

TECHNICAL REPORT



Report No: FCC1512112

File reference No: 2015-12-25

Applicant: Technovare Systems, Inc.

Product: Embedded Computer

Model No: OPS-PCIB

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: December 25, 2015

**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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## Test Report Conclusion

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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 Karman Ave., 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 Karman Ave., Suite 175, Irvine, CA 92606, USA  
Brand Name: Technovare TNET-PC  
Model Number: OPS-PCIB  
Rating: DC16V, 3A

### 1.4 Submitted Sample: 1 Samples

1.5 Test Duration: 2015-12-21 to 2015-12-25

### 1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

### 1.7 Test Engineer

The sample tested by

A handwritten signature in black ink that reads "Terry Tong".

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

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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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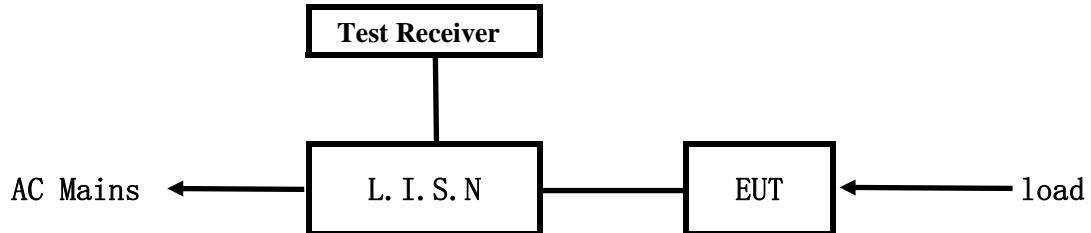
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#### 4.0 Conducted Power line Test

##### 4.1 Schematics of the test



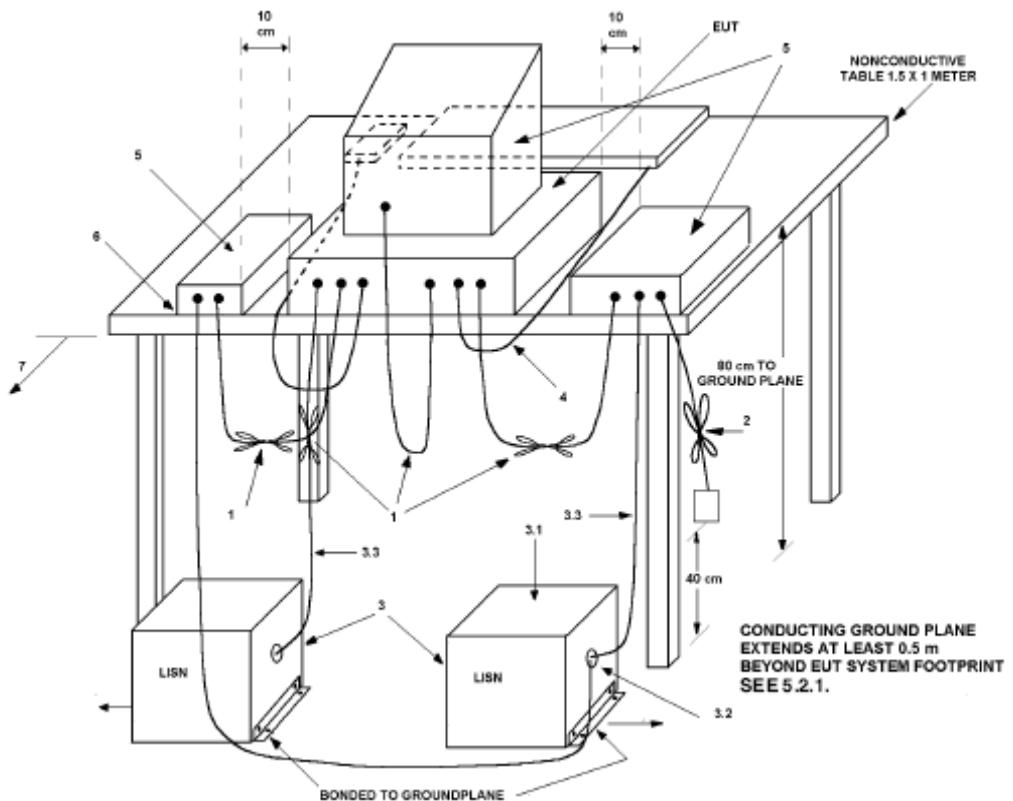
EUT: Equipment Under Test

##### 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.

Actual Working 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(μV)		Class B Limits dB(μV)	
	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: 1. \*decreasing linearly with logarithm of frequency.

2. 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**

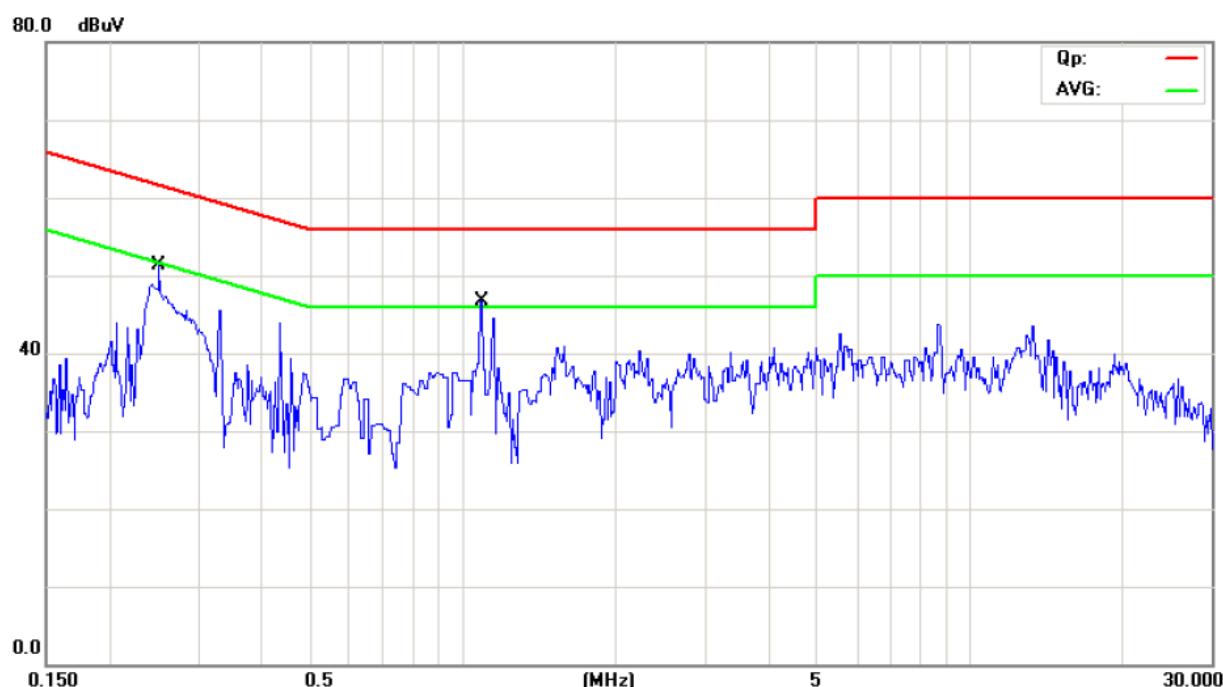
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 KPa

**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.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	*	0.2501	35.00	11.11	46.11	61.75	-15.64	QP	
2		0.2501	2.30	11.11	13.41	51.75	-38.34	AVG	
3		1.0840	22.90	11.93	34.83	56.00	-21.17	QP	
4		1.0840	6.90	11.93	18.83	46.00	-27.17	AVG	

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

**EUT Operating Environment**

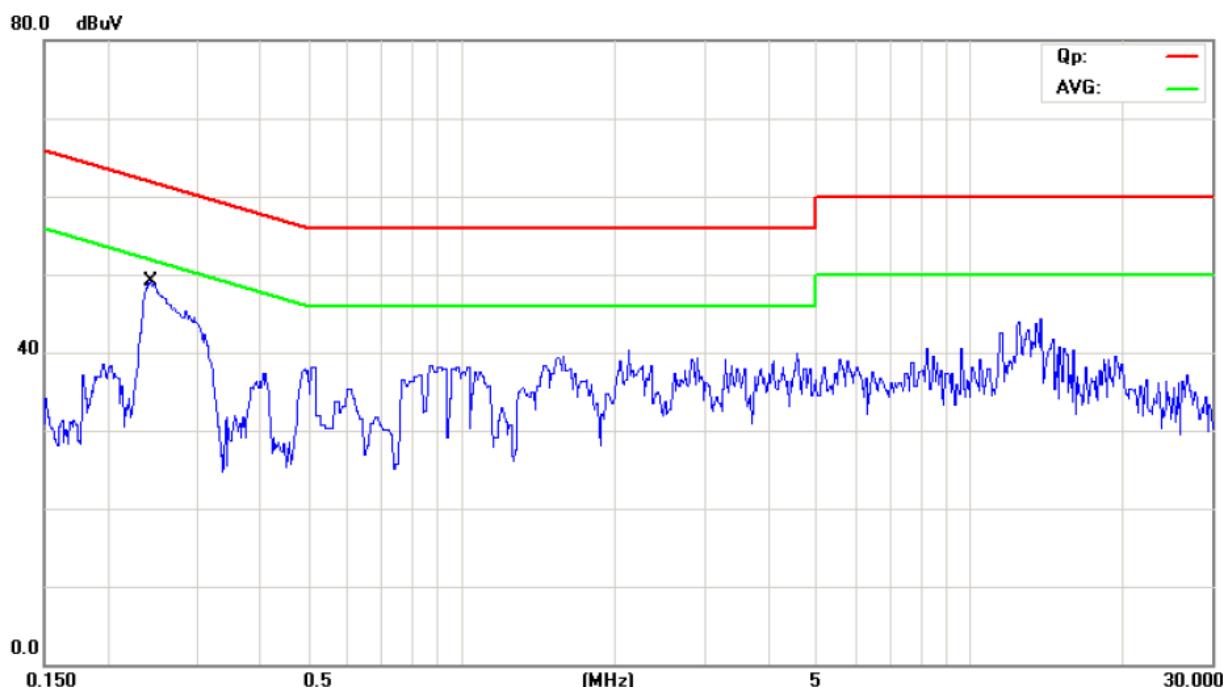
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 kPa

**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	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	*	0.2418	36.30	11.10	47.40	62.03	-14.63	QP	
2		0.2418	11.10	11.10	22.20	52.03	-29.83	AVG	

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

**EUT Operating Environment**

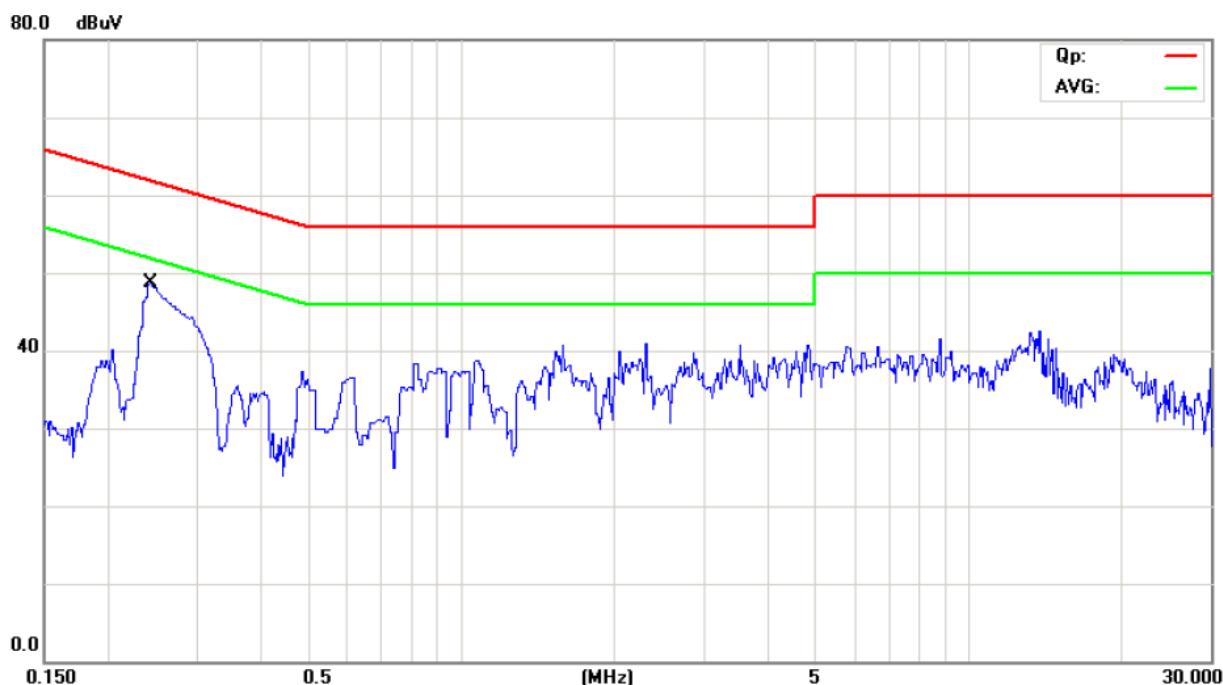
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 KPa

**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	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2423	36.00	11.10	47.10	62.02	-14.92	QP	
2		0.2423	10.60	11.10	21.70	52.02	-30.32	AVG	

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

**EUT Operating Environment**

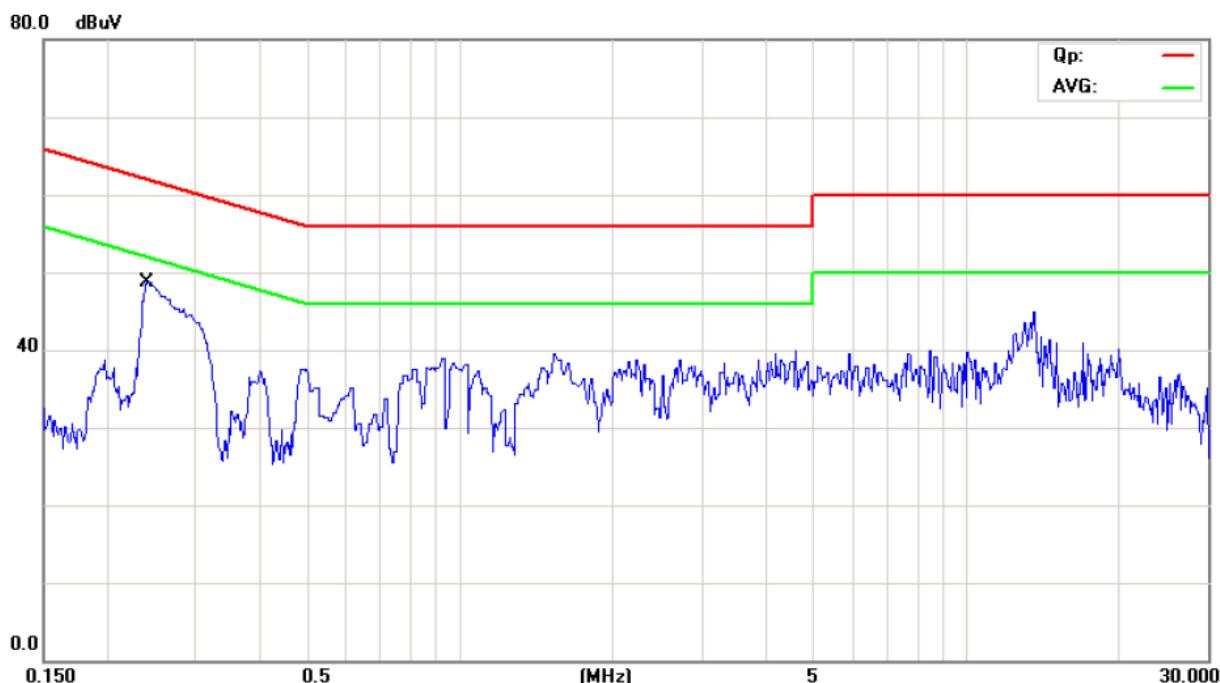
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 KPa

**EUT set Condition: Play USB**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dB	Detector	Comment
1	*	0.2405	35.40	11.10	46.50	62.08	-15.58	QP
2		0.2405	11.20	11.10	22.30	52.08	-29.78	AVG

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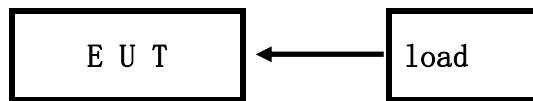
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## 5.0 Radiated Disturbance Test

### 5.1 Schematics of the test

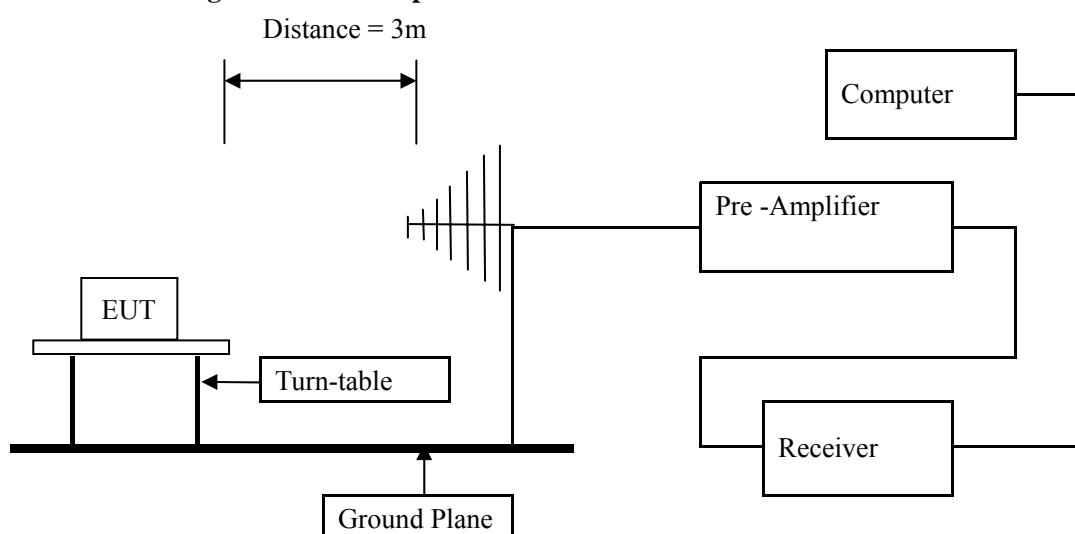


### 5.2 Test Method and test Procedure:

The EUT was tested according to ANSI C63.4 –2014; The frequency spectrum from 30MHz to 5GHz 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

Actual Working Voltage and Frequency: 120V~, 60Hz

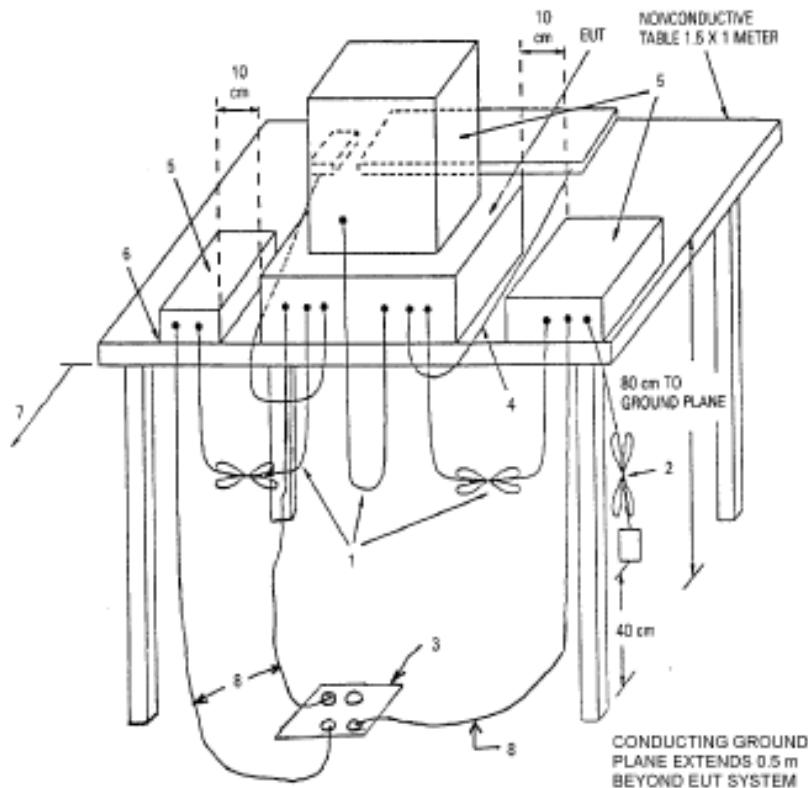
#### Block diagram of Test setup



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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 30GHz 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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**Test 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)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
200.880	32.44	H	43.50
912.040	45.07	H	46.00
481.400	35.86	H	46.00
161.120	34.42	H	43.50
590.640	40.77	V	46.00
483.280	43.37	V	46.00
138.240	32.98	V	43.50
164.520	33.80	V	43.50

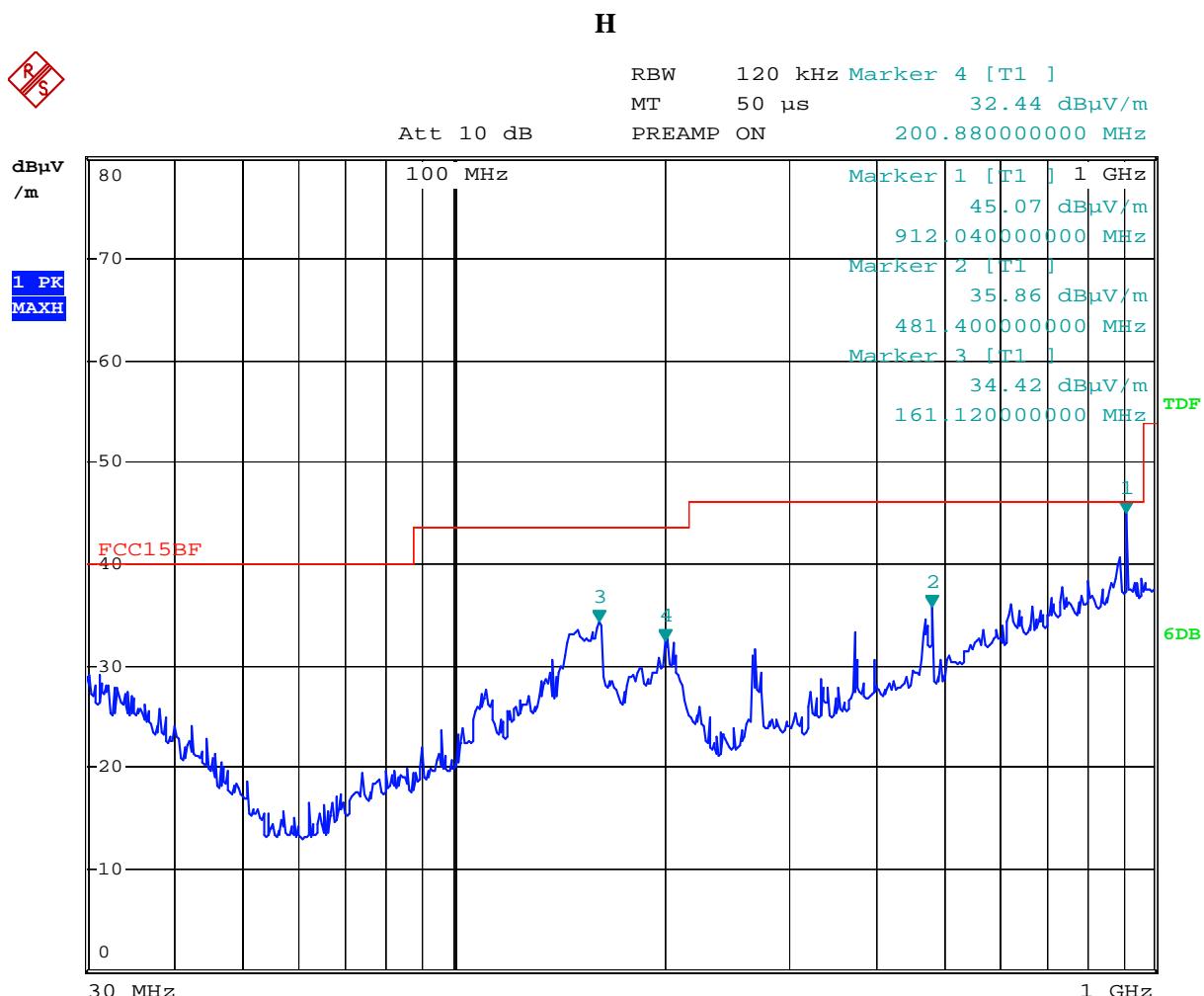
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Test Figure:



Date: 25.DEC.2015 08:54:01

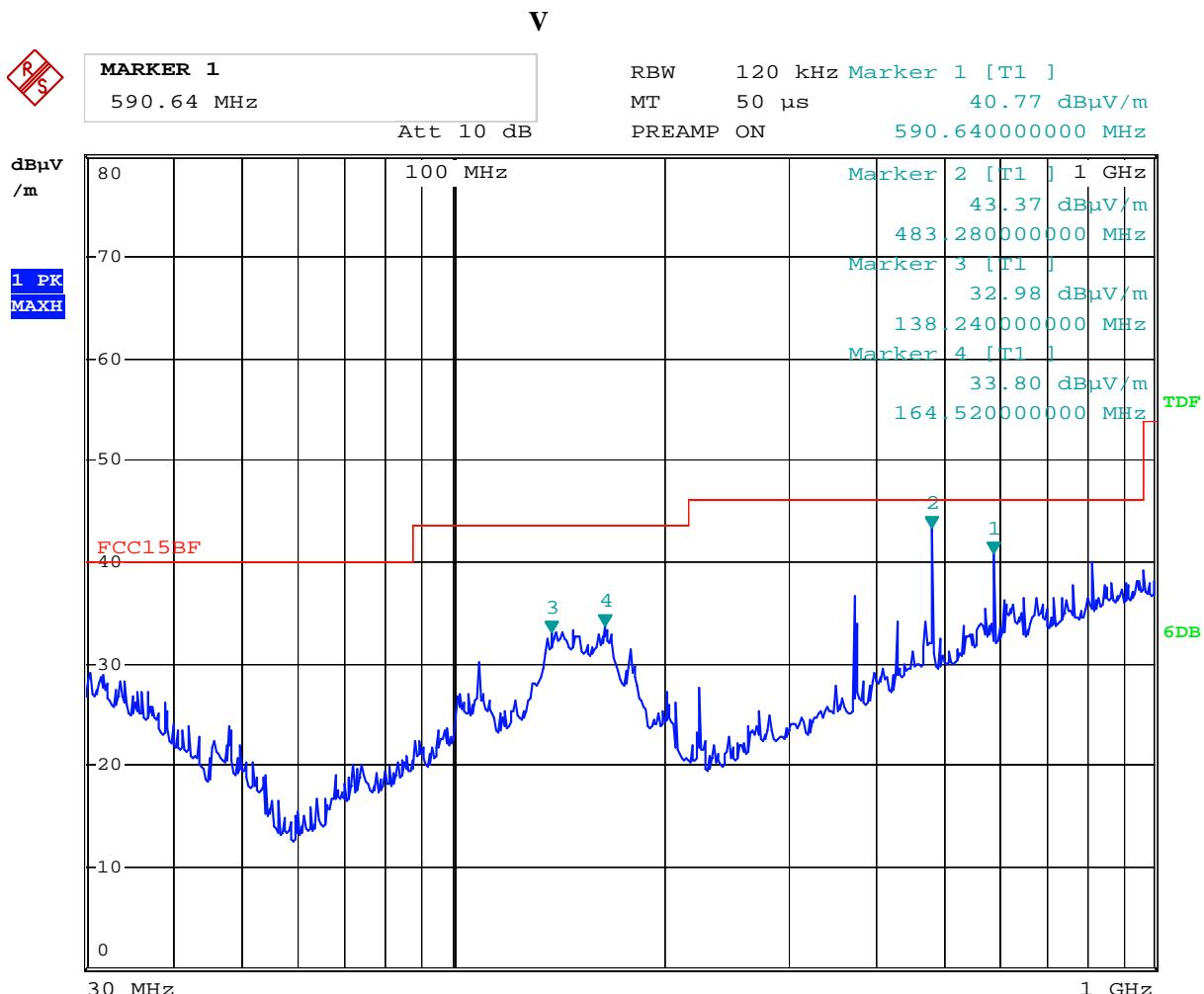
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Test Figure:



Date: 25.DEC.2015 08:55:06

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**Test 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)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
207.600	31.63	H	43.50
483.280	37.69	H	46.00
165.080	33.12	H	43.50
816.000	44.10	H	46.00
816.000	42.14	V	46.00
590.680	39.56	V	46.00
483.280	39.87	V	46.00
150.080	38.39	V	43.50

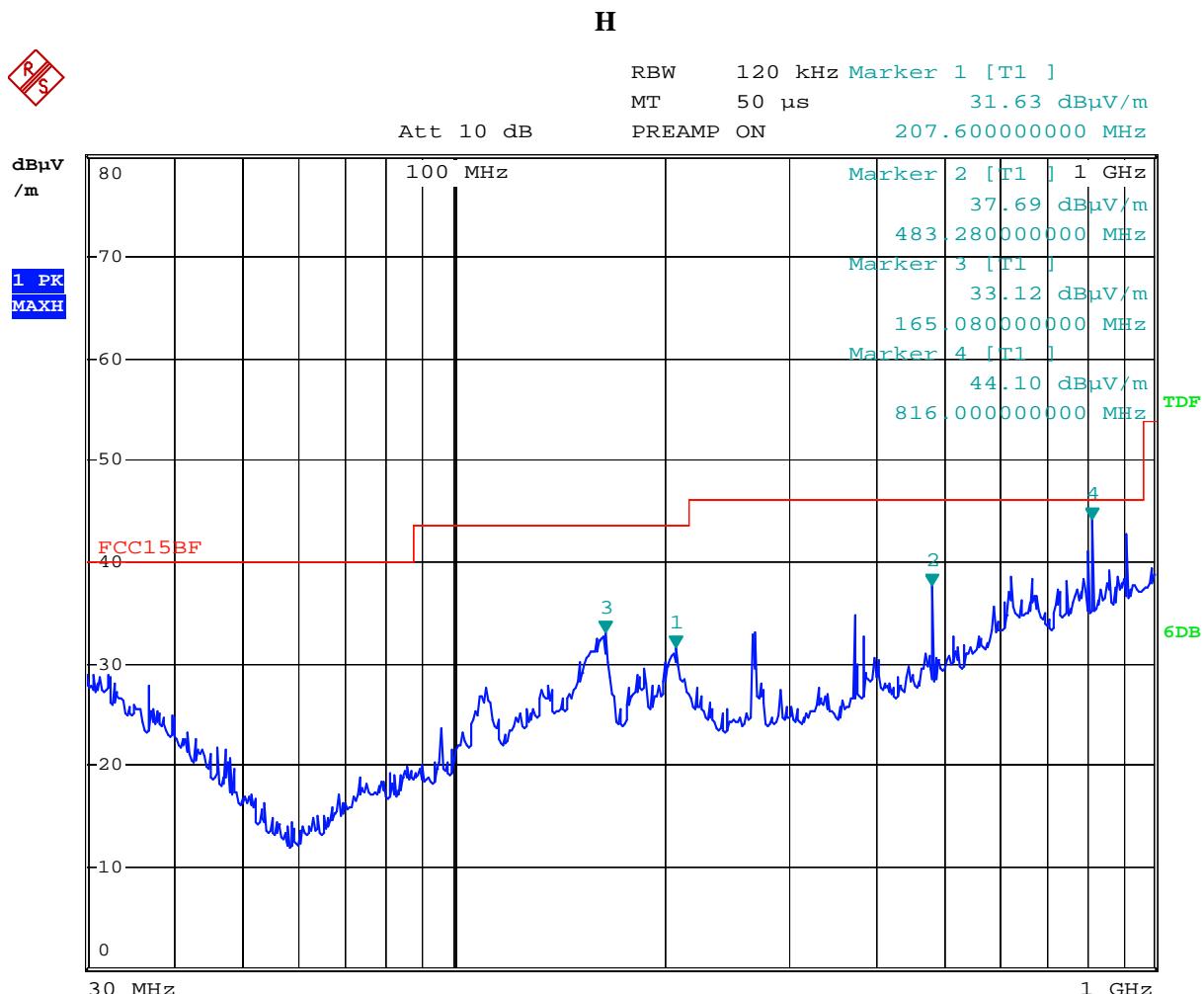
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Test Figure:



Date: 25.DEC.2015 08:58:08

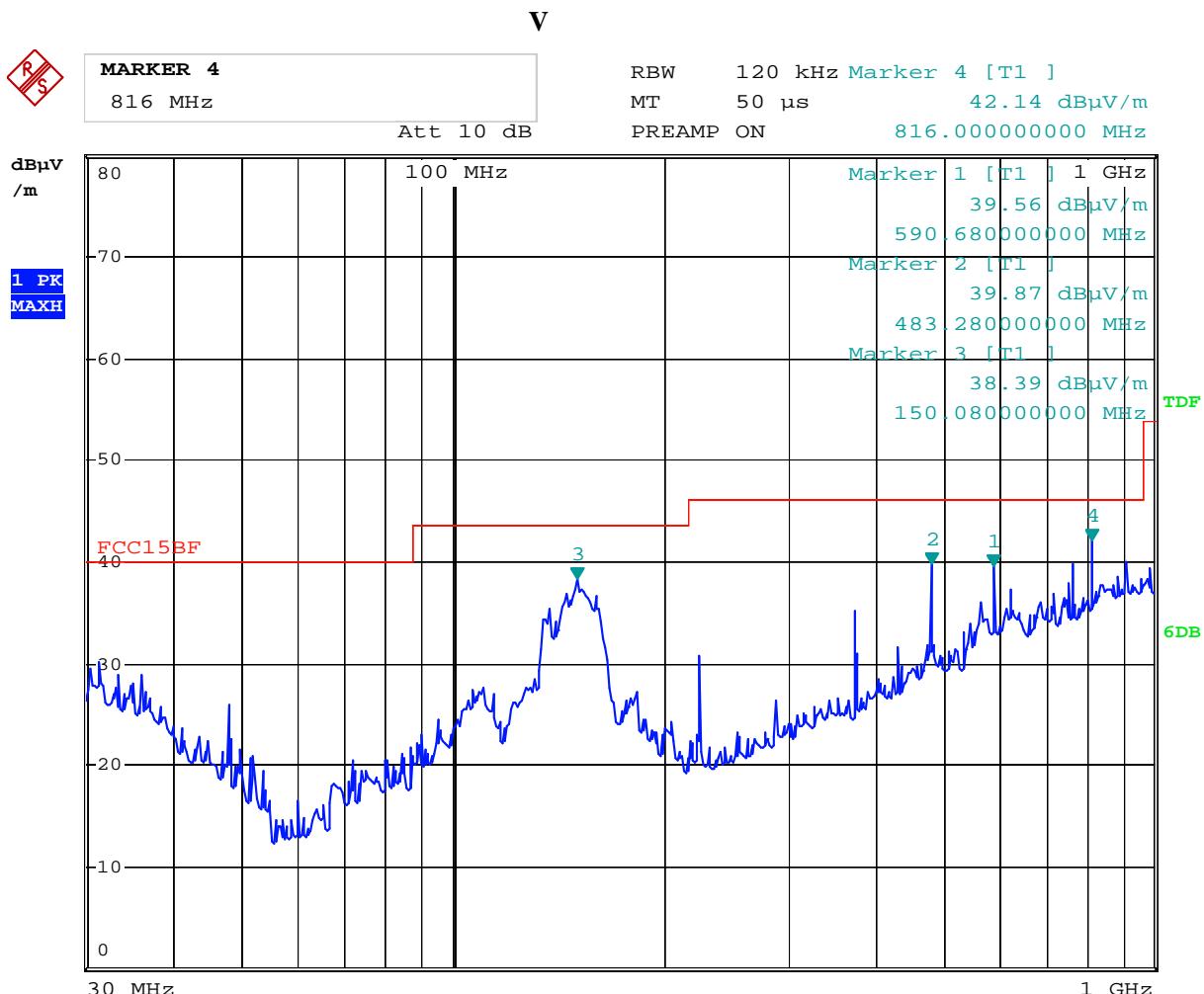
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Test Figure:



Date: 25.DEC.2015 08:55:43

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### Radiated Disturbance (1000MHz----18000MHz)

#### EUT Operating Environment

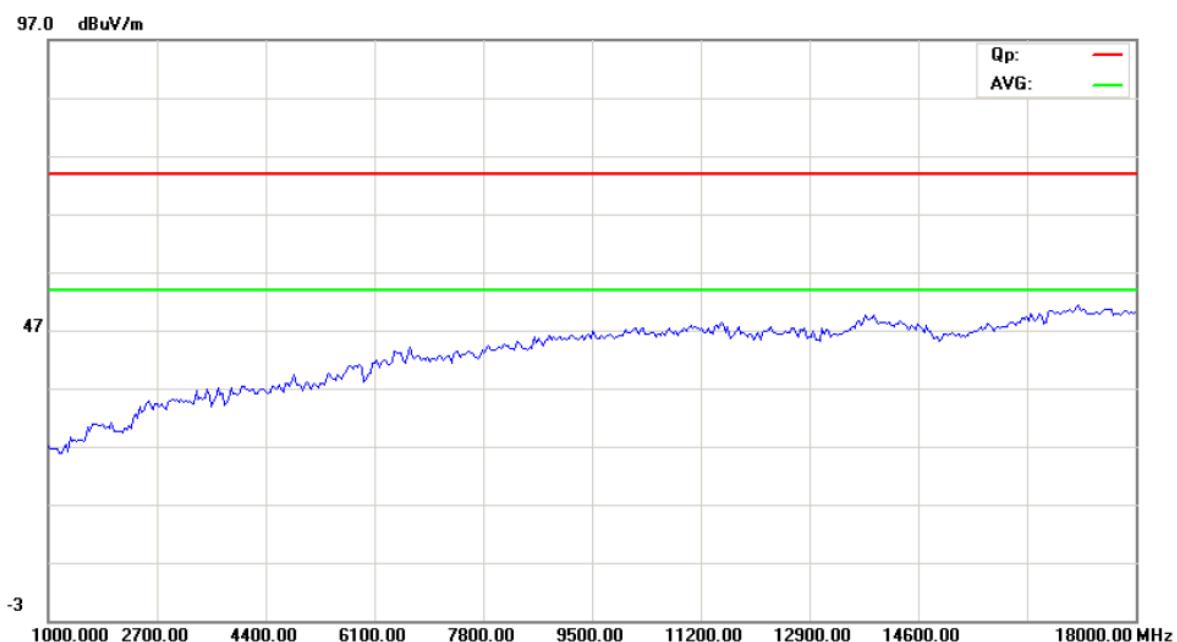
Temperature:25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa

EUT set Condition: Running EMC test Program

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/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 18-30GHz, it is only the floor noise.

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### Radiated Disturbance (1000MHz----18000MHz)

#### EUT Operating Environment

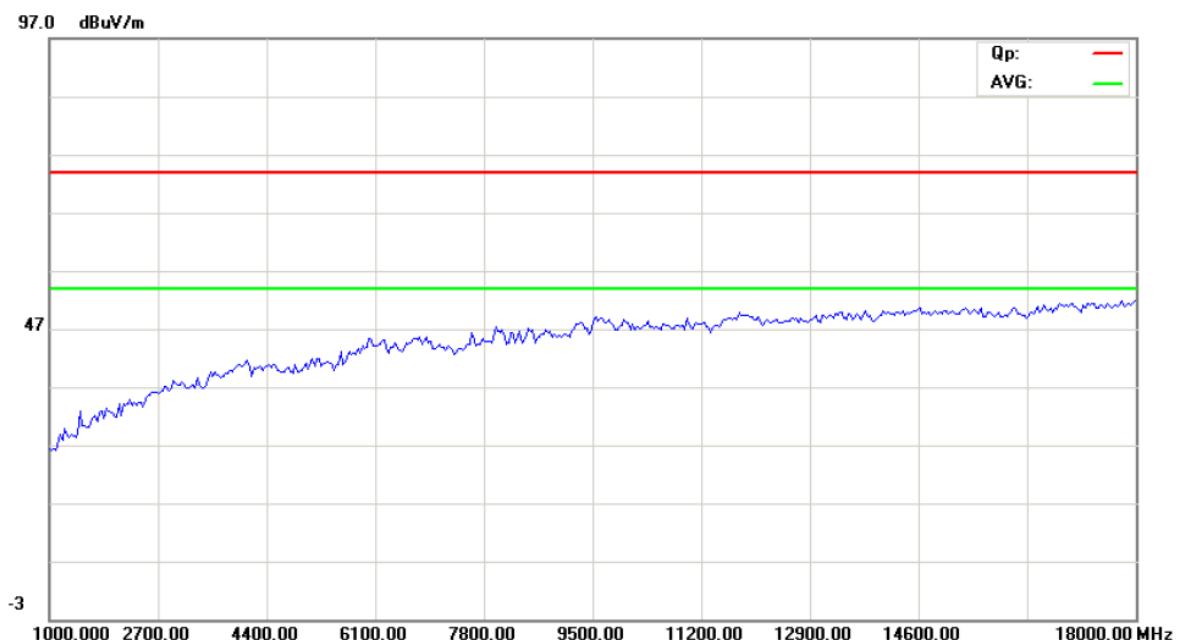
Temperature:25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa

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

#### Equipment Level: Class B

#### Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
--	--	V	54(AV)

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### Radiated Disturbance (1000MHz----18000MHz)

#### EUT Operating Environment

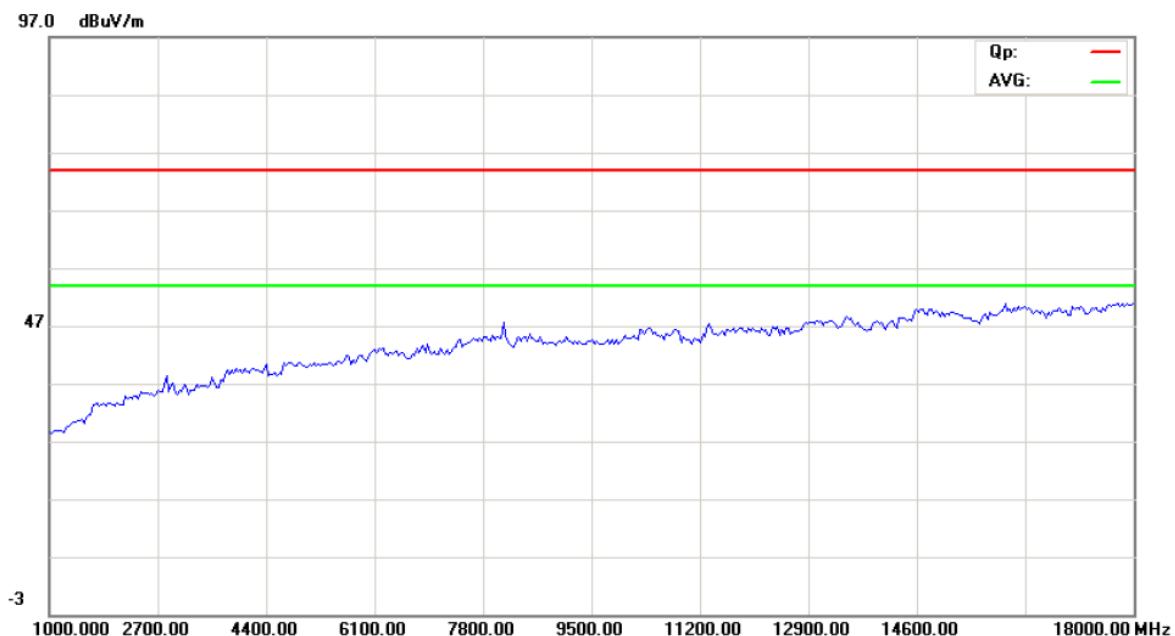
Temperature:25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa

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  
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### Radiated Disturbance (1000MHz----18000MHz)

#### EUT Operating Environment

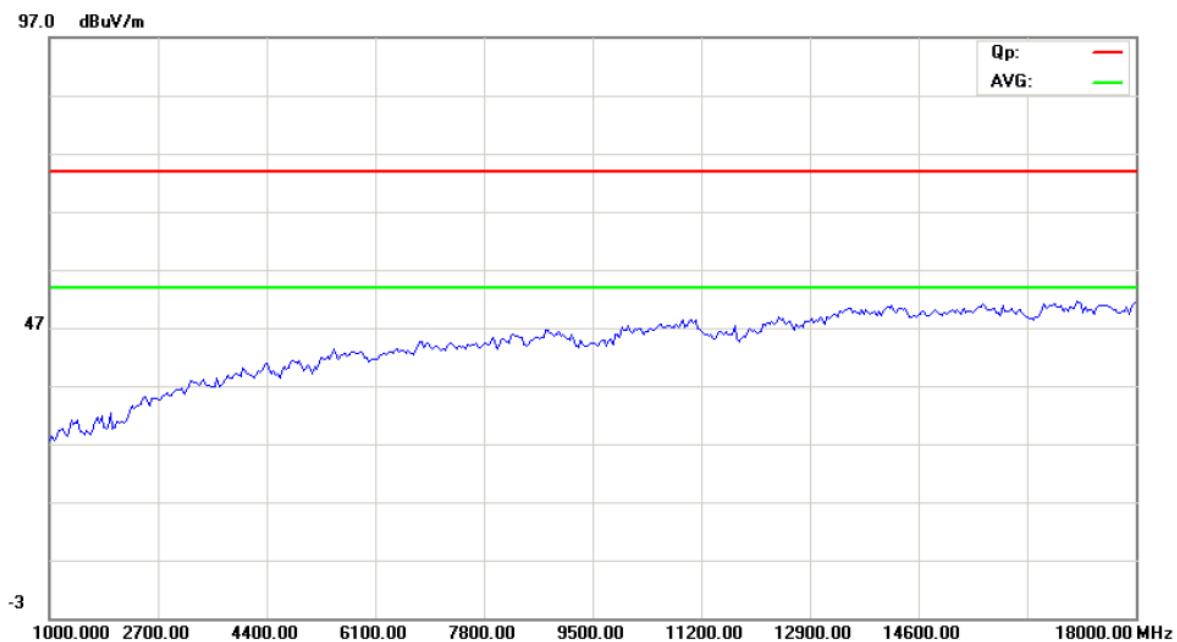
Temperature:25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa

#### EUT set Condition: Play USB

#### Equipment Level: Class B

#### Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/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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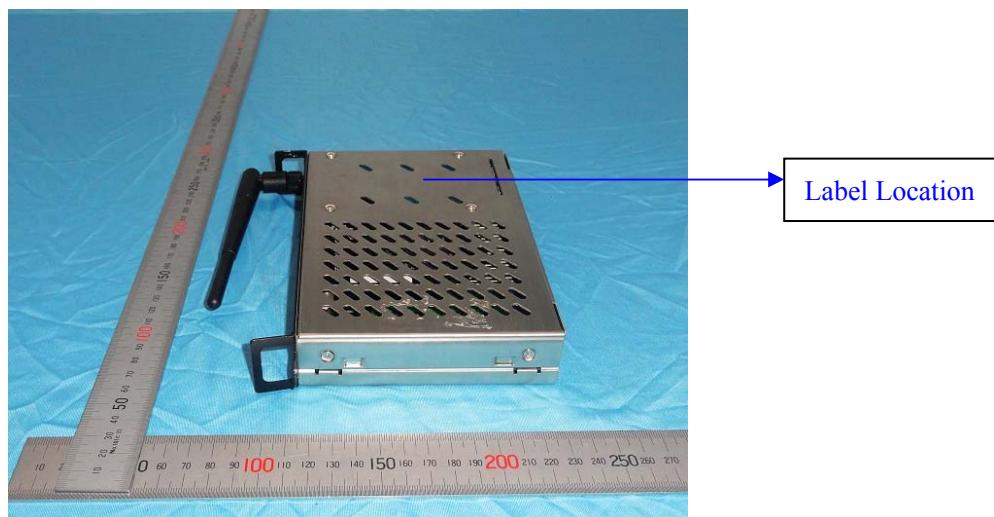
## 6.0 FCC ID Label

**FCC ID:YS2OPSPCIB-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--



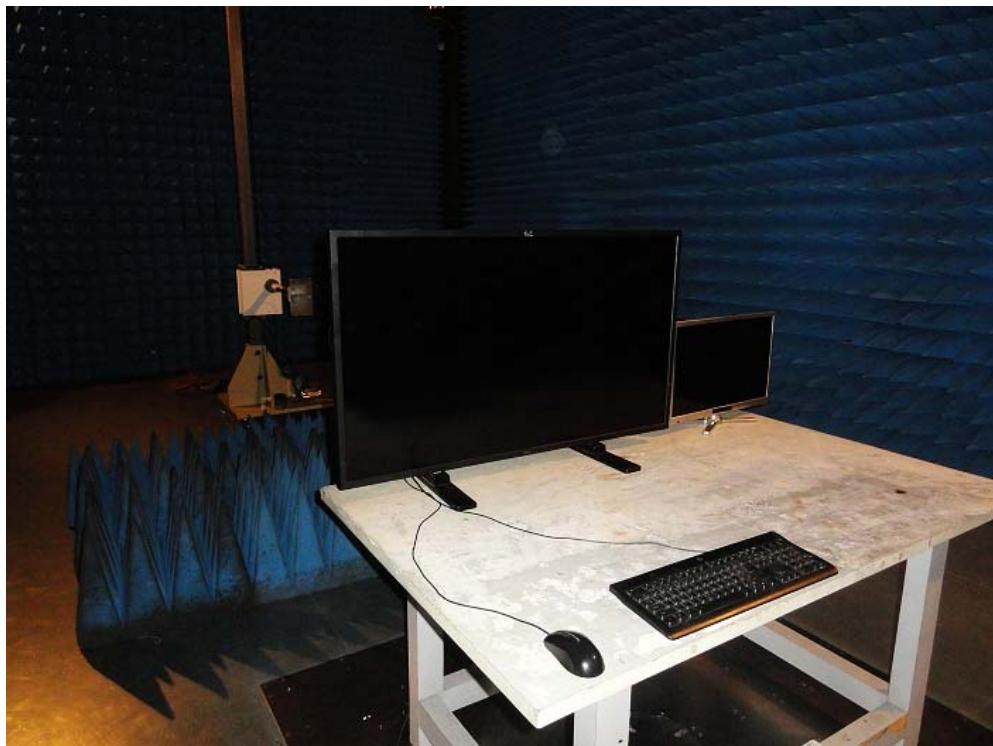
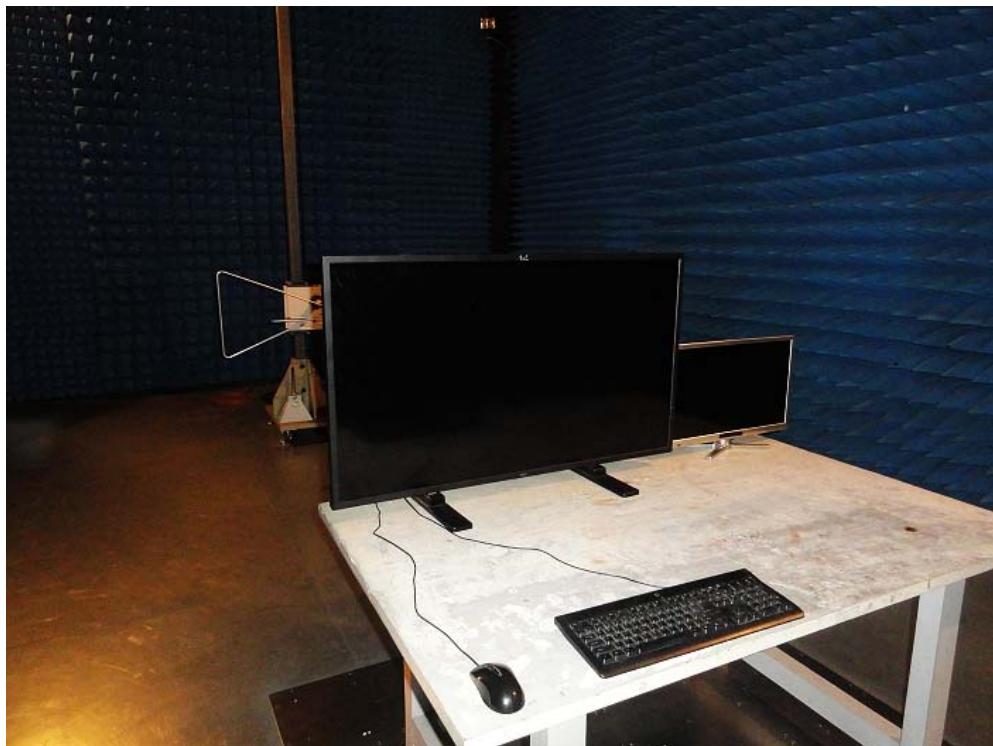
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7.2 Radiated emission test view--



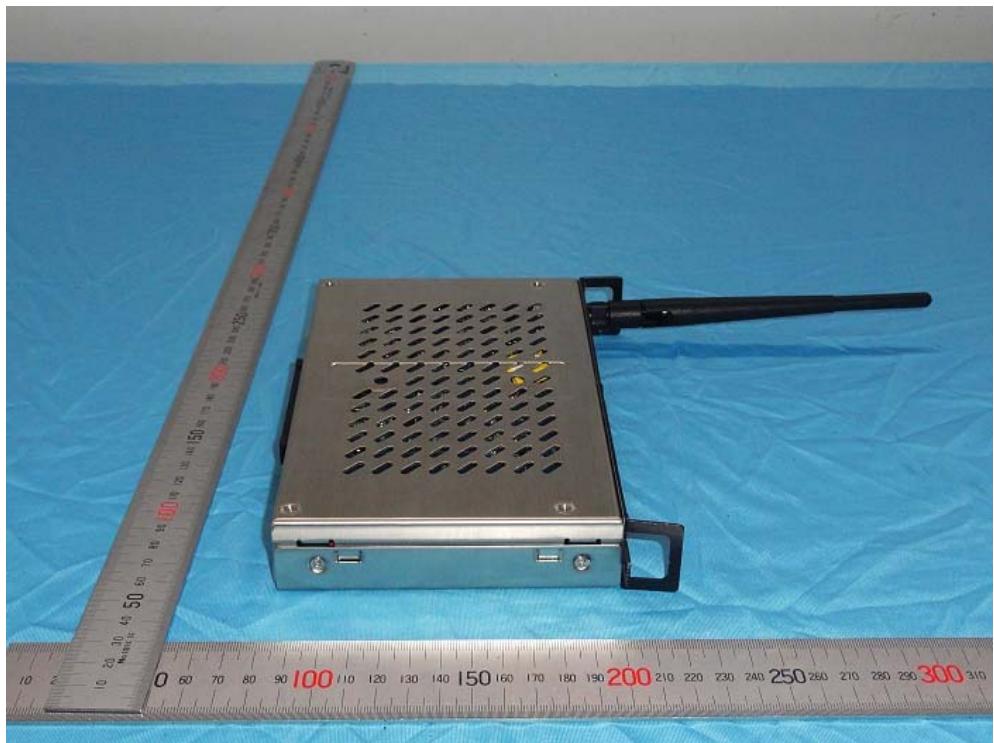
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**Photos of EUT**



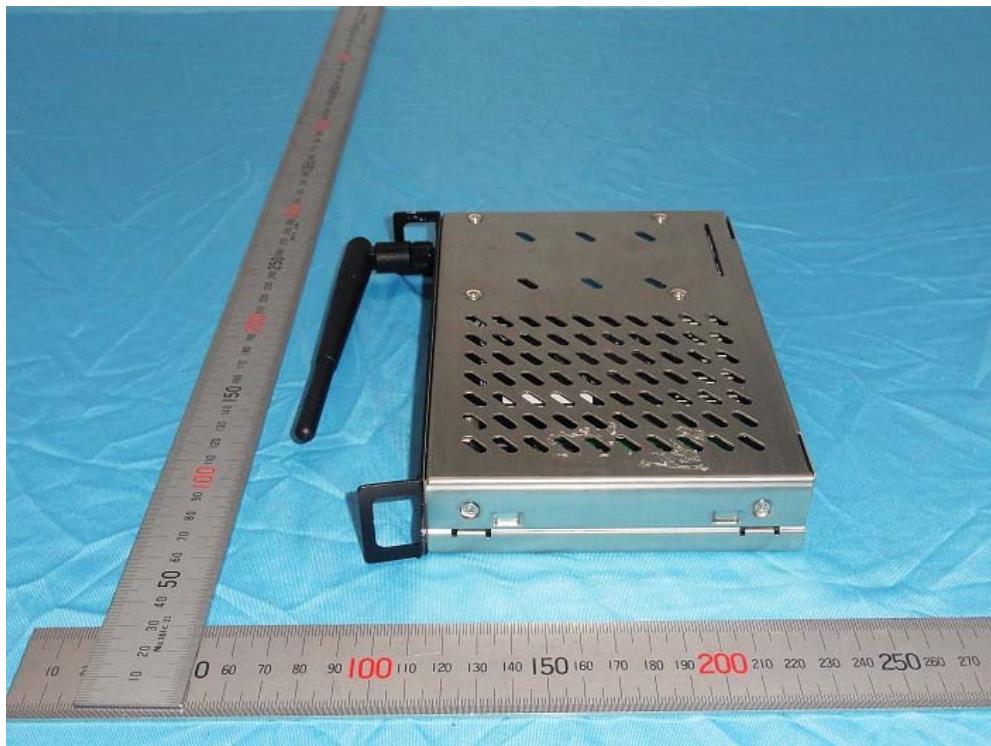
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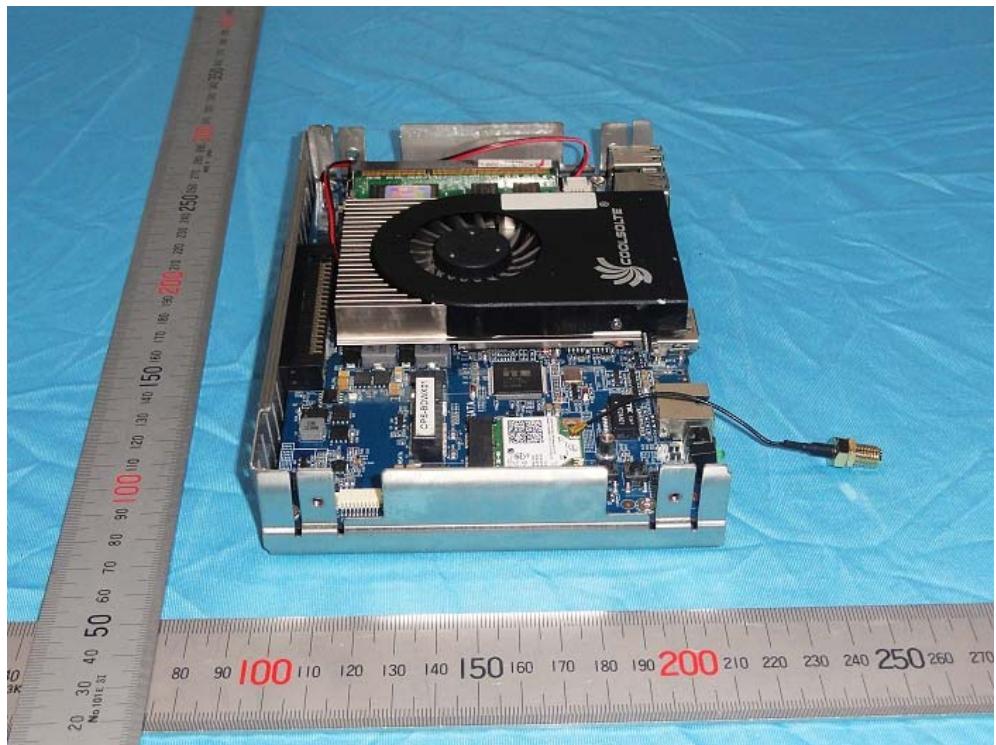
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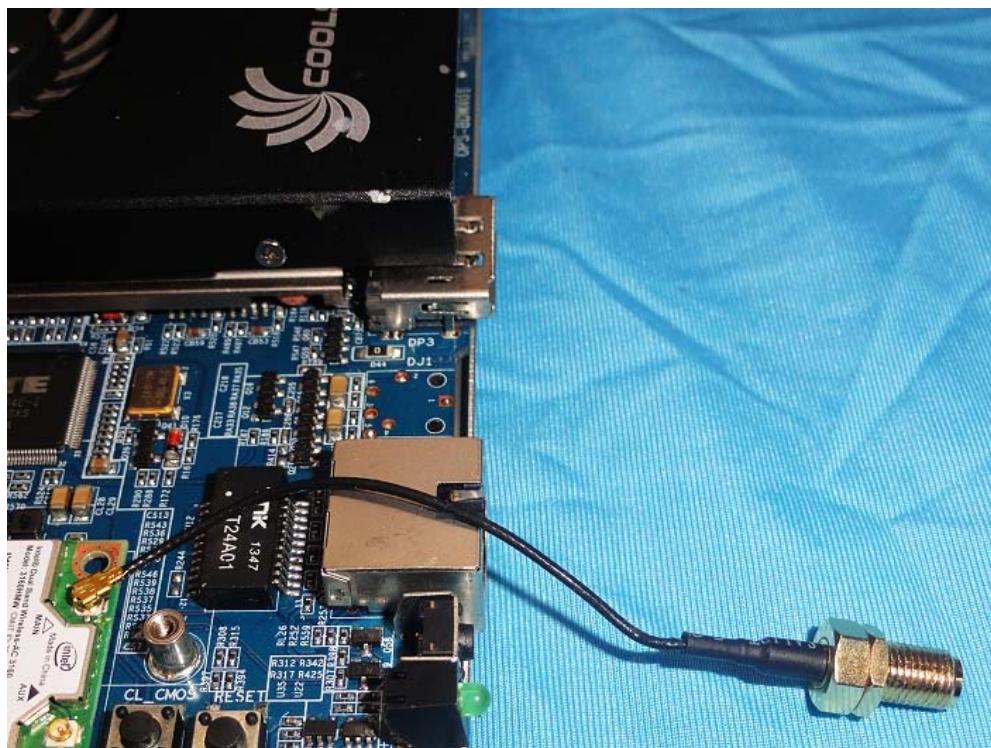
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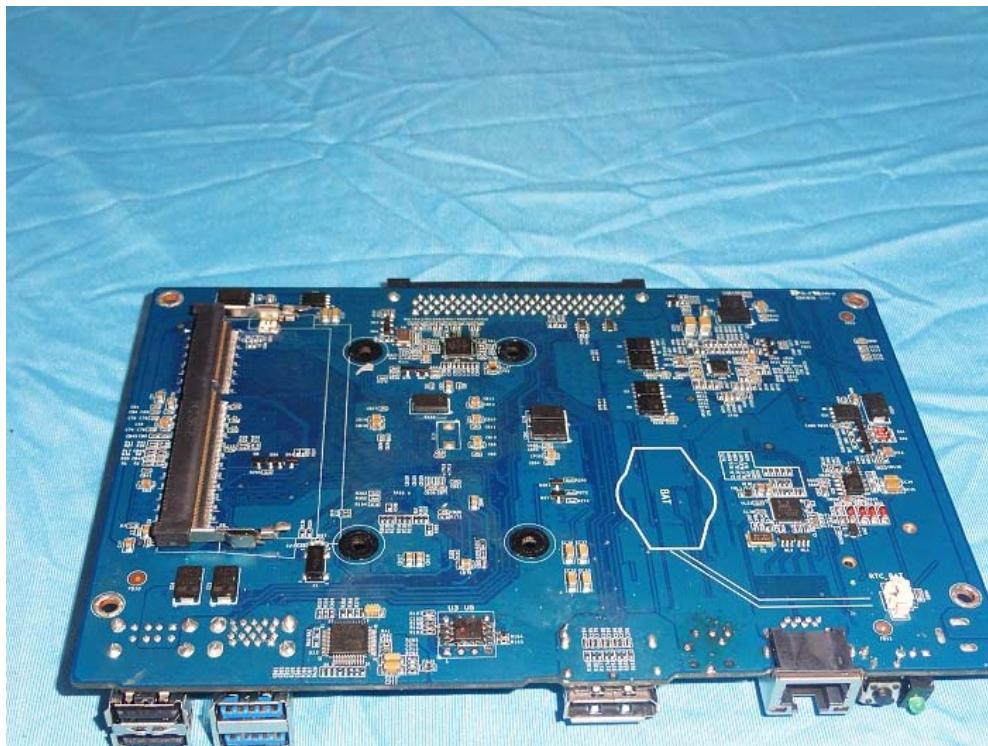
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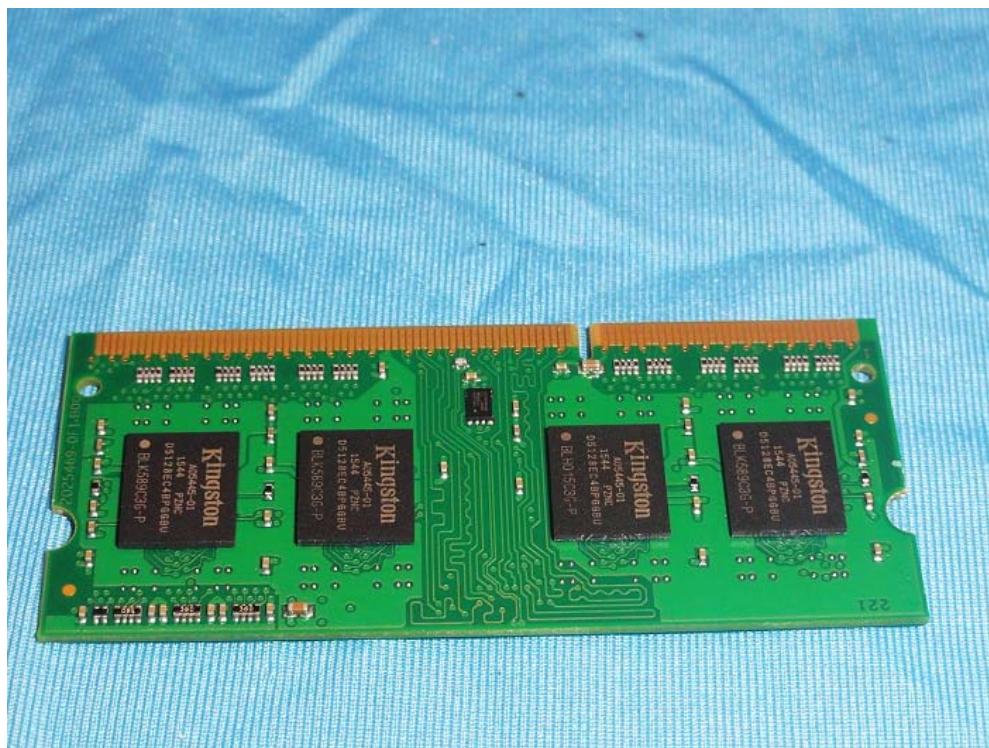
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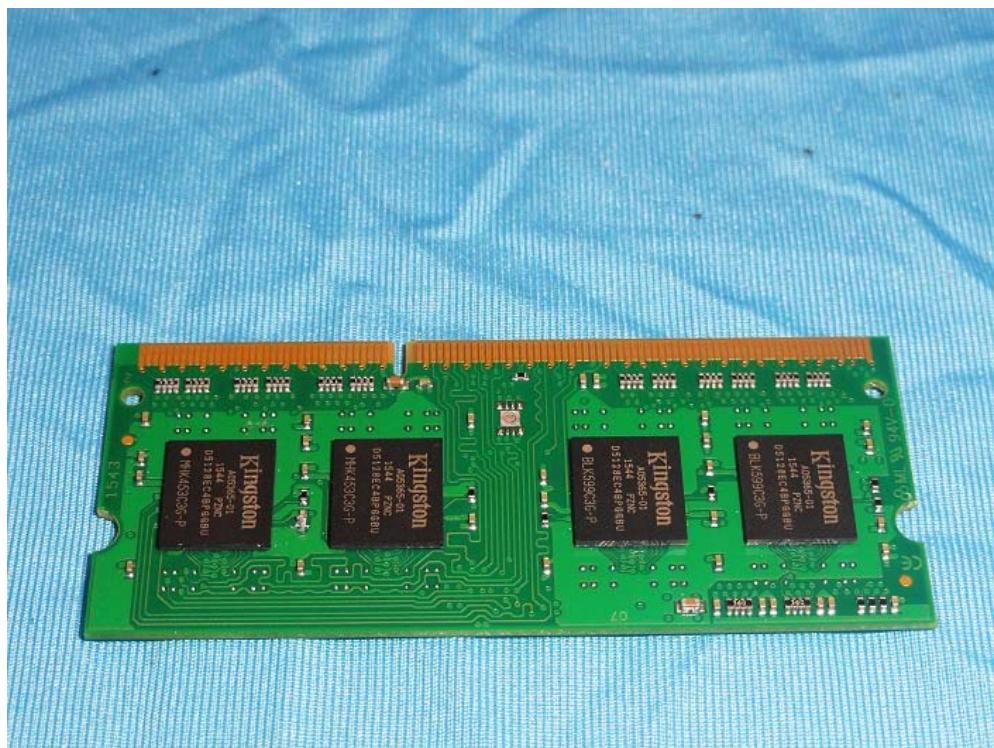
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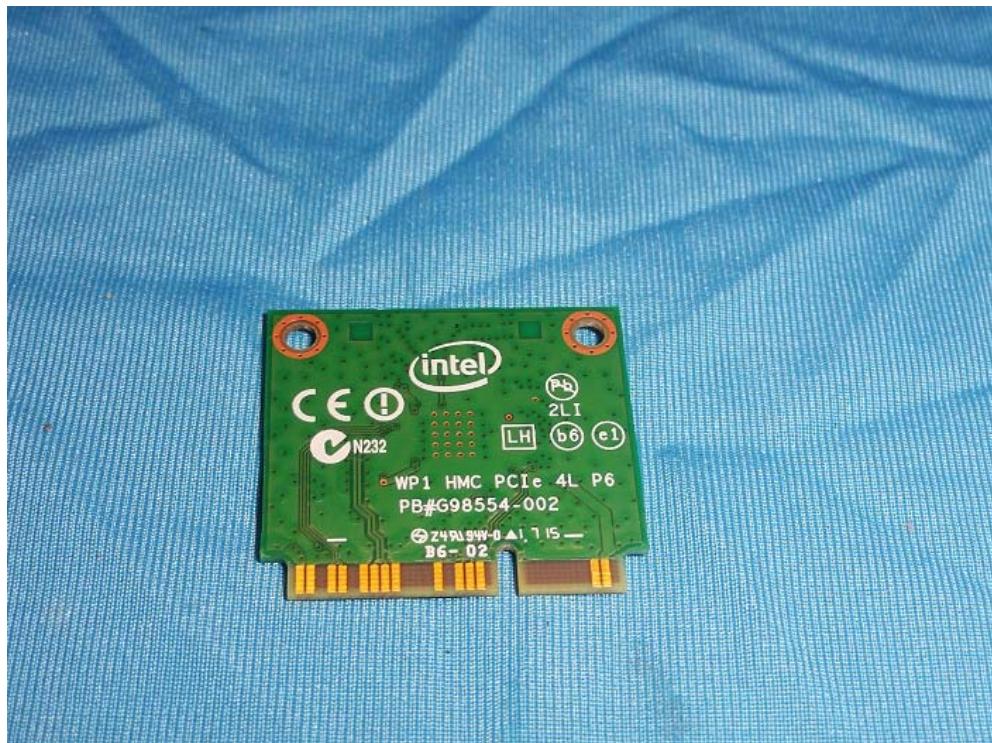
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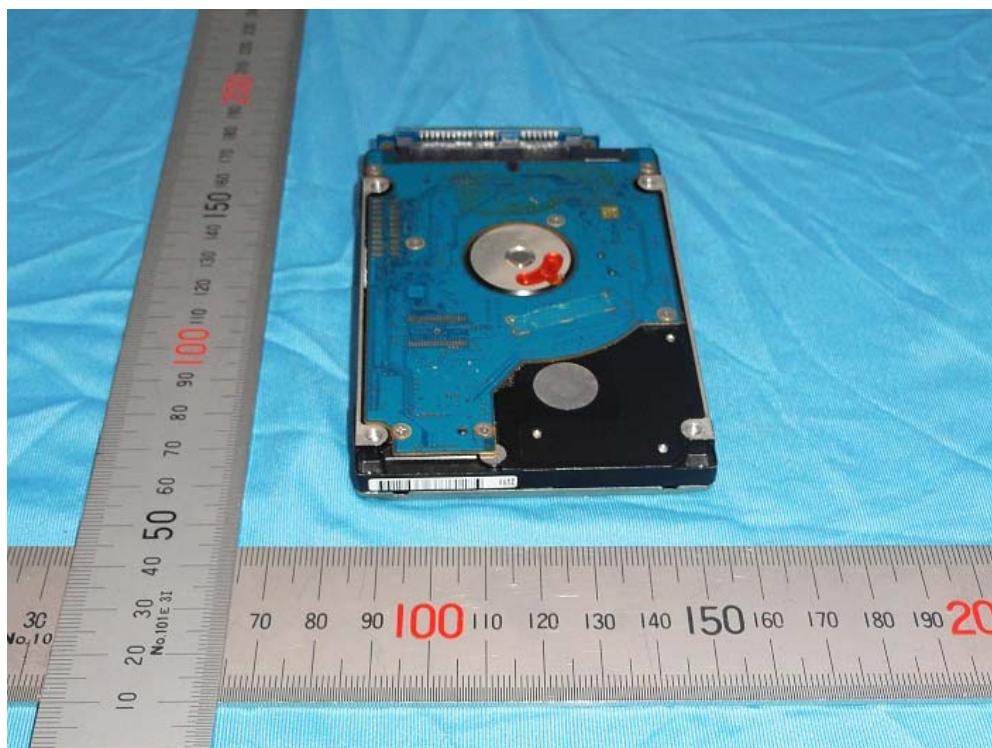
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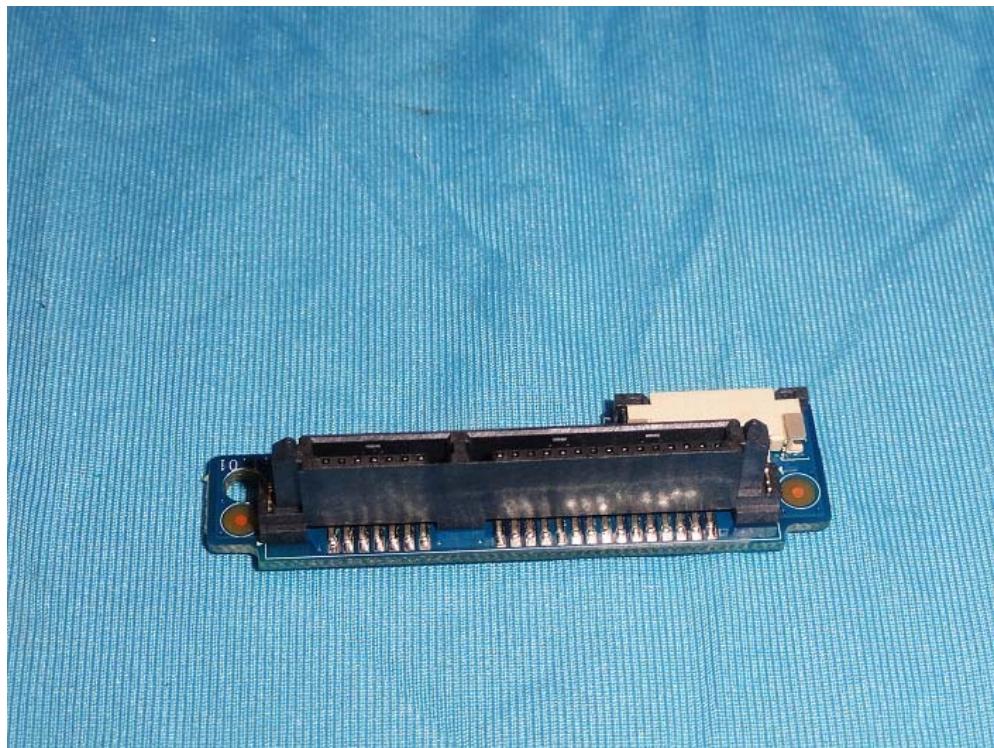
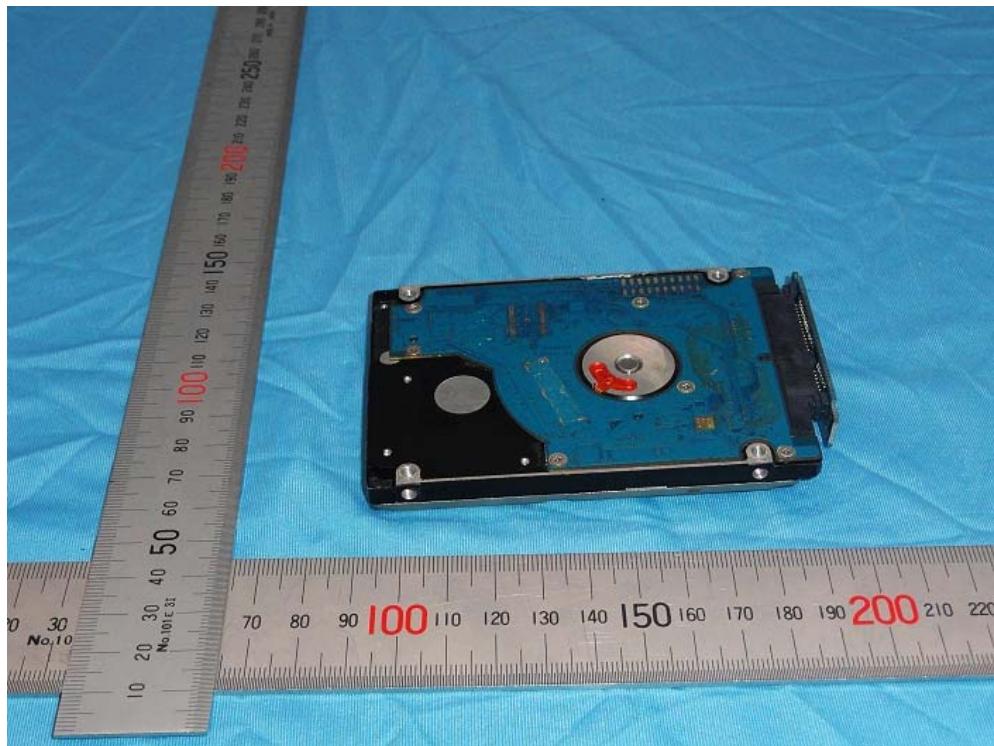
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**-End of the report-**

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