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Report Template Version: V03
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Test Report

Report No. :	CQASZ20180600056E
Applicant:	Shenzhen Qihua Star Optoelectronics Technology Co., Ltd.
Address of Applicant:	4th Floor, Building A, Lianxin Technology, Hangcheng Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, China
Manufacturer:	Nanning Qihua Star Optoelectronic Technology Co., Ltd.
Address of Manufacturer:	5th Floor, 3#, Zhiyuan Incubation Base, No. 27, Anping Road, Guangxi-ASEAN Economic and Technological Development Zone
Factory:	Nanning Qihua Star Optoelectronic Technology Co., Ltd.
Address of Factory:	5th Floor, 3#, Zhiyuan Incubation Base, No. 27, Anping Road, Guangxi-ASEAN Economic and Technological Development Zone

Equipment Under Test (EUT):

Product:	Multifunction Projection Clock
Model No.:	QHX-R-P-001, QHX-R-P-002, QHX-R-P-003, QHX-R-P-004, QHX-R-P-005, QHX-R-P-006
Test Model No.:	QHX-R-P-001
Brand Name:	N/A
FCC ID:	2AQAY-QHX
Standards:	47 CFR PART 15, Subpart B
Date of Test:	2018-06-19 to 2018-06-22
Date of Issue:	2018-06-22
Test Result :	**PASS***

Tested By: Martin Lee

(Martin Lee)

Reviewed By: Owen Zhou

(Owen Zhou)

Approved By:

(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO., LTD
华夏准测
APPROVED

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

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20180600056E	Rev.01	Initial report	2018-06-22

2 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 6GHz)	47 CFR PART 15,Subpart B	ANSI C63.4:2014	Class B	PASS
Conducted Emission (150kHz to 30MHz)	47 CFR PART 15,Subpart B	ANSI C63.4:2014	Class B	PASS

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement Range (MHz)
Below 1.705	30
1.705 to 108	1000
108 to 500	2000
500 to 1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

Note:

The highest frequency of the internal sources of the EUT is 108 MHz

All model: QHX-R-P-001, QHX-R-P-002, QHX-R-P-003, QHX-R-P-004, QHX-R-P-005, QHX-R-P-006

Only the model QHX-R-P-001 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

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4 General Information

4.1 Details of E.U.T.

Power Supply:	USB:5V 1A or battery:2*AAA DC3.0V
Test voltage:	120V/60Hz
Hardware Version:	V1.0
Software Version:	V1.0
FM receive frequency:	87.5~108MHz
FM Antenna:	Integral antenna
Antenna gain	0dBi

4.2 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark
Adapter	Samsung	EP-TA50CBC	Provide by lab

4.3 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 Huaxia 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 **CQA** laboratory is reported:

Test	Range	Uncertainty	Notes
Radiated Emission	Below 1GHz	±5.12dB	(1)
Radiated Emission	Above 1GHz	±4.60dB	(1)
Conducted Disturbance	0.15~30MHz	±3.34dB	(1)

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

4.4 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

4.5 Test Facility

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

• CNAS (No. CNAS L5785)

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• ISED Registration No.: 22984-1

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

• A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

• FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen 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 No.:522263

5 Equipment List

Radiated Emission					
Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
Horn Antenna	R&S	HF906	CQA-012	2017/9/25	2018/9/24
Bilog Antenna	R&S	HL562	CQA-011	2017/9/25	2018/9/24
EMI Test Receiver	R&S	ESR7	CQA-005	2017/9/25	2018/9/24
Spectrum analyzer	R&S	FSU26	CQA-038	2017/9/25	2018/9/24
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2017/9/25	2018/9/24
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2017/9/25	2018/9/24
Coaxial cable (1GHz~40GHz)	CQA	N/A	C019	2017/10/18	2018/10/17
Coaxial cable (9KHz~1GHz)	CQA	N/A	C020	2017/10/18	2018/10/17

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Instrument No.	Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2017/9/25	2018/9/24
LISN	R&S	ENV216	CQA-003	2017/9/25	2018/9/24
Coaxial cable (9KHz~300MHz)	CQA	N/A	C009	2017/10/18	2018/10/17

6 Test Results

6.1 Conducted Emissions Mains Terminals, 150kHz to 30MHz

Test Requirement: 47 CFR PART 15,Subpart B

Test Method: ANSI C63.4

Frequency Range: 150kHz to 30MHz

Class / Severity: Class B

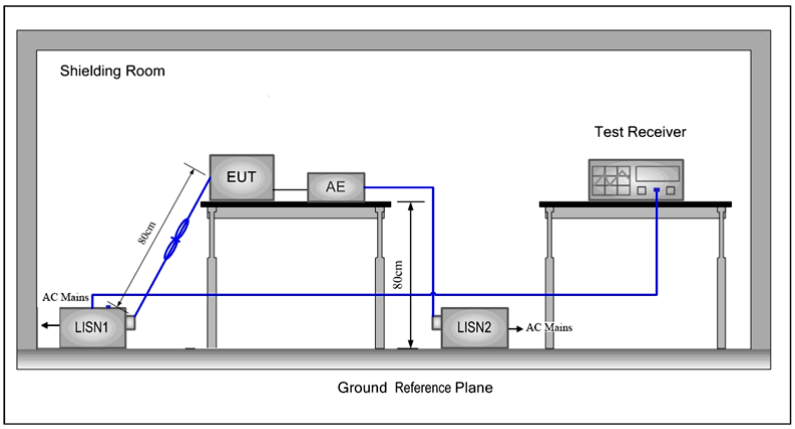
Limit:

0.15M-0.5MHz 66dB(dBμV)-56dB(dBμV) quasi-peak, 56dB(dBμV)-46dB(dBμV) average

0.5M-5MHz 56dB(dBμV) quasi-peak, 46dB(dBμV) average

5M-30MHz 60dB(dBμV) quasi-peak, 50dB(dBμV) average

Test Setup:



Test Procedure:

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

Detector: Peak for pre-scan (9kHz Resolution Bandwidth)

Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit

6.1.1 E.U.T. Operation

Operating Environment:

Temperature:	25.0 °C	Humidity:	55 % RH	Atmospheric Pressure:	1015	mbar

EUT Operation: Mode a: USB charging
Mode b: FM radio
Mode c: Clock projection

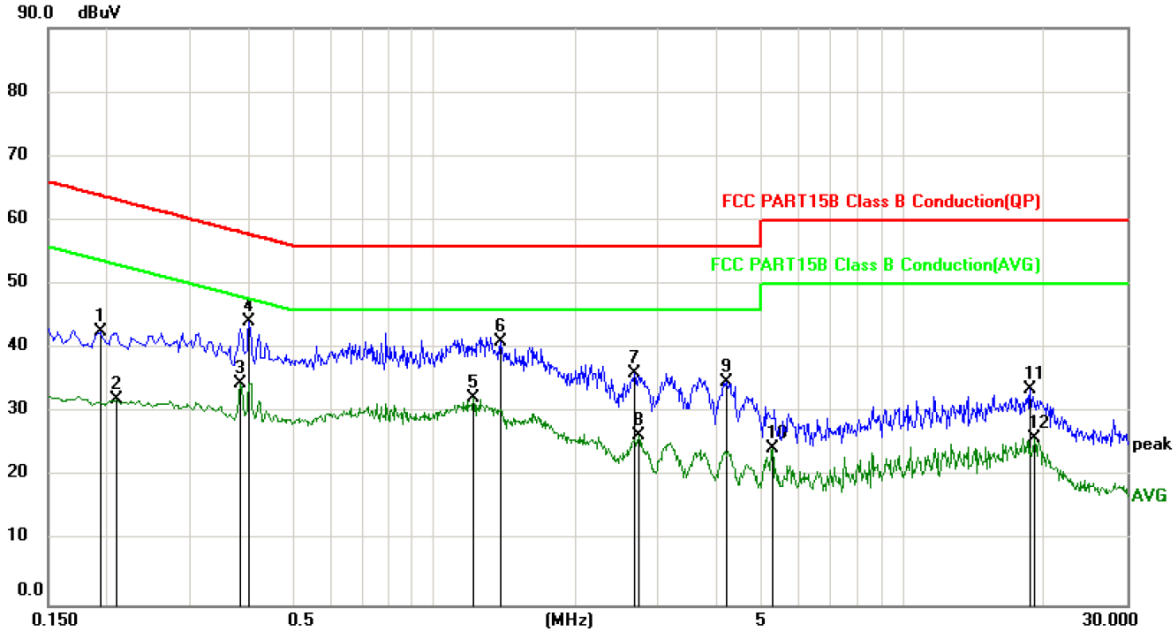
Test Status: Pretest the EUT at different test mode and found the Mode b which is worst case, the test worst case mode is recorded in the report.

6.1.2 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

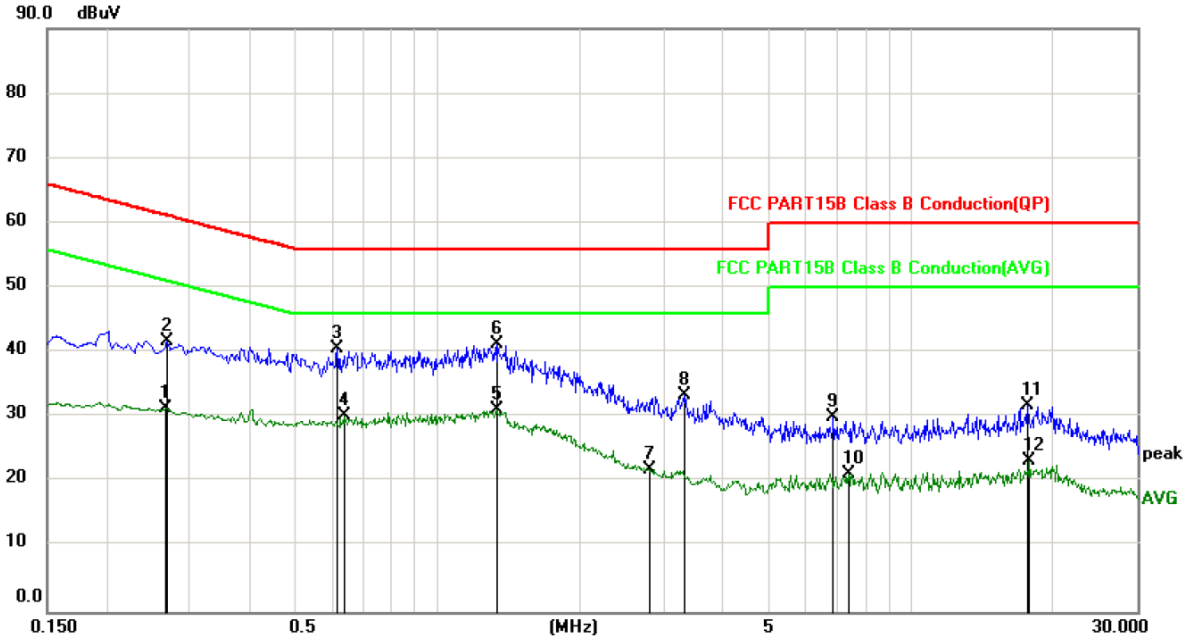
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1940	32.79	9.74	42.53	63.86	-21.33	peak	
2		0.2100	22.22	9.74	31.96	53.21	-21.25	AVG	
3	*	0.3860	24.89	9.74	34.63	48.15	-13.52	AVG	
4		0.4020	34.41	9.74	44.15	57.81	-13.66	peak	
5		1.2140	22.52	9.75	32.27	46.00	-13.73	AVG	
6		1.3820	31.38	9.75	41.13	56.00	-14.87	peak	
7		2.6780	26.44	9.77	36.21	56.00	-19.79	peak	
8		2.7260	16.73	9.77	26.50	46.00	-19.50	AVG	
9		4.1940	25.07	9.78	34.85	56.00	-21.15	peak	
10		5.2740	14.72	9.79	24.51	50.00	-25.49	AVG	
11		18.6940	23.72	9.87	33.59	60.00	-26.41	peak	
12		19.1020	16.14	9.88	26.02	50.00	-23.98	AVG	

Neutral line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2660	21.59	9.80	31.39	51.24	-19.85	AVG	
2		0.2700	32.02	9.80	41.82	61.12	-19.30	peak	
3		0.6140	30.82	9.80	40.62	56.00	-15.38	peak	
4		0.6340	20.44	9.80	30.24	46.00	-15.76	AVG	
5		1.3340	21.41	9.83	31.24	46.00	-14.76	AVG	
6	*	1.3380	31.50	9.83	41.33	56.00	-14.67	peak	
7		2.8140	12.11	9.85	21.96	46.00	-24.04	AVG	
8		3.3300	23.64	9.83	33.47	56.00	-22.53	peak	
9		6.8500	20.13	9.85	29.98	60.00	-30.02	peak	
10		7.3900	11.46	9.85	21.31	50.00	-28.69	AVG	
11		17.6340	21.86	9.88	31.74	60.00	-28.26	peak	
12		17.8380	13.43	9.88	23.31	50.00	-26.69	AVG	

Remark:

1. The following Peak, Quasi-Peak and Average measurements were performed on the EUT:
2. Correct Factor= LISN Factor + Cable Loss
3. Final Test Level =Receiver Reading + Correct Factor.
4. Over Limit= Final Test Level - Limit

6.2 Radiated Emissions, 30MHz to 6GHz

Test Requirement:	47 CFR PART 15,Subpart B
Test Method:	ANSI C63.4
Frequency Range:	30MHz to 6GHz
Measurement Distance:	3m
Class:	Class B
Limit:	40.0 dBμV/m between 30MHz & 88MHz
	43.5 dBμV/m between 88MHz & 216MHz
	46.0 dBμV/m between 216MHz & 960MHz /54.0 dBμV/m above 960MHz
The highest frequence:	74 dBμV/m above 960MHz for peak 54 dBμV/m above 960MHz for average

Test Setup:

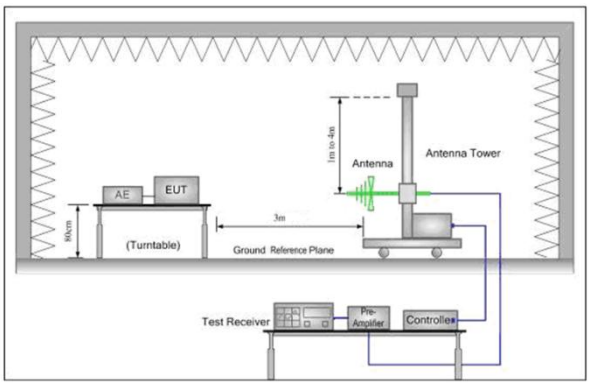


Figure 1. 30MHz to 1GHz

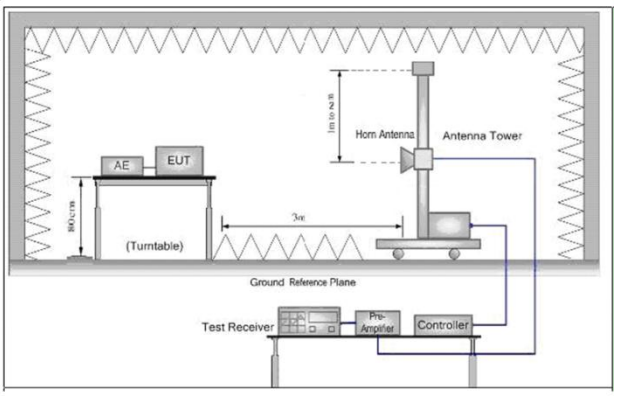


Figure 2. Above 1 GHz

Test Procedure:

1) The radiated emissions were tested in a semi-anechoic chamber.
2) The EUT is placed on a turntable, which is 0.8m above ground plane.
3) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4) EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
5) Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7) Repeat above procedures until the measurements for all frequencies are complete.

2. Above 1GHz test procedure as below:

1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and receiving antenna is moved from 1m to 4m.

Detector: Peak for pre-scan (120kHz resolution bandwidth)
Quasi-Peak if maximised peak within 6dB of limit

6.2.1 E.U.T. Operation

Operating Environment:

Temperature:	22.0 °C	Humidity:	54 % RH	Atmospheric Pressure:	1015	mbar

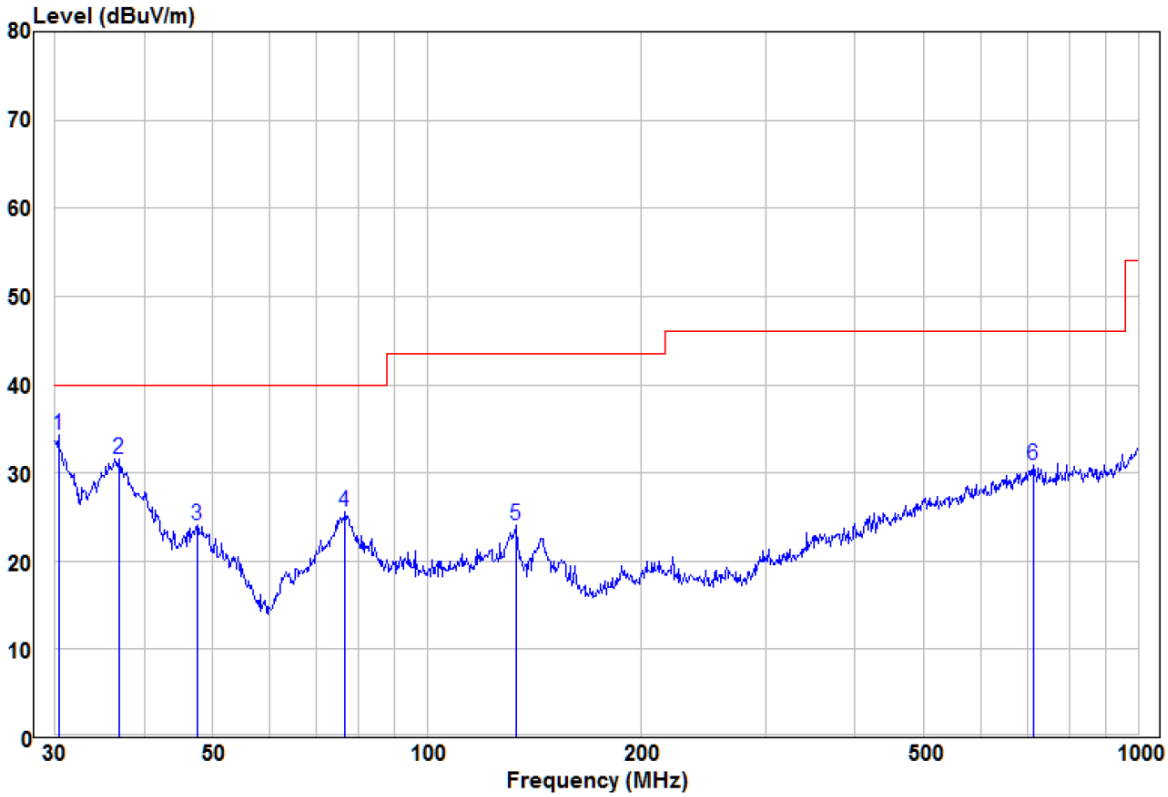
EUT Operation: Mode a: USB charging
Mode b: FM radio
Mode c: Clock projection

Test Status: Pretest the EUT at different test mode and found the Mode b which is worst case, the test worst case mode is recorded in the report.

6.2.2 Measurement Data

Below 1GHz

Vertical



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	pp	30.32	15.43	18.88	34.31	40.00	-5.69	Peak	VERTICAL
2		36.90	14.42	17.17	31.59	40.00	-8.41	Peak	VERTICAL
3		47.49	13.36	10.64	24.00	40.00	-16.00	Peak	VERTICAL
4		76.78	16.28	9.30	25.58	40.00	-14.42	Peak	VERTICAL
5		133.62	14.54	9.48	24.02	43.50	-19.48	Peak	VERTICAL
6		711.67	11.13	19.82	30.95	46.00	-15.05	Peak	VERTICAL

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic

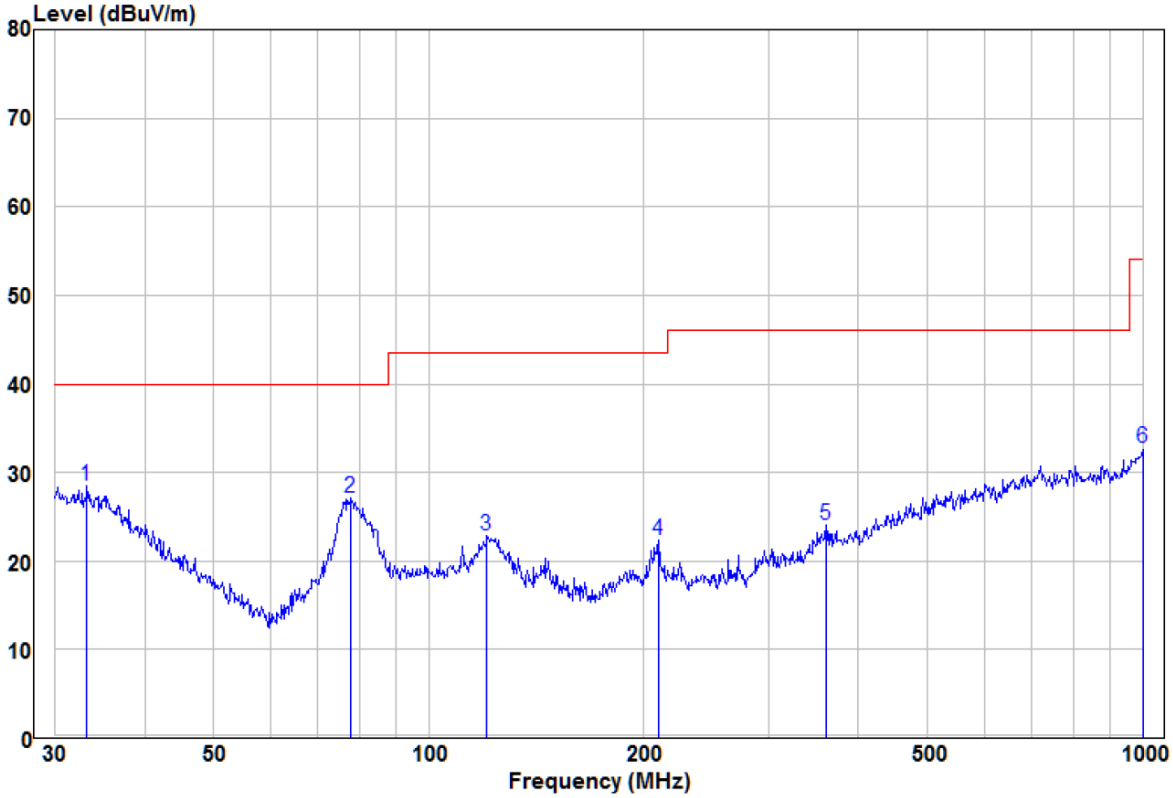
equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

Horizontal



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	pp	33.21	9.86	18.65	28.51	40.00	-11.49	Peak	HORIZONTAL
2		77.87	17.59	9.50	27.09	40.00	-12.91	Peak	HORIZONTAL
3		120.70	12.24	10.66	22.90	43.50	-20.60	Peak	HORIZONTAL
4		210.05	12.25	10.10	22.35	43.50	-21.15	Peak	HORIZONTAL
5		360.45	10.43	13.69	24.12	46.00	-21.88	Peak	HORIZONTAL
6		1000.00	9.74	22.94	32.68	54.00	-21.32	Peak	HORIZONTAL

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic

equation with a sample calculation is as follows:

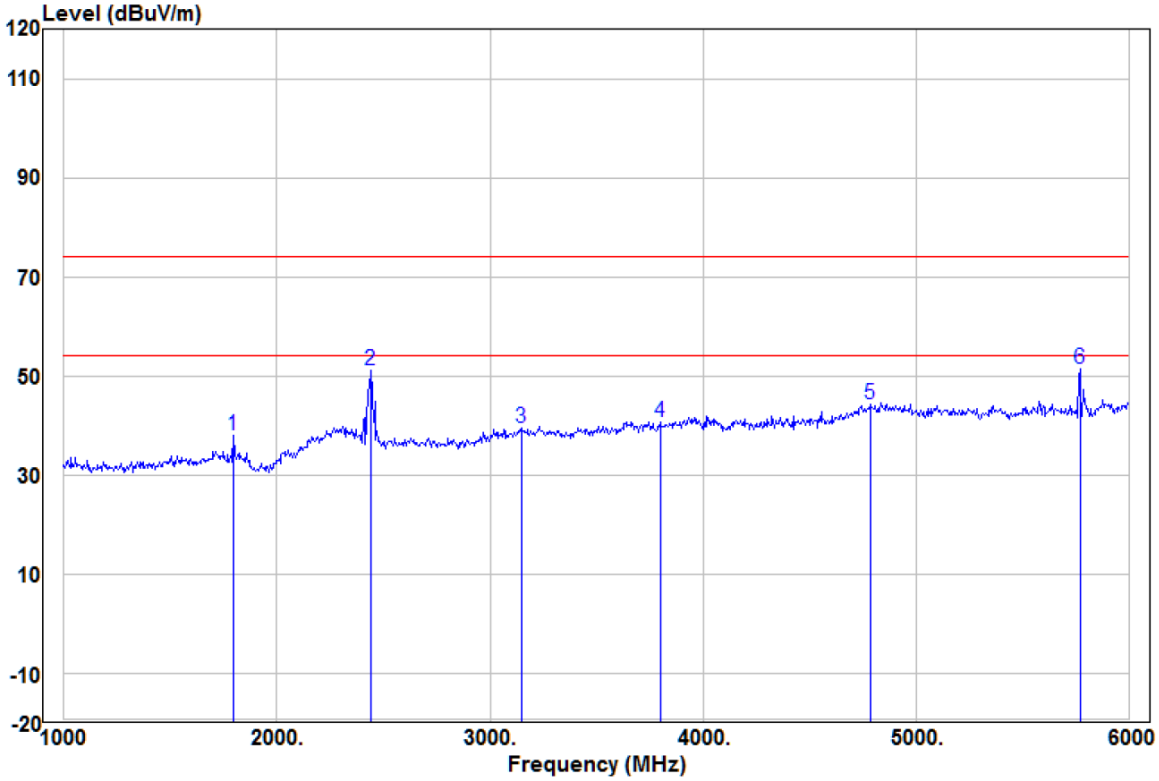
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

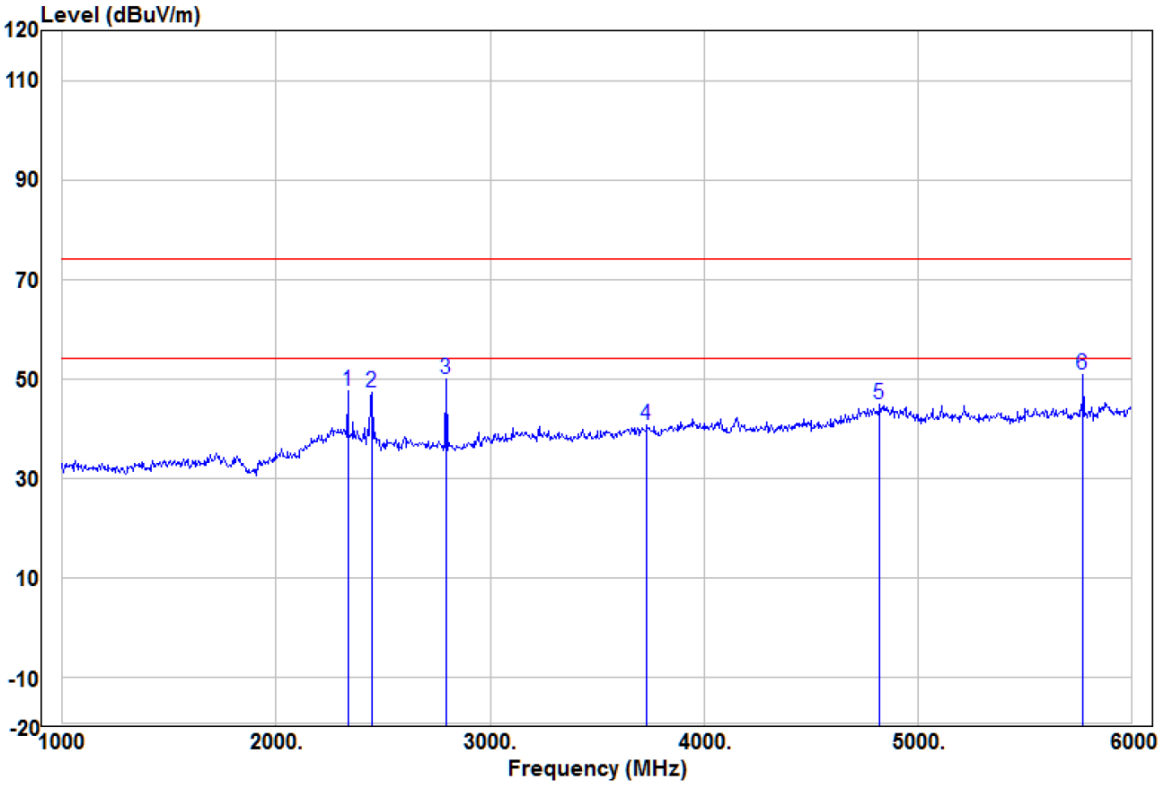
Above 1GHz

Horizontal



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	1795.00	51.68	-13.85	37.83	74.00	-36.17	Peak	HORIZONTAL
2	2440.00	62.19	-11.17	51.02	74.00	-22.98	Peak	HORIZONTAL
3	3150.00	49.06	-9.74	39.32	74.00	-34.68	Peak	HORIZONTAL
4	3800.00	48.82	-8.10	40.72	74.00	-33.28	Peak	HORIZONTAL
5	4785.00	48.38	-4.11	44.27	74.00	-29.73	Peak	HORIZONTAL
6 pp	5770.00	54.16	-2.86	51.30	74.00	-22.70	Peak	HORIZONTAL

Vertical



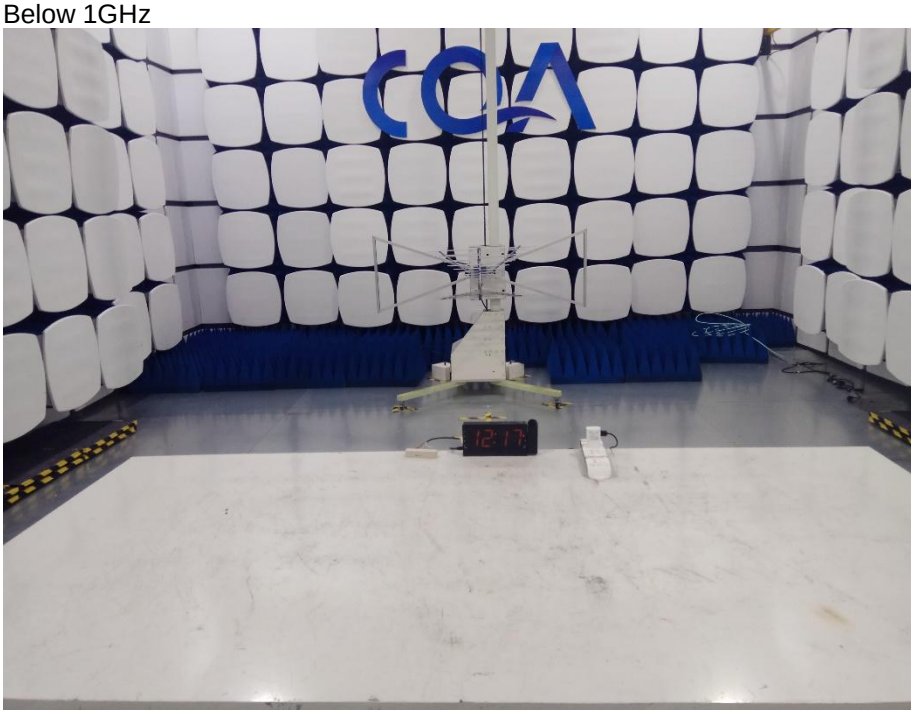
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	2335.00	56.94	-9.41	47.53	74.00	-26.47	Peak	VERTICAL
2	2445.00	58.37	-11.17	47.20	74.00	-26.80	Peak	VERTICAL
3	2795.00	61.70	-11.78	49.92	74.00	-24.08	Peak	VERTICAL
4	3735.00	48.91	-8.32	40.59	74.00	-33.41	Peak	VERTICAL
5	4825.00	48.74	-3.97	44.77	74.00	-29.23	Peak	VERTICAL
6 pp	5775.00	53.68	-2.83	50.85	74.00	-23.15	Peak	VERTICAL

7 Photographs

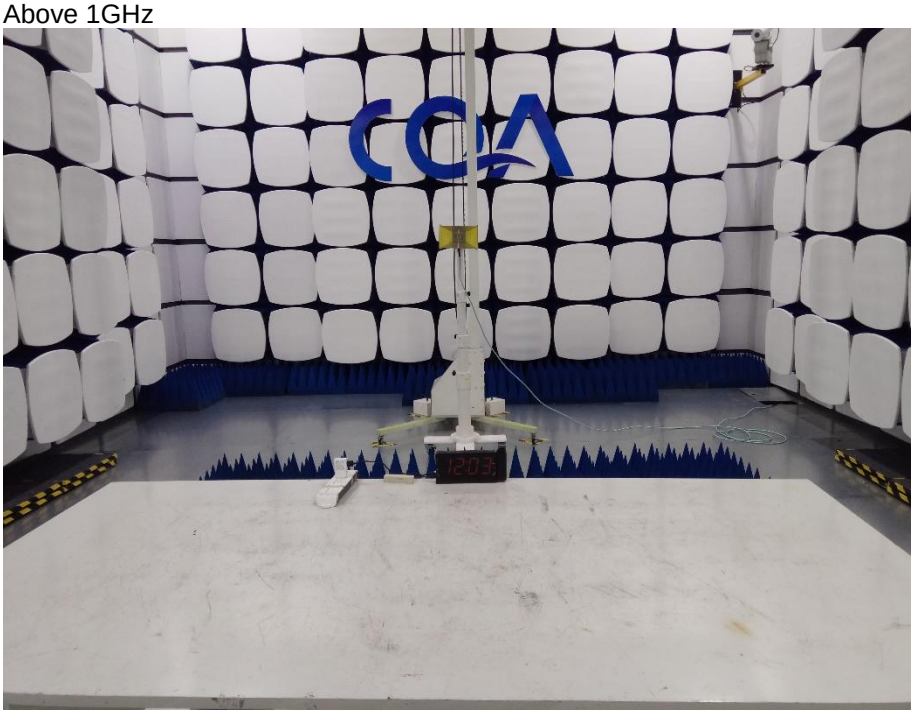
7.1 Conducted Emission Test Setup

7.2 Radiated Emission Test Setup

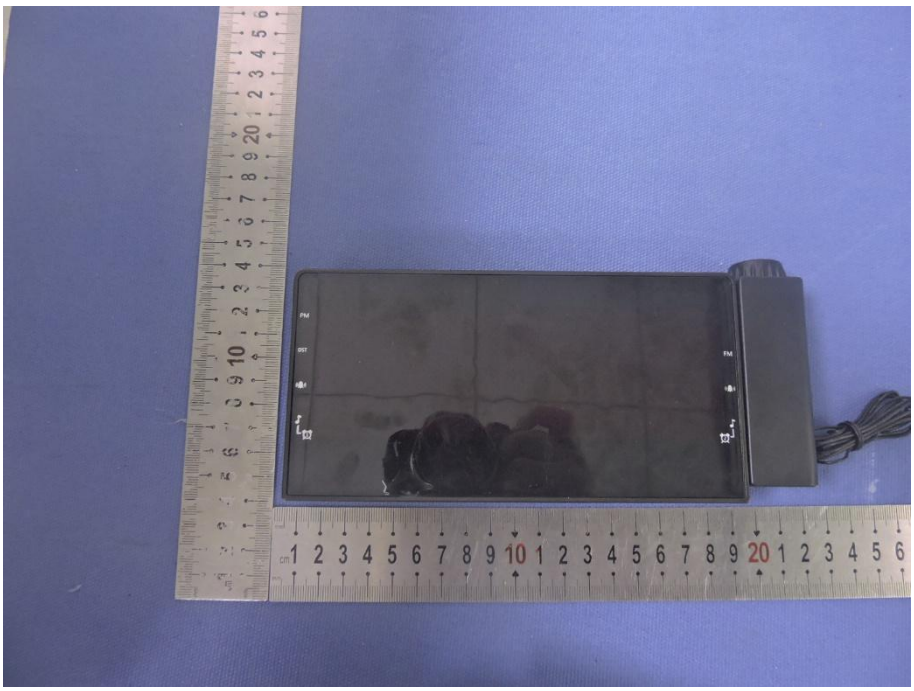
Below 1GHz

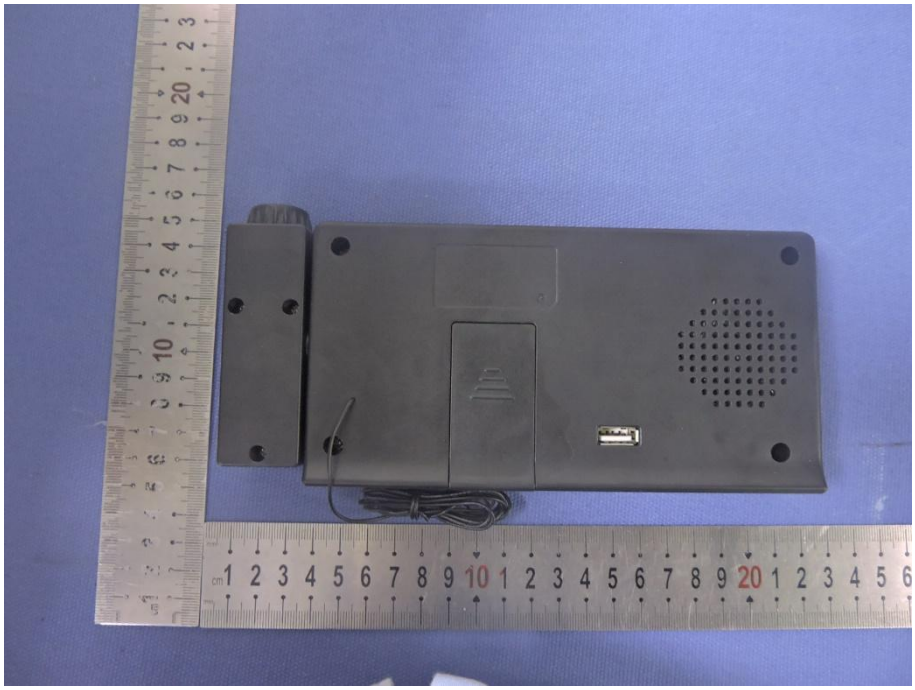


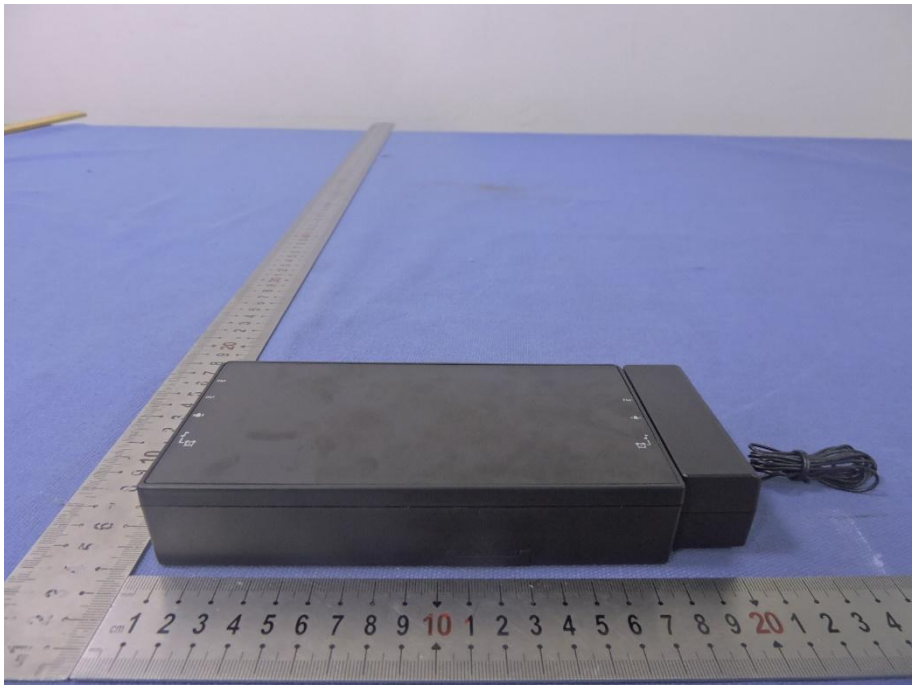
Above 1GHz

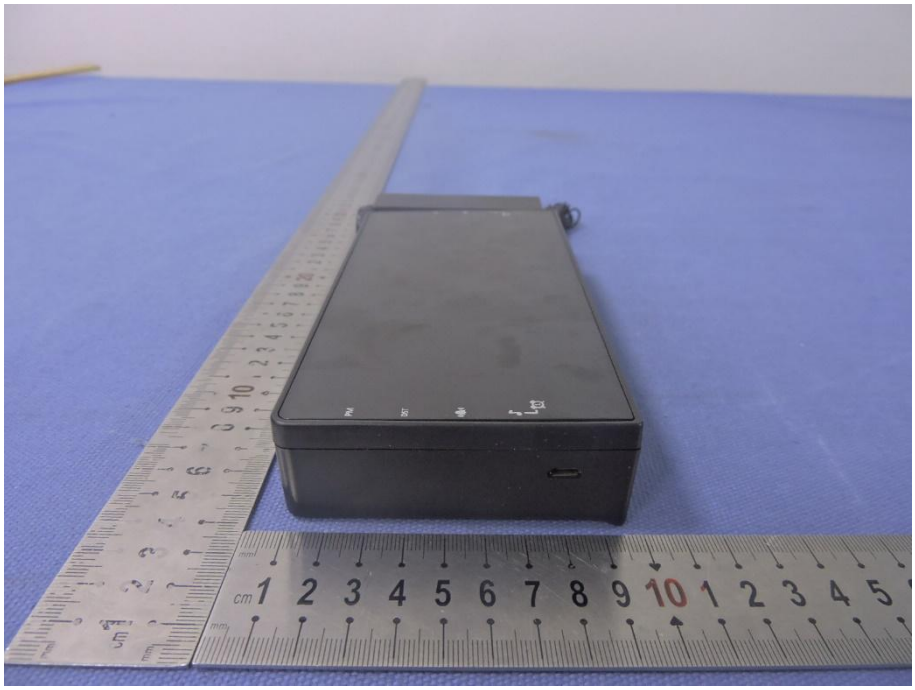


7.3 EUT Constructional Details

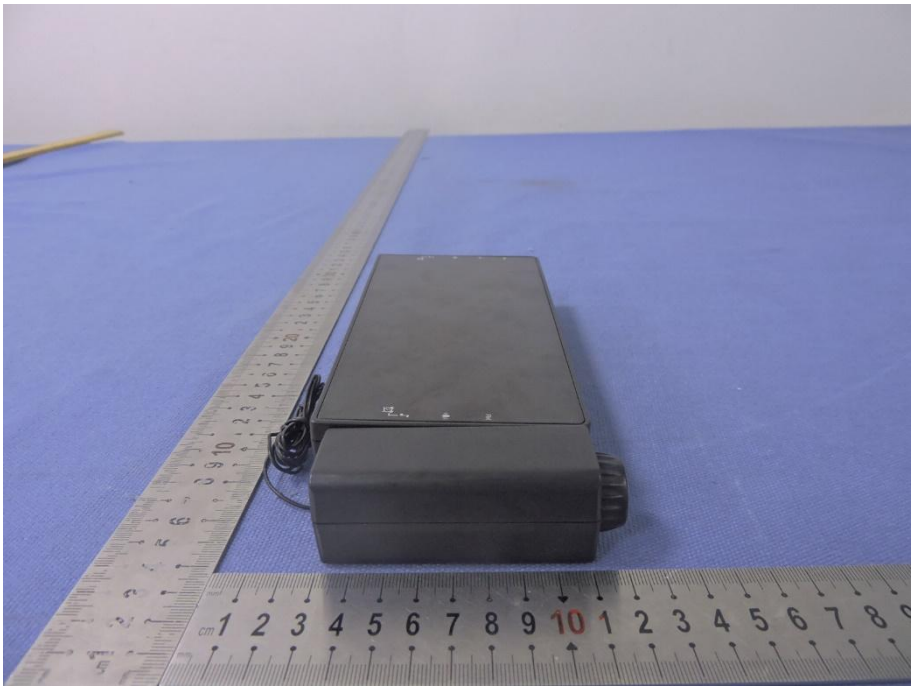


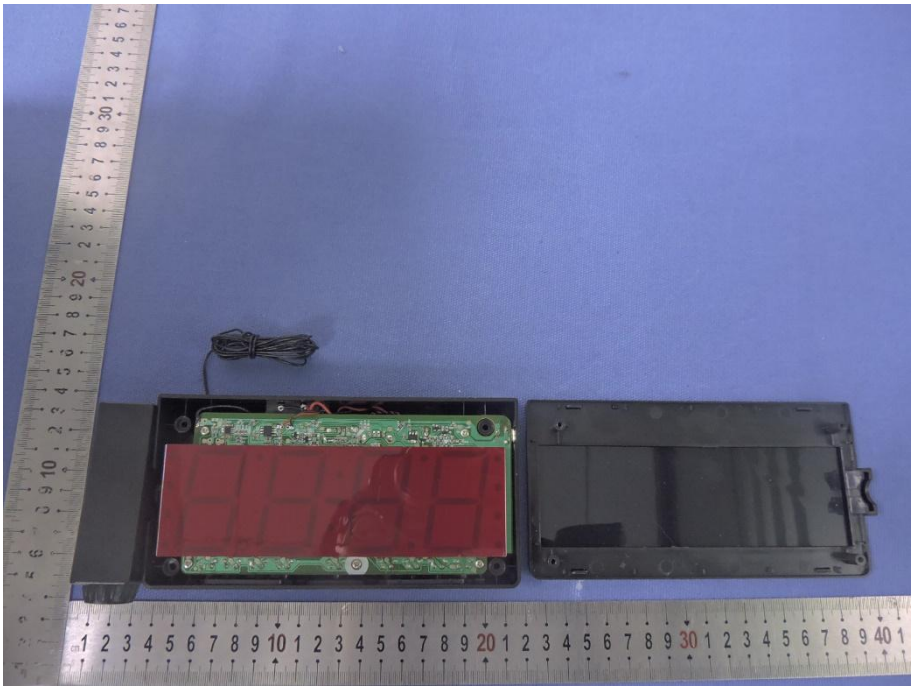


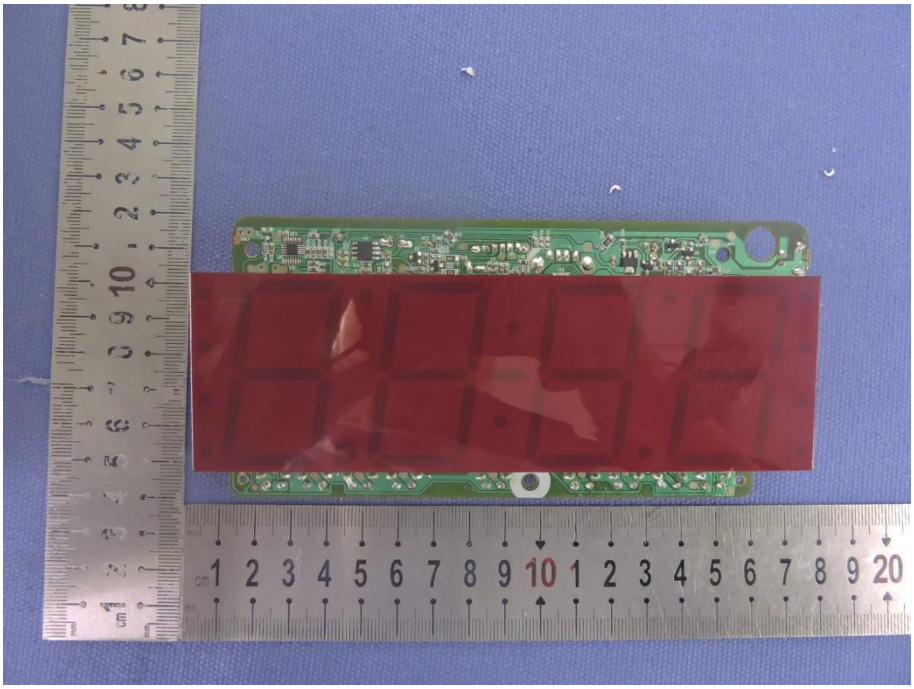


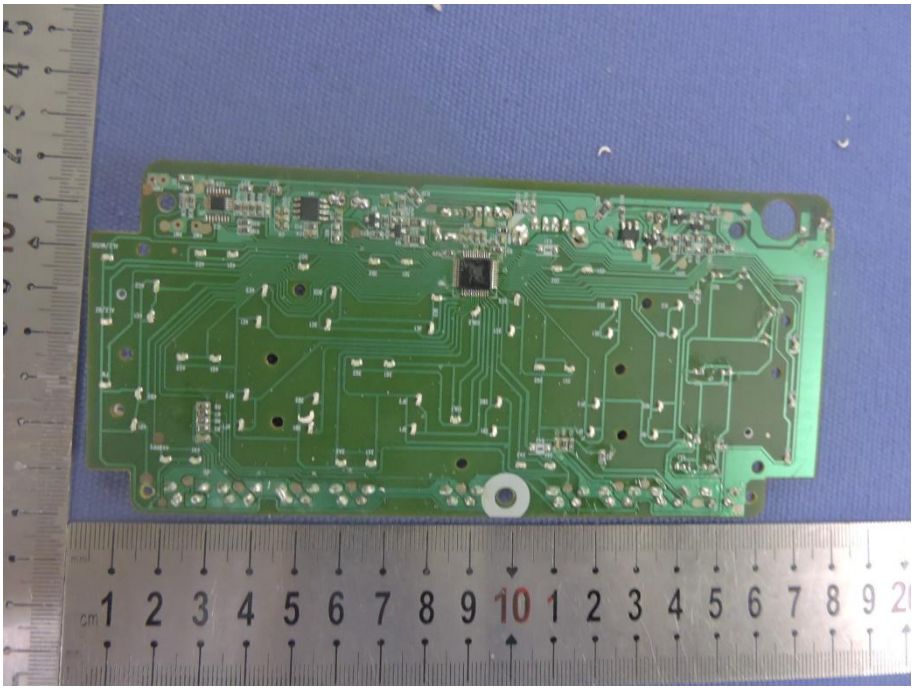


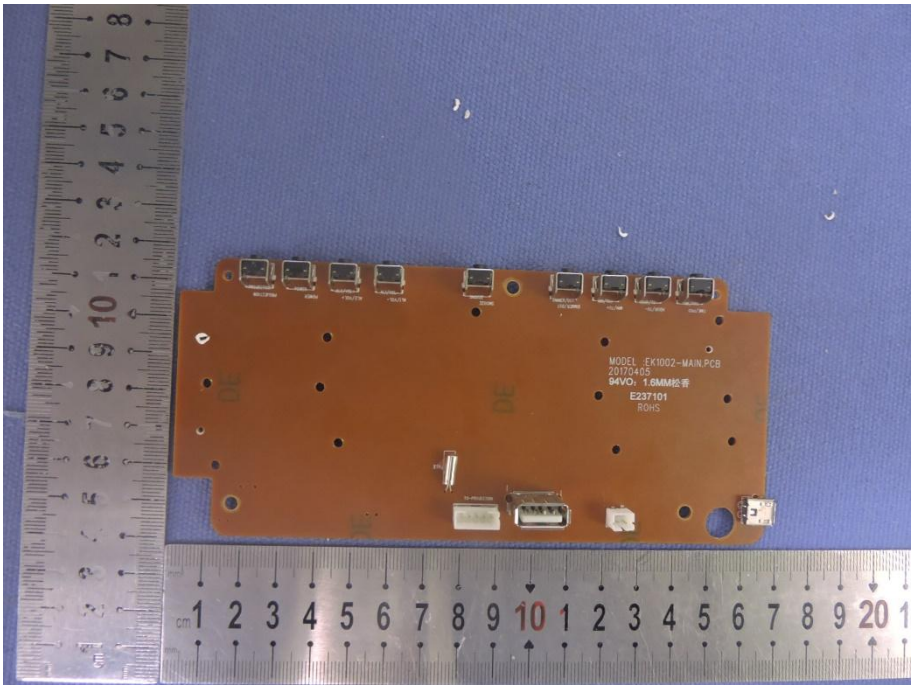
PROJECTION MODE
FM
AL2
AL1
VOL-
VOL+
SLEEP
TIME
HOUR
MIN
DIMMER
TU-
TU+
DST
PRO

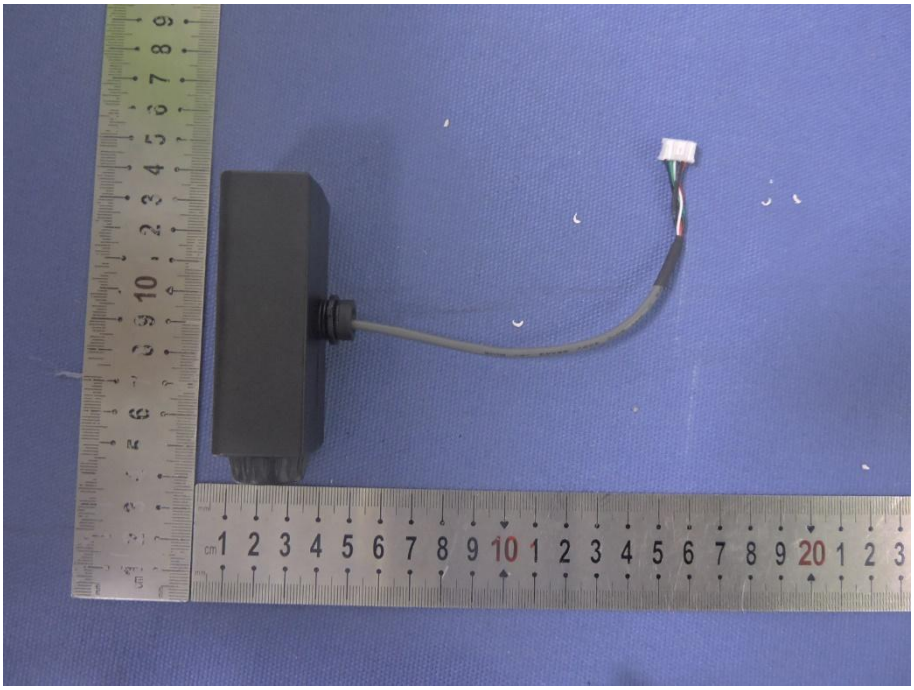


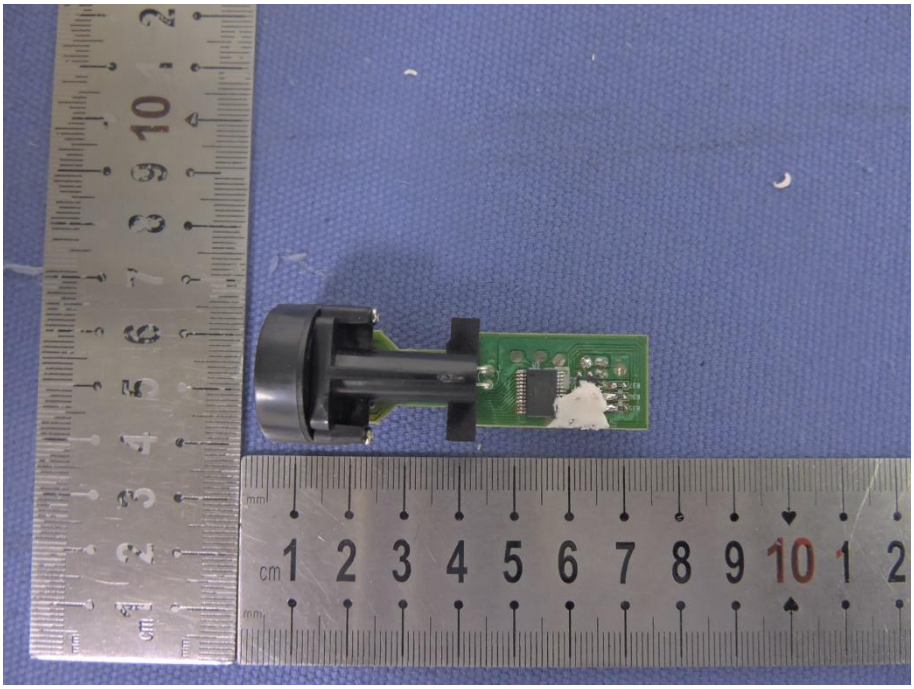


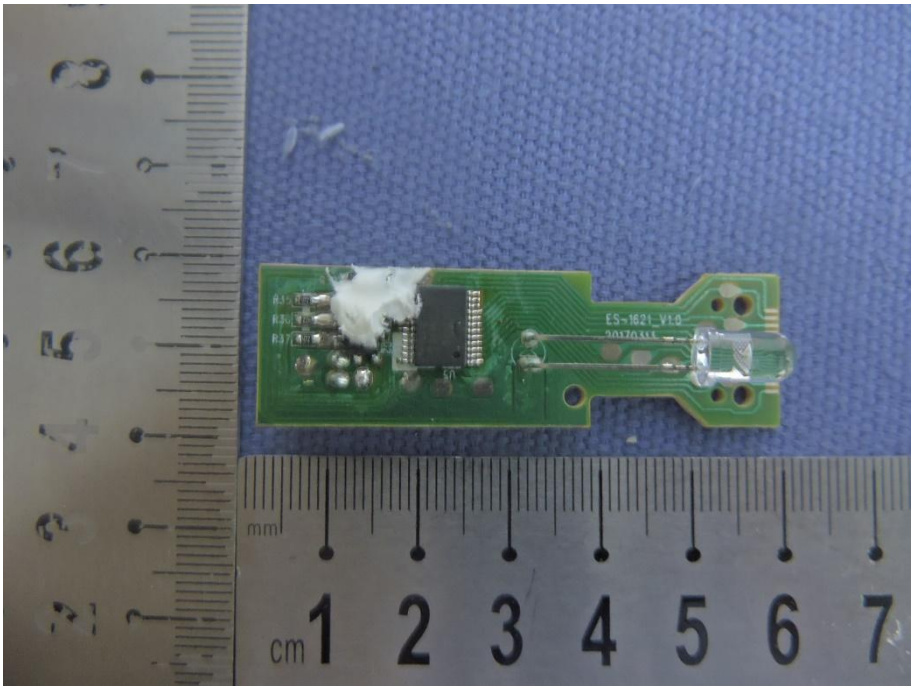


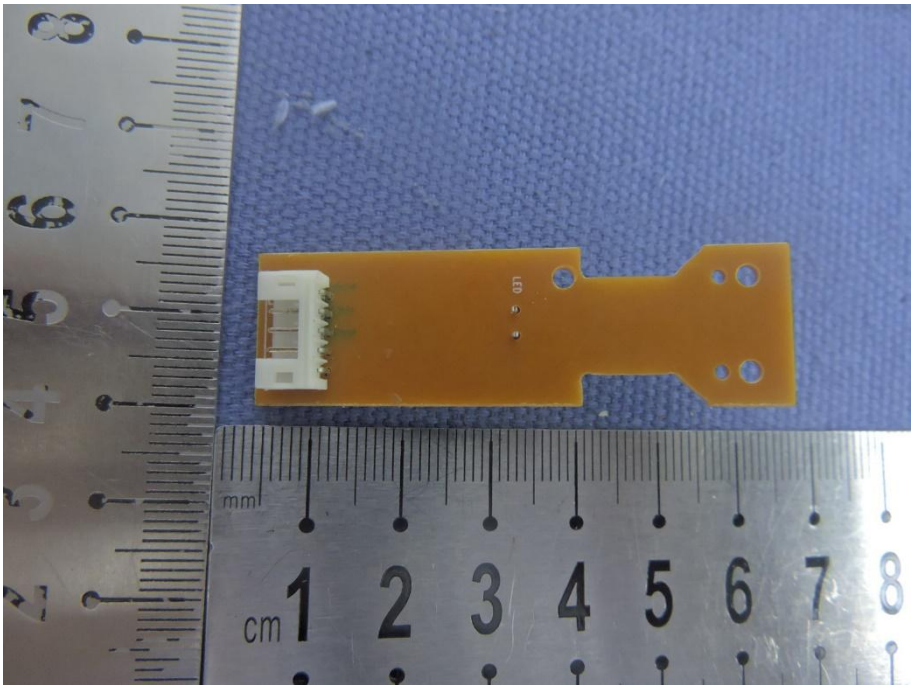



MODEL :EK1002-MAIN.PCB
20170405
94V0, 1.6MM经香
E237101
ROHS









END OF THE REPORT