



# TEST REPORT

**Report Reference No.**..... : **TRE1706012503** R/C.....: 13541

**FCC ID**..... : **ZSW-30-044**

**Applicant's name**..... : **b mobile HK Limited**

Address..... : Flat 18; 14/F Block 1; Golden Industrial Building;16-26 KwaiTak Street; Kwai Chung; New Territories; Hong Kong.

Manufacturer..... : b mobile HK Limited

Address..... : Flat 18; 14/F Block 1; Golden Industrial Building;16-26 KwaiTak Street; Kwai Chung; New Territories; Hong Kong.

**Test item description** ..... : **Mobile Phone**

Trade Mark ..... : Bmobile

Model/Type reference..... : AX681

Listed Model(s)..... : -

**Standard** ..... : **FCC CFR Title 47 Part 15 Subpart C Section 15.247**

Date of receipt of test sample..... : Jun.14, 2017

Date of testing..... : Jun.15, 2017- Jun.29, 2017

Date of issue..... : Jun.30, 2017

**Result**..... : **PASS**

Compiled by  
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**Testing Laboratory Name** ..... : **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address..... : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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## Contents

<b>1.</b>	<b><u>TEST STANDARDS AND TEST DESCRIPTION</u></b>	<b>3</b>
1.1.	Test Standards	3
1.2.	Report version	3
<b>2.</b>	<b><u>TEST DESCRIPTION</u></b>	<b>4</b>
<b>3.</b>	<b><u>SUMMARY</u></b>	<b>5</b>
3.1.	Client Information	5
3.2.	Product Description	5
3.3.	Operation state	6
3.4.	EUT configuration	6
3.5.	Modifications	6
<b>4.</b>	<b><u>TEST ENVIRONMENT</u></b>	<b>7</b>
4.1.	Address of the test laboratory	7
4.2.	Test Facility	7
4.3.	Environmental conditions	8
4.4.	Statement of the measurement uncertainty	8
4.5.	Equipments Used during the Test	9
<b>5.</b>	<b><u>TEST CONDITIONS AND RESULTS</u></b>	<b>10</b>
5.1.	Antenna requirement	10
5.2.	Conducted Emission (AC Main)	11
5.3.	Conducted Peak Output Power	14
5.4.	20dB Emission Bandwidth	17
5.5.	Carrier Frequencies Separation	20
5.6.	Hopping Channel Number	22
5.7.	Dwell Time	24
5.8.	Pseudorandom Frequency Hopping Sequence	27
5.9.	Restricted band (radiated)	28
5.10.	Bandedge and Spurious Emission (conducted)	30
5.11.	Spurious Emission (radiated)	34
<b>6.</b>	<b><u>TEST SETUP PHOTOS OF THE EUT</u></b>	<b>38</b>
<b>7.</b>	<b><u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u></b>	<b>39</b>

# **1. TEST STANDARDS AND TEST DESCRIPTION**

## **1.1. Test Standards**

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices

## **1.2. Report version**

Version No.	Date of issue	Description
00	Jun.30, 2017	Original

## **2. Test Description**

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)	Pass
Dwell Time	15.247 (a)(1)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List (7 July 2002)	Pass
Restricted band	15.247(d)/15.205	Pass
Radiated Emission	15.247(d)/15.209	Pass

Note: The measurement uncertainty is not included in the test result.

### 3. SUMMARY

#### 3.1. Client Information

Applicant:	b mobile HK Limited
Address:	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong
Manufacturer:	b mobile HK Limited
Address:	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong

#### 3.2. Product Description

Name of EUT:	Mobile Phone
Trade Mark:	Bmobile
Model No.:	AX681
Listed Model(s):	-
Power supply:	DC 3.7V From internal battery
Adapter information:	Input:100-240Va.c., 50-60Hz, 0.4A Output: 5Vd.c.,600mA
Hardware version:	4085_MB_V1.0
Software version:	Bmobile_AX681_TEM_GT_V001
<b>Bluetooth</b>	
Version:	Supported BT4.0+EDR
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Integral Antenna
Antenna gain:	-2.7dBi

### 3.3. Operation state

#### ➤ Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

Channel	Frequency (MHz)
0	2402
1	2403
:	:
39	2441
:	:
77	2479
78	2480

#### ➤ Test mode

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).
For AC power line conducted emissions:
The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.
For RF test axis
EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

### 3.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

<input type="radio"/>	Power Cable	Length (m):	/
		Shield:	/
		Detachable:	/
<input type="radio"/>	Multimeter	Manufacturer:	/
		Model No.:	/

### 3.5. Modifications

No modifications were implemented to meet testing criteria.

## **4. TEST ENVIRONMENT**

### **4.1. Address of the test laboratory**

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Phone: 86-755-26748019 Fax: 86-755-26748089

### **4.2. Test Facility**

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

#### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 3902.01**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### **FCC-Registration No.: 317478**

Shenzhen Huatongwei International Inspection 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 317478.

#### **IC-Registration No.: 5377B**

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B.

#### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

### 4.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

### 4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter Power Conducted	0.57 dB	(1)
Transmitter Power Radiated	2.20 dB	(1)
Conducted Spurious Emission 9 kHz ~ 40 GHz	1.60 dB	(1)
Radiated Spurious Emission 9 kHz ~ 40 GHz	2.20 dB	(1)
Conducted Emission 9 kHz ~ 30 MHz	3.39 dB	(1)
Radiated Emission 30 ~ 1000 MHz	4.24 dB	(1)
Radiated Emission 1 ~ 18 GHz	5.16 dB	(1)
Radiated Emission 18 ~ 40 GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=1.96$ .



#### 4.5. Equipments Used during the Test

Conducted Emission (AC Main)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	2016/11/13
2	EMI Test Receiver	Rohde&Schwarz	ESCI3	100038	2016/11/13
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2016/11/13
4	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2016/11/13
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2016/11/13
3	EMI TEST Software	Audix	E3	N/A	N/A
4	TURNTABLE	ETS	2088	2149	N/A
5	ANTENNA MAST	ETS	2075	2346	N/A
6	EMI TEST Software	Rohde&Schwarz	ESK1	N/A	N/A
7	HORNANTENNA	ShwarzBeck	9120D	1011	2016/11/13
8	Amplifer	Sonoma	310N	E009-13	2016/11/13
9	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2016/11/13
10	High pass filter	Compliance Direction systems	BSU-6	34202	2016/11/13
11	HORNANTENNA	ShwarzBeck	9120D	1012	2016/11/13
12	Amplifer	Compliance Direction systems	PAP1-4060	120	2016/11/13
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2016/11/13
14	TURNTABLE	MATURO	TT2.0	----	N/A
15	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
16	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2016/11/13
17	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2016/11/13

Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2016/11/13

The Cal.Interval was one year

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Antenna requirement

#### Requirement

##### **FCC CFR Title 47 Part 15 Subpart C Section 15.203:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

##### **FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):**

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### Test Result:

**Passed**       **Not Applicable**

The antenna is integral antenna, the best case gain of the antenna is -2.7dBi.



## 5.2. Conducted Emission (AC Main)

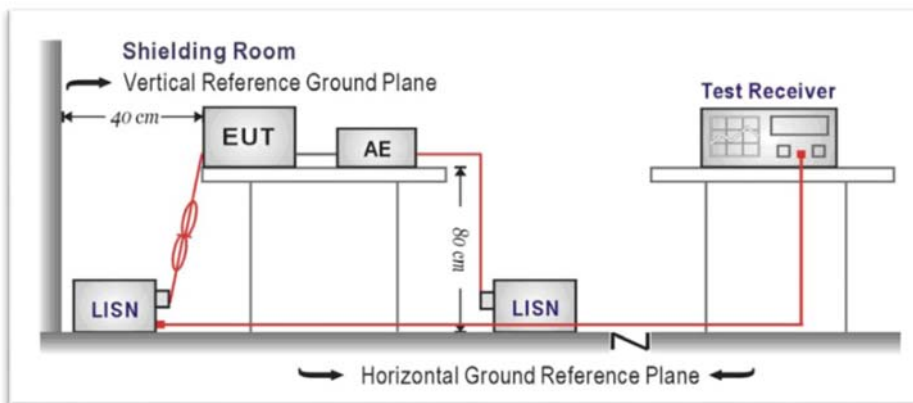
### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.
- 9.

### TEST RESULTS

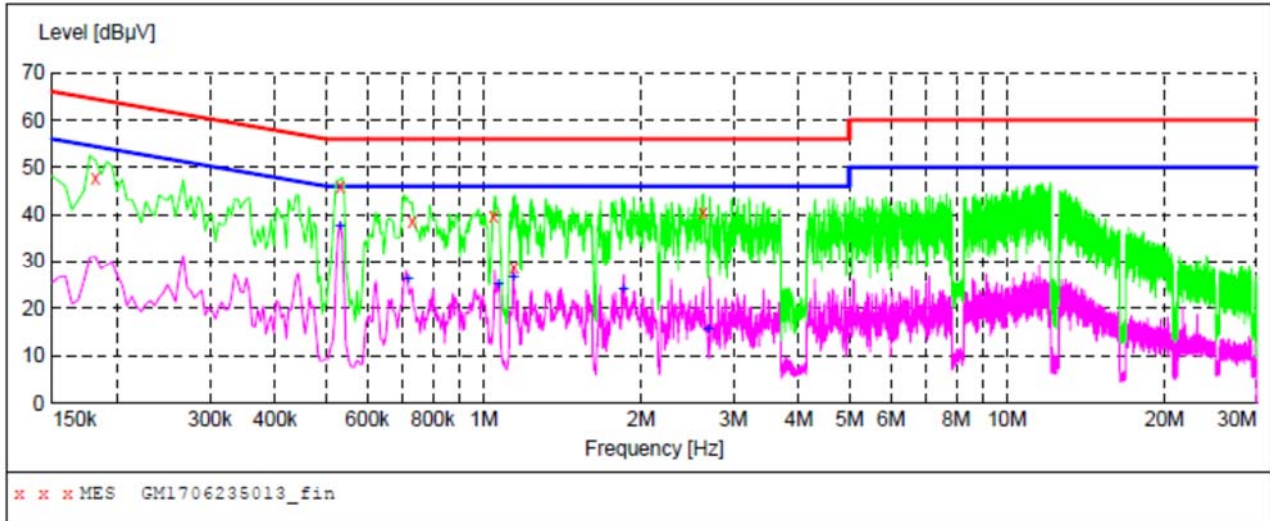
Passed       Not Applicable

Note:

- 1) Transd= Cable lose + Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit - Level

Test Line:

L



**MEASUREMENT RESULT: "GM1706235013\_fin"**

6/23/2017 9:40AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.181500	47.60	10.3	64	16.8	QP	L1	GND
0.532500	46.10	10.2	56	9.9	QP	L1	GND
0.730500	38.60	10.2	56	17.4	QP	L1	GND
1.045500	39.90	10.2	56	16.1	QP	L1	GND
1.144500	28.90	10.2	56	27.1	QP	L1	GND
2.629500	40.60	10.2	56	15.4	QP	L1	GND

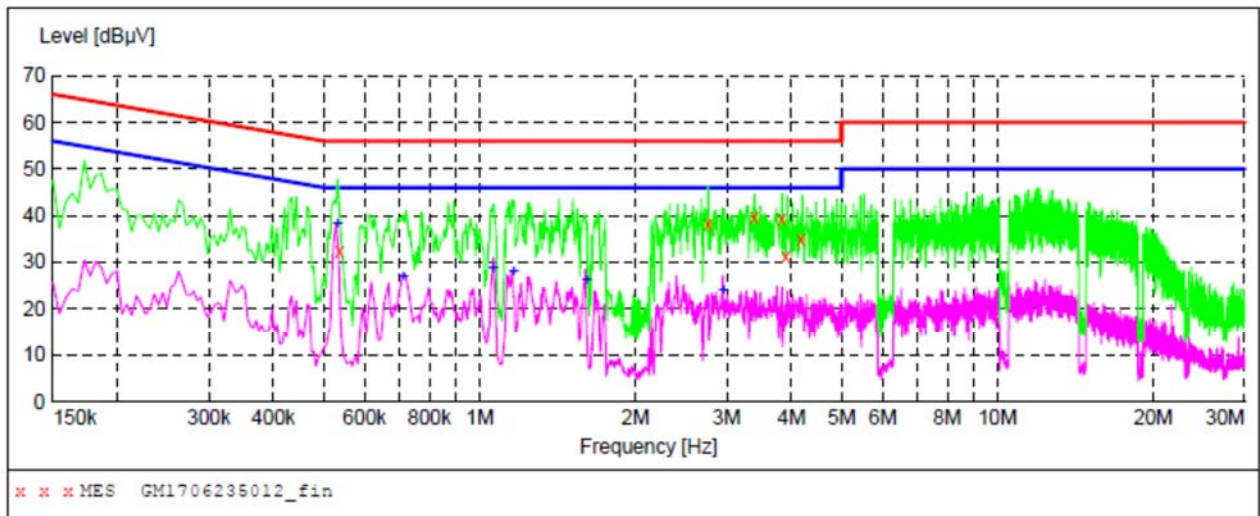
**MEASUREMENT RESULT: "GM1706235013\_fin2"**

6/23/2017 9:40AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.532500	37.50	10.2	46	8.5	AV	L1	GND
0.717000	26.20	10.2	46	19.8	AV	L1	GND
1.068000	25.00	10.2	46	21.0	AV	L1	GND
1.140000	26.40	10.2	46	19.6	AV	L1	GND
1.851000	23.90	10.2	46	22.1	AV	L1	GND
2.683500	15.50	10.2	46	30.5	AV	L1	GND

Test Line:

N



**MEASUREMENT RESULT: "GM1706235012\_fin"**

6/23/2017 9:37AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.537000	32.40	10.2	56	23.6	QP	N	GND
2.769000	38.20	10.2	56	17.8	QP	N	GND
3.399000	39.80	10.3	56	16.2	QP	N	GND
3.840000	39.50	10.3	56	16.5	QP	N	GND
3.903000	31.40	10.3	56	24.6	QP	N	GND
4.182000	35.00	10.3	56	21.0	QP	N	GND

**MEASUREMENT RESULT: "GM1706235012\_fin2"**

6/23/2017 9:37AM

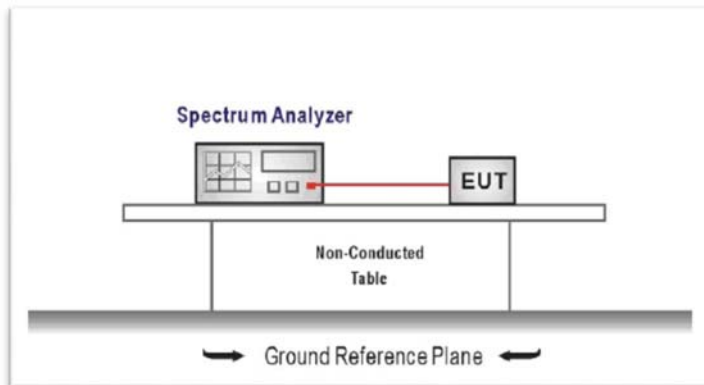
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.532500	38.10	10.2	46	7.9	AV	N	GND
0.712500	26.80	10.2	46	19.2	AV	N	GND
1.063500	28.80	10.2	46	17.2	AV	N	GND
1.162500	27.90	10.2	46	18.1	AV	N	GND
1.608000	26.30	10.2	46	19.7	AV	N	GND
2.953500	23.80	10.2	46	22.2	AV	N	GND

### 5.3. Conducted Peak Output Power

#### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): **30dBm**

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
 Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel  
 RBW ≥ the 20 dB bandwidth of the emission being measured, VBW ≥ RBW  
 Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

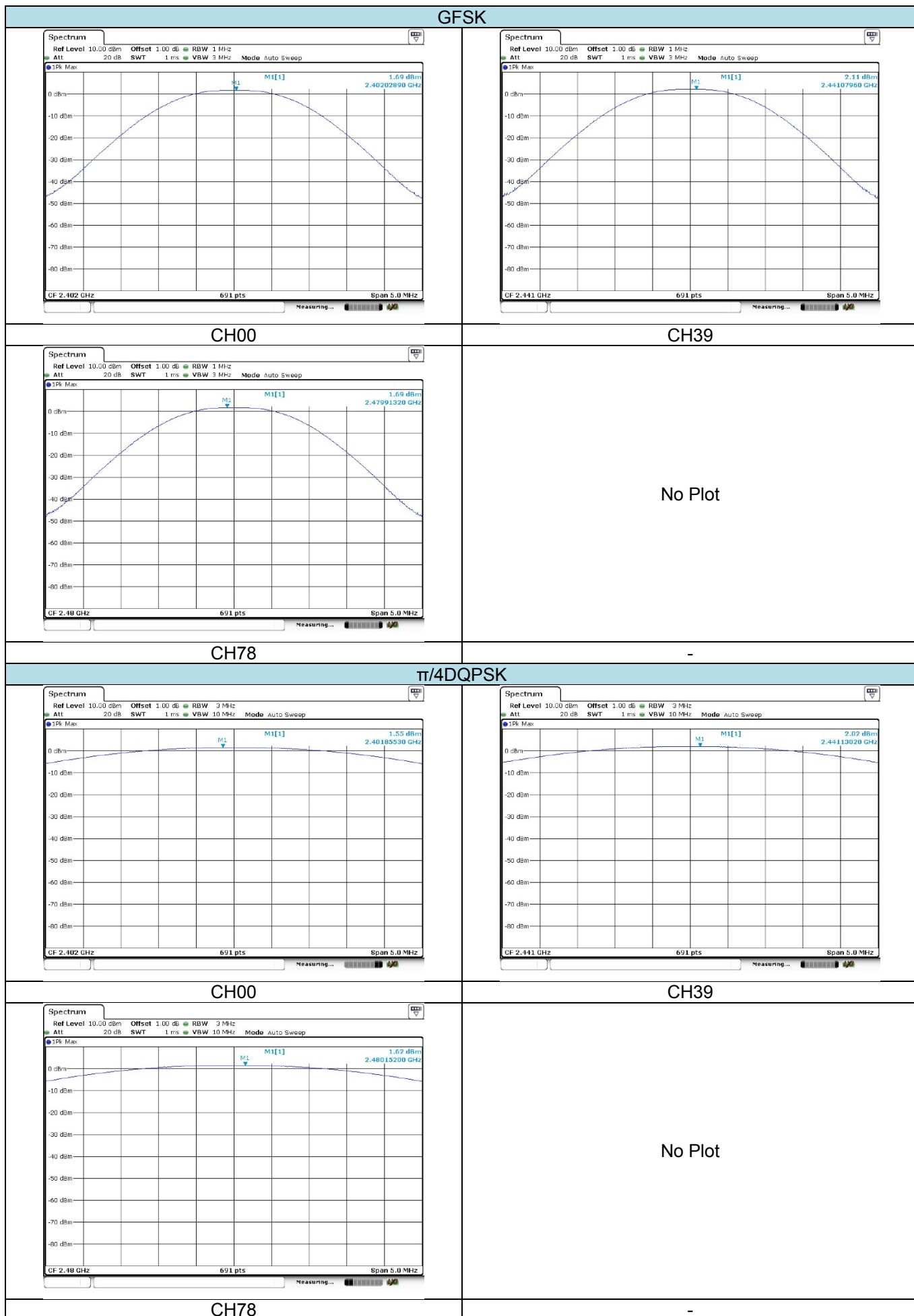
#### TEST MODE:

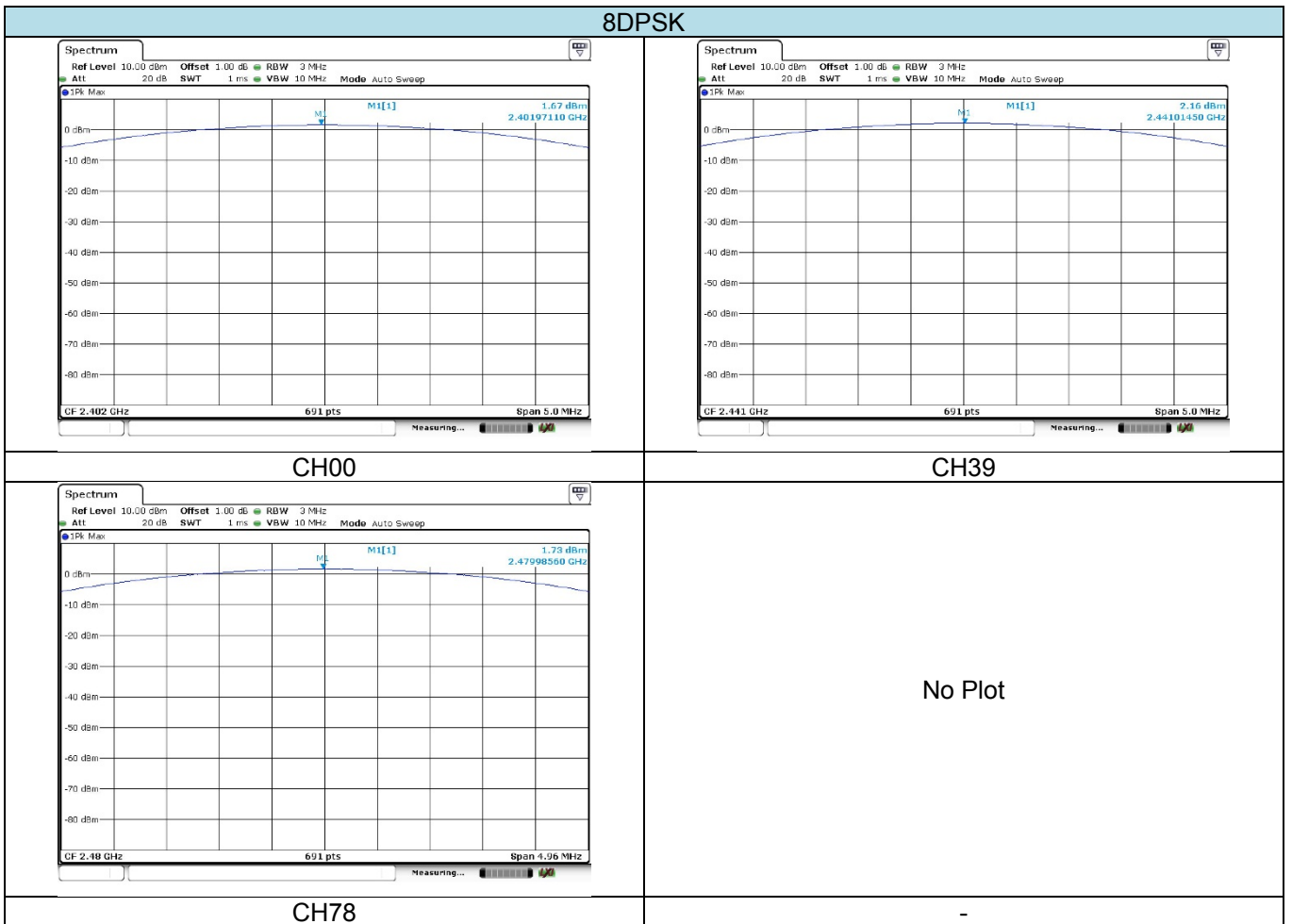
Please refer to the clause 3.3

#### TEST RESULTS

**Passed**       **Not Applicable**

Modulation type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	1.69	30.00	Pass
	39	2.11		
	78	1.69		
π/4DQPSK	00	1.55	21.00	Pass
	39	2.02		
	78	1.62		
8DPSK	00	1.67	21.00	Pass
	39	2.16		
	78	1.73		





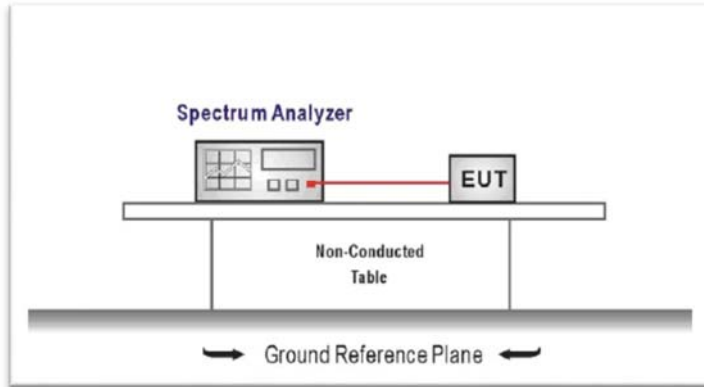


### 5.4. 20dB Emission Bandwidth

**LIMIT**

N/A

**TEST CONFIGURATION**



**TEST PROCEDURE**

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. 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
4. Measure and record the results in the test report.

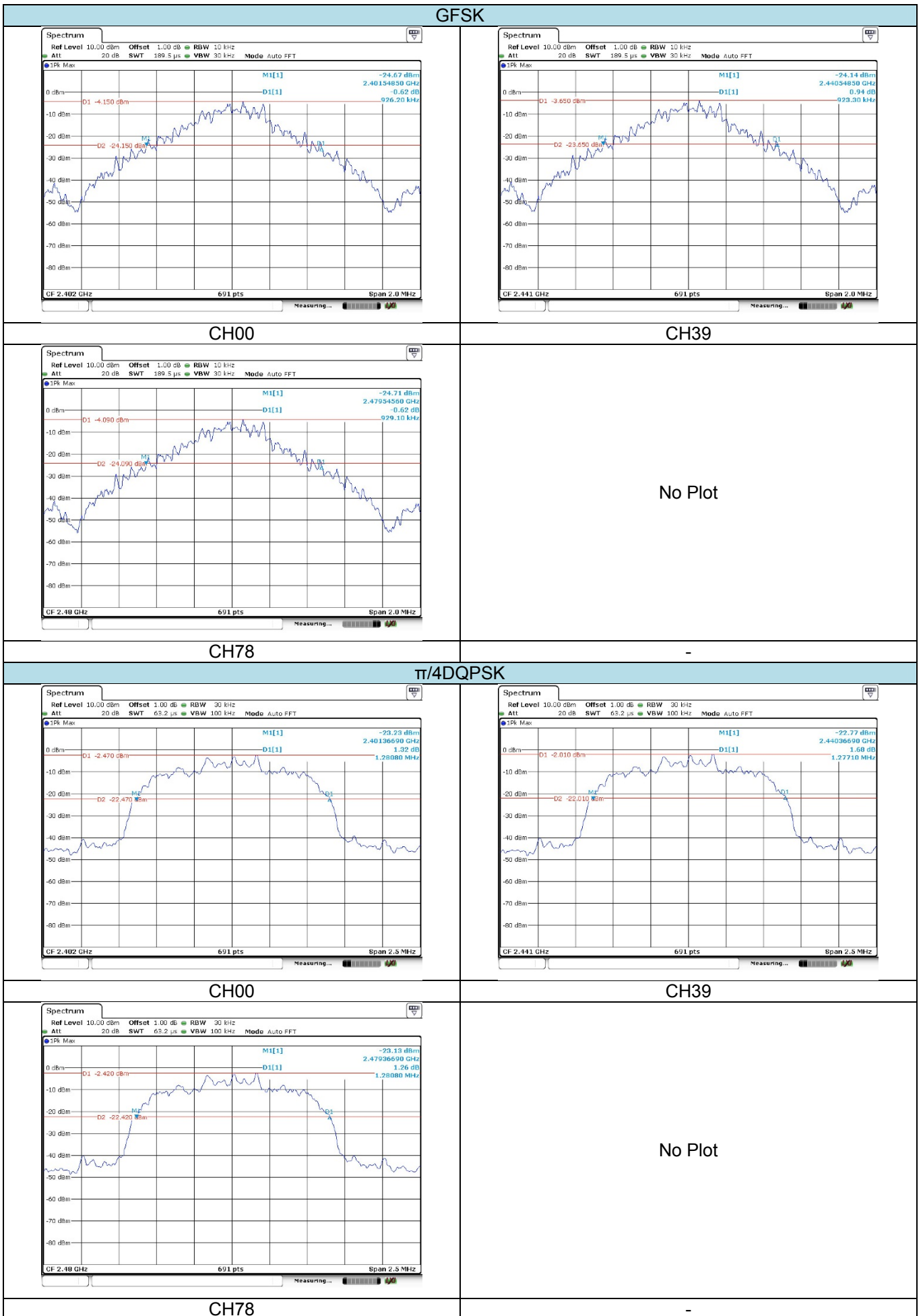
**TEST MODE:**

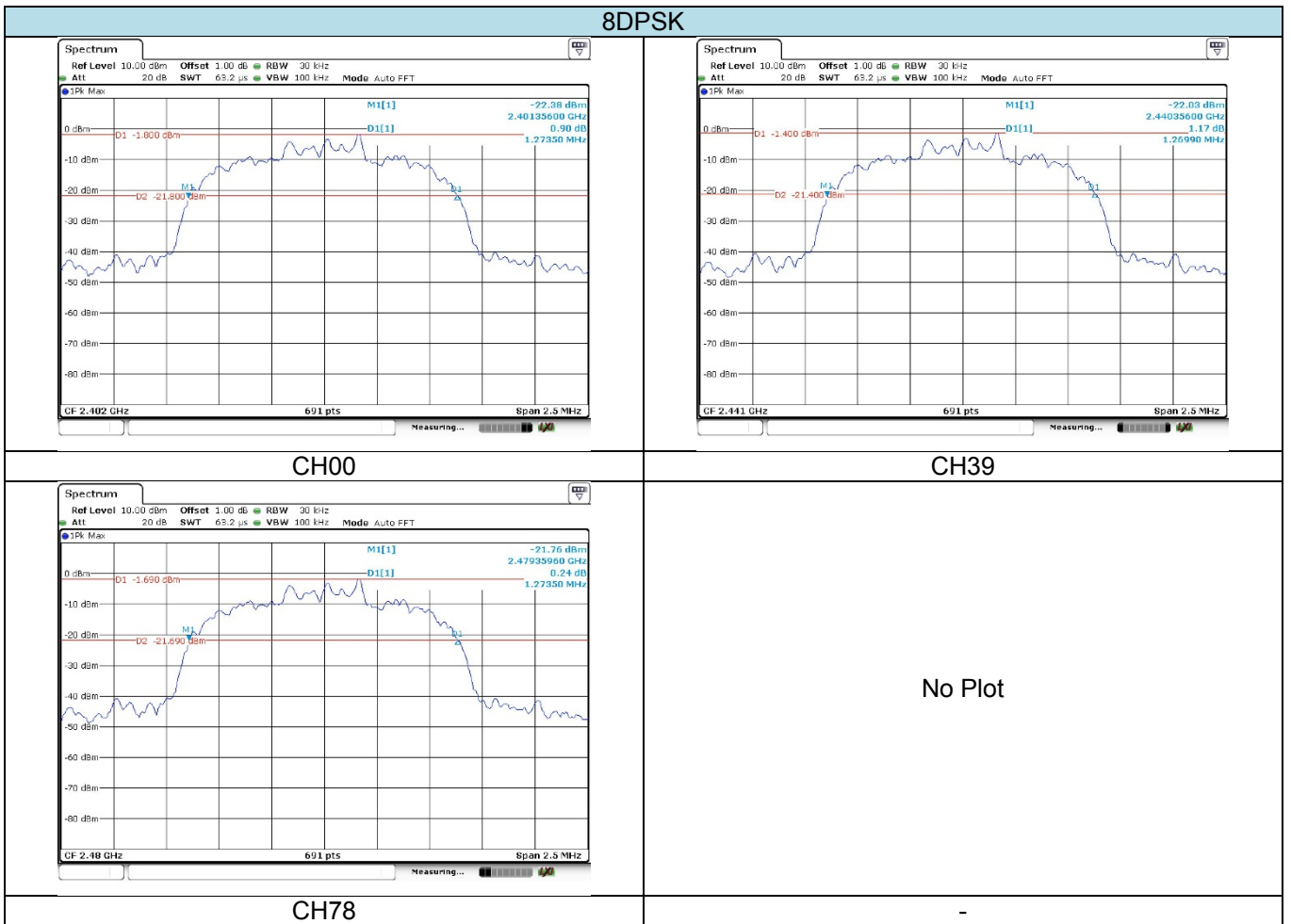
Please refer to the clause 3.3

**TEST RESULTS**

**Passed**       **Not Applicable**

Modulation type	Channel	20dB Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.927	-	Pass
	39	0.923		
	78	0.929		
π/4DQPSK	00	1.281	-	Pass
	39	1.277		
	78	1.281		
8DPSK	00	1.274	-	Pass
	39	1.270		
	78	1.274		



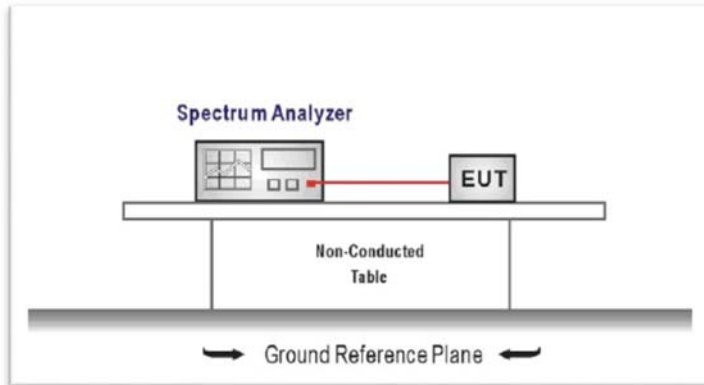


### 5.5. Carrier Frequencies Separation

**LIMIT**

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):  
 frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the 2/3\*20 dB bandwidth of the hopping channel, whichever is greater.

**TEST CONFIGURATION**



**TEST PROCEDURE**

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
 Span = wide enough to capture the peaks of two adjacent channels  
 RBW ≥ 1% of the span, VBW ≥ RBW  
 Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

**TEST MODE:**

Please refer to the clause 3.3

**TEST RESULTS**

**Passed**       **Not Applicable**

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result
GFSK	39	0.999	0.929	Pass
π/4DQPSK	39	1.004	0.854	Pass
8DPSK	39	1.007	0.849	Pass