



# TEST REPORT

## FCC PART 15.247

**Report Reference No.:** CTL2401122031-WF01

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( position+printed name+signature) (File administrators)

Tested by: Snow Tang  
( position+printed name+signature) (Test Engineer)

Approved by: Ivan Xie  
( position+printed name+signature) (Manager)



**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

<b>Test Report No. :</b>	<b>CTL2401122031-WF01</b>	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

<b>Test result</b>	<b>Pass *</b>
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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

<b>FCC PART 15.247</b>		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(1)(i)	20dB Bandwidth	N/A
FCC Part 15.247(d)	Spurious RF Conducted Emission	N/A
FCC Part 15.247(b)	Maximum Peak Output Power	N/A
FCC Part 15.247(a)	Pseudorandom Frequency Hopping Sequence	N/A
FCC Part 15.247(a)(1)(iii)	Number of hopping frequency& Time of Occupancy	N/A
FCC Part 15.247(a)(1)	Frequency Separation	N/A
FCC Part 15.205/15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	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, Shahexi 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
<b>Bluetooth:</b>	
Version:	Supported BR/EDR
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
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 79 channels provided to the EUT and Channel 00/39/78 were selected to test.

### Operation Frequency :

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

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

## 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	US46220290	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
LISN	R&S	ESH2-Z5	860014/010	2023/05/04	2024/05/03
Test Software					
Name of Software			Version		
TST-PASS			V1.1.0		
EZ_EMC(Below 1GHz)			V1.1.4.2		
EZ_EMC((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

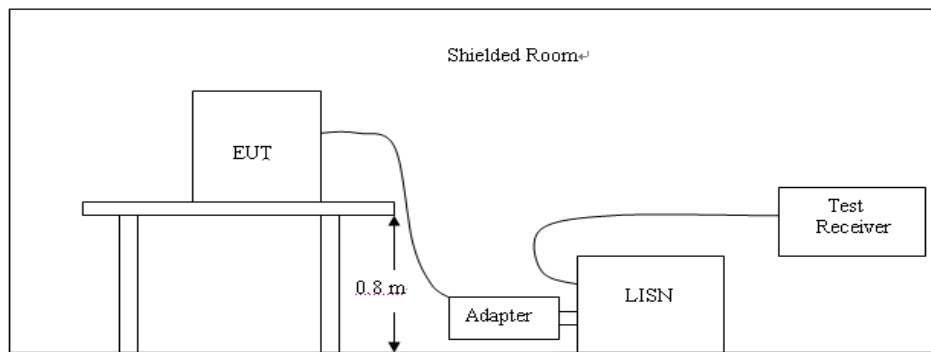
##### LIMIT

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

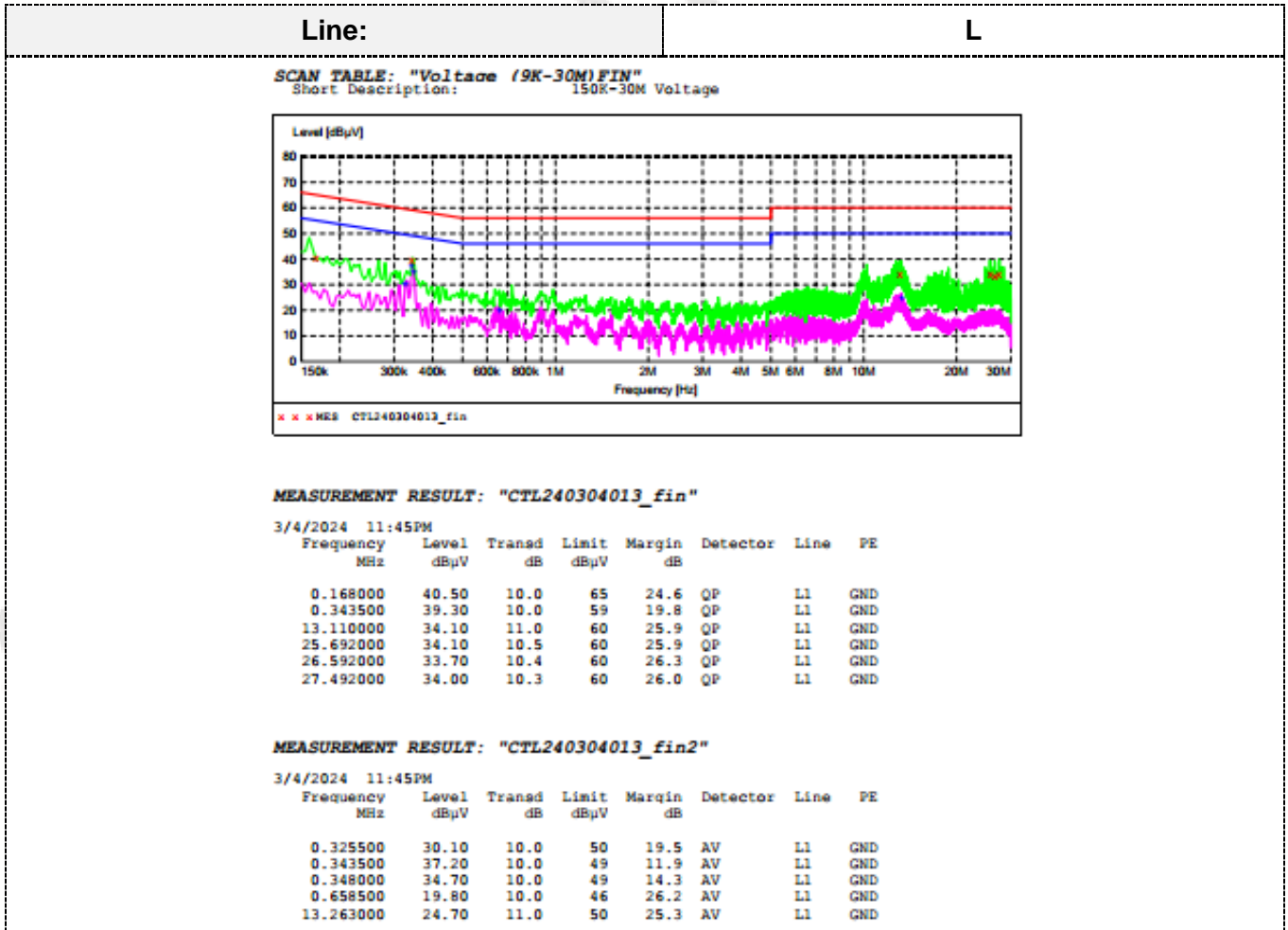


##### TEST PROCEDURE

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**

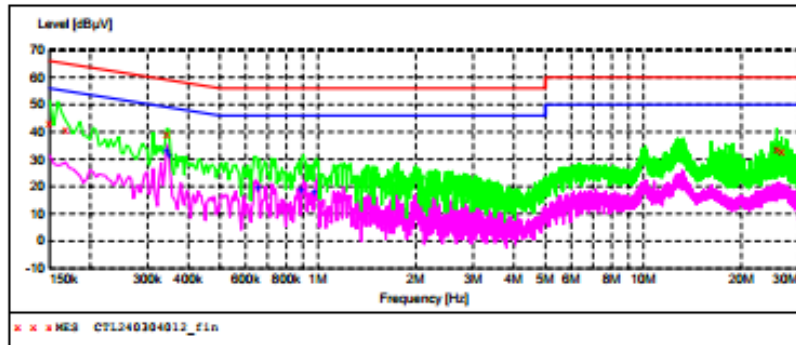
Remark: All modes of GFSK, Pi/4 DQPSK, and 8DPSK were test at Low, Middle, and High channel; only the worst result of GFSK Middle Channel was reported as below:



Line:

N

SCAN TABLE: "Voltage (9K-30M)FIN"  
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL240304012\_fin"

3/4/2024 11:42PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	43.30	10.0	66	22.7	QP	N	GND
0.168000	41.00	10.0	65	24.1	QP	N	GND
0.343500	39.50	10.0	59	19.6	QP	N	GND
25.696500	33.70	10.5	60	26.3	QP	N	GND
26.592000	32.90	10.4	60	27.1	QP	N	GND

MEASUREMENT RESULT: "CTL240304012\_fin2"

3/4/2024 11:42PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.343500	33.00	10.0	49	16.1	AV	N	GND
0.348000	31.50	10.0	49	17.5	AV	N	GND
0.654000	19.40	10.0	46	26.6	AV	N	GND
0.888000	18.50	10.1	46	27.5	AV	N	GND
0.969000	17.70	10.1	46	28.3	AV	N	GND

### 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.

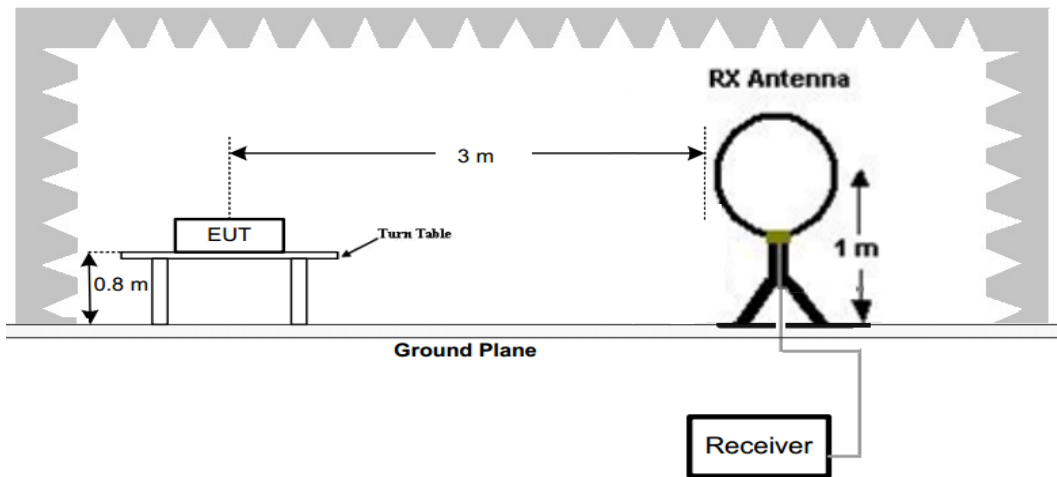
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

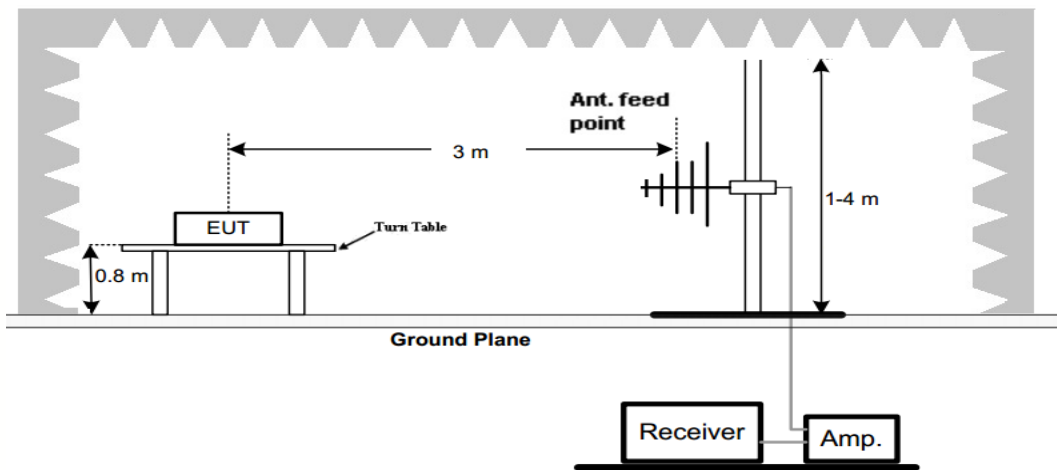
Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+ 40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+ 40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960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

#### TEST CONFIGURATION

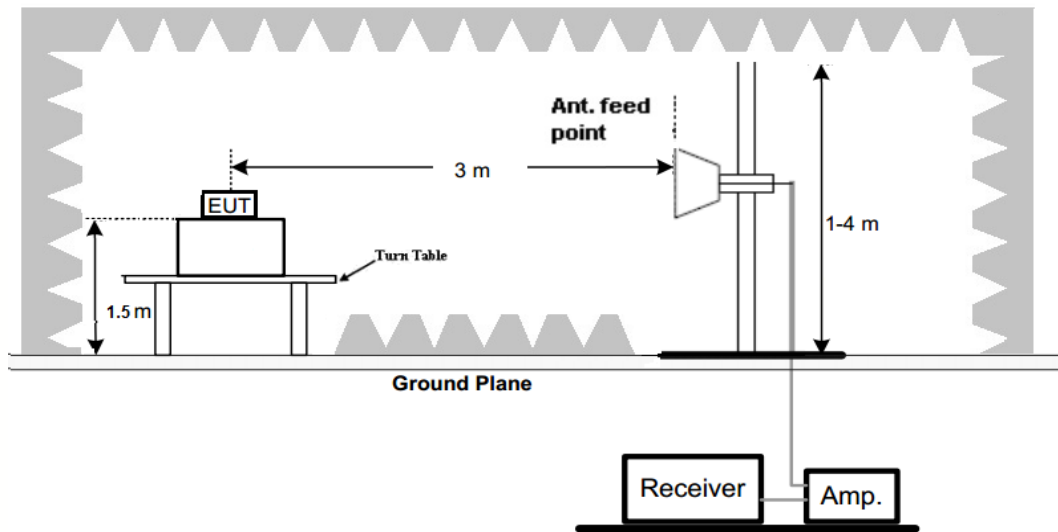
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(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:

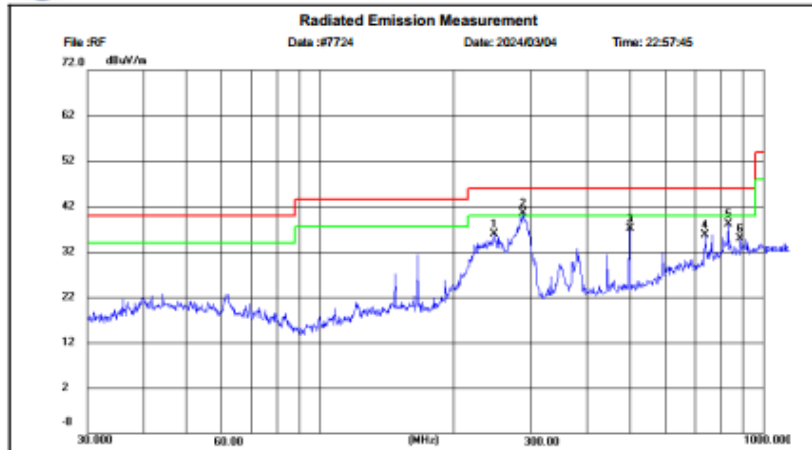
1. We measured Radiated Emission at GFSK,  $\pi/4$  DQPSK and 8DPSK mode from 9 KHz to 25GHz and recorded worst case at GFSK DH5 mode..
2. For below 1GHz testing recorded worst at GFSK DH5 low channel.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, Found the emission 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



Site: LAB Chamber 2  
Limit: FCC Part15 RE-Class C\_30-1000MHz  
EUT: /  
MN: X23A3U-Z2  
Mode: BT 2402MHz  
Note: Atlanta DTH, Inc.

Polarization: *Horizontal*  
Power:  
Distance: 3m

Temperature: 25(C)  
Humidity: 50 %

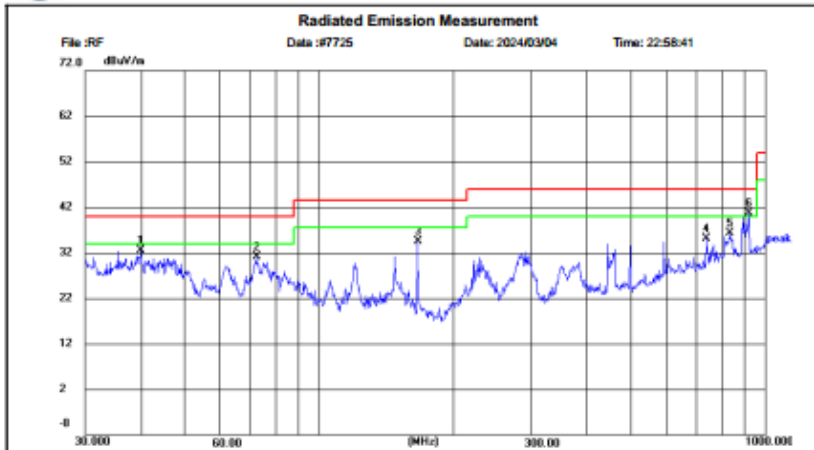
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	247.6818	22.59	13.23	35.82	46.00	10.18	peak	100	340	P	
2	287.9904	26.34	14.12	40.46	46.00	5.54	peak	100	301	P	
3	499.4246	17.87	19.28	37.15	46.00	8.85	peak	100	203	P	
4	739.6604	11.63	24.01	35.64	46.00	10.36	peak	100	10	P	
5	833.3171	12.23	25.90	38.13	46.00	7.87	peak	100	311	P	
6	890.7277	8.55	26.31	34.86	46.00	11.14	peak	100	351	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: /  
M/N: X23A3U-Z2  
Mode: BT 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	39.9942	18.12	14.32	32.44	40.00	7.56	peak	100	350	P	
2	72.5916	19.51	11.50	31.01	40.00	8.99	peak	100	138	P	
3	166.6514	21.29	13.13	34.42	43.50	9.08	peak	100	99	P	
4	739.6604	11.19	24.01	35.20	46.00	10.80	peak	100	41	P	
5	833.3171	10.33	25.90	36.23	46.00	9.77	peak	100	331	P	
6	919.2866	13.96	26.75	40.71	46.00	5.29	peak	100	331	P	

### 3.3. 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.

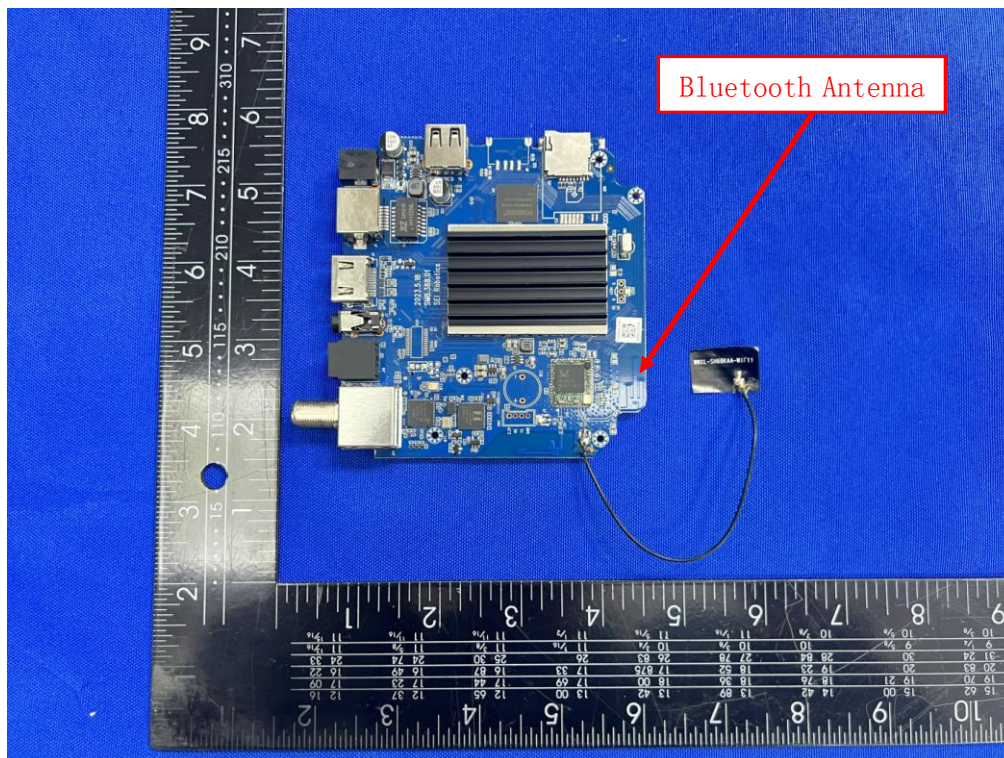
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### **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 1.44dBi



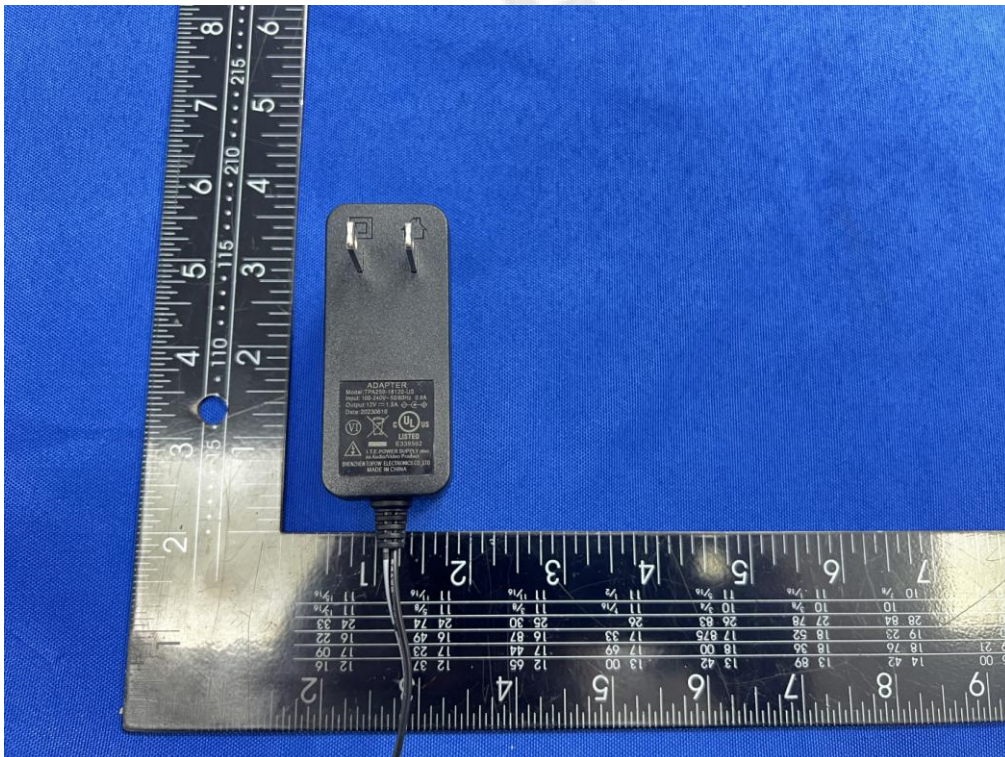
#### 4. Test Setup Photos of the EUT



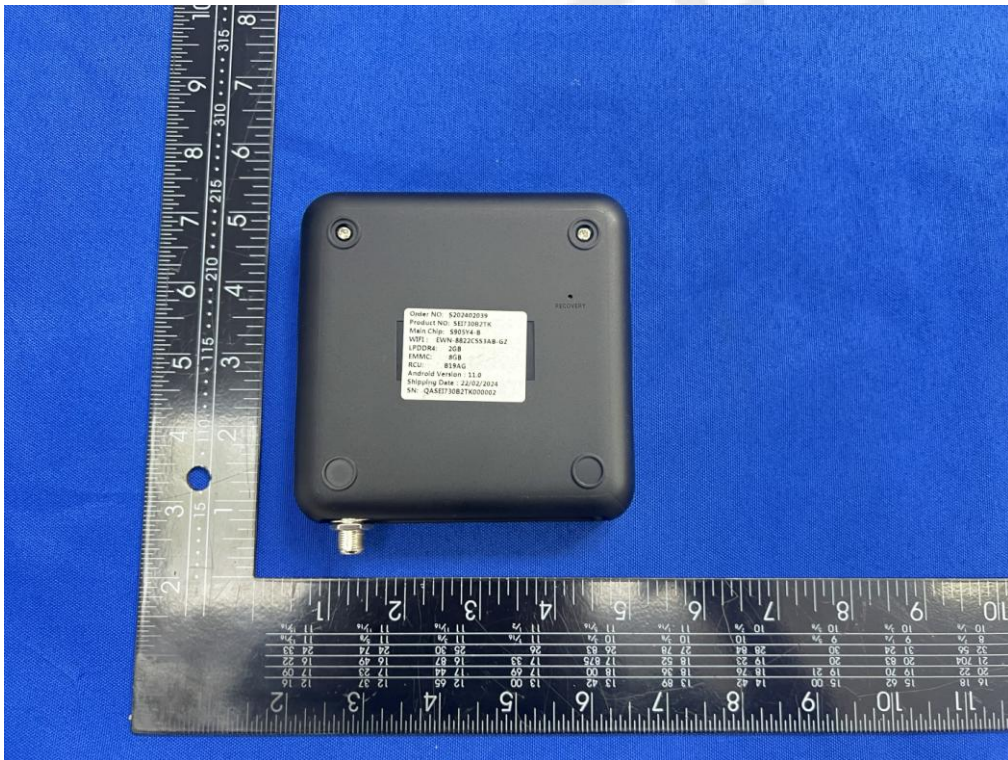
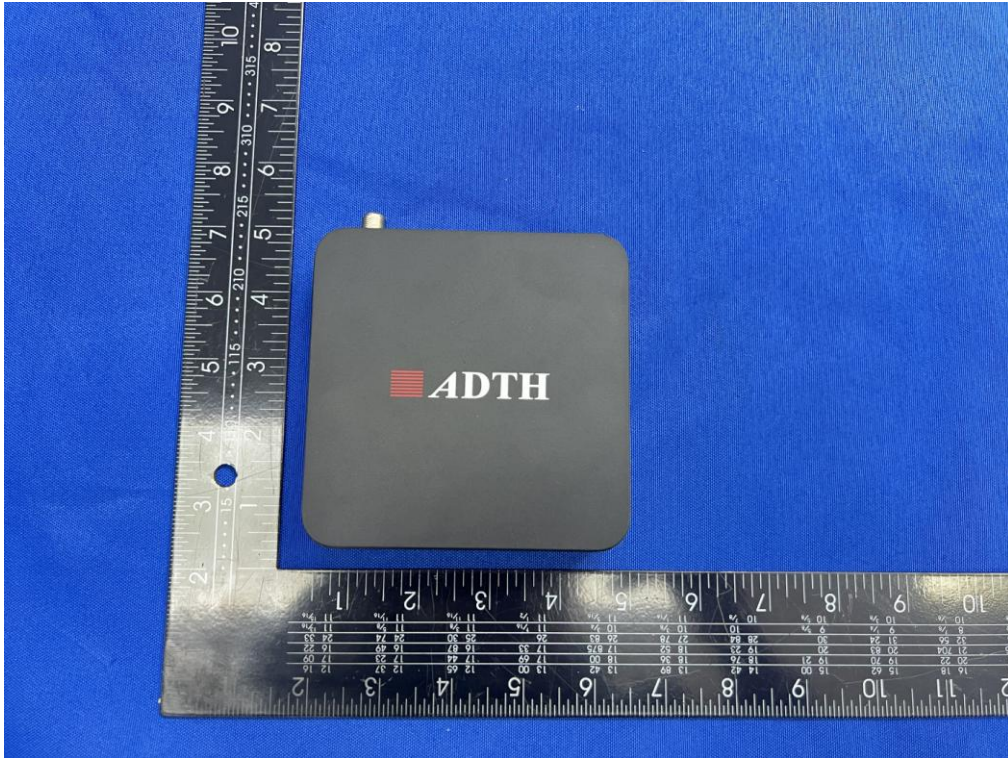


# 5. Photos of the EUT

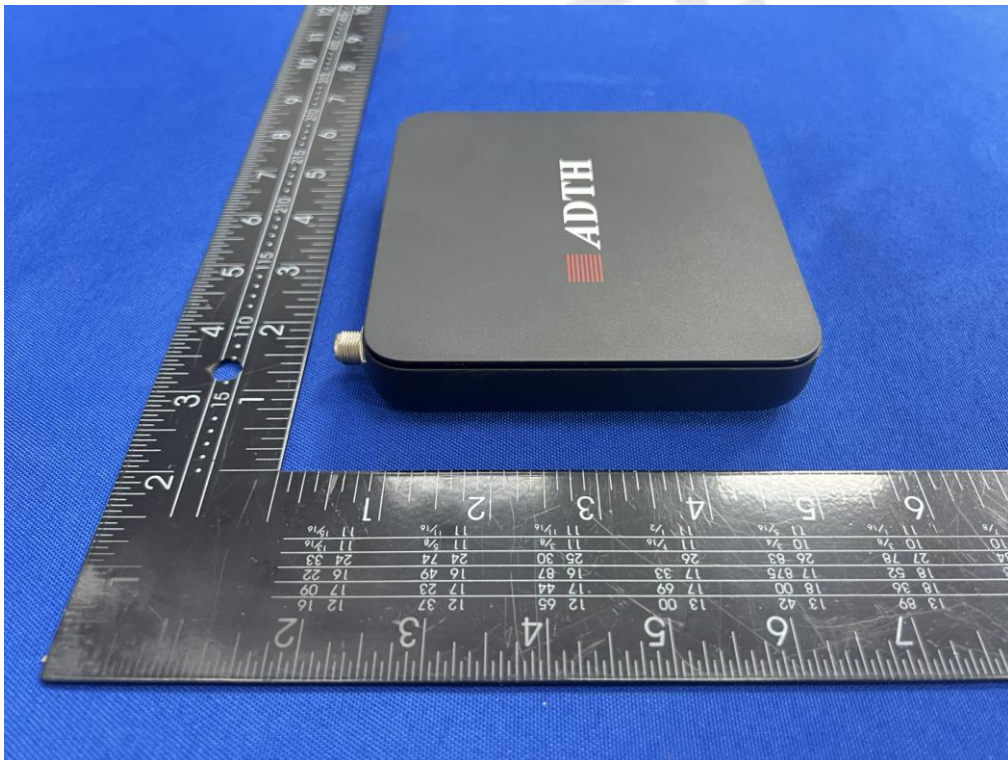
## External Photos of EUT

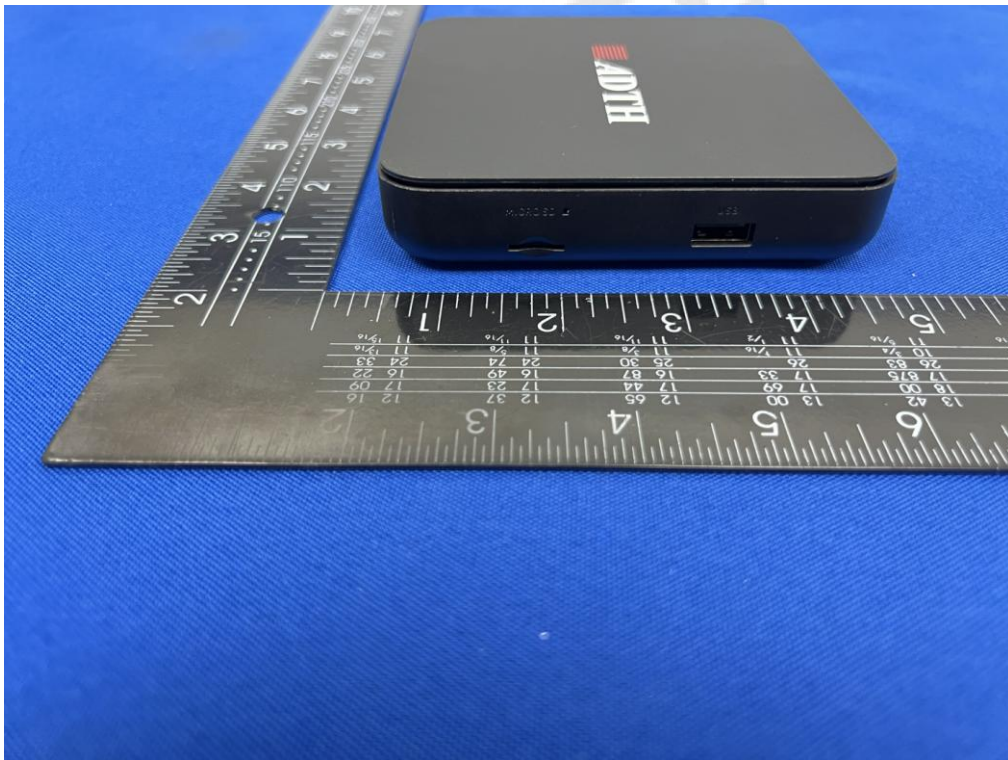




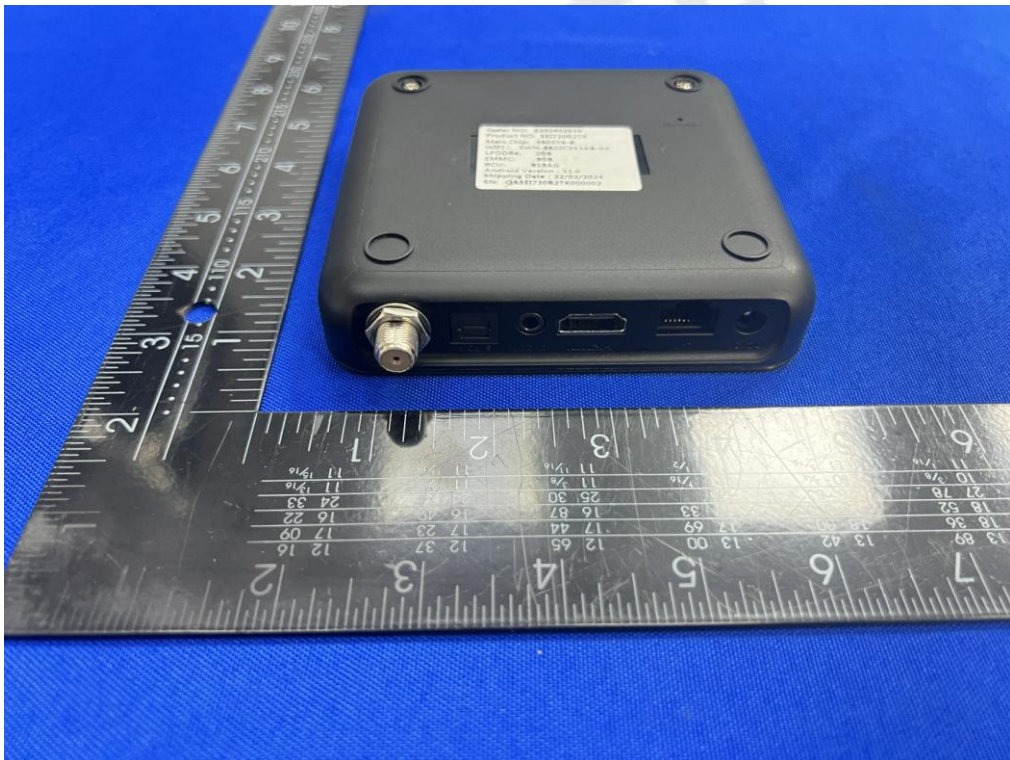
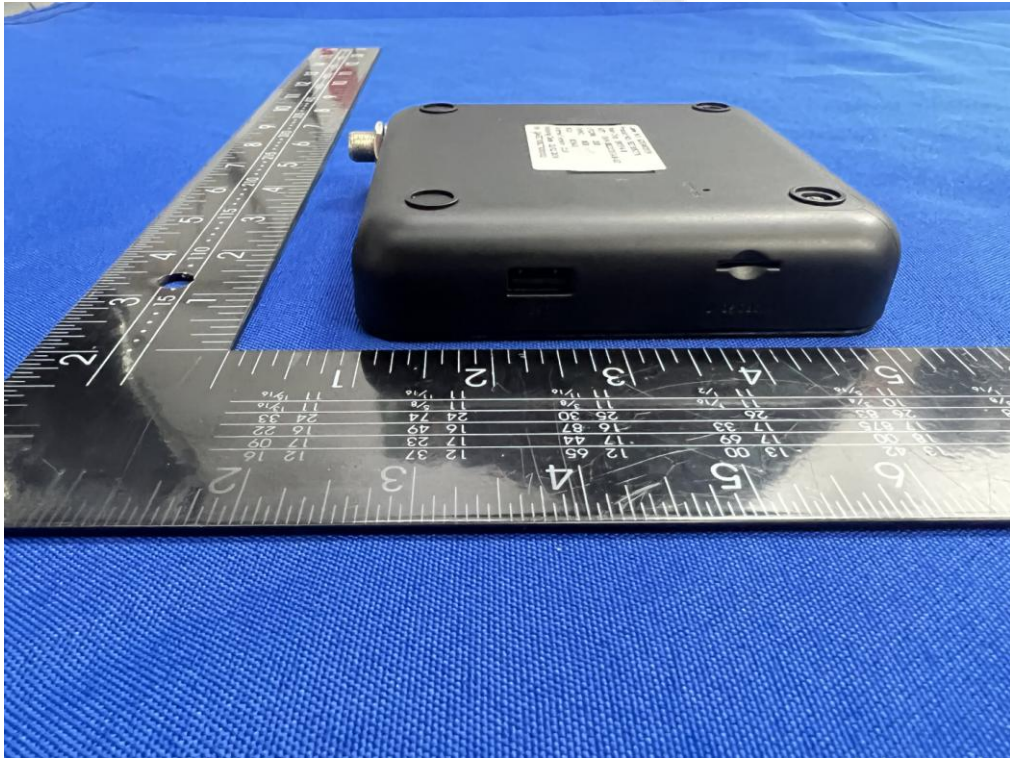






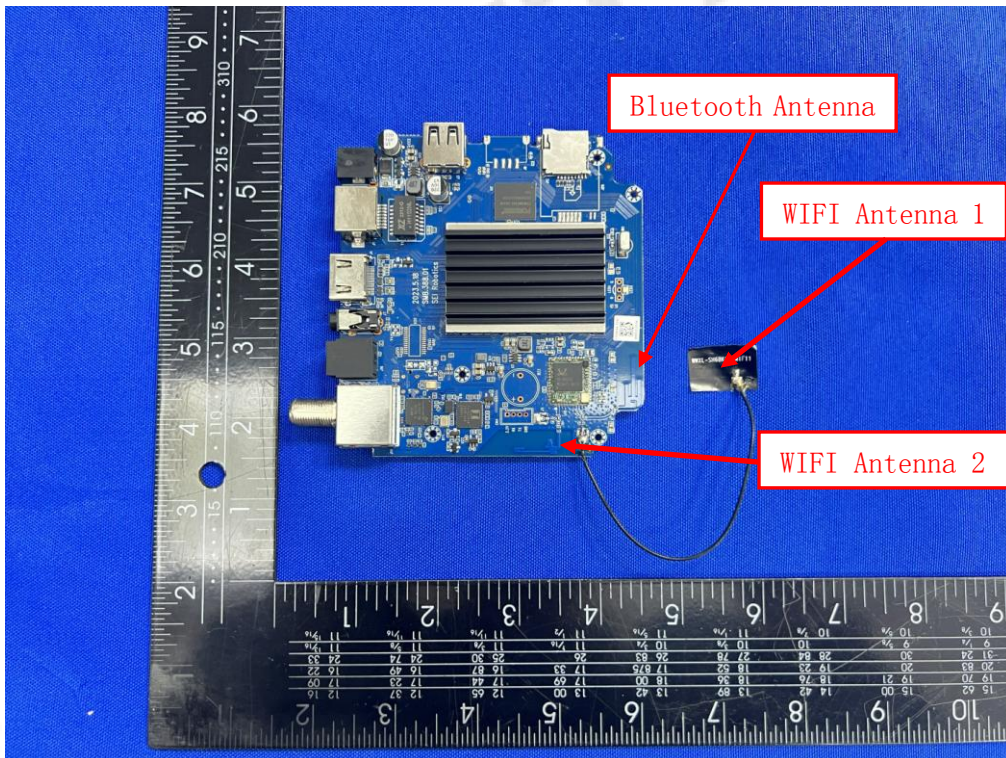
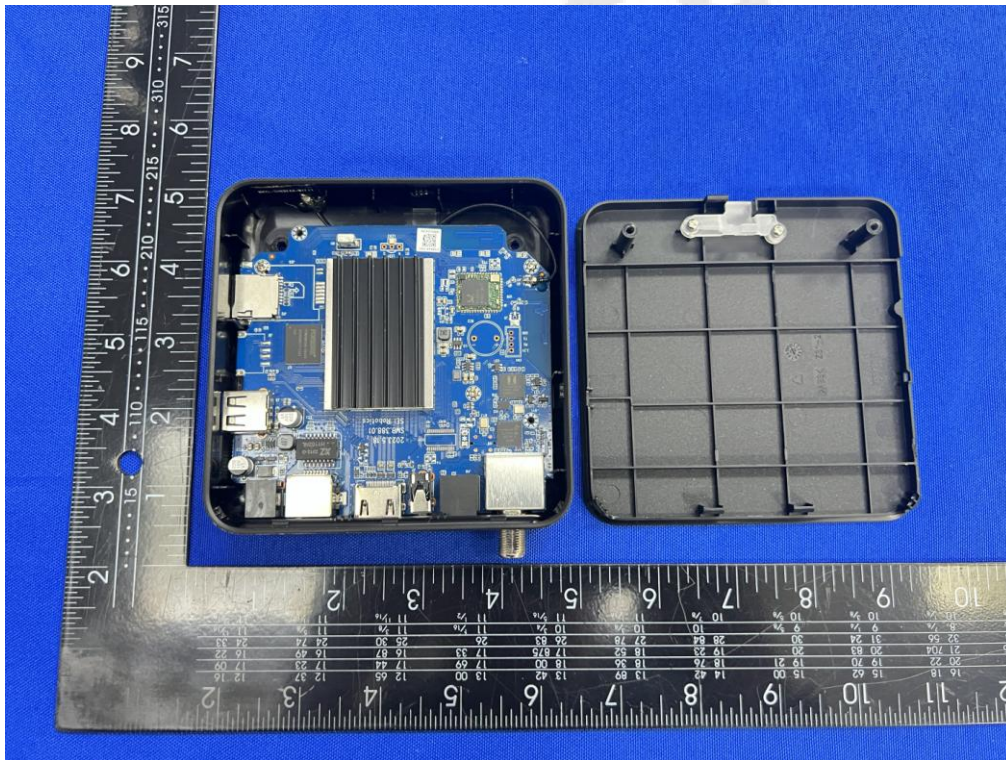




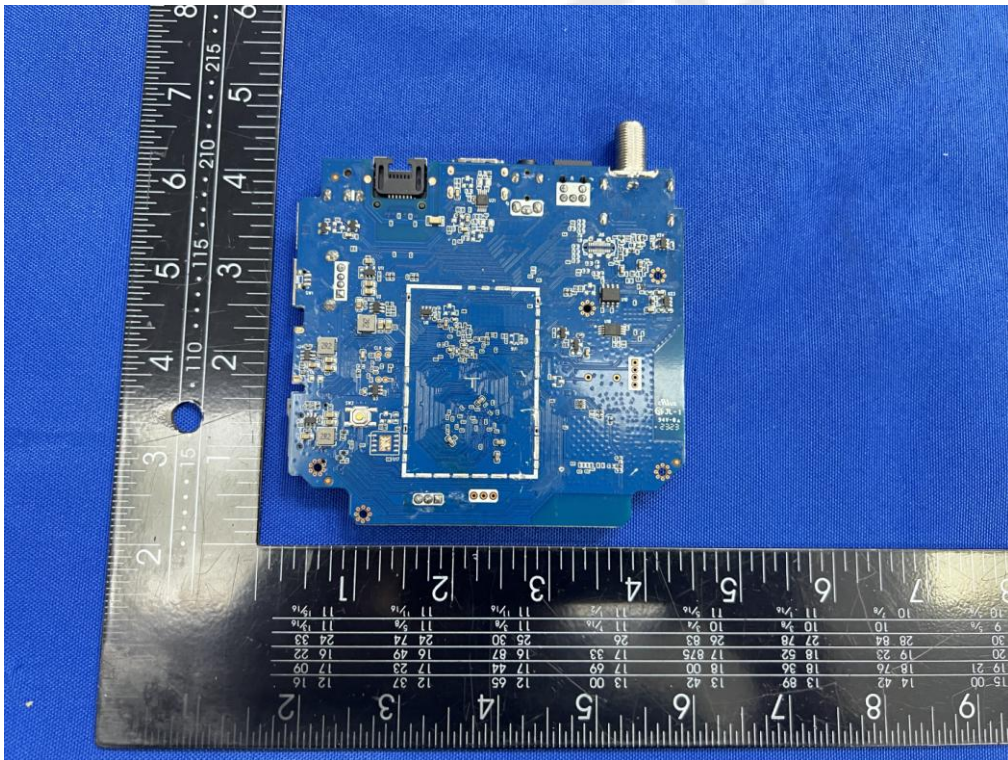
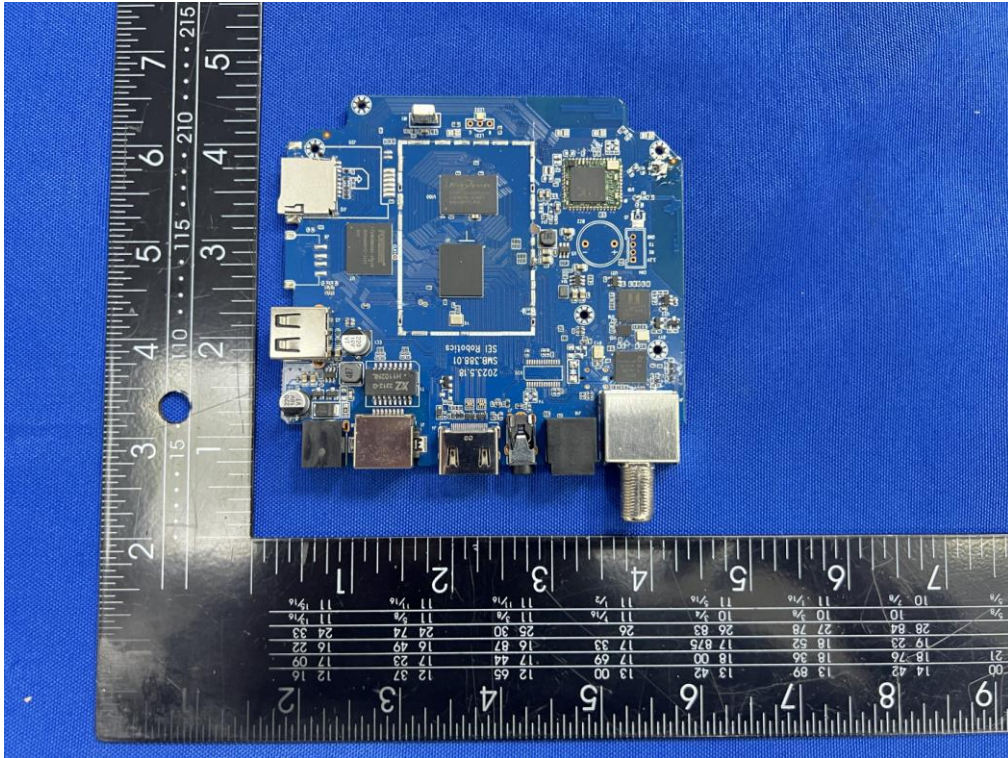




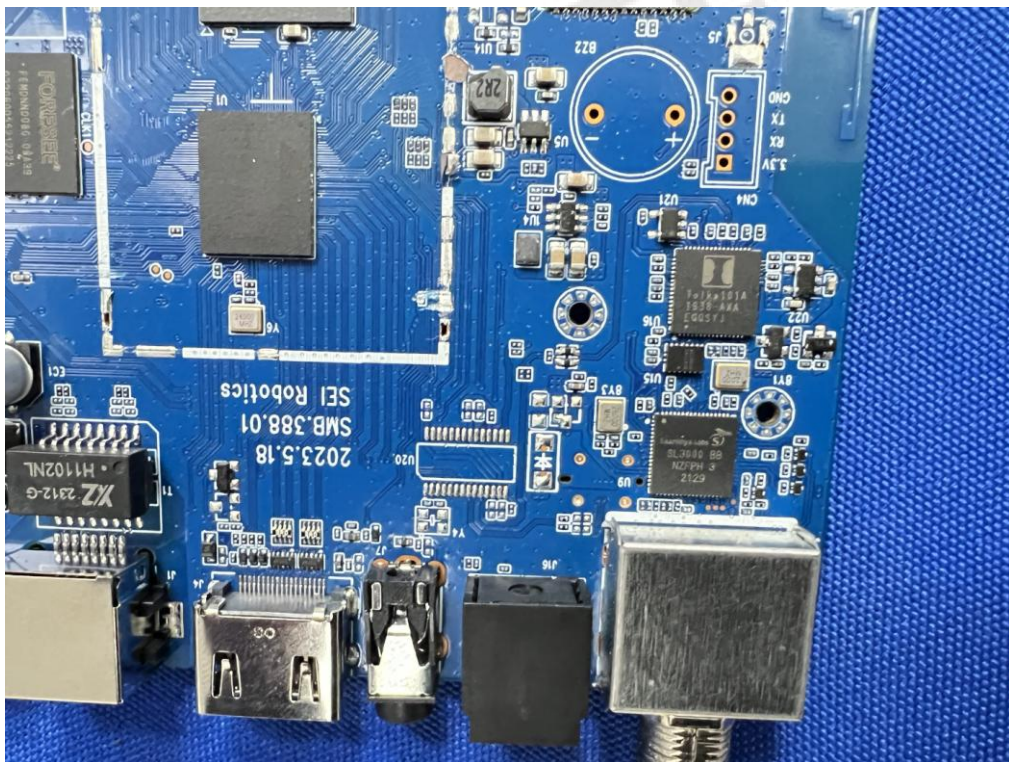
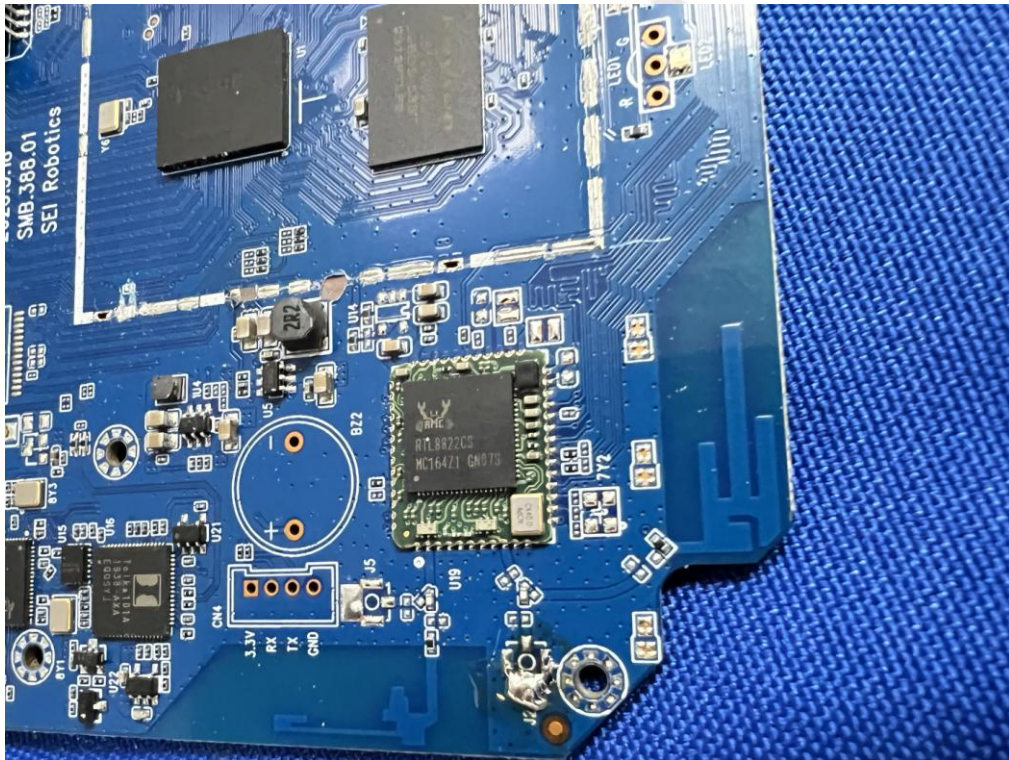
**Internal Photos of EUT**



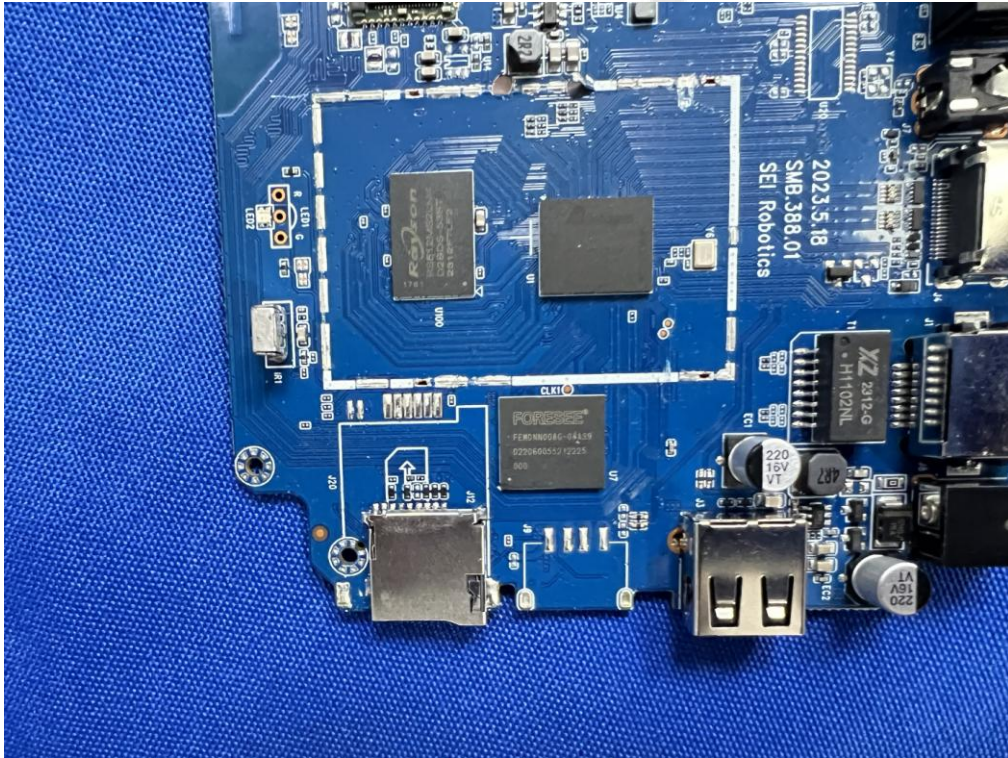












\*\*\*\*\* End of Report \*\*\*\*\*