



TE	EST REPORT	
Report Reference No : Project No : FCC ID :	CHTEW19070079 SHT1906076101EW YPVITALCOMGUMBO	Report verification:
Applicant's name : Address : Manufacturer : Address :	ITALCOM GROUP 1728 Coral Way, Coral Gables Emocom Technology Co., Limi Unit 17,9/F., Tower A, New Ma Museum Road, Tsimshatsui, K	ted ndarin Plaza, No.14 Science
Test item description : Trade Mark : Model/Type reference : Listed Model(s) :	Smart watch NYX Mobile GUMBO	
Standard : Date of receipt of test sample Date of testing Date of issue	FCC CFR Title 47 Part 15 Sub Jun 28, 2019 Jun 29, 2019- Jul 17, 2019 Jul 18, 2019	opart C Section 15.247
Result: Compiled by (Position+Printed name+Signature): Supervised by (Position+Printed name+Signature):	PASS File administrators Silvia Li Project Engineer Aaron Fang	Silvia Li Aaron.Fang
Approved by (Position+Printed name+Signature): Testing Laboratory Name: :	RF Manager Hans Hu Shenzhen Huatongwei Intern	Hamsty
Address: Shenzhen Huatongwei International I	1/F, Bldg 3, Hongfa Hi-tech Inc Tianliao, Gongming, Shenzher nspection Co., Ltd. All rights r	, 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

<u>KDB 558074 D01 15.247 Meas Guidance v05r01:</u> Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

Revision No.	Date of issue	Description
N/A	2019-07-18	Original

2. TEST DESCRIPTION

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

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

3. <u>SUMMARY</u>

3.1. Client Information

Applicant:	ITALCOM GROUP
Address: 1728 Coral Way, Coral Gables, Miami, Florida, United States	
Manufacturer: Emocom Technology Co., Limited	
Address:	Unit 17,9/F., Tower A, New Mandarin Plaza, No.14 Science Museum Road, Tsimshatsui, Kowloon, Hong Kong.

3.2. Product Description

Name of EUT:	Smart watch	
Trade Mark:	NYX Mobile	
Model No.:	GUMBO	
Listed Model(s):	-	
Power supply:	DC 3.7V	
Adapter information:	Input:100-240Va.c., 50/60Hz, 0.15A Output:5.0Vd.c., 500mA	
Hardware version:	NYX_GUMBO_001	
Software version:	GUMBO_AMXNYX_V001R	
Bluetooth		
Version:	Supported BT4.0+EDR	
Modulation:	GFSK, π/4DQPSK, 8DPSK	
Operation frequency:	2402MHz~2480MHz	
Channel number:	79	
Channel separation:	1MHz	
Antenna type:	PIFA Antenna	
Antenna gain:	1.3dBi	

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

> TEST MODE

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:	/
,	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.:5377A

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.: 5377A.

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	0.51 dB	(1)
Conducted spurious emissions 9kHz~40GHz	0.51 dB	(1)
Conducted Disturbance 150kHz~30MHz	3.02 dB	(1)
Radiated Emissions below 1GHz	4.90 dB	(1)
Radiated Emissions above 1GHz	4.96 dB	(1)
Occupied Bandwidth	70 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
•	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 emission-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		
•	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	2019/04/26	2020/04/25		
•	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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•	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 Method							
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

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of 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)

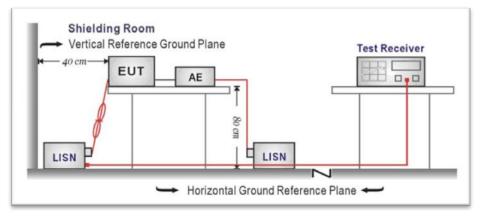
<u>LIMIT</u>

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

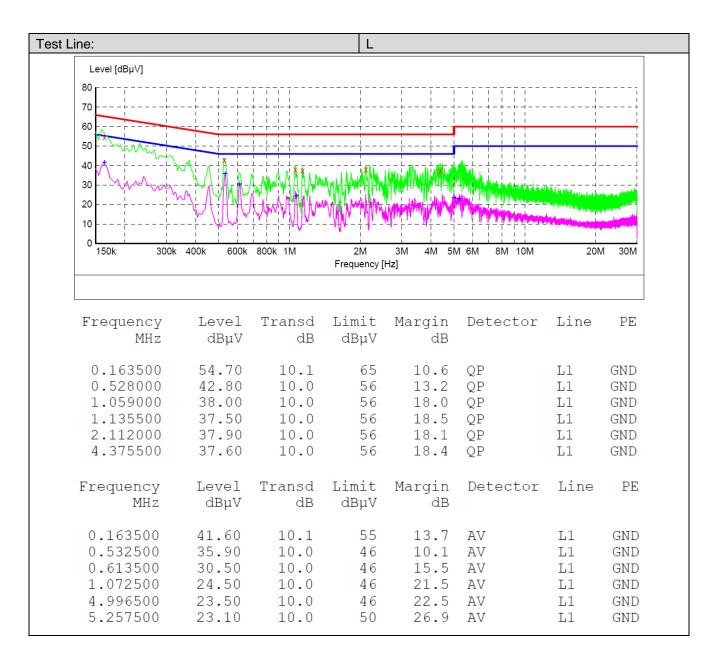
- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm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

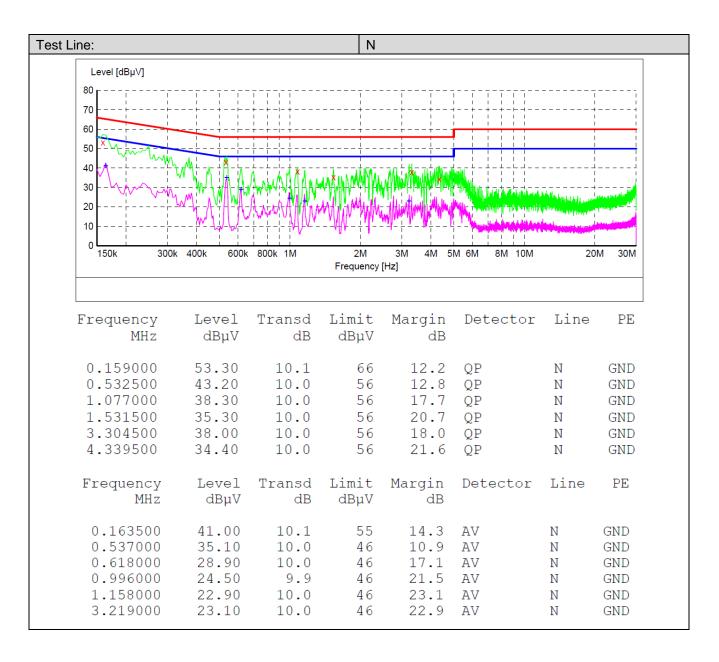
TEST RESULTS

☑ Passed □ Not Applicable

Note:

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



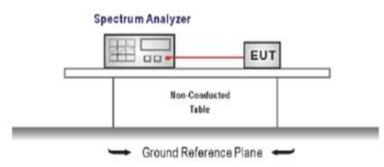


5.3. Conducted Peak Output Power

<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	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
	00	-1.81	-1.83		
GFSK	39	-2.21	-2.24	≤ 30.00	Pass
	78	-2.38	-2.40		
	00	-1.98	-2.63		
π/4DQPSK	39	-2.35	-2.89	≤ 21.00	Pass
	78	-2.48	-3.01		
	00	-1.96	-2.65		
8DPSK	39	-2.28	-2.89	≤ 21.00	Pass
	78	-2.38	-3.04		

Modulation Type: GFSK Spectrum Ref Level 20.00 dBm Att 30 dB Count 500/500 1Pk View
 Offset
 1.00 dB
 RBW
 1 MHz

 SWT
 1 ms
 VBW
 3 MHz
 Mode
 Auto Sweep
 M1[1] -1.81 dE 2.40213020 G LO dBmм1 0 dBm 10 dBm--20 dBm CH00 30 dBm -40 dBm 50 dBm -60 dBm 70 dBm 691 pts .0 MHz CF 2.402 GH Date:11.JUL.2019 19:41:10 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 M1[1] -2.21 dB 2.44110850 CP 10 dBm 0 dBm--10 dBm -20 dBm CH39 -30 dBm -40 dBm -50 dBm -60 dBm 70 dBm-CF 2.441 GH 691 pts 5.0 MHz Sp 11 A 444 Date:11.JUL.2019 19:43:33 Spectrum RefLevel 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 M1[1] -2.38 dB 2.47985530 GF 10 dBm-0 dBm M1 -10 dBm 20 dBm CH78 30 dBm -40 dBm -50 dBm -60 dBm 70 dBm 691 pts .0 MHz CF 2.48 G III 840 **A** 1 1 1 1 Data:11.JUL.2019 19:44:45

ulation Type:	π/4DQPSK	
	Spectrum Ref Level 20.00 dBm Offset 1.00 dB • RBW 2 MHz Att 30 dB SWT 1 ms • VBW 5 MHz Mode Auto Sweep Count \$300/\$500 Count \$300/\$500 SWT 1 ms • VBW 5 MHz Mode Auto Sweep	
		dBm D GHz
	10 dBm M1	
	-10 dBm	
	-20 dBm	_
H00	-30 dBm	
	-40 dBm-	
	-70 dBm-	
	CF 2.402 GHz 691 pts Span 5.0 M	MHz
	Dam:11.JUL.2019 194616	
	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Att 30 dB SWT 1 ms VBW 5 MHz	(♥)
	Count 500/500 PIPk View M1[1] -2.35 d	dBm
	10 dBm) GHz
	0 dBm	
	-10 dBm	/
СН39	-30 dBm	
	-40 dBm-	
	-50 dBm-	
	-60 dBm	
	CF 2.441 GHz 691 pts Span 5.0 M	MHz
	Mesondio (1987) Massado (1987)	
	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 Ptk View	
	10 dBm	dBm D GHz
	0 dBm M1	
	-10 dBm	_
CH78	-20 dem	
	-40 dBm	
	-50 dBm	
	-60 dBm	
	CF 2.48 GHz 691 pts Span 5.0 M	MHz
	Daw: 11,JUL2019 194910	

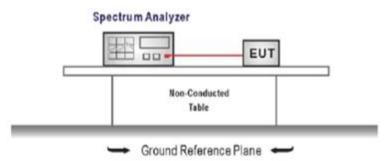
Modulation Type:		8DPSK		
<u> </u>	Spectrum			
	RefLevel 20.00 dBm Att 30 dB	Offset 1.00 dB	Mode Auto Sweep	
	Count 500/500 Pk View			
			M1[1]	-1.96 dBm 2.40197110 GHz
	10 dBm			
	0 dBm	M:		
	-10 dBm			
	-20 dBm			
CH00				
	-30 dBm			
	-40 dBm			
	-50 dBm			
	-60 dBm			
	-70 dBm			
	CF 2.402 GHz	691	pts Measuring.	Span 5.0 MHz
	Date:11.JUL.2019 19:50:49			
	Spectrum			
	Ref Level 20.00 dBm	Offset 1.00 dB RBW 2 MHz	Mode with Corre	[V]
	 Att 30 dB Count 500/500 1Pk View 	SWT 1 ms 👄 VBW 5 MHz	mode Auto Sweep	
	UPR VIEW		M1[1]	-2.28 dBm 2.44099280 GHz
	10 dBm			2.44099280 GH2
	0 dBm	M	1	
	-10 dBm			
	-20 dBm			
CH39				
СПЗЭ	-30 dBm			
	-40 dBm			
	-50 dBm			
	-60 dBm			
	-70 dBm			
	-70 dbm			
	CF 2.441 GHz	691	pts	Span 5.0 MHz
	Date: 11.JUL.2019 19:52:16		Steastining.	4/0
	Spectrum Ref Level 20.00 dBm	Offset 1.00 dB 🖷 RBW 2 MHz		
	Att 30 dB Count 500/500	SWT 1 ms VBW 5 MHz	Mode Auto Sweep	
	• 1Pk View		M1[1]	-2.38 dBm
	10 dBm			2.48002890 GHz
	0 dBm		11	I
	0 dBm			
	-10 d8m		*	
CH78	-10 d8m			
CH78	-10 dBm -20 dBm-			
CH78	-10 dBm -20 dBm -30 dBm			
CH78	-10 dBm -20 dBm -30 dBm -40 dBm -50 dBm			
CH78	-10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm			
CH78	-10 dBm -20 dBm -30 dBm -40 dBm -50 dBm			
CH78	-10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm	691	*1	Span 5.0 MHz
CH78	-10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm	691	1	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	0.93	-	Pass
	78	0.93		
	00	1.27		
π/4DQPSK	39	1.28	-	Pass
	78	1.28		
	00	1.26		
8DPSK	39	1.27	-	Pass
	78	1.27		

Iodulation 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
	●1Pk View M1[1] -28.18 dBm
	10 dBm 2.40154750 GHz 2.40156750 GHz 2.40156750 GHz 2.40156750 GHz 2.40156750 GHz 2.40156750 GHz 2.4015750 GHz 2.40150 GHz 2.4015750 GHz
	0 dBm 2.40205750 GHz
	-10 dBm
	-20 dBm 1 -27.602 dBm
CH00	-40 dBm
	-69,08m
	-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 -28.18 dBm M2 1 2.4020575 GHz -7.60 dBm
	D3 M1 1 927.5 kHz -0.48 d8 Measuring
	Data: 11.0U.2019 19:41.00
	Spectrum 🕎
	RefLevel 20.00 dBm Offset 1.00 dB 🖷 RBW 10 kHz
	● Att 30 dB SWT 189.6 μs ● VBW 30 kHz Mode Auto FFT Count 500/500
	1Pk View M1[1] -28.71 dBm
	10 dBm 2.44054750 GHz 7.96 dBm 7.96 dBm
	0 dBm 2.44105750 GHz
	-10 dBm
	-20 dBm MI ANN WWA A
	-30 dBm 01 -27.963 dBm 74 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
CH39	
	-60,d8h
	-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 -28.71 dBm M2 1 2.4410575 GHz -7.96 dBm D3 M1 927.5 KHz -0.29 dB
	Do Intel A Delto Kite OteD GD Di (intel (intel) (intel) (intel)
	Dam:11.JUL.2019 19:43:24
	Spectrum 🕎
	RefLevel 20.00 dBm Offset 1.00 dB
	Count 500/500
	M1[1] -28.89 dbm
	10 BBM M2[1] -8.09 BBm
	-10 d8m
	-20 dBm V V V V V V V V V V V V V V V V V V V
01170	
CH78	the second se
	-90, 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 -28.89 dBm
	M2 1 2.4800755 GHz -8.09 dBm D3 M1 1 927.5 kHz -0.20 dB
	Dam:11.JUL.2019 19:44:35

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 Count 500/500
	1Pk View M1[1] -24.66 dBm
	10 dBm 2.40137250 GHz 2.40137250 GHz 4.60 dBm
	0 dBm 2.40216250 GHz
	-10 dBm
	-20 dBm
01100	-30 dem
CH00	-40 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
	Mi 1 2.4013725 GHz -24.66 dBm M2 1 2.4021625 GHz -4.60 dBm
	D3 M1 1 1.2725 MHz -0.02 dB
	Data:11.JUL.2019 19:46:06
	Spectrum T
	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
	PIK View M1[1] -25.45 dBm Out Out
	10 dBm 2.44037000 GHz4.82 dBm4.82 dBm 2.44116250 GHz
	-20 dBm mg/ 03 03
CU 120	-30 dBm-
CH39	-50 dBm
	-60 dBm
	-70 d8m-
	CF 2.441 GHz 1001 pts Span 2.5 MHz
	Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.44037 GHz -25.45 BBn M2 1 2.4411625 GHz -4.82 dBm
	D3 M1 1 1.2775 MHz 0.46 dB
	Data:11.JUL.2019 1947.36
	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
	Plk View M1[1] -25.67 dBm O 100000000000000000000000000000000
	10 dBm 2.47937000 GHz -4.97 dBm 2.47937000 GHz -4.97 dBm 2.49846550 GHz
	0 dBm- 2.49016250 GHz
	-10 d8m
	-20 dBm
	-30 dBm
CH78	40 dbm
	-50 dBm
	-60 dBm
	CF 2.48 GHz 1001 pts Span 2.5 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.47937 GHz -25.67 dBm -25.67 dBm -25.67 dBm
	M2 1 2.4801625 GHz -4.97 dBm D3 M1 1 1.2775 MHz 0.52 dB
	Measuring ((HEREE) 40
	Dame:11.JUL.2019 19×49:00

Iodulation Type:	8DPSK
	Spectrum Image: Control of the sector of the
	Count subjob -24.26 dBm ID dBm M2[1] -3.90 dBm 0 dBm -24.26 dBm -3.90 dBm -10 dBm -2.00 dBm -2.40136000 GHz -20 dBm -10 dBm -0.1 -20 dBm -0.1 -23.905 dBm
CH00	40 dbm 50 dbm 50 dbm -50 dbm -50 dbm -50 dbm -50 dbm -50 dbm -50 dbm -70 dbm -50 dbm -50 dbm
	M2 1 2:40216 GHz -3:90 dBm D3 M1 1 1:265 MHz 0:28 dB 1 Date::11.00L2019 19:60 M0 1
СНЗ9	Refuevel 20.00 dbm Offset 1.00 dbm RBW 30 kHz Mode Auto FFT Count 500/500 FIPK View -24.23 dbm -24.23 dbm 10 dbm M2[1] 2.443160 cHz -4.13 dbm 0 dbm M2[1] 2.44316250 CHz -4.13 dbm 0 dbm M2 2.44316250 CHz -4.13 dbm -20 dbm M2 -24.23 dbm -4.13 dbm -20 dbm M2 -2.44316250 CHz -4.13 dbm -30 dbm M2 2.44316250 CHz -4.13 dbm -30 dbm M2 2.44316250 CHz -4.13 dbm -30 dbm M2 Span 2.5 MHz -50 dbm -70 dbm 1 2.44316350 CHz -24.25 dbm Marker 100 lpts Span 2.5 MHz Marker 1 2.44116250 CHz -24.25 dbm M3 1 1.27 MHz 0.03 db -24.25 dbm
CH78	Spectrum We Ref Level 20.00 dbm Offset 1.00 db RBW 30 kHz At 30 db SWT 63.1 µs VBW 100 kHz Mode Auto FFT Count 500/500 TPk View -24.37 dbm 24.4736 dbm 10 dbm M2[1] 2.47936 dbm -4.22 dbm 0 dbm 40 M2[1] 2.48016000 cHz -10 dbm 40 40 40 40 -20 dbm 1.24.27 dbm 4.24.20 dbm -4.22 dbm -30 dbm 40 40 40 40 -70 dbm 1.24.27 dbm 100 pts Span 2.5 MHz Marker 10.24.27 dbm -24.37 dbm 50 dbm -70 dbm 1 2.47936 GHz -24.37 dbm Yope Kef Trc X-value Function Result M1 M1 1 2.47936 GHz -24.37 dbm 100 pts

5.5. Carrier Frequencies Separation

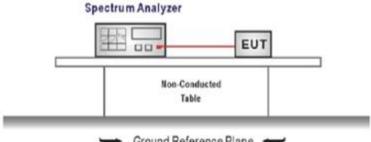
LIMIT

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

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively,

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST CONFIGURATION



Ground Reference Plane

TEST PROCEDURE

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

TEST MODE:

Please refer to the clause 3.3

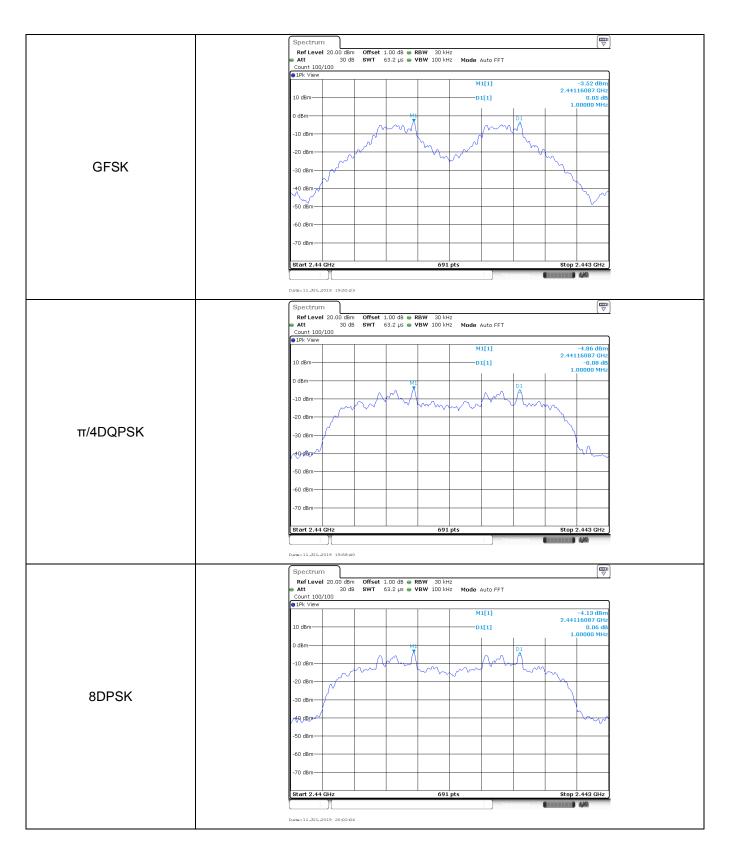
TEST RESULTS

Passed Not Applicable

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

Note:

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

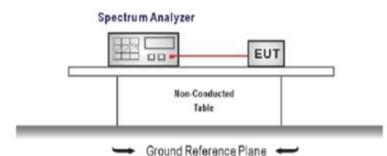


5.6. Hopping Channel Number

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		

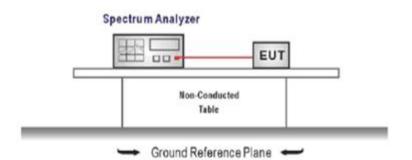
	Spectrum Image: Constraint of the sector of th
	Att 30 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep IPk View
	10 dBm-
	0 dBm————————————————————————————————————
	-141640-0010-0010-0010-0010-0010-0010-00
	-50 qgm
GFSK	-B0 dBm
SI SIX	
	-40 dBm
	-50 dBm
	-60 d8m
	-70 dBm
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	Dam:11.JUL.2019 19:56:33
	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB RBW 100 Hz Att 30 dB SWT 1 ms VBW 300 Hz Mode Auto Sweep
	IPk View
	10 dBm-
	0 dBm
	- Maran Manara Manara Manan Manara Manan Mana
	-20 dam-
π/4DQPSK	-30 dBm
	Λ -40 dBm
	-50 dBm
	-60 dBm
	-70 dBm
	Start 2.4 GHz 691 pts Stop 2.4835 GHz
	Date:11.3012019 19:59:37
	Spectrum 🕎
	RefLevel 20.00 dBm Offset 1.00 dB ● RBW 100 kHz ● Att 30 dB SWT 1 ms ● VBW 300 kHz Mode Auto Sweep
	ALC SUB SWI THIS VEW SUCKEZ MULE AUCOSWEEP
	10 dBm
	o dem Manualianti wanana wana wana
	-to generate the second s
	-20 dam
8DPSK	-80 dBm-
	40 dem
	-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

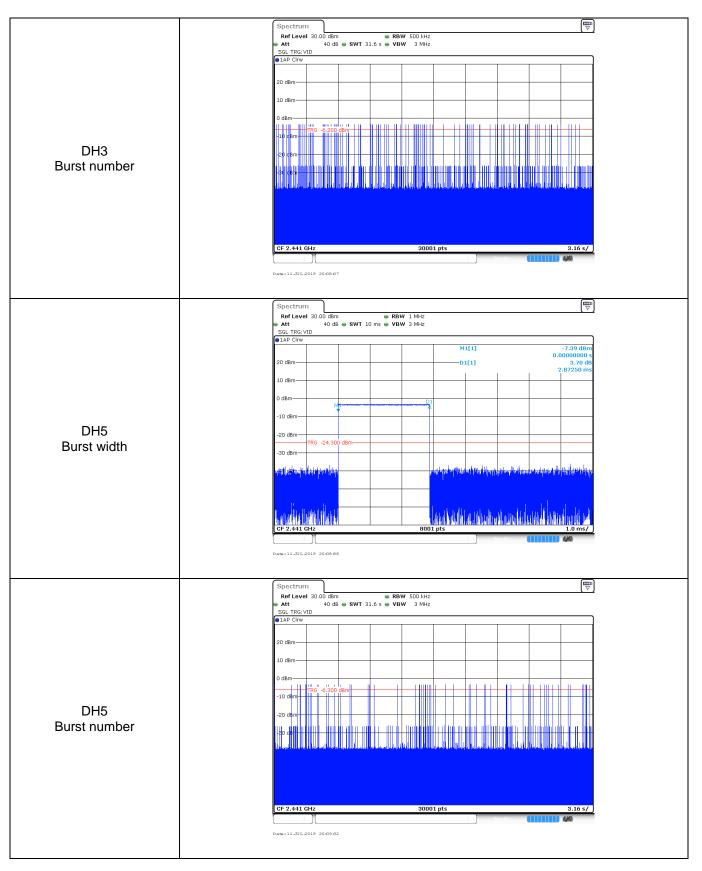
☑ Passed □ Not Applicable

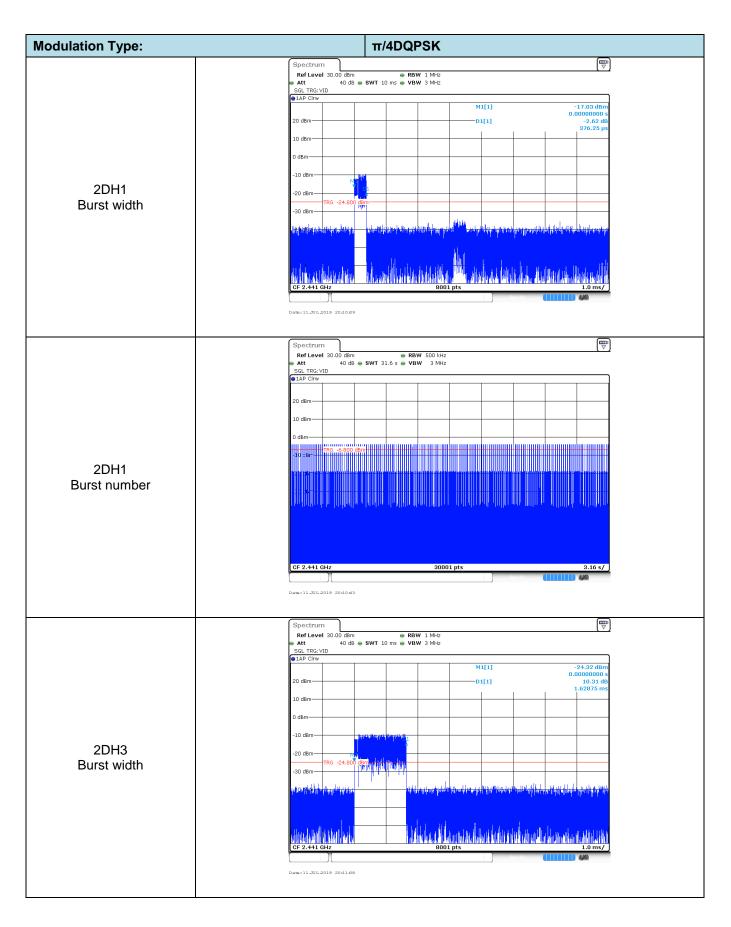
Modulation type	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
	DH1 0.37		317.00	0.12		
GFSK	DH3	1.63	108.00 0.18 ≤ 0.40		≤ 0.40	Pass
	DH5 2.87	61.00	0.18			
	2DH1	0.38	316.00	0.12	≤ 0.40	
π/4DQPSK	2DH3	1.63	113.00	0.18		Pass
	2DH5		67.00	0.19		1
	3DH1 0.38 8DPSK 3DH3 1.63		319.00	0.12		
8DPSK			99.00	0.16	≤ 0.40	Pass
	3DH5	2.88	72.00	0.21		

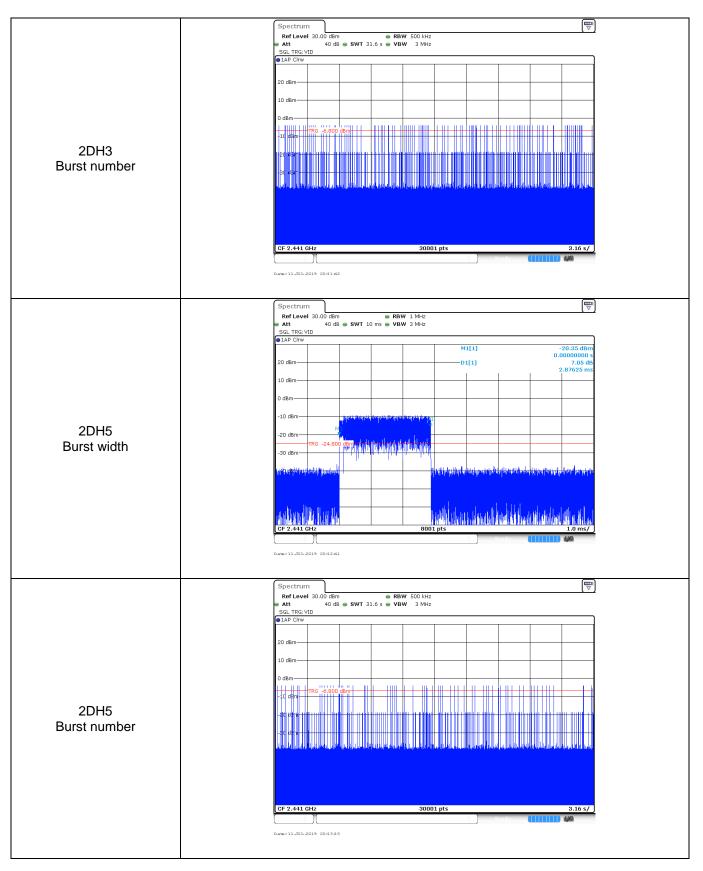
Modulation Type: GFSK ₿ Spectrum
 RefLevel 30.00 dbm
 RBW 1 MHz

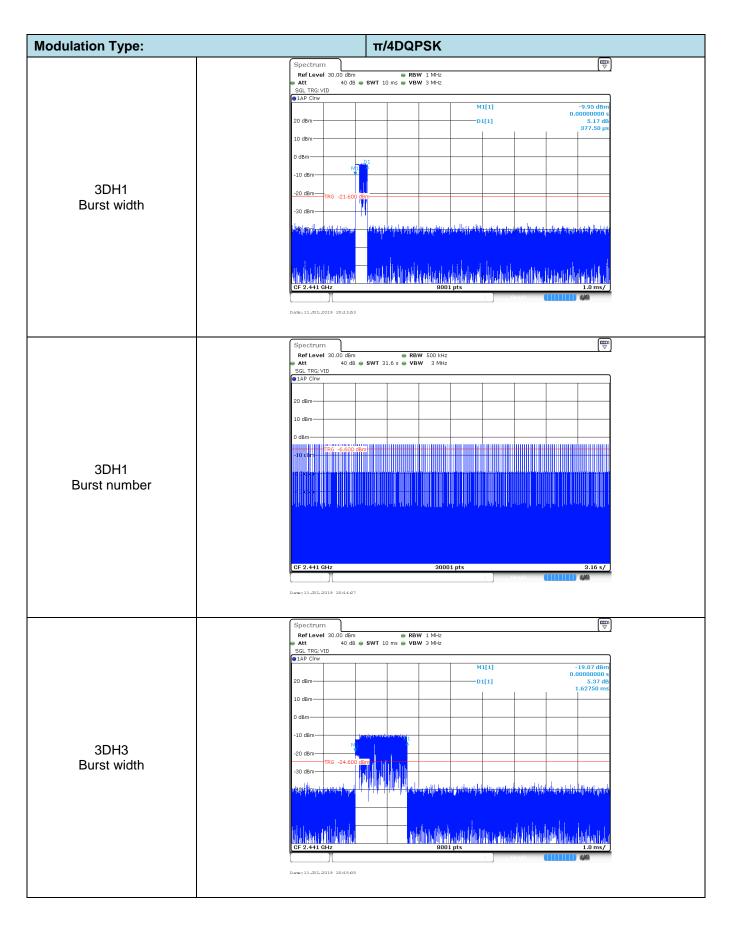
 Att
 40 db e
 SWT 10 ms
 VBW 3 MHz

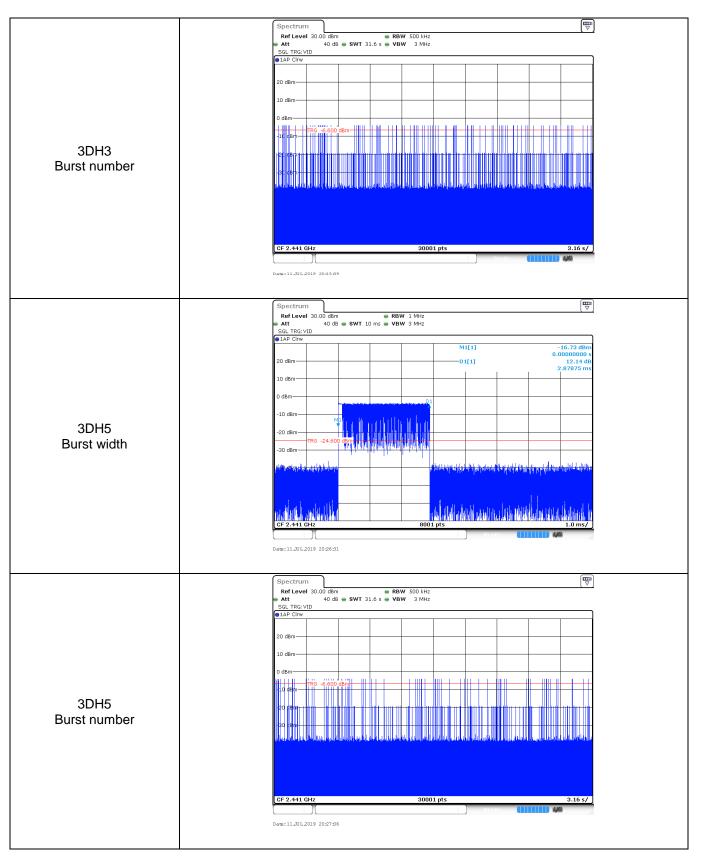
 SGL TRG:VID
 14P CInv
 14P CInv
 14P CInv
 M1[1] 20.33 dE 0.000000 20 dBm 16.64 (370.00 D1[1] 10 dBm 0 dBm -10 dBm DH1 -20 dBm RG -24.30 Burst width dB 30 dBm Lan takakén délakatén dénékénén véladat Date:11.JUL.2019 20:06:02 opectrum Ref Level 30.00 d8m Att 40 d8 ● SWT 31.6 s ● VBW 3 MHz SGL TRG:VID ●1AP CIrw □ 20 dBm-10 dBm 0 dBn 10 ce..... DH1 eo a Burst number CF 2.441 GHz 30001 pts 3.16 s/ Date:11.JUL.2019 20:06:36 Spectrum RefLevel 30.00 dBm Att 40 dB SGL TRG: VID -23.15 dE M1[1] 20 dBm-D1[1] 4.60 10 dBm 0 dBm--10 dBm DH3 -20 dBm Burst width RG -24.20 30 dBm t a ba dhalladh a th' dhallad ann an an bhalladh i i nantis. Date:11.JUL.2019 20:07:33











5.8. Pseudorandom Frequency Hopping Sequence

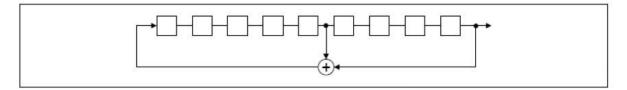
LIMIT

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,forexample: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				 ·····			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.

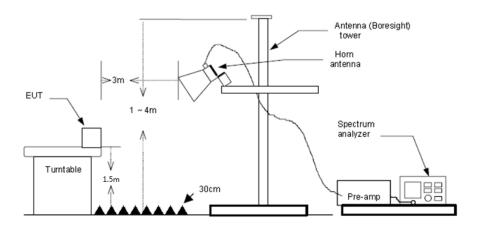
5.9. Restricted band (radiated)

<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 + 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.

Report No.: CHTEW19070079

Test channe	l:		СН	СН00						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization	Test value			
2310.00	52.43	-2.34	50.09	74.00	23.91	Horizontal	Peak			
2390.00	51.87	-2.41	49.46	74.00	24.54	Horizontal	Peak			
2310.00	52.46	-2.34	50.12	74.00	23.88	Vertical	Peak			
2390.00	53.72	-2.41	51.31	74.00	22.69	Vertical	Peak			
2310.00	42.29	-2.34	39.95	54.00	14.05	Horizontal	Average			
2390.00	41.85	-2.41	39.44	54.00	14.56	Horizontal	Average			
2310.00	42.28	-2.34	39.94	54.00	14.06	Vertical	Average			
2390.00	41.86	-2.41	39.45	54.00	14.55	Vertical	Average			

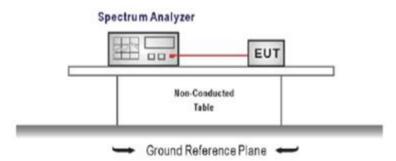
Test channe	l:		CH	CH78						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization	Test value			
2483.50	54.04	-2.15	51.89	74.00	22.11	Horizontal	Peak			
2500.00	53.31	-2.10	51.21	74.00	22.79	Horizontal	Peak			
2483.50	52.52	-2.15	50.37	74.00	23.63	Vertical	Peak			
2500.00	52.21	-2.10	50.11	74.00	23.89	Vertical	Peak			
2483.50	42.74	-2.15	40.59	54.00	13.41	Horizontal	Average			
2500.00	42.21	-2.10	40.11	54.00	13.89	Horizontal	Average			
2483.50	43.54	-2.15	41.39	54.00	12.61	Vertical	Average			
2500.00	42.15	-2.10	40.05	54.00	13.95	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: Construction of first 1.00 dB • RBW 100 kHz 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 • Max • • • •
		M1[1] -2.30 dBm 10 dBm 2.402100 GHz 0 dBm M2[1] -55.03 dBm -10 dBm - -
CH00		-20 dBm 01 -22.300 dBm
No hopping mode		Stort 2.31 GHz 691 pts Storp 2.405 GHz
		Marker Yupe Ref Trc X-value Yu-value Function Function Result M1 1 2.40218 GHz -2.30 dBm Function Function Result M2 1 2.40 GHz -55.03 dBm Function Function M3 1 2.39 GHz -55.71 dBm Function Function M4 1 2.31 GHz -54.92 dBm Function Function
		Massurinow Massurinow Date:11.JUL2019 1941.24 Spectrum Image: 11.JUL2019
		Ref Level 20:00 dBm Offset 1:00 dB RBW 100 kHz Att 30 dB SWT 1:1 ms VBW 300 kHz Court S00/500 IPK Max M1[1] -2.85 dBm
		10 dBm 2.402040 GHz 0 dBm 2.400000 GHz -10 dBm 2.400000 GHz
CH00		-20 dBm 01 -22.850 dBm
Hopping mode		Start 2.31 GHz 691 pts Stop 2.405 GHz
		Marker Yupe Ref Trc X-value Y-value Function Function Result M1 1 2.40204 GHz -2.85 dBm Function Function Result M2 1 2.4 GHz -5.58 dBm Function Function M3 1 2.39 GHz -55.34 dBm Function Function M4 1 2.33 CHz -55.34 dBm Function Function M4 1 2.325007 GHz -53.71 dBm Function Function
		Date:11.2012.2019 1956.61
		Ref Level 20.00 dbm Offset 1.00 db RBW 100 HHz Att 30 db SWT 56.9 μs VBW 300 kHz Mode Auto FFT Count 500/500 PPk Max
		10 dBm
CH78 No hopping mode		-20 dBm D1 -22.500 dBm
		-50 dBm
		Stop 2.5 GH2 Stop 2.5 GH2 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.479631 GH2 ~2.50 dBm M2 1 2.498631 GH2 ~56.39 dBm M3 1 2.95 GH2 ~56.01 dBm M4 1 2.4963971 GH2 ~57.83 dBm
		Date: 11.2012 2019 19:44:59

Report No.: CHTEW19070079

	Spectrum [] 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
	DPk Max
	10 dBm M1[1] -2.88 dBm 2.4788440 GHz
	0 dgm M2[1] -60.13 dBm 2.4835000 GHz
	-20 dsm 01 -22.880 dBm
	-30 dBm
CH78 Hopping mode	-40 dBm
hopping mode	-60 dBm - M2
	-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 2.478844 GHz -2.88 dBm -2.88 dBm -2.88 dBm
	M2 1 2.49394 GHZ -2.60 UBM M2 1 2.4935 GHZ -60.13 dBm
	M3 1 2.5 GHz -59.41 dbm
	M4 1 2.4930174 GHz -56.58 dBm
	Measuring
	M4 1 2.4930174 GHz -56.58 dBm

Shenzhen Huatongwei International Inspection Co., Ltd.

est Item:	Band edge		Modul	ation ty	pe:	π/4DQP	SK
		Spectrum Ref Level 20.00 dBm	Offset 1.00 dB 👄	RBW 100 kHz			
		Att 30 dB Count 500/500	SWT 1.1 ms 🖷	VBW 300 kHz	Mode Auto Sweep		
		1Pk Max			M1[1]	-3.14	dBm
		10 dBm			M2[1]	2.402180 -54.37	dBm
		0 dBm				2.400000	CH2
		-10 dBm					
		-20 dBm D1 -23.140	dBm				
CH00		-40 dBm					NY
No hopping mode		-50 dBm	where where we wanted		manna	M3 M4	H
no nopping mode	P	-60 dBm	the both both both and both an		- and an and a start of the sta	ananantala lata dika Tanaka ang m	
		-70 dBm					
		Start 2.31 GHz 1arker		691 pts		Stop 2.405	GHz
		Type Ref Trc M1 1	X-value 2.40218 GHz	Y-value -3.14 dBm	Function	Function Result	_
	-	M2 1 M3 1	2.4 GHz 2.39 GHz	-54.37 dBm -56.13 dBm			
		M4 1 M5 1	2.31 GHz 2.325558 GHz	-55.92 dBm -53.65 dBm			
					Mela	4/4	
	D	ate:11.JUL.2019 19:46:30					_
		Spectrum Ref Level 20.00 dBm	Offset 1.00 dB 👄	PBW 100 kHz			
		Att 30 dB Count 500/500		VBW 300 kHz	Mode Auto Sweep		
		1Pk Max			M1[1]	-4.21	dBm
		10 dBm			M2[1]	2.403010 -55.75) GHz
		0 dBm				2.40000	
		-10 dBm					MW
		-20 dBm	dBm				
CL 100		-30 dBm					N
CH00		-50 dBm	MS				
Hopping mode		-60 dBm	methorofinement	manunuhan	ungulu sugar denno	Marken Bausen un	
		-70 dBm					
		Start 2.31 GHz		691 pts		Stop 2.405	GHz
		1arker Type Ref Trc	X-value	Y-value	Function	Function Result	
		M1 1 M2 1	2.40301 GHz 2.4 GHz	-4.21 dBm -55.75 dBm			
	-	M3 1 M4 1 M5 1	2.39 GHz 2.31 GHz 2.336022 GHz	-56.29 dBm -55.27 dBm -53.72 dBm			
			2.330022 GH2	-53.72 UBII	Mela		
	D	ate:11.JUL.2019 20:00:18					
	ſ	Spectrum					
			Offset 1.00 dB 👄 SWT 56.9 μs 👄		Mode Auto FFT		
		Count 500/500 1Pk Max					
	l l	10 dBm			M1[1]	-3.18 2.4801490) GHz
		0 dBm ML			M2[1]	-59.38 2.4835000	dBm) GHz
		-10 dBm					
		-20 dBm - D1 - 22 190	dBm				
		-30 dBm					
CH78				+ +			_
No hopping mode		50 dBm	M2 M2	14 X			
		-60 dBm	- Alter a programmer	Afr		and the second	~~~
		-70 dBm					
						1 1 1	
		Start 2.478 GHz		691 pts		Stop 2.5	GHZ
		larker Type Ref Trc	X-value	Y-value	Function	Stop 2.5 Function Result	
		Narker Type Ref Trc M1 1 M2 1	2.480149 GHz 2.4835 GHz	Y-value -3.18 dBm -59.38 dBm			GHz
		Narker Type Ref Trc M1 1	2.480149 GHz	Y-value -3.18 dBm			GHz

Report No.: CHTEW19070079

	Spectrum Image: Constraint of the sector of t
	20 dBm
CH78 Hopping mode	-30 dBm 01 - 25.990 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Hopping mode	-50 dBm
	Start 2.478 GHz 691 pts Stop 2.5 GHz Marker
	Type Ref Trc X-value Y-value Function Function M1 1 2.478016 GHz -5.99 dBm M2 1 2.478016 GHz -5.22 dBm M3 1 2.5 GHz -59.51 dBm M4 1 2.48955 GHz -57.16 dBm
	Imm 1 2.4663603 GnZ ~57.10 U000 If or online If on on online If on online

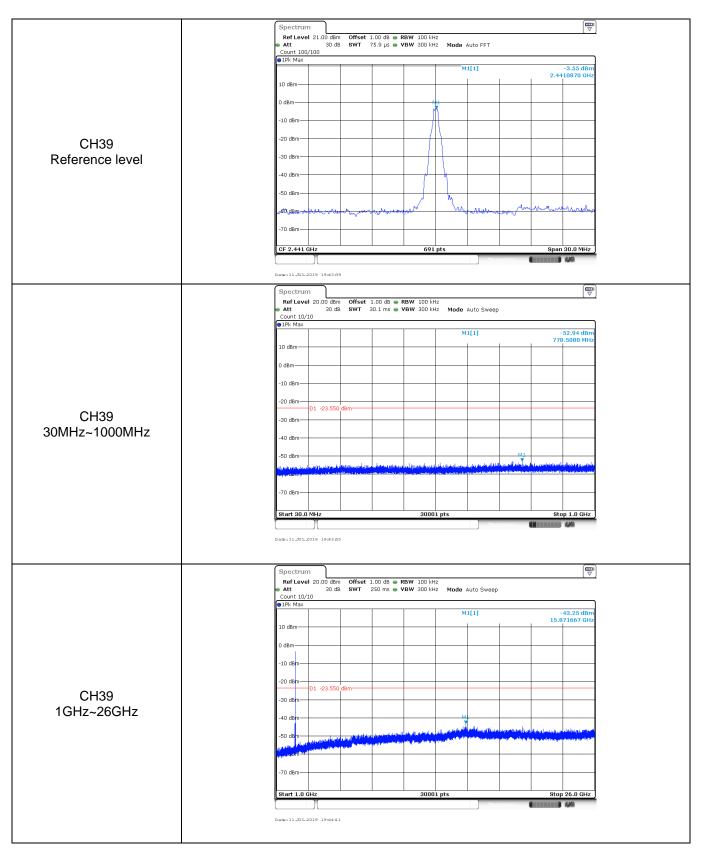
est Item:	Band edge		Modula	ation ty	/pe:	8	DPSK			
		Spectrum Image: Constraint of the second seco								
		10 dBm			M1[1] M2[1]		2.4021	52 dBm		
CH00 No hopping mode		-20 dBm -30 dBm -40 dBm -50 dBm -60 dBm	Bm				M3 P			
		-70 dBm Start 2.31 GHz Marker Type Ref Trc	X-value	691 p	Function	Funct	Stop 2.40	5 GHz		
		M1 1 M2 1 M3 1 M4 1 M5 1	2.40218 GHz 2.4 GHz 2.39 GHz 2.31 GHz 2.399493 GHz	-3.14 dBm -54.52 dBm -56.45 dBm -56.56 dBm -53.51 dBm		asuring				
		Spectrum Ref Level 20.00 dBm Att 30 dB Count 500/500	Offset 1.00 dB SWT 1.1 ms	RBW 100 kHz VBW 300 kHz	Mode Auto Swee	p				
		1Pk Max 10 dBm 0 dBm			M1[1] M2[1]		2.4021	56 dBm		
CH00		-10 dBm -20 dBm -30 dBm -40 dBm	Bm					R		
Hopping mode		-50 dBm -60 dBm -70 dBm Start 2.31 GHz	rtantelle-hijselett kontenensjonende	(ut	M5.	harrowstation	5top 2.40			
		Marker Type Ref Trc M1 1 M2 1 M3 1 M4 1	X-value 2.40218 GHz 2.4 GHz 2.39 GHz 2.31 GHz	691 p -3.18 dBm -55.56 dBm -55.79 dBm -55.41 dBm	Function	Funct	ion Result			
		M5 1 Date:11.JUL.2019 20:04:05	2.364659 GHz	-53.42 dBm	Me	asuring 🚺	1 <i>1</i> 0			
			Offset 1.00 dB ● SWT 56.9 µs ●							
		10 dBm 0 dBm -10 dBm			M1[1] M2[1]		2.48014	94 dBm		
CH78 o hopping mode		-20 dBm D1 -23.160 d -30 dBm	M2 M	4						
		-60 dBm		691 p		Erre-	Stop 2.	5 GHz		
		Type Ref Trc M1 1 M2 1 M3 1 M4 1	X-value 2.480149 GHz 2.4835 GHz 2.5 GHz 2.486513 GHz	Y-value -3.16 dBm -57.94 dBm -59.58 dBm -57.52 dBm			ion Result			
		Data:11.JUL.2019 19:53:41								

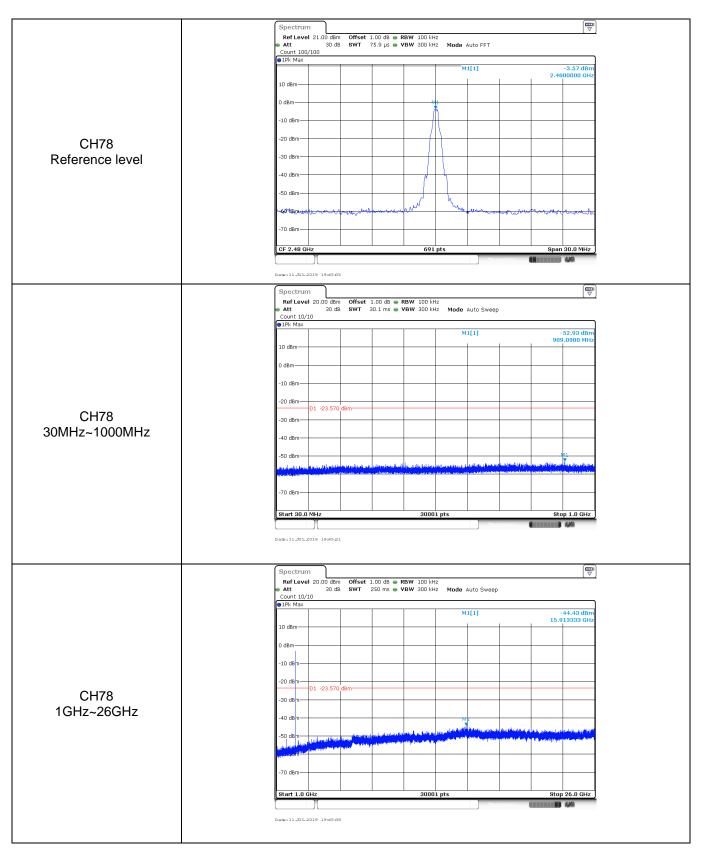
Report No.: CHTEW19070079

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	Spectrum 🕎
	Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Mode Auto FFT Att 30 dB SWT 56.9 μs VBW 300 kHz Mode Auto FFT Count 500/500 Count 500/500 State 100 kHz State 100 kHz State 100 kHz
	IPk Max
	10 dBm M1[1] -3.14 dBm 2.4791620 GH2 M2[1] -58.88 dBm
	0 dBm
	-20 dBm 01 -23.140 dBm
CH78	-30 dBm
CH78 Hoppig mode	-40 dBm
	-60 dBm - Manufacture and an and a second and a
	-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 2.479162 GHz -3.14 dBm
	M1 1 2.499102 GH2 -3.14 04m M2 1 2.4935 GH2 -58.88 08m
	M3 1 2.5 GHz -59.74 dBm
	M4 1 2.4943884 GHz -56.11 dBm
	Measuring. (REALING MA
	Date:11_JUL_2019 20:05:02

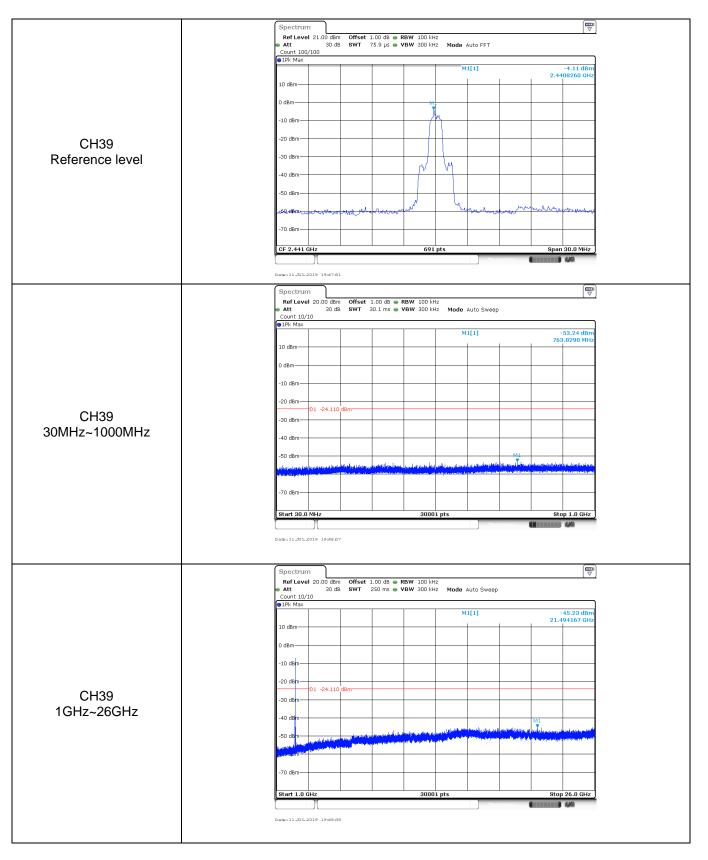
est Item:	SE		Modul	ation t	ype:		GFS	(
		Spectrum						(TH
		Ref Level 21.00 dBm Att 30 dB	Offset 1.00 dB ● SWT 75.9 µs ●			FT		
		Count 100/100						
					M1[1]		2.4	-3.03 dBn 020000 GH
		10 dBm					+	
		0 dBm			1			
		-10 dBm						
		-20 d8m						
CH00								
Reference level		-30 dBm						
		-40 dBm		ľ				
		-50 dBm		M				
		v6Q.dBmr varmer	we phone the	ww	- Municores	monor	handerand	muntur
		-70 dBm						
		CF 2.402 GHz		691	nts		Sna	n 30.0 MHz
						Measuring		
		Date:11.JUL.2019 19:41:31						
		Spectrum						
		RefLevel 20.00 dBm Att 30 dB		RBW 100 kH VBW 300 kH	z z Mode Auto S	Sweep		
		Count 10/10 Ptk Max						
					M1[1]		87	-53.10 dBn 8.4790 MH
		10 dBm						
		0 dBm						
		-10 dBm						
		-20 dBmD1 -23.030 c	iBm					
CH00		-30 dBm						
30MHz~1000MHz		-40 dBm						
		-50 dBm					641	
		بالمرجع والمتركبة ومراجع والمراجع والمتلا ومعادل	alesteration and a south		a sundar da dista	الاعتار بعراجا والعاد	-	and the second state
		-70 dBm						
		Start 30.0 MHz		3000	L pts			op 1.0 GHz
								4,40
		Data:11.JUL.2019 19:41:46						
								(=
		Spectrum Ref Level 20.00 dBm						
		Att 30 dB Count 10/10				weep		
		● 1Pk Max		_	M1[1]			-44.60 dBn
		10 dBm					16.	225000 GH
		0 dBm						
		-10 dBm						
		-20 dem						
CH00		D1 -23.030 d	iBm					
1GHz~26GHz		-30 dBm						
		-40 dBm			March 1 and 1		-	
		-50 dB m	Note the second second	nalitestaanteilan. Maanta taasanteila	alan Andra dalaman Manakari Manakari	an pina a la chia a bai an Na pina a sa	Alalis - Alabiano Alabiano de la contra de la c	Man Ulikova (Hili) A selector a secondor (hiji)
		and a start of a start						
		-70 dBm						ļ
				1				1
		Start 1.0 GHz		3000	L pts	Measuring		p 26.0 GHz
		Start 1.0 GHz		3000	L pts	Measuring	Sto	

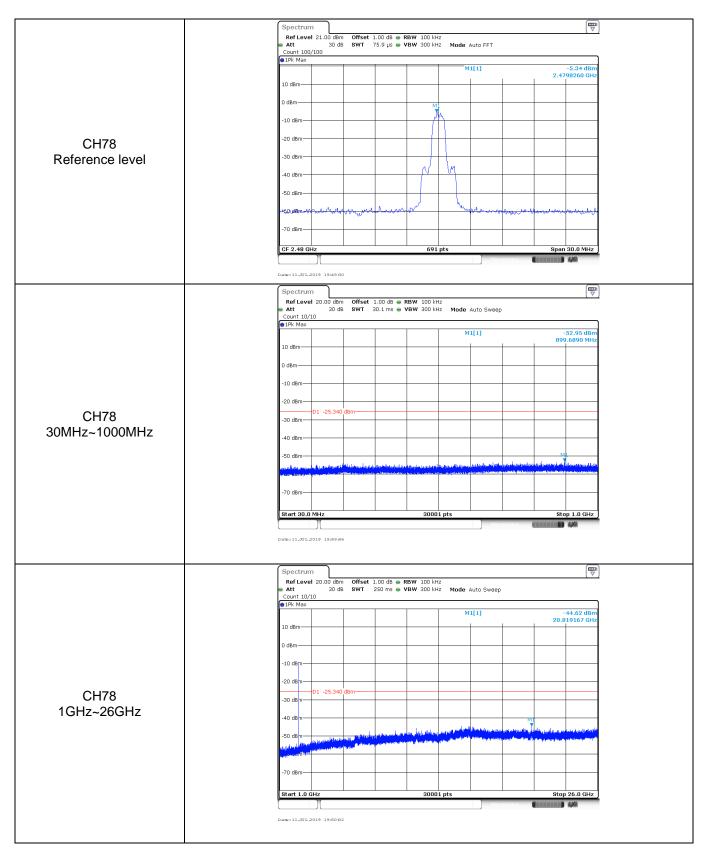




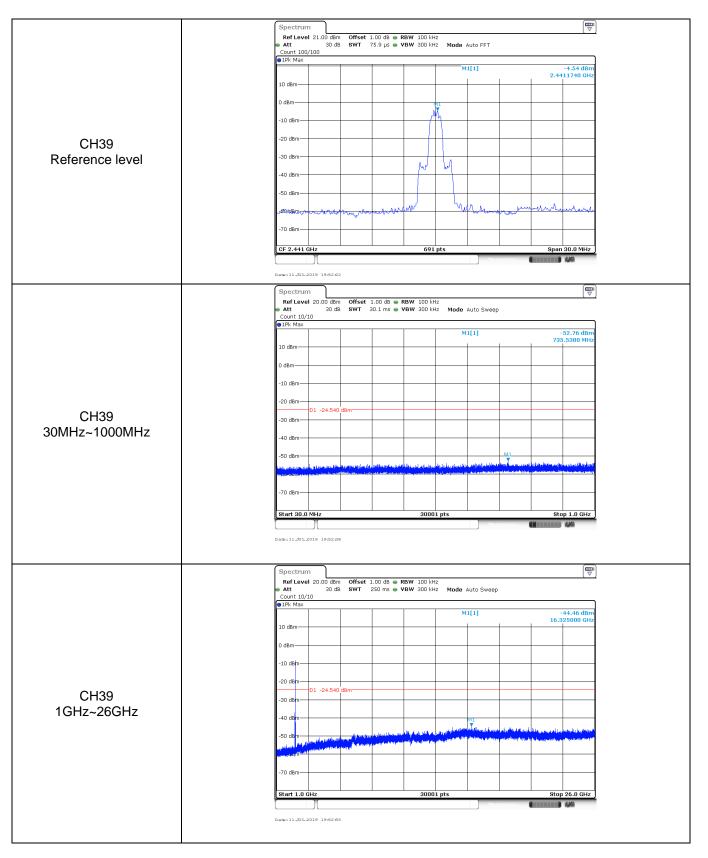
Shenzhen Huatongwei International Inspection Co., Ltd.

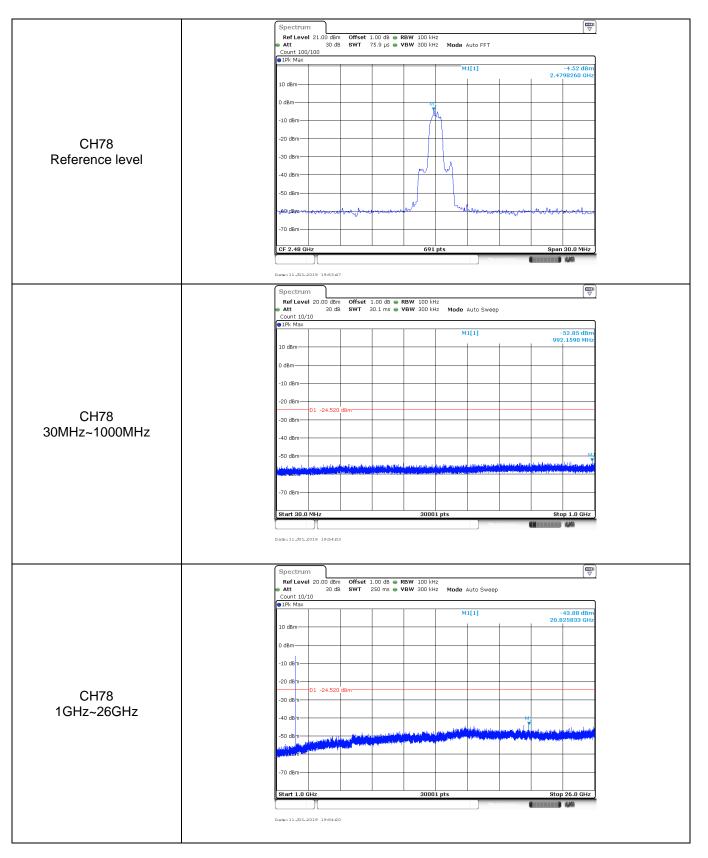
CH00 eference level	Spectrum Ref Level 21.00 dBm Att 30 dB Count 100/100 • IPk Max 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm -30 dBm				7FT	2.401	₹ 3.82 dBm 8260 GHz
	PIPk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm			M1[1]		2.401	3.82 dBm 8260 GHz
	0 dBm					2.401	8260 GHz
	-10 dBm						
	-20 dBm						
	-30 dBm					1 1	
	-40 dBm						
eference level							
	-50 dBm		-r	by			
	neederant much	to any appropriate	whole	how	www.	met man	www.
	-70 dBm						
	CF 2.402 GHz		691	pts		Span (30.0 MHz
]	Measuring		iya.
	Date:11.JUL.2019 19:46:36						
	Spectrum Ref Level 20.00 dBm	Offset 1.00 dB	DBW 100 ki				
	 Att 30 dB Count 10/10 				Sweep		
	● 1Pk Max			M1[1]		-5	2.94 dBm
	10 dBm					702.	2040 MHz
	0 dBm						
	-10 dBm						
	-20 dBm-01 -23.820	dBm					
CH00	-30 dBm						
MHz~1000MHz	-40 dBm						
	-50 dBm		an ol ol rabier	- Jin	143 Lange Anne Antoniold		al at the second
		Najad Aline ya gi yang dina katala sa kat	Alta Incore en alleres	anna ailte à anna a' thatanna	na attanti atti centi fildin harjetati.	an parta an	da anti-petremi
	-70 dBm					+	
	Start 30.0 MHz		3000	1 pts			1.0 GHz
	Date:11.JUL.2019 19:46:52	2					l)KI
	Spectrum	0#-		-			
	Ref Level 20.00 dBm Att 30 dB Count 10/10				Sweep		
	1Pk Max			M1[1]		-4	4.56 dBm
	10 dBm					20.03	3333 GHz
	0 dBm					+	
	-10 dBm					+	
	-20 dBm	dBm					
CH00	-30 dBm					+ +	
GHz~26GHz	-40 dBm						
	-50 dB m	and a second		and their sector design	1. 1920 - 1. 1930 -	the second second	and a salard
	and the second s					+	
	-70 dBm						
	Start 1.0 GHz		3000	1 pts			26.0 GHz
	Date:11_JUL_2019 19:47:09				Measuring		





Test Item:	SE	Modulation type: 8DPSK	
		Spectrum Image: Constraint of the section of the sectio	
		Count 200 years	
		0 dBm	
CH00 Reference level		-20 dBm	
Reletence level		-40 dBm	
		CF 2.402 CHz 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 Mode Auto Sweep Count 10/10 P!Pk Max	
		10 dBm	
CH00		-20 dBm	
30MHz~1000MHz		-40 d8m	
		Start 30.0 MHz 30001 pts Stop 1.0 GHz	
		Spectrum	
		RefLevel 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 PIk Max	
		10 dBm	
		-10 d2m	
CH00 1GHz~26GHz		-30 d2m	
		-70 dBm	
		Date:11.2012/019 19:51:42	





5.11. Spurious Emissions (radiated)

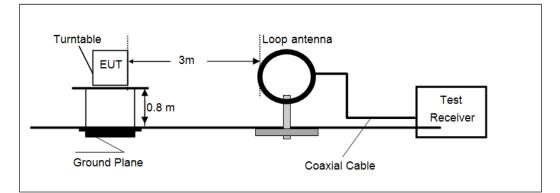
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

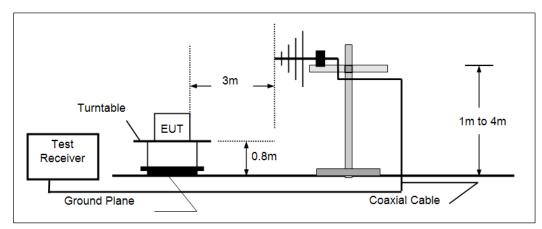
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

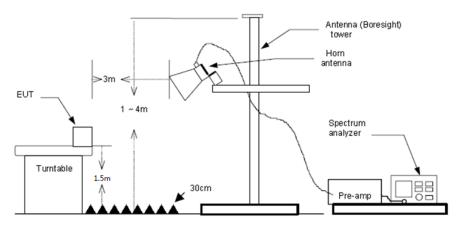
Below 30 MHz



> 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

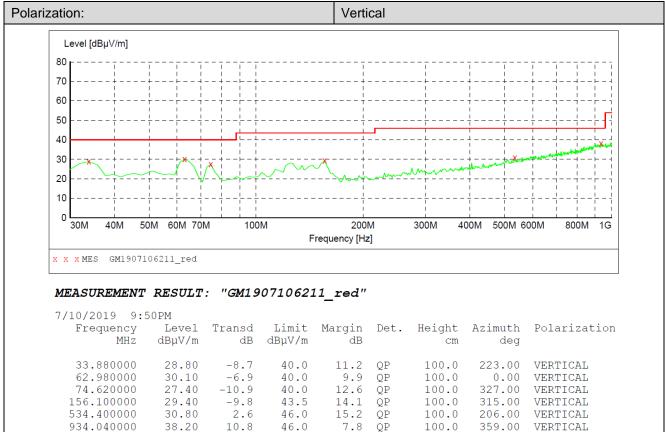
Note:

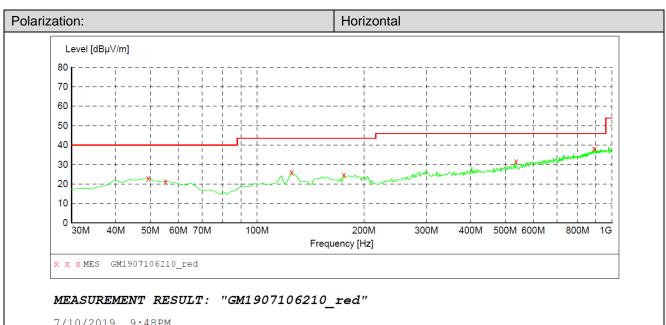
- 1) Final Level = Receiver Read level + Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3) Below 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation High channel which it was worst case, so only the worst case's data on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





Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
$\begin{array}{r} 49.400000\\ 55.220000\\ 125.060000\\ 175.500000\\ 536.340000\\ 891.360000\end{array}$	23.00	-4.8	40.0	17.0	QP	100.0	127.00	HORIZONTAL
	21.30	-5.3	40.0	18.7	QP	100.0	0.00	HORIZONTAL
	25.90	-9.1	43.5	17.6	QP	100.0	184.00	HORIZONTAL
	24.70	-8.9	43.5	18.8	QP	100.0	7.00	HORIZONTAL
	31.50	2.7	46.0	14.5	QP	100.0	23.00	HORIZONTAL
	38.20	10.3	46.0	7.8	QP	100.0	355.00	HORIZONTAL

> 1 GHz ~ 25 GHz

CH00											
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization	Test value				
1239.4063	37.30	-5.73	31.57	74.00	42.43	Vertical	Peak				
1499.3750	44.45	-5.63	38.82	74.00	35.18	Vertical	Peak				
5146.2813	31.56	8.88	40.44	74.00	33.56	Vertical	Peak				
6720.7813	31.04	13.41	44.45	74.00	29.55	Vertical	Peak				
1333.4063	34.89	-5.57	29.32	74.00	44.68	Horizontal	Peak				
3148.7813	33.97	0.57	34.54	74.00	39.46	Horizontal	Peak				
5113.9688	32.47	8.83	41.30	74.00	32.70	Horizontal	Peak				
6952.8438	29.70	14.67	44.37	74.00	29.63	Horizontal	Peak				

CH39										
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization	Test value			
1499.3750	45.13	-5.63	39.50	74.00	34.50	Vertical	Peak			
1624.2188	37.49	-6.24	31.25	74.00	42.75	Vertical	Peak			
5625.0938	31.40	8.83	40.23	74.00	33.77	Vertical	Peak			
7938.3750	31.96	17.65	49.61	74.00	24.39	Vertical	Peak			
1749.0625	37.54	-5.95	31.59	74.00	42.41	Horizontal	Peak			
3128.2188	34.58	0.47	35.05	74.00	38.95	Horizontal	Peak			
4671.8750	31.16	6.21	37.37	74.00	36.63	Horizontal	Peak			
6830.9375	30.57	13.48	44.05	74.00	29.95	Horizontal	Peak			

CH78										
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization	Test value			
1499.3750	45.76	-5.63	40.13	74.00	33.87	Vertical	Peak			
1750.5313	40.67	-5.95	34.72	74.00	39.28	Vertical	Peak			
4999.4063	31.98	7.85	39.83	74.00	34.17	Vertical	Peak			
7007.1875	31.02	15.19	46.21	74.00	27.79	Vertical	Peak			
1301.0938	35.01	-5.57	29.44	74.00	44.56	Horizontal	Peak			
1750.5313	36.87	-5.95	30.92	74.00	43.08	Horizontal	Peak			
4435.4063	31.51	5.07	36.58	74.00	37.42	Horizontal	Peak			
5263.7813	31.29	8.64	39.93	74.00	34.07	Horizontal	Peak			

Remark:

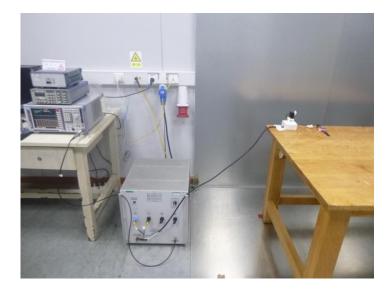
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

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.

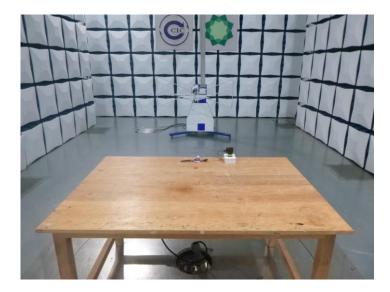
6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



Radiated Emissions







7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No. CHTEW19070077

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