

FCC PART 15.247

TEST REPORT

For

ITALCOM GROUP

1728 Coral Way , Coral Gables , Miami , Florida , United States

FCC ID: YPVITALCOMKAMEO

Report Type: Original Report	Product Type: Mobile Phone
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Report Number: <u>RSZ120418002-00B</u>	
Report Date: <u>2012-05-31</u>	
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* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *ITALCOM GROUP*'s product, model number: *Kameo* (FCC ID: *YPVITALCOMKAMEO* (the "EUT")) in this report was a *Mobile Phone*, which was measured approximately: 11.3cm (L) x 6.5cm (W) x 1.5cm (H), rated input voltage: DC 3.7V Lithium battery or DC 5.0V from adapter for charging.

Adapter Information:

MODEL NO:Komeo

ENTRADA: 100-240Vca, 50/60 Hz, 0.15A

SALIDA: DC5Vcc, 500mA

Frequency Range:

GSM850: 824-849 MHz (Tx), 869-894 MHz (Rx)

PCS 1900: 1850-1910 MHz (Tx), 1930-1990 MHz (Rx)

Wifi:2412-2462MHz

Bluetooth:2402-2480MHz

Modulation Mode: GMSK (Cellular/PCS);

DSSS,OFDM(Wifi)

GFSK,8-DPSK, $\pi/4$ -DQPSK(Bluetooth)

Transmitter Output Power:

GSM: 32.8dBm (ERP)

PCS: 29.9dBm (EIRP)

BT: 5.16dBm (conducted)

Wi-Fi: 802.11b: 17.48 dBm (conducted), 802.11g: 14.96dBm (conducted)

802.11n ht 20:14.63 dBm(conducted), 802.11n ht40: 12.87dBm (conducted)

** All measurement and test data in this report was gathered from production sample serial number: 1204041 (Assigned by BACL, Shenzhen). The EUT was received on 2012-04-23.*

Objective

This report is prepared on behalf of *ITALCOM GROUP* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine the compliance of EUT with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 22H&24E PCE submissions with FCC ID: YPVITALCOMKAMEO.

FCC Part 15B JBP submissions with FCC ID: YPVITALCOMKAMEO.

FCC Part 15C DSS submissions with FCC ID: YPVITALCOMKAMEO for Wifi.

Test Methodology

All measurements contained in this report were conducted 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.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ± 0.96 dB, the uncertainty of any radiation on emissions measurement is ± 4.0 dB

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). 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 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which is provided by manufacturer.

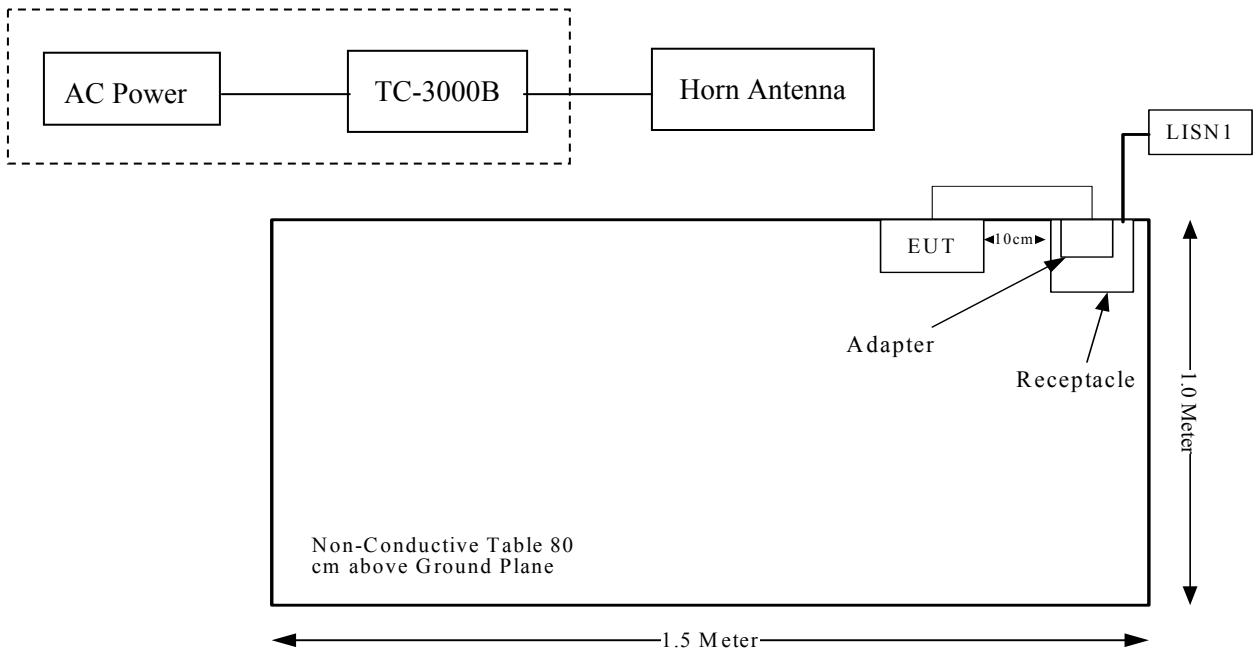
Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
TESCOM	Bluetooth Tester	TC-3000B	3000B650083

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 15.247 (i), § 2.1093	RF Exposure	Compliance
§ 15.203	Antenna Requirement	Compliance
§ 15.207 (a)	Conducted Emissions	Compliance
§ 15.205, § 15.209, § 15.247(d)	Radiated Emissions	Compliance
§ 15.247 (a)(1)	20 dB Bandwidth	Compliance
§ 15.247(a)(1)	Channel Separation Test	Compliance
§ 15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§ 15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§ 15.247(b)(1)	Peak Output Power Measurement	Compliance
§ 15.247(d)	Band Edges	Compliance

FCC §15.247 (I) AND §2.1093 – RF EXPOSURE

Applicable Standard

According to §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.

Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	SAR not required: <u>Unlicensed only</u> <ul style="list-style-type: none"> when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas <u>Licensed & Unlicensed</u> <ul style="list-style-type: none"> when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: <u>Licensed & Unlicensed</u> antenna pairs with SAR to peak location separation ratio ≥ 0.3 ; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	<p><u>When there is no simultaneous transmission –</u></p> <ul style="list-style-type: none"> output ≤ 60 f: SAR not required output > 60 f: stand-alone SAR required <p><u>When there is simultaneous transmission –</u></p> <p><u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> output $\leq 2 \cdot P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas output $\leq P_{Ref}$ and antenna is ≥ 2.5 cm from other antennas output $\leq P_{Ref}$ and antenna is < 2.5 cm from other antennas, each with either output power $\leq P_{Ref}$ or 1-g SAR < 1.2 W/kg <p><u>Otherwise stand-alone SAR is required</u></p> <p><u>When stand-alone SAR is required</u></p> <ul style="list-style-type: none"> test SAR on highest output channel for each wireless mode and exposure condition if SAR for highest output channel is $> 50\%$ of SAR limit, evaluate all channels according to normal procedures 	
Jaw, Mouth and Nose	<p><u>Flat phantom SAR required</u></p> <ul style="list-style-type: none"> when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations 	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

- 1) Bluetooth can transmit simultaneously with Wi-Fi and GSM.
- 2) The distance between BT and GSM antenna is $4.5\text{cm} > 2.5\text{cm}$. The max output power of Bluetooth antenna is $(6.94\text{dBm}) 4.94\text{mW} < P_{\text{Ref}}(12\text{mW})$. According to KDB648474, stand-alone SAR is not required for BT antenna and simultaneous SAR evaluation is not required for Bluetooth and GSM antennas.
- 3) The distance between BT and Wifi antenna is 2.0cm . The max output power of Bluetooth antenna is $(6.94\text{dBm}) 4.94\text{mW} < P_{\text{Ref}}(12\text{mW})$, and the wifi 1-g SAR $< 1.2\text{W/kg}$. According to KDB648474, stand-alone SAR is not required for BT antenna and simultaneous SAR evaluation is not required for Bluetooth and Wifi antennas.
- 4) P_{Ref} is defined as the maximum conducted power available at the antenna according to source-based time-averaging requirements of Section 2.1093(d) (5).

Result: Compliance

FCC §15.203 - ANTENNA REQUIREMENT

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.

Antenna Connector Construction

The EUT has a monopole antenna mounted on the print circuit board, which complied with 15.203, the maximum gain is -2.0dBi, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

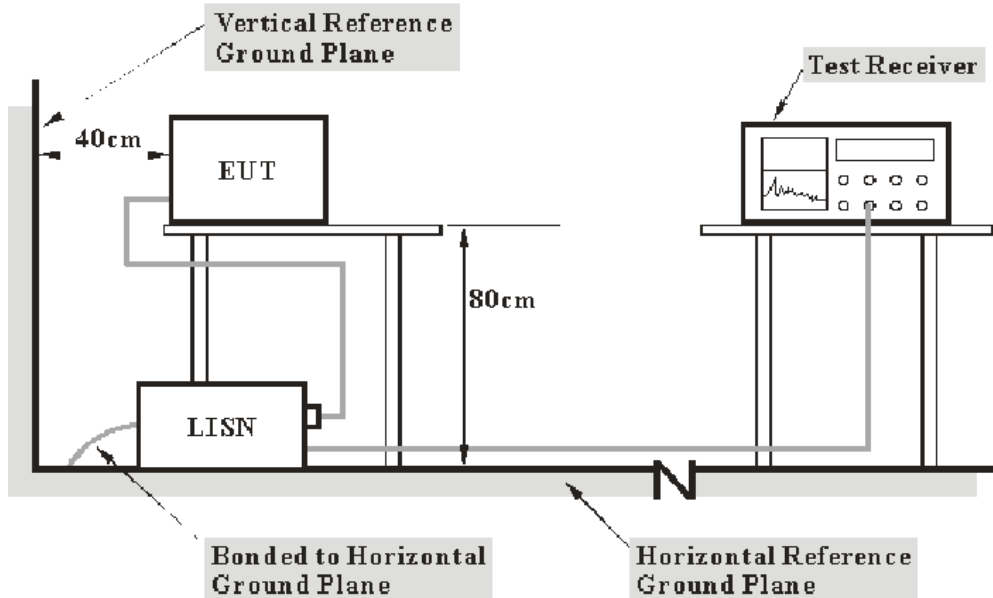
FCC §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB(k=2, 95% level of confidence).

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>IF BW</i>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	101122	2011-11-17	2012-11-16
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

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

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

18.84 dB at 27.120 MHz in the Line conducted mode

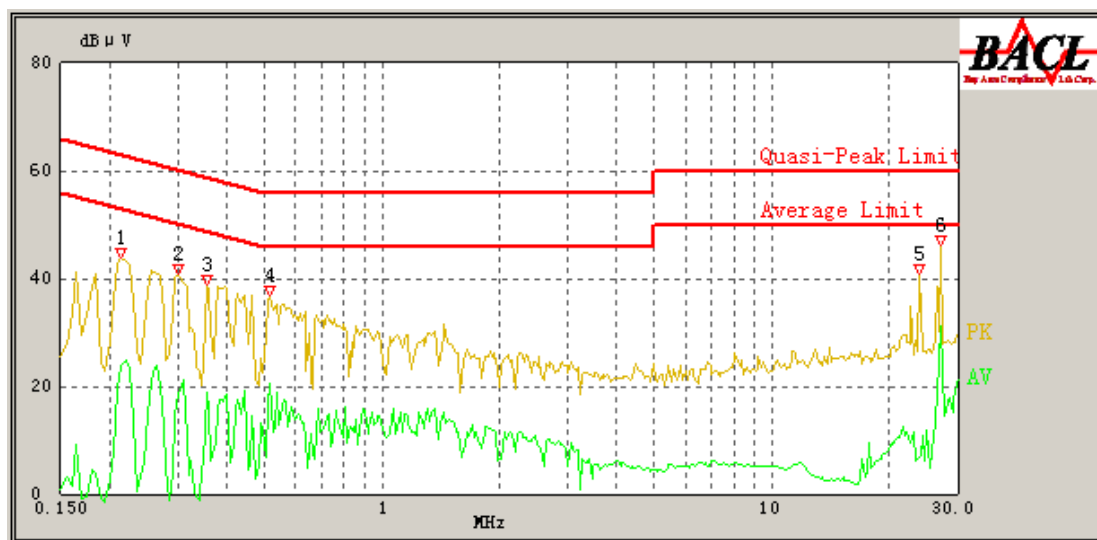
Test Data

Environmental Conditions

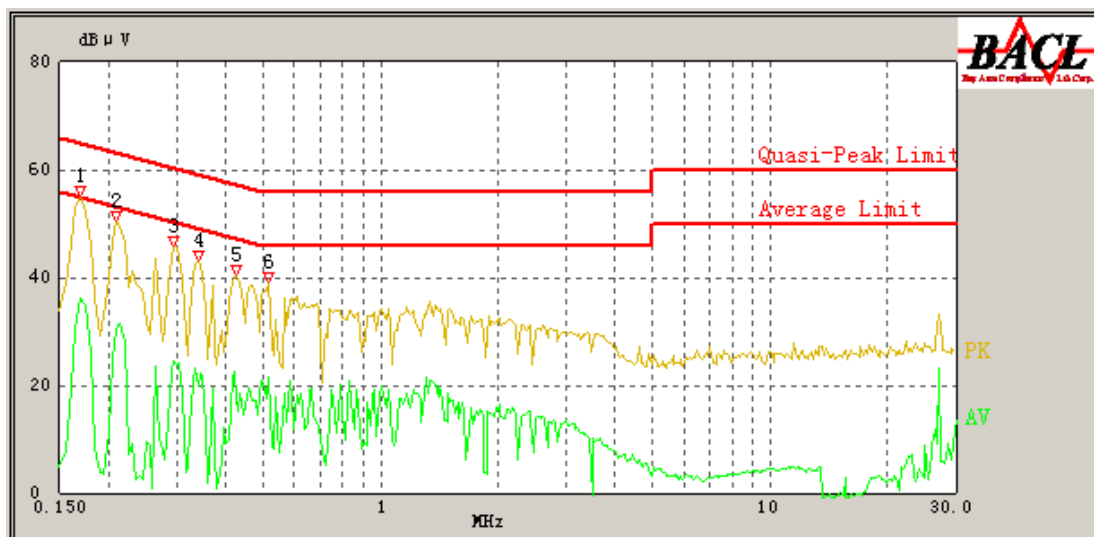
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

* The testing was performed by Dean Liu on 2012-05-03.

Test Mode: Transmitting



Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
27.120	31.16	2.21	50.00	18.84	AV
0.515	20.34	0.42	46.00	25.66	AV
0.215	23.79	0.42	54.14	30.35	AV
0.355	18.92	0.42	50.14	31.22	AV
0.300	18.68	0.42	51.71	33.03	AV
0.515	22.46	0.42	56.00	33.54	QP
0.215	26.62	0.42	64.14	37.52	QP
24.045	7.29	2.32	50.00	42.71	AV
27.270	15.63	2.20	60.00	44.37	QP
24.010	14.58	2.31	60.00	45.42	QP
0.355	13.80	0.42	60.14	46.34	QP
0.300	14.17	0.42	61.71	47.54	QP

120V, 60 Hz, Neutral:

Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.170	36.20	0.41	55.43	19.23	AV
0.210	30.03	0.42	54.29	24.26	AV
0.515	21.49	0.42	46.00	24.51	AV
0.295	24.60	0.42	51.86	27.26	AV
0.425	17.74	0.42	48.14	30.40	AV
0.340	19.93	0.42	50.57	30.64	AV
0.515	25.07	0.42	56.00	30.93	QP
0.425	21.12	0.42	58.14	37.02	QP
0.210	27.03	0.42	64.29	37.26	QP
0.170	22.70	0.41	65.43	42.73	QP
0.340	16.92	0.42	60.57	43.65	QP
0.295	17.58	0.42	61.86	44.28	QP

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

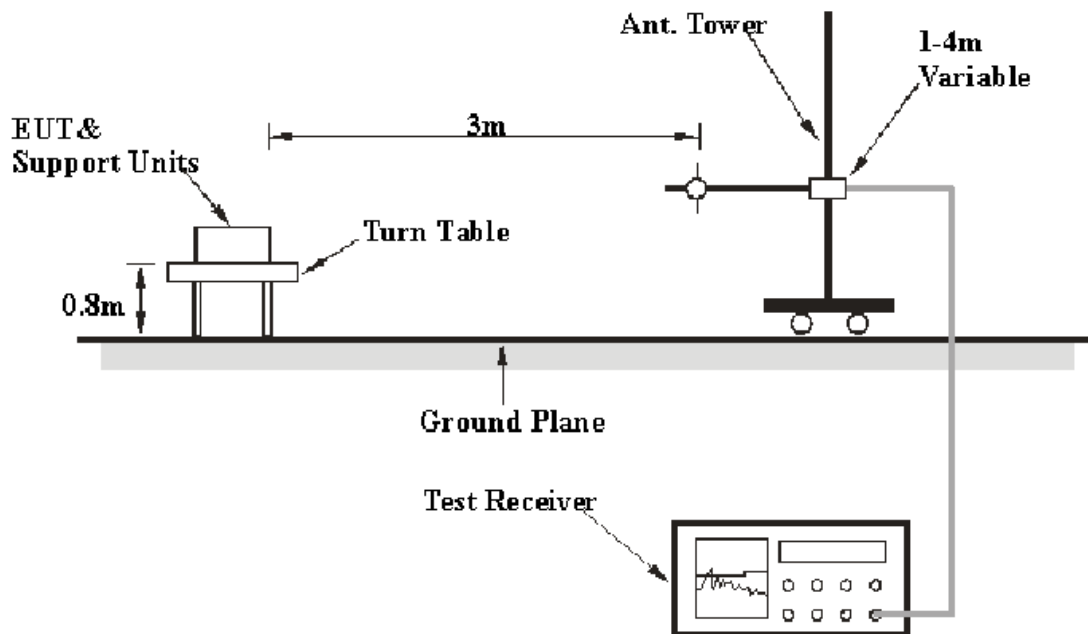
FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in 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 NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB(k=2, 95% level of confidence).

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video BW</i>	<i>Detector</i>
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave.

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2011-11-24	2012-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
DUCOMMUN Technologies	Pre-amp	ALN-09173030-01	991396-01	2011-11-24	2012-12-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2012-12-01	2012-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ 26	8386001028	2011-11-24	2012-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.247, with the worst margin reading of:

BDR Mode: 3.93 dB at 2483.5 MHz in the Horizontal polarization at low channel

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Dean Liu on 2012-05-03.

Test Mode: Transmitting (GFSK mode is the worse case):

Frequency (MHz)	Reading (dBμV)	Detector (PK/QP /Ave.)	Polar (H/V)	Corrected Amplitude (dB/m)	Correction Data (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2402MHz)								
2352	14.42	Ave.	H	35.5	49.92	54	4.08	spurious
2352	14.21	Ave.	V	35.5	49.71	54	4.29	spurious
2352	28.21	PK	H	35.5	63.71	74	10.29	spurious
2352	28.09	PK	V	35.5	63.59	74	10.41	spurious
323	29.35	QP	V	-4.83	24.52	46	21.48	spurious
323	28.44	QP	H	-4.83	23.61	46	22.39	spurious
4804	17.76	Ave.	H	10.54	28.3	54	25.7	Harmonic
4804	17.22	Ave.	V	10.54	27.76	54	26.24	Harmonic
4804	33.01	PK	H	10.79	43.8	74	30.2	Harmonic
4804	32.01	PK	V	10.79	42.8	74	31.2	Harmonic
2402	57.79	PK	H	34.91	92.7	N/A	N/A	Fundamental
2402	35.89	Ave.	H	34.91	70.8	N/A	N/A	Fundamental
2402	63.61	PK	V	34.91	98.52	N/A	N/A	Fundamental
2402	38.02	Ave.	V	34.91	72.93	N/A	N/A	Fundamental
Middle Channel (2441MHz)								
259	29.18	QP	V	-6.72	22.46	46	23.54	spurious
259	27.95	QP	H	-6.72	21.23	46	24.77	spurious
4882	17.42	Ave.	H	11.07	28.49	54	25.51	Harmonic
4882	17.42	Ave.	H	11.07	28.49	54	25.51	Harmonic
4882	33.56	PK	V	11.07	44.63	74	29.37	Harmonic
4882	32.21	PK	H	11.07	43.28	74	30.72	Harmonic
2441	58.91	PK	H	35.24	94.15	N/A	N/A	Fundamental
2441	36.9	Ave.	H	35.24	72.14	N/A	N/A	Fundamental
2441	65.55	PK	V	35.24	100.79	N/A	N/A	Fundamental
2441	38.68	Ave.	V	35.24	73.92	N/A	N/A	Fundamental
High Channel (2480MHz)								
2483.5	14.77	Ave.	H	35.3	50.07	54	3.93*	spurious
2483.5	14.56	Ave.	V	35.3	49.86	54	4.14	spurious
2483.5	29.05	PK	V	35.3	64.35	74	9.65	spurious
2483.5	28.64	PK	H	35.3	63.94	74	10.06	spurious
401	29.01	QP	H	-2.52	26.49	46	19.51	spurious
401	28.79	QP	V	-2.52	26.27	46	19.73	spurious
4960	17.36	Ave.	H	10.96	28.32	54	25.68	Harmonic
4960	17.25	Ave.	V	10.96	28.21	54	25.79	Harmonic
4960	33.64	PK	V	10.96	44.6	74	29.4	Harmonic
4960	32.11	PK	H	10.96	43.07	74	30.93	Harmonic
2480	57.96	PK	H	35.3	93.26	N/A	N/A	Fundamental
2480	36.4	Ave.	H	35.3	71.7	N/A	N/A	Fundamental
2480	63.61	PK	V	35.3	98.91	N/A	N/A	Fundamental
2480	37.95	Ave.	V	35.3	73.25	N/A	N/A	Fundamental

FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hopping 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 2400-2483.50 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

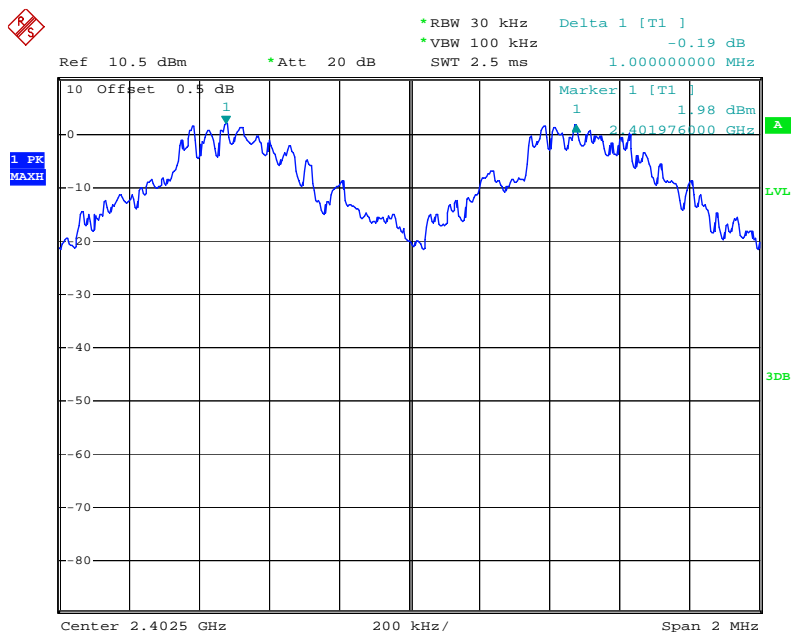
* The testing was performed by Dean Liu on 2012-05-03.

Test Result: Compliance.

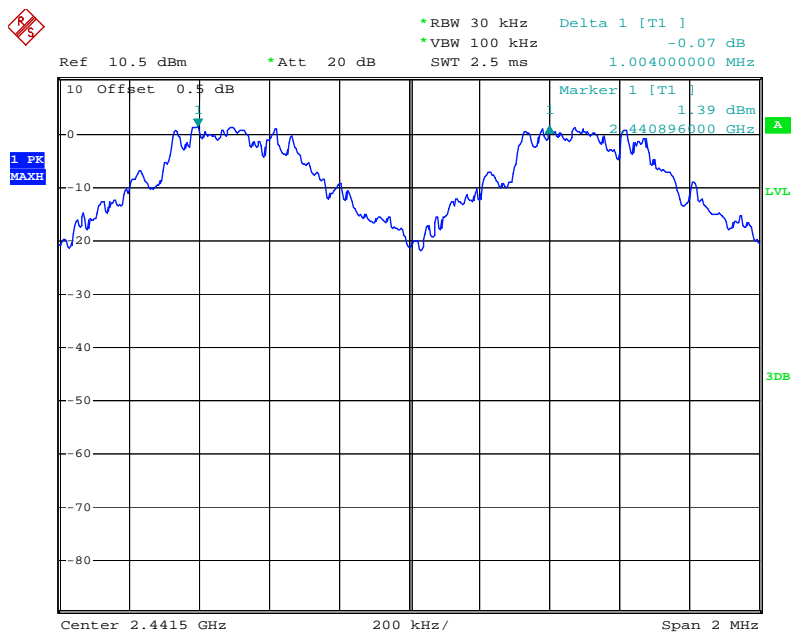
Please refer to following tables and plots

Test Mode: Transmitting

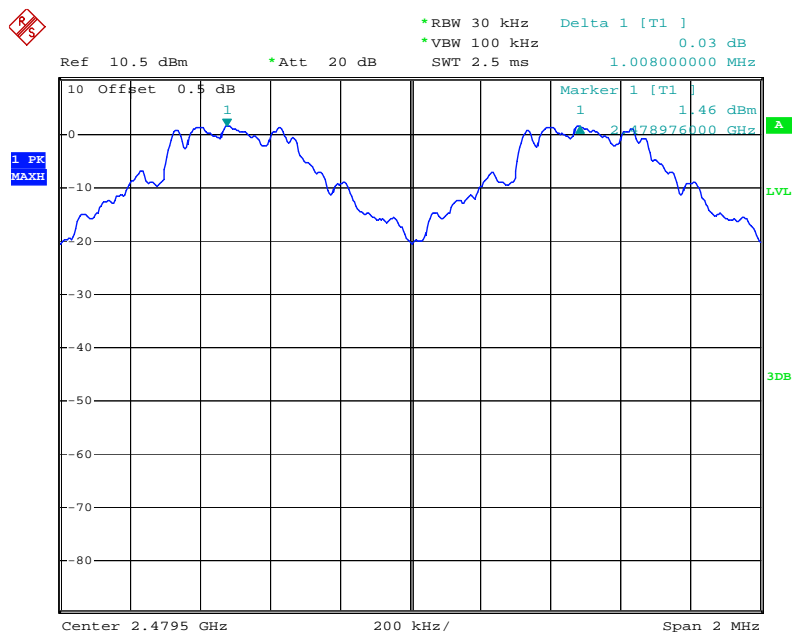
Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
<i>BDR Mode (GFSK)</i>	Low	2402	1.000	0.579	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.664	Pass
	Adjacent	2442			
	High	2480	1.008	0.664	Pass
	Adjacent	2479			
<i>EDR Mode ($\pi/4$-DQPSK)</i>	Low	2402	1.000	0.827	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.861	Pass
	Adjacent	2442			
	High	2480	1.000	0.869	Pass
	Adjacent	2479			
<i>EDR Mode (8DPSK)</i>	Low	2402	1.004	0.84	Pass
	Adjacent	2403			
	Middle	2441	1.004	0.845	Pass
	Adjacent	2442			
	High	2480	1.000	0.845	Pass
	Adjacent	2479			

BDR - Low Channel

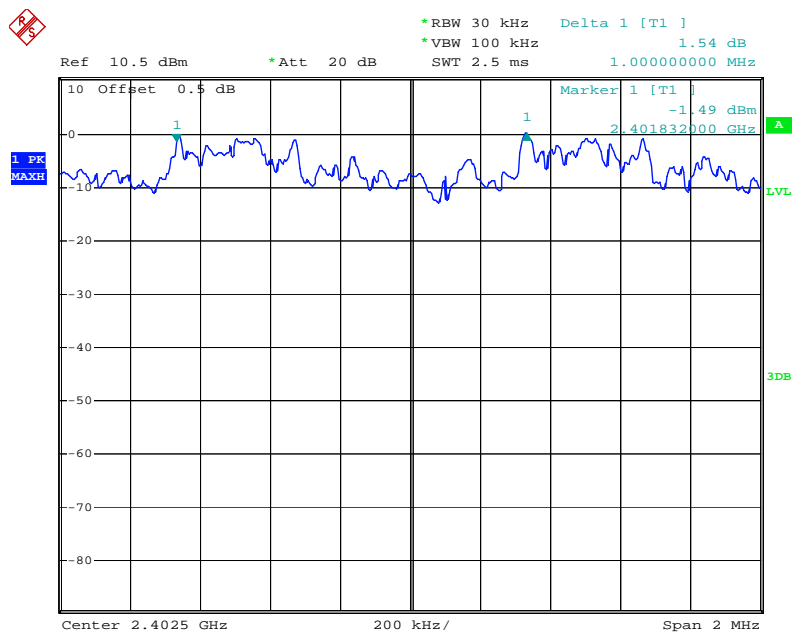
Date: 3.MAY.2012 12:43:34

BDR - Middle Channel

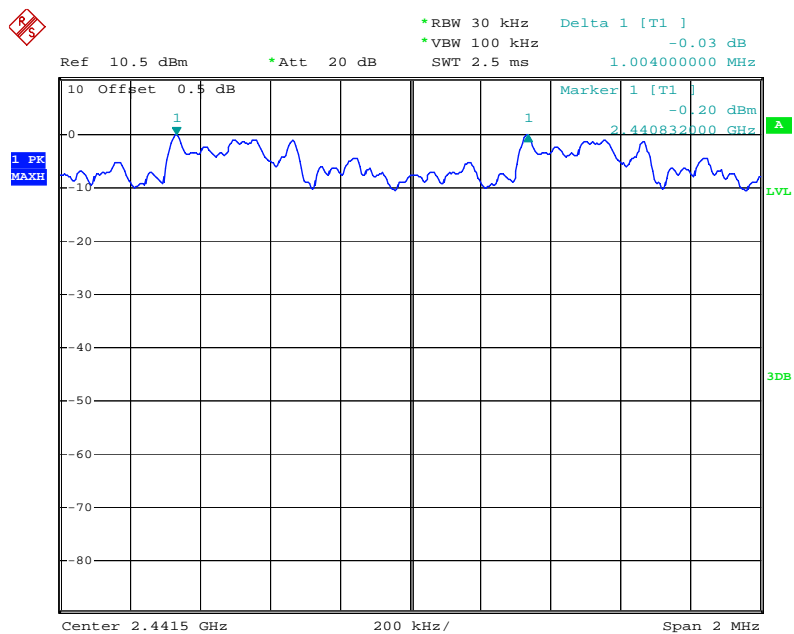
Date: 3.MAY.2012 12:47:24

BDR - High Channel

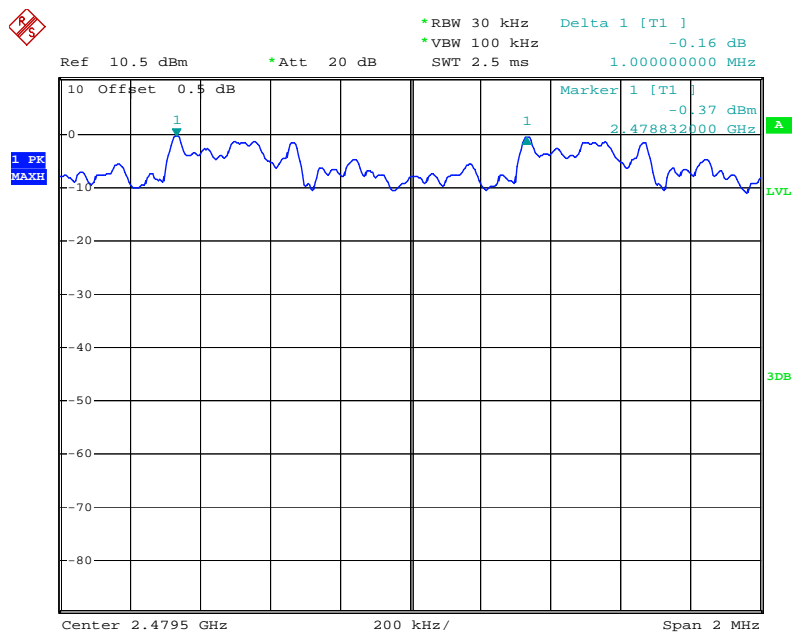
Date: 3.MAY.2012 12:49:11

EDR ($\pi/4$ -DQPSK) - Low Channel

Date: 3.MAY.2012 12:55:18

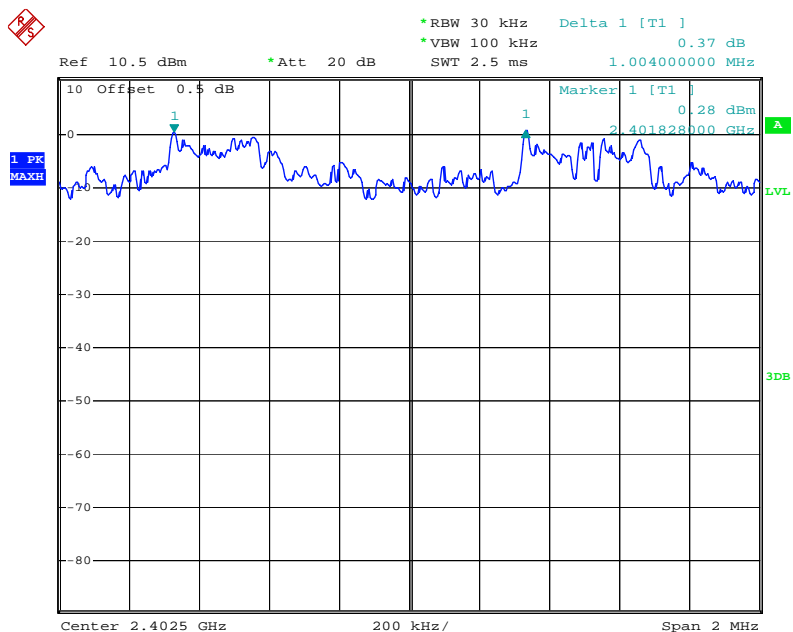
EDR ($\pi/4$ -DQPSK) - Middle Channel

Date: 3.MAY.2012 12:57:02

EDR ($\pi/4$ -DQPSK) - High Channel

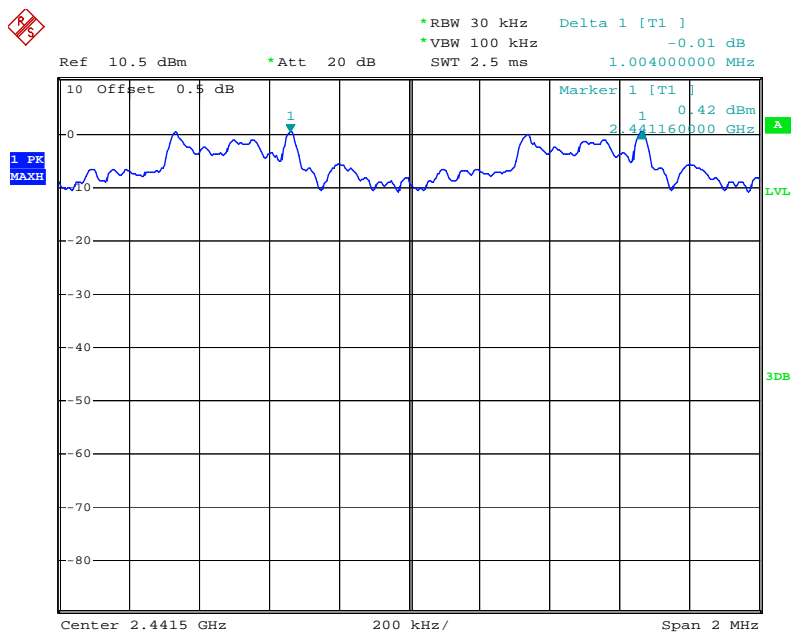
Date: 3.MAY.2012 12:58:28

EDR (8DPSK) - Low Channel



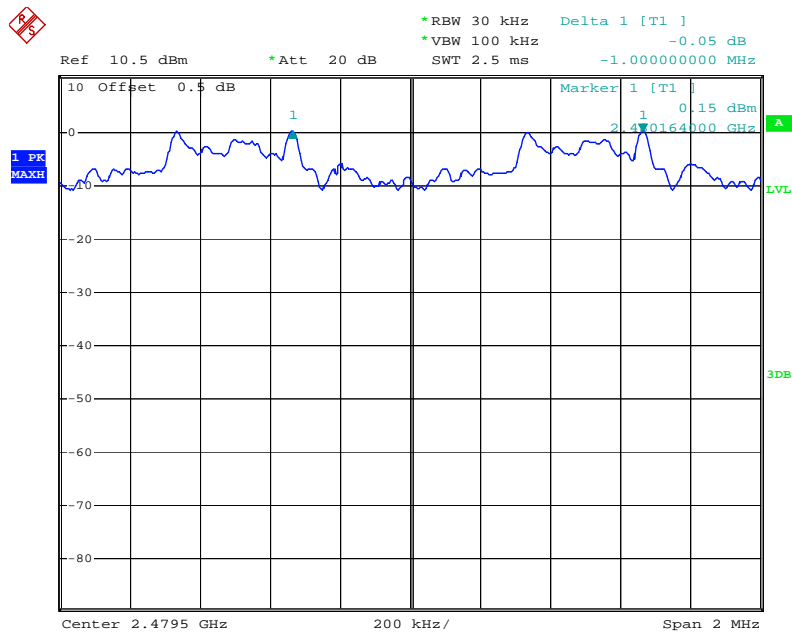
Date: 3.MAY.2012 13:03:22

EDR (8DPSK) - Middle Channel



Date: 3.MAY.2012 13:00:43

EDR (8DPSK) - High Channel



Date: 3.MAY.2012 12:59:31

FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

Applicable Standard

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.

Test 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 on the test table without connection to measurement instrument. Turn on the EUT. Then 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 emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

* The testing was performed by Dean Liu on 2012-05-03.

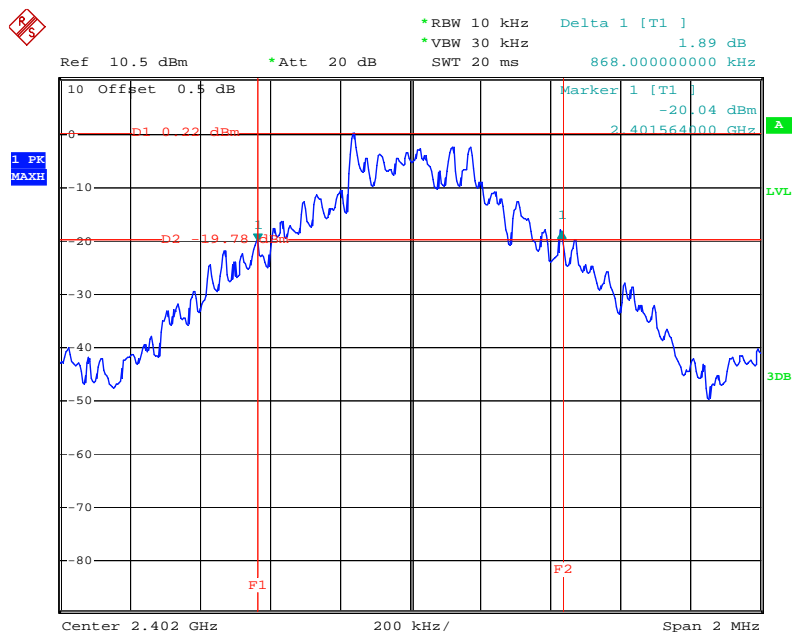
Test Result: Compliance.

Please refer to following tables and plots

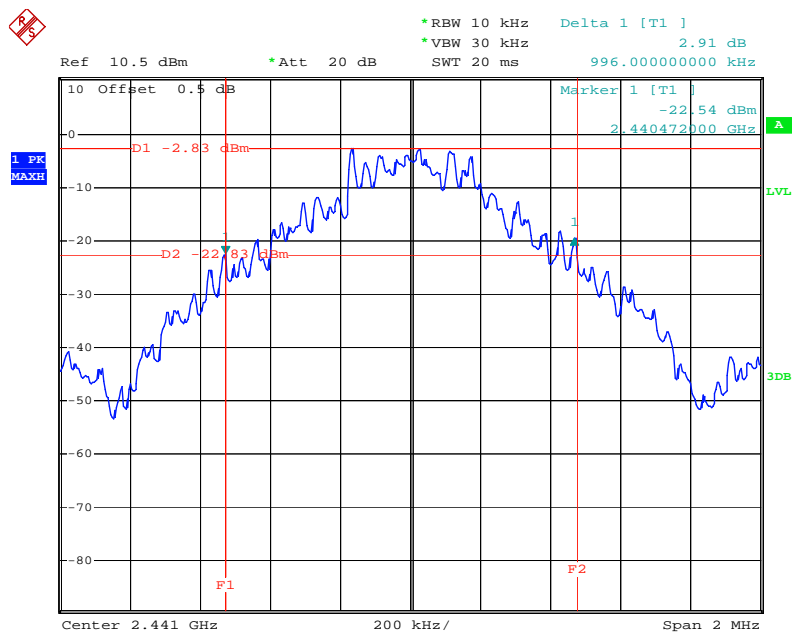
Test Mode: Transmitting

	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
<i>BDR Mode (GFSK)</i>	Low	2402	0.868
	Middle	2441	0.996
	High	2480	0.996
<i>EDR Mode ($\pi/4$-DQPSK)</i>	Low	2402	1.240
	Middle	2441	1.292
	High	2480	1.304
<i>EDR Mode (8DPSK)</i>	Low	2402	1.260
	Middle	2441	1.268
	High	2480	1.268

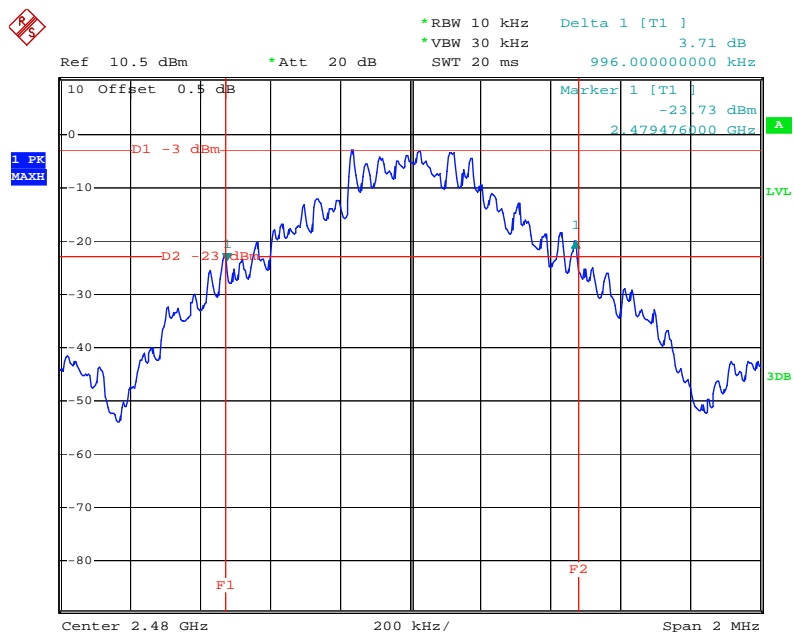
Please refer to the following plots.

BDR - Low Channel

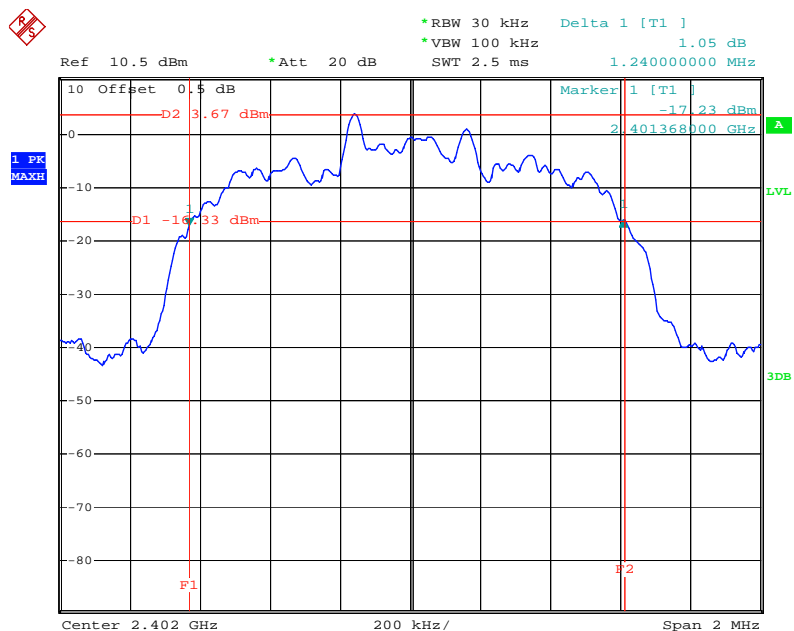
Date: 3.MAY.2012 11:27:25

BDR - Middle Channel

Date: 3.MAY.2012 11:23:46

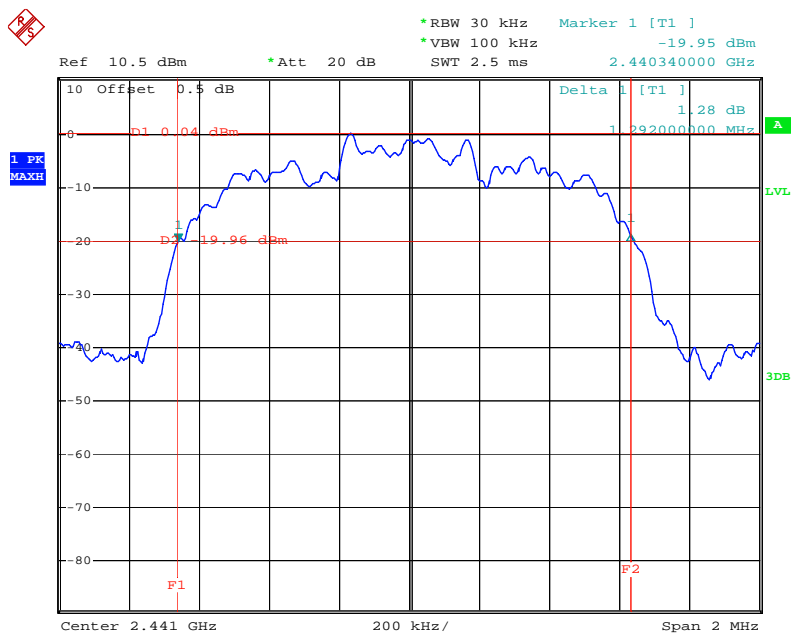
BDR - High Channel

Date: 3.MAY.2012 11:29:20

EDR ($\pi/4$ -DQPSK) - Low Channel

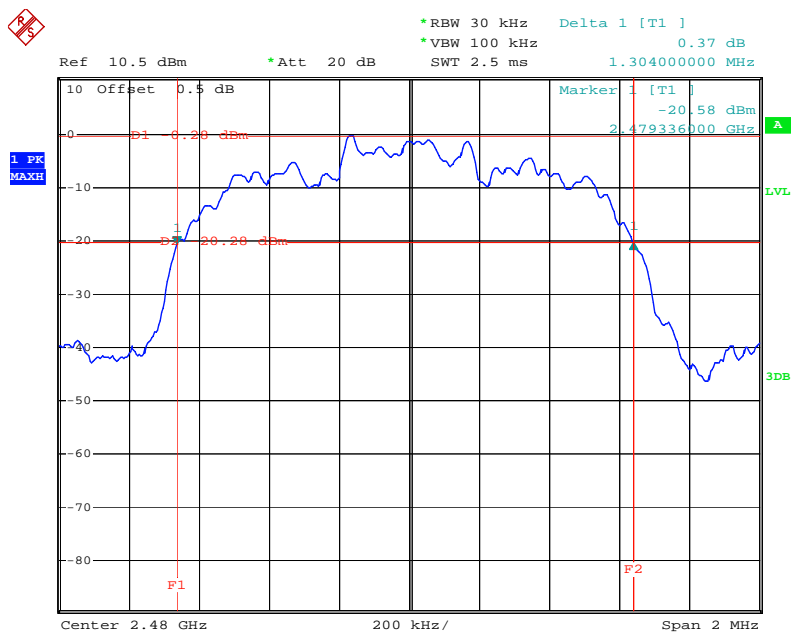
Date: 3.MAY.2012 11:49:55

EDR ($\pi/4$ -DQPSK) - Middle Channel



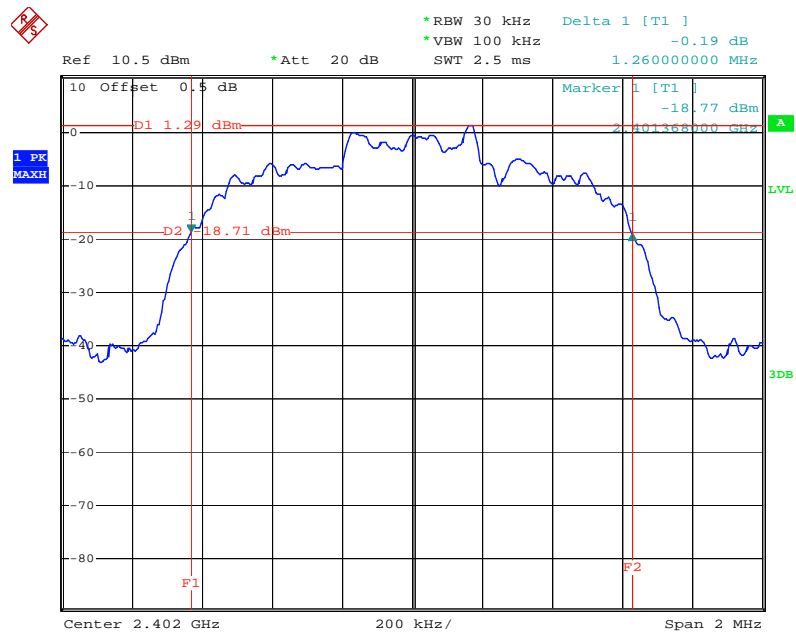
Date: 3.MAY.2012 11:55:42

EDR ($\pi/4$ -DQPSK) - High Channel



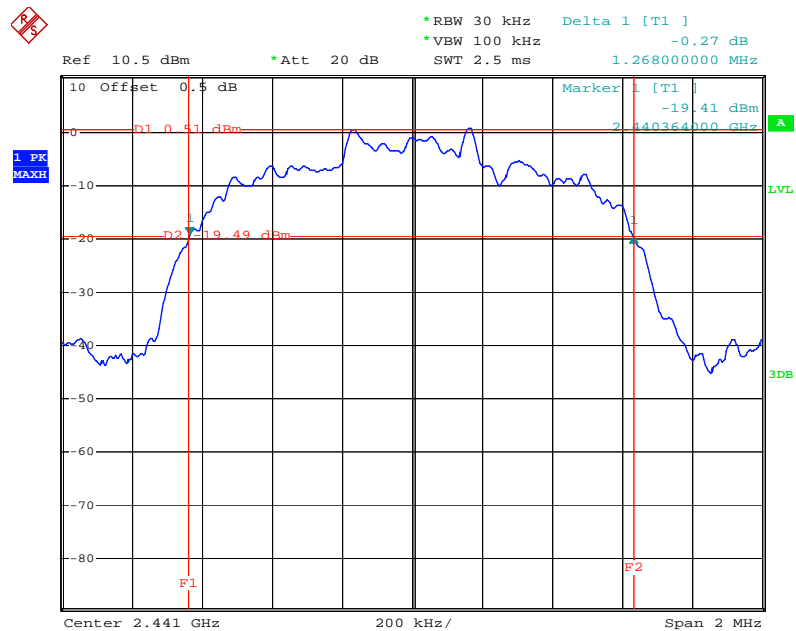
Date: 3.MAY.2012 11:59:42

EDR (8DPSK) - Low Channel



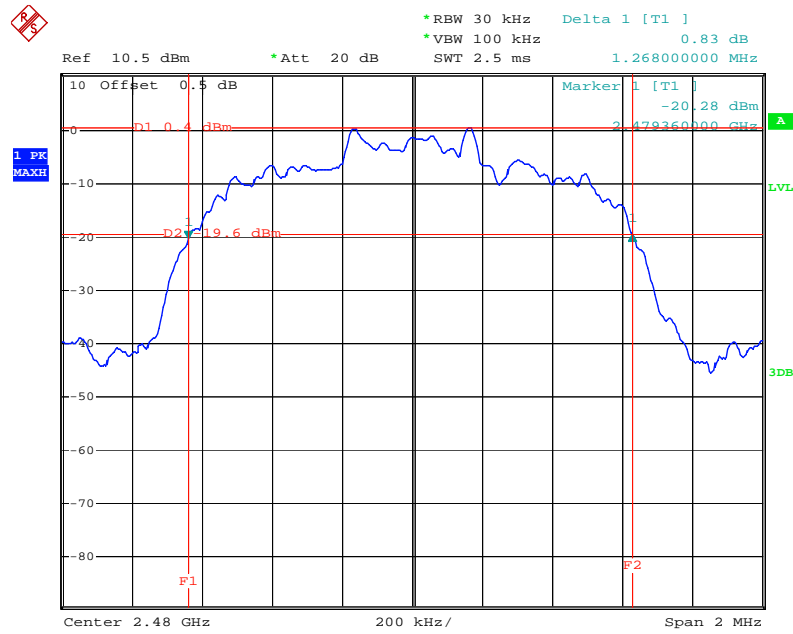
Date: 3.MAY.2012 11:52:10

EDR (8DPSK) - Middle Channel



Date: 3.MAY.2012 11:54:05

EDR (8DPSK) - High Channel



Date: 3.MAY.2012 12:01:42

FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

The testing was performed by Dean Liu on 2012-05-03.

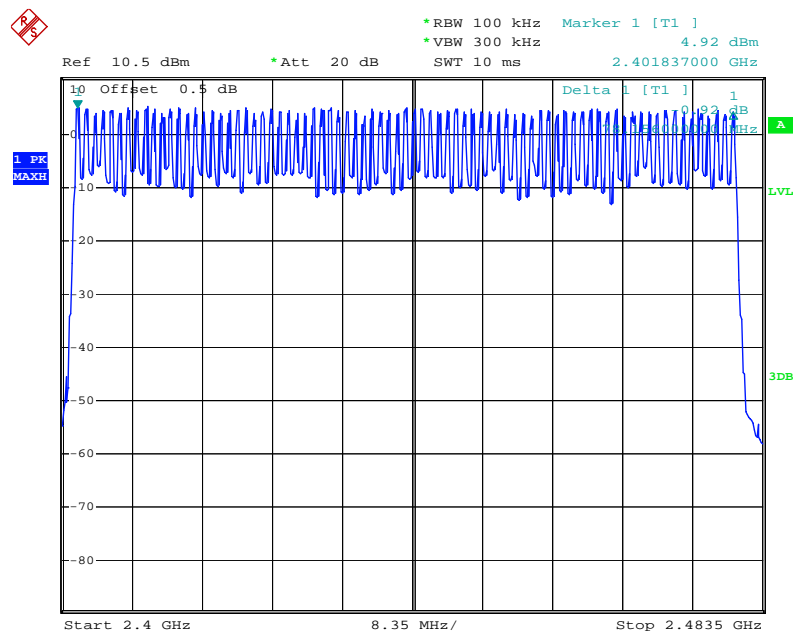
Test Result: Compliance.

Please refer to following tables and plots

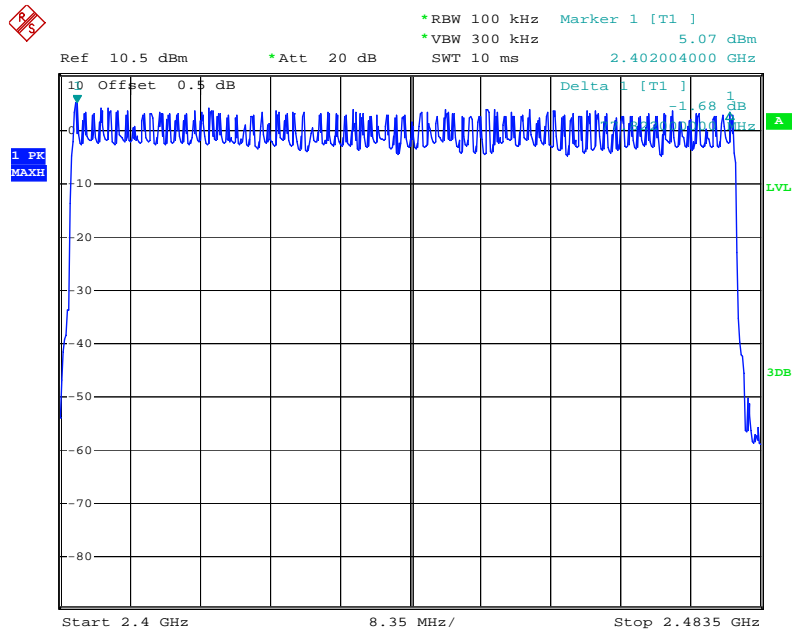
Test Mode: Transmitting (BDR & EDR)

	Frequency Range (MHz)	Number of Hopping Channel	Limit
BDR	2400-2483.50	79	≥ 15
EDR ($\pi/4$ -DQPSK)	2400-2483.50	79	≥ 15
EDR (8DPSK)	2400-2483.50	79	≥ 15

BDR - Number of Hopping Channels

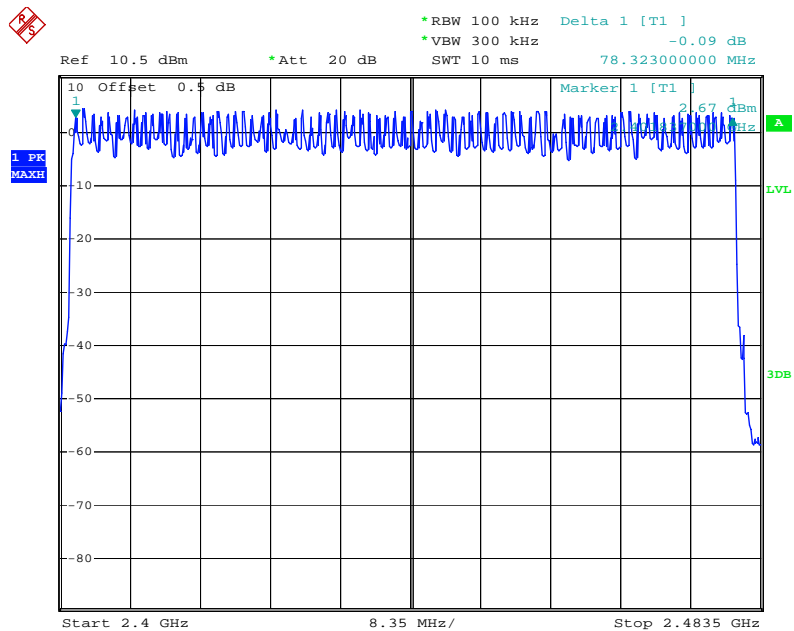


Date: 3.MAY.2012 12:39:11

EDR ($\pi/4$ -DQPSK) - Number of Hopping Channels

Date: 3.MAY.2012 12:37:20

EDR (8DPSK) - Number of Hopping Channels



Date: 3.MAY.2012 12:34:51

FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWEELL TIME)

Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 * channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length * hope rate/ number of hopping channels * 31.6s
Hop rate=1600/s

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	8386001028	2011-11-24	2012-12-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

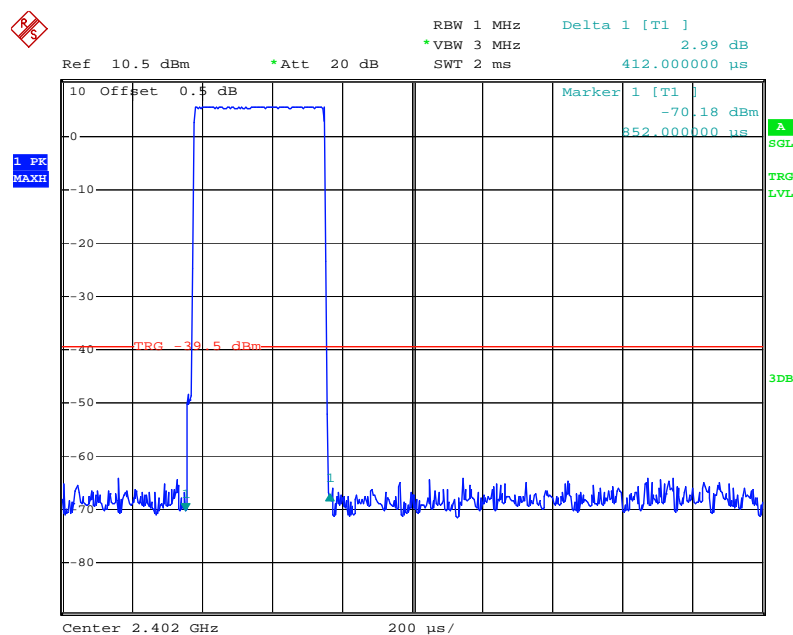
* The testing was performed by Dean Liu on 2012-05-03.

Test Result: Compliance.

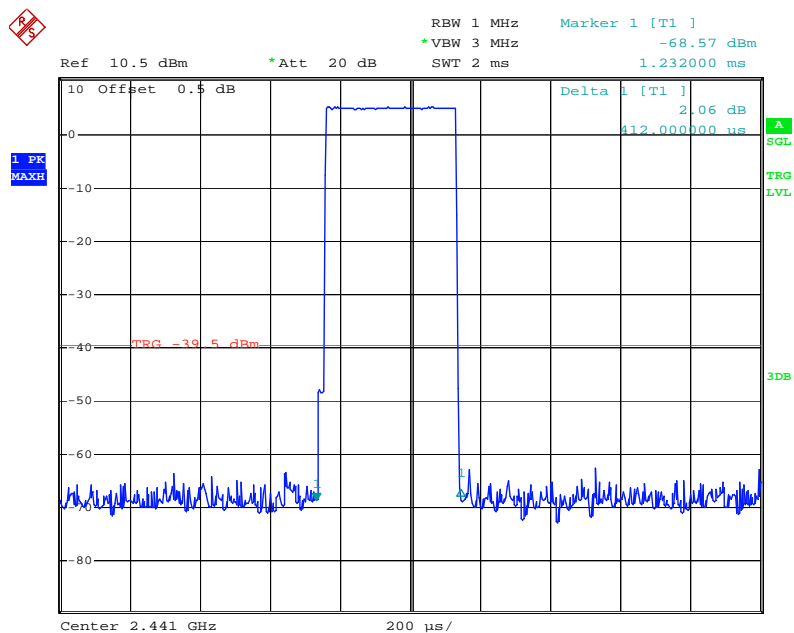
Please refer to following tables and plots

DH1:*Test Mode: Transmitting*

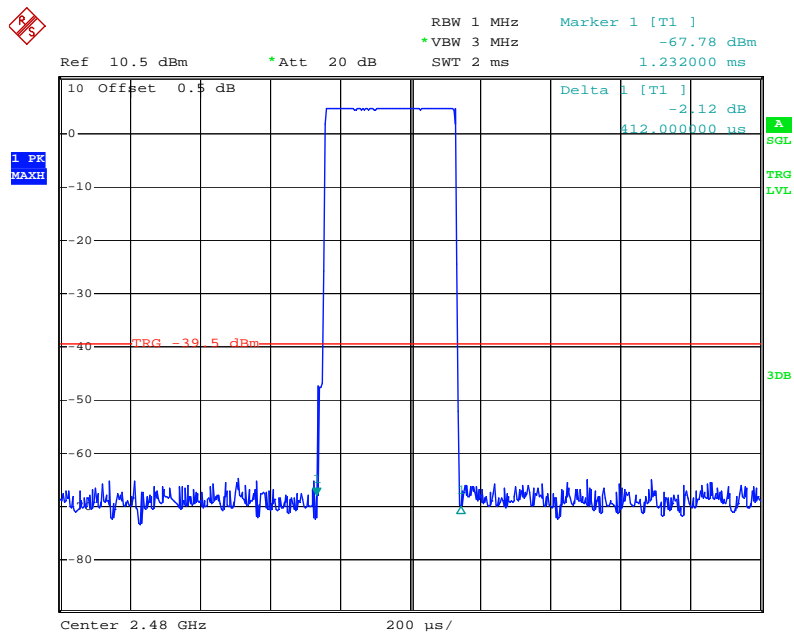
	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR Mode (GFSK)	Low	0.412	0.132	0.4	Pass
	Middle	0.412	0.132	0.4	Pass
	High	0.412	0.132	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				
EDR Mode ($\pi/4$ -DQPSK)	Low	0.416	0.133	0.4	Pass
	Middle	0.416	0.133	0.4	Pass
	High	0.416	0.133	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				
EDR Mode (8DPSK)	Low	0.420	0.134	0.4	Pass
	Middle	0.420	0.134	0.4	Pass
	High	0.420	0.134	0.4	Pass
	Note: Dwell time = Pulse time*(1600/2/79)*31.6S				

BDR - Low Channel

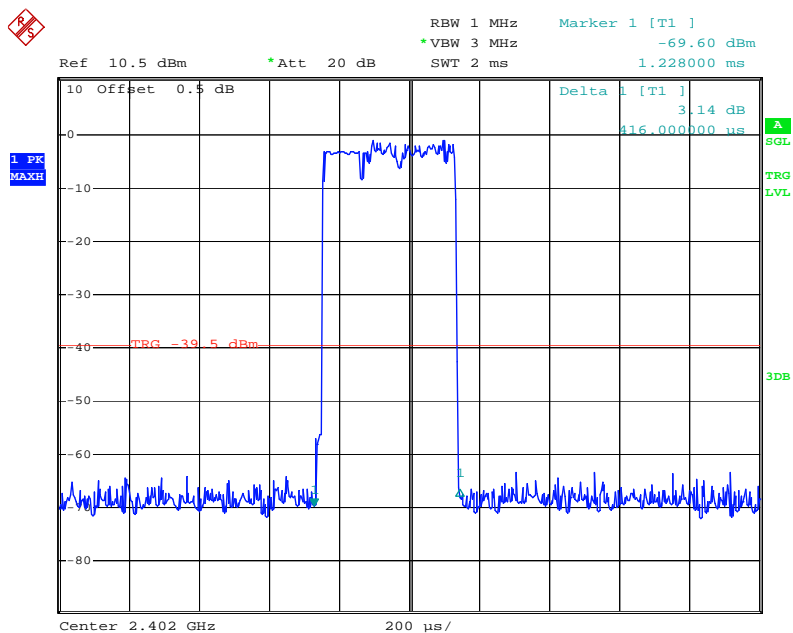
Date: 3.MAY.2012 13:08:34

BDR - Middle Channel

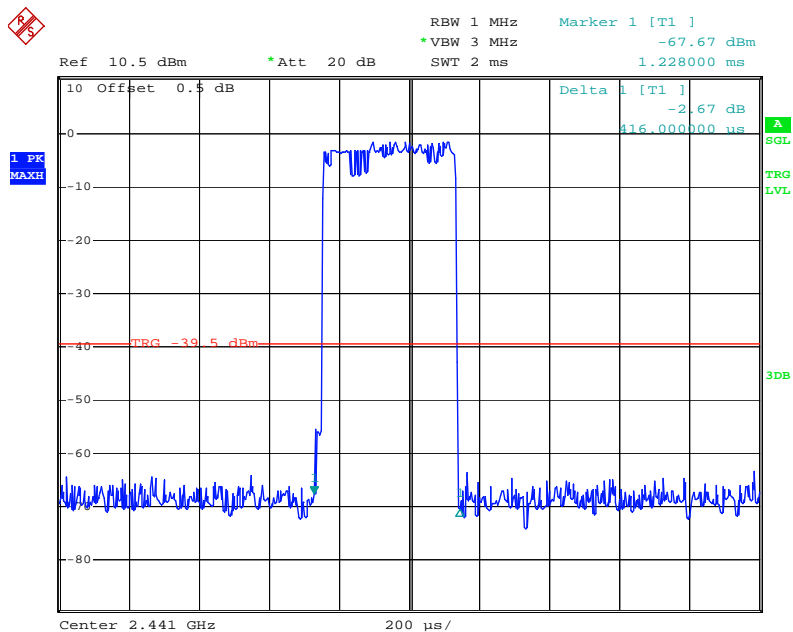
Date: 3.MAY.2012 13:10:22

BDR - High Channel

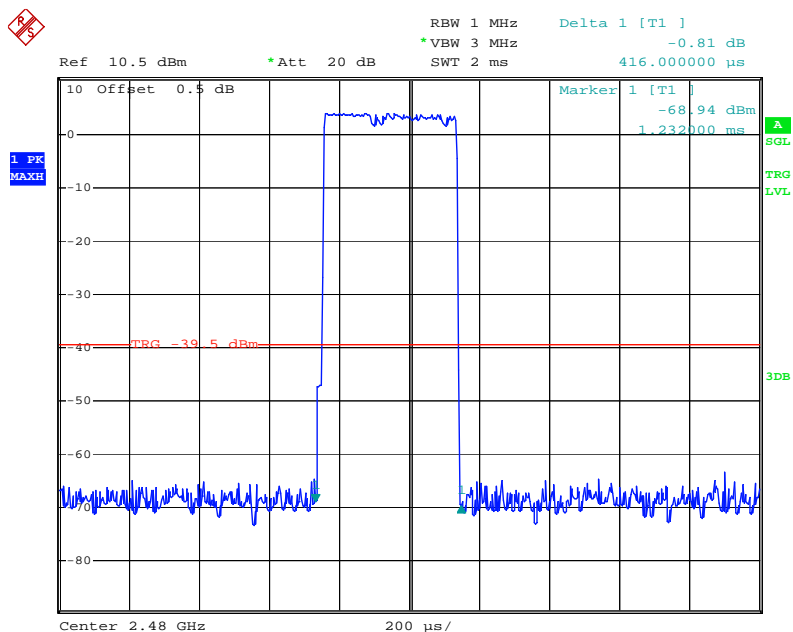
Date: 3.MAY.2012 13:12:59

EDR ($\pi/4$ -DQPSK) - Low Channel

Date: 3.MAY.2012 13:15:26

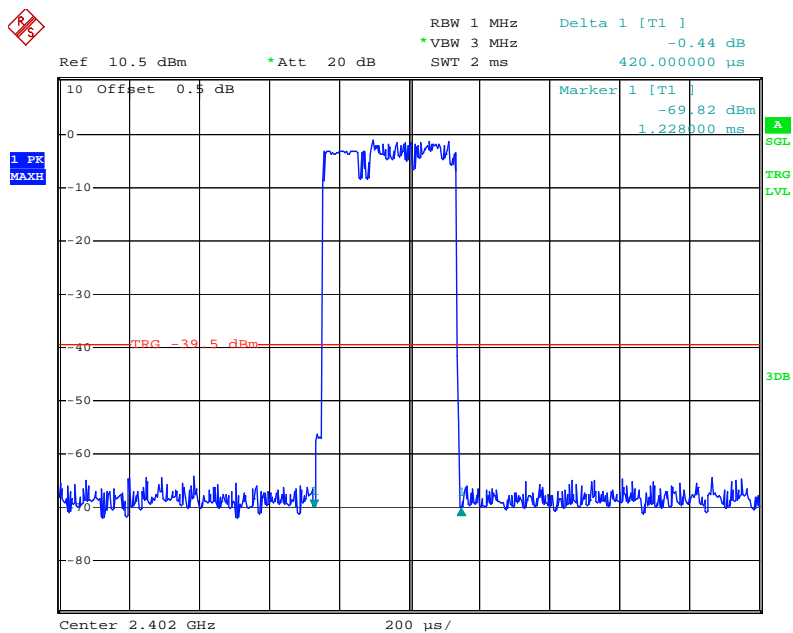
EDR ($\pi/4$ -DQPSK) - Middle Channel

Date: 3.MAY.2012 13:14:53

EDR ($\pi/4$ -DQPSK) - High Channel

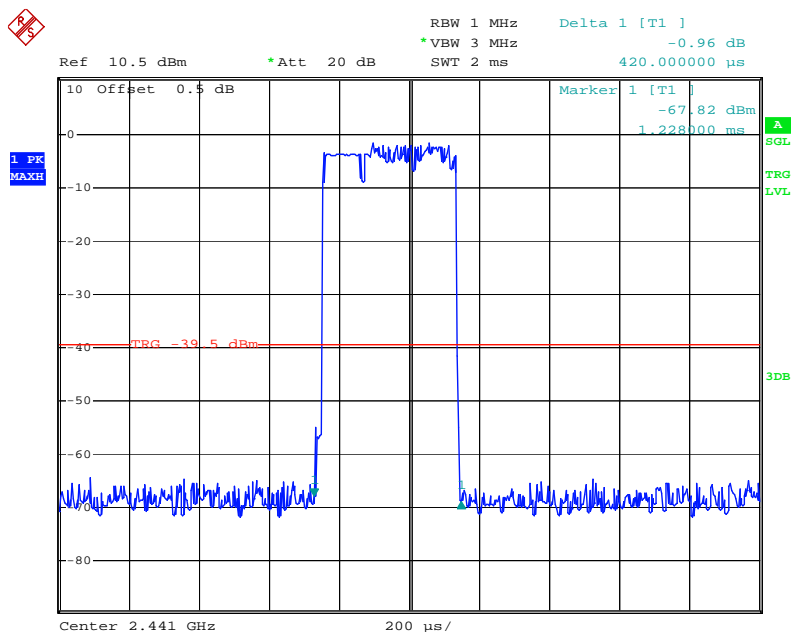
Date: 3.MAY.2012 13:14:00

EDR (8DPSK) - Low Channel



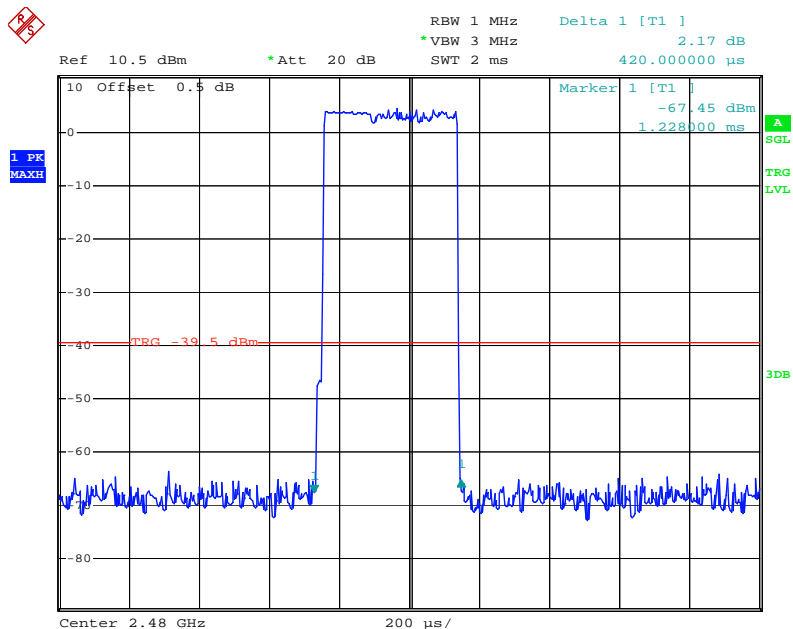
Date: 3.MAY.2012 13:16:18

EDR (8DPSK) - Middle Channel



Date: 3.MAY.2012 13:16:46

EDR (8DPSK) - High Channel

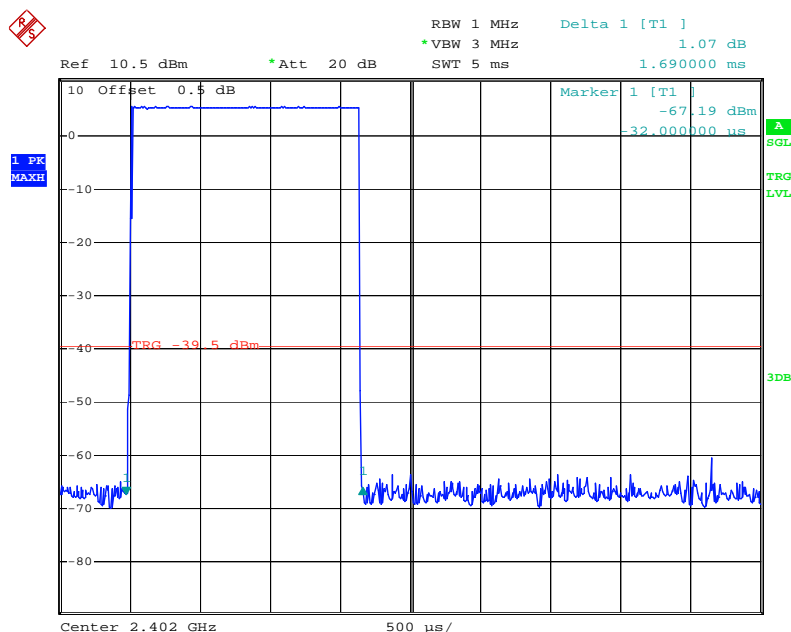


Date: 3.MAY.2012 13:17:16

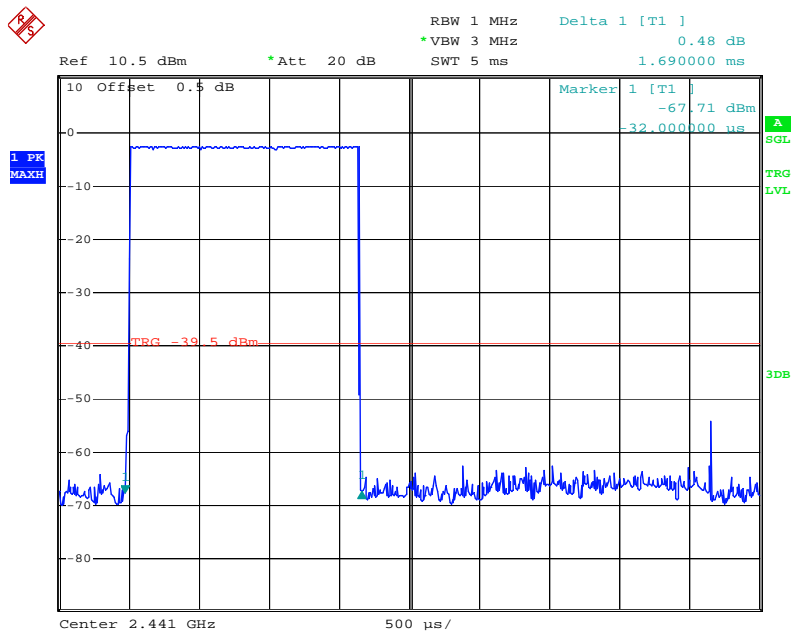
DH3:

Test Mode: Transmitting

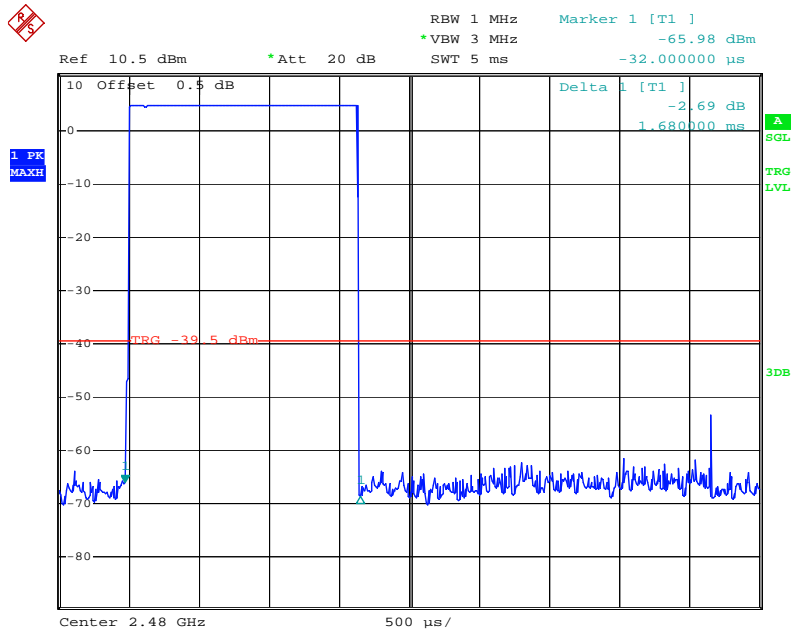
	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR Mode (GFSK)	Low	1.690	0.270	0.4	Pass
	Middle	1.690	0.270	0.4	Pass
	High	1.680	0.269	0.4	Pass
	Note: Dwell time = Pulse time*(1600/4/79)*31.6S				
EDR Mode ($\pi/4$ -DQPSK)	Low	1.690	0.270	0.4	Pass
	Middle	1.690	0.270	0.4	Pass
	High	1.680	0.269	0.4	Pass
	Note: Dwell time = Pulse time*(1600/4/79)*31.6S				
EDR Mode (8DPSK)	Low	1.680	0.269	0.4	Pass
	Middle	1.680	0.269	0.4	Pass
	High	1.690	0.270	0.4	Pass
	Note: Dwell time = Pulse time*(1600/4/79)*31.6S				

BDR - Low Channel

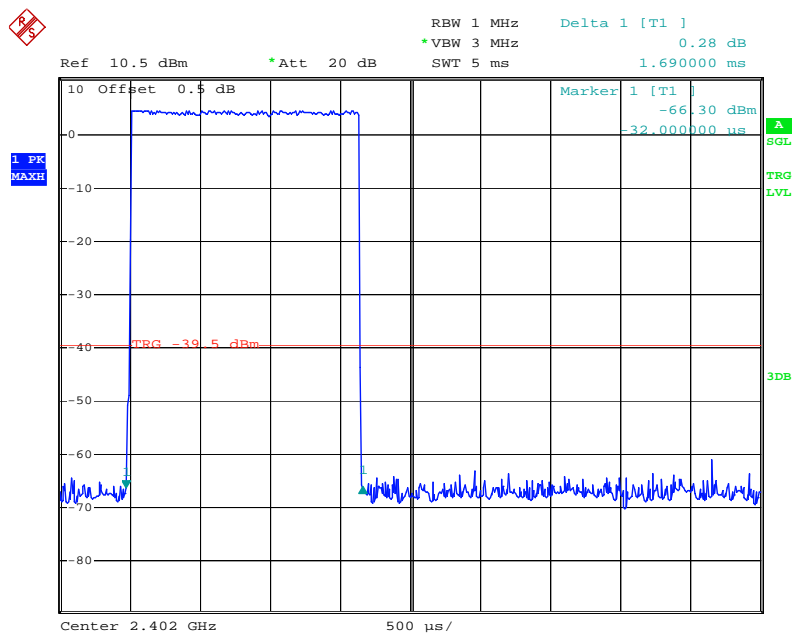
Date: 3.MAY.2012 13:24:51

BDR - Middle Channel

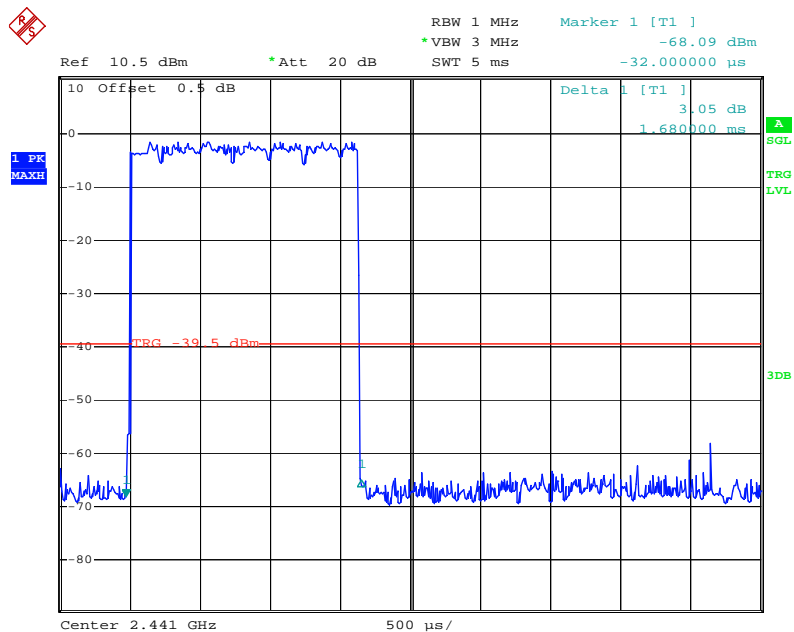
Date: 3.MAY.2012 13:24:32

BDR - High Channel

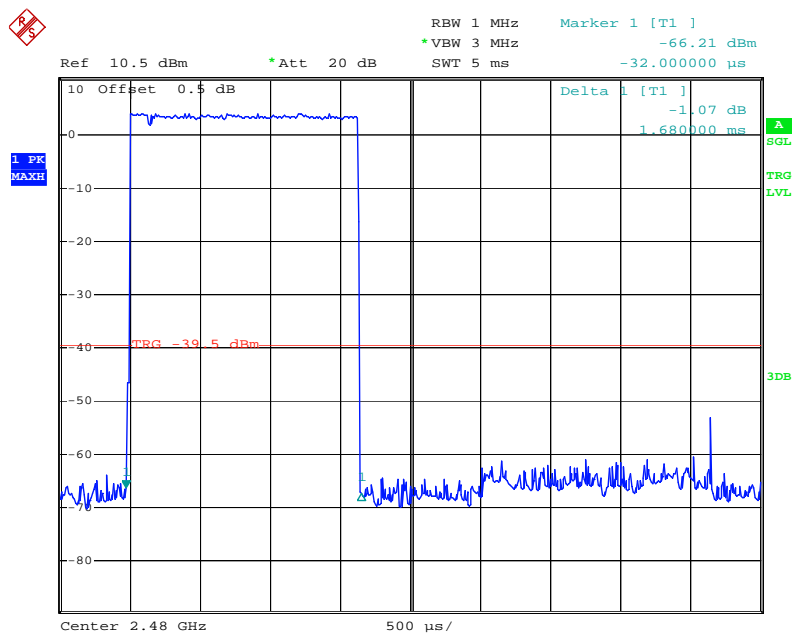
Date: 3.MAY.2012 13:23:48

EDR ($\pi/4$ -DQPSK) - Low Channel

Date: 3.MAY.2012 13:20:08

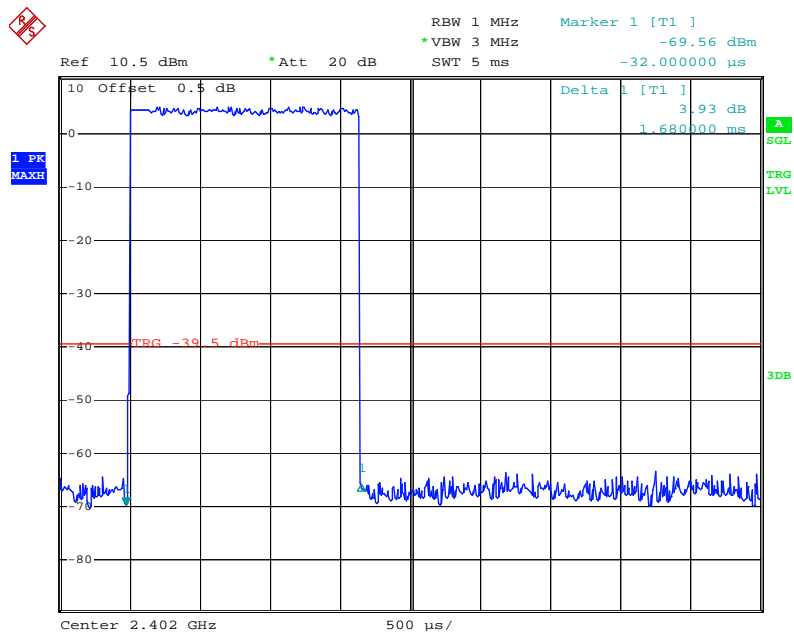
EDR ($\pi/4$ -DQPSK) - Middle Channel

Date: 3.MAY.2012 13:19:41

EDR ($\pi/4$ -DQPSK) - High Channel

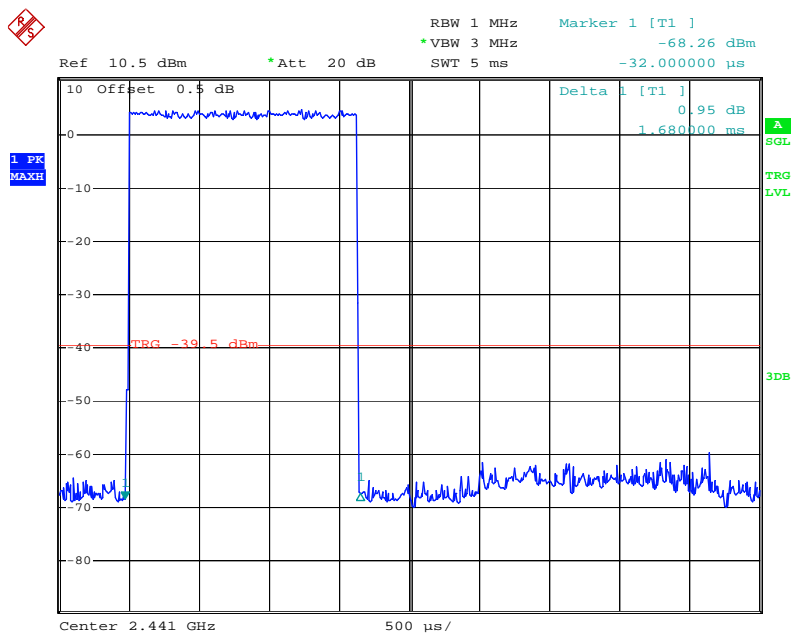
Date: 3.MAY.2012 13:19:13

EDR (8DPSK) - Low Channel



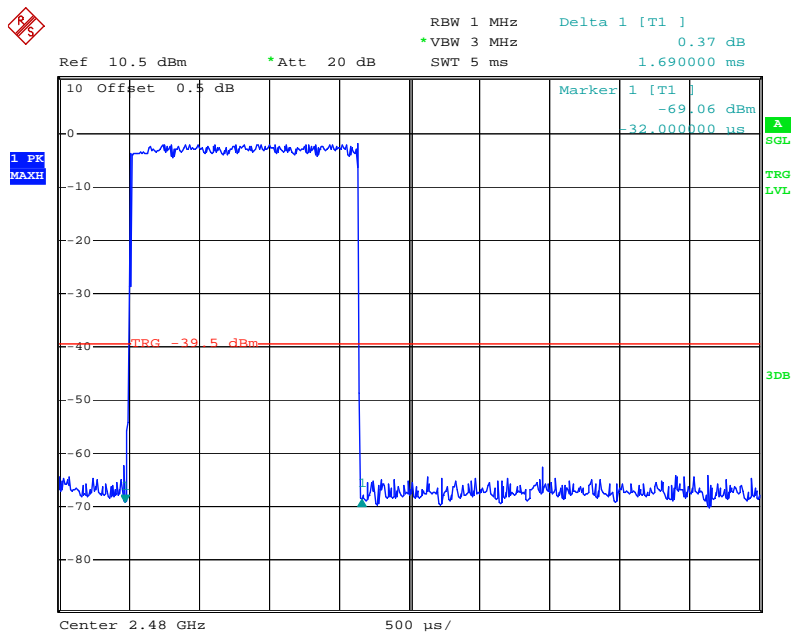
Date: 3.MAY.2012 13:21:21

EDR (8DPSK) - Middle Channel



Date: 3.MAY.2012 13:22:00

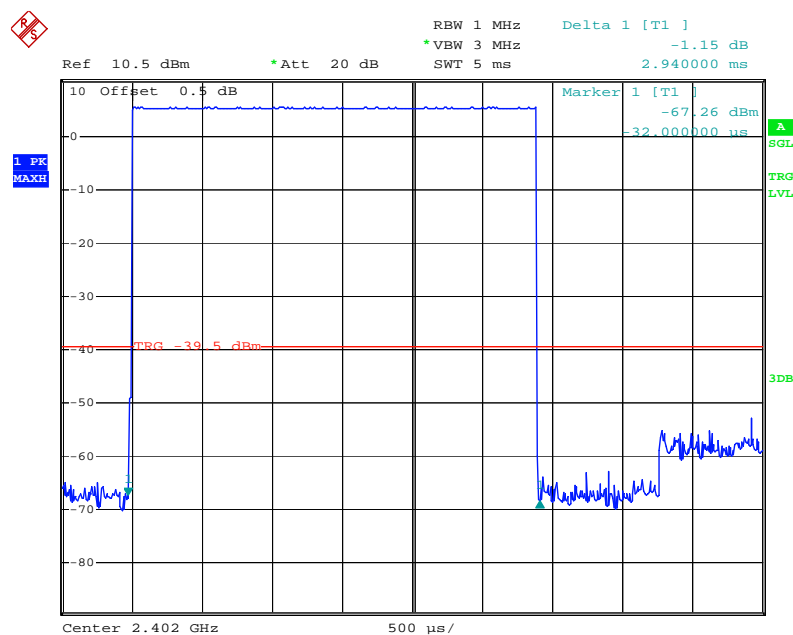
EDR (8DPSK) - High Channel



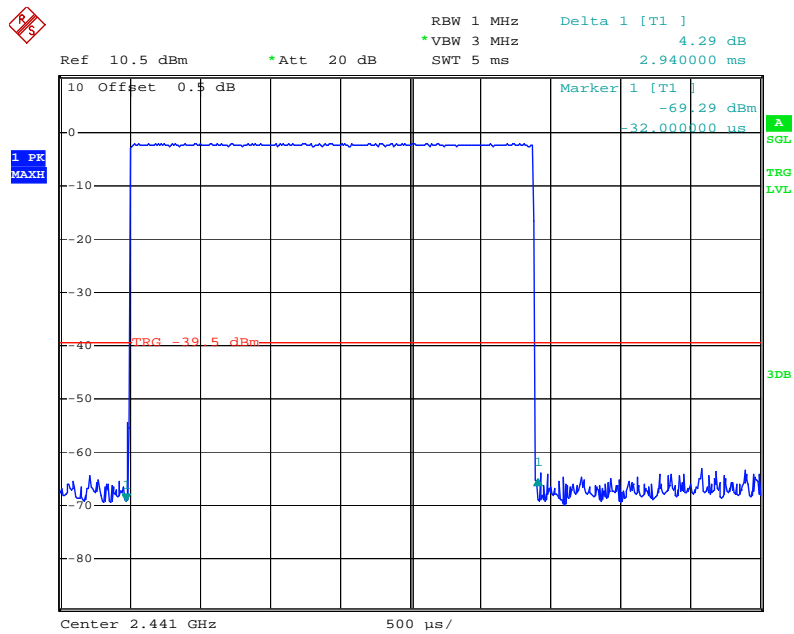
Date: 3.MAY.2012 13:22:34

DH5:*Test Mode: Transmitting*

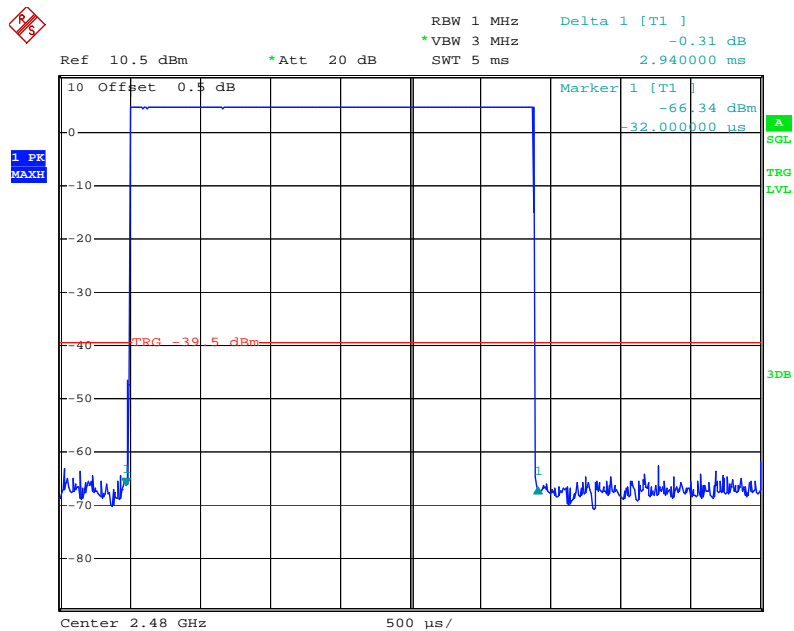
	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
BDR Mode (GFSK)	Low	2.940	0.314	0.4	Pass
	Middle	2.940	0.314	0.4	Pass
	High	2.940	0.314	0.4	Pass
	Note: Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR Mode ($\pi/4$ -DQPSK)	Low	2.940	0.314	0.4	Pass
	Middle	2.930	0.313	0.4	Pass
	High	2.930	0.313	0.4	Pass
	Note: Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR Mode (8DPSK)	Low	2.940	0.314	0.4	Pass
	Middle	2.940	0.314	0.4	Pass
	High	2.940	0.314	0.4	Pass
	Note: Dwell time = Pulse time*(1600/6/79)*31.6S				

BDR - Low Channel

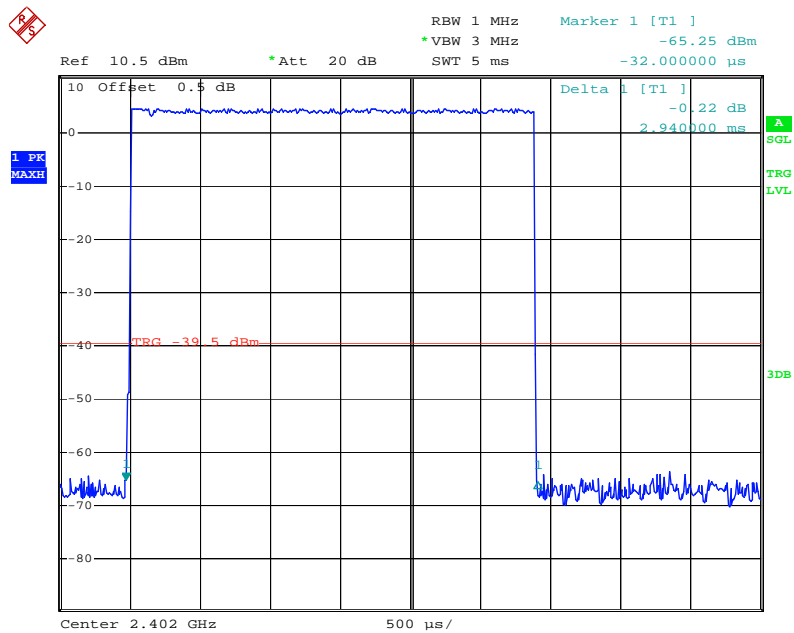
Date: 3.MAY.2012 13:25:40

BDR - Middle Channel

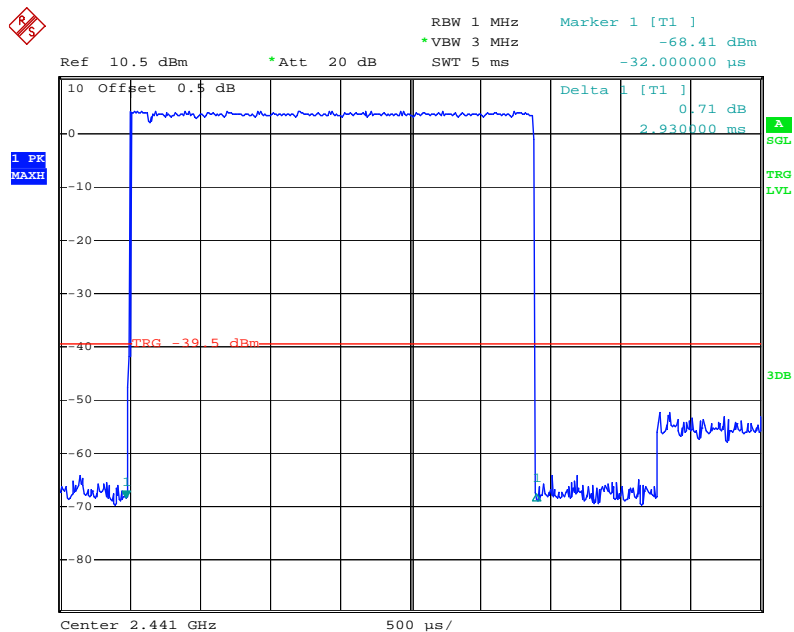
Date: 3.MAY.2012 13:25:58

BDR - High Channel

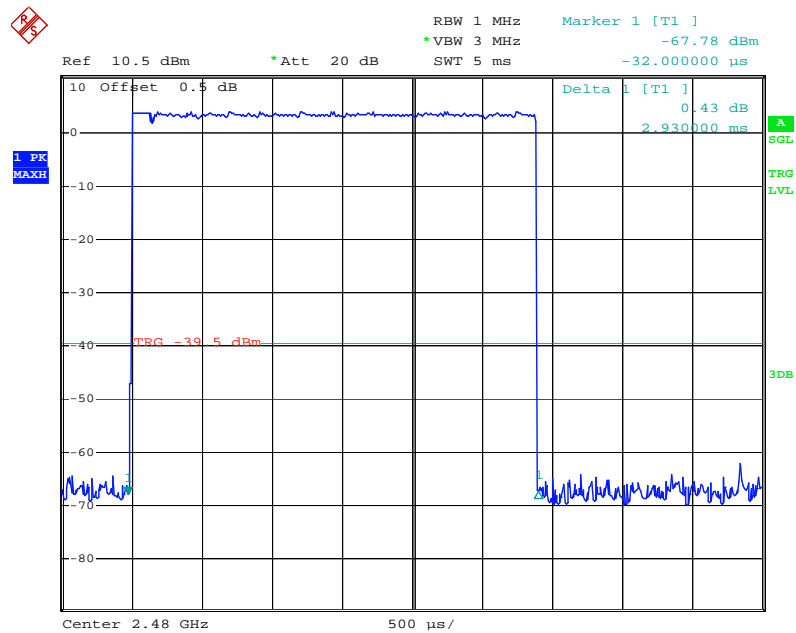
Date: 3.MAY.2012 13:26:24

EDR ($\pi/4$ -DQPSK) - Low Channel

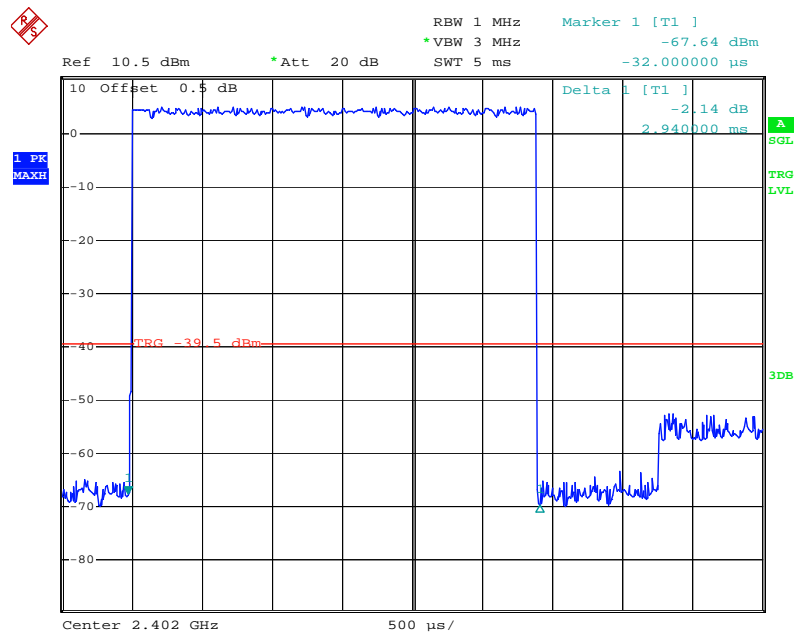
Date: 3.MAY.2012 13:28:11

EDR ($\pi/4$ -DQPSK) - Middle Channel

Date: 3.MAY.2012 13:27:38

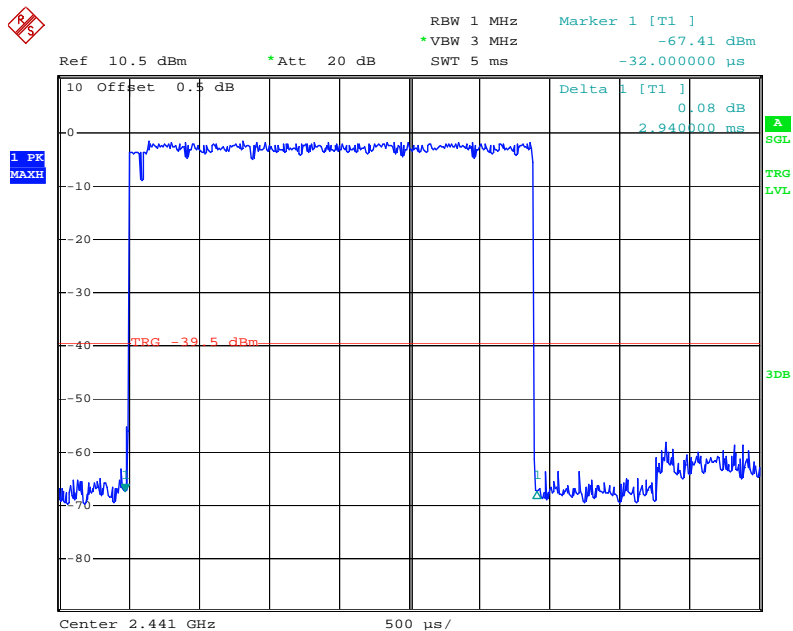
EDR ($\pi/4$ -DQPSK) - High Channel

Date: 3.MAY.2012 13:27:15

EDR (8DPSK) - Low Channel

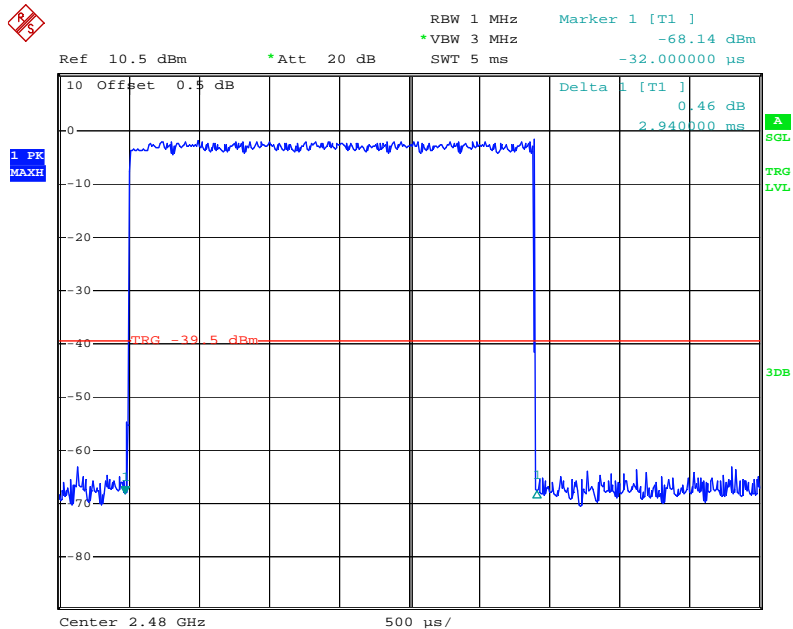
Date: 3.MAY.2012 13:29:18

EDR (8DPSK) - Middle Channel



Date: 3.MAY.2012 13:29:45

EDR (8DPSK) - High Channel



Date: 3.MAY.2012 13:30:48

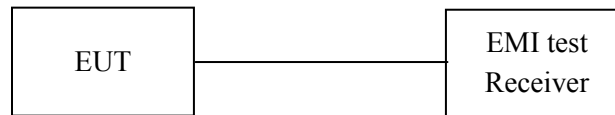
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (1), 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.

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.9kPa

* The testing was performed by Dean Liu on 2012-05-03.

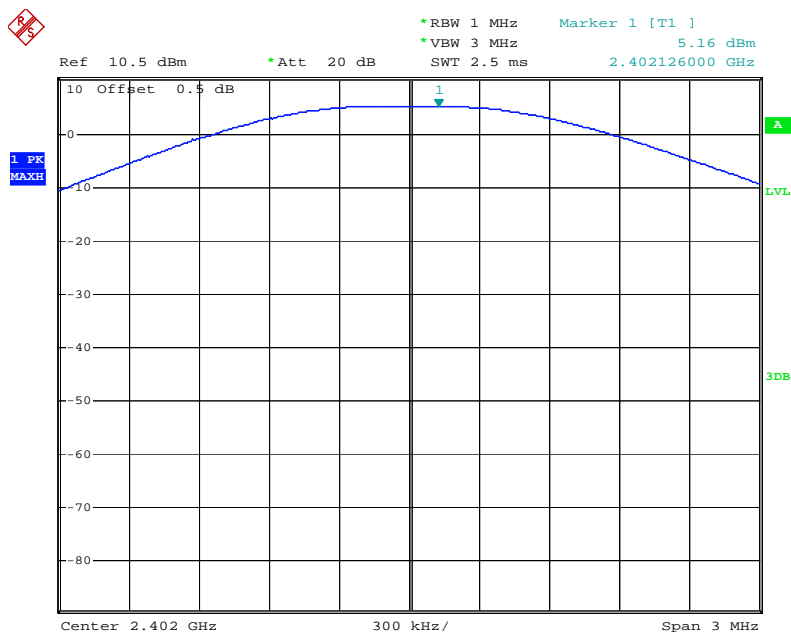
Test Result: Compliance.

Test Mode: Transmitting

	Channel	Frequency (MHz)	Output power (dBm)	Limit (dBm)
BDR Mode (GFSK)	Low	2402	5.16	30
	Middle	2441	4.79	30
	High	2480	4.61	30
EDR Mode ($\pi/4$ -DQPSK)	Low	2402	4.98	30
	Middle	2441	4.64	30
	High	2480	4.3	30
EDR Mode (8DPSK)	Low	2402	5.01	30
	Middle	2441	4.95	30
	High	2480	4.67	30

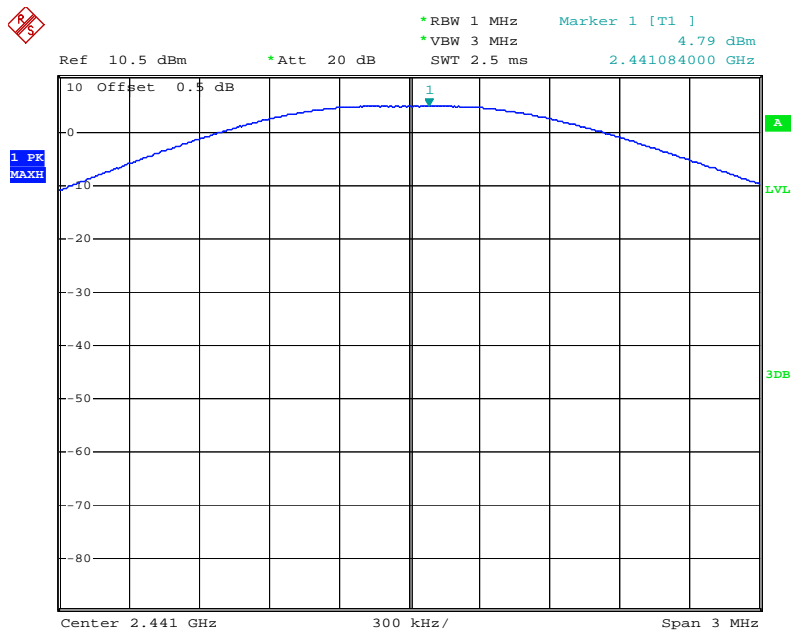
Note: The data above was tested in conducted mode.

BDR - Low Channel



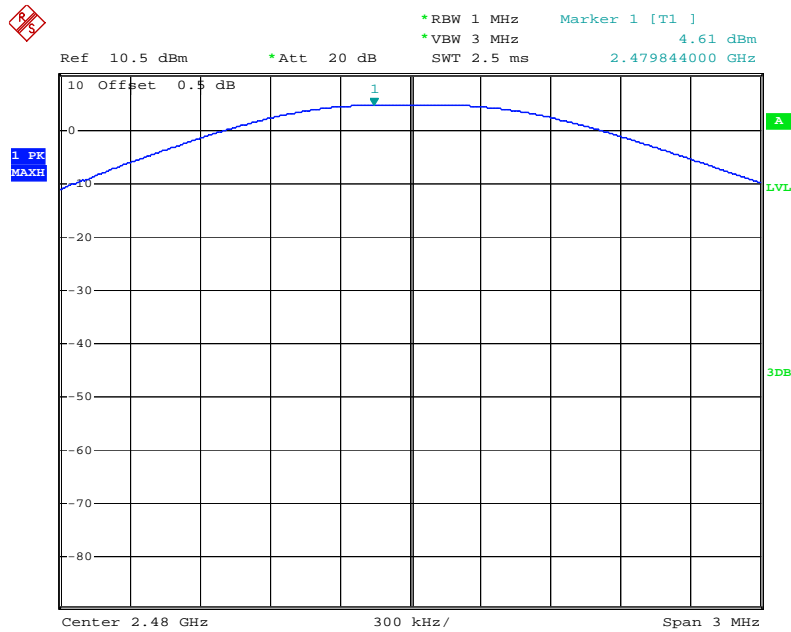
Date: 3.MAY.2012 11:31:53

BDR - Middle Channel



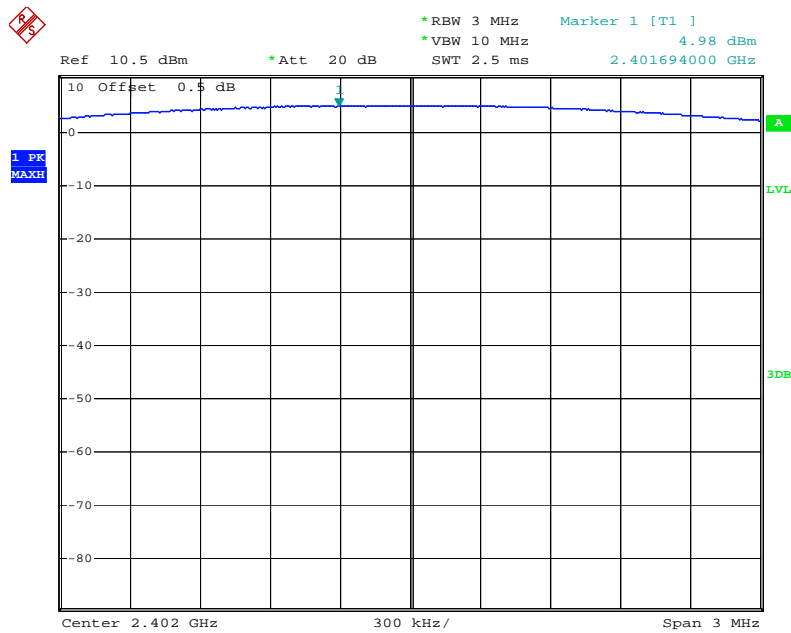
Date: 3.MAY.2012 11:31:26

BDR - High Channel



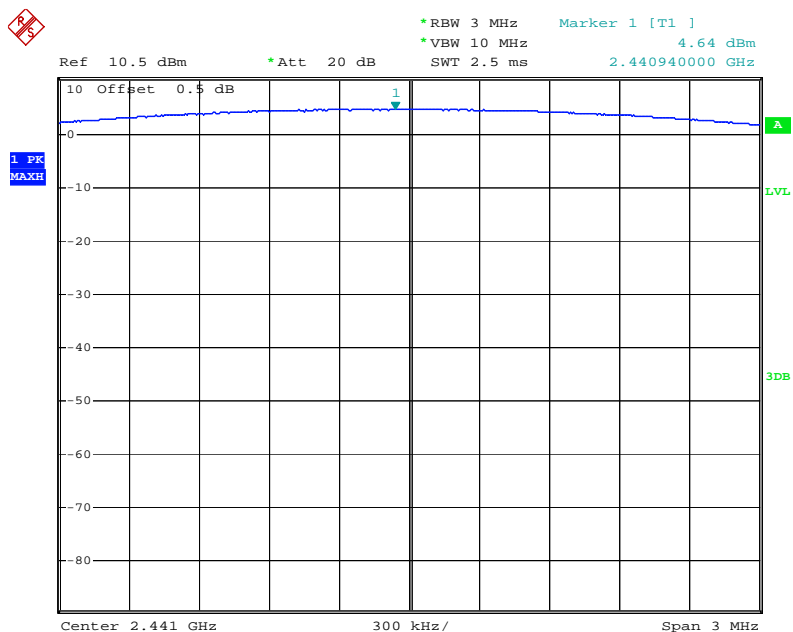
Date: 3.MAY.2012 11:31:02

EDR ($\pi/4$ -DQPSK) - Low Channel



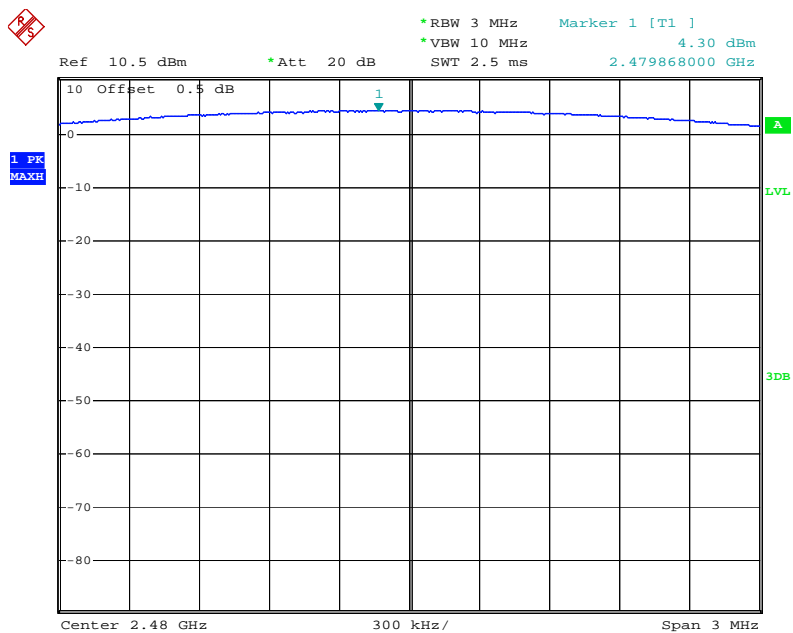
Date: 3.MAY.2012 12:07:32

EDR ($\pi/4$ -DQPSK) - Middle Channel



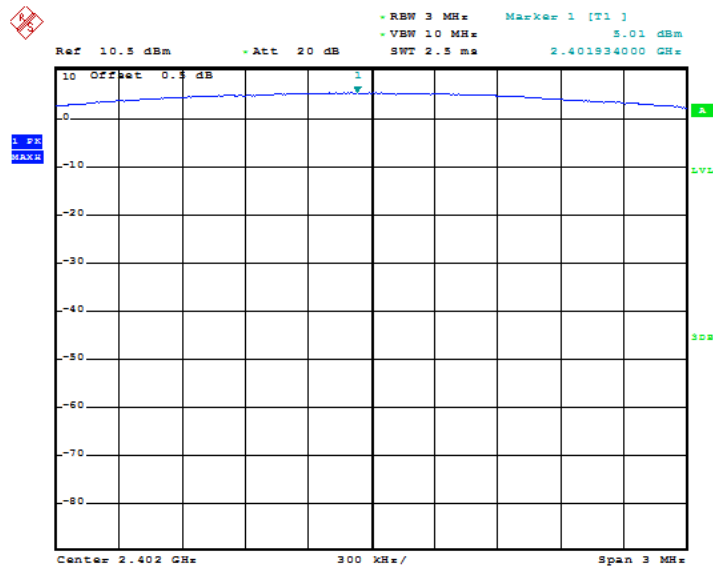
Date: 3.MAY.2012 12:05:08

EDR ($\pi/4$ -DQPSK) - High Channel



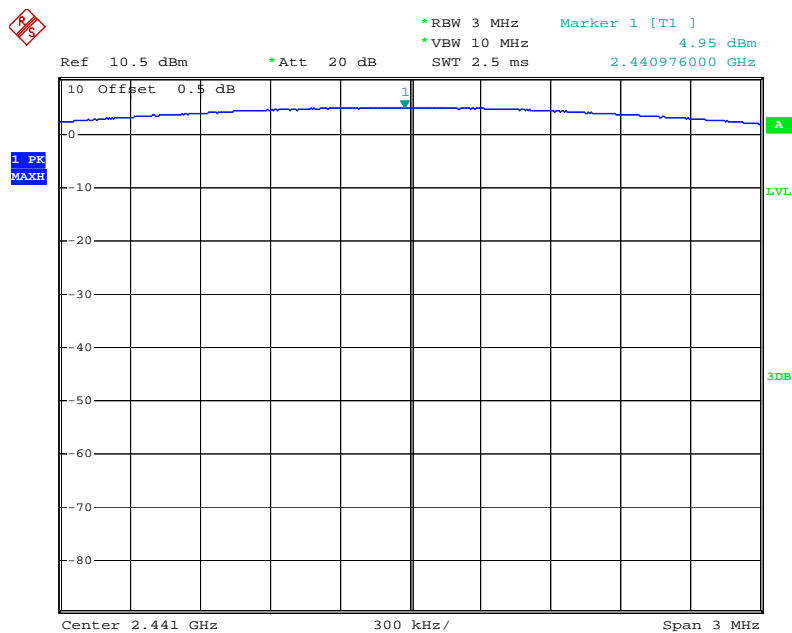
Date: 3.MAY.2012 12:04:32

EDR (8DPSK) - Low Channel



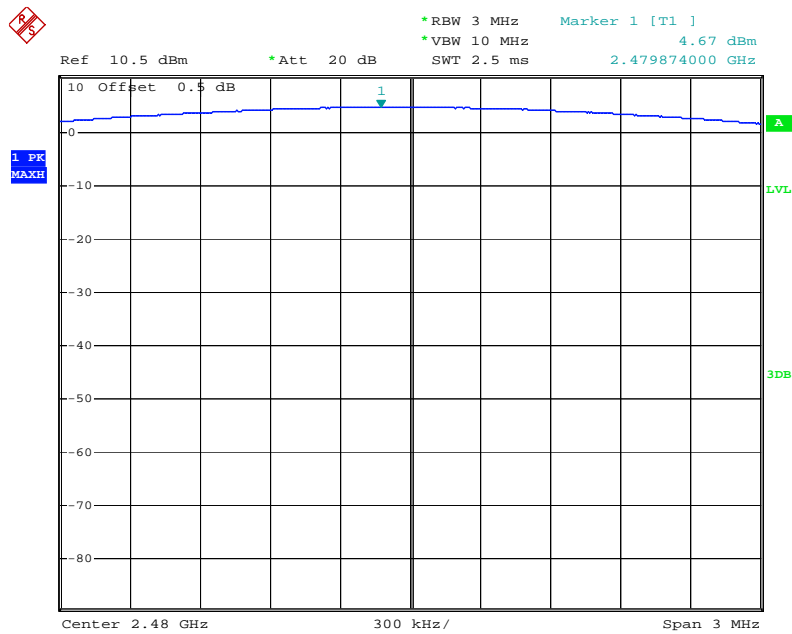
Date: 3.MAY.2012 12:06:45

EDR (8DPSK) - Middle Channel



Date: 3.MAY.2012 12:05:53

EDR (8DPSK) - High Channel



Date: 3.MAY.2012 12:03:58

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

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)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

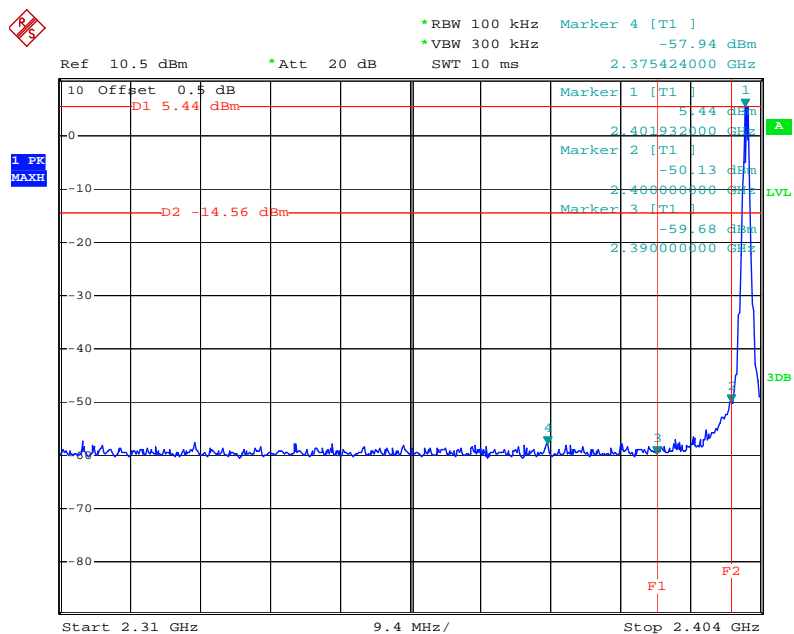
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data**Environmental Conditions**

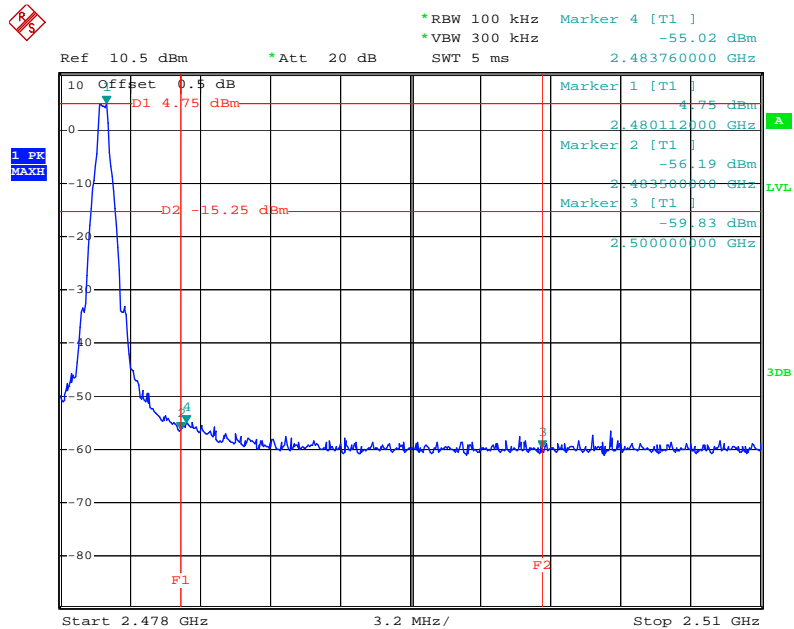
Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

**The testing was performed by Dean Liu on 2012-05-03.*

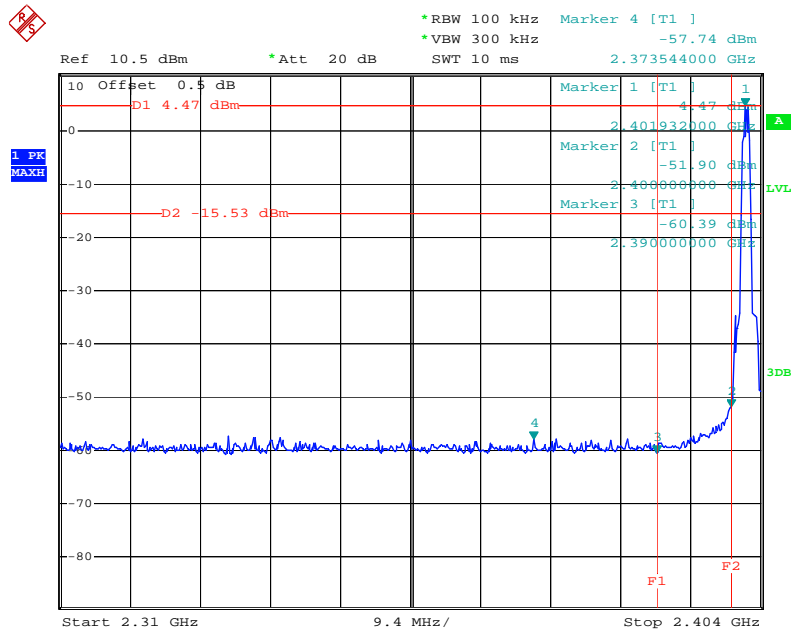
Test Result: Compliance

BDR: Band Edge, Left Side

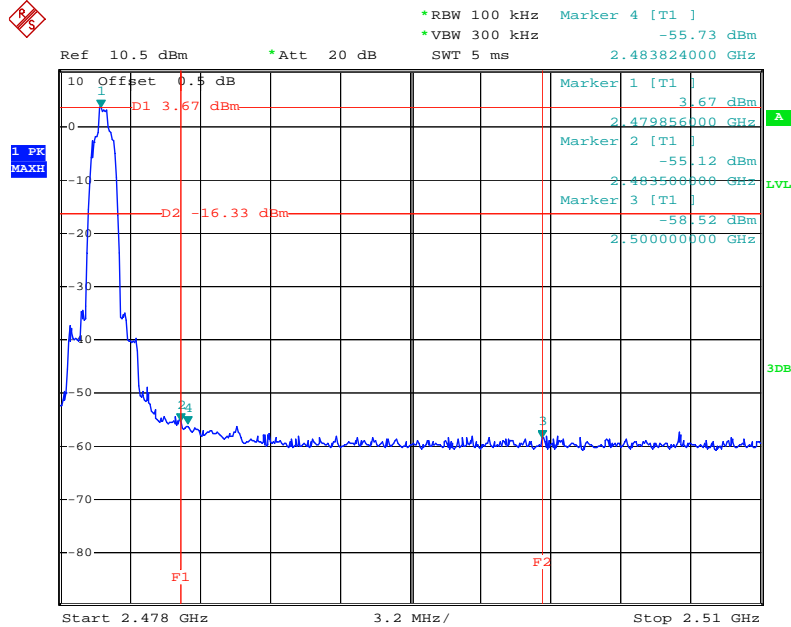
Date: 3.MAY.2012 11:34:49

BDR: Band Edge, Right Side

Date: 3.MAY.2012 11:45:04

EDR ($\pi/4$ -DQPSK) : Band Edge, Left Side

Date: 3.MAY.2012 11:37:41

EDR ($\pi/4$ -DQPSK) : Band Edge, Right Side

Date: 3.MAY.2012 11:43:40



EDR (8DPSK): Band Edge, Right Side



***** END OF REPORT *****