APPLICATION CERTIFICATION
On Behalf of
Digital Gallery Global Limited

Bluetooth CD/Radio Boombox
Model No.: IBC233, IBC233B, IBC233S

FCC ID: P5FIBC233

Prepared for	:	Digital Gallery Global Limited
Address	:	Flat A, 12/F, World Tech Centre, 95 How Ming Stree, Hong Kong
Prepared by	:	ACCURATE TECHNOLOGY CO. LTD
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China
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Report Number	:	ATE20130326
Date of Test	:	March 5-April 7, 2013
Date of Report	:	April 8, 2013

TABLE OF CONTENTS

Description Page

Test Report Certification

Applicant **:** Digital Gallery Global Limited

Manufacturer **:** Dongguan Shangzheng Industrial Co., Ltd.

EUT Description **:** Bluetooth CD/Radio Boombox

(A) MODEL NO.: IBC233, IBC233B, IBC233S

(B) SERIAL NO.: N/A

(C) POWER SUPPLY: AC 120V/60Hz

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.4: 2009

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : March 5-April 7, 2013

Prepared by :

Apple

(Engineer)

Approved & Authorized Signer :

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Bluetooth CD/Radio Boombox
Model Number	:	IBC233, IBC233B, IBC233S (Note: These samples are same except for the appearance color is difference. So we prepare the IBC233 for FCC test.)
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Data rate	:	GFSK (1Mbps), π/4 DQPSK (2Mbps) and 8DPSK (3Mbps)
Antenna Gain		0dBi
Power Supply	:	AC 120V/60Hz
Applicant	:	Digital Gallery Global Limited
Address	:	Flat A, 12/F, World Tech Centre, 95 How Ming Stree, Hong Kong
Manufacturer	:	Dongguan Shangzheng Industrial Co., Ltd.
Address	:	Building D Xinxing Industrial Zone, Wangao Road, Wanjiang District, Dongguan, Guangdong, China
Date of sample received	:	March 5, 2013
Date of Test	:	March 5-April 7, 2013

1.2.Special Accessory and Auxiliary Equipment

N/A

1.3.Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen Listed by FCC The Registration Number is 752051 Listed by Industry Canada The Registration Number is 5077A-2 Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.4.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 12, 2013	Jan. 11, 2014
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 12, 2013	Jan. 11, 2014
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 12, 2013	Jan. 11, 2014
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 12, 2013	Jan. 11, 2014
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Feb. 6, 2013	Feb. 5, 2014
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Feb. 6, 2013	Feb. 5, 2014
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Feb. 6, 2013	Feb. 5, 2014
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Feb. 6, 2013	Feb. 5, 2014
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 12, 2013	Jan. 11, 2014
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 12, 2013	Jan. 11, 2014
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 12, 2013	Jan. 11, 2014
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 12, 2013	Jan. 11, 2014

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode
Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz
Hopping

3.2.Configuration and peripherals

EUT

Setup: Transmitting mode

(EUT: Bluetooth CD/Radio Boombox)

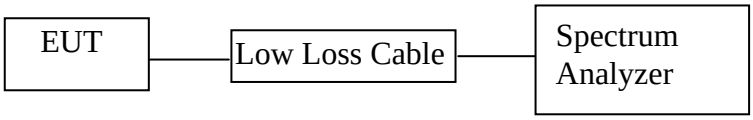
4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(1)	20dB Bandwidth Test	Compliant
Section 15.247(a)(1)	Carrier Frequency Separation Test	Compliant
Section 15.247(a)(1)(iii)	Number Of Hopping Frequency Test	Compliant
Section 15.247(a)(1)(iii)	Dwell Time Test	Compliant
Section 15.247(b)(1)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

Remark: “N/A” means “Not applicable”.

5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



(EUT: Bluetooth CD/Radio Boombox)

5.2.The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.3.EUT Configuration on Measurement

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.3.1.Bluetooth CD/Radio Boombox (EUT)

Model Number	**:**	IBC233
Serial Number	**:**	N/A
Manufacturer	**:**	Dongguan Shangzheng Industrial Co., Ltd.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX(Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 30kHz and VBW to 100kHz.

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

5.6.Test Result

PASS.

Date of Test:	Mar. 28, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX	Test Engineer:	Apple

GFSK (1Mbps)			
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2402	0.846	N/A
Middle	2441	0.924	N/A
High	2480	0.852	N/A

π/4 DQPSK (2Mbps)			
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2402	1.218	N/A
Middle	2441	1.212	N/A
High	2480	1.224	N/A

8DPSK (3Mbps)			
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2402	1.266	N/A
Middle	2441	1.266	N/A
High	2480	1.266	N/A

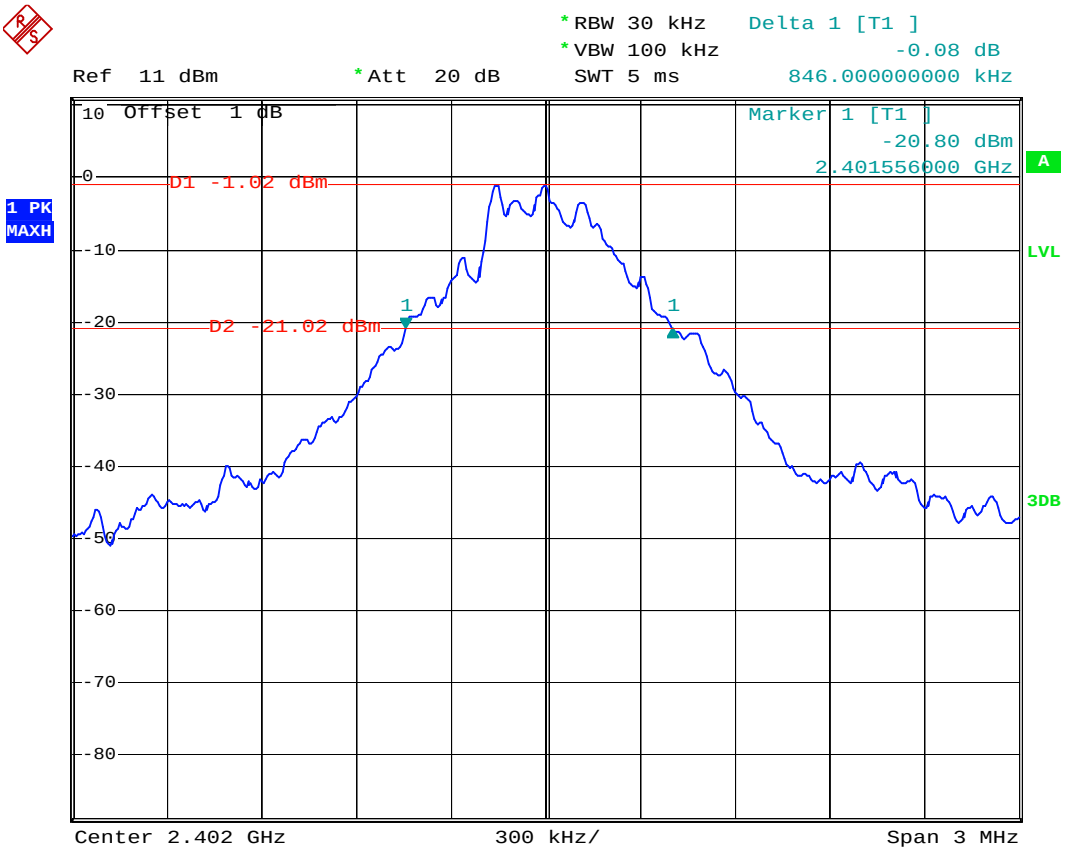
Note: N/A: 1) The 20 dB bandwidth of the hopping channel is not limit.

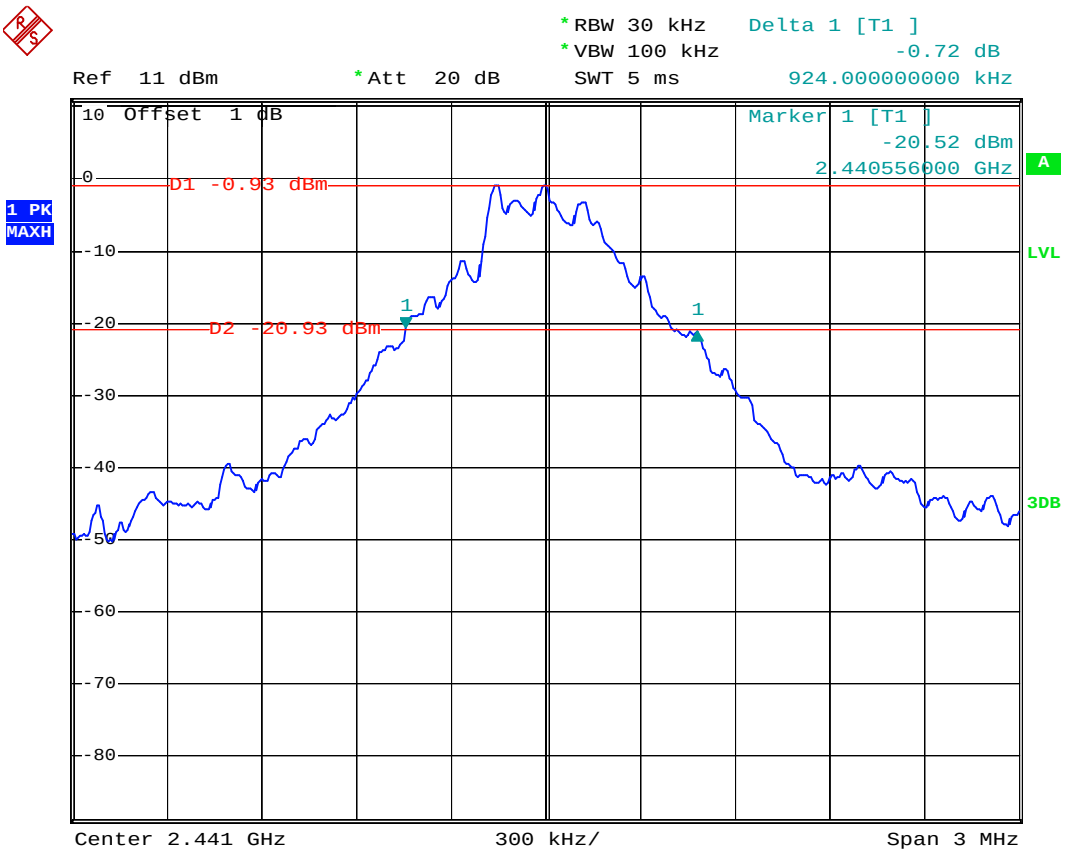
2) The data of 20 dB bandwidth of the hopping channel is limit of carrier frequencies separated

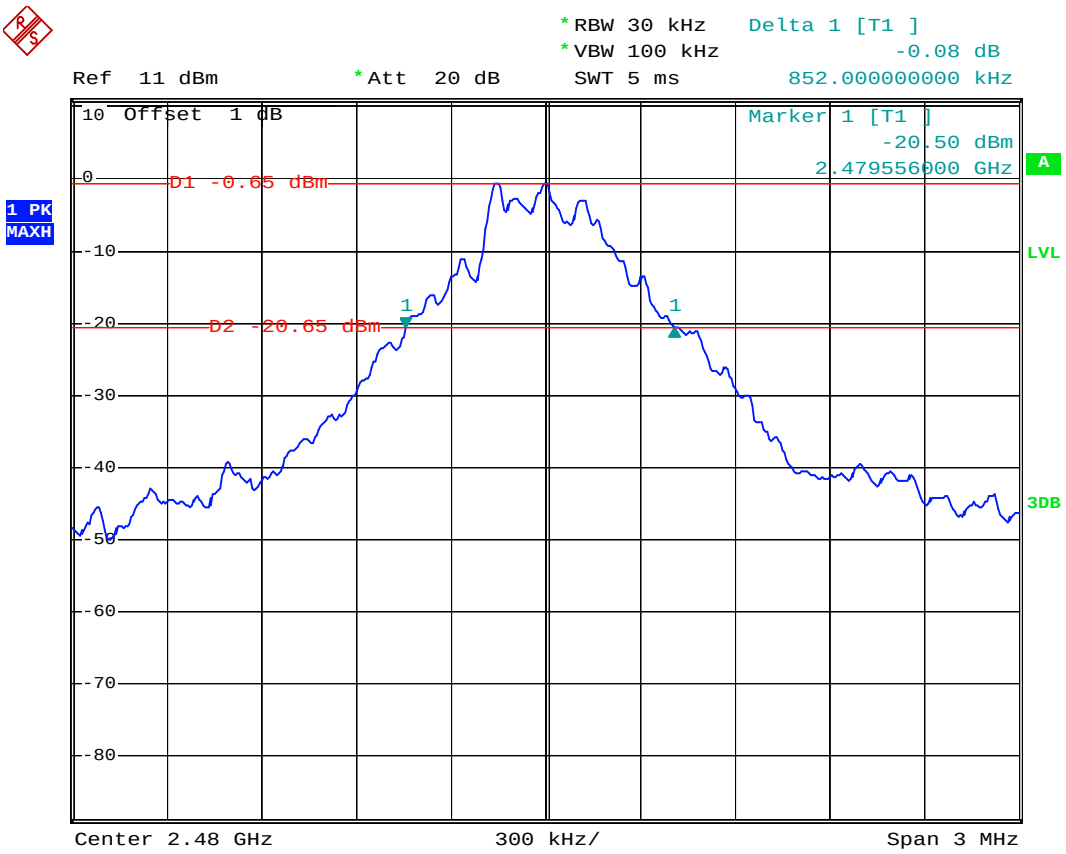
The spectrum analyzer plots are attached as below.

"Spectrum analyzer" is R/S

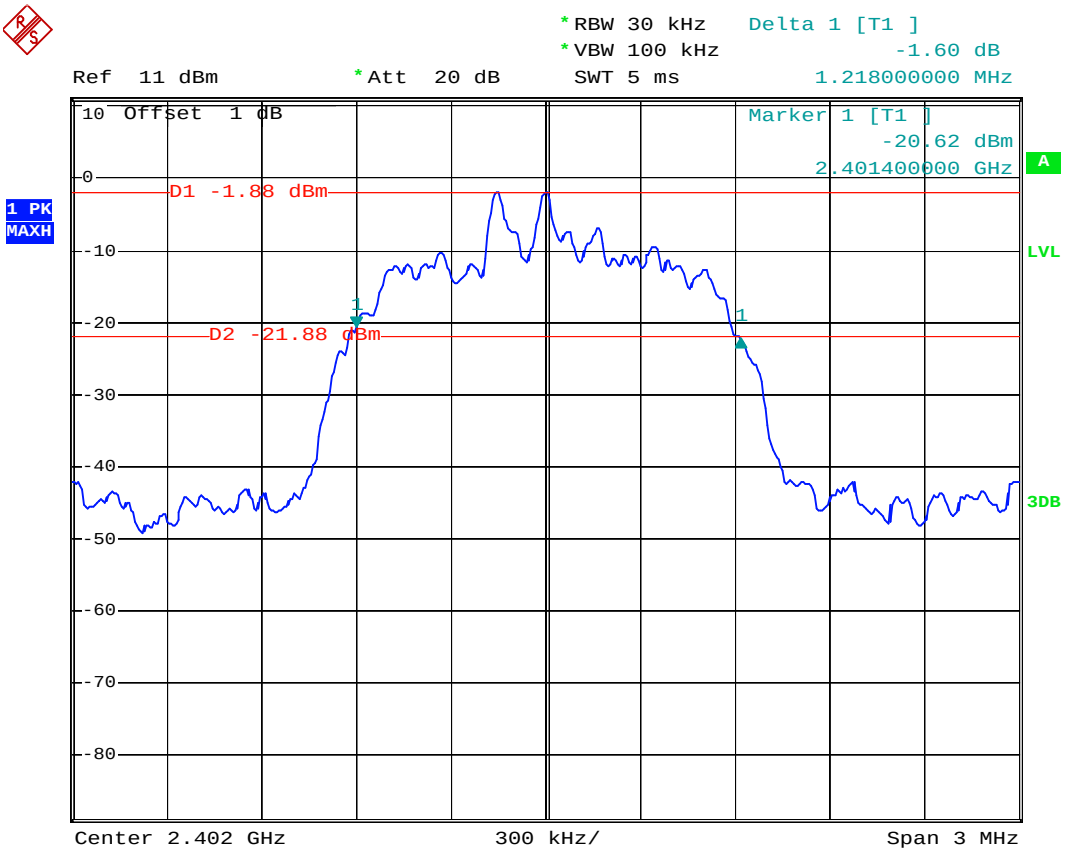
GFSK (1Mbps)

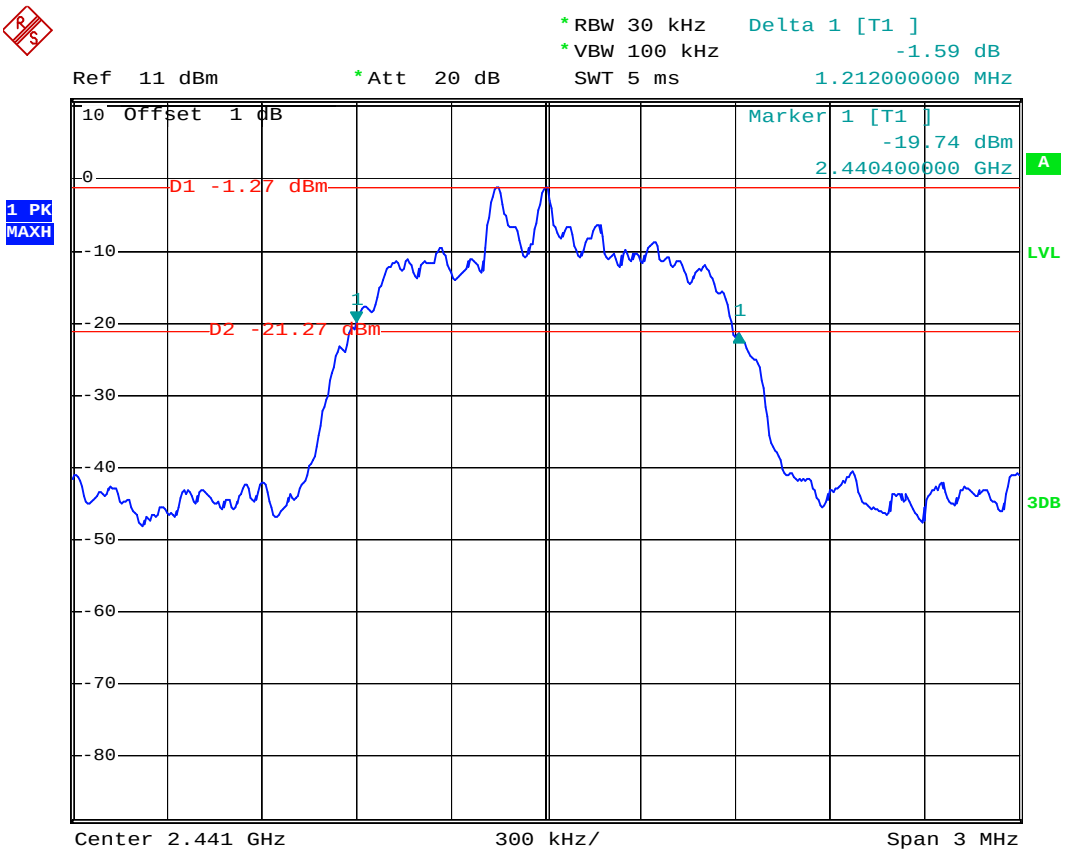


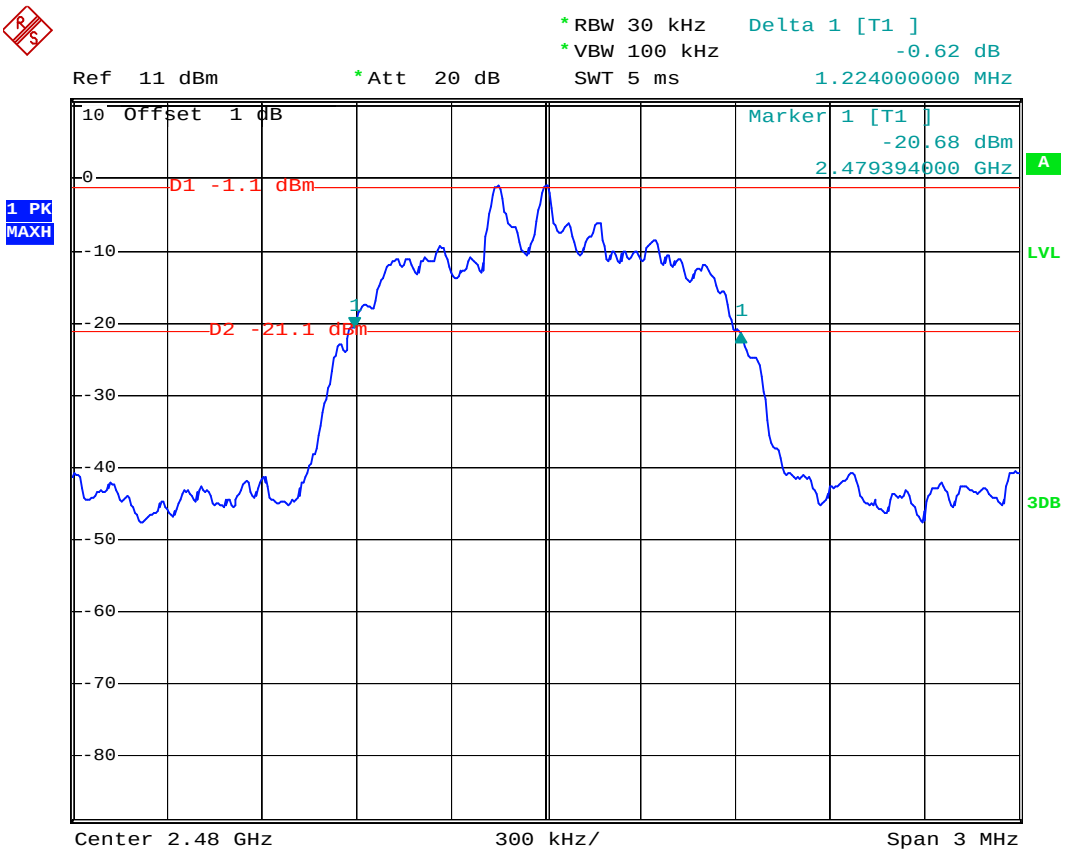

*RBW 30 kHz
*VBW 100 kHz
Delta 1 [T1]
-0.72 dB
924.000000000 kHz
Ref 11 dBm
*Att 20 dB
SWT 5 ms
10 Offset 1 dB
Marker 1 [T1]
-20.52 dBm
2.440556000 GHz
D1 -0.93 dBm
D2 -20.93 dBm
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
300 kHz/
Span 3 MHz


*RBW 30 kHz
*VBW 100 kHz
SWT 5 ms
Delta 1 [T1]
-0.08 dB
852.000000000 kHz
Ref 11 dBm
*Att 20 dB
10 Offset 1 dB
Marker 1 [T1]
-20.50 dBm
2.479556000 GHz
D1 -0.65 dBm
D2 -20.65 dBm
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
300 kHz/
Span 3 MHz

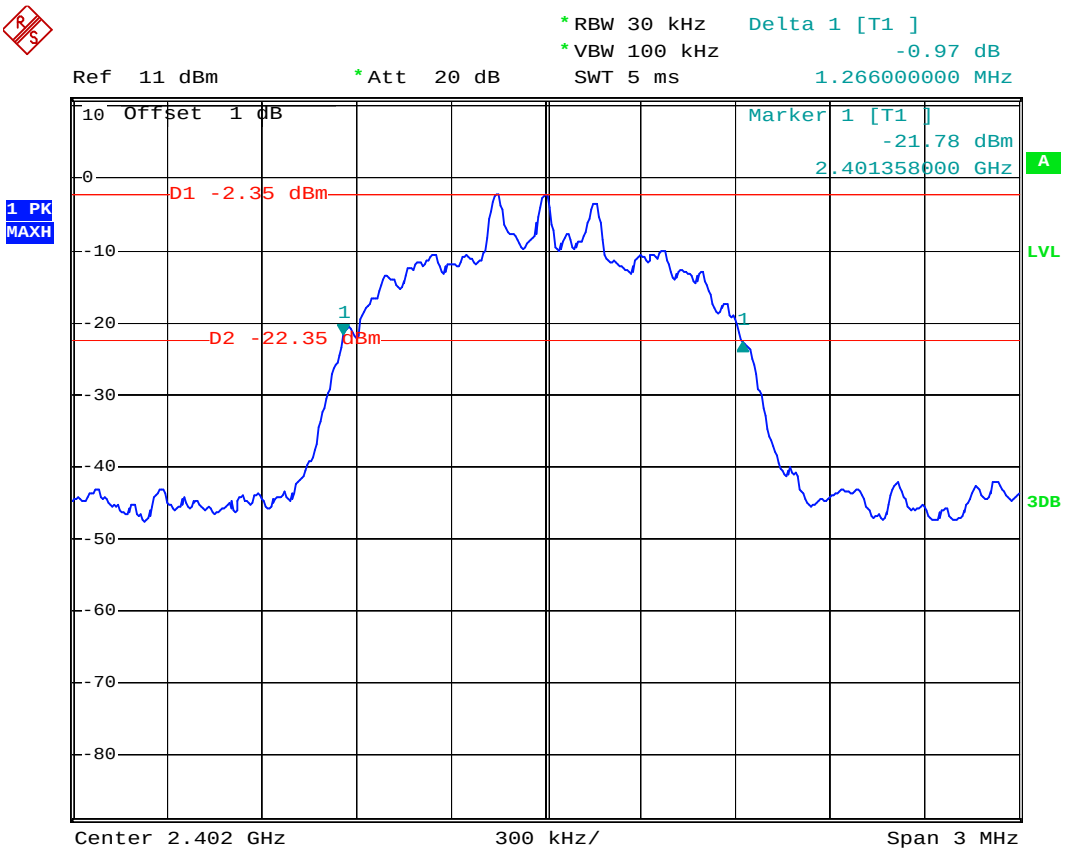
π/4 DQPSK (2Mbps)

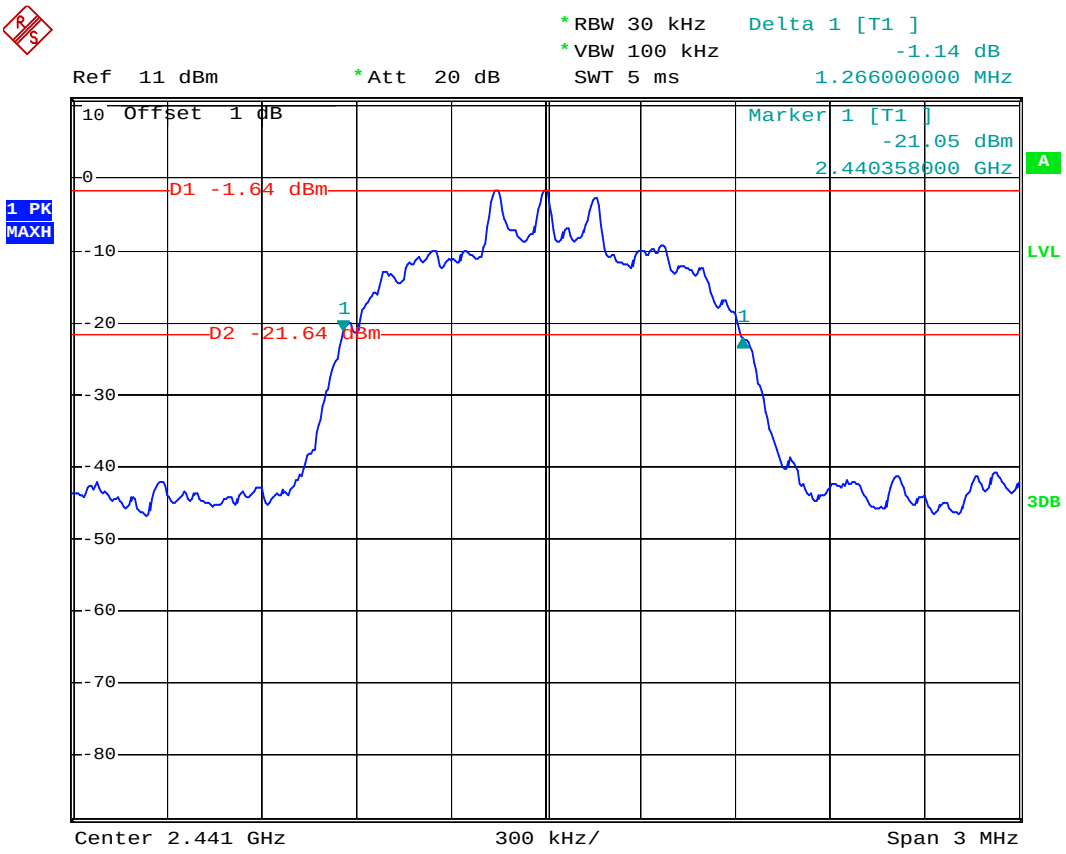


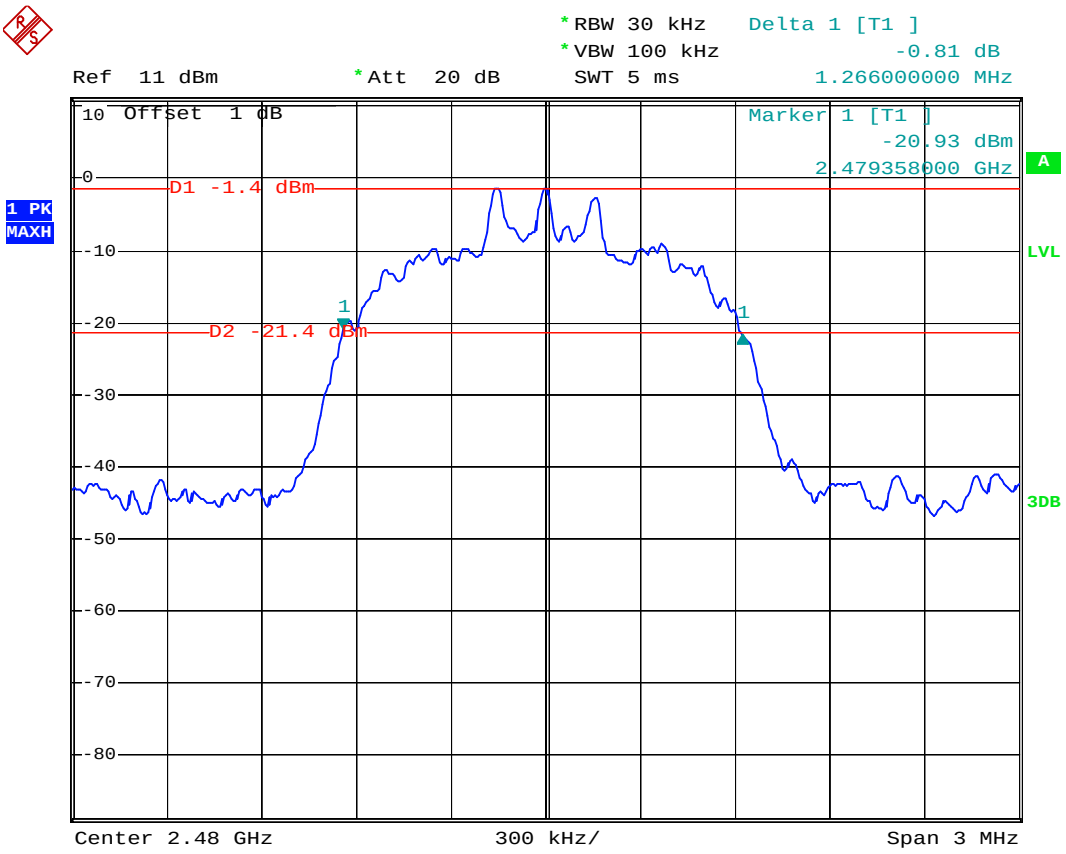

*RBW 30 kHz
*VBW 100 kHz
Ref 11 dBm
*Att 20 dB
SWT 5 ms
Delta 1 [T1]
-1.59 dB
1.212000000 MHz
10 Offset 1 dB
Marker 1 [T1]
-19.74 dBm
2.440400000 GHz
D1 -1.27 dBm
D2 -21.27 dBm
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
300 kHz/
Span 3 MHz


*RBW 30 kHz
*VBW 100 kHz
Ref 11 dBm
*Att 20 dB
SWT 5 ms
Delta 1 [T1]
-0.62 dB
1.224000000 MHz
10 Offset 1 dB
Marker 1 [T1]
-20.68 dBm
2.479394000 GHz
D1 -1.1 dBm
D2 -21.1 dBm
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
300 kHz/
Span 3 MHz

8DPSK (3Mbps)

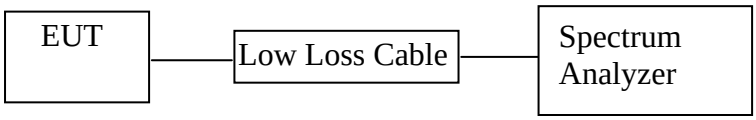

*RBW 30 kHz
*VBW 100 kHz
Ref 11 dBm
*Att 20 dB
SWT 5 ms
Delta 1 [T1]
-0.97 dB
1.266000000 MHz
10 Offset 1 dB
Marker 1 [T1]
-21.78 dBm
2.401358000 GHz
1 PK
MAXH
A
LVL
3DB
D1 -2.35 dBm
D2 -22.35 dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.402 GHz
300 kHz/
Span 3 MHz


*RBW 30 kHz
*VBW 100 kHz
Ref 11 dBm
*Att 20 dB
SWT 5 ms
Delta 1 [T1]
-1.14 dB
1.266000000 MHz
10 Offset 1 dB
Marker 1 [T1]
-21.05 dBm
2.440358000 GHz
A
1 PK
MAXH
D1 -1.64 dBm
D2 -21.64 dBm
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
300 kHz/
Span 3 MHz


*RBW 30 kHz
*VBW 100 kHz
Ref 11 dBm
*Att 20 dB
SWT 5 ms
Delta 1 [T1]
-0.81 dB
1.266000000 MHz
10 Offset 1 dB
Marker 1 [T1]
-20.93 dBm
2.479358000 GHz
1 PK
MAXH
A
LVL
3DB
D1 -1.4 dBm
D2 -21.4 dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
300 kHz/
Span 3 MHz

6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



(EUT: Bluetooth CD/Radio Boombox)

6.2.The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

6.3.EUT Configuration on Measurement

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.3.1.Bluetooth CD/Radio Boombox (EUT)

Model Number	**:**	IBC233
Serial Number	**:**	N/A
Manufacturer	**:**	Dongguan Shangzheng Industrial Co., Ltd.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

6.5. Test Procedure

6.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2. Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz.

6.5.3. Set the adjacent channel of the EUT maxhold another trace.

6.5.4. Measurement the channel separation

6.6. Test Result

PASS.

Date of Test:	Mar. 28, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	Hopping	Test Engineer:	Apple

GFSK (1Mbps)			
Channel	Channel Frequency (MHz)	Channel separation (MHz)	Limit
Low	2402	1.004	> 20 dB bandwidth of the hopping channel (0.846MHz) or 25kHz (whichever is greater)
Middle	2441	1.004	> 20 dB bandwidth of the hopping channel (0.924MHz) or 25kHz (whichever is greater)
High	2480	1.004	> 20 dB bandwidth of the hopping channel (0.852MHz) or 25kHz (whichever is greater)

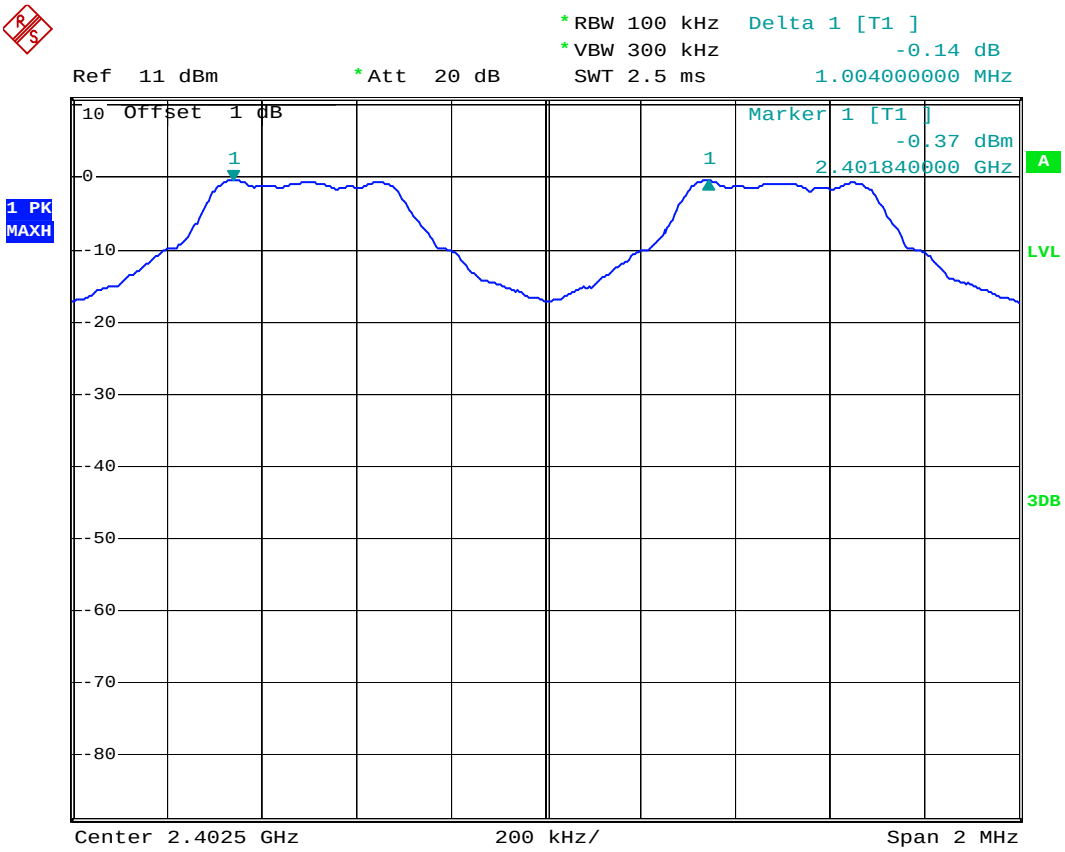
π/4 DQPSK (2Mbps)			
Channel	Channel Frequency (MHz)	Channel separation (MHz)	Limit
Low	2402	1.008	> two-thirds of the 20 dB bandwidth (0.812MHz) or 25kHz (whichever is greater)
Middle	2441	1.002	> two-thirds of the 20 dB bandwidth (0.808MHz) or 25kHz (whichever is greater)
High	2480	1.008	> two-thirds of the 20 dB bandwidth (0.816MHz) or 25kHz (whichever is greater)

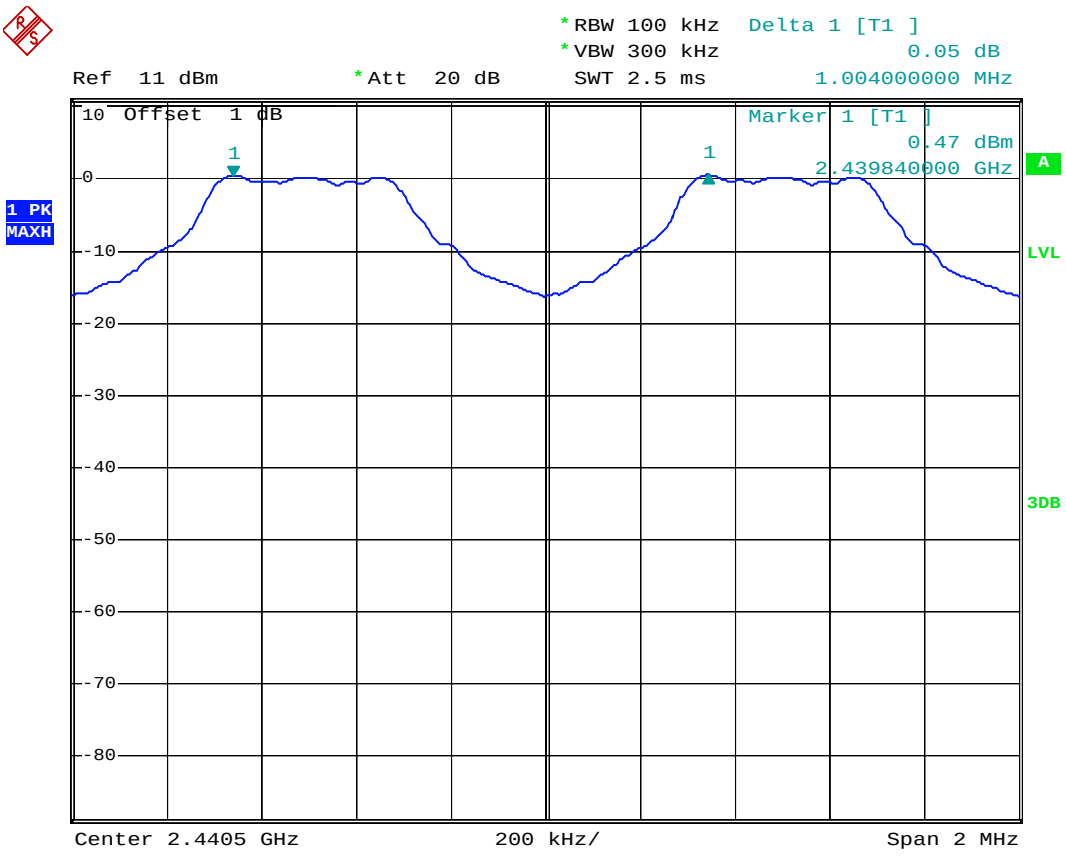
8DPSK (3Mbps)			
Channel	Channel Frequency (MHz)	Channel separation (MHz)	Limit
Low	2402	1.000	> two-thirds of the 20 dB bandwidth (0.844MHz) or 25kHz (whichever is greater)
Middle	2441	1.000	> two-thirds of the 20 dB bandwidth (0.844MHz) or 25kHz (whichever is greater)
High	2480	1.000	> two-thirds of the 20 dB bandwidth (0.844MHz) or 25kHz (whichever is greater)

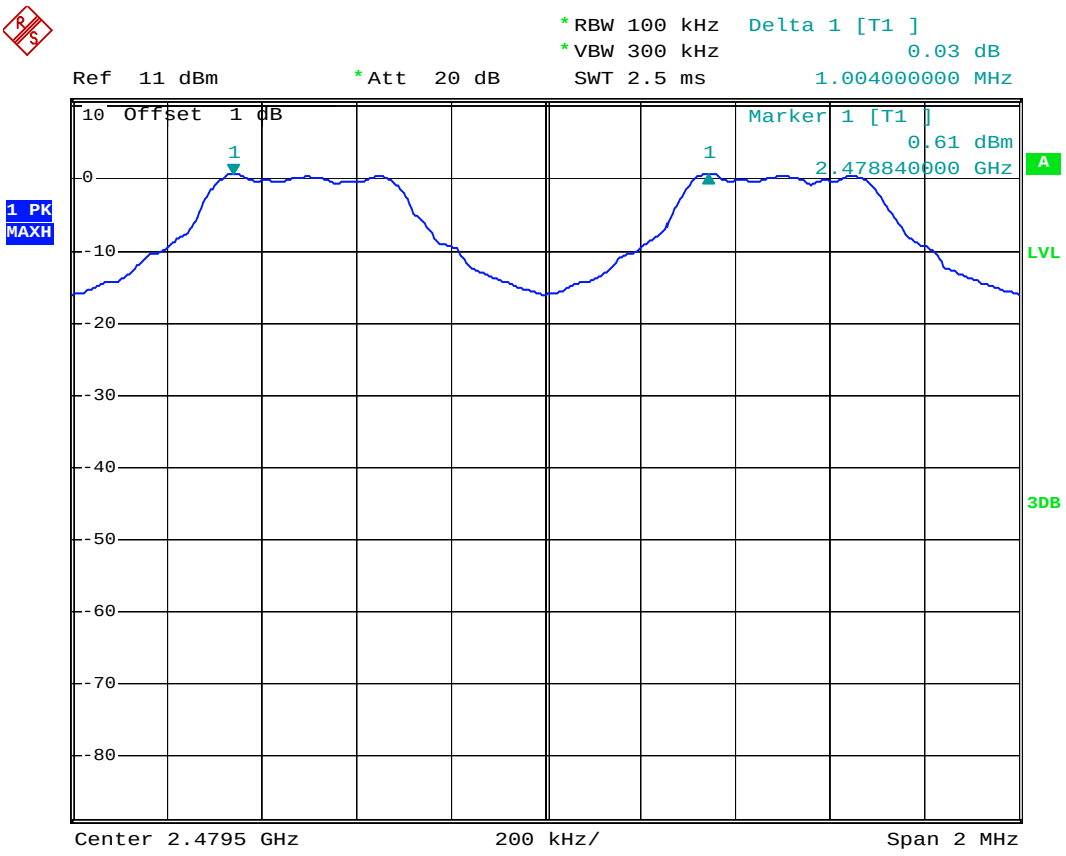
The spectrum analyzer plots are attached as below.

"Spectrum analyzer" is R/S

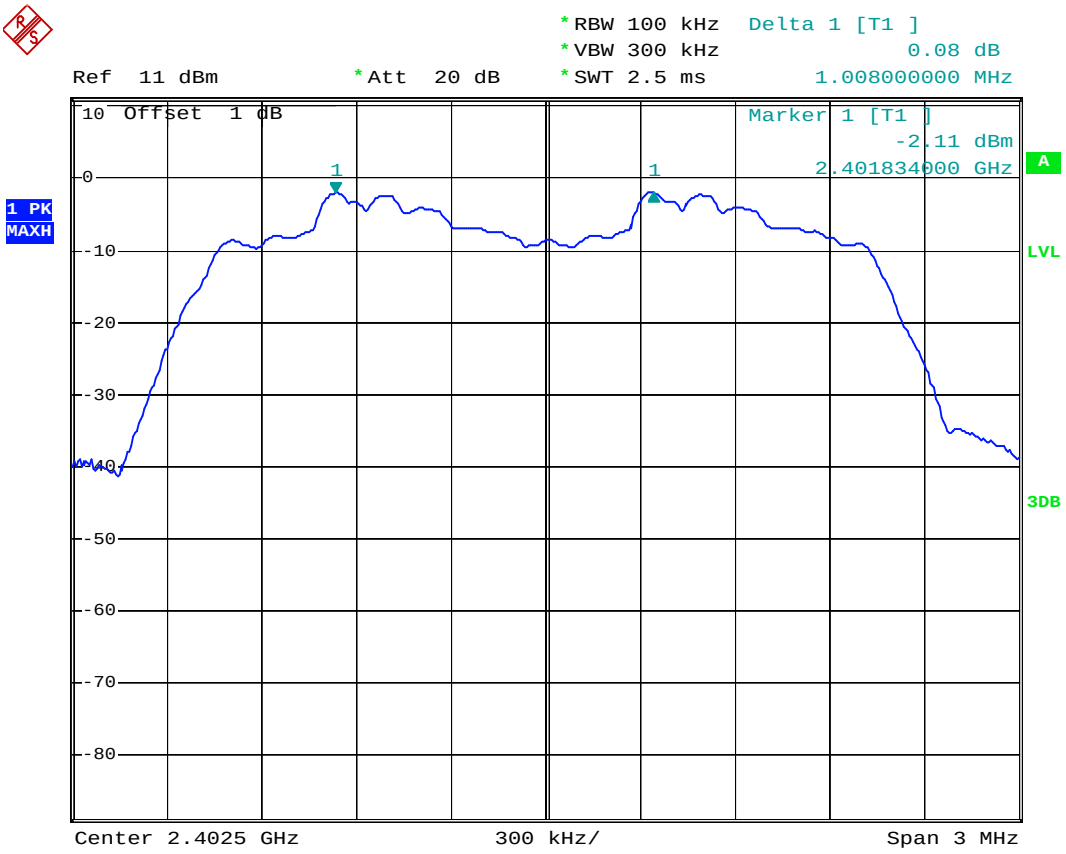
GFSK (1Mbps)

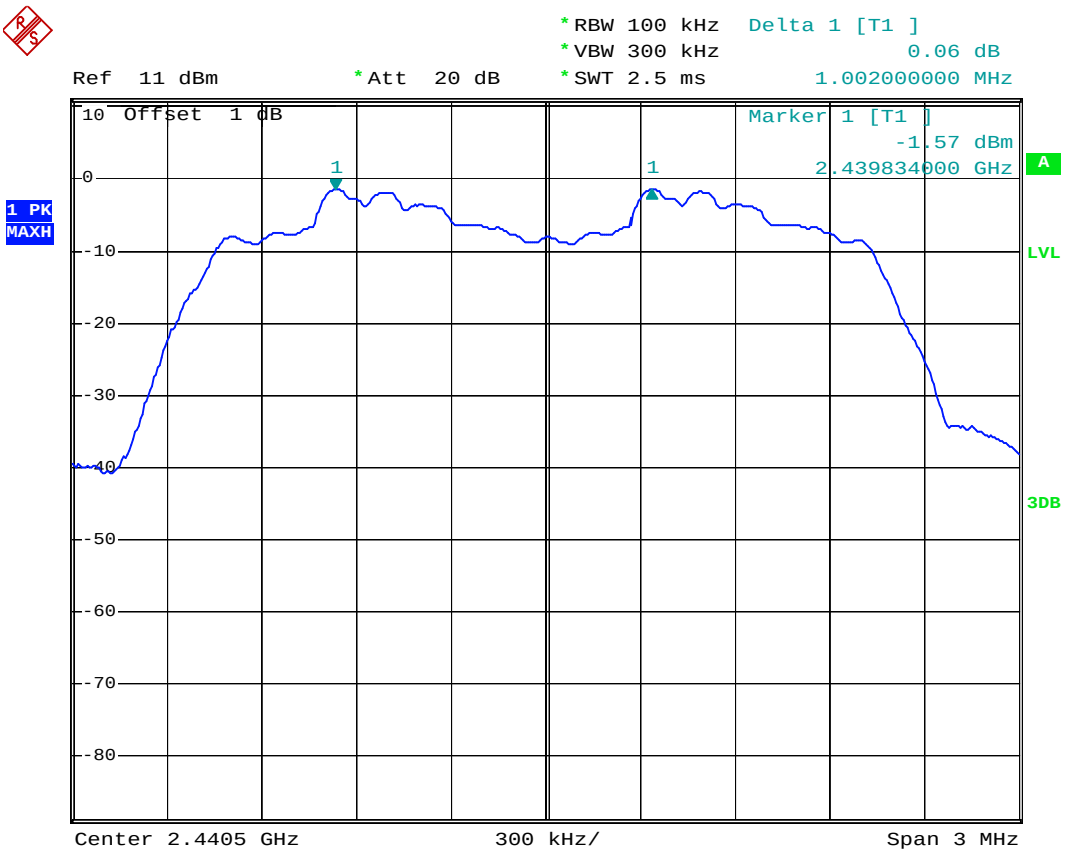


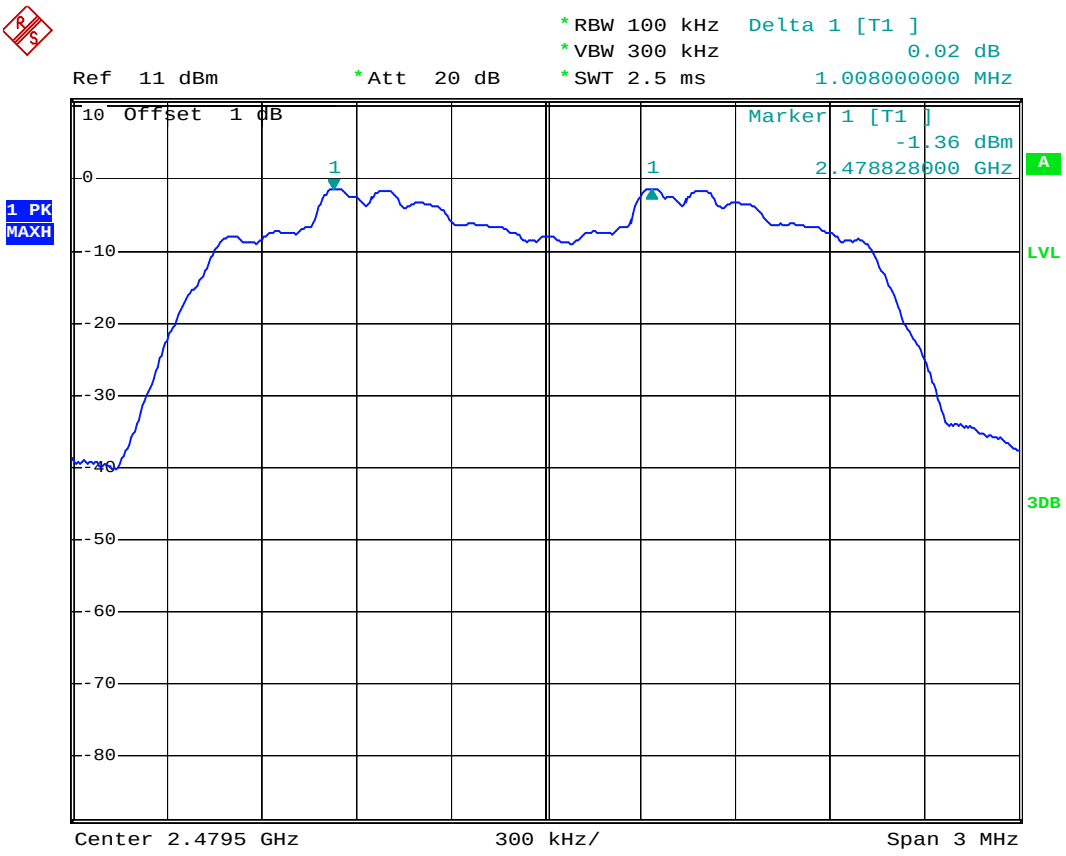

*RBW 100 kHz
*VBW 300 kHz
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
Delta 1 [T1]
0.05 dB
1.004000000 MHz
Marker 1 [T1]
0.47 dBm
2.439840000 GHz
10 Offset 1 dB
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4405 GHz
200 kHz/
Span 2 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
0.03 dB
1.004000000 MHz
Ref 11 dBm
*Att 20 dB
10 Offset 1 dB
Marker 1 [T1]
0.61 dBm
2.478840000 GHz
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4795 GHz
200 kHz/
Span 2 MHz

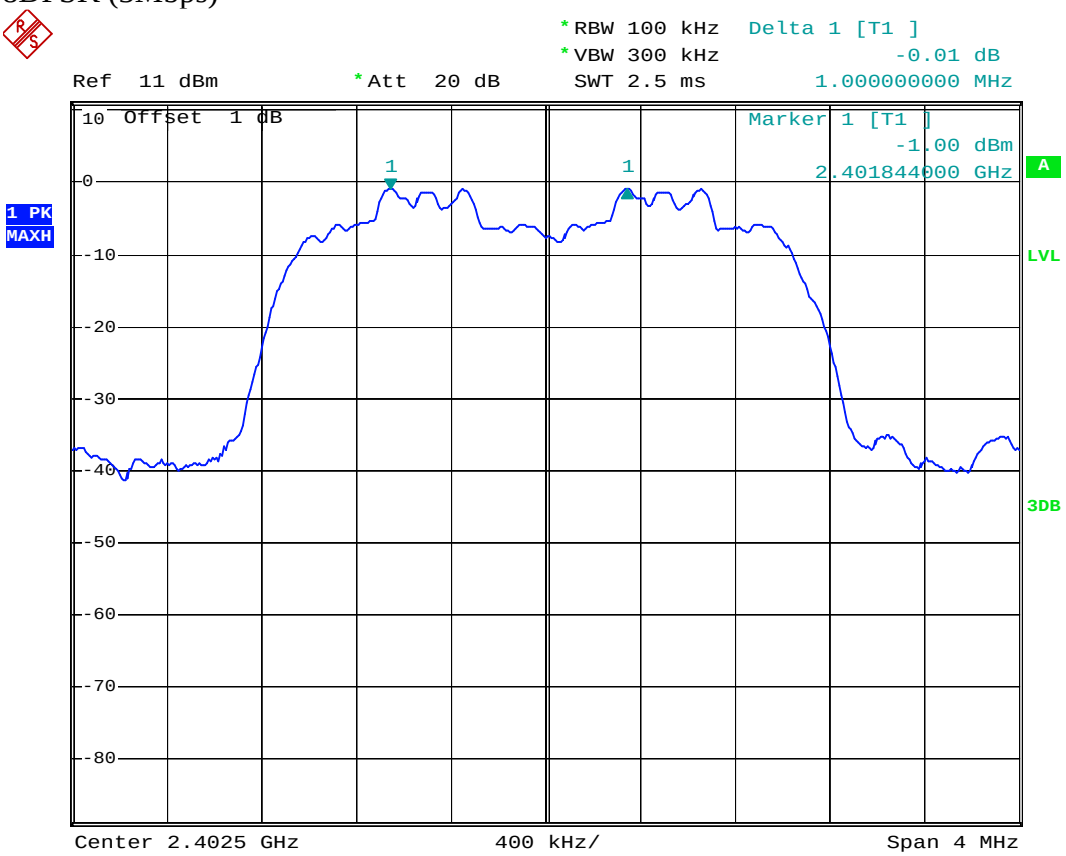
π/4 DQPSK (2Mbps)

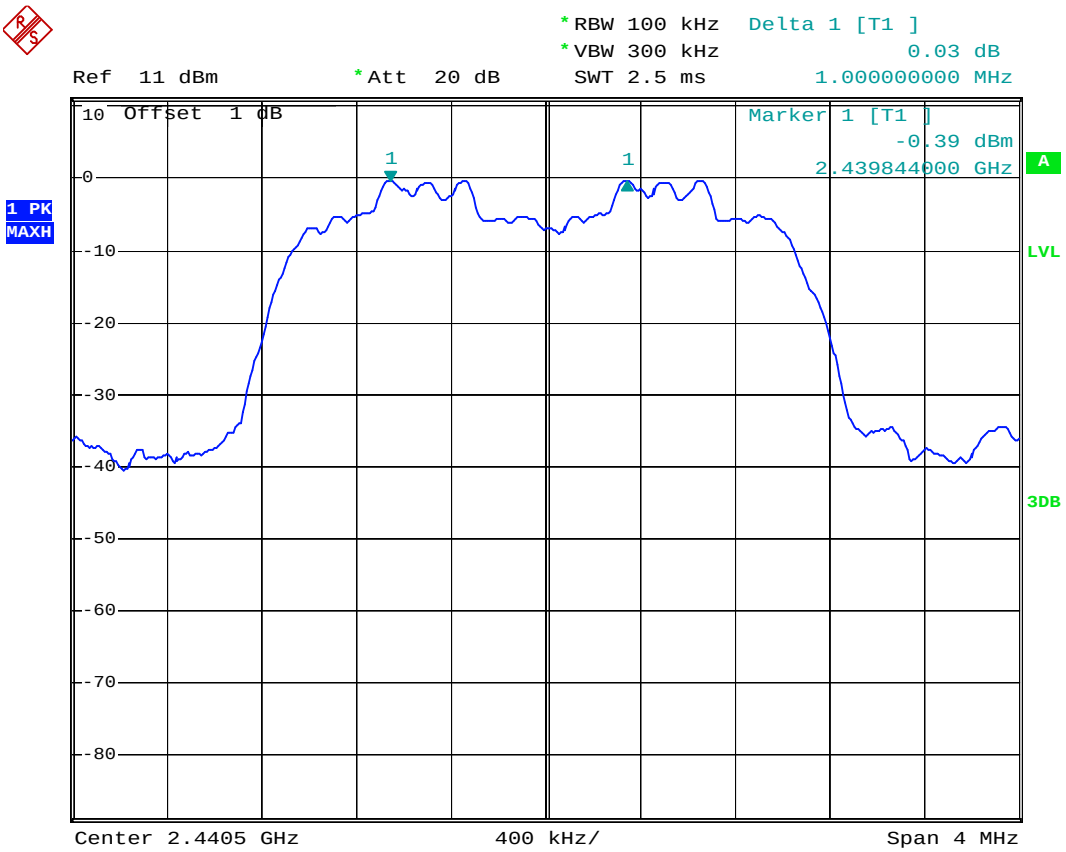


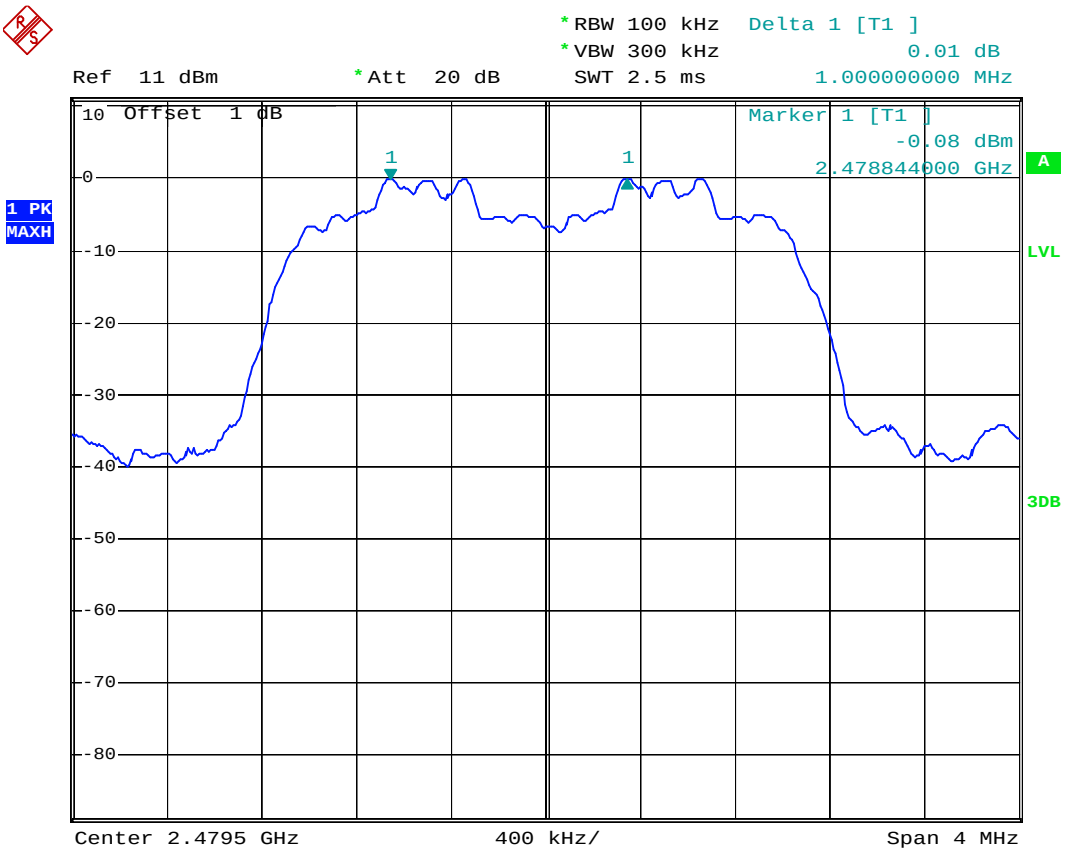

*RBW 100 kHz
*VBW 300 kHz
*SWT 2.5 ms
Delta 1 [T1]
0.06 dB
1.002000000 MHz
Ref 11 dBm
*Att 20 dB
10 Offset 1 dB
Marker 1 [T1]
-1.57 dBm
2.439834000 GHz
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4405 GHz
300 kHz/
Span 3 MHz


*RBW 100 kHz
*VBW 300 kHz
*SWT 2.5 ms
Delta 1 [T1]
0.02 dB
1.008000000 MHz
Ref 11 dBm
*Att 20 dB
10 Offset 1 dB
Marker 1 [T1]
-1.36 dBm
2.478828000 GHz
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4795 GHz
300 kHz/
Span 3 MHz

8DPSK (3Mbps)

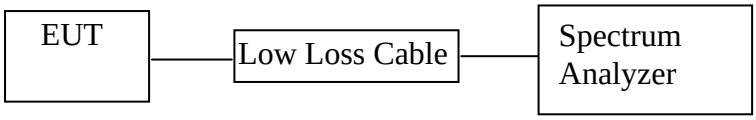

*RBW 100 kHz
*VBW 300 kHz
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
Delta 1 [T1]
-0.01 dB
1.000000000 MHz
10 Offset 1 dB
Marker 1 [T1]
-1.00 dBm
2.401844000 GHz
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4025 GHz
400 kHz/
Span 4 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
0.03 dB
1.000000000 MHz
Ref 11 dBm
*Att 20 dB
10 Offset 1 dB
Marker 1 [T1]
-0.39 dBm
2.439844000 GHz
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4405 GHz
400 kHz/
Span 4 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
0.01 dB
1.000000000 MHz
Ref 11 dBm
*Att 20 dB
10 Offset 1 dB
Marker 1 [T1]
-0.08 dBm
2.478844000 GHz
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4795 GHz
400 kHz/
Span 4 MHz

7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



(EUT: Bluetooth CD/Radio Boombox)

7.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

7.3.EUT Configuration on Measurement

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.3.1.Bluetooth CD/Radio Boombox (EUT)

Model Number	:	IBC233
Serial Number	:	N/A
Manufacturer	:	Dongguan Shangzheng Industrial Co., Ltd.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX (Hopping on) modes measure it.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Set the spectrum analyzer as Span=83.5MHz, RBW=100kHz, VBW=300kHz.

7.5.3.Max hold, view and count how many channel in the band.

7.6.Test Result

PASS.

Date of Test:	Mar. 28, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	Hopping	Test Engineer:	Apple

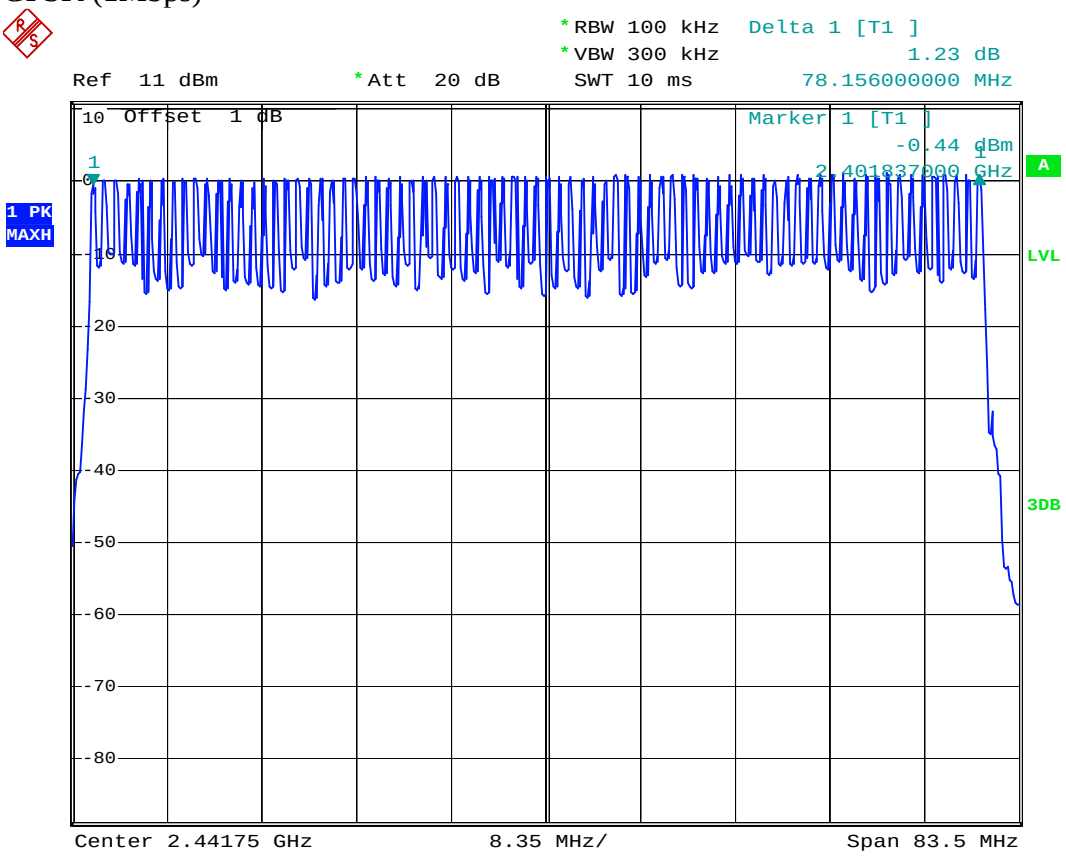
GFSK (1Mbps)		
Total number of hopping channel	Measurement result (CH)	Limit (CH)
	79	>15

π/4 DQPSK (2Mbps)		
Total number of hopping channel	Measurement result (CH)	Limit (CH)
	79	>15

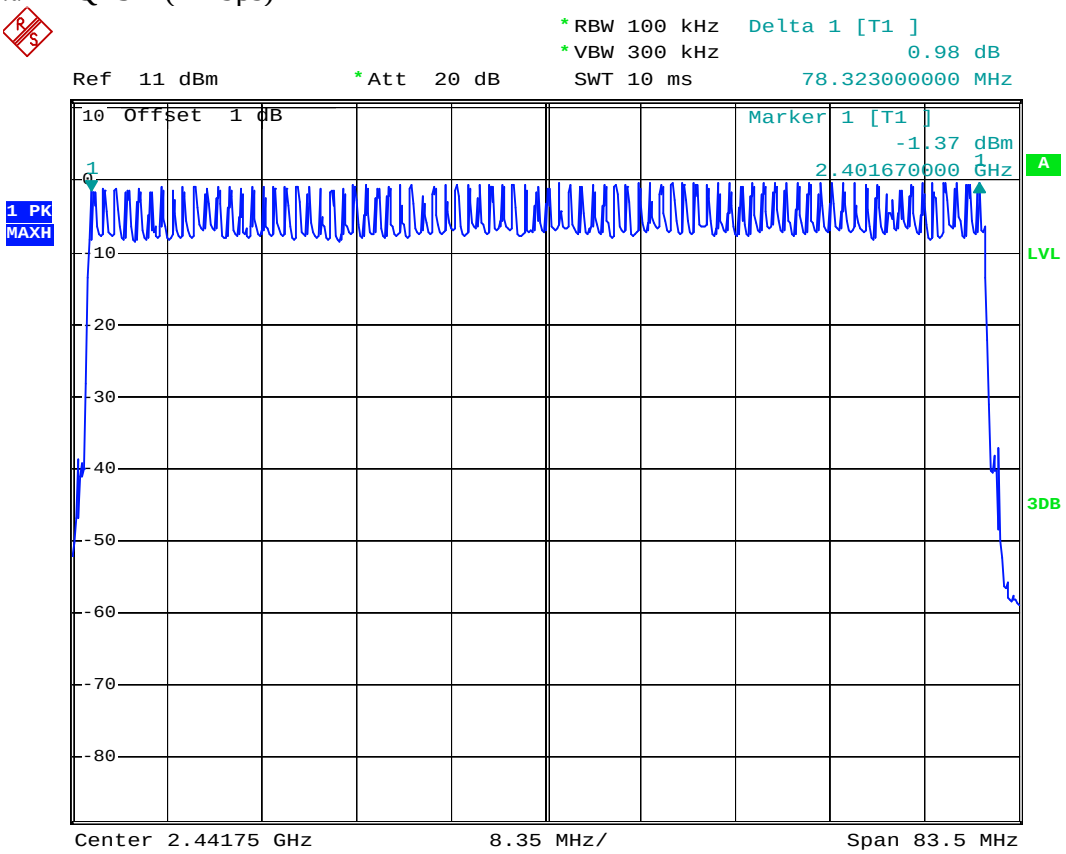
8DPSK (3Mbps)		
Total number of hopping channel	Measurement result (CH)	Limit (CH)
	79	>15

The spectrum analyzer plots are attached as below.

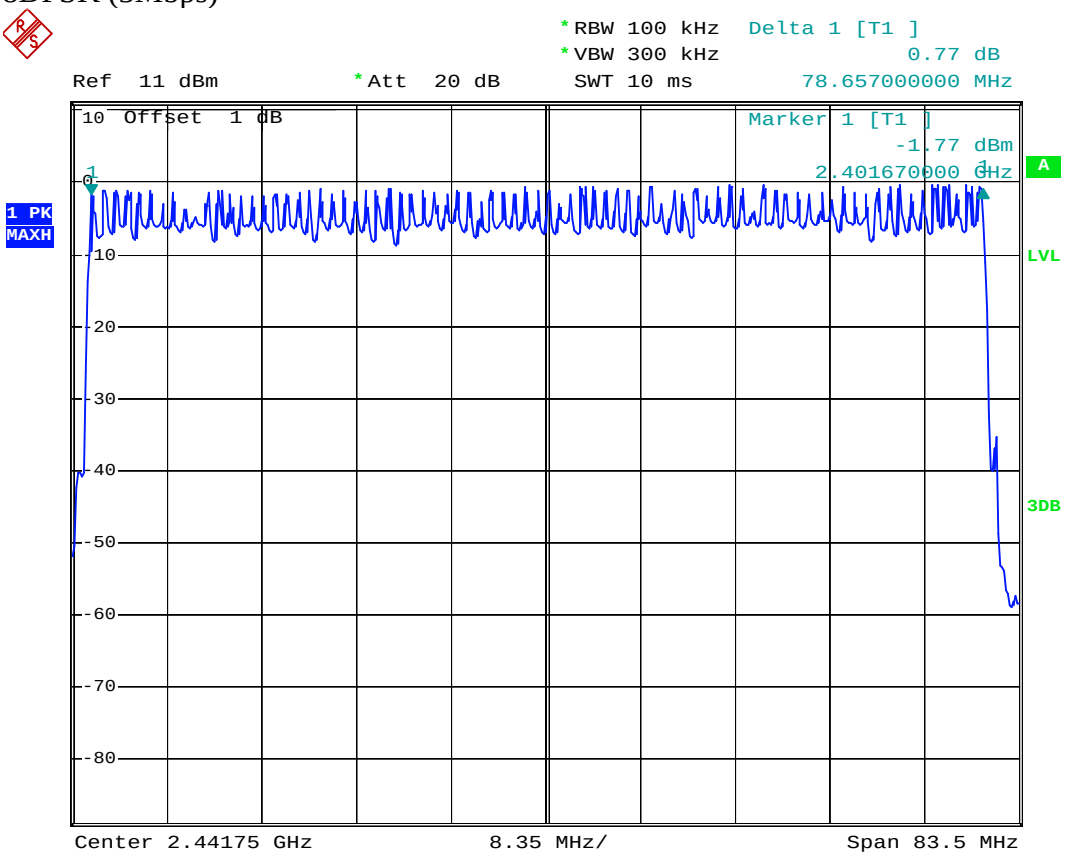
"Spectrum analyzer" is R/S
GFSK (1Mbps)



π/4 DQPSK (2Mbps)

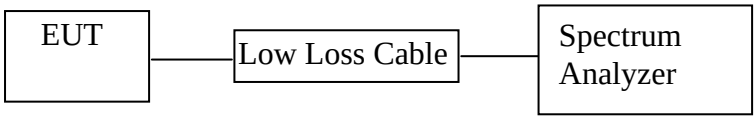


8DPSK (3Mbps)


*RBW 100 kHz
*VBW 300 kHz
Ref 11 dBm
*Att 20 dB
SWT 10 ms
Delta 1 [T1]
0.77 dB
78.657000000 MHz
10 Offset 1 dB
Marker 1 [T1]
-1.77 dBm
2.401670000 GHz
1 PK
MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.44175 GHz
8.35 MHz/
Span 83.5 MHz

8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



(EUT: Bluetooth CD/Radio Boombox)

8.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

8.3.EUT Configuration on Measurement

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.3.1.Bluetooth CD/Radio Boombox (EUT)

Model Number	**:**	IBC233
Serial Number	**:**	N/A
Manufacturer	**:**	Dongguan Shangzheng Industrial Co., Ltd.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

8.5.Test Procedure

8.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2.Set center frequency of spectrum analyzer = operating frequency.

8.5.3.Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz. Get the pulse time.

8.5.4.Repeat above procedures until all frequency measured were complete.

8.6.Test Result

PASS.

Date of Test:	Mar. 25, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	Hopping	Test Engineer:	Apple

The test was performed with GFSK (1Mbps) (DH1)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(2*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	0.444	142.08	400
Middle	2441	0.444	142.08	400
High	2480	0.420	134.40	400

The test was performed with GFSK (1Mbps) (DH3)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(4*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	1.722	275.52	400
Middle	2441	1.716	274.56	400
High	2480	1.698	271.68	400

The test was performed with GFSK (1Mbps) (DH5)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(6*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	3.003	320.32	400
Middle	2441	3.003	320.32	400
High	2480	2.976	317.44	400

The test was performed with π/4 DQPSK (2Mbps) (DH1)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(2*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	0.470	150.40	400
Middle	2441	0.461	147.52	400
High	2480	0.437	139.84	400

The test was performed with π/4 DQPSK (2Mbps) (DH3)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(4*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	1.730	296.80	400
Middle	2441	1.688	270.08	400
High	2480	1.694	271.04	400

The test was performed with π/4 DQPSK (2Mbps) (DH5)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(6*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	2.999	319.89	400
Middle	2441	3.008	320.85	400
High	2480	2.963	316.05	400

The test was performed with 8DPSK (3Mbps) (DH1)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(2*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	0.467	149.44	400
Middle	2441	0.452	144.64	400
High	2480	0.436	139.52	400

The test was performed with 8DPSK (3Mbps) (DH3)
A period transmit time = 0.4 × 79 = 31.6

Dwell time = pulse time × (1600/(4*79))*31.6

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	1.739	278.24	400
Middle	2441	1.733	277.28	400
High	2480	1.739	278.24	400

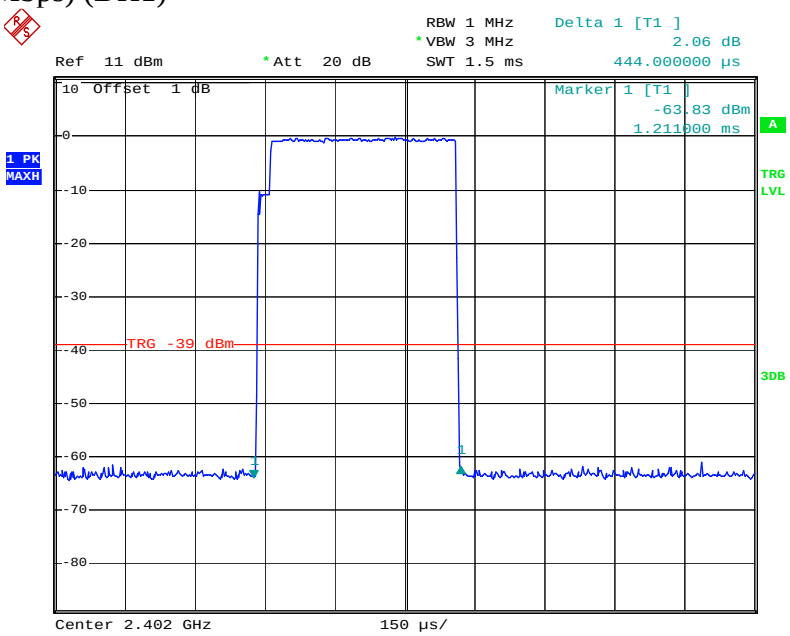
The test was performed with 8DPSK (3Mbps) (DH5)
A period transmit time = 0.4 × 79 = 31.6

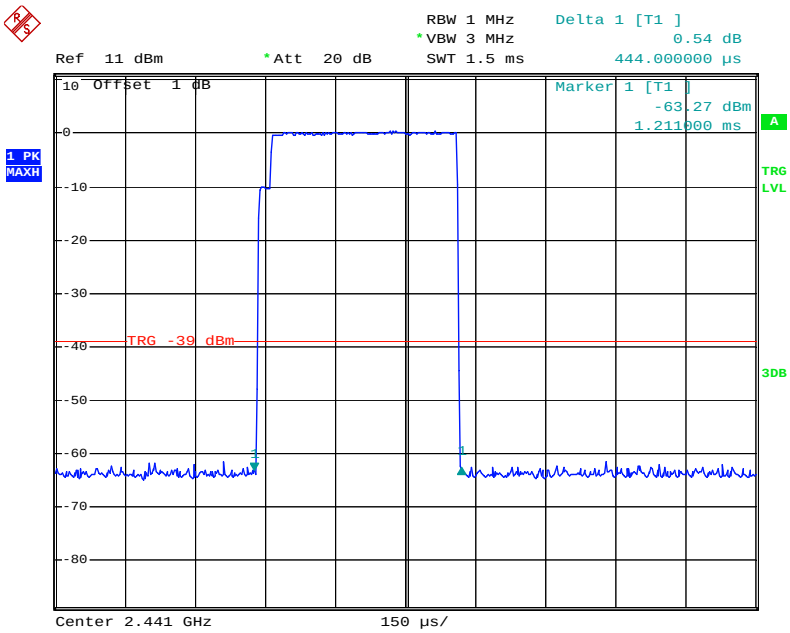
Dwell time = pulse time × (1600/(6*79))*31.6

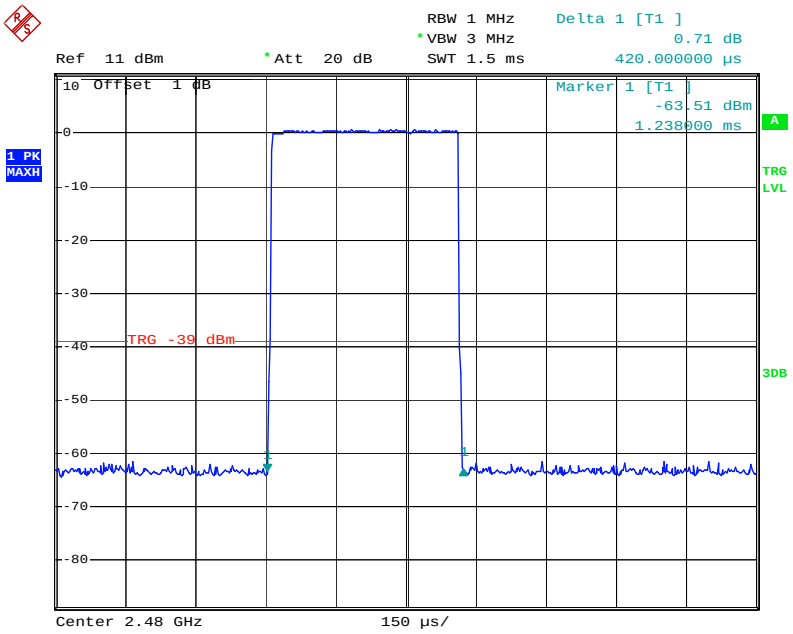
Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	2.999	319.89	400
Middle	2441	2.999	319.89	400
High	2480	2.999	319.89	400

The spectrum analyzer plots are attached as below.

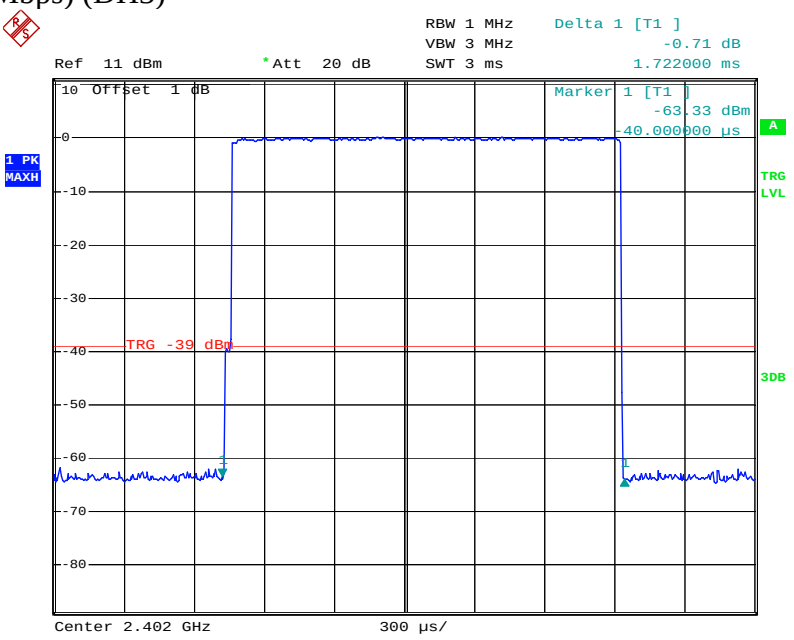
"Spectrum analyzer" is R/S
GFSK (1Mbps) (DH1)

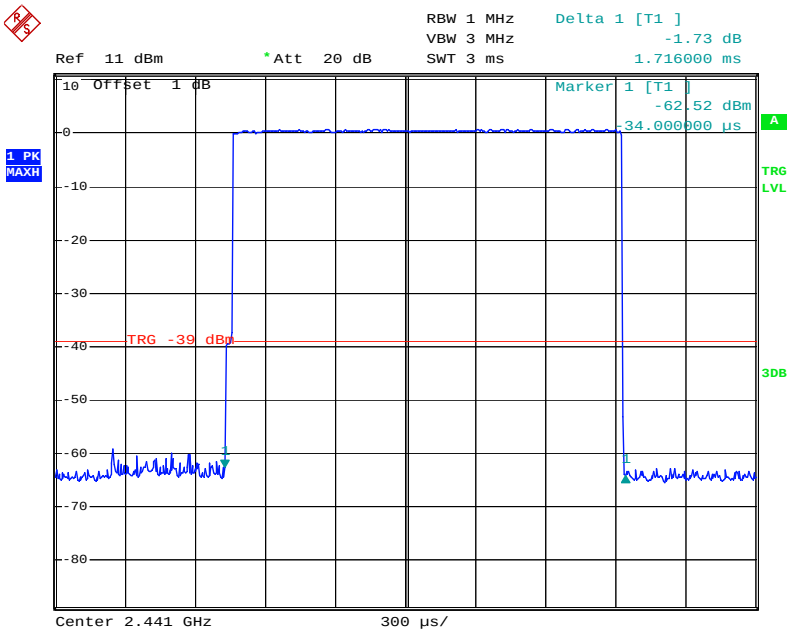


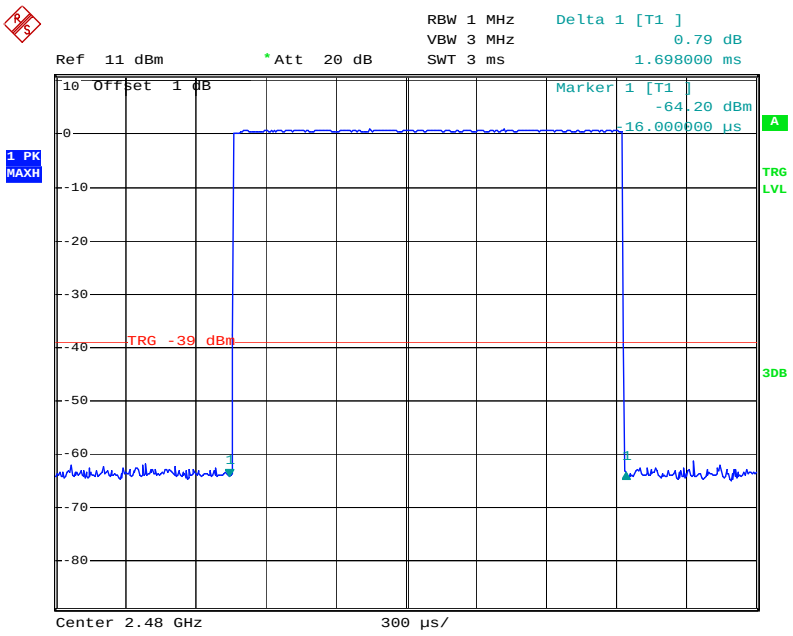




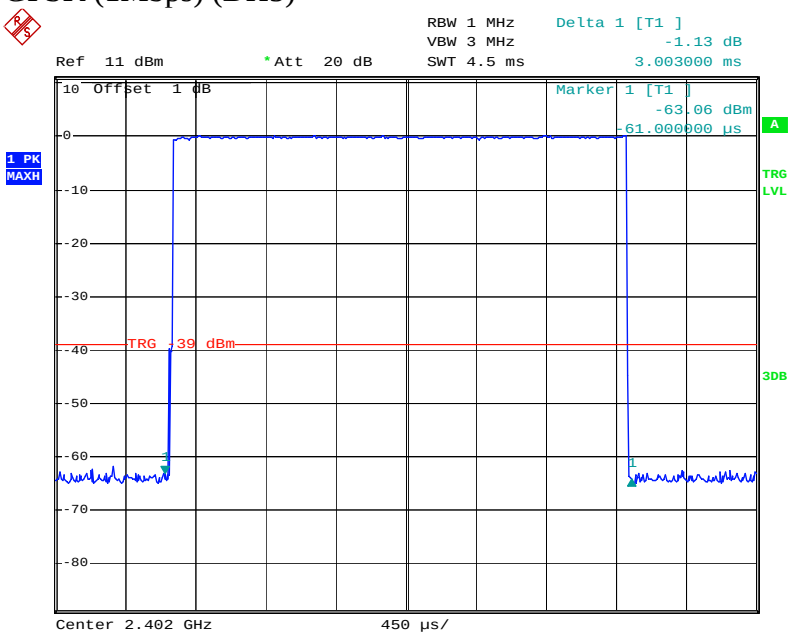
GFSK (1Mbps) (DH3)

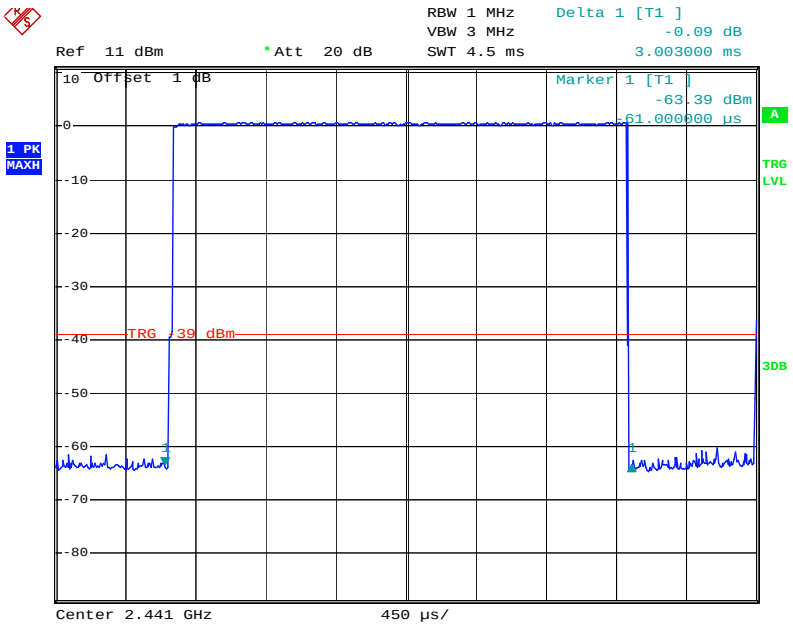


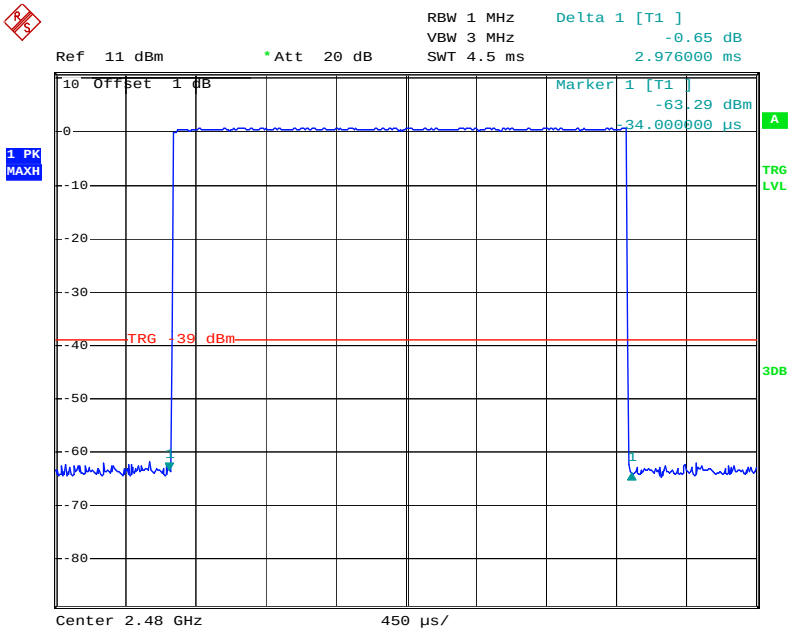

RBW 1 MHz
VBW 3 MHz
SWT 3 ms
Delta 1 [T1]
-1.73 dB
1.716000 ms
Ref 11 dBm
*Att 20 dB
Offset 1 dB
Marker 1 [T1]
-62.52 dBm
34.000000 µs
1 PK
MAXH
A
TRG
LVL
3DB
TRG -39 dBm
Center 2.441 GHz
300 µs/


RBW 1 MHz
VBW 3 MHz
SWT 3 ms
Delta 1 [T1]
0.79 dB
1.698000 ms
Ref 11 dBm
*Att 20 dB
Offset 1 dB
Marker 1 [T1]
-64.20 dBm
16.000000 µs
1 PK
MAXH
A
TRG
LVL
3DB
TRG -39 dBm
Center 2.48 GHz
300 µs/

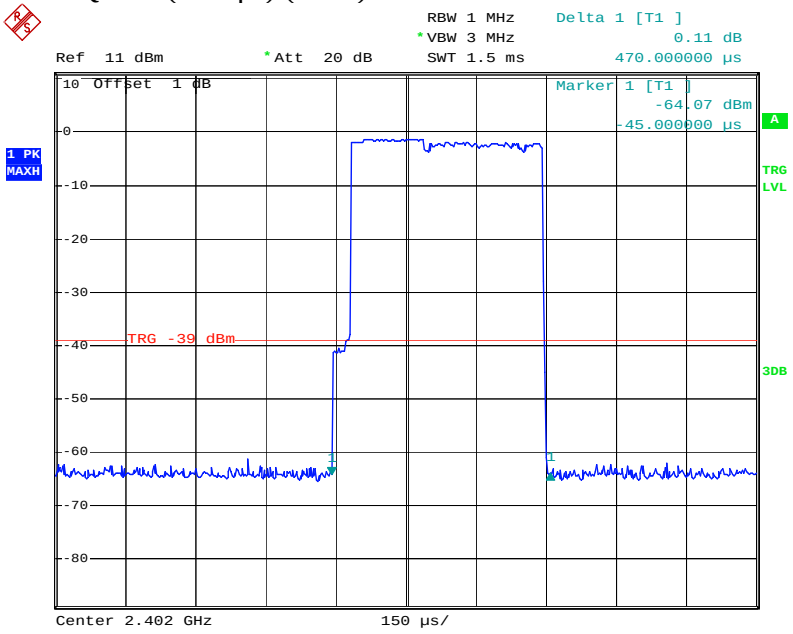
GFSK (1Mbps) (DH5)

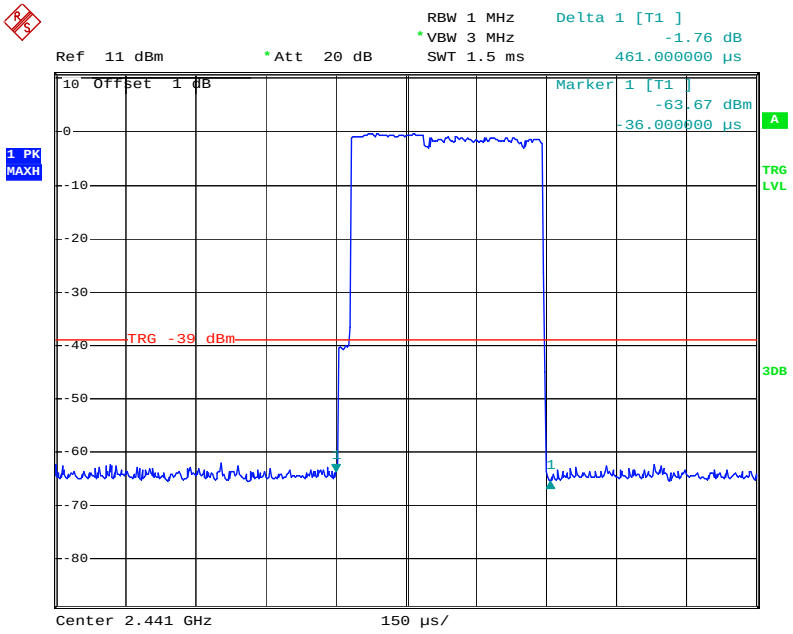


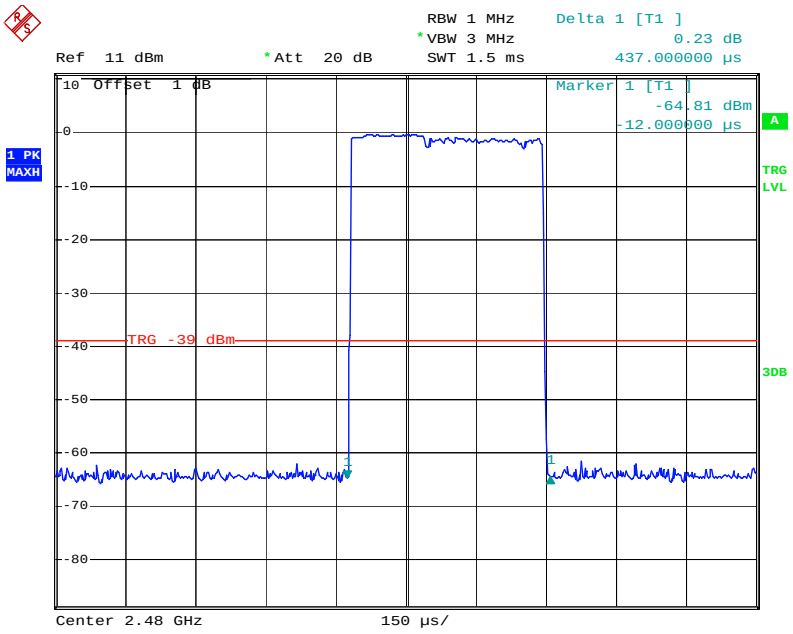




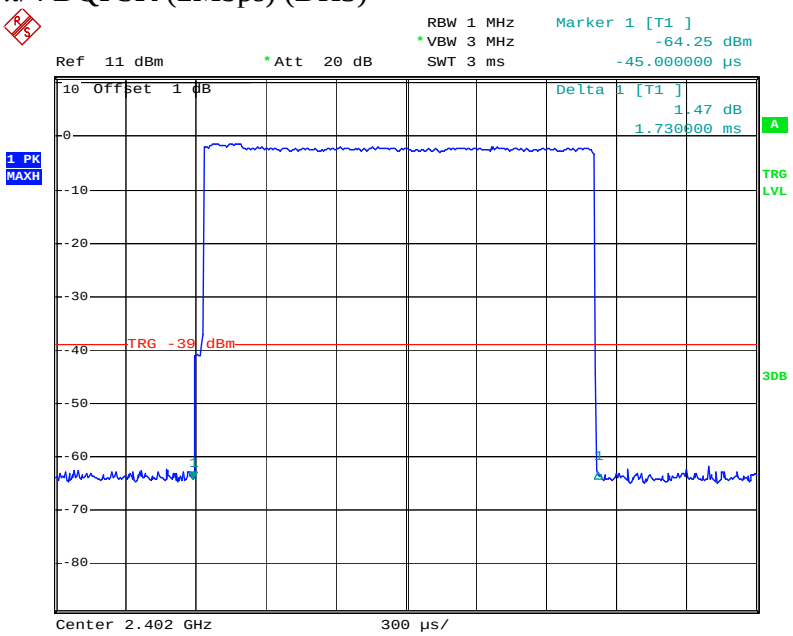
π/4 DQPSK (2Mbps) (DH1)

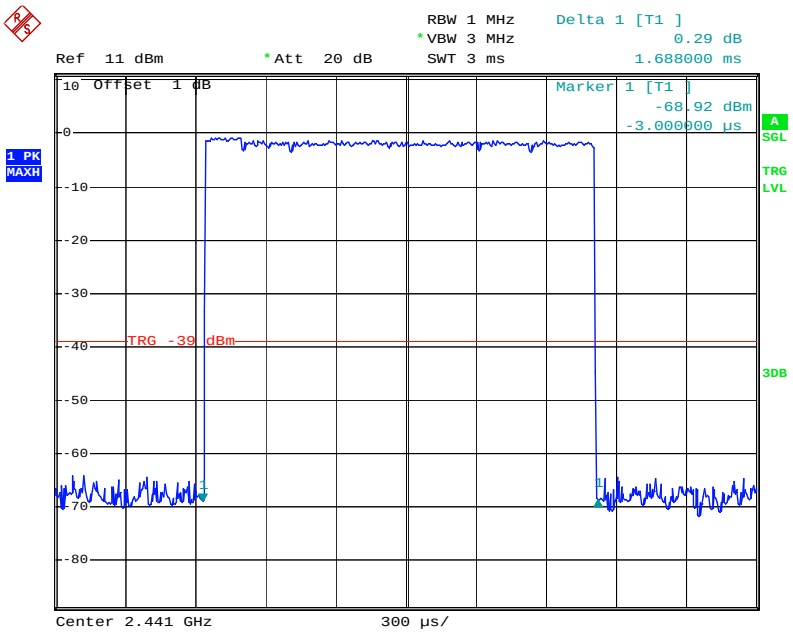


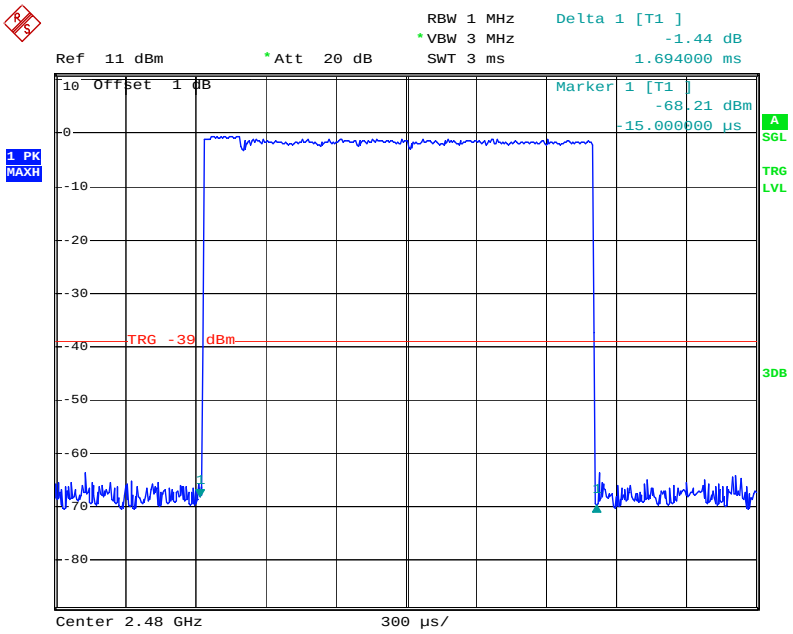

RBW 1 MHz
VBW 3 MHz
SWT 1.5 ms
Delta 1 [T1]
-1.76 dB
461.000000 µs
Ref 11 dBm
Att 20 dB
Offset 1 dB
Marker 1 [T1]
-63.67 dBm
-36.000000 µs
1 PK MAXH
A
TRG LVL
3DB
TRG -39 dBm
Center 2.441 GHz
150 µs/


RBW 1 MHz
VBW 3 MHz
SWT 1.5 ms
Delta 1 [T1]
0.23 dB
437.000000 µs
Ref 11 dBm
Att 20 dB
Offset 1 dB
Marker 1 [T1]
-64.81 dBm
-12.000000 µs
1 PK MAXH
A
TRG LVL
3DB
TRG -39 dBm
Center 2.48 GHz
150 µs/

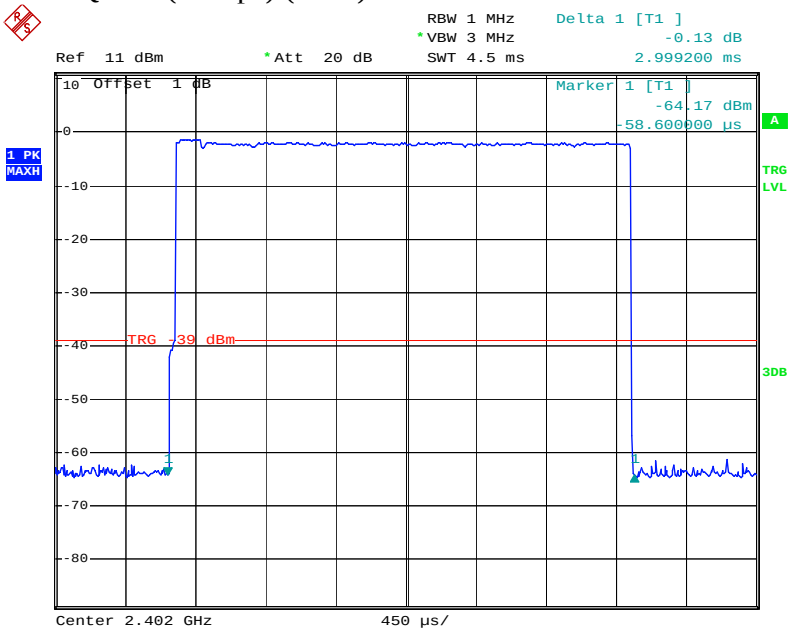
π/4 DQPSK (2Mbps) (DH3)

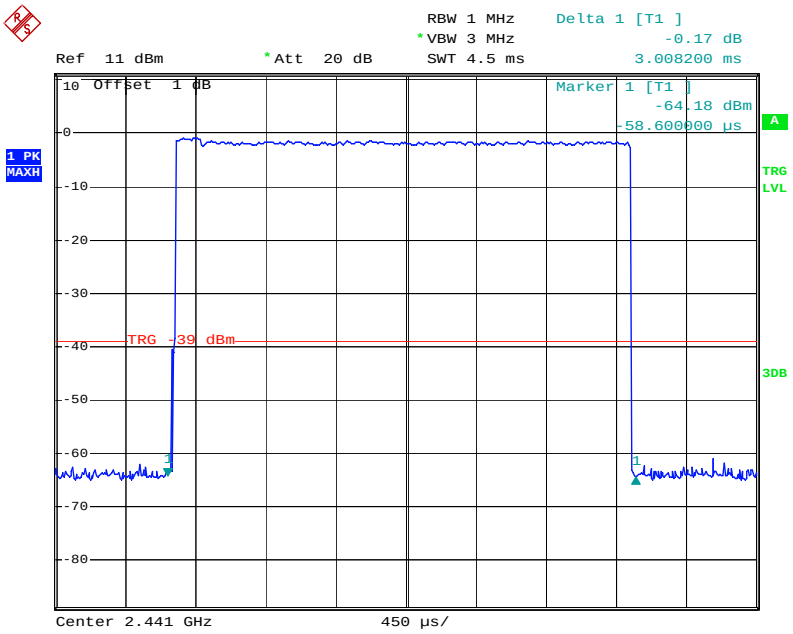


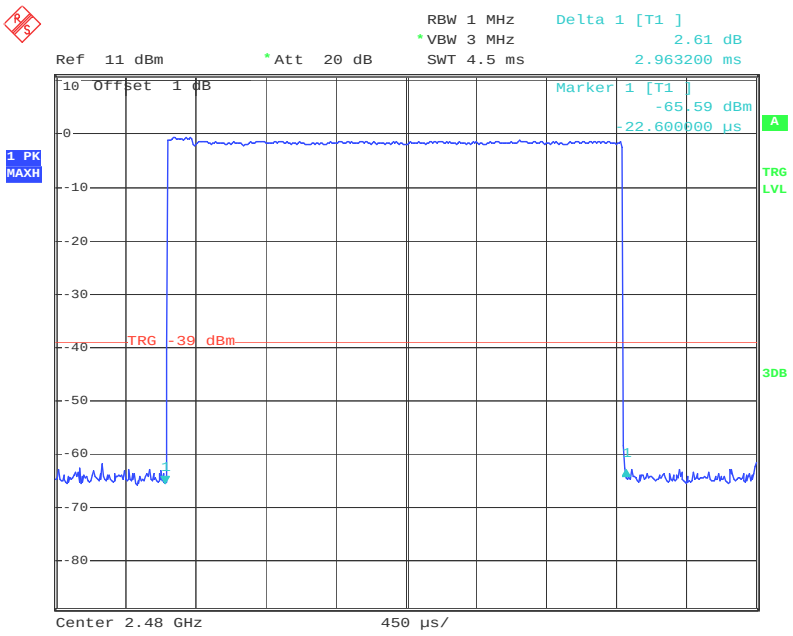




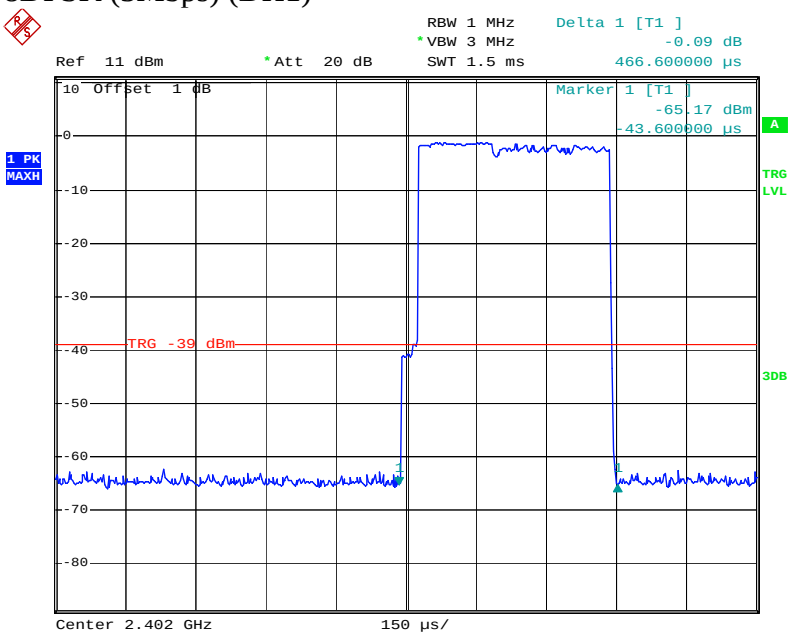
π/4 DQPSK (2Mbps) (DH5)

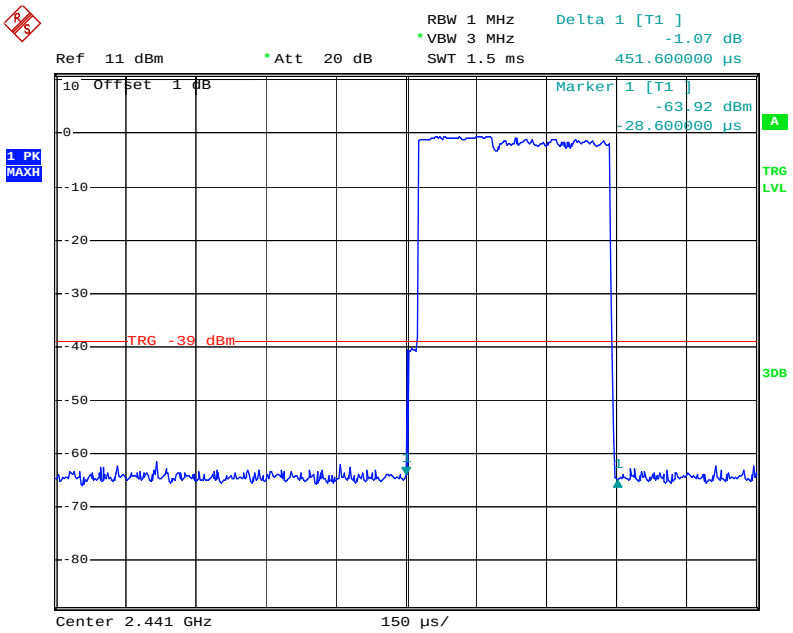


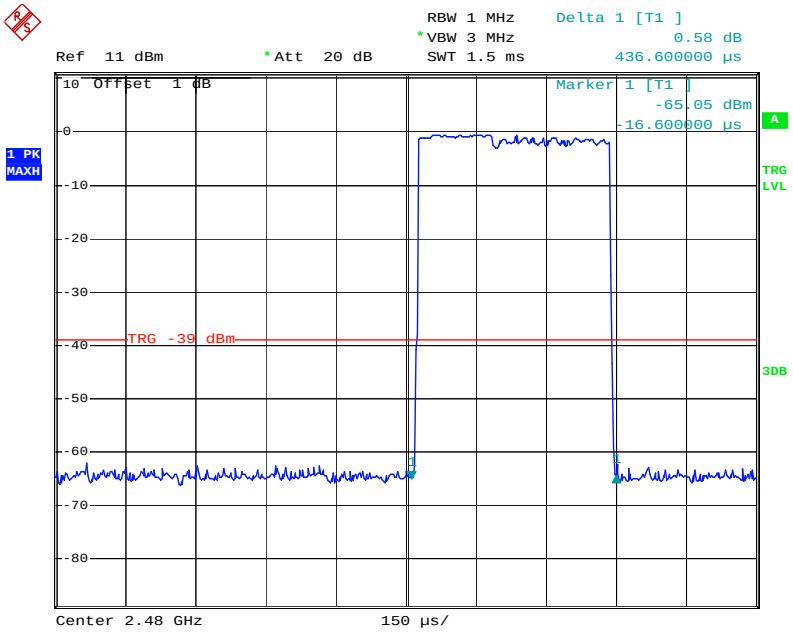

RBW 1 MHz
Delta 1 [T1]
*VBW 3 MHz
-0.17 dB
Ref 11 dBm
*Att 20 dB
SWT 4.5 ms
3.008200 ms
10 Offset 1 dB
Marker 1 [T1]
-64.18 dBm
-58.600000 µs
1 PK
MAXH
A
TRG
LVL
3DB
TRG -39 dBm
Center 2.441 GHz
450 µs/


RBW 1 MHz
Delta 1 [T1]
*VBW 3 MHz
2.61 dB
Ref 11 dBm
*Att 20 dB
SWT 4.5 ms
2.963200 ms
10 Offset 1 dB
Marker 1 [T1]
-65.59 dBm
-22.600000 µs
1 PK
MAXH
A
TRG
LVL
3DB
TRG -39 dBm
Center 2.48 GHz
450 µs/

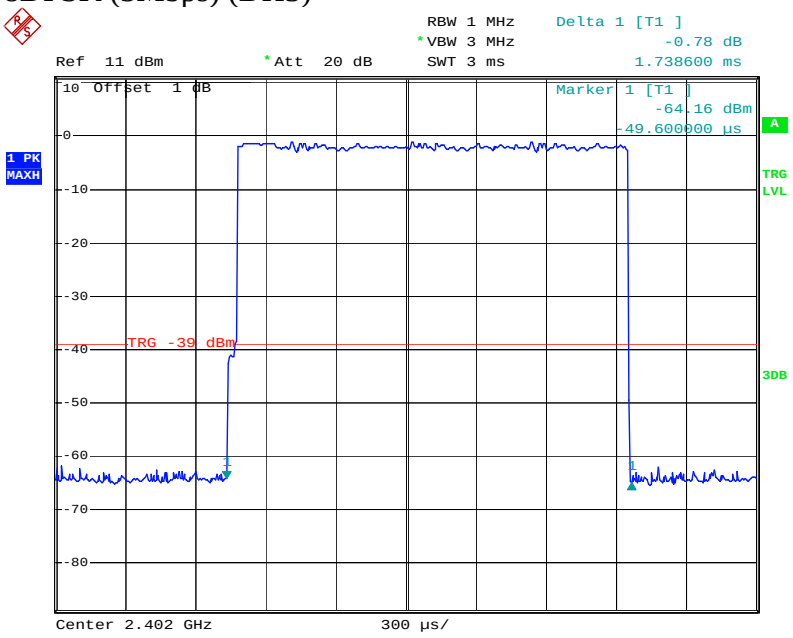
8DPSK (3Mbps) (DH1)

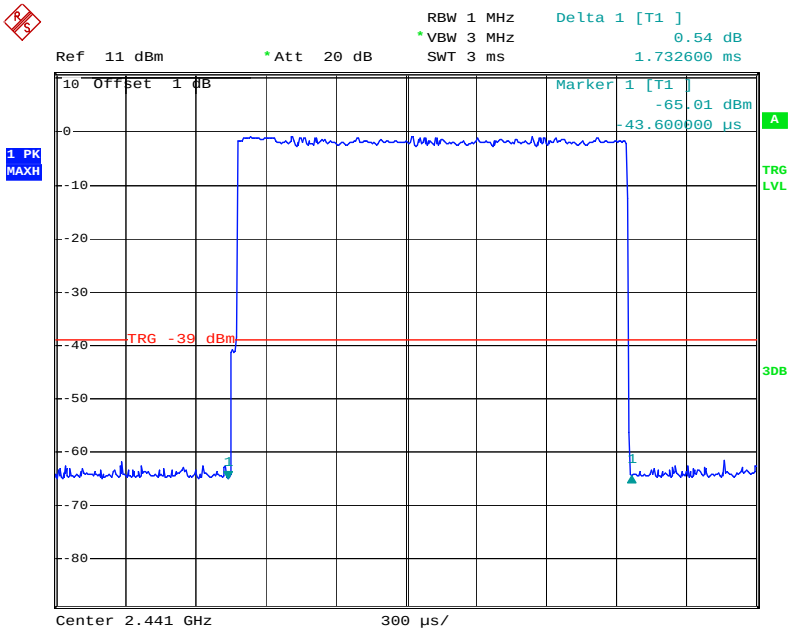


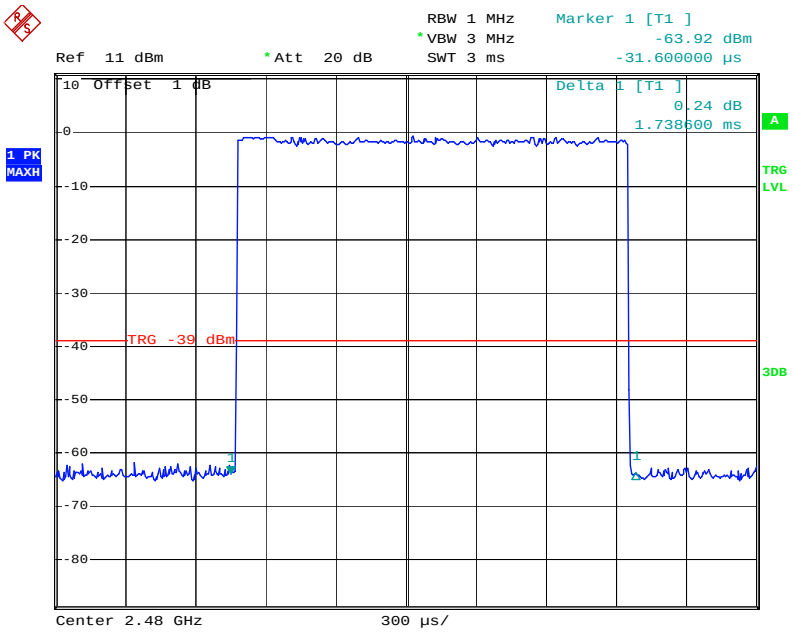




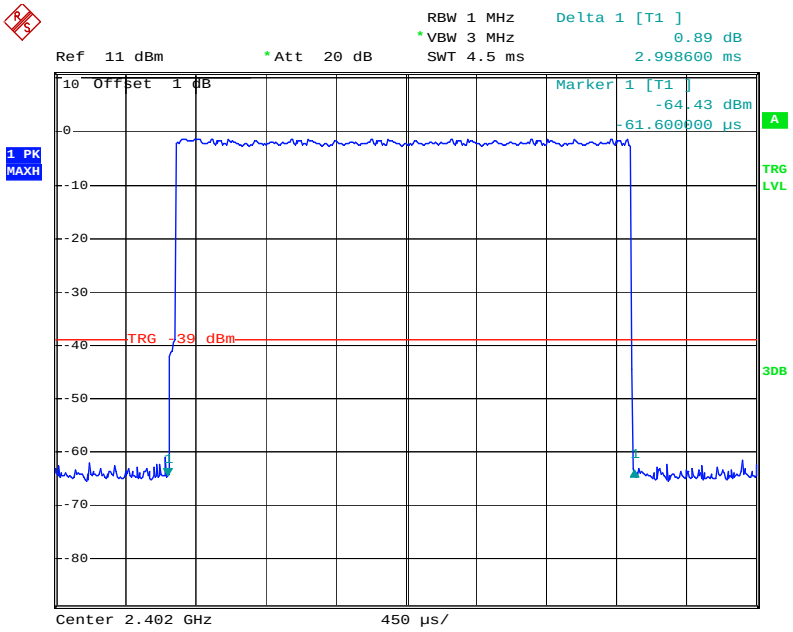
8DPSK (3Mbps) (DH3)

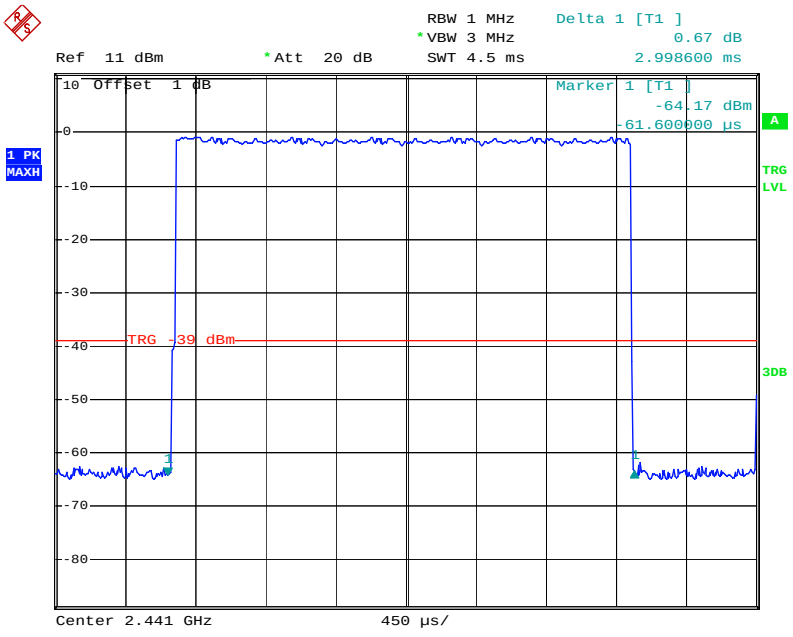


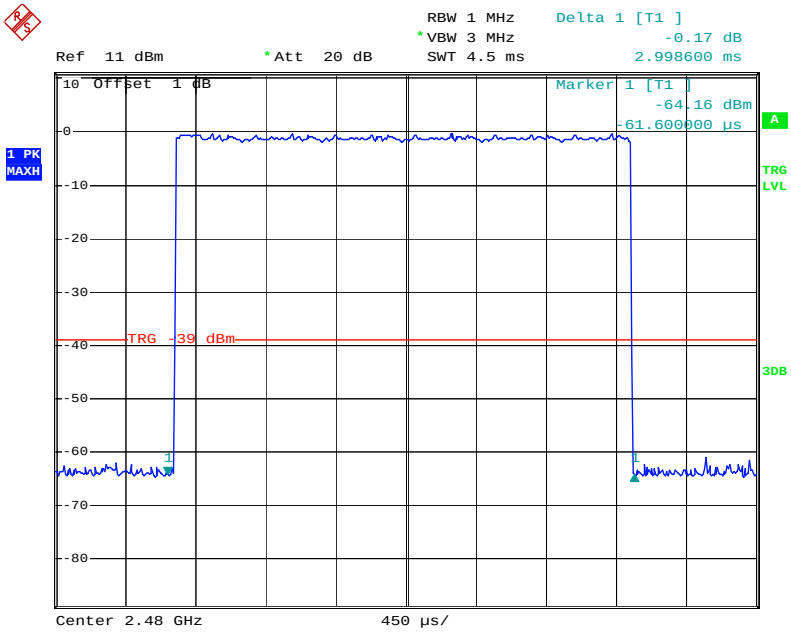

RBW 1 MHz
VBW 3 MHz
SWT 3 ms
Delta 1 [T1]
0.54 dB
1.732600 ms
Ref 11 dBm
Att 20 dB
Offset 1 dB
Marker 1 [T1]
-65.01 dBm
-43.600000 µs
1 PK MAXH
A
TRG LVL
3DB
TRG -39 dBm
Center 2.441 GHz
300 µs/


RBW 1 MHz
VBW 3 MHz
SWT 3 ms
Marker 1 [T1]
-63.92 dBm
-31.600000 µs
Delta 1 [T1]
0.24 dB
1.738600 ms
Ref 11 dBm
Att 20 dB
Offset 1 dB
1 PK MAXH
A
TRG LVL
3DB
TRG -39 dBm
Center 2.48 GHz
300 µs/

8DPSK (3Mbps) (DH5)

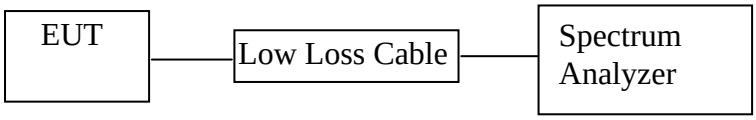





RBW 1 MHz
VBW 3 MHz
SWT 4.5 ms
Delta 1 [T1]
-0.17 dB
2.998600 ms
Ref 11 dBm
Att 20 dB
Offset 1 dB
Marker 1 [T1]
-64.16 dBm
-61.600000 µs
1 PK MAXH
A
TRG LVL
3DB
TRG -39 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
450 µs/

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



(EUT: Bluetooth CD/Radio Boombox)

9.2.The Requirement For Section 15.247(b)(1)

Section 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

9.3.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.3.1.Bluetooth CD/Radio Boombox (EUT)

Model Number	**:**	IBC233
Serial Number	**:**	N/A
Manufacturer	**:**	Dongguan Shangzheng Industrial Co., Ltd.

9.4.Operating Condition of EUT

9.4.1.Setup the EUT and simulator as shown as Section 9.1.

9.4.2.Turn on the power of all equipment.

9.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

9.5.Test Procedure

9.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz.

9.5.3.Measurement the maximum peak output power.

9.6.Test Result

PASS.

Date of Test:	Mar. 28, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX	Test Engineer:	Apple

GFSK (1Mbps)

Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2402	0.16	1.038	30 dBm / 1 W
Middle	2441	0.60	1.148	30 dBm / 1 W
High	2480	0.83	1.211	30 dBm / 1 W

π/4 DQPSK (2Mbps)

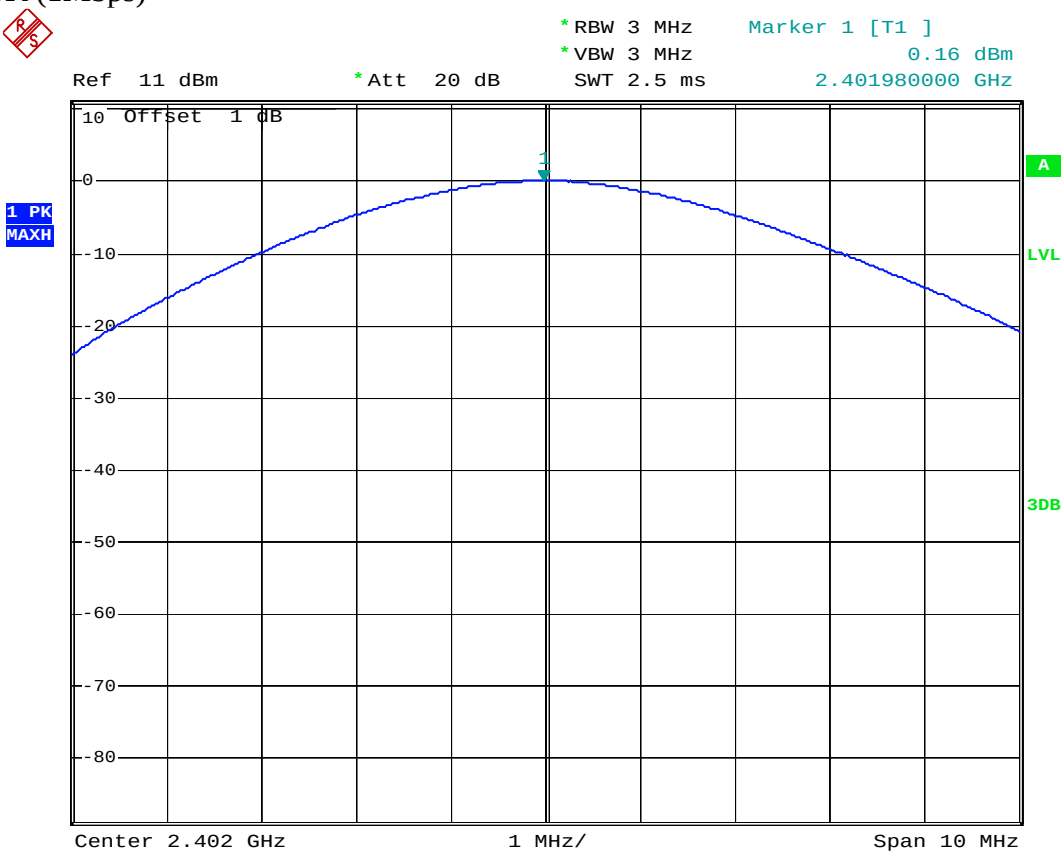
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2402	0.13	1.030	21 dBm / 0.125 W
Middle	2441	0.77	1.194	21 dBm / 0.125 W
High	2480	-0.78	0.835	21 dBm / 0.125 W

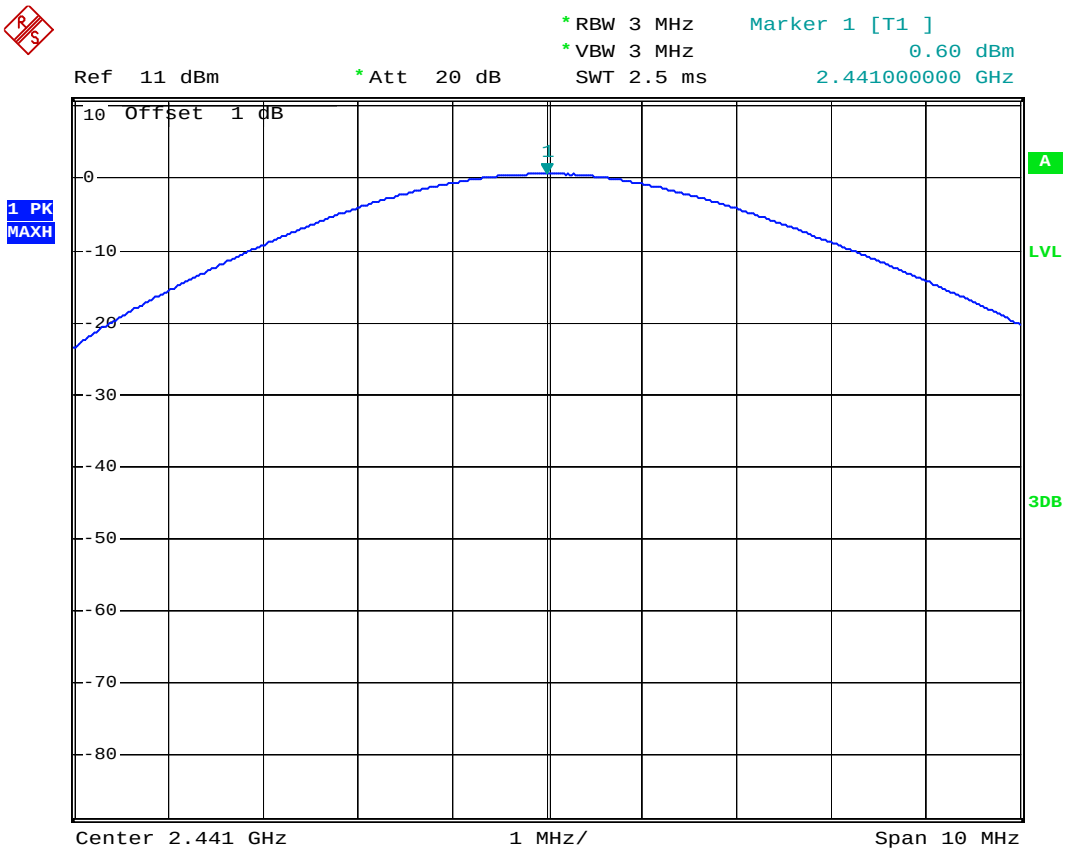
8DPSK (3Mbps)

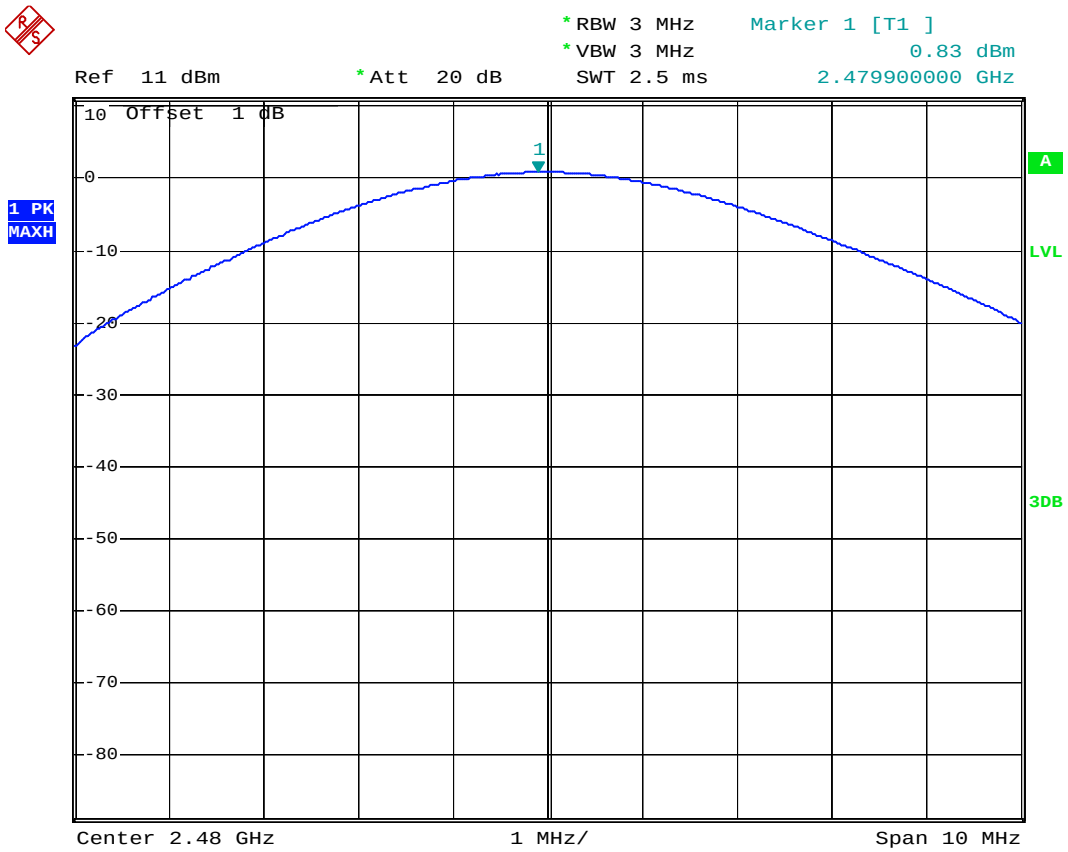
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2402	-0.26	0.942	21 dBm / 0.125 W
Middle	2441	0.47	1.114	21 dBm / 0.125 W
High	2480	0.58	1.143	21 dBm / 0.125 W

The spectrum analyzer plots are attached as below.

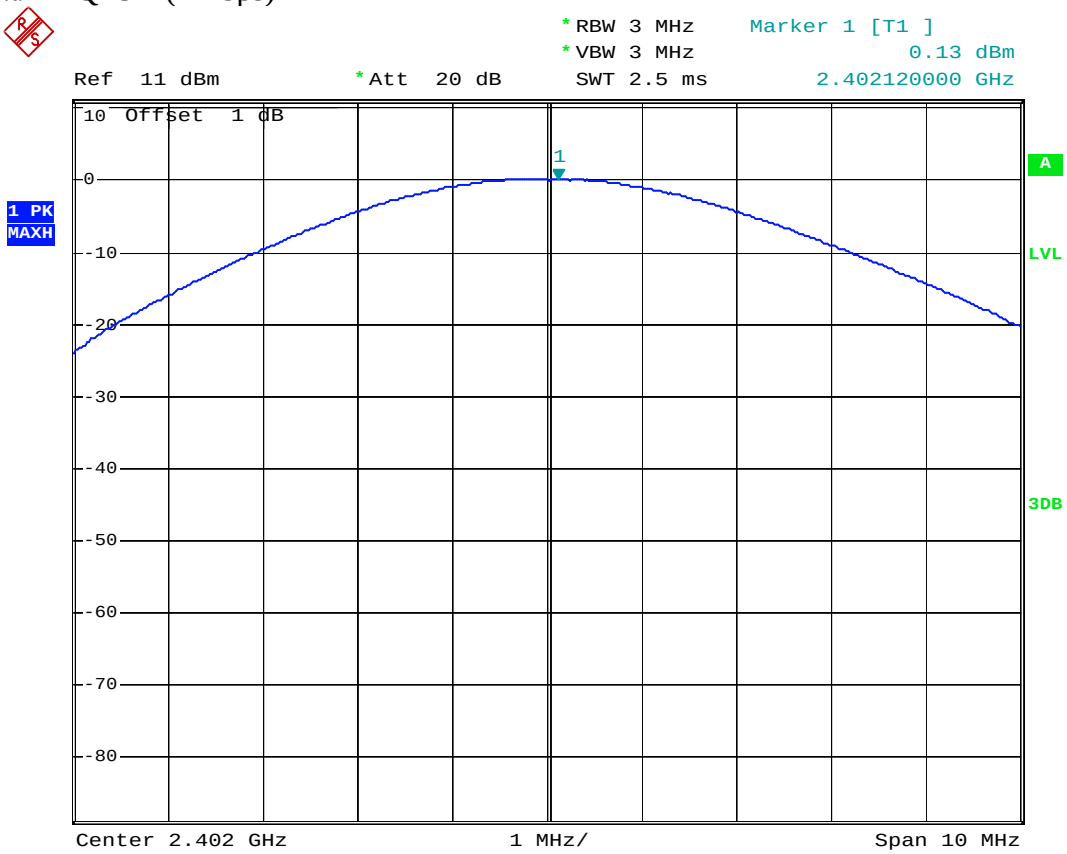
"Spectrum analyzer" is R/S
GFSK (1Mbps)

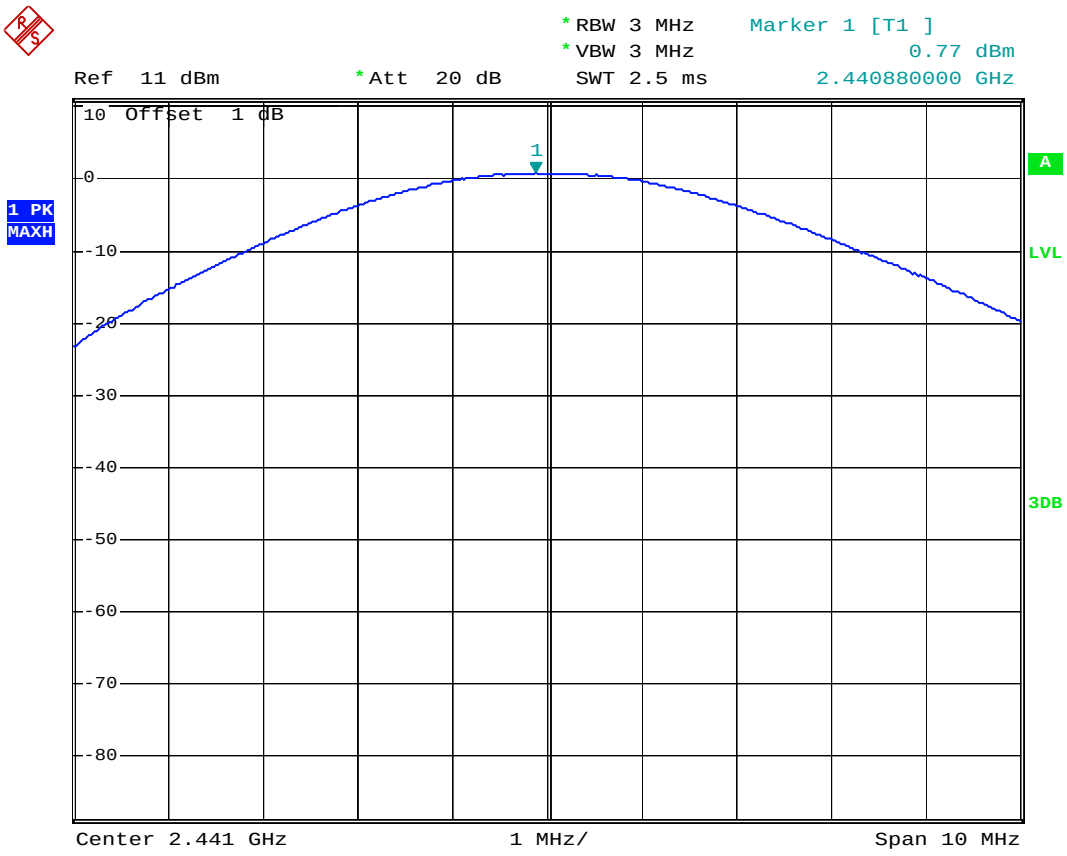


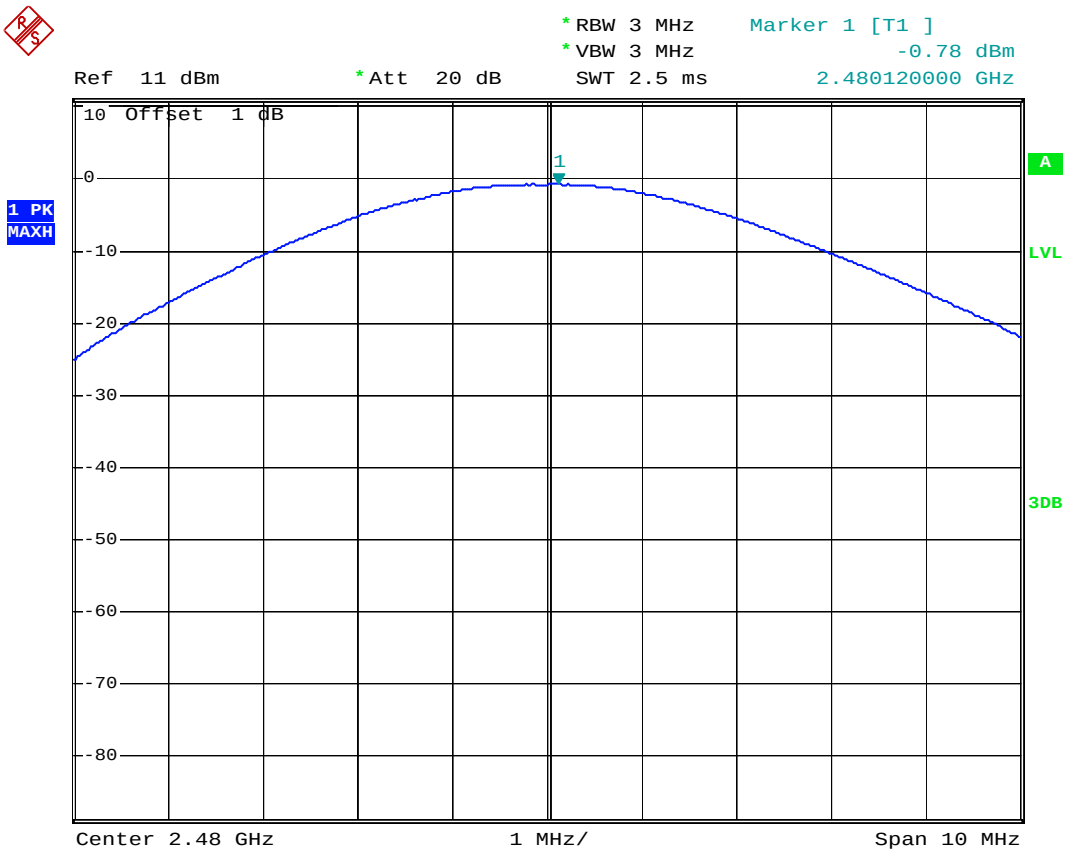

*RBW 3 MHz
Marker 1 [T1]
*VBW 3 MHz
0.60 dBm
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
2.441000000 GHz
10 Offset 1 dB
1
0
-10
-20
-30
-40
-50
-60
-70
-80
1 PK
MAXH
A
LVL
3DB
Center 2.441 GHz
1 MHz/
Span 10 MHz


*RBW 3 MHz
Marker 1 [T1]
*VBW 3 MHz
0.83 dBm
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
2.479900000 GHz
10 Offset 1 dB
1
0
-10
-20
-30
-40
-50
-60
-70
-80
1 PK
MAXH
A
LVL
3DB
Center 2.48 GHz
1 MHz/
Span 10 MHz

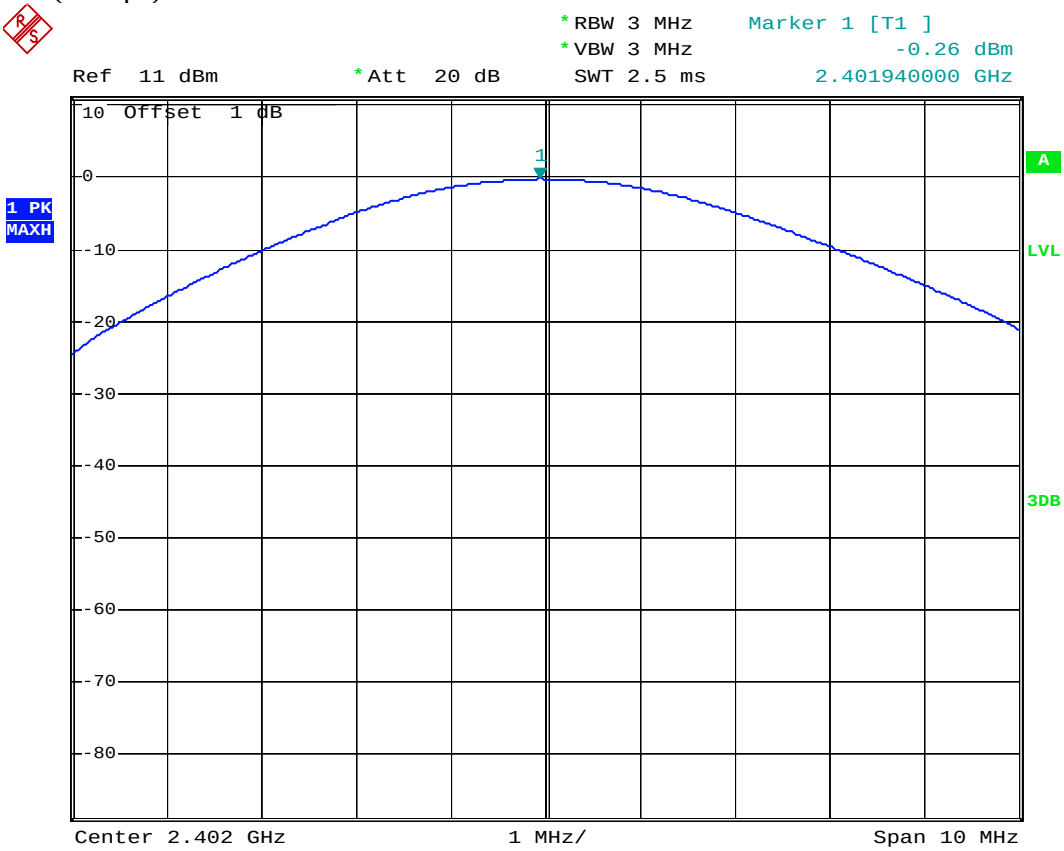
π/4 DQPSK (2Mbps)

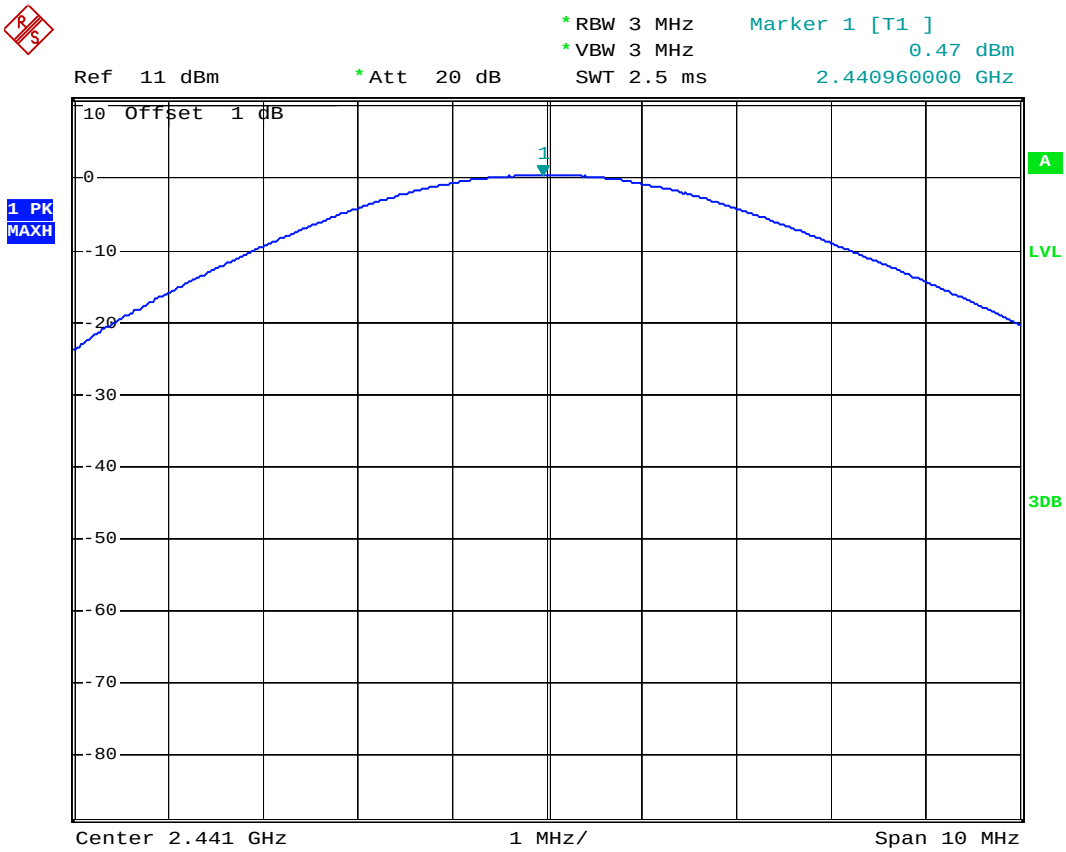


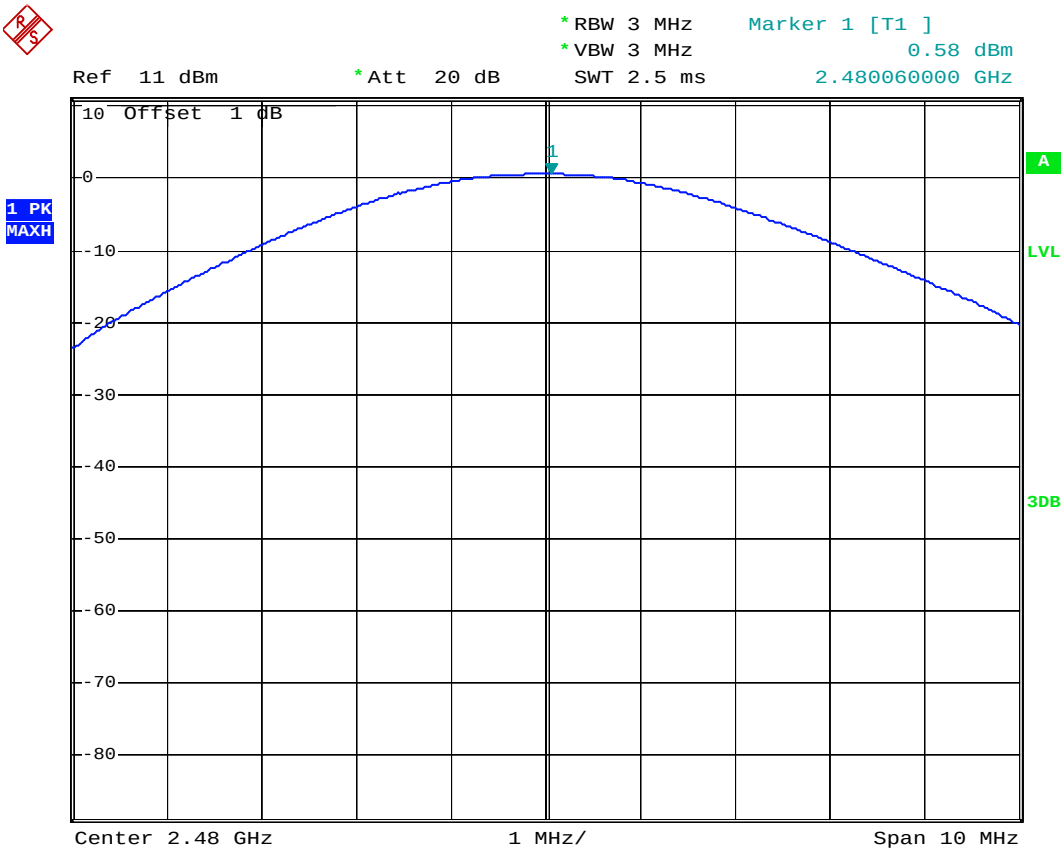

*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
0.77 dBm
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
2.440880000 GHz
10 Offset 1 dB
1
0
-10
-20
-30
-40
-50
-60
-70
-80
1 PK
MAXH
A
LVL
3DB
Center 2.441 GHz
1 MHz/
Span 10 MHz


*RBW 3 MHz
*VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
-0.78 dBm
2.480120000 GHz
Ref 11 dBm
*Att 20 dB
10 Offset 1 dB
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 MHz/
Span 10 MHz

8DPSK (3Mbps)

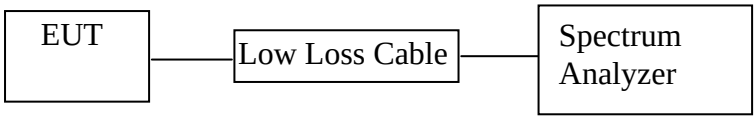

*RBW 3 MHz
Marker 1 [T1]
*VBW 3 MHz
-0.26 dBm
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
2.401940000 GHz
10 Offset 1 dB
1
0
-10
-20
-30
-40
-50
-60
-70
-80
1 PK
MAXH
A
LVL
3DB
Center 2.402 GHz
1 MHz/
Span 10 MHz


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
0.47 dBm
2.440960000 GHz
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
10 Offset 1 dB
1 PK
MAXH
A
LVL
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.441 GHz
1 MHz/
Span 10 MHz


*RBW 3 MHz
Marker 1 [T1]
*VBW 3 MHz
0.58 dBm
Ref 11 dBm
*Att 20 dB
SWT 2.5 ms
2.480060000 GHz
10 Offset 1 dB
1
0
-10
-20
-30
-40
-50
-60
-70
-80
1 PK
MAXH
A
LVL
3DB
Center 2.48 GHz
1 MHz/
Span 10 MHz

10.BAND EDGE COMPLIANCE TEST

10.1.Block Diagram of Test Setup



(EUT: Bluetooth CD/Radio Boombox)

10.2.The Requirement For Section 15.247(d)

Section 15.247(d): 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 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).

10.3.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

10.3.1.Bluetooth CD/Radio Boombox (EUT)

Model Number	:	IBC233
Serial Number	:	N/A
Manufacturer	:	Dongguan Shangzheng Industrial Co., Ltd.

10.4.Operating Condition of EUT

10.4.1.Setup the EUT and simulator as shown as Section 10.1.

10.4.2.Turn on the power of all equipment.

10.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

10.5.Test Procedure

Conducted Band Edge:

10.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

10.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz.

Radiate Band Edge:

10.5.3.The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

10.5.4.The turntable was rotated for 360 degrees to determine the position of maximum emission level.

10.5.5.EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

10.5.6.Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

10.5.7.The band edges was measured and recorded.

10.6.Test Result

Pass

Date of Test:	Mar. 28, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (Hopping)	Test Engineer:	Apple

Conducted test

GFSK (1Mbps)

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2402	51.32	> 20dBc
2480	52.08	> 20dBc

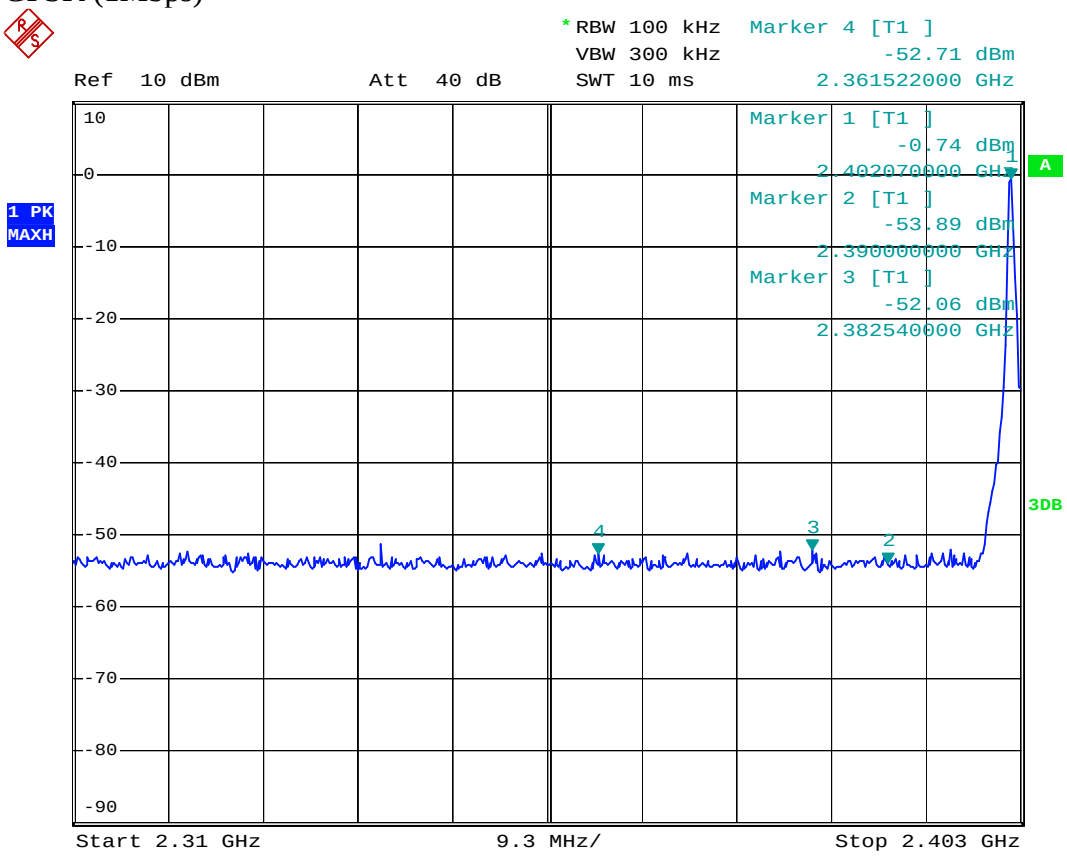
π/4 DQPSK (2Mbps)

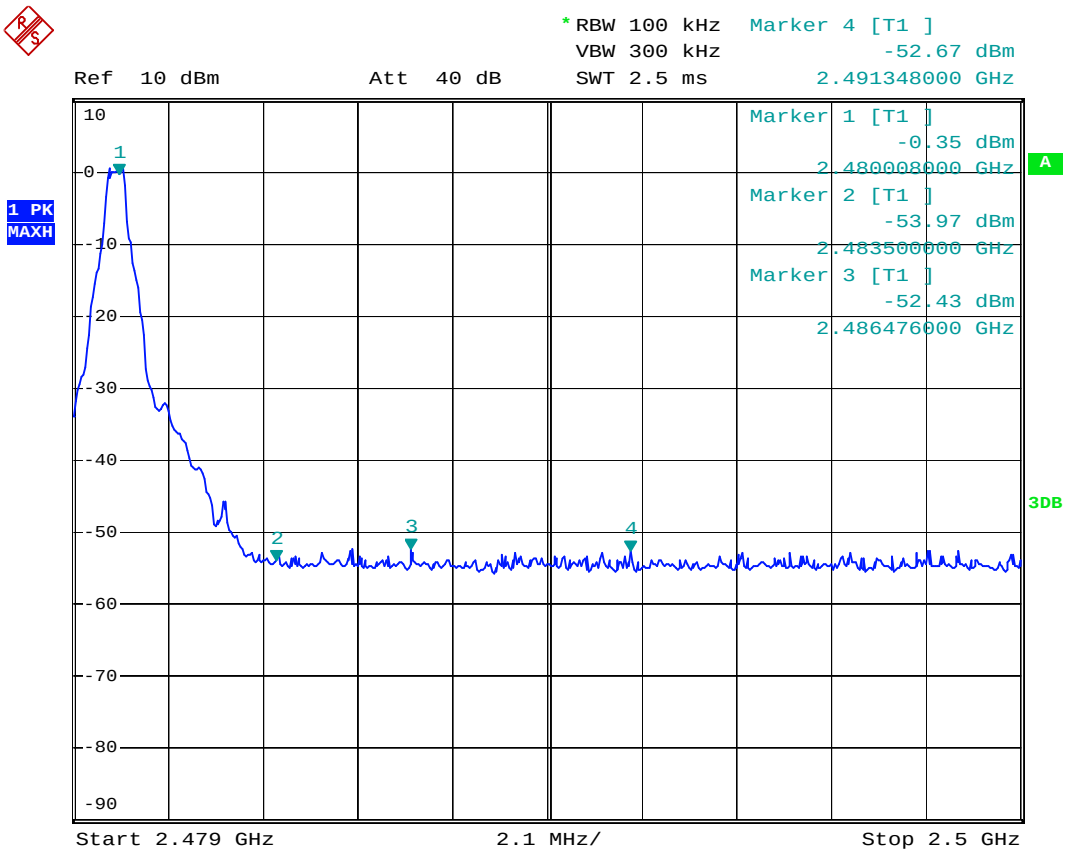
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2402	49.65	> 20dBc
2480	51.88	> 20dBc

8DPSK (3Mbps)

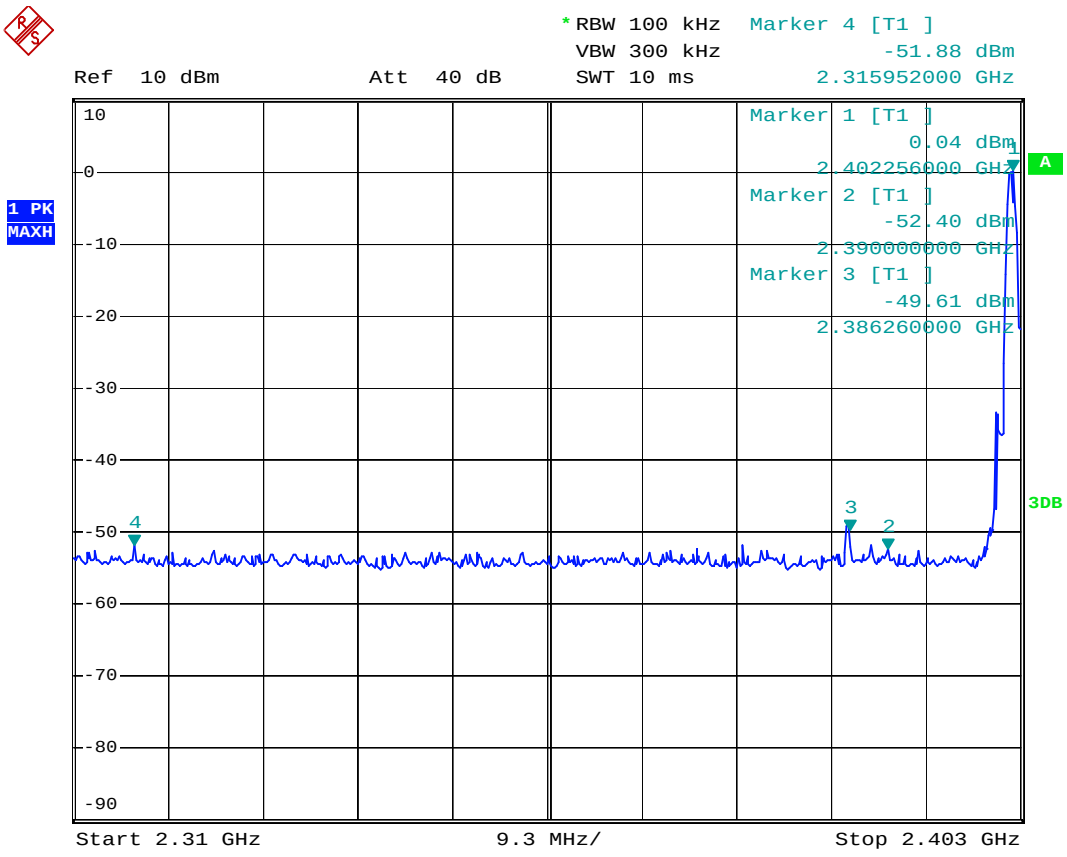
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2402	50.04	> 20dBc
2480	51.31	> 20dBc

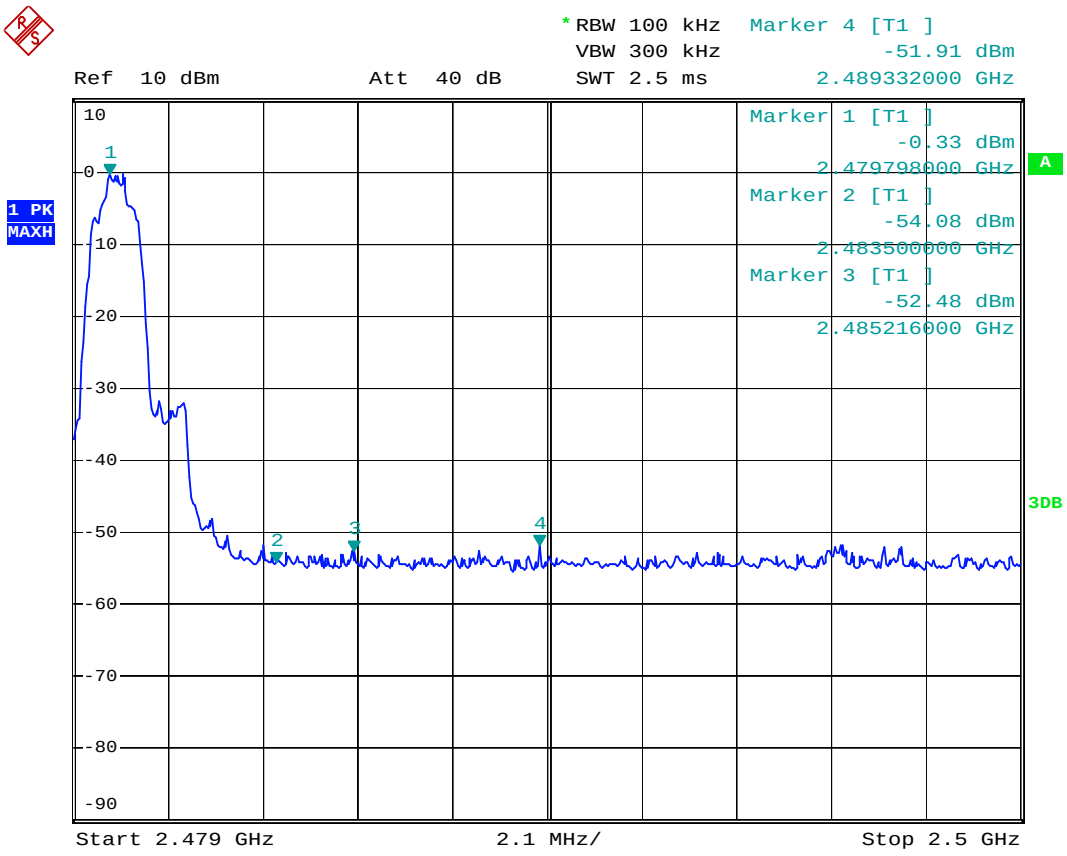
"Spectrum analyzer" is R/S
GFSK (1Mbps)



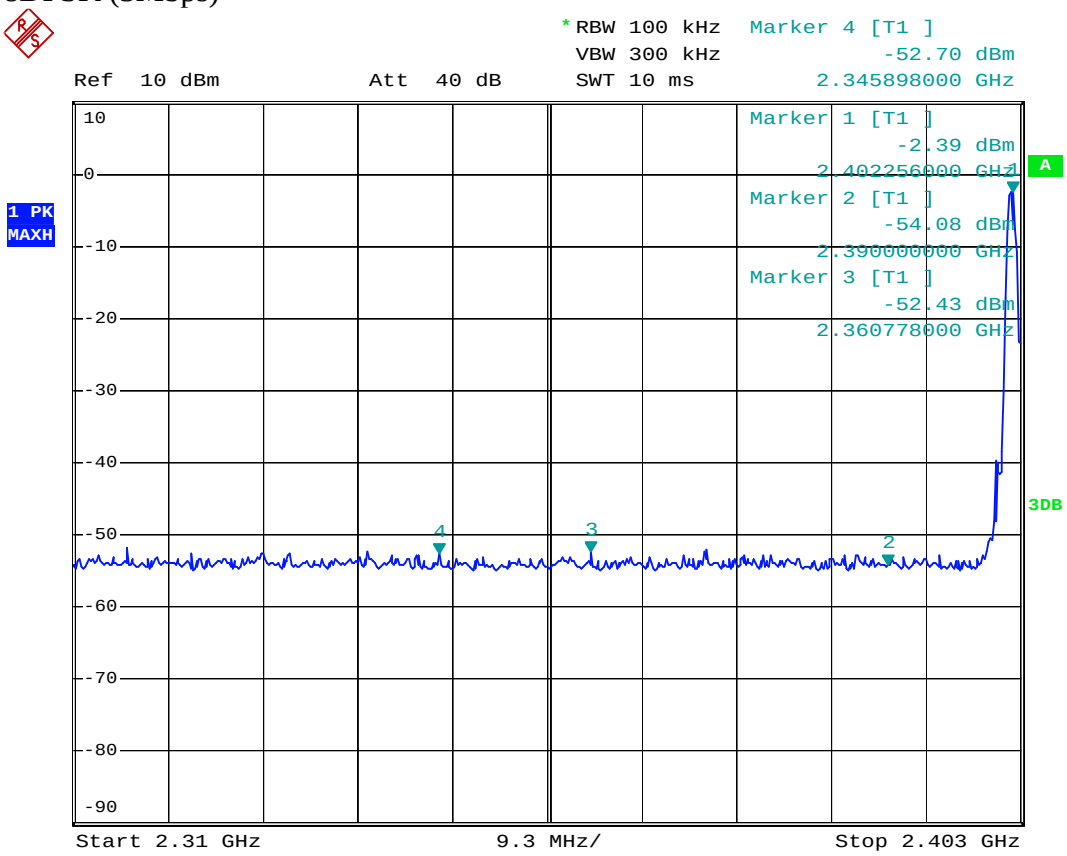

*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Marker 4 [T1]
-52.67 dBm
2.491348000 GHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-0.35 dBm
2.480008000 GHz
Marker 2 [T1]
-53.97 dBm
2.483500000 GHz
Marker 3 [T1]
-52.43 dBm
2.486476000 GHz
1 PK
MAXH
A
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.479 GHz
2.1 MHz/
Stop 2.5 GHz

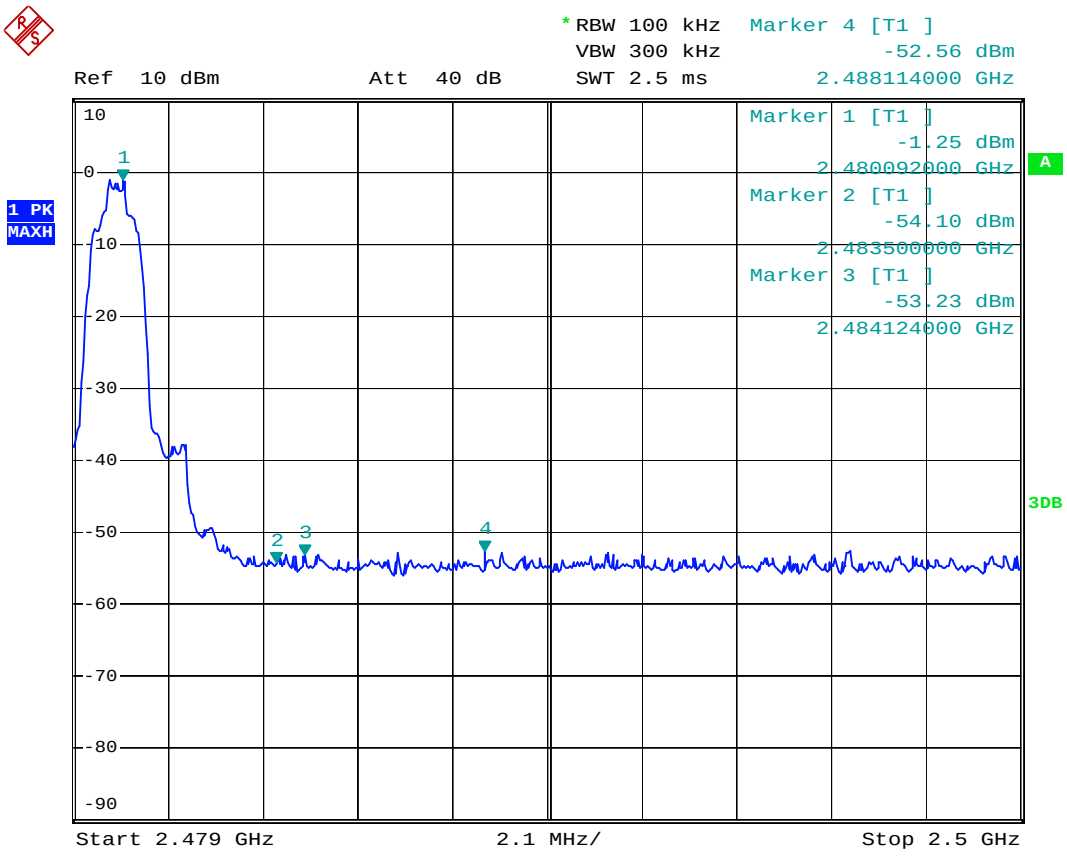
π/4 DQPSK (2Mbps)




*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Marker 4 [T1]
-51.91 dBm
2.489332000 GHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-0.33 dBm
2.479798000 GHz
Marker 2 [T1]
-54.08 dBm
2.483500000 GHz
Marker 3 [T1]
-52.48 dBm
2.485216000 GHz
1 PK
MAXH
A
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.479 GHz
2.1 MHz/
Stop 2.5 GHz

8DPSK (3Mbps)


*RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 4 [T1]
-52.70 dBm
2.345898000 GHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-2.39 dBm
2.402256000 GHz
Marker 2 [T1]
-54.08 dBm
2.390000000 GHz
Marker 3 [T1]
-52.43 dBm
2.360778000 GHz
1 PK
MAXH
A
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.31 GHz
9.3 MHz/
Stop 2.403 GHz


*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Marker 4 [T1]
-52.56 dBm
2.488114000 GHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-1.25 dBm
2.480092000 GHz
Marker 2 [T1]
-54.10 dBm
2.483500000 GHz
Marker 3 [T1]
-53.23 dBm
2.484124000 GHz
1 PK
MAXH
A
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.479 GHz
2.1 MHz/
Stop 2.5 GHz

Radiated Band Edge Result

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2402MHz)	Test Engineer:	Kai

GFSK (1Mbps)

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2400.000	60.24	69.45	-7.46	52.78	61.99	54.00	74.00	-1.22	-12.01	Vertical
2400.000	60.07	70.32	-7.46	52.61	62.86	54.00	74.00	-1.39	-11.14	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2480MHz)	Test Engineer:	Kai

The data was shown the worst case GFSK (1Mbps)

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2483.529	50.10	56.20	-7.37	42.73	48.83	54.00	74.00	-11.27	-25.17	Vertical
2483.529	53.00	58.79	-7.37	45.63	51.42	54.00	74.00	-8.37	-22.58	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows: Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2402MHz)	Test Engineer:	Kai

π/4 DQPSK (2Mbps)

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2400.000	59.78	38.88	-7.46	52.32	61.42	54.00	74.00	-1.68	-12.58	Vertical
2400.000	59.74	70.31	-7.46	52.28	62.85	54.00	74.00	-1.72	-11.15	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2480MHz)	Test Engineer:	Kai

π/4 DQPSK (2Mbps)

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2483.529	49.55	53.57	-7.37	42.18	46.20	54.00	74.00	-11.82	-27.80	Vertical
2483.529	49.41	53.28	-7.37	42.04	45.91	54.00	74.00	-11.96	-28.09	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:
   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2402MHz)	Test Engineer:	Kai

8DPSK (3Mbps)

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2400.000	59.83	69.37	-7.46	52.37	61.91	54.00	74.00	-1.63	-12.09	Vertical
2400.000	59.45	70.11	-7.46	51.99	62.65	54.00	74.00	-2.01	-11.35	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2480MHz)	Test Engineer:	Kai

8DPSK (3Mbps)

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2483.529	50.47	56.33	-7.37	43.10	48.96	54.00	74.00	-10.90	-25.04	Vertical
2483.529	52.49	58.32	-7.37	45.12	50.95	54.00	74.00	-8.88	-23.05	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows: Result = Reading + Corrected Factor
3. Display the measurement of peak values.

GFSK(1MHz)

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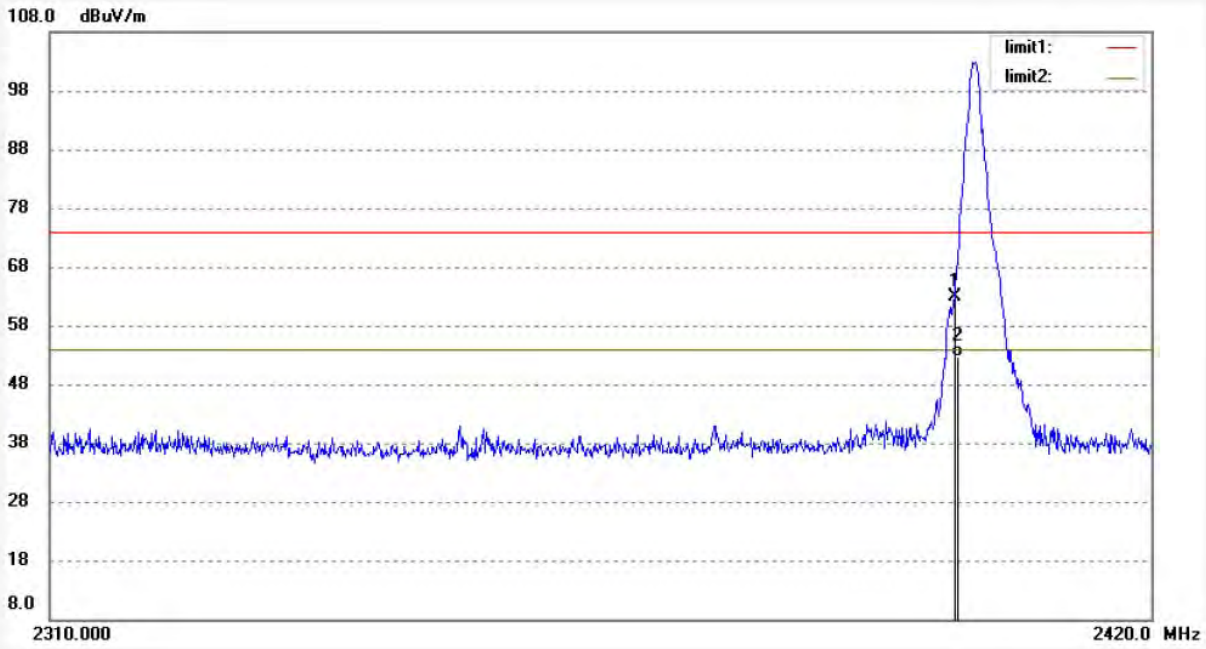
Job No.: rucky3 #32	Polarization: Horizontal
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 21/36/18
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IBC233	
Manufacturer: Shangzheng	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	70.32	-7.46	62.86	74.00	-11.14	peak			
2	2400.000	60.07	-7.46	52.61	54.00	-1.39	AVG			

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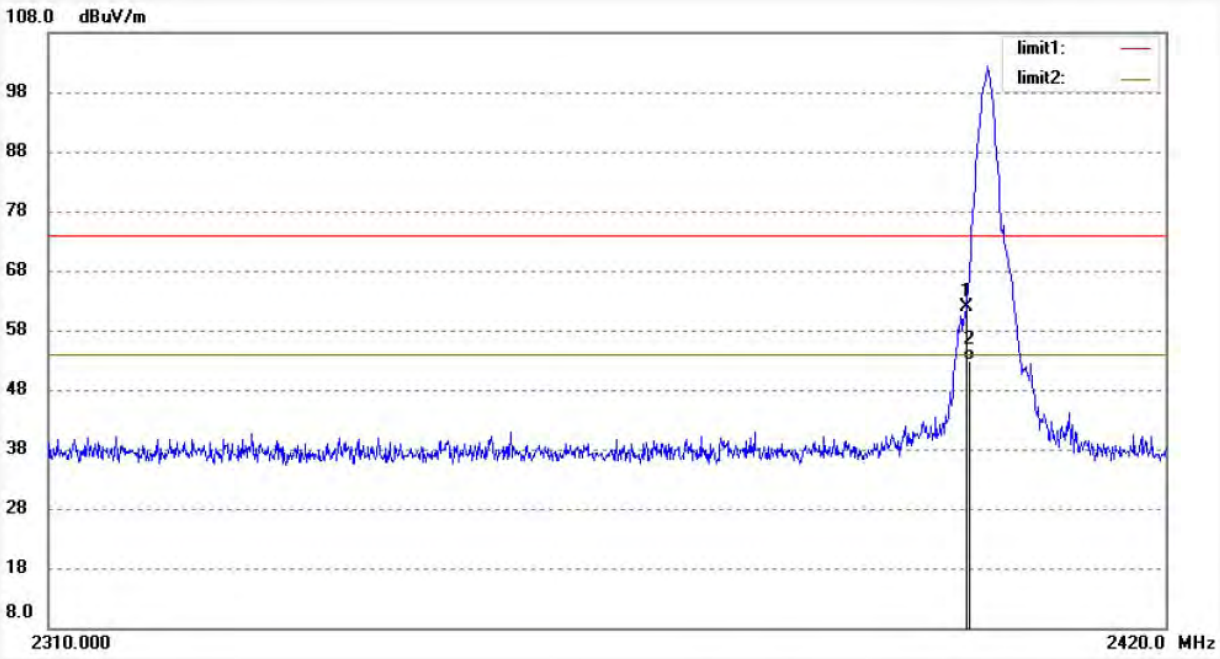
Job No.: rucky3 #31	Polarization: Vertical
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 21/32/53
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IBC233	
Manufacturer: Shangzheng	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	69.45	-7.46	61.99	74.00	-12.01	peak			
2	2400.000	60.24	-7.46	52.78	54.00	-1.22	AVG			

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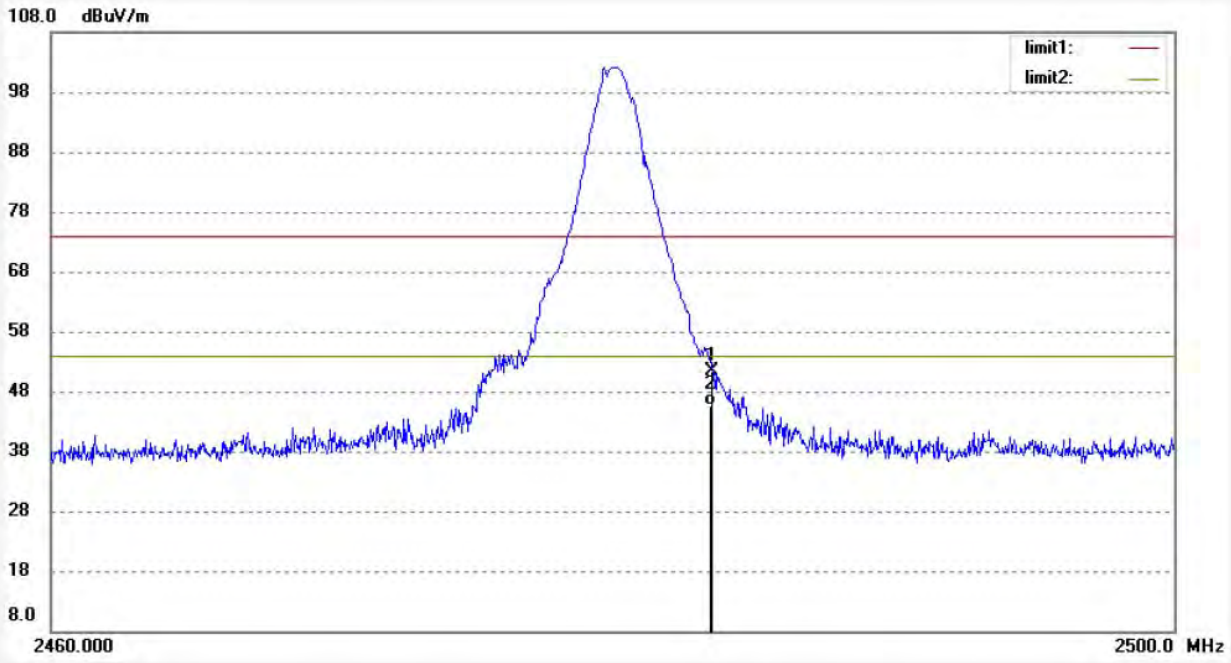
Job No.: rucky3 #27	Polarization: Horizontal
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 21/17/26
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: IBC233	
Manufacturer: Shangzheng	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.529	58.79	-7.37	51.42	74.00	-22.58	peak			
2	2483.529	53.00	-7.37	45.63	54.00	-8.37	AVG			

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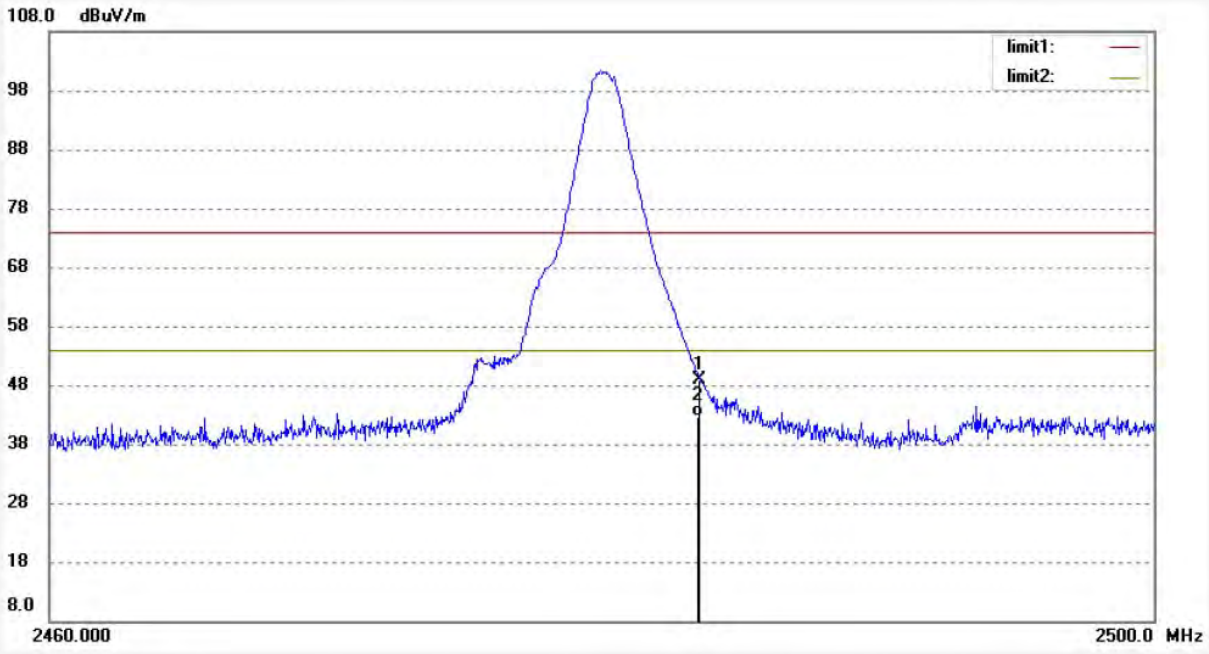
Job No.: rucky3 #28	Polarization: Vertical
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 21/20/23
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: IBC233	
Manufacturer: Shangzheng	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.529	56.20	-7.37	48.83	74.00	-25.17	peak			
2	2483.529	50.10	-7.37	42.73	54.00	-11.27	AVG			

π/4 DQPSK (2Mbps)

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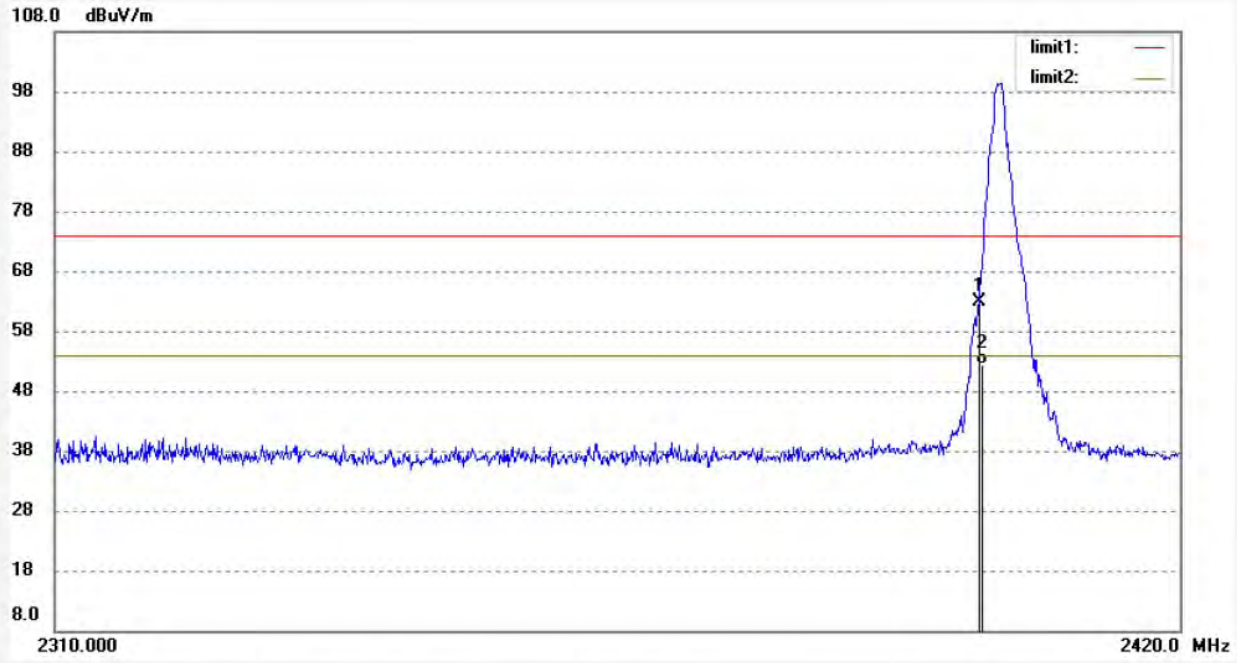
Job No.: RUCKY6 #30	Polarization: Horizontal
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 11/22/22
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IBC233	
Manufacturer: Nosanky	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	70.31	-7.46	62.85	74.00	-11.15	peak			
2	2400.000	59.74	-7.46	52.28	54.00	-1.72	AVG			

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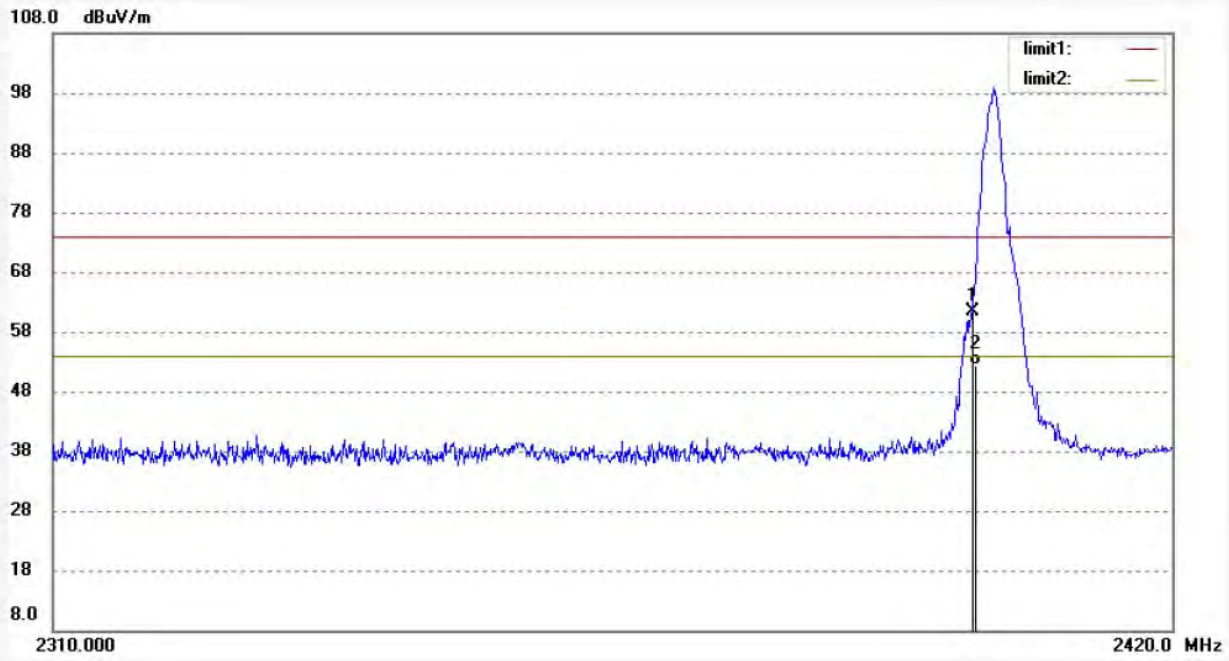
Job No.: RUCKY6 #29
Standard: FCC 15C PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Bluetooth CD/Radio Boombox
Mode: TX 2402MHz
Model: IBC233
Manufacturer: Nosanky

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2013/03/27
Time: 11/19/28
Engineer Signature: Ricky
Distance: 3m

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	68.88	-7.46	61.42	74.00	-12.58	peak			
2	2400.000	59.78	-7.46	52.32	54.00	-1.68	AVG			

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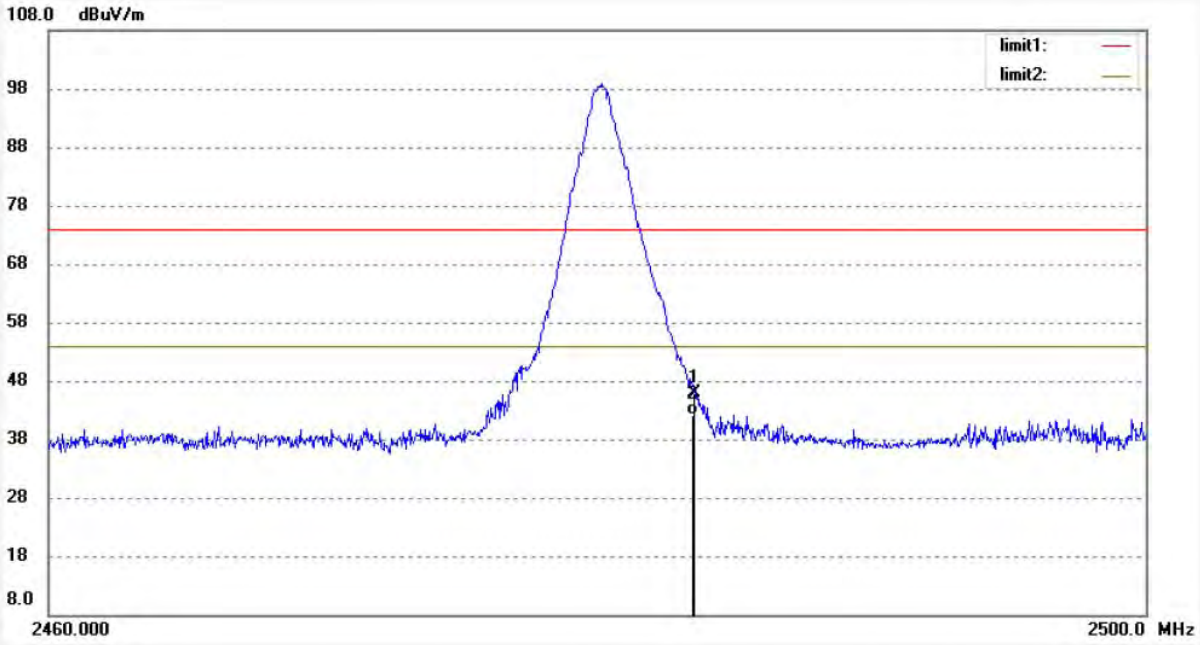
Job No.: RUCKY6 #26
Standard: FCC 15C PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Bluetooth CD/Radio Boombox
Mode: TX 2480MHz
Model: IBC233
Manufacturer: Nosanky

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 2013/03/27
Time: 11/10/46
Engineer Signature: Ricky
Distance: 3m

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.529	53.28	-7.37	45.91	74.00	-28.09	peak			
2	2483.529	49.41	-7.37	42.04	54.00	-11.96	AVG			

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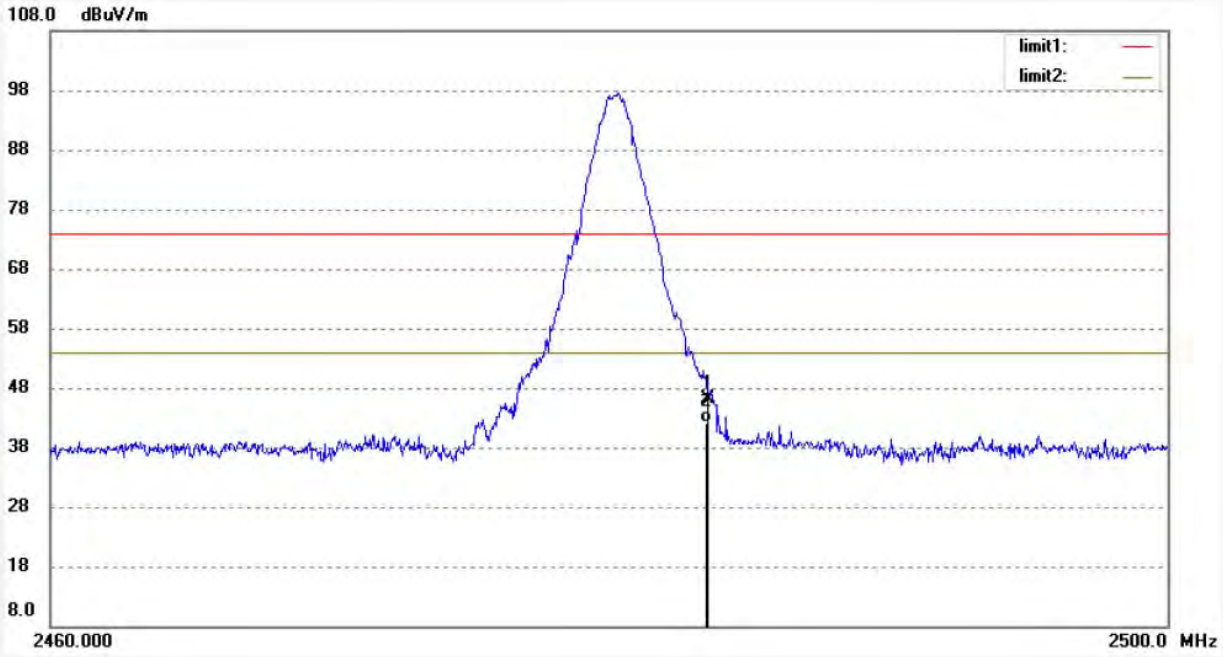
Job No.: RUCKY6 #25	Polarization: Vertical
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 11/08/55
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: IBC233	
Manufacturer: Nosanky	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.529	53.57	-7.37	46.20	74.00	-27.80	peak			
2	2483.529	49.55	-7.37	42.18	54.00	-11.82	AVG			

8DPSK (3Mbps)

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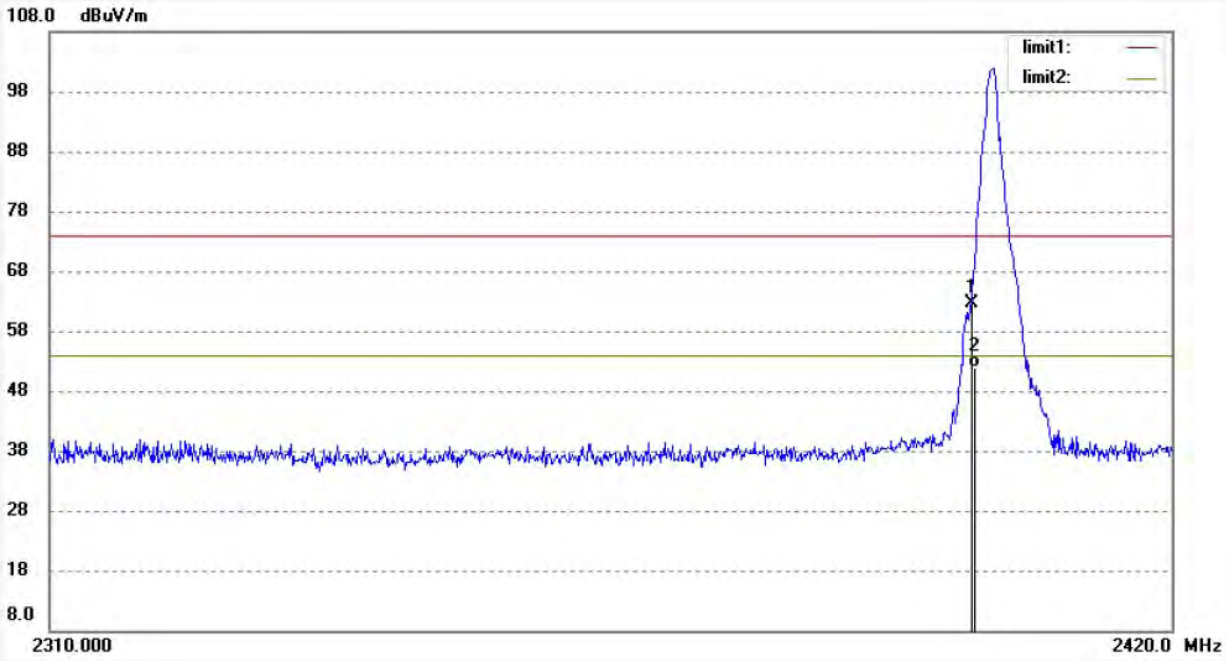
Job No.: RUCKY6 #32	Polarization: Horizontal
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 11/29/15
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: IBC233	
Manufacturer: Nosanky	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	70.11	-7.46	62.65	74.00	-11.35	peak			
2	2400.000	59.45	-7.46	51.99	54.00	-2.01	AVG			

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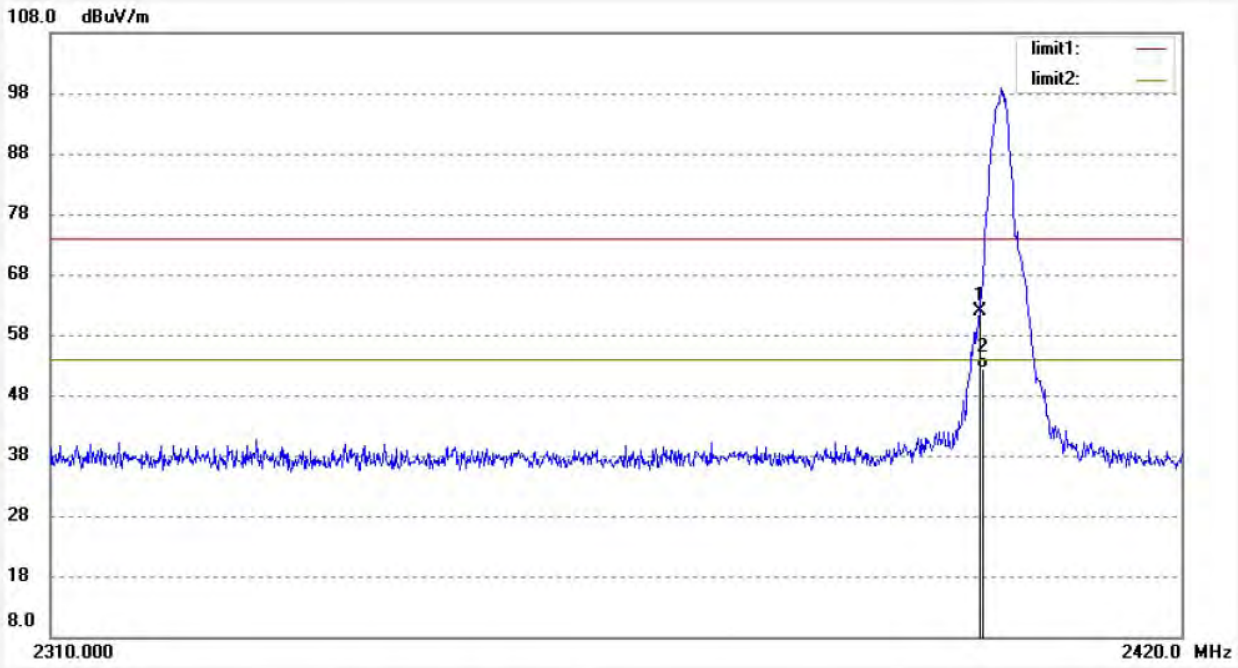
Job No.: RUCKY6 #31
Standard: FCC 15C PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Bluetooth CD/Radio Boombox
Mode: TX 2402MHz
Model: IBC233
Manufacturer: Nosanky

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2013/03/27
Time: 11/26/52
Engineer Signature: Ricky
Distance: 3m

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	69.37	-7.46	61.91	74.00	-12.09	peak			
2	2400.000	59.83	-7.46	52.37	54.00	-1.63	AVG			

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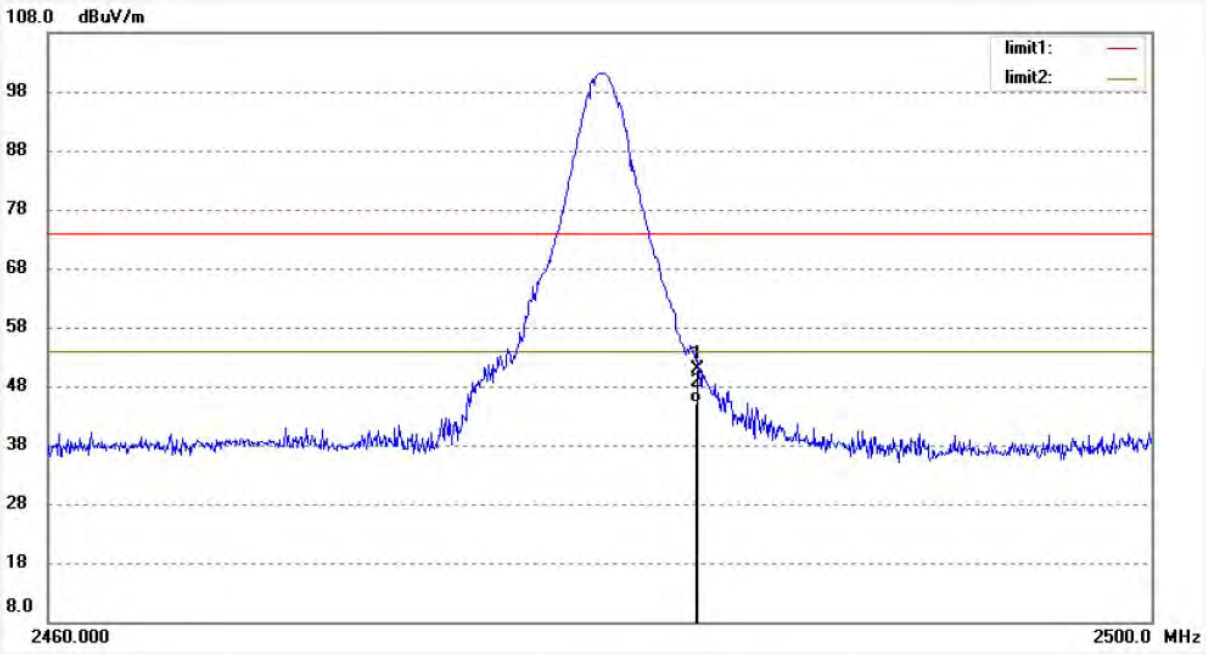
Job No.: RUCKY6 #27
Standard: FCC 15C PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 49 %
EUT: Bluetooth CD/Radio Boombox
Mode: TX 2480MHz
Model: IBC233
Manufacturer: Nosanky

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 2013/03/27
Time: 11/14/32
Engineer Signature: Ricky
Distance: 3m

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.529	58.32	-7.37	50.95	74.00	-23.05	peak			
2	2483.529	52.49	-7.37	45.12	54.00	-8.88	AVG			

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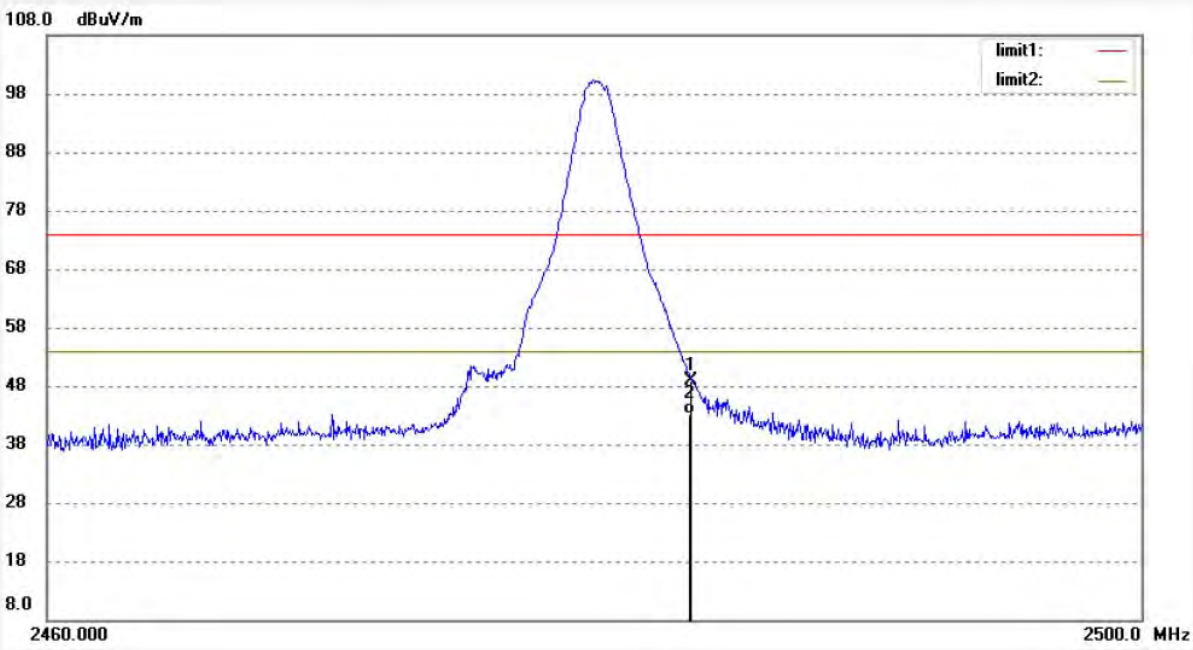
Job No.: RUCKY6 #28	Polarization: Vertical
Standard: FCC 15C PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 2013/03/27
Temp.(C)/Hum.(%) 23 C / 49 %	Time: 11/17/24
EUT: Bluetooth CD/Radio Boombox	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: IBC233	
Manufacturer: Nosanky	

Note: Report No:ATE20130326



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.529	56.33	-7.37	48.96	74.00	-25.04	peak			
2	2483.529	50.47	-7.37	43.10	54.00	-10.90	AVG			

11.RADIATED SPURIOUS EMISSION TEST

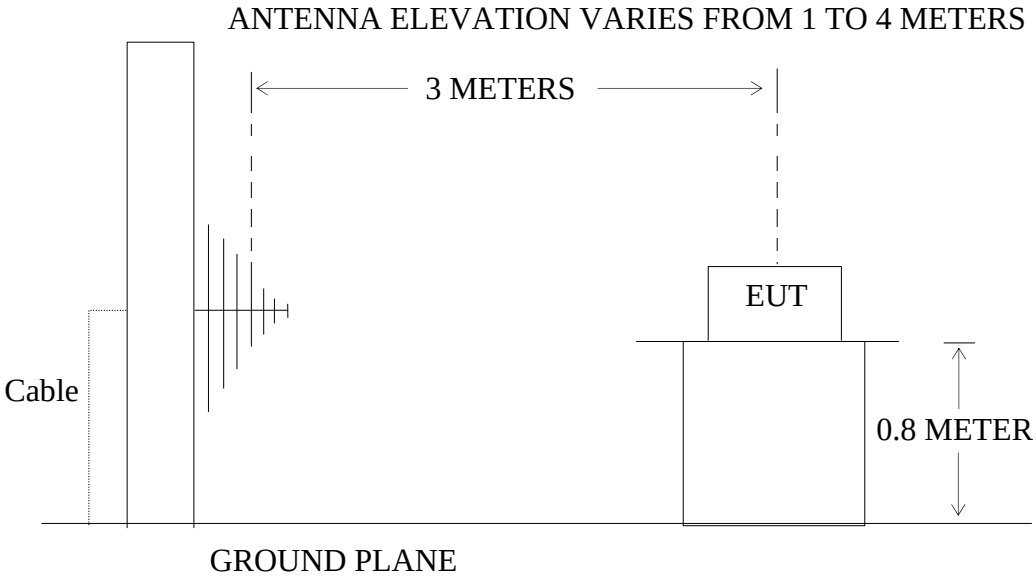
11.1.Block Diagram of Test Setup

11.1.1.Block diagram of connection between the EUT and simulators

Setup: Transmitting mode

(EUT: Bluetooth CD/Radio Boombox)

11.1.2.Semi-Anechoic Chamber Test Setup Diagram



(EUT: Bluetooth CD/Radio Boombox)

11.2.The Limit For Section 15.247(d)

Section 15.247(d): 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 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).

11.3.Restricted bands of operation

11.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510

[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

11.4.Configuration of EUT on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

11.4.1.Bluetooth CD/Radio Boombox (EUT)

Model Number	**:**	IBC233
Serial Number	**:**	N/A
Manufacturer	**:**	Dongguan Shangzheng Industrial Co., Ltd.

11.5.Operating Condition of EUT

11.5.1.Setup the EUT and simulator as shown as Section 11.1.

11.5.2.Turn on the power of all equipment.

11.5.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

11.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9kHz in below 30MHz. and set at 120kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9kHz to 25GHz is checked.

The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

11.7.The Field Strength of Radiation Emission Measurement Results

PASS.

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2402MHz)	Test Engineer:	Apple

GFSK (1Mbps)

Below 30MHz

Frequency (MHz)	Reading (dBμV/m) QP	Factor(dB) Corr.	Result (dBμV/m) QP	Limit (dBμV/m) QP	Margin (dB) QP	Polarization
-	-	-	-	-	-	X
-	-	-	-	-	-	Y
-	-	-	-	-	-	Z

For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m) QP	Factor Corr. (dB)	Result (dBμV/m) QP	Limit (dBμV/m) QP	Margin (dB) QP	Polarization
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	Horizontal

For 1GHz-25GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
-	-	-	-	-	-	-	-	-	-	Vertical
-	-	-	-	-	-	-	-	-	-	Horizontal

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The fundamental radiated emissions were reduced by Band Reject Filter in the attached plots.

Date of Test:	Mar. 27, 2013	Temperature:	25°C
EUT:	Bluetooth CD/Radio Boombox	Humidity:	50%
Model No.:	IBC233	Power Supply:	AC 120V/60HZ
Test Mode:	TX (2441MHz)	Test Engineer:	Apple

GFSK (1Mbps)

Below 30MHz

Frequency (MHz)	Reading (dBμV/m)	Factor(dB) Corr.	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	X
-	-	-	-	-	-	Y
-	-	-	-	-	-	Z

For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	Horizontal

For 1GHz-25GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
-	-	-	-	-	-	-	-	-	-	Vertical
-	-	-	-	-	-	-	-	-	-	Horizontal

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The fundamental radiated emissions were reduced by Band Reject Filter in the attached plots.