

# TECHNICAL REPORT



Report No: FCC1604133  
File reference No: 2016-06-12

Applicant: Technovare Systems, Inc.

Product: Embedded Computer

Model No: OPS-PCAED

Trademark: Technovare TNET-PC

Test Standards: FCC Part 15 Subpart B: 2015

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15 regulations for the evaluation of electromagnetic compatibility

Approved By

*Jack Chung*

---

Jack Chung

Manager

Dated: June 12, 2016

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

**SHENZHEN TIMEWAY TESTING LABORATORIES**

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District,  
Shenzhen, Guangdong, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



### **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

#### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

#### **FCC-Registration No.: 899988**

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

#### **IC- Registration No.: IC5205A-02**

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-02.



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## 1.0 General Details

### 1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.  
Address: Room 512-519,5/F., East Tower,Building 4, Anhua Industrial Zone,  
Futian District,Shenzhen, Guangdong China  
Telephone: (755) 83448688  
Fax: (755) 83442996  
Site on File with the Federal Communications Commission – United States  
Registration Number: 899988  
For 3m & 10 m OATS  
Site Listed with Industry Canada of Ottawa, Canada  
Registration Number: IC: 5205A-02  
For 3m & 10 m OATS

### 1.2 Applicant Details

Applicant: Technovare Systems, Inc.  
Address: 16815 Von KarmanAve., Suite 175, Irvine, Ca 92606, USA  
Telephone: 1-714-966-9099  
Fax: 1-714-966-9199

### 1.3 Description of EUT

Product: Embedded Computer  
Manufacturer: Technovare Systems, Inc.  
Address: 16815 Von KarmanAve., Suite 175, Irvine, Ca 92606, USA  
Brand Name: Technovare TNET-PC  
Model Number: OPS-PCAED  
Rating: DC16V, 3A

### 1.4 Submitted Sample: 1 Samples

### 1.5 Test Duration: 2016-04-14 to 2016-06-08

### 1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB  
Radiated Emissions Uncertainty =4.7dB

### 1.7 Test Engineer

The sample tested by

Print Name: Terry Tong

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## 2.0 List of Measurement Equipment

### 2.1 Conducted Emission Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESH3	860905/006	RS	2015.08.22	1Year
Spectrum Analyzer	ESA-L1500A	US37451154	HP	2015.08.22	1Year
PULSE LIMITER	ESH3-Z2	100281	RS	2015.08.22	1Year
LISN	ESH3-Z5	100294	RS	2015.08.22	1Year
LISN	ESH3-Z5	100253	RS	2015.08.22	1Year

### 2.2 Radiated electromagnetic disturbance test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESVD	100008	RS	2015.08.22	1Year
Coaxial Switch	MP59B	M70585	ANRITSU	N/A	N/A
Spectrum Analyzer	8595E	3441A00893	HP	2015.06.24	1Year
Amplifier	8447D	2727A05017	HP	2015.08.22	1Year
Bilog Antenna	VULB9163	9163/340	Schwarebeck	2015.08.23	1Year
Horn Antenna	BBHA 9120D	9120D-631	Schwarebeck	2015.08.24	1Year
Horn Antenna	BBHA 9170	BBHA9170265	Schwarebeck	2015.08.24	1Year

### 2.3 Auxiliary Equipment

Name	Model No.	Serial No.	Manufacturer	Cable	FCC DOC/ ID
LED Display	P2450	--	SAMSUNG	Data cable of 1.5m length	FCC DOC
Mouse	M-F105	--	L.SEleton	Data cable of 1.5m length	FCC DOC
LCD display*	MultiSync V463	--	NEC	--	FCC DOC
Keyboard	L100	--	DELL	Data cable of 1.5m length	FCC DOC
USB	--	--	Kingston	--	FCC DOC

**\*NOTE: EUT built-in this LCD display**

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### 3.0 Technical Details

#### 3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] tests for FCC Requirement.

#### 3.2 Test Standards

**FCC Part 15 Subpart B: 2015**

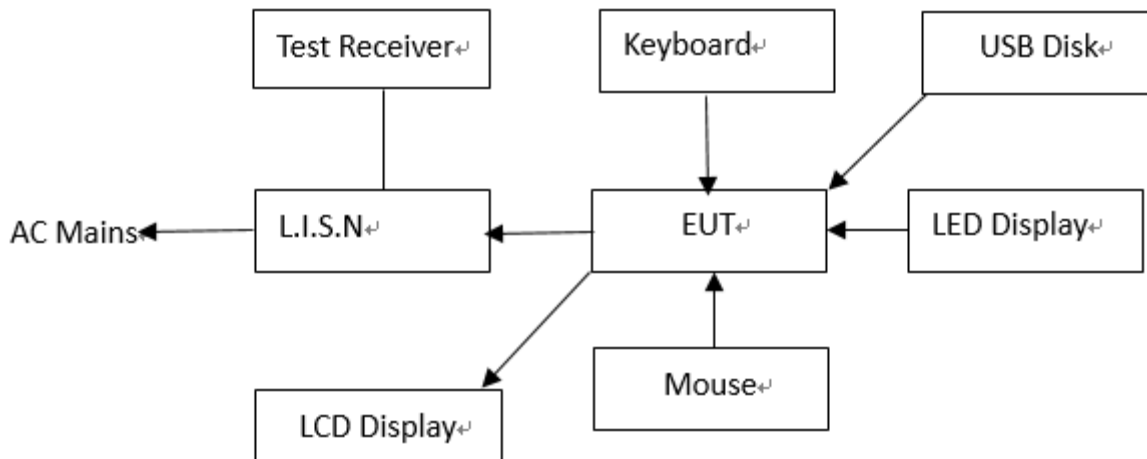
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#### 4.0 Conducted Power line Test

##### 4.1 Schematics of the test



EUT: Equipment Under Test

##### 4.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2014. Cables and peripherals were moved to find the maximum emission levels for each frequency.

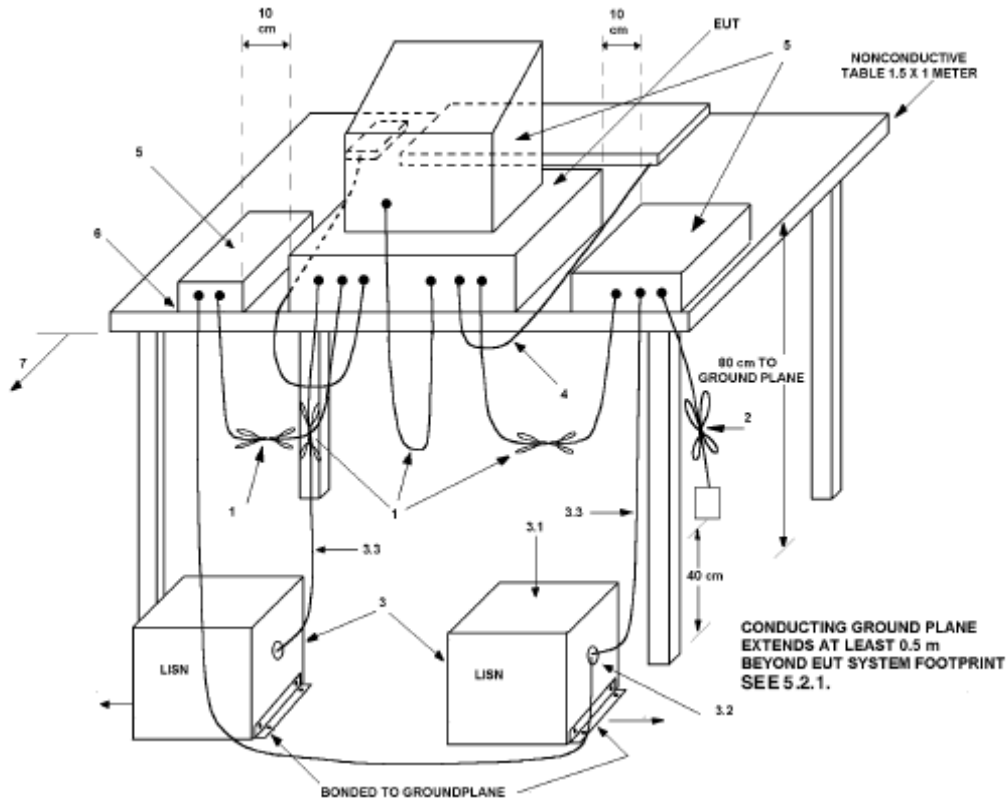
Testing Voltage and Frequency: 120V~, 60Hz

Block diagram of Test setup

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#### 4.3 Power line conducted Emission Limit

Frequency(MHz)	Class A Limits dB( $\mu$ V)		Class B Limits dB( $\mu$ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.00	66.00	66.00~56.00*	56.00~46.00*
0.50 ~ 5.00	73.00	60.00	56.00	46.00
5.00 ~ 30.00	73.00	60.00	60.00	50.00

- Notes:
- \*decreasing linearly with logarithm of frequency.
  - The tighter limit shall apply at the transition frequencies

#### 4.4 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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**A: Conducted Emission on Live Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

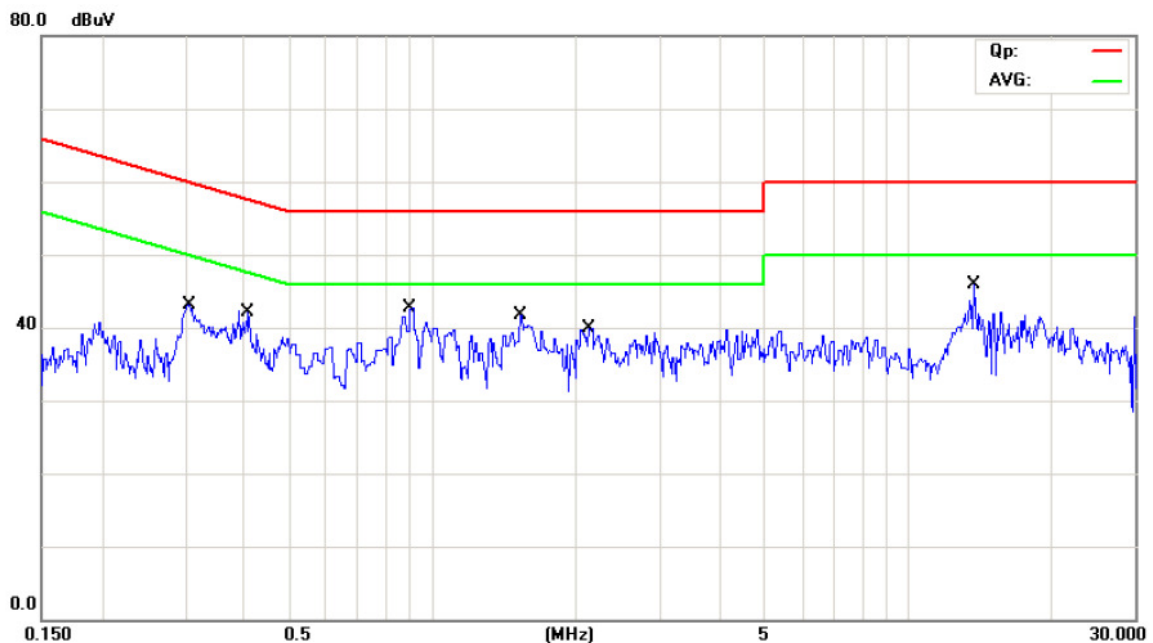
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

**EUT set Condition: Running EMC test Program and Ping Network**

**Equipment Level: Class B**

**Results: PASS**

Please refer to following diagram for individual



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.3031	31.75	11.16	42.91	60.16	-17.25	QP
2		0.3031	17.25	11.16	28.41	50.16	-21.75	AVG
3		0.4072	30.91	11.27	42.18	57.71	-15.53	QP
4		0.4072	13.26	11.27	24.53	47.71	-23.18	AVG
5	*	0.9050	30.80	11.80	42.60	56.00	-13.40	QP
6		0.9050	14.19	11.80	25.99	46.00	-20.01	AVG
7		1.5350	29.52	12.11	41.63	56.00	-14.37	QP
8		1.5350	11.67	12.11	23.78	46.00	-22.22	AVG
9		2.1650	27.47	12.37	39.84	56.00	-16.16	QP
10		2.1650	10.81	12.37	23.18	46.00	-22.82	AVG
11		13.7200	24.00	11.33	35.33	60.00	-24.67	QP
12		13.7200	11.00	11.33	22.33	50.00	-27.67	AVG

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**B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

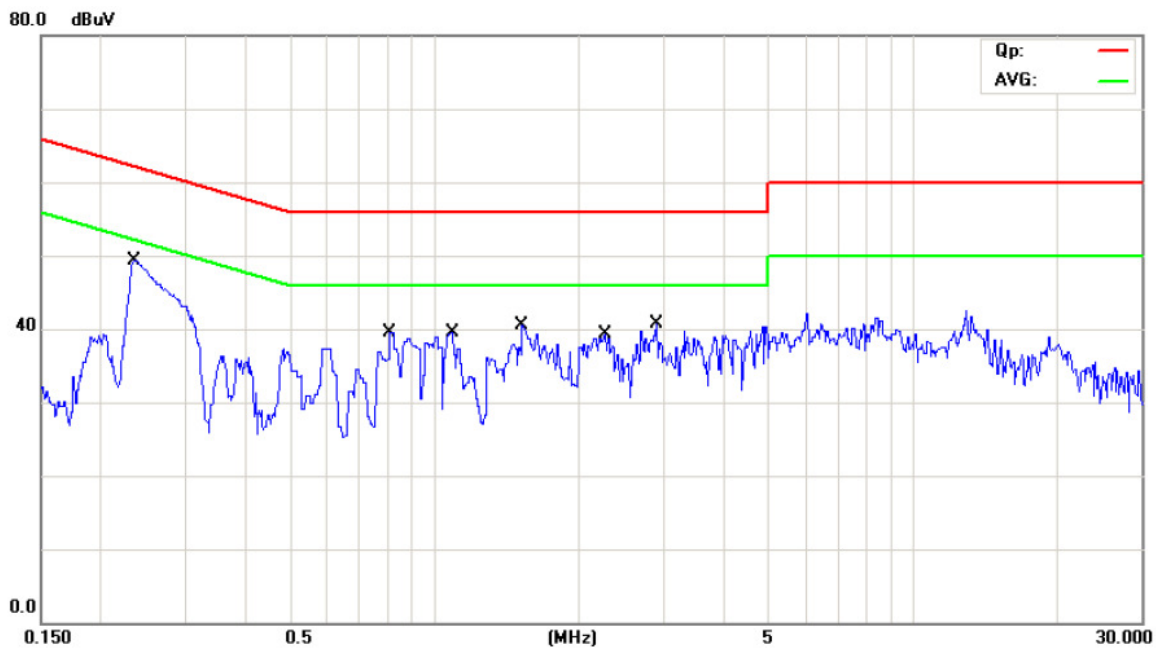
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

**EUT set Condition: Running EMC test Program and Ping Network**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1	*	0.2351	37.20	11.09	48.29	62.27	-13.98	QP
2		0.2351	21.10	11.09	32.19	52.27	-20.08	AVG
3		0.8150	27.84	11.70	39.54	56.00	-16.46	QP
4		0.8150	13.49	11.70	25.19	46.00	-20.81	AVG
5		1.0850	27.54	11.93	39.47	56.00	-16.53	QP
6		1.0850	15.25	11.93	27.18	46.00	-18.82	AVG
7		1.5237	28.42	12.11	40.53	56.00	-15.47	QP
8		1.5237	14.27	12.11	26.38	46.00	-19.62	AVG
9		2.2550	26.58	12.40	38.98	56.00	-17.02	QP
10		2.2550	11.82	12.40	24.22	46.00	-21.78	AVG
11		2.8961	28.02	12.66	40.68	56.00	-15.32	QP
12		2.8961	13.29	12.66	25.95	46.00	-20.05	AVG

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**C: Conducted Emission on Live Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

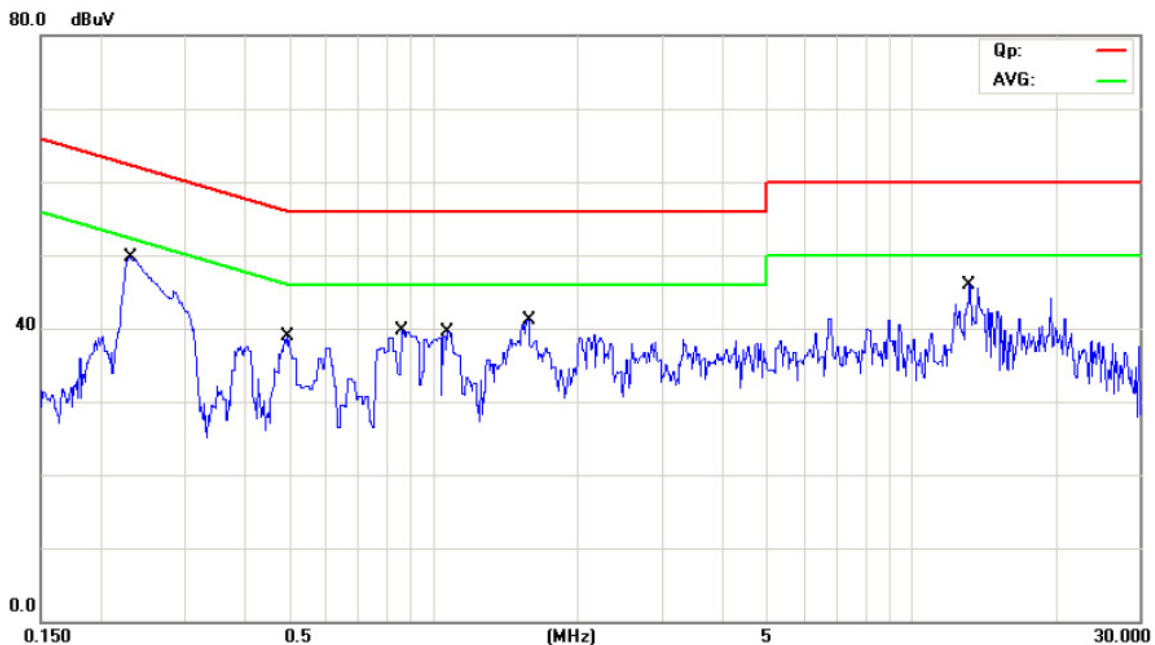
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

**EUT set Condition: Play USB**

**Equipment Level: Class B**

**Results: PASS**

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1	*	0.2296	38.61	11.08	49.69	62.46	-12.77	QP
2		0.2296	21.23	11.08	32.31	52.46	-20.15	AVG
3		0.8600	27.86	11.75	39.61	56.00	-16.39	QP
4		0.8600	13.36	11.75	25.11	46.00	-20.89	AVG
5		0.4938	27.46	11.36	38.82	56.10	-17.28	QP
6		0.4938	11.51	11.36	22.87	46.10	-23.23	AVG
7		1.0850	27.03	11.93	38.96	56.00	-17.04	QP
8		1.0850	12.49	11.93	24.42	46.00	-21.58	AVG
9		1.5687	28.88	12.13	41.01	56.00	-14.99	QP
10		1.5687	12.26	12.13	24.39	46.00	-21.61	AVG
11		13.2500	34.58	11.34	45.92	60.00	-14.08	QP
12		13.2500	18.91	11.34	30.25	50.00	-19.75	AVG

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**D: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

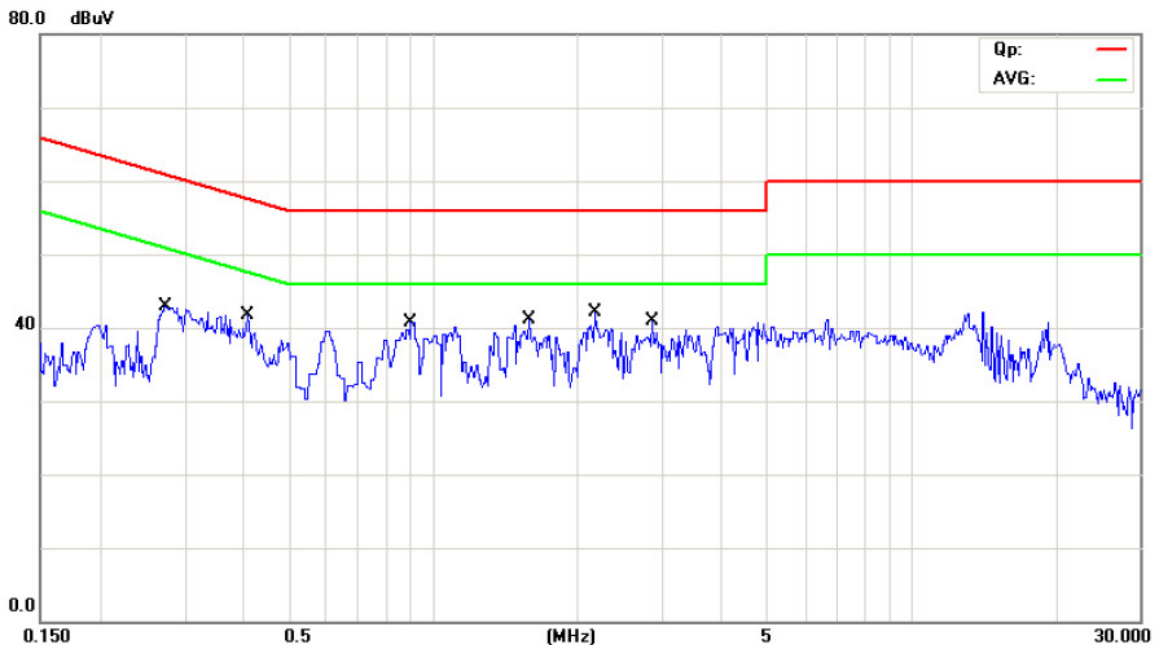
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

**EUT set Condition: Play USB**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		2.1680	23.20	12.37	35.57	56.00	-20.43	QP
2		2.1680	11.42	12.37	23.79	46.00	-22.21	AVG
3		0.2733	31.81	11.13	42.94	61.02	-18.08	QP
4		0.2733	18.36	11.13	29.49	51.02	-21.53	AVG
5		0.4063	30.43	11.27	41.70	57.72	-16.02	QP
6		0.4063	15.69	11.27	26.96	47.72	-20.76	AVG
7		0.9050	28.83	11.80	40.63	56.00	-15.37	QP
8		0.9050	13.37	11.80	25.17	46.00	-20.83	AVG
9	*	1.5800	28.96	12.13	41.09	56.00	-14.91	QP
10		1.5800	11.33	12.13	23.46	46.00	-22.54	AVG
11		2.8624	28.35	12.64	40.99	56.00	-15.01	QP
12		2.8624	12.54	12.64	25.18	46.00	-20.82	AVG

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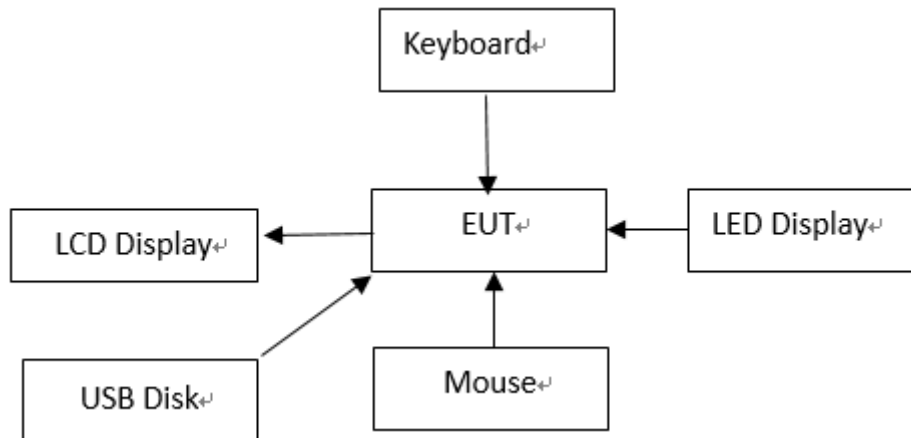
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## 5.0 Radiated Disturbance Test

### 5.1 Schematics of the test

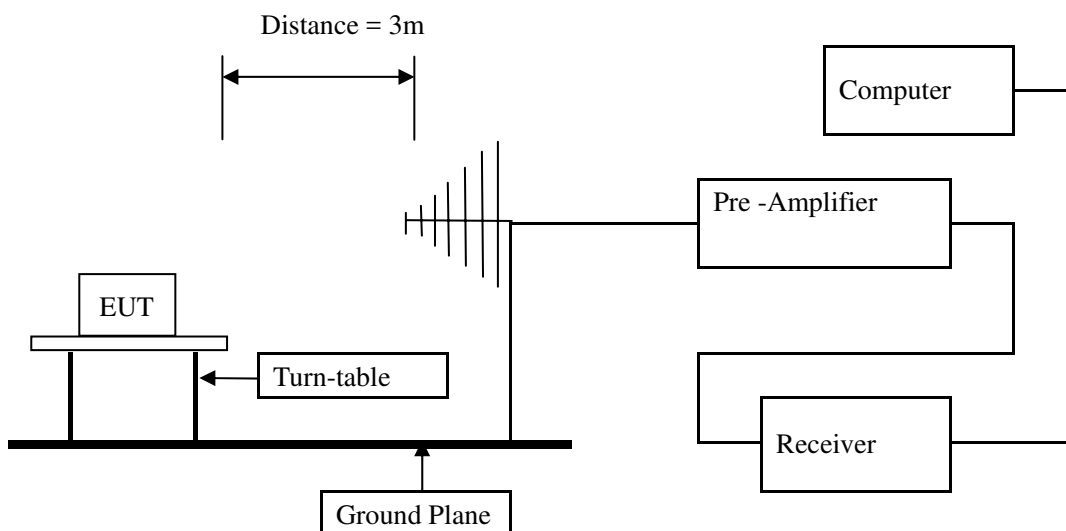


### 5.2 Test Method and test Procedure:

The EUT was tested according to ANSI C63.4-2014; The frequency spectrum from 30MHz to 40GHz was investigated. All reading from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK

Testing Voltage and Frequency: 120V~, 60Hz

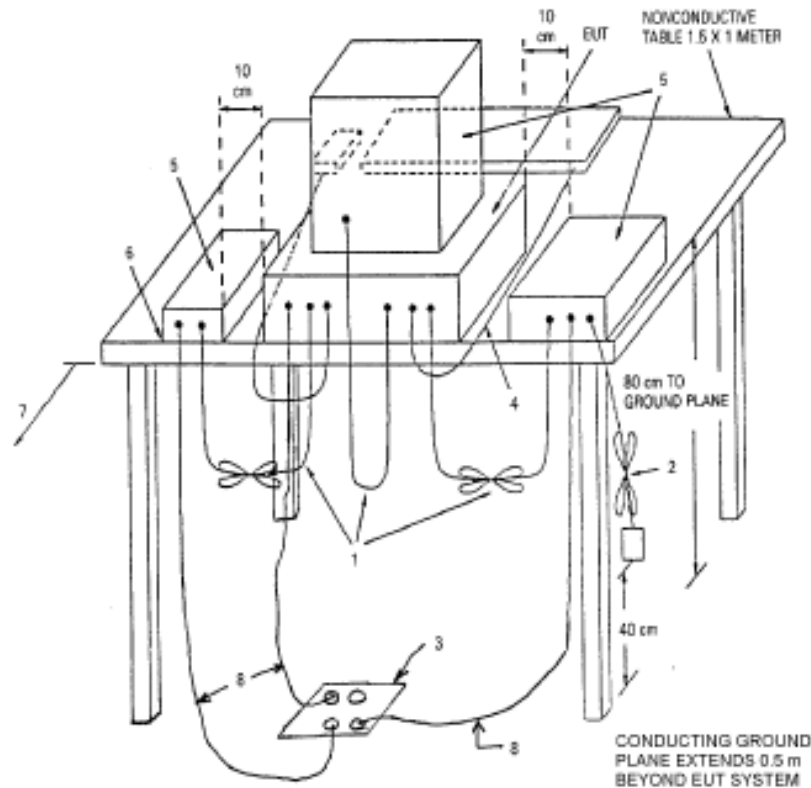
#### Block diagram of Test setup



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### 5.3 Radiated Emission Limit

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.00
88-216	3	43.50
216-960	3	46.00
Above 960	3	54.00

Note: 1. The lower limit shall apply at the transition frequencies

2. This is a handheld device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

### 5.4 Test result

The frequency spectrum from 30MHz to 40GHz was investigated. All reading from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK. Measurements were made at 3 meters.

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**T est result**

**General Radiated Emission Data and Harmonics Radiated Emission Data**

**Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)**

**EUT set Condition: Running EMC test Program and Ping Network**

**Results: Pass**

Frequency (MHz)	Reading (dB $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
164.440	27.59	7.47	2.53	37.59	H	43.50
483.240	13.43	15.25	4.35	33.03	H	46.00
590.680	16.57	17.01	4.77	38.35	H	46.00
373.640	10.78	12.98	3.92	27.68	H	46.00
268.480	17.54	10.10	3.22	30.86	H	46.00
761.253	16.64	19.09	5.52	41.25	H	46.00
164.400	30.83	7.47	2.53	40.83	V	43.50
483.280	21.93	15.25	4.35	41.53	V	46.00
590.680	11.19	17.01	4.77	32.97	V	46.00
375.880	14.88	12.99	3.92	31.79	V	46.00
268.480	17.89	10.10	3.22	31.21	V	46.00
736.910	13.07	19.09	5.52	37.68	V	46.00

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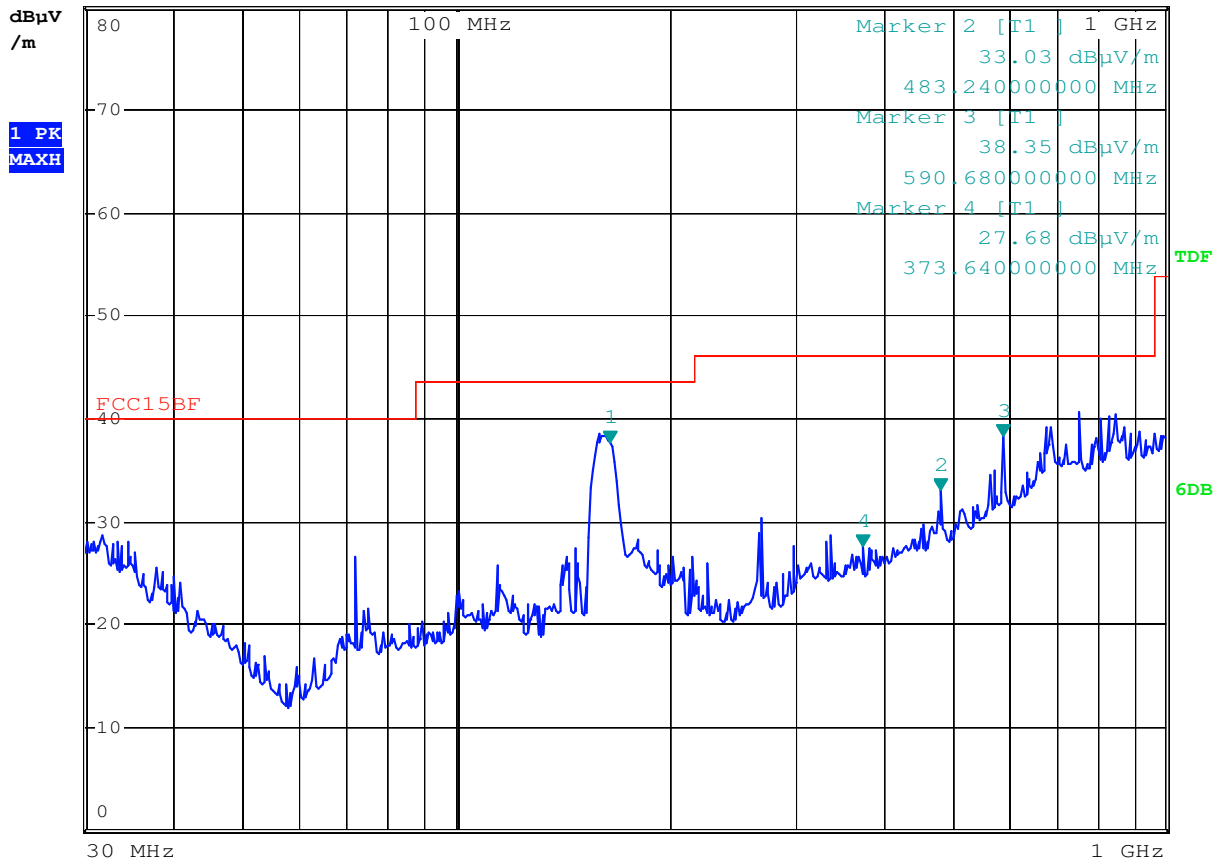
Test Figure:

H



**RECEIVER FREQUENCY**  
 77.64 MHz  
 Att 10 dB

RBW 120 kHz Marker 1 [T1 ]  
 MT 50 μs 37.59 dBμV/m  
 PREAMP ON 164.440000000 MHz



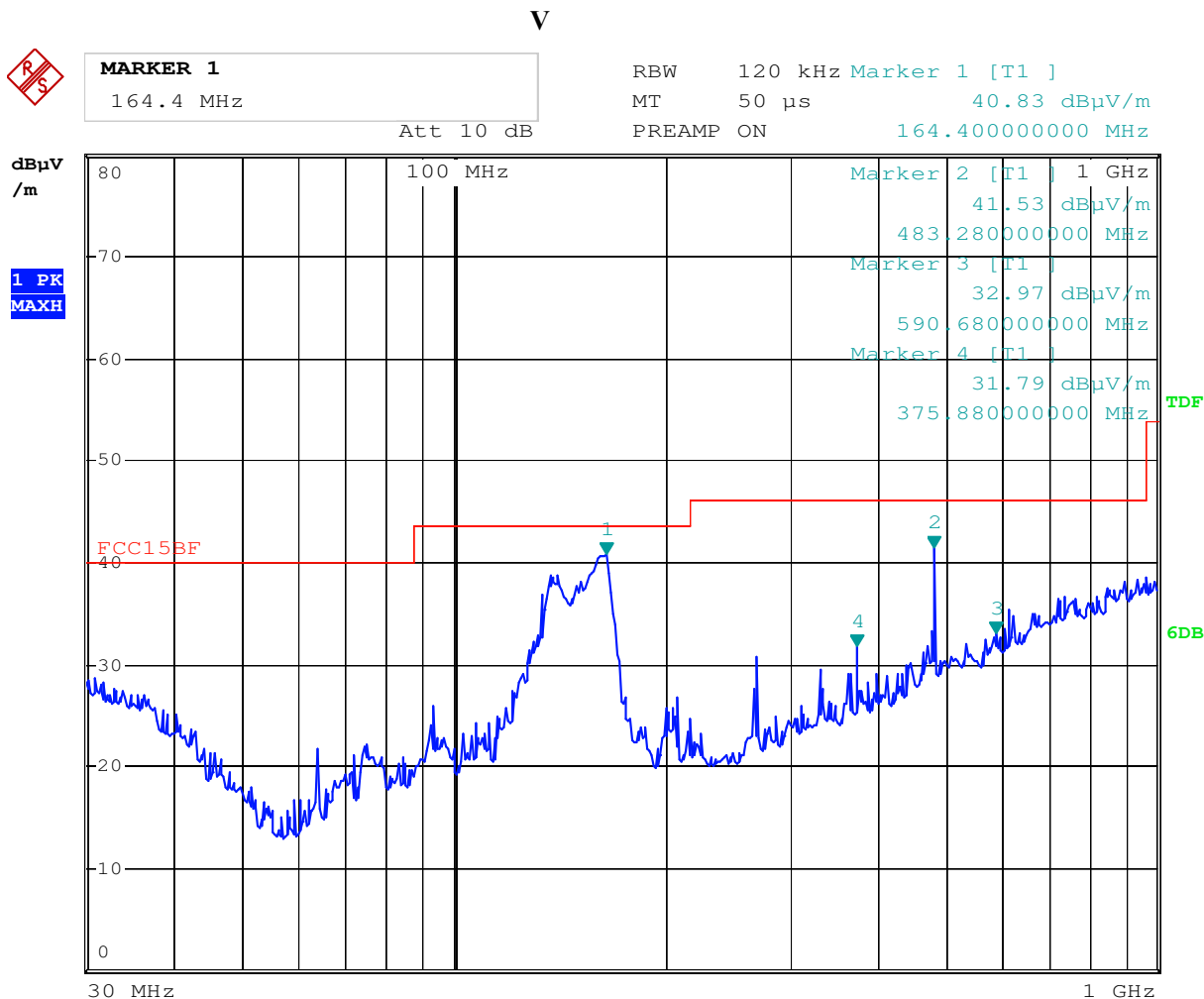
Date: 8.APR.2016 10:26:44

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Test Figure:



Date: 8.APR.2016 10:23:14

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**T est result**

**General Radiated Emission Data and Harmonics Radiated Emission Data**

**Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)**

**EUT set Condition: Play USB**

**Results: Pass**

Frequency (MHz)	Reading (dB $\mu$ V)	Antenna Factor (db/m)	Cable Loss (dB)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
375.880	19.38	12.99	3.92	36.29	H	46.00
920.080	14.15	21.00	6.26	41.41	H	46.00
483.240	17.52	15.25	4.35	37.12	H	46.00
163.120	26.33	7.48	2.49	36.30	H	43.50
268.480	21.84	10.10	3.22	35.16	H	46.00
72.530	20.79	7.11	1.86	29.76	H	40.00
511.360	20.13	15.78	4.63	40.54	V	46.00
590.680	21.21	17.01	4.77	42.99	V	46.00
155.320	27.73	7.87	2.41	38.01	V	43.50
268.480	24.65	10.10	3.22	37.97	V	46.00
72.530	24.75	7.11	1.86	33.72	V	40.00
375.880	20.30	13.04	3.92	37.26	V	46.00

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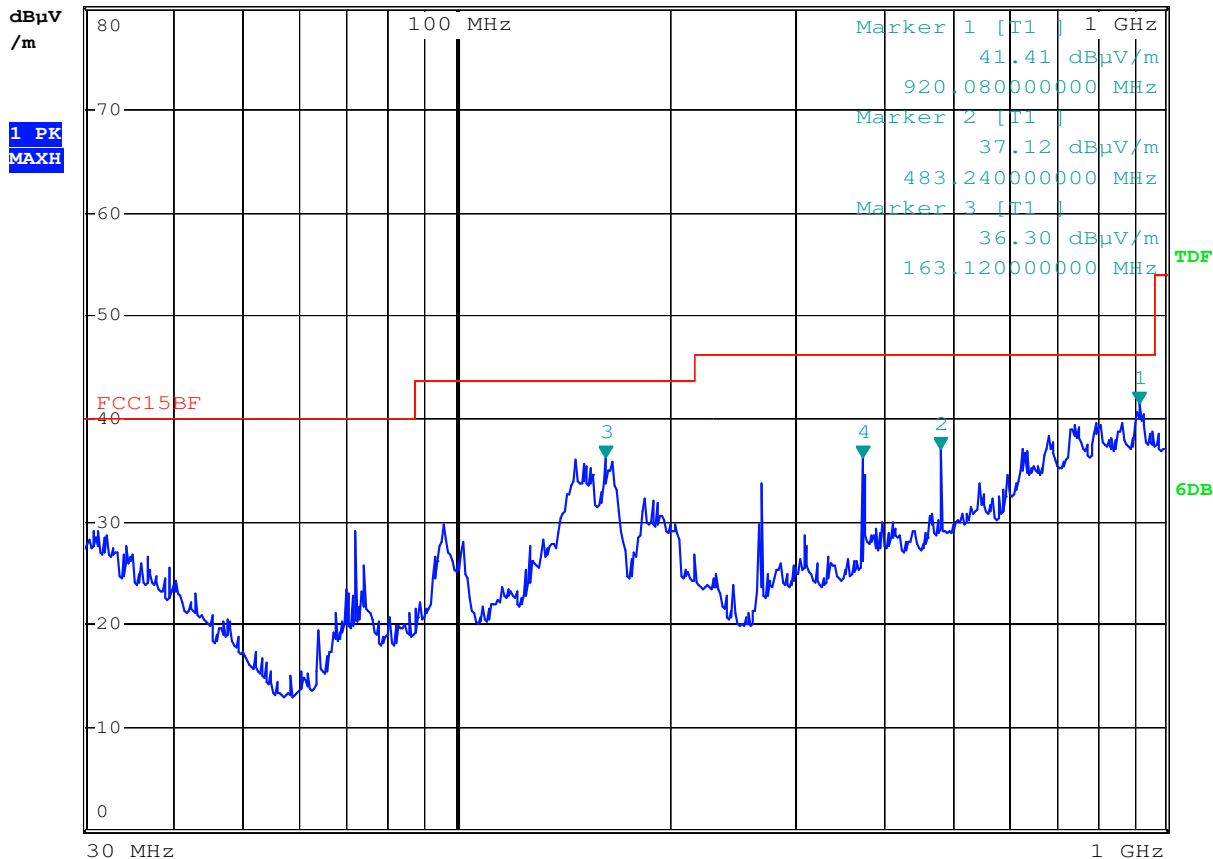
Test Figure:

H



**MARKER 4**  
 375.88 MHz  
 Att 10 dB

RBW 120 kHz Marker 4 [T1 ]  
 MT 50 μs 36.29 dBμV/m  
 PREAMP ON 375.88000000 MHz

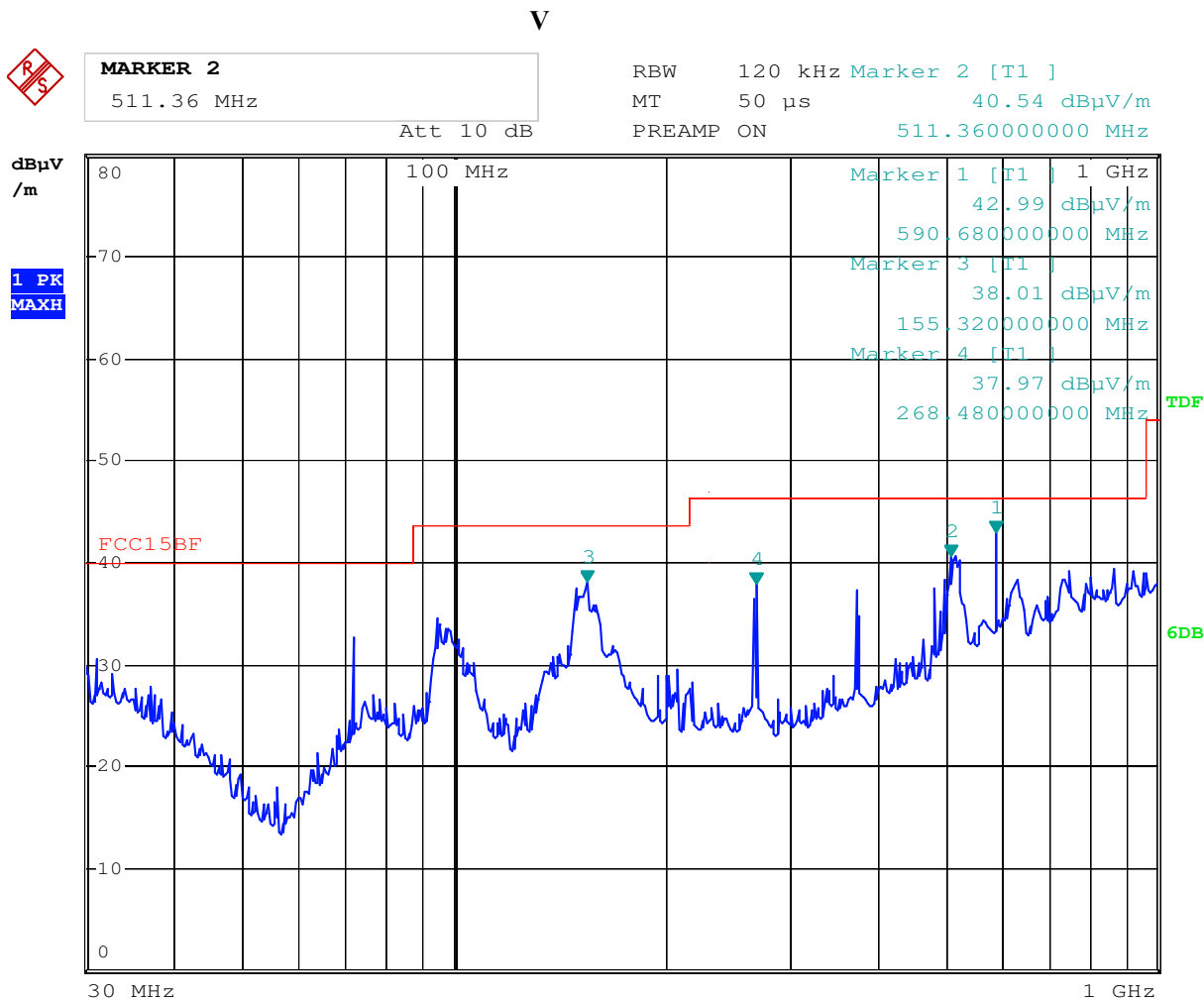


Date: 8.APR.2016 10:02:19

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Test Figure:



Date: 8.APR.2016 09:54:14

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**Radiated Disturbance (1000MHz----40000MHz)**

**EUT Operating Environment**

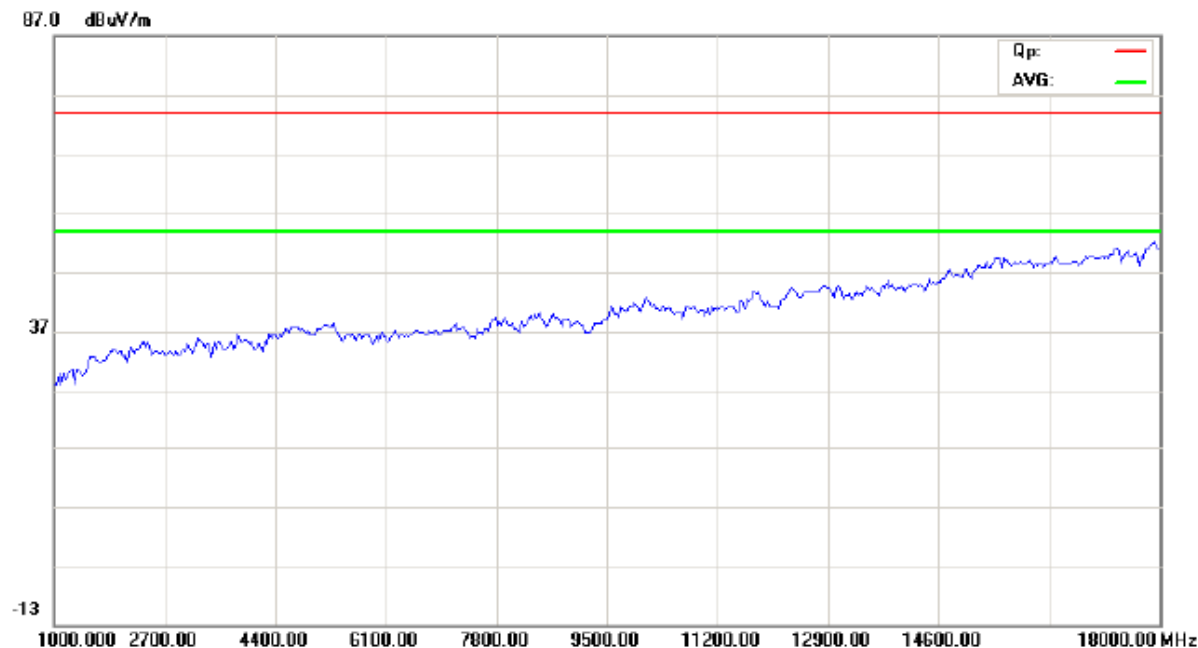
**Temperature:25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa**

**EUT set Condition: Running EMC test Program**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	H	54(AV)

- Note: 1. Due to the final radiated level much less than the limit, so necessary take down final radiated level  
 2. For radiated Emissions from 18-40GHz, it is only the floor noise.

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**Radiated Disturbance (1000MHz----40000MHz)**

**EUT Operating Environment**

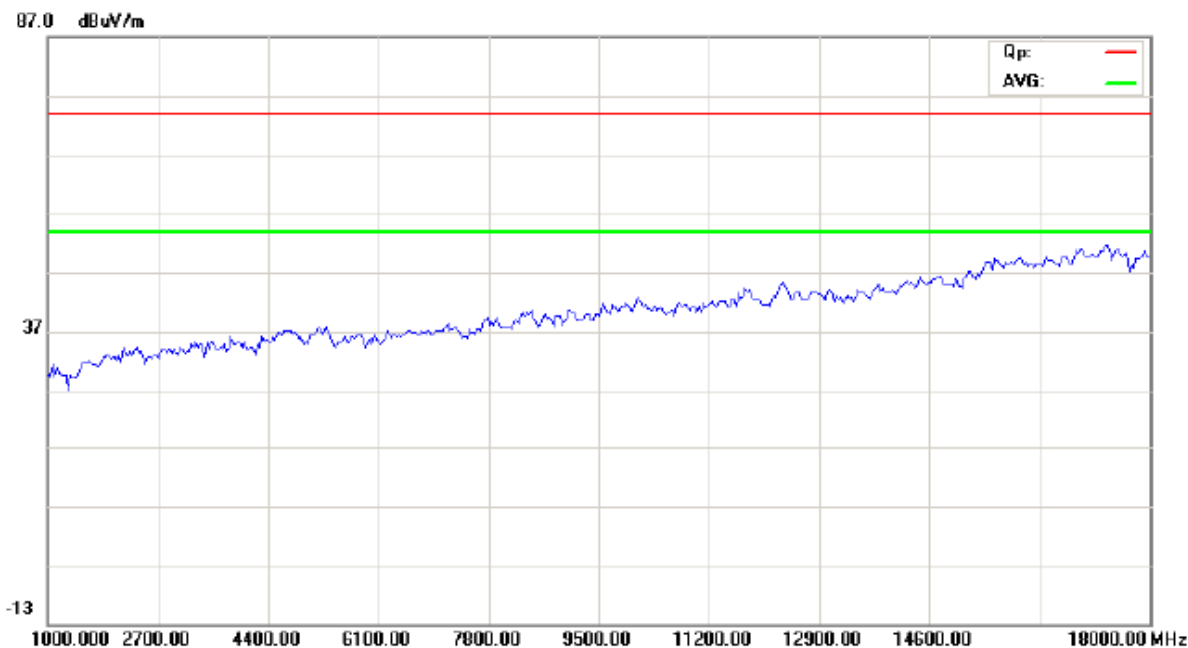
Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa

**EUT set Condition: Running EMC test Program**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	V	54(AV)

- Note: 1. Due to the final radiated level much less than the limit, so necessary take down final radiated level  
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**Radiated Disturbance (1000MHz----40000MHz)**

**EUT Operating Environment**

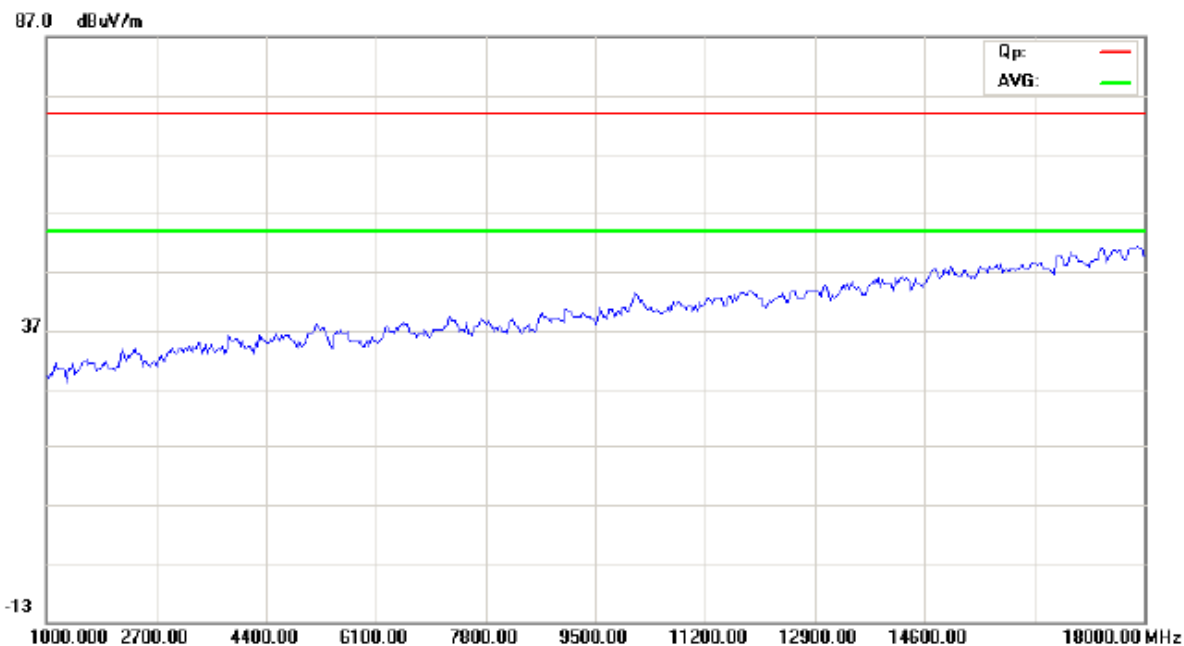
**Temperature:25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa**

**EUT set Condition: Play USB**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	H	54(AV)

- Note: 1. Due to the final radiated level much less than the limit, so necessary take down final radiated level  
 2. For radiated Emissions from 18-40GHz, it is only the floor noise.

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**Radiated Disturbance (1000MHz----40000MHz)**

**EUT Operating Environment**

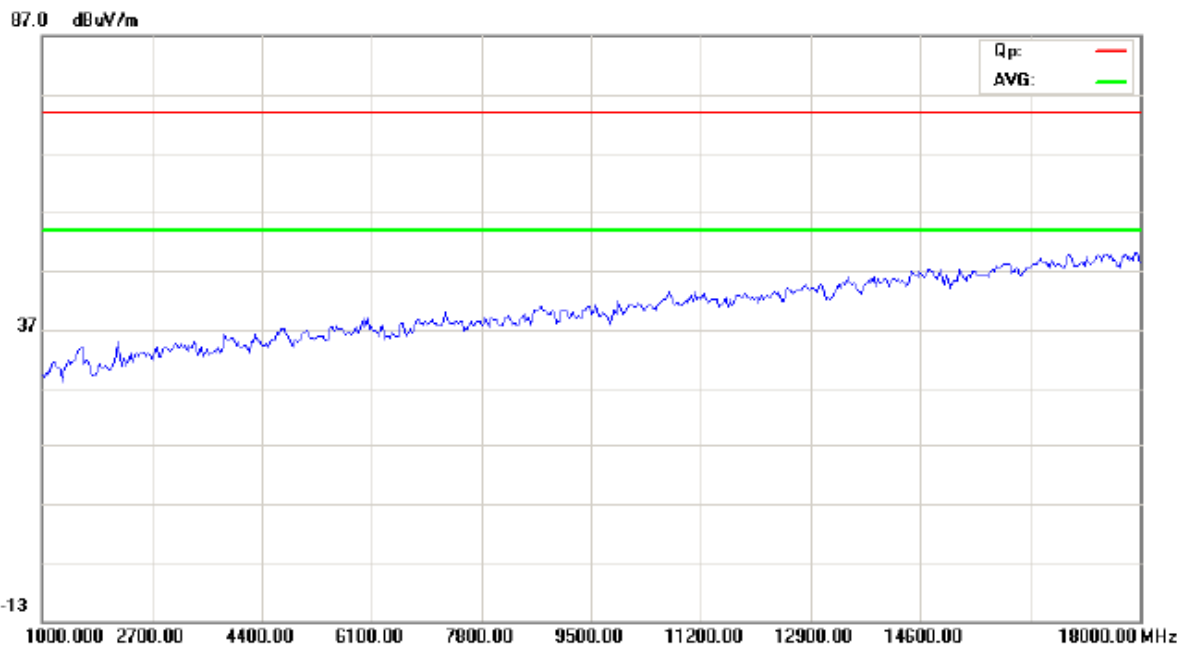
Temperature:25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa

**EUT set Condition: Play USB**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	V	54(AV)

- Note: 1. Due to the final radiated level much less than the limit, so necessary take down final radiated level  
 2. For radiated Emissions from 18-40GHz, it is only the floor noise.

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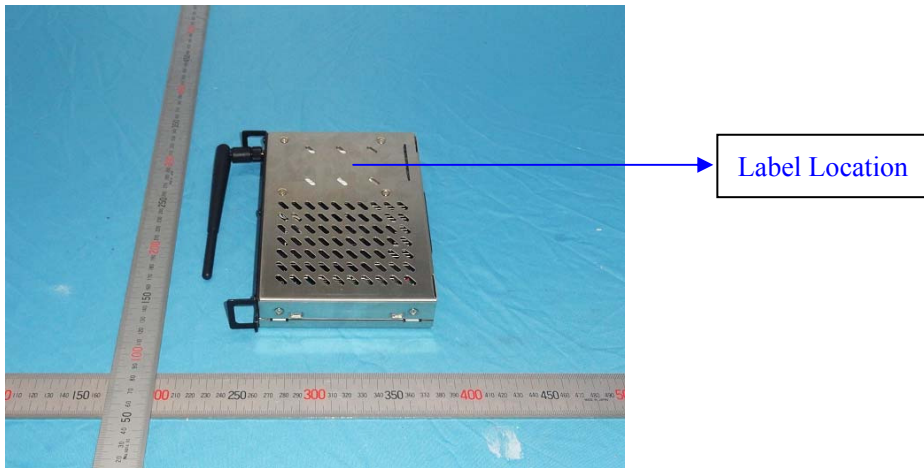
## 6.0 FCC ID Label

### FCC ID: YS2OPSPCAED-PH-PS

**This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

#### Mark Location:



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7.0 Photo of testing

7.1 Conducted test View--

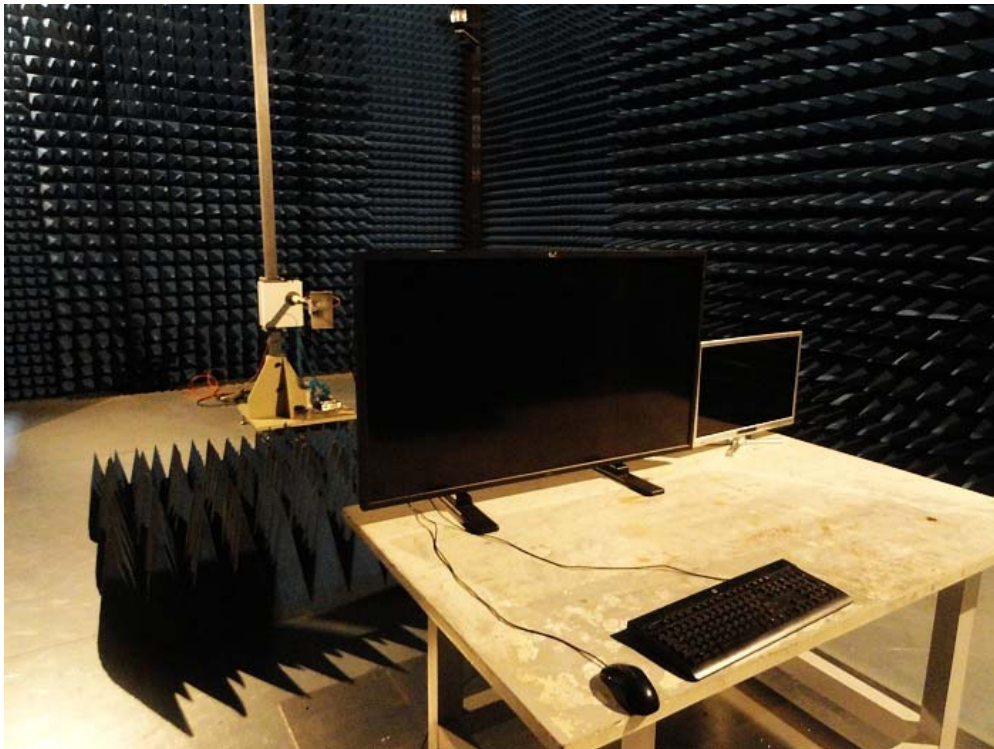


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7.2 Radiated emission test view--



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**Photos of EUT**



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**Photos of EUT**



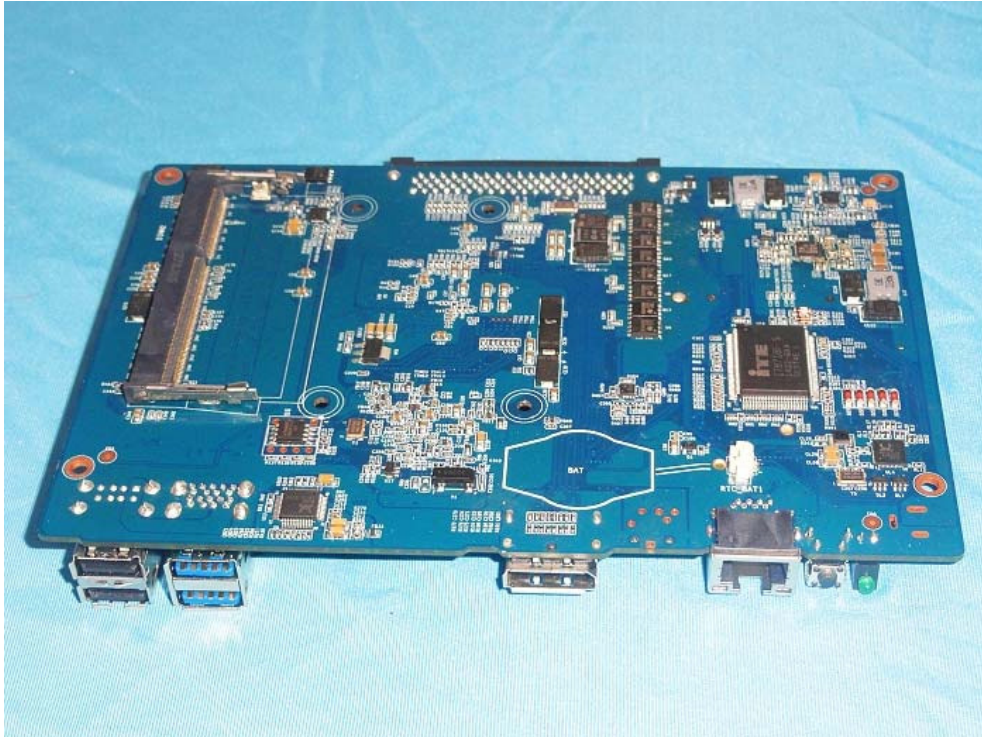
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**Photos of EUT**

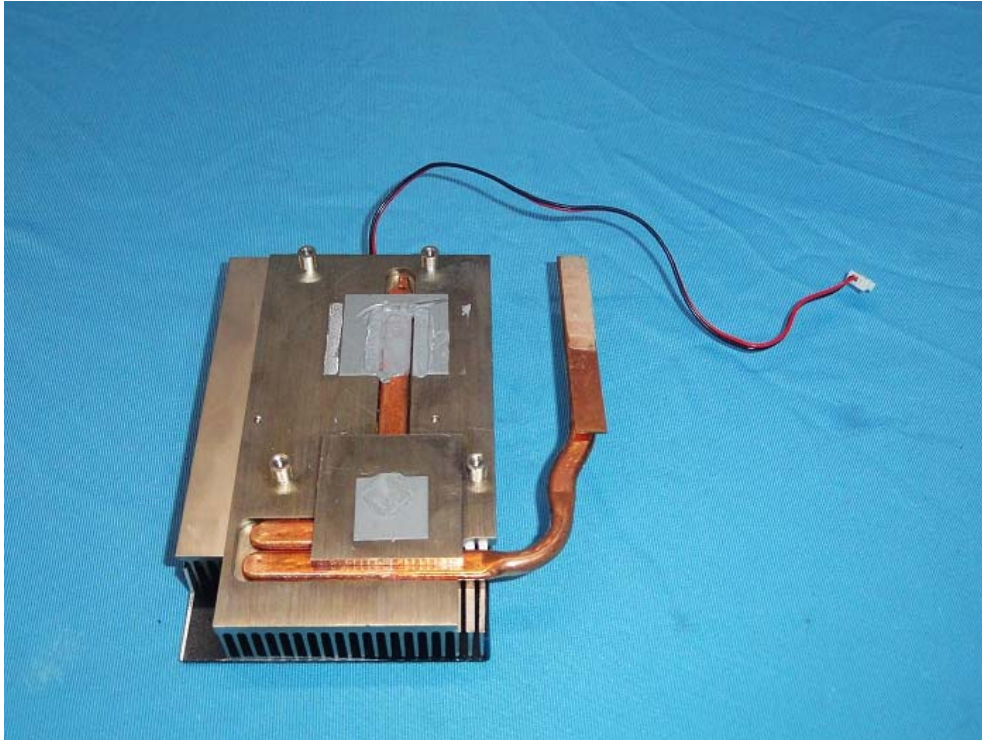


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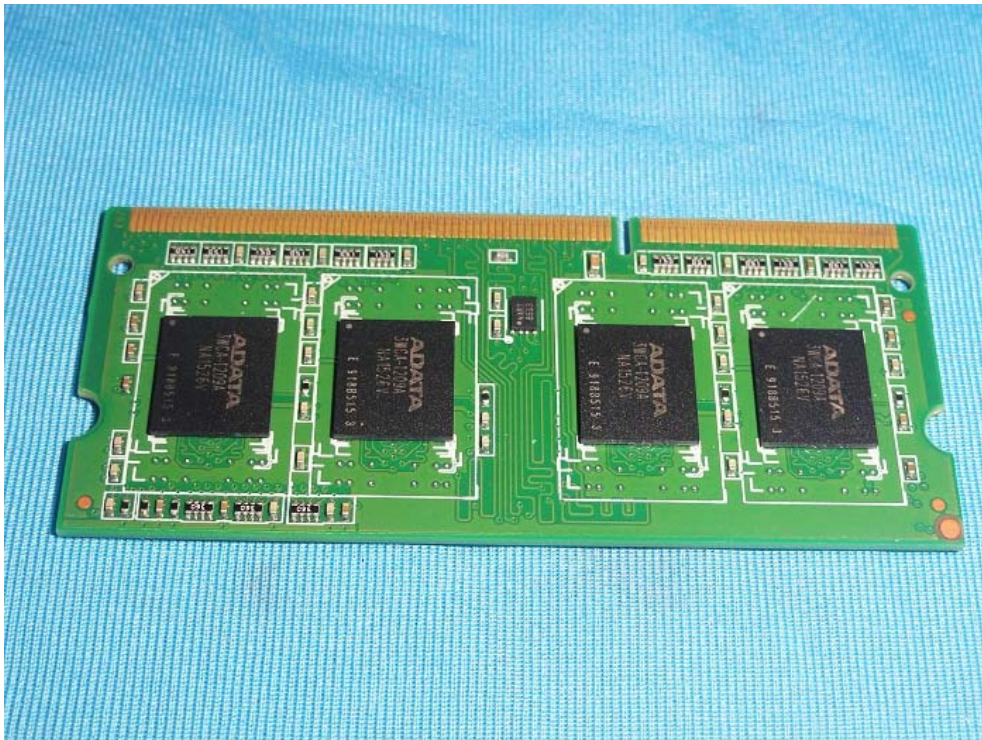
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**Photos of EUT**



**-End of the report-**

The report refers only to the sample tested and does not apply to the bulk.  
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