

FCC Part 15 Subpart C
EMI TEST REPORT
of

E.U.T. : Wireless Handsfree

FCC ID. : QJGAROMA40H

MODEL : AROMA 40

Working Frequency : 49.844MHz

for

APPLICANT : YIH TAY TECH. CO., LTD

ADDRESS : 3F No.651-3 Chung Cheng Rd. Hsin Chuang,
Taipei 242 Taiwan.

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 8, LANE 29, WEN-MING RD.,
LO-SHAN TSUN, KUI-SHAN HSIANG,
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Report Number: ET91S-09-107-02

TEST REPORT CERTIFICATION

Applicant : YIH TAY TECH. CO., LTD
3F No.651-3 Chung Cheng Rd. Hsin Chuang, Taipei 242 Taiwan.

Manufacturer : SINOCA ENTERPRISES CO., LTD.
NO. 2, CHUNG HO RD., KEELUNG TAIWAN, R. O. C.

Description of EUT :

a) Type of EUT : Wireless Handsfree
b) Trade Name : AROMA
c) Model No. : AROMA 40
d) FCC ID : QJGAROMA40H
e) Working Frequency : 49.844MHz
f) Power Supply : DC 3.6V
Charger: DVE/DVR-0610-3508
I/P: 120V, 60Hz, 60mA
O/P: DC 6V, 100mA

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C (2001)

I HEREBY CERTIFY THAT; The data shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Issued Date : Sep. 25, 2002

Test Engineer : 

Approve & Authorized Signer :



Win-Po Tsai, Manager, NVLAP Signatory
EMC Dept. of ELECTRONICS
TESTING CENTER, TAIWAN

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	: Wireless Handsfree
b) Trade Name	: AROMA
c) Model No.	: AROMA 40
d) FCC ID	: QJGAROMA40H
e) Working Frequency	: 49.844MHz
f) Power Supply	: DC 3.6V
	Charger: DVE/DVR-0610-3508
	I/P: 120V, 60Hz, 60mA
	O/P: DC 6V, 100mA

1.2 Characteristics of Device:

Wireless hand free for cell phone, operate frequency 49.844 MHz.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in chapter 13 of ANSI C63.4.

The Wireless Handsfree(Handset) under test was operated in its normal operating mode for the purpose of the measurements.

The receiving antenna polarized horizontally was varied from 1 to 4 meters and the wooden turntable was rotated through 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer. And also, each emission was to be maximized by changing the orientation of the Wireless Handsfree(Handset) under test.

1.4 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.

This site has been accreditation as a FCC filing site.

2. DEFINITION AND LIMITS

2.1 Definition

Intentional radiator:

A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

Remark “***” : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.3 Limitation

(1) Conducted Emission Limits :

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

Frequency (MHz)	Emission (μ V)	Emission (dB μ V)
0.45 - 30.0	250	48.0

(2) Radiated Emission Limits :

According to 15.235 the field strength of emissions from intentional radiators operated under these frequency bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental	
	$\mu\text{V}/\text{meter}$	$\text{dB}\mu\text{V}/\text{meter}$
49.87-49.90	10000	80

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209, as following table:

Other Frequencies (MHz)	Field Strength of Fundamental	
	$\mu\text{V}/\text{meter}$	$\text{dB}\mu\text{V}/\text{meter}$
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

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.

(3) Antenna Requirement :

For intentional device, according to §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.

(4) Emissions Band Limits :

According to 15.235(b), the field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209, whichever permits the higher emission levels

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

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.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. RADIATED EMISSION MEASUREMENT

3.1 Applicable Standard

1. The field strength of any emission within this band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.
2. The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

3.2 Measurement Procedure

1. Setup the configuration per figure 1 for frequencies measured below 1 GHz respectively.
2. For emission frequencies measured below 1 GHz, it is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions.
3. For emission frequencies measured below 1GHz,set the spectrum analyzer on a 100kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.
7. Record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

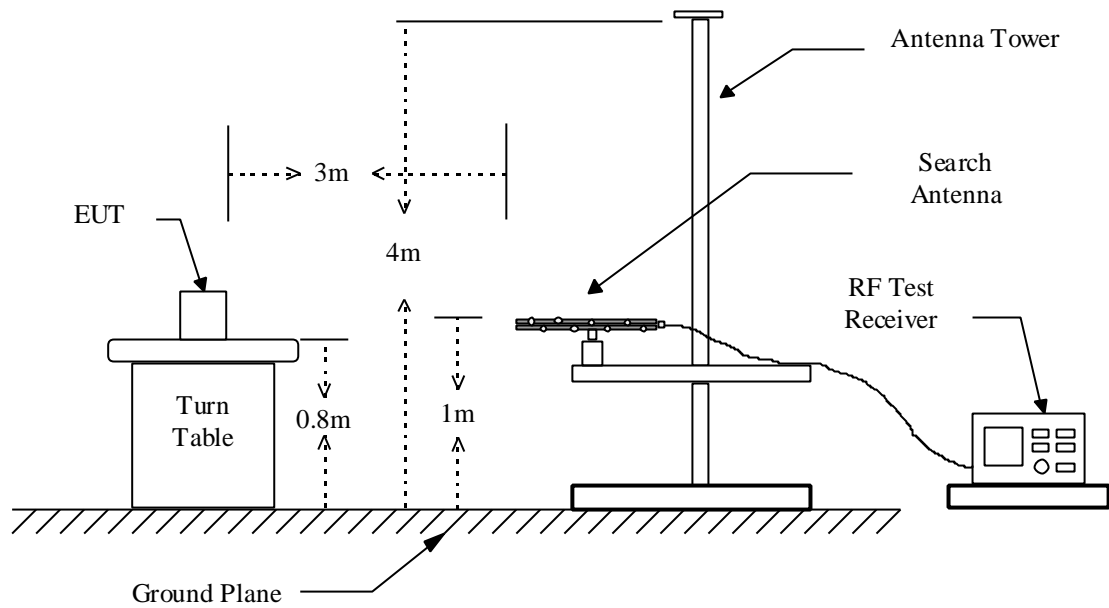
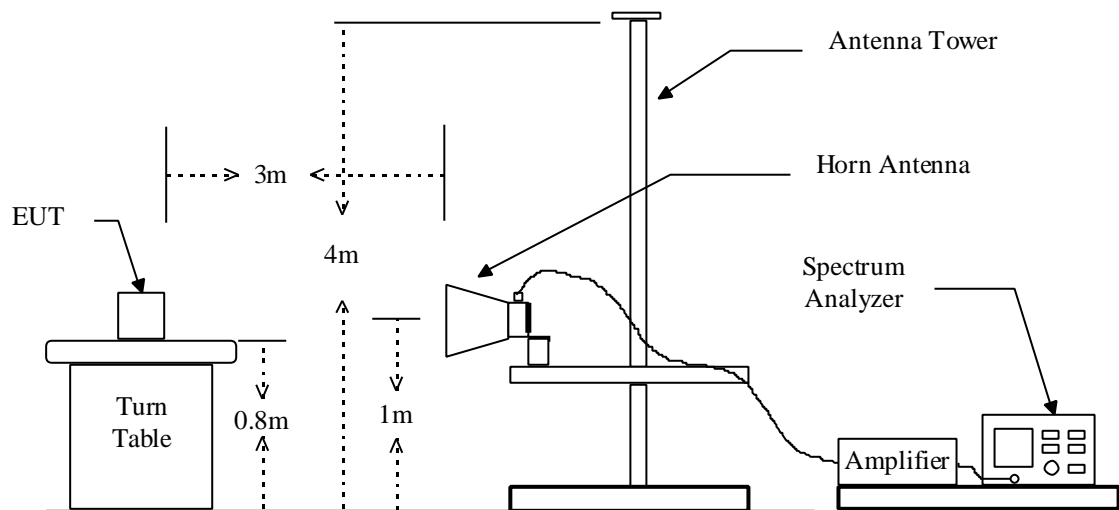


Figure 2 : Frequencies measured above 1 GHz configuration



3.3 Test Data

Operation Mode : TX/RX
 Temperature : 21
 Humidity : 60 %
 Test Date : Sep. 20, 2002

Frequency (MHz)	Meter Reading (dBuV)		Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
	H	V						
49.848	36.6	49.9	8.0	57.9	80.0	-38.4	270	1.00
99.696	---	---	9.4	---	43.5	---	---	---
149.564	16.8	---	12.7	29.5	43.5	-14.0	45	3.20
199.392	---	---	12.7	---	43.5	---	---	---
249.240	---	---	14.5	---	46.0	---	---	---
299.088	---	---	17.5	---	46.0	---	---	---
348.936	---	---	19.0	---	46.0	---	---	---
398.784	---	---	20.6	---	46.0	---	---	---
448.632	---	---	21.3	---	46.0	---	---	---
498.480	---	---	22.3	---	46.0	---	---	---

Note :

1. Remark “---” means that the emission level is too low to be measured.

3.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

$$\text{Peak} = \text{Reading} + \text{Corrected Factor}$$

where

Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)

3.5 Radiated Test Equipment

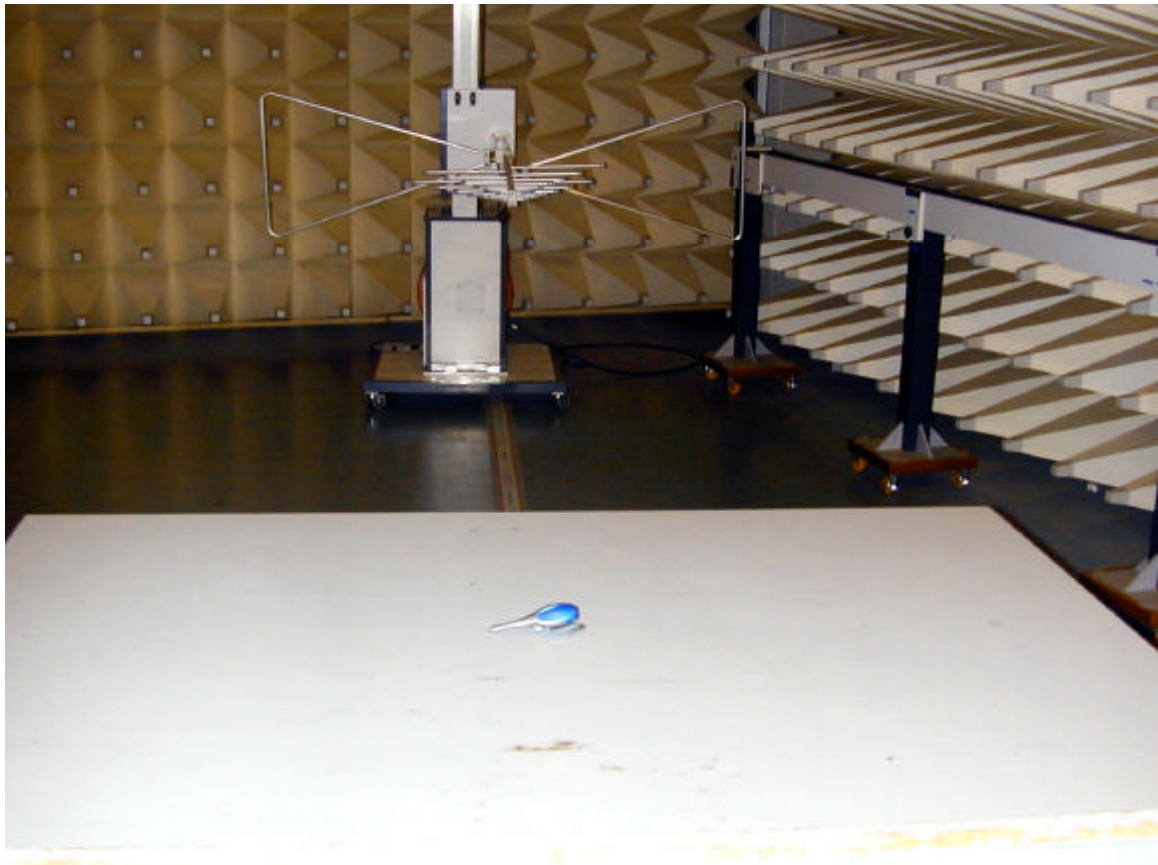
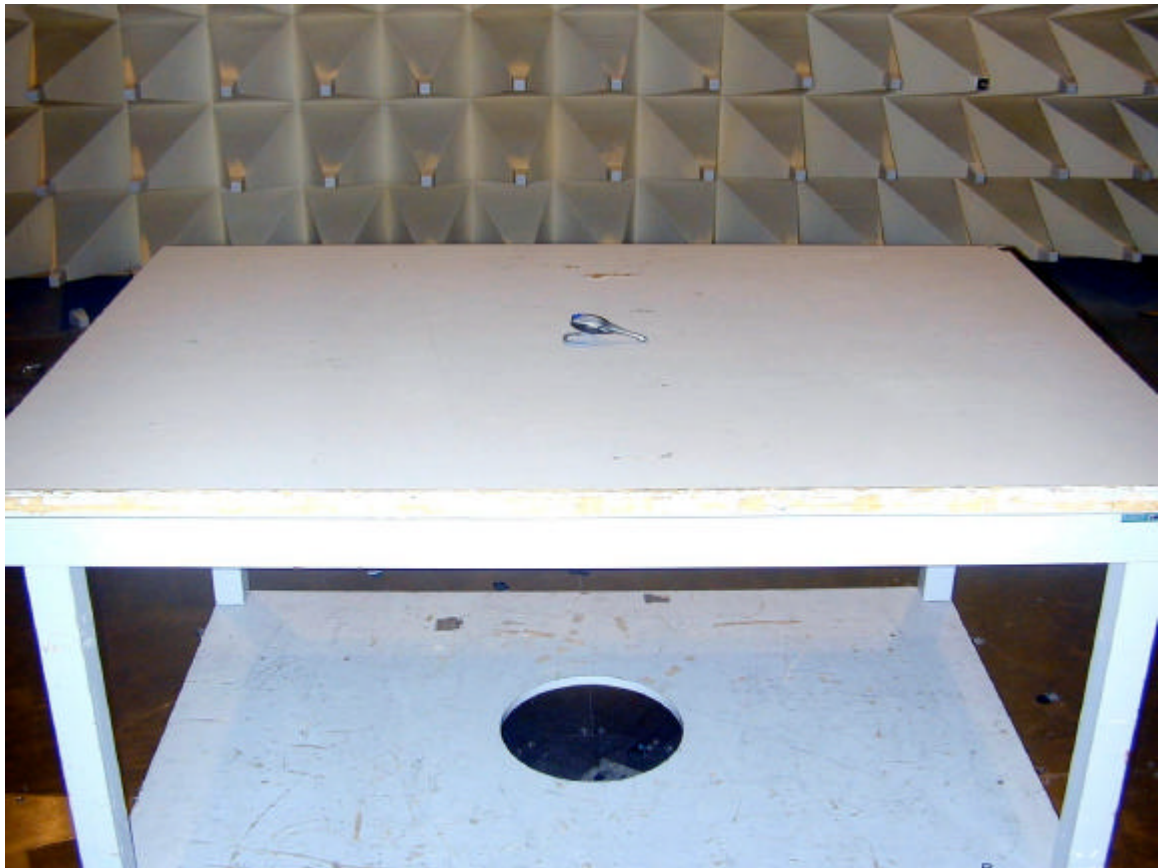
Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
EMI Test Receiver	Hewlett-Packard	8546A	13054404-001	Nov. 06, 2002
LogBicone Antenna	Schwarzbeck	VULB9160	13057310-001	Oct. 18, 2002

3.6 Measuring Instrument Setup

Explanation of measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	EMI Test Receiver	Quasi Peak	120 kHz	300 kHz
	EMI Test Receiver	Peak	120 kHz	300 kHz

3.7 Radiated Measurement Photos



4 CONDUCTED EMISSION MEASUREMENT

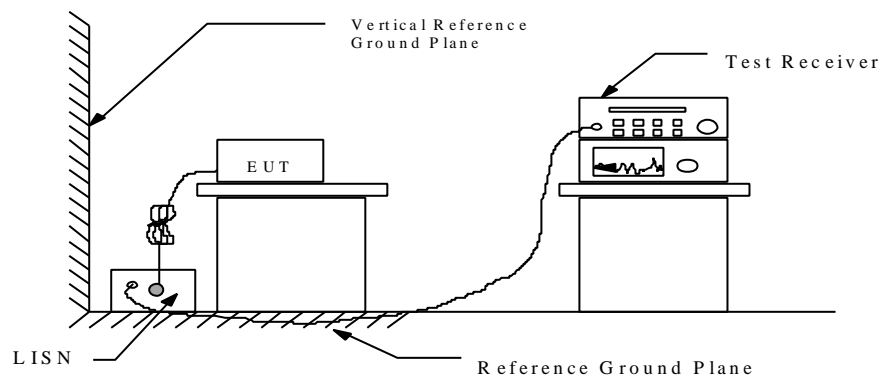
4.1 Standard Applicable

For intentional device, Line Conducted Emission Limits are in accordance to §5.207(a), any emissions level shall not exceed 48 dBuV.

4.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then records the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



4.3 Conducted Emission Data

Operation Mode : Charge

Test Date : Sep. 20, 2002

Temperature : 21

Humidity: 62 %

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV)		Limit (dBuV)	Margin (dB)
	N	L1		N	L1		
0.458	---	16.0	0.1	---	16.1	48.0	-31.9
0.540	---	17.3	0.1	---	17.4	48.0	-30.7
0.548	14.9	---	0.1	15.0	---	48.0	-33.0
0.583	---	16.5	0.1	---	16.6	48.0	-31.4
0.610	---	15.9	0.1	---	16.0	48.0	-32.0
1.035	---	15.1	0.2	---	15.3	48.0	-32.7
1.047	14.5	---	0.2	14.7	---	48.0	-33.3
1.543	16.6	---	0.2	16.8	---	48.0	-31.2
6.379	16.7	17.5	0.2	16.9	17.8	48.0	-31.1
20.691	18.3	---	0.5	18.8	---	48.0	-29.2
22.344	17.7	---	0.5	18.2	---	48.0	-29.9

Note :

1. Remark “---” means that the emission level is too low to be measured.
2. Please see appendix 1 for Plotted Data .

4.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

$$\text{RESULT} = \text{READING} + \text{LISN FACTOR}$$

Assume a receiver reading of 22.5 dB μ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB μ V.

$$\text{RESULT} = 22.5 + 0.1 = 22.6 \text{ dB } \mu \text{ V}$$

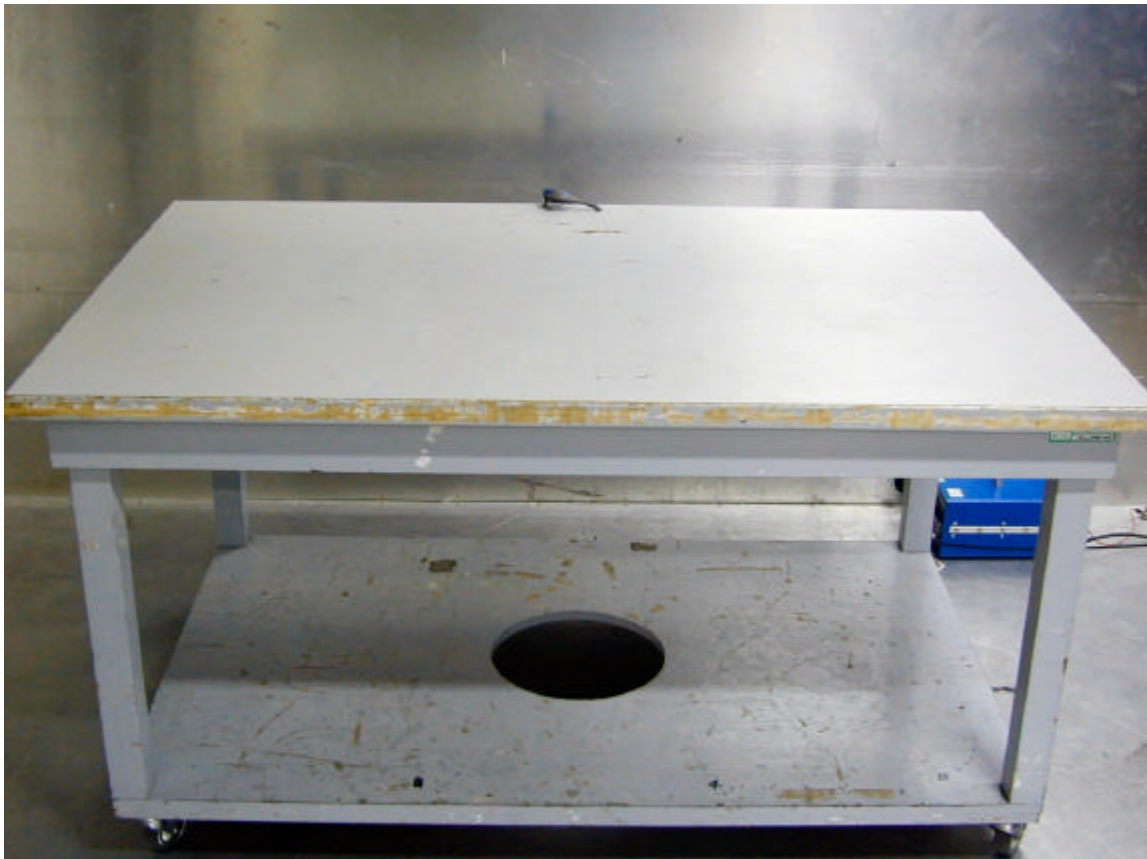
$$\begin{aligned} \text{Level in } \mu \text{ V} &= \text{Common Antilogarithm}[(22.6 \text{ dB } \mu \text{ V})/20] \\ &= 13.48 \mu \text{ V} \end{aligned}$$

4.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Next Cal. Date
LISN	EMCO	3825	Oct. 27,2002
EMI Test Receiver	R&S	ESCS30	Sep. 18,2003

4.6 Photos of Conduction Measuring Setup



5 ANTENNA REQUIREMENT

5.1 Standard Applicable

According to §5.203, 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.

5.2 Antenna Construction

The antenna is permanently mounted on PCB, no consideration of replacement.

6 EMISSION BAND MEASUREMENT

6.1 Standard Applicable

According to 15.235(b), the field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209, whichever permits the higher emission levels

6.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 1 and measurement the turn on the EUT. Then have the EUT activating in normal operation and make sure the instrument is operated in its linear range.
3. Adjust the measurement frequency range to contain the signal radiated from the Eut. Set both RBW and VBW of spectrum analyzer to 10 kHz and 100kHz respectively with a convenient frequency span including 200kHz bandwidth of the emission.
4. Mark the bandwidth of 49.82-49.90 MHz and plot the graph on spectrum analyzer.

6.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESBI	07/27/2003
Plotter	Hewlett-Packard	7440A	N/A

6.4 Measurement Data

Test Date : Sep. 23, 2002

Temperature : 22

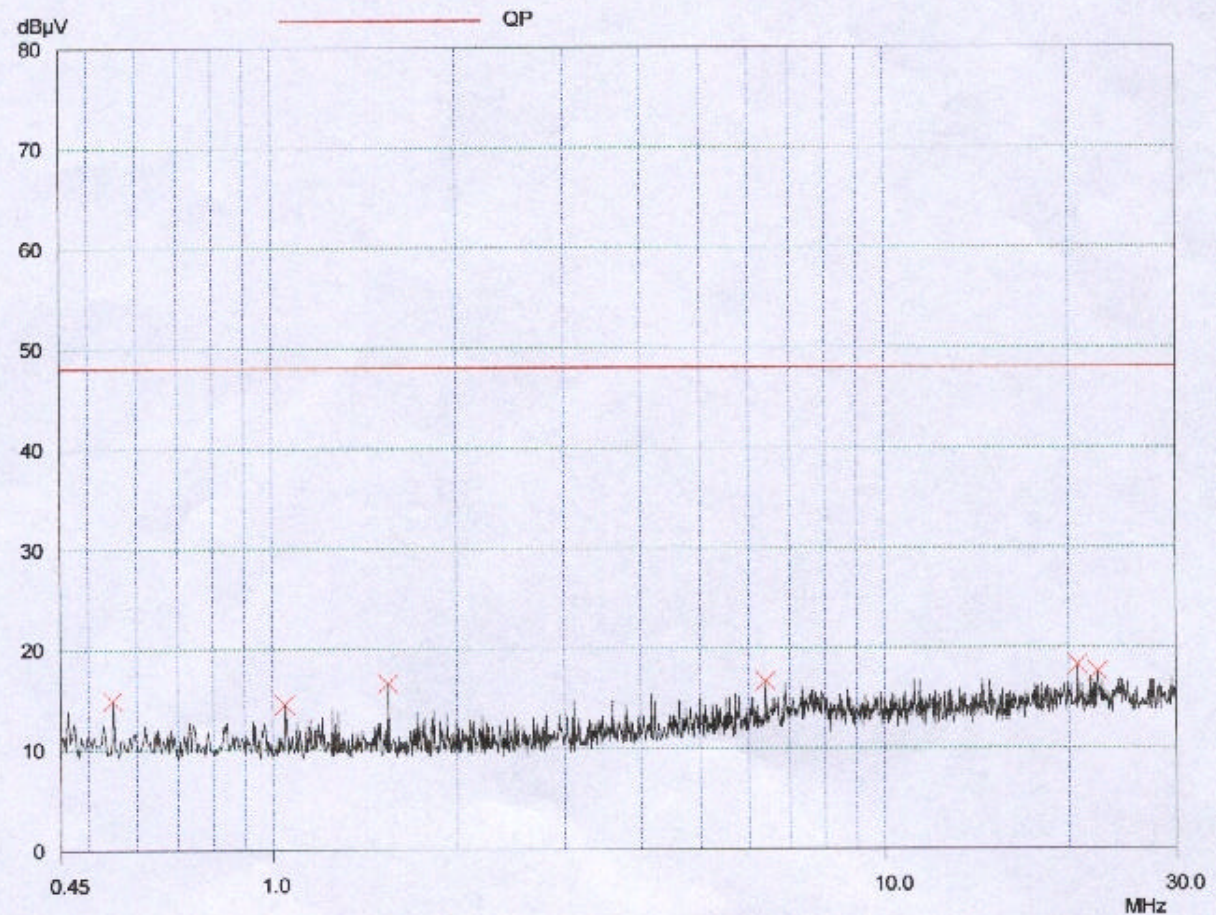
Humidity: 65 %

Note : Please see appendix 2 for Plotted Data

Appendix 1 : Plotted Data For Conducted Emission**Conducted Emission****Peak Value**

EUT: Wireless Handfree
Manuf: Charge (Handset)
Op Cond: Rick Hu
Test Spec: FCC Part 15 Class B
Comment: L1
Model : AROMA40

Prescan Measurement: Detector: X PK
Meas Time: see scan settings
Peaks: 8
Acc Margin: 40 dB

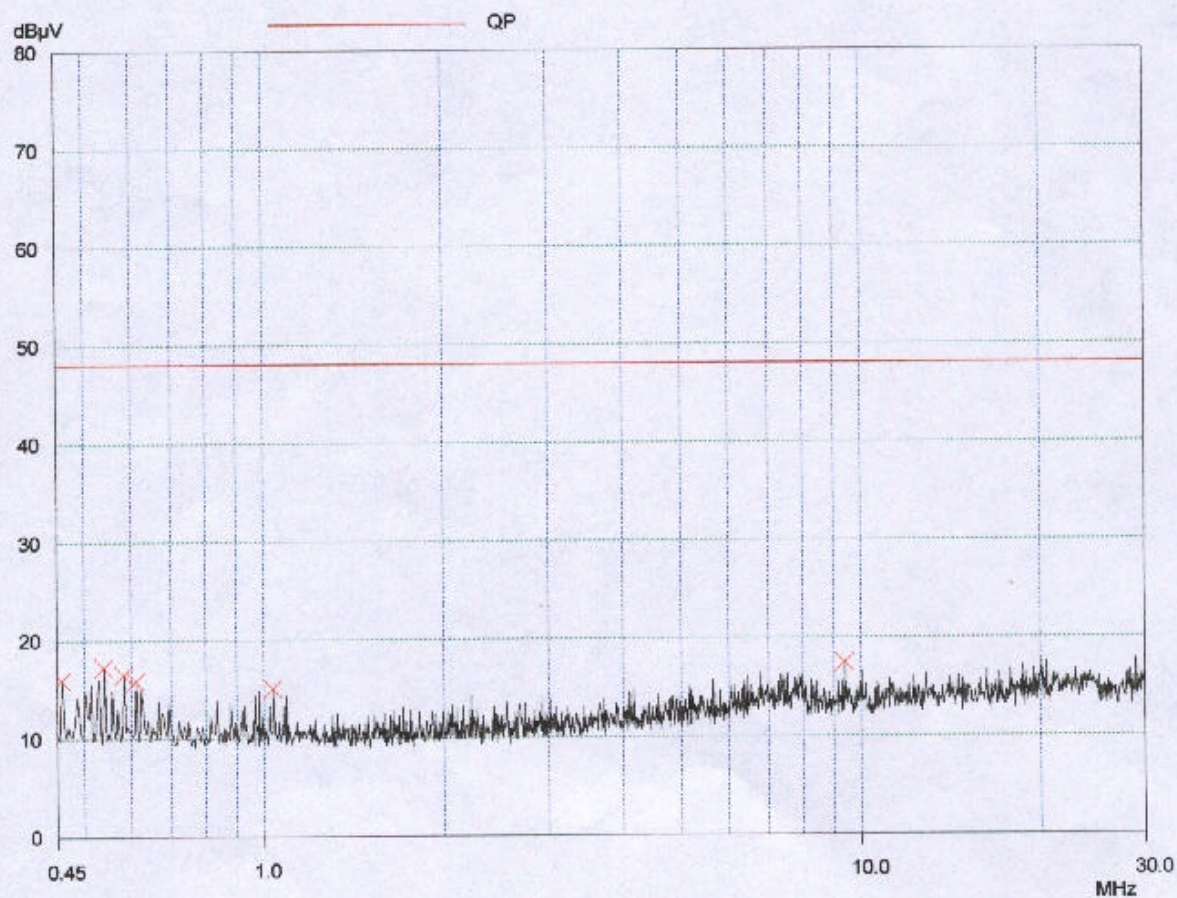


Conducted Emission

Peak Value

EUT: Wireless Handfree
Manuf:
Op Cond: Charge (Handset)
Operator: Rick Hu
Test Spec: FCC Part 15 Class B
Comment: L2
Model : AROMA40

Prescan Measurement: Detector: X PK
Meas Time: see scan settings
Peaks: 8
Acc Margin: 40 dB



Appendix 2 : Plotted Data For Emission Band Measurement