

# CE/EMC TEST REPORT

For

CHIPSEE CO., LIMITED.

Embedded Industrial Computer

Prepared for : CHIPSEE CO., LIMITED.

Address : Room 1#910, Zhujiang Mall International Mansion 5#,  
Beiqing Road No.1, Changping District, Beijing, China, 102206

Prepared by : EST Technology Co., Ltd.

Address : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,  
Guangdong, China

Tel: 86-769-83081888

Fax: 86-769-83081878

Report No. : ESTE-E1704069




Date of Report : Apr. 24, 2017



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# EST Technology Co., Ltd.

<b>Applicant:</b>	CHIPSEE CO., LIMITED.		
<b>Address:</b>	Room 1#910, Zhujiang Mall International Mansion 5#, Beiqing Road No.1, Changping District, Beijing, China, 102206		
<b>Manufacturer:</b>	CHIPSEE CO., LIMITED.		
<b>Address:</b>	Room 1#910, Zhujiang Mall International Mansion 5#, Beiqing Road No.1, Changping District, Beijing, China, 102206		
<b>Factory:</b>	CHIPSEE CO., LIMITED.		
<b>Address:</b>	Room 1#910, Zhujiang Mall International Mansion 5#, Beiqing Road No.1, Changping District, Beijing, China, 102206		
<b>E.U.T:</b>	Embedded Industrial Computer		
<b>Model Number:</b>	CS80480T050P, CS80480T050E		
<b>Trade Name:</b>	Chipsee	<b>Serial No:</b>	-----
<b>Date of Receipt:</b>	Mar. 24, 2017	<b>Date of Test:</b>	Mar. 24, - Apr. 24, 2017
<b>Test Specification:</b>	EN 55032:2015 EN 55024:2010+A1:2015		
<b>Test Result:</b>	The equipment under test was found to be compliance with the requirements of the standards applied.		
<b>Issue Date: Apr. 24, 2017</b>			
Prepared by:	Tested by:	Approved by:	
			
_____ Amy / Assistant	_____ Hale / Engineer	_____ Iceman Hu / Manager	
<b>Other Aspects:</b> None.			
Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under tested			
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 EST Technology Co., Ltd.			

# 1. GENERAL PRODUCT INFORMATION

## 1.1. Product Function

Refer to Technical Construction Form and User Manual.

## 1.2. Description of Device (EUT)

Description	: Embedded Industrial Computer
Model No.	: CS80480T050P
System Input Voltage	: DC 12V, 2.0A Max.
DC Line	: Unshielded, Detachable 0.4 m
Headphone Line	: Unshielded, Detachable 1.2 m

## 1.3. Difference between Model Numbers

**Note:** The products are only different the model number,  
and the “CS80480T050E” is without shell,  
the “CS80480T050P” is with shell.  
But the PCB boards inside are identical.

## 1.4. Independent Operation Modes

The basic operation modes are:

1.4.1. Network

1.4.2. USB Play

1.4.3. wifi Mode

## 2. TEST STANDARDS AND SITES

### 2.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION(EN 55032:2015)				
Description of Test Item	Standard	Limits		Results
Asymmetric mode conducted emissions	EN 55032:2015	Class B		PASS
		Minimum passing margin is 14.47dB at 0.23MHz		
Radiated disturbance	EN 55032:2015	Class B		PASS
		Minimum passing margin is 9.45dB at 87.23MHz		
Harmonic current emissions	EN 61000-3-2:2014	-----		N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013	-----		N/A
IMMUNITY (EN 55024:2010+A1:2015)				
Description of Test Item	Basic Standard	Performance Criteria	Observation Criteria	Results
Electrostatic discharge (ESD)	EN 61000-4-2:2009	B	A	PASS
Radio-frequency, Continuous radiated disturbance	EN 61000-4-3:2006+A1:2008+A2:2010	A	A	PASS
Electrical fast transient (EFT)	EN 61000-4-4:2012	B	A	PASS
Surge (Input a.c. power port)	EN 61000-4-5:2014	B	A	PASS
Radio-frequency,Continuous conducted disturbance	EN 61000-4-6:2014	A	A	PASS
Power frequency magnetic field	EN 61000-4-8:2010	A	A	PASS
Voltage dips, >95% reduction	EN 61000-4-11:2004	B	*	N/A
Voltage dips, 30% reduction		C	*	N/A
Voltage interruptions		C	*	N/A
N/A is an abbreviation for Not Applicable.				

## 2.2. Test Facilities

EMC Lab :      Certificated by CNAS, CHINA  
                            Registration No.: L5288  
                            Date of registration: December 07, 2015

                            Certificated by FCC, USA  
                            Registration No.: 989591  
                            Date of registration: November 15, 2016

                            Certificated by Industry Canada  
                            Registration No.: 9405A  
                            Date of registration: December 03, 2015

                            Certificated by VCCI, Japan  
                            Registration No.: R-3663 & C-4103  
                            Date of registration: July 25, 2014

                            Certificated by TUV Rheinland, Germany  
                            Registration No.: UA 50195514 0001  
                            Date of registration: February 07, 2015

                            Certificated by TUV/PS, Shenzhen  
                            Registration No.: SCN1017  
                            Date of registration: January 27, 2011

                            Certificated by Intertek ETL SEMKO  
                            Registration No.: 2011-RTL-L2-64  
                            Date of registration: April 28, 2011

                            Certificated by Nemko, Hong Kong  
                            Registration No.: 175193  
                            Date of registration: May 4, 2011

Name of Firm :      EST Technology Co., Ltd.

Site Location :      Chilingxiang, Qishantou, Santun, Houjie, Dongguan,  
                            Guangdong, China

## 2.3. List of Test and Measurement Instruments

### 2.3.1. For Asymmetric mode conducted emissions test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	832354	June 25,16	1 Year
ISN	Teseq	T8	39153	June 25,16	1 Year

### 2.3.2. For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	101780	Jan. 17,17	1 Year
Bilog Antenna	Teseq	CBL 6111D	27090	Oct. 24,16	1 Year

### 2.3.3. For electrostatic discharge immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	HAEFELY	ONYX16	174153	June 28,16	1 Year

### 2.3.4. Radio Frequency Electromagnetic Field Immunity (R/S) Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	HP	8648A	3426A01263	Jan. 15,17	1 Year
Amplifier	A&R	500A100	17034	Jan. 15,17	1 Year
Amplifier	A&R	100W	17028	Jan. 15,17	1 Year
Isotropic Field Monitor	A&R	FM2000	16829	Jan. 15,17	1 Year
Isotropic Field Probe	A&R	FP2000	16755	Jan. 15,17	1 Year
Biconic Antenna	EMCO	3108	9507-2534	Jan. 15,17	1 Year
Log-periodic Antenna	A&R	AT1080	16812	Jan. 15,17	1 Year

### 2.3.5. For electrical fast transient/burst immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EFT Generator	HAEFELY	ECOMPACT 4	173659	June 25,16	1 Year
Capacitive Coupling Clamp	HAEFELY	IP4A	181035	June 25,16	1 Year

### 2.3.6. For injected currents susceptibility test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
CS Test System	FRANKONIA	CIT-10	126A1163	June 25,16	1 Year
CDN	FRANKONIA	CDN-M2+M3	A2210150	June 25,16	1 Year
EM-Clamp	FRANKONIA	EMCL-20	132A1207	June 25,16	1 Year

### 2.3.7. For surge immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Surge Generator	EMC PARTNER	MIG0624TEL	562	Nov.17,16	1 Year

### 2.3.8. For power frequency magnetic field immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Magnetic Field Tester	HEAFELY	MFS 100		June 25,16	1 Year

### 3. TEST SET-UP AND OPERATION MODES

#### 3.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

**Immunity:** The equipment under test (EUT) was configured to the representative operating mode and conditions.

#### 3.2. Block Diagram of Test Set-up

System Diagram of Connections Between EUT and Simulators

EMI



EMS



(EUT: Embedded Industrial Computer)

#### 3.3. Test Operation Mode and Test Software

Refer to Test Setup in clause 4 & 5.

#### 3.4. Special Accessories and Auxiliary Equipment

##### 3.4.1. Headphone

M / N	:	K800
S / N	:	K6325HP-C
Manufacturer	:	HP
Data Cable	:	Shielded, Detachable, 1.2m

#### 3.5. Countermeasures to Achieve EMC Compliance

None.



## 4. EMISSION TEST RESULTS

### 4.1. Asymmetric mode conducted emissions test

**RESULT** : **Pass**  
Test procedure : EN 55032:2015  
Frequency range : 0.15~30MHz  
Test Site : Shielded Room  
Limits : EN 55032:2015 Class B

#### Test Setup

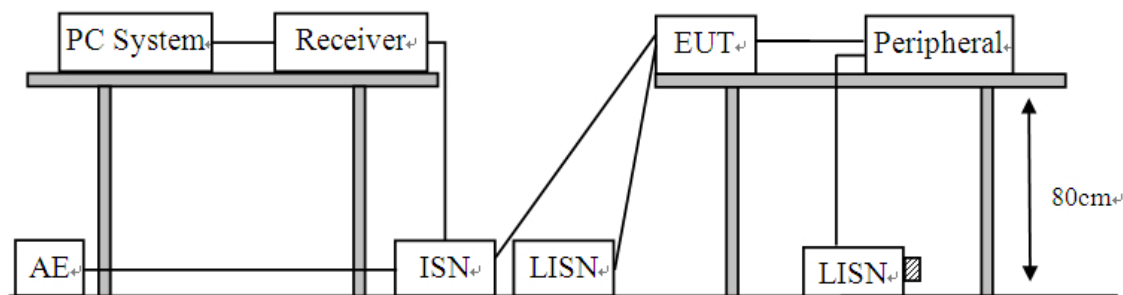
Date of test : Apr. 19, 2017  
Model No. : CS80480T050P  
Input Voltage : DC 12V From Battery  
Operation Mode : Network

The frequency range from 150 kHz to 30 MHz was investigated.

The bandwidth of the test receiver was set at 9 kHz.

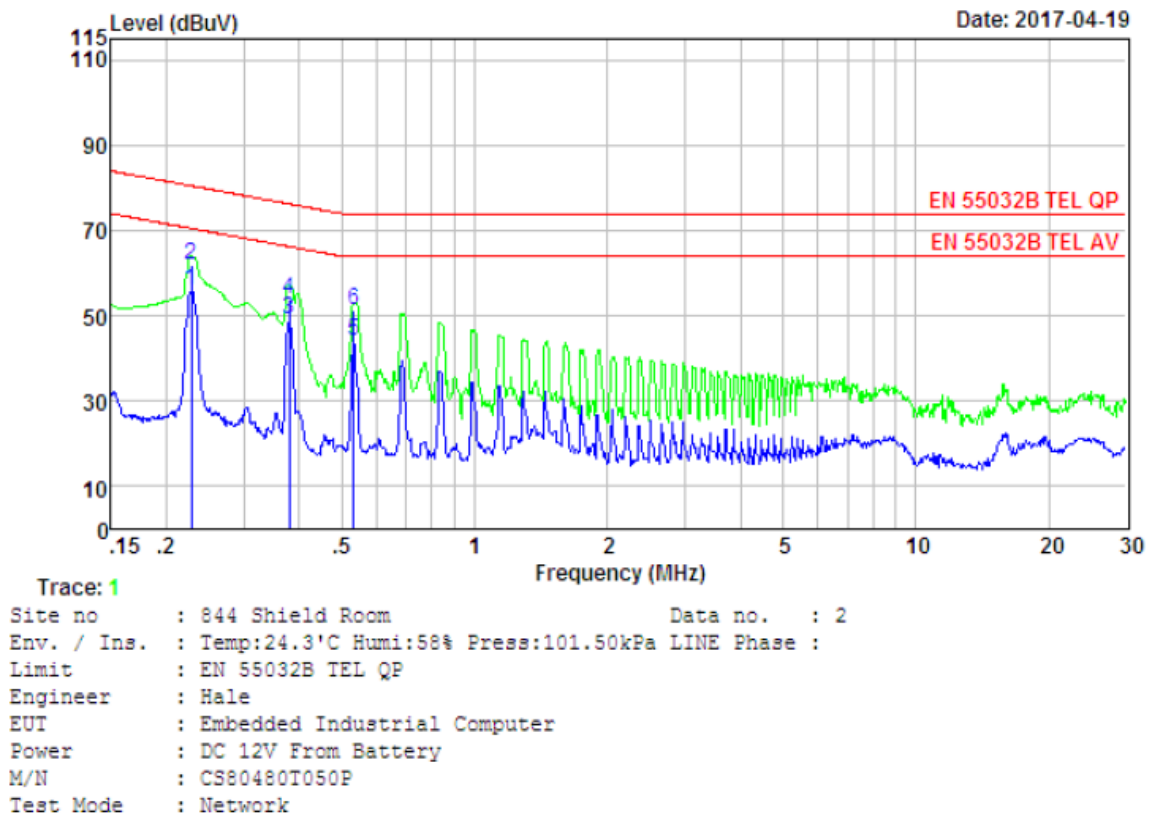
The test data of the worst case condition(s) was reported on the following page.

LAN Port 100Mbps Transmitting.



**Note: Test uncertainty:  $\pm 2.54\text{dB}$  at a level of confidence of 95%.**

## Test Data



	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.23	9.93	9.80	36.32	56.05	70.52	14.47	Average
2	0.23	9.93	9.80	42.37	62.10	80.52	18.42	QP
3	0.38	9.79	9.82	29.75	49.36	66.30	16.94	Average
4	0.38	9.79	9.82	34.09	53.70	76.30	22.60	QP
5	0.53	9.73	9.81	24.64	44.18	64.00	19.82	Average
6	0.53	9.73	9.81	31.86	51.40	74.00	22.60	QP

## 4.2. Radiated Emission Test

**RESULT** : **Pass**  
Test procedure : EN 55032:2015  
Frequency range : 30MHz-1000MHz, 1GHz-6GHz  
Test Site : 966 Chamber  
Limits : EN 55032:2015 Class B

### Test Setup

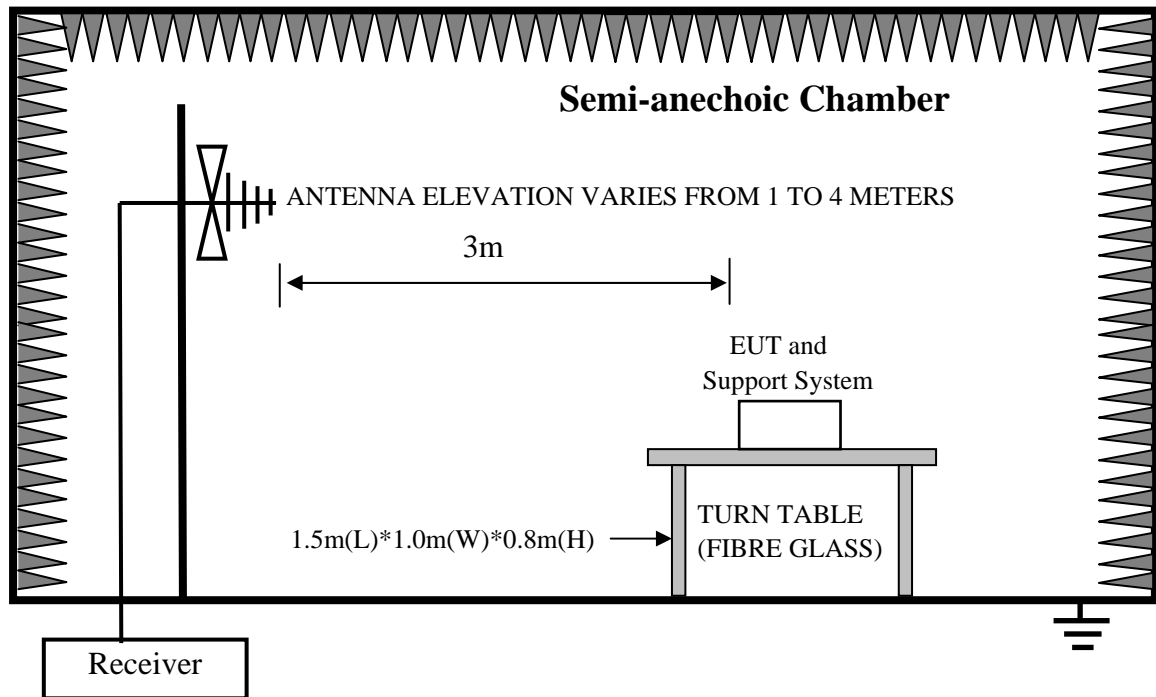
Date of test : Apr. 18, 2017  
Model No. : CS80480T050P  
Input Voltage : DC 12V From Battery  
Operation Mode : USB Play, Network, wifi Mode

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

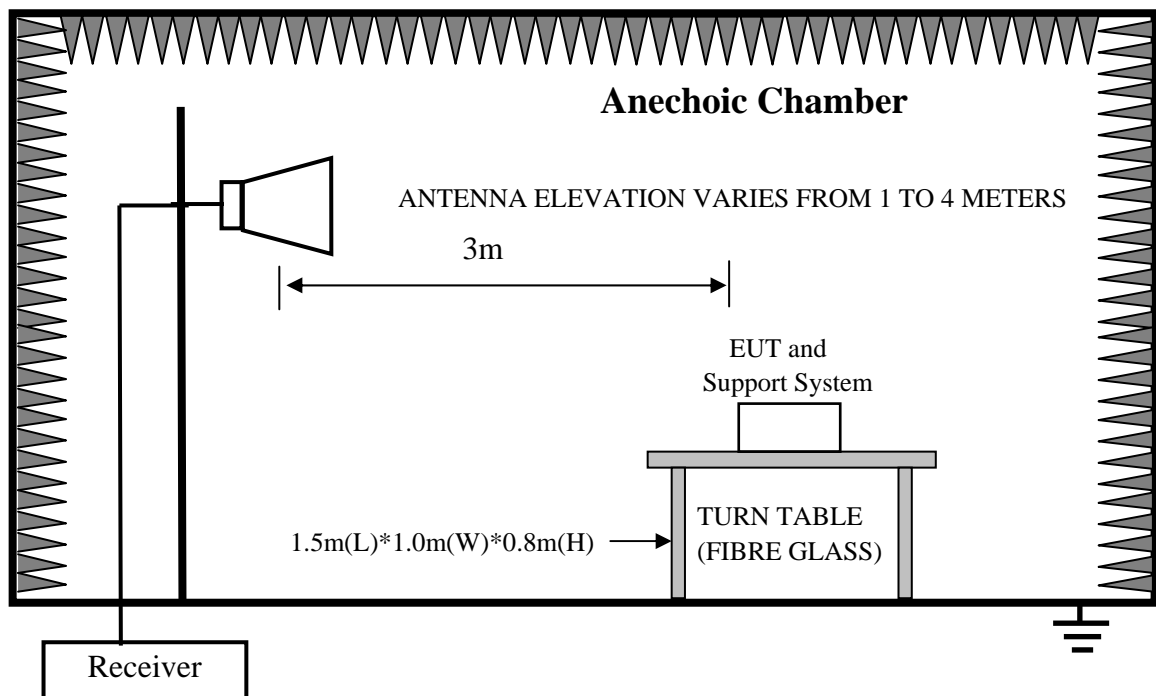
The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth setting on the test receiver was 120 kHz.

1、 In Semi-anechoic Chamber Test Setup Diagram for 30MHz-1000MHz



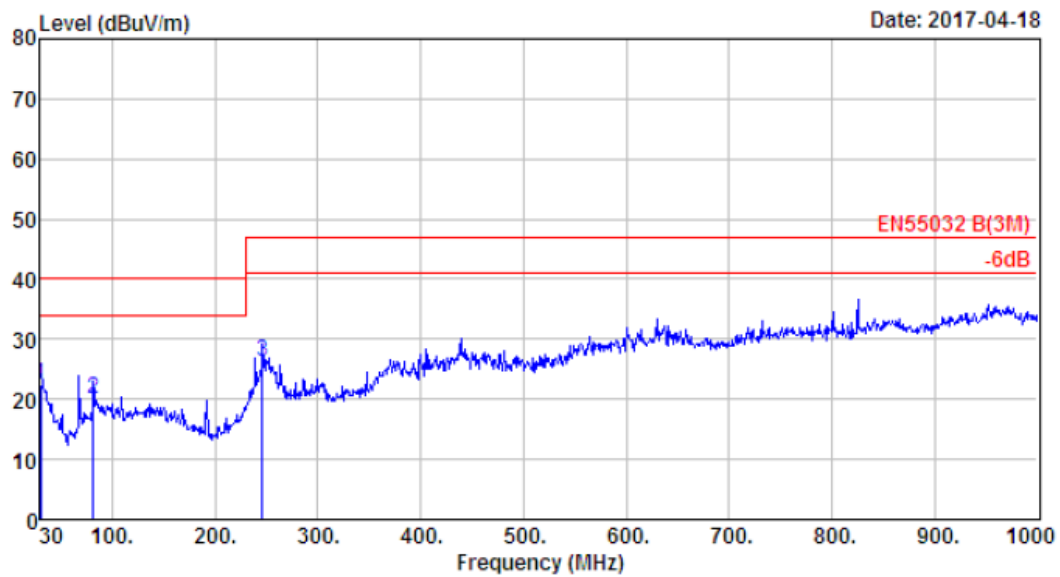
2、 In Anechoic Chamber Test Setup Diagram for 1GHz-6GHz



**Note:**Test uncertainty:  $\pm 3.62\text{dB}$  at a level of confidence of 95%

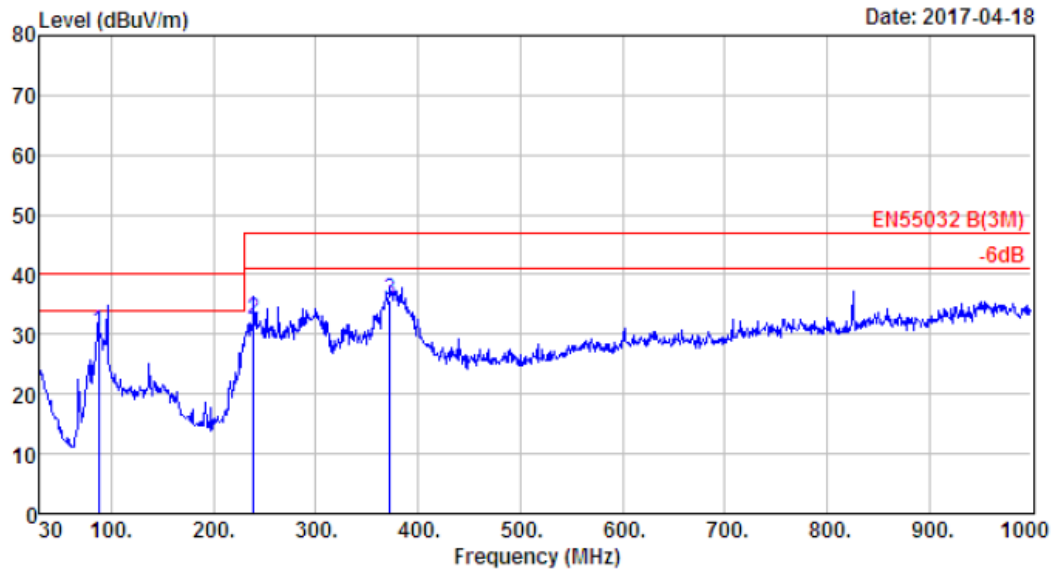
## Test Data

30MHz-1000MHz



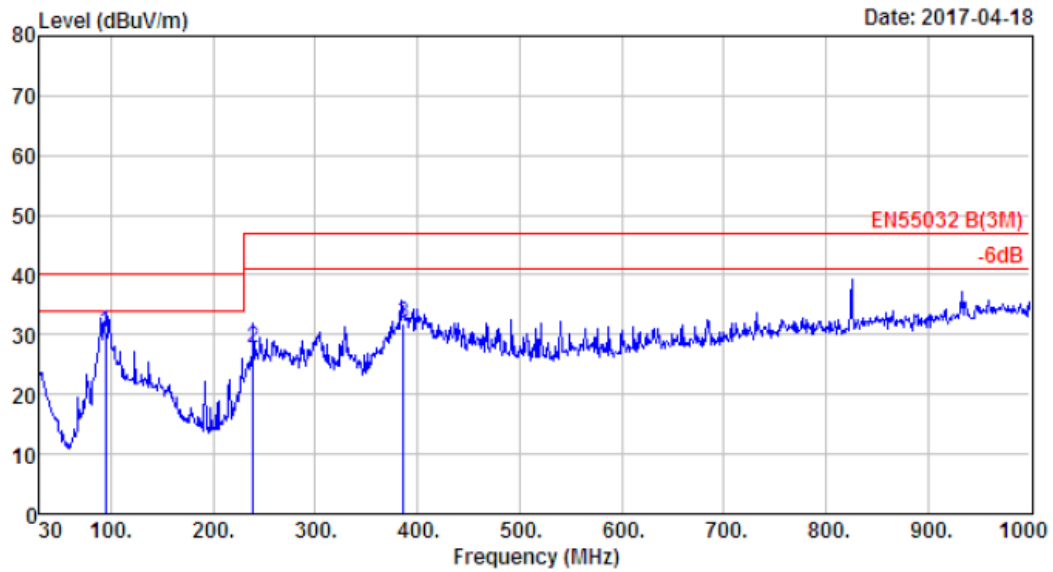
Site no. : 2# 966 chamber      Data no. : 1  
 Dis. / Ant. : 3m 37062      Ant. pol. : VERTICAL  
 Limit : EN55032 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : USB Play

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.000	18.09	1.04	3.20	22.33	40.00	17.67	QP
2	81.410	7.24	1.17	11.52	19.93	40.00	20.07	QP
3	246.310	11.33	2.13	12.67	26.13	47.00	20.87	QP



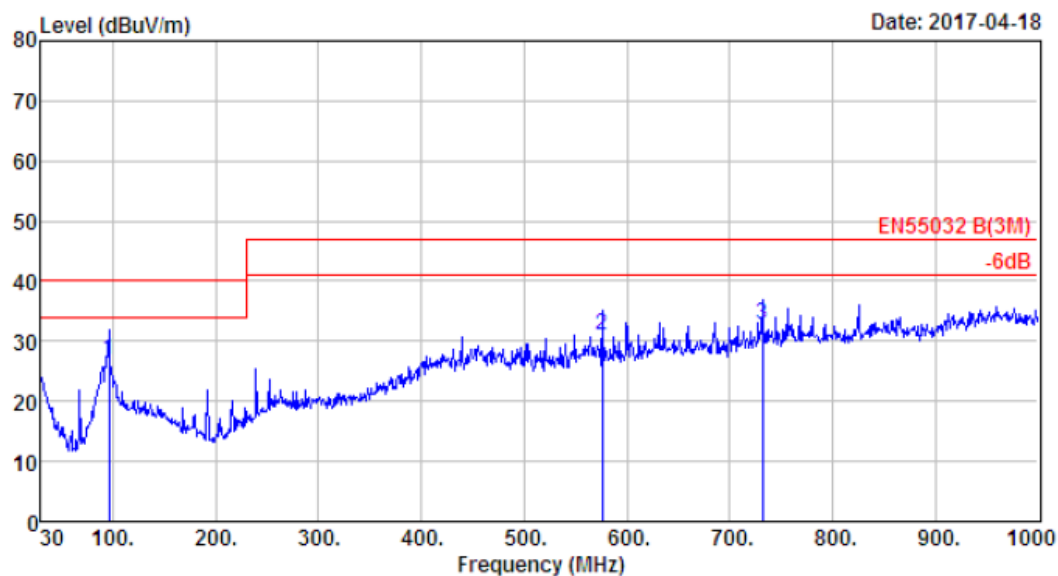
Site no. : 2# 966 chamber      Data no. : 2  
 Dis. / Ant. : 3m 37062      Ant. pol. : HORIZONTAL  
 Limit : EN55032 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : USB Play

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	87.230	8.17	1.40	20.98	30.55	40.00	9.45	QP
2	239.520	10.25	2.13	20.03	32.41	47.00	14.59	QP
3	372.410	14.68	2.90	18.11	35.69	47.00	11.31	QP



Site no. : 2# 966 chamber      Data no. : 3  
 Dis. / Ant. : 3m 37062      Ant. pol. : HORIZONTAL  
 Limit : EN55032 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Network

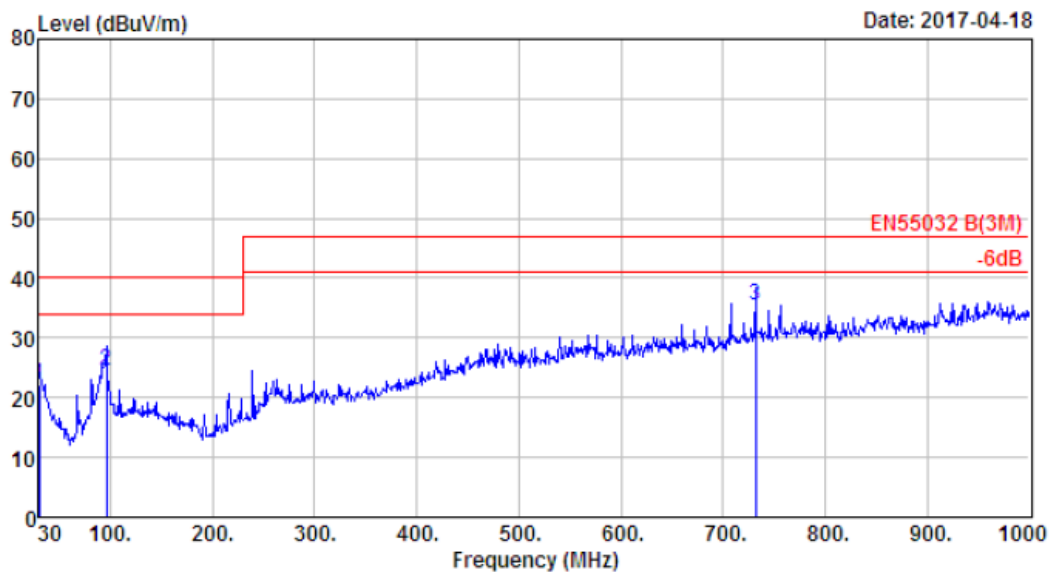
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	94.020	8.95	1.62	19.93	30.50	40.00	9.50	QP
2	239.520	10.25	2.13	15.37	27.75	47.00	19.25	QP
3	385.990	15.23	2.85	13.79	31.87	47.00	15.13	QP



Site no. : 2# 966 chamber Data no. : 4  
 Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL  
 Limit : EN55032 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Network

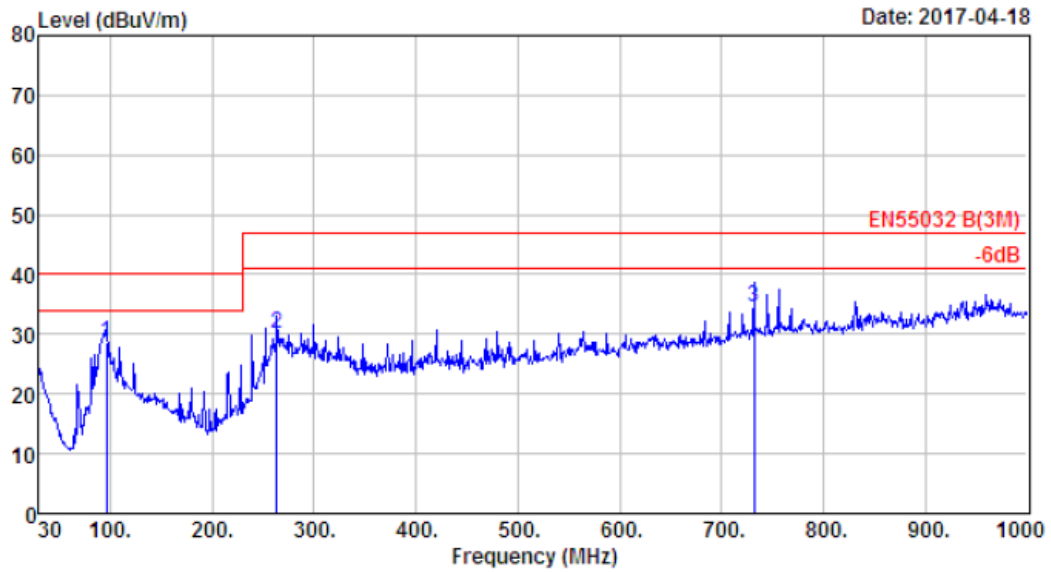
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	95.960	9.11	1.77	16.03	26.91	40.00	13.09	QP
2	576.110	19.76	3.52	7.71	30.99	47.00	16.01	QP
3	732.280	22.16	3.92	6.79	32.87	47.00	14.13	QP





Site no. : 2# 966 chamber      Data no. : 5  
 Dis. / Ant. : 3m 37062      Ant. pol. : VERTICAL  
 Limit : EN55032 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Wifi Mode

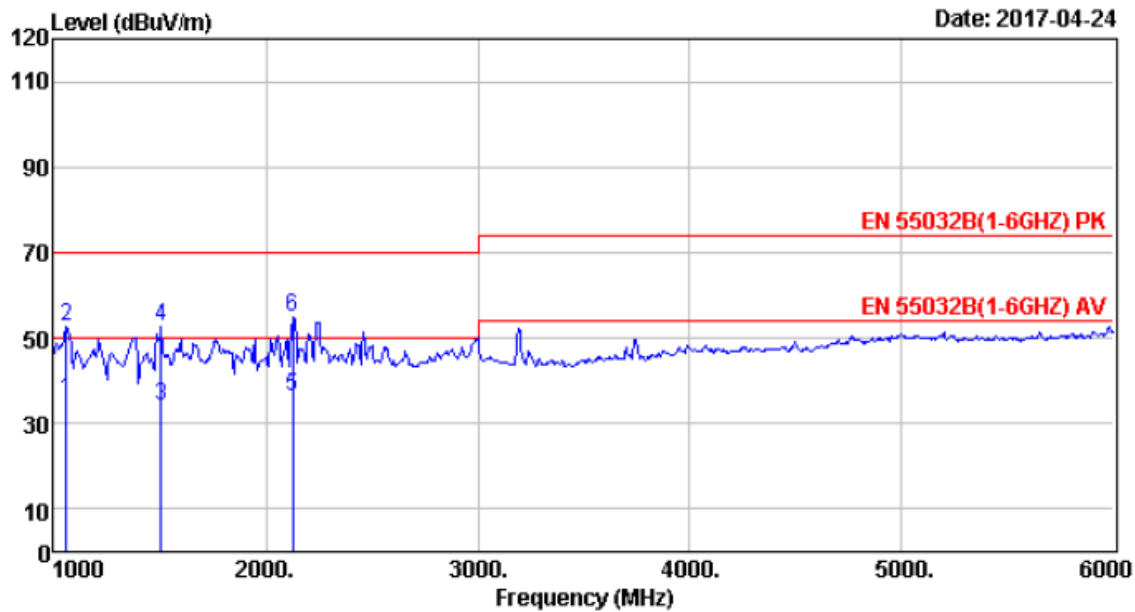
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.000	18.09	1.04	2.95	22.08	40.00	17.92	QP
2	95.960	9.11	1.77	13.63	24.51	40.00	15.49	QP
3	732.280	22.16	3.92	9.35	35.43	47.00	11.57	QP



Site no. : 2# 966 chamber Data no. : 6  
 Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL  
 Limit : EN55032 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Wifi Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	95.960	9.11	1.77	17.80	28.68	40.00	11.32	QP
2	263.770	13.38	2.27	14.53	30.18	47.00	16.82	QP
3	732.280	22.16	3.92	8.47	34.55	47.00	12.45	QP

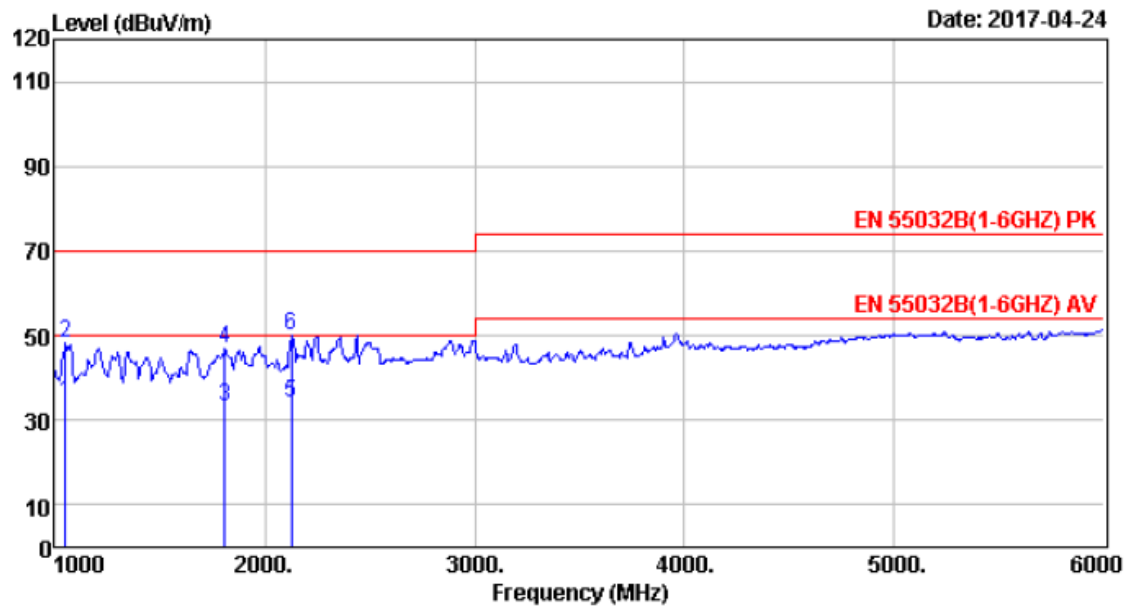
# 1GHz-6GHz



Site no : 1# 966 Chamber  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa VERTICAL  
 Limit : EN 55032B(1-6GHZ) PK  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Wifi Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1060.00	24.19	3.56	34.41	41.96	35.30	50.00	14.70	Average
2	1060.00	24.19	3.56	34.41	59.44	52.78	70.00	17.22	Peak
3	1505.00	24.89	4.38	34.45	39.28	34.10	50.00	15.90	Average
4	1505.00	24.89	4.38	34.45	57.75	52.57	70.00	17.43	Peak
5	2125.00	27.27	6.32	34.42	37.03	36.20	50.00	13.80	Average
6	2125.00	27.27	6.32	34.42	55.95	55.12	70.00	14.88	Peak

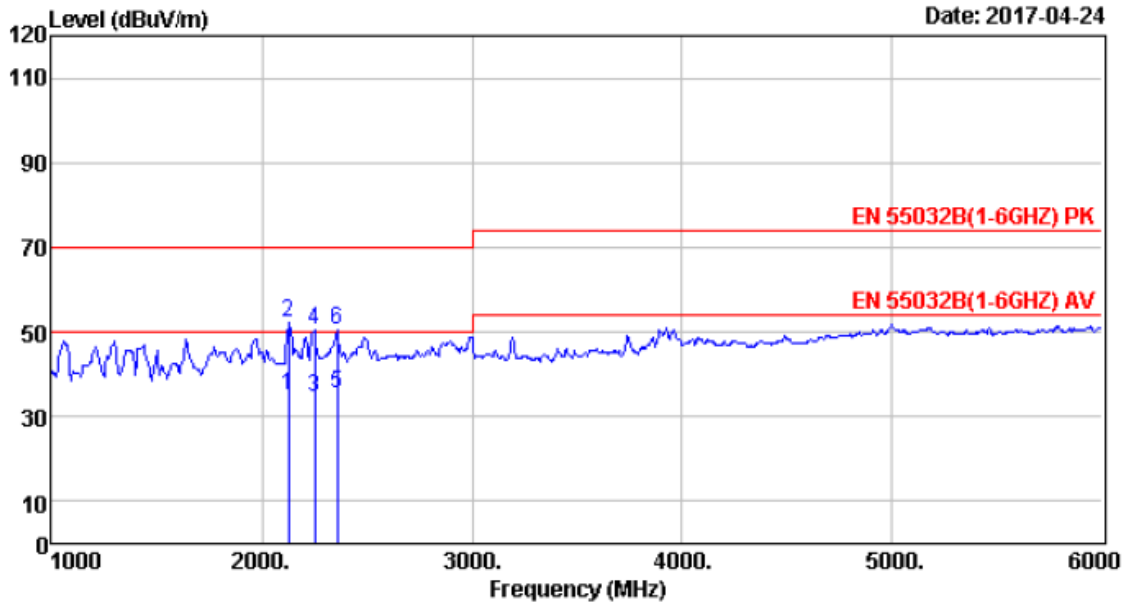
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no : 1# 966 Chamber  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa HORIZONTAL  
 Limit : EN 55032B(1-6GHz) PK  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Wifi Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1050.00	24.19	3.53	34.41	40.89	34.20	50.00	15.80	Average
2	1050.00	24.19	3.53	34.41	55.00	48.31	70.00	21.69	Peak
3	1810.00	25.02	5.50	34.48	37.06	33.10	50.00	16.90	Average
4	1810.00	25.02	5.50	34.48	50.89	46.93	70.00	23.07	Peak
5	2125.00	27.27	6.32	34.42	35.13	34.30	50.00	15.70	Average
6	2125.00	27.27	6.32	34.42	50.68	49.85	70.00	20.15	Peak

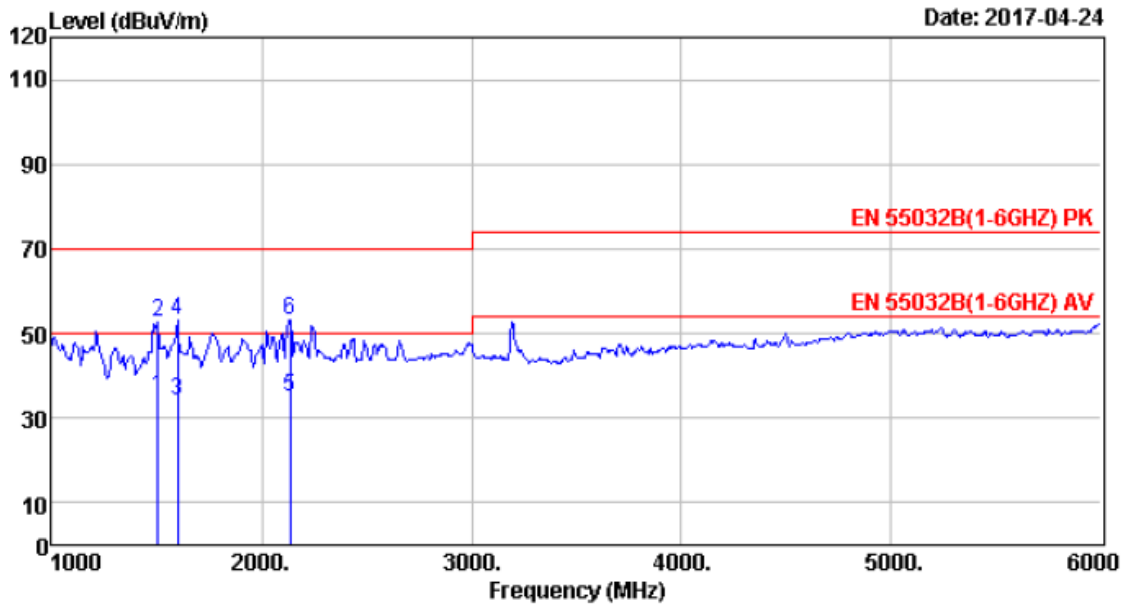
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no : 1# 966 Chamber  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa HORIZONTAL  
 Limit : EN 55032B(1-6GHZ) PK  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : USB Play

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2125.00	27.27	6.32	34.42	35.83	35.00	50.00	15.00	Average
2	2125.00	27.27	6.32	34.42	53.02	52.19	70.00	17.81	Peak
3	2250.00	27.80	6.47	34.28	34.41	34.40	50.00	15.60	Average
4	2250.00	27.80	6.47	34.28	50.62	50.61	70.00	19.39	Peak
5	2360.00	27.67	6.58	34.20	35.25	35.30	50.00	14.70	Average
6	2360.00	27.67	6.58	34.20	50.29	50.34	70.00	19.66	Peak

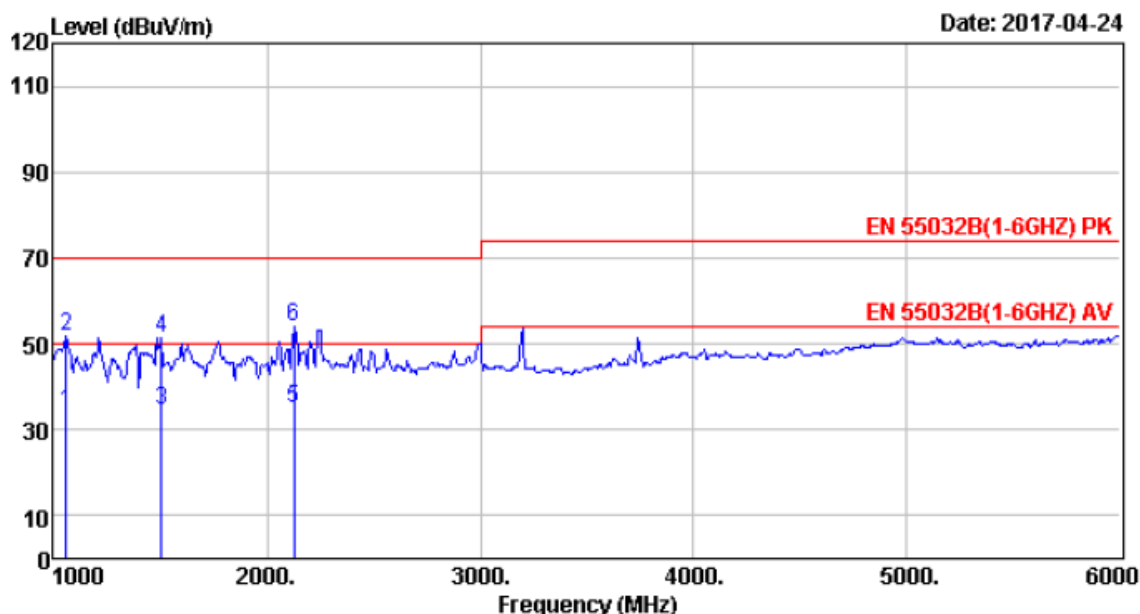
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no : 1# 966 Chamber  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa VERTICAL  
 Limit : EN 55032B(1-6GHZ) PK  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : USB Play

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1505.00	24.89	4.38	34.45	40.38	35.20	50.00	14.80	Average
2	1505.00	24.89	4.38	34.45	57.67	52.49	70.00	17.51	Peak
3	1600.00	24.85	4.69	34.46	39.02	34.10	50.00	15.90	Average
4	1600.00	24.85	4.69	34.46	58.11	53.19	70.00	16.81	Peak
5	2135.00	27.41	6.34	34.39	35.44	34.80	50.00	15.20	Average
6	2135.00	27.41	6.34	34.39	53.86	53.22	70.00	16.78	Peak

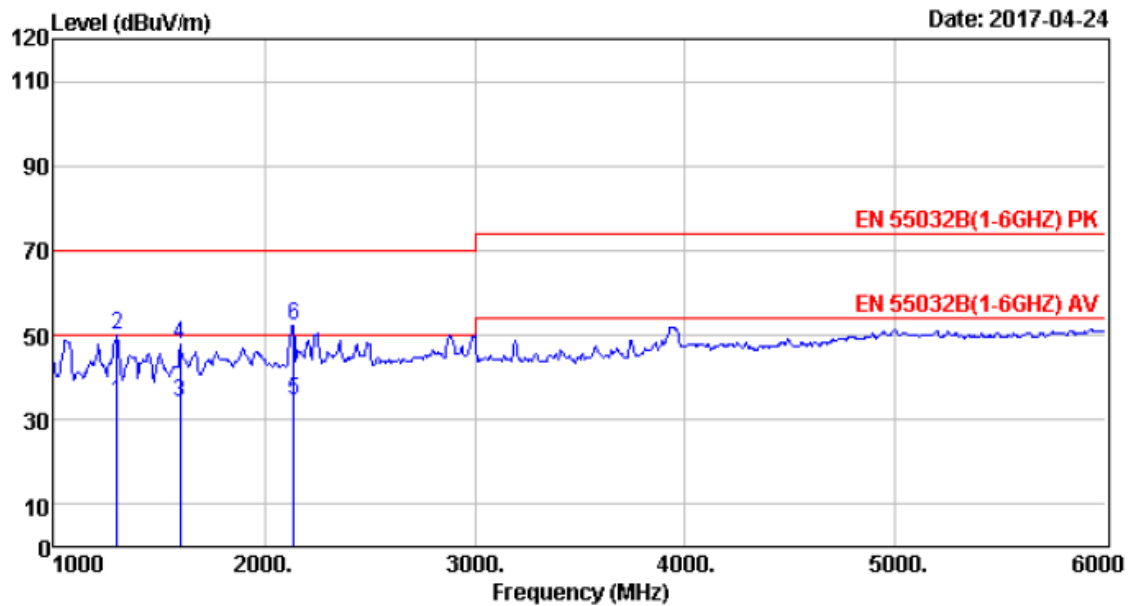
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no : 1# 966 Chamber  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa VERTICAL  
 Limit : EN 55032B(1-6GHZ) PK  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Network

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1060.00	24.19	3.56	34.41	40.86	34.20	50.00	15.80	Average
2	1060.00	24.19	3.56	34.41	58.40	51.74	70.00	18.26	Peak
3	1505.00	24.89	4.38	34.45	39.68	34.50	50.00	15.50	Average
4	1505.00	24.89	4.38	34.45	56.54	51.36	70.00	18.64	Peak
5	2125.00	27.27	6.32	34.42	36.03	35.20	50.00	14.80	Average
6	2125.00	27.27	6.32	34.42	54.64	53.81	70.00	16.19	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no : 1# 966 Chamber  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa HORIZONTAL  
 Limit : EN 55032B(1-6GHz) PK  
 Engineer : Hale  
 EUT : Embedded Industrial Computer  
 Power : DC 12V From Battery  
 M/N : CS80480T050P  
 Test Mode : Network

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1300.00	25.02	3.99	34.43	39.72	34.30	50.00	15.70	Average
2	1300.00	25.02	3.99	34.43	55.39	49.97	70.00	20.03	Peak
3	1600.00	24.85	4.69	34.46	39.02	34.10	50.00	15.90	Average
4	1600.00	24.85	4.69	34.46	52.71	47.79	70.00	22.21	Peak
5	2140.00	27.41	6.34	34.39	35.34	34.70	50.00	15.30	Average
6	2140.00	27.41	6.34	34.39	52.90	52.26	70.00	17.74	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



## 5. IMMUNITY TEST RESULT

### 5.1. Description of Performance Criteria:

#### Performance criteria A

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

#### Performance criteria B

After the test, the EUT 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 EUT is used as intended. 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.

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.

#### Performance criteria C

During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a backup, shall not be lost.

## 5.2. Electrostatic Discharge Immunity Test

<b>RESULT</b>	<b>:</b>	<b>Pass</b>
Test procedure	:	EN 55024:2010+A1:2015
Basic standard	:	EN 61000-4-2:2009
Test specification	:	+/-2.0kV ;+/-4.0kV(Contact discharge) +/-2.0kV ; +/-4.0kV ; +/-8.0kV(Air discharge)
Number of discharges	:	≥ 10(Air discharge for single polarity discharge) ≥ 25 (Contact discharge for single polarity discharge)
Polarity	:	Positive/Negative
Performance criterion	:	B

## Test Setup

Date of test	:	Apr. 18, 2017
Model No.	:	CS80480T050P
Input Voltage	:	DC 12V From Battery
Operation Mode	:	USB Play, Network, wifi Mode
Temperature	:	24.8°C
Humidity	:	56%
Pressure	:	101.50kPa

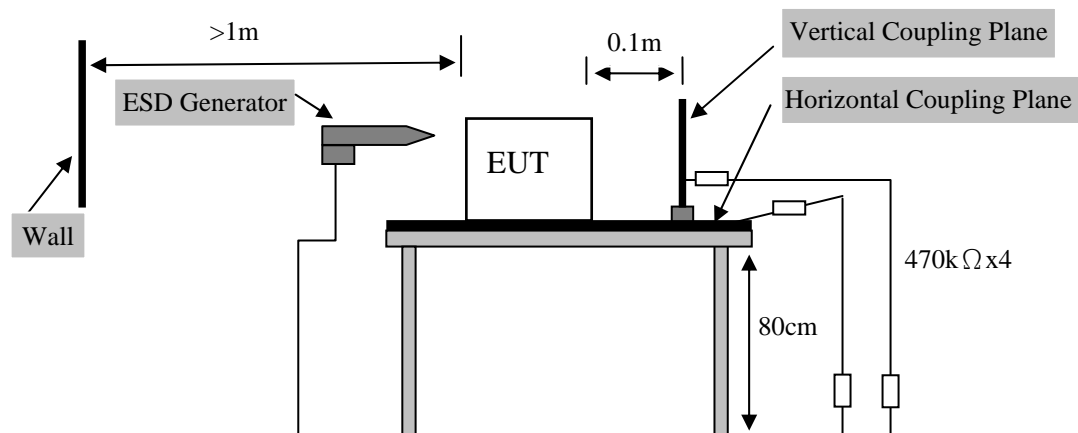


Table 1: Electrostatic Discharge Immunity Test Result

Discharge Location		Type of discharge	Result
HCP	4 points	Contact	Pass
VCP	4 points	Contact	Pass
Slot	1 point	Air	Pass
Headphone Port	1 point	Air	Pass
AUX IN Port	1 point	Air	Pass

*Remark: 1. There was no change compared with initial operation during the test.  
2. Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).*

### 5.3. Radio Frequency Electromagnetic Field Immunity Test

**RESULT** : **Pass**  
Test procedure : EN 55024:2010+A1:2015  
Basic standard : EN 61000-4-3:2006+A1:2008+A2:2010  
Performance criterion : A  
Test site : ITS

#### Test Setup

Date of test : Apr. 18, 2017  
Model No. : CS80480T050P  
Input Voltage : DC 12V From Battery  
Operation Mode : USB Play, Network, wifi Mode  
Temperature : 24.8°C  
Humidity : 56%  
Pressure : 101.50kPa

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The EUT was set 3 m away from the transmitting antenna which was mounted on an antenna tower. Both horizontal and vertical polarization of the antenna were 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 was used to monitor EUT screen.

All the scanning conditions were as follows:

Condition of Test	Remarks
1. Field 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	3 Sec.

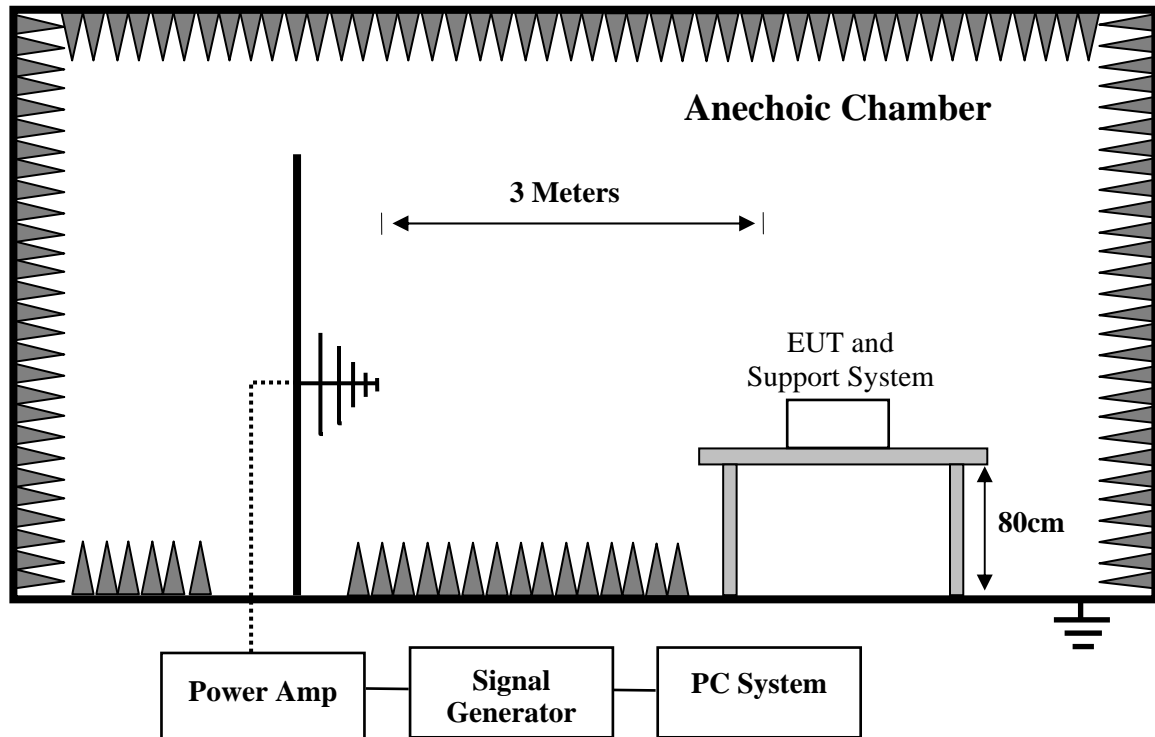


Table 2: Radio Frequency Electromagnetic Field Immunity Test Result

Position	Modulated signal	Test level	Step	Result
Front	AM 80% 1kHz	3 V/m	1%	Pass
Right				Pass
Rear				Pass
Left				Pass

*Remark: There was no change compared with initial operation during the test.*

## 5.4. Electrical Fast Transient/Burst Immunity Test

**RESULT** : **Pass**  
Test procedure : EN 55024:2010+A1:2015  
Basic standard : EN 61000-4-4:2012  
Pulseform : Tr/Th = 5/50ns  
Repetition Frequency : 5kHz  
Test Duration : 120s  
Performance criterion : B

### Test Setup

Date of test : Apr. 18, 2017  
Model No. : CS80480T050P  
Input Voltage : DC 12V From Battery  
Operation Mode : Network  
Temperature : 24.8°C  
Humidity : 56%  
Pressure : 101.50kPa

The EUT and its simulators were placed 0.1m high above the ground reference plane which was a min. 2m\*2m 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.

#### 1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device which coupled 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 can't less than 2 mains.

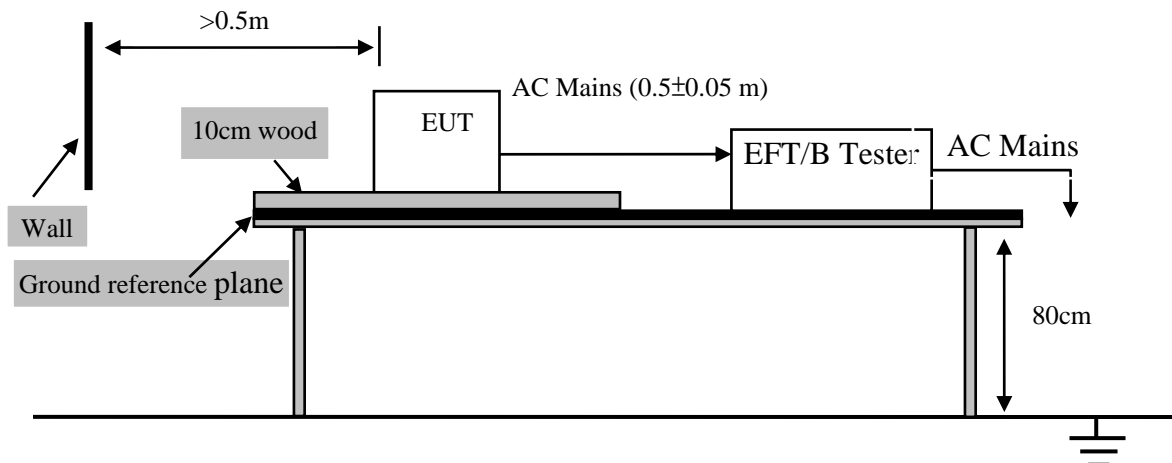


Table 3: Electrical Fast Transient/Burst Immunity Test Result

Coupling Ports	Coupling Voltage	Inject Method	Result
Signal Line	0.5kV	Capacitive Clamp	Pass

*Remark: There was no change compared with initial operation during the test.*

## 5.5. Surge Immunity Test

**RESULT** : **Pass**  
Test procedure : EN 55024:2010+A1:2015  
Basic standard : EN 61000-4-5:2006  
Pulseform :  $Tr/Td = 1.2/50\mu s$   
Test Duration : 60s  
Performance criterion : B

### Test Setup

Date of test : Apr. 18, 2017  
Model No. : CS80480T050P  
Input Voltage : DC 12V From Battery  
Operation Mode : Network  
Temperature :  $24.8^{\circ}C$   
Humidity : 56%  
Pressure : 101.50kPa

$2\Omega$  effective output impedance of the generator was used for L-N test.  $12\Omega$  effective output impedance of the generator was used for L-PE, N-PE test.

5 positive and 5 negative (polarity) tests were applied successively synchronized to the voltage phase  $0^{\circ}$ ,  $90^{\circ}$ ,  $180^{\circ}$ ,  $270^{\circ}$  to L-N respectively. The repetition rate was 1 per minute during test.

#### 1. For input and AC power ports:

The EUT was connected to the power mains by using a coupling device which coupled the surge interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration was 1 minute.

#### 2. For signal lines and control lines ports:

None.

#### 3. For DC input and DC output power ports:

None.

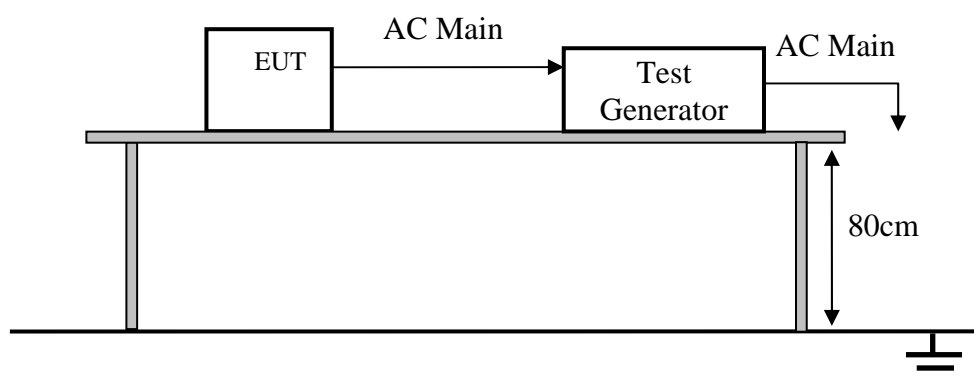




Table 4: Surge Immunity Test Result

Coupling Ports	Coupling Voltage	Coupling Phase / Result
LAN Port	+/-1kV	Pass

*Remark: There was no change compared with initial operation during the test*

## 5.6. Injected Currents Susceptibility Test

<b>RESULT</b>	<b>: Pass</b>
Test procedure	: EN 55024:2010+A1:2015
Basic standard	: EN 61000-4-6:2009
Test specification	: 3V(r.m.s) unmodulated,1kHz sinusoidal signal, AM 80%, 0.15MHz ~ 80MHz
Performance criterion	: A

### Test Setup

Date of test	: Apr. 18, 2017
Model No.	: CS80480T050P
Input Voltage	: DC 12V From Battery
Operation Mode	: Network
Temperature	: 24.8°C
Humidity	: 56%
Pressure	: 101.50kPa

The EUT were placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) was placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT were as short as possible, and their height above the ground reference plane were between 30 and 50 mm (where possible).

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

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

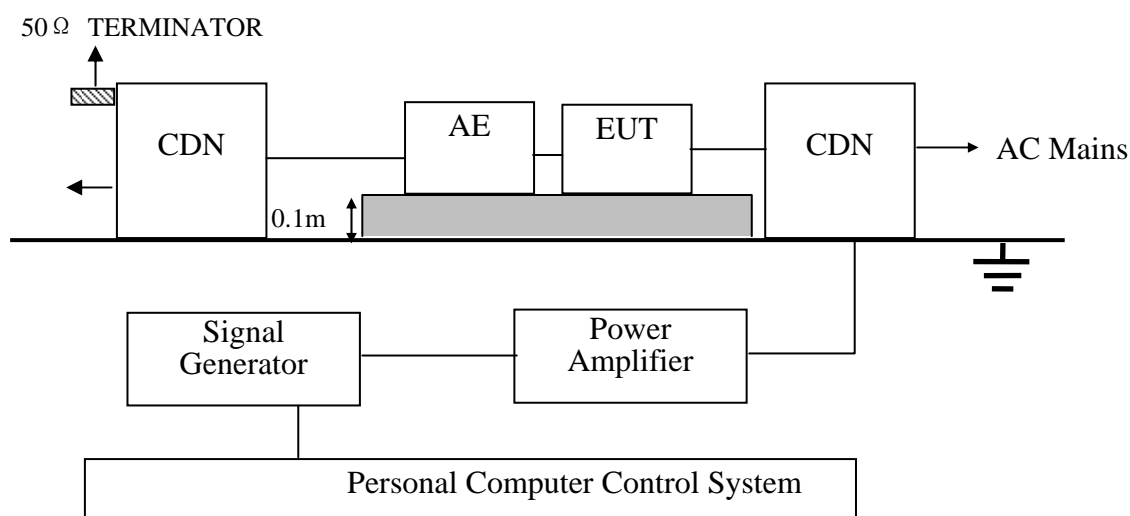


Table 5: Injected Currents Susceptibility Test Result

Coupling ports	Voltage (r.m.s)	Modulation	Freq. step	Dwell time	Coupling method	Result
AC power ports	/	1kHz AM 80%	/	/	CDN	/
DC power ports	/		/	/	EM Clamp	/
Signal/control	3V		1%	1.5s	EM Clamp	Pass

*Remark: There was no change compared with initial operation during the test*

## 5.7. Power Frequency Magnetic Field Immunity Test

**RESULT** : **Pass**  
Test procedure : EN 55024:2010+A1:2015  
Basic standard : EN 61000-4-8:2010  
Test specification : 1 A/m  
Performance criterion : A

### Test Setup

Date of test : Apr. 18, 2017  
Model No. : CS80480T050P  
Input Voltage : DC 12V From Battery  
Operation Mode : USB Play, Network, wifi Mode  
Temperature : 24.8°C  
Humidity : 56%  
Pressure : 101.50kPa

The EUT was subjected to the test magnetic field by using the induction coil of standard dimensions (1m\*1m). The induction coil then was rotated by 90° in order to expose the EUT to the test field with different orientations.

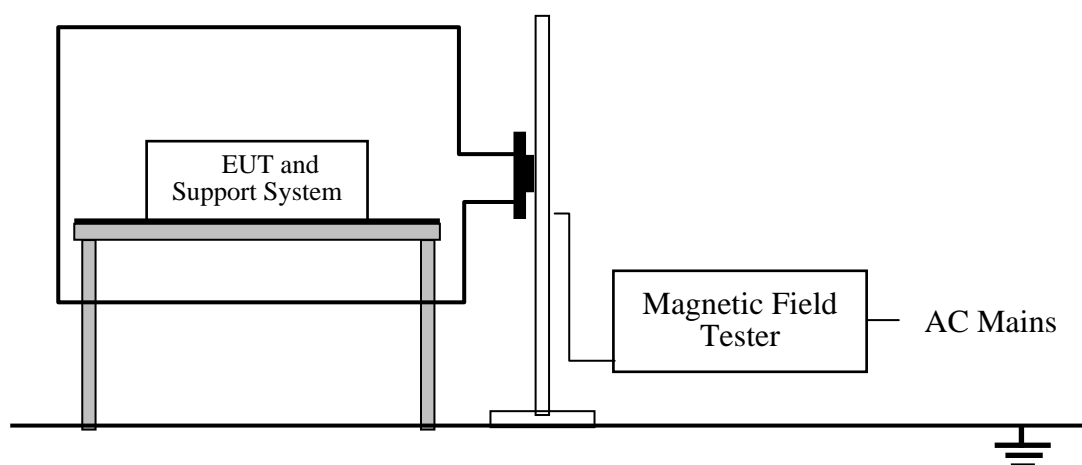


Table 6: Power Frequency Magnetic Field Immunity Test Result

Test Level	Testing Duration	Coil Orientation	Criterion	Result
1A/m	5 mins	X	A	Pass
1A/m	5 mins	Y	A	Pass
1A/m	5 mins	Z	A	Pass

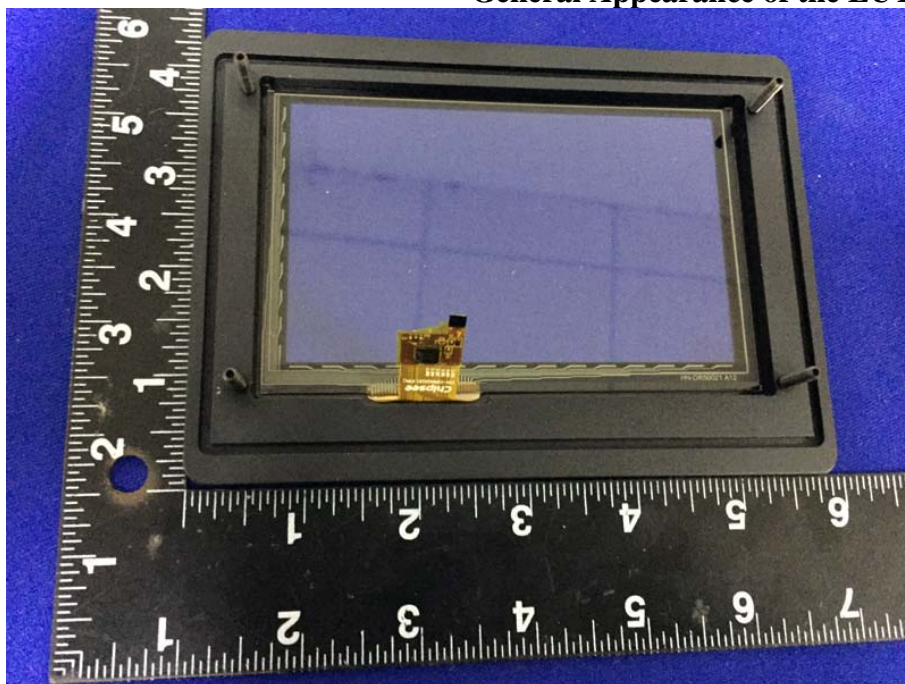
*Remark: There was no change compared with initial operation during the test*

## 6. PHOTOGRAPHS OF THE EUT

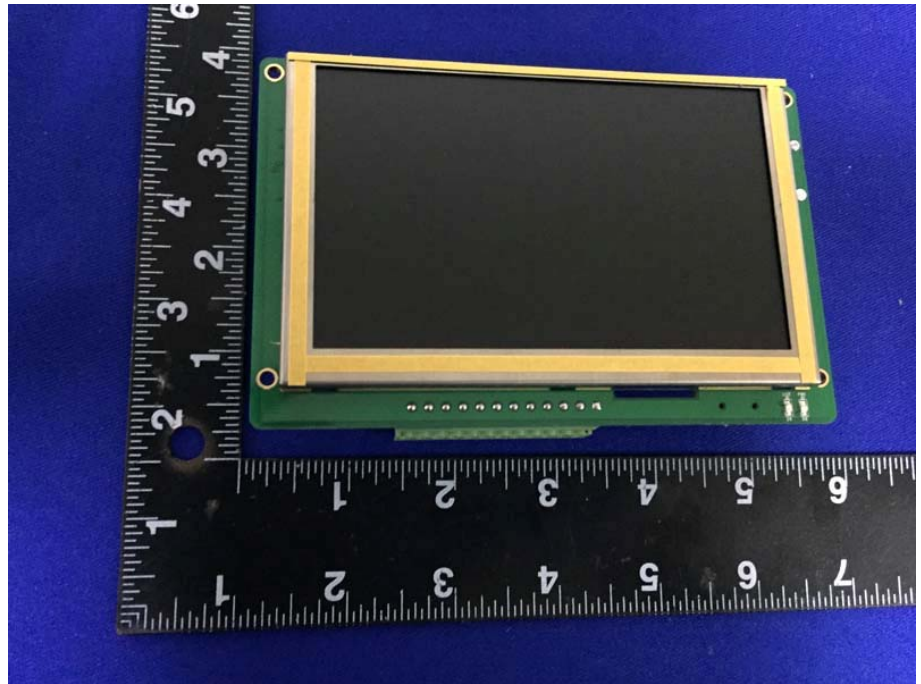
**Figure 1**  
**General Appearance of the EUT**



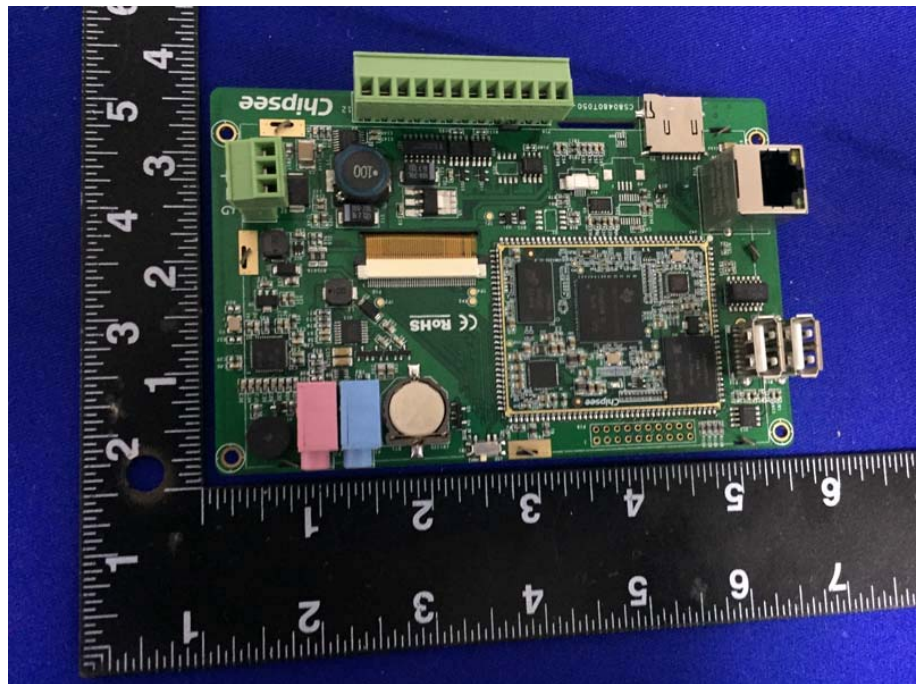
**Figure 2**  
**General Appearance of the EUT**



**Figure 3**  
**Inside View of the EUT**



**Figure 4**  
**Inside View of the EUT**





**Figure 5**  
**Inside View of the EUT**

