

# CE EMC Test Report



(Declaration of Conformity)

For  
Electromagnetic compatibility  
Of

**Product :** Tile Display

**Trade Mark :** 

**Model Number :** M/PTL35.1, HDL-MPL35C/TILE.48

**Prepared for**

HDL Automation Co., Ltd.  
No.86 Lotus west Road. Lifeng Street, Shilou Town, Panyu District, Guangzhou 511447  
China

**Prepared by**

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**TEST RESULT CERTIFICATION**

**Applicant's Name** ..... : HDL Automation Co., Ltd.  
Address..... : No.86 Lotus west Road. Lifeng Street, Shilou Town, Panyu District, Guangzhou 511447 China

**Manufacturer's Name** ..... : HDL Automation Co., Ltd.  
Address..... : No.86 Lotus west Road. Lifeng Street, Shilou Town, Panyu District, Guangzhou 511447 China

**Factory's Name**..... : HDL Automation Co., Ltd.  
Address..... : No.86 Lotus west Road. Lifeng Street, Shilou Town, Panyu District, Guangzhou 511447 China

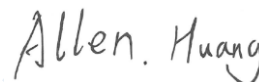
**Product description**  
Product name..... : Tile Display  
Model Number..... : M/PTL35.1, HDL-MPL35C/TILE.48

**Standards**..... : EN IEC 63044-5-1:2019  
EN IEC 63044-5-2:2019

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**Test Sample Number** ..... : S220919058004  
**Date of Test**..... :  
Date (s) of performance of tests..... : 20 Sep. 2022 ~ 12 Oct. 2022  
Date of Issue ..... : 12 Oct. 2022  
Test Result ..... : **Pass**

Testing Engineer :



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(Allen Huang)

Technical Manager :



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(Sky Zhang)

Authorized Signatory :



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(Alex)

**Table of Contents**
**Page**

1 . TEST SUMMARY	5
1.1 TEST FACILITY	7
1.2 MEASUREMENT UNCERTAINTY	7
2 . GENERAL INFORMATION	9
2.1 GENERAL DESCRIPTION OF EUT	9
2.2 DESCRIPTION OF TEST MODES	10
2.3 DESCRIPTION OF TEST SETUP	11
2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL	12
2.5 MEASUREMENT INSTRUMENTS LIST	13
3 . EMC EMISSION TEST	15
3.1 RADIATED EMISSION MEASUREMENT	15
3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT	15
3.1.2 LIMITS OF RADIATED EMISSION MEASUREMENT	16
3.1.3 TEST PROCEDURE	16
3.1.4 TEST SETUP	17
3.1.5 EUT OPERATING CONDITIONS	17
3.1.6 TEST RESULTS (30-1000MHz)	18
3.1.7 TEST RESULTS (1000-6000MHz)	20
4 . EMC IMMUNITY TEST	22
4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA	22
4.2 GENERAL PERFORMANCE CRITERIA	23
4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP	23
4.4 ESD TESTING	24
4.4.1 TEST SPECIFICATION	24
4.4.2 TEST PROCEDURE	24
4.4.3 TEST SETUP	25
4.4.4 TEST RESULTS	26
4.5 RS TESTING	28
4.5.1 TEST SPECIFICATION	28
4.5.2 TEST PROCEDURE	28
4.5.3 TEST SETUP	29
4.5.4 TEST RESULTS	30
4.6 EFT/BURST TESTING	31
4.6.1 TEST SPECIFICATION	31
4.6.2 TEST PROCEDURE	31
4.6.3 TEST SETUP	32

<b>Table of Contents</b>	<b>Page</b>
4.6.4 TEST RESULTS	33
4.7 CONTINUOUS RADIO FREQUENCY DISTURBANCES TESTING	34
4.7.1 TEST SPECIFICATION	34
4.7.2 TEST PROCEDURE	34
4.7.3 TEST SETUP	35
4.7.4 TEST RESULTS	36
4.8 POWER FREQUENCY MAGNETIC FIELD TESTING	37
4.8.1 TEST SPECIFICATION	37
4.8.2 TEST PROCEDURE	37
4.8.3 TEST SETUP	38
4.8.4 TEST RESULTS	39
5 . EUT TEST PHOTO	40
ATTACHMENT PHOTOGRAPHS OF EUT	41

## 1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN IEC 63044-5-1:2019	Conducted Emission On AC And Telecom Port 150kHz to 30MHz	-----	N/A	
	Disturbance Voltage at The Antenna Terminals (30MHz To 2150MHz)	-----	N/A	
	Wanted signal and disturbance voltage at the RF output terminals (30MHz To 2150MHz)	-----	N/A	
	Radiated Emission 30MHz to 1000MHz	Class B	PASS	
	Radiated Emission 1GHz to 6GHz	Class B	PASS	NOTE (2)
EMC Immunity				
Section	Test Item	Performance Criteria	Judgment	Remark
EN IEC 63044-5-2:2019				
EN 61000-4-2	Electrostatic Discharge	B	PASS	
EN 61000-4-3	RF electromagnetic field	A / B	PASS	
EN 61000-4-4	Fast transients	A / B	PASS	
EN 61000-4-5	Surges	B	N/A	
EN 61000-4-6	Continuous radio frequency disturbances	A / B	PASS	
EN 61000-4-8	Power Frequency Magnetic Field	A	PASS	
EN 61000-4-11	Volt. Interruptions Volt. Dips	A / B / B / C	N/A	

## NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.

If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, measurement shall only be made up to 5 GHz.

If the highest frequency of the internal sources of the EUT is above 1 GHz, the Measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

(3) For client's request and manual description, the test will not be executed.

### 1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd.

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China

CNAS-Lab. : The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2018 (identical to ISO/IEC 17025:2017)  
The Certificate Registration Number is L5516

IC-Registration : The Certificate Registration Number is CN0074

FCC- Accredited : Test Firm Registration Number: 463705  
Designation Number: CN1184

A2LA-Lab. : The Certificate Registration Number is 4298.01  
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95** %.

Test Item	Measurement Frequency Range	K	U(dB)
Conducted Emission	0.009kHz ~ 0.15MHz	2	2.66
Conducted Emission	0.15MHz ~ 30MHz	2	2.80
Telecom Conducted Emission (Cat 3)	0.15MHz ~ 30MHz	2	3.08
Telecom Conducted Emission (Cat 5)	0.15MHz ~ 30MHz	2	3.60
Telecom Conducted Emission (Cat 6)	0.15MHz ~ 30MHz	2	4.14
Radiated Emission	30MHz ~ 1000MHz	2	2.64
Radiated Emission	1000MHz ~ 18000MHz	2	5.10
Power Clamp	30MHz ~ 300MHz	2	2.20





## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Tile Display	
Model Number	M/PTL35.1	
Additional Model Number(s)	HDL-MPL35C/TILE.48	
Model Difference	All models are identical except model's name.	
Product Description	The EUT is a Tile Display.	
	Operating frequency:	N/A
	Connecting I/O port:	N/A
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as a Multimedia Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	DC Voltage	
Power Rating	Working Voltage: DC 21-30V Auxiliary Power Supply: DC 20-30V	

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

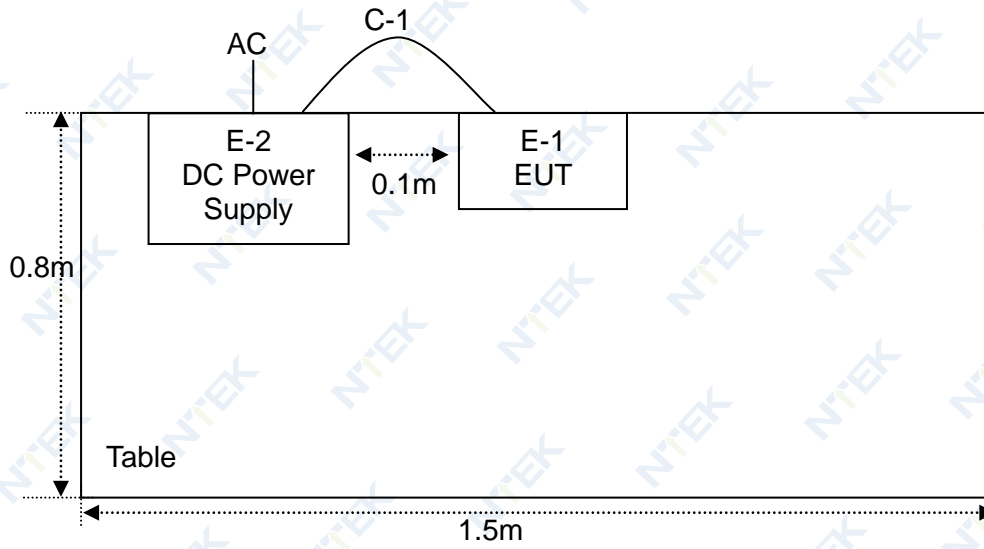
Pretest Mode	Description
Mode 1	Working

For Radiated Test	
Final Test Mode	Description
Mode 1	Working

For EMS Test	
Final Test Mode	Description
Mode 1	Working

### 2.3 DESCRIPTION OF TEST SETUP

Mode RE : Working



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Tile Display	<b>HDL</b> ®	M/PTL35.1	N/A	EUT
E-2	DC Power Supply	Zhaoxin	PS-6005D	20170400781	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	80cm	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) "YES" means "shielded" "with core"; "NO" means "unshielded" "without core".

## 2.5 MEASUREMENT INSTRUMENTS LIST

### 2.5.1 RADIATED TEST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	EMI Test Receiver	R&S	ESPI7	101318	Apr. 06, 2022	Apr. 05, 2023	1 year
2	Bilog Antenna	TESEQ	CBL6111D	31216	Mar. 30, 2022	Mar. 29, 2023	1 year
3	System Controller	SKET	N/A	N/A	N/A	N/A	N/A
4	Antenna Mast	SKET	N/A	N/A	N/A	N/A	N/A
5	System Controller	ADT	SC100	N/A	N/A	N/A	N/A
6	Antenna Mast	ADT	N/A	N/A	N/A	N/A	N/A
7	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	May 11, 2020	May 10, 2023	3 years
8	Cable	Talent Microwave	A81-NWMSM AM-12M	21120897	Dec. 16, 2021	Dec. 15, 2024	3 years
9	Cable	Talent Microwave	A81-NMNM-1 0M	22084896	Sep. 09, 2022	Sep. 08, 2025	3 years
10	Cable	Talent Microwave	A81-NMNM-2 M	22084895	Sep. 09, 2022	Sep. 08, 2025	3 years
11	Attenuator	Eastsheep	5W-N-JK-6G-6DB	N/A	Aug. 14, 2022	Aug. 13, 2023	1 year
12	RF Cable	Pasternack	PE332-1000C M	N/A	Nov. 10, 2019	Nov. 09, 2022	3 years
13	Broadband Horn Antenna	EM	EM-AH-10180	2011071402	Mar. 31, 2022	Mar. 30, 2023	1 year
14	Spectrum Analyzer	Agilent	E4407B	MY45108040	Apr. 01, 2022	Mar. 31, 2023	1 year
15	Pre-Amplifier	EMC	EMC051835S E	980246	Jun. 17, 2022	Jun. 16, 2023	1 year
16	Cable	Keysight	A40-2.92M2.9 2M-2M	1808041	Nov. 18, 2019	Nov. 17, 2022	3 years

### 2.5.2 ESD

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Electrostatic Discharge Generator	Lioncel	ESD-203B	ESD203B015 0402	Aug. 15, 2022	Aug. 14, 2023	1 year

## 2.5.3 RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	RF Test System Controller	AR	SC1000	0350156	Feb. 22, 2021	Feb. 21, 2024	3 years
2	3M Semi Anechoic Chamber	N/A	8*4*4	N/A	Aug. 07, 2020	Aug. 06, 2023	3 years
3	Broadband Amplifier	AR	60S1G6	0350414	Mar. 26, 2022	Mar. 25, 2023	1 year
4	Bilog Antenna	ETS	3142E	00214344	Nov. 07, 2021	Nov. 06, 2022	1 year
5	Power Amplifier	rflight	NTWPA-00810200	17063153	Jun. 17, 2022	Jun. 16, 2023	1 year
6	ESG Vector Signal Generator	Agilent	E4438C	MY45093347	Apr. 01, 2022	Mar. 31, 2023	1 year

## 2.5.4 EFT/BURST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Electrical Intelligent Transient Generator	EVERFINE	EMS61000-4A	P612005CM5421115	Jul. 27, 2022	Jul. 26, 2023	1 year
2	Capacitive Coupling Clamp	EVERFINE	EFTC-2-V1	910006	Apr. 06, 2022	Apr. 05, 2023	1 year

## 2.5.5 CONTINUOUS RADIO FREQUENCY DISTURBANCES

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Signal Generator	R&S	SML03	100954	Nov. 04, 2021	Nov. 03, 2022	1 year
2	Coupling and Decoupling Network	TESEQ	CDN M016	38722	Jun. 28, 2022	Jun. 27, 2023	1 year
3	Power Amplifier	TESEQ	CBA 230M-080	T44376	Sep. 01, 2022	Aug. 31, 2023	1 year
4	RF Cable	TESEQ	RF Cable	N/A	N/A	N/A	N/A
5	Attenuator	Jingtenghong	JTH-SJ-100W-6dB	100145143000686	Apr. 01, 2022	Mar. 31, 2025	3 years
6	EM Clamp	TESEQ	KEMZ 801A	47860	Nov. 04, 2021	Nov. 03, 2022	1 year

## 2.5.6 MF

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Magnetic Field Generator	EVERFINE	EMS61000-8K	1007001	Feb. 21, 2022	Feb. 20, 2023	1 year
2	Magnetic Field Coil	EVERFINE	N/A	N/A	Feb. 21, 2022	Feb. 20, 2023	1 year

### 3. EMC EMISSION TEST

#### 3.1 RADIATED EMISSION MEASUREMENT

##### 3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

**Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB( $\mu$ V/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A2.1	30 – 230	10	Quasi Peak / 120 kHz	40
	230 – 1 000			47
A2.2	30 – 230	3		50
	230 – 1 000			57

Apply only A2.1 or A2.2 across the entire frequency range.

**Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB( $\mu$ V/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47

Apply only table clause A4.1 or A4.2 across the entire frequency range.

**Table A.6 – Requirements for radiated emissions from FM receivers**

Table clause	Frequency range MHz	Measurement		Class B limit dB( $\mu$ V/m)		
		Distance m	Detector type/ bandwidth	Fundamental	Harmonics	
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)	
A6.1	30 – 230	10	Quasi peak/ 120 kHz	50	42	
	230 – 300				42	
	300 – 1 000				46	
A6.2	30 – 230	3		Quasi peak/ 120 kHz	60	52
	230 – 300					52
	300 – 1 000					56

Apply only A.6.1 or A.6.2 across the entire frequency range.

These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.

### 3.1.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

**Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A3.1	1 000 – 3 000	3	Average / 1 MHz	56
	3 000 – 6 000			60
A3.2	1 000 – 3 000		Peak / 1 MHz	76
	3 000 – 6 000			80

Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

**Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average/ 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak/ 1 MHz	70
	3 000 – 6 000			74

Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

**Notes:**

- (1) The limit for radiated test was performed according to as following: CISPR 32.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBμV/m)=20log Emission level (uV/m).

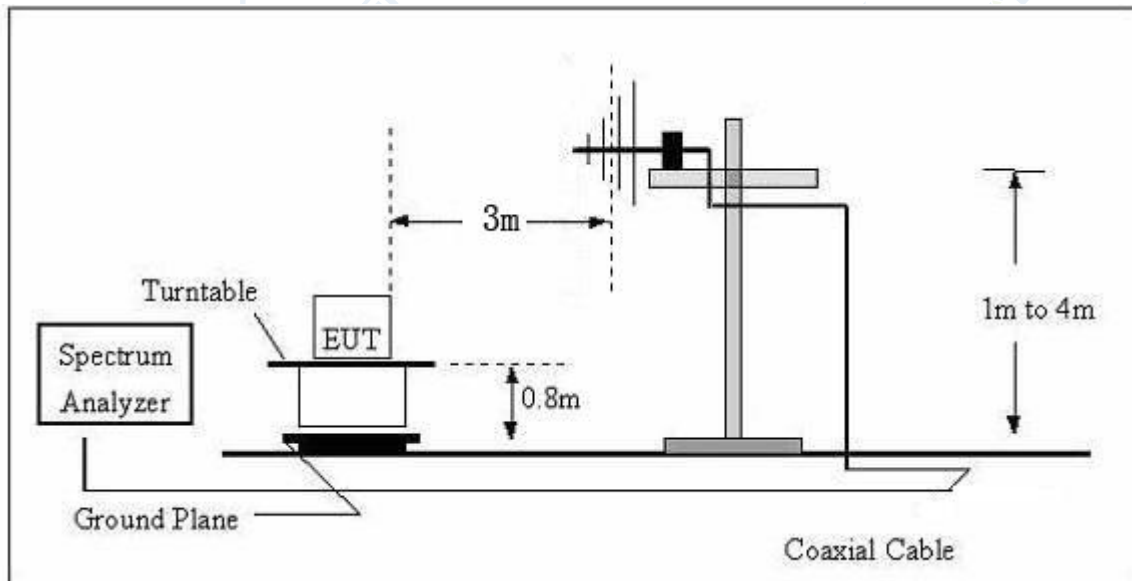
### 3.1.3 TEST PROCEDURE

- a. The measuring distance of at 3m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item -EUT Test Photos.

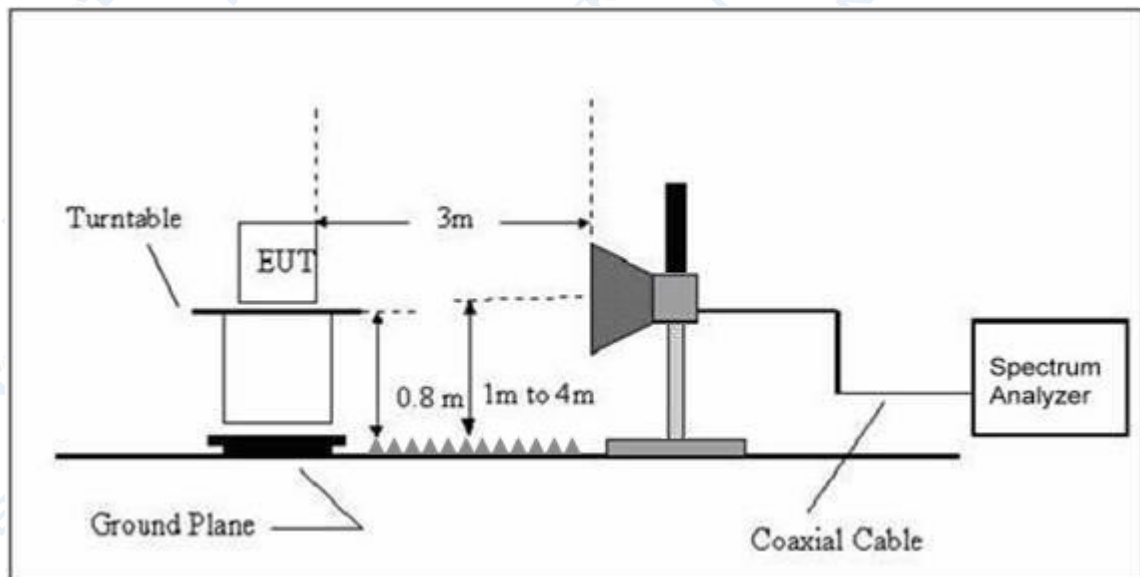


### 3.1.4 TEST SETUP

#### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz



#### (B) Radiated Emission Test Set-Up Frequency Above 1GHz

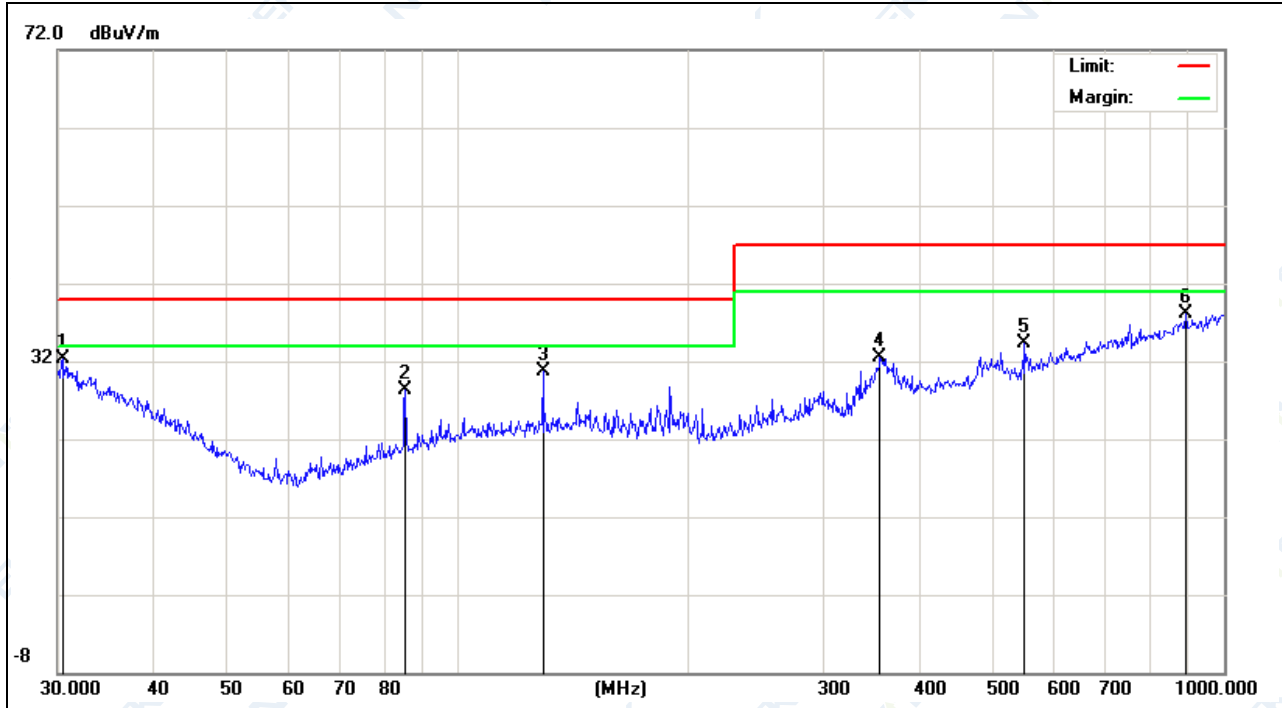


### 3.1.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.6 TEST RESULTS (30-1000MHz)

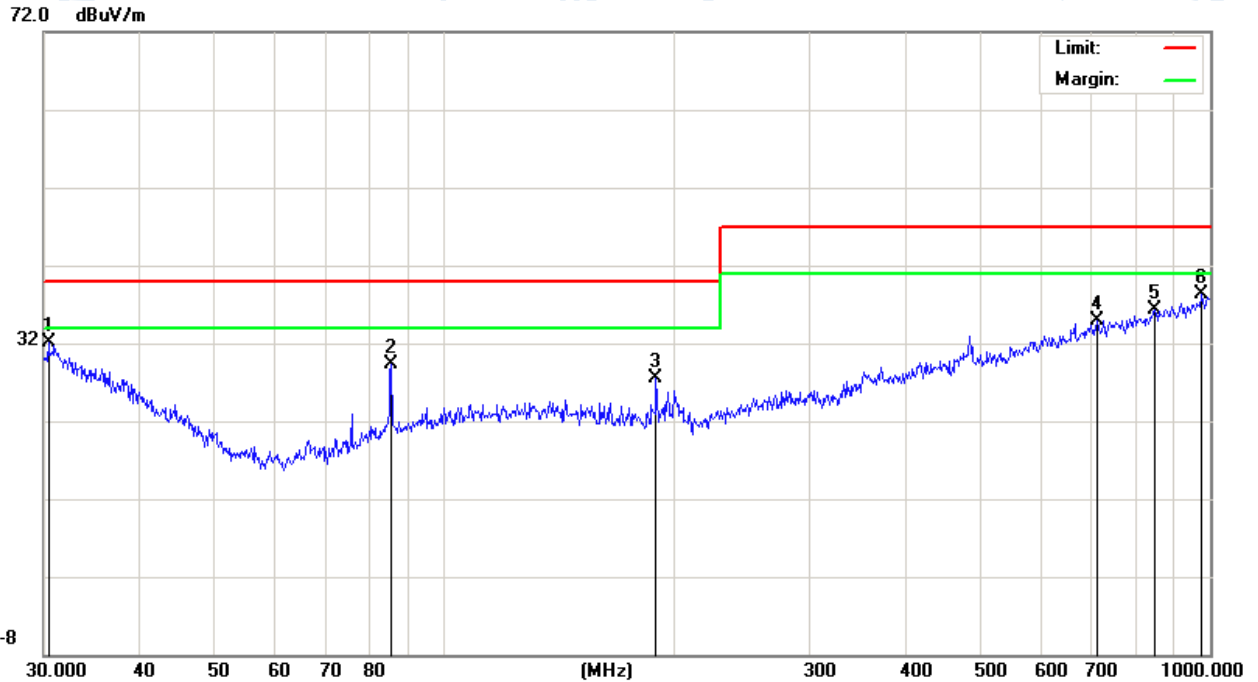
EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	25.3℃	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2022-09-22
Test Mode:	Working	Polarization:	Horizontal
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	30.4237	6.35	25.87	32.22	40.00	-7.78	QP		
2		85.2980	12.10	16.27	28.37	40.00	-11.63	QP		
3		129.0146	12.30	18.48	30.78	40.00	-9.22	QP		
4		355.4273	10.45	21.99	32.44	47.00	-14.56	QP		
5		549.0193	8.58	25.66	34.24	47.00	-12.76	QP		
6		890.7278	7.68	30.38	38.06	47.00	-8.94	QP		

Remark:  
Factor = Antenna Factor + Cable Loss.

EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	25.3°C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2022-09-22
Test Mode:	Working	Polarization:	Vertical
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		

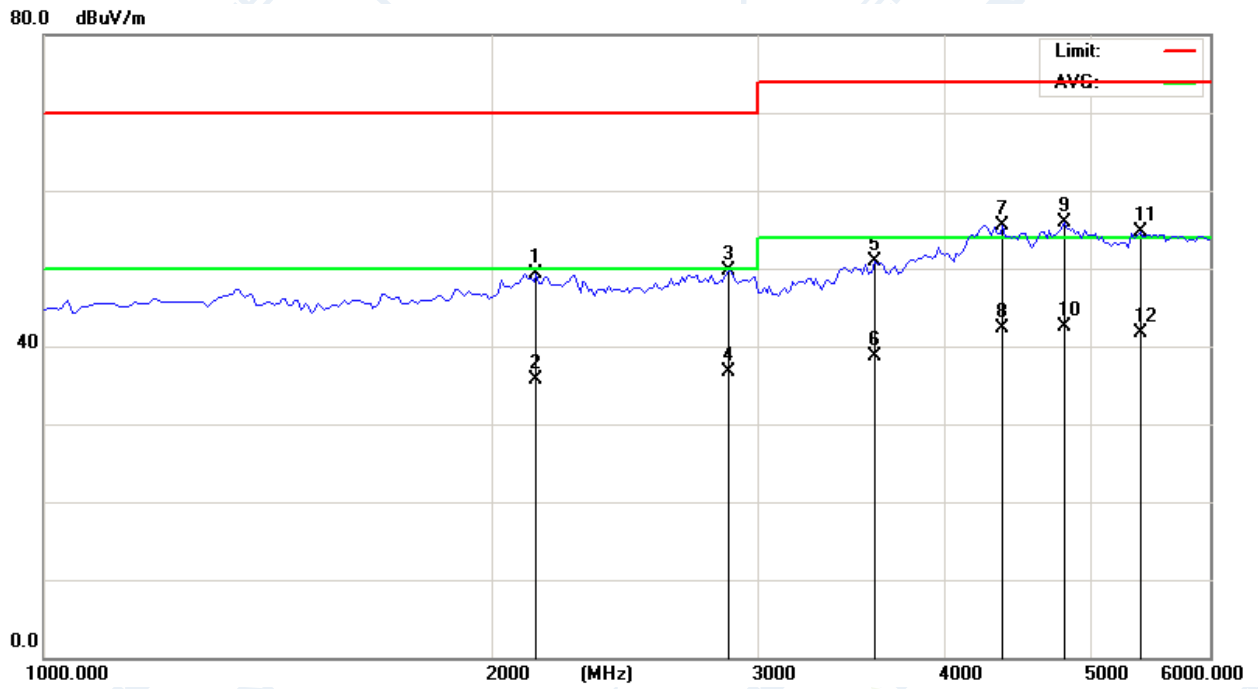


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	30.4237	6.15	25.87	32.02	40.00	-7.98	QP			
2		85.2980	13.05	16.27	29.32	40.00	-10.68	QP			
3		189.0740	11.24	16.18	27.42	40.00	-12.58	QP			
4		711.6734	6.87	28.04	34.91	47.00	-12.09	QP			
5		845.0878	6.41	29.91	36.32	47.00	-10.68	QP			
6		975.7527	6.67	31.58	38.25	47.00	-8.75	QP			

Remark:  
Factor = Antenna Factor + Cable Loss.

3.1.7 TEST RESULTS (1000-6000MHz)

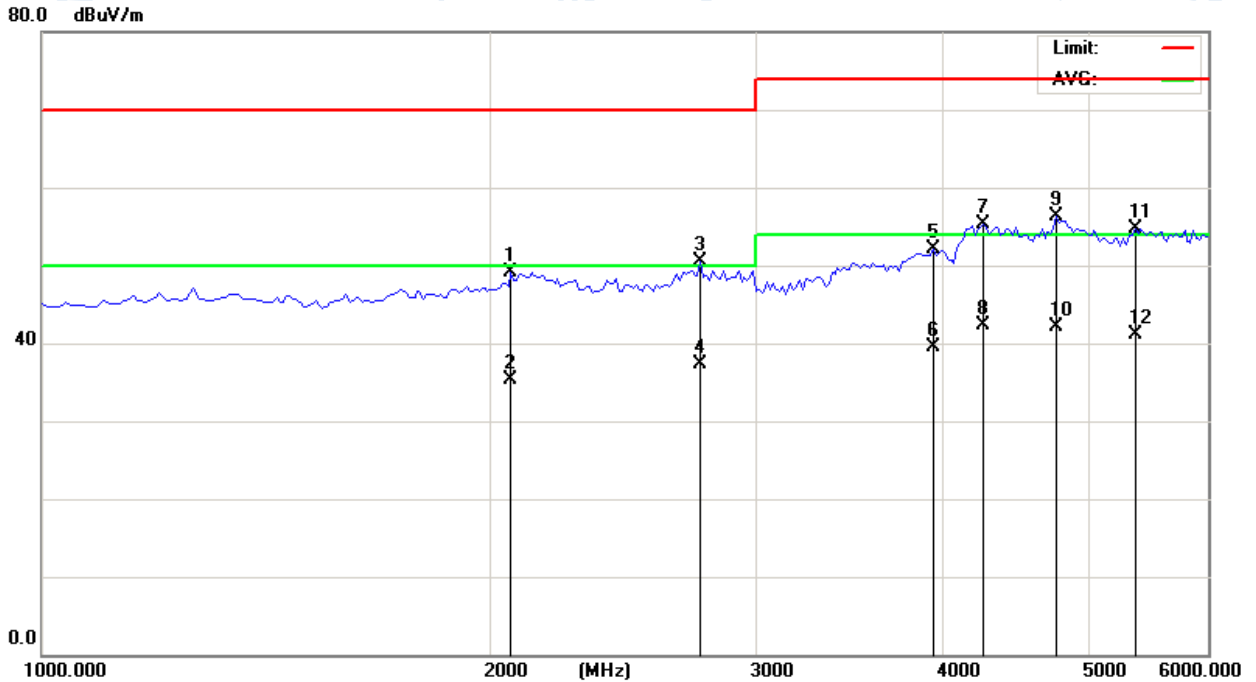
EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	25.3℃	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2022-09-23
Test Mode:	Working	Polarization:	Horizontal
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		2137.500	37.98	11.38	49.36	70.00	-20.64	peak		
2		2137.500	24.37	11.38	35.75	50.00	-14.25	AVG		
3		2875.000	37.98	11.76	49.74	70.00	-20.26	peak		
4		2875.000	25.04	11.76	36.80	50.00	-13.20	AVG		
5		3600.000	36.27	14.56	50.83	74.00	-23.17	peak		
6		3600.000	24.14	14.56	38.70	54.00	-15.30	AVG		
7		4375.000	37.57	17.95	55.52	74.00	-18.48	peak		
8		4375.000	24.45	17.95	42.40	54.00	-11.60	AVG		
9		4812.500	36.19	19.78	55.97	74.00	-18.03	peak		
10	*	4812.500	22.80	19.78	42.58	54.00	-11.42	AVG		
11		5400.000	35.76	18.85	54.61	74.00	-19.39	peak		
12		5400.000	22.95	18.85	41.80	54.00	-12.20	AVG		

Remark:  
Factor = Antenna Factor + Cable Loss.

EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	25.3°C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2022-09-23
Test Mode:	Working	Polarization:	Vertical
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Detector	Comment
1		2062.500	38.35	10.74	49.09	70.00	-20.91			peak	
2		2062.500	24.50	10.74	35.24	50.00	-14.76			AVG	
3		2762.500	38.88	11.55	50.43	70.00	-19.57			peak	
4		2762.500	25.75	11.55	37.30	50.00	-12.70			AVG	
5		3950.000	35.85	16.18	52.03	74.00	-21.97			peak	
6		3950.000	23.32	16.18	39.50	54.00	-14.50			AVG	
7		4262.500	37.40	17.86	55.26	74.00	-18.74			peak	
8	*	4262.500	24.44	17.86	42.30	54.00	-11.70			AVG	
9		4762.500	37.14	19.25	56.39	74.00	-17.61			peak	
10		4767.100	22.77	19.32	42.09	54.00	-11.91			AVG	
11		5375.000	35.69	18.97	54.66	74.00	-19.34			peak	
12		5375.000	22.13	18.97	41.10	54.00	-12.90			AVG	

Remark:  
Factor = Antenna Factor + Cable Loss.

#### 4. EMC IMMUNITY TEST

##### 4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION	Test Mode Test Ports	Perform. Criteria
1. ESD IEC/EN 61000-4-2	8kV air discharge 4kV contact discharge	Direct Mode	B
	4kV HCP discharge 4kV VCP discharge	Indirect Mode	B
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz 1000Hz, 80% AM modulated	Enclosure	A
	87 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 790 MHz 1000Hz, 80% AM modulated		B
	1.4 GHz to 2.0GHz 2.0 GHz to 2.7GHz 1000Hz, 80% AM modulated		A
3. EFT/Burst IEC/EN 61000-4-4	5/50ns Tr/Th 5kHz Repetition Freq.	Power Supply Port	A / B
	5/50ns Tr/Th 5kHz Repetition Freq.	CTL/Signal Data Line Port	A / B
4. Continuous radio frequency disturbances IEC/EN 61000-4-6	0.15 MHz to 80 MHz, 47 MHz to 68 MHz, 1000Hz 80%, AM Modulated 150Ω source impedance	CTL/Signal Port	A / B
		AC Power Port	A / B
		DC Power Port	A / B
5. Power Frequency Magnetic Field IEC/EN 61000-4-8	50 Hz	Enclosure	A

#### 4.2 GENERAL PERFORMANCE CRITERIA

According to **EN IEC 63044-5-2** standard, the general performance criteria as following:

<b>Criterion A</b>	<p>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.</p> <p>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.</p>
<b>Criterion B</b>	<p>After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended.</p> <p>The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p>
<b>Criterion C</b>	<p>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.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

#### 4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.4 ESD TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330ohm / 150pF
Required Performance:	B
Discharge Voltage:	Air Discharge:2kV/4kV/8kV (Direct) Contact Discharge:2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.4.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Indirect application of the discharge:

Vertical Coupling Plane (VCP):

At least 10 single discharges (in the most sensitive polarity) shall be applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0,5 m × 0,5 m, is placed parallel to, and positioned at a distance of 0,1 m from, the EUT.

Discharges shall be applied to the coupling plane, with sufficient different positions such that the four faces of the EUT are completely illuminated. One VCP position is considered to illuminate 0,5 m × 0,5 m area of the EUT surface.

Horizontal Coupling Plane (HCP):

Discharge to the HCP shall be made horizontally to the edge of the HCP.

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the centre point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

The discharge electrode shall be in contact with the edge of the HCP before the discharge switch is operated

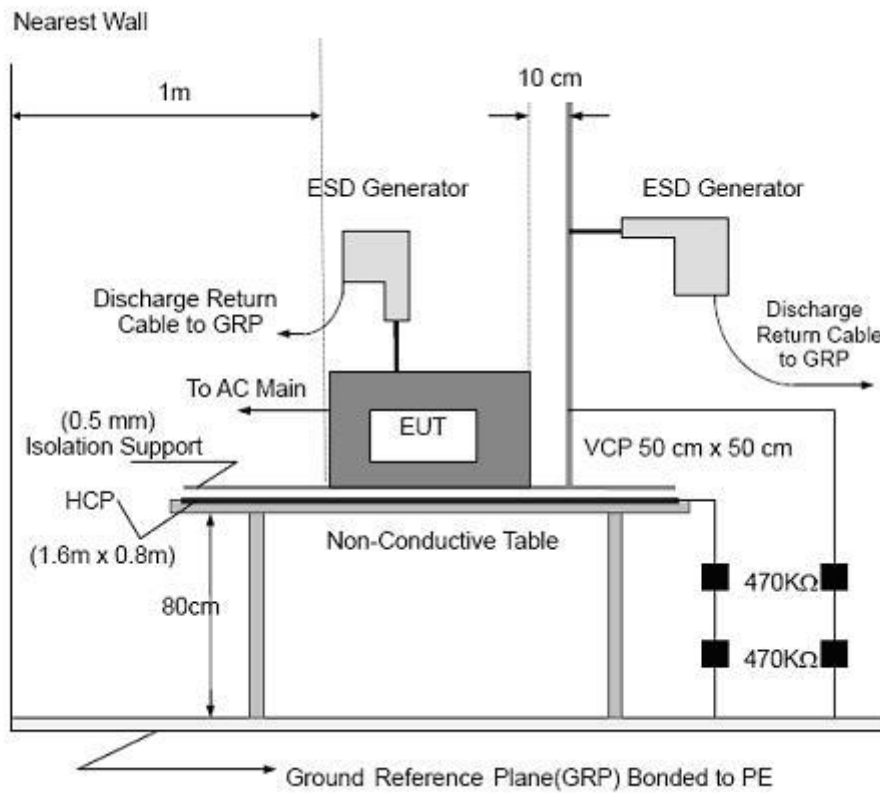
b. Direct application of discharges to the EUT

The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.

For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.



4.4.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

## 4.4.4 TEST RESULTS

EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	23.3°C	Relative Humidity:	40%
Pressure:	1010hPa	Test Date:	2022-10-10
Test Mode:	Working		
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		

Mode	Contact Discharge (Indirect)							Criterion	Result
Test level(kV)	Test Point	2		4		6			
Test Location		+	-	+	-	+	-		
HCP	Front	P	P	P	P			<b>B</b>	<b>Complies</b>
	Rear	P	P	P	P				
	Left	P	P	P	P				
	Right	P	P	P	P				
VCP	Front	P	P	P	P				
	Rear	P	P	P	P				
	Left	P	P	P	P				
	Right	P	P	P	P				

Mode	Air Discharge								Contact Discharge								Criterion	Result	
Test level(kV)	2		4		8		15		2		4		6		8				
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-			
Gap	P	P	P	P	P	P												<b>B</b>	<b>Complies</b>
Screen	P	P	P	P	P	P													
Metal									P	P	P	P							

## Note:

- 1) +/- denotes the Positive/Negative polarity of the output voltage.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: Normal performance within limits specified by the manufacturer, requestor or purchaser.
- 4) Criteria B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention.
- 5) Criteria C: Temporary loss of function or degradation of performance, the correction of which requires operator intervention.
- 6) Criteria D: Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

## 4.5 RS TESTING

### 4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz to 1000 MHz 87 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 790 MHz 1.4 GHz to 2.0GHz 2.0 GHz to 2.7GHz
Field Strength:	3 V/m / 10 V/m / 1 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	3 seconds

### 4.5.2 TEST PROCEDURE

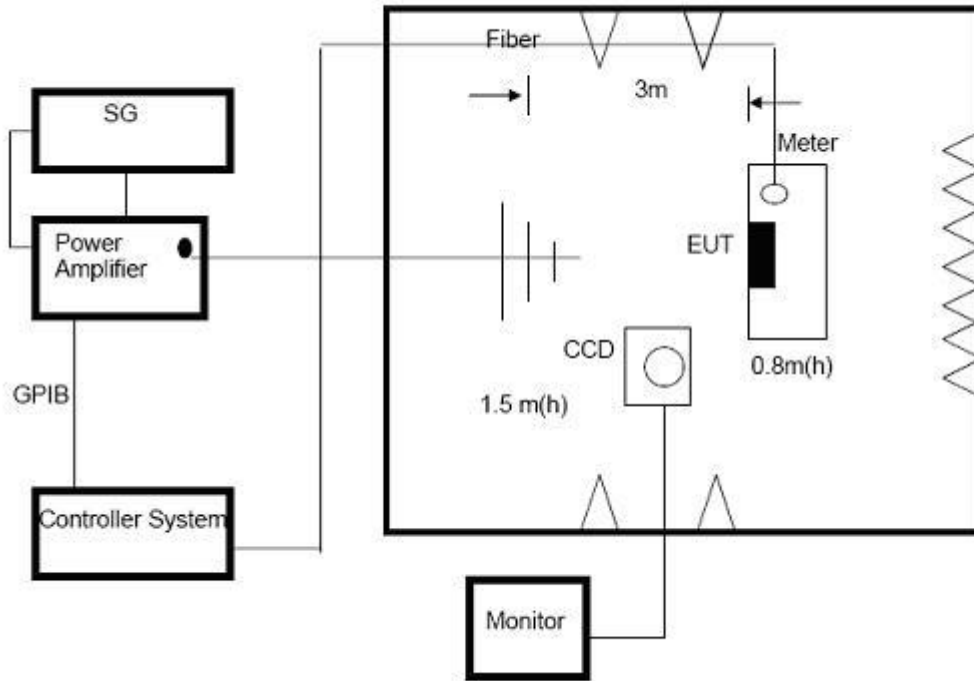
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

- a. The frequency range is swept from 80 MHz to 1000 MHz, 87 MHz to 108 MHz, 174 MHz to 230 MHz, 470 MHz to 790 MHz with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- b. Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

## 4.5.4 TEST RESULTS

EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	26.1°C	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2022-09-24
Test Mode:	Working		
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		

Frequency Range	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80 - 1000 MHz 1.4 - 2.0 GHz	H / V	3 V/m (r.m.s) AM Modulated 1000Hz, 80%	Front	<b>A</b>	<b>P</b>	<b>Complies</b>
			Rear			
			Left			
			Right			
2.0 - 2.7 GHz		Front	1 V/m (r.m.s) AM Modulated 1000Hz, 80%	Rear		
		Left				
		Right				
		Front		<b>B</b>		
Rear						
Left						
Right						
87 - 108 MHz 174 - 230 MHz 470 - 790 MHz	Front	10 V/m (r.m.s) AM Modulated 1000Hz, 80%	Rear			
	Left					
	Right					
	Front					

## Note:

- 1) N/A - denotes test is not applicable in this test report.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

4.6 EFT/BURST TESTING

4.6.1 TEST SPECIFICATION

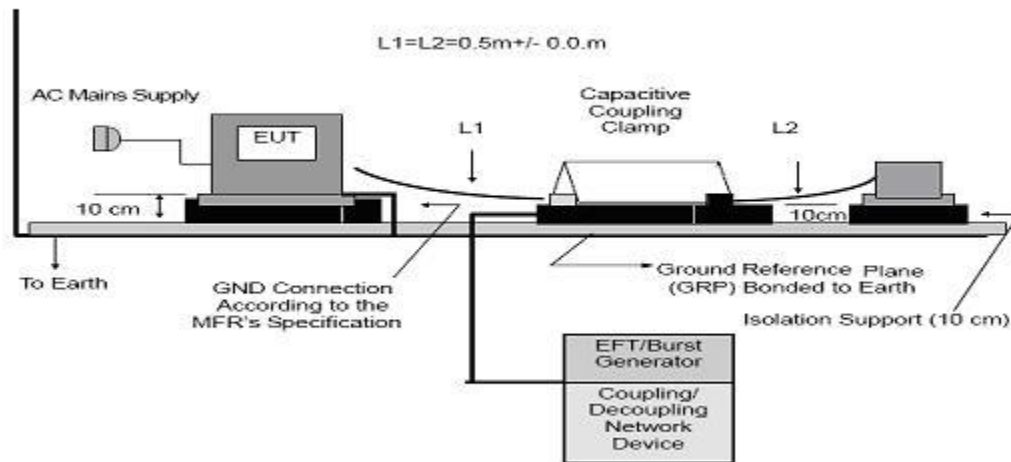
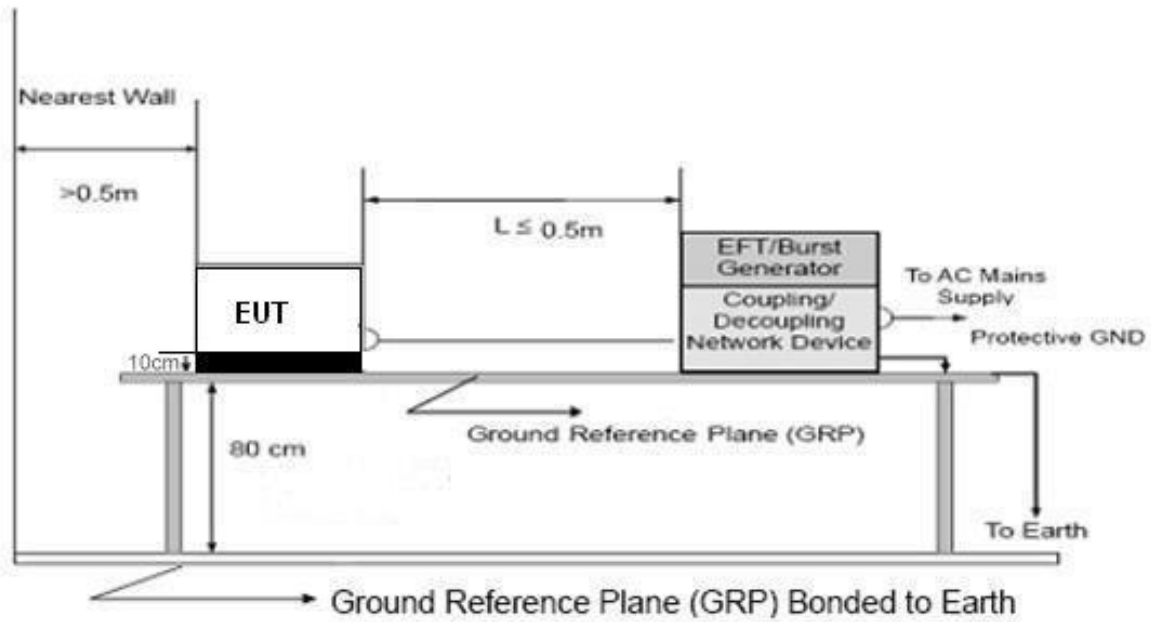
Basic Standard:	IEC/EN 61000-4-4
Required Performance:	A
Test Voltage:	Power Line:0.5 kV, 1 kV, 2kV Signal/Control Line: 0.5 kV, 1 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	2 minutes

4.6.2 TEST PROCEDURE

The EUT and its simulators were placed on a ground reference plane and were insulated from it by a wood support 0.1m ± 0.01m thick. The ground reference plane was 1m\*1m metallic sheet with 0.65mm minimum thickness. The other condition as following manner:

- a. The length of power cord between the coupling device and the EUT should not exceed 0.5 meter.
- b. Both positive and negative polarity discharges were applied.
- c. The duration time of each test sequential was 2 minutes.

4.6.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8 m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25 mm thick and 2.5 m square) connected to the protective grounding system. A minimum distance of 0.5 m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25 mm thick and 2.5 m square) connected to the protective grounding system.



## 4.6.4 TEST RESULTS

EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	23.8°C	Relative Humidity:	47%
Pressure:	1010hPa	Test Date:	2022-09-23
Test Mode:	Working		
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		

Coupling Line		Test level (kV)								Criterion	Result
		0.5		1		2		4			
		+	-	+	-	+	-	+	-		
AC line	L									A	Complies
	N										
	PE										
	L+N										
	L+PE										
	N+PE										
	L+N+PE										
DC Line		P	P								
Signal Line											

## Note:

- 1) +/- denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report
- 3) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 4) Criteria A: There was no change operated with initial operating during the test.
- 5) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 6) Criteria C: The system shut down during the test.

## 4.7 CONTINUOUS RADIO FREQUENCY DISTURBANCES TESTING

### 4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance:	A / B
Frequency Range:	0.15 - 80 MHz / 47 - 68 MHz
Field Strength:	3 Vr.m.s. / 10 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	3 seconds

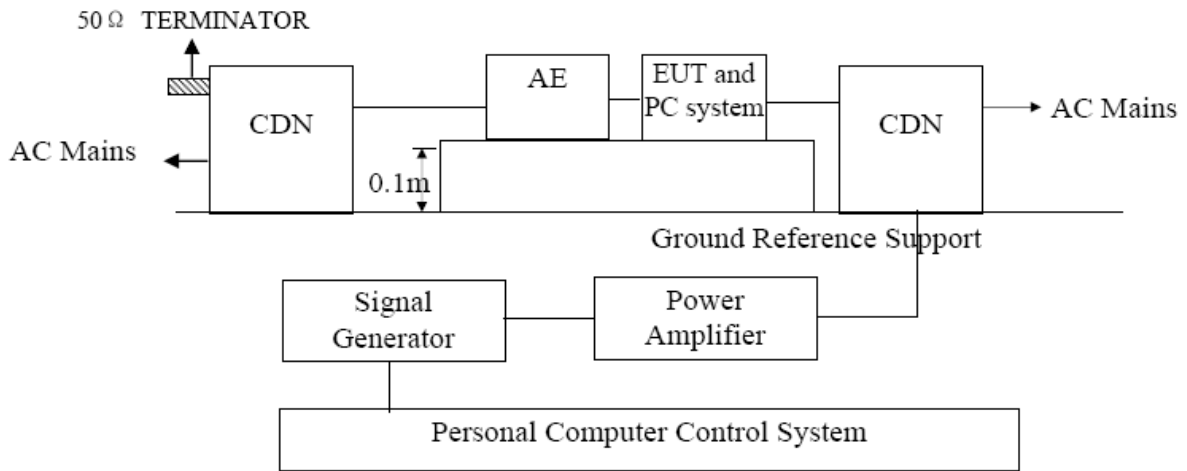
### 4.7.2 TEST PROCEDURE

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible). The disturbance signal described below is injected to EUT through CDN.

The other condition as following manner:

- a. The frequency range is swept from 0.15 - 80 MHz, 47 - 68 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- b. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

4.7.3 TEST SETUP



NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

## 4.7.4 TEST RESULTS

EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	23.8°C	Relative Humidity:	47%
Pressure:	1010hPa	Test Date:	2022-09-23
Test Mode:	Working		
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input AC. Power Port	0.15 --- 80	3V(r.m.s) AM Modulated 1kHz, 80%	<b>A</b>	<b>N/A</b>	<b>N/A</b>
	47 --- 68	10V(r.m.s) AM Modulated 1kHz, 80%	<b>B</b>	<b>N/A</b>	<b>N/A</b>
Input DC. Power Port	0.15 --- 80	3V(r.m.s) AM Modulated 1kHz, 80%	<b>A</b>	<b>P</b>	<b>Complies</b>
	47 --- 68	10V(r.m.s) AM Modulated 1kHz, 80%	<b>B</b>	<b>P</b>	<b>Complies</b>
Signal Line	0.15 --- 80	3V(r.m.s) AM Modulated 1kHz, 80%	<b>A</b>	<b>N/A</b>	<b>N/A</b>
	47 --- 68	10V(r.m.s) AM Modulated 1kHz, 80%	<b>B</b>	<b>N/A</b>	<b>N/A</b>

## Note:

- 1) N/A - denotes test is not applicable in this Test Report.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

**4.8 POWER FREQUENCY MAGNETIC FIELD TESTING**

**4.8.1 TEST SPECIFICATION**

Basic Standard:	IEC/EN 61000-4-8
Required Performance:	A
Frequency Range:	50Hz
Field Strength:	3 A/m
Observation Time:	5 minutes
Inductance Coil:	Rectangular type, 1mx1m

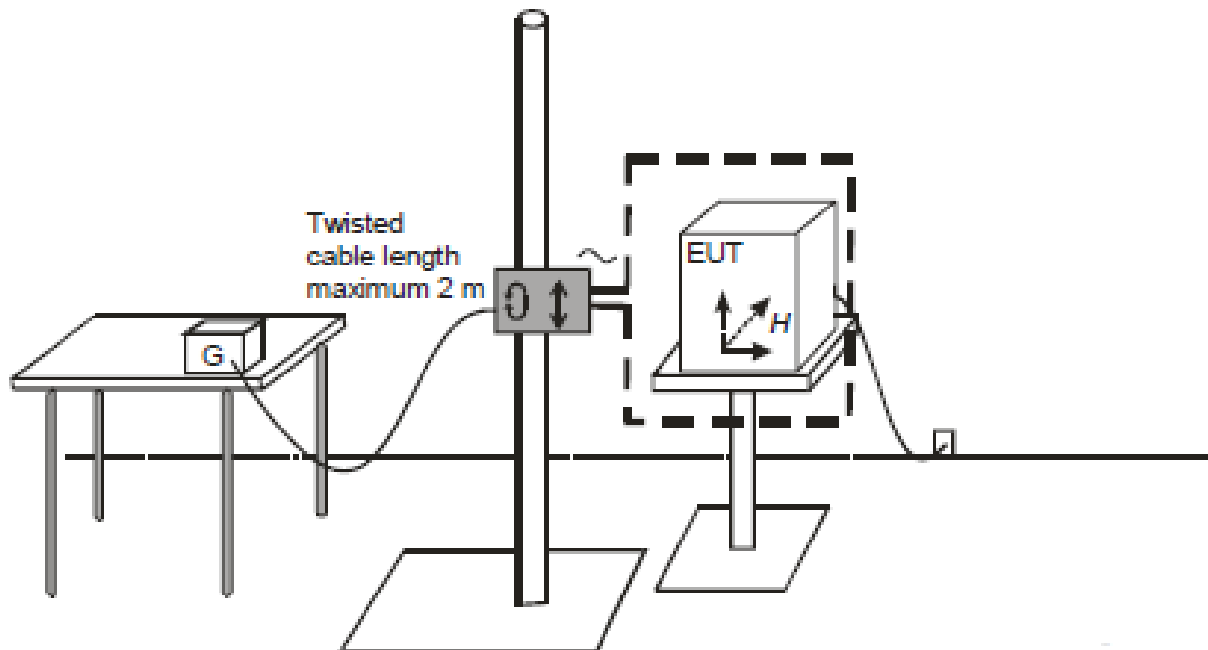
**4.8.2 TEST PROCEDURE**

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m\*1m min. and 0.65mm thick min.

The other condition as following manner:

- a. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- b. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

4.8.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

## 4.8.4 TEST RESULTS

EUT:	Tile Display	Model Name:	M/PTL35.1
Temperature:	23.8°C	Relative Humidity:	47%
Pressure:	1010hPa	Test Date:	2022-09-23
Test Mode:	Working		
Test Power:	DC 24V powered by DC Power Supply AC 230V/50Hz		

Test Mode	Test Level	Antenna aspect	Duration(s)	Perform Criteria	Results	Judgment
Enclosure	3 A/m	X	300 s	A	P	Complies
Enclosure	3 A/m	Y	300 s	A	P	
Enclosure	3 A/m	Z	300 s	A	P	

## Note:

- 1) N/A - denotes test is not applicable in this test report
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

5. EUT TEST PHOTO

Radiated Measurement Photo





ATTACHMENT PHOTOGRAPHS OF EUT

Photo 1

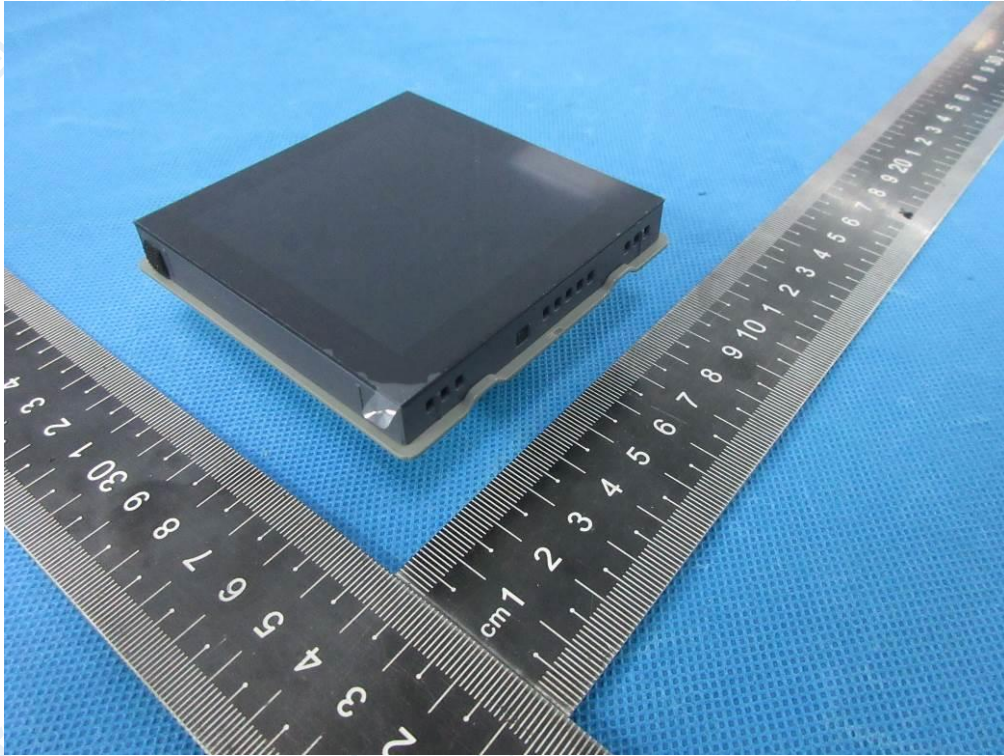


Photo 2

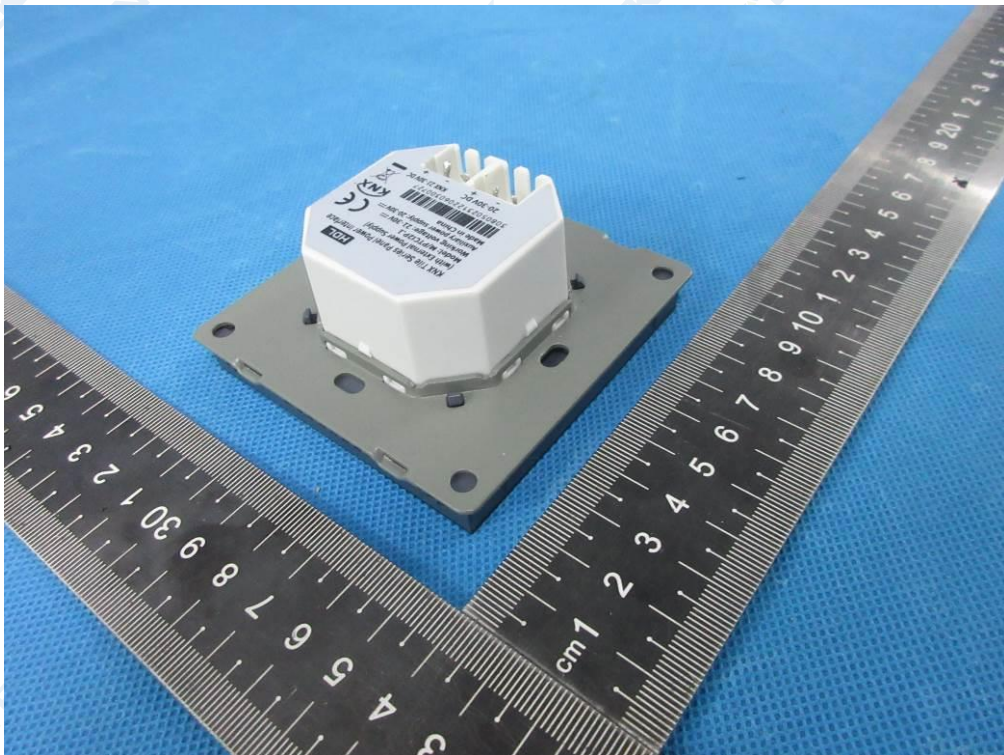


Photo 3



Photo 4

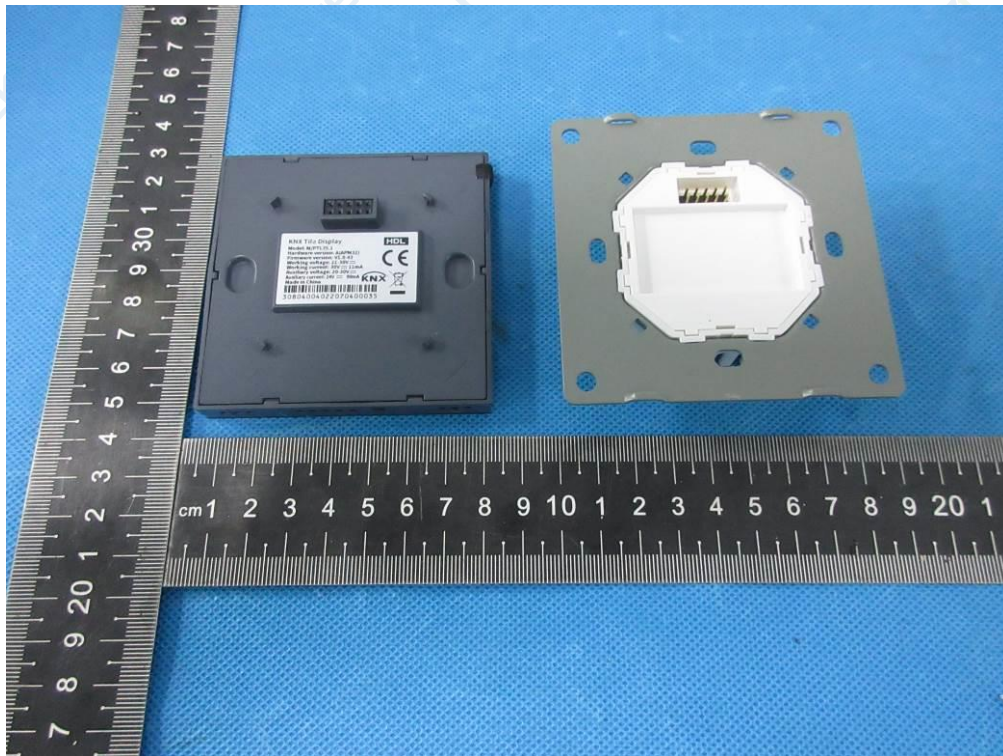


Photo 5

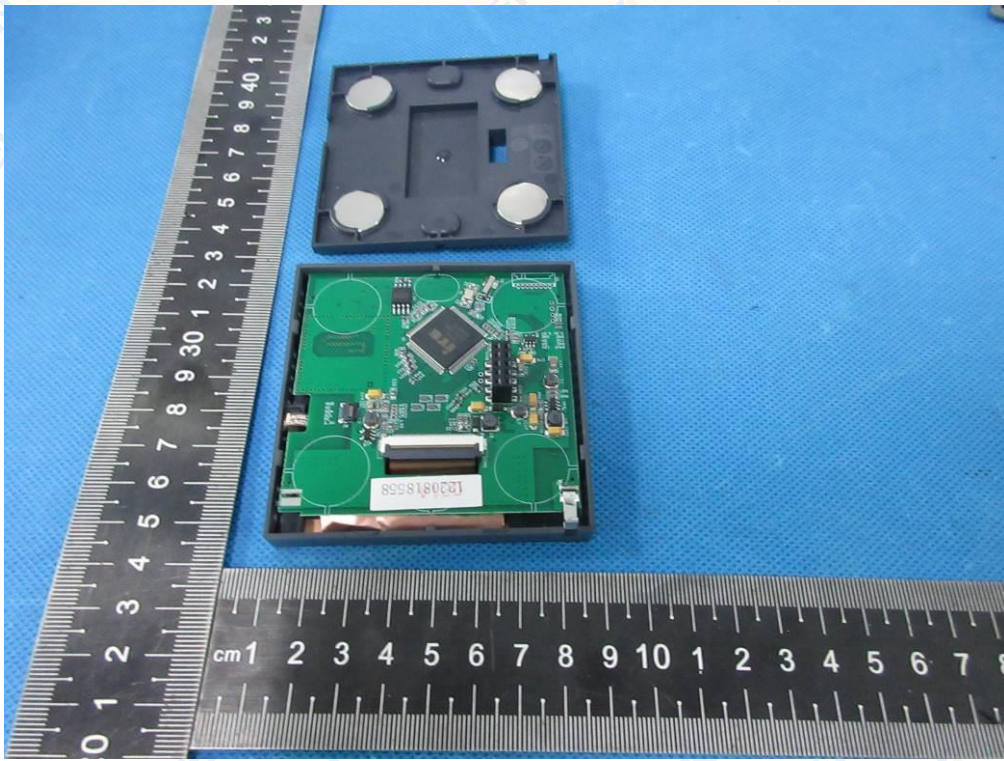


Photo 6

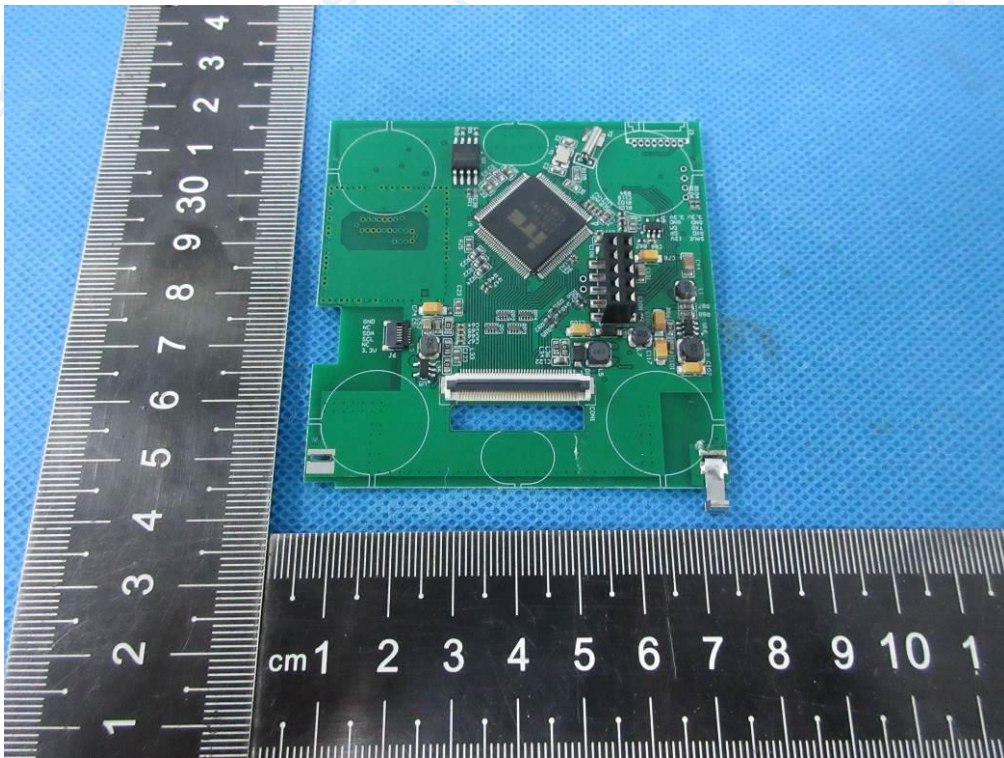


Photo 7

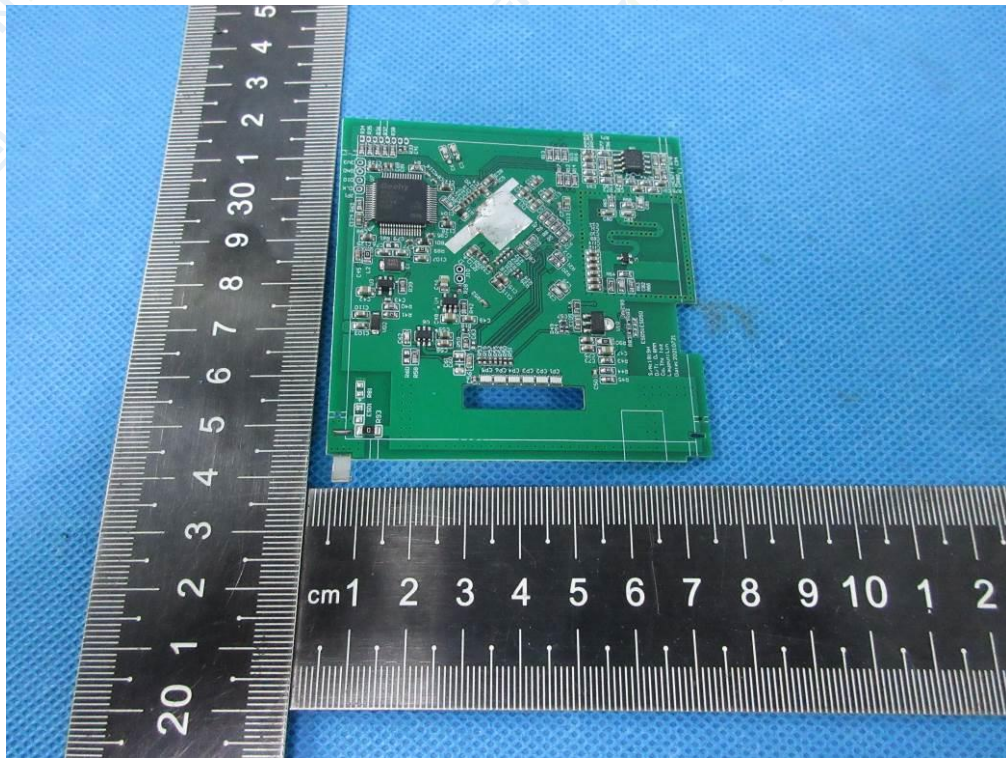


Photo 8

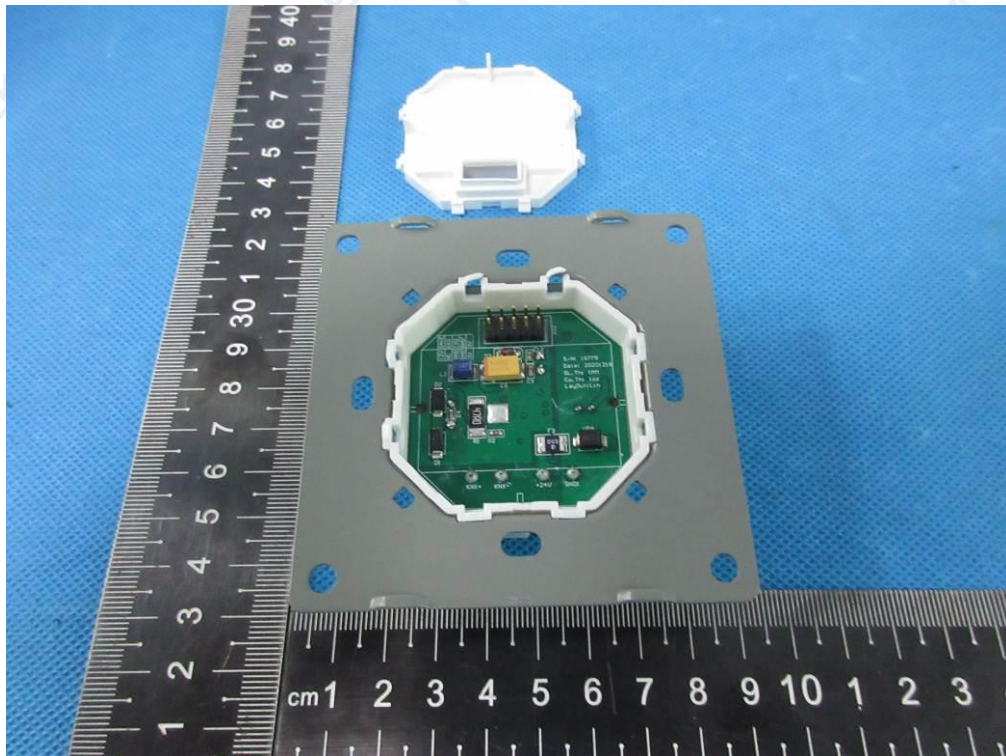


Photo 9

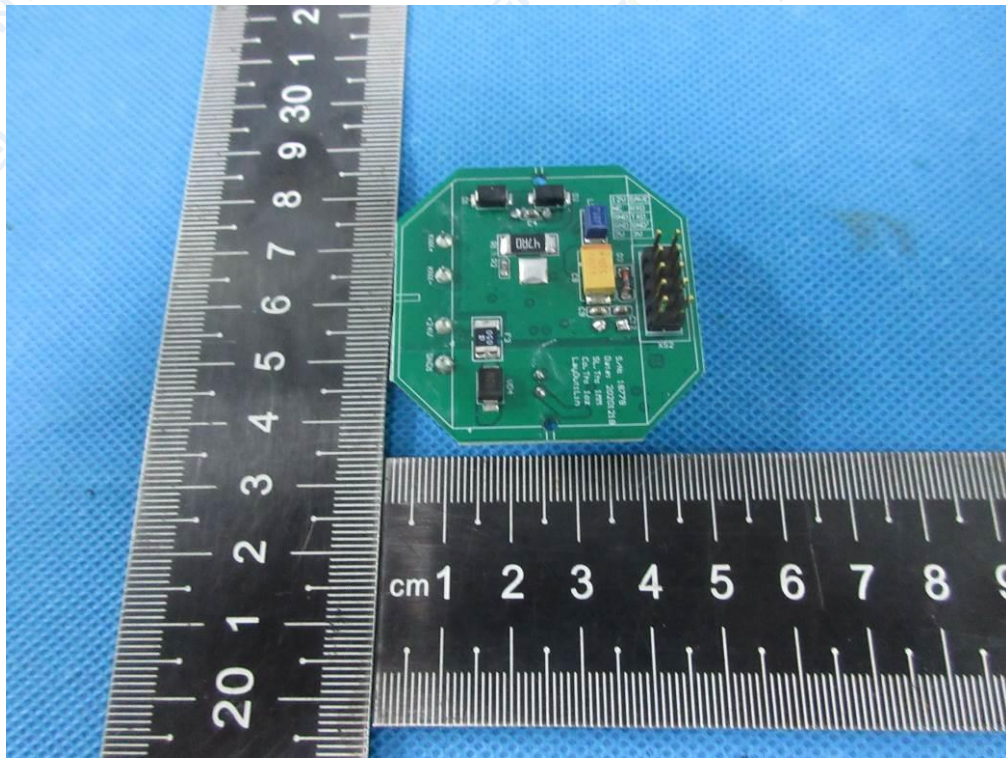
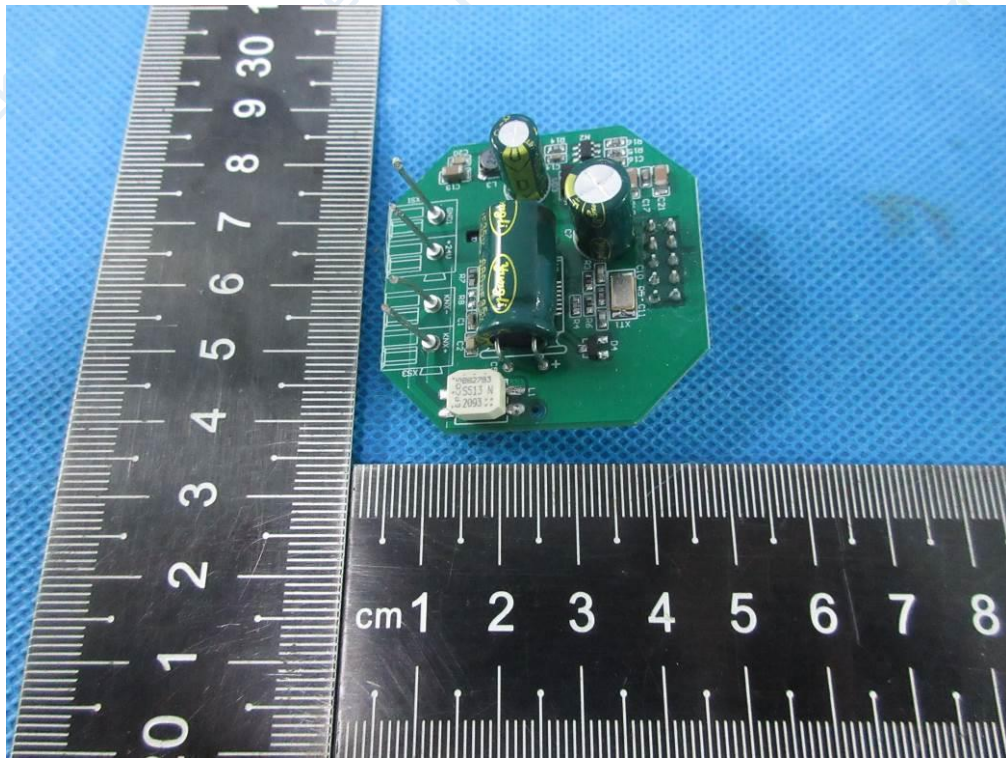


Photo 10



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