



# TEST REPORT

**Report Reference No.**..... : **4787598692-3**

**FCC ID**..... : **2AB7X-WISEPOS**

**Applicant's name**..... : **BBPOS International Limited**

**Address**..... : Suite 1602, 16/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road,  
Tsuen Wan, N.T., Hong Kong

**Manufacturer**..... : BBPOS International Limited

**Address**..... : Suite 1602, 16/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road,  
Tsuen Wan, N.T., Hong Kong

**Test item description** ..... : **WisePOS**

**Trade Mark** ..... : -

**Model/Type reference**..... : WSC11

**Listed Model(s)**..... : WSC10

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

**Date of receipt of test sample**..... : Oct. 25,2016

**Date of testing**..... : Oct. 26,2016- Nov. 02, 2016

**Date of issue**..... : Nov. 09, 2016

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

Reviewed by :

A handwritten signature in black ink that reads 'Denny Huang'.

Denny Huang (Project Engineer)

Approved by:

A handwritten signature in black ink that reads 'Stephen Guo'.

Stephen Guo (Laboratory Manager)

**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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# **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. Test Description**

ReportSection	Test Item	Section in CFR 47	Result
4.1	Antenna Requirement	15.203/15.247 (c)	Pass
4.2	AC Power Line Conducted Emission	15.207	Pass
4.3	Conducted Peak Output Power	15.247 (b)(1)	Pass
4.4	20dB Occupied Bandwidth	15.247 (a)(1)	Pass
4.5	Carrier Frequencies Separation	15.247 (a)(1)	Pass
4.6	Hopping Channel Number	15.247 (a)(1)	Pass
4.7	Dwell Time	15.247 (a)(1)	Pass
4.8	Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List (7 July 2002)	Pass
4.9	Restricted band	15.247(d)/15.205	Pass
4.10/4.11	Radiated Emission	15.247(d)/15.209	Pass

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

## 2. SUMMARY

### 2.1. Client Information

Applicant:	BBPOS International Limited
Address:	Suite 1602, 16/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road, Tsuen Wan, N.T., Hong Kong
Manufacturer:	BBPOS International Limited
Address:	Suite 1602, 16/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road, Tsuen Wan, N.T., Hong Kong

### 2.2. Product Description

Name of EUT	WisePOS
Trade Mark:	-
Model No.:	WSC11
Listed Model(s):	WSC10
IMEI 1:	352788070030212
IMEI 2:	352788070030220
Power supply:	DC 3.8V From internal battery
Adapter information:	-
<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:	Internal Antenna
Antenna gain:	-0.5dBi

### 2.3. 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/receive.

For AC power line conducted emissions:

the EUT was set to connect with the Bluetooth under large package sizes transmission.

### 2.4. EUT configuration

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

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

	Length (m) :	
	Shield :	
	Manufacturer :	
	Model No. :	

### 2.5. Modifications

No modifications were implemented to meet testing criteria.

### **3. TEST ENVIRONMENT**

#### **3.1. 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

#### **3.2. 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, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

##### **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. Valid time is until December 31, 2016.

##### **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, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

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

The 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. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.

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 on Dec.03, 2014, valid time is until Dec.03, 2017.

##### **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.

### 3.3. 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

### 3.4. 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 according 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 according 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 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	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.



### 3.5. 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	2015/11/02
2	EMI Test Receiver	Rohde&Schwarz	ESCI3	100038	2015/11/02
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2015/11/02
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	2015/11/02
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2015/11/02
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	2015/11/02
8	Amplifer	Sonoma	310N	E009-13	2015/11/02
9	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2015/11/02
10	High pass filter	Compliance Direction systems	BSU-6	34202	2015/11/02
11	HORNANTENNA	ShwarzBeck	9120D	1012	2015/11/02
12	Amplifer	Compliance Direction systems	PAP1-4060	120	2015/11/02
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2015/11/02
14	TURNTABLE	MATURO	TT2.0	----	N/A
15	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
16	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2015/11/02
17	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2015/11/02

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	2015/11/02

The Cal.Interval was one year

## 4. TEST CONDITIONS AND RESULTS

### 4.1. Antenna requirement

#### Requirement

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

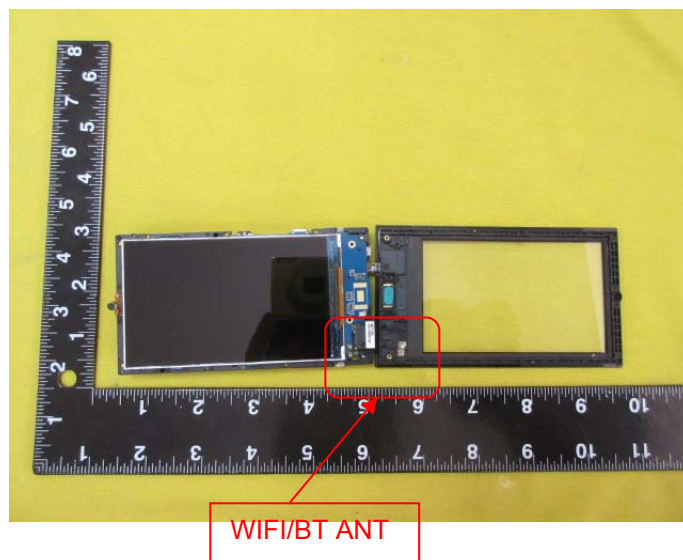
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

#### Test Result:

The antenna is integral antenna, the best case gain of the antenna is -0.5dBi



## 4.2. Conducted Emission (AC Main)

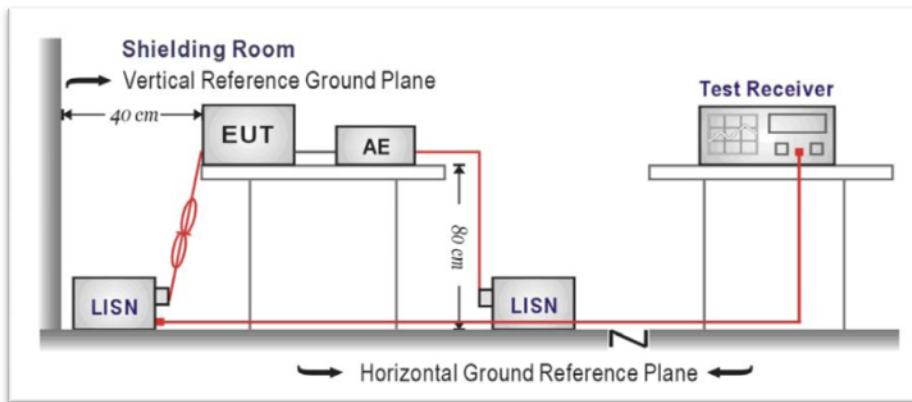
### LIMIT

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

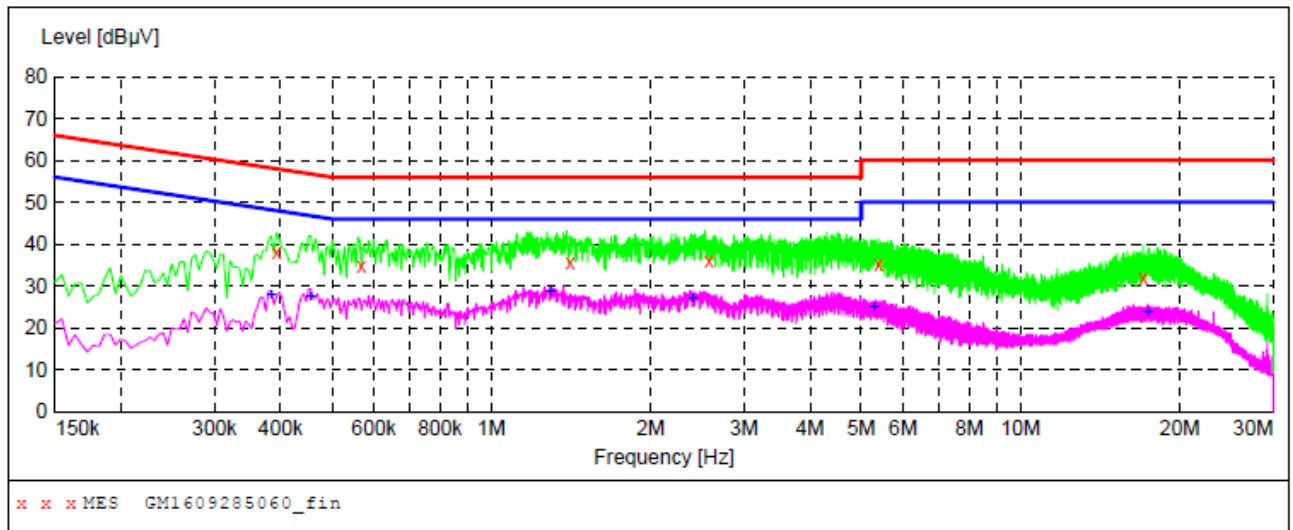


### TEST PROCEDURE

1. The EUT was setup and tested 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 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

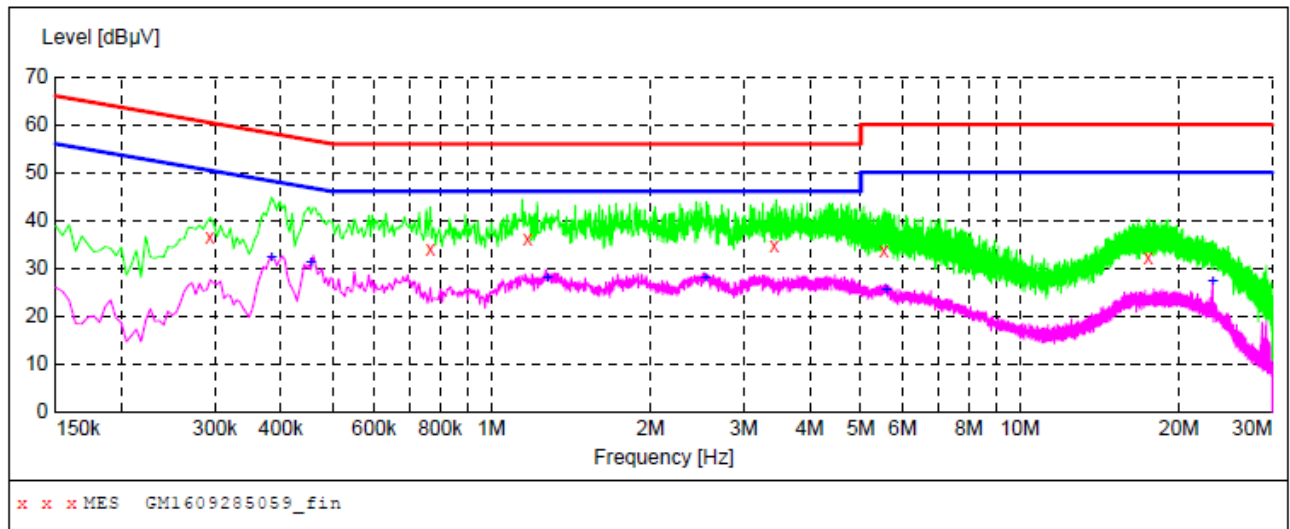
### TEST RESULTS

Test mode:AC 120V	BT	Polarization	L
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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.393000	38.10	10.2	58	19.9	QP	L1	GND
0.568500	34.80	10.2	56	21.2	QP	L1	GND
1.410000	35.80	10.3	56	20.2	QP	L1	GND
2.580000	36.00	10.3	56	20.0	QP	L1	GND
5.397000	35.00	10.5	60	25.0	QP	L1	GND
17.065500	31.90	10.7	60	28.1	QP	L1	GND
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.384000	28.00	10.2	48	20.2	AV	L1	GND
0.456000	27.60	10.2	47	19.2	AV	L1	GND
1.293000	28.70	10.3	46	17.3	AV	L1	GND
2.400000	27.10	10.3	46	18.9	AV	L1	GND
5.289000	24.80	10.5	50	25.2	AV	L1	GND
17.358000	23.70	10.7	50	26.3	AV	L1	GND

Test mode: AC 120V	BT	Polarization	N
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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.294000	36.40	10.2	60	24.0	QP	N	GND
0.766500	34.00	10.2	56	22.0	QP	N	GND
1.171500	36.10	10.3	56	19.9	QP	N	GND
3.435000	34.80	10.4	56	21.2	QP	N	GND
5.541000	33.50	10.5	60	26.5	QP	N	GND
17.502000	32.10	10.7	60	27.9	QP	N	GND
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.384000	32.30	10.2	48	15.9	AV	N	GND
0.456000	31.00	10.2	47	15.8	AV	N	GND
1.275000	28.10	10.3	46	17.9	AV	N	GND
2.539500	28.00	10.3	46	18.0	AV	N	GND
5.577000	25.30	10.5	50	24.7	AV	N	GND
23.131500	27.20	10.8	50	22.8	AV	N	GND

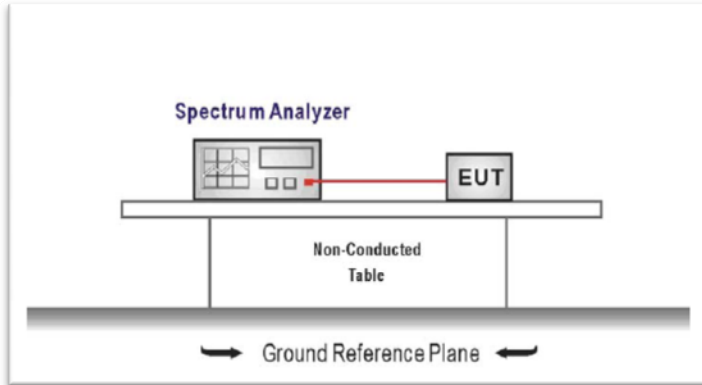
Remark: Transd=Cable lose+PULSE LIMITER factor+ARTIFICIAL MAINS factor; Margin=Limit-Level

### 4.3. Conducted Peak Output Power

#### LIMIT

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

#### TEST CONFIGURATION



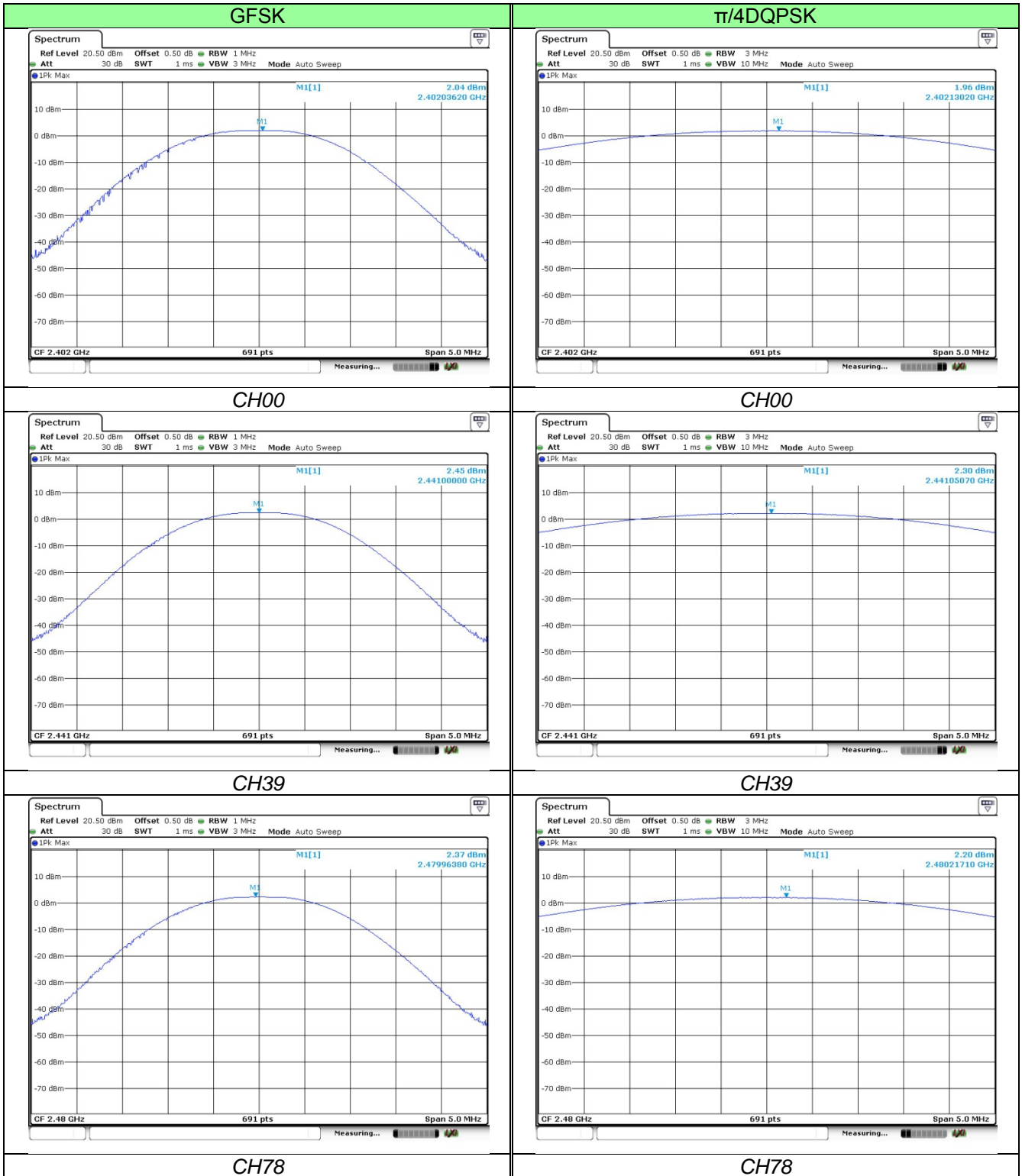
#### TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.

#### TEST RESULTS

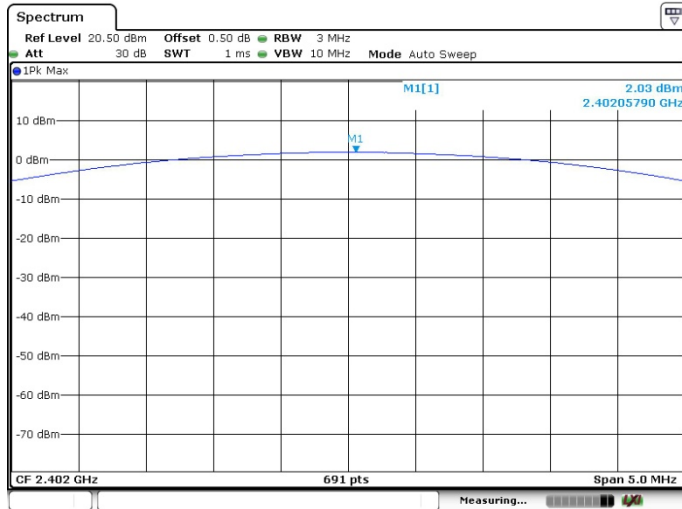
Modulation type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	2.04	30.00	Pass
	39	2.45		
	78	2.37		
$\pi/4$ DQPSK	00	1.96	21.00	Pass
	39	2.30		
	78	2.20		
8DPSK	00	2.03	21.00	Pass
	39	2.43		
	78	2.35		

Test plot as follows:

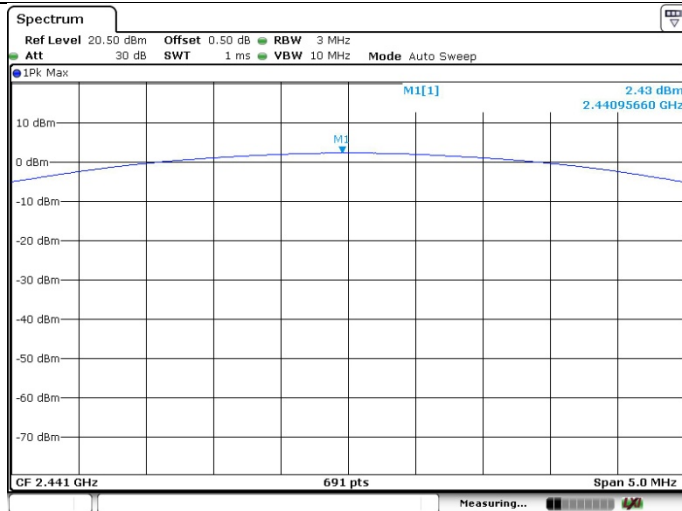


8DPSK

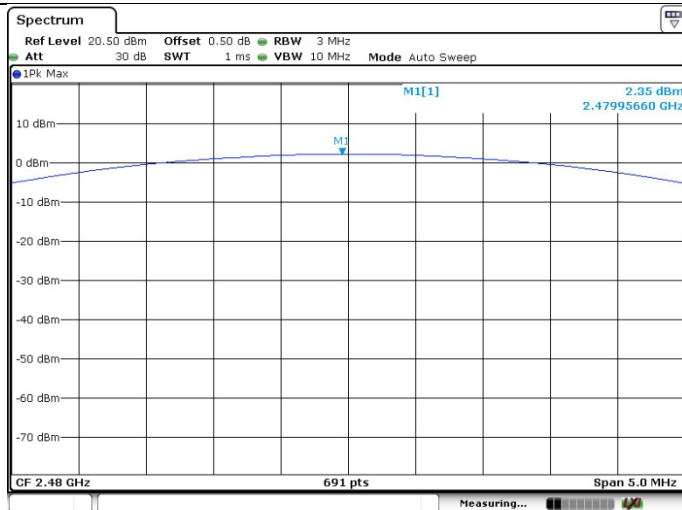
7



CH00



CH39



CH78

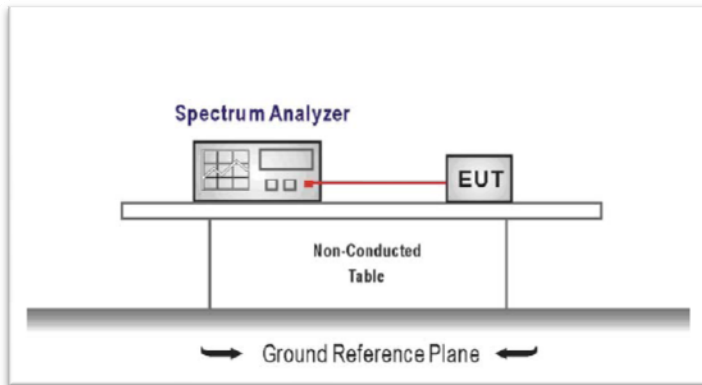


#### 4.4. 20dB Emission Bandwidth

##### LIMIT

N/A

##### TEST CONFIGURATION



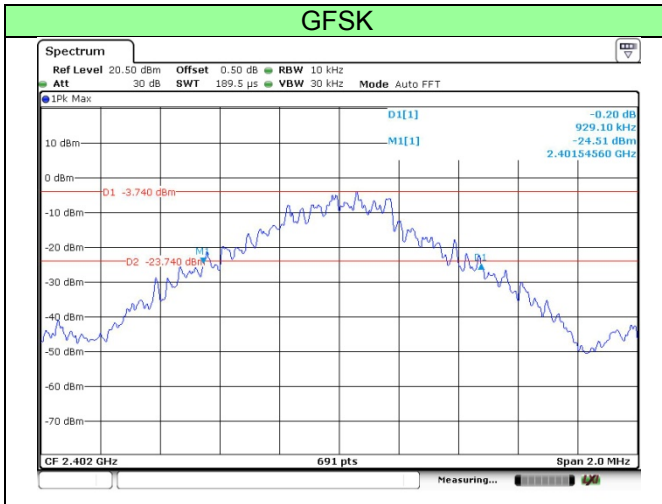
##### TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with  $RBW \geq 1\%$  of the 20 dB bandwidth and  $VBW \geq RBW$ .
3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

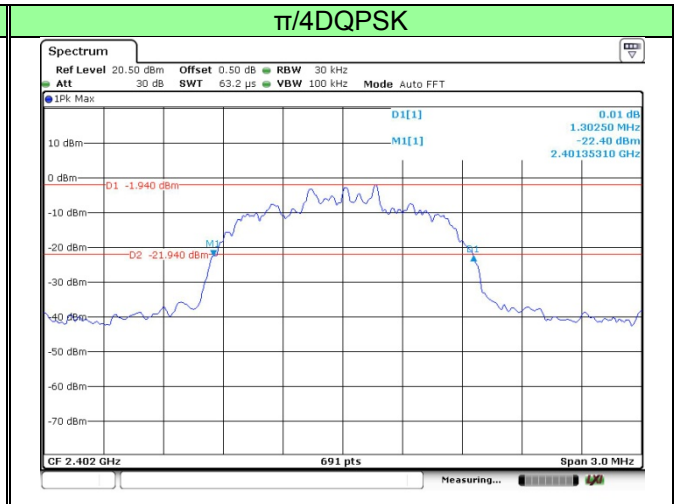
##### TEST RESULTS

Modulation type	Channel	20dB Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.929	/	Pass
	39	0.926		
	78	0.929		
$\pi/4$ DQPSK	00	1.303	/	Pass
	39	1.298		
	78	1.303		
8DPSK	00	1.289	/	Pass
	39	1.289		
	78	1.289		

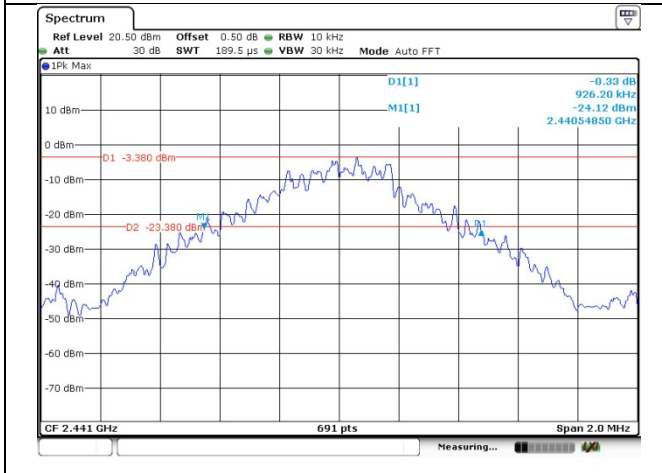
Test plot as follows:



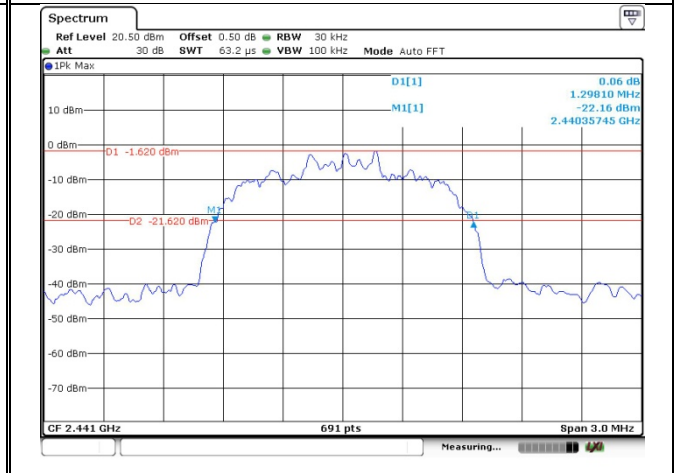
CH00



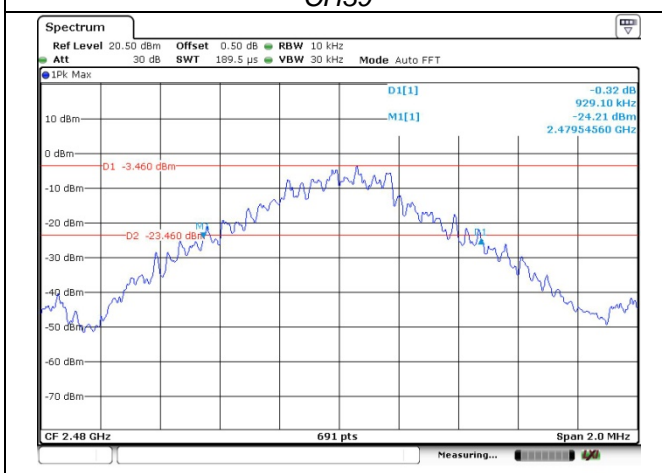
CH00



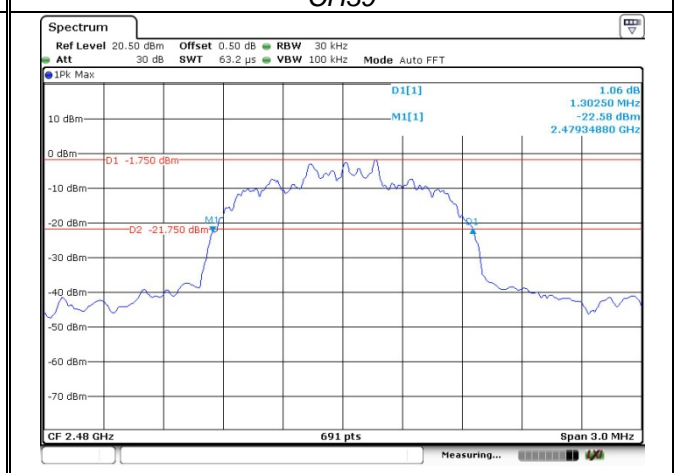
CH39



CH39

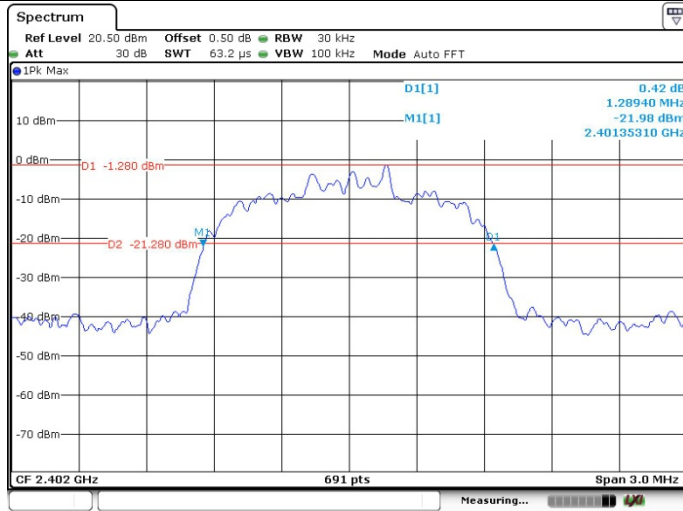


CH78

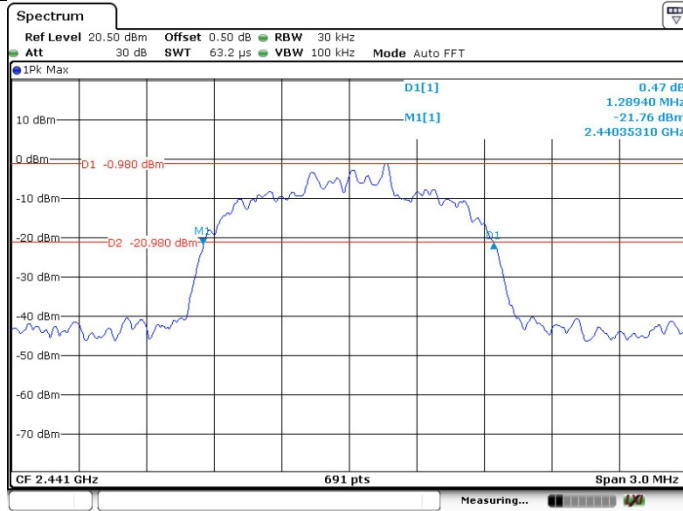


CH78

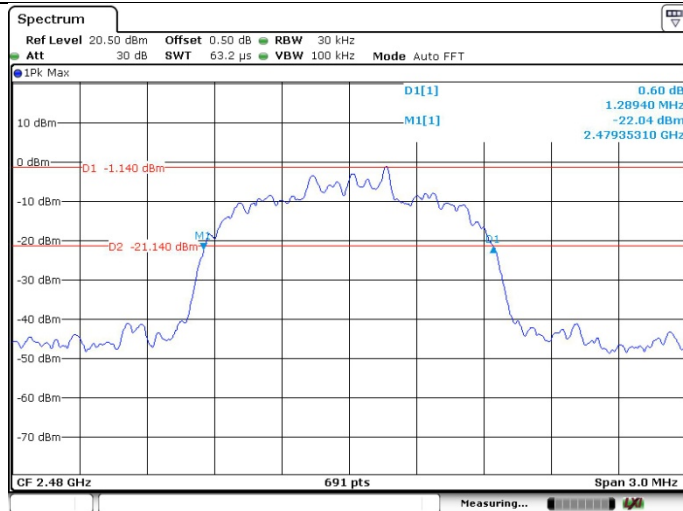
### 8DPSK



### CH00



### CH39



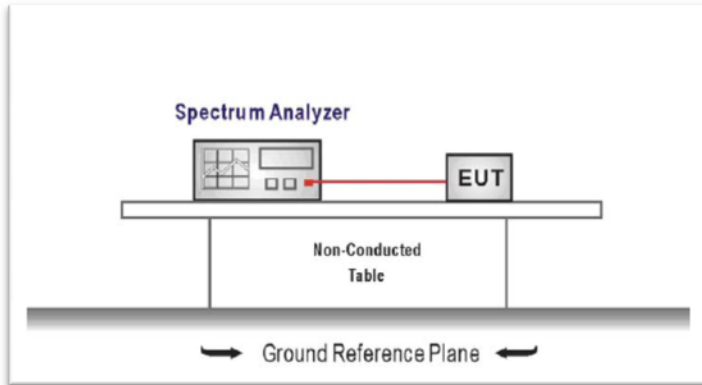
### CH78

### 4.5. 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 25KHz or the  $\frac{2}{3} * 20\text{dB}$  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.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30 KHz and VBW=100KHz.

#### TEST RESULTS

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result
GFSK	39	1.004	0.929	Pass
$\pi/4$ DQPSK	39	1.001	0.865	Pass
8DPSK	39	0.999	0.860	Pass

Test plot as follows: