TEST REPORT

Applicant:	ZhenHui Electronic Technology (Dongguan) Co., Ltd
Address:	Room 201, building 1, 101shutian road, humen town，dongguan city, guangdong province, China.
Manufacturer:	ZhenHui Electronic Technology (Dongguan) Co., Ltd
Address:	Room 201, building 1, 101shutian road, humen town，dongguan city, guangdong province, China.
EUT:	Face Recognition Equipment
Brand Name:	ZHTECO 振汇通
Model Number:	ZH-800T ZH-800L, ZH-800G, ZH-800Q, ZH700L, ZH700G, ZH500, ZH350
Date of Receipt:	Apr. 01, 2020
Test Date:	Apr. 01, 2020 - Apr. 08, 2020
Date of Report:	Apr. 08, 2020
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
Address:	Part One of 301, A-2 Factory Building, Yalijia Industrial Plant, No. 87, Hengping Road, Yuanshan Street, Longgang District, Shenzhen, China
Applicable Standards:	ETSI EN 301 489-1 V2.2.3 (2019-11), Draft ETSI EN 301 489-17 V3.2.2 (2019-12) EN 55032:2015/AC:2016, EN 55035:2017/AC:2019
Test Result:	Pass
Report Number:	DL-2020040731R

Prepared by(Engineer):	Alisa Song
Reviewer(Supervisor):	Nico Zou
Approved(Manager):	Jade Yang

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

TABLE OF CONTENT

1. VERSION

Version No.	Date	Description
00	Apr. 08, 2020	Original

2. TEST SUMMARY

EMC Emission				
Standard	Test Item	Limit	Result	Remark
ETSI EN 301 489-1, EN 55032	Conducted Emission at power ports	Class B	PASS	
	Conducted Emission at LAN port	Class B	N/A	
	Radiated Emission below 1GHz	Class B	PASS	
	Radiated Emission above 1GHz	Class B	N/A	
EN 61000-3-2	Harmonic Current Emission	Class A or D	N/A NOTE (2)	
EN 61000-3-3	Voltage Fluctuations & Flicker	------	PASS	
EMC Immunity				
Section Draft ETSI EN 301 489-17, EN 55035	Test Item	Performance Criteria	Result	Remark
EN 61000-4-2	Electrostatic Discharge	B	PASS	
EN 61000-4-3	RF electromagnetic field	A	PASS	
EN 61000-4-4	Fast transients	B	PASS	
EN 61000-4-5	Surges	B	PASS	
EN 61000-4-6	Injected Current	A	PASS	
EN 61000-4-11	Volt. Interruptions Volt. Dips	B / C / C NOTE (3)	PASS	

NOTE:

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

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) Voltage dip: 100% reduction – Performance Criteria B

Voltage dip: 100% reduction – Performance Criteria B

Voltage dip: 70% reduction – Performance Criteria C

Voltage Interruption: 100% Interruption – Performance Criteria C

(4) Test Facility: Shenzhen DL Testing Technology Co., Ltd.

Address: Part One of 301, A-2 Factory Building, Yalijia Industrial Plant, No. 87, Hengping Road, Yuanshan Street, Longgang District, Shenzhen, China

3. GENERAL INFORMATION

3.1 Description of Device (EUT)

EUT	:	Face Recognition Equipment
Brand Name	:	ZHTECO 振汇通
Model Number	:	ZH-800T ZH-800L, ZH-800G, ZH-800Q, ZH700L, ZH700G, ZH500, ZH350
Model difference	:	The product's different for model number and appearance color.
Power Supply	:	DC 12V from adapter
Adapter	:	Model: JHD-AP024C-120200BA-A Input: AC 100-240V 50/60Hz 0.45A Output: DC 12V ⎓ 2000mA
Working Frequency	:	Below 108MHz

Note: ZH-800T was selected as the test model and the data's have been recorded in this report.

3.2 Tested System Details

None.

3.3 Test Mode Description

Mode1. On Mode

3.4 Test Uncertainty

Conducted Emission Uncertainty : ±2.57dB

Radiated Emission Uncertainty : ±4.51dB

4. TEST INSTRUMENT USED

For Conducted Emission Test (843 Shielded Room)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
843 Shielded Room	ChengYu	843 Room	843	Nov. 25, 2019	Nov. 24, 2022
EMI Receiver	R&S	ESR	101421	Feb. 06, 2020	Feb. 05, 2021
LISN	R&S	ENV216	102417	Feb. 06, 2020	Feb. 05, 2021
ISN T8	Schwarzbeck	NTFM 8158	101135	Feb. 06, 2020	Feb. 05, 2021
ISN T5	Schwarzbeck	NTFM 8158	101136	Feb. 06, 2020	Feb. 05, 2021
843 Cable 1#	ChengYu	CE Cable	001	Feb. 06, 2020	Feb. 05, 2021

For Radiated Emission Test (966 chamber)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	Nov. 25, 2019	Nov. 24, 2022
Spectrum Analyzer	Agilent	E4408B	MY50140780	Feb. 06, 2020	Feb. 05, 2021
EMI Receiver	R&S	ESRP7	101393	Feb. 06, 2020	Feb. 05, 2021
Amplifier	Schwarzbeck	BBV9743B	00153	Feb. 06, 2020	Feb. 05, 2021
Amplifier	EMEC	EM01G8GA	00270	Feb. 06, 2020	Feb. 05, 2021
Broadband Trilog Antenna	Schwarzbeck	VULB9162	00306	Feb. 07, 2020	Feb. 06, 2021
Horn Antenna	Schwarzbeck	BBHA9120D	02139	Feb. 07, 2020	Feb. 06, 2021
966 Cable 1#	ChengYu	966	004	Feb. 06, 2020	Feb. 05, 2021
966 Cable 2#	ChengYu	966	003	Feb. 06, 2020	Feb. 05, 2021

For Harmonic & Flicker Test (EMS --- site)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
Harmonics, Flicker & power Analyser	LAPLACE INSTRUMENTS	AC2000A	311370	Feb. 06, 2020	Feb. 05, 2021
AC Power Supply	MToni	HPF5010	633659	Feb. 06, 2020	Feb. 05, 2021

For Electrostatic Discharge Immunity Test (EMS --- site)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
ESD Tester	SCHLODER	SESD 230	17352	Feb. 06, 2020	Feb. 05, 2021

For RF Field Strength Susceptibility Test (Keyway --- site)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
Signal Generator	HP	8648A	3625U00573	Sep. 26, 2019	Sep. 26, 2020
Amplifier	A&R	500A100	17034	Sep. 26, 2019	Sep. 26, 2020
Amplifier	A&R	100W/1000M1	17028	Sep. 26, 2019	Sep. 26, 2020
Audio Analyzer (20Hz~1GHz)	Panasonic	2023B	202301/428	Sep. 26, 2019	Sep. 26, 2020
Isotropic Field Probe	A&R	FP2000	16755	Sep. 26, 2019	Sep. 26, 2020
Antenna	EMCO	3108	9507-2534	Sep. 26, 2019	Sep. 26, 2020
Log-periodic Antenna	A&R	AT1080	16812	Sep. 26, 2019	Sep. 26, 2020

For EFT /B, Surge, Voltage Dips Interruptions Test (EMS --- site)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
Transient Comprehensive Immunity Test System	Graphtec	HVIP16T+HCOMPACT 5	192501+192202	Feb. 06, 2020	Feb. 05, 2021
Coupling Clamp	HTEC	001	0001	Feb. 06, 2020	Feb. 05, 2021

For Injected Currents Susceptibility Test (EMS --- site)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
C/S Test System	LIONCEL	RIS-6091-85	0191101	Feb. 06, 2020	Feb. 05, 2021
CDN	LIONCEL	CDN-M2-16	0191001	Feb. 06, 2020	Feb. 05, 2021
CDN	LIONCEL	CDN-M3-16	0191002	Feb. 06, 2020	Feb. 05, 2021
Injection Clamp	Frankonia	EMCL-20	18101728-0108	Feb. 06, 2020	Feb. 05, 2021

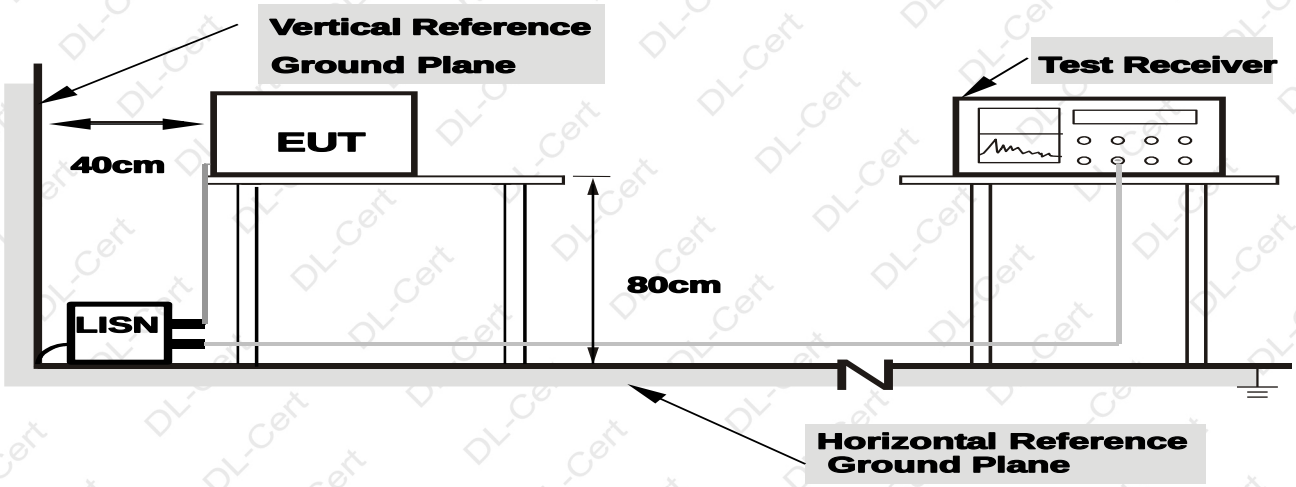
For Magnetic Field Immunity Test (EMS --- site)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
Magnetic field Test System	LIONCEL	PMF-801C-C/ PMF-801C-T	190401	Feb. 06, 2020	Feb. 05, 2021

5. CONDUCTED EMISSION TEST

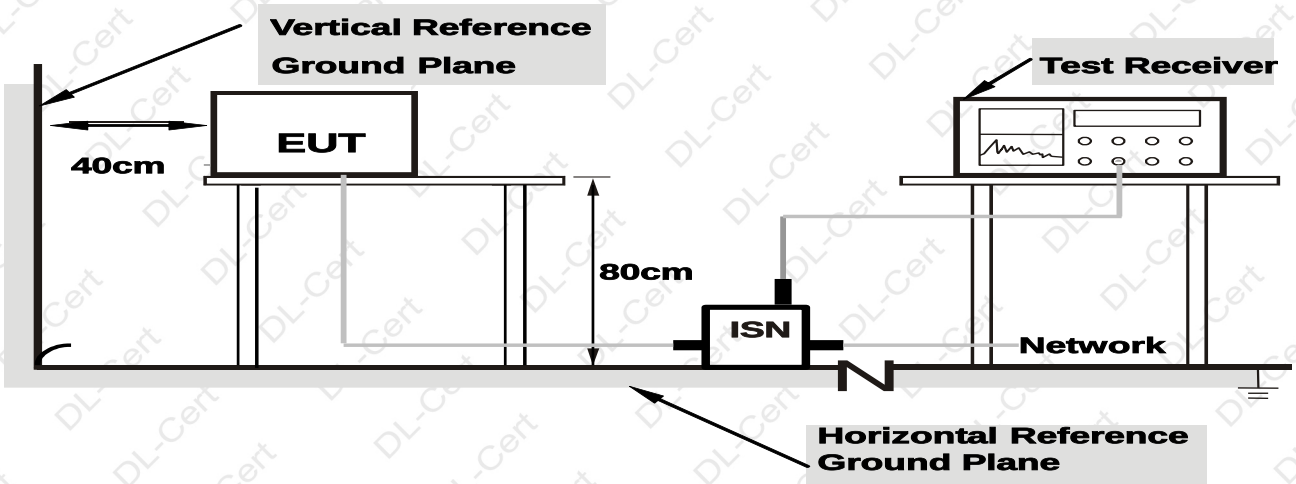
5.1 Block Diagram Of Test Setup

For Mains Terminals Test



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For Telecom Port Test



Note: 1.Support units were connected to second LISN.
2.Both of ISNs are 80 cm from EUT and at least 80 cm from other units and other metal planes

5.2 Test Standard and Limit

EN 55032

For Mains Terminals Test			For Telecom Port Test		
Frequency MHz	Limits dB(μV)		Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level		Quasi-peak Level	Average Level
0.15~0.50	66 ~ 56*	55 ~ 46*	0.15~0.50	84 ~ 74*	74 ~ 64*
0.50~5.00	56	46	0.50~30.00	74	64
5.00~30.00	60	50	/	/	/

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

5.3 EUT Configuration on Test

The following equipment's are installed on conducted emission test to meet EN 55032 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

5.4 Operating Condition of EUT

5.5.1 Setup the EUT and simulators as shown in Section 5.1.
5.5.2 Turn on the power of all equipments.
5.5.3 Let the EUT work in test modes and test it.

5.5 Test Procedure

The EUT is put on the table and connected to the AC mains through a Artificial Mains Network (AMN) or ISN. This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the **EN 55032** regulations during conducted emission test.

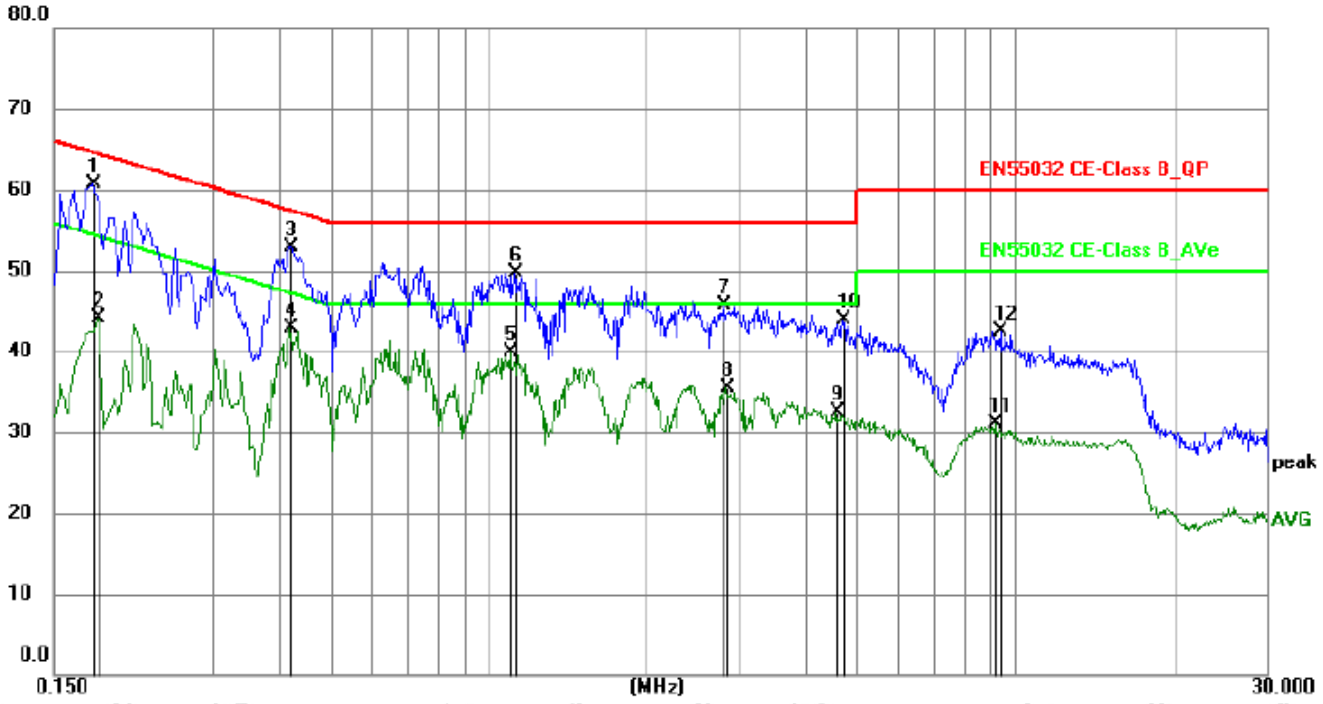
The bandwidth of the test receiver (R&S Test Receiver ESR) is set at 10KHz.

The frequency range from 150 KHz to 30 MHz is investigated.

5.6 Test Result

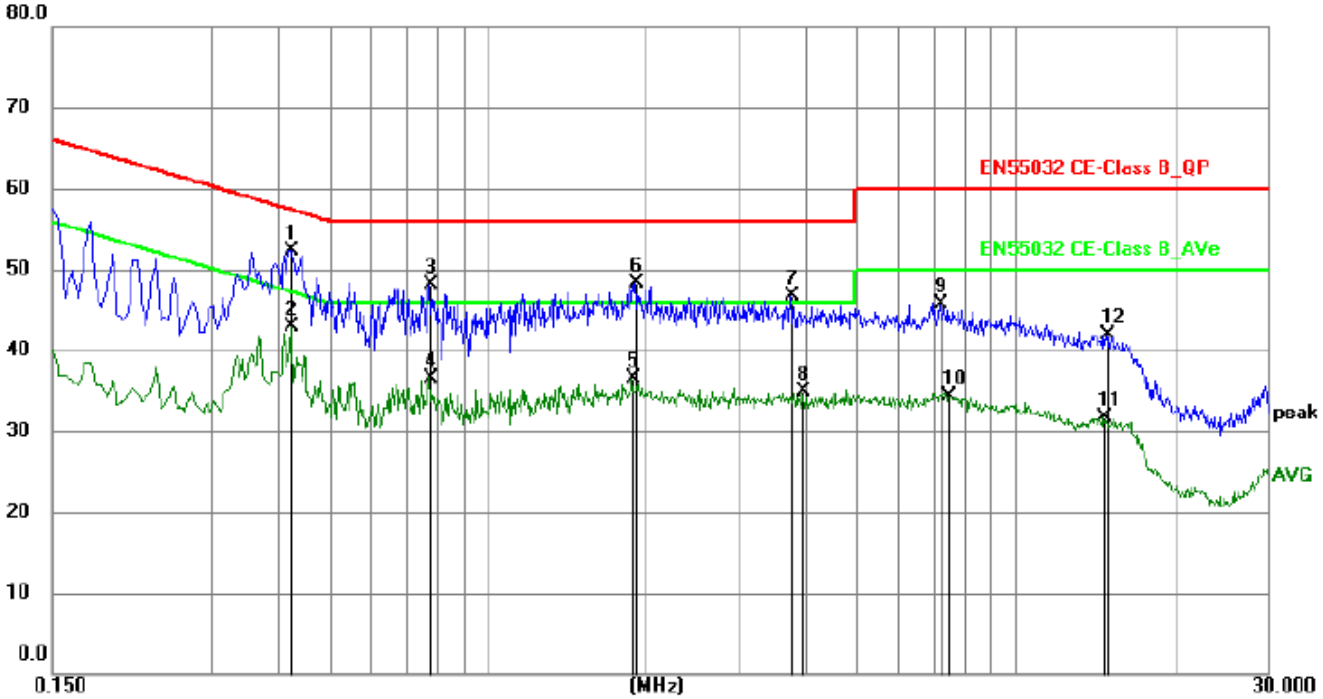
PASS
Please refer to the following page.

Conducted Emission Test Data			
Temperature:	24.5 ℃	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Line
Test Voltage:	AC 230V/50Hz	Test Mode:	ON Mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1768	50.10	10.51	60.61	64.63	-4.02	QP
2	0.1814	33.63	10.51	44.14	54.42	-10.28	AVG
3	0.4200	42.43	10.52	52.95	57.45	-4.50	QP
4	0.4200	32.39	10.52	42.91	47.45	-4.54	AVG
5	1.1040	29.71	10.24	39.95	46.00	-6.05	AVG
6	1.1174	39.42	10.24	49.66	56.00	-6.34	QP
7	2.7960	35.43	10.28	45.71	56.00	-10.29	QP
8	2.8275	25.23	10.28	35.51	46.00	-10.49	AVG
9	4.5780	22.22	10.32	32.54	46.00	-13.46	AVG
10	4.7175	33.56	10.32	43.88	56.00	-12.12	QP
11	9.1680	20.54	10.61	31.15	50.00	-18.85	AVG
12	9.3795	31.90	10.63	42.53	60.00	-17.47	QP

Conducted Emission Test Data			
Temperature:	24.5 ℃	Relative Humidity:	54%
Pressure:	1009hPa	Phase :	Neutral
Test Voltage:	AC 230V/50Hz	Test Mode:	ON Mode

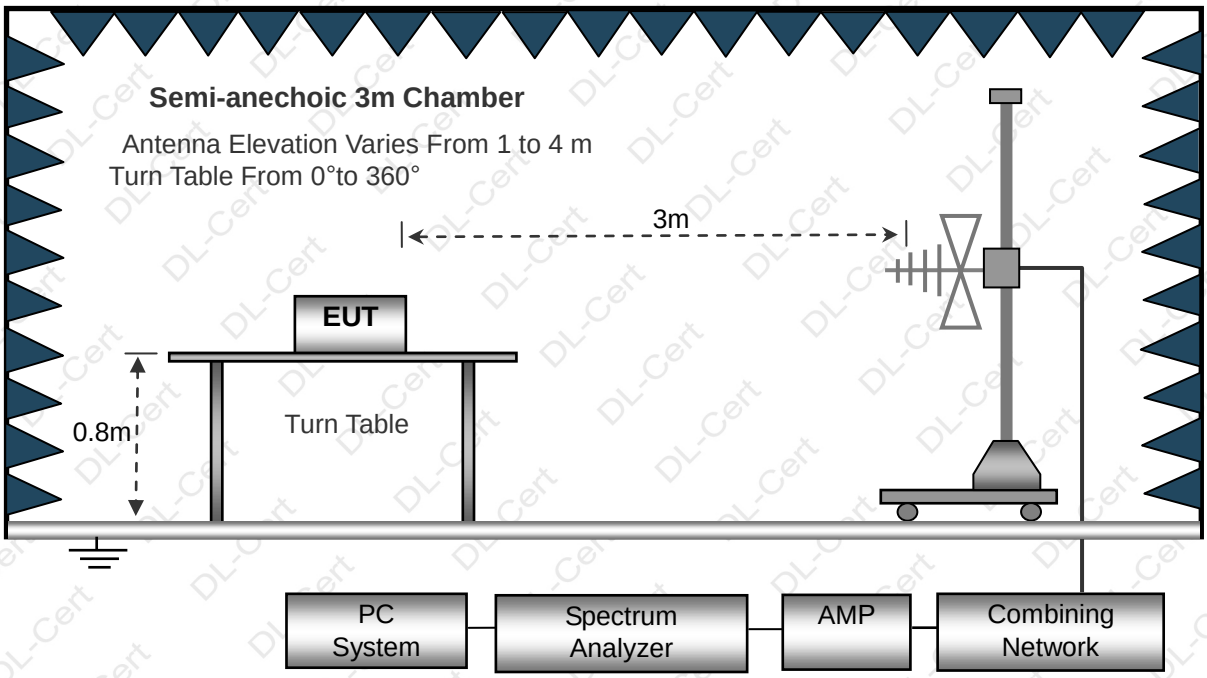


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4245	41.84	10.52	52.36	57.36	-5.00	QP
2	0.4245	32.39	10.52	42.91	47.36	-4.45	AVG
3	0.7755	37.81	10.36	48.17	56.00	-7.83	QP
4	0.7755	26.24	10.36	36.60	46.00	-9.40	AVG
5	1.8870	26.31	10.26	36.57	46.00	-9.43	AVG
6	1.9050	38.03	10.26	48.29	56.00	-7.71	QP
7	3.7590	36.31	10.30	46.61	56.00	-9.39	QP
8	3.9615	24.64	10.31	34.95	46.00	-11.05	AVG
9	7.2060	35.31	10.48	45.79	60.00	-14.21	QP
10	7.4580	23.78	10.50	34.28	50.00	-15.72	AVG
11	14.7345	20.87	10.74	31.61	50.00	-18.39	AVG
12	14.8515	31.16	10.74	41.90	60.00	-18.10	QP

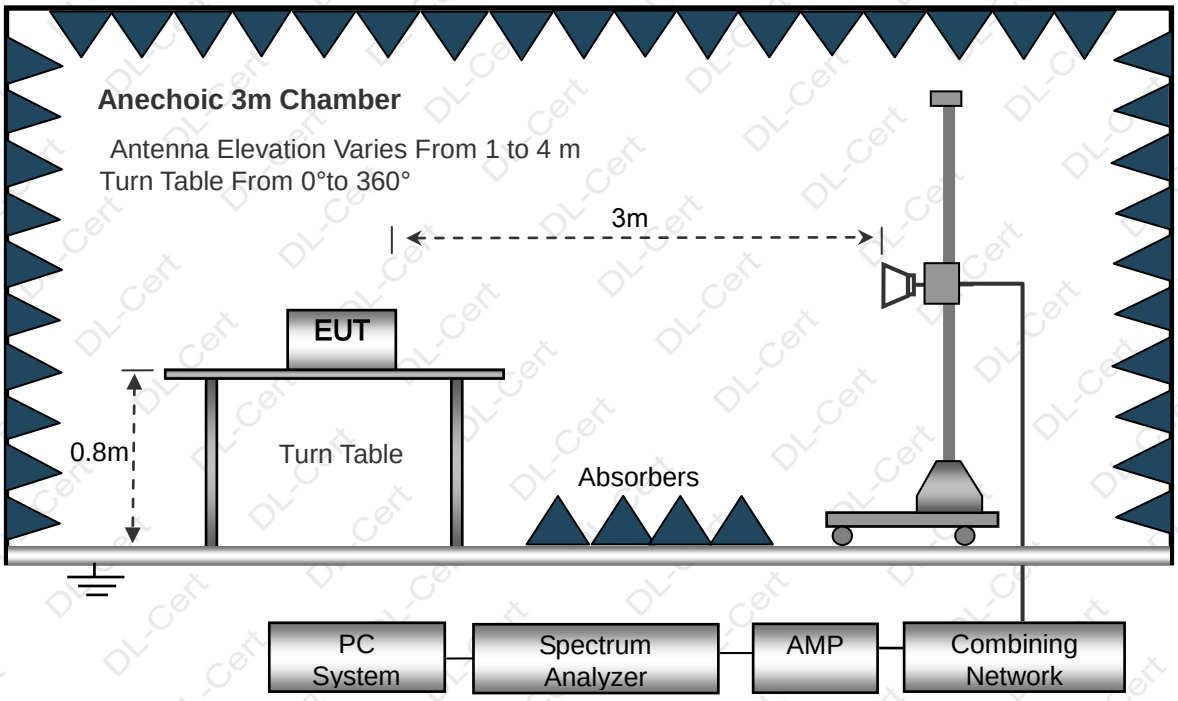
6. RADIATION EMISSION TEST

6.1 Block Diagram of Test Setup

Below 1GHz



Above 1GHz



6.2 Test Standard and Limit

EN 55032

Below 1GHz

Equipment type	Distance (Meters)	Frequency MHz	Limit values dB(μV/m) Quasi-peak
FM receivers	3	≤1 000	Fundamental 60
		30 to 230	Harmonics 52
		230 to 300	Harmonics 52
		300 to 1 000	Harmonics 56
Other		30 to 300	40
		300 to 1 000	47

Above 1GHz

Frequency MHz	Distance (Meters)	Field Strengths Limits dB(μV)/m	Detector
1000～3000	3	76.0	PEAK
1000～3000	3	56.0	AVERAGE
3000～6000	3	80.0	PEAK
3000～6000	3	60.0	AVERAGE

Remark:

(1) The smaller limit shall apply at the cross point between two frequency bands.

(2) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

6.3 EUT Configuration on Test

The EN 55032 regulations test method must be used to find the maximum emission during radiated emission test.

The configuration of EUT is the same as used in conducted emission test.

Please refer to Section 5.3.

6.4 Operating Condition of EUT

Same as conducted emission test, which is listed in Section 5.4 except the test set up replaced as Section 6.2.

6.5 Test Procedure

1) The radiated emissions test was conducted in a semi-anechoic chamber.

2) 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, but separated from metallic contact with the ground

reference plane by 0.1m of insulation.

3) Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.

4) The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

5) The bandwidth setting on the field strength meter (R&S Test Receiver ESCI) is set at 120KHz.

6) The frequency range from 30MHz to 1000MHz is checked.

6.6 Test Result

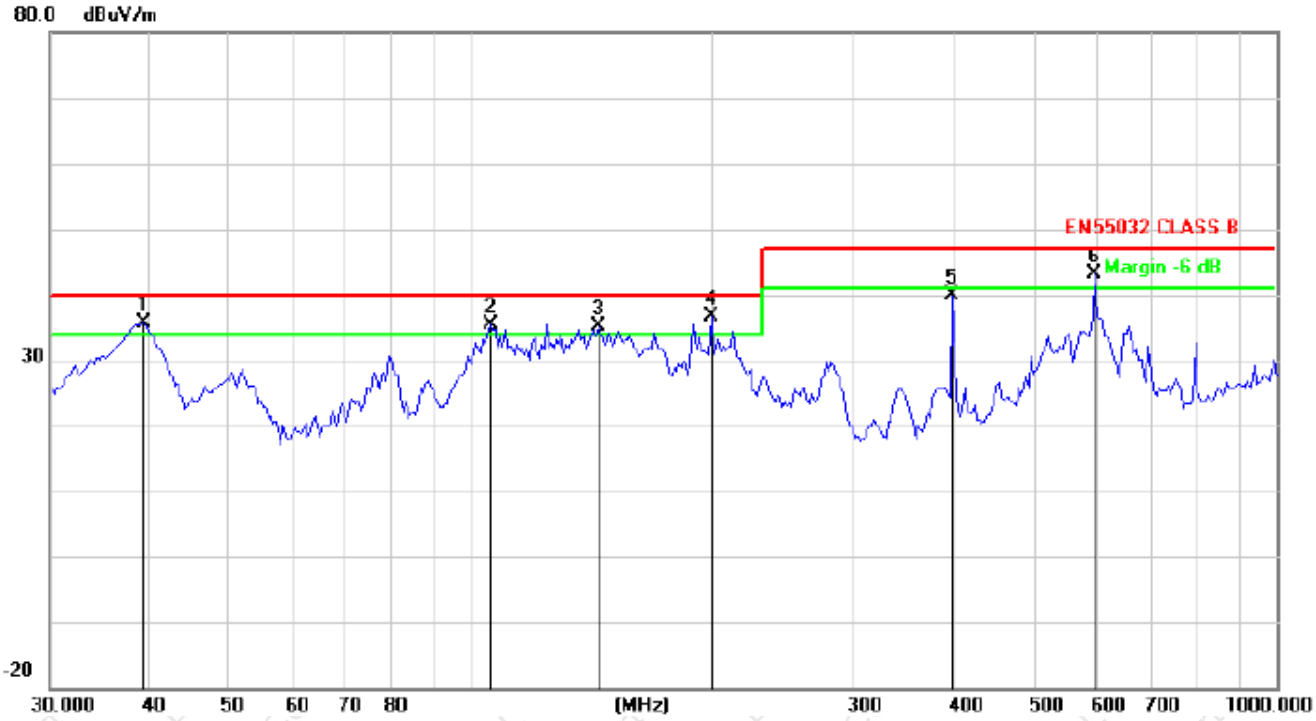
PASS

Please refer to the following page.

Radiation Emission Test Data			
Temperature:	24.5 ℃	Relative Humidity:	54%
Pressure:	1009hPa	Polarization :	Horizontal
Test Voltage:	AC 230V/50Hz	Test Mode:	ON Mode

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure-ment dBuV/m	Limit dB/	Margin dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		39.4588	31.90	-14.60	17.30	40.00	-22.70	QP			
2		119.7672	45.69	-17.77	27.92	40.00	-12.08	QP			
3	*	198.6424	52.34	-15.77	36.57	40.00	-3.43	QP			
4		272.5246	40.91	-13.53	27.38	47.00	-19.62	QP			
5	!	395.5071	53.75	-10.69	43.06	47.00	-3.94	QP			
6		594.5143	42.67	-6.84	35.83	47.00	-11.17	QP			

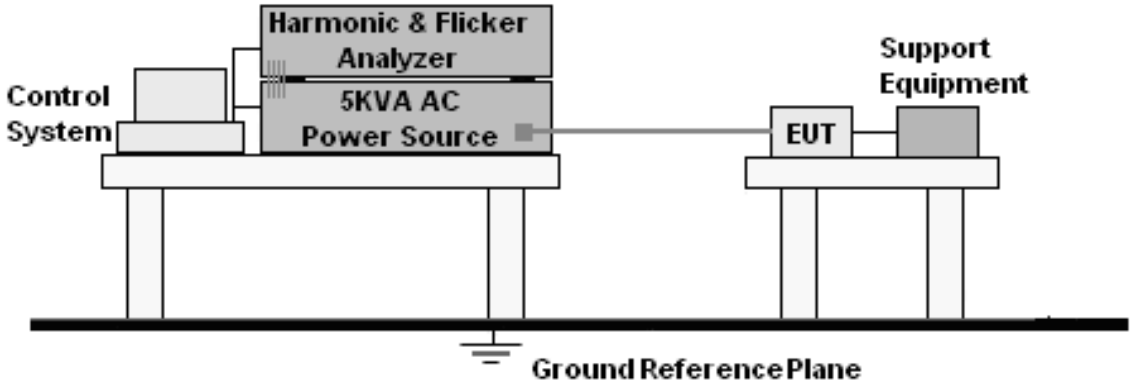
Radiation Emission Test Data			
Temperature:	24.5 ℃	Relative Humidity:	54%
Pressure:	1009hPa	Polarization :	Vertical
Test Voltage:	AC 230V/50Hz	Test Mode:	ON Mode



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure-ment dBuV/m	Limit dB/	Margin dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	!	39.1824	50.21	-14.66	35.55	40.00	-4.45	QP			
2	!	105.5369	43.65	-8.31	35.34	40.00	-4.66	QP			
3	!	143.7760	45.70	-10.68	35.02	40.00	-4.98	QP			
4	*	198.6424	46.34	-9.64	36.70	40.00	-3.30	QP			
5		395.5070	50.69	-10.69	40.00	47.00	-7.00	QP			
6	!	594.5143	49.87	-6.84	43.03	47.00	-3.97	QP			

7. HARMONIC CURRENT EMISSION TEST

7.1 Block Diagram of Test Setup



7.2 Test Standard

EN 61000-3-2

7.3 Operating Condition of EUT

Setup the EUT as shown in Section 5.1.
Turn on the power of all equipments.
Let the EUT work in test mode and test it.

7.4 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.

7.5 Test Results

PASS
Please refer to the following page.

There is no need for Harmonic current test to be performed on this product (rated power is less than 75 W) in accordance with EN 61000-3-2.
For further details, please refer to Clause 7 of EN 61000-3-2 which states:
"For the following categories of equipment, limits are not specified in this standard:
- equipment with a rated power of 75 W or less, other than lighting equipment."

8. VOLTAGE FLUCTUATIONS & FLICKER TEST

8.1 Block Diagram of Test Setup

Same as Section 7.1.

8.2 Test Standard

EN 61000-3-3

8.3 Operating Condition of EUT

Same as Section 7.3. 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.

Flicker Test Limit

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

8.4 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.

8.5 Test Results

Flicker Test Data			
Temperature:	24.5 ℃	Relative Humidity:	54%
Test Voltage:	AC 230V/50Hz	Test Mode:	ON Mode

Voltage Fluctuation	Limit	Value
Relative Voltage Change Characteristic Tmax（dc＞3%）	500 ms	0 ms
Maximum Relative Voltage Change dmax	4%	0.00
	6%	/
	7%	/
Relative Steady-state Voltage Change dc	3.3%	0.00

Flicker	Limit	Value
Short-term Flicker Indicator Pst	1.0	0.063
Long-term Flicker Indicator Plt	0.65	/

9. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA

Product Standard	EN 55035, ETSI EN 301 489-17	
Criteria	**During the test**	**After the test**
A	Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.

NOTE: Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2.

6.2.2 Minimum performance level

For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

PERFORMANCE FOR TT

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR TR

The performance criteria B shall apply, except for voltage dips of 100ms and voltage interruptions of 5 000ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR CT

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

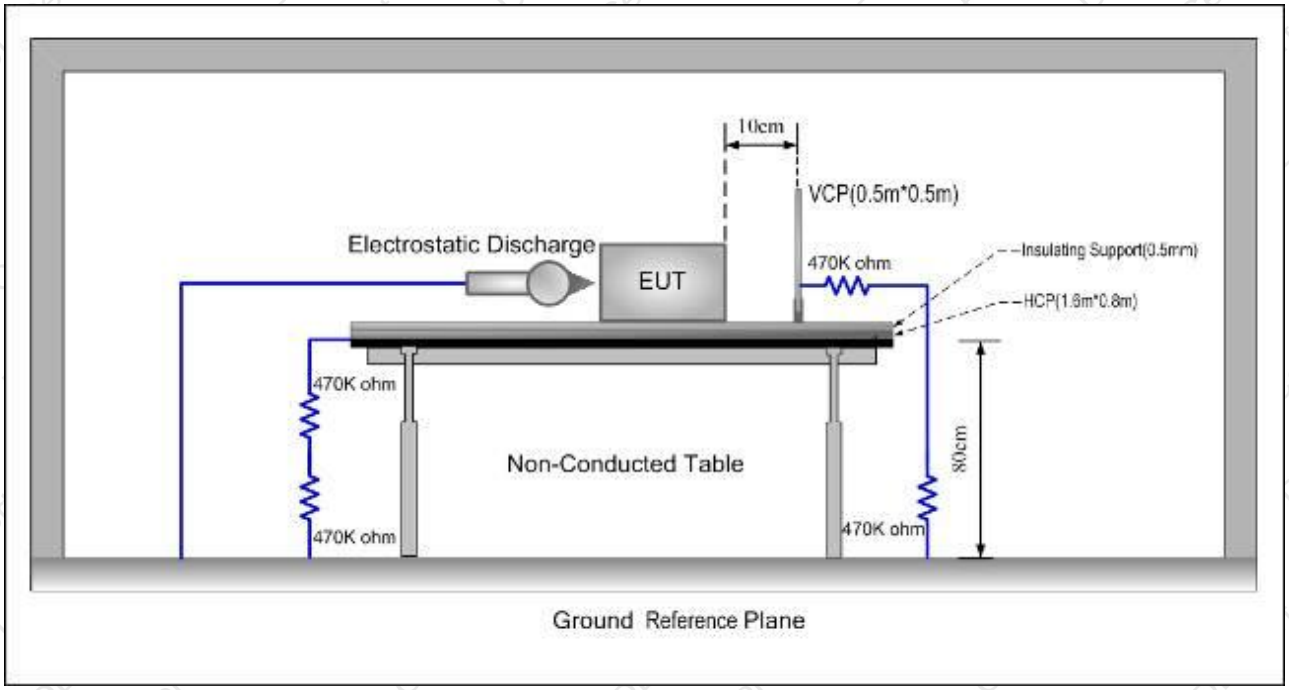
PERFORMANCE FOR CR

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

10. ELECTROSTATIC DISCHARGE IMMUNITY TEST

10.1 Block Diagram of Test Setup



10.2 Test Standard

ETSI EN 301 489-17, EN 55035, EN 61000-4-2

10.3 Severity Levels and Performance Criterion

Severity Level: 3 / Air Discharge:±8KV
Level: 2 / Contact Discharge:±4KV
Performance criterion : B

10.4 Test Procedure

a. Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from

the Product and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the Product. The ESD generator was positioned vertically at a distance of 0.1 meters from the Product with the discharge electrode touching the HCP.

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.

10.5 Test Results

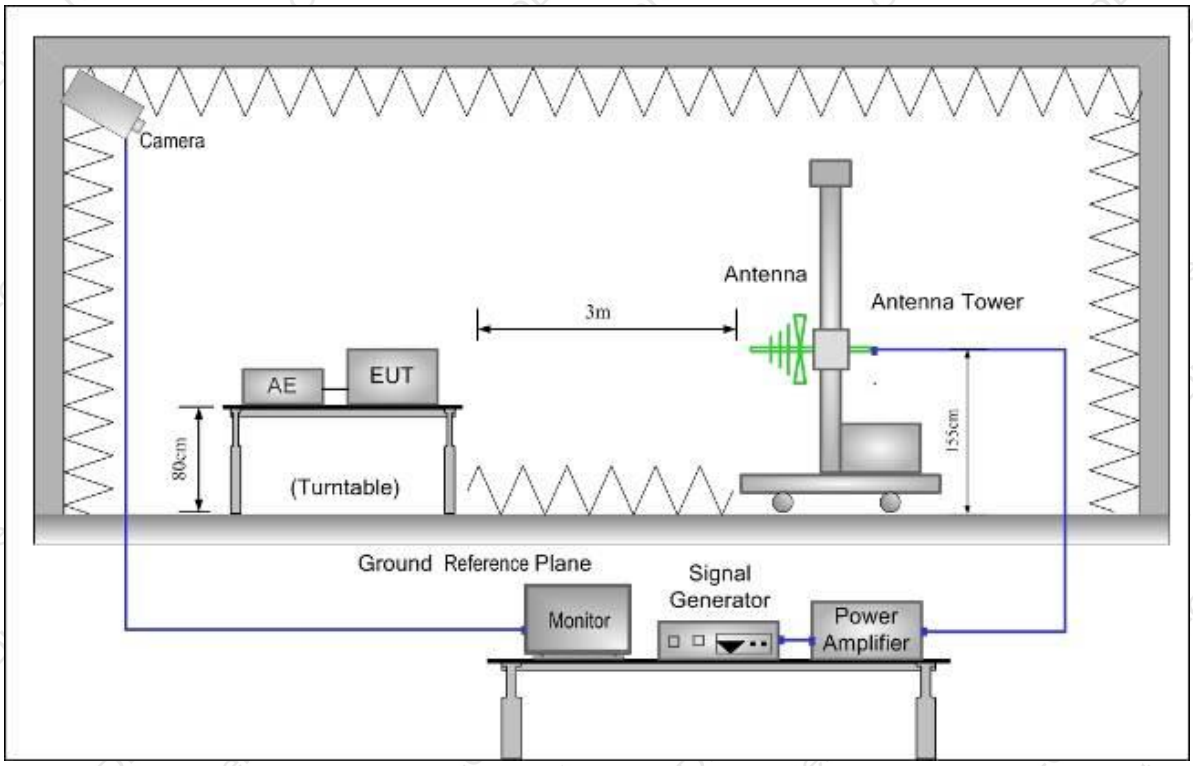
PASS

Please refer to the following page.

Electrostatic Discharge Test Data					
Temperature:	25.1℃		Humidity:	55%	
Power Supply :	AC 230V/50Hz		Test Mode:	ON Mode	
Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Level	Result
Contact Discharge	Conductive Surfaces	4	10	B	Pass
	Indirect Discharge HCP	4	10	B	Pass
	Indirect Discharge VCP	4	10	B	Pass
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	Pass
Note: N/A					

11. RF FIELD STRENGTH SUSCEPTIBILITY TEST

11.1 Block Diagram of Test Setup



11.2 Test Standard

ETSI EN 301 489-17, EN 55035, EN 61000-4-3

11.3 Severity Levels and Performance Criterion

Severity Level 2, 3V / m
Performance criterion: A

11.4 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 polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows:

Condition of Test	Remarks
Fielded Strength	3 V/m (Severity Level 2)
Radiated Signal	Modulated
Scanning Frequency	80 – 6000 MHz
Dwell time of radiated	0.0015 decade/s
Waiting Time	1 Sec.

11.5 Test Results

PASS

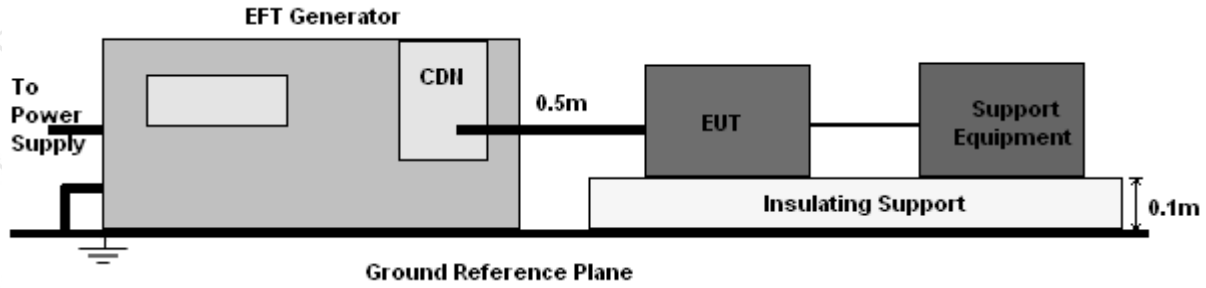
Please refer to the following page.

R/S Test Data				
Temperature:	25.1℃	Humidity:	55%	
Power Supply :	AC 230V/50Hz	Test Mode:	ON Mode	
Criterion:	A	Steps	1 %	
Frequency (MHz)	Position	Field Strength (V/m)	Required Level	Result
80 – 6000	Front, Right, Back, Left	3	A	Pass
Note: N/A				

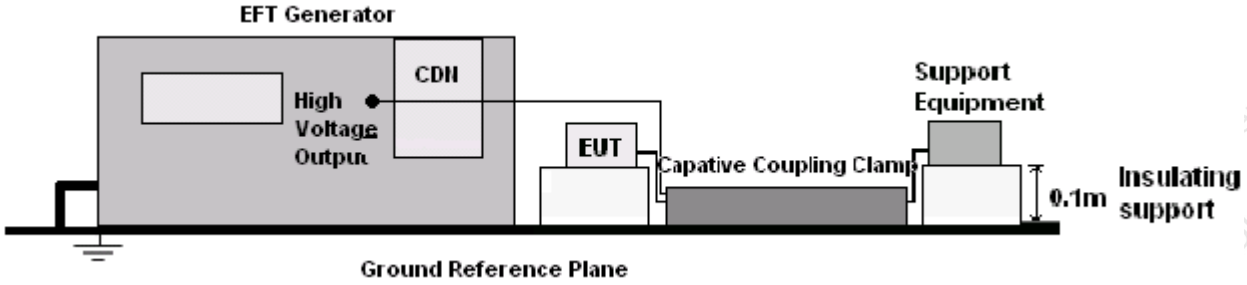
12. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

12.1 Block Diagram of EUT Test Setup

For input a.c. / d.c. power port:



For signal lines and control lines:



12.2 Test Standard

ETSI EN 301 489-17, EN 55035, EN 61000-4-4

12.3 Severity Levels and Performance Criterion

Severity Level 2 at 1KV, Pulse Rise time & Duration: 5 nS / 50 nS
Performance criterion: B

12.4 Test Procedure

EUT shall be placed 0.8m high above the ground reference plane which is a min.1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m

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 2 minutes.

12.5 Test Results

PASS

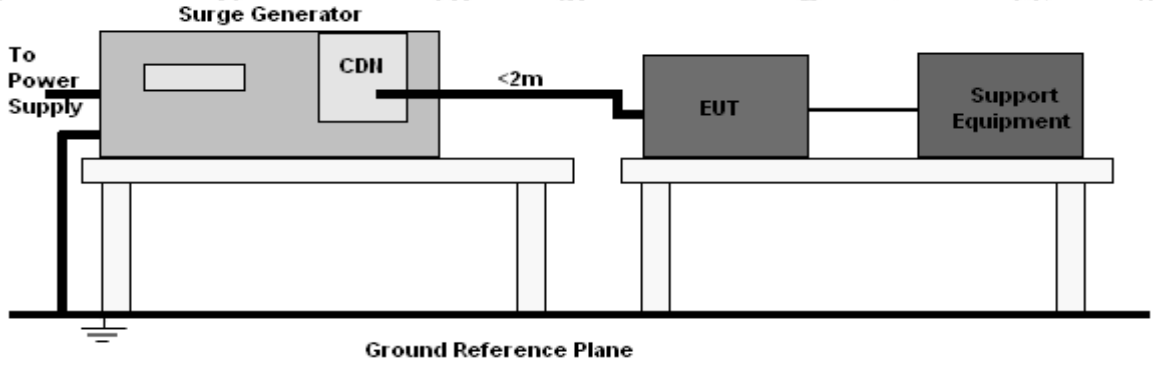
Please refer to the following page.

EFT Test Data			
Temperature:	24.5℃	Humidity:	53%
Power Supply :	AC 230V/50Hz	Test Mode:	ON Mode

Coupling Line	Test Voltage(kV)	Performance Criterion	Result
L	±0.5, 1	B	PASS
N	±0.5, 1	B	PASS
L-N	±0.5, 1	B	PASS

13. SURGE TEST

13.1 Block Diagram of EUT Test Setup



13.2 Test Standard

ETSI EN 301 489-17, EN 55035, EN61000-4-5

13.3 Severity Levels and Performance Criterion

Severity Level: Line to Line, Level 2 at 1KV;
Severity Level: Line to Earth, Level 3 at 2KV.

Performance criterion: B

13.4 Test Procedure

1) Set up the EUT and test generator as shown on section 11.1

2) For line to line coupling mode, provide a 1KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.

4) Different phase angles are done individually.

5) Repeat procedure 2) to 4) except the open-circuit test voltage change from 1KV to 2KV for line to earth coupling mode test.

6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

13.5 Test Result

PASS

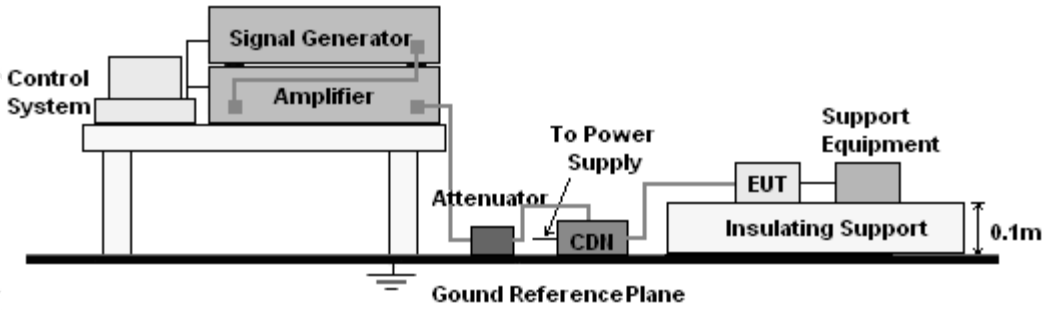
Please refer to the following page.

Surge Test Data						
Temperature:	24.5℃		Humidity:	53%		
Power Supply :	AC 230V/50Hz		Test Mode:	ON Mode		
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (KV)	Performance Criterion	Result
L-N	±	0, 90, 180, 270	5	1	B	Pass
Note: N/A						

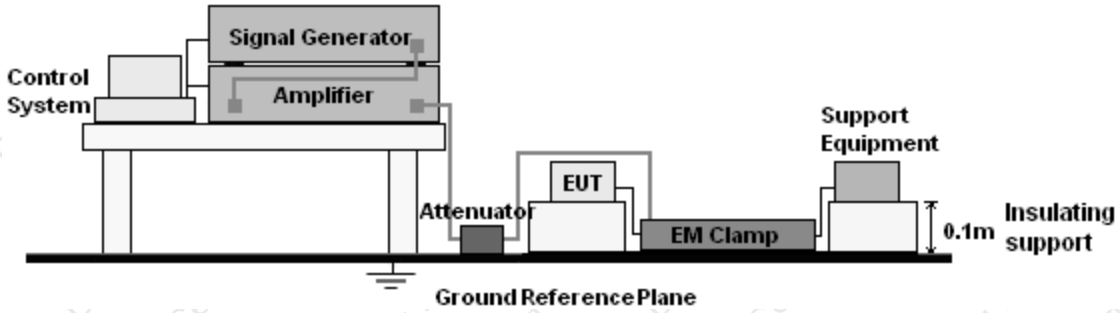
14. INJECTED CURRENTS SUSCEPTIBILITY TEST

14.1 Block Diagram of EUT Test Setup

For input a.c. / d.c. power port:



For signal lines and control lines:



14.2 Test Standard

ETSI EN 301 489-17, EN 55035, EN61000-4-6

14.3 Severity Levels and Performance Criterion

Severity Level 2: 3V(rms), 150KHz ～ 80MHz

Performance criterion: A

14.4 Test Procedure

1) Set up the EUT, CDN and test generator as shown on section 12.1

2) Let EUT work in test mode and measure.

3) The EUT and supporting equipments 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 at above 0.1-0.3m 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 50 mm (where possible).

4) The disturbance signal described below is injected to EUT through CDN.

5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.

6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave

7) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

8) Recording the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

14.5 Test Result

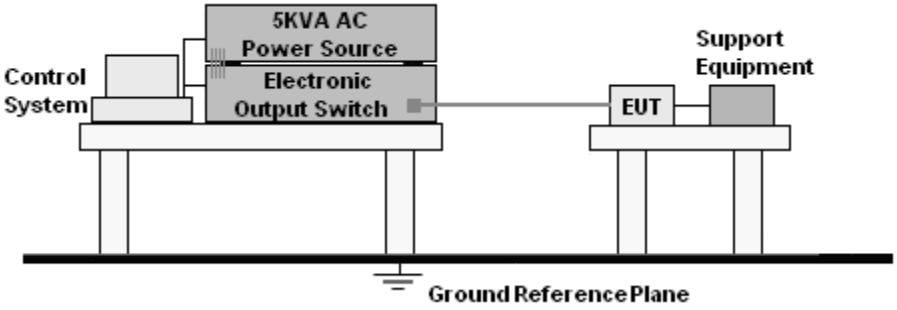
PASS

Please refer to the following page.

CS Test Data						
Temperature:	24.5℃			Humidity:	53%	
Power Supply :	AC 230V/50Hz			Test Mode:	ON Mode	
Frequency Range(MHz)	Injected Position	Strength	Modulation Signal	Freq. Step	Performance Criterion	Result
0.15 ~ 80	AC Line	3V(rms), Unmodulated	AM 80%, 1kHz sine wave	1%	A	Pass
0.15 ~ 80	DC Line, Signal Line	3V(rms), Unmodulated	AM 80%, 1kHz sine wave	1%	/	/
Note: N/A						

15. VOLTAGE DIPS AND INTERRUPTIONS TEST

15.1 Block Diagram of EUT Test Setup



15.2 Test Standard

ETSI EN 301 489-17, EN 55035, EN61000-4-11

15.3 Severity Levels and Performance Criterion

Input and Output AC Power Ports.

☑ Voltage Dips.

☑ Voltage Interruptions.

Environmental Phenomena	Test Specification	Units	Performance Criterion
Voltage Dips	100 0.5	% Reduction period	B
	100 1	% Reduction period	B
	30 25	% Reduction period	C
Voltage Interruptions	100 250	% Reduction period	C

15.4 Test Procedure

1) Set up the EUT and test generator as shown on section 14.1
2) The interruption is introduced at selected phase angles with specified duration. There is a 3mins minimum interval between each test event.
3) After each test a full functional check is performed before the next test.
4) Repeat procedures 2 & 3 for voltage dips, only the level and duration is

changed.

5) Record any degradation of performance.

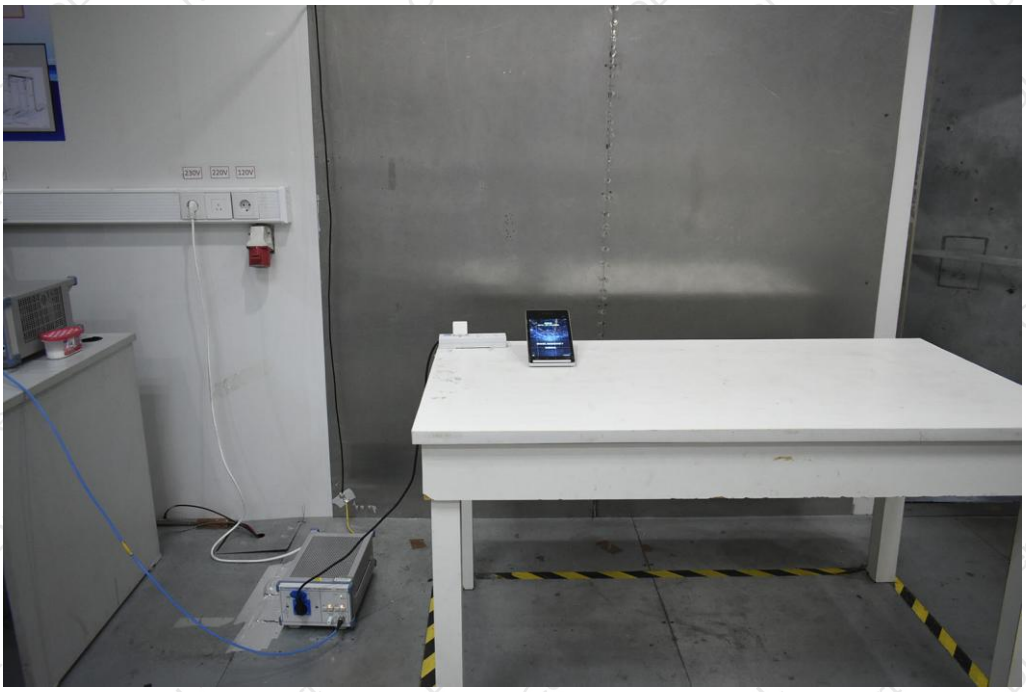
15.5 Test Result

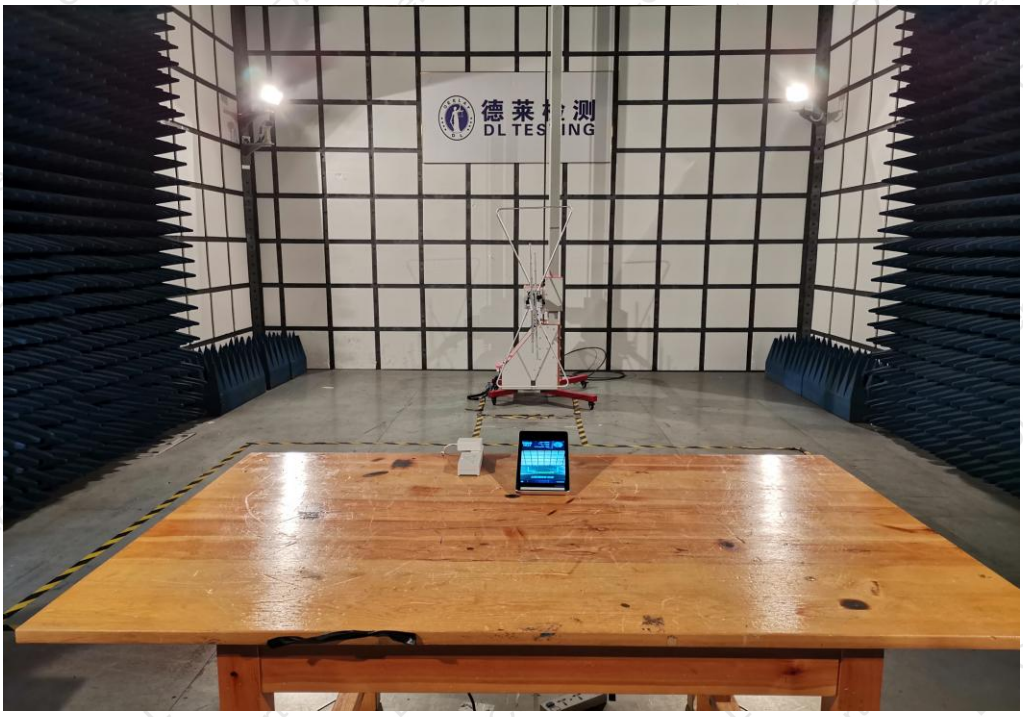
PASS

Please refer to the following page.

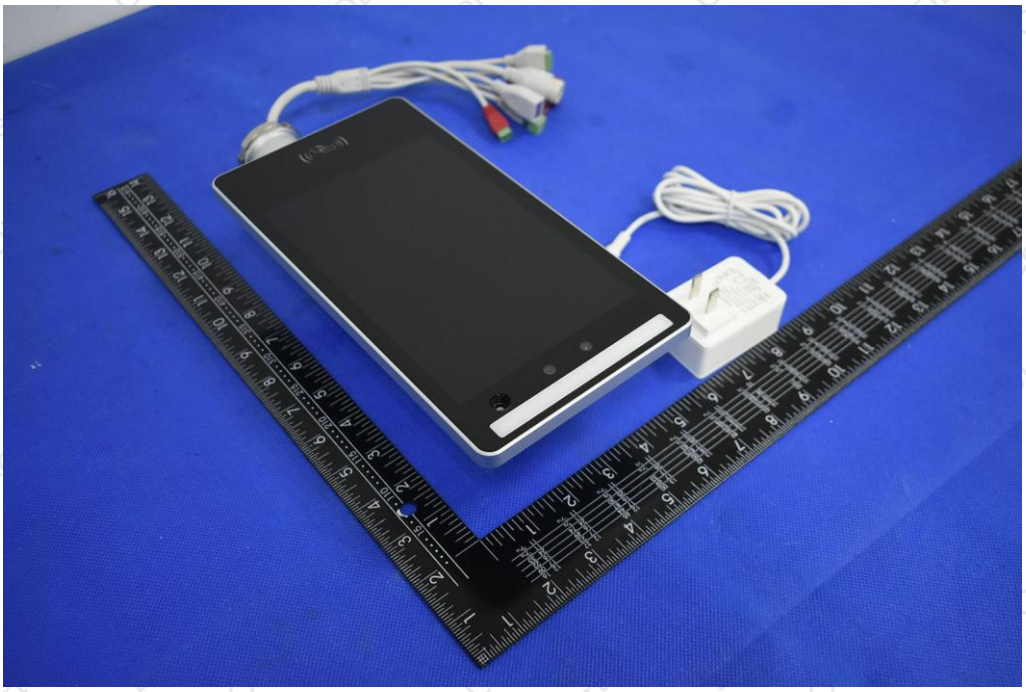
DIPS Test Data				
Temperature:	24.5℃	Humidity:	53%	
Power Supply :	AC 230V/50Hz	Test Mode:	ON Mode	
Environmental Phenomena	Test Specification	Units	Performance Criterion	Result
Voltage Dips	100 0.5	% Reduction period	B	Pass
	100 1	% Reduction period	B	Pass
	30 25	% Reduction period	C	Pass
Voltage Interruptions	100 250	% Reduction period	C	Pass

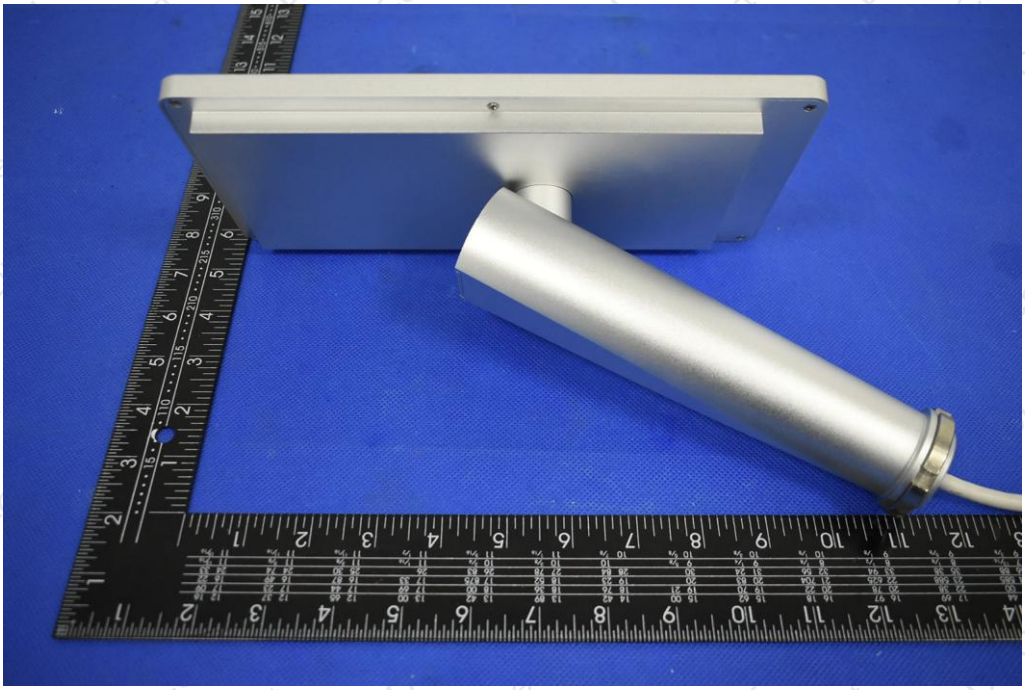
16. SETUP PHOTOGRAPHS

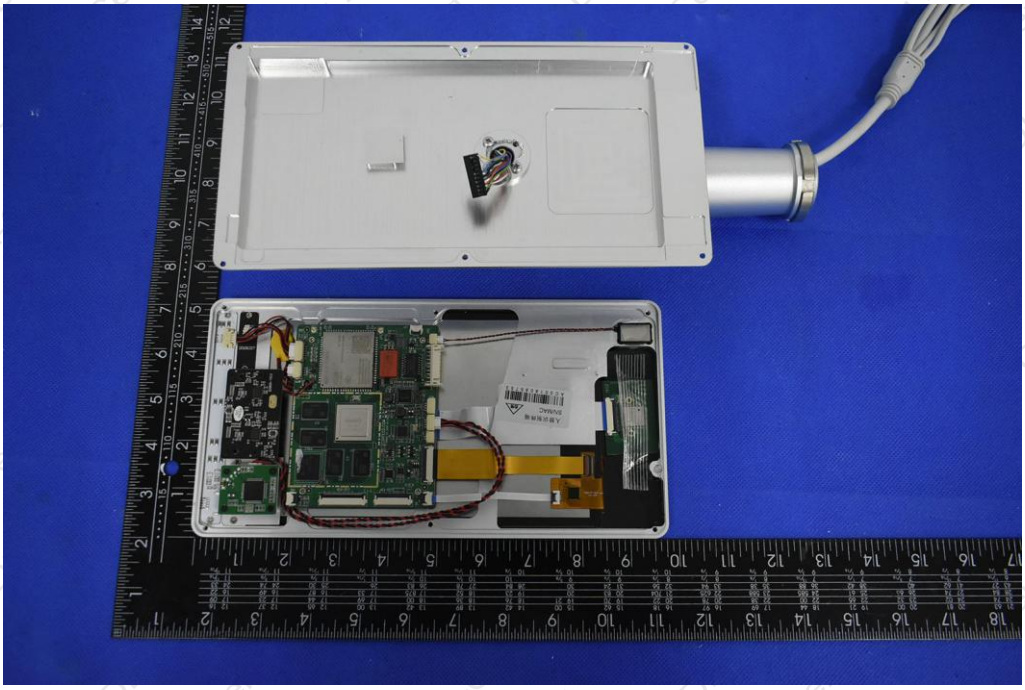


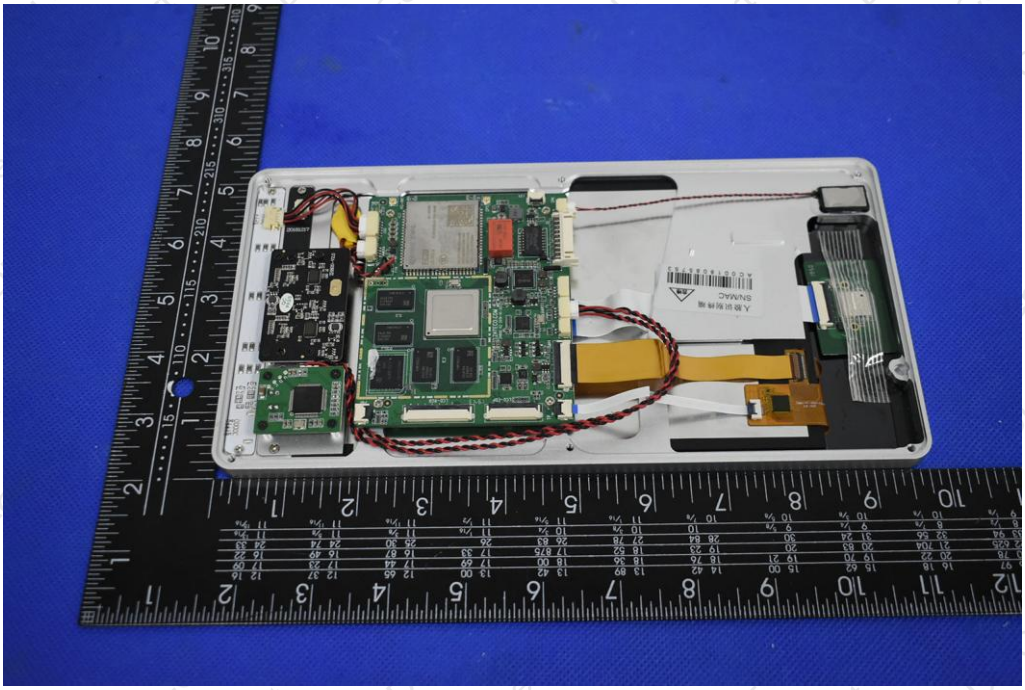


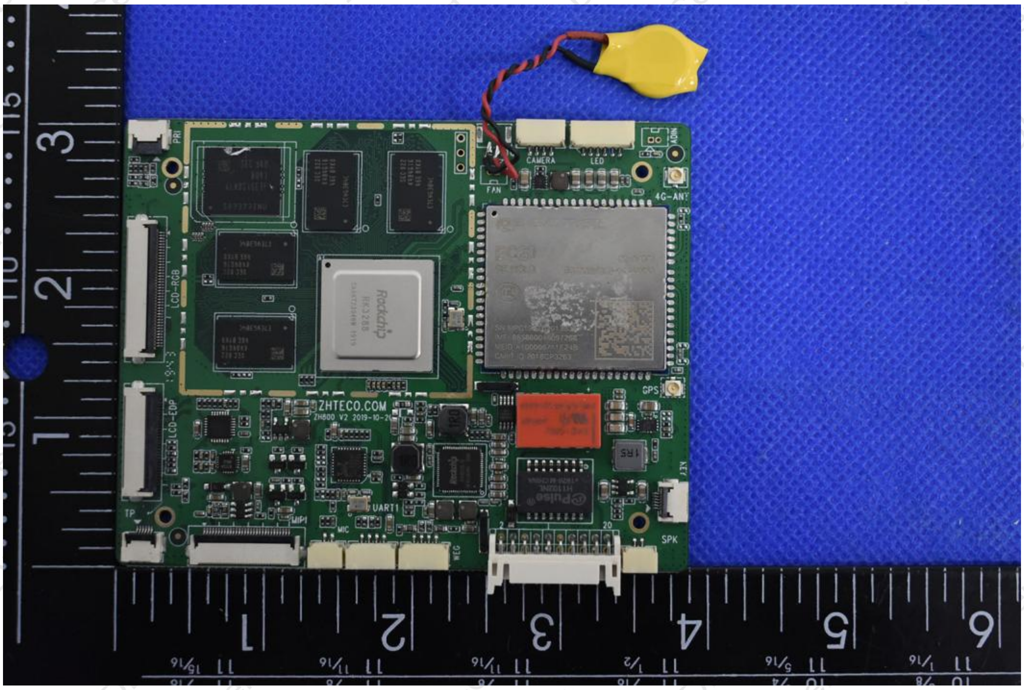
17. EUT PHOTOGRAPHS

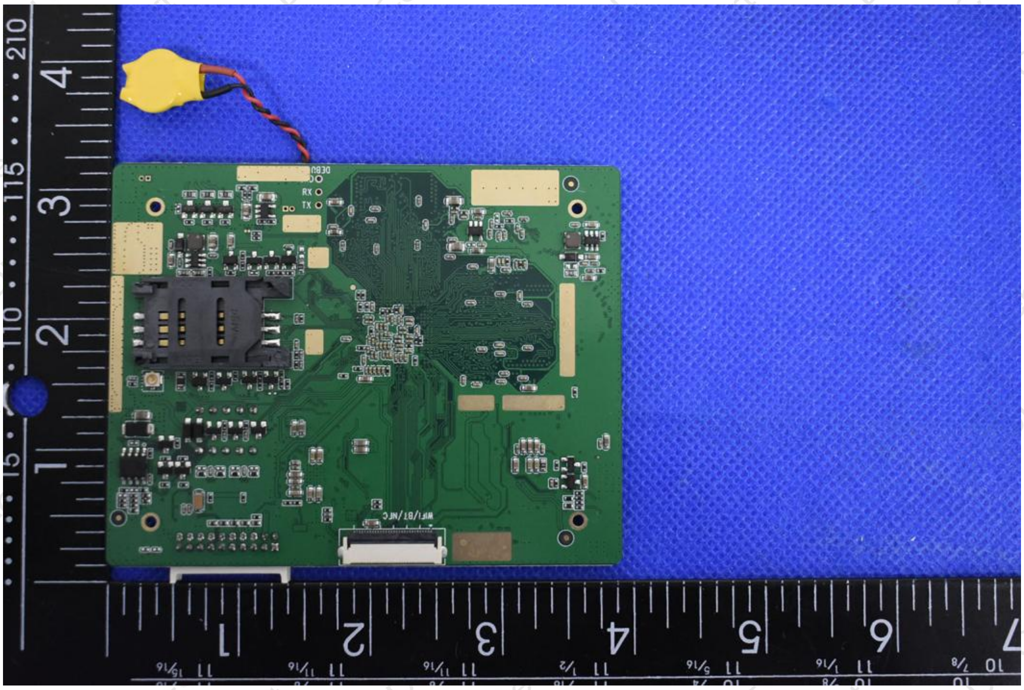


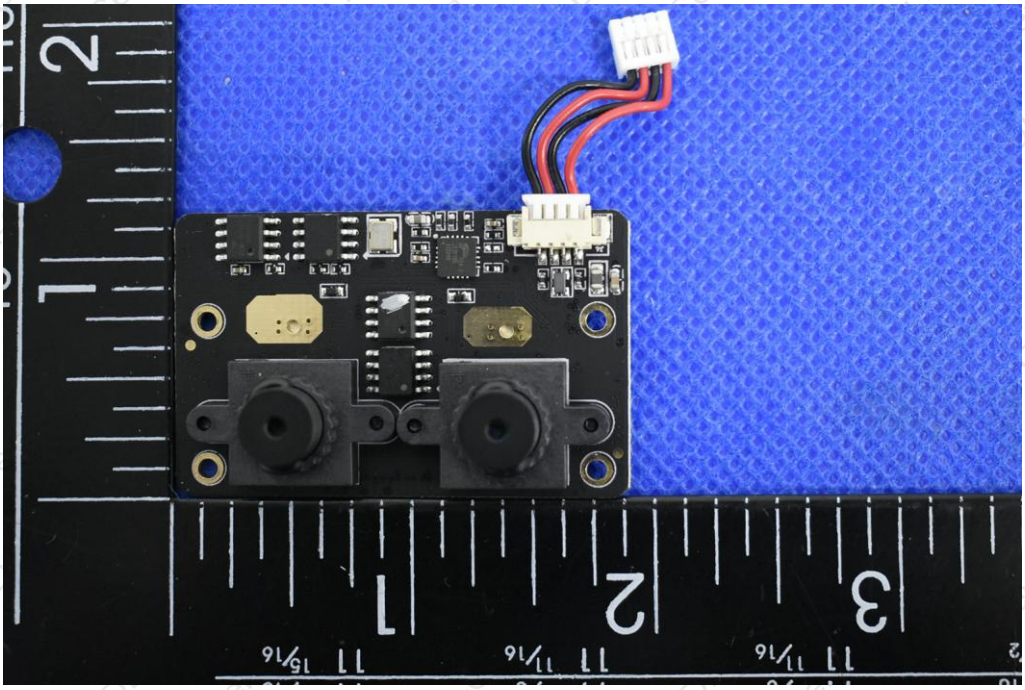


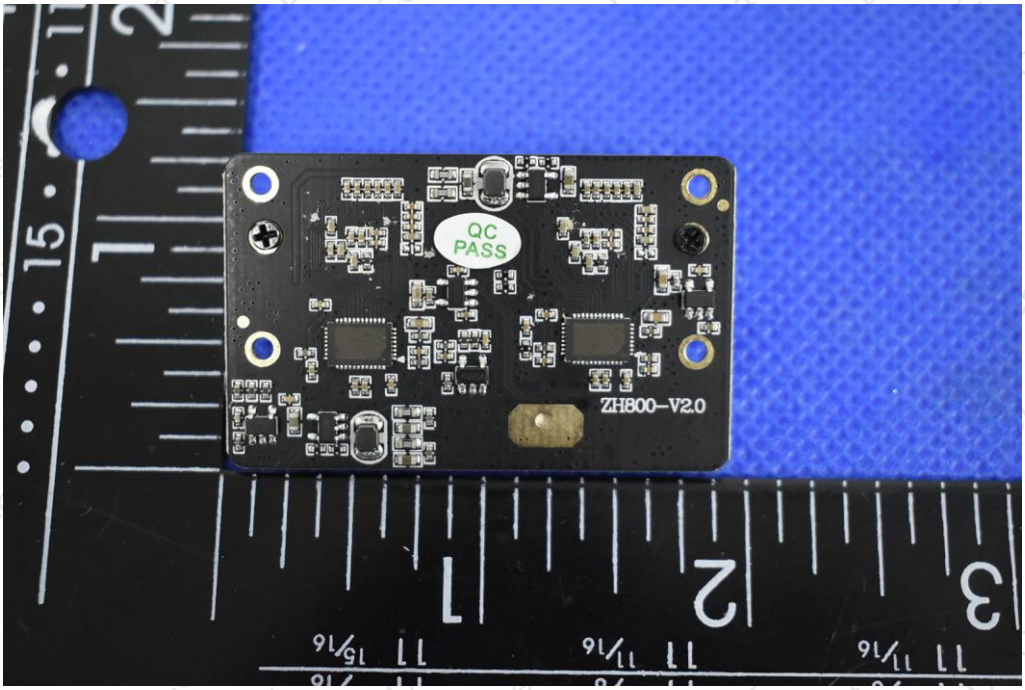








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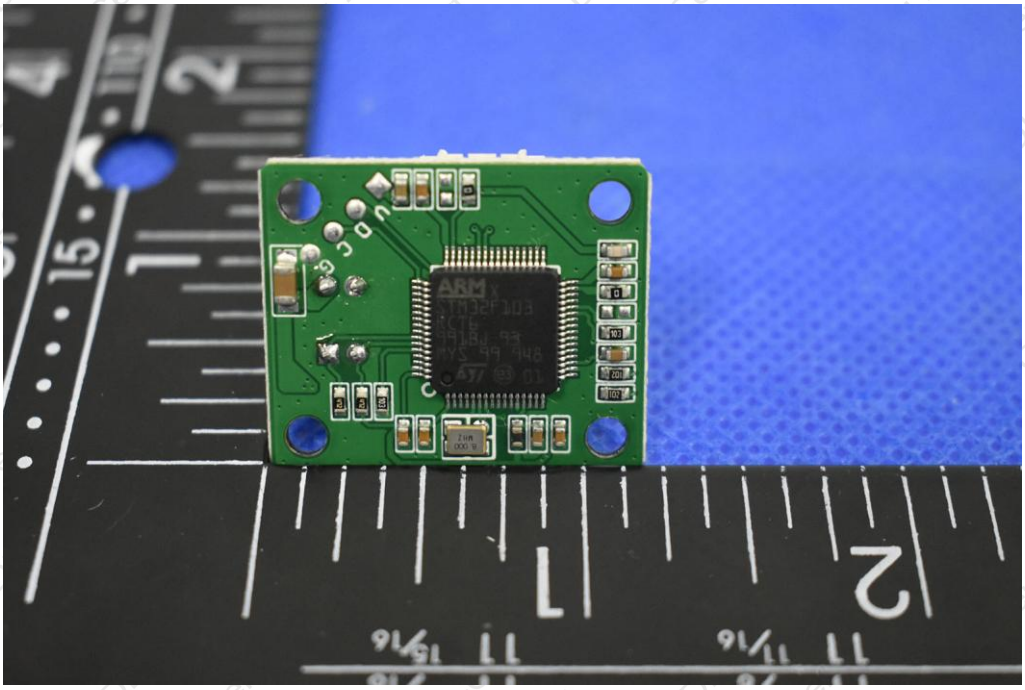

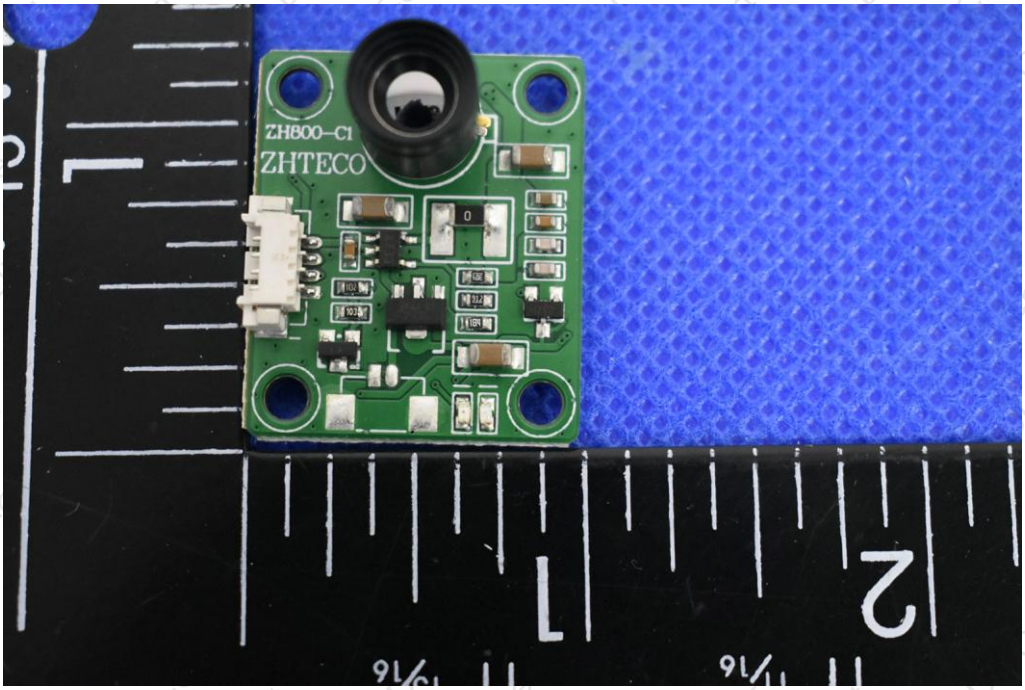
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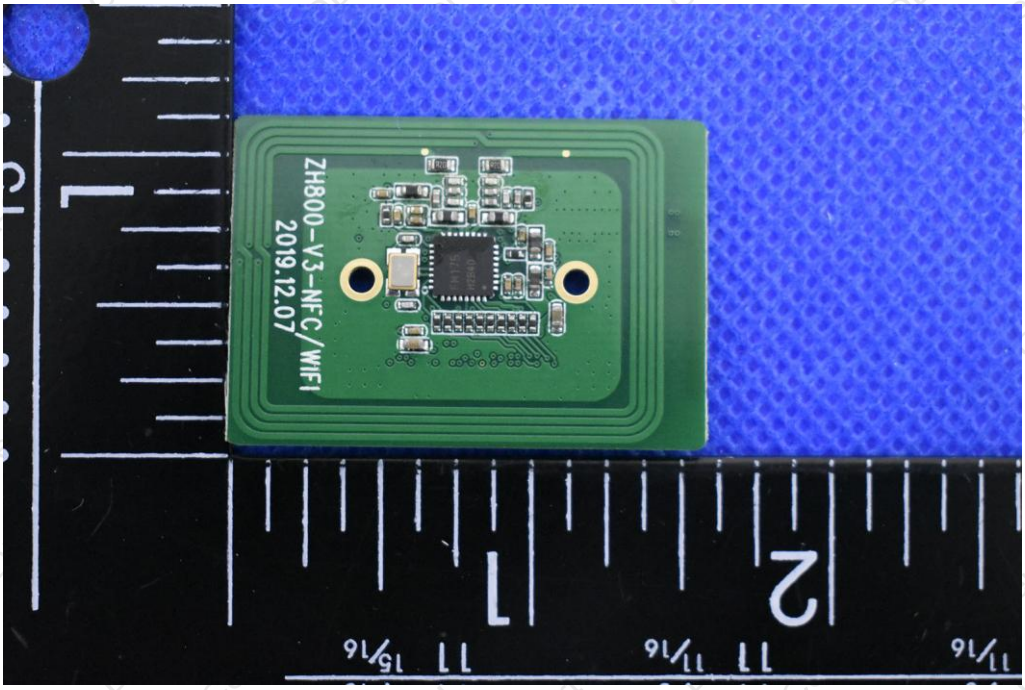
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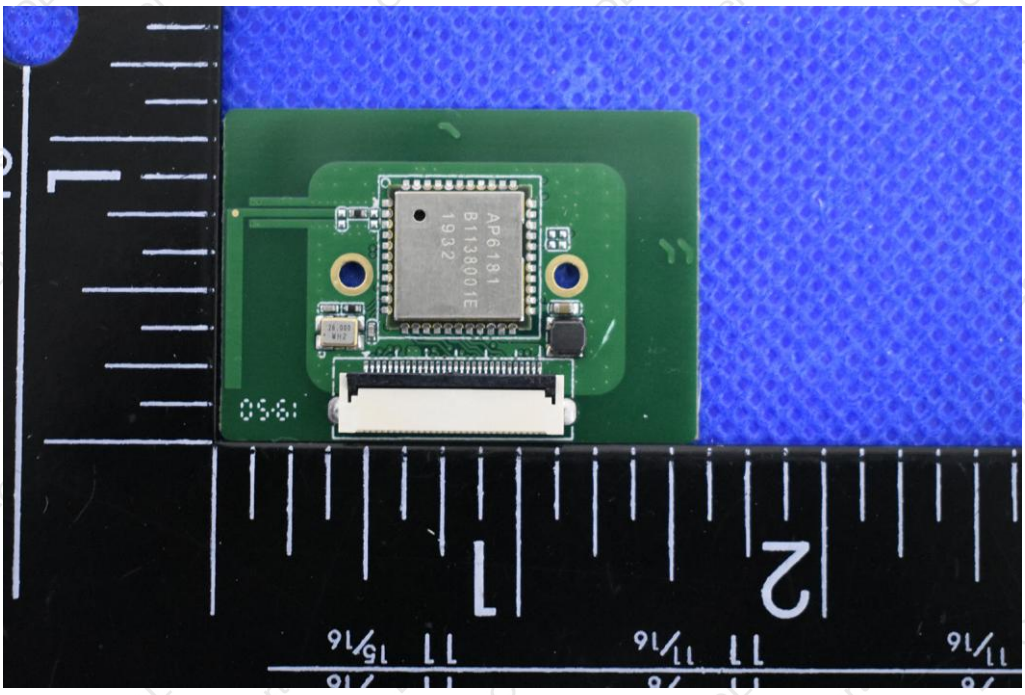
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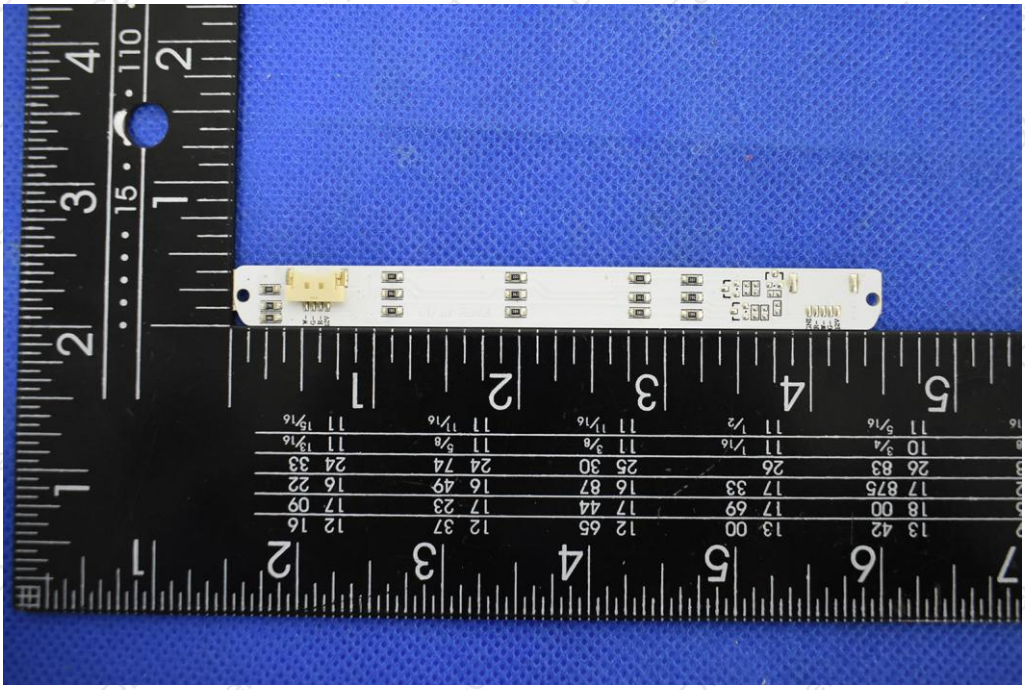

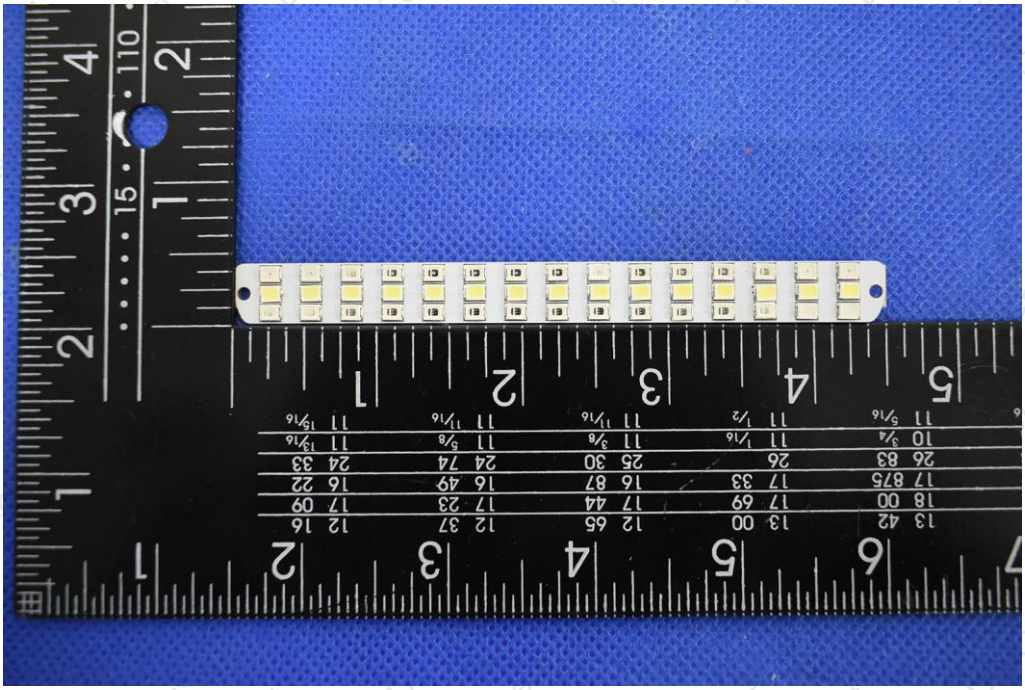

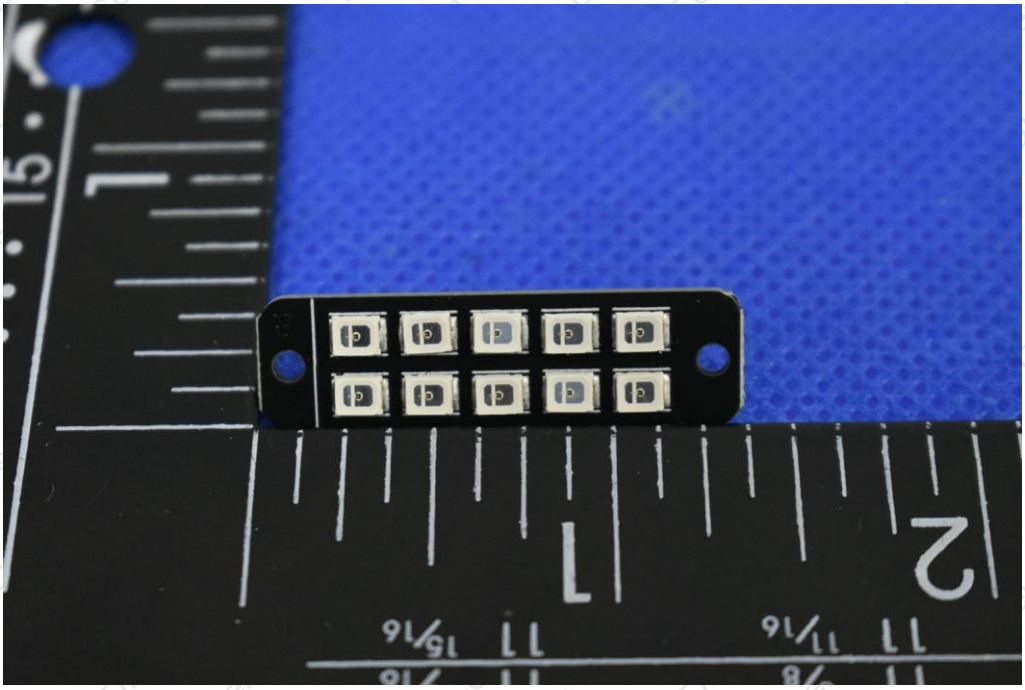

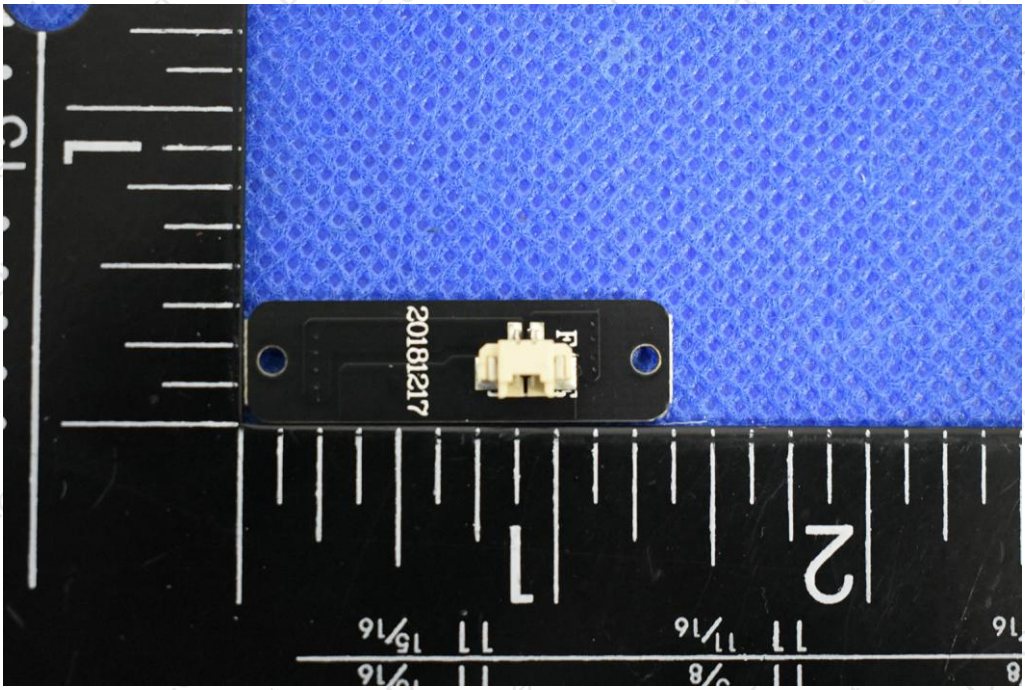
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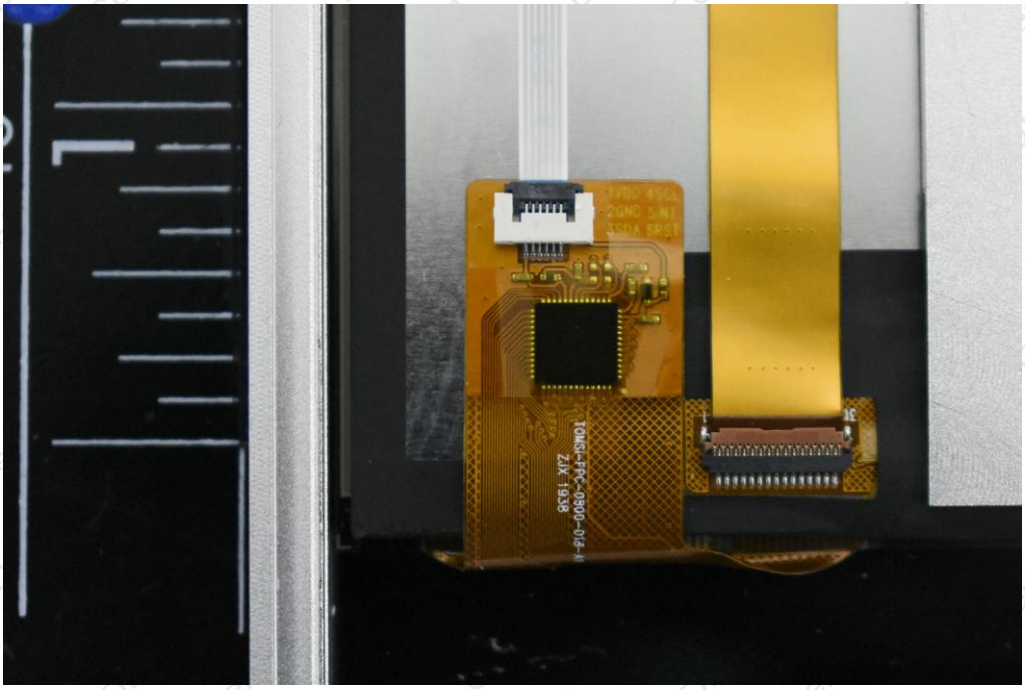

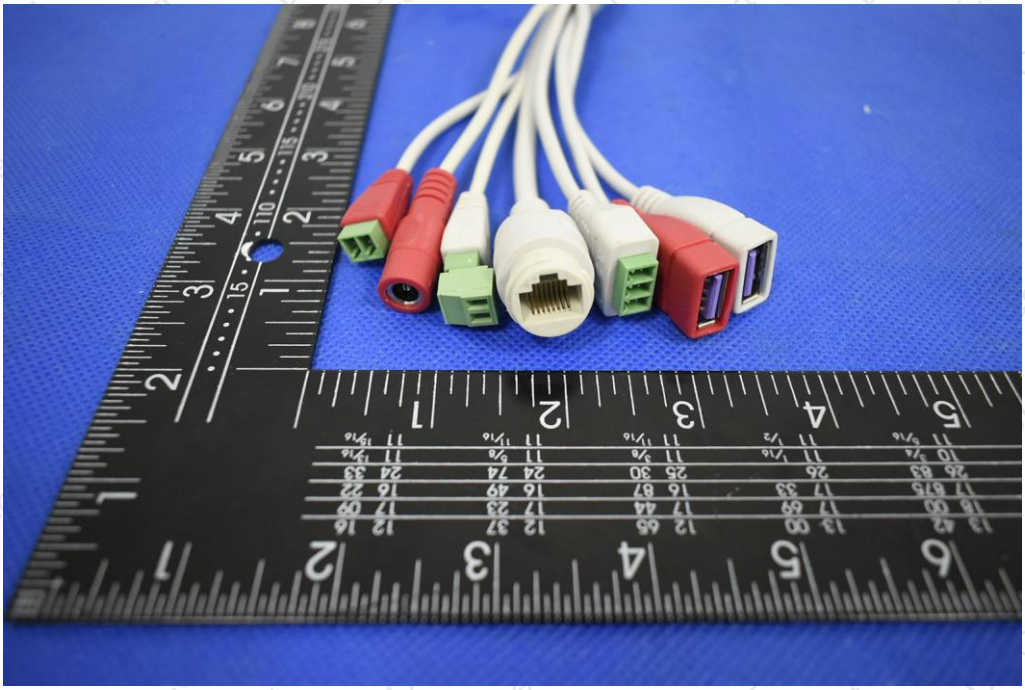

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