# TEST REPORT

### For Bluetooth-LE

Report No. ....: CHTW24040011 Report Verification:

Project No...... SHT2310042313EW

FCC ID.....: 2BFX7-0044

Applicant's name.....: Teljane Medical Technology (Suzhou) Co., Ltd.

Address....... 5F, Building 2A, 69 Jiepu Road, Suzhou Industrial Park, Suzhou,

PRC

Product Name .....: Continuous Glucose Monitoring System

Trade Mark .....

Model No. ..... TX-14

Listed Model(s) ...... -

Standard .....: FCC CFR Title 47 Part 15 Subpart C § 15.247

Date of receipt of test sample.......... Mar.26, 2024

Date of testing...... Mar.26, 2024- Apr .16, 2024

Date of issue...... Apr .17, 2024

Result...... PASS

Compiled by

( Position+Printed name+Signature): File administrators Kiki Kong

Supervised by

(Position+Printed name+Signature): Project Engineer Kiki Kong

Approved by

(Position+Printed name+Signature): RF Manager Xu yang

Testing Laboratory Name .....: Shenzhen Huatongwei International Inspection Co., Ltd.

Yangguang Community, Xili Subdistrict, Nanshan District,

Shenzhen, Guangdong, China

Shenzhen Huatongwei International Inspection Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Huatongwei International Inspection Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Huatongwei International Inspection Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

The test report merely correspond to the test sample.

Report No.: CHTW24040011 Page: 2 of 35 Date of issue: 2024-04-17

# **Contents**

<u>1.</u>	TEST STANDARDS AND REPORT VERSION	3
1.1.	Test Standards	3
1.2.	Report version	3
<u>2.</u>	TEST DESCRIPTION	4
<u>3.</u>	SUMMARY	5
3.1.	Client Information	5
3.2.	Product Description	5
3.3.	Radio Specification Description	5 5
3.4.	Testing Laboratory Information	6
<u>4.</u>	TEST CONFIGURATION	7
4.1.	Took fraguency list	7
4.1. 4.2.	Test frequency list Descriptions of Test mode	7 7
4.2. 4.3.	Test sample information	7
4.3. 4.4.	Support unit used in test configuration and system	8
4.5.	Testing environmental condition	8
4.6.	Statement of the measurement uncertainty	8
4.7.	Equipment Used during the Test	9
<u>5.</u>	TEST CONDITIONS AND RESULTS	11
5.1.	Antenna Requirement	11
5.2.	AC Conducted Emission	12
5.3.	Peak Output Power	13
5.4.	Power Spectral Density	14
5.5.	6dB bandwidth	15
5.6.	99% Occupied Bandwidth	16
5.7.	Duty Cycle	17
5.8.	Conducted Band edge and Spurious Emission	18
5.9.	Radiated Band edge Emission	19
5.10.	Radiated Spurious Emission	21
<u>6.</u>	TEST SETUP PHOTOS	28
<u>7.</u>	EXTERNAL AND INTERNAL PHOTOS	30
	ternal photos	30
1.2 Int	ernal photos	33
8 <u>.</u>	APPENDIX REPORT	35

Report No.: CHTW24040011 Page: 3 of 35 Date of issue: 2024-04-17

# 1. TEST STANDARDS AND REPORT VERSION

#### 1.1. Test Standards

The tests were performed according to following standards:

- FCC CFR Title 47 Part 15 Subpart C § 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- ANSI C63.10:2020: 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	2024-04-17	Original

Report No.: CHTW24040011 Page: 4 of 35 Date of issue: 2024-04-17

# 2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result	Test Engineer
5.1	Antenna Requirement	15.203/15.247(c)	PASS	Xiangyu Wei
5.2	AC Conducted Emission	15.207	N/A	N/A
5.3	Peak Output Power	15.247(b)(3)	PASS	Xiangyu Wei
5.4	Power Spectral Density	15.247(e)	PASS	Xiangyu Wei
5.5	6dB Bandwidth	15.247(a)(2)	PASS	Xiangyu Wei
5.6	99% Occupied Bandwidth	-	PASS <sup>*1</sup>	Xiangyu Wei
5.7	Duty cycle	-	PASS <sup>*1</sup>	Xiangyu Wei
5.8	Conducted Band Edge and Spurious Emission	15.247(d)/15.205	PASS	Xiangyu Wei
5.9	Radiated Band Edge Emission	15.205/15.209	PASS	Yifan Wang
5.10	Radiated Spurious Emission	15.247(d)/15.205/15.209	PASS	Yifan Wang

### Note:

- The measurement uncertainty is not included in the test result.
- \*1: No requirement on standard, only report these test data.
- N/A:Not applicable (this product is battery powered)

Report No.: CHTW24040011 Page: 5 of 35 Date of issue: 2024-04-17

# 3. **SUMMARY**

### 3.1. Client Information

Applicant:	Teljane Medical Technology (Suzhou) Co., Ltd.	
Address:	5F, Building 2A, 69 Jiepu Road, Suzhou Industrial Park, Suzhou, PRC	
Manufacturer:	Teljane Medical Technology (Suzhou) Co., Ltd.	
Address:	5F, Building 2A, 69 Jiepu Road, Suzhou Industrial Park, Suzhou, PRC	

# 3.2. Product Description

Main unit information:		
Product Name:	Continuous Glucose Monitoring System	
Trade Mark:	-	
Model No.:	TX-14	
Listed Model(s):	-	
Power supply:	DC 3.0V from Battery	
Hardware version:	V1.0.0.0	
Software version:	V1.0.0.0	

# 3.3. Radio Specification Description

Bluetooth version:	V5.0
Support function:	BLE 1M,BLE2M
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	PCB Antenna
Antenna gain:	2.26dBi

Report No.: CHTW24040011 Page: 6 of 35 Date of issue: 2024-04-17

# 3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.		
Laboratory Location	Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China		
Contact information:	Phone: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn		
	Туре	Accreditation Number	
Qualifications	FCC Registration Number	762235	
	FCC Designation Number	CN1181	

Report No.: CHTW24040011 Page: 7 of 35 Date of issue: 2024-04-17

# 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	2404
19	2440
38	2478
39	2480

### 4.2. Descriptions of Test mode

For RF test items

The engineering test program was provided and enabled to make EUT continuous transmit.

For Radiated spurious emissions:

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.

### 4.3. Test sample information

Test item	HTW sample no.
RF Conducted test items	Please refer to the description in the appendix report
RF Radiated test items	YPHT23100423007
EMI test items	YPHT23100423007

Note:

RF Conducted test items: Peak Output Power, Power Spectral Density, 6dB Bandwidth, 99% Occupied Bandwidth, Duty cycle, Conducted Band Edge and Spurious Emission

RF Radiated test items: Radiated Band Edge Emission, Radiated Spurious Emission

EMI test items: AC Conducted Emission

Report No.: CHTW24040011 Page: 8 of 35 Date of issue: 2024-04-17

## 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?			
✓ No			
Item	Equipment	Trade Name	Model No.
1			
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. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	3.21dB
2	Peak Output Power	1.07
3	Power Spectral Density	1.07
4	6dB Bandwidth	0.002%
5	99% Occupied Bandwidth	0.002%
6	Duty cycle	-
7	Conducted Band Edge and Spurious Emission	1.68dB
8	Radiated Band Edge Emission	4.54dB for 30MHz-1GHz
0		5.10dB for above 1GHz
9	Radiated Spurious Emission	4.54dB for 30MHz-1GHz
9		5.10dB for above 1GHz

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

Report No.: CHTW24040011 Page: 9 of 35 Date of issue: 2024-04-17

# 4.7. Equipment Used during the Test

•	RF Conducted	test item					
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Signal and spectrum Analyzer	R&S	HTWE0242	FSV40	100048	2023/08/22	2024/08/21
•	Signal & Spectrum Analyzer	R&S	HTWE0262	FSW26	103440	2023/08/22	2024/08/21
•	Vector signal generator	R&S	HTWE0244	SMBV100A	260790	2023/05/23	2024/05/22
•	Test software	Tonscend	N/A	JS1120	N/A	N/A	N/A

•	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)
•	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2023/8/22	2024/8/21
•	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2023/8/18	2024/8/17
•	Protection Network	SCHWARZBECK	HTWE0567	VTSD9561FN	00899	2023/8/18	2024/8/17
•	ISN	FCC	HTWE0148	FCC-TLISN-T2- 02	20371	2023/8/18	2024/8/17
•	ISN	FCC	HTWE0150	FCC-TLISN-T8- 02	20375	2023/8/18	2024/8/17
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

•	Radiated Emission – 9kHz~30MHz									
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	2023/4/6	2026/4/5			
•	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/22	2024/8/21			
•	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/4/6	2024/4/5			
•	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2024/04/08	2027/04/07			
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A			

•	Radiated Emission - 30MHz~1GHz									
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	2023/4/6	2026/4/5			
•	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/22	2024/8/21			
•	Ultra-Broadband Antenna	SCHWARZBEC K	HTWE0119	VULB9163	546	2023/2/22	2026/2/21			
•	Pre-Amplifer	SCHWARZBEC K	HTWE0295	BBV 9742	/	2023/5/25	2024/5/24			
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A			

Report No.: CHTW24040011 Page: 10 of 35 Date of issue: 2024-04-17

•	Radiated emission-Above 1GHz									
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	C11121	2023/4/17	2026/4/16			
•	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2023/8/22	2024/8/21			
•	Horn Antenna	SCHWARZBE CK	HTWE0126	BBHA 9120D	1011	2023/2/14	2026/2/13			
•	Horn Antenna	SCHWARZBE CK	HTWE0103	BBHA9170	BBHA9170472	2023/2/20	2026/2/19			
•	Broadband Pre- amplifier	SCHWARZBE CK	HTWE0201	BBV 9718	9718-248	2023/5/25	2024/5/24			
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A			

Report No.: CHTW24040011 Page: 11 of 35 Date of issue: 2024-04-17

# 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 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.

### **TEST RESULT**

⊠ Passed	☐ Not Applicable
----------	------------------

The antenna type is a PCB antenna, please refer to the below antenna photo.



Report No.: CHTW24040011 Page: 12 of 35 Date of issue: 2024-04-17

#### 5.2. AC Conducted Emission

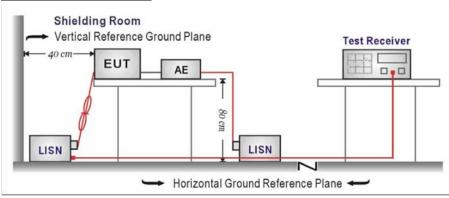
#### LIMIT

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

Fraguescy rongo (MILIT)	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			

<sup>\*</sup> Decreases with the logarithm of the frequency.

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

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

Refer to the clause 4.2

#### **TEST RESULT**

☐ Passed ☐ Not Applicable

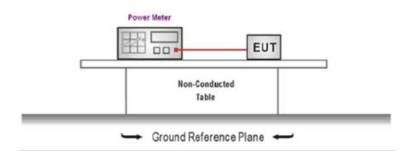
Report No.: CHTW24040011 Page: 13 of 35 Date of issue: 2024-04-17

### 5.3. Peak Output Power

#### **LIMIT**

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): 30dBm

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

- 1. The EUT was tested according to ANSI C63.10 and KDB 558074 D01 requirements.
- 2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
- 3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
- 4. Record the measurement data.

#### **TEST MODE**

Refer to the clause 4.2

### **TEST RESULT**

#### **TEST DATA**

Report No.: CHTW24040011 Page: 14 of 35 Date of issue: 2024-04-17

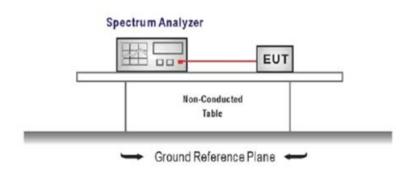
#### 5.4. Power Spectral Density

#### **LIMIT**

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

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

- 1. Connect the antenna port(s) to the spectrum analyzer input,
- Configure the spectrum analyzer as shown below:

Center frequency=DTS channel center frequency

Span =1.5 times the DTS bandwidth

RBW =  $3 \text{ kHz} \le \text{RBW} \le 100 \text{ kHz}$ , VBW  $\ge 3 \times \text{RBW}$ 

Sweep time = auto couple

Detector = peak

Trace mode = max hold

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
- 4. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### **TEST MODE**

Refer to the clause 4.2

#### **TEST RESULT**

#### **TEST DATA**

Report No.: CHTW24040011 Page: 15 of 35 Date of issue: 2024-04-17

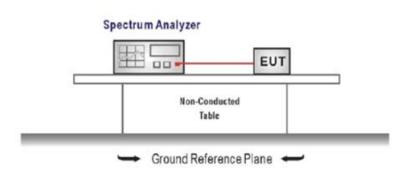
#### 5.5. 6dB bandwidth

#### LIMIT

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

#### **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 =DTS channel center frequency

Span=2 x DTS bandwidth

RBW = 100 kHz, VBW ≥ 3 × RBW

Sweep time= auto couple

Detector = Peak

Trace mode = max hold

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission, and record the pertinent measurements.

#### **TEST MODE**

Refer to the clause 4.2

#### **TEST RESULT**

#### **TEST DATA**

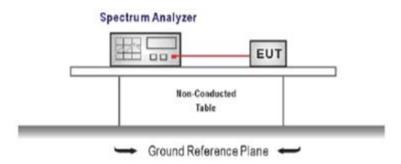
Report No.: CHTW24040011 Page: 16 of 35 Date of issue: 2024-04-17

### 5.6. 99% Occupied Bandwidth

#### **LIMIT**

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 andthe 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

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

#### TEST MODE

Refer to the clause 4.2

#### **TEST RESULT**

#### **TEST DATA**

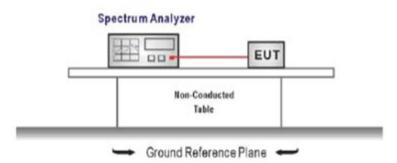
Report No.: CHTW24040011 Page: 17 of 35 Date of issue: 2024-04-17

### 5.7. Duty Cycle

#### **LIMIT**

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=zero span, Frequency=centered channel, RBW= 1 MHz, VBW ≥ RBW
  - Sweep=as necessary to capture the entire dwell time,
  - Detector function = peak, Trigger mode
- 4. Measure and record the duty cycle data

#### **TEST MODE**

Refer to the clause 4.2

#### **TEST DATA**

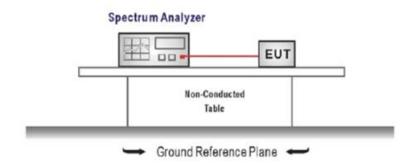
Report No.: CHTW24040011 Page: 18 of 35 Date of issue: 2024-04-17

# 5.8. Conducted Band edge and Spurious Emission

#### **LIMIT**

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  $\geq$  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

Refer to the clause 4.2

#### **TEST RESULT**

#### **TEST DATA**

Report No.: CHTW24040011 Page: 19 of 35 Date of issue: 2024-04-17

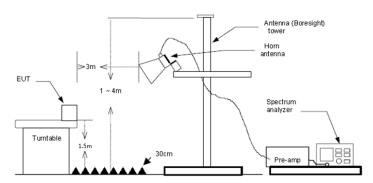
#### 5.9. Radiated Band edge Emission

#### 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.
- 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. Thisis 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.
- 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:

- VBW=10Hz, When duty cycle is no less than 98 percent
- VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clasue 5.6 duty cycle.

#### TEST MODE

Refer to the clause 4.2

#### **TEST RESULT**

#### Note:

- 1) Level= Reading + Factor; Factor = 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).

Report No.: CHTW24040011 Page: 20 of 35 Date of issue: 2024-04-17

### BLE 1M:

Test channel		CH00			Polarit	у		Horizont	al
Mark	Frequency MHZ 2310.00	Reading dBuV/m 47.99	Antenna dB 27.86	Cable dB 4.01	Preamp dB 41.80	Level dBuV/m 38.06	Limit dBuV/m 74.00	Over limit	Remark Peak
2	2390.03	50.87	27.54	4.31	41.80	40.92	74.00	-33.08	Peak
T ( . l l									
Test channel		CH00			Polarit	у		Vertical	
l est channel  Mark	Frequency MHz	CH00 Reading dBuV/m	Antenna dB	Cable dB	Polarit Preamp dB		Limit dBuV/m	Over	Remark

Test channel		CH39			Polarity	У		Horizonta	al
Mark 1	Frequency MHZ 2483.50	Reading dBuV/m 60.61	Antenna dB 27.33	Cable dB 4.18	Preamp dB 41.80	Level dBuV/m 50.32	Limit dBuV/m 74.00	Over limit -23.68	Remark Peak
2	2500.00	48.07	27.30	4.19	41.80	37.76	74.00	-36.24	Peak
Test channel		CH39			Polarity	у		Vertical	
Mark	Frequency	Reading	Antenna	Cable	Preamp		Limit	Over	Remark
	MHZ	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	ı limit	
1	MHZ 2483.50	aBu√/m 58.44	27.33	4.18	41.80	48.15	74.00	-25.85	Peak

### BLE 2M:

Test channel		CH00			Polarity	у		Horizonta	al
Mark 1 2	Frequency MHz 2310.00 2390.03	Reading dBuV/m 48.34 49.66	Antenna dB 27.86 27.54	Cable dB 4.01 4.31	Preamp dB 41.80	Level dBuV/m 38.41 39.71	Limit dBuV/m 74.00 74.00	Over limit -35.59	Remark Peak Peak
Test channel	2550.05	CH00	27.34	4.51	Polarity		74.00	Vertical	TCOK
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/r	Over n limit	Remark
1 2	2310.00 2390.03	47.96 47.98	27.86 27.54	4.01 4.31	41.80 41.80	38.03 38.03	74.00 74.00	-35.97 -35.97	Peak Peak

Test channel		CH39			Polari	ty		Horizor	ntal
Mark 1 2	Frequency MHz 2483.52 2500.00	Reading dBuV/m 59.53 47.52	Antenna dB 27.33 27.30	Cable dB 4.18 4.19	Preamp dB 41.80 41.80	D Level dBuV/m 49.24 37.21	Limit dBuV/m 74.00 74.00	Over limit -24.76 -36.79	Peak
Test channel		CH39			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
1	2483.50	57.15	27.33	4.18	41.80	46.86	74.00	-27.14	Peak

Report No.: CHTW24040011 Page: 21 of 35 Date of issue: 2024-04-17

# 5.10. Radiated Spurious Emission

#### **LIMIT**

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

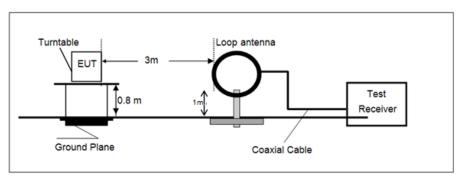
Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

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.

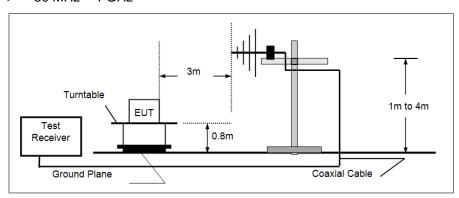
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
Above IGHZ	74.00	Peak

#### **TEST CONFIGURATION**

#### → 9 kHz ~ 30 MHz

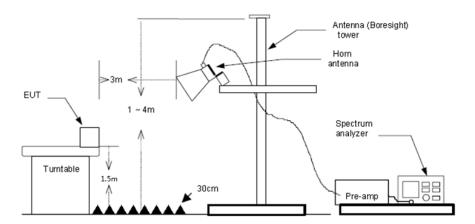


#### > 30 MHz ~ 1 GHz



Above 1 GHz

Report No.: CHTW24040011 Page: 22 of 35 Date of issue: 2024-04-17



#### **TEST PROCEDURE**

- 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.
- 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.

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

For average measurement:

- VBW=10Hz, When duty cycle is no less than 98 percent
- VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clasue 5.6 duty cycle.

#### TEST MODE

Refer to the clause 4.2

#### **TEST RESULT**

#### Note:

- 1) Level= Reading + Factor/Transd; Factor/Transd = 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) for above 1GHz.

Report No.: CHTW24040011 Page: 23 of 35 Date of issue: 2024-04-17

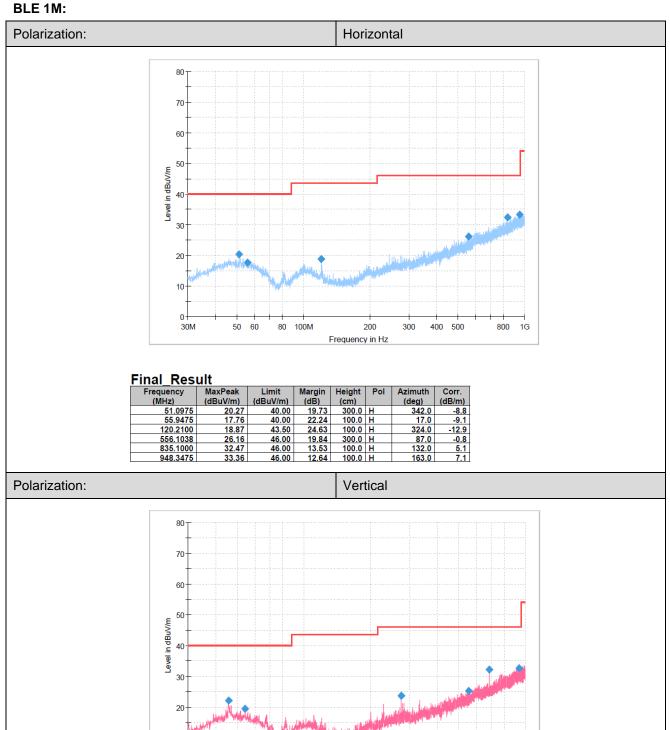
#### For 9 kHz ~ 30 MHz

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.

### 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.

Report No.: CHTW24040011 24 of 35 Date of issue: 2024-04-17 Page:



Final	Result
-------	--------

0 30M

50 60

Frequency	MaxPeak	Limit	Margin	Height	Pol	Azimuth	Corr.
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(cm)		(deg)	(dB/m)
45.6413	22.21	40.00	17.79	100.0	V	293.0	-8.9
54.2500	19.54	40.00	20.46	100.0	V	355.0	-9.1
274.9250	23.58	46.00	22.42	100.0	٧	144.0	-8.3
552.2238	25.15	46.00	20.85	100.0	V	68.0	-0.9
687.5388	32.25	46.00	13.75	100.0	V	0.0	2.1
938.6475	32.69	46.00	13.31	100.0	V	221.0	7.0

80 100M

200

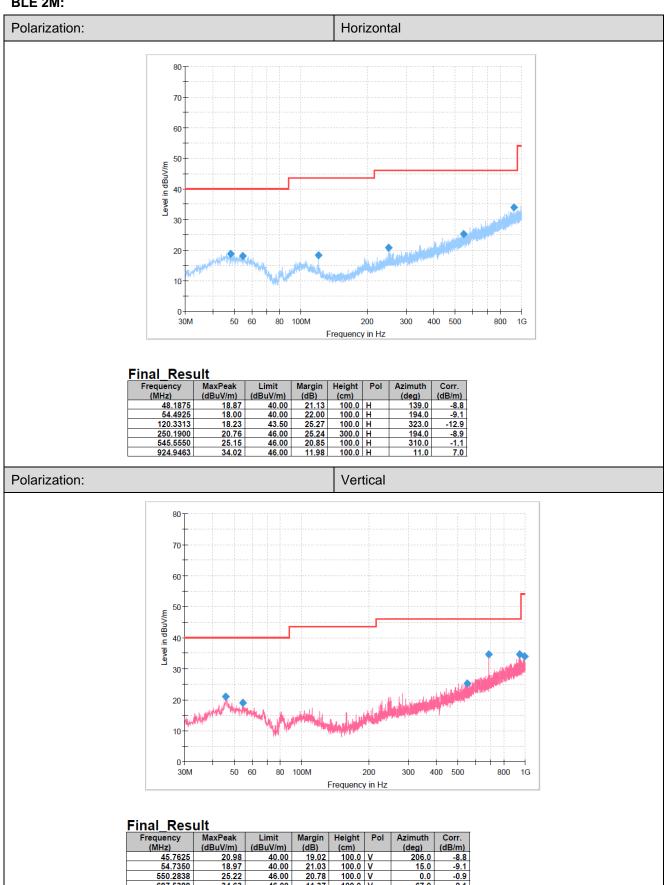
Frequency in Hz

400 500

800

Report No.: CHTW24040011 Page: 25 of 35 Date of issue: 2024-04-17

#### BLE 2M:



687.5388 945.1950

34.63 34.56

46.00 46.00

11.37 11.44

100.0 V 100.0 V

-0.9

67.0 0.0

Report No.: CHTW24040011 Page: 26 of 35 Date of issue: 2024-04-17

# BLE 1M:

### For 1 GHz ~ 25 GHz

Test channel		CH00			Polari	ity		Horizo	ntal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	3096.33	44.30	28.79	4.65	41.60	36.14	74.00	-37.86	Peak
2	4809.50	48.57	31.28	6.00	41.34	44.51	74.00	-29.49	Peak
3	7209.02	42.54	36.00	7.56	40.95	45.15	74.00	-28.85	Peak
4	10999.95	40.78	40.50	10.00	42.30	48.98	74.00	-25.02	Peak
Test channel		CH00			Polari	ity		Vertica	al
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	5762.24	48.30	31.92	6.66	40.71	46.17	74.00	-27.83	Peak
2	7209.02	47.75	36.00	7.56	40.95	50.36	74.00	-23.64	Peak
3	9204.60	40.39	38.83	9.30	41.00	47.52	74.00	-26.48	Peak
4	11428.08	40.93	40.43	10.31	42.30	49.37	74.00	-24.63	Peak

Test channel		CH19			Polai	rity		Horizo	ontal
Mark	Frequency	Reading	Antenna	Cable	Preamp		Limit	Over	Remark
	MHZ	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	4664.81	47.30	31.03	5.87	41.40	42.80	74.00	-31.20	Peak
2	4883.52	48.97	31.20	6.21	41.25	45.13	74.00	-28.87	Peak
3	4946.07	49.26	31.20	6.06	41.17	45.35	74.00	-28.65	Peak
4	10374.42	39.76	39.82	9.69	40.65	48.62	74.00	-25.38	Peak
		01140			Dala	eit.		\/a=tia	al
Test channel		CH19			Polai	ity		Vertic	aı
Test channel		CH19			Polai			vertic	aı
Test channel	Frequency	CH19 Reading	Antenna	Cable	Polai		Limit	Over	Remark
	Frequency MHz		Antenna dB	Cable dB			Limit dBuV/m		
		Reading			Preamp	Level		Over	
Mark	MHz 4883.52	Reading dBuV/m	dB	dB	Preamp dB	Level dBuV/m	dBuV/m	Over limit	Remark
Mark 1	MHZ	Reading dBuV/m 47.03	dB 31.20	dB 6.21	Preamp dB 41.25	Level dBuV/m 43.19	dBuV/m 74.00	Over limit	Remark Peak

Test channel		CH39			Polari	ity		Horizon	ntal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	4664.81	49.64	31.03	5.87	41.40	45.14	74.00	-28.86	Peak
2	4958.68	52.13	31.23	6.07	41.16	48.27	74.00	-25.73	Peak
3	7413.73	41.65	36.20	7.84	41.02	44.67	74.00	-29.33	Peak
4	10191.20	40.92	39.29	9.60	40.98	48.83	74.00	-25.17	Peak
Test channel		CH39			Polari	ity		Vertica	l
Mark	Fooduones	Dooding	Antenna	Cable	Doormo	Level	Limit	Ouen	Remark
Mark	Frequency MHz	Reading dBuV/m	dB	dB	Preamp dB	dBuV/m	dBuV/m	Over limit	Kellidi'K
1	4664.81	45.86	31.03	5.87	41.40	41.36	74.00	-32.64	Peak
2	4958.68	47.25	31.23	6.07	41.16	43.39	74.00	-30.61	Peak
3	5762.24	48.05	31.92	6.66	40.71	45.92	74.00	-28.08	Peak

Report No.: CHTW24040011 Page: 27 of 35 Date of issue: 2024-04-17

BLE 2M: For 1 GHz ~ 25 GHz

Test channel		CH00			Polar	ity		Horizoi	ntal
Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	over	Remark
	MHZ	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	4809.50	49.34	31.28	6.00	41.34	45.28	74.00	-28.72	Peak
2	5762.24	45.89	31.92	6.66	40.71	43.76	74.00	-30.24	Peak
3	8104.56	40.92	36.98	8.11	40.59	45.42	74.00	-28.58	Peak
4	10191.20	40.82	39.29	9.60	40.98	48.73	74.00	-25.27	Peak
Test channel		CH00			Polar	ity		Vertica	I
Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	Over	Remark
	MHZ	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	3983.75	46.24	29.77	5.60	41.47	40.14	74.00	-33.86	Peak
2	5762.24	47.47	31.92	6.66	40.71	45.34	74.00	-28.66	Peak
	7200 02	47.66	36.00	7.56	40.95	50.27	74.00	-23.73	Peak
3	7209.02	47.00	30.00						

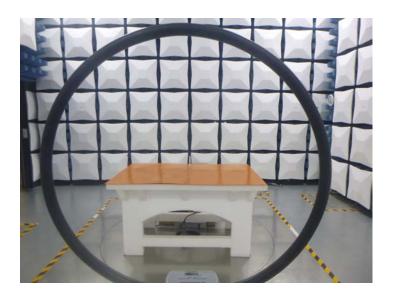
Test channel		CH19			Polari	ty		Horizor	ntal
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	4004.08	42.71	29.81	5.63	41.46	36.69	74.00	-37.31	Peak
2	4883.52	47.10	31.20	6.21	41.25	43.26	74.00	-30.74	Peak
3	8002.06	40.99	37.00	8.00	40.81	45.18	74.00	-28.82	Peak
4	10348.05	40.42	39.74	9.68	40.70	49.14	74.00	-24.86	Peak
Test channel		CH19			Polari	ty		Vertica	l
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	4883.52	45.00	31.20	6.21	41.25	41.16	74.00	-32.84	Peak
2	5762.24	47.88	31.92	6.66	40.71	45.75	74.00	-28.25	Peak
		46 05	36.14	7.74	40.98	48.95	74.00	-25.05	Peak
3	7319.96	46.05	30.14	/ • / -					

Test channel		CH39			Polari	ty		Horizon	ital
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	4664.81	45.81	31.03	5.87	41.40	41.31	74.00	-32.69	Peak
2	4958.68	49.98	31.23	6.07	41.16	46.12	74.00	-27.88	Peak
3	5060.69	47.42	31.76	6.15	41.08	44.25	74.00	-29.75	Peak
4	10916.26	40.67	40.50	9.96	42.28	48.85	74.00	-25.15	Peak
Test channel		CH39			Polari	ty		Vertical	
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	4664.81	48.30	31.03	5.87	41.40	43.80	74.00	-30.20	Peak
2	4958.68	47.78	31.23	6.07	41.16	43.92	74.00	-30.08	Peak
3	5762.24	47.74	31.92	6.66	40.71	45.61	74.00	-28.39	Peak
4	7451.57	43.37	36.20	7.83	41.05	46.35	74.00	-27.65	Peak

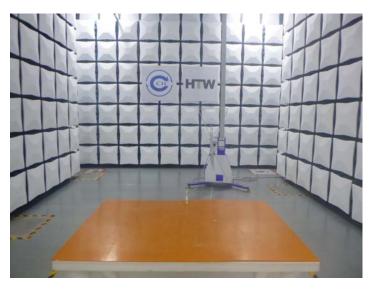
Report No.: CHTW24040011 Page: 28 of 35 Date of issue: 2024-04-17

# 6. TEST SETUP PHOTOS

Radiated Emission



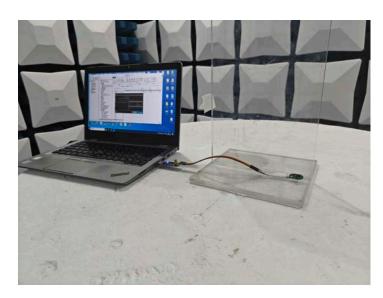




Report No.: CHTW24040011 Page: 29 of 35 Date of issue: 2024-04-17







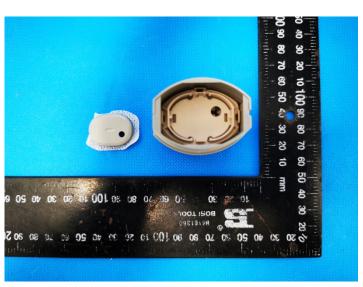
Report No.: CHTW24040011 Page: 30 of 35 Date of issue: 2024-04-17

# 7. EXTERNAL AND INTERNAL PHOTOS

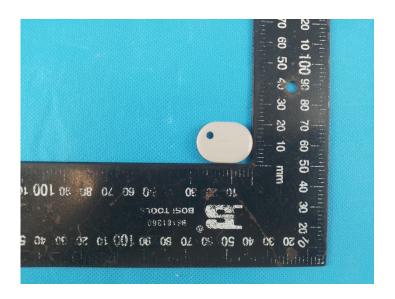
# 7.1 External photos

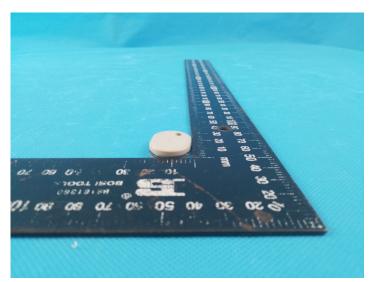


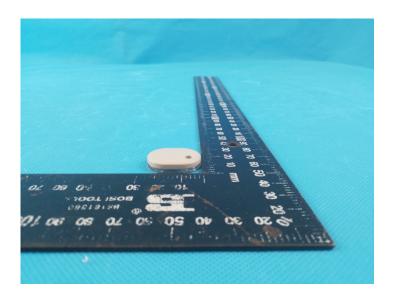




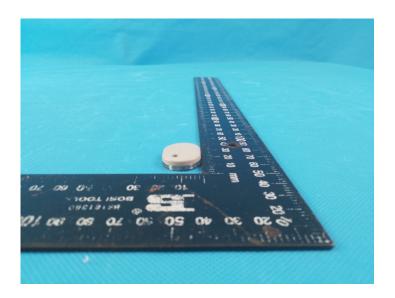
Report No.: CHTW24040011 Page: 31 of 35 Date of issue: 2024-04-17

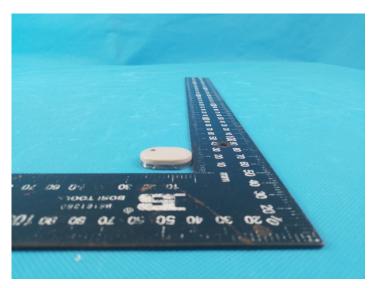






Report No.: CHTW24040011 Page: 32 of 35 Date of issue: 2024-04-17

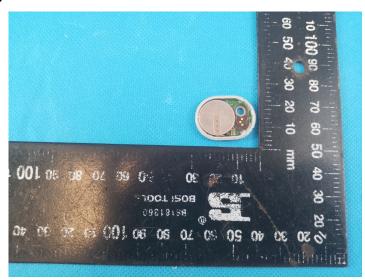




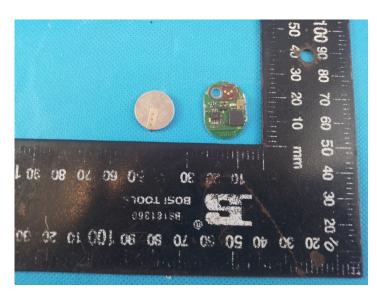


Report No.: CHTW24040011 Page: 33 of 35 Date of issue: 2024-04-17

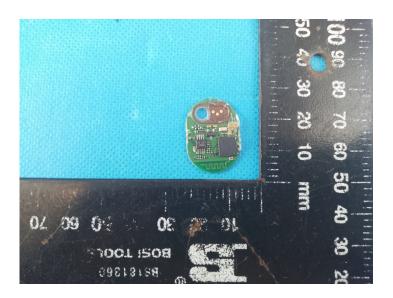
# 7.2 Internal photos

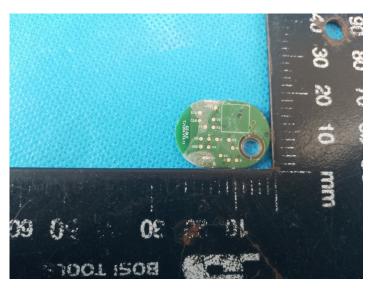






Report No.: CHTW24040011 Page: 34 of 35 Date of issue: 2024-04-17







Report No.: CHTW24040011 Page: 35 of 35 Date of issue: 2024-04-17





# 8. APPENDIX REPORT

Project No.: SHT2310042313EW Radio Specification: Bluetooth BLE

# **APPENDIX REPORT**

Project No.	SHT2310042313EW	Radio Specification	Bluetooth BLE
Test sample No.	YPHT23100423007	Model No.	TX-
Start test date	2024-04-02	Finish date	2024-04-16
Temperature	25℃	Humidity	51%
Test Engineer	Xiangyu Wei	Auditor	Xiaodong Zheo

Appendix clause	Test item	Result
А	Peak Output Power	PASS
В	Power Spectral Density	PASS
С	6 dB Bandwidth	PASS
D	99% Occupied Bandwidth	PASS
Е	Duty cycle	PASS
F	Band edge and Spurious Emissions (conducted)	PASS

# Appendix A: Peak Output Power

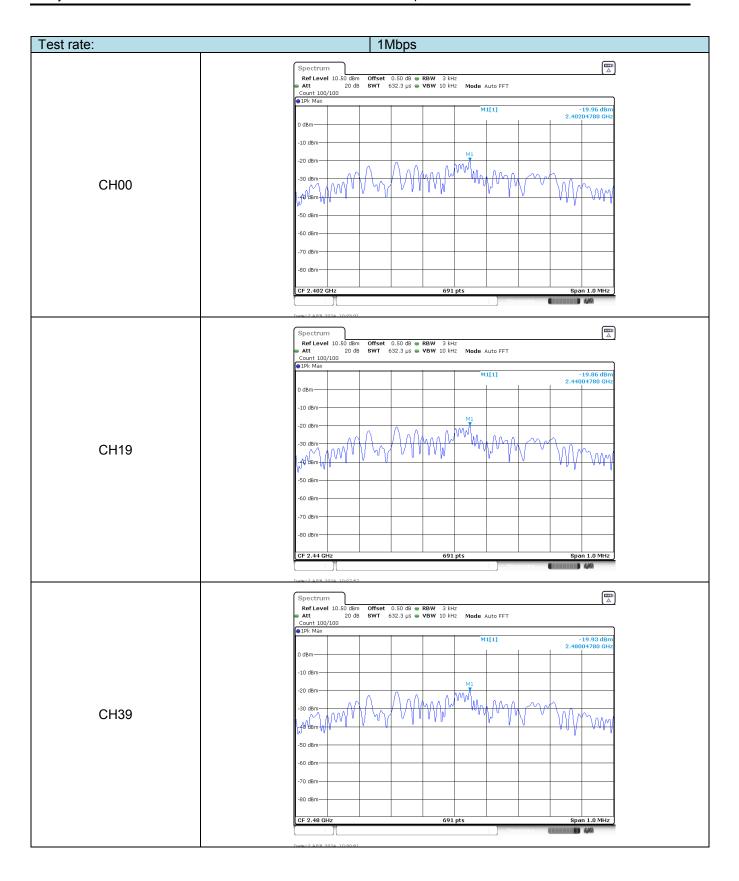
Test rate	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
	00	-2.06	-2.09	≤ 30.00	Pass
1Mbps	19	-1.85	-1.87		
	39	-1.80	-1.83		
	00	-2.02	-2.06		
2Mbps	19	-1.82	-1.85	≤ 30.00	Pass
	39	-1.77	-1.80		

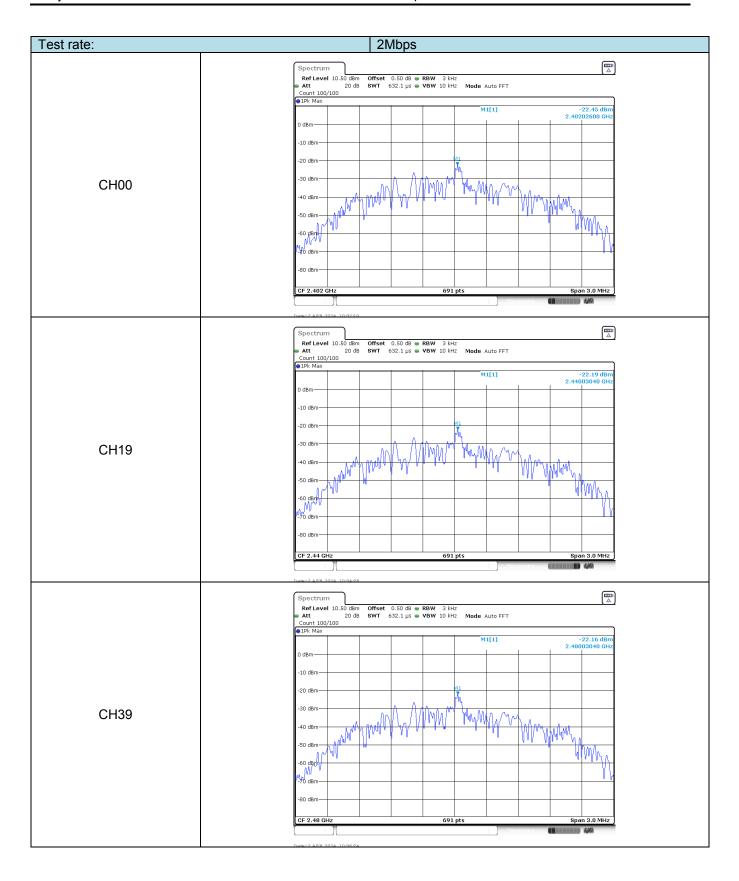




## Appendix B: Power Spectral Density

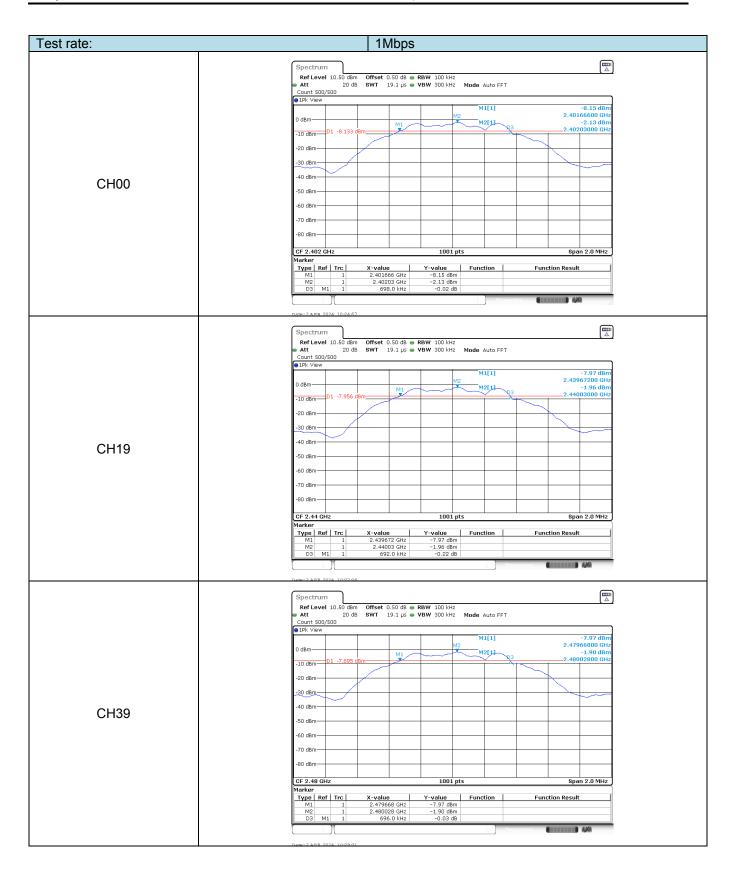
Test rate	Channel	Power Spectral Density(dBm/3KHz)	Limit (dBm/3KHz)	Result
	00	-19.96		
1Mbps	19	-19.86	≤8.00	Pass
	39	-19.93		
	00	-22.45		
2Mbps	19	-22.19	≤8.00	Pass
	39	-22.16		





## Appendix C: 6dB bandwidth

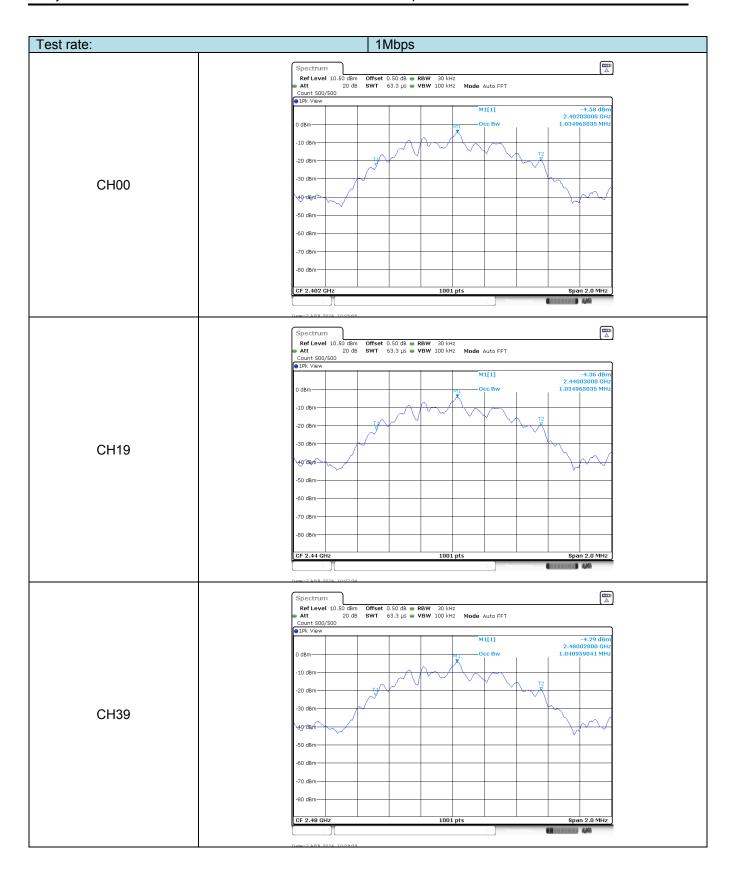
Туре	Channel	6dB Bandwidth(kHz)	Limit (kHz)	Result
	00	698.00		
1Mbps	19	692.00	≥500	Pass
	39	696.00		
	00	1195.00		
2Mbps	19	1205.00	≥500	Pass
	39	1194.00		

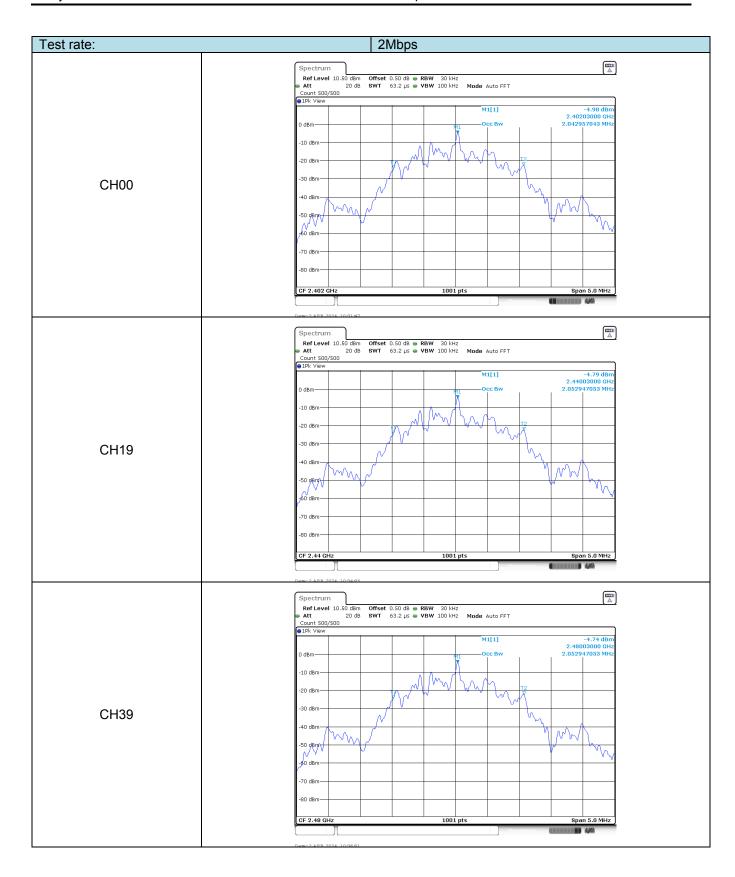




## Appendix D: 99% Occupied Bandwidth

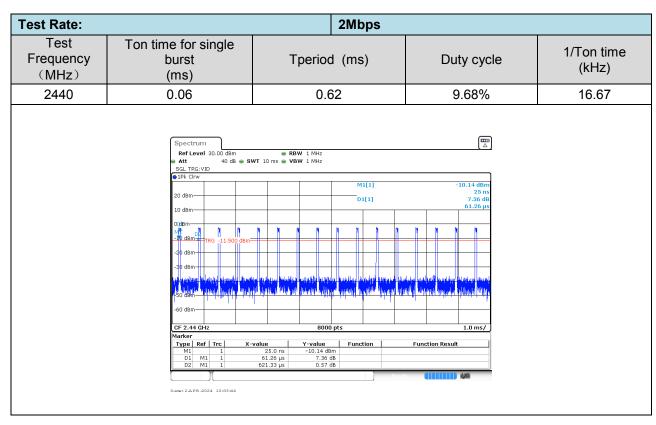
Test rate	e Channel 99% Occupied Bandwidth(MHz)		Limit (kHz)	Result
	00	1.03		
1Mbps	19	1.03	-	Pass
	39	1.04		
	00	2.04		
2Mbps	19	2.05	-	Pass
	39	2.05		



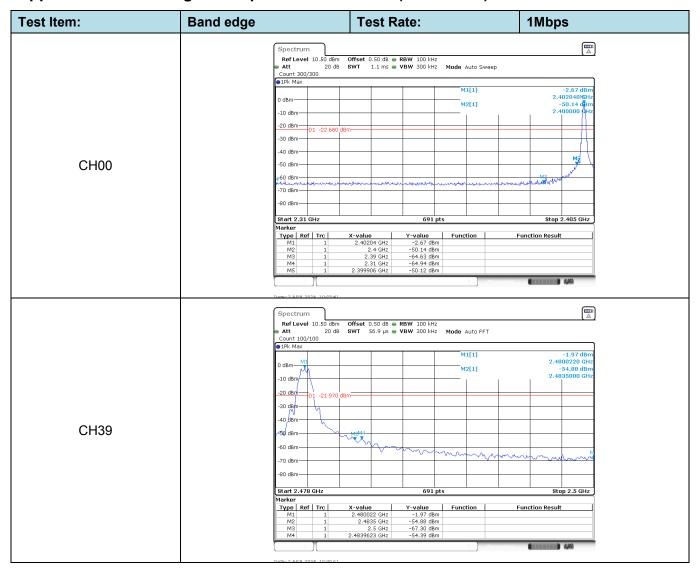


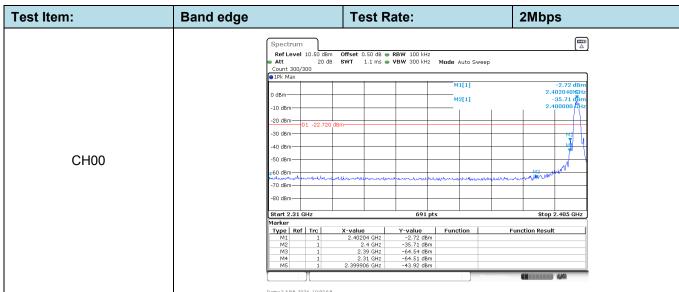
#### Appendix E: Duty cycle

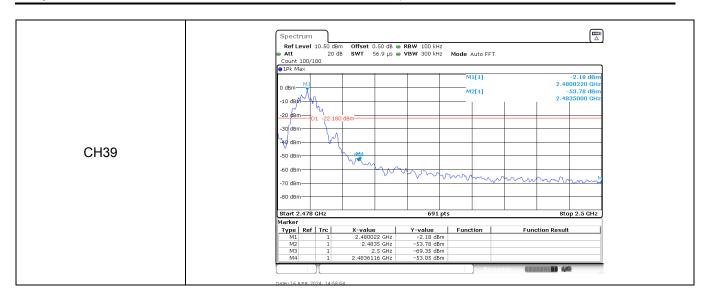
Test Rate:			1Mbps		
Test Frequency (MHz)	Ton time for single burst (ms)	Tperiod (ms)		Duty cycle	1/Ton time (kHz)
2440	0.10	0.62		16.13%	10.00
	SGL TRG:VID     IPK Clrw  20 dBm  10 dBm  -cd dBm	● RBW 1 MHz WT 10 ms ● VBW 1 MHz  800	Do pts  Function  dB	1.3.90 dBm -1.23 µs 11.26 dB 103.76 µs 10.3.76 µs 1.0.ms/	

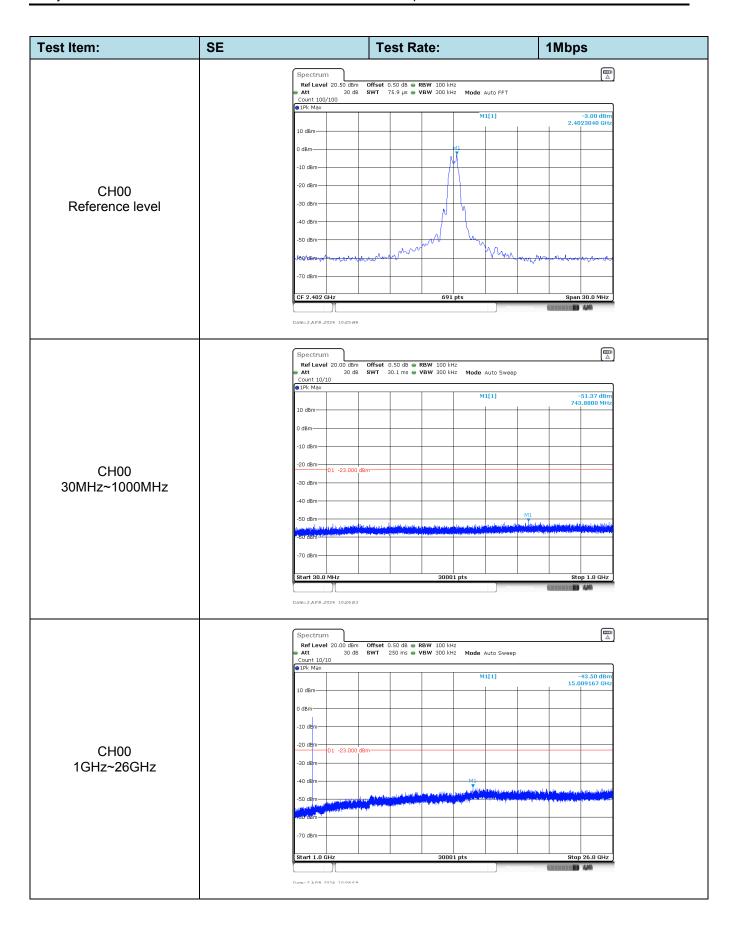


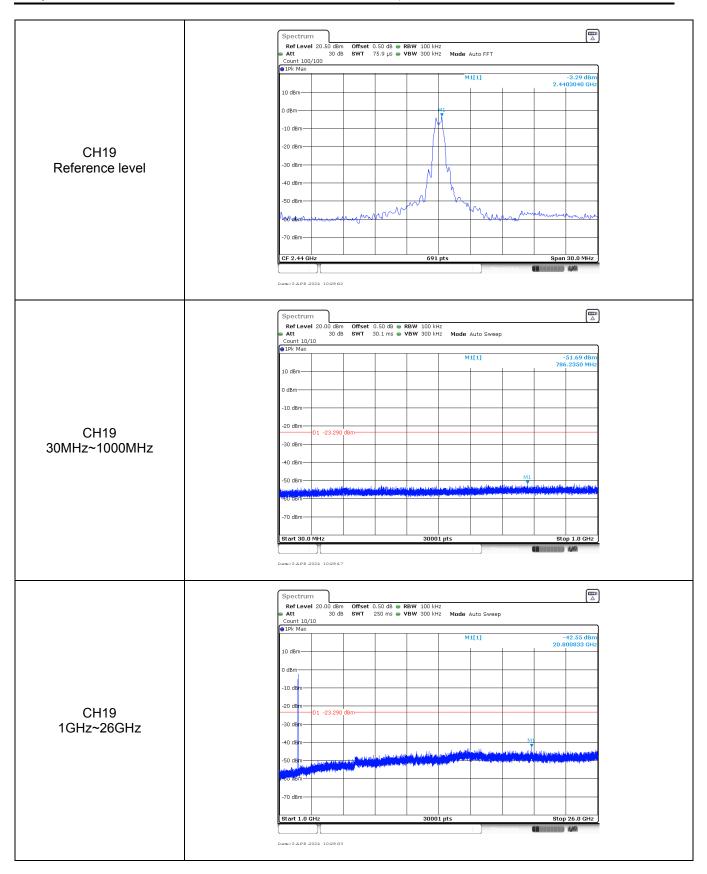
#### Appendix F: Band edge and Spurious Emissions (conducted)

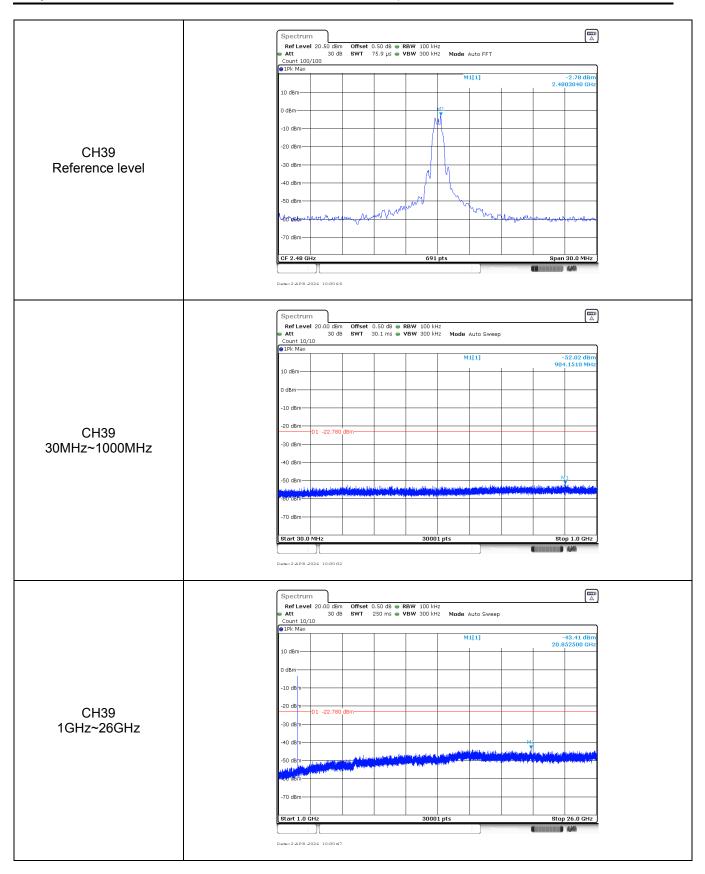


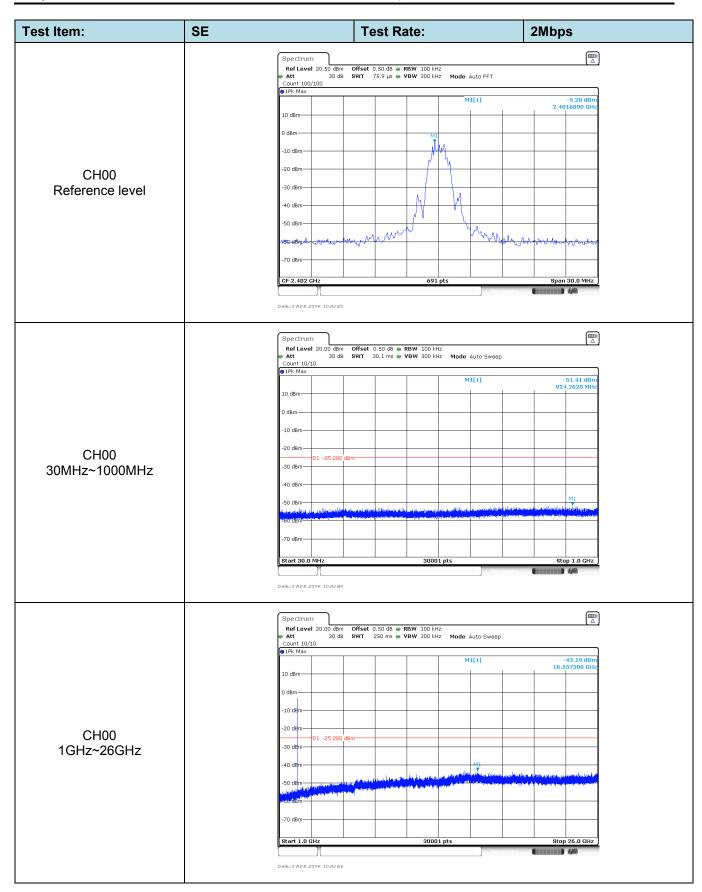


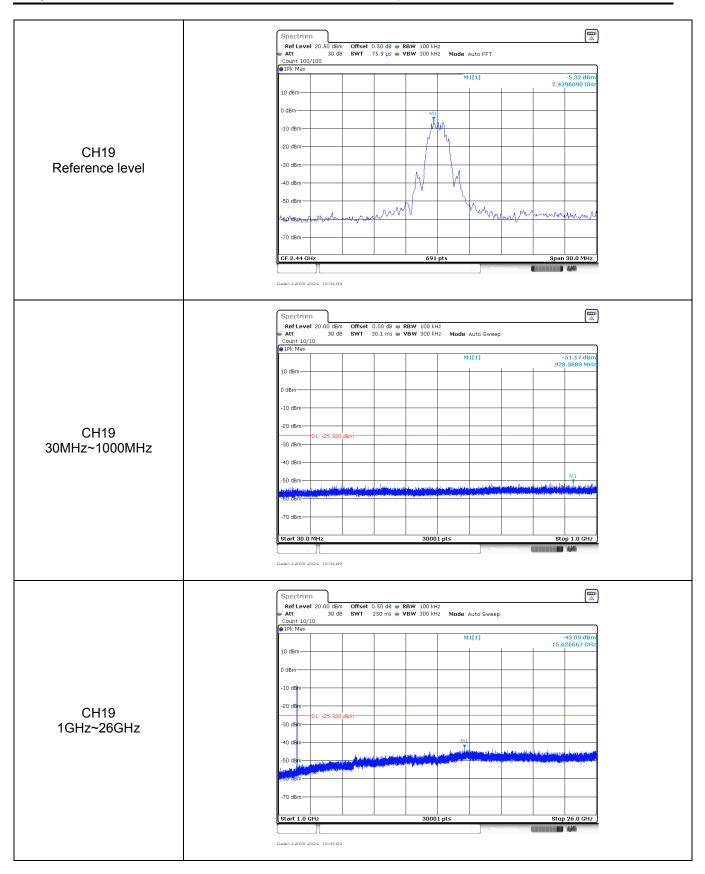


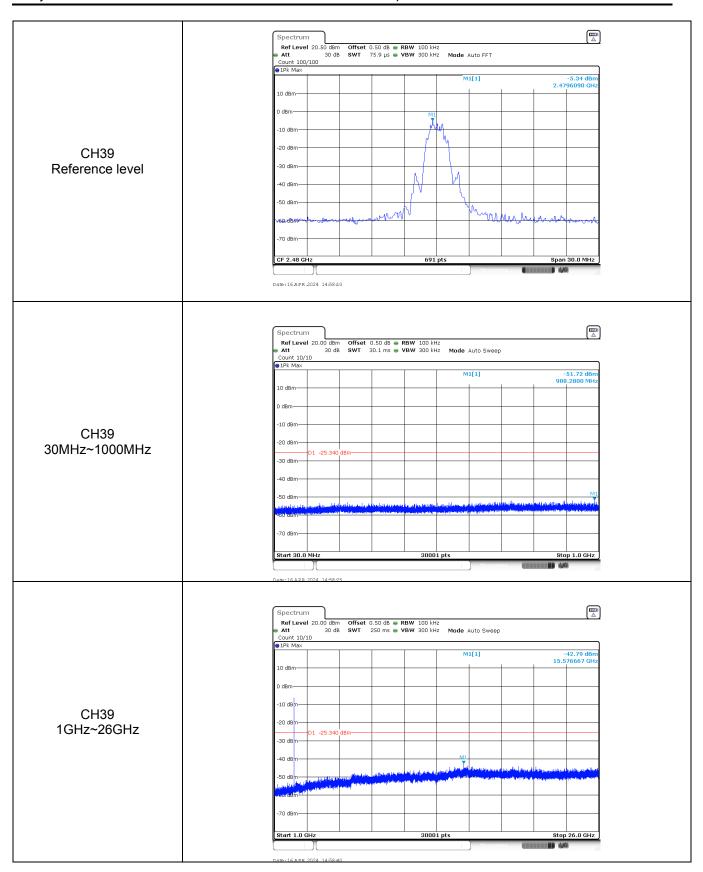












-----End of Report-----