

FCC TEST REPORT

Product Name: Intelligent Processing Card
Trade Mark: Cambricon
Model No.: MLU100-C3
Add. Model No.: MLU100-C4
Report Number: 181113004EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
Test Result: PASS
Date of Issue: November 28, 2018

Prepared for:

Cambricon Technologies Corporation Limited
Room 1805, Building 1, Lane 2290, Zuchongzhi Road, Zhangjiang Hi-Tech Park, Shanghai, China

Prepared by:

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Date: November 28, 2018



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Version

Version No.	Date	Description
V1.0	November 28, 2018	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Cambricon Technologies Corporation Limited
Address of Applicant:	Room 1805, Building 1, Lane 2290, Zuchongzhi Road, Zhangjiang Hi-Tech Park, Shanghai, China
Manufacturer:	Cambricon Technologies Corporation Limited
Address of Manufacturer:	Room 1805, Building 1, Lane 2290, Zuchongzhi Road, Zhangjiang Hi-Tech Park, Shanghai, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Intelligent Processing Card
Model No.:	MLU100-C3
Add. Model No.:	MLU100-C4
Trade Mark:	Cambricon
DUT Stage:	Production Unit
Rated Voltage:	12.0 V $\Rightarrow$ 7.5 A
Classification of digital devices:	Class B
Sample Received Date:	November 15, 2018
Sample Tested Date:	November 15, 2018 to November 20, 2018
Note: The additional model MLU100-C4 is identical with the test model MLU100-C3 except the model number for marketing purpose.	

1.2.2 Description of Accessories

None.

1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Flat Panel Monitor	DELL	E1916HVI	NA	Applicant
Computer host	DELL	E25S	NA	UnionTrust

2) Support Cable

Description	Quantity	Cable Type	Length (m)	Supplied by
Power Cable	1	Unshielded without ferrite	1.50	UnionTrust
VGA Cable	1	Unshielded without ferrite	1.0	UnionTrust

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
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1.5 TEST FACILITY

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

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1194
Test Firm Registration Number: 259480

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart B Test Cases			
Test Item	Test Requirement	Test Method	Result
Conducted Emission	FCC 47 CFR Part 15.107	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109	ANSI C63.4-2014	PASS
Note:			
1) N/A: In this whole report not application.			

3. EQUIPMENT LIST

Radiated Emission Test Equipment List (3M Chamber)						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 20, 2015	Dec. 19, 2018
☒	Receiver	R&S	ESIB26	100114	Dec. 10, 2017	Dec. 10, 2018
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 17, 2017	Dec. 17, 2018
☒	Preamplifier	HP	8447F	2805A02960	Dec. 10, 2017	Dec. 10, 2018
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 22, 2019
☒	Multi device Controller	ETS-LINDGREN	7006-001	N/A	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Dec. 10, 2017	Dec. 10, 2018
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Dec. 10, 2017	Dec. 10, 2018
☒	LISN	R&S	ESH2-Z5	860014/024	Dec. 10, 2017	Dec. 10, 2018
☒	Test Software	Audix	e3	Software Version: 9.160323		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NT/NV	+15 to +35	12Vdc	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)	Tested by
Conducted Emission	23.5	47	100.01	Geimini Huang
Radiated Emission(3m)	23.0	47	100.01	Andy Lin

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	TM1: Data processing
Conducted Emission	TM1: Data processing

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

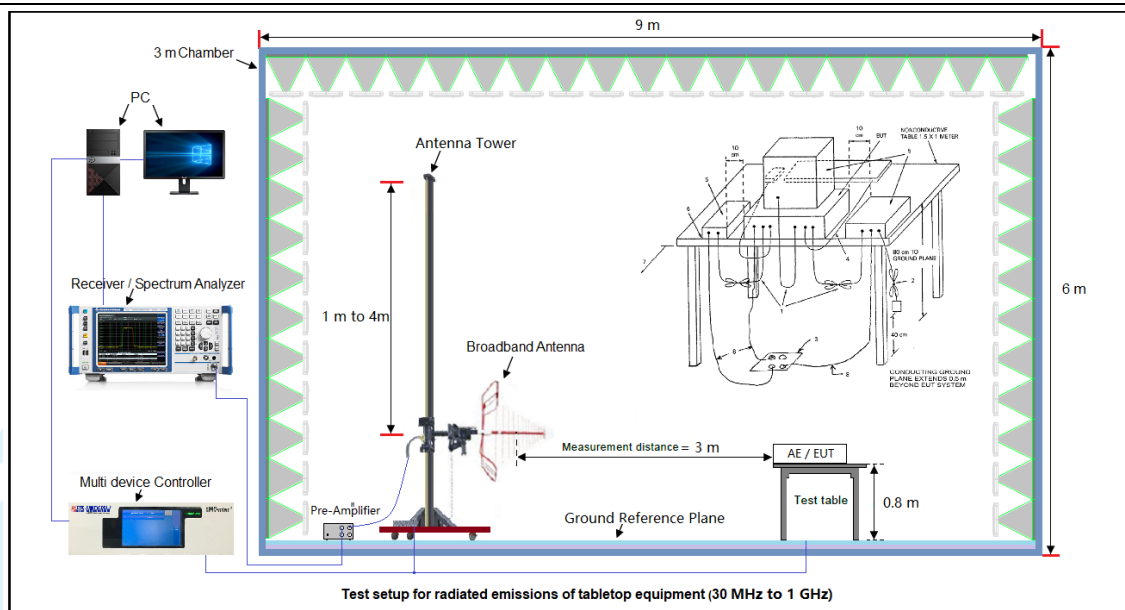
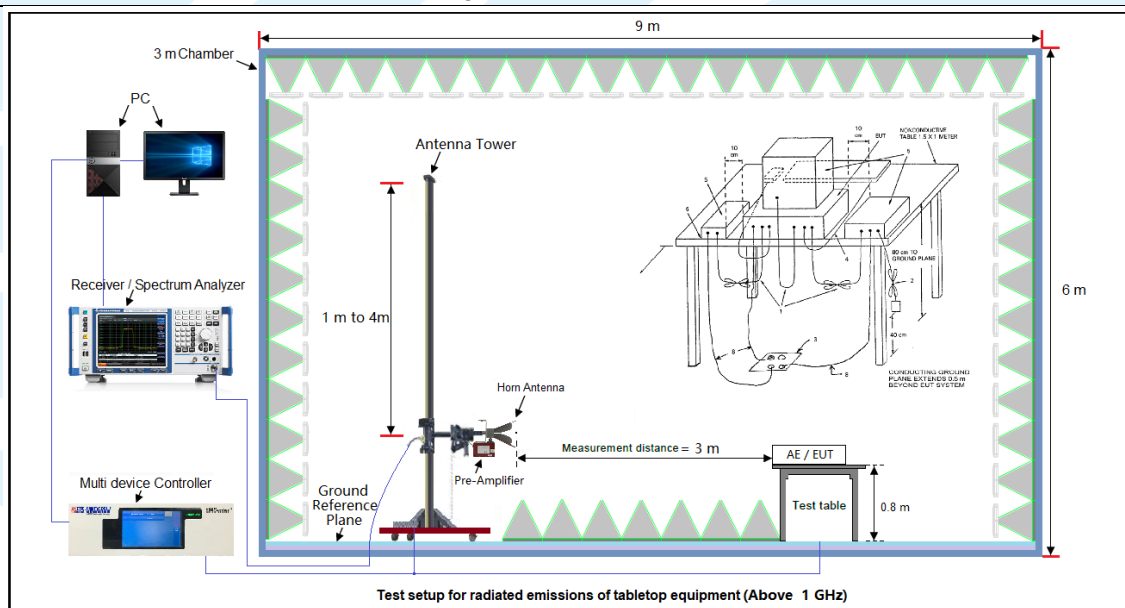
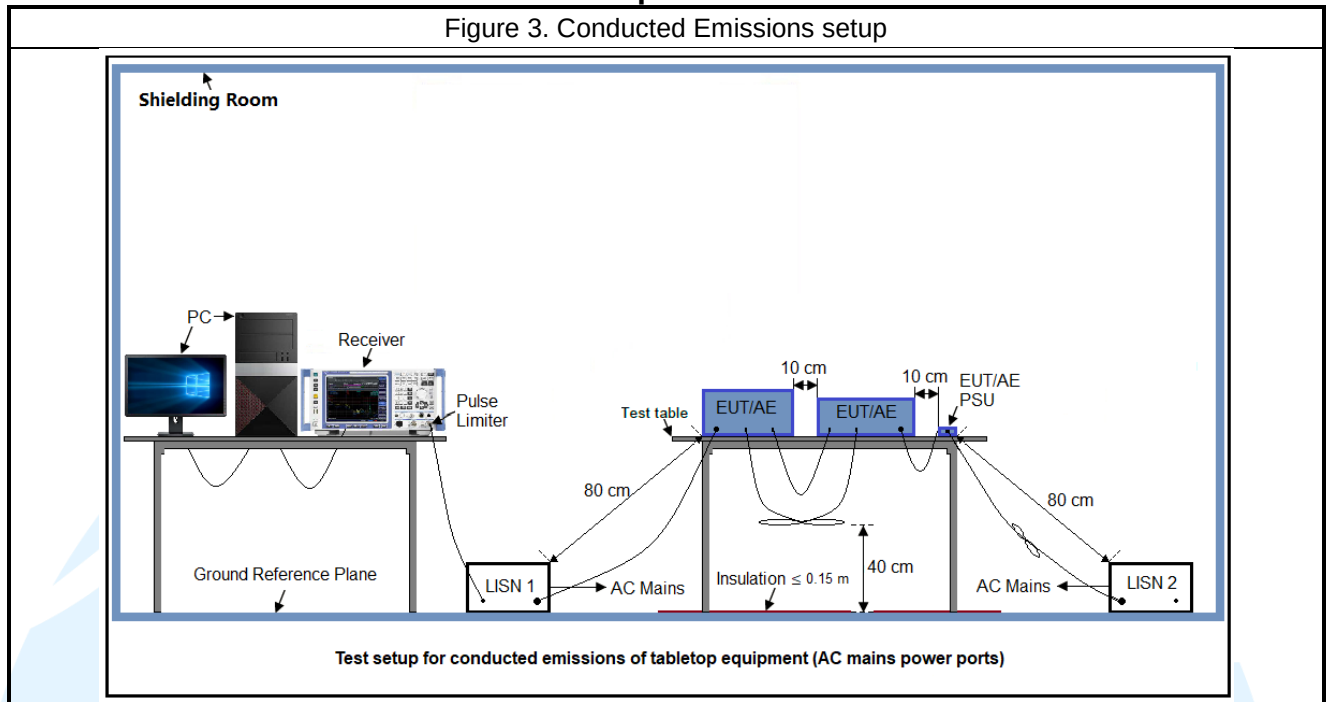


Figure 2. Above 1GHz



4.3.2 For Conducted Emissions test setup



4.4 SYSTEM TEST CONFIGURATION

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic (according to KDB 896810 D02 SDoC FAQ v01r01) of the highest fundamental frequency or to 40 GHz, whichever is lower.

5. REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part15 Subpart B	Unintentional Radiators
2	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
3	KDB 174176 D01 Line Conducted FAQ v01r01	AC power-line conducted emission frequency asked questions
4	KDB 896810 D02 SDoC FAQ v01r02	Supplier's Declaration of Conformity frequency asked questions

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109

Test Method: ANSI C63.4-2014

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
$30 \leq f \leq 1\,000$	Quasi Peak	120 kHz	300 kHz
$f \geq 1000$	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Measured frequency range

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Limits:

Limits for Class B devices

Frequency (MHz)	limits at 3 m (dB μ V/m)		
	QP Detector	PK Detector	AV Detector
30-88	40	--	--
88-216	43.5	--	--
216-960	46	--	--
960 to 1000	54	--	--
Above 1000	--	74	54

Remark:

- The lower limit shall apply at the transition frequencies.
- Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

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1. From 30 MHz to 1GHz test procedure as below:

- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

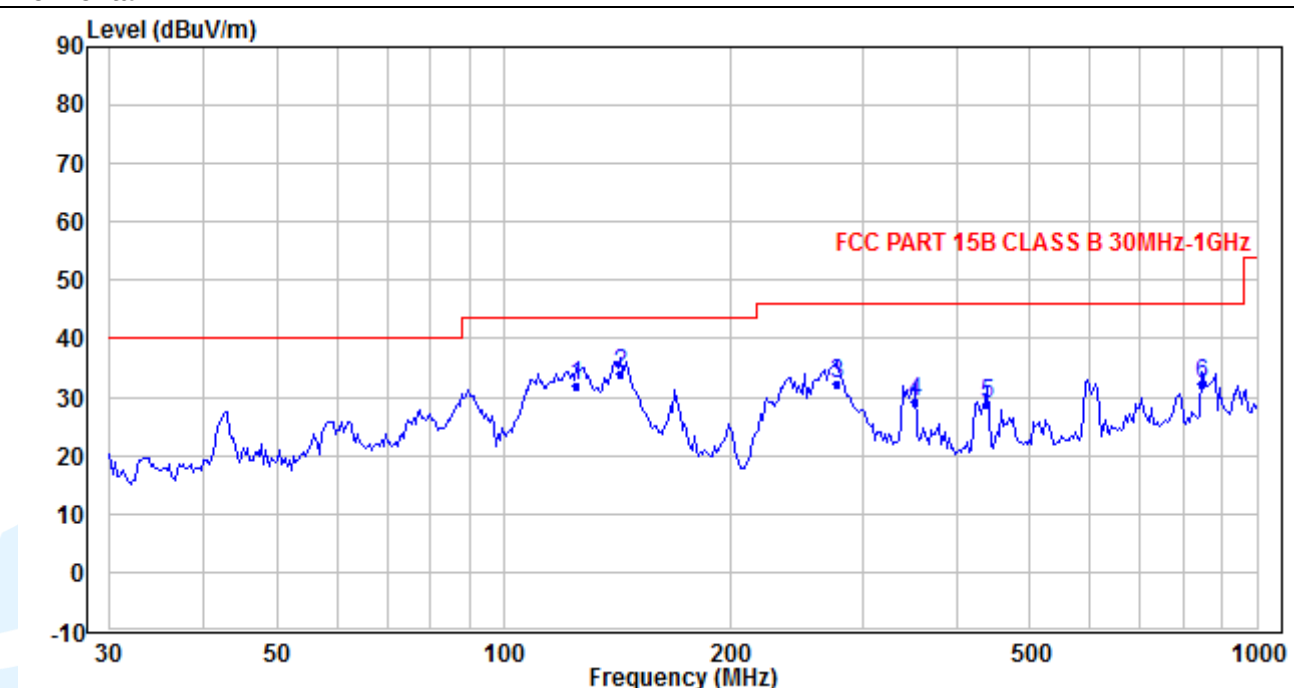
Test Result: Pass

The measurement data as follows:

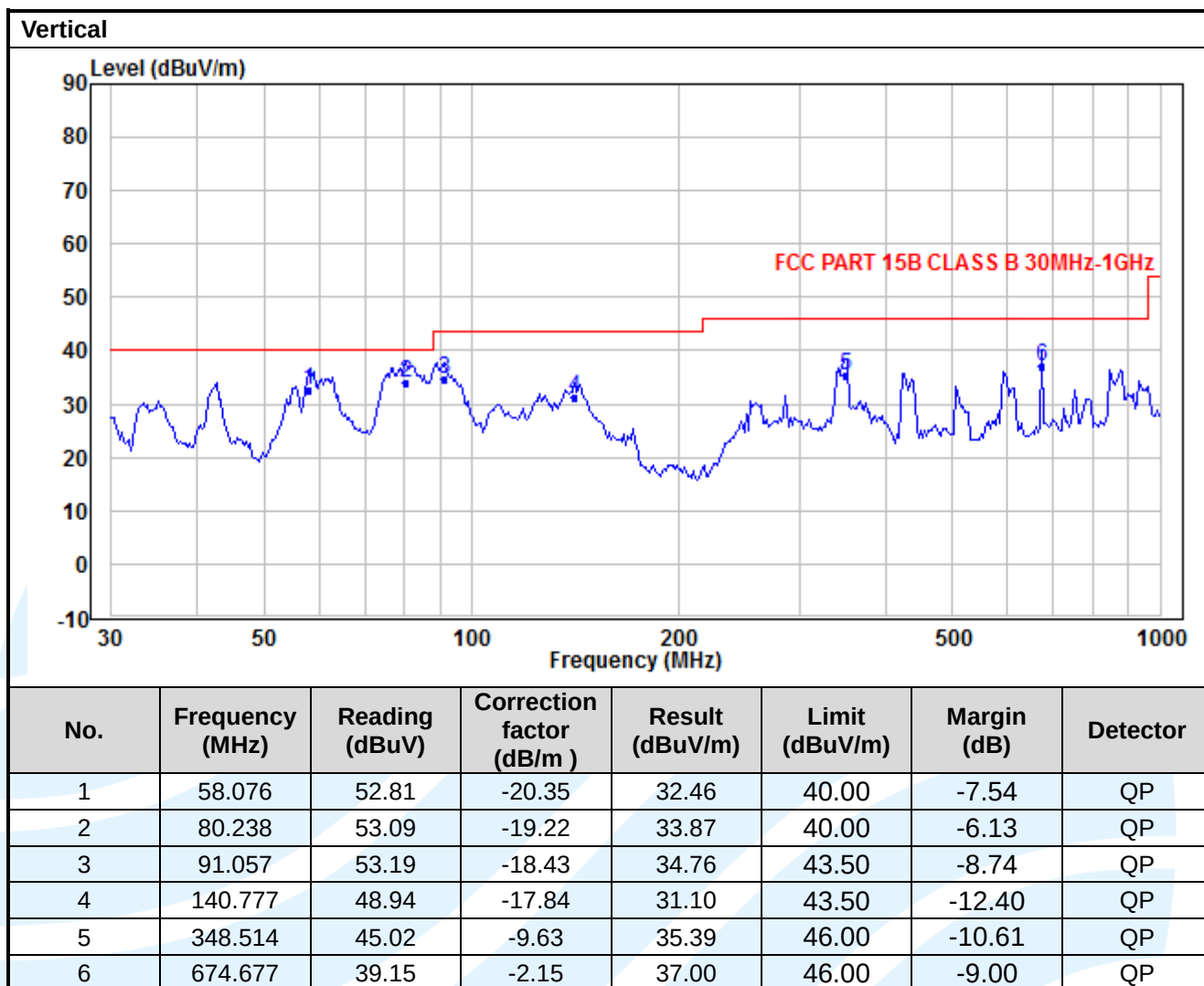
Below 1GHz(Quasi Peak):

Mode1

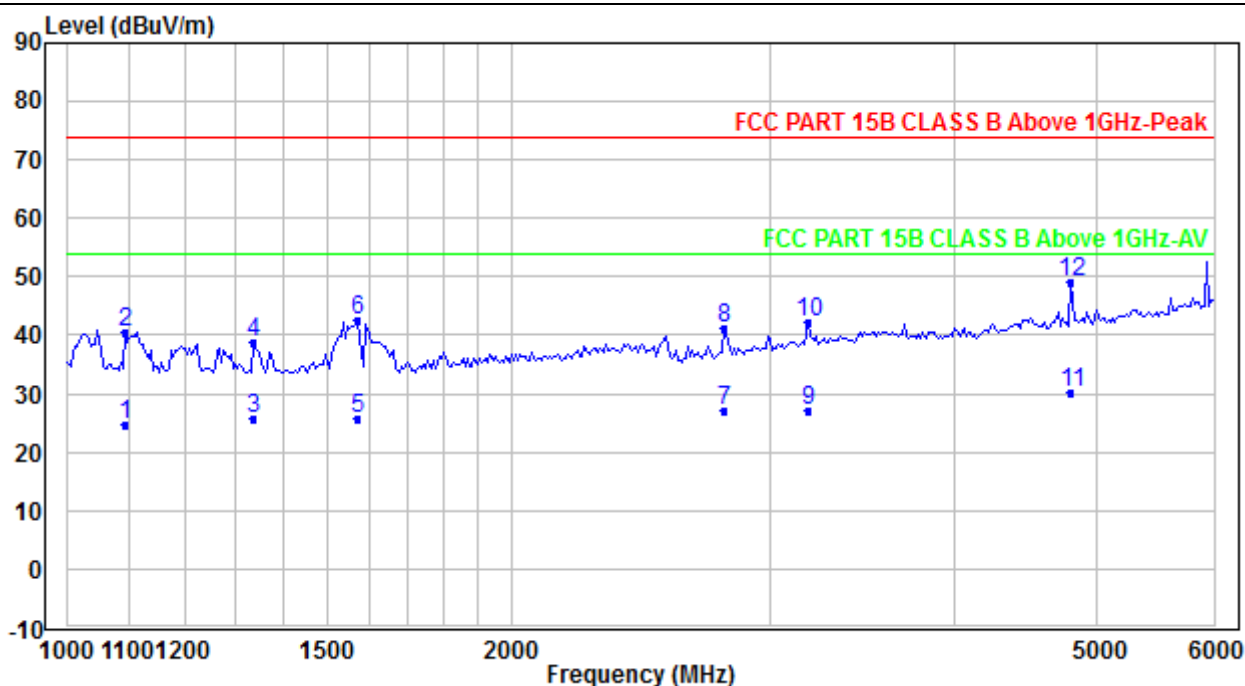
Horizontal



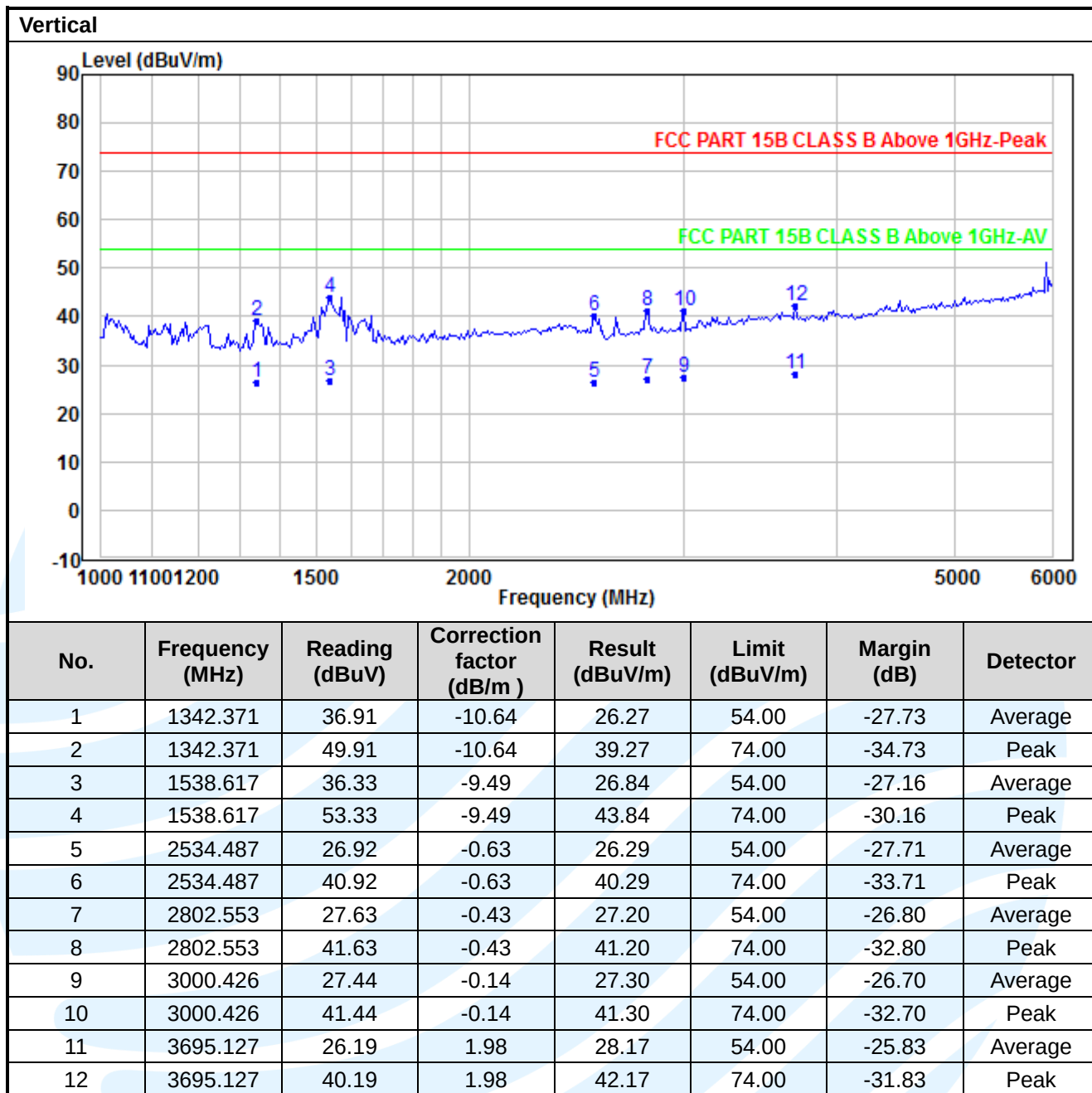
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	124.925	49.63	-17.56	32.07	43.50	-11.43	QP
2	142.769	51.48	-17.66	33.82	43.50	-9.68	QP
3	276.382	43.68	-11.51	32.17	46.00	-13.83	QP
4	350.972	38.74	-9.56	29.18	46.00	-16.82	QP
5	439.473	35.64	-6.86	28.78	46.00	-17.22	QP
6	844.803	33.05	-0.75	32.30	46.00	-13.70	QP



Above 1GHz(Peak & Average)
Mode1
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1093.920	36.38	-11.74	24.64	54.00	-29.36	Average
2	1093.920	52.38	-11.74	40.64	74.00	-33.36	Peak
3	1337.560	36.39	-10.67	25.72	54.00	-28.28	Average
4	1337.560	49.39	-10.67	38.72	74.00	-35.28	Peak
5	1572.125	34.72	-9.09	25.63	54.00	-28.37	Average
6	1572.125	51.72	-9.09	42.63	74.00	-31.37	Peak
7	2792.509	27.56	-0.45	27.11	54.00	-26.89	Average
8	2792.509	41.56	-0.45	41.11	74.00	-32.89	Peak
9	3177.852	26.39	0.67	27.06	54.00	-26.94	Average
10	3177.852	41.39	0.67	42.06	74.00	-31.94	Peak
11	4802.497	27.34	2.83	30.17	54.00	-23.83	Average
12	4802.497	46.34	2.83	49.17	74.00	-24.83	Peak



Remark:

1. N/A, since there are not any ancillary equipments connected to the radio equipment. The Radiated Emission test is only applicable to ancillary equipment not incorporated in the radio equipment and intended to be measured on a stand-alone basis, as declared by the manufacturer.

6.2 CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15.107

Test Method: ANSI C63.4-2014

Limits:

Limits for Class B devices

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66-56	56-46
0.50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.3.2 for details.

Test Procedures:

- 1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- 2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- 3) For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

Equipment Used: Refer to section 3 for details.

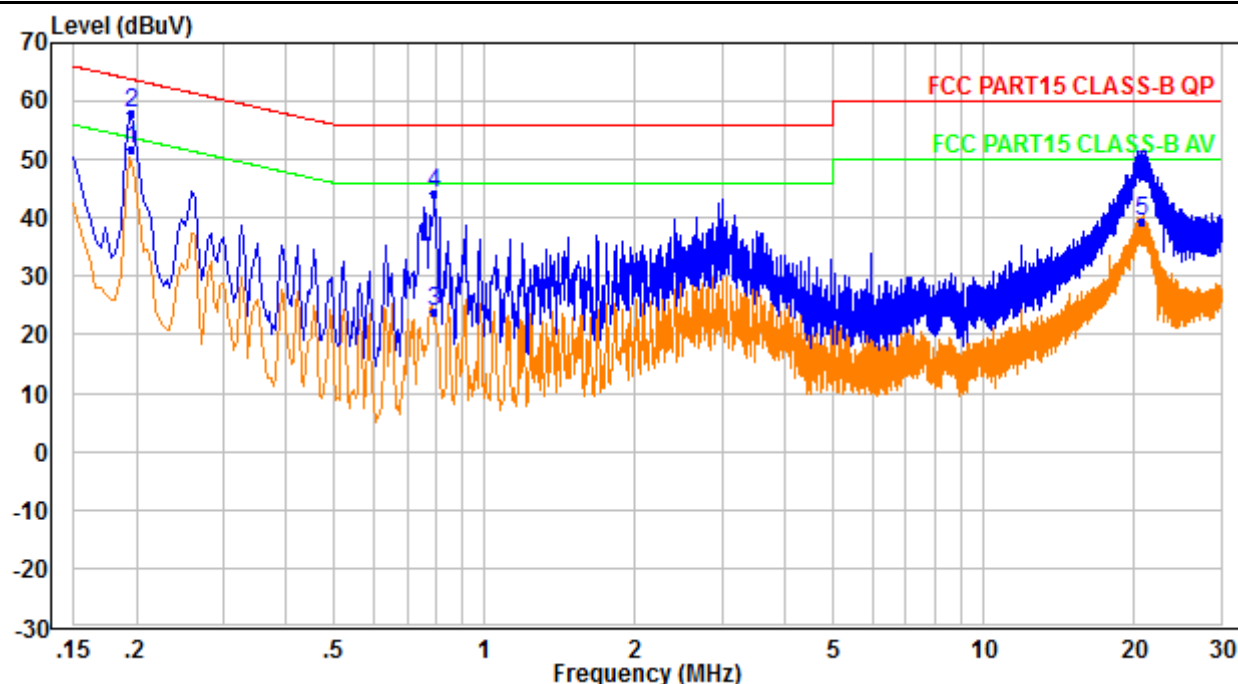
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

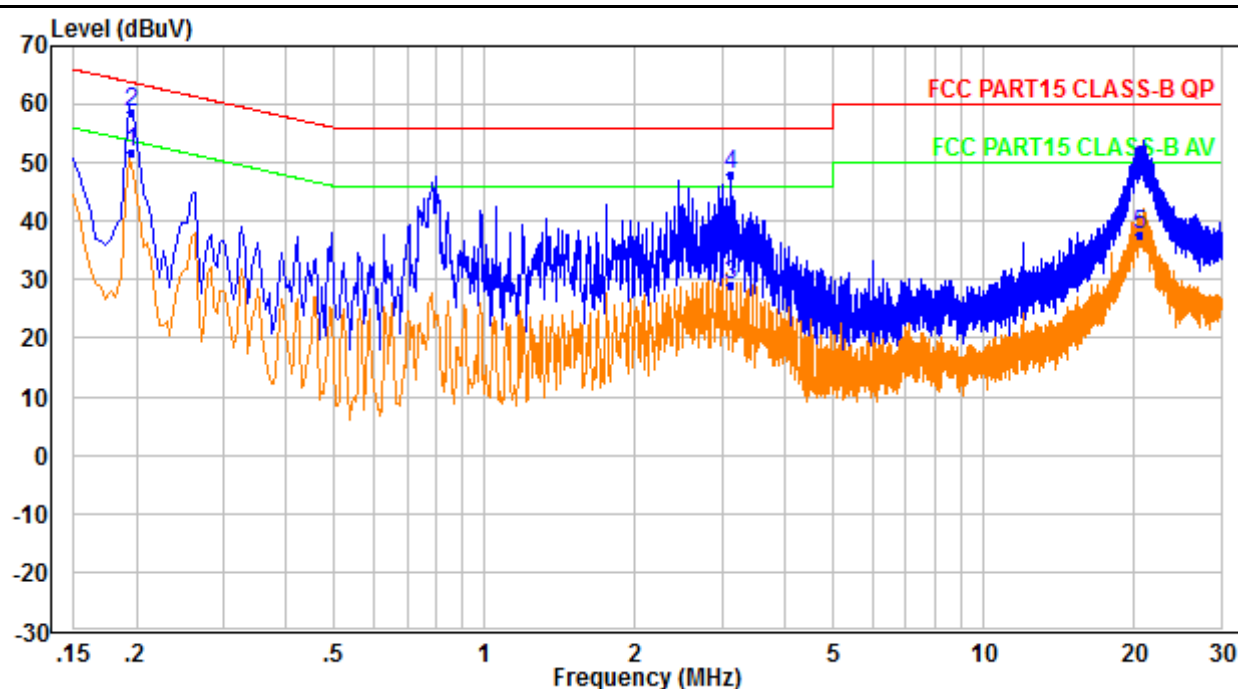
Mode 1

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1948	41.70	10.20	51.90	53.83	-1.93	Average
2	0.1948	47.80	10.20	58.00	63.83	-5.83	QP
3	0.794	13.81	10.25	24.06	46.00	-21.94	Average
4	0.794	33.90	10.25	44.15	56.00	-11.85	QP
5	20.754	26.61	12.85	39.46	50.00	-10.54	Average
6	20.754	34.41	12.85	47.26	60.00	-12.74	QP

Neutral Line



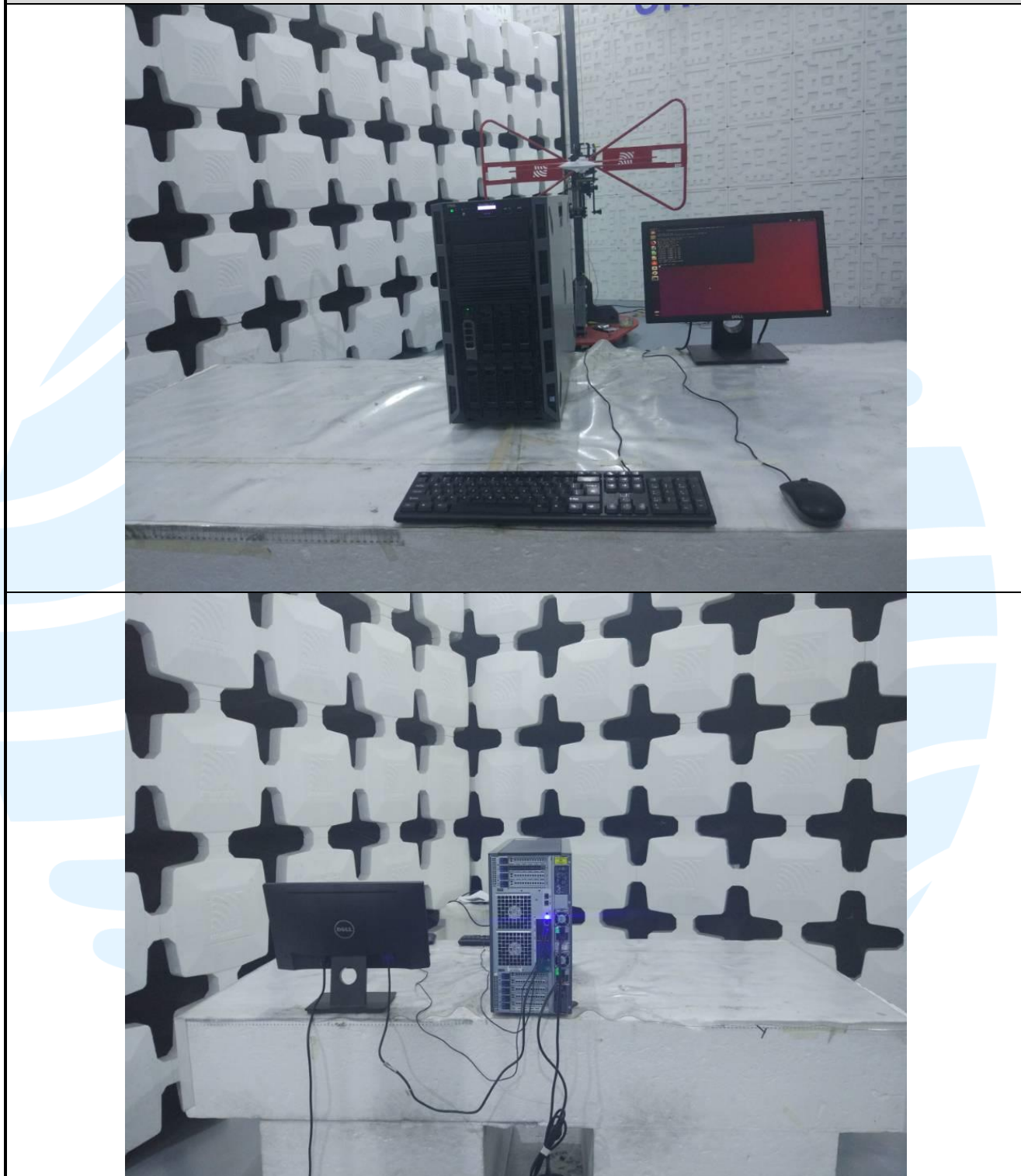
No.	Frequency (MHz)	Reading (dBUV)	Correction factor (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector
1	0.196	41.50	10.25	51.75	53.80	-2.05	Average
2	0.196	48.40	10.25	58.65	63.80	-5.15	QP
3	3.114	18.38	10.57	28.95	46.00	-17.05	Average
4	3.114	37.33	10.57	47.90	56.00	-8.1	QP
5	20.548	25.00	12.78	37.78	50.00	-12.22	Average
6	20.548	36.02	12.78	48.80	60.00	-11.20	QP

Remark:

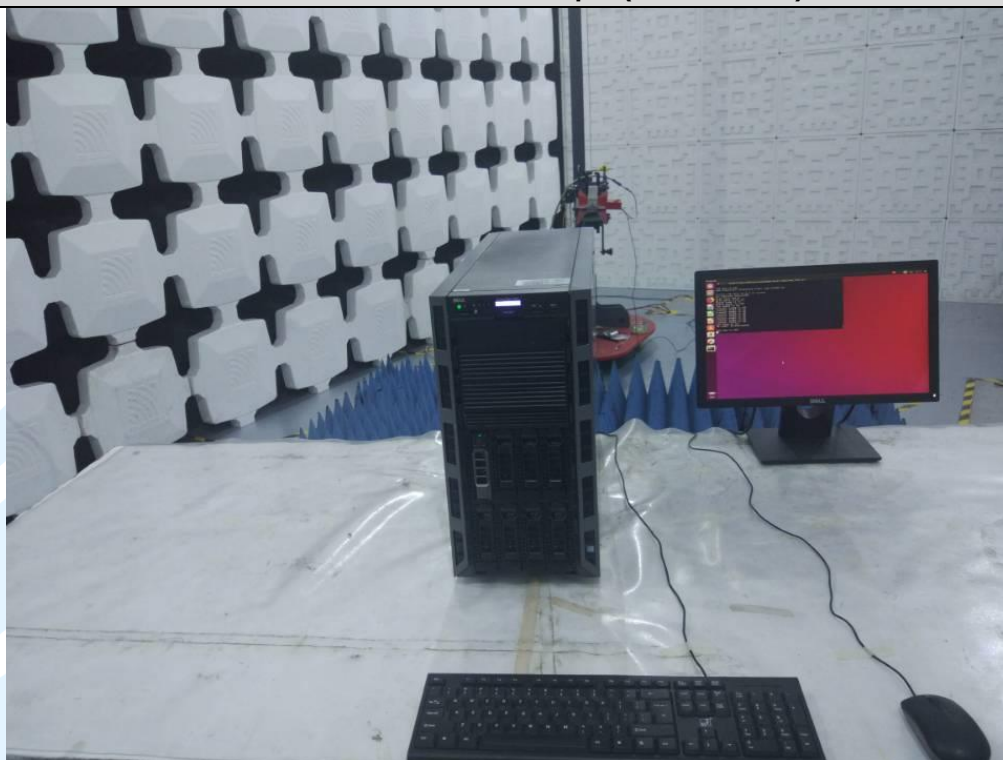
1. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX 1 PHOTOS OF TEST SETUP

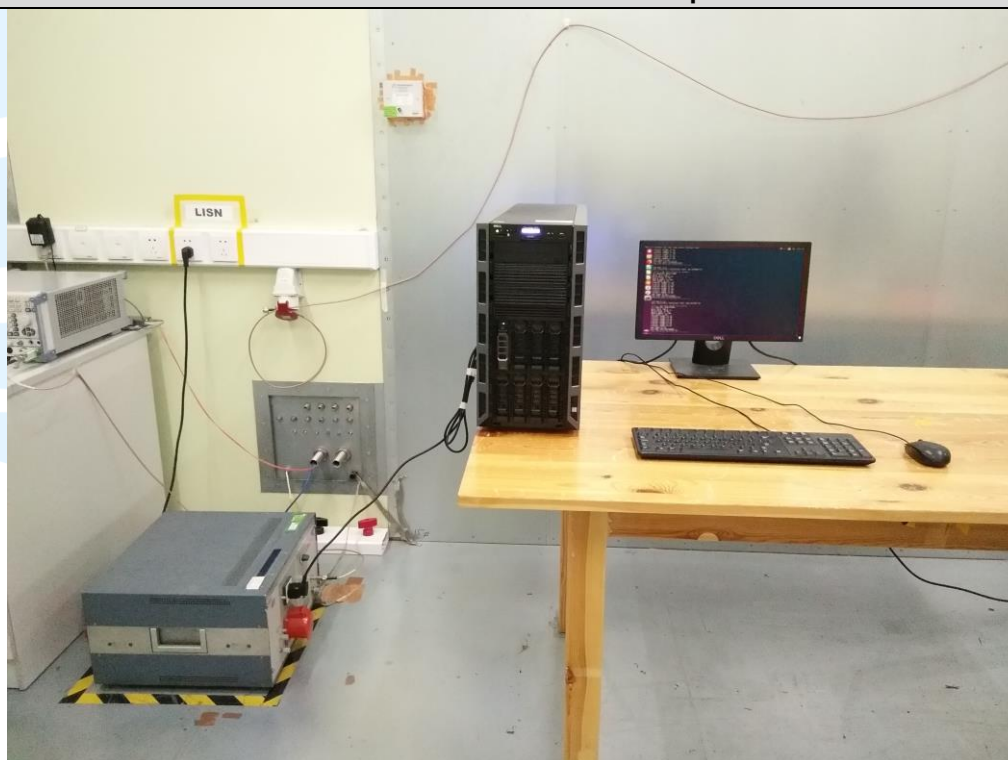
Radiated emission Test Setup-1 (30 MHz~1 GHz)



Radiated emission Test Setup-2 (Above 1 GHz)

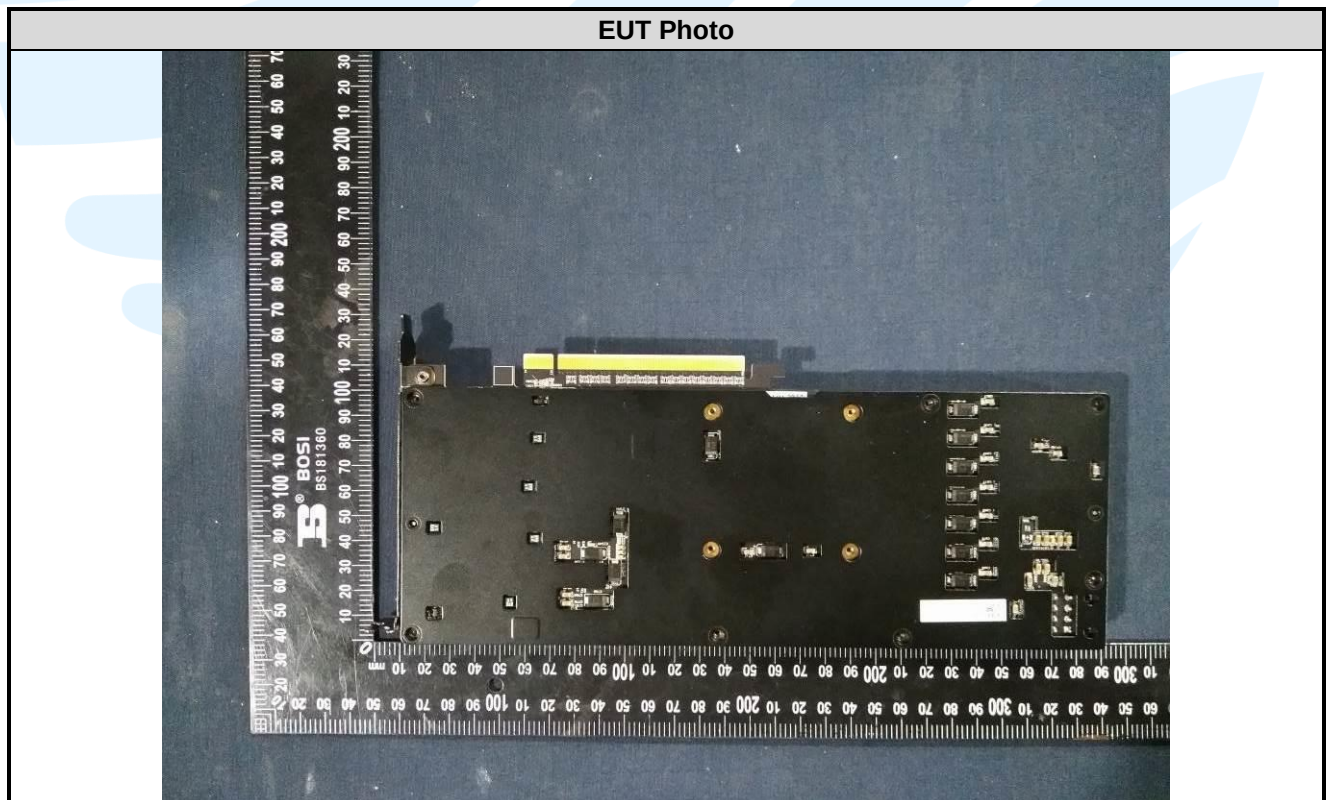
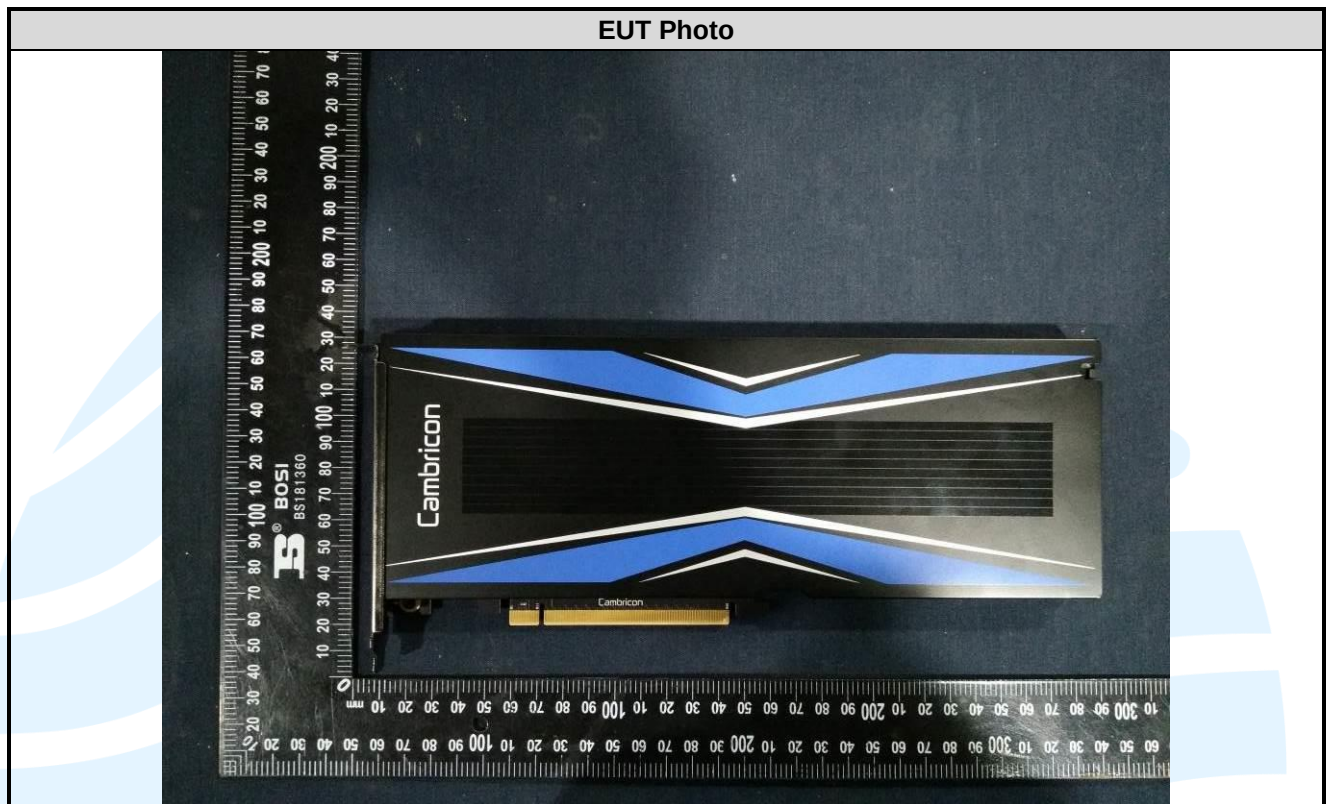


Conducted Emission Test Setup-3

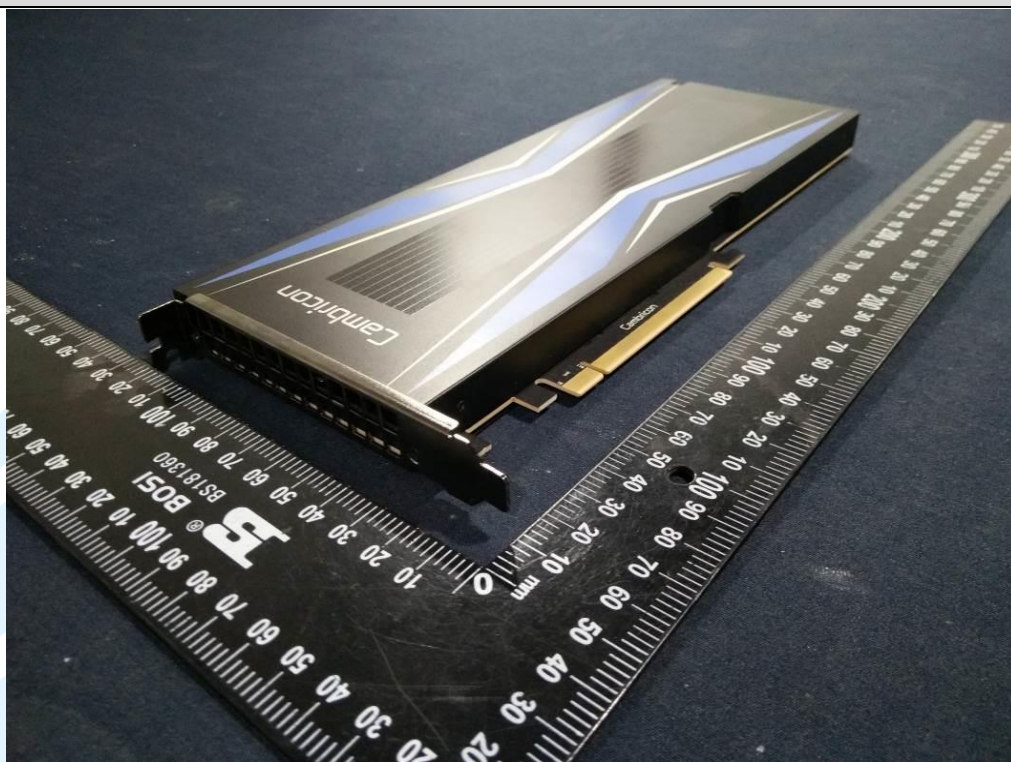


APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

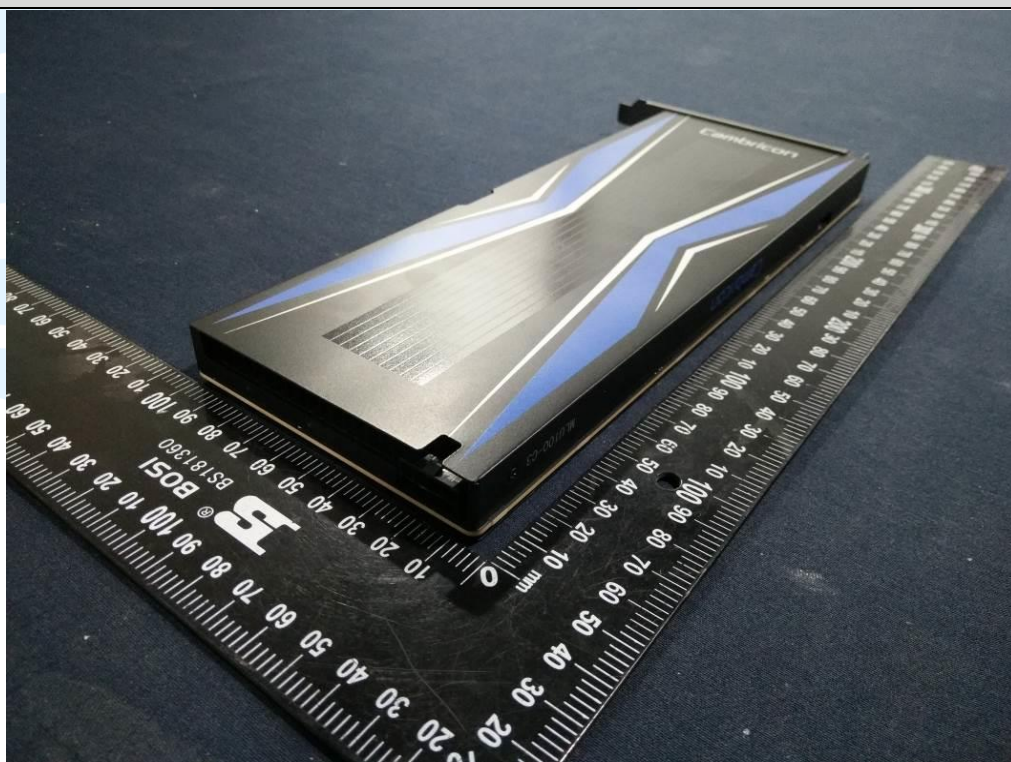
EUT EXTERNAL PHOTOS



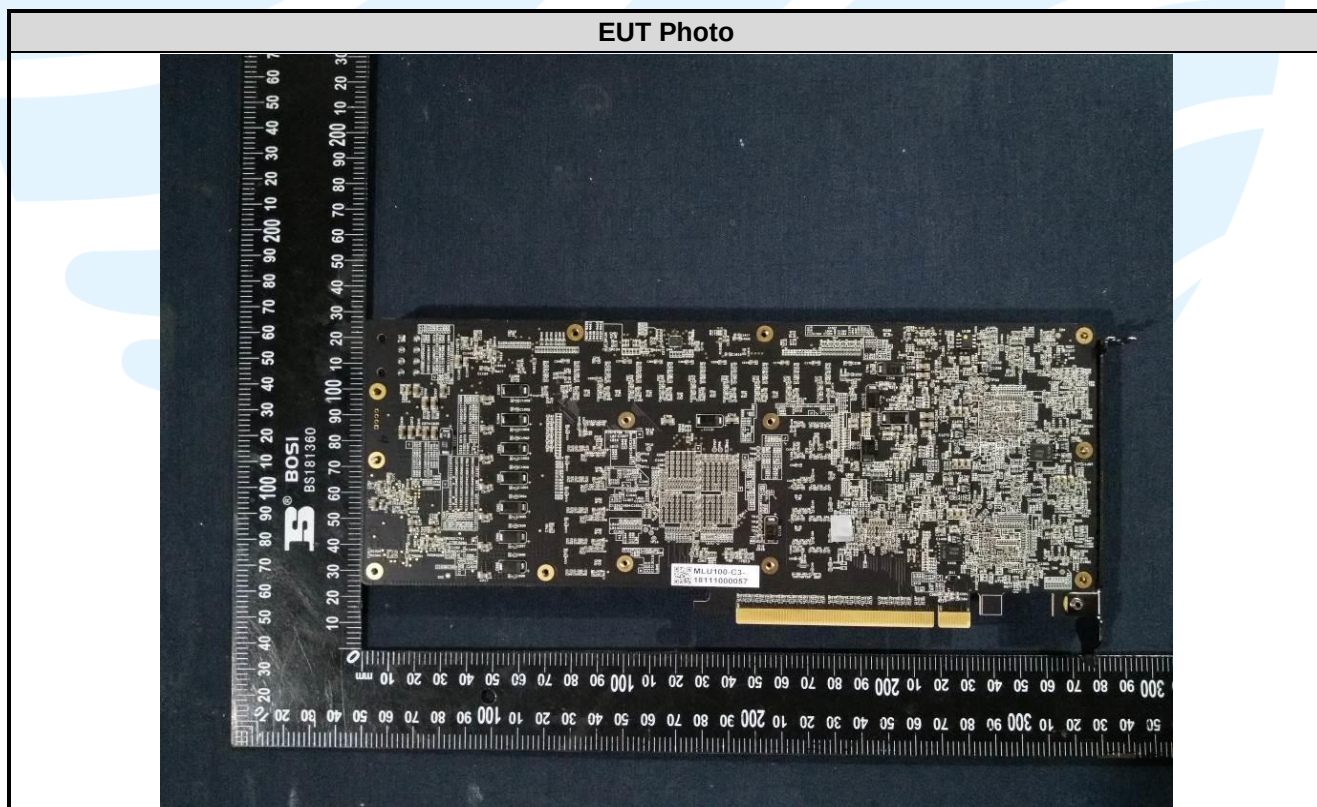
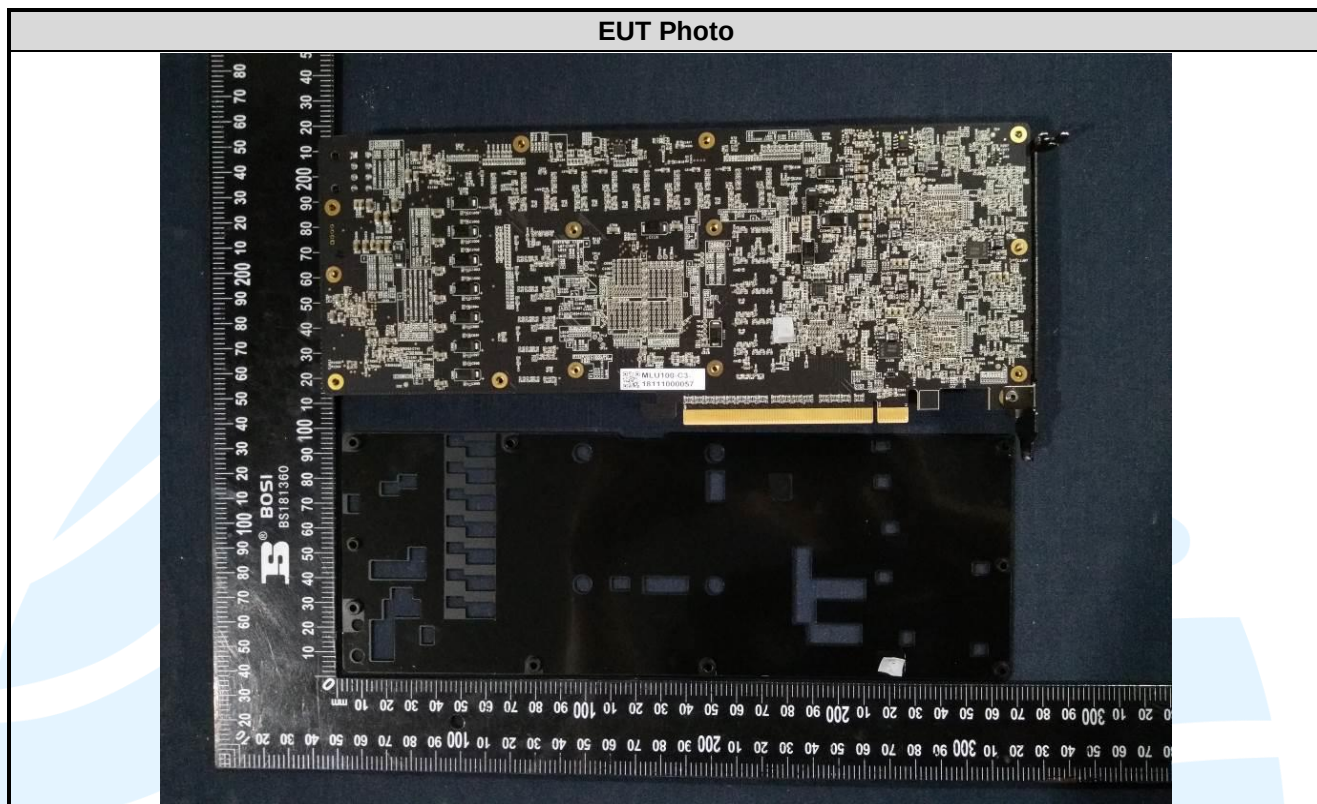
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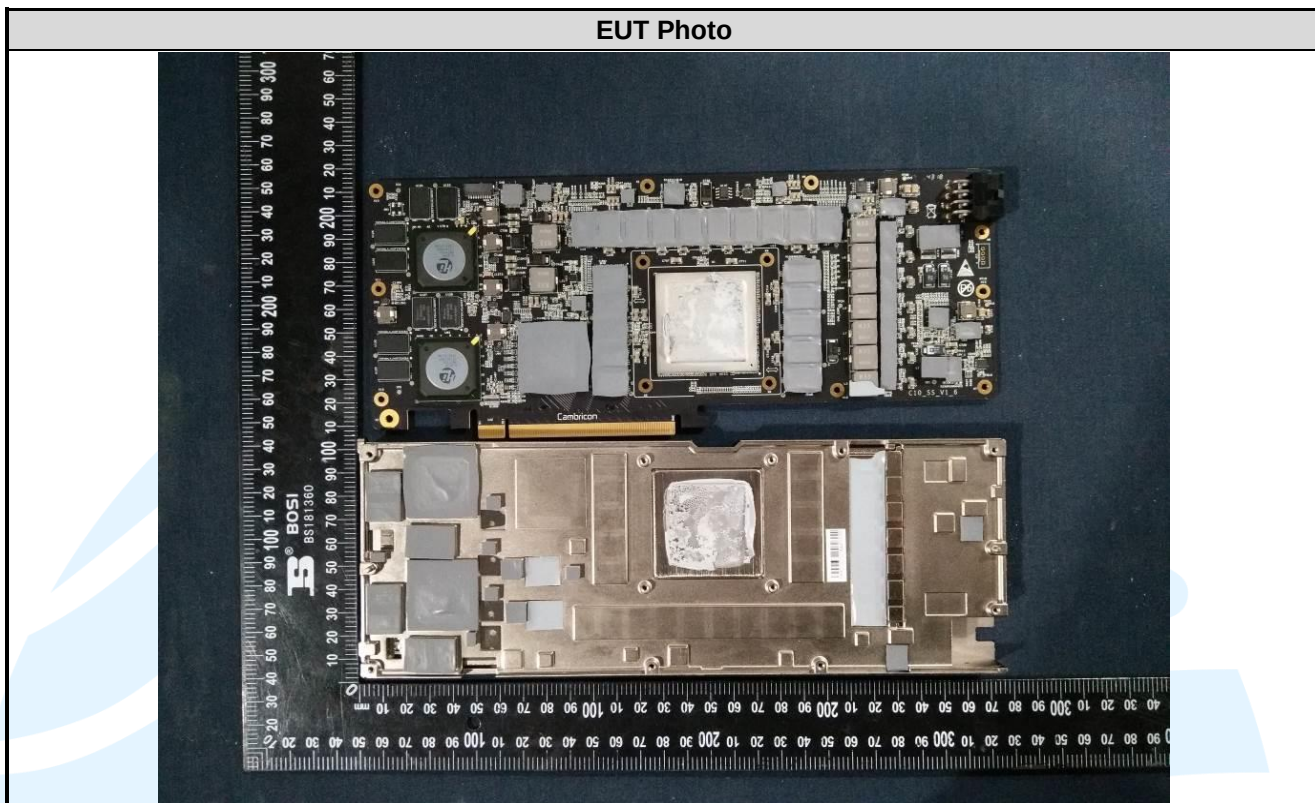
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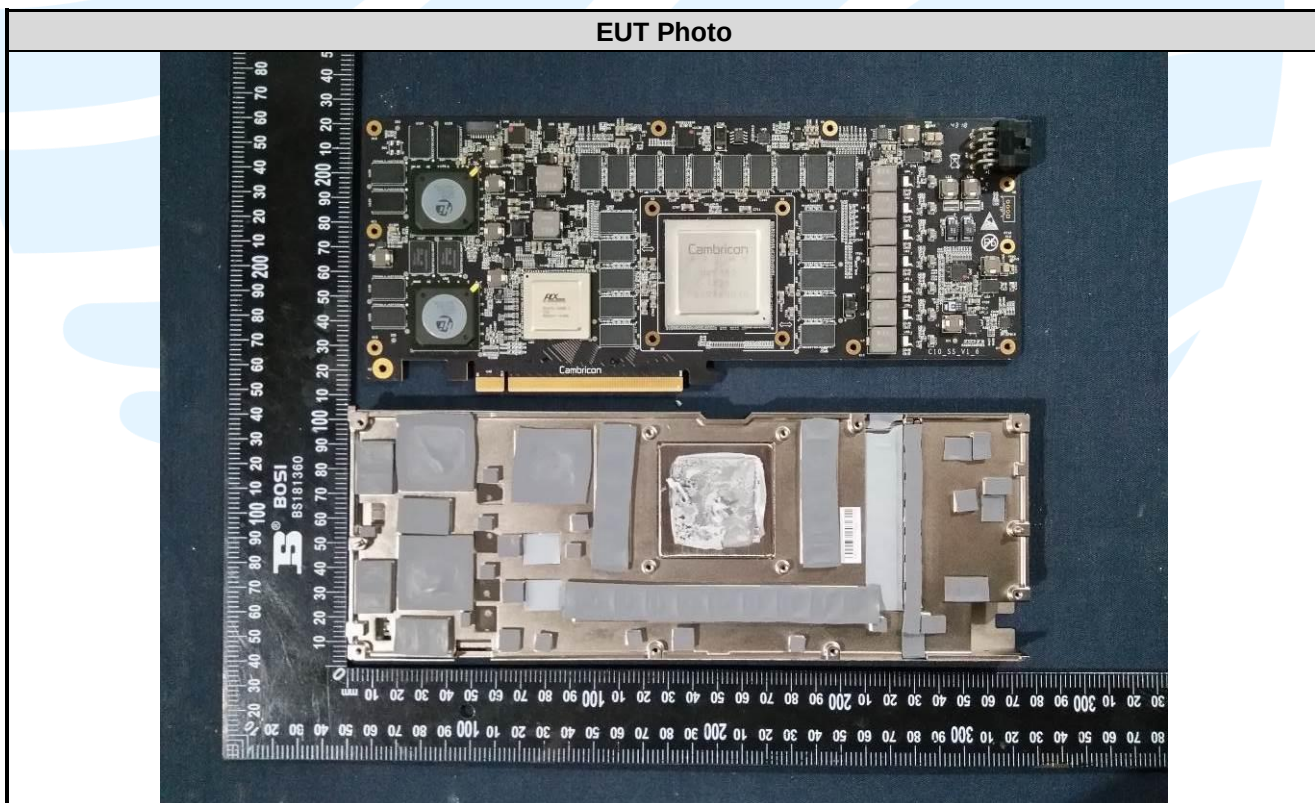
EUT INTERNAL PHOTOS

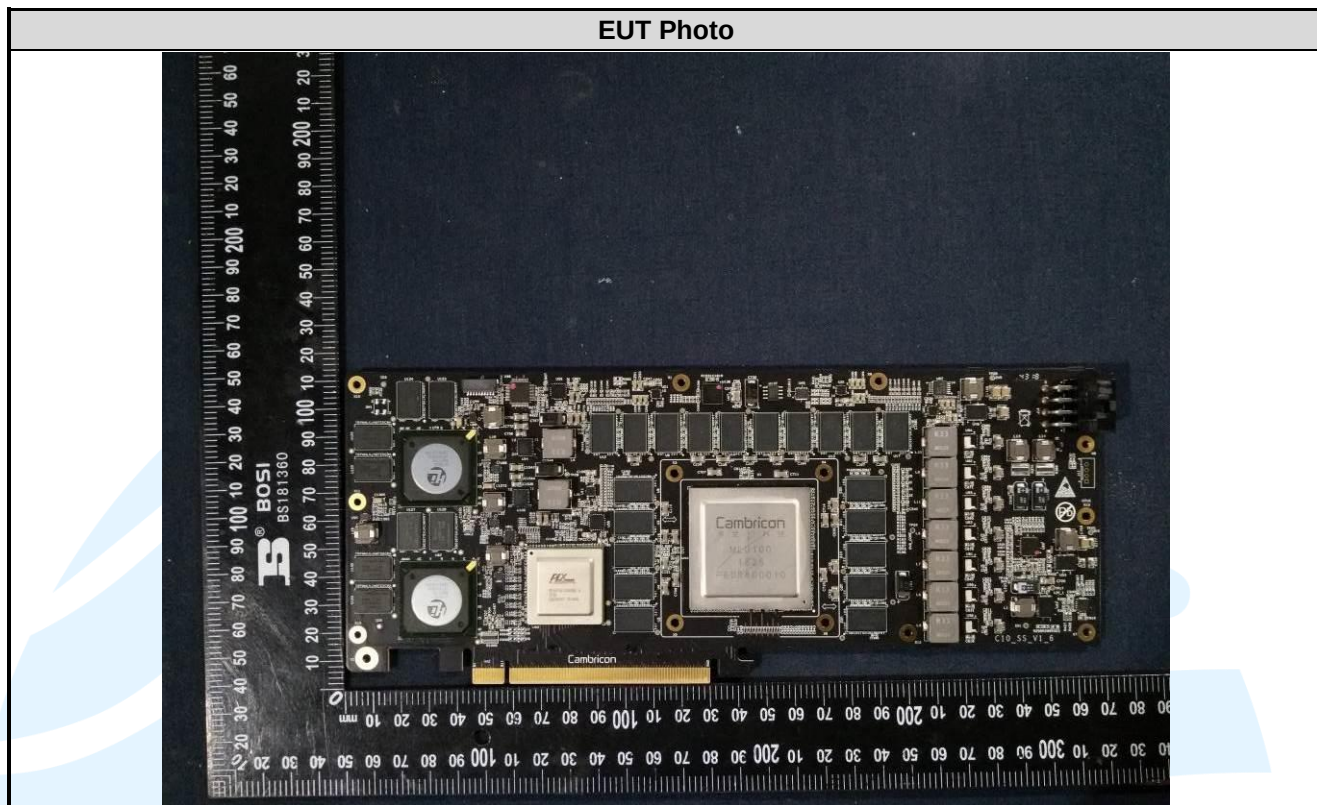


EUT Photo



EUT Photo





***** End of Report *****

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