

FCC REPORT

(Bluetooth)

Applicant: Grand Electronics, INC

Address of Applicant: 11650 Brentcross Dr Tomball, TX 77377, United States

Equipment Under Test (EUT)

Product Name: Bluetooth Earphone

Model No.: HPB4HE

Trade mark: tec.art, tecart

FCC ID: 2AGNK-HPB4HE

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 26 Sep., 2016

Date of Test: 26 Sep., to 09 Oct., 2016

Date of report issued: 09 Oct., 2016

Test Result: PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	09 Oct., 2016	Original

Tested by:

Zora Lee

Date:

09 Oct., 2016

Test Engineer

Reviewed by:

M. Liang

Date:

09 Oct., 2016

Project Engineer

3 Contents

Page

1	COVER PAGE.....	1
2	VERSION	2
3	CONTENTS	3
4	TEST SUMMARY.....	4
5	GENERAL INFORMATION.....	5
5.1	CLIENT INFORMATION	5
5.2	GENERAL DESCRIPTION OF E.U.T.	5
5.3	TEST MODE	7
5.4	MEASUREMENT UNCERTAINTY.....	7
5.5	LABORATORY FACILITY.....	7
5.6	LABORATORY LOCATION	7
5.7	TEST INSTRUMENTS LIST.....	8
6	TEST RESULTS AND MEASUREMENT DATA	9
6.1	ANTENNA REQUIREMENT	9
6.2	CONDUCTED EMISSIONS	10
6.3	CONDUCTED OUTPUT POWER.....	13
6.4	20dB OCCUPY BANDWIDTH.....	17
6.5	CARRIER FREQUENCIES SEPARATION.....	21
6.6	HOPPING CHANNEL NUMBER	26
6.7	DWELL TIME.....	28
6.8	PSEUDORANDOM FREQUENCY HOPPING SEQUENCE	32
6.9	BAND EDGE.....	33
6.9.1	Conducted Emission Method.....	33
6.9.2	Radiated Emission Method.....	37
6.10	SPURIOUS EMISSION	50
6.10.1	Conducted Emission Method.....	50
6.10.2	Radiated Emission Method	57
7	TEST SETUP PHOTO	62
8	EUT CONSTRUCTIONAL DETAILS.....	64

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)	Pass
Dwell Time	15.247 (a)(1)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Grand Electronics, INC
Address of Applicant:	11650 Brentcross Dr Tomball, TX 77377, United States
Manufacturer:	GRAND ELECTRI-TECH GLOBAL TRADING LIMITED
Address of Manufacturer:	UNIT 04, 7/F, BRIGHT WAY TOWER, NO. 33 MONG KOK ROAD, KOWLOON, HK.
Factory:	SHENZHEN KAINUOMING TECHNOLOGYCO., LTD
Address of Factory:	6A6, Xingsheng Creative Park, Wushaxing Second Road No. 18, Changan Town, Dongguan, Guangdong, China

5.2 General Description of E.U.T.

Product Name:	Bluetooth Earphone
Model No.:	HPB4HE
Operation Frequency:	2402MHz~2480MHz
Transfer rate:	1/2/3 Mbits/s
Number of channel:	79
Modulation type:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation technology:	FHSS
Antenna Type:	Internal Antenna
Antenna gain:	2.0 dBi
Power supply:	DC 3.7V supplied by the rechargeable battery

Operation Frequency each of channel for GFSK, $\pi/4$ -DQPSK, 8DPSK							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		
Remark: Channel 0, 39 & 78 selected for GFSK, $\pi/4$ -DQPSK and 8DPSK.							

5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with worst case data rate.
Remark	GFSK (1 Mbps) is the worst case mode.
The sample was placed 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground plane of 3m chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working with a fresh battery, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

5.4 Measurement Uncertainty

Items	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 30MHz)	2.14 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	4.24 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	4.35 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	4.44 dB (k=2)
Radiated Emission (18GHz ~ 26.5GHz)	4.56 dB (k=2)

5.5 Laboratory Facility

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

● **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282
Fax: +86-755-23116366

5.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	03-25-2016	03-25-2017
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	03-25-2016	03-25-2017
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2016	03-31-2017
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2016	03-31-2017
6	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2016	03-31-2017
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2016	03-31-2017
8	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	03-28-2016	03-28-2017
9	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	03-28-2016	03-28-2017
10	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2016	03-31-2017
11	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

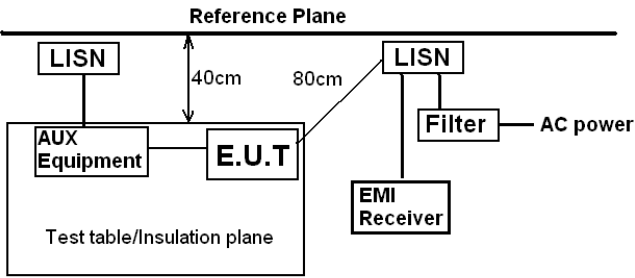
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	08-23-2014	08-22-2017
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-24-2016	03-24-2017
3	LISN	CHASE	MN2050D	CCIS0074	03-26-2016	03-26-2017
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2016	03-31-2017
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement

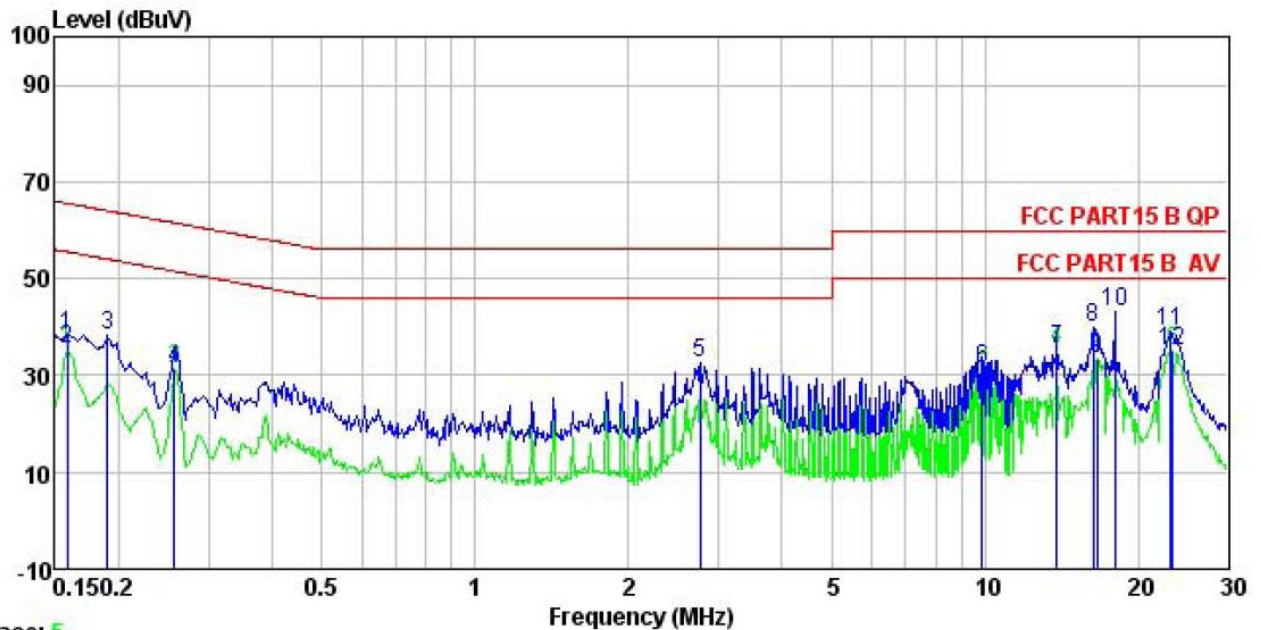
Standard requirement:	FCC Part 15 C Section 15.203 /247(c)
<i>15.203 requirement:</i> <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i> <i>15.247(c) (1)(i) requirement:</i> <i>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</i>	
E.U.T Antenna:	
<i>The Bluetooth antenna is an integral antenna which permanently attached, and the best case gain of the antenna is 2.0 dBi.</i>	
	

6.2 Conducted Emissions

Test Requirement:	FCC Part 15 C Section 15.207		
Test Method:	ANSI C63.4:2014		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	 Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.		
Test Instruments:	Refer to section 5.7 for details		
Test mode:	Bluetooth (Continuous transmitting) mode		
Test results:	Pass		

Measurement Data:

Line:



Trace: 5

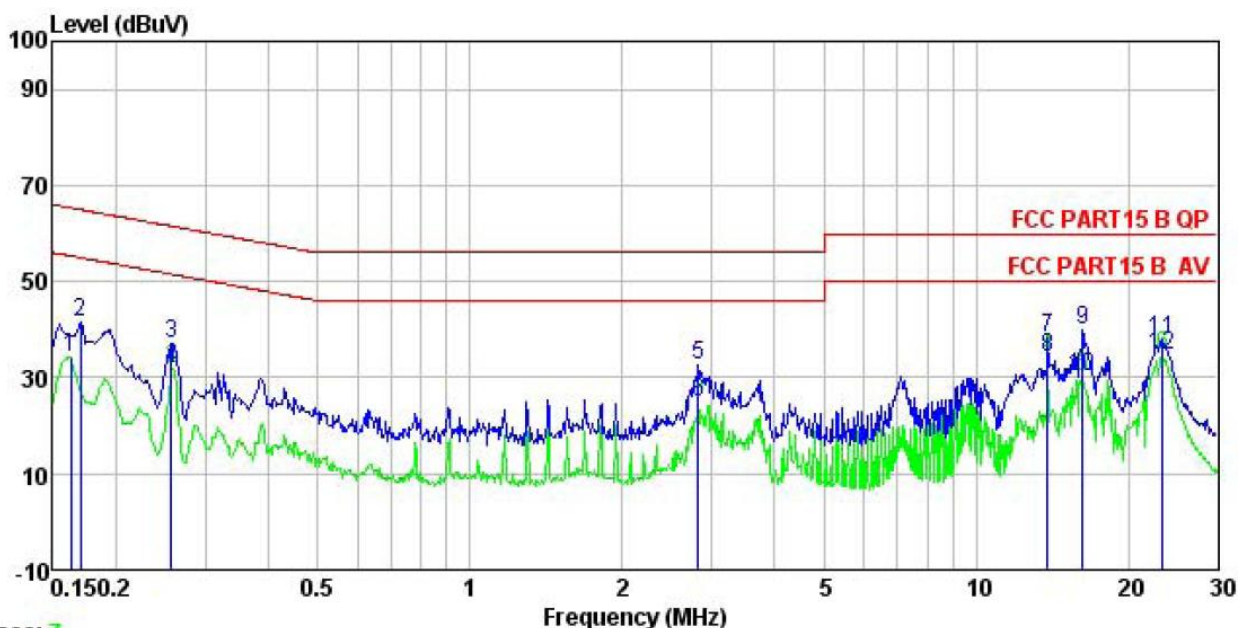
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN LINE
 EUT : Bluetooth Earphone
 Model : HPB4HE
 Test Mode : BT mode
 Power Rating : AC120/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Zora
 Remark :

	Read	LISN	Cable		Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	27.53	0.14	10.78	38.45	65.56	-27.11 QP
2	0.158	24.51	0.14	10.78	35.43	55.56	-20.13 Average
3	0.190	27.32	0.15	10.76	38.23	64.02	-25.79 QP
4	0.258	20.55	0.16	10.75	31.46	51.51	-20.05 Average
5	2.765	21.33	0.33	10.93	32.59	56.00	-23.41 QP
6	9.861	20.00	0.30	10.93	31.23	50.00	-18.77 Average
7	13.841	24.17	0.26	10.91	35.34	50.00	-14.66 Average
8	16.312	28.78	0.28	10.91	39.97	60.00	-20.03 QP
9	16.573	22.12	0.28	10.91	33.31	50.00	-16.69 Average
10	17.944	31.86	0.31	10.90	43.07	60.00	-16.93 QP
11	23.140	27.86	0.35	10.89	39.10	60.00	-20.90 QP
12	23.387	23.99	0.35	10.89	35.23	50.00	-14.77 Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

Neutral:



Trace: 7

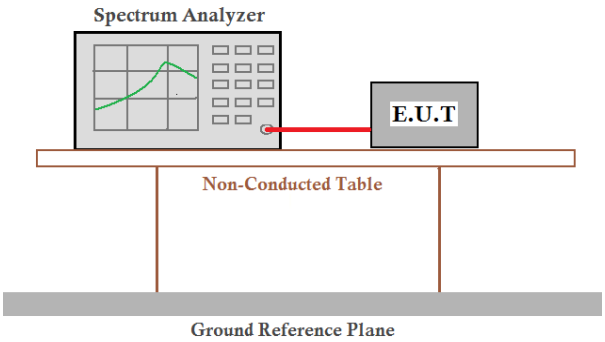
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN NEUTRAL
 EUT : Bluetooth Earphone
 Model : HPB4HE
 Test Mode : BT mode
 Power Rating : AC120/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Zora
 Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	23.30	0.13	10.77	34.20	55.34	-21.14	Average
2	0.170	30.53	0.13	10.77	41.43	64.94	-23.51	QP
3	0.258	26.10	0.17	10.75	37.02	61.51	-24.49	QP
4	0.258	20.71	0.17	10.75	31.63	51.51	-19.88	Average
5	2.824	21.41	0.30	10.93	32.64	56.00	-23.36	QP
6	2.824	13.75	0.30	10.93	24.98	46.00	-21.02	Average
7	13.841	27.23	0.26	10.91	38.40	60.00	-21.60	QP
8	13.841	23.04	0.26	10.91	34.21	50.00	-15.79	Average
9	16.226	28.56	0.27	10.91	39.74	60.00	-20.26	QP
10	16.226	19.10	0.27	10.91	30.28	50.00	-19.72	Average
11	23.387	26.60	0.25	10.89	37.74	60.00	-22.26	QP
12	23.387	23.48	0.25	10.89	34.62	50.00	-15.38	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

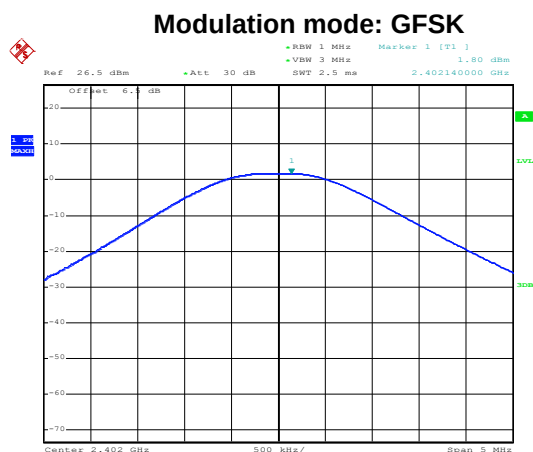
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW ≤1 MHz) RBW=3MHz, VBW=10MHz, Detector=Peak (If 20dB BW > 1 MHz and < 3MHz)
Limit:	125 mW(21 dBm)
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 5.7 for details
Test mode:	Non-hopping mode
Test results:	Pass

Measurement Data:

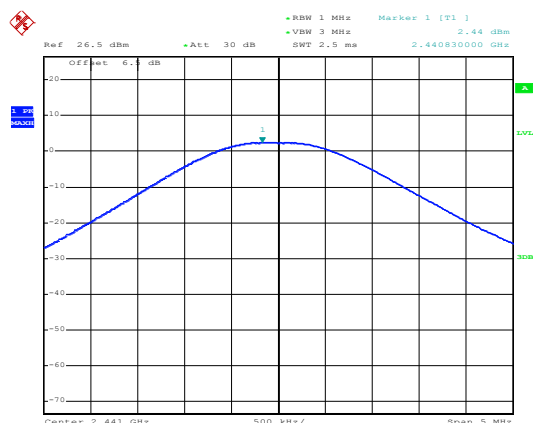
GFSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	1.80	21.00	Pass
Middle	2.44	21.00	Pass
Highest	1.74	21.00	Pass
π/4-DQPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	0.47	21.00	Pass
Middle	0.28	21.00	Pass
Highest	-0.11	21.00	Pass
8DPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	-0.27	21.00	Pass
Middle	0.50	21.00	Pass
Highest	-0.08	21.00	Pass

Test plot as follows:



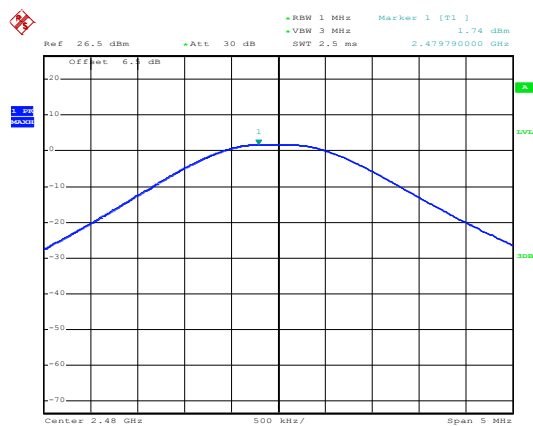
Date: 27.SEP.2016 10:00:53

Lowest channel



Date: 27.SEP.2016 10:02:01

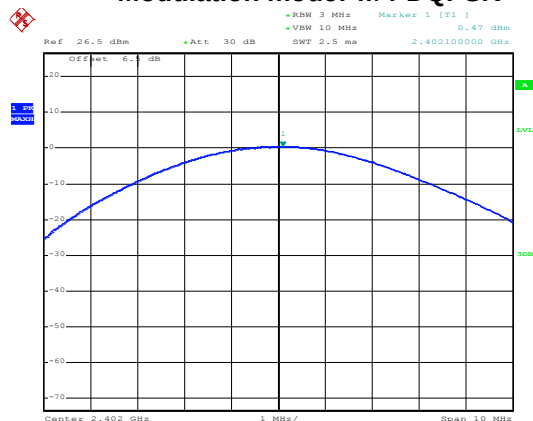
Middle channel



Date: 27.SEP.2016 10:02:27

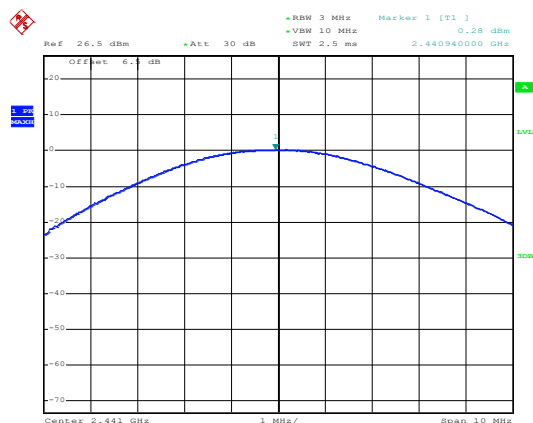
Highest channel

Modulation mode: $\pi/4$ -DQPSK



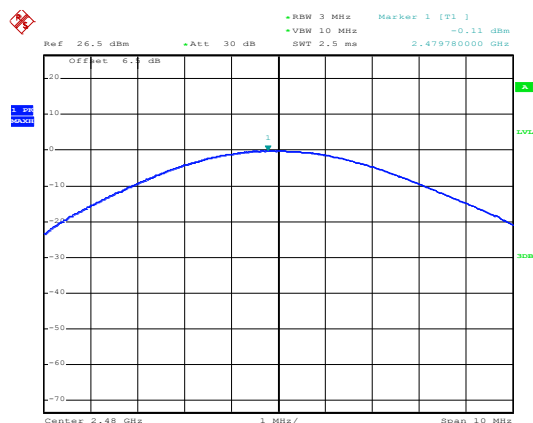
Date: 27.SEP.2016 10:06:01

Lowest channel



Date: 27.SEP.2016 11:50:29

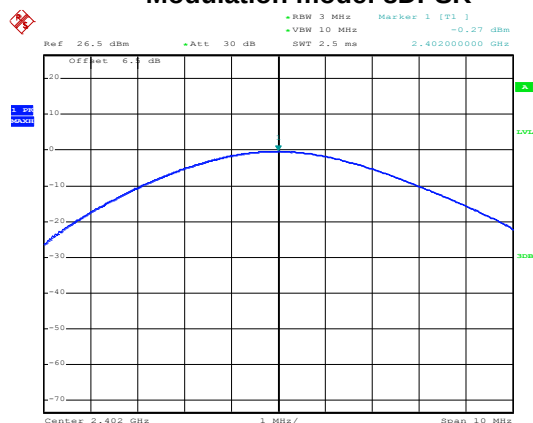
Middle channel



Date: 27.SEP.2016 11:49:38

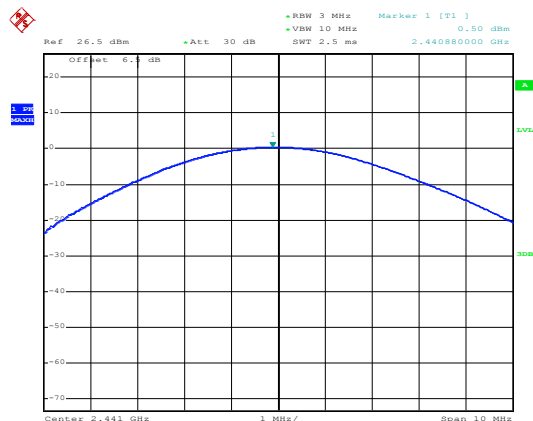
Highest channel

Modulation mode: 8DPSK



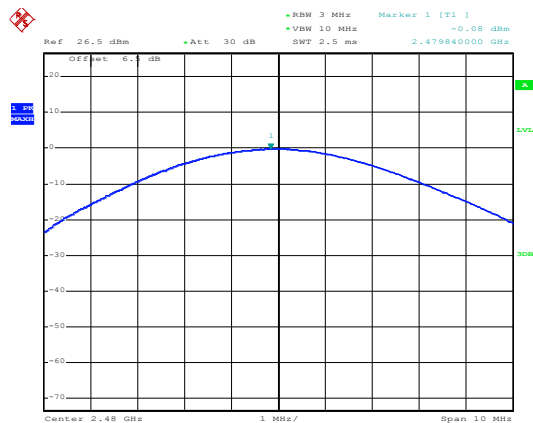
Date: 27.SEP.2016 11:46:07

Lowest channel



Date: 27.SEP.2016 11:47:02

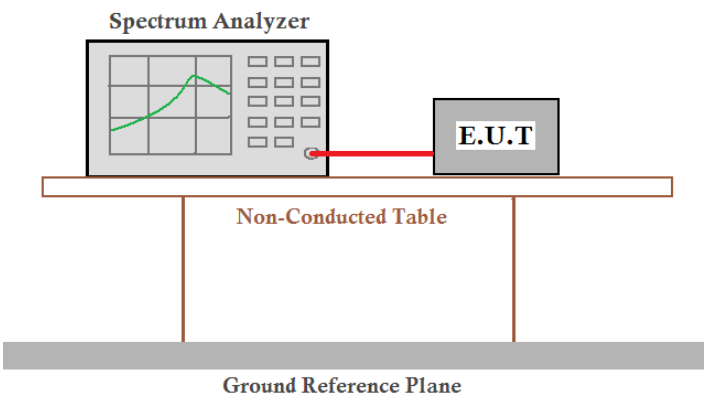
Middle channel



Date: 27.SEP.2016 11:48:06

Highest channel

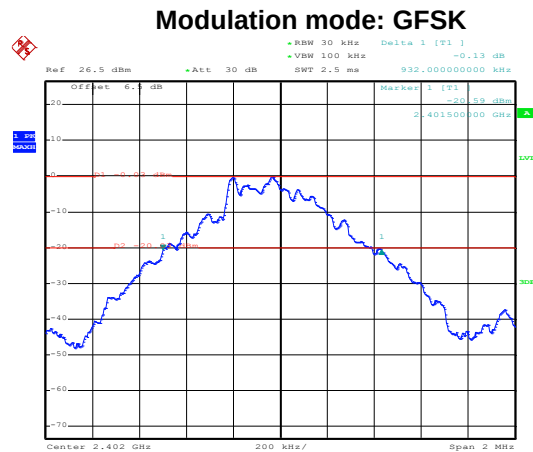
6.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=30 kHz, VBW=100 kHz, detector=Peak
Limit:	NA
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 5.7 for details
Test mode:	Non-hopping mode
Test results:	Pass

Measurement Data:

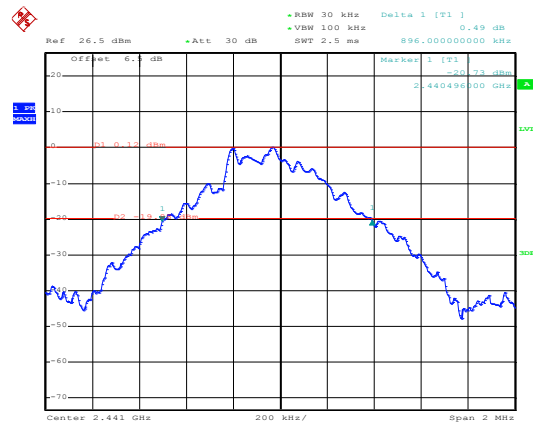
Test channel	20dB Occupy Bandwidth (kHz)		
	GFSK	$\pi/4$ -DQPSK	8DPSK
Lowest	932	1224	1216
Middle	896	1232	1220
Highest	872	1232	1224

Test plot as follows:



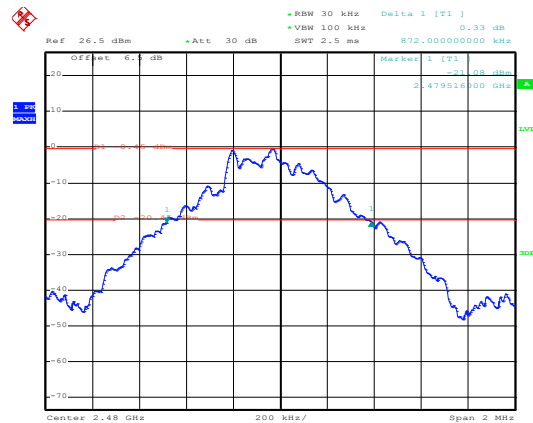
Date: 27.SEP.2016 11:29:05

Lowest channel



Date: 27.SEP.2016 11:30:33

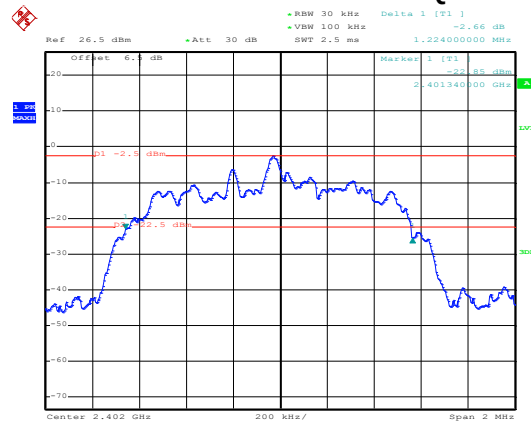
Middle channel



Date: 27.SEP.2016 11:31:52

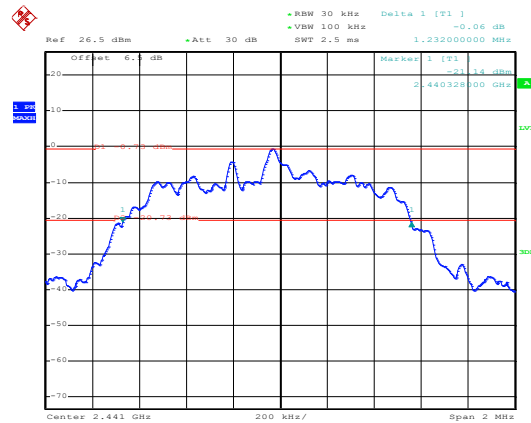
Highest channel

Modulation mode: $\pi/4$ -DQPSK



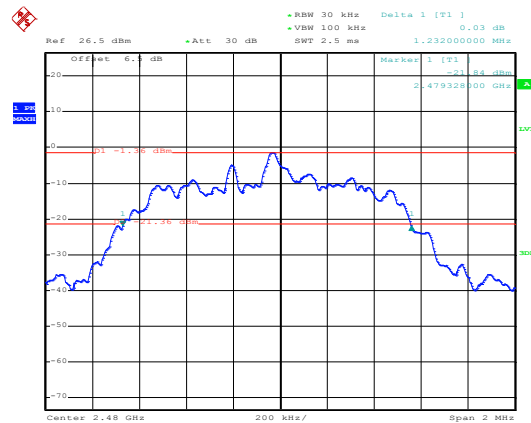
Date: 27.SEP.2016 11:33:31

Lowest channel



Date: 27.SEP.2016 11:38:02

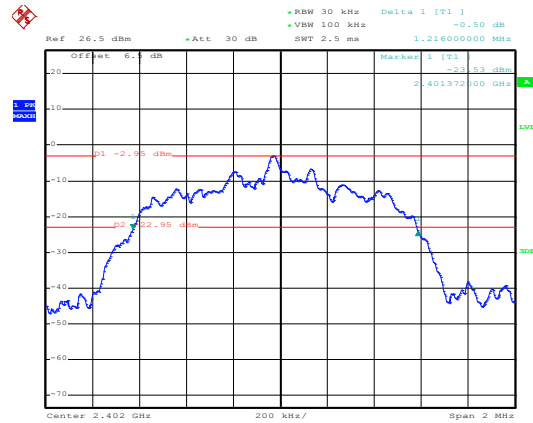
Middle channel



Date: 27.SEP.2016 11:40:06

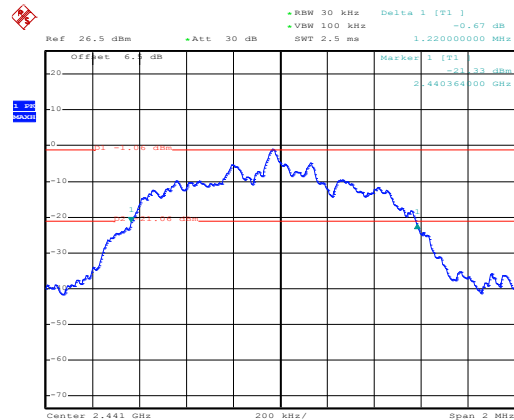
Highest channel

Modulation mode: 8DPSK



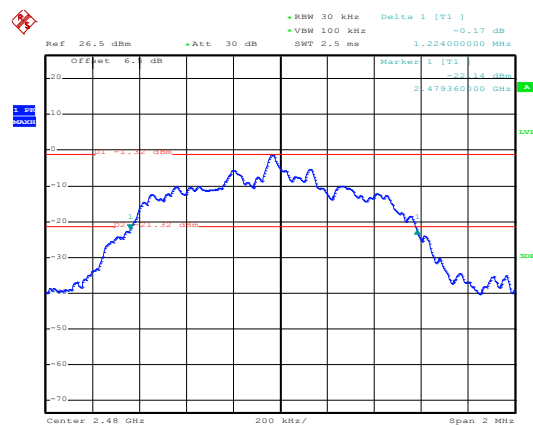
Date: 27.SEP.2016 11:44:14

Lowest channel



Date: 27.SEP.2016 11:43:11

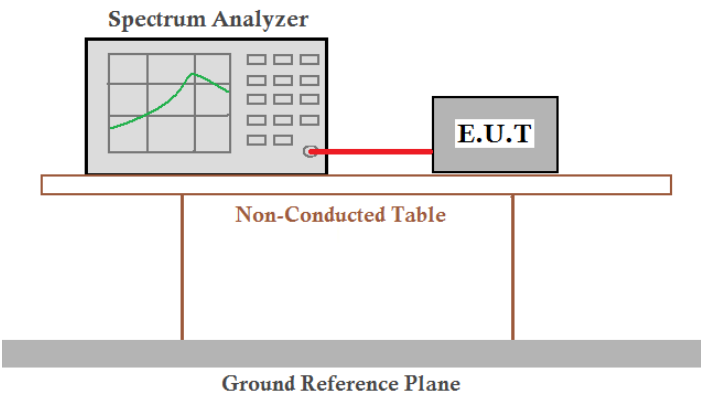
Middle channel



Date: 27.SEP.2016 11:41:48

Highest channel

6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=100 kHz, VBW=300 kHz, detector=Peak
Limit:	0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green trace, is connected to an E.U.T (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T are positioned on a 'Non-Conducted Table', which is a rectangular platform supported by two vertical legs. Below this table is a 'Ground Reference Plane', represented by a thick grey horizontal bar.
Test Instruments:	Refer to section 5.7 for details
Test mode:	Hopping mode
Test results:	Pass

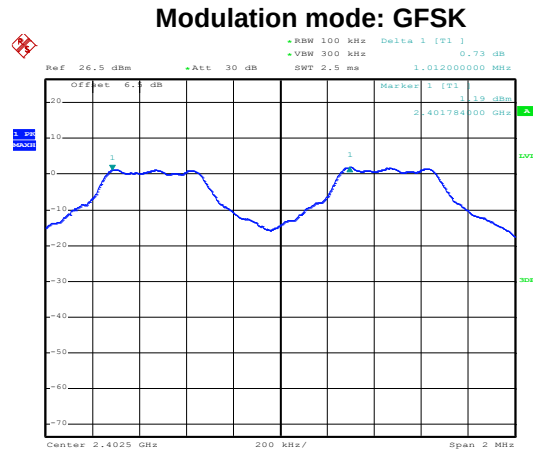
Measurement Data:

GFSK mode			
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	1012	621.33	Pass
Middle	1004	621.33	Pass
Highest	1004	621.33	Pass
$\pi/4$ -DQPSK mode			
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	1004	821.33	Pass
Middle	1004	821.33	Pass
Highest	1004	821.33	Pass
8DPSK mode			
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	1012	816.00	Pass
Middle	1004	816.00	Pass
Highest	1004	816.00	Pass

Note: According to section 6.4

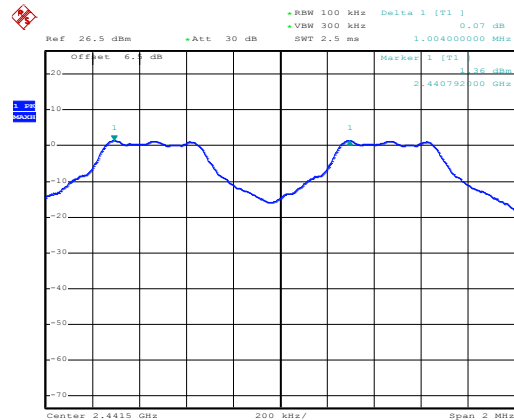
Mode	20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
GFSK	932	621.33
$\pi/4$ -DQPSK	1232	821.33
8DPSK	1224	816.00

Test plot as follows:



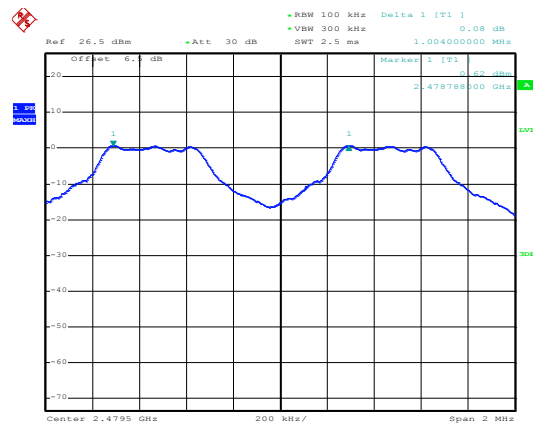
Date: 27.SEP.2016 13:46:10

Lowest channel



Date: 27.SEP.2016 13:47:13

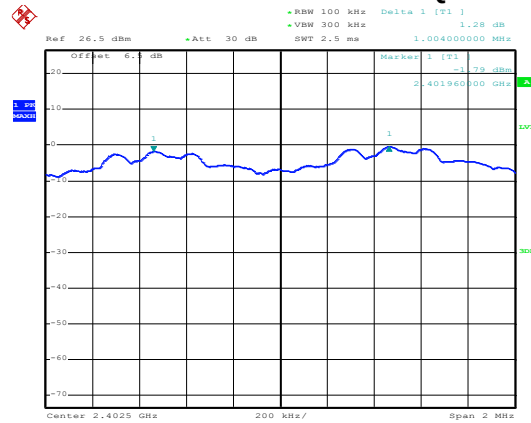
Middle channel



Date: 27.SEP.2016 13:48:20

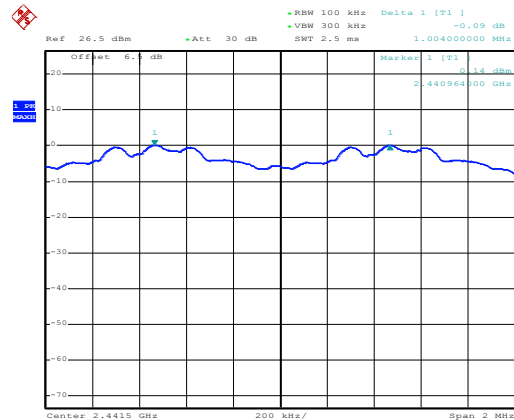
Highest channel

Modulation mode: $\pi/4$ -DQPSK



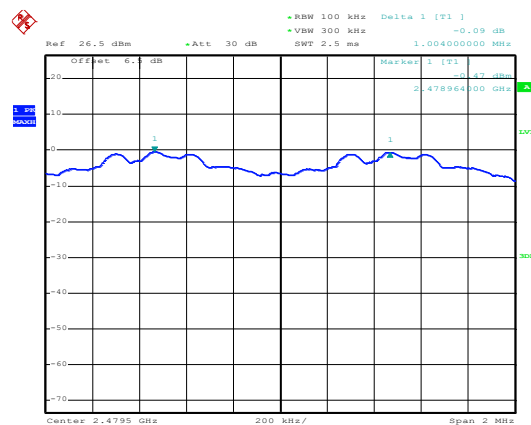
Date: 27.SEP.2016 13:49:51

Lowest channel



Date: 27.SEP.2016 13:51:03

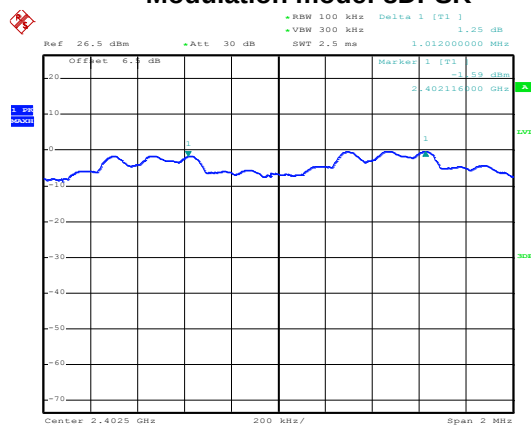
Middle channel



Date: 27.SEP.2016 13:52:18

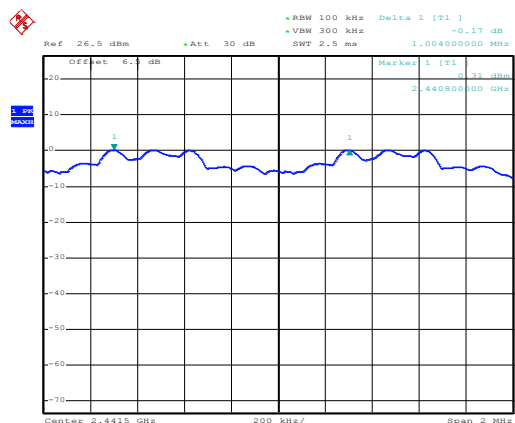
Highest channel

Modulation mode: 8DPSK



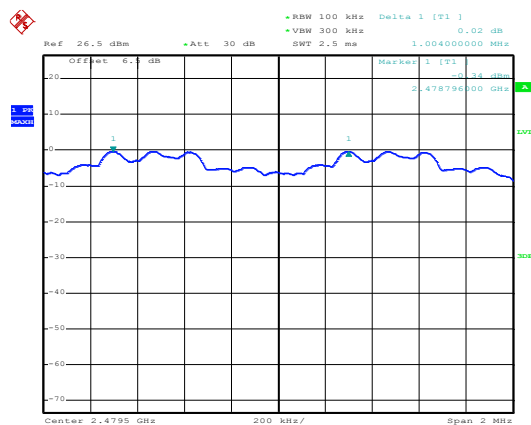
Date: 27.SEP.2016 13:53:45

Lowest channel



Date: 27.SEP.2016 13:55:08

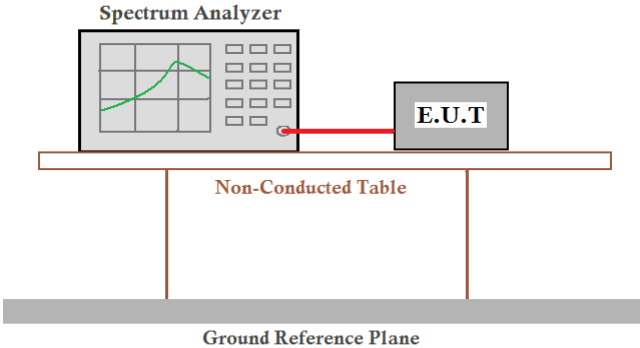
Middle channel



Date: 27.SEP.2016 13:56:22

Highest channel

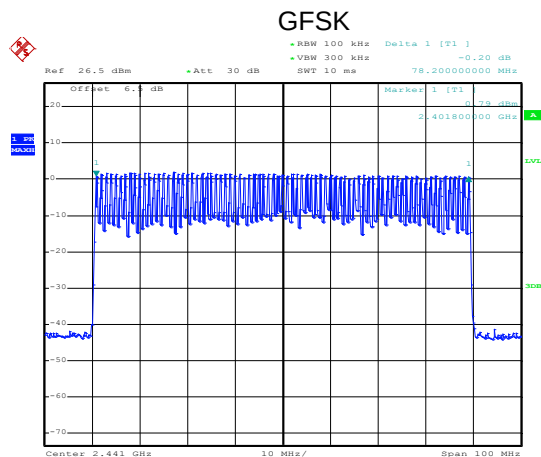
6.6 Hopping Channel Number

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and DA00-705
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane, which is represented by a thick grey bar at the bottom.
Test Instruments:	Refer to section 5.7 for details
Test mode:	Hopping mode
Test results:	Pass

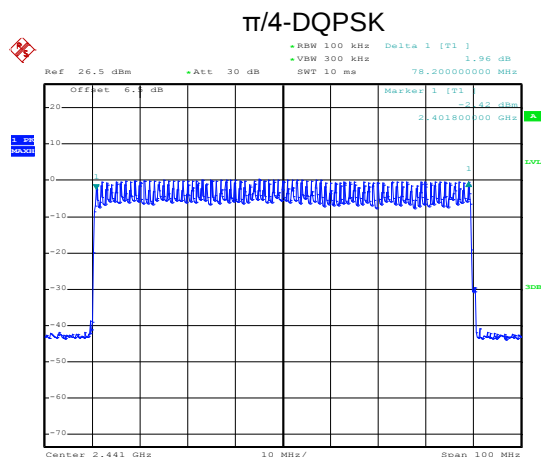
Measurement Data:

Mode	Hopping channel numbers	Limit	Result
GFSK, $\pi/4$ -DQPSK, 8DPSK	79	15	Pass

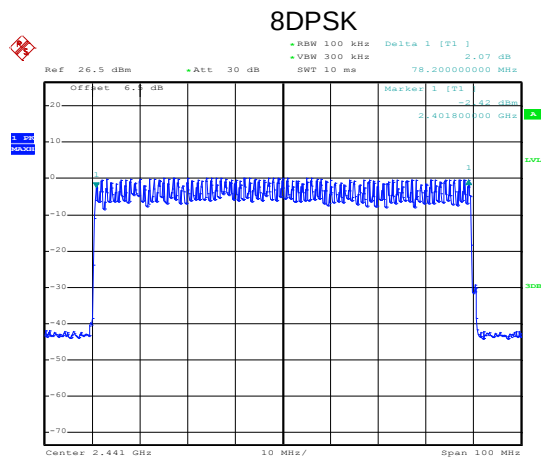
Test plot as follows:



Date: 27.SEP.2016 13:59:39

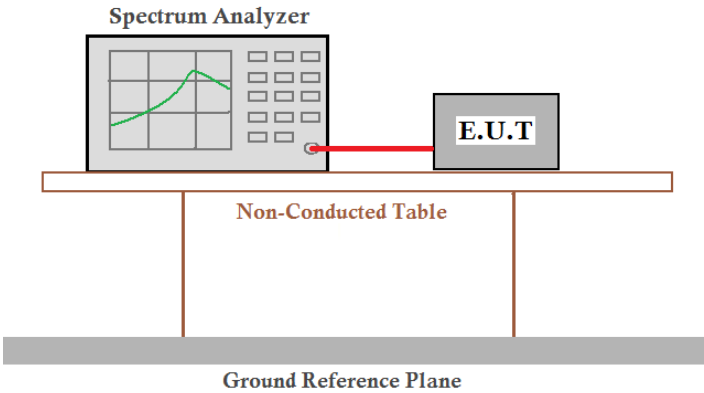


Date: 27.SEP.2016 14:03:11



Date: 27.SEP.2016 14:06:04

6.7 Dwell Time

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and KDB DA00-705
Receiver setup:	RBW=1 MHz, VBW=1 MHz, Span=0 Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 5.7 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data (Worse case):

Mode	Packet	Dwell time (second)	Limit (second)	Result
GFSK	DH1	0.13952	0.4	Pass
	DH3	0.27328		
	DH5	0.31680		
$\pi/4$ -DQPSK	2-DH1	0.14400	0.4	Pass
	2-DH3	0.27616		
	2-DH5	0.31680		
8DPSK	3-DH1	0.14336	0.4	Pass
	3-DH3	0.27424		
	3-DH5	0.31765		

For GFSK, $\pi/4$ -DQPSK and 8DPSK:

The test period: $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$

DH1 time slot = $0.436 \times (1600 / (2 \times 79)) \times 31.6 = 139.52 \text{ ms}$

DH3 time slot = $1.708 \times (1600 / (4 \times 79)) \times 31.6 = 273.28 \text{ ms}$

DH5 time slot = $2.970 \times (1600 / (6 \times 79)) \times 31.6 = 316.80 \text{ ms}$

2-DH1 time slot = $0.450 \times (1600 / (2 \times 79)) \times 31.6 = 144.00 \text{ ms}$

2-DH3 time slot = $1.726 \times (1600 / (4 \times 79)) \times 31.6 = 276.16 \text{ ms}$

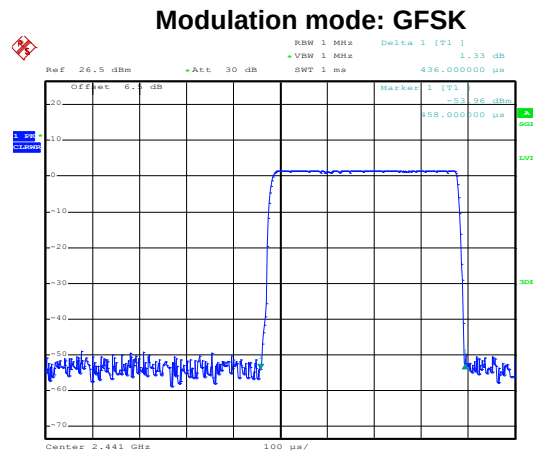
2-DH5 time slot = $2.970 \times (1600 / (6 \times 79)) \times 31.6 = 316.80 \text{ ms}$

3-DH1 time slot = $0.448 \times (1600 / (2 \times 79)) \times 31.6 = 143.36 \text{ ms}$

3-DH3 time slot = $1.714 \times (1600 / (4 \times 79)) \times 31.6 = 274.24 \text{ ms}$

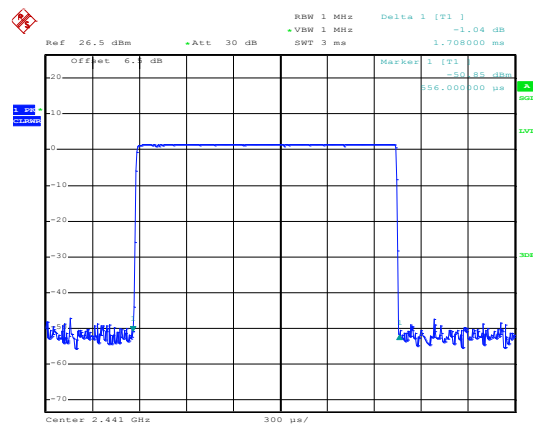
3-DH5 time slot = $2.978 \times (1600 / (6 \times 79)) \times 31.6 = 317.65 \text{ ms}$

Test plot as follows:



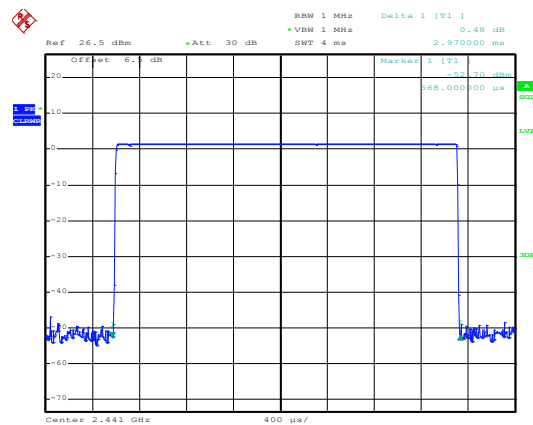
Date: 27.SEP.2016 10:55:54

DH1



Date: 27.SEP.2016 10:59:39

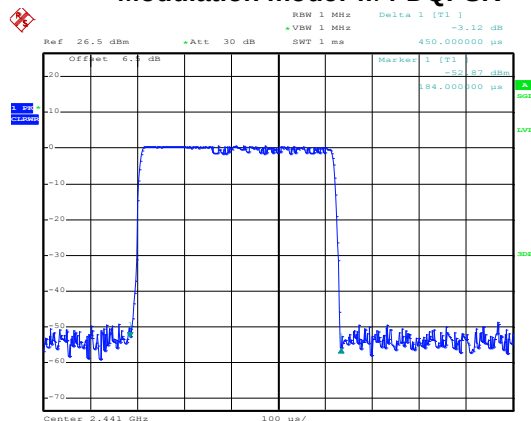
DH3



Date: 27.SEP.2016 11:03:03

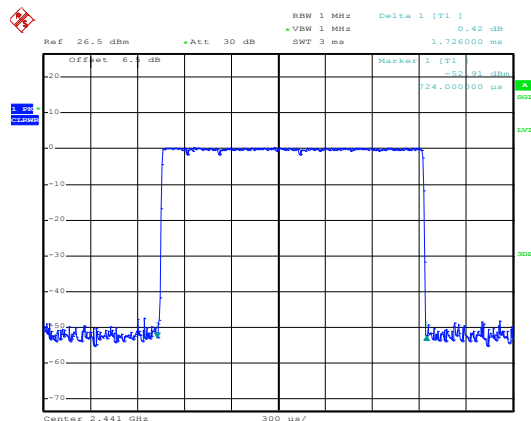
DH5

Modulation mode: $\pi/4$ -DQPSK



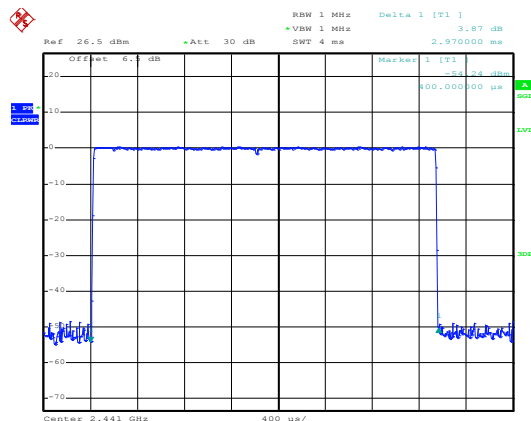
Date: 27.SEP.2016 10:57:19

2-DH1



Date: 27.SEP.2016 11:00:41

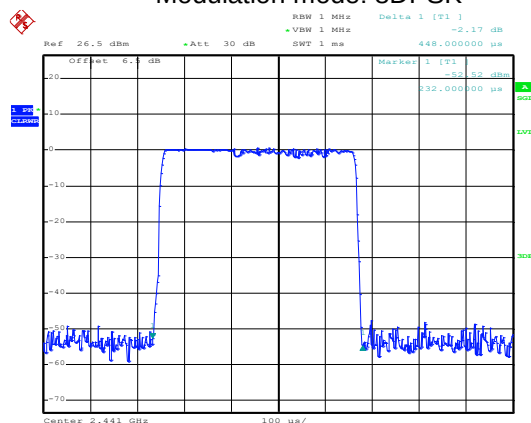
2-DH3



Date: 27.SEP.2016 11:04:49

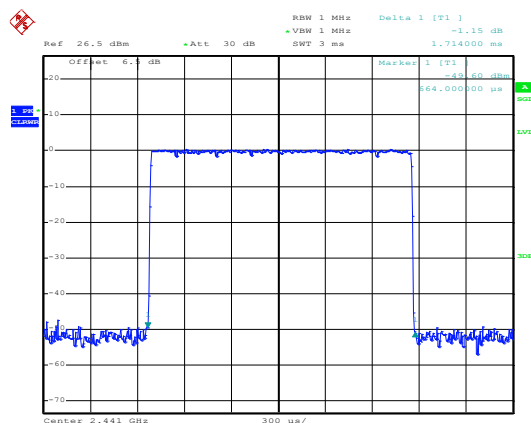
2-DH5

Modulation mode: 8DPSK



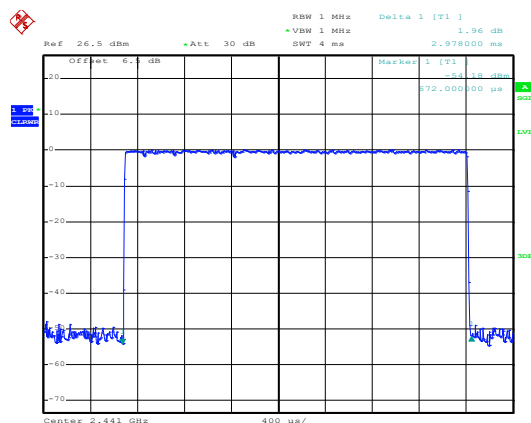
Date: 27.SEP.2016 10:58:15

3-DH1



Date: 27.SEP.2016 11:01:38

3-DH3



Date: 27.SEP.2016 11:05:44

3-DH5