Shenzhen Huatongwei International Inspection Co., Ltd.
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CNASL1225

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No.....:	**TRE1304000901 R/C: 96345**
FCC ID.....:	**ZG8BH701**
Compiled by (position+printed name+signature)..:	File administrators Eric Zhang
Supervised by (position+printed name+signature)..:	Test Engineer Tim Zhang
Approved by (position+printed name+signature)..:	Manager Wenliang Li
Date of issue.....:	Apr 08, 2013
Testing Laboratory Name .....:	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address .....:	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Applicant's name.....:	**LANYA ELECTRONIC Co., Ltd.**
Address .....:	3-5F，Workshop of 6,Lijincheng Science&Technolagy Industrial Area,The East Road of Industrial AREA,longhua Street,Bao'an District,Shenzhen City,Guangdong Province,P.R.China
Test specification:	
Standard .....:	**FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System**
TRF Originator.....:	Shenzhen Huatongwei International Inspection CO., Ltd
Master TRF.....:	Dated 2006-06

Test item description .....:	Bluetooth Headset
Trade Mark .....:	/
Model/Type reference.....:	BH701
Listed Models .....:	BH702
Modulation .....:	GFSK, π/4 DQPSK, 8DPSK
Result.....:	**Positive**

T E S T R E P O R T

Test Report No. :	TRE1304000901	Apr 08, 2013 Date of issue

Equipment under Test	:	Bluetooth Headset
Model /Type	:	BH701
Listed Models	:	BH702
Applicant	:	**LANYA ELECTRONIC Co., Ltd.**
Address	:	3-5F，Workshop of 6,Lijincheng Science&Technolagy Industrial Area,The East Road of Industrial AREA,longhua Street,Bao'an District,Shenzhen City,Guangdong Province,P.R.China
Manufacturer	:	**LANYA ELECTRONIC Co., Ltd.**
Address	:	3-5F，Workshop of 6,Lijincheng Science&Technolagy Industrial Area,The East Road of Industrial AREA,longhua Street,Bao'an District,Shenzhen City,Guangdong Province,P.R.China

Test Result according to the standards on page 4:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices

2 . SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Apr 04,2013
Testing commenced on	:	Apr 04,2013
Testing concluded on	:	Apr 08,2013

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.7V from battery

2.3. Short description of the Equipment under Test (EUT)

2.4GHz (Bluetooth handset (BH701，BH702)) For more details, refer to the user's manual of the EUT.

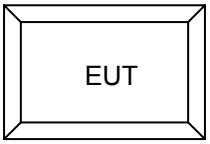
Serial number: Prototype

2.4. EUT operation mode

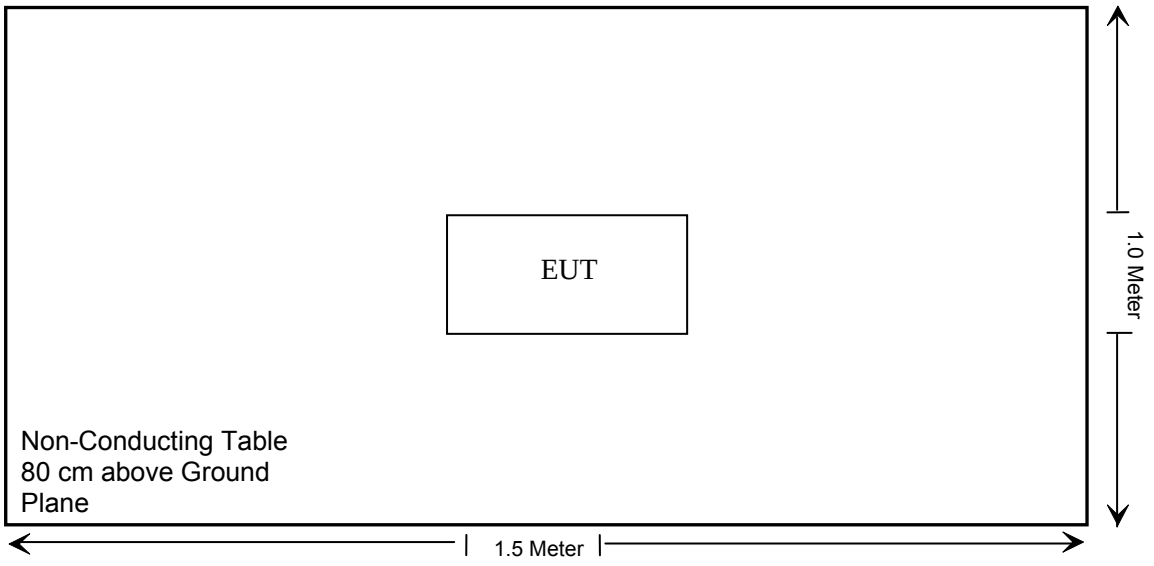
The EUT has been tested under typical operating condition. There are EDR (Enhanced Data Rate) and BDR (Basic Data Rate)mode.The Applicant provides communication tools software to control the EUT for staying in continous transmitting and receiving mode for testing. There are 79 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel .

Frequency Range:	2400-2483.5MHz
Channel number:	79 channels
Antenna:	PCB Antenna

2.5. Configuration of Test System



Block Diagram of Test Setup



2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: ZG8BH701** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

2.8. NOTE

1. The functions of the EUT are listed as below:

	Test Standards	Reference Report
Bluetooth	FCC Part 15 Subpart C (Section15.247)	TRE1304000901
Bluetooth	MPE report	TRE1304000902

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
EUT	√	—	—	—

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 01, 2012. Valid time is until Feb 28, 2015.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2013.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date Jun. 01, 2012, valid time is until Jun. 01, 2015.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

NEMKO-Aut. No.: ELA125

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10, the authorization is valid through July 07, 2013

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2010. Valid time is until May 06, 2013.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

FCC PART 15C		
FCC Part 15.207	AC Power Conducted Emission	N/A
FCC Part 15.247(a)	20dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.247(a)(1)	Frequency Separation	PASS
FCC Part 15.247(a)(1)(iii)	Number of hopping frequency	PASS
FCC Part 15.247(a)(1)(iii)	Time of Occupancy	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

Remark: The measurement uncertainty is not included in the test result.

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.42 dB	(1)
Radiated Emission 30~1000MHz	4.65 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.6. Equipments Used during the Test

Radiated Emission& Spurious Emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2012/10/27
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2012/10/27
3	RF TEST PANEL	Rohde&Schwarz	TS / RSP	335015/ 0017	2012/10/27
4	TURNTABLE	ETS	2088	2149	2012/10/27
5	ANTENNA MAST	ETS	2075	2346	2012/10/27
6	EMI TEST OFTWARE	Rohde&Schwarz	ESK1	N/A	2012/10/27
7	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2012/10/27
8	Amplifer	Sonoma	310N	E009-13	2012/10/27
9	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2012/10/27
10	High pass filter	Compliance Direction systems	BSU-6	34202	2012/10/27
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	470	2012/10/27
12	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2012/10/27
13	HORN ANTENNA	ShwarzBeck	9120D	1011	2012/10/27
14	TURNTABLE	MATURO	TT2.0	----	2012/10/27
15	ANTENNA MAST	MATURO	TAM-4.0-P	----	2012/10/27

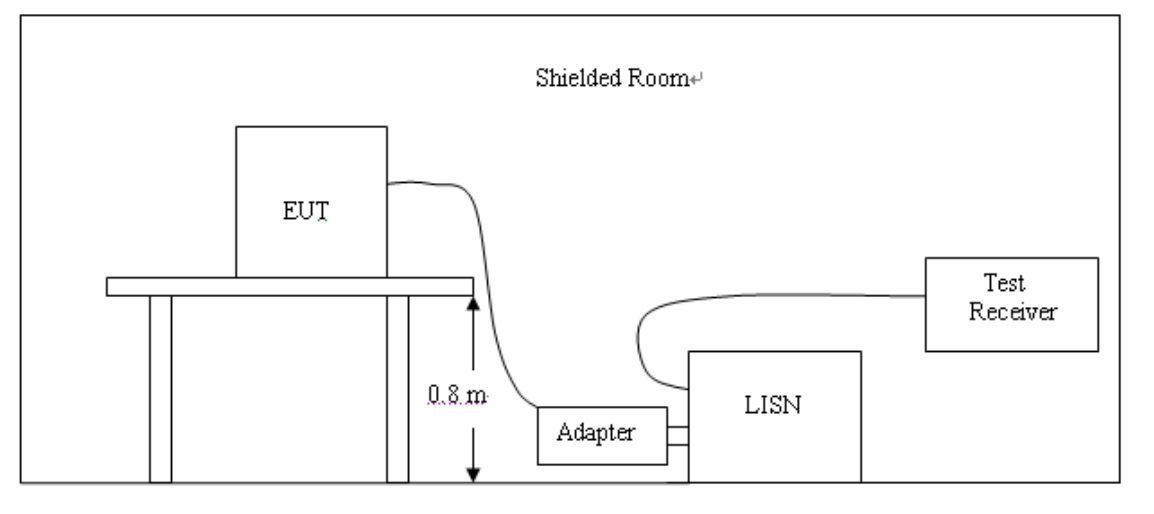
Maximum Peak Output Power / Frequency Separation / 20dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission/ Number of hopping frequency/ Time of Occupancy					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2012/10/27

The Calibration Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1.The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2009.
2 Support equipment, if needed, was placed as per ANSI C63.10-2009
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2009
4 The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

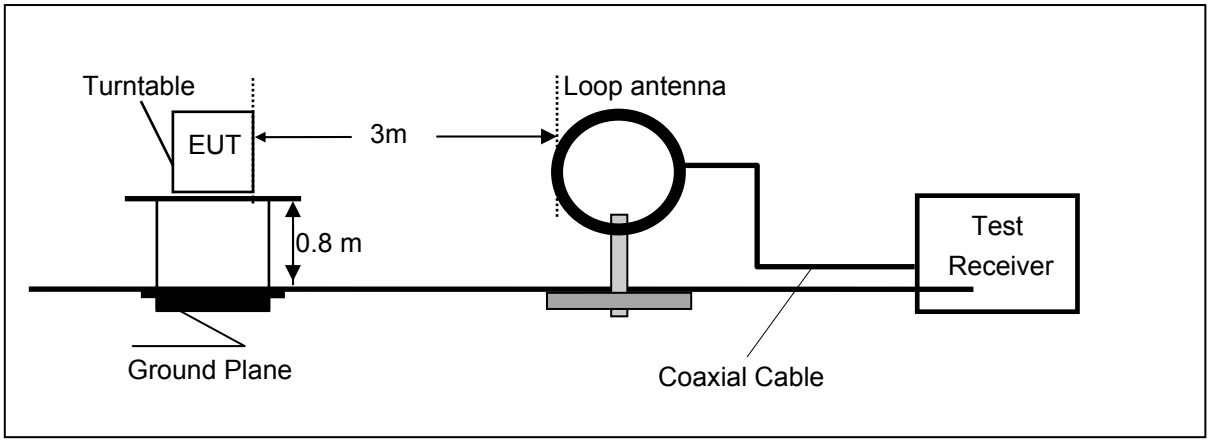
Not applicable to this device .

4.2. Radiated Emission

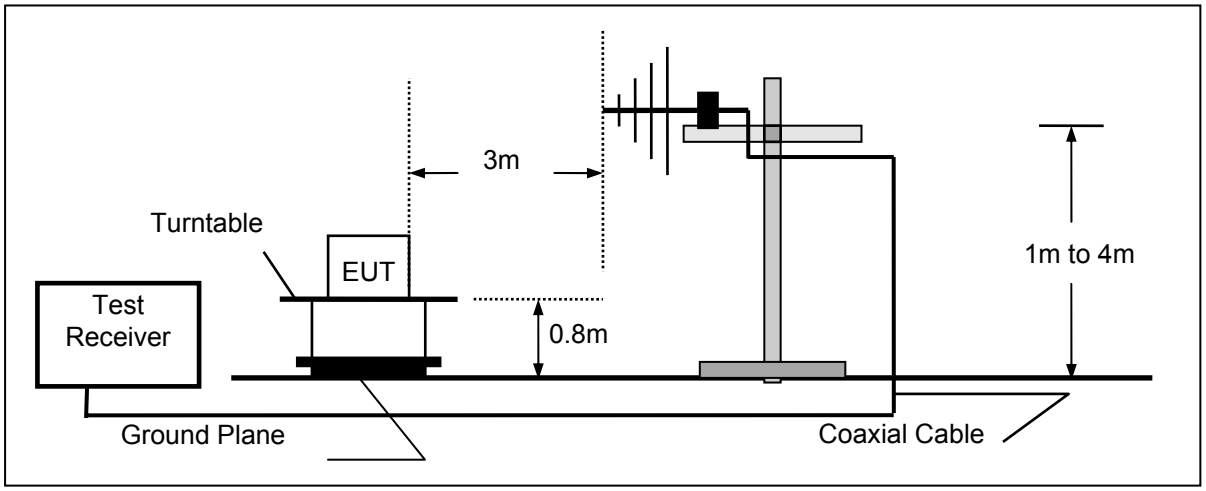
TEST CONFIGURATION

Radiated Emission Test Set-Up

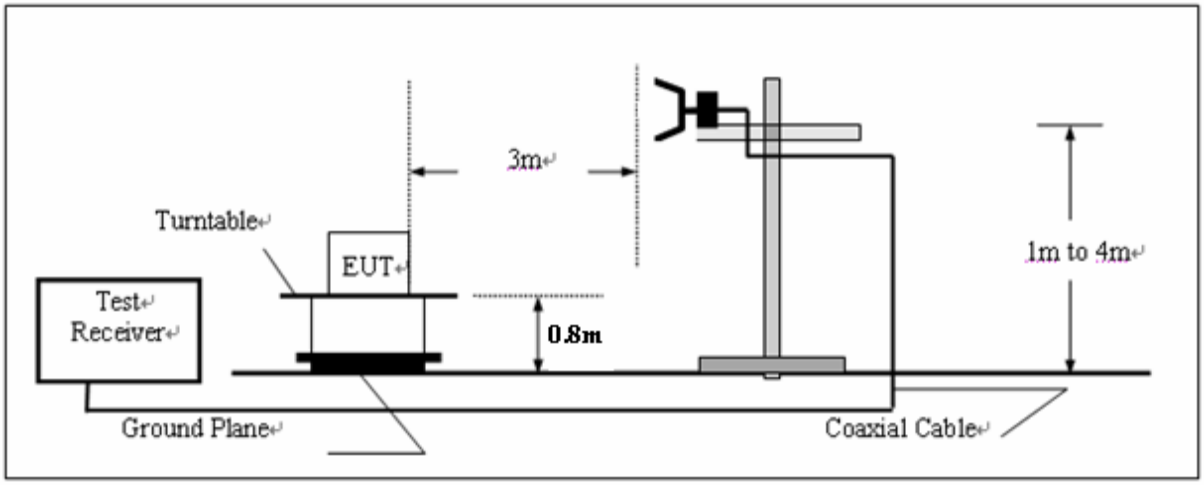
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. the fundamental frequency is 2402-2480MHz and the lowest crystal frequency is 16MHz, So the radiation emissions frequency range were tested from 9KHz to 25GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL – AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

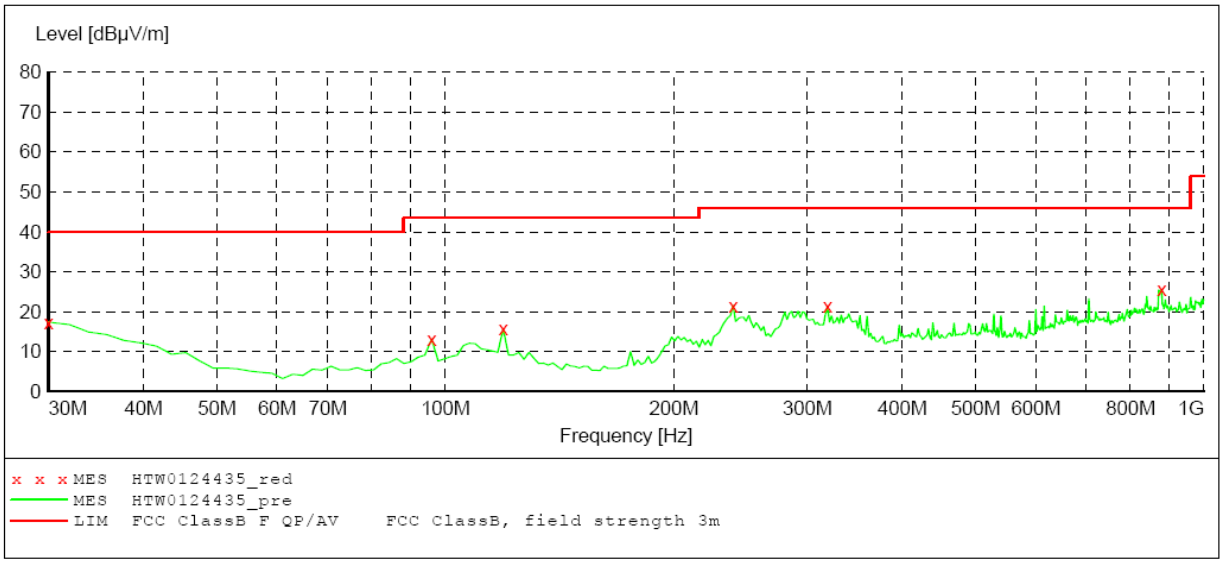
TEST RESULTS

Note:We tested Radiated Emission of GFSK, π/4 DQPSK and 8DPSK mode from 30MHz to 1000MHz We recorded the worst case data in the following.

Below 1G:

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562



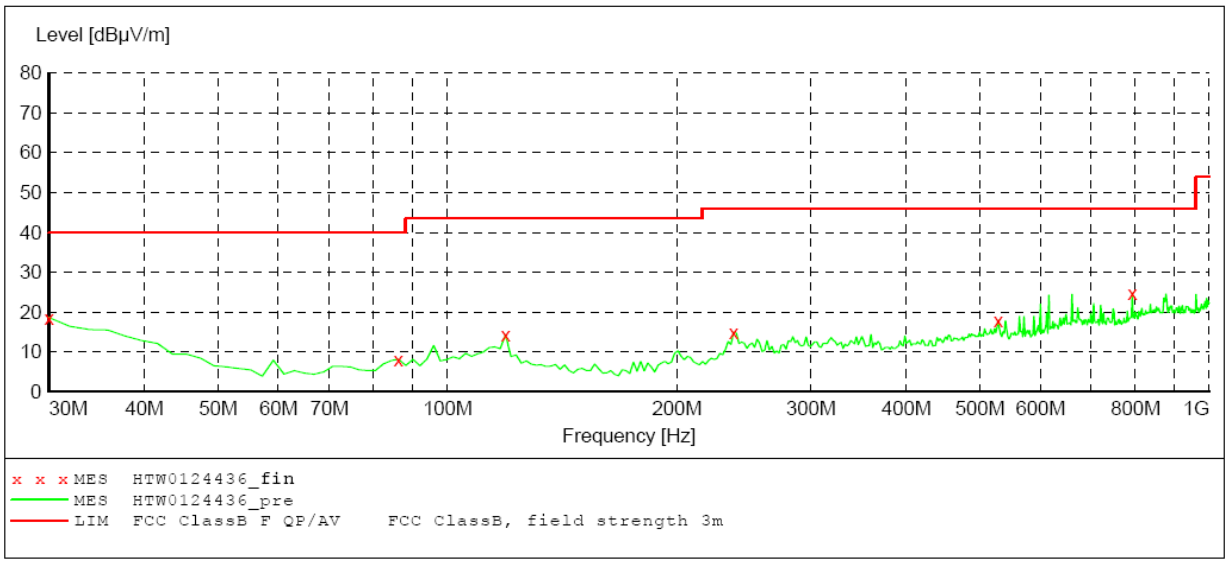
MEASUREMENT RESULT: "HTW0124435_red"

3/07/2013 7:31PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	17.40	-11.1	40.0	22.6	QP	100.0	-303.00	HORIZONTAL
95.960000	13.20	-20.1	43.5	30.3	QP	300.0	-292.00	HORIZONTAL
119.240000	15.70	-19.3	43.5	27.8	QP	300.0	-173.00	HORIZONTAL
239.520000	21.60	-18.9	46.0	24.4	QP	100.0	-289.00	HORIZONTAL
319.060000	21.40	-16.4	46.0	24.6	QP	100.0	-2.00	HORIZONTAL
879.720000	25.50	-7.0	46.0	20.5	QP	100.0	-289.00	HORIZONTAL

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562



MEASUREMENT RESULT: "HTW0124436_fin"

3/07/2013 7:45PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	18.60	-11.1	40.0	21.4	QP	100.0	-107.00	VERTICAL
86.260000	8.20	-20.9	40.0	31.8	QP	100.0	-74.00	VERTICAL
119.240000	14.40	-19.3	43.5	29.1	QP	100.0	-280.00	VERTICAL
237.580000	15.00	-19.1	46.0	31.0	QP	100.0	-50.00	VERTICAL
528.580000	18.00	-13.1	46.0	28.0	QP	100.0	-173.00	VERTICAL
792.420000	24.80	-9.0	46.0	21.2	QP	100.0	-1.00	VERTICAL

Above 1G:

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector,Readings are both peak and average values. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

GFSK mdoe (Low channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2402.00	92.36	PK			1.00	175	95.76	28.3	4.90	36.6	-3.40
1	*2402.00	83.02	AV			1.00	175	86.42	28.3	4.90	36.6	-3.40
2	4804.00	40.56	PK	74.00	33.44	1.00	256	37.36	32.7	7.00	36.5	3.20
3	7206.00	43.62	PK	74.00	30.38	1.00	136	34.22	35.8	8.90	35.3	9.40
4	10721.72	47.75	PK	74.00	26.25	1.00	215	31.15	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2402.00	95.59	PK			1.00 V	124	98.99	28.3	4.90	36.6	-3.40
1	*2402.00	85.88	AV			1.00 V	124	89.28	28.3	4.90	36.6	-3.40
2	4804.00	43.78	PK	74.00	30.22	1.00 V	339	40.58	32.7	7.00	36.5	3.20
3	7206.00	45.82	PK	74.00	28.18	1.00 V	340	36.42	35.8	8.90	35.3	9.40
4	10721.72	49.63	PK	74.00	24.37	1.00	20	33.03	38.0	11.30	32.7	16.6

GFSK mdoe (middle channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2441.00	94.15	PK			1.00	153	97.35	28.3	5.10	36.6	-3.20
1	*2441.00	84.06	AV			1.00	153	87.26	28.3	5.10	36.6	-3.20
2	4882.00	40.47	PK	74.00	33.53	1.00	202	37.07	32.3	7.60	36.5	3.40
3	7323.00	43.06	PK	74.00	30.94	1.00	355	33.66	36.1	8.60	35.3	9.40
4	10721.72	49.70	PK	74.00	24.3	1.00	28	33.10	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2441.00	95.66	PK			1.00	121	98.86	28.3	5.10	36.6	-3.20
1	*2441.00	85.74	AV			1.00	121	88.94	28.3	5.10	36.6	-3.20
2	4882.00	43.89	PK	74.00	30.11	1.00	97	40.49	32.3	7.60	36.5	3.40
3	7323.00	45.63	PK	74.00	28.37	1.00	288	36.23	36.1	8.60	35.3	9.40
4	10721.72	50.63	PK	74.00	23.37	1.00	89	34.03	38.0	11.30	32.7	16.6

GFSK mdoe (High channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	95.15	PK			1.00	156	99.45	28.2	5.10	36.6	-3.30
1	*2480.00	83.79	AV			1.00	156	87.09	28.2	5.10	36.6	-3.30
2	4960.00	46.68	PK	74.00	31.32	1.00	198	42.88	33.0	7.00	36.2	3.80
3	7340.00	47.66	PK	74.00	30.34	1.00	90	38.26	36.2	8.50	35.3	9.40
4	10721.72	52.86	PK	74.00	24.14	1.00	124	36.26	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	97.92	PK			1.000 V	125	101.22	28.2	5.10	36.6	-3.30
1	*2480.00	89.53	AV			1.00 V	125	92.83	28.2	5.10	36.6	-3.30
2	4960.00	47.53	PK	74.00	30.47	1.00 V	96	43.73	36.2	8.50	35.3	3.80
3	7340.00	49.28	PK	74.00	27.72	1.00 V	35	39.88	37.4	10.10	34.8	9.40
4	10721.72	52.84	PK	74.00	23.16	1.00 V	37	36.24	38.0	11.30	32.7	16.6

Suprious emission in restricted band and frequency band below 30MHz（GFSK mdoe）:

Indicated		Detector	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	Receiver Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Comment
24	30.27	QP	163	1.0	/	/	0.1	/	30.37	69.54	39.17	spurious
2483.50	46.27	PK	15	1.2	V	28.2	5.10	36.6	42.97	54.00	11.03	spurious
2483.50	46.13	PK	0	1.5	H	28.2	5.10	36.6	42.83	54.00	11.17	spurious
2390.00	54.06	PK	120	1.2	V	28.3	4.90	36.6	50.66	54.00	3.34	spurious
2390.00	55.25	PK	360	15	H	28.3	4.90	36.6	51.85	54.00	2.15	spurious

π/4 DQPSK (Low channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2402.00	91.36	PK			1.00	275	94.76	28.3	4.90	36.6	-3.40
1	*2402.00	82.02	AV			1.00	275	85.42	28.3	4.90	36.6	-3.40
2	4804.00	39.56	PK	74.00	33.44	1.00	156	36.36	32.7	7.00	36.5	3.20
3	7206.00	42.62	PK	74.00	30.38	1.00	47	33.22	35.8	8.90	35.3	9.40
4	10721.72	46.75	PK	74.00	26.25	1.00	218	30.15	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2402.00	92.59	PK			1.00 V	124	96.99	28.3	4.90	36.6	-3.40
1	*2402.00	84.88	AV			1.00 V	124	88.28	28.3	4.90	36.6	-3.40
2	4804.00	41.78	PK	74.00	30.22	1.00 V	339	38.58	32.7	7.00	36.5	3.20
3	7206.00	42.82	PK	74.00	28.18	1.00 V	340	34.42	35.8	8.90	35.3	9.40
4	10721.72	47.63	PK	74.00	24.37	1.00	20	31.03	38.0	11.30	32.7	16.6

π/4 DQPSK (middle channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2441.00	93.15	PK			1.00	155	96.35	28.3	5.10	36.6	-3.20
1	*2441.00	83.06	AV			1.00	155	86.26	28.3	5.10	36.6	-3.20
2	4882.00	40.47	PK	74.00	33.53	1.00	243	37.07	32.3	7.60	36.5	3.40
3	7323.00	42.06	PK	74.00	30.94	1.00	356	32.66	36.1	8.60	35.3	9.40
4	10721.72	47.70	PK	74.00	24.3	1.00	12	31.1	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2441.00	94.66	PK			1.00	121	97.86	28.3	5.10	36.6	-3.20
1	*2441.00	85.24	AV			1.00	121	88.44	28.3	5.10	36.6	-3.20
2	4882.00	43.89	PK	74.00	30.11	1.00	210	40.49	32.3	7.60	36.5	3.40
3	7323.00	45.63	PK	74.00	28.37	1.00	288	36.23	36.1	8.60	35.3	9.40
4	10721.72	49.63	PK	74.00	23.37	1.00	173	33.03	38.0	11.30	32.7	16.6

π/4 DQPSK (High channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	94.15	PK			1.00	234	97.45	28.2	5.10	36.6	-3.30
1	*2480.00	82.79	AV			1.00	234	86.09	28.2	5.10	36.6	-3.30
2	4960.00	45.68	PK	74.00	31.32	1.00	203	41.88	33.0	7.00	36.2	3.80
3	7340.00	46.66	PK	74.00	30.34	1.00	91	37.26	36.2	8.50	35.3	9.40
4	10721.72	52.86	PK	74.00	24.14	1.00	127	36.26	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	95.92	PK			1.000 V	325	99.22	28.2	5.10	36.6	-3.30
1	*2480.00	87.53	AV			1.00 V	325	90.83	28.2	5.10	36.6	-3.30
2	4960.00	46.53	PK	74.00	30.47	1.00 V	129	42.73	36.2	8.50	35.3	3.80
3	7340.00	48.28	PK	74.00	27.72	1.00 V	48	38.88	37.4	10.10	34.8	9.40
4	10721.72	52.84	PK	74.00	23.16	1.00 V	69	36.24	38.0	11.30	32.7	16.6

Suprious emission in restricted band and frequency band below 30MHz（π/4 DQPSK）:

Indicated		Detector	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	Receiver Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Comment
24	30.27	QP	163	1.0	/	/	0.1	/	30.37	69.54	39.17	spurious
2483.50	55.75	PK	15	1.2	V	28.2	5.10	36.6	52.45	54.00	1.55	spurious
2483.50	55.91	PK	0	1.5	H	28.2	5.10	36.6	52.61	54.00	1.39	spurious
2390.00	55.61	PK	120	1.2	V	28.3	4.90	36.6	52.21	54.00	1.79	spurious
2390.00	54.01	PK	360	15	H	28.3	4.90	36.6	50.61	54.00	3.39	spurious

8DPSK (Low channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2402.00	91.36	PK			1.00	275	94.76	28.3	4.90	36.6	-3.40
1	*2402.00	82.02	AV			1.00	275	85.42	28.3	4.90	36.6	-3.40
2	4804.00	39.56	PK	74.00	33.44	1.00	156	36.36	32.7	7.00	36.5	3.20
3	7206.00	42.62	PK	74.00	30.38	1.00	47	33.22	35.8	8.90	35.3	9.40
4	10721.72	46.75	PK	74.00	26.25	1.00	218	30.15	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2402.00	92.59	PK			1.00 V	124	96.99	28.3	4.90	36.6	-3.40
1	*2402.00	84.88	AV			1.00 V	124	88.28	28.3	4.90	36.6	-3.40
2	4804.00	41.78	PK	74.00	30.22	1.00 V	339	38.58	32.7	7.00	36.5	3.20
3	7206.00	42.82	PK	74.00	28.18	1.00 V	340	34.42	35.8	8.90	35.3	9.40
4	10721.72	47.63	PK	74.00	24.37	1.00	20	31.03	38.0	11.30	32.7	16.6

8DPSK (middle channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2441.00	93.15	PK			1.00	155	96.35	28.3	5.10	36.6	-3.20
1	*2441.00	83.06	AV			1.00	155	86.26	28.3	5.10	36.6	-3.20
2	4882.00	40.47	PK	74.00	33.53	1.00	243	37.07	32.3	7.60	36.5	3.40
3	7323.00	42.06	PK	74.00	30.94	1.00	356	32.66	36.1	8.60	35.3	9.40
4	10721.72	47.70	PK	74.00	24.3	1.00	12	31.1	38.0	11.30	32.7	16.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2441.00	94.66	PK			1.00	121	97.86	28.3	5.10	36.6	-3.20
1	*2441.00	85.24	AV			1.00	121	88.44	28.3	5.10	36.6	-3.20
2	4882.00	43.89	PK	74.00	30.11	1.00	210	40.49	32.3	7.60	36.5	3.40
3	7323.00	45.63	PK	74.00	28.37	1.00	288	36.23	36.1	8.60	35.3	9.40
4	10721.72	49.63	PK	74.00	23.37	1.00	173	33.03	38.0	11.30	32.7	16.6

8DPSK (High channel)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	94.15	PK			1.00	234	97.45	28.2	5.10	36.6	-3.30
1	*2480.00	82.79	AV			1.00	234	86.09	28.2	5.10	36.6	-3.30
2	4960.00	45.68	PK	74.00	31.32	1.00	203	41.88	33.0	7.00	36.2	3.80
2	4960.00	--	AV	54.00	--	1.00	203	--	33.0	7.00	36.2	3.80
3	7340.00	46.66	PK	74.00	30.34	1.00	91	37.26	36.2	8.50	35.3	9.40
3	7340.00	--	AV	54.00	--	1.00	91	--	36.2	8.50	35.3	9.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	95.92	PK			1.000 V	325	99.22	28.2	5.10	36.6	-3.30
1	*2480.00	87.53	AV			1.00 V	325	90.83	28.2	5.10	36.6	-3.30
2	4960.00	46.53	PK	74.00	30.47	1.00 V	129	42.73	36.2	8.50	35.3	3.80
2	4960.00	--	AV	54.00	--	1.00 V	129	--	36.2	8.50	35.3	3.80
3	7340.00	48.28	PK	74.00	27.72	1.00 V	48	38.88	37.4	10.10	34.8	9.40
3	7340.00	--	AV	54.00	--	1.00 V	48	--	37.4	10.10	34.8	9.40

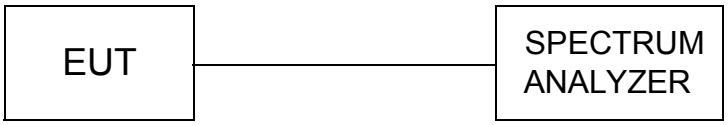
Suprious emission in restricted band and frequency band below 30MHz（8DPSK）:

Indicated		Detector	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	Receiver Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Comment
24	30.27	QP	163	1.0	/	/	0.1	/	30.37	69.54	39.17	spurious
2483.50	55.75	PK	15	1.2	V	28.2	5.10	36.6	52.45	54.00	1.55	spurious
2483.50	55.91	PK	0	1.5	H	28.2	5.10	36.6	52.61	54.00	1.39	spurious
2390.00	55.61	PK	120	1.2	V	28.3	4.90	36.6	52.21	54.00	1.79	spurious
2390.00	54.01	PK	360	15	H	28.3	4.90	36.6	50.61	54.00	3.39	spurious

REMARKS:
1. Emission level (dBuV/m) =Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Pre-amplifier Factor
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. The limit value is defined as per 15.247
6. " * " : Fundamental frequency
7. The average measurement was not performed when the peak measured data under the limit of average detection.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

GFSK Mode:

Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Results
2402	-1.30	30	PASS
2441	-2.60	30	PASS
2480	-3.41	30	PASS

π/4 DQPSK Mode:

Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Results
2402	-3.14	30	PASS
2441	-4.33	30	PASS
2480	-3.27	30	PASS

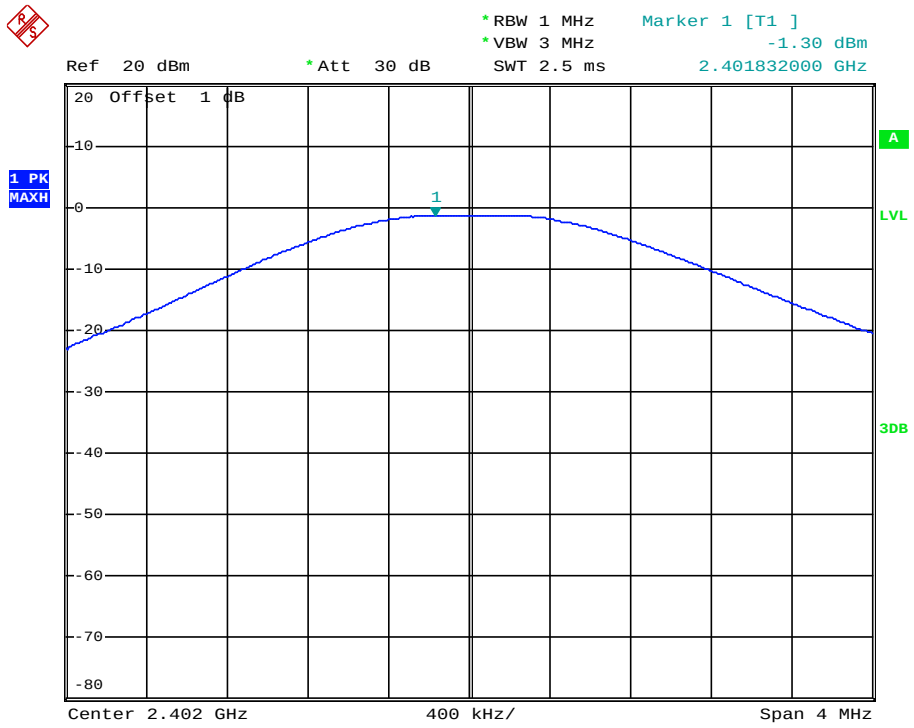
8DPSK Mode:

Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Results
2402	-3.39	30	PASS
2441	-4.79	30	PASS
2480	-4.88	30	PASS

Note: The test results including the cable lose.

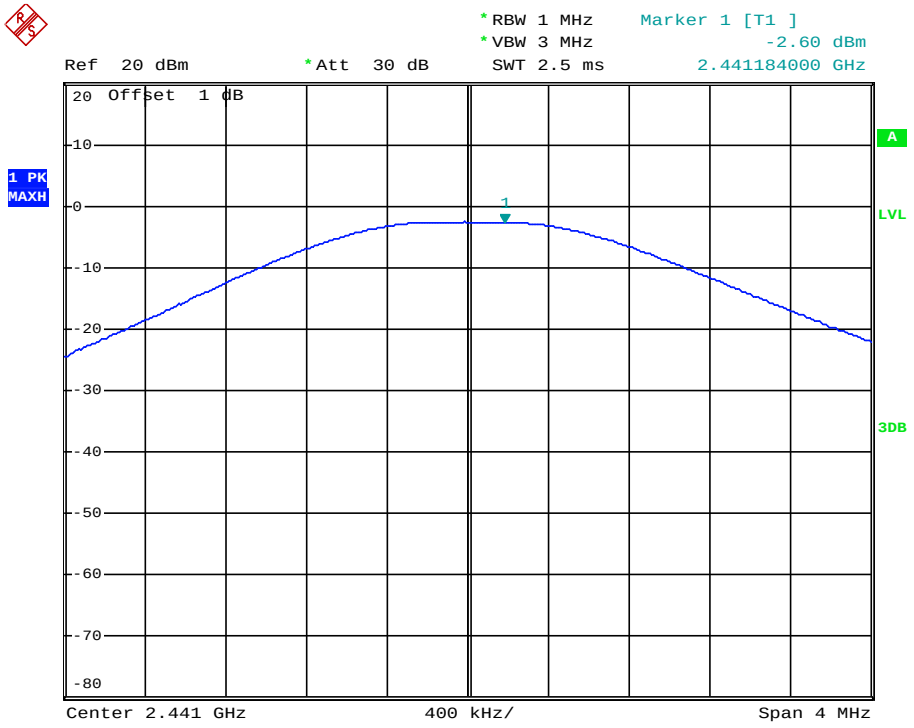
GFSK Mode:

Low channel



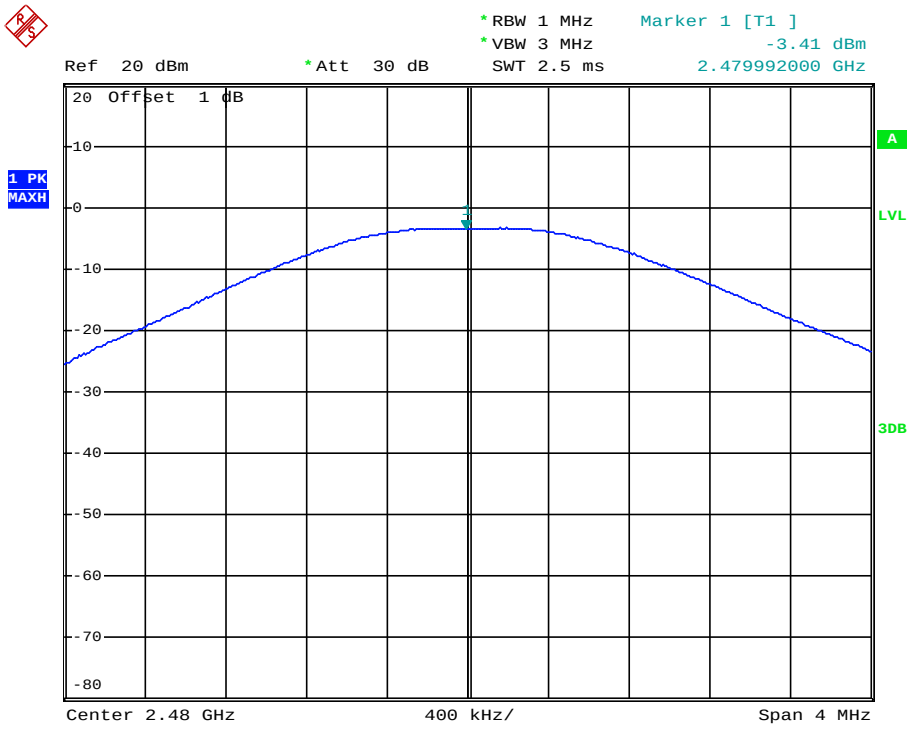
Date: 7.APR.2013 11:08:01

Middle channel



Date: 7.APR.2013 11:08:49

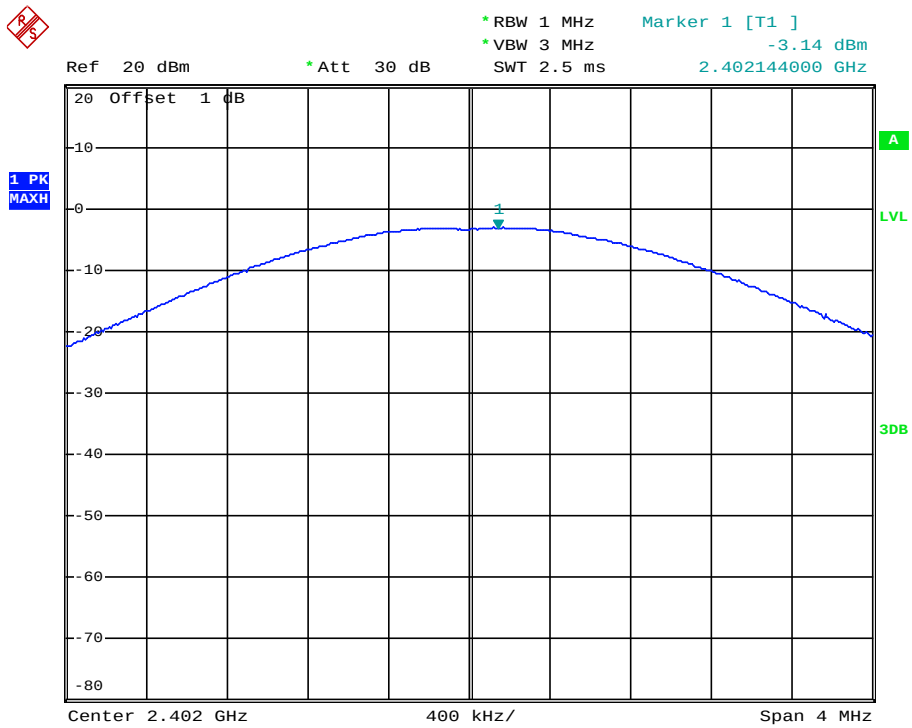
High channel



Date: 7.APR.2013 11:09:18

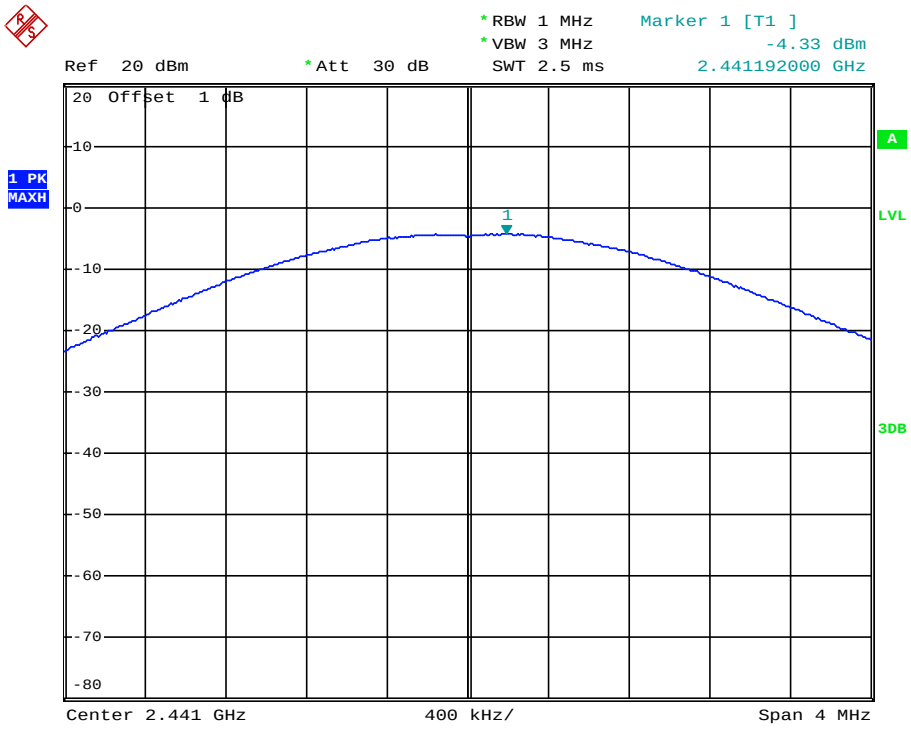
π/4 DQPSK Mode:

Low channel



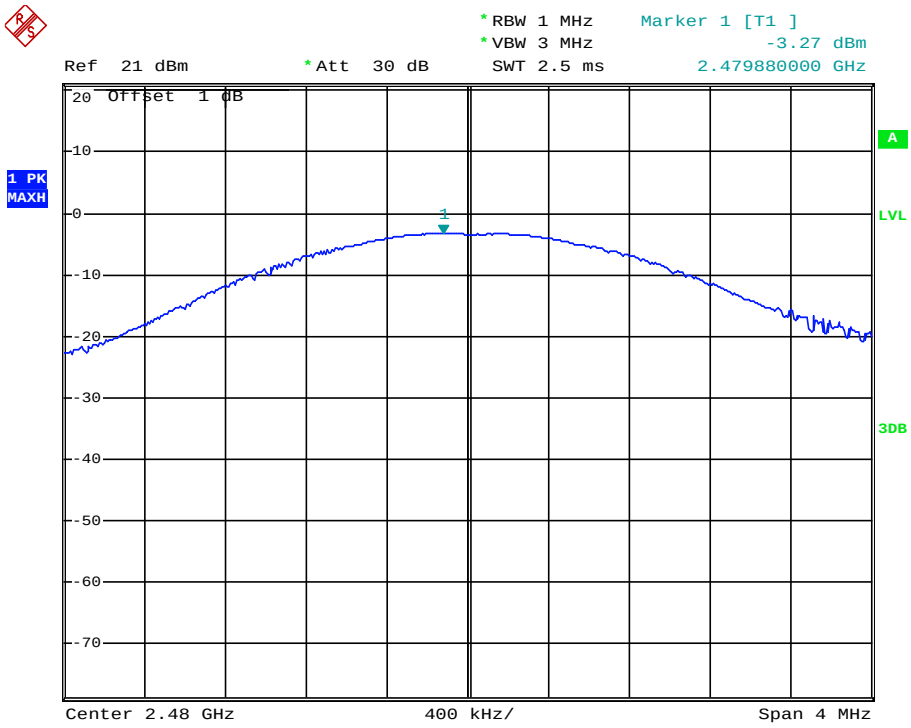
Date: 7.APR.2013 11:12:10

Middle channel



Date: 7.APR.2013 11:11:45

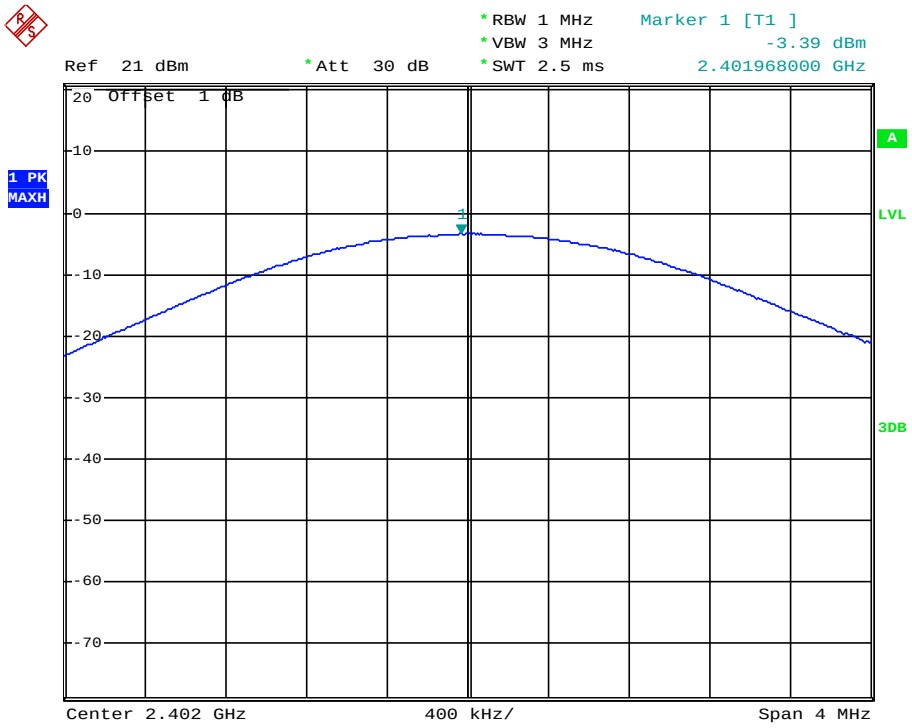
High channel



Date: 7.APR.2013 18:34:41

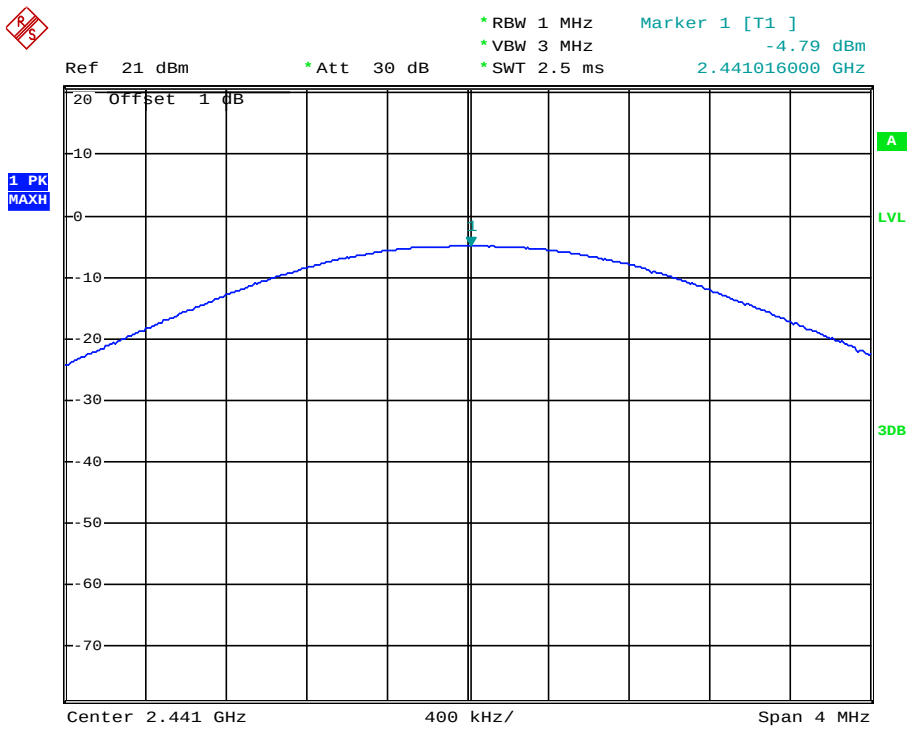
8DPSK Mode:

Low channel



Date: 8.APR.2013 17:03:09

Middle channel



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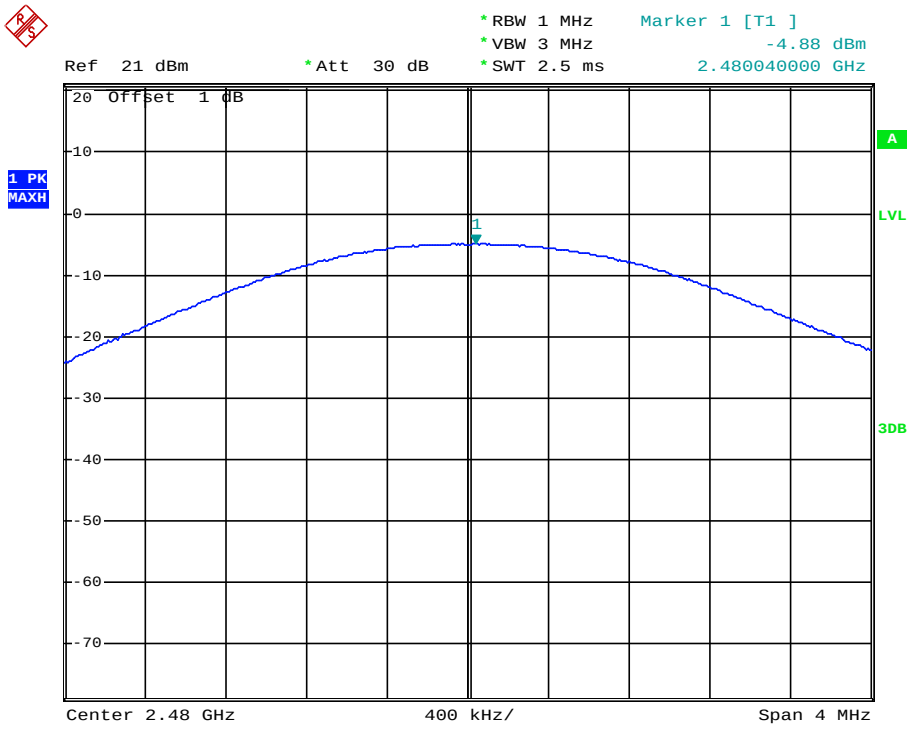
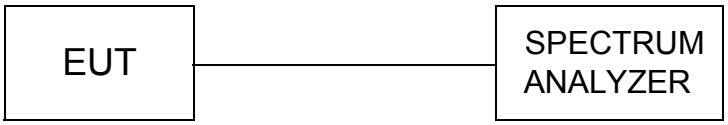
High channel



Date: 8.APR.2013 17:04:08

4.4. 20dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

LIMIT

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwith.

TEST RESULTS

GFSK Mode:

Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Results
2402	0.804	/	PASS
2441	0.792	/	PASS
2480	0.788	/	PASS

π/4 DQPSK Mode:

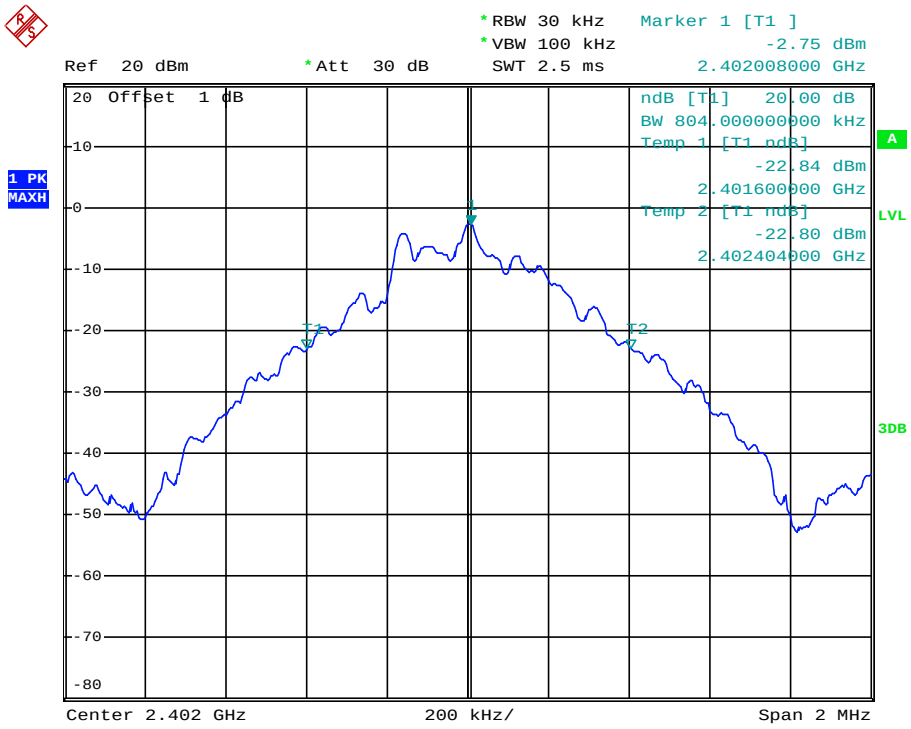
Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Results
2402	1.204	/	PASS
2441	1.200	/	PASS
2480	1.200	/	PASS

8DPSK Mode:

Channel Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Results
2402	1.300	/	PASS
2441	1.214	/	PASS
2480	1.216	/	PASS

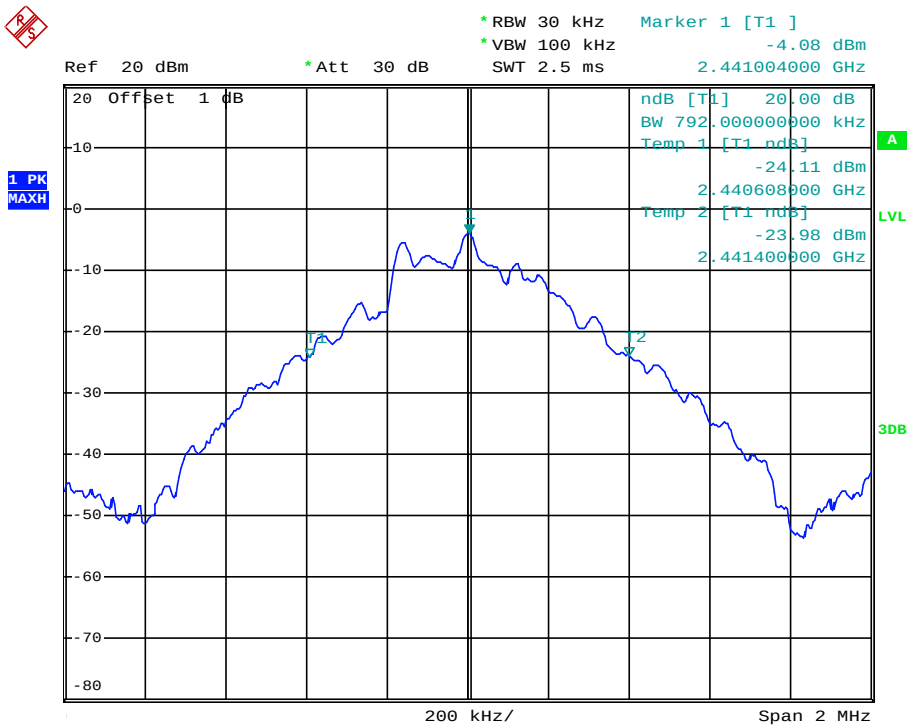
Photos of 20dB Bandwidth Measurement(GFSK Mode)

Low Channel



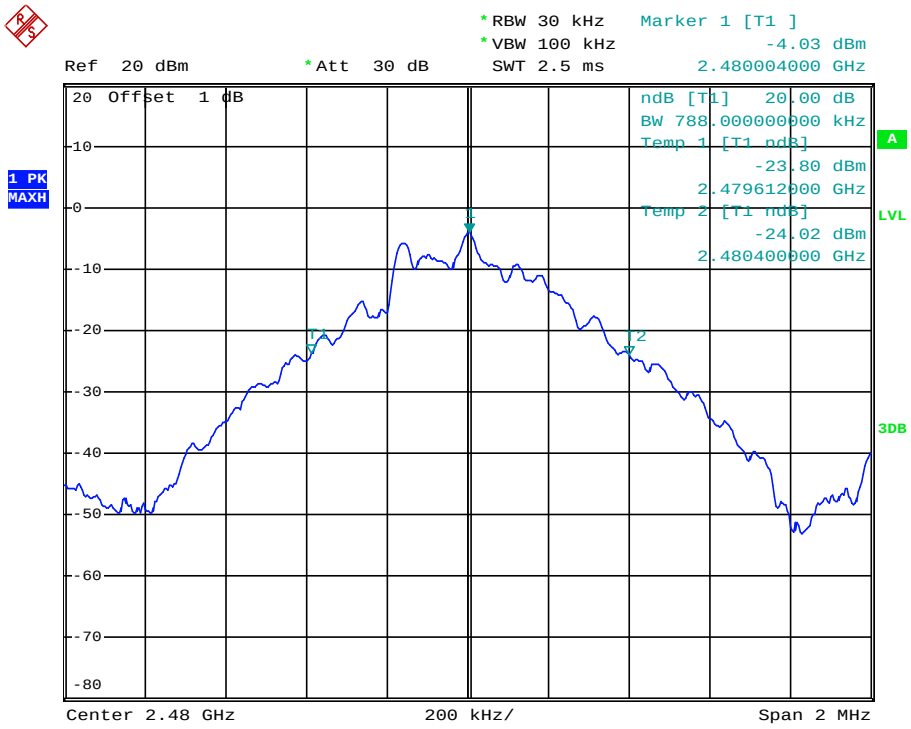
Date: 7.APR.2013 11:17:19

Middle Channel



Date: 7.APR.2013 11:16:35

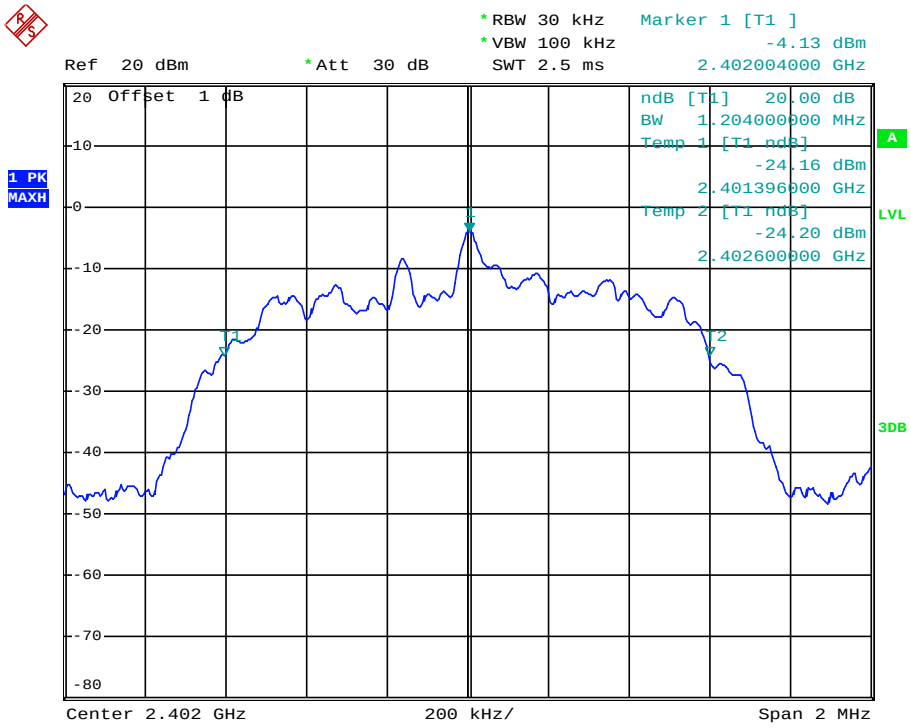
High Channel



Date: 7.APR.2013 11:16:05

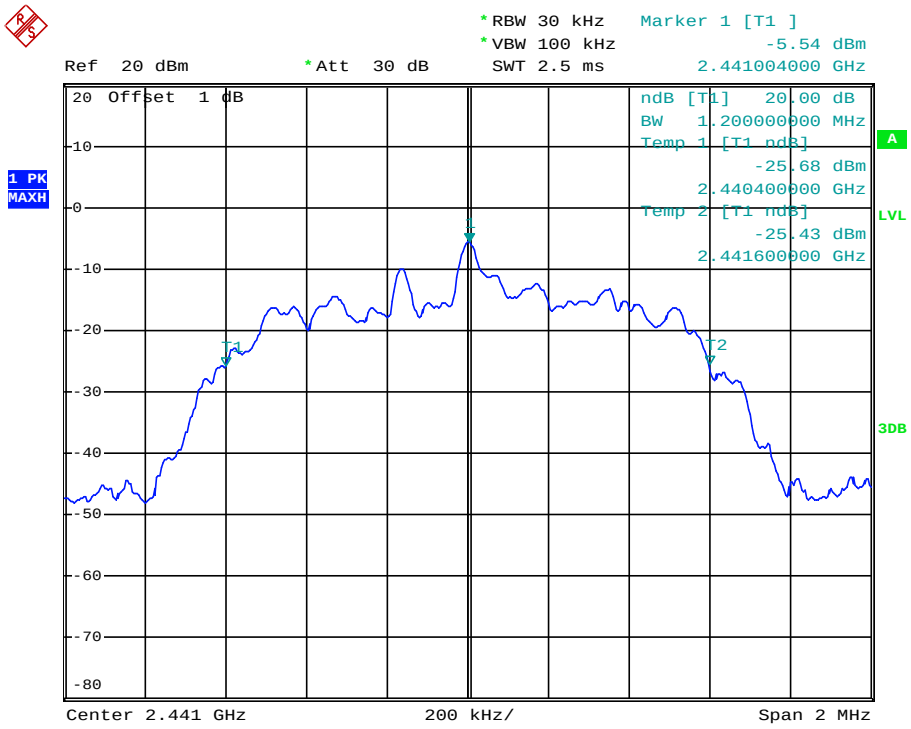
Photos of 20dB Bandwidth Measurement(π /4 DQPSK Mode)

Low Channel



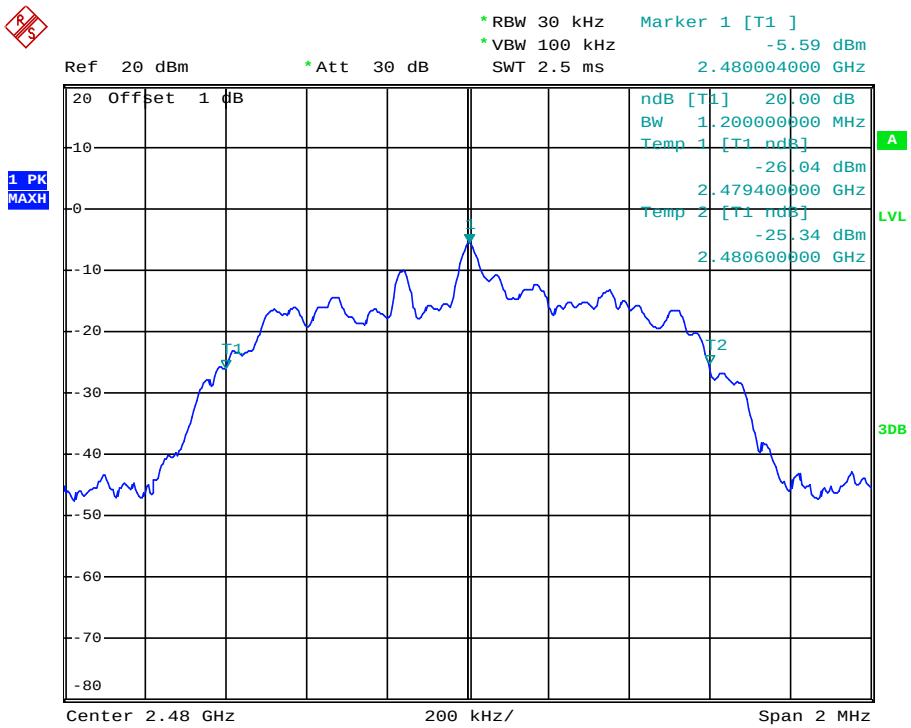
Date: 7.APR.2013 11:14:00

Middle Channel



Date: 7.APR.2013 11:14:30

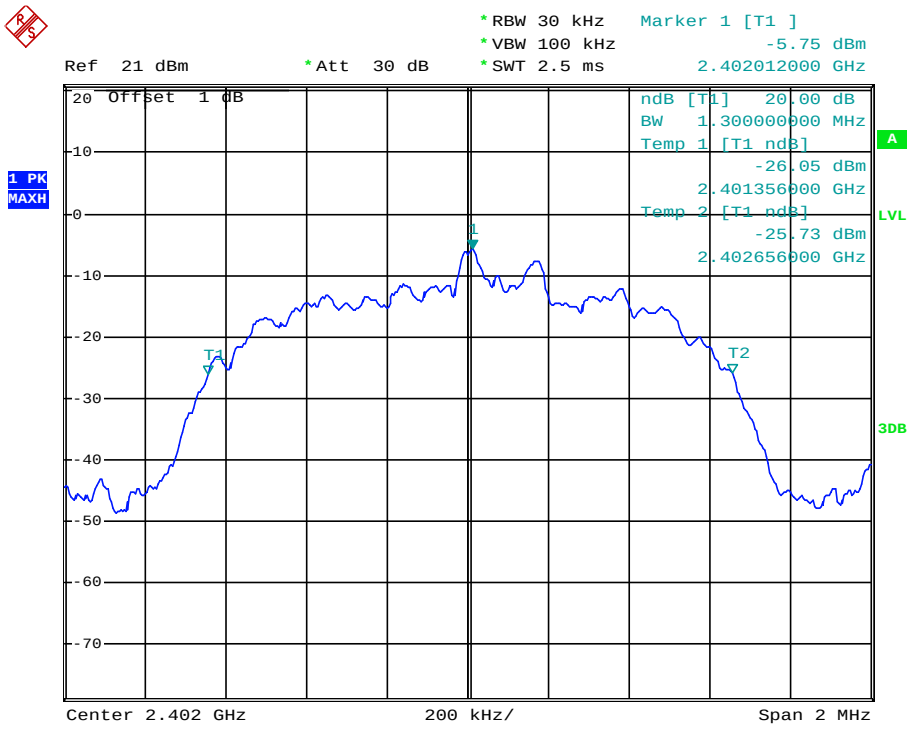
High Channel



Date: 7.APR.2013 11:15:02

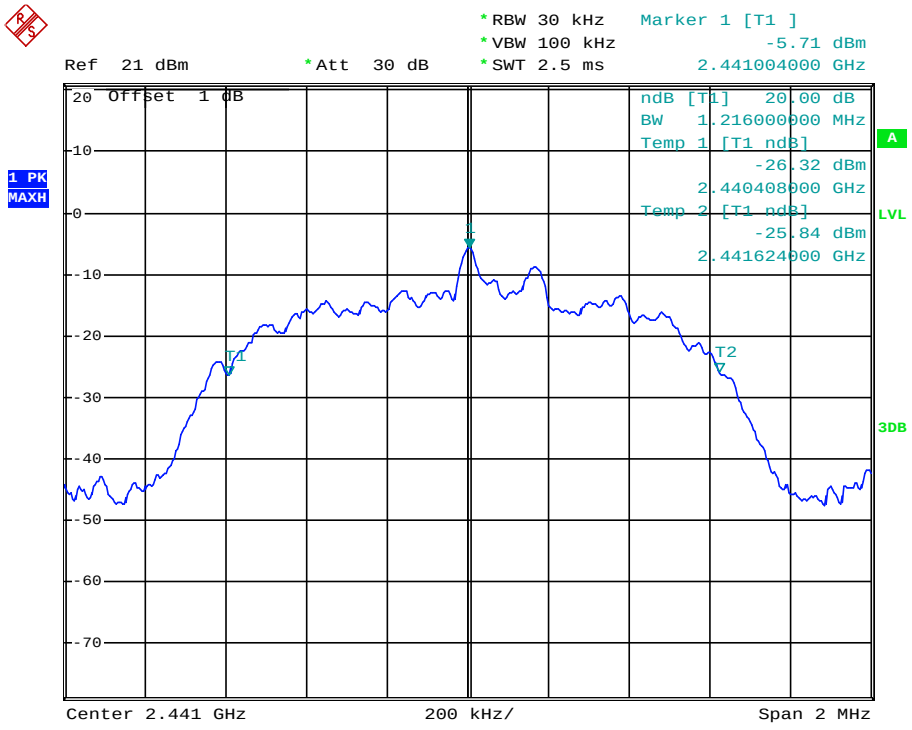
Photos of 20dB Bandwidth Measurement(8DPSK Mode)

Low Channel



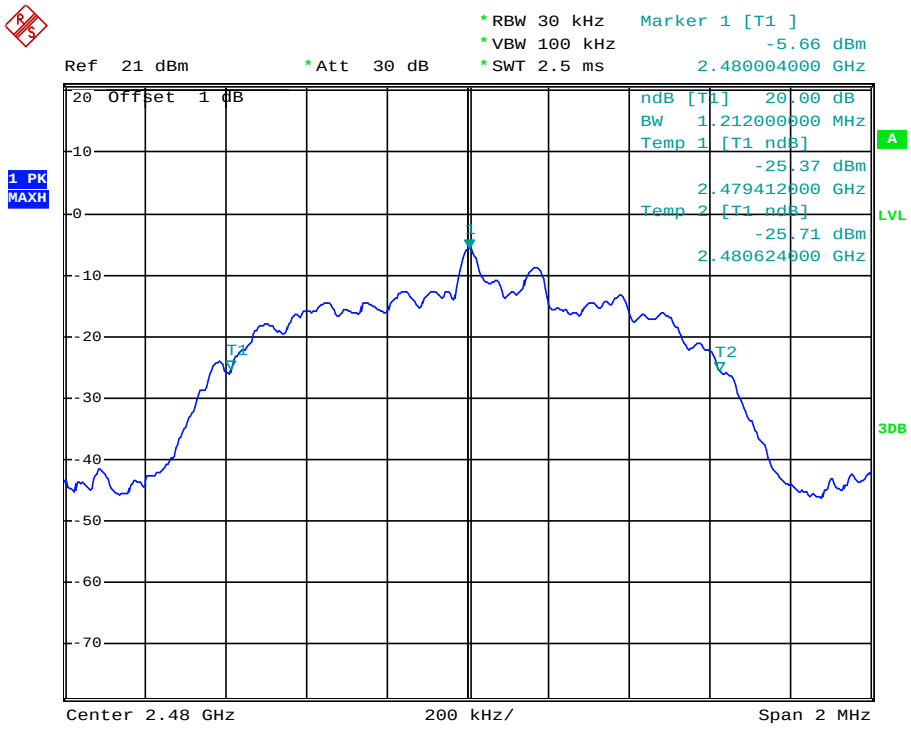
Date: 8.APR.2013 17:06:23

Middle Channel



Date: 8.APR.2013 17:05:56

High Channel



Date: 8.APR.2013 17:05:30

4.5. Band Edge

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 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
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 RESULTS

Photos of Band Edge Measurement（GFSK Mode）

Frequency	Delta peak to band emission	Limit(dBc)
2400MHz	43.15	20
2483.5MHz	45.65	20

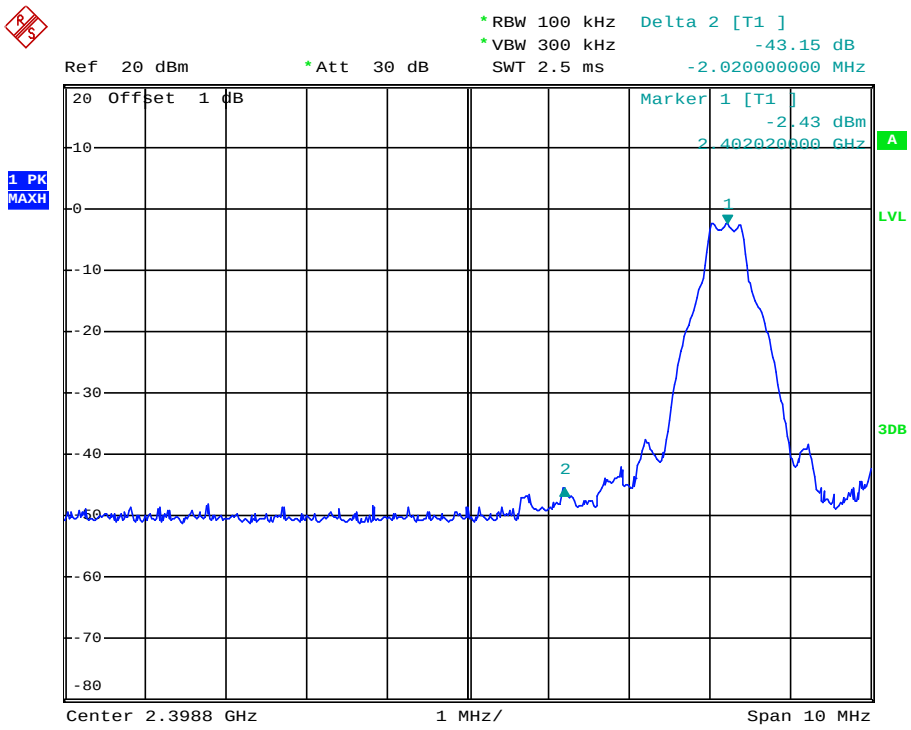
Photos of Band Edge Measurement（π/4 DQPSK Mode）

Frequency	Delta peak to band emission	Limit(dBc)
2400MHz	46.03	20
2483.5MHz	42.66	20

Photos of Band Edge Measurement（8DPSK Mode）

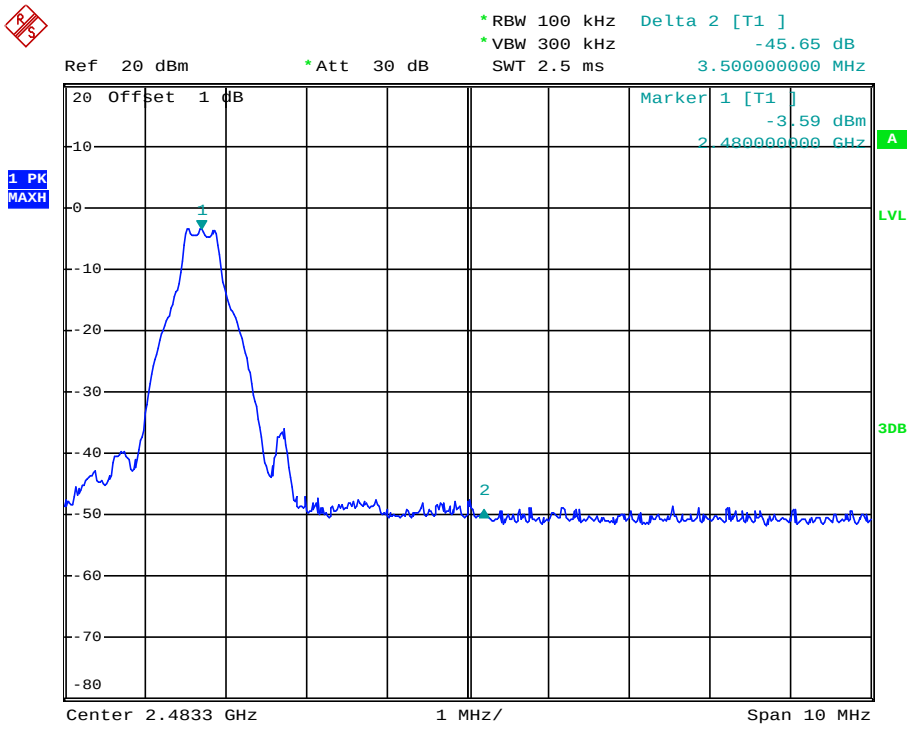
Frequency	Delta peak to band emission	Limit(dBc)
2400MHz	42.79	20
2483.5MHz	43.36	20

Band Edge: Left Side（GFSK Mode）



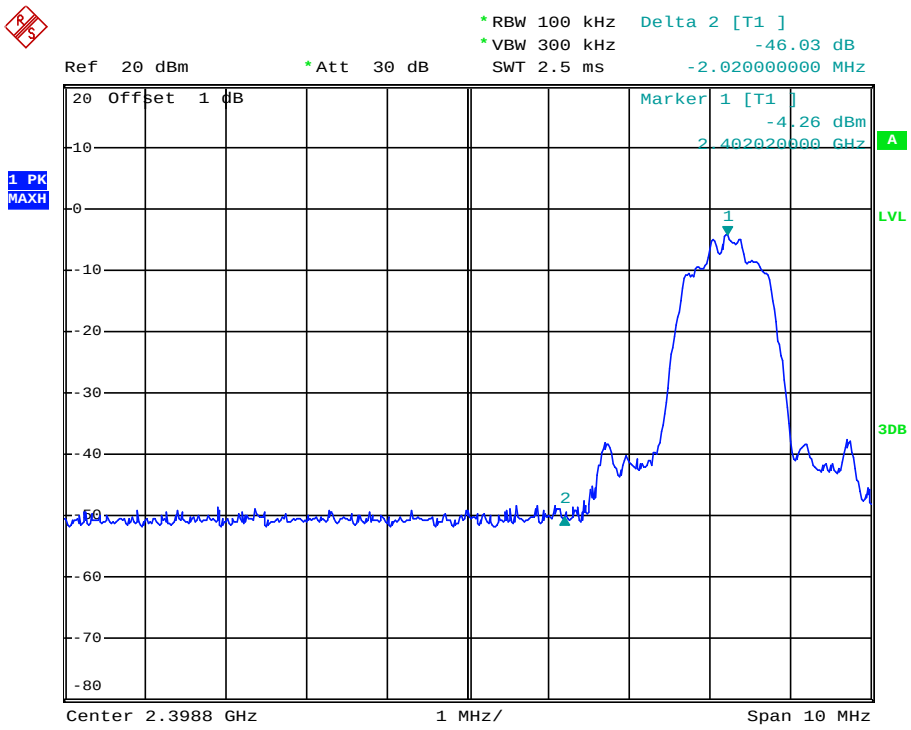
Date: 7.APR.2013 11:21:49

Band Edge: Right Side（GFSK Mode）



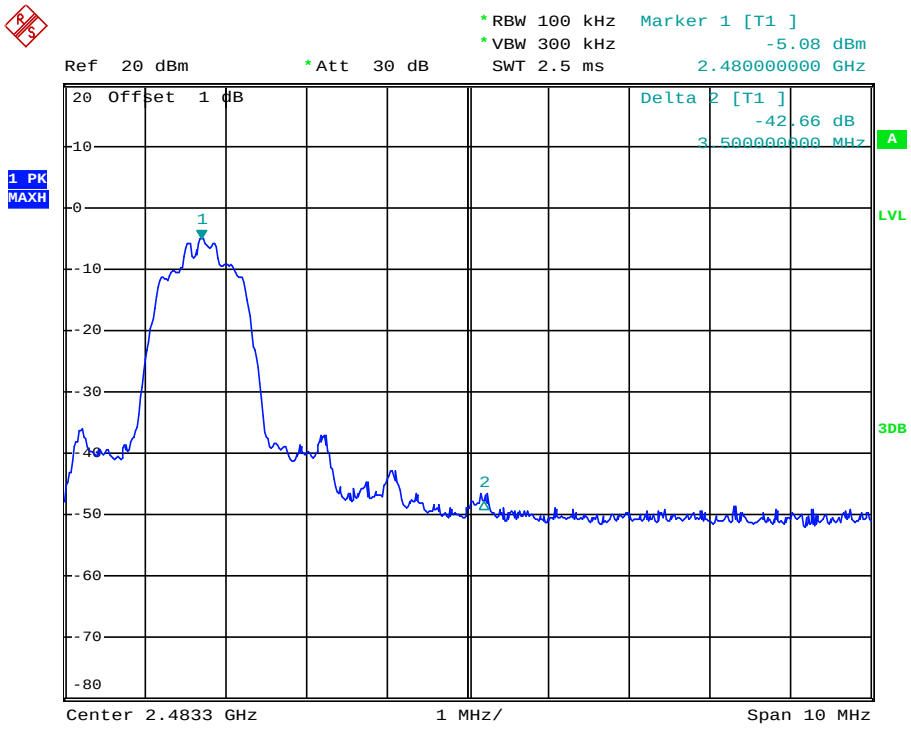
Date: 7.APR.2013 11:23:22

Band Edge: Left Side（π/4 DQPSK Mode）



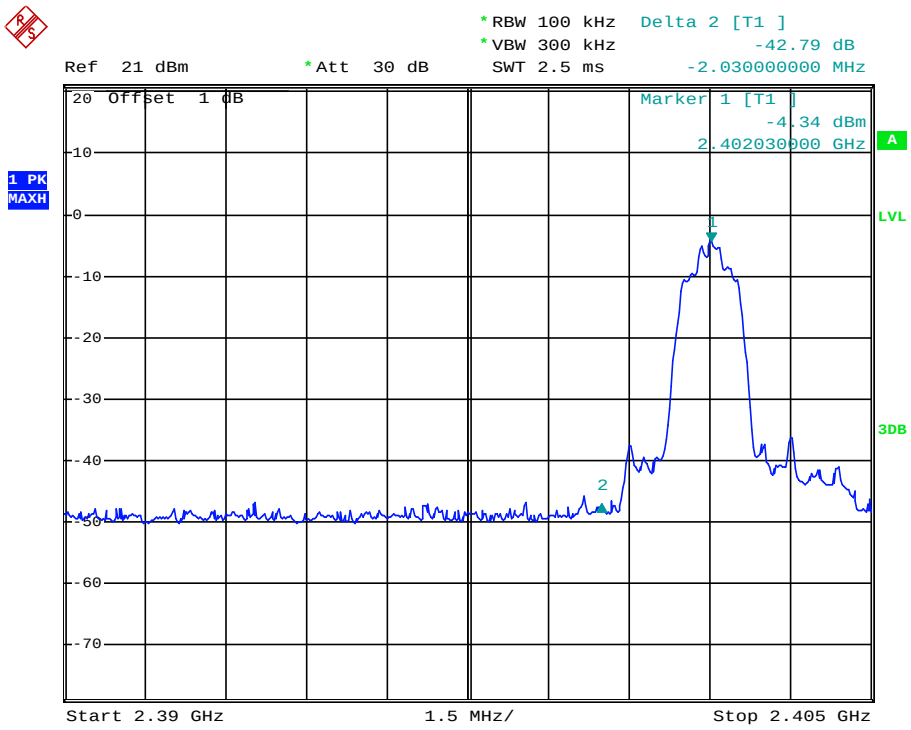
Date: 7.APR.2013 11:25:33

Band Edge: Right Side（π/4 DQPSK Mode）



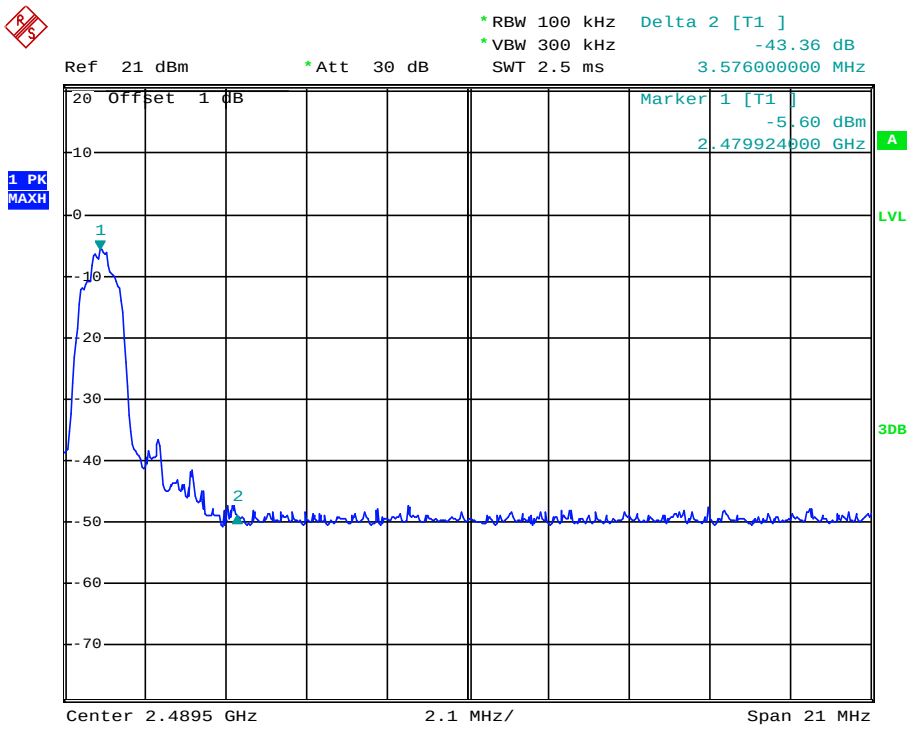
Date: 7.APR.2013 11:24:30

Band Edge: Left Side（π/4 DQPSK Mode）



Date: 8.APR.2013 17:25:17

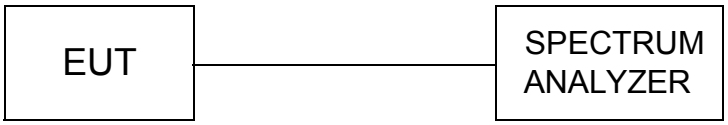
Band Edge: Right Side（π/4 DQPSK Mode）



Date: 8.APR.2013 17:26:10

4.6. Frequency Separation

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with30 KHz RBW and 100KHz VBW.

LIMIT

According to 15.247(a)(1),frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

TEST RESULTS

GFSK Mode:

Test Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.000	25KHz or 2/3*20dB bandwidth(0.536MHz)	Pass
Adjacency Channel	2403			
Mid Channel	2441	1.000	25KHz or 2/3*20dB bandwidth(0.528MHz)	Pass
Adjacency Channel	2440			
High Channel	2480	0.996	25KHz or 2/3*20dB bandwidth(0.525MHz)	Pass
Adjacency Channel	2479			

π/4 DQPSK Mode:

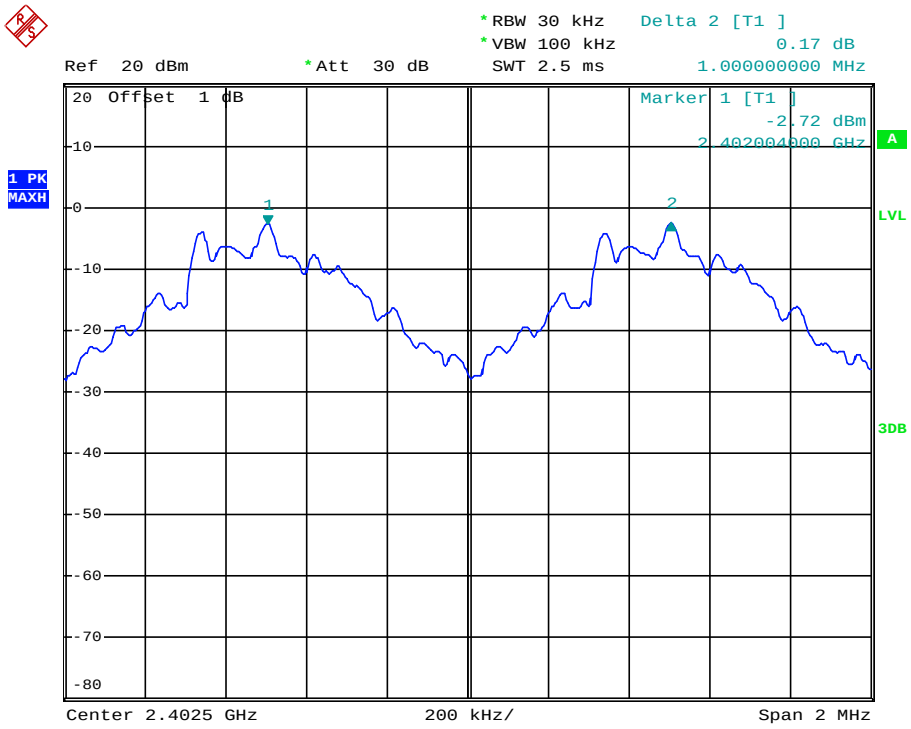
Test Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.000	25KHz or 2/3*20dB bandwidth(0.536MHz)	Pass
Adjacency Channel	2403			
Mid Channel	2441	1.004	25KHz or 2/3*20dB bandwidth(0.528MHz)	Pass
Adjacency Channel	2440			
High Channel	2480	1.004	25KHz or 2/3*20dB bandwidth(0.525MHz)	Pass
Adjacency Channel	2479			

8DPSK Mode:

Test Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.004	25KHz or 2/3*20dB bandwidth(0.536MHz)	Pass
Adjacency Channel	2403			
Mid Channel	2441	1.004	25KHz or 2/3*20dB bandwidth(0.528MHz)	Pass
Adjacency Channel	2440			
High Channel	2480	1.004	25KHz or 2/3*20dB bandwidth(0.525MHz)	Pass
Adjacency Channel	2479			

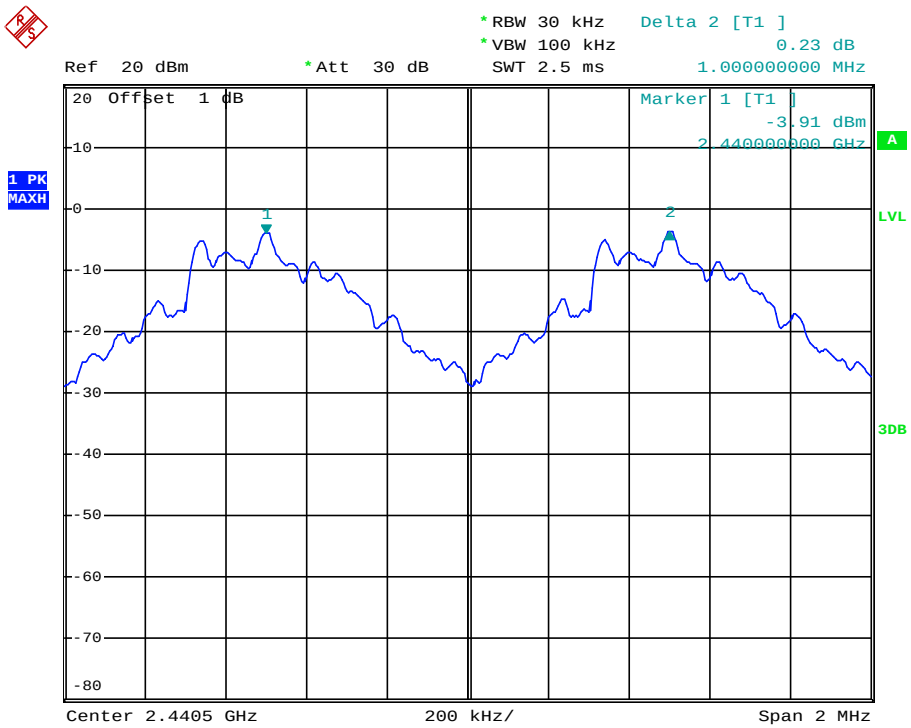
Photos of Frequency separation Measurement(GFSK Mode)

Low channel



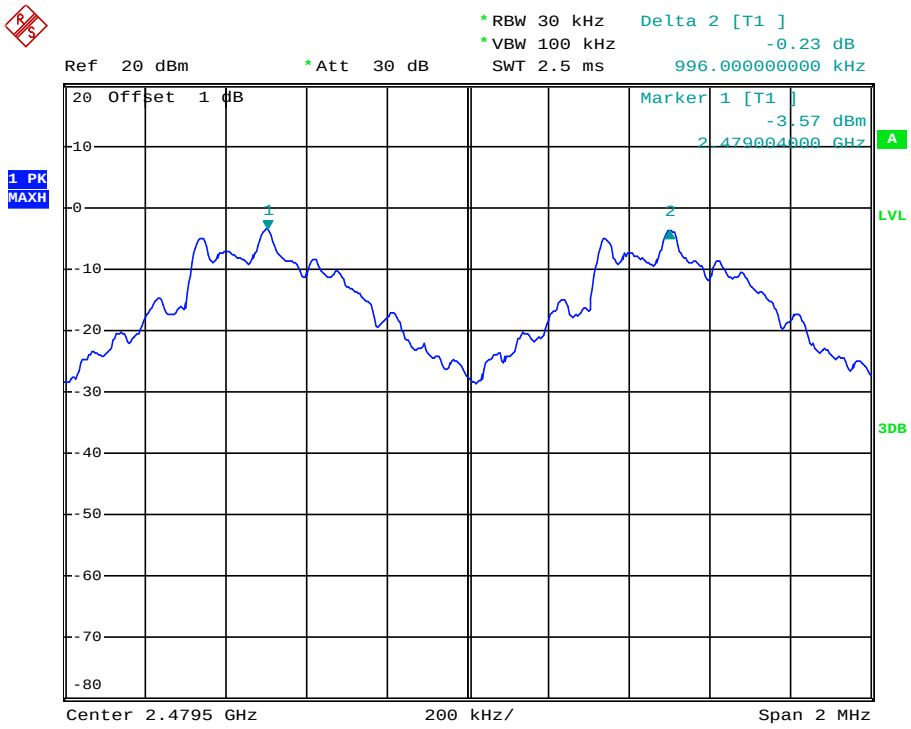
Date: 7.APR.2013 11:33:11

Middle channel



Date: 7.APR.2013 11:32:26

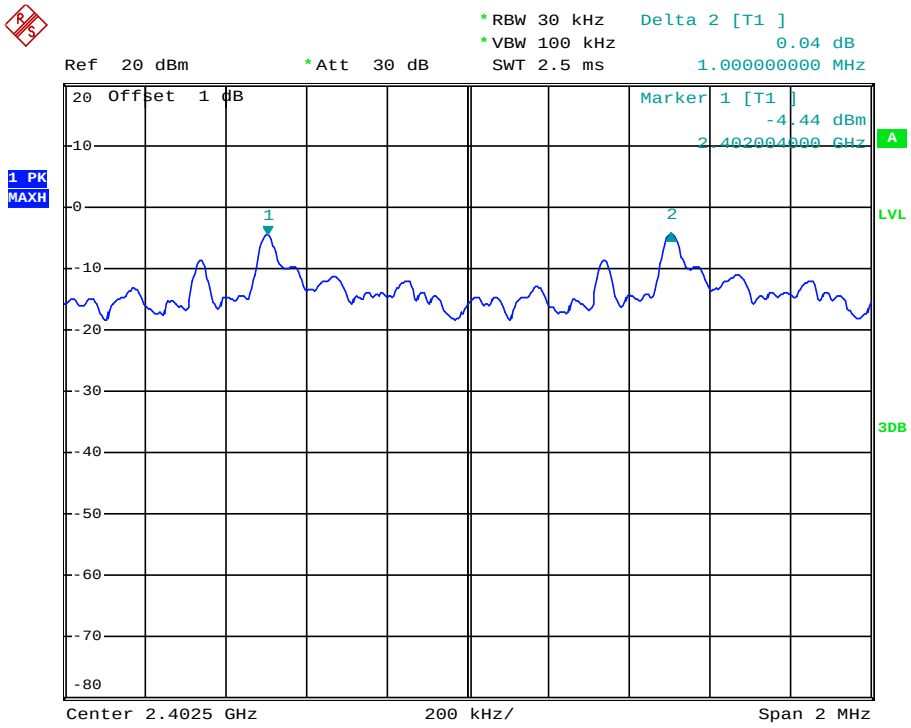
High channel



Date: 7.APR.2013 11:31:06

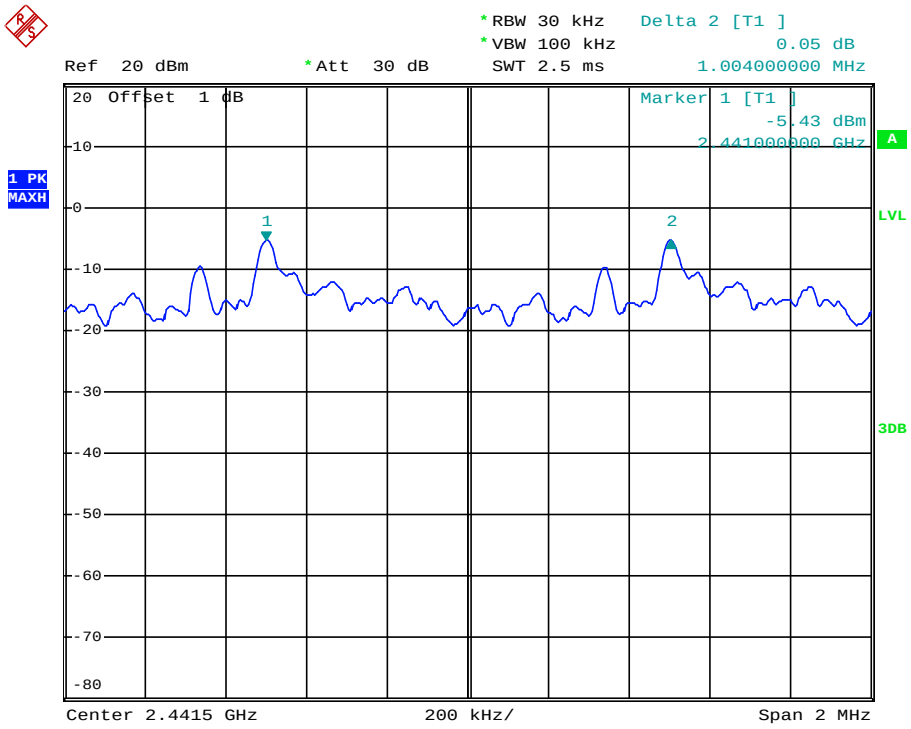
Photos of Frequency separation Measurement(π /4 DQPSK Mode)

Low channel



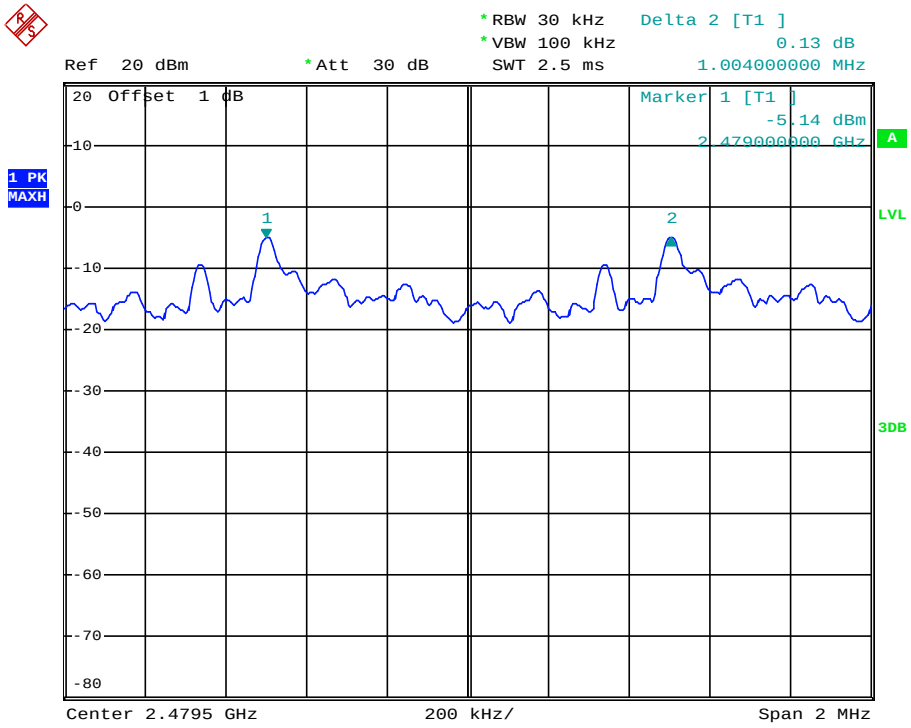
Date: 7.APR.2013 11:28:08

Middle channel



Date: 7.APR.2013 11:28:56

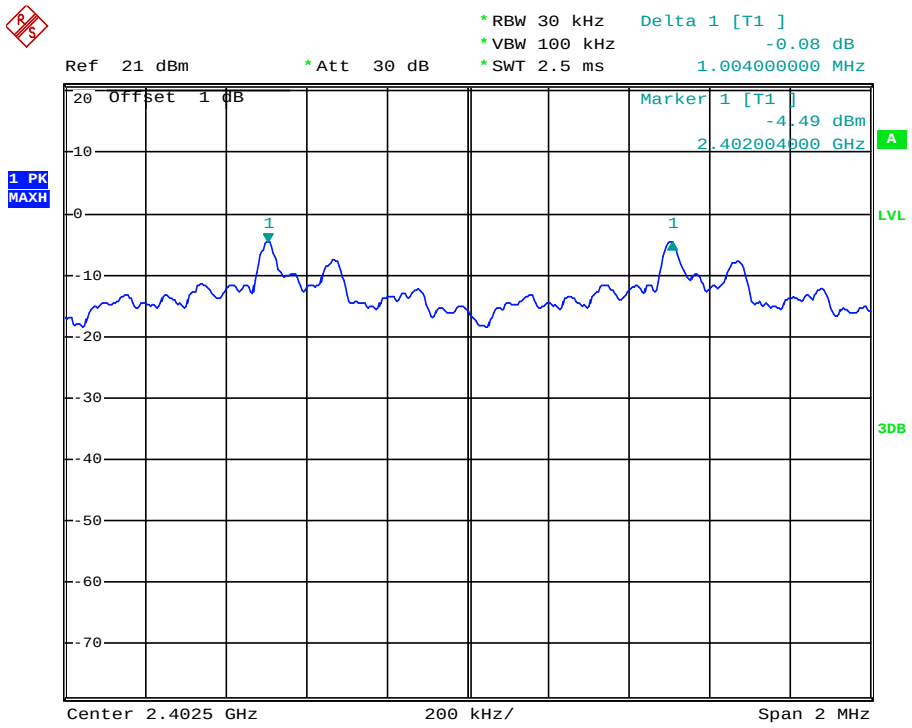
High channel



Date: 7.APR.2013 11:30:00

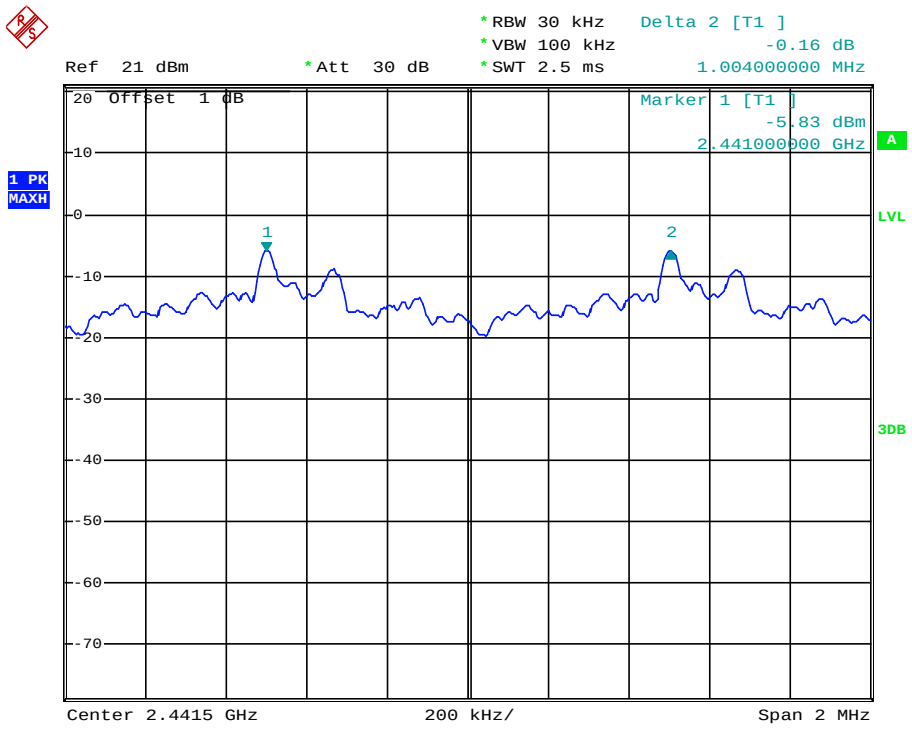
Photos of Frequency separation Measurement(8DPSK Mode)

Low channel



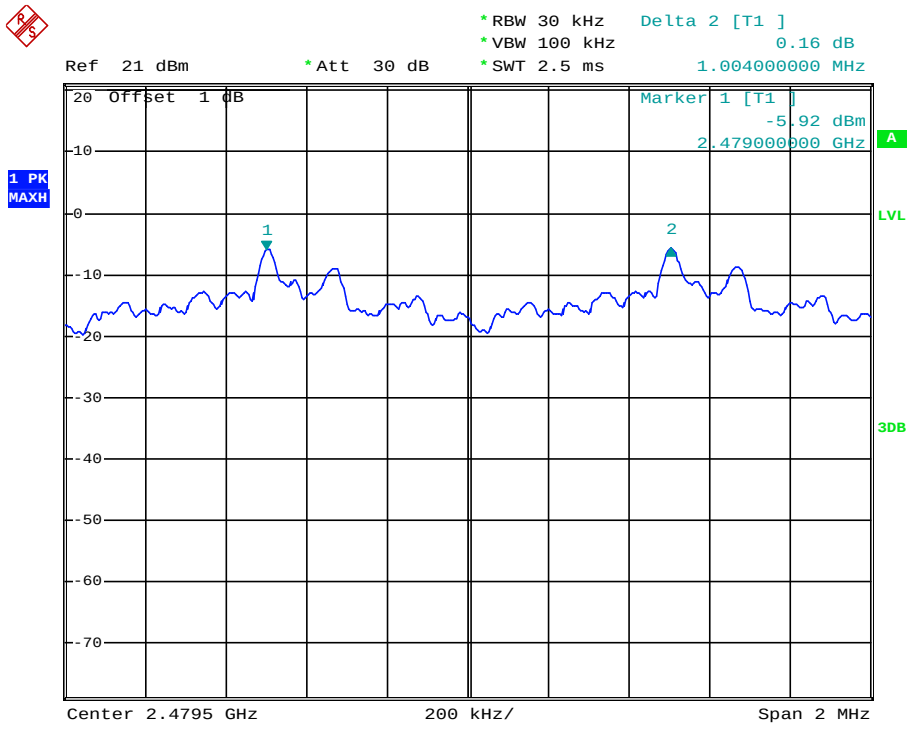
Date: 8.APR.2013 17:08:01

Middle channel



Date: 8.APR.2013 17:09:01

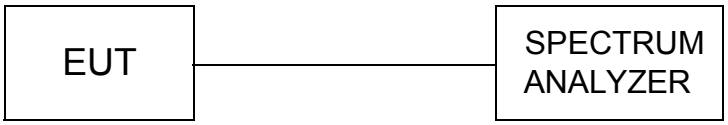
High channel



Date: 8.APR.2013 17:10:01

4.7. Number of hopping frequency

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator.Set spectrum analyzer start 2400MHz to 2483.5MHz with 30 KHz RBW and 100KHz VBW.

LIMIT

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

TEST RESULTS

GFSK Mode:

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

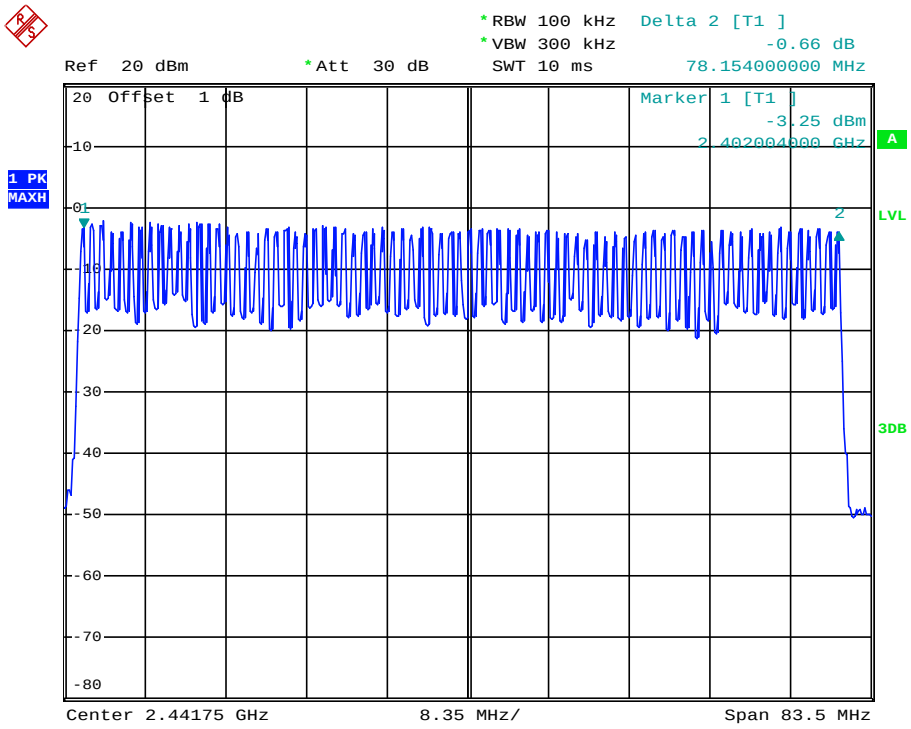
π/4 DQPSK Mode:

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

8DPSK Mode:

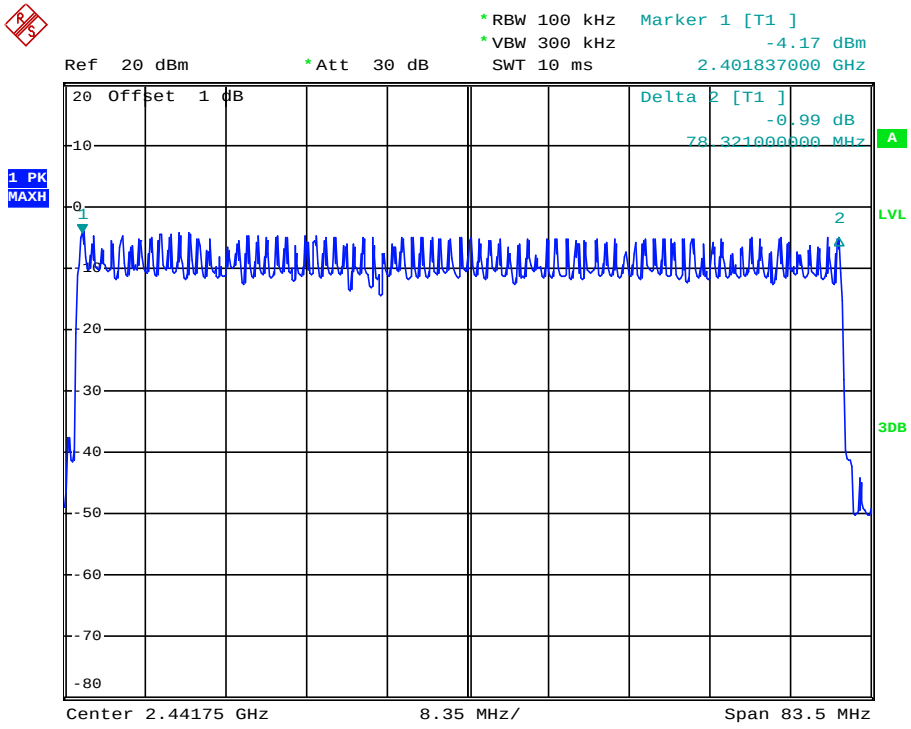
Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥15

Photos of Number of hopping channel Measurement(GFSK Mode)



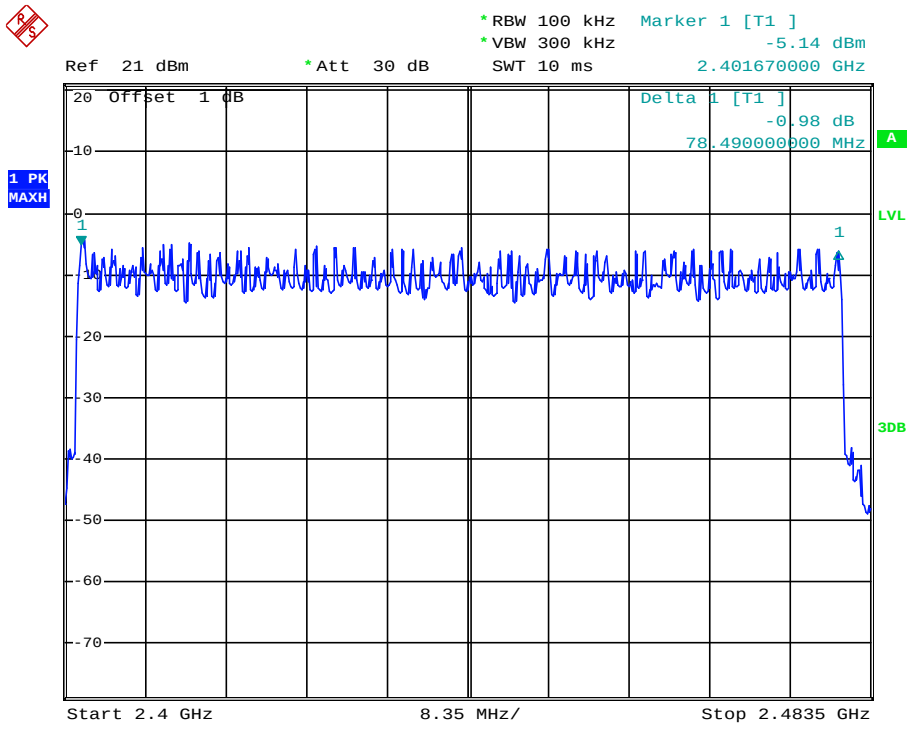
Date: 7.APR.2013 11:37:18

Photos of Number of hopping channel Measurement(π /4 DQPSK Mode)



Date: 7.APR.2013 11:42:50

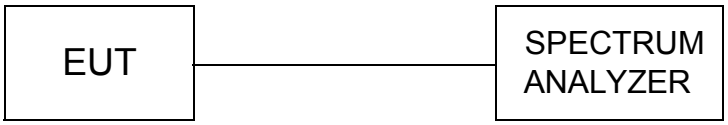
Photos of Number of hopping channel Measurement(8DPSK Mode)



Date: 8.APR.2013 17:13:31

4.8. Time Of Occupancy(Dwell Time)

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. Set center frequency of spectrum analyzer=operating frequency with 1MHz RBW and 3MHz VBW,Span 0Hz.

LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.

TEST RESULTS

GFSK Mode:

Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.435	0.1392	0.4	Pass
	Middle	0.440	0.1408	0.4	Pass
	High	0.440	0.1408	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
DH 3	Low	1.705	0.2728	0.4	Pass
	Middle	1.705	0.2728	0.4	Pass
	High	1.715	0.2744	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH 5	Low	2.985	0.3184	0.4	Pass
	Middle	2.965	0.3163	0.4	Pass
	High	2.955	0.3152	0.4	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

π/4 DQPSK Mode:

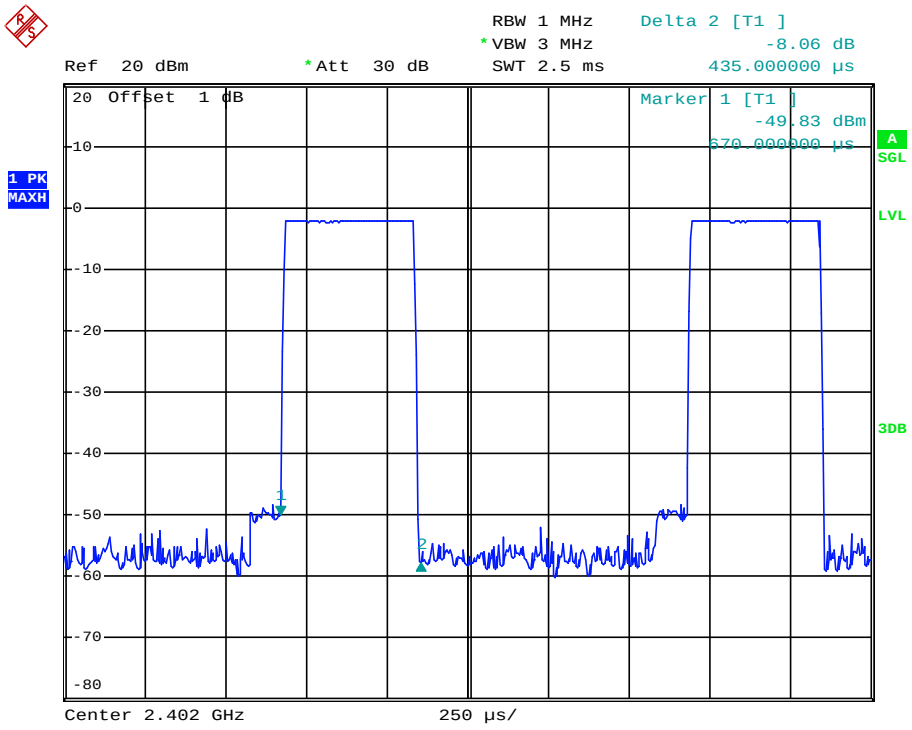
Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.445	0.1424	0.4	Pass
	Middle	0.450	0.1440	0.4	Pass
	High	0.460	0.1472	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
DH 3	Low	1.215	0.1944	0.4	Pass
	Middle	1.215	0.1944	0.4	Pass
	High	1.205	0.1928	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH 5	Low	2.975	0.3173	0.4	Pass
	Middle	2.975	0.3173	0.4	Pass
	High	2.975	0.3173	0.4	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

8DPSK Mode:

Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.450	0.1440	0.4	Pass
	Middle	0.455	0.1456	0.4	Pass
	High	0.455	0.1456	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
DH 3	Low	1.220	0.1952	0.4	Pass
	Middle	1.210	0.1936	0.4	Pass
	High	1.210	0.1936	0.4	Pass
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH 5	Low	2.970	0.3168	0.4	Pass
	Middle	2.970	0.3168	0.4	Pass
	High	2.970	0.3168	0.4	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

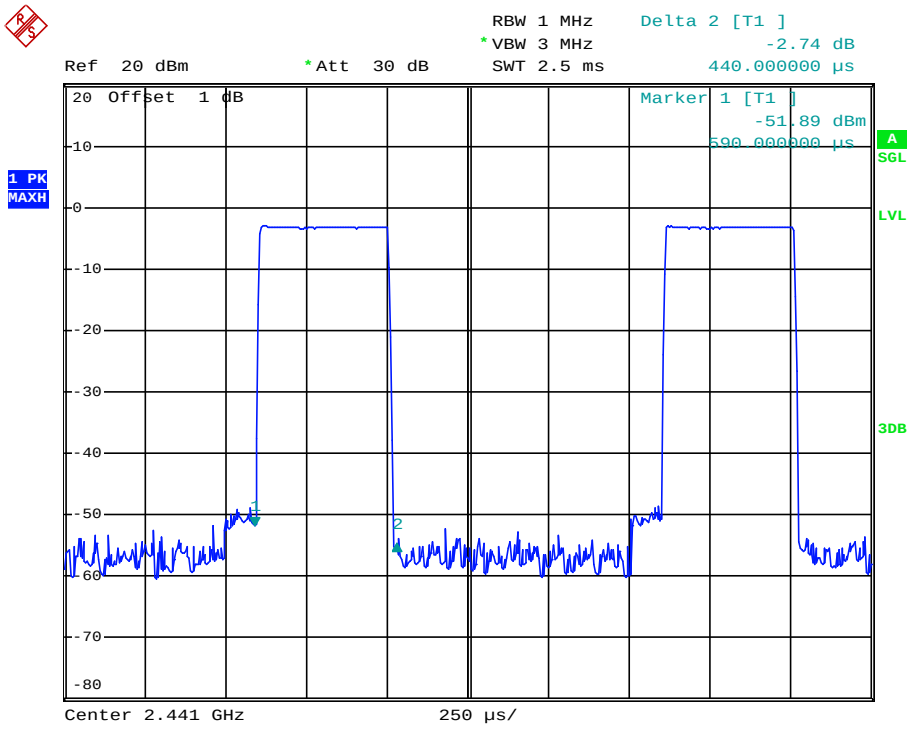
Photos of Dwel time Measurement(GFSK Mode)

DH1-Low channel



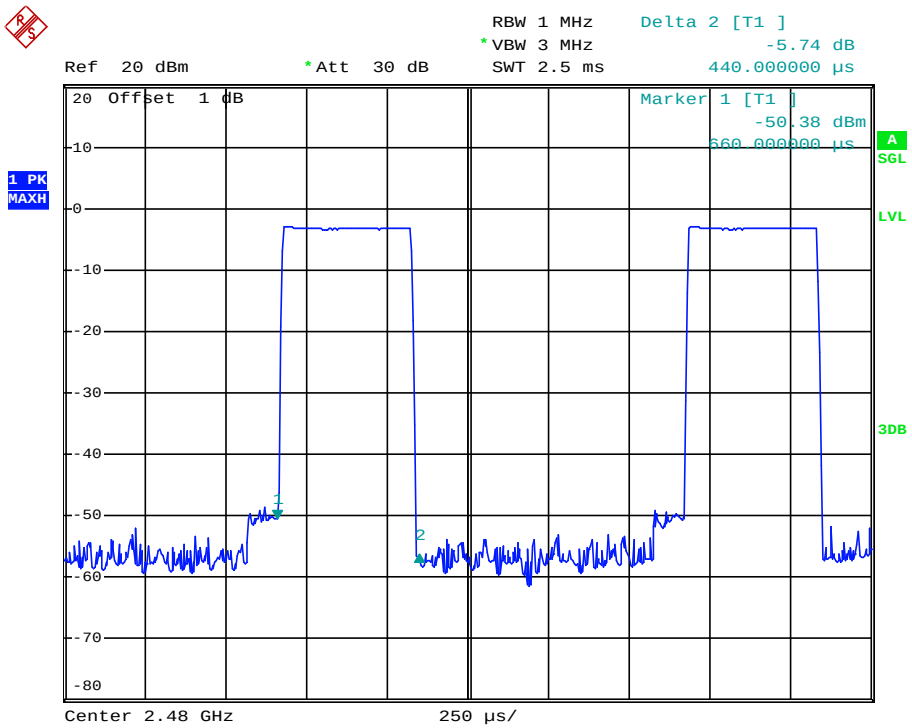
Date: 7.APR.2013 12:12:10

DH1-Middle channel



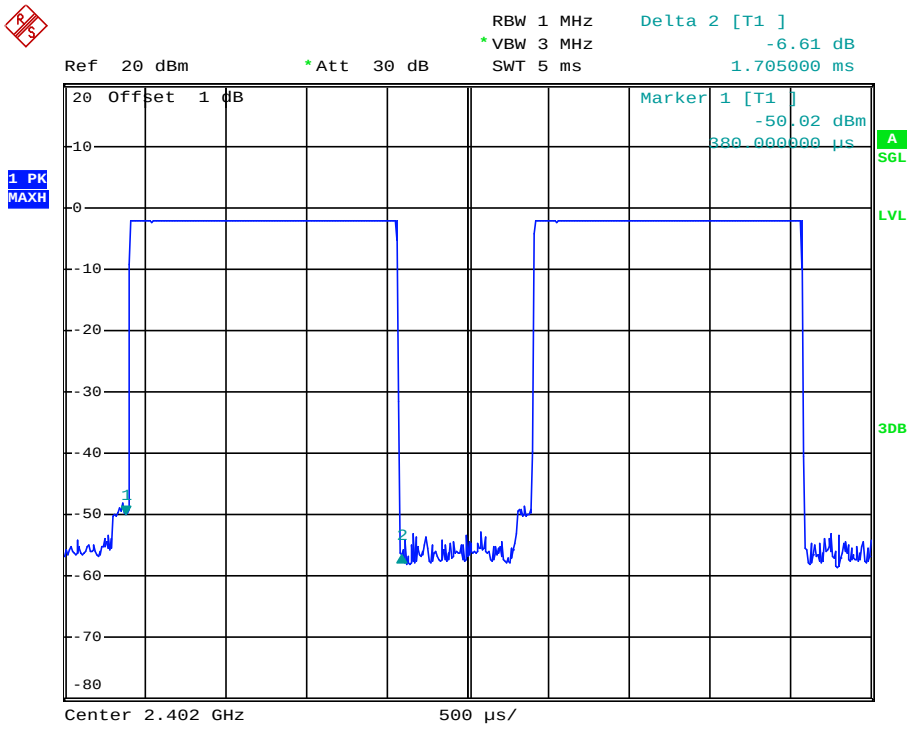
Date: 7.APR.2013 12:10:48

DH1-High channel



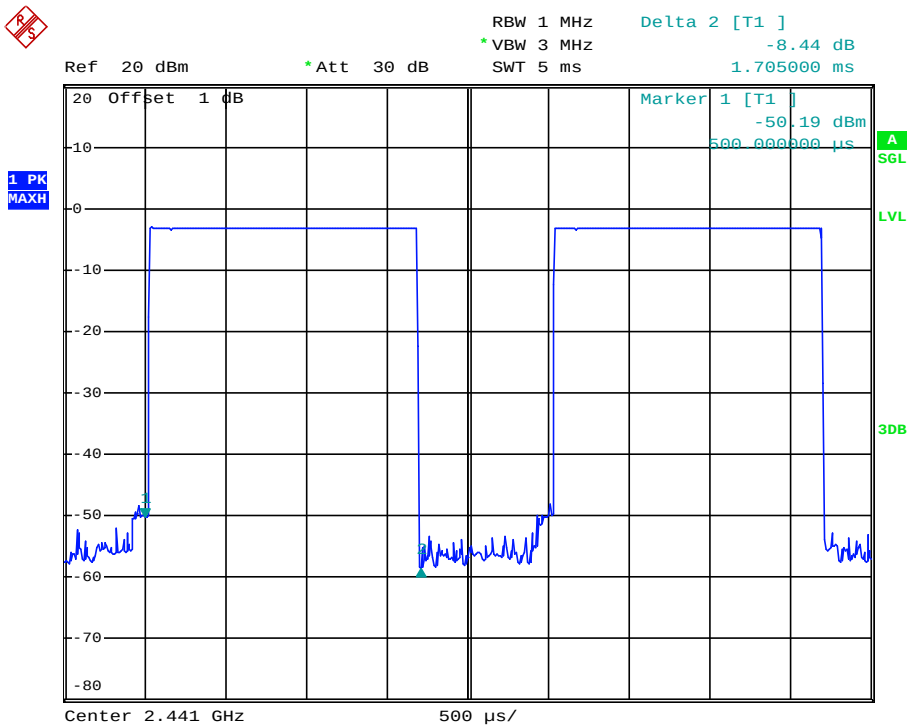
Date: 7.APR.2013 12:11:37

DH3-Low channel



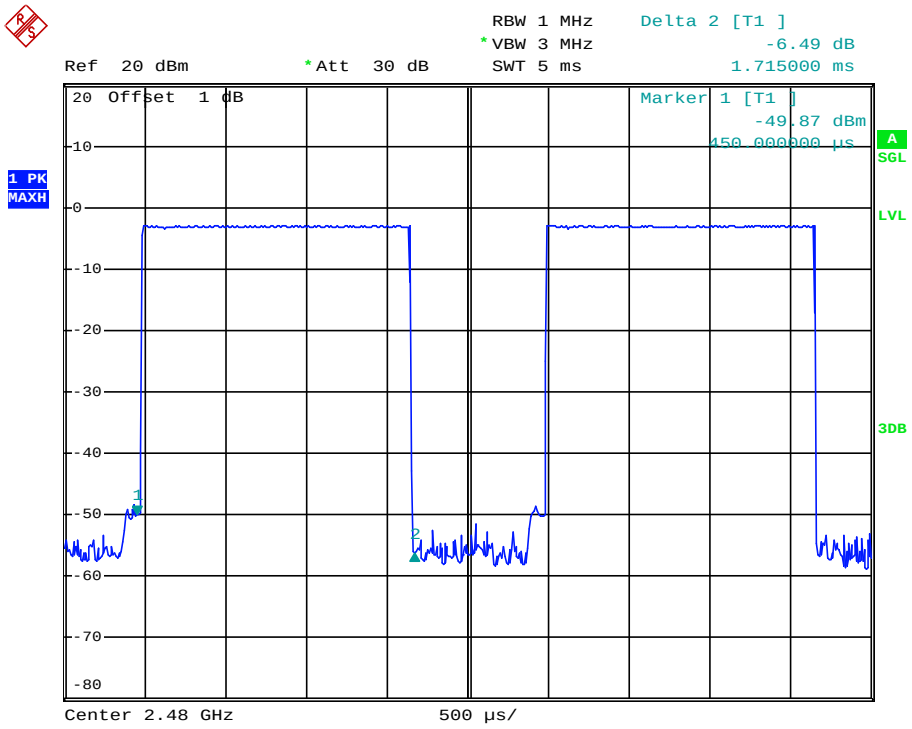
Date: 7.APR.2013 12:13:11

DH3-Middle channel



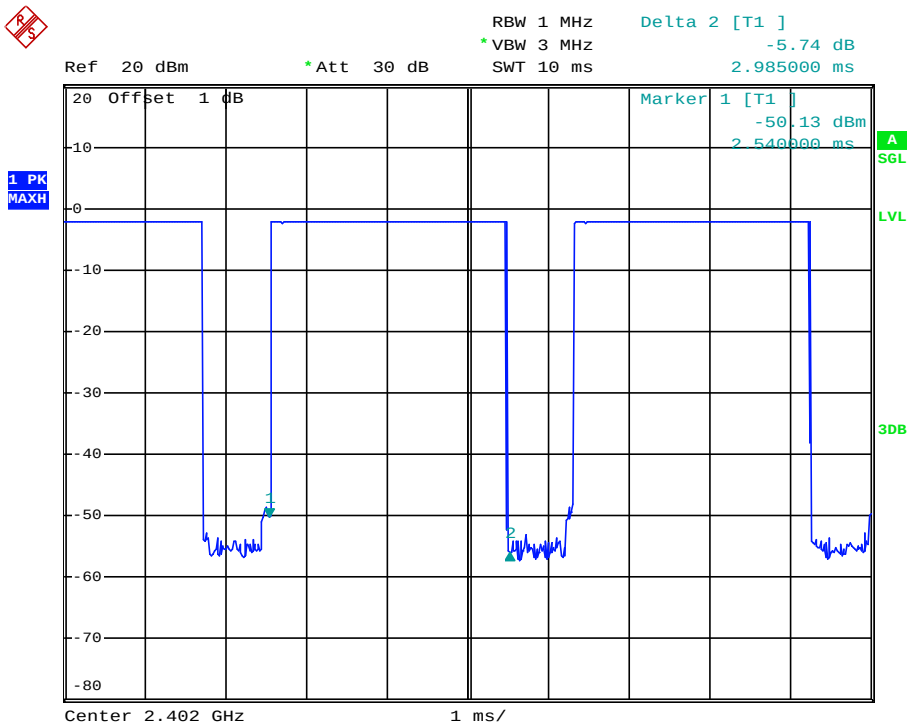
Date: 7.APR.2013 12:13:58

DH3-High channel



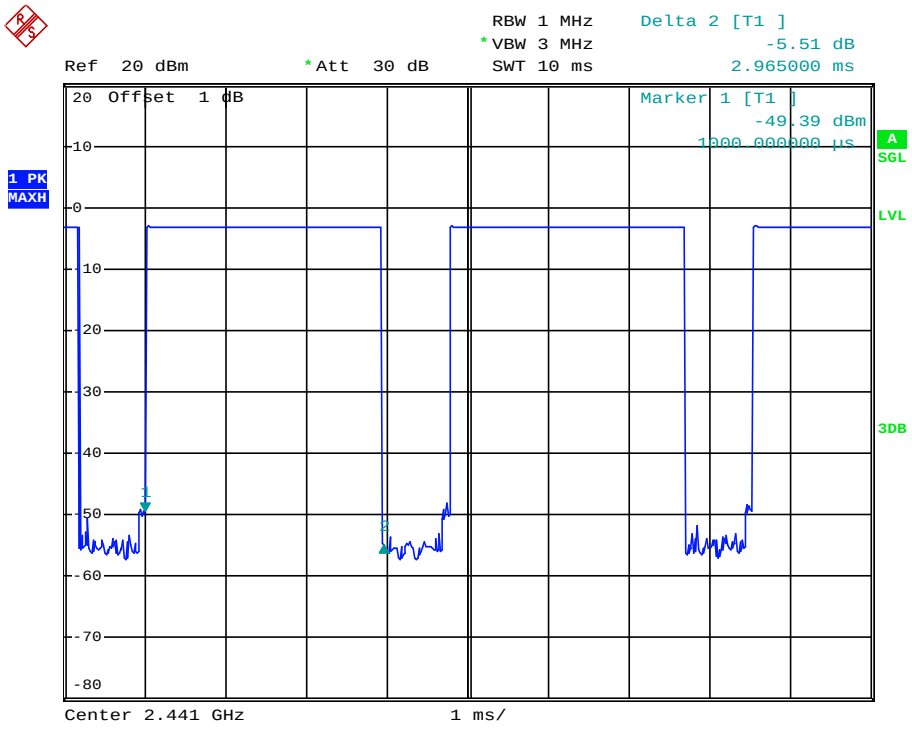
Date: 7.APR.2013 12:14:39

DH5-Low channel



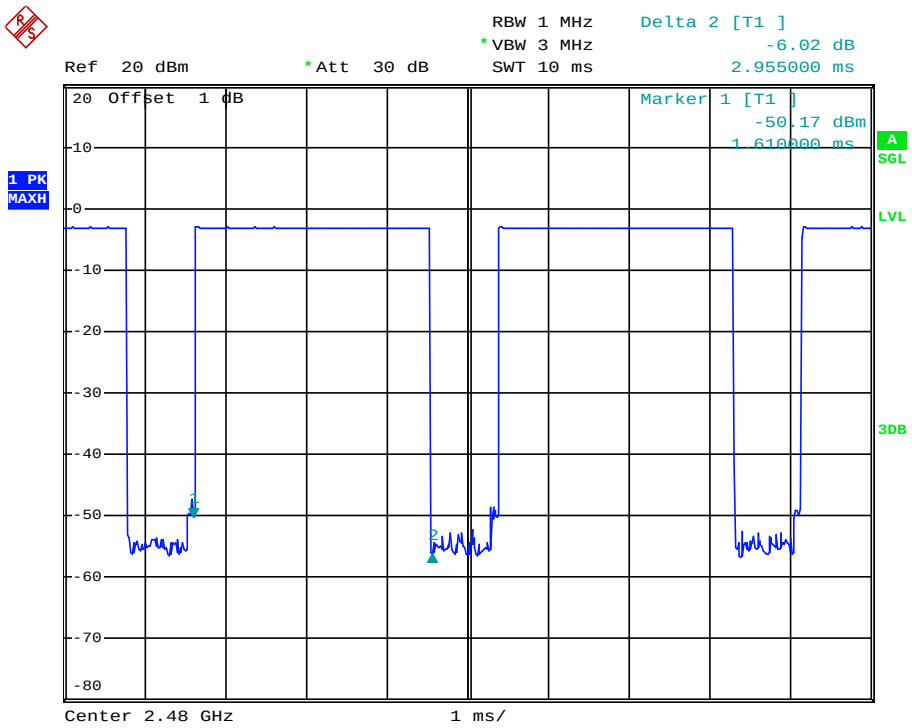
Date: 7.APR.2013 12:18:06

DH5-Middle channel



Date: 7.APR.2013 12:17:15

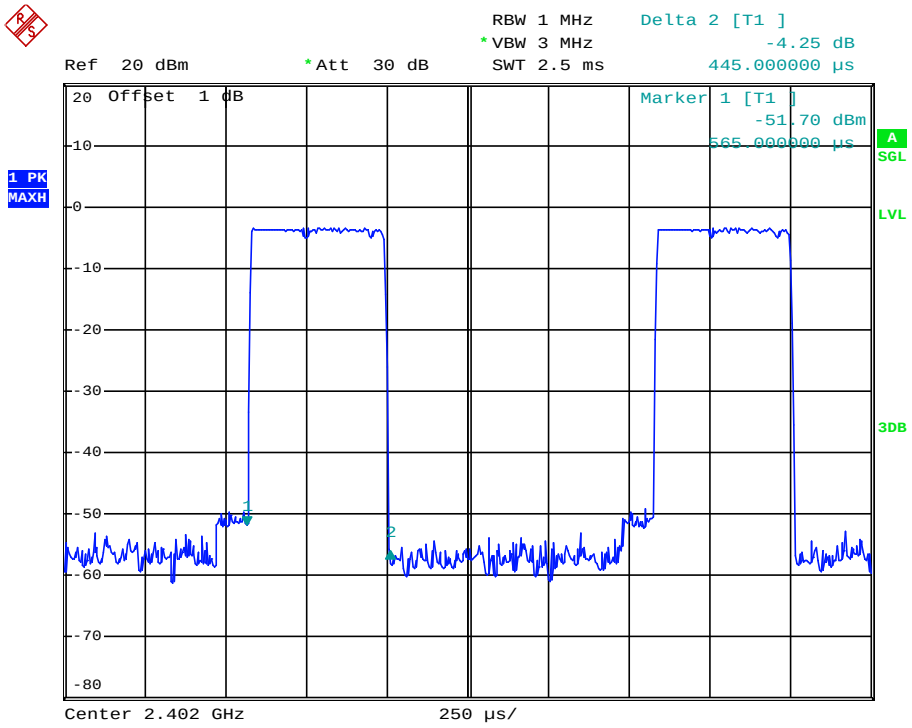
DH5-High channel



Date: 7.APR.2013 12:15:43

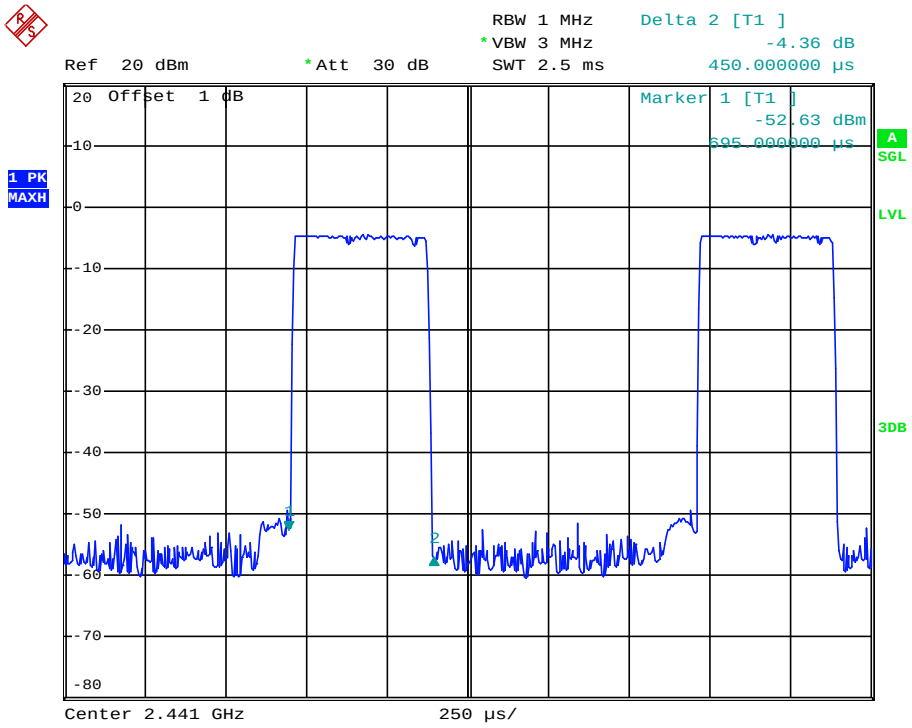
Photos of Dwel time Measurement(π /4 DQPSK Mode)

DH1-Low channel



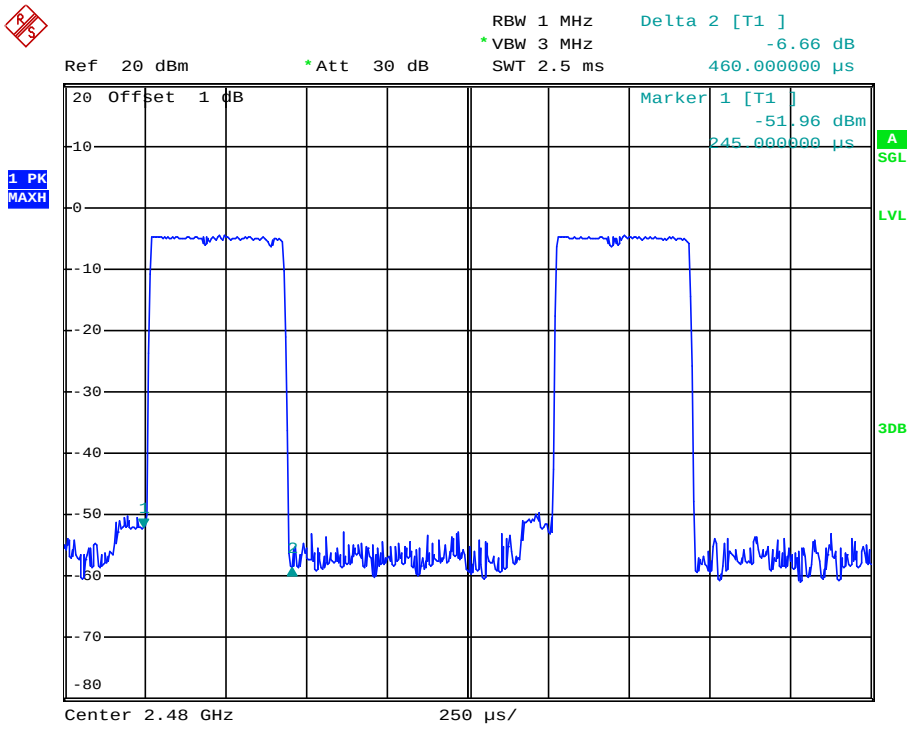
Date: 7.APR.2013 11:53:23

DH1-Middle channel



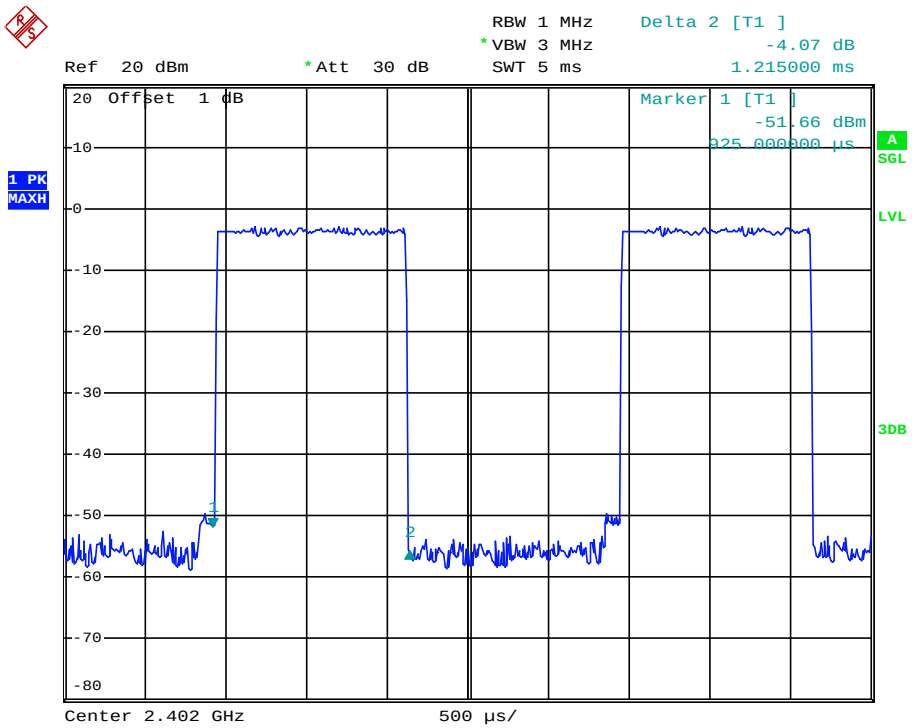
Date: 7.APR.2013 12:07:22

DH1-High channel



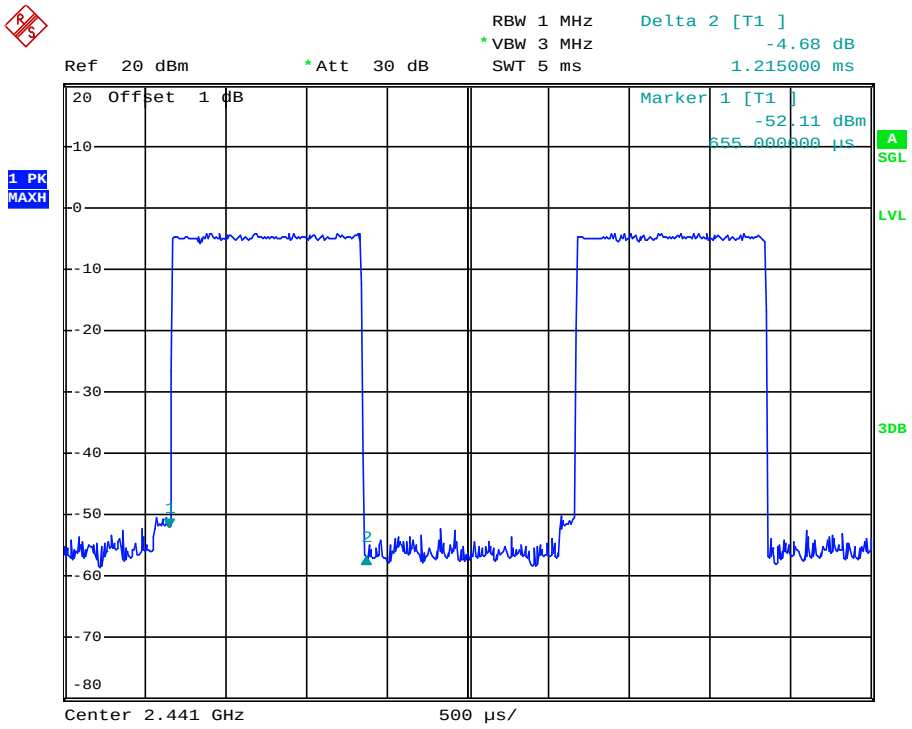
Date: 7.APR.2013 12:08:45

DH3-Low channel



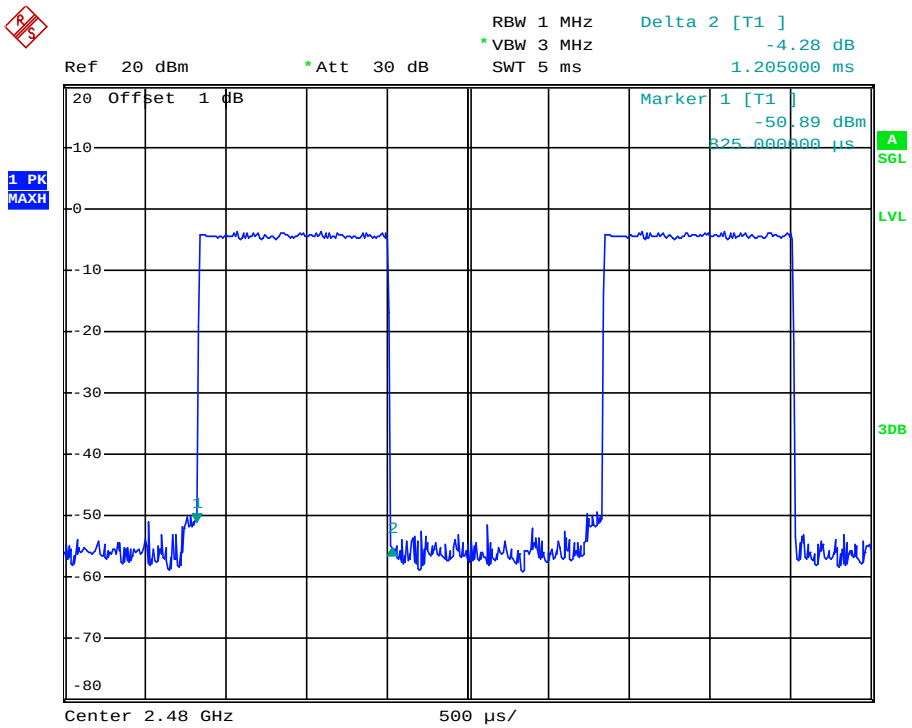
Date: 7.APR.2013 12:02:28

DH3-Middle channel



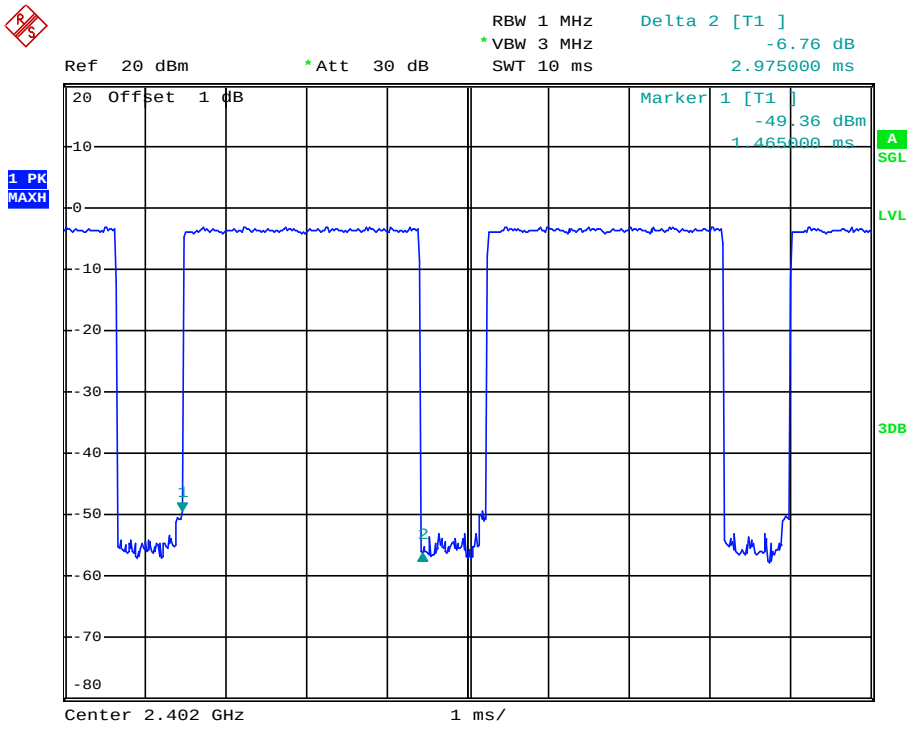
Date: 7.APR.2013 12:03:08

DH3-High channel



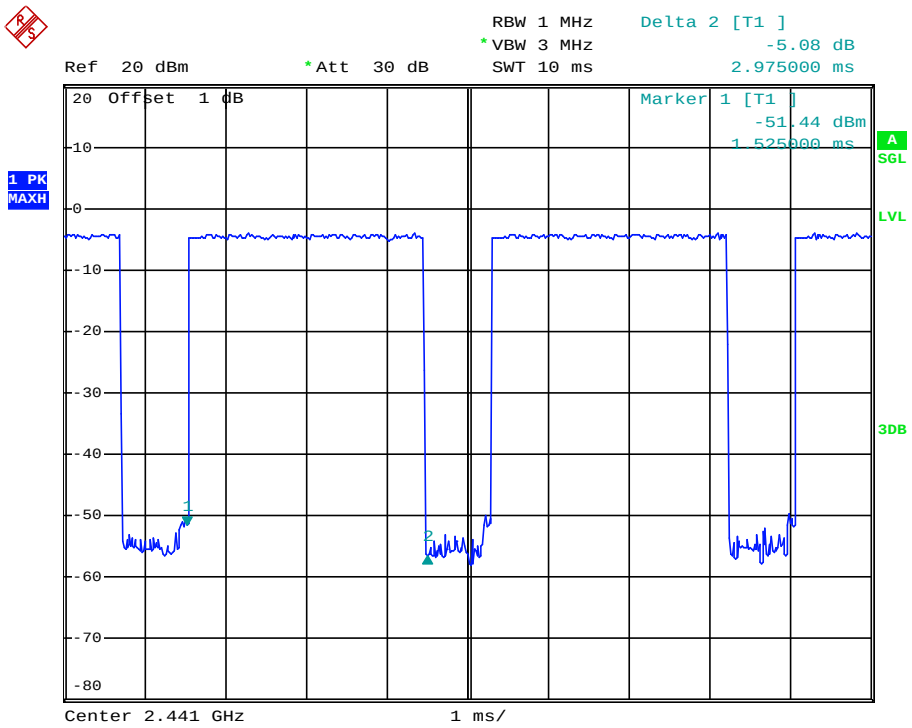
Date: 7.APR.2013 12:00:09

DH5-Low channel



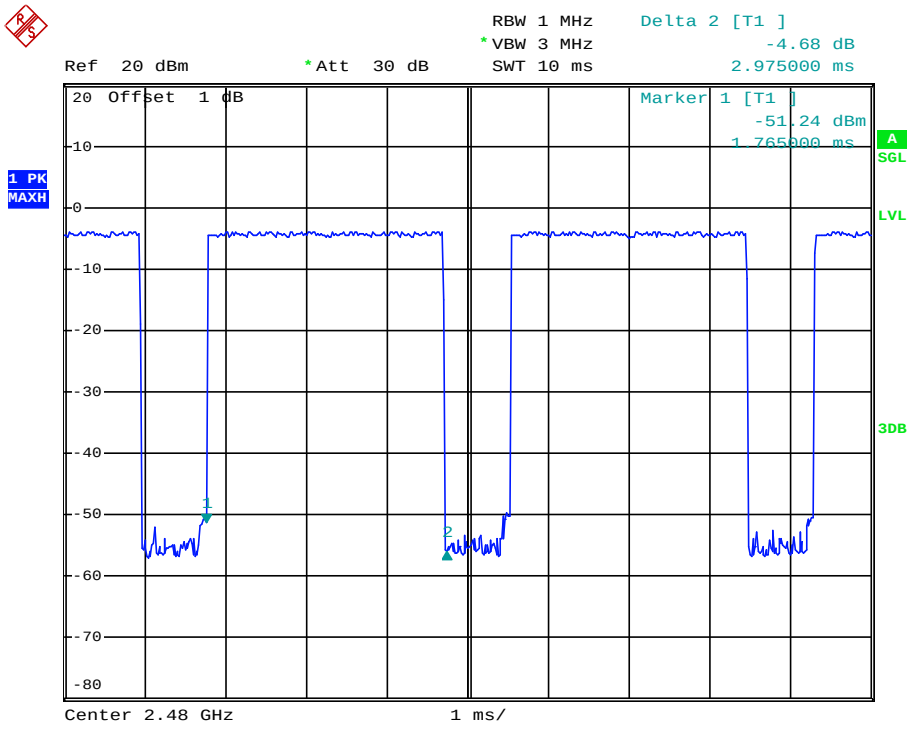
Date: 7.APR.2013 11:56:46

DH5-Middle channel



Date: 7.APR.2013 11:57:58

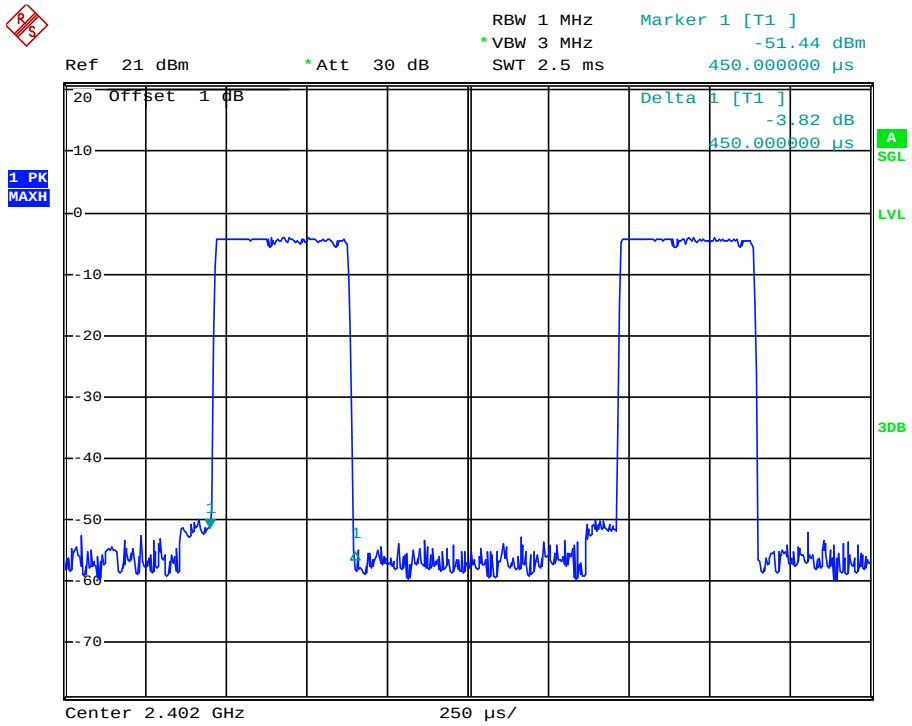
DH5-High channel



Date: 7.APR.2013 11:58:53

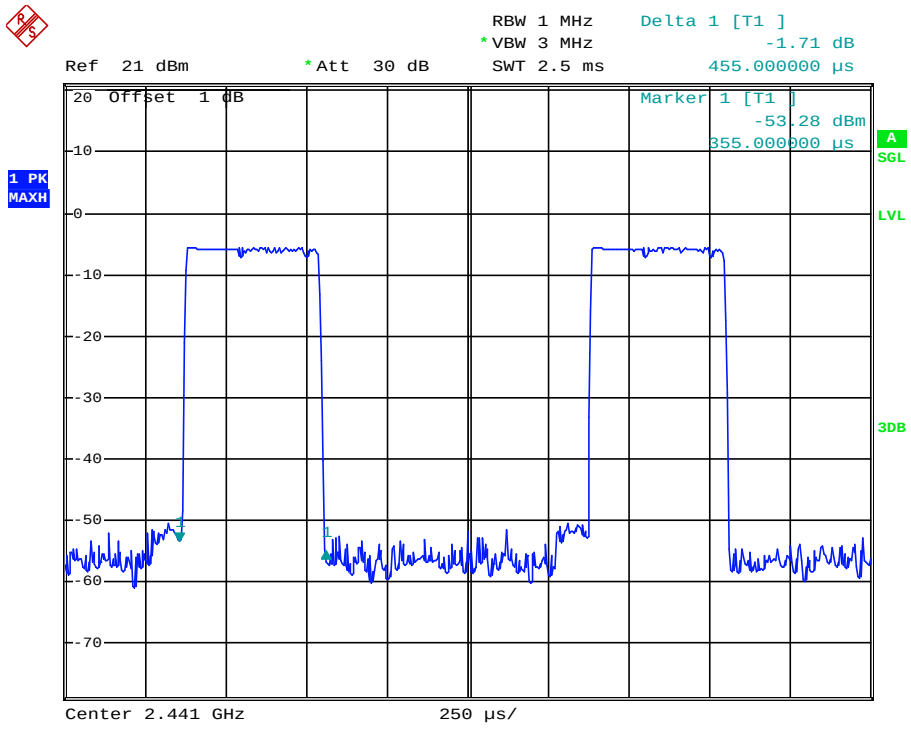
Photos of Dwel time Measurement(8DPSK Mode)

DH1-Low channel



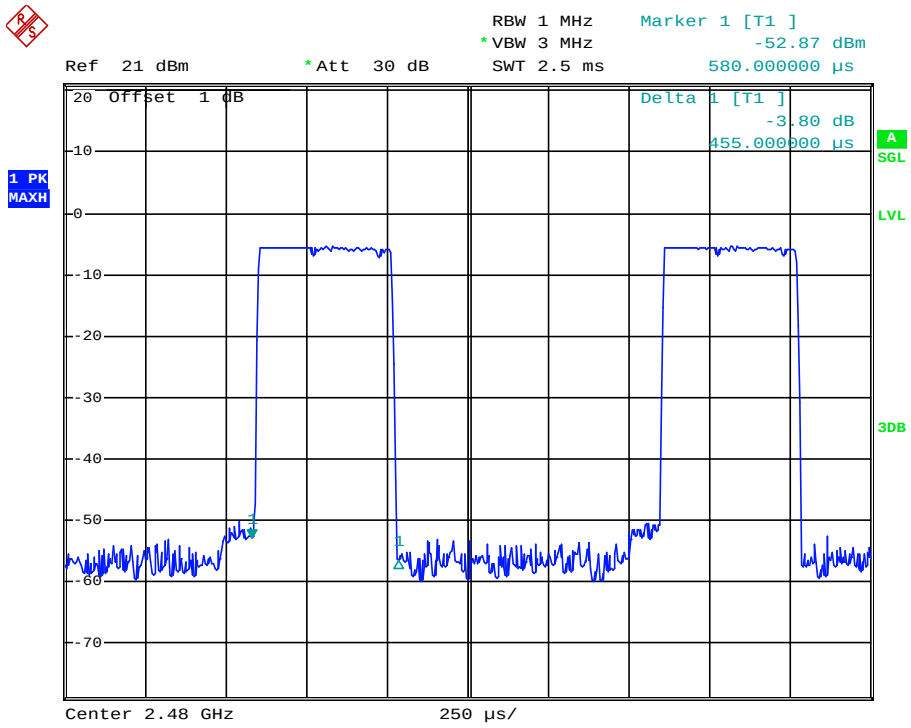
Date: 8.APR.2013 17:19:37

DH1-Middle channel



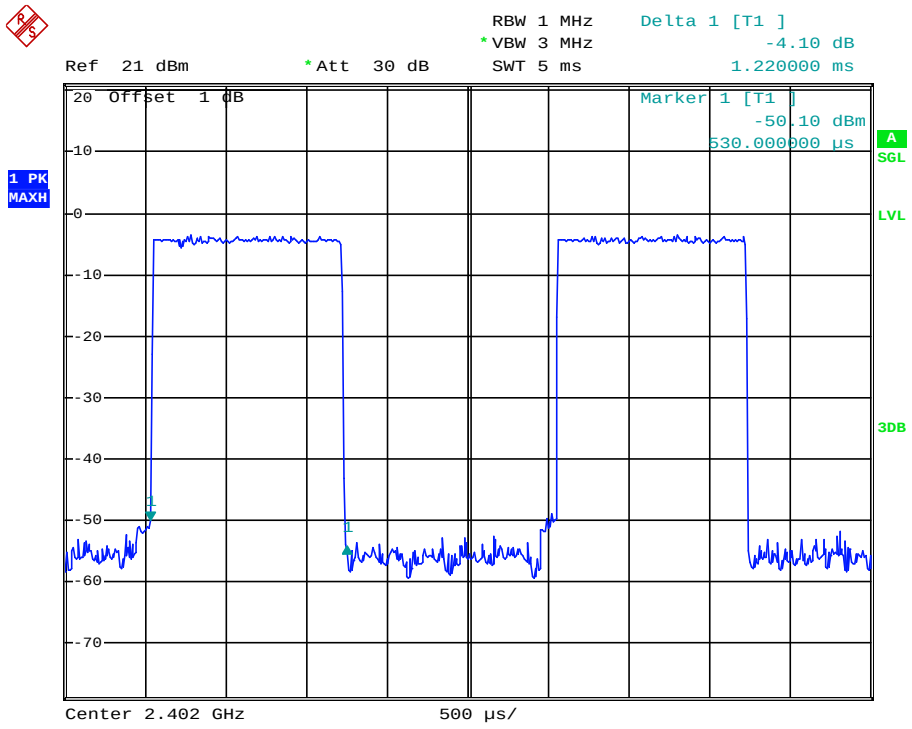
Date: 8.APR.2013 17:18:54

DH1-High channel



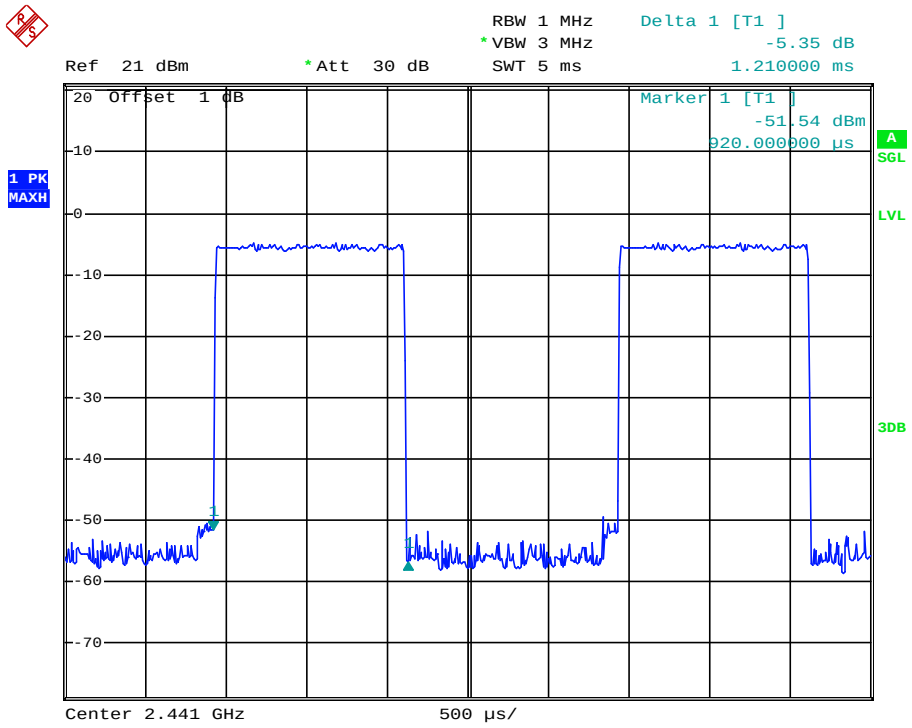
Date: 8.APR.2013 17:18:20

DH3-Low channel



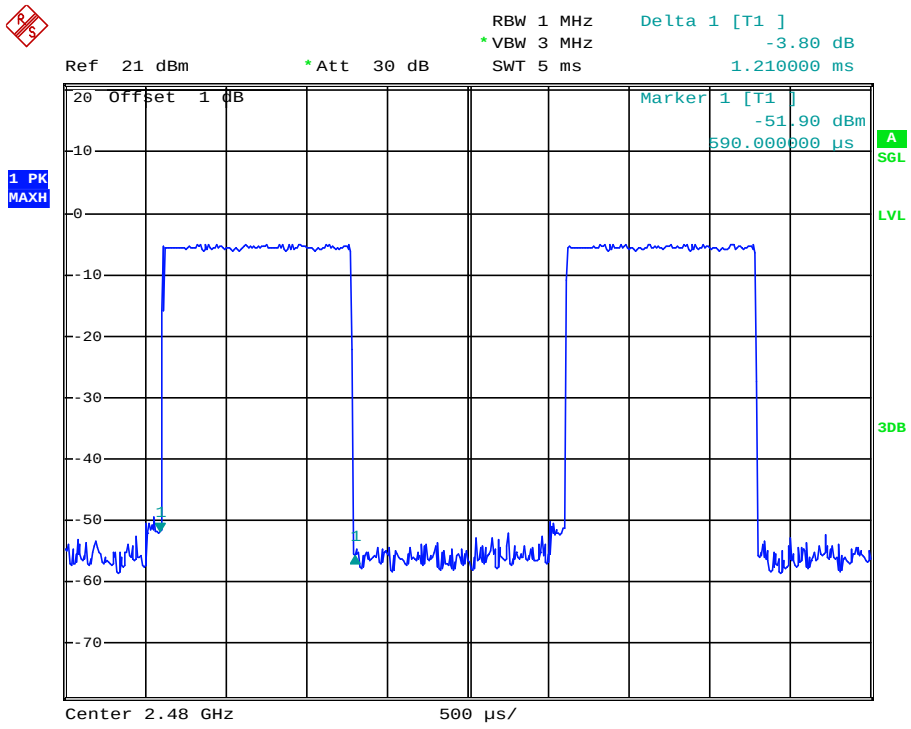
Date: 8.APR.2013 17:15:42

DH3-Middle channel



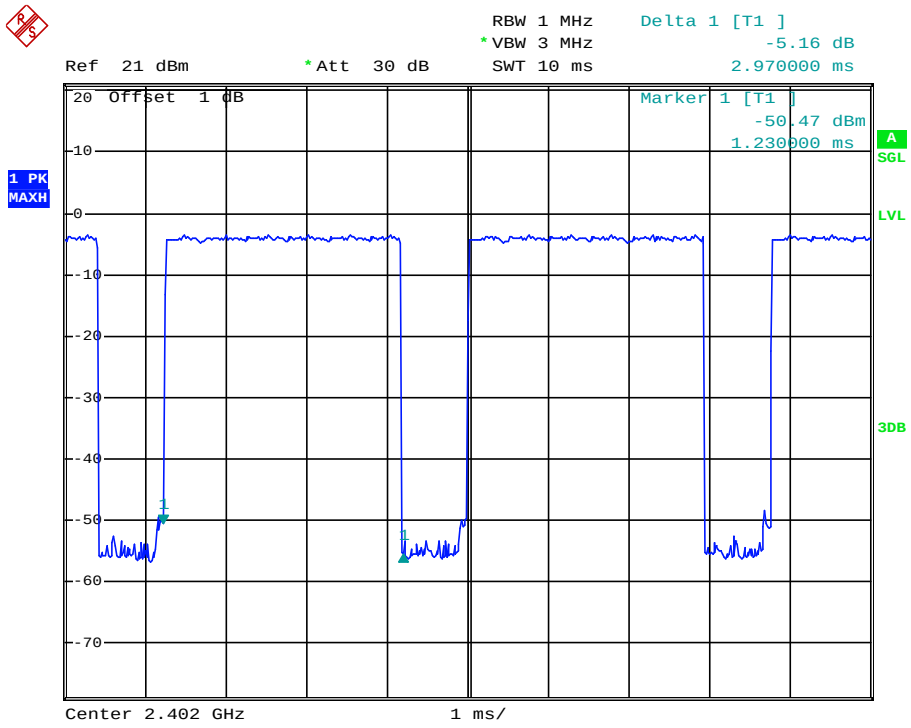
Date: 8.APR.2013 17:16:18

DH3-High channel



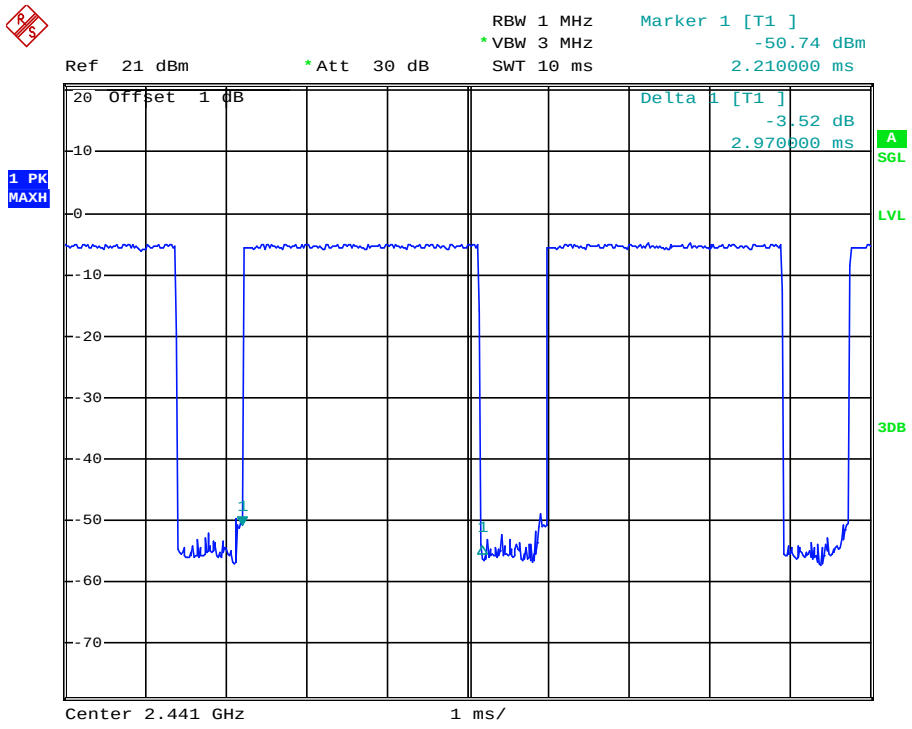
Date: 8.APR.2013 17:16:55

DH5-Low channel



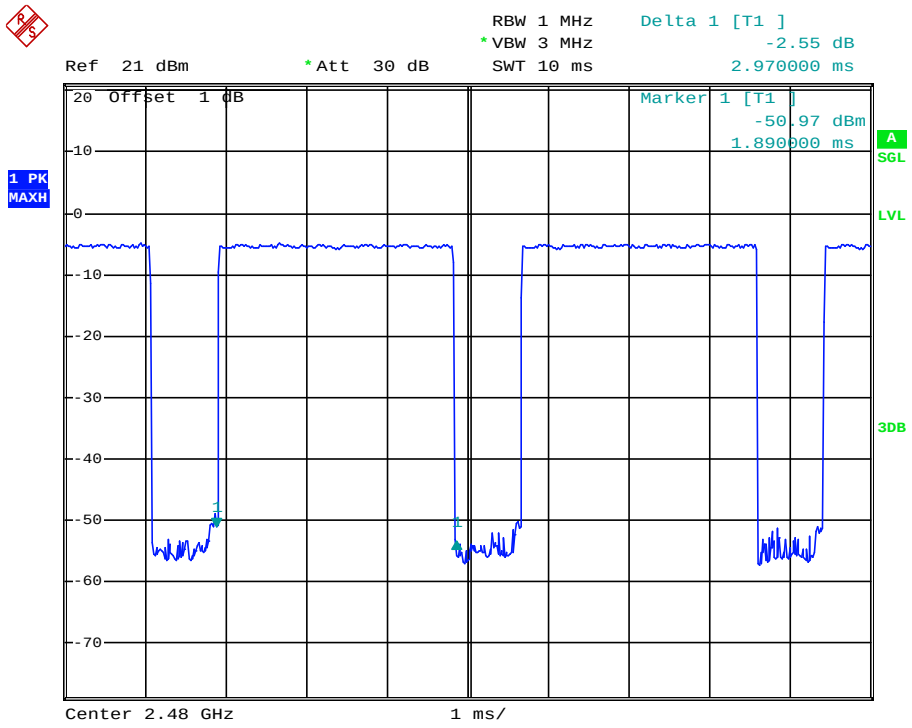
Date: 8.APR.2013 17:20:39

DH5-Middle channel



Date: 8.APR.2013 17:21:19

DH5-High channel



Date: 8.APR.2013 17:22:12

4.9. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

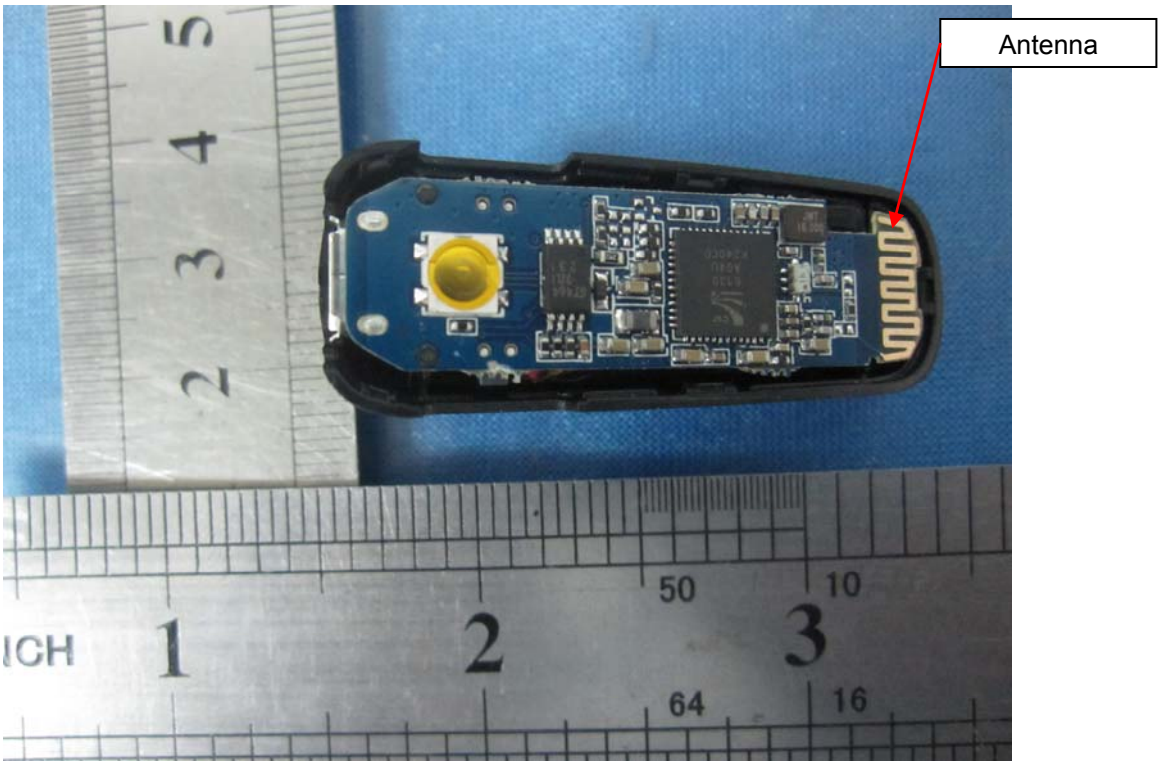
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a PCB Antenna. The maximum antenna gain of product is 2.0dBi.please see the photos as following:

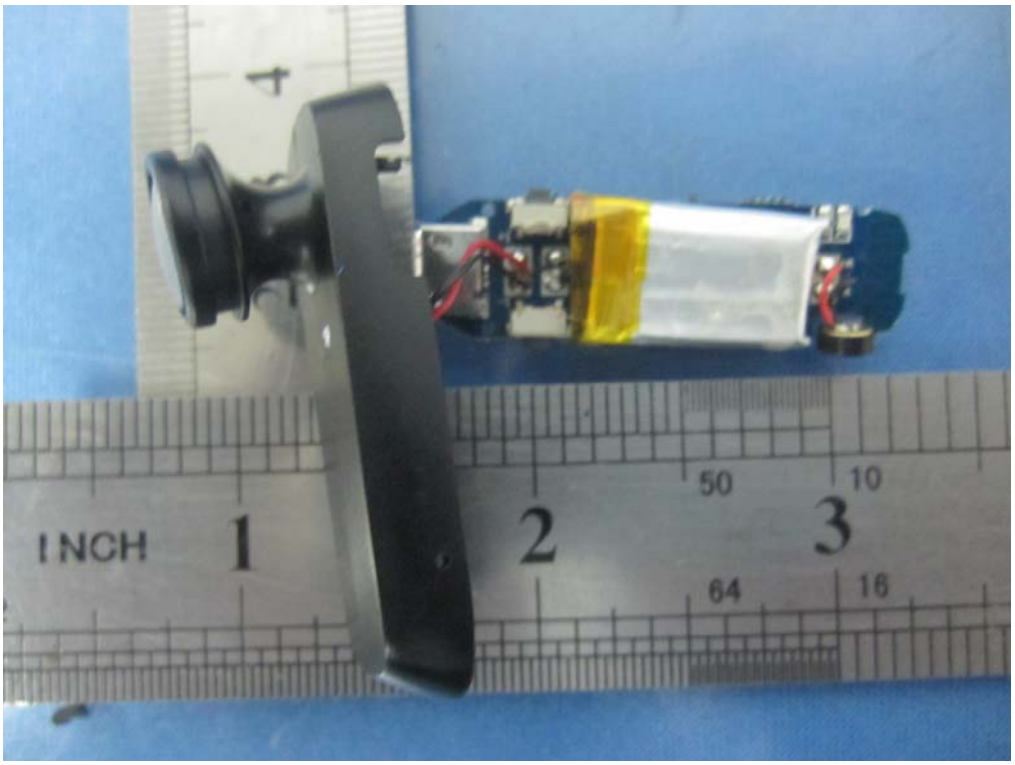


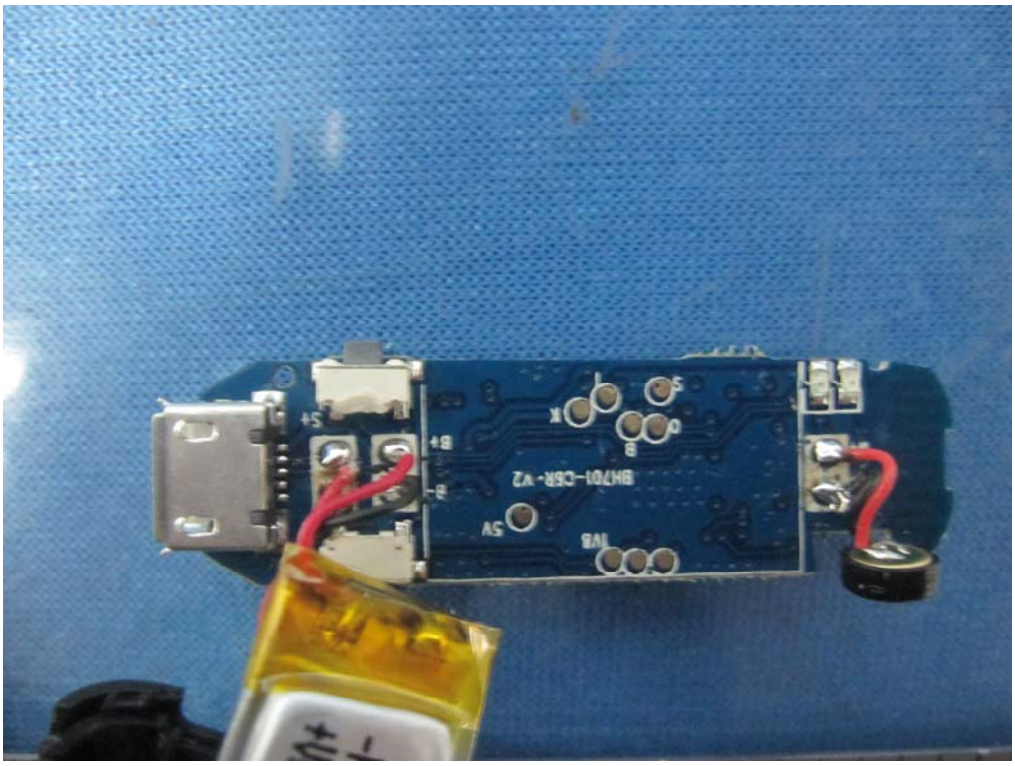
5. Test Setup Photos of the EUT

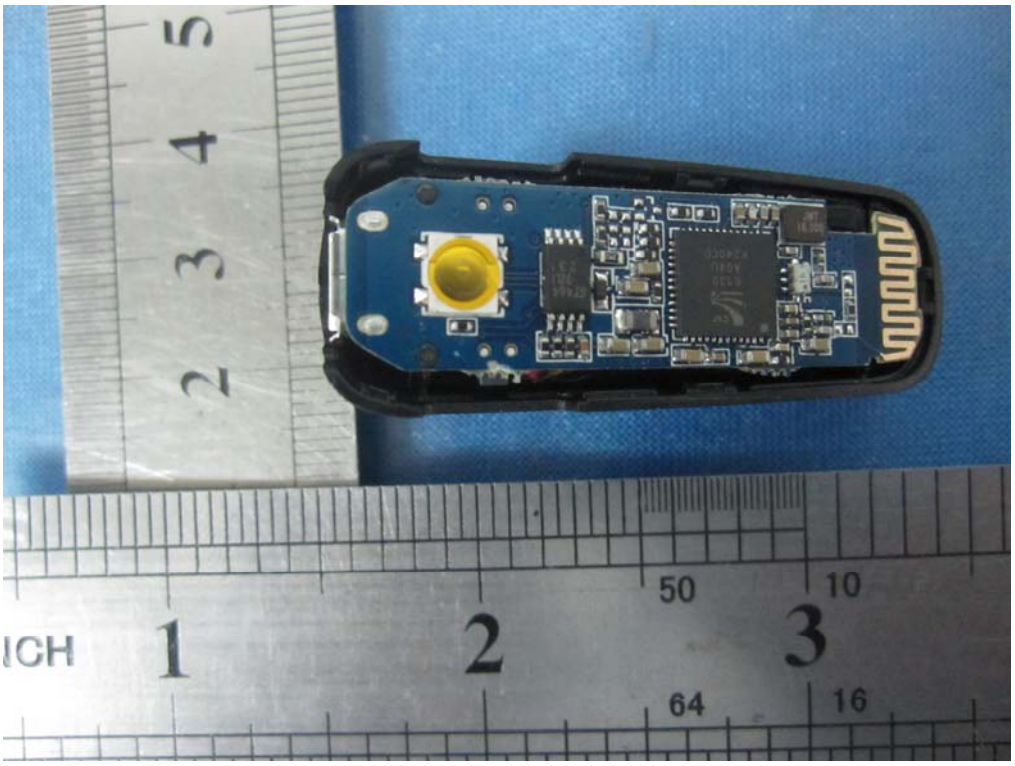
6. External and Internal Photos of the EUT

External Photos

Internal Photos







.....End of Report.....