

FCC TEST REPORT

FCC ID : SJ8CA520-9

Applicant : **RDI Technology (Shenzhen) Co., Ltd.**
Building C1 Xingtang Industrial Park, East Baishixia, Fuyong, Baoan,
Shenzhen, P.R.C.

Equipment Under Test (EUT) :

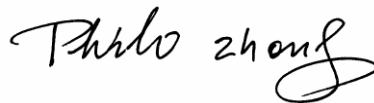
Product description : Wireless Pan and Tilt Camera

Model No. : CA520-9

Standards : FCC 15 Paragraph 15.249

Date of Test : Mar. 3, 2008

Test Engineer : **Tiger Su**

Reviewed By : 

PERPARED BY:

Waltek Services (Shenzhen) Co., Ltd.

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2 Contents

	Page
1 COVER PAGE.....	1
2 CONTENTS	2
3 TEST SUMMARY	4
4 GENERAL INFORMATION	5
4.1 CLIENT INFORMATION	5
4.2 GENERAL DESCRIPTION OF E.U.T.	5
4.3 DETAILS OF E.U.T.....	5
4.4 DESCRIPTION OF SUPPORT UNITS	5
4.5 STANDARDS APPLICABLE FOR TESTING	5
4.6 TEST FACILITY	6
4.7 TEST LOCATION	6
5 EQUIPMENT USED DURING TEST.....	7
6 CONDUCTED EMISSION TEST.....	8
6.1 TEST EQUIPMENT	8
6.2 TEST PROCEDURE.....	8
6.3 CONDUCTED TEST SETUP	9
6.4 EUT OPERATING CONDITION	9
6.5 CONDUCTED EMISSION LIMITS.....	10
6.6 CONDUCTED EMISSION TEST RESULT	11
6.7 MEASUREMENT DATA	12
7 RADIATION EMISSION TEST	13
7.1 TEST EQUIPMENT	13
7.2 MEASUREMENT UNCERTAINTY	13
7.3 TEST PROCEDURE.....	13
7.4 RADIATED TEST SETUP	14
7.5 SPECTRUM ANALYZER SETUP	14
7.6 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	15
7.7 SUMMARY OF TEST RESULTS	15
7.8 EUT OPERATING CONDITION.....	16
7.9 RADIATED EMISSIONS LIMIT	16
7.10 RADIATED EMISSIONS TEST RESULT	17
8 BAND EDGE.....	22
8.1 TEST EQUIPMENT	22
8.2 TEST PROCEDURE.....	22
8.3 BAND EDGE.....	22
8.4 BAND EDGE TEST RESULT	23
9 PHOTOGRAPHS OF TESTING	25
9.1 CONDUCTED EMISSION TEST VIEW	25
9.2 RADIATION EMISSION TEST VIEW FOR 30MHZ-1000MHZ.....	26
9.3 RADIATION EMISSION TEST VIEW FOR 1GHZ-10GHZ.....	26
10 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS.....	27
10.1 EUT - FRONT VIEW	27
10.2 EUT - BACK VIEW	27

10.3 ADAPTER - FRONT VIEW28

10.4 ADAPTER - BACK VIEW.....28

10.5 PCB1 - FRONT VIEW29

10.6 PCB1 - BACK VIEW29

10.7 PCB2 - FRONT VIEW30

10.8 PCB2 - BACK VIEW30

10.9 PCB3 - FRONT VIEW31

10.10 PCB3 - BACK VIEW31

11 FCC ID LABEL32

3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 10GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS

4 General Information

4.1 Client Information

Applicant: **RDI Technology (Shenzhen) Co., Ltd.**
Address of Applicant: Building C1 Xingtang Industrial Park, East Baishixia, Fuyong, Baoan, Shenzhen, P.R.C.
Manufacturer: RDI Technology (Shenzhen) Co., Ltd.
Address: Building C1 Xingtang Industrial Park, East Baishixia, Fuyong, Baoan, Shenzhen, P.R.C.

4.2 General Description of E.U.T.

Product description: Wireless Pan and Tilt Camera
Model No.: CA520-9

4.3 Details of E.U.T.

Power Supply: Adapter input: 120V AC 60Hz
Adapter output: 9V DC

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Wireless Pan and Tilt Camera. The standards used were FCC 15 Paragraph 15.249, Paragraph 15.207, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

4.6 Test Facility

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

- **FCC – Registration No.: 759397**

Solid Industrial (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 759397, December 28, 2006.

4.7 Test Location

All Emissions tests were performed at:-

Solid Industrial (Shenzhen) Co., Ltd. at 333 Bulong Highway Buji Longgang, Shenzhen, Guangdong, China.

5 Equipment Used during Test

Equipment	Brand Name	Model	Cal. Int Months	Last Cal. Date
3m Anechoic chamber				
EMC Analyzer	Agilent	E7402A	12	2007-08
EMI Test Receiver	R&S	ESS	12	2007-08
Pre Amplifier	Anritsu	MH648A	12	2007-08
Bilog Antenna	SCHAFFNER	CBL6111C	12	2007-08
Loop Antenna	R&S	6108	12	2007-08
Horn Antenna	ETS.LINDGERN	GH14-H052	12	2007-08
AM/FM Stereo Signal Generator	Panasonic	VP-8122A	12	2007-08
Signal Generator	R&S	SMG	12	2007-08
RF Selector	TOYO	NS4901A	-	-
Turn Disc	HD	DS4150S	-	-
Antenna Mast	HD	MA2400	-	-
EMI Shielded Room				
Spectrum analyzer	ADVANTEST	R3261C	12	2007-08
EMI Test Receiver	R&S	ESS	12	2007-08
Pre Amplifier	Anritsu	MH648A	12	2007-08
LISN	Kyoritsu	KNW-403D	12	2007-08
Absorbing Clamp	R&S	MDS-21	12	2007-08
Distortion Meter	MEGURO	MAK-6578A	12	2007-08
AM/FM Stereo Signal Generator	Panasonic	VP-8122A	12	2007-08
Oscilloscope	LEADER	LS1020	12	2007-08
Function Generator	National	VP-7422A	12	2007-08
Signal Generator	R&S	SMG	12	2007-08
RF Selector	TOYO	NS4000	-	-
Remote Controller	TOYO	MAC	-	-

6 Conducted Emission Test

Product Name:	Wireless Pan and Tilt Camera
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	Mar. 3, 2008
Frequency Range:	150 kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9 kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 Test Equipment

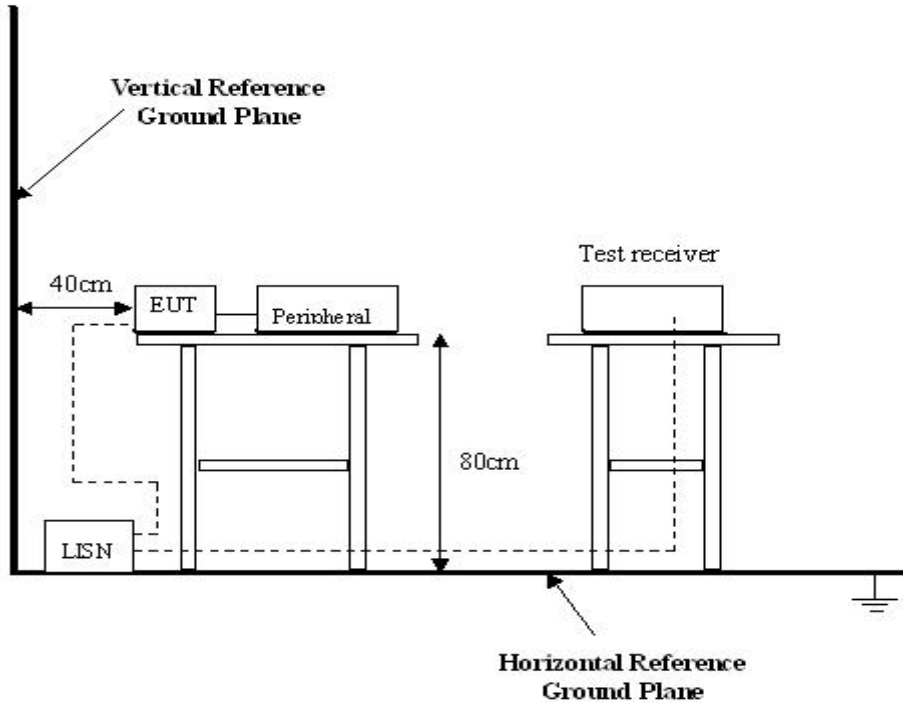
Please refer to Section 5 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.3 Conducted Test Setup

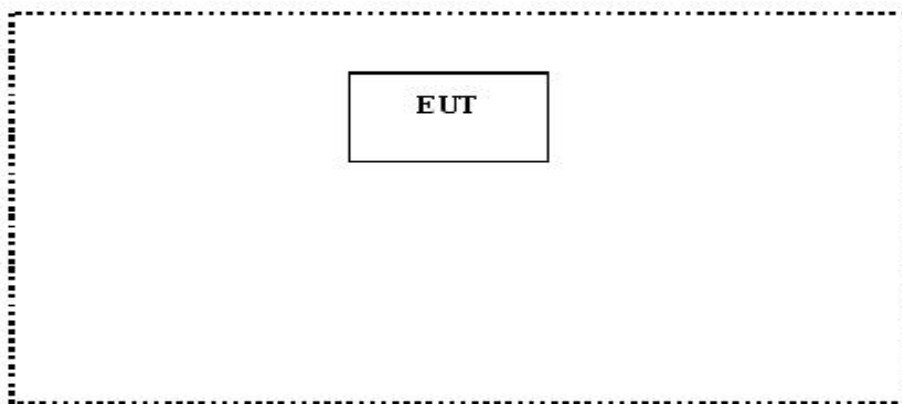
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4: 2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



6.5 Conducted Emission Limits

66-56 dB μ V/m between 0.15MHz & 0.5MHz

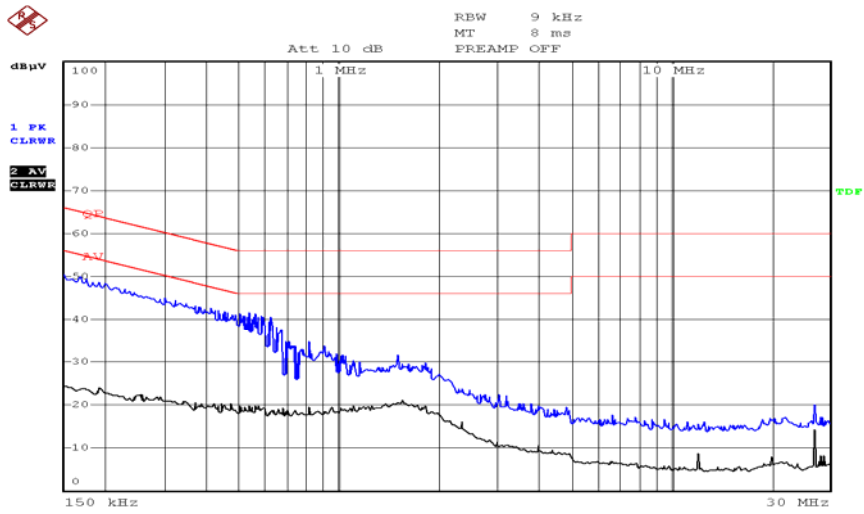
56 dB μ V/m between 0.5MHz & 5MHz

60 dB μ V/m between 5MHz & 30MHz

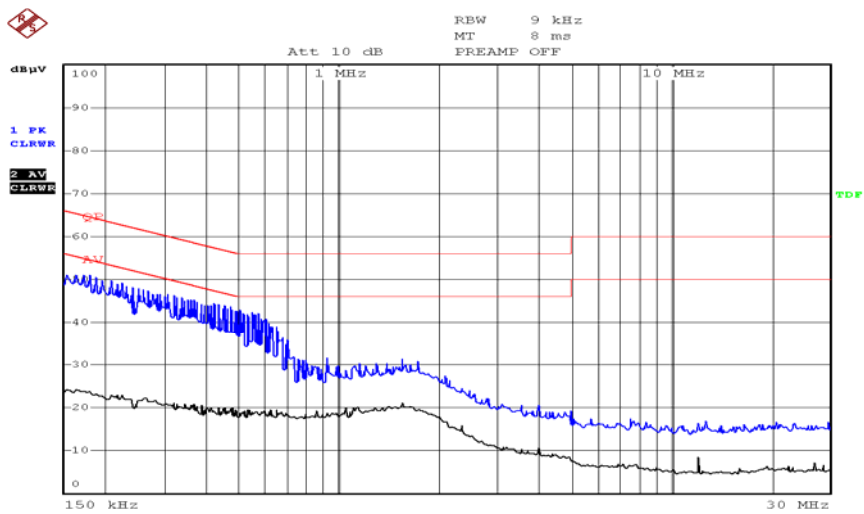
Note: In the above limits, the tighter limit applies at the band edges.

6.6 Conducted Emission Test Result

Live Line



Neutral Line



6.7 Measurement Data

Freq. MHz	Line	QP Reading dBuV	FCC 15 Limit dBuV	Margin dB	AV Reading dBuV	FCC 15 Limit dBuV	Margin dB
0.17	Live	48.21	64.96	16.75	24.23	54.96	30.73
1.56	Live	31.17	56.00	24.83	20.35	46.00	25.65
0.18	Neutral	50.03	64.49	14.46	23.41	54.49	31.08
1.57	Neutral	30.29	56.00	25.71	19.64	46.00	26.36

7 Radiation Emission Test

Product Name:	Wireless Pan and Tilt Camera
Test Requirement:	FCC Part15 Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.31 and Paragraph 15.33
Test Date:	Mar. 3, 2008
Frequency Range:	30MHz to 10GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

7.1 Test Equipment

Please refer to Section 5 this report.

7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase centre variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

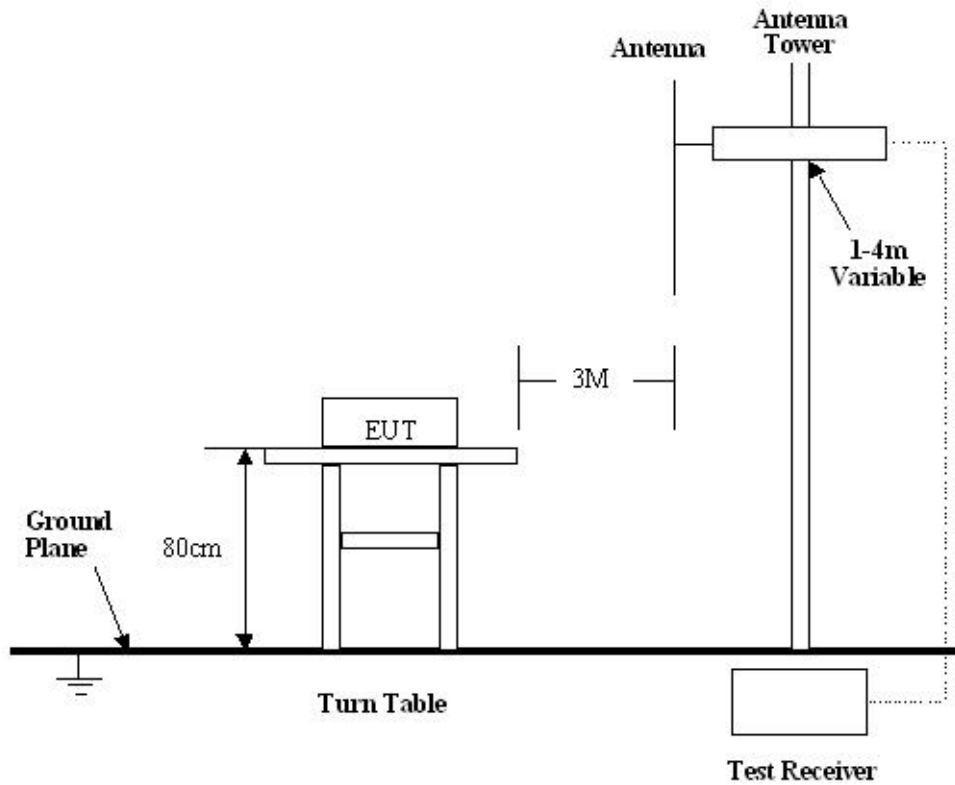
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Solid EMC Lab is +4.0 dB.

7.3 Test Procedure

1. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
2. All data was recorded in the peak detection mode.
3. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.
4. According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section.

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.249 and Paragraph 15.209 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.249 Rules, the system was tested to 10000 MHz.

- Start Frequency..... 30 MHz
- Stop Frequency..... 10000 MHz
- Sweep Speed Auto
- IF Bandwidth..... 100 kHz
- Video Bandwidth..... 1 MHz
- Quasi-Peak Adapter Bandwidth 120 kHz
- Quasi-Peak Adapter Mode Normal
- Resolution Bandwidth 1MHz

7.6 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of $-7\text{dB}\mu\text{V}$ means the emission is $7\text{dB}\mu\text{V}$ below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.249 standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25GHz	250	108	2500	68

- Note:**
- (1) $RF\ Voltage(dBuV) = 20 \log RF\ Voltage(uV)$
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 - (3) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
 - (4) Above 1GHz, do a Peak and average measurements for all emissions, Limit for peak is 94dBuV/m, According to Part 15.35(b) and average is 54BuV/m.

B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:**
- (1) $RF\ Voltage(dBuV) = 20 \log RF\ Voltage(uV)$
 - (2) In the Above Table, the tighter limit applies at the band edges.
 - (3) Distance refers to the distance in meters between the measuring instrument antenna.

7.10 Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding
The meter reading of the spectrum analyzer (which is set to read in units of dBuV)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stated in terms of dB. The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS
33 20dBuV+10.36dB=30.36dBuV/m @3m

Radiated Emission Test Data

Test Voltage: 120VAC

Test Mode: TX On

Temperature: 24 °C

Humidity: 52%RH

Test Result: PASS

Remarks: 30-1000MHz radiation test no significant emissions above the equipment noise floor
were detected.

1GHz-10GHz Radiated Emission Data**Channel 1**

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
910		Vertical	81.12	94.00	12.88	1.5	30
910		Horizontal	80.94	94.00	13.06	1.5	90
1820	AV	Vertical	32.26	54.00	21.74	1.5	45
2730	AV	Vertical	33.69	54.00	20.31	1.5	100
3640	AV	Vertical	31.17	54.00	22.83	1.5	90
4550	AV	Vertical	32.45	54.00	21.55	1.5	120
5460	AV	Vertical	33.43	54.00	20.57	1.5	180
6370	AV	Vertical	34.28	54.00	19.72	1.5	100
7280	AV	Vertical	35.12	54.00	18.88	1.5	90
8190	AV	Vertical	35.76	54.00	18.24	1.5	120
9100	AV	Vertical	35.88	54.00	18.12	1.5	45
1820	AV	Horizontal	32.15	54.00	21.85	1.5	90
2730	AV	Horizontal	32.57	54.00	21.43	1.5	100
3640	AV	Horizontal	31.00	54.00	23.00	1.5	60
4550	AV	Horizontal	31.94	54.00	22.06	1.5	60
5460	AV	Horizontal	32.84	54.00	21.16	1.5	90
6370	AV	Horizontal	33.85	54.00	20.15	1.5	45
7280	AV	Horizontal	37.98	54.00	16.02	1.5	120
8190	AV	Horizontal	35.57	54.00	18.43	1.5	100
9100	AV	Horizontal	35.82	54.00	18.18	1.5	120
1820	PK	Vertical	37.33	74.00	36.67	1.5	90
2730	PK	Vertical	38.62	74.00	35.38	1.5	60
3640	PK	Vertical	39.51	74.00	34.49	1.5	45
4550	PK	Vertical	39.84	74.00	34.16	1.5	60
5460	PK	Vertical	39.77	74.00	34.23	1.5	90
6370	PK	Vertical	40.29	74.00	33.71	1.5	100
7280	PK	Vertical	41.26	74.00	32.74	1.5	120
8190	PK	Vertical	42.27	74.00	31.73	1.5	180
9100	PK	Vertical	42.86	74.00	31.14	1.5	180
1820	PK	Horizontal	37.07	74.00	36.93	1.5	60
2730	PK	Horizontal	37.55	74.00	36.45	1.5	90
3640	PK	Horizontal	38.62	74.00	35.38	1.5	120

4550	PK	Horizontal	38.88	74.00	35.12	1.5	100
5460	PK	Horizontal	39.46	74.00	34.54	1.5	120
6370	PK	Horizontal	40.11	74.00	33.89	1.5	90
7280	PK	Horizontal	41.13	74.00	32.87	1.5	45
8190	PK	Horizontal	42.25	74.00	31.75	1.5	60
9100	PK	Horizontal	42.63	74.00	31.37	1.5	180

Channel 2

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
920		Vertical	82.75	94.00	11.25	1.5	180
920		Horizontal	81.44	94.00	12.56	1.5	100
1840	AV	Vertical	34.45	54.00	19.55	1.5	120
2760	AV	Vertical	34.52	54.00	19.48	1.5	90
3680	AV	Vertical	35.74	54.00	18.26	1.5	100
4600	AV	Vertical	36.37	54.00	17.63	1.5	45
5520	AV	Vertical	36.85	54.00	17.15	1.5	60
6440	AV	Vertical	37.73	54.00	16.27	1.5	90
7360	AV	Vertical	37.82	54.00	16.18	1.5	100
8280	AV	Vertical	38.26	54.00	15.74	1.5	90
9200	AV	Vertical	38.72	54.00	15.28	1.5	120
1840	AV	Horizontal	34.32	54.00	19.68	1.5	180
2760	AV	Horizontal	34.41	54.00	19.59	1.5	120
3680	AV	Horizontal	35.56	54.00	18.44	1.5	45
4600	AV	Horizontal	36.11	54.00	17.89	1.5	60
5520	AV	Horizontal	36.58	54.00	17.42	1.5	45
6440	AV	Horizontal	37.44	54.00	16.56	1.5	120
7360	AV	Horizontal	37.64	54.00	16.36	1.5	90
8280	AV	Horizontal	37.95	54.00	16.05	1.5	100
9200	AV	Horizontal	38.38	54.00	15.62	1.5	180
1840	PK	Vertical	39.49	74.00	34.51	1.5	120
2760	PK	Vertical	39.57	74.00	34.43	1.5	90
3680	PK	Vertical	40.14	74.00	33.86	1.5	45
4600	PK	Vertical	41.35	74.00	32.66	1.5	60
5520	PK	Vertical	42.46	74.00	31.54	1.5	100
6440	PK	Vertical	42.64	74.00	31.36	1.5	180
7360	PK	Vertical	43.67	74.00	30.33	1.5	180
8280	PK	Vertical	43.89	74.00	30.11	1.5	120
9200	PK	Vertical	44.37	74.00	29.63	1.5	60
1840	PK	Horizontal	38.62	74.00	35.38	1.5	90
2760	PK	Horizontal	38.84	74.00	35.16	1.5	100
3680	PK	Horizontal	40.15	74.00	33.85	1.5	120
4600	PK	Horizontal	41.23	74.00	32.77	1.5	60

5520	PK	Horizontal	42.58	74.00	31.42	1.5	45
6440	PK	Horizontal	43.63	74.00	30.37	1.5	90
7360	PK	Horizontal	43.79	74.00	30.21	1.5	180
8280	PK	Horizontal	43.94	74.00	30.06	1.5	180
9200	PK	Horizontal	44.41	74.00	29.59	1.5	180

Note: Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 94dBuvV/m,According to Part15.35(b) and average is 54BuvV/m.

8 Band Edge

8.1 Test Equipment

Please refer to Section 5 this report.

8.2 Test Procedure

1. The EUT, peripherals were put on the turntable which table size is 1mX1.5m, table high 0.8m. All set up is according to ANSI C63.4: 2003.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

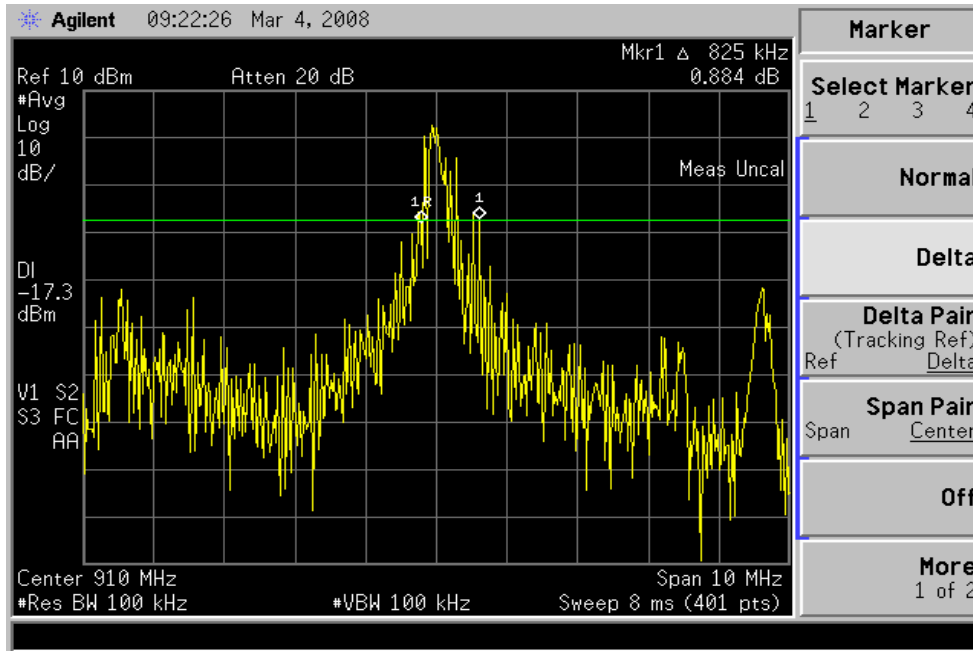
8.3 Band Edge

Requirements: FCC 15.249(d), the emission power at the START and STOP frequencies shall be at least 50dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209.

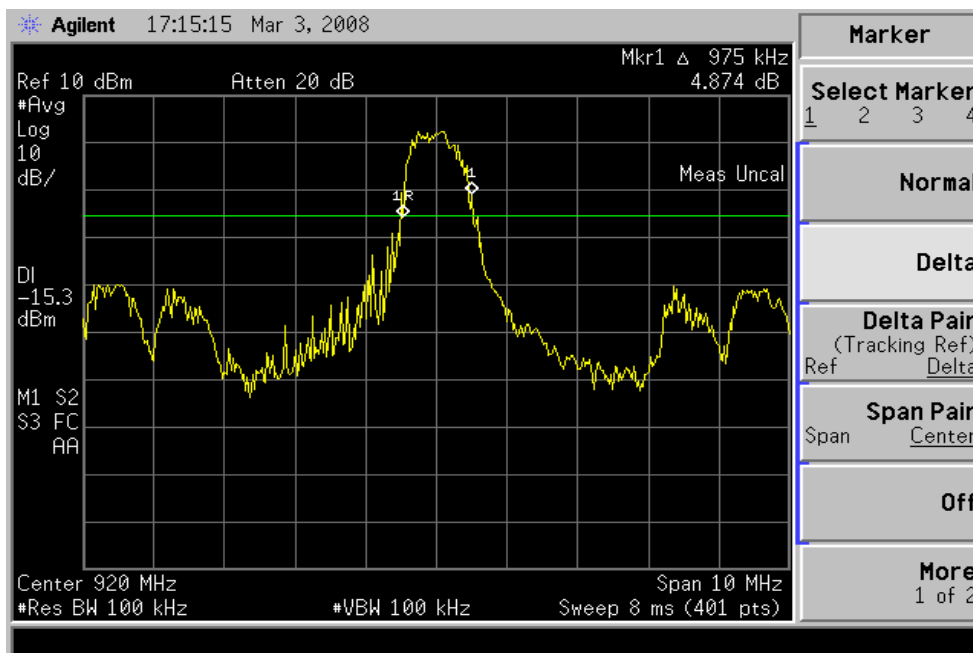
8.4 Band Edge Test Result

Product Name:	Wireless Pan and Tilt Camera
Test Item:	Band Edge Test
Test Voltage:	120VAC
Test Mode:	TX On
Temperature:	24 °C
Humidity:	52%RH

Channel 1



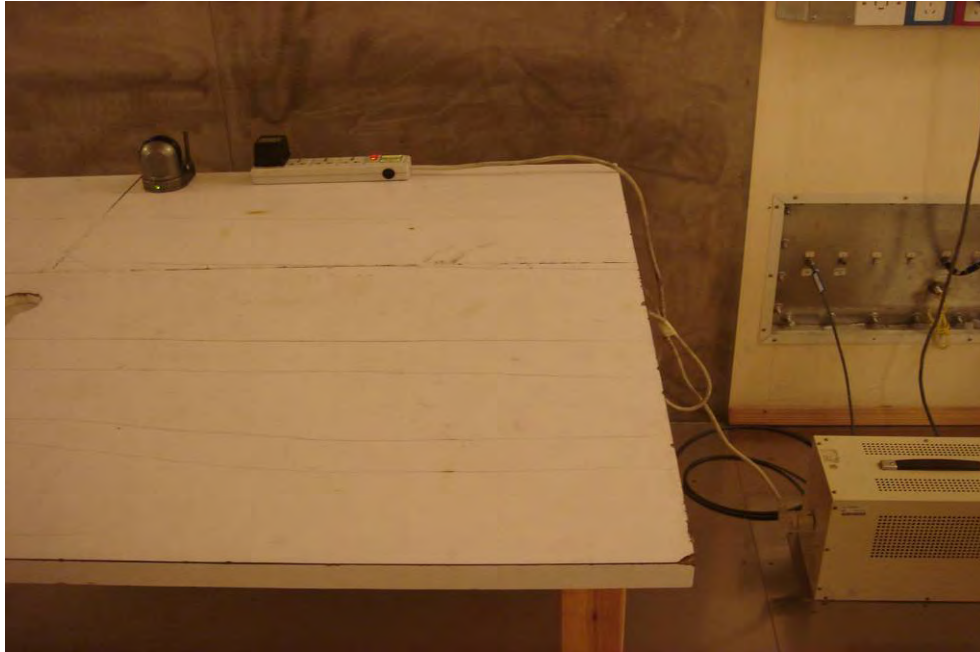
Channel 2



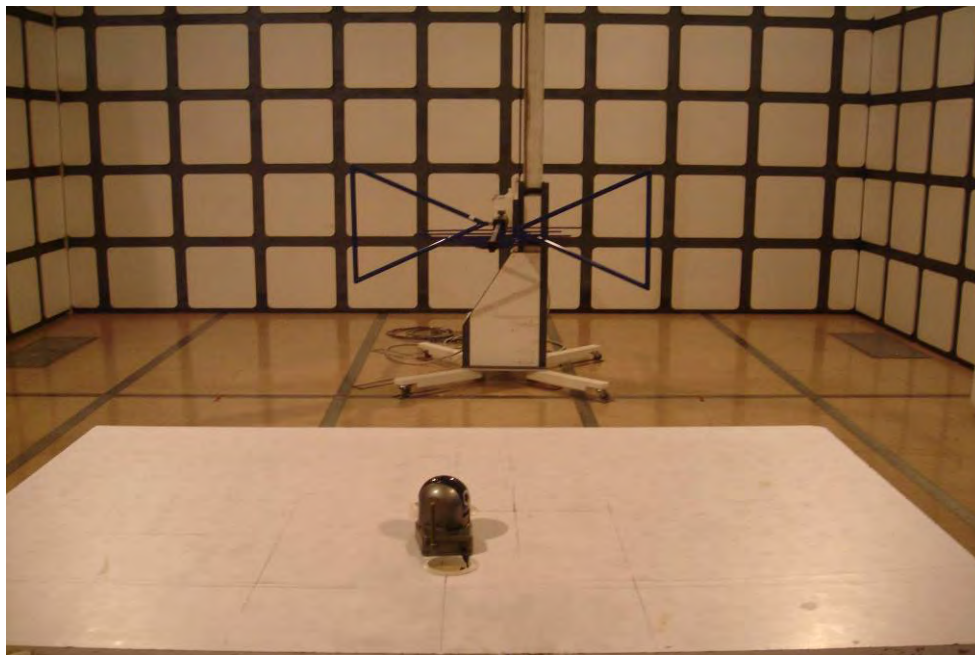
- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.249.
 - (2) This device does meet the FCC requirement.

9 Photographs of Testing

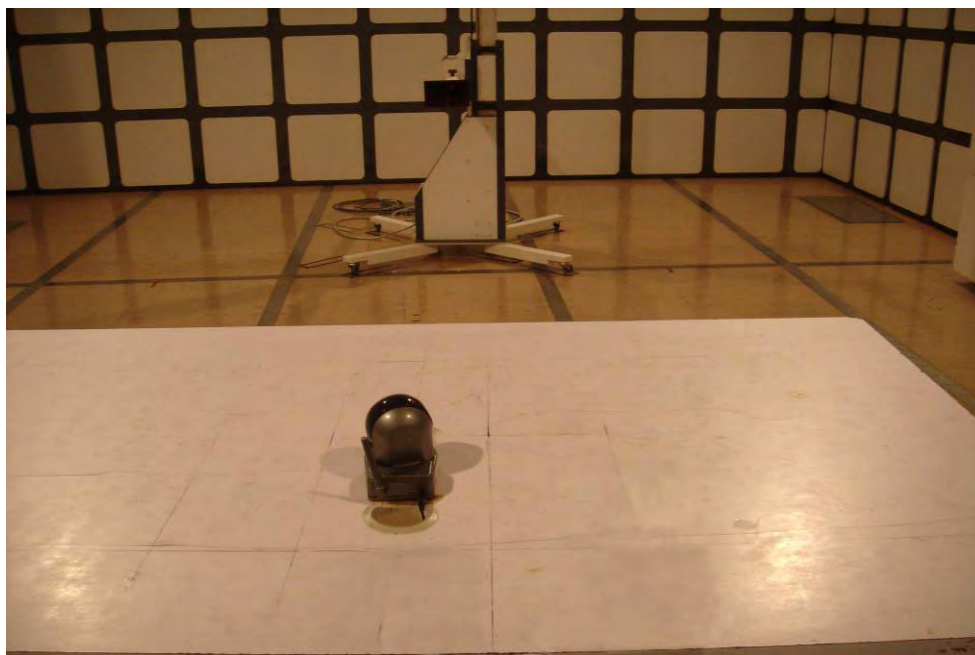
9.1 Conducted Emission Test View



9.2 Radiation Emission Test View For 30MHz-1000MHz



9.3 Radiation Emission Test View For 1GHz-10GHz



10 Photographs - Constructional Details

10.1 EUT - Front View



10.2 EUT - Back View



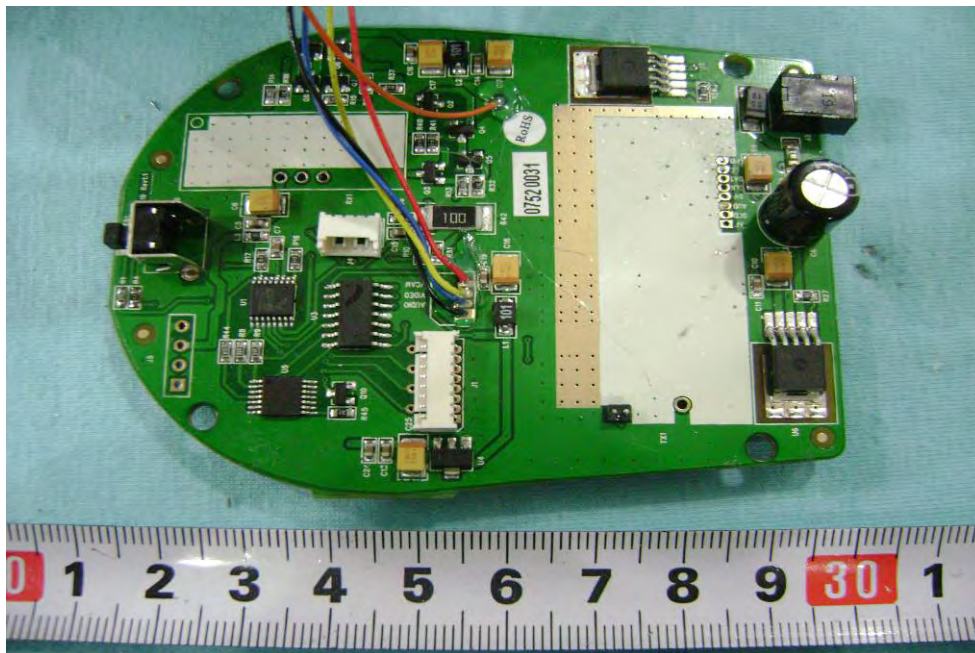
10.3 Adapter - Front View



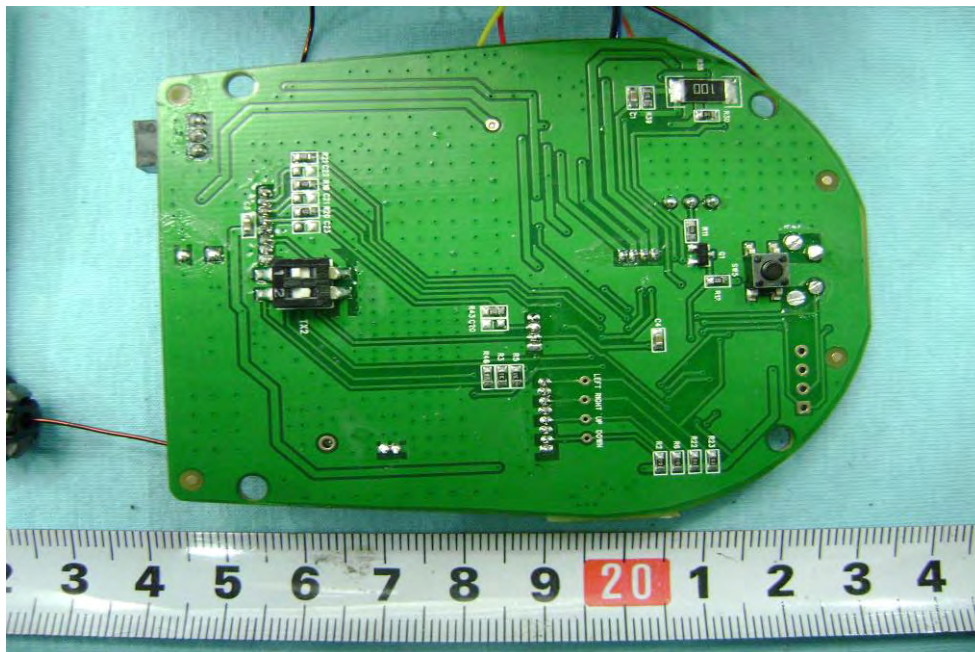
10.4 Adapter - Back View



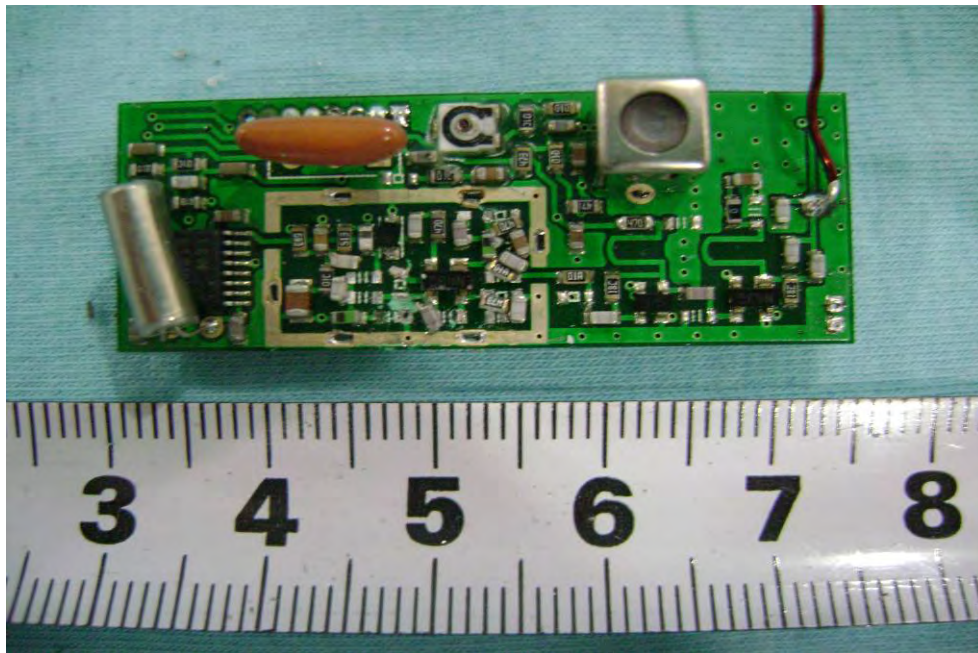
10.5 PCB1 - Front View



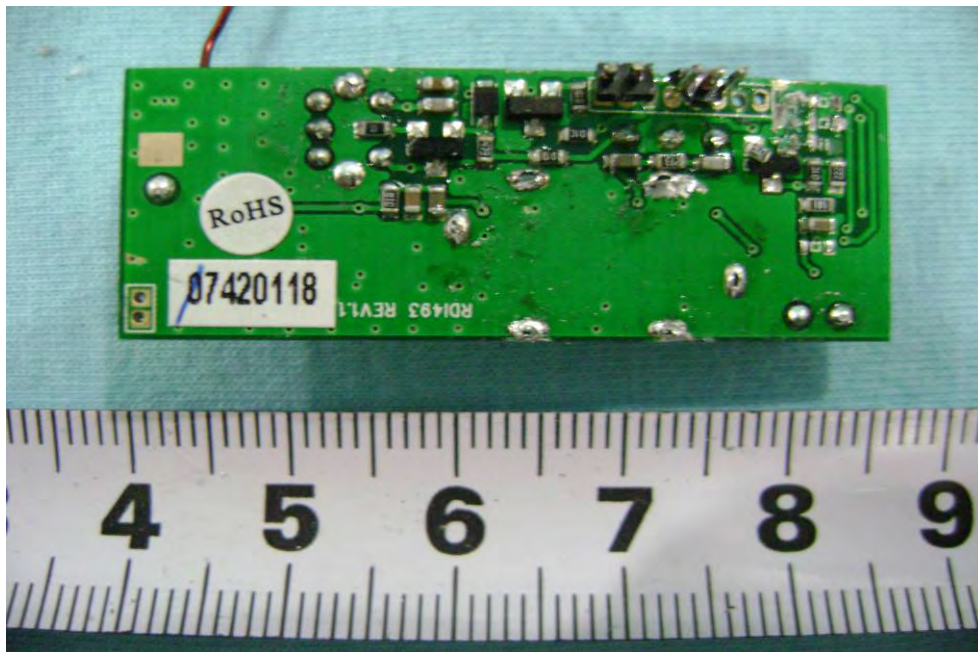
10.6 PCB1 - Back View



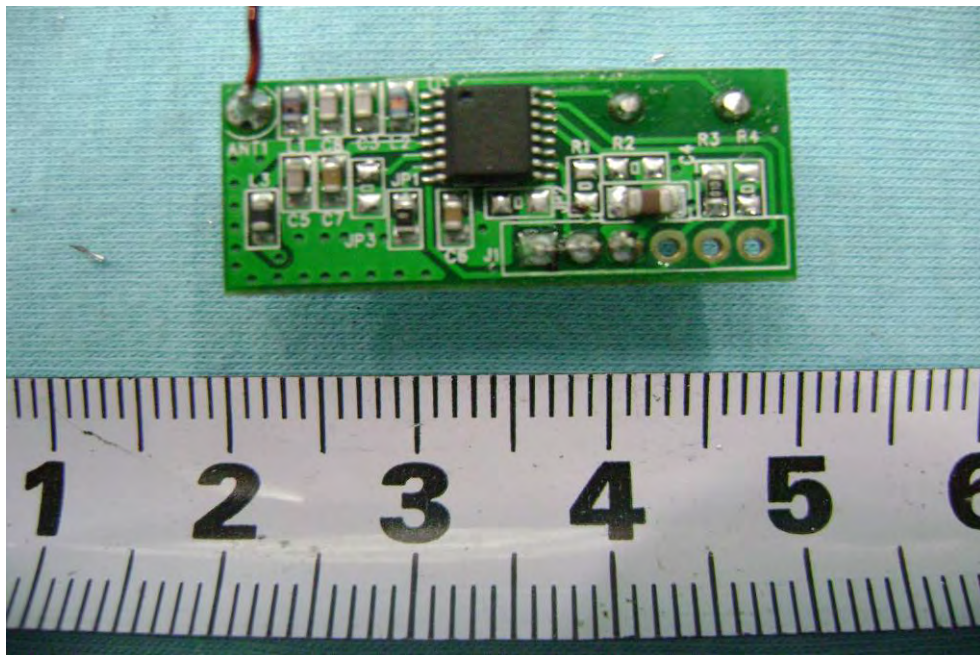
10.7 PCB2 - Front View



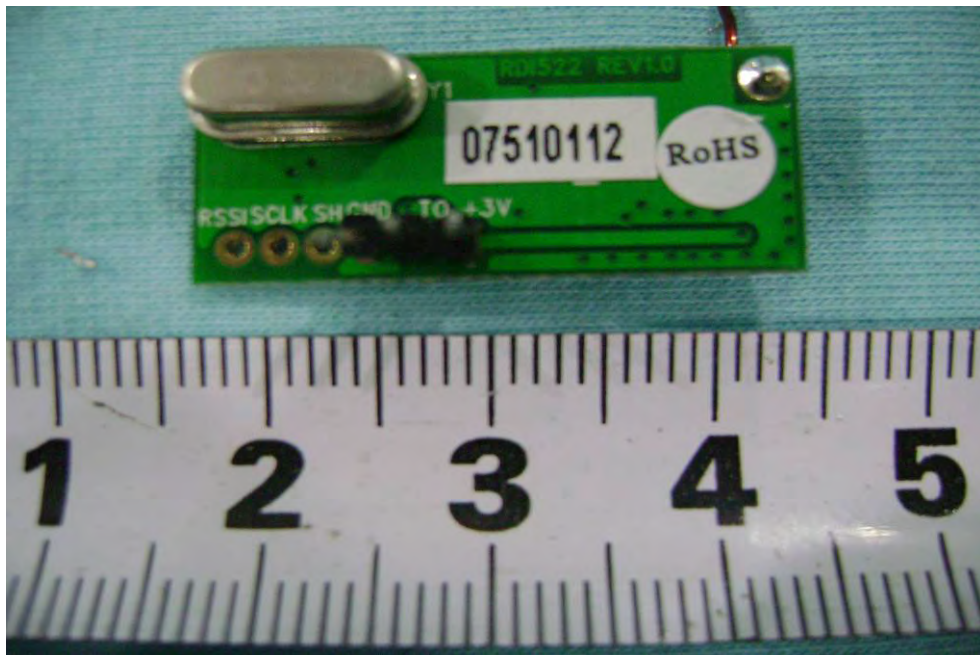
10.8 PCB2 - Back View



10.9 PCB3 - Front View



10.10 PCB3 - Back View



11 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT
EUT Bottom View/proposed FCC Mark Location

