

TEST REPORT			
Report No:	CHTEW2201010501 Re	eport Verification:	
Project No	SHT2112079903EW		
FCC ID:	2AKSGST700	To 7.755 (1995) Reportion Chitwizzo (1995)	
Applicant's name:	Shanghai Hulu Devices Co., L	td	
Address:	509 Caobao Road, Room 101-2 Shanghai, China	2 Building 9, Xuhui District,	
Test item description:	Smart Wireless Stethoscope		
Trade Mark			
Model/Type reference:	STEMO700		
Listed Model(s)			
Standard:	FCC CFR Title 47 Part 15 Sub	part C Section 15.247	
Date of receipt of test sample	Dec.28, 2021	~	
Date of testing	Dec.29, 2021-Jan.17, 2022		
Date of issue	Jan.19, 2022		
Result	PASS		
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- , ,	-		
Testing Laboratory Name: :	Shenzhen Huatongwei Interna	ational Inspection Co., Ltd.	
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Shenzhen Huatongwei International Inspe			
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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
- <u>ANSI C63.10:2013</u>: American National Standard for Testing Unlicensed Wireless Devices
- KDB 558074 D01 15.247 Meas Guidance v05r02: 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	2022-01-19	Original

### 2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result
5.1	Antenna Requirement	15.203/15.247 (c)	PASS
5.2	AC Conducted Emission	15.207	PASS
5.3	Peak Output Power	15.247 (b)(1)	PASS
5.4	20 dB Bandwidth	15.247 (a)(1)	PASS
5.5	99% Occupied Bandwidth	-	PASS <sup>*1</sup>
5.6	Carrier Frequency Separation	15.247 (a)(1)	PASS
5.7	Hopping Channel Number	15.247 (a)(1)	PASS
5.8	Dwell Time	15.247 (a)(1)	PASS
5.9	Duty Cycle Correction Factor	-	PASS <sup>*1</sup>
5.10	Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	PASS
5.11	Conducted Band Edge and Spurious Emission	15.247(d)/15.205	PASS
5.12	Radiated Band Edge Emission	15.205/15.209	PASS
5.13	Radiated Spurious Emission	15.247(d)/15.205/15.209	PASS

Note:

- The measurement uncertainty is not included in the test result.

\*1: No requirement on standard, only report these test data.

### 3. SUMMARY

### 3.1. Client Information

Applicant:	Shanghai Hulu Devices Co., Ltd	
Address:	509 Caobao Road, Room 101-2 Building 9, Xuhui District, Shanghai, China	
Manufacturer:	Shanghai Hulu Devices Co., Ltd	
Address:	509 Caobao Road, Room 101-2 Building 9, Xuhui District, Shanghai, China	

#### 3.2. Product Description

Name of EUT:	Smart Wireless Stethoscope
Trade Mark:	-
Model No.:	STEMO700
Listed Model(s):	-
Power supply:	DC 3.7V
Hardware version:	1.0 '
Software version:	1.0.0

### 3.3. Radio Specification Description

Bluetooth version:	V4.0
Support function <sup>*2</sup> :	EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	SMD Antenna
Antenna gain:	2dBi

Note:

\*2: only show the RF function associated with this report.

### 3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.		
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China		
Connect information:	Phone: 86-755-26715499 E-mail: <u>cs@szhtw.com.cn</u> <u>http://www.szhtw.com.cn</u>		
Qualifications	Туре	Accreditation Number	
Qualifications	FCC	762235	

### 4. TEST CONFIGURATION

#### 4.1. Test frequency list

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

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

#### 4.2. Descriptions of Test mode

Preliminary tests were performed in different data rates and recorded the RF output power in the clause 5.3

Note:

- 1) The manufacturer declare that the maximum power value of the product is set as a default value in the enter test mode software.
- 2) All the test data for each data rate were verified, found <u>8DPSK Modulation</u> which is worse case mode

#### 4.3. Test mode

The engineering test program	was provided and ena	bled to make EUT continuous t	ransmitting.
Modulation / Data Rate			
Test Item	GFSK 1Mbps	π/4DQPSK 2Mbps	8DPSK 3Mbps
Conducted test item	$\checkmark$	✓	$\checkmark$
Radiated test item	-	-	$\checkmark$

 For radiated test item, the worst mode data rate 3Mbps was reported only, because this data rate has the highest RF output power at preliminary tests.

The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

#### 4.4. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?					
✓					
Item	Equipement	Trade Name	Model No.	FCC ID	Power cord
1	Adapter	-	SICO More 3	-	-
2					

### 4.5. Testing environmental condition

Туре	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

#### 4.6. Measurement uncertainty

Test Item	Measurement Uncertainty
AC Conducted Emission (150kHz~30MHz)	3.00 dB
Radiated Emission (30MHz~1000MHz	4.36 dB
Radiated Emissions (1GHz~25GHz)	5.10 dB
Peak Output Power	0.77dB
Power Spectral Density	0.77dB
Conducted Spurious Emission	0.77dB
6dB Bandwidth	70Hz for <1GHz 130Hz for >1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

### 4.7. Equipment Used during the Test

•	Conducted E	mission					
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
•	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2021/9/14	2022/9/13
•	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2021/9/17	2022/9/16
•	Pulse Limiter	R&S	HTWE0033	ESH3-Z2	100499	2021/9/13	2022/9/12
•	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLE X_142	EF-NM- BNCM-2M	2021/9/17	2022/9/16
•	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

•	Radiated emi	ssion-6th test sit	te				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2022/09/29
•	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2021/9/14	2022/9/13
•	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2022/04/05
•	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2022/04/05
•	Pre-Amplifer	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2021/11/5	2022/11/4
•	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2021/02/26	2022/02/25
•	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2021/02/26	2022/02/25
•	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

•	Radiated em	ission-7th test s	ite				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	N/A	2018/09/27	2022/09/26
•	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2021/9/13	2022/9/12
•	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
•	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/4/27	2023/4/27
•	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2021/11/5	2022/11/4
•	Broadband Pre- amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2021/03/05	2022/03/04
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
•	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
•	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
•	RF Connection Cable	HUBER+SUHNER	HTWE0121-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
•	Test Software	Audix	N/A	E3	N/A	N/A	N/A

Last Cal. Date (YY-MM-DD) Next Cal. Date (YY-MM-DD) Test Equipment Equipment No. Used Model No. Serial No. Manufacturer Signal and spectrum Analyzer R&S HTWE0242 FSV40 100048 2021/9/13 2022/9/12 Signal & Spectrum R&S HTWE0262 FSW26 103440 2021/9/13 2022/9/12 • Analyzer Spectrum • Agilent HTWE0286 N9020A MY50510187 2021/9/13 2022/9/12 Analyzer Radio communication R&S HTWE0287 CMW500 137688-Lv 2021/9/13 2022/9/12 tester • Test software Tonscend N/A JS1120 N/A N/A N/A

## 5. TEST CONDITIONS AND RESULTS

#### 5.1. Antenna Requirement

#### <u>Requirement</u>

#### FCC CFR Title 47 Part 15 Subpart C Section 15.203:

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

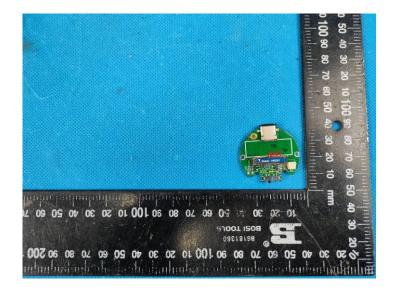
#### FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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 antenna type is a SMD Antenna, the directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



#### 5.2. AC Conducted Emission

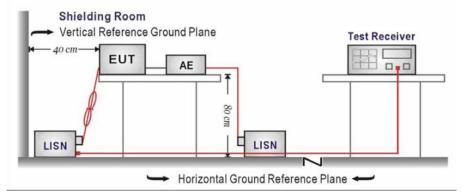
#### LIMIT

#### FCC CFR Title 47 Part 15 Subpart C Section 15.207

	Limit (dBuV)				
Frequency range (MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			

\* Decreases with the logarithm of the frequency.

#### **TEST CONFIGURATION**



#### TEST PROCEDURE

- 1. The EUT was setup according to ANSI C63.10 requirements.
- 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.
- 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.

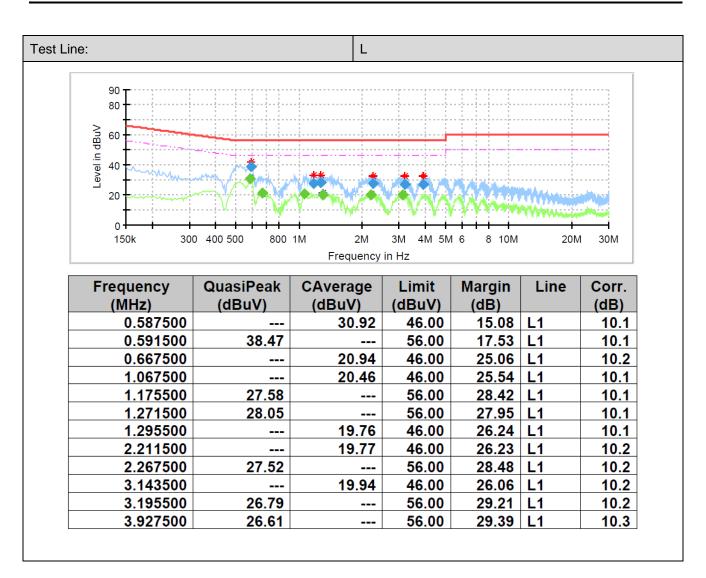
#### TEST MODE:

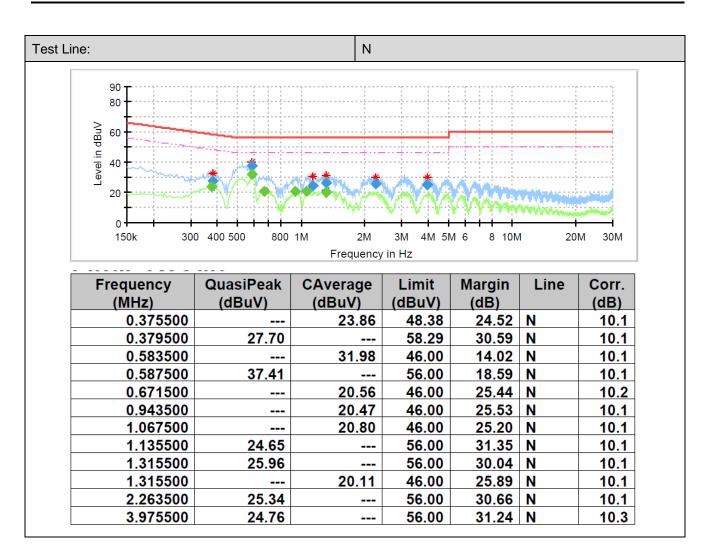
Please refer to the clause 4.3

#### TEST RESULT

☑ Passed □ Not Applicable

Shenzhen Huatongwei International Inspection Co., Ltd.





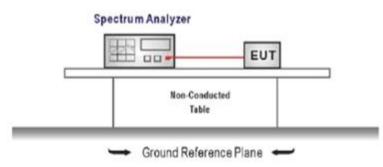
#### 5.3. Peak Output Power

#### <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 4.3

#### TEST RESULT

☑ Passed □ Not Applicable

#### TEST Data

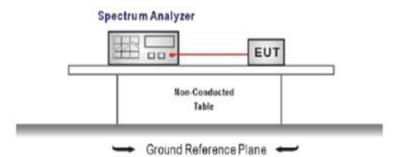
Please refer to appendix A on the appendix report

#### 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
- Use the following spectrum analyzer settings: Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel RBW ≥ 1% of the 20 dB bandwidth, 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 4.3

#### TEST RESULT

🛛 Passed

Not Applicable

#### TEST Data

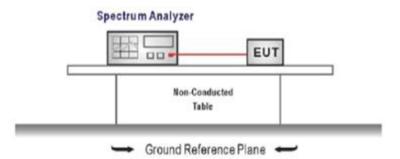
Please refer to appendix B on the appendix report

#### 5.5. 99% Occupied Bandwidth

#### <u>LIMIT</u>

N/A

#### **TEST CONFIGURATION**



#### TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency =channel center frequency Span≥1.5 x OBW RBW = 1%~5%OBW VBW ≥ 3 × RBW Sweep time= auto couple Detector = Peak Trace mode = max hold Place the radio in continuous transmit mode, of

3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.

#### TEST MODE:

Please refer to the clause 4.3

#### TEST RESULT

☑ Passed □ Not Applicable

#### TEST Data

Please refer to appendix C on the appendix report

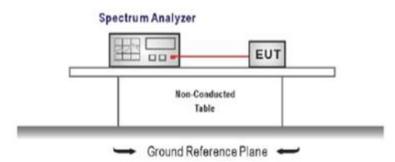
#### 5.6. Carrier Frequencies Separation

#### <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 25kHz 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**



#### 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 = wide enough to capture the peaks of two adjacent channels RBW  $\ge$  1% of the span, 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 4.3

#### TEST RESULTS

☑ Passed □ Not Applicable

#### TEST Data

Please refer to appendix D on the appendix report

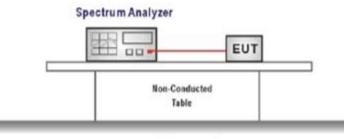
#### 5.7. Hopping Channel Number

#### 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**



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 = the frequency band of operation RBW ≥ 1% of the span, VBW ≥ RBW Sweep = auto, Detector function = peak, Trace = max hold
   Measure and record the results in the test report.

TEST MODE: Please refer to the clause 4.3

#### **TEST RESULTS**

☑ Passed □ Not Applicable

#### TEST Data

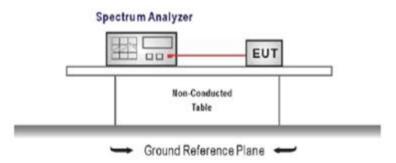
Please refer to appendix E on the appendix report

#### 5.8. 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 4.3

#### TEST RESULTS

☑ Passed □ Not Applicable

#### TEST Data

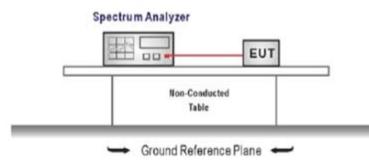
Please refer to appendix F on the appendix report

### 5.9. Duty Cycle Correction Factor (DCCF)

#### <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
- 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, Trigger mode
- 4. Measure and record the duty cycle data

#### TEST MODE:

Please refer to the clause 4.3

#### TEST Data

Please refer to appendix G on the appendix report

#### 5.10. Pseudorandom Frequency Hopping Sequence

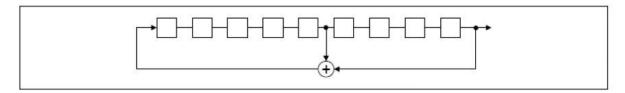
#### <u>LIMIT</u>

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	78	1	73	75 77
٦				 				 	
				1					
						1		1	
				 l	∟.			 L	

Each frequency used equally one the average by each transmitter.

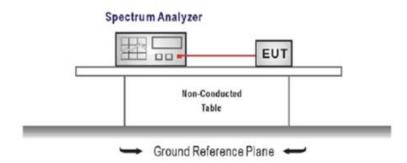
The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

#### 5.11. Conducted Band edge and Spurious Emission

#### <u>LIMIT</u>

**FCC CFR Title 47 Part 15 Subpart C Section15.247 (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. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Emission level measurement

Set the center frequency and span to encompass frequency range to be measured

RBW = 100 kHz, VBW  $\ge$  3 x RBW

Detector = peak, Sweep time = auto couple, Trace mode = max hold

Allow trace to fully stabilize

Use the peak marker function to determine the maximum amplitude level.

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
- 4. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

#### TEST MODE:

Please refer to the clause 4.3

#### TEST RESULT

☑ Passed □ Not Applicable

### TEST Data

Please refer to appendix H on the appendix report

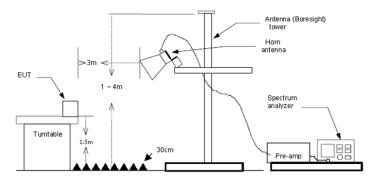
#### 5.12. Radiated Band edge Emission

#### 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 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.
- 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 themaximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
- 5. Use the following spectrum analyzer settings:
  - a) Span shall wide enough to fully capture the emission being measured
  - b) Set RBW=100kHz for <1GHz, VBW=3\*RBW, Sweep time=auto, Detector=peak, Trace=max hold
  - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement: use duty cycle correction factor method (DCCF)

Averager level = Peak level + DCCF

#### TEST MODE:

Please refer to the clause 4.3

#### TEST RESULT

Note:

- 1) Level= Reading + Factor; Factor = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level- Limit
- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m).

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Test channe	el:	CH00		Pola	arity		Hori	zontal	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	39.76	27.96	5.43	37.56	35.59	74.00	-38.41	Peak
2	2390.03	39.86	27.72	5.53	37.45	35.66	74.00	-38.34	Peak
Test channe	el:	CH00		Pola	arity		Vert	ical	
Mark	Frequency MHz	/ Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	39.74	27.96	5.43	37.56	35.57	74.00	-38.43	Peak
2	2390.03	39.63	27.72	5.53	37.45	35.43	74.00	-38.57	Peak

Test chann	el:	CH78		Ро	larity		Но	rizonta	l
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	43.23	27.43	5.64	37.26	39.04	74.00	-34.96	Peak
2	2500.00	39.16	27.40	5.66	37.26	34.96	74.00	-39.04	Peak
Test chann	el:	CH78		Po	larity		Ve	rtical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	2483.50	44.95	27,43	5.64	37.26	40.76	74.00	-33.24	Peak
1	2403.30								

#### 5.13. Radiated Spurious Emission

#### <u>LIMIT</u>

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

Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

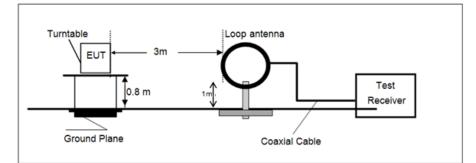
Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40\*log(300/3)= Limit dBuV/m @300m +80,

Limit dBuV/m @3m = Limit dBuV/m @30m +40\*log(30/3)= Limit dBuV/m @30m + 40.

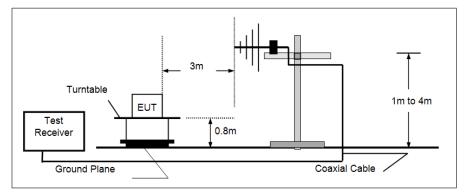
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

#### **TEST CONFIGURATION**

➢ 9 kHz ~ 30 MHz

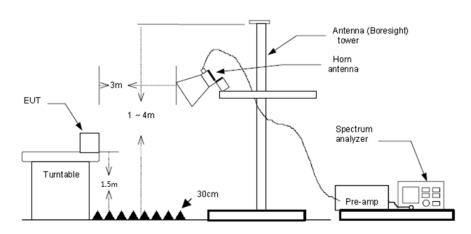


> 30 MHz ~ 1 GHz



> Above 1 GHz

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#### TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10 .
- 2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 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
  - a) Span shall wide enough to fully capture the emission being measured;
  - b) 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 detector is 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.

c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement: use duty cycle correction factor method (DCCF)

Averager level = Peak level + DCCF

#### TEST MODE:

Please refer to the clause 4.3

#### TEST RESULT

☑ Passed □ Not Applicable

Note:

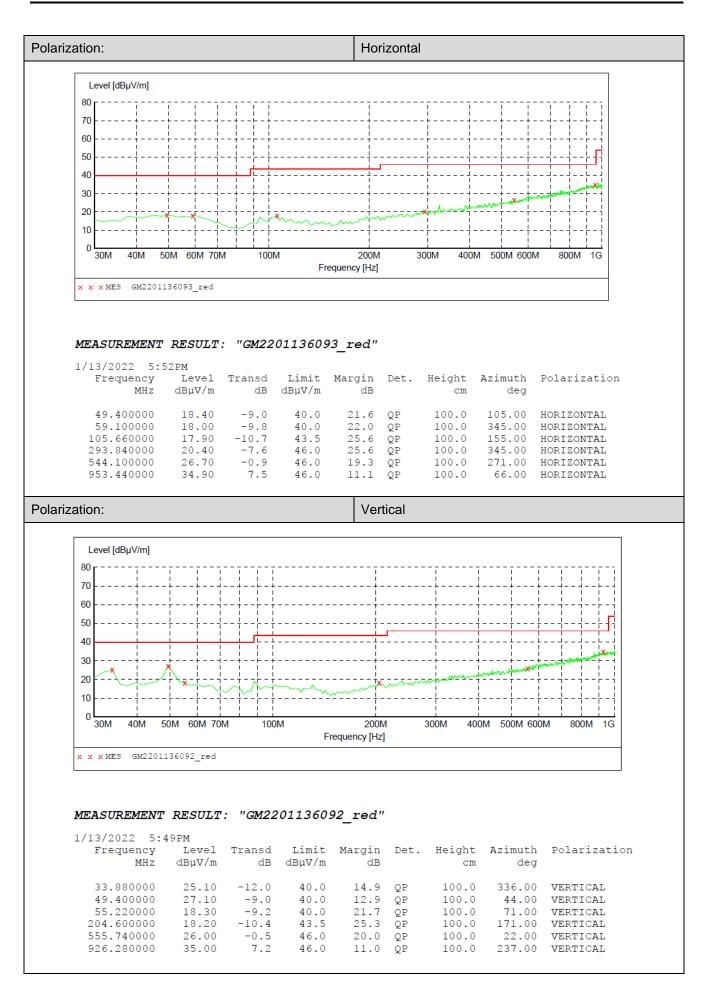
- 1) Level= Reading + Factor/Transd; Factor/Transd = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level- Limit
- Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

#### TEST DATA FOR 9 kHz ~ 30 MHz

The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

#### TEST DATA FOR 30 MHz ~ 1000 MHz

Have pre-scan all test channel, found CH39 which it was worst case, so only show the worst case's data on this report.



Test channel		CH00			Polarit	t <b>y</b>		Horizon	tal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1327.69	48.99	26.17	4.07	36.37	42.86	74.00	-31.14	Peak
2	1666.72	49.07	25.10	4.57	37.18	41.56	74.00	-32.44	Peak
3	5742.47	37.22	31.90	9.57	34.84	43.85	74.00	-30.15	Peak
4	8051.03	32.33	37.20	11.04	33.32	47.25	74.00	-26.75	Peak
Test channel		CH00			Polarit	y		Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
Mark 1		0							Remark Peak
	MHz	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	MHz 1329.15	dBuV/m 49.90	dB 26.18	dB 4.07	dB 36.37	dBuV/m 43.78	dBuV/m 74.00	limit -30.22	Peak

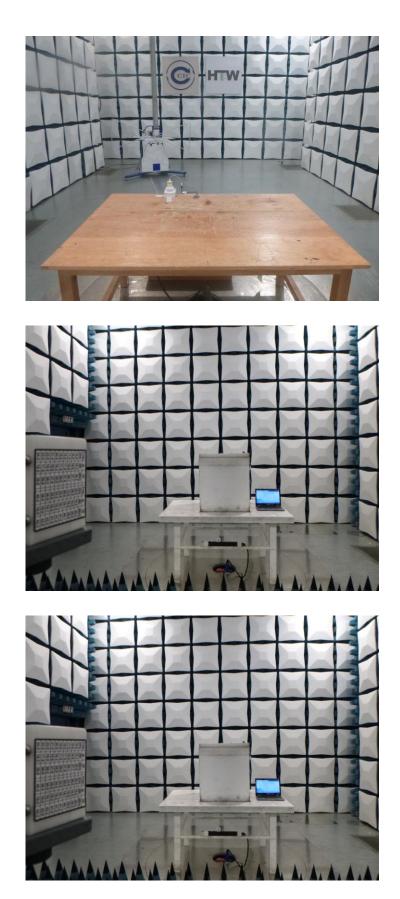
#### <u> TEST DATA FOR 1 GHz ~ 25 GHz</u>

Test channe	I	CH39			Polar	ity		Horizo	ontal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1327.69	48.99	26.17	4.07	36.37	42.86	74.00	-31.14	Peak
2	1666.72	49.07	25.10	4.57	37.18	41.56	74.00	-32.44	Peak
3	4974.45	37.13	31.70	8.79	35.21	42.41	74.00	-31.59	Peak
4	8719.52	33.79	37.70	11.97	34.74	48.72	74.00	-25.28	Peak
Test channe	I	CH39			Polar	ity		Vertica	al
Test channe Mark	Frequency MHz	CH39 Reading dBuV/m	Antenna dB	Cable dB	Polar Preamp dB	<b>ity</b> Level dBuV/m	Limit dBuV/m	Vertica Over limit	a <b>l</b> Remark
	Frequency	Reading			Preamp	Level		Over limit	
Mark	Frequency MHz	Reading dBuV/m	dB	dB	Preamp dB	Level dBuV/m	dBuV/m	Over limit -30.22	Remark
Mark 1	Frequency MHz 1329.15	Reading dBuV/m 49.90	dB 26.18	dB 4.07	Preamp dB 36.37	Level dBuV/m 43.78	dBuV/m 74.00	Over limit -30.22	Remark Peak Peak

Test channe		CH78			Polari	ty		Horizor	ntal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1327.69	48.99	26.17	4.07	36.37	42.86	74.00	-31.14	Peak
2	1666.72	49.07	25.10	4.57	37.18	41.56	74.00	-32.44	Peak
3	4881.54	35.76	31.40	8.66	35.18	40.64	74.00	-33.36	Peak
4	8004.46	32.31	37.11	10.91	33.31	47.02	74.00	-26.98	Peak
Test channel		CH78			Polari	ty		Vertica	I
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
Mark 1									Remark Peak
	MHz	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	MHz 1329.15	dBuV/m 49.90	dB 26.18	dB 4.07	dB 36.37	dBuV/m 43.78	dBuV/m 74.00	limit -30.22	Peak

## 6. TEST SETUP PHOTOS

Radiated Emission



AC Conducted Emission



## 7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No. : CHTEW22010105.

### 8. APPENDIX REPORT

# **APPENDIX REPORT**

Project No.	SHT2112079903EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21120799007	Model No.	STETHO700
Start test date	2022-1-13	Finish date	2022-1-13
Temperature	<b>23.4</b> ℃	Humidity	32%
Test Engineer	Xiaoqin Li	Auditor	Xiaodong Zheo

Appendix clause	Test item	Result
A	Peak Output Power	PASS
В	20 dB Bandwidth	PASS
С	99% Occupied Bandwidth	PASS
D	Carrier Frequencies Separation	PASS
E	Hopping Channel Number	PASS
F	Dwell Time	PASS
G	Duty Cycle Correction Factor (DCCF)	PASS
н	Band edge and Spurious Emissions(coducted)	PASS

Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
	00	0.75	0.74		
GFSK	39	1.32	1.31	≤ 30.00	Pass
	78	1.61	1.60		
	00	1.47	1.12		
π/4DQPSK	39	1.95	1.60	≤ 21.00	Pass
	78	2.31	1.96		

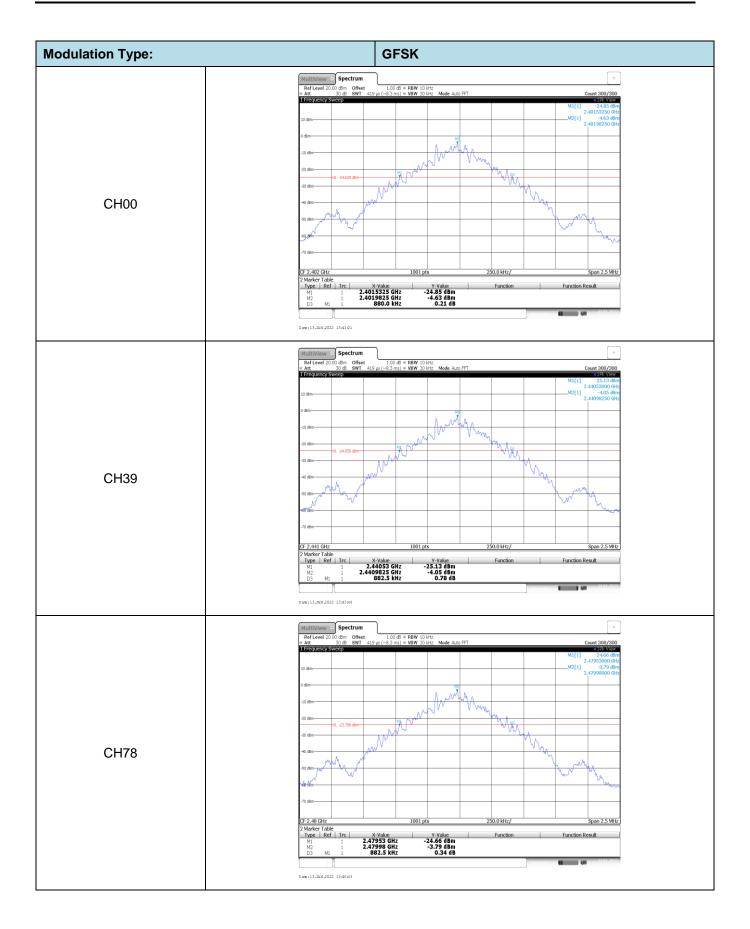
### Appendix A: Peak Output Power

Modulation Type:	GFSK
	Nultiview = Spectrum
	Ref Level 20:00.d8m         DfRet         1:00 d8 + RBW 1 MHz         Mode Auto FFT         Count 300/300           # Att         30 d6         SWT 4.21 µs (~31 ms) = VBW 3 MHz         Mode Auto FFT         Count 300/300           T Frequency Sweep         #16W / Nem
	10 dim 2-40183020 GHz
	M3
	0 dan
	-12 dbn
	-22 dbn
CH00	-20 dbn
	-4: dan
	51 dbi
	40.dbn
	-71 de=
	CF 2.402 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz
	Date:13.3M.2022 1341.39
	MultiView E Spectrum
	Ref Level 20.00 dbm         Offset         1.00 db         RBW 1 MHz           # Att         30 db         SWI         4.21 µs (~31 ms) = VBW 3 MHz   Count 300/300
	1 Frequency Sweep #112 View M1[1] 11.22 dbm 2,44082520 GHz
	20 dan
	D.Gan
	-11 den
	21 dbs
CH39	-31 dbn
	4 80
	51.dec
	40 dbr
	-71 dan
	GF 2.441 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz
	Date:13,374.42
	MultiView         Spectrum         v           Ref Level 20.00 dbm         Offset         1.00 db # RBW 1 MHz         count 300/300           * Att         30 db SWT = 421 µcl < * 0 db SWT = 421 µcl < * 1 MHz         Vew 3 MHz         Count 300/300           # Frequency System         # Interview         # Interview         # Interview
	Contraction of the second
	ນ ຜິກ
	D din
	43 de
	-3 da
CH78	-30 dan
	40 dbs
	51 den
	41.dbn
	77 de:
	CF 2.48 GHz 1001 pts 500.0 kHz/ Spon 5.0 MHz
	U- 2.48 GHZ 1001 pts 300.0 kHZ/ Span 3.0 kHZ

lodulation Type:	π/4DQPSK	
	MultiView 😫 Spectrum	
	Ref Level 20.00_66m         Offset 1.00_06 = RBW 2.14tz           # Att         30.06         SWT 1.01 ms = VSW 5.14tz         Mode Auto Sweep         Count 500/500           I Prequency Sweep         101 ms = VSW 5.14tz         Mode Auto Sweep         16.15tk View	
	Mi[1] 1.47 dbm 2.40199010 GHz	
	10 dBm	
	0 din-	
	1192	
	40 den	
CH00	-30 dbn	
	40 dm	
	50 dan	
	40 dan	
	79 dbn	
	GF 2.402 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz	
	Date:13.48453	
	MultiView 🗄 Spectrum	
	Ref Level 20.00 dBm         Offset 1.00 dB ≈ RBW 210Hz           a Att         30 dB SWT 1.01 ms ≈ WBW 51Hz         Mode Auto Sweep         Count 500/500	
	1 Frequency Sweep	
	10 dan-	
	0 dim	
	31.580	
	48 dm	
CH39	-10 dkn	
Chico	40 dan	
	50 den	
	40 dkn	
	70 dbn	
	OF 2.441 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz	
	Daw:13.JAN 2022 13:52:06	
	MultiView 😂 Spectrum	
	MultiView         Spectrum         v           RefLevel 20:0 dm         offset 1:0:0 ds         RBW 2 MHz         Count 500/500           • Att         30:0 ds         SWT 1:01 ms = VBW 5 MHz         Mode Auto Sweep         Count 500/500           • I requery Swccp         #154 Wes         100 ms = VBW 5 MHz         Mode Auto Sweep         Count 500/500	
	2.47987510 Gtz	
	10 dám	
	0.00	
	31.851	
	40 dm	
CH78	-10 dan	
	40 @.0.	
	50 dén	
	40 dan	
	-70 dbm-	
	CF 2.48 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz	

# Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
	00	880.00		
GFSK	39	882.50	882.50 - 882.50	Pass
	78	882.50		
	00	1322.50		
π/4DQPSK	39	1322.50	-	Pass
	78	1325.00		



Iodulation Type:	π/4DQPSK
	MultiView <sup>11</sup> Spectrum
	Ref Level 20.00 dbm         Offset         1.00 db         RBW         30 Hz           # Att         30 db         SWT         1.40 µs (~7.1 mc) = VBW         100 Hz         Mode Auto FFT         Count 500/500           T Frequency Swedp         # BBW View         • VBW         VIOU         • # DBV View         • # BBV View
	MI[1] -72.84 dBm 2.40131250 GHz M2[1] -72.56 dBm
	2.40198250 GHz
	-10 dbm
CH00	
Child	-50 dbm
	40 dbn
	-71 dbn
	CF 2.402 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz
	2 Marker Table
	Type         Ref.         Tr.         X-Value         Y-value         Function         Function Result           M1         1         2.4013125 GHz         -2.2.84 dBm         1         1         1         2.4019825 GHz         -2.2.84 dBm         1         1         1         1         1.3225 HHz         0.20 dB         1 </td
	Dab:13.JNN.2022 13:49:05
	MultiView 😫 Spectrum
	Ref Level 20:00 dbm         Offset         1:00 db         RBW         30 kHz         Count 500/500           # Att         30 db         SWT         140 µc (~7.1 mc)         VBW 100 kHz         Mode Auto FFT         Count 500/500           T Frequency Sweep         # BIV View         If View         If View         If View
	M1[1] -22.16 dBm 2.44031250 GHz
	2.44098250 GHz
	20 dbn 41 -21.50 dbn 41
01100	
CH39	10 dbs-
	191 UBUT 46 dbm-
	70 don-
	GF 2.441 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz 2 Marker Table
	Type         Ref         Trc         X-Value         Y-value         Function         Function Result           M1         1         2.4409325 GHz         -2.21 6 dBm         1 </td
	Dat:13.3NN.2022 1351.48
	MultiView 🗄 Spectrum
	MultiView         Spectrum         v           Ref Level 2000 dbm         Offset         1.00 db         RBW 30 HHz         Count 500/500           e Att         30 db         SWT 140 µg (~7.1 ms)         VBW 100 HHz         Mode Auto FFT         Count 500/500           1 Frequency Sweep         VBW 100 HHz         Mode Auto FFT         Count 500/500
	2.47931250 GHz
	10 dtm M2[1]77 dtm247996250 GHz
	20 ddm +1 -21.705 ddm +1 -21.705 ddm +2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2
01170	
CH78	
	-70 dbm
	CF 2.48 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz 2 Marker Table Toron Definition of the Marker Science Sci
	Type         Ref         Trc         X-Value         Y-value         Function         Function Result           M1         1         2.4799125 GHz         -1.1.91 dBm         1 </td
	D3 M1 1 1.325 MHz -0.30 dB
	Date:13.jps.2022 13:54:33

# Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
	00	0.86		
GFSK	39	0.86	-	Pass
	78	0.86		l l
	00	1.19		
π/4DQPSK	39	1.19	-	Pass
	78	1.19		

dulation Type:	GFSK
	MultiView # Spectrum
	Ref Level 20.00 dbm         Offset         1.00 db ≈ RBW         30 Hz           = Att         30 db         SWT 1.40 µs (~7.1 ms) = VBW 100 Hz         Mode Auto FFT         Count 300/300           1 O'Conject Bandwitht         ■ IPK View
	1 Occupied Bandwidth = 16K View M1[1 2-1/3 dBm 240193010 GFb
	-10 dbm
	20 dbm
	30.860
01100	40 dan
CH00	
	40 dm
	-70 dbm
	DF 2.402 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz
	2 Marker Table Type   Ref   Trc   X-Value   Y-Value Function Function Result M1 1 2.4019301 GHz -1.73 dBm
	M1         1         2.4019301 GHz         -1.73 dBm           T1         1         2.40154296 GHz         -18.99 dBm         Ocr Bw         859.140859141 kHz           T2         1         2.402020 GHz         -2.10.00 dBm         Ocr Bw         859.140859141 kHz
	Datu:13.INN 2022 13:41:30
	MultiView 🗄 Spectrum
	Ref Level 20.00 d8m         Offset         1.00 d8 ≈ BBW         30 lift           # Att         30 d8         SWI         1.40 µs (~7.1 ms) = VBW         100 lift         Count 300/300           I Occupied Bandwall         Start Vean         Start Vean         Start Vean
	M1[1] -1.11 dBm 2,44093010 GHz
	10 din-
	-10.6km
	40.dbn
	-10 dim
CH39	40 dan
CH39	
	40 dan
	-70 dbm-
	CF 2.441 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz
	Yumrker         Table         Y-Value         Function         Function Result           M1         1         2.4409301 GHz         -1.11 dBm         -1.11 dBm
	M1         1         2.4405301 GHz         -1.11 dBm           T1         1         2.440545 GHz         -18.80 dBm         Occ Bw         856.643356643 kHz           T2         1         2.441420 GHz         -70.04 dBm         Occ Bw         856.643356643 kHz
	1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	Dam:13.33.1 2022 1343.52
	MultiView         Spectrum         v           Ref Level 2000 dbm         Offset         1.00 db * RBW         30 kHz         count 300/300           e Att         30.db         SWT         140 µp (~7.1 ms) = VBW         100 kHz         Mode Auto FFT         Count 300/300           I Occuricad Benotivation         9.194 kVBW         9.194 kVBW         9.194 kVBW
	# Att 30.d8 SWT 140 µs (~7.1 ms) ≠ VBW 100 kHz Mode Auto FFT Count 300/300     1 OccupidG Bandwidth     10 CoupidG Bandwidth     10 00 gen
	M1[1]0.90 dim 2.47992760 GHz
	-10 d8m
CH78	19 dbn 17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
CH78	18 db     19 db       18 db     11       18 db     11       18 db     11       19 db     11       10 db     10       10 db       10 db     10
CH78	18 800 T1 28 800 T1 28 800 T1 28 800 T1 28 800 T1 29 800 T1 29 800 T1 29 800 T1 29 800 T1 29 800 T1 29 800 T1 20 800 T1

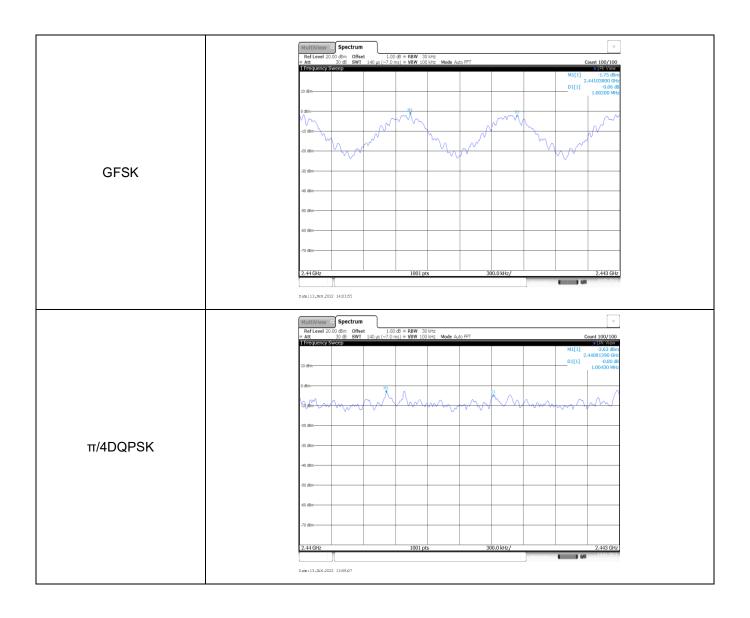
dulation Type:		π/4DQP	SK		
	MultiView 🖽 Spectrum				
	Ref Level 20.00 dBm Offset # Att 30 dB SWT 1-	1.00 dB ⊕ RBW 30 kH 40 µs (~7.1 ms) ⊕ VBW 100 kH	z Mode Auto FFT		Count 500/500
	1 Occupied Bandwidth				• 19k Wew M1[1] -2.43 dBm 2.40198250 GHz
	10 d8m				2.401902.00 042
	D dBm				
	-10 dBm-		$\sim$	m	
	-20 d8m-	₽~ i i		72 72	
		Γ'			
	-30 dBm				
CH00	-#1 280				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	-50 d8m-				
	-60 d8m				
	-70 d8m-				
	CF 2.402 GHz	1001 pts	250.01	457	Span 2.5 MHz
	2 Marker Table			ction	Function Result
	M1 1 2.4 T1 1 1 T2 1	X-Value Y 019825 GHz -2. 2.40138062 GHz -1 2.40257193 GHz -1	/-Value Fur .43 dBm 18.11 dBm Occ Bw 19.51 dBm		1.191308691 MHz
	T2 1 2	2.40257193 GHz -1	19.51 dBm	Manuelos	(IIIIII) (A) 121012022
	Date:13.JAN.2022 13:49:44				
	MultiView 🗄 Spectrum				
	Ref Level 20.00 dBm Offset Att 30 dB SWT 1- 1 Occupied Bandwidth	1.00 dB = RBW 30 kH 40 µs (~7.1 ms) = VBW 100 kH	z z Mode Auto FFT		Count 500/500
	1 Occupied Bandwidth				• 1Pk View M1[1] -1.81 dBm
	10 dBm				2.44098000 GHz
	D dBm-		M3		
	-10 dBm			m	
		THE REAL PROPERTY AND A DECEMBER OF A DECEMBER		The second se	
	-20 d8m				
	-30 dBm				
CH39	140 dB/hv				
	-50 d8m				
	-60 d8m-				
	-70 dBm-				
	CF 2.441 GHz 2 Marker Table	1001 pts	250.0 k		Span 2.5 MHz
	Type   Ref   Trc   M1 1 2 T1 1	X-Value Y 2.44098 GHz -1. 2.44038062 GHz -1	7-Value Fur .81 dBm 17.45 dBm Occ Bw 18.83 dBm	ction	Function Result 1.191308691 MHz
	T1 1 T2 1	2.44157193 GHz -1	18.83 dBm		(18101.2022
					11/11/3
	Date:13.JAN.2022 13:51:57				
	MultiView 🗄 Spectrum				V
	MultiView Spectrum Ref level 20.0 dem Offset	1.00 dB € RBW 30 kH; t0 µs (~7.1 ms) € VBW 100 kH;	z z Mode Auto FFT		≂ Count 500/500
	MultiView 🗄 Spectrum	1.00 d8 ∈ <b>RBW</b> 30 kH 40 μs (~7.1 ms) ∈ <b>VBW</b> 100 kH	z Mode Auto FFT		Count 500/500
	MultiView Spectrum Ref level 20.0 dem Offset	1.00 dB = RBW 30 kH 40 µs (~7.1 ms) = VBW 100 kH	z Mode Auto FFT		
	MultiView D Spectrum Ref Level 20.00 dbm Offset # Att 30.06 SWT 1 Occupied Bandwidth		M1		Count 500/500
	MathYlmer Spectrum Ref Level 2000 dbm Offset Att Stock Statistics		Z Mode Auto FFT		Count 500/500
	MultiView D Spectrum Ref Level 20.00 dbm Offset # Att 30.06 SWT 1 I Occupied Bandwidth 10 dbm		M1		Count 500/500
	MultiView         Spectrum           Ref evel 2000 dbm         Offset           # Att         30 db         SWT           I Occuried Exercised         10 dbm           0 dbm         10 dbm         10 dbm           -0 dbm		M1	han the	Count 500/500
	MultiView D Spectrum Ref Level 20.00 dbm Offset # Att 30.06 SWT 1 I Occupied Bandwidth 10 dbm		M1	View Market	Count 500/500
CH78	MultiView         Spectrum           Ref evel 2000 dbm         Offset           # Att         30 db         SWT           I Occuried Exercised         10 dbm           0 dbm         10 dbm         10 dbm           -0 dbm		M1	View View View View View View View View	Count 500/500 • 1Pk View
CH78	MultiView         Spectrum           Ref Level 20.00 dbm         Offset           + Att         30.06         SWT           1 Occord/d bendwidth         1           20 dbm         0         0           0 dbm         1         1           30 dbm         30         30		M1	Von Ve	Count 500/500 115 Augus MI[1]19 den 2.47998250 GH
CH78	MathWiew Spectrum Ref Level 2000 dbm Offset + Att Solod Berlinking 10 dbm		M1	Want Re	Count 500/500 115 Augus MI[1]19 den 2.47998250 GH
CH78	MathWiney         Spectrum           Ref Level 2000 dbm         Offset           Att         Att           10 dbm         0           10 dbm         0           18 dbm         0           36 dbm         0           36 dbm         0		M1	March Re	Count 500/500 115 Augus MI[1]19 den 2.47998250 GH
CH78	MultiView         Spectrum           Ref Level 20.00 dbm         Offset           + Att         S0.06           0 dbm         0           0 dbm         0           10 dbm         0           -10 dbm         0           -10 dbm         -           -10 dbm         -           -70 dbm         -				Count 500/500 3109 cam MI[1] 2,47998250 GH
CH78	MultiView         Spectrum           Ref Level 20.00 dbm         Offset           + Att         S0.06         SWT           10 dbm         0         0           0 dbm         0         0           10 dbm         0         0           30 dbm         0         0           46 dbm         0         0           46 dbm         0         0           70 dbm         0         0	1001 pts		Hz/	Count 500/500 105/600 MT[1] 109 dan 2.47998250 GH
CH78	MultiView         Spectrum           Ref Level 20.00 dbm         Offset           + Att         S0.06         SWT           10 dbm         0         0           0 dbm         0         0           10 d	1001 pts	250.01	Hz/	Count 500/500 310 Julia MT[1] 2,47998250 GH
CH78	MultiView         Spectrum           Ref Level 20.00 dbm         Offset           + Att         30.06         SWT           10 dbm         0.0         0.00           0 dbm         0         0.00           0 dbm         0         0.00           10 dbm         0.00	1001 pts		Hz/	Count 500/500 105/600 MT[1] 109 dan 2.47998250 GH

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥882.50	Pass
π/4DQPSK	39	1.00	≥883.33	Pass

Note:

\*: GFSK limit = The maximum 20 dB Bandwidth for GFSK modulation on the appendix B.  $\pi/4DQPSK$  limit = 2/3 \* The maximum 20 dB Bandwidth for  $\pi/4DQPSK$  modulation on the appendix B.

8DPSK limit = 2/3 \* The maximum 20 dB Bandwidth for 8DPSK modulation on the appendix B



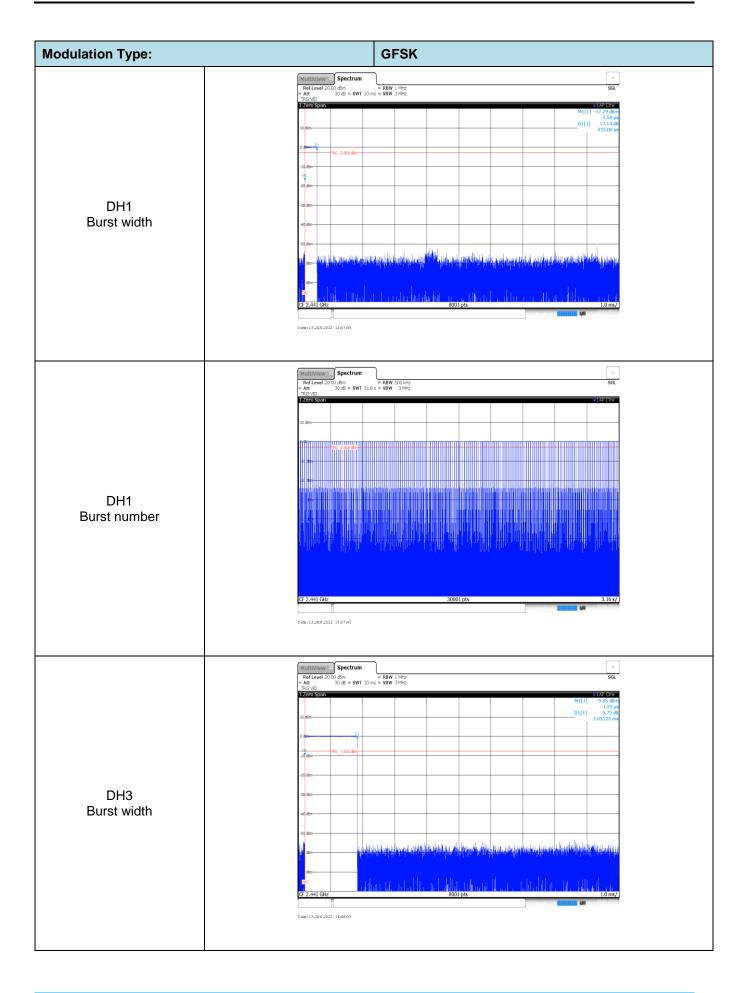
# Appendix E: Hopping Channel Number

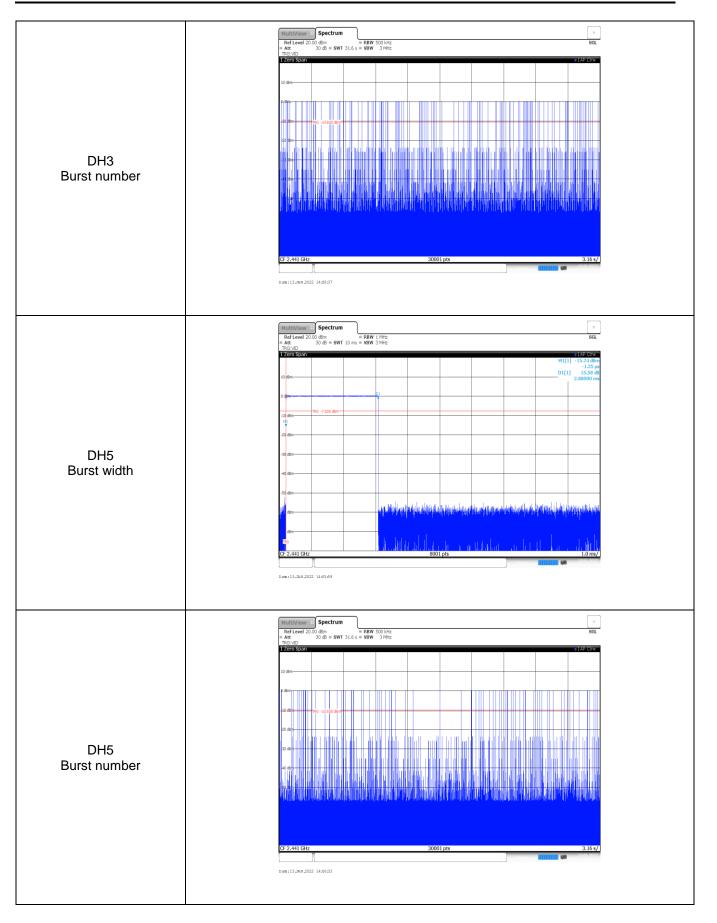
Modulation type	Channel number	Limit	Result
GFSK	79	>15.00	Pass
π/4DQPSK	79	≥15.00	Fass

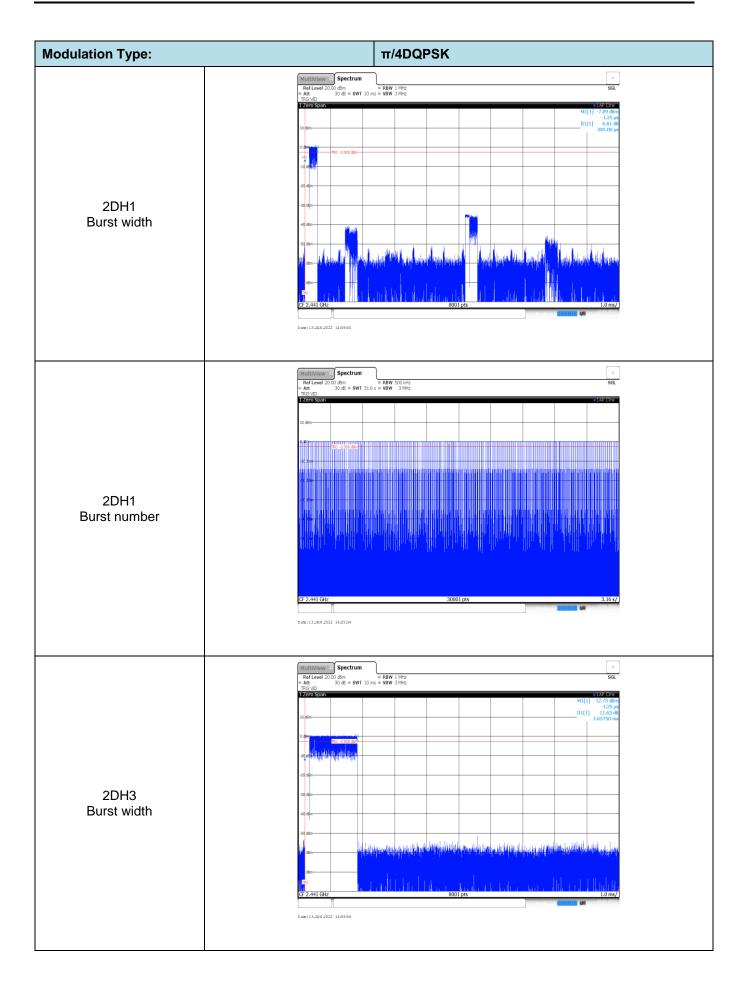
	MultiView 🗄 Sp	pectrum							v
	Ref Level 20.00 dB Att 30 c	m Offset 1.00 dB ⊕ RE 18 SWT 1.02 ms ⊕ VB	W 100 kHz W 300 kHz M	de Auto Sween					
	1 Frequency Sweep			ae nate enterp					1Pk View
	10 dBm-								
	0 dBm H						h . h		*****
	- 730000000	ANANI MANANA	HUUUUUU	ANNANA.	AD AD MA	AMADAI	BADAMA	MANIM	ANNA
	-10 d8a		WWWW	HWWW	WWW	<u>Allar</u> t		i v v v v v	ANN -
	-28 dBm	VAADDAAAAAAAAAA	10.1.01.	A11x 11	identities a	o turt		utina	
	-20 dem								
GFSK	-30 dBm								
	1.								
	-#0 d8m								4
	-50 d8m								- L.
									LAN .
	-60 d8m								
	-70 d8m								
	2.4 GHz		1001 pt	6	8.	35 MHz/			2.4835 GHz
							Neasuring	······································	12113 12(122)
	Date:13_JAN 2022 14:	15:01							
	MultiView Sp Ref Level 20.00 dB		W 100 kHz						$\nabla$
	Att 30 c     Trequency Sweep	m Offset 1.00 dB ⊕ RB dB SWT 1.02 ms ⊕ VB	W 300 kHz M	ode Auto Sweep					• 1Pk View
	10 d8m-								
	MAAAAA	Muhhhut	MWM	MANU	WHAT	MANAN	MMMM	WAAAA	WWW.
	-10 dBm								
	-20 d8m								
π/4DQPSK	-30 d8m								
	~								1
	-40 d8m								
	-50 d8m-								
	-50 d8m								W
	-50 d8m								W
	-60 d8m								W
									W
	-60 d8m		1001 pt	6	8.	35 MHz/			2.4835 GHz
	-60 dBm		1001 pt	ŝ	8.	35 MHz/	Masurbig	(	
	-60 dBm	00.22	1001 pt	ŝ	8.	35 MHz/	Meenologi	(mm) (4	

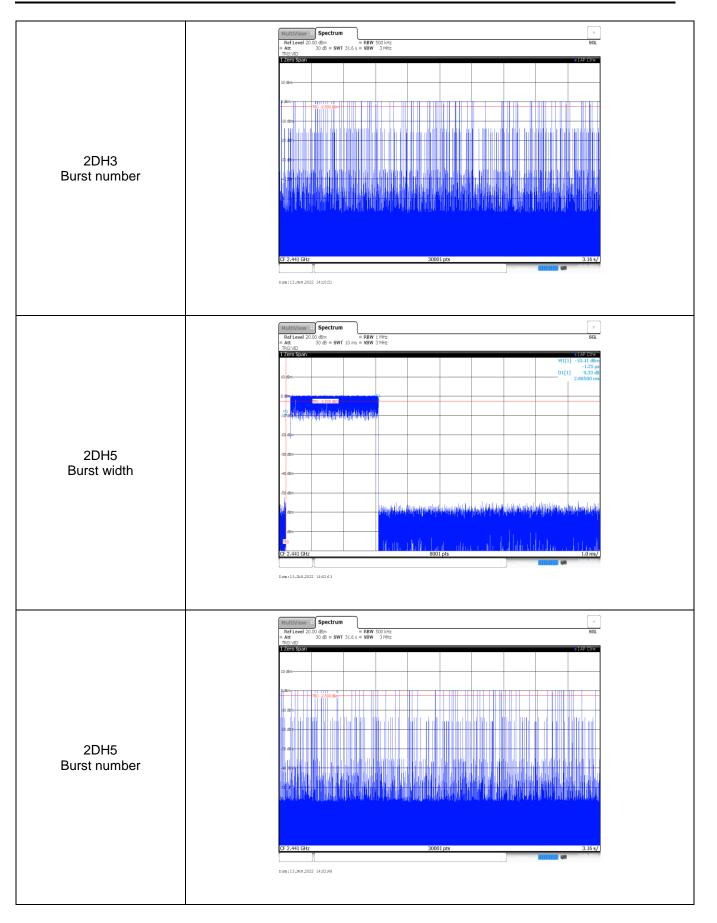
# Appendix F: Dwell Time

Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
	DH1	0.38	316	0.12		
GFSK	DH3	1.63	121	0.20	≤ 0.40	Pass
	DH5	2.88	75	0.22		
	2DH1	0.38	315	0.12		
π/4DQPSK	2DH3	1.64	101	0.17	≤ 0.40	Pass
	2DH5	2.89	72	0.21		



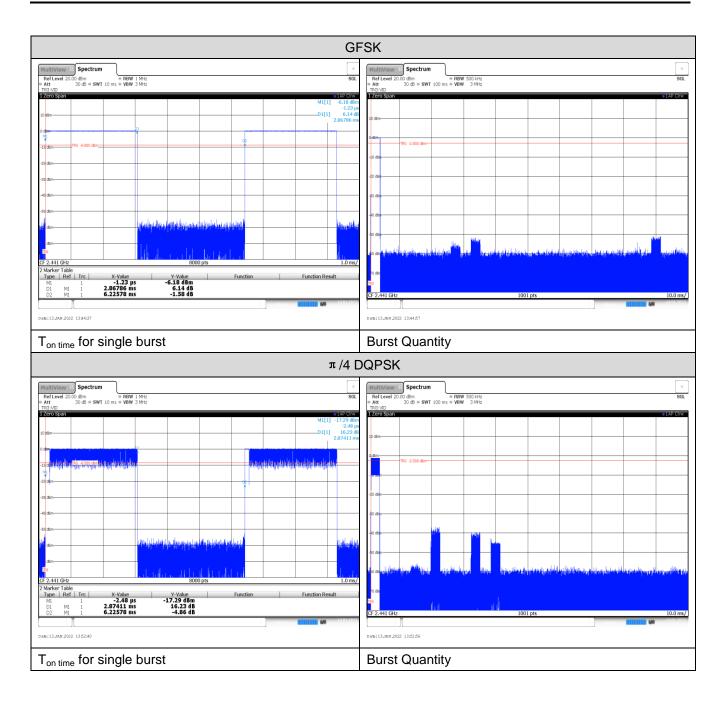






# Appendix G: Duty Cycle Correction Factor (DCCF)

DCCF Calculate Formula								
DCCF=20 * Log(duty cycle) = 20 * Log(T <sub>on time</sub> / T <sub>period</sub> )								
Modulation type	Test Frequency (MHz)	T <sub>on time</sub> for single burst [ms]	T <sub>period</sub> [ms]	Burst Quantity	DCCF [dB]			
GFSK	2441	2.87	100	1	-30.84			
π /4 DQPSK	2441	2.87	100	1	-30.84			



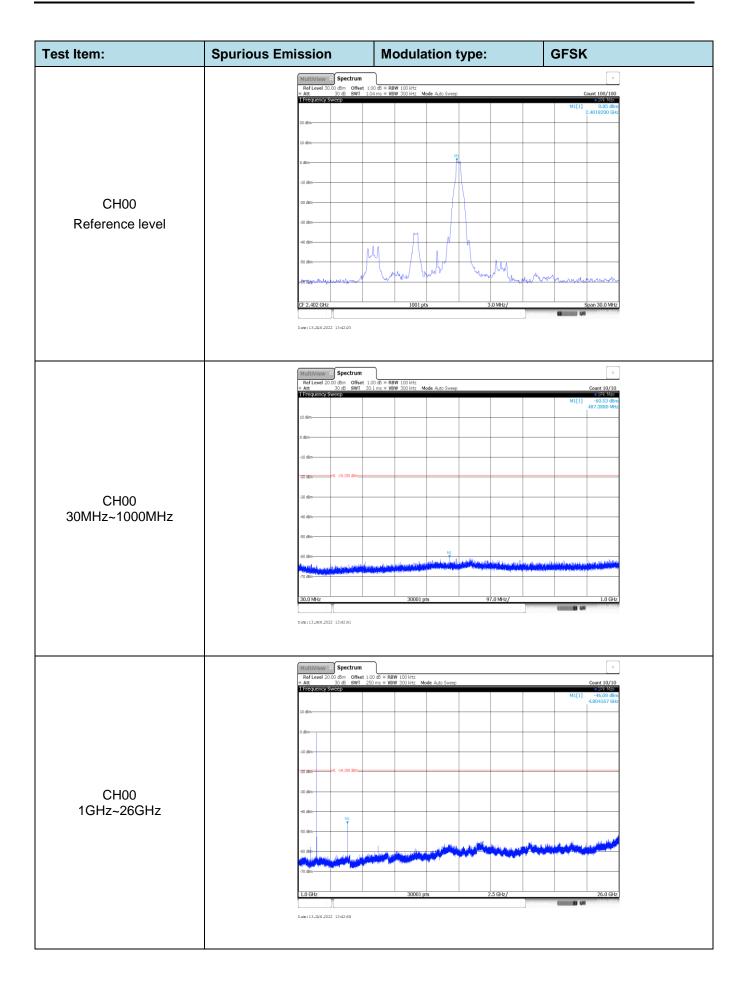
Test Item:	Band edge	edge Modulation type:			GF	sĸ	
		MultiView Spectrum					V
CH00 No hopping mode		Ref Level 200 dbm         Offset         100 db         PBW 100 Htz           Att         30 db         SWI         1.05 ms         VBW 300 Htz         Mode Auto Sweep         SWI 200 Htz         SWI 200 Htz					
		10 d8m					2.4018210 GHz M2[1] -45.77 dBm 2.4000000 GHz M1
		0 d8m					
		-20 d8m					
		-30 d8m					MS
		-40 d8m -50 d8m					W M2
		60 alm	ورواسه والمالية والمالية والمستر والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمح	بالمراجع والمحالية والمراجع والمحالية والمحالية والمحالية والمحالية والمحالية والمحالية والمحالية والمحالية وال	un here have been and the	Here mark her rate	
		-70 d8m				a da far faren an en	
		2.31 GHz 2 Marker Table Type   Ref   Trc	1001 X-Value		9.5 MHz/ Function	Fun	2.405 GHz
		M1 1 2. M2 1 M3 1	X-Value 401821 GHz 2.4 GHz 2.39 GHz 2.31 GHz 2.39816 GHz	Y-Value 0.66 dBm -45.77 dBm -63.74 dBm -63.43 dBm -35.02 dBm	Turctor	1.017	
		M4 1 M5 1 2	2.31 GHz 2.39816 GHz	-63.43 dBm -35.02 dBm			18101-2022
		Date:13.JAN 2022 13:42:18					
		MultiView B Spectrum					
CH00 Hopping mode		Ref Level 20.00 dBm Offset Att 30 dB SWT 1 Frequency Sweep	1.00 dB = RBW 100 kHz 1.05 ms = VBW 300 kHz	Mode Auto Sweep			Count 500/500 10k Max 11[1] 0.29 dBm
		10 d8m					2.4021050 GHz M2[1] -36.57 dBm 2.4000000 GHz
		0 dām					ĬM
		-10 dBm -20 dBm					111
		-30 d8m					MB42
		-40 d8m					MANA
		_60 dBm	L. Marchen March Marchen	in the stand of the		mali mana marana an	
		-70 dBm		and the other states of the st	rander and a second of the	- And Charles - Contract - Contra	
		2.31 GHz 2 Marker Table	1001		9.5 MHz/	F	2.405 GHz
		Type         Ref         Trc           M1         1         2.           M2         1           M3         1	X-Value 402105 GHz 2.4 GHz 2.39 GHz 2.31 GHz 398825 GHz	Y-Value 0.29 dBm -36.57 dBm -63.69 dBm -63.40 dBm -36.11 dBm	Function	Pul	ction Result
		M3 1 M4 1 M5 1 <b>2.</b>	2.31 GHz 398825 GHz	-63.40 dBm -36.11 dBm			AND 12101-2022
		Dame:13_JAN 2022 14:05:15					
		MultiView :: Spectrum					<b>v</b>
CH78 No hopping mode		Ref Level 20.00 dBm Offset Att 30 dB SWT 1 Frequency Sweep	1.00 dB ⊕ RBW 100 kHz 1.02 ms ⊕ VBW 300 kHz	Mode Auto Sweep			Count 300/300
		10 dBm			_		M1[1] 1.49 dBm 2.4798130 GHz M2[1] -48.62 dBm 2.4835000 GHz
		0 dBm					
		-10 dBm -20 dBm H1 -18 510 dBm					
		-30 d8m			_		
		-40 d8g	M2				
			min	A. A			
		-60 d8m	mus	u man	a marken and and and and and and and and and an	manner	mannel
		2.478 GHz	1001	pts	2.2 MHz/		2.5 GHz
		2 Marker Table Type Ref Trc M1 1 2. M2 1	X-Value 479813 GHz 2.4835 GHz 2.5 GHz 483522 GHz	Y-Value 1.49 dBm -48.62 dBm -64.24 dBm -49.10 dBm	Function	Fun	ction Result
		M2 1 M3 1 M4 1 <b>2</b> .	2.5 GHz 483522 GHz	-64.24 dBm -49.10 dBm			1970 1970 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 1970 - 19
		Date:13.JAN.2022 13:47:37					

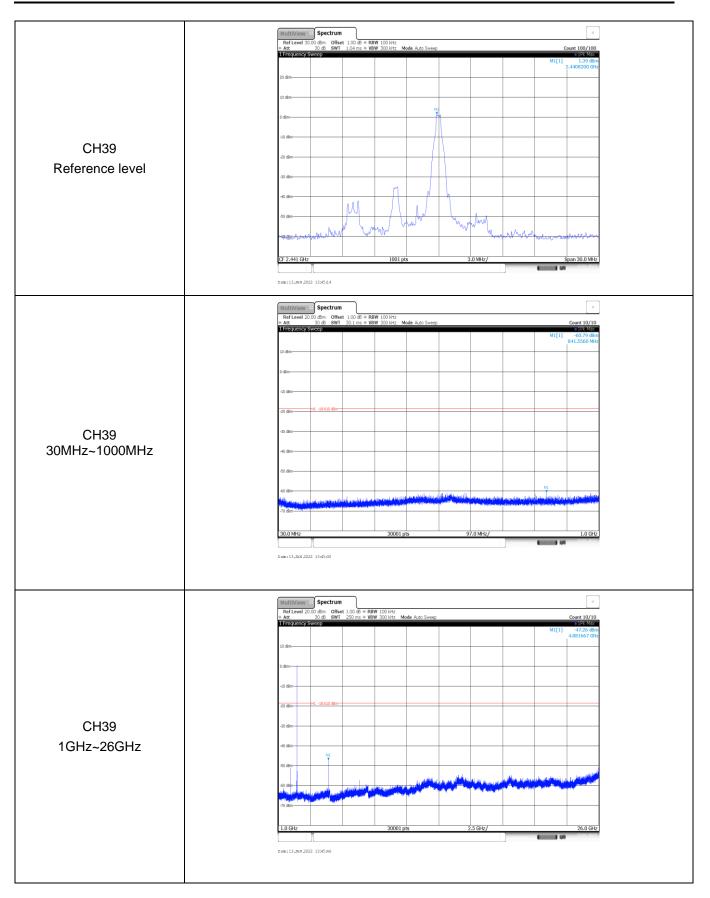
#### Appendix H: Band edge and Spurious Emissions (conducted)

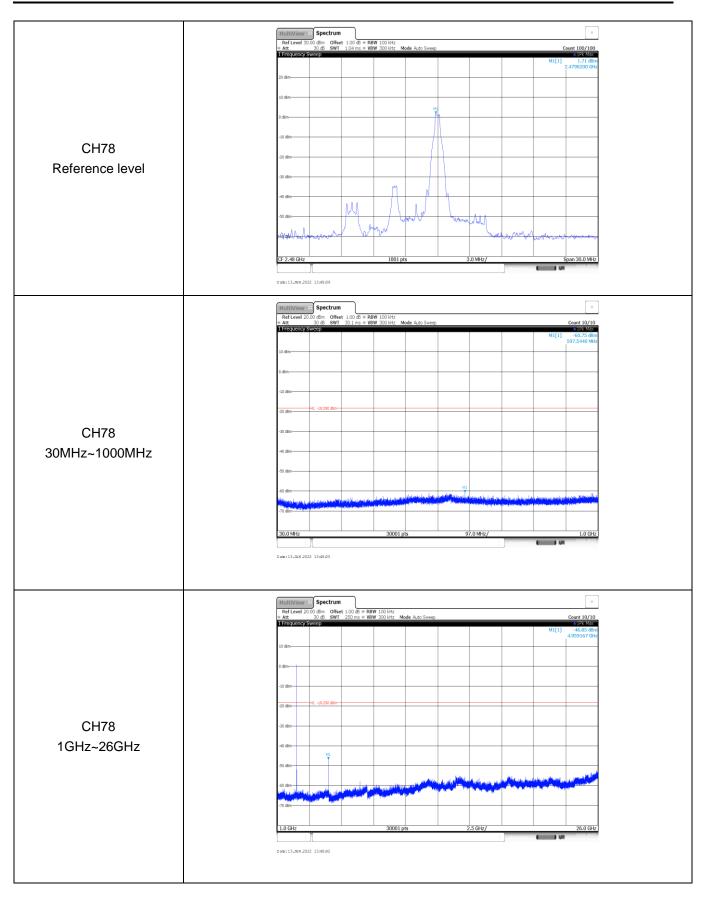
	MultiView         Spectrum         v           RefLevel 20:00 dm         Offset         1:00 db         # RBW 100 kHz           Att         30 db         SW1         1:00 db         # VBW 300 kHz
CH78 Hopping mode	I request Sweep         MI [1]         1/2 More           10 dm         2.480 1430 GH         2.480 1430 GH           10 dm         -51.2 dH         2.483 500 GH           10 dm         -12 dH         2.483 500 GH           10 dm         -12 dH         -12 dH           10
	2.478 GHz         1001 pts         2.2 MHz/         2.5 GHz           2 Marker Table         Type         Ref         Trc         X-Yalue         Y-Yalue         Function         Function Result           Mi         1         2.480143 GHz         0.96 dBm         Function         Function Result           M3         1         2.4835 GHz         -53.25 dBm         M           M4         1         2.483522 GHz         -52.15 dBm         M           Date:13.mbt 2022 14:05:30         Date:13.mbt 2022 14:05:30         Date:13.mbt 2022 14:05:30         Date:13.mbt 2022 14:05:30

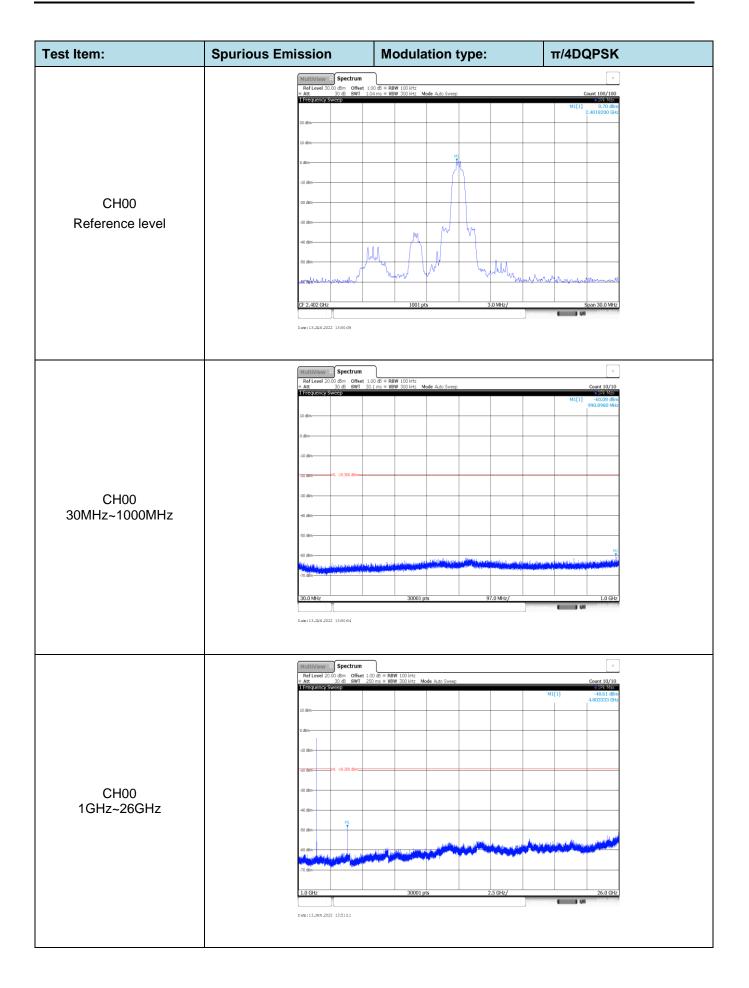
Test Item:	Band edge		Modulatio	n type:	π/4D0	QPSK
	_	MultiView :: Spectrum				Ţ
CH00 No hopping mode		Ref Level 20.00 dbm         Offset 1.00 dbm           Att         30 dbm           1 Frequency Sweep         10 dbm           10 dbm		9.5 Mtz/	MI[1] 	2.405 GHz esult
CH00 Hopping mode		HultiView         Spectrum           Ref Level 20.00 dm         Offset 1.00 db           att 30 db SWT 1.05 ms         10 dm           10 dm         0           -10 db		9.5 Mt2/	M1[1]	2.405 GHz esult
CH78 No hopping mode		Hutthinger         Spectrum           Ref Level 20.00 dm         Offset 1.00 db           att         30 db         Offset 1.00 db           1 dramon structure         30 db         Mail 1.02 million           30 db         Mail 1.02 million         30 db           30 db         Mail 1.02 million         30 db           30 db         Mail 1.02 million         30 db           40 db         Mail 1.22 million         30 db           30 db         Mail 1.22 million         30 db           2.478 GHz         Zumer Table         72.483           Mail 1.22 million         1.248351         31 db           0 ab         1.2.48351         31 db         31 db           0 ab         1.2.48351         31 db         31 db           0 ab         1.2.48351         31 db         31 db	1001 pts	2.2 Mtz/	M1[1]	2.5 GHz esult

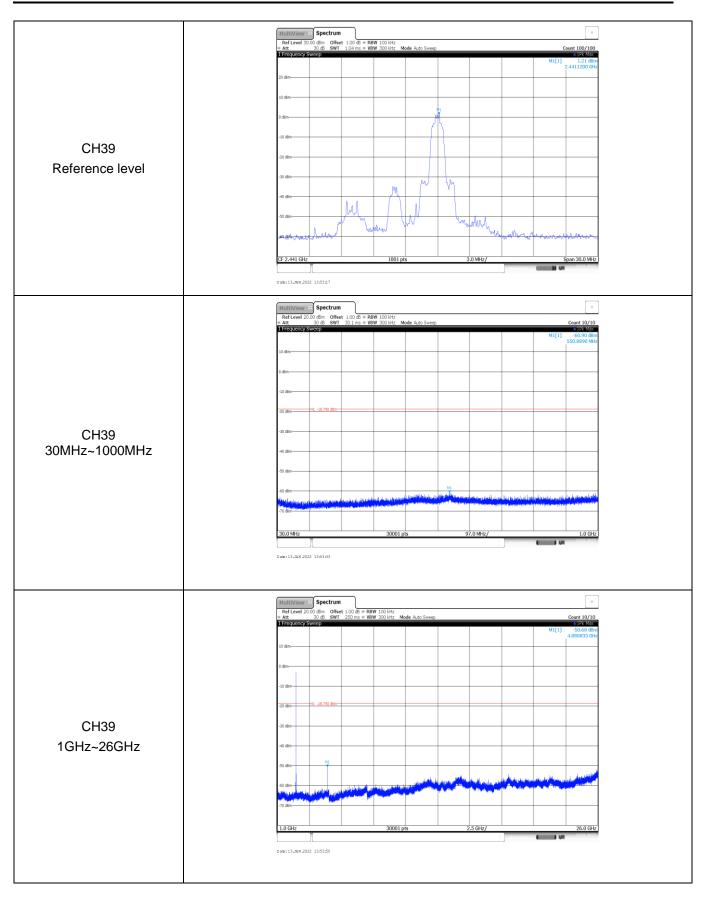
	MultiView         Spectrum           RefLevel 20:00 dBm         Offset 1:00 dB • RBW 100 Htz           + Att         306         SWT 1:02 ms • VBW 300 Htz	
CH78 Hopping mode	1 Frequency Sweep	M11 121 dBm 2.4799560 GHz 
	40 das	unumundummund
	Z.478 GHz         1001 pts         2.2 MHz/           2 Warker Table         Type I Ref         RC         Y-Value         Function           Type I Ref         Tr         X-Value         Y-Value         Function           M1         1         2.478956 GHz         1.21 dBm           M2         1         2.435 GHz         -49.48 dBm           M3         1         2.5 GHz         -62.96 dBm           M4         1         2.43522 GHz         -459.46 dBm	2.5 GHz Function Result
	M4 1 2.463522 UH2 -45.46 UBU	121012022

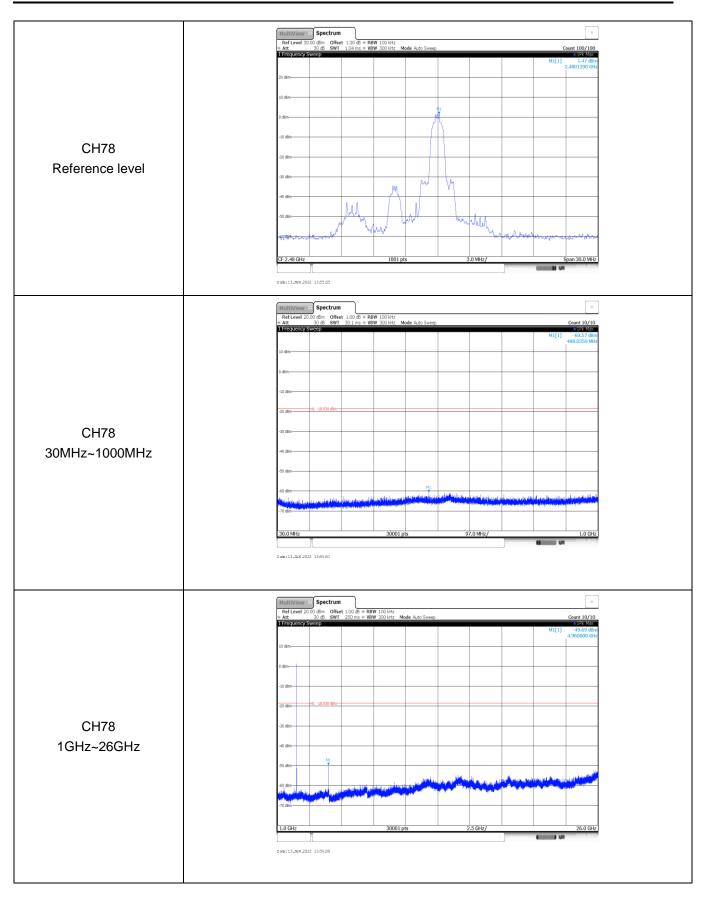












-----End of Report------