FCC TEST REPORT

Product Name	:	Industrial Radio Remote Controller
Trade Name	:	UTING
Model Name	:	F21-RX
Serial Number	:	N/A
Technical Data	:	AC/DC 18V~65V
FCC ID	:	OFNF21-RX
Report Number	:	EESZE04160024-1
Date	:	Jun. 15, 2012
Regulations	:	See below

Test Standards	Results
☒ 47 CFR FCC Part 15 Subpart B:2010	PASS

Prepared for:

NINGBO UTING ELECTRONIC CO., LTD

No. 578 Xiufeng RD, Gaoqiao Town, Yinzhou, Ningbo City, Zhejiang

Prepared by:

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Tested by: Reviewed by:

Approved by: Date: Jun. 15, 2012

Jimmy Li

Lab manager

Check No.: 40018384

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(Note: N/A means not applicable)

1. GENERAL INFORMATION

Applicant: NINGBO UTING ELECTRONIC CO., LTD
No. 578 Xiufeng RD, Gaoqiao Town, Yinzhou, Ningbo City, Zhejiang

Manufacturer: NINGBO UTING ELECTRONIC CO., LTD
No. 578 Xiufeng RD, Gaoqiao Town, Yinzhou, Ningbo City, Zhejiang

Equipment Authorization: Certification

FCC ID: OFNF21-RX

Product Name: Industrial Radio Remote Controller

Receiver Frequency: 433.47MHz

Trade Name: UTING

Model Name: F21-RX

Serial Number: N/A

Report Number: EESZE04160024-1

Date of Test: Apr. 16, 2012 to Jun. 15, 2012

2. TEST SUMMARY

The EUT has been tested according to the following specifications:

Standard	Test Item	Test
FCC 15.107	Conducted Emission	Yes
FCC 15.109	Radiated Emission	Yes

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT 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 disturbance	3.2
Radiated disturbance (30MHz to 1GHz)	4.5
Radiated disturbance (1GHz to 6GHz)	4.8

4. PRODUCT INFORMATION AND TEST SETUP

4.1. PRODUCT INFORMATION

Technical Data: AC/DC 18V~65V

4.2. TEST SETUP CONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

4.3. SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	---	---	---	---	---	---
2.	---	---	---	---	---	---
3.	---	---	---	---	---	---
4.	---	---	---	---	---	---

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.

5. FACILITIES AND ACCREDITATIONS

5.1 TEST FACILITY

All test facilities used to collect the test data are located at Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4:2003, CISPR 16-1-1 and other equivalent standards.

5.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipments used at CTI for testing.
The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

Equipment used during the tests:

Shielding Room No. 1 - Conducted Emission Test				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
Receiver	R&S	ESCI	100009	07/06/2012
LISN	R&S	ENV216	100098	07/06/2012

3M Semi-anechoic Chamber - Radiated Emission Test				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2012
Spectrum Analyzer	Agilent	E4440A	MY46185649	03/07/2013
TRILOG Broadband Antenna	schwarzbeck	VULB 9136	401	07/06/2012
Horn Antenna	ETS-LINGREN	3117	00044562	07/06/2012
Microwave Preamplifier	Agilent	11909A	186871	07/06/2012
Multi device Controller	ETS-LINGREN	2090	00057230	N/A

6. SYSTEM TEST CONFIGURATION

6.1. JUSTIFICATION

The system was configured for testing in a typical fashion (as a customer would normally use it), The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement as outlined in ANSI C63.4 (2009).

The worst test data are that the EUT was powered by 48VAC/ 60Hz during test.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. The rear of unit shall be flushed with the rear of the table.

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 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

6.2. EUT EXERCISING SOFTWARE

No Software was used during testing.

7. CONDUCTED EMISSION TEST

7.1. LIMITS

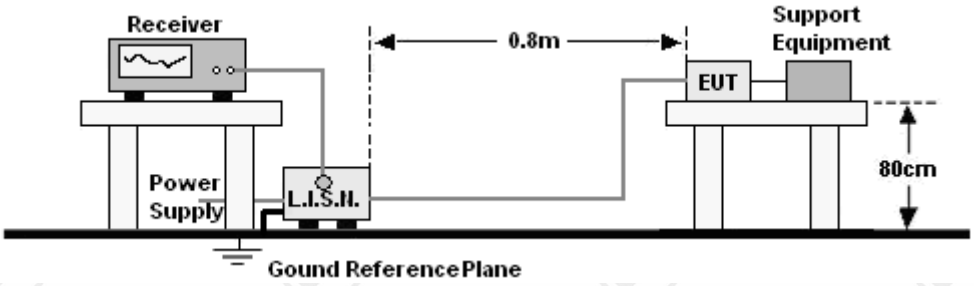
Limits for Class B digital devices

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

NOTE: 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.

7.2. BLOCK DIAGRAM OF TEST SETUP



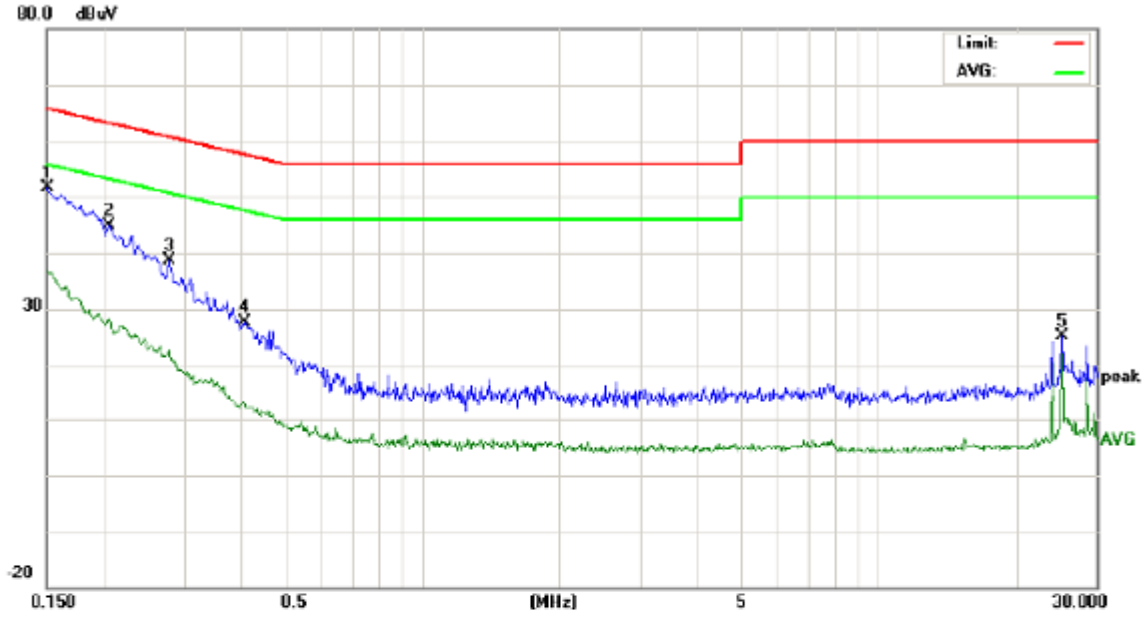
7.3. PROCEDURE OF CONDUCTED EMISSION TEST

a. The EUT was placed on a nonconductive table 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).

b. 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 EUT in all power lines in the full band.

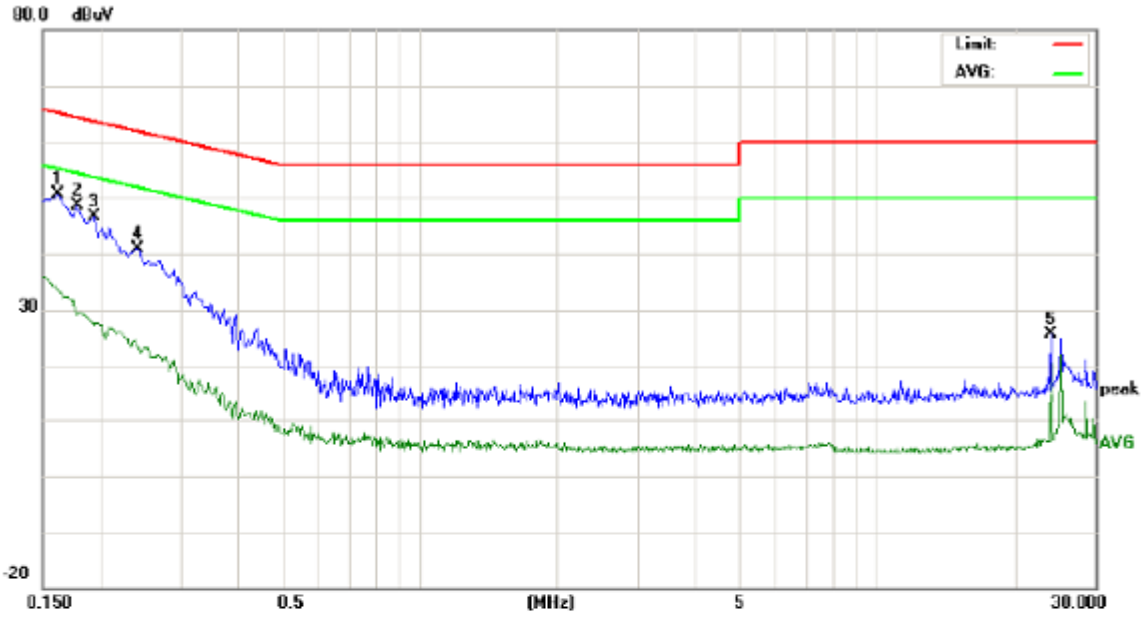
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

7.4. WORST CASE TEST GRAPHS AND TEST DATA



Site site #1 Phase: L1 Temperature: 23
Limit: FCC Class B CE (QP) Power: AC 48V/60Hz Humidity: 58 %
EUT: Industrial Radio Remote Controller
M/N: F21-RX
Mode: RX
Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1500	41.63	35.14	26.21	10.00	51.63	45.14	36.21	65.99	55.99	-20.85	-19.78	P	
2	0.2060	34.78	27.71	15.78	10.00	44.78	37.71	25.78	63.36	53.36	-25.65	-27.58	P	
3	0.2779	28.65	21.35	10.44	10.00	38.65	31.35	20.44	60.88	50.88	-29.53	-30.44	P	
4	0.4100	17.55	10.41	1.75	10.00	27.55	20.41	11.75	57.65	47.65	-37.24	-35.90	P	
5	25.2020	14.82	12.57	11.76	10.20	25.02	22.77	21.96	60.00	50.00	-37.23	-28.04	P	



Site site #1 Phase: N Temperature: 23

Limit: FCC Class B CE (QP) Power: AC 48V/60Hz Humidity: 58 %

EUT: Industrial Radio Remote Controller

M/N: F21-RX

Mode: RX

Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1620	40.62	33.53	22.91	10.00	50.62	43.53	32.91	65.36	55.36	-21.83	-22.45	P	
2	0.1780	38.53	31.50	19.42	10.00	48.53	41.50	29.42	64.57	54.57	-23.07	-25.15	P	
3	0.1955	39.48	28.95	16.61	10.00	49.48	38.95	26.61	63.80	53.80	-24.85	-27.19	P	
4	0.2420	30.84	23.97	12.86	10.00	40.84	33.97	22.86	62.02	52.02	-28.05	-29.16	P	
5	24.0300	15.40	11.08	8.51	10.20	25.60	21.28	18.71	60.00	50.00	-38.72	-31.29	P	

8. RADIATED EMISSION TEST

8.1. LIMITS

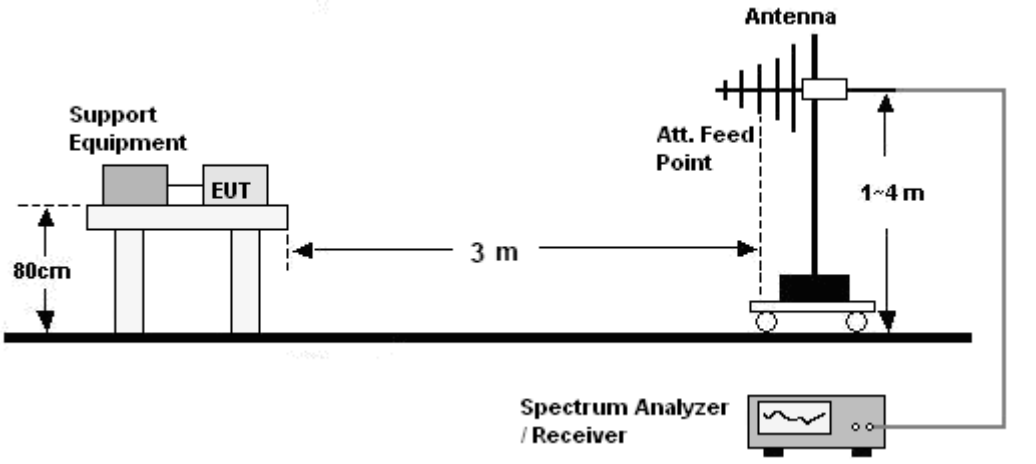
Limits for Class B digital devices

Frequency (MHz)	limits at 3m dB(μV/m)
30-88	40.0
88-216	43.5
216-960	46.0
Above 960	54.0

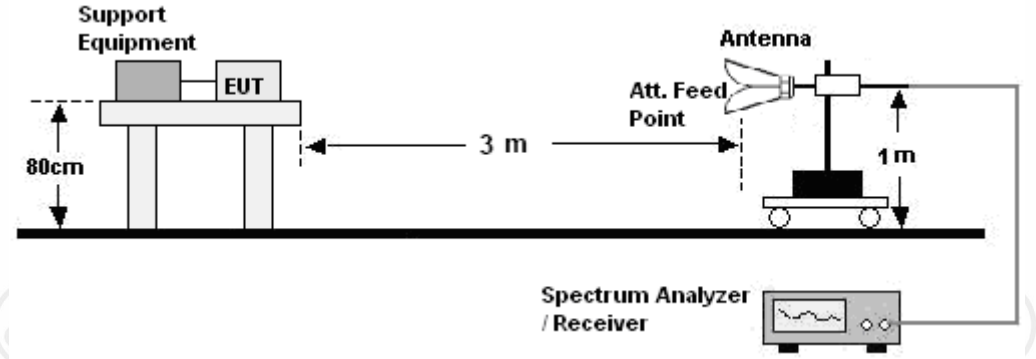
NOTE: 1. The lower limit shall apply at the transition frequency.
2. The limits shown above are based on measuring equipment employing a CISPR quasi-peak detector function for frequencies below or equal to 1000MHz.
3. The limits shown above are based on measuring equipment employing an average detector function for frequencies above 1000MHz.

8.2. BLOCK DIAGRAM OF TEST SETUP

30MHz ~ 1GHz:



Above 1GHz:



8.3. PROCEDURE OF RADIATED EMISSION TEST

30MHz ~ 1GHz:

a. The EUT 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 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 EUT 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.

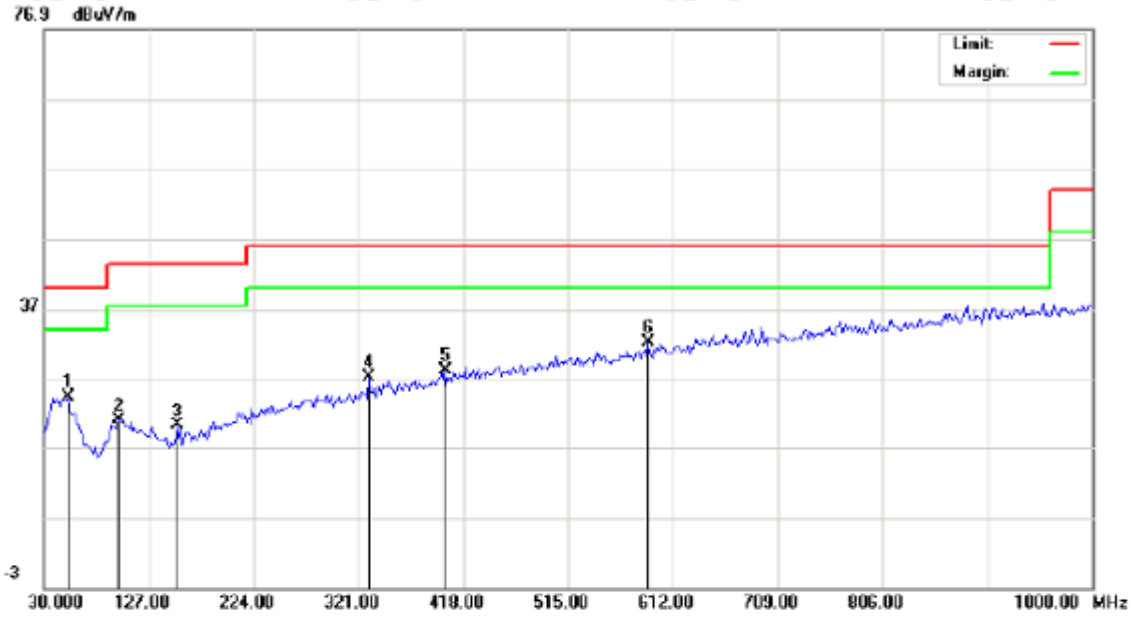
Above 1GHz:

a. The EUT was placed on the non-conductive turntable 0.8 m 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.

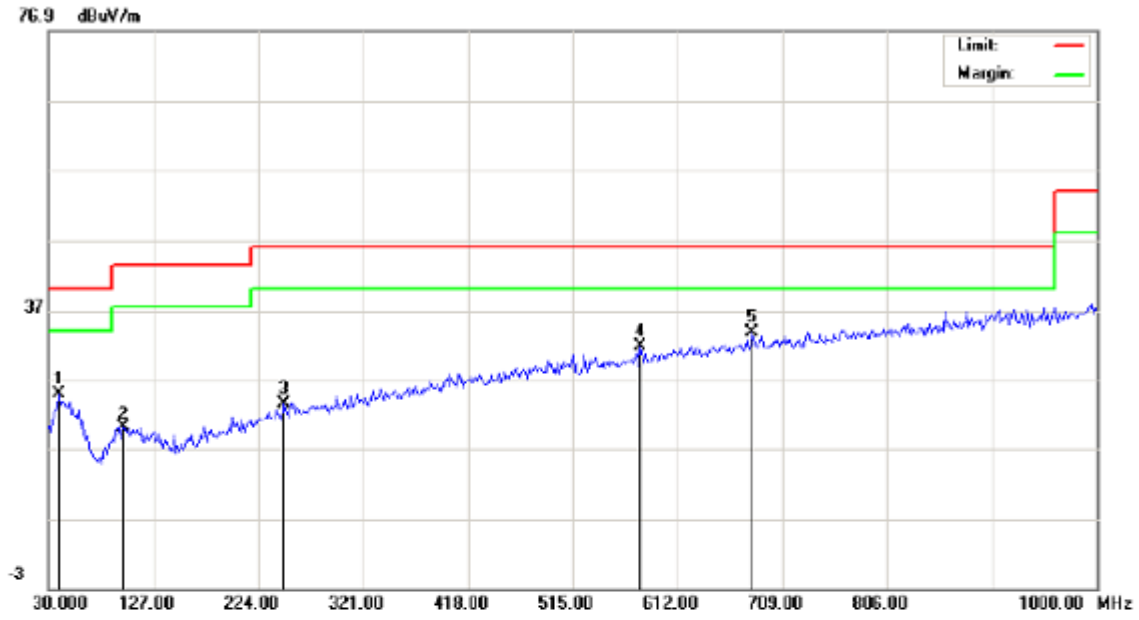
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where EUT radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

8.4. WORST CASE TEST GRAPHS AND TEST DATA



Site site #1 Polarization: *Horizontal* Temperature: 23
Limit: FCC PART15 B Power: AC 48V/60Hz Humidity: 58 %
EUT: Industrial Radio Remote Controller
M/N: F21-RX
Mode: RX
Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F Comment
1	52.6333	8.70			15.76	24.46			40.00		-15.54		P
2	99.5167	8.15			12.88	21.03			43.50		-22.47		P
3	152.8667	10.10			10.17	20.27			43.50		-23.23		P
4	330.7000	9.95			17.16	27.11			46.00		-18.89		P
5	401.8333	9.47			18.83	28.30			46.00		-17.70		P
6	589.3667	9.52			22.74	32.26			46.00		-13.74		P



Site site #1 Polarization: *Vertical* Temperature: 23
Limit: FCC PART15 B Power: AC 48V/60Hz Humidity: 58 %
EUT: Industrial Radio Remote Controller
M/N: F21-RX
Mode: RX
Note:

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	39.7000	7.82			17.12	24.94			40.00		-15.06		P	
2	99.5167	7.17			12.88	20.05			43.50		-23.45		P	
3	248.2500	8.68			14.90	23.58			46.00		-22.42		P	
4	578.0500	9.37			22.50	31.87			46.00		-14.13		P	
5	681.5167	9.58			24.26	33.84			46.00		-12.16		P	

Note:

1. The correct factor = cable loss+ antenna factor.
2. Final Emission _QP = Reading Level_ QP+ correct factor.
3. The high operated frequency is less than 500MHz, and the data of above 1GHz are very low, and they are not recorded.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP

CONDUCTED EMISSION TEST SETUP

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT

Fig.1- General View（For Receiver）

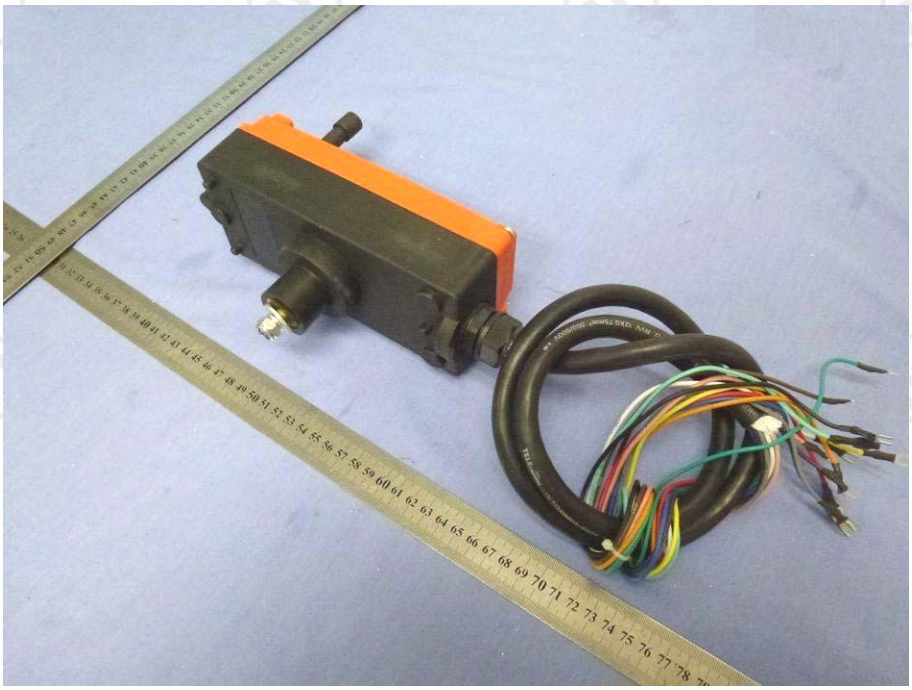


Fig.2- General View（For Receiver）

APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT

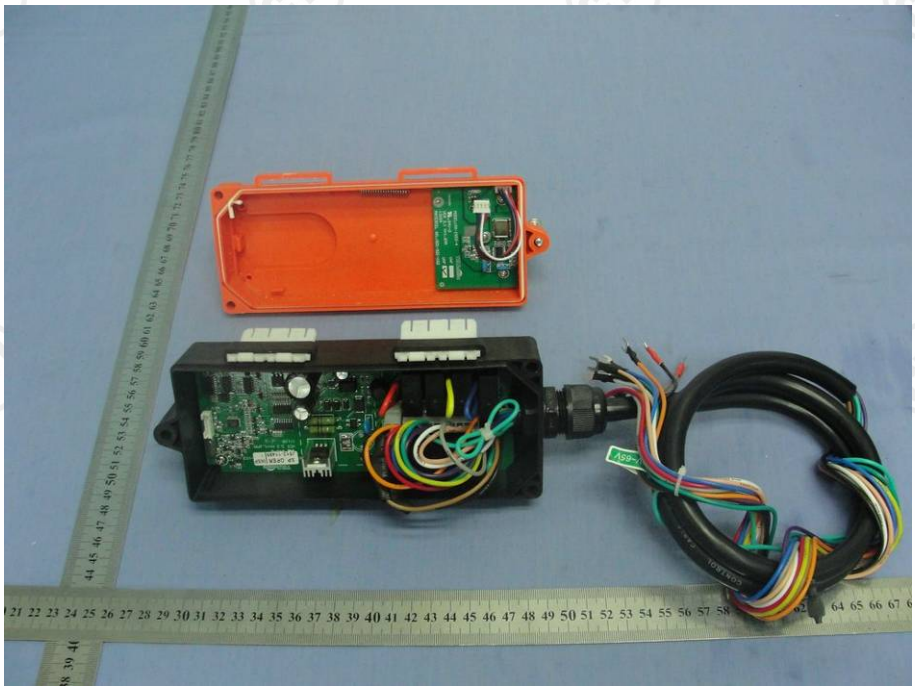


Fig.1- Inner View（For Receiver）

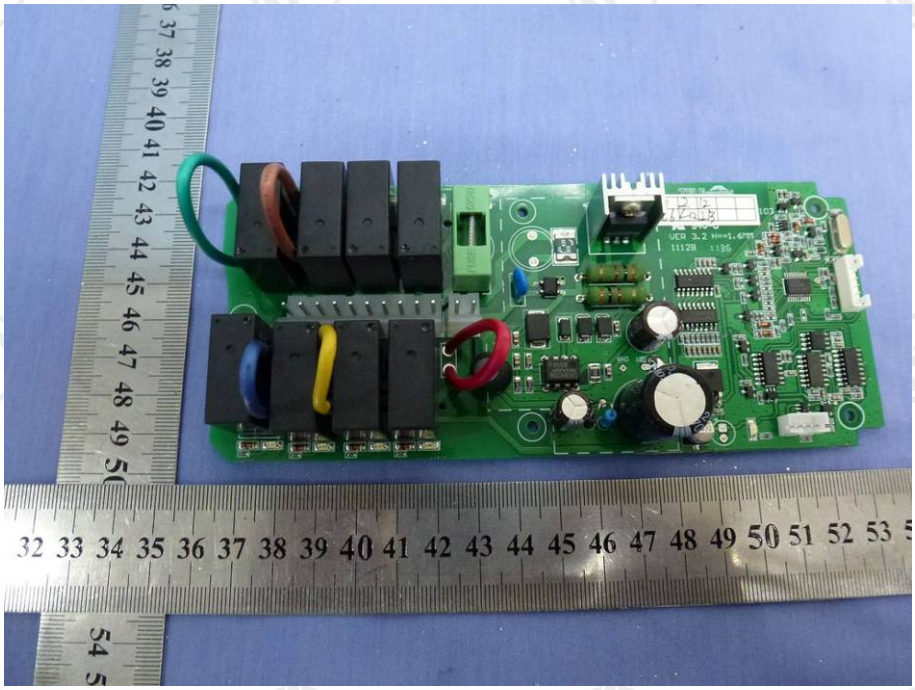


Fig.2- PCB View（For Receiver）

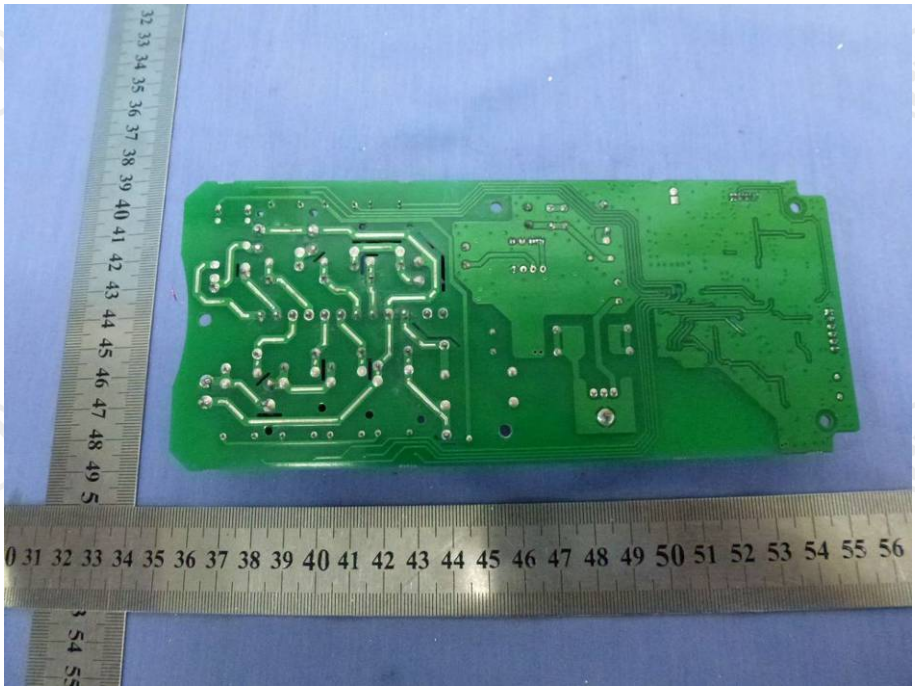


Fig.3- PCB View（For Receiver）

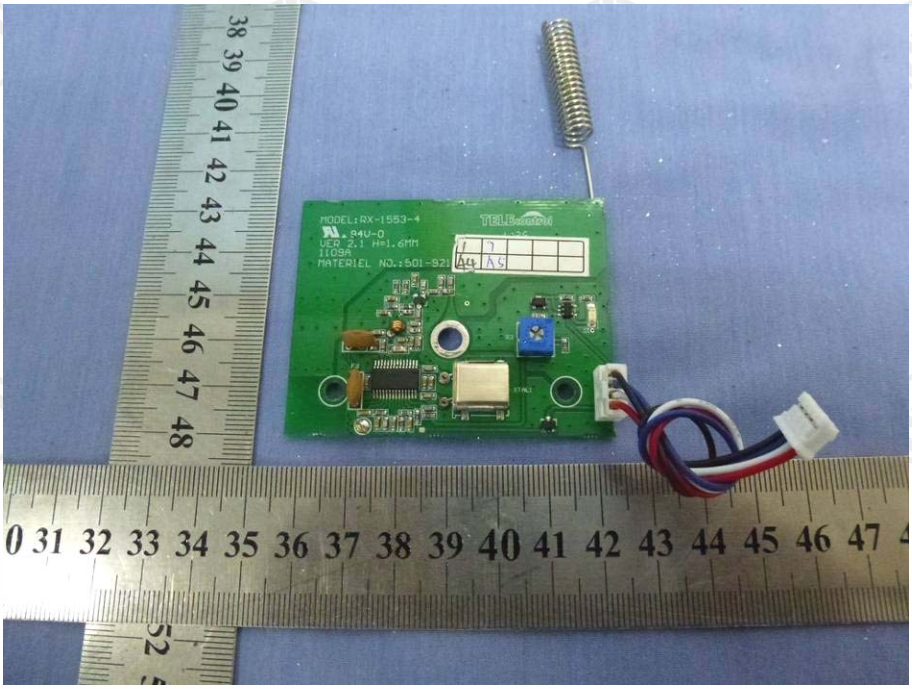


Fig.4- PCB View（For Receiver）

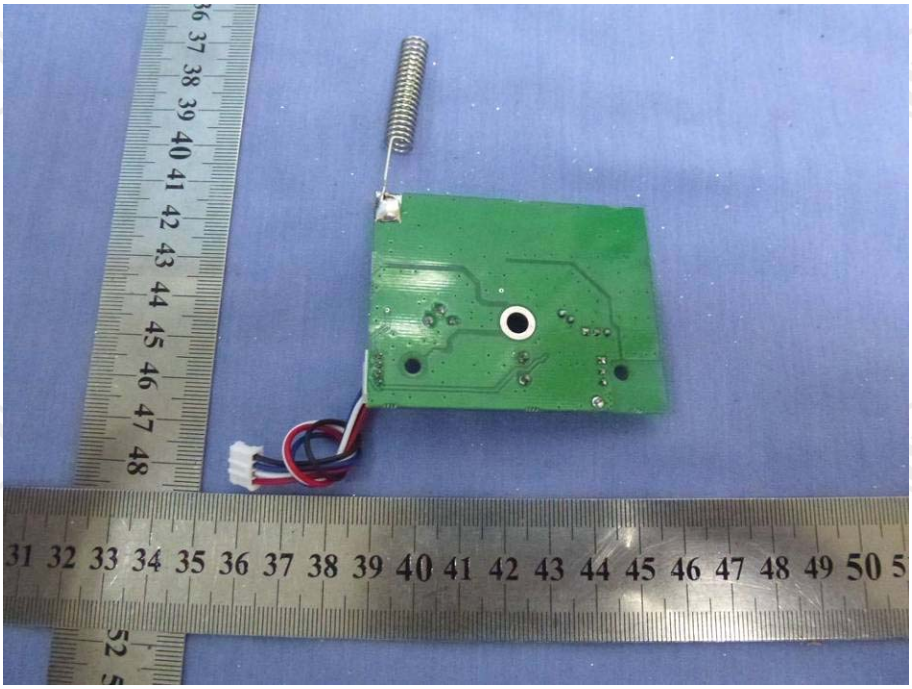


Fig.5- PCB View（For Receiver）

*** End of report ***

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