Ke Mei Ou Laboratory Co., Ltd.

7A, Jiaxiangge, Jiahuixincheng, No.3027, Shennan Rd., Futian,
Shenzhen, Guangdong, P.R.China. Zip Code: 518033
Tel: + 86 755 83642690 Fax: + 86 755 83297077
www.kmolab.com

Ke Mei Ou Lab Corp.
FEDERAL COMMUNICATIONS COMMISSION
Registration Number: 125782

FCC TEST REPORT

Under
FCC 15 Subpart C, Paragraph 15.239

Prepared For :

GUANGZHOU GRGLAMKO MOLD MANUFACTURING CO., LTD.

680 XiaGang Street, Guangzhou Economic & Technological Development District, P.R.China

FCC ID: RWNCZ100
EUT: HandFree Car Kit
Model: CZ-100

Mach 15, 2004

Report Type: Original Report
Test Engineer: Peter Lin
Test Date: February 29, 2004
Review By: Apollo Liu / Manager

The test report consists 23 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Ke Mei Ou Laboratory Corporation. The test result in the report only applied to the tested sample.

TABLE OF CONTENTS

1. General Information 3
1. 1 Notes 3
1. 2 Testing Laboratory 3
1. 3 Details of Applicant 3
1. 4 Application Details 3
1. 5 Test Item 3
1. 6 Test Standards 4
2. Technical Test 5
2. 1 Summary of Test Results 5
3. EUT Modifications 6
4. Conducted Power Line Test 7
4. 1 Test Equipment 7
4. 2 Test Procedure 7
4. 3 Test Setup 7
4. 4 Configuration of The EUT 8
4. 5 EUT Operating Condition 9
4. 6 Conducted Power Line Emission Limits 9
4. 7 Conducted Power Line Test Result 10
5. Radiated Emission Test 11
5. 1 Test Equipment 11
5. 2 Test Procedure 11
5. 3 Radiated Test Setup 11
5. 4 Configuration of The EUT 12
5. 5 EUT Operating Condition 12
5. 6 Radiated Emission Limit 12
5. 7 Radiated Emission Test Result 13
6. Band Edge 15
6. 1 Test Equipment 15
6. 2 Test Procedure 15
6. 3 Radiated Test Setup 15
6. 4 Configuration of The EUT 16
6. 5 EUT Operating Condition 16
6. 6 Band Edge FCC 15.239 Limit 16
6. 7 Band Edge Test Result 16
7. Photos of Testing 18
7. 1 EUT Test Photographs 18
7. 2 EUT Detailed Photographs 19
8. FCC ID Label 22
9. Test Equipment 23

1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

Ke Mei Ou Laboratory Co., Ltd.

7A, Jiaxiangge, Jiahuixincheng, No.3027, Shennan Rd., Futian, Shenzhen, Guangdong, P.R.China.

Tel: +86 755 83642690 Fax: +86 755 83297077

Email: kmo@kmolab.com

Internet: www.kmolab.com

1. 3 Details of Applicant

Name	**: GUANGZHOU GRGLAMKO MOLD MANUFACTURING CO., LTD.**
Address	**: 680 XiaGang Street, Guangzhou Economic & Technological Development District, P.R.China**
Contact	**: Jiawen Zhang / Engineer**
Tel	**: + 86 20 82210879**
Fax	**: + 86 20 82221480**

1. 4 Application Details

Date of Receipt of Application	: February 6, 2004
Date of Receipt of Test Item	: February 26, 2004
Date of Test	: February 29, 2004

1. 5 Test Item

Manufacturer	: See Applicant
Model No.	: CZ-100
Description	: HandFree Car Kit

Additional Information

Frequency	: 88.7~107.9MHz
Transmission Range	: 3 meters
Number of Channels	: 3
Power Supply	: DC 9~24V / 80mA
Extreme Temp. Tolerance	: N/A

1. 6 Test Standards

FCC 15 Subpart C, Paragraph 15.239

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2. 1 Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.207	Conducted Test	N/A	Owing to the DC operation of EUT, this test item is not performed.
FCC Part 15 Subpart C Paragraph 15.239 Limit	Field Strength of Fundamental	PASS	Minimum passing margin is -13.36 / -2.16 dB at 107.896 MHz Horizontal
FCC Part 15, Subpart C Paragraph 15.239 Limit & Paragraph 15.209	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is –4.2 dB at 81.000 MHz Horizontal
FCC Part 15 Subpart C Paragraph 15.239 Limit	Measured Bandwidth	PASS	Complies.

3. EUT Modifications

No modification by Ke Mei Ou Laboratory Co., Ltd.

4. Conducted Power Line Test

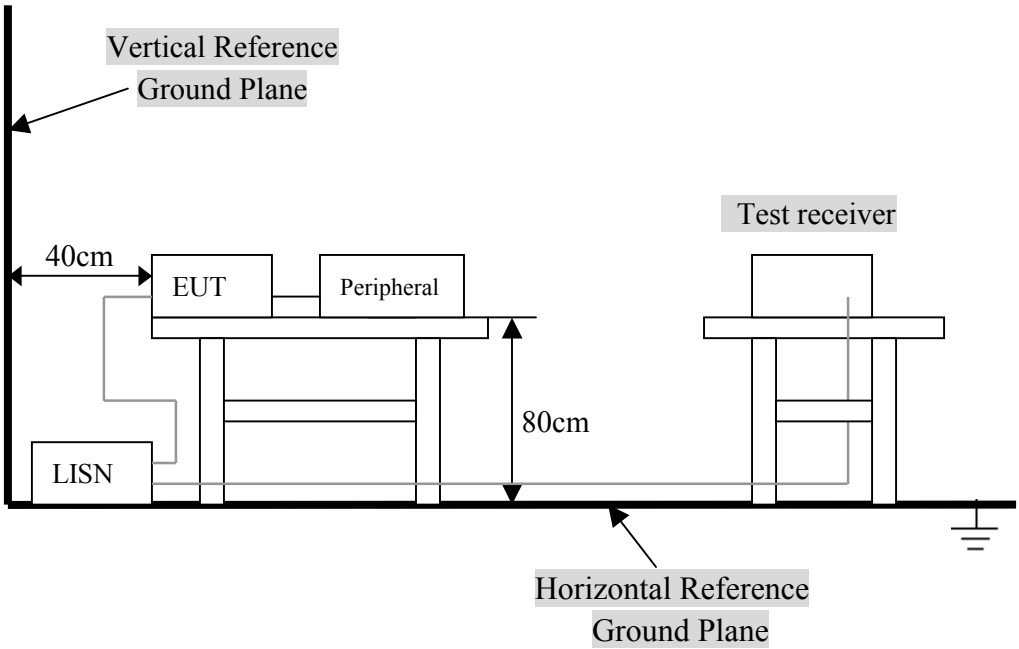
4. 1 Test Equipment

Please refer to Section 9 this report.

4. 2 Test Procedure

The EUT was tested according to ANSI C63.4 - 2001. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by section 5.1 of ANSI C63.4 - 2001. cables and peripherals were moved to find the maximum emission levels for each frequency.

4. 3 Test Setup



For the actual test configuration, Please refer to the related items– Photos of Testing.

4. 4 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2001. EUT is the transmitter part of a FM transmitter. According to the specifications of the manufacturer, The EUT has been tested as an independent unit together with other necessary accessories or support units.
Three channels were provided to this EUT.

Channel	Frequency (MHz)
1	88.7
2	106.5
3	107.9

Note: The channel 1, 2, 3 were pre-tested, The channel 3, worst case one, was chosen for radiated emission test.

The following support units or accessories were used to form a representative test configuration during the tests.

A. EUT

Device	Manufacturer	Model #	FCC ID
HandFree Car Kit	GUANGZHOU GRGLAMKO MOLD MANUFACTURERING CO., LTD.	CZ-100	RWNCZ100

B. Internal Devices

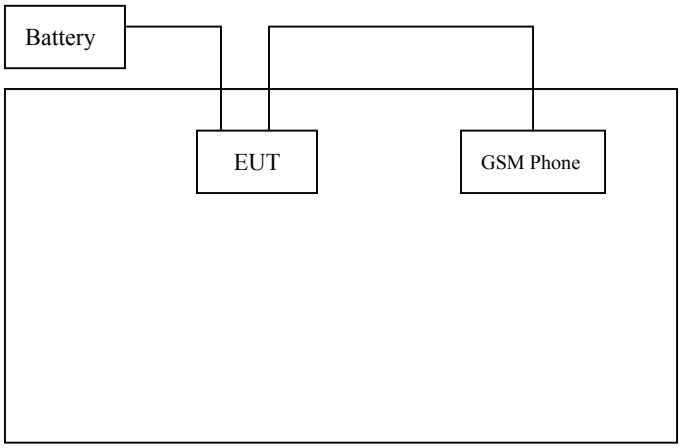
Device	Manufacturer	Model #	FCCID / DoC
N/A			

C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
GSM Phone	Samsung	SGH-T408	N/A	N/A

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2001.
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.



4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency Range (MHz)	**Class A QP/AV**	**Class B QP/AV**
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

NOTE ：In the above table, the tighter limit applies at the band edges.

4. 7 Conducted Power Line Test Result

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

5. Radiated Emission Test

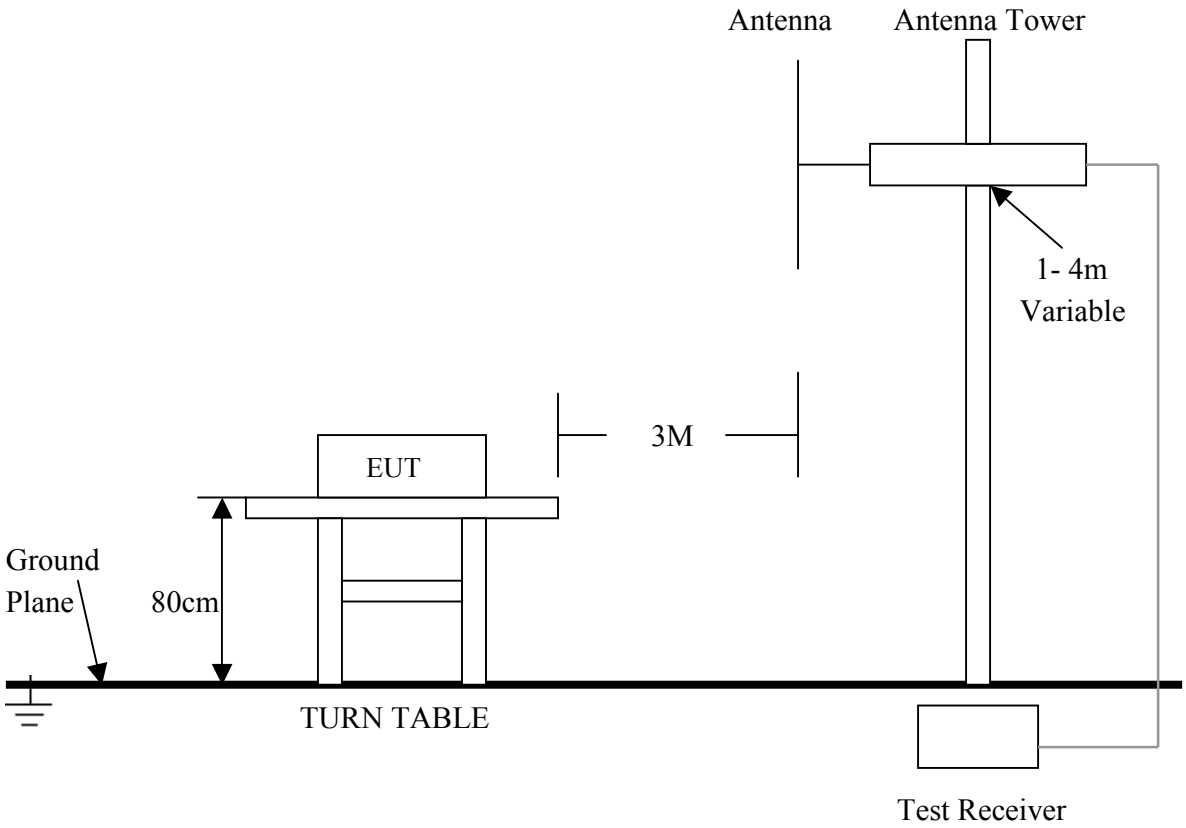
5. 1 Test Equipment

Please refer to Section 9 this report.

5. 2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2001. The radiated test was performed at Ke Mei Ou Laboratory. This site is on file with the FCC laboratory division, Registration No. 125782.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2001.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. 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 of specification limit), and are distinguished with a " **QP**" in the data table.
6. The antenna polarization : Vertical polarization and Horizontal polarization.

5. 3 Radiated Test Setup



For the actual test configuration , please refer to the related items– Photos of Testing.

5. 4 Configuration of The EUT

Same as section 4 . 4 of this report

5. 5 EUT Operating Condition

Same as section 4 . 5 of this report.

5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below ：

A. FCC Part 15 Subpart C Paragraph 15.239 Limit

According to 15.239 the field strength of emission from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)	
	Peak (dBuV/m)	Average (dBuV/m)
88 to 108	67.96	47.96

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

Frequency (MHz)	Distance (m)	Field Strength (microvolts/m)
0.009 - 0.490	300	2400/F(kHz)
0.490 - 1.705	30	24000/F(kHz)
1.705 – 30.0	30	30
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
ABOVE 960	3	500

Note: As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

5. 7 Radiated Emission Test Result

A. Fundamental Radiated Emission Data

Product	: HandFree Car Kit	Test Mode	: Channel 1
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Freq. (MHz)	Emission PK/AV (dBuV/m)	HORIZ / VERT	Limits PK/AV (dBuV/m)	Margin (dB)
88.758	43.6 / 38.6	HORIZ	67.96 / 47.96	-24.36 / -9.36
88.758	42.3 / 36.9	VERT	67.96 / 47.96	-25.66 / -11.06

Note: (1) PK= Peak, AV=Average.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.

Product	: HandFree Car Kit	Test Mode	: Channel 2
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Freq. (MHz)	Emission PK/AV (dBuV/m)	HORIZ / VERT	Limits PK/AV (dBuV/m)	Margin (dB)
106.51	44.5 / 40.1	HORIZ	67.96 / 47.96	-23.46 / -7.86
106.51	43.7 / 37.6	VERT	67.96 / 47.96	-24.26 / -10.36

Note: (1) PK= Peak, AV=Average.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.

Product	: HandFree Car Kit	Test Mode	: Channel 3
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Freq. (MHz)	Emission PK/AV (dBuV/m)	HORIZ / VERT	Limits PK/AV (dBuV/m)	Margin (dB)
107.896	54.6 / 45.8	HORIZ	67.96 / 47.96	-13.36 / -2.16
107.896	53.4 / 44.9	VERT	67.96 / 47.96	-15.56 / -3.06

Note: (1) PK= Peak, AV=Average.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.

B. General Radiated Emission Data & Harmonics Radiated Emission Data

Product	: HandFree Car Kit	Test Mode	: Channel 3
Test Item	: General Radiated Emission Data & Harmonics Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
54.000	33.3	HORIZ	40.0	-6.7
54.000	32.5	VERT	40.0	-7.5
81.100	35.8	HORIZ	40.0	-4.2
81.100	33.8	VERT	40.0	-6.2
215.960	28.6	HORIZ	43.5	-14.9
215.960	27.2	VERT	43.5	-16.3
323.900	23.1	HORIZ	46.0	-22.9
323.900	22.6	VERT	46.0	-23.4
431.896	25.0	HORZ	46.0	-21.0
431.896	24.3	VERT	46.0	-21.7
540.010	29.1	HORIZ	46.0	-16.9
540.010	28.6	VERT	46.0	-17.4

Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.

6. Band Edge

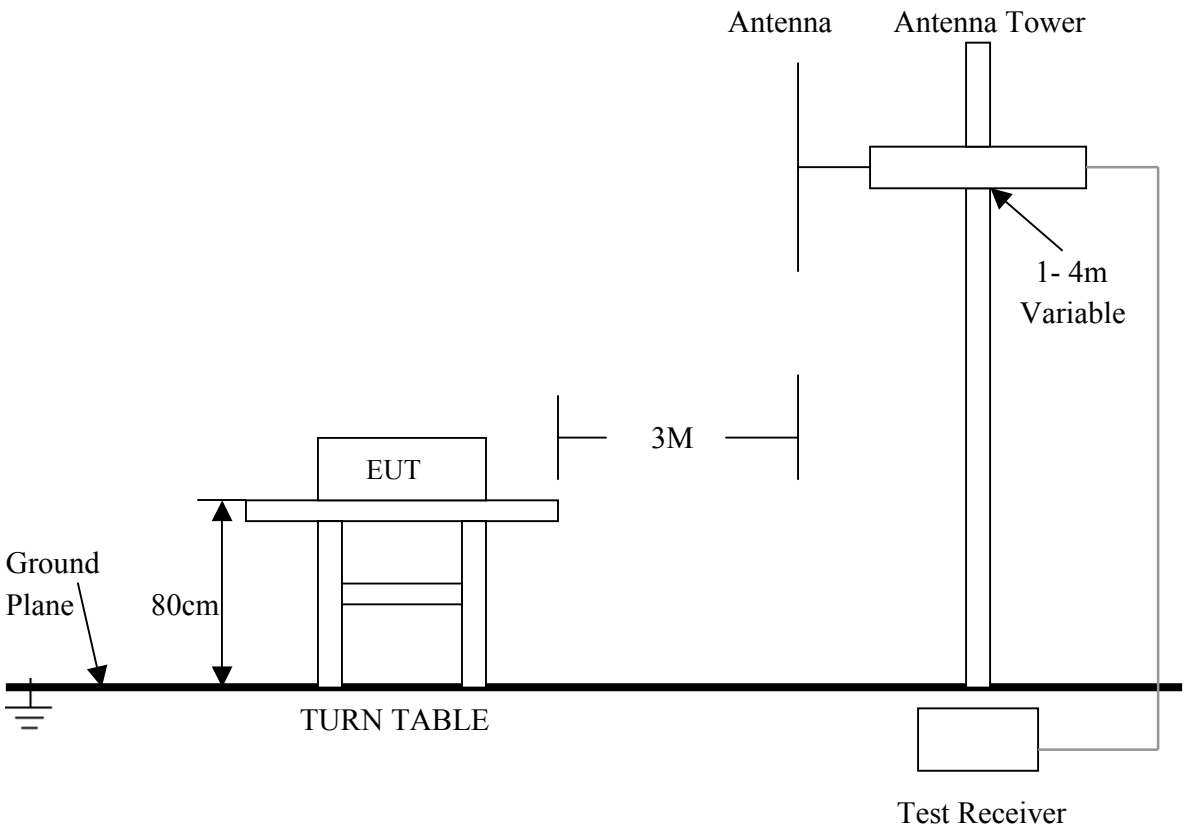
6. 1 Test Equipment

Please refer to Section 9 this report.

6. 2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2001. The radiated test was performed at Ke Mei Ou Laboratory. This site is on file with the FCC laboratory division, Registration No. 125782.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2001.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high were varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement. The bandwidth below 30MHz setting on the field strength meter is 10 kHz, above 1GHz are 1 MHz.
6. Maximizing procedure was performed on the highest emissions to ensure EUT compliance is with all installation combinations. 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 of specification limit), and are distinguished with a "**QP**" in the data table.
7. The antenna polarization ： Vertical polarization and horizontal polarization.

6. 3 Radiated Test Setup



For the actual test configuration , please refer to the related items– Photos of Testing

6. 4 Configuration of The EUT

Same as section 4 . 4 of this report

6. 5 EUT Operating Condition

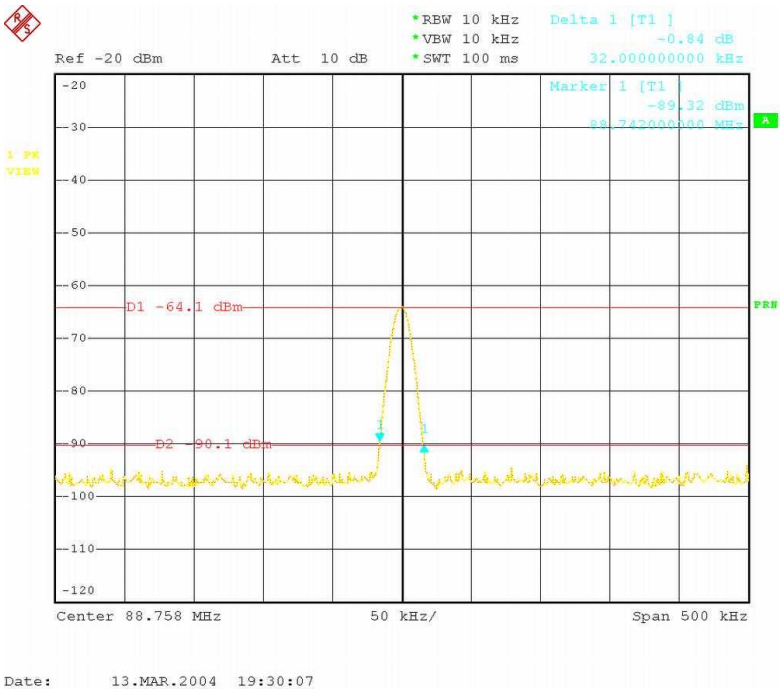
Same as section 4 . 5 of this report.

6. 6 Band Edge FCC 15.239 Limit

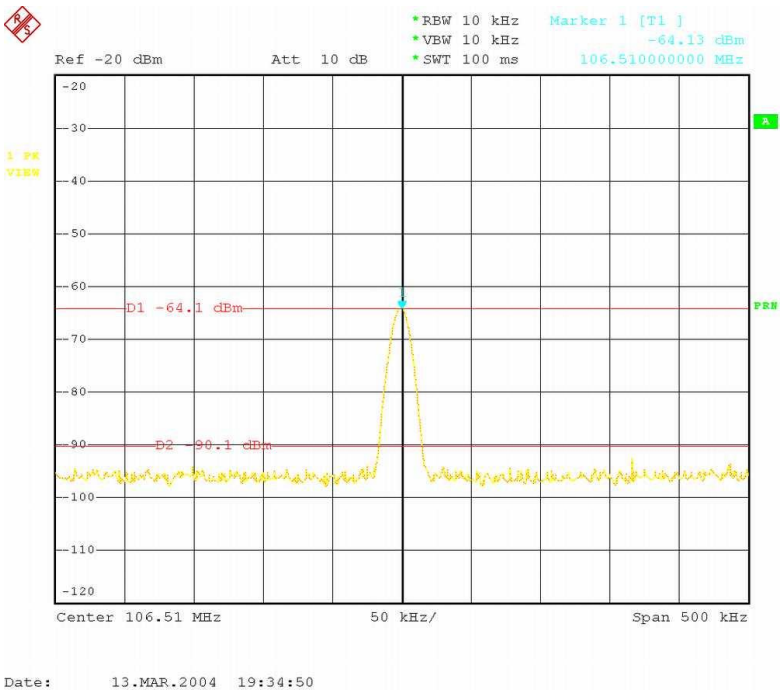
Emission from the intentional radiator shall be confined within a bands 200kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88 to 108 MHz.

6. 7 Band Edge Test Result

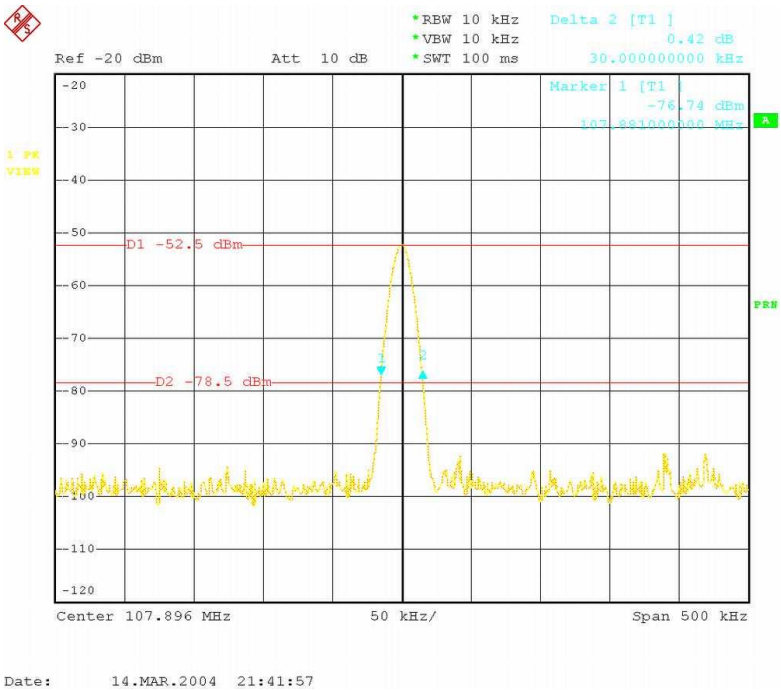
Product	: HandFree Car Kit	Test Mode	: Channel 1
Test Item	: Band Edge Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		



Product	: HandFree Car Kit	Test Mode	: Channel 2
Test Item	: Band Edge Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		



Product	: HandFree Car Kit	Test Mode	: Channel 3
Test Item	: Band Edge Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		



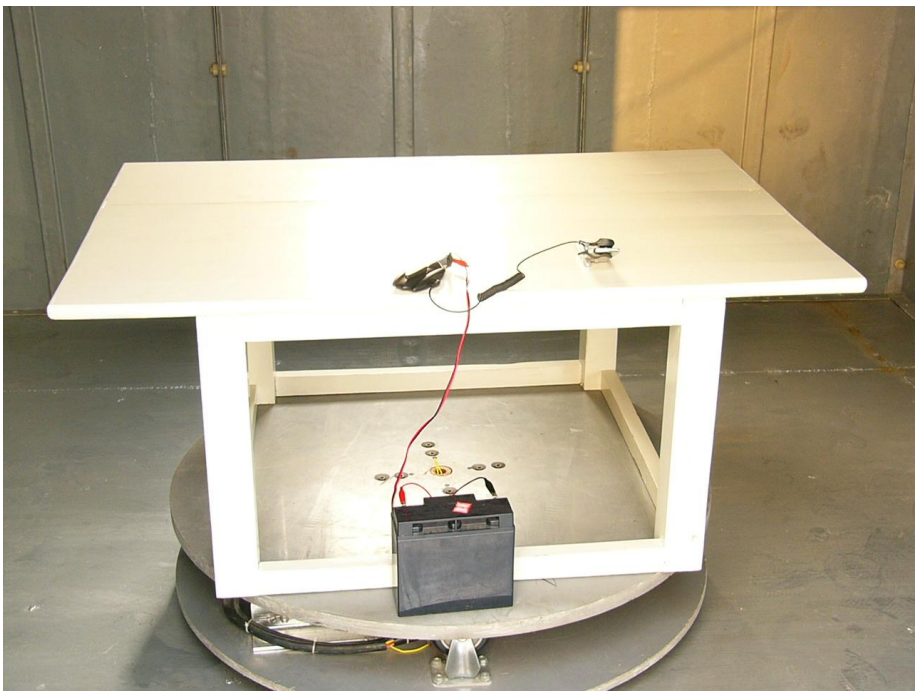
Note: (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

(2) The average measurement was not performed when the peak measured data under the limit of average detection.

7. Photos of Testing

7. 1 EUT Test Photographs

Radiated emission test view

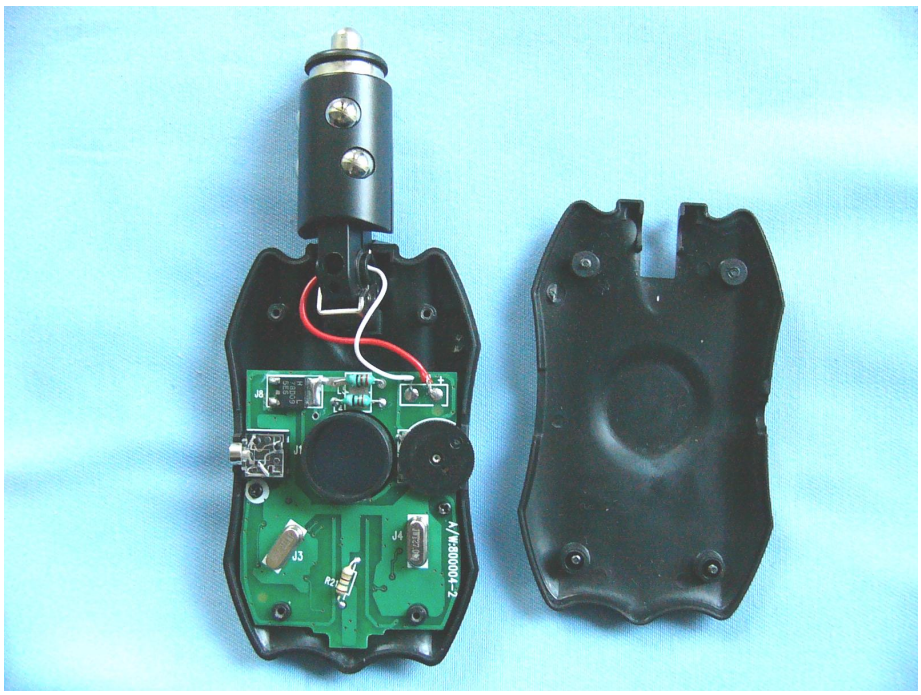


7. 2 EUT Detailed Photographs

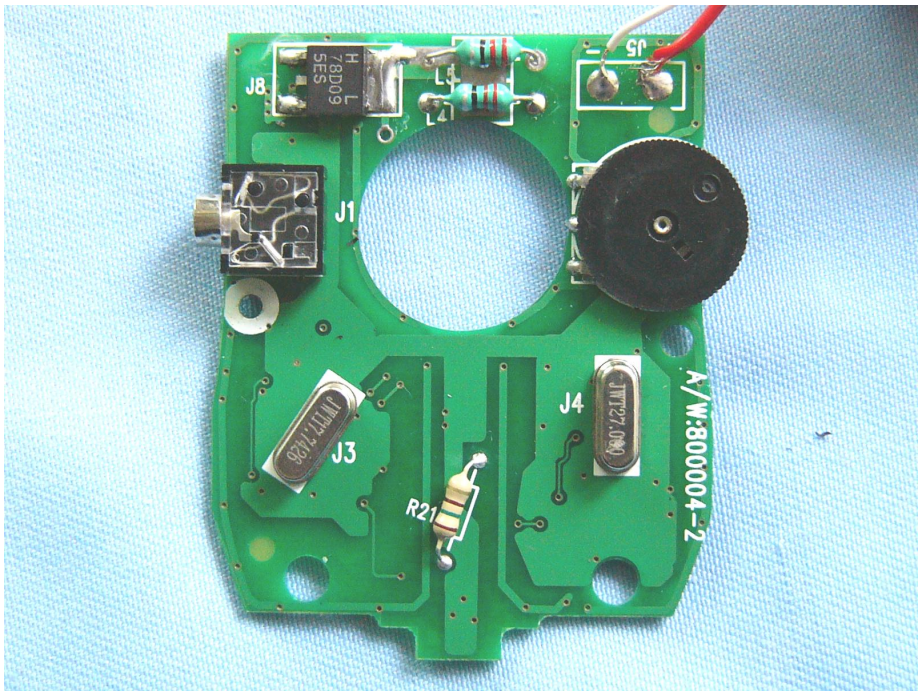
EUT top view

EUT bottom view

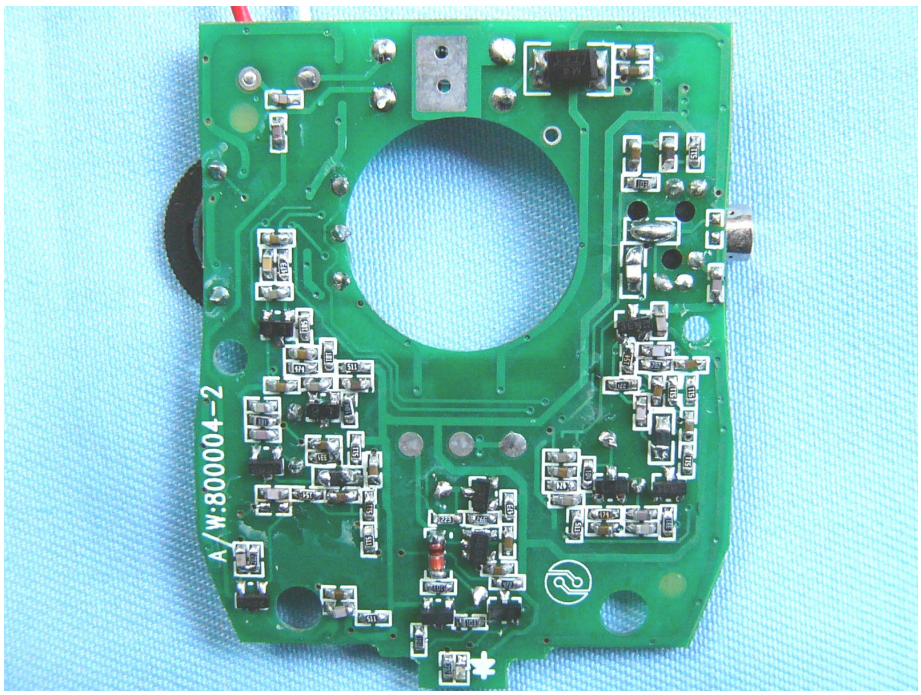
EUT inside whole view



Main board component side



Main board solder side



8. FCC ID Label

FCC ID: RWNCZ100

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 label. 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 ID Label Location

9. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Date of Cal.	Due Date
Turntable	KMO	KSZ001T	200306	NCR	NCR
Antenna Tower	KMO	KSZ002AT	200307	NCR	NCR
OATS	KMO	KSZSITE001	N/A	July 06, 2003	July 06, 2004
EMI Test Receiver	Rohde & Schwarz	ESPI3	100180	Oct.18, 2003	Oct.18, 2004
Signal Generator	Rohde & Schwarz	SMT03	100059	Feb.01, 2004	Feb.01, 2005
Bilog Antenna	Chase	CBL6111C	2576	Feb.01, 2004	Feb.01, 2005
Ultra Broadband Antenna	Rohde & Schwarz	HL 562	100110	June.05, 2003	June.05, 2004
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23,2003	Oct. 23, 2004
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23,2003	Oct. 23, 2004
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
KMO Shielded Room	KMO	KMO-001	N/A	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb. 27, 2004	Feb.27, 2005
AMN	Rohde & Schwarz	ESH3-Z5	100002	Feb. 01, 2004	Feb.01, 2005
LISN	Kyoritsu	KNW-407	8-1441-8	Feb. 23, 2004	Feb.23, 2005
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	Feb. 01, 2004	Feb.01, 2005
Bilog Antenna	Chase	CBL6112B	2591	Feb. 01, 2004	Feb.01, 2005
Horn Antenna	Rohde & Schwarz	HF906	100014	Feb. 01, 2004	Feb.01, 2005
3m Semi-Anechoic Chamber	Albatross Projects	9mX6mX6m	N/A	Feb. 01, 2004	Feb.01, 2005