



TEST REPORT

FCC ID: 2AU3F-WIOT

Product Name: Wireless Internet of Things System
Trademark: N/A
Model Number: WIOT
Prepared For: Innovent Integrated Solutions FZ LLC
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Manufacturer: Shenzhen TVIS Technology Co., Ltd
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Prepared By: Shenzhen BCTC Testing Co., Ltd.
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Sample Received Date: Aug. 26, 2019
Sample tested Date: Aug. 26, 2019 to Nov. 26, 2019
Issue Date: Nov. 26, 2019
Report No.: BCTC-FY190805420E
Test Standards: 47 CFR FCC Part 15 Subpart B
Test Results: PASS

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Zero Zhou/Manager

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(Note: N/A means not applicable)



1. VERSION

Report No.	Issue Date	Description	Approved
BCTC-FY190805420E	Nov. 26, 2019	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 EUT is powered by the DC only , the test item is not applicable.



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)
Radiated Emission(30MHz~1GHz)	4.80
Radiated Emission(1GHz~18GHz)	4.90
Radiated Emission(18GHz~40GHz)	3.34



4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Ratings: DC 24V

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-40GHz) Class B	Data exchanging	DC 24V
All test mode were tested and passed, only 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.

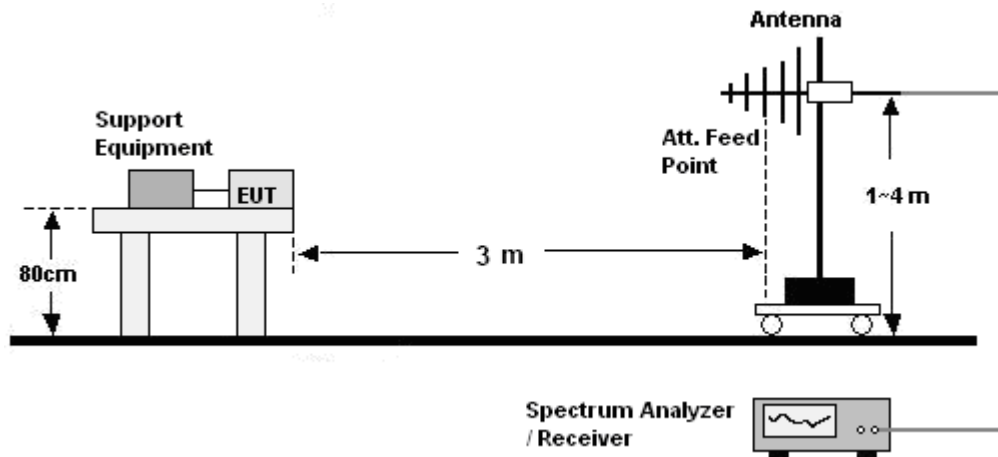
5.2 Test Instrument Used

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
Receiver	R&S	ESRP	101154	Jun. 13, 2019	Jun. 12, 2020
Spectrum Analyzer	Aglient	FSP40	100363	Jun. 13, 2019	Jun. 12, 2020
Amplifier	Schwarzbeck	BBV9718	9718-309	Jun. 25, 2019	Jun. 24, 2020
Amplifier	Schwarzbeck	BBV9744	9744-0037	Jun. 25, 2019	Jun. 24, 2020
Amplifier	MITEQ	TTA1840-35-HG	2034381	Jun. 17, 2019	Jun. 16, 2020
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	VULB9163-942	Jun. 22, 2019	Jun. 21, 2020
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 22, 2018	Jun. 21, 2023
Horn Antenna	Schwarzbeck	BBHA9170	822	Jun. 22, 2019	Jun. 21, 2020
RF cables3	Huber+Suhnar	1GHz-40GHz	1607106	Jun. 25, 2019	Jun. 24, 2020
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

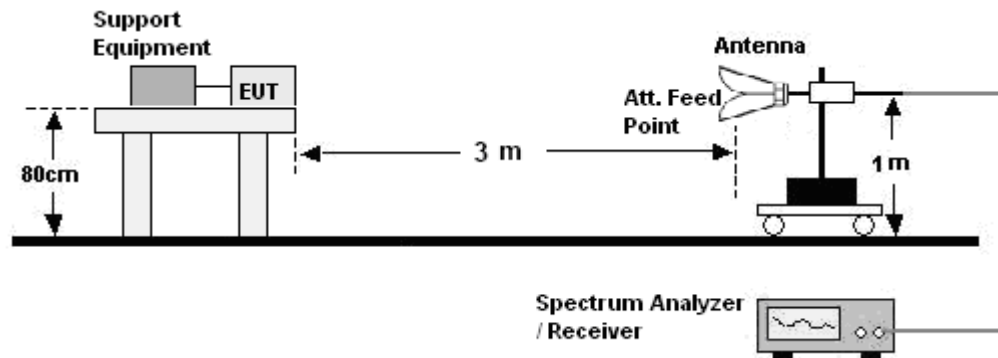
6. RADIATION EMISSION TEST

6.1 Block Diagram Of Test Setup

30MHz ~ 1GHz:



Above 1GHz:



6.2 Limit

Limits for Class B devices

Frequency (MHz)	limits at 3m dB(μV/m)		
	QP Detector	PK Detector	AV Detector
30-88	40.0	--	--
88-216	43.5	--	--
216-960	46.0	--	--
960 to 1000	54.0	--	--
Above 1000	--	74.0	54.0

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.

Above 1GHz:

- a. The Product was placed on the non-conductive turntable 0.8m above the ground at a chamber.
- b. 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.
- c. 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.

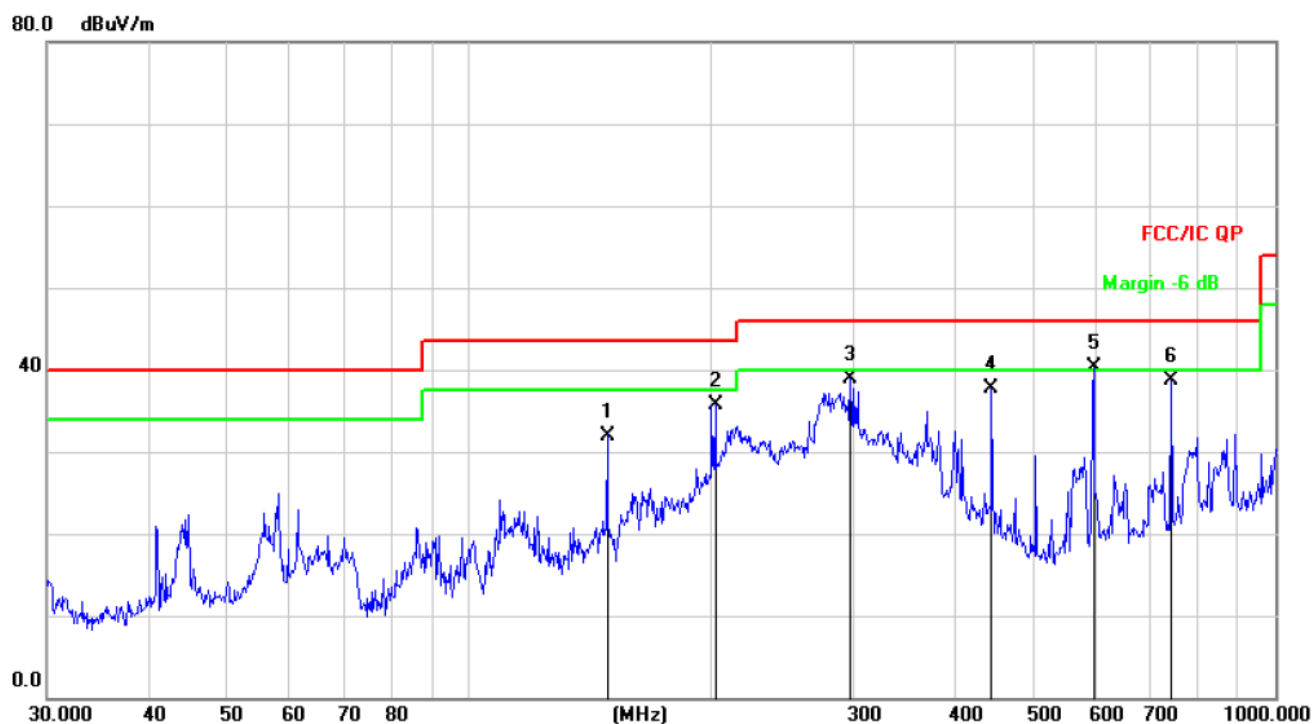
Remark:

The highest frequency of the internal sources of the EUT is 8GHz, so the measurement shall to 40 GHz.



6.4 Test Result

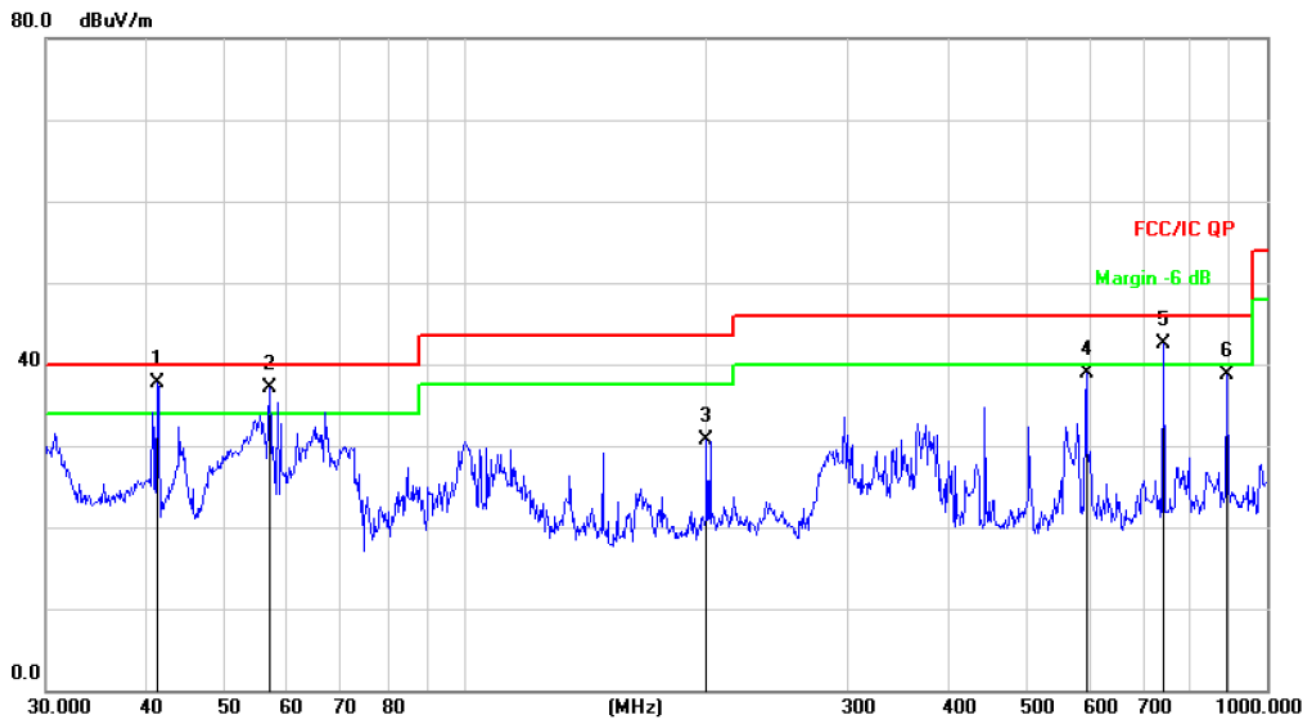
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Horizontal
Test Voltage :	DC 24V	Test Mode:	Working



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		148.4410	51.40	-19.40	32.00	43.50	-11.50	QP
2		202.1005	52.04	-16.25	35.79	43.50	-7.71	QP
3		297.2241	52.58	-13.69	38.89	46.00	-7.11	QP
4		444.8514	47.82	-10.09	37.73	46.00	-8.27	QP
5	*	595.1329	46.91	-6.63	40.28	46.00	-5.72	QP
6		742.2587	43.20	-4.46	38.74	46.00	-7.26	QP



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Vertical
Test Voltage :	DC 24V	Test Mode:	Working



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	41.2765	52.99	-15.34	37.65	40.00	-2.35	QP
2	!	56.9912	52.79	-15.59	37.20	40.00	-2.80	QP
3		199.9856	47.03	-16.30	30.73	43.50	-12.77	QP
4		595.1329	45.53	-6.63	38.90	46.00	-7.10	QP
5	!	742.2587	47.00	-4.46	42.54	46.00	-3.46	QP
6		890.7278	40.36	-1.69	38.67	46.00	-7.33	QP

Remark:

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



Above 1GHz:

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	4836.25	58.25	39.55	7.77	25.66	52.13	74.00	-21.87	PK
V	7312.25	57.35	38.33	7.30	24.55	50.87	74.00	-23.13	PK
V	15485.36	50.14	35.23	6.60	26.59	48.10	74.00	-25.90	PK
H	4815.36	57.41	39.56	7.76	25.67	51.28	74.00	-22.72	PK
H	7352.36	55.36	38.32	7.35	24.58	48.97	74.00	-25.03	PK
H	15625.36	47.36	38.24	6.52	27.01	42.65	74.00	-31.35	PK

Note: PK value is lower than the Average value limit, So average didn't record.

The amplitude of emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

7. EUT PHOTOGRAPHS

EUT Photo 1



EUT Photo 2



EUT Photo 3



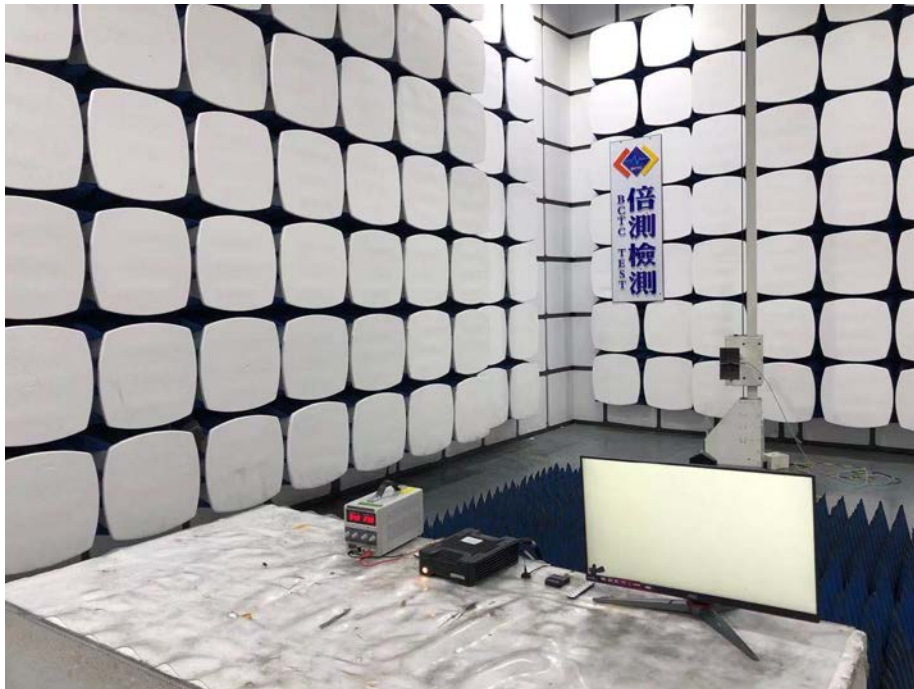
EUT Photo 4

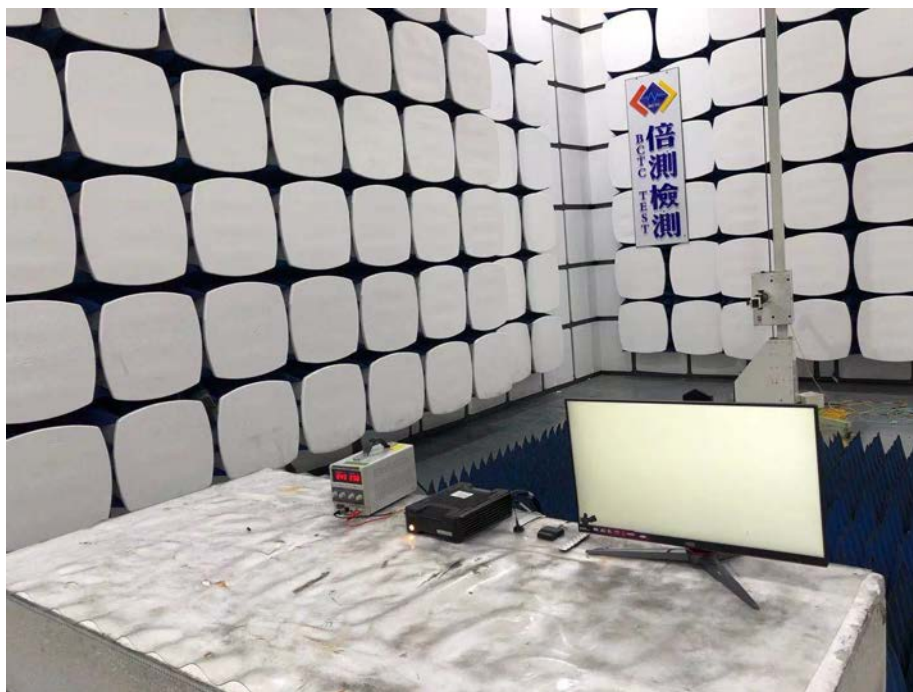




8. EUT TEST SETUP PHOTOGRAPHS

Radiated emission





***** END OF REPORT *****