APPLICATION FOR EMC DIRECTIVE

On Behalf of

Shenzhen Wins Novelty Co.,Ltd.

Head Up Display

Trade Name: N/A

Model: C1

Prepared For : **Shenzhen Wins Novelty Co.,Ltd.**
2F, Building 30, Chen Tian industrial park, bao min second road, xi xiang, Bao an district, Shen zhen, China

Prepared By : **TMC Testing Services (Shenzhen) Co., Ltd**

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Date of Test:	August 05-07, 2019
Date of Report:	August 09, 2019
Report Number:	TMC190802119-E

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TEST REPORT DECLARATION

Applicant	:	Shenzhen Wins Novelty Co.,Ltd.
Address	:	2F, Building 30, Chen Tian industrial park, bao min second road, xi xiang, Bao an district, Shen zhen, China
EUT Description	:	Head Up Display
Model Number	:	C1

Test Standards:

EN 55032:2015
EN 55035:2017

The EUT described above is tested by TMC Testing Services (Shenzhen) Co., Ltd EMC Laboratory to determine the maximum emissions from the EUT and ensure the EUT to be compliance with the immunity requirements of the EUT. TMC Testing Services (Shenzhen) Co., Ltd EMC Laboratory is assumed full responsibility for the accuracy of the test results. Also, this report shows that the EUT technically complies with the 2014/30/EU directive and its amendment requirements.
The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Prepared by : Nina Wu

Nina Wu/Assistant

Reviewer : Vivian Jiang

Vivian Jiang/Supervisor

Approved & Authorized Signer : Lemon Rao

Lemon Rao/ Manager

1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	Test Results
Radiated Emission	PASS
Electrostatic Discharge Immunity	PASS
Radiated Electromagnetic Fields Immunity	PASS
Magnetic Field Immunity	PASS

2. GENERAL INFORMATION

2.1. Report information

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

2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, TMC therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through TMC, unless the applicant has authorized TMC in writing to do so.

2.2. Measurement Uncertainty

Available upon request.

3. PRODUCT DESCRIPTION

3.1. EUT Description

Description	:	Head Up Display
Applicant	:	Shenzhen Wins Novelty Co.,Ltd. 2F, Building 30, Chen Tian industrial park, bao min second road, xi xiang, Bao an district, Shen zhen, China
Manufacturer	:	Shenzhen Wins Novelty Co.,Ltd. 2F, Building 30, Chen Tian industrial park, bao min second road, xi xiang, Bao an district, Shen zhen, China
Model Number	:	C1

3.2. Block Diagram of EUT Configuration

3.3. Operating Condition of EUT

Test mode : operating

3.4. Support Equipment List

N/A

3.5. Test Conditions

Temperature: 23-26℃
Relative Humidity: 55-68 %

3.6. Modifications

No modification was made.

3.7. Abbreviations

AC	Alternating Current
AMN	Artificial Mains Network
DC	Direct Current
EM	ElectroMagnetic
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
IF	Intermediate Frequency
RF	Radio Frequency
rms	root mean square
EMI	Electromagnetic Interference
EMS	Electromagnetic Susceptibility

3.8. Performance Criterion

Criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance of loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended.

Criterion B: 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.

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

4. TEST EQUIPMENT USED

4.1. For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	ANRITSU	MS2661C	6200140915	May 20, 2019	1 Year
2.	Test Receiver	Rohde&Schwarz	ESC830	828982/018	May 20, 2019	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	142	May 20, 2019	1 Year
4.	50 Coaxial Switch	Anritsu Corp	MP59B	6100237248	May 20, 2019	1 Year
5.	Cable	Schwarzbeck	AK9513	ACRX1	May 20, 2019	1 Year
6.	Cable	Rosenberger	N/A	FR2RX2	May 20, 2019	1 Year
7.	Cable	Schwarzbeck	AK9513	CRRX2	May 20, 2019	1 Year
8.	Cable	Schwarzbeck	AK9513	CRRX2	May 20, 2019	1 Year
9.	Signal Generator	HP	864A	3625U00573	May 20, 2019	1 Year

4.2. For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	HAEFELY	PSD 1600	H911’292	May 20, 2019	1 Year

4.3. For RF Strength Susceptibility Test

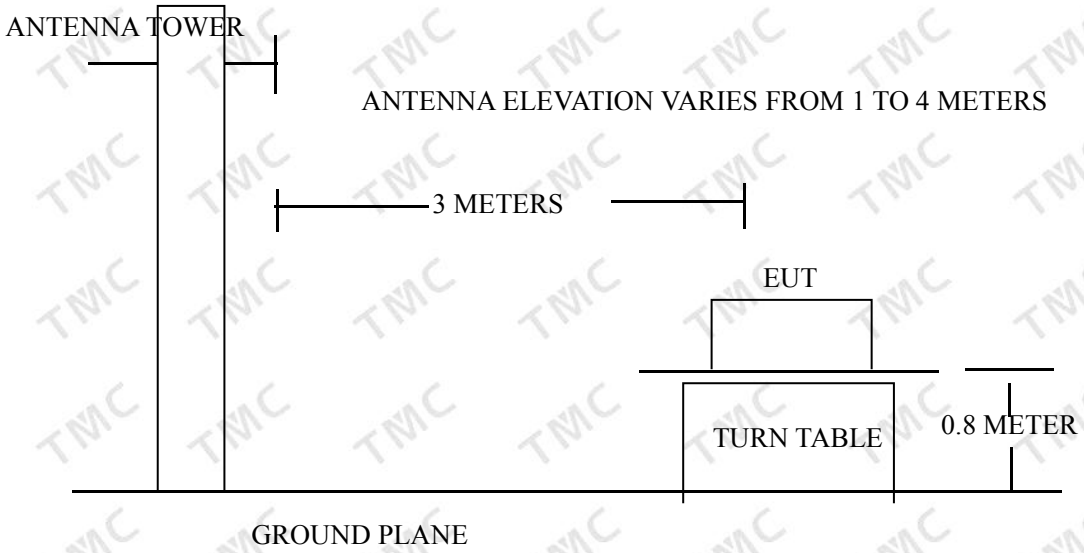
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	HP	8648A	3633A02081	May 20, 2019	1 Year
2.	Amplifier	A&R	500A100	17034	NCR	NCR
3.	Amplifier	A&R	100W/1000M1	17028	NCR	NCR
4.	Isotropic Field Monitor	A&R	FM2000	16829	NCR	NCR
5.	Isotropic Field Probe	A&R	FLW220100	16755	May 20, 2019	1 Year
6.	Biconic Antenna	EMCO	EVOD PROTANK8	9507-2534	NCR	NCR
7.	Log-periodic Antenna	A&R	AT1080	16812	NCR	NCR
8.	PC	N/A	486DX2	N/A	N/A	N/A
	Injection Clamp	EMTEST	F-2031-23MM	368	May 20, 2019	1 Year
1.	Attenuator	EMTEST	ATT6	0010222a	May 20, 2019	1 Year

4.4. For Magnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Magnetic Field Tester	HEAFELY	MAG100.1	083858-10	May 20, 2019	1 Year

5. RADIATED EMISSION TEST

5.1. Open Site Setup Diagram



5.2. Test Standard

EN 55032:2015

5.3. Radiated Emission Limit

All emanations from a Class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note:(1) The tighter limit shall apply at the edge between two frequency bands.
(2) Distance refers to the distance in meters between the measuring instruments antenna and the closed point of any part of the EUT.

FREQUENCY (GHz)	DISTANCE (Meters)	Average limit (dBμV/m)	Peak limit (dBμV/m)
1 ~ 3	3	50	70
3 ~ 6	3	54	74

Note :The lower limit applies at the transition frequency.

5.4. EUT Configuration on Test

The EN55032 Class B regulations test method must be used to find the maximum emission during radiated emission test.

5.5. Operating Condition of EUT

5.5.1. Setup the EUT as shown on Section 5.1.

5.5.2. Turn on the power of all equipments.

5.5.3. Let the EUT work in test mode and measure it.

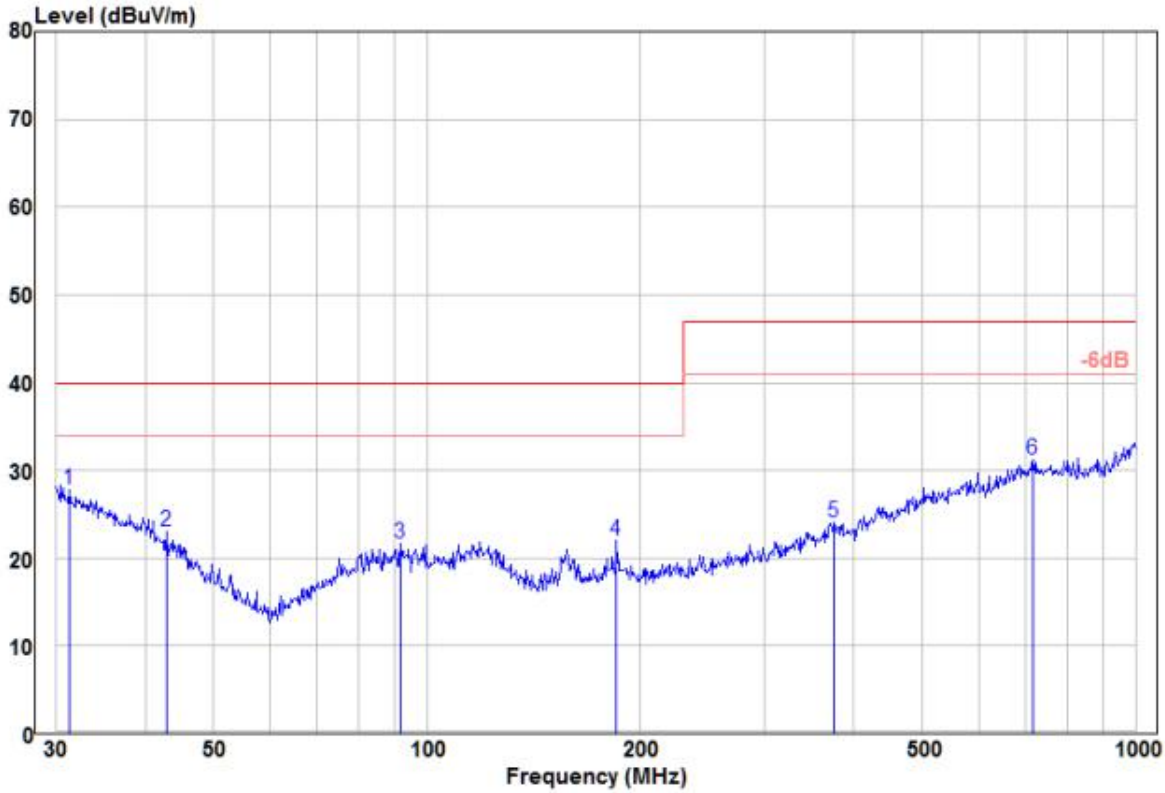
5.6. Test Procedure

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna (calibrated by dipole antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.
The bandwidth setting on the test receiver (R&S TEST RECEIVER ESCS20) is 120 KHz.
The EUT is tested in Anechoic Chamber

5.7. Test Results

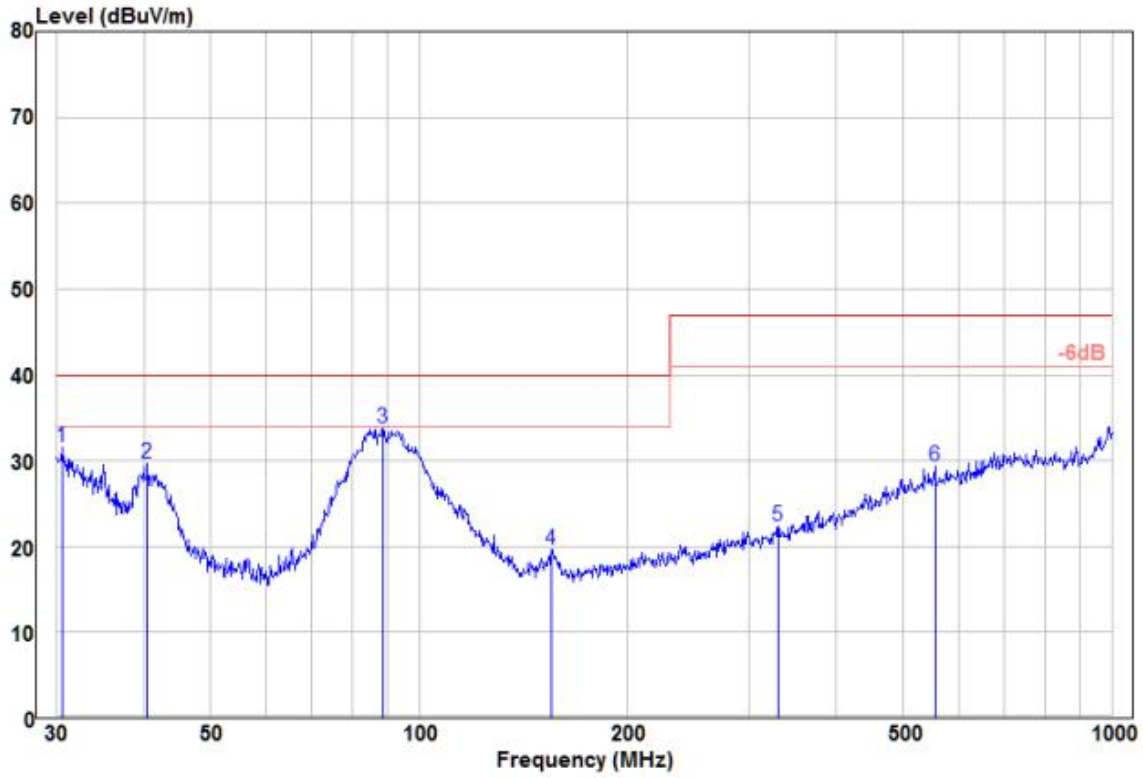
PASS.

Test Mode: operating



Condition: EN55032 CLASS B HORIZONTAL

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase	APos	TPos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB			cm	deg
1 pp	31.29	9.86	17.95	27.81	40.00	-12.19	Peak	HORIZONTAL	---	---
2	42.90	9.95	13.15	23.10	40.00	-16.90	Peak	HORIZONTAL	---	---
3	91.82	11.51	10.13	21.64	40.00	-18.36	Peak	HORIZONTAL	---	---
4	185.14	13.80	8.14	21.94	40.00	-18.06	Peak	HORIZONTAL	---	---
5	374.62	10.60	13.54	24.14	47.00	-22.86	Peak	HORIZONTAL	---	---
6	716.68	11.03	20.20	31.23	47.00	-15.77	Peak	HORIZONTAL	---	---

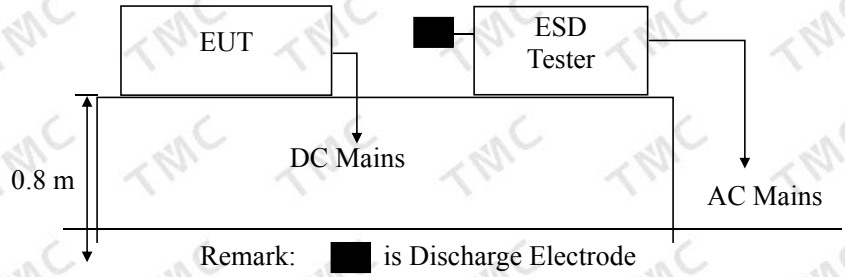


Condition: EN55032 CLASS B VERTICAL

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase	APos	TPos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB			cm	deg
1	30.53	13.40	18.22	31.62	40.00	-8.38	Peak	VERTICAL	---	---
2	40.56	15.14	14.48	29.62	40.00	-10.38	Peak	VERTICAL	---	---
3 pp	88.65	23.75	9.98	33.73	40.00	-6.27	Peak	VERTICAL	---	---
4	155.36	11.45	8.10	19.55	40.00	-20.45	Peak	VERTICAL	---	---
5	330.19	9.90	12.46	22.36	47.00	-24.64	Peak	VERTICAL	---	---
6	554.83	11.58	17.84	29.42	47.00	-17.58	Peak	VERTICAL	---	---

6. ELECTROSTATIC DISCHARGE TEST

6.1. Block Diagram of ESD Test Setup



6.2. Test Standard

EN 55035:2017
Severity Level 3 for Air Discharge at 8KV
Severity Level 2 for Contact Discharge at 4KV

6.3. Severity Levels and Performance Criterion

6.3.1. Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

6.3.2. Performance criterion: B

6.4. EUT Configuration on Test

The configuration of EUT are listed in Section 3.2.

6.5. Operating Condition of EUT

6.5.1. Setup the EUT as shown in Section 9.1.

6.5.2. Turn on the power of all equipments.

6.5.3. Let the EUT work in test mode (full load) and test it.

6.6. Test Procedure

6.6.1. Air Discharge:

This test is done on a non-conductive surfaces. The round discharge tip of the discharge

electrode shall be approached as fast as possible to touch the EUT.
After each discharge, the discharge electrode shall be removed from the EUT.
The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

6.6.2. Contact Discharge:

All the procedure shall be same as Section 9.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

6.6.3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

6.6.4. Indirect discharge for vertical coupling plane

At least 20 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

6.7. Test Results

PASS.

Please refer to the following page.

Electrostatic Discharge Test Results

TMC Testing Services (Shenzhen) Co., Ltd

Date: August 09, 2019

Applicant :	Shenzhen Wins Novelty Co.,Ltd.	Test Date :	August 05, 2019
EUT :	Head Up Display	Temperature :	22℃
M/N :	C1	Humidity :	50%
Power Supply :	DC12V	Test Mode :	Operating
Test Engineer :	Jason		

Air Discharge: ±8KV For each point positive 10 times and negative 10 times discharge.

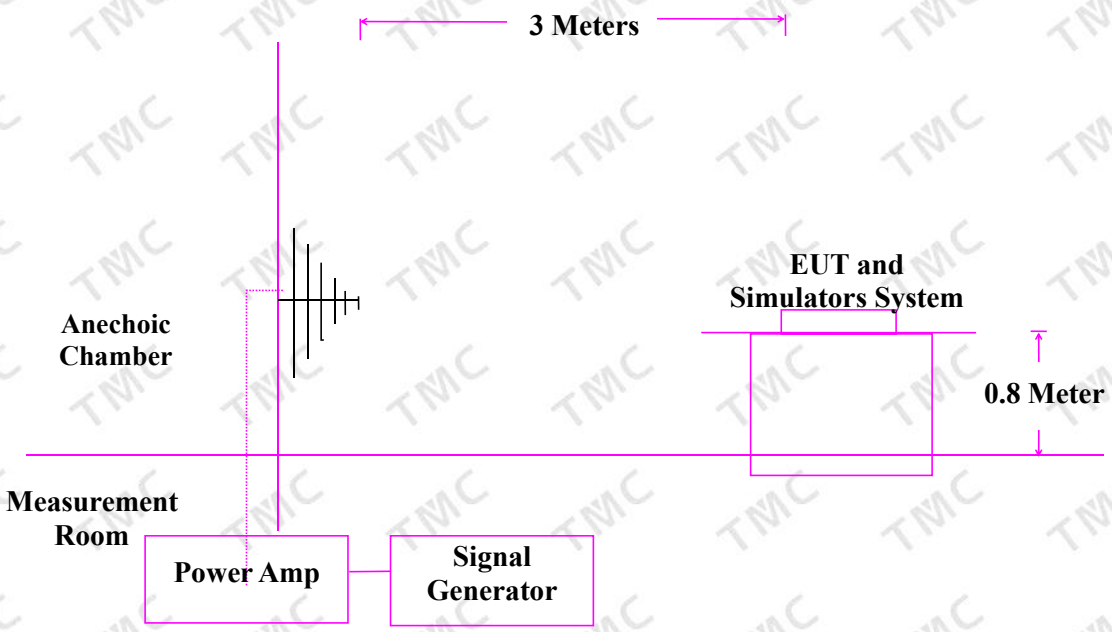
Contact Discharge: ±4KV

Location		Kind (A-Air Discharge C-Contact Discharge)	Result (PASS)
surface Slots	15 points	Air Discharge	A
interface Slots	6 points	Air Discharge	A
surface	10 points	Air Discharge	A
HCP	8 points	Contact Discharge	A
VCP	8 points	Contact Discharge	A

Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

7. RF FIELD STRENGTH SUSCEPTIBILITY TEST

7.1. R/S Test Setup



7.2. Test Standard

EN 55035:2017
Severity Level 2 at 3V / m

7.3. Severity Levels and Performance Criterion

7.3.1. Severity level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

7.3.2. Performance criterion : A

7.4. EUT Configuration on Test

The configuration of EUT are listed in Section 3.2

7.5. Operating Condition of EUT

Setup the EUT as shown in Section 10.1.. The operating condition of EUT are listed in section 3.3.

7.6. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters 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.
In order to judge the EUT performance, a CCD camera is used to monitor the EUT.
All the scanning conditions are as follows **:**

Condition of Test	Remarks
1.Fielded Strength	3 V/m (Severity Level 2)
2.Radiated Signal	Modulated
3.Scanning Frequency	80 - 1000 MHz
4.Sweeping time of radiated	0.0015 decade/s
5.Dwell Time	1 Sec.

7.7. Test Results

PASS.

Please refer to the following page.

RF Field Strength Susceptibility Test Results

TMC Testing Services (Shenzhen) Co., Ltd

Date: August 09, 2019

Applicant :	Shenzhen Wins Novelty Co.,Ltd.	Test Date :	August 05, 2019
EUT :	Head Up Display	Temperature :	22 ℃
M/N :	C1	Humidity :	50 %
Power Supply :	DC12V	Test Mode :	Operating
Test Engineer :	Jason	Frequency Range :	80 MHz to 1000 MHz
Modulation:	☑ AM ☐ Pulse ☐ none 1 KHz 80%		
Criterion : A			

	Frequency Rang : 80-1000	
Steps	1%	1%
	Horizontal	Vertical
Front	A(pass)	A(pass)
Right	A(pass)	A(pass)
Rear	A(pass)	A(pass)
Left	A(pass)	A(pass)

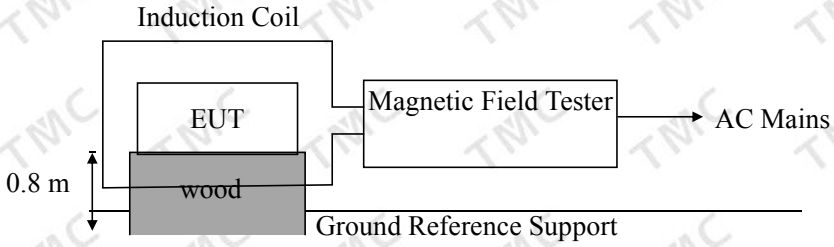
8. MAGNETIC FIELD IMMUNITY TEST

8.1. Block Diagram of Test Setup

8.1.1. Block Diagram of the EUT

(EUT: Head Up Display)

8.1.2. Block Diagram of Test Setup



8.2. Test Standard

EN 55035:2017
Severity Level 2 at 3V / m

8.3. Severity Levels and Performance Criterion

8.3.1. Severity level

Level	Magnetic Field Strength A/m
1.	1
9.	3
10.	10
11.	30
12.	100
X.	Special

8.3.2 Performance criterion : A

8.4 EUT Configuration on Test

The configuration of EUT are listed in Section 3.2.

8.5 Operating Condition of EUT

8.5.1 Setup the EUT as shown in Section 14.1

8.5.2 Turn on the power of all equipments.

8.5.3 Let the EUT work in test mode (ON) and test it.

8.6. Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 14.1. The induction coil shall then be rotated by 90°in order to expose the EUT to the test field with different orientations.

8.7. Test Results

PASS.

Please refer to the following page.

Magnetic Field Immunity Test Results

TMC Testing Services (Shenzhen) Co., Ltd

Applicant: Shenzhen Wins Novelty Co.,Ltd. EUT : Head Up Display M/N : C1 Power Supply : DC12V	Test Date :August 05, 2019 Temperature :26 ℃ Humidity : 60 % Test Engineer :Davis

Test Model: ON

Test Level	Testing Duration	Coil Orientation	Criterion	Result
3A/M	5 mins	Horizontal	A	PASS
3A/M	5 mins	Vertical	A	PASS

Remark:	Test Equipment : Magnetic Field Tester MAG100

APPENDIX I

(TEST SETUP PHOTOGRAPHS)

RADIATED EMISSION MEASUREMENT

APPENDIX Ⅱ

(Photos of the EUT)

Photo 1 General Appearance of the EUT

Photo 2 General Appearance of the EUT

Photo 3 General Appearance of the EUT

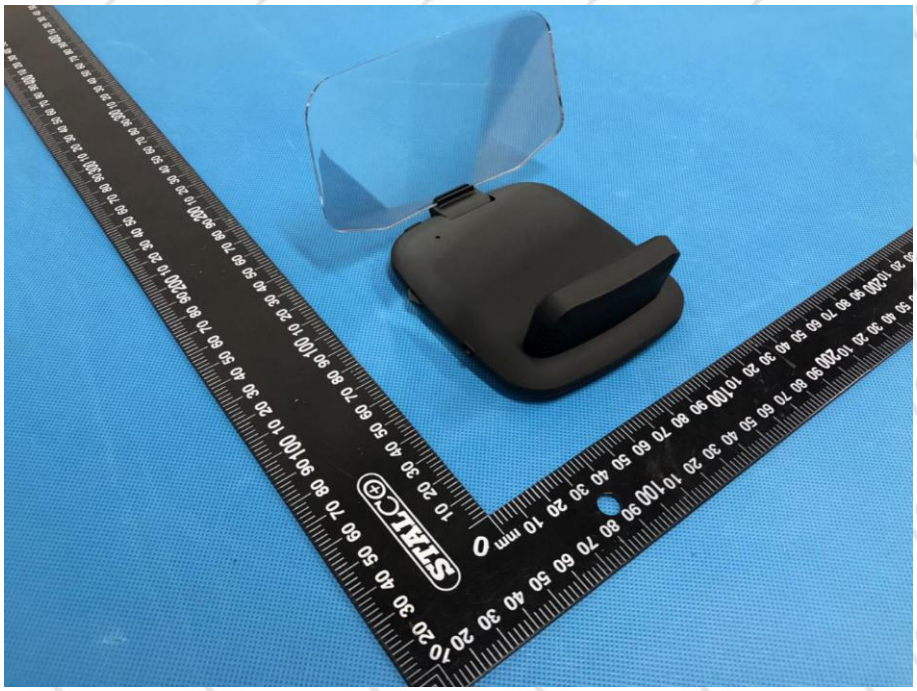


Photo 4 General Appearance of the EUT

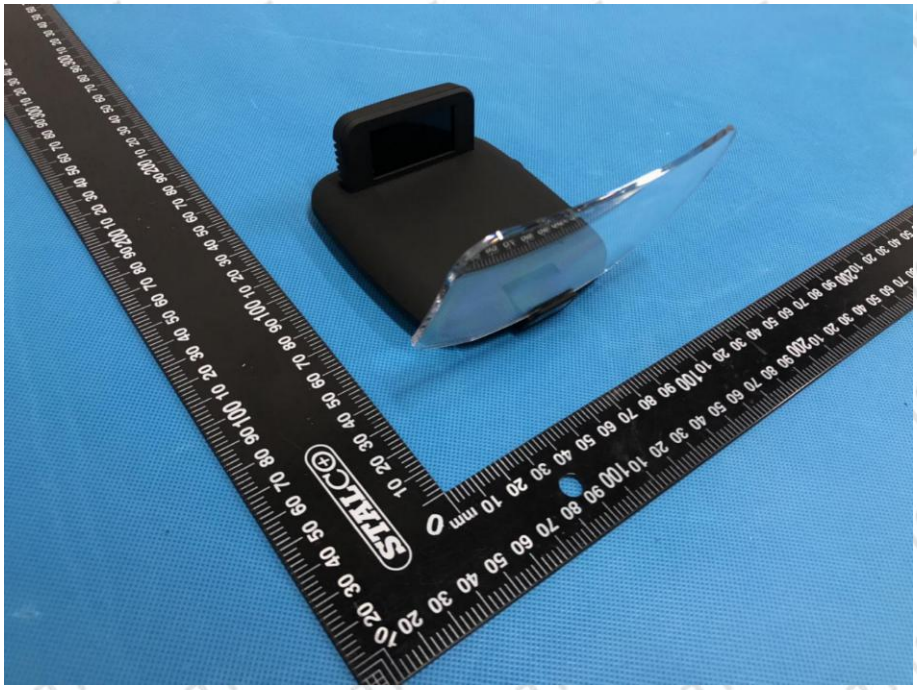


Photo 5 General Appearance of the EUT

******END OF REPORT******