



Shenzhen CTL Testing Technology Co., Ltd.
Tel: +86-755-89486194 E-mail: ctl@ctl-lab.com

TEST REPORT

FCC PART 15.247

Report Reference No.....: CTL2606232061-WF

Compiled by: Andy Su
(printed name+signature)

Reviewed by: Happy Guo
(printed name+signature)

Approved by: Ivan Xie
(printed name+signature)



Product Name.....: Earbuds

Model/Type reference: CPP-6959

List Model(s).....: UT2611, UT2612, UT2613, UT2614, UT2615, UT2616,
CPP-6958, CPP-6960, CPP-6961, CPP-6962, CPP-6963

Trade Mark.....: N/A

FCC ID.....: 2AJ9K-UT2612

Applicant's name: UTONG (HK) COMMERCIAL LIMITED

Address of applicant.....: Room 913, 9F, Hollywood Plaza, 610 Nathan Road, Mong Kok,
Kowloon, HongKong

Test specification.....:

Standard: FCC Part 15.247: Operation within the bands 902-928 MHz,
2400-2483.5 MHz and 5725-5850 MHz.

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF.....: Dated 2011-01

Date of receipt of test item: Jun 30, 2026

Date of Test Date.....: Jun 30, 2026- Jul 07, 2026

Date of Issue: Jul 08, 2026

Result.....: Pass

Shenzhen CTL Testing Technology Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen CTL Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen CTL Testing Technology 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.

TEST REPORT

Test Report No. :	CTL2606232061-WF	Jul 08, 2026
		Date of issue

Equipment under Test : Earbuds

Sample No : CTL260623206001, CTL260623206002, CTL260623206003

Model /Type : CPP-6959

Listed Models : UT2611, UT2612, UT2613, UT2614, UT2615, UT2616,
CPP-6958, CPP-6960, CPP-6961, CPP-6962, CPP-6963

Applicant : **UTONG (HK) COMMERCIAL LIMITED**

Address : Room 913, 9F, Hollywood Plaza, 610 Nathan Road, Mong
Kok, Kowloon, HongKong

Manufacturer : **UTONG (HK) COMMERCIAL LIMITED**

Address : Room 913, 9F, Hollywood Plaza, 610 Nathan Road, Mong
Kok, Kowloon, HongKong

Test result	Pass *
-------------	--------

*In the configuration tested, the EUT complied with the standards specified page 5.

This device (product name: Earbuds) model name: CPP-6959, UT2611, UT2612, UT2613, UT2614, UT2615, UT2616, CPP-6958, CPP-6960, CPP-6961, CPP-6962, CPP-6963 R electrical, PCB, BOM are electrical identical including the same software parameter and hardware design circuit design, PCB Layout, RF module/circuit, antenna type(s) and antenna location, components on PCB, same mechanical structure and design (including product enclosure), the only difference is the model name and appearance color, which does not affect the test results.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

[illegible]

Table of Contents

Page

1. SUMMARY	5
1.1. TEST STANDARDS	5
1.2. TEST DESCRIPTION	5
1.3. TEST FACILITY	6
1.4. EUT CONFIGURATION	6
1.5. STATEMENT OF THE MEASUREMENT UNCERTAINTY	7
2. GENERAL INFORMATION	8
2.1. ENVIRONMENTAL CONDITIONS	8
2.2. GENERAL DESCRIPTION OF EUT	8
2.3. DESCRIPTION OF TEST MODES AND TEST FREQUENCY	9
2.4. EQUIPMENTS USED DURING THE TEST	10
2.5. RELATED SUBMITTAL(S) / GRANT (S)	11
2.6. MODIFICATIONS	11
3. TEST CONDITIONS AND RESULTS	12
3.1. CONDUCTED EMISSIONS TEST	12
3.2. RADIATED EMISSIONS AND BAND EDGE	16
3.3. MAXIMUM PEAK OUTPUT POWER	30
3.4. 20dB BANDWIDTH	31
3.5. FREQUENCY SEPARATION	32
3.6. NUMBER OF HOPPING FREQUENCY	33
3.7. TIME OF OCCUPANCY (DWELL TIME)	34
3.8. OUT-OF-BAND EMISSIONS	35
3.9. PSEUDORANDOM FREQUENCY HOPPING SEQUENCE	36
3.10. ANTENNA REQUIREMENT	37
4. TEST SETUP PHOTOS OF THE EUT	38
5. PHOTOS OF THE EUT	40

1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024](#): American National Standard for Testing Unlicensed Wireless Devices

1.2. Test Description

FCC PART 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(1)(i)	20dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(b)	Pseudorandom Frequency Hopping Sequence	PASS
FCC Part 15.247(a)(1)(iii)	Number of hopping frequency& Time of Occupancy	PASS
FCC Part 15.247(a)(1)	Frequency Separation	PASS
FCC Part 15.205/15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

1.3. Test Facility

Company Name:	Shenzhen CTL Testing Technology Co., Ltd.
Address 1:	Zone A.1/F..Warehouse 2.Baisha Technology Park, No.3011,Shahexi Road, Nanshan District,Shenzhen.518055,P.R.C.
Address 2:	Fl.A1, Bldg.A3, No.2533 GuanGuang Road, Fenghuang Community Fenghuang Street, Guangming District, Shenzhen, Guangdong, PR.C

1.3.2 Test location

All tests were performed at:

Company Name:	Shenzhen CTL Testing Technology Co., Ltd.
☐ Main location	Zone A.1/F..Warehouse 2.Baisha Technology Park, No.3011,Shahexi Road, Nanshan District,Shenzhen.518055,P.R.C.
☒ Satellite location	Fl.A1, Bldg.A3, No.2533 GuanGuang Road, Fenghuang Community Fenghuang Street, Guangming District, Shenzhen, Guangdong, PR.C

1.3.3 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC CAB identifier: CN0041

Main Company Number :9618B

Satellite Company Number:35187

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Main Company Number:9618B and Satellite Company Number:35187.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation No.: CN1216. Test Firm Registration 399832.

1.4. EUT configuration

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

- - supplied by the manufacturer
- - supplied by the lab

☐	Adapter	Manufacturer :	HUAWEI
		Model No. :	HW-100225C00

1.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Conducted Emission 0.15~30MHz	$\pm 3.11\text{dB}$	(1)
Magnetic Field Emission 9KHz~30MHz	$\pm 3.24\text{dB}$	(1)
Radiated Emission 30~1000MHz	$\pm 4.5\text{dB}$	(1)
Radiated Emission Above 1GHz	$\pm 5.08\text{dB}$	(1)
DTS Bandwidth	$\pm 1.9\%$	(1)
Maximum Conducted Output Power	$\pm 1.18\text{ dB}$	(1)
Maximum Power Spectral Density Level	$\pm 0.98\text{ dB}$	(1)
Band-edge	$\pm 1.21\text{dB}$	(1)
Unwanted Emissions In Non-restricted Freq Bands	9kHz-7GHz: $\pm 1.09\text{dB}$ 7GHz-26.5GHz: $\pm 3.27\text{dB}$	(1)
Carrier Frequency Separation	$\pm 1.9\%$	(1)
Number of Hopping Channel	$\pm 1.9\%$	(1)
Radiated Spurious Emission	25MHz-1000MHz: $\pm 1.50\text{ dB}$ 1000MHz-20000MHz: $\pm 2.20\text{ dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2.0$.

(2) Decision rule for Statement of Conformity: The measurement uncertainty is not taken into account but only measured result.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	18-28°C
Relative Humidity:	30-60%
Air Pressure:	965-1030hPa

2.2. General Description of EUT

Product Name:	Earbuds
Model/Type reference:	CPP-6959
Power supply:	DC3.7V from battery or charge by AC-DC adapter
Test Voltage	DC3.7V from battery or charge by AC-DC adapter
Bluetooth:	
Version:	Supported BR/EDR
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Operation frequency:	2400MHz~2483.5MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Chip antenna
Antenna gain:	2.7 dBi provided by ☒ Applicant ☐ Manufacturer

Note1: For more details, please refer to the user's manual of the EUT.

Note2: Antenna gain provided by the applicant.

Note3: The model CPP-6959 is selected as representative model for full tests

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing. There are 79 channels provided to the EUT and Channel 00/39/78 were selected to test.

Operation Frequency :

Channel	Frequency (MHz)
00	2402
01	2403
⋮	⋮
38	2440
39	2441
40	2442
⋮	⋮
77	2479
78	2480

Preliminary tests were performed in each mode and packet length of BT, and found worst case as bellow, finally test were conducted at those mode and recorded in this report.

Test Items	Worst case
Conducted Emissions	DH5 Middle channel
Radiated Emissions and Band Edge	DH5
Maximum Conducted Output Power	DH5/2DH5/3DH5
20dB Bandwidth	DH5/2DH5/3DH5
Frequency Separation	DH5/2DH5/3DH5 Middle channel
Number of hopping frequency	DH5/2DH5/3DH5
Time of Occupancy (Dwell Time)	DH1/DH3/DH5 Middle channel 2DH1/2DH3/2DH5 Middle channel 3DH1/3DH3/3DH5 Middle channel
Out-of-band Emissions	DH5/2DH5/3DH5

RF Cable List and Details

RF Cable	RF Cable loss	RF Cable loss provided by
RF1.13	0.5dB	☒ Applicant ☐ Manufacturer ☐ Testing Laboratory (CTL)
RG 316	0.8dB	☒ Applicant ☐ Manufacturer ☐ Testing Laboratory (CTL)

2.4. Equipments Used during the Test

Conducted Emission						
Test Equipment	Manufacturer	Model No.	Serial No.	Previous calibration	Last Cal.	Cal.Due
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	/	2026/01/05	2027/01/04
LISN	ROHDE & SCHWARZ	ESH2-Z5	860014/010	/	2026/01/05	2027/01/04
Limitator	ROHDE & SCHWARZ	ESH3-Z2	100408	/	2026/01/05	2027/01/04
Software:						
Name of Software:			Version:			
ES-K1			V1.71			

Radiated Emission						
Test Equipment	Manufacturer	Model No.	Serial No.	Previous calibration	Last Cal.	Cal.Due
Active Loop Antenna	BEIJING DA ZE TECHNOLOGY CO., LTD	ZN30900 A	/	2026/07/01	2026/06/30	2027/06/29
ULTRA-BROADBAND ANTENNA	Sunol Sciences Corp.	JB1 Antenna	A061713	2026/07/01	2026/06/28	2027/06/27
Horn Antenna	Sunol Sciences Corp	DRH-118	A062013	/	2026/01/05	2027/01/04
Horn Antenna	Ocean Microwave	OBH1004 00	26999002	2026/07/01	2026/06/30	2027/06/29
Amplifier	MRT-AP01M06	MRT	S-001	/	2026/01/05	2027/01/04
Amplifier	Agilent	8449B	3008A02306	/	2026/01/05	2027/01/04
Amplifier	Brief&Smart	LNA-4018	2104197	2026/07/02	2026/06/30	2027/06/29
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	/	2026/01/05	2027/01/04
Spectrum Analyzer	RS	FSP	1164.4391.38	2026/07/02	2026/06/30	2027/06/29
9kHz-40GHz coaxial line chamber 2	/	Z108-NJ-NJ-9.5M	21121049	2026/07/02	2026/06/30	2027/06/29
Software:						
Name of Software:			Version:			
EZ EMC(Below 1GHz)			V1.1.4.2			
EZ EMC(Above 1GHz)			V1.1.4.2			

RF Conducted						
Test Equipment	Manufacturer	Model No.	Serial No.	Previous calibration	Last Cal.	Cal.Due
Spectrum Analyzer	Keysight	N9020A	MY53420874	2026/07/02	2026/06/30	2027/06/29
Power meter	TSTPASS	TSPS2023R	TSCB220016	2026/07/02	2026/06/30	2027/06/29
Temperature/Humidity Meter	Ji Yu	MC501	/	2026/07/02	2026/06/30	2027/06/29
Software:						
Name of Software:			Version:			

TST-PASS	V2.0.2
----------	--------

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

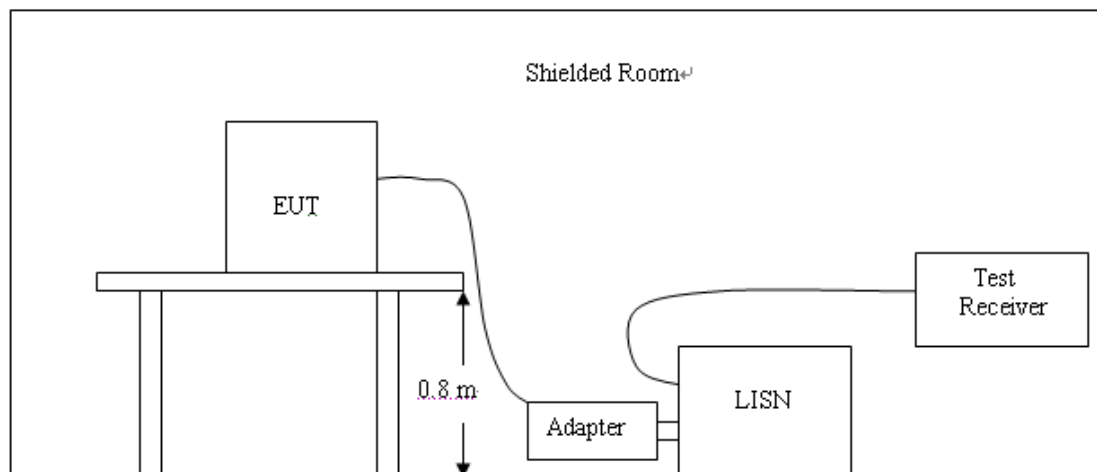
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	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 equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024.
2. Support equipment, if needed, was placed as per ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.

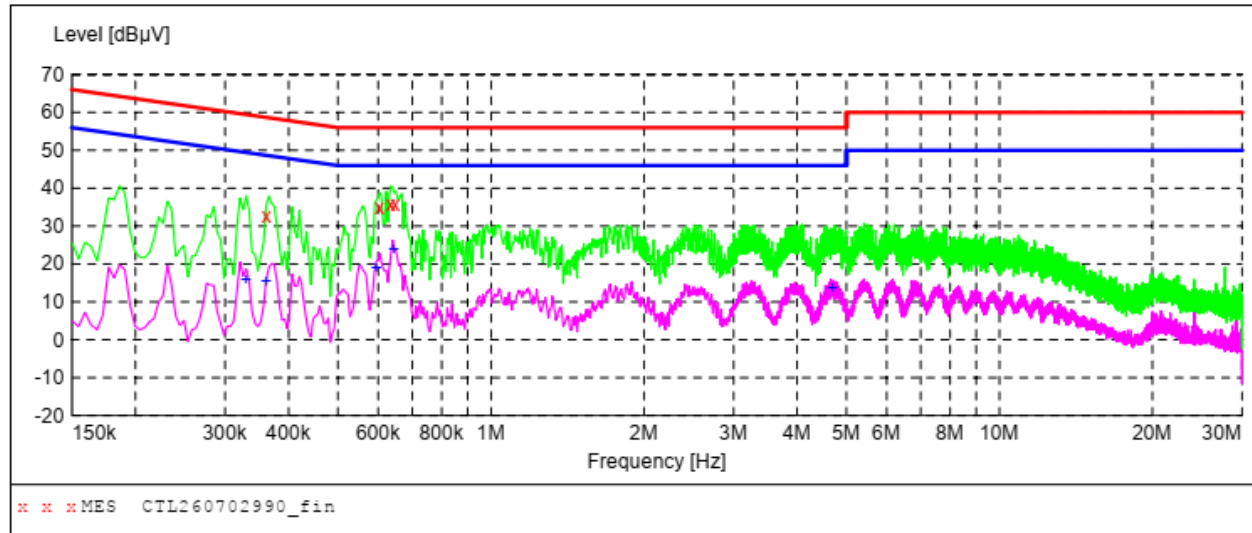
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Remark: We have tested all modes, only recorded worst at report.

Test Mode**BT****Line:****L****SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL260702990_fin"**

7/2/2026 6:58PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.361500	32.70	9.9	59	26.0	QP	L1	GND
0.604500	34.70	10.0	56	21.3	QP	L1	GND
0.636000	35.90	10.0	56	20.1	QP	L1	GND
0.649500	35.80	10.0	56	20.2	QP	L1	GND

MEASUREMENT RESULT: "CTL260702990_fin2"

7/2/2026 6:58PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.330000	16.00	9.9	50	33.5	AV	L1	GND
0.361500	15.40	9.9	49	33.3	AV	L1	GND
0.595500	19.00	10.0	46	27.0	AV	L1	GND
0.645000	23.80	10.0	46	22.2	AV	L1	GND
4.699500	13.50	10.5	46	32.5	AV	L1	GND

Test Mode

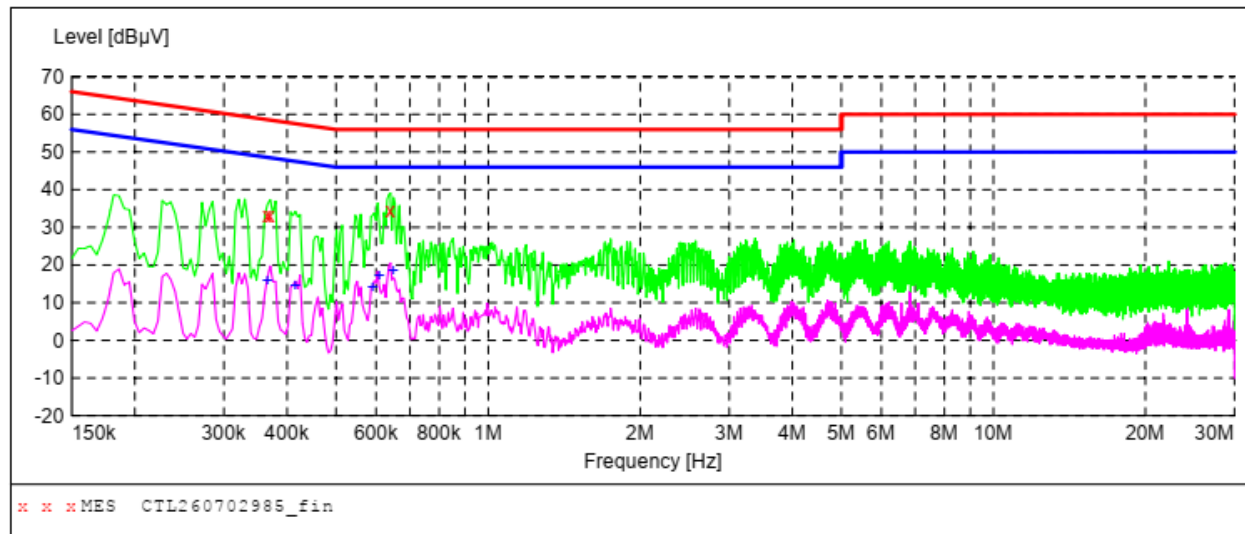
BT

Line:

N

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL260702985_fin"**

7/2/2026 6:44PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.366000	32.90	9.9	59	25.7	QP	N	GND
0.370500	32.90	9.9	59	25.6	QP	N	GND
0.640500	34.60	10.0	56	21.4	QP	N	GND

MEASUREMENT RESULT: "CTL260702985_fin2"

7/2/2026 6:44PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.366000	16.00	9.9	49	32.6	AV	N	GND
0.415500	14.30	9.9	48	33.2	AV	N	GND
0.591000	14.10	10.0	46	31.9	AV	N	GND
0.609000	17.20	10.0	46	28.8	AV	N	GND
0.649500	18.60	10.0	46	27.4	AV	N	GND

3.2. Radiated Emissions and Band Edge

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

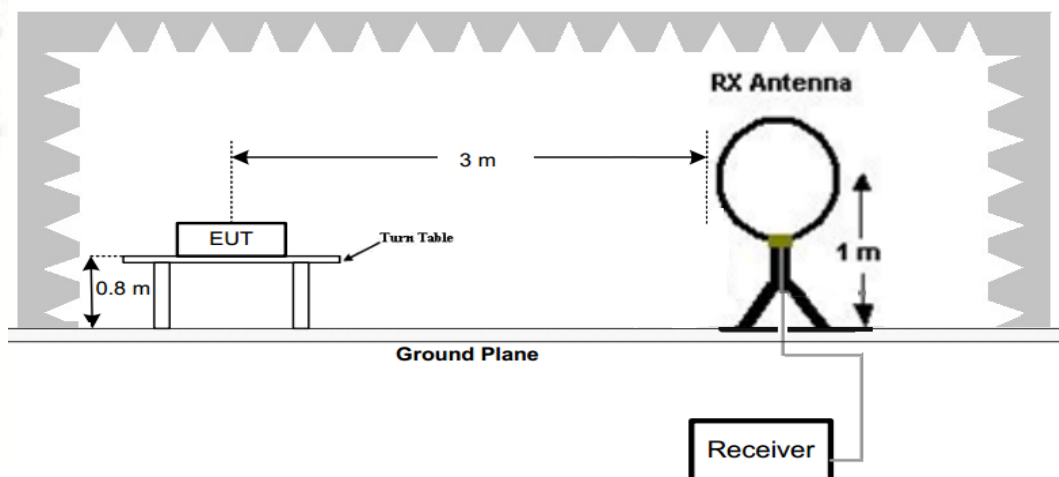
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

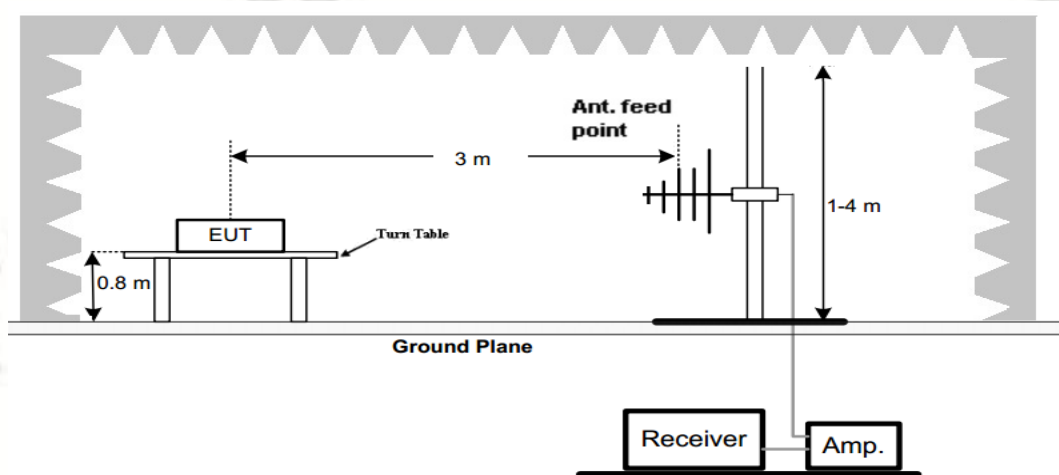
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz})) + 40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz})) + 40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30) + 40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

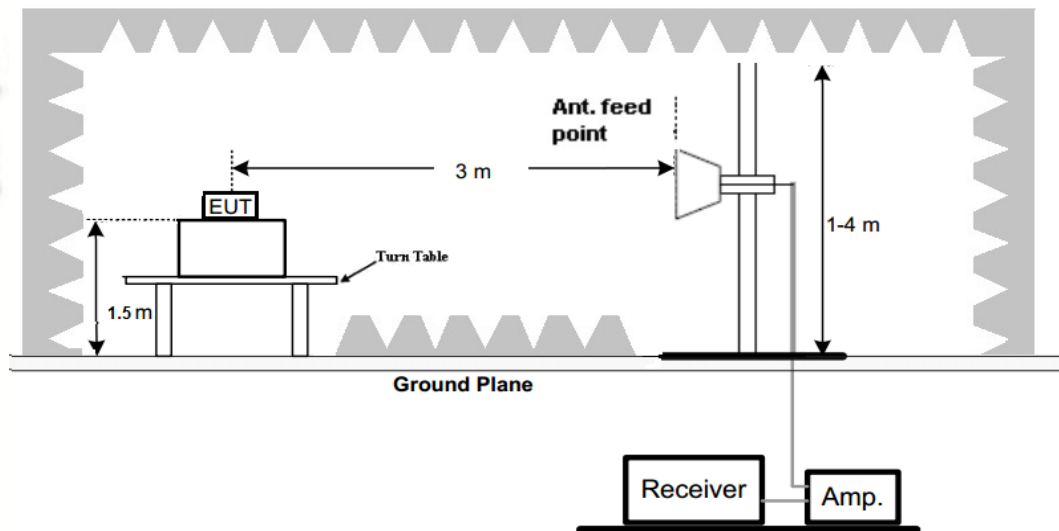
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

TEST RESULTS

Remark:

1. We measured Radiated Emission at GFSK, $\pi/4$ DQPSK and 8DPSK mode from 9 KHz to 25GHz and recorded worst case at GFSK DH5 mode.
2. For below 1GHz testing recorded worst at GFSK DH5 low channel.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, Found the emission level are attenuated 20dB below the limits from 9 kHz to 30MHz, so it does not recorded in report.

For 30MHz-1GHz

Horizontal



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

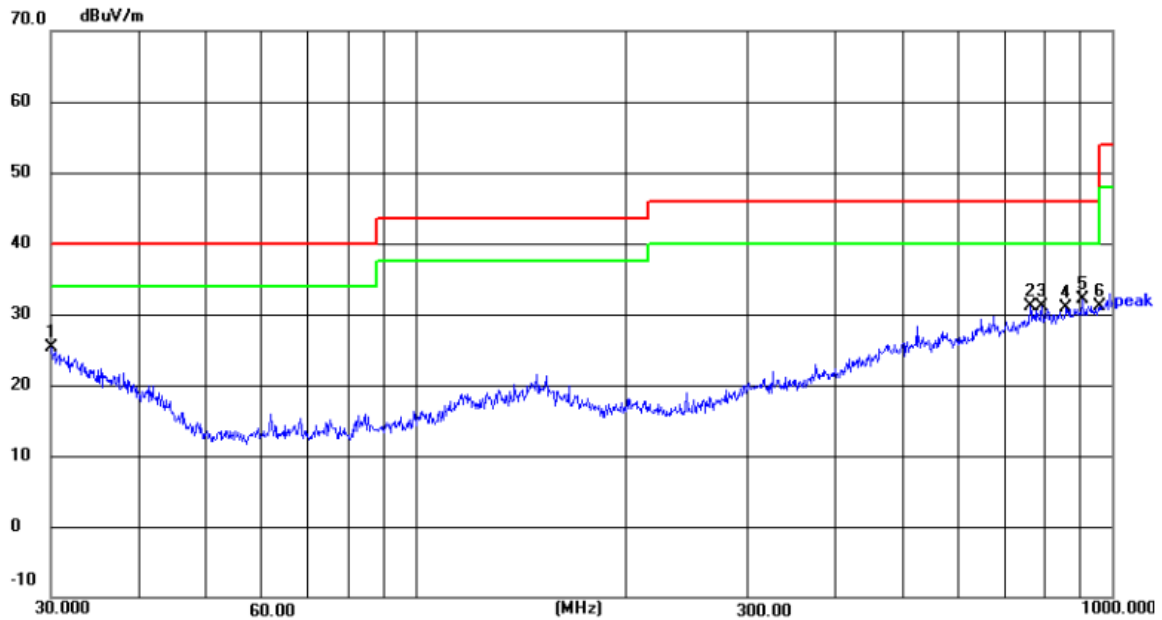
Radiated Emission Measurement

File :RF2

Data :#8021

Date: 2026/07/02

Time: 19:01:14



Site LAB Chamber 1

Limit: FCC Part15 Class C_30-1000MHz

EUT:

M/N:

Mode: BT 2402MHz

Note: CTL2606232061-WF

Polarization: **Horizontal**

Power:

Distance: 3m

Temperature: 25(C)

Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.1053	5.00	20.31	25.31	40.00	14.69	peak	100	34	P	
2	763.3757	6.99	24.10	31.09	46.00	14.91	peak	100	43	P	
3	793.3959	6.56	24.53	31.09	46.00	14.91	peak	100	327	P	
4	860.0351	6.03	24.96	30.99	46.00	15.01	peak	100	16	P	
5	906.4824	6.55	25.51	32.06	46.00	13.94	peak	100	255	P	
6	958.7943	4.97	26.05	31.02	46.00	14.98	peak	100	291	P	

Vertical



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

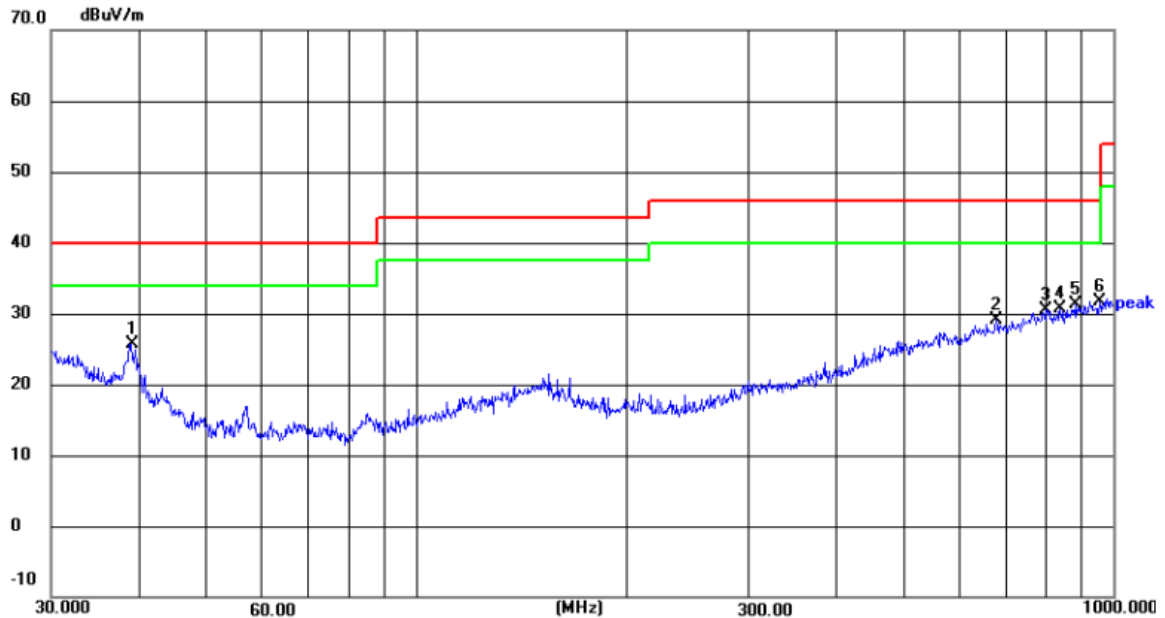
Radiated Emission Measurement

File :RF2

Data :#8022

Date: 2026/07/02

Time: 19:02:00



Site LAB Chamber 1

Limit: FCC Part15 Class C_30-1000MHz

EUT:

M/N:

Mode: BT 2402MHz

Note: CTL2606232061-WF

Polarization: **Vertical**

Power:

Distance: 3m

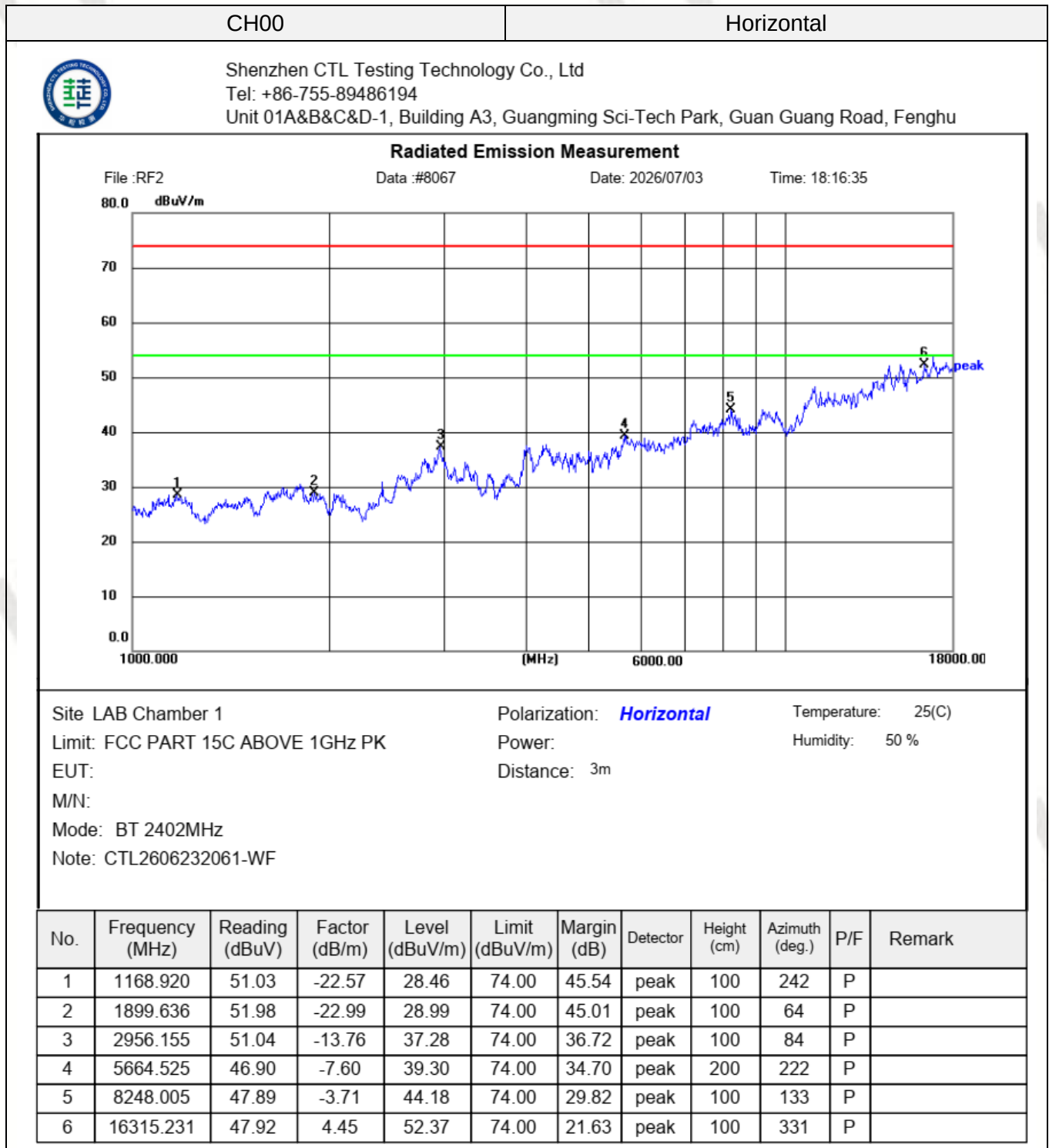
Temperature: 25(C)

Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	39.0245	9.98	15.81	25.79	40.00	14.21	peak	100	105	P	
2	679.9600	6.07	22.98	29.05	46.00	16.95	peak	100	169	P	
3	801.7863	5.84	24.60	30.44	46.00	15.56	peak	100	59	P	
4	839.1818	6.01	24.67	30.68	46.00	15.32	peak	100	252	P	
5	881.4067	6.16	25.21	31.37	46.00	14.63	peak	100	188	P	
6	955.4381	5.84	25.84	31.68	46.00	14.32	peak	100	59	P	

For 1GHz to 25GHz

Note: GFSK, Pi/4 DQPSK and 8DPSK all have been tested, only worse case GFSK is reported.

GFSK (above 1GHz)

CH00

Vertical



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

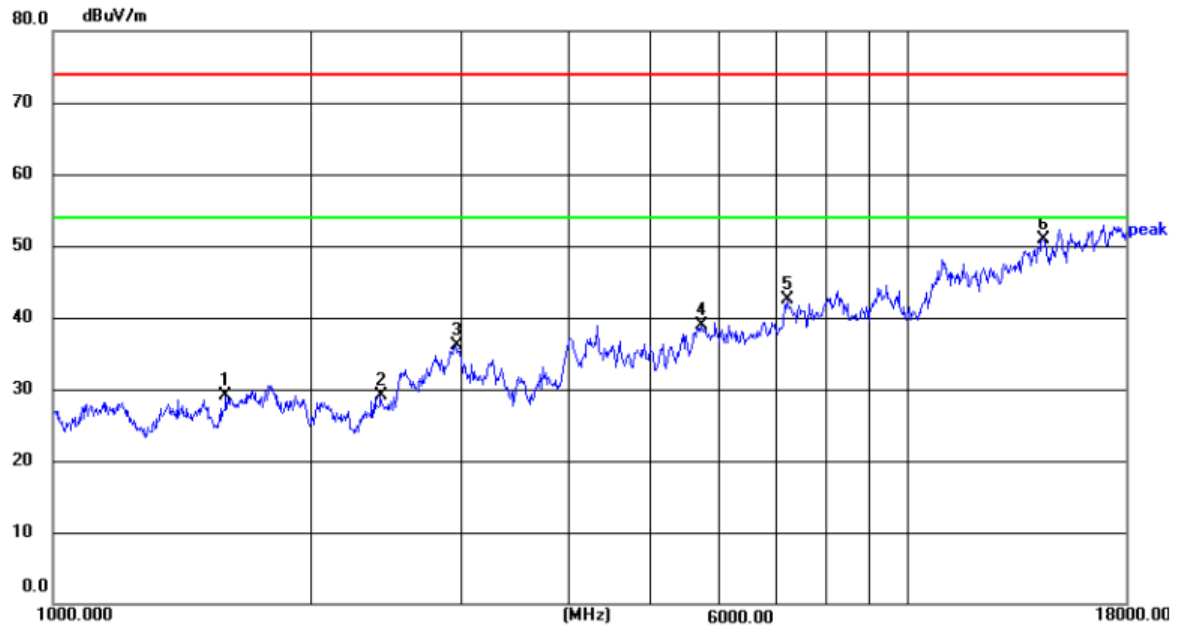
Radiated Emission Measurement

File :RF2

Data :#8068

Date: 2026/07/03

Time: 18:17:21



Site LAB Chamber 1

Limit: FCC PART 15C ABOVE 1GHz PK

EUT:

M/N:

Mode: BT 2402MHz

Note: CTL2606232061-WF

Polarization: **Vertical**

Power:

Distance: 3m

Temperature: 25(C)

Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1592.571	51.74	-22.55	29.19	74.00	44.81	peak	100	355	P	
2	2414.672	47.71	-18.60	29.11	74.00	44.89	peak	100	247	P	
3	2956.155	49.90	-13.76	36.14	74.00	37.86	peak	100	355	P	
4	5730.395	46.39	-7.48	38.91	74.00	35.09	peak	200	167	P	
5	7221.150	46.54	-4.09	42.45	74.00	31.55	peak	100	355	P	
6	14366.840	48.38	2.58	50.96	74.00	23.04	peak	100	296	P	

CH39

Horizontal



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

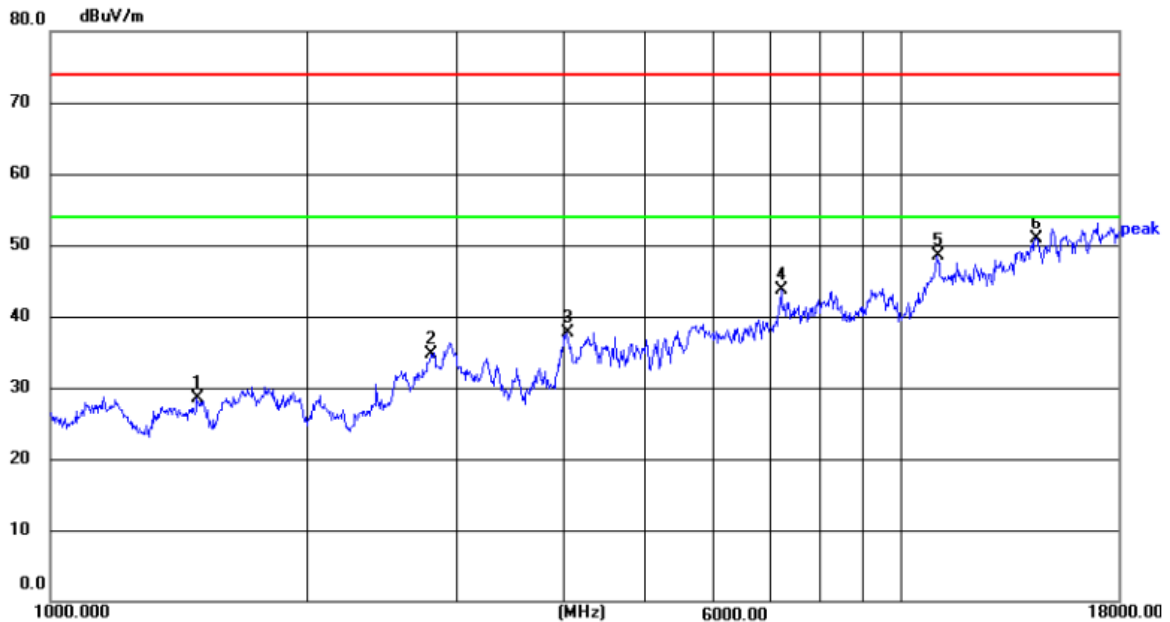
Radiated Emission Measurement

File :RF2

Data :#8069

Date: 2026/07/03

Time: 18:18:40



Site LAB Chamber 1

Limit: FCC PART 15C ABOVE 1GHz PK

EUT:

M/N:

Mode: BT 2441MHz

Note: CTL2606232061-WF

Polarization: **Horizontal**

Temperature: 25(C)

Power:

Humidity: 50 %

Distance: 3m

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1485.841	50.54	-21.95	28.59	74.00	45.41	peak	100	360	P	
2	2798.189	48.88	-14.09	34.79	74.00	39.21	peak	100	94	P	
3	4039.212	46.56	-8.91	37.65	74.00	36.35	peak	100	174	P	
4	7221.150	47.74	-4.09	43.65	74.00	30.35	peak	100	25	P	
5	11012.253	47.43	1.11	48.54	74.00	25.46	peak	200	283	P	
6	14366.840	48.30	2.58	50.88	74.00	23.12	peak	100	302	P	

CH39

Vertical



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

Radiated Emission Measurement

File :RF2

Data :#8070

Date: 2026/07/03

Time: 18:19:26



Site LAB Chamber 1

Limit: FCC PART 15C ABOVE 1GHz PK

EUT:

M/N:

Mode: BT 2441MHz

Note: CTL2606232061-WF

Polarization: **Vertical**

Power:

Distance: 3m

Temperature: 25(C)

Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1350.667	50.33	-22.03	28.30	74.00	45.70	peak	100	295	P	
2	2782.060	47.91	-14.60	33.31	74.00	40.69	peak	100	147	P	
3	5697.365	46.32	-7.17	39.15	74.00	34.85	peak	200	37	P	
4	7221.150	46.51	-4.09	42.42	74.00	31.58	peak	100	226	P	
5	8248.005	48.07	-3.71	44.36	74.00	29.64	peak	100	226	P	
6	14366.840	49.04	2.58	51.62	74.00	22.38	peak	100	236	P	

CH78

Horizontal



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

Radiated Emission Measurement

File :RF2

Data :#8071

Date: 2026/07/03

Time: 18:20:49

80.0 dBuV/m



Site LAB Chamber 1

Limit: FCC PART 15C ABOVE 1GHz PK

EUT:

M/N:

Mode: BT 2480MHz

Note: CTL2606232061-WF

Polarization: **Horizontal**

Temperature: 25(C)

Power:

Humidity: 50 %

Distance: 3m

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1196.264	51.10	-22.28	28.82	74.00	45.18	peak	100	213	P	
2	2580.652	47.87	-14.90	32.97	74.00	41.03	peak	100	114	P	
3	4004.339	45.32	-8.99	36.33	74.00	37.67	peak	100	25	P	
4	7221.150	47.48	-4.09	43.39	74.00	30.61	peak	200	312	P	
5	10791.685	46.55	-1.11	45.44	74.00	28.56	peak	100	15	P	
6	16988.970	47.52	5.12	52.64	74.00	21.36	peak	100	174	P	

CH78

Vertical



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

Radiated Emission Measurement

File :RF2

Data :#8072

Date: 2026/07/03

Time: 18:21:35



Site LAB Chamber 1

Limit: FCC PART 15C ABOVE 1GHz PK

EUT:

M/N:

Mode: BT 2480MHz

Note: CTL2606232061-WF

Polarization: **Vertical**

Power:

Distance: 3m

Temperature: 25(C)

Humidity: 50 %

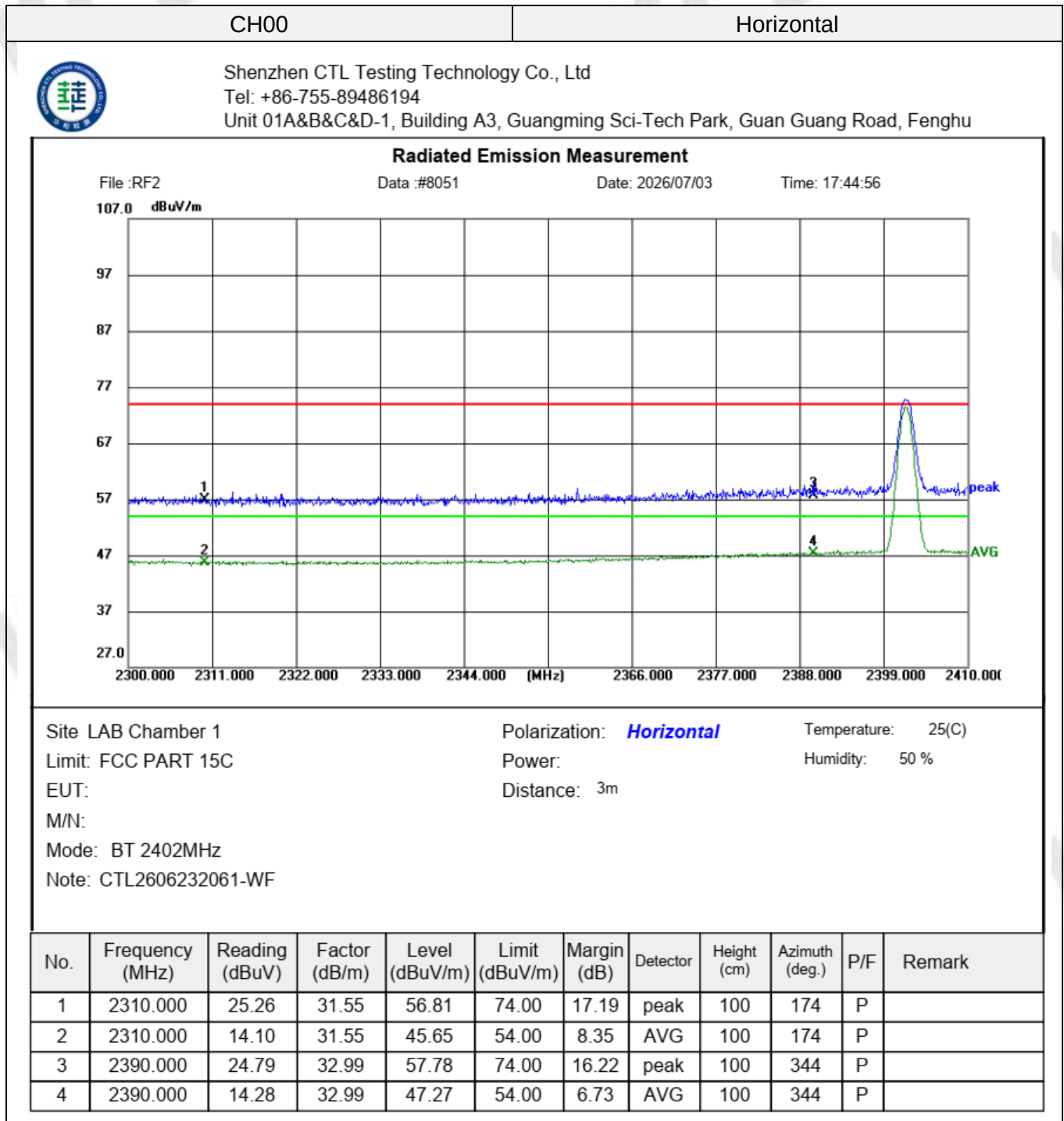
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1132.340	52.23	-22.91	29.32	74.00	44.68	peak	100	128	P	
2	1798.127	52.98	-21.62	31.36	74.00	42.64	peak	100	356	P	
3	4039.212	46.16	-8.91	37.25	74.00	36.75	peak	100	247	P	
4	8248.005	47.04	-3.71	43.33	74.00	30.67	peak	100	89	P	
5	11012.253	46.64	1.11	47.75	74.00	26.25	peak	200	89	P	
6	17588.562	47.33	5.89	53.22	74.00	20.78	peak	100	276	P	

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
5. Other emissions are attenuated 20dB below the limits from 9kHz to 30MHz, so it does not recorded in report.
6. 18GHz-26GHz not recorded for no spurious point have a margin of less than 20 dB with respect to the limits
7. While performing the testing, the notch filter is used for avoiding test instrument overload.

Results of Band Edges Test (Radiated)

Note: All modulations have been tested, only worse case GFSK is reported.

GFSK

CH00

Vertical



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

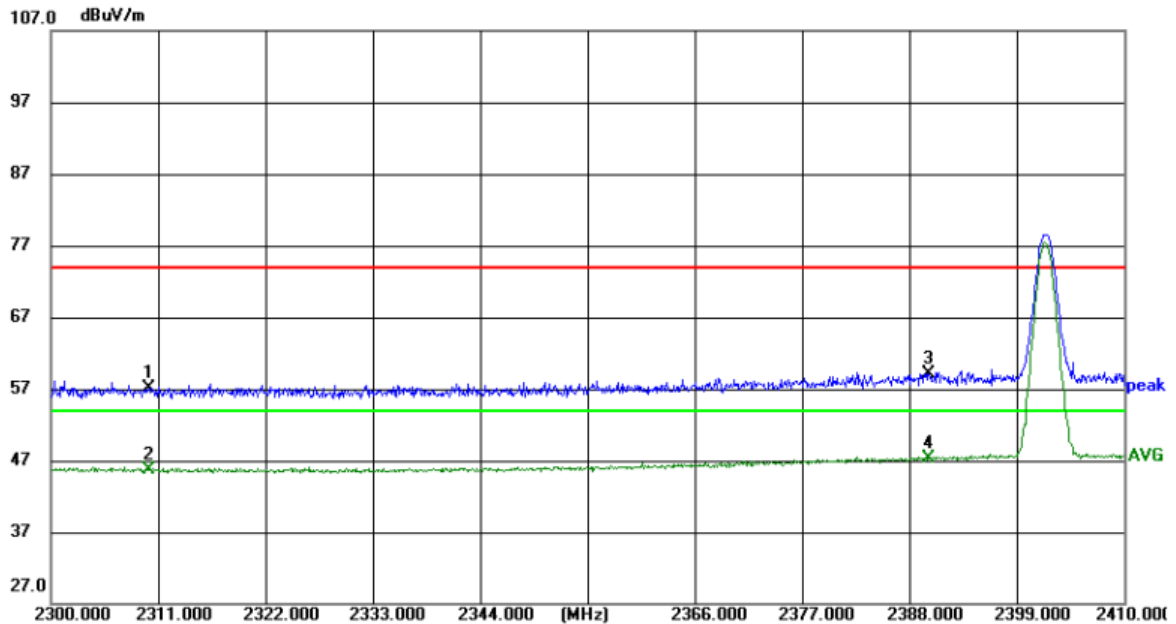
Radiated Emission Measurement

File :RF2

Data :#8052

Date: 2026/07/03

Time: 17:45:43



Site LAB Chamber 1

Limit: FCC PART 15C

EUT:

M/N:

Mode: BT 2402MHz

Note: CTL2606232061-WF

Polarization: **Vertical**

Power:

Distance: 3m

Temperature: 25(C)

Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	25.46	31.55	57.01	74.00	16.99	peak	100	247	P	
2	2310.000	14.07	31.55	45.62	54.00	8.38	AVG	100	247	P	
3	2390.000	26.19	32.99	59.18	74.00	14.82	peak	100	309	P	
4	2390.000	14.24	32.99	47.23	54.00	6.77	AVG	100	309	P	

CH78

Horizontal



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

Radiated Emission Measurement

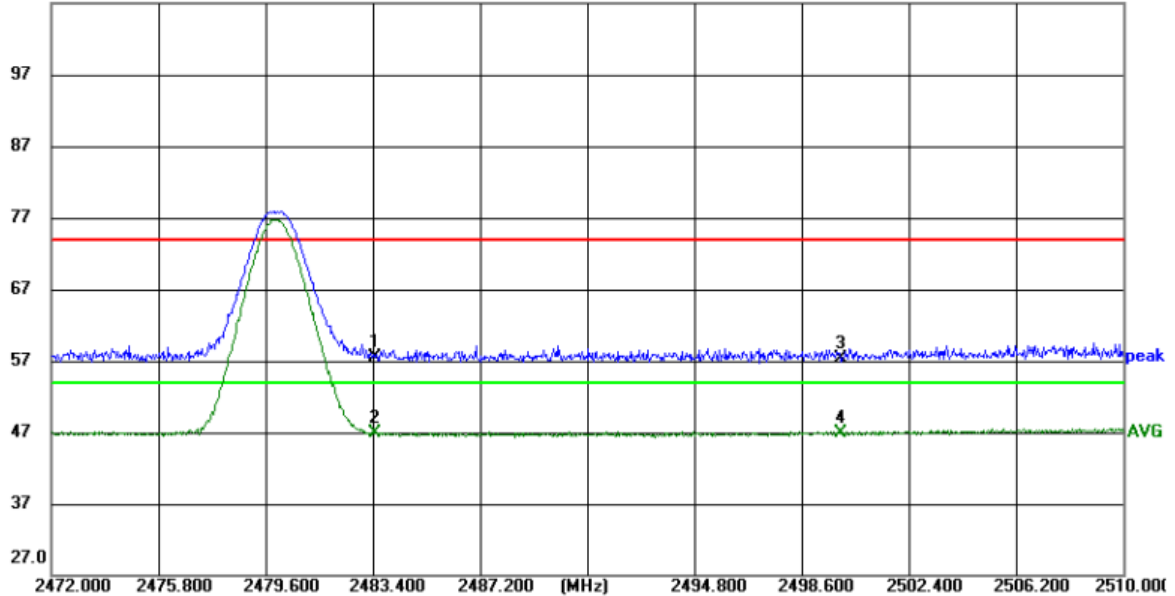
File :RF2

Data :#8049

Date: 2026/07/03

Time: 17:41:41

107.0 dBuV/m



Site LAB Chamber 1

Limit: FCC PART 15C

EUT:

M/N:

Mode: BT 2480MHz

Note: CTL2606232061-WF

Polarization: **Horizontal**

Temperature: 25(C)

Power:

Humidity: 50 %

Distance: 3m

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	24.49	33.03	57.52	74.00	16.48	peak	100	98	P	
2	2483.500	13.82	33.03	46.85	54.00	7.15	AVG	100	98	P	
3	2500.000	24.31	33.07	57.38	74.00	16.62	peak	100	52	P	
4	2500.000	13.75	33.07	46.82	54.00	7.18	AVG	100	52	P	

CH78

Vertical



Shenzhen CTL Testing Technology Co., Ltd

Tel: +86-755-89486194

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road, Fenghu

Radiated Emission Measurement

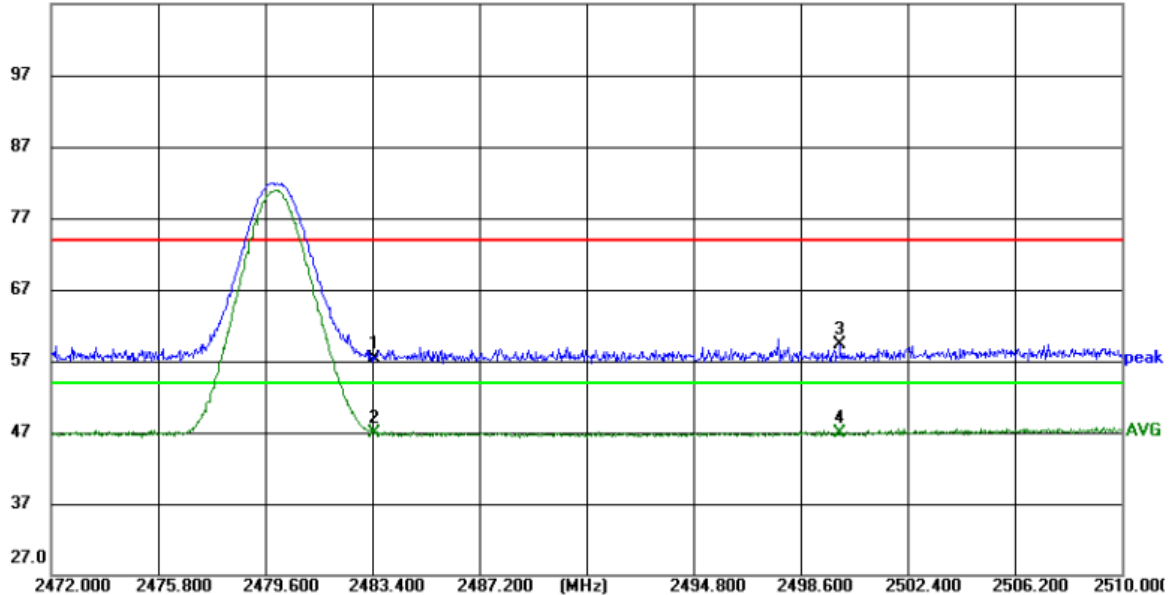
File :RF2

Data :#8050

Date: 2026/07/03

Time: 17:42:27

107.0 dBuV/m



Site LAB Chamber 1

Limit: FCC PART 15C

EUT:

M/N:

Mode: BT 2480MHz

Note: CTL2606232061-WF

Polarization: **Vertical**

Temperature: 25(C)

Power:

Humidity: 50 %

Distance: 3m

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	24.34	33.03	57.37	74.00	16.63	peak	100	60	P	
2	2483.500	13.88	33.03	46.91	54.00	7.09	AVG	100	60	P	
3	2500.000	26.23	33.07	59.30	74.00	14.70	peak	100	355	P	
4	2500.000	13.76	33.07	46.83	54.00	7.17	AVG	100	355	P	

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.

3.3. Maximum Peak Output Power

Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power measurement module.

Test Configuration



Test Results

Raw data reference to Section 2 from CTL2606232061-WF Annex for BT.

3.4. 20dB Bandwidth

Limit

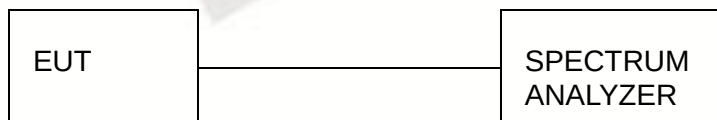
For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Configuration



Test Results

Raw data reference to Section 1 from CTL2606232061-WF Annex for BT.

3.5. Frequency Separation

LIMIT

According to 15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the $2/3 \times 20\text{dB}$ bandwidth of the hopping channel, whichever is greater.

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 300 KHz RBW and 300 KHz VBW.

TEST CONFIGURATION



TEST RESULTS

Raw data reference to Section 3 from CTL2606232061-WF Annex for BT.

3.6. Number of hopping frequency

Limit

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 2400MHz to 2483.5MHz with 300 KHz RBW and 300 KHz VBW.

Test Configuration



Test Results

Raw data reference to Section 4 from CTL2606232061-WF Annex for BT.

3.7. Time of Occupancy (Dwell Time)

Limit

The average time of occupancy on any channel shall not be greater than 400 milliseconds within a period of 400 milliseconds multiplied by the number of hopping channels employed.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. Set center frequency of spectrum analyzer=operating frequency with 1MHz RBW and 1MHz VBW, Span 0Hz.

Test Configuration



Test Results

Raw data reference to Section 5 from CTL2606232061-WF Annex for BT.

3.8. Out-of-band Emissions

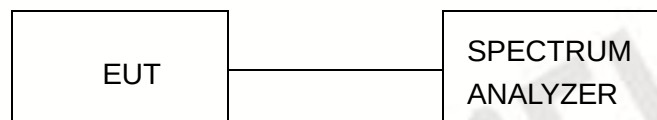
Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

Test Configuration



Test Results

Raw data reference to Section 6 from CTL2606232061-WF Annex for BT.

3.9. Pseudorandom Frequency Hopping Sequence

TEST APPLICABLE

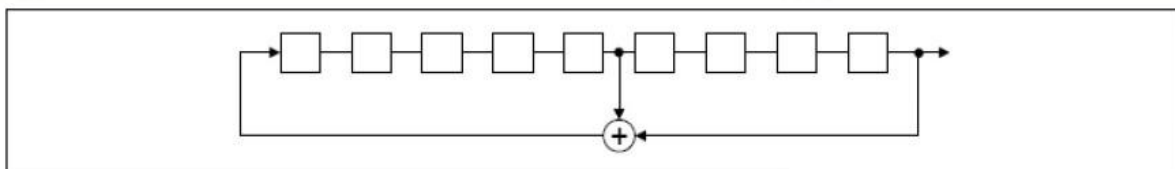
For 47 CFR Part 15C section 15.247 (a) (1) requirement:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence Requirement

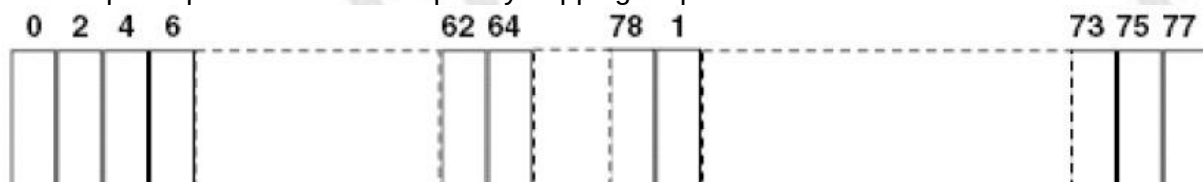
The pseudorandom frequency hopping sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: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



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.

3.10. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

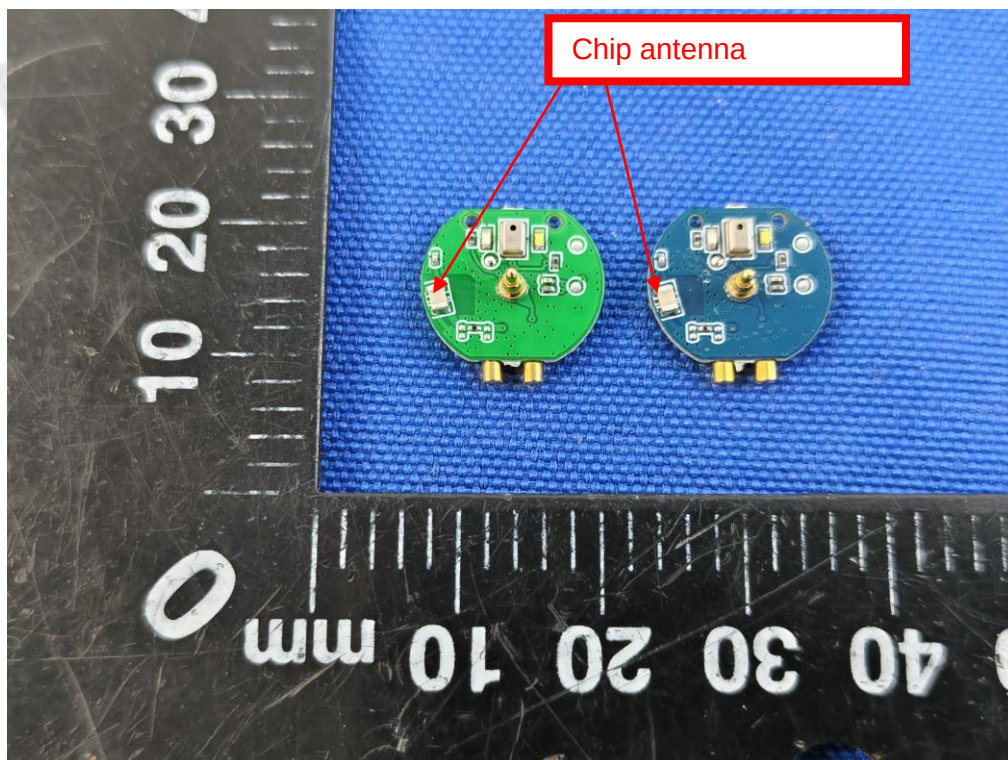
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance

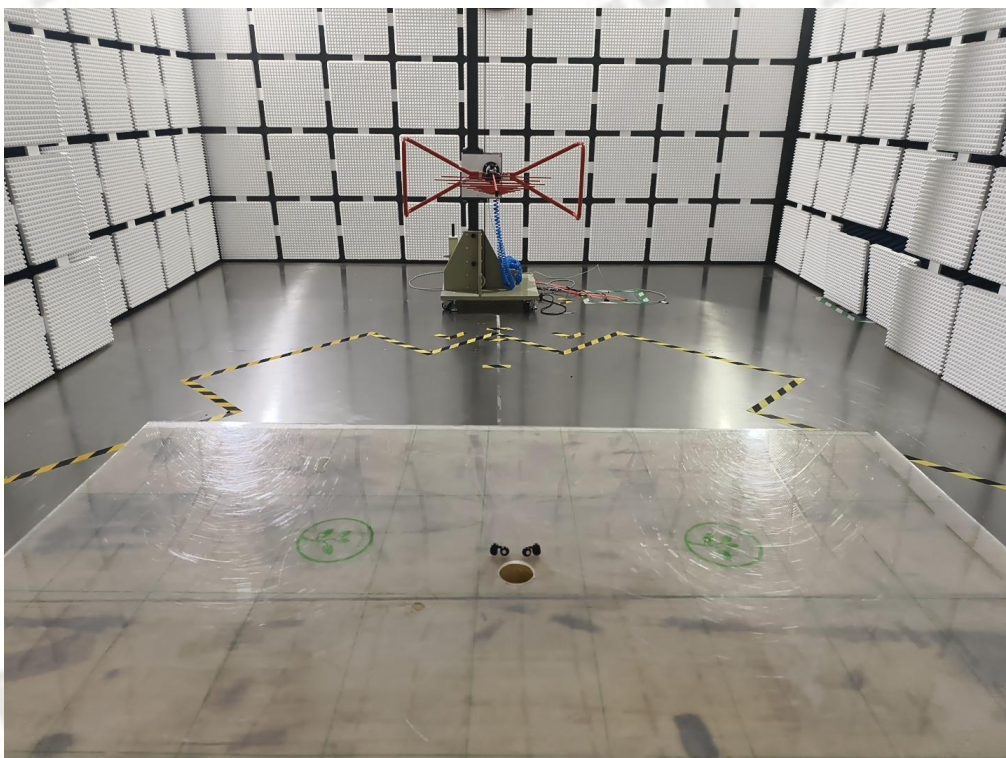
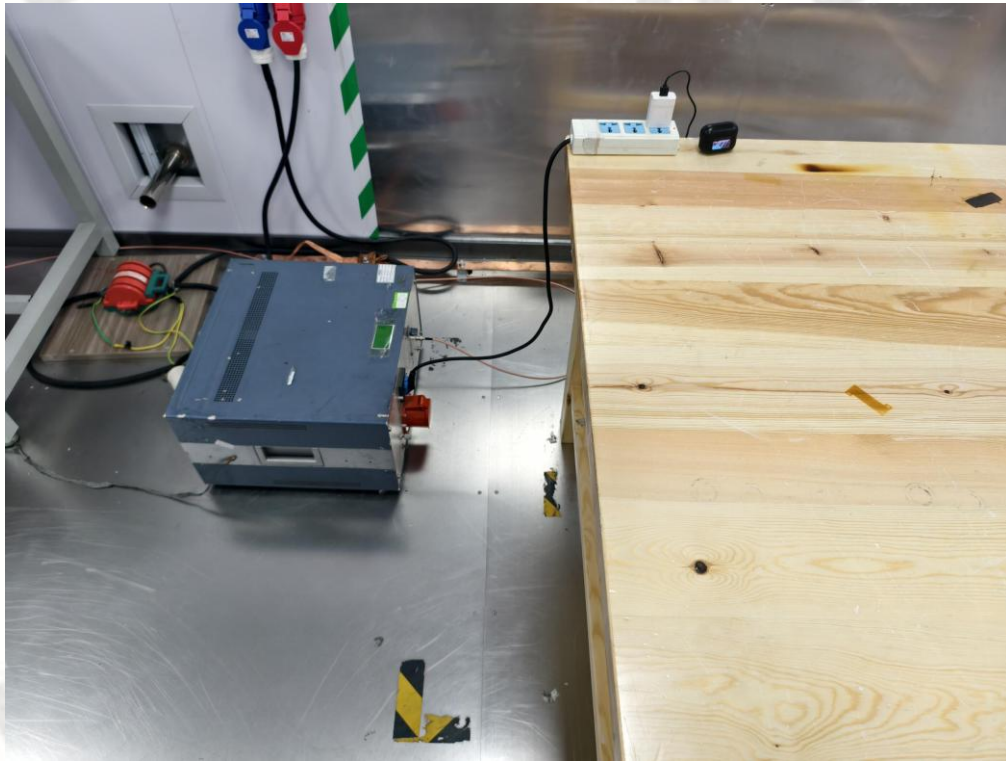
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

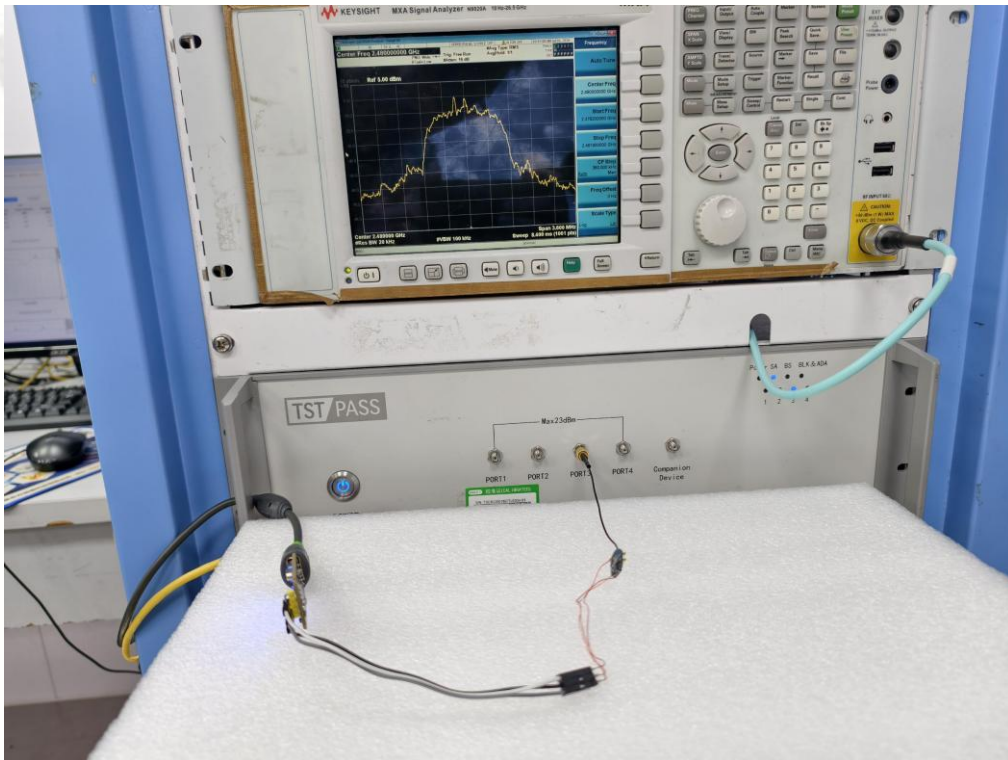
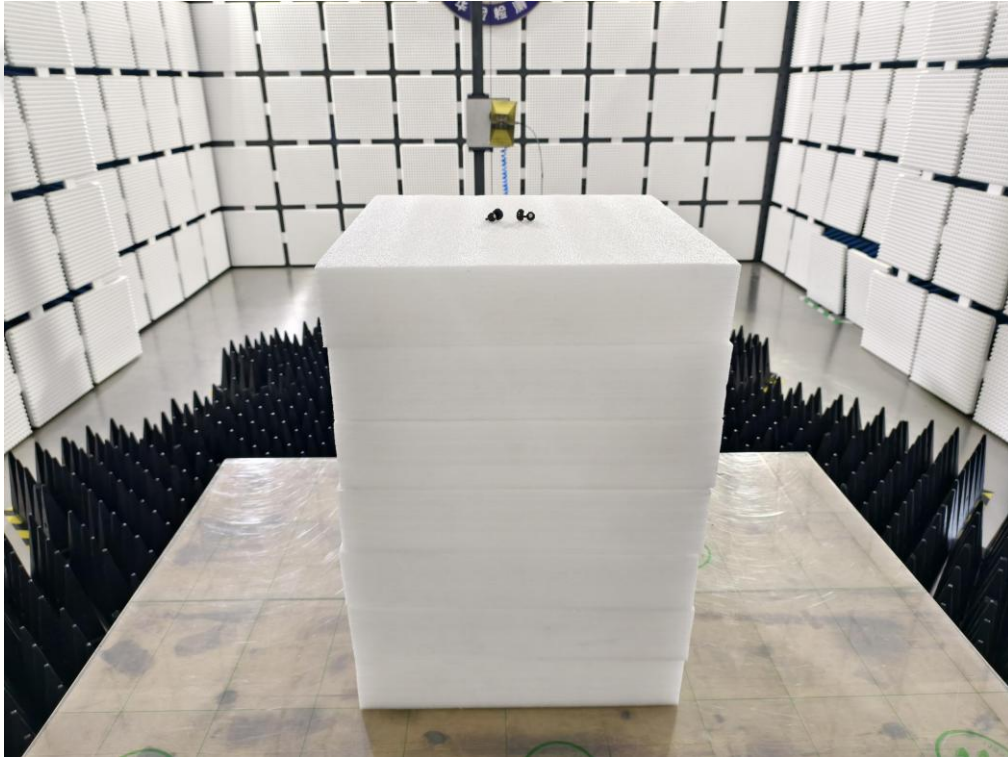
Antenna Connected Construction

The maximum gain of antenna was 2.7 dBi



4. Test Setup Photos of the EUT





5. Photos of the EUT

External Photo

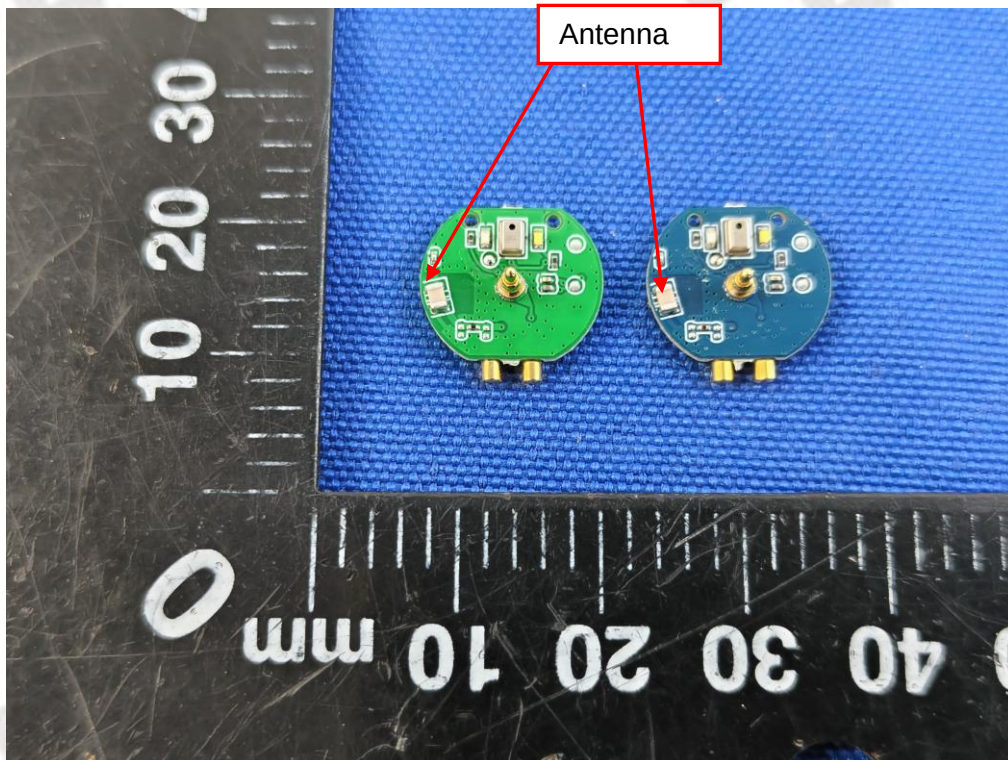


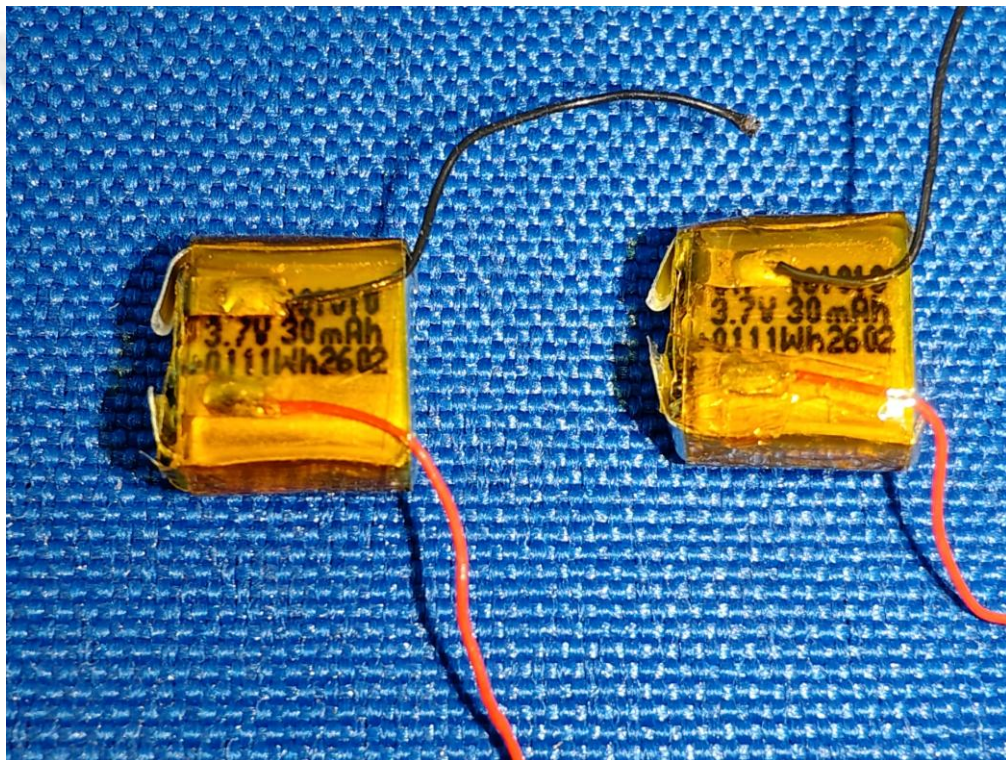
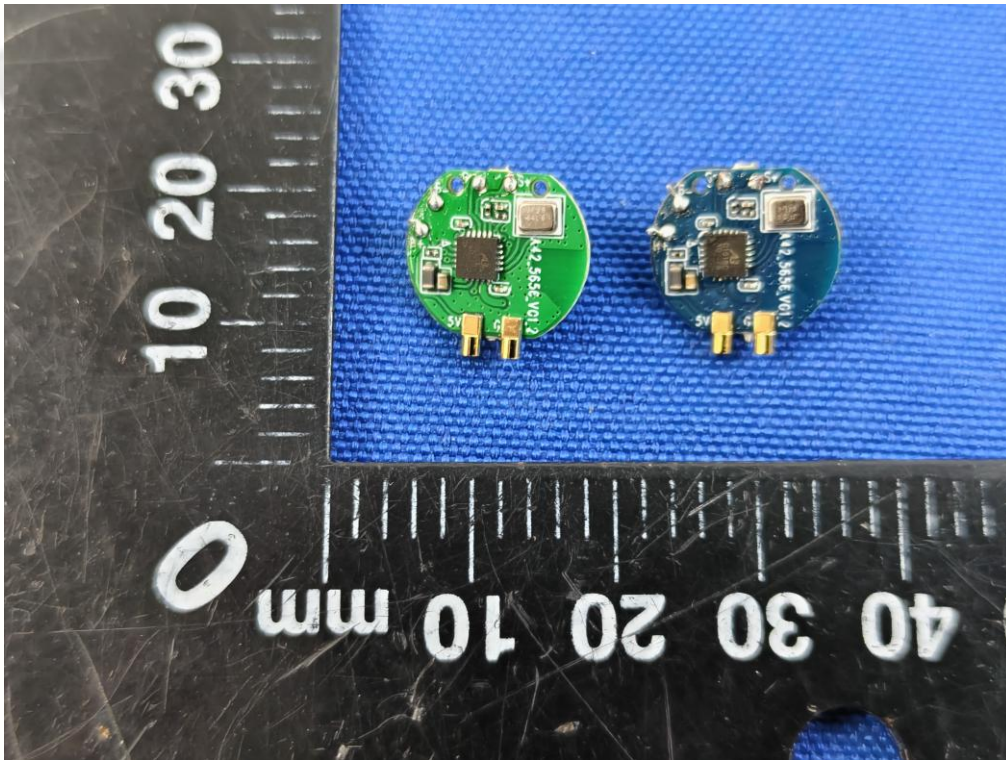


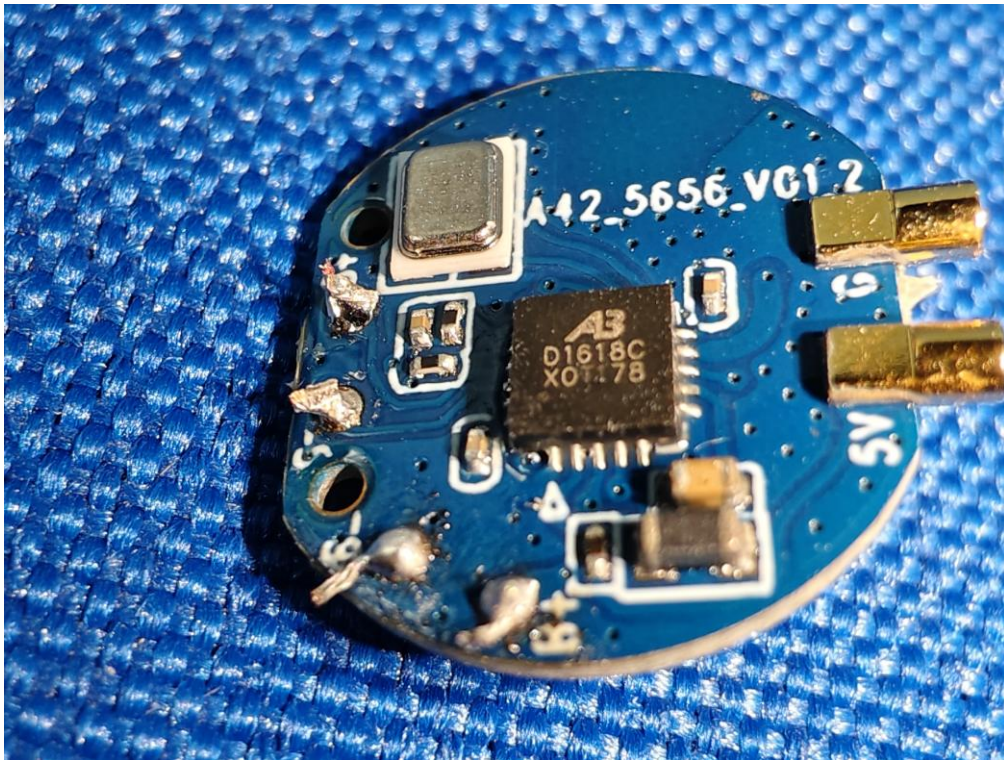




Internal photo







***** End of Report *****