



т	EST REPORT		
Report Reference No	TRE1801004302 R/C: 84584		
FCC ID:	ZSW-10-014		
Applicant's name:	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.		
Test item description:	Mobile Phone		
Trade Mark:	Bmobile		
Model/Type reference:	K370		
Listed Model(s)			
Standard:	FCC CFR Title 47 Part 15 Subpart C Section 15.247		
Date of receipt of test sample:	Jan.08,2018		
Date of testing	Jan.08,2018 - Jan.25,2018		
Date of issue	Jan.26,2018		
Result	PASS		
Compiled by (position+printedname+signature):	File administrators Candy Liu		
Supervised by (position+printed name+signature):	Project Engineer Cary Luo		
Approved by (Position+Printed name+Signature):	RF Manager Hans Hu		
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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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

<u>FCC Rules Part 15.247:</u> 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 Devicese

1.2. Report version

Version No.	Date of issue	Description
00	Jan.26,2018	Original

2. TEST DESCRIPTION

Test Item	Section in CFR 47	Result	Test Engineer
Antenna Requirement	15.203/15.247 (c)	Pass	Zhaohui.Ouyang
AC Power Line Conducted Emissions	15.207	Pass	Alex Guo
Conducted Peak Output Power	15.247 (b)(1)	Pass	Zhaohui.Ouyang
20 dB Bandwidth	15.247 (a)(1)	Pass	Zhaohui.Ouyang
Carrier Frequencies Separation	15.247 (a)(1)	Pass	Zhaohui.Ouyang
Hopping Channel Number	15.247 (a)(1)	Pass	Zhaohui.Ouyang
Dwell Time	15.247 (a)(1)	Pass	Zhaohui.Ouyang
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	Pass	Zhaohui.Ouyang
Restricted band	15.247(d)/15.205	Pass	Jiuru Pan
Radiated Emissions	15.247(d)/15.209	Pass	Jiuru Pan

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

3. <u>SUMMARY</u>

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.:	K370	
Listed Model(s):	-	
IMEI:	351547041021622	
Power supply:	DC 3.7V	
Adapter information:	Input:100-240Va.c.,50/60Hz,0.15A Output: 5Vd.c.,500mA	
Hardware version:	FF257-0.2A	
Software version:	Bmobile_K370_V004	
Bluetooth		
Version:	Supported BT2.1+EDR	
Modulation:	GFSK, π/4DQPSK, 8DPSK	
Operation frequency:	2402MHz~2480MHz	
Channel number:	79	
Channel separation:	1MHz	
Antenna type:	Integral Antenna	
Antenna gain:	1.75dBi	

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)
00	2402
01	2403
:	:
39	2441
:	÷
77	2479
78	2480

> <u>TEST MODE</u>

For RF test items:

The engineering test program was provided and enabled to make EUT continuous transmit

For AC power line conducted emissions:

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

For Radiated suprious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The 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

	Manufacturer:	/
7	Model No.:	/
	Manufacturer:	/
7	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

4.2. Test Facility

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.: 762235

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.

IC-Registration No.:5377B-1

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-1.

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 in 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 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.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes	
Transmitter power conducted	0.57 dB	(1)	
Transmitter power Radiated	2.20 dB	(1)	
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)	
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)	
Conducted Emissions 9kHz~30MHz	3.39 dB	(1)	
Radiated Emissions 30~1000MHz	4.24 dB	(1)	
Radiated Emissions 1~18GHz	5.16 dB	(1)	
Radiated Emissions 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.

Conducted Emissions Last Cal. Next Cal. Test Item Model No. Serial No. Manufacturer Equipment (mm-dd-yy) (mm-dd-yy) **EMI** Test R&S ESCI 101247 11/11/2017 11/10/2018 1 Receiver 2 Artificial Mains SCHWARZBECK **NNLK 8121** 573 11/11/2017 11/10/2018 2-Line V-3 R&S 100049 11/11/2017 11/10/2018 ESH3-Z5 Network **Pulse Limiter** ESH3-Z2 101488 11/11/2017 11/10/2018 4 R&S RF 5 Connection HUBER+SUHNER EF400 N/A 11/21/2017 11/20/2018 Cable 6 **Test Software** R&S ES-K1 N/A N/A N/A **Radiated Emissions** Last Cal. Next Cal. Test Item Manufacturer Model No. Serial No. Equipment (mm-dd-yy) (mm-dd-yy) EMI Test 11/11/2017 1 R&S ESCI 101247 11/10/2018 Receiver 2 Loop Antenna R&S HFH2-Z2 100020 11/20/2017 11/19/2018 Ultra-3 Broadband 538 SCHWARZBECK VULB9163 4/5/2017 4/4/2018 Antenna 4 Preamplifier SCHWARZBECK **BBV 9743** 9743-0022 10/18/2017 10/17/2018 RF HUBER+SUHNE 5 Connection RE-7-FL N/A 11/21/2017 11/20/2018 R Cable EMI Test R&S 6 ESK1 N/A N/A N/A Software Spectrum 7 R&S FSP40 100597 11/11/2017 11/10/2018 Analyzer 8 Horn Antenna SCHWARZBECK 9120D 1011 3/26/2018 3/27/2017 9 Horn Antenna SCHWARZBECK **BBHA9170** 25841 3/27/2017 3/26/2018 Broadband 10 SCHWARZBECK BBV 9718 9718-248 10/18/2017 10/17/2018 Preamplifier High Compliance pass 11 BSU-6 34202 11/11/2017 11/10/2018 Direction systems filter RF HUBER+SUHNE 12 Connection RE-7-FH N/A 11/21/2017 11/20/2018 R Cable EMI Test N/A 13 Audix E3 N/A N/A Software TT2.0 14 Turntable MATURO 1 N/A N/A 15 Antenna Mast MATURO TAM-4.0-P 1 N/A N/A

4.5. Equipments Used during the Test

RF Con	RF Conducted Test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Spectrum Analyzer	R&S	FSV40	100048	11/11/2017	11/10/2018
2	EXA Signal Analyzer	Agilent	N9020A	184247	9/22/2017	9/21/2018
3	Power Meter	Agilent	U2021XA	178231	9/22/2017	9/21/2018
4	OSP	R&S	OSP120	101317	N/A	N/A

The Cal.Interval was one year.

5. TEST CONDITIONS AND RESULTS

5.1. Antenna requirement

<u>Requirement</u>

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 anantenna 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 directional gain of the antenna less than 1.75 dBi, please refer to the below antenna photo.



5.2. Conducted Emissions (AC Main)

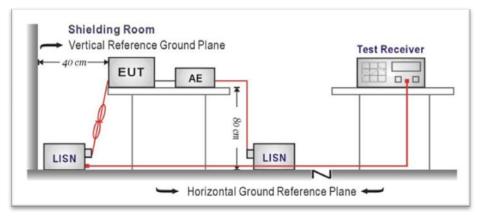
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207

	Limit (dBuV)		
Frequency range (MHz)	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

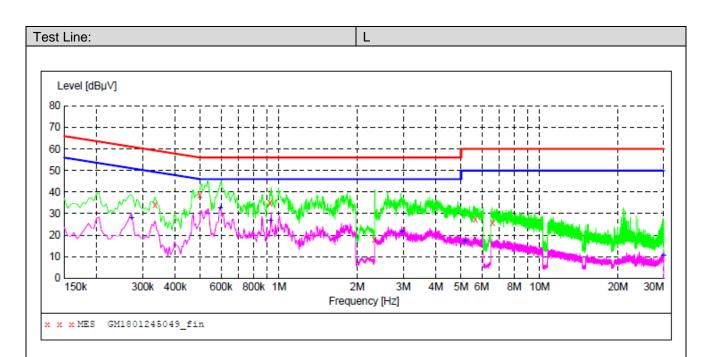
- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- 3. The EUT and simulators are connected to the main power through a line impedances 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.
- 8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

☑ Passed □ Not Applicable

Note:

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

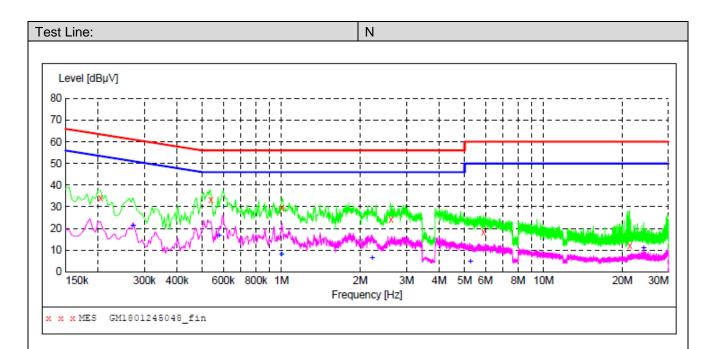


MEASUREMENT RESULT: "GM1801245049_fin"

1/24/2018 1:58PM Frequency Level Transd Limit Margin Detector Line PE MHz dBµV dB dBµV dB 9.9 59 0.334500 34.10 25.2 QP ь1 GND 9.9 0.496500 56 38.60 17.5 QP ь1 GND 56 0.924000 34.90 10.0 21.1 QP ь1 GND 2.323500 18.10 10.1 56 37.9 QP ь1 GND 5.662500 27.40 10.2 60 6.594000 25.60 10.2 60 5.662500 32.6 QP ь1 GND L1 34.4 QP GND

MEASUREMENT RESULT: "GM1801245049 fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.271500	27.80	9.9	51	23.3	AV	L1	GND
0.595500	32.40	10.0	46	13.6	AV	L1	GND
0.928500	26.70	10.0	46	19.3	AV	L1	GND
2.967000	21.70	10.1	46	24.3	AV	L1	GND
5.154000	17.00	10.2	50	33.0	AV	L1	GND
29.922000	10.30	10.9	50	39.7	AV	L1	GND



MEASUREMENT RESULT: "GM1801245048_fin"

1/24/2018 1:55PM Frequency Level Transd Limit Margin Detector Line PE MHz dBµV dB dBµV dB 34.20 9.9 29.2 QP 0.204000 63 Ν GND 10.0 0.537000 22.8 QP 33.20 56 GND Ν 1.005000 29.60 10.1 56 26.4 QP Ν GND 2.616000 24.10 10.1 56 31.9 QP 5.901000 18.30 10.2 60 41.7 QP 21.313500 12.10 10.7 60 47.9 QP N GND GND N N GND

MEASUREMENT RESULT: "GM1801245048 fin2"

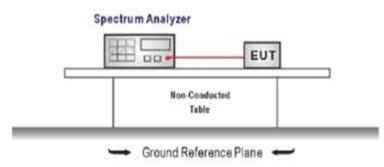
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.271500	21.30	9.9	51	29.8	AV	N	GND
0.577500	16.70	10.0	46	29.3	AV	N	GND
1.000500	8.10	10.1	46	37.9	AV	N	GND
2.220000	6.50	10.1	46	39.5	AV	N	GND
5.271000	4.90	10.2	50	45.1	AV	N	GND
24.112500	10.70	10.8	50	39.3	AV	N	GND

5.3. Conducted Peak Output Power

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 nonoverlapping 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.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 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.

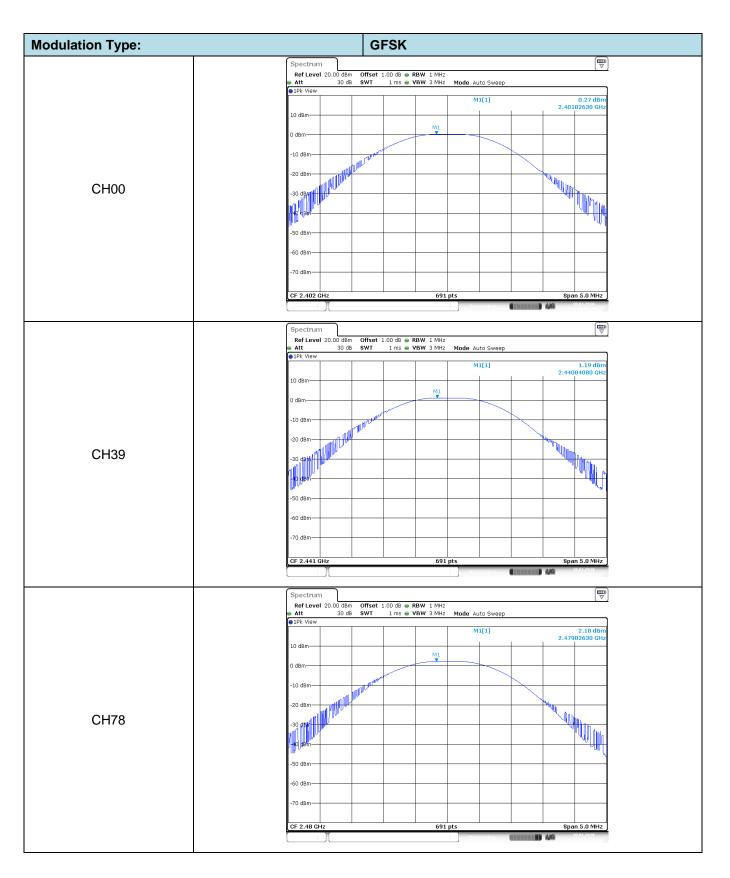
TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

Modulation type	Channel	Output power (dBm)	Limit (dBm)	Result
	00	0.27		
GFSK	39	1.19	≤ 30.00	Pass
	78	2.18		
	00	1.40		
π/4DQPSK	39	2.59	≤ 21.00	Pass
	78	2.86		
	00	1.59		
8DPSK	39	2.71	≤ 21.00	Pass
	78	3.36		



Modulation Type:	π/4DQPSK
	Spectrum (□) Ref Level 20.00 dBm Offset 1.00 dB ● RBW 2 MHz
	● Att 30 dB SWT 1 ms ● VBW 5 MHz Mode Auto Sweep ● 1Pk View
	M1[1] 1.40 dBm
	10 dBm
	M1
	0 dBm
	-10 dBm
	-20 d8m-
CH00	-30 dBm
	-40 dBm
	-50 d8m
	-60 dBm
	-70 dBm
	CF 2.402 CHz 691 pts Span 5.0 MHz
	Measuring.
	Spectrum Ref Level 20.00 dBm Offset 1.00 dB ● RBW 2 MHz
	● Att 30 dB SWT 1 ms ● VBW 5 MHz Mode Auto Sweep ● 1Pk View
	M1[1] 2.59 dBm 2.44084080 GHz
	10 dBm
	0 dBm
	-10.48m
	-20 dBm-
CH39	-30 dBm
	-40 dBm-
	-50 dBm
	-60 d8m-
	-70 dBm
	-70 UBIII-
	CF 2.441 GHz 691 pts Span 5.0 MHz
	Spectrum (♥)
	RefLevel 20.00 dBm Offset 1.00 dB RBW 2 MHz Att 30 dB SWT 1 ms VBW 5 MHz Mode Auto Sweep
	IPk View M1[1] 2.86 dBm
	10 dBm
	0 dBm
	-10 d8m
	-20 dBm
CH78	
	-30 dBm-
	-40 dBm
	-50 d8m
	-60 dBm-
	-70 dBm
	CF 2.48 CHz 691 pts Span 5.0 MHz

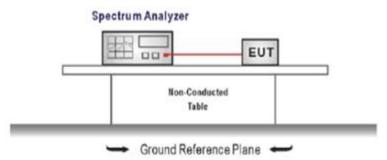
Modulation Type:	8DPSK
	Spectrum Image: Constraint of the sector of t
	0 dBm
	-20 dBm
CH00	-30 dBm
	-50 dBm
	-70 dBm-
	CF 2.402 CHz 691 pts Span 5.0 MHz
	Spectrum Imp Ref Level 20.00 dBm Offset 1.00 dB @ RBW 2 MHz Att 30 dB SWT Ins @ VBW 5 MHz Mode Auto Sweep Ins W 10 MHz Mode Auto Sweep
	10 dBm M1[1] 2.71 dBm M1[1] 2.71 dBm 2.44097110 GHz
	0 dBm
СН39	-20 dBm
	-40 dBm
	-60 dBm
	CF 2.441 GHz 691 pts Span 5.0 MHz
	Spectrum (₩) Ref Level 20.00 dBm Offset 1.00 dB ● RBW 2 MHz
CH78	Att 30 dB SWT 1 ms ● VBW 5 MHz Mode Auto Sweep ●1Pk View Niew N1[1] 3.36 dBm 2.48001450 GHz
	0 dBm
	-20 dBm
	-30 dBm
	-50 dBm
	-70 dBm
	CF 2.48 GHZ B91 pts Span 3.0 MHZ

5.4. 20 dB Bandwidth

<u>LIMIT</u>

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 \ge 1% of the 20 dB bandwidth, VBW \ge 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	20 dB Bandwidth (MHz)	Limit (MHz)	Result
	00	0.93		
GFSK	39	0.93	-	Pass
	78	0.93		
	00	1.28		
π/4DQPSK	39	1.28	-	Pass
	78	1.29		
	00	1.28		
8DPSK	39	1.28	-	Pass
	78	1.28		

odulation Type:	GFSK
	Spectrum (
	RefLevel 20.00 dBm Offset 1.00 dB ● RBW 10 kHz ● Att 30 dB SWT 189.6 µs ● VBW 30 kHz Mode Auto FFT
	1Pk View M1[1] -25.71 dBm
	10 dBm 2.40153750 GHz -5.57 dBm
	0 dBm M2 440205250 GHz
	D1 -25.570 dBm
CI 100	-30 dBm
CH00	
	-50 dBm/ 4 M/V
	-60 dBm
	-70 dBm
	CF 2.402 GHz 1001 pts Span 2.5 MHz
	Marker Type Ref Trc X-value Y-value Function Function Result
	Type ref Trvanue Punction Punction Result M1 1 2.4015375 GHz -25.71 dbm -25.71 dbm M2 1 2.4020525 GHz -5.57 dbm -5.57 dbm
	D3 M1 1 932.5 kHz -0.57 dB
	Measuring (111111 (1) (40) 1841-2015
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB
	● Att 30 dB SWT 189.6 µs ● YBW 30 kHz Mode Auto FFT ●1Pk View
	M1[1] -24.74 dBm 2.44053750 GHz
	10 dBm M2[1] -4.65 dBm 2.44105250 GHz
	-10 dBm
	-20 d8m 01 -24.650 d8m 01 - 0 WW 04 04 04 04 04 04 04 04 04 04 04 04 04
	-30 dBm
CH39	-30 dBm
	-so deput the source of the so
	-60 dBm
	-70 dBm
	CF 2.441 GHz 1001 pts Span 2.5 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.4405375 GHz -24.74 dBm
	M1 1 2.4405375 GHz -2.7.74 UBH M2 1 2.4410525 GHz -4.65 dBm D3 M1 932.5 Hz -0.57 dB
	DS M1 SS2.5 km2 -0.57 MB Monocord Monoco
	Spectrum (100 dBm) Ref Level 20.00 dBm Offset 1.00 dB ● RBW 10 kHz
	\cdots Att 30 dB SWT 189.6 μs 🖝 VBW 30 kHz Mode Auto FFT
	●1Pk View M1[1] -23.74 dBm
	10 dBm 2.47953750 GHz M2[1] -3.69 dBm
	0 dBm 2.48005250 GHz
	-10 dBm
	-20 dBm D1 -23.690 dBm W W W W W W W W W W W W W W W W W W W
	-20 (Bin - 01 -23.690 (Bin
CH78	-40 dBm
	-50 dBm/ VIV
	-60 dBm
	-70 dBm
	CF 2.48 GHz 1001 pts Span 2.5 MHz
	Marker Type Ref Trc X-value Y-value Function Function Result
	Image: Market and the state of the
	03 M1 1 932.5 kHz -0.50 dB

dulation Type:	π/4DQPSK
· ·	Spectrum
	RefLevel 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 63.1 µs VBW 100 kHz Mode Auto FFT
	● 1Pk View
	10 dBm M1[1] -22.15 dBm 2.40136250 GHz
	0 dBm M2[1] -1.98 dBm M2 2.40216000 GHz
	-20 dBm 01 -21,960 dBm 63
	-30 dBm
CH00	-40 dBm
	-50 dBm
	-60 dBm
	-70 d8m-
	CF 2.402 GHz 1001 pts Span 2.5 MHz
	Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.4013625 GHz -22.15 dBm -22.15 dBm -
	M2 1 2.40216 GHz -1.98 dBm D3 M1 1 1.2825 MHz 0.04 dB
	Measuring 10.11211
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 30 kHz
	Att 30 dB SWT 63.1 µs ● VBW 100 kHz Mode Auto FFT ● 1Pk View
	M1[1] -21.04 dBm 2.44036250 GHz
	10 dBm M2[1] -1.04 dBm M2 2.44116000 GHz
	-20. d8m 01 -21.040 d8m
	-30 dBm
CH39	-40 d8m
	-50 dBm
	-60 dBm
	-70 dBm
	CF 2.441 GHz 1001 pts Span 2.5 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.4403625 GHz -21.04 dBm -21.04 dBm -
	M2 1 2.44116 GHz -1.04 dBm D3 M1 1 1.2825 MHz -0.02 dB
	Measuring
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz
	Att 30 dB SWT 63.1 µs VBW 100 kHz Mode Auto FFT P1Pk View
	10 dBm M1[1] -21.68 dBm 2.47936000 GHz
	-20. dBm 01 -21.050 dBm 4
	-30 dBm
CH78	-40 dBm
	750 dBm
	-60 dBm
	-70 dBm
	CF 2.48 GHz 1001 pts Span 2.5 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.47936 GHz -21.68 dBm -
	M2 1 2.48016 GHz -1.05 dBm D3 M1 1 1.2875 MHz 0.30 dB
	Measuring

Modulation Type:	8DPSK
	Spectrum 🕎
	RefLevel 20.00 dBm Offset 1.00 dB RBW 30 kHz
	Att 30 dB SWT 63.1 µs ● VBW 100 kHz Mode Auto FFT ● IPk View
	M1[1] -21.90 dBm 2.40135000 GHz
	10 dBm M2[1] -1.34 dBm M2[1] -1.34 dBm M2 M2[1] -1.34 dBm
	-10 dBm
	-20 dBm 01 -21.340 dBm
	-30 dBm
CH00	-40 dBm
	-50 dBm
	-60 dBm-
	-70 dBm
	CF 2.402 GHz 1001 pts Span 2.5 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.40135 GHz -21.90 dBm
	M2 1 2.40216 GHz -1.34 dBm D3 M1 1 1.2825 MHz 0.39 dB
	Messuring
	Spectrum (TTD) Ref Level 20.00 dBm Offset 1.00 dB ● RBW 30 kHz
	● Att 30 dB SWT 63.1 µs ● VBW 100 kHz Mode Auto FFT ● 1Pk View
	M1[1] -20.93 dBm
	10 dBm M2[1]038 dBm M2[1]038 dBm
	0 dBm / / / / / / / / / / / / / / / /
	-10 dBm
	-20 d8m D1 -20.380 d8m
	-30 dBm-
CH39	-40 dBm
	-50 dBm
	-60 dBm
	-70 dBm
	CF 2.441 GHz 1001 pts Span 2.5 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.44035 GHz -20.93 dBm
	M2 1 2.44105 GHz 20.59 GBm M2 1 2.44116 GHz -0.38 GBm D3 M1 1 1.2825 MHz 0.36 dB
	DG Hit 1.2023 Milz 0.00 U Maxwelline Maxwelline 1002010
	Spectrum (TTD) Ref Level 20.00 dBm Offset 1.00 dB ● RBW 30 kHz
	Att 30 dB SWT 63.1 μs
	O 1Pk View M1[1] -20.46 dBm
	10 dBm 2.47935250 GHz 10 dBm M2[1] -0.29 dBm
	0 dBm 0 0
	-10 dBm
	-20 d8m D1 -20.290 d8m
	-30 dBm
CH78	-40 dBm
00	750 dBm
	-50 dBm
	-70 dBm
	CF 2.48 GHz 1001 pts Span 2.5 MHz
	Marker Type Ref Trc X-value Y-value Function Function Result
	M1 1 2.4793525 GHz -20.46 dBm M2 1 2.48016 GHz -0.29 dBm
	D3 M1 1 1.2775 MHz 0.03 dB 10.12012

5.5. Carrier Frequencies Separation

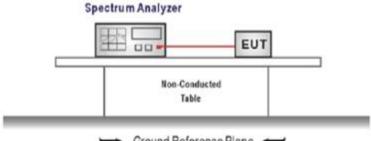
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):

Frequency hopping systems shall have hopping channel carrier frequencies separated by 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.

TEST CONFIGURATION



Ground Reference Plane

TEST PROCEDURE

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

TEST MODE:

Please refer to the clause 3.3

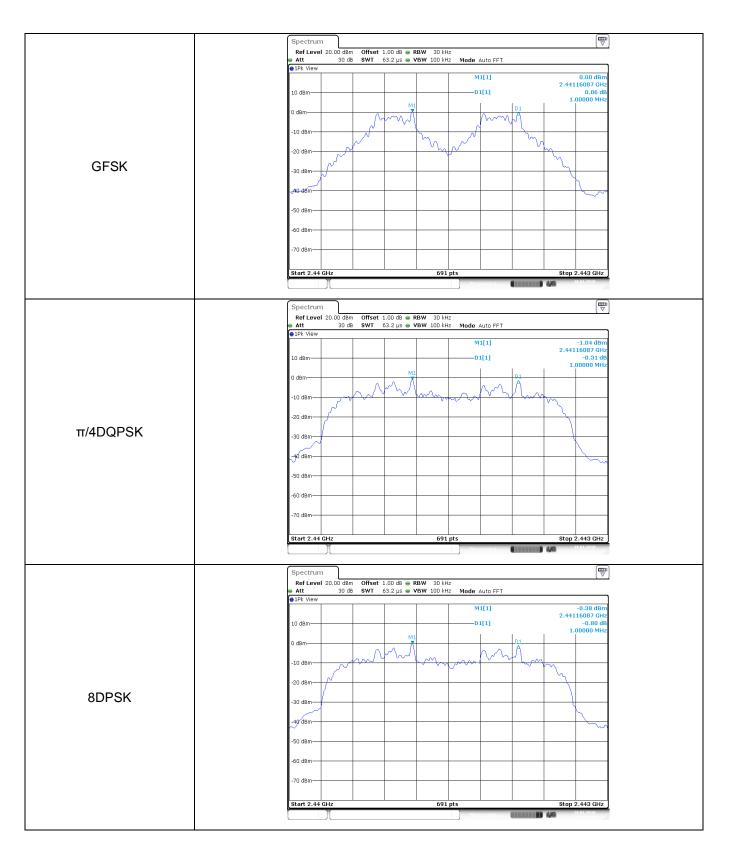
TEST RESULTS

Passed Not Applicable

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (MHz) *	Result
GFSK	39	1.00	>0.93	Pass
π/4DQPSK	39	1.00	>0.86	Pass
8DPSK	39	1.00	>0.85	Pass

Note:

*: GFSK limit = The maximum 20 dB Bandwidth for GFSK modulation on the section 5.4. π /4DQPSK limit = 2/3 * The maximum 20 dB Bandwidth for π /4DQPSK modulation on the section 5.4. 8DPSK limit = 2/3 * The maximum 20 dB Bandwidth for 8DPSK modulation on the section 5.4

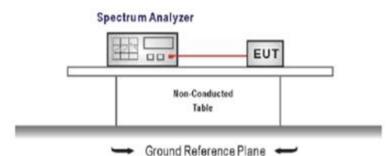


5.6. Hopping Channel Number

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems in the 2400–2483.5 MHz band shall use at least **15** channels.

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
- Use the following spectrum analyzer settings: Span = the frequency band of operation 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 number	Limit	Result
GFSK	79		
π/4DQPSK	79	≥15.00	Pass
8DPSK	79		

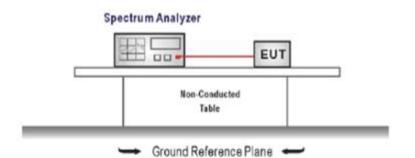
	Spectrum 🕎
	RefLevel 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep
	PIR View
	10 dBm-
	0 d9m
	╴┼╡╞╪╬┝╫╅┾┅╔┨╖╖╢┸┟╖╢╢╢╖╍╢╬╖╢╏╫╍╢╬╖┙╏╫╍╖╏╖╸┙╢┙┑┨╏╢┝╢╢╖┙╢╢┙╢╢┙╢╢╸┙╢┙╸┥╢┙╸╽┼╸╢╸╸╢╸╸╢╸╸
	-20 dBm-
GFSK	-B0 d8m
	40 dBm
	-50 dBm-
	-60 dBm
	-70 dBm
	Start 2.4 GHz 691 pts Stop 2.4835 GHz Mexaning 10.01311
	Spectrum □□□ Ref Level 20.00 dBm Offset 1.00 dB ● RBW 100 kHz
	Att 30 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep
	10 dBm
	0 \$
	o Yeller and the second of the second of the second of the second s
	-10 dbm
	-20 dBm-
π/4DQPSK	-30 dBm
	140 d8m
	-50 dBm
	-60 dBm
	-70 dBm
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	Otor 2.4 volu Ost pt/s Ost pt/s Ost pt/s Measuring 1001201 1001201 1001201
	Spectrum Image: Spectrum Ref Level 20.00 dBm Offset 1.00 dB ● RBW 100 kHz
	● Att 30 dB SWT 1 ms ● VBW 300 kHz Mode Auto Sweep ●1Pk View
	10 dBm
	° ABRANA WARMANA ANA WARMANA W
	-10 dBm
	-20 dBm
8DPSK	
ODF SIX	-30 dBm
	140 dBm
	-50 d8m-
	-60 dBm-
	-70 dBm
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	Measuring

5.7. Dwell Time

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):The average time of occupancy on any channel shall not be greater than 0.4 seconds within a pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.

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
- Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel, RBW= 1 MHz, VBW ≥ RBW Sweep = as necessary to capture the entire dwell time per hopping channel, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE:

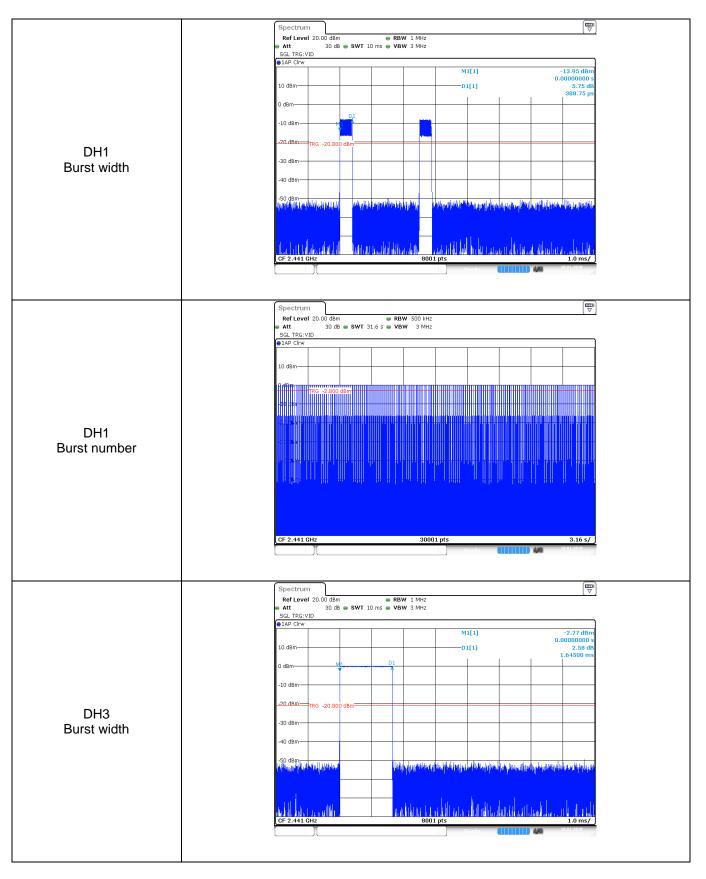
Please refer to the clause 3.3

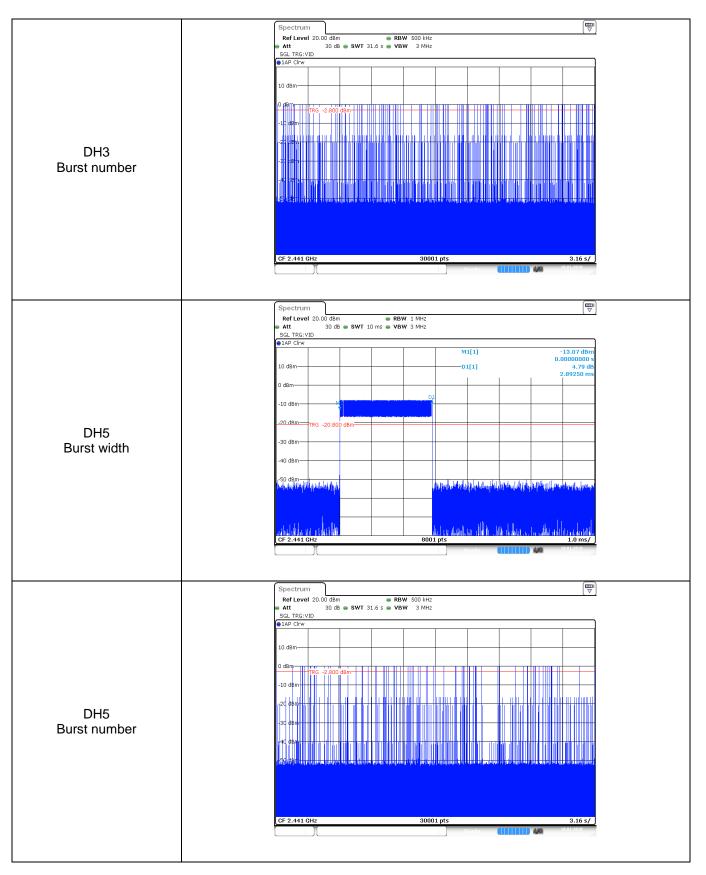
TEST RESULTS

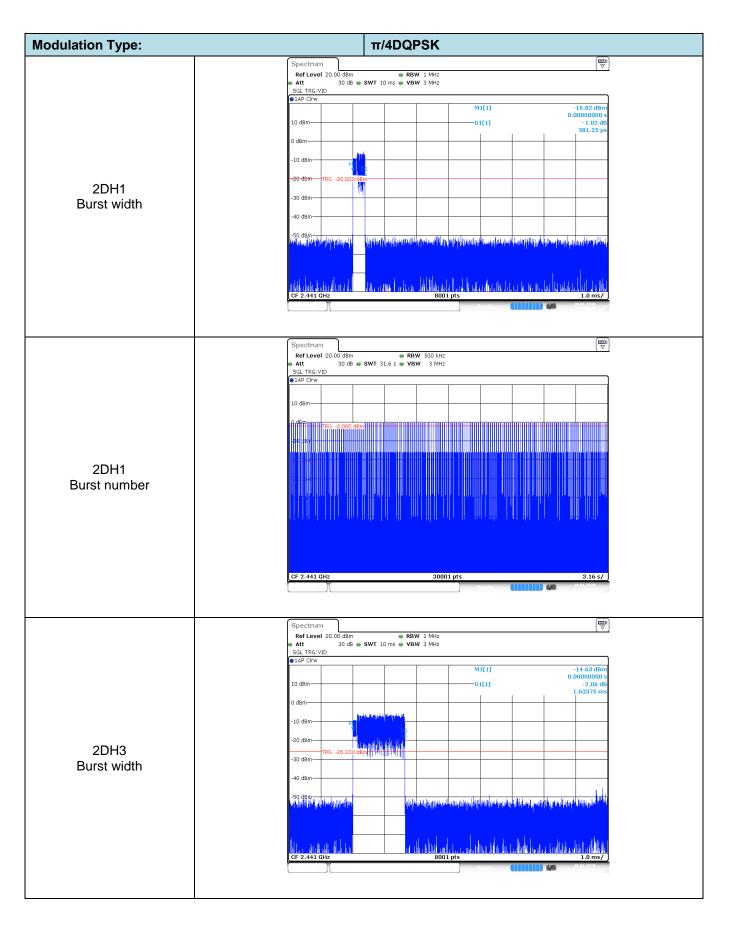
☑ Passed □ Not Applicable

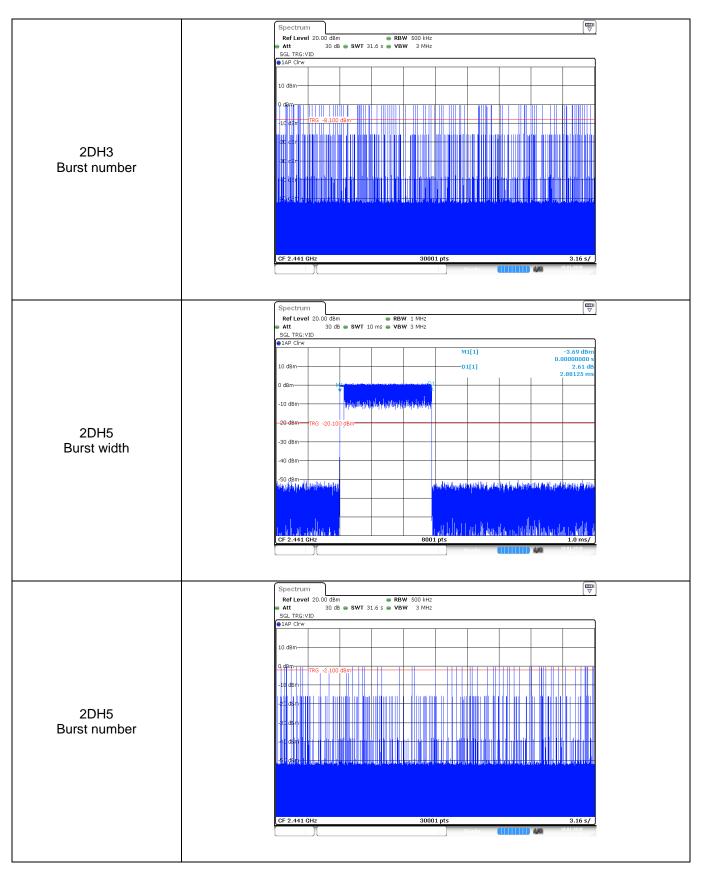
Modulation type	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result	
	DH1	0.39	319.00	0.12			
GFSK	DH3	1.65	119.00	0.20	≤ 0.40	Pass	
	DH5	2.89	68.00	0.20			
	2DH1	0.38	316.00	0.12	≤ 0.40		
π/4DQPSK	2DH3	1.63	107.00	0.18		Pass	
	2DH5	2.88	57.00	0.16			
	3DH1	0.38	321.00	0.12	≤ 0.40	Pass	
8DPSK	3DH3	1.63	107.00	0.17			
	3DH5	2.88	49.00	0.14			

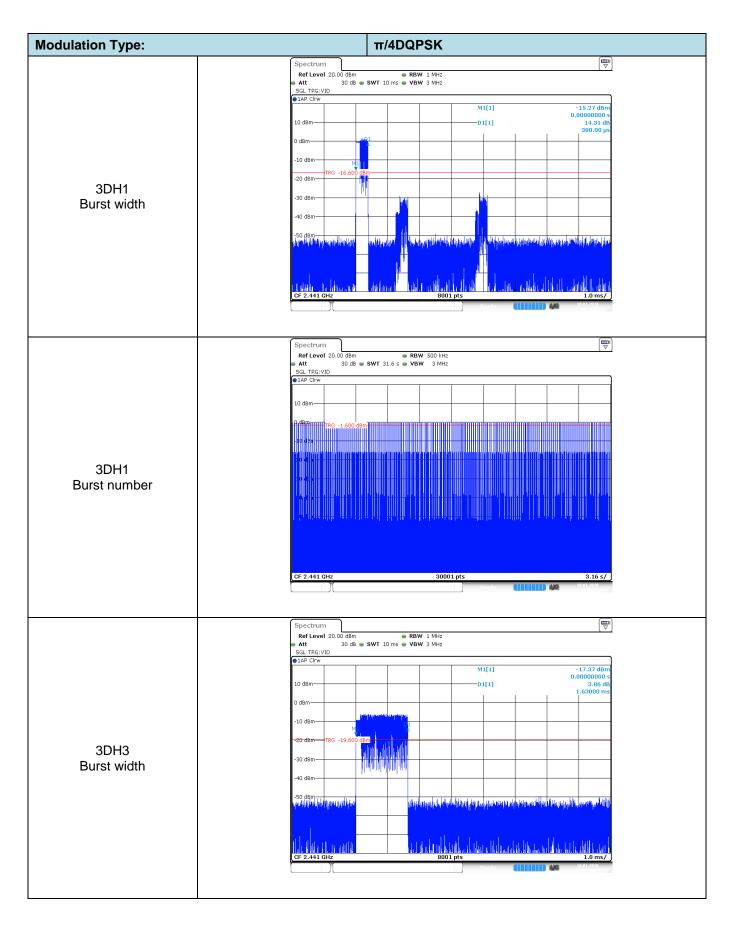
Modulation Type:	GFSK
------------------	------

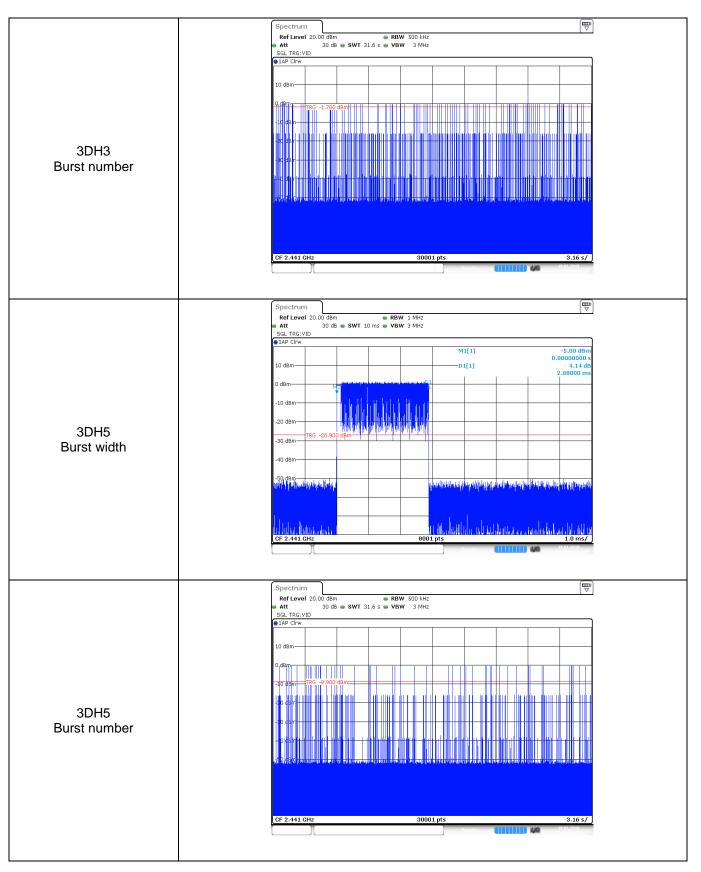












5.8. Pseudorandom Frequency Hopping Sequence

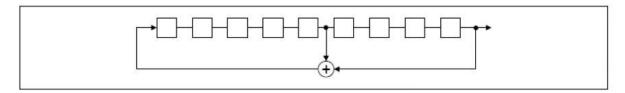
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems shall have hopping channel carrier fre-quencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Al-ternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier fre-quencies 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 chan-nel frequencies that are selected at the system hopping rate from a pseudo ran-domly ordered list of hopping fre-quencies. Each frequency must be used equally on the average by each trans-mitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their cor-responding transmitters and shall shift frequencies in synchronization with the transmitted signals.

TEST RESULTS

The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the friststage. The sequence begins with the frist one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence:29-1=511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An explame of pseudorandom frequency hopping sequence as follows:

0	2	4	6	62	64	J	78	1	73	75 7
				 1			1		 Γ	
				1			1		1	
							1		1	
									 L	

Each frequency used equally one the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

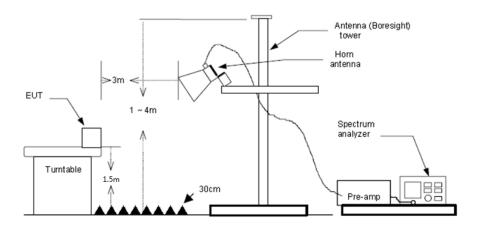
5.9. Restricted band (radiated)

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C 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, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

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 is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- The receiver set as follow: RBW=1 MHz, VBW=3 MHz Peak detector for Peak value RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

Note:

- 1) Final level= Read level + Antenna Factor+ Cable Loss- Preamp Factor
- Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report.
- 3) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

Test chann	el:				СН00						
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value		
2483.50	55.03	27.26	6.83	37.87	51.25	74.00	-22.75	Vertical	Peak		
2500.00	32.24	27.20	6.84	37.87	28.41	74.00	-45.59	Vertical	Peak		
2483.50	56.81	27.26	6.83	37.87	53.03	74.00	-20.97	Horizontal	Peak		
2500.00	30.45	27.20	6.84	37.87	26.62	74.00	-47.38	Horizontal	Peak		
2310.00	19.73	28.05	6.62	37.65	16.75	54.00	-37.25	Vertical	Average		
2320.00	28.11	28.00	6.64	37.68	25.07	54.00	-28.93	Vertical	Average		
2390.03	19.82	27.65	6.75	37.87	16.35	54.00	-37.65	Vertical	Average		
2310.00	17.97	28.05	6.62	37.65	14.99	54.00	-39.01	Horizontal	Average		
2320.00	31.48	28.00	6.64	37.68	28.44	54.00	-25.56	Horizontal	Average		
2390.03	17.80	27.65	6.75	37.87	14.33	54.00	-39.67	Horizontal	Average		

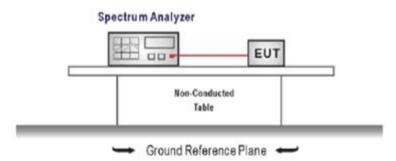
Test channe	el:				CH78						
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value		
2310.00	31.21	28.05	6.62	37.65	28.23	74.00	-45.77	Vertical	Peak		
2320.00	38.64	28.00	6.64	37.68	35.60	74.00	-38.40	Vertical	Peak		
2390.03	31.66	27.65	6.75	37.87	28.19	74.00	-45.81	Vertical	Peak		
2310.00	29.42	28.05	6.62	37.65	26.44	74.00	-47.56	Horizontal	Peak		
2319.90	38.42	28.00	6.64	37.68	35.38	74.00	-38.62	Horizontal	Peak		
2390.03	30.25	27.65	6.75	37.87	26.78	74.00	-47.22	Horizontal	Peak		
2483.50	29.68	27.26	6.83	37.87	25.90	54.00	-28.10	Vertical	Average		
2500.00	19.96	27.20	6.84	37.87	16.13	54.00	-37.87	Vertical	Average		
2483.50	29.65	27.26	6.83	37.87	25.87	54.00	-28.13	Horizontal	Average		
2500.00	19.10	27.20	6.84	37.87	15.27	54.00	-38.73	Horizontal	Average		

5.10. Band edge and Spurious Emissions (conducted)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

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
- Use the following spectrum analyzer settings: RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic. 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

est Item:	Band edge	Modulation type:	GFSK
	Spectrur		
	🖷 Att	I 20.00 dBm Offset 1.00 dB RBW 100 kHz 30 dB SWT 1.1 ms VBW 300 kHz Mode	Auto Sweep
	1Pk Max		41[1] -0.13 dBm
	10 dBm		2.401770 GHz 42[1] -57.15 dBm
	0 dBm		2.400000 ° Hz
	-10 dBm	01 00 100 days	
	-30 dBm-	D1 -20.130 dBm	
CH00	-40 dBm		
No hopping mode	-50 dBm	ms	MP MP
	4 Pos'dama-b	and and a state of the state of	M3
	-70 dBm		
	Start 2.31	GHz 691 pts	Stop 2.405 GHz
	Marker Type Re	f Trc X-value Y-value Fun	ction Function Result
	M1 M2	1 2.40177 GHz -0.13 dBm 1 2.4 GHz -57.15 dBm	
	M3 M4	1 2.39 GHz -58.96 dBm 1 2.31 GHz -58.97 dBm	
	MS	1 2.350065 GHz -55.96 dBm	asuring 10.01/2010
	Spectrur	n 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz	
	Att IPk Max	30 dB SWT 1.1 ms • VBW 300 kHz Mode	Auto Sweep
	The Max		41[1] -0.52 dBm 2.403830 GHz
	10 dBm		42[1] -59.29 dBm 2.400000 GF
	0 dBm		2.40000 GAR
	-10 dBm		100
	-30 dBm-	D1 -20.520 dBm	
CH00	-40 dBm		
Hopping mode	-50 dBm	M5	
hopping mode	4 ************************************	have at the approximate and all all and the second s	M3 M2
	-70 dBm		
	Start 2.31	GHz 691 pts	Stop 2.405 GHz
	Marker Type Re		ction Function Result
	M1 M2	1 2.40383 GHz -0.52 dBm 1 2.4 GHz -59.29 dBm	
	M3 M4	1 2.39 GHz -57.58 dBm 1 2.31 GHz -59.21 dBm	
	M5	1 2.348964 GHz -53.44 dBm	asuring 10.012018
	Spectrur		
	e Att	I 20.00 dBm Offset 1.00 dB ● RBW 100 kHz 30 dB SWT 56.9 µs ● VBW 300 kHz Mode	Auto FFT
	1Pk Max		M1[1] 1.99 dBm
	10 dBm		2.4801490 GHz M2[1] -58.84 dBm
	0 dBm		2.4835000 GHz
	-10 dBm		+ + + + 1
	-20 dBm	D1 -18.010 dBm	+ + + 1
01170	-30 dBm		
CH78	-40 dBm		+ + + + - 1
No hopping mode	-50 dBm	M2 M4	+ + + + 1
	-60 dBm	M2 M4	atter and an all a strate and
	-70 dBm		+ + + 1
	Start 2.47	8 GHz 691 pts	Stop 2.5 GHz
	Marker Type Re	f Trc X-value Y-value Fur	ction Function Result
	M1 M2	1 2.480149 GHz 1.99 dBm 1 2.4835 GHz -58.84 dBm	
	M3 M4	1 2.5 GHz -60.31 dBm 1 2.4844406 GHz -57.24 dBm	
			asuring (1111111) 🚧 10.01.2018

Report No.: TRE1801004302

		RBW 100 kHz VBW 300 kHz Mode Auto FFT	
CH78 Hopping mode	10 dBm 10 dBm	M1[1] M2[1]	2.06 dBm 2.4788440 GHz -60.20 dBm 2.4835000 GHz
opping mode	-50 dBm	691 pts	nut and the second
	Marker	691 pts	Stop 2.5 GHz
	Type Ref Trc X-value M1 1 2.478844 GHz M2 M2 1 2.4835 GHz M3 M3 1 2.5 GHz 2.490912 GHz M4 1 2.490912 GHz 2.490912 GHz	Y-value Function 2.06 dBm -60.20 dBm -58.91 dBm -55.65 dBm	Function Result

est Item:	Band edge	Modulation type:	π/4DQPSK
	Spectrum Ref Level 20.0		
		0 dBm Offset 1.00 dB RBW 100 kHz 30 dB SWT 1.1 ms VBW 300 kHz Mode Auto Sweep)
	10 dBm	M1[1]	-0.56 dBm 2.402180 GHz
	0 dBm	M2[1]	-53.80 dBm 2.400000 GHz
	-10 dBm		
		0.560 dBm	
	-30 dBm		
CH00	-40 dBm		
No hopping mode	-50 dBm 4 ¹² 56-135-14	nor when the second	M3 MB
	-70 dBm		
	Start 2.31 GHz	691 pts	Stop 2.405 GHz
	Marker Type Ref Tro		Function Result
	M1	1 2.40218 GHz -0.56 dBm 1 2.4 GHz -53.80 dBm	
	M3 M4	1 2.39 GHz -57.65 dBm 1 2.31 GHz -57.80 dBm	
	M5	1 2.399906 GHz -54.02 dBm Measuring	10.01.2018
	Spectrum Ref Level 20.0	0 dBm Offset 1.00 dB 👄 RBW 100 kHz	
		30 dB SWT 1.1 ms • VBW 300 kHz Mode Auto Sweep]
	10 dBm	M1[1]	-1.96 dBm 2.404930 GHz
	0 dBm	M2[1]	-59.22 dBm 2.400000 GHZ
	-10 dBm		AW
	-20 dBm-D1 -2	1.960_d8m	
	-30 dBm		
CH00	-40 dBm		l l l l l l l l l l l l l l l l l l l
Hopping mode	-50 dBm 4 %50~dBm/dd-processed	MG	M3 M2
	-70 dBm		
	Start 2.31 GHz	691 pts	Stop 2.405 GHz
	Marker Type Ref Tro		Function Result
	M1	1 2.40493 GHz -1.96 dBm 1 2.4 GHz -59.22 dBm	
	M3 M4	1 2.39 GHz -58.78 dBm 1 2.31 GHz -58.53 dBm	
	M5	1 2.343043 GHz -54.64 dBm Measuring.	10.01.2018
)	
		0 dBm Offset 1.00 dB 👄 RBW 100 kHz	
		30 dB SWT 56.9 μs 👄 VBW 300 kHz Mode Auto FFT	
	10 dBm	M1[1]	0.75 dBm 2.4801490 GHz
		M2[1]	-59.78 dBm 2.4835000 GHz
	-10 dBm		
		9.250 dBm	
	-30 dBm		
CH78	-40 dBm		
No hopping mode	50 dBm	M2 M2	M4
	-60 dBm	M Me Me and a contract of a second and a second and a second a sec	he and a factor of the second se
	-70 dBm		
	Start 2.478 GHz Marker	691 pts	Stop 2.5 GHz
	Type Ref Tro	X-value Y-value Function 1 2.480149 GHz 0.75 dBm	Function Result
	M2 M3	1 2.4835 GHz -59.78 dBm 1 2.5 GHz -60.70 dBm	
		1 2.4948029 GHz -57.19 dBm	10.01.2018
		Measuring	

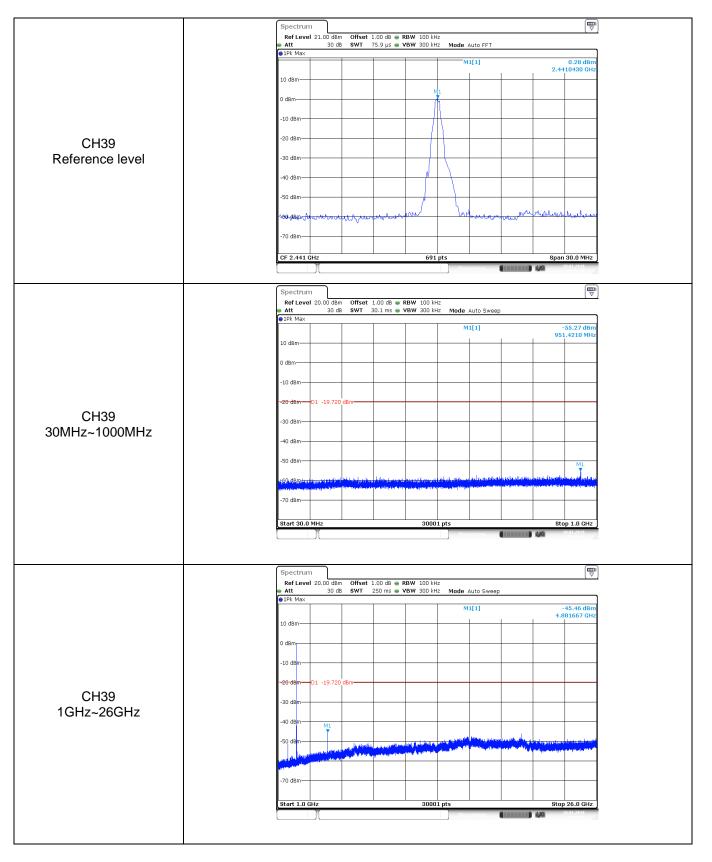
	Spectrum Ref Level 2 Att				IDD kHz BW 300 kHz	Mode A	uto FFT			
	10 dBm					M1 M2			2.47	-3.07 dBm 789710 GHz -59.68 dBm 335000 GHz
		1 -23.070 di	Bm							
CH78 lopping mode	-30 dBm	L.			M4					
	-60 dBm		M2 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	h Carlo an	- Anna	4000-000	Lanny	h runna.		
	Start 2.478 G Marker	GHz			691 p	ts			Sto	pp 2.5 GHz
	Marker <u>Type</u> Ref M1 M2 M3 M4	Trc 1 1 1 1	X-value 2.47897 2.483 2.4 2.4 2.4 2.4 87310	5 GHz 5 GHz	Y-value -3.07 dBm -59.68 dBm -60.16 dBm -56.38 dBm	1			tion Result	t
][Meas	uring		4/0	10.01.2018

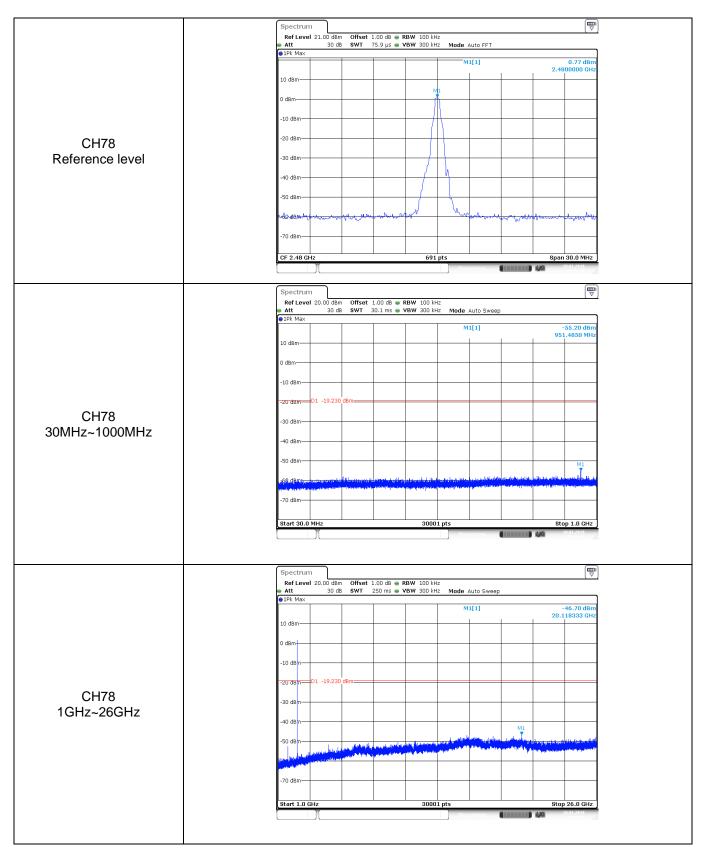
Test Item:	Band edge		Modula	8DPSK		
			Offset 1.00 dB 🖷			
CH00 No hopping mode		10 dBm 0 10 dBm 0 -10 dBm 0 -20 dBm 0 -30 dBm 0 -40 dBm 0 -50 dBm -60 dBm -60 dBm -70 dBm		M1[1] M2[1] M2[1]		
		Start 2.31 GHz Marker	X-value 2:40177 GHz 2:4 GHz 2:39 GHz 2:31 GHz 2:399906 GHz	691 pts Y-value Function -0.51 dbm -55.62 dbm -55.62 dbm -56.07 dbm -59.07 dbm -59.07 dbm -54.33 dbm -54.33 dbm	Stop 2.405 GHz	
			Offset 1.00 dB	RBW 100 kHz VBW 300 kHz Mode Auto Swee		
CH00 Hopping mode		1Pk Max 10 dBm 0 dBm		VBW 300 kHz Mode Auto Swee MI[1] M2	3.32 dBm 2.404790 GHz -57.83 dBm 2.400000 GHz -57.83 dBm 2.400000 GHz 	
CH78 No hopping mode	6	Ref Level 20.00 dBm Att 30 dB 31 PK Max 30 dB 10 dBm 10 dBm -10 dBm	SWT 56.9 μs ●		0.75 dBm 2.4801490 GHz -59.47 dBm 2.4835000 GHz	
	i i i i i i i i i i i i i i i i i i i	-70 dBm -70	M2 M4 X-value 2.480149 GHz 2.48035 GHz 2.4843768 GHz	691 pts Function 0.75 dfm -59.47 dfm -59.47 dfm -57.78 dfm	Stop 2.5 GHz	

Report No.: TRE1801004302

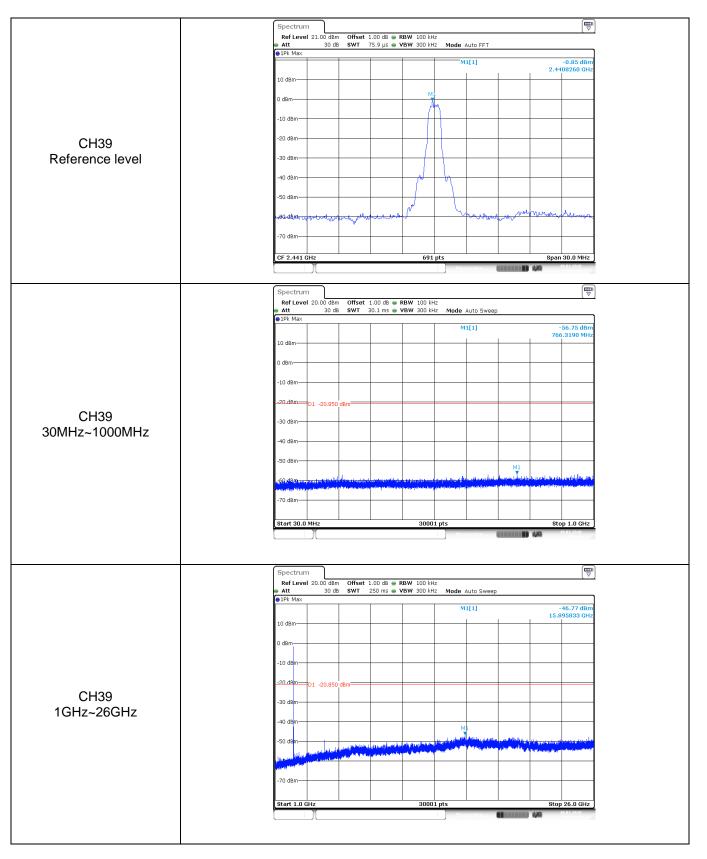
	👄 Att 30 dB SWT 56.9 μ:	 RBW 100 kHz VBW 300 kHz Mode Auto FFT 	
	19k Max 10 dBm 0 dBm	M1[1] M2[1]	-1.71 dBm 2.4780480 GHz -59.20 dBm 2.4835000 GHz
	-10 dBm		
CH78 oppig mode	-40 d8m	M4	
	-60 dBm	691 pts	Stop 2.5 GHz
	Marker Type Ref Trc X-value M1 1 2.478048 GHz M2 1 2.4935 GHz	Y-value Function -1.71 dBm -59.20 dBm	Function Result
	M3 1 2.5 GH; M4 1 2.4891275 GH;		10.01.2018

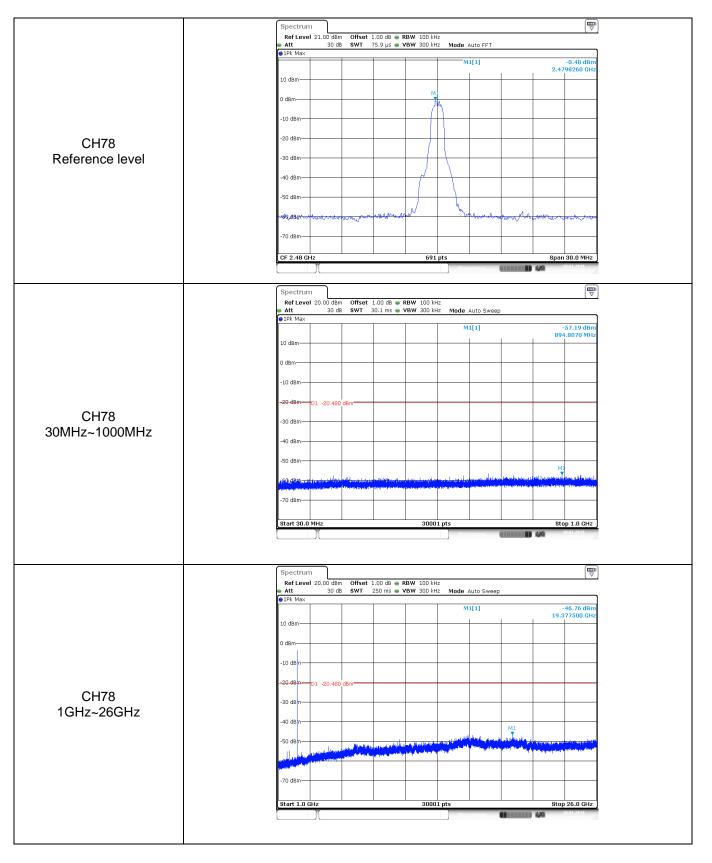
Fest Item:	SE	SE			Modulation type:				
		Spectrum							
		Ref Level 21.00 dBr Att 30 d 1Pk Max				uto FFT			
		THK MAX			M1	[1]		9 41	-0.84 dBm 019570 GHz
		10 dBm						2.11	
		0 dBm		- <u>M</u>	1				
		-10 dBm							
		-20 dBm							
CH00		-30 dBm							
Reference level					$\langle \rangle$				
		-40 dBm		ſ					
		-50 dBm		w					
		-292.4980	a for the second second	var	- Lune	-termpe	Minghor	where a	more was
		-70 dBm							
		CF 2.402 GHz		691	pts				1 30.0 MHz
					Meas	uring		40	10.01.2018
		Spectrum Ref Level 20.00 dBr		RBW 100 kH	z				
		e Att 30 d 9 1Pk Max		VBW 300 kH	z Mode A]
					M1	[1]		95	-54.93 dBm 1.4210 MHz
		10 dBm							
		0 dBm							
		-10 dBm							
		-20.dBm-D1 -20.840) dBm						
CH00		-30 dBm							
30MHz~1000MHz		-40 dBm							
		-50 dBm							M1
			A design of the second s	the second section of the	الرز واليون والار	والمروط والمراجع والم	ومعد وروفاعلو	<u>ى المارى يەرى</u>	a state and state and
		-70 dBm	an lan an a	udera dra a jek dese ta alfesta	epideparta ann paosta	Young Blackburg	nanakas bepaditastipas D	natazzt ostábar	hillin dhina para
		Start 30.0 MHz		30001	L pts Meas	uring			op 1.0 GHz
		Spectrum							
		Ref Level 20.00 dBr Att 30 d		RBW 100 kH	z Z Mode A	uto Sweep			(*)
		Pk Max				[1]			-41.26 dBm
		10 dBm						4.8	803333 GHz
		0 dBm							
		-10 dBm							
CH00		<u>20 dPm</u> 01 -20.840) dBm						
1GHz~26GHz		-30 dBm							
		-40 dBm		+ +					<u> </u>
		-50 dBm	L August Markey processed and	tu		and an		inali productiva	
			and the birth of a second s		e		· •	- Min Sanada a	
		-70 dBm							
		Ptart 1.0 OU-		00000	Late			01	26.0.011-
		Start 1.0 GHz		30001	L pts				p 26.0 GHz
					A Care	01110		44	



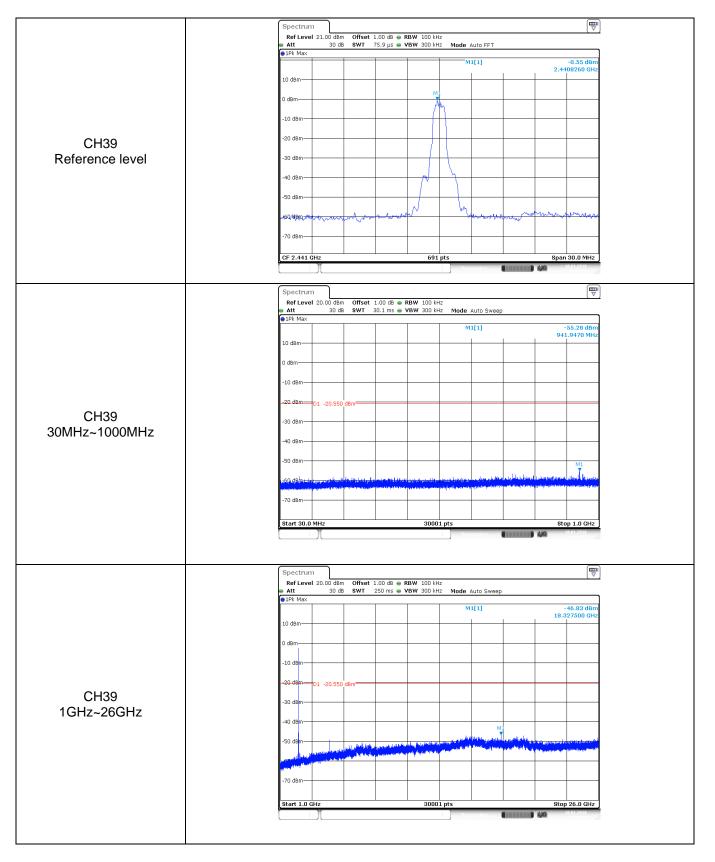


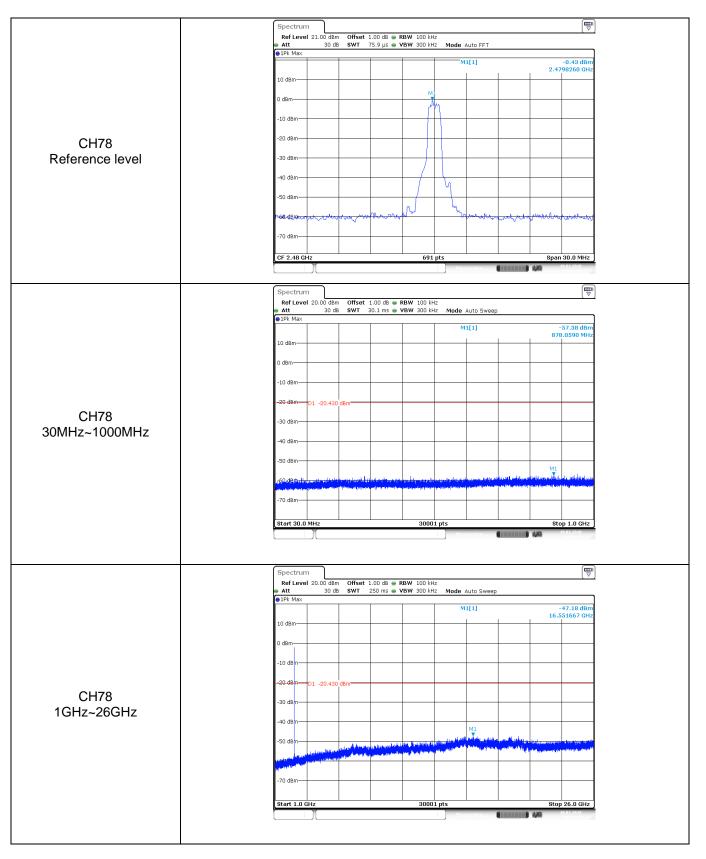
Fest Item:	SE		Modul	ation typ	e:	π/4D	QPSK	
		Spectrum						
		RefLevel 21.00 dBr Att 30 d	n Offset 1.00 dB B SWT 75.9 µs	RBW 100 kHz VBW 300 kHz Mi	ode Auto FFT			
		●1Pk Max			M1[1]	2.4	-1.78 dBm 018260 GHz	
		10 dBm				2.1		
		0 dBm		M				
		-10 dBm		$ \hat{m}$				
		-20 dBm						
CH00		-30 dBm						
Reference level		-40 dBm						
		-50 dBm						
				mand	m .			
		MBQ.dBQH	who was warded			- marcharland	and a second	
		-70 dBm						
		CF 2.402 GHz		691 pts	Measuring	Spa	n 30.0 MHz	
		Spectrum						
		RefLevel 20.00 dBr Att 30 d	n Offset 1.00 dB e B SWT 30.1 ms e	RBW 100 kHz VBW 300 kHz M	ode Auto Sweep		<u> </u>	
		●1Pk Max			M1[1]		-56.14 dBm	
		10 dBm				87	9.5790 MHz	
		0 dBm						
		-10 dBm						
		-20 dBm						
CH00		-30 dBm) dBm					
30MHz~1000MHz		-40 dBm-						
		-50 dBm						
			adulta da care e	. I . In the same	t tota colleterate	M1	المراجع	
		-60 d8 made area (stilled		th July manufacture of a contract of	o the second	debudubte quart paparite	ter en fên de natione y pronen	
		-70 dBm						
		Start 30.0 MHz		30001 pts	Measuring	S1	op 1.0 GHz	
		Spectrum						
		RefLevel 20.00 dBr Att 30 d	n Offset 1.00 dB e B SWT 250 ms e	RBW 100 kHz VBW 300 kHz M4	ode Auto Sween		(4)	
		●1Pk Max			M1[1]		-45.93 dBm	
		10 dBm				4.	804167 GHz	
		0 dBm						
		-10 dem		_				
		-20 dBm						
CH00		-30 dBm	J dBm					
1GHz~26GHz		-40 dBm						
		M1 T			مى بىرىمى رو <mark>مايىت الرور</mark> ىي	ahe, alid. a	. n. a do. na	
		-50 dBm					na portuga ing dina dina dina dina dina dina dina dina	
		Contract of the set of Tasker						
		-70 dBm						
		Start 1.0 GHz		30001 pts		Sta	p 26.0 GHz	
	1	i – Л				1.74		





est Item:	SE		Modu	lation type:		8DPSI	(
		Spectrum						
		Ref Level 21.00 di		RBW 100 kHz VBW 300 kHz Mode /	uto FFT			
		● 1Pk Max		м	l[1]	-	3.44 dBm	
		10 dBm				2.401	8700 GHz	
		0 dBm		Mt				
		-10 dBm		- M				
CH00		-20 dBm						
Reference level		-30 dBm						
		-40 dBm		- pr A				
		-50 dBm						
		v69/kl80	monter	water with	andrown	randrampoor	www.	
		-70 dBm						
		CF 2.402 GHz		691 pts		Snan (0.0 MHz	
				091 pts	suring		01.2018	
		Spectrum						
		Ref Level 20.00 df		RBW 100 kHz VBW 300 kHz Mode	luto Sweep			
		• 1Pk Max		м	L[1]	-5	6.76 dBm	
		10 dBm				670.	L620 MHz	
		0 dBm						
		-10 dBm						
		-20 dBm						
CH00		D1 -23.44	40 dBm					
30MHz~1000MHz		-30 dBm						
		-40 dBm						
		-50 dBm			M1			
		,60 dBm		na ana ang ang ang ang ang ang ang ang a	data and data and and and and and and and and and an	tii aa aa aha baa haa hada dhidhaa dhi waxaya ka ahaa ahaa ka ta	and the former the second s	
		-70 dBm						
		Start 30.0 MHz		30001 pts		Stop	1.0 GHz	
				Mea	suring 💶	4,0	01.2018	
		Spectrum		- pput koo !::				
		Ref Level 20.00 df Att 30 1Pk Max		RBW 100 kHz VBW 300 kHz Mode /	uto Sweep			
				М	L[1]	-4 4.80	6.57 dBm 4167 GHz	
		10 dBm						
		0 dBm		+ +				
		-10 dBm						
		-20 dBm-	10 40 -					
CH00		-30 dBm	40 aBm					
1GHz~26GHz		-40 dBm						
		M1 T			ملالة، الإردانية، ومحققه			
		-50 dBm			And the part of the second sec	and the second	and a second second b	
		A PERMIT						
		-70 dBm						
		Start 1.0 GHz		30001 pts			6.0 GHz	
						11 1/9		





5.11. Spurious Emissions (radiated)

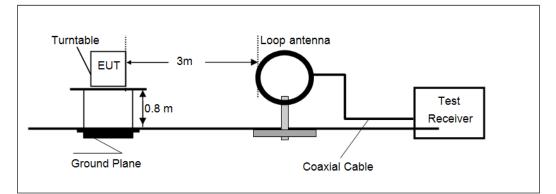
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

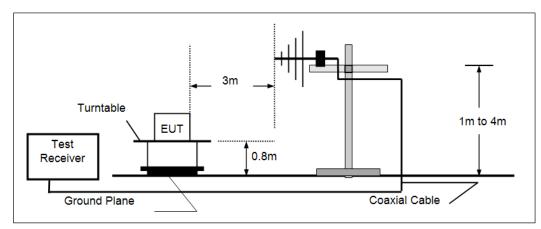
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

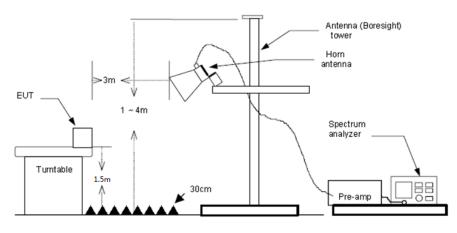
Below 30 MHz



> 30 MHz ~1000 MHz



> Above 1 GHz



TEST PROCEDURE

- 1. The EUT was tested according to ANSI C63.10:2013.
- 2. The EUT is placed on a turn table with 0.8 meter above ground for below 1GHz, 1.5 meter above ground for above 1GHz.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detectoris 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(3) From 1 GHz to 10th harmonic: RBW=1 MHz, VBW=3 MHz Peak detector for Peak value RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

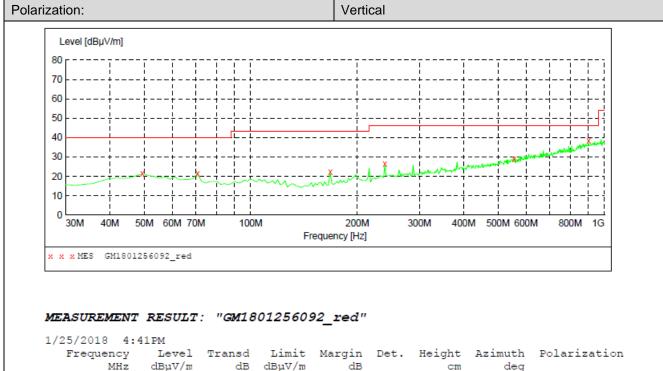
Note:

- 1) Final Level = Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3) Below 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation High channel which it was worst case, so only the worst case's data on the test report.
- 4) Above 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report
- 5) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

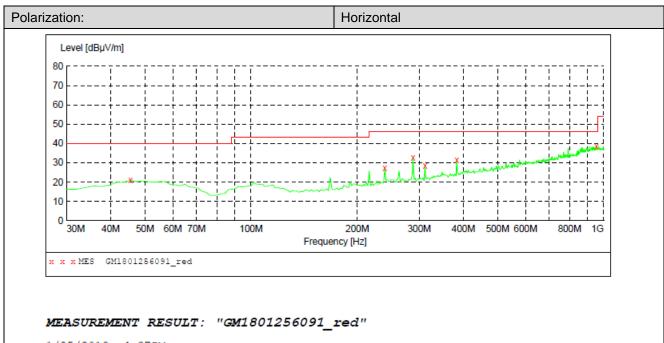
➢ 9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.





MHz	dBµV/m	dB	dBµV/m	dB		cm	deg		
49.400000	21.30	-8.7	40.0	18.7	QP	100.0	352.00	VERTICAL	
70.740000	21.40	-13.3	40.0	18.6	QP	100.0	212.00	VERTICAL	
167.740000	22.20	-13.0	43.5	21.3	QP	100.0	0.00	VERTICAL	
239.520000	26.40	-8.8	46.0	19.6	QP	100.0	171.00	VERTICAL	
555.740000	29.10	-0.6	46.0	16.9	QP	100.0	359.00	VERTICAL	
901.060000	38.40	6.7	46.0	7.6	QP	100.0	158.00	VERTICAL	



1/25/2018 4:3 Frequency MHz	37PM Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	21.10	-8.8	40.0	18.9	QP	100.0	356.00	HORIZONTAL
239.520000	27.10	-8.8	46.0	18.9	QP	100.0	267.00	HORIZONTAL
288.020000	32.60	-7.5	46.0	13.4	QP	100.0	227.00	HORIZONTAL
311.300000	28.60	-7.1	46.0	17.4	QP	100.0	239.00	HORIZONTAL
383.080000	31.60	-4.9	46.0	14.4	QP	100.0	107.00	HORIZONTAL
953.440000	38.40	7.3	46.0	7.6	QP	300.0	360.00	HORIZONTAL

Shenzhen Huatongwei International Inspection Co., Ltd.

Report Template Version: V01 (2018-01)

1 GHz ~ 25 GHz	
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CH00									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1746.25	46.35	25.29	5.86	37.03	40.47	74.00	-33.53	Vertical	Peak
3672.11	35.64	29.30	8.35	38.26	35.03	74.00	-38.97	Vertical	Peak
4809.50	50.91	31.58	9.55	36.93	55.11	74.00	-18.89	Vertical	Peak
7209.02	38.56	36.21	11.87	35.07	51.57	74.00	-22.43	Vertical	Peak
7209.02	22.88	36.21	11.87	35.07	35.89	54.00	-18.11	Vertical	Average
4809.50	34.01	31.58	9.55	36.93	38.21	54.00	-15.79	Vertical	Average
1549.34	34.52	25.35	5.43	36.65	28.65	74.00	-45.35	Horizontal	Peak
4128.28	37.01	29.93	8.88	37.81	38.01	74.00	-35.99	Horizontal	Peak
4809.50	56.04	31.58	9.55	36.93	60.24	74.00	-13.76	Horizontal	Peak
7209.02	42.81	36.21	11.87	35.07	55.82	74.00	-18.18	Horizontal	Peak
7209.02	25.05	36.21	11.87	35.07	38.06	54.00	-15.94	Horizontal	Average
4809.50	33.27	31.58	9.55	36.93	37.47	54.00	-16.53	Horizontal	Average

CH39									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1746.25	42.33	25.29	5.86	37.03	36.45	74.00	-37.55	Vertical	Peak
4117.79	37.44	29.92	8.87	37.84	38.39	74.00	-35.61	Vertical	Peak
4883.52	46.48	31.43	9.59	36.73	50.77	74.00	-23.23	Vertical	Peak
7319.96	35.19	36.30	11.99	34.92	48.56	74.00	-25.44	Vertical	Peak
1851.54	33.77	25.35	6.04	37.18	27.98	74.00	-46.02	Horizontal	Peak
3690.85	33.28	29.30	8.37	38.25	32.70	74.00	-41.30	Horizontal	Peak
4883.52	55.89	31.43	9.59	36.73	60.18	74.00	-13.82	Horizontal	Peak
7319.96	42.60	36.30	11.99	34.92	55.97	74.00	-18.03	Horizontal	Peak
7319.97	25.20	36.30	11.99	34.92	38.57	54.00	-15.43	Horizontal	Average
4883.52	41.23	31.43	9.59	36.73	45.52	54.00	-8.48	Horizontal	Average

CH78									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1746.25	48.66	25.29	5.86	37.03	42.78	74.00	-31.22	Vertical	Peak
3834.51	34.46	29.63	8.55	38.21	34.43	74.00	-39.57	Vertical	Peak
4958.68	58.31	31.46	9.64	36.52	62.89	74.00	-11.11	Vertical	Peak
7451.57	45.29	36.20	12.24	34.86	58.87	74.00	-15.13	Vertical	Peak
7451.57	21.80	36.20	12.24	34.86	35.38	54.00	-18.62	Vertical	Average
4958.68	33.82	31.46	9.64	36.52	38.40	54.00	-15.60	Vertical	Average
1728.56	44.67	25.26	5.82	36.99	38.76	74.00	-35.24	Horizontal	Peak
3543.55	35.33	29.13	8.18	38.35	34.29	74.00	-39.71	Horizontal	Peak
4958.68	52.63	31.46	9.64	36.52	57.21	74.00	-16.79	Horizontal	Peak
7451.57	36.85	36.20	12.24	34.86	50.43	74.00	-23.57	Horizontal	Peak
7451.57	22.06	36.20	12.24	34.86	35.64	54.00	-18.36	Horizontal	Average
4958.68	31.94	31.46	9.64	36.52	36.52	54.00	-17.48	Horizontal	Average

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor

2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

3. The emission levels of other frequencies are very lower than the limit and not show in test report.

6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



Radiated Emissions







7. EXTERANAL AND INTERNAL PHOTOS

-----End of Report------