LABCODE: 500069-0

FCC PART 15.247

TEST REPORT

For

Shenzhen Autone-Tronic Technology Co.,Ltd.

Fl4, Building 21,Changxing Technology Park, Shayi Village, Shajin Town, Baoan District, Shenzhen, Guangdong, China

FCC ID: YZG-DDAGR
Model: LA-6200

Report Type:	**Product Type:**
Original Report	In-dash multimedia

Test Engineer:	Leon Chen
Report Number:	R2DG130325005-00
Report Date:	2013-04-24
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Autone-Tronic Technology Co.,Ltd.*'s product, model number: *LA-6200 (FCC ID: YZG-DDAGR) or* ("EUT") in this report is a *In-dash multimedia,* which was measured approximately: 19.9 cm (L) x 11.8cm (W) x 17.6cm (H), rated input voltage: DC 12 V from battery.

** All measurement and test data in this report was gathered from production sample serial number: 130325005 (Assigned by BACL, Dongguan). The EUT was received on 2013-03-26.*

Objective

This report is prepared on behalf of *Shenzhen Autone-Tronic Technology Co.,Ltd.* 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 Bluetooth of EUT compliance 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)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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 C63.4-2003.

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. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).

The current scope of accreditations can be found at http://ts.nist.gov/standards/scopes/5000690.htm

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

EUT Exercise Software

CSR bluesuite

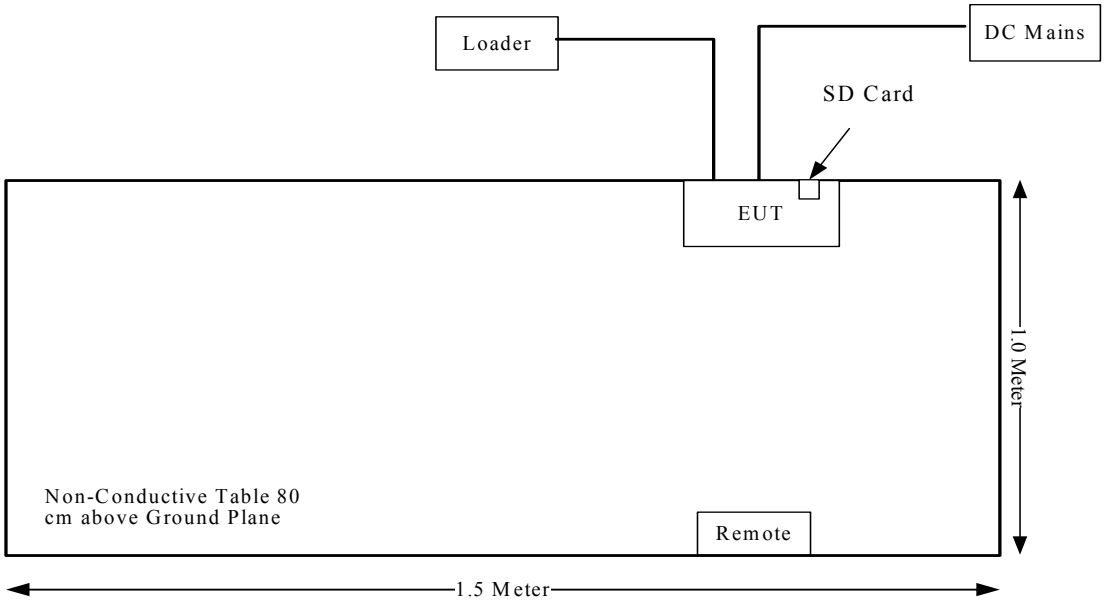
Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Kinston	USB flash disk	/	/
Kinston	SD card	/	/

Block Diagram of Test Setup



Note: Loader were AV cables without load

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1307 (b) (2) & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE	Compliace
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Not Applicable
§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

Not Applicable: the EUT powered by battery.

FCC §15.247 (i) & §1.1307 (b) (2) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i)and subpart §1.1307(b)(2), 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 Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) 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)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	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;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency (MHz)	**Antenna Gain**		**Conducted Power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
2480	0	1	5.38	3.45	20	0.000687	1

Result: The device meet FCC MPE at 20 cm distance

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 printed antenna, which was permanently attached on the PCB, and the maximum gain was 0 dBi, which complied with 15.203, please refer to the internal photos.

Result: Compliance.

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

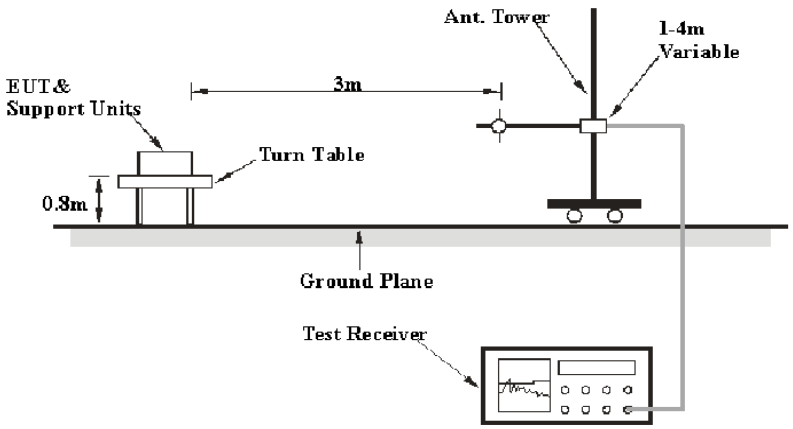
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

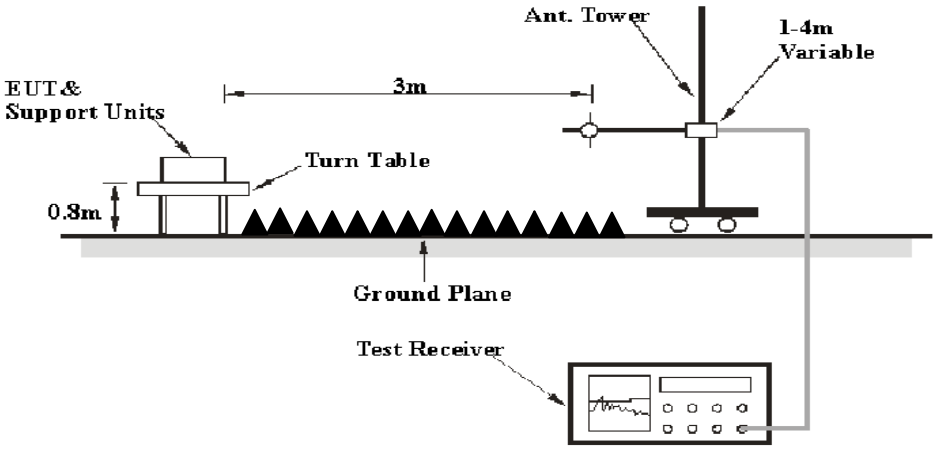
Measurement		U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)	(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)	(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)	(6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2003. 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 spacing between the peripherals was 10 cm.

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:

Frequency Range	***RBW***	***Video BW***	***Detector***
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

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
R&S	EMI TEST RECIEVER	ESCI	100224	2012-5-14	2013-5-13
Sunol Sciences	Antenna	JB3	A060611-1	2012-9-6	2013-9-5
HP	HP AMPLIFIER	8447E	2434A02181	N/A	N/A
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3
ETS LINDGREN	horn antenna	3115	000 527 35	2012-9-6	2013-9-5
Mini-Circuits	Amplifier	ZVA-213-S+	54201245	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – 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:

2.96 dB at **288.02 MHz** in the **Horizontal** polarization of BDR Mode

Test Data

Environmental Conditions

Temperature:	22.9°C
Relative Humidity:	69 %
ATM Pressure:	100kPa

** The testing was performed by Leon Chen on 2013-04-19.*

Mode: Transmitting

BDR Mode (GFSK):

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402(MHz)									
2402	65.02	PK	H	25.65	3.90	0.00	94.57	N/A	N/A
2402	31.23	AV	H	25.65	3.90	0.00	60.78	N/A	N/A
2402	61.13	PK	V	25.65	3.90	0.00	90.68	N/A	N/A
2402	29.78	AV	V	25.65	3.90	0.00	59.33	N/A	N/A
2390	28.36	PK	H	25.61	3.84	0.00	57.81	74.00	16.19
2390	14.08	AV	H	25.61	3.84	0.00	43.53	54.00	10.47
4804	49.12	PK	H	30.59	4.67	27.26	57.12	74.00	16.88
4804	26.53	AV	H	30.59	4.67	27.26	34.53	54.00	19.47
7206	31.62	PK	H	34.09	6.50	26.30	45.91	74.00	28.09
7206	17.63	AV	H	34.09	6.50	26.30	31.92	54.00	22.08
9608	31.95	PK	H	35.96	8.75	26.22	50.44	74.00	23.56
9608	17.97	AV	H	35.96	8.75	26.22	36.46	54.00	17.54
3789	32.25	PK	H	29.44	4.96	27.44	39.21	74.00	34.79
3789	18.59	AV	H	29.44	4.96	27.44	25.55	54.00	28.45
288.02	48.44	QP	H	13.89	2.04	21.51	42.86	46.00	3.14*
Middle Channel: 2441(MHz)									
2441	64.25	PK	H	25.75	3.99	0.00	93.99	N/A	N/A
2441	30.51	AV	H	25.75	3.99	0.00	60.25	N/A	N/A
2441	60.04	PK	V	25.75	3.99	0.00	89.78	N/A	N/A
2441	29.22	AV	V	25.75	3.99	0.00	58.96	N/A	N/A
4882	49.18	PK	H	30.79	4.75	27.26	57.46	74.00	16.54
4882	26.51	AV	H	30.79	4.75	27.26	34.79	54.00	19.21
7323	31.69	PK	H	34.38	6.72	26.53	46.26	74.00	27.74
7323	17.74	AV	H	34.38	6.72	26.53	32.31	54.00	21.69
9764	31.89	PK	H	36.33	8.58	25.62	51.18	74.00	22.82
9764	17.88	AV	H	36.33	8.58	25.62	37.17	54.00	16.83
3789	32.34	PK	H	29.44	4.96	27.44	39.30	74.00	34.70
3789	18.71	AV	H	29.44	4.96	27.44	25.67	54.00	28.33
3230	32.22	PK	H	27.94	5.10	27.47	37.79	74.00	36.21
3230	18.57	AV	H	27.94	5.10	27.47	24.14	54.00	29.86
288.02	48.62	QP	H	13.89	2.04	21.51	43.04	46.00	2.96*
High Channel: 2480(MHz)									
2480	63.49	PK	H	25.85	3.82	0.00	93.16	N/A	N/A
2480	30.32	AV	H	25.85	3.82	0.00	59.99	N/A	N/A
2480	59.93	PK	V	25.85	3.82	0.00	89.60	N/A	N/A
2480	29.01	AV	V	25.85	3.82	0.00	58.68	N/A	N/A
2483.5	29.26	PK	H	25.86	3.80	0.00	58.92	74.00	15.08
2483.5	14.84	AV	H	25.86	3.80	0.00	44.50	54.00	9.50
4960	48.99	PK	H	31.00	4.70	27.27	57.42	74.00	16.58
4960	26.35	AV	H	31.00	4.70	27.27	34.78	54.00	19.22
7440	31.53	PK	H	34.66	6.95	26.56	46.58	74.00	27.42
7440	17.57	AV	H	34.66	6.95	26.56	32.62	54.00	21.38
9920	31.89	PK	H	36.71	8.41	25.50	51.51	74.00	22.49
9920	17.88	AV	H	36.71	8.41	25.50	37.50	54.00	16.50
3789	32.21	PK	H	29.44	4.96	27.44	39.17	74.00	34.83
3789	18.55	AV	H	29.44	4.96	27.44	25.51	54.00	28.49
288.02	48.03	QP	H	13.89	2.04	21.51	42.45	46.00	3.55*

*Within measurement uncertainty!

EDR Mode (π/4-DQPSK):

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402(MHz)									
2402	63.95	PK	H	25.65	3.90	0.00	93.50	N/A	N/A
2402	30.79	AV	H	25.65	3.90	0.00	60.34	N/A	N/A
2402	60.24	PK	V	25.65	3.90	0.00	89.79	N/A	N/A
2402	29.31	AV	V	25.65	3.90	0.00	58.86	N/A	N/A
2390	27.89	PK	H	25.61	3.84	0.00	57.34	74.00	16.66
2390	14.12	AV	H	25.61	3.84	0.00	43.57	54.00	10.43
4804	49.06	PK	H	30.59	4.67	27.26	57.06	74.00	16.94
4804	26.4	AV	H	30.59	4.67	27.26	34.40	54.00	19.60
7206	31.65	PK	H	34.09	6.50	26.30	45.94	74.00	28.06
7206	17.61	AV	H	34.09	6.50	26.30	31.90	54.00	22.10
9608	31.92	PK	H	35.96	8.75	26.22	50.41	74.00	23.59
9608	17.9	AV	H	35.96	8.75	26.22	36.39	54.00	17.61
3789	32.36	PK	H	29.44	4.96	27.44	39.32	74.00	34.68
3789	18.74	AV	H	29.44	4.96	27.44	25.70	54.00	28.30
288.02	47.96	QP	H	13.89	2.04	21.51	42.38	46.00	3.62*
Middle Channel: 2441(MHz)									
2441	63.49	PK	H	25.75	3.99	0.00	93.23	N/A	N/A
2441	30.24	AV	H	25.75	3.99	0.00	59.98	N/A	N/A
2441	59.77	PK	V	25.75	3.99	0.00	89.51	N/A	N/A
2441	28.96	AV	V	25.75	3.99	0.00	58.70	N/A	N/A
4882	49.17	PK	H	30.79	4.75	27.26	57.45	74.00	16.55
4882	26.47	AV	H	30.79	4.75	27.26	34.75	54.00	19.25
7323	31.68	PK	H	34.38	6.72	26.53	46.25	74.00	27.75
7323	17.68	AV	H	34.38	6.72	26.53	32.25	54.00	21.75
9764	32.04	PK	H	36.33	8.58	25.62	51.33	74.00	22.67
9764	18.02	AV	H	36.33	8.58	25.62	37.31	54.00	16.69
3789	32.32	PK	H	29.44	4.96	27.44	39.28	74.00	34.72
3789	18.73	AV	H	29.44	4.96	27.44	25.69	54.00	28.31
3230	32.29	PK	H	27.94	5.10	27.47	37.86	74.00	36.14
3230	18.57	AV	H	27.94	5.10	27.47	24.14	54.00	29.86
288.02	48.05	QP	H	13.89	2.04	21.51	42.47	46.00	3.53*
High Channel: 2480(MHz)									
2480	63.47	PK	H	25.85	3.82	0.00	93.14	N/A	N/A
2480	30.25	AV	H	25.85	3.82	0.00	59.92	N/A	N/A
2480	59.76	PK	V	25.85	3.82	0.00	89.43	N/A	N/A
2480	28.93	AV	V	25.85	3.82	0.00	58.60	N/A	N/A
2483.5	28.99	PK	H	25.86	3.80	0.00	58.65	74.00	15.35
2483.5	14.72	AV	H	25.86	3.80	0.00	44.38	54.00	9.62
4960	48.07	PK	H	31.00	4.70	27.27	56.50	74.00	17.50
4960	26.20	AV	H	31.00	4.70	27.27	34.63	54.00	19.37
7440	32.29	PK	H	34.66	6.95	26.56	47.34	74.00	26.66
7440	18.48	AV	H	34.66	6.95	26.56	33.53	54.00	20.47
9920	31.76	PK	H	36.71	8.41	25.50	51.38	74.00	22.62
9920	18.07	AV	H	36.71	8.41	25.50	37.69	54.00	16.31
3789	31.59	PK	H	29.44	4.96	27.44	38.55	74.00	35.45
3789	18.78	AV	H	29.44	4.96	27.44	25.74	54.00	28.26
288.02	47.83	QP	H	13.89	2.04	21.51	42.25	46.00	3.75*

*Within measurement uncertainty!

EDR Mode (8-DPSK):

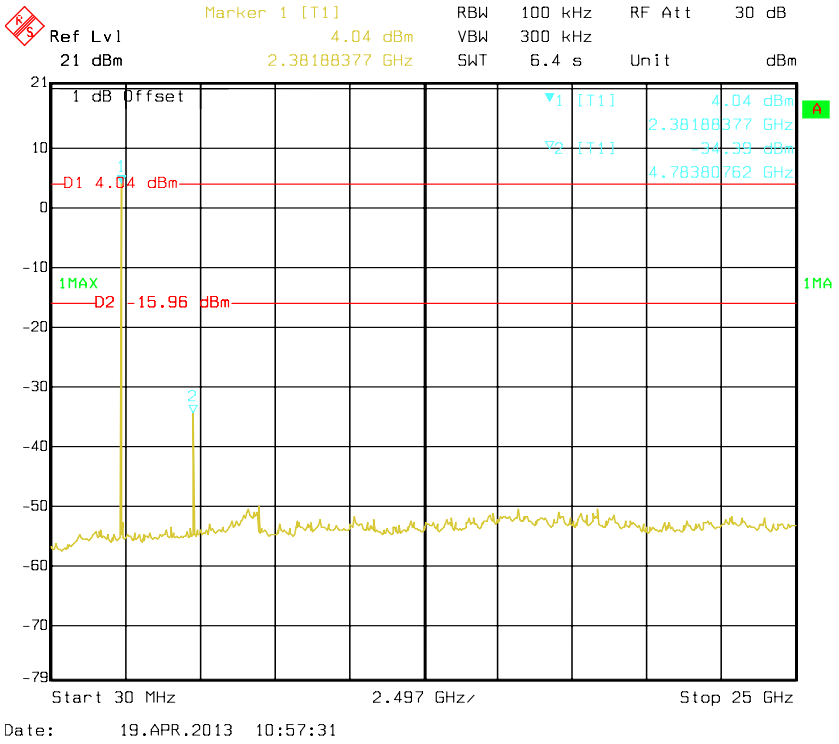
Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402(MHz)									
2402	64.07	PK	H	25.65	3.90	0.00	93.62	N/A	N/A
2402	30.76	AV	H	25.65	3.90	0.00	60.31	N/A	N/A
2402	60.35	PK	V	25.65	3.90	0.00	89.90	N/A	N/A
2402	29.38	AV	V	25.65	3.90	0.00	58.93	N/A	N/A
2390	28.14	PK	H	25.61	3.84	0.00	57.59	74.00	16.41
2390	14.09	AV	H	25.61	3.84	0.00	43.54	54.00	10.46
4804	49.15	PK	H	30.59	4.67	27.26	57.15	74.00	16.85
4804	26.51	AV	H	30.59	4.67	27.26	34.51	54.00	19.49
7206	31.58	PK	H	34.09	6.50	26.30	45.87	74.00	28.13
7206	17.73	AV	H	34.09	6.50	26.30	32.02	54.00	21.98
9608	32.05	PK	H	35.96	8.75	26.22	50.54	74.00	23.46
9608	17.98	AV	H	35.96	8.75	26.22	36.47	54.00	17.53
3789	32.32	PK	H	29.44	4.96	27.44	39.28	74.00	34.72
3789	18.71	AV	H	29.44	4.96	27.44	25.67	54.00	28.33
288.02	47.83	QP	H	13.89	2.04	21.51	42.25	46.00	3.75*
Middle Channel: 2441(MHz)									
2441	63.75	PK	H	25.75	3.99	0.00	93.49	N/A	N/A
2441	30.34	AV	H	25.75	3.99	0.00	60.08	N/A	N/A
2441	59.86	PK	V	25.75	3.99	0.00	89.60	N/A	N/A
2441	28.97	AV	V	25.75	3.99	0.00	58.71	N/A	N/A
4882	49.02	PK	H	30.79	4.75	27.26	57.30	74.00	16.70
4882	26.4	AV	H	30.79	4.75	27.26	34.68	54.00	19.32
7323	31.62	PK	H	34.38	6.72	26.53	46.19	74.00	27.81
7323	17.61	AV	H	34.38	6.72	26.53	32.18	54.00	21.82
9764	32.02	PK	H	36.33	8.58	25.62	51.31	74.00	22.69
9764	17.89	AV	H	36.33	8.58	25.62	37.18	54.00	16.82
3789	32.28	PK	H	29.44	4.96	27.44	39.24	74.00	34.76
3789	18.74	AV	H	29.44	4.96	27.44	25.70	54.00	28.30
3230	31.74	PK	H	27.94	5.10	27.47	37.31	74.00	36.69
3230	18.24	AV	H	27.94	5.10	27.47	23.81	54.00	30.19
288.02	47.95	QP	H	13.89	2.04	21.51	42.37	46.00	3.63*
High Channel: 2480(MHz)									
2480	63.64	PK	H	25.85	3.82	0.00	93.31	N/A	N/A
2480	30.27	AV	H	25.85	3.82	0.00	59.94	N/A	N/A
2480	59.79	PK	V	25.85	3.82	0.00	89.46	N/A	N/A
2480	28.92	AV	V	25.85	3.82	0.00	58.59	N/A	N/A
2483.5	28.95	PK	H	25.86	3.80	0.00	58.61	74.00	15.39
2483.5	14.74	AV	H	25.86	3.80	0.00	44.40	54.00	9.60
4960	48.13	PK	H	31.00	4.70	27.27	56.56	74.00	17.44
4960	26.24	AV	H	31.00	4.70	27.27	34.67	54.00	19.33
7440	31.64	PK	H	34.66	6.95	26.56	46.69	74.00	27.31
7440	18.36	AV	H	34.66	6.95	26.56	33.41	54.00	20.59
9920	30.49	PK	H	36.71	8.41	25.50	50.11	74.00	23.89
9920	18.24	AV	H	36.71	8.41	25.50	37.86	54.00	16.14
3789	32.47	PK	H	29.44	4.96	27.44	39.43	74.00	34.57
3789	18.83	AV	H	29.44	4.96	27.44	25.79	54.00	28.21
288.02	47.52	QP	H	13.89	2.04	21.51	41.94	46.00	4.06*

*Within measurement uncertainty!

Conducted Spurious Emissions at Antenna Port

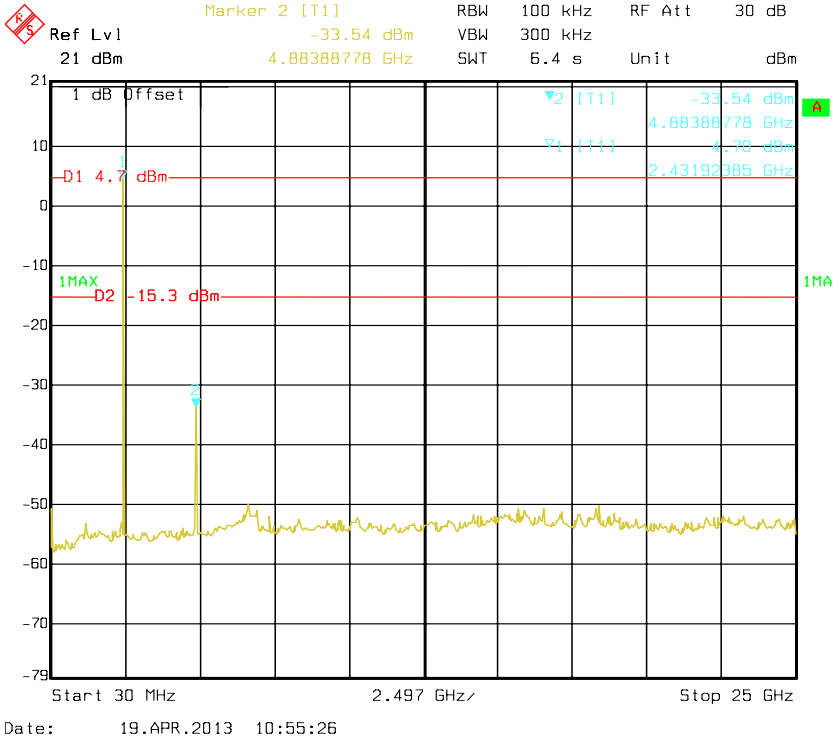
BDR Mode (GFSK):

Low Channel



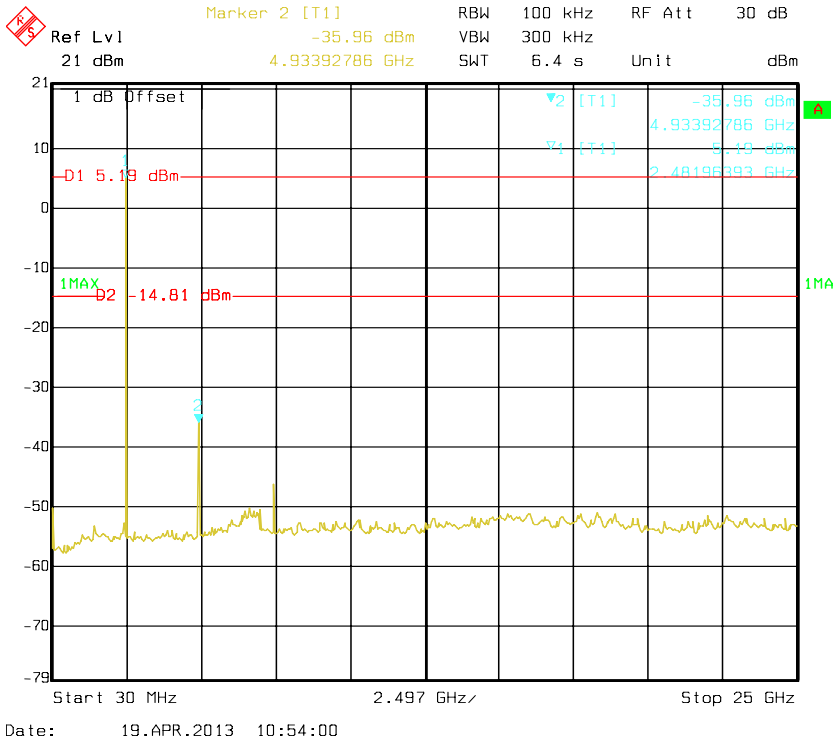
Date: 19.APR.2013 10:57:31

Middle Channel



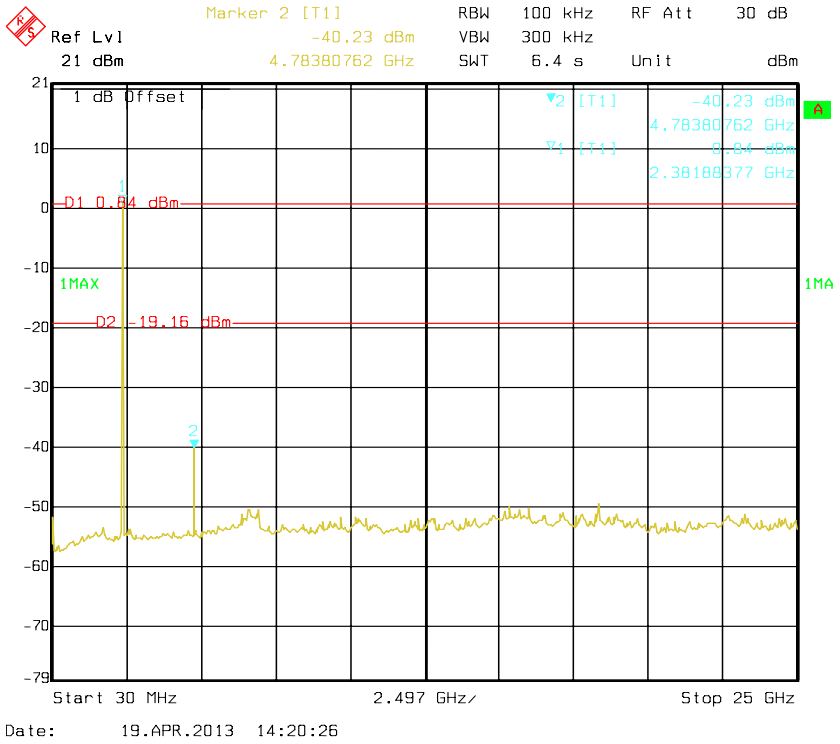
Date: 19.APR.2013 10:55:26

High Channel

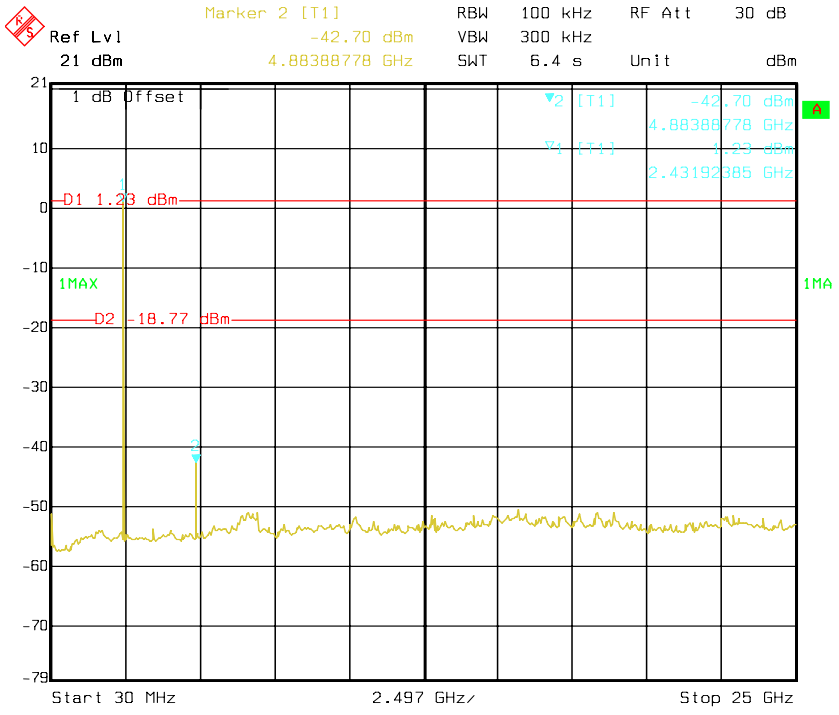


EDR Mode (π/4-DQPSK):

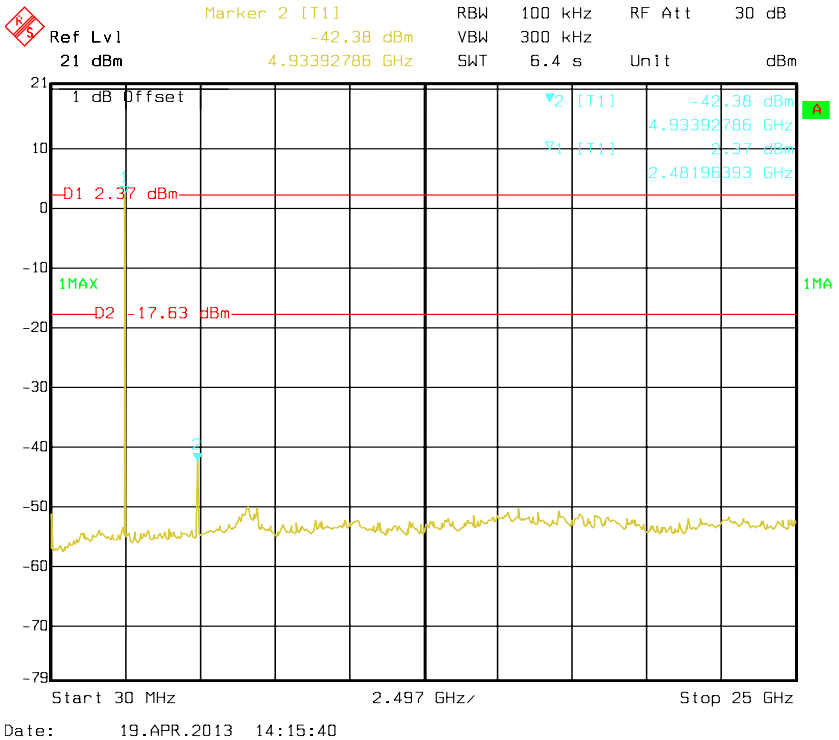
Low Channel



Middle Channel

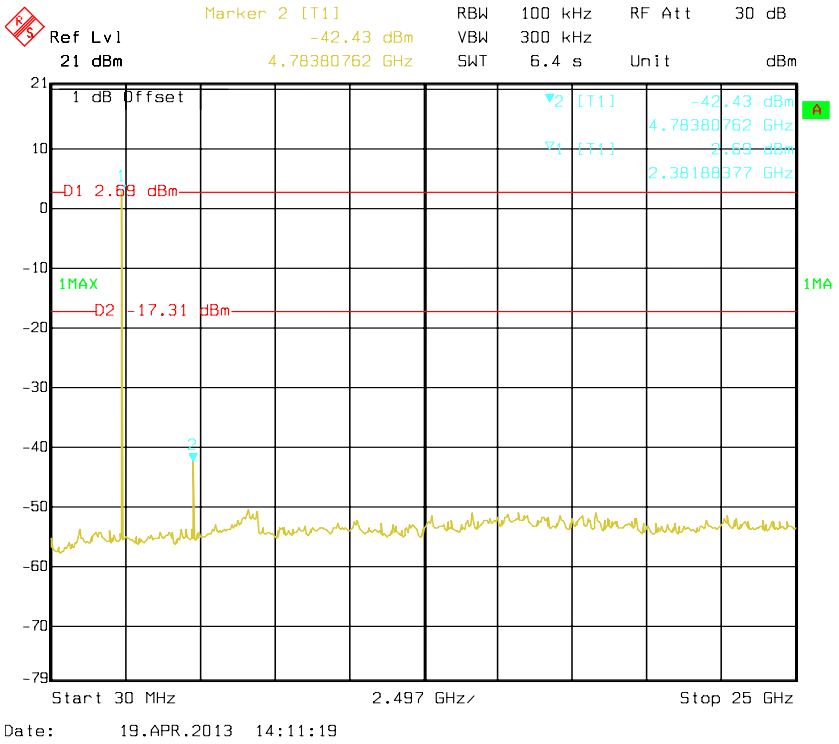


High Channel

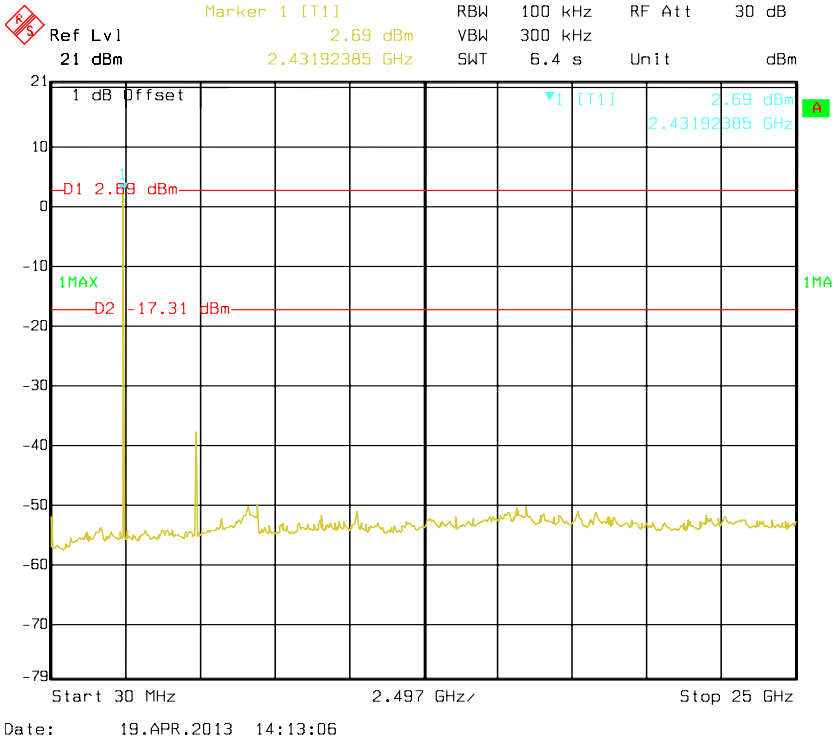


EDR Mode (8-DPSK):

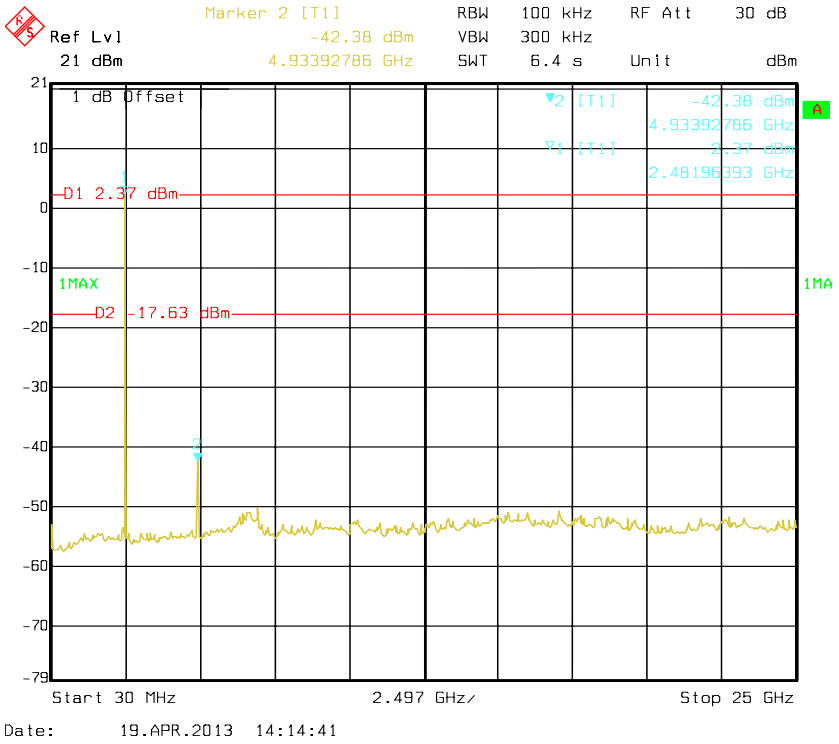
Low Channel



Middle Channel



High Channel



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

Applicable Standard

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 2400-2483.50 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
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

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:	26.8°C
Relative Humidity:	69 %
ATM Pressure:	100kPa

** The testing was performed by Leon Chen on 2013-04-19.*

Test Result: Compliance.

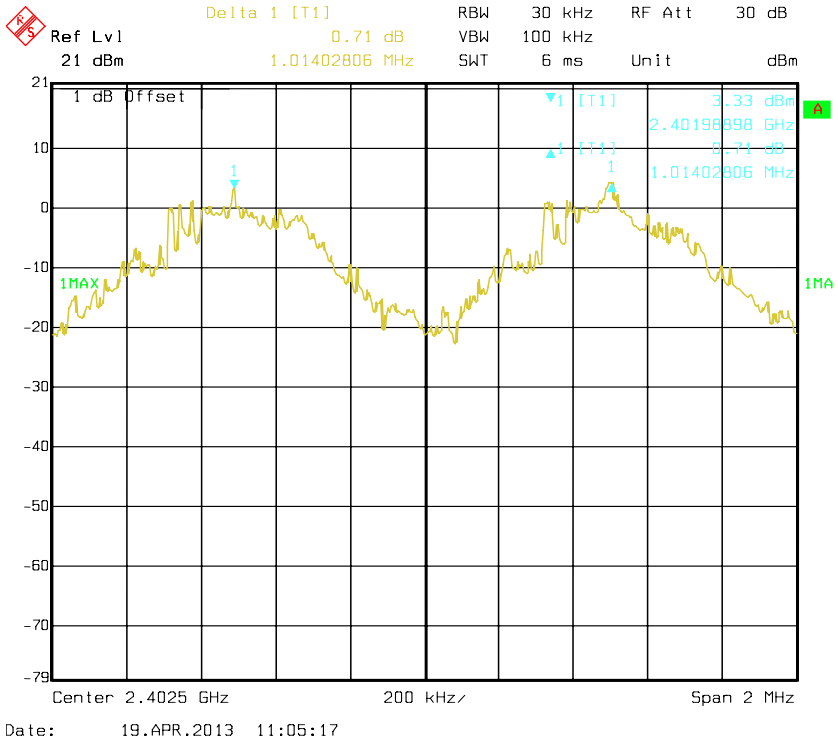
Please refer to following tables and plots

Test Mode: Transmitting

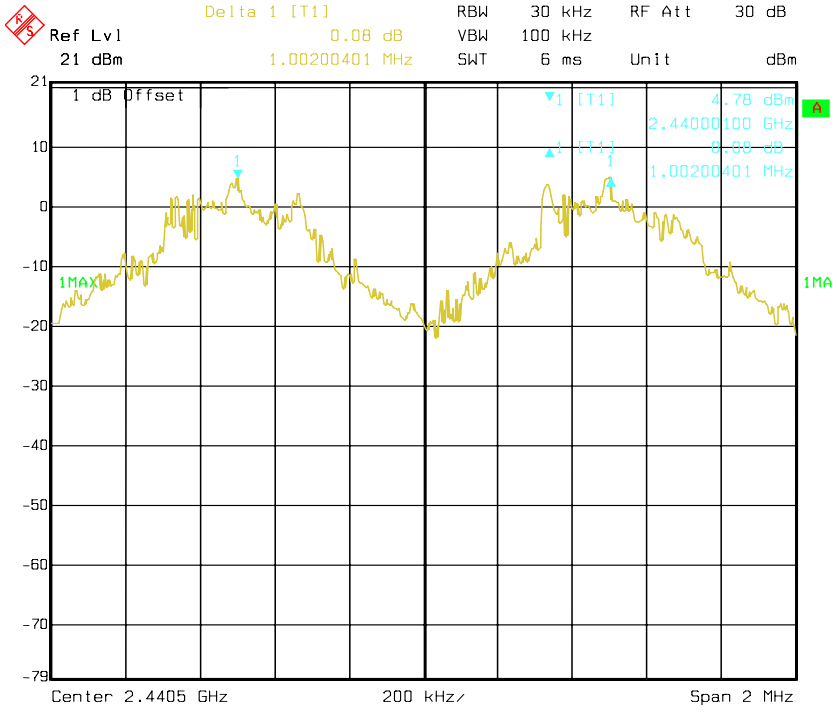
Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
BDR Mode (GFSK)	Low	2402	1.014	0.63	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.63	Pass
	Adjacent	2440			
	High	2480	1.010	0.63	Pass
	Adjacent	2479			
EDR Mode (π/4-DQPSK):	Low	2402	1.006	0.83	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.83	Pass
	Adjacent	2440			
	High	2480	1.002	0.83	Pass
	Adjacent	2479			
EDR Mode (8-DPSK):	Low	2402	1.006	0.81	Pass
	Adjacent	2403			
	Middle	2441	1.010	0.81	Pass
	Adjacent	2440			
	High	2480	1.002	0.81	Pass
	Adjacent	2479			

BDR Mode (GFSK):

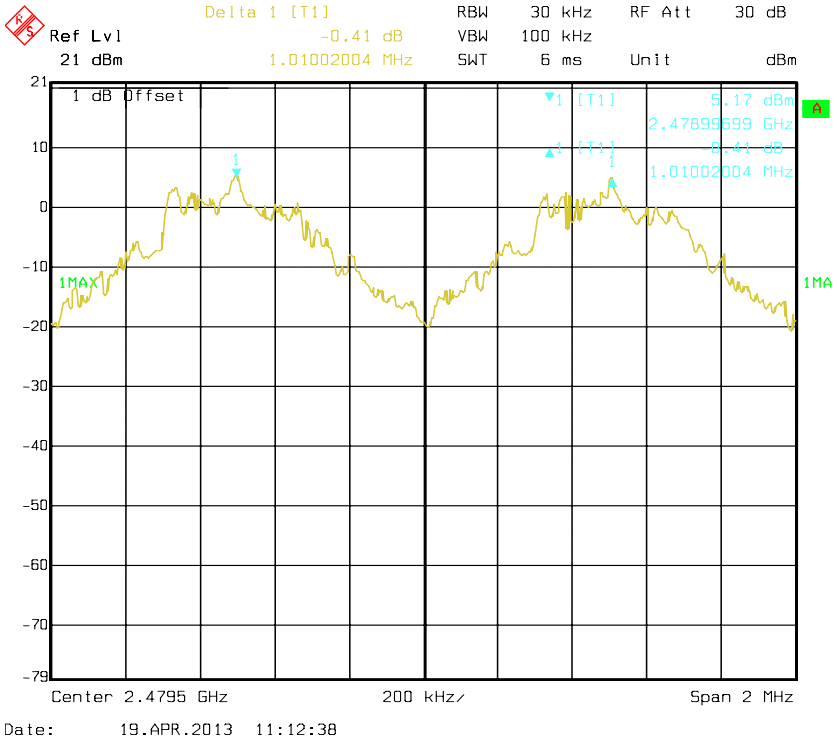
Low Channel



Middle Channel

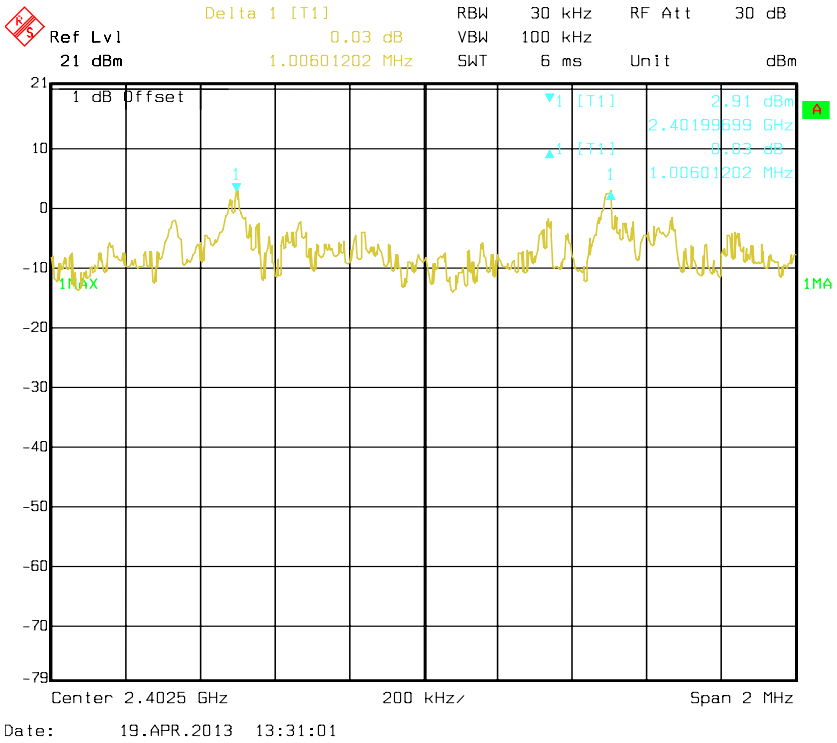


High Channel

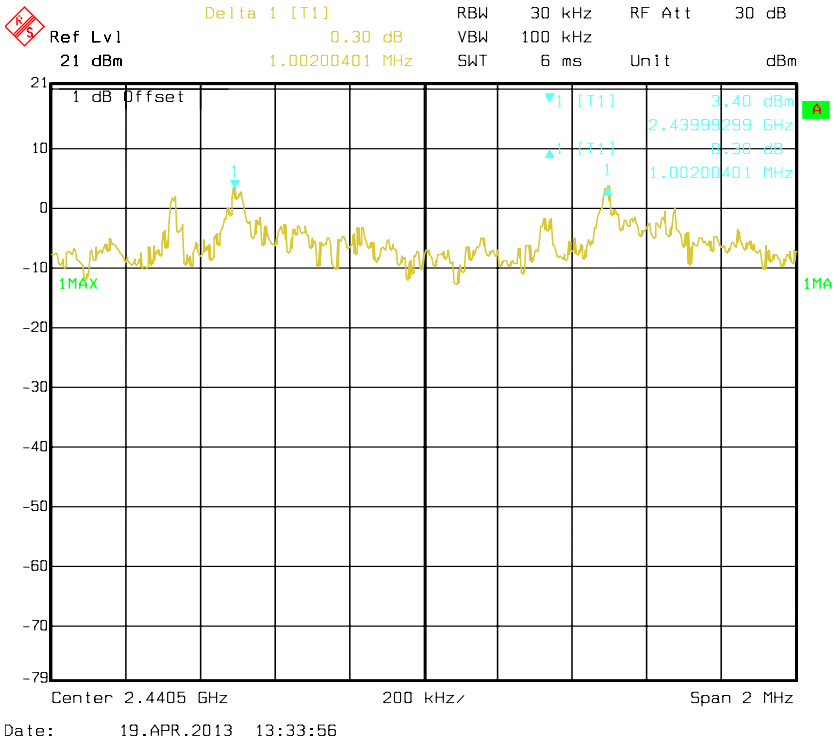


EDR Mode (π/4-DQPSK):

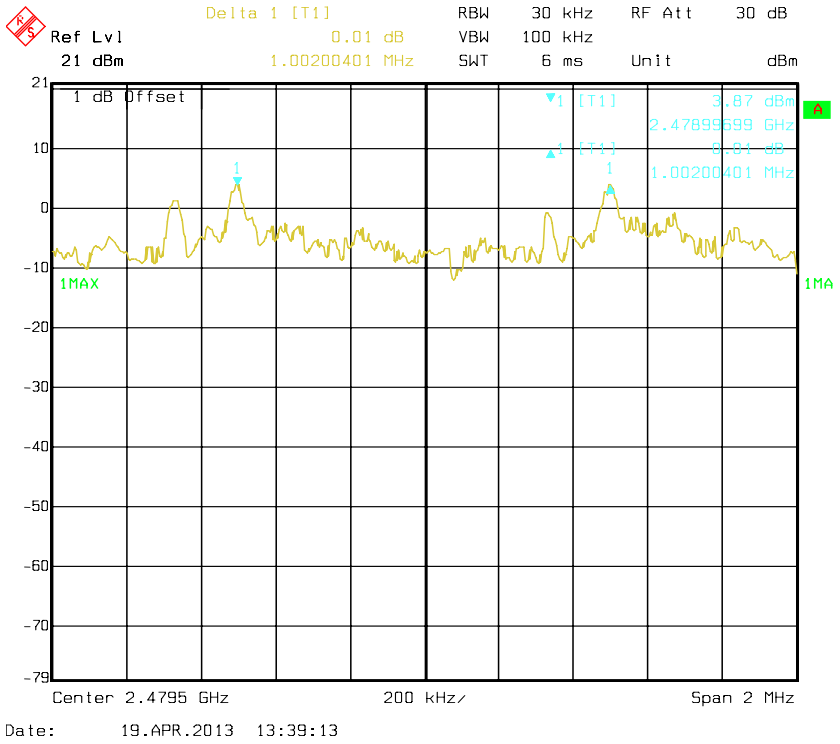
Low Channel



Middle Channel

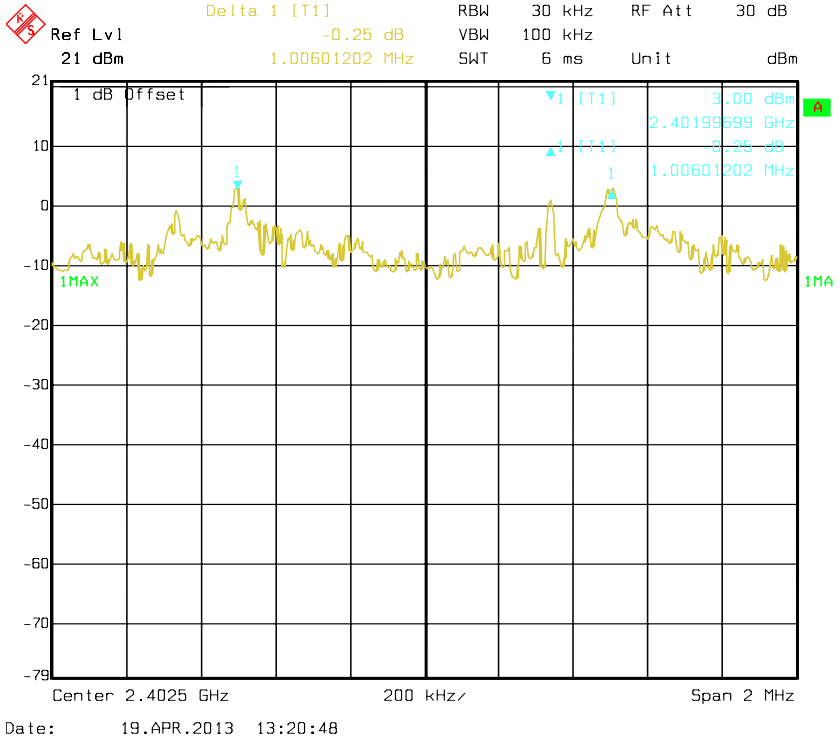


High Channel

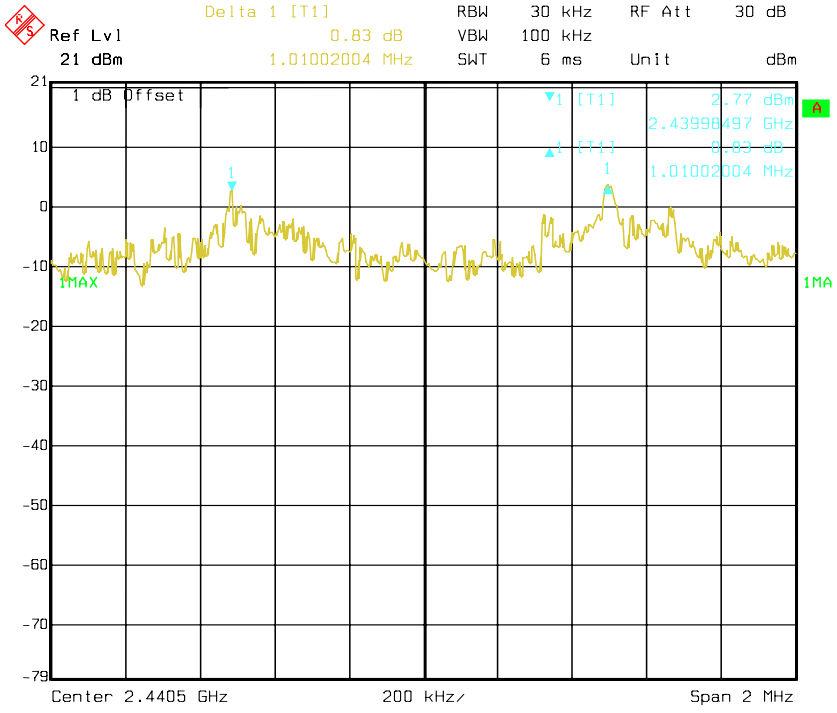


EDR Mode (8-DPSK):

Low Channel

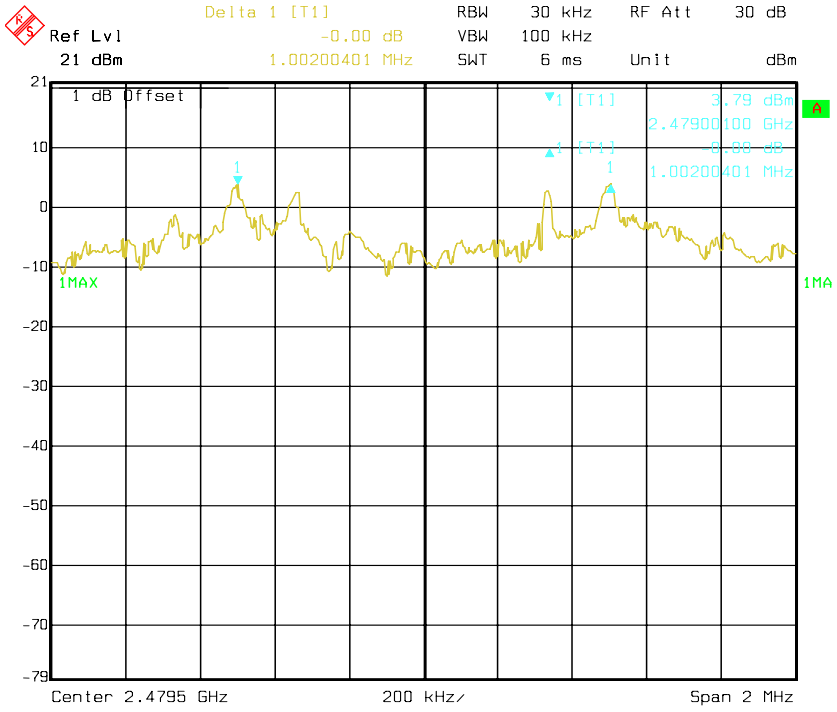


Middle Channel



Date: 19.APR.2013 13:22:33

High Channel



Date: 19.APR.2013 13:28:04

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
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.8°C
Relative Humidity:	69 %
ATM Pressure:	100kPa

** The testing was performed by Leon Chen on 2013-04-19.*

Test Result: Compliance.

Please refer to following tables and plots

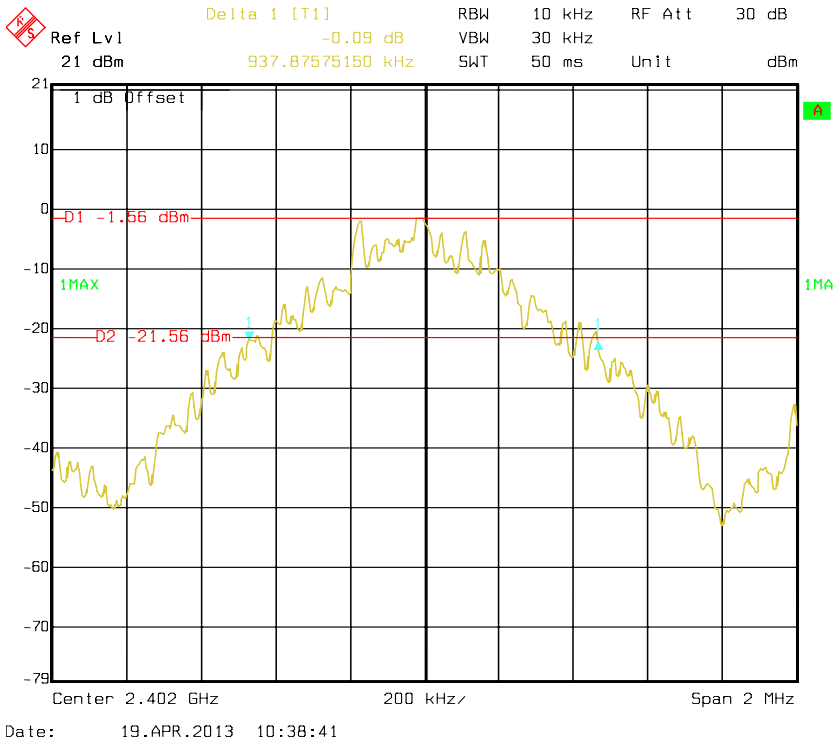
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR Mode (GFSK)	Low	2402	0.938
	Middle	2441	0.922
	High	2480	0.922
EDR Mode (π/4-DQPSK):	Low	2402	1.251
	Middle	2441	1.251
	High	2480	1.214
EDR Mode (8-DPSK):	Low	2402	1.22
	Middle	2441	1.214
	High	2480	1.218

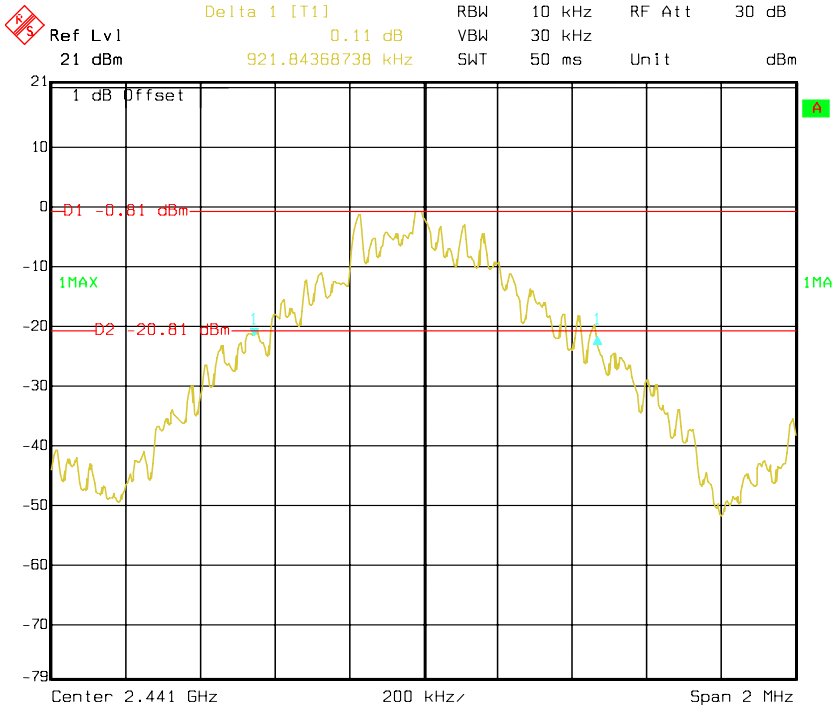
Please refer to the following plots.

BDR Mode (GFSK):

Low Channel

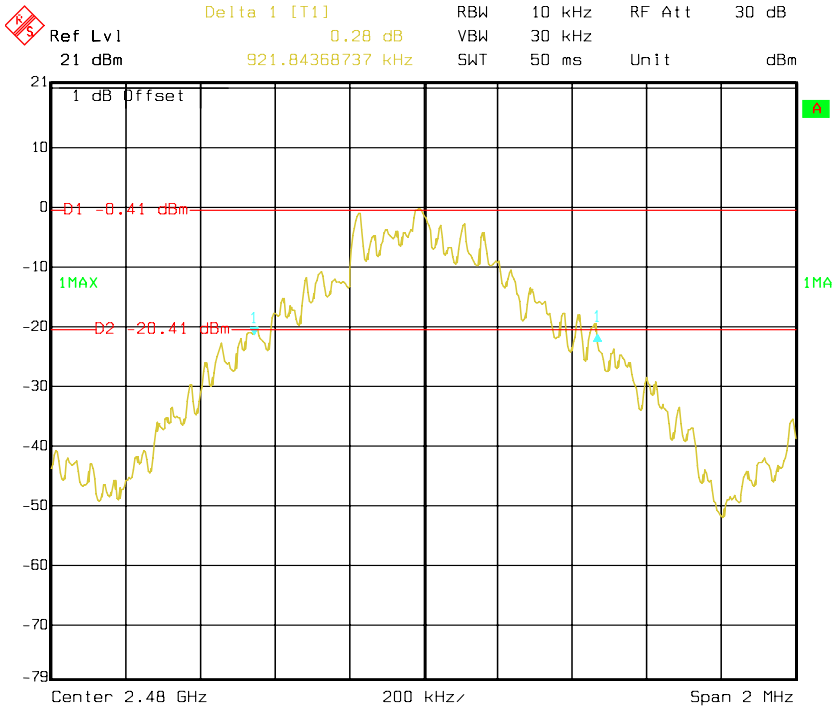


Middle Channel



Date: 19.APR.2013 10:40:12

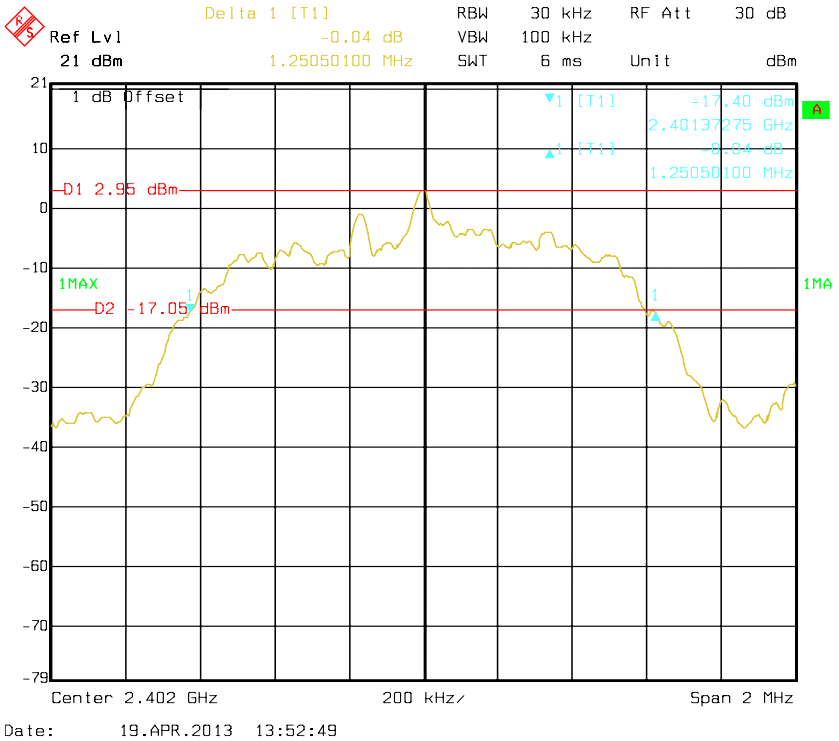
High Channel



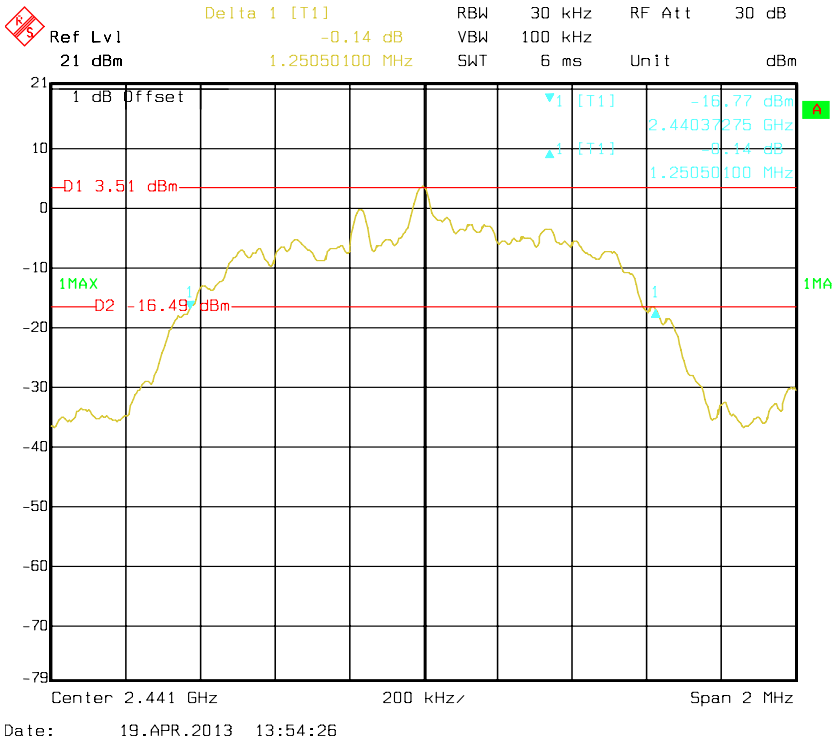
Date: 19.APR.2013 10:41:10

EDR Mode (π/4-DQPSK):

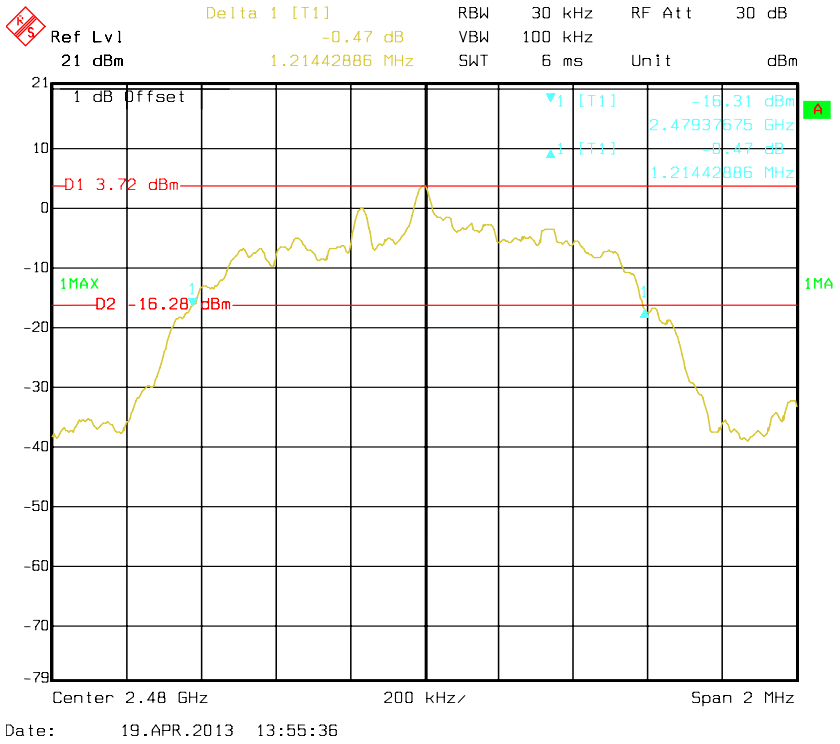
Low Channel



Middle Channel

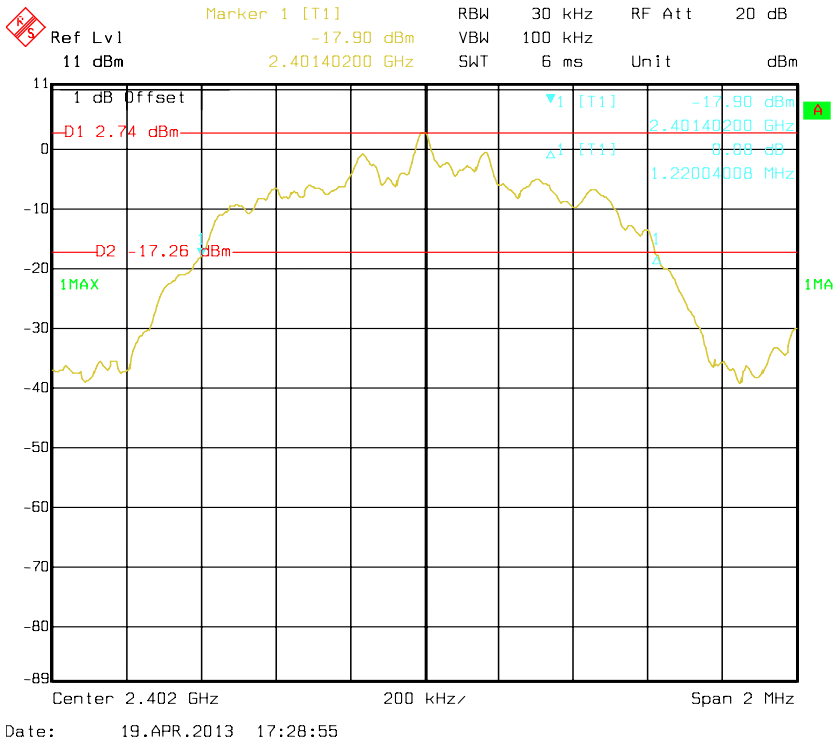


High Channel

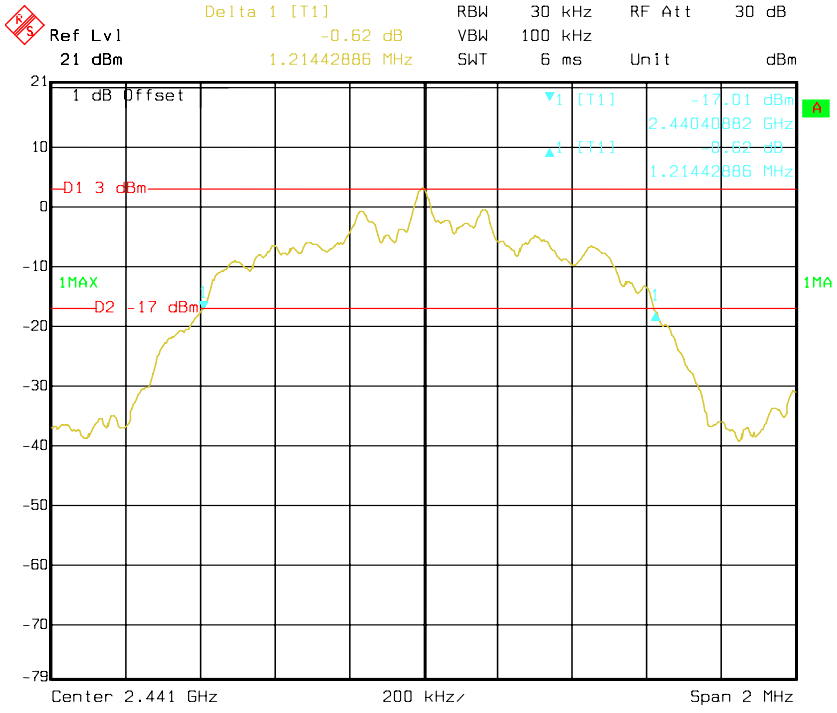


EDR Mode (8-DPSK):

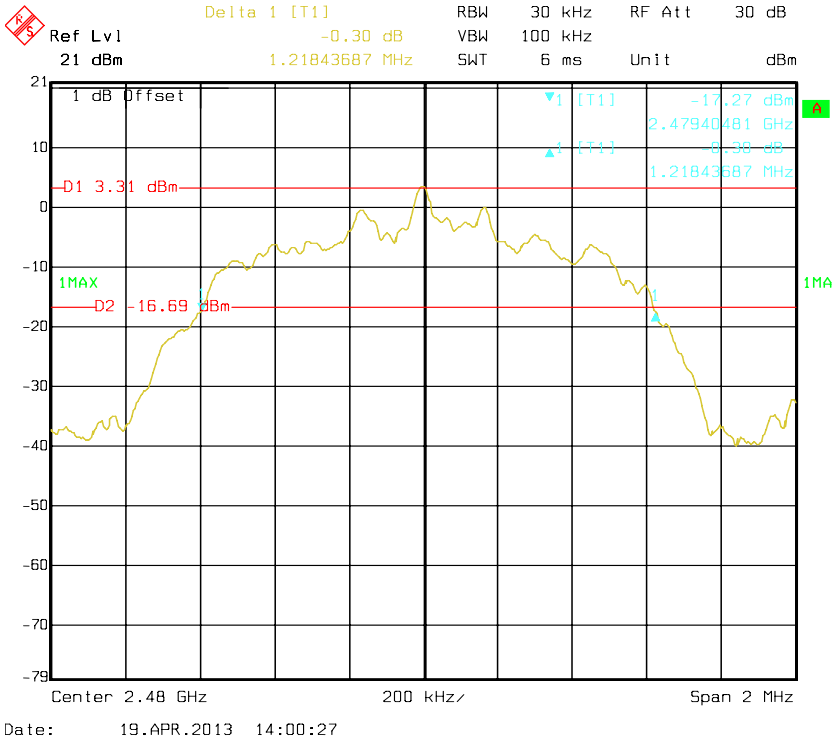
Low Channel



Middle Channel



High Channel



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
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.8°C
Relative Humidity:	69 %
ATM Pressure:	100kPa

** The testing was performed by Leon Chen on 2013-04-19.*

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Test Result: Compliance.

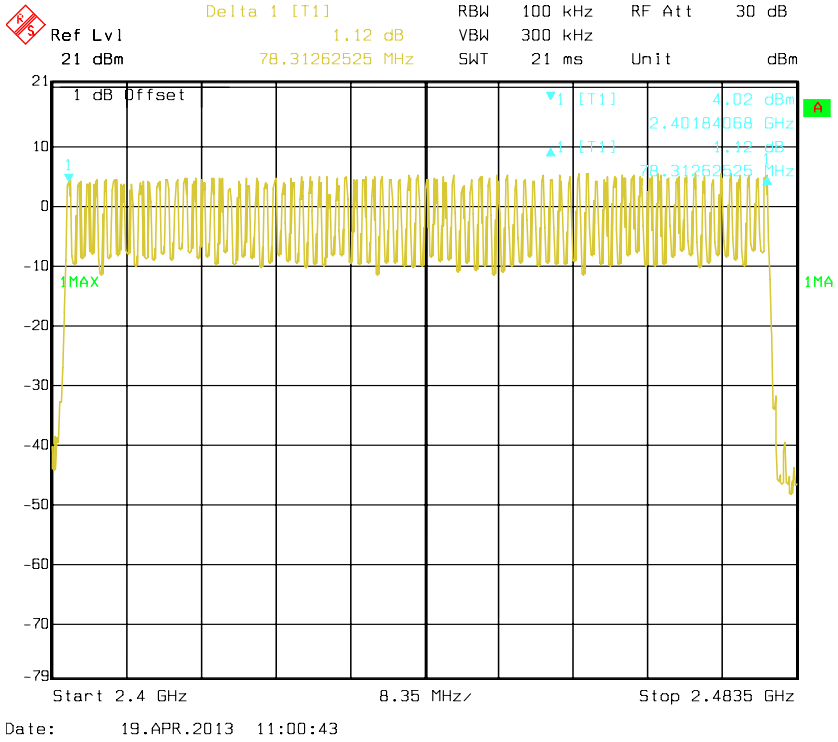
Please refer to following tables and plots

Test Mode: Transmitting

BDR Mode (GFSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	⩾15

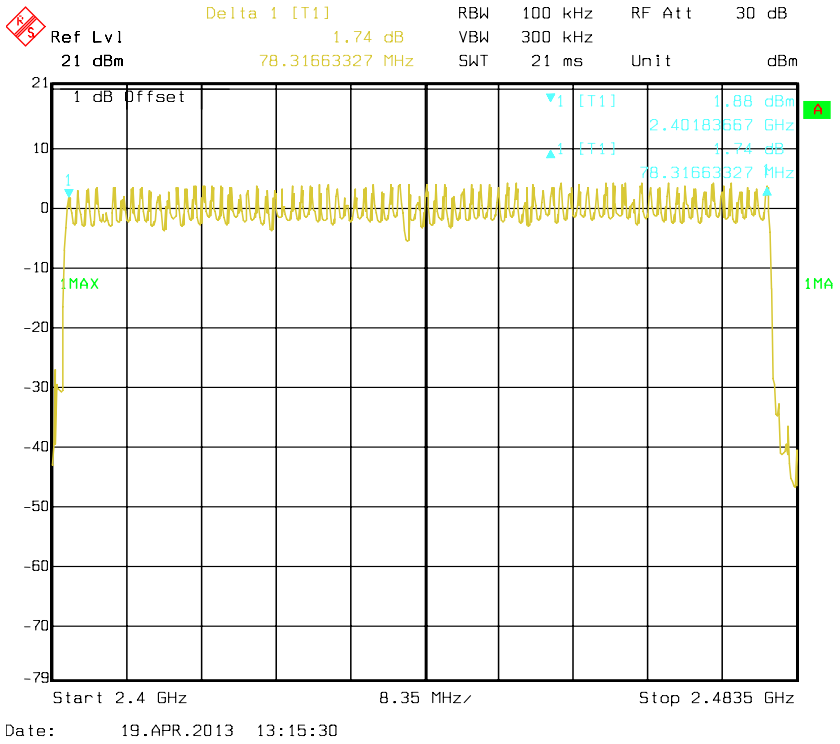
Number of Hopping Channels



EDR Mode (π/4-DQPSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	⩾15

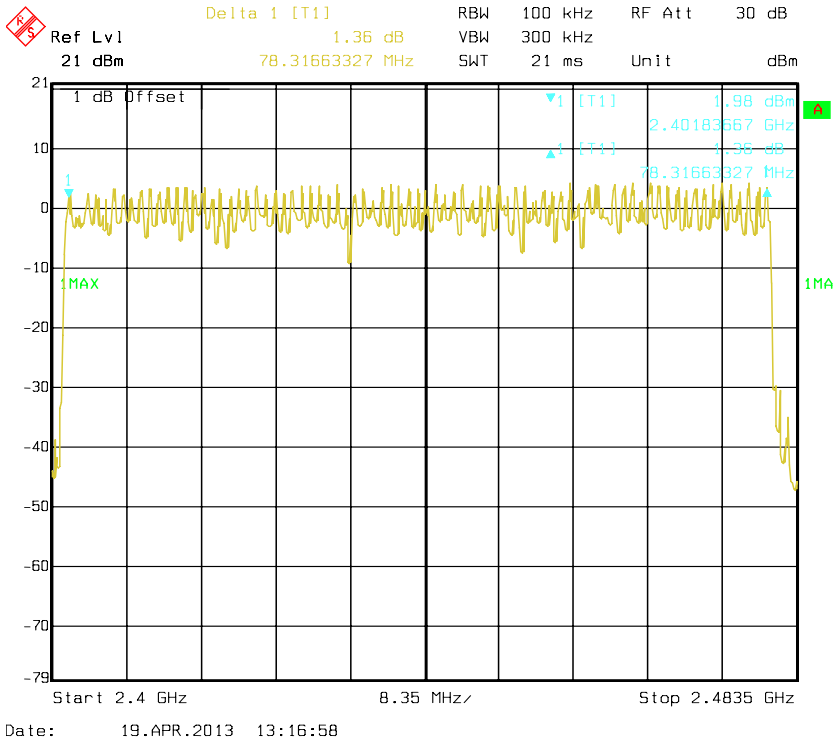
Number of Hopping Channels



EDR Mode (8-DPSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	⩾15

Number of Hopping Channels



FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL 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
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.8°C
Relative Humidity:	69 %
ATM Pressure:	100kPa

** The testing was performed by Leon Chen on 2013-04-19.*

Test Result: Compliance.

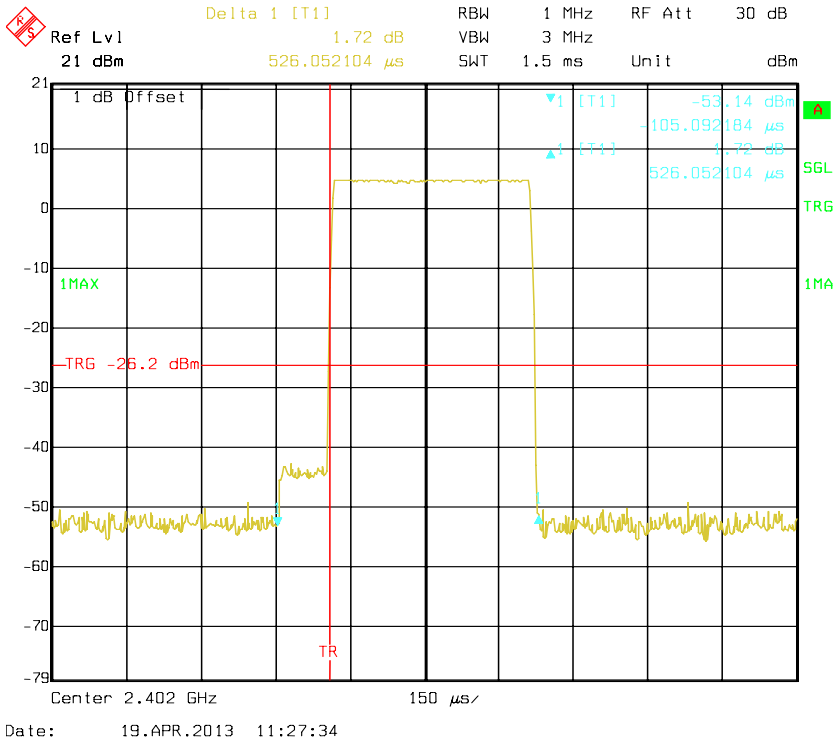
Please refer to following tables and plots

Test Mode: Transmitting

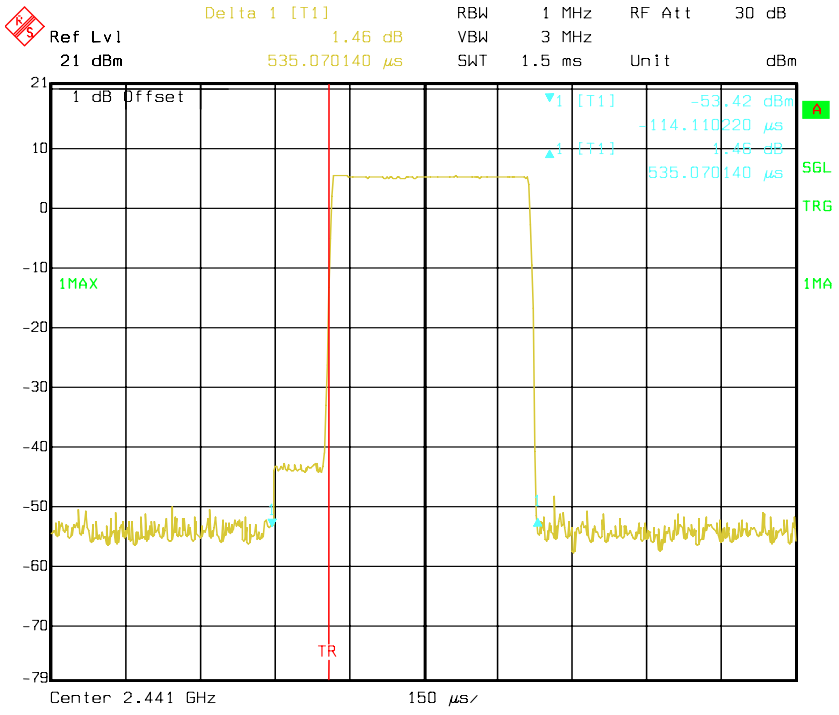
BDR Mode (GFSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.526	0.168	0.4	Pass
	Middle	0.535	0.171	0.4	Pass
	High	0.535	0.171	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s				
DH3	Low	1.801	0.288	0.4	Pass
	Middle	1.811	0.290	0.4	Pass
	High	1.811	0.290	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s				
DH5	Low	3.087	0.329	0.4	Pass
	Middle	3.087	0.329	0.4	Pass
	High	3.087	0.329	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s				

DH1: Low Channel

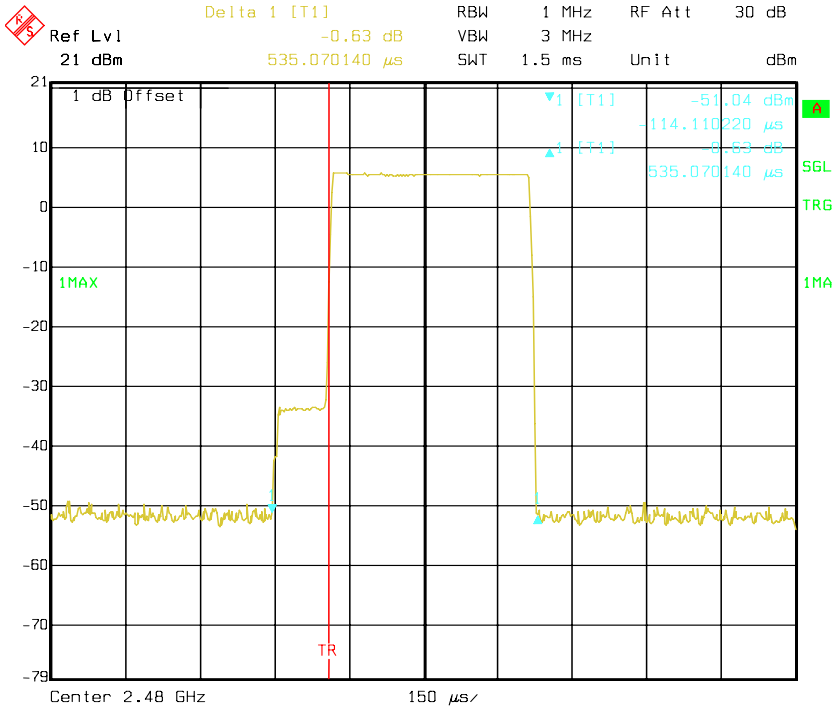


DH1: Middle Channel



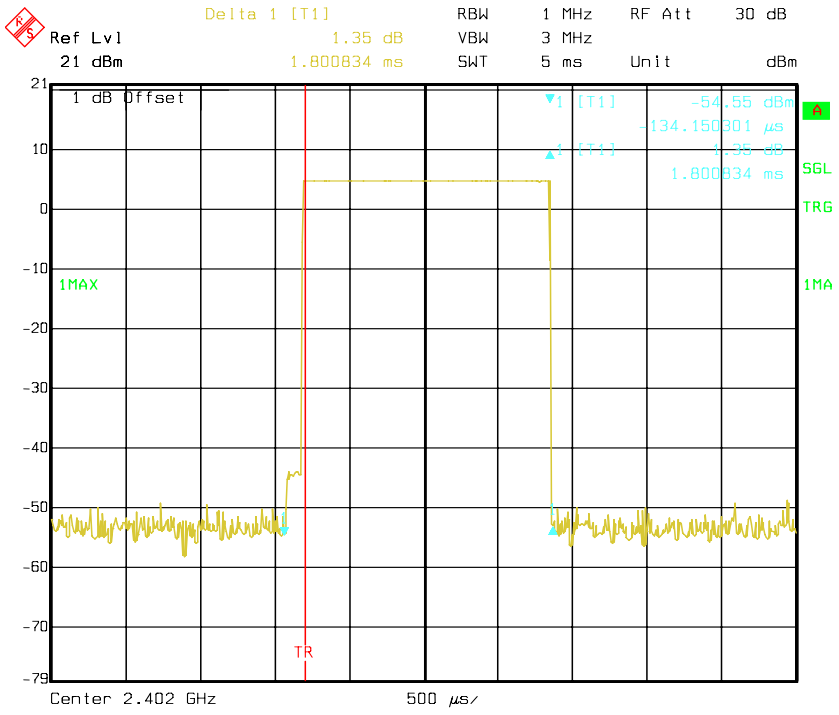
Date: 19.APR.2013 11:29:30

DH1: High Channel



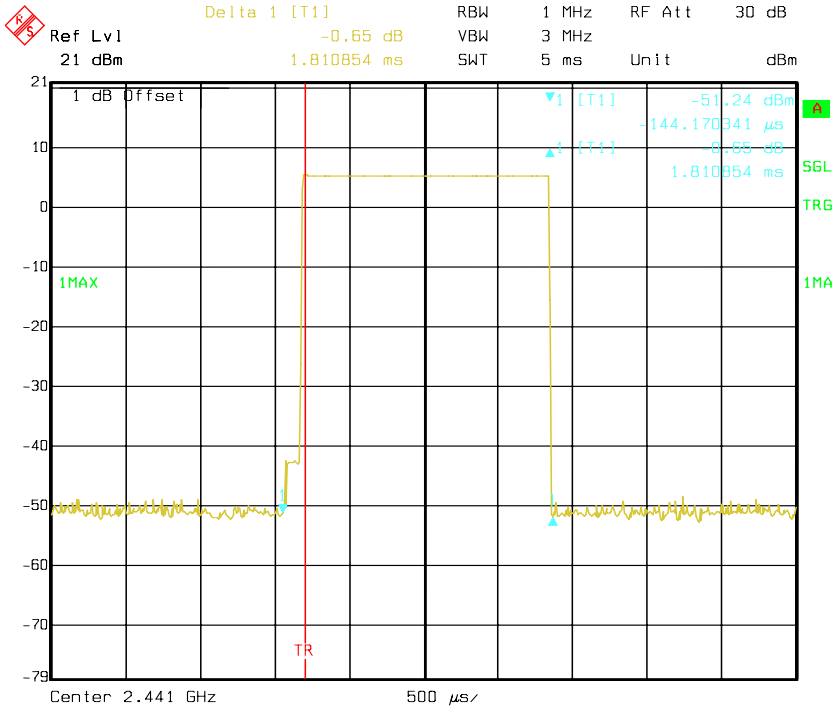
Date: 19.APR.2013 11:30:44

DH3: Low Channel



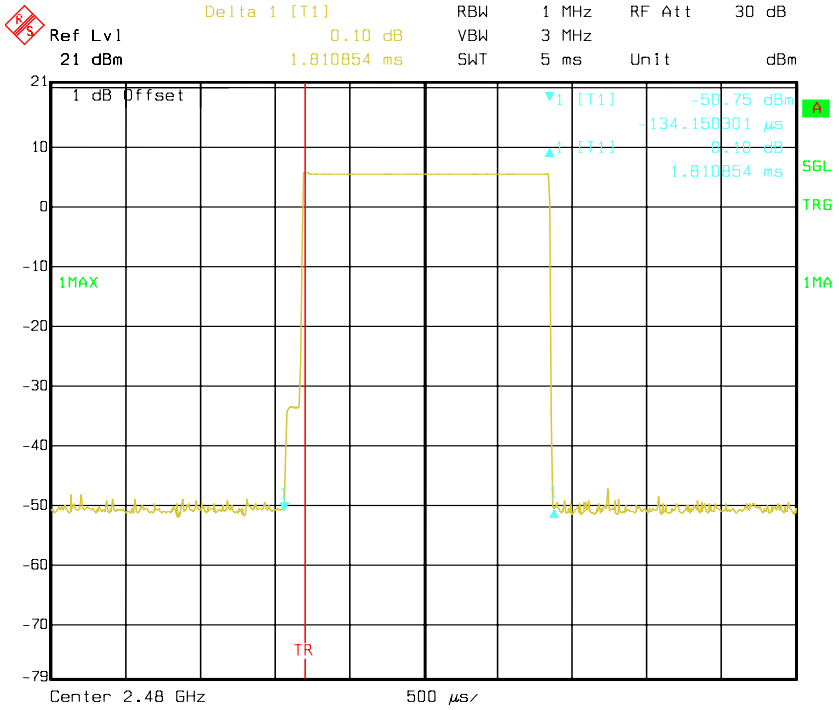
Date: 19.APR.2013 11:34:42

DH3: Middle Channel

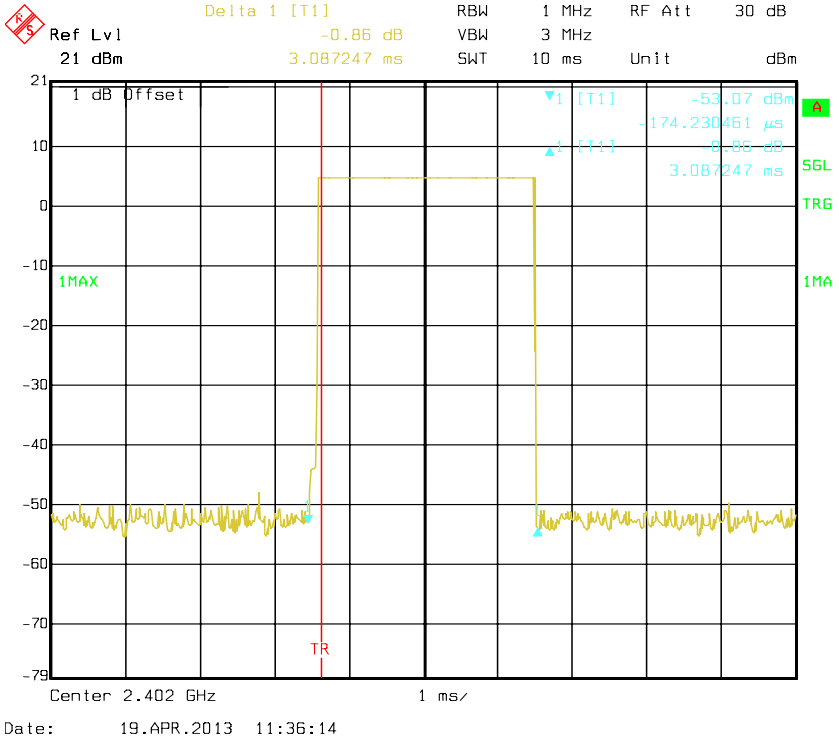


Date: 19.APR.2013 11:34:10

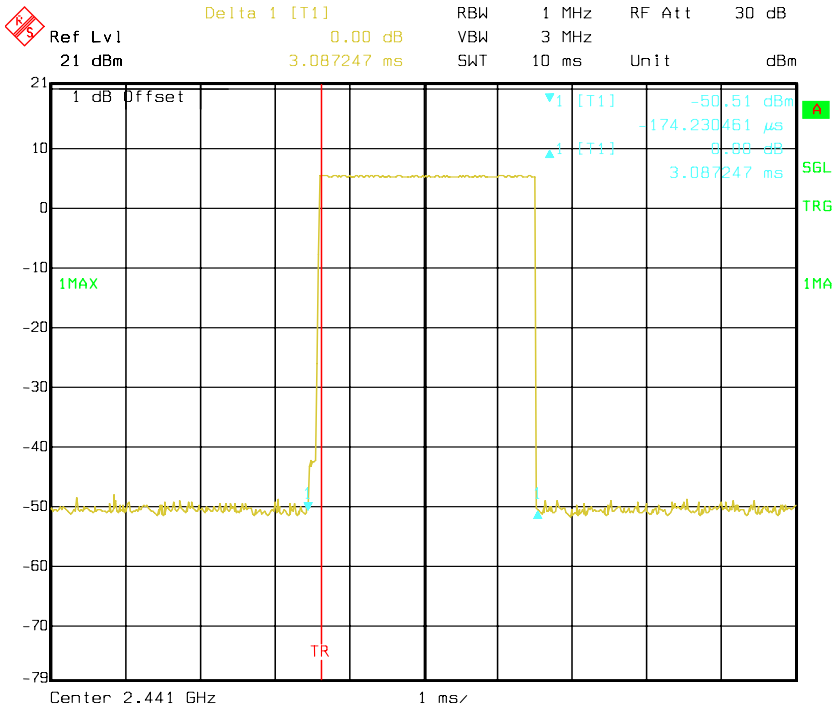
DH3: High Channel



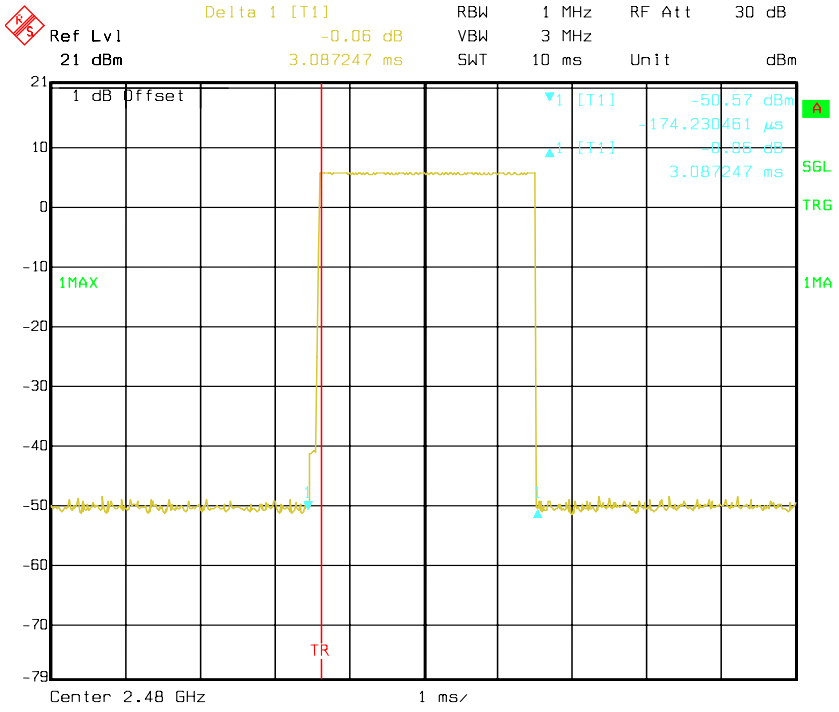
DH5: Low Channel



DH5: Middle Channel



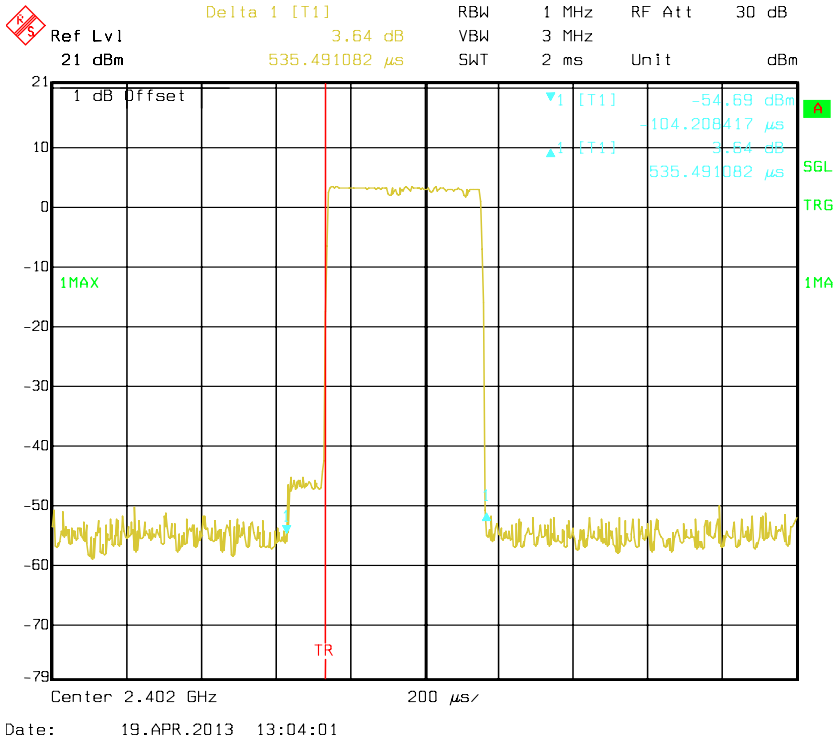
DH5: High Channel



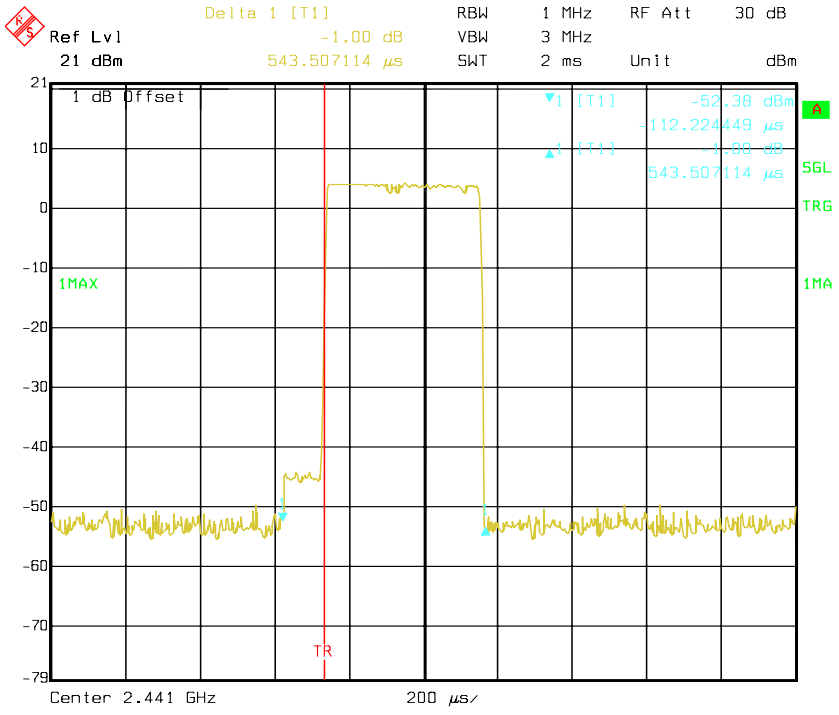
EDR Mode (π/4-DQPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.535	0.171	0.4	Pass
	Middle	0.544	0.174	0.4	Pass
	High	0.548	0.175	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s				
DH3	Low	1.817	0.291	0.4	Pass
	Middle	1.817	0.291	0.4	Pass
	High	1.817	0.291	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s				
DH5	Low	3.086	0.329	0.4	Pass
	Middle	3.087	0.329	0.4	Pass
	High	3.107	0.331	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s				

DH1: Low Channel

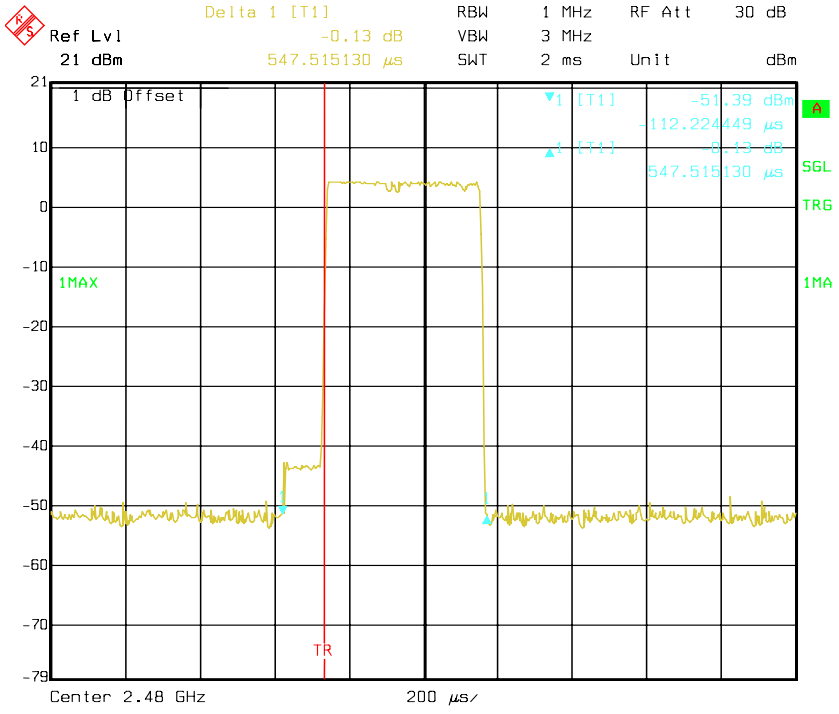


DH1: Middle Channel



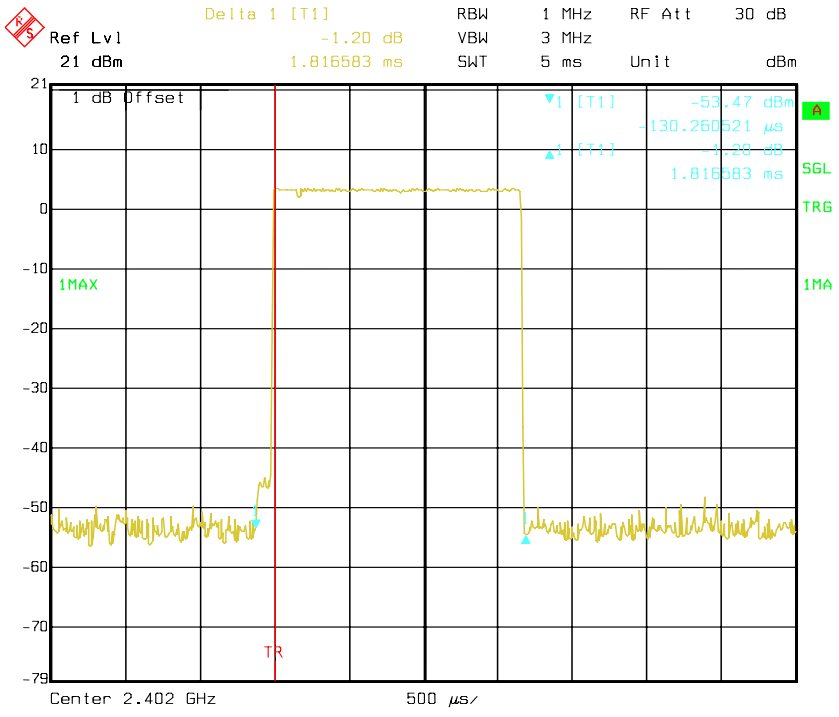
Date: 19.APR.2013 13:03:34

DH1: High Channel



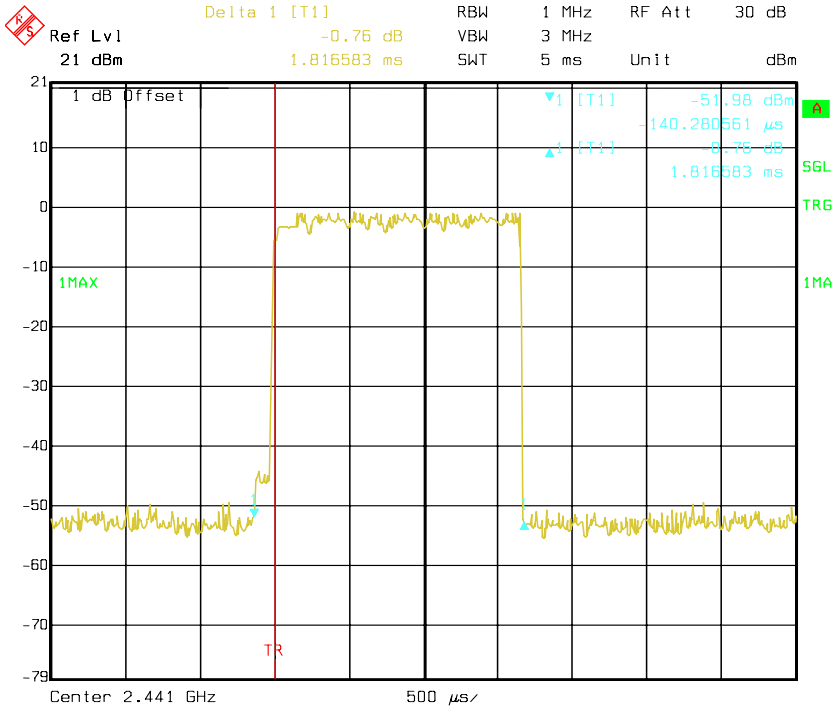
Date: 19.APR.2013 13:02:45

DH3: Low Channel



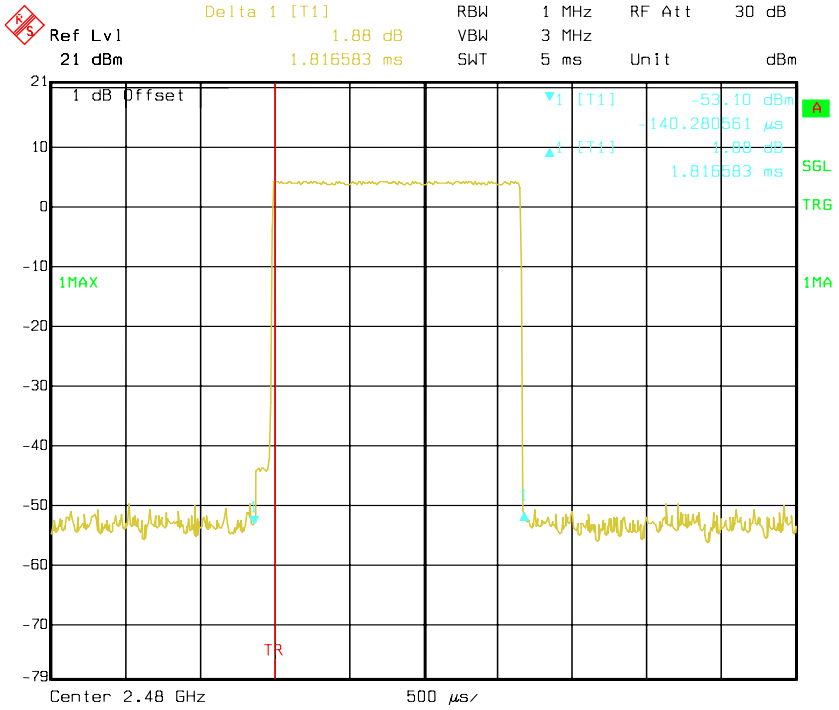
Date: 19.APR.2013 12:56:10

DH3: Middle Channel

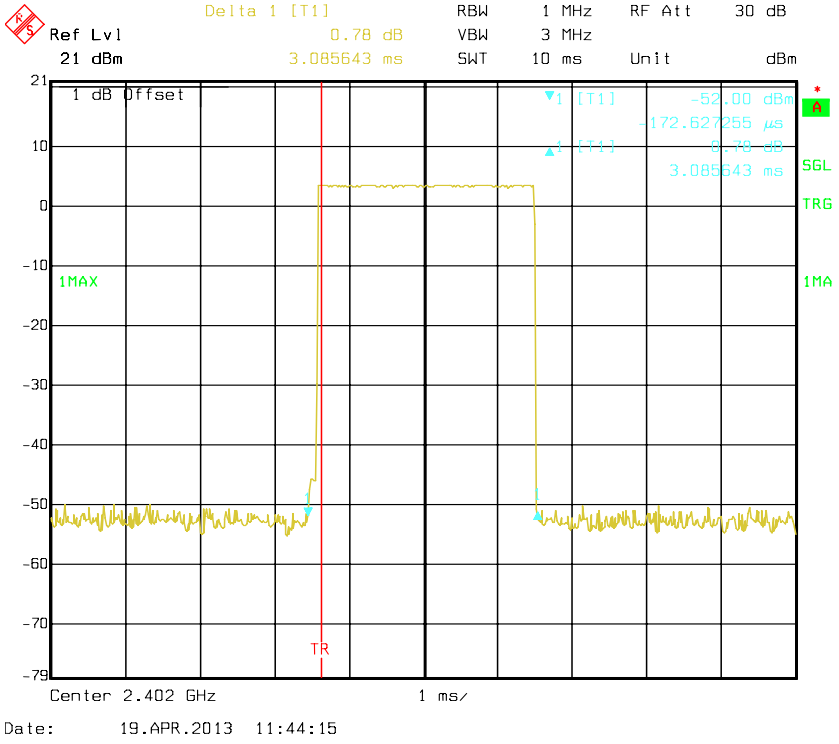


Date: 19.APR.2013 12:56:58

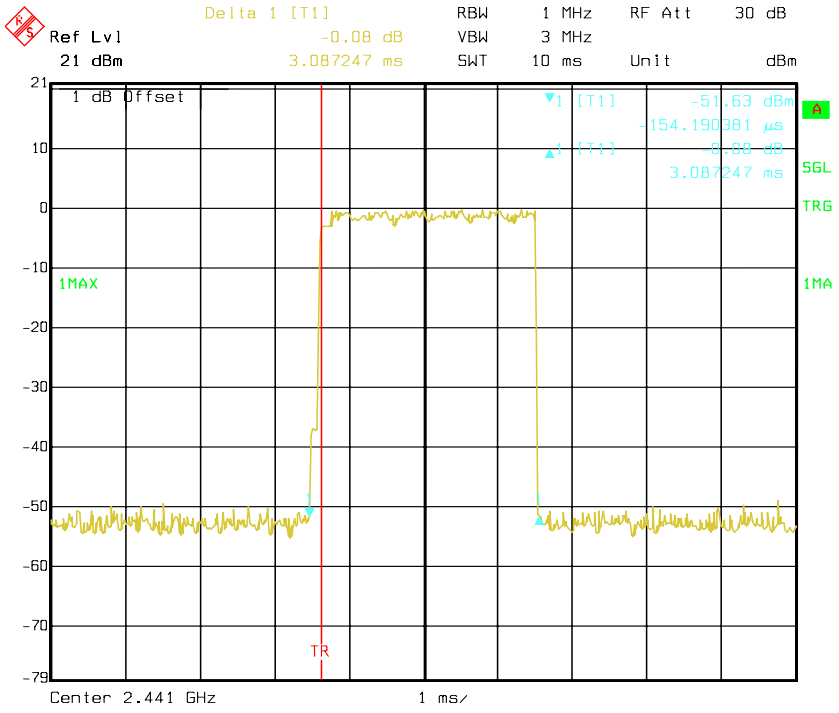
DH3: High Channel



DH5: Low Channel



DH5: Middle Channel



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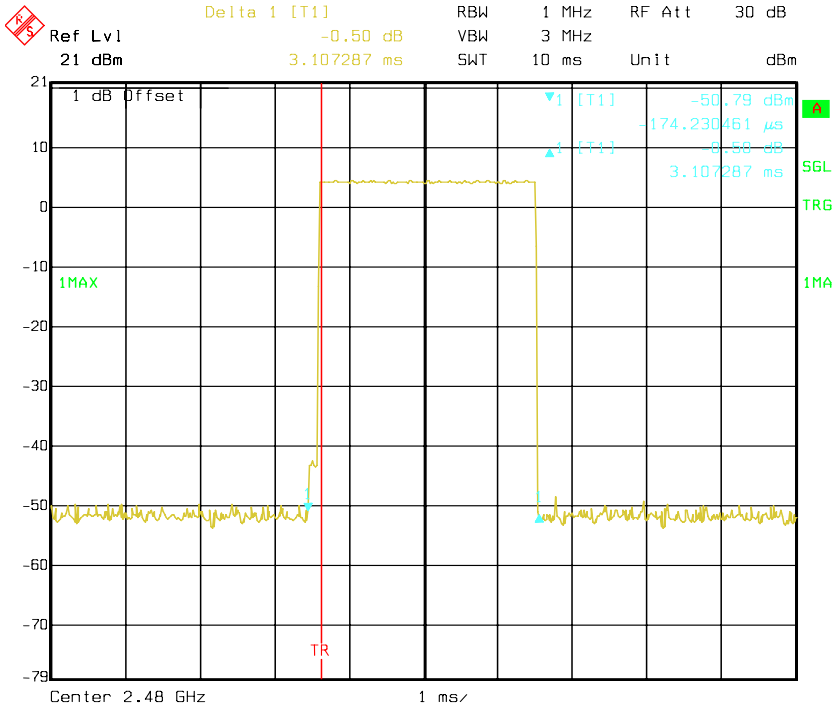
DH5: High Channel

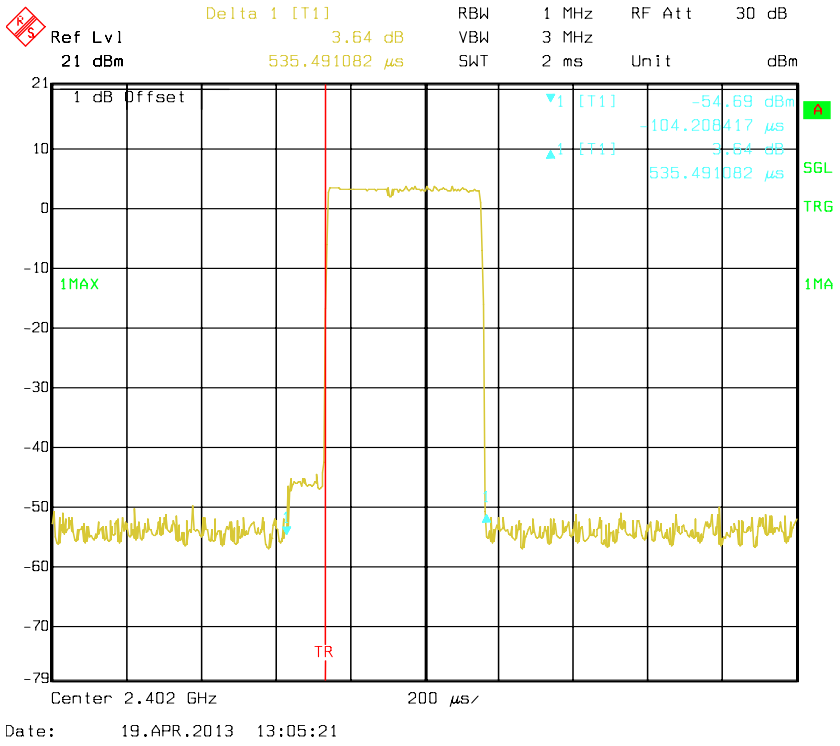


Date: 19.APR.2013 11:40:05

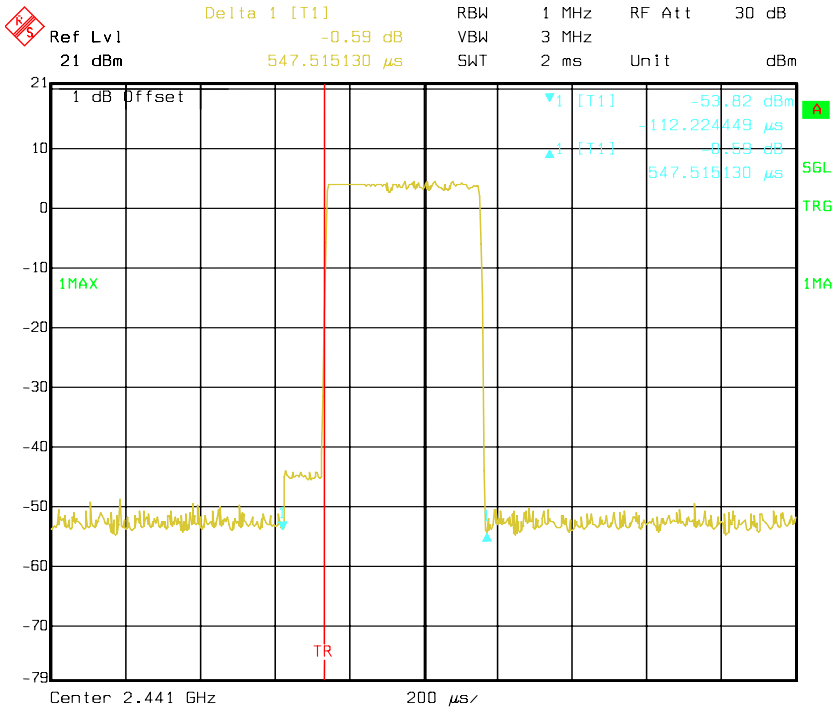
EDR Mode (8-DPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.535	0.171	0.4	Pass
	Middle	0.548	0.175	0.4	Pass
	High	0.548	0.175	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s				
DH3	Low	1.799	0.288	0.4	Pass
	Middle	1.809	0.289	0.4	Pass
	High	1.799	0.288	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s				
DH5	Low	3.095	0.330	0.4	Pass
	Middle	2.995	0.319	0.4	Pass
	High	3.115	0.332	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s				

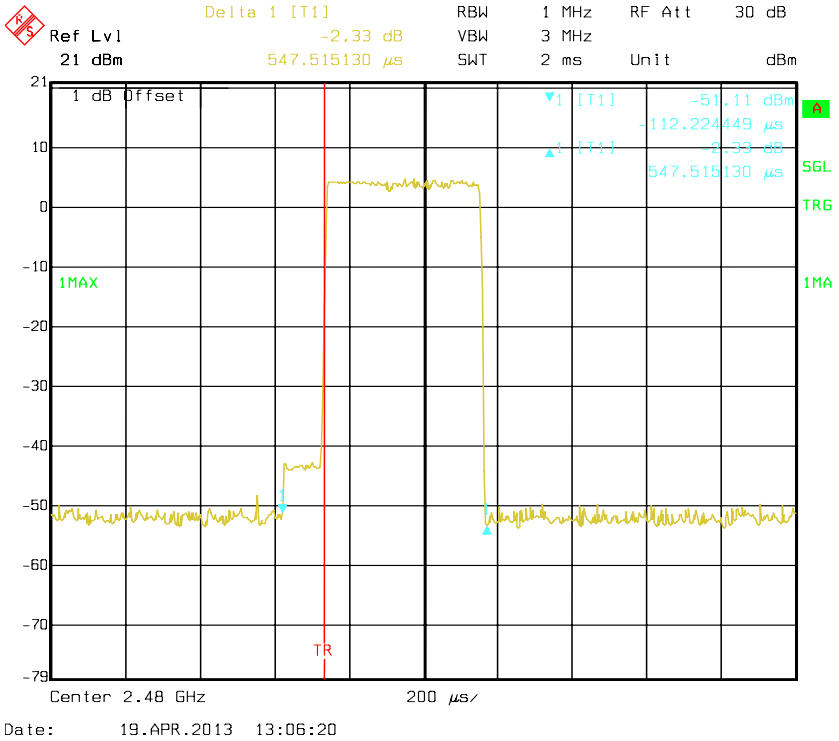
DH1: Low Channel



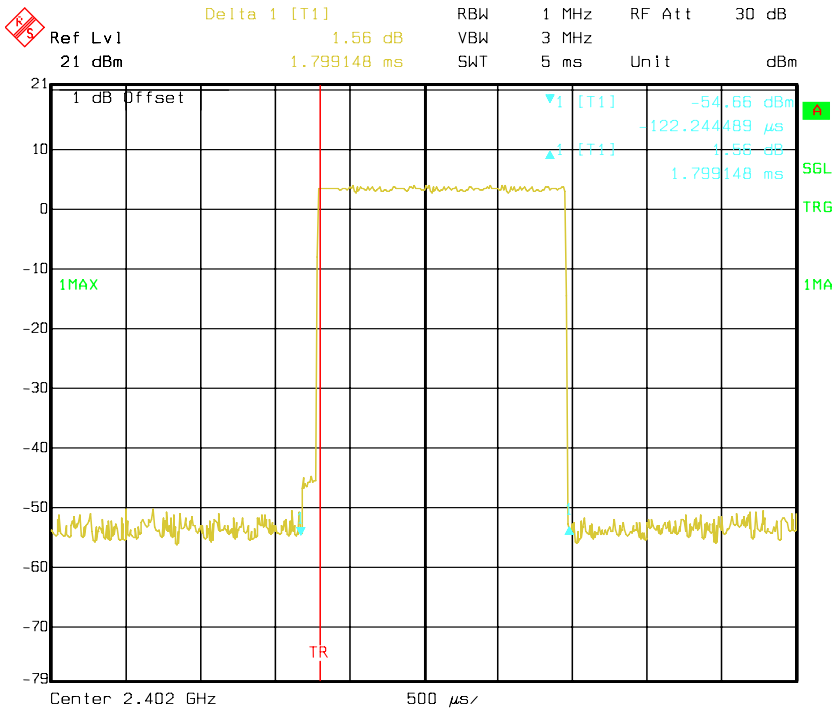
DH1: Middle Channel



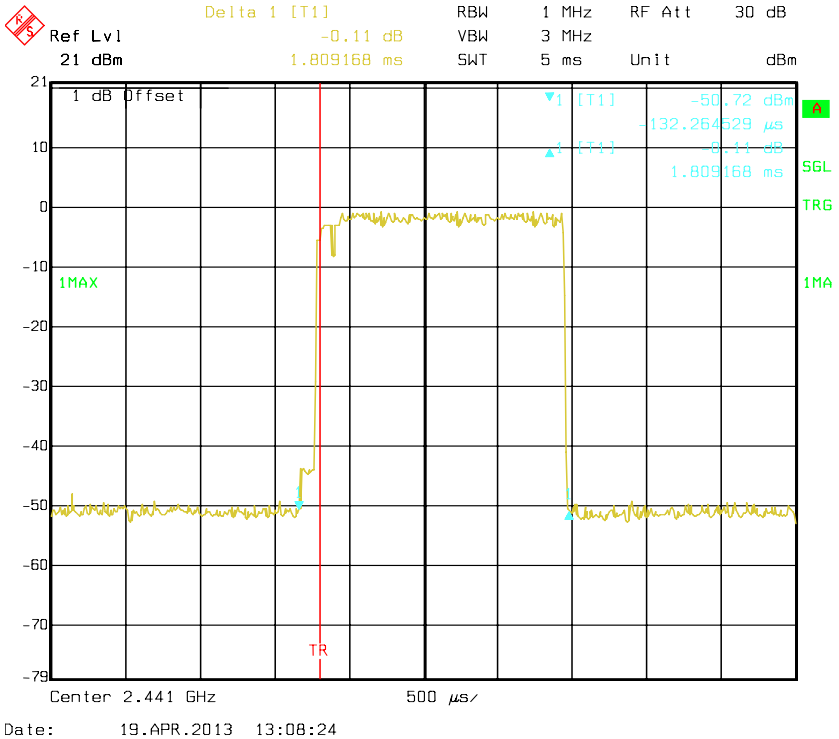
DH1: High Channel



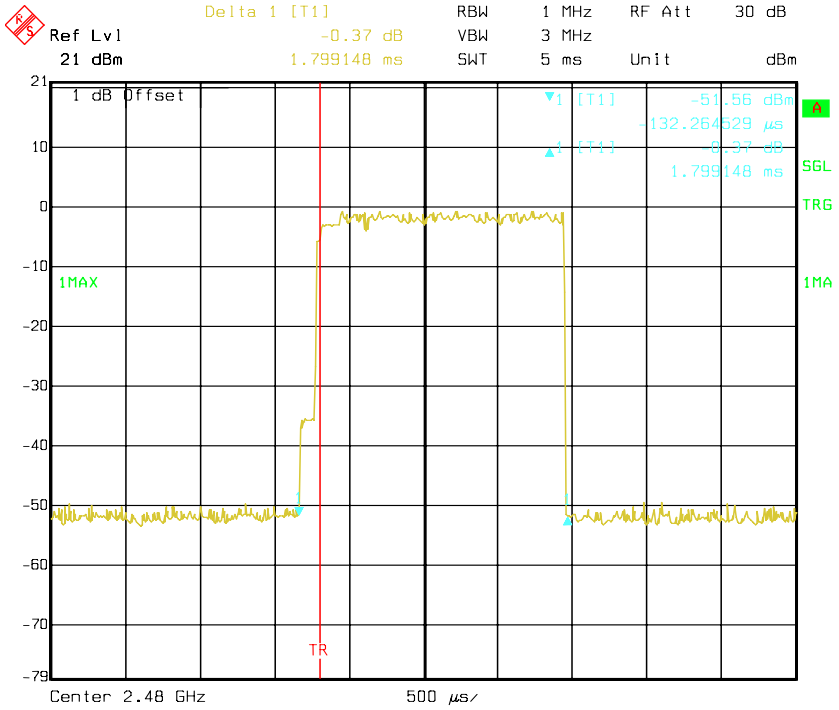
DH3: Low Channel



DH3: Middle Channel



DH3: High Channel



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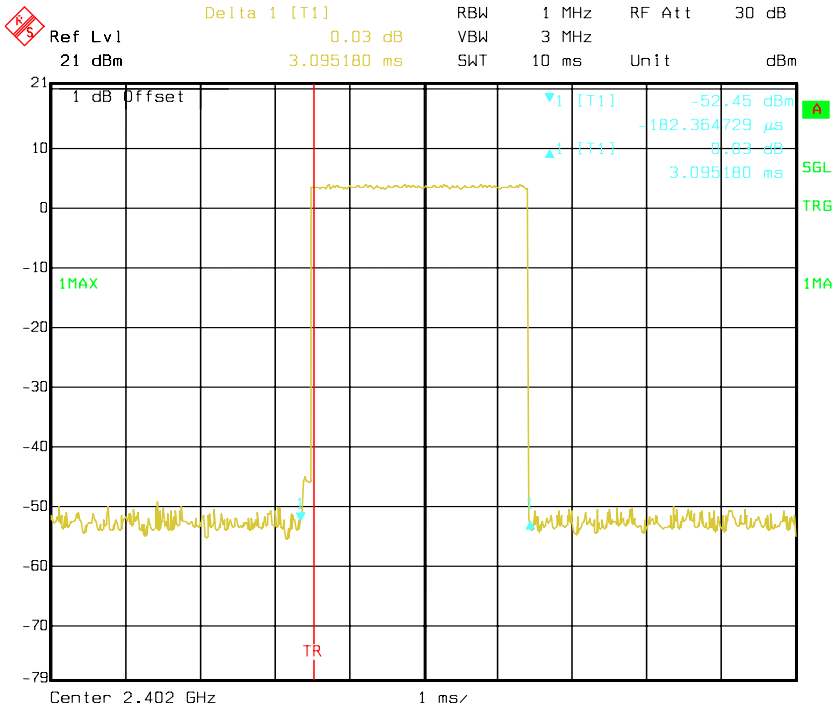
DH5: Low Channel



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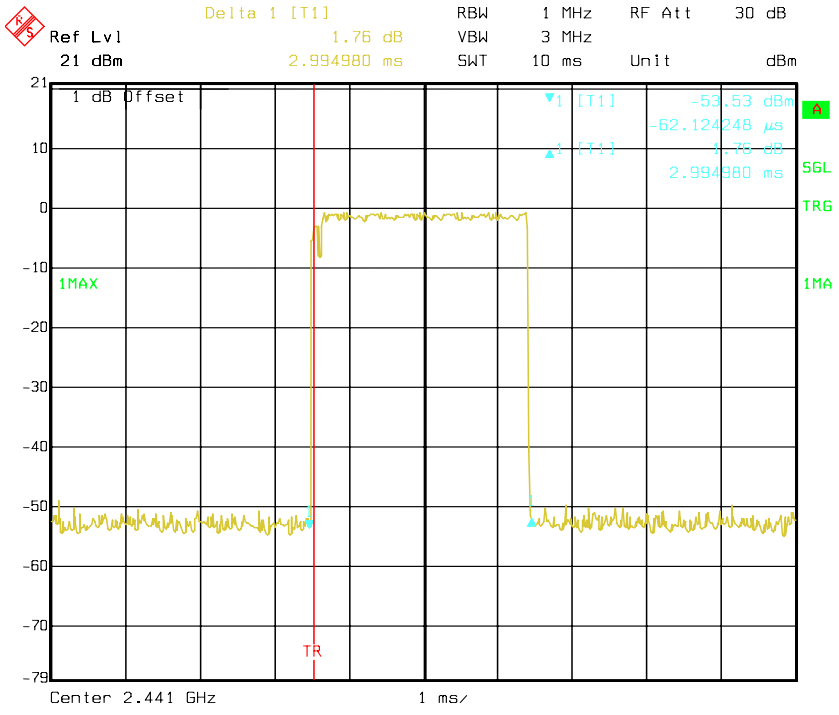
DH5: Middle Channel



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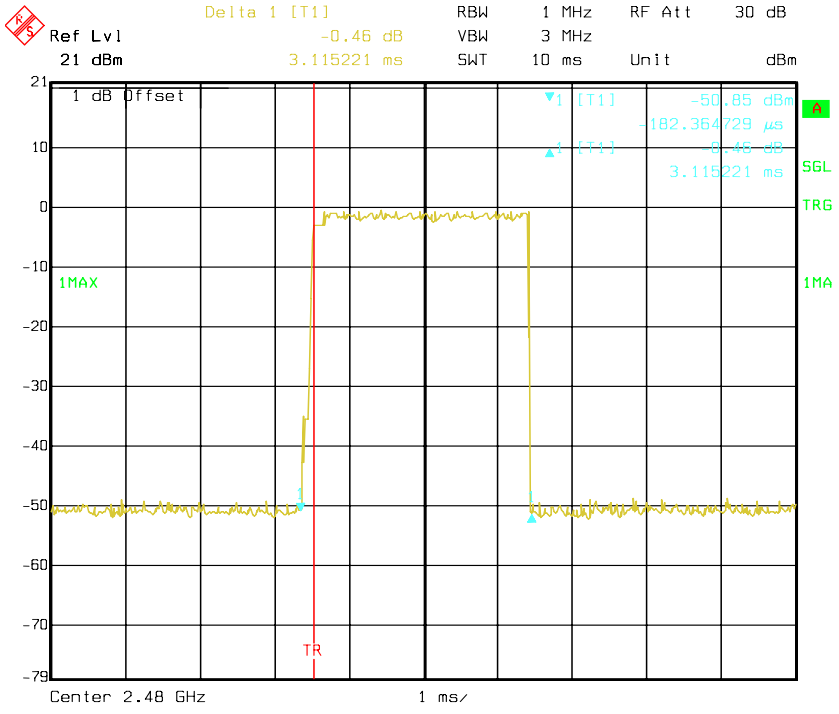
DH5: High Channel



Date: 19.APR.2013 13:11:53

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
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.8°C
Relative Humidity:	69 %
ATM Pressure:	100kPa

* *The testing was performed by Leon Chen on 2013-04-19.*

Test Result: Compliance.

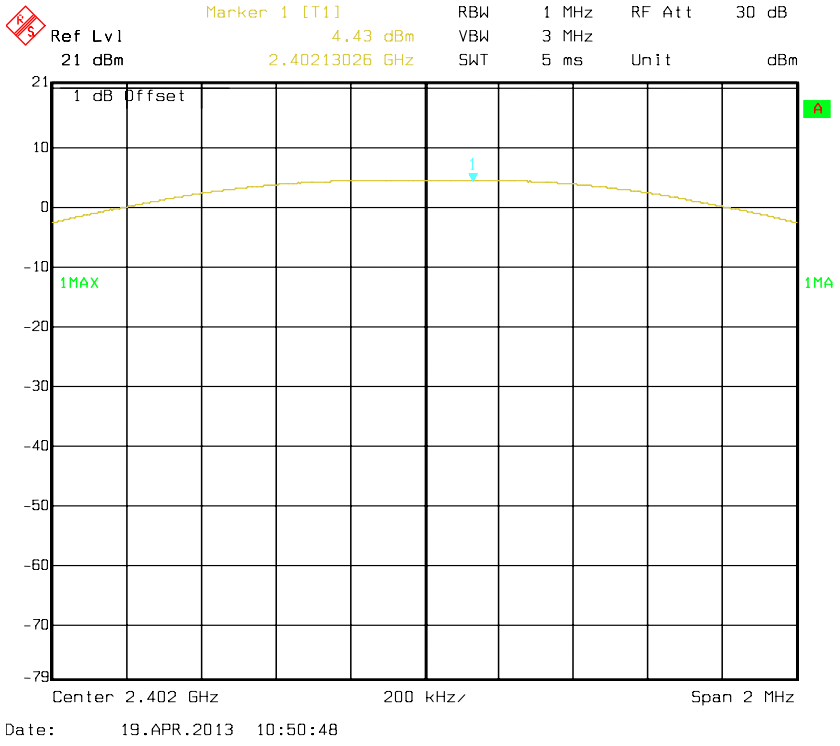
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Output power (dBm)	Limit (dBm)
BDR Mode (GFSK)	Low	2402	4.43	30
	Middle	2441	5.07	30
	High	2480	5.38	30
EDR Mode (π/4-DQPSK)	Low	2402	3.74	30
	Middle	2441	4.31	30
	High	2480	4.57	30
EDR Mode (8-DPSK)	Low	2402	3.80	30
	Middle	2441	4.57	30
	High	2480	4.75	30

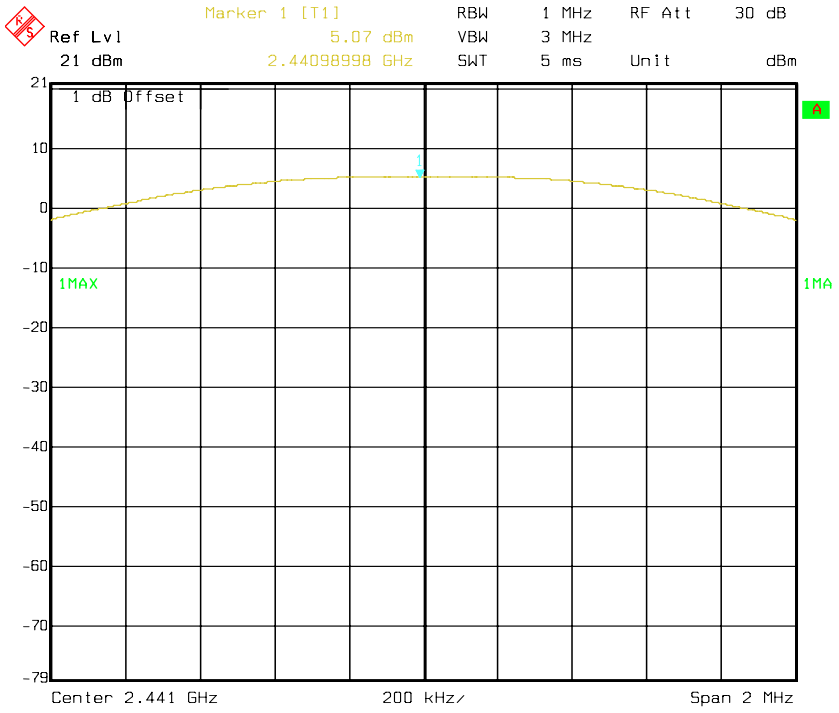
Note: The data above was tested in conducted mode.

BDR Mode (GFSK):

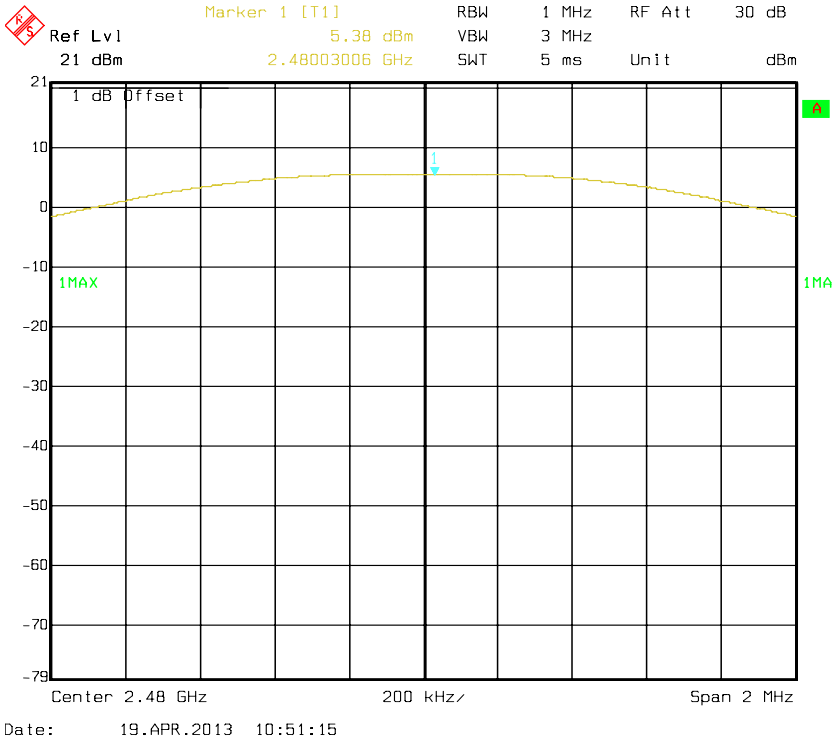
Output Power, Low



Output Power, Middle

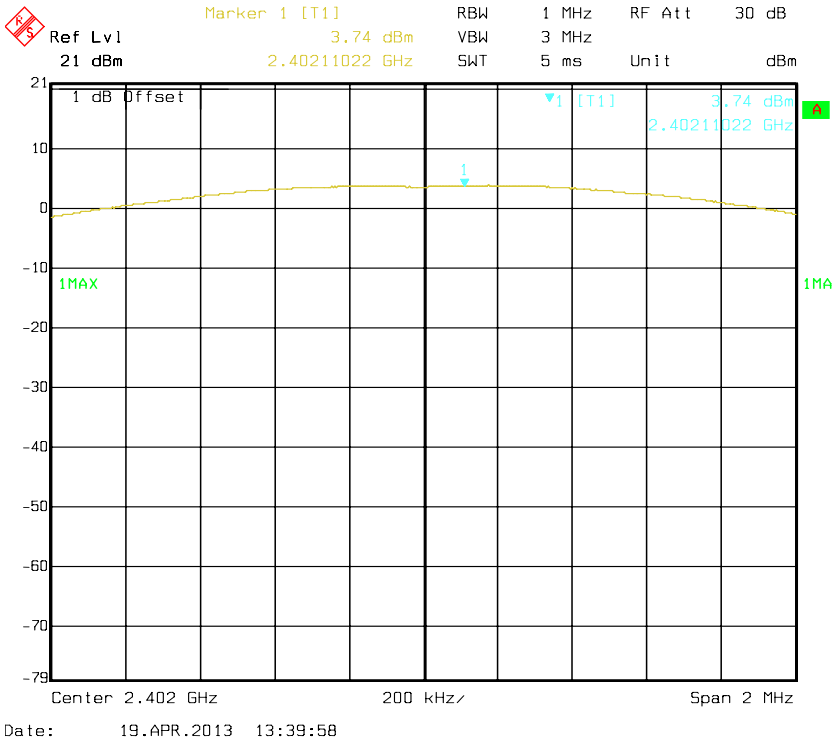


Output Power, High

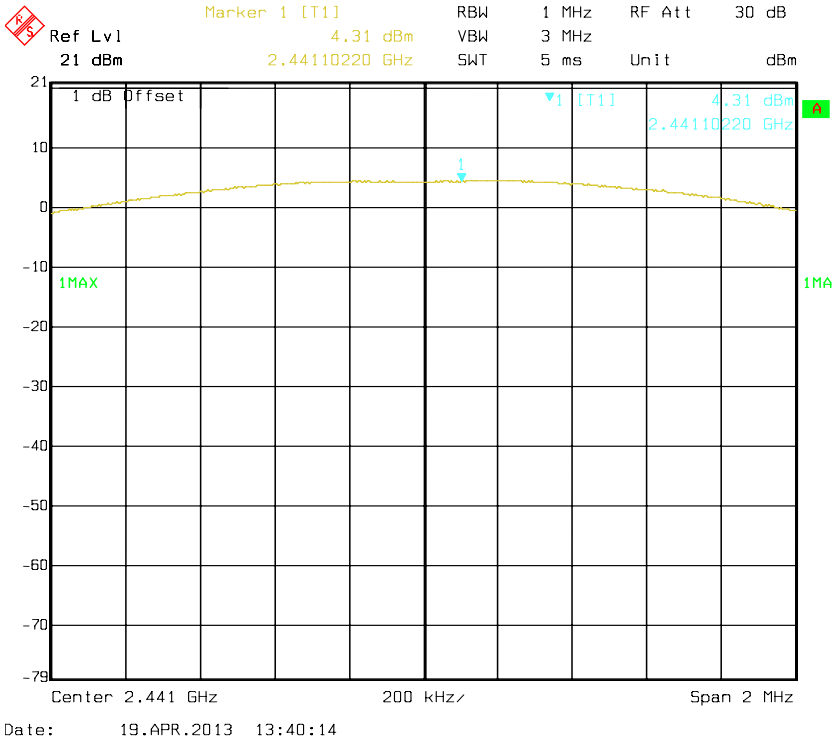


EDR Mode (π/4-DQPSK):

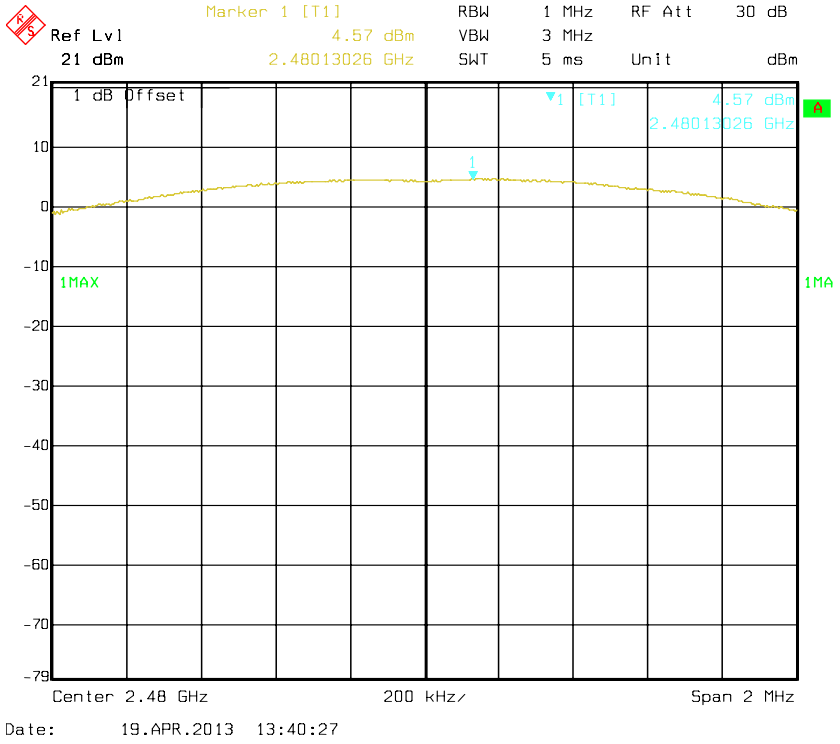
Output Power, Low



Output Power, Middle

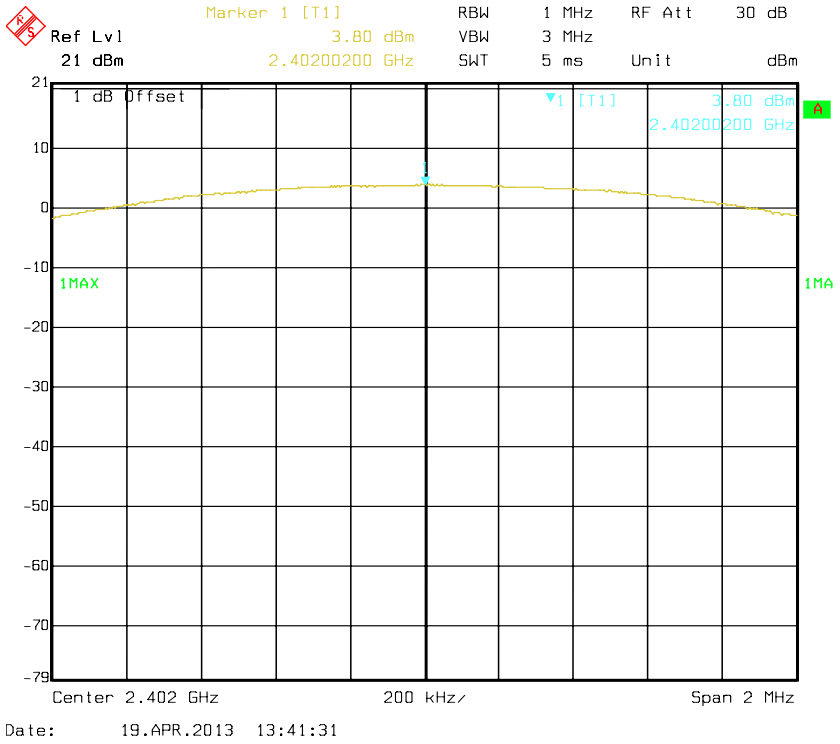


Output Power, High

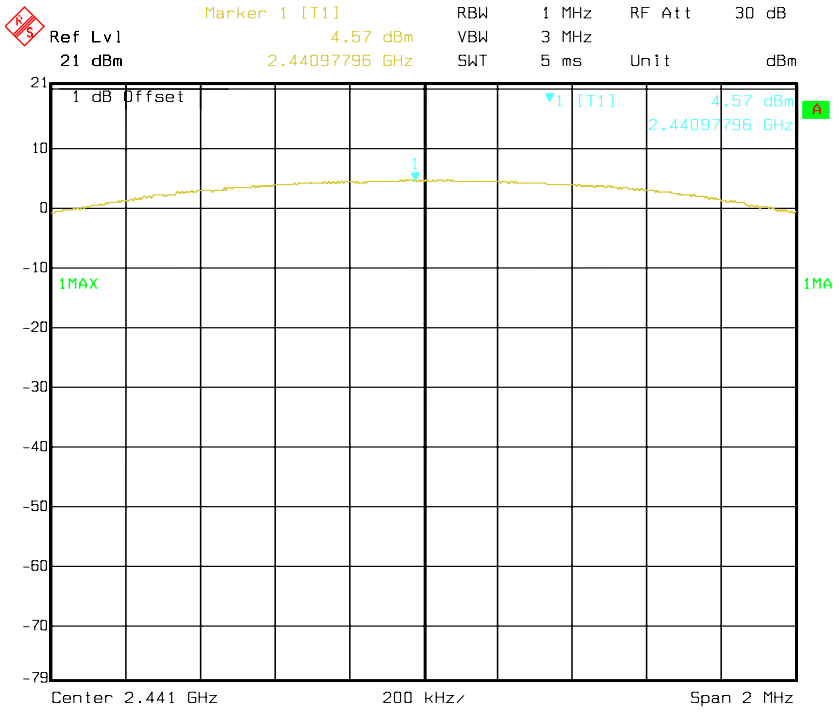


EDR Mode (8-DPSK):

Output Power, Low



Output Power, Middle



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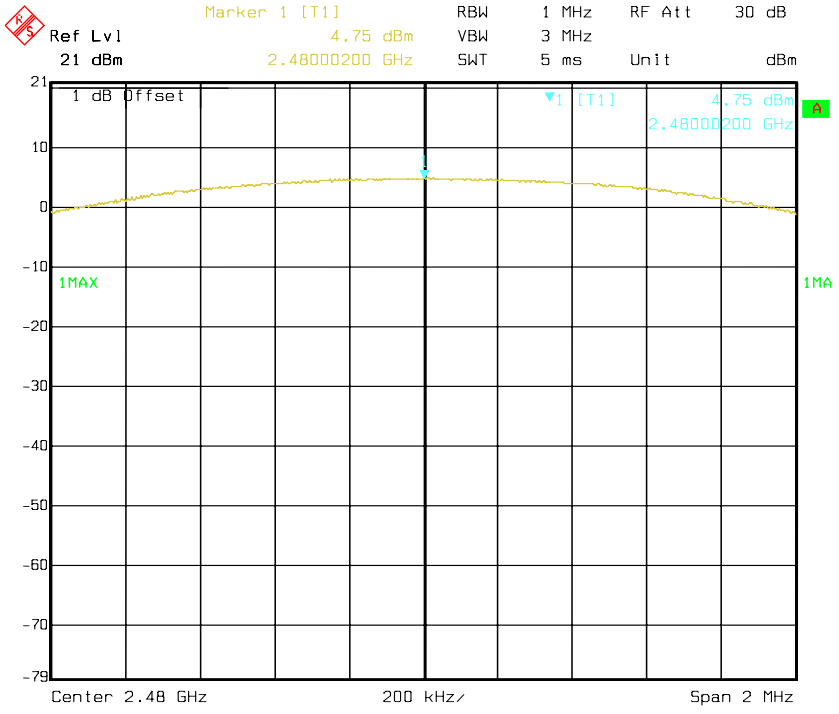
Output Power, High



Date: 19.APR.2013 13:42:14

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
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

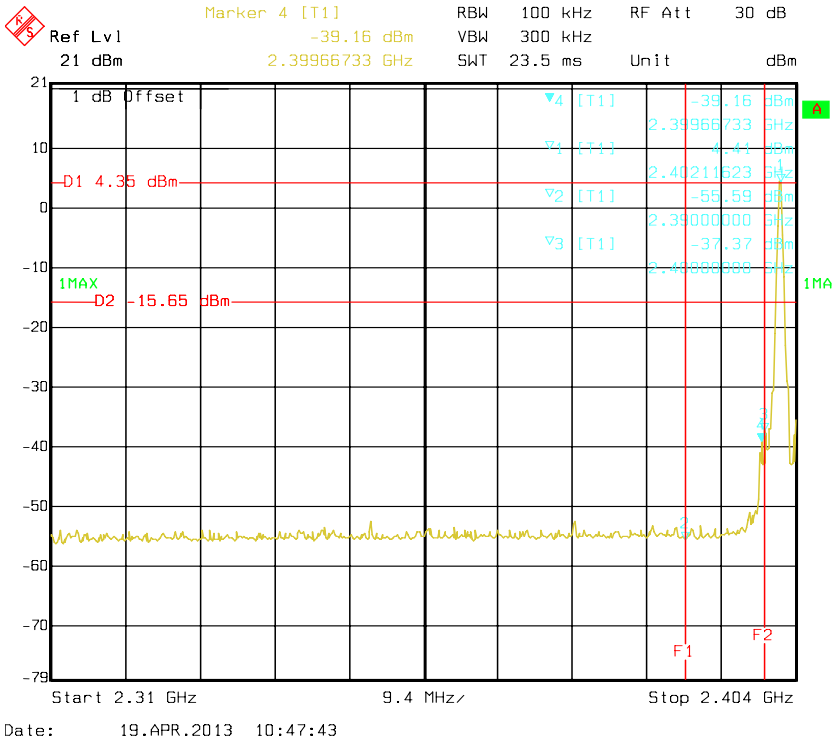
Temperature:	26.8°C
Relative Humidity:	69 %
ATM Pressure:	100kPa

** The testing was performed by Leon Chen on 2013-04-19.*

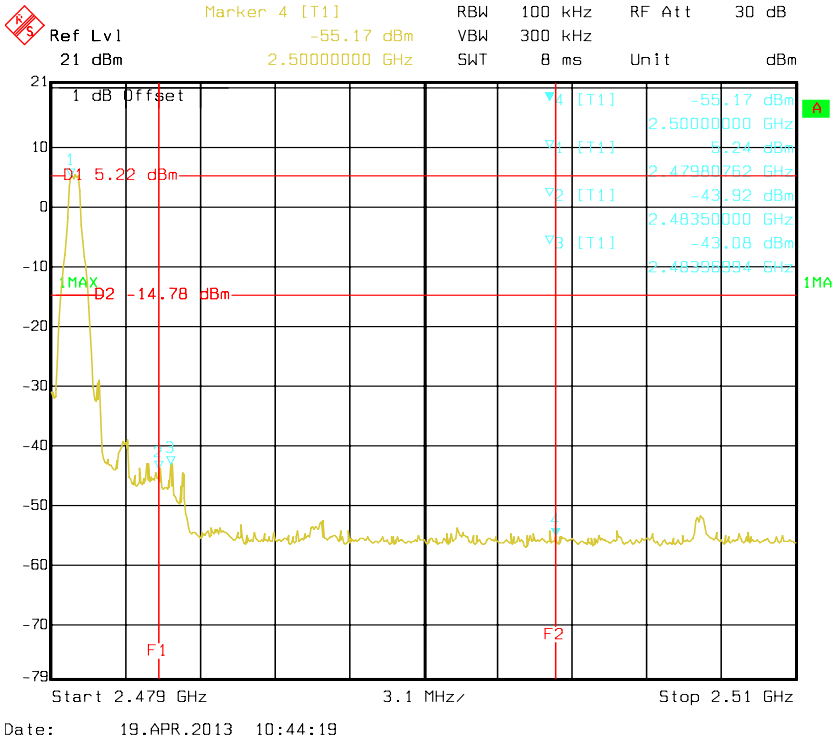
Test Result: Compliance

BDR Mode (GFSK):

Band Edge, Left Side

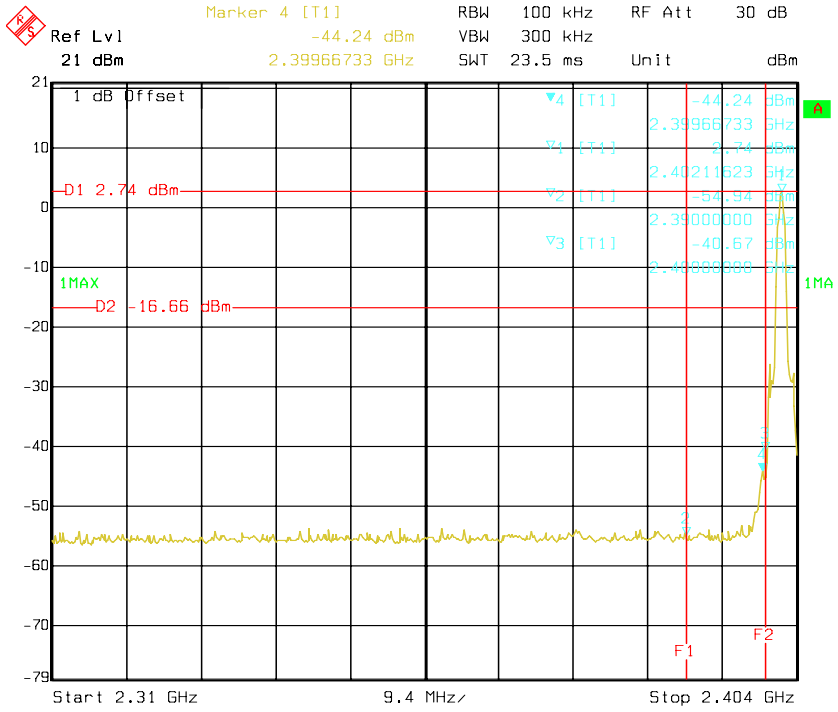


Band Edge, Right Side



EDR Mode (π/4-DQPSK):

Band Edge, Left Side



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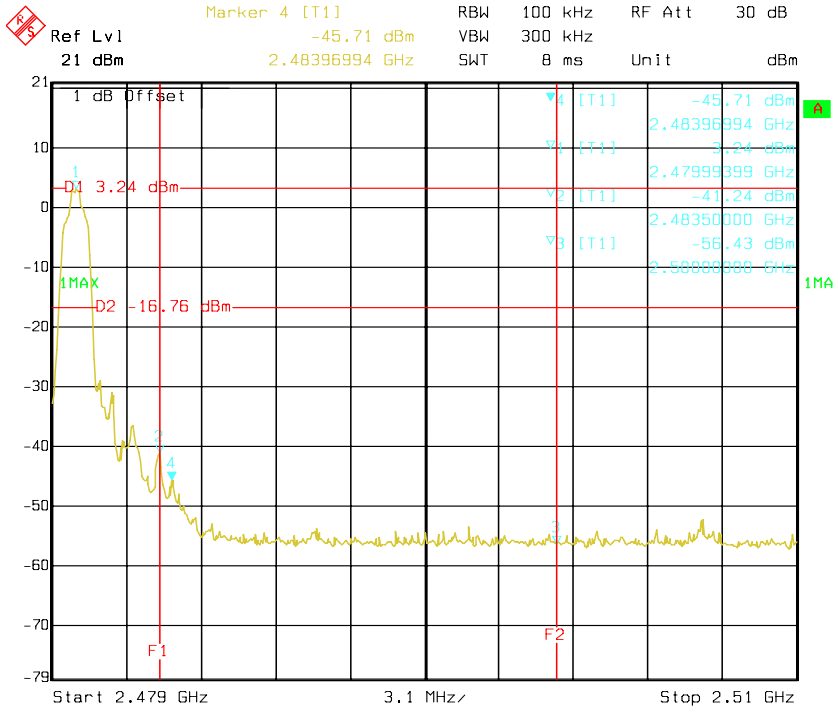
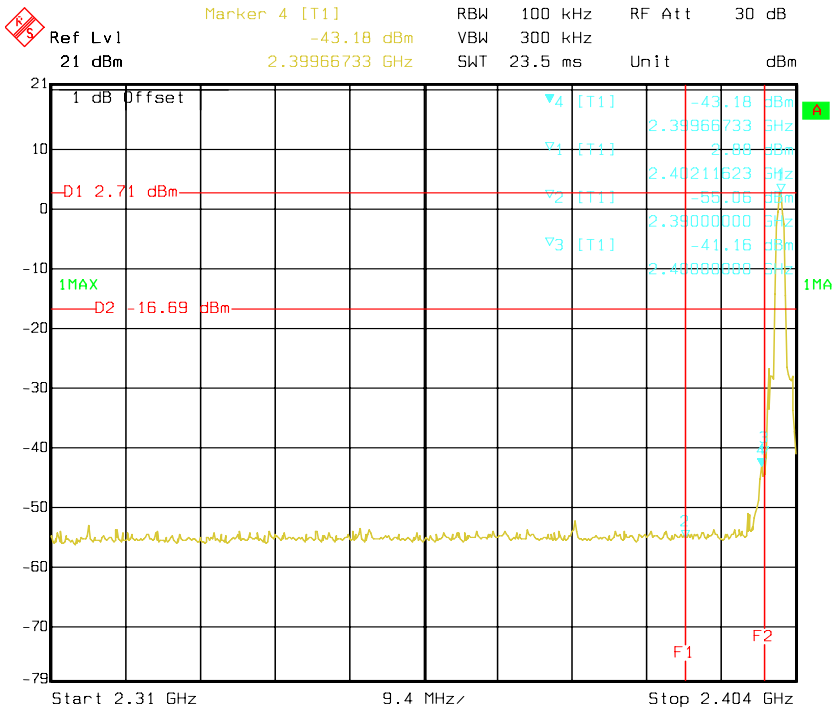
Band Edge, Right Side



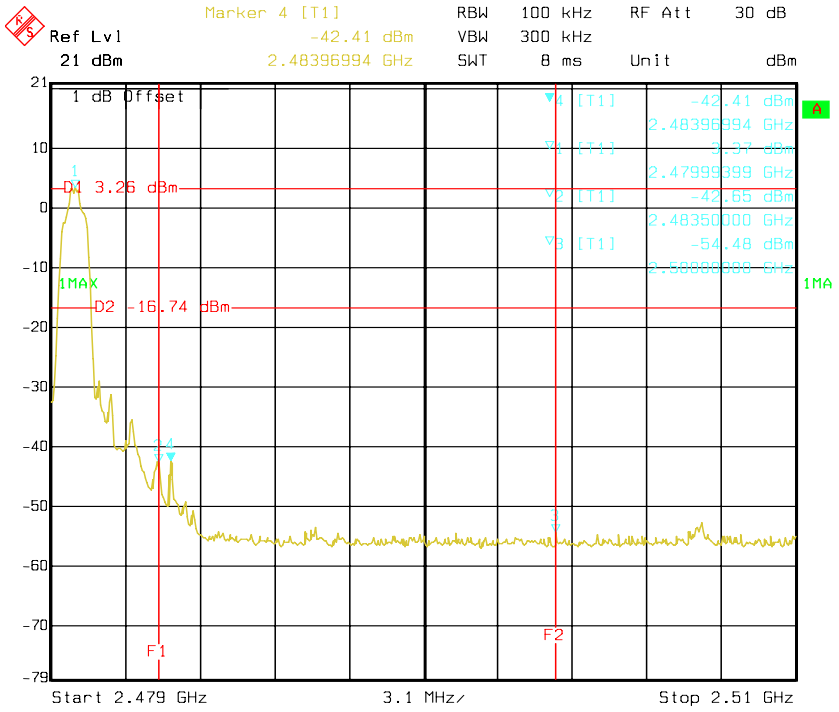
Date: 19.APR.2013 14:07:21

EDR Mode (8-DPSK):

Band Edge, Left Side



Band Edge, Right Side



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