FCC PART 15B

MEASUREMENT AND TEST REPORT

FOR

Cubietech Co., Ltd.

303,1st Bldg, A Zone, Baoan Internet Industry Base, No.1009, Baoyuan Road, Baoan District, Shenzhen, China.

Report Concerns: Original Report	**Equipment Type:** Cubietruck
Model:	Cubietruck
Report No.:	MWR150708201
Test Date:	2015-07-17 to 2015-08-03
Issue Date:	2015-08-04
Tested By:	***Young Li*** ***Project Engineer***
Reviewed By:	***Dixon Hao*** ***Reviewer***
Approved & Authorized By:	**Jackson Long** **Laboratory Manager**
Prepared By:	

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Maxwell International Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Cubietech Co., Ltd.

Address of applicant: 303,1st Bldg, A Zone, Baoan Internet Industry Base, No.1009, Baoyuan Road, Baoan District, Shenzhen, China.

Manufacturer: Cubietech Co., Ltd.

Address of manufacturer: 303,1st Bldg, A Zone, Baoan Internet Industry Base, No.1009, Baoyuan Road, Baoan District, Shenzhen, China.

General Description of E.U.T

Items	Description
EUT Description:	Cubietruck
Trade Name:	Cubieboard
Model No.:	Cubietruck
Power Supply:	DC5V,2A
Adaptor Model:	SP0502000EU
Rated Voltage:	100-240VAC,50/60Hz,0.2A
Battery Capacity:	/
For more information refer to the circuit diagram form and the user's manual.	

The test data is gathered from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Cubietech Co., Ltd. in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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.

The equipment under test (EUT) was configured to measure its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility Location

Building1, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen, China

1.5 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the system components. The test software, provided by the customer, is started while the EUT is on to simulate the normal work.

1.6 Accessories Equipment List and Details

Description	Manufacturer	Model	Serial Number
Adapter	STT	SP0502000EU	N/A

1.7 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
DC Cable	0.5	Unshielded	Without Core
SATA Cable	0.2	Shielded	Without Core
USB Cable	0.5	Unshielded	Without Core

2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.107 (a) Conducted Emission	Compliant
§15.109(a) Radiated Emission	Compliant

3. §15.107 (a) - CONDUCTED EMISSION

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

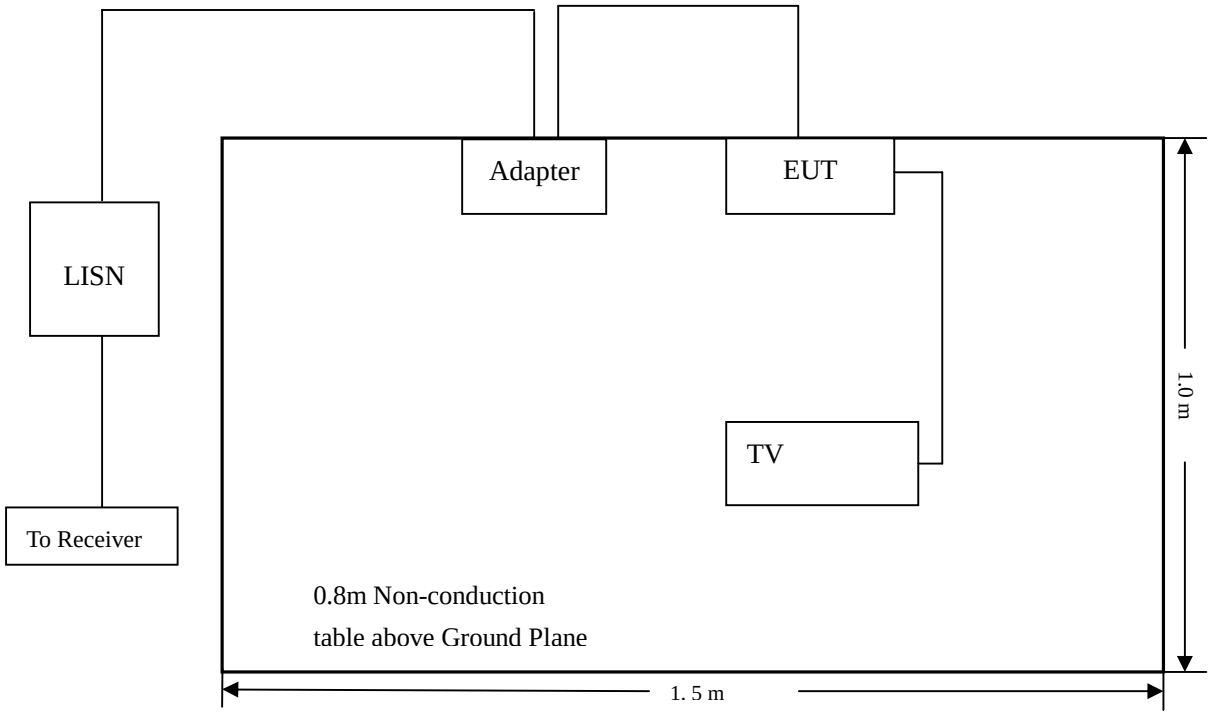
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2015-03-28	2016-03-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2015-03-28	2016-03-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2015-03-28	2016-03-27

3.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.107 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

3.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency.....150 kHz
Stop Frequency.....30 MHz
Sweep Speed.....Auto
IF Bandwidth.....10 kHz
Quasi-Peak Adapter Bandwidth.....9 kHz
Quasi-Peak Adapter Mode .....Normal

3.7 Summary of Test Results/Plots

According to the data in section 3.8, the EUT complied with the FCC Part 15B Conducted margin for a Class B device, with the *worst* margin reading of:

-3.39 dBmV at **0.786 MHz** in the **Line, Average** Detector, 0.15-30MHz

3.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

Conducted Disturbance

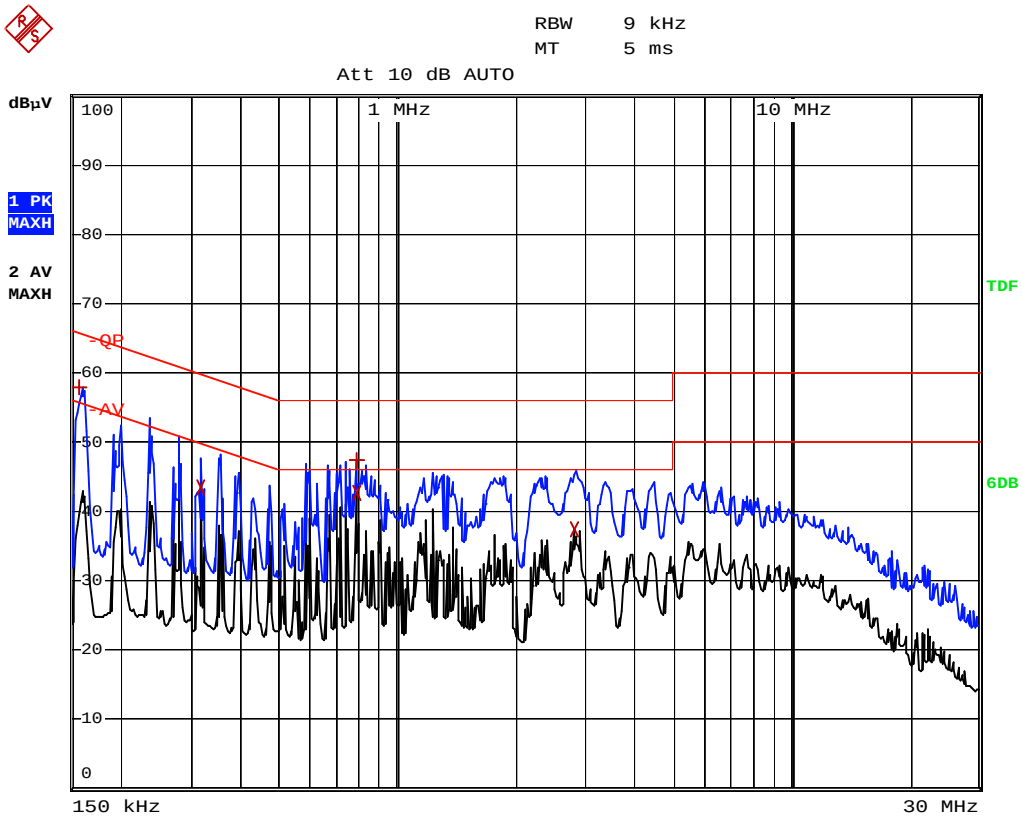
EUT: Cubietruck

M/N: Cubietruck

Operating Condition: Playing

Test Specification: Line

Comment: AC 120V/60Hz/Adapter DC 5V



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	158 kHz	57.80	-7.76
2 Average	314 kHz	43.46	-6.40
1 Max Peak	786 kHz	47.30	-8.69
2 Average	786 kHz	42.60	-3.39
2 Average	2.81 MHz	37.28	-8.72

Plot of Conducted Emissions Test Data

Conducted Disturbance

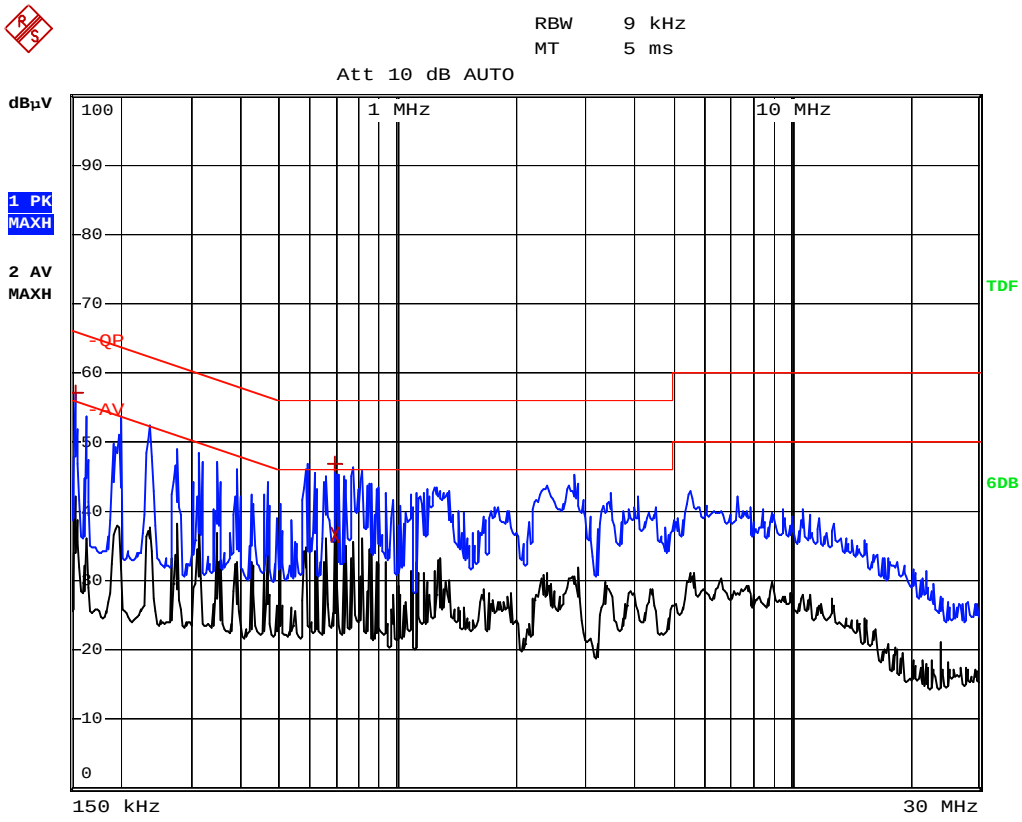
EUT: Cubietruck

M/N: Cubietruck

Operating Condition: Playing

Test Specification: Neutral

Comment: AC 120V/60Hz/Adapter DC 5V



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	154 kHz	57.01	-8.76
1 Max Peak	694 kHz	46.83	-9.16
2 Average	694 kHz	36.59	-9.40

4. §15.109(a) - RADIATED EMISSION

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Equipment List and Details

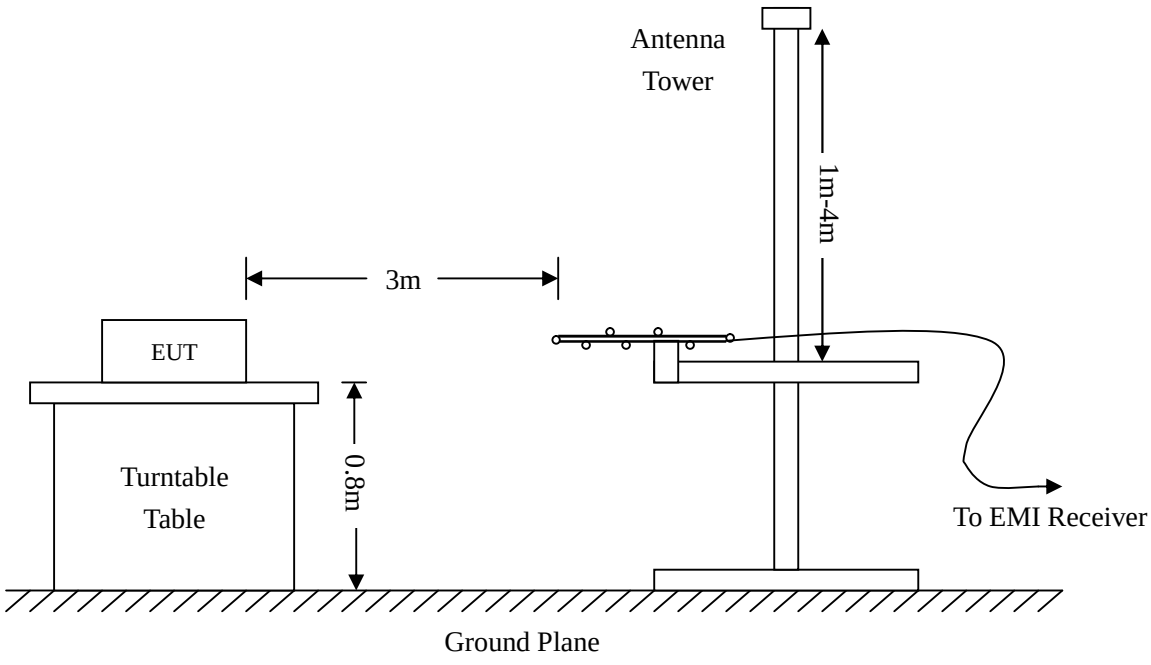
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2015-03-28	2016-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2015-03-28	2016-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2015-03-28	2016-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2015-03-28	2016-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2015-03-28	2017-03-27
Horn Antenna	ETS	3117	00086197	2015-03-28	2017-03-27

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.205 and FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading – Corr. Factor

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15B Limit

4.6 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

According to the data, the EUT complied with the FCC Part 15B Class B standards, and had the worst margin of:

-4.89 dBmV at **72.0843 MHz** in the **Vertical** polarization, **Downloading** Mode,**9 kHz to 5 GHz, 3Meters**

Plot of Radiation Emissions Test Data

Radiated Disturbance

EUT: Cubietruck

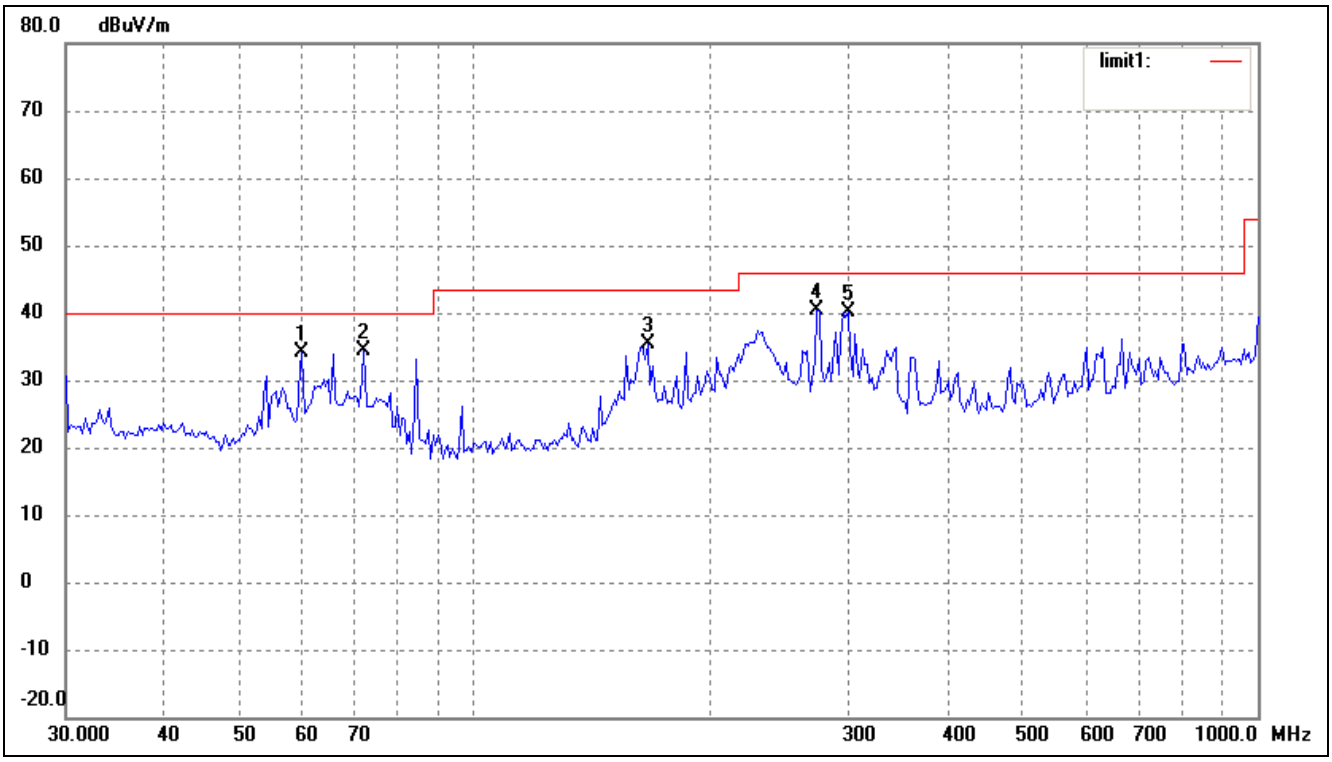
M/N: Cubietruck

Operating Condition: Downloading

Test Specification: Horizontal & Vertical

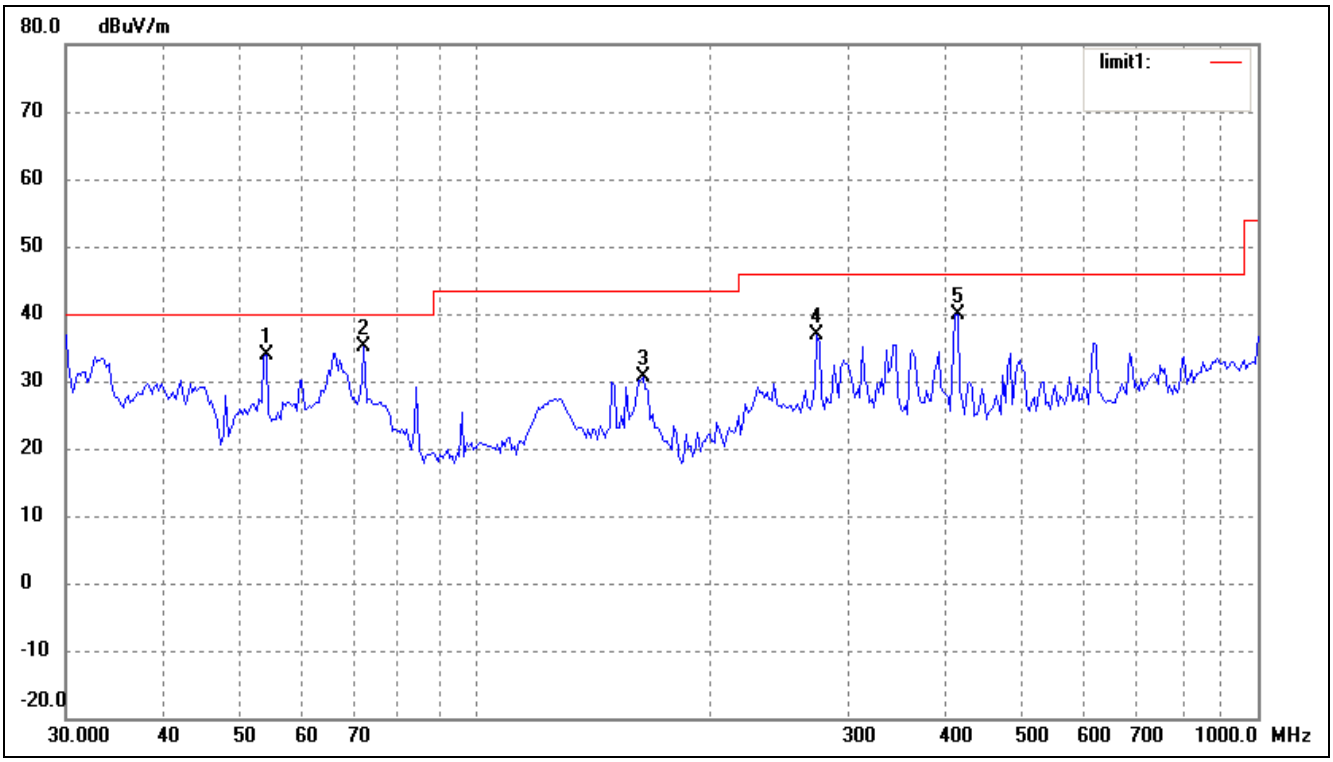
Comment: AC 120V/60Hz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	60.0691	29.11	5.10	34.21	40.00	-5.79	360	100	peak
2	72.0843	32.49	1.77	34.26	40.00	-5.74	360	100	peak
3	166.0680	32.67	2.71	35.38	43.50	-8.12	360	100	peak
4	273.2341	32.53	7.87	40.40	46.00	-5.60	360	100	peak
5	299.3158	30.94	9.12	40.06	46.00	-5.94	360	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	54.0711	28.25	5.60	33.85	40.00	-6.15	360	100	peak
2	72.0843	33.34	1.77	35.11	40.00	-4.89	360	100	peak
3	163.7550	27.93	2.70	30.63	43.50	-12.87	360	100	peak
4	273.2341	29.06	7.87	36.93	46.00	-9.07	360	100	peak
5	413.2706	30.21	9.64	39.85	46.00	-6.15	360	100	peak

Plot of Radiation Emissions Test Data (Above 1GHz)

Radiated Disturbance

EUT: Cubietruck

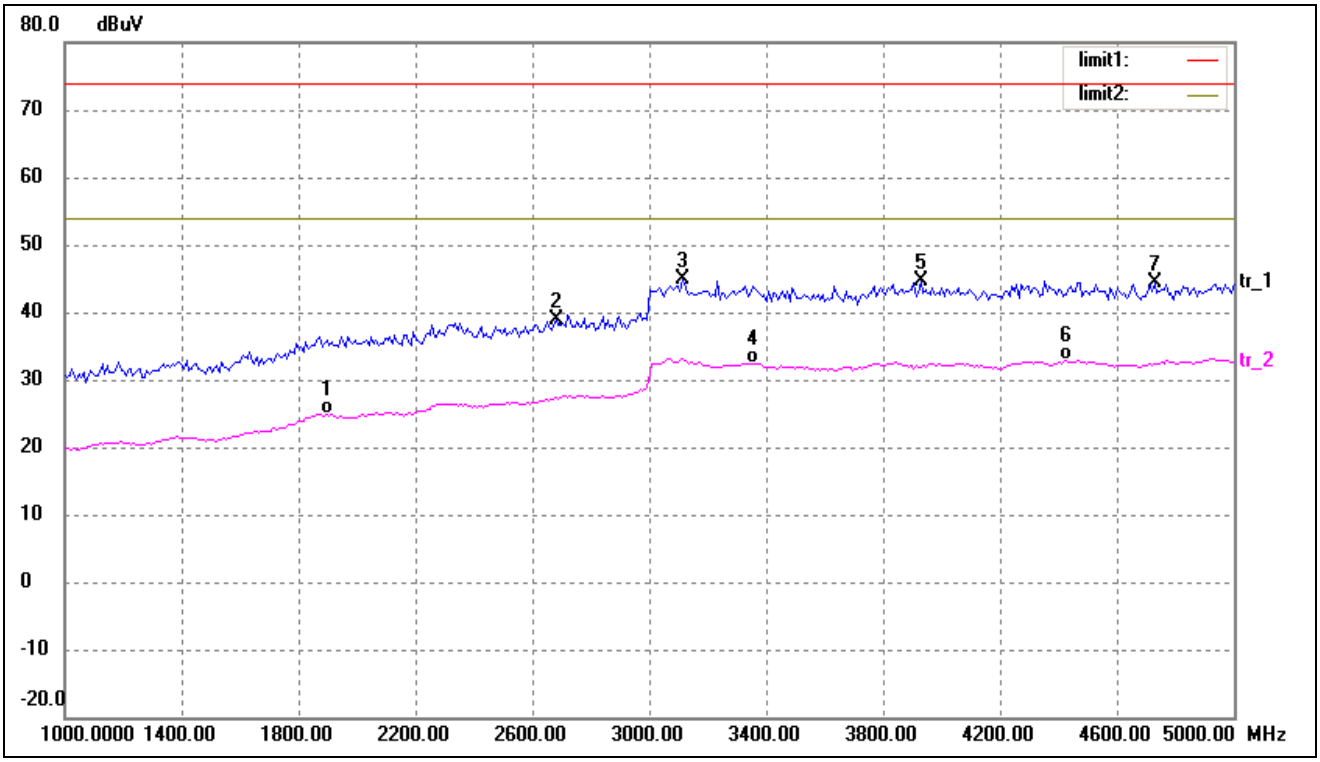
M/N: Cubietruck

Operating Condition: Playing

Test Specification: Horizontal & Vertical

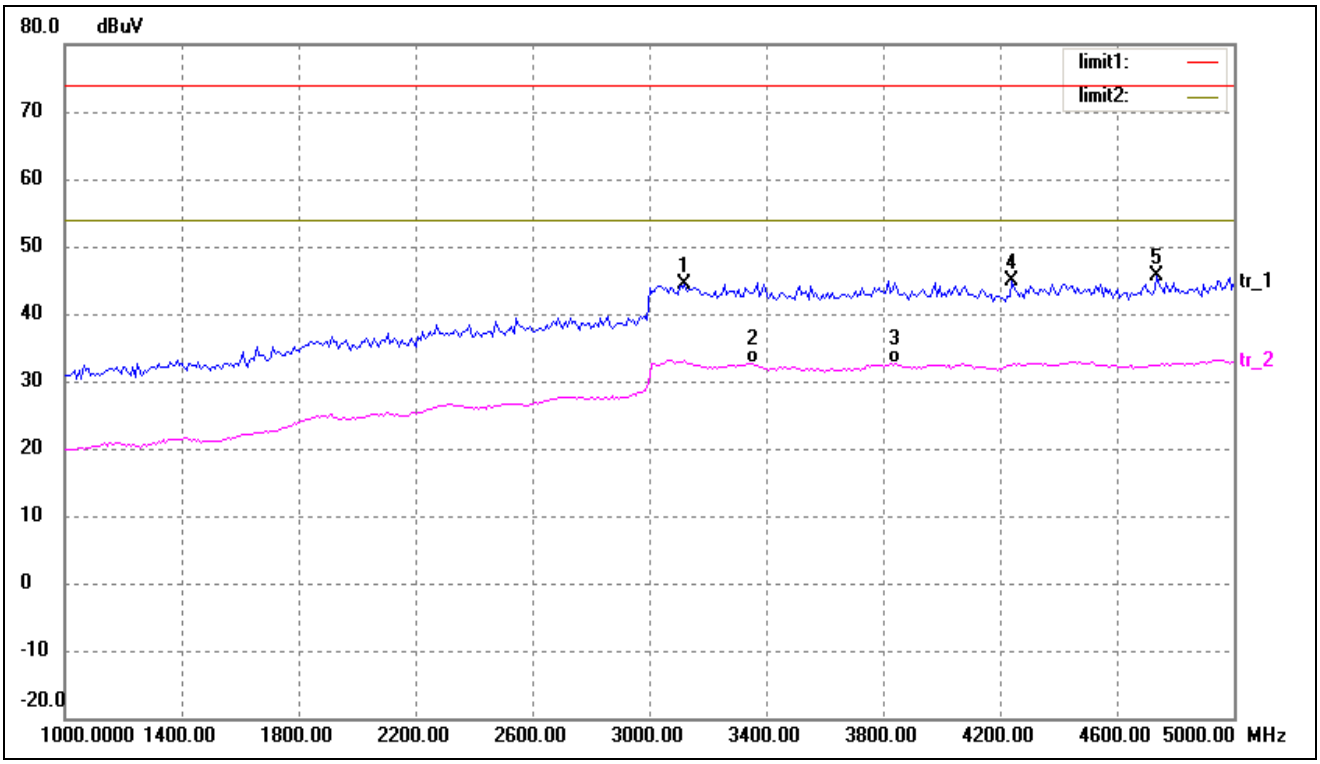
Comment: AC 120V/60Hz DC 5V Adapter

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	(°)	(cm)	
1	1896.000	33.77	-8.85	24.92	54.00	-29.08	360	100	AVG
2	2680.000	45.54	-6.78	38.76	74.00	-35.24	360	100	peak
3	3112.000	51.16	-6.16	45.00	74.00	-29.00	360	100	peak
4	3352.000	38.50	-6.00	32.50	54.00	-21.50	360	100	AVG
5	3928.000	50.01	-5.44	44.57	74.00	-29.43	360	100	peak
6	4424.000	37.90	-4.98	32.92	54.00	-21.08	360	100	AVG
7	4728.000	49.07	-4.72	44.35	74.00	-29.65	360	100	peak

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	(°)	(cm)	
1	3120.000	50.52	-6.17	44.35	74.00	-29.65	360	100	peak
2	3352.000	38.66	-6.00	32.66	54.00	-21.34	360	100	AVG
3	3840.000	38.05	-5.53	32.52	54.00	-21.48	360	100	AVG
4	4240.000	49.94	-5.14	44.80	74.00	-29.20	360	100	peak
5	4736.000	50.35	-4.70	45.65	74.00	-28.35	360	100	peak

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The measurements greater than 20dB below the limit from 9kHz to 30MHz..

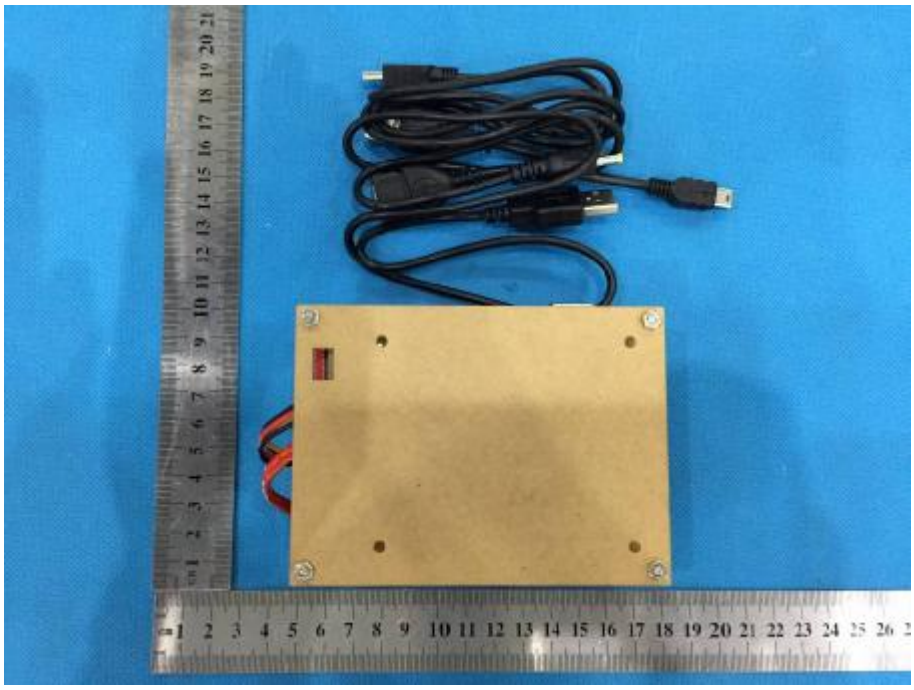
5. Test Setup Photo

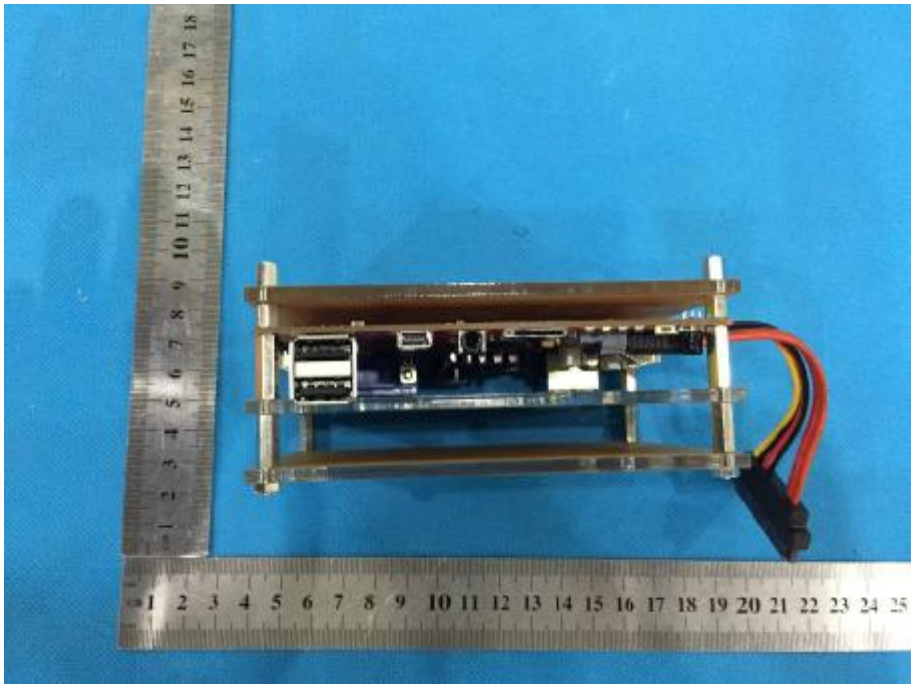
Conducted Emission

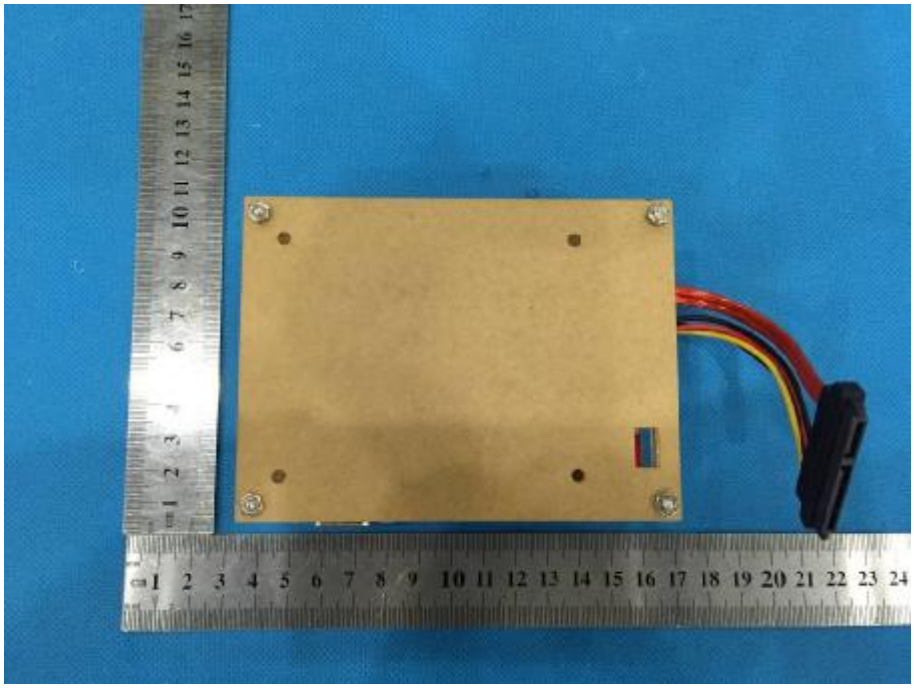
Radiated Emission

6. Test Setup Photo

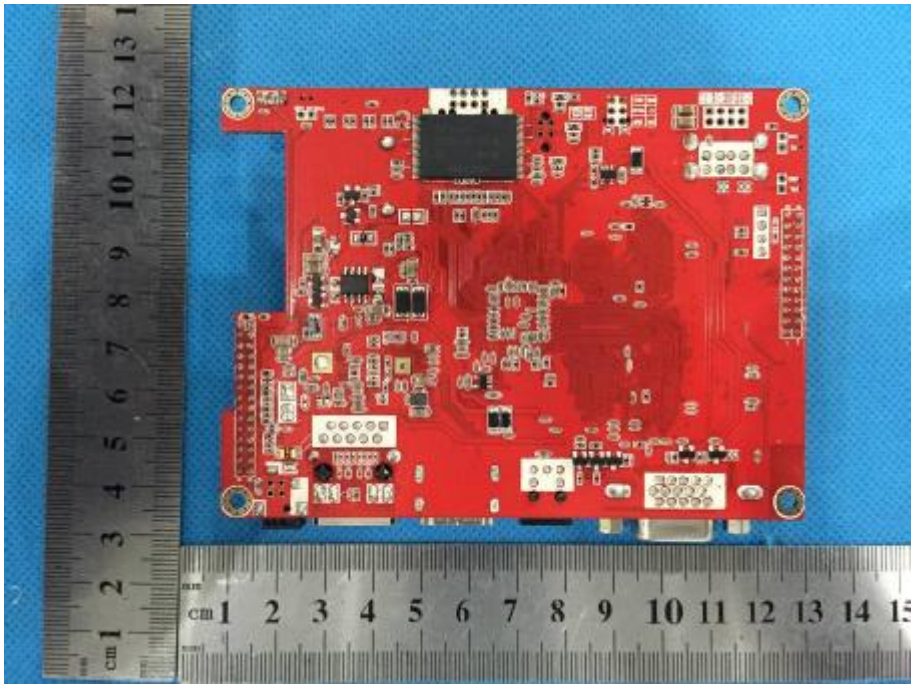
External Views

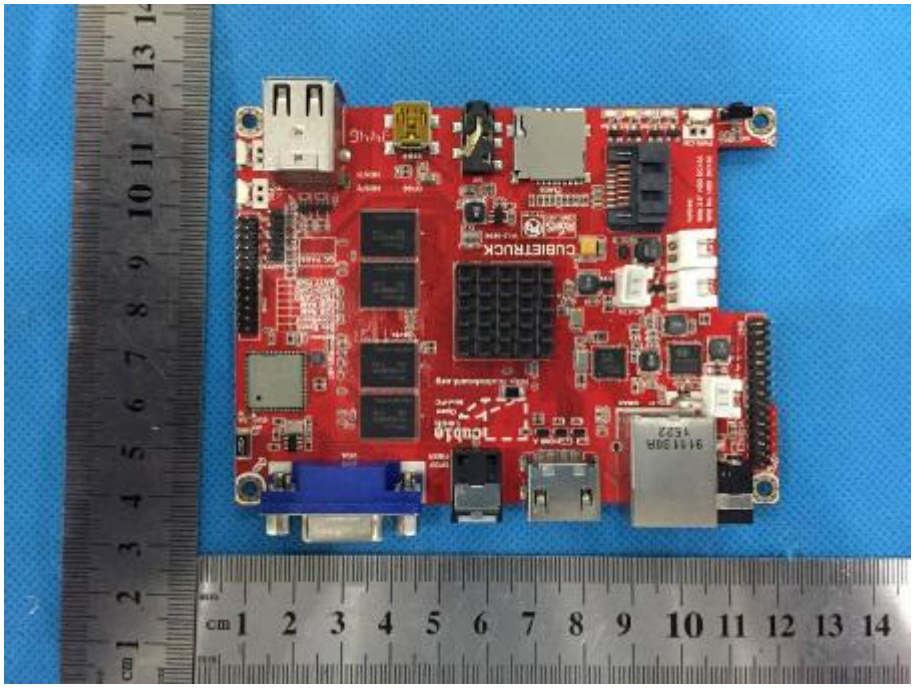


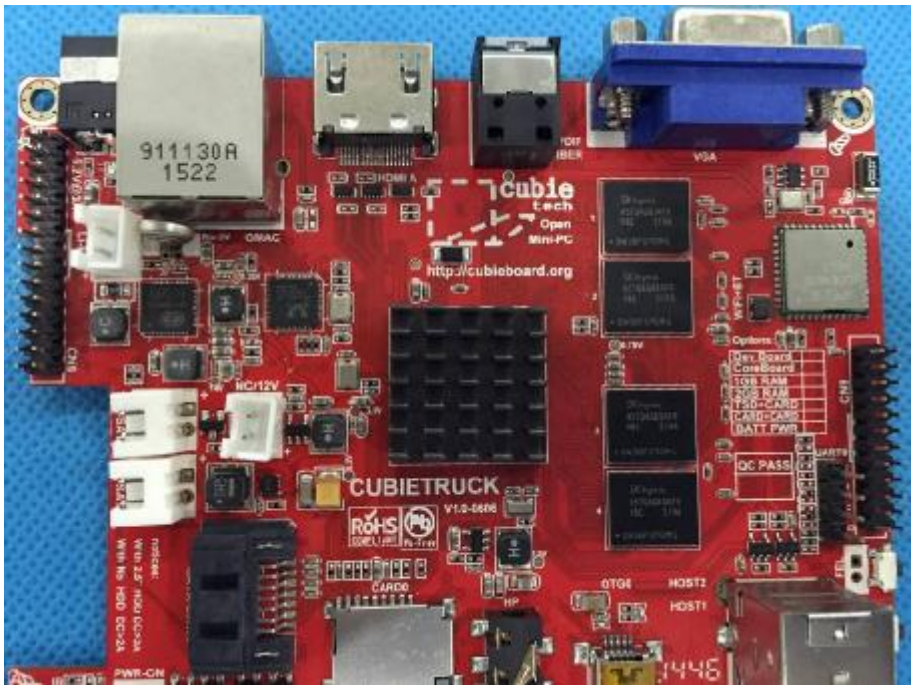




Internal Views







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