Shenzhen Huatongwei International Inspection Co., Ltd.
Keji S,12th , Road, Hi-tech Industrial Park, Shenzhen, Guangdong, China
Phone:86-755-26748099 Fax:86-755-26748089 http://www.szhtw.com.cn

CNASL1225

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No.....:	**TRE1303010901 R/C:78606**
FCC ID.....:	**SMQDX12REDAN**
Compiled by (position+printed name+signature)..:	File administrators Eric Zhang
Supervised by (position+printed name+signature)..:	Test Engineer Yuchao Wang
Approved by (position+printed name+signature)..:	Manager Wenliang Li
Date of issue.....:	May 28, 2013
Testing Laboratory Name .....:	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address .....:	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Applicant's name.....:	**Edan Instruments, Inc.**
Address .....:	3/F - B, Nanshan Medical Equipments Park, Nanhai Rd 1019#, Shekou, Nanshan Shenzhen,518067 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 Frequency hopping systems**
TRF Originator.....:	Shenzhen Huatongwei International Inspection CO., Ltd
Master TRF.....:	Dated 2006-06

Test item description .....:	PC ECG
Trade Mark .....:	EDAN 理邦仪器
Manufacturer .....:	**Edan Instruments, Inc.**
Model/Type reference.....:	SE-1010 (DX12: Receiver)
Listed Models .....:	/
Modulation Type.....:	GFSK, π /4 DQPSK
Operation Frequency.....:	From 2402MHz to 2480MHz
Result.....:	**Positive**

T E S T R E P O R T

Test Report No. :	TRE1303010901	May 28, 2013 Date of issue

Equipment under Test	:	PC ECG
Model /Type	:	SE-1010 (DX12: Receiver)
Listed Models	:	/
Applicant	:	**Edan Instruments, Inc.**
Address	:	3/F - B, Nanshan Medical Equipments Park, Nanhai Rd 1019#, Shekou, Nanshan Shenzhen,518067 P.R. China
Manufacturer	:	**Edan Instruments, Inc.**
Address	:	3/F - B, Nanshan Medical Equipments Park, Nanhai Rd 1019#, Shekou, Nanshan Shenzhen,518067 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	:	May 10, 2013
Testing commenced on	:	May 14, 2013
Testing concluded on	:	May 28, 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)		

USB DC 5V

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

The EUT is an electrocardiogram equipment with bluebooth module.

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 Bluetooth 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 .

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	**2402**	40	2442
1	2403	41	2443
2	2404	42	2444
3	2405	43	2445
4	2406	44	2446
5	2407	45	2447
6	2408	46	2448
7	2409	47	2449
8	2410	48	2450
9	2411	49	2451
10	2412	50	2452
11	2413	51	2453
12	2414	52	2454
13	2415	53	2455
14	2416	54	2456
15	2417	55	2457
16	2418	56	2458

17	2419	57	2459
18	2420	58	2460
19	2421	59	2461
20	2422	60	2462
21	2423	61	2463
22	2424	62	2464
23	2425	63	2465
24	2426	64	2466
25	2427	65	2467
26	2428	66	2468
27	2429	67	2469
28	2430	68	2470
29	2431	69	2471
30	2432	70	2472
31	2433	71	2473
32	2434	72	2474
33	2435	73	2475
34	2436	74	2476
35	2437	75	2477
36	2438	76	2478
37	2439	77	2479
38	2440	**78**	**2480**
39	**2441**		

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

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

This submittal(s) (test report) is intended for **FCC ID: SMQDX12REDAN** 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 EUT is a Bluetooth Standard type device,The functions of the EUT listed as below:

	Test Standards	Reference Report
Bluetooth	FCC Part 15 Subpart C (Section15.247)	TRE1303010901
MPE REPORT	FCC Per 47 CFR 2.1093(d)	TRE1303010902

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

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

3. The EUT provides one completed transmitter and receiver.

Modulation Mode	TX Function
Bluetooth	1TX

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. 29, 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 June. 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, 2013. Valid time is until May 06, 2016.

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.

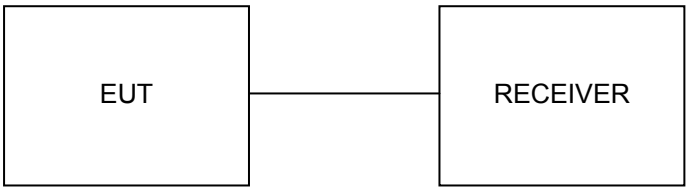
3.3. Environmental conditions

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

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

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. Test Description

FCC PART 15 15.247		
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 Compliance of RF Emission	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
FCC Part 15.247(b)	Pseudorandom Frequency Hopping Sequence	PASS

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

3.6. 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	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 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.

3.7. Equipments Used during the Test

Maximum transmit power & Band edge & Hopping Requirement					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Spectrum Analyzer	AGILENT	E4407B	MY44210775	2012/10/27
2	Climate Chamber	ESPEC	EL-10KA	05107008	2012/10/27
3	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2012/10/27

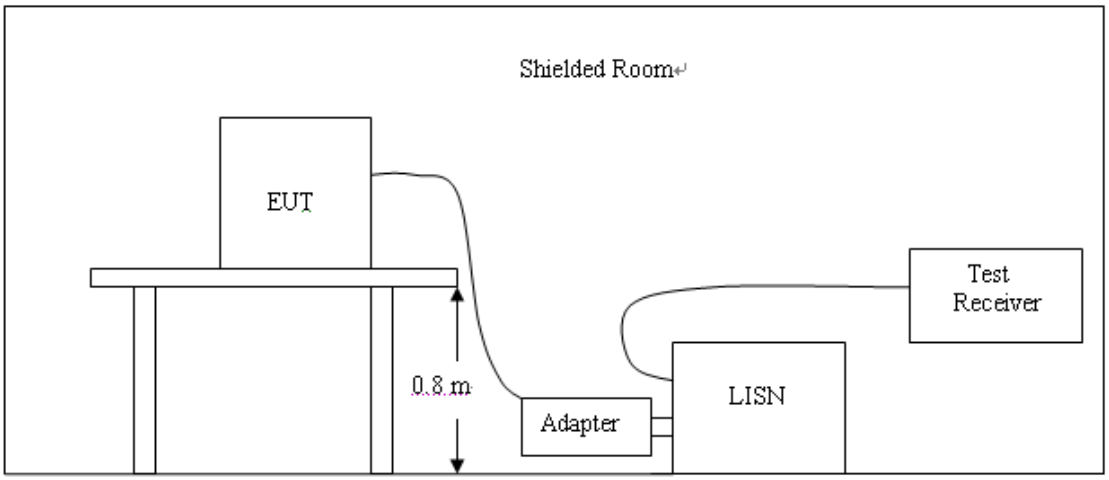
Transmitter spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2012/10/27
2	EMI TEST RECEIVER	Rohde&Schwarz	ESIB 26	100009	2012/10/27
3	RF TEST PANEL	Rohde&Schwarz	TS / RSP	335015/ 0017	2012/10/27
4	TURNTABLE	ETS	2088	2149	2012/10/27
5	ANTENNA MAST	ETS	2075	2346	2012/10/27
6	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2012/10/27
7	EMI TEST SOFTWARE	Rohde&Schwarz	ESK1	N/A	2012/10/27
8	High pass filter	Compliance Direction systems	BSU-6	34202	2012/10/27
9	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2012/10/27
10	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2012/10/27
11	HORN ANTENNA	ShwarzBeck	9120D	1011	2012/10/27
12	HORN ANTENNA	ShwarzBeck	9120D	1012	2012/10/27
13	TURNTABLE	MATURO	TT2.0	----	2012/10/27
14	ANTENNA MAST	MATURO	TAM-4.0-P	----	2012/10/27
15	High pass filter	Compliance Direction systems	BSU-6	34202	2012/10/27
16	EMI TEST SOFTWARE	Rohde&Schwarz	ESK1	N/A	2012/10/27
17	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2012/10/27
18	Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	470	2012/10/27
19	Broadband Preamplifier	ShwarzBeck	BBV743	9743-0079	2012/10/27
20	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2012/10/27
21	Amplifer	Compliance Direction systems	PAP1-4060	120	2012/10/27

The Calication 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：

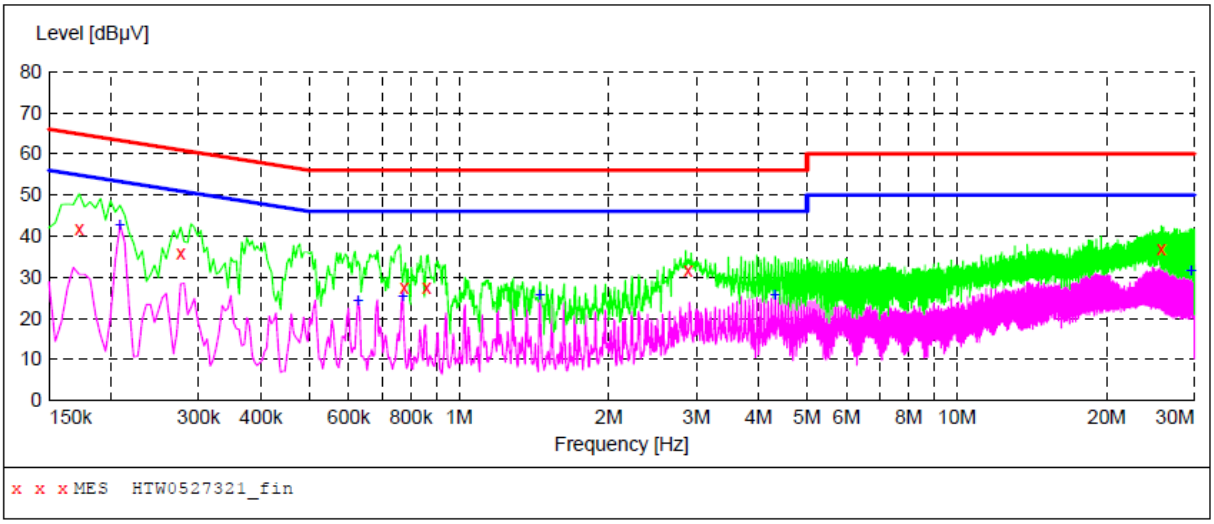
Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0527327_fin"

5/27/2013 9:04AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.172500	41.90	10.2	65	22.9	QP	N	GND
0.276000	35.90	10.2	61	25.0	QP	N	GND
0.775500	27.60	10.1	56	28.4	QP	N	GND
0.861000	27.60	10.1	56	28.4	QP	N	GND
2.886000	31.60	10.2	56	24.4	QP	N	GND
25.737000	37.00	10.6	60	23.0	QP	N	GND

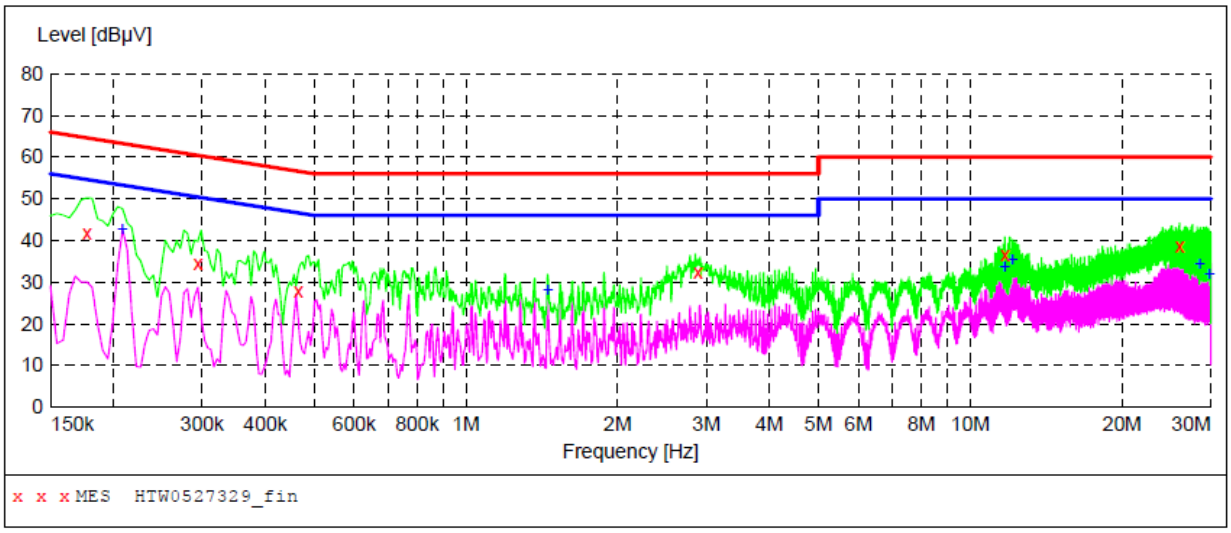
MEASUREMENT RESULT: "HTW0527327_fin2"

5/27/2013 9:04AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.208500	42.80	10.2	53	10.5	AV	N	GND
0.627000	24.40	10.2	46	21.6	AV	N	GND
0.771000	25.60	10.1	46	20.4	AV	N	GND
1.455000	25.70	10.2	46	20.3	AV	N	GND
4.312500	25.70	10.2	46	20.3	AV	N	GND
29.562000	31.70	10.6	50	18.3	AV	N	GND

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0527329_fin"

5/27/2013 9:07AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	41.90	10.2	65	22.7	QP	L1	GND
0.294000	34.50	10.3	60	25.9	QP	L1	GND
0.465000	27.90	10.4	57	28.7	QP	L1	GND
2.881500	32.60	10.2	56	23.4	QP	L1	GND
11.706000	36.40	10.3	60	23.6	QP	L1	GND
26.007000	38.80	10.6	60	21.2	QP	L1	GND

MEASUREMENT RESULT: "HTW0527329_fin2"

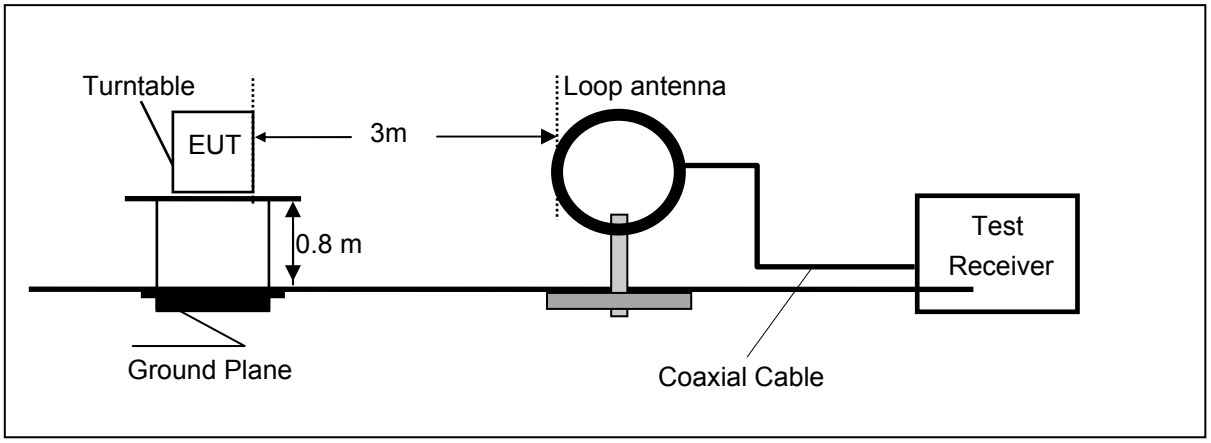
5/27/2013 9:07AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.208500	42.70	10.2	53	10.6	AV	L1	GND
1.455000	28.30	10.2	46	17.7	AV	L1	GND
11.706000	33.80	10.3	50	16.2	AV	L1	GND
12.133500	35.50	10.3	50	14.5	AV	L1	GND
28.576500	34.40	10.6	50	15.6	AV	L1	GND
29.832000	31.90	10.6	50	18.1	AV	L1	GND

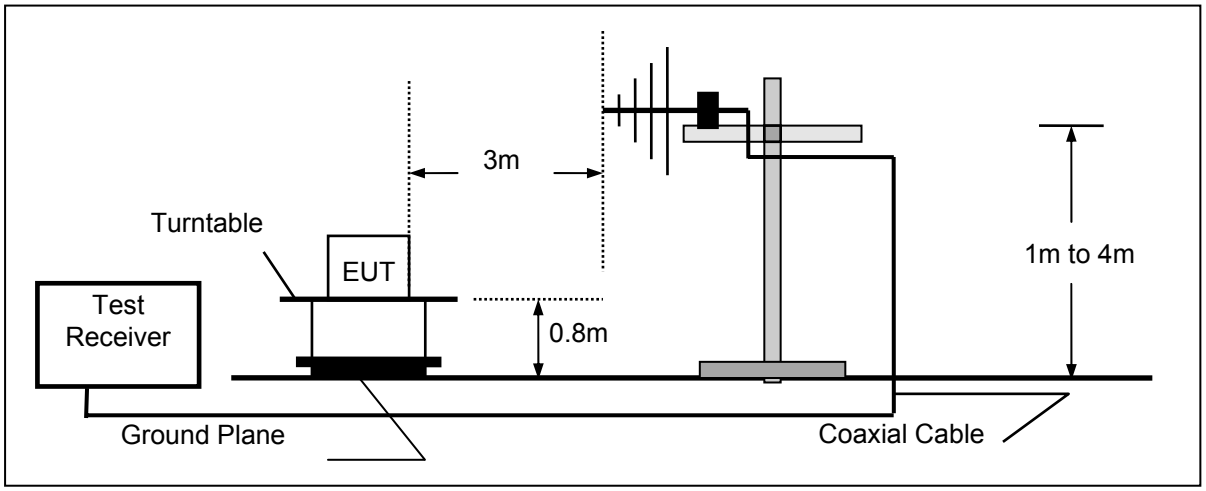
4.2. Radiated Emission

TEST CONFIGURATION

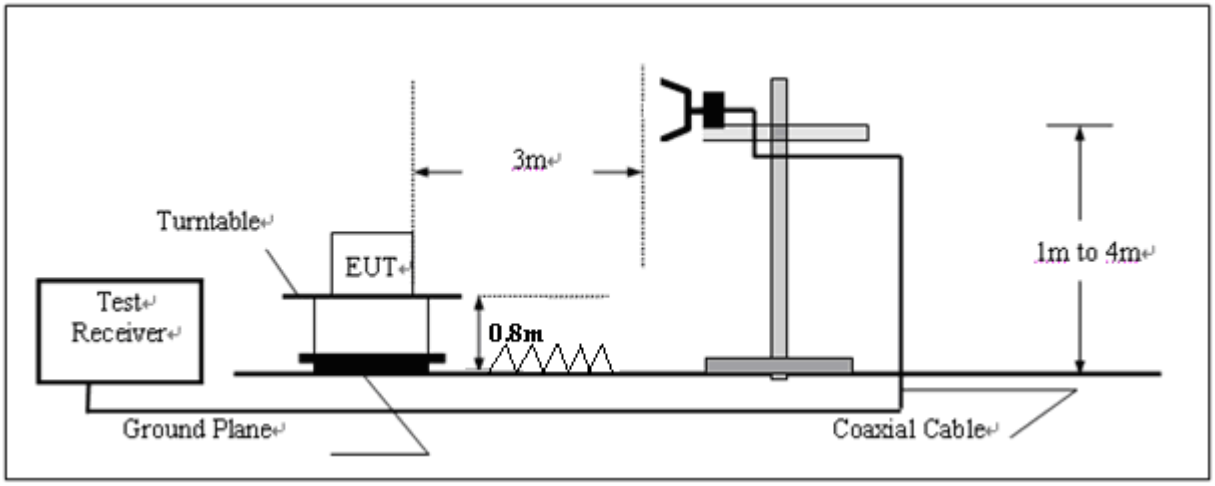
Frequency range 9KHz – 30MHz



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 crystal was 8MHz and maximum operation frequency was 2480MHz,so the radiated frequency range was 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.

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.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	300	20log(2400/F(KHz))	2400/F(KHz)
0.49-1.705	30	20log(24000/F(KHz))	24000/F(KHz)
1.705-30	30	20log(30)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following table.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)
1.705-30	3	20log(30)+ 40log(30/3)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

TEST RESULTS

Note:We tested Radiated Emission of GFSK and π/4 DQPSK mode from 9KHz to 1000MHz and We recorded the worst case at GFSK mode.

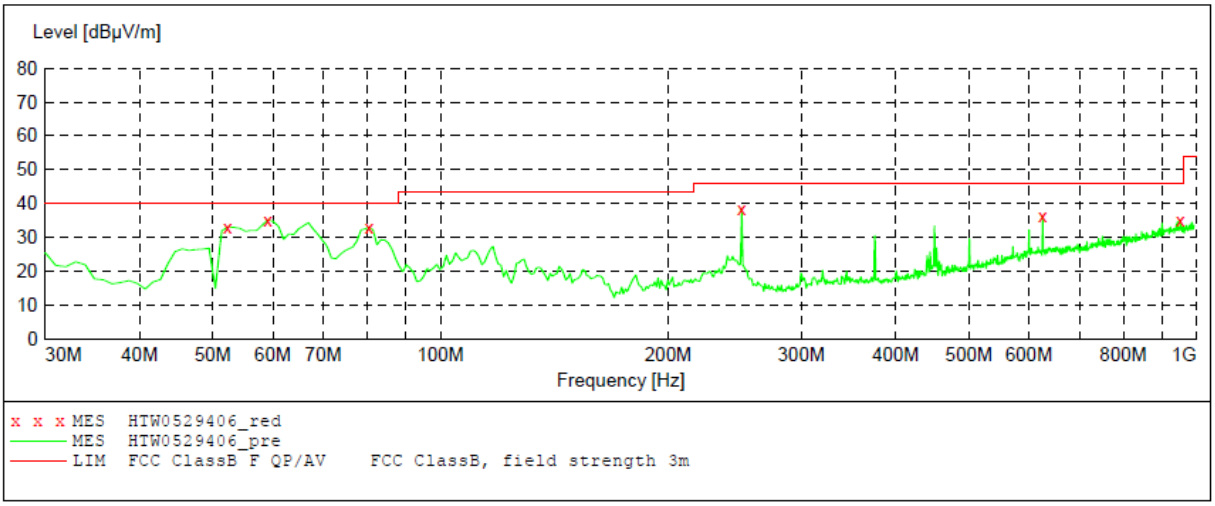
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
0.58	50.24	72.34	22.10	QP	PASS
1.68	49.25	63.10	13.85	QP	PASS
15.24	51.36	69.54	18.18	QP	PASS
25.26	48.36	69.54	21.18	QP	PASS

For 30MHz to 1000MHz

SCAN TABLE: "test Field(30M-1G)QP"

```
Short Description:              Field Strength(30M-1G)
Start      Stop       Step       Detector  Meas.     IF       Transducer
Frequency  Frequency  Width                Time      Bandw.
30.0 MHz   1.0 GHz    60.0 kHz   QuasiPeak 1.0 s     120 kHz HL562
```



MEASUREMENT RESULT: "HTW0529406_red"

5/29/2013 8:29PM

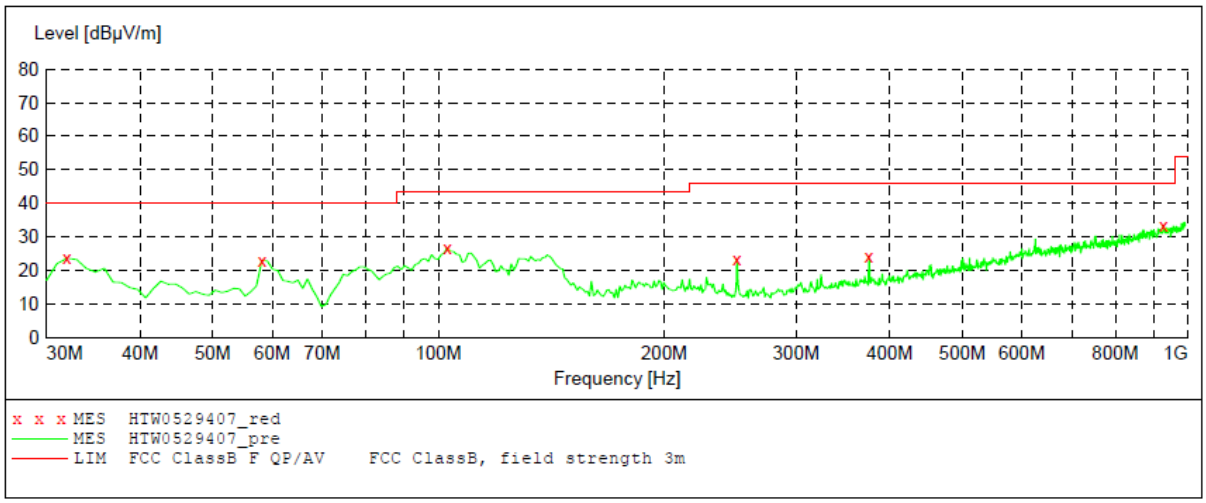
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
52.310000	33.00	-15.3	40.0	7.0	QP	100.0	3.00	HORIZONTAL
59.100000	35.20	-15.6	40.0	4.8	QP	100.0	28.00	HORIZONTAL
80.440000	33.00	-19.0	40.0	7.0	QP	300.0	110.00	HORIZONTAL
250.190000	38.60	-15.7	46.0	7.4	QP	100.0	132.00	HORIZONTAL
625.580000	36.20	-2.6	46.0	9.8	QP	100.0	80.00	HORIZONTAL
951.500000	34.90	3.4	46.0	11.1	QP	100.0	360.00	HORIZONTAL

SCAN TABLE: "test Field(30M-1G)QP"

Short Description:			Field Strength(30M-1G)			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562

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

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.1 GHz	MaxPeak	Coupled	100 kHz	VULB9163



MEASUREMENT RESULT: "HTW0529407_red"

5/29/2013 8:34PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	23.60	-16.3	40.0	16.4	QP	100.0	105.00	VERTICAL
58.130000	22.90	-15.5	40.0	17.1	QP	100.0	105.00	VERTICAL
102.750000	26.70	-13.9	43.5	16.8	QP	100.0	75.00	VERTICAL
250.190000	23.30	-15.7	46.0	22.7	QP	100.0	116.00	VERTICAL
375.320000	24.30	-11.6	46.0	21.7	QP	100.0	63.00	VERTICAL
927.250000	33.40	3.1	46.0	12.6	QP	100.0	211.00	VERTICAL

REMARKS：

1. ∗Undetectable
2. The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz
3.The Transd=Cabel loss +Antenna factor -pre-amplifier factor
4. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

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.

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)
1	*2402.00	93.76	PK			1.00	147	97.16	28.3	4.90	36.6	-3.40
1	*2402.00	85.38	AV			1.00	147	88.78	28.3	4.90	36.6	-3.40
2	4804.00	55.76	PK	74.00	18.24	1.00	230	52.56	32.7	7.00	36.5	3.20
2	4804.00	43.75	AV	54.00	10.25	1.00	230	40.55	32.7	7.00	36.5	3.20
3	7206.00	51.26	PK	74.00	22.74	1.00	125	41.86	35.8	8.90	35.3	9.40
3	7206.00	--	AV	54.00	--	1.00	125	--	35.8	8.90	35.3	9.40
4	12020.41	57.37	PK	74.00	16.63	1.00	45	40.77	38.0	11.30	32.7	16.60
4	12020.41	45.35	AV	54.00	8.65	1.00	45	28.75	38.0	11.30	32.7	16.60
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	*2402.00	96.58	PK			1.00 V	157	99.98	28.3	4.90	36.6	-3.40
1	*2402.00	87.58	AV			1.00 V	147	90.98	28.3	4.90	36.6	-3.40
2	4804.00	57.25	PK	74.00	16.75	1.00 V	358	54.05	32.7	7.00	36.5	3.20
2	4804.00	47.58	AV	54.00	6.42	1.00 V	358	44.38	32.7	7.00	36.5	3.20
3	7206.00	49.57	PK	74.00	24.43	1.00 V	374	40.17	35.8	8.90	35.3	9.40
3	7206.00	--	AV	54.00	--	1.00 V	371	--	35.8	8.90	35.3	9.40
4	12020.41	58.78	PK	74.00	15.22	1.00	48	42.18	38.0	11.30	32.7	16.60
4	12020.41	43.89	AV	54.00	10.11	1.00 V	48	27.29	38.0	11.30	32.7	16.60

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	93.24	PK			1.00	153	96.44	28.3	5.10	36.6	-3.20
1	*2441.00	84.27	AV			1.00	153	87.47	28.3	5.10	36.6	-3.20
2	4882.00	56.47	PK	74.00	17.53	1.00	202	53.07	32.3	7.60	36.5	3.40
2	4882.00	47.24	AV	54.00	6.76	1.00	202	43.84	32.3	7.60	36.5	3.40
3	7323.00	52.24	PK	74.00	21.76	1.00	355	42.84	36.1	8.60	35.3	9.40
3	7323.00	--	AV	54.00	--	1.00	355	--	36.1	8.60	35.3	9.40
4	12020.41	55.35	PK	74.00	18.65	1.00	28	38.75	38.0	11.30	32.7	16.60
4	12020.41	43.57	AV	54.00	10.43	1.00	28	26.97	38.0	11.30	32.7	16.60
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	95.47	PK			1.00	121	98.67	28.3	5.10	36.6	-3.20
1	*2441.00	86.57	AV			1.00	121	89.77	28.3	5.10	36.6	-3.20
2	4882.00	58.35	PK	74.00	15.65	1.00	97	54.95	32.3	7.60	36.5	3.40
2	4882.00	48.27	AV	54.00	5.73	1.00	97	44.87	32.3	7.60	36.5	3.40
3	7323.00	47.35	PK	74.00	26.65	1.00	288	37.95	36.1	8.60	35.3	9.40
3	7323.00	--	AV	54.00	--	1.00	288	--	36.1	8.60	35.3	9.40
4	12020.41	57.35	PK	74.00	16.65	1.00	89	40.75	38.0	11.30	32.7	16.60
4	12020.41	43.75	AV	54.00	10.25	1.00	89	27.15	38.0	11.30	32.7	16.60

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	94.57	PK			1.00	156	97.87	28.2	5.10	36.6	-3.30
1	*2480.00	85.75	AV			1.00	156	89.05	28.2	5.10	36.6	-3.30
2	4960.00	54.35	PK	74.00	19.65	1.00	198	50.55	33.0	7.00	36.2	3.80
2	4960.00	48.54	AV	54.00	5.46	1.00	198	44.74	33.0	7.00	36.2	3.80
3	7340.00	48.32	PK	74.00	25.68	1.00	90	38.92	36.2	8.50	35.3	9.40
3	7340.00	--	AV	54.00	--	1.00	90	--	36.2	8.50	35.3	9.40
4	12020.41	56.14	PK	74.00	17.86	1.00	124	39.54	38.0	11.30	32.7	16.60
4	12020.41	47.25	AV	54.00	6.75	1.00	124	30.65	38.0	11.30	32.7	16.60

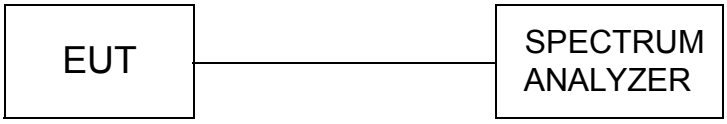
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	97.24	PK			1.000 V	125	100.54	28.2	5.10	36.6	-3.30
1	*2480.00	87.35	AV			1.00 V	125	90.65	28.2	5.10	36.6	-3.30
2	4960.00	60.34	PK	74.00	13.66	1.00 V	96	56.54	36.2	8.50	35.3	3.80
2	4960.00	48.57	AV	54.00	5.43	1.00 V	96	44.77	36.2	8.50	35.3	3.80
3	7340.00	49.54	PK	74.00	24.46	1.00 V	35	40.14	37.4	10.10	34.8	9.40
3	7340.00	--	AV	54.00	--	1.00 V	35	--	37.4	10.10	34.8	9.40
4	12020.41	55.34	PK	74.00	18.66	1.00 V	37	38.74	38.0	11.30	32.7	16.60
4	12020.41	46.37	AV	54.00	7.63	1.00 V	37	29.77	38.0	11.30	32.7	16.60

Suprious emission in restricted band												
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	2439.0	59.27	PK	74.00	14.73	1.00 H	137	62.67	28.3	4.90	36.6	-3.40
1	2439.0	47.27	AV	54.00	6.73	1.00 H	137	50.67	28.3	4.90	36.6	-3.40
2	2439.0	60.24	PK	74.00	13.76	1.00 V	155	63.64	28.3	4.90	36.6	-3.40
2	2439.0	50.02	AV	54.00	3.98	1.00 V	155	53.42	28.3	4.90	36.6	-3.40
3	2483.5	57.74	PK	74.00	16.26	1.00 H	318	61.04	28.2	5.10	36.6	-3.30
3	2483.5	46.24	AV	54.00	7.76	1.00 H	318	49.54	28.2	5.10	36.6	-3.30
4	2483.5	57.24	PK	74.00	16.76	1.00 V	47	60.54	28.2	5.10	36.6	-3.30
4	2483.5	48.48	AV	54.00	5.52	1.00 V	47	51.78	28.2	5.10	36.6	-3.30

REMARKS: 1. The other emission levels were very low against the limit.
2. The limit value is defined as per 15.247
3. The worst test mode is GFSK mode and the data is recorded. 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. Set the RBW=3MHz VBW=10MHz.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

GFSK Mode:

Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Verdict
2402	1.09	30	PASS
2441	0.51	30	PASS
2480	0.91	30	PASS

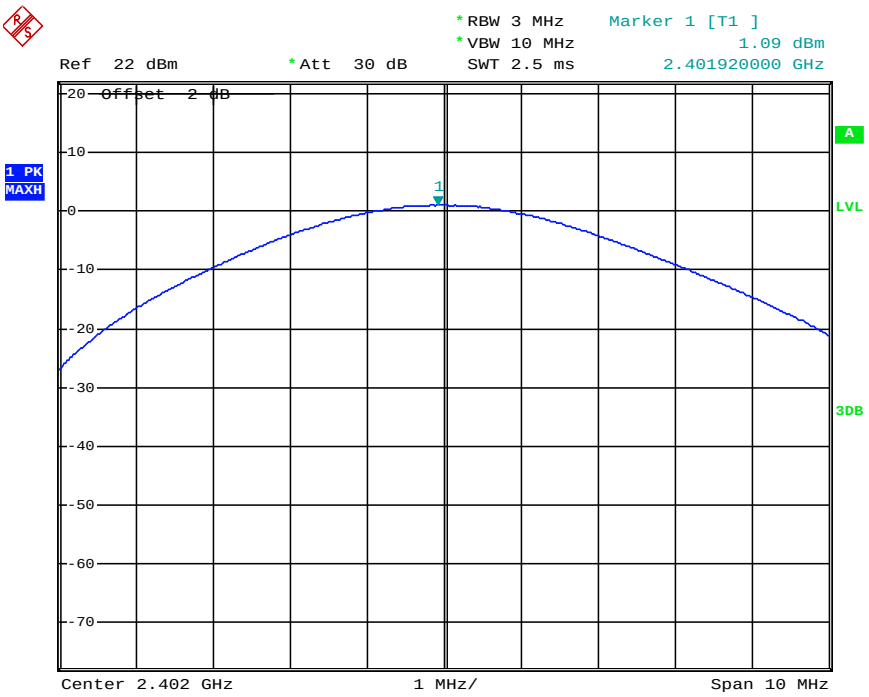
π/4DQPSK Mode:

Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Verdict
2402	0.27	30	PASS
2441	0.30	30	PASS
2480	-0.34	30	PASS

Note: The test results including the cable lose.

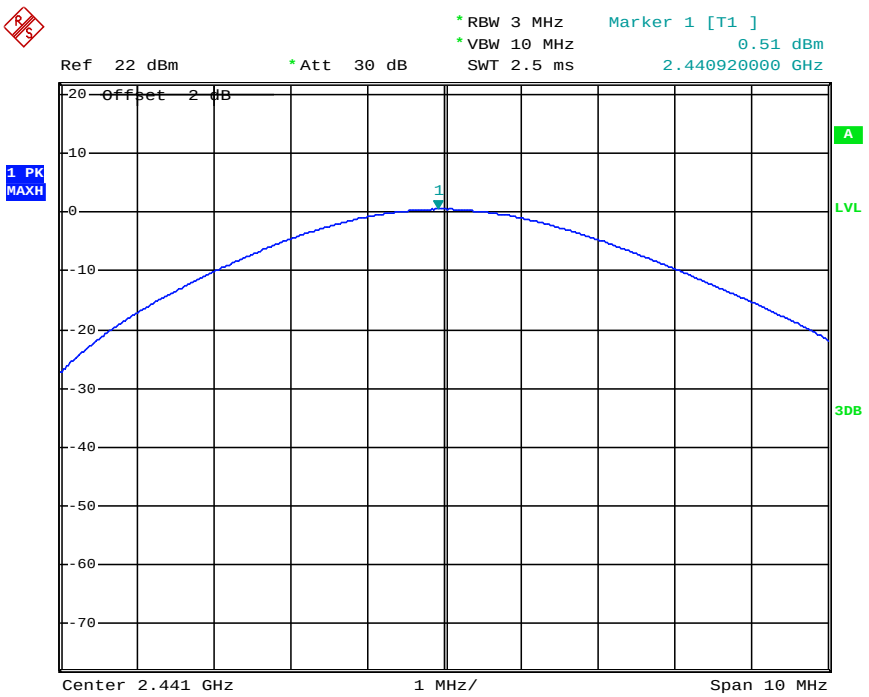
Test Photos For GFSK Mode:

Low channel



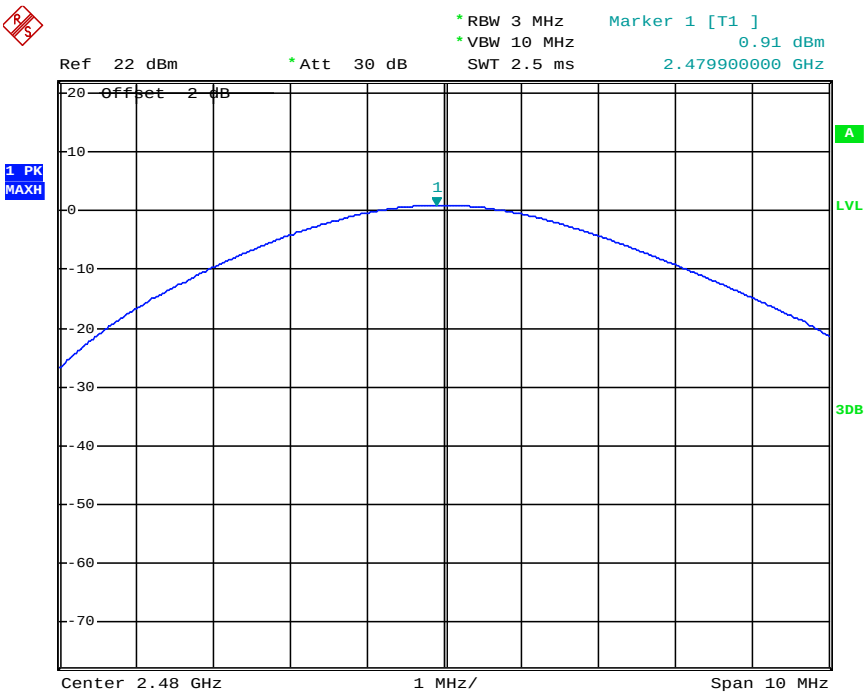
Date: 9.MAY.2013 15:56:14

Middle channel



Date: 9.MAY.2013 15:56:52

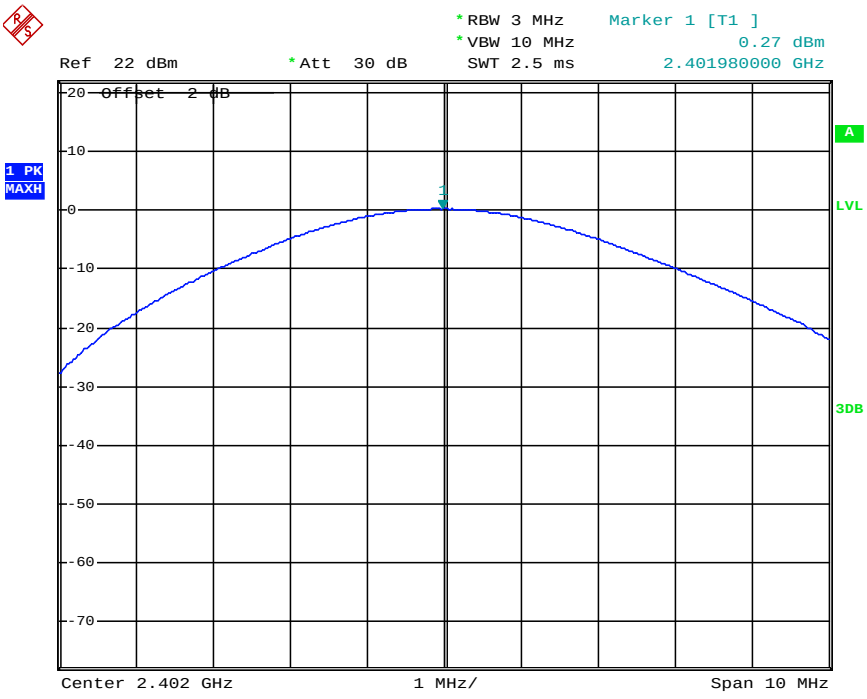
High channel



Date: 9.MAY.2013 15:57:49

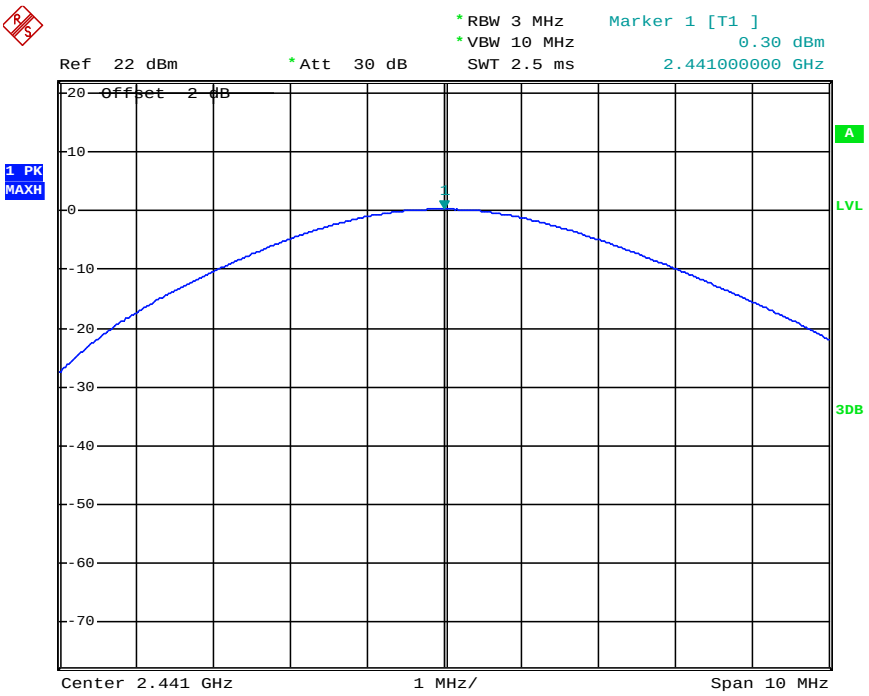
Test Photos For π/4DQPSK Mode:

Low channel



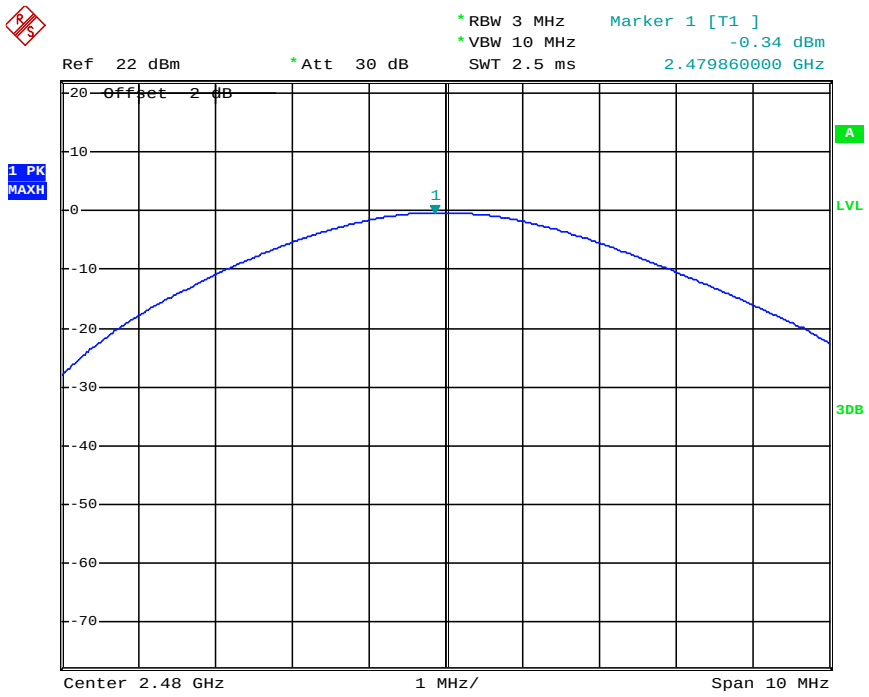
Date: 9.MAY.2013 16:00:32

Middle channel



Date: 9.MAY.2013 15:59:36

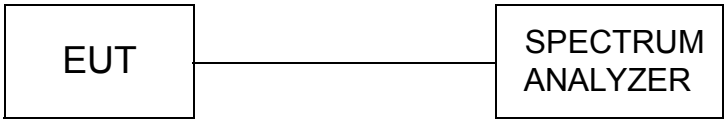
High channel



Date: 9.MAY.2013 15:59:07

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 with30 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:

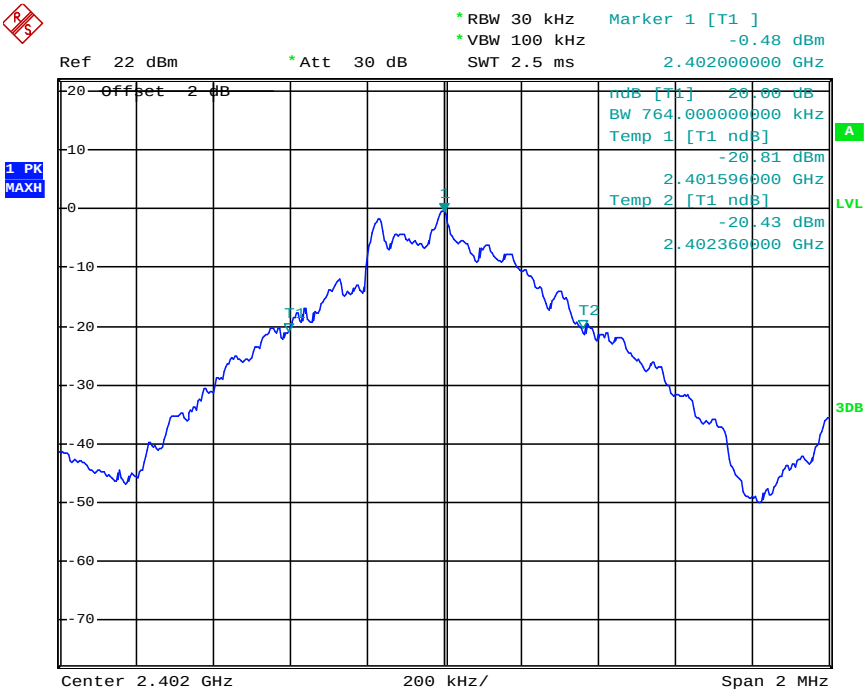
Channel Frequency (MHz)	20dB BandWidth (MHz)	Limit (dBm)	Verdict
2402	0.764	/	PASS
2441	0.792	/	PASS
2480	0.808	/	PASS

π/4DQPSK Mode:

Channel Frequency (MHz)	20dB BandWidth (MHz)	Limit (dBm)	Verdict
2402	1.200	/	PASS
2441	1.196	/	PASS
2480	1.192	/	PASS

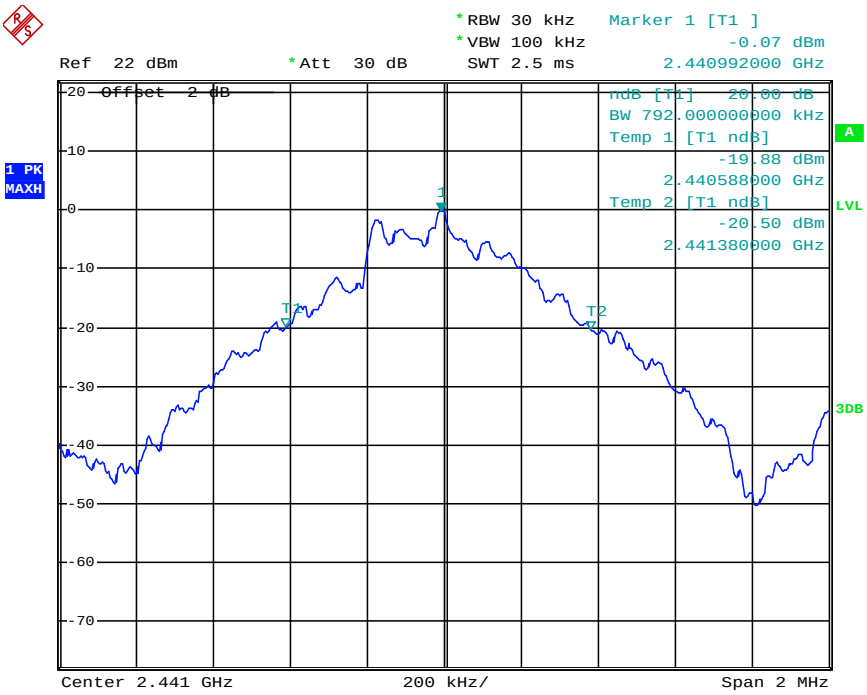
Photos of 20dB Bandwidth Measurement(GFSK Mode)

Low Channel



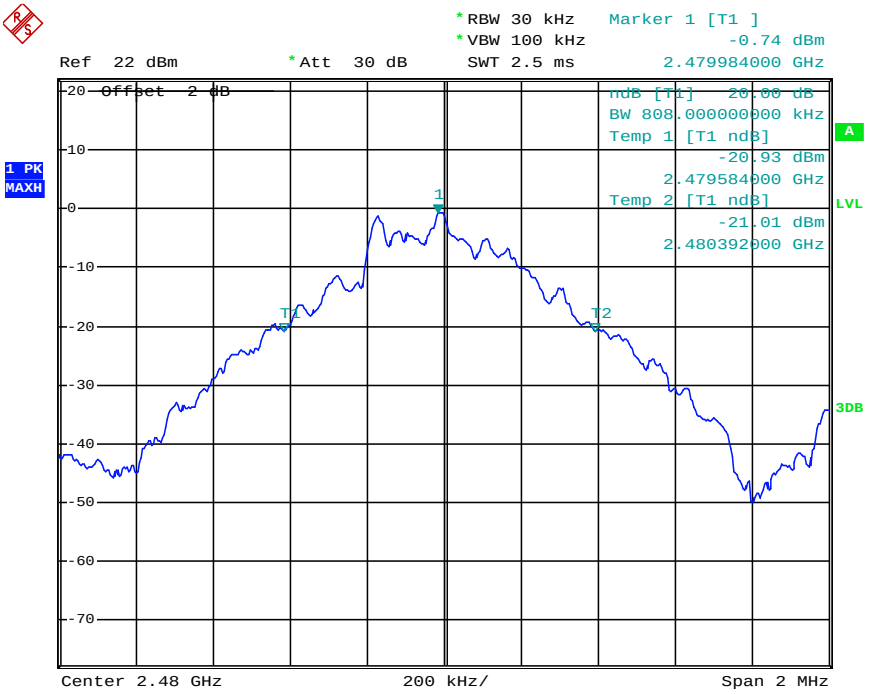
Date: 9.MAY.2013 16:07:25

Middle Channel



Date: 9.MAY.2013 16:06:37

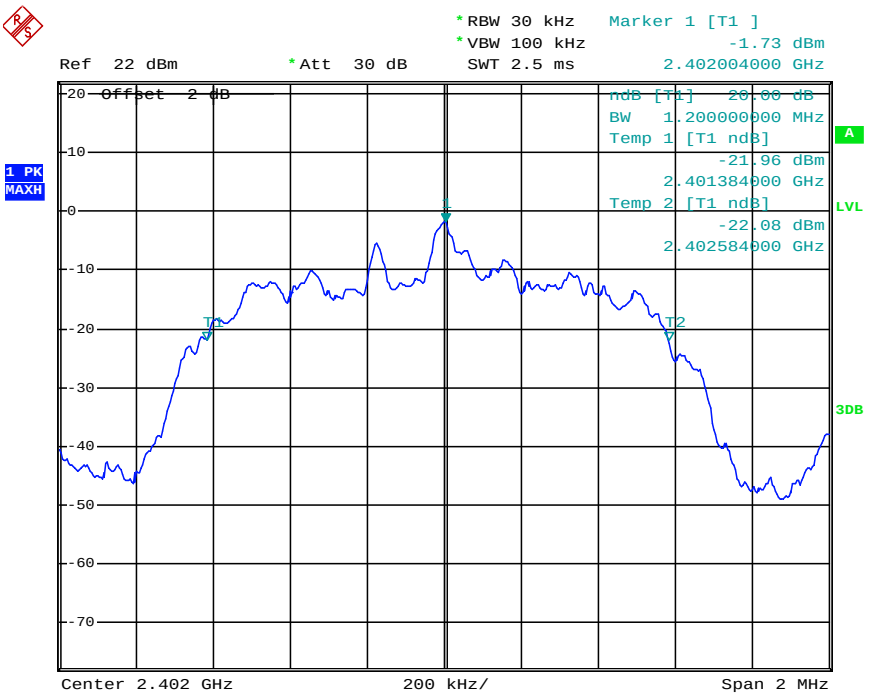
High Channel



Date: 9.MAY.2013 16:05:36

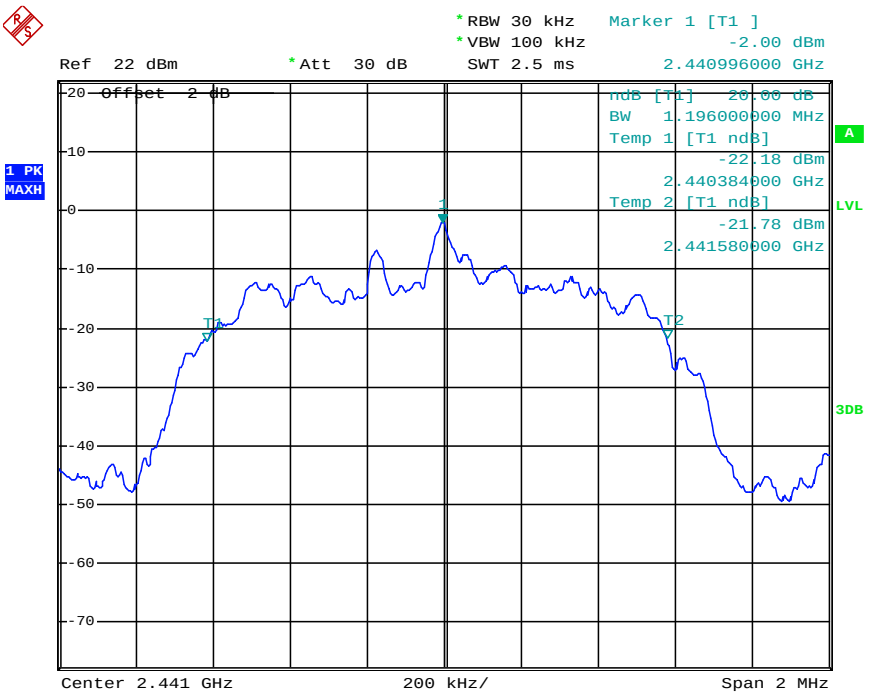
Photos of 20dB Bandwidth Measurement(π/4DQPSK Mode)

Low Channel



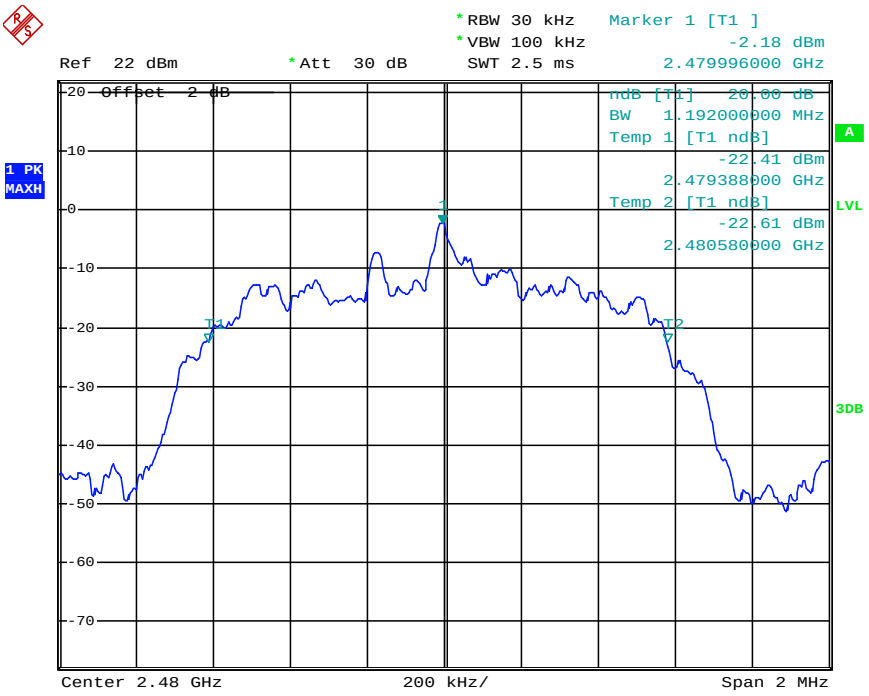
Date: 9.MAY.2013 16:02:37

Middle Channel



Date: 9.MAY.2013 16:03:29

High Channel



Date: 9.MAY.2013 16:04:19

4.5. Band Edge Compliance of RF Emission

APPLICABLE STANAARD

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 for peak detector and RBW=1MHz, VBW=10Hz for average detector.
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.

LIMIT

1. Below -20dB of the highest emission level in operating band.

2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209(see Section 15.205(c)).

Frequency (MHz)	Limit Average (dBuv/m)	Limit Peak (dBuv/m)
Below 2390 or Above 2483.5	54	74

TEST RESULTS

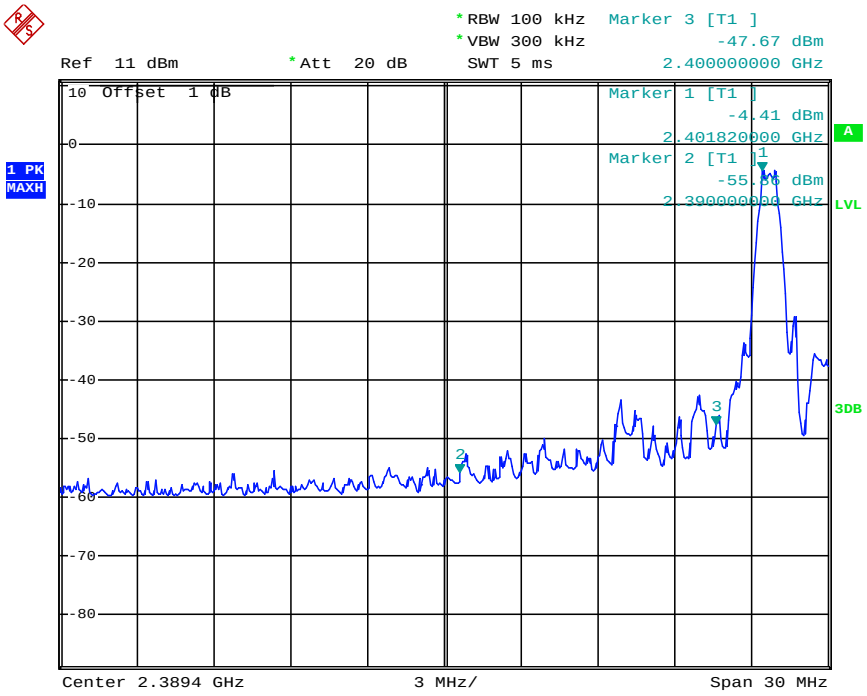
Mode	Channel	Frequency	Delta peak to band emission	Limit(dBc)
GFSK	00	2390.0MHz	51.27	20
	79	2483.5MHz	46.34	20
π/4DQPSK	00	2390.0MHz	58.65	20
	79	2483.5MHz	45.08	20

Suprious emission in restricted band please see page 18

Photos of Conducted Band Edge Measurement

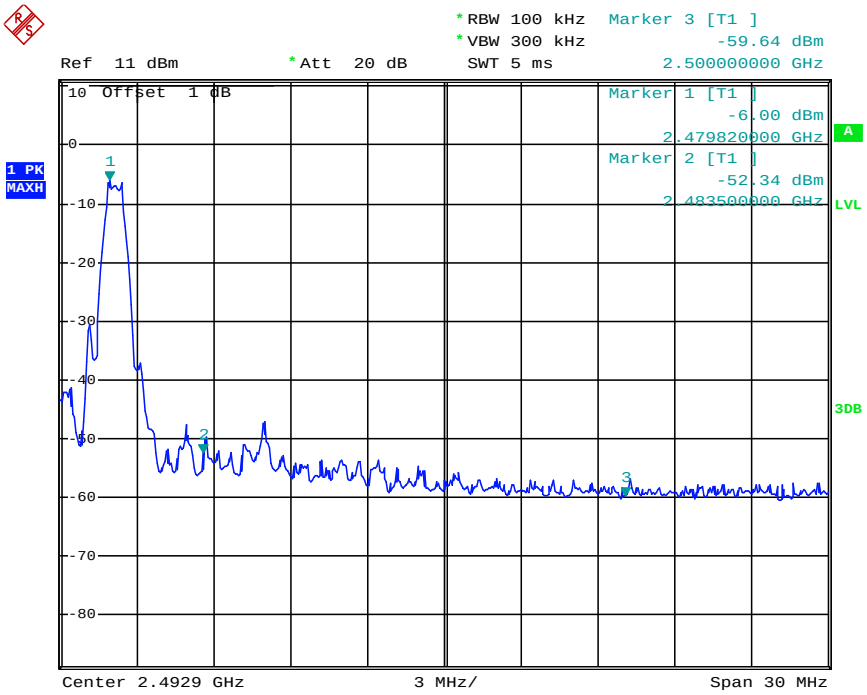
GFSK Mode

Channel 00



Date: 4.MAY.2013 14:54:03

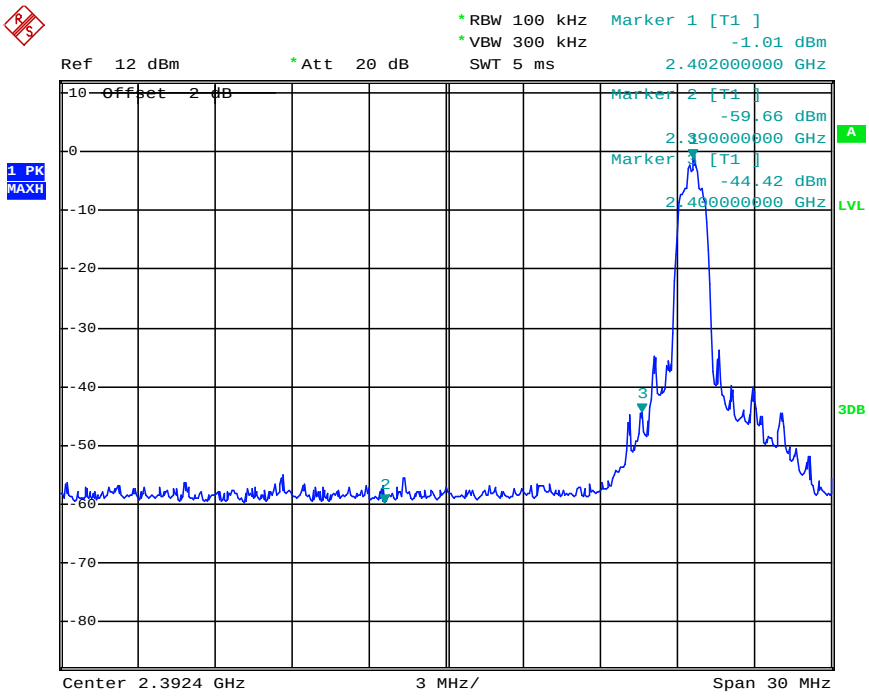
Channel 79



Date: 4.MAY.2013 14:52:03

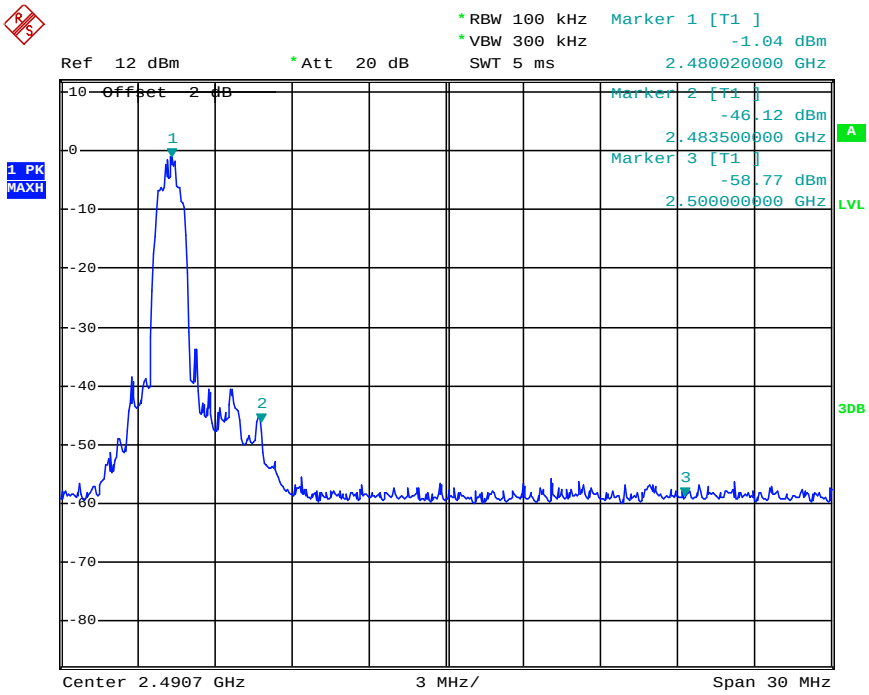
π/4DQPSK Mode

Channel 00



Date: 9.MAY.2013 17:33:55

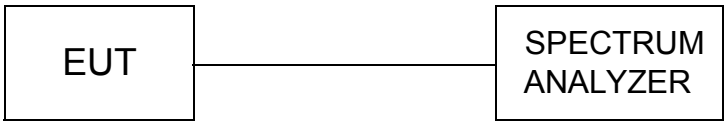
Channel 79



Date: 9.MAY.2013 16:43:00

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:

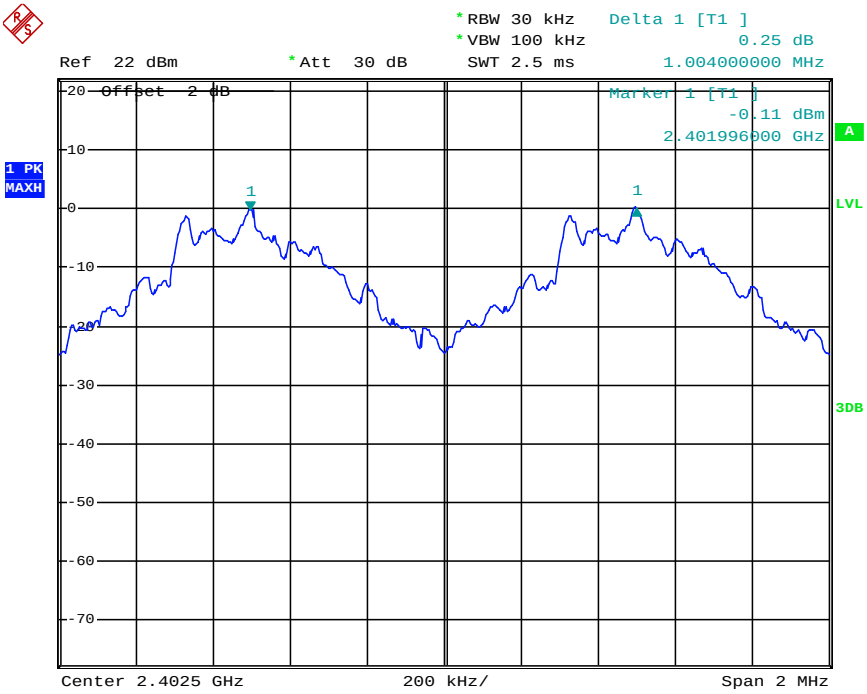
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Verdict
Low Channel	2402	1.004	25KHz or 2/3*20dB bandwidth	PASS
Adjacency Channel	2403			
Mid Channel	2441	1.004	25KHz or 2/3*20dB bandwidth	PASS
Adjacency Channel	2442			
High Channel	2479	1.004	25KHz or 2/3*20dB bandwidth	PASS
Adjacency Channel	2480			

π/4DQPSK Mode:

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Verdict
Low Channel	2402	1.004	25KHz or 2/3*20dB bandwidth	PASS
Adjacency Channel	2403			
Mid Channel	2441	1.004	25KHz or 2/3*20dB bandwidth	PASS
Adjacency Channel	2442			
High Channel	2479	1.004	25KHz or 2/3*20dB bandwidth	PASS
Adjacency Channel	2480			

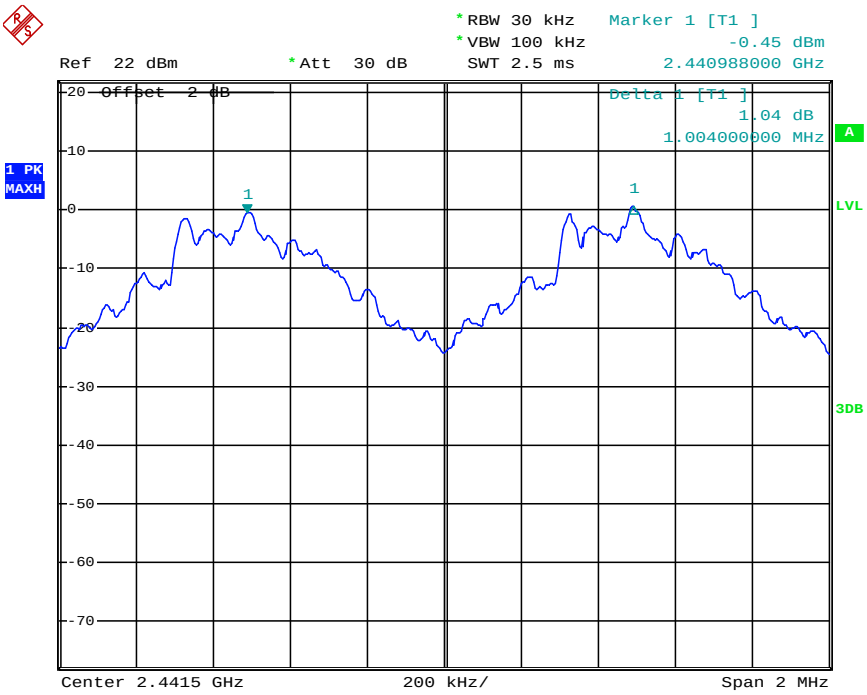
Photos of Frequency separation Measurement(GFSK Mode)

Low channel



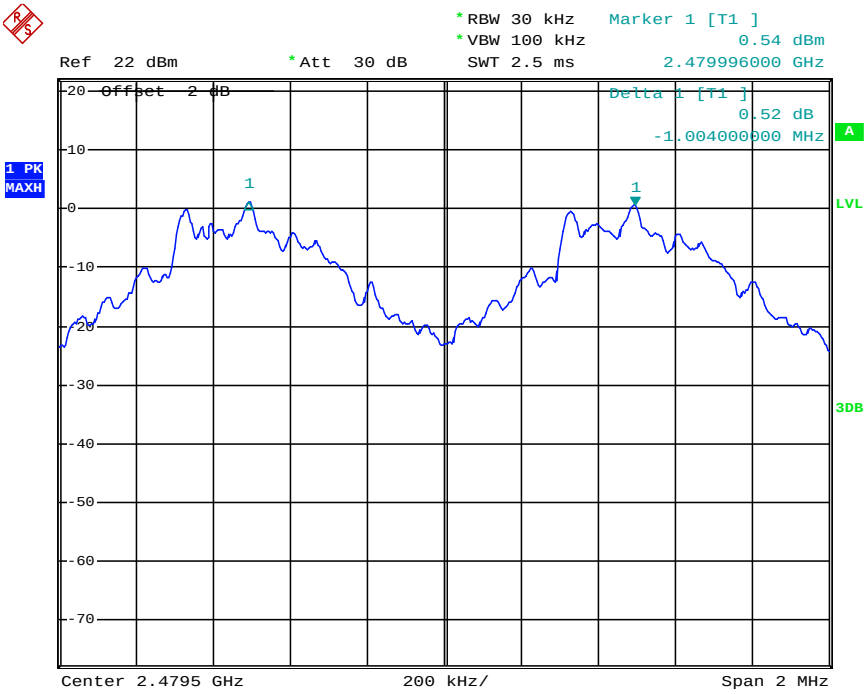
Date: 9.MAY.2013 16:11:21

Middle channel



Date: 9.MAY.2013 16:13:16

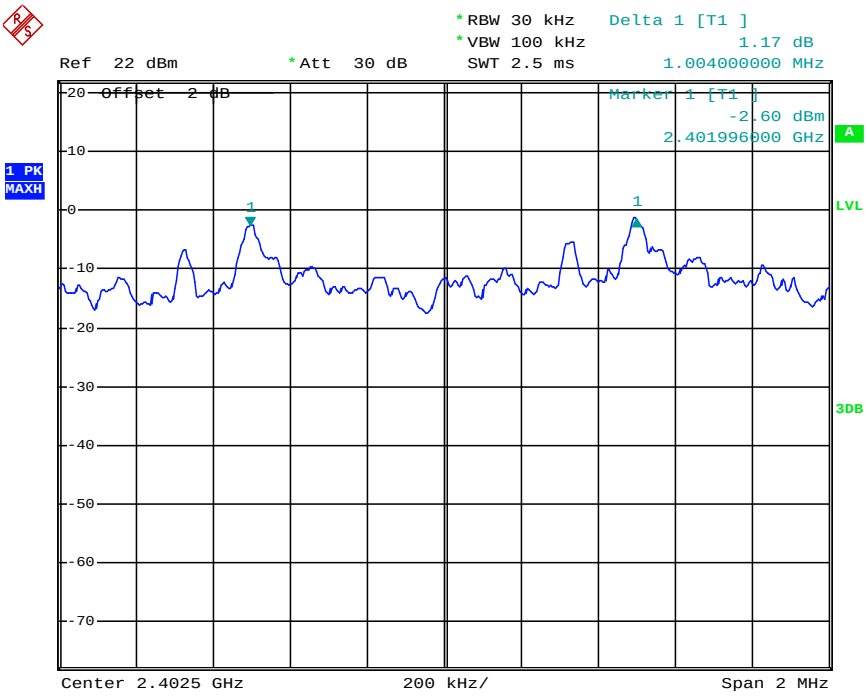
High channel



Date: 9.MAY.2013 16:15:07

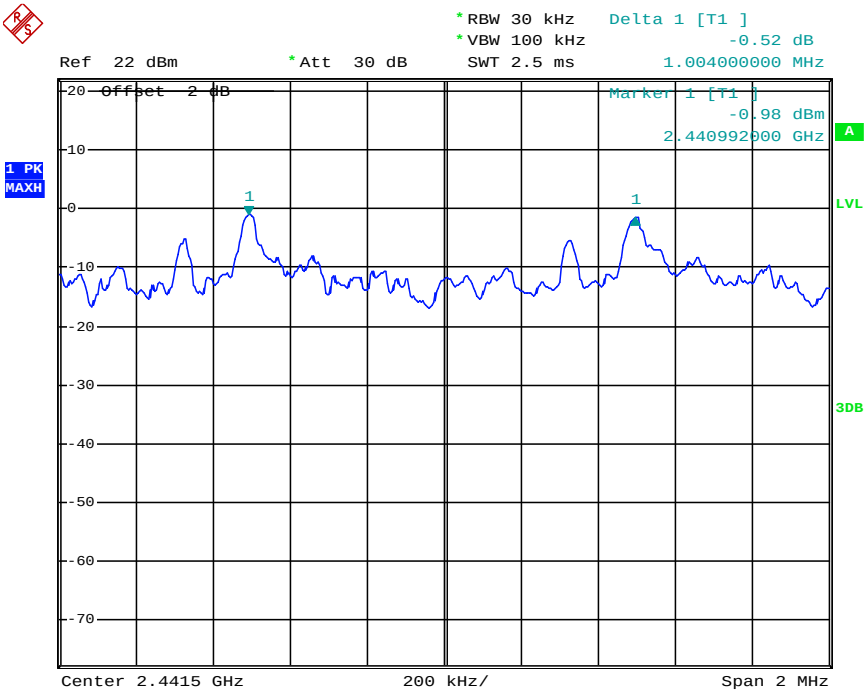
Photos of Frequency separation Measurement(π/4DQPSK Mode)

Low channel



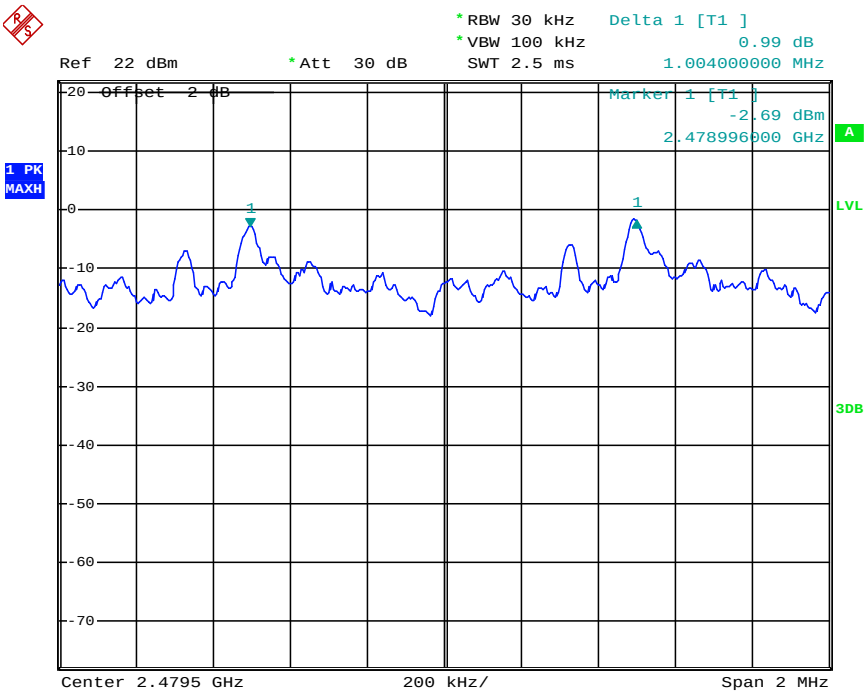
Date: 9.MAY.2013 16:20:14

Middle channel



Date: 9.MAY.2013 16:18:15

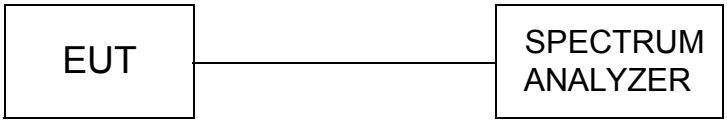
High channel



Date: 9.MAY.2013 16:16:40

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 100 KHz RBW and 300KHz VBW.

LIMIT

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

TEST RESULTS

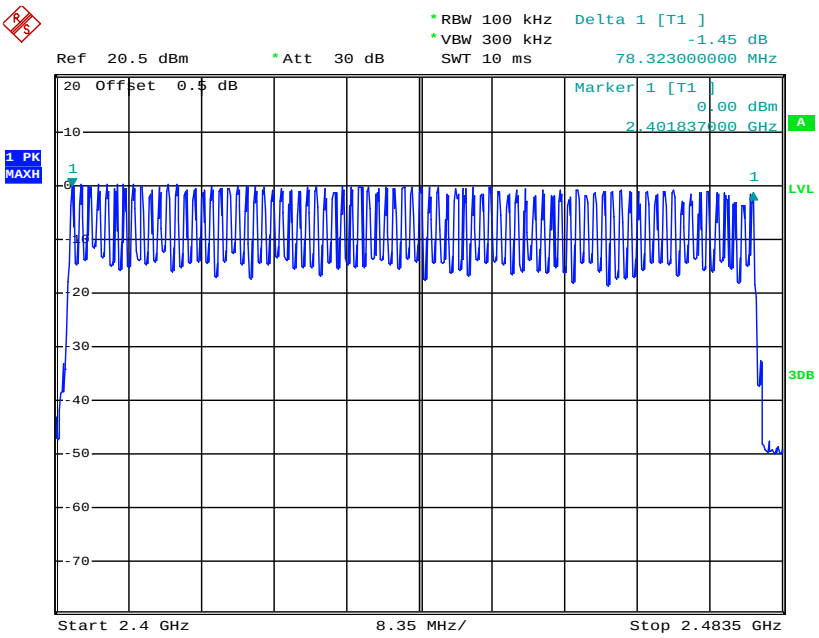
GFSK Mode:

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

π/4QDPSK Mode:

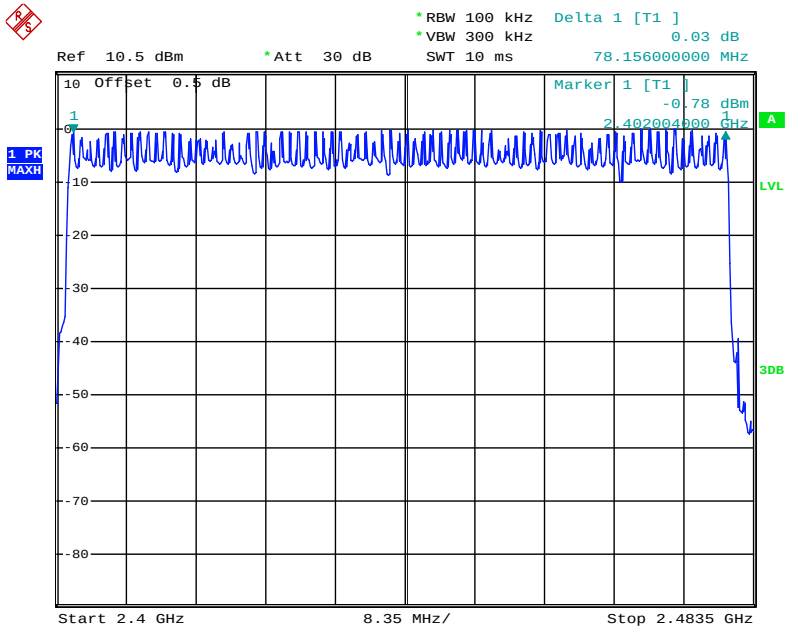
Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥15

Photos of Number of hopping channel Measurement(GFSK Mode)



Date: 9.MAY.2013 16:58:43

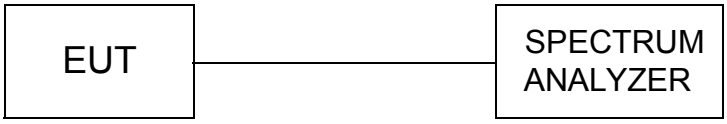
Photos of Number of hopping channel Measurement(π/4QDPSK Mode)



Date: 9.MAY.2013 17:01:54

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:

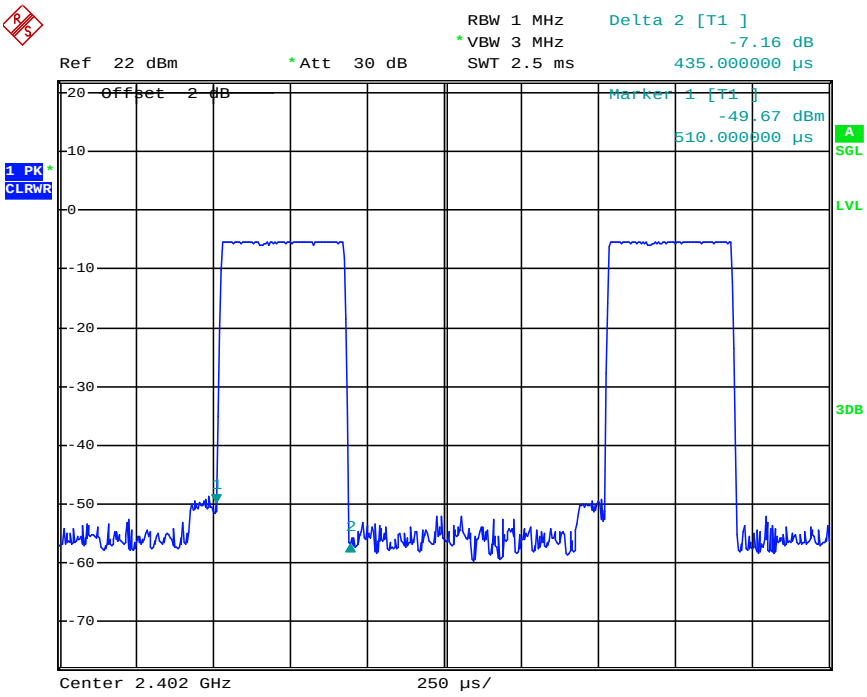
Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.435	0.1392	0.4	PASS
	Middle	0.435	0.1392	0.4	PASS
	High	0.430	0.1376	0.4	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
DH 3	Low	1.700	0.2720	0.4	PASS
	Middle	1.710	0.2736	0.4	PASS
	High	1.700	0.2720	0.4	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH 5	Low	2.980	0.3179	0.4	PASS
	Middle	2.980	0.3179	0.4	PASS
	High	2.980	0.3179	0.4	PASS
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

π/4DQPSK Mode:

Mode	Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
DH 1	Low	0.450	0.1440	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	1.220	0.1952	0.4	PASS
	Middle	1.220	0.1952	0.4	PASS
	High	1.220	0.1952	0.4	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH 5	Low	2.980	0.3179	0.4	PASS
	Middle	2.980	0.3179	0.4	PASS
	High	2.980	0.3179	0.4	PASS
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

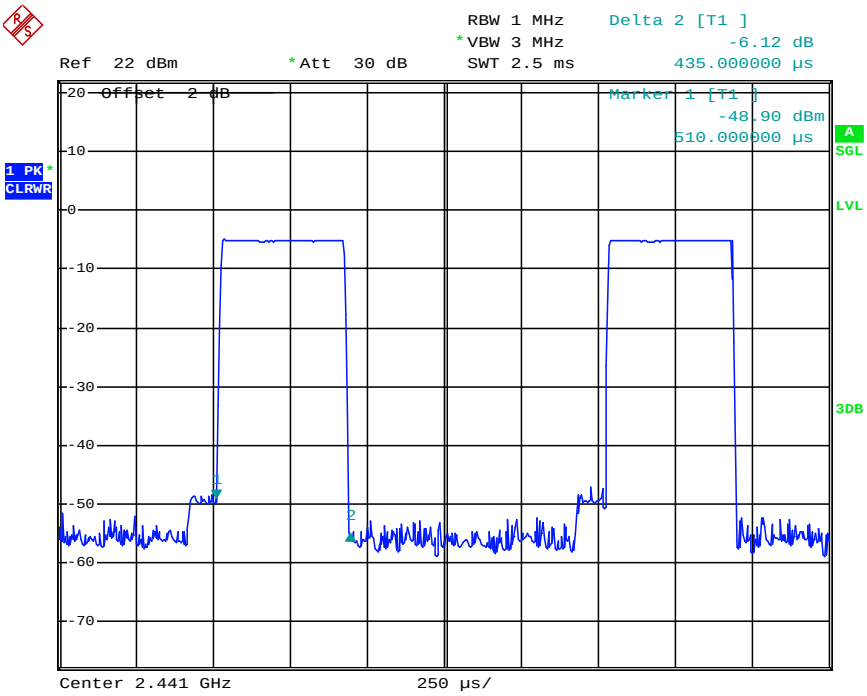
Photos of Dwel time Measurement(GFSK)

DH1-Low channel



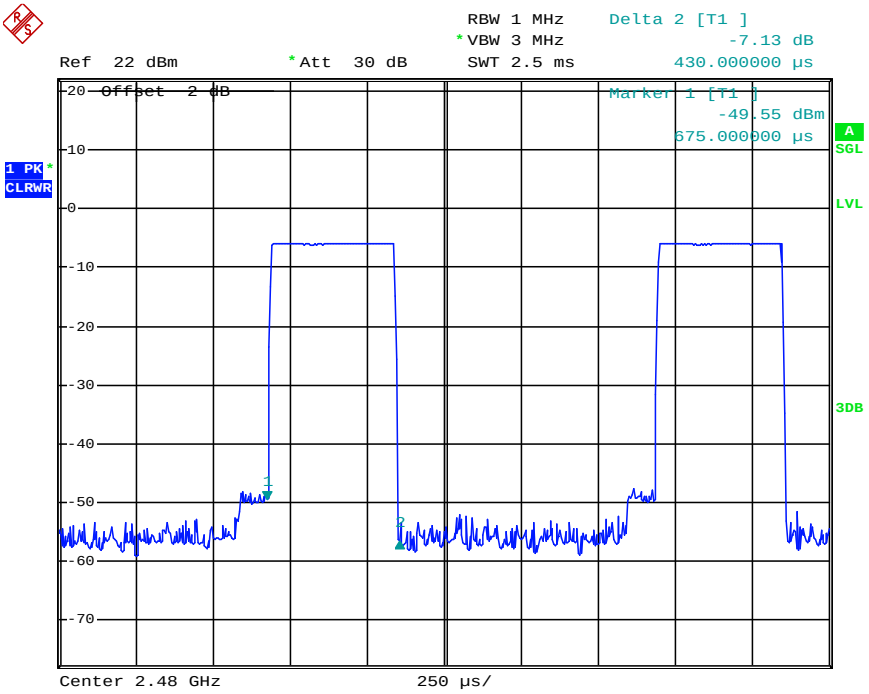
Date: 9.MAY.2013 16:43:00

DH1-Middle channel



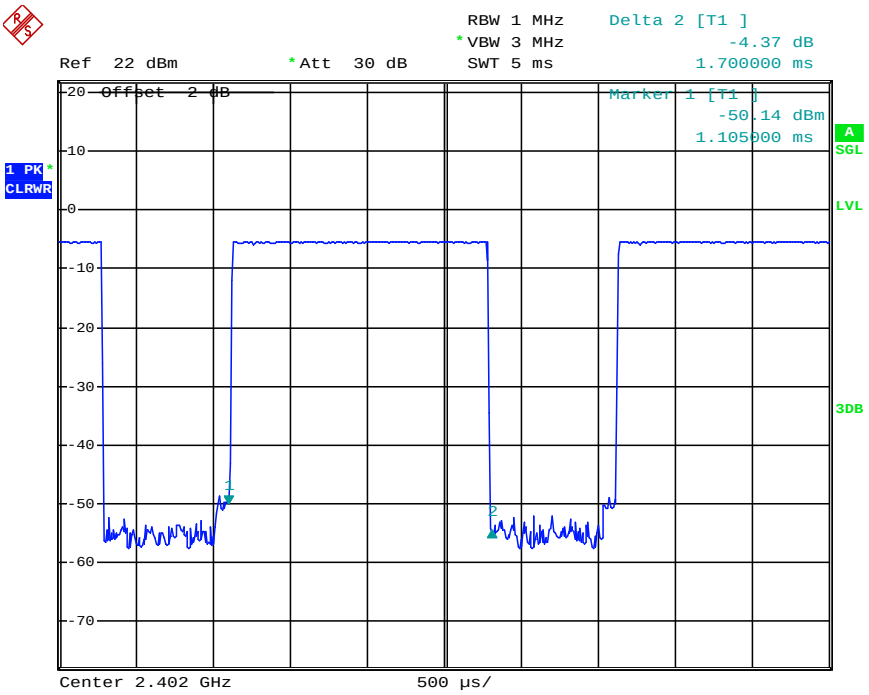
Date: 9.MAY.2013 16:44:09

DH1-High channel



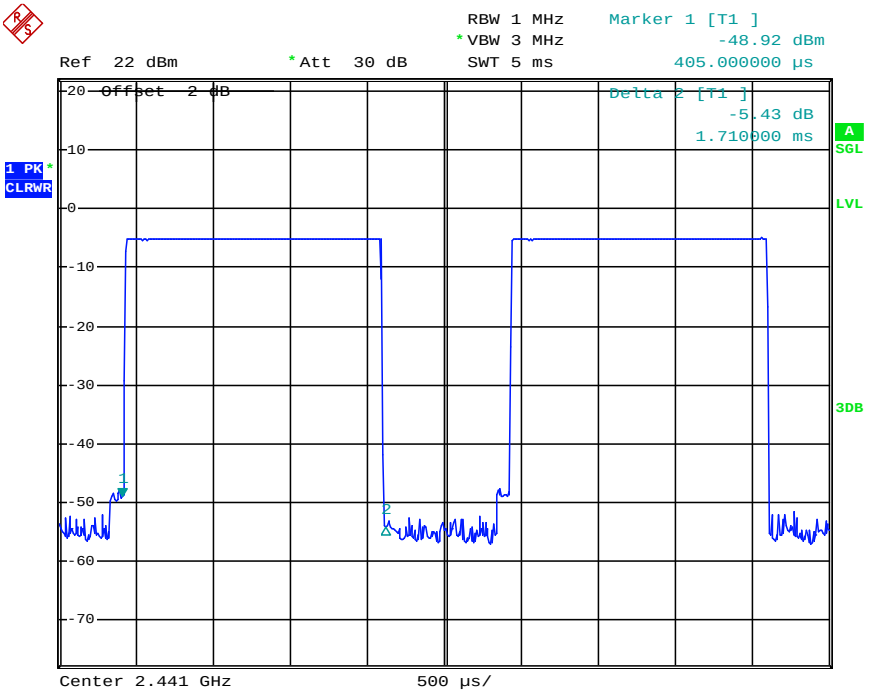
Date: 9.MAY.2013 16:45:17

DH3-Low channel



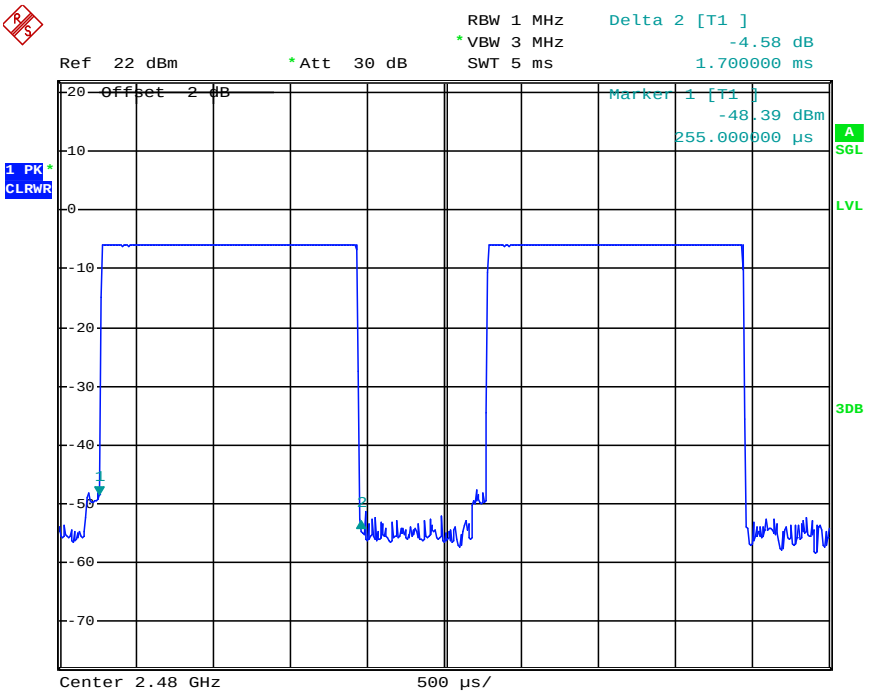
Date: 9.MAY.2013 16:49:37

DH3-Middle channel



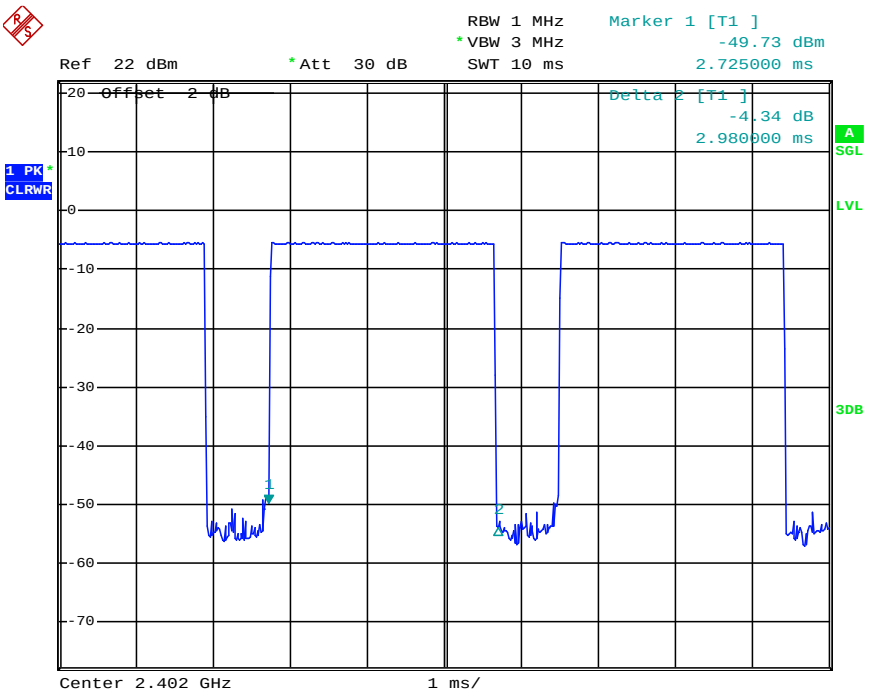
Date: 9.MAY.2013 16:48:31

DH3-High channel



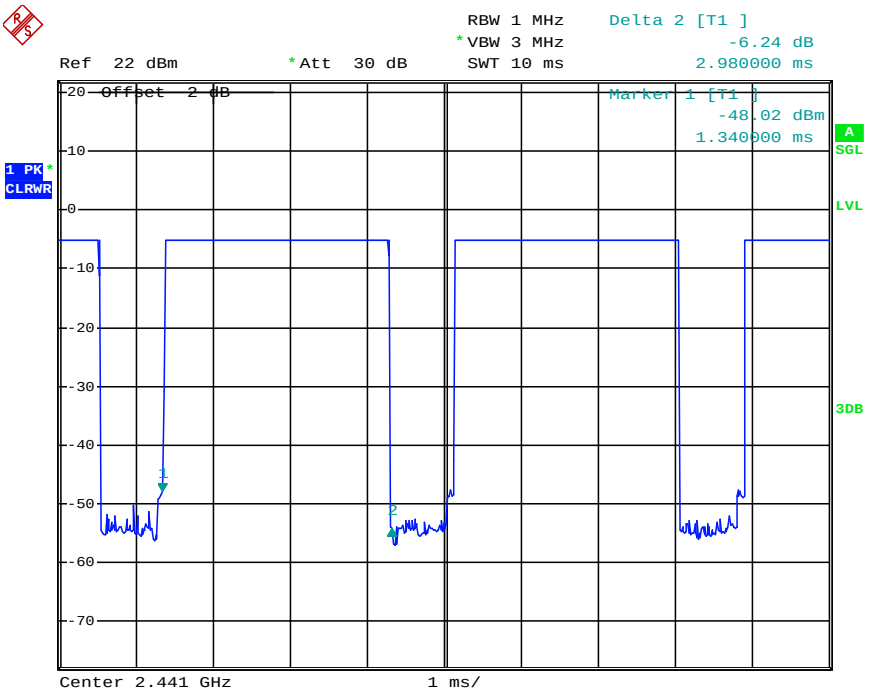
Date: 9.MAY.2013 16:47:14

DH5-Low channel



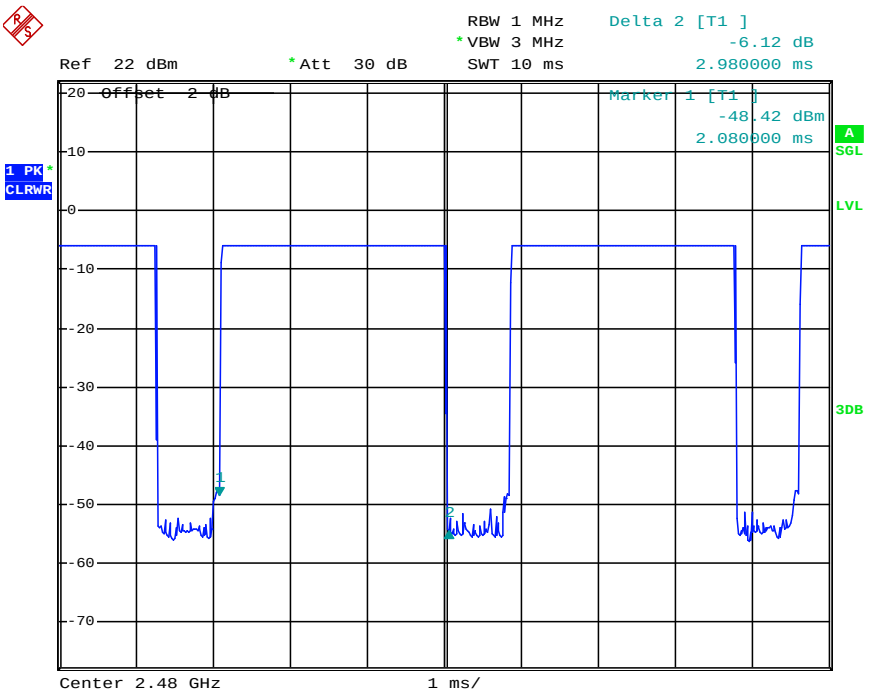
Date: 9.MAY.2013 16:51:11

DH5-Middle channel



Date: 9.MAY.2013 16:52:08

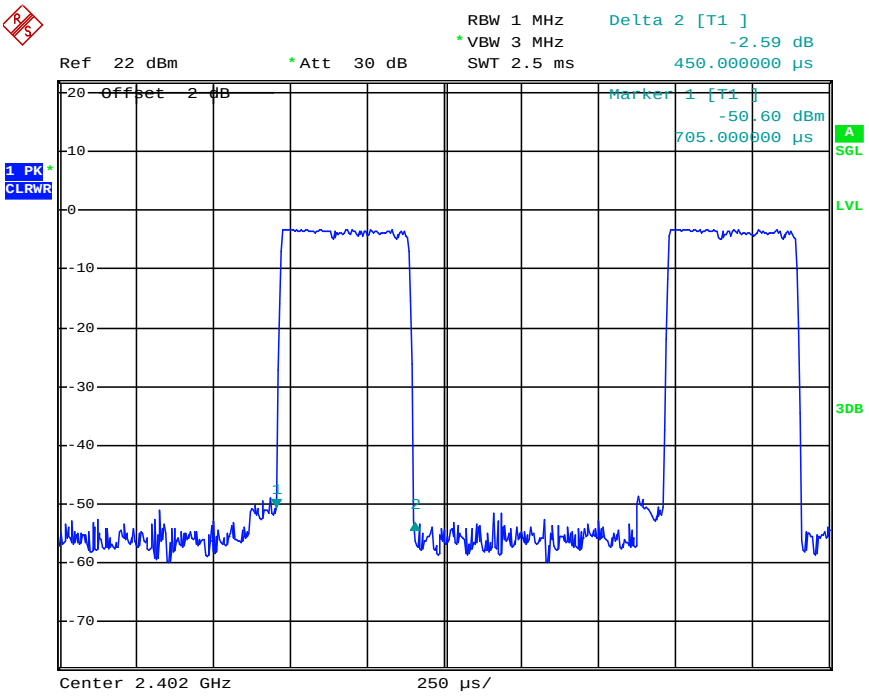
DH5-High channel



Date: 9.MAY.2013 16:53:04

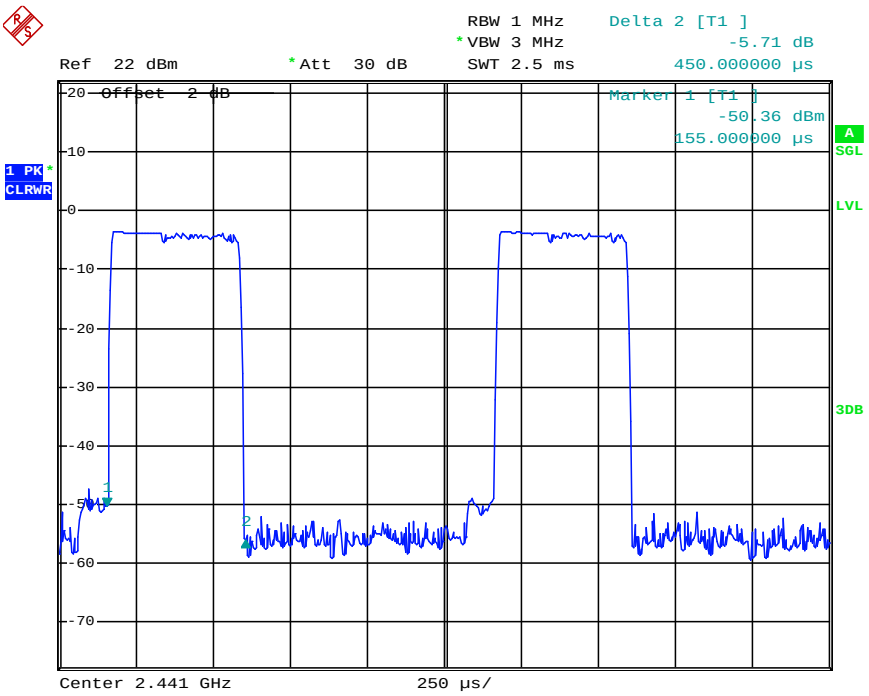
Photos of Dwel time Measurement(π/4DQPSK)

DH1-Low channel



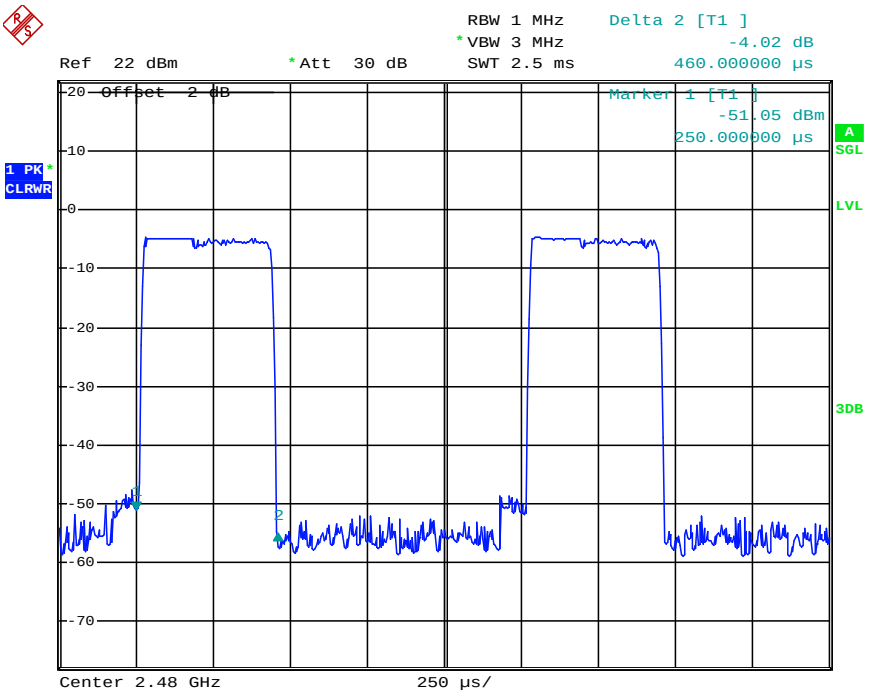
Date: 9.MAY.2013 16:55:07

DH1-Middle channel



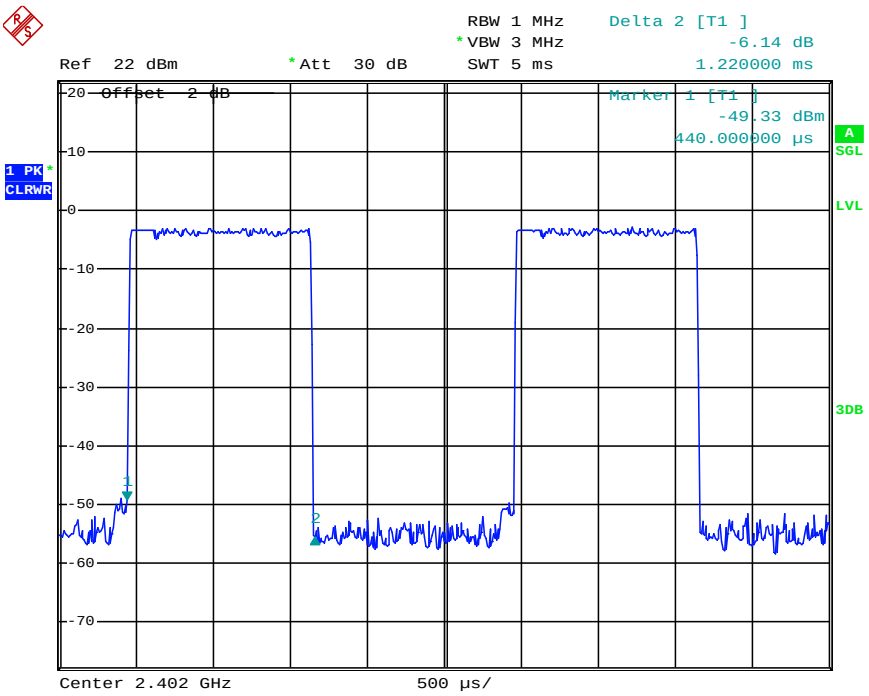
Date: 9.MAY.2013 16:56:04

DH1-High channel



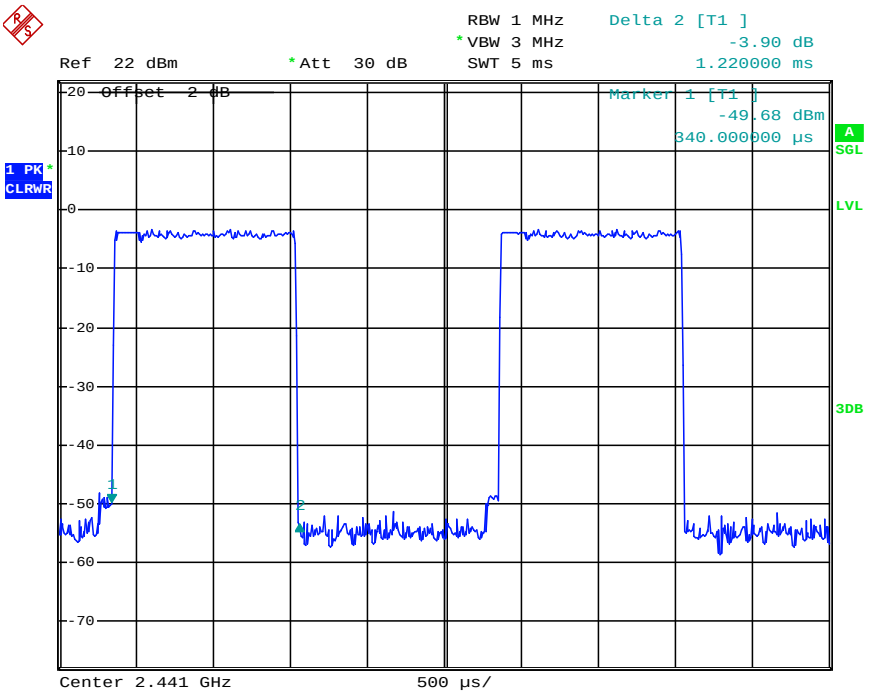
Date: 9.MAY.2013 16:56:55

DH3-Low channel



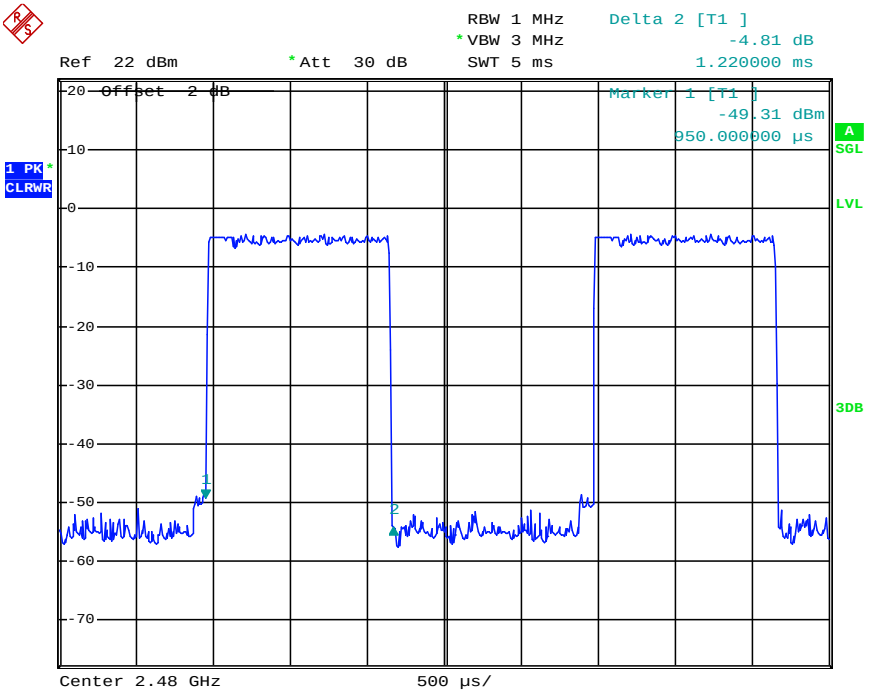
Date: 9.MAY.2013 16:59:22

DH3-Middle channel



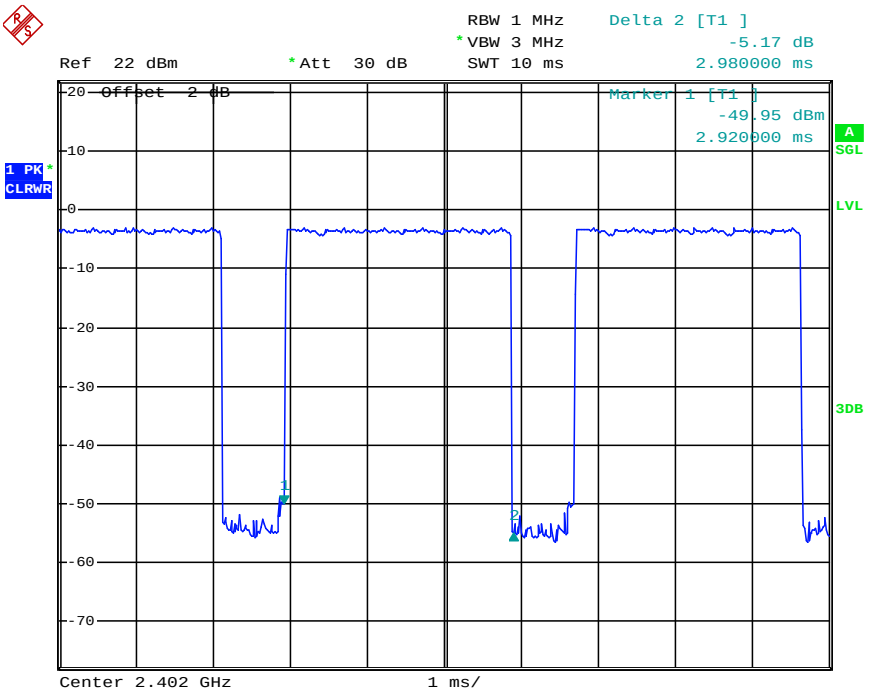
Date: 9.MAY.2013 16:58:43

DH3-High channel



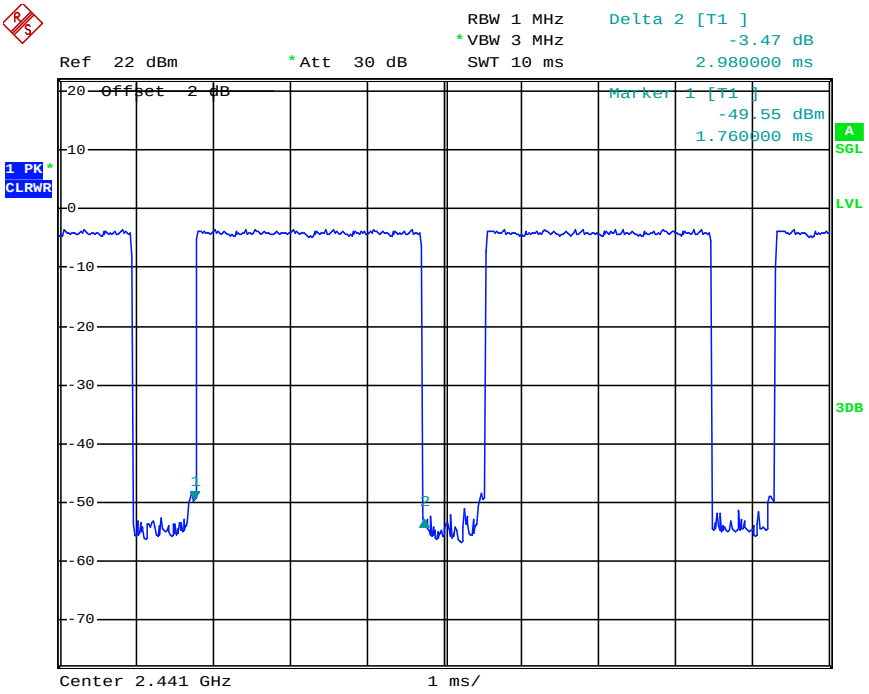
Date: 9.MAY.2013 16:58:04

DH5-Low channel



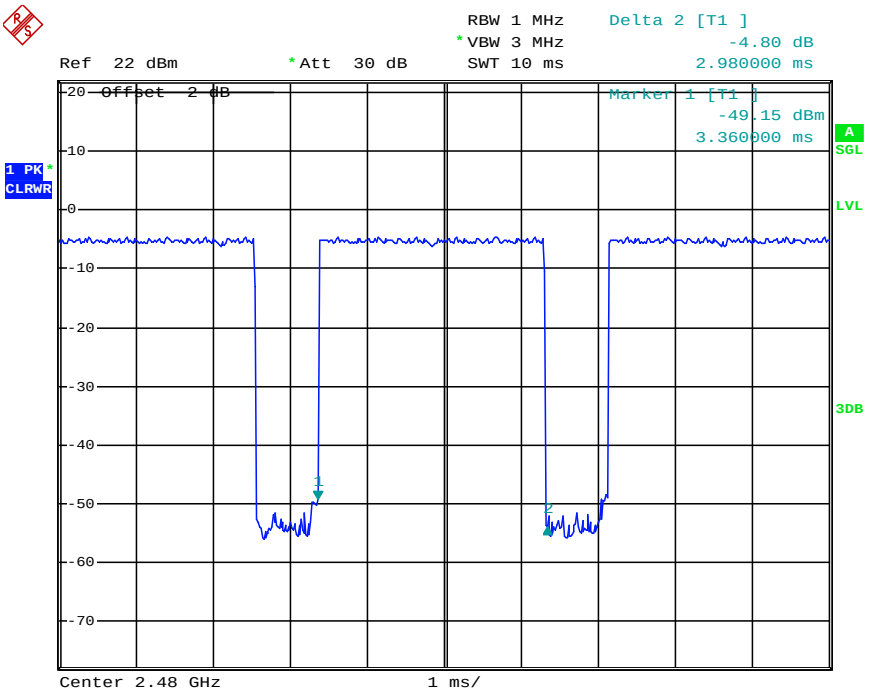
Date: 9.MAY.2013 17:00:55

DH5-Middle channel



Date: 9.MAY.2013 17:01:54

DH5-High channel



Date: 9.MAY.2013 17:03:23

4.9. Pseudorandom Frequency Hopping Sequence

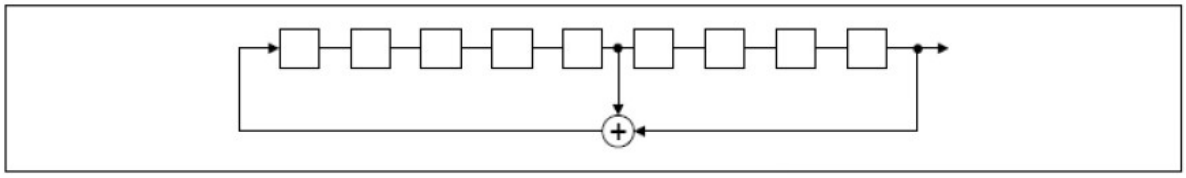
TEST APPLICABLE

For 47 CFR Part 15C section 15.247 (a)(1) requirement:
Frequency hopping systems shall have hopping channel carrier fre-quencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Al-ternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier fre-quencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to chan-nel frequencies that are selected at the system hopping rate from a pseudo ran-domly ordered list of hopping fre-quencies. Each frequency must be used equally on the average by each trans-mitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their cor-responding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence Requirement

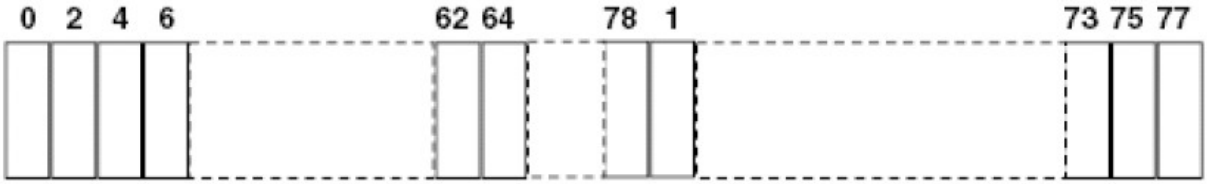
The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage.And the result is fed back to the input of the frist stage.The sequence begins with the frist one of 9 consecutive ones,for example:the shift register is initialized with nine ones.

- Number of shift register stages:9
- Length of pseudo-random sequence:29-1=511 bits
- Longest sequence of zeros:8(non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An explame of pseudorandom frequency hopping sequence as follows:



Each frequency used equally one the average by each transmitter.
The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

4.10. 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.

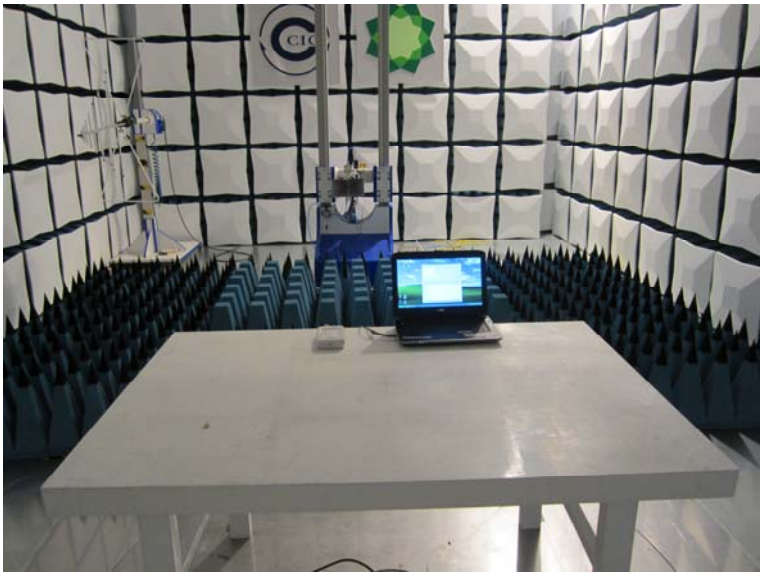
Refer to statement below for compliance.

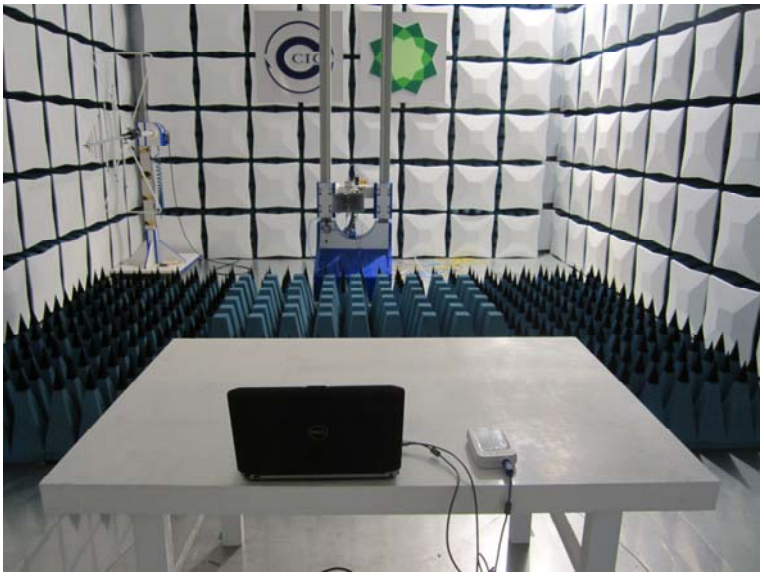
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

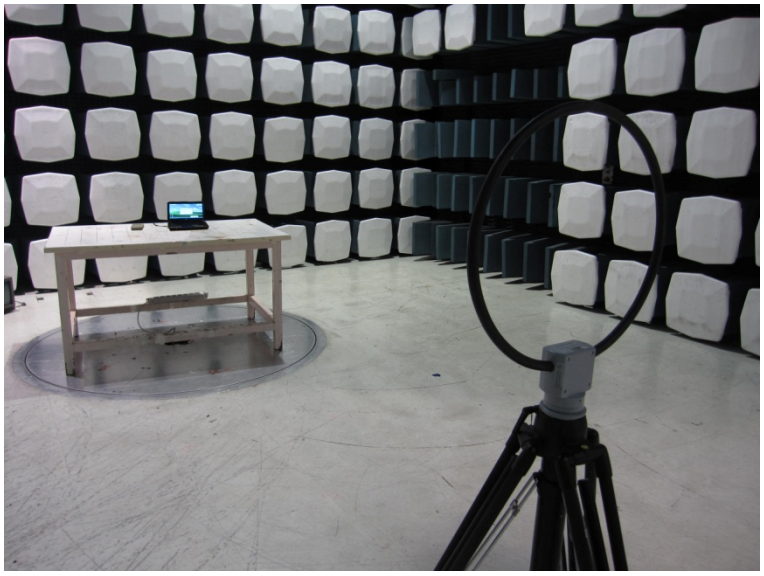
Antenna Connected Construction

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

5. Test Setup Photos of the EUT

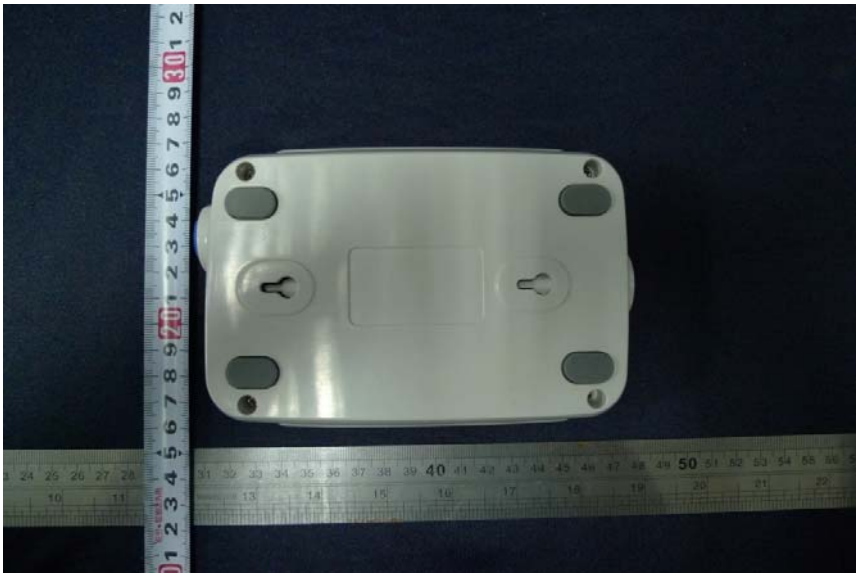






6. External and Internal Photos of the EUT

External photos of the EUT

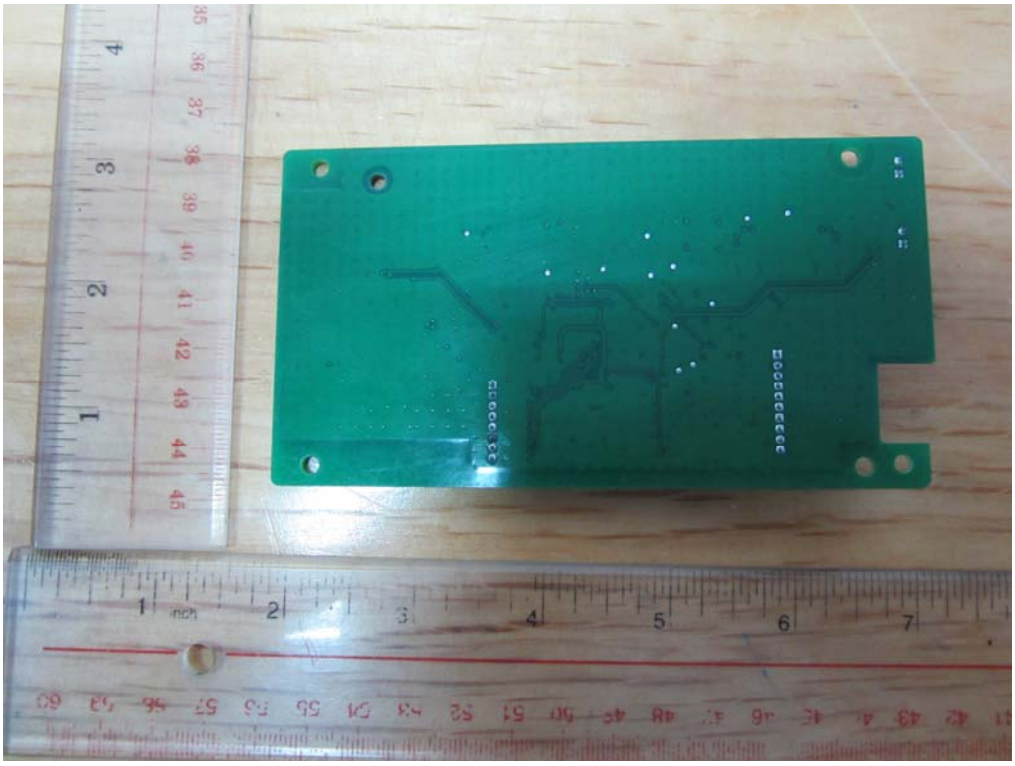


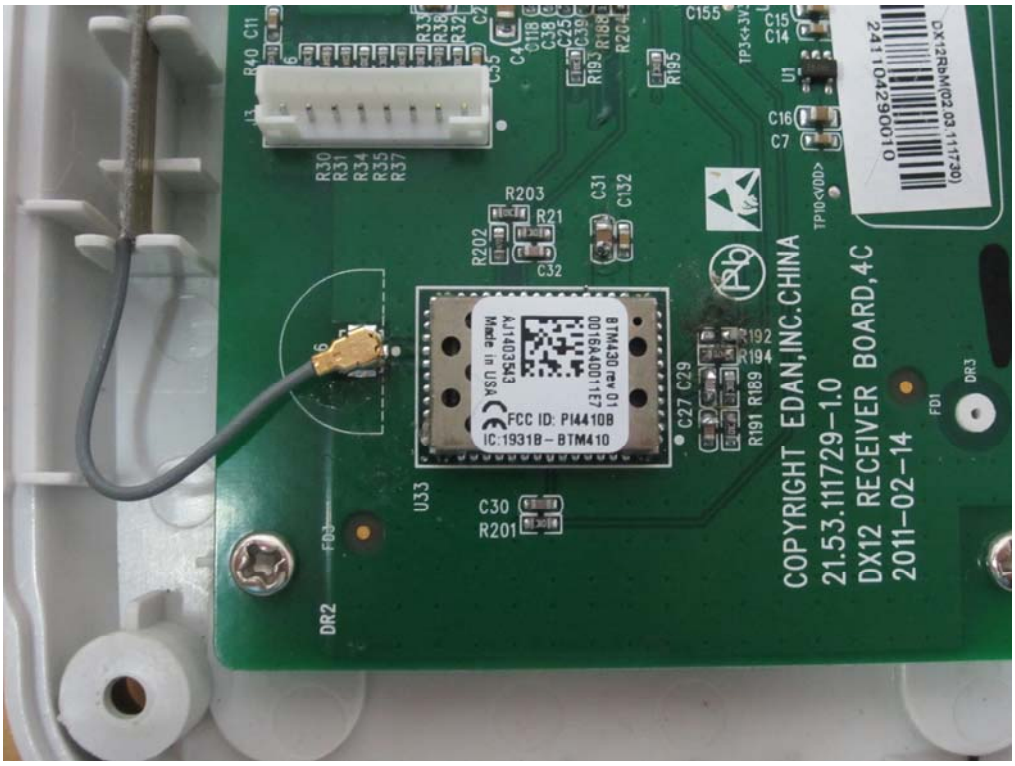

EDAN


EDAN
USB


EDAN

Internal photos of the EUT





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