

FCC TEST REPORT

FCC ID : SJ8CA520

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

Equipment Under Test (EUT) :

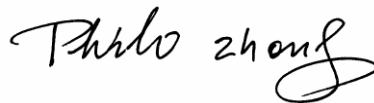
Product description : Wireless Pan and Tilt Camera

Model No. : CA520

Standards : FCC 15 Paragraph 15.249

Date of Test : Mar.5, 2008

Test Engineer : **Tiger Su**

Reviewed By : 

PERPARED BY:

Waltek Services (Shenzhen) Co., Ltd.

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11 FCC ID LABEL33

3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 25GHz)	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

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

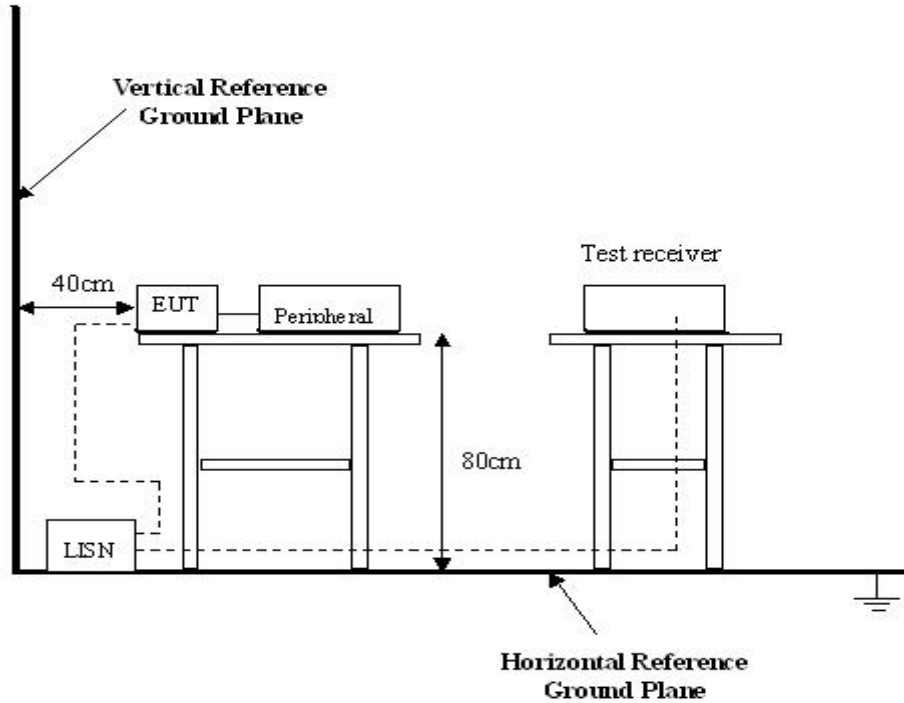
Please refer to Section 5 this report.

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

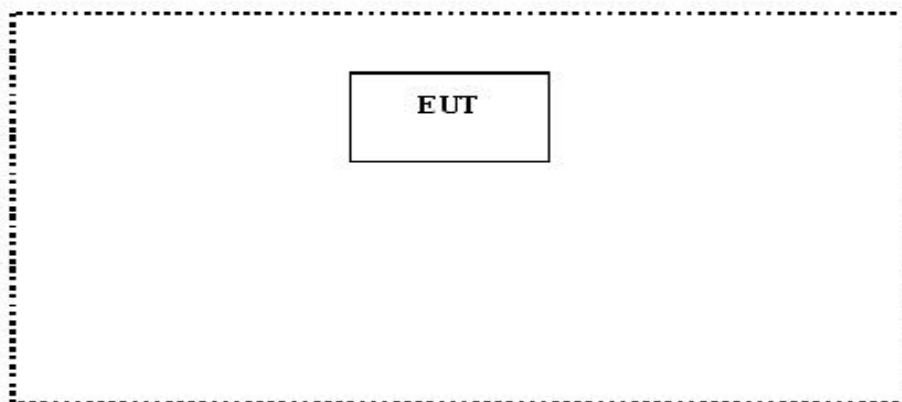
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



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

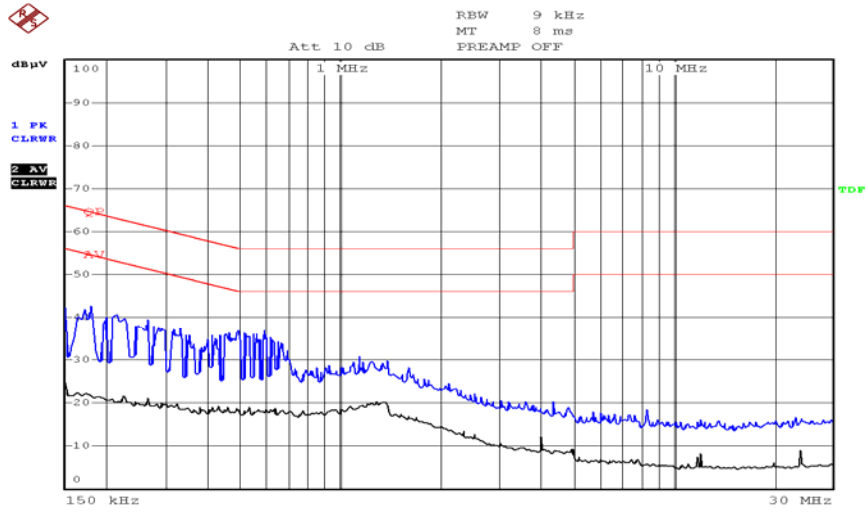
56 dB μ V/m between 0.5MHz & 5MHz

60 dB μ V/m between 5MHz & 30MHz

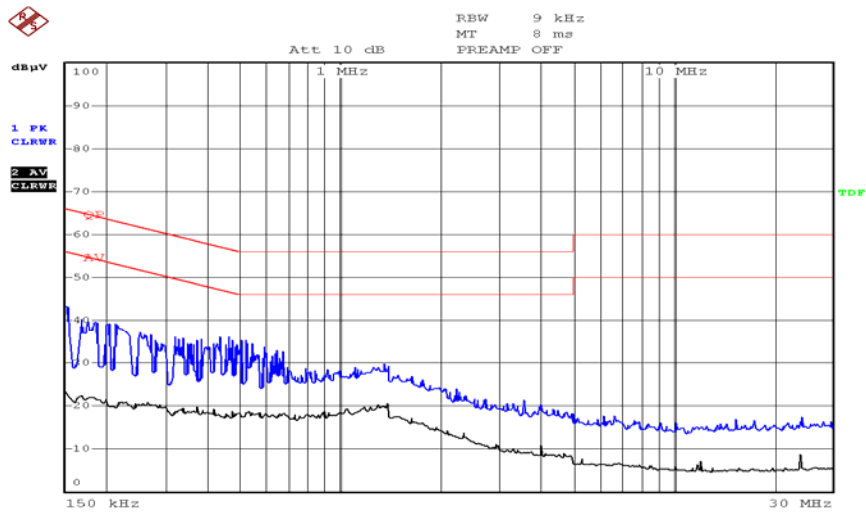
Note: In the above limits, the tighter limit applies at the band edges.

6.6 Conducted Emission Test Result

Live Line



Neutral Line



6.7 Conducted Emission Test Data

Freq. MHz	Line	QP Reading dBuV	Limit dBuV	Margin dB	AV Reading dBuV	Limit dBuV	Margin dB
0.15	Live	43.27	66.00	22.73	24.45	56.00	31.55
0.18	Live	42.12	64.49	22.37	22.27	54.49	32.22
0.15	Neutral	43.21	66.00	22.79	23.79	56.00	32.21
0.22	Neutral	39.44	62.83	23.39	20.89	52.83	31.94

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 25GHz
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.

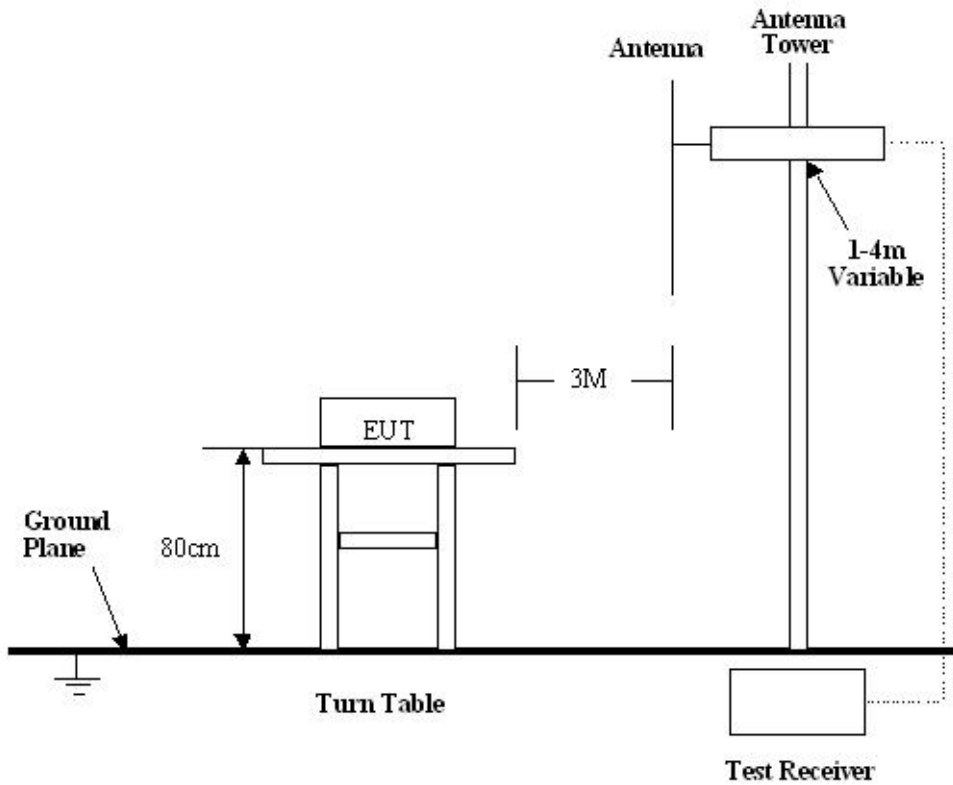
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Solid EMC Lab is +4.0 dB.

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. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB μ V of specification limits), and are distinguished with a "Qp" in the data table.
3. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

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 25000 MHz.

- Start Frequency..... 30 MHz
- Stop Frequency..... 25000 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: DC 9V
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-25GHZ Radiated Emission Data

Frequency(MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low frequency							
2410.00	AV	Vertical	71.36		(Fund.)	1.5	90
4820.00	AV	Vertical	48.62	54.00	4.38	1.5	90
7230.00	AV	Vertical	47.34	54.00	6.66	1.8	45
9640.00	AV	Vertical	45.18	54.00	8.82	1.5	90
12050.00	AV	Vertical	44.30	54.00	9.70	1.5	180
14460.00	AV	Vertical	41.12	54.00	12.88	1.8	45
2410.00	AV	Horizontal	70.36		(Fund.)	1.5	230
4820.00	AV	Horizontal	49.32	54.00	4.77	1.6	60
7230.00	AV	Horizontal	46.65	54.00	9.05	1.5	180
9640.00	AV	Horizontal	45.98	54.00	9.02	1.8	45
12050.00	AV	Horizontal	43.95	54.00	10.05	1.5	90
14460.00	AV	Horizontal	41.12	54.00	12.88	1.8	90
2410.00	PK	Vertical	81.52		(Fund.)	1.5	270
4820.00	PK	Vertical	59.16	74.00	14.84	1.6	90
7230.00	PK	Vertical	58.89	74.00	15.11	1.5	90
9640.00	PK	Vertical	57.78	74.00	16.22	1.5	90
12050.00	PK	Vertical	55.12	74.00	18.88	1.5	180
14460.00	PK	Vertical	47.12	74.00	26.88	1.8	45
2410.00	PK	Horizontal	82.41		(Fund.)	1.5	230
4820.00	PK	Horizontal	62.12	74.00	11.88	1.5	60
7230.00	PK	Horizontal	55.23	74.00	18.77	1.8	180
9640.00	PK	Horizontal	59.78	74.00	14.22	1.6	90
12050.00	PK	Horizontal	55.32	74.00	18.68	1.5	90
14460.00	PK	Horizontal	50.12	74.00	23.88	1.5	90
Middle frequency							
2440.00	AV	Vertical	70.56		(Fund.)	1.5	90
4880.00	AV	Vertical	48.45	54.00	5.55	4.5	90
7320.00	AV	Vertical	47.29	54.00	6.71	1.6	60
9760.00	AV	Vertical	43.45	54.00	10.55	1.8	90
12200.00	AV	Vertical	42.23	54.00	11.77	1.5	90
14640.00	AV	Vertical	43.68	54.00	10.33	1.5	90

2440.00	AV	Horizontal	71.09		(Fund.)	1.5	45
4880.00	AV	Horizontal	49.47	54.00	4.53	1.5	250
7320.00	AV	Horizontal	47.41	54.00	6.59	1.8	60
9760.00	AV	Horizontal	43.45	54.00	10.55	1.5	90
12200.00	AV	Horizontal	41.87	54.00	12.13	1.6	180
14640.00	AV	Horizontal	42.63	54.00	11.37	1.8	90
2440.00	PK	Vertical	81.52		(Fund.)	1.5	45
4880.00	PK	Vertical	59.16	74.00	14.84	1.5	80
7320.00	PK	Vertical	53.89	74.00	20.11	1.5	230
9760.00	PK	Vertical	51.65	74.00	22.35	1.5	250
12200.00	PK	Vertical	49.89	74.00	24.11	1.5	60
14640.00	PK	Vertical	48.14	74.00	25.86	1.5	90
2440.00	PK	Horizontal	82.41		(Fund.)	1.5	180
4880.00	PK	Horizontal	61.52	74.00	12.48	1.8	60
7320.00	PK	Horizontal	54.26	74.00	19.74	1.5	90
9760.00	PK	Horizontal	57.63	74.00	16.37	1.6	180
12200.00	PK	Horizontal	53.21	74.00	20.79	1.8	90
14640.00	PK	Horizontal	48.63	74.00	25.37	1.5	90
High frequency							
2470.00	AV	Vertical	70.58		(Fund.)	1.5	120
4940.00	AV	Vertical	49.47	54.00	4.53	1.5	60
7410.00	AV	Vertical	47.29	54.00	6.71	1.5	80
9880.00	AV	Vertical	44.25	54.00	9.75	1.5	90
12350.00	AV	Vertical	42.23	54.00	11.77	1.6	180
14820.00	AV	Vertical	41.38	54.00	12.62	1.8	90
2470.00	AV	Horizontal	71.65		(Fund.)	1.5	120
4940.00	AV	Horizontal	48.43	54.00	5.57	1.5	45
7410.00	AV	Horizontal	46.79	54.00	7.21	1.5	210
9880.00	AV	Horizontal	43.45	54.00	10.55	1.5	230
12350.00	AV	Horizontal	42.36	54.00	11.64	1.6	250
14820.00	AV	Horizontal	40.63	54.00	13.64	1.5	60
2470.00	PK	Vertical	78.52		(Fund.)	1.5	80
4940.00	PK	Vertical	58.56	74.00	2.44	1.5	270
7410.00	PK	Vertical	56.65	74.00	17.35	1.5	90
9880.00	PK	Vertical	53.63	74.00	20.37	1.5	80
12350.00	PK	Vertical	50.89	74.00	23.11	1.6	270
14820.00	PK	Vertical	47.17	74.00	26.83	1.5	90

2470.00	PK	Horizontal	83.41		(Fund.)	1.5	45
4940.00	PK	Horizontal	71.66	74.00	2.34	1.8	250
7410.00	PK	Horizontal	59.26	74.00	14.74	1.5	80
9880.00	PK	Horizontal	57.93	74.00	16.07	1.5	230
12350.00	PK	Horizontal	51.21	74.00	22.79	1.6	90
14820.00	PK	Horizontal	50.63	74.00	23.37	1.5	60

Note: Above 1GHz,do a Peak and average measurements for all emissions, According to Part15.35(b), Limit for 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 1MHz RBW and 3MHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

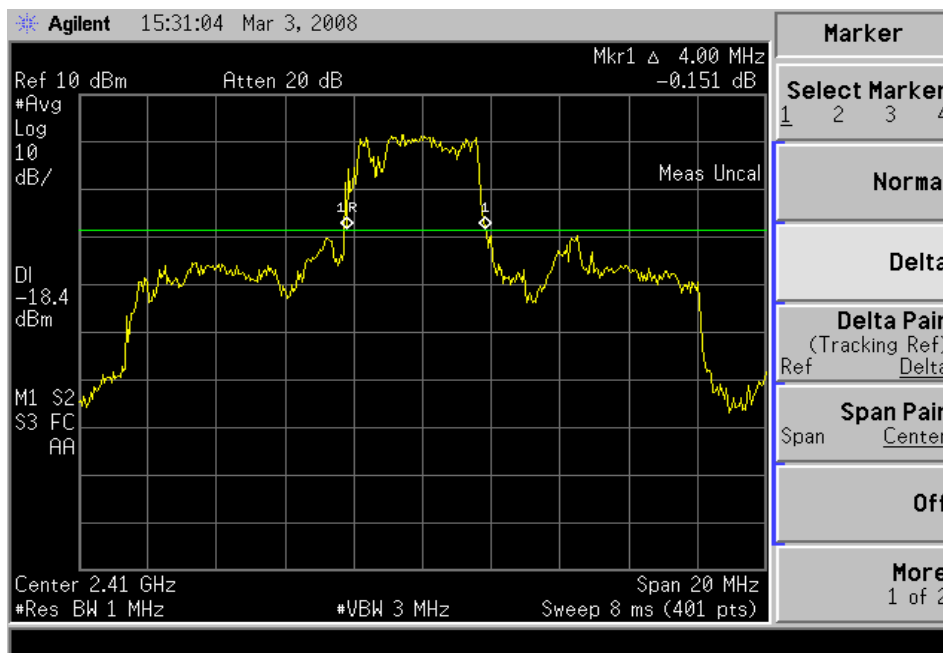
8.3 Band Edge

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: DC 9V
 Test Mode: TX On
 Temperature: 24 °C
 Humidity: 52%RH

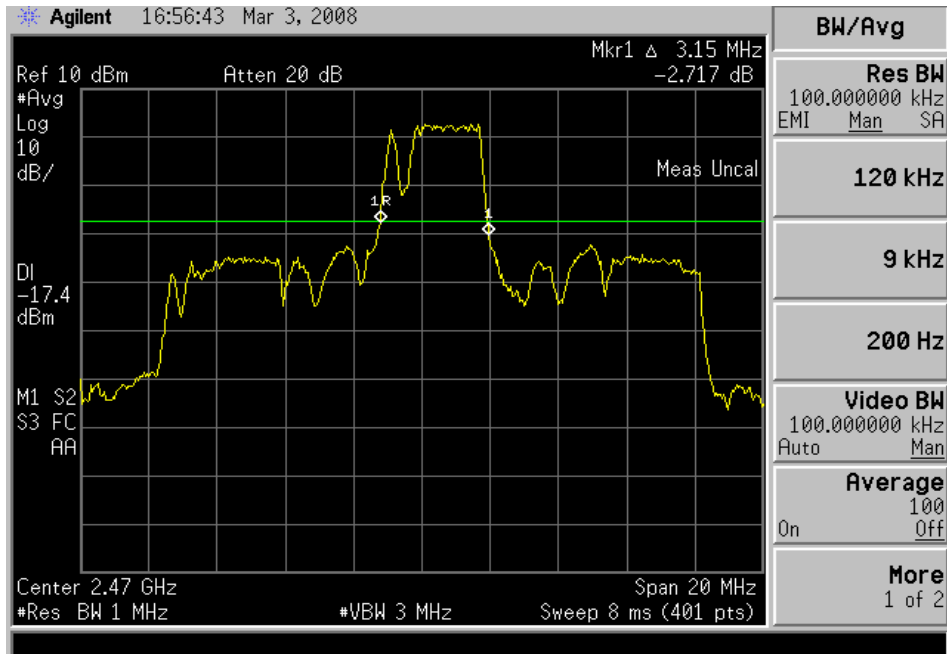
2410MHz



2440MHz



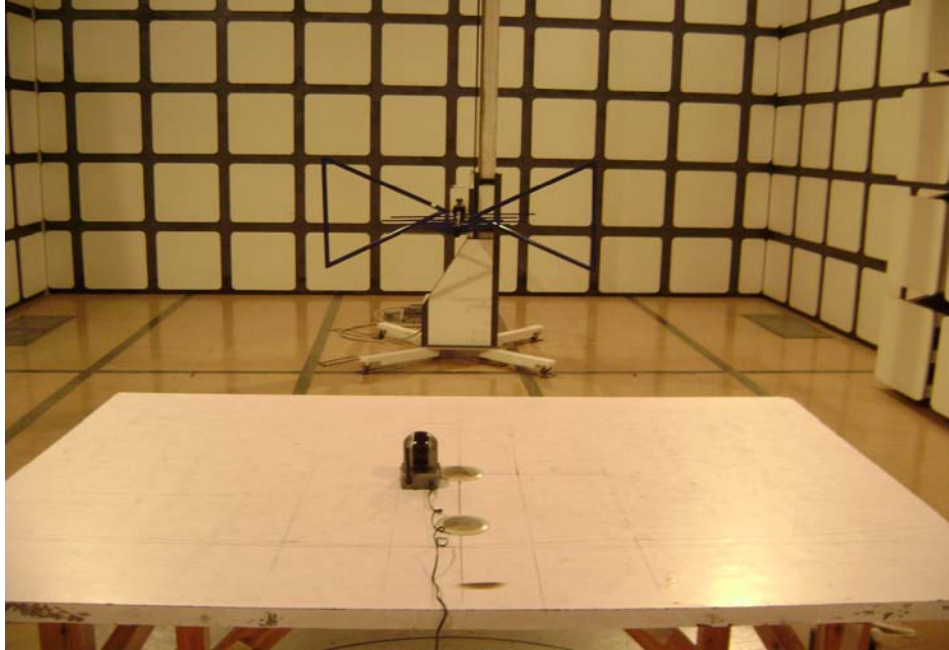
2470MHz



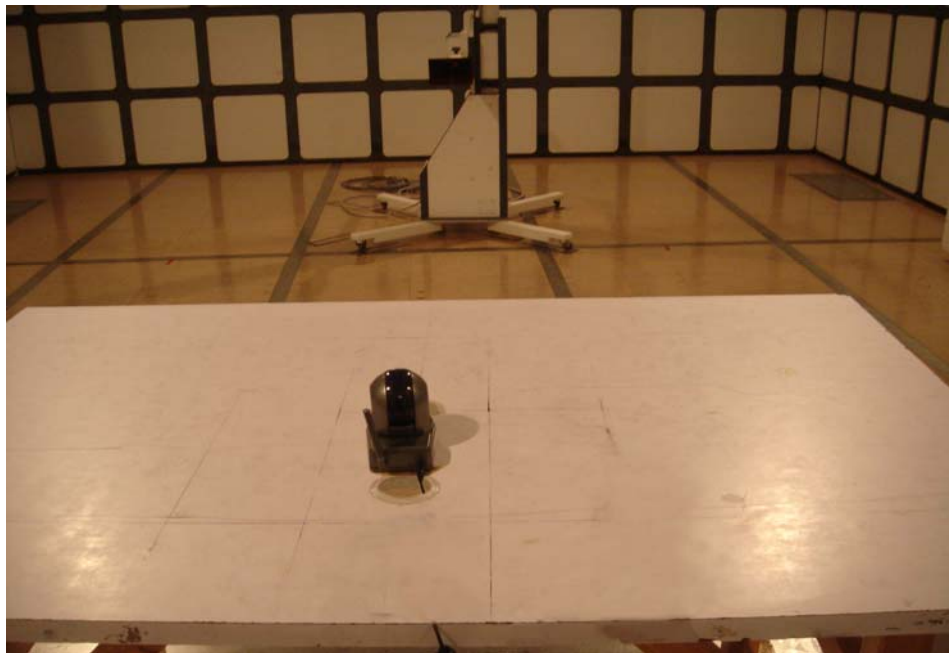
- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.249.
 - (2) This device does meet the FCC requirement.

9 Photographs of Testing

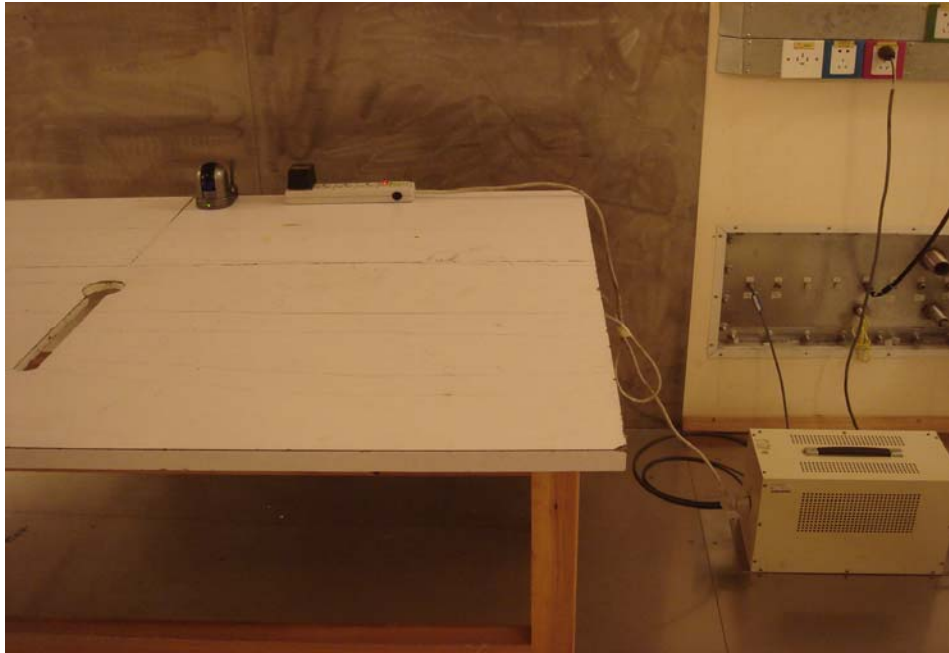
9.1 Radiation Emission Test View For 30MHz-1000MHz



9.2 Radiation Emission Test View For 1GHz-25GHz



9.3 Conducted Emission Test View



10 Photographs - Constructional Details

10.1 EUT - Front View



10.2 EUT - Back View



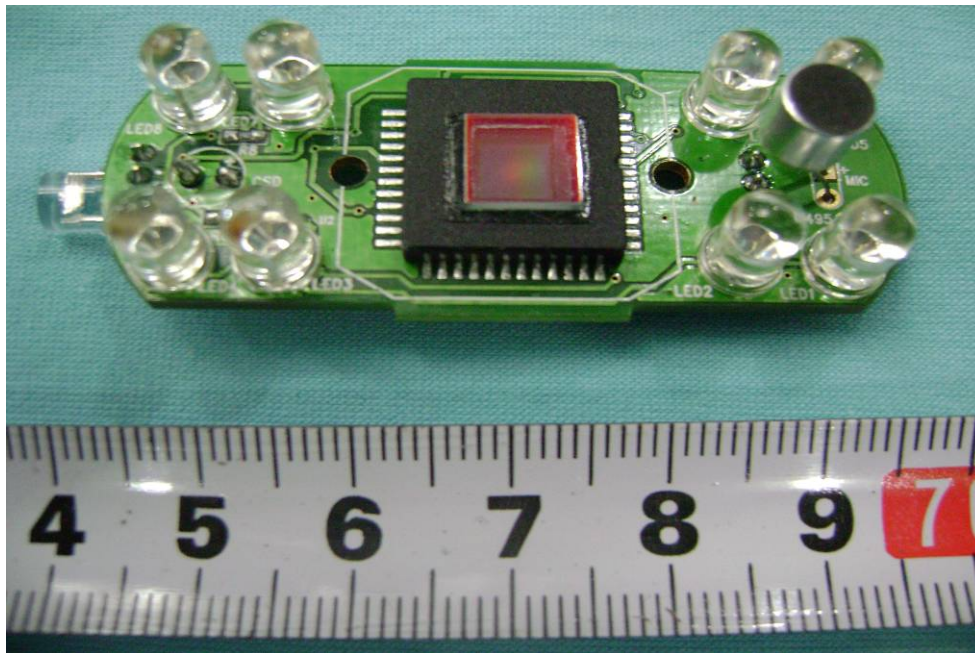
10.3 Adapter - Front View



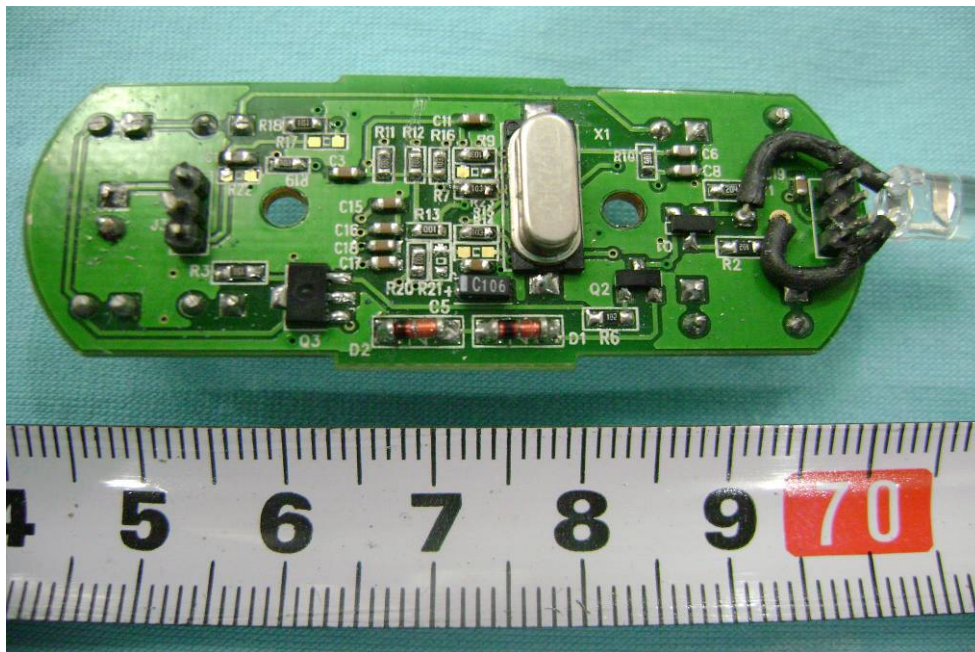
10.4 Adapter - Back View



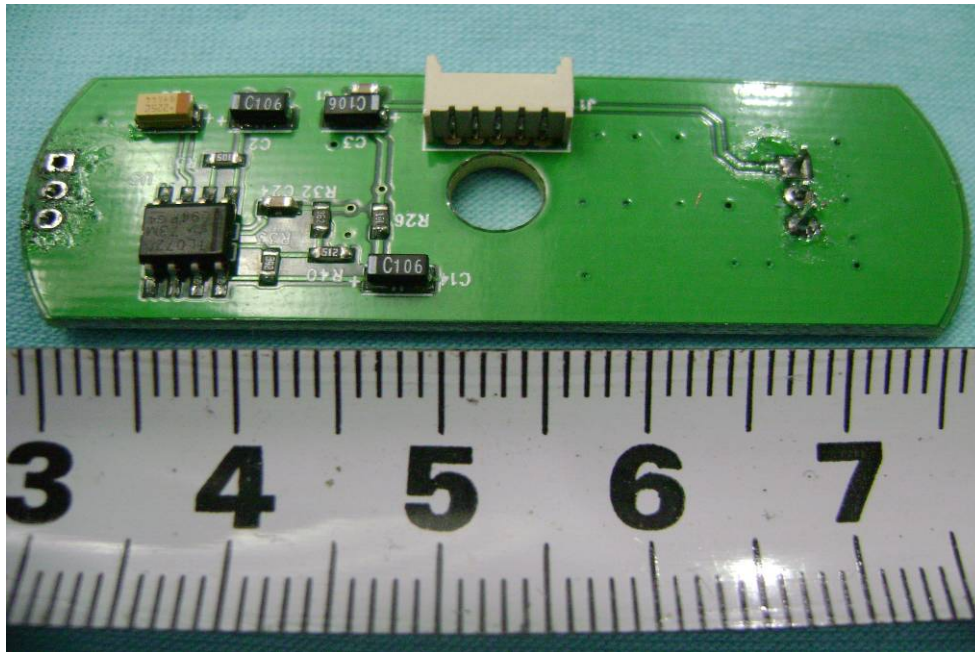
10.5 PCB1 - Front View



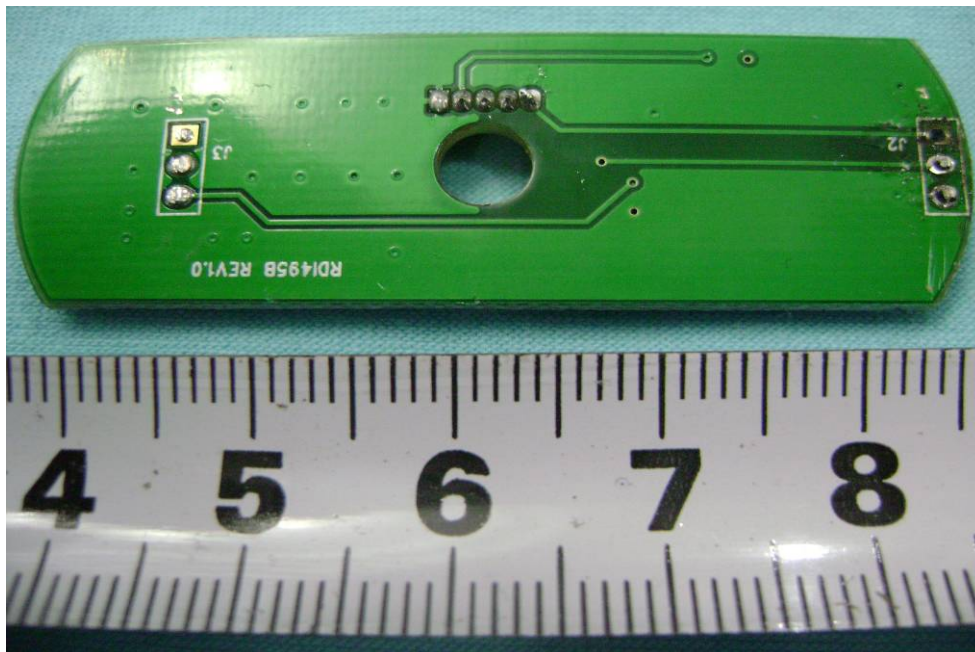
10.6 PCB1 - Back View



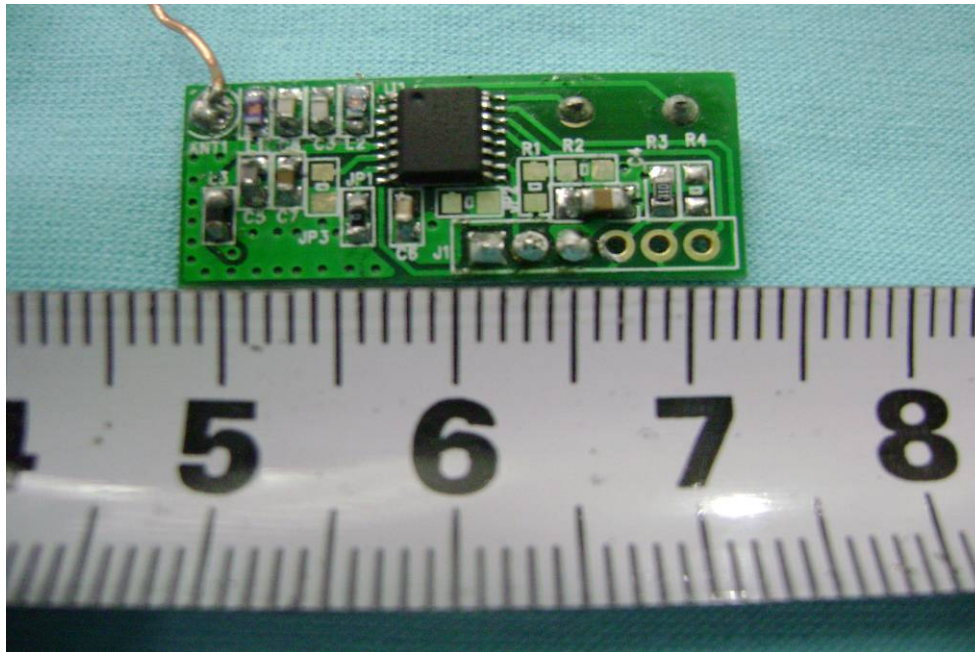
10.7 PCB2 - Front View



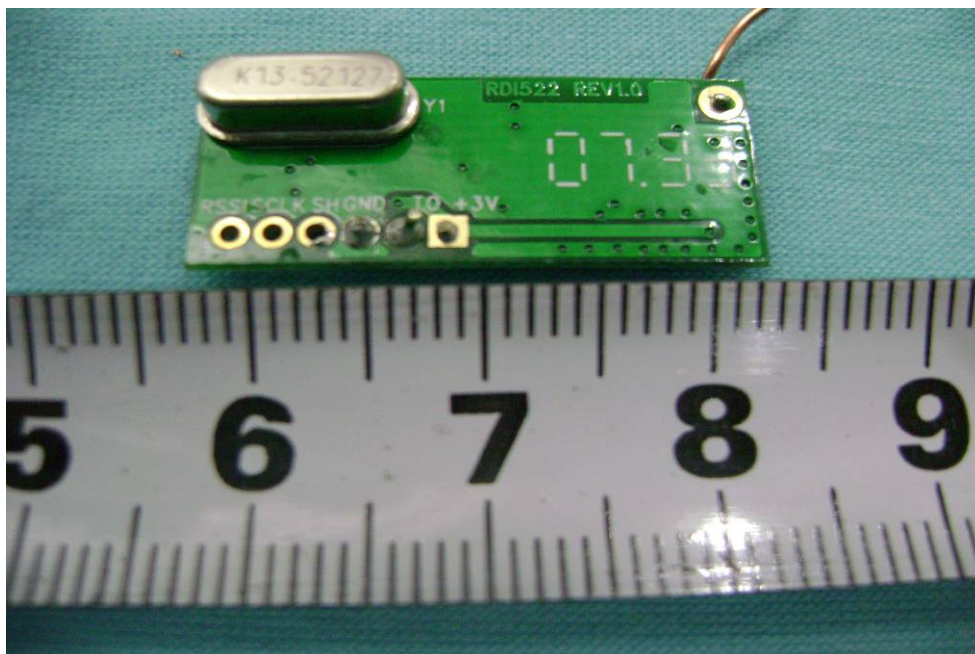
10.8 PCB2 - Back View



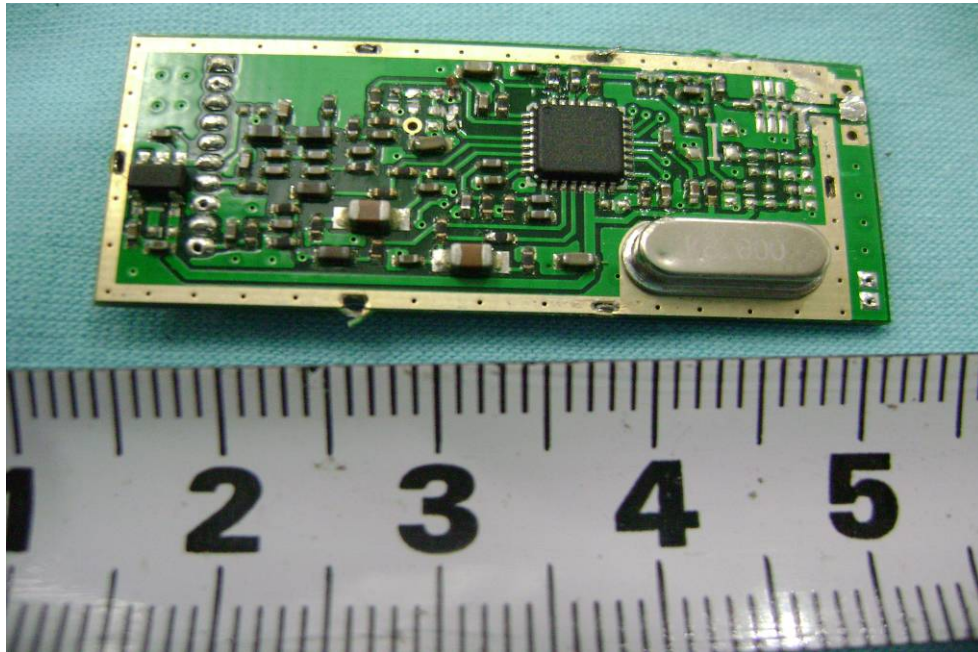
10.9 PCB3 - Front View



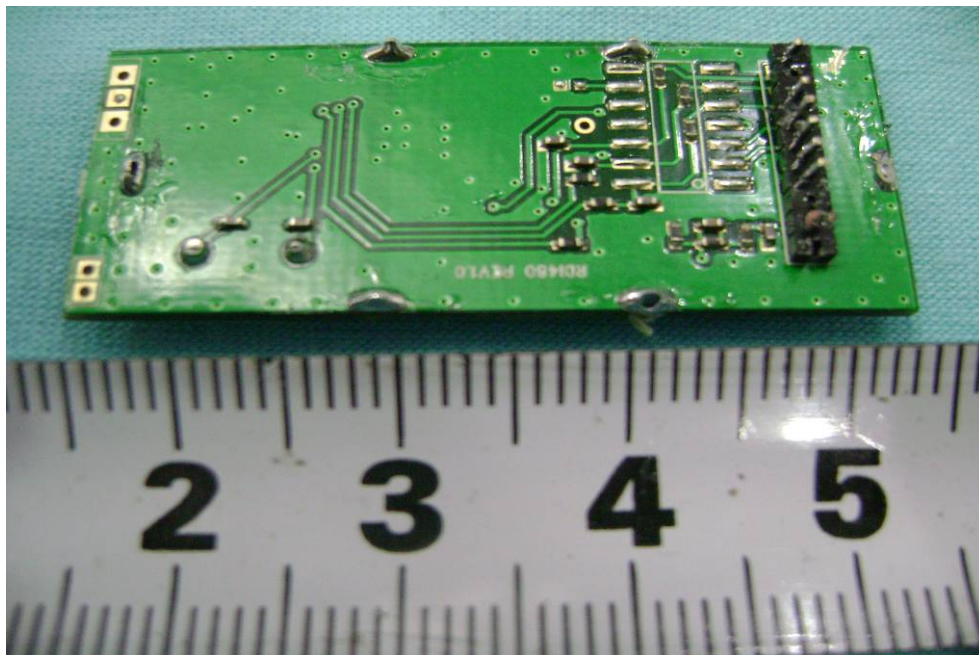
10.10 PCB3 - Back View



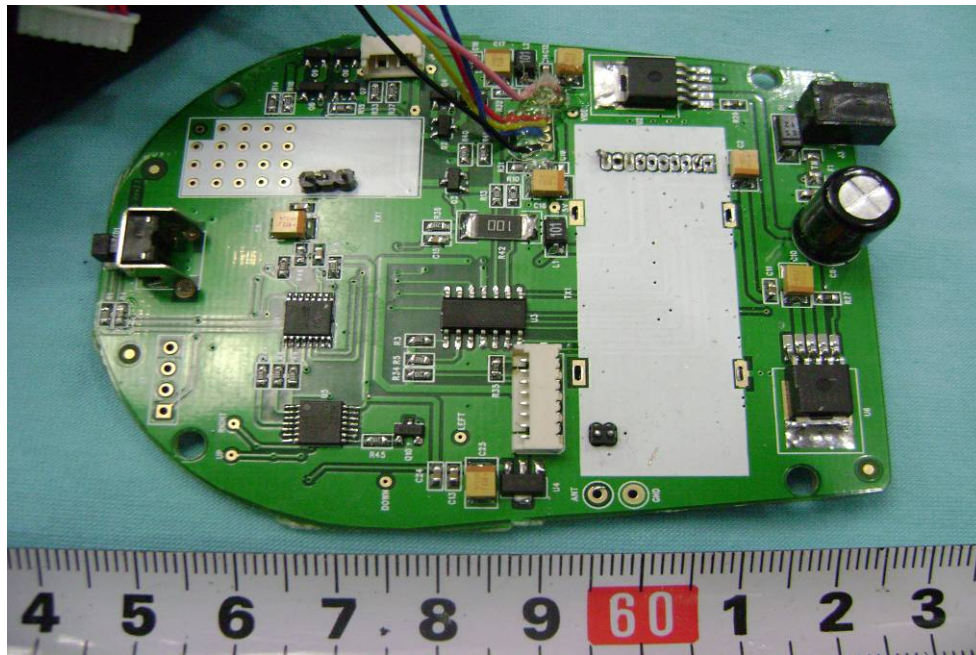
10.11 PCB4 - Front View



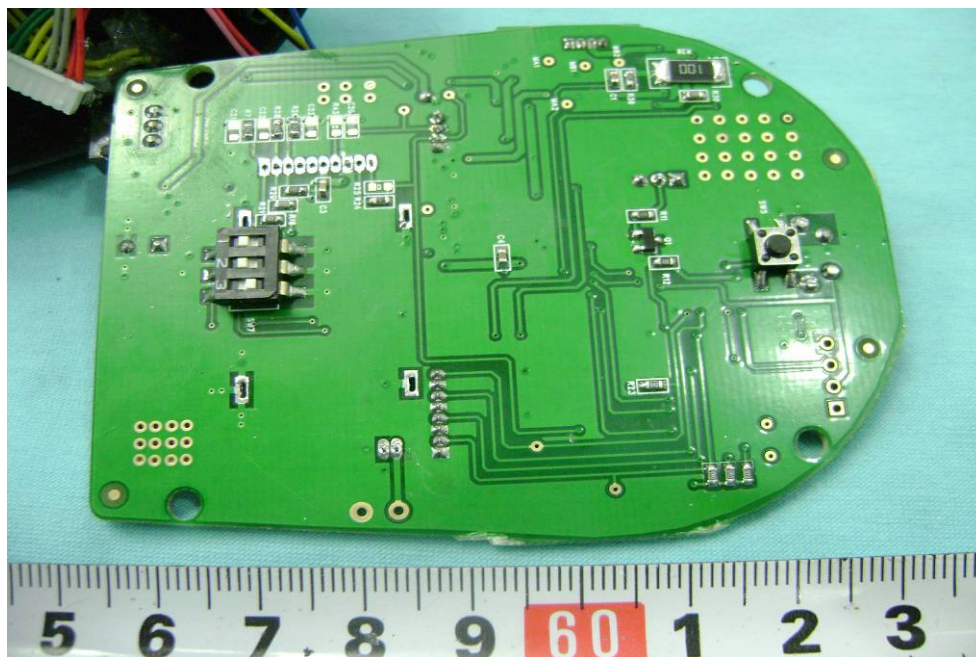
10.12 PCB4 - Back View



10.13 PCB5 - Front View



10.14 PCB5 - Back View



10.15 PCB6 - 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 Locatio

