

FCC TEST REPORT

FCC ID : UHVNP700W

Applicant : **N&P CAR AUDIO SYSTEM CO., LTD.**

Room 2502, Caiwuwei Development Building, No. 3083, Baoan South Road,
Luohu District, Shenzhen, China

Equipment Under Test (EUT) :


Product description : Back-up Camera

Model No. : NP700W

Standards : FCC 15 Paragraph 15.249

Date of Test : January 29, 2007

Test Engineer : **Tiger Su**

Reviewed By : 

PERPARED BY:

Waltek Services (Shenzhen) Co., Ltd.

8C, West Tower, Aidi Building, No.5003 Binhe Rd, Futian District, Shenzhen518045,
Guangdong, China.

Tel: 86-755-83551033

Fax: 86-755-83552400

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	10
7 RADIATION EMISSION TEST	11
7.1 TEST EQUIPMENT	11
7.2 MEASUREMENT UNCERTAINTY	11
7.3 TEST PROCEDURE	11
7.4 RADIATED TEST SETUP	12
7.5 SPECTRUM ANALYZER SETUP	12
7.6 CORRECTED AMPLITUDE & MARGIN CALCULATION	13
7.7 SUMMARY OF TEST RESULTS	13
7.8 EUT OPERATING CONDITION	14
7.9 RADIATED EMISSIONS LIMIT	14
7.10 RADIATED EMISSIONS TEST RESULT	15
8 BAND EDGE	16
8.1 TEST EQUIPMENT	16
8.2 TEST PROCEDURE	16
8.3 BAND EDGE	16
8.4 BAND EDGE TEST RESULT	17
9 PHOTOGRAPHS OF TESTING	18
9.1 RADIATION EMISSION TEST VIEW FOR 30MHz-1000MHz	18
9.2 RADIATION EMISSION TEST VIEW FOR 1GHz-25GHz	18
10 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS	19
10.1 EUT - FRONT VIEW	19
10.2 EUT - BACK VIEW	19
10.3 PCB1 - FRONT VIEW	20
10.4 PCB1 - BACK VIEW	20

10.5 PCB2 - FRONT VIEW21

10.6 PCB2 - BACK VIEW21

11 FCC ID LABEL22

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	N/A

4 General Information

4.1 Client Information

Applicant:	N&P CAR AUDIO SYSTEM CO., LTD.
Address of Applicant:	Room 2502, Caiwuwei Development Building, No. 3083, Baoan South Road, Luohu District, Shenzhen, China
Manufacturer:	N&P CAR AUDIO SYSTEM CO., LTD.
Address:	Room 2502, Caiwuwei Development Building, No. 3083, Baoan South Road, Luohu District, Shenzhen, China

4.2 General Description of E.U.T.

Product description:	Back-up Camera
Model No.:	NP700W

4.3 Details of E.U.T.

Power Supply:	DC 12V
---------------	--------

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 Back-up 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.: 97379**

Shenzhen Academy Of Metrology and Quality Inspection 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 97379, April 20, 2006.

4.7 Test Location

All Emissions tests were performed at:-

Bldg,of Metrology and Quality Inspection ,Longzhu Road ,Nanshan
District ,Shenzhen ,Guangdong ,China

5 Equipment Used during Test

Conducted Emission Test						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due date
1	CE Variac	GZ Debao Factory	TS/DGC ₂ -5	N/A	N/A	N/A
2	LISN	SCHAFFNER CHASE	MNZ050D 11	100002	18-11-2006	17-11-2007
3	Shielding Room	Frankonia	12 x 4 x 4 m ³	N/A	N/A	N/A
4	EMI Receiver	ROHDE & SCHWARZ	ESCS30	830245/009	18-11-2006	17-11-2007
5	Coaxial Cable	SMQ	2m	N/A	18-11-2006	17-11-2007
Radiated Emission Test						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due date
1	3m Semi- Anechoic Chamber	Albatross Projects	9X6X6	N/A	18-11-2006	17-11-2007
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	830245/009	18-11-2006	17-11-2007
3	EMI Test Software	ROHDE & SCHWARZ	ES-K1	N/A	N/A	N/A
4	Coaxial cable	SMQ	N/A	N/A	18-11-2006	17-11-2007
5	Bilog Antenna	Chase	CBL6112B	2591	18-11-2006	17-11-2007
6	Horn Antenna	ROHDE & SCHWARZ	HF906	100014	18-11-2006	17-11-2007
Common Used Equipment						
Item	Test Equipment	Manufacturer	Model No.	Series No.	Cal. Date	Due date
1	Temperature, Humidity & Barometer	OREGON SCIENTIFIC	BA-888	EMC0001 to EMC0004	11-11-2006	10-11-2007
2	DMM	FLUKE	73	70681569 or 70671122	11-11-2006	10-11-2007

6 Conducted Emission Test

Product Name:	Back-up Camera
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:
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

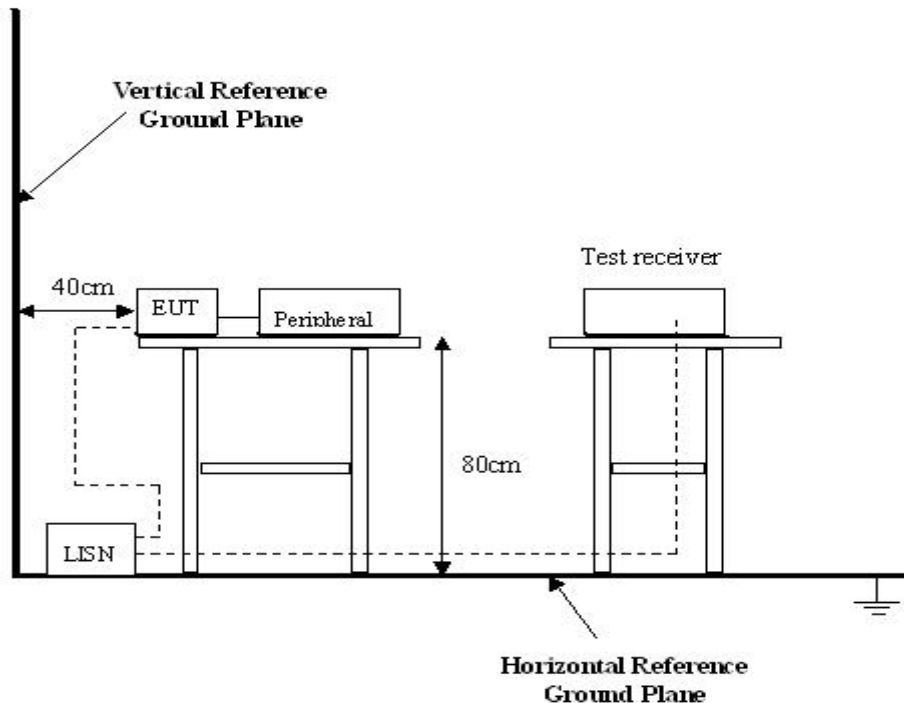
Please refer to Section 5 this report.

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

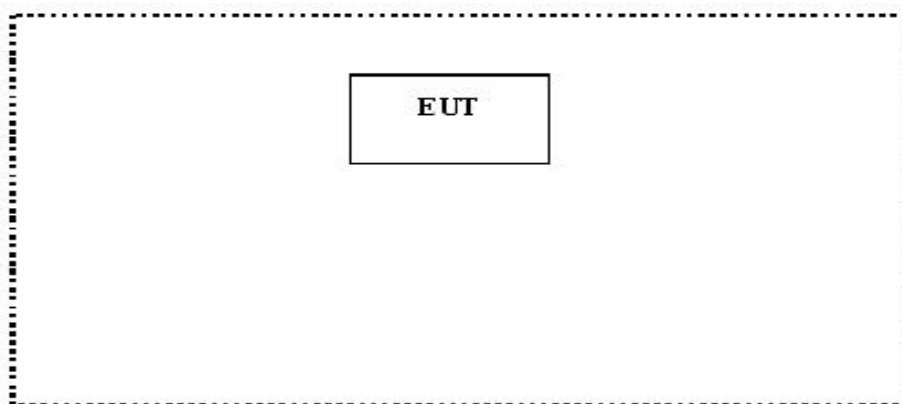
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 EUT Operating Condition

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

- Setup the EUT and simulators as shown on follow.
- Enable RF signal and confirm EUT active.
- 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

Owing to the DC operation of EUT, this test is not performed.

7 Radiation Emission Test

Product Name:	Back-up Camera
Test Requirement:	FCC Part15 Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.31 and Paragraph 15.33
Test Date:	January 29, 2007
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.

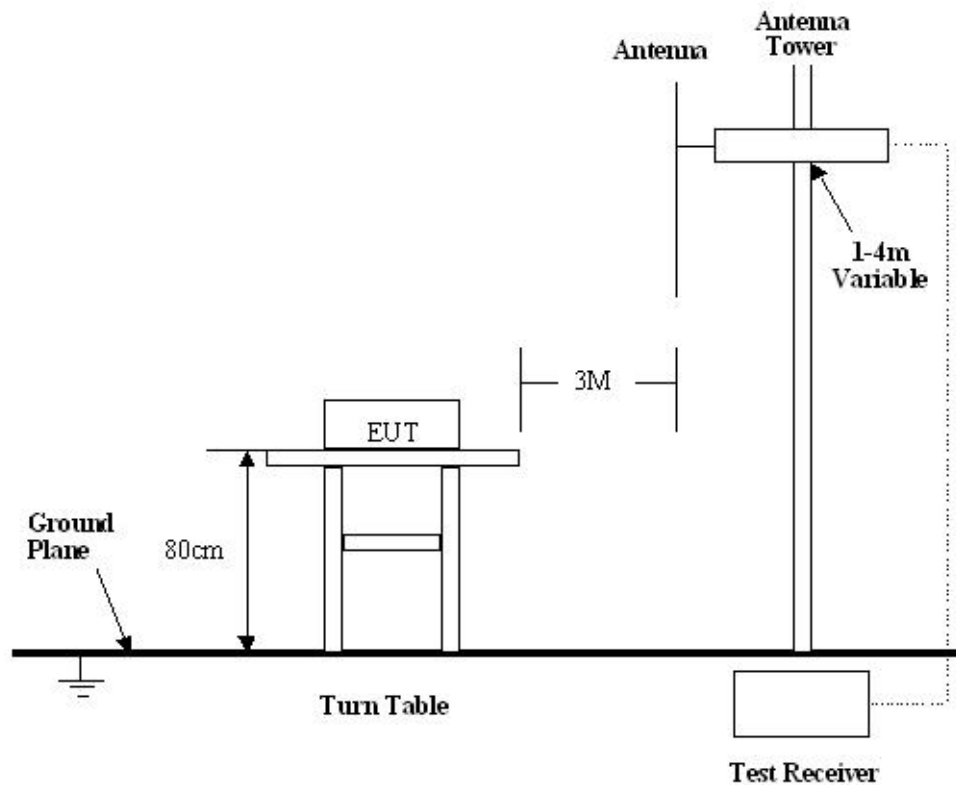
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at SMQ EMC Lab is +4.0 dB.

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 -7dBμV means the emission is 7dBμV 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) $\text{RF Voltage(dBuV)} = 20 \log \text{RF Voltage(uV)}$
 - (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) $\text{RF Voltage(dBuV)} = 20 \log \text{RF Voltage(uV)}$
 - (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 pressetor 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 12V

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 (°)
2432.00		Vertical	62.13	94.00	31.87	1.5	90
2432.00		Horizontal	61.39	94.00	32.61	1.5	120
4864.00	AV	Vertical	48.47	54.00	5.53	1.5	45
7296.00	AV	Vertical	48.32	54.00	5.68	1.5	90
9728.00	AV	Vertical	48.33	54.00	5.67	1.5	90
4864.00	AV	Horizontal	48.74	54.00	5.26	1.5	180
7296.00	AV	Horizontal	48.59	54.00	5.41	1.5	45
9728.00	AV	Horizontal	48.34	54.00	5.66	1.5	45
4684.00	PK	Vertical	55.76	74.00	18.24	1.5	120
7296.00	PK	Vertical	55.66	74.00	18.34	1.5	120
9728.00	PK	Vertical	55.38	74.00	18.62	1.5	90
4684.00	PK	Horizontal	55.23	74.00	18.77	1.5	45
7296.00	PK	Horizontal	55.11	74.00	18.89	1.5	90
9728.00	PK	Horizontal	55.13	74.00	18.87	1.5	180

Note: Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 94dBuV/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

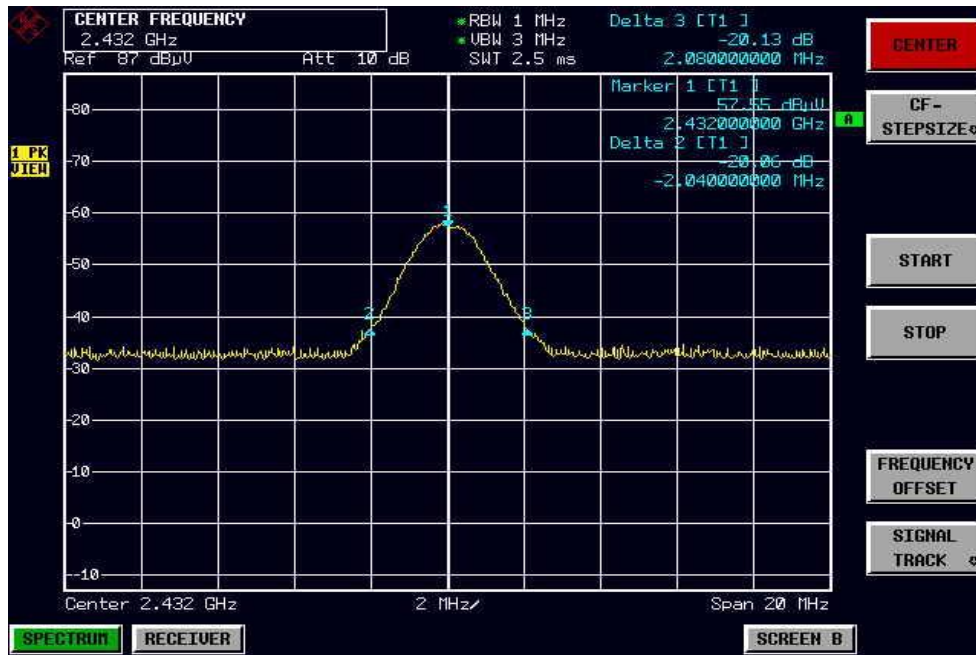
1. The EUT, peripherals were put on the turntable which table size is 1mX1.5m, table high 0.8m. All set up is according to ANSI C63.4: 2003.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 1MHz RBW and 3MHz VBW. The 20dB bandwidth is defined as the total spectrum the 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

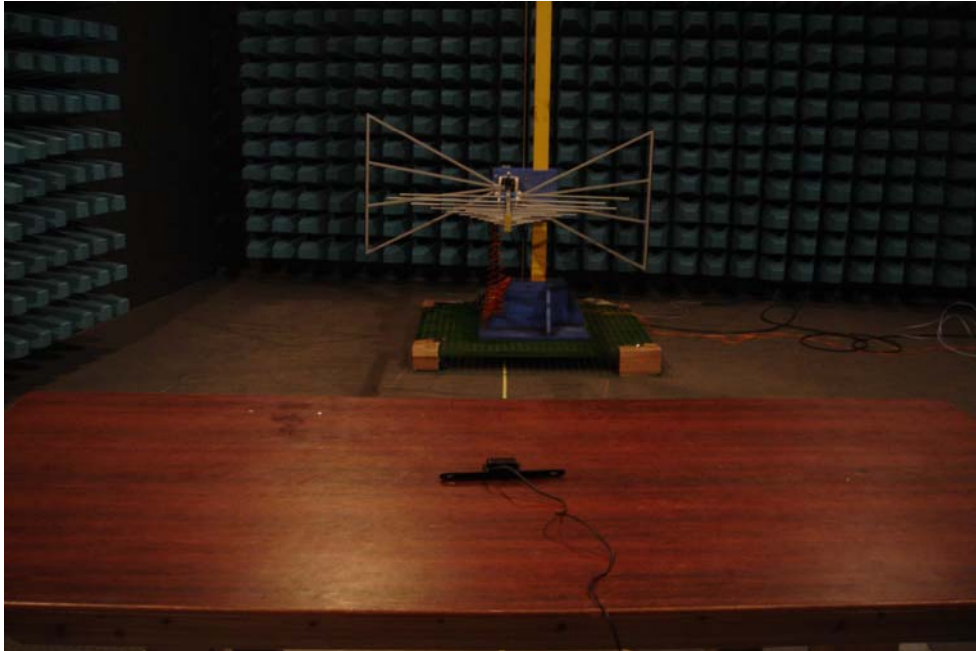
Product Name: Back-up Camera
Test Item: Band Edge Test
Test Voltage: DC 12V
Test Mode: TX On
Temperature: 24 °C
Humidity: 52%RH



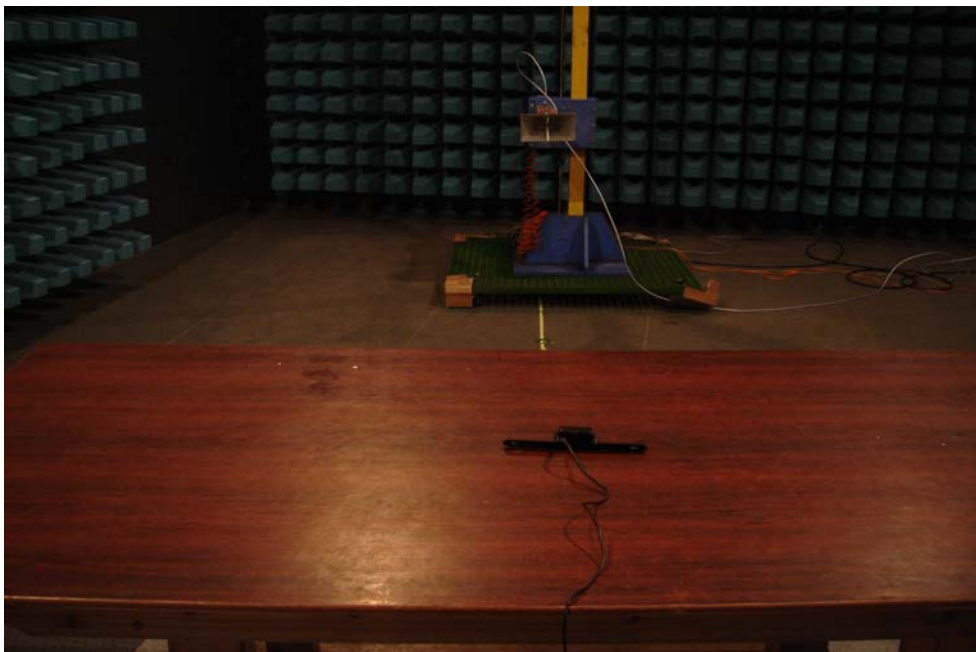
- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.249.
 - (2) This device does meet the FCC requirement.

9 Photographs of Testing

9.1 Radiation Emission Test View For 30MHz-1000MHz



9.2 Radiation Emission Test View For 1GHz-25GHz



10 Photographs - Constructional Details

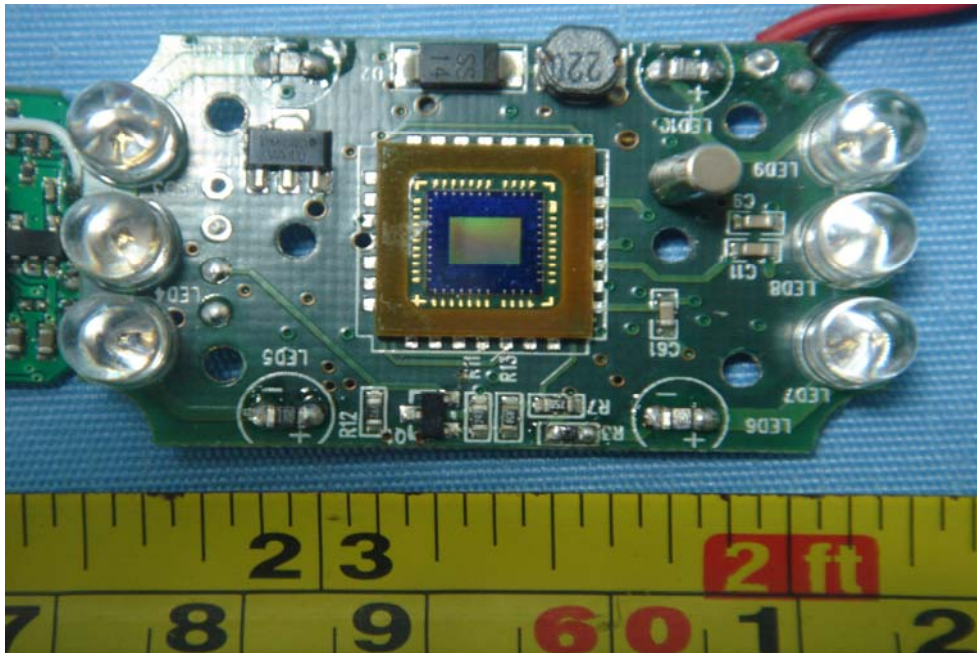
10.1 EUT - Front View



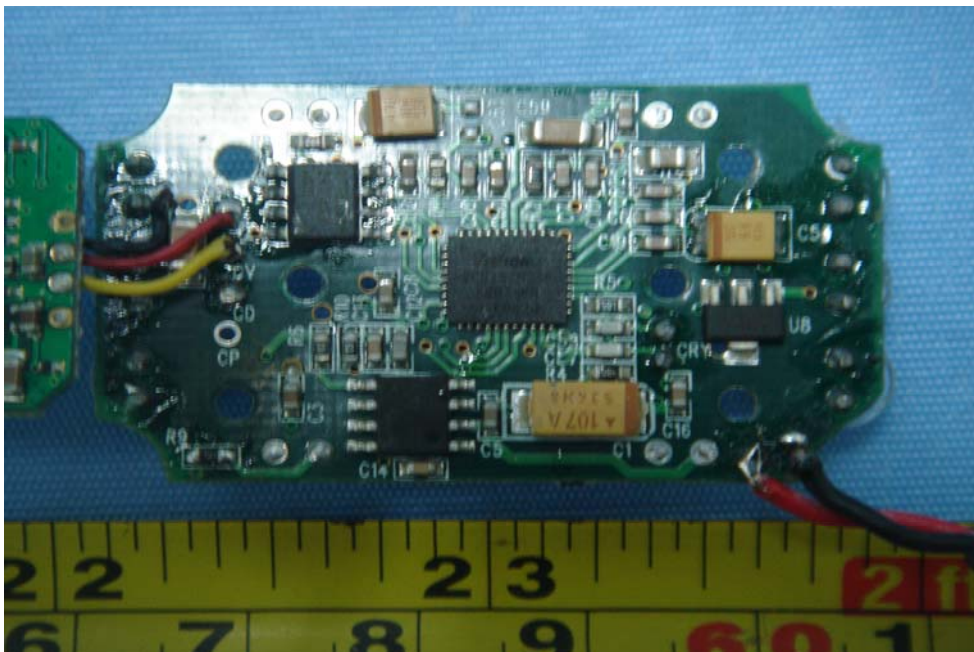
10.2 EUT - Back View



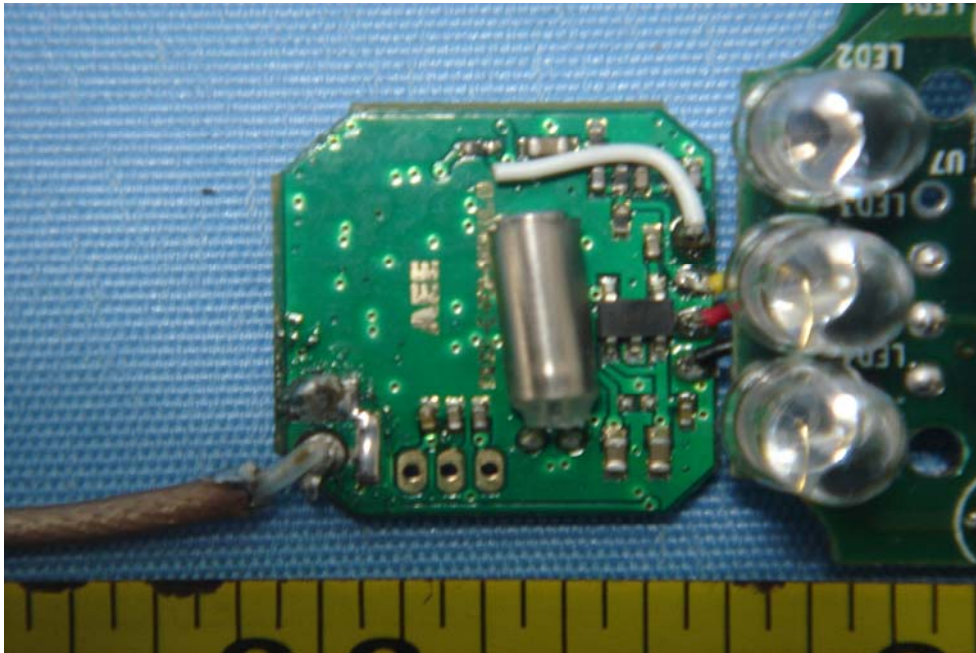
10.3 PCB1 - Front View



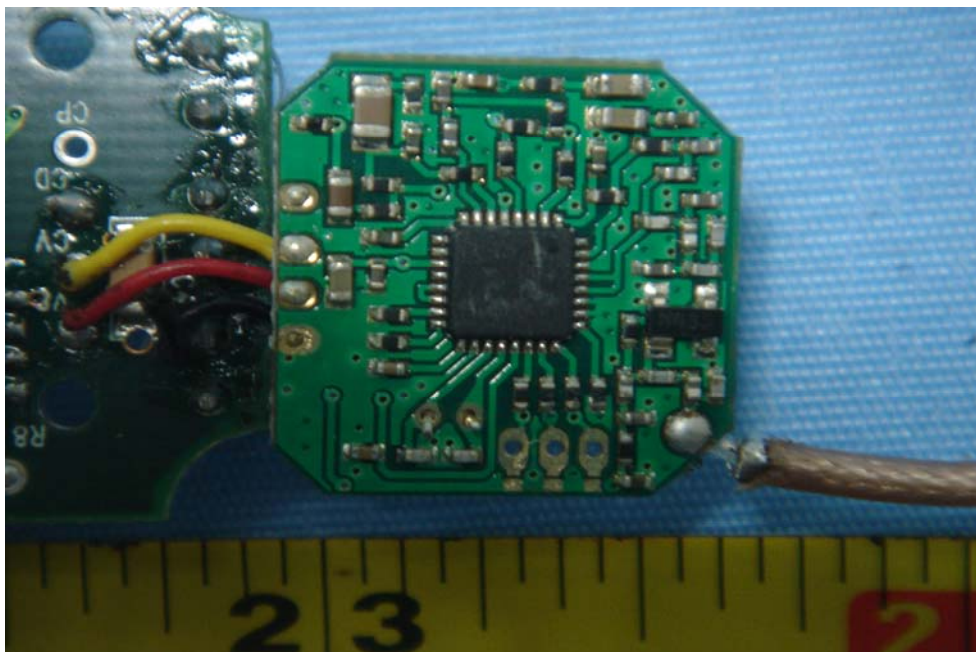
10.4 PCB1 - Back View



10.5 PCB2 - Front View



10.6 PCB2 - 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

