



TEST REPORT

Report Reference No:	CHTEW18120548	Report veri	fication:	
Project No:	SHT1812022601EW			
FCC ID:	ZSW-30-077			Reportivo: CHTW18120548
Applicant's name:	b mobile HK Limited			
Address	Flat 18; 14/F Block 1; Golden Street; Kwai Chung; New Terr			-26 Kwai Tak
Manufacturer	b mobile HK Limited			
Address:	Flat 18; 14/F Block 1; Golden Street; Kwai Chung; New Terr			-26 Kwai Tak
Test item description:	Mobile Phone			
Trade Mark	Bmobile			
Model/Type reference:	AX715			
Listed Model(s)				
Standard:	FCC CFR Title 47 Part 15 Subpart C Section 15.247			
Date of receipt of test sample:	Dec 12, 2018			
Date of testing	Dec 13, 2018- Dec 27, 2018			
Date of issue	Dec 28, 2018			
Result:	PASS			
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Supervised by (Position+Printed name+Signature):	Project Engineer Aaron Fang			.Fang
Approved by (Position+Printed name+Signature):	RF Manager Hans Hu		Ham	sНи
Testing Laboratory Name: :	Shenzhen Huatongwei Interr	national Ins	pection	Co., Ltd.
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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

Revision No.	Date of issue	Description
N/A	2018-12-28	Original

2. TEST DESCRIPTION

Test Item	Section in CFR 47	Result	Test Engineer
Antenna Requirement	15.203/15.247 (c)	PASS	Xiaokang Tan
AC Power Line Conducted Emissions	15.207	PASS	Tony Duan
Conducted Peak Output Power	15.247 (b)(1)	PASS	Xiaokang Tan
20 dB Bandwidth	15.247 (a)(1)	PASS	Xiaokang Tan
Carrier Frequencies Separation	15.247 (a)(1)	PASS	Xiaokang Tan
Hopping Channel Number	15.247 (a)(1)	PASS	Xiaokang Tan
Dwell Time	15.247 (a)(1)	PASS	Xiaokang Tan
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	PASS	Xiaokang Tan
Restricted band	15.247(d)/15.205	PASS	Shower Dai
Radiated Emissions	15.247(d)/15.209	PASS	Shower Dai

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.:	AX715
Listed Model(s):	-
IMEI:	Conducted: 362523432570946 Radiated: 362523432572421
Power supply:	DC 3.7V
Adapter information:	Input:100-240Va.c. 50/60Hz 0.15A Output:5.0Vd.c. 500mA
Hardware version:	sc2728 V00
Software version:	Bmobile_AX715_OM_LTM_V001
Bluetooth	
Version:	Supported BT4.2+EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	PIFA Antenna
Antenna gain:	0 dBi

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

1	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	0.63 dB	(1)
Conducted spurious emissions 9kHz~40GHz	0.63 dB	(1)
Conducted Disturbance 150kHz~30MHz	3.35 dB	(1)
Radiated Emissions below 1GHz	4.28 dB	(1)
Radiated Emissions above 1GHz	5.16 dB	(1)
Occupied Bandwidth	69 Hz	(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

Condu	Conducted Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)	
1	EMI Test Receiver	R&S	ESCI	101247	10/27/2018	10/26/2019	
2	Artificial Mains	SCHWARZBECK	NNLK 8121	573	10/27/2018	10/26/2019	
3	Pulse Limiter	R&S	ESH3-Z2	101488	10/27/2018	10/26/2019	
4	RF Connection Cable	HUBER+SUHNER	EF400	N/A	11/14/2017	11/13/2019	
5	Test Software	R&S	ES-K1	N/A	N/A	N/A	
6	Temperature and Humidity Meter	MIAOXIN	TH10R	N/A	10/30/2018	10/29/2019	

Radia	Radiated Emissions(Below 1GHz)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)	
1	Semi-Anechoic Chamber	Albatross projects	SAC-3m-02	C11121	09/30/2018	09/29/2021	
2	EMI Test Receiver	R&S	ESCI	100900	10/28/2018	10/27/2019	
3	Loop Antenna	R&S	HFH2-Z2	100020	04/02/2018	04/02/2021	
4	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	04/05/2017	04/04/2020	
5	Pre-amplifer	SCHWARZBECK	BBV 9742	N/A	11/15/2018	11/14/2019	
6	RF Connection Cable	HUBER+SUHNER	N/A	N/A	09/28/2018	09/27/2019	
7	RF Connection Cable	HUBER+SUHNER	SUCOFLEX104	501184/4	09/28/2018	09/27/2019	
8	Test Software	R&S	ES-K1	N/A	N/A	N/A	
9	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A	
10	Antenna Mast	Maturo Germany	TAM-4.0-P	N/A	N/A	N/A	
11	Temperature and Humidity Meter	KEJIAN	KJ03	N/A	10/30/2018	10/29/2019	

Radia	Radiated Emissions(Above 1GHz)							
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)		
1	Anechoic Chamber	Albatross projects	SAC-3m-01	C11121	09/30/2018	09/29/2021		
2	Horn Antenna	SCHWARZBECK	9120D	1011	03/27/2017	03/26/2020		
3	Preamplifier	BONN	BLWA0160-2M	1811887	11/14/2018	11/13/2019		
4	Broadband Pre-amplifier	SCHWARZBECK	BBV 9718	9718-248	04/28/2018	04/27/2019		
5	Spectrum Analyzer	R&S	FSP40	100597	10/27/2018	10/26/2019		
6	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	11/15/2018	11/14/2019		
7	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	11/15/2018	11/14/2019		
8	Test Software	Audix	E3	N/A	N/A	N/A		
9	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A		
10	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A		
11	Temperature and Humidity Meter	MINGLE	YH101	N/A	10/30/2018	10/29/2019		

RF Cor	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	10/28/2018	10/27/2019		
2	EXA Signal Analyzer	Agilent	N9020A	MY5050187	09/29/2018	09/28/2019		

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.

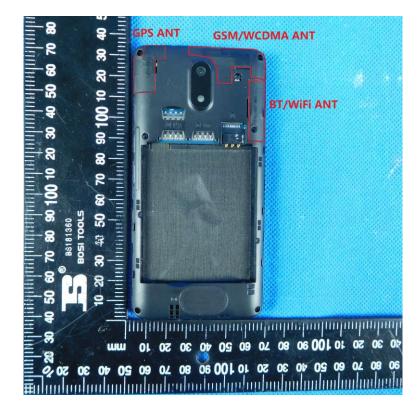
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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 6 dBi, please refer to the below antenna photo.



5.2. Conducted Emissions (AC Main)

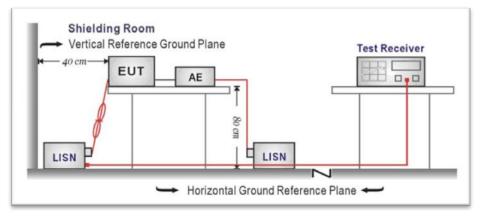
<u>LIMIT</u>

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

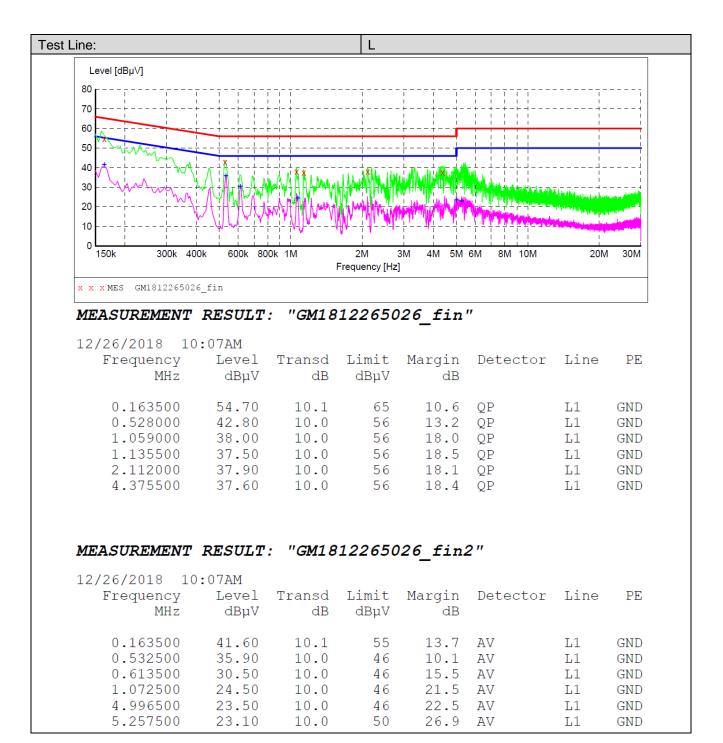
- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm 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.

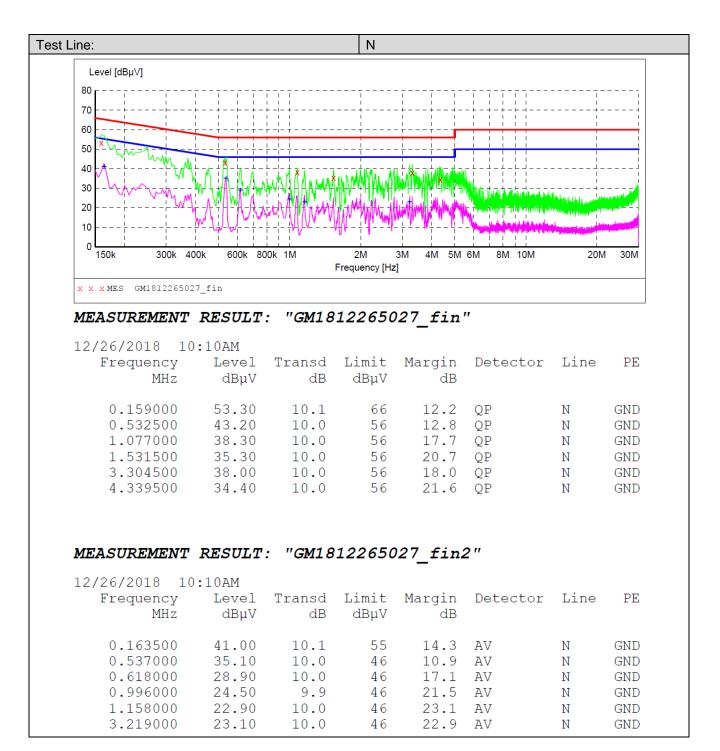
TEST RESULTS

☑ Passed □ Not Applicable

Note:

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



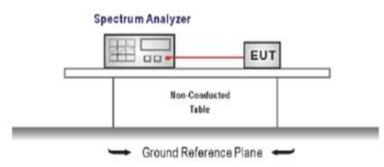


5.3. Conducted Peak Output Power

<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	4.36			
GFSK	39	5.05	≤ 30.00	Pass	
	78	4.58			
	00	5.06	≤ 21.00	Pass	
π/4DQPSK	39	5.68			
	78	5.20			
	00	5.13			
8DPSK	39	5.75	≤ 21.00	Pass	
	78	5.30			

dulation Type:	GFSK
	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz
	Att 30 dB SWT 1 ms VBW 3 MHz Mode Auto Sweep Count 500/500
	1Pk View 1 1 1 1 4.36 dBm 2.40215920 GHz
	10 dPm
	0 dBm
	-10 dBm
CH00	-20 dBm
01100	-38 ⁷ dBm
	-40 dBm
	-50 dBm
	-60 dBm
	-70 dBm
	CF 2.402 GHz 691 pts Span 5.0 MHz
	Spectrum Ref Level 20.00 dBm Offset 1.00 dB ● RBW 1 MHz
	Att 30 dB SWT 1 ms VBW 3 MHz Mode Auto Sweep Count 500/500
	●1Pk View M1[1] 5.05 dBm
	10 dBm M1 Z.44114470 GHz
	0 dBm
	-10 dBm
	-20 dBm
CH39	
	-50 dBm
	-40 dBm
	-50 dBm
	-60 dBm-
	-70 dBm
	CF 2.441 GHz 691 pts Span 5.0 MHz
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz Att 30 dB SWT 1 ms VBW 3 MHz
	● ATT 30 GB SWI 1 ms ● VBW 3 MHz Mode Auto Sweep Count 500/500 ● JPk View
	M1[1] 4.58 dBm 2.47983360 GHz
	10 dBm M1
	0 dBm
	-10 dBm
	-20 dBm
CH78	_30 dBm
	-40 dBm
	-50 dBm-
	-60 dBm-
	-70 dBm-
	CF 2.48 GHz 691 pts Span 5.0 MHz

Modulation Type	π/4DQPSK
Modulation Type:	
	Spectrum
	RefLevel 20.00 dBm Offset 1.00 dB @ RBW 2 MHz Att 30 dB SWT 1 ms @ VBW 5 MHz Mode Auto Sweep
	Count 500/500
	M1[1] 5.06 dBm
	10 dBm M1 Z.40211580 GHz
	0 dBm
	10 d8m
	-20 dBm-
CH00	
	-30 dBm
	-40 dBm-
	-50 dBm-
	-60 dBm
	-70 dBm-
	CF 2.402 GHz 691 pts Span 5.0 MHz
	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 Count 500/500
	IPk View
	M1[1] 5.68 dBm 2.44112300 GHz
	10 dBm
	0 dBm
	-10 dBm
01120	-20 dBm
CH39	-30 dBm
	-40 d8m
	-50 dBm
	-60 dBm
	-70 dBm-
	CF 2.441 GHz 691 pts Span 5.0 MHz
	Mexaning Mexaning
	Spectrum
	RefLevel 20.00 dBm Offset 1.00 dB RBW 2 MHz Att 30 dB SWT 1 ms VBW 5 MHz Mode Auto Sweep
	Count 500/500 1Pk View
	10 dBm M1
	0 dBm
	-10 dBm-
	-20 dBm
CH78	
	-30 dBm
	-40 dBm
	-50 dBm-
	-60 dBm
	-70 dBm
	CF 2.48 GHz 691 pts Span 5.0 MHz
	Meximina 🖉

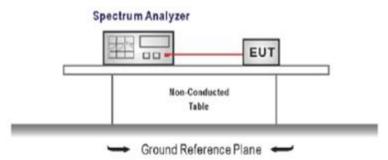
Modulation Type:	8DPSK
	Spectrum Image: Constraint of the sector of t
	Count 500/500
	0 dBm
CH00	-20 dBm
	-40 dBm
	-60 dBm
	CF 2.402 GHz 691 pts Span 5.0 MHz
	Spectrum Image: Constraint of the second secon
	0 dBm
CH39	-20 d8m
	-40 dBm
	-60 dBm
	CF 2.441 GHz 691 pts Span 5.0 MHz
	Spectrum Image: Constraint of the sector of th
	10 dBm
	-20 dBm
CH78	-30 dBm
	-50 dBm
	-70 dBm
	UF 2.48 GHz 691 pts span 5.0 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	0.92		
GFSK	39	0.92	-	Pass
	78	0.92		
	00	1.33	-	Pass
π/4DQPSK	39	1.33		
	78	1.33		
	00	1.31		
8DPSK	39	1.31	- Pa	Pass
	78	1.31		

odulation Type:	GFSK
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB RBW 10 kHz ● Att 30 dB SWT 189.6 µs ● VBW 30 kHz Mode Auto FFT
	Count 500/500 P1Pk View
	10 dBm M1[1] -22.79 dBm 2.40154750 GHz 10 dBm M2[1] -1.52 dBm
	2.40205750 GHz
	-10 dBm 01 -21.521 dB
01100	
CH00	-30 GBm
	50 dent who was here a he
	-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 2.4015475 GHz -22.78 dBm -22.78 dBm -22.78 dBm
	M2 1 2.4020575 GHz -1.52 dBm D3 M1 1 922.5 kHz 0.70 dB
	Measuring - Marine Ma
	Spectrum
	Ref Level 20.00 dBm Offset 1.00 dB 🕢 RBW 10 kHz
	Count 500/500
	●1Pk View M1[1] -22.19 dBm
	10 dBm 2.44054750 GHz M2[1] -0.87 dBm
	0 dBm 2.44105750 GHz
	-10 dBm
	-20.dBm 01 -20.859.dBm M1.01.01
CH39	-30 dBm
	soushwhite
	-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 2.4405475 GHz -22.19 dBm -22.19 dBm -22.19 dBm
	M2 1 2.4410575 GHz -0.87 dBm D3 M1 1 922.5 kHz 0.85 dB
	Measuring
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB 👄 RBW 10 kHz
	Att 30 dB SWT 189.6 μs VBW 30 kHz Mode Auto FFT Count 500/500
	1Pk View
	10 dom 2.47954750 GHz
	1.35 dBm M2[1] -1.35 dBm 0 dBm 2.48005500 GHz -10 dBm -1.21.348 dBm -20 dBm 01 -21.348 dBm
	-10 dBm
	-10 dBm
	-30 dBm
CH78	-40 dBm
	50 dem Mh Man
	-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 2.4795475 GHz -22.29 dBm <
I I	M2 1 2.480055 GHz -1.35 dBm
	D3 M1 1 922.5 kHz 0.29 dB

odulation 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
	Caunt 500/500
	M1[1] -21.51 dBm
	M2[1] -1.34 dBm
	D1 -21.336 dBm
CH00	-30 dBm
СПОО	-40,d8m
	-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 2.401335 GHz -21.51 dBm M2 1 2.40216 GHz -1.34 dBm
	D3 M1 1 1.3275 MHz 0.07 dB
	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
	Count 500/500 PIPk View
	M1[1] -21.03 dBm 2.44033500 GHz
	10 dBm M2[1] -0.74 dBm M2[1] -0.74 dBm M2[1] 2.44116000 GHz
	-20.d8m 01 -20.745 d8m
CH39	-30 dBm
01105	-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 2.440335 GHz -21.03 dBm M2 1 2.44116 GHz -0.74 dBm D3 M1 1 1.333 MHz -0.33 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
	Count 500/500
	10 dBm M1[1] -21.66 dBm 2.47933500 GHz
	M2[1] -1.28 dbm M2 2.48016000 GHz
	-10 doint
	-30 dBm
CH78	
00	
	-50 dam-
	-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 2.479335 GHz -21.66 dBm M2 1 2.48016 GHz -1.28 dBm
	D3 M1 1 1.3275 MHz 0.30 dB

Iodulation 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
	Count 500/500
	M1[1] -20.78 dBm
	M2[1] -0.74 dBm
	-10 dBm
	-20.d8m 01 -20.744 d8m 4
CI 100	-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
	M1 1 2.4013475 GHz -20.78 dBm M2 1 2.4021575 GHz -0.74 dBm
	D3 M1 1 1.3075 MHz -0.31 dB
	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
	Count 500/500 IPk View
	10 dem
	10 dBm 0.14 dBm 0.14 dBm 0.14 dBm 0.244115750 GHz
	-10 dBm
	-20 dBm D1 -20.136 dBm
	-30 dBm
CH39	
01100	-40. dBm
	-50 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 2.4403475 GHz -20.26 dBm -
	M2 1 2.4411575 GHz -0.14 dBm D3 M1 1 1.3075 MHz -0.33 dB
	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 Count 500/500
	IPk View M1[1] -20.73 dBm
	10 dBm 2.47934750 GHz
	0 dBm
	-10 dBm
	-20-d8m-D1 -20.687 d8m
	-30 dBm
CH78	
	-50 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 2.4793475 GHz -20.73 dBm M2 1 2.4801575 GHz -0.69 dBm
	D3 M1 1 1.305 MHz -0.06 dB

5.5. Carrier Frequencies Separation

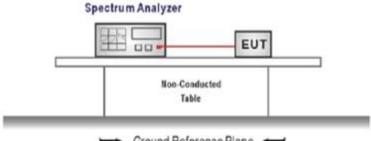
LIMIT

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

- 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 = 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

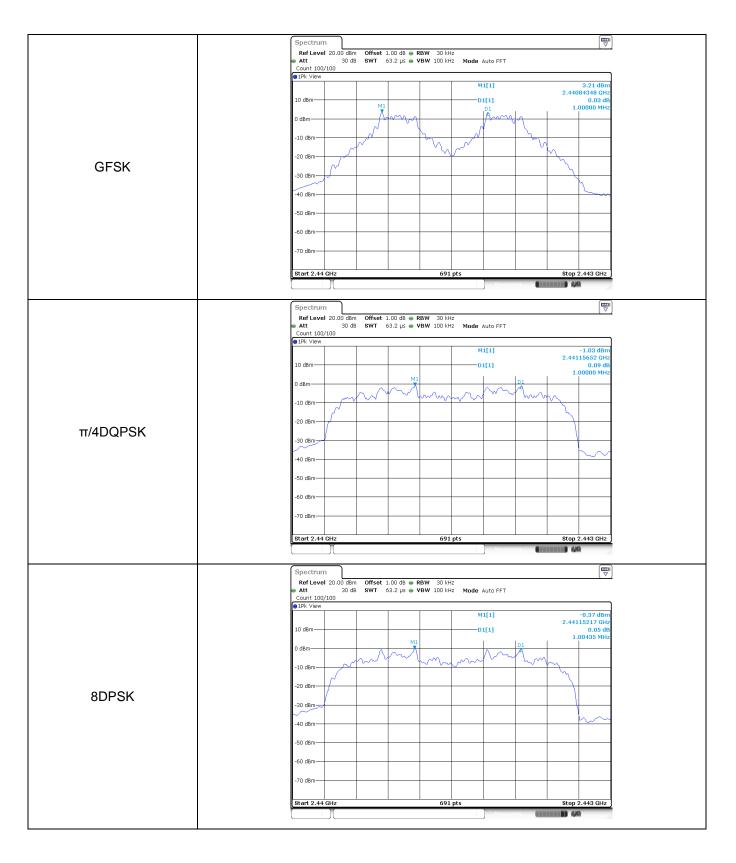
TEST RESULTS

☑ Passed □ Not Applicable

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (MHz) *	Result
GFSK	39	1.00	≥0.92	Pass
π/4DQPSK	39	1.00	≥0.89	Pass
8DPSK	39	1.00	≥0.87	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

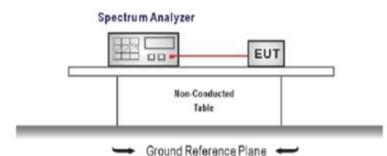


5.6. Hopping Channel Number

LIMIT

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		

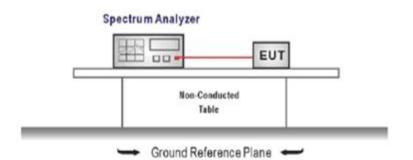
	Spectrum The spectrum
	Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz
	● Att 30 dB SWT 1 ms ● VBW 300 kHz Mode Auto Sweep ●1Pk View
	• HEALTER ALL AND A DEPARTMENT AND AND A DEPARTMENT AND A DEPARTMENT AND A DEPARTMENT AND A DEPARTMENT AND A D
	-1 4 86¹⁶ 14 14 14 14 14 14 14 14 14 14 14 14 14
	-20 d8m
GFSK	430 dBm
	-40 d8m
	-50 dBm
	-60 dBm
	-70 d8m
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	Spectrum Image: Construction of the section of the sect
	Att 30 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep
	10 dBm
	 ได้สัพทานสุ่งหน่าววานที่สุนถนานที่สามารถในสาวานการสุบระทุนส์ของการปล่าวส่งหน้าสามารถในสามารถในสามารถ
	-10 dBm
π/4DQPSK	-20 d8m
II/4DQP5K	-30 dBm
	-40 dBm
	-50 d8m
	-60 dBm
	-70 d8m
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	Meximine.
	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
	IPk View
	10 dBm
	• ๒๕๚๛๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚
	5 ของังหม่งการการการการการการการการการการการการการก
	-10 dBm
	-20 dBm
8DPSK	-50 dBm-
	-40 d8m
	-50 dBm
	-60 dBm
	-70 dBm
	Start 2.4 GHz 691 pts Stop 2.4835 GHz

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.

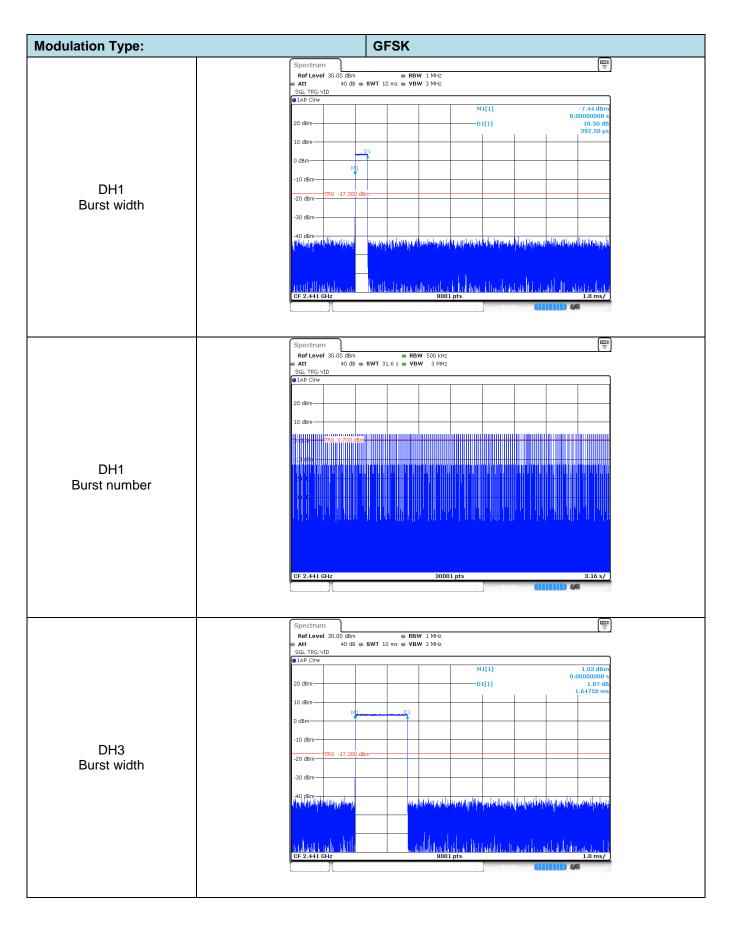
TEST MODE:

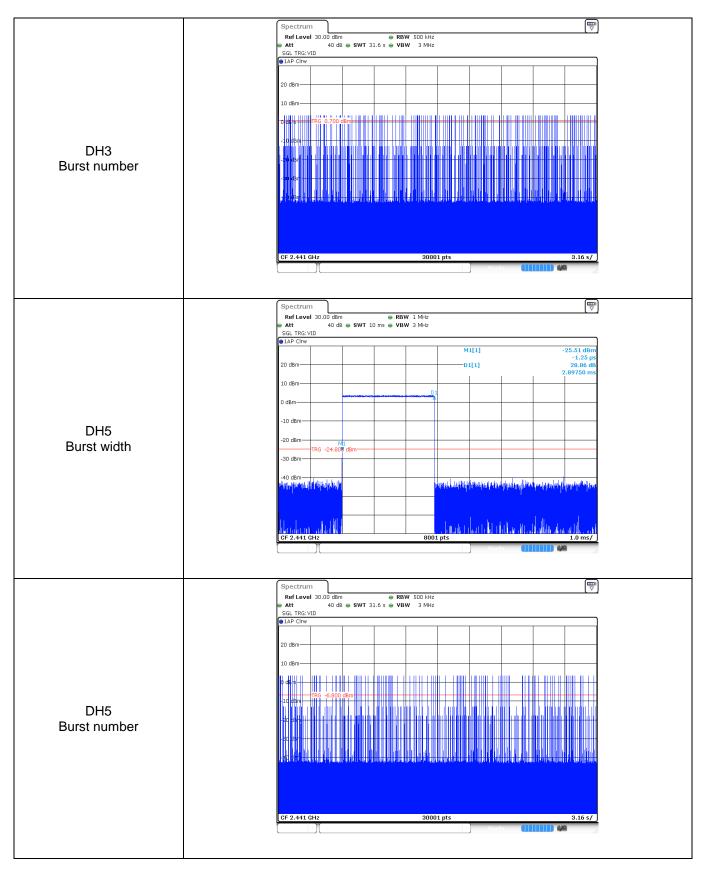
Please refer to the clause 3.3

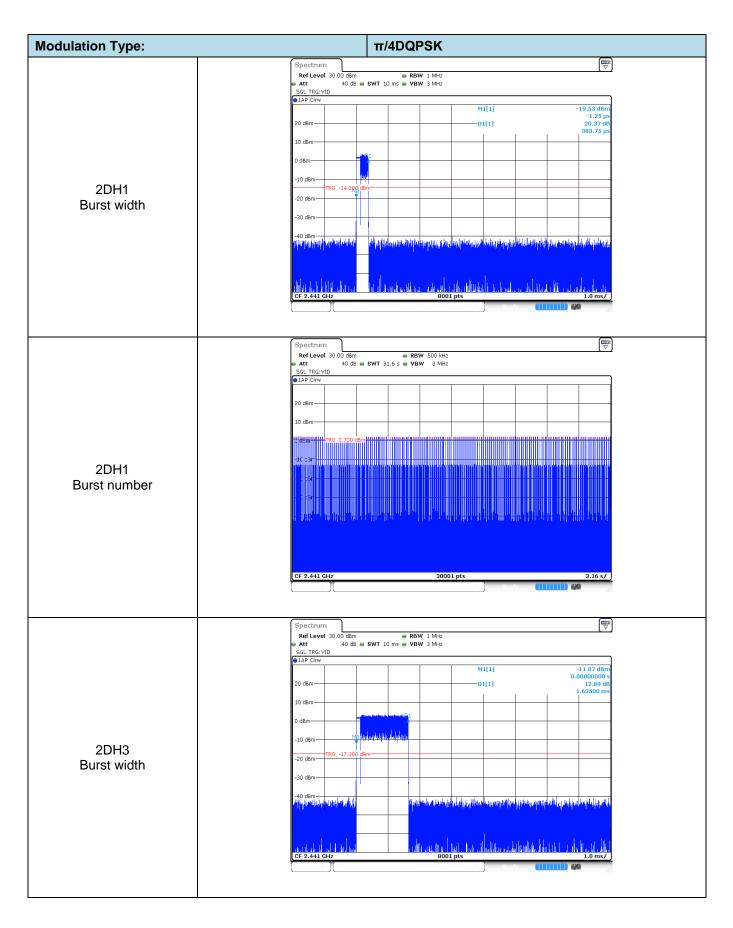
TEST RESULTS

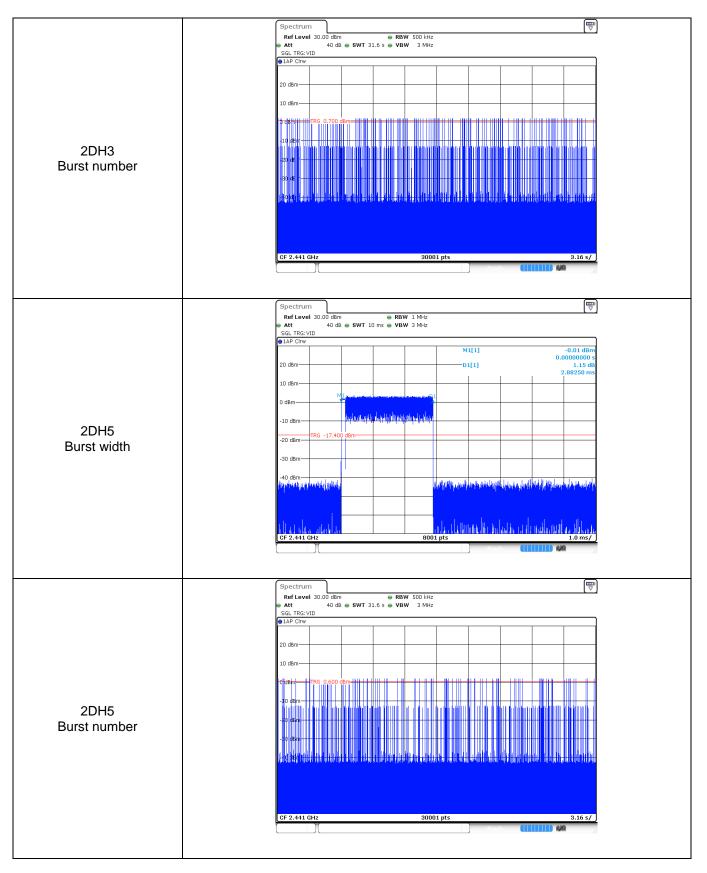
☑ Passed □ Not Applicable

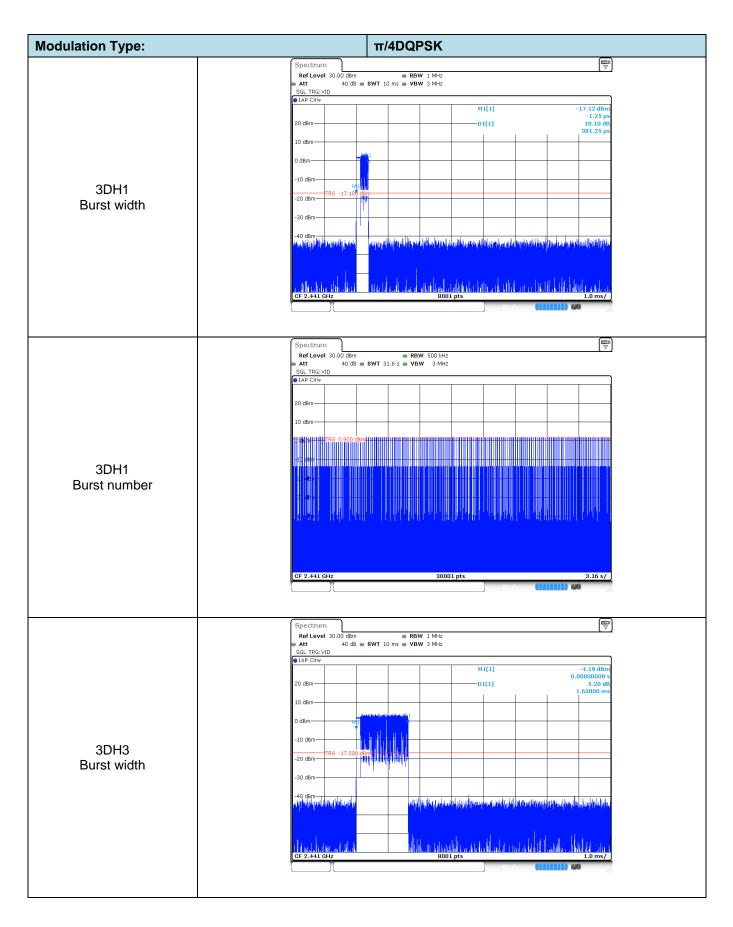
Modulation type	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result	
	DH1	0.39	320.00	0.13			
GFSK	DH3	1.65	159.00	159.00 0.26		Pass	
	DH5	2.90	117.00	0.34			
	2DH1	0.38	321.00	0.12			
π/4DQPSK	2DH3	1.64	157.00	0.26	≤ 0.40	Pass	
	2DH5	2.88	106.00	0.31			
	3DH1	0.38	320.00	0.12			
8DPSK	3DH3	1.63	150.00	0.25	≤ 0.40	Pass	
	3DH5	2.88	118.00	0.34			

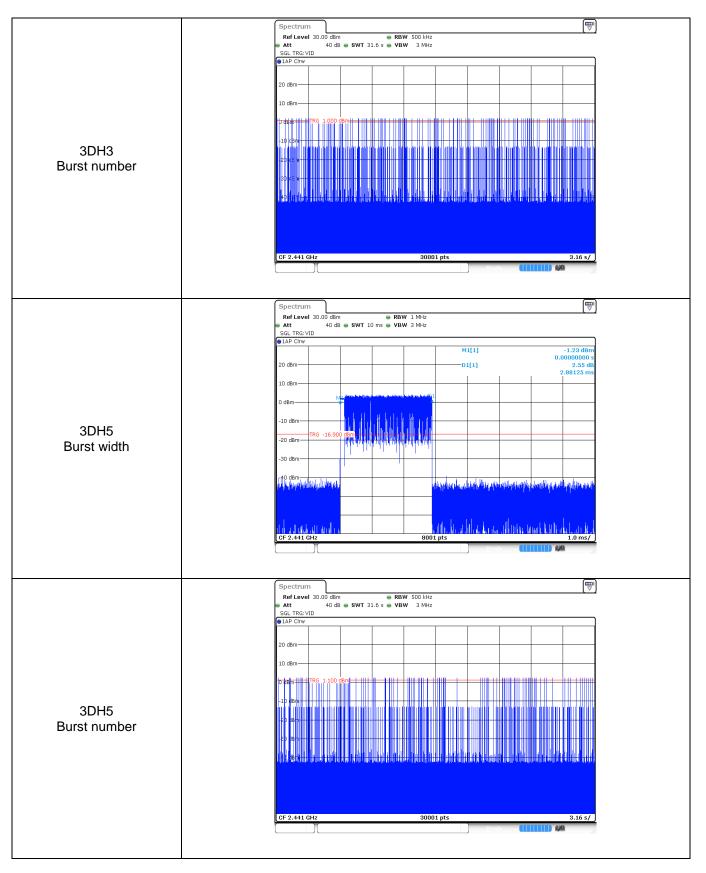












5.8. Pseudorandom Frequency Hopping Sequence

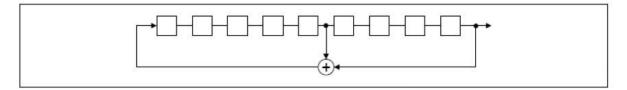
<u>LIMIT</u>

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	-	78	1	73	75 7
٦				 <u>F</u>			1		 - T	П
							i i			
				1			1			
				 			<u>i</u>		 _Ĺ_	

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.

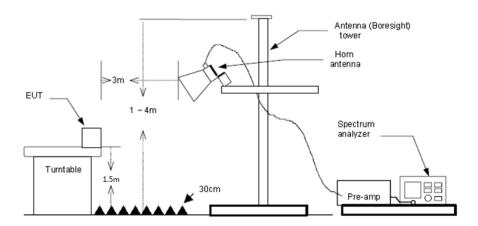
5.9. Restricted band (radiated)

<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
- 2) 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:				CH00	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		
2310.00	35.18	28.05	6.62	37.59	32.26	74.00	-41.74	Horizontal	Peak		
2390.03	33.85	27.65	6.75	37.59	30.66	74.00	-43.34	Horizontal	Peak		
2310.00	35.04	28.05	6.62	37.59	32.12	74.00	-41.88	Vertical	Peak		
2390.03	35.17	27.65	6.75	37.59	31.98	74.00	-42.02	Vertical	Peak		
2310.00	21.60	28.05	6.62	37.59	18.68	54.00	-35.32	Horizontal	Average		
2390.03	21.39	27.65	6.75	37.59	18.20	54.00	-35.80	Horizontal	Average		
2310.00	22.37	28.05	6.62	37.59	19.45	54.00	-34.55	Vertical	Average		
2390.03	22.10	27.65	6.75	37.59	18.91	54.00	-35.09	Vertical	Average		

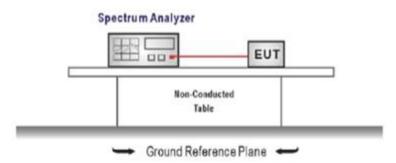
Test channel:					CH78					
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value	
2483.50	52.78	27.26	6.83	37.59	49.28	74.00	-24.72	Horizontal	Peak	
2500.00	30.22	27.20	6.84	37.59	26.67	74.00	-47.33	Horizontal	Peak	
2483.50	53.80	27.26	6.83	37.59	50.30	74.00	-23.70	Vertical	Peak	
2500.00	29.85	27.20	6.84	37.59	26.30	74.00	-47.70	Vertical	Peak	
2483.50	25.55	27.26	6.83	37.59	22.05	54.00	-31.95	Horizontal	Average	
2500.00	21.05	27.20	6.84	37.59	17.50	54.00	-36.50	Horizontal	Average	
2483.50	26.13	27.26	6.83	37.59	22.63	54.00	-31.37	Vertical	Average	
2500.00	21.26	27.20	6.84	37.59	17.71	54.00	-36.29	Vertical	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		Modul	ation type:		GFSK	
		Spectrum Ref Level 20.00 dBm Att 30 dB	Offset 1.00 dB 👄		Sween	Ē]
		Count 500/500	3W1 1.1 ms	VBW 300 KH2 MODE AUTO	Sweep		r
		10 dBm		M1[1]		3.91 dBm 2.402040 GHz	z
		0 dBm		M2[1]		-55.17 plgm 2.400000 0Hz	z
		-10 dBm					
		-20 dBm D1 -16.090 d	Bm				-
0		-30 dBm				+	_
CH00		-40 dBm				+ $+$ $+$	-
No hopping mode		-50 dBm				M3 M8	-
		BordBM*************	and the second	er Monnegeber or mitgeetilgeret. Al	and the second	Remain Transmether	
		-70 dBm					
		Start 2.31 GHz Marker		691 pts		Stop 2.405 GHz	1
		Type Ref Trc M1 1	X-value 2.40204 GHz	Y-value Function 3.91 dBm	E E	unction Result	I
		M2 1 M3 1 M4 1	2.4 GHz 2.39 GHz 2.31 GHz	-55.17 dBm -58.73 dBm -59.39 dBm			-
		M5 1	2.399355 GHz	-56.40 dBm		III 4/4	<u> </u>
					measuring		
		Spectrum Ref Level 20.00 dBm	Offset 1.00 dB 👄	PBW 100 kHz			<u>_</u>
		 Att 30 dB Count 500/500 	SWT 1.1 ms	VBW 300 kHz Mode Auto	Sweep		
		●1Pk Max		M1[1]		3.65 dBm	1
		10 dBm		M2[1]		2.401910 GHz	z
		0 dBm				-58.55 d9m 2.400000 G4k	z
		-10 dBm -20 dBm D1 -16.350 d	Bm			01	8
		-30 dBm					
CH00		-40 dBm					-
Hopping mode		-50 dBm				M3 M5 M2	-
		60'dsm	manna	d and an	- name and the second	in the part of the section of the se	
		-70 dBm]
		Start 2.31 GHz Marker		691 pts		Stop 2.405 GHz	J
		Type Ref Trc	X-value 2.40191 GHz	Y-value Function 3.65 dBm	F	unction Result	
		M2 1 M3 1 M4 1	2.4 GHz 2.39 GHz 2.31 GHz	-58.55 dBm -58.96 dBm -58.66 dBm			-
		M5 1	2.392746 GHz	-57.54 dBm			<u>]</u>
					Measuring	6 /4	11
		Spectrum				[Ţ	<u>]</u>
		Ref Level 20.00 dBm Att 30 dB Count 500/500	SWT 56.9 µs 👄	VBW 300 kHz Mode Auto	FFT		
		●1Pk Max		M1[1]		4.25 dBm	1
		10 dBm 1911		M2[1]		2.4798310 GHz -57.79 dBm	z
		0 dBm		<u> </u>	1	2.4835000 GHz	z
		-10 dBm	Bm				
		-20 dBm					1
CH78		-30 dBm -40 dBm					
No hopping mode		-50 dBm					4
		-60 dBm	MB war			- Jun	
		-70 dBm					-
		Start 2.478 GHz		691 pts		Stop 2.5 GHz	J
		Marker Type Ref Trc	X-value	Y-value Function	F	unction Result	I
		M1 1 M2 1	2.479831 GHz 2.4835 GHz	4.25 dBm -57.79 dBm			
		M3 1 M4 1	2.5 GHz 2.4835159 GHz	-60.07 dBm -57.46 dBm			
					Measuring	4,4	

Report No.: CHTEW18120548

	Spectrum Ref Level 20.00 dBm Offset 1.00 dB ● Att 30 dB SWT 56.9 µs ● Count 500/500 ● JPK Max	RBW 100 kHz VBW 300 kHz Mode Auto FFT
CH78 Hopping mode	■ JPK Max 10 dBm 10 dBm -20 dBm -30 dBm -50 dBm -50 dBm -70 dBm -70 dBm	M1[1] 4.05 dBm 2.4791620 dHz 3.4791620 dHz 2.4835000 GHz 2.4835000 GHz 2.493500 GHz 2.495500 GHZ 2.4955000 GHZ 2.4955000 GHZ 2
	Stort 2.478 GHz Marker X-value Type Ref Trc X-value M1 1 2.479152 GHz M2 1 2.479152 GHz M3 1 2.5 GHz M4 1 2.49015116 GHz	691 pts Stop 2.5 GHz Y-value Function Function Result 4.05 dBm - - -59.39 dBm - - -50.18 dBm - - -57.87 dBm - -

Test Item:	Band edge	Modulation type: π/4DQPSK
CH00 No hopping mode		Spectrum Image: Constraint of the set
CH00 Hopping mode		Spectrum Ref Level 20.00 dbm Offset 1.00 db RBW 100 HHz Att 30 db SWT 1.1 ms VBW 300 kHz Mode Auto Sweep Count 500/500 IPK Max M1[1] 2.12 dbm 0 dbm 2.404240 GHz 3.6 st dbm 0 dbm M2[1] 2.38 ds dbm -10 dbm M2[1] 2.400000 GHz -20 dbm D1 -17.880 dbm M3 -30 dbm M3 M3 -40 dbm M3 M3 -70 dbm M3 M3 -70 dbm M1 2.40424 GHz 5.91 pts Stop 2.405 GHz Marker M3 M3 M3 M3 -70 dbm -70 dbm -70 dbm -70 dbm -70 dbm Marker -70 dbm -70 dbm -70 dbm -70 dbm Marker -70 dbm -70 dbm -70 dbm -70 dbm Marker -70 dbm -70 dbm -70 dbm -70 dbm Marker -70 dbm -70 dbm <th-70 dbm<<="" td=""></th-70>
CH78 No hopping mode		Spectrum Image: Control 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 56.9 µs VBW 300 kHz Mode Auto FFT Count 500/500 IPK Max 10 dBm M1[1] 2.459 dBm 0 dBm M1[1] 2.4798 d10 GHz -58.06 dBm 0 dBm M2[1] -58.06 dBm - -10 dBm M2 - - -20 dBm - - - - -30 dBm - - - - -30 dBm - - - - - -30 dBm - - - - - - -30 dBm - - - - - - - -30 dBm -

Report No.: CHTEW18120548

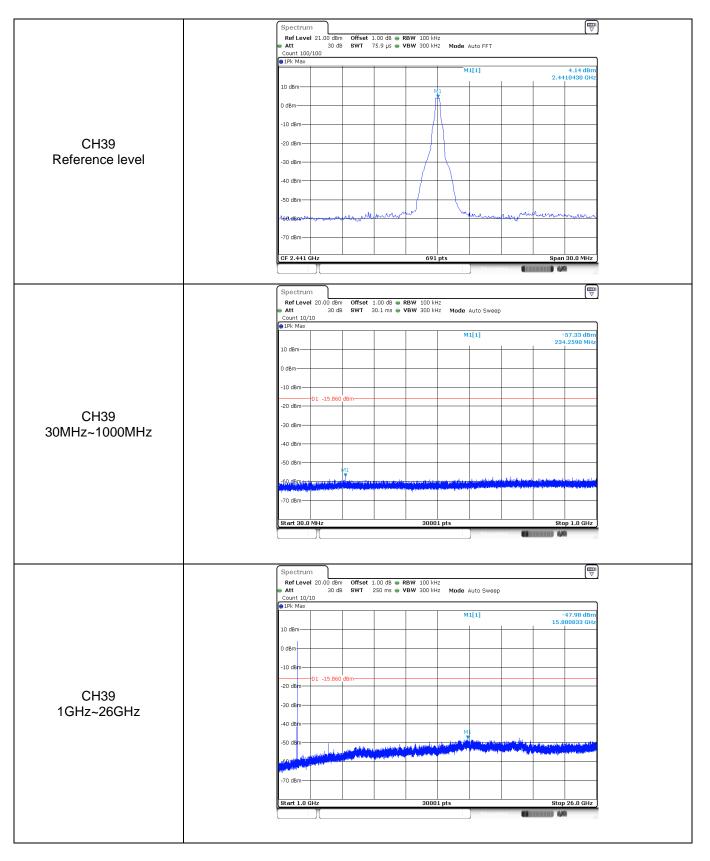
CH78 Hopping mode			dBm Offset 1.00 dB ● 0 dB SWT 56.9 µs ●		Mode Auto FF1	Ţ
Marker Y-volue Y-volue Function Function Result M1 1 2.480149 GHz 2.41 dBm Function Function Result M2 1 2.433 GHz -59.56 dBm Function Function	CH78 Hopping mode		M1 M2	—	M2[1]	2.4801490 GH -59.56 dBn 2.4835000 GH
M1 1 2.480149 GHz 2.41 dBm M2 1 2.4835 GHz -59.56 dBm		Marker	X-value			•
M3 1 2.5 GHz -50.19 dBm M4 1 2.4880435 GHz -57.00 dBm		M1 1 M2 1 M3 1	2.480149 GHz 2.4835 GHz 2.5 GHz	2.41 dBm -59.56 dBm -60.19 dBm	, anction	Function Resolu

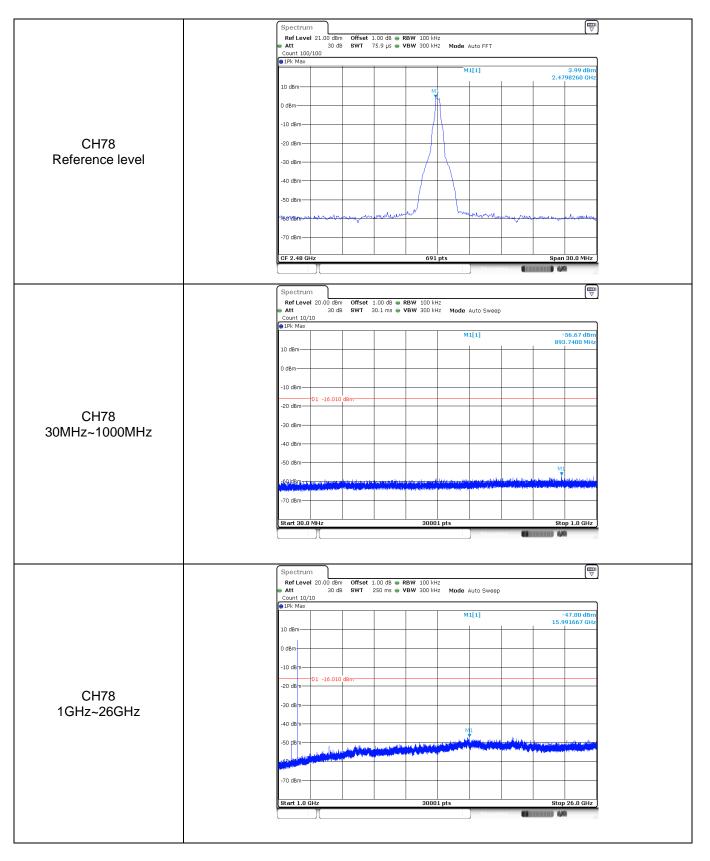
est Item:	Band edge	Modulation type	e: 8DPSK	
	Spectru			
	👄 Att	2 20.00 dBm Offset 1.00 dB ● RBW 100 kHz 30 dB SWT 1.1 ms ● VBW 300 kHz Moo	le Auto Sweep	
	Count 50)/500		
			M1[1] 2.30 dBm 2.402180 GHz	
	10 dBm		M2[1] -50.63 dBm - 2.400000 gHz	
	0 dBm		2.400000 gHz	
	-10 dBm-	D1 -17.700 dBm		
	-20 dBm			
CH00	-30 dBm			
No hopping mode	-40 dBm-		· · · · · · · · · · · · · · · · · · ·	
No hopping mode	-50 dBm		M3	
	∾60*₩8m~~ -70 d8m—			
	Start 2.3 Marker	GHz 691 pts	Stop 2.405 GHz	
	Type R	of Trc X-value Y-value Fu	unction Function Result	
	M1 M2	1 2.40218 GHz 2.30 dBm 1 2.4 GHz -50.63 dBm		
	M3 M4	1 2.39 GHz -58.62 dBm 1 2.31 GHz -59.28 dBm		
	MS	1 2.39963 GHz -49.09 dBm	Measuring	
	Spectru	n		
	Ref Lev	el 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz		
	Count 50	30 dB SWT 1.1 ms 👄 VBW 300 kHz Moc)/500	ie auto Sweep	
	●1Pk Max		M1[1] 2.12 dBm	
	10 dBm		2.403140 GHz M2[1] -53.87 d원in	
	0 dBm		= 2.400000 GM/t	
	-10 dBm—			
	-20 dBm-	D1 -17.880 dBm		
A 1 1 A 1	-30 dBm—			
CH00	-40 dBm—			
Hopping mode	-50 dBm		M3 M3	
		the second water and the second second	the second	
	-70 dBm			
	Start 2.3	GHz 691 pts	Stop 2.405 GHz	
	Marker Type R	of Trc X-value Y-value Fi	unction Function Result	
	M1	1 2.40314 GHz 2.12 dBm		
	M2 M3	1 2.4 GHz -53.87 dBm 1 2.39 GHz -59.07 dBm		
	M4 M5	1 2.31 GHz -59.19 dBm 1 2.399768 GHz -50.57 dBm		
)(Measuring	
			ſm	
	Spectru Ref Lev	m al 20.00 dBm Offset 1.00 dB 👄 RBW 100 kHz	(III)	Į
	Att Count 50	30 dB SWT 56.9 µs 👄 VBW 300 kHz Moo	le Auto FFT	
	• 1Pk Max	// 305		
	10 dBm		M1[1] 2.65 dBm 2.4801490 GHz	
	0 dBm	и Х	M2[1] -58.72 dBm 2.4835000 GHz	
	-10 dBm-			
		D1 -17.350.dBm		
	-20 dBm-			
CH78	-30 dbm			
No hopping mode	-40 dBm—			
no nopping mode	,/50 dBm—			
	-60 dBm—		and a many marked and the second	
	-70 dBm			
	Start 2.4	/8 GHz 691 pts	Stop 2.5 GHz	
	Marker			
	Type R M1	1 2.480149 GHz 2.65 dBm	unction Function Result	
	M2 M3	1 2.4835 GHz -58.72 dBm 1 2.5 GHz -58.99 dBm		
	M4	1 2.497513 GHz -57.64 dBm		
		11	Measuring	

Report No.: CHTEW18120548

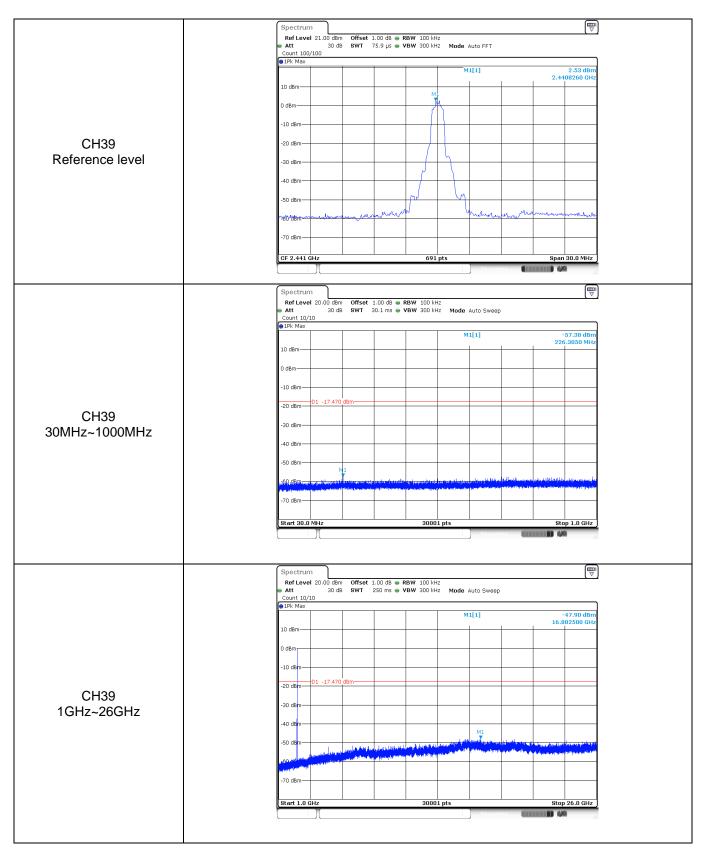
	Spectrum Ref Level 20.00 dBm Offset 1.00 dB ● RBW 100 kHz Att 30 dB SWT 56.9 µs VBW 300 kHz Count 500/500 ● IFK Max	₩ Mode Auto FFT
CH78 Hoppig mode	-10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -50 dBm -50 dBm -50 dBm -50 dBm -50 dBm -50 dBm -50 dBm	M1[1] 2.46 dBm 2.4791620 GHz M2[1] -599.46 dBm 2.4835000 GHz
	Type Bef Trc X-value Y-value M1 1 2.479166 GHz 2.46 dBm M2 1 2.4935 GHz -59.46 dBm M3 1 2.5 GHz -66.46 dBm M4 1 2.4805 913 GHz -57.52 dBm	s Stop 2.5 GHz

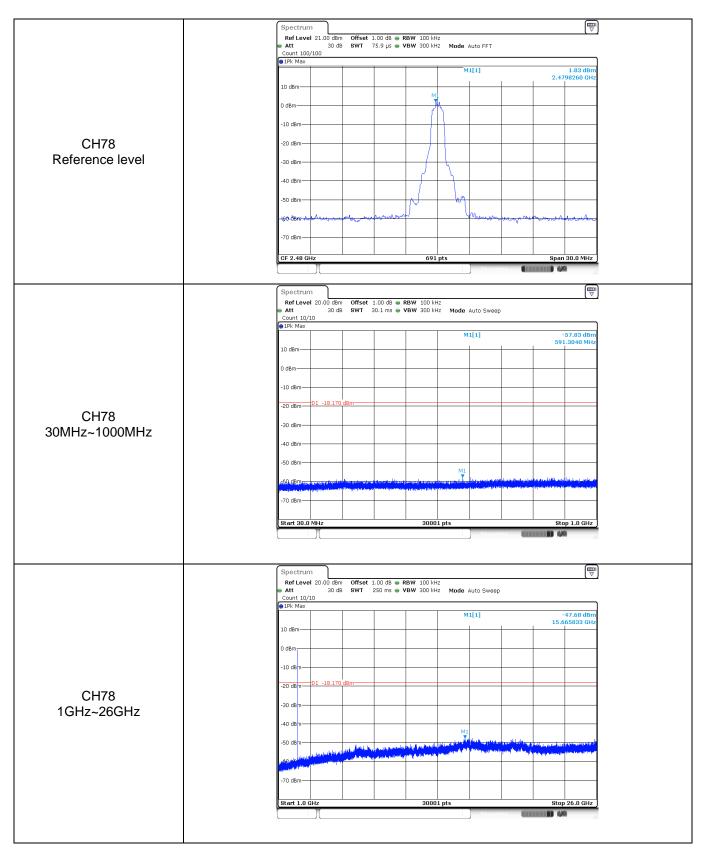
Test Item:	SE	Modula	ation type:	GFSK				
		Spectrum Ref Level 21.00 dBm Offset 1.00 dB • RBW 100 kHz						
		● Att 30 dB SWT 75.9 μs ● Count 100/100 ●1Pk Max	VBW 300 kHz Mode Auto FFT]			
		10 dBm-	M1[1]	3.88 dBm 2.4018260 GHz				
		0 dBm	M-					
		-10 dBm						
		-20 d8m						
CH00		-30 dBm						
Reference level		-40 dBm						
		-50 dBm						
		waayaamaanahahahaanaanayaanaa ahaanahahambahanahahambahambahambahambah	and mondance	manne				
		-70 dBm						
		CF 2.402 GHz	691 pts	Span 30.0 MHz				
			Measu	nina				
		Spectrum)			
		Ref Level 20.00 dBm Offset 1.00 dB Att 30 dB SWT 30.1 ms Count 10/10	RBW 100 kHz VBW 300 kHz Mode Auto Swee		•			
		IPk Max	M1[1]	-57.14 dBm 232.9010 MHz				
		10 dBm						
		0 dBm						
		-10 dBm						
CH00		-20 dBm						
30MHz~1000MHz		-30 dBm						
		-40 dBm						
		-50 dBm						
		-60 (BD)	a Theorem and a start from the first of the start of the					
		Start 30.0 MHz	30001 pts	Stop 1.0 GHz	J			
		Spectrum Ref Level 20.00 dBm Offset 1.00 dB • Att 30 dB SWT 250 ms •	RBW 100 kHz VBW 300 kHz Mode Auto Swee	(₩ ▽	J			
		Count 10/10						
		10 dBm	M1[1]	-47.54 dBm 19.470833 GHz				
		0 dBm						
		-10 d <mark>2</mark> m						
_		-20 dBm						
CH00 1GHz~26GHz		-30 dem						
10112~2000		-40 dem						
		-50 dg m	interation of the second se					
		-Solar Ballin States of All Andrew Provide States and All Andrew P		an heaten i han an a				
		-70 dBm						
		Start 1.0 GHz	30001 pts	Stop 26.0 GHz				
			Measu	ring (1997) (20				



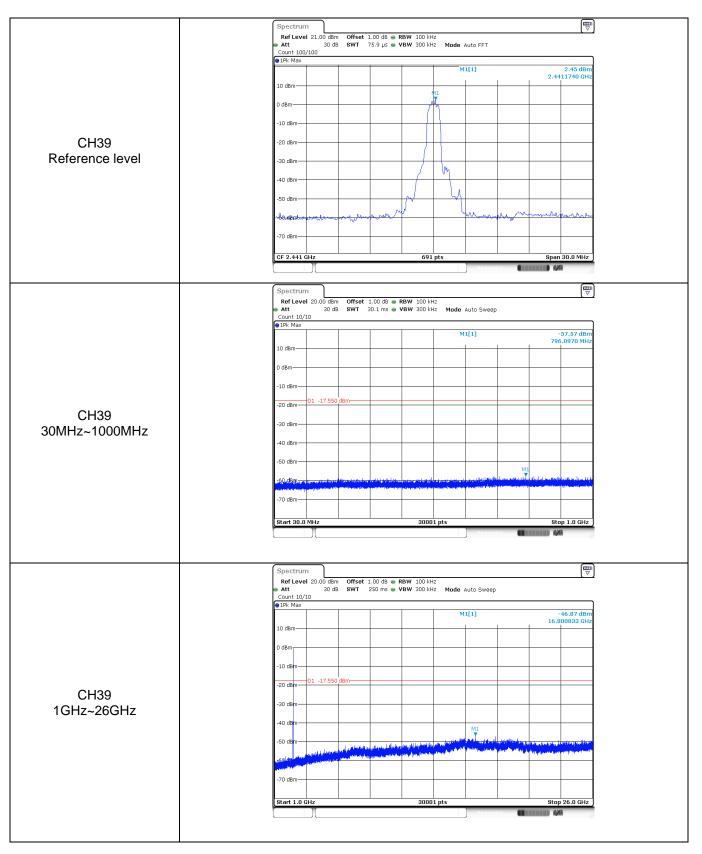


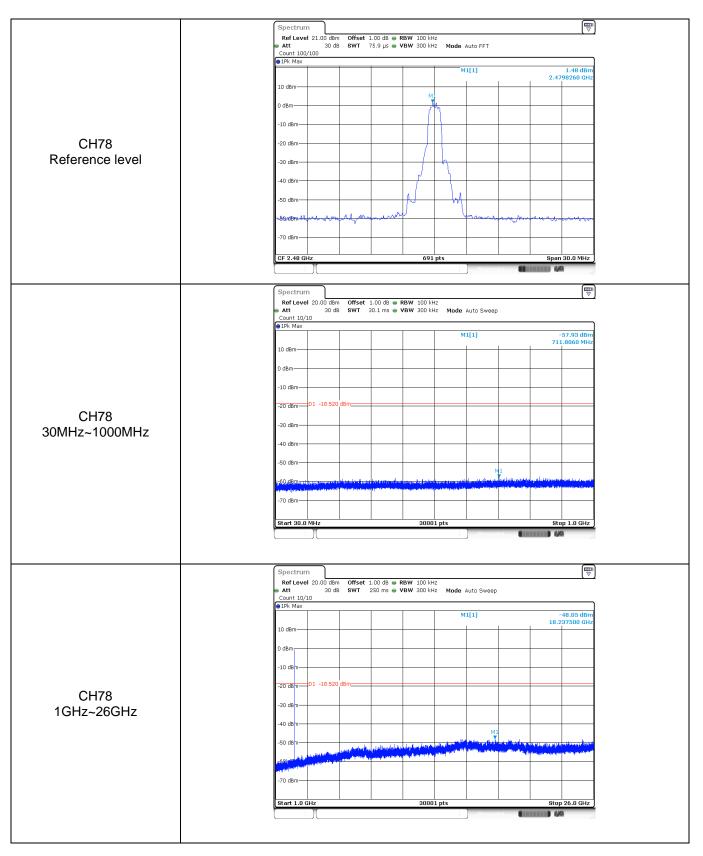
est Item:	SE	Modulation type: π/4DQPSK	
		Spectrum Image: Constraint of the section of the secti	
		Count 100/100	
CH00 Reference level		-10 dBm	
		-40 dBm	
		-70 dBm CF 2.402 GHz 691 pts Span 30.0 MHz (
		Spectrum Imp Ref Level 20.00 dbm Offset 1.00 db ● RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep	
		Count 10/10	
01100		0 dBm	
CH00 30MHz~1000MHz		-30 dBm	
		-59.dBrute and the description of the frequency of the second sec	
		Start 30.0 MHz 30001 pts Stop 1.0 GHz	
		Spectrum Image: Constraint of the section of the sectio	
CH00		-10 dBm	
1GHz~26GHz		-30 dgm	
		-50 B	
		Start 1.0 GHz 30001 pts Stop 26.0 GHz	





Test Item:	SE	Modulation type: 8DPSK
		Spectrum (₩) Ref Level 21.00 dBm Offset 1.00 dB ● RBW 100 kHz ▲ Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT Count 100/100 Count 100/100 SWT 75.9 µs VBW 300 kHz Mode Auto FFT
		0 dBm
CH00 Reference level		-20 dBm
		-50 dBm
		-70 dBm
		Spectrum
		Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 6 10
		10 dBm
		-20 dBm D1 -19.160 dBm
30MHz~1000MHz		-40 dBm
		Start 30.0 MHz 30001 pts Stop 1.0 GHz
		Spectrum Image: Constraint of the second secon
		0 dBm -10 dBm -20 dBm D1 -18.160 dBm
CH00 1GHz~26GHz		-40 d2m
		-50 d8 m
		-70 dBm





5.11. Spurious Emissions (radiated)

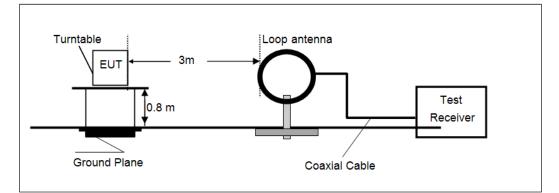
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

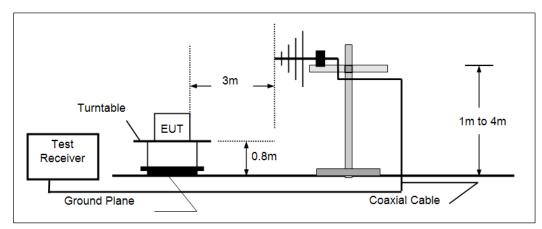
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

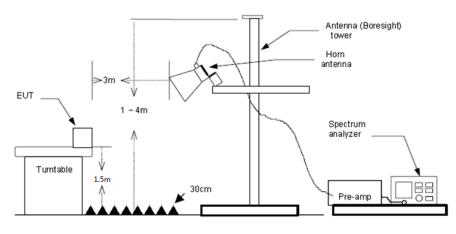
Below 30 MHz



> 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

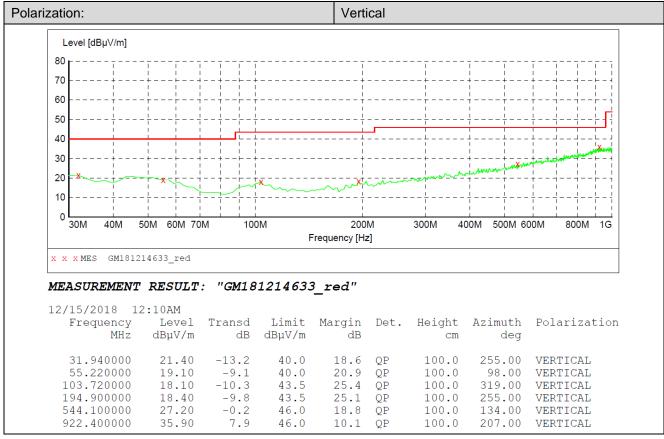
Note:

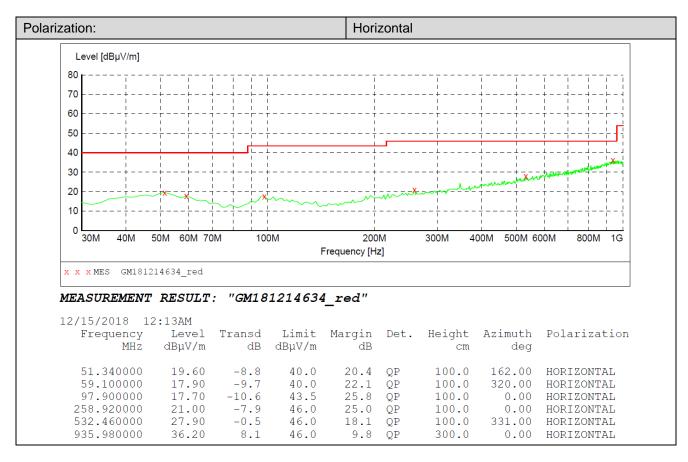
- 1) Final Level = Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3) Below 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation High channel which it was worst 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.

➢ 30 MHz ~ 1 GHz





> 1 GHz ~ 25 GHz

	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		
1428.14	33.48	25.87	5.08	37.10	27.33	74.00	-46.67	Vertical	Peak		
3350.56	33.91	28.20	7.90	37.26	32.75	74.00	-41.25	Vertical	Peak		
4772.91	33.04	31.49	9.53	35.78	38.28	74.00	-35.72	Vertical	Peak		
7508.69	31.97	36.11	12.42	33.02	47.48	74.00	-26.52	Vertical	Peak		
1210.36	34.56	26.29	4.68	37.22	28.31	74.00	-45.69	Horizontal	Peak		
2129.79	32.12	26.94	6.38	37.60	27.84	74.00	-46.16	Horizontal	Peak		
3786.01	32.63	29.56	8.48	36.92	33.75	74.00	-40.25	Horizontal	Peak		
7357.33	31.59	36.30	12.03	33.26	46.66	74.00	-27.34	Horizontal	Peak		

	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		
1195.05	34.42	26.26	4.65	37.23	28.10	74.00	-45.90	Vertical	Peak		
3225.04	33.58	28.65	7.75	37.37	32.61	74.00	-41.39	Vertical	Peak		
5151.68	32.32	31.69	9.79	35.08	38.72	74.00	-35.28	Vertical	Peak		
8042.90	31.55	37.06	12.40	33.06	47.95	74.00	-26.05	Vertical	Peak		
1732.97	34.37	25.27	5.83	37.34	28.13	74.00	-45.87	Horizontal	Peak		
3258.04	33.75	28.45	7.79	37.34	32.65	74.00	-41.35	Horizontal	Peak		
6363.65	31.81	33.23	10.99	33.76	42.27	74.00	-31.73	Horizontal	Peak		
8022.46	31.51	37.08	12.35	33.06	47.88	74.00	-26.12	Horizontal	Peak		

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
1685.12	34.12	25.16	5.74	37.28	27.74	74.00	-46.26	Vertical	Peak
3120.06	33.58	28.80	7.62	37.47	32.53	74.00	-41.47	Vertical	Peak
4797.27	31.46	31.59	9.54	35.74	36.85	74.00	-37.15	Vertical	Peak
7547.01	31.00	36.15	12.55	33.02	46.68	74.00	-27.32	Vertical	Peak
1533.65	33.74	25.49	5.38	37.11	27.50	74.00	-46.50	Horizontal	Peak
3080.60	33.59	28.76	7.58	37.50	32.43	74.00	-41.57	Horizontal	Peak
5230.96	32.00	31.44	9.88	34.93	38.39	74.00	-35.61	Horizontal	Peak
8104.56	32.19	36.99	12.55	33.04	48.69	74.00	-25.31	Horizontal	Peak

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

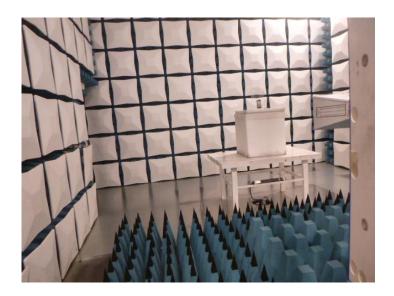
Conducted Emissions (AC Mains)



Radiated Emissions







7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No.: CHTEW18120546

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