Test Report of FCC CFR 47 Part 15 Subpart C

On Behalf of

SHENZHEN GONBES TECHNOLOGY CO., LTD

FCC ID:	**2ABMEK1**
Product Description:	**Bluetooth Sunglasses**
Model No.:	**K1**
Supplementary Model:	**N/A**

Prepared for:	**SHENZHEN GONBES TECHNOLOGY CO., LTD** Room 1102, Unit B4, Kexing Science Park, No.15 Keyuan Rd, Nanshan, Shenzhen, China
Prepared by:	**Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.** 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: 86-755-86337020 Fax: 86-755-86337028
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Test Date:	February 18-24, 2014

Tested by: Lion Cai

Reviewed by: Owen Yang

Approved by: Kendy Wang

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	**SHENZHEN GONBES TECHNOLOGY CO., LTD**
Address of applicant:	Room 1102, Unit B4, Kexing Science Park, No.15 Keyuan Rd, Nanshan, Shenzhen, China
Manufacturer :	**SHENZHEN GONBES TECHNOLOGY CO., LTD**
Address of manufacturer:	Room 1102, Unit B4, Kexing Science Park, No.15 Keyuan Rd, Nanshan, Shenzhen, China

General Description of E.U.T

Items	**Description**
EUT Description:	Bluetooth Sunglasses
Model No.:	K1
Trade Name:	Gonbes
Supplementary Model:	N/A
BT Module	V2.1+EDR
Frequency Band:	2402~2480MHz
Number of Channels:	79
Type of Modulation:	GFSK, Pi/4 DQPSK, 8-DPSK
Antenna Gain	3 dBi
Antenna Type:	Integral Antenna
Rated Voltage:	DC 3.7V from Battery, DC 5V from Adapter.

Remark: * *The test data gathered are from the production sample provided by the manufacturer.*

1.2 Related Submittal(s) / Grant (s) and Test Methodology

The tests were performed based on the Electromagnetic Interference (EMI) tests performed on the EUT. Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003 Radiated testing was performed at an antenna to EUT distance 3 meters.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.207, 15.209 and 15.247 rules. Test was carried out according to the above mentioned FCC rules and the FCC publication notice DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

1.3 Test Facility

All measurement required was performed at laboratory of Shenzhen CTL Testing Technology Co., Ltd. at Floor 1-A,Baisha Technology Park,No.3011,Shahexi Road, Nanshan District, Shenzhen, China 518055.

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

FCC – Registration No.: 970318

Shenzhen CTL Testing Technology 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 970318, December, 2013.

2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions: The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions: The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

2.5Support Equipments

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

Support equipments or special accessories in test configuration：

AUX Description:	Manufacturer	Model No.	Certificate	CABLE
TRAVEL CHARGER	SMART BEAR	LFS0501500 D-A8S	CE, FCC	N/A

2.6Test Equipment List and Details

Test equipments list of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2013/07/12	2014/07/11
EMI Test Receiver	R&S	ESCI3	103710	2013/07/10	2014/07/09
EMI Test Receiver	R&S	ESPI	1164.6407.07	2013/07/10	2014/07/09
Spectrum Analyzer	Agilent	E4407B	MY45108355	2013/07/06	2014/07/05
Controller	EM Electronics	Controller EM 1000	N/A	2013/07/06	2014/07/05
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2013/07/12	2014/07/11
Horn Antenna	SCHWARZBECK	BBHA9170	1562	2013/07/12	2014/07/11
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2013/07/12	2014/07/11
LISN	R&S	ENV216	101316	2013/07/10	2014/07/09
LISN	SCHWARZBECK	NSLK8127	8127687	2013/07/10	2014/07/09
Microwave Preamplifier	HP	8349B	3155A00882	2013/07/10	2014/07/09
Amplifier	HP	8447D	3113A07663	2013/07/10	2014/07/09
Transient Limiter	Com-Power	LIT-153	532226	2013/07/10	2014/07/09

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.207	AC Power Line Conducted Emission	Pass
FCC §15.247(a)(1)	Hopping Channel Bandwidth	Pass
FCC §15.247(a)(1)	Hopping Channel Separation	Pass
FCC §15.247(a)(1)	Number of Hopping Frequency Used	Pass
FCC §15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass
FCC §15.247(b)(1)	Maximum Peak Output Power	Pass
FCC §15.247(d)	Band Edges Emission	Pass
FCC §15.247(d)	Spurious Radiated Emission	Pass
FCC §15.203/15.247(b)/(c)	Antenna Requirement	Pass

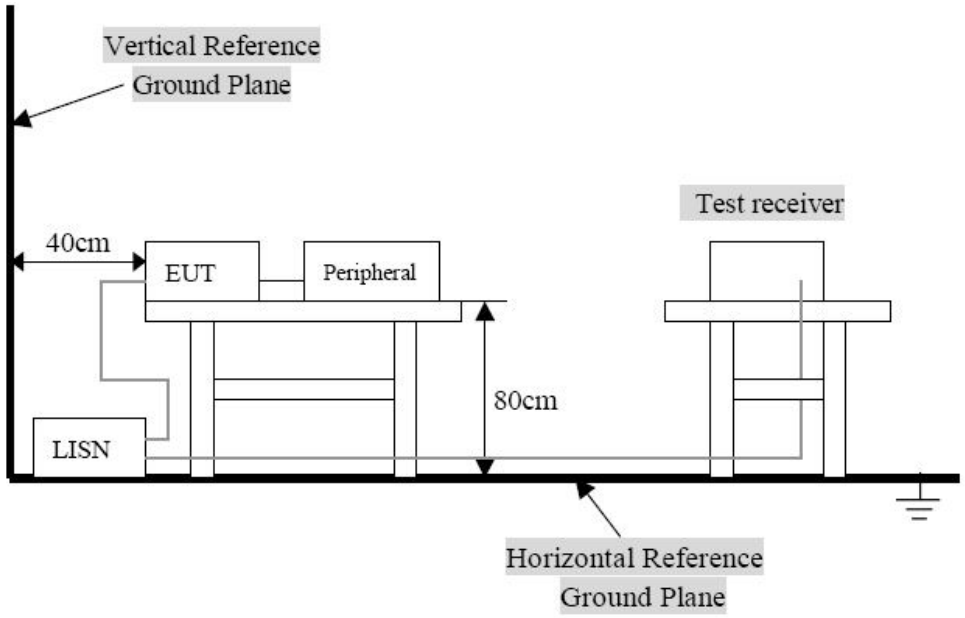
4. TEST OF AC POWER LINE CONDUCTED EMISSION

4.1 Applicable Standard

Refer to FCC §15.207.
For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150～0.500	66～56	56～46
0.500～5.000	56	46
5.000～30.00	60	50

4.2 Test Setup Diagram



Remark: The EUT was connected to a 120 VAC/ 60Hz power source.

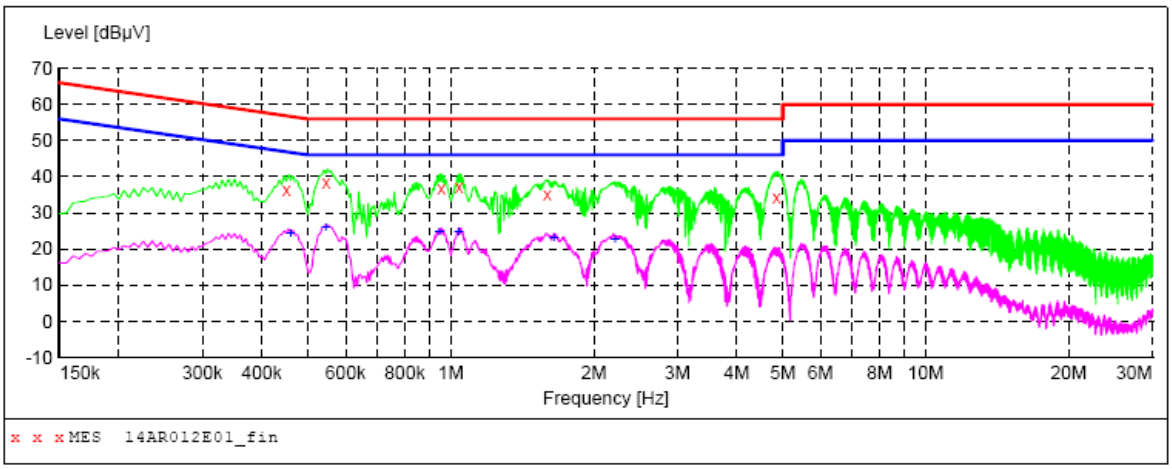
4.3 Test Result

Temperature (℃) : 23~25	EUT: Bluetooth Sunglasses
Humidity (%RH): 45~58	M/N: K1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Conducted Emission:

EUT:	Bluetooth Sunglasses
M/N:	K1
Operating Condition:	Tx Mode
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for adapter
Comment:	L Line

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "14AR012E01_fin"

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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.450000	36.50	10.6	57	20.4	QP	L1	GND
0.545000	38.20	10.5	56	17.8	QP	L1	GND
0.955000	36.70	10.4	56	19.3	QP	L1	GND
1.040000	37.00	10.5	56	19.0	QP	L1	GND
1.595000	35.20	10.4	56	20.8	QP	L1	GND
4.845000	34.40	10.4	56	21.6	QP	L1	GND

MEASUREMENT RESULT: "14AR012E01_fin2"

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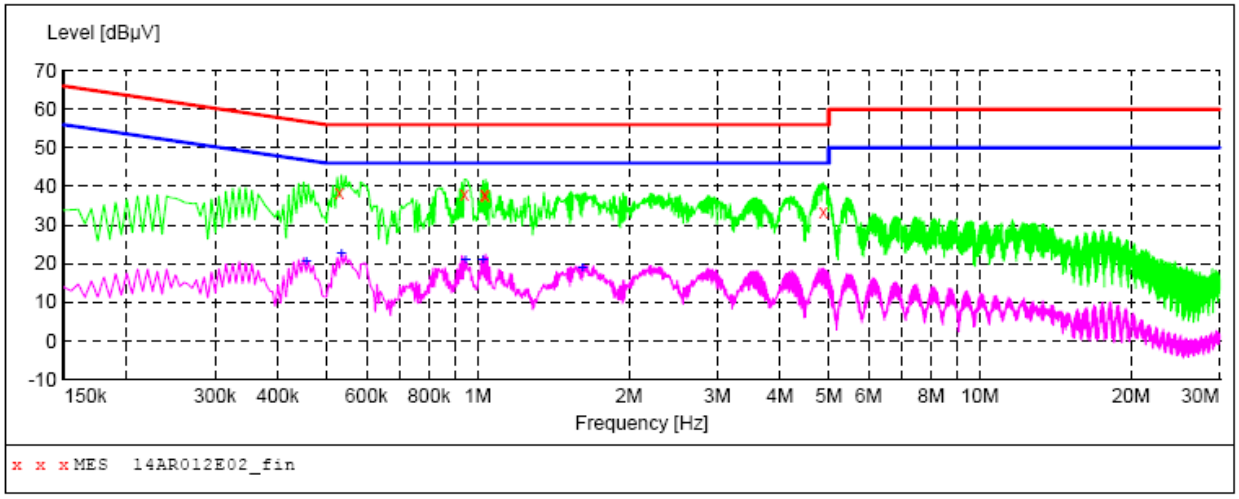
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.460000	24.40	10.6	47	22.3	AV	L1	GND
0.545000	26.00	10.5	46	20.0	AV	L1	GND
0.945000	24.50	10.4	46	21.5	AV	L1	GND
1.040000	24.60	10.5	46	21.4	AV	L1	GND
1.645000	23.00	10.4	46	23.0	AV	L1	GND
2.215000	22.80	10.4	46	23.2	AV	L1	GND

Conducted Emission:

EUT:	Bluetooth Sunglasses
M/N:	K1
Operating Condition:	Tx Mode
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for adapter
Comment:	N Line

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "14AR012E02_fin"

2/18/2014 15:15

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.530000	38.40	10.5	56	17.6	QP	N	GND
0.940000	37.80	10.4	56	18.2	QP	N	GND
1.030000	37.80	10.5	56	18.2	QP	N	GND
1.035000	37.60	10.5	56	18.4	QP	N	GND
4.875000	33.60	10.4	56	22.4	QP	N	GND

MEASUREMENT RESULT: "14AR012E02_fin2"

2/18/2014 15:15

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.455000	20.50	10.6	47	26.3	AV	N	GND
0.535000	22.50	10.5	46	23.5	AV	N	GND
0.945000	20.90	10.4	46	25.1	AV	N	GND
1.025000	21.00	10.5	46	25.0	AV	N	GND
1.615000	19.00	10.4	46	27.0	AV	N	GND

5. Test of Hopping Channel Bandwidth

5.1 Applicable Standard

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.

5.2 EUT Setup

Spectrum Analyzer

5.3 Test Equipment List and Details

See section 2.5.

5.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Use the following spectrum analyzer settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
   RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold

3. The spectrum width with level higher than 20dB below the peak level.

4. Repeat above 1~3 points for the middle and highest channel of the EUT.

5.5 Test Result

Temperature (℃) : 22~23	EUT: Bluetooth Sunglasses
Humidity (%RH): 50~54	M/N: K1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

BDR 1M

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)
GFSK	Low	2402.00	924
GFSK	Middle	2441.00	924
GFSK	High	2480.00	888

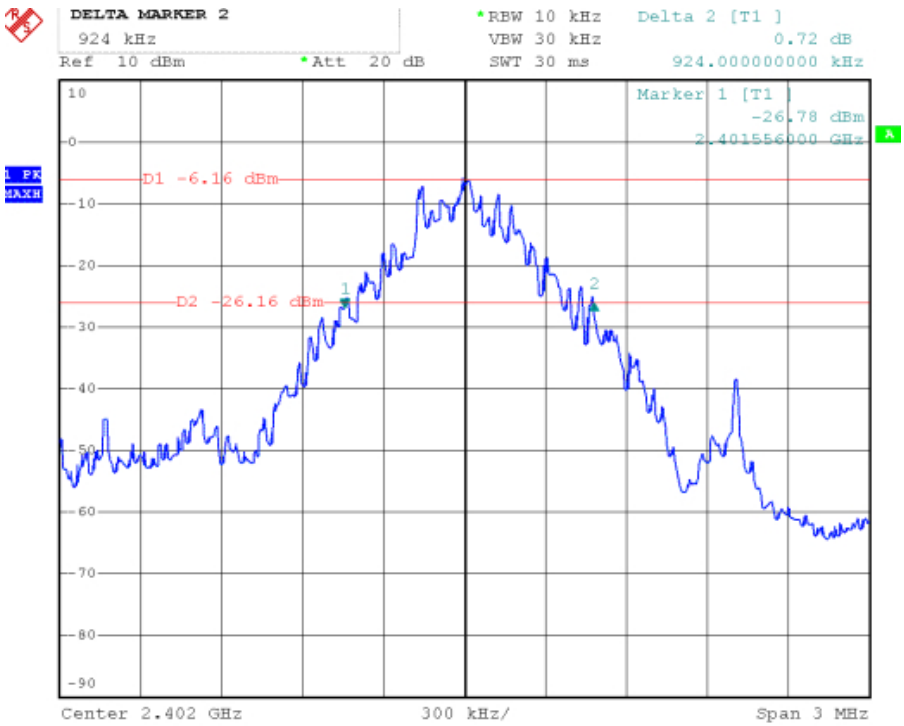
EDR 2M

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)
Pi/4 DQPSK	Low	2402.00	1194
Pi/4 DQPSK	Middle	2441.00	1302
Pi/4 DQPSK	High	2480.00	1230

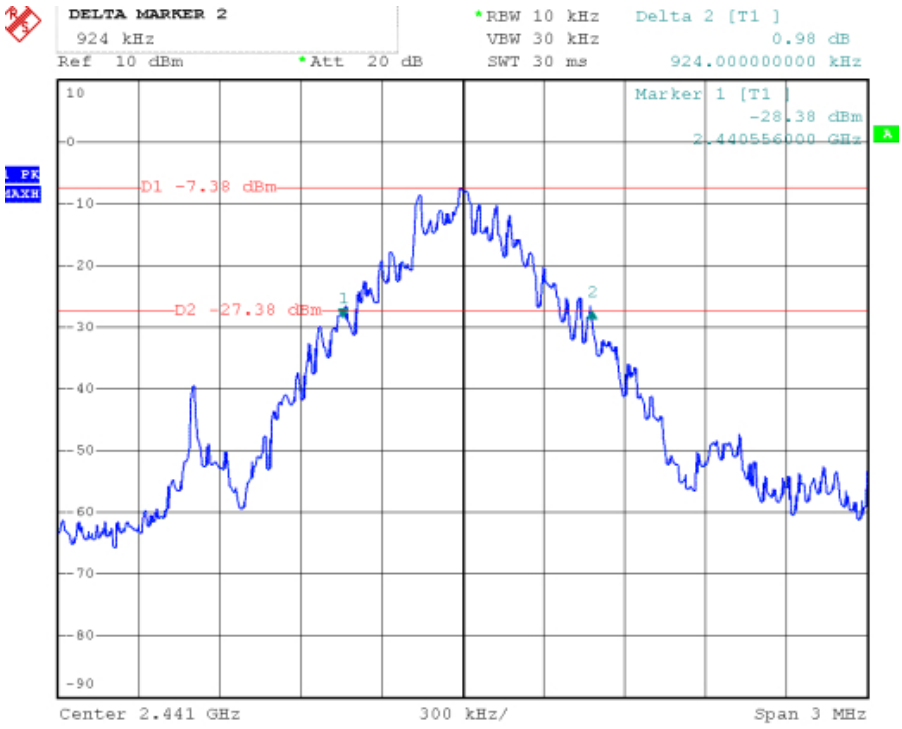
EDR 3M

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)
8-DPSK	Low	2402.00	1212
8-DPSK	Middle	2441.00	1218
8-DPSK	High	2480.00	1188

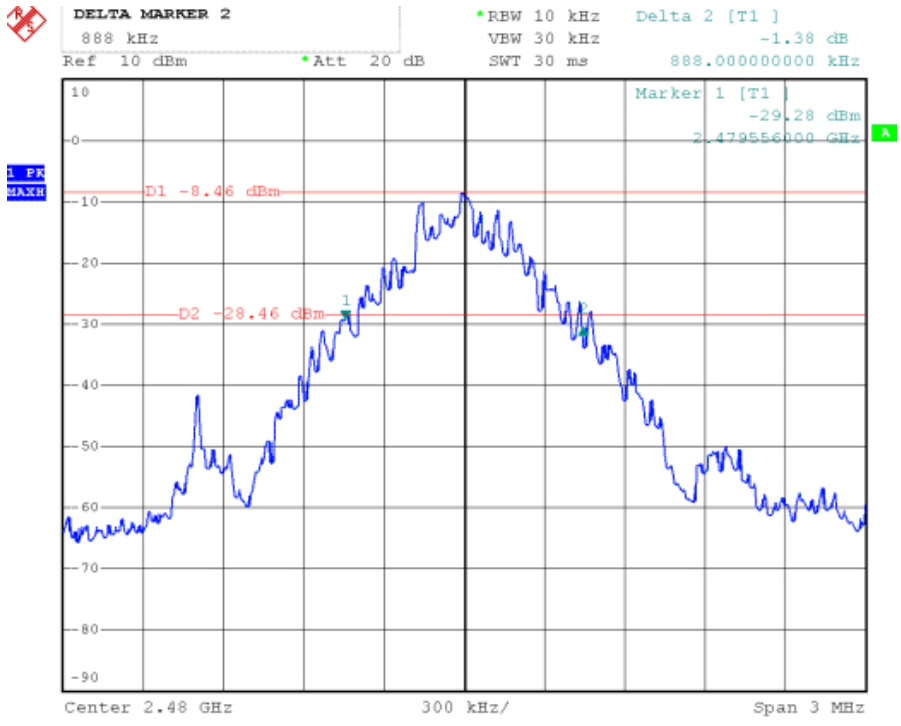
BDR 1M
Channel Low



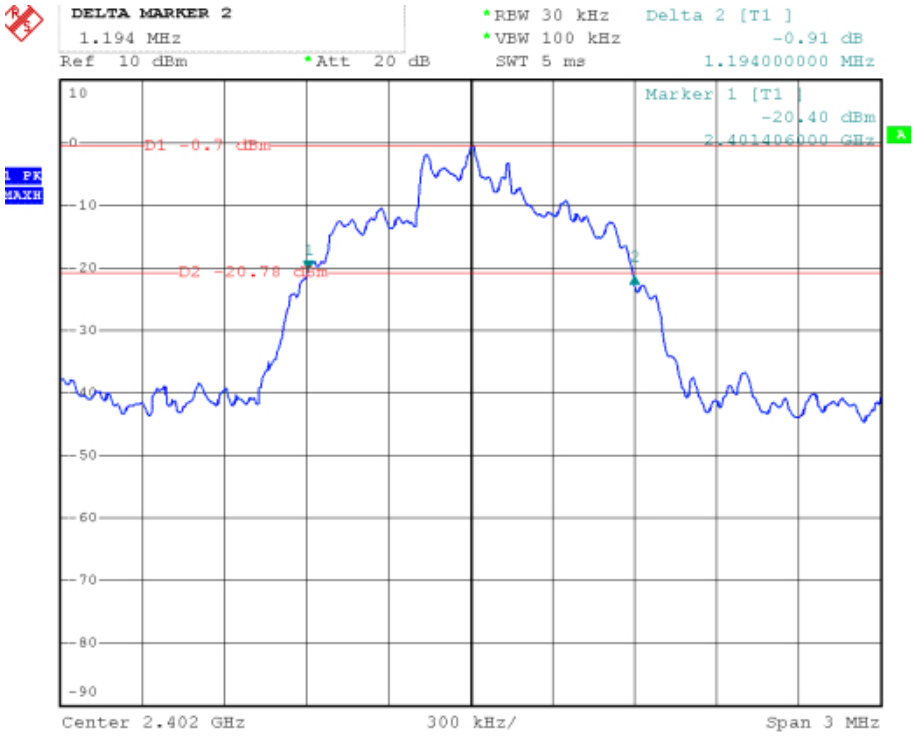
Channel Middle



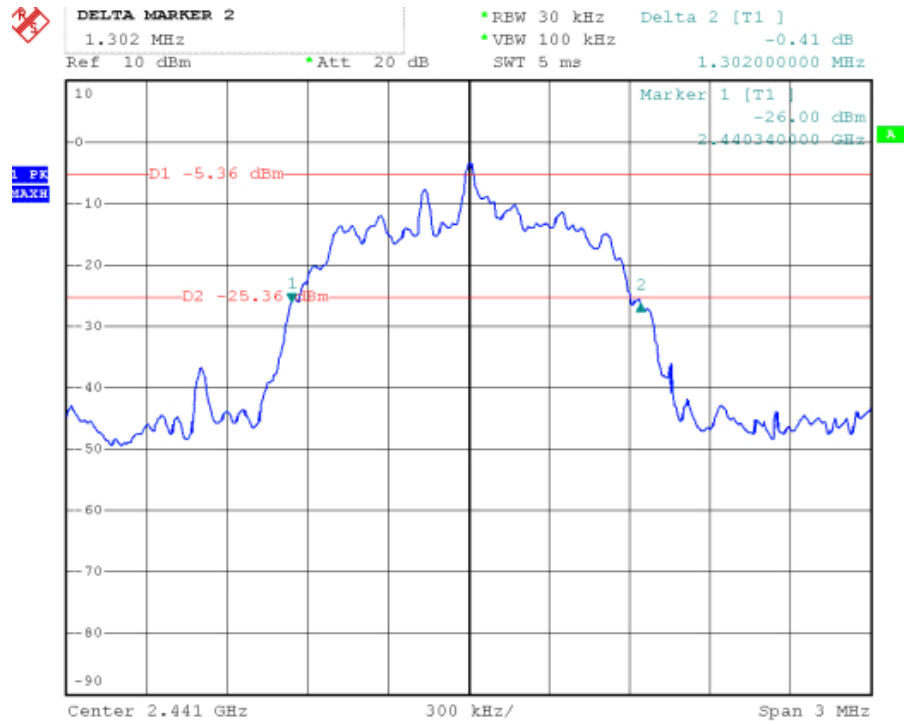
Channel High



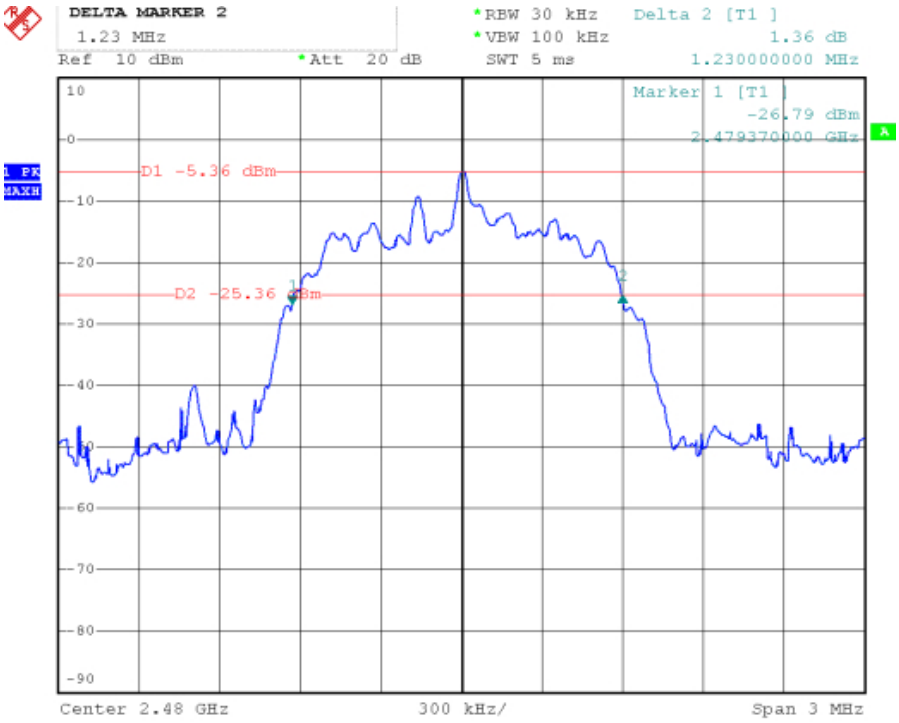
EDR 2M
Channel Low



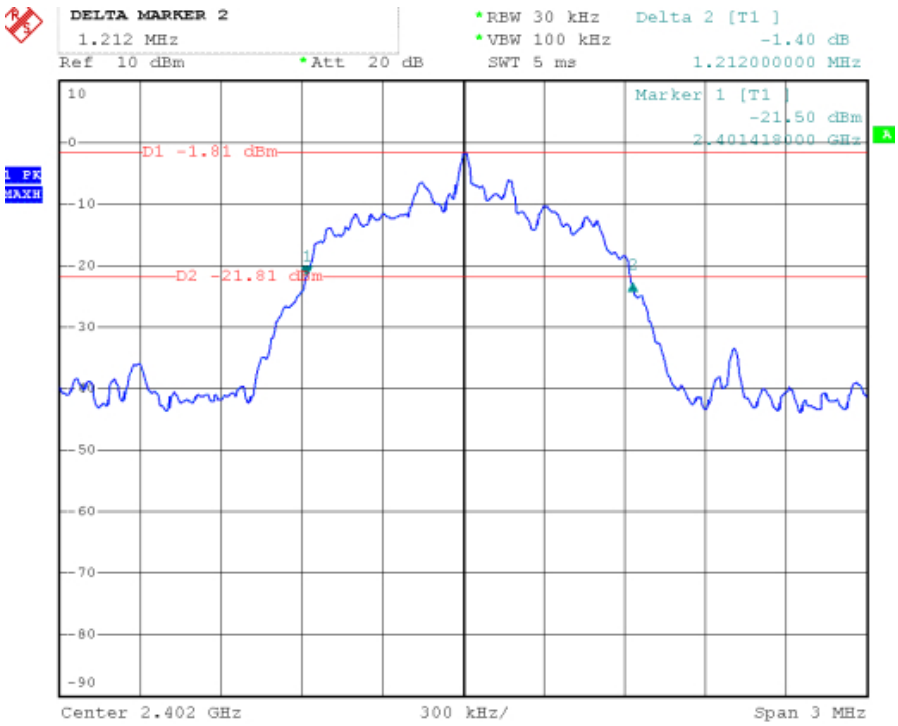
Channel Middle



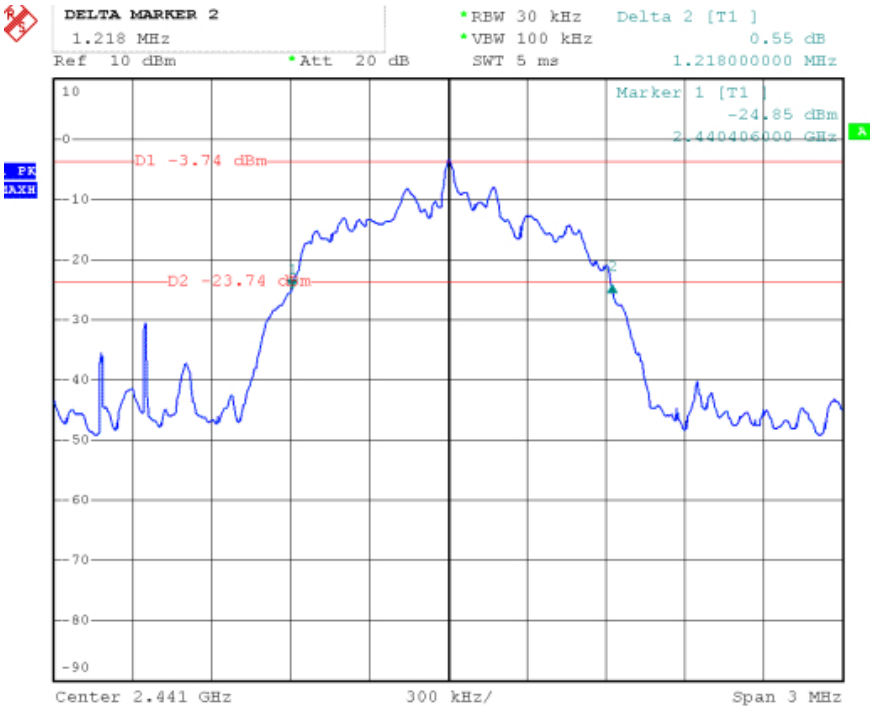
Channel High



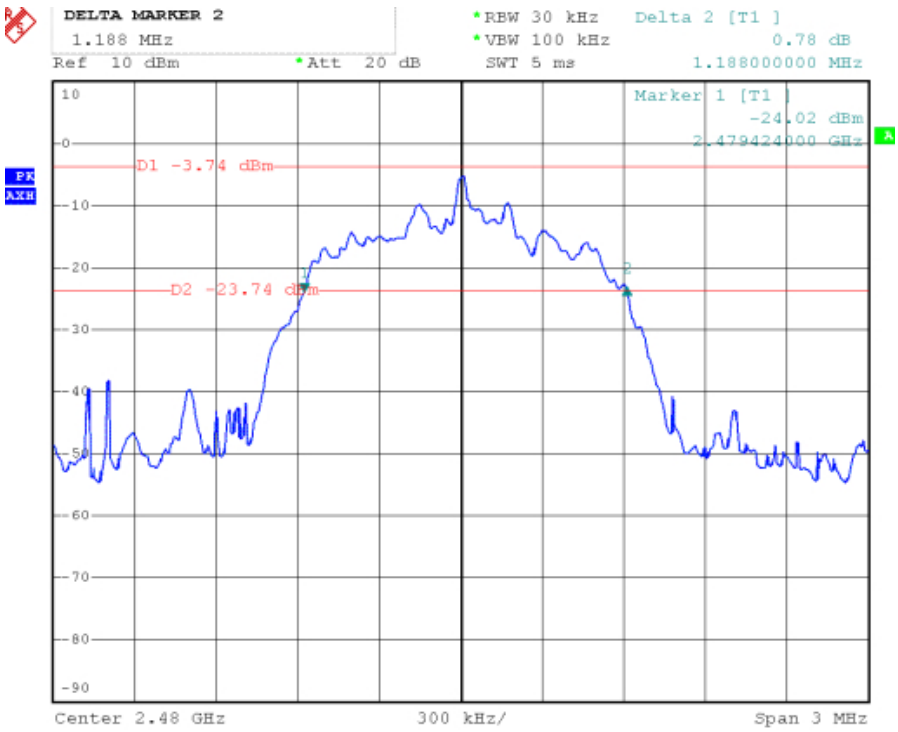
EDR 3M
Channel Low



Channel Middle



Channel High



6. Test of Hopping Channel Separation

6.1 Applicable Standard

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.

6.2 EUT Setup

Spectrum Analyzer

6.3 Test Equipment List and Details

See section 2.5.

6.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 30KHz and VBW to 100KHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.

4. The Hopping Channel Separation is defined as the separation between 2 neighboring hopping frequencies.

5. Repeat above 1~3 points for the middle and highest channel of the EUT.

6.5 Test Result

Temperature (℃) : 22~23	EUT: Bluetooth Sunglasses
Humidity (%RH): 50~54	M/N: K1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

BDR 1M

Modulation Type	Frequency (MHz)	Channel Separation (MHz)	Min. Limit (kHz)
GFSK	2402~2403	1.000	>25
GFSK	2441~2442	1.008	>25
GFSK	2479~2480	1.012	>25

EDR 2M

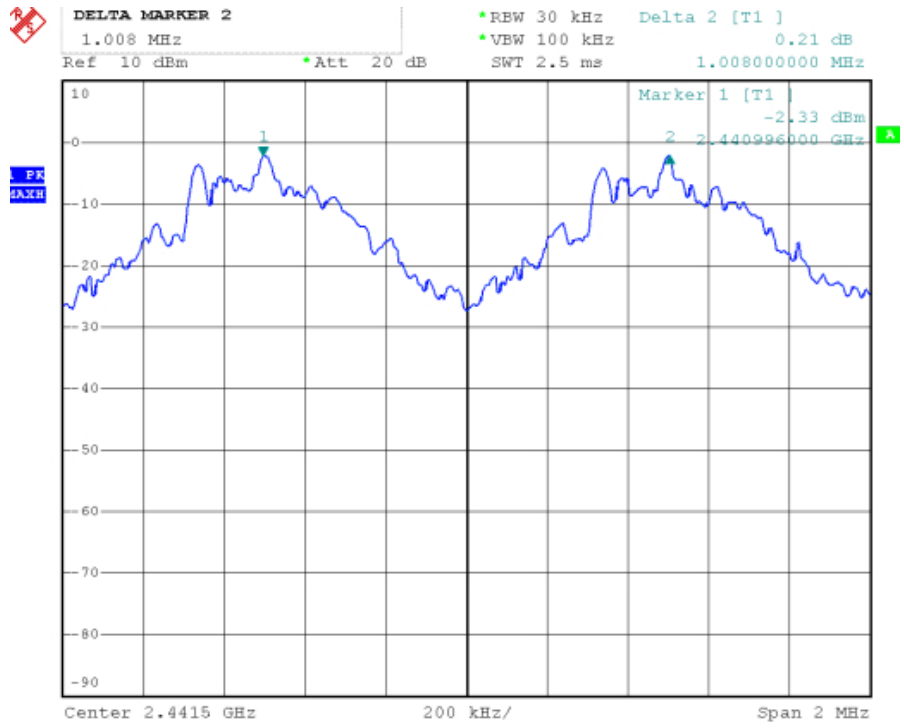
Modulation Type	Frequency (MHz)	Channel Separation (MHz)	Min. Limit (kHz)
Pi/4 DQPSK	2402~2403	1.012	>25
Pi/4 DQPSK	2441~2442	1.020	>25
Pi/4 DQPSK	2479~2480	1.004	>25

EDR 3M

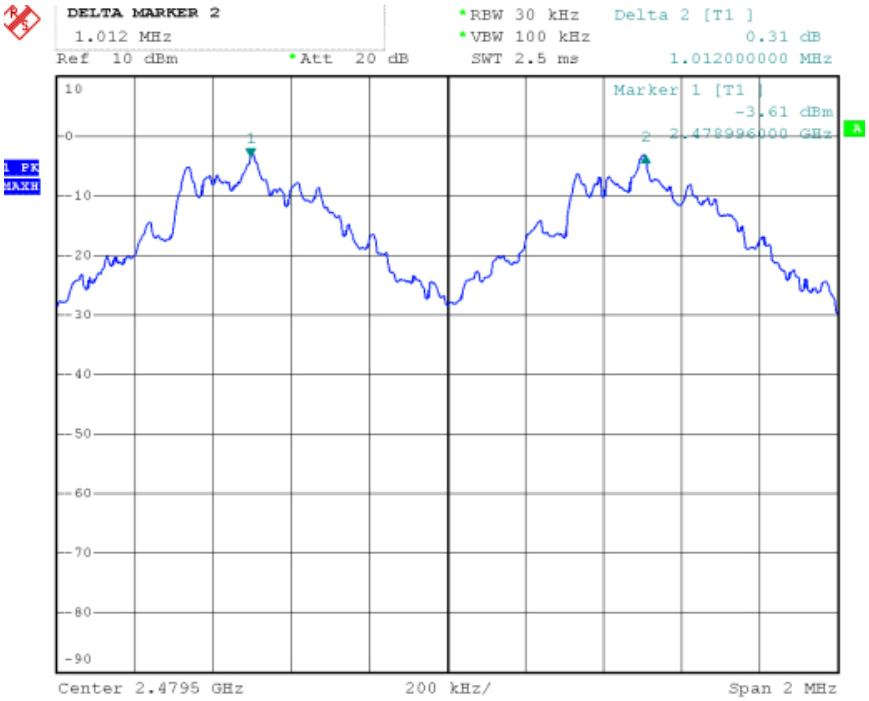
Modulation Type	Frequency (MHz)	Channel Separation (MHz)	Min. Limit (kHz)
8-DPSK	2402~2403	1.012	>25
8-DPSK	2441~2442	1.012	>25
8-DPSK	2479~2480	1.000	>25

BDR 1M
Channel Low

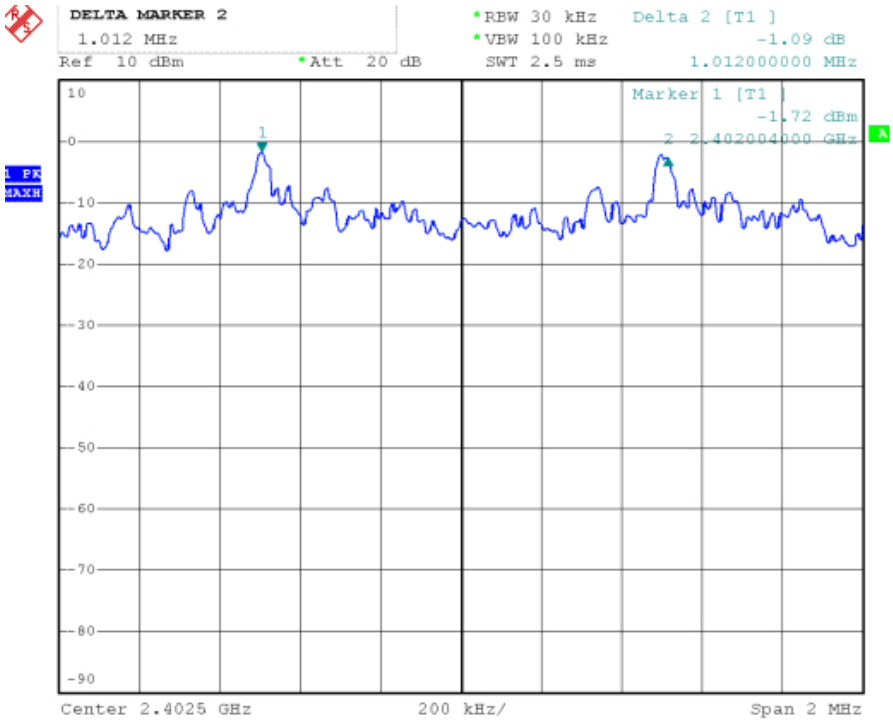
Channel Middle



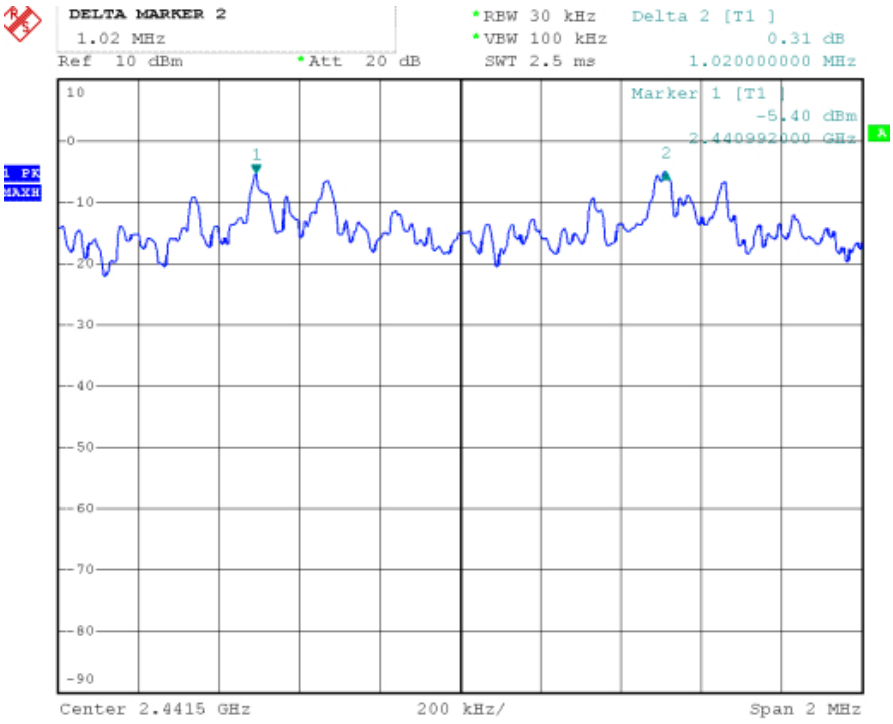
Channel High



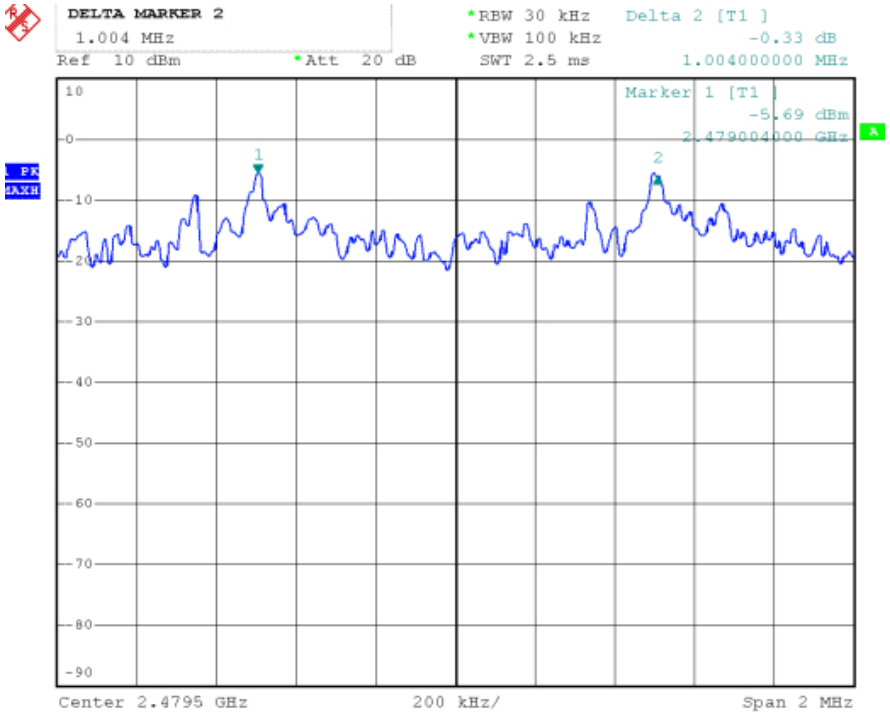
EDR 2M
Channel Low



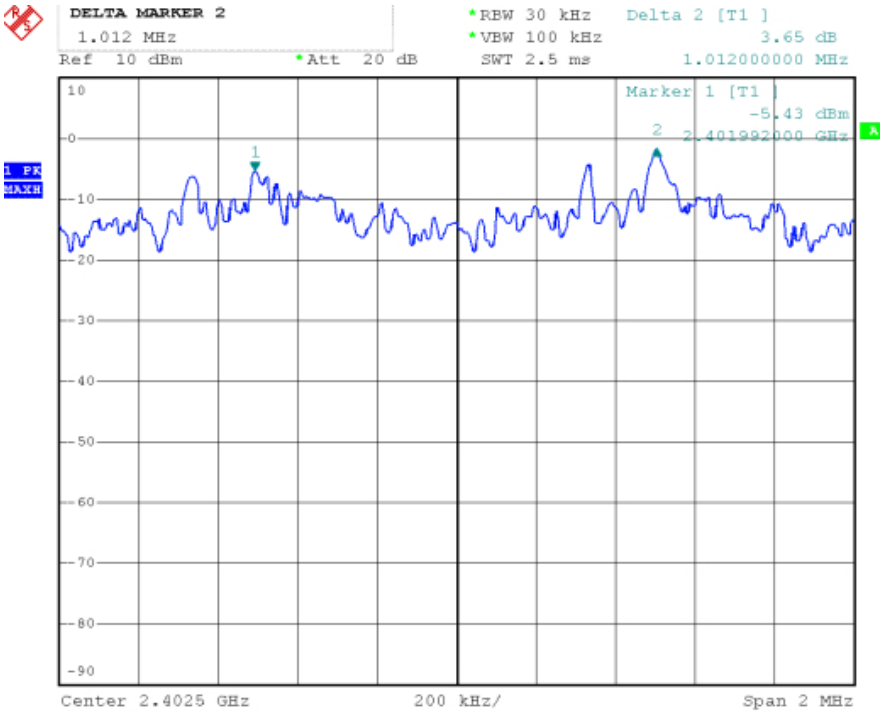
Channel Middle



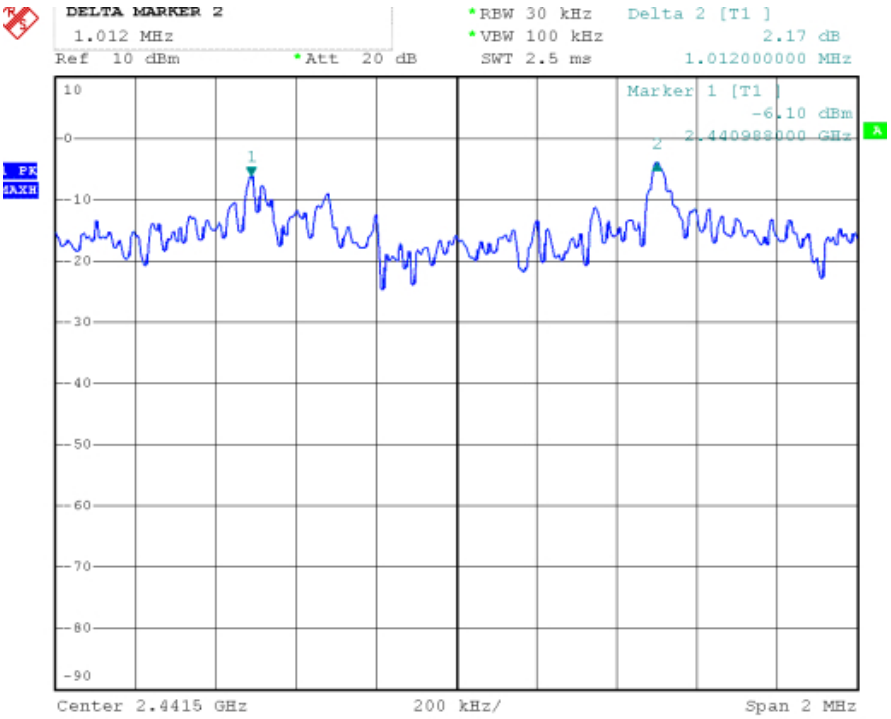
Channel High



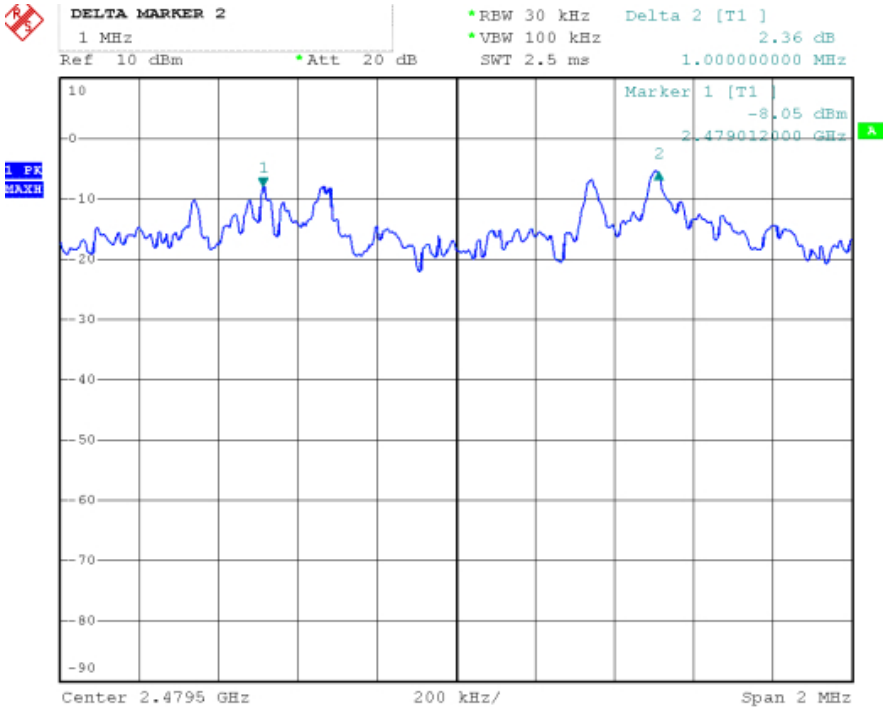
EDR 3M
Channel Low



Channel Middle



Channel High



7. Test of Number of Hopping Frequency

7.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 15 non-overlapping hopping channels. Frequency hopping system which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping system may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

7.2 EUT Setup

Spectrum Analyzer

7.3 Test Equipment List and Details

See section 2.5.

7.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.

4. Observe frequency hopping in 2400MHz~2483.5MHz, there are at least 32 non-overlapping channels.

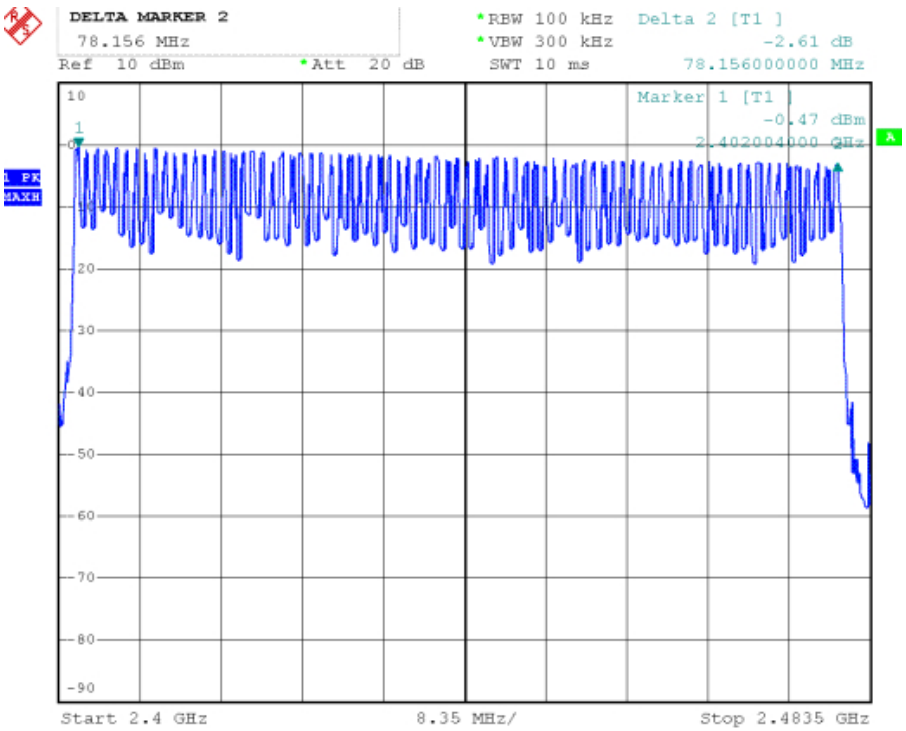
5. Repeat above 1~3 points for the middle and highest channel of the EUT.

7.5 Test Result

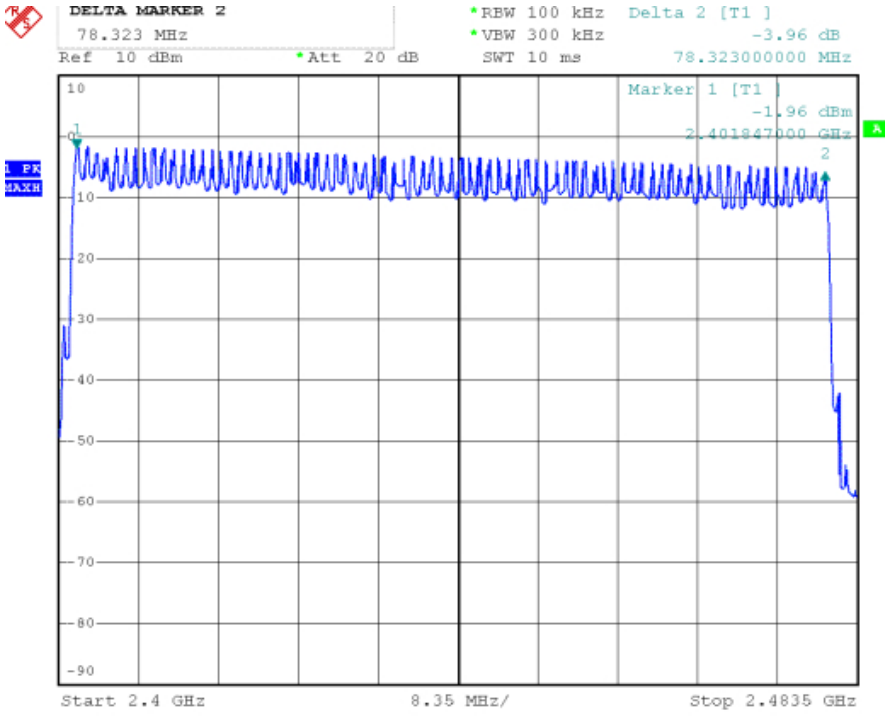
Temperature (℃) : 22~23	EUT: Bluetooth Sunglasses
Humidity (%RH): 50~54	M/N: K1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Modulation Type	Frequency (MHz)	Number of Hopping Channels	Min. Limit
GFSK	2402~2480	79	≥15
Pi/4 DQPSK	2402~2480	79	≥15
8-DPSK	2402~2480	79	≥15

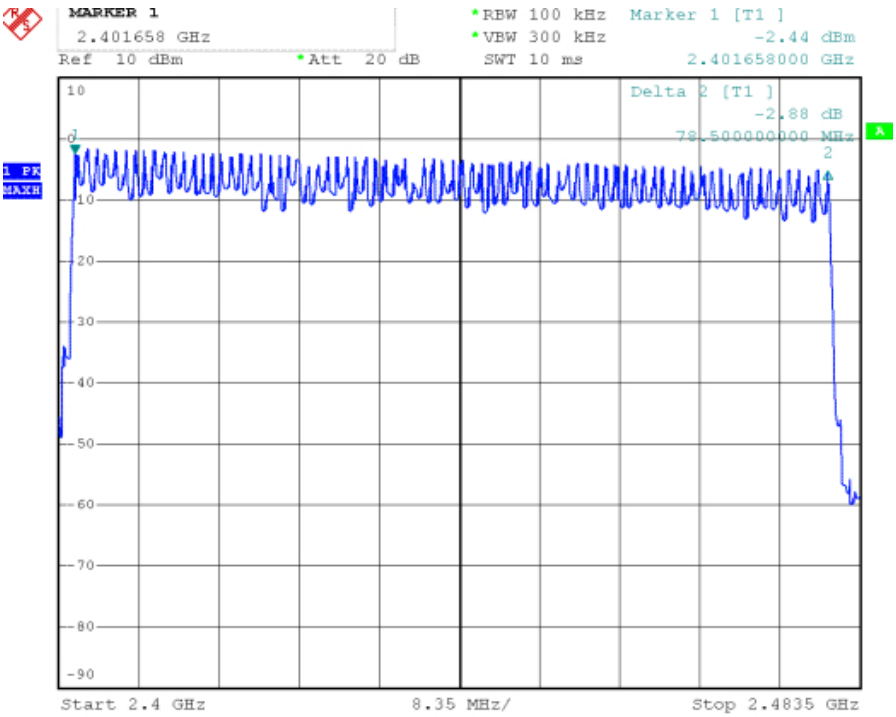
BDR-1M


DELTA MARKER 2
78.156 MHz
Ref 10 dBm
*Att 20 dB
*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Delta 2 [T1]
-2.61 dB
78.156000000 MHz
Marker 1 [T1]
-0.47 dBm
2.402004000 GHz
Start 2.4 GHz
8.35 MHz/
Stop 2.4835 GHz

EDR-2M


DELTA MARKER 2
78.323 MHz
Ref 10 dBm
*Att 20 dB
*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Delta 2 [T1]
-3.96 dB
78.323000000 MHz
Marker 1 [T1]
-1.96 dBm
2.401847000 GHz
Start 2.4 GHz
8.35 MHz/
Stop 2.4835 GHz

EDR-3M


MARKER 1
2.401658 GHz
Ref 10 dBm
Att 20 dB
RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-2.44 dBm
2.401658000 GHz
Delta 2 [T1]
-2.88 dB
78.500000000 MHz
Start 2.4 GHz
8.35 MHz/
Stop 2.4835 GHz

8. Test of Dwell Time of Each Frequency

8.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4seconds multiplied by the number of hopping channels employed.

8.2 EUT Setup

Spectrum Analyzer

8.3 Test Equipment List and Details

See section 2.5.

8.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 1000kHz and VBW to 1000kHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is more than once pulse time.

4. Set the center frequency on any frequency would be measure and set the frequency span to zero span.

5. Measure the maximum time duration of one single pulse.

8.5 Test Result

Temperature (℃) : 22~23	EUT: Bluetooth Sunglasses
Humidity (%RH): 50~54	M/N: K1
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

DH1

Dwell time= t*(1.6/2/79)*31.6

DH3

Dwell time= t*(1.6/4/79)*31.6

DH5

Dwell time= t*(1.6/6/79)*31.6

BDR 1M
Low Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
GFSK	DH1	0.400	128.00	400
GFSK	DH3	1.632	261.12	400
GFSK	DH5	2.872	306.35	400

Middle Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
GFSK	DH1	0.400	128.00	400
GFSK	DH3	1.632	261.12	400
GFSK	DH5	2.872	306.35	400

High Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
GFSK	DH1	0.400	128.00	400
GFSK	DH3	1.632	261.12	400
GFSK	DH5	2.872	306.35	400

EDR 2M
Low Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
Pi/4 DQPSK	2DH1	0.400	128.00	400
Pi/4 DQPSK	2DH3	1.648	263.68	400
Pi/4 DQPSK	2DH5	2.872	306.35	400

Middle Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
Pi/4 DQPSK	2DH1	0.408	130.56	400
Pi/4 DQPSK	2DH3	1.632	261.12	400
Pi/4 DQPSK	2DH5	2.872	306.35	400

High Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
Pi/4 DQPSK	2DH1	0.408	130.56	400
Pi/4 DQPSK	2DH3	1.648	263.68	400
Pi/4 DQPSK	2DH5	2.872	306.35	400

EDR 3M

Low Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
8-DPSK	3DH1	0.408	130.56	400
8-DPSK	3DH3	1.648	263.68	400
8-DPSK	3DH5	2.896	308.91	400

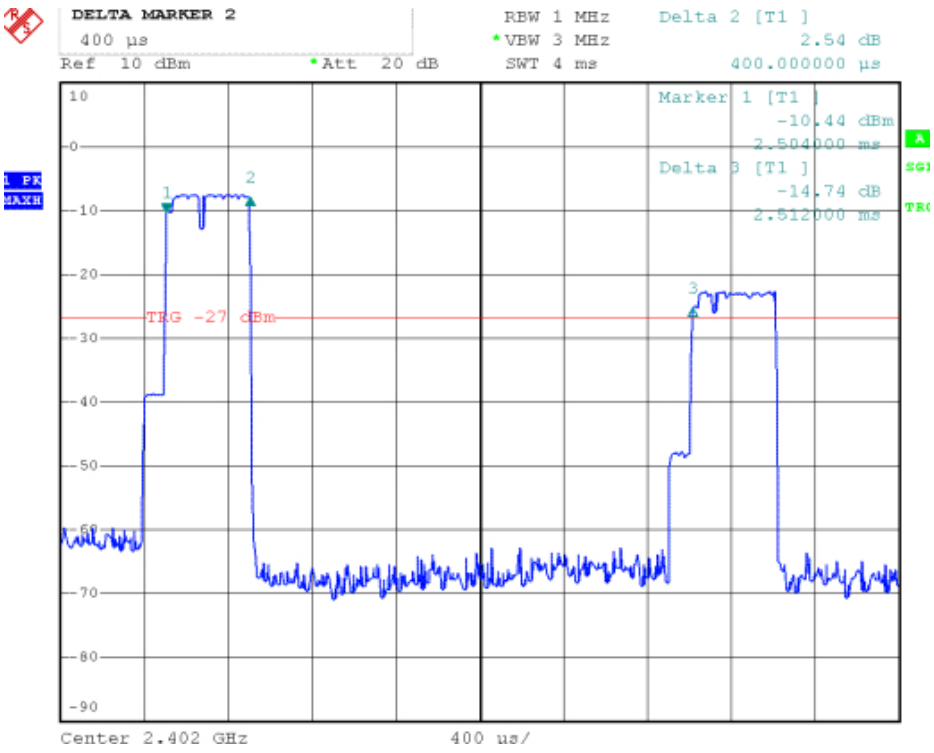
Middle Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
8-DPSK	3DH1	0.408	130.56	400
8-DPSK	3DH3	1.600	256.00	400
8-DPSK	3DH5	2.896	308.91	400

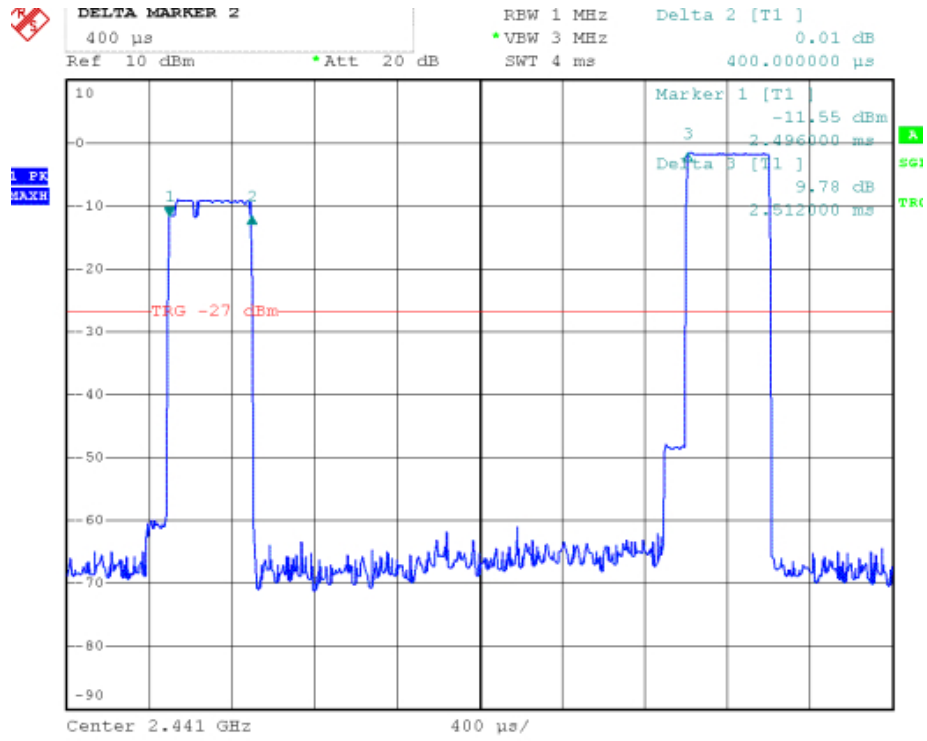
High Channel

Modulation Type		Reading （ms）	Dwell Time (ms)	Limit (ms)
8-DPSK	3DH1	0.408	130.56	400
8-DPSK	3DH3	1.600	256.00	400
8-DPSK	3DH5	2.872	306.35	400

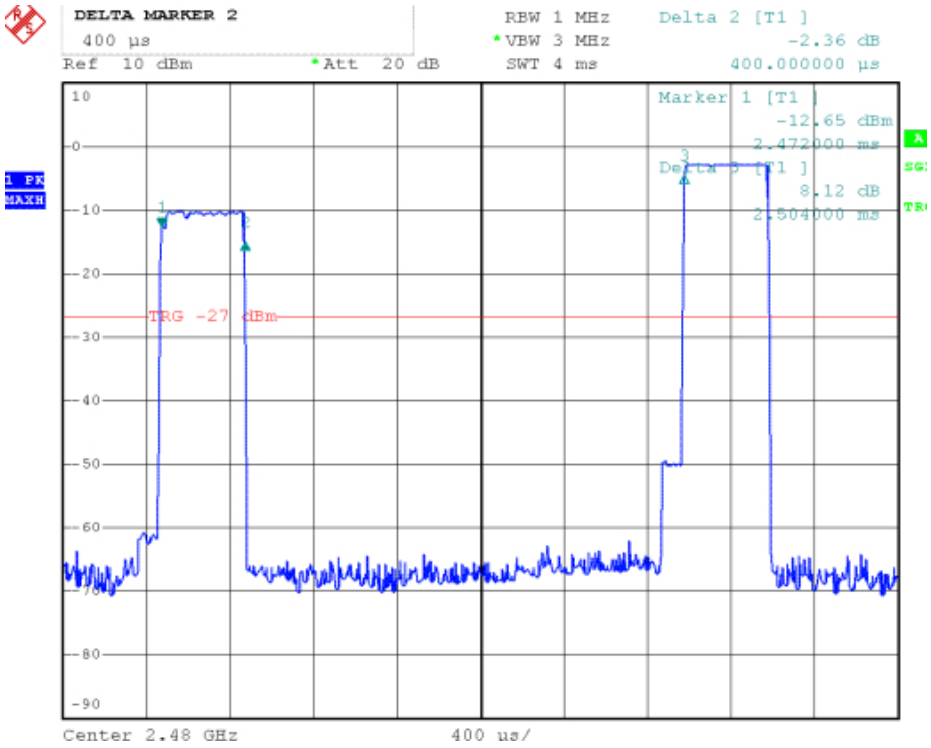
BDR-DH1
Channel Low



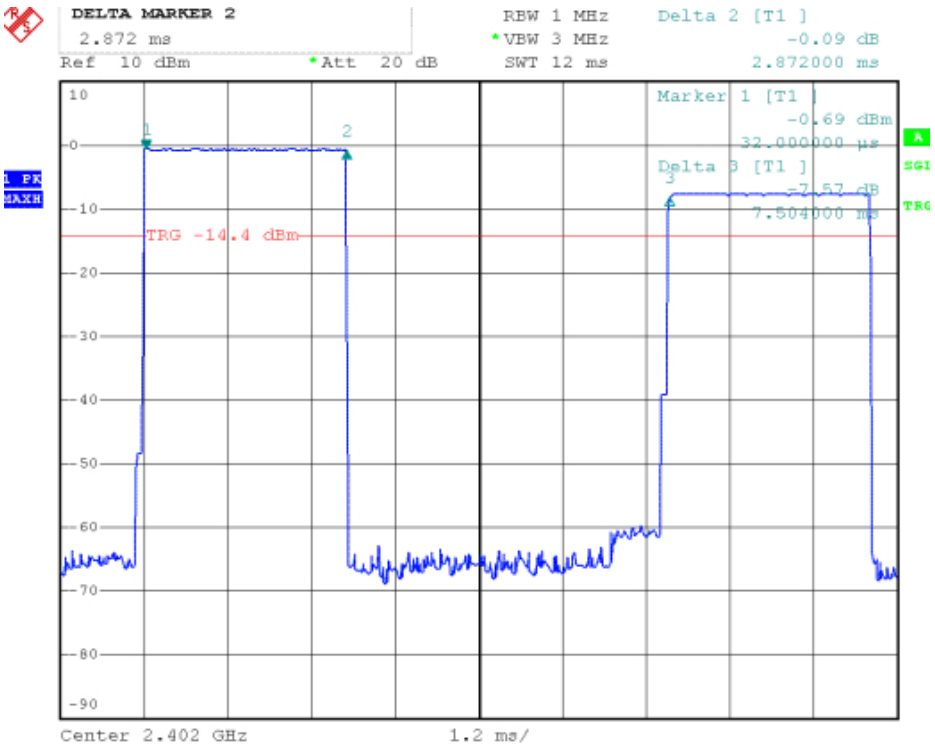
Channel Middle



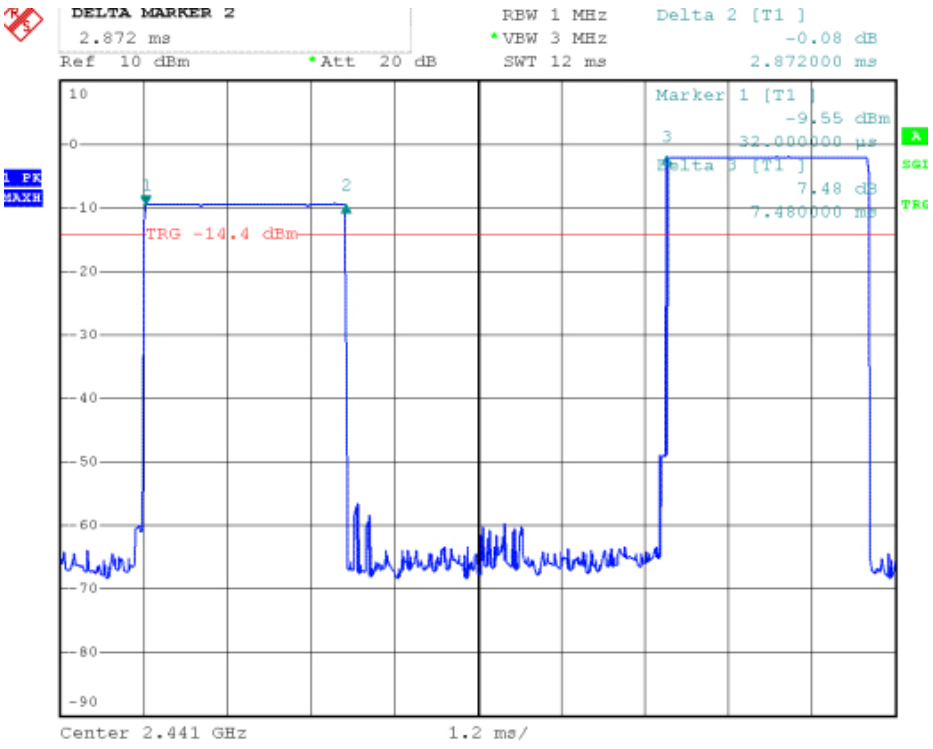
Channel High



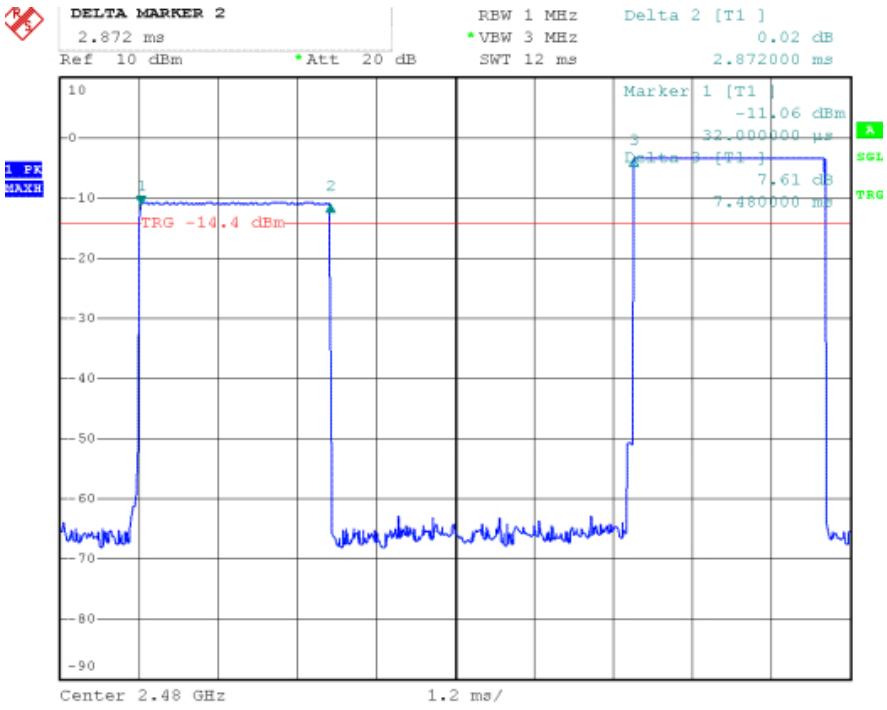
DH3
Channel Low



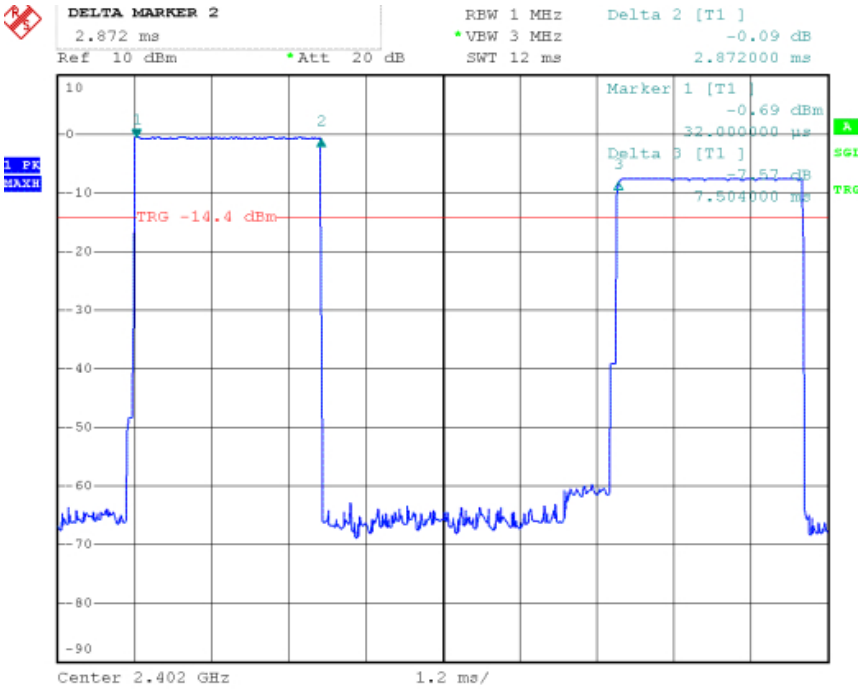
Channel Middle



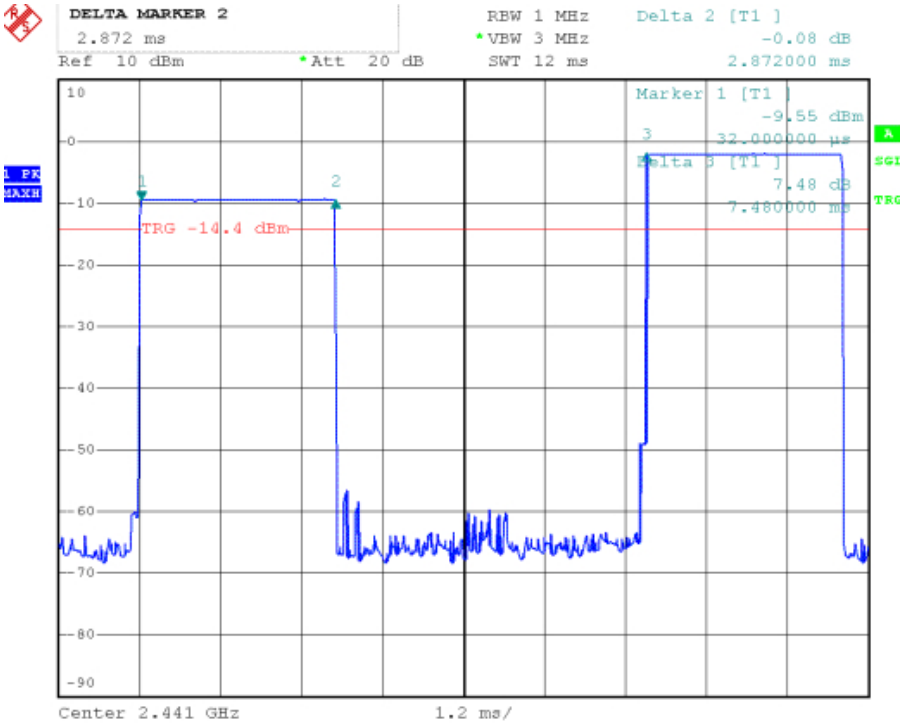
Channel High



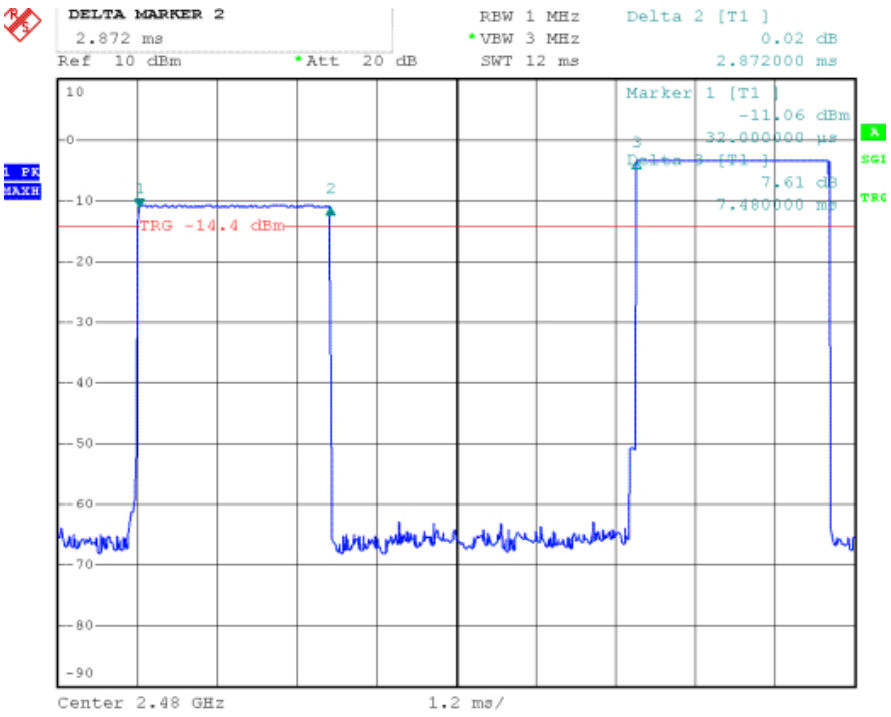
DH5
Channel Low



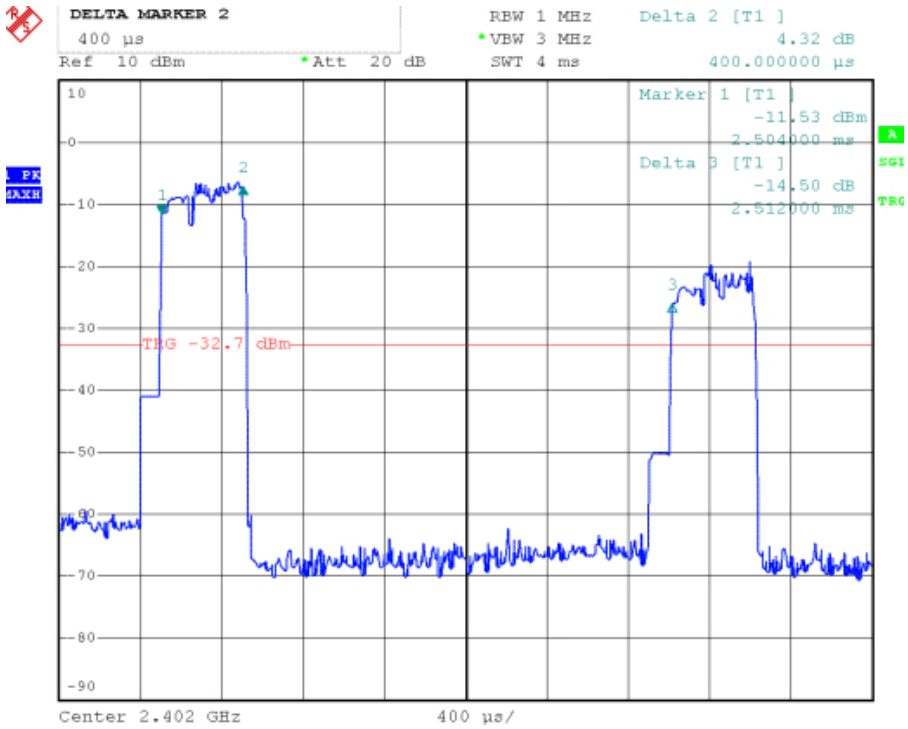
Channel Middle



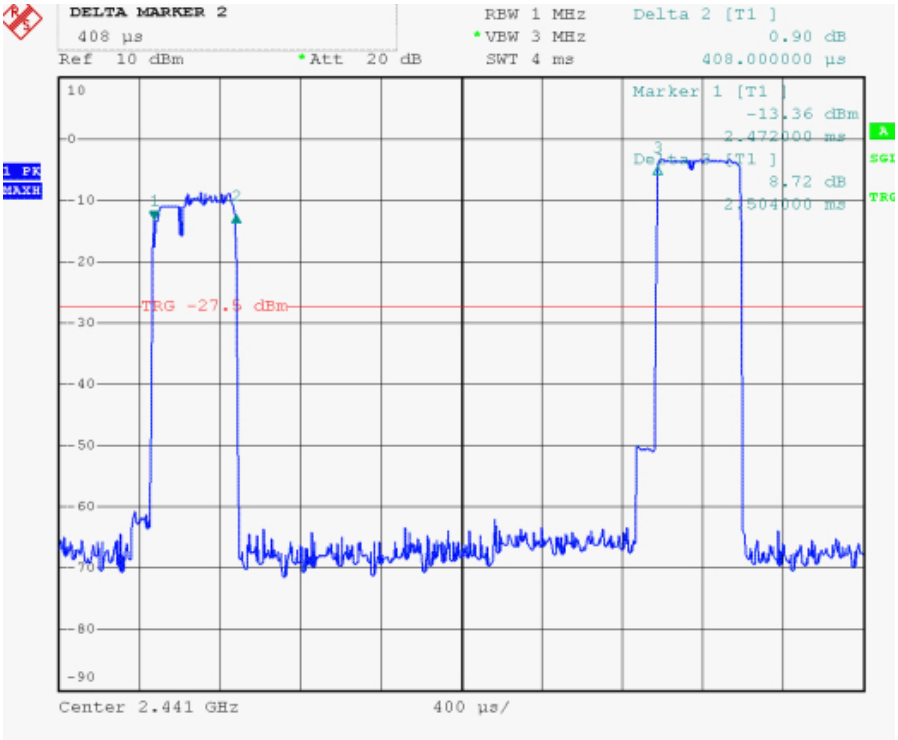
Channel High



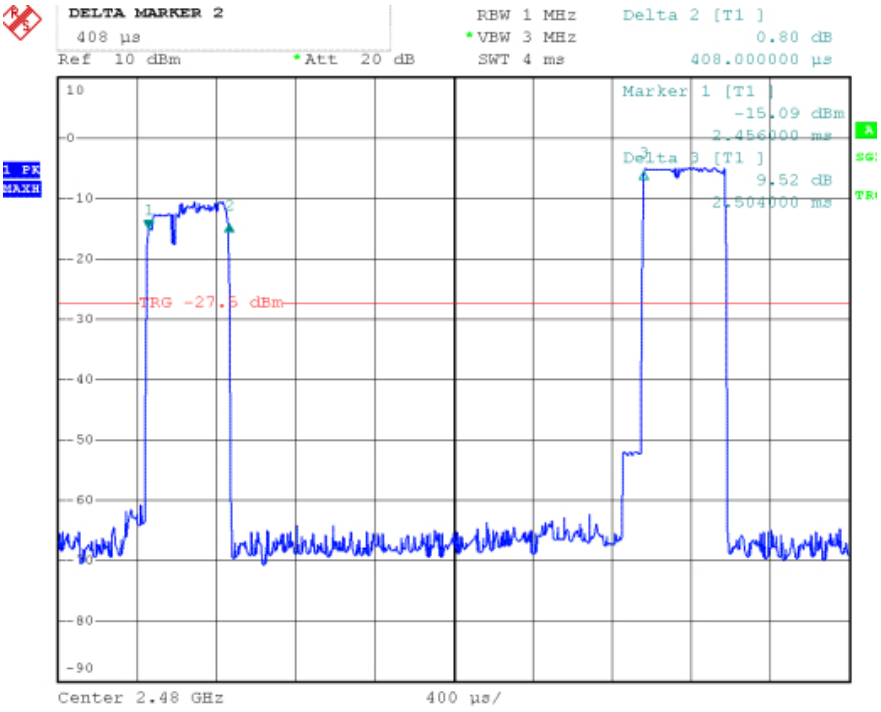
EDR 2M 2DH1
Channel Low



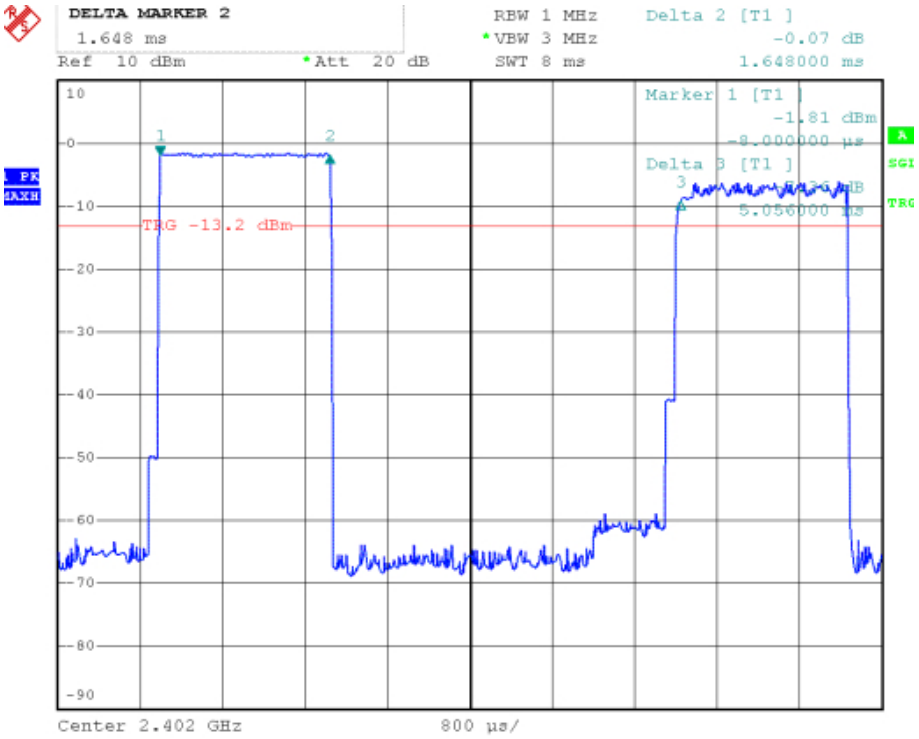
Channel Middle



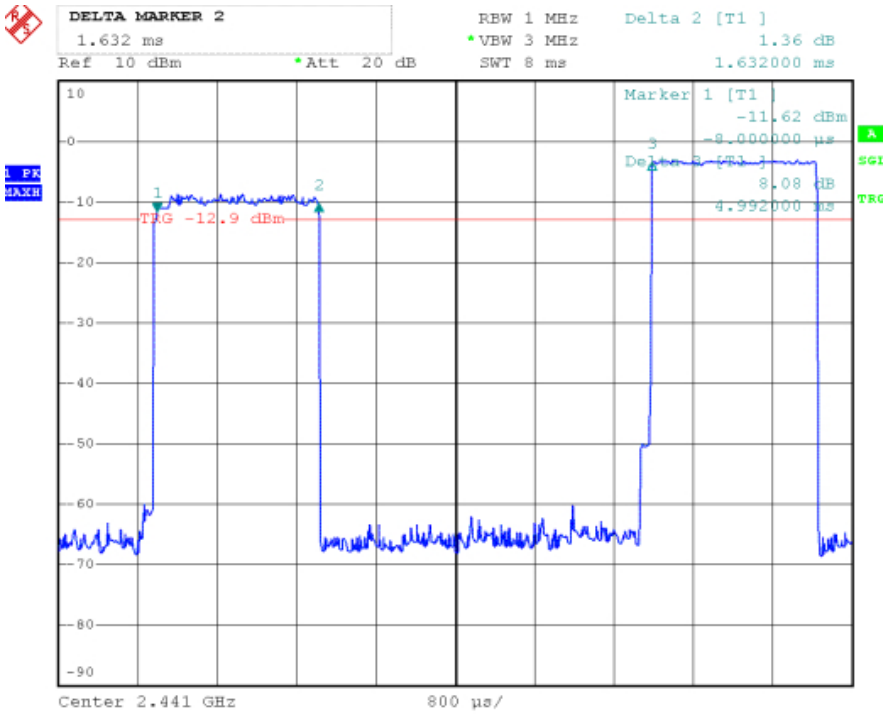
Channel High



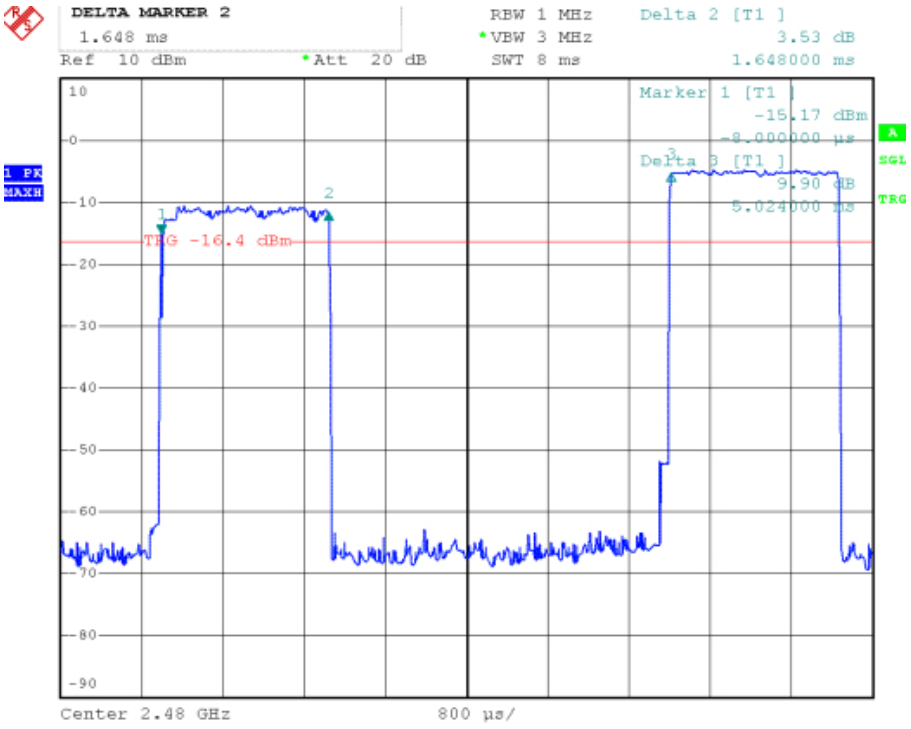
EDR 2M 2DH3
Channel Low



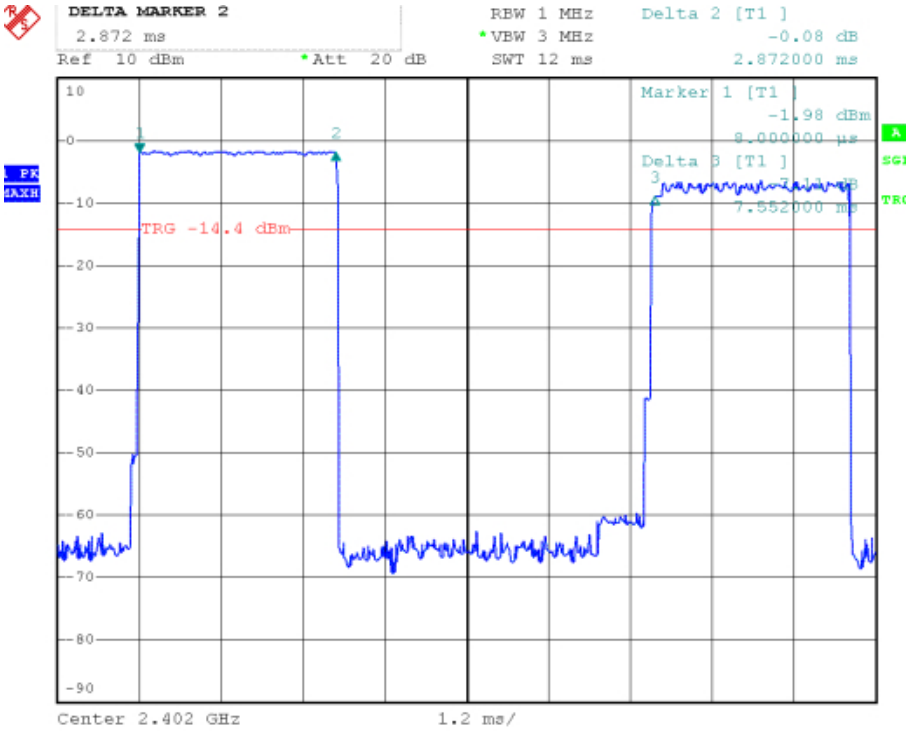
Channel Middle



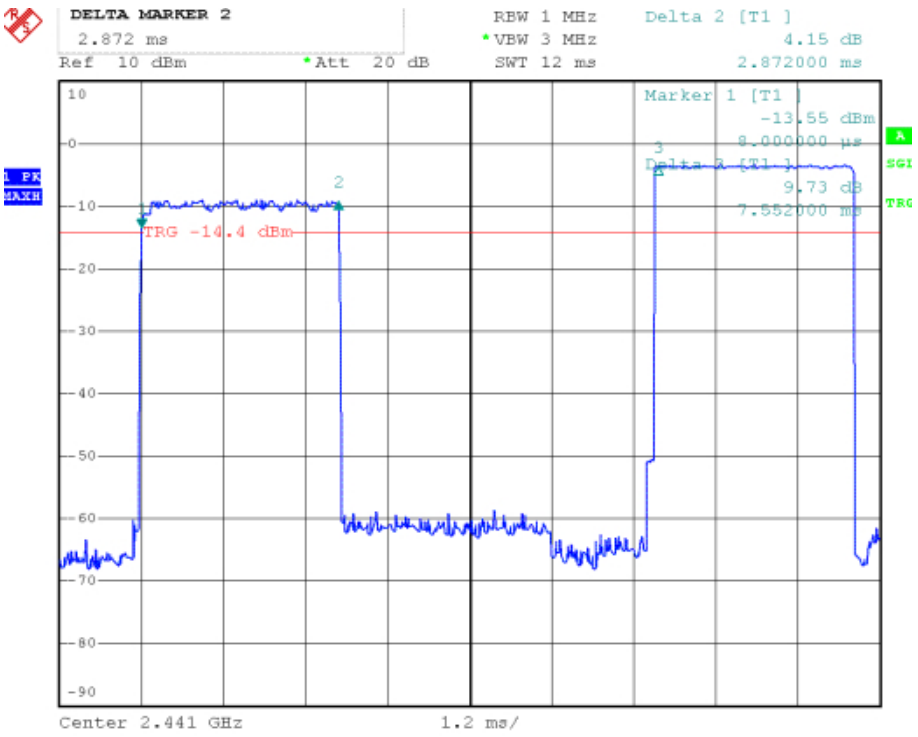
Channel High



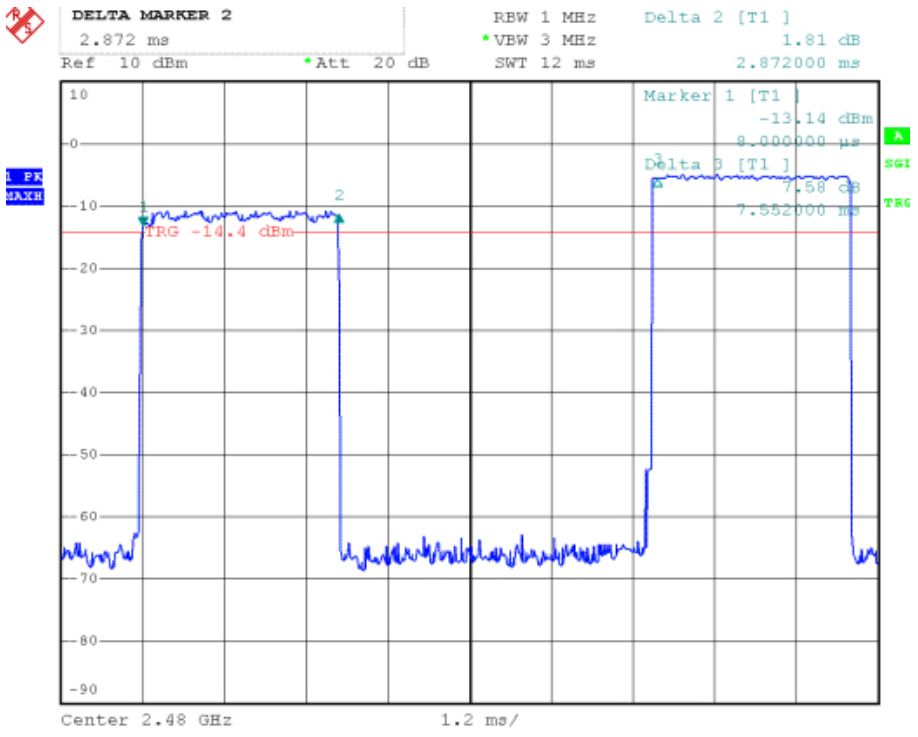
EDR 2M 2DH5
Channel Low



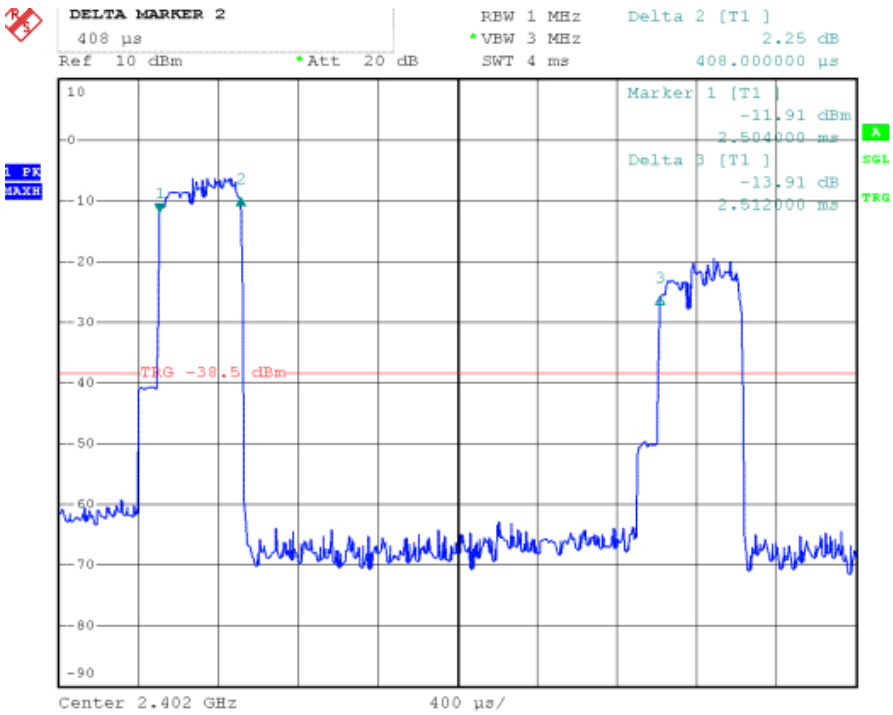
Channel Middle



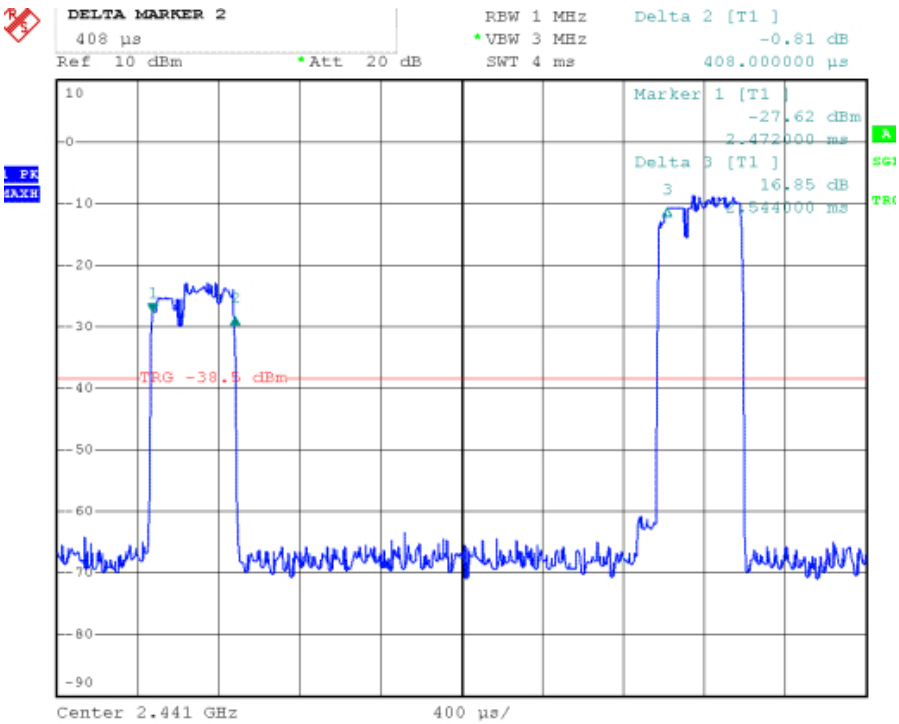
Channel High



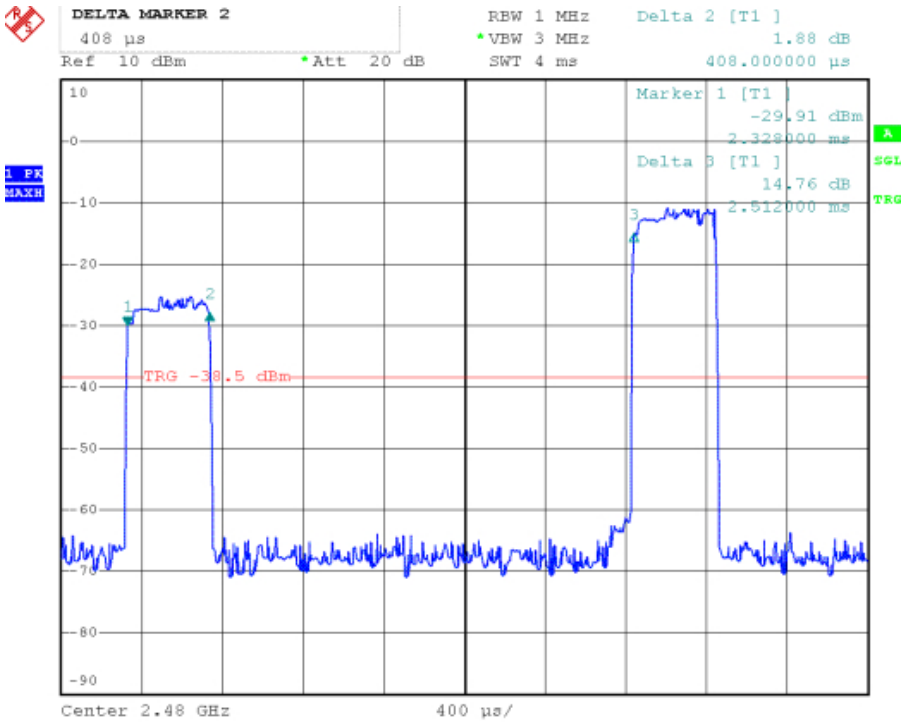
EDR 3M 3DH1
Channel Low



Channel Middle



Channel High



EDR 3M 3DH3
Channel Low