

EMC TEST REPORT

For

2.0 Computer Multimedia Speaker

**Model Number: T-60X Pro, T-60X, T-65X, T-65X Pro, T-68X, T-68X Pro,
T-69X, T-69X Pro**

Report Number : WT228000036

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Inspection
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Test report declaration

Applicant : SHENZHEN FENDA TECHNOLOGY CO.,LTD
Address : Fenda Hi-Tech Park, Zhoushi Road, Shiyan Street, Baoan District, Shenzhen, China
Manufacturer : SHENZHEN FENDA TECHNOLOGY CO.,LTD
Address : Fenda Hi-Tech Park, Zhoushi Road, Shiyan Street, Baoan District, Shenzhen, China
EUT Description : 2.0 Computer Multimedia Speaker
Model No. : T-60X Pro, T-60X, T-65X, T-65X Pro, T-68X, T-68X Pro, T-69X, T-69X Pro
Trade mark : F&D
Serial Number : --

Test Standards:

EN 301 489-1 V2.2.3

EN 301 489-17 V3.2.4

EN 55032:2015+A1:2020

EN 55035:2017+A11:2020

EN IEC 61000-3-2:2019

EN 61000-3-3:2013+A1:2019

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT and ensure the EUT to be compliance with the immunity requirements of the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

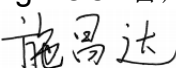
Project
Engineer:



(Zeng weisi 曾炜斯)

Date: Mar.16,2022

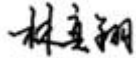
Checked by:



(Shi Changda 施昌达)

Date: Mar.16,2022

Approved by:



(Lin Yixiang 林奕翔)

Date: Mar.16,2022

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1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	Test Results
Conducted Emission	Pass
Radiated Emission	Pass
Harmonic current	Pass
Flicker	Pass
ESD Immunity	Pass
Radiated Electromagnetic Field Immunity	Pass
EFT Immunity	Pass
Surge Immunity	Pass
Conducted Immunity	Pass
Voltage dips and interruptions Immunity	Pass

Remark: “ N/A” means “ Not applicable.”

2. GENERAL INFORMATION

2.1. Report information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

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The lab will not be liable for any loss or damage resulting from false inaccurate, inappropriate or incomplete product information provided by the applicant/manufacturer.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is Accredited Testing Laboratory of FCC with Designation number CN1165 and Site registration number 582918.

The Laboratory is registered to perform emission tests with Innovation, Science and Economic Development (ISED), and the registration number is 11177A.

The Laboratory is registered to perform emission tests with VCCI, and the registration number are C-20048, G20076, R-20077, R-20078 and T-20047.

The Laboratory is Accredited Testing Laboratory of American Association for Laboratory Accreditation (A2LA) and certificate number is 3292.01.

2.3.Measurement Uncertainty

Conducted Emission

9 kHz~150 kHz U=3.7dB k=2

150 kHz~30MHz U=3.3dB k=2

Radiated Emission

30MHz~1000MHz U=4.3dB k=2

1GHz~6GHz U=4.6dB k=2

Harmonics Current

2.9%

Flicker

6.2%

ESD Immunity

It is compliant with the requirements of the standard at the confidence of 95%.

Radiated Immunity

1.8dB

EFT Immunity

It is compliant with the requirements of the standard at the confidence of 95%.

Surge Immunity

It is compliant with the requirements of the standard at the confidence of 95%.

Conducted Immunity

Voltage : 2.4dB

Voltage dips, short interruptions and voltage variations immunity

It is compliant with the requirements of the standard at the confidence of 95%.

*The measurement uncertainty was given with the confidence of 95%.

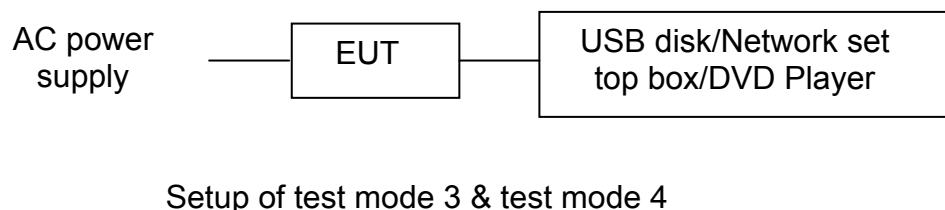
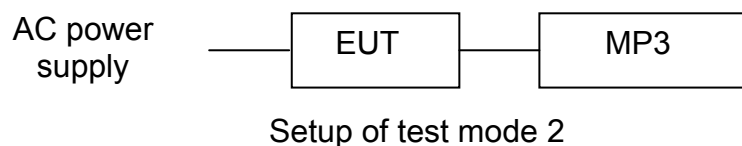
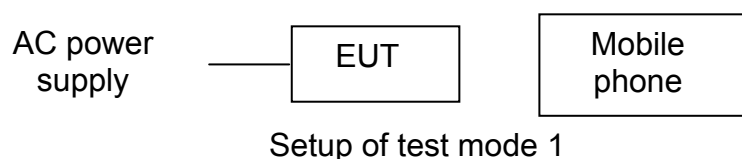
3. PRODUCT DESCRIPTION

3.1.EUT Description

Description : 2.0 Computer Multimedia Speaker
 Manufacturer : SHENZHEN FENDA TECHNOLOGY CO.,LTD
 Model Number : T-60X Pro, T-60X, T-65X, T-65X Pro, T-68X, T-68X Pro, T-69X, T-69X Pro
 Rating input : AC 220V-240V 50Hz/60Hz 0.7A
 Antenna Designation : Internal Antenna
 AC adaptor : /

Remark: T-60X Pro compared with T-60X, T-65X, T-65X Pro, T-68X, T-68X Pro, T-69X and T-69X Pro, only have different model number and sales area. All of the models' circuit theory, electrical design and the critical components are the same. The differences do not affect the EMC performance. Unless otherwise specified, the model T-60X Pro was chosen as representative model to perform all the tests.

3.2.Block Diagram of EUT Configuration



3.3. Test Mode

Test Mode 1: EUT connected to mobile phone via Bluetooth and play 1kHz signal.

Test Mode 2: EUT connected to MP3 via Aux in cable and play 1kHz signal.

Test Mode 3: EUT connected to USB disk and play 1kHz signal.

Test Mode 4: EUT connected to Network set top box via Optical fiber line and play 1kHz signal.

Test Mode 5: EUT connected to DVD Player via COAXIAL line and play 1kHz signal.

Remark: For EMI, if EUT has more than one typical operation, only the worst test mode will be recorded in this report.

3.4. Support Equipment List

Table 2 Support Equipment List

Name	Model No.	S/N	Manufacturer
iPod	--	--	Apple Inc
Mobile phone	S7	--	Samsung
USB disk	--	--	SanDisk
Network set top box	Q5	--	HIMEDIA
DVD Player	PDVD-959A	--	SAST

3.5. Test Conditions

Date of test : Jan.18, 2022- Jan.25, 2022

Date of EUT Receive : Dec.07, 2021

Temperature: 21°C-23°C

Relative Humidity: 44%-53%

Atmospheric Pressure: 101.3kPa~101.8kPa

3.6. Modifications

No modification was made.

3.7. Performance Criterion

EN 301 489 series

The performance criteria are used to take a decision on whether a radio equipment passes or fails immunity tests.

Performance criteria for continuous phenomena

During the test, the equipment shall: continue to operate as intended; not unintentionally transmit; not unintentionally change its operating state; not unintentionally change critical stored data.

Performance criteria for transient phenomena

For all ports and transient phenomena with the exception described below, the following applies: The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data. After application of the transient phenomena, the equipment shall operate as intended.

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies: For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

For a 0 % residual voltage dip tests the following performance criteria apply: The performance criteria for transient phenomena shall apply.

For a 70 % residual voltage dip and voltage interruption tests, the following performance criteria apply: in the case where the equipment is fitted with or connected to a battery back-up, the performance criteria for transient phenomena shall apply; in the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator; no unintentional responses shall occur at the end of the test, when the voltage is restored to nominal; in the event of loss of function(s) or in the event of loss of user stored data, this fact shall be recorded.

Performance Criterion of EN 55035

Criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Criterion B: During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4. TEST EQUIPMENT USED

4.1. Test Equipment Used to Measure Conducted Emission

Table 3 Conducted Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB9058/05	Test Receiver	R&S	ESCI 3	Sep.24,2021	1 Year
SB4357	AMN	R&S	ENN216	Aug.25,2021	1 Year
SB9547	Shielded room	Albatross	SR	Sep.24,2021	1 Year

4.2. Test Equipment Used to Measure Radiated Disturbance

Table 4 Radiated Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB15044/01	Test Receiver	R&S	ESW8	Oct.09,2021	1 Year
SB18856	Broadband Antenna	R&S	VULB9163	Sep.26,2021	1 Year
SB9422/16	Horn Antenna	R&S	HF907	Apr.09,2021	1 Year
SB18844	Anechoic Chamber	Albatross	3mSAC	Mar.23,2021	1 Year

4.3. Test Equipment Used to Measure Harmonic Current /Voltage Fluctuation and Flicker

Table 5 Harmonic Current /Voltage Fluctuation and Flicker Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB18847	Power	AMETEK	5001lx-400-411-413	Jan.25,2022	1 Year

4.4. Test Equipment Used to Measure Electrostatic Discharge Immunity

Table 6 ESD Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB8001	ESD Tester	EM TEST	ESD 30N	Dec.03,2021	1 Year

4.5. Test Equipment Used to Measure Electrical Fast Transient/Burst Immunity

Table 7 EFT Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB3070	Immunity Generator	EM TEST	UCS500M4	May.08,2021	1 Year
--	Capacitive Clamp	EM Test	HFk	---	---

4.6. Test Equipment Used to Measure Radio Frequency Electromagnetic Fields Immunity

Table 8 Radiated Electromagnetic Field Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB18869	Signal Generator	R&S	SMB100A	Jan.17,2022	1 Year
SB7933	Power Amplifier	AR	250W1000A	Dec.03,2021	1 Year
SB7934	Power Amplifier	MILMEGA	AS0860-75/45	May.25,2021	1 Year
SB16482/01	Broadband Antenna	SCHWARZBEC K	STLP 9128D	--	--
SB16481/01	Horn Antenna	SCHWARZBEC K	BBHA 9120J	--	--
SB9555/03	Anechoic Chamber	Albatross	--	Apr.30,2021	1 Year

4.7. Test Equipment Used to Measure Surge Immunity

Table 9 Surge Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB3070	Immunity Generator	EM TEST	UCS500M4	May.08,2021	1 Year

4.8. Test Equipment Used to Measure Conducted Immunity

Table 10 Conducted Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB2605	Signal Generator	R&S	SMB100B	Nov.04,2021	1 Year
SB2605/01	CDN	EMTEST	CDN-M3	Nov.04,2021	1 Year
SB2605/03	Attenuator	EMTEST	ATT6	--	--
SB2605/04	Electromagnetic clamp	FCC	F-2031-23mm	Nov.04,2021	1 Year

4.9. Test Equipment Used to Measure Voltage Dips and Interruptions Immunity

Table 11 Voltage Dips and Interruption Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB3070	Immunity Generator	EM TEST	UCS500M4	May.08,2021	1 Year
SB3070/03	Motorised variac	EM TEST	MV2616	May.08,2021	1 Year

5. CONDUCTED EMISSION TEST

5.1. Test Standard and Limit

5.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55032:2015+A1:2020

5.1.2. Test Limit

Table 12 Conducted Emission Test Limit (Class B)

Frequency(MHz)	Limit (dB μ V/m)	
	Quasi-peak	Average
0.15~0.5	66 ~ 56*	56~46*
0.5~5	56	46
5~30	60	50

* Decreasing linearly with logarithm of the frequency

5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver used to test the emissions from both sides of AC line. The bandwidth of EMI test receiver is set at 9 kHz.

5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

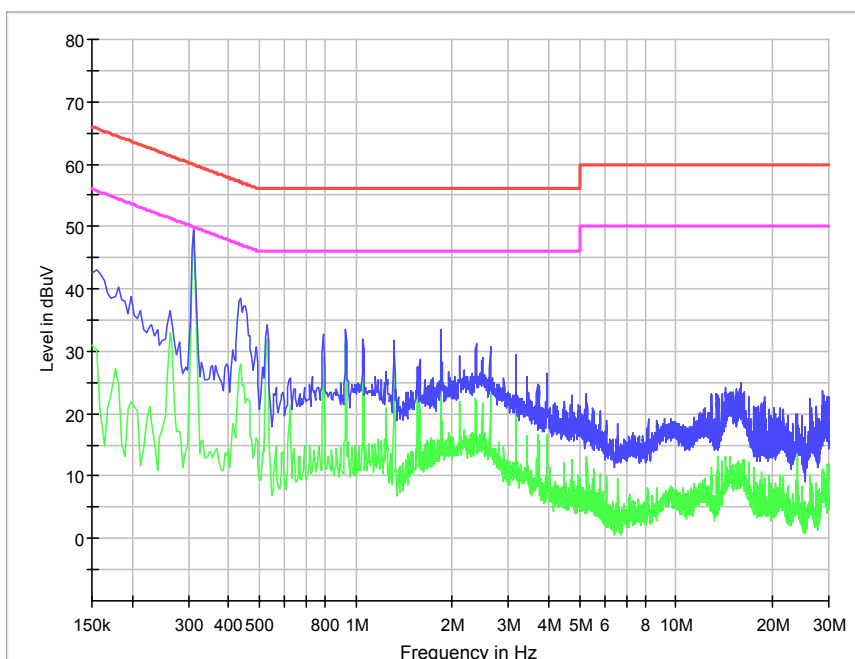
5.4. Test Data

Note: Emissions not reported below are too low against the prescribed limits. “ ---” means the test data is too low against the limit.

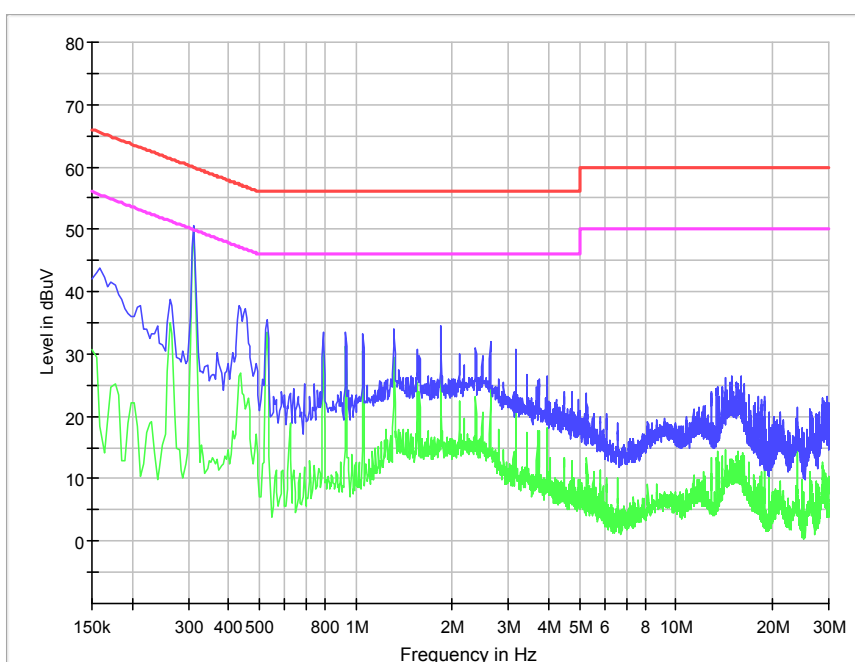
Table 13 Conducted Emission Test Data (mains port)

Model No.: T-60X Pro									
Test Mode: 1									
Test Voltage: AC 230V/50Hz									
L					N				
Frequency (MHz)	Quasi-Peak		Average		Frequency (MHz)	Quasi-Peak		Average	
	Reading (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Limit (dB μ V)		Reading (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Limit (dB μ V)
0.314	49.6	59.9	47.1	49.9	0.312	49.8	59.9	47.8	49.9
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EUT: T-60X Pro
 Operating Condition: Test Mode 1
 Test Site: SMQ
 Test Specification: L&N
 Test Voltage: AC 230V/50Hz
 L



N



6. RADIATED EMISSION TEST

6.1. Test Standard and Limit

6.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55032:2015+A1:2020

6.1.2. Test Limit

Table 14 Radiated Emission Test Limit

Frequency	Limit (dB μ V/m)	
	Quasi-peak	
30MHz~230MHz	40	
230MHz~1000MHz	47	

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

Table 15 Radiated Emission Test Limit

Frequency	Limit (dB μ V/m)	
	Average	Peak
1GHz~3GHz	50	70
3GHz~6GHz	54	74

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna at frequency range 30MHz to 1000MHz, Horn antenna is used as a receiving antenna at frequency range 1GHz to 6GHz, Horn antenna is set at 1.5 meter, both horizontal and vertical polarizations of the antenna is set on test.

6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

6.4. Test Data

Note: Emissions not reported below are too low against the prescribed limits. “ ---” means the test data is too low against the limit.

Table 16 Radiated Emission Test Data (30MHz-1GHz)

Model No.: T-60X Pro			
Test Mode: 1			
Test Voltage: AC 230V/50Hz			
Frequency MHz	Reading dB(μ V/m)	Polarization	Limit dB (μ V/m)
93.050	26.6	Vertical	40
---	---	Horizontal	---

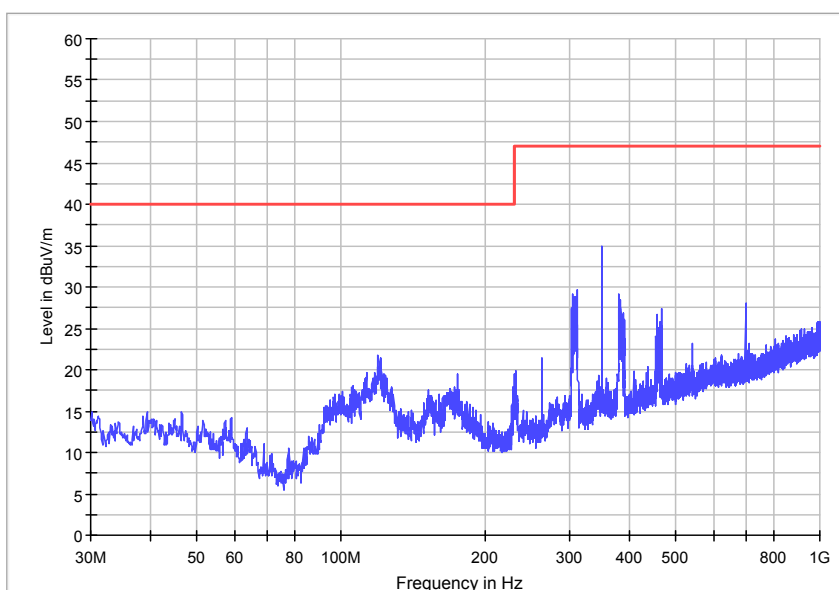
Table 17 Radiated Emission Test Data (1GHz-6GHz)

Model No.: T-60X Pro					
Test Mode: 1					
Test Voltage: AC 230V/50Hz					
Frequency MHz	Reading Peak dB(μ V/m)	Reading Average dB(μ V/m)	Polarization	Limit Peak dB (μ V/m)	Limit Average dB (μ V/m)
1.068	40.5	37.9	Vertical	70	50
1.068	44.8	43.1	Horizontal	70	50

Radiated Emission

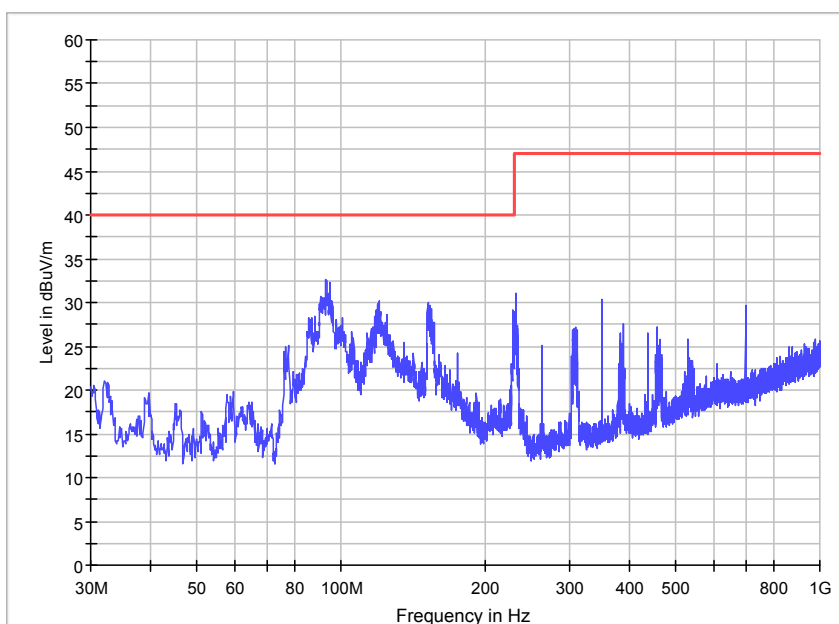
EUT Name: T-60X Pro
Operating Condition: Test Mode 1
Test site: SMQ EMC Lab.
Antenna Position: Horizontal & Vertical
Test Voltage: AC 230V/50Hz
Horizontal

ESW8 Field strength 30M-1GHz



Vertical

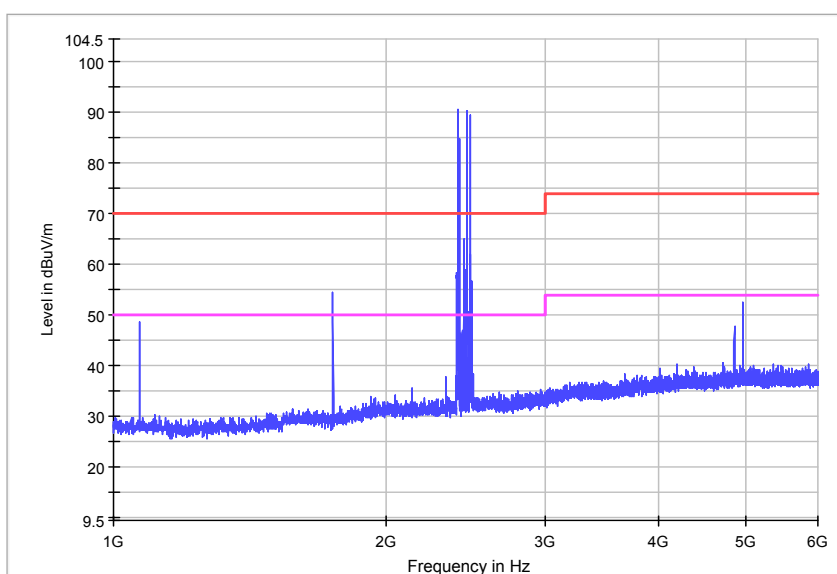
ESW8 Field strength 30M-1GHz



Radiated Emission

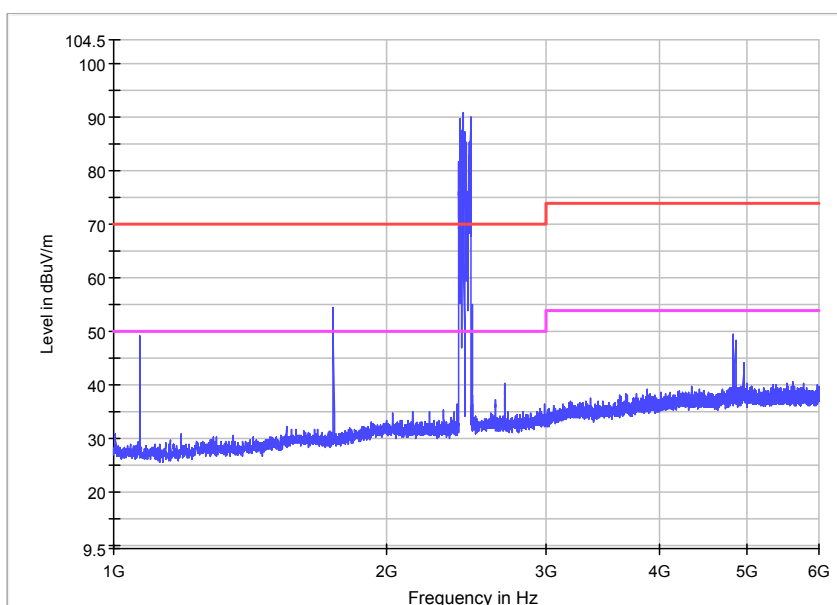
EUT: T-60X Pro
 Operating Condition: Test Mode 1
 Test Site: SMQ EMC Lab.
 Test Specification: Horizontal & Vertical
 Test Voltage: AC 230V/50Hz
 Horizontal

ESW8 Field strength 1-6GHz



Vertical

ESW8 Field strength 1-6GHz



Remark : The peaks above limits are the frequencies of BT.

7. HARMONIC CURRENT EMISSION TEST

7.1. Test Standard and Limit

7.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN IEC 61000-3-2:2019

7.1.2. Limits

Table 18 Harmonic Current Test Limit (Class A)

Harmonic order (h)	Maximum permissible harmonic current (A)
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≤h≤39	0.15×15/h
Even harmonics	
2	1.08
4	0.43
6	0.30
8≤h≤40	0.23×8/h

7.2. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the Power of the EUT and use the test system to test the harmonic current level.

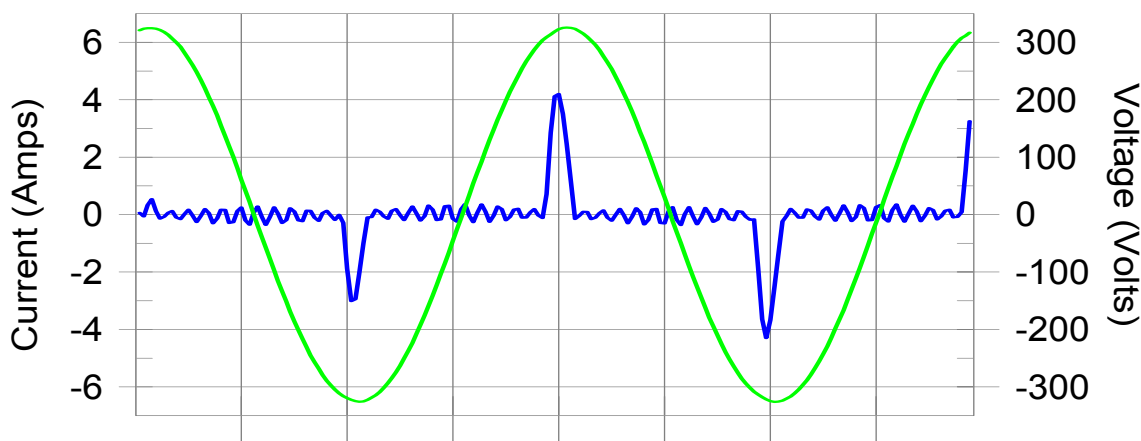
7.3. Test Data

Harmonics – Class-A per IEC 61000-3-2:2018/AMD1:2020(Run time) incl. inter-harmonics

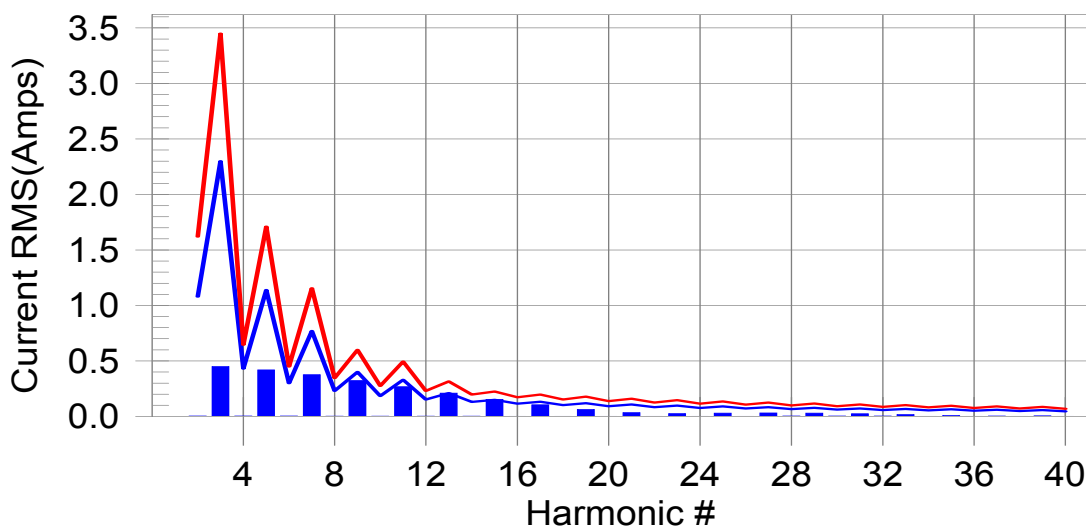
Test category: Class-A (European limits) Test Margin: 100
 Test date: 1/19/2022 Start time: 3:08:56 PM End time: 3:11:37 PM
 Test duration (min): 2.5 Data file name: H-000313.cts_data
 Comment: Comments
 Customer: Customer information

Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonics H15-65.7% of 150% limit, H15-97.3% of 100% limit

Current Test Result Summary (Run time)

Test category: Class-A (European limits) Test Margin: 100
 Test date: 1/19/2022 Start time: 3:08:56 PM End time: 3:11:37 PM
 Test duration (min): 2.5 Data file name: H-000313.cts_data
 Comment: Comments
 Customer: Customer information

Test Result: Pass Source qualification: Normal
 THC(A): 0.885 I-THD(%): 180.4 POHC(A): 0.076 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 229.93	Frequency(Hz): 50.00
I_Peak (Amps): 4.430	I_RMS (Amps): 1.066
I_Fund (Amps): 0.491	Crest Factor: 4.683
Power (Watts): 110.9	Power Factor: 0.462

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.003	1.080	N/A	0.007	1.620	N/A	Pass
3	0.449	2.300	19.5	0.470	3.450	13.6	Pass
4	0.004	0.430	N/A	0.008	0.645	N/A	Pass
5	0.418	1.140	36.7	0.438	1.710	25.6	Pass
6	0.003	0.300	N/A	0.007	0.450	N/A	Pass
7	0.376	0.770	48.8	0.394	1.155	34.1	Pass
8	0.003	0.230	N/A	0.007	0.345	N/A	Pass
9	0.325	0.400	81.2	0.341	0.600	56.8	Pass
10	0.003	0.184	N/A	0.006	0.276	N/A	Pass
11	0.268	0.330	81.2	0.282	0.495	57.0	Pass
12	0.002	0.153	N/A	0.005	0.230	N/A	Pass
13	0.210	0.210	99.9	0.222	0.315	70.5	Pass
14	0.002	0.131	N/A	0.005	0.197	N/A	Pass
15	0.146	0.150	97.3	0.148	0.225	65.7	Pass
16	0.002	0.115	N/A	0.004	0.173	N/A	Pass
17	0.104	0.132	79.0	0.112	0.198	56.6	Pass
18	0.002	0.102	N/A	0.004	0.153	N/A	Pass
19	0.063	0.118	53.5	0.069	0.178	38.9	Pass
20	0.002	0.092	N/A	0.004	0.138	N/A	Pass
21	0.035	0.107	32.9	0.039	0.161	24.2	Pass
22	0.002	0.084	N/A	0.003	0.125	N/A	Pass
23	0.026	0.098	26.3	0.028	0.147	18.8	Pass
24	0.001	0.077	N/A	0.003	0.115	N/A	Pass
25	0.029	0.090	32.4	0.032	0.135	24.1	Pass
26	0.002	0.071	N/A	0.003	0.107	N/A	Pass
27	0.032	0.083	38.5	0.035	0.125	27.9	Pass
28	0.004	0.066	N/A	0.005	0.099	N/A	Pass
29	0.030	0.078	39.2	0.032	0.116	27.3	Pass
30	0.003	0.061	N/A	0.004	0.092	N/A	Pass
31	0.025	0.073	34.3	0.026	0.109	24.2	Pass
32	0.004	0.058	N/A	0.004	0.086	N/A	Pass
33	0.017	0.068	25.2	0.019	0.102	18.6	Pass
34	0.002	0.054	N/A	0.002	0.081	N/A	Pass
35	0.009	0.064	14.0	0.011	0.096	11.5	Pass
36	0.001	0.051	N/A	0.001	0.077	N/A	Pass
37	0.003	0.061	N/A	0.005	0.091	N/A	Pass
38	0.001	0.048	N/A	0.001	0.073	N/A	Pass
39	0.006	0.058	N/A	0.009	0.087	N/A	Pass
40	0.001	0.046	N/A	0.001	0.069	N/A	Pass

8. VOLTAGE FLUCTUATION AND FLICKER TEST

8.1. Test Standard and Limit

8.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 61000-3-3:2013+A1:2019

8.1.2. Limit

Table 19 Flicker Test Limit

Test items	Limits
Pst	1.0
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

8.2. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the voltage fluctuation and flicker.

8.3. Test Data

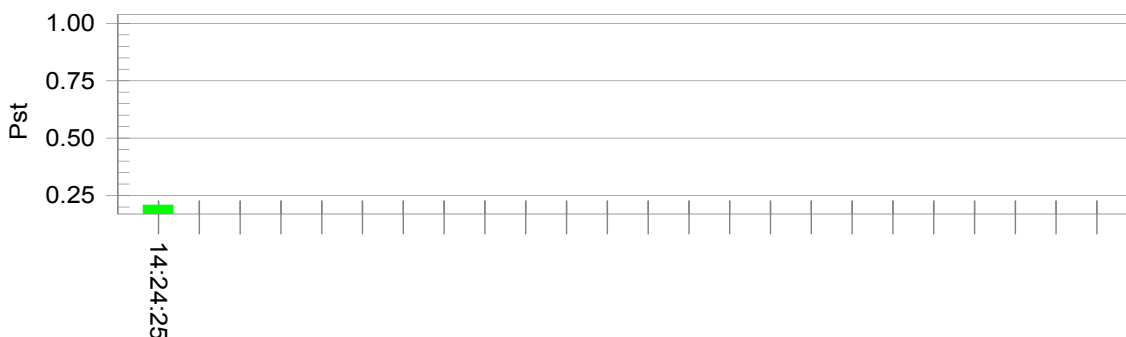
Flicker Test Summary per EN/IEC61000-3-3 (Run time)

Test category: All parameters (European limits) Test Margin: 100
 Test date: 1/19/2022 Start time: 2:14:04 PM End time: 2:24:31 PM
 Test duration (min): 10 Data file name: F-000311.cts_data
 Comment: Comments
 Customer: Customer information

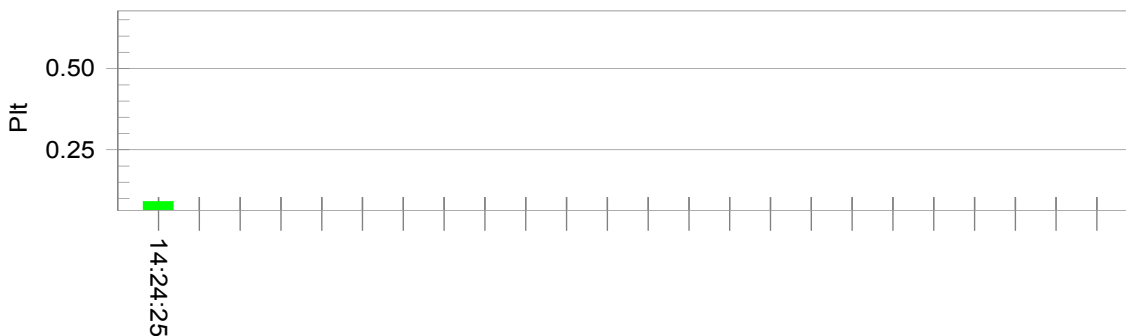
Test Result: Pass Status: Test Completed

Pst_i and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.97		
Highest dt (%):		Test limit (%):	
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.209	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.091	Test limit:	0.650 Pass

9. ELECTROSTATIC DISCHARGE IMMUNITY TEST

9.1. Test Requirements

9.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55035:2017+A11:2020

9.1.2. Test Level

Table 20 Test Level for ESD

Port	Test Specification	Performance Criterion
Enclosure Port	±8kV air discharge ±4kV contact discharge	Performance criteria for transient phenomena, B, see clause 3.7

9.2. Test Procedure

9.2.1. Contact Discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

9.2.2. Air Discharge:

Air discharge is used where contact discharge can' t be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

9.2.3. Indirect discharge for horizontal coupling plane

At least 10 single discharges shall be applied to the horizontal coupling plane, at

points on each side of the EUT.

9.2.4. Indirect discharge for vertical coupling plane

At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

9.3. Test Data

Table 21 ESD Test Data

Model No.: T-60X Pro Test Mode: 1-5				
Location	Voltage	Amount of test points	Discharge Method	Results
HCP	±4kV	4	C	Pass
VCP	±4kV	4	C	Pass
Conductive enclosure	±4kV	22	C	Pass
Non-Conductive enclosure	±2kV, ±4kV, ±8kV	87	A	Pass
Remark: C=Contact discharging A=Air discharging				

10. RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

10.1. Test Requirements

10.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55035:2017+A11:2020

10.1.2. Test Level

Table 22 Test Level for Radiated Electromagnetic Field Immunity Test

Port	Test Specification		Performance Criterion
	EN 301489-1	EN 55035	
Enclosure Port	80-6000MHz, 3V/m(r.m.s.) (unmodulated) 80 % AM(1kHz)	80-1000MHz, 1800 MHz ± 1%, 2600 MHz ± 1%, 3500 MHz ± 1%, 5000 MHz ± 1%, 3 V/m (r.m.s.) (unmodulated) 80 % AM(1kHz)	Performance criteria for continuous phenomena,A, , see clause 3.7

10.2. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on Test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

10.3. Test Data

Table 23 Radiated Electromagnetic Field Immunity Test Data

Model No.: T-60X Pro		
Test Mode: 1-5		
Frequency Range	80-6000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	
Field Strength	3V/m, 80 % AM(1kHz)	
Steps	1%	
Dwell time	1 second	
	Horizontal	Vertical
Front	Pass	Pass
Rear	Pass	Pass
Left	Pass	Pass
Right	Pass	Pass

11. ELECTRICAL FAST TRANSIENT/BURST TEST

11.1. Test Requirements

11.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55035:2017+A11:2020

11.1.2. Level

Table 24 Test Level for EFT

Port	Test Specification	Performance Criterion
AC main power Port	±1kV 5/50 ns 5kHz repetition frequency	Performance criteria for transient phenomena, B, see clause 3.7
Digital data ports	±0.5kV 5/50 ns 5kHz repetition frequency	

11.2. Test Procedure

11.2.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 minutes.

11.2.2. For signal lines and control lines ports:

A coupling clamp is use to couple the EFT interference signal to the signal and control lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 minutes.

11.2.3. For DC input and DC output power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage

should be applied during compliance test and the duration of the test is 1 minutes.

11.3.Test Data

Table 25 EFT Test Data

Model No.: T-60X Pro Test Mode: 1-5				
Injected Line	Voltage (kV)	Test Time (s)	Injected Method	Result
L	+1	60	Direct	Pass
	-1	60	Direct	Pass
N	+1	60	Direct	Pass
	-1	60	Direct	Pass
L,N	+1	60	Direct	Pass
	-1	60	Direct	Pass
COAXIAL cable	+0.5	60	Direct	Pass
	-0.5	60	Direct	Pass
AUX in cable	+0.5	60	Direct	Pass
	-0.5	60	Direct	Pass
Audio output cable	+0.5	60	Direct	Pass
	-0.5	60	Direct	Pass

12. SURGE IMMUNITY TEST

12.1. Test Requirements

12.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55035:2017+A11:2020

12.1.2. Level

Table 26 Test Level for Surge

Port	Test Specification	Performance criterion
AC main power Port	1.2/50(8/20) μ s \pm 1kV (L-N) \pm 2kV (L,N-PE)	The performance criteria for transient phenomena, B, see clause 3.7

12.2. Test Procedure

Set up the EUT according to the standard. A coupling device is used to couple the surge signal to the EUT. Five positive and five negative pulses is applicable and the interval between pulses is 1 minutes.

12.3. Test Data

Table 27 Surge Test Data

Model No.: T-60X Pro Test Mode: 1-5						
Injected Line	Wave Form	Voltage (kV)	Phase	Number of Pulse	Interval time	Result
L-N	1.2/50 μ s	+1	0°,90°,180°,270°	20	60s	Pass
		-1	0°,90°,180°,270°	20	60s	Pass

13. CONDUCTED IMMUNITY TEST

13.1. Test Requirements

13.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55035:2017+A11:2020

13.1.2. Level

Table 28 Test Level for Conducted Immunity

Port	Test Specification		Performance Criterion
	EN 301489-1	EN 55035	
AC main power Port	0.15MHz~80MHz 3V(r.m.s.) (unmodulated) 80% AM (1kHz)	0.15MHz~10MHz 3V(r.m.s.) (unmodulated) 80% AM (1kHz) 150Ω	Performance criteria for continuous phenomena, A, see clause 3.7
		10MHz~30MHz 3V-1V(r.m.s.) (unmodulated) 80% AM (1kHz) 150Ω	
		30MHz~80MHz 1V(r.m.s.) (unmodulated) 80% AM (1kHz) 150Ω	
Digital data ports	0.15MHz~80MHz 3V(r.m.s.) (unmodulated) 80% AM (1kHz)	0.15MHz~10MHz 3V(r.m.s.) (unmodulated) 80% AM (1kHz) 150Ω	
		10MHz~30MHz 3V-1V(r.m.s.) (unmodulated) 80% AM (1kHz) 150Ω	
		30MHz~80MHz 1V(r.m.s.) (unmodulated) 80% AM (1kHz) 150Ω	

13.2. Test Procedure

Set up the EUT, CDN and test generators as shown above. The test is performed with

the generator contacted to each CDN in turn. The frequency range is swept from 150 kHz to 80MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz (400Hz) sine wave.

13.3.Test Data

Table 29 Conducted Immunity Test Data(EN 301489)

Model No.: T-60X Pro			
Test Mode: 1-5			
Frequency Range (MHz)	Injected Position	Strength	Result
0.15MHz ~ 80MHz	AC Lines	3V(rms Unmodulated)	Pass
0.15MHz ~ 80MHz	COAXIAL cable	3V(rms Unmodulated)	Pass
0.15MHz ~ 80MHz	AUX in cable	3V(rms Unmodulated)	Pass
0.15MHz ~ 80MHz	Audio output cable	3V(rms Unmodulated)	Pass
Dwell time: 1s; Steps: 1%			

Table 30 Conducted Immunity Test Data(EN 55035)

Model No.: T-60X Pro			
Test Mode: 1-5			
Frequency Range (MHz)	Injected Position	Strength	Result
0.15MHz ~ 10MHz	AC Lines	3V(rms Unmodulated)	Pass
10MHz ~ 30MHz	AC Lines	3V-1V(rms Unmodulated)	Pass
30MHz ~ 80MHz	AC Lines	1V(rms Unmodulated)	Pass
0.15MHz ~ 10MHz	COAXIAL cable	3V(rms Unmodulated)	Pass
10MHz ~ 30MHz	COAXIAL cable	3V-1V(rms Unmodulated)	Pass
30MHz ~ 80MHz	COAXIAL cable	1V(rms Unmodulated)	Pass
0.15MHz ~ 10MHz	AUX in cable	3V(rms Unmodulated)	Pass
10MHz ~ 30MHz	AUX in cable	3V-1V(rms Unmodulated)	Pass
30MHz ~ 80MHz	AUX in cable	1V(rms Unmodulated)	Pass
0.15MHz ~ 10MHz	Audio output cable	3V(rms Unmodulated)	Pass
10MHz ~ 30MHz	Audio output cable	3V-1V(rms Unmodulated)	Pass
30MHz ~ 80MHz	Audio output cable	1V(rms Unmodulated)	Pass
Dwell time: 1s; Steps: 1%			

14. VOLTAGE DIPS AND INTERRUPTIONS IMMUNITY TEST

14.1. Test Requirements

14.1.1. Test Standard

EN 301 489-1 V2.2.3
EN 301 489-17 V3.2.4
EN 55035:2017+A11:2020

14.1.2. Level

Table 31 Test Level for Voltage Dips and Interruptions (EN 301489-1)

Port	Environmental phenomenon	Voltage dip and short interruptions % residual voltage	Duration (cycle)	Performance criterion
AC main power Port	Voltage dips	0	0.5	Performance criteria for transient phenomena, see clause 3.7
		0	1	
		70	25	
	Voltage interruptions	0	250	

Table 32 Test Level for Voltage Dips and Interruptions (EN 55035)

Port	Environmental phenomenon	Residual voltage %UT	Duration (cycle)	Performance criterion
AC main power Port	Voltage interruption	<5	250	C
	Voltage dips	<5	0.5	B
		70	25	C

14.2. Test Procedure

Set up the EUT and test generator as shown above. The EUT is tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10s minimum.

14.3. Test Data

Table 33 Voltage Dips and Interruptions test data(EN 301 489)

Model No.: T-60X Pro				
Test Mode: 1-5				
Environmental phenomenon	Voltage Dips & Short Interruptions % residual voltage	Duration (cycle)	Phase Angle	Result
Voltage dips	0	0.5	0°	Pass
	0	1	0°	Pass
	70	25	0°	Pass
Voltage interruptions	0	250	0°	Pass

Table 34 Voltage Dips and Interruptions test data(EN 55035)

Model No.: T-60X Pro				
Test Mode: 1-5				
Environmental phenomenon	Voltage Dips & Short Interruptions % residual voltage	Duration (cycle)	Phase Angle	Result
Voltage dips	<5	0.5	0°	Pass
	70	25	0°	Pass
Voltage interruptions	<5	250	0°	Pass

APPENDIX I TEST PHOTOS

Photo 1 Conducted Emission Test



Photo 2 Radiated Emission

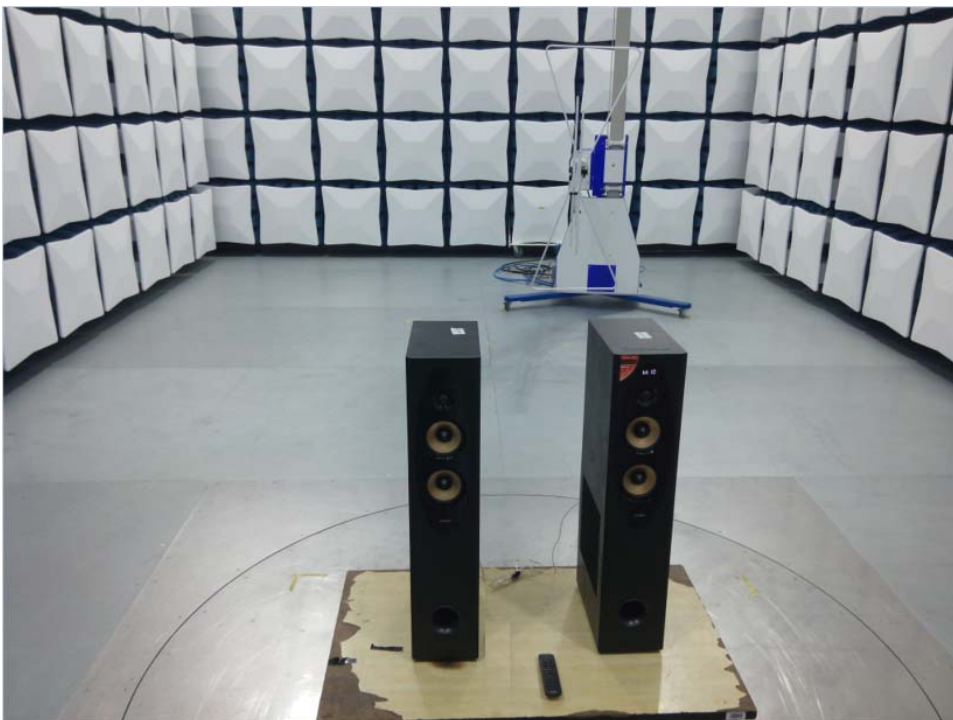


Photo 3 Radiated Emission

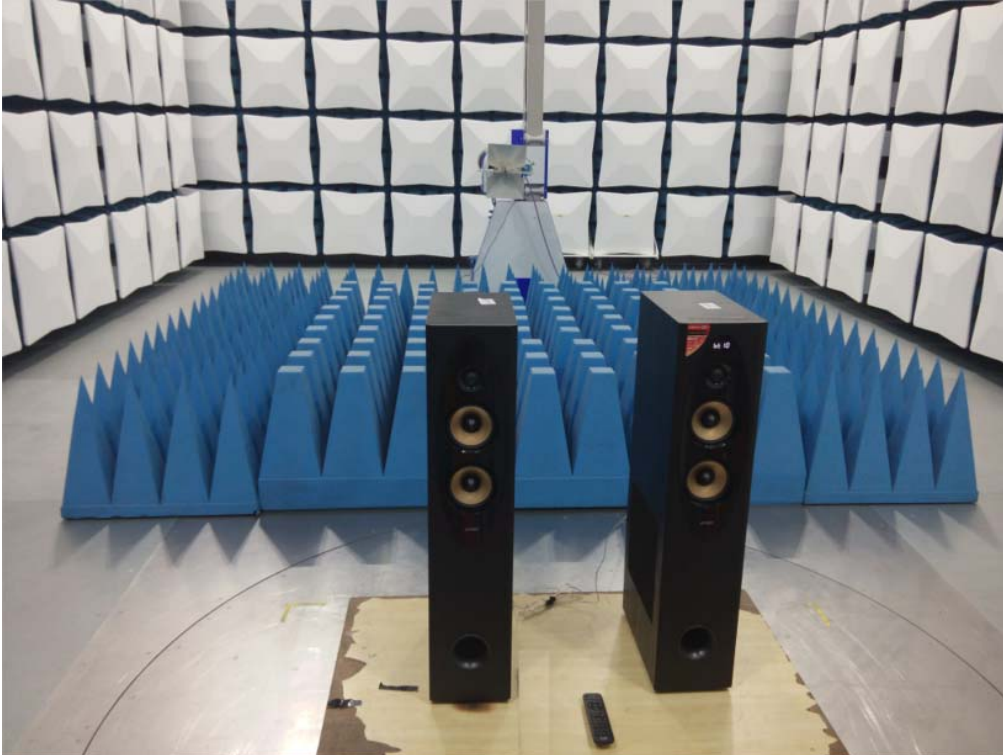


Photo 4 Harmonic current /Voltage Fluctuation and Flicker test



Photo 5 ESD Immunity Test



Photo 6 Radio Frequency Electromagnetic Fields Immunity test



Photo 7 Radio Frequency Electromagnetic Fields Immunity test



Photo 8 Surge Immunity Test



Photo 9 Voltage Dips and Interruptions Immunity Test



Photo 10 EFT Immunity Test



Photo 11 EFT Immunity Test

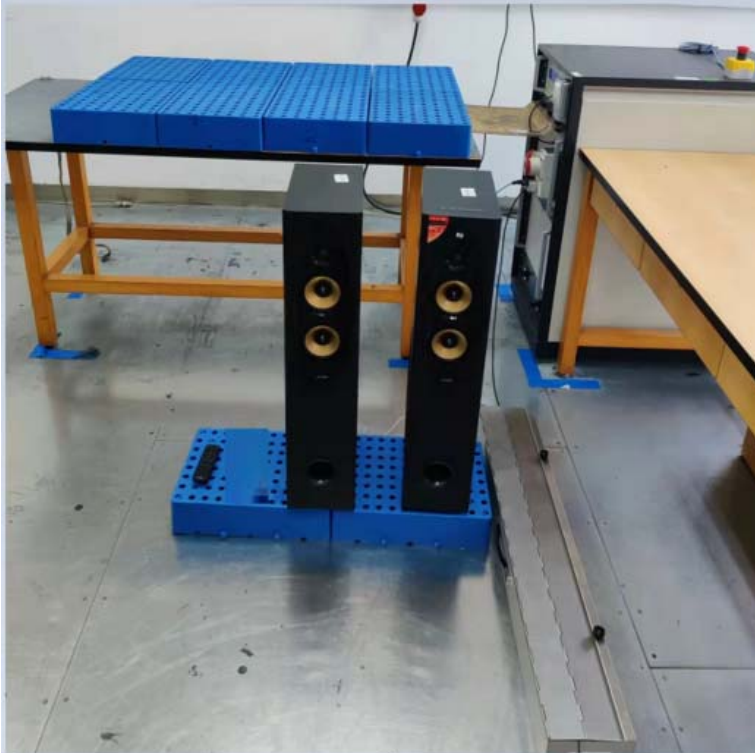


Photo 12 EFT Immunity Test

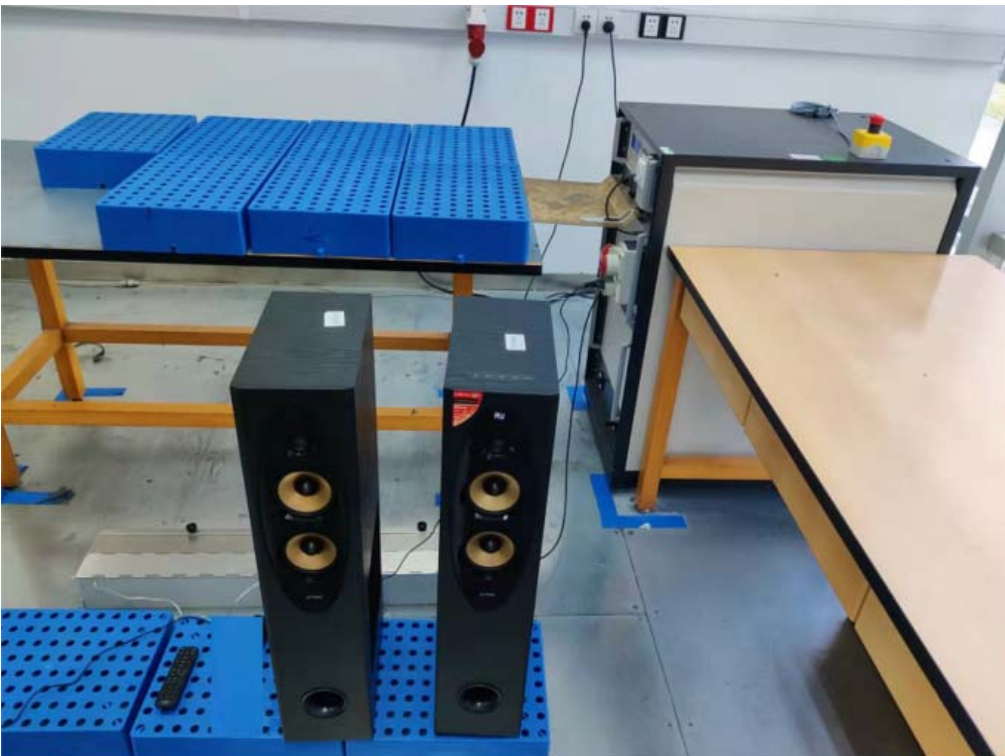


Photo 13 Conducted Immunity Test



Photo 14 Conducted Immunity Test

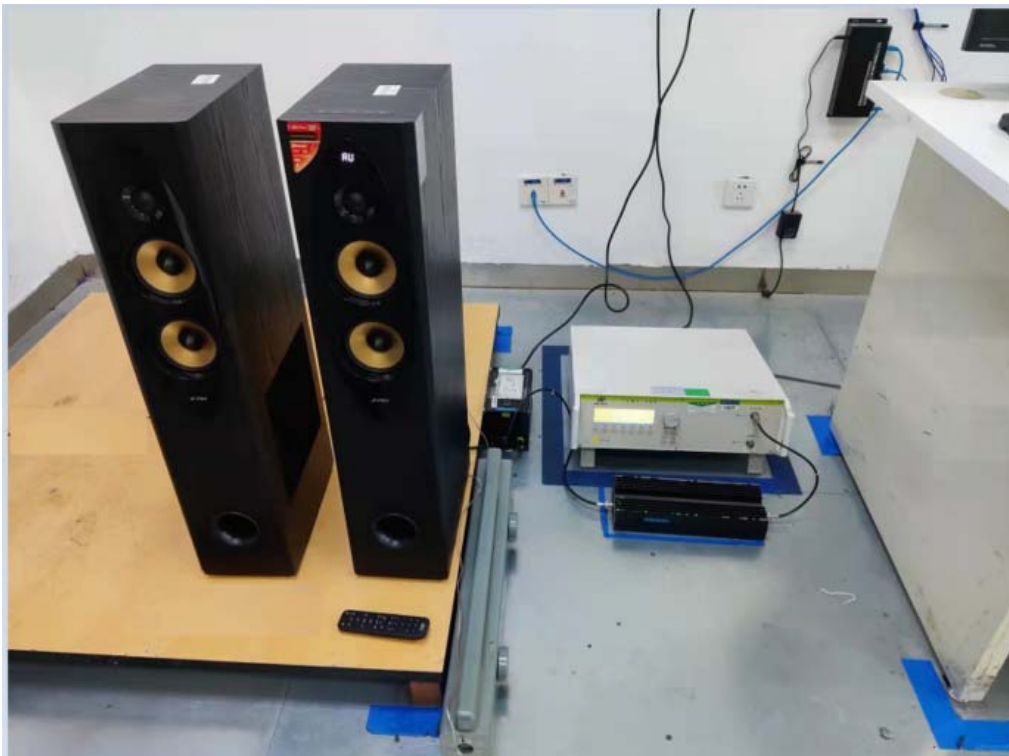


Photo 15 Conducted Immunity Test



APPENDIX II TEST PHOTOS

Please refer the document “WT228000036-Annex 1.PDF”.

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

Annex 1 EUT PHOTOS

Photo 1 Appearance of EUT



Photo 2 Appearance of EUT



Photo 3 Appearance of EUT

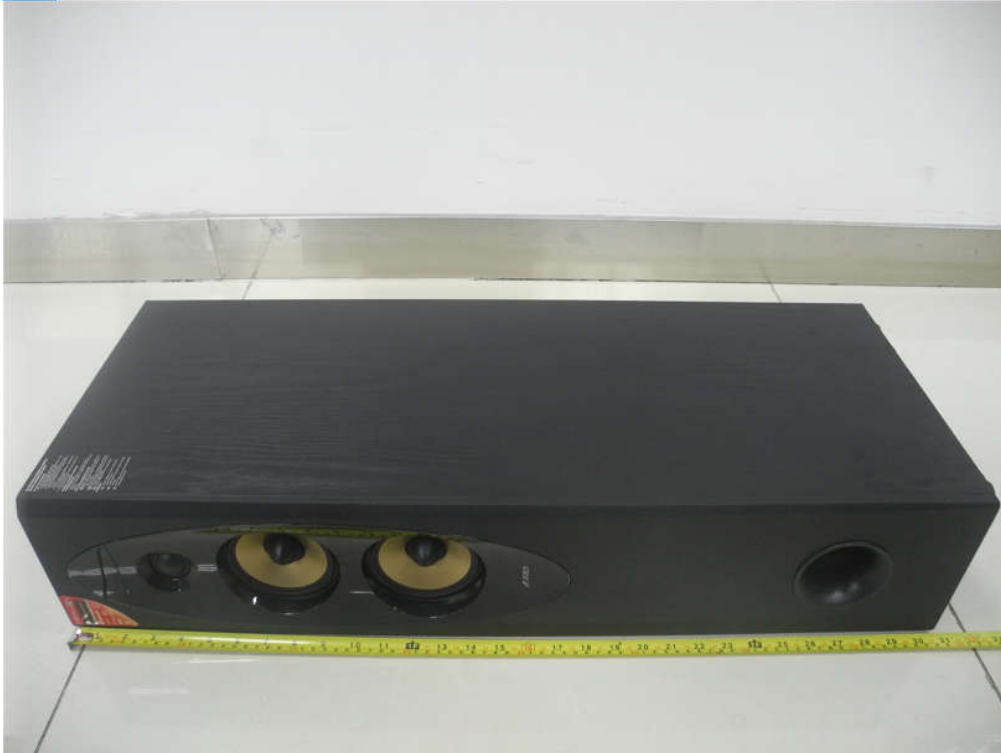


Photo 4 Appearance of EUT



Photo 5 Inside of EUT



Photo 6 Inside of EUT

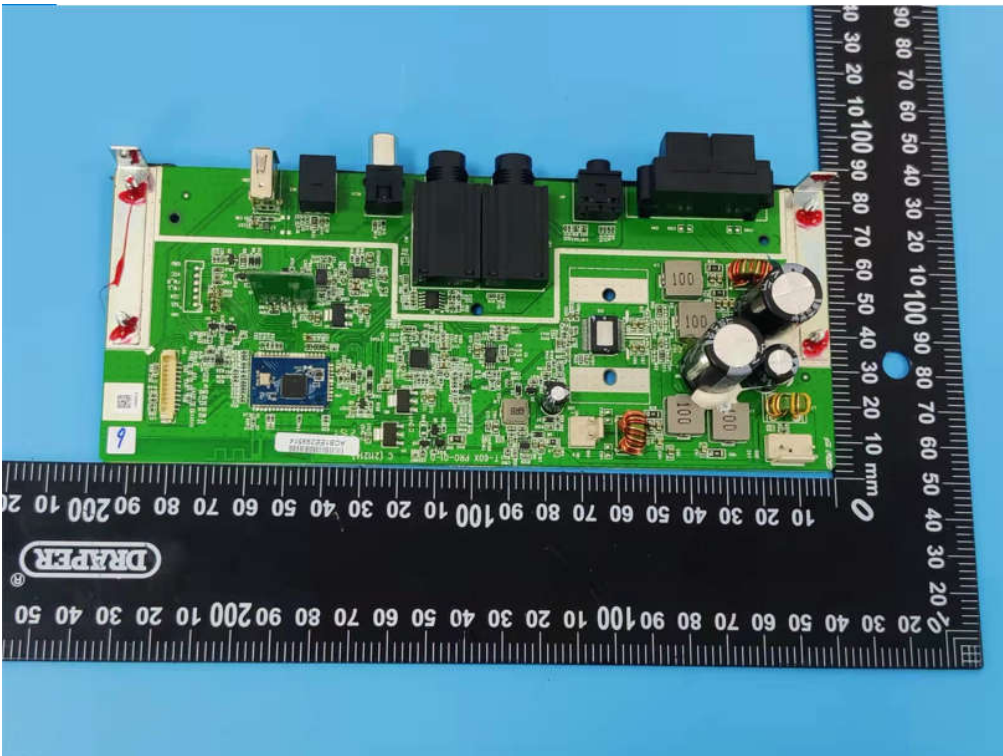


Photo 7 Inside of EUT

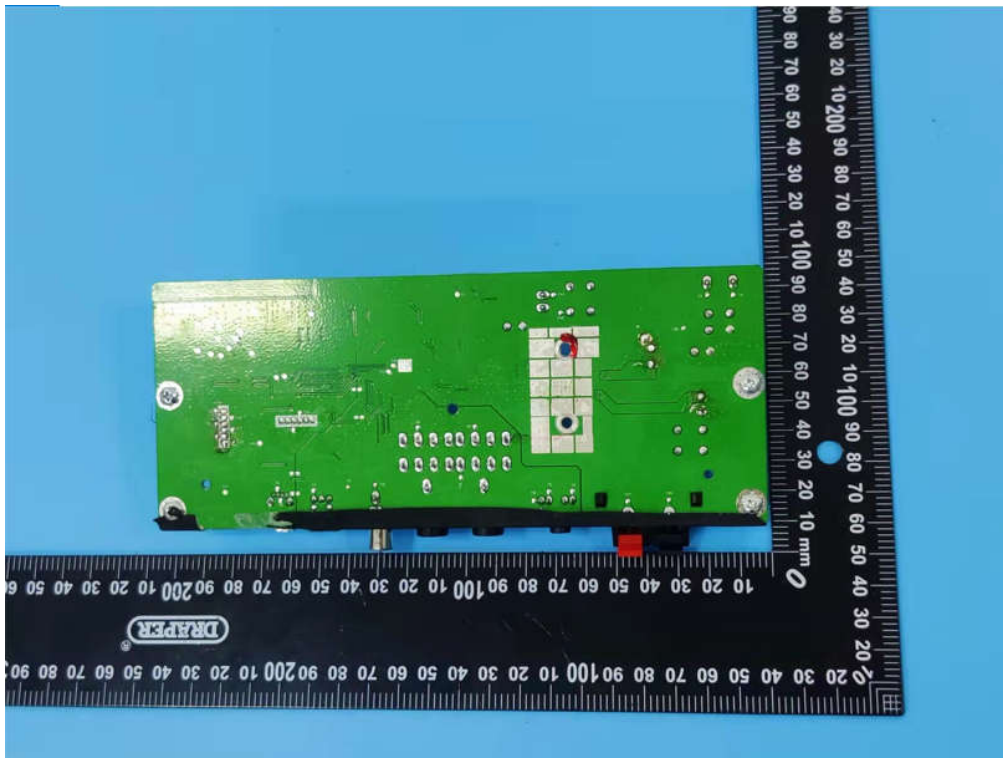


Photo 8 Inside of EUT

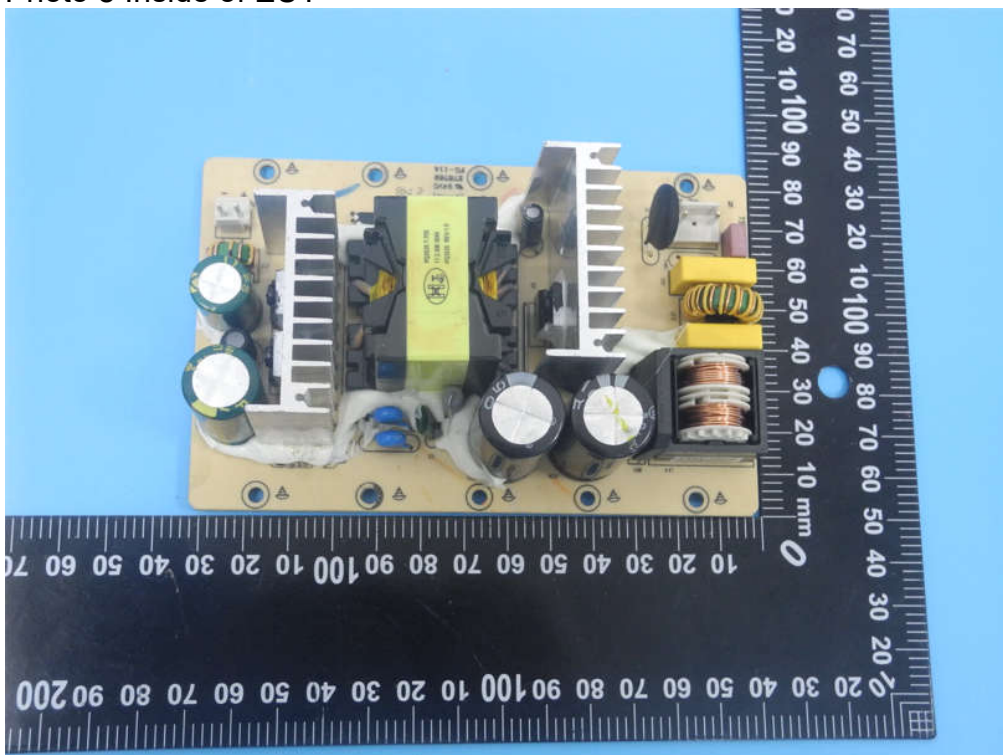


Photo 9 Inside of EUT

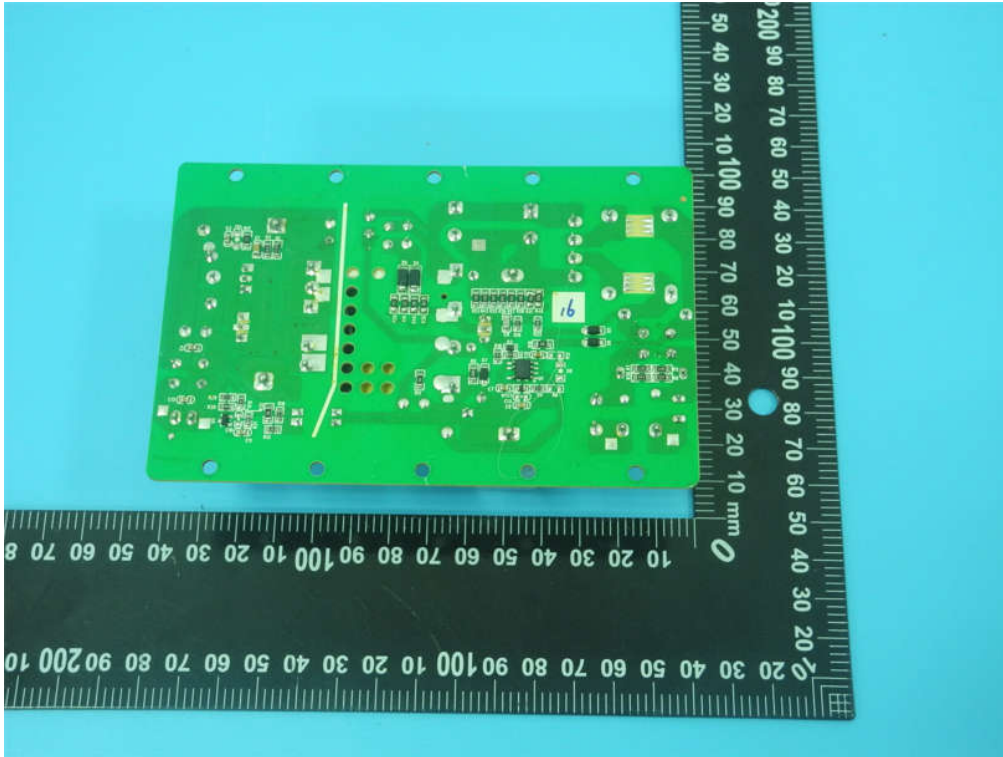


Photo 10 Inside of EUT

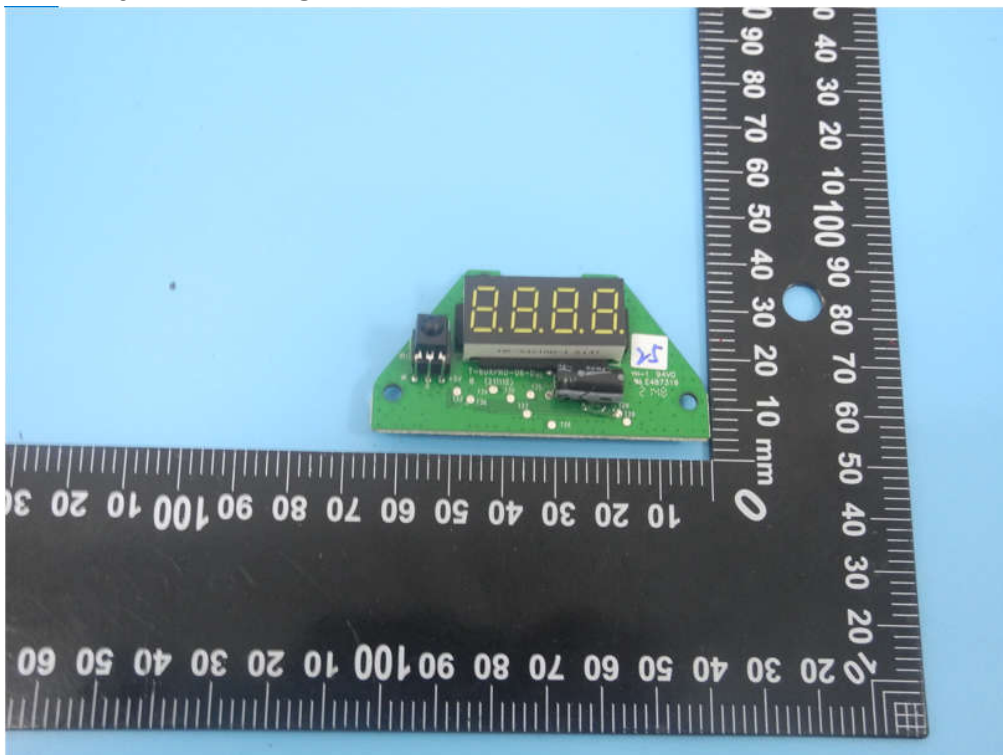


Photo 11 Inside of EUT

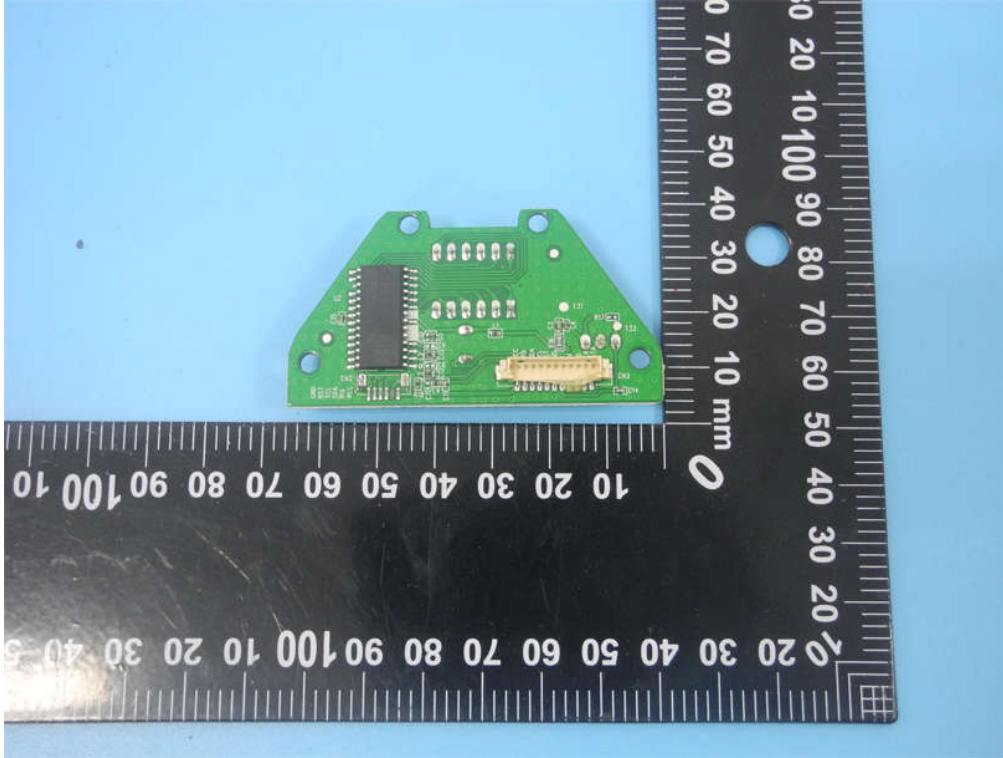


Photo 12 Appearance of EUT



Photo 13 Appearance of EUT

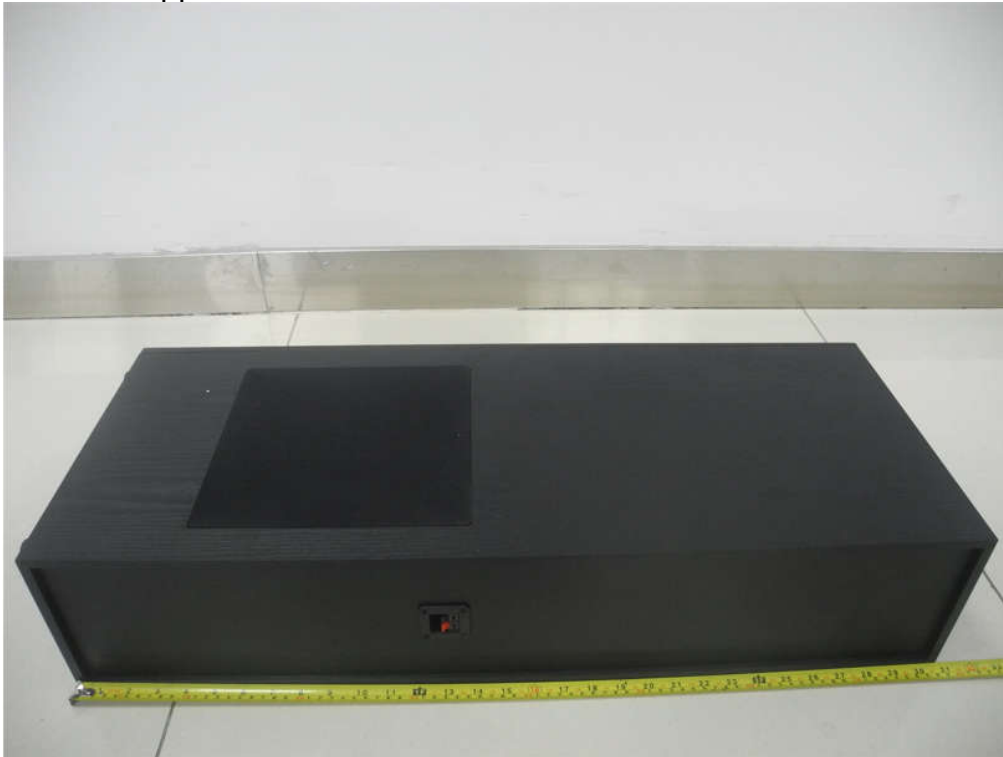


Photo 14 Inside of EUT



Photo 15 Inside of EUT

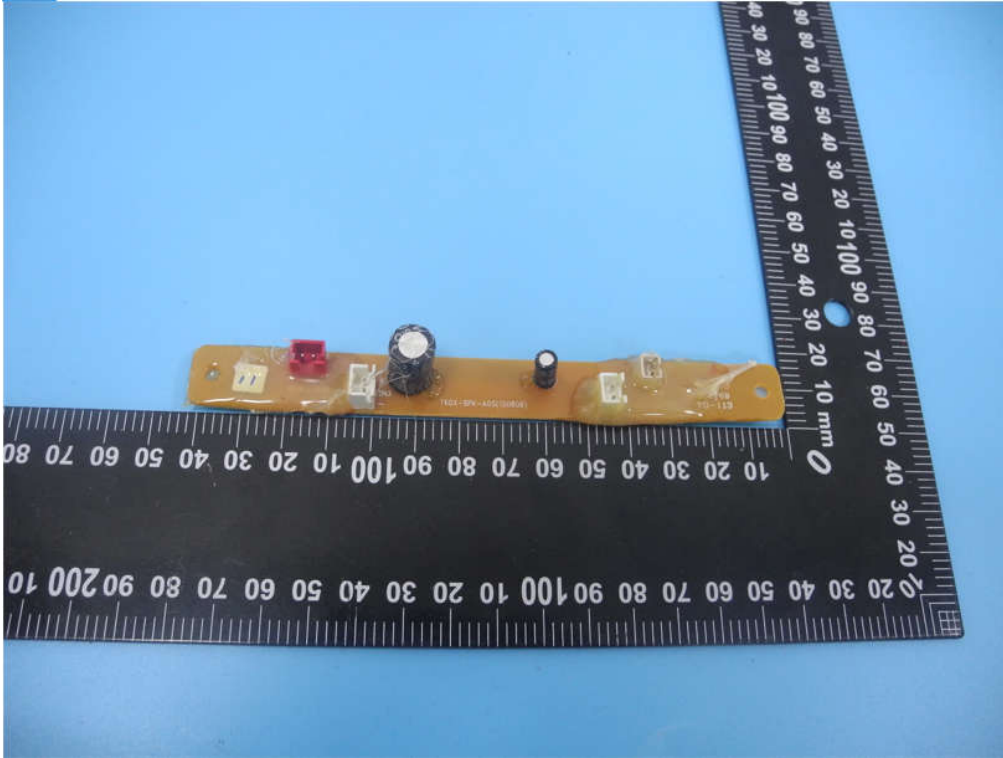


Photo 16 Inside of EUT



Photo 17 Appearance of Remote



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