π/4-DQPSK – DH1

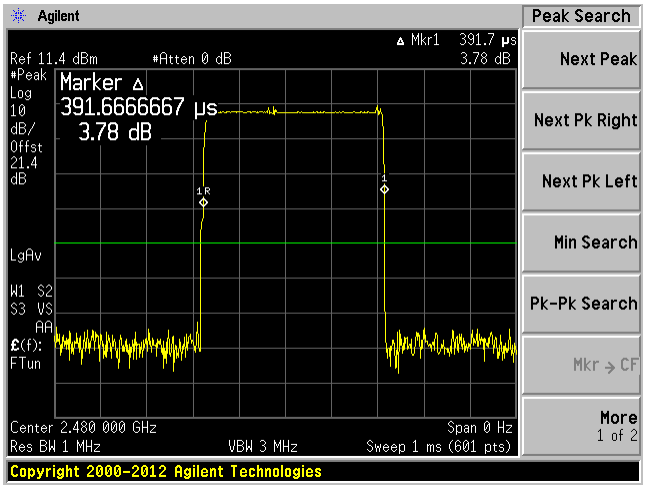
Low channel: 2402 MHz



Middle Channel: 2441 MHz

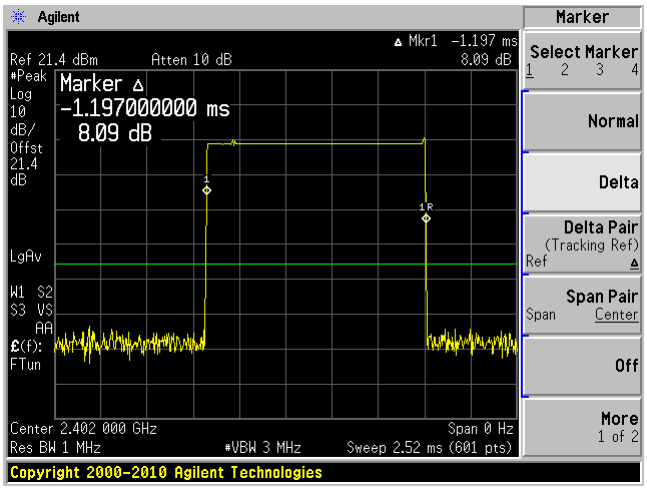


High Channel: 2480 MHz

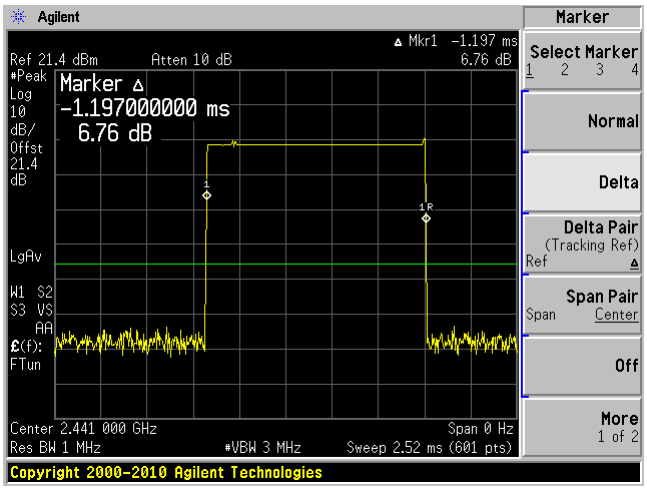


Π/4-DQPSK – DH3

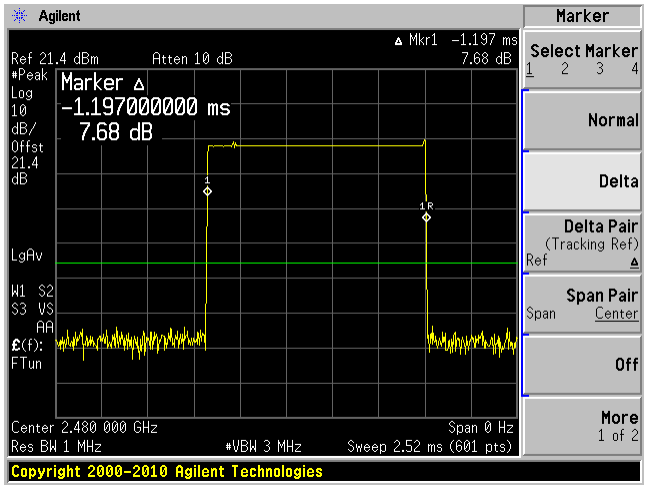
Low channel: 2402 MHz



Middle Channel: 2441 MHz

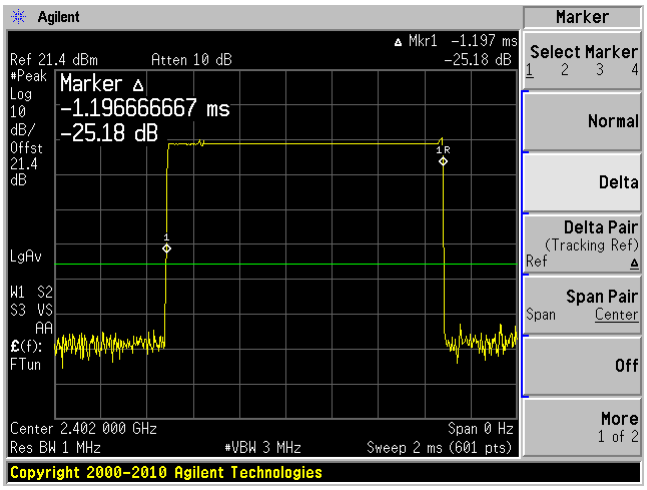


High Channel: 2480 MHz

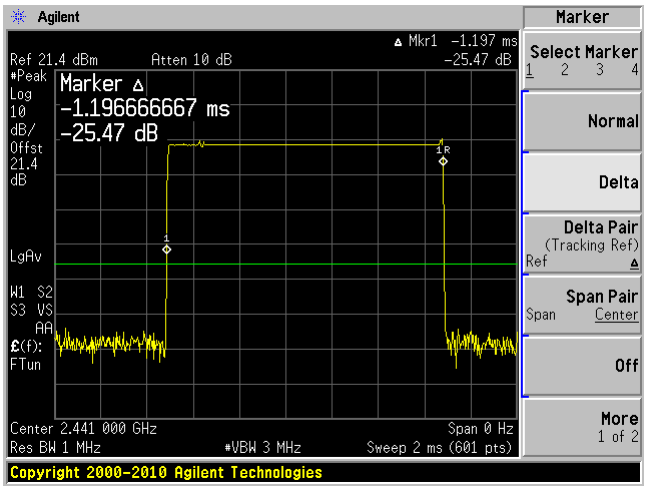


Π/4-DQPSK – DH5

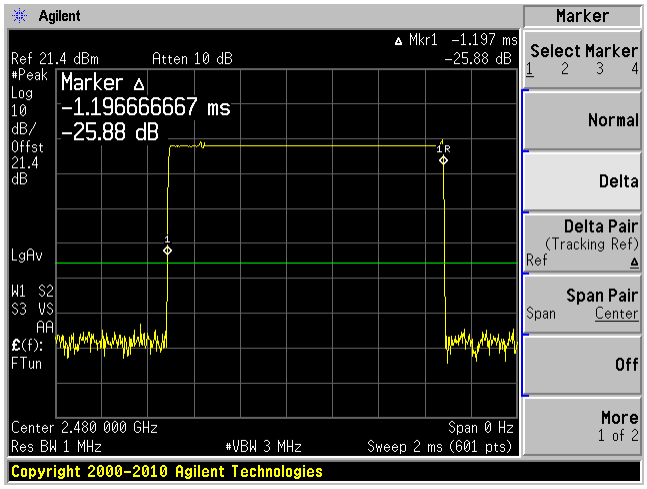
Low channel: 2402 MHz



Middle Channel: 2441 MHz

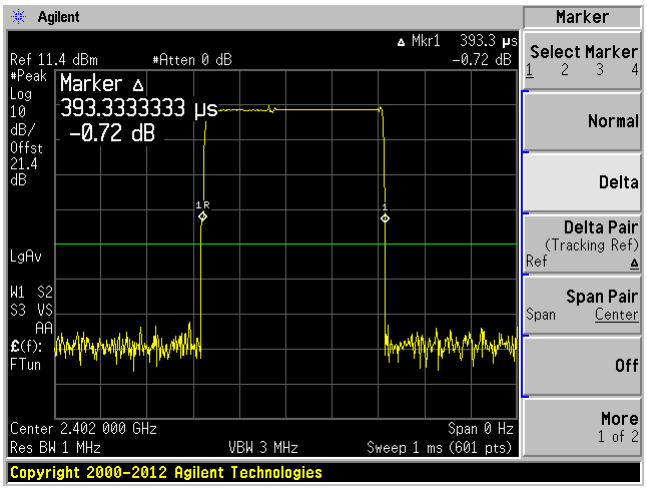


High Channel: 2480 MHz

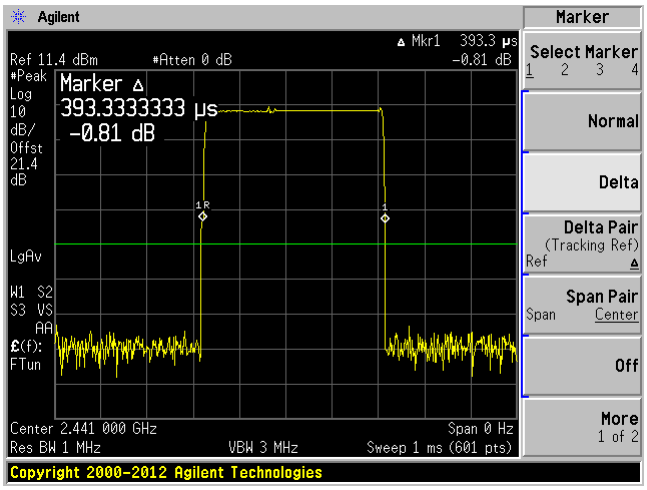


8DPSK – DH1

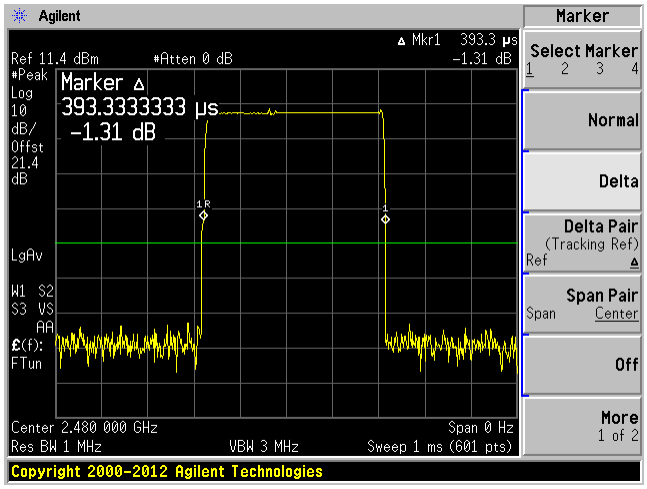
Low channel: 2402 MHz



Middle Channel: 2441 MHz

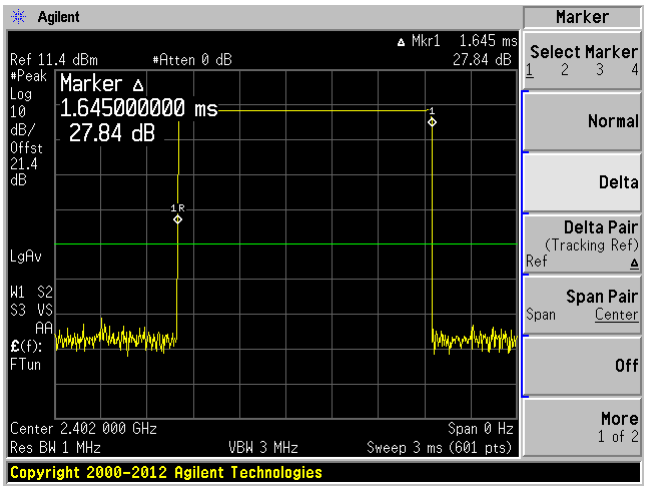


High Channel: 2480 MHz

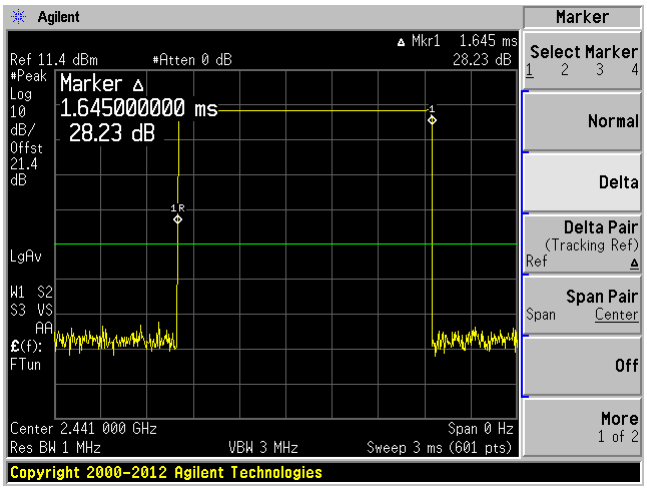


8DPSK – DH3

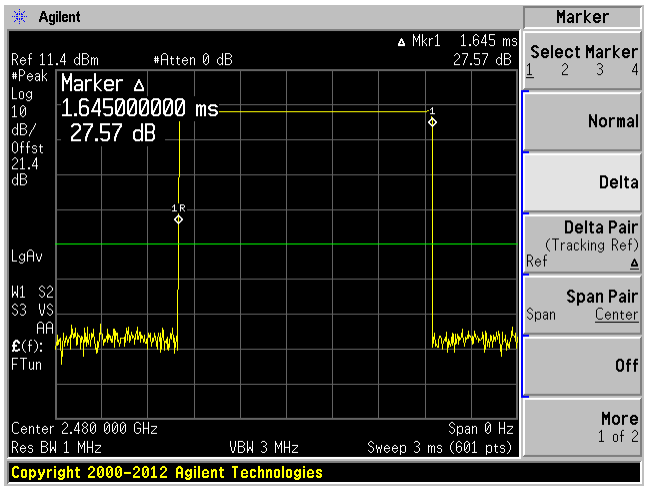
Low channel: 2402 MHz



Middle Channel: 2441 MHz

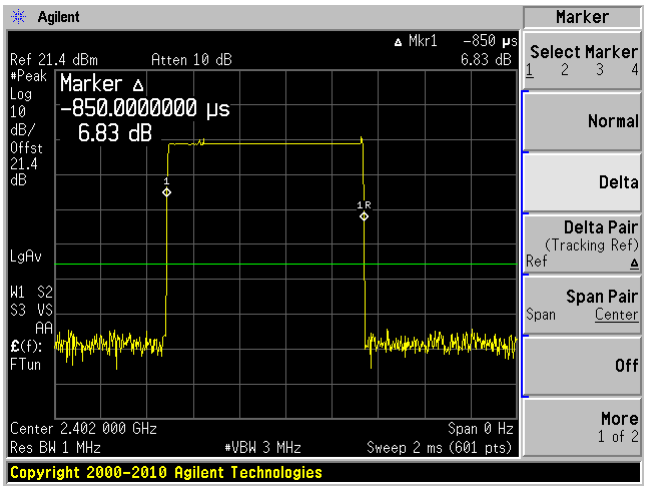


High Channel: 2480 MHz

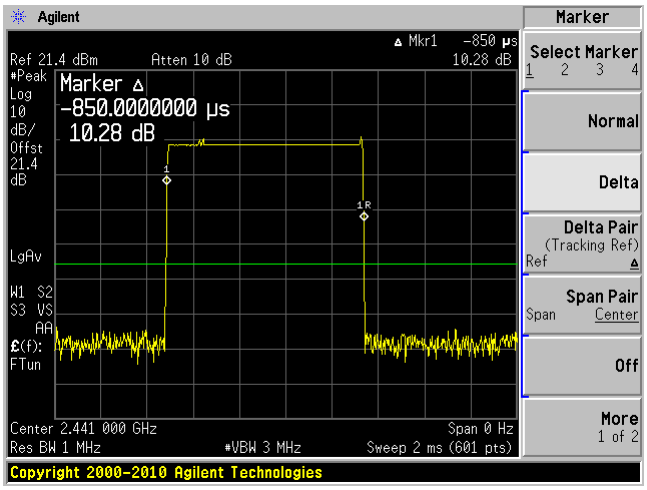


8DPSK – DH5

Low channel: 2402 MHz



Middle Channel: 2441 MHz



High Channel: 2480 MHz