



TEST REPORT

FCC PART 15.247

Report Reference No. : CTL2401122031-WF02

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Product Name : ADTH NEXTGEN TV Box

Model/Type reference : X23A3U-Z2

List Model(s)..... : X23A3U-XX

Trade Mark..... : ADTH

FCC ID..... : 2BBTW-X23A3U-Z1

Applicant's name : Atlanta DTH, Inc.

Address of applicant : 40 Technology Parkway South, Suite 210,
Peachtree Corners, GA 30092

Test Firm..... : Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm : Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

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 : Feb.26, 2024

Date of Test Date..... : Feb.26, 2024-Mar.06, 2024

Date of Issue : Mar.07, 2024

Result..... : Pass

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TEST REPORT

Test Report No. :	CTL2401122031-WF02	Mar.07, 2024 ----- Date of issue
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Equipment under Test : ADTH NEXTGEN TV Box

Sample No : CTL2401122031

Model /Type : X23A3U-Z2

Listed Models : X23A3U-XX

Applicant : **Atlanta DTH, Inc.**

Address : 40 Technology Parkway South, Suite 210,
Peachtree Corners, GA 30092

Manufacturer : **Atlanta DTH, Inc.**

Address : 40 Technology Parkway South, Suite 210,
Peachtree Corners, GA 30092

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

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.

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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: 2013](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB 558074 D01 v05r02](#): KDB558074 D01 15.247 Meas Guidance v05r02

1.2. Test Description

FCC PART 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	N/A
FCC Part 15.247(d)	Spurious RF Conducted Emission	N/A
FCC Part 15.247(b)	Maximum Conducted Output Power	N/A
FCC Part 15.247(e)	Power Spectral Density	N/A
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	N/A
FCC Part 15.203/15.247 (b)	Antenna Requirement	N/A

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co.,Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahehexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 32/EN 55032 requirements.

1.3.2 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: 2005 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: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

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 Registration No.: 9618B on Jan. 22, 2019.

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. Registration 399832, December 08, 2017.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors 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
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission9KHz~30MHz	±3.66dB	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)

Radiated Emission Above 1GHz	$\pm 4.32\text{dB}$	(1)
Conducted Disturbance 0.15~30MHz	$\pm 3.20\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

1.5. Auxiliary test equipment information

Manufacturer	Description	Model	Serial Number
TPV Display Technology (Xiamen) Co. LTD	LCD TV	T1951MD	LYSL3YA000234 NG
GUANGDONG SENEASY INTELLIGENT TECHNOLOGY CO.,LTD	Remote Control	B19AG	---

2. GENERAL INFORMATION

2.1. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	ADTH NEXTGEN TV Box
Model/Type reference:	X23A3U-Z2
Power supply:	Input: 100-240V~ 50/60Hz 0.6A Output: 12V-1.5A
Bluetooth LE	
Supported type:	Bluetooth Low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	PCB Antenna
Antenna gain:	1.44dBi

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

Note2: Antenna gain provided by the applicant.

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 40 channels provided to the EUT and Channel 00/19/39 were selected for BLE test.

Test Modes	BLE 1M Continuous Transmitting	BLE 2M Continuous Transmitting
1	■	
2		■

Operation Frequency List :

Channel	Frequency (MHz)
00	2402
02	2404
03	2406
⋮	⋮
19	2440
⋮	⋮
37	2476
38	2478
39	2480

Note: The line display in grey were the channel selected for testing

2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ESH2-Z5	860014/010	2023/05/04	2024/05/03
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2023/02/13	2026/02/12
Horn Antenna	Ocean Microwave	OBH100400	26999002	2021/12/22	2024/12/21
EMI Test Receiver	R&S	ESCI	1166.5950.03	2023/05/04	2024/05/03
Spectrum Analyzer	Agilent	E4407B	MY41440676	2023/05/05	2024/05/04
Spectrum Analyzer	Agilent	N9020A	UE22220290	2023/05/05	2024/05/04
Spectrum Analyzer	Keysight	N9020A	MY53420874	2023/05/05	2024/05/04
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/12/23	2024/12/22
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/13	2024/05/12
Amplifier	Agilent	8449B	3008A02306	2023/05/04	2024/05/03
Amplifier	Agilent	8447D	2944A10176	2023/05/04	2024/05/03
Amplifier	Brief&Smart	LNA-4018	2104197	2023/05/05	2024/05/04
Temperature/Humidity Meter	Ji Yu	MC501	/	2023/05/09	2024/05/08
Power Sensor	Agilent	U2021XA	MY55130004	2023/05/05	2024/05/04
Power Sensor	Agilent	U2021XA	MY55130006	2023/05/05	2024/05/04
Power Sensor	Agilent	U2021XA	MY54510008	2023/05/05	2024/05/04
Power Sensor	Agilent	U2021XA	MY55060003	2023/05/05	2024/05/04
Spectrum Analyzer	RS	FSP	1164.4391.38	2023/05/05	2024/05/04
Test Software					
Name of Software			Version		
TST-PASS			V1.1.0		
EZ_EMG(Below 1GHz)			V1.1.4.2		
EZ_EMG((Above 1GHz)			V1.1.4.2		

The calibration interval was one year

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

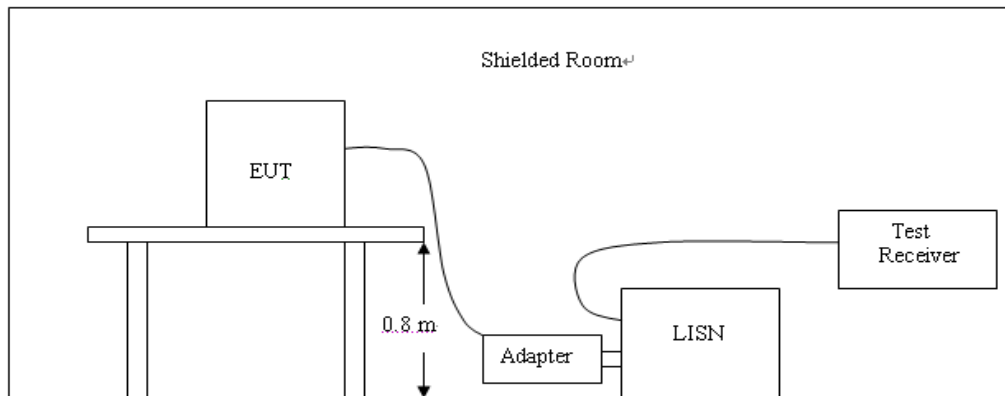
LIMIT

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.

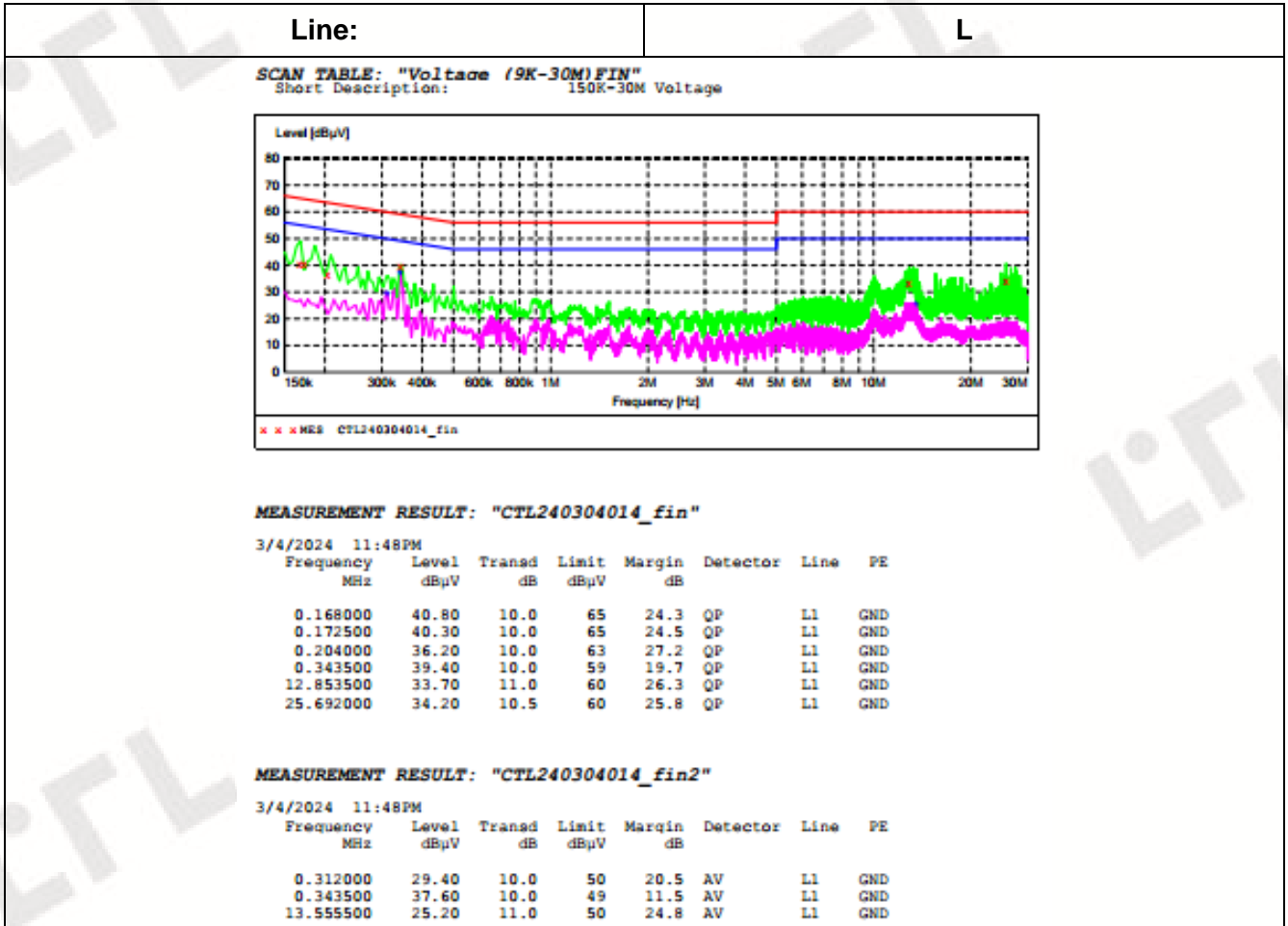
TEST CONFIGURATION

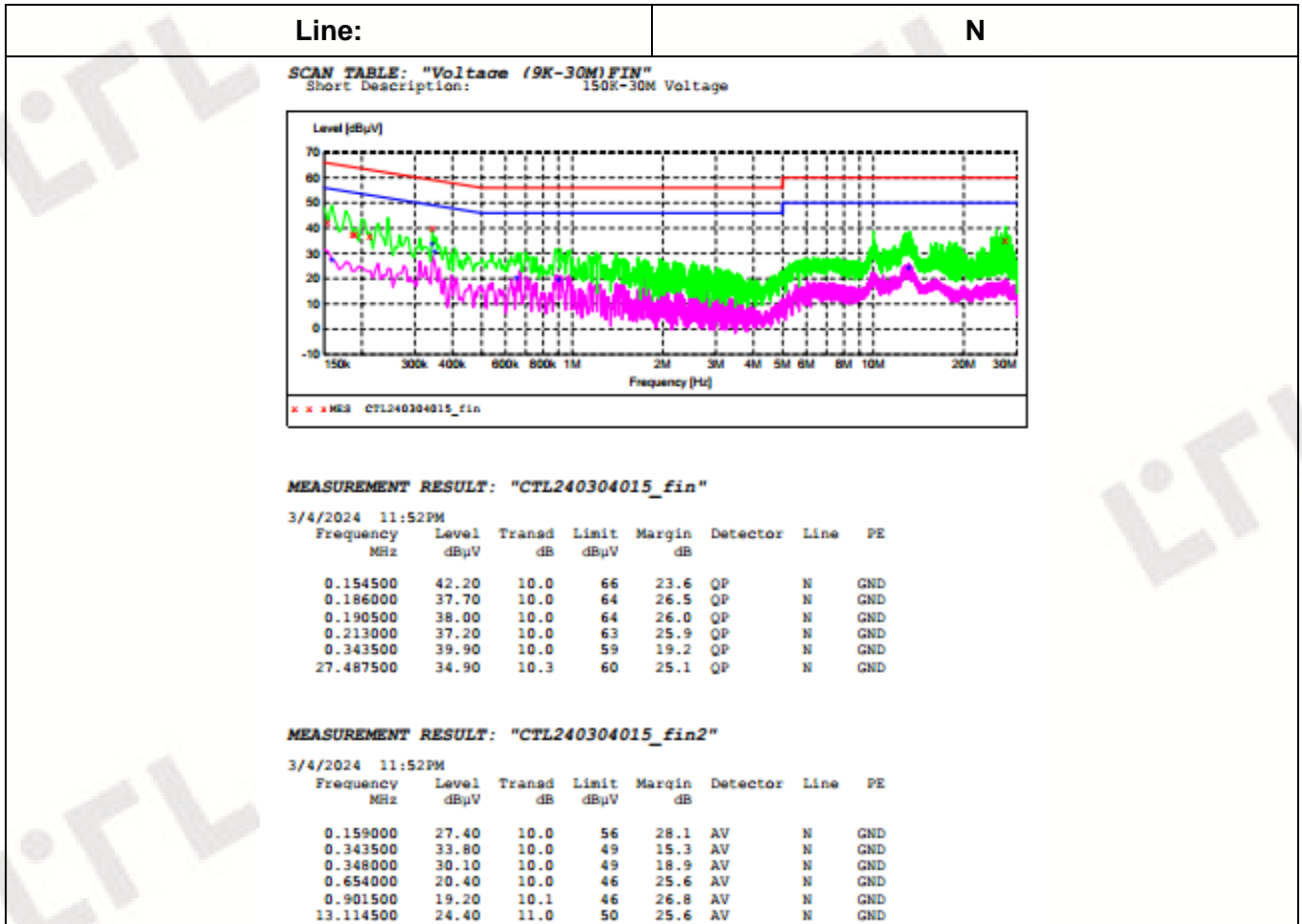


TEST PROCEDURE

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 C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
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





3.2. Radiated Emissions

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.

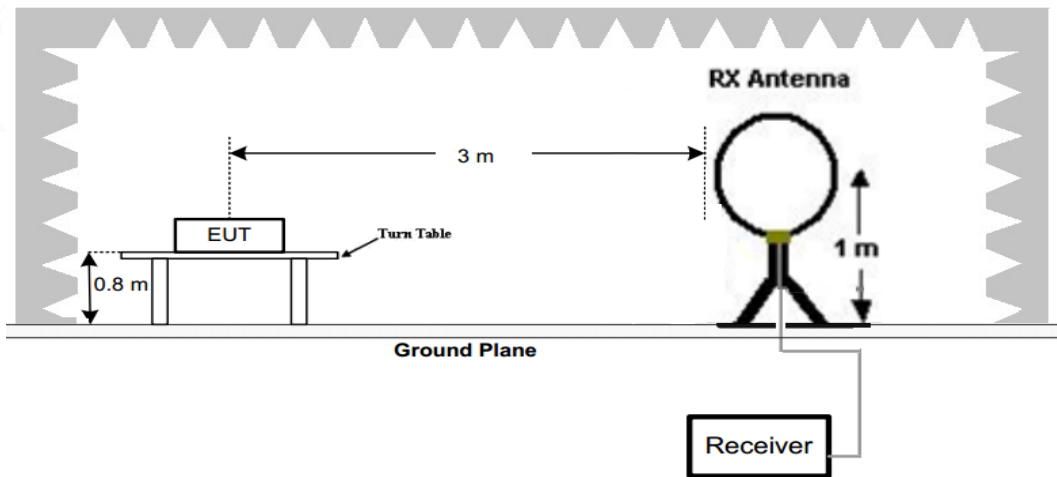
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

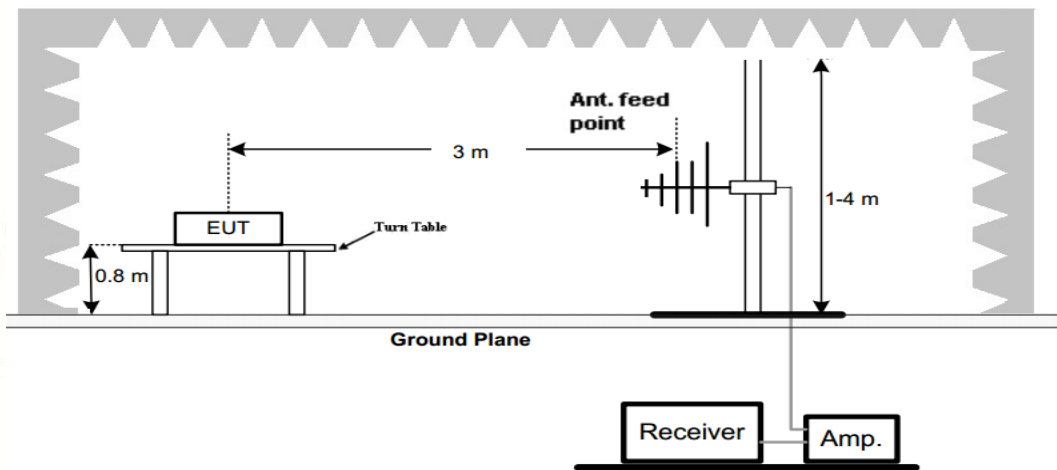
Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960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

TEST CONFIGURATION

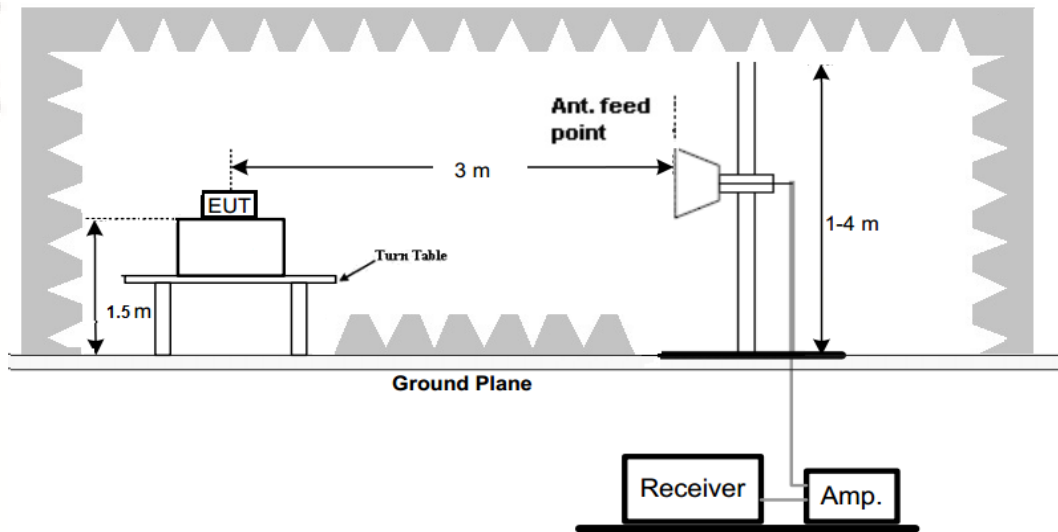
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(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:

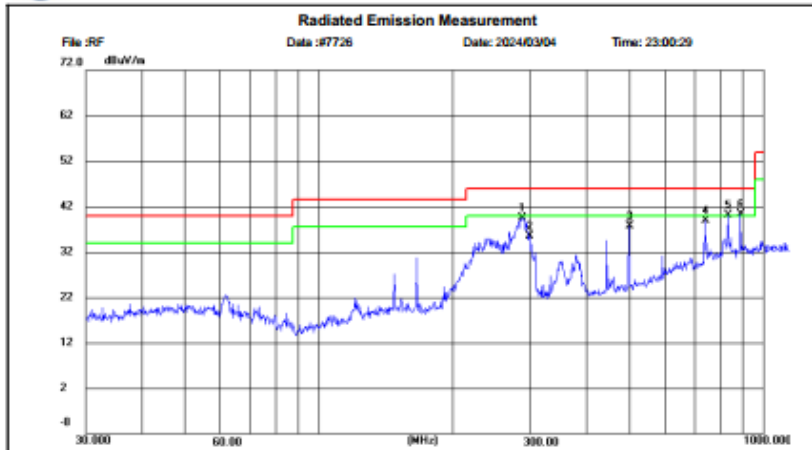
1. For below 1GHz testing recorded worst at BLE low channel.
2. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, Found the emission level are attenuated 20dB below the limits from 9 kHz to 30MHz, so it does not recorded in report.

For 30MHz-1GHz

Horizontal



Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site: LAB Chamber 2
Limit: FCC Part15 RE-Class C_30-1000MHz
EUT: /
MN: X23A3U-Z2
Mode: BLE1M 2402MHz
Note: Atlanta DTH, Inc.

Polarization: *Horizontal*
Power:
Distance: 3m

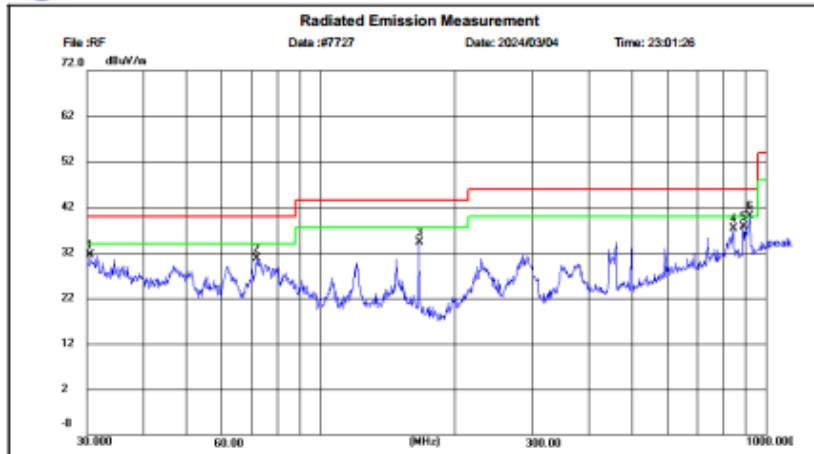
Temperature: 25(C)
Humidity: 50 %

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	286.9823	25.34	14.10	39.44	46.00	6.56	peak	100	311	P	
2	298.2681	21.02	14.42	35.44	46.00	10.56	peak	100	232	P	
3	499.4246	18.41	19.28	37.69	46.00	8.31	peak	100	204	P	
4	742.2587	14.89	24.09	38.98	46.00	7.02	peak	100	321	P	
5	833.3171	14.27	25.90	40.17	46.00	5.83	peak	100	311	P	
6	887.6098	14.02	26.20	40.22	46.00	5.78	peak	100	321	P	

Vertical



Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site: LAB Chamber 2
Limit: FCC Part15 RE-Class C_30-1000MHz
EUT: /
MN: X23A3U-Z2
Mode: BLE1M 2402MHz
Note: Atlanta DTH, Inc.

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	30.4238	18.78	12.63	31.41	40.00	8.59	peak	100	272	P	
2	72.0843	19.31	11.44	30.75	40.00	9.25	peak	100	105	P	
3	166.6514	21.21	13.13	34.34	43.50	9.16	peak	100	86	P	
4	845.0878	11.06	26.22	37.28	46.00	8.72	peak	100	321	P	
5	887.6099	11.43	26.20	37.63	46.00	8.37	peak	100	311	P	
6	919.2866	13.45	26.75	40.20	46.00	5.80	peak	100	341	P	

3.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

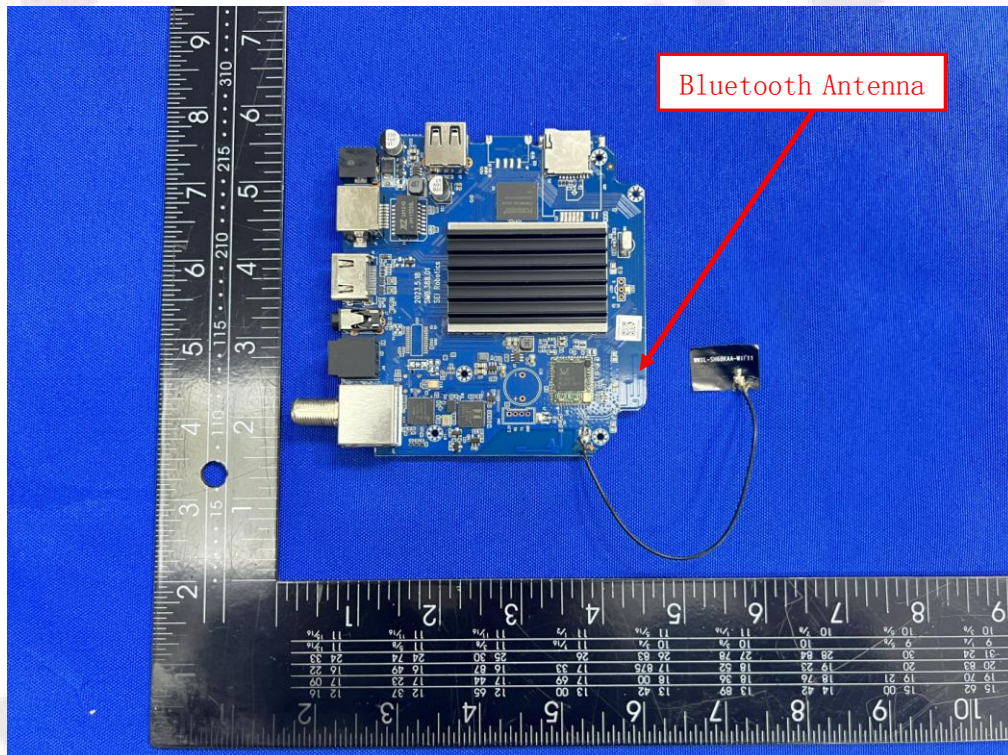
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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(b) (4):

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Result:

The maximum gain of antenna was 1.44dBi



4. Test Setup Photos of the EUT



5. Photos of the EUT

Reference to the test report No. CTL2401122031-WF01

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