ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPARTC REQUIREMENT

OF

HOME THEATER SPEAKER SYSTEM WITH BLUETOOTH

MODEL No.: CHT914n, SBB-9115, CHT914, CHT914A, CHT916, CHT916BT

FCC ID: OKUCHT914N

Trade Mark: CRAIG

REPORT NO: ES121207039E

ISSUE DATE: December 26, 2012

Prepared for

Shenzhen Junlan Electronic Ltd
District 2 type A plant in the second layer 1-4, NO.2 Industrial Fuyuan Tangwei Fuyong Baoan Shenzhen China

Prepared by
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VERIFICATION OF COMPLIANCE

Applicant:	Shenzhen Junlan Electronic Ltd District 2 type A plant in the second layer 1-4, NO.2 Industrial Fuyuan Tangwei Fuyong Baoan Shenzhen China
Manufacturer:	Shenzhen Junlan Electronic Ltd District 2 type A plant in the second layer 1-4, NO.2 Industrial Fuyuan Tangwei Fuyong Baoan Shenzhen China
Product Description:	HOME THEATER SPEAKER SYSTEM WITH BLUETOOTH
Model Number:	CHT914n, SBB-9115, CHT914, CHT914A, CHT916, CHT916BT
Trade Mark:	CRAIG
Serial Number:	N/A
File Number:	ES121207039E
Date of Test:	December 07, 2012 to December 26, 2012

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 C63.4 (2009) 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 : December 07, 2012 to December 26, 2012

Prepared by : Aaron Lai/Editor

Reviewer : King Wang/Supervisor

Approve & Authorized Signer : Lisa Wang/Manager

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1. GENERAL INFORMATION

1.1 Product Description

The SHENZHEN JUNLAN ELECTRONIC LTD

The EUT is a short range, lower power, HOME THEATER SPEAKER SYSTEM WITH BLUETOOTH designed as a Device. It is designed by way of utilizing the GFSK, 1/4∏-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, 1/4∏-DQPSK, 8DPSK
C). Number of Channel: 79
D). Channel space: 1MHz
E). RF Output Power: 1.95dBm
F). BIT Rate of Transmission: 1Mbps, 2Mbps, 3Mbps
G). Antenna Type: PCB antenna
H). Antenna GAIN: 0dBi
H). Rating: AC 120V, 60Hz

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: OKUCHT914N filing to comply with Section 15.247 of the FCC Part 15 Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2009) and FCC Public Notice DA 00-705. 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, 2010.10.29
The certificate is valid until 2013.10.28
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, October 28, 2010
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 13.1.4.1 of ANSI C63.4-2009 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 EUT is a placed on as turn table which is 0.8 m above ground plane. 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 hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009.

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 20 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)	Quantity of Hopping Channel	Limit(kHz) 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(25Channel)	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

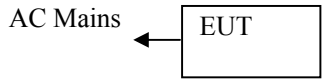
FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

Frequency (MHz)	Field strength μV/m	Distance(m)	Field strength at 3m dBμV/m
0.009~0.490	2400/F(KHz)	300	See the remark
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

Fig. 2-1 Configuration of Tested System



2.6 Equipment Used in Tested System

Equipment	Mfr/Brand	Model/Type No.	FCC ID / IC	Series No.	Note
HOME THEATER SPEAKER SYSTEM WITH BLUETOOTH	JUNLAN ELECTRONIC LTD	CHT914n	FCC ID: OKUCHT914N	N/A	EUT

2.7 Description of test modes

The EUT has been tested under TX operating condition.
This EUT is a FHSS system, 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 GFSK, 1/4Π -DQPSK, 8DPSK have been tested and the worst result was reported with modulation GFSK. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

Channel	Frequency(MHz)
1	2402
40	2441
79	2480

3. Summary of Test Results

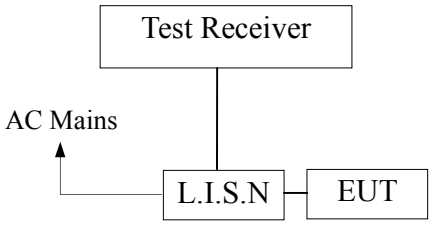
FCC Rule	Description Of Test	Result
15.247(a)(1)	Channel Separation test	Compliant
15.247(a)(1)	20dB Bandwidth	Compliant
15.247(a)(1)	Quantity of Hopping Channel	Compliant
15.247(a)(1)	Time of Occupancy (Dwell Time)	Compliant
15.247(b)(1)	Max Peak output Power test	Compliant
15.247(d)	Band edge test	Compliant
15.207	AC Power Conducted Emission	Compliant
15.247(d)	Radiated Emission	Compliant
§15.247(d)	Antenna Port Emission	Compliant
15.203&15.247(b)	Antenna Application	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 six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used:

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2012	05/28/2013
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2012	05/28/2013
50ΩCoaxial Switch	Anritsu	MP59B	M20531	05/29/2012	05/28/2013

4.4 Conducted Emission Limit

(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:

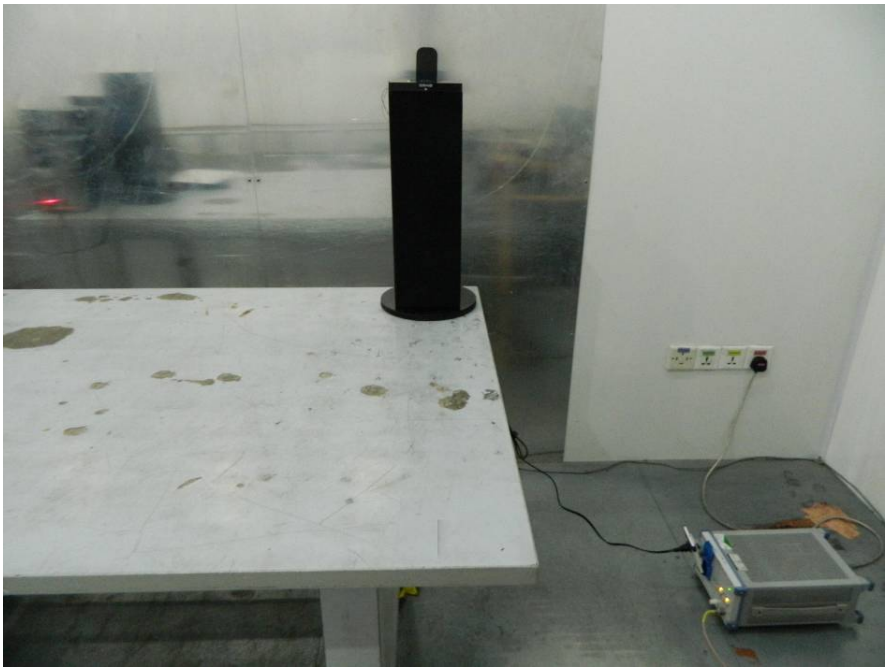
1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.5 Measurement Result:

Date of Test:	December 10, 2012	Temperature:	22℃
Frequency Detector:	0.15~30MHz	Humidity:	50%
Test Result:	PASS	Test Mode:	TX Mode

Test Line	Frequency MHz	Emission Level QP dB(μV)	Emission Level AV dB(μV)	Limits QP dB(μV)	Limits AV dB(μV)	Margin QP dB(μV)	Margin AV dB(μV)
Line	0.15	25.47	9.88	66.00	56.00	-40.53	-46.12
	0.19	19.93	9.02	64.04	54.04	-44.11	-45.02
	8.00	20.40	8.29	60.00	50.00	-39.60	-41.71
	19.10	31.23	21.72	60.00	50.00	-28.77	-28.28
	20.20	29.68	22.81	60.00	50.00	-30.32	-27.19
	24.05	23.25	17.77	60.00	50.00	-36.75	-32.23
Neutral	0.15	27.47	9.70	66.00	56.00	-38.53	-46.30
	0.19	18.68	8.95	64.04	54.04	-45.36	-45.09
	7.40	19.87	8.24	60.00	50.00	-40.13	-41.76
	14.60	19.53	9.15	60.00	50.00	-40.47	-40.85
	19.50	29.21	21.22	60.00	50.00	-30.79	-28.78
	24.00	21.79	15.45	60.00	50.00	-38.21	-34.55

4.6 Conducted Measurement Photos:



5. Radiated Emission Test

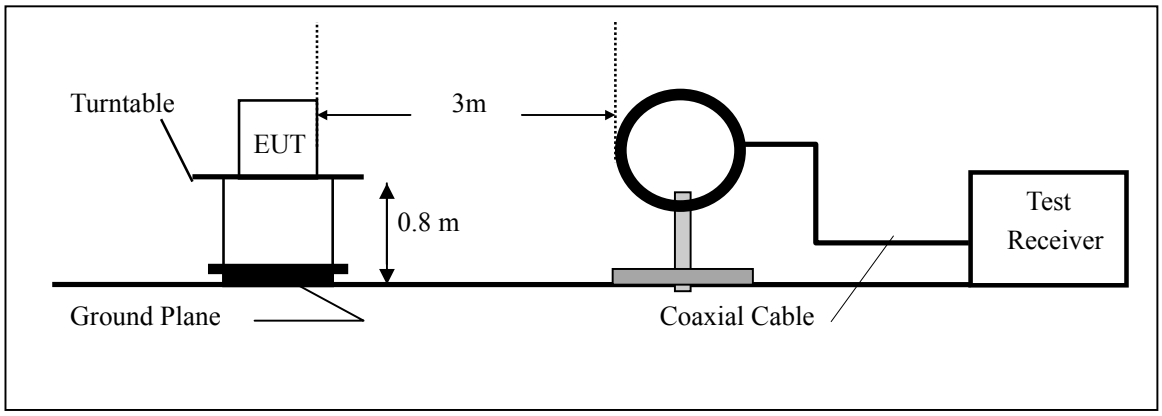
5.1 Measurement Procedure

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.

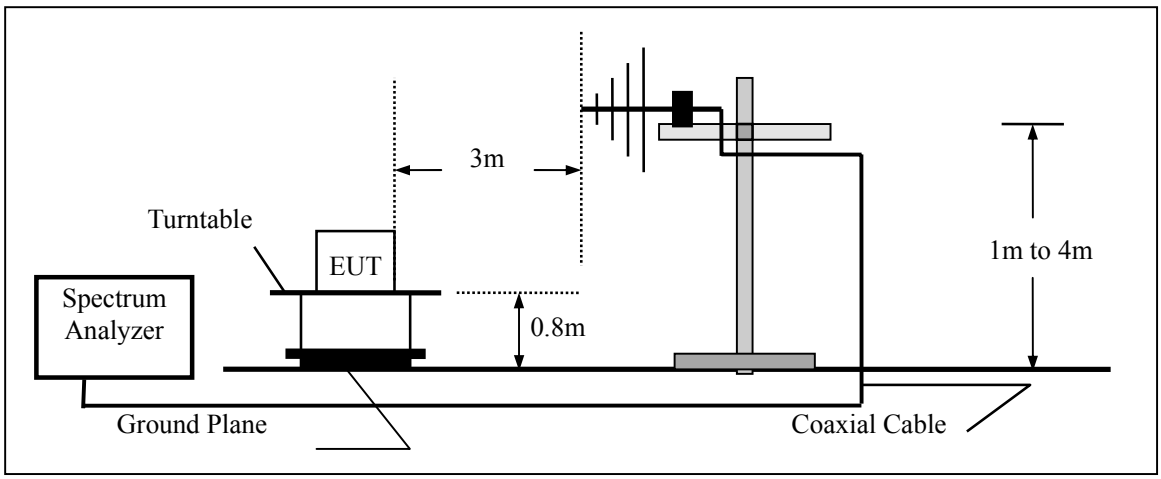
When spectrum scanned from 30 MHz to 1GHz setting resolution bandwidth 100 kHz and video bandwidth 300kHz. And spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz.

5.2 Test SET-UP (Block Diagram of Configuration)

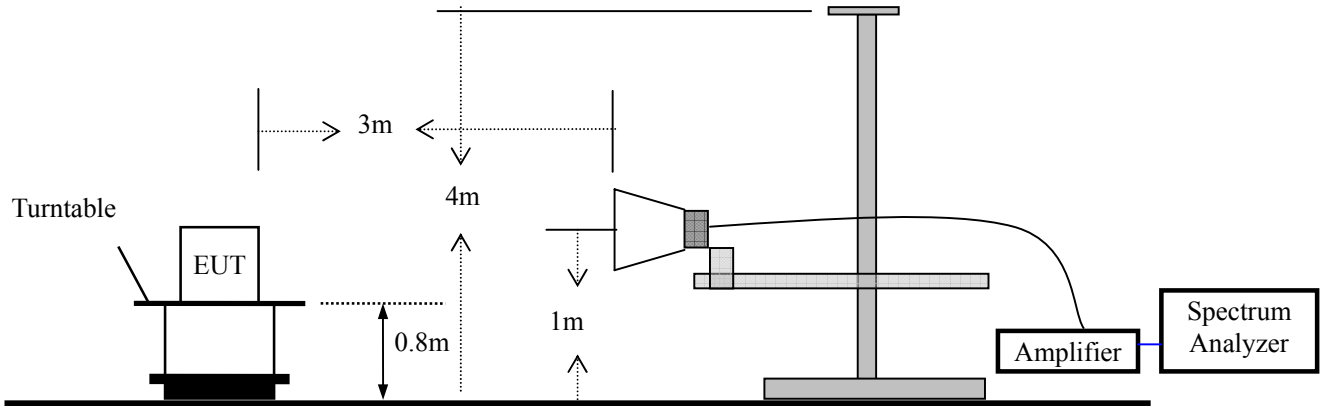
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



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



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



5.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSP7	839511/010	05/29/2012	05/28/2013
Spectrum Analyzer	HP	E4407B	839840481	05/29/2012	05/28/2013
EMI Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2012	05/28/2013
Pre-Amplifier	HP	8447D	2944A07999	05/29/2012	05/28/2013
Bilog Antenna	Schwarzbeck	VULB9163	142	05/29/2012	05/28/2013
Loop Antenna	ARA	PLA-1030/B	1029	05/29/2012	05/28/2013
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/29/2012	05/28/2013
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/29/2012	05/28/2013

5.4 Measurement Result

All the modulation modes were tested the data of the worst mode (GFSK) are recorded in the following pages and the others modulation methods do not exceed the limits.

Operation Mode:	Bluetooth Mode	Test Date :	December 10, 2012
Frequency Range:	9KHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	WOLF

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Operation Mode:	2402MHz	Test Date :	December 10, 2012
Frequency Range:	30~1000MHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KL

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
42.44	V	34.52	40.00	-5.48	QP
95.29	V	35.57	46.00	-10.43	QP
143.48	V	36.64	46.00	-9.36	QP
191.67	V	40.55	46.00	-5.45	QP
336.23	V	41.06	46.00	-4.94	QP
365.77	V	35.94	46.00	-10.06	QP
47.10	H	35.88	43.50	-7.62	QP
159.02	H	37.90	43.50	-5.60	QP
288.04	H	40.60	46.00	-5.40	QP
351.78	H	37.50	46.00	-8.50	QP
446.60	H	37.19	46.00	-8.81	QP
480.80	H	40.66	46.00	-5.34	QP

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) EUT stood on the table position is the worst case result in the report.

Operation Mode:	2441MHz	Test Date :	December 10, 2012
Frequency Range:	30~1000MHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KL

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
40.88	V	34.61	40.00	-5.39	QP
288.04	V	36.60	46.00	-9.40	QP
336.23	V	39.65	46.00	-6.35	QP
350.22	V	40.92	46.00	-5.08	QP
367.32	V	39.21	46.00	-6.79	QP
480.80	V	35.97	46.00	-10.03	QP
159.02	H	35.29	43.50	-8.21	QP
191.67	H	36.00	43.50	-7.50	QP
239.86	H	36.41	46.00	-9.59	QP
288.04	H	40.95	46.00	-5.05	QP
367.32	H	37.71	46.00	-8.29	QP
449.71	H	36.78	46.00	-9.22	QP

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) EUT stood on the table position is the worst case result in the report.

Operation Mode:	2480MHz	Test Date :	December 10, 2012
Frequency Range:	30~1000MHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KL

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
47.10	V	33.48	40.00	-6.52	QP
95.29	V	31.90	43.50	-11.60	QP
288.04	V	36.55	46.00	-9.45	QP
336.23	V	40.48	46.00	-5.52	QP
350.22	V	40.41	46.00	-5.59	QP
480.80	V	36.33	46.00	-9.67	QP
71.97	H	29.72	40.00	-10.28	QP
143.48	H	33.33	43.50	-10.17	QP
159.02	H	34.21	43.50	-9.29	QP
288.04	H	38.41	46.00	-7.59	QP
454.38	H	37.28	46.00	-8.72	QP
480.80	H	40.04	46.00	-5.96	QP

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) EUT stood on the table position is the worst case result in the report.

Operation Mode:	CH1: 2402MHz	Test Date :	December 10, 2012
Frequency Range:	1-25GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
10916.66	V	55.64	43.25	74.00	54.00	-18.36	-10.75
13722.75	V	56.71	43.98	74.00	54.00	-17.29	-10.02
14185.89	V	55.99	41.68	74.00	54.00	-18.01	-12.32
10017.62	H	56.71	44.47	74.00	54.00	-17.29	-9.53
10371.79	H	57.36	43.09	74.00	54.00	-16.64	-10.91
10834.93	H	57.44	42.72	74.00	54.00	-16.56	-11.28

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.247.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operation Mode:	CH40: 2441MHz	Test Date :	December 10, 2012
Frequency Range:	1-25GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
10426.28	V	57.08	43.47	74.00	54.00	-16.92	-10.53
10971.15	V	58.06	43.32	74.00	54.00	-15.94	-10.68
13695.51	V	57.20	43.01	74.00	54.00	-16.80	-10.99
11134.61	H	58.27	43.94	74.00	54.00	-15.73	-10.06
13259.61	H	57.23	41.13	74.00	54.00	-16.77	-12.87
13668.26	H	58.05	42.95	74.00	54.00	-15.95	-11.05

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.247.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operation Mode:	CH79: 2480MHz	Test Date :	December 10, 2012
Frequency Range:	1-25GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) PK	Emission Level(dBuV/m) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
7565.71	V	52.48	39.99	74.00	54.00	-21.52	-14.01
9881.41	V	57.21	43.14	74.00	54.00	-16.79	-10.86
10399.03	V	57.63	43.82	74.00	54.00	-16.37	-10.18
11080.12	H	57.34	43.74	74.00	54.00	-16.66	-10.26
11461.53	H	56.27	42.56	74.00	54.00	-17.73	-11.44
13395.83	H	57.34	43.97	74.00	54.00	-16.66	-10.03

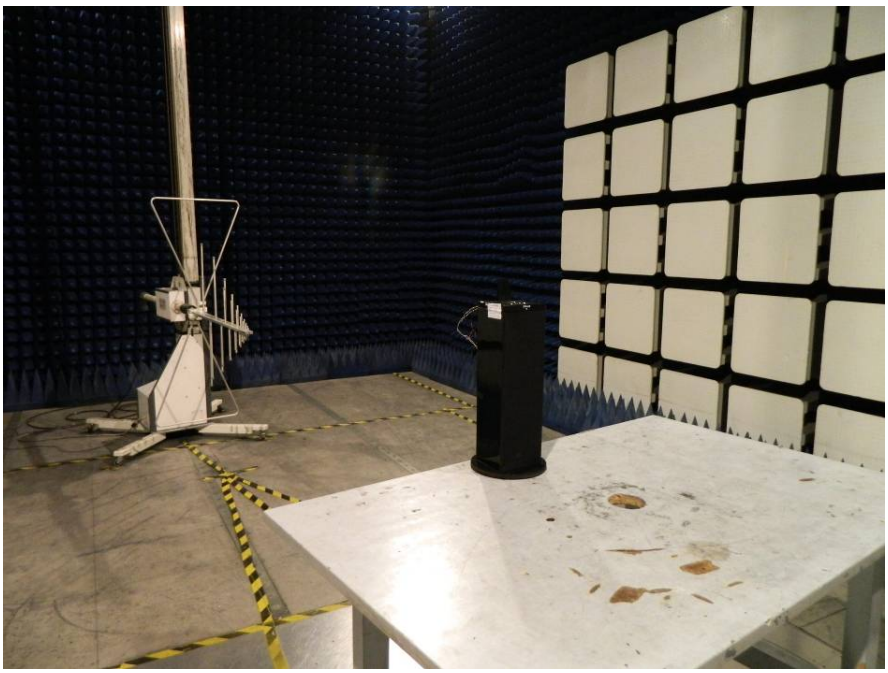
No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.247.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5.5 Radiated Measurement Photos:

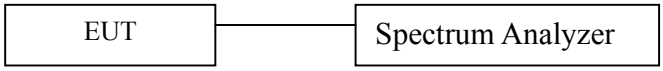


6. Channel Separation test

6.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed 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:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	88156318	05/29/2012	05/28/2013

6.4 Measurement Results:

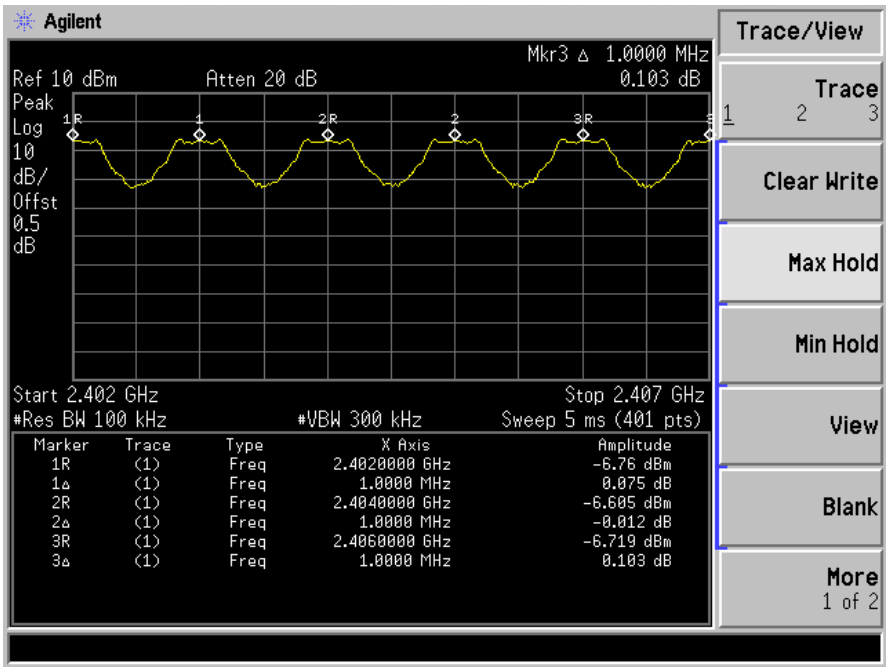
The following table is the setting of spectrum analyzer.

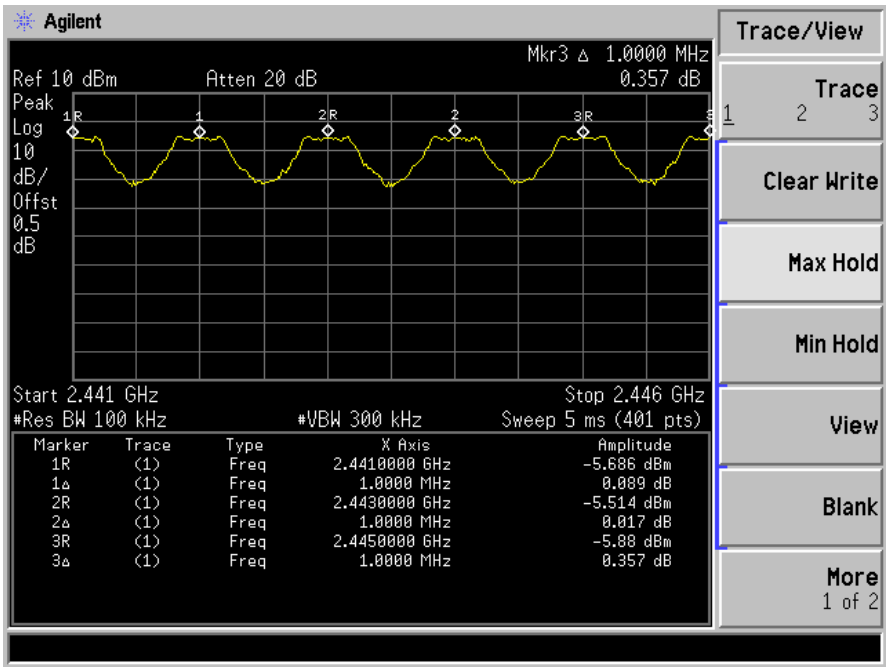
EMI Test Receiver	Setting
Attenuation	Auto
RB	100kHz
VB	300kHz
Detector	Peak
Trace	Max hold

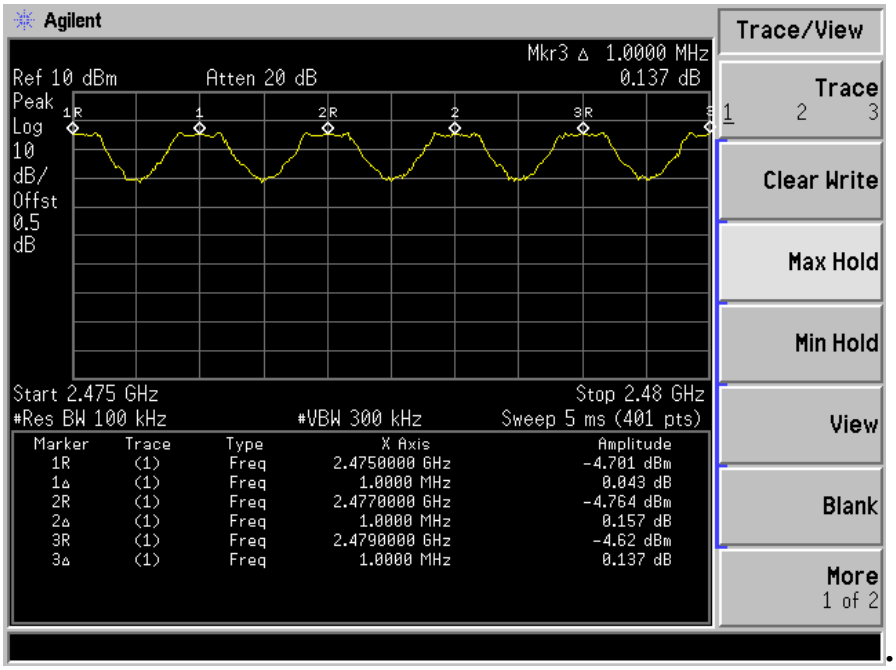
All the modes GFSK, 1/4Π-DQPSK,8DPSK have been tested and the worst result recorded in the following pages.
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Modulation:	GFSK		

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1000.00	>885.167 kHz
40	2441	1000.00	>852.060 kHz
79	2480	1000.00	>825.871 kHz

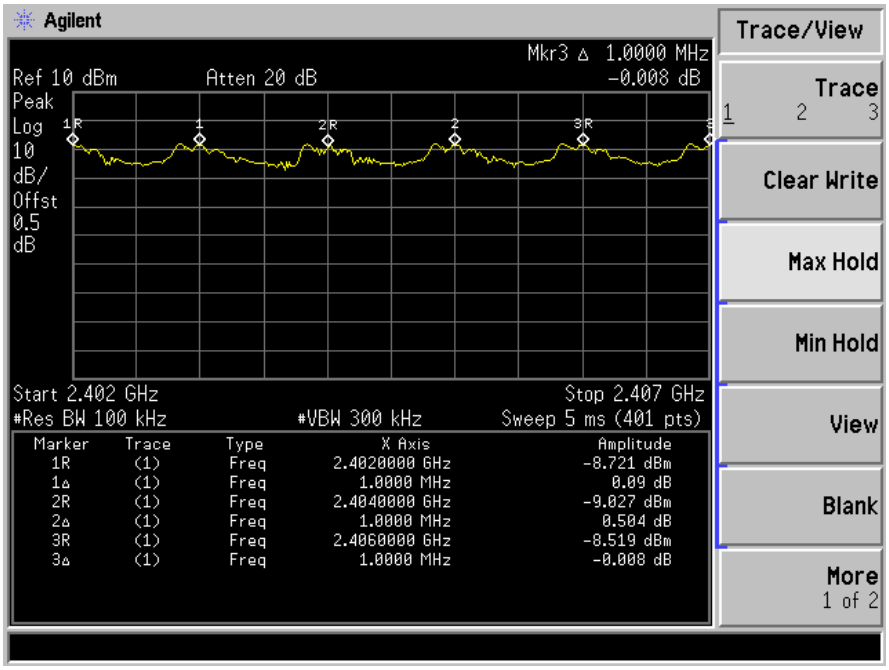

Agilent
Trace/View
Mkr3 Δ 1.0000 MHz
Ref 10 dBm
Atten 20 dB
0.103 dB
Peak
Log
10
dB/
Offst
0.5
dB
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.402 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.407 GHz
Sweep 5 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.4020000 GHz -6.76 dBm
1Δ (1) Freq 1.0000 MHz 0.075 dB
2R (1) Freq 2.4040000 GHz -6.605 dBm
2Δ (1) Freq 1.0000 MHz -0.012 dB
3R (1) Freq 2.4060000 GHz -6.719 dBm
3Δ (1) Freq 1.0000 MHz 0.103 dB

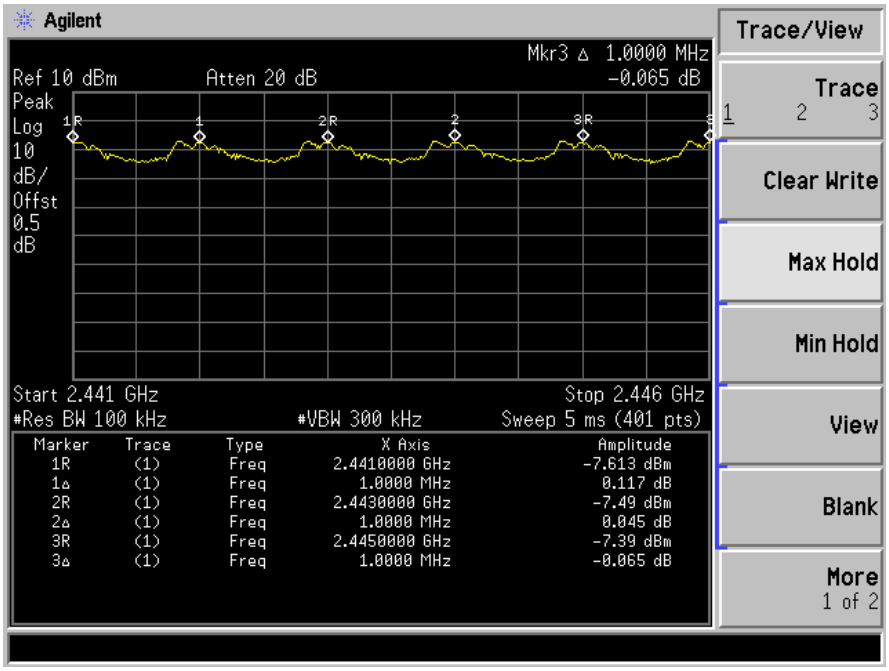

Agilent
Trace/View
Mkr3 Δ 1.0000 MHz
Ref 10 dBm
Atten 20 dB
0.357 dB
Peak
Log
10
dB/
Offst
0.5
dB
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.441 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.446 GHz
Sweep 5 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.4410000 GHz -5.686 dBm
1Δ (1) Freq 1.0000 MHz 0.089 dB
2R (1) Freq 2.4430000 GHz -5.514 dBm
2Δ (1) Freq 1.0000 MHz 0.017 dB
3R (1) Freq 2.4450000 GHz -5.88 dBm
3Δ (1) Freq 1.0000 MHz 0.357 dB

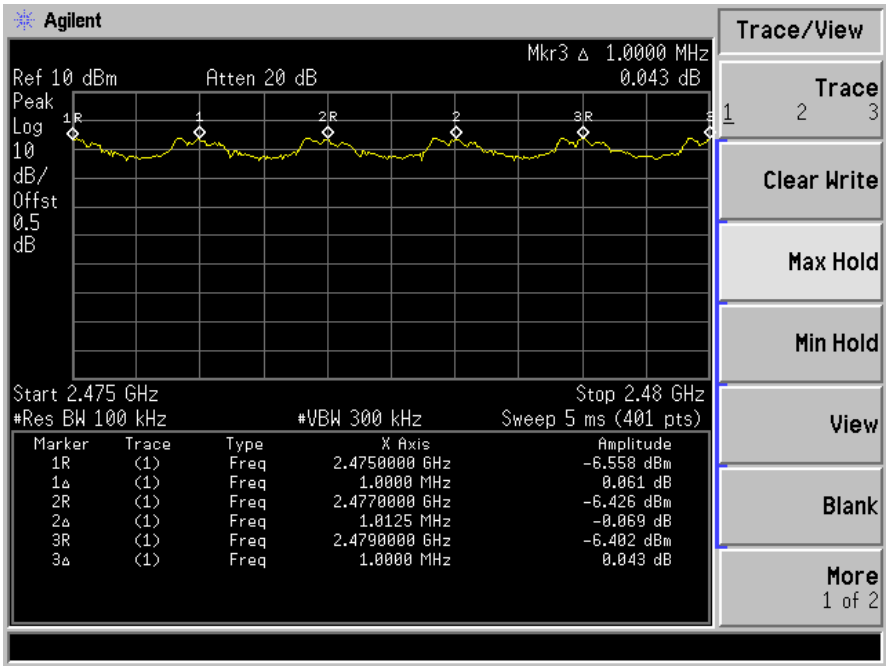


Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Modulation:	1/4∏-DQPSK		

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1000.00	>806.00 kHz
40	2441	1000.00	>800.66 kHz
79	2480	1000.00	>801.33 kHz

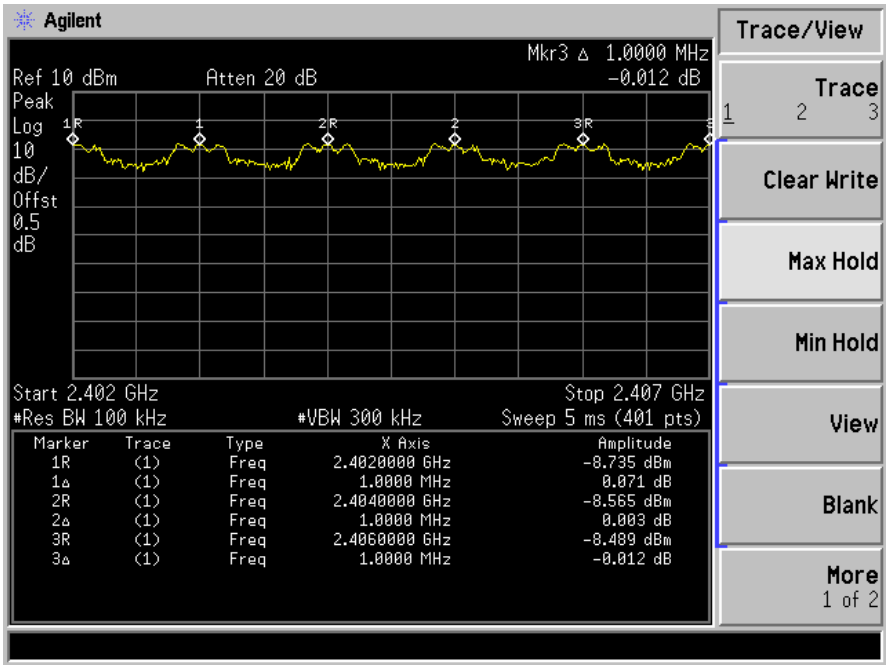

Agilent
Trace/View
Mkr3 Δ 1.0000 MHz
Ref 10 dBm
Atten 20 dB
-0.008 dB
Peak
Log
10
dB/
Offst
0.5
dB
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.402 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.407 GHz
Sweep 5 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.4020000 GHz -8.721 dBm
1Δ (1) Freq 1.0000 MHz 0.09 dB
2R (1) Freq 2.4040000 GHz -9.027 dBm
2Δ (1) Freq 1.0000 MHz 0.504 dB
3R (1) Freq 2.4060000 GHz -8.519 dBm
3Δ (1) Freq 1.0000 MHz -0.008 dB

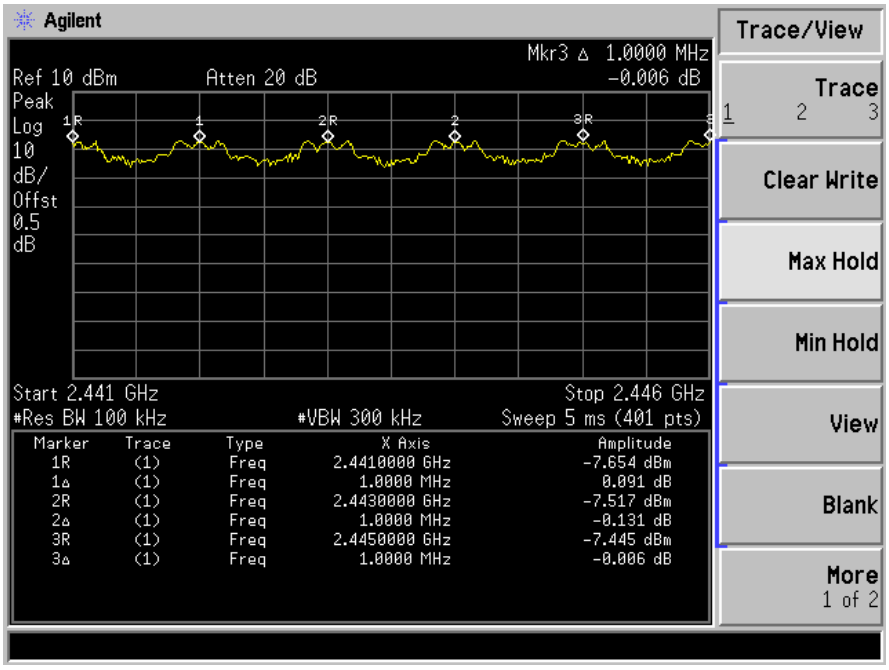

Agilent
Trace/View
Mkr3 Δ 1.0000 MHz
Ref 10 dBm
Atten 20 dB
-0.065 dB
Peak
Log
10
dB/
Offst
0.5
dB
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.441 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.446 GHz
Sweep 5 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.4410000 GHz -7.613 dBm
1Δ (1) Freq 1.0000 MHz 0.117 dB
2R (1) Freq 2.4430000 GHz -7.49 dBm
2Δ (1) Freq 1.0000 MHz 0.045 dB
3R (1) Freq 2.4450000 GHz -7.39 dBm
3Δ (1) Freq 1.0000 MHz -0.065 dB

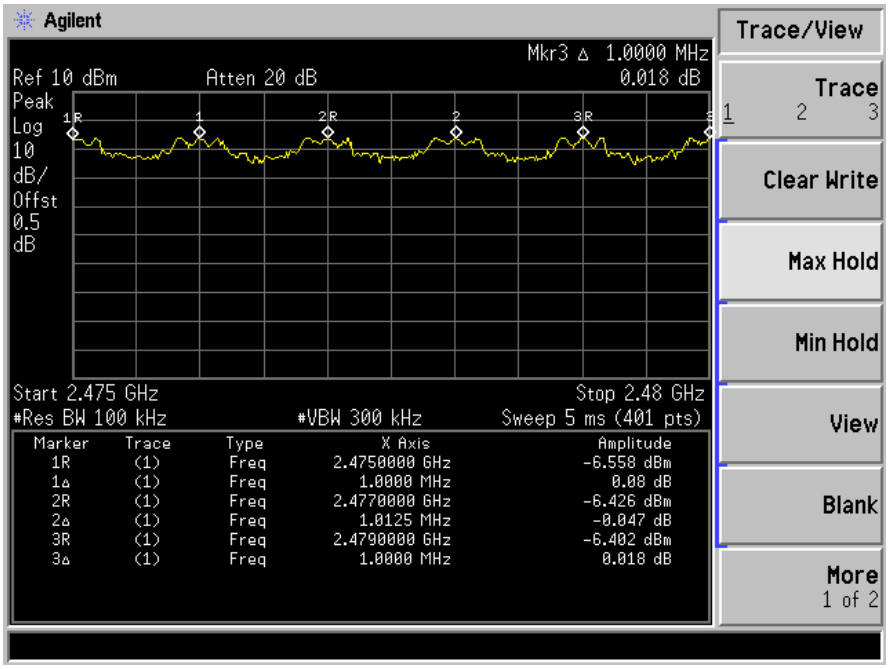


Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Modulation:	8DPSK		

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1000.00	>826.66kHz
40	2441	1000.00	>809.33kHz
79	2480	1000.00	>810.00kHz


Agilent
Trace/View
Mkr3 Δ 1.0000 MHz
Ref 10 dBm
Atten 20 dB
-0.012 dB
Peak
Log
10
dB/
Offst
0.5
dB
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.402 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.407 GHz
Sweep 5 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.4020000 GHz -8.735 dBm
1Δ (1) Freq 1.0000 MHz 0.071 dB
2R (1) Freq 2.4040000 GHz -8.565 dBm
2Δ (1) Freq 1.0000 MHz 0.003 dB
3R (1) Freq 2.4060000 GHz -8.489 dBm
3Δ (1) Freq 1.0000 MHz -0.012 dB


Agilent
Trace/View
Mkr3 Δ 1.0000 MHz
Ref 10 dBm
Atten 20 dB
-0.006 dB
Peak
Log
10
dB/
Offst
0.5
dB
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.441 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.446 GHz
Sweep 5 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.4410000 GHz -7.654 dBm
1Δ (1) Freq 1.0000 MHz 0.091 dB
2R (1) Freq 2.4430000 GHz -7.517 dBm
2Δ (1) Freq 1.0000 MHz -0.131 dB
3R (1) Freq 2.4450000 GHz -7.445 dBm
3Δ (1) Freq 1.0000 MHz -0.006 dB

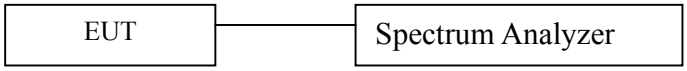

Agilent
Mkr3 Δ 1.0000 MHz
Ref 10 dBm
Atten 20 dB
0.018 dB
Peak
Log
10
dB/
Offst
0.5
dB
Start 2.475 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48 GHz
Sweep 5 ms (401 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.4750000 GHz -6.558 dBm
1Δ (1) Freq 1.0000 MHz 0.08 dB
2R (1) Freq 2.4770000 GHz -6.426 dBm
2Δ (1) Freq 1.0125 MHz -0.047 dB
3R (1) Freq 2.4790000 GHz -6.402 dBm
3Δ (1) Freq 1.0000 MHz 0.018 dB
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

7. 20dB Bandwidth test

7.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed 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:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	88156318	05/29/2012	05/28/2013

7.4 Measurement Results:

The following table is the setting of spectrum analyzer.

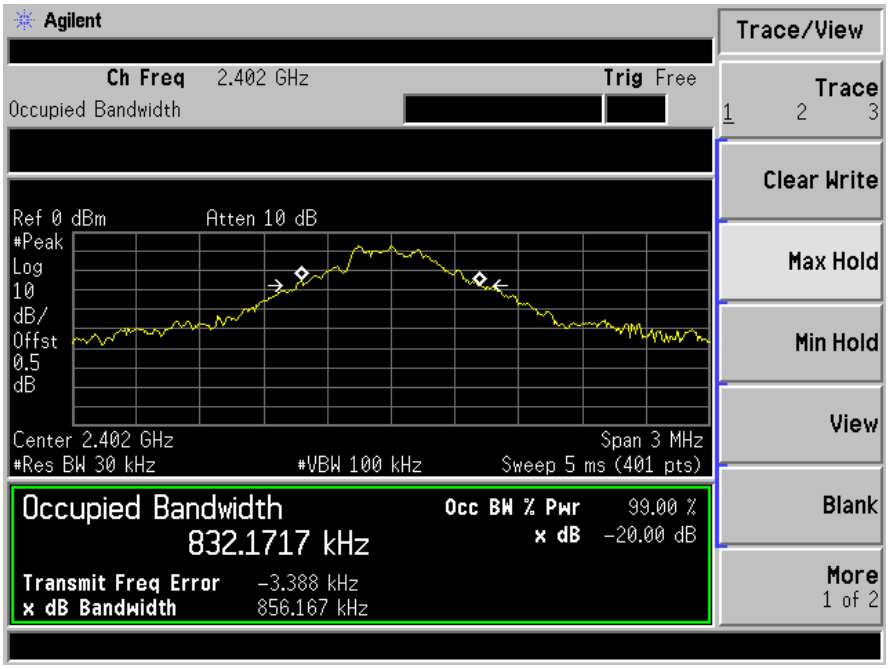
EMI Test Receiver	Setting
Attenuation	Auto
Span	3MHz
RB	30kHz
VB	100kHz
Detector	Peak
Trace	Max hold

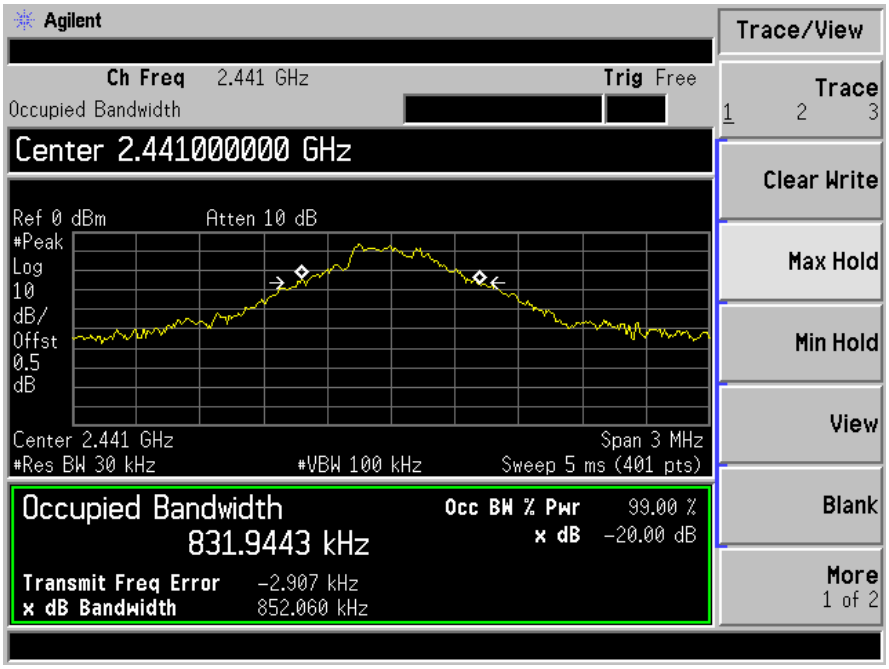
All the modes GFSK, 1/4Π-DQPSK,8DPSK have been tested and the worst result recorded in the following pages.

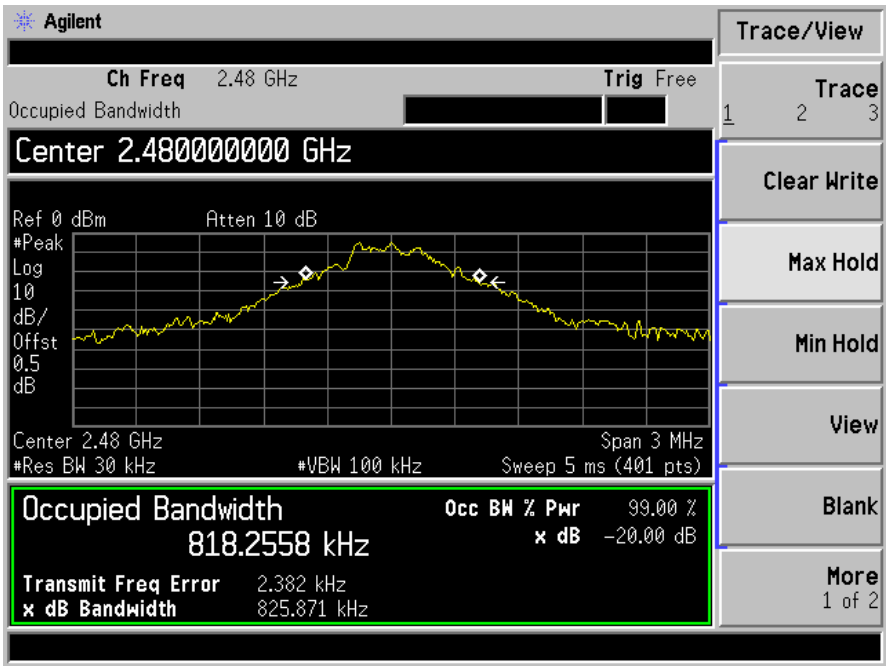
7.4.1. 20dB Bandwidth test data Chart:
Refer to attached data chart.

Spectrum Detector:	PK	Test Date:	December 10, 2012
Test By:	Andy	Temperature:	28 ℃
Test Result:	PASS	Humidity:	65 %
Modulation:	GFSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	885.167
40	2441	852.060
79	2480	825.871

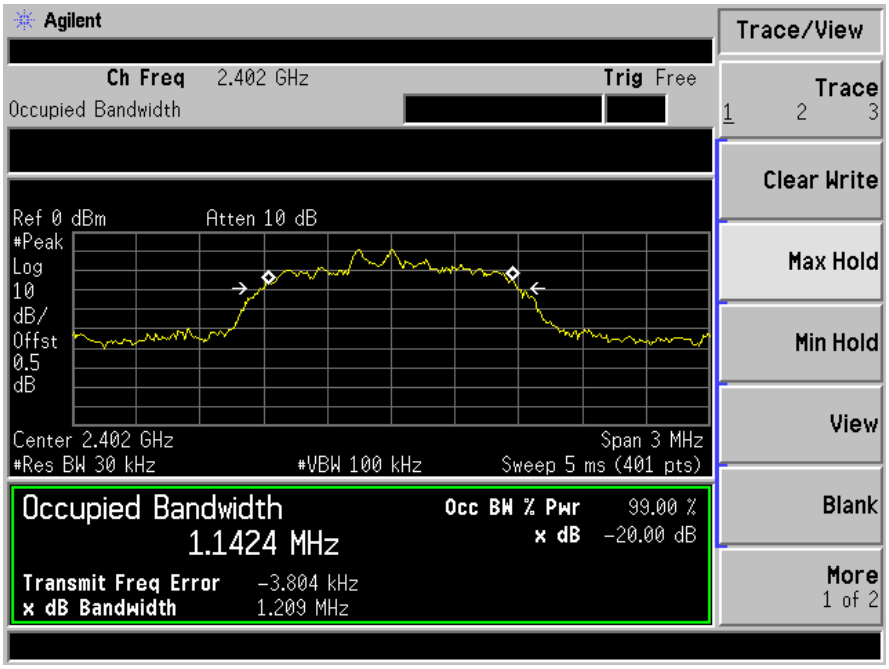

Agilent
Trace/View
Ch Freq 2.402 GHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Center 2.402 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
832.1717 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -3.388 kHz
x dB Bandwidth 856.167 kHz

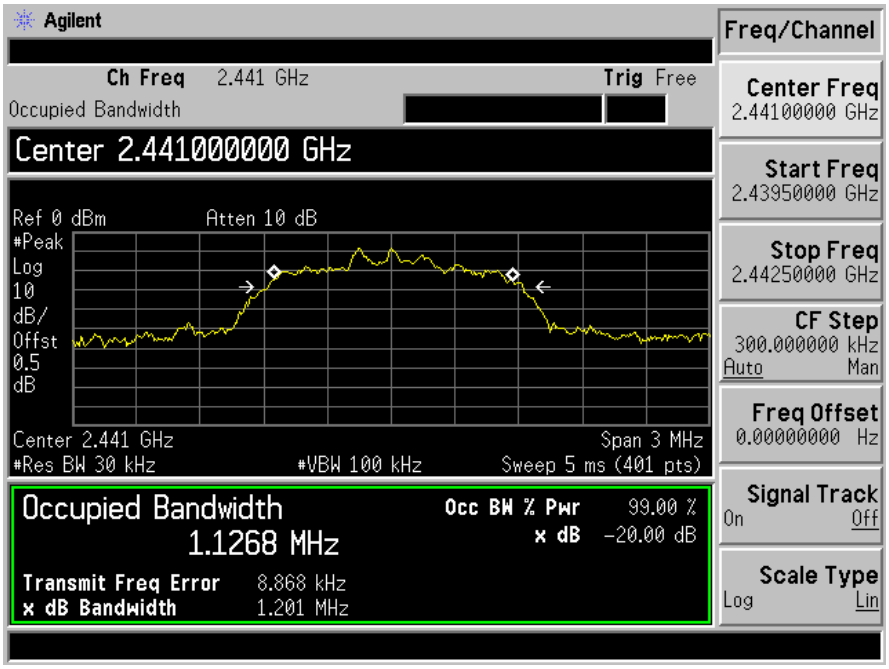

Agilent
Trace/View
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Center 2.441000000 GHz
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Center 2.441 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
831.9443 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -2.907 kHz
x dB Bandwidth 852.060 kHz

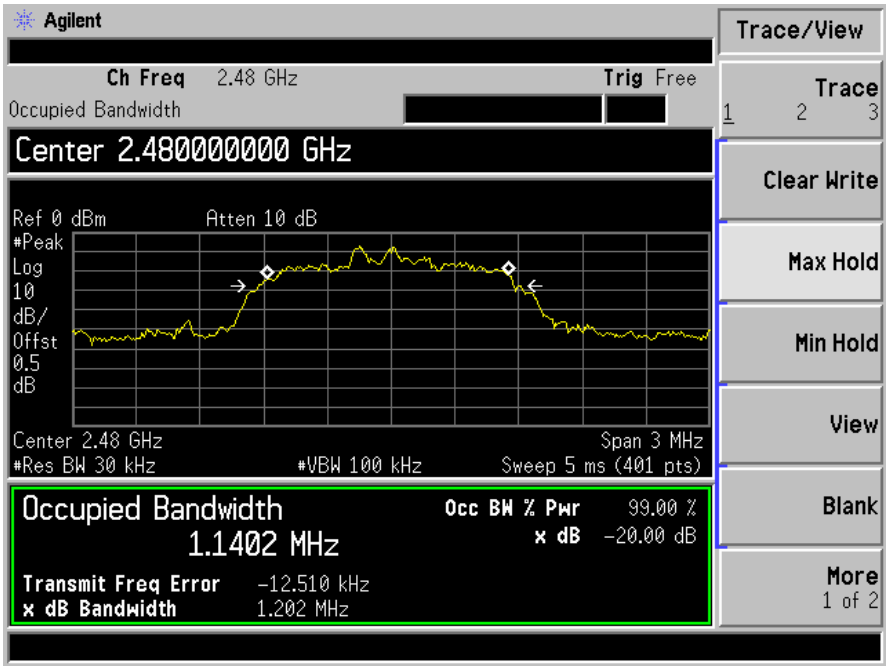


Spectrum Detector:	PK	Test Date:	December 10, 2012
Test By:	Andy	Temperature:	28 ℃
Test Result:	PASS	Humidity:	65 %
Modulation:	1/4∏-DQPSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1209.00
40	2441	1201.00
79	2480	1202.00

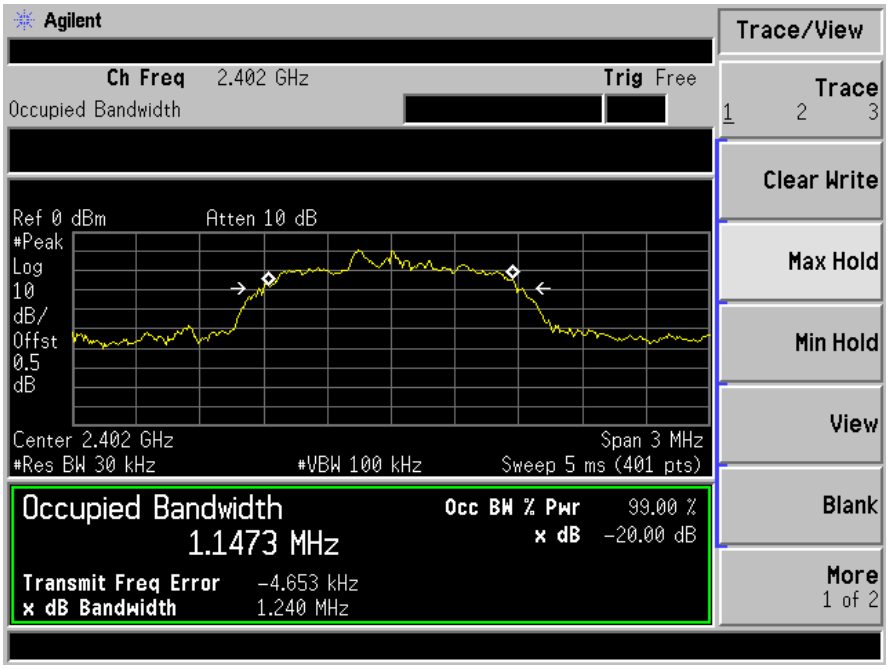

Agilent
Trace/View
Ch Freq 2.402 GHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Center 2.402 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
1.1424 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -3.804 kHz
x dB Bandwidth 1.209 MHz

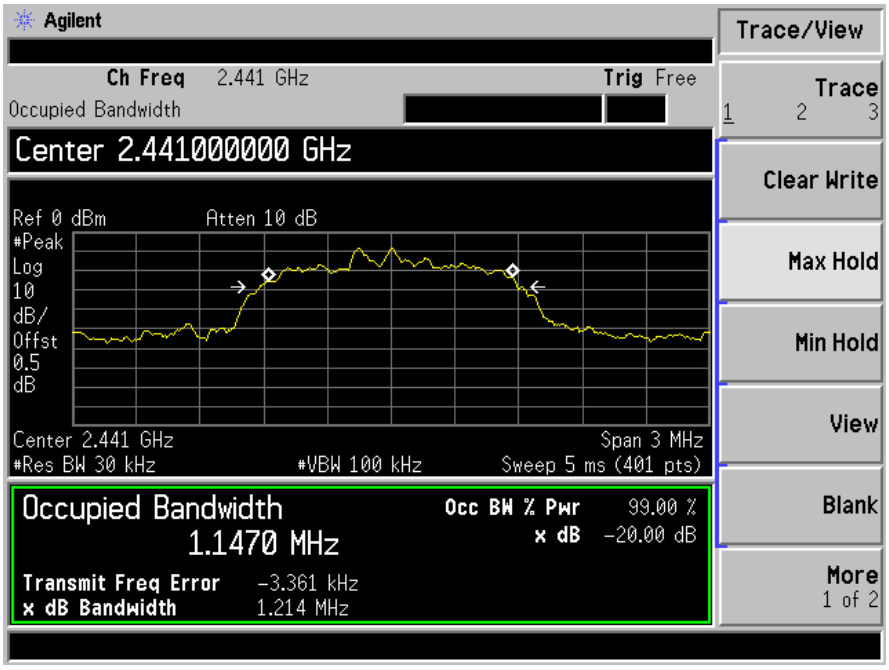

Agilent
Freq/Channel
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Center Freq
2.44100000 GHz
Center 2.441000000 GHz
Start Freq
2.43950000 GHz
Stop Freq
2.44250000 GHz
CF Step
300.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Scale Type
Log Lin
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Center 2.441 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
1.1268 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error 8.868 kHz
x dB Bandwidth 1.201 MHz

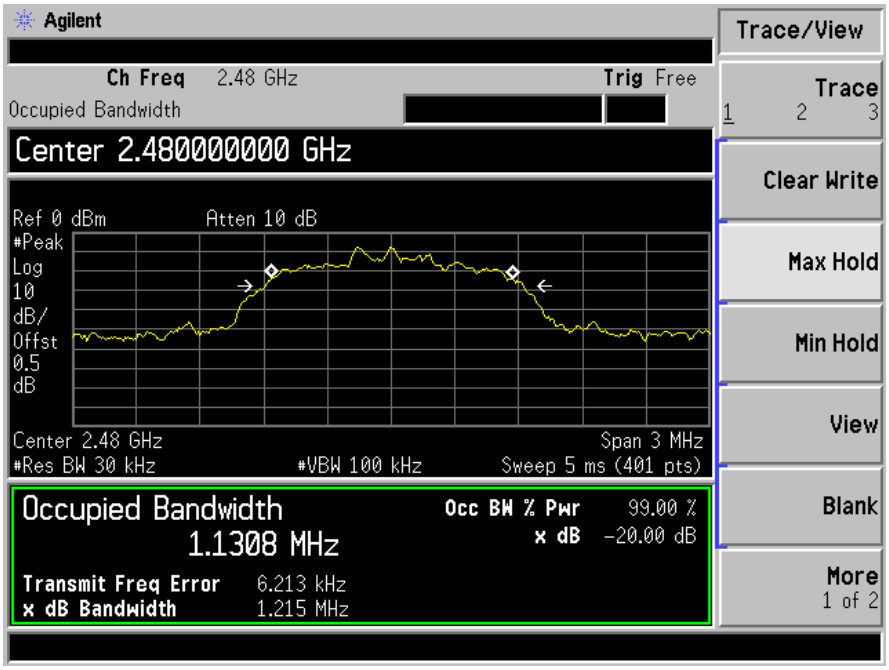


Spectrum Detector:	PK	Test Date:	December 10, 2012
Test By:	Andy	Temperature:	28 ℃
Test Result:	PASS	Humidity:	65 %
Modulation:	8DPSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1240.00
40	2441	1214.00
79	2480	1215.00


Agilent
Trace/View
Ch Freq 2.402 GHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Clear Write
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Max Hold
Min Hold
View
Center 2.402 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Blank
Occupied Bandwidth
1.1473 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -4.653 kHz
x dB Bandwidth 1.240 MHz
More
1 of 2


Agilent
Trace/View
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Center 2.441000000 GHz
Clear Write
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Max Hold
Min Hold
View
Center 2.441 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 5 ms (401 pts)
Blank
Occupied Bandwidth
1.1470 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -3.361 kHz
x dB Bandwidth 1.214 MHz
More
1 of 2

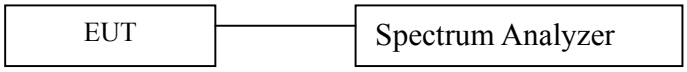

Agilent
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Center 2.480000000 GHz
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
1.1308 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error 6.213 kHz
x dB Bandwidth 1.215 MHz
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

8. Quantity of Hopping Channel Test

8.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed 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:

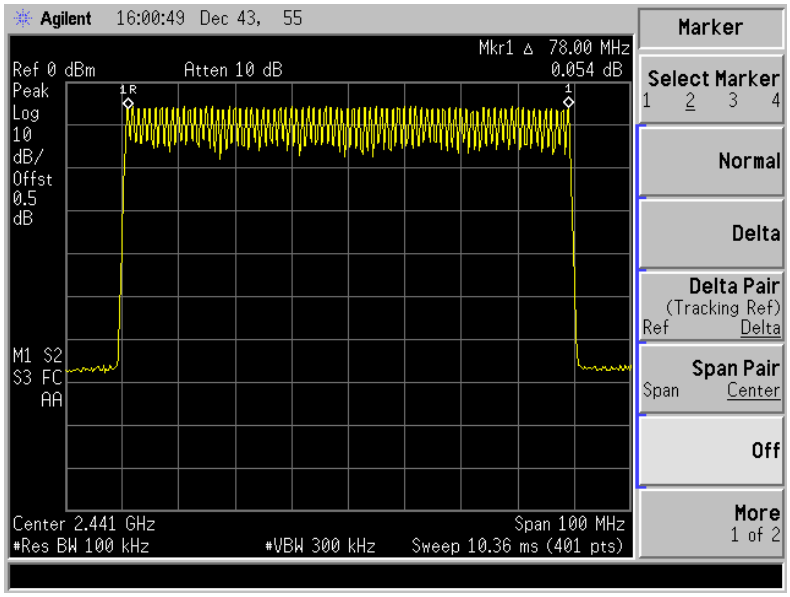
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	88156318	05/29/2012	05/28/2013

8.4 Measurement Results:

All the modulation modes were tested the data of the worst mode (GFSK) are recorded in the following pages and the others modulation methods do not exceed the above mentioned limits.

Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %

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

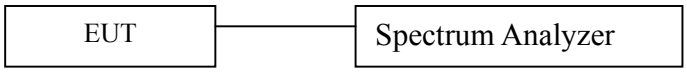


9. Time of Occupancy (Dwell Time) test

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:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	88156318	05/29/2012	05/28/2013

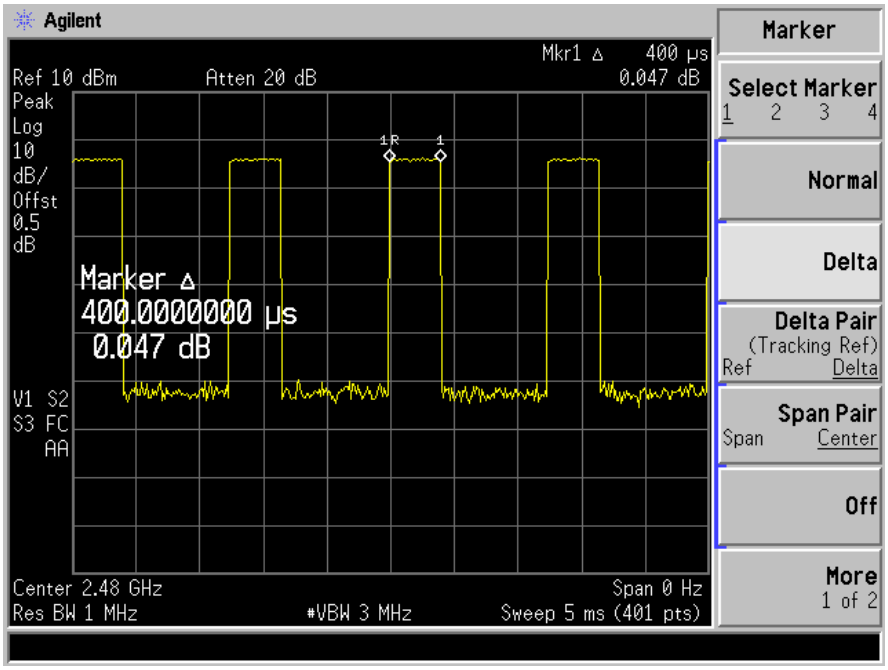
9.4 Measurement Results:

All the modulation modes were tested and the data of the GFSK mode are recorded in the following pages. Low, Middle and Highest channels have been tested, the worst test data channel 2402 was recorded in this report, all modulation methods do not exceed the above mentioned limits.

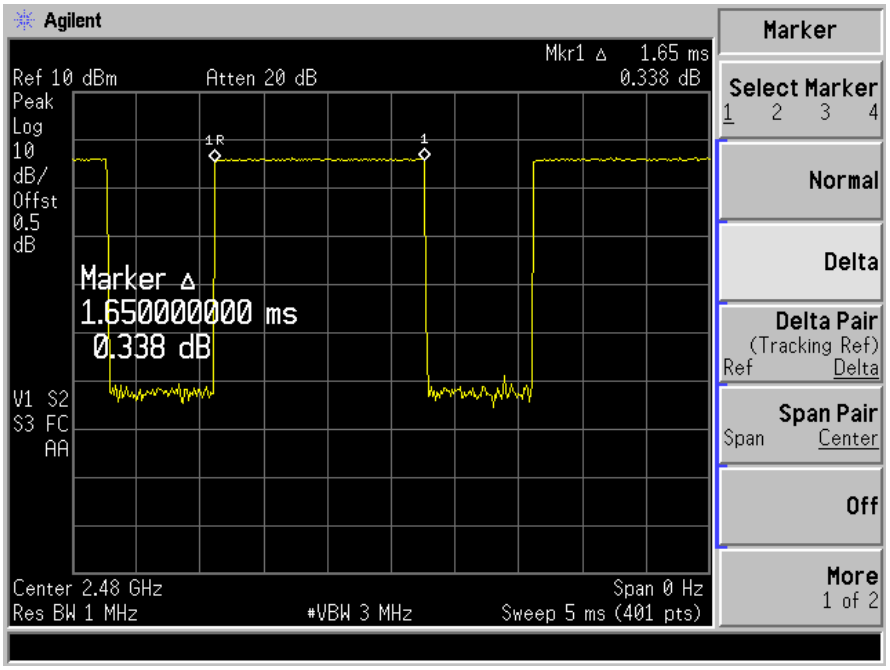
Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %

Mode	Number of transmission in a 31.6(79 Hopping*0.4)	Length of transmissions time(msec)	Result (msec)	Limit (msec)
DH1	1600/(2*79) x 31.6 = 320	0.400	128.000	400
DH3	1600/(4*79) x 31.6 =160	1.650	264.000	400
DH5	1600/(6*79) x 31.6 =106.67	2.900	309.343	400

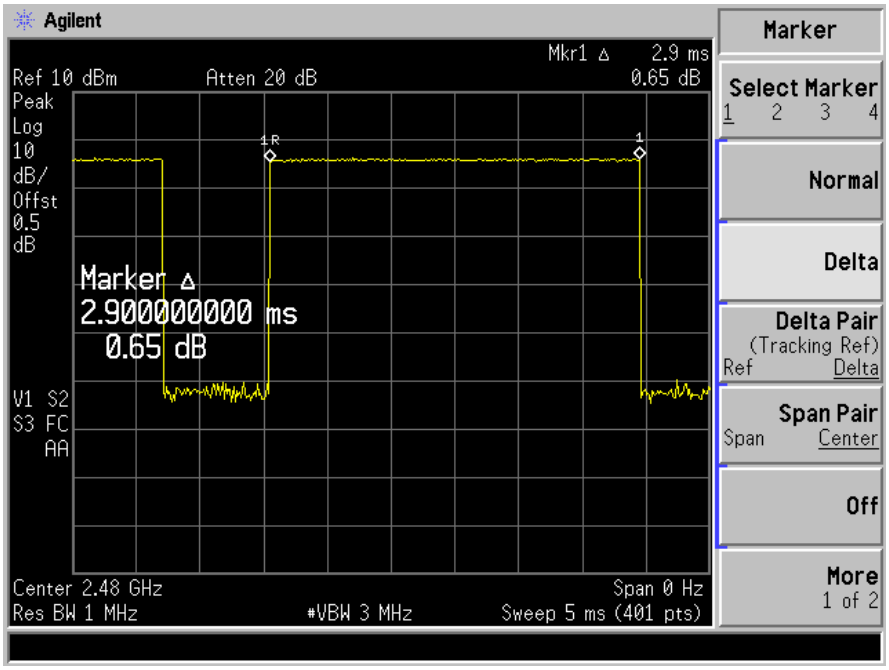
DH1


Agilent
Mkr1 Δ 400 µs
0.047 dB
Ref 10 dBm
Atten 20 dB
Peak
Log
10
dB/
Offst
0.5
dB
1R 1
Marker Δ
400.0000000 µs
0.047 dB
V1 S2
S3 FC
AA
Center 2.48 GHz
Res BW 1 MHz
#VBW 3 MHz
Span 0 Hz
Sweep 5 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

DH3


Agilent
Mkr1 Δ 1.65 ms
0.338 dB
Ref 10 dBm
Atten 20 dB
Peak
Log
10
dB/
Offst
0.5
dB
1R 1
Marker Δ
1.650000000 ms
0.338 dB
V1 S2
S3 FC
AA
Center 2.48 GHz
Res BW 1 MHz
#VBW 3 MHz
Span 0 Hz
Sweep 5 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

DH5

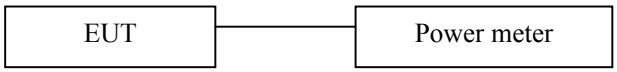

Agilent
Mkr1 Δ 2.9 ms
Ref 10 dBm
Atten 20 dB
0.65 dB
Peak
Log
10
dB/
Offst
0.5
dB
1R
1
Marker Δ
2.900000000 ms
0.65 dB
V1 S2
S3 FC
AA
Center 2.48 GHz
Res BW 1 MHz
#VBW 3 MHz
Span 0 Hz
Sweep 5 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

10. MAX IMUM PEAK OUTPUT POWER TEST

10.1 Measurement Procedure

a. Check the calibration of the measuring instrument(Power meter) 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:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power meter	Boonton	4232A	29001	05/29/2012	05/28/2013
Power sensor	Boonton	51011-EMC	31184	05/29/2012	05/28/2013

10.4 Measurement Results:

All the modes GFSK, 1/4Π-DQPSK,8DPSK have been tested and the worst result recorded in the following pages and the others modulation methods do not exceed the limits.

Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Modulation:	GFSK		

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power Limit(mW)	Pass/Fail
1	2402.00	1.87	125	PASS
40	2441.00	1.90	125	PASS
79	2480.00	1.95	125	PASS

Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Modulation:	1/4∏-DQPSK		

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power Limit(mW)	Pass/Fail
1	2402.00	1.31	125	PASS
40	2441.00	1.20	125	PASS
79	2480.00	1.10	125	PASS

Spectrum Detector:	PK	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Modulation:	8DPSK		

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power Limit(mW)	Pass/Fail
1	2402.00	0.55	125	PASS
40	2441.00	0.49	125	PASS
79	2480.00	0.41	125	PASS

11. Band EDGE test

11.1 Measurement Procedure

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.

11.2 Test SET-UP (Block Diagram of Configuration)

As 5.2 Test set up (B) and (C)

11.3 Measurement Equipment Used:

Same as 5.3 Radiated Emission Measurement.

11.4 Measurement Results:

Spectrum Detector:	PK/AV	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test channel:	00	Humidity :	65 %
Modulation:	GFSK		

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2379.50	H	50.13	42.88	74	54
2378.96	V	49.72	40.67	74	54

Spectrum Detector:	PK/AV	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test channel:	78	Humidity :	65 %
Modulation:	GFSK		

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2485.25	H	49.30	41.21	74	54
2484.20	V	48.66	39.79	74	54

Spectrum Detector:	PK/AV	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test channel:	00	Humidity :	65 %
Modulation:	1/4∏-DQPSK		

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2380.10	H	48.62	39.83	74	54
2380.36	V	47.75	38.39	74	54

Spectrum Detector:	PK/AV	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test channel:	78	Humidity :	65 %
Modulation:	1/4∏-DQPSK		

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2488.40	H	46.48	38.47	74	54
2487.50	V	47.60	39.79	74	54

Spectrum Detector:	PK/AV	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test channel:	00	Humidity :	65 %
Modulation:	8DPSK		

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2380.50	H	47.90	39.51	74	54
2380.10	V	46.78	38.49	74	54

Spectrum Detector:	PK/AV	Test Date :	December 10, 2012
Test By:	Andy	Temperature :	28 ℃
Test channel:	78	Humidity :	65 %
Modulation:	8DPSK		

Frequency (MHz)	Polarity	Level (dBuV/m)		Limited (dBuV/m)	
		PK	AV	PK	AV
2487.60	H	47.11	40.79	74	54
2486.25	V	45.62	39.41	74	54

12. Antenna Port Emission

12.1 Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	88156318	05/29/2012	05/28/2013

12.2 Measuring Instruments and setting

All the modulation modes were tested and the data of the GFSK mode are recorded in the following pages and the others modulation methods do not exceed the limits.

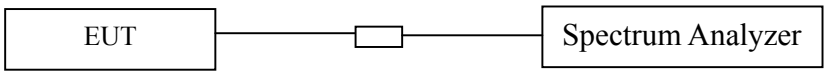
The following table is the setting of spectrum analyzer.

EMI Test Receiver	Setting
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.

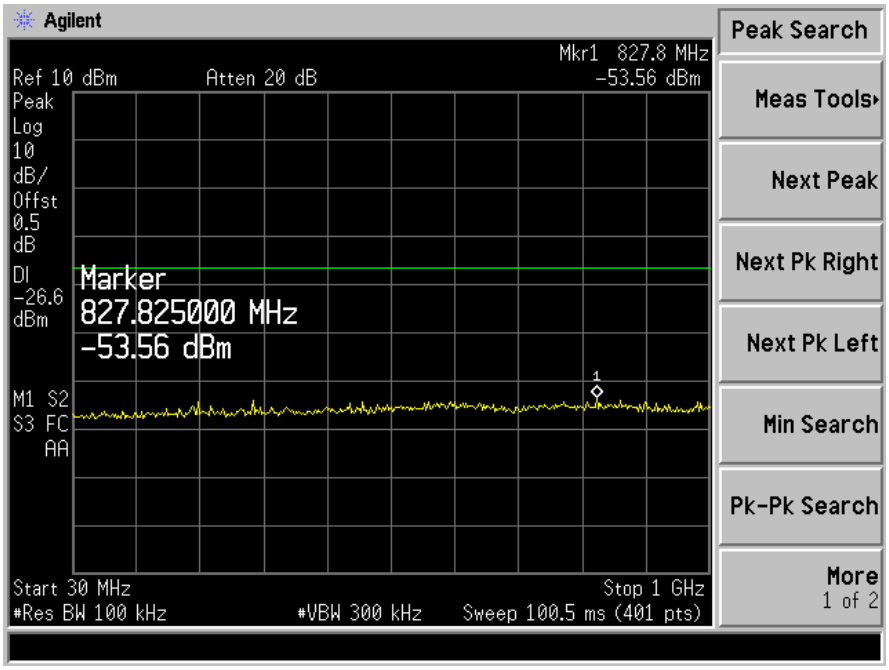
12.4 Block Diagram of Test setup

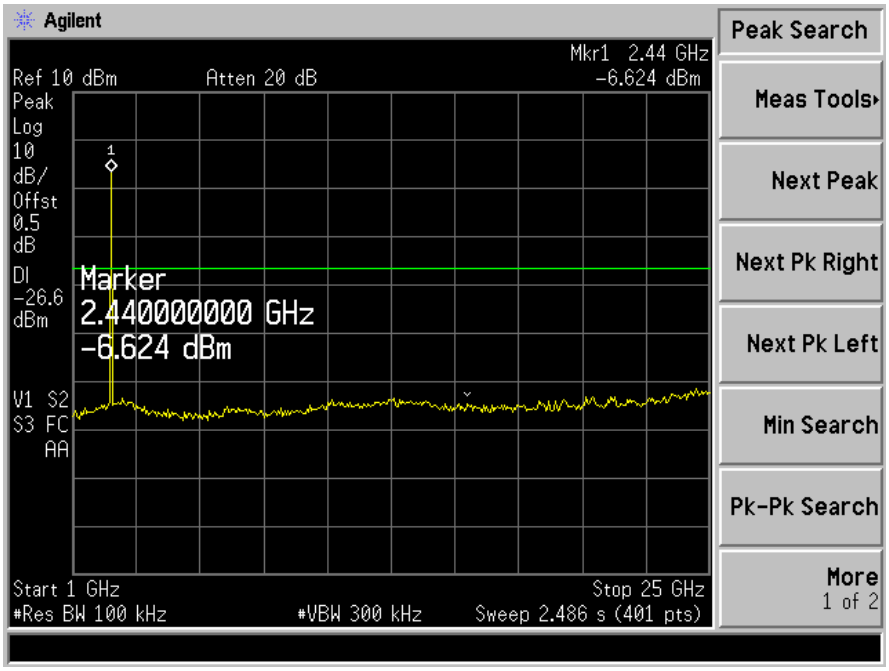


12.5 Test Result

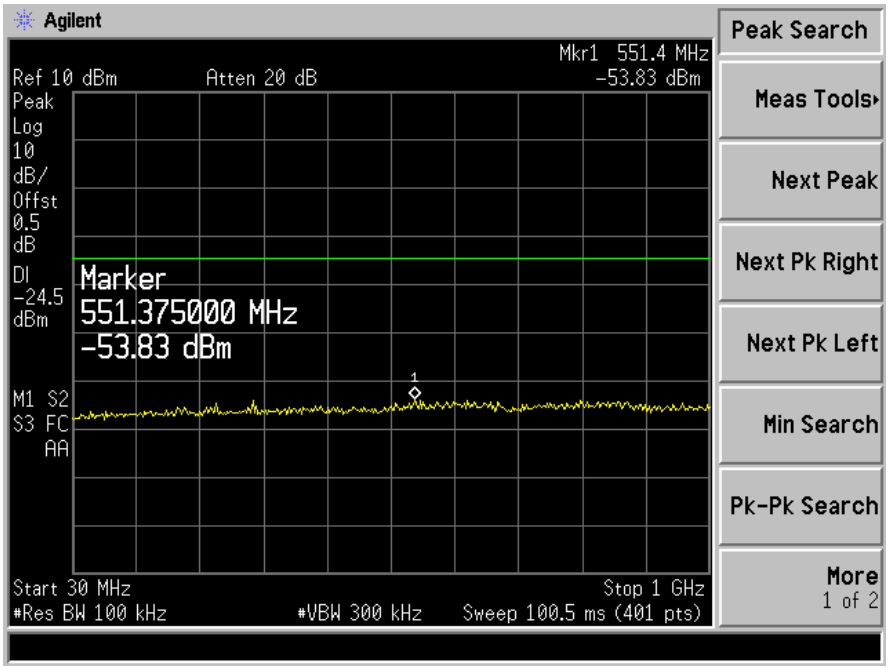
PASS.

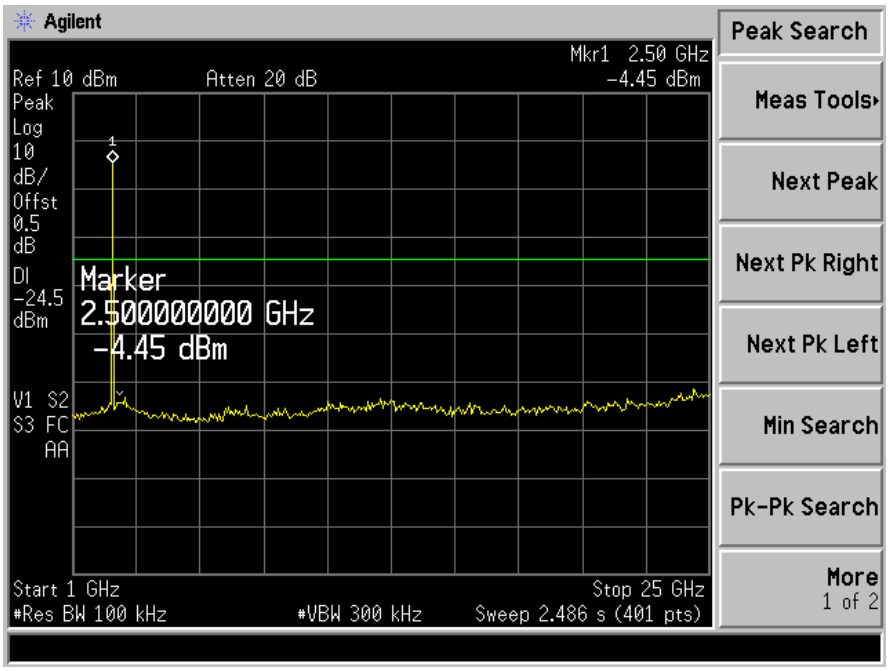
TX 2402MHz


Agilent
Mkr1 827.8 MHz
Ref 10 dBm
Atten 20 dB
-53.56 dBm
Peak
Log
10
dB/
Offst
0.5
dB
Dl
-26.6
dBm
Marker
827.825000 MHz
-53.56 dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1 GHz
Sweep 100.5 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

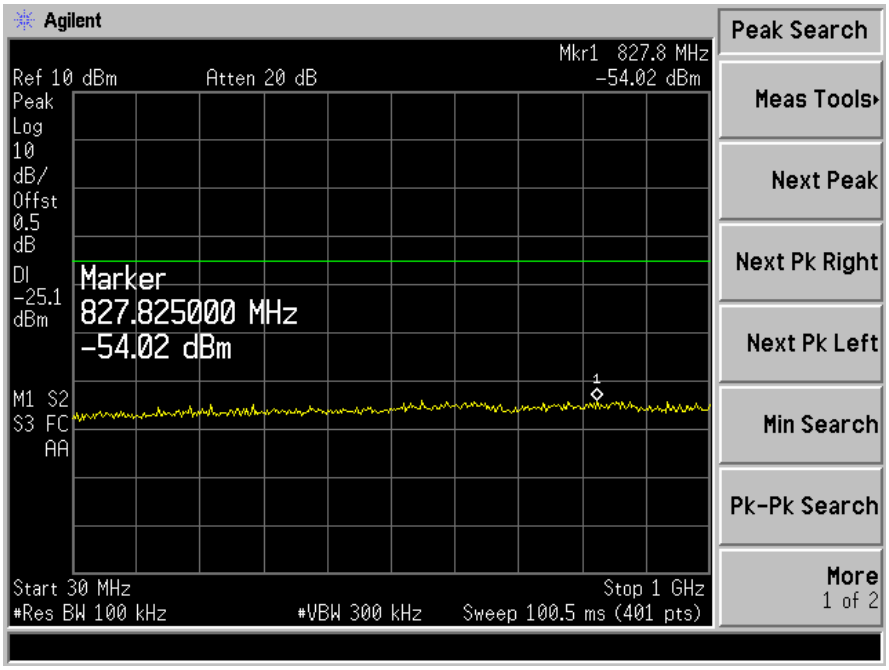

Agilent
Mkr1 2.44 GHz
Ref 10 dBm
Atten 20 dB
-6.624 dBm
Peak
Log
10
dB/
Offst
0.5
dB
Dl
-26.6
dBm
Marker
2.440000000 GHz
-6.624 dBm
V1 S2
S3 FC
AA
Start 1 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25 GHz
Sweep 2.486 s (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

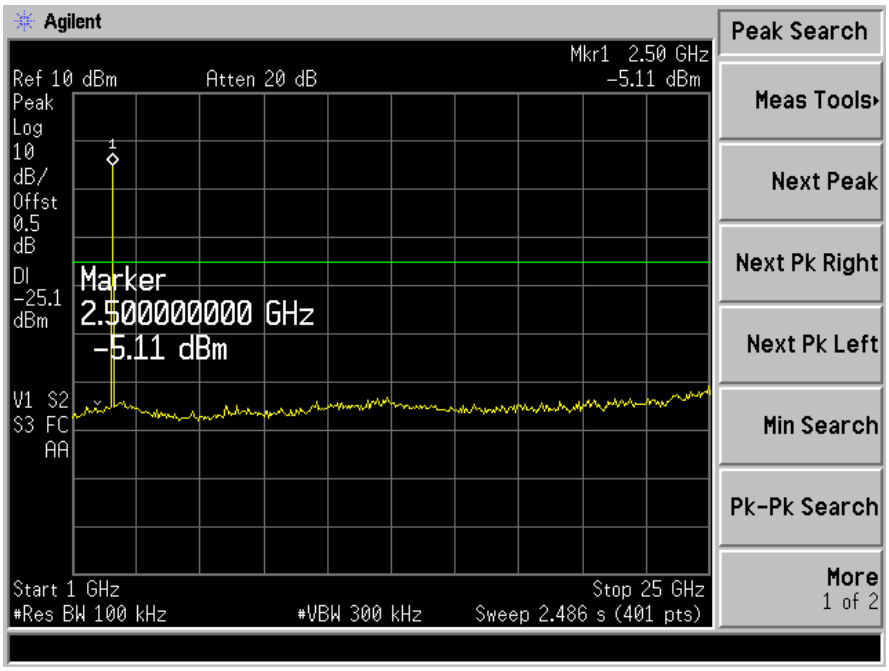
TX 2441MHz


Agilent
Mkr1 551.4 MHz
Ref 10 dBm
Atten 20 dB
-53.83 dBm
Peak
Log
10
dB/
Offst
0.5
dB
Dl
-24.5
dBm
Marker
551.375000 MHz
-53.83 dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1 GHz
Sweep 100.5 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2


Agilent
Mkr1 2.50 GHz
Ref 10 dBm
Atten 20 dB
-4.45 dBm
Peak
Log
10
dB/
Offst
0.5
dB
Dl
-24.5
dBm
Marker
2.500000000 GHz
-4.45 dBm
V1 S2
S3 FC
AA
Start 1 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25 GHz
Sweep 2.486 s (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

TX 2480MHz


Agilent
Mkr1 827.8 MHz
Ref 10 dBm
Atten 20 dB
-54.02 dBm
Peak
Log
10
dB/
Offst
0.5
dB
Dl
-25.1
dBm
Marker
827.825000 MHz
-54.02 dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1 GHz
Sweep 100.5 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2


Agilent
Mkr1 2.50 GHz
Ref 10 dBm
Atten 20 dB
-5.11 dBm
Peak
Log
10
dB/
Offst
0.5
dB
Dl
-25.1
dBm
Marker
2.500000000 GHz
-5.11 dBm
V1 S2
S3 FC
AA
Start 1 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25 GHz
Sweep 2.486 s (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

13. Antenna Application

13.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247

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 0dBi and meets the requirement.