ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C
REQUIREMENT T

OF

AUDIO

MODEL No.: BTSPK-S10

Trademark: N/A

FCC ID: 2AAHC-BTSPKS10

REPORT NO: ES150331325E

ISSUE DATE: May 18, 2015

Prepared for

Ningbo Prosound Electronics Co., Ltd.

1288 Zhongshan East Road, Fenghua City, 315500, Zhejiang Province, China

Prepared by

SHENZHEN EMTEK CO., LTD

Bldg 69, Majialong Industry Zone, Nanshan District,
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VERIFICATION OF COMPLIANCE

Applicant	:	Ningbo Prosound Electronics Co., Ltd. 1288 Zhongshan East Road, Fenghua City, 315500, Zhejiang Province, China
Manufacturer	:	Ningbo Prosound Electronics Co., Ltd. 1288 Zhongshan East Road, Fenghua City, 315500, Zhejiang Province, China
Product Description	:	AUDIO
Brand Name	:	N/A
Model Number	:	BTSPK-S10
File Number	:	ES150331325E
Date of Test:	:	Apr 02, 2015 to May 10, 2015

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : Apr 02, 2015 to May 10, 2015

Prepared by : Jack Li/Editor

Reviewer : Joe Xia/Supervisor

Approve & Authorized Signer : Lisa Wang/Manager

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1. General Information

1.1 Product Description

Ningbo Prosound Electronics CO., Ltd
Model: BTSPK-S10 (referred to as the EUT in this report) The EUT (AUDIO) is an short range, lower power Device. It is designed by way of utilizing the GFSK, π/4-DQPSK and 8DPSK modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

A). Operation Frequency: 2402-2480MHz
B). Modulation: GFSK, π/4-DQPSK, 8DPSK
C). Number of Channel: 79
D). Channel Space: 1MHz
E). BIT Rate of Transmission: 1Mbps, 2Mbps, 3Mbps
F). Antenna Type: PCB antenna
G). Antenna Gain: 0dBi
H). Power Supply: DC 5V/1A ,Batery: DC 3.7V

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for 2AAHC-BTSPKS10 filing to comply with Section 15.247 of the FCC Part 15 Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10 -2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2013.10.29
The certificate is valid until 2016.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01:2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2010.5.25
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, April 17, 2014
The Certificate Registration Number is 406365.

Accredited by Industry Canada, March 5, 2010
The Certificate Registration Number is 4480A-2.

Name of Firm : SHENZHEN EMTEK CO., LTD

Site Location : Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this AUDIO (EUT) was rotated through three orthogonal axes according to the requirements in section 6.4, section 6.5 and section 6.6 of ANSI C63.10-2013

2.4 Limitation

(1) Channel Separation Test

FCC Part 15, Subpart C Section 15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB Bandwidth of the hopping channel, whichever is greater.

Frequency Range (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

(2) 20dB Bandwidth

Frequency Range(MHz)	Limit(kHz)			
Quantity of Hopping Channel	50	25	15	75
902-928	<250	>250	NA	NA
2400-2483.5	NA	NA	>1000	<1000

(3) Quantity of Hopping Channel

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	Limit(Quantity of Hopping Channel)			
	20dB bandwidth <250kHz	20dB bandwidth >250kHz	20dB bandwidth <1MHz	20dB bandwidth >1MHz
902-928	50	25	NA	NA
2400-2483.5	NA	NA	75	15
5725-5850	NA	NA	75	NA

(4) Time of Occupancy(Dwell Time)

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	LIMIT(rms)		
	20dB bandwidth <250kHz(50Channel)	20dB bandwidth >250kHz(25 Channel)	20dB bandwidth <1MHz(75Channel)
902-928	400(20S)	400(10S)	NA
2400-2483.5	NA	NA	400(30S)
5725-5850	NA	NA	400(30S)

Note: The "()"is all channel's average time of occupancy.

(5) Maximum Peak Output Power

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	Quantity of Hopping Channel	LIMIT(W) 50	25	15	75
902-928		1(30dBm)	0.125(21dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30dBm)
5725-5850		NA	NA	NA	1(30dBm)

(6) Band edge

FCC Part15, Subpart C Section 15.247, In any 100kHz bandwidth outside the frequency band in with the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Operating Frequency Range(MHz)	Spurious emission frequency	Limit Peak power ration to emission(dBc)	Emission level(dBuV/m)
902-928	<902	>20	NA
	>928	>20	NA
	960-1240	NA	54
2400-2483.5	<2400	>20	NA
	>2483.5-2500	NA	54
5725-5850	<5350-5460	NA	54
	<5725	>20	NA
	>5850	>20	NA

(7) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

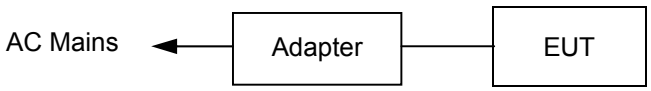
(8) Radiated Emission

FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

Frequency (MHz)	Field strength μV/m	Distance(m)	Field strength at 3m dBμV/m
0.009~0.490	2400/F(KHz)	300	/
0.490~1.705	2400/F(KHz)	30	/
1.705~30.0	30	30	/
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

2.5 Configuration of Tested System



2.6 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	AUDIO	N/A	BTSPK-S10	2AAHC-BTSPKS10	N/A	EUT
2.	ADAPTER	Century	YD-908	N/A	N/A	/

Note:
(1) Unless otherwise denoted as EUT in『Remark』column, device(s) used in tested system is a support equipment.

2.7 Description of Test Modes

The EUT (AUDIO) has been tested under normal operating condition. This EUT is a FHSS system.
Pre-scanned tests, were conducted to determine the final configuration from all possible combinations. We use software control the EUT, Let EUT hopping on and transmit with highest power, all the modes have been tested. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test

Channel	Frequency(MHz)
Low channel	2402
Middle channel	2441
High channel	2480

3. Summary of Test Results

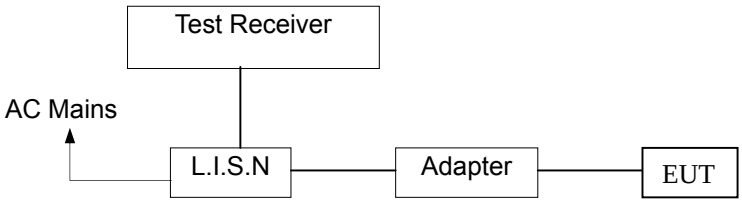
FCC Rules	Description Of Test	Result
FCC Part 15.247(a)(1)	Channel Separation Test	Compliant
FCC Part 15.247(a)(1)	20dB Bandwidth	Compliant
FCC Part 15.247(a)(1)	Quantity of Hopping Channel	Compliant
FCC Part 15.247(a)(1)	Time of Occupancy (Dwell Time)	Compliant
FCC Part 15.247(b)	Max Peak Output Power Test	Compliant
FCC Part 15.247(d)	Band Edge Test	Compliant
FCC Part 15.207	Conducted Emission	Compliant
FCC Part 15.247(d)&15.209	Radiated Emission	Compliant
FCC Part 15.247(d)	Antenna Port Emission	Compliant
FCC Part 15.203&15.247(b)	Antenna Requirement	Compliant

4. Conducted Emissions Test

4.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the three highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

4.2 Test SET-UP (Block Diagram of Configuration)



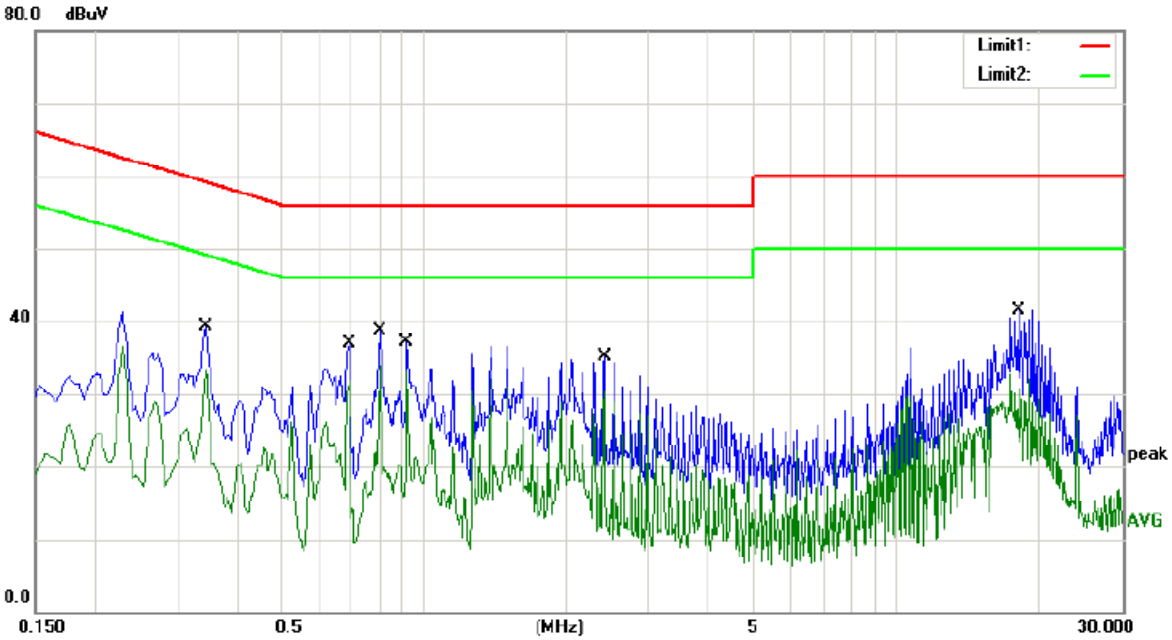
4.3 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/17/2014	05/16/2015
L.I.S.N.	Rohde & Schwarz	ENV216	101161	05/17/2014	05/16/2015
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/17/2014	05/16/2015
50Ω Coaxial Switch	Anritsu	MP59B	M20531	N/A	N/A
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	05/17/2014	05/16/2015

4.4 Measurement Equipment Used

Please refer to the following data.

Test Date :	04/18/2015	Temperature :	22 ℃
Test Result:	PASS	Humidity :	50 %
Test By:	CX		



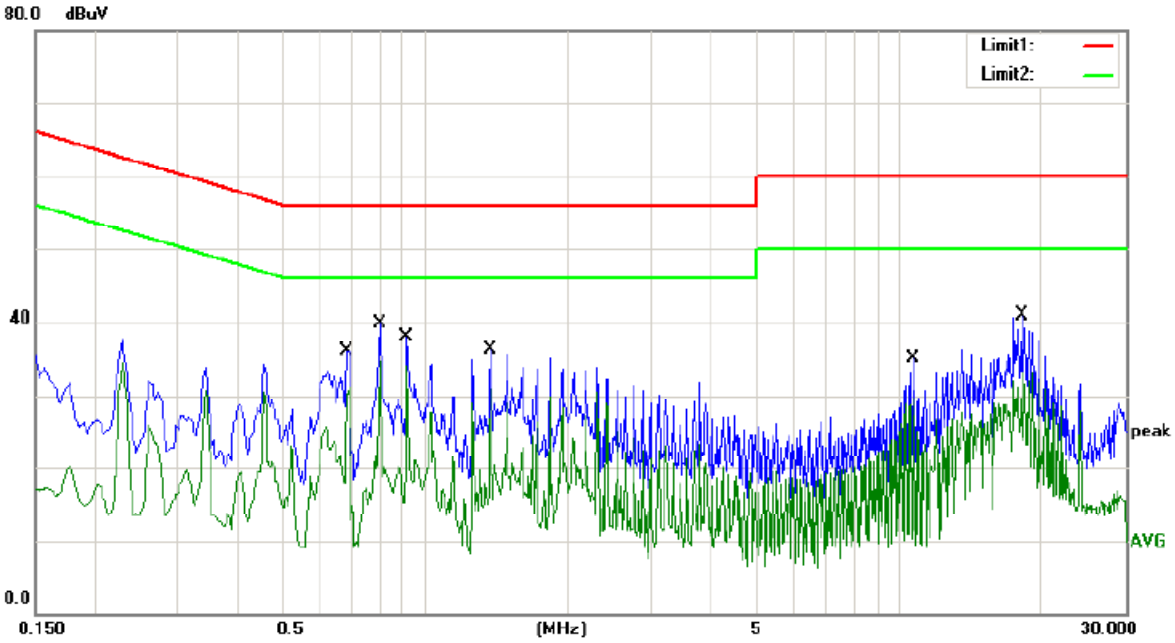
Site site #1 Phase: N Temperature: 20

Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 55 %

Mode: Charging + Tx(GFSK,low channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3460	28.30	11.00	39.30	59.06	-19.76	QP	
2		0.3460	22.30	11.00	33.30	49.06	-15.76	AVG	
3		0.6900	25.90	11.00	36.90	56.00	19.10	QP	
4		0.6900	13.50	11.00	24.50	46.00	-21.50	AVG	
5		0.8060	27.70	11.00	38.70	56.00	-17.30	QP	
6		0.8060	21.80	11.00	32.80	46.00	-13.20	AVG	
7		0.9180	26.10	11.00	37.10	56.00	-18.90	QP	
8	*	0.9180	22.10	11.00	33.10	46.00	-12.90	AVG	
9		2.4100	24.00	11.00	35.00	56.00	-21.00	QP	
10		2.4100	5.60	11.00	16.60	46.00	-29.40	AVG	
11		18.0840	30.50	11.00	41.50	60.00	-18.50	QP	
12		18.0840	12.50	11.00	23.50	50.00	-26.50	AVG	



Site site #1 Phase: *L1* Temperature: 20

Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 55 %

Mode: Charging+Tx(GFSK,low channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.6860	25.00	11.00	36.00	56.00	-20.00	QP	
2		0.6860	19.30	11.00	30.30	46.00	-15.70	AVG	
3		0.8020	28.80	11.00	39.80	56.00	-16.20	QP	
4		0.8020	21.40	11.00	32.40	46.00	-13.60	AVG	
5		0.9180	27.00	11.00	38.00	56.00	-18.00	QP	
6	*	0.9180	23.10	11.00	34.10	46.00	-11.90	AVG	
7		1.3740	25.30	11.00	36.30	56.00	-19.70	QP	
8		1.3740	19.90	11.00	30.90	46.00	-15.10	AVG	
9		10.6600	24.00	11.00	35.00	60.00	-25.00	QP	
10		10.6800	0.40	11.00	11.40	50.00	-38.60	AVG	
11		18.0840	29.80	11.00	40.80	60.00	-19.20	QP	
12		18.0840	13.70	11.00	24.70	50.00	-25.30	AVG	

5. Radiated Emission Test

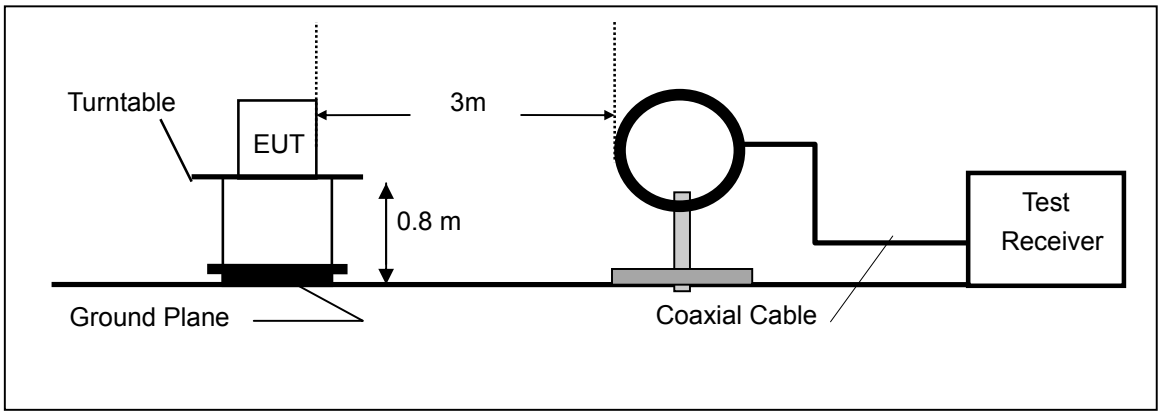
5.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
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 measured was complete.

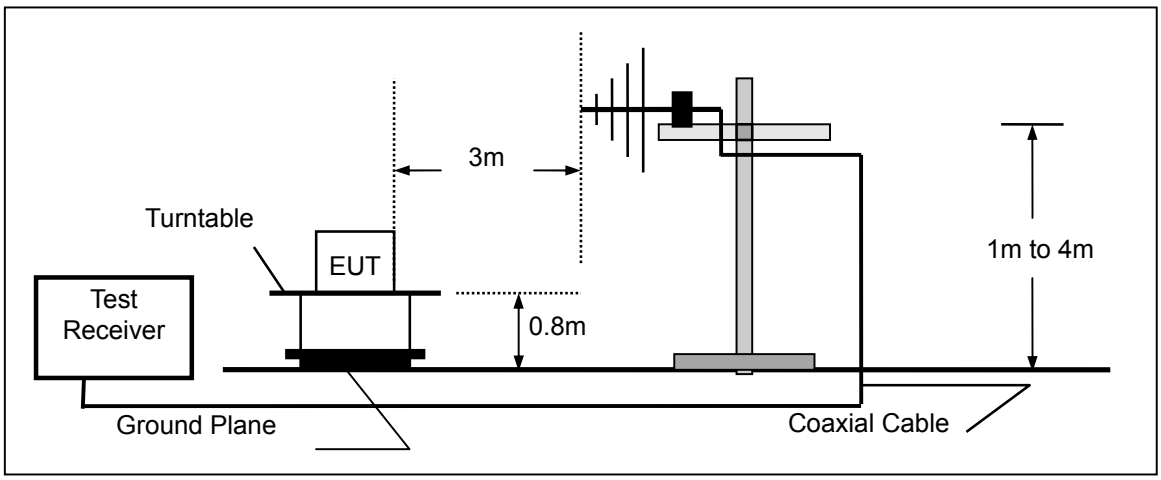
The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector (RBW=100kHz, VBW=300kHz) and all final readings of measurement from Test Receiver are Quasi-Peak values(Quasi Peak detector used with a bandwidth of 120 kHz).
The frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

5.2 Test SET-UP (Block Diagram of Configuration)

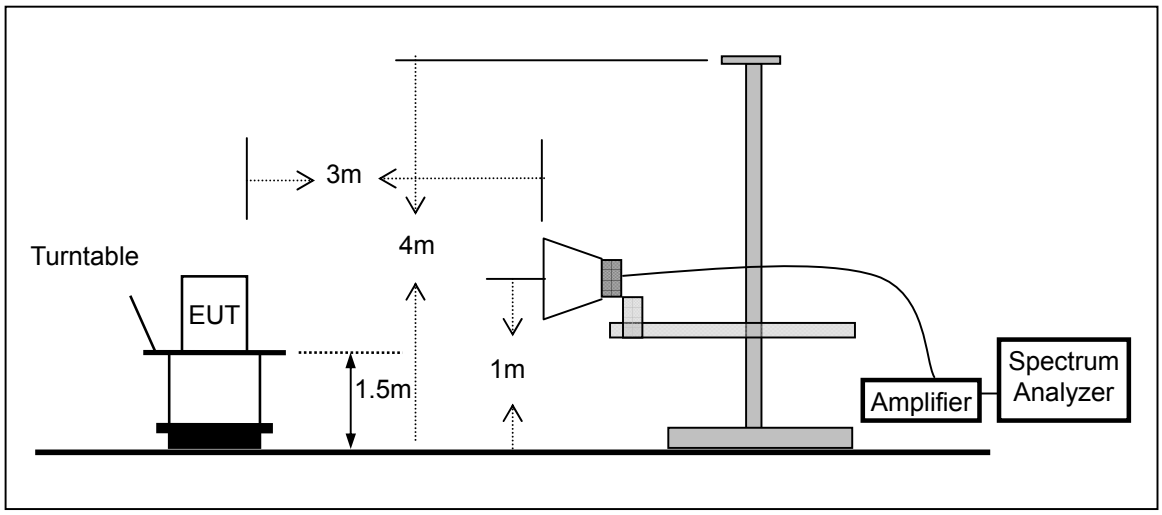
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



5.3 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/17/2014	1 Year
2.	Pre-Amplifier	HP	8447D	2944A07999	05/17/2014	1 Year
3.	Pre-Amplifier	A.H.	PAM-0126	1415261	05/17/2014	1 Year
4.	Bilog Antenna	Schwarzbeck	VULB9163	142	05/17/2014	1 Year
5.	Loop Antenna	Schwarzbeck	FMZB 1519	1519-012	05/17/2014	1 Year
6.	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/17/2014	1 Year
7.	Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/17/2014	1 Year
8.	Cable	Schwarzbeck	AK9513	ACRX1	05/17/2014	1 Year
9.	Cable	Rosenberger	N/A	FP2RX2	05/17/2014	1 Year
10.	Cable	Schwarzbeck	AK9513	CRPX1	05/17/2014	1 Year
11.	Cable	Schwarzbeck	AK9513	CRRX2	05/17/2014	1 Year

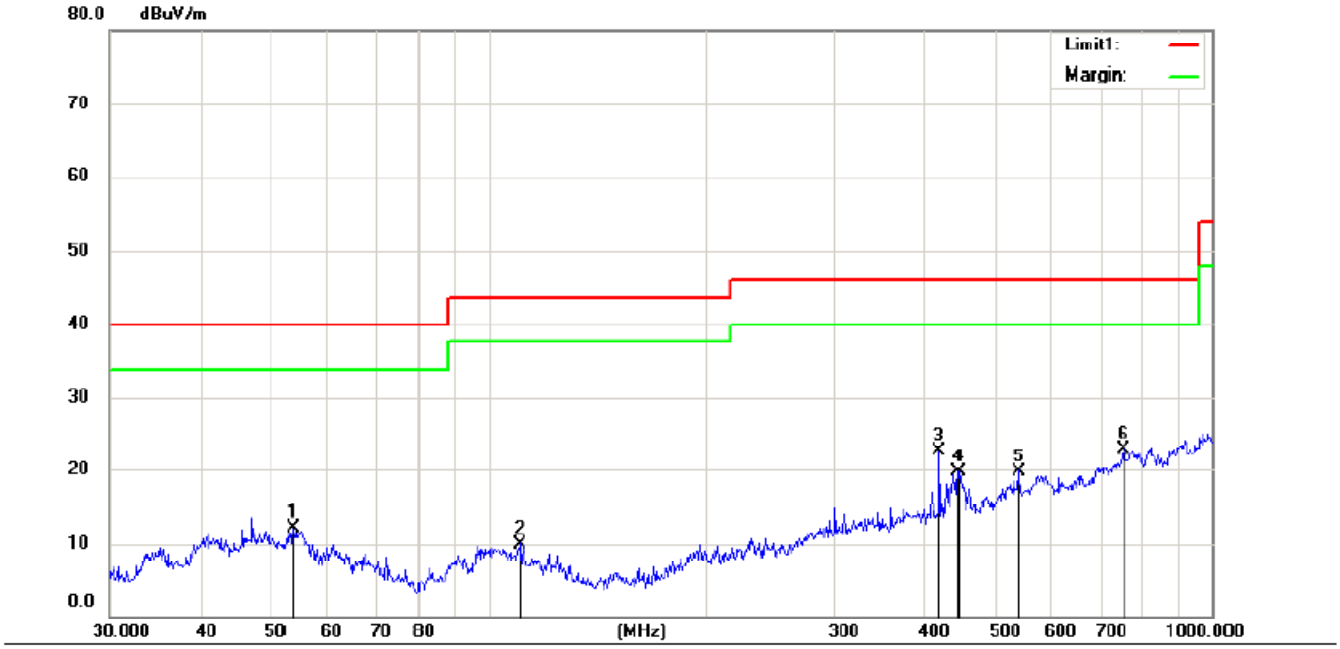
5.4 Measurement Result

(For range 9KHz~30MHz, The measured value is really too low to be recorded.)

Below 1000MHz (30M-1GHz)

BT mode:

(Bluetooth (GFSK, pi/4-DQPSK, 8DPSK) mode have been tested, and the worst result was report as below.)



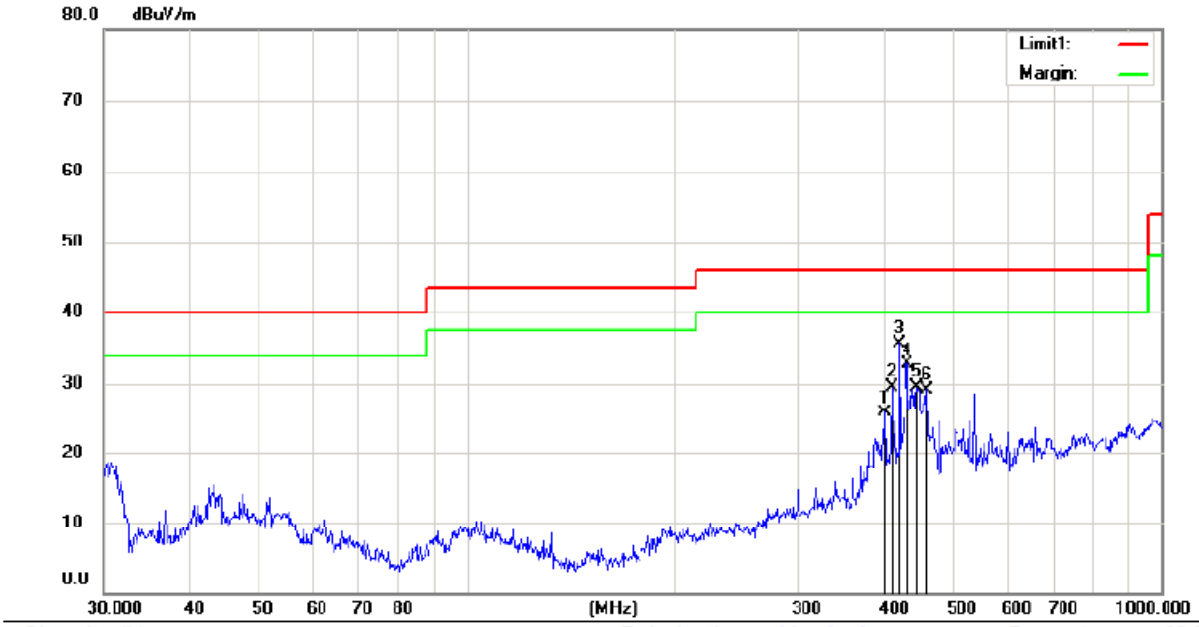
Site site #1 Polarization: *Horizontal* Temperature: 20 C

Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 52 %

Mode:Charging+Tx(GFSK,Low,Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		53.6932	31.65	-19.55	12.10	40.00	-27.90	QP			
2		110.5687	31.94	-21.94	10.00	43.50	-33.50	QP			
3		420.5803	39.35	-16.65	22.70	46.00	-23.30	QP			
4		446.4141	36.61	-16.91	19.70	46.00	-26.30	QP			
5		539.4775	32.69	-12.89	19.80	46.00	-26.20	QP			
6	*	752.7432	31.59	-8.59	23.00	46.00	-23.00	QP			

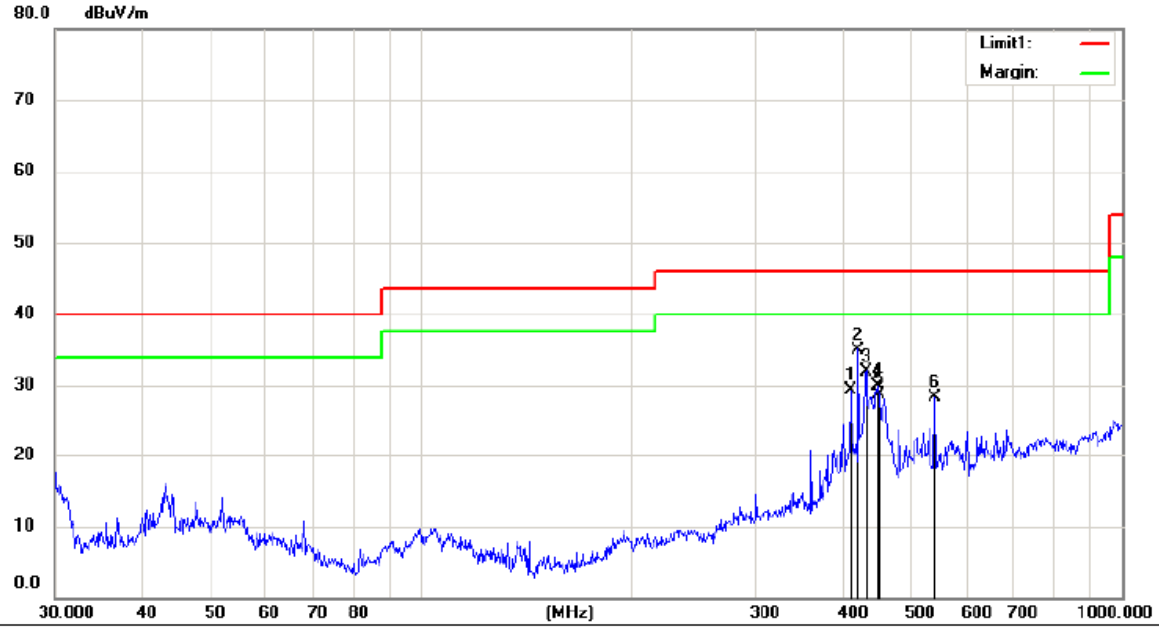


Site site #1
Limit: FCC Part15 Class B 3M Radiation
Mode:Charging+Tx(GFSK,Low,Channel)
Note:

Polarization: *Vertical*
Power: AC 120V/60Hz

Temperature: 20 C
Humidity: 52 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		400.4320	43.41	-17.51	25.90	46.00	-20.10	QP			
2		410.3825	46.18	-16.68	29.50	46.00	-16.50	QP			
3	*	420.5803	52.45	-16.65	35.80	46.00	-10.20	QP			
4		431.0316	49.55	-16.85	32.70	46.00	-13.30	QP			
5		446.4141	46.41	-16.91	29.50	46.00	-16.50	QP			
6		460.7271	45.16	-15.96	29.20	46.00	-16.80	QP			



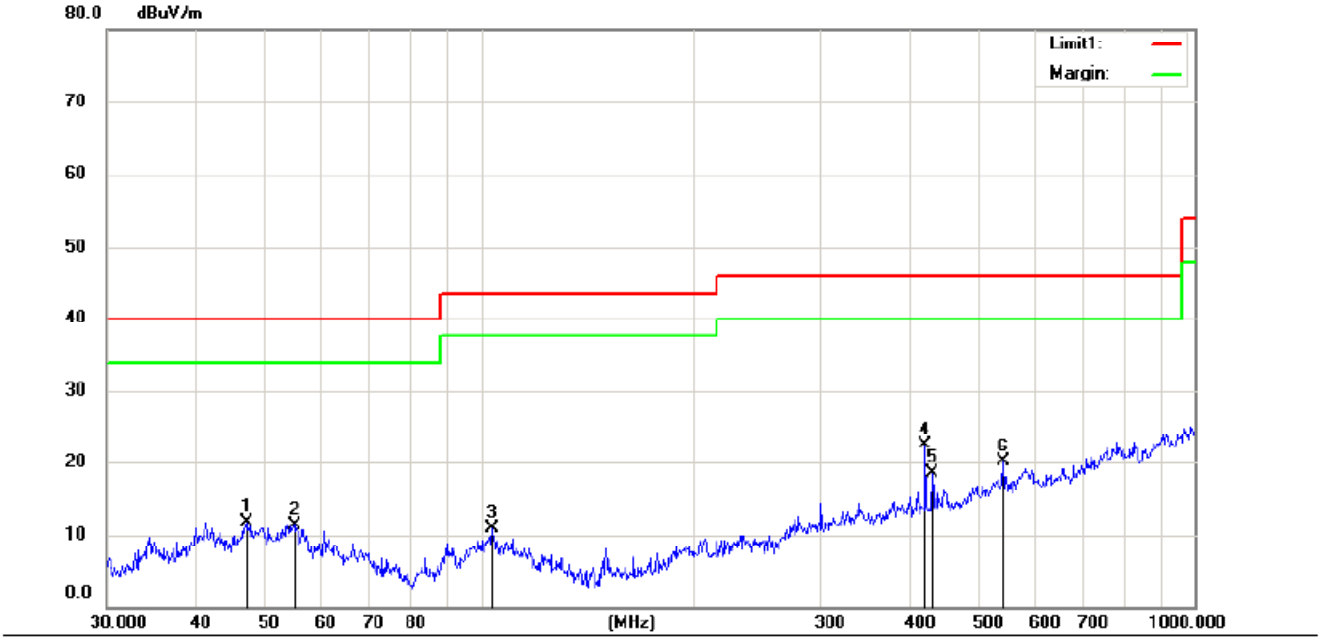
Site site #1 Polarization: *Vertical* Temperature: 20 C

Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 52 %

Mode:Charging+Tx(GFSK,Middle,Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		410.3825	46.08	-16.68	29.40	46.00	-16.60	QP			
2	*	420.5803	51.65	-16.65	35.00	46.00	-11.00	QP			
3		431.0316	48.85	-16.85	32.00	46.00	-14.00	QP			
4		447.9822	46.89	-16.99	29.90	46.00	-16.10	QP			
5		451.1350	45.65	-16.95	28.70	46.00	-17.30	QP			
6		541.3725	41.26	-12.96	28.30	46.00	-17.70	QP			



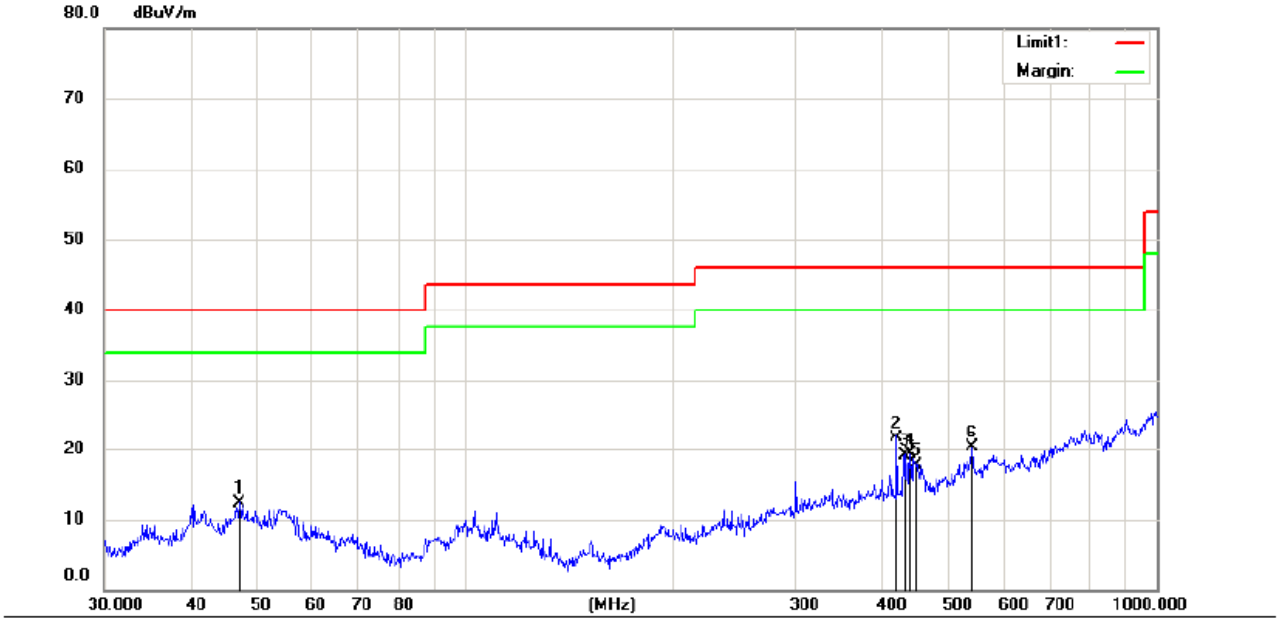
Site site #1 Polarization: *Horizontal* Temperature: 20 C

Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 52 %

Mode:Charging+Tx(GFSK,Middle,Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		46.9940	31.36	-19.66	11.70	40.00	-28.30	QP			
2		54.8348	31.16	-19.76	11.40	40.00	-28.60	QP			
3		103.8055	32.07	-21.17	10.90	43.50	-32.60	QP			
4	*	420.5803	39.15	-16.65	22.50	46.00	-23.50	QP			
5		429.5228	35.37	-16.87	18.50	46.00	-27.50	QP			
6		541.3725	33.06	-12.96	20.10	46.00	-25.90	QP			



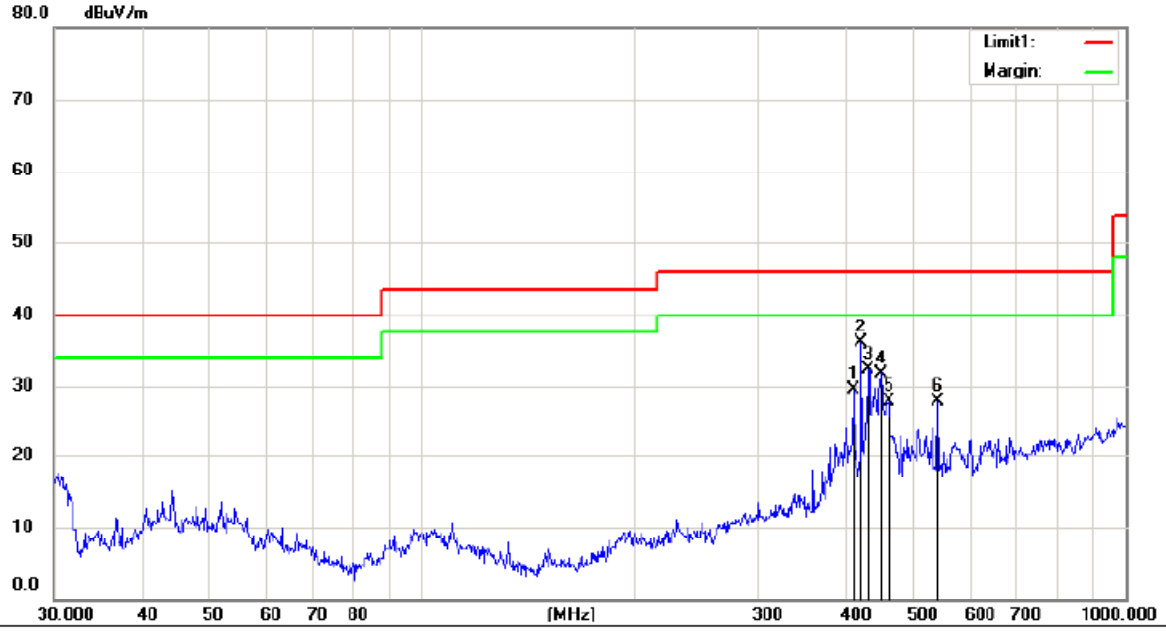
Site site #1 Polarization: *Horizontal* Temperature: 20 C

Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 52 %

Mode:Charging+Tx(GFSK,High,Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		47.1600	32.10	-19.70	12.40	40.00	-27.60	QP			
2	*	420.5803	38.45	-16.65	21.80	46.00	-24.20	QP			
3		431.0316	36.05	-16.85	19.20	46.00	-26.80	QP			
4		440.1963	35.94	-16.64	19.30	46.00	-26.70	QP			
5		447.9822	34.69	-16.99	17.70	46.00	-28.30	QP			
6		541.3725	33.26	-12.96	20.30	46.00	-25.70	QP			



Site site #1 Polarization: *Vertical* Temperature: 20 C

Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 52 %

Modc:Charging+Tx(GFSK,High,Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		410.3825	46.18	-16.68	29.50	46.00	-16.50	QP			
2	*	420.5803	52.75	-16.65	36.10	46.00	-9.90	QP			
3		429.5220	49.17	-16.07	32.30	46.00	-13.70	QP			
4		447.9822	48.79	-16.99	31.80	46.00	-14.20	QP			
5		460.7271	43.86	-15.96	27.90	46.00	-18.10	QP			
6		541.3725	40.86	-12.96	27.90	46.00	-18.10	QP			

Above 1000MHz:

Test Date :	04/20/2015	Temperature :	24 ℃
Test Result:	PASS	Humidity :	53 %
Test By:	KK		

GFSK Mode: Low channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
4841.346	V	50.27	40.40	74.00	54.00	-23.73	-13.60
7184.295	V	55.07	43.60	74.00	54.00	-18.93	-10.40
7729.167	V	55.22	43.50	74.00	54.00	-18.78	-10.50
9854.167	V	60.32	46.90	74.00	54.00	-13.68	-7.10
10862.179	V	61.75	50.70	74.00	54.00	-12.25	-3.30
14376.603	V	66.78	50.50	74.00	54.00	-7.22	-3.50
4623.397	H	49.87	39.80	74.00	54.00	-24.13	-14.20
8028.846	H	57.38	45.60	74.00	54.00	-16.62	-8.40
10426.282	H	61.74	50.40	74.00	54.00	-12.26	-3.60
13940.705	H	63.50	43.80	74.00	54.00	-10.50	-10.20
14594.551	H	66.07	47.50	74.00	54.00	-7.93	-6.50
16419.872	H	65.07	44.80	74.00	54.00	-8.93	-9.20

GFSK Mode: Middle channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
7184.295	V	54.57	43.60	74.00	54.00	-19.43	-10.32
7729.167	V	54.72	44.20	74.00	54.00	-19.28	-9.74
10780.449	V	61.63	48.80	74.00	54.00	-12.37	-2.98
14158.654	V	64.25	48.20	74.00	54.00	-9.75	-2.76
14376.603	V	66.28	50.50	74.00	54.00	-7.72	-3.43
15820.513	V	64.72	48.00	74.00	54.00	-9.28	-5.99
4623.397	H	48.87	40.70	74.00	54.00	-25.13	-13.30
7238.782	H	55.17	45.50	74.00	54.00	-18.83	-8.50
9363.782	H	58.42	47.00	74.00	54.00	-15.58	-7.00
10426.282	H	61.24	50.30	74.00	54.00	-12.76	-3.70
14322.115	H	63.83	50.80	74.00	54.00	-10.17	-3.20
14594.551	H	65.07	50.20	74.00	54.00	-8.93	-3.80

GFSK Mode: High channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
3560.897	V	46.71	36.80	74.00	54.00	-27.29	-17.20
4841.346	V	49.77	37.50	74.00	54.00	-24.23	-16.50
7184.295	V	55.07	43.60	74.00	54.00	-18.93	-10.40
10862.179	V	61.25	49.60	74.00	54.00	-12.75	-4.40
14376.603	V	66.78	50.40	74.00	54.00	-7.22	-3.60
16556.090	V	64.88	48.30	74.00	54.00	-9.12	-5.70
5032.051	H	50.18	40.60	74.00	54.00	-23.82	-13.40
7238.782	H	55.67	44.50	74.00	54.00	-18.33	-9.50
8028.846	H	57.38	45.20	74.00	54.00	-16.62	-8.80
9363.782	H	58.92	47.90	74.00	54.00	-15.08	-6.10
10426.282	H	61.74	50.30	74.00	54.00	-12.26	-3.70
14594.551	H	66.07	50.20	74.00	54.00	-7.93	-3.80

Test Date : 04/20/2015 Temperature : 24 ℃
Test Result: PASS Humidity : 53 %
Test By: KK

π/4-DQPSK: Low channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
3560.897	V	46.21	35.80	74.00	54.00	-27.79	-18.20
4841.346	V	49.77	38.20	74.00	54.00	-24.23	-15.80
7729.167	V	55.22	43.30	74.00	54.00	-18.78	-10.70
9282.051	V	59.02	49.00	74.00	54.00	-14.98	-5.00
10862.179	V	61.25	49.70	74.00	54.00	-12.75	-4.30
14376.603	V	66.28	49.70	74.00	54.00	-7.72	-4.30
4623.397	H	49.37	38.40	74.00	54.00	-24.63	-15.60
7238.782	H	55.17	44.70	74.00	54.00	-18.83	-9.30
8028.846	H	56.88	45.30	74.00	54.00	-17.12	-8.70
10426.282	H	61.74	50.10	74.00	54.00	-12.26	-3.90
10753.205	H	60.83	48.60	74.00	54.00	-13.17	-5.40
14431.090	H	64.61	50.50	74.00	54.00	-9.39	-3.50

π/4-DQPSK: Middle channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
3560.897	V	45.21	36.80	74.00	54.00	-28.79	-17.20
4841.346	V	49.27	37.20	74.00	54.00	-24.73	-16.80
7184.295	V	54.07	41.00	74.00	54.00	-19.93	-13.00
9690.705	V	59.42	48.40	74.00	54.00	-14.58	-5.60
11080.128	V	60.34	49.70	74.00	54.00	-13.66	-4.30
14376.603	V	66.28	50.50	74.00	54.00	-7.72	-3.50
5032.051	H	49.18	40.60	74.00	54.00	-24.82	-13.40
8028.846	H	56.88	44.40	74.00	54.00	-17.12	-9.60
10426.282	H	61.24	50.60	74.00	54.00	-12.76	-3.40
11325.32	H	60.36	48.30	74.00	54.00	-13.64	-5.70
14594.551	H	65.07	49.10	74.00	54.00	-8.93	-4.90
15956.731	H	64.26	45.90	74.00	54.00	-9.74	-8.10

π/4-DQPSK: High channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
4841.346	V	49.27	37.20	74.00	54.00	-24.73	-16.80
7184.295	V	54.07	41.80	74.00	54.00	-19.93	-12.20
7729.167	V	54.72	44.10	74.00	54.00	-19.28	-9.90
9690.705	V	59.42	48.40	74.00	54.00	-14.58	-5.60
11080.128	V	60.34	49.70	74.00	54.00	-13.66	-4.30
14376.603	V	65.78	50.80	74.00	54.00	-8.22	-3.20
5032.051	H	49.18	40.60	74.00	54.00	-24.82	-13.40
7157.051	H	55.05	44.50	74.00	54.00	-18.95	-9.50
8600.961	H	55.78	46.50	74.00	54.00	-18.22	-7.50
10426.282	H	61.24	50.60	74.00	54.00	-12.76	-3.40
11325.32	H	60.36	48.30	74.00	54.00	-13.64	-5.70
14594.551	H	65.07	49.10	74.00	54.00	-8.93	-4.90

Test Date : 04/20/2015 Temperature : 24 ℃
Test Result: PASS Humidity : 53 %
Test By: ZHL

8DPSK: Low channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
4434.000	V	42.72	35.20	74.00	54.00	-31.28	-18.80
6729.000	V	45.10	36.50	74.00	54.00	-28.9	-17.50
8480.000	V	47.87	36.80	74.00	54.00	-26.13	-17.20
9602.000	V	48.03	37.60	74.00	54.00	-25.97	-16.40
12152.000	V	47.93	37.20	74.00	54.00	-26.07	-16.80
14549.000	V	50.14	38.50	74.00	54.00	-23.86	-15.50
4587.000	H	42.81	34.20	74.00	54.00	-31.19	-19.80
6321.000	H	45.17	36.20	74.00	54.00	-28.83	-17.80
8378.000	H	47.30	37.40	74.00	54.00	-26.7	-16.60
9636.000	H	47.81	37.50	74.00	54.00	-26.19	-16.50
11659.000	H	47.67	37.60	74.00	54.00	-26.33	-16.40
14447.000	H	50.61	38.50	74.00	54.00	-23.39	-15.50

8DPSK: Middle channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
1289.000	V	37.64	29.50	74.00	54.00	-36.36	-24.50
5046.000	V	43.95	36.90	74.00	54.00	-30.05	-17.10
8514.000	V	48.18	37.30	74.00	54.00	-25.82	-16.70
9670.000	V	47.91	36.90	74.00	54.00	-26.09	-17.10
14379.000	V	51.32	37.60	74.00	54.00	-22.68	-16.40
15807.000	V	51.10	38.50	74.00	54.00	-22.9	-15.50
5029.000	H	44.35	36.00	74.00	54.00	-29.65	-18.00
6542.000	H	46.08	37.20	74.00	54.00	-27.92	-16.80
8446.000	H	46.98	36.90	74.00	54.00	-27.02	-17.10
9585.000	H	48.00	37.60	74.00	54.00	-26	-16.40
11676.000	H	48.63	37.50	74.00	54.00	-25.37	-16.50
15229.000	H	50.66	38.50	74.00	54.00	-23.34	-15.50

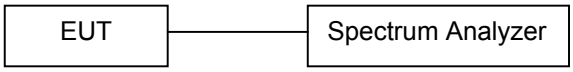
8DPSK: High channel							
Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	(H/V)	PK	AV	PK	AV	PK	AV
2428.000	V	38.32	30.20	74.00	54.00	-35.68	-23.80
4485.000	V	43.51	36.50	74.00	54.00	-30.49	-17.50
8463.000	V	47.09	37.20	74.00	54.00	-26.91	-16.80
9551.000	V	49.24	37.60	74.00	54.00	-24.76	-16.40
11523.000	V	47.76	38.00	74.00	54.00	-26.24	-16.00
13767.000	V	49.36	38.20	74.00	54.00	-24.64	-15.80
4434.000	H	44.26	35.20	74.00	54.00	-29.74	-18.80
6882.000	H	46.11	36.90	74.00	54.00	-27.89	-17.10
8259.000	H	46.98	36.80	74.00	54.00	-27.02	-17.20
9517.000	H	48.47	37.50	74.00	54.00	-25.53	-16.50
12169.000	H	47.63	37.60	74.00	54.00	-26.37	-16.40
14532.000	H	50.49	38.20	74.00	54.00	-23.51	-15.80

6. Channel Separation Test

6.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Print out the test result from the spectrum by hard copy function.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	10017	08/01/2014	08/01/2015

6.4 Measurement Results

The following table is the setting of spectrum analyzer.

Attenuation	Auto
RB	100KHz
VB	300KHz
Detector	Peak
Trace	Max hold

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	04/16/2015
Test By:	Kuki	Temperature :	21 ℃
Test Result:	PASS	Humidity :	55 %

GFSK Mode:

Test Channel	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 20dB Down BW(kHz)
Low Channel	2402	1000.00	828
Adjacency Chanel	2403		
Middle channel	2441	1000.00	824
Adjacency Chanel	2440		
High Channel	2480	1000.00	832
Adjacency Chanel	2479		

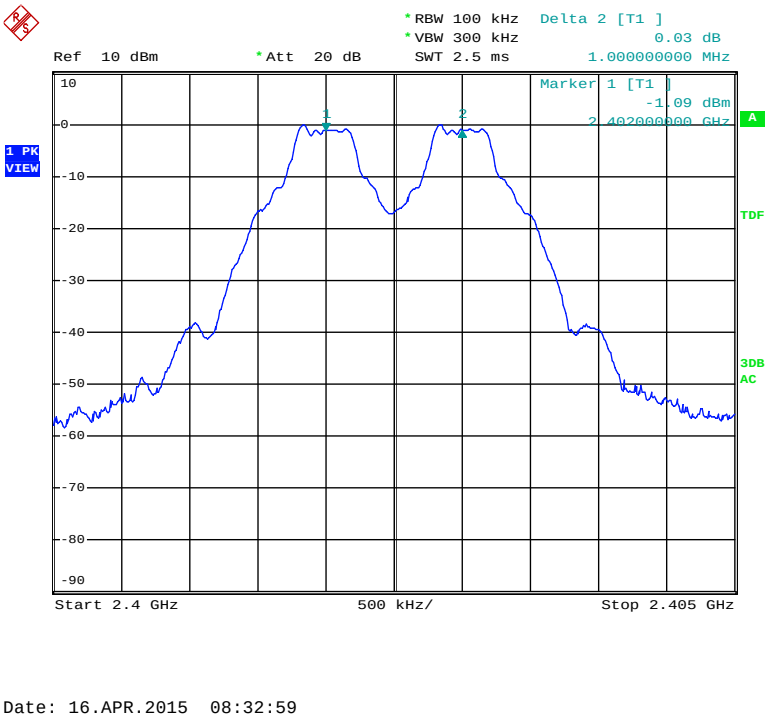
π/4-DQPSK Mode

Test Channel	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
Low Channel	2402	1000.00	744
Adjacency Chanel	2403		
Middle channel	2441	1000.00	744
Adjacency Chanel	2440		
High Channel	2480	1000.00	741
Adjacency Chanel	2479		

8DPSK Mode:

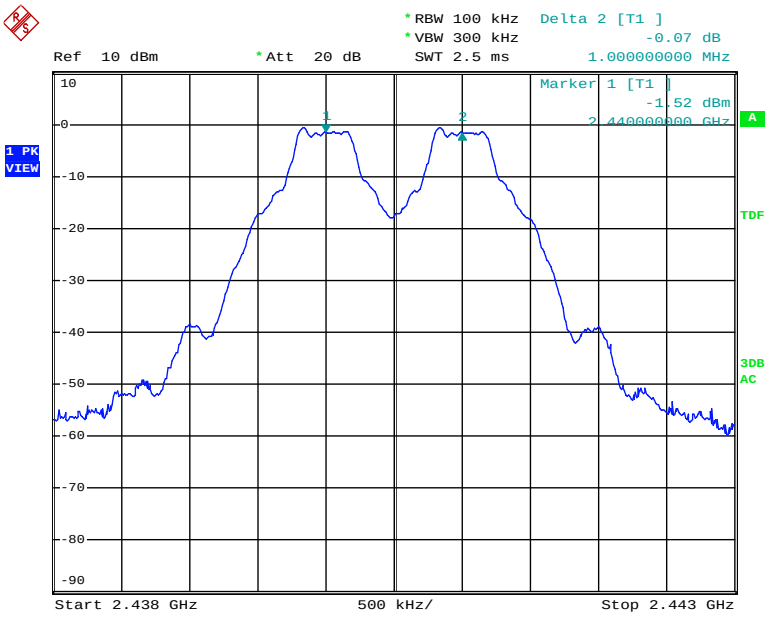
Test Channel	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
Low Channel	2402	1000.00	776
Adjacency Chanel	2403		
Middle channel	2441	1000.00	768
Adjacency Chanel	2440		
High Channel	2480	1000.00	773
Adjacency Chanel	2479		

GFSK Mode: Low channel



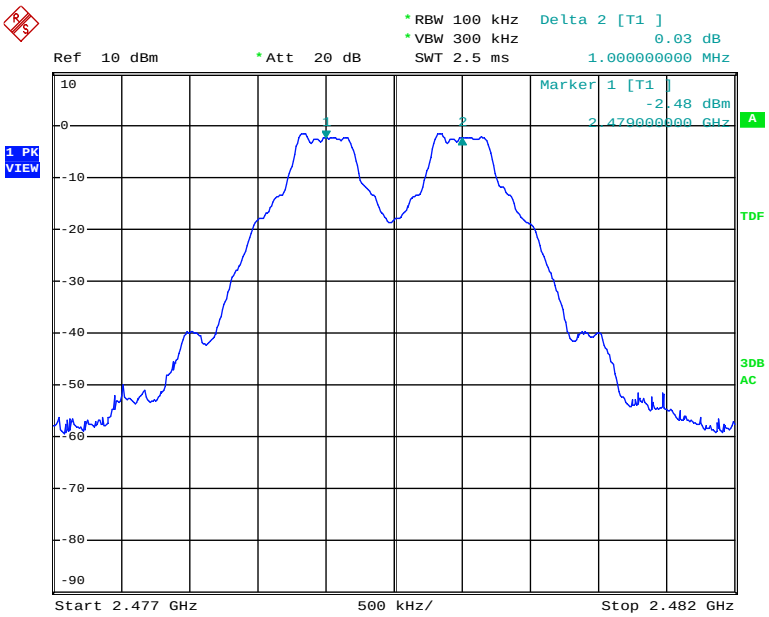
Date: 16.APR.2015 08:32:59

GFSK Mode: Middle channel



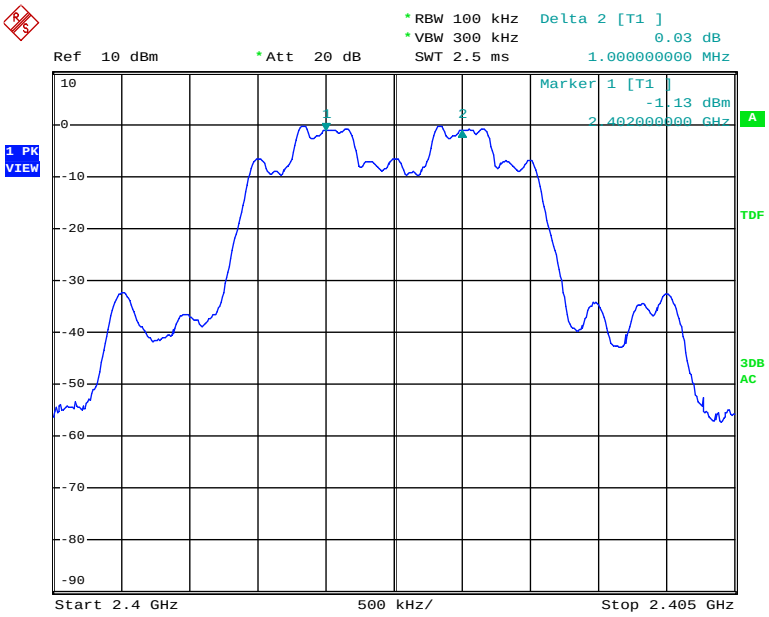
Date: 16.APR.2015 08:36:19

GFSK Mode: High channel



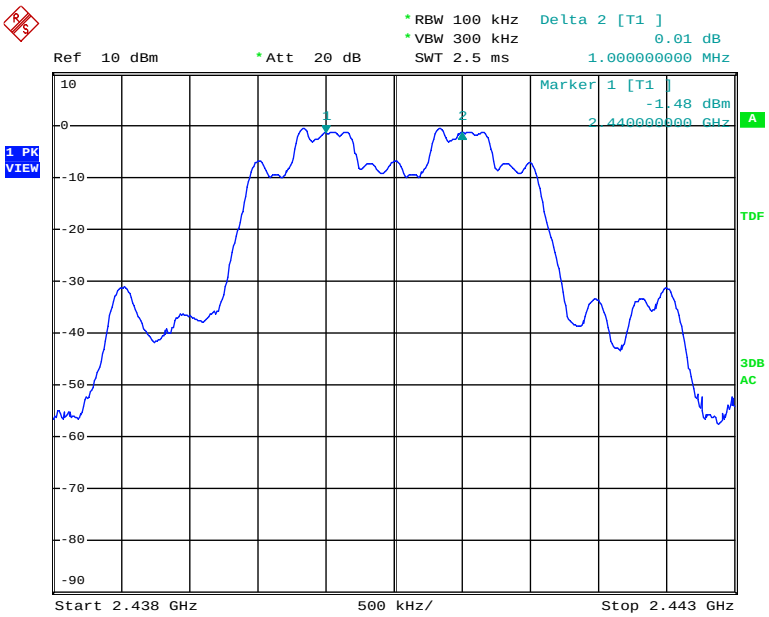
Date: 16.APR.2015 08:38:07

π/4-DQPSK Mode: Low channel



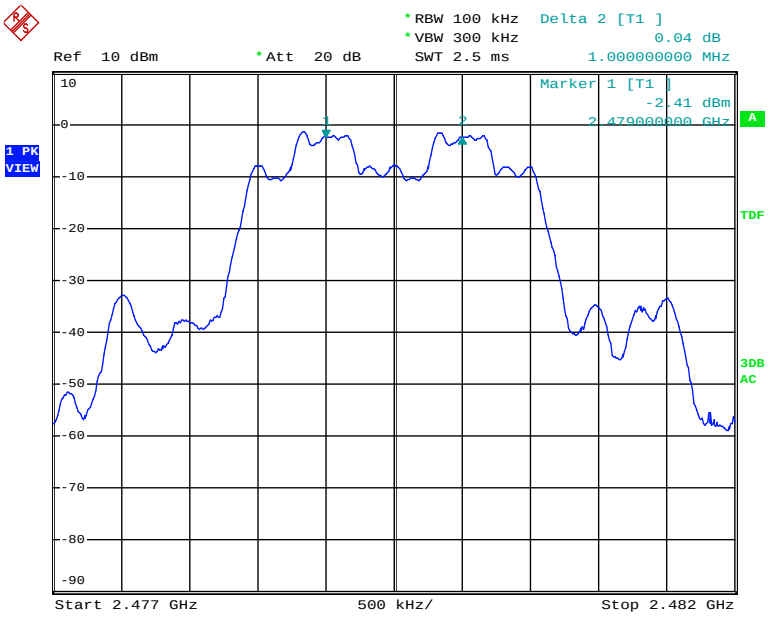
Date: 16.APR.2015 08:43:00

π/4-DQPSK Mode: Middle channel



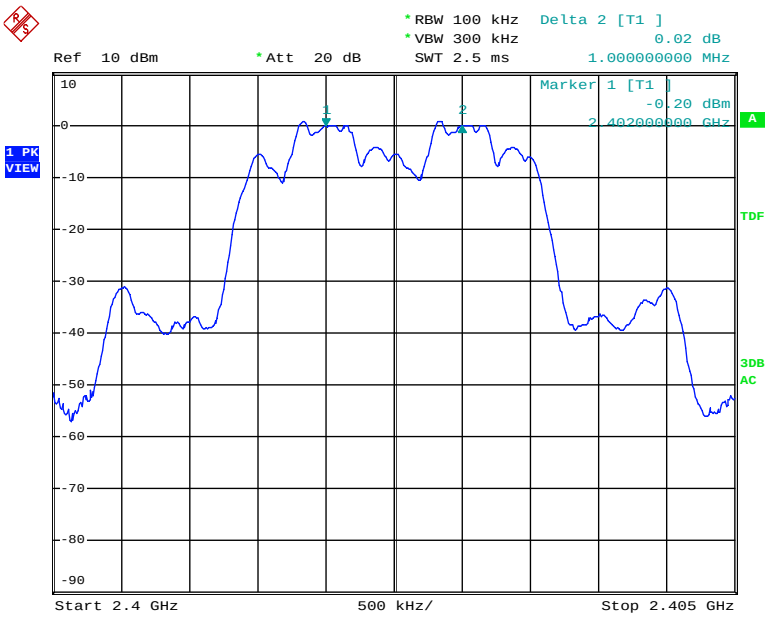
Date: 16.APR.2015 08:45:12

π/4-DQPSK Mode: High channel



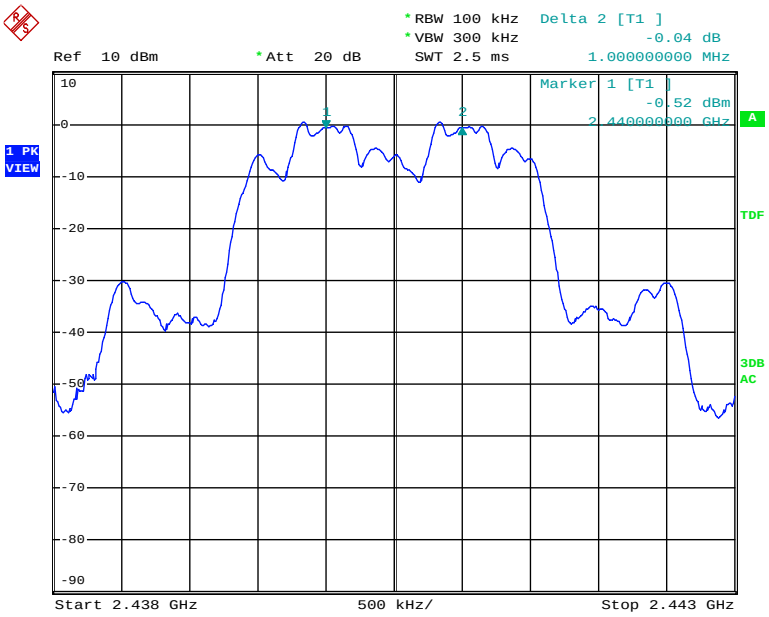
Date: 16.APR.2015 08:52:35

8DPSK Mode: Low channel



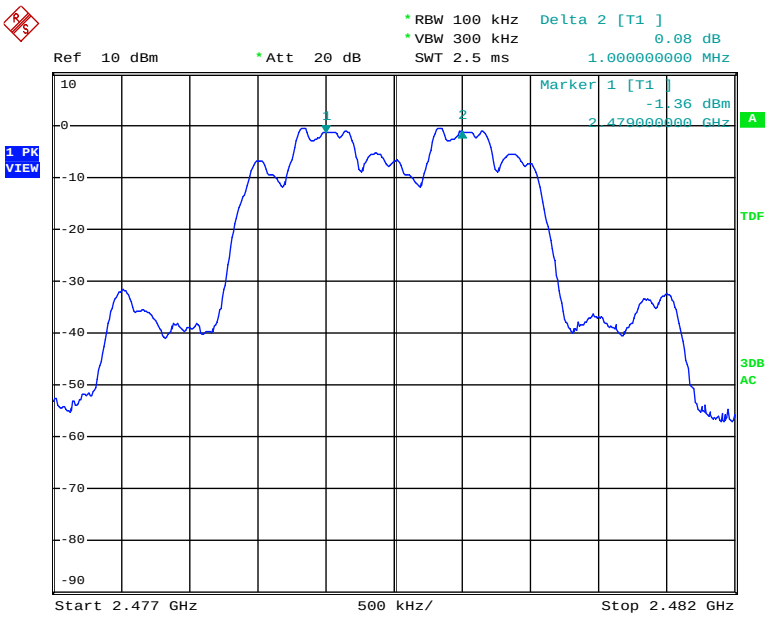
Date: 16.APR.2015 08:55:18

8DPSK Mode: Middle channel



Date: 16.APR.2015 08:57:04

8DPSK Mode: High channel



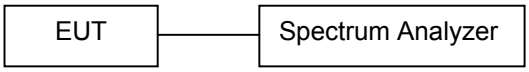
Date: 16.APR.2015 09:00:59

7. Bandwidth Test

7.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Print out the test result from the spectrum by hard copy function.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	10017	08/01/2014	08/01/2015

7.4 Measurement Results

The following table is the setting of spectrum analyzer.

Attenuation	Auto
SPAN	3MHz
RB	30KHz
VB	100KHz
Detector	Peak
Trace	Max hold

20dB Bandwidth test data Chart:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date:	04/16/2015
Test By:	Kuki	Temperature:	21 ℃
Test Result:	N/A	Humidity:	55 %

GFSK Mode:

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
Low channel	2402	828
Middle channel	2441	824
High channel	2480	832

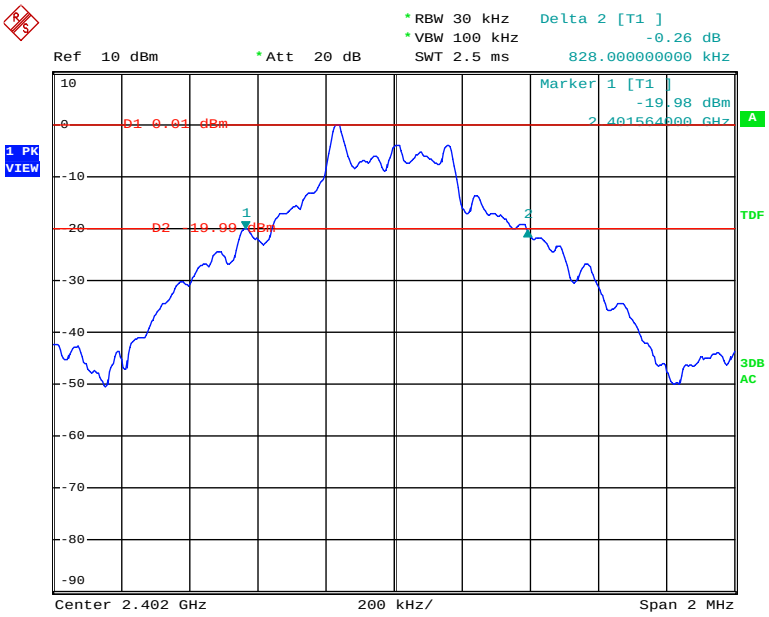
π/4-DQPSK Mode:

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
Low channel	2402	1116
Middle channel	2441	1116
High channel	2480	1112

8DPSK Mode:

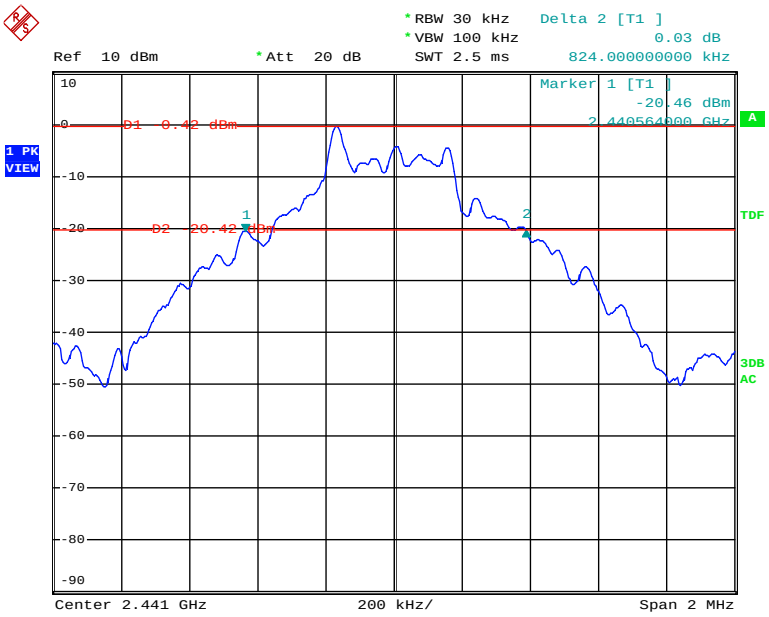
Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
Low channel	2402	1164
Middle channel	2441	1152
High channel	2480	1160

GFSK Mode: Low channel



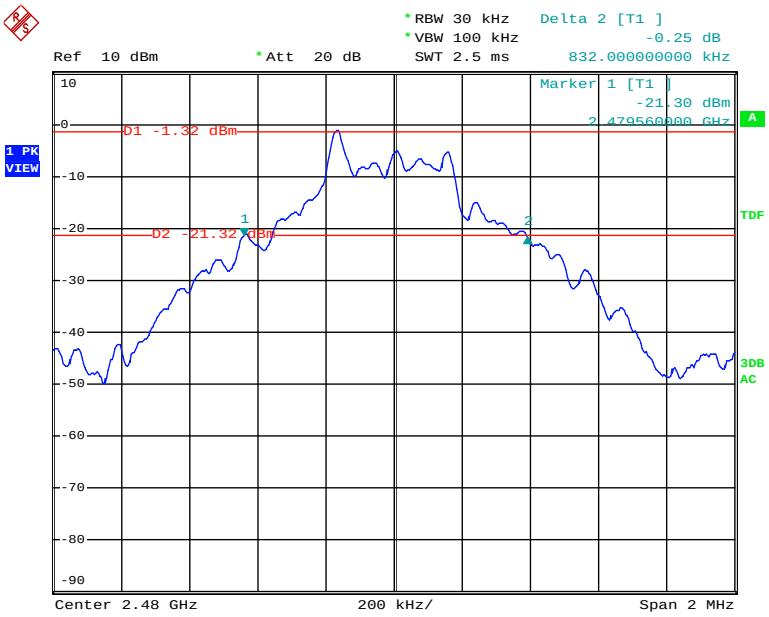
Date: 16.APR.2015 06:58:10

GFSK Mode: Middle channel



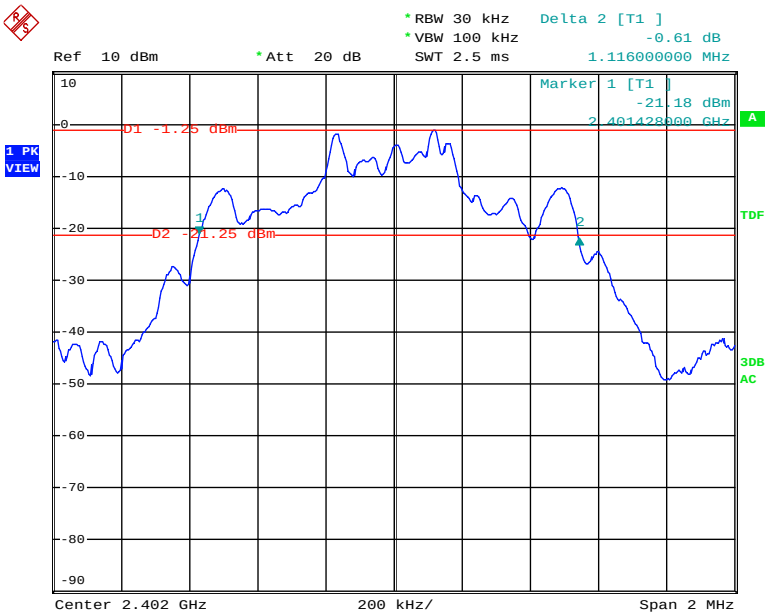
Date: 16.APR.2015 06:59:38

GFSK Mode: High channel



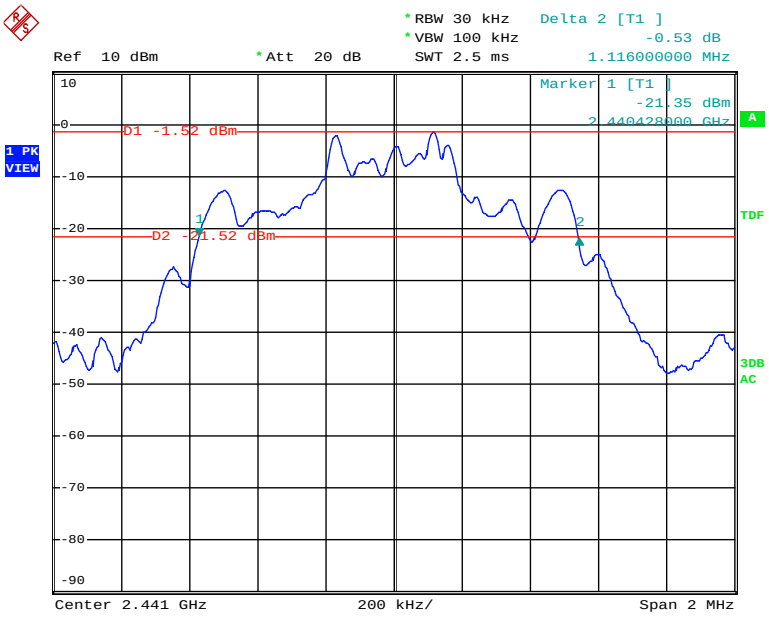
Date: 16.APR.2015 07:00:51

π /4-DQPSK Mode: Low channel



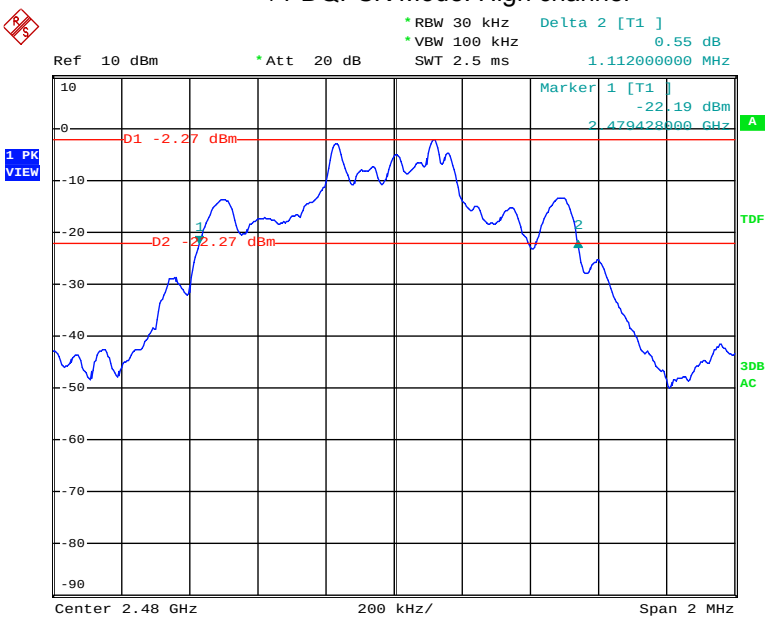
Date: 16.APR.2015 07:04:46

π /4-DQPSK Mode: Middle channel



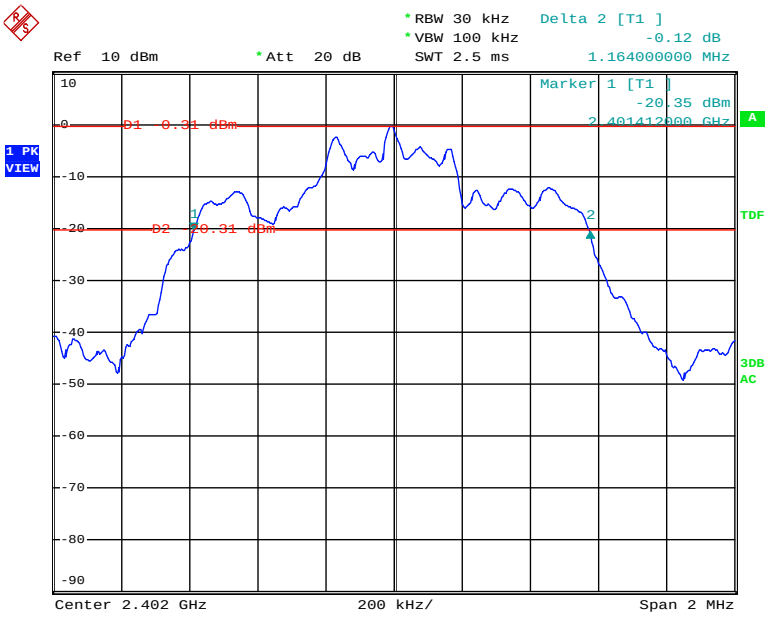
Date: 16.APR.2015 07:05:56

π /4-DQPSK Mode: High channel



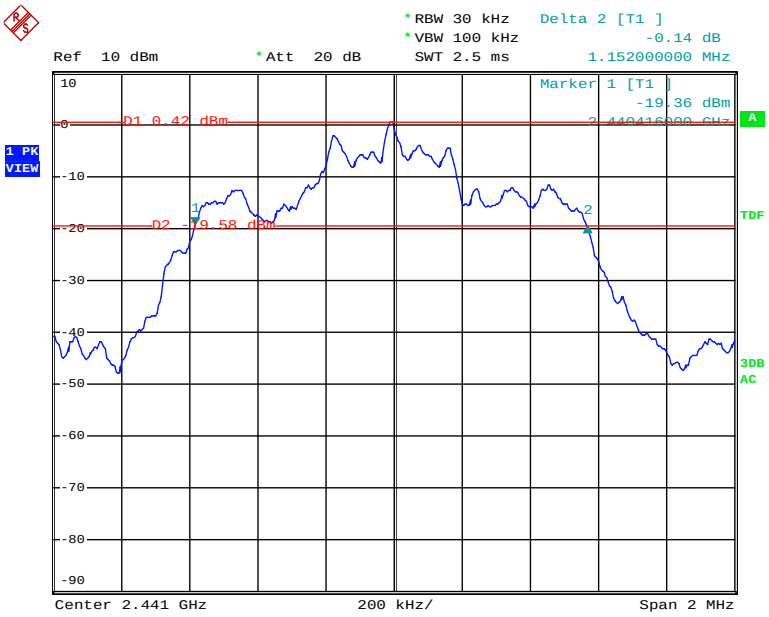
Date: 16.APR.2015 07:07:11

8DPSK Mode: Low channel



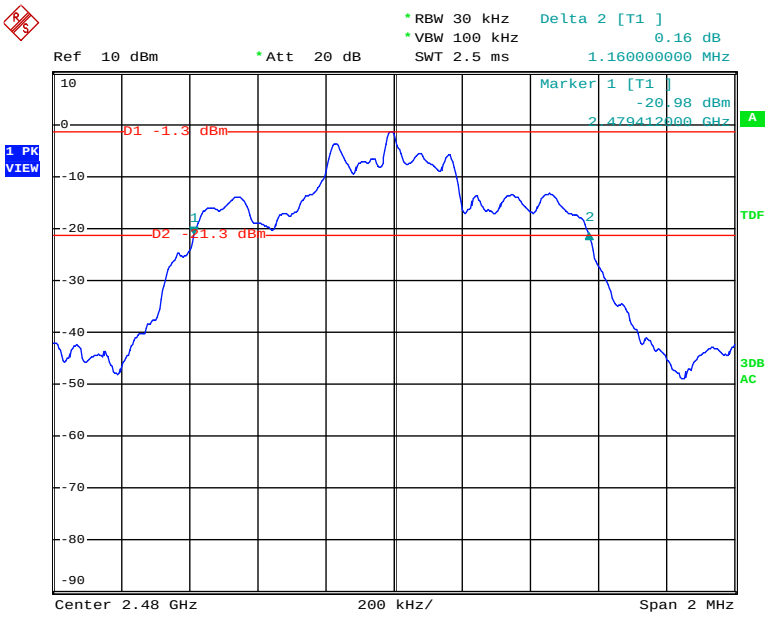
Date: 16.APR.2015 07:11:56

8DPSK Mode: Middle channel



Date: 16.APR.2015 07:13:12

8DPSK Mode: High channel



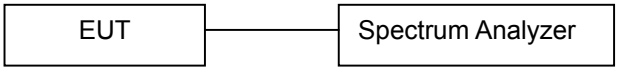
Date: 16.APR.2015 07:14:43

8. Quantity of Hopping Channel Test

8.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Print out the test result from the spectrum by hard copy function.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	10017	08/01/2014	08/01/2015

8.4 Measurement Results

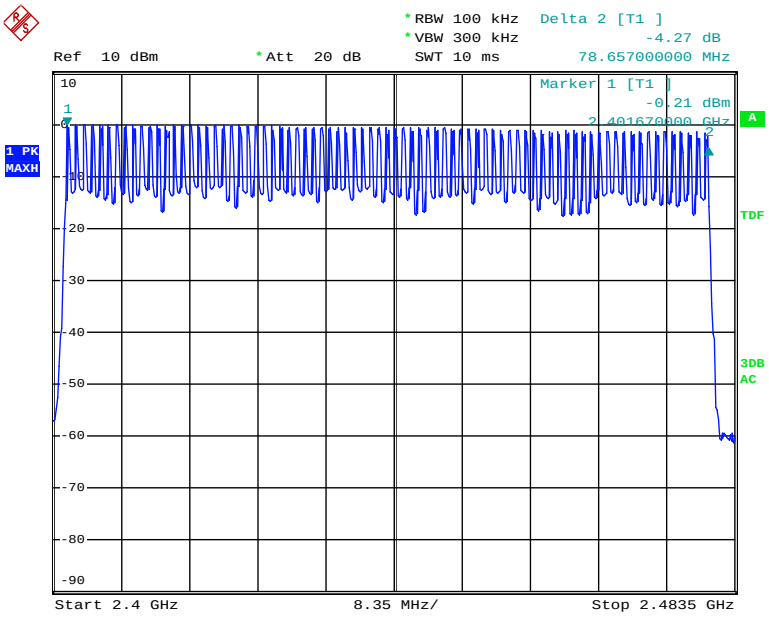
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	04/16/2015
Test By:	Kiki	Temperature :	21 ℃
Test Result:	Pass	Humidity :	55 %

GFSK Mode, π/4-DQPSK Mode, 8DPSK Mode:

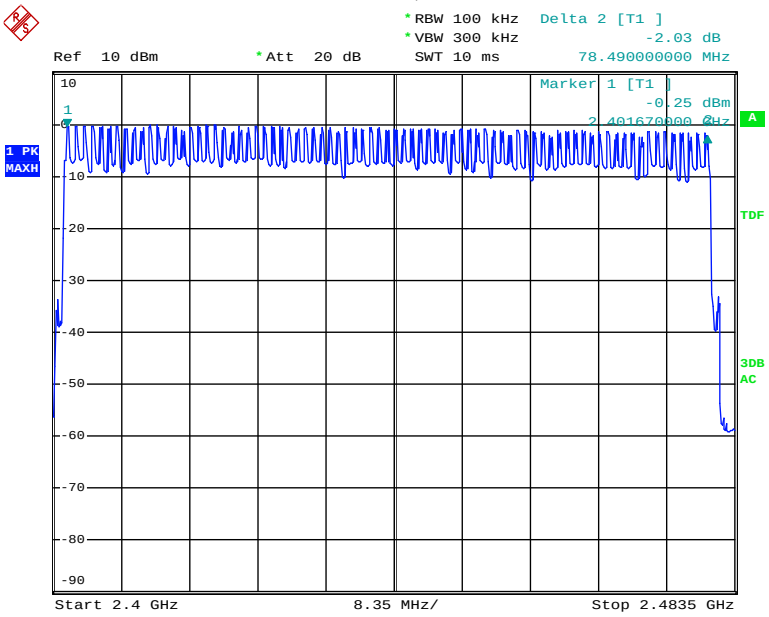
Hopping Channel Frequency Range	Quantity of Hopping Channel	Quantity of Hopping Channel limit
2402-2480	79	>15

GFSK Mode



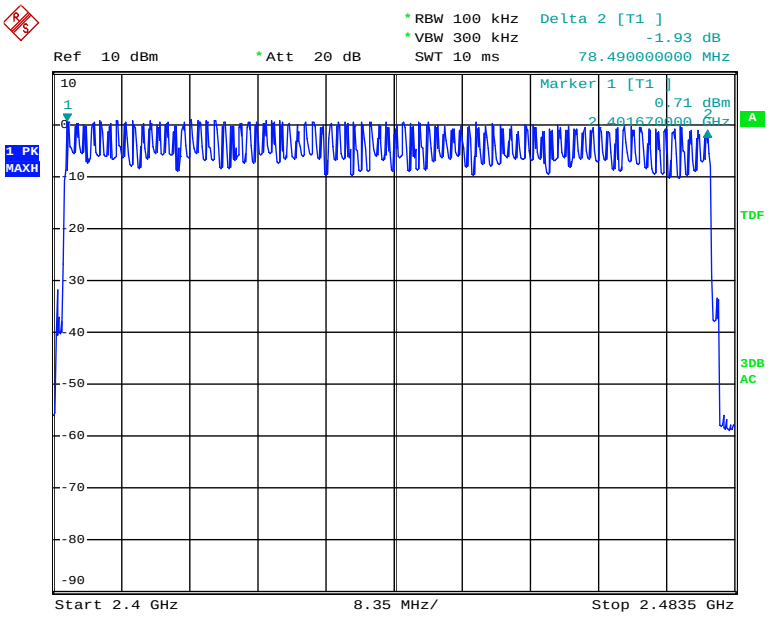
Date: 16.APR.2015 07:31:39

π/4-DQPSK Mode



Date: 16.APR.2015 07:42:40

8DPSK Mode



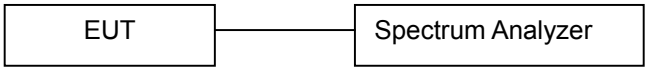
Date: 16.APR.2015 07:48:59

9. Time of Occupancy (Dwell Time) Test

9.1 Measurement Procedure

a. Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

9.2 Test SET-UP (Block Diagram of Configuration)



9.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	10017	08/01/2014	08/01/2015

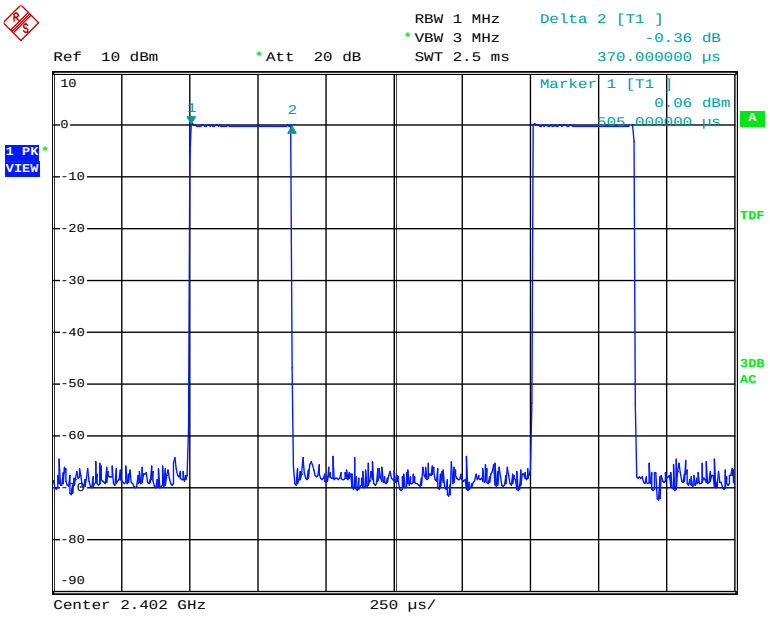
9.4 Measurement Results

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	04/16/2015
Test By:	Kuki	Temperature :	21 ℃
Test Result:	PASS	Humidity :	55 %

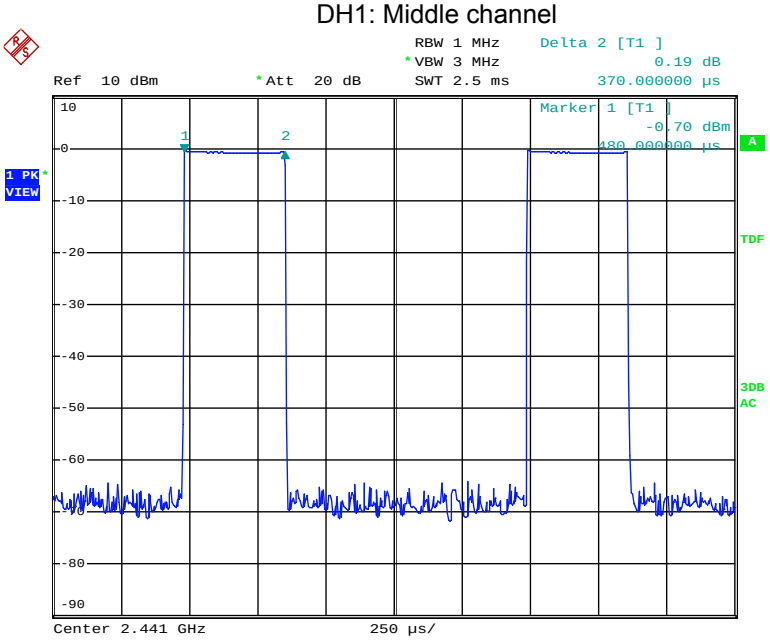
Mode	Channel	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
GFSK Mode					
DH1	Low channel	0.370	118.4	400	Pass
	Middle channel	0.370	118.4	400	Pass
	High channel	0.370	118.4	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
DH3	Low channel	1.630	260.8	400	Pass
	Middle channel	1.630	260.8	400	Pass
	High channel	1.630	260.8	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH5	Low channel	2.880	307.2	400	Pass
	Middle channel	2.880	307.2	400	Pass
	High channel	2.880	307.2	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				
π/4-DPSK Mode					
2DH1	Low channel	0.375	120.0	400	Pass
	Middle channel	0.380	121.6	400	Pass
	High channel	0.380	121.6	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
2DH3	Low channel	1.635	261.2	400	Pass
	Middle channel	1.630	260.8	400	Pass
	High channel	1.630	260.8	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
2DH5	Low channel	2.880	307.2	400	Pass
	Middle channel	2.880	307.2	400	Pass
	High channel	2.880	307.2	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				
8DPSK Mode					
3DH1	Low channel	0.380	121.6	400	Pass
	Middle channel	0.380	121.6	400	Pass
	High channel	0.380	121.6	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
3DH3	Low channel	1.630	260.8	400	Pass
	Middle channel	1.630	260.8	400	Pass
	High channel	1.630	260.8	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
3DH5	Low channel	2.880	307.2	400	Pass
	Middle channel	2.880	307.2	400	Pass
	High channel	2.880	307.2	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

DH1: Low channel



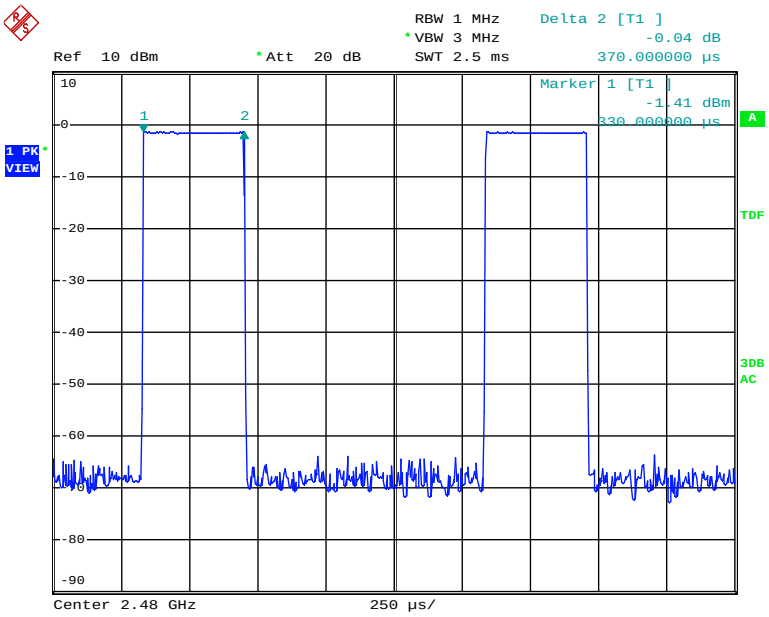
Date: 16.APR.2015 07:56:08

DH1: Middle channel



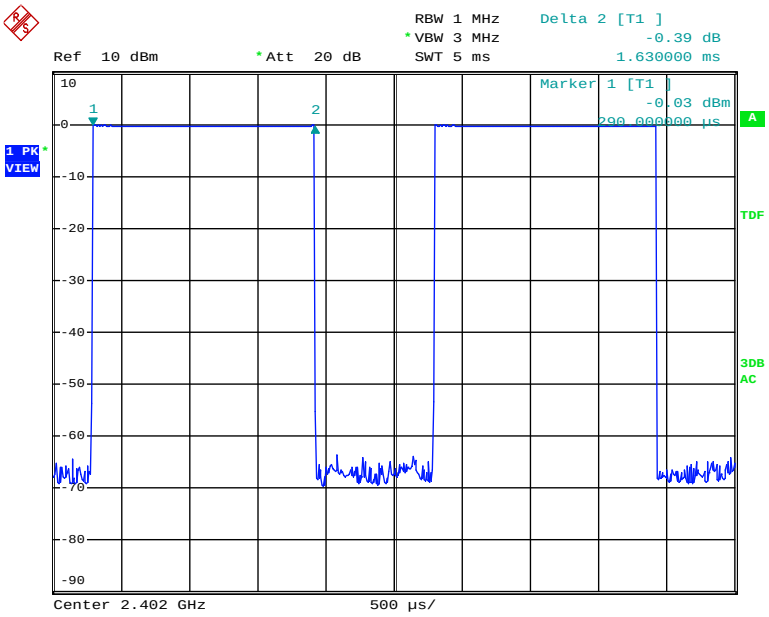
Date: 16.APR.2015 07:55:35

DH1: High channel



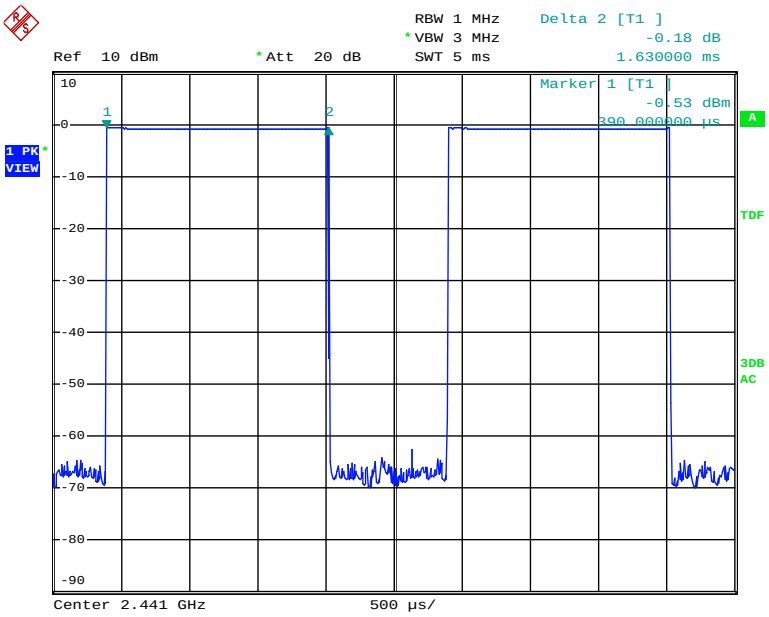
Date: 16.APR.2015 07:54:33

DH3: Low channel



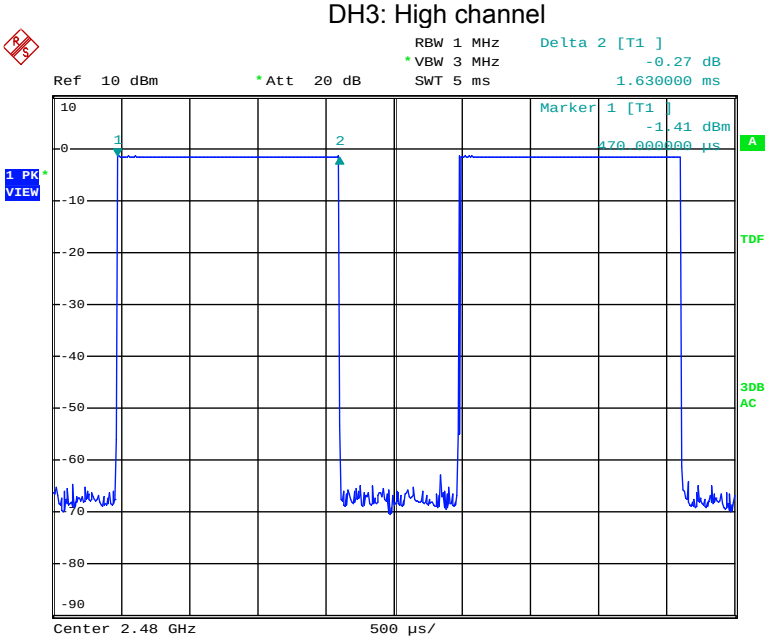
Date: 16.APR.2015 07:57:41

DH3: Middle channel



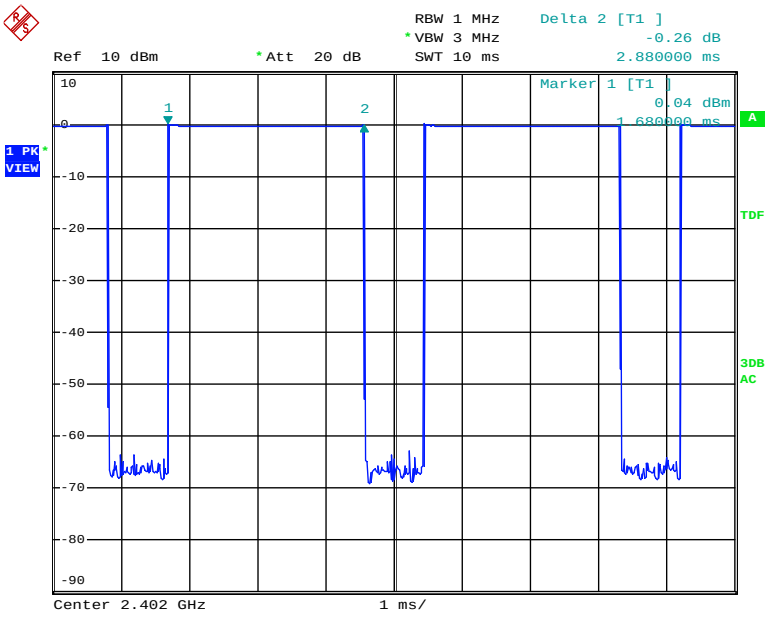
Date: 16.APR.2015 07:58:14

DH3: High channel



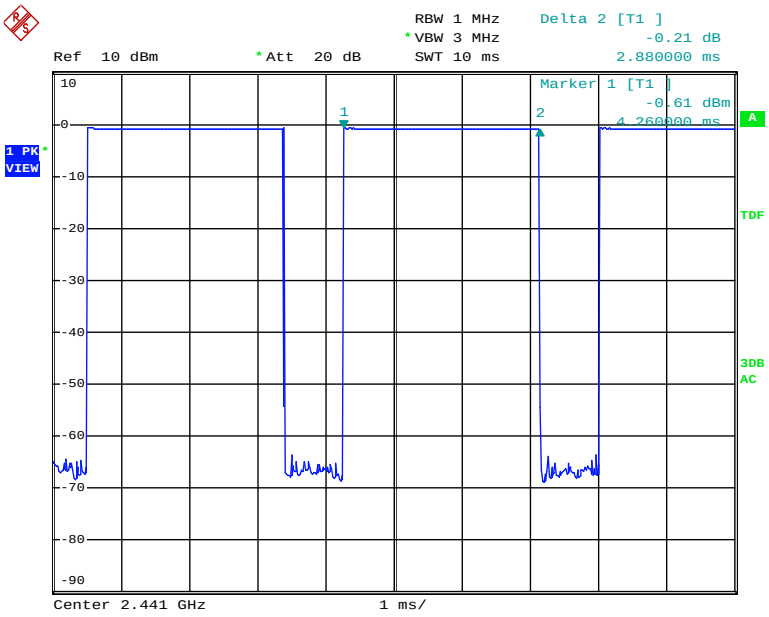
Date: 16.APR.2015 07:58:44

DH5: Low channel



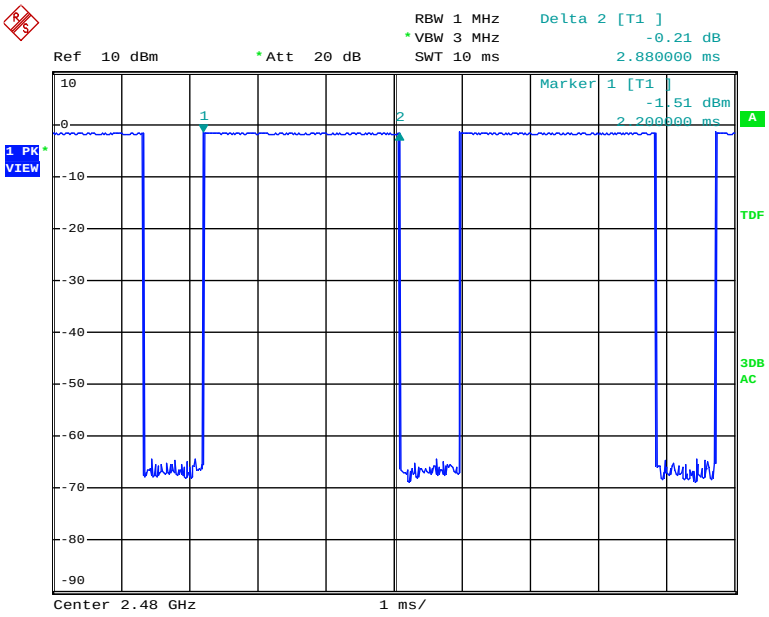
Date: 16.APR.2015 08:00:39

DH5: Middle channel



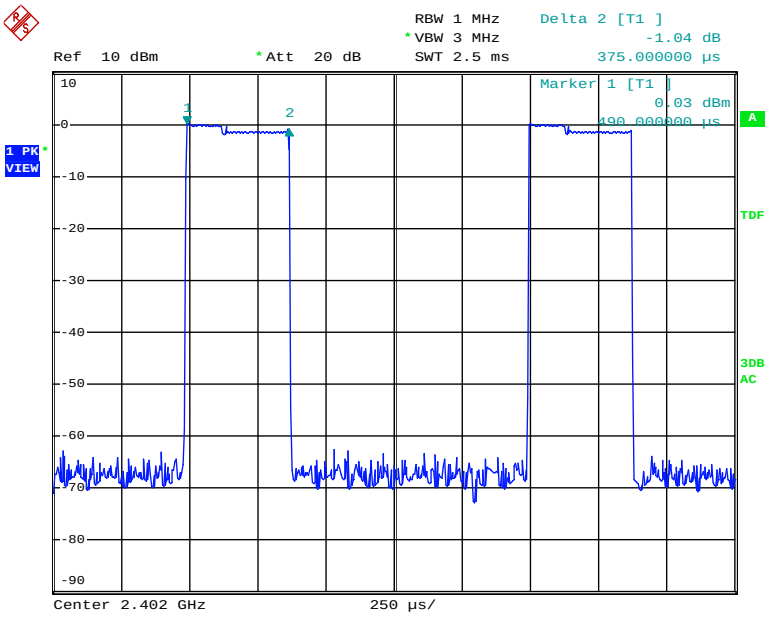
Date: 16.APR.2015 08:01:40

DH5: High channel



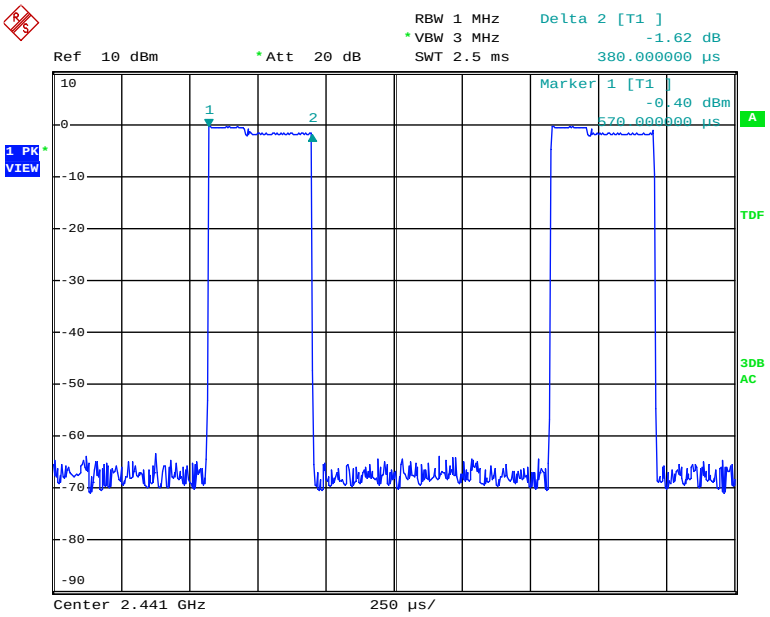
Date: 16.APR.2015 08:02:33

2DH1: Low channel



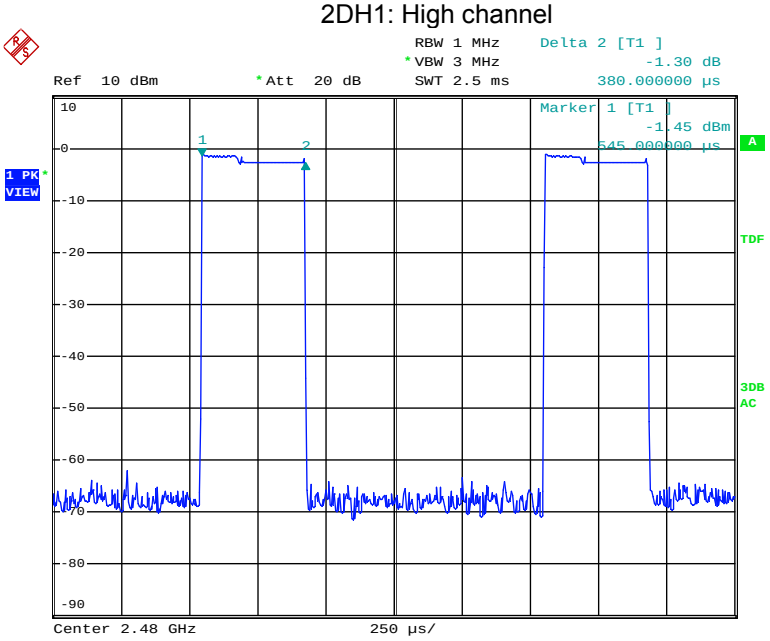
Date: 16.APR.2015 08:03:59

2DH1: Middle channel



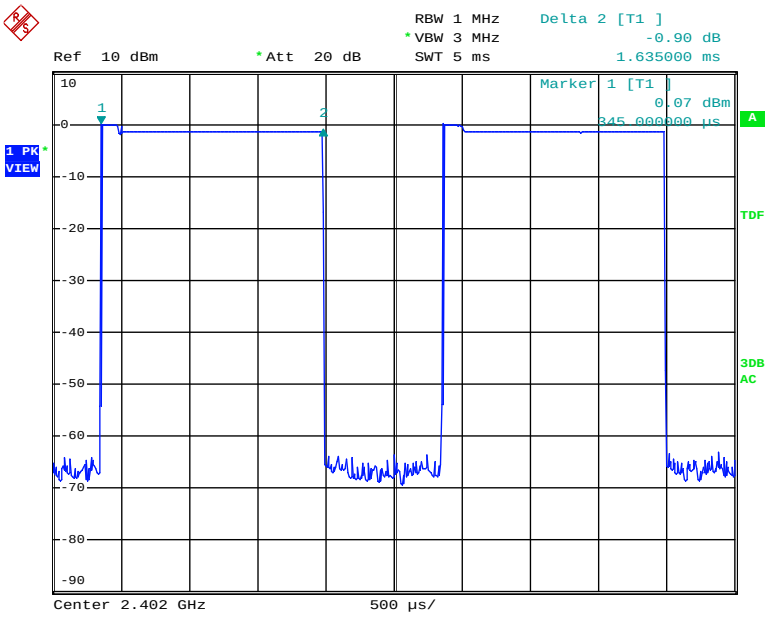
Date: 16.APR.2015 08:04:46

2DH1: High channel



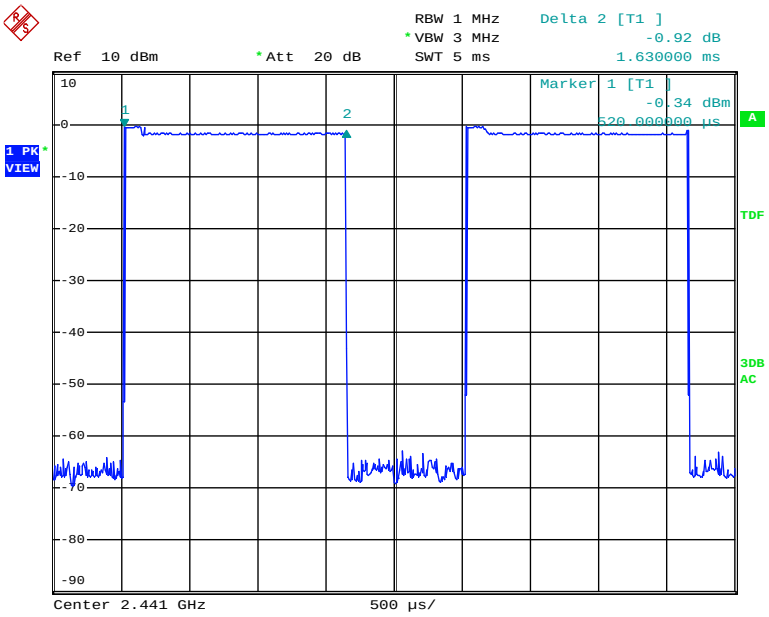
Date: 16.APR.2015 08:05:41

2DH3: Low channel



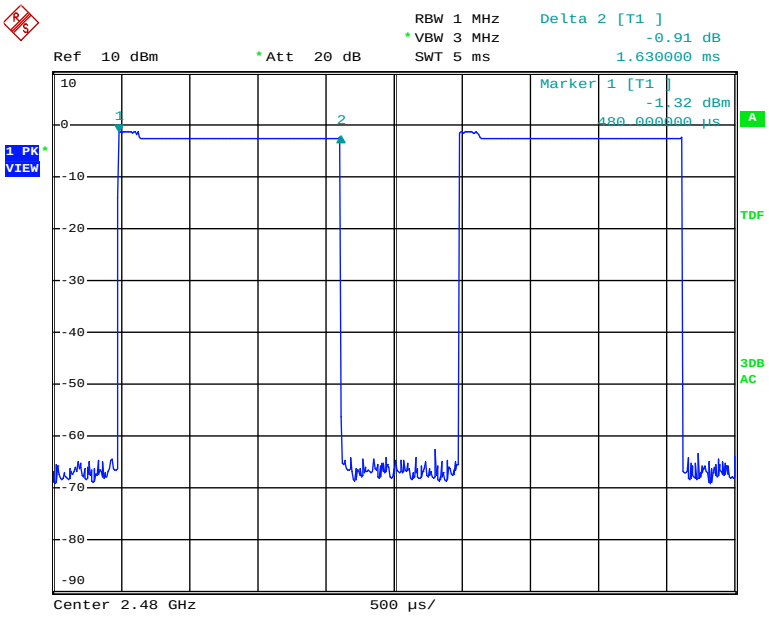
Date: 16.APR.2015 08:06:37

2DH3: Middle channel



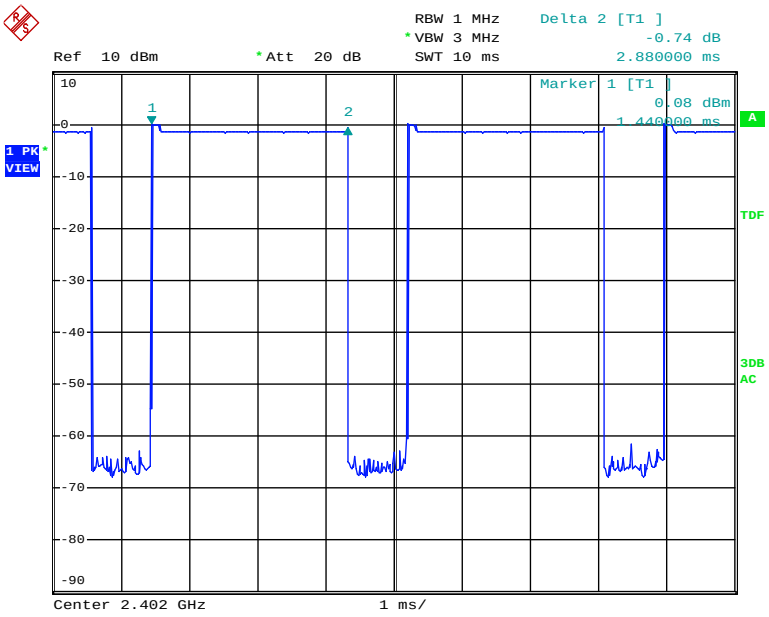
Date: 16.APR.2015 08:07:04

2DH3: High channel



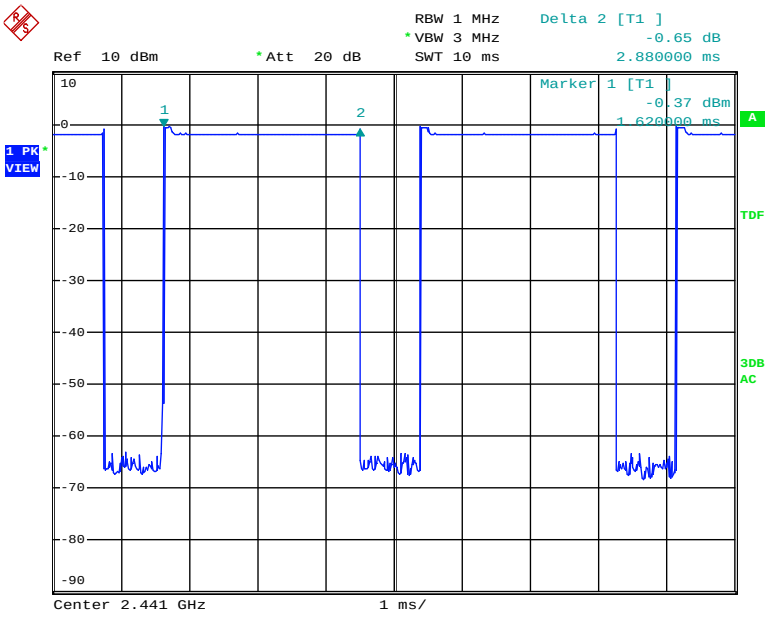
Date: 16.APR.2015 08:07:32

2DH5: Low channel



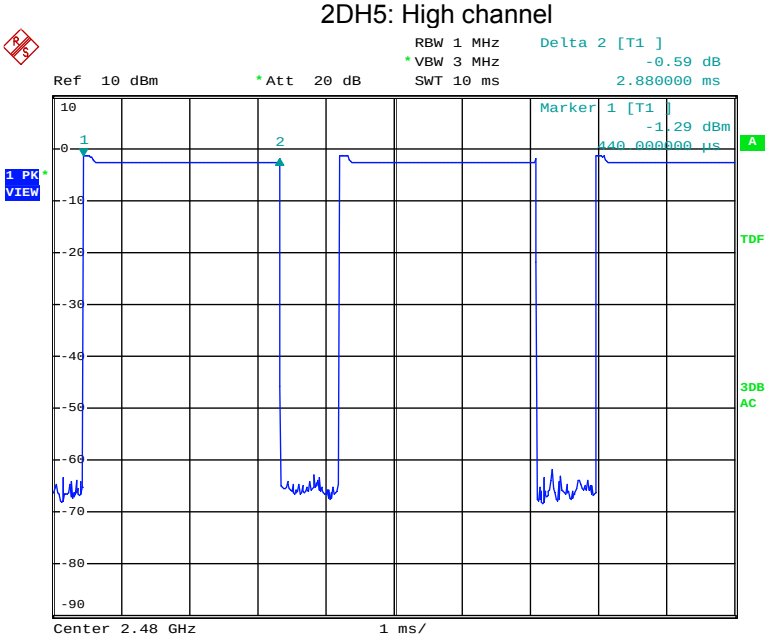
Date: 16.APR.2015 08:09:02

2DH5: Middle channel



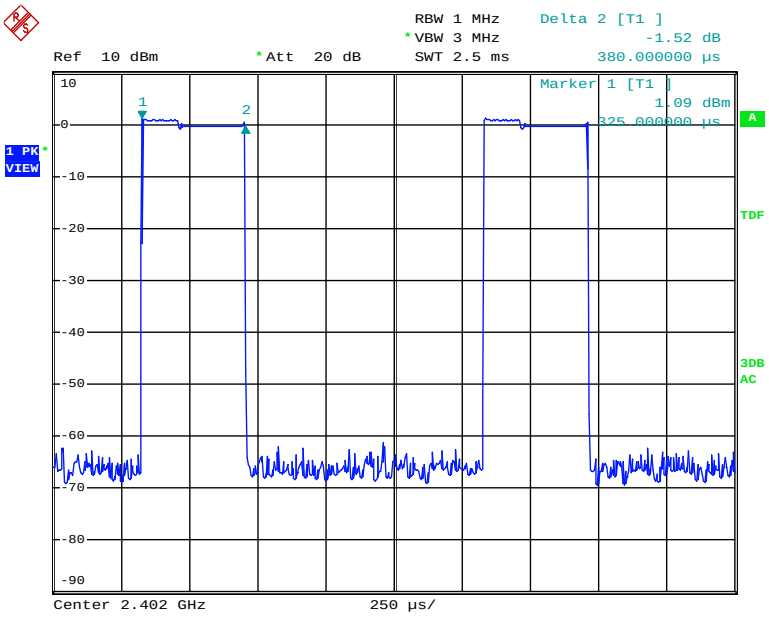
Date: 16.APR.2015 08:09:53

2DH5: High channel



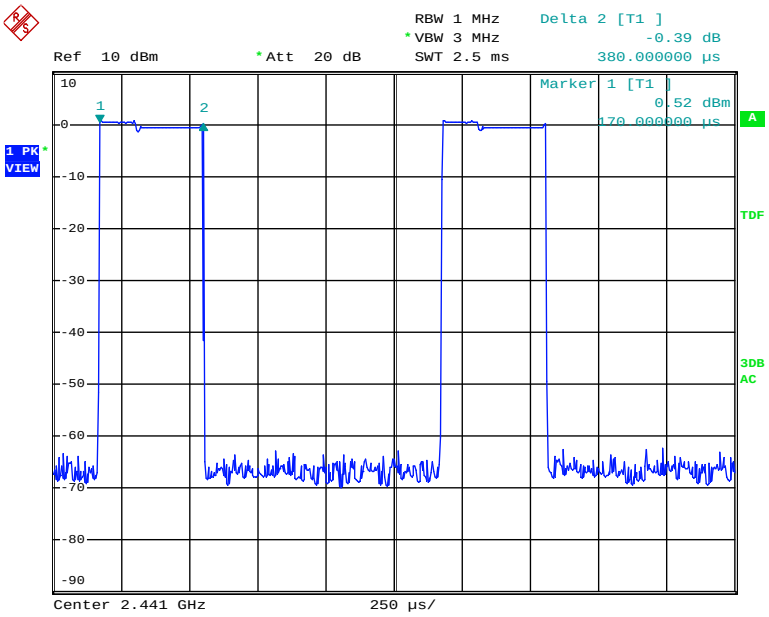
Date: 16.APR.2015 08:10:49

3DH1: Low channel



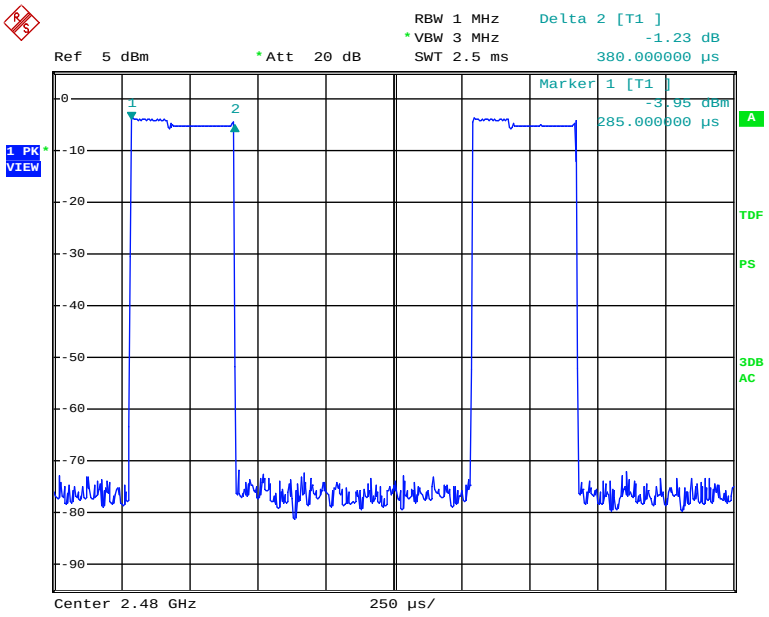
Date: 16.APR.2015 08:13:52

3DH1: Middle channel



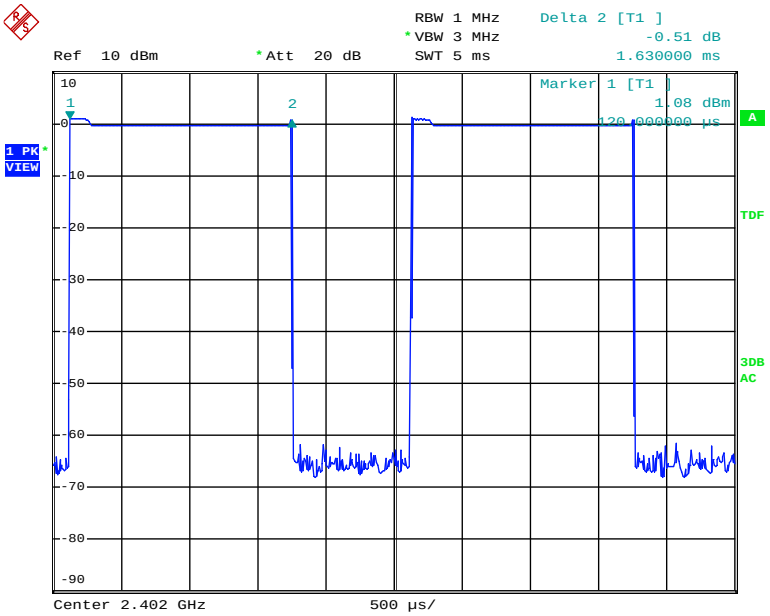
Date: 16.APR.2015 08:13:22

3DH1: High channel



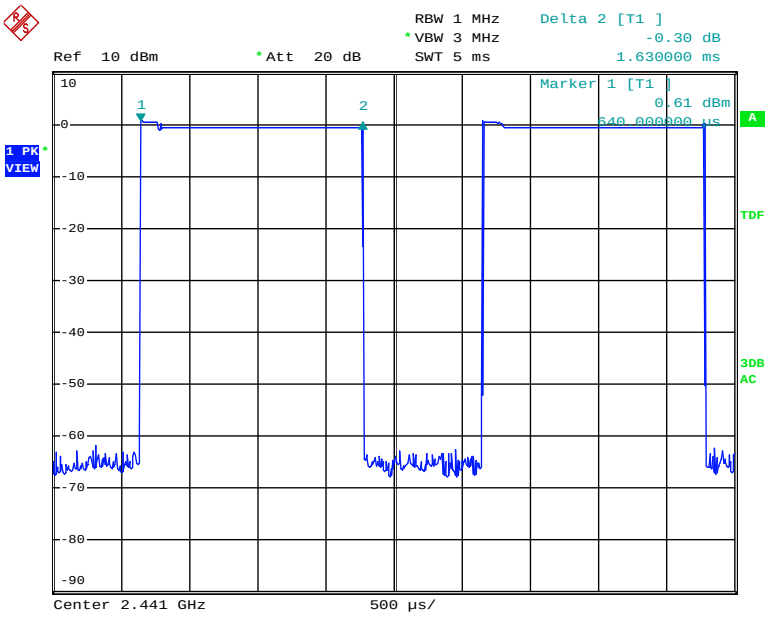
Date: 15.APR.2015 06:59:44

3DH3: Low channel



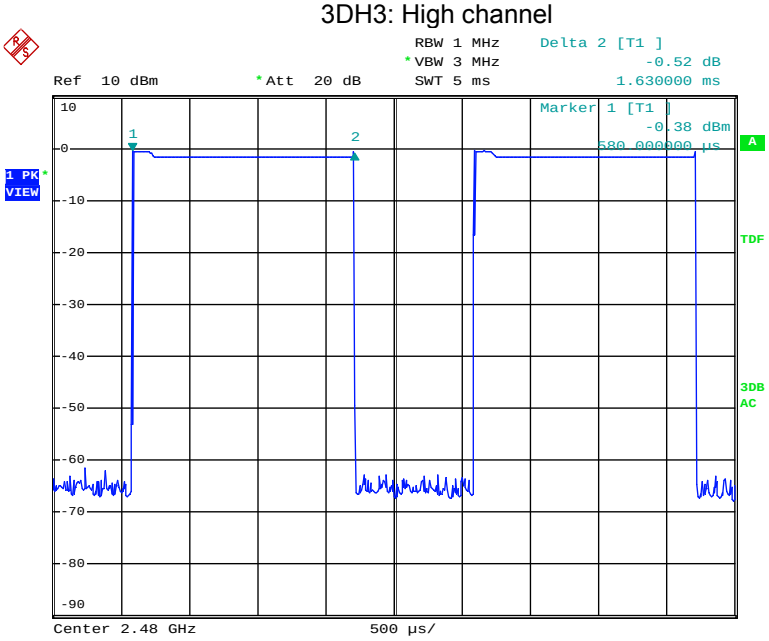
Date: 16.APR.2015 08:15:54

3DH3: Middle channel



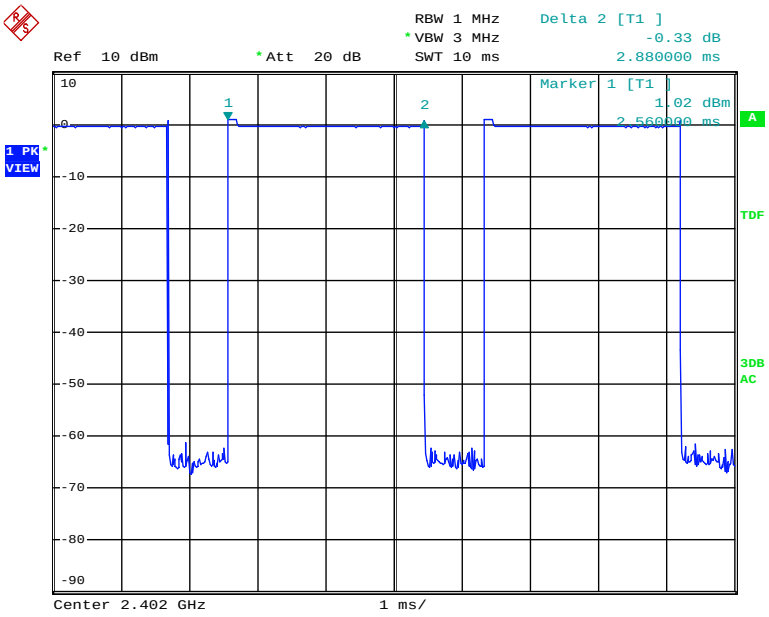
Date: 16.APR.2015 08:16:30

3DH3: High channel



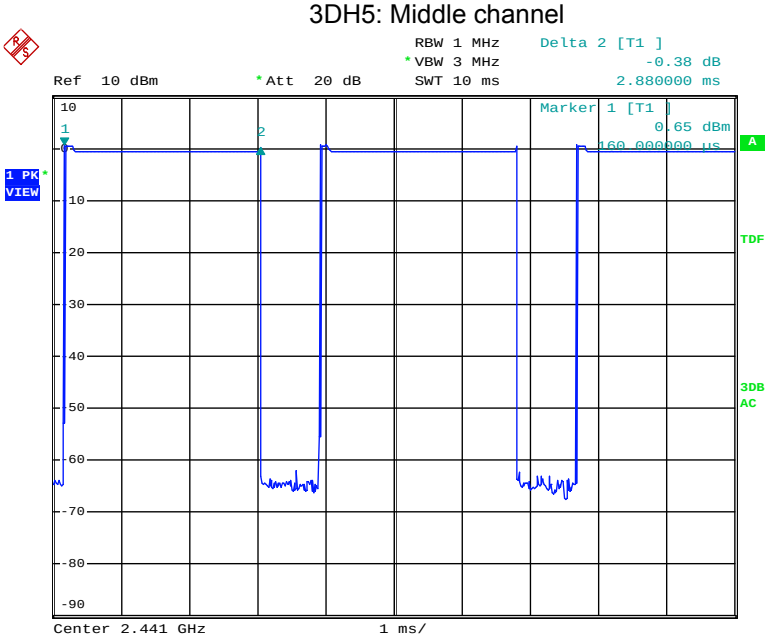
Date: 16.APR.2015 08:17:02

3DH5: Low channel



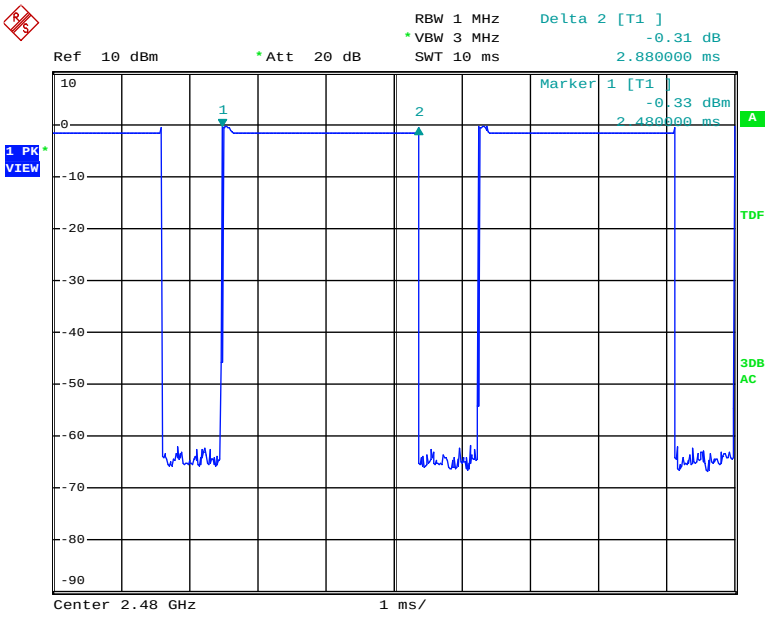
Date: 16.APR.2015 08:17:53

3DH5: Middle channel



Date: 16.APR.2015 08:18:27

3DH5: High channel



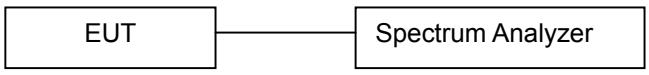
Date: 16.APR.2015 08:18:54

10. Maximum Peak Output Power Test

10.1 Measurement Procedure

a. Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.
d. Measure the captured power within the band and recording the plot.
e. Repeat above procedures until all frequencies required were complete.

10.2 Test SET-UP (Block Diagram of Configuration)



10.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	10017	08/01/2014	08/01/2015

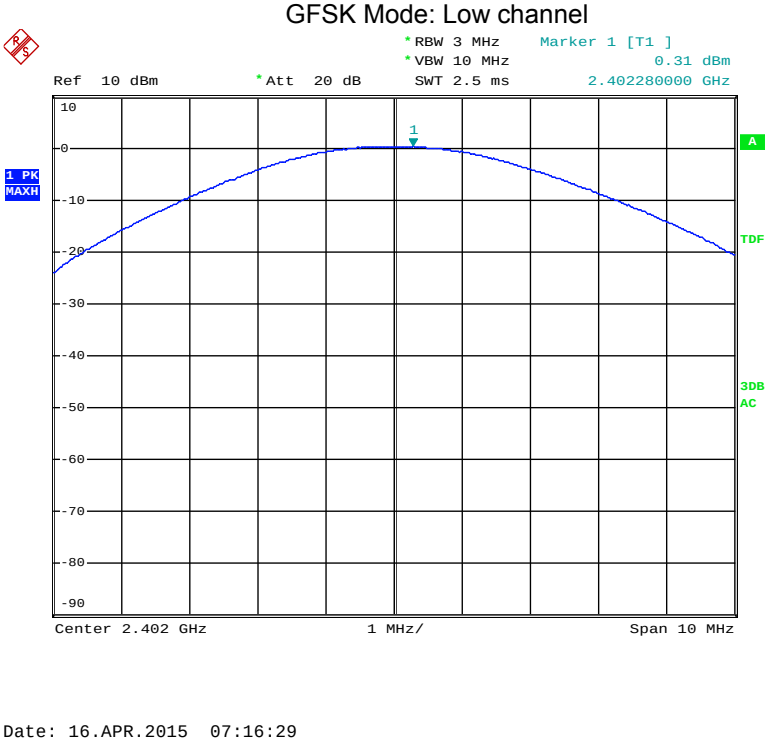
10.4 Measurement Results

Refer to attached data chart.

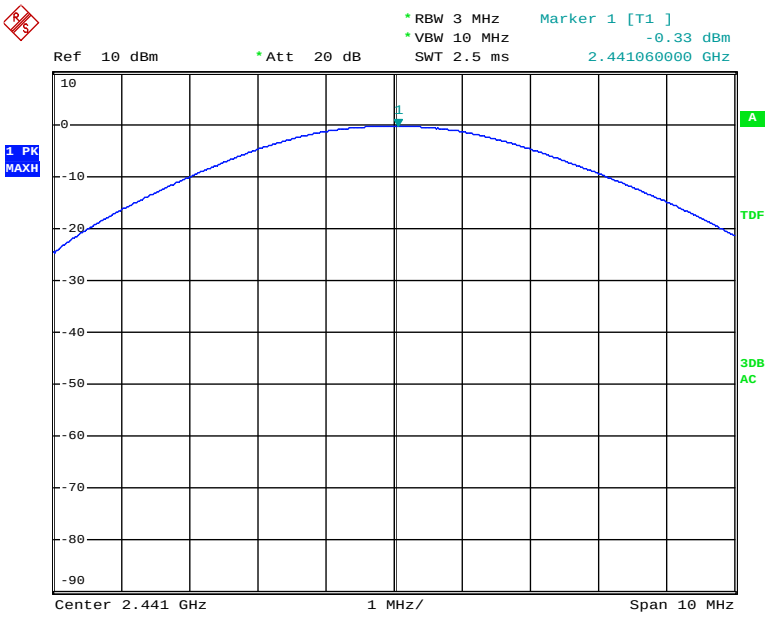
Spectrum Detector:	PK	Test Date :	04/16/2015
Test By:	Kuki	Temperature :	21 ℃
Test Result:	PASS	Humidity :	55 %

GFSK Mode					
Channel	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(W)	Pass/Fail
Low channel	2402.00	0.31	1.074	1	PASS
Middle channel	2441.00	-0.33	0.927	1	PASS
High channel	2480.00	-1.25	0.750	1	PASS
π/4-DQPSK Mode					
Channel	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
Low channel	2402.00	0.44	1.107	125	PASS
Middle channel	2441.00	-0.05	0.989	125	PASS
High channel	2480.00	-0.97	0.800	125	PASS
8DPSK Mode					
Channel	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
Low channel	2402.00	1.50	1.413	125	PASS
Middle channel	2441.00	1.01	1.262	125	PASS
High channel	2480.00	0.12	1.028	125	PASS

GFSK Mode: Low channel

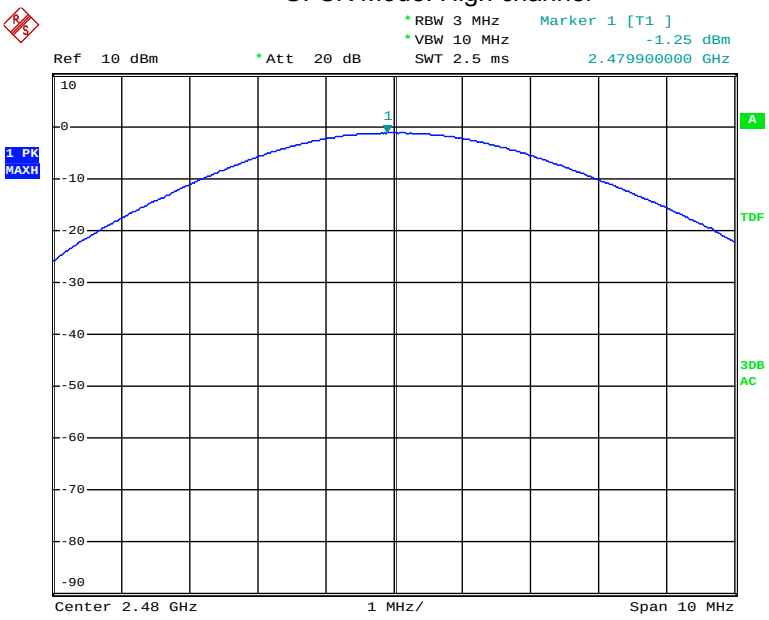


GFSK Mode: Middle channel



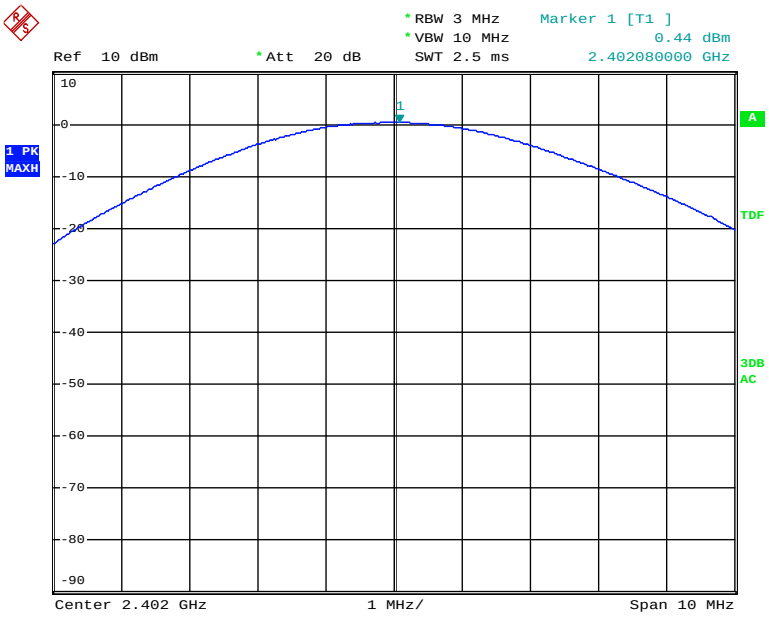
Date: 16.APR.2015 07:17:23

GFSK Mode: High channel



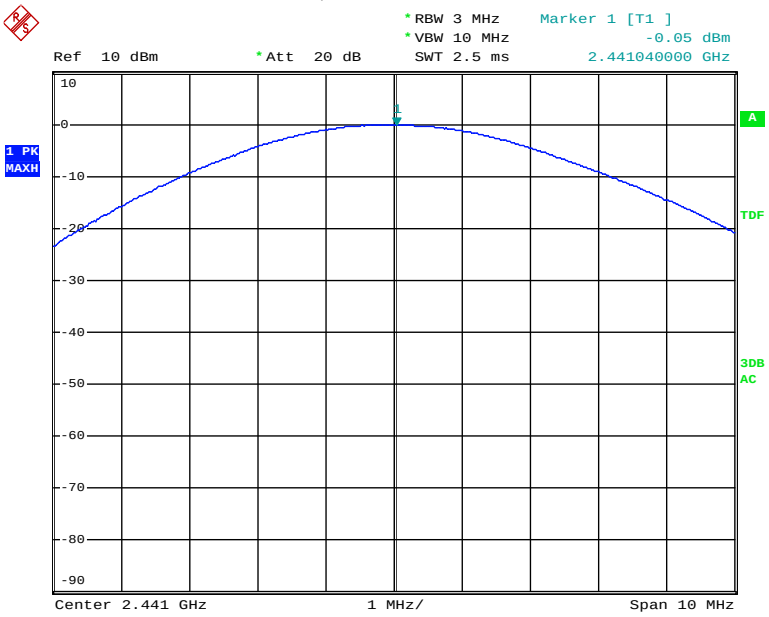
Date: 16.APR.2015 07:18:26

π/4-DQPSK Mode: Low channel



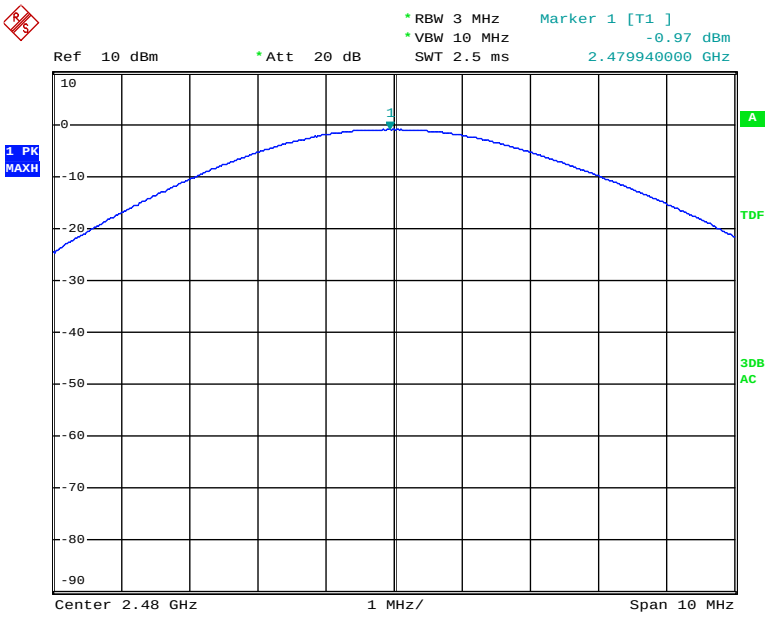
Date: 16.APR.2015 07:20:13

π/4-DQPSK Mode: Middle channel



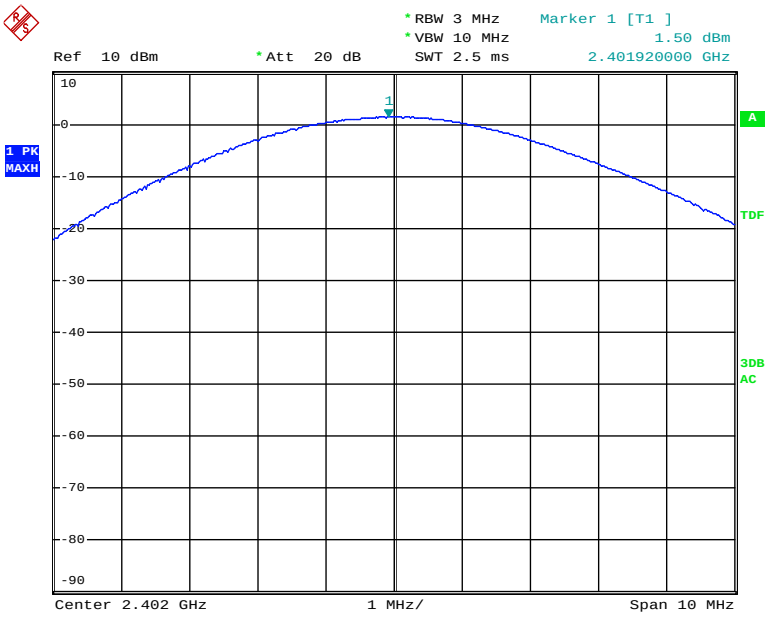
Date: 16.APR.2015 07:21:01

π/4-DQPSK Mode: High channel



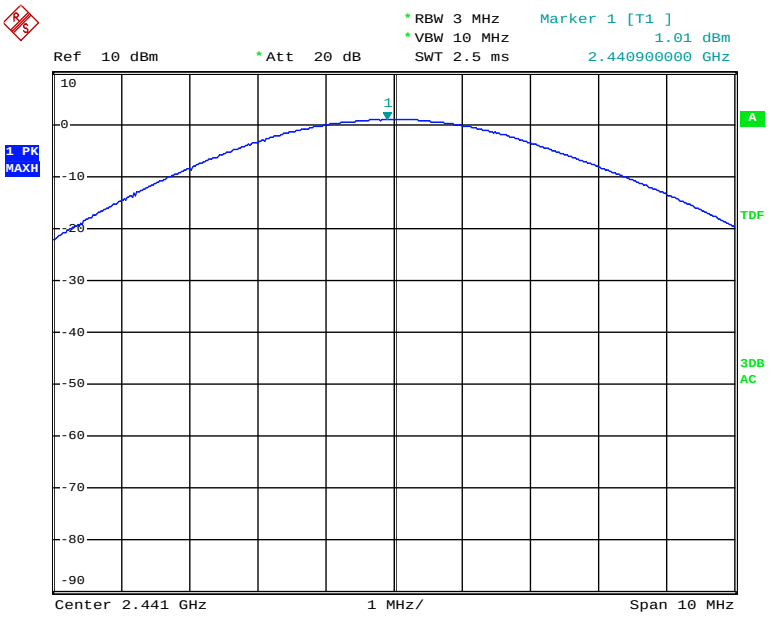
Date: 16.APR.2015 07:21:48

8DPSK Mode: Low channel



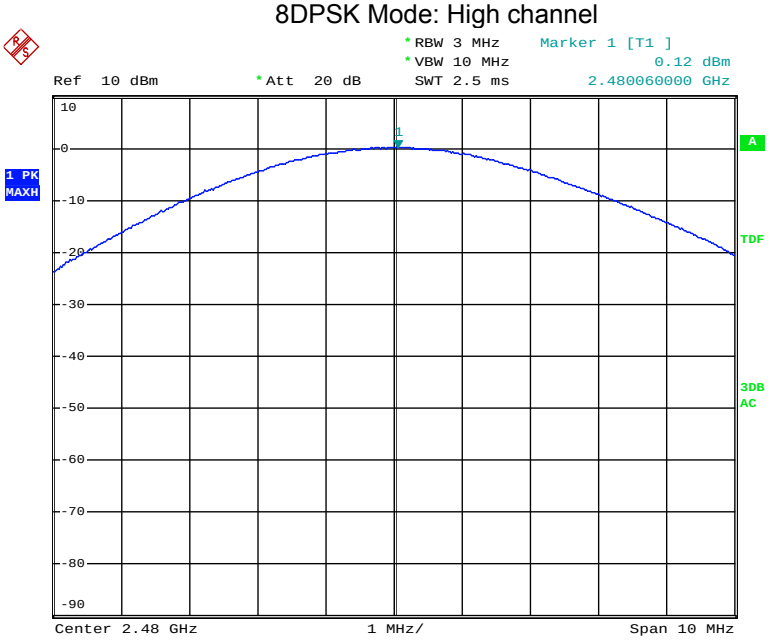
Date: 16.APR.2015 07:22:45

8DPSK Mode: Middle channel



Date: 16.APR.2015 07:23:32

8DPSK Mode: High channel



Date: 16.APR.2015 07:24:05

11. Band Edge Test

11.1 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)).

11.2 Measurement Procedure

(A) Conducted method:
Measurements were performed using a spectrum analyzer with a suitable span to encompass the peak of the fundamental and using the following settings: RBW = 100kHz, VBW = 300kHz.

(B) Radiated method:
1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.

(Peak measurement: Peak detector, RBW=1MHz, VBW=3MHz, Sweep=Auto
Average measurement: Peak detector, RBW=1MHz, VBW=10Hz, Sweep=Auto)

11.3 Measurement Equipment Used

Conducted method: Same as 6.3 Channel Separation Measurement.
Radiated method: Same as 5.3 Radiated Emission Measurement.

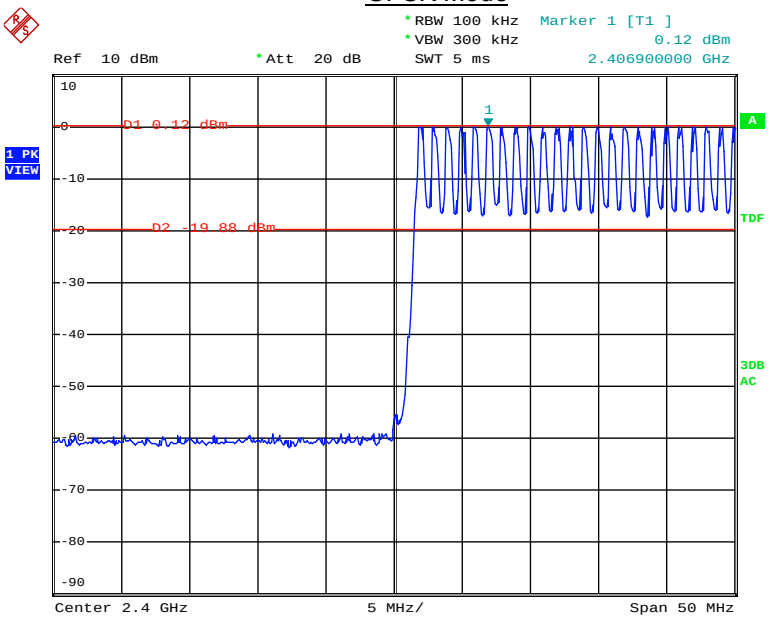
11.4 Measurement Results

Pass
Refer to attached data chart.

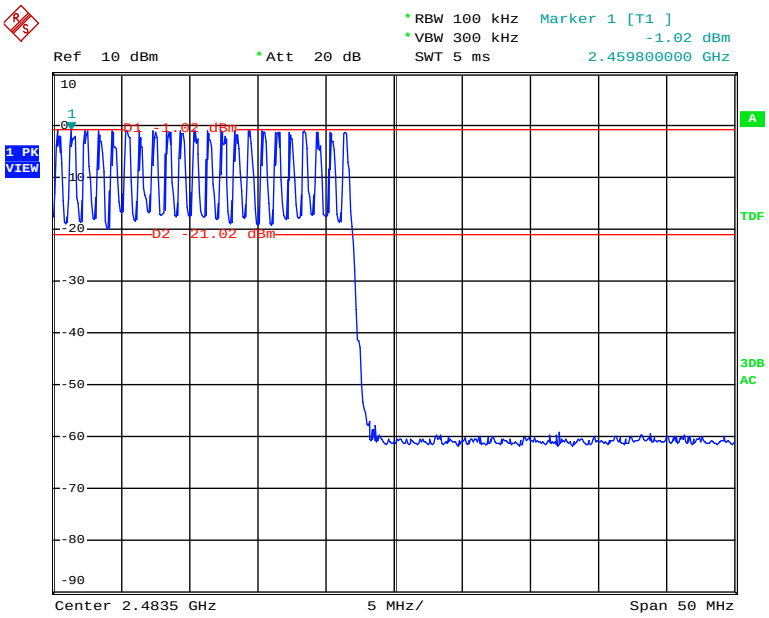
(A) Conducted Measurement

For Hopping Mode:

GFSK Mode

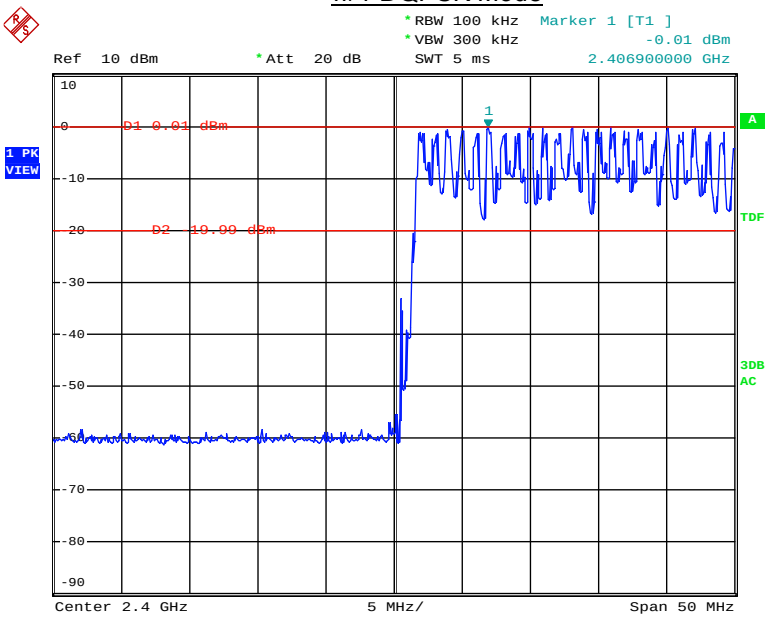


Date: 17.APR.2015 07:11:49

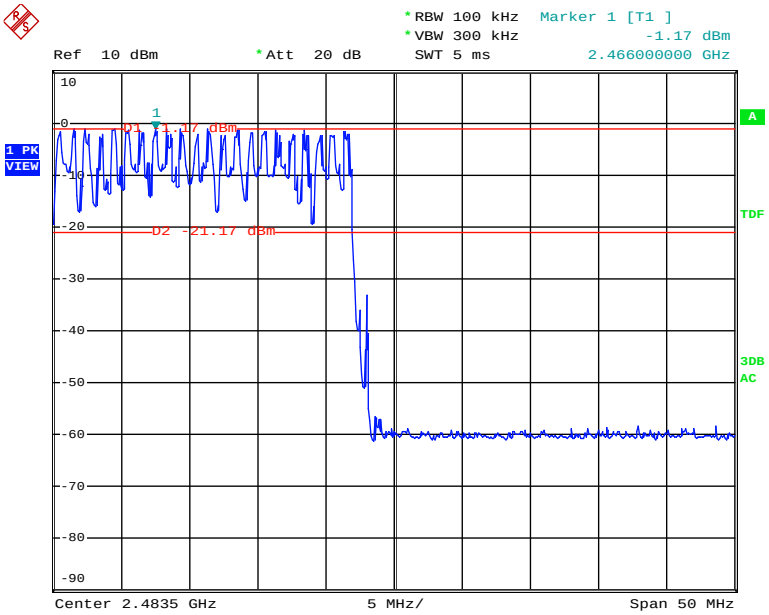


Date: 17.APR.2015 07:17:39

π/4-DQPSK Mode

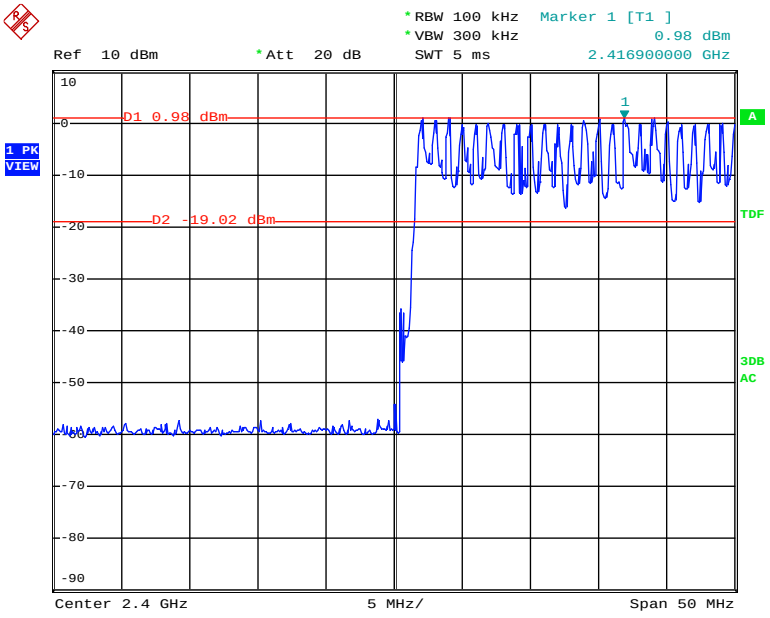


Date: 17.APR.2015 07:23:38

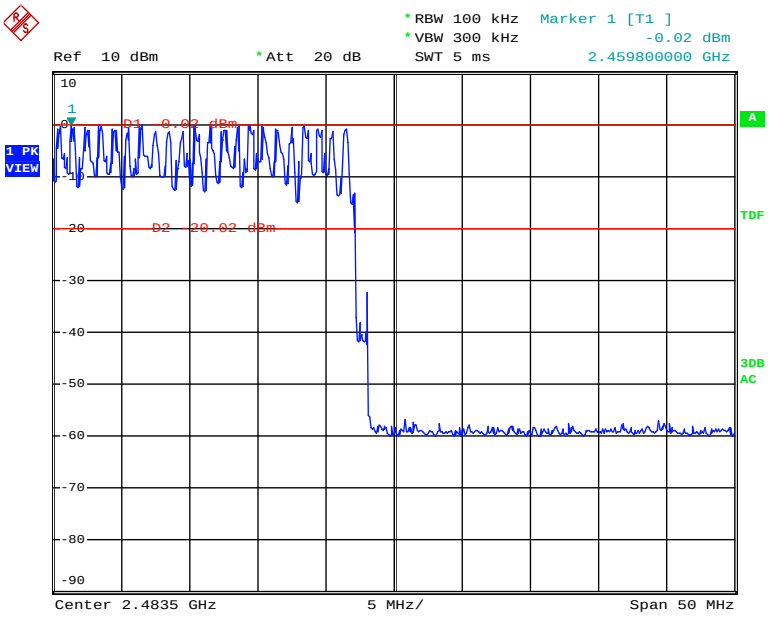


Date: 17.APR.2015 07:25:49

8DPSK Mode



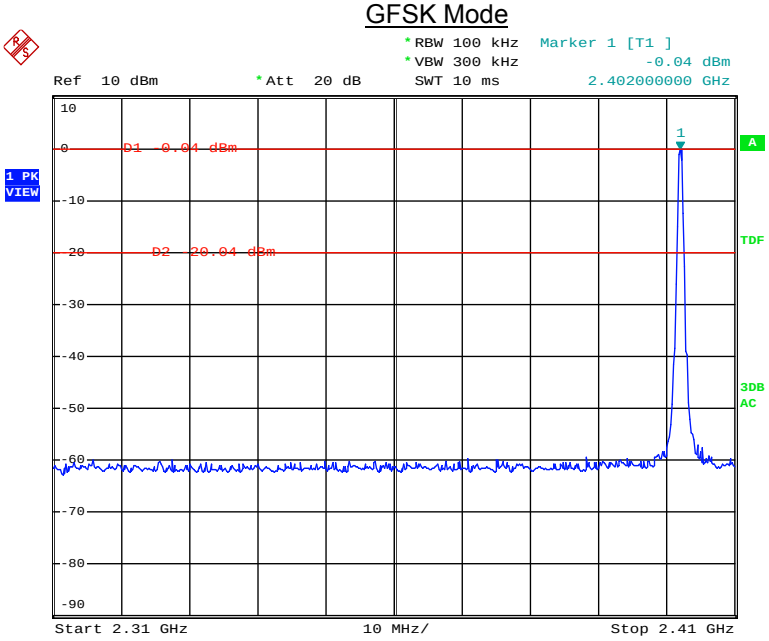
Date: 17.APR.2015 07:28:03



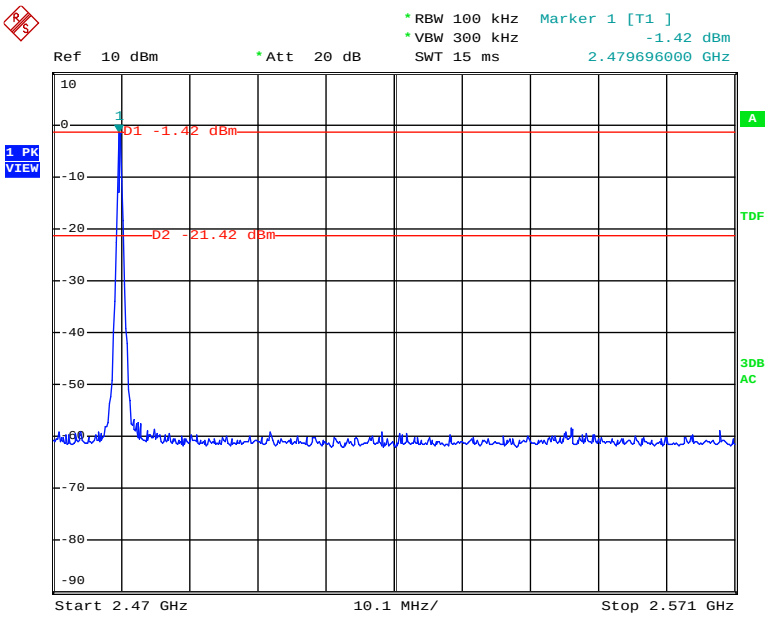
Date: 17.APR.2015 07:30:43

For Non-Hopping Mode

GFSK Mode

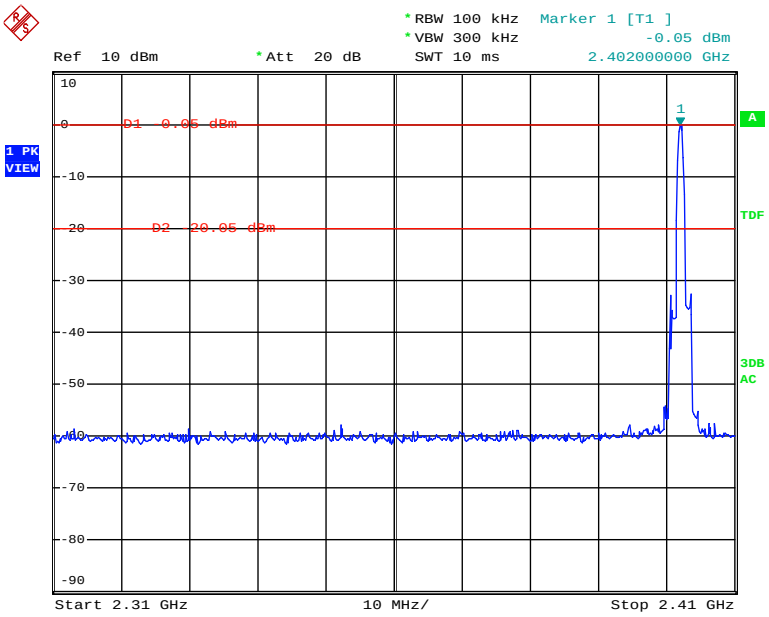


Date: 17.APR.2015 07:32:32

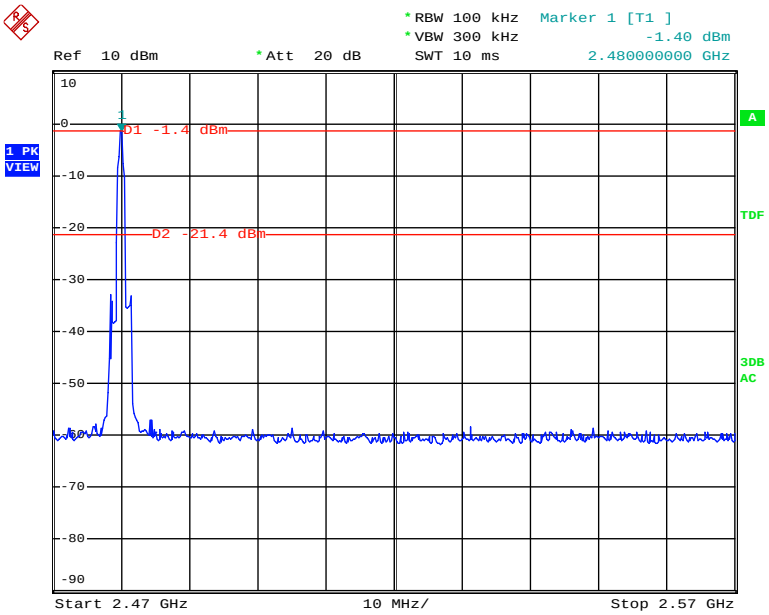


Date: 17.APR.2015 07:33:56

π/4-DQPSK Mode

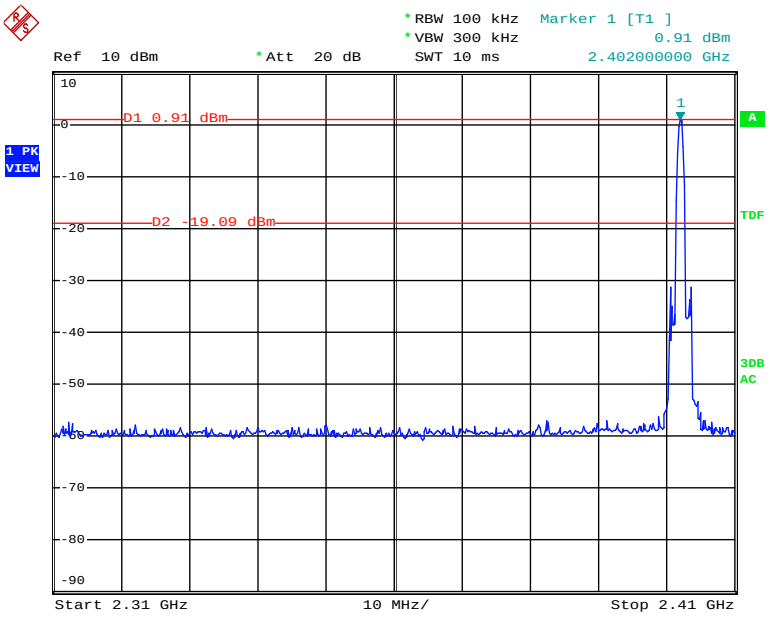


Date: 17.APR.2015 07:35:39

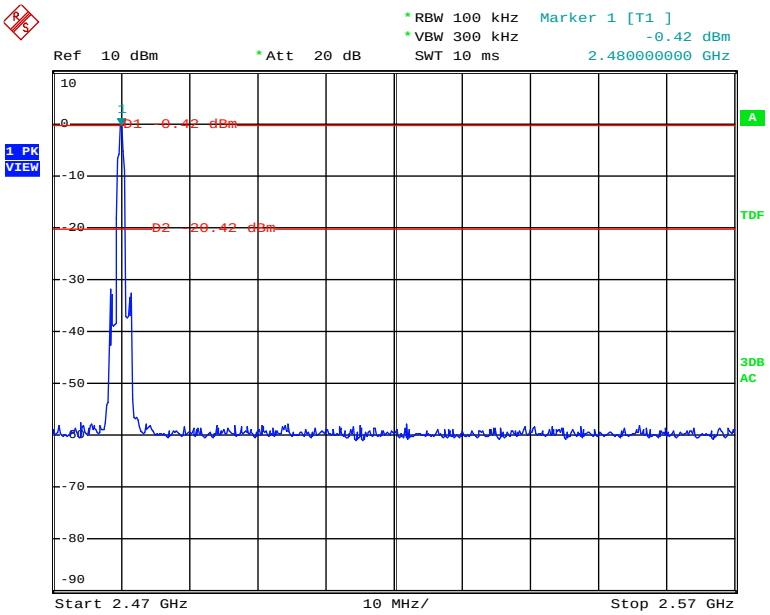


Date: 17.APR.2015 07:36:49

8DPSK Mode



Date: 17.APR.2015 07:38:35



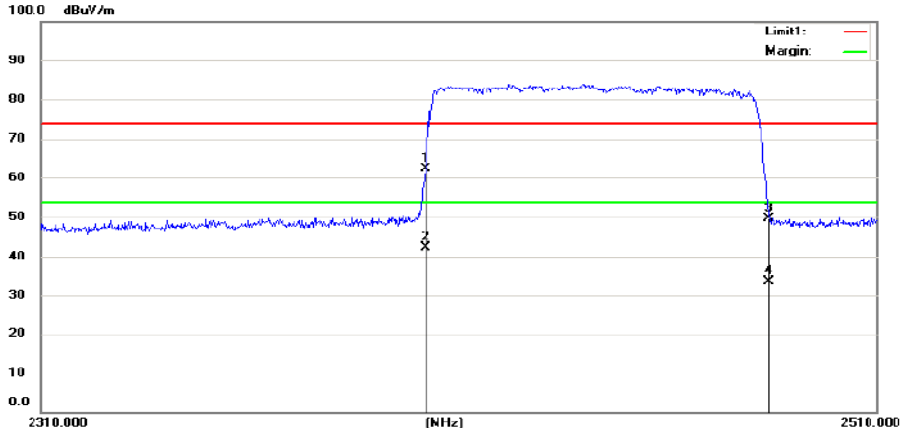
Date: 17.APR.2015 07:39:32

(B) Radiated Measurement

For Hopping Mode:

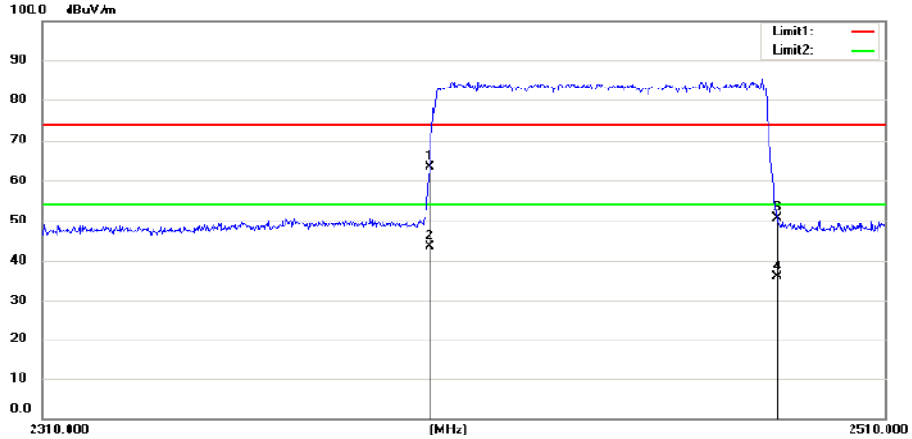
GFSK Mode

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	51.38	10.93	62.31	73.90	-11.59
2	*	2400.000	31.57	10.93	42.50	53.90	-11.40
3		2483.500	38.74	11.00	49.74	73.90	-24.16
4		2483.500	22.60	11.00	33.60	53.90	-20.30

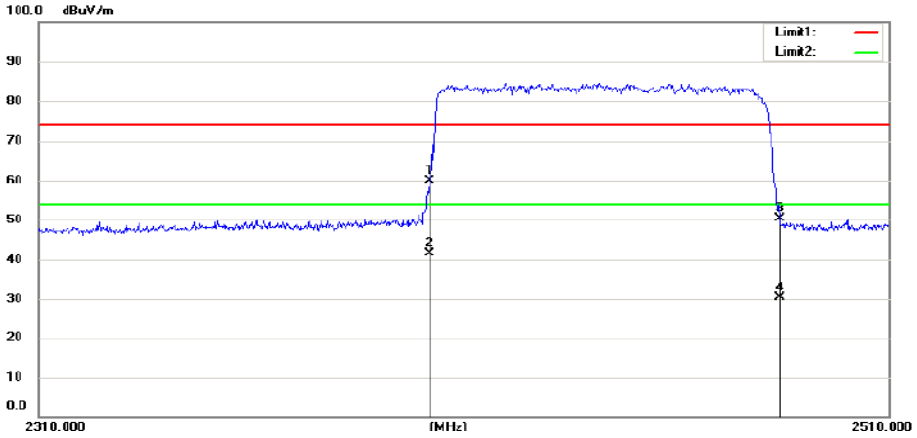
Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	52.56	10.93	63.49	73.90	-10.41
2	*	2400.000	32.67	10.93	43.60	53.90	-10.30
3		2483.500	39.61	11.00	50.61	73.90	-23.29
4		2483.500	24.80	11.00	35.80	53.90	-18.10

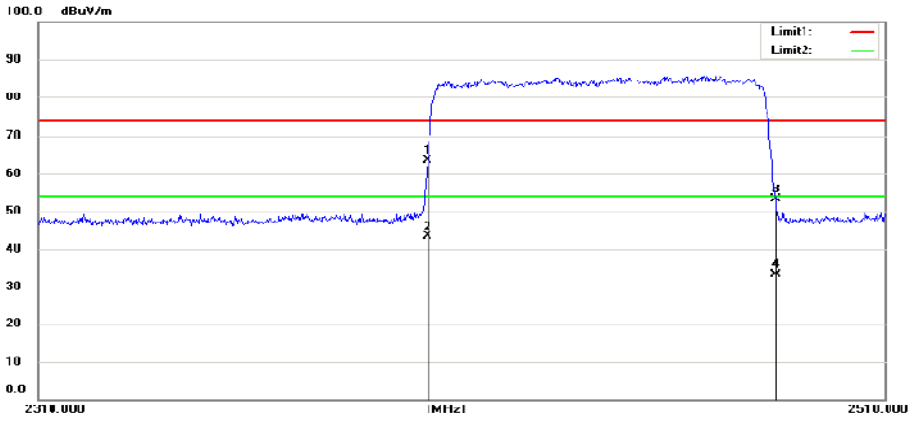
π/4-DQPSK Mode

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	48.99	10.93	59.92	73.90	-13.98
2	*	2400.000	30.77	10.93	41.70	53.90	-12.20
3		2483.500	39.30	11.00	50.30	73.90	-23.60
4		2483.500	19.40	11.00	30.40	53.90	-23.50

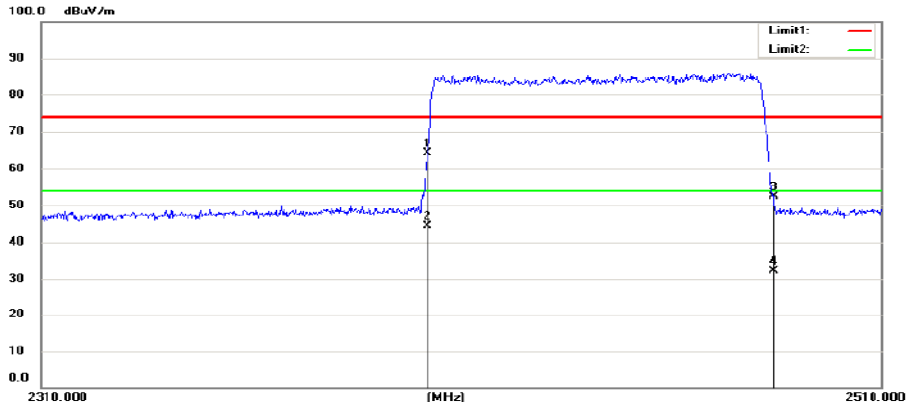
Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	52.54	10.93	63.47	73.90	-10.43
2	*	2400.000	32.57	10.93	43.50	53.90	-10.40
3		2483.500	42.20	11.00	53.20	73.90	-20.70
4		2483.500	22.30	11.00	33.30	53.90	-20.60

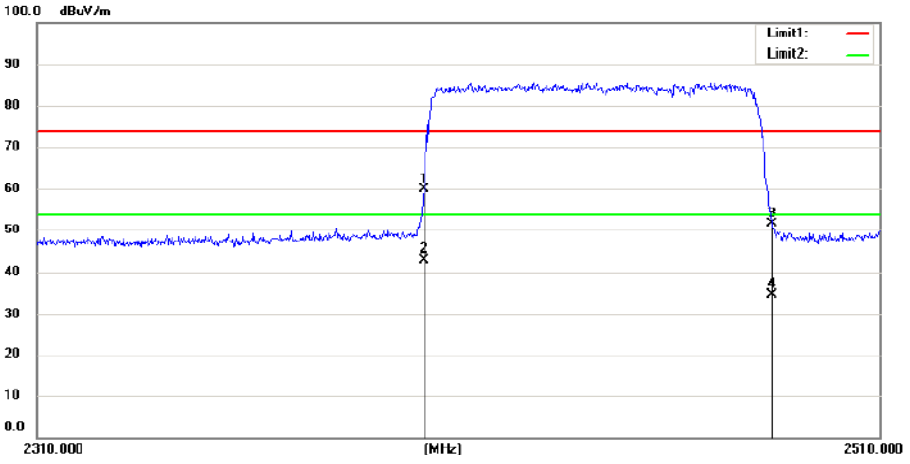
8DPSK Mode

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	53.20	10.93	64.13	73.90	-9.77
2	*	2400.000	33.37	10.93	44.30	53.90	-9.60
3		2483.500	41.41	11.00	52.41	73.90	-21.49
4		2483.500	21.20	11.00	32.20	53.90	-21.70

Horizontal:

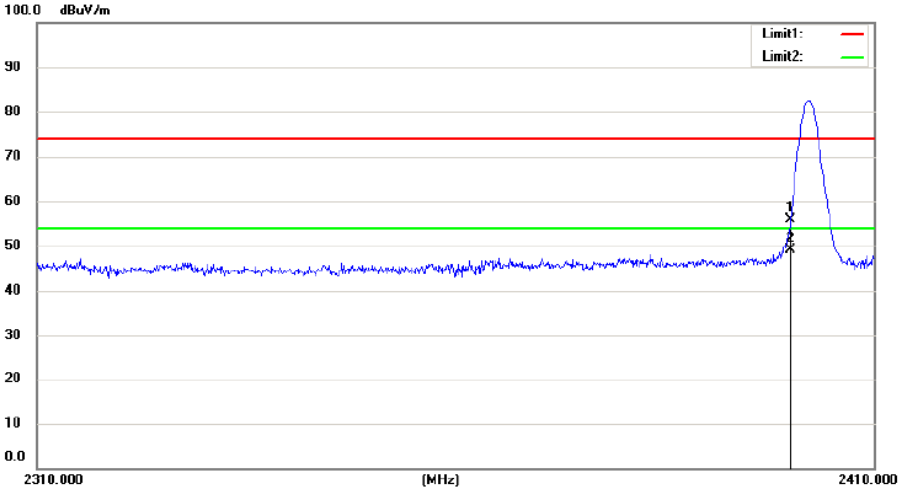


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	48.93	10.93	59.86	73.90	-14.04
2	*	2400.000	31.87	10.93	42.80	53.90	-11.10
3		2483.500	40.72	11.00	51.72	73.90	-22.18
4		2483.500	23.40	11.00	34.40	53.90	-19.50

For Non-Hopping Mode:

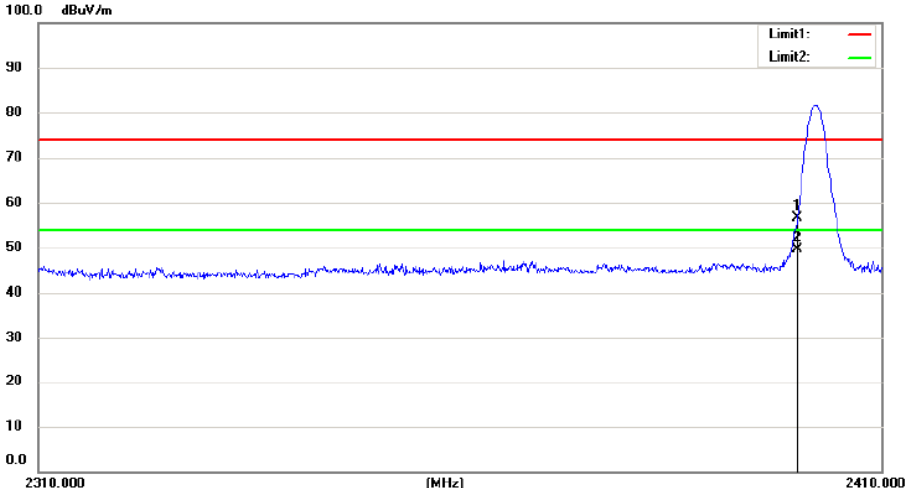
GFSK Mode

Low Channel (Vertical):



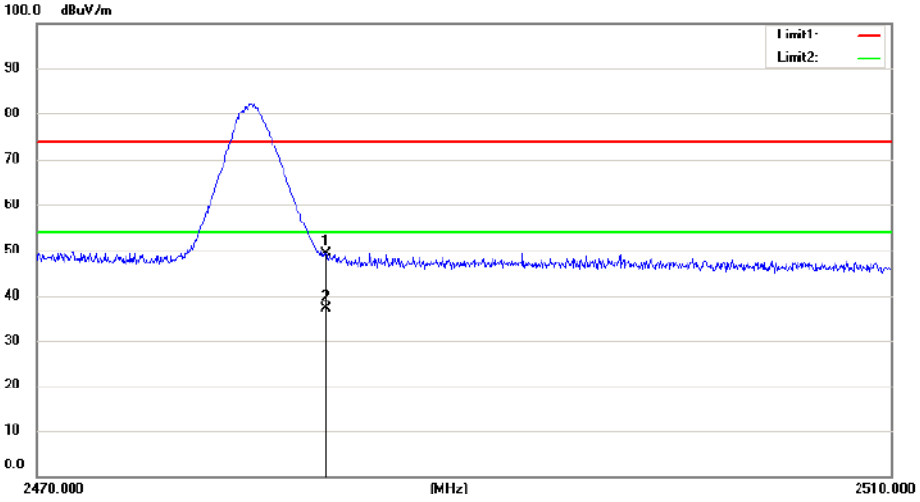
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	44.89	10.93	55.82	73.90	-18.08
2	*	2400.000	38.27	10.93	49.20	53.90	-4.70

Low Channel (Horizontal):



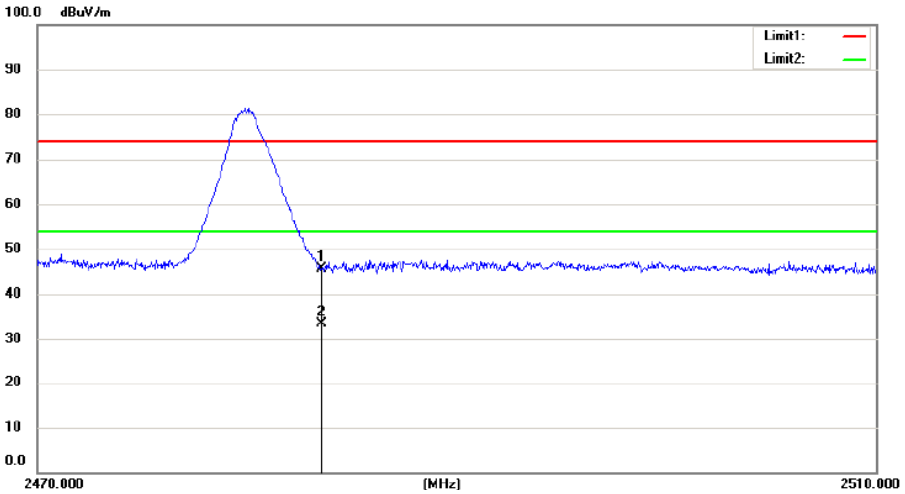
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	45.69	10.93	56.62	73.90	-17.28
2	*	2400.000	38.67	10.93	49.60	53.90	-4.30

High Channel (Vertical):



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2483.500	38.26	11.00	49.26	73.90	-24.64
2	*	2483.500	26.10	11.00	37.10	53.90	-16.80

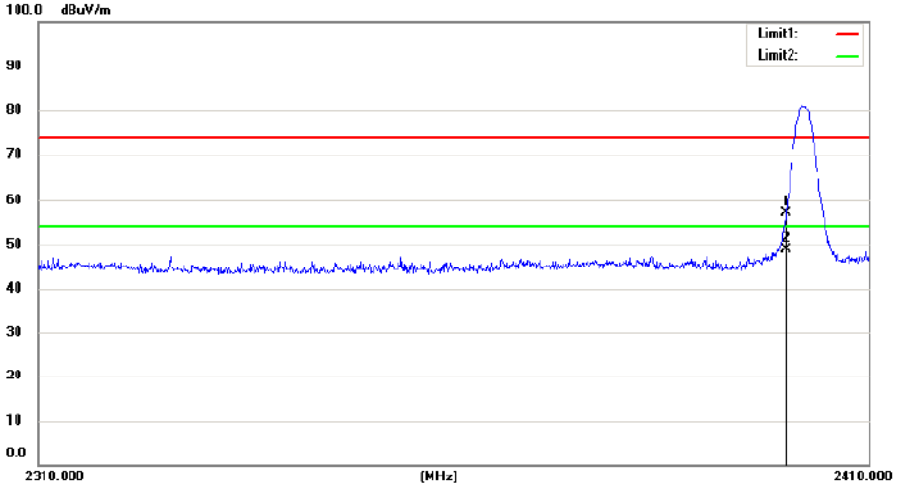
High Channel (Horizontal):



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2483.500	34.58	11.00	45.58	73.90	-28.32
2	*	2483.500	22.50	11.00	33.50	53.90	-20.40

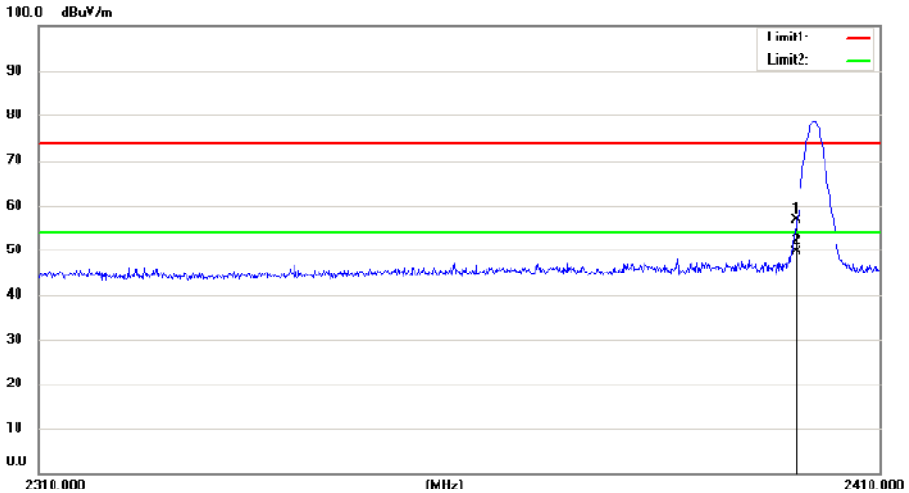
π/4-DQPSK Mode

Low Channel (Vertical):



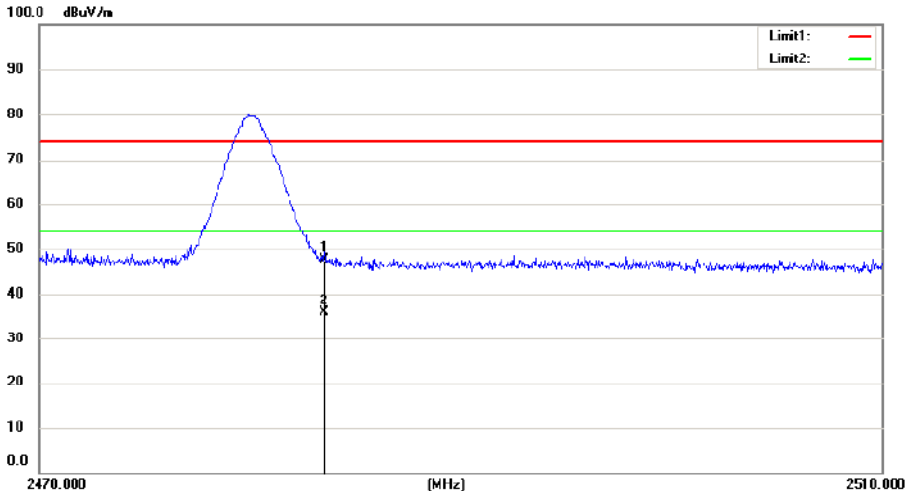
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	46.13	10.93	57.06	73.90	-16.84
2	*	2400.000	37.97	10.93	48.90	53.90	-5.00

Low Channel (Horizontal):



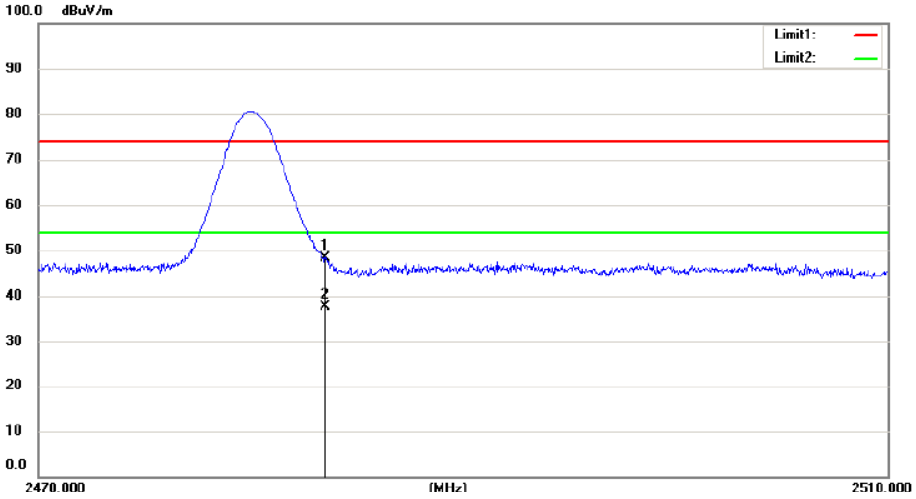
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	45.74	10.93	56.67	73.90	-17.23
2	*	2400.000	38.67	10.93	49.60	53.90	-4.30

High Channel (Vertical):



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2483.500	36.64	11.00	47.64	73.90	-26.26
2	*	2483.500	24.80	11.00	35.80	53.90	-18.10

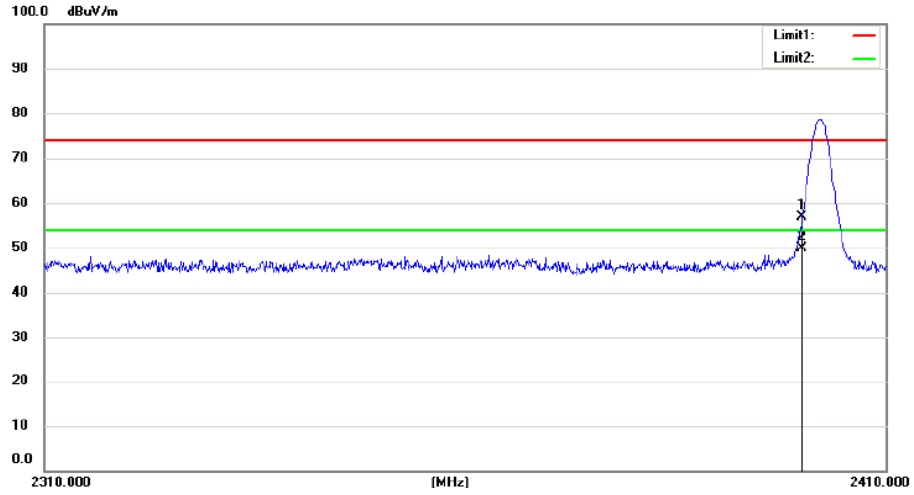
High Channel (Horizontal):



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2483.500	37.42	11.00	48.42	73.90	-25.48
2	*	2483.500	26.60	11.00	37.60	53.90	-16.30

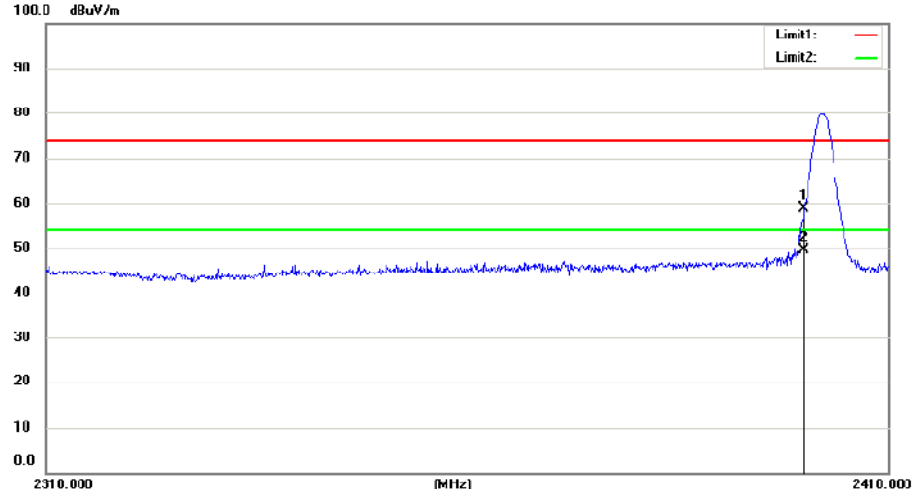
8DPSK Mode

Low Channel (Vertical):



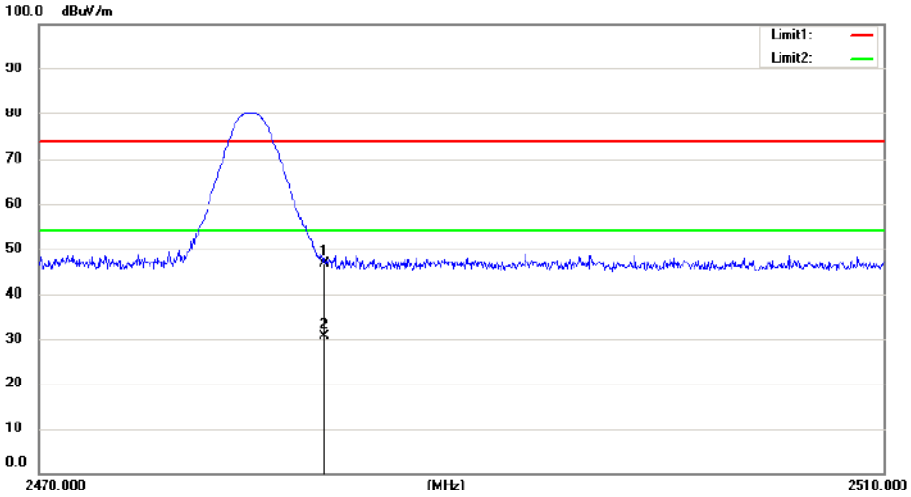
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	45.99	10.93	56.92	73.90	-16.98
2	*	2400.000	38.87	10.93	49.80	53.90	-4.10

Low Channel (Horizontal):



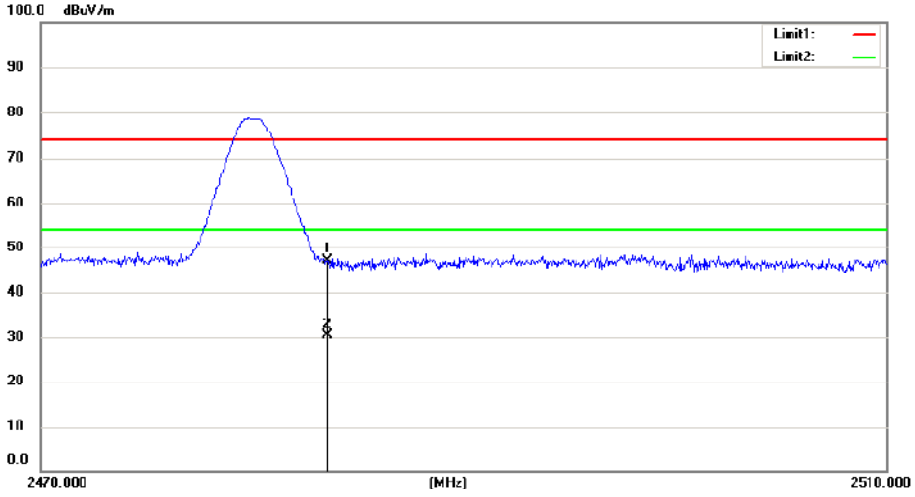
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2400.000	47.86	10.93	58.79	73.90	-15.11
2	*	2400.000	38.77	10.93	49.70	53.90	-4.20

High Channel (Vertical):



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2483.500	35.92	11.00	46.92	73.90	-26.98
2	*	2483.500	19.70	11.00	30.70	53.90	-23.20

High Channel (Horizontal):



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		2483.500	36.24	11.00	47.24	73.90	-26.66
2	*	2483.500	19.50	11.00	30.50	53.90	-23.40

12. Antenna Port Emission

12.1 Test Equipment

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	MY45107013	05/17/2014	05/16/2015

12.2 Measuring Instruments and setting

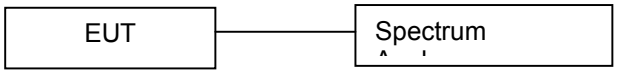
The following table is the setting of spectrum analyzer.

Attenuation	Auto
RB	100kHz
VB	300kHz
Detector	Peak
Trace	Max hold

12.3 Test Procedures

The conducted spurious emissions were measured conducted using a spectrum analyzer at low, mid, and hi channels, the limit was determined by attenuation 20dB of the RF peak power output.

12.4 Block Diagram of Test setup

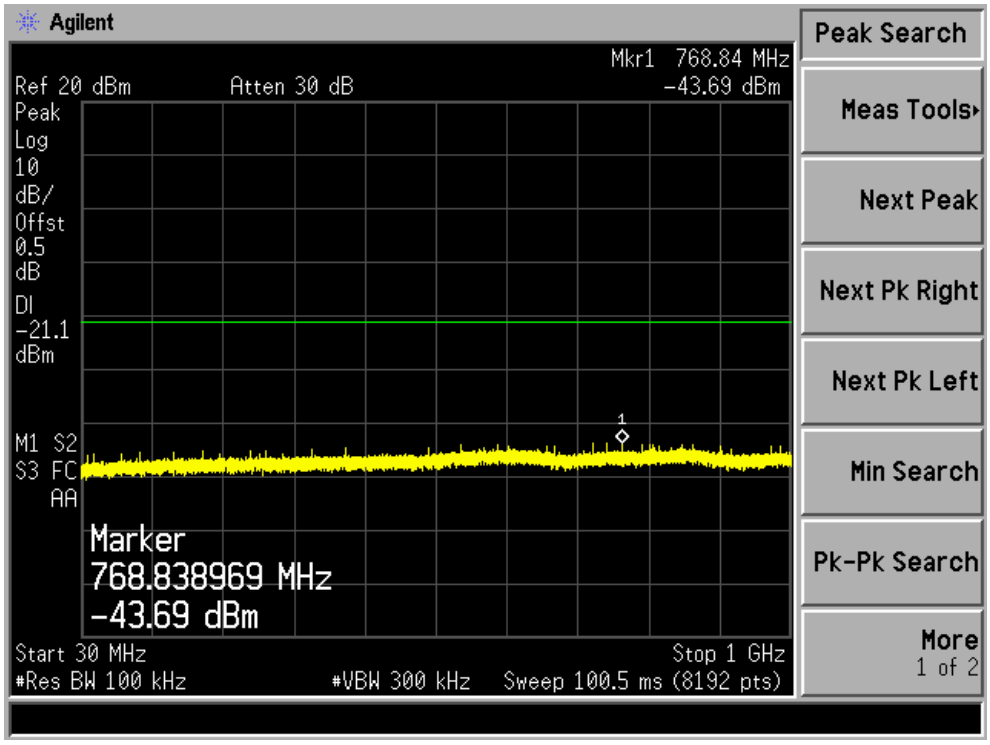


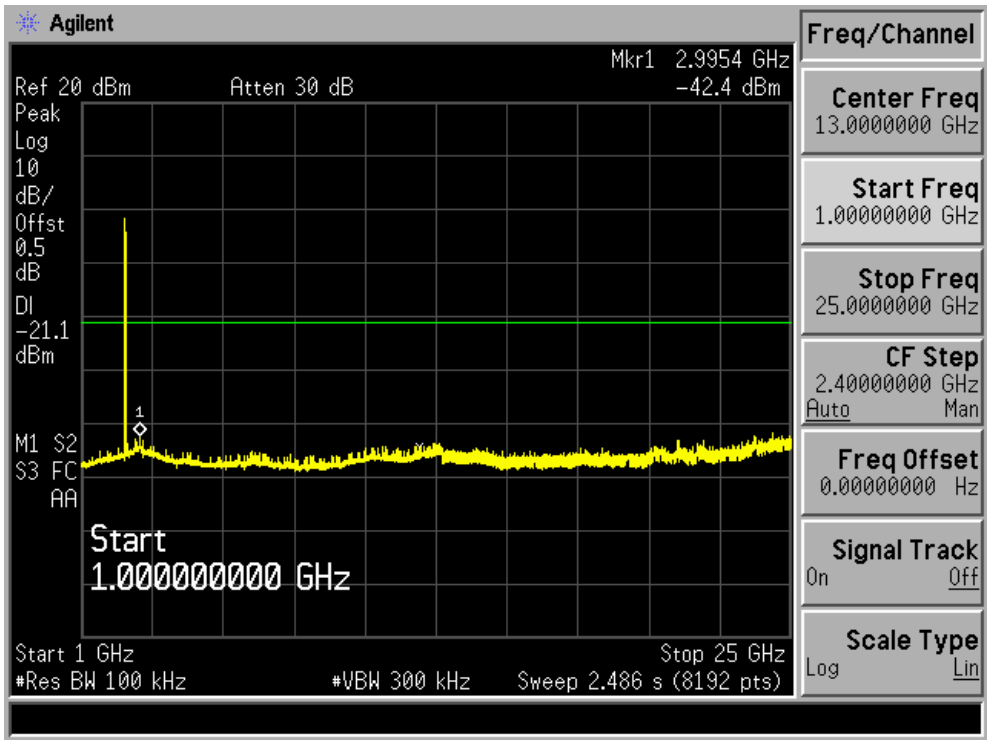
12.5 Test Result

PASS.

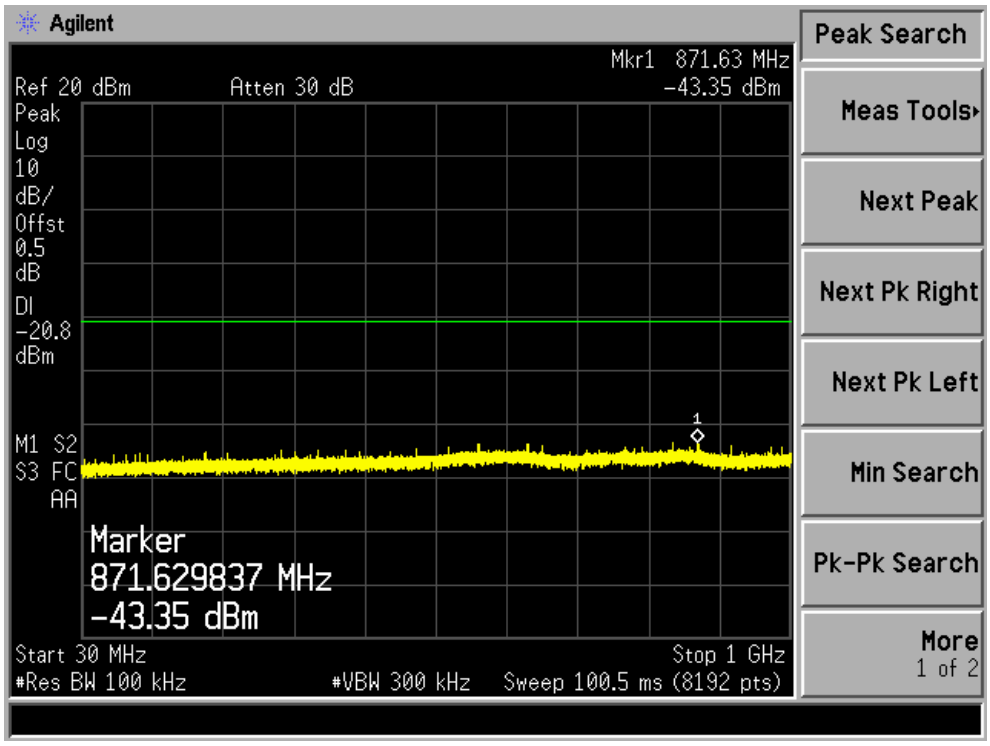
(Bluetooth (GFSK, pi/4-DQPSK, 8DPSK) mode have been tested, and the worst result(GFSK) was report as below.)

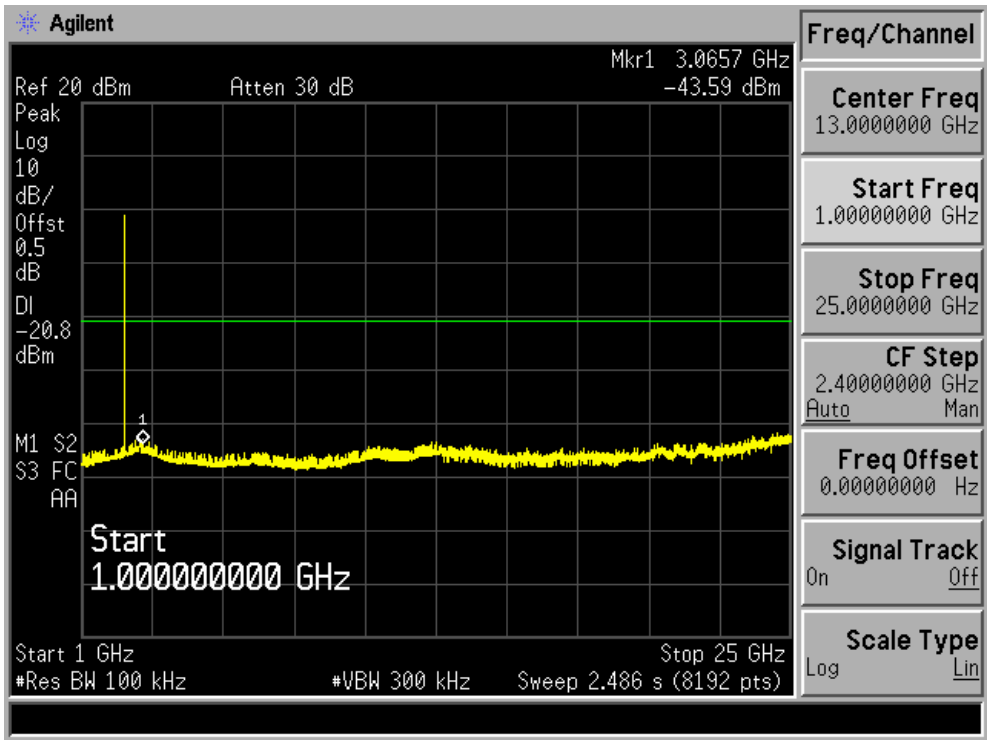
GFSK Mode: Low channel



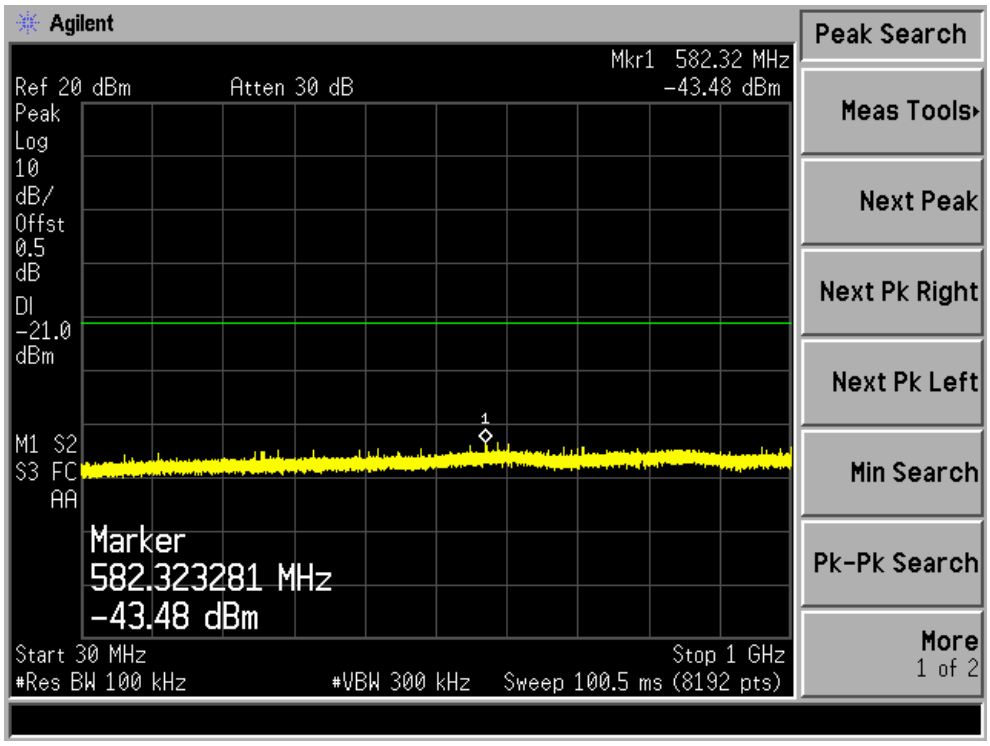


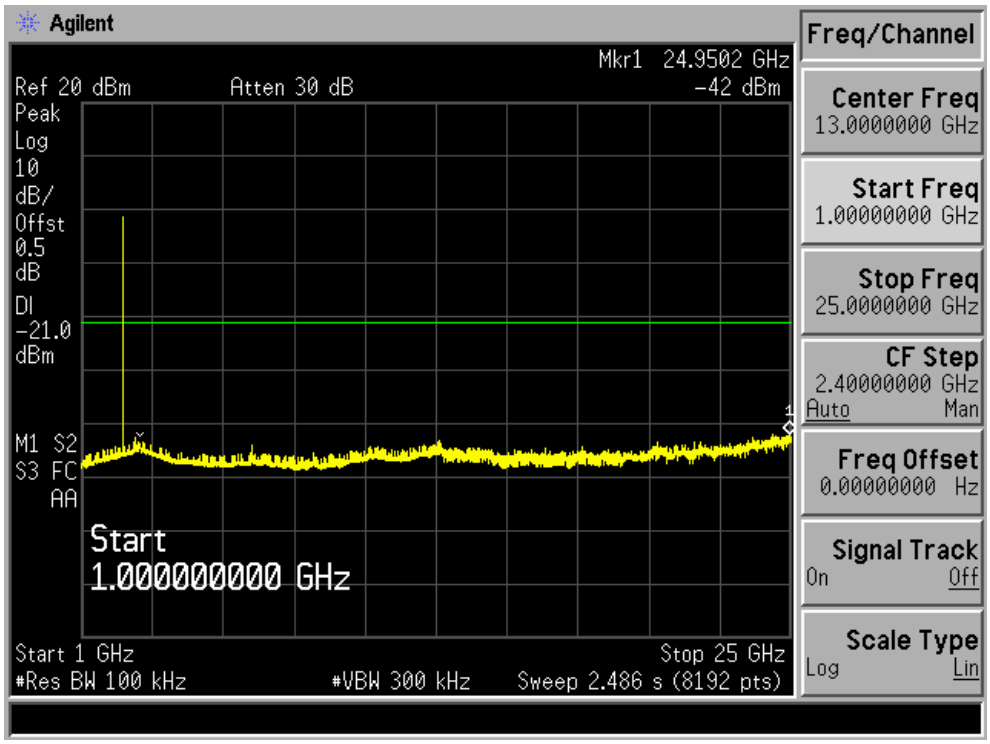
GFSK Mode: Middle channel





GFSK Mode: High channel





13. Antenna Application

13.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.240.

FCC part 15C section 15.247 requirements:
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

13.2 Result

The EUT's antenna integrated on PCB, The antenna's gain is 0 dBi and meets the requirement

---The End---