



TI	EST REPOR	Г			
Report No:	CHTEW19030203	Report verification :			
Project No	SHT1901068504EW				
FCC ID:	Q5EDP58001	Reportion Control Days			
Applicant's name:	Kirisun Communication Co.	,Ltd.			
Address	3rd Floor, Building A, Tongfar Langshan Road, Nanshan Dis	ng Information Habour, No.11 strict, Shenzhen 518057, P.R.China			
Manufacturer	Kirisun Communication Co.,Lt	td.			
Address	3rd Floor, Building A, Tongfar Langshan Road, Nanshan Dis	ng Information Habour, No.11 strict, Shenzhen 518057, P.R.China			
Test item description:	DMR Two Way Radio				
Trade Mark	KIRISUN				
Model/Type reference	DP580-01				
Listed Model(s)	DP585-01				
Standard:	FCC CFR Title 47 Part 15 Su	ubpart C Section 15.247			
Date of receipt of test sample	Jan.31, 2019				
Date of testing	Jan.31, 2019- Mar.22, 2019				
Date of issue	Mar.26, 2019				
Result:	PASS				
Compiled by (position+printed name+signature):	File administrators Fanghui Zl	hu fanghui.Zhu			
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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

Revision No.	Date of issue	Description
N/A	2019-03-26	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	Zhiwei Liu
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	Xiaokang Tan
Radiated Emissions	15.247(d)/15.209	PASS	Xiaokang Tan

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

3. <u>SUMMARY</u>

3.1. Client Information

Applicant:	Kirisun Communication Co.,Ltd.
Address:3rd Floor, Building A, Tongfang Information Habour, No.11 Langsha Road, Nanshan District, Shenzhen 518057, P.R.China	
Manufacturer: Kirisun Communication Co.,Ltd.	
Address:	3rd Floor, Building A, Tongfang Information Habour, No.11 Langshan Road, Nanshan District, Shenzhen 518057, P.R.China

3.2. Product Description

Name of EUT:	DMR Two Way Radio	
Trade Mark:	KIRISUN	
Model No.:	DP580-01	
Listed Model(s):	DP585-01	
Power supply:	DC 7.4V	
Adapter information:	Model: ZAC-A120100A-04 Input: 100-240Va.c., 50/60Hz, 0.4A Output: 12Vd.c., 1000mA	
Hardware version:	V1.0	
Software version:	V1.2.0.9	
Bluetooth		
Version:	Supported BT4.2+EDR	
Modulation:	GFSK, π/4DQPSK, 8DPSK	
Operation frequency:	2402MHz~2480MHz	
Channel number:	79	
Channel separation:	1MHz	
Antenna type:	Integral Antenna	
Antenna gain:	0dBi	

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.:	/
/	1	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

•	Conducted Emission						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)	
•	Shielded Room	Albatross projects	N/A	N/A	2018/09/28	2023/09/27	
•	EMI Test Receiver	R&S	ESCI	101247	2018/10/27	2019/10/26	
•	Artificial Mains	SCHWARZBECK	NNLK 8121	573	2018/10/27	2019/10/26	
•	Pulse Limiter	R&S	ESH3-Z2	100499	2018/10/27	2019/10/26	
•	RF Connection Cable	HUBER+SUHNER	EF400	N/A	2018/11/15	2019/11/14	
•	Test Software	R&S	ES-K1	N/A	N/A	N/A	
0	Single Balanced Telecom Pair ISN	FCC	FCC-TLISN-T2-02	20371	2018/10/28	2019/10/27	
0	Two Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T4-02	20373	2018/10/28	2019/10/27	
0	Four Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T8-02	20375	2018/10/28	2019/10/27	
0	V-Network	R&S	ESH3-Z6	100211	2018/10/27	2019/10/26	
0	V-Network	R&S	ESH3-Z6	100210	2018/10/27	2019/10/26	
0	2-Line V-Network	R&S	ESH3-Z5	100049	2018/10/27	2019/10/26	

•	Radiated Emission-6th test site					
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	SAC-3m-02	N/A	2018/09/30	2021/09/29
•	EMI Test Receiver	R&S	ESCI	100900	2018/10/28	2019/10/27
0	Loop Antenna	R&S	HFH2-Z2	100020	2017/11/20	2020/11/19
•	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	2017/04/05	2020/04/04
•	Pre-Amplifer	SCHWARZBECK	BBV 9742	N/A	2018/11/15	2019/11/14
•	RF Connection Cable	HUBER+SUHNER	N/A	N/A	2018/09/28	2019/09/27
•	RF Connection Cable	HUBER+SUHNER	SUCOFLEX104	501184/4	2018/09/28	2019/09/27
•	Test Software	R&S	ES-K1	N/A	N/A	N/A
•	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
•	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A

•	Radiated emissi	on-7th test site				
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	SAC-3m-01	N/A	2018/09/30	2021/09/29
•	Spectrum Analyzer	R&S	FSP40	100597	2018/10/27	2019/10/26
•	Horn Antenna	SCHWARZBECK	9120D	1011	2017/03/27	2020/03/26
0	Pre-amplifier	BONN	BLWA0160-2M	1811887	2018/11/14	2019/11/13
•	Pre-amplifier	CD	PAP-0102	12004	2018/11/14	2019/11/13
•	Broadband Pre- amplifier	SCHWARZBECK	BBV 9718	9718-248	2018/04/28	2019/04/27
•	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	2018/11/15	2019/11/14
•	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	2018/11/15	2019/11/14
•	Test Software	Audix	E3	N/A	N/A	N/A

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٠	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
•	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A

•	RF Conducted N	lethod				
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Signal and spectrum Analyzer	R&S	FSV40	100048	2018/10/28	2019/10/27
•	Spectrum Analyzer	Agilent	N9020A	MY50510187	2018/09/29	2019/09/28
0	Radio communication tester	R&S	CMW500	137688-Lv	2018/09/29	2019/09/28
0	Test software	Tonscend	JS1120-1(LTE)	N/A	N/A	N/A
0	Test software	Tonscend	JS1120-2(WIFI)	N/A	N/A	N/A
0	Test software	Tonscend	JS1120-3(WCDMA)	N/A	N/A	N/A
0	Test software	Tonscend	JS1120-4(GSM)	N/A	N/A	N/A

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.

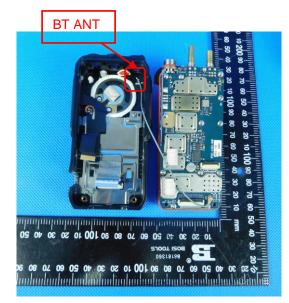
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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)

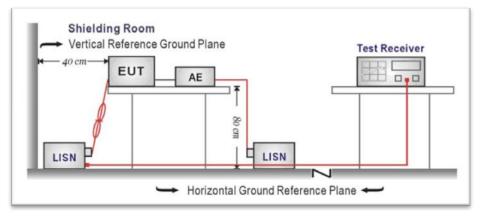
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207

	Limit (d	lBuV)
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

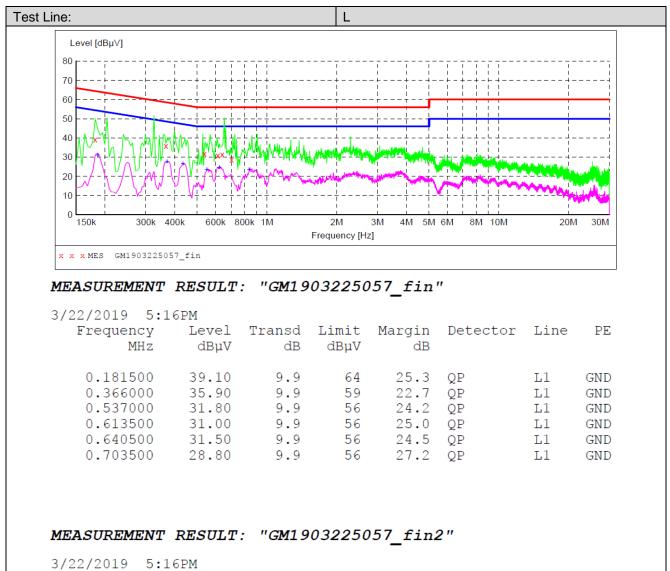
- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm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

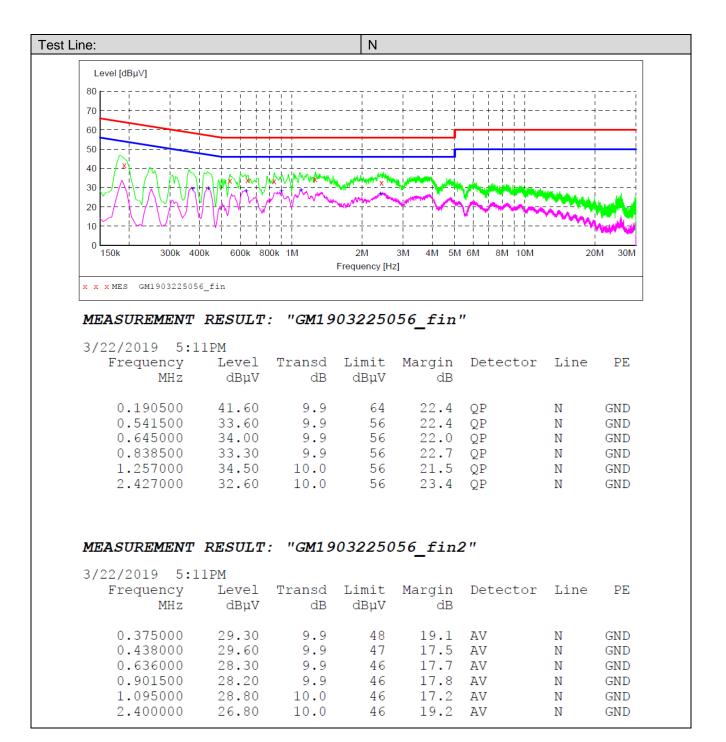
☑ Passed □ Not Applicable

Note:

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



5/22/2015 5.1	0114							
Frequency	Level	Transd	Limit	Margin	Detector	Line	PE	
MHz	dBuV	dB	dBuV	dB				
MILZ	αвμν	uь	αвμν	uь				
0.186000	30.90	9.9	54	23.3	AV	L1	GND	
0.370500	27.50	9.9	49	21.0	AV	L1	GND	
0.433500	26.40	9.9	47	20.8	AV	L1	GND	
					11.4		OND	
0.550500	23.40	9.9	46	22.6	AV	L1	GND	
0.622500	24.60	9.9	46	21.4	AV	L1	GND	
0.838500	23.40	9.9	46	22.6	AV	L1	GND	

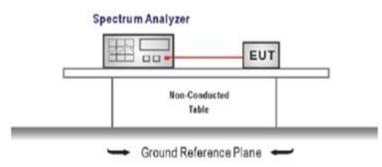


5.3. Conducted Peak Output Power

<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	7.97		
GFSK	39	8.72	≤ 30.00	Pass
	78	8.76		
	00	6.51		
π/4DQPSK	39	7.47	≤ 21.00	Pass
	78	7.52		
	00	6.86		
8DPSK	39	7.78	≤ 21.00	Pass
	78	7.84		

Iodulation Type:	GFSK
	Spectrum Image: Construction of the sector of
	Count_5000/500 ●1Pk View M1[1] 7.97 dBm 10 dBm M1 2.40208680 GHz
	0 dBm
CH00	-20 dBm
	-40 dBm
	-50 dBm
	CF 2.402 GHz 691 pts Span 5.0 MHz
	Spectrum Image: Count Story Sto
	M1[1] 8.72 dBm 10 dBm M1 0 dBm V
	-10 dBm
CH39	-30 dBm
	-50 dBm
	-70 dBm CF 2.441 GHz 691 pts Span 5.0 MHz
	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/S00
	10 dBm M1 2.47992040 GHz 0 dBm V
CH78	-10 dBm
	-40 dBm
	-50 dBm
	CF 2.48 GHz 691 pts Span 5.0 MHz

Modulation Type:	π/4DQPSK
	Spectrum Image: Constraint of the sector
	Count 500/500
CH00	0 dBm
	-10 dBm
	-30 dBm
	-50 dBm
	-70 dBm
	Spectrum Image: Content of the second s
	10 dBm M1[1] 7.47 dBm
	0 dBm
СН39	-20 dBm
	-40 dBm
	-60 d8m
	CF 2.441 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 0 1 ms VBW 5 MHz Mode Auto Sweep FIR: View 0 1 ms 0 ms 0 ms
	10 dBm M1[1] 7.52 dBm 2.47976850 GHz
	0 dbm
CH78	-20 dBm
	-40 d8m
	-60 dBm
	CF 2.48 GHz 691 pts Span 5.0 MHz

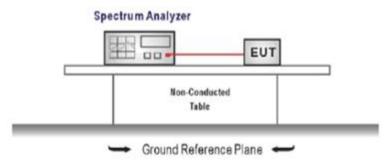
Modulation Type:	8DPSK
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz • Att 30 dB SWT 1 ms • VBW 5 MHz Mode Auto Sweep Count 500/500
	●1Pk View M1[1] 6.86 dBm 2.40194210 GHz
	10 dBm
	-10 dBm
CH00	-30 dBm-
	-40 dBm-
	-50 dBm-
	-60 dBm
	-70 dBm
	CF 2.402 GHz 691 pts Span 5.0 MHz
	Spectrum Image: Constraint of the second secon
	Count 500/500
	10 d8m M1[1] 7.78 d8m M1[1] 2.44092760 GHz
	0 dBm
	-10 dBm
CH39	-20 dBm
	-30 dBm
	-40 dBm
	-60 dam
	-70 dBm-
	CF 2.441 GHz 691 pts Span 5.0 MHz
	Spectrum Image: 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 ● JFk View
	M1[1] 7.84 dBm 2.47994930 GHz
	-10 dBm
CH78	-20 dBm
	-30 dBm-
	-40 dBm-
	-50 dBm
	-60 dBm
	CF 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	0.93		
GFSK	39	0.92	-	Pass
	78	0.92		
	00	1.24		
π/4DQPSK	39	1.24	-	Pass
	78	1.24		
	00	1.26		
8DPSK	39	1.26	-	Pass
	78	1.26		

Modulation Type:	GFSK
CH00	Spectrum Image: Control in the image: Conthe image: Control in the image: Control in the ima
CH39	Spectrum Image: Constraint of the second secon
CH78	Spectrum Image: Constraint of the second secon

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
	Count 500/500
	M1[1] -16.27 dBm
	10 dem M2 M2[1] 4.38 dBm
	-10 dBm03
	-20 dBm
CH00	-30 UB/III -40 38/m
	-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 2.401305 GHz -16.27 dBm -
	M2 1 2.401935 GHz 4.38 dBm D3 M1 1 1.24 MHz 0.57 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 File View
	M1[1] - 15.04 dBm
	10 dBm M2 M2[1] 5.48 dBm 0 dBm 2.44093250 GHz
	-10 dBm
	-20 dBm 01 -14.517 dBm 23
	-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 2.4403025 GHz -15.04 dBm
	D3 M1 1 1.24 MHz 0.51 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 f1Pk View
	10 dBm M1[1] -14.70 dBm 2.47930250 GHz 5.54 dBm
	2.47993250 GHz
	-10 dBm
	-20 dBm20 dBm20 dBm20 dBm20 dBm
	-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 2.4793025 GHz -14.70 dBm M2 1 2.4793325 GHz 5.54 dBm
	D3 M1 1 1.24 MHz 0.24 dB

Modulation Type:	8DPSK
	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 ●1Pk View
	10 dBm
	0 dBm 2.40193750 GHz
	-10 dBm 01 -15.586 dBm 23 -20 dBm 24 - 20
0400	-30 dBm
CH00	-30 dBm
	-60 dBm-
	-70 dBm-
	CF 2.402 GHz 1001 pts Span 2.5 MHz Marker
	Type Ref Tro X-volue Y-value Function Function Result M1 1 2.4012925 GHz -15.83 dBm M2 1 2.4019375 GHz 4.41 dBm <t< td=""></t<>
	D3 M1 1 1.2575 MHz -0.08 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
	10 dBm 2.44028750 GHz
	-20 dBm
CH39	-30 d8m
	-50 dBm-
	-60 dBm-
	-70 dBm
	Marker Type Ref Trc X-value Y-value Function Function Result
	M1 1 2.4402875 GHz -14.95 dBm M2 1 2.440935 GHz 5.54 dBm D3 M1 1 1.26 MHz 0.27 dB
	Mescuring
	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
	● JPk. View 10 dBm
	0 dBm M2[1]S.57 dBm 0 dBm 0 dBm
	-10 dBm
	-20 dBm
CH78	-40 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 2.4792875 GHz -14.84 dBm
	M2 1 2.4799325 GHz 5.57 dBm D3 M1 1 1.26 MHz 0.01 dB

5.5. Carrier Frequencies Separation

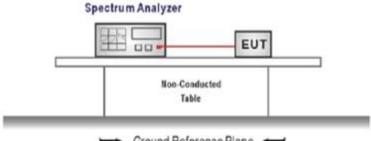
LIMIT

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

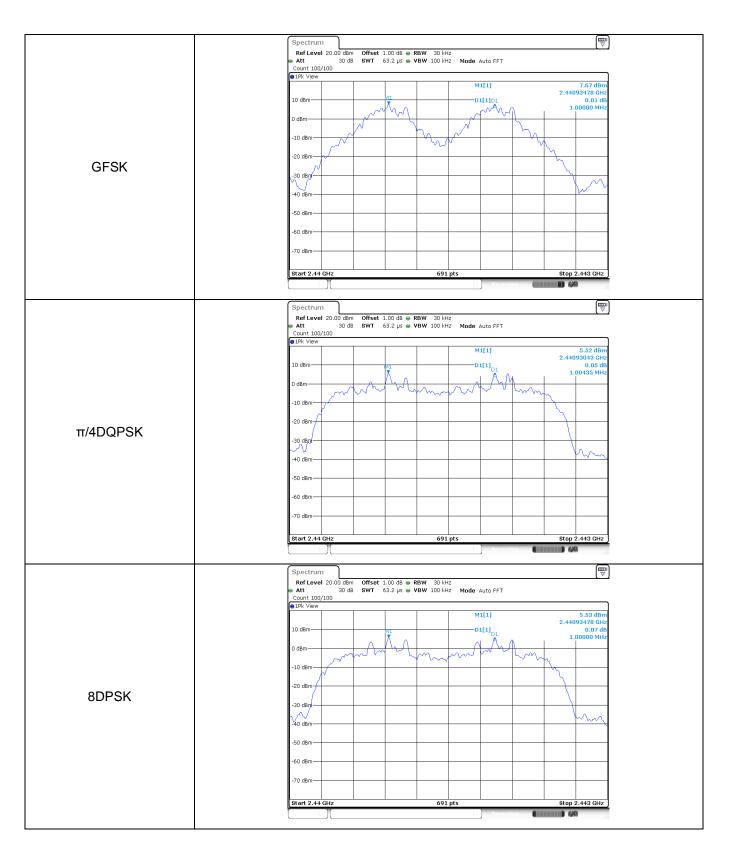
TEST RESULTS

☑ Passed □ Not Applicable

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (MHz) *	Result
GFSK	39	1.00	≥0.93	Pass
π/4DQPSK	39	1.00	≥0.83	Pass
8DPSK	39	1.00	≥0.84	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

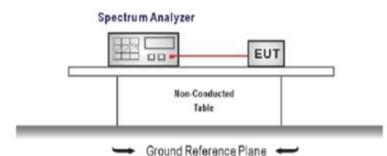


5.6. Hopping Channel Number

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		

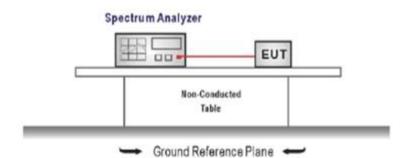
I	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz
	● Att 30 dB SWT 1 ms ● VBW 300 kHz Mode Auto Sweep ● 1Pk View
	10 dBm 6 8 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
	0/d6/ 10/00/00/00/00/00/00/00/00/00/00/00/00/0
	-10 dBm
GFSK	-20 dBm-
GFSK	-30 dBm
	-40 d8m
	-50 dBm
	-60 dBm-
	-70 dBm
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	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
	0,998,474,444,414,444,444,444,444,444,444,444
	-10 dBm
	-20 dBm
π/4DQPSK	
	/30 dBm
	-40 dBm
	-50 d8m
	-60 dBm
	-70 dBm-
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	Spectrum 🕎
	RefLevel 20.00 dBm Offset 1.00 dB ● RBW 100 kHz ● Att 30 dB SWT 1 ms ● VBW 300 kHz Mode Auto Sweep
	PIPk View
	10 dBm
	Mannan
	-10 dBm-
	-20 d8m
	430 d8m
8DPSK	
8DPSK	
8DPSK	-40 dBm
8DPSK	-40 dBm
8DPSK	
8DPSK	-50 dBm
8DPSK	-50 dBm-
8DPSK	-50 dBm

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.

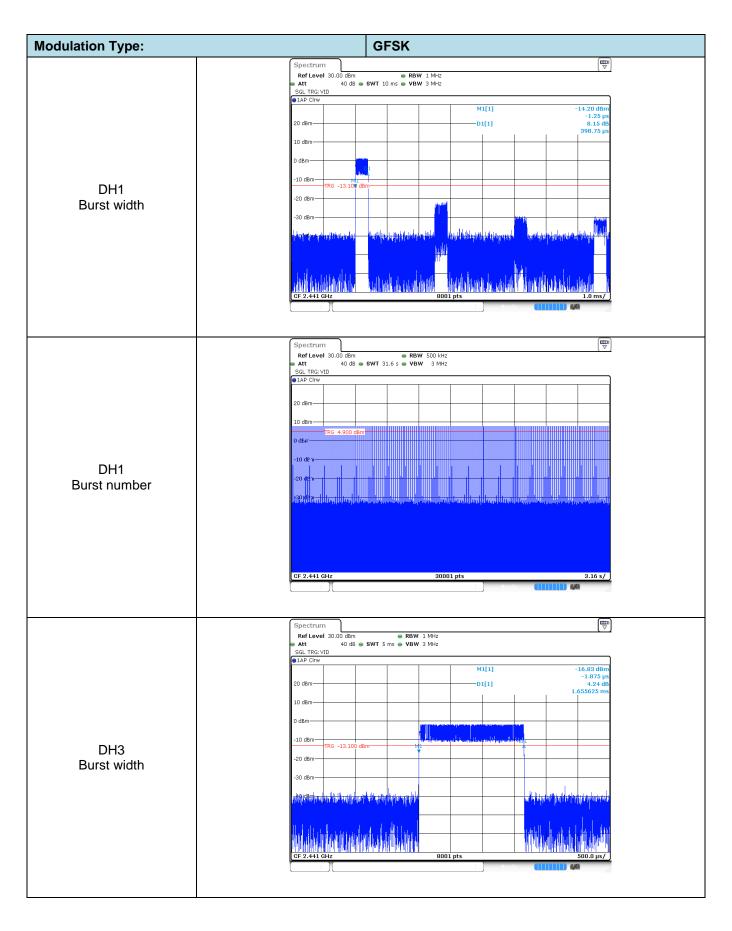
TEST MODE:

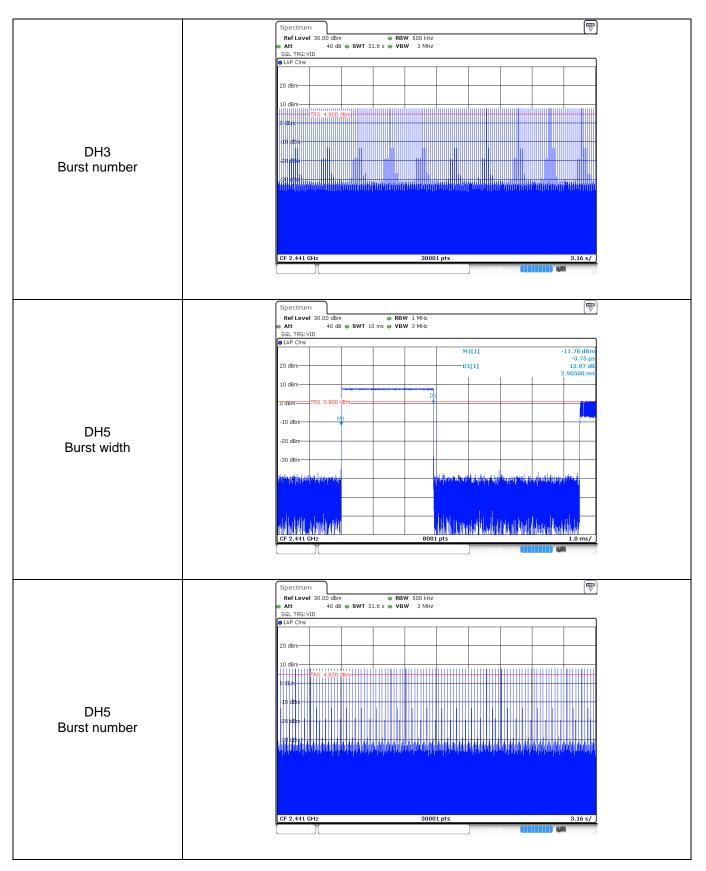
Please refer to the clause 3.3

TEST RESULTS

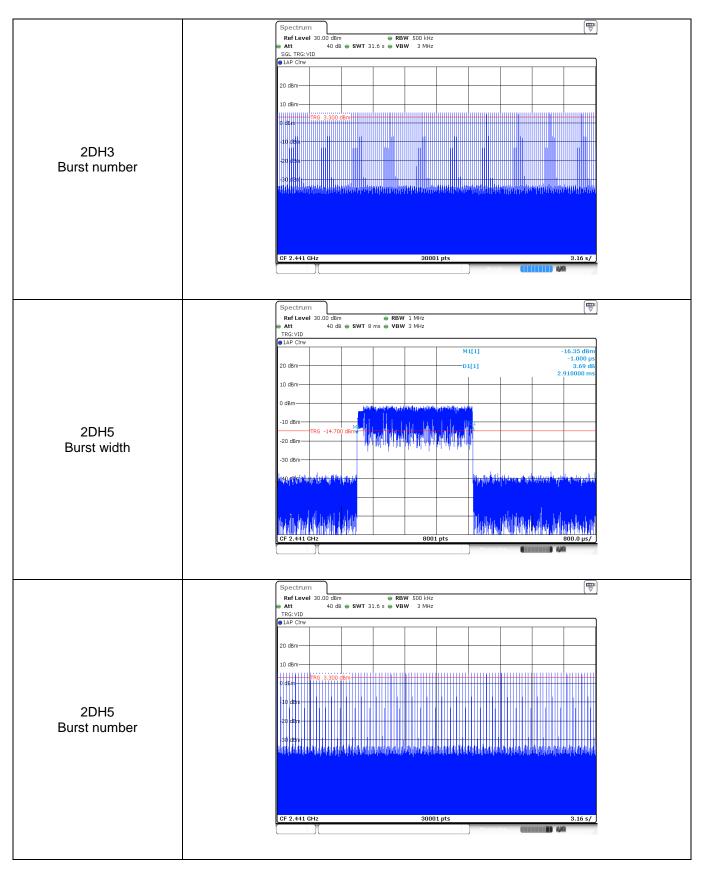
☑ Passed □ Not Applicable

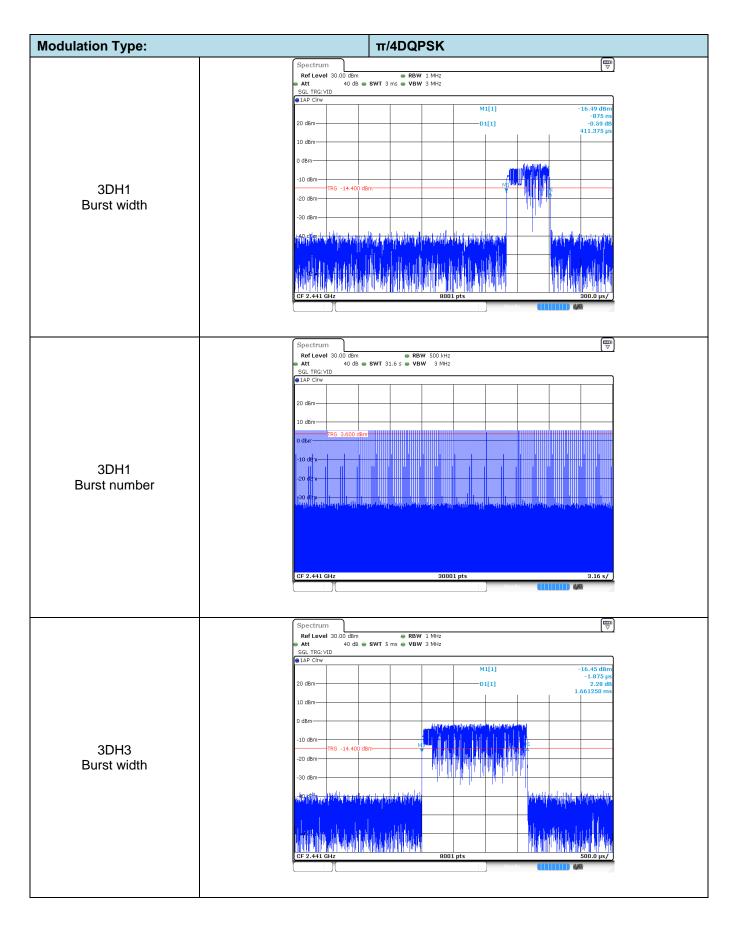
Modulation type	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
	DH1	0.40	320.00	0.13		
GFSK	DH3	1.66	160.00	0.27	≤ 0.40	Pass
	DH5	2.91	107.00	0.31		
	2DH1 DQPSK 2DH3	0.41	320.00	0.13		
π/4DQPSK		1.66	160.00	0.27	≤ 0.40	Pass
	2DH5	2.91	107.00	0.31		
	3DH1	0.41	320.00	0.13		
8DPSK	3DH3	1.66	160.00	0.27	≤ 0.40	Pass
	3DH5	2.91	107.00	0.31		

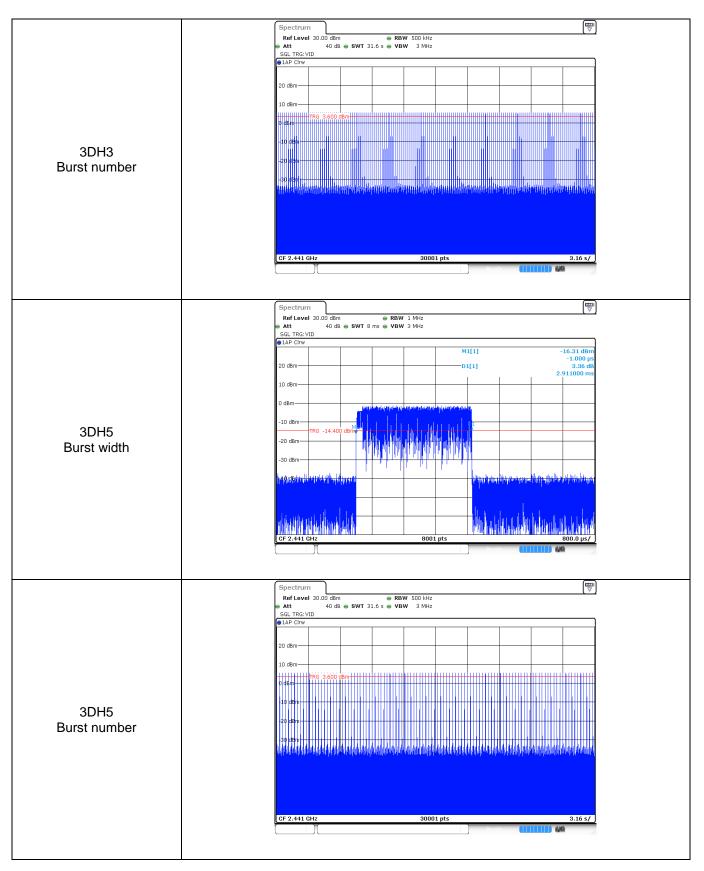




Iodulation Type:	π/4DQPSK
	Spectrum Image: Spectrum Ref Level 30.00 dBm RBW 1 MHz Att 40 dB SWT 3 ms SGL TRG: VID SGL TRG: VID I AP CITW Image: VID
	20 dBm M1[1] -16.54 dBm 20 dBm -0.06 dB 10 dBm 411.375 μs
2DH1 Burst width	0 dBm
	-30 dBm at BRESserie programs a meetical water from the providence of the providence of the providence of the providence Legislation to difficulty of all of the clift of the balance of the clift of the clift of the clift of the clift
	CF 2.441 CHz 8001 pts 300.0 µs/
	Spectrum Image: Constraint of the system RBW Sol kHz Ref Level 30.00 dBm ■ RBW Sol kHz Image: Constraint of the system Sol kHz ■ Att 40 dB ■ SWT 31.6 s ♥ VBW 3 MHz SGL TRG: VID ■ SWT 31.6 s ♥ VBW 3 MHz GL TRG: VID ■ IAP CITW ■ ■
	20 dBm
2DH1 Burst number	0 d&r
	s väälle ja kärinnä timmallimin kärin kärinnä timmallimmällimmä timmallimmällimmällimmällimmällimmällimmällimm
	CF 2.441 GHz 30001 pts 3.16 s/ (111111) (111111) (4011111)
	Spectrum (□□) Ref Level 30.00 dbm ● RBW 1 MHz ▲ Att 40 db ● SWT 5 ms ∨ VBW 3 MHz
	SGL TRG: VID • 1AP Cirw 20 dBm 10 dBm 10 dBm
2DH3 Burst width	0 dBm [bitst pa + thisting p + thisti
	CF 2.441 CHz 8001 pts 500.0 μs/







5.8. Pseudorandom Frequency Hopping Sequence

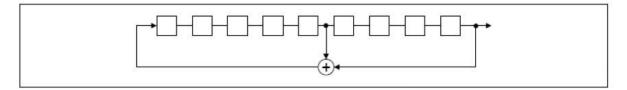
<u>LIMIT</u>

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:

5 7	73 7		1	78	64	62	1	4	2	ĺ,
Т		 				1	 Τ	Т		Т
				1		1				T
				1						Т

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.

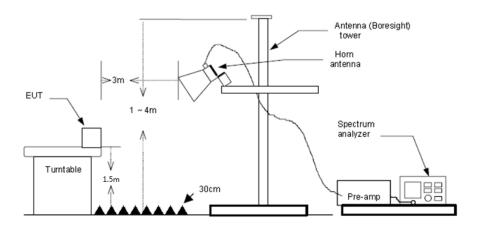
5.9. Restricted band (radiated)

<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	Test channel: 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
2310.00	32.32	28.05	6.62	37.59	29.40	74.00	-44.60	Horizontal	Peak
2386.10	49.51	27.67	6.75	37.59	46.34	74.00	-27.66	Horizontal	Peak
2390.03	42.78	27.65	6.75	37.59	39.59	74.00	-34.41	Horizontal	Peak
2310.00	33.27	28.05	6.62	37.59	30.35	74.00	-43.65	Vertical	Peak
2385.71	50.50	27.67	6.75	37.59	47.33	74.00	-26.67	Vertical	Peak
2390.03	44.58	27.65	6.75	37.59	41.39	74.00	-32.61	Vertical	Peak
2310.00	20.89	28.05	6.62	37.59	17.97	54.00	-36.03	Horizontal	Average
2390.03	23.65	27.65	6.75	37.59	20.46	54.00	-33.54	Horizontal	Average
2310.00	20.85	28.05	6.62	37.59	17.93	54.00	-36.07	Vertical	Average
2390.03	24.98	27.65	6.75	37.59	21.79	54.00	-32.21	Vertical	Average

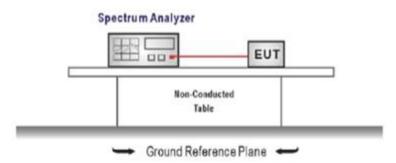
Test channe	el:				CH78				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.50	61.30	27.26	6.83	37.59	57.80	74.00	-16.20	Horizontal	Peak
2500.00	43.68	27.20	6.84	37.59	40.13	74.00	-33.87	Horizontal	Peak
2483.50	58.75	27.26	6.83	37.59	55.25	74.00	-18.75	Vertical	Peak
2500.00	41.10	27.20	6.84	37.59	37.55	74.00	-36.45	Vertical	Peak
2483.50	28.15	27.26	6.83	37.59	24.65	54.00	-29.35	Horizontal	Average
2500.00	22.57	27.20	6.84	37.59	19.02	54.00	-34.98	Horizontal	Average
2483.50	28.73	27.26	6.83	37.59	25.23	54.00	-28.77	Vertical	Average
2500.00	23.40	27.20	6.84	37.59	19.85	54.00	-34.15	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

Test Item:	Band edge	Modulation type: GFSK
		Spectrum Image: Constraint of the sector of th
		M2[1] -38.30 dBm 0 dBm 2.400800 dHz -10 dBm 01 -12.580 dBm -20 dBm -30 dBm -30 dBm -30 dBm
CH00 No hopping mode		-40 dBm
		Visit of the second s
		Spectrum Image: Constraint of the section
CH00 Hopping mode		Count 500/500
		-10.08m D1 -11.890 d8m
		-60 dBm
		M1 1 2.40479 GHz 8.11 dBm M2 1 2.4 GHz -33.86 dBm M3 1 2.39 GHz -37.20 dBm M4 1 2.31 GHz -46.12 dBm M5 1 2.39908 GHz -33.57 dBm
		Spectrum Imm Ref Level 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 pIFk Max Diff Diff Diff Diff
		MI 8.64 dBm 10 dBm M1[1] 8.64 dBm 0 dBm M2[1] -47.04 dBm 0 dBm 2.4835000 GHz -47.04 dBm -10 dBm 0 -11.360 dBm -11.360 dBm
CH78 No hopping mode		-20 dBm
		-70 dBm
		M1 1 2.479926 6Hz 8.64 MB M2 1 2.4835 GHz -47.04 Bm M3 1 2.5 GHz -50.72 Bm M4 1 2.4839304 GHz -33.61 Bm

Report No.: CHTEW1903020

	Spectrum Image: Construction of the sector of
CH78 Hopping mode	e_IPk Max MI[1] 7.80 dBm 10 dBm M2[1] -49.54 dBm 2.4805000 CHz -49.54 dBm 2.480500 CHz -20 dBm -20 dBm -49.54 dBm -49.54 dBm -30 dBm -12.200 dBm -49.54 dBm -49.54 dBm -20 dBm -60 dBm -70 dBm -70 dBm -70 dBm
	Start 2.478 GHz 691 pts Stop 2.5 GHz Marker Type Ref Trc X-value Function Function M1 1 2.47878 GHz 7.80 dBm M2 1 2.4835 GHz -49.54 dBm M3 1 2.5 GHz -49.54 dBm M4 1 2.4839304 GHz -34.56 dBm

Test Item:	Band edge	Modulation type:	π/4DQPSK
	R A		
		int 500/500 k Max	1.00.45
	10	IBM	4.92 dBm 2.401910,6Hz -33.10 d p m
	0 d		2.400000 AHz
		dBmD1 -15.080 dBm	
		dBm-	Me
CH00		dBm	
No hopping mode		dBm-	
3		and the second	in the had been been been
	-70	dBm	
		rt 2.31 GHz 691 pts	Stop 2.405 GHz
	Mar Ty	pe Ref Trc X-value Y-value Function	Function Result
		M1 1 2.40191 GHz 4.92 dBm M2 1 2.4 GHz -33.10 dBm M3 1 2.39 GHz -47.79 dBm	
		M3 1 2.39 GHz -47.97 dBm M4 1 2.31 GHz -55.98 dBm M5 1 2.399493 GHz -34.95 dBm	
		ectrum of Level 20.00 dBm Offset 1.00 dB RBW 100 kHz	
	- A		
	● 1F	k Max M1[1]	4.61 dBm
	10	IBm	2.404930 GHz -39.95 dBm
	0 d		2.400000
		dBm	
		dBm	545.
CH00		dBm	M3
Hopping mode		Brinder and a state an	panto de
511 5		dBm	1400~W
	-70	dBm-	
		rt 2.31 GHz 691 pts	Stop 2.405 GHz
		pe Ref Trc X-value Y-value Function	Function Result
		M1 1 2.40493 GHz 4.61 dBm M2 1 2.4 GHz -39.95 dBm	
		M3 1 2.39 GHz -40.21 dBm M4 1 2.31 GHz -51.09 dBm M5 1 2.399493 GHz -35.17 dBm	
		Mol T 2.555455 Griz 55.17 dbm)[() 4/4
	_		
		ectrum of Level 20.00 dBm Offset 1.00 dB 🖷 RBW 100 kHz	
	A Co	tt 30 dB SWT 56.9 µs 👄 VBW 300 kHz Mode Auto FFT int 500/500	
		k Max M1[1]	6.30 dBm
	10	IBm M1 M2[1]	2.4799260 GHz -41.11 dBm
	0 d		2.4835000 GHz
		dBm D1 -13.700 dBm	
CH78	· · · · · · · · · · · · · · · · · · ·	dam wy M2wy	1914 M
No hopping mode			
		dBm hourself hourself	and hanna
		dBm	
	Sta	rt 2.478 GHz 691 pts Ker	Stop 2.5 GHz
	_ <u></u>	Dee Ref Trc X-value Y-value Function M1 1 2.479926 GHz 6.30 dBm 6.30 dBm 6.30 dBm	Function Result
		M2 1 2.4835 GHz -41.11 dBm M3 1 2.5 GHz -51.21 dBm	
		M4 1 2.4959507 GHz -36.06 dBm	••••••
		Measuring	

Report No.: CHTEW1903020

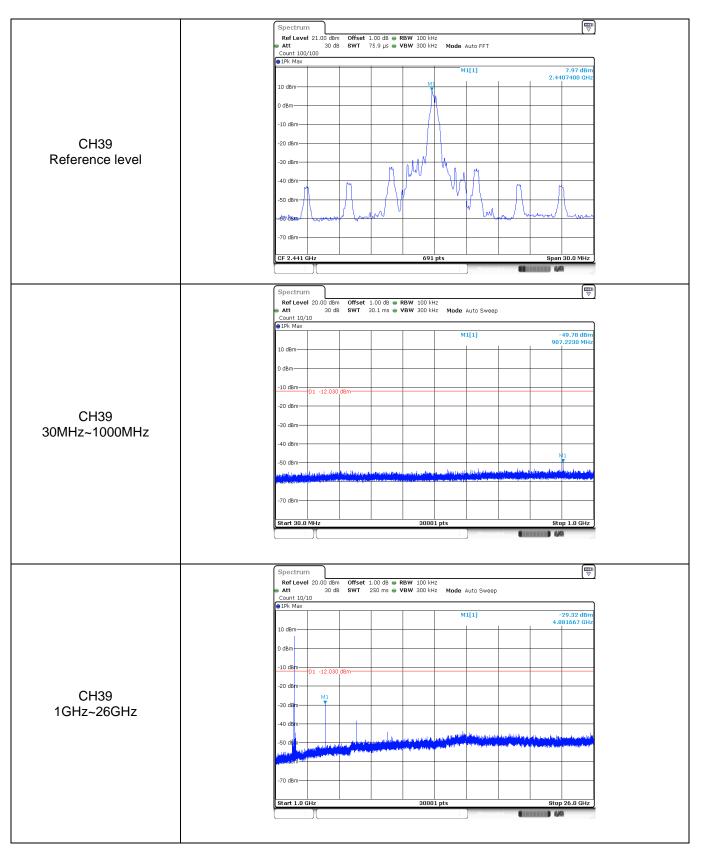
	Spectrum Image: Construction of the sector of
	10 dBm M1[1] 5.94 dBm 0.66m M2[1] -41.98 dBm -41.98 dBm 2.4835000 GHz -10 dBm - -
CH78 Hopping mode	-20 dBm
	-50 dBm
	Start 2.478 GHz 691 pts Stop 2.5 GHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.47808 GHz 5.94 dBm
	M2 1 2.4835 GHz -41.98 dBm M3 1 2.5 GHz -48.19 dBm M4 1 2.4890957 GHz -36.44 dBm

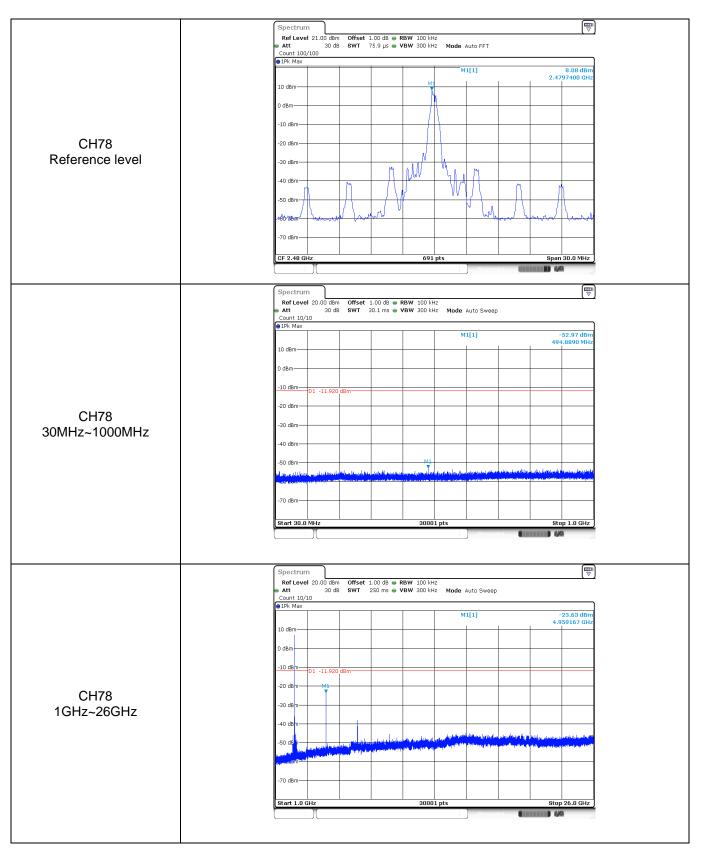
Test Item:	Band edge	Modulation type: 8DPSK
CH00 No hopping mode		Spectrum Image: Spectrum Ref Level 20.00 dbm Offset 1.00 db RBW 100 kHz Att 30 db SWT 1.1 ms • VBW 300 kHz Mode Auto Sweep Count 500/500 • IPk Max MI[1] 5.08 dBm 10 dBm M2[1] -32.04 dBm 0 dBm M2[1] -32.04 dBm 10 dBm D1 -14.920 dBm M2[1] -32.04 dBm 20 dBm M2[1] -32.04 dBm M3 40 dbm M3 M4 M4 40 dbm M3 M3 M4 40 dbm M3 M4 M4 1 2.4017 GHZ S109 dBm M4 M4 1 2.4017 GHZ S109 dBm M4 1 2.30 GHZ -33.06 dBm M4
CH00 Hopping mode		Spectrum Image: Control of Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 1.1 ms VBW 300 kHz Mode Auto Sweep Count 500/S00 IPk Max M1[1] 2.403970 GHz -38.80 dBm 10 dBm M2[1] -38.80 dBm -38.80 dBm 10 dBm M2[1] -38.80 dBm -38.80 dBm -10 dBm M2[1] -38.80 dBm -38.80 dBm -20 dBm M2[1] -38.80 dBm -38.80 dBm -30 dBm M3 M3 M3 -30 dBm M3 M3 M3 -30 dBm M3 M3 M3 -40 dBm M3 M3 M3 -59 dBm M4 M3 M3 -70 dBm -591 pts Stop 2.405 GHz M4 1 2.3966 GHz -38.32 dBm M4 1 2.39663 GHz -38.32 dBm
CH78 No hopping mode		Spectrum Composition Ref Level 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 Int Max M1[1] 6.37 dbm 10 dbm 41

Report No.: CHTEW1903020

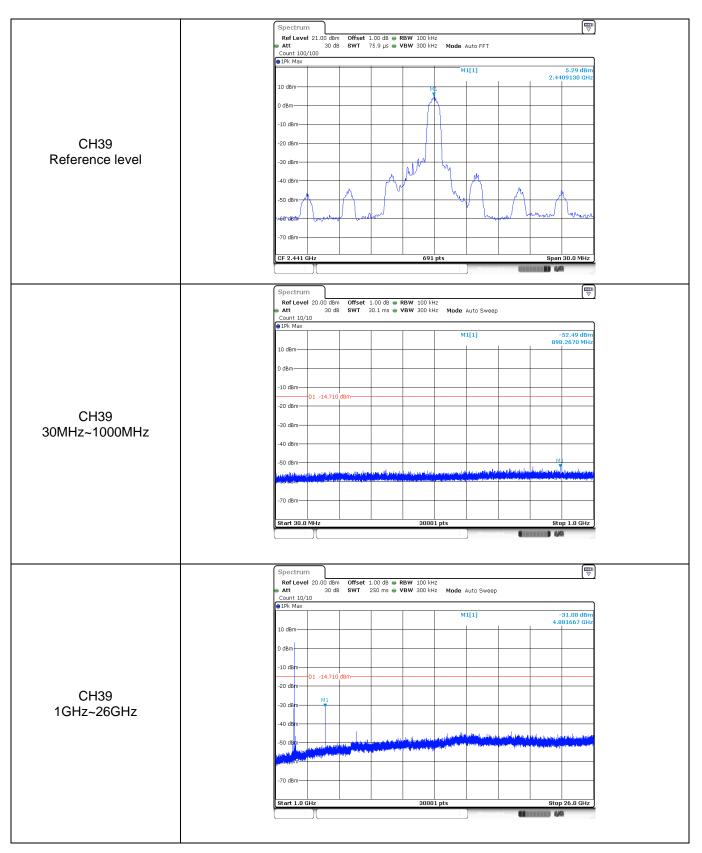
	Count 500/500	RBW 100 kHz VBW 300 kHz Mode Auto FF	([™])
	1Pk Max		
	10 dBm-44	M1[1] M2[1]	5.70 dBm 2.4800850 GHz -42.06 dBm 2.4835000 GHz
	-10 dBm D1 -14.300 dBm		
CH78 Hoppig mode	-30 dBm	www.where	MA MA
Hoppig mode	-50 dBm		
	-70 dBm		
	Start 2.478 GHz	691 pts	Stop 2.5 GHz
	Marker Type Ref Trc X-value	Y-value Function	Function Result
	M1 1 2.480085 GHz M2 1 2.4835 GHz	5.70 dBm -42.06 dBm	
	M3 1 2.5 GHz M4 1 2.494771 GHz	-51.11 dBm -36.09 dBm	
		Mea	asurina (IIIIIII) 🎶

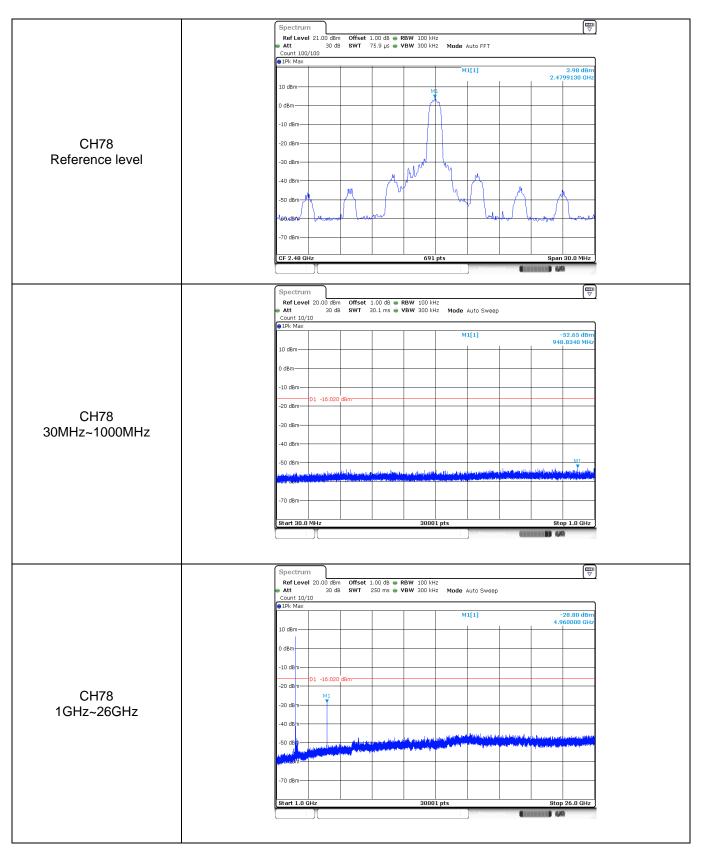
Test Item:	SE	Modulation ty		
CH00 Reference level	S C 0 110 0 -1 -2 -3 -4 -4 -5 -7	Betrum f Level 21.00 dBm Offset 1.00 dB • RBW 100 kHz t 30 dB \$WT 75.9 µs • VBW 300 kHz int 100/100 K Max IBm dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm	Mode Auto FFT	2007
CH00 30MHz~1000MHz	-1 -2 -3 -4 -5	Bectrum Image: Constraint of the second	Mode Auto Sweep M1[1] -52.72 (984.8200) 984.8200 984.8200 Image: State	MHz
CH00 1GHz~26GHz	-1 -2 -3 -4 -5	Bar Offset 1.00 dB (M) Offset 250 ms (M) VBW 300 kHz nt 10/10 30 dB (M) 250 ms (M) VBW 300 kHz IBm 1 1 1 dBm 1 1 1 1 dBm 1 1 1 1 1 dBm 1 <t< td=""><td>Mode Auto Sweep M1[1] 26.13 (4.80333) 4.80333 26.13 (4.80333) </td><td></td></t<>	Mode Auto Sweep M1[1] 26.13 (4.80333) 4.80333 26.13 (4.80333)	



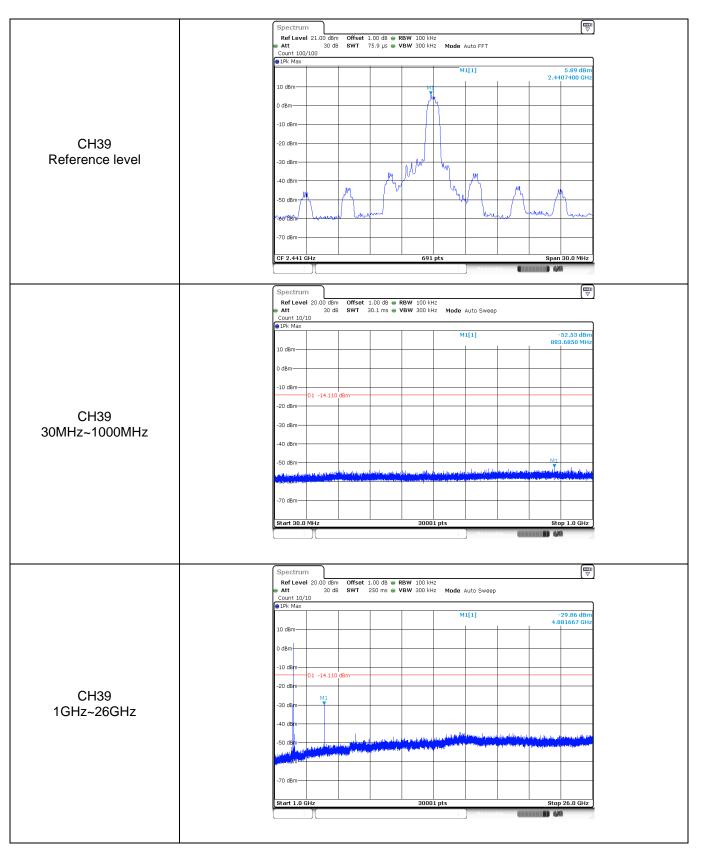


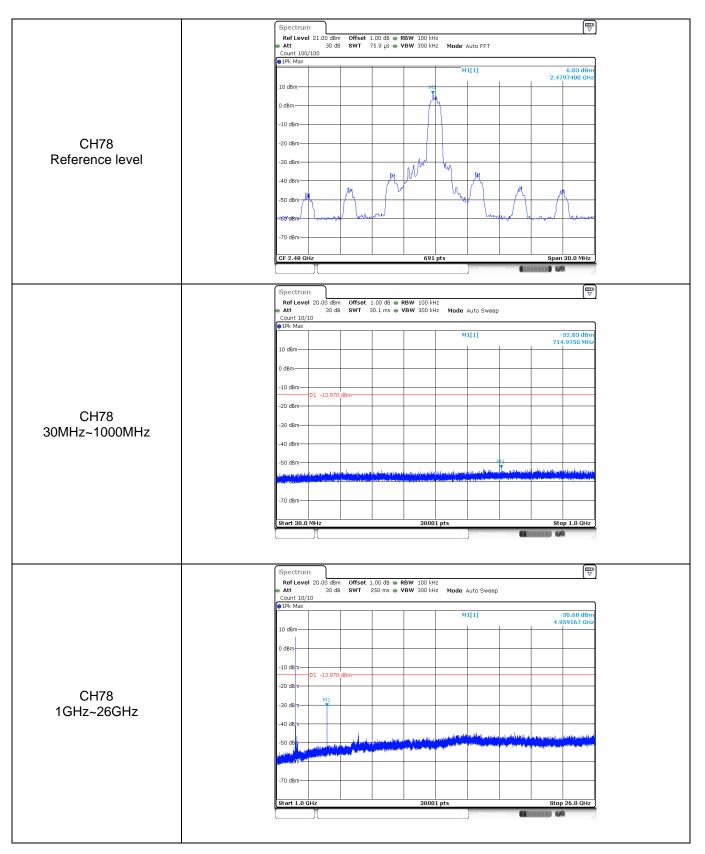
Fest Item:	SE	Modulation type: π/4DQPSK
		Spectrum Image: Constraint of the section
		0 dBm
CH00 Reference level		-20 dBm
		-50 dBm
		-70 dBm CF 2.402 GHz 691 pts Span 30.0 MHz
		Spectrum 🕎
		Ref Level 20.00 dbm Offset 1.00 db RBW 100 kHz Att 30 db SWT 30.1 ms VBW 300 kHz Count 10/10 Image: Count 10/10
		10 dBm
CH00		-10 dBm 01 -17.050 dBm 01 -17.050 dBm
30MHz~1000MHz		-30 dBm
		Start 30.0 MHz 30001 pts Stop 1.0 GHz
		Spectrum □ Ref Level 20.00 dBm Offset 1.00 dB ● RBW 100 kHz
		● Att 30 dB SWT 250 ms ● VBW 300 kHz Mode Auto Sweep Count 10/10 ● 1Pk Max M1[1] -32.87 dBm 4.803333 GHz
		10 dBm
CH00		-20 dBm 01 -17.050 dBm
1GHz~26GHz		-40 dBm
		-70 dBm
		Start 1.0 GHz 30001 pts Stop 26.0 GHz





Test Item:	SE	Modulation type: 8DPSK
		Spectrum Image: Constraint of the sector of th
CH00 Reference level		• Irk Max M1[1] 4.76 dBm 10 dBm M3 2.4017400 GHz 0 dBm M3 10 dBm
		-10 dBm
		-40 dBm // // // // // // // /// /// /// //////
		-70 dBm CF 2.402 GHz 691 pts Span 30.0 MHz (
		Spectrum (100 db ● RBW 100 kHz Ref Level 20.00 dbm Offset 1.00 db ● RBW 100 kHz Att 30 dB SWT 30.1 ms ● VBW 300 kHz
		Count 10/10
		0 dBm
CH00 30MHz~1000MHz		-20 dBm
		-40 dBm
		-70 dBm
		Start 30.0 MHz 30001 pts Stop 1.0 GHz
		Spectrum Image: Construct with the system of
		• •
		0 dBm -10 dBm -10 dBm -10 dBm -20 dBm -20 dBm
CH00 1GHz~26GHz		-20 dem
		-70 dBm





5.11. Spurious Emissions (radiated)

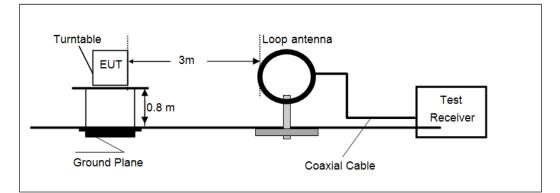
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

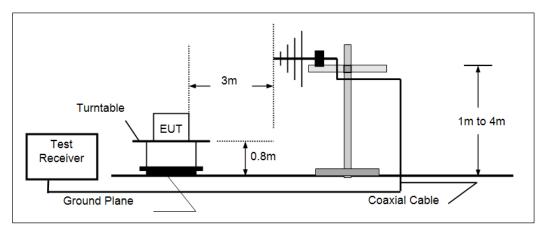
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

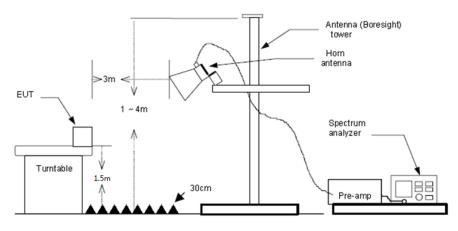
Below 30 MHz



> 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

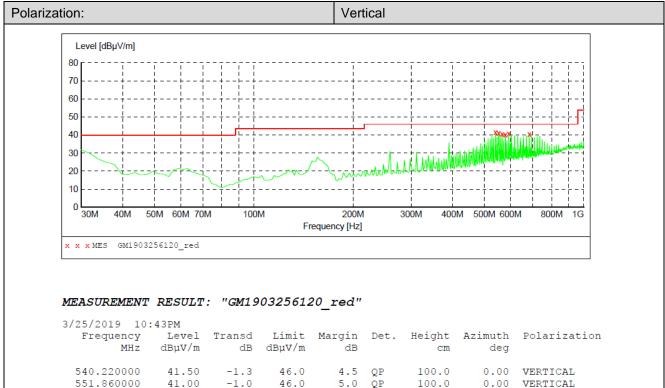
Note:

- 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.

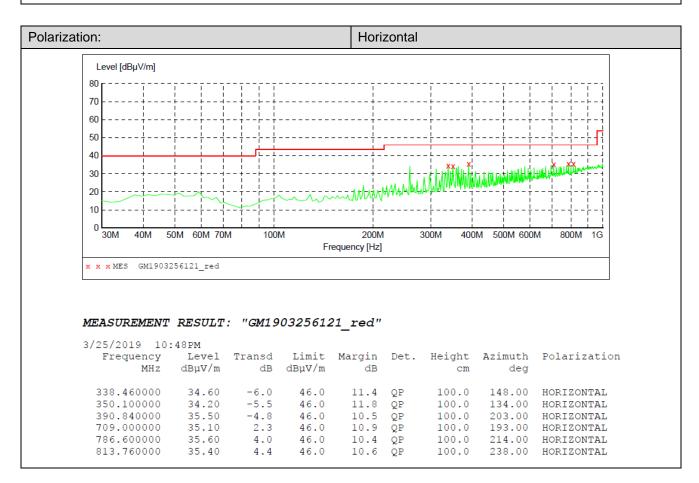
➢ 9 kHz ~ 30 MHz

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



551.860000	41.00	-1.0	46.0	5.0	QP	100.0	0.00	VERTICAL
565.440000	40.50	-0.7	46.0	5.5	QP	100.0	0.00	VERTICAL
579.020000	40.30	-0.1	46.0	5.7	QP	100.0	360.00	VERTICAL
592.600000	40.70	0.6	46.0	5.3	QP	100.0	0.00	VERTICAL
683.780000	40.40	2.0	46.0	5.6	QP	100.0	0.00	VERTICAL



➢ 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	
2113.59	33.87	26.81	6.37	37.60	29.45	74.00	-44.55	Vertical	Peak	
3598.09	34.98	29.29	8.27	37.06	35.48	74.00	-38.52	Vertical	Peak	
4809.50	45.14	31.58	9.55	35.72	50.55	74.00	-23.45	Vertical	Peak	
7702.28	31.85	36.10	13.00	33.04	47.91	74.00	-26.09	Vertical	Peak	
1413.67	34.01	25.89	5.04	37.11	27.83	74.00	-46.17	Horizontal	Peak	
2995.54	48.02	28.60	7.48	37.58	46.52	74.00	-27.48	Horizontal	Peak	
4809.50	43.51	31.58	9.55	35.72	48.92	74.00	-25.08	Horizontal	Peak	
7527.83	31.67	36.13	12.49	33.02	47.27	74.00	-26.73	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	
2995.54	46.33	28.60	7.48	37.58	44.83	74.00	-29.17	Vertical	Peak	
3993.90	38.70	29.70	8.77	36.76	40.41	74.00	-33.59	Vertical	Peak	
4883.52	42.74	31.43	9.59	35.58	48.18	74.00	-25.82	Vertical	Peak	
9251.58	30.18	38.91	13.55	33.44	49.20	74.00	-24.80	Vertical	Peak	
2987.92	49.59	28.59	7.47	37.58	48.07	74.00	-25.93	Horizontal	Peak	
3993.90	35.05	29.70	8.77	36.76	36.76	74.00	-37.24	Horizontal	Peak	
4883.52	44.33	31.43	9.59	35.58	49.77	74.00	-24.23	Horizontal	Peak	
8703.29	30.93	37.89	13.00	32.96	48.86	74.00	-25.14	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	
2987.92	43.32	28.59	7.47	37.58	41.80	74.00	-32.20	Vertical	Peak	
4958.68	42.42	31.46	9.64	35.45	48.07	74.00	-25.93	Vertical	Peak	
7489.60	31.10	36.12	12.36	33.04	46.54	74.00	-27.46	Vertical	Peak	
8208.37	31.40	36.67	12.77	33.00	47.84	74.00	-26.16	Vertical	Peak	
2987.92	50.91	28.59	7.47	37.58	49.39	74.00	-24.61	Horizontal	Peak	
3993.90	34.30	29.70	8.77	36.76	36.01	74.00	-37.99	Horizontal	Peak	
4958.68	44.68	31.46	9.64	35.45	50.33	74.00	-23.67	Horizontal	Peak	
5311.47	33.55	31.32	10.00	34.77	40.10	74.00	-33.90	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.

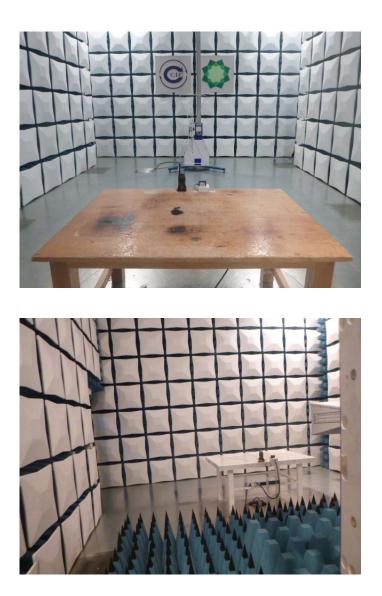
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



Radiated Emissions



7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No.: CHTEW19030201.

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