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Т	EST REPORT	
Report No: Project No:	CHTEW19070046 Re SHT1906080901EW	eport Verification:
FCC ID:	2ABQ6-K10	Reporting Cirrowing date
Applicant's name:	Inspira Technologies LLC	
Address	1901 4th Ave, Suite 210, San D	Diego, CA 92101, USA
Manufacturer	Inspira Technologies LLC	
Address	1901 4th Ave, Suite 210, San D	Diego, CA 92101, USA
Test item description	Tablet	
Trade Mark		
Model/Type reference	K10	
Listed Model(s)		
Standard:	FCC CFR Title 47 Part 15 Sub	part C Section 15.247
Date of receipt of test sample:	Jun.27, 2019	
Date of testing	Jun.27, 2019- Jul.12, 2019	
Date of issue	Jul.15, 2019	
Result	PASS	
Compiled by		
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Testing Laboratory Name :	Shenzhen Huatongwei Intern	ational Inspection Co. 1 td
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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	2019-07-15	Original		

# 2. TEST DESCRIPTION

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

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

# 3. <u>SUMMARY</u>

## 3.1. Client Information

Applicant:	Inspira Technologies LLC	
Address: 1901 4th Ave, Suite 210, San Diego, CA 92101, USA		
Manufacturer:	Inspira Technologies LLC	
Address:	1901 4th Ave, Suite 210, San Diego, CA 92101, USA	

## 3.2. Product Description

Name of EUT:	Tablet	
Trade Mark:	-	
Model No.:	К10	
Listed Model(s):	-	
Power supply:	DC 3.7V from battery	
Adapter information:Model: K-T100502000UInput: 100-240Va.c., 50-60Hz, 0.35A MaxOutput: 5Vd.c., 2000mA		
Hardware version:	android 9.0	
Software version:	EM_T6318_V2.0	
Bluetooth		
Version:	Supported BT4.2+EDR	
Modulation:	GFSK, π/4DQPSK, 8DPSK	
Operation frequency:	2402MHz~2480MHz	
Channel number:	79	
Channel separation:	1MHz	
Antenna type:	FPCB	
Antenna gain:	≥0dBi±0.5 dBi	

### 3.3. Operation state

### Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

Channel	Frequency (MHz)
00	2402
01	2403
:	:
39	2441
:	:
77	2479
78	2480

### > 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.:	/
,	/	Manufacturer:	/
		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.

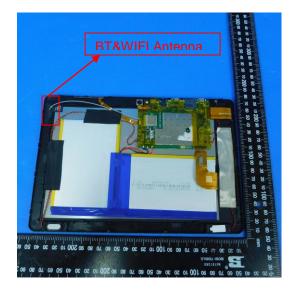
### FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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)

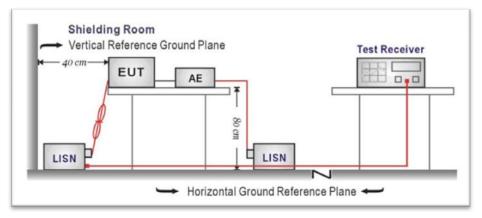
### <u>LIMIT</u>

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

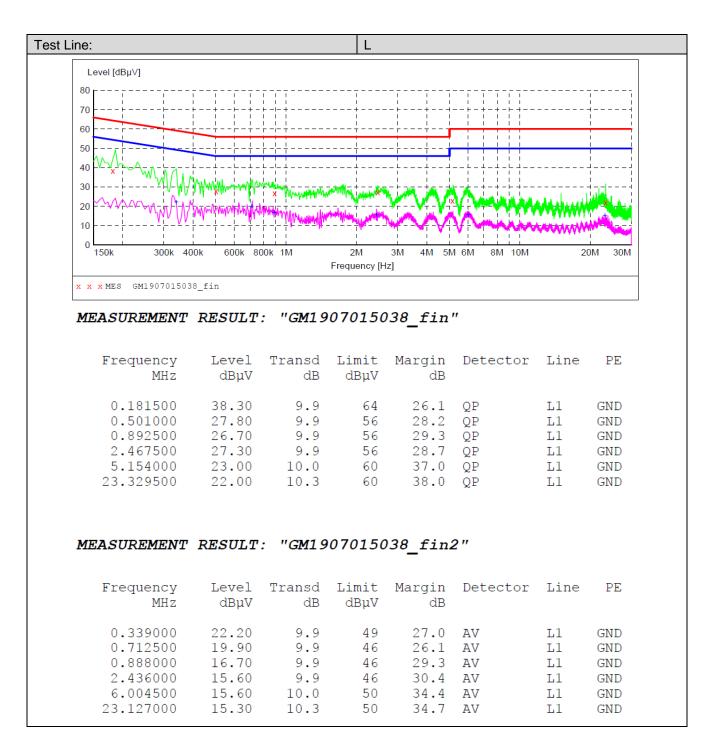
- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm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

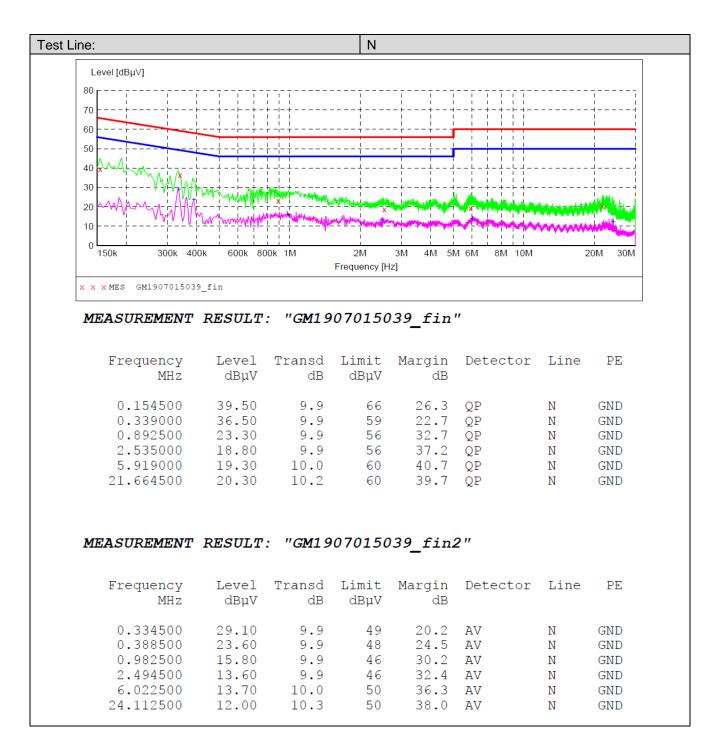
### TEST RESULTS

### ☑ Passed □ Not Applicable

Note:

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



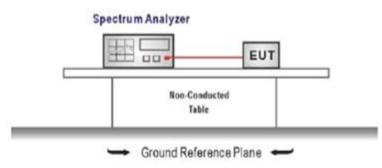


### 5.3. Conducted Peak Output Power

### <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	Output power (dBm)	AV Power	Limit (dBm)	Result
	00	6.54	6.45		
GFSK	39	6.33	6.24	≤ 30.00	Pass
	78	6.07	5.99		
	00	5.89	5.14		
π/4DQPSK	39	5.80	5.10	≤ 21.00	Pass
	78	5.28	4.61		
	00	5.91	5.11		
8DPSK	39	5.82	5.06	≤ 21.00	Pass
	78	5.33	4.57		

Modulation Type:	GFSK
	Spectrum         Image: Construction of the section of the sect
	• IPk View               M1[1]             • 6.54 dBm             2.40204340 GHz            10 dBm               • 7            0 dBm               • 7
CH00	-10 dBm
Child	-30 dBm
	-60 dBm70 dB
	CF 2.402 CH2     B91 pts     Span 5.0 VH2       Daw:2.01.2019 161648     Monorman     Monorman
	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 Plk View
	M1[1] 6.33 dBm 2.44095660 GHz 0 dBm 0 dBm
CH39	-10 dBm -20 dBm
0100	-30 dBm
	-60 dBm
	CF 2.441 GHz         691 pts         Span 5.0 MHz
	Spectrum         Image: Construction of the section of the sect
	(1) dBm     (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2
	-10 dBm
CH78	-30 d8m
	-50 dBm
	CF 2.48 GHz 691 pts Span 5.0 MHz

Ilation Type:	π/4DQPSK
	Spectrum RefLevel 20.00 dBm Offset 1.00 dB  RBW 2 MHz Att 30 dB SWT 1 ms VBW 5 MHz Mode Auto Sweep
	Count 500/500 9 IPk View
	M1[1] 5.89 ( 2.40212300
	10 dBm
	0 dBm
	-10 dBm
	-20 dBm
CH00	-30 d8m
	-40 dBm
	-50 dBm
	-60 d8m-
	-70 d8m
	CF 2.402 GHz 691 pts Span 5.0 M
	Data:2.JUL2019 162331
	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] 5.80 (
	10 dBm Y Z.44110130
	0 dBm
	-10 dBm
СН39	-20 dBm-
2039	-30 dBm
	-40 dBm
	-50 dBm
	-60 dBm
	-70 dBm
	CF 2.441 GHz 691 pts Span 5.0 M
	Date:2.JUL2019 1625#2
	Spectrum
	RefLevel 20:00 dBm Offset 1:00 dB ● RBW 2 MHz ● Att 30 dB SWT 1 ms ● VBW 5 MHz Mode Auto Sweep
	Count 500/500  FIR: View
	10 dBm M1[1] 5.28 c 2.48013020
	0 dBm
	-10 dBm-
	-20 dBm-
H78	-30 dBm
	-40 d8m-
	-50 dBm
	-60 dBm
	-70 d8m
	CF 2.48 GHz 691 pts Span 5.0 M
	Messuring Messuring Messuring

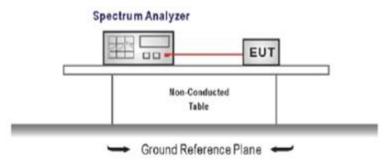
Spectrum           Ref Level         20.00 dBm         Offset         1.00 dB         RBW         2 MHz           Att         30 dB         SWT         1 ms         VBW         5 MHz           Compt S0/E00         SWT         1 ms         VBW         5 MHz	
	91 dBm 30 GHz
0 dBm	
-10 dBm	
-30 dam	
-40 dBm-	
-60 dBm	
CF 2.402 GHz 691 pts Span 5.0	
Date:2.JUL2019 162967	
Ref Level         20.00         dBm         Offset         1.00         dB         RBW         2 MHz           Att         30         30 WT         1 ms         VBW 5 MHz         Mode         Auto Sweep           Count 500/0500         500         500         500         500         500         500	
10 dBm	32 dBm 50 GHz
0 dBm	
-20 dam	
-30 dBm-	
-50 dBm	
-70 dBm-	
CF 2.441 GHz 691 pts Span 5.0	
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	
	33 dBm 50 GHz
10 dBm MI	
-10 dBm	
-30 dBm-	
-40 dBm	
-60 dBm	
CF 2.48 GHz 691 pts Span 5.0	
	Att 10 20 B WT 1 firs # VBW 5 Mz Mode Auto Sweep      Att 13     Att 23     Att 24     Att 24

### 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	1.29		
π/4DQPSK	39	1.29	-	Pass
	78	1.29		
	00	1.28		
8DPSK	39	1.29	-	Pass
	78	1.29		

Modulation Type:	GFSK
CH00	Spectrum       Image: Constraint of the cons
CH39	Spectrum         Image: Content of the content of
CH78	Spectrum         Image: Construction of the construle of the construction of the construle of the construction of

dulation Type:	π/4DQPSK
	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
	Caunt 500/500  P1Pk View
	M1[1] -18:23 dBm
	10 dBm M2 M2[1] 2.01 dBm 2.01 dBm 2.40216500 GHz 2.40216500 GHz
	-10 dbm 01 -17,990 dbm 02 03
	-20 dBm
CI 100	
CH00	-50 dBm
	-50 dBm
	-00 USIN
	CF 2.402 GHz 1001 pts Span 2.5 MHz Marker
	Type         Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         2.4013675 GHz         ~18.23 dBm
	M2         1         2.402165 GHz         2.01 dBm           D3         M1         1         1.285 MHz         0.19 dB
	Measuring
	Datu: 2.JUL 2019 16:22:51
	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 M1[1] -18.18 dBm
	10 dBm 2.44036750 GHz M2 M2[1] 1.96 dBm X 2.44116500 GHz
	0 dBm
	-10 dBm
	-20 dBm 01 -18.041 dBm
	-30 dBm
CH39	740-dB/h
	-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         2.4403675 GHz         -18.18 dBm           M2         1         2.441165 GHz         1.96 dBm
	D3 M1 1 1.2875 MHz -0.32 dB Nesturing
	Dam:2.JUL2019 1625:11
	RefLevel 20.00 dBm Offset 1.00 dB 👄 RBW 30 kHz
	Att 30 dB SWT 63.1 µs
	●1Pk View M1[1] -18.62 dBm
	10 dBm 2.47936750 GHz 
	-10 d8m
	-10 dem
	-30 d8m
CH78	~10 dBm
	-50 d8m-
	-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 2.4793675 GHz -18.62 dBm
	M1         1         2.4793675 GHz         -18.62 dBm           M2         1         2.490165 GHz         1.50 dBm           D3         M1         1         1.285 MHz         0.08 dB
	M1         1         2.4793675 GHz         -18.62 dBm           M2         1         2.480165 GHz         1.50 dBm

Modulation Type:	8DPSK
Modulation Type:	Spectrum         Image: Constraint of the set is a constraint of the s
	Type         Ref         Trc.         X-value         Y-value         Function         Function           M1         1         2.403575 GHz         -77.61.dBm         -
CH39	Ref Level 20.00 diam       Offset 1.00 dia       RBW 30 kHz         Att       30 dis       SWT 63.1 µs       VBW 100 kHz       Mode Auto FFT         Count 500/500       91% View       M1[1]       -17.50 diam         10 diam       M2 M2[1]       2.44035750 cHz       2.66 diam         0 diam       M2 M2[1]       2.36 diam       2.66 diam         0 diam       M2 M2[1]       2.36 diam       2.66 diam         -10 diam       M4       M2 M2[1]       2.36 diam         -20 diam       M4       M4       M4       4.4403750 cHz       3.4403750 cHz         -30 diam       M4       M4       M4       4.4403750 cHz       1.0404 cHz       1.0404 cHz         -70 diam       M4       M4       M4       1.0504 cHz       1.0404 cHz       1.0404 cHz         Type       Ref Trc       X-value       Y-value       Function       Function Result       1.0404 cHz         Marker       Type       Ref Trc       X-value       -17.50 diam       1.0104 cHz       1.0014 cHz       1.0104 cHz       1.0
CH78	Spectrum         Image: Spectrum           Ref Level 20.00 dbm         Offset 1.00 db         RBW         30 kHz           Att         30 db         SWT         63.1 µs         VBW         Mode Auto FFT           Count 500/500         IPK View         17.99 dbm         2.47935750 GHz         2.13 dbm           0 dbm         M2 M2[1]         2.30 dbm         2.4016250 GHz         2.30 dbm           0 dbm         M1[1]         2.4793575 GHz         3         3           20 dbm         M1         1.7.99 dbm         2.4016250 GHz         2.30 dbm           -10 dbm         M1         1.7.99 dbm         3         3         3           -20 dbm         M1         1.7.99 dbm         3         3         3         3           -30 dbm         M1         1.27.90 dbm         3         4

### 5.5. Carrier Frequencies Separation

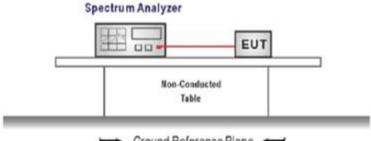
### <u>LIMIT</u>

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

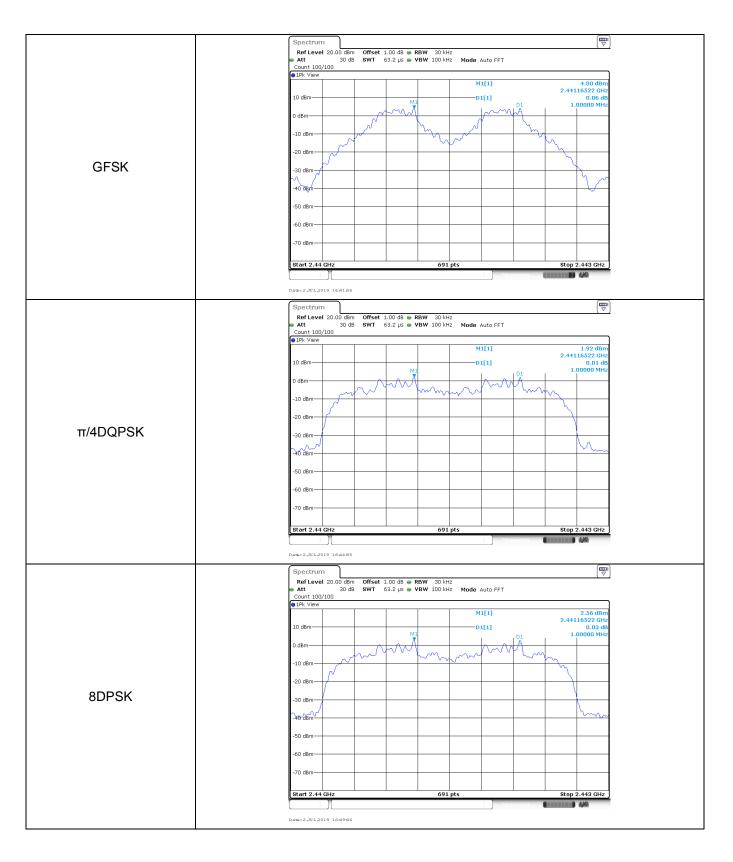
#### TEST RESULTS

#### ☑ 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	≥0.86	Pass
8DPSK	39	1.00	≥0.86	Pass

Note:

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

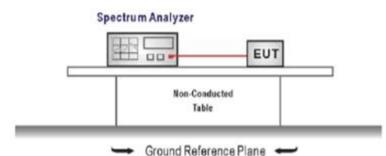


### 5.6. Hopping Channel Number

### 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		

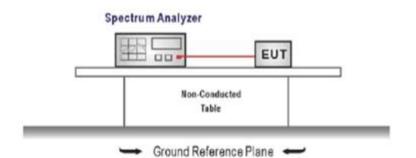
GFSK	
GFSK	
-40 dBm	
(-50 dBm	
	-   L
-60 dBm-	
-70 dBm-	
Start 2.4 GHz 691 pts	Stop 2.4835 GHz
Measuring	·····
Date: 2.JUL.2019 16:41:49	(
Spectrum Ref Level 20.00 dBm Offset 1.00 dB  RBW 100 kHz	
Att 30 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep	
0.09844444444444444444444444444444444444	ANNANANA ANA
-10 d8m	
-20 dBm	
π/4DQPSK	
	- I Y
-40 dBm-	
-50 dBm-	4
-60 d8m-	
-70 dBm	
Start 2.4 GHz 691 pts	Stop 2.4835 GHz
Heasting	
Date:2.JUL2019 16:4538	
Spectrum	
RefLevel 20.00 d8m Offset 1.00 d8 RBW 100 kHz Att 30 d8 SWT 1 ms VBW 300 kHz Mode Auto Sweep	
PPk View	
10 dBm	
0.0844400444444444444444444444444444444	Allandraider and
-10 dBm	
- 20 dBm	
8DPSK	
-40 dBm	
-50 dBm-	
-60 d8m	
-70 dBm	
Start 2.4 GHz 691 pts	Stop 2.4835 GHz
Measuring	4/6

### 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:

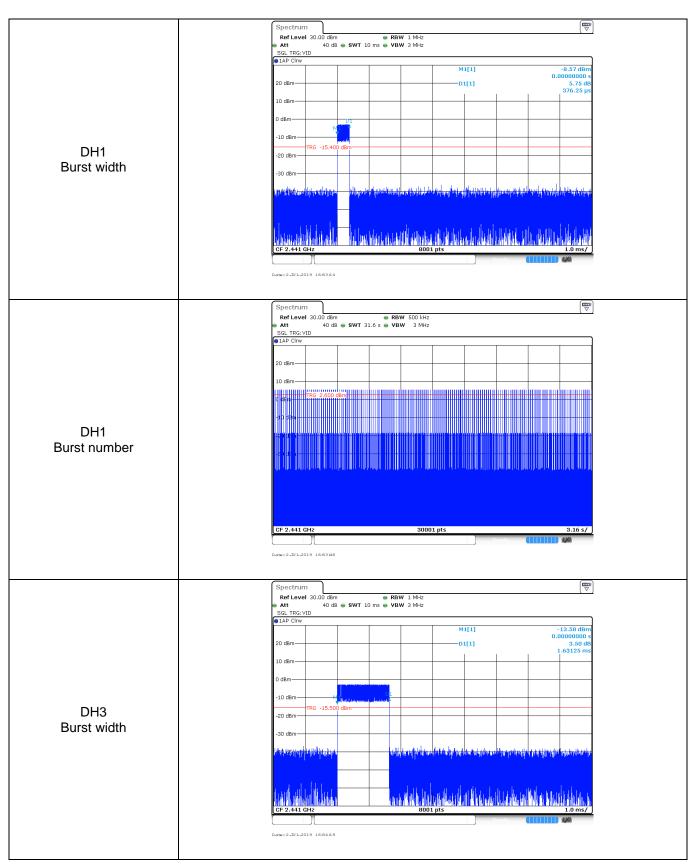
Please refer to the clause 3.3

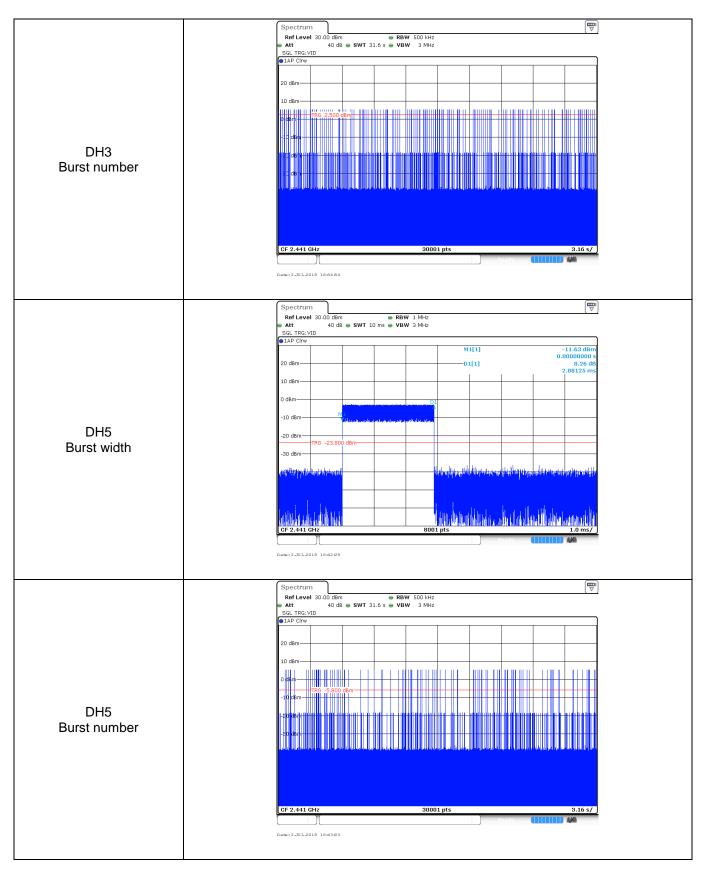
#### TEST RESULTS

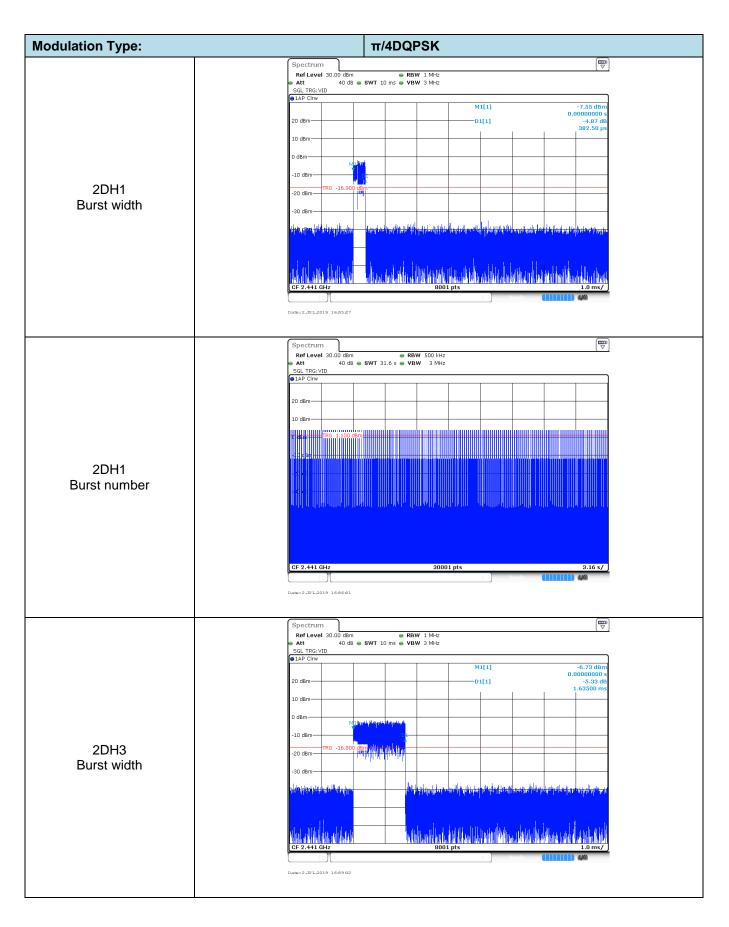
### ☑ Passed □ Not Applicable

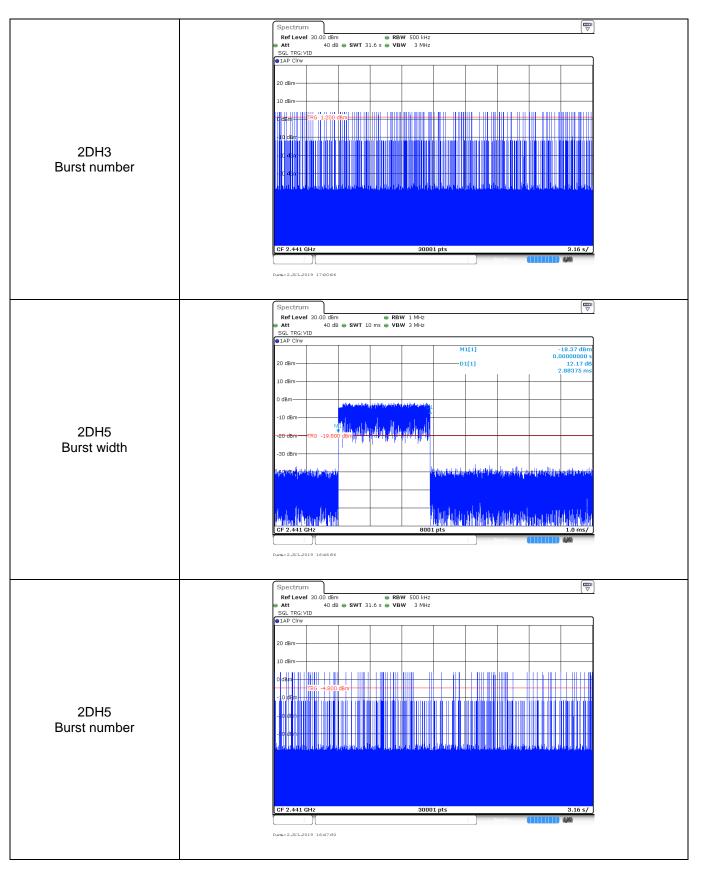
Modulation type	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
	DH1	0.38	314.00	0.12		
GFSK	DH3	1.63	162.00	0.26	≤ 0.40	Pass
	DH5	2.88	105.00	0.30		
	2DH1	0.38	314.00	0.12		
π/4DQPSK	QPSK 2DH3	1.63	163.00	0.27	≤ 0.40	Pass
	2DH5	2.88	112.00	0.32		
	3DH1	0.38	314.00	0.12		
8DPSK	3DH3	1.63	157.00	0.26 ≤ 0.40		Pass
	3DH5	2.89	102.00	0.29		

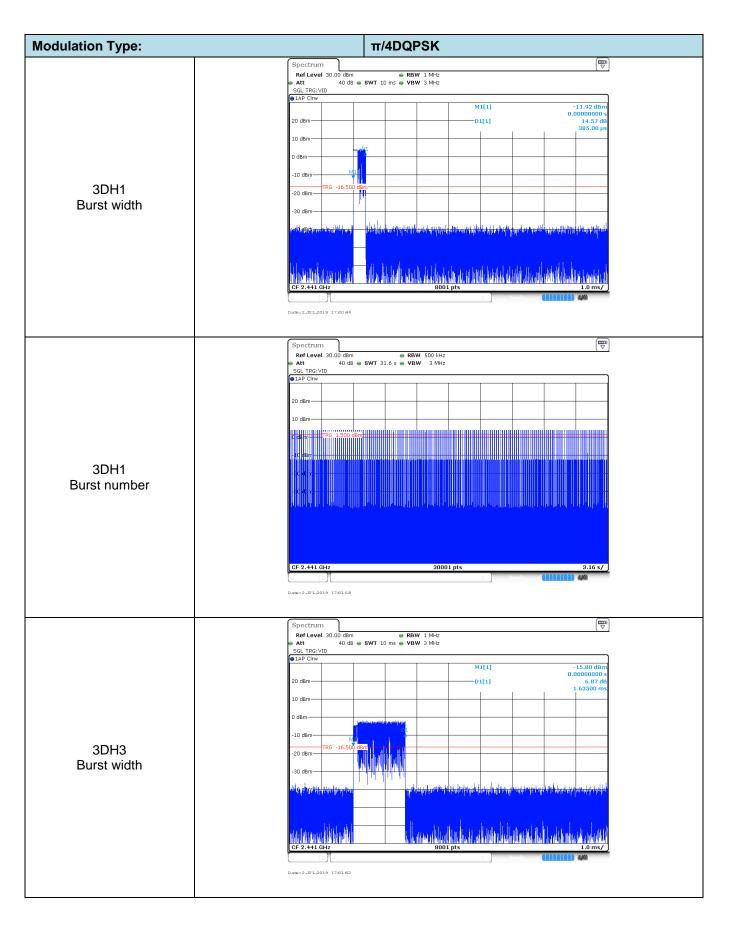
Modulation Type:	GFSK
------------------	------

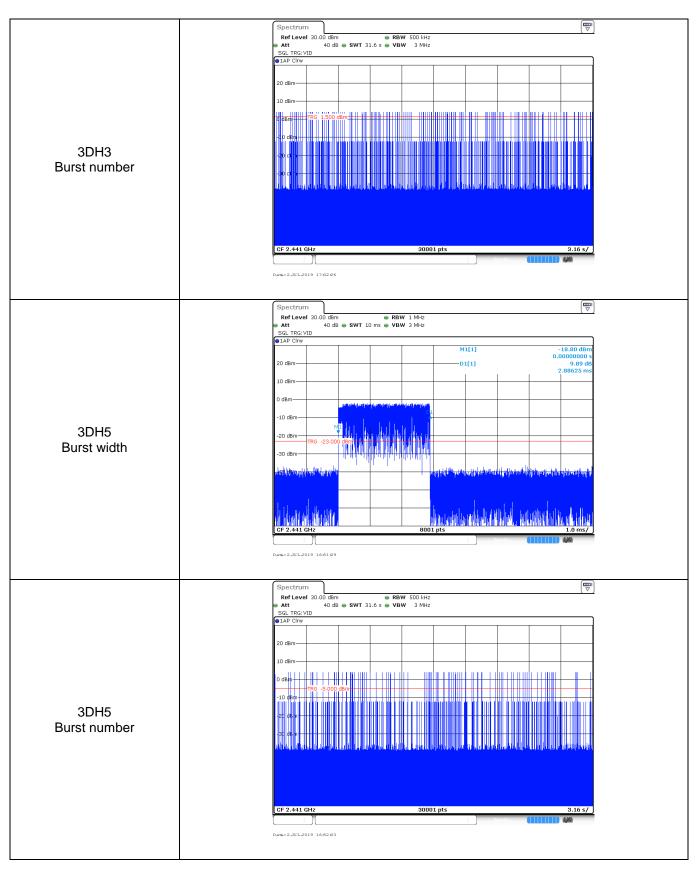












### 5.8. Pseudorandom Frequency Hopping Sequence

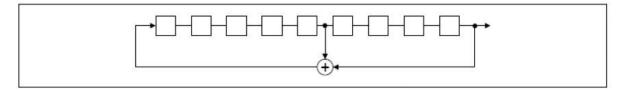
### <u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems shall have hopping channel carrier fre-quencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Al-ternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier fre-quencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to chan-nel frequencies that are selected at the system hopping rate from a pseudo ran-domly ordered list of hopping fre-quencies. Each frequency must be used equally on the average by each trans-mitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their cor-responding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### TEST RESULTS

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

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



Linear Feedback Shift Register for Generation of the PRBS sequence

An explame of pseudorandom frequency hopping sequence as follows:

0	2	4	6	62	64	Ũ	78	1	73	75 7
٦				 1			1		 Γ	
				1			i		1	
							1			
					∟.		<u>i</u>	$\Box$	 L	

Each frequency used equally one the average by each transmitter.

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

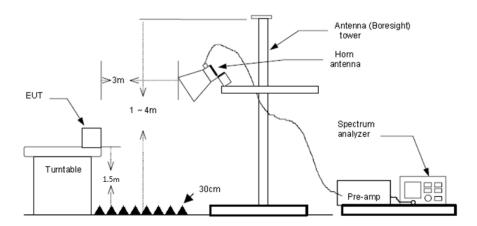
### 5.9. Restricted band (radiated)

### <u>LIMIT</u>

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

### **TEST CONFIGURATION**



#### TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- The receiver set as follow: RBW=1 MHz, VBW=3 MHz Peak detector for Peak value RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

☑ Passed □ Not Applicable

Note:

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

Test channe	el:			СН00				
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector	
2310.000	24.85	-2.33	22.52	54.00	31.48	Vertical	AV	
2310.000	31.36	-2.33	29.03	74.00	44.97	Vertical	PK	
2390.000	44.51	-2.41	42.10	74.00	31.90	Vertical	PK	
2390.000	30.89	-2.41	28.48	54.00	25.52	Vertical	AV	
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector	
2310.000	30.13	-2.33	27.80	74.00	46.20	Horizontal	PK	
2310.000	23.23	-2.33	20.90	54.00	33.10	Horizontal	AV	
2390.000	37.68	-2.41	35.27	54.00	18.73	Horizontal	AV	
2390.000	53.60	-2.41	51.19	74.00	22.81	Horizontal	PK	

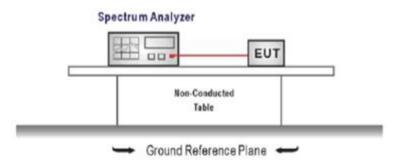
Fest channe	el:			CH78				
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector	
2483.500	58.63	-2.15	56.48	74.00	17.52	Vertical	PK	
2483.500	45.41	-2.15	43.26	54.00	10.74	Vertical	AV	
2500.000	30.18	-2.10	28.08	54.00	25.92	Vertical	AV	
2500.000	42.67	-2.10	40.57	74.00	33.43	Vertical	PK	
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector	
2483.500	66.42	-2.15	64.27	74.00	9.73	Horizontal	PK	
2483.500	53.46	-2.15	51.31	54.00	2.69	Horizontal	AV	
2500.000	35.87	-2.10	33.77	54.00	20.23	Horizontal	AV	
2500.000	50.42	-2.10	48.32	74.00	25.68	Horizontal	PK	

# 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 10<sup>th</sup> 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 the second sec
		Image: big start with the start withe start with the start with the start with the start
CH00		-10 dBm
No hopping mode		-50 dBm
		Start 2.31 GHz         691 pts         Stop 2.405 GHz           Marker         Type [Ref]         Trc         X-value         Y-value         Function           M1         1         2.40248 GHz         6.05 dBm         Function Result           M2         1         2.4 GHz         -52.57 dBm         Image: Start 2.31 GHz         Start 2.37 dBm           M3         1         2.39 GHz         -55.91 dBm         Image: Start 2.37 dBm         Image: Start 2.37 dBm           M4         1         2.31 GHz         -55.21 dBm         Image: Start 2.37 dBm         Image: Start 2.37 dBm
		Measuring (111111) (4)
		Spectrum         TOT           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         GBK Max         SWE         SWE         SWE         SWE
		DPL Max         M1[1]         6.15 dBm           10 dBm         2.404240 GMz           0 dBm         M2[1]         -53.21 dPr           0 dBm         2.40000 dPz
		-10 dBm 01 -13.850 dBm 01 -13.850 dBm 01 -13.950 dB
CH00 Hopping mode		MC         MC         MC           MS         MS         MS
		Start 2.31 GHz         691 pts         Stop 2.485 GHz           Marker         Type   Kef   Trc           X-value         Function         Function Result           M1         1         2.40424 GHz         6.15 dBm
		M2         1         2.4 GHz         -53.21 dBm           M3         1         2.39 GHz         -56.44 dBm           M4         1         2.31 GHz         -55.70 dBm           M5         1         2.373884 GHz         -53.62 dBm
		Date:2.2012:019 1642:03           Spectrum         Image: Control of the sector of the sect
		Att         30 dB         SWT         56.9 µs         VBW 300 kHz         Mode         Auto FFT           Count 500/S00         FIRk Max         M1[1]         5.90 dBm           10 dBm         2.4801490 GHz
		M2[1]         -56.74 dBm           0 dBm         2.4835000 GHz           -10 dBm         0           -20 dBm         0
CH78 No hopping mode		-30 dgm
		-60 dBm
		Start 2.478 GHz         Stop 2.5 GHz           Marker         Type Ref         Trc         X-value         Y-value         Function         Function Result           M1         1         2.480149 GHz         5.90 dBm
		M3 1 2:4935159 GHz -59:39 GHm M4 1 2:4935159 GHz -56:77 dBm Date:2.3012019 162120

#### Report No.: CHTEW19070046

	Spectrum         Image: Constraint of the sector of t
	10 dBm M1[1] 4.99 dBm 2.4780480 GHz M2[1] -59.47 dBm
	2.4835000 GHz
	-10 USI/V 1 -15.010 dBm
CH78	-30 dBm
CH78 Hopping mode	
	-60 dBm - "" ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
	Start 2.478 GHz 691 pts Stop 2.5 GHz
	Start 2.478 GH2 091 pts Stop 2.5 GH2
	Type Ref Trc X-value Y-value Function Function Result
	M1 1 2.478048 GHz 4.99 dBm
	M2         1         2.4835 GHz         -59.47 dBm           M3         1         2.5 GHz         -60.07 dBm           M4         1         2.4980232 GHz         -57.24 dBm
	Measuring (Annumatic Annumatic
	Dam:2.JUL2019 16%220

Fest Item:	Band edge	Modulation type:	π/4DQPSK
CH00 No hopping mode		Militian         Militian           1 20.00 dBm         Offset 1.00 dB @ RBW 100 kHz         Mode Auto Swee           30 dB         SWT         1.1 ms @ VBW 300 kHz         Mode Auto Swee           500         M1[1]         M2[1]         M2[1]           D1 -15.460 dBm         Image: Sweet Swe	
	Marker         Type         Re           Type         Re         M2           M2         M3         M3           M4         M5         M4           Dates (2.201.2)         Spectrur	1     2.40191 GHz     4.54 dBm       1     2.4 GHz     -50.88 dBm       1     2.39 GHz     -55.87 dBm       1     2.319 GHz     -54.96 dBm       1     2.399493 GHz     -51.62 dBm	Function Result
CH00	Ref Lave Att Count 500 IPk Max 10 dBm	1 20.00 dbm Offset 1.00 db @ RBW 100 kHz Mode Auto Swee 30 db SWT 1.1 ms @ VBW 300 kHz Mode Auto Swee /500 M1[1] M2[1] O1 -16.410 dBm O1 -16.410 dBm O1 -16.410 dBm	2.404110 GHz -3.59 dBm 2.404110 GHz -35.00 dBrg 2.400000 dHg
Hopping mode	+50 dBm 	f         Trc         X-value         Y-value         Function           1         2.40411 GHz         3.59 dBm         1           1         2.4 GHz         55.08 dBm         1           1         2.39 GHz         -55.09 dBm         1           1         2.31 GHz         -55.09 dBm         1           1         2.31 GHz         -55.09 dBm         1           1         2.399906 GHz         -53.10 dBm         1	Stop 2,405 GHz
	Date: 2.201.2 Spectrur Ref Leve Att Count 500 IPk Max 10 dBmm	1 20.00 dBm Offset 1.00 dB = RBW 100 kHz 30 dB SWT 56.9 μs = VBW 300 kHz Mode Auto FFT /500 M1[1]	(₩
CH78 No hopping mode	10 dam, min       0 dam       -10 dam       -20 dam       -20 dam       -30 dam       -00 dam       -50 dam       -60 dam       -70 dam       Start 2.47       Marker       Type   Rt       Mil       M3       M4		

#### Report No.: CHTEW19070046

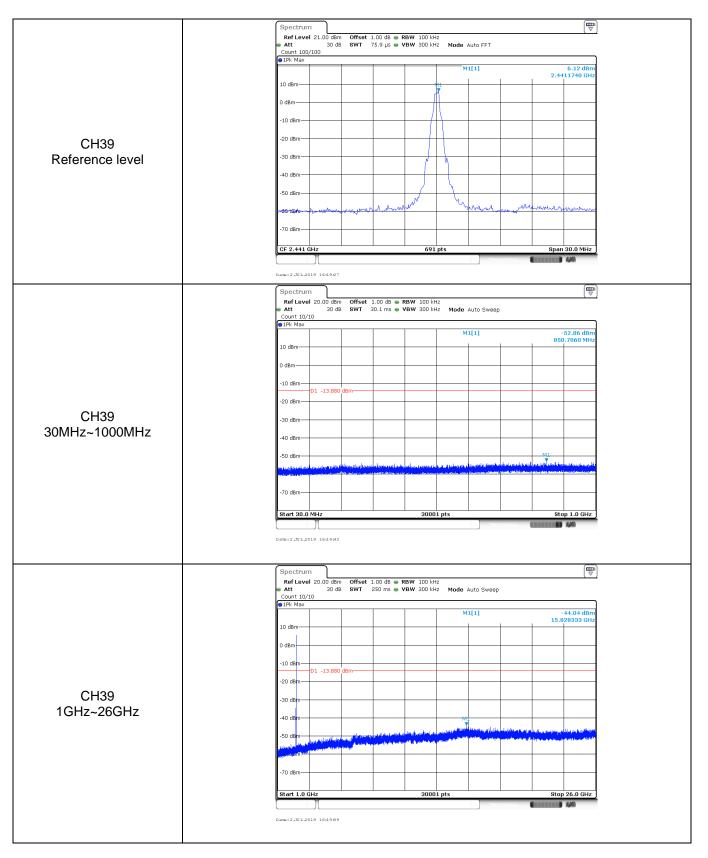
	Spectrum         Image: Spectrum           Ref Level 20.00 dBm         Offset 1.00 dB ● RBW 100 kHz           Att         30 dB         SWT         56.9 µs ● VBW 300 kHz         Mode Auto FFT           Count S00/500         Count S00/500         Count S00/500         Count S00/500         Count S00/500
	IPk Max
	10 dBm
	BdBm
	-10 dBm
	-20 dBm
	-30 dBm
CH78 Hopping mode	-40 dBm
hopping mode	
	-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 2.47808 GHz 3.69 dBm M2 1 2.4835 GHz -59.79 dBm
	M2         1         2.8 G M         577 9 G M           M3         1         2.8 G H         -60.05 d Bm           M4         1         2.4837072 GHz         -57.23 d Bm
	Measuring.
	Datu:2.JUL2019 164647

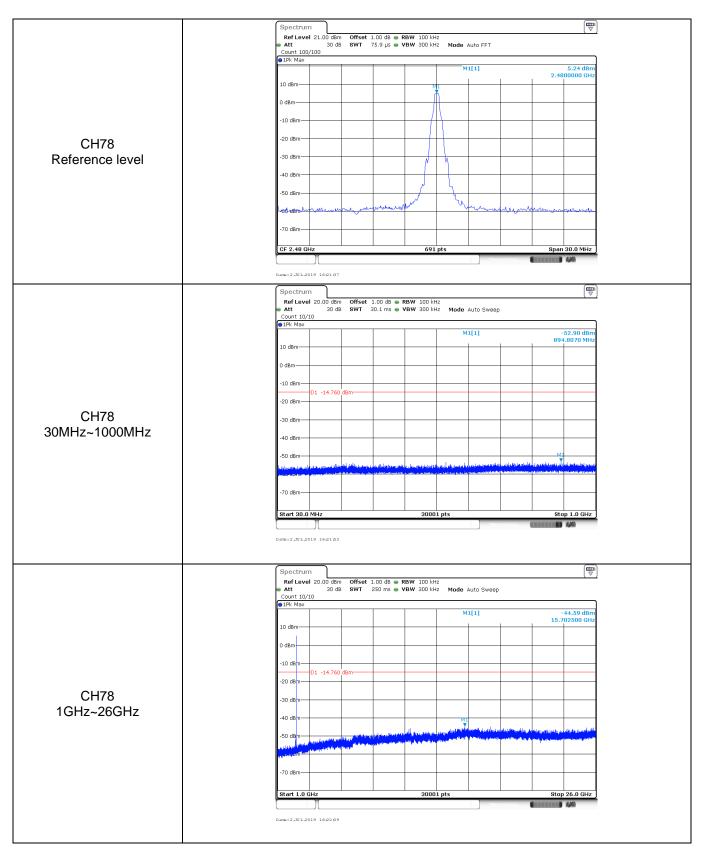
st Item:	Band edge		Modu	llation	type:		8DF	SK
	Att     Count     Dept	evel 20.00 dBm 30 dB 500/500	Offset 1.00 dE SWT 1.1 ms				•	4.43 dBm 2.401910,GHz
	10 dBr 0 dBm -10 dB -20 dB -30 dB	mD1 -15.570 dB	3m		M2[	1]		2.401910.012 -52.02 dBm 2.400000 BHz
CH00 No hopping mode	-40 de -50 de -60 de -70 de	m m m	-notesta and -	Aurona Maria		an and a start and a start a st	M3	
	Marke	Ref         Trc           1         1           1         1           1         1	X-value 2.40191 GHz 2.4 GHz 2.39 GHz 2.31 GHz 2.399768 GHz	Y-value 4.43 -52.02 -56.92 -55.91	dBm dBm dBm dBm	in	S Function Re	top 2.405 GHz esult
	Spec	UL.2019 16:31:32	Offset 1.00 dB	• RBW 1001	Hz	Measuri	DO	<b>₩</b>
	Att     Count     Count     To den     O dBm	500/500 Max	SWT 1.1 ms	• VBW 3001	Hz Mode Au	1]		2.89 dBm 2.404930 GHz -53.52 dBm 2.400000 gw
	-10 d8 -20 d8 -30 d8	mD1 -17.110 dB	3m					
CH00 Hopping mode	-40 dB -50 dB -60 dB -70 dB	m /w////////////////////////	handerstanders	h-m-qlonutne-ndl	madrawet in the second	rolline alon	M3	Me
	Marke Type MM M2 M42	Ref         Trc           1         1           1         1           1         1	X-value 2.40493 GHz 2.4 GHz 2.39 GHz 2.31 GHz	Y-value 2.89 -53.52 -56.47 -55.80	JBm JBm JBm JBm	in	S Function Re	top 2.405 GHz əsult
	Spec	UL.2019 16:50:13	2.399768 GHz			Measuri	ng	<b>₩</b>
	🗕 Att	30 dB 500/500 Max	Offset 1.00 dE SWT 56.9 μs		Hz Mode Au	1]		4.37 dBm 2.4801490 GHz
CH78 No hopping mode	0 dBm -10 dB -20 dB	D1 -15.630 dE	Jm		M2[	1]		-57.52 dBm 2.4835000 GHz
	-ao da -bo da /50 da -60 da	m	M2994	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	****	1.054 ct		
	Marke	2.478 GHz -   Ref   Trc	X-value 2.480149 GHz	Y-value		in	Function Re	Stop 2.5 GHz esult
	MS M3 M-	1	2.4835 GHz 2.4835 GHz 2.5 GHz 2.4839304 GHz	-57.52	dBm dBm	Measuri		49

#### Report No.: CHTEW19070046

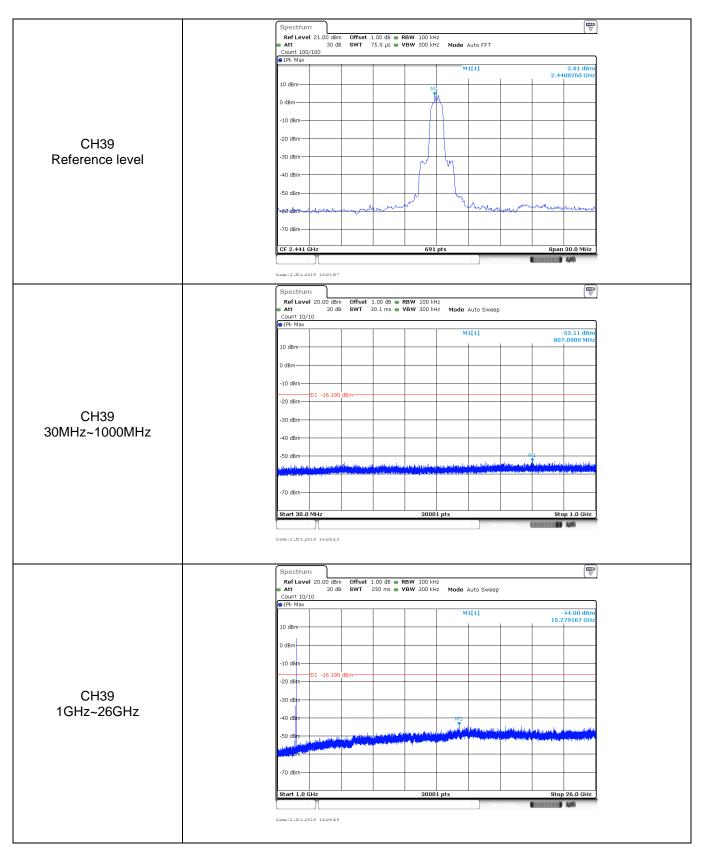
	Spectrum Ref Level Att	20.00 dBm			BW 100 kHz BW 300 kHz	Mode Auto Fi	T		
CH78 Hoppig mode	Count 500/ Irk Max 10 dBm -10 dBm -10 dBm	/500	M2 X-value 2.478175 2.4893	GHz GHz GHz GHz GHz	BW 300 kHz	M1[1] M2[1] M2[1] M2 M2 M2 M2 M2 M2 M2 M2 M2 M2		2.4	top 2.5 GHz

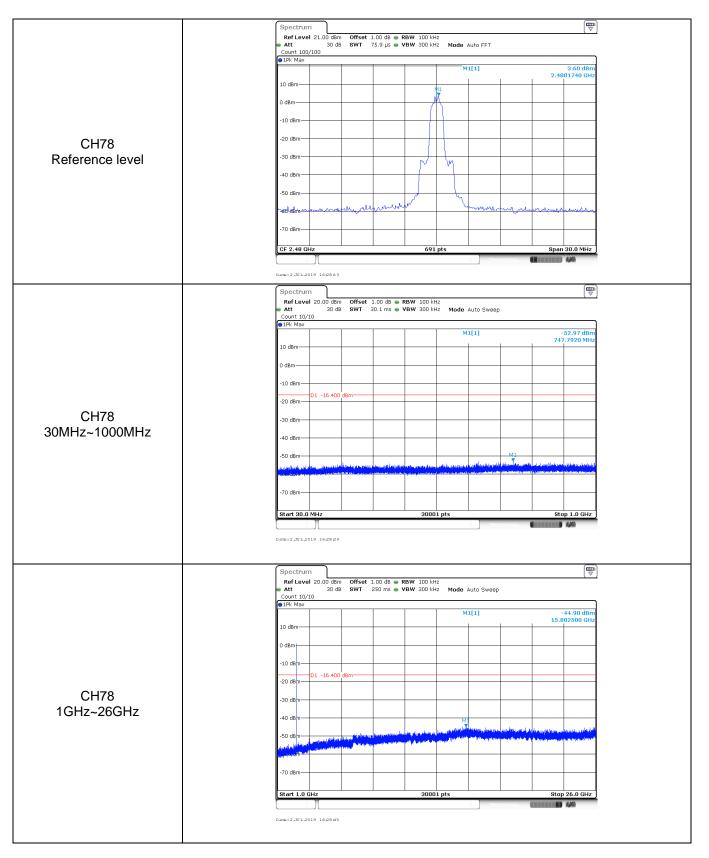
CH00 CH00	est Item:	SE		Μ	odula	ation t	ype:		G	FSK
CH00 eference level										E C
CH00 eference level			Att					uto FFT		
CH00 eference level										
CH00 eference level							м	u[1]	I	5.76 dBi 2.4020000 GH
CH00 eference level						2				
CH00 eference level			0 dBm							
CH00 eference level			-10 dBm							
CH00 MHz-1000MHz	CHOO		-20 dBm							
CH00 MHz~1000MHz			-30 dBm				4			
CH00 MHz~1000MHz	Reference level		-40 dBm							
CH00 MHz-1000MHz			-50 dBm			l v	<u> </u>			
CH00 MHz~1000MHz			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and	mont	r	July	untryfu	Mr. Market	Manan
CH00 MHz-1000MHz			-70 dBm							
CH00 MHz-1000MHz			CE 2 402 GHz			691	nts			Span 30.0 MHz
CH00 MHz-1000MHz						051	pes	Measu	ring	
CH00 MHz~1000MHz			Date:2.JUL.2019 16	6:17:18						
CH00 MHz~1000MHz										
CH00 MHz~1000MHz					1 00 40 - 1					
CH00 MHz~1000MHz			👄 Att	30 dB SWT	30.1 ms 👄 '	VBW 300 kH	z Mode	Auto Sweep		
CH00 MHz~1000MHz							м	u[1]		-53.58 dBi
CH00 MHz~1000MHz			10 dBm							631.5900 MH
CH00 MHz~1000MHz			0 dBm							
CH00 MHz~1000MHz			-10 dBm							
CH00 MHz~1000MHz         30 dm			D1 -	14.240 dBm						
MHz~1000MHz         40 dBm         40 dBm         10	CH00									
CH00 GHz~26GHz										
CH00 GHz~26GHz			-40 dBm							
Start 30.0 MHz         30001 pts         Stor           Dam: 22.012.2019 1647.04         Dam: 22.012.2019 1647.04         Dam: 22.012.2019 1647.04           Spectrum         Ref Level 20.00 dBm Offset 1.00 dB @ RBW 100 kHz Att 30 dB WYT 250 ms @ VBW 300 kHz         Mode Auto Sweep           Court 10/10         Dam: 20.00 dBm Offset 1.00 dB @ RBW 100 kHz         Mode Auto Sweep           Court 10/10         Dam: 20 dB m Offset 1.00 dB @ RBW 100 kHz         Mode Auto Sweep           Court 10/10         Dam: 20 dB m Offset 1.00 dB m			-50 dBm	ata at Julian which can be		مراجلين فراعام فل	a data da a da a da a da a da a da a da	M2 J. Local Republic	م المراجع الم	Matteries Description of the
Start 30.0 MHz         30001 pts         Stor           Dam: 22.012.2019 1647.04         Dam: 22.012.2019 1647.04         Dam: 22.012.2019 1647.04           Spectrum         Ref Level 20.00 dBm Offset 1.00 dB @ RBW 100 kHz Att 30 dB WYT 250 ms @ VBW 300 kHz         Mode Auto Sweep           Court 10/10         Dam: 20.00 dBm Offset 1.00 dB @ RBW 100 kHz         Mode Auto Sweep           Court 10/10         Dam: 20 dB m Offset 1.00 dB @ RBW 100 kHz         Mode Auto Sweep           Court 10/10         Dam: 20 dB m Offset 1.00 dB m			-	an dents Middan y consul y in			dayah yang kana kana kata da	a na shekara da katalikan kudir	belien verklen die erze viereite	a na an
CH00 GHz~26GHz			-70 dBm							
CH00 GHz~26GHz			Start 30.0 MHz			3000	1 pts			Stop 1.0 GHz
Spectrum         Ref Level 20.00 dBm         Offset 1.00 dB         RBW 100 kHz         Mode Auto Sweep           Count 10/10         Image: Spectrum         Ima								Measu	ring 💵	1991 - Carlos Ca
CH00         GBr         Offset 1.00 dB • RBW 100 kHz         Mode Auto Sweep           Count 10/10         • IPk Max         • M1[1]         • · · · · · · · · · · · · · · · · · · ·			Date:2.JUL.2019 16	6:17:34						
CH00         GBr         Offset 1.00 dB • RBW 100 kHz         Mode Auto Sweep           Count 10/10         • IPk Max         • M1[1]         • · · · · · · · · · · · · · · · · · · ·		<b></b>	<u>(</u>	<u></u>						( <b>-</b>
CH00 GHz~26GHz			Ref Level 20.0	00 dBm Offset	1.00 dB 👄 I	RBW 100 kH	z			
CH00 GHz~26GHz			Count 10/10	30 dB <b>SWT</b>	250 ms 👄 🕻	VBW 300 kH	z Mode /	uto Sweep		
CH00 GHz~26GHz			THK Max				м	I[1]		-44.17 dBi 15.856667 GH
CH00 GHz~26GHz			10 dBm							10.00007 GP
CH00 GHz~26GHz			0 dBm							
CH00 GHz~26GHz				14.040 d2-						
GHz~26GHz				14.240 dBm						
GHz~26GHz			-30 dBm							
	1GHz~26GHz						101			
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-70 dBm										
			-70 dBm							
			Start 1.0 GHz	1	1	3000	1 pts			Stop 26.0 GHz
Datu:2.201.2019 1617:50								Measu	ring	4/4



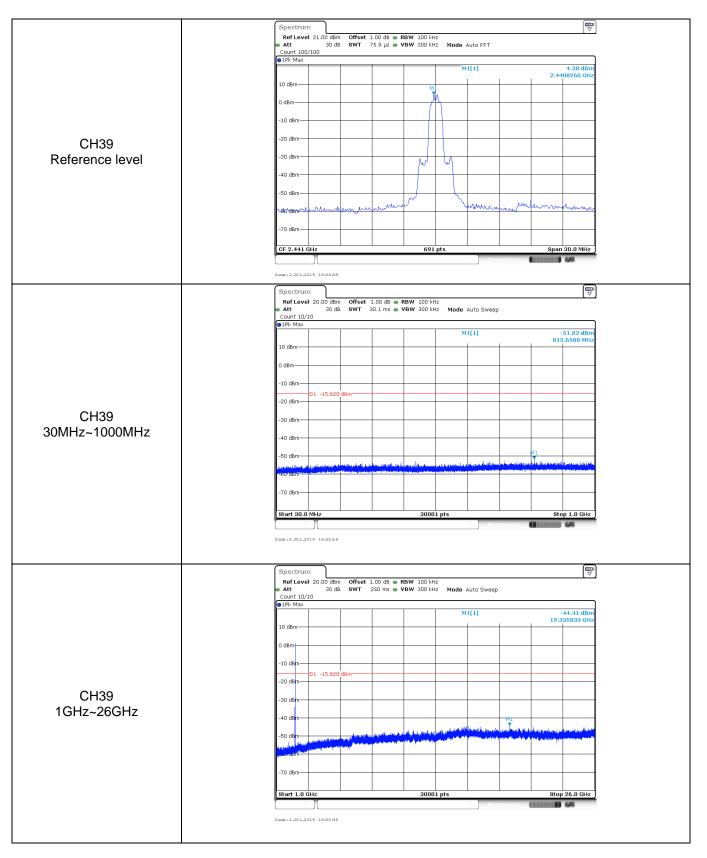


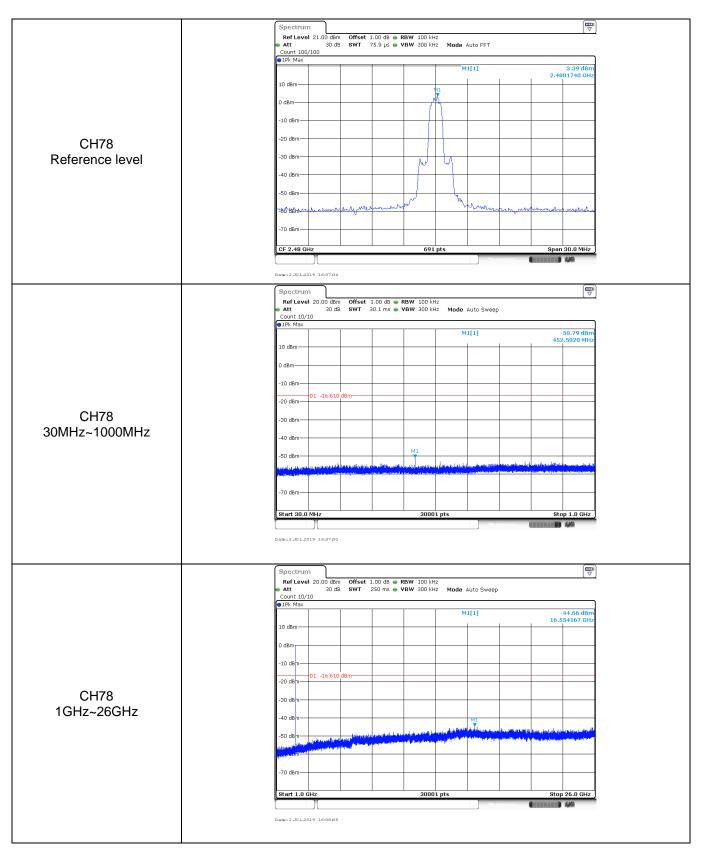
t Item:	SE		Modula	ation ty	/pe:		π/4D0	QPSK
		Spectrum						
		RefLevel 21.00 dBm Att 30 dB	Offset 1.00 dB		Mode Auto FET			
		Count 100/100			House Hate III			
					M1[1]		2.40	3.78 dBm )18260 GHz
		10 dBm		M		-	- 2.11	
		0 dBm						
		-10 dBm						
CH00		-20 dBm						
Reference level		-30 dBm			m			
		-40 dBm						
		-50 dBm		M	- Un -		-	
		~50 dBm ~~~~~~~~~~~~~~~~~~~~~~~	munum	w)"	Merilino	ner an	maraanar	antar
		-70 dBm						
		CF 2.402 GHz		691 pt				30.0 MHz
				041 hr	.s	easuring	apar	
		Data:2.JUL.2019 16:24:10						
		Spectrum						
		RefLevel 20.00 dBm Att 30 dB	Offset 1.00 dB ● SWT 30.1 ms ●		Mode Auto Swe	ер		
		Count 10/10 Pk Max						
					M1[1]		. 97	-52.16 dBm 5.8020 MHz
		10 dBm						
		0 dBm						
		-10 dBm						
		-20 dBm	IBm-					
CH00		-30 dBm						
0MHz~1000MHz		-40 dBm						
		-50 dBm						M1
		labitentially partition	and at so the term as the part of the	و المادر بسير ها، به	te any first second as a first second second		an ang ang ang ang ang ang ang ang ang a	that supported
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		-70 dBm						
		Start 30.0 MHz		30001 p	ots			op 1.0 GHz
					M	easuring		4,40
		Date:2.JUL.2019 16:24:26						
								_
		Spectrum Ref Level 20.00 dBm	Offset 1.00 dB 👄 I	RBW 100 kHz				
		Att 30 dB Count 10/10	SWT 250 ms 👄	VBW 300 kHz	Mode Auto Swee	эр		
		●1Pk Max			M1[1]			-44.31 dBm
		10 dBm		+		-	20.0	061667 GHz
		0 dBm						
		-10 dgm						
		D1 -16.220 c	IBm-	+				
CH00		-20 dBm-						
		-30 dBm		+				
1GHz~26GHz		-40 dBm		+		INT.		
		-50 dBm	with the second second		a construction of the second structure of	ephonaticality Angeonetrapping	al den stelsand Agenteren stel	las itratificat
		Cardina and Car	A REAL PROPERTY OF A REAL PROPER					
		-70 dBm						
		, o dom						
		Start 1.0 GHz		30001 p	ots	easurine -	Stop	26.0 GHz





est Item:	SE		Modu	lation type		8DPSK
		Spectrum				
		Ref Level 21.00 dBm Att 30 dB Count 100/100	Offset 1.00 dB SWT 75.9 μs (	VBW 300 kHz Mode	Auto FFT	
		IPk Max		_	M1[1]	4.07 dBm
		10 dBm		M1	+	2.4021740 GHz
		0 dBm		, Å		
		-10 dBm				
		-20 d8m				
CH00		-30 dBm				
Reference level		-40 dBm		MM		
		-50 dBm	ine and	www.	your engine	anturbos . alman
		-160-dBmllinen conclineder				
		-70 dBm				
		CF 2.402 GHz		691 pts	Measuring	Span 30.0 MHz
		Date:2.JUL.2019 16:31:56				
		Spectrum Ref Level 20.00 dBm		- PRUL 402 MI-		
		Att 30 dB Count 10/10	Offset 1.00 dB SWT 30.1 ms	RBW 100 kHz VBW 300 kHz Mode	Auto Sweep	
		e 1Pk Max			M1[1]	-53.03 dBm
		10 dBm			+	705.6960 MHz
		0 dBm				
		-10 dBm				
		-20 dBm	dBm			
CH00		-30 dBm				
30MHz~1000MHz		-40 dBm				
		-50 dBm			м	
		and a file of press of the set of the set	Shawad yaya daridhiraa	and the state of the	and the state of the	ي هو روسه الاستانا المالية وموجودها مخرج أمريك (1992) مواريد وماريخ مسابق المراجعة المربوع مسابقها وال
		-70 dBm				
		Start 30.0 MHz		30001 pts	Measuring	Stop 1.0 GHz
		Data:2.JUL.2019 16:32:12				
		Spectrum Ref Level 20.00 dBm	Offset 1.00 dB	BRW 100 kils		
		Att 30 dB		VBW 300 kHz Mode	Auto Sweep	
		● 1Pk Max			M1[1]	-44.67 dBm
		10 dBm			+ +	15.805833 GHz
		0 dBm				
		-10 dem				
		-20 dBm	dBm			
CH00		-30 dBm				
1GHz~26GHz		-40 dBm			via	
		-50 dBm		he had a second second been	A station of the second	
			NATE A		C. CONTRACTOR OF THE OWNER	an a
		-70 dBm				
		-/ 0 upin				
		Start 1.0 GHz		30001 pts	Measuring	Stop 26.0 GHz





# 5.11. Spurious Emissions (radiated)

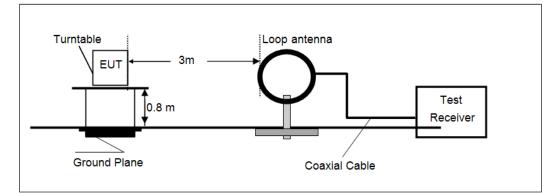
# <u>LIMIT</u>

### FCC CFR Title 47 Part 15 Subpart C Section 15.209

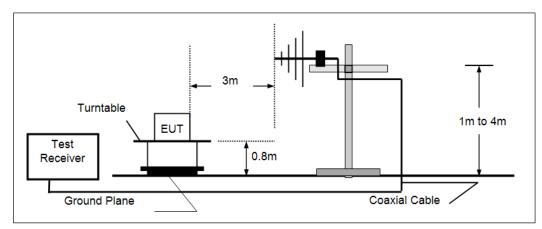
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

# **TEST CONFIGURATION**

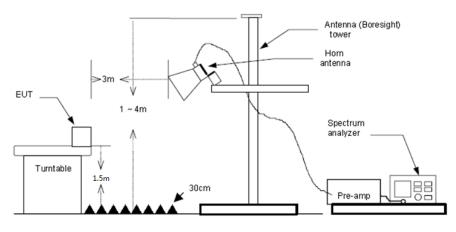
Below 30 MHz



#### > 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 10<sup>th</sup> harmonic: RBW=1 MHz, VBW=3 MHz Peak detector for Peak value RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

☑ Passed □ Not Applicable

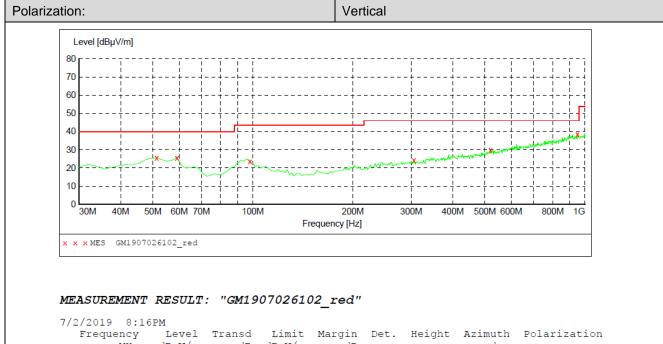
#### Note:

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

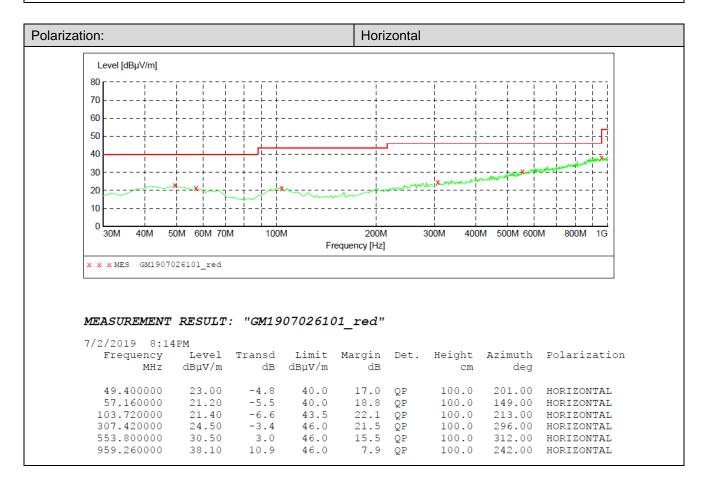
#### ➢ 9 kHz ~ 30 MHz

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





MHz	dBµV/m	dB	dBµV/m	dB		CM	deg		
51.340000	25.60	-4.9	40.0	14.4	QP	100.0	49.00	VERTICAL	
59.100000	25.60	-5.9	40.0	14.4	QP	100.0	77.00	VERTICAL	
97.900000	23.70	-6.9	43.5	19.8	QP	100.0	292.00	VERTICAL	
305.480000	24.10	-3.4	46.0	21.9	QP	100.0	292.00	VERTICAL	
518.880000	29.80	2.4	46.0	16.2	QP	100.0	107.00	VERTICAL	
949.560000	38.40	10.8	46.0	7.6	QP	100.0	350.00	VERTICAL	



	CH00									
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector			
1920.906	33.34	-5.59	27.75	74.00	46.25	Vertical	PK			
4696.843	31.23	6.36	37.59	74.00	36.41	Vertical	PK			
6523.968	30.18	12.67	42.85	74.00	31.15	Vertical	PK			
8008.875	30.13	18.20	48.33	74.00	25.67	Vertical	PK			
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector			
2662.625	38.26	-0.13	38.13	74.00	35.87	Horizontal	PK			
4198.937	31.41	3.81	35.22	74.00	38.78	Horizontal	PK			
8029.437	31.37	18.23	49.60	74.00	24.40	Horizontal	PK			
8564.062	31.91	18.69	50.60	74.00	23.40	Horizontal	PK			

# > 1 GHz ~ 25 GHz

CH39										
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector			
1472.937	34.57	-5.62	28.95	74.00	45.05	Vertical	PK			
4326.718	31.87	4.08	35.95	74.00	38.05	Vertical	PK			
6457.875	30.09	12.00	42.09	74.00	31.91	Vertical	PK			
9179.468	31.53	18.69	50.22	74.00	23.78	Vertical	PK			
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector			
1480.281	33.99	-5.62	28.37	74.00	45.63	Horizontal	PK			
4334.062	30.68	4.16	34.84	74.00	39.16	Horizontal	PK			
5422.406	31.51	8.74	40.25	74.00	33.75	Horizontal	PK			
6607.687	30.60	13.17	43.77	74.00	30.23	Horizontal	PK			

CH78										
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector			
1706.468	35.08	-6.08	29.00	74.00	45.00	Vertical	PK			
4290.000	32.56	3.78	36.34	74.00	37.66	Vertical	PK			
5945.281	29.65	10.20	39.85	74.00	34.15	Vertical	PK			
7362.625	30.70	16.25	46.95	74.00	27.05	Vertical	PK			
Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Detector			
3195.781	33.83	0.82	34.65	74.00	39.35	Horizontal	PK			
4959.750	34.94	7.58	42.52	74.00	31.48	Horizontal	PK			
5921.781	29.55	10.08	39.63	74.00	34.37	Horizontal	PK			
8064.687	30.66	18.29	48.95	74.00	25.05	Horizontal	PK			

Remark:

1. Final Level =Receiver Read level + Antenna 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.

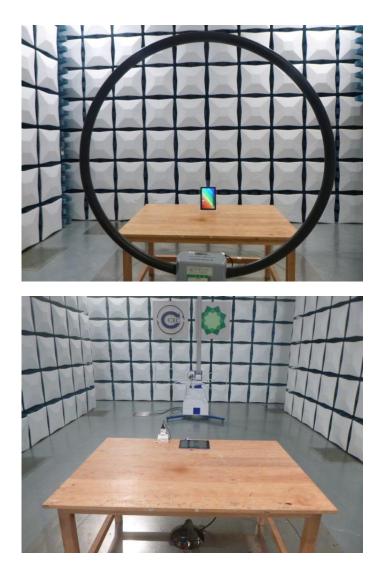
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

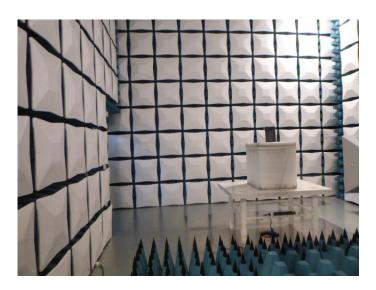
# 6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



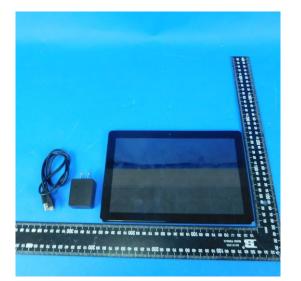
#### **Radiated Emissions**



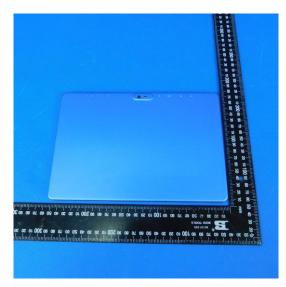


# 7. EXTERANAL AND INTERNAL PHOTOS

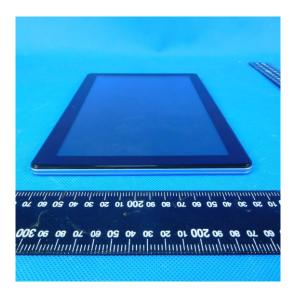
# **External Photos**









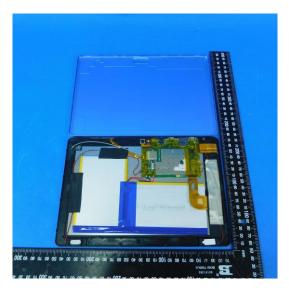


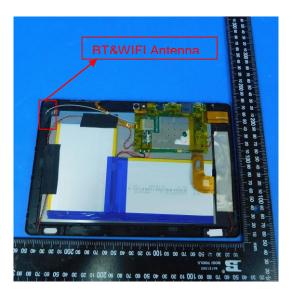


Shenzhen Huatongwei International Inspection Co., Ltd.



### Internal Photos













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