TEST REPORT

Product Name:	Fanless Embedded BOX PC
Trademark:	WG
Model Number:	WBOX-5601 WBOX-5602, WBOX-5603, WBOX-2875-6C, WBOX-2875-LY, WBOX-5701, WBOX-5702, WBOX-5681, WBOX-5683, WBOX-5685, WBOX-5687
Prepared For:	Shanghai Fusheng Well Intelligent Control Technology Co., Ltd.
Address:	2nd Floor, 16th Building, No.481, Guiping Road, Xuhui District, Shanghai, China
Manufacturer:	Shanghai Fusheng Well Intelligent Control Technology Co., Ltd.
Address:	2nd Floor, 16th Building, No.481, Guiping Road, Xuhui District, Shanghai, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Sample Received Date:	Dec. 13, 2019
Sample tested Date:	Dec. 13, 2019 to Feb. 18, 2020
Issue Date:	Feb. 18, 2020
Report No.:	BCTC1912002785E
Test Standards	47 CFR FCC Part 15 Subpart B
Test Results	PASS

Compiled by:	Reviewed by:	Approved by:
Icey Chen	Eric Yang	Zero Zhou/Manager

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
BCTC1912002785E	Feb. 18, 2020	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Standard	Test Item	Test result
FCC 15.107	Conducted Emission	N/A*
FCC 15.109	Radiated Emission	Pass

Remark *: The Product is powered by 12V DC.

3. 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.

Test item	Value (dB)
Conducted Emission (150kHz-30MHz)	3.20
Radiated Emission(30MHz~1GHz)	4.80
Radiated Emission(1GHz~6GHz)	4.90

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Ratings: DC 12V 3A

Model difference: All models are identical except for the appearance color, the test model is WBOX-5601 and the test results are applicable to other tests.

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	---	---	---	---	---	---

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Test Mode

Test item	Test Mode	Test Voltage
Radiated mission(30MHz-1GHz) Class A	Full Load +VGA	AC 120V/60Hz*
	Full Load +HDMI	AC 120V/60Hz
All test mode were tested and passed, only Conducted Emissions, Radiated Emissions shows (*) is the worst case mode which were recorded in this report.		

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

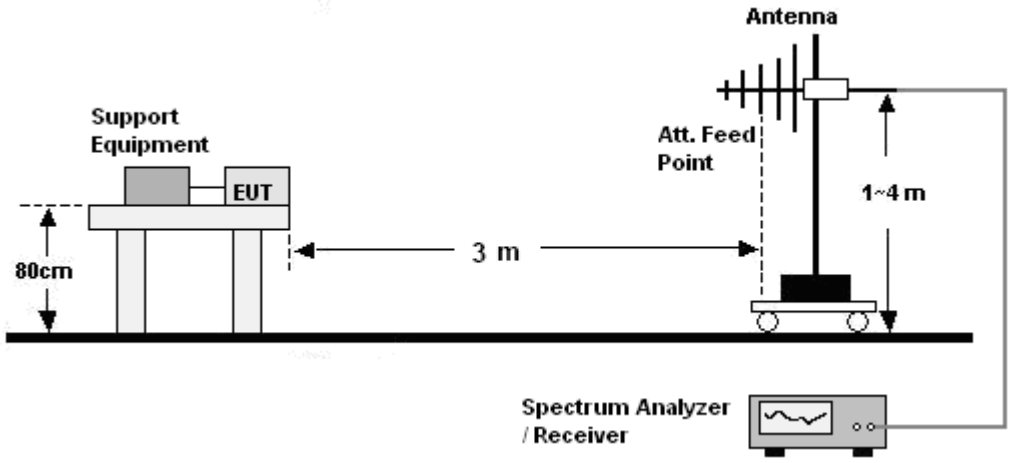
5.2 Test Instrument Used

Radiated emissions Test (966 chamber)					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
966 chamber	ChengYu	966 Room	966	Jun. 19, 2018	Jun. 18, 2021
Receiver	R&S	ESR3	102075	Jun. 13, 2019	Jun. 12, 2020
Amplifier	Schwarzbeck	BBV9718	9718-309	Jun. 13, 2019	Jun. 12, 2020
Amplifier	Schwarzbeck	BBV9744	9744-0037	Jun. 25, 2019	Jun. 24, 2020
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	VULB9163-942	Jun. 25, 2019	Jun. 24, 2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1201	Jun. 22, 2019	Jun. 21, 2020
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

6. RADIATION EMISSION TEST

6.1 Block Diagram Of Test Setup

30MHz ~ 1GHz:



6.2 Limit

Limits for Class A devices

Frequency (MHz)	limits at 3m dB(μV/m)		
	QP Detector	PK Detector	AV Detector
30-88	49.0	--	--
88-216	53.5	--	--
216-960	56.4	--	--
960 to 1000	59.5	--	--
Above 1000	--	79.5	59.5

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

6.3 Test Procedure

30MHz ~ 1GHz:

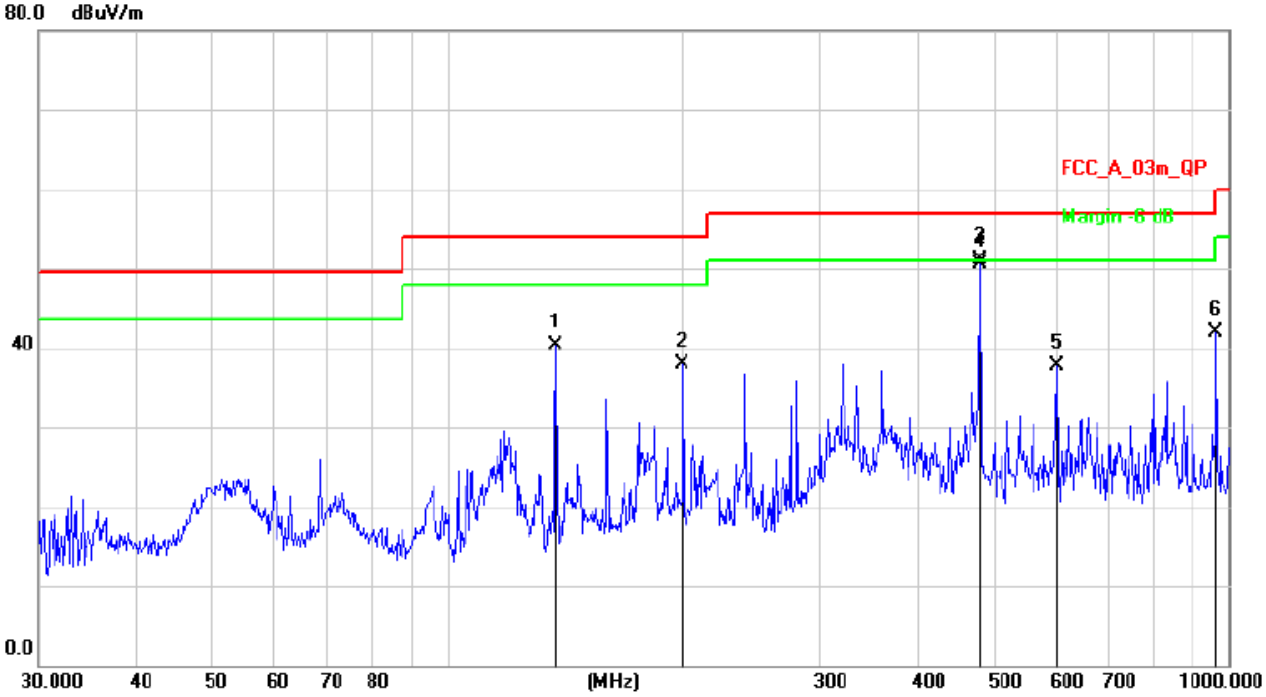
a. The Product was placed on the nonconductive turntable 0.8 m above the ground at a chamber.

b. 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.

c. 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.

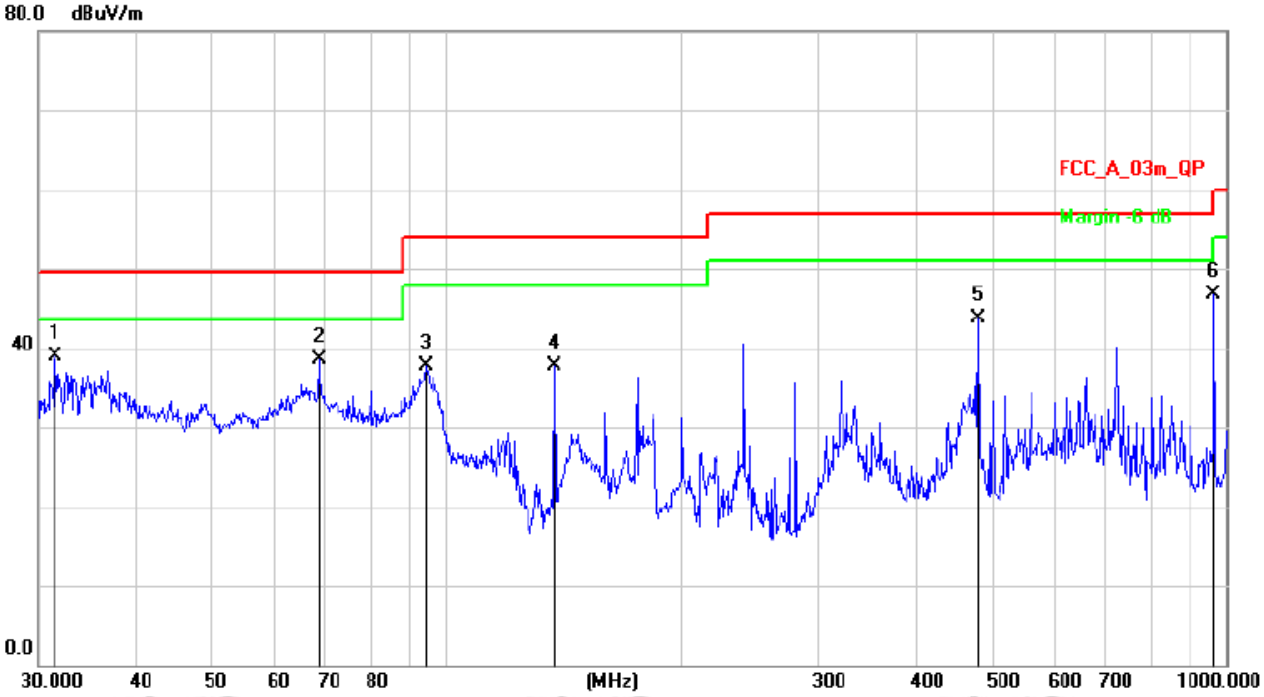
6.4 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Horizontal
Test Voltage :	AC 120V/60Hz	Test Mode:	Full Load +VGA



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		137.4199	58.95	-18.69	40.26	53.90	-13.64	QP
2		199.9856	54.13	-16.30	37.83	53.90	-16.07	QP
3	*	480.0086	60.42	-9.35	51.07	56.90	-5.83	QP
4		480.5276	59.83	-9.34	50.49	56.90	-6.41	QP
5		601.4265	44.30	-6.53	37.77	56.90	-19.13	QP
6		962.1621	42.98	-1.04	41.94	60.00	-18.06	QP

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Vertical
Test Voltage :	AC 120V/60Hz	Test Mode:	Full Load +VGA

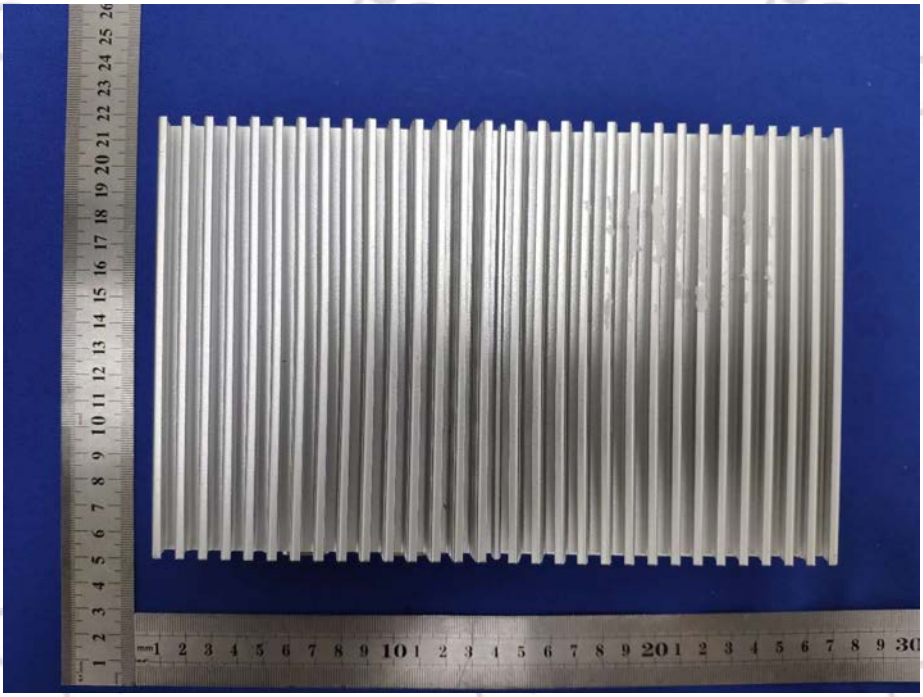


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	31.5095	55.81	-17.00	38.81	49.50	-10.69	QP
2		68.6310	56.34	-17.88	38.46	49.50	-11.04	QP
3		94.0979	54.99	-17.35	37.64	53.90	-16.26	QP
4		137.4202	56.35	-18.69	37.66	53.90	-16.24	QP
5		480.5276	53.13	-9.34	43.79	56.90	-13.11	QP
6		962.1623	47.77	-1.04	46.73	60.00	-13.27	QP

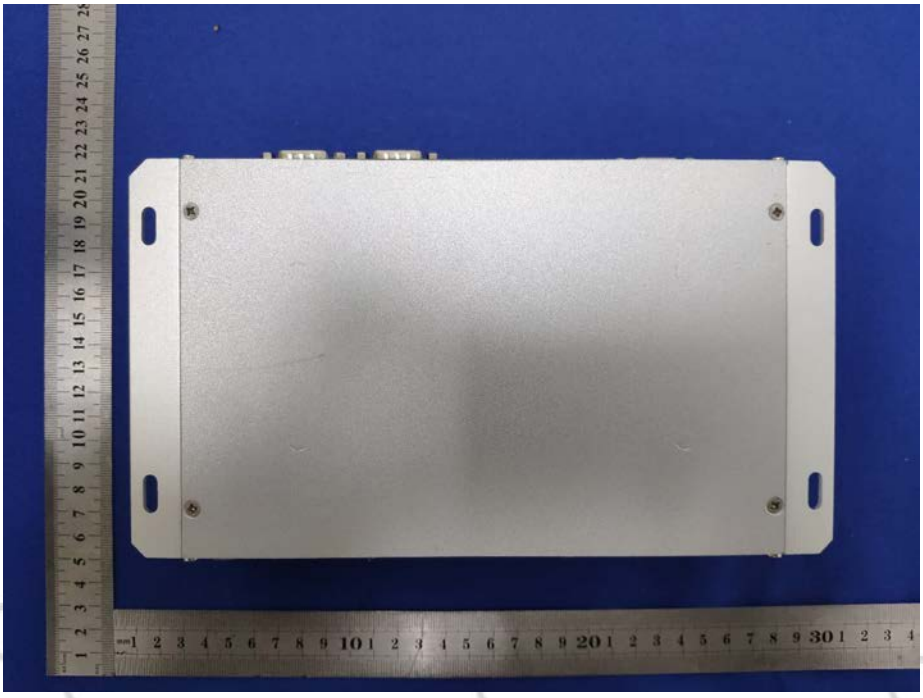
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

7. EUT PHOTOGRAPHS

EUT Photo 1



EUT Photo 2

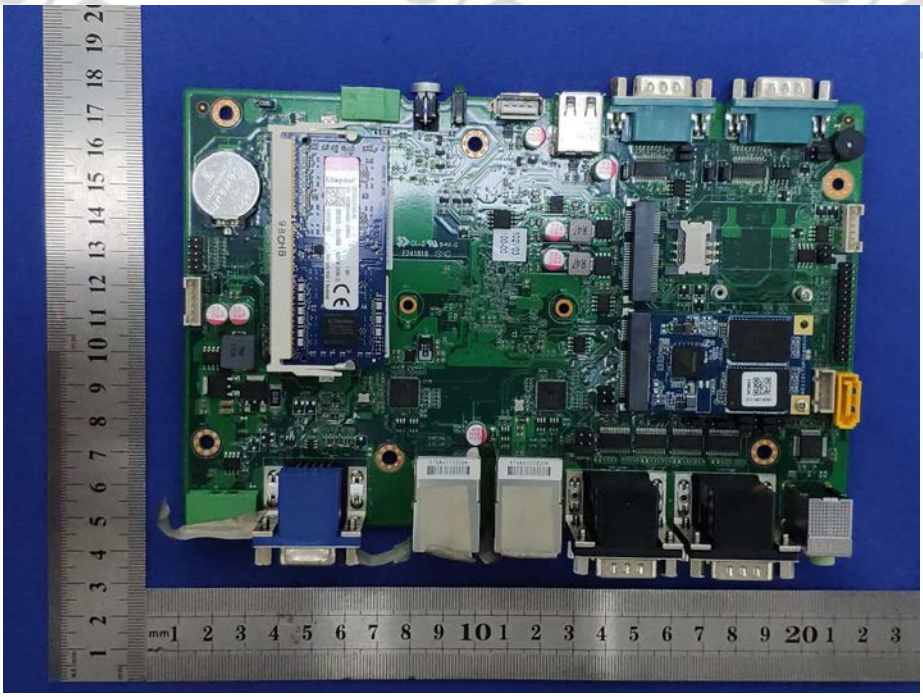


EUT Photo 3

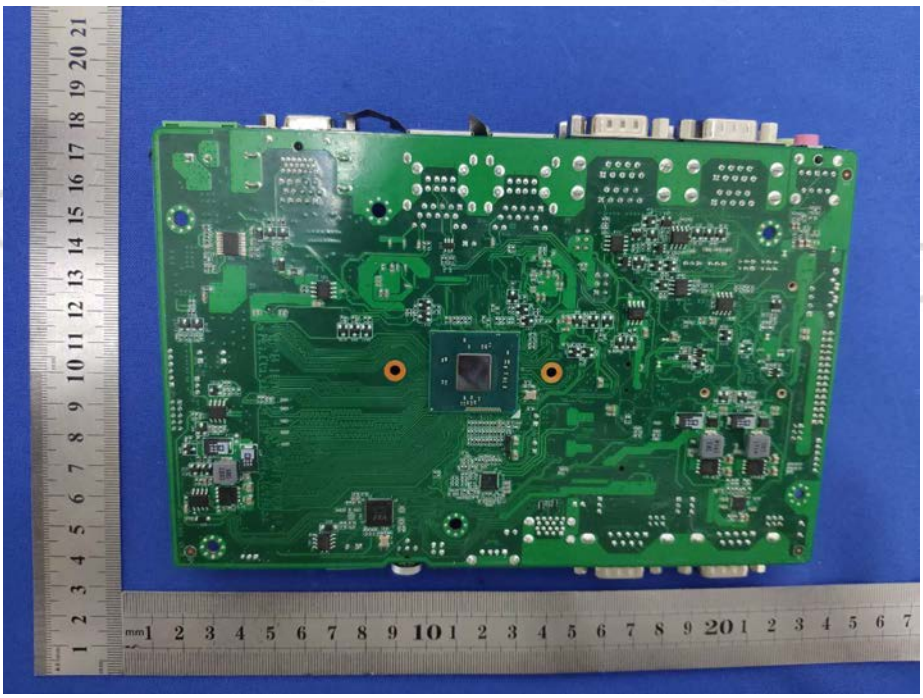
EUT Photo 4

EUT Photo 5

EUT Photo 6



EUT Photo 7



8. EUT TEST SETUP PHOTOGRAPHS

Radiated emission

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