

TECHNICAL REPORT



Report No: FCC1706236

File reference No: 2017-07-08

Applicant: Technovare Systems, Inc.

Product: Embedded Computer

Model No: OPS-TCIS

Trademark: Technovare TNET-PC

Test Standards: FCC Part 15 Subpart B: 2016

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: July 08, 2017

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-TCIS
Rating: Input: 16VDC, 5A

1.4 Submitted Sample: 1 Samples

1.5 Test Duration: 2017-06-26 to 2017-07-07

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 Tang".

Print Name: Terry Tang

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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	2016.08.22	1Year
Spectrum Analyzer	ESA-L1500A	US37451154	HP	2016.08.22	1Year
PULSE LIMITER	ESH3-Z2	100281	RS	2016.08.22	1Year
LISN	ESH3-Z5	100294	RS	2016.08.22	1Year
LISN	ESH3-Z5	100253	RS	2016.08.22	1Year

2.2 Radiated electromagnetic disturbance test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESVD	100008	RS	2016.08.22	1Year
Coaxial Switch	MP59B	M70585	ANRITSU	N/A	N/A
Amplifier	8447D	2727A05017	HP	2016.08.22	1Year
Bilog Antenna	VULB9163	9163/340	Schwarebeck	2016.08.23	1Year
Horn Antenna	BBHA 9120D	9120D-631	Schwarebeck	2016.08.24	1Year
Horn Antenna	BBHA 9170	BBHA9170265	Schwarebeck	2016.08.24	1Year
Test Receiver	ESI26	838786/013	RS	2016.08.22	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: 2016

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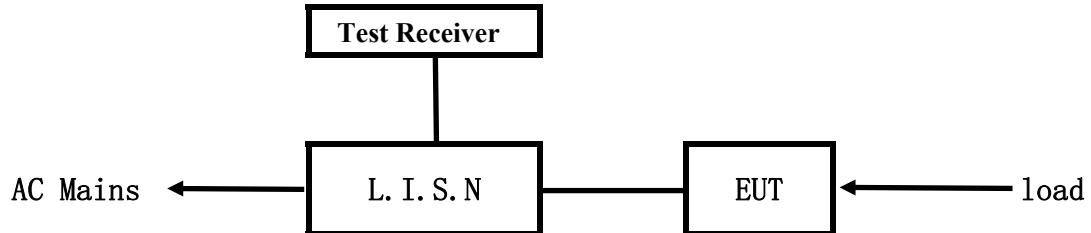
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4.0 Conducted Power line Test

4.1 Schematics of the test



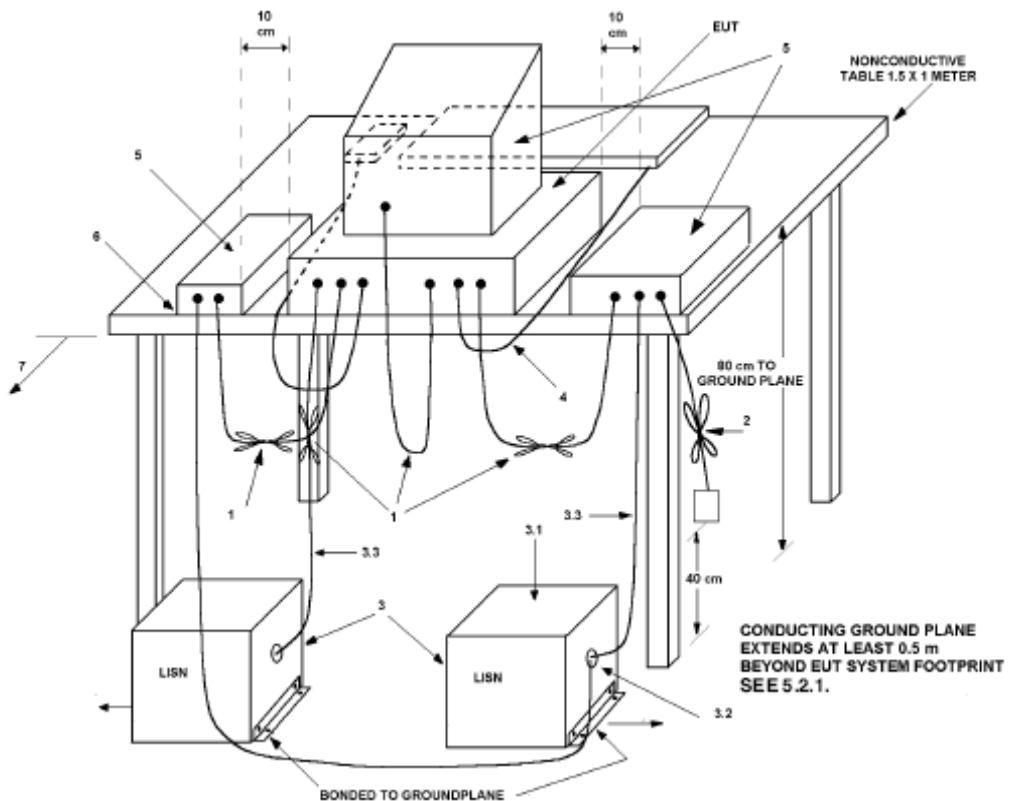
EUT: Equipment Under Test

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

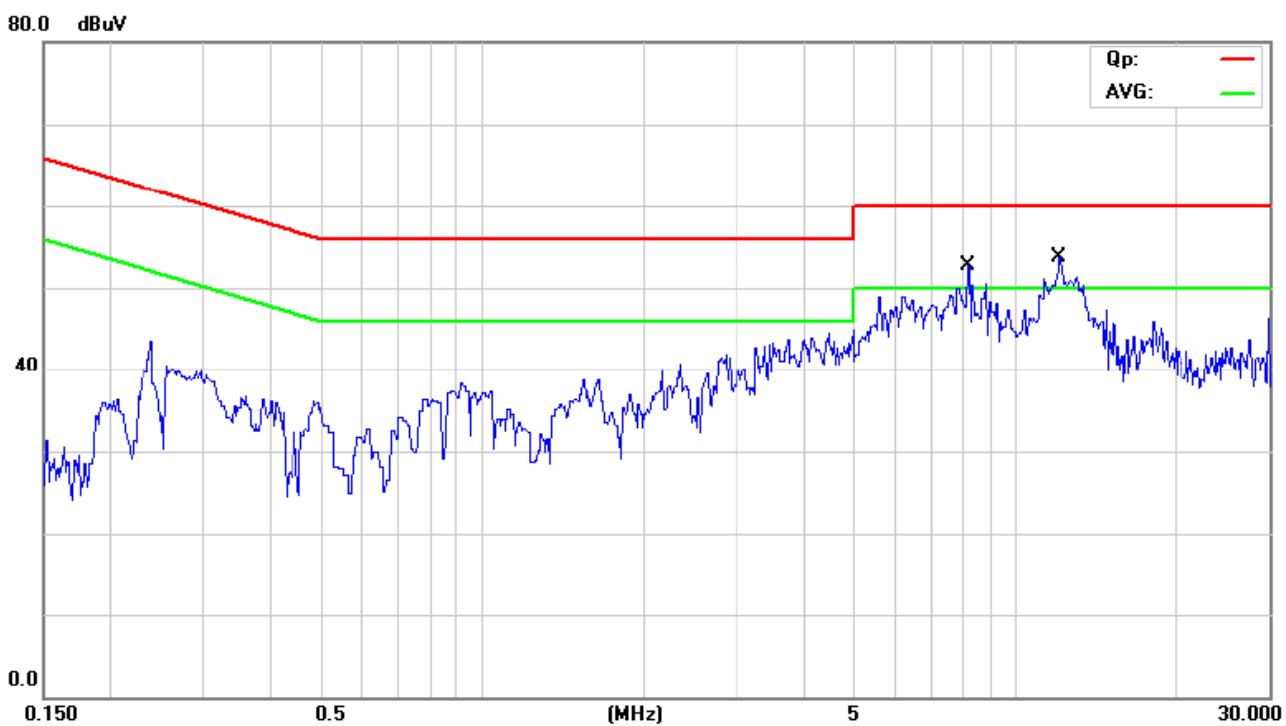
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

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				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		8.1656	30.80	11.19	41.99	60.00	-18.01	QP	
2		8.1656	19.60	11.19	30.79	50.00	-19.21	AVG	
3	*	12.0652	35.10	11.36	46.46	60.00	-13.54	QP	
4		12.0652	19.80	11.36	31.16	50.00	-18.84	AVG	

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

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

EUT Operating Environment

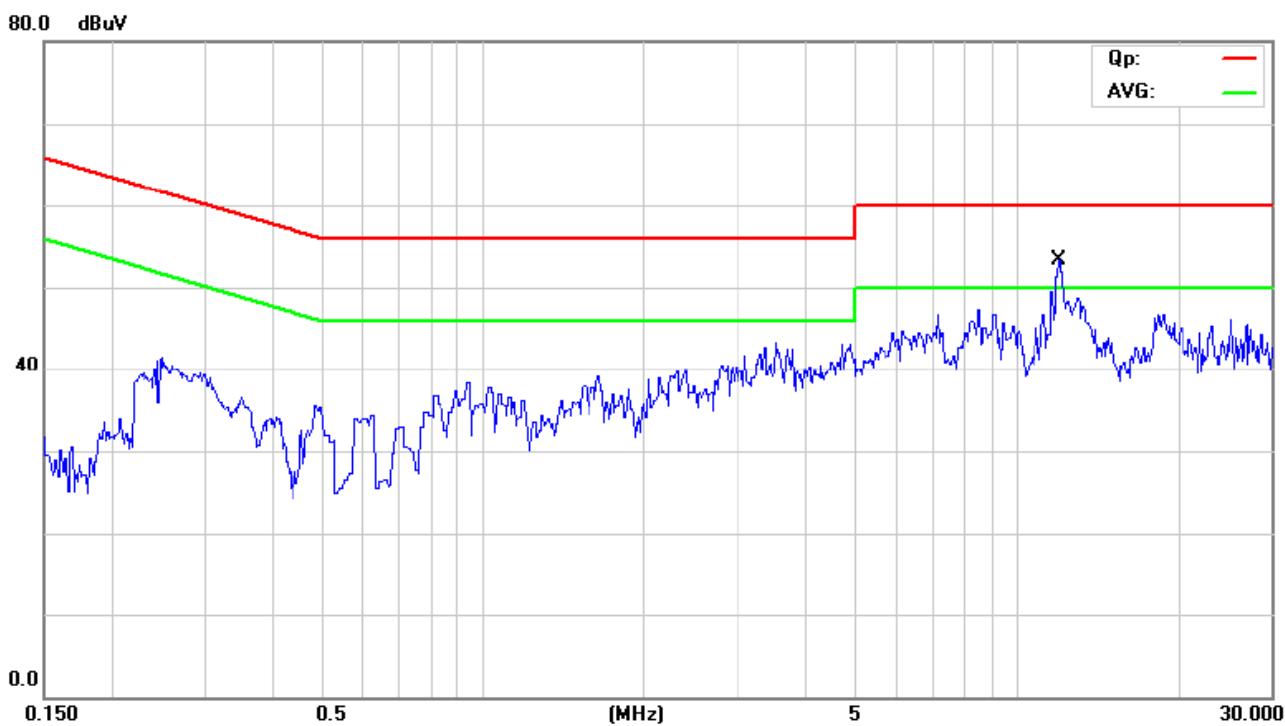
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

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				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	11.9531	35.40	11.36	46.76	60.00	-13.24	QP	
2		11.9531	21.50	11.36	32.86	50.00	-17.14	AVG	

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

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

EUT Operating Environment

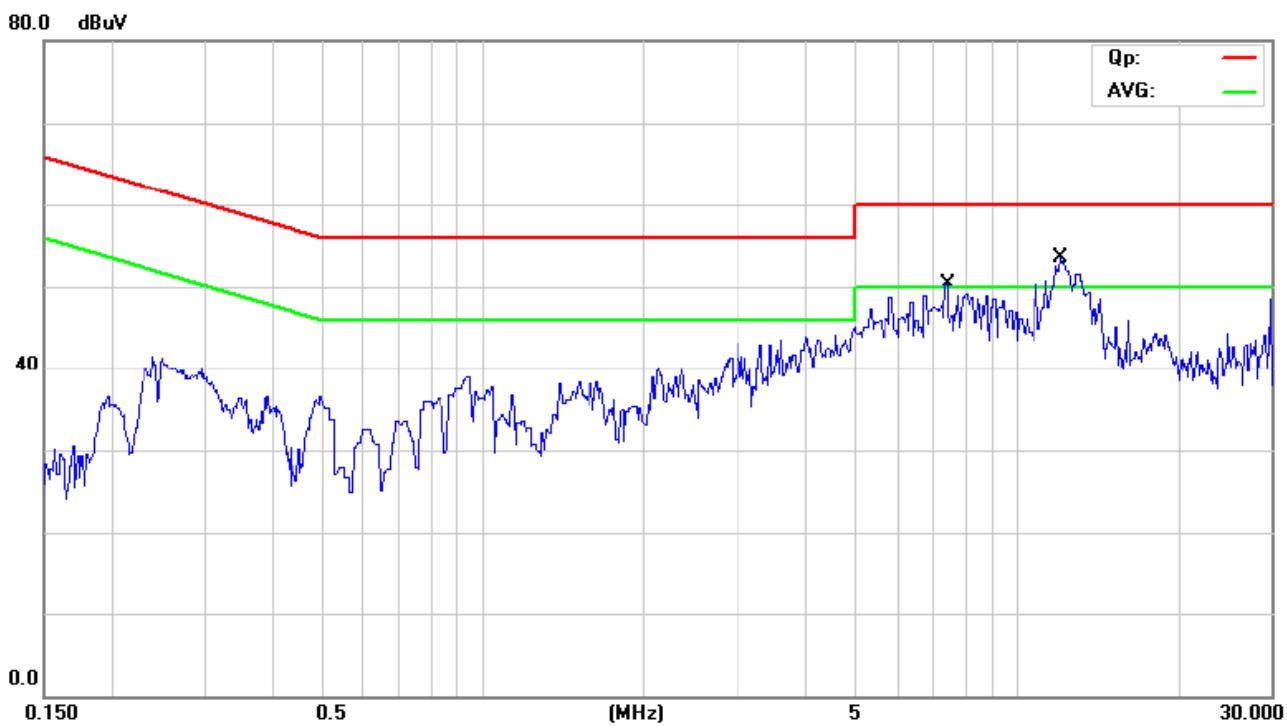
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Play USB

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		7.3892	30.60	11.10	41.70	60.00	-18.30	QP	
2		7.3892	17.60	11.10	28.70	50.00	-21.30	AVG	
3	*	12.0503	36.00	11.36	47.36	60.00	-12.64	QP	
4		12.0503	20.50	11.36	31.86	50.00	-18.14	AVG	

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

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

EUT Operating Environment

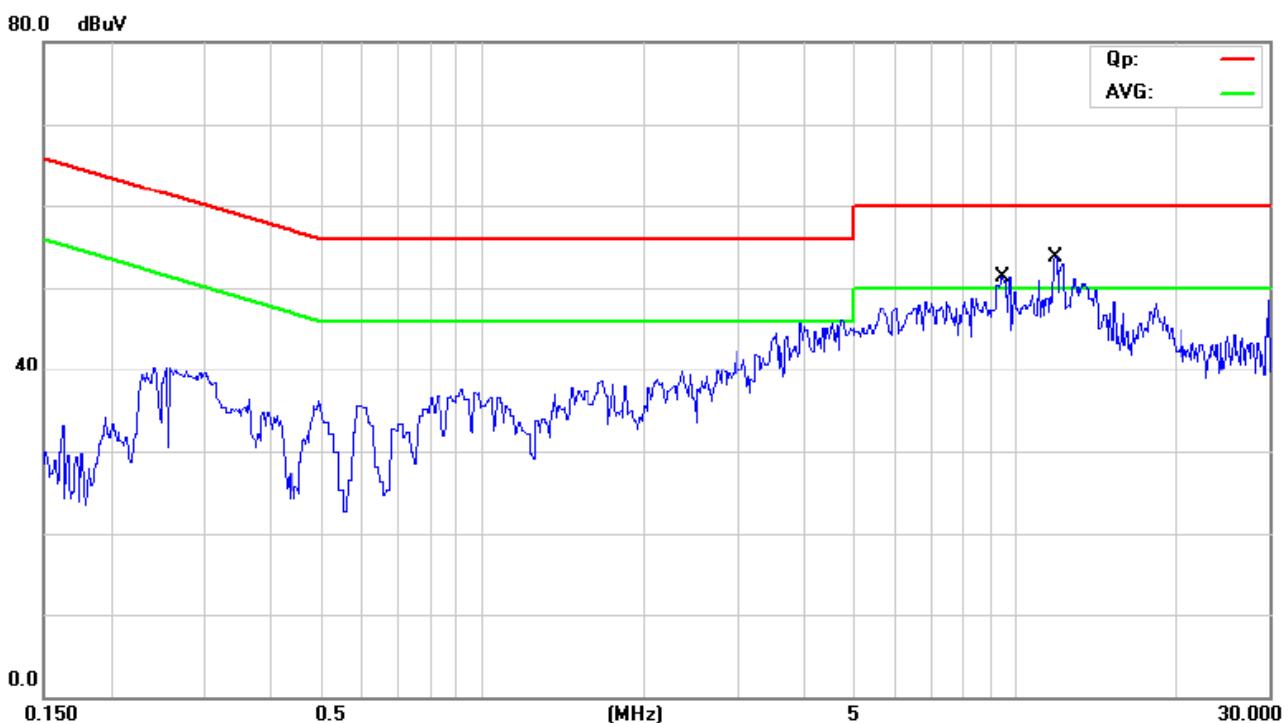
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Play USB

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		9.4236	30.00	11.33	41.33	60.00	-18.67	QP	
2		9.4236	19.20	11.33	30.53	50.00	-19.47	AVG	
3	*	11.9070	34.90	11.36	46.26	60.00	-13.74	QP	
4		11.9070	22.30	11.36	33.66	50.00	-16.34	AVG	

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

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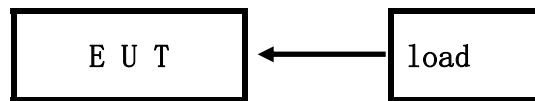
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5.0 Radiated Disturbance Test

5.1 Schematics of the test

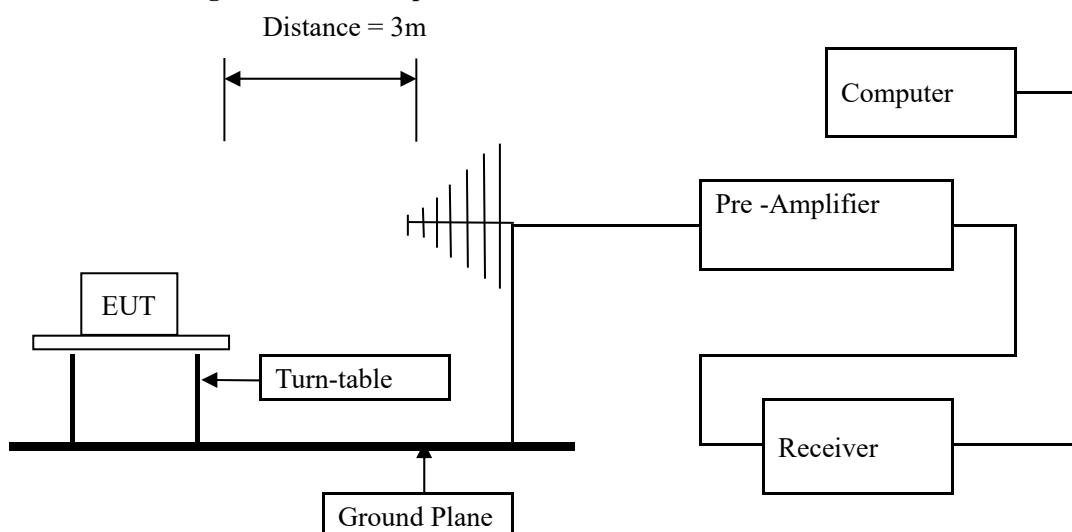


5.2 Test Method and test Procedure:

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

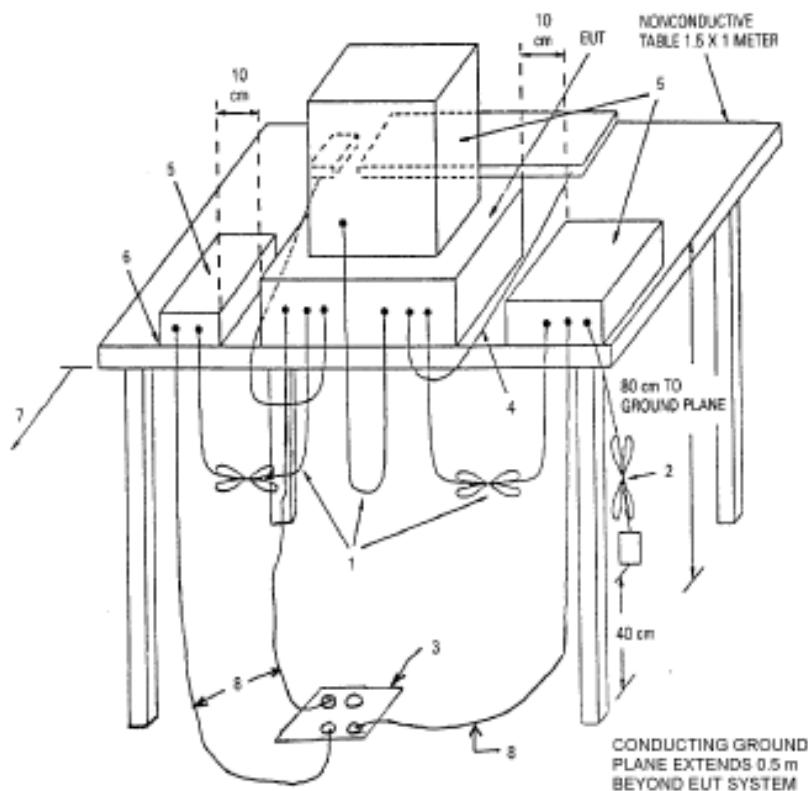
Block diagram of Test setup



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5.3 Radiated Emission Limit

Frequency Range (MHz)	Distance (m)	Field strength (dB μ 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 μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
976.320	40.10	H	54.00
213.560	35.76	H	43.50
60.440	26.32	H	40.00
59.680	30.36	V	40.00
939.760	40.48	V	46.00
217.640	33.85	V	46.00

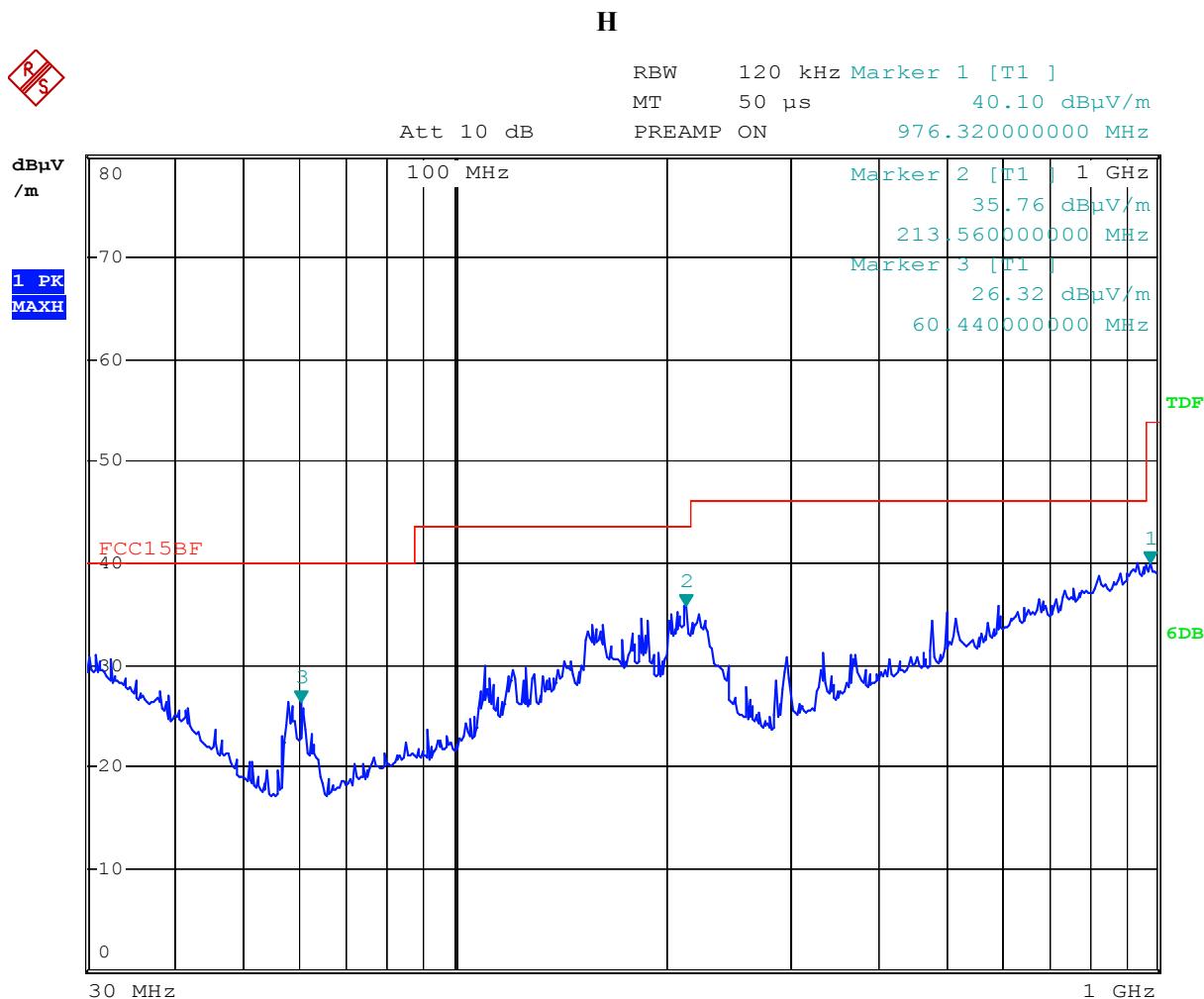
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Test Figure:



Date: 7.JUL.2017 09:33:58

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

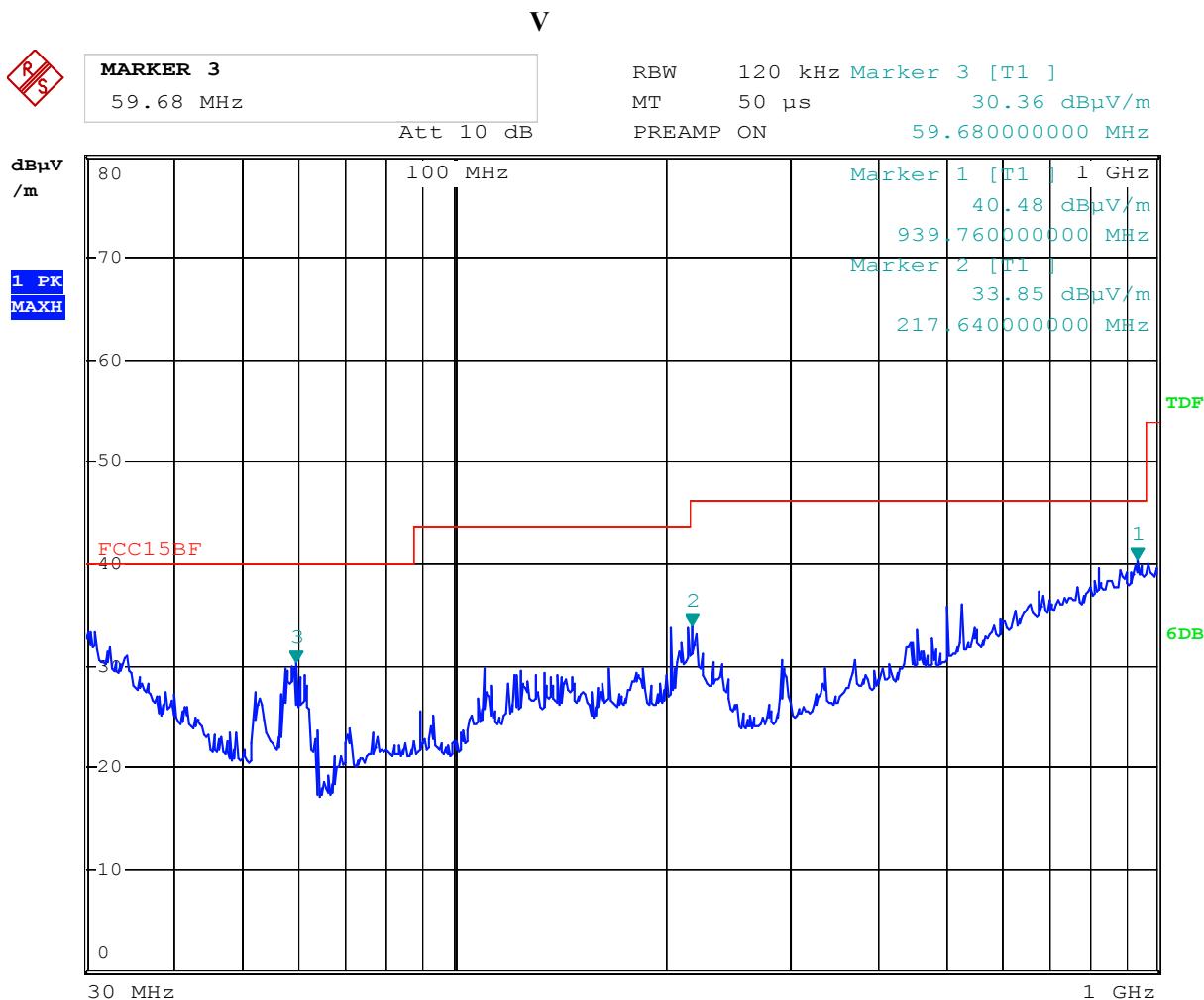
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Test Figure:



Date: 7.JUL.2017 09:36:07

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

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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 μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
185.160	35.96	H	43.50
890.120	42.07	H	46.00
214.000	36.19	H	43.50
224.800	33.66	V	46.00
964.960	40.47	V	54.00
178.240	35.56	V	43.50

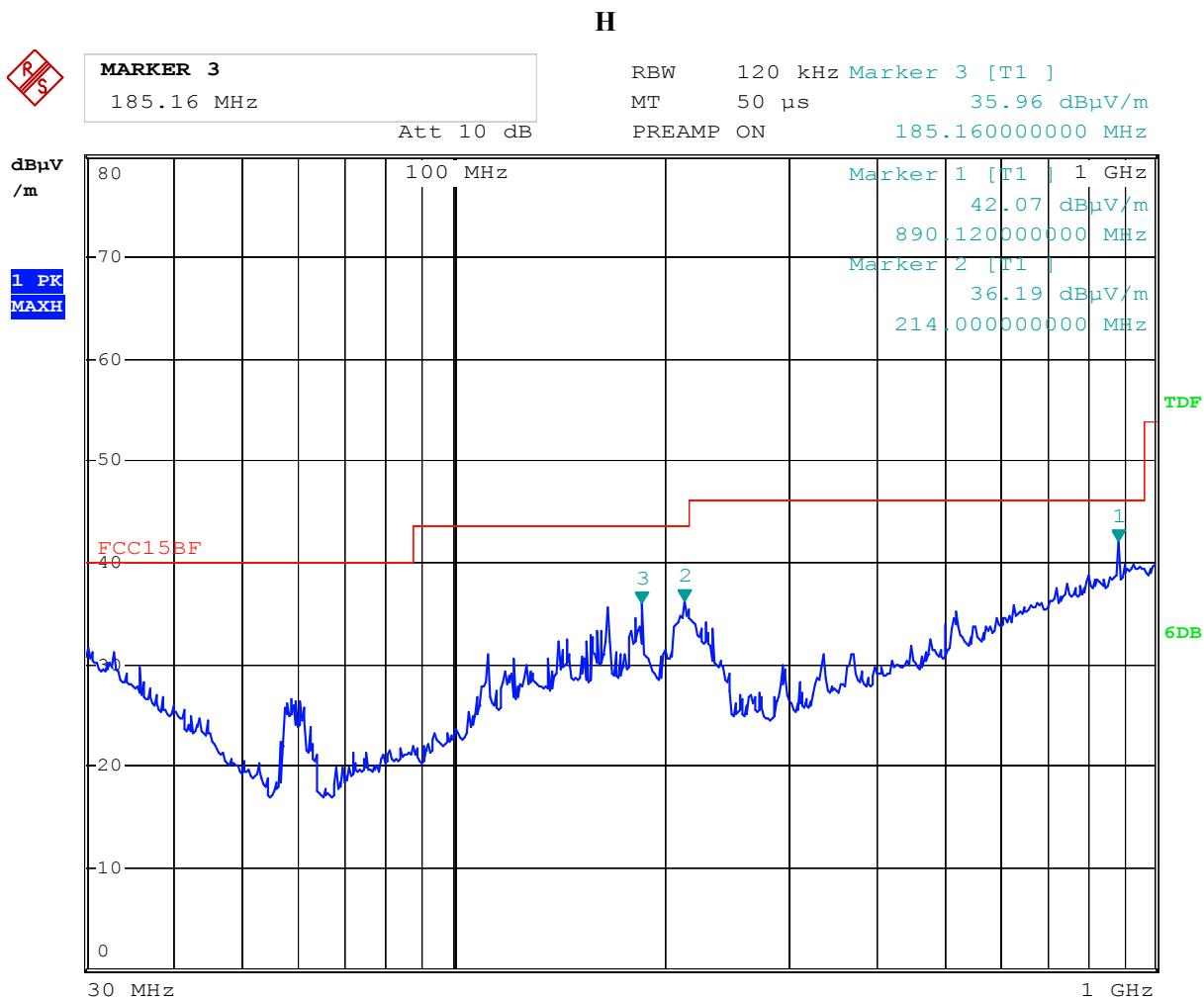
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Test Figure:



Date: 7.JUL.2017 09:31:02

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

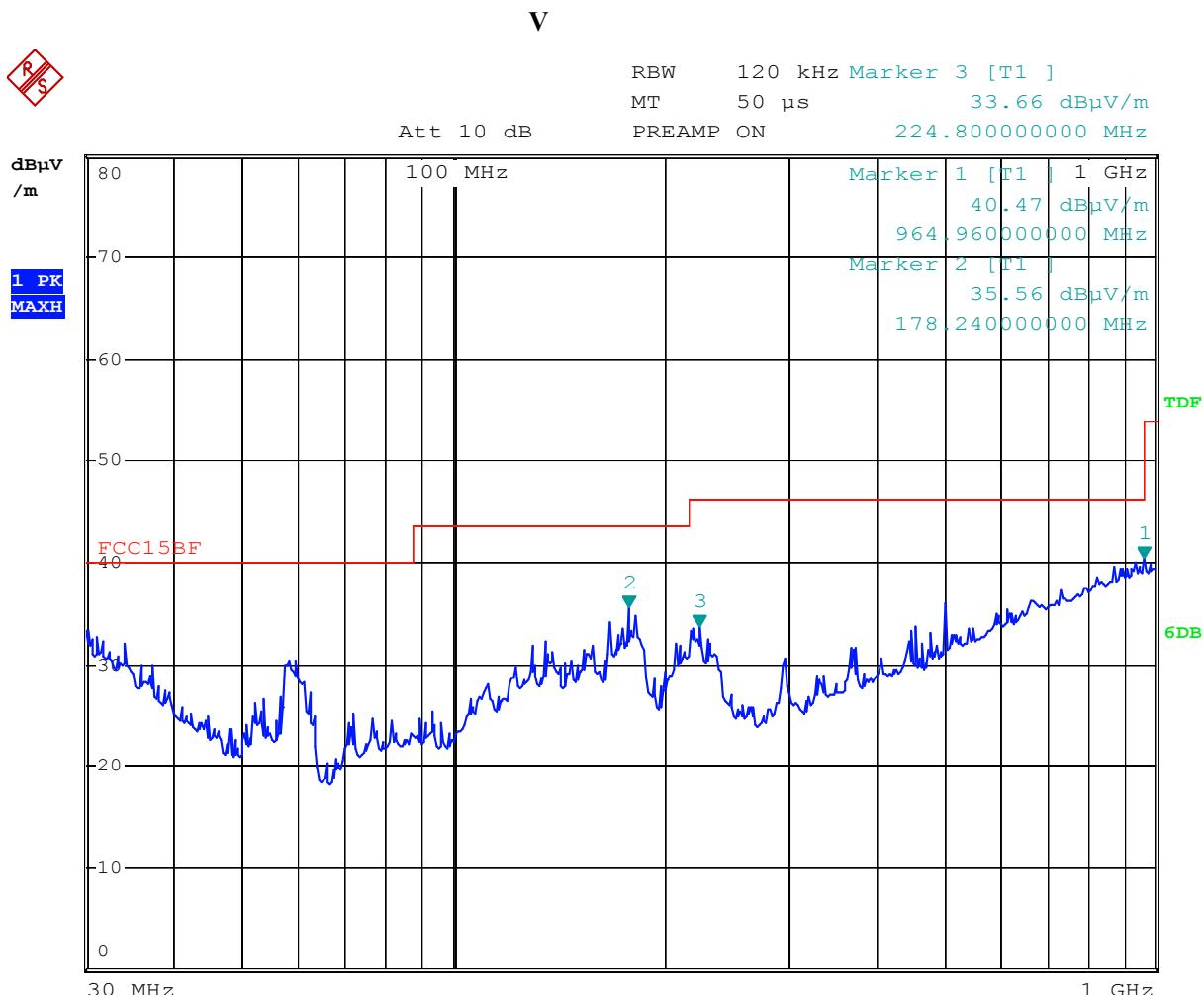
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Test Figure:



Date: 7.JUL.2017 09:27:12

Note: for other frequencies not marked, the emission level less than the limit for more than 20dB.

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

EUT Operating Environment

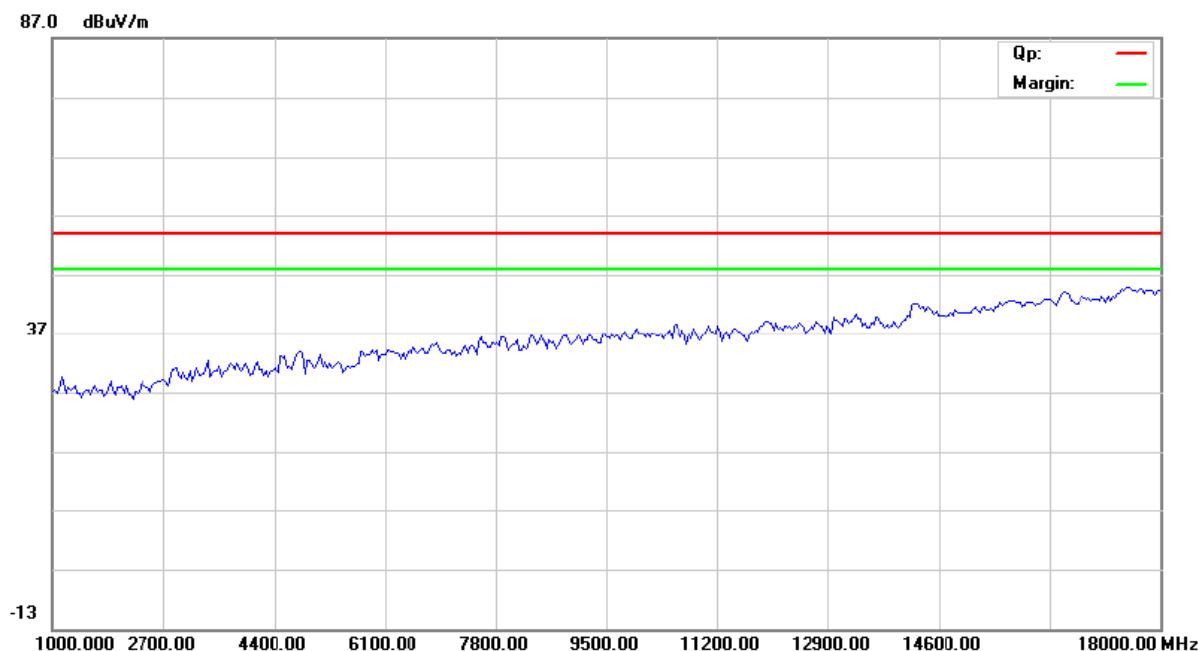
Temperature:25°C Humidity: 75%RH Atmospheric Pressure: 101 kPa

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 μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	H	54(AV)

Note: 1. Due to the final radiated level much less than the limit for more than 20dB, 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

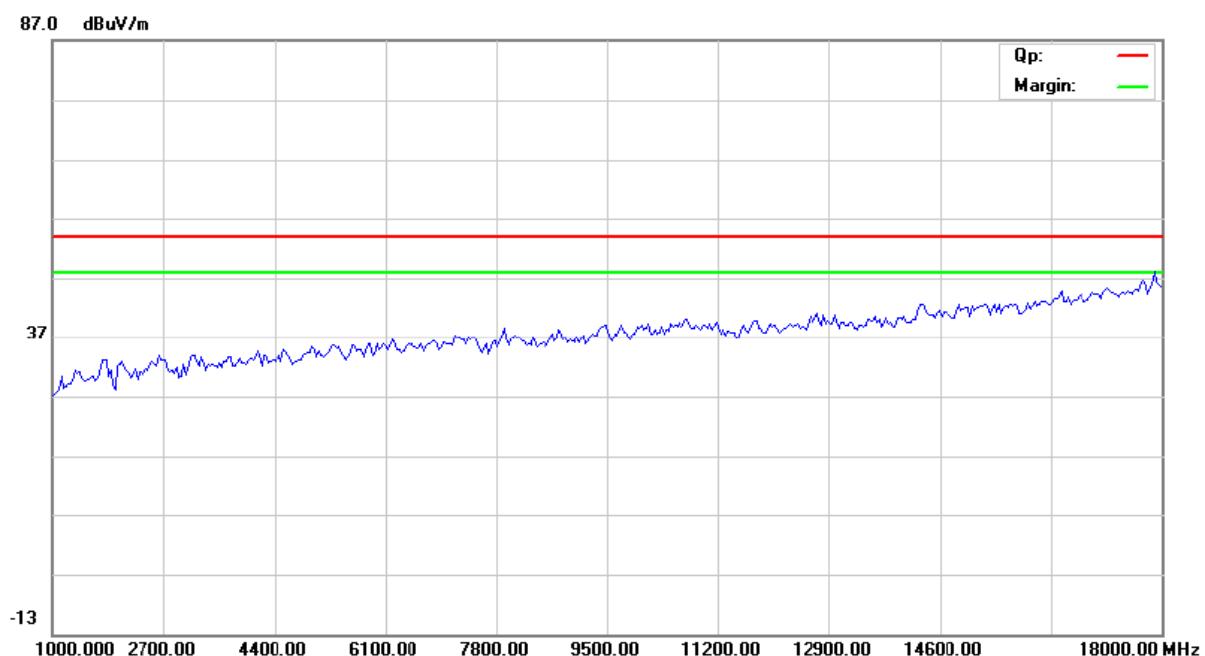
Temperature:25°C Humidity: 75%RH Atmospheric Pressure: 101 kPa

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 μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	V	54(AV)

Note: 1. Due to the final radiated level much less than the limit for more than 20dB, so necessary take down final radiated level
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Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

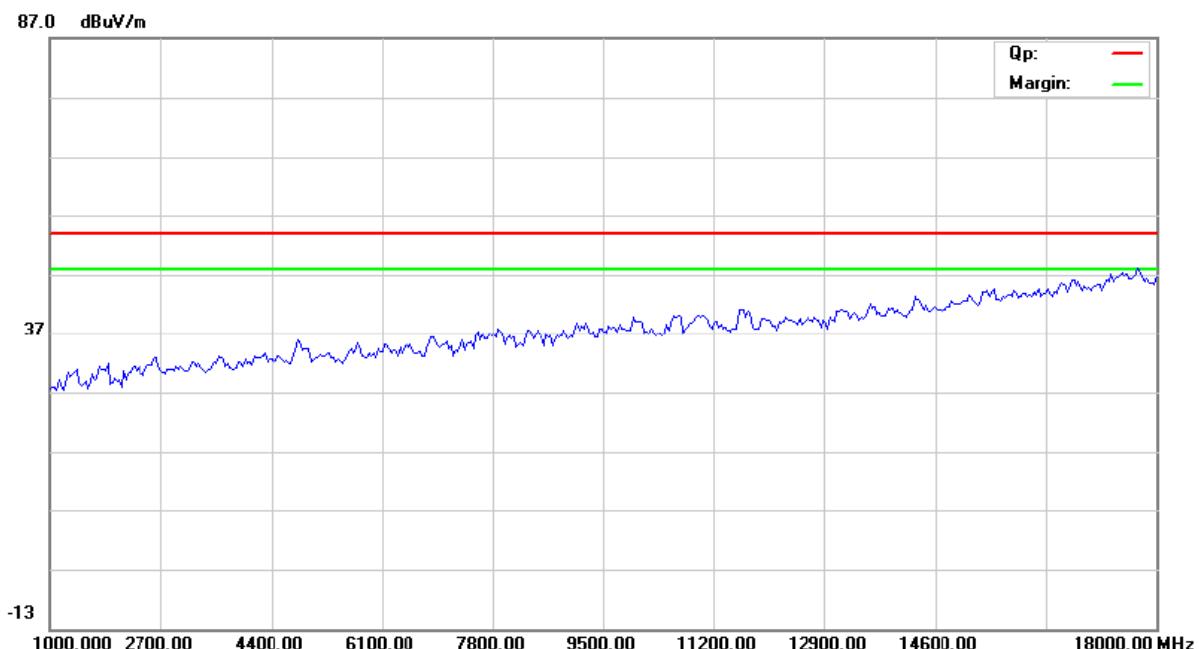
Temperature:25°C Humidity: 75%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Play USB

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



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

Note: 1. Due to the final radiated level much less than the limit for more than 20dB, so necessary take down final radiated level
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Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

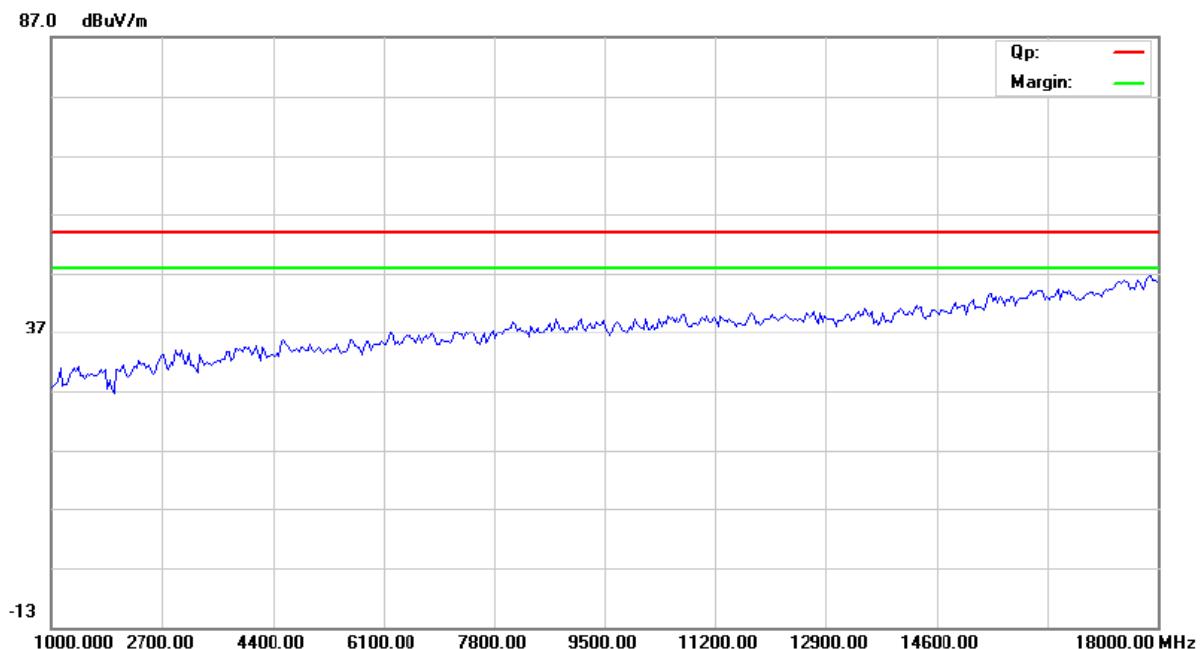
Temperature:25°C Humidity: 75%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Play USB

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



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

Note: 1. Due to the final radiated level much less than the limit for more than 20dB, so necessary take down final radiated level
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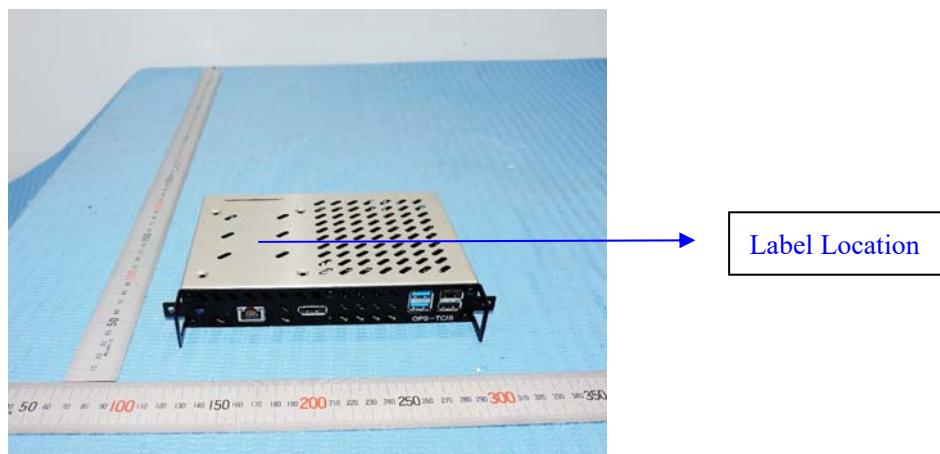
6.0 FCC ID Label

FCC ID: YS2OPS-TCIS-M2-H

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--



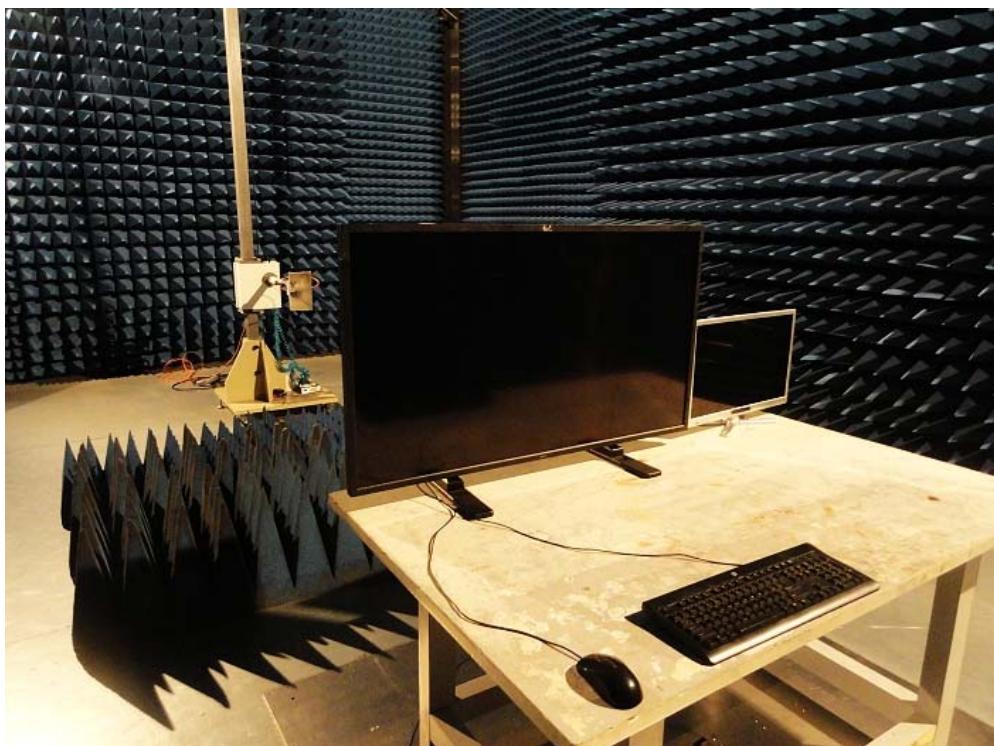
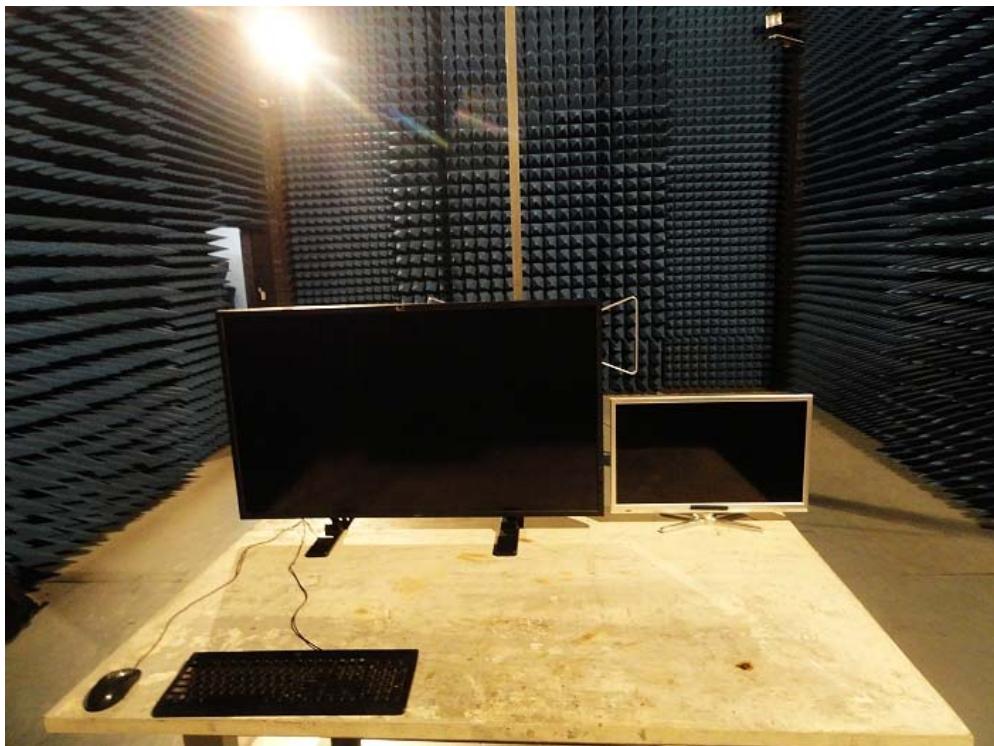
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7.2 Radiated emission test view--



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Photos of EUT



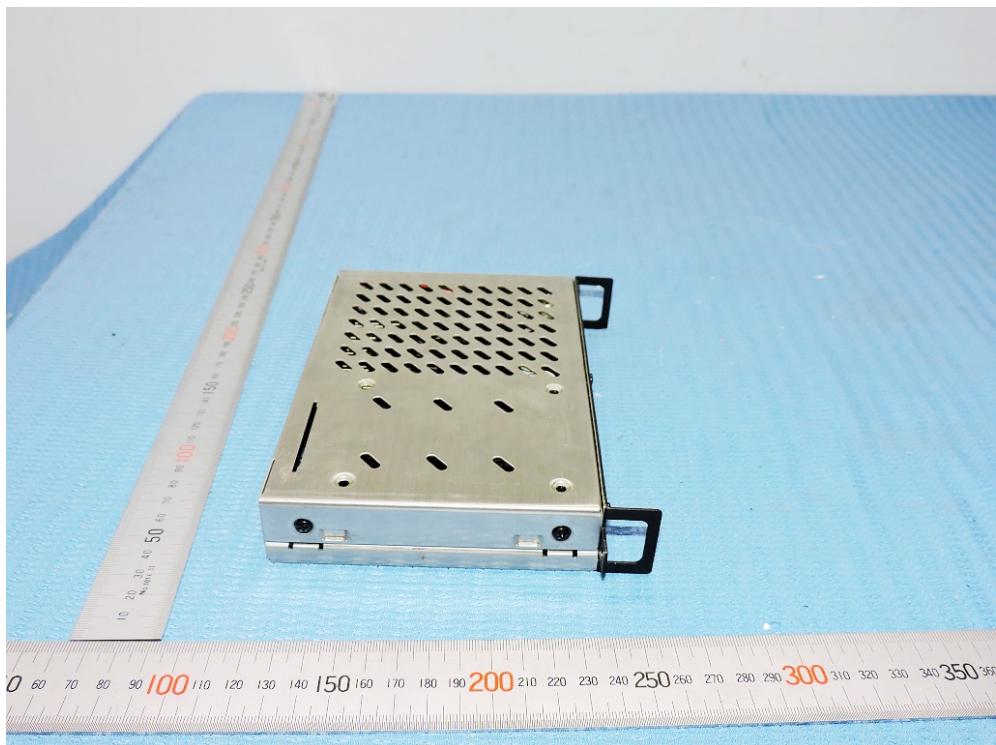
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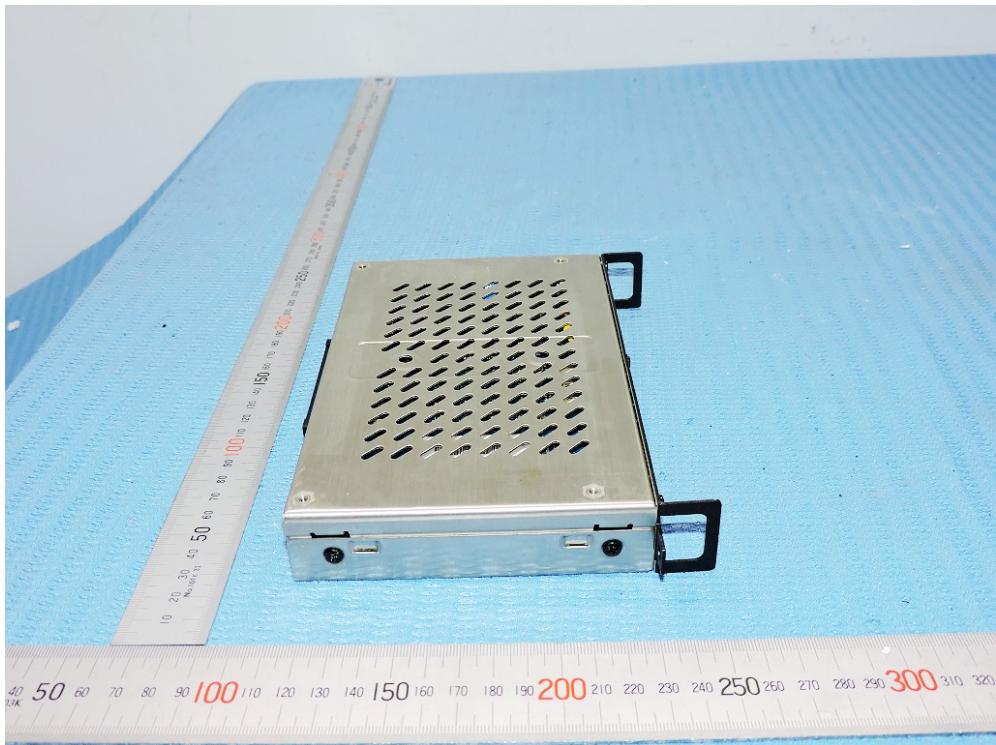
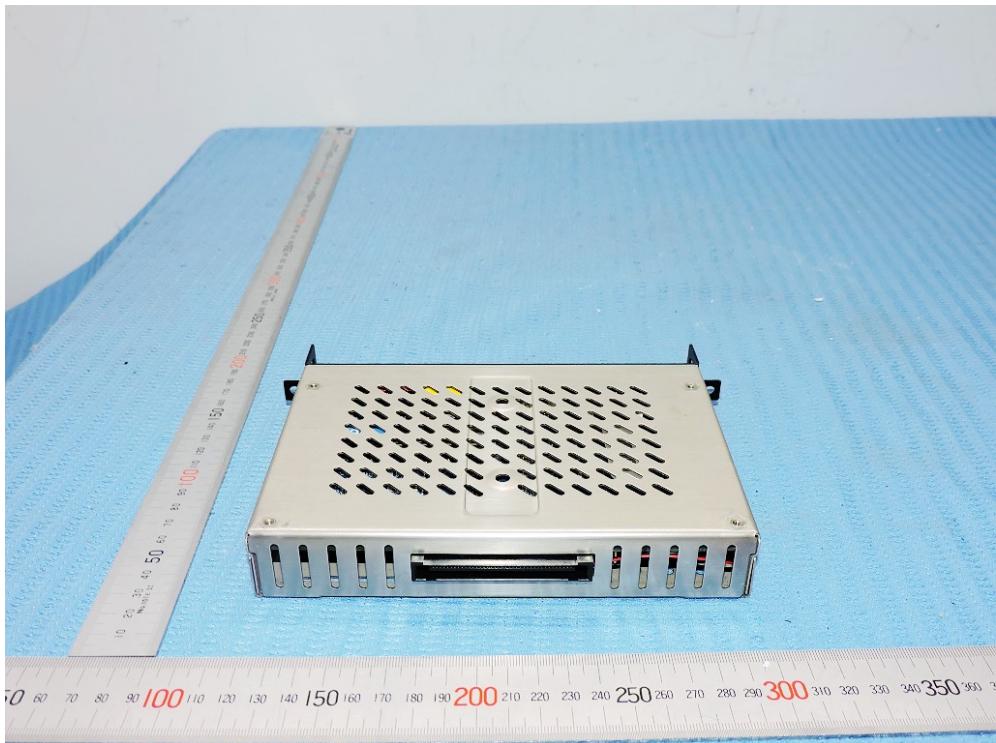
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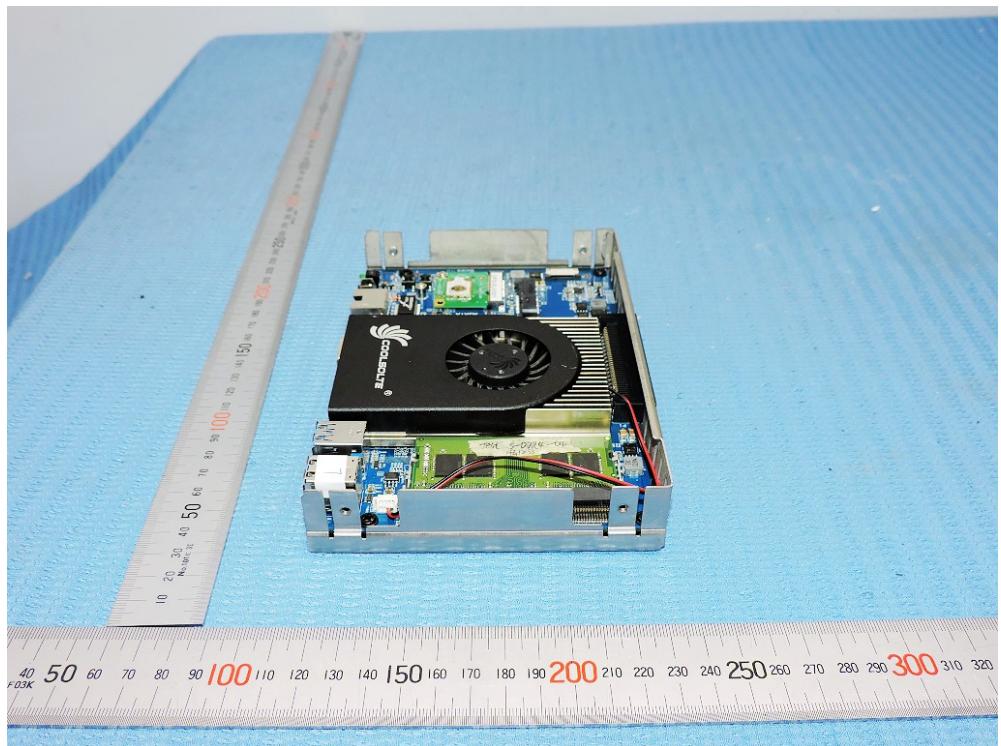
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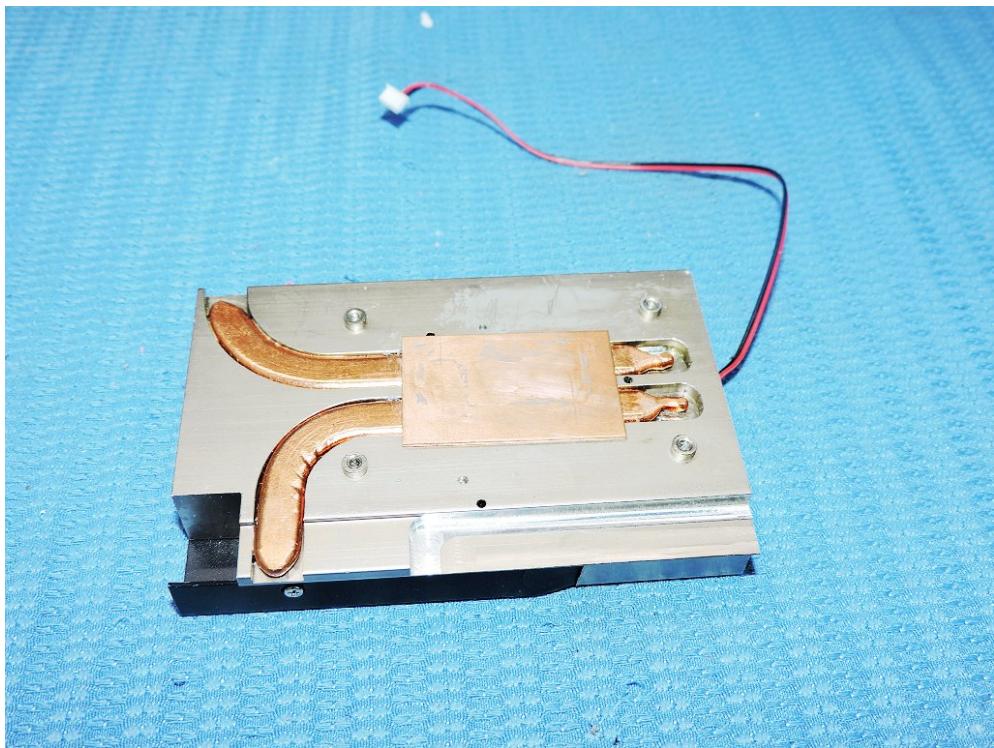
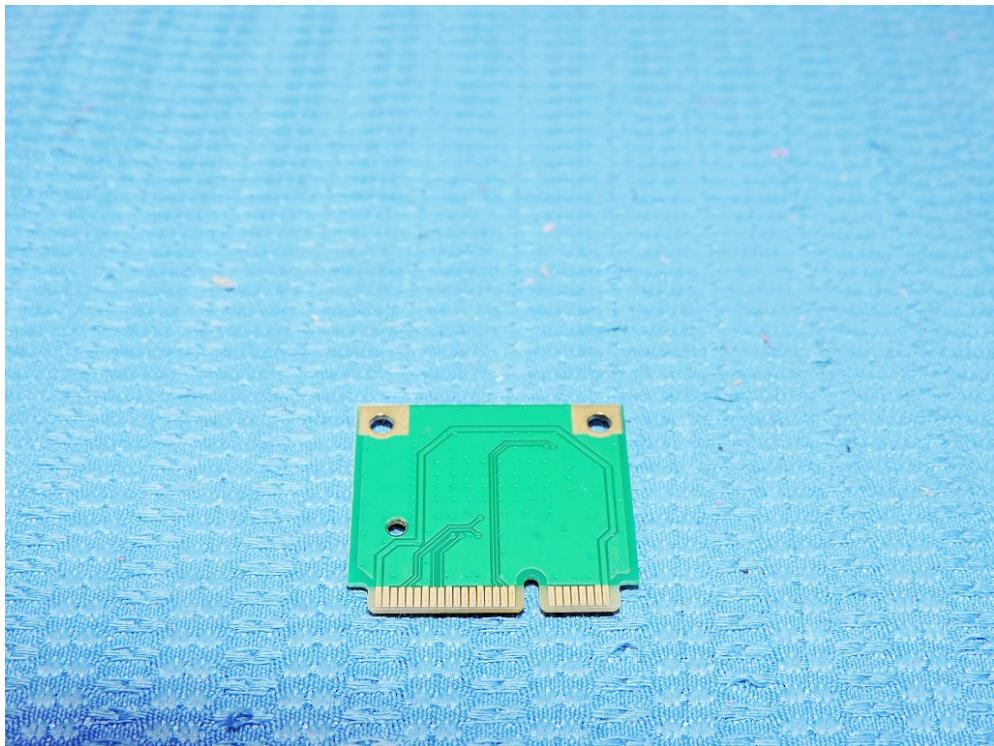
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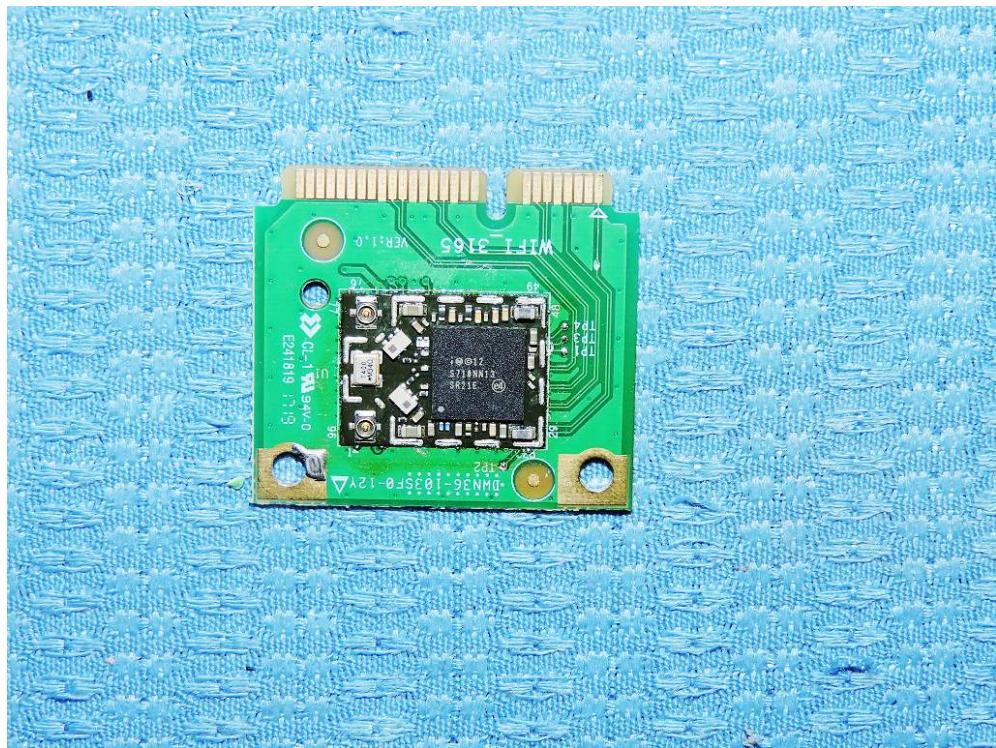
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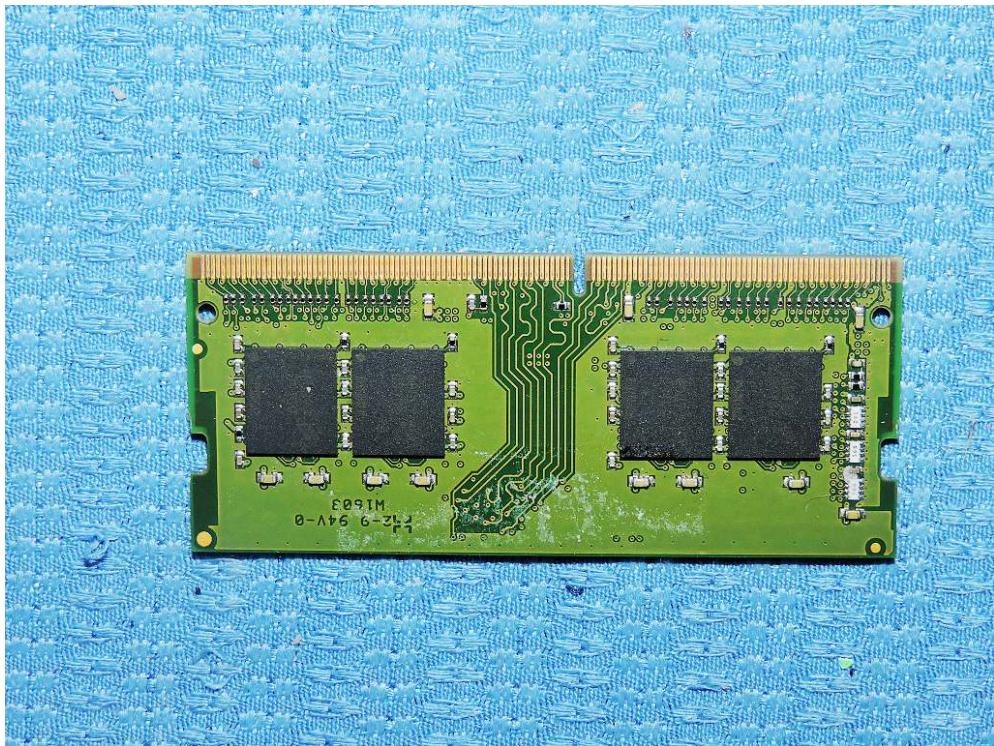
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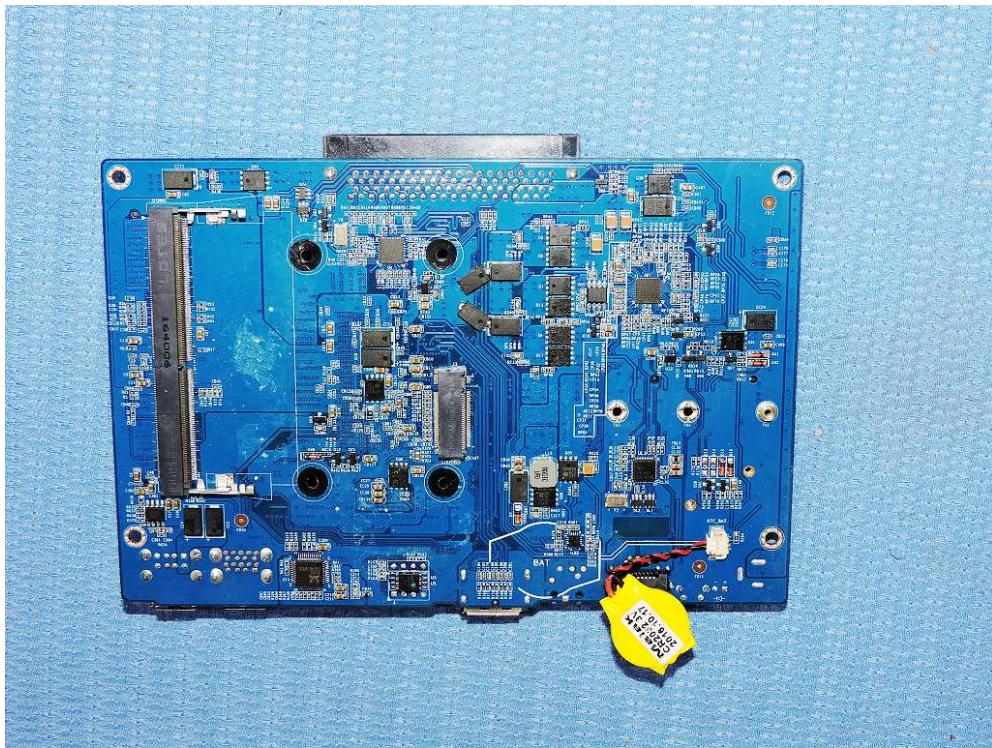
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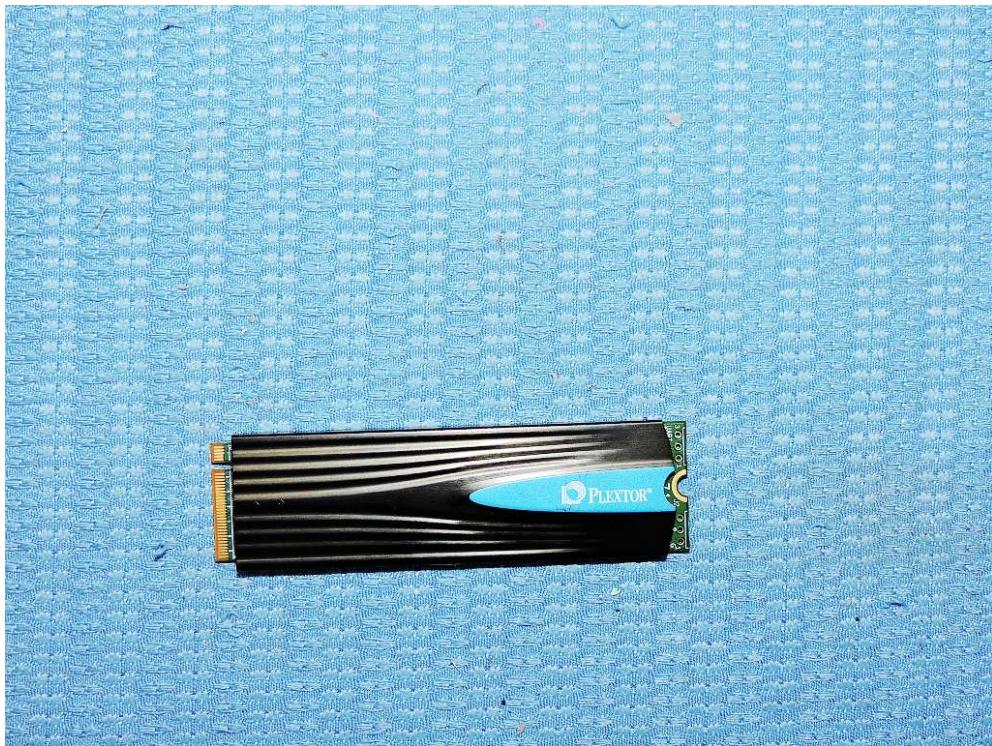
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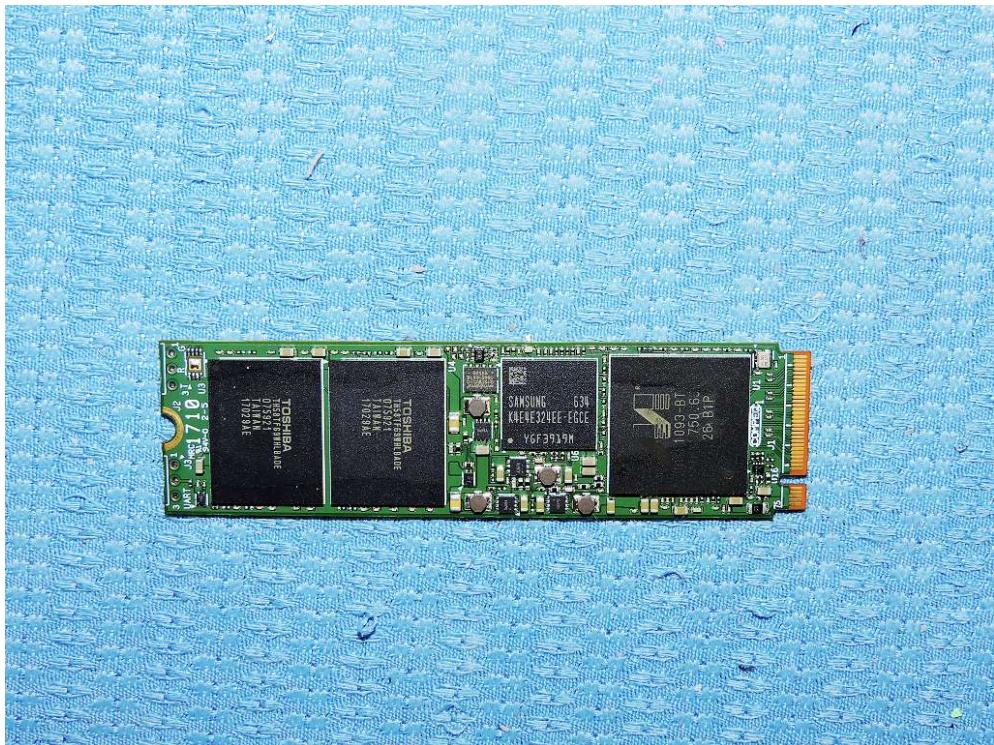
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Photos of EUT



-End of the report-

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