APPLICATION CERTIFICATION
On Behalf of
New Tech Development Ltd

Speaker
Model No.: FY-28

FCC ID: 2AB4AFY-28

Prepared for	:	New Tech Development Ltd
Address	:	Building 2, Yuanzheng Industry Park, Wuhe Avenue, Bantian Town, Longgang District, Shenzhen China
Prepared by	:	ACCURATE TECHNOLOGY CO., LTD
Address	:	F1, Bldg. A, Chan Yuan New Material Port, Keyuan Rd. Science & Industry Park, Nan Shan, Shenzhen, Guangdong P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number	:	ATE20140248
Date of Test	:	Mar 07, 2014-Mar 25, 2014
Date of Report	:	Mar 25, 2014

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Description Page

Test Report Certification

Applicant : New Tech Development Ltd

Manufacturer : New Tech Development Ltd

EUT Description : Speaker

(A) MODEL NO.: FY-28

(B) Trade Name.: /

(C) POWER SUPPLY: DC 7.4V(battery) & DC 5V(Powered by USB Port)

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 : Mar 07, 2014-Mar 25, 2014

Prepared by : Tim Zhang

(Tim.zhang, Engineer)

Approved & Authorized Signer :

(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Speaker
Model Number	:	FY-28
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Modulation type	:	GFSK, Π/4-DQPSK, 8DPSK
Antenna Gain	:	0dBi
Bluetooth version	:	Bluetooth V3.0
Antenna type	:	PCB Antenna
Power Supply	:	DC7.4V(battery) & DC 5V(Powered by USB Port)
Applicant	:	New Tech Development Ltd
Address	:	Building 2, Yuanzheng Industry Park, Wuhe Avenue, Bantian Town, Longgang District, Shenzhen China
Manufacturer	:	New Tech Development Ltd
Address	:	Building 2, Yuanzheng Industry Park, Wuhe Avenue, Bantian Town, Longgang District, Shenzhen China
Date of sample received	:	Mar 07, 2014
Date of Test	:	Mar 07, 2014-Mar 25, 2014

1.2.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

1.3.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. 11, 2014	Jan. 10, 2015
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2014	Jan. 10, 2015
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2014	Jan. 10, 2015
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 11, 2014	Jan. 10, 2015
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2014	Jan. 14, 2015
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan. 15, 2014	Jan. 14, 2015
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2014	Jan. 10, 2015
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2014	Jan. 10, 2015
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 11, 2014	Jan. 10, 2015
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 11, 2014	Jan. 10, 2015

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

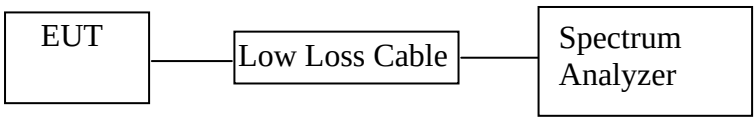
(EUT: Speaker)

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Power Line Conducted Emission	Compliant
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) Section 15.209	Radiated Emission Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



(EUT: Speaker)

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 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.

5.4.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, and 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 30 kHz and VBW to 100 kHz.

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

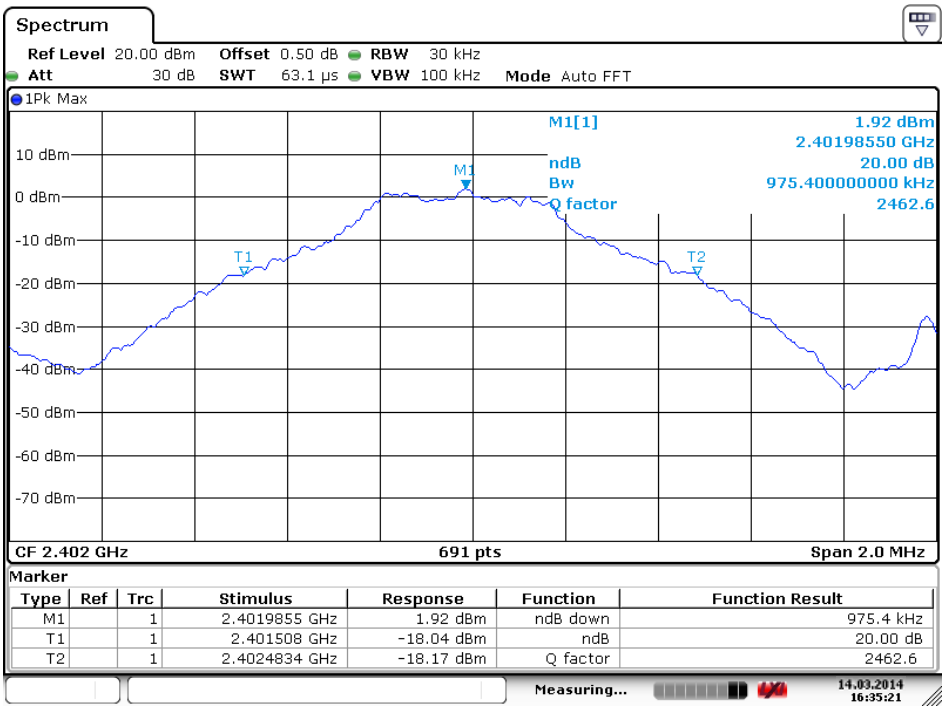
5.6.Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	Π/4-DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.975	1.285	1.256	Pass
Middle	2441	0.897	1.274	1.268	Pass
High	2480	0.929	1.274	1.256	Pass

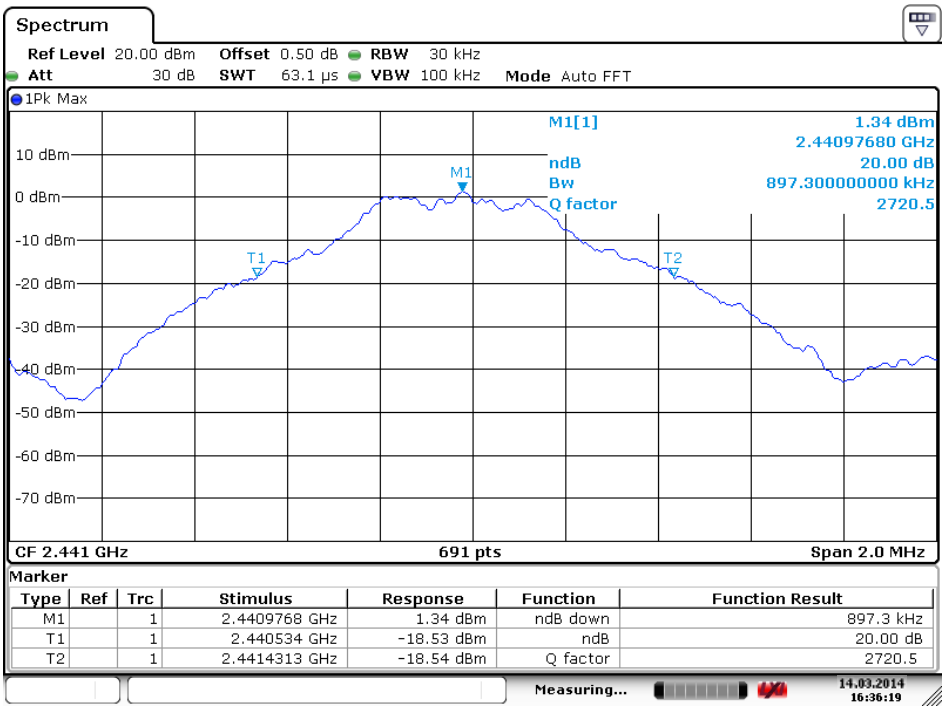
The spectrum analyzer plots are attached as below.

Mode 1: GFSK Link Mode

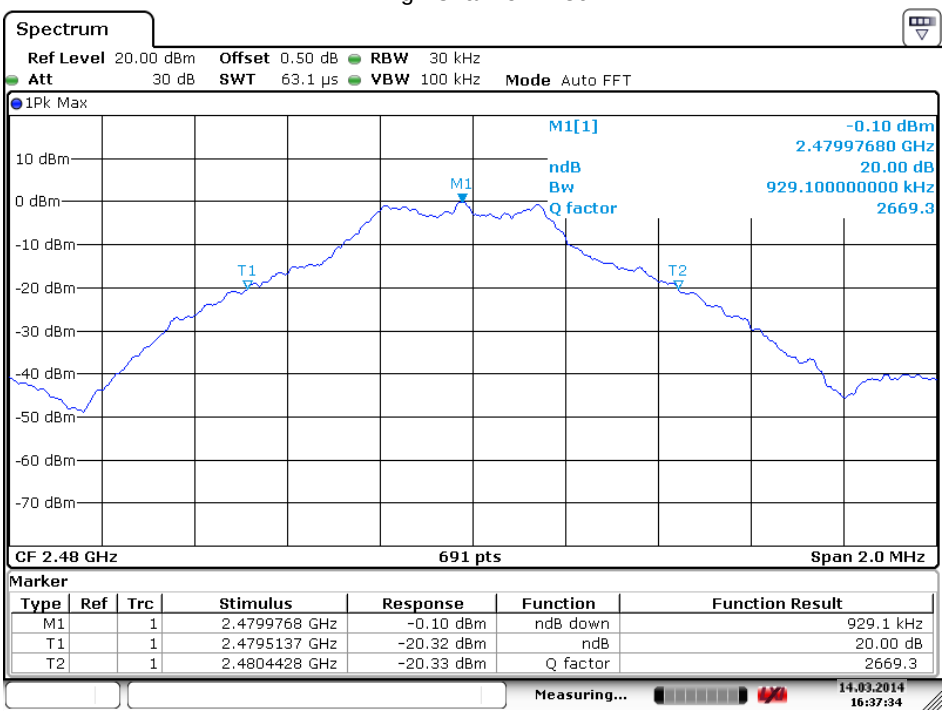
Low Channel: 2402MHz



Middle Channel: 2441MHz

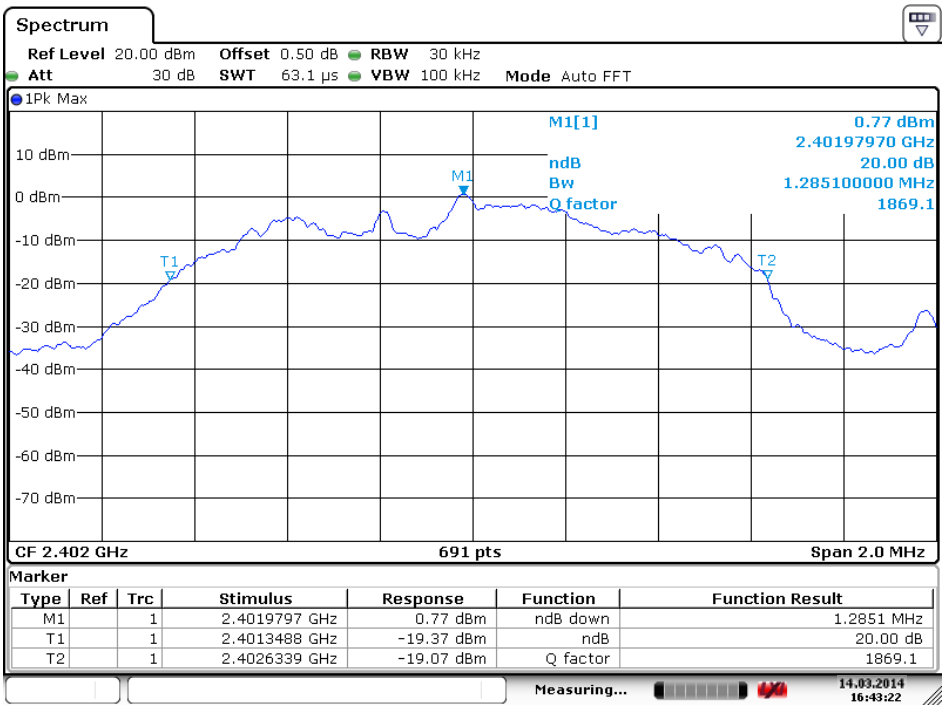


High Channel: 2480MHz

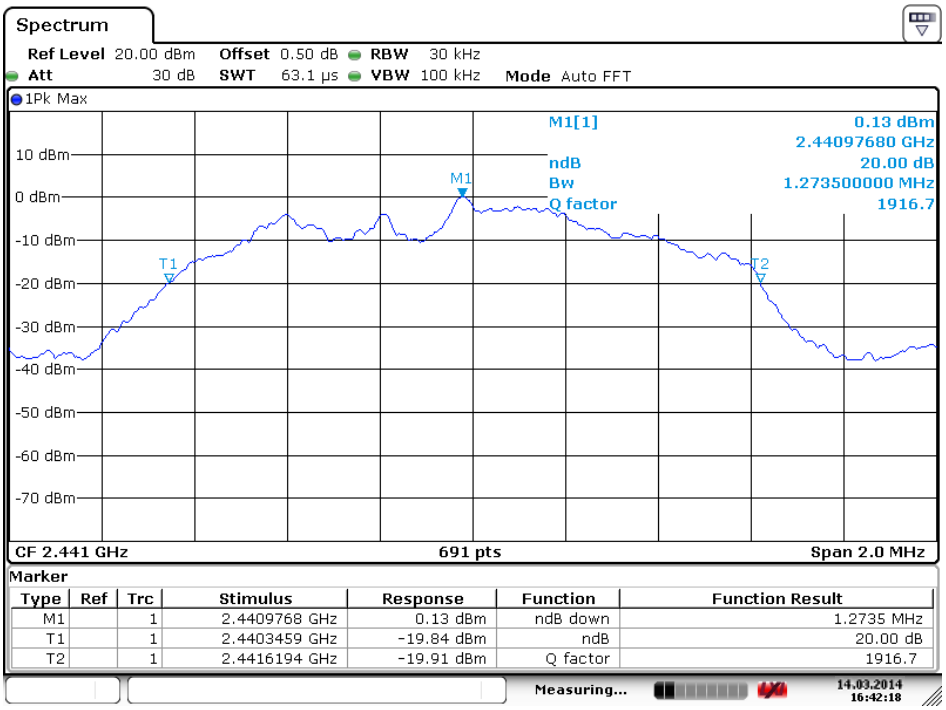


Mode 2: π/4 DQPSK Link Mode

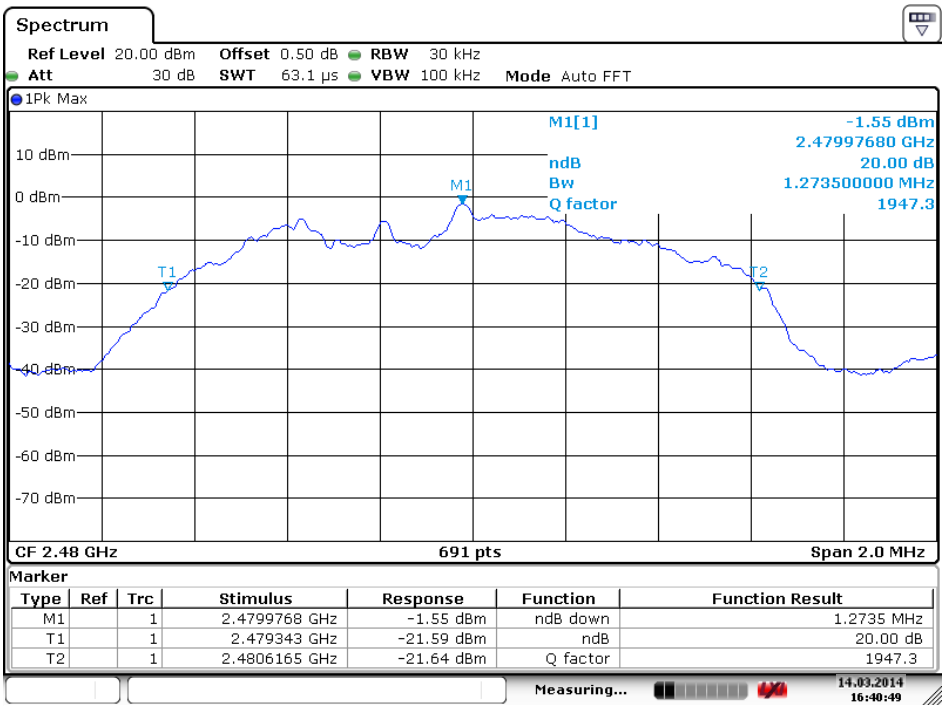
Low Channel: 2402MHz



Middle Channel: 2441MHz

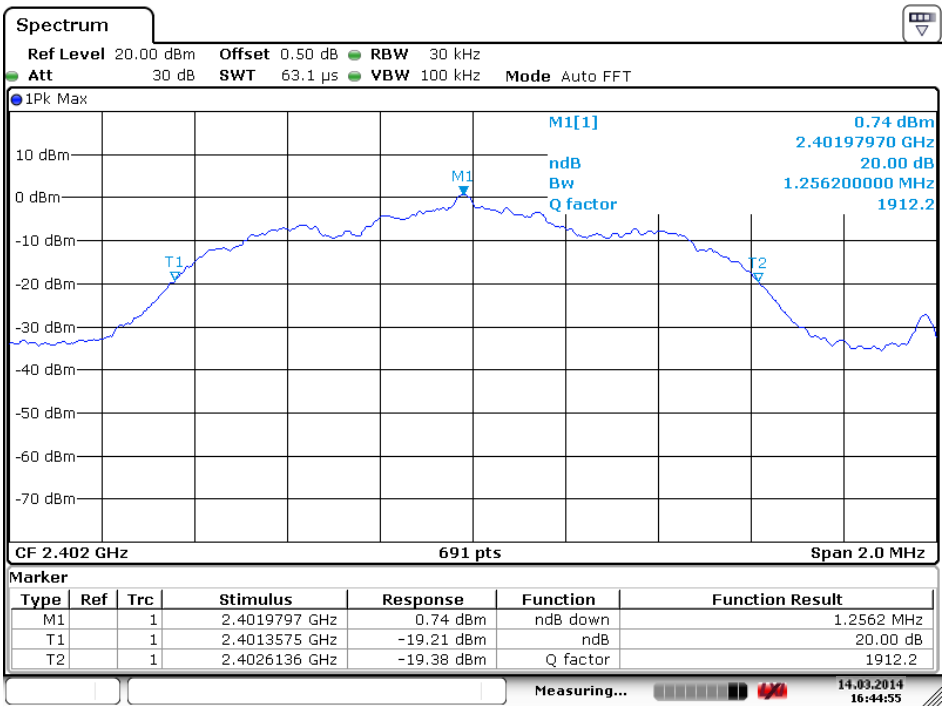


High Channel: 2480MHz

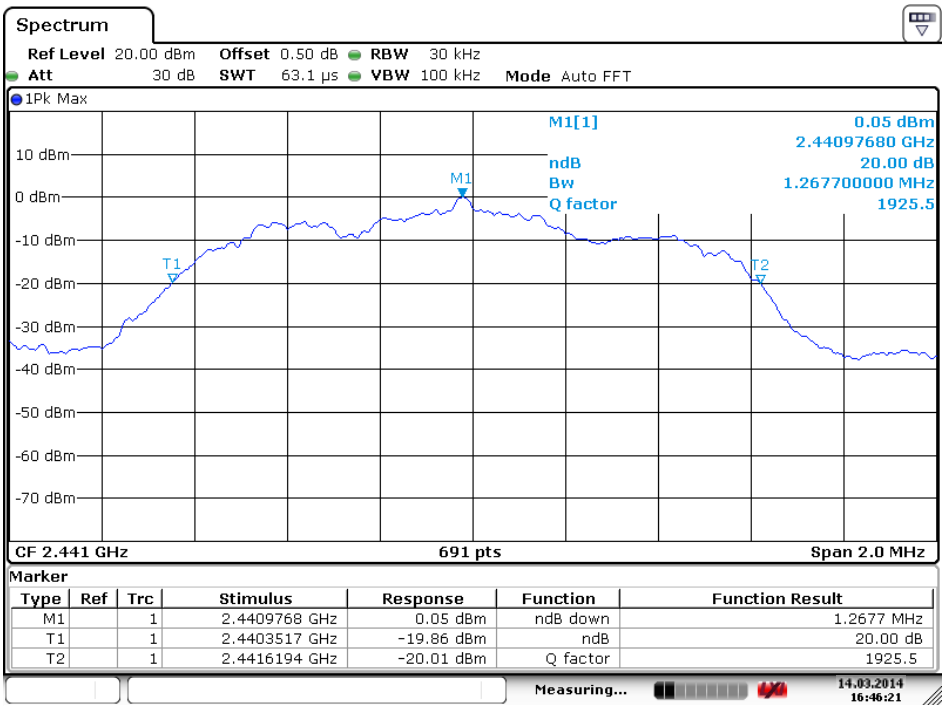


Mode 3: 8DPSK Link Mode

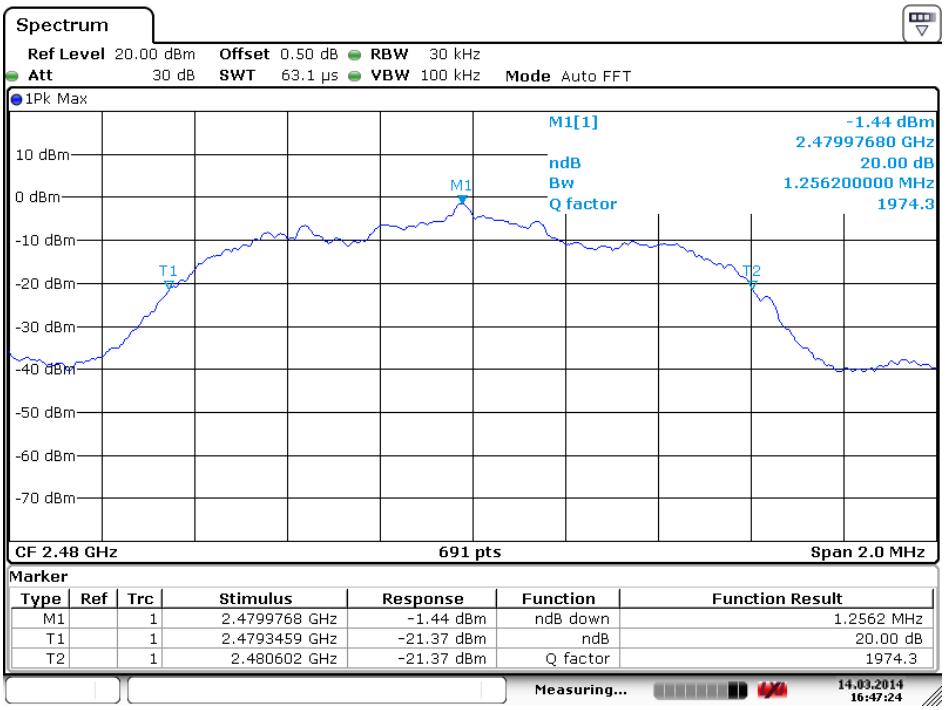
Low Channel: 2402MHz



Middle Channel: 2441MHz

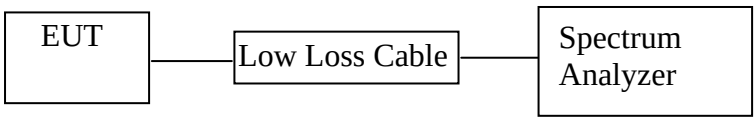


High Channel: 2480MHz



6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



(EUT: Speaker)

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 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.

6.4.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, and 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 100 kHz and VBW to 300 kHz. Adjust Span to 3 MHz.

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

6.5.4.Measurement the channel separation

6.6.Test Result

GFSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0058	25KHz or 20dB bandwidth	PASS
	2403			
Middle	2440	1.0029	25KHz or20dB bandwidth	PASS
	2441			
High	2479	1.0029	25KHz or 20dB bandwidth	PASS
	2480			

Π/4-DQPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0029	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.0029	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.0029	25KHz or 2/3*20dB bandwidth	PASS
	2480			

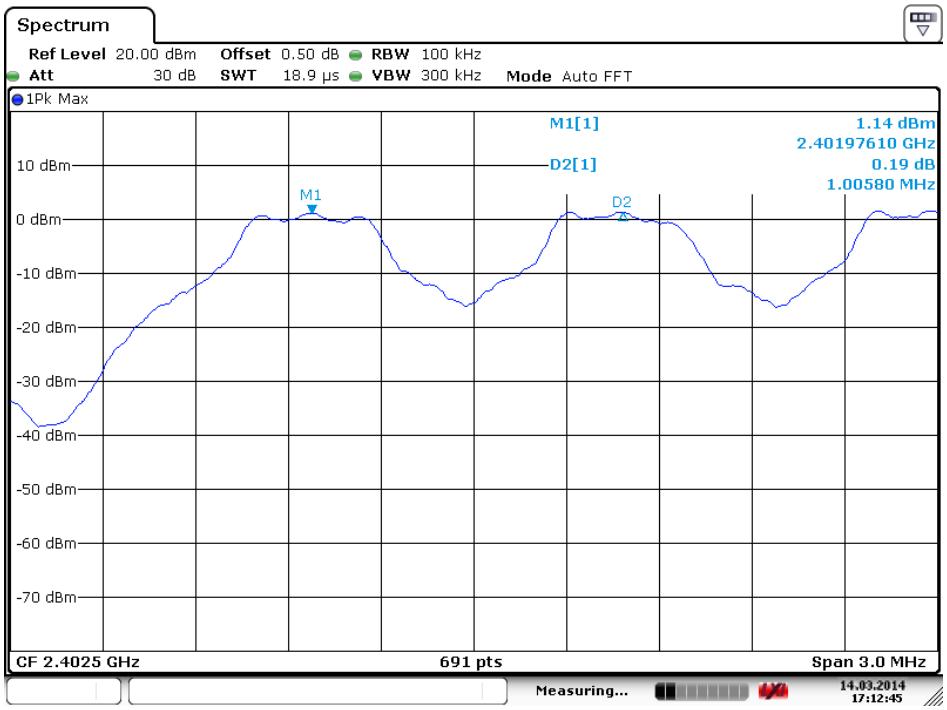
8DPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0029	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.0029	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.0029	25KHz or 2/3*20dB bandwidth	PASS
	2480			

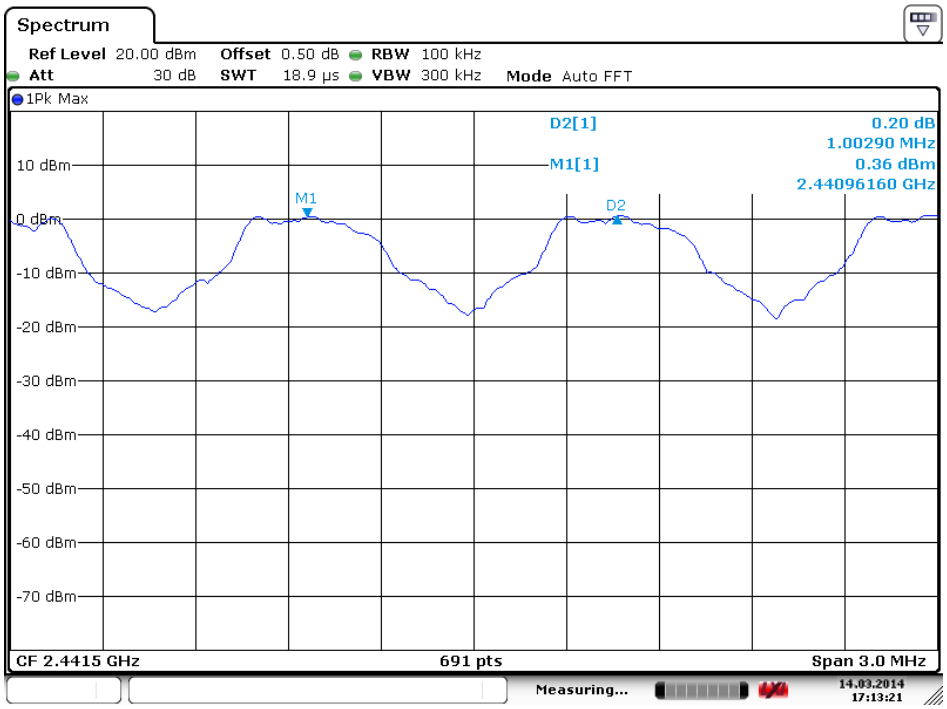
The spectrum analyzer plots are attached as below.

Mode 1: GFSK Link Mode

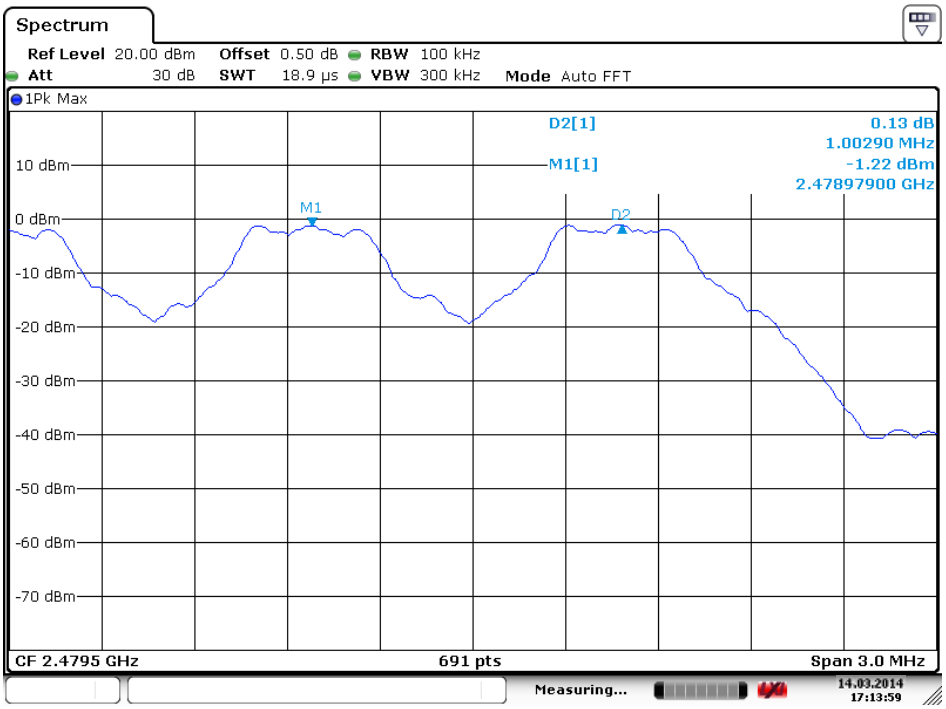
Low Channel: 2402MHz



Middle Channel: 2441MHz

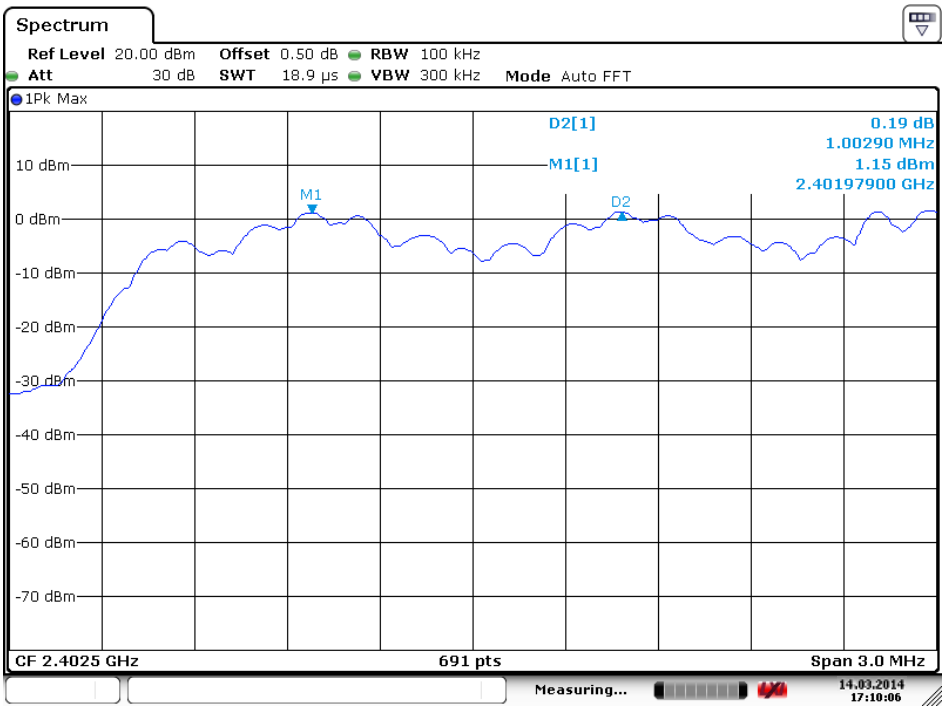


High Channel: 2480MHz

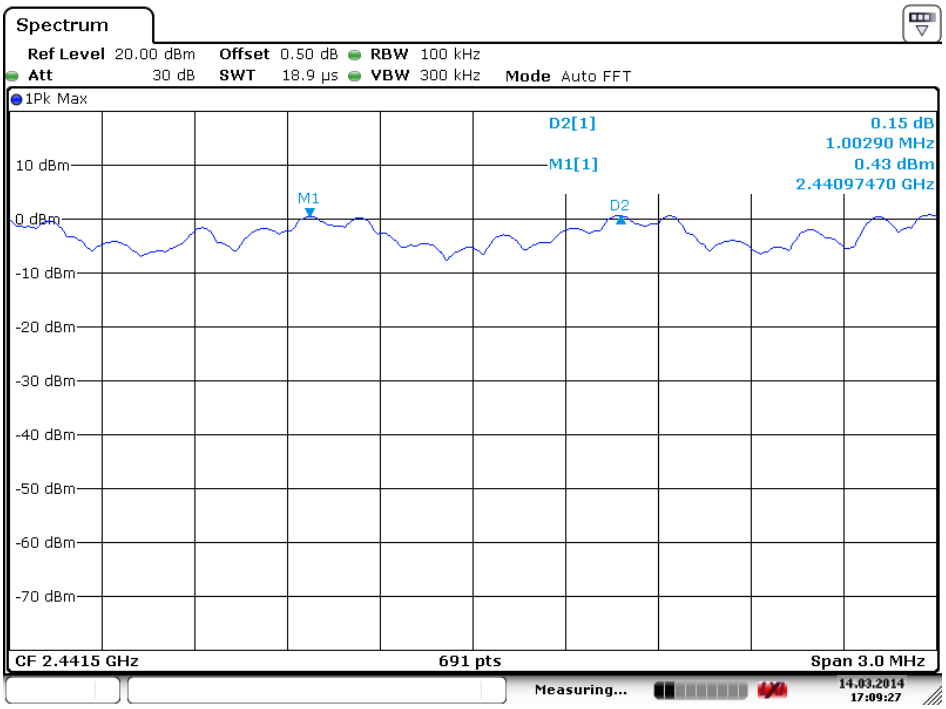


Mode 2: π/4 DQPSK Link Mode

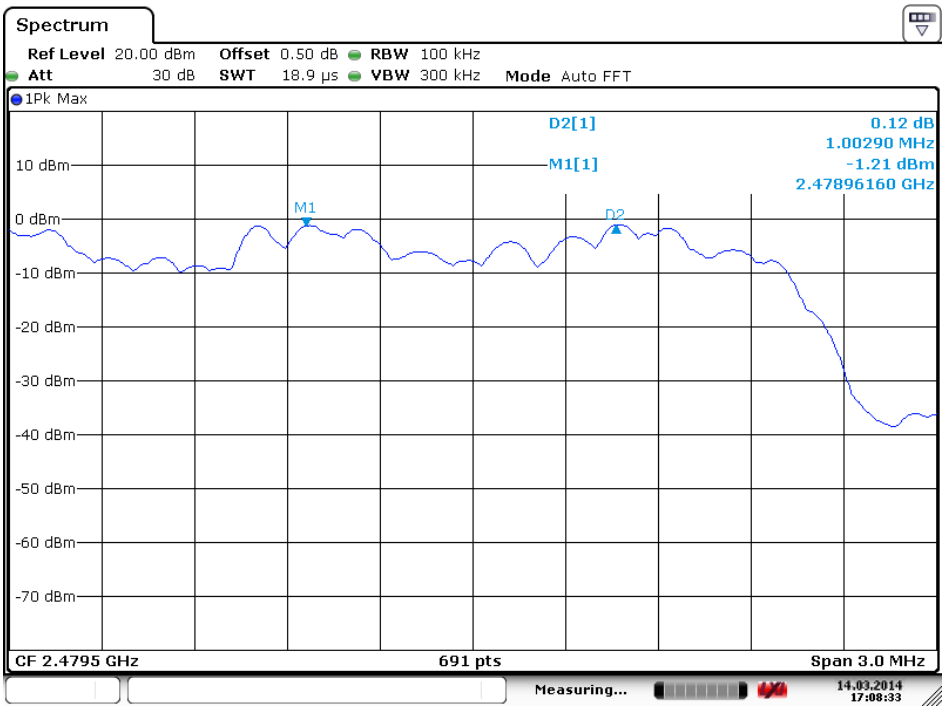
Low Channel: 2402MHz



Middle Channel: 2441MHz

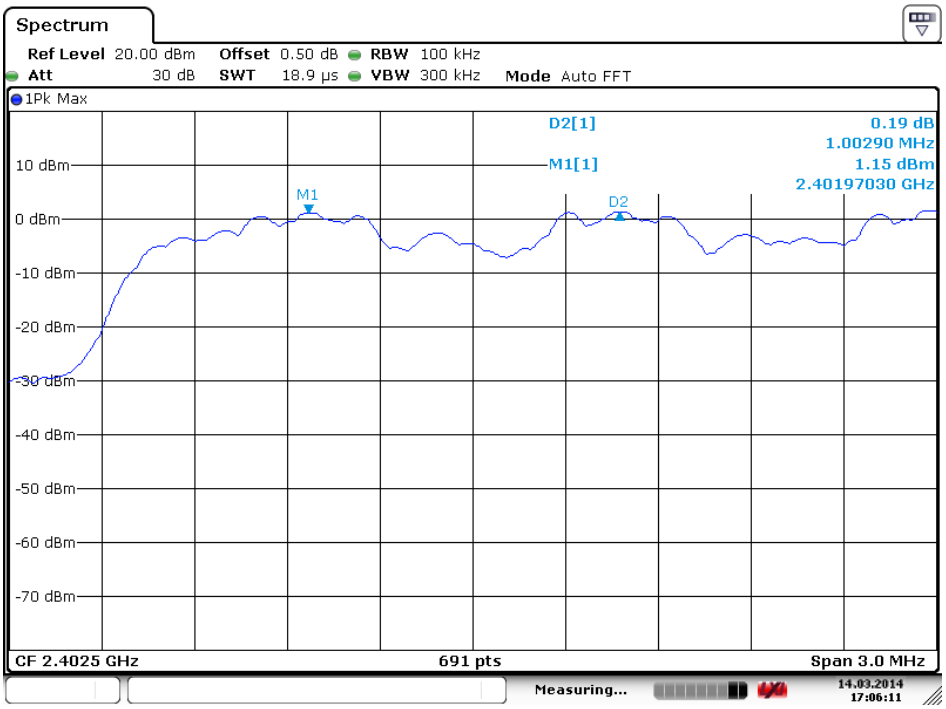


High Channel: 2480MHz

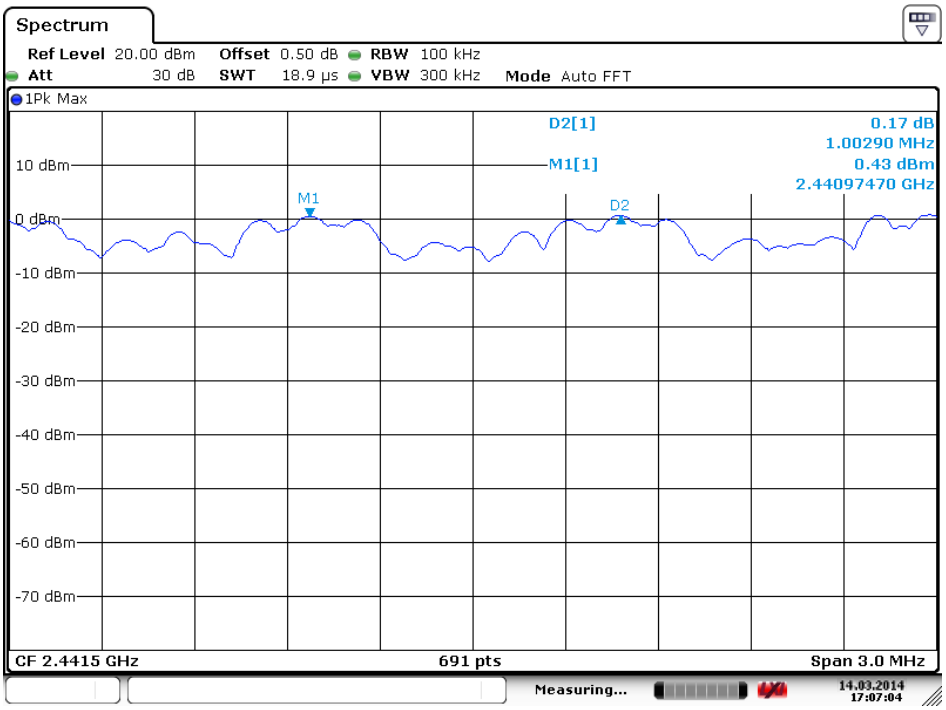


Mode 3: 8DPSK Link Mode

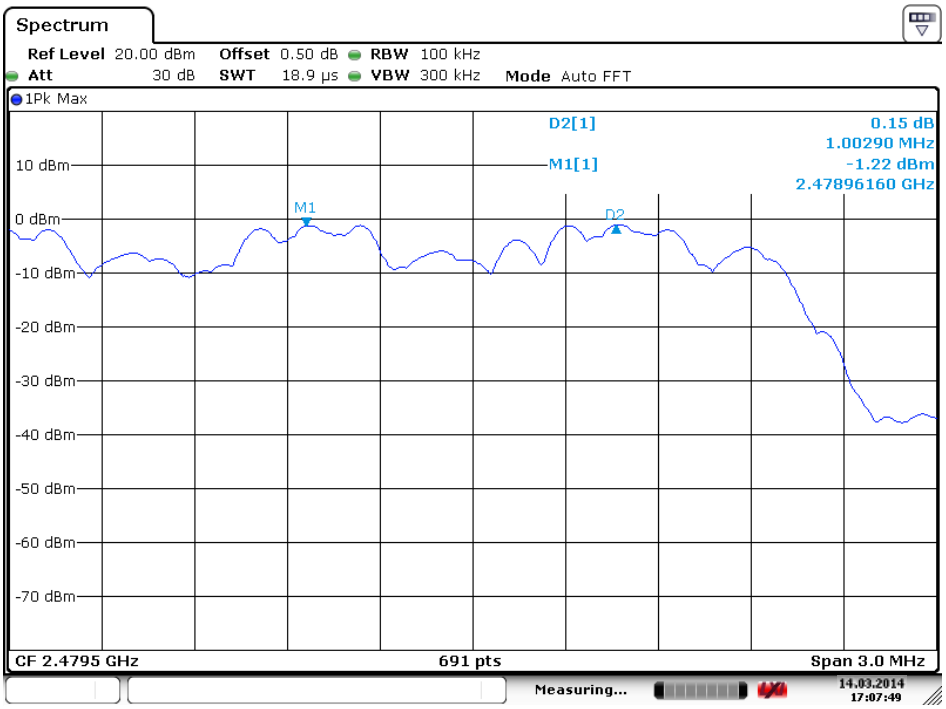
Low Channel: 2402MHz



Middle Channel: 2441MHz

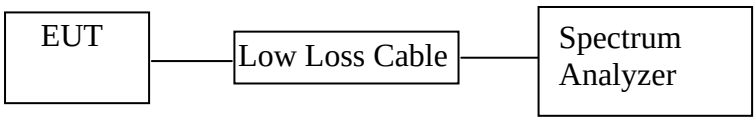


High Channel: 2480MHz



7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



(EUT: Speaker)

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 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.

7.4.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=100 kHz, VBW=300 kHz.

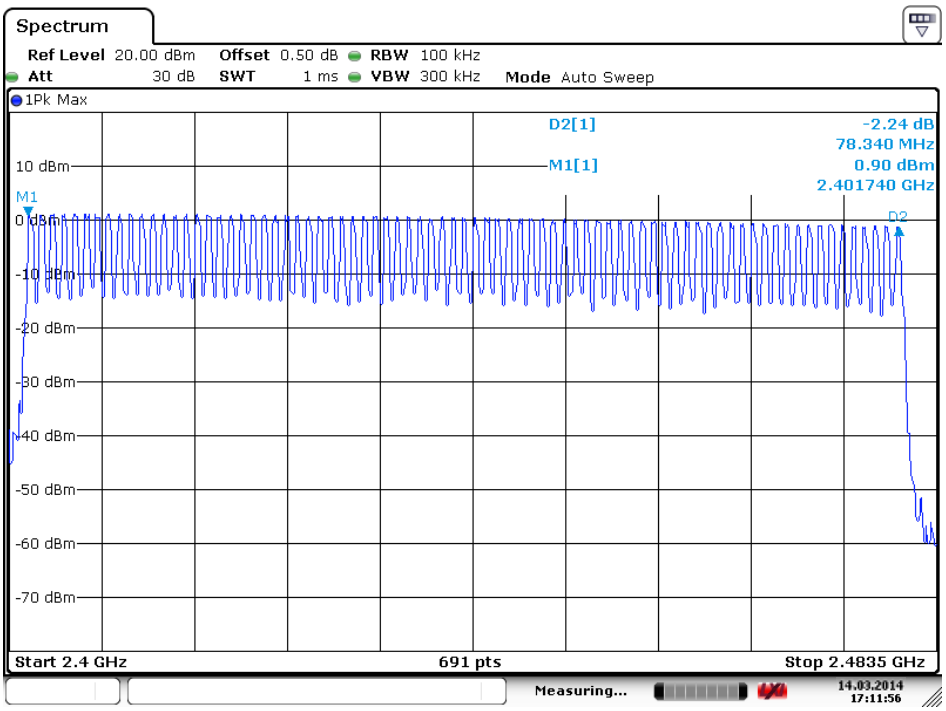
7.5.3.Max hold, view and count how many channel in the band.

7.6.Test Result

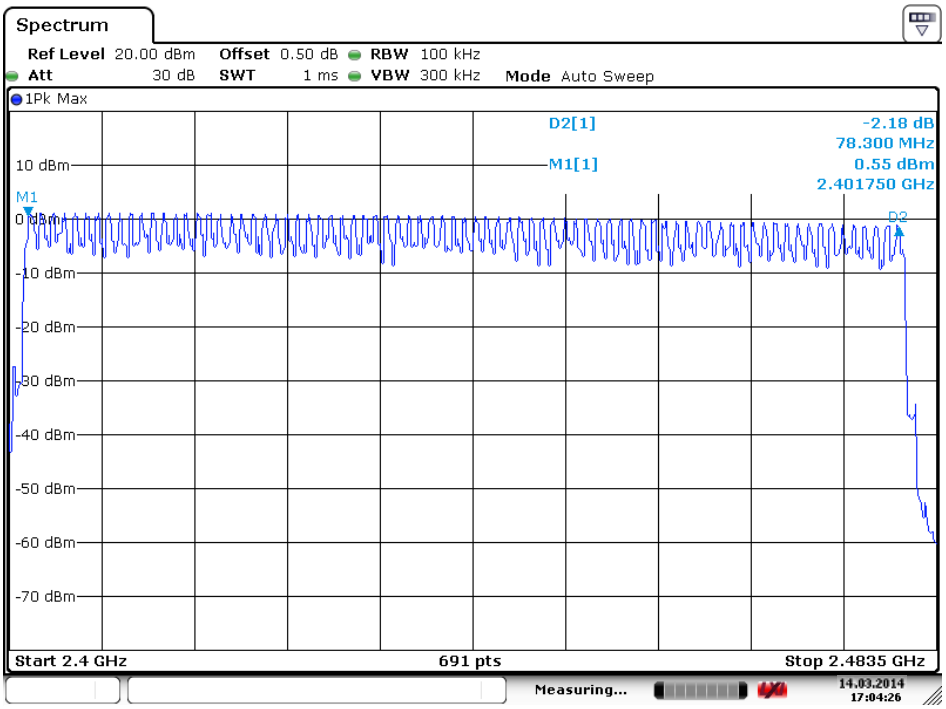
Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	⩾15

The spectrum analyzer plots are attached as below.

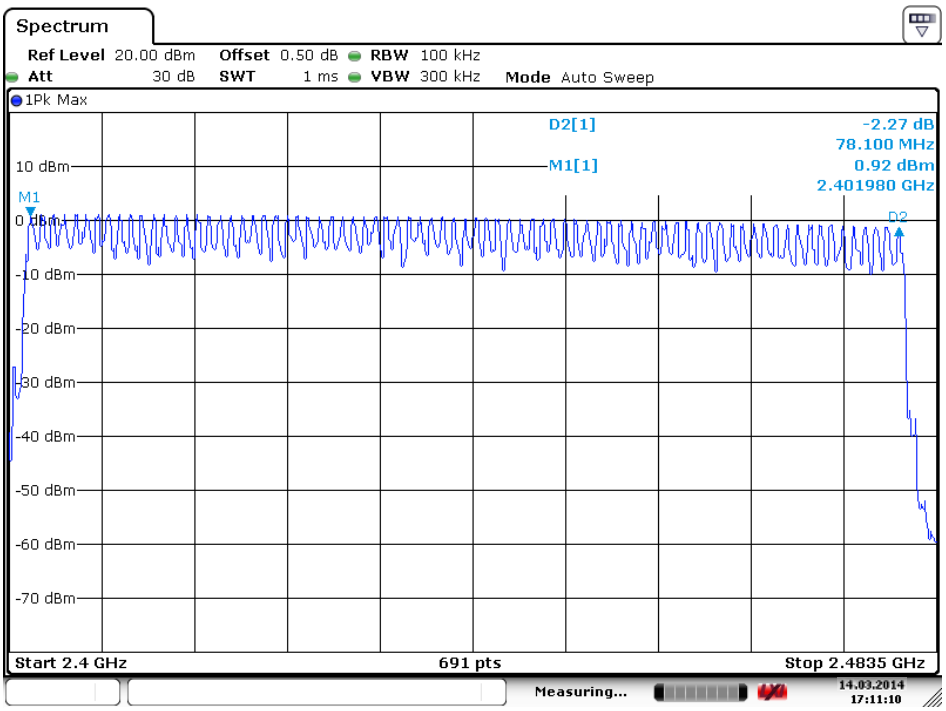
Number of hopping channels(GFSK)



Number of hopping channels(Π/4-DQPSK)

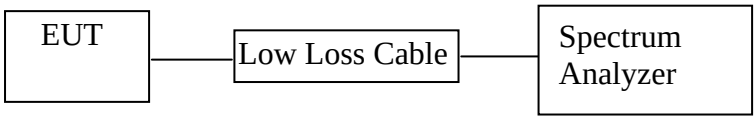


Number of hopping channels(8DPSK)



8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



(EUT: Speaker)

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 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.

8.4.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, and 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, Adjust Sweep=5ms, 10ms, 15ms. Get the pulse time.

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

8.6.Test Result

GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.5362	171.58	400
	2441	0.5290	169.28	400
	2480	0.5362	171.58	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.8261	292.18	400
	2441	1.8116	289.86	400
	2480	1.8116	289.86	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2402	3.0725	327.73	400
	2441	3.0725	327.73	400
	2480	3.0725	327.73	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

Π/4-DQPSK

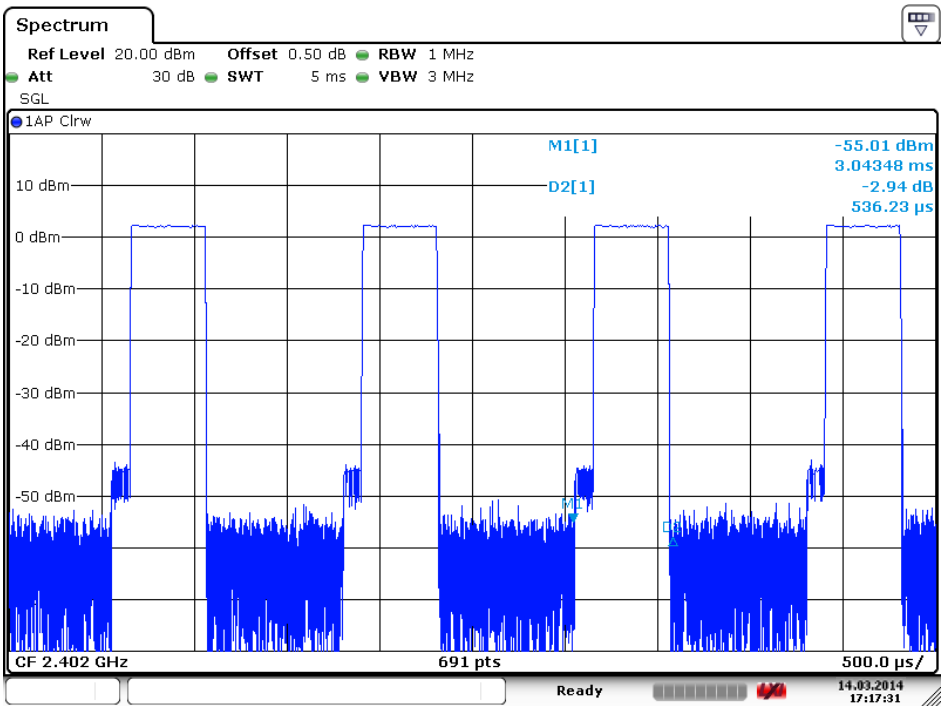
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.5507	176.22	400
	2441	0.5507	176.22	400
	2480	0.5435	173.92	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.8261	292.18	400
	2441	1.8261	292.18	400
	2480	1.8043	288.69	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2402	3.0435	324.64	400
	2441	3.0652	326.95	400
	2480	2.9783	317.69	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

8DPSK Mode

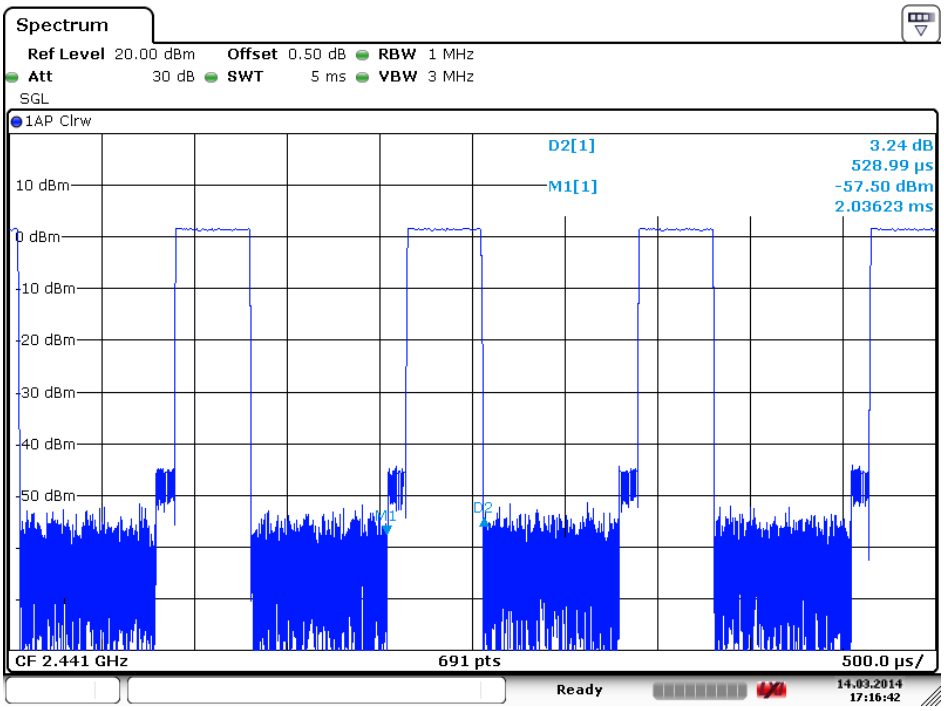
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.5435	173.92	400
	2441	0.5435	173.92	400
	2480	0.5435	173.92	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.8188	291.01	400
	2441	1.8188	291.01	400
	2480	1.8188	291.01	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2402	3.0797	328.50	400
	2441	3.0580	326.19	400
	2480	3.0797	328.50	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

The spectrum analyzer plots are attached as below.

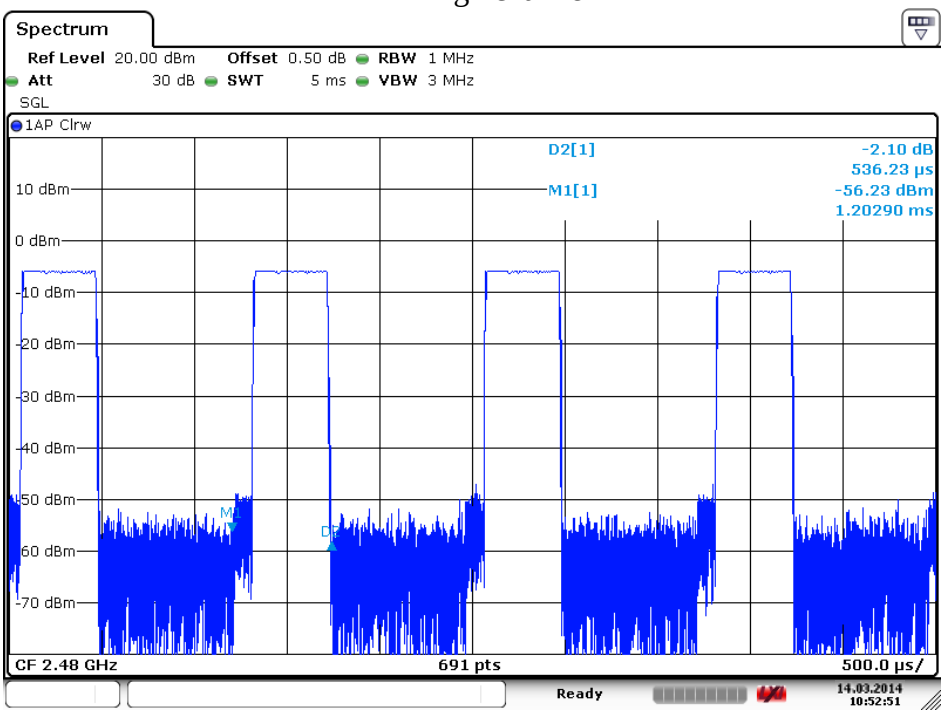
DH1 Low channel



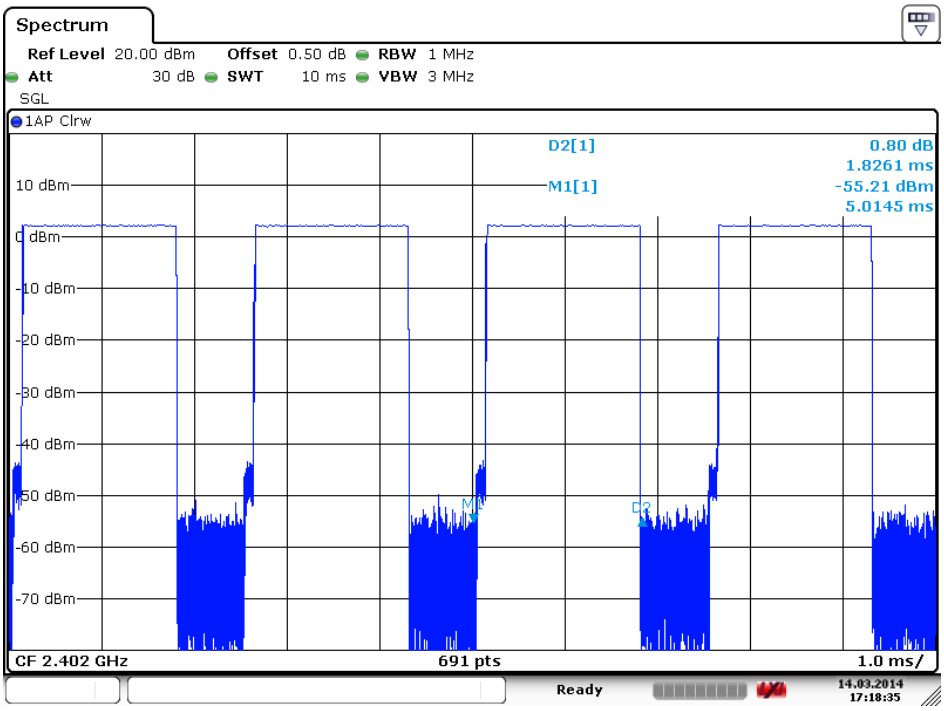
DH1 Middle channel



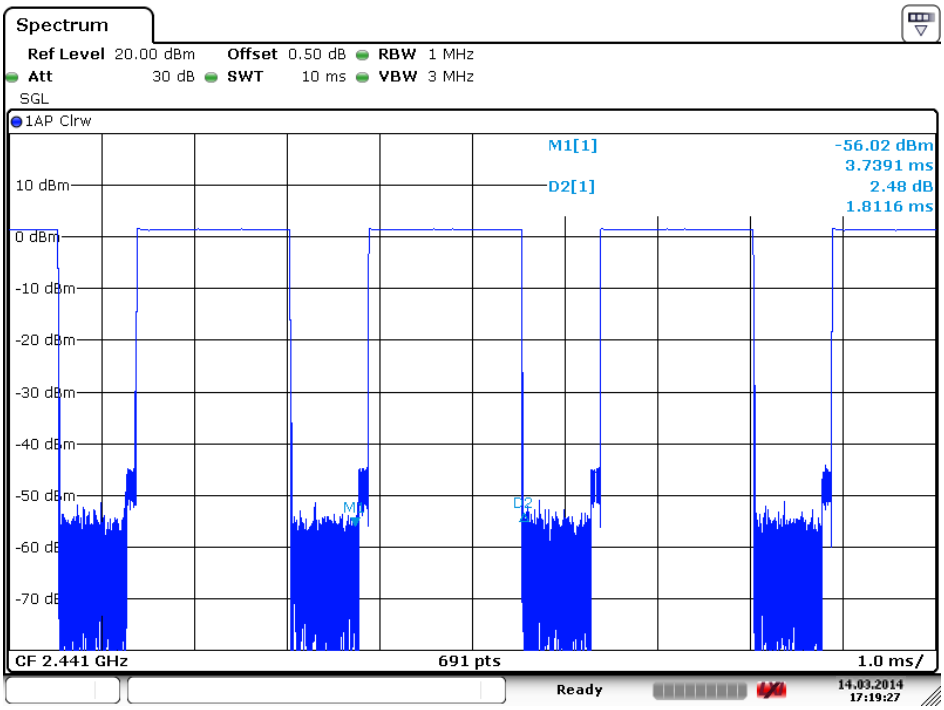
DH1 High channel



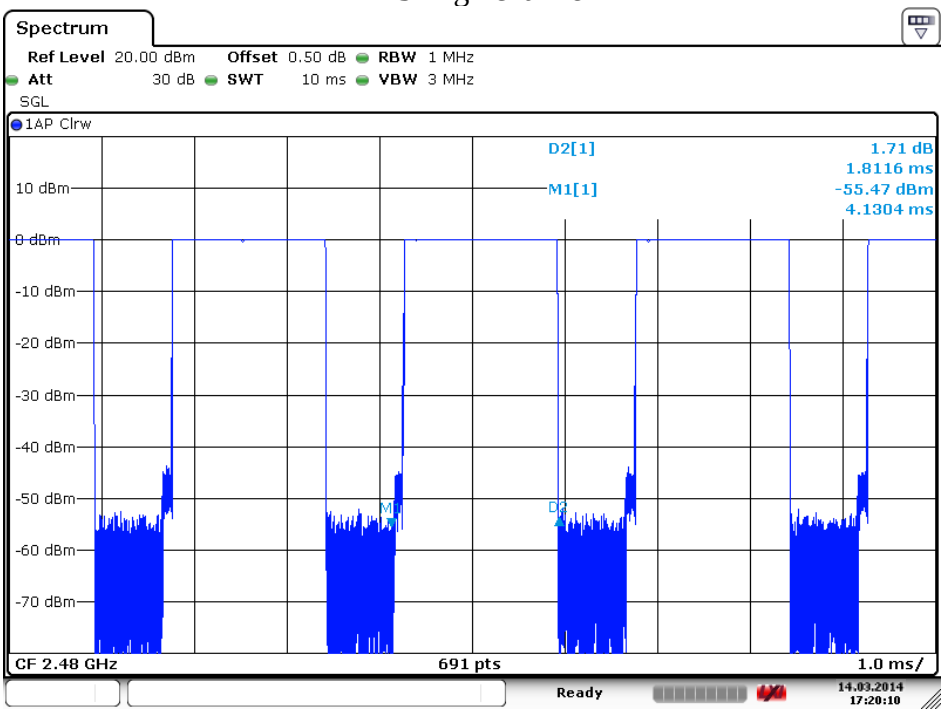
DH3 Low channel



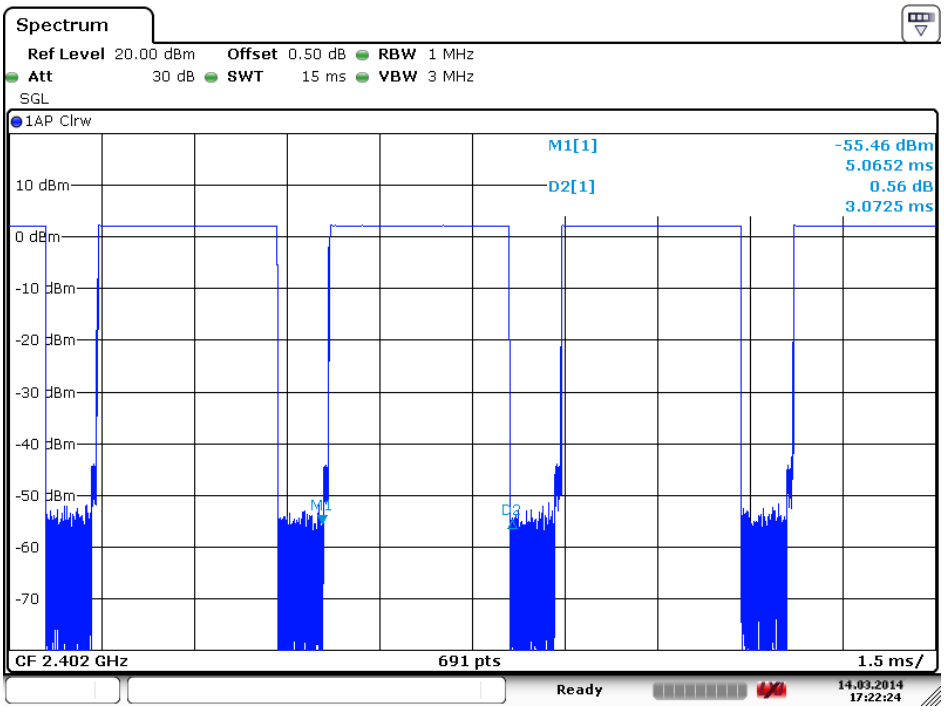
DH3 Middle channel



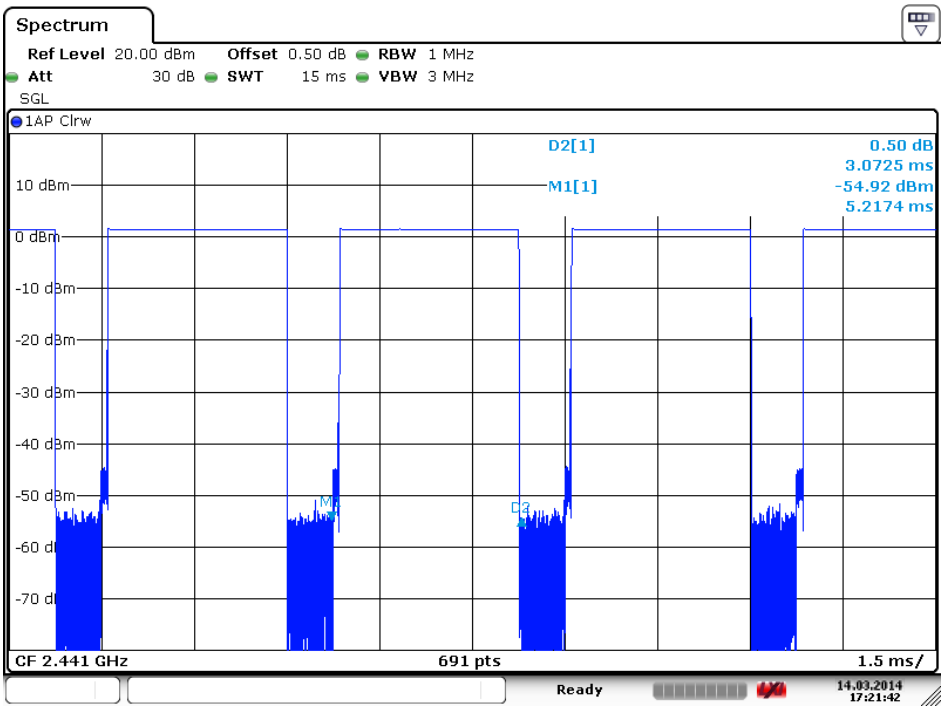
DH3 High channel



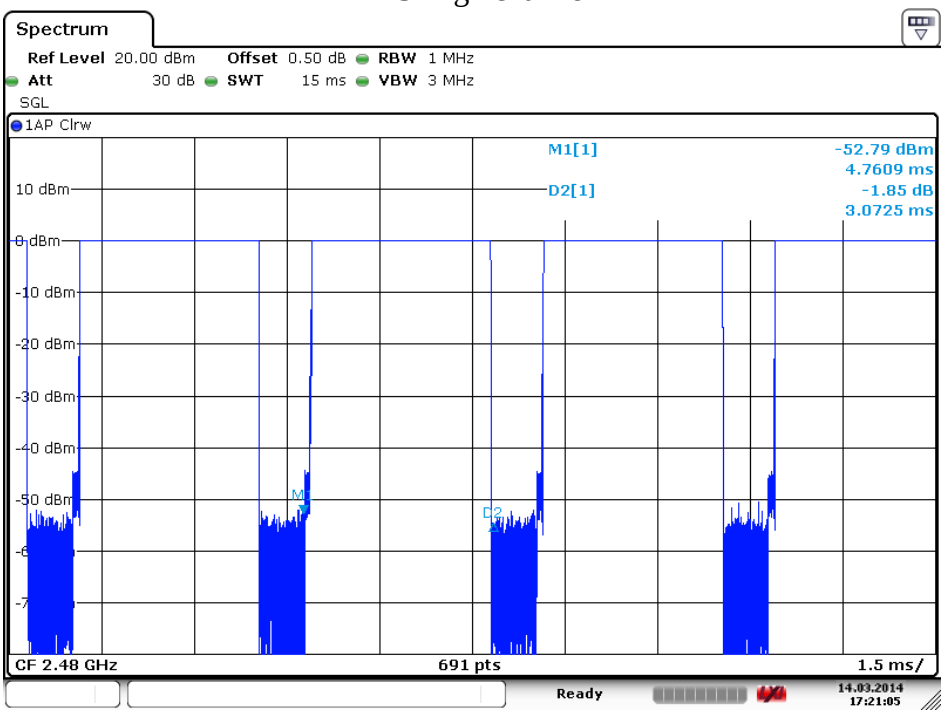
DH5 Low channel



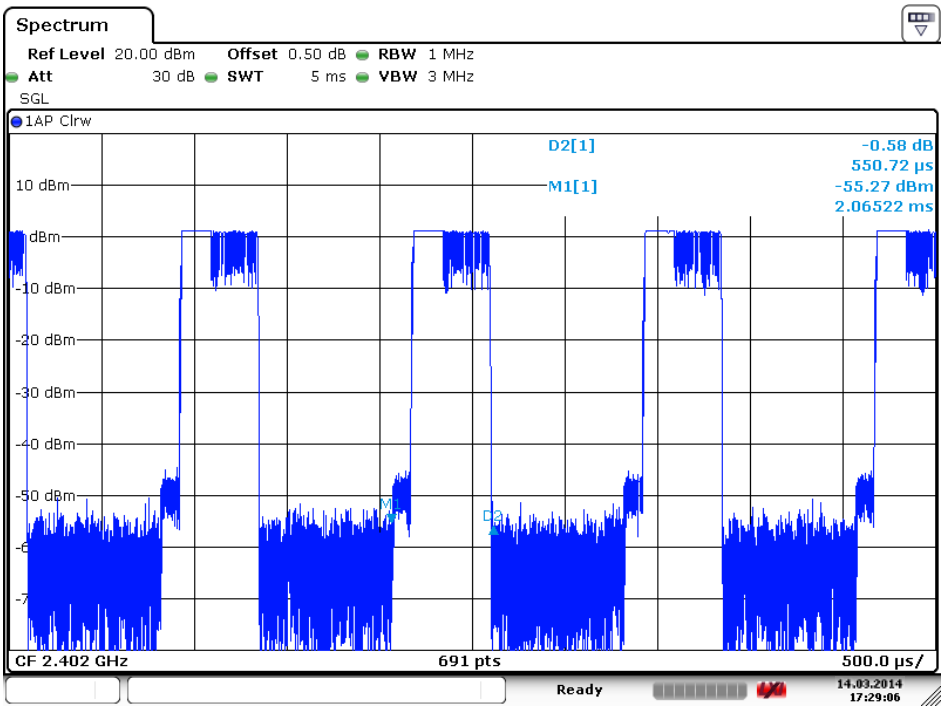
DH5 Middle channel



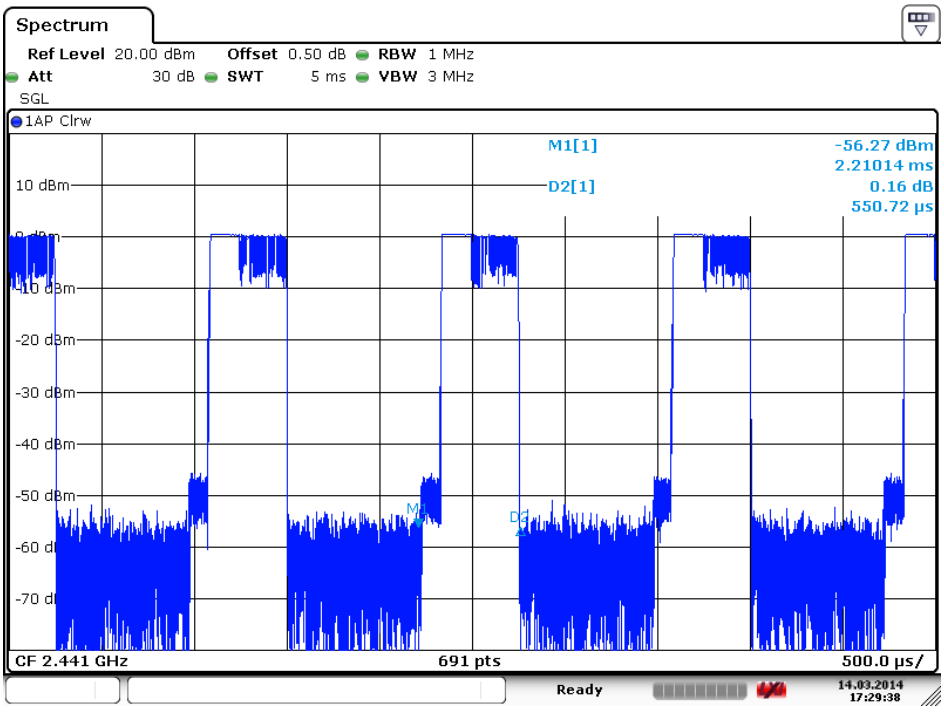
DH5 High channel



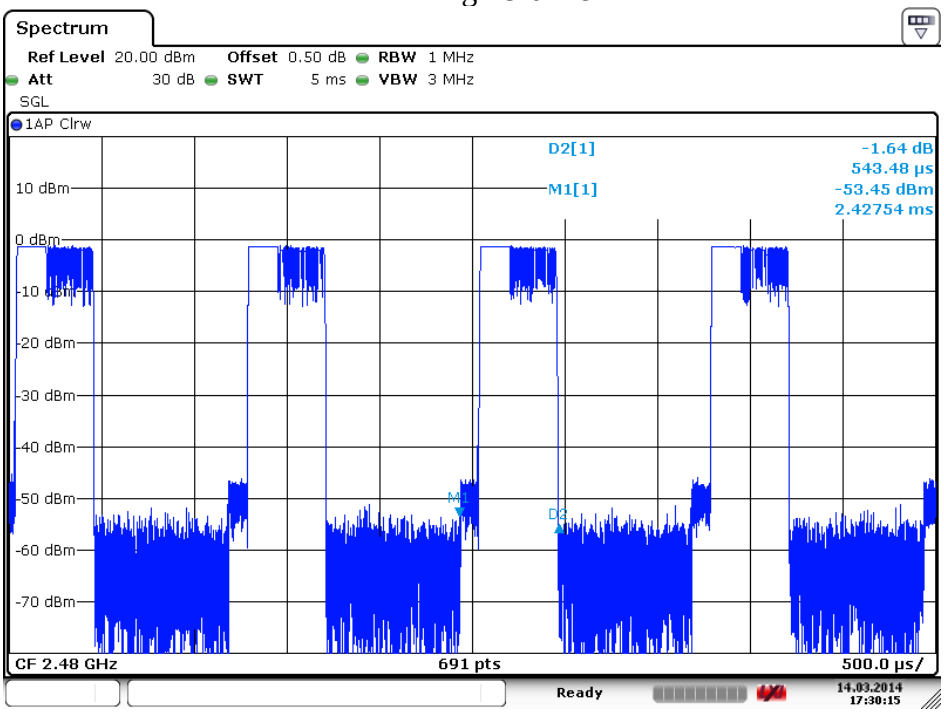
2DH1 Low channel



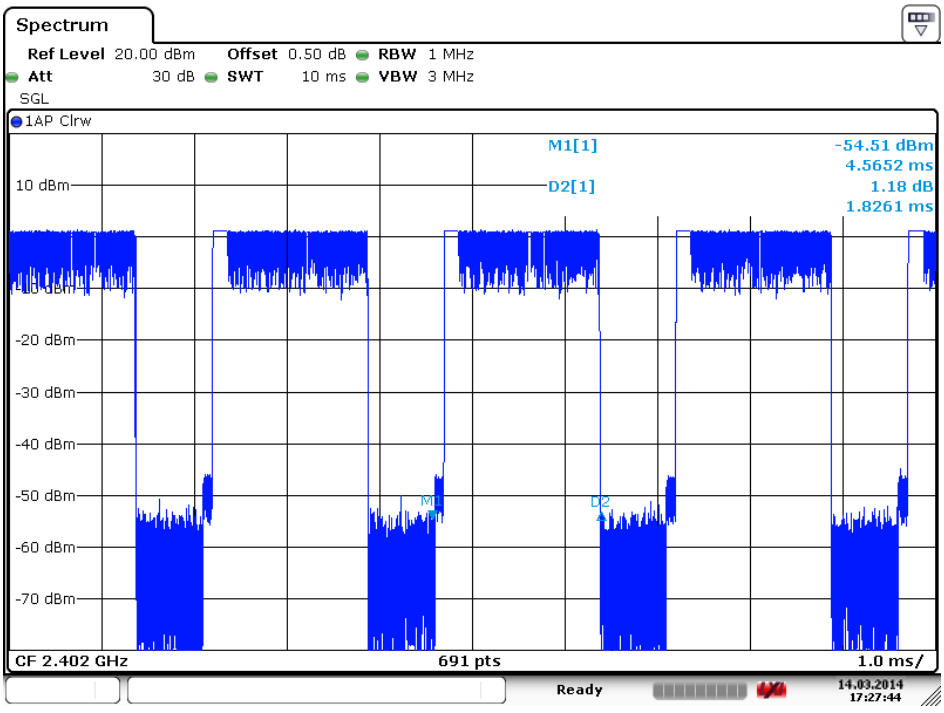
2DH1 Middle channel



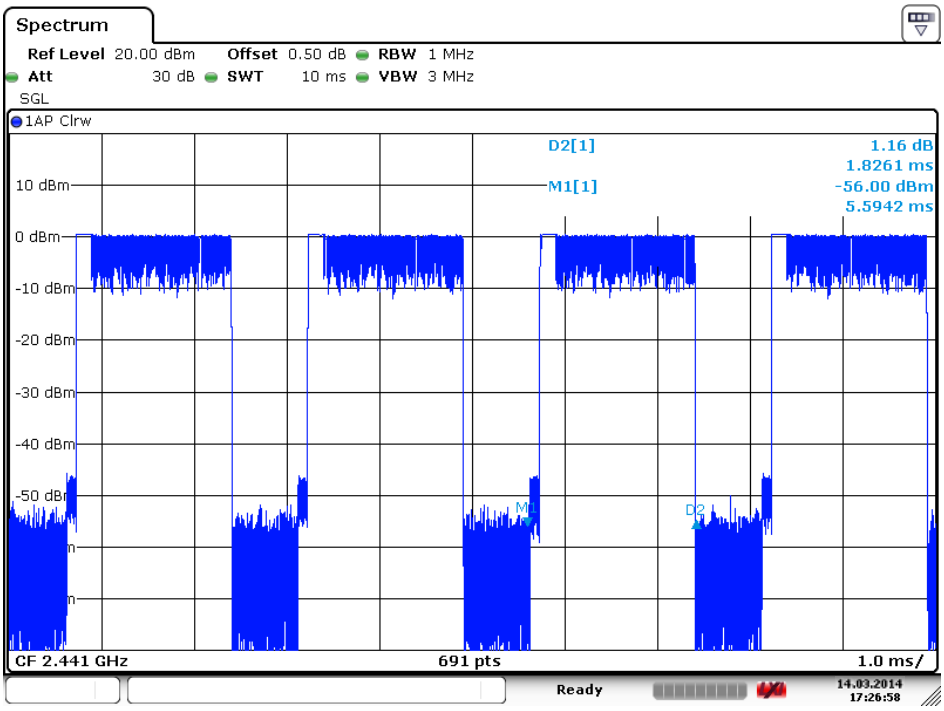
2DH1 High channel



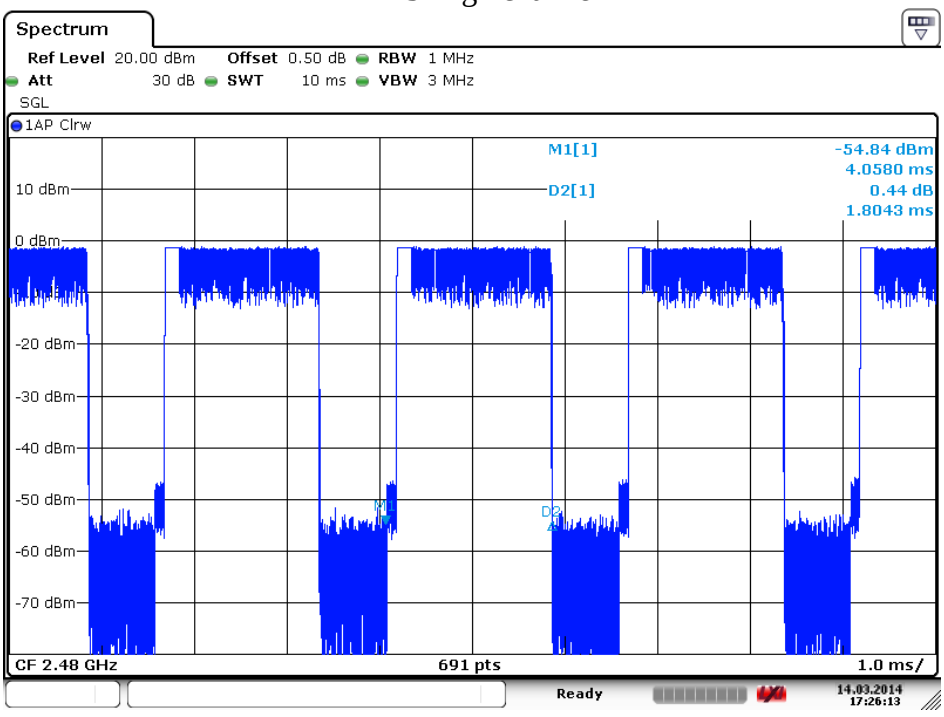
2DH3 Low channel



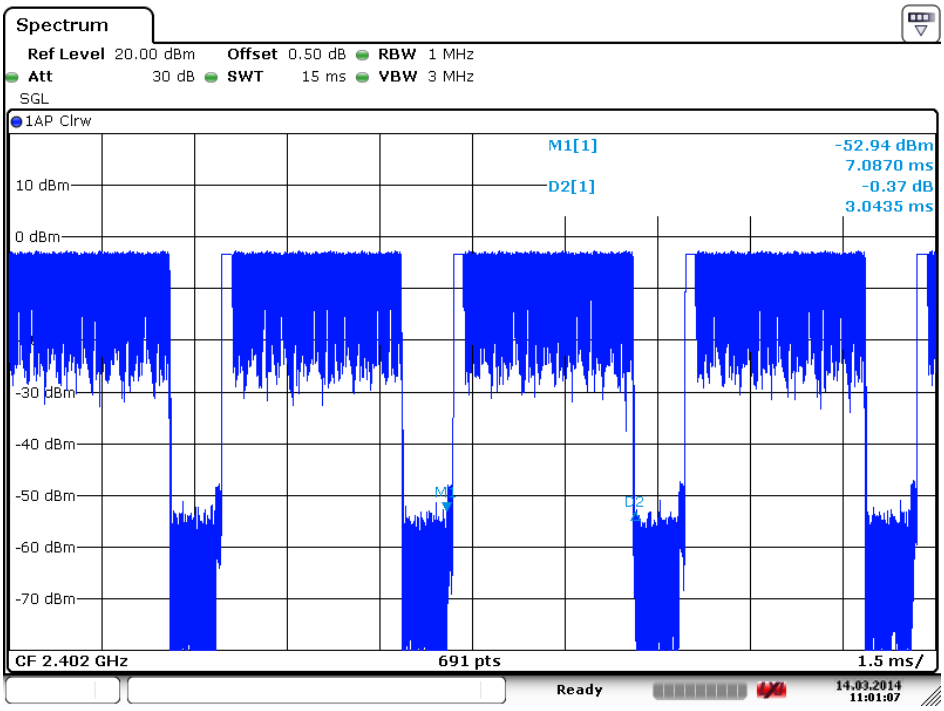
2DH3 Middle channel



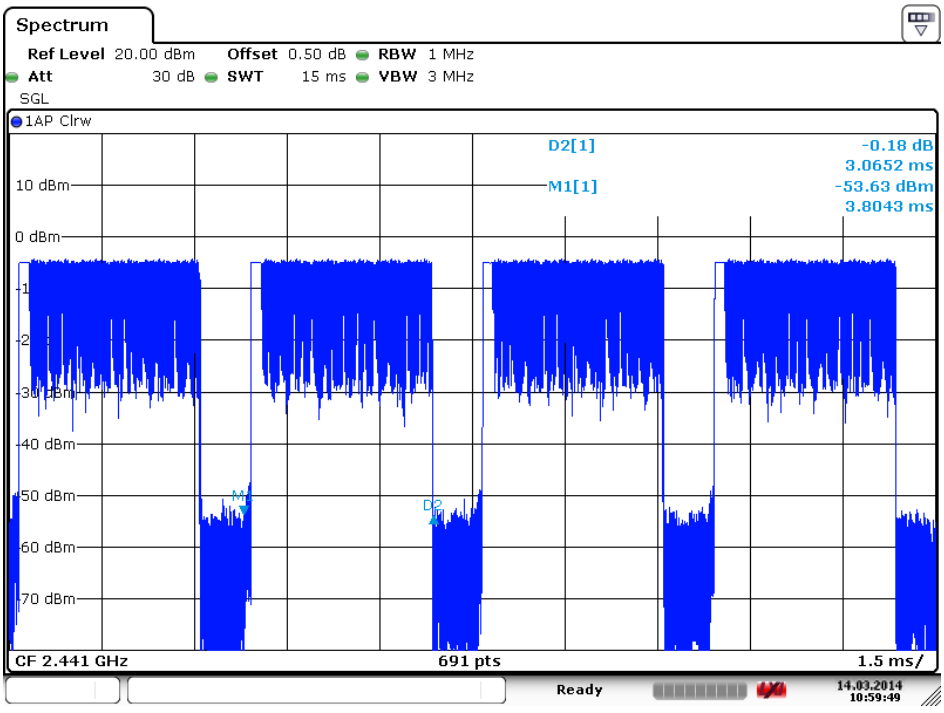
2DH3 High channel



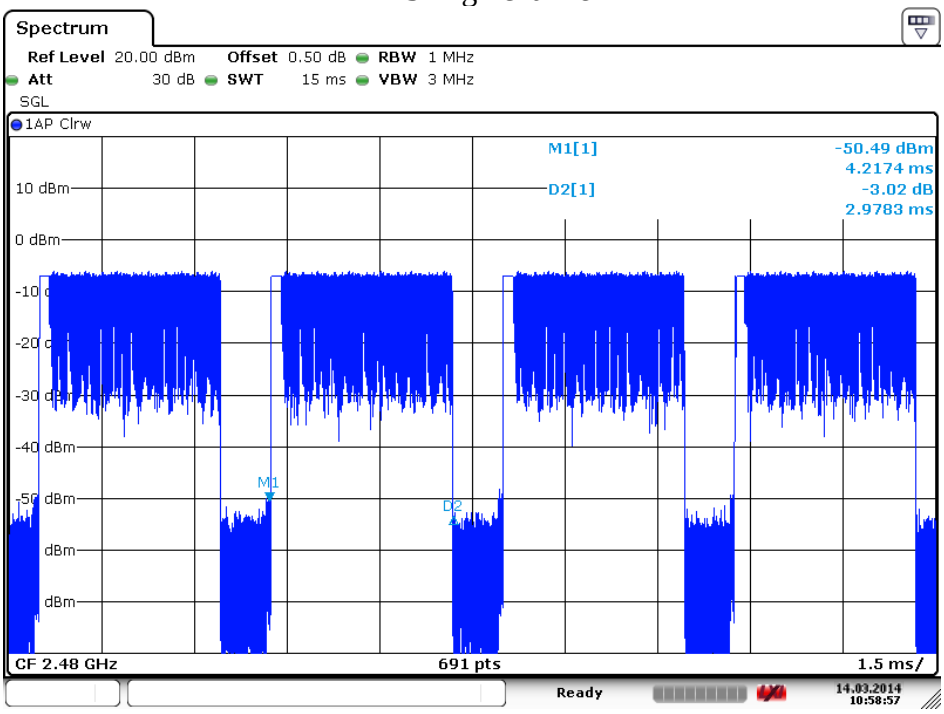
2DH5 Low channel



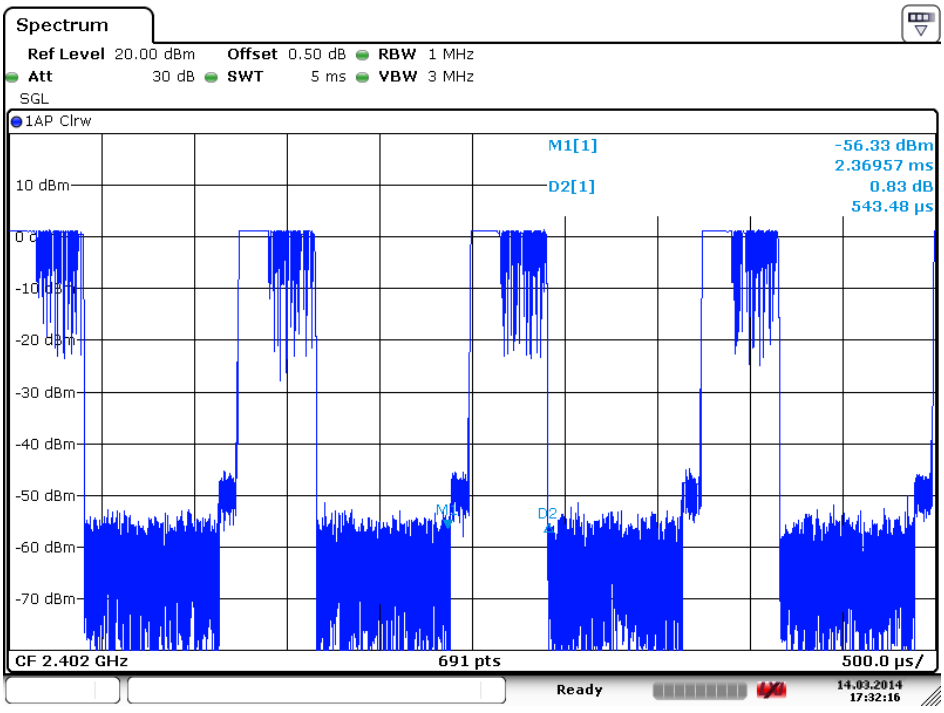
2DH5 Middle channel



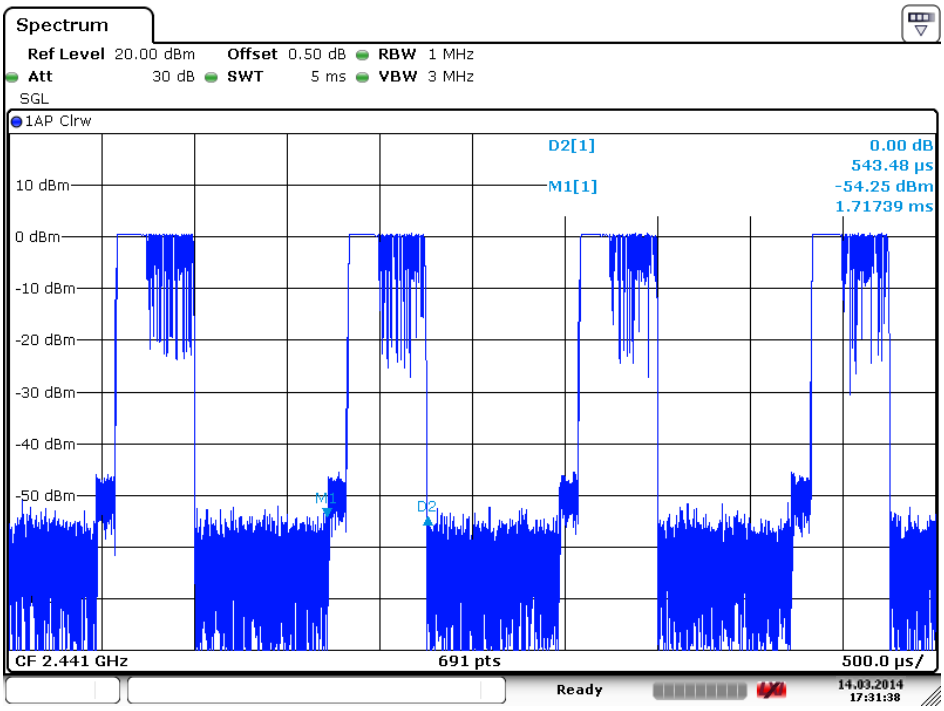
2DH5 High channel



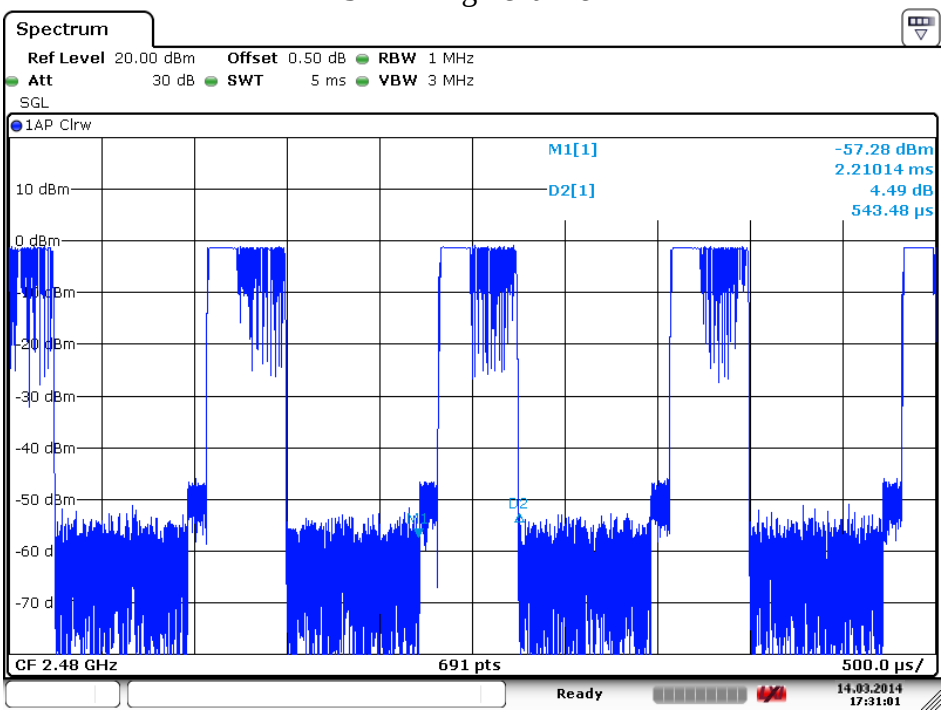
3DH1 Low channel



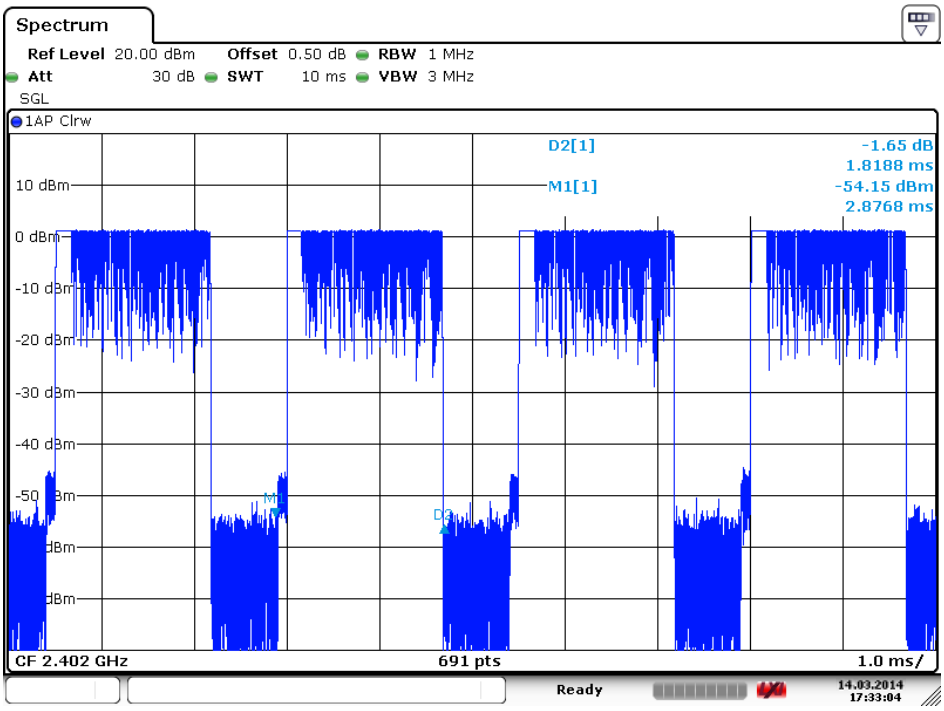
3DH1 Middle channel



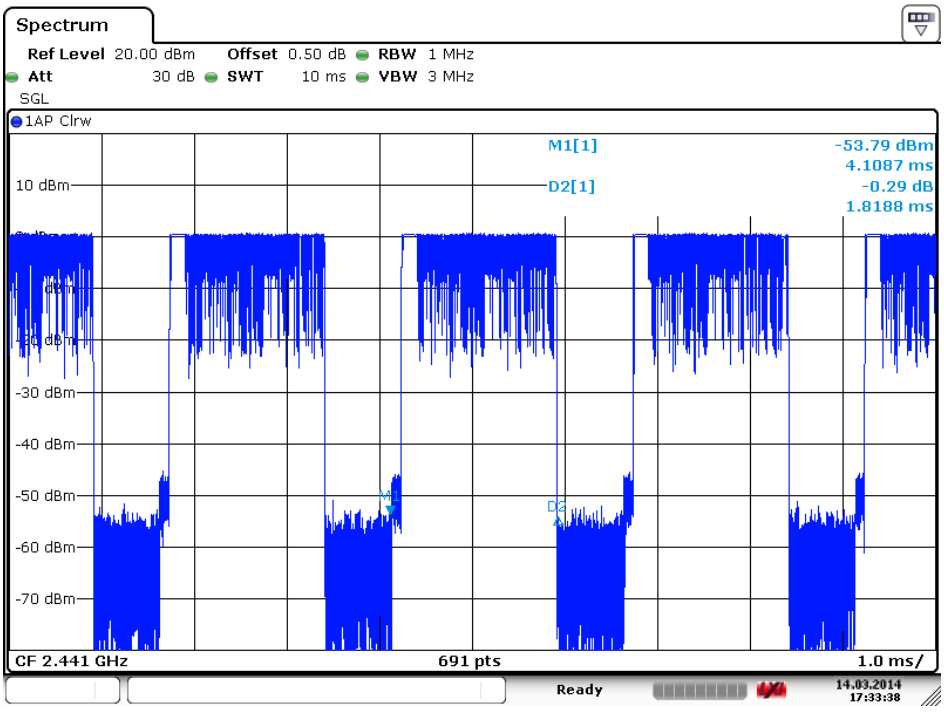
3DH1 High channel



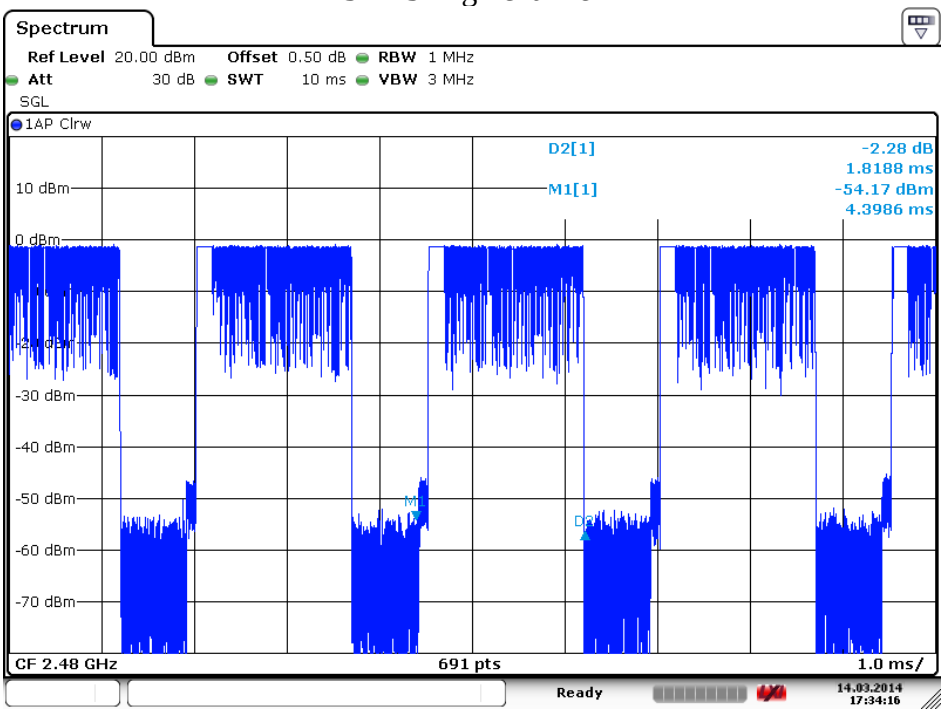
3DH3 Low channel



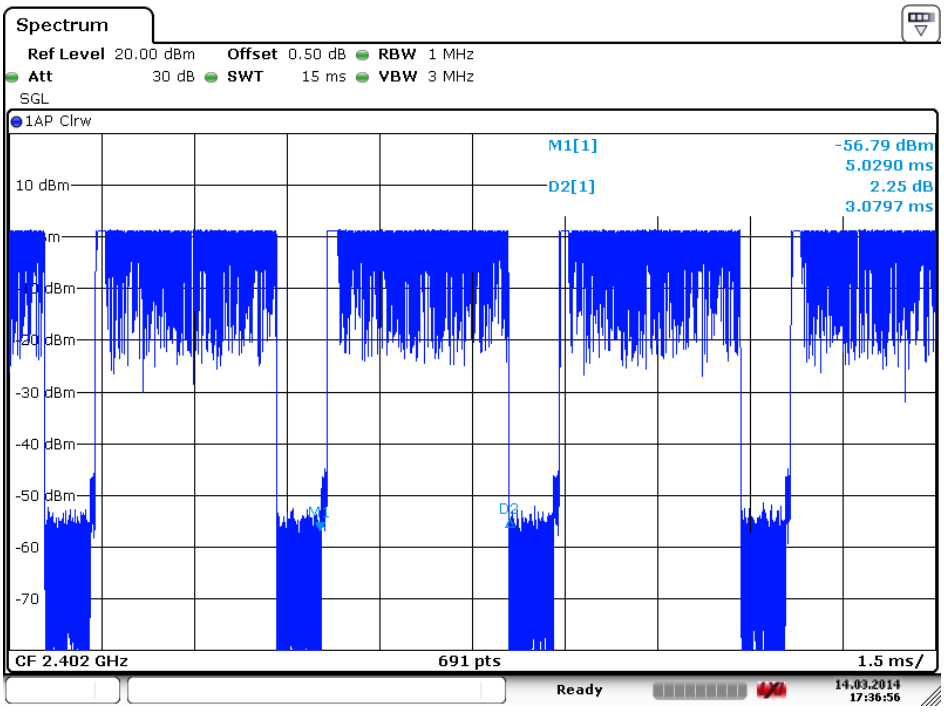
3DH3 Middle channel



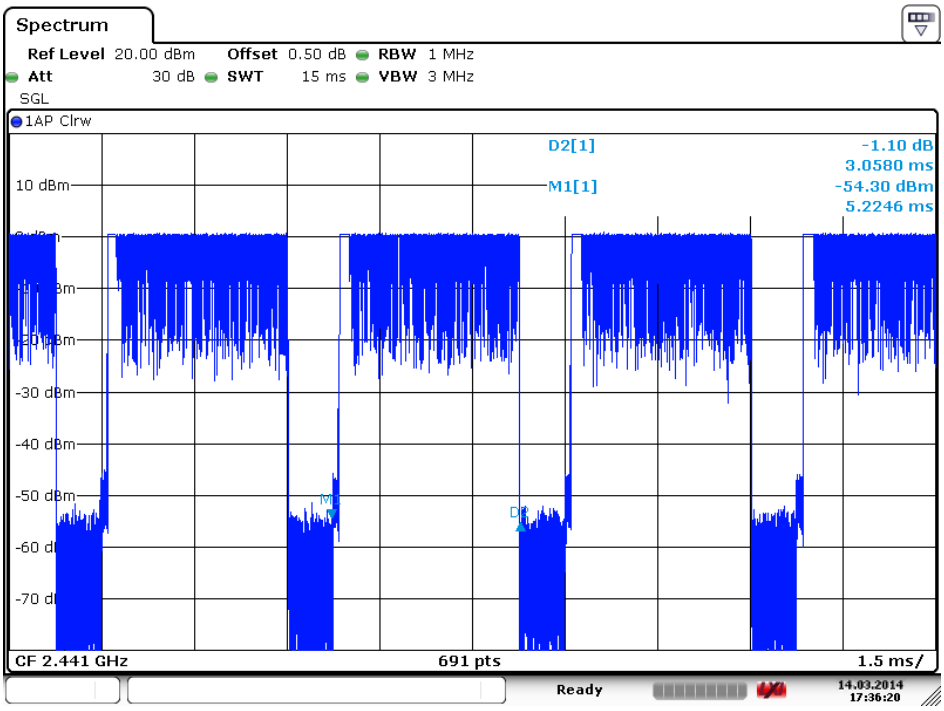
3DH3 High channel



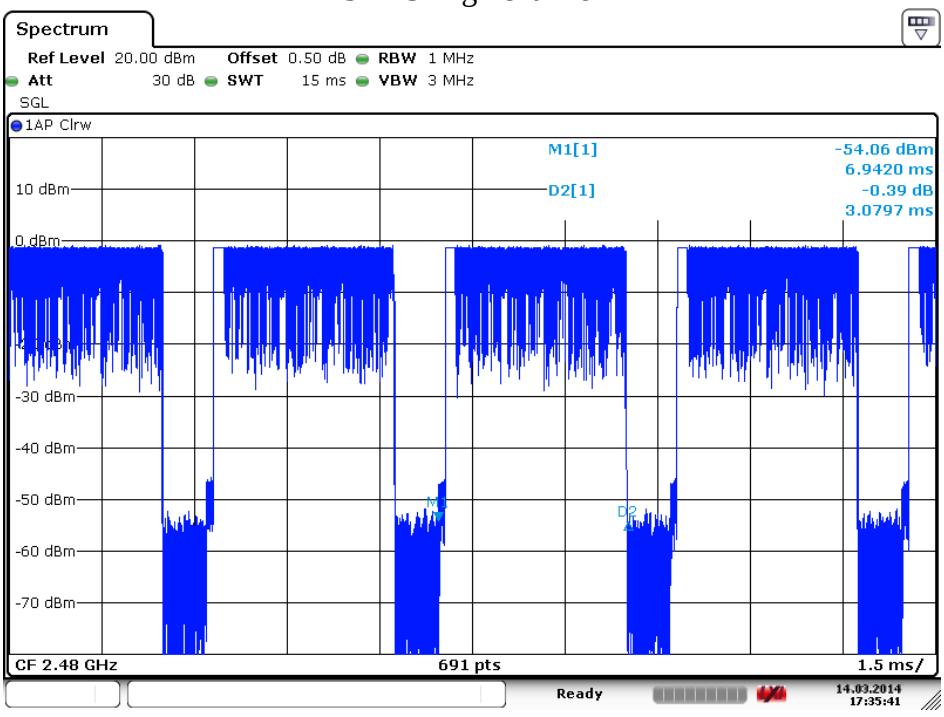
3DH5 Low channel



3DH5 Middle channel

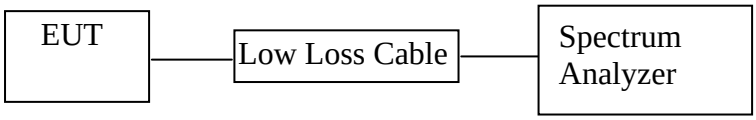


3DH5 High channel



9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



(EUT: Speaker)

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 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.

9.4.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, and 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 1MHz and VBW to 3MHz for GFSK mode

9.5.3.Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz for other mode

9.5.4.Measurement the maximum peak output power.

9.6.Test Result

GFSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	2.31/0.0017	30 / 1.0
Middle	2441	1.65/0.0015	30 / 1.0
High	2480	-1.02/0.0008	30 / 1.0

Π/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	1.98/0.0016	21 / 0.125
Middle	2441	1.23/0.0013	21 / 0.125
High	2480	-0.45/0.0009	21 / 0.125

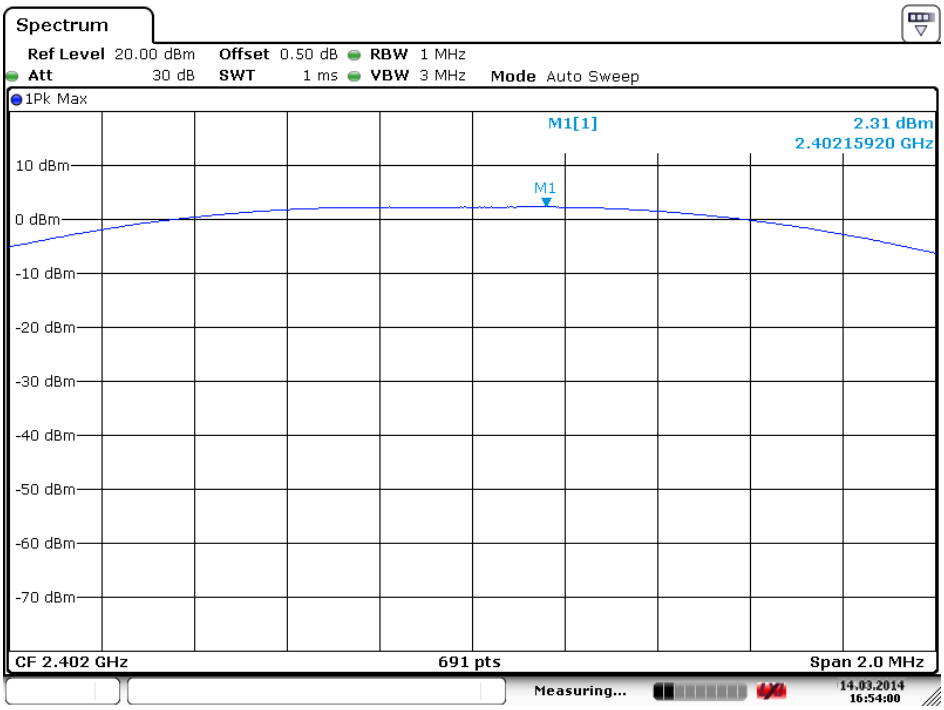
8DPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	2.11/0.0016	21 / 0.125
Middle	2441	1.42/0.0014	21 / 0.125
High	2480	-0.24/0.0009	21 / 0.125

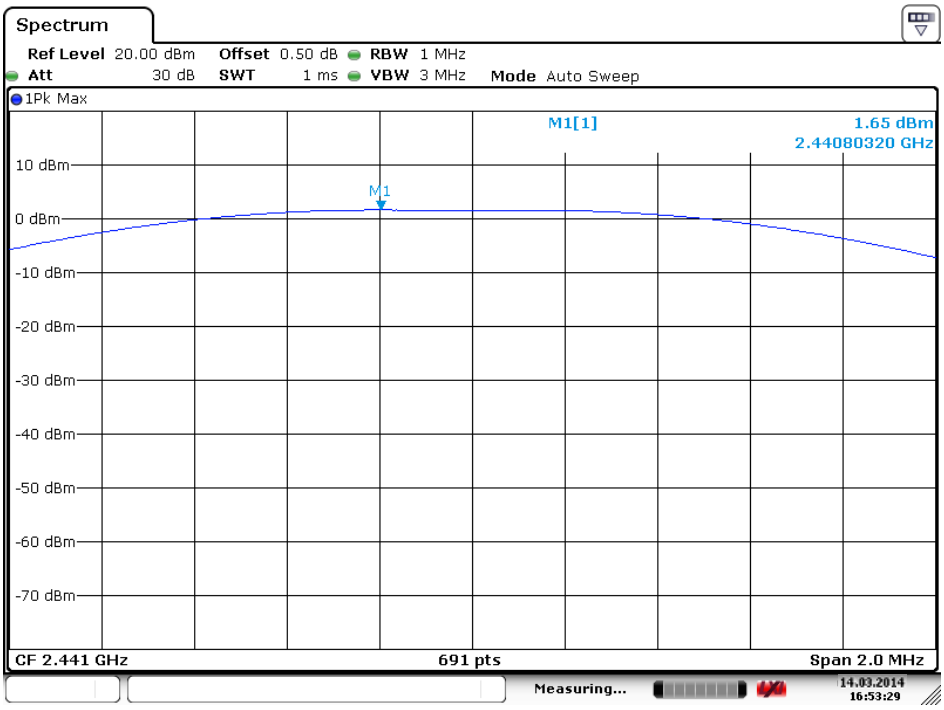
The spectrum analyzer plots are attached as below.

GFSK Mode

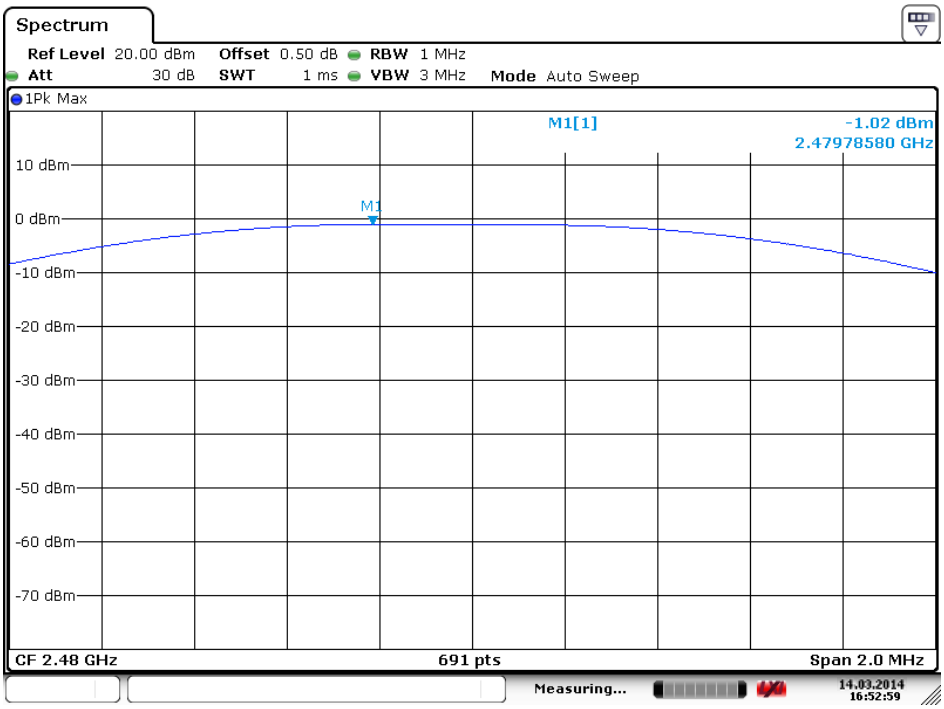
Low channel



Middle channel

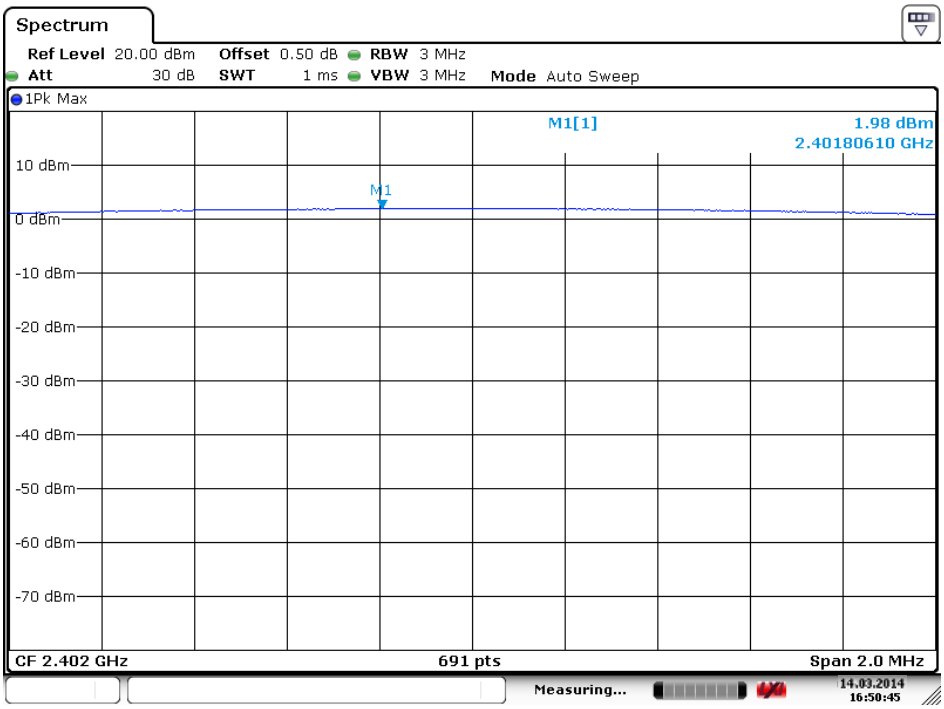


High channel

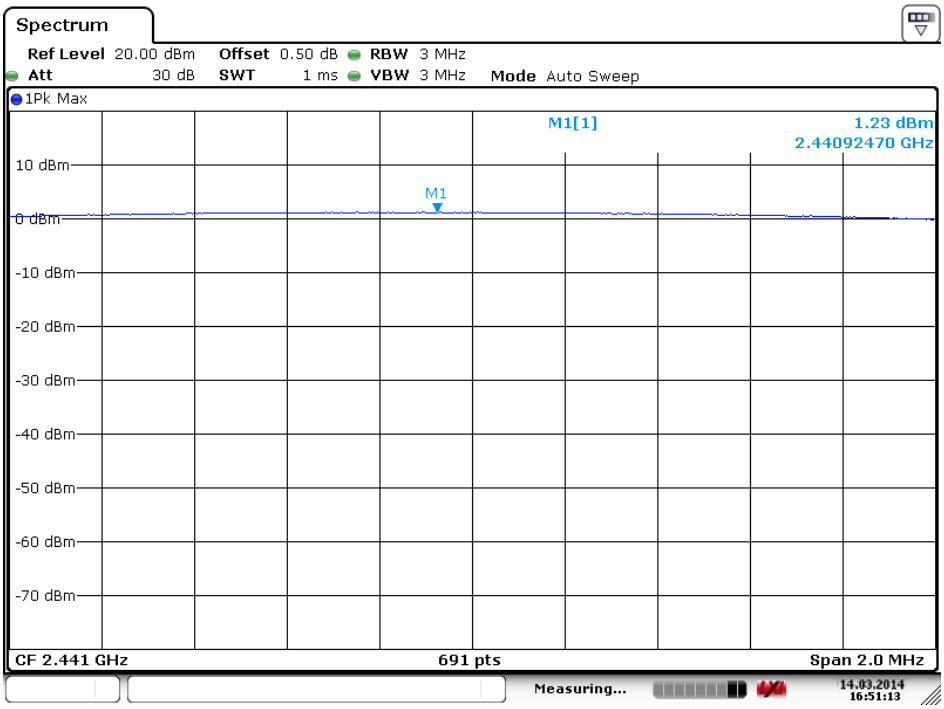


Π/4-DQPSK Mode

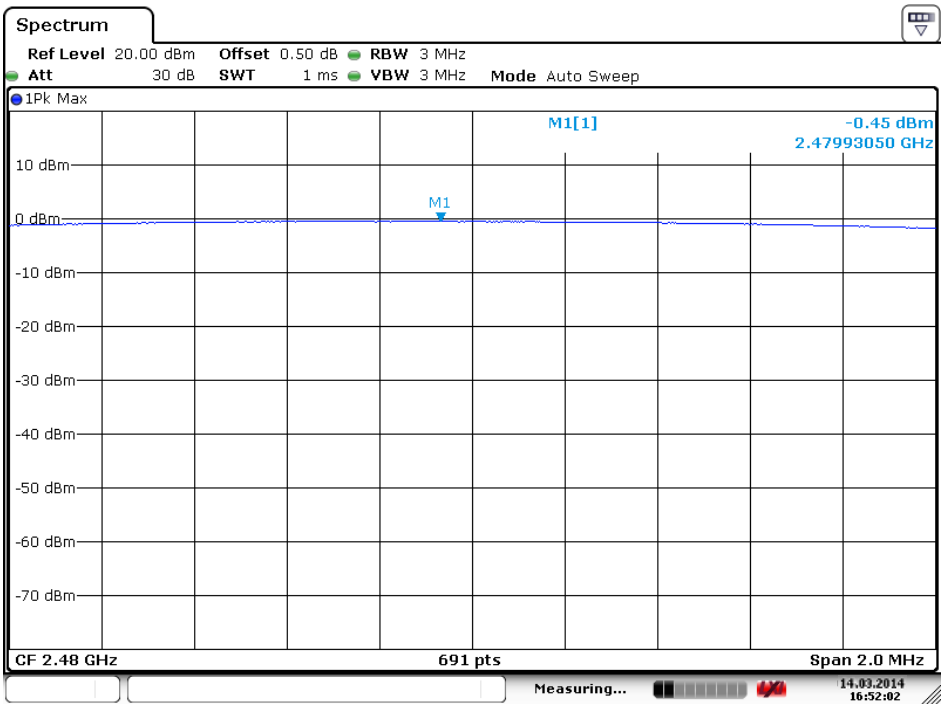
Low channel



Middle channel

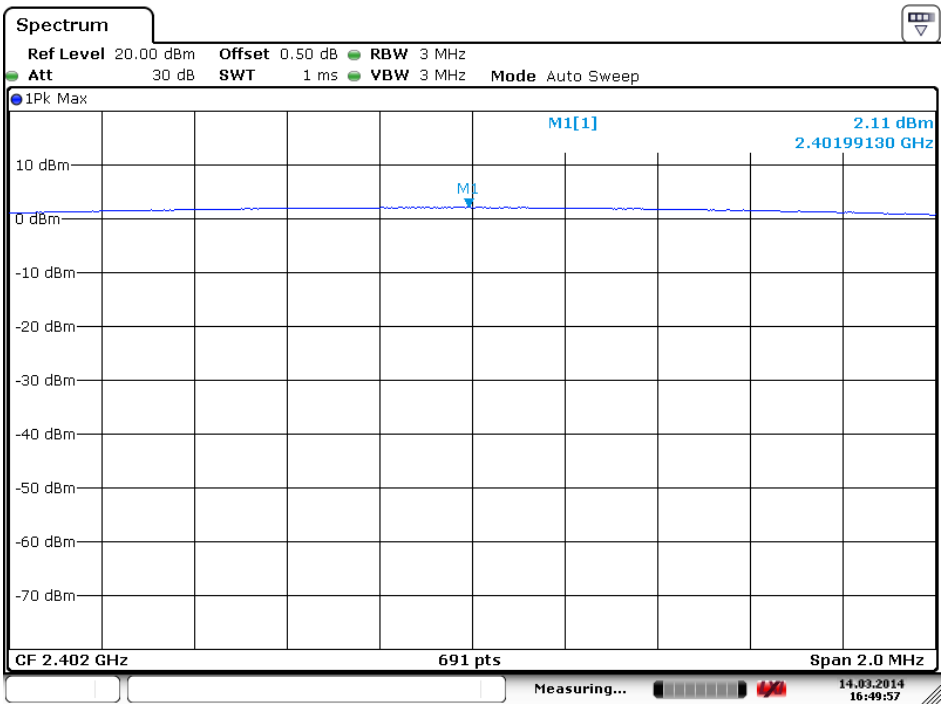


High channel

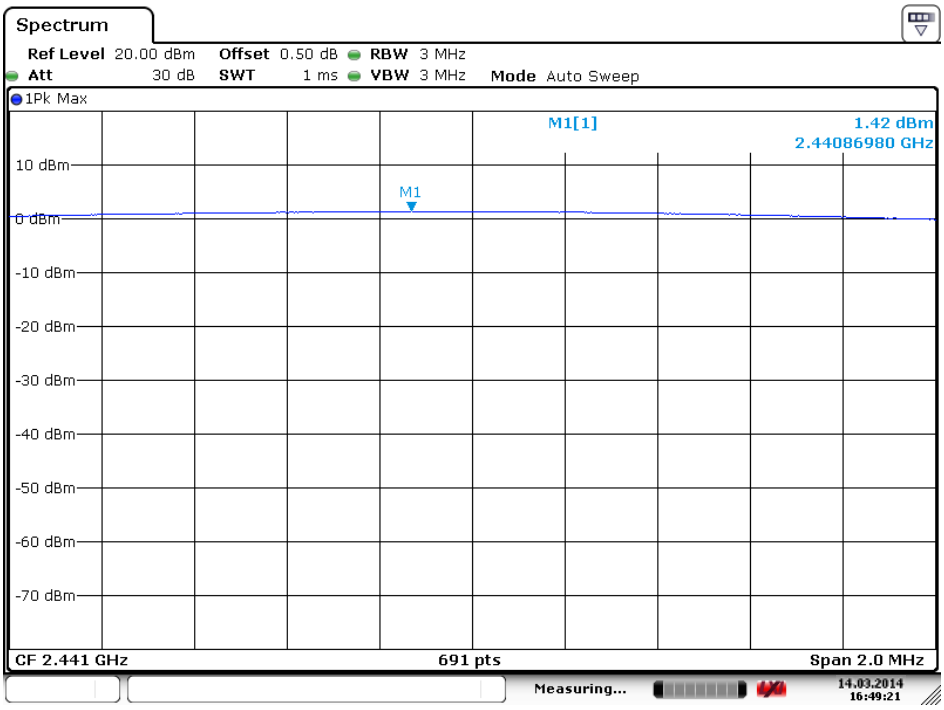


8DPSK Mode

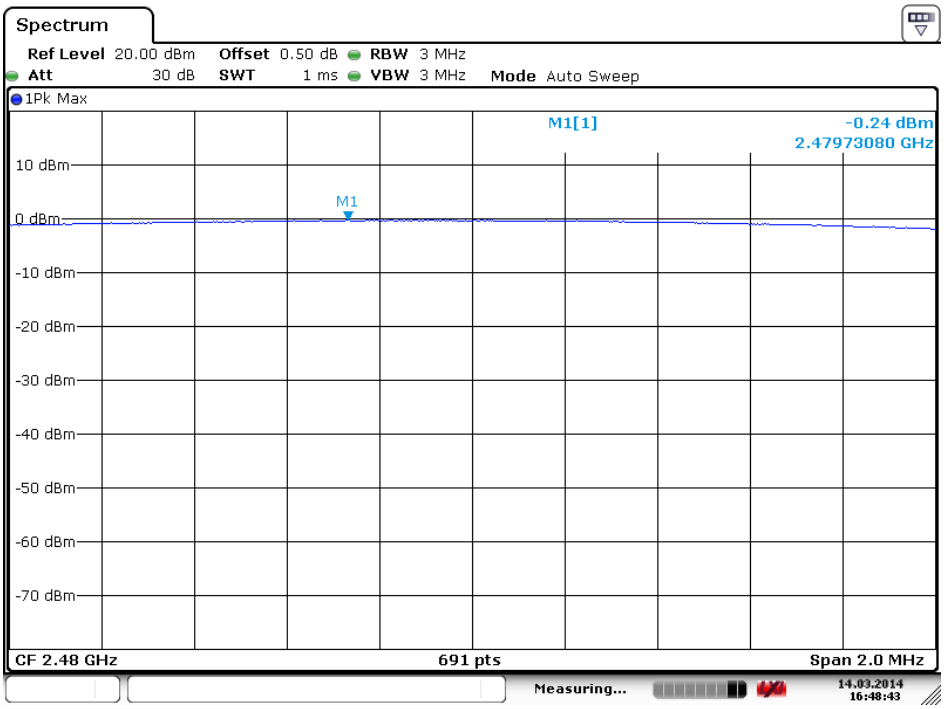
Low channel



Middle channel



High channel



10.RADIATED EMISSION TEST

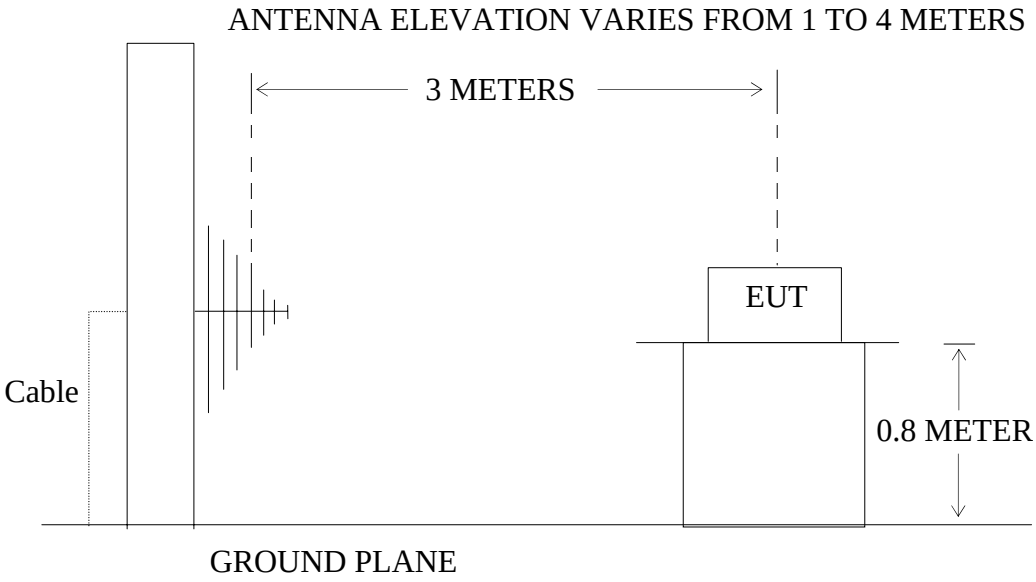
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Speaker)

10.1.2.Anechoic Chamber Test Setup Diagram



10.2.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).

10.3.Restricted bands of operation

10.3.1.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.

10.4.Configuration of EUT on Measurement

The equipment is 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.

10.5.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 bandwidth of test receiver (R&S ESI26) is set at 120 KHz in 30-1000MHz. and set at 1MHz in above 1000MHz.
The frequency range from 30MHz to 25000MHz is checked.
The final measurement in band 9-90 kHz, 110-490 kHz 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

10.6.The Field Strength of Radiation Emission Measurement Results

Note: 1.We tested GFSK mode, Π/4-DQPSK Mode & 8DPSK mode and recorded the worst case data (GFSK mode) for all test mode.

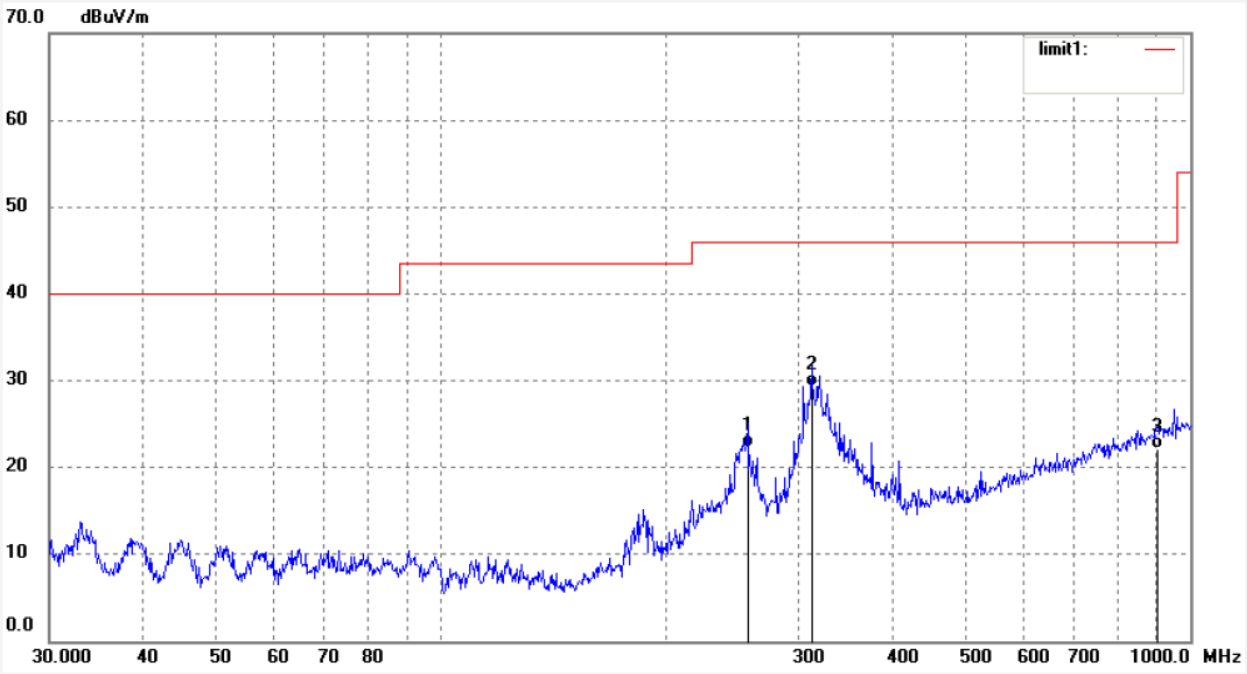
2. The 18-25GHz emissions are not reported, because the levels are too low against the limit.

Below 1GHz

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: alen #3721	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 7.4V
Test item: Radiation Test	Date: 14/03/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/25/16
EUT: Speaker	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: FY-28	
Manufacturer: New Tech	

Note: Report No:ATE20140248

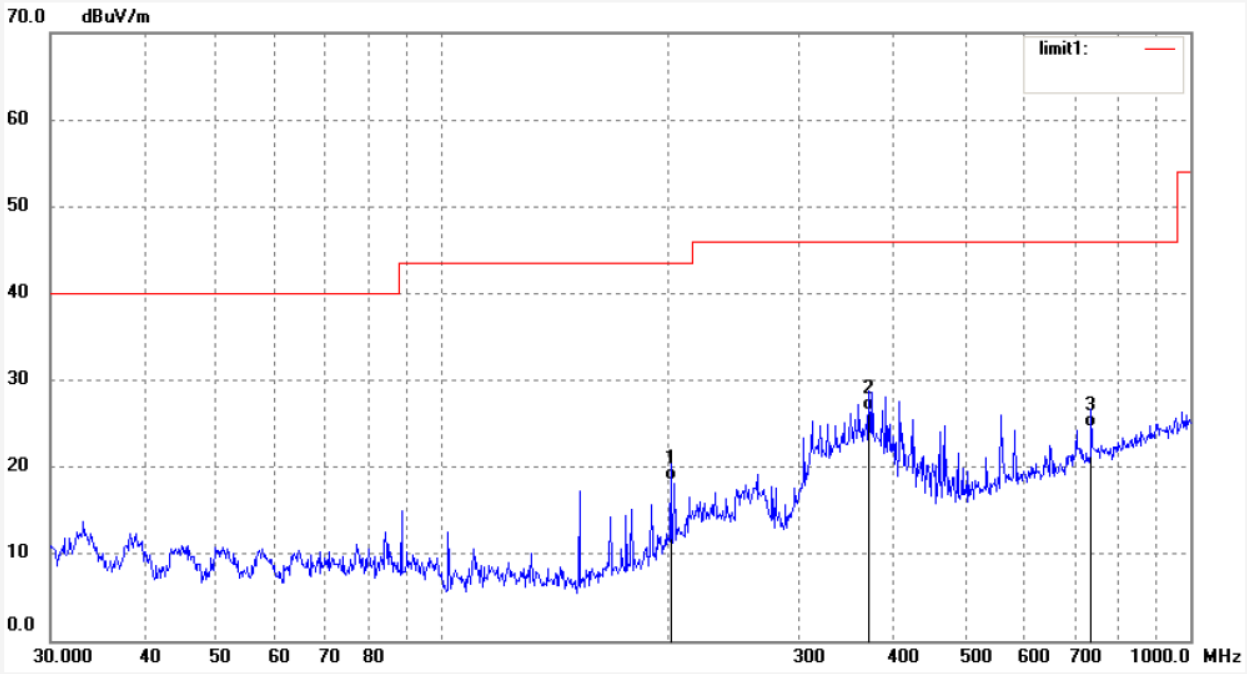


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	256.5210	41.70	-19.36	22.34	46.00	-23.66	QP			
2	312.1792	46.87	-17.61	29.26	46.00	-16.74	QP			
3	903.3093	28.25	-6.05	22.20	46.00	-23.80	QP			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: alen #3720	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 7.4V
Test item: Radiation Test	Date: 14/03/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/24/21
EUT: Speaker	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: FY-28	
Manufacturer: New Tech	

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	202.1005	38.65	-20.16	18.49	43.50	-25.01	QP			
2	372.0045	42.32	-15.84	26.48	46.00	-19.52	QP			
3	737.0714	33.45	-8.92	24.53	46.00	-21.47	QP			

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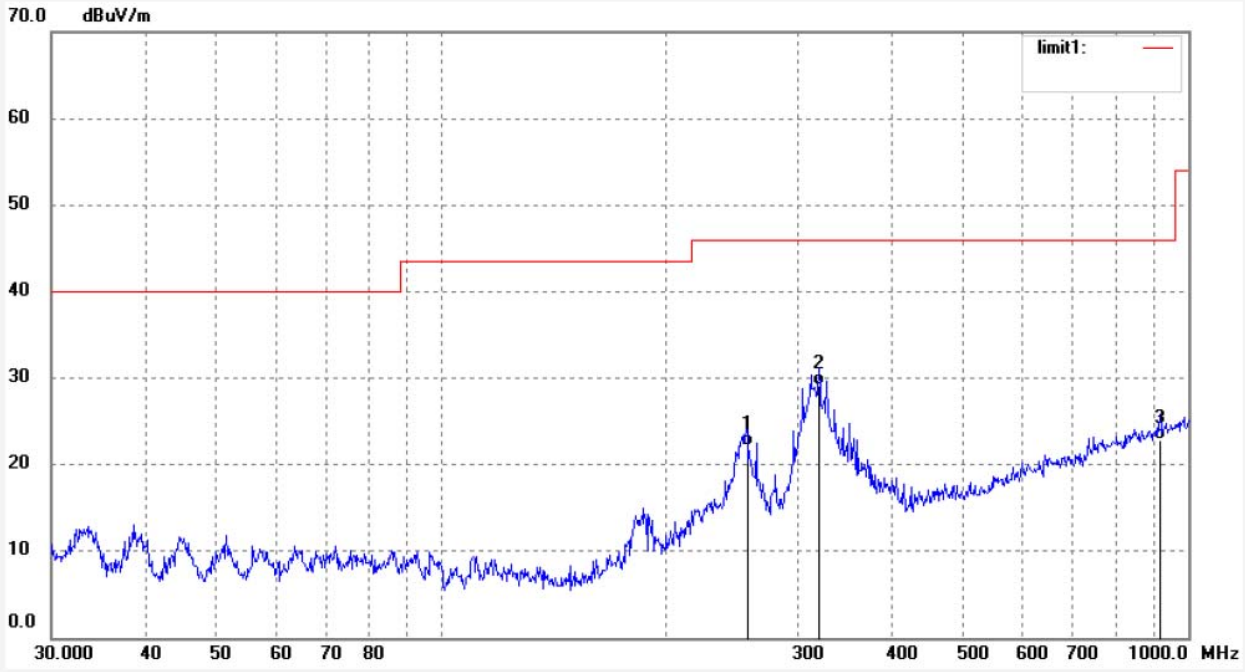
Job No.: alen #3718	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 7.4V
Test item: Radiation Test	Date: 14/03/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/22/46
EUT: Speaker	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: FY-28	
Manufacturer: New Tech	

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	256.5210	41.58	-19.36	22.22	46.00	-23.78	QP			
2	319.9370	46.52	-17.40	29.12	46.00	-16.88	QP			
3	916.0687	28.77	-5.86	22.91	46.00	-23.09	QP			

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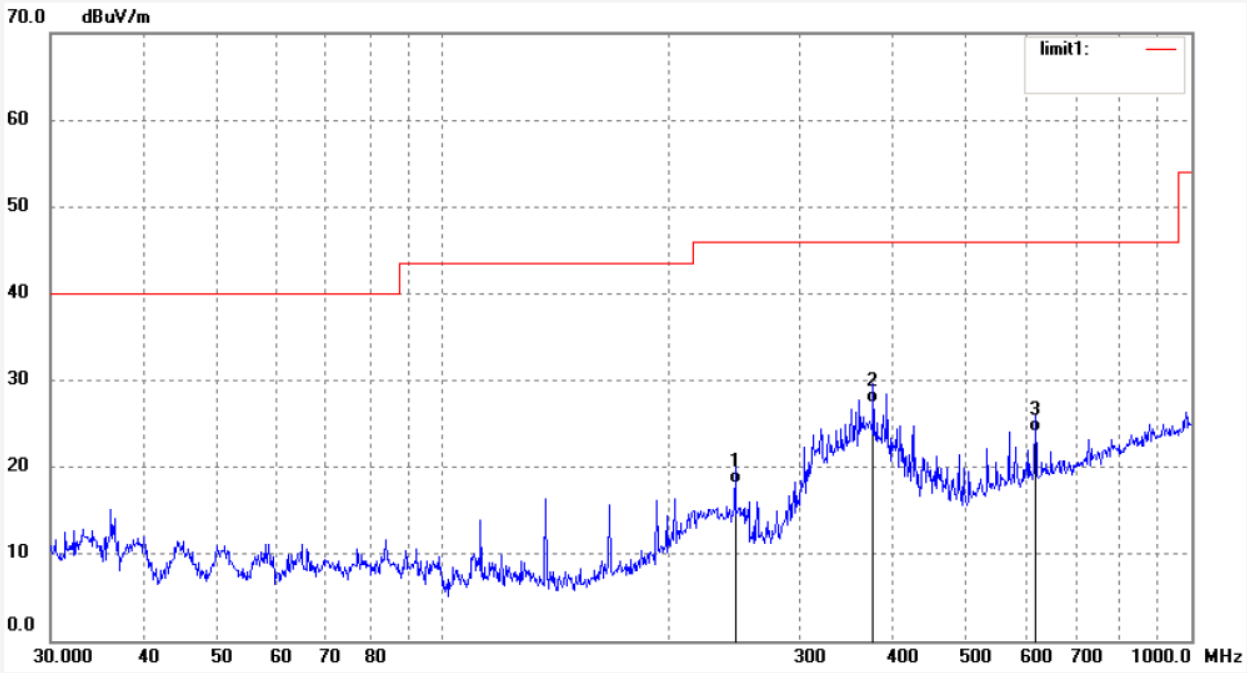
Job No.: alen #3719	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 7.4V
Test item: Radiation Test	Date: 14/03/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/23/32
EUT: Speaker	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: FY-28	
Manufacturer: New Tech	

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	245.9508	37.89	-19.76	18.13	46.00	-27.87	QP			
2	375.9384	43.20	-15.81	27.39	46.00	-18.61	QP			
3	618.5368	35.40	-11.28	24.12	46.00	-21.88	QP			

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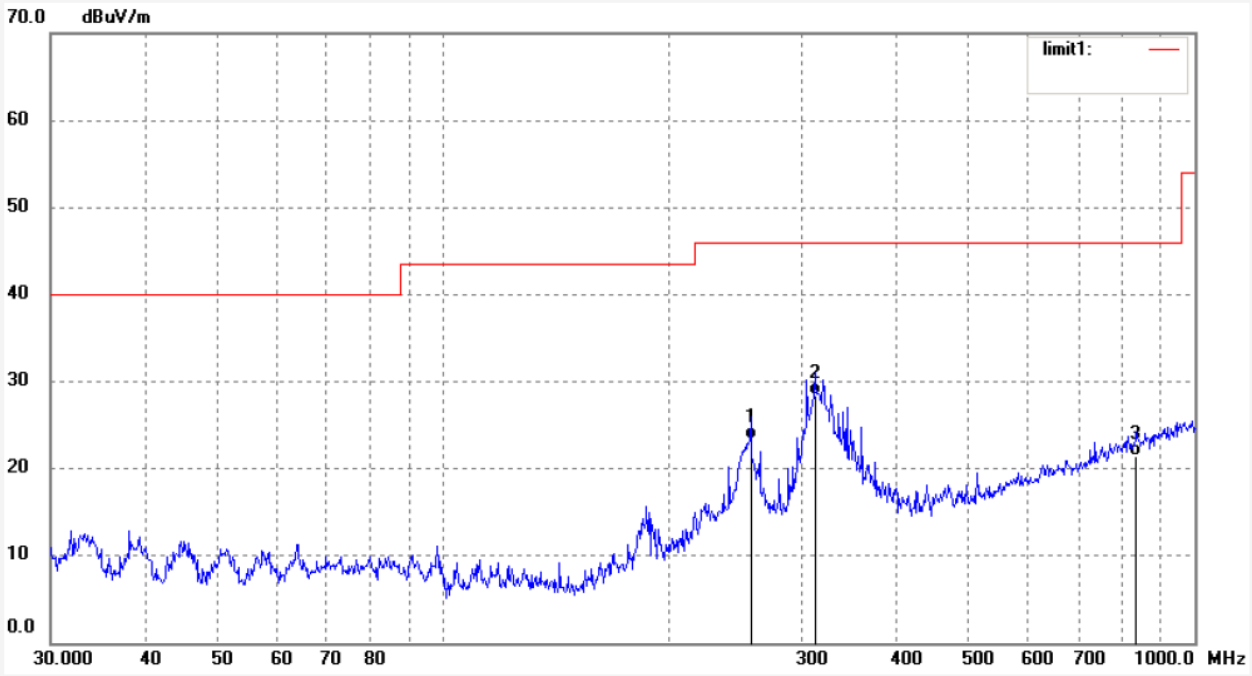
Job No.: alen #3717	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 7.4V
Test item: Radiation Test	Date: 14/03/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/22/06
EUT: Speaker	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: FY-28	
Manufacturer: New Tech	

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	256.5210	42.74	-19.36	23.38	46.00	-22.62	QP			
2	312.1792	46.12	-17.61	28.51	46.00	-17.49	QP			
3	836.2441	28.65	-7.18	21.47	46.00	-24.53	QP			

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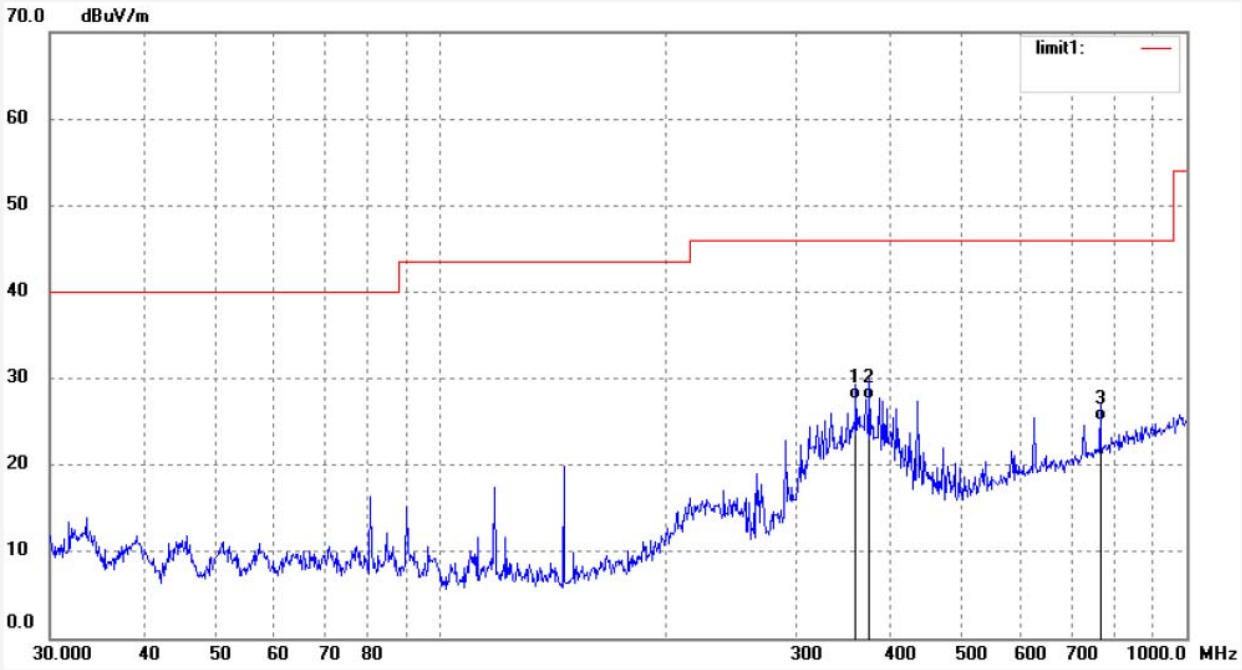
Job No.: alen #3716
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Speaker
Mode: TX 2480MHz
Model: FY-28
Manufacturer: New Tech

Polarization: Vertical
Power Source: DC 7.4V
Date: 14/03/11/
Time: 9/21/13
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	360.4476	43.41	-15.92	27.49	46.00	-18.51	QP			
2	375.9384	43.45	-15.81	27.64	46.00	-18.36	QP			
3	766.0571	33.41	-8.32	25.09	46.00	-20.91	QP			

Above 1GHz

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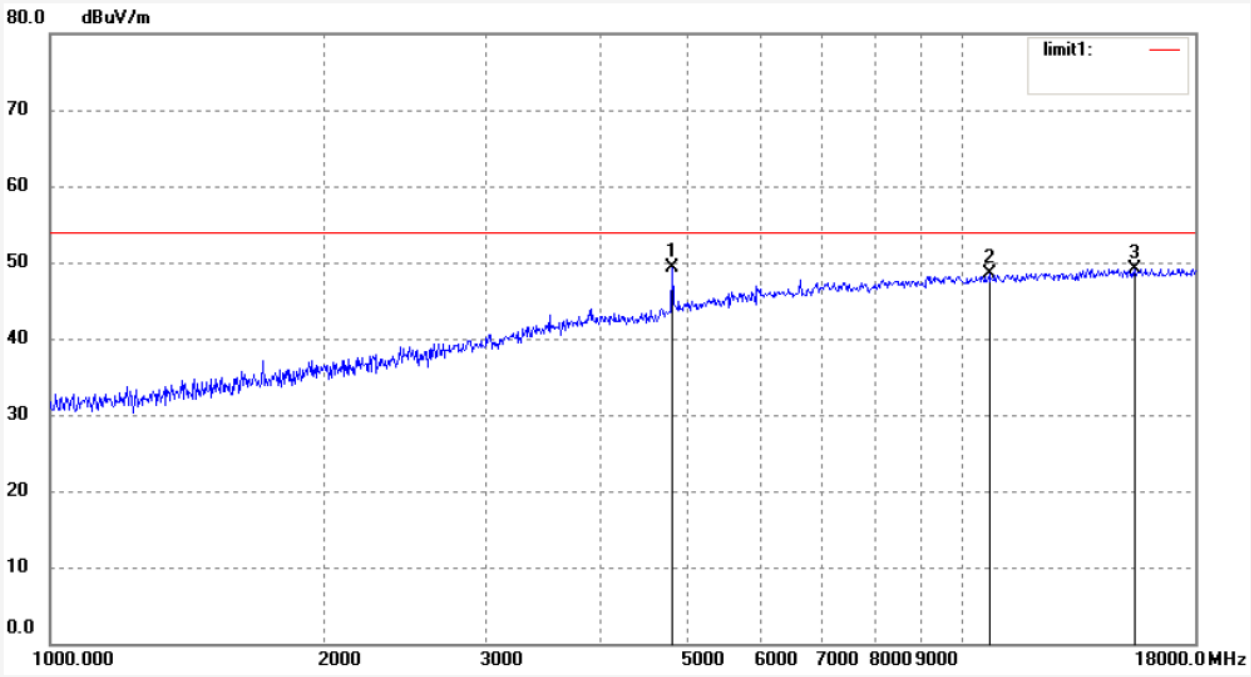
Job No.: alen #3722
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Speaker
Mode: TX 2402MHz
Model: FY-28
Manufacturer: New Tech

Polarization: Horizontal
Power Source: DC 7.4V
Date: 14/03/11/
Time: 9/28/00
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.110	50.96	-1.59	49.37	74.00	-24.63	peak			
2	10698.514	43.10	5.32	48.42	74.00	-25.58	peak			
3	15443.405	37.77	11.33	49.10	74.00	-24.90	peak			

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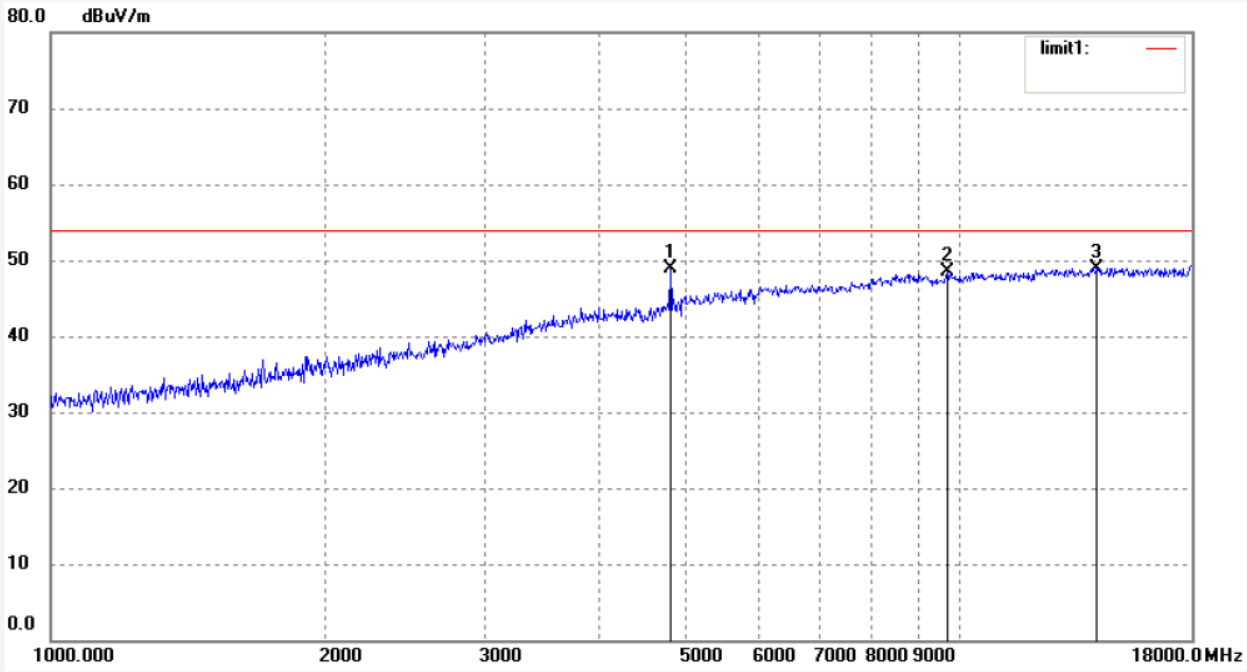
Job No.: alen #3723
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Speaker
Mode: TX 2402MHz
Model: FY-28
Manufacturer: New Tech

Polarization: Vertical
Power Source: DC 7.4V
Date: 14/03/11/
Time: 9/29/29
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.110	50.53	-1.59	48.94	74.00	-25.06	peak			
2	9697.152	43.42	5.00	48.42	74.00	-25.58	peak			
3	14160.705	37.64	11.24	48.88	74.00	-25.12	peak			

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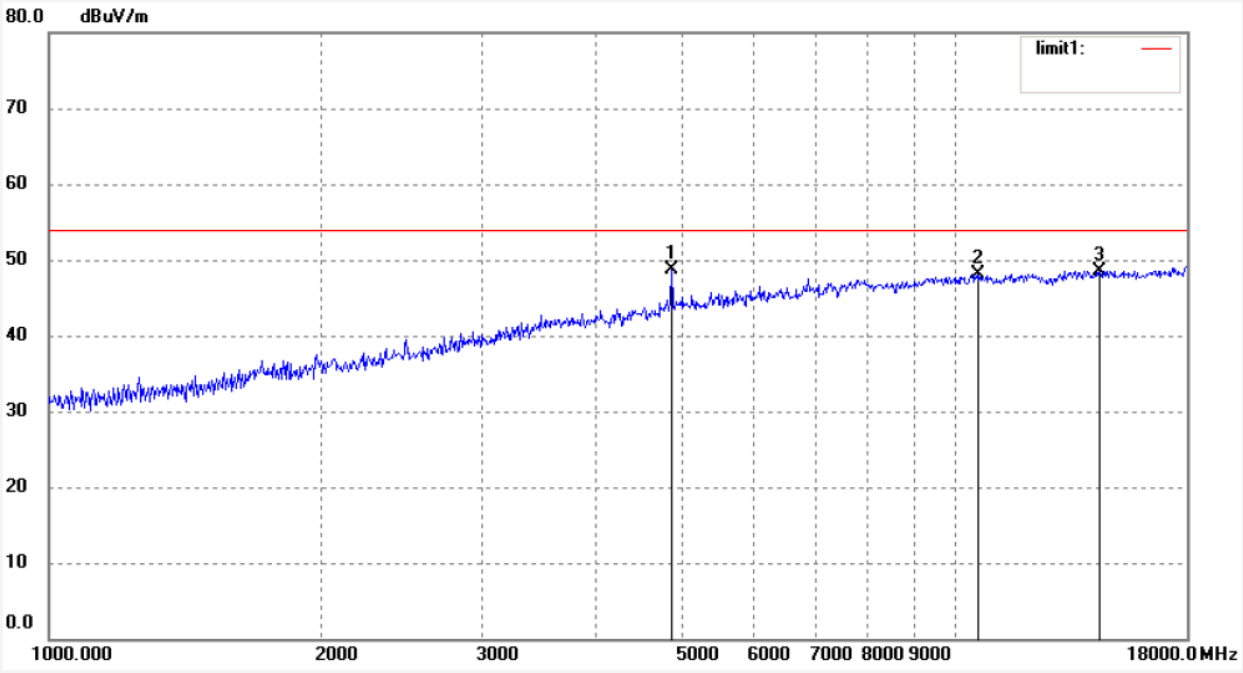
Job No.: alen #3725	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 7.4V
Test item: Radiation Test	Date: 14/03/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/31/20
EUT: Speaker	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: FY-28	
Manufacturer: New Tech	

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4859.975	50.12	-1.41	48.71	74.00	-25.29	peak			
2	10606.147	42.81	5.26	48.07	74.00	-25.93	peak			
3	14408.425	36.07	12.53	48.60	74.00	-25.40	peak			

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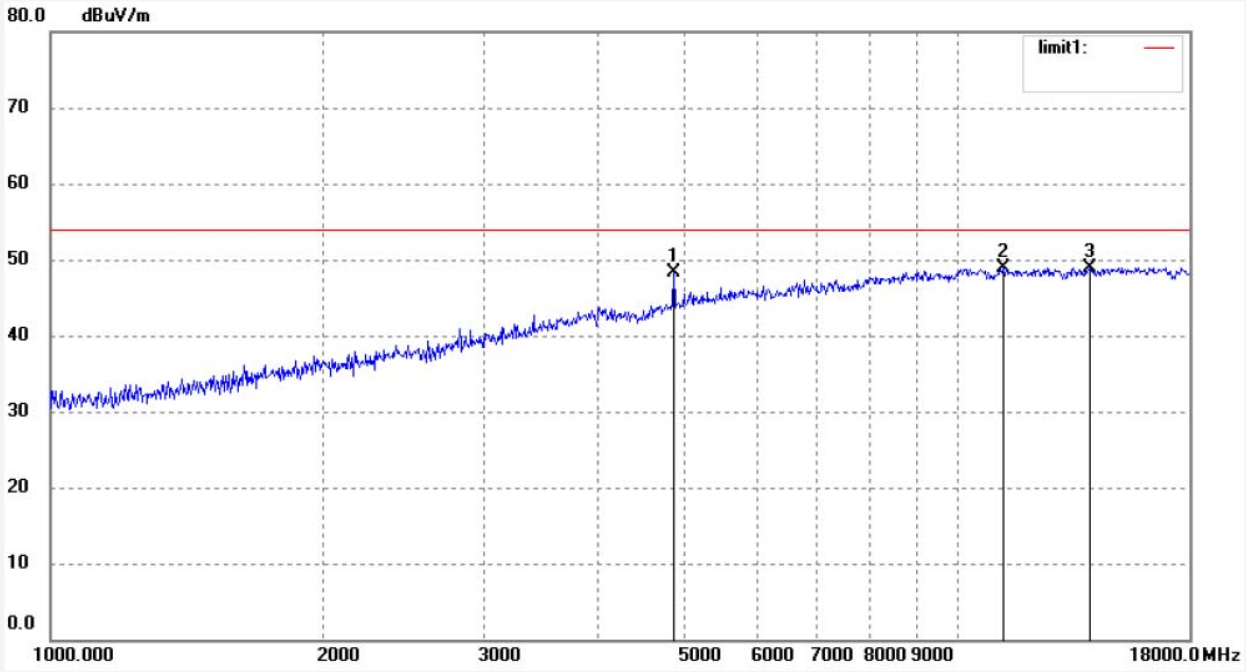
Job No.: alen #3724	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 7.4V
Test item: Radiation Test	Date: 14/03/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/30/27
EUT: Speaker	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: FY-28	
Manufacturer: New Tech	

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4859.975	49.77	-1.41	48.36	74.00	-25.64	peak			
2	11204.896	43.15	5.72	48.87	74.00	-25.13	peak			
3	13997.929	38.50	10.40	48.90	74.00	-25.10	peak			

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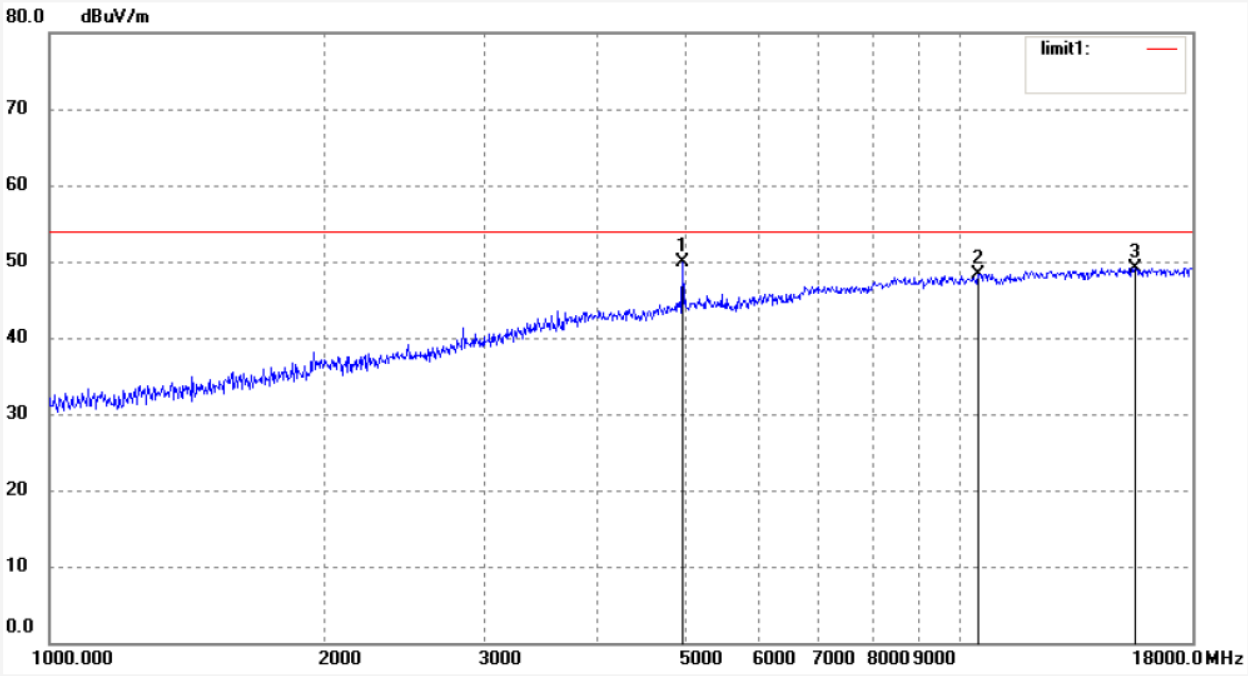
Job No.: alen #3726
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Speaker
Mode: TX 2480MHz
Model: FY-28
Manufacturer: New Tech

Polarization: Horizontal
Power Source: DC 7.4V
Date: 14/03/11/
Time: 9/32/37
Engineer Signature:
Distance: 3m

Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4959.307	51.09	-1.12	49.97	74.00	-24.03	peak			
2	10484.230	43.20	5.20	48.40	74.00	-25.60	peak			
3	15577.899	37.80	11.30	49.10	74.00	-24.90	peak			

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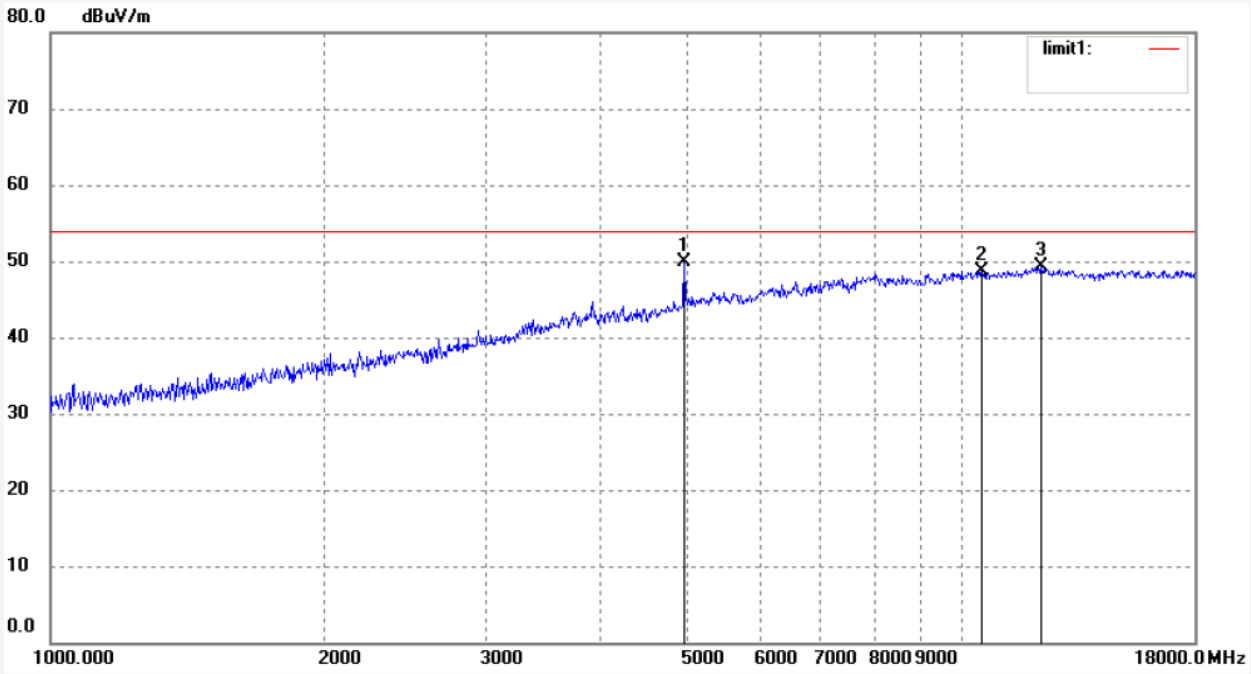
Job No.: alen #3727
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Speaker
Mode: TX 2480MHz
Model: FY-28
Manufacturer: New Tech

Polarization: Vertical
Power Source: DC 7.4V
Date: 14/03/11/
Time: 9/33/48
Engineer Signature:
Distance: 3m

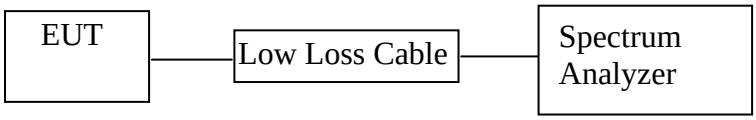
Note: Report No:ATE20140248



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4959.307	51.05	-1.12	49.93	74.00	-24.07	peak			
2	10514.577	43.47	5.20	48.67	74.00	-25.33	peak			
3	12219.853	42.61	6.79	49.40	74.00	-24.60	peak			

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: Speaker)

11.2.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).

11.3.EUT Configuration on Measurement

The 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.

11.4.Operating Condition of EUT

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

11.4.2.Turn on the power of all equipment.

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

11.5.Test Procedure

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

11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

11.5.3.The band edges was measured and recorded.

11.6.Test Result

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK		
2399.942	37.61	> 20dBc
2484.600	55.76	> 20dBc
Π/4-DQPSK Mode		
2399.520	39.75	> 20dBc
2490.400	55.79	> 20dBc
8DPSK		
2398.920	39.62	> 20dBc
2485.300	55.29	> 20dBc