



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test report file number : E03OR-022

Applicant : CYBERTREE CO., LTD.

Address : 409-7, Chungcheon 2-dong, Pupyung-gu, Incheon, Korea

Manufacturer : CYBERTREE CO., LTD.

Address : 409-7, Chungcheon 2-dong, Pupyung-gu, Incheon, Korea

Type of Equipment : WIRELESS DIGITAL MOBILE HEADSET

FCC ID. : RLRCWH900D009150H

Model Name : CWH-900D

Serial number : N/A

Total page of Report : 14 pages (including this page)

Date of Incoming : September 26, 2003


Date of Issuing : October 10, 2003

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C Section 15.249**

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

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CONTENTS

	Page
1. VERIFICATION OF COMPLIANCE.....	3
2. GENERAL INFORMATION.....	4
2.1 PRODUCT DESCRIPTION	4
2.2 MODEL DIFFERENCES:	4
2.3 RELATED SUBMITTAL(S) / GRANT(S).....	4
2.3 TEST SYSTEM DETAILS.....	5
2.4 TEST METHODOLOGY	5
2.5 TEST FACILITY.....	5
3. SYSTEM TEST CONFIGURATION.....	5
3.1 JUSTIFICATION.....	5
3.2 EUT EXERCISE SOFTWARE	5
3.3 EQUIPMENT MODIFICATIONS	5
3.4 CONFIGURATION OF TEST SYSTEM	6
3.5 ANTENNA REQUIREMENT.....	6
4. PRELIMINARY TEST	6
4.1 AC POWER LINE CONDUCTED EMISSIONS TESTS	6
4.2 RADIATED EMISSIONS TESTS.....	6
5. FINAL RESULT OF MEASUREMENT	7
5.1 CONDUCTED EMISSION TEST	7
5.2 FIELD STRENGTH.....	9
5.2.1 Filed Strength of the Fundamental Frequency.....	9
5.2.2 Emission of radiated outside of the specified frequency band.....	10
5.2.3 Spurious Emission Test, for harmonics.....	12
6. FIELD STRENGTH CALCULATION.....	13
7. LIST OF TEST EQUIPMENT	14

**1. VERIFICATION OF COMPLIANCE**

APPLICANT : CYBERTREE CO., LTD.
ADDRESS : 409-7, Chungcheon 2-dong, Pupyung-gu, Incheon, Korea
CONTACT PERSON : Mr. Beom Mo, Jeong / Director in R&D
TELEPHONE NO : +82-32-508-1490
FCC ID : RLRCWH900D009150H
MODEL NO/NAME : CWH-900D
SERIAL NUMBER : N/A
DATE : October 10, 2003

DEVICE TYPE	WIRELESS DIGITAL MOBILE HEADSET - INTENTIONAL RADIATOR
E.U.T. DESCRIPTION	WIRELESS DIGITAL MOBILE HEADSET - TRANCEIVER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.249
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	Yes
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.207 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 and is not affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



2. GENERAL INFORMATION

2.1 Product Description

The CYBERTREE CO., LTD., Model CWH-900D (referred to as the EUT in this report) is a digital mobile wireless headset that consists of Handy and Base. The associated transceiver, base unit is manufactured by Cybertree Co., Ltd, Model No. is same as above, but the FCC ID: RLRCWH900D009150B. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX/RX FREQUENCY	907.3 ~ 921.3 MHz
TYPE OF MODULATION	FSK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	8.0 and 39.0 MHz on the main board
NUMBER OF CHANNEL	8
CHANNEL ACCESS	MCA(Multi Channel Access)
DATA TRANSFER RATE	76.8 KBPS
ANTENNA TYPE	Built-in on the PCB in the EUT
ANTENNA GAIN	0 dBi
USED AC/DC ADAPTER FOR CHARGING	AT-3720C manufactured by A-Tech IND Co., Ltd. INPUT: AC100~240V, 50/60Hz, 2W / OUTPUT: DC3.7V, 140mA
RATED SUPPLY POWER	3.7V 150mA, Li-Polymer
NUMBER OF LAYERS	4 LAYERS
FUNCTION OF BUTTON	Talk, Stand-by and Switch-Off
EXTERNAL CONNECTOR	Phone Plug and DC Jack
TEMPERATURE CONDITION	-10°C ~ +60°C

2.2 Model Differences:

-. No other model differences have been mentioned

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only



2.3 Test System Details

The EUT was tested with the following all equipment used in the tested systems are:

Model	Manufacturer	FCC ID	Description	Connected to
CWH-900D	CYBERTREE CO., LTD.	RLRCWH900D009150 H	Handy Unit TRANSCEIVER	N/A

2.4 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Gwangju-Gun, Gyeonggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on October 02, 2002. (Registration Number: 529838)

3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	CYBERTREE CO., LTD.	N/A	N/A

3.2 EUT exercise Software

To get a maximum radiated emission from the EUT, the talk button on the EUT was pressed to transmit the signal. To activate continuous transmission, the handy and base unit was linked each other.

3.3 Equipment Modifications

To achieve compliance to FCC part 15 rules, the following change(s) was made by the applicant during compliance testing:

1. Capacitor value was changed from 68pF to 100pF at C2.
2. Inductor value was changed from 330mH to 680mH at L1.
3. The transformer was shielded with copper tape and then the ground was connected to 1st side ground pattern.

3.4 Configuration of Test System

Line Conducted Test: The power cord of the EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power lines Conducted Emission tests were performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

3.5 Antenna Requirement

For intentional device, according to section 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.

Antenna Construction:

The transmitter antenna of the EUT is built-in on the PCB, so no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Charging Mode	X

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Stand-by mode	
Charging mode	
TX mode	X

**5. FINAL RESULT OF MEASUREMENT**

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Emission Test

Humidity Level : 39 %

Temperature : 22°C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.207(a)

Result : PASSED BY -3.45 dB at 1.16 MHz at Average Mode

EUT : WIRELESS DIGITAL MOBILE HEADSET Date : October 09, 2003
 Operating Condition : Charging Mode of the Handy & Base at a time
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)
 Used AC/DC Adaptor : AT-3720C manufactured by A-Tech IND Co., Ltd.

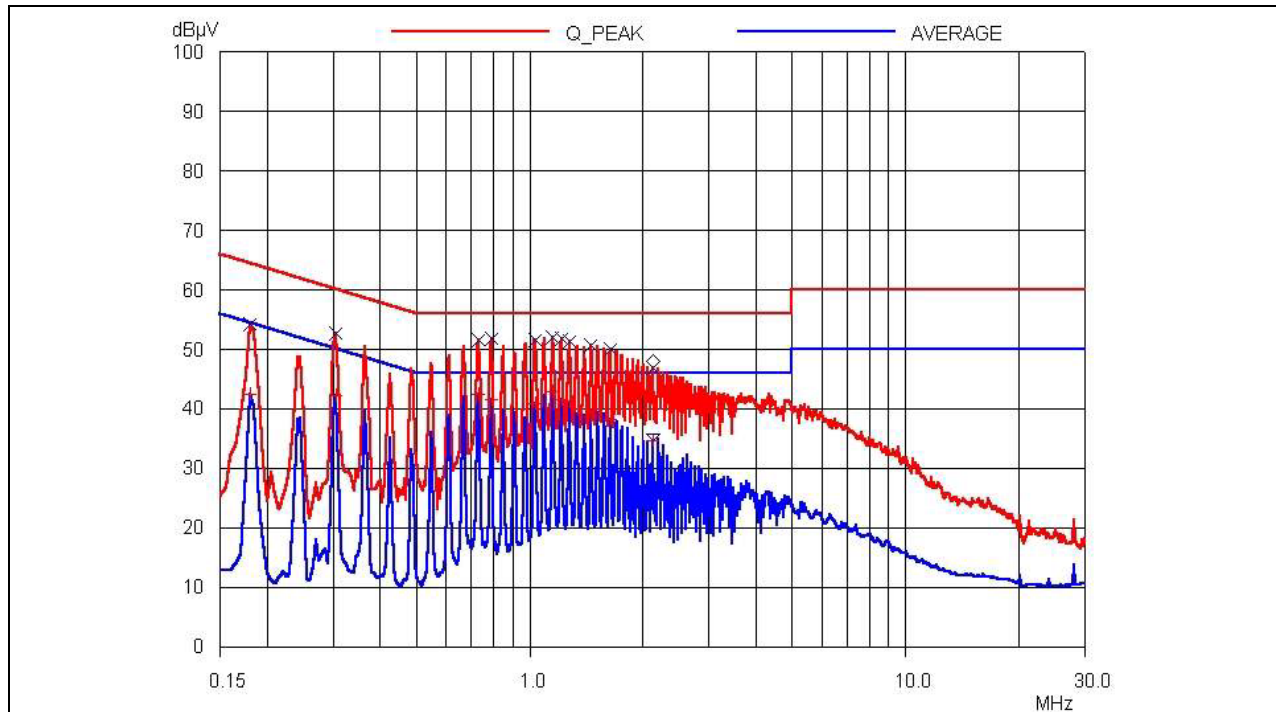
Frequency (MHz)	Line	Quasi-Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission Level	Detector Mode	Limits		Emission level	Limits	
0.18	H	54.16	P	64.49	-10.33	42.39	54.49	-12.10
0.31	H	52.62	P	60.11	-7.49	42.28	50.11	-7.83
0.73	N	51.92	P	56.00	-4.08	42.12	46.00	-3.88
0.79	N	52.00	P	56.00	-4.00	42.12	46.00	-3.88
1.10	N	52.24	P	56.00	-3.76	42.31	46.00	-3.69
1.16	N	52.29	P	56.00	-3.71	42.55	46.00	-3.45
1.40	N	51.03	P	56.00	-4.97	38.86	46.00	-7.14

Line Conducted Emission Tabulated Data

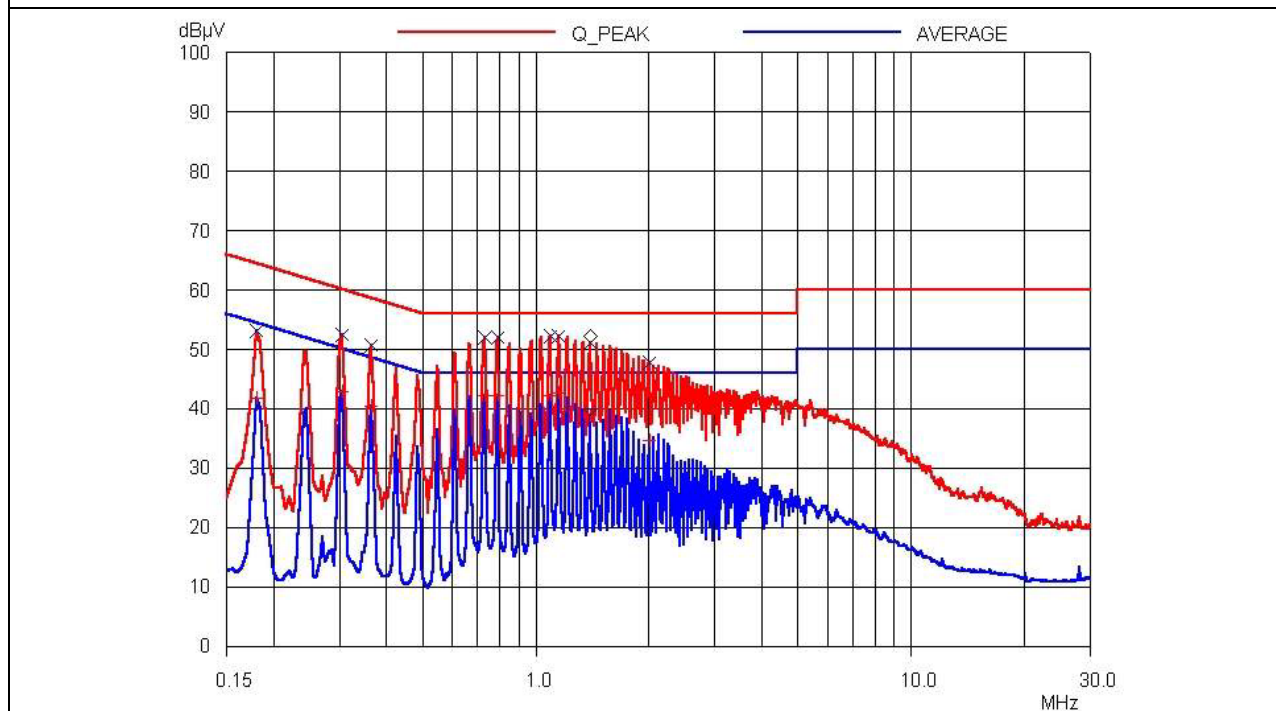
Remark: "H": Hot Line, "N": Neutral Line, "P": Peak Detector mode.

See next page for an overview sweep performed with peak and average detector at each mode.

Tested by: Dan-Gi Lee / Project Engineer



HOT LINE



NEUTRAL LINE



5.2 Field Strength

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

5.2.1 Filed Strength of the Fundamental Frequency

Humidity Level : 43 % Temperature : 22°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.249(a)
 Type of Test : Intentional Radiator
 Result : PASSED BY -3.04 dB at 921.20MHz

EUT : WIRELESS DIGITAL MOBILE HEADSET Date: October 10, 2003
 Operating Condition : TX mode
 Distance : 3 Meter

Operation Band (MHz)	Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
	Carrier Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Bottom	907.37	64.10	PEAK	H	22.31	3.84	90.25	94.00	-3.75
	907.37	59.10	PEAK	V	22.31	3.84	85.25	94.00	-8.75
Middle	915.20	64.40	PEAK	H	22.26	3.85	90.51	94.00	-3.49
	915.20	59.80	PEAK	V	22.26	3.85	85.91	94.00	-8.09
Top	921.20	64.80	PEAK	H	22.31	3.85	90.96	94.00	-3.04
	921.20	59.90	PEAK	V	22.31	3.85	86.06	94.00	-7.94

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: Dan-Gi Lee / Project Engineer

**5.2.2 Emission of radiated outside of the specified frequency band**

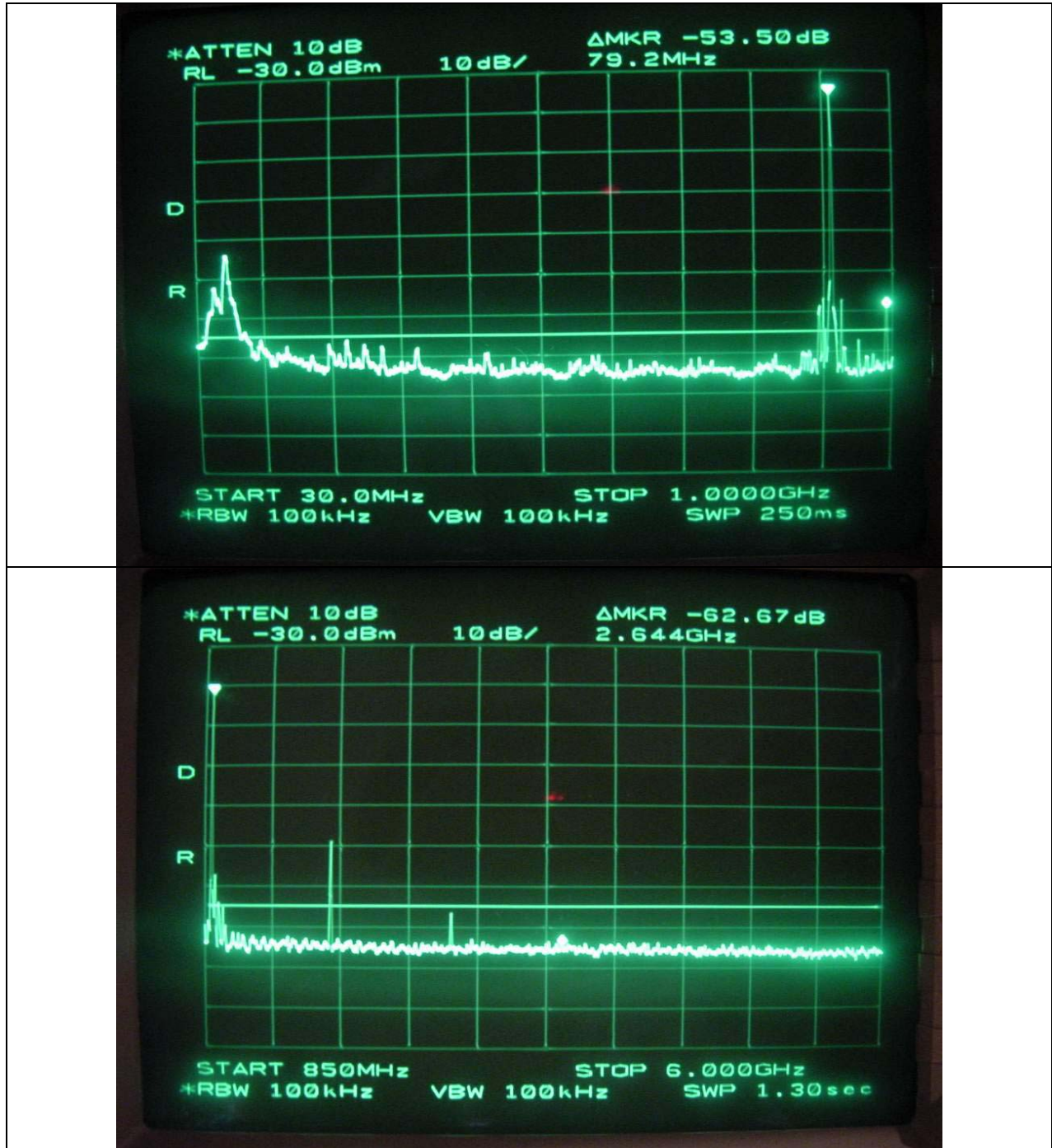
Humidity Level : 44 % Temperature : 22°C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.249(d)
Type of Test : Intentional Radiator
Result : PASS

EUT : WIRELESS DIGITAL MOBILE HEADSET Date: October 10, 2003
Operating Condition : TX mode
Distance : 3 Meter

Operation Band (MHz)	Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
	Carrier Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Bottom	Spurious frequencies, except harmonics, were not found up to 10 GHz. See next page for graph data, which was obtained by search probe.								
Middle									
Top									

Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: Dan-Gi Lee / Project Engineer





5.2.3 Spurious Emission Test, for harmonics

Humidity Level : 44 %

Temperature: 22°C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.249(a)

Type of Test : Intentional Radiator

Result : PASSED BY -0.10dB at 1830.58MHz with Peak detector

EUT : WIRELESS DIGITAL MOBILE HEADSET

Date: October 10, 2003

Operating Condition : TX mode

Distance : 3 Meter

Operation Band (MHz)	Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
	Harmonic Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Bottom	1814.44	18.20	Peak	H	28.86	6.25	53.32	54.00	-0.78
	1814.36	16.40	Peak	V	28.86	6.25	51.52	54.00	-3.58
	1814.36	9.30	Average	H	28.86	6.25	44.42	54.00	-9.68
Middle	1830.58	18.60	Peak	H	28.95	6.26	53.80	54.00	-0.10
	1830.58	10.10	Average	H	28.95	6.26	45.30	54.00	-8.60
	1830.58	17.90	Peak	V	28.95	6.26	53.10	54.00	-0.80
	2745.52	6.50	Average	H	33.65	9.66	49.83	54.00	-4.19
Top	1842.41	18.50	Peak	H	29.01	6.27	53.78	54.00	-0.22
	1842.41	9.30	Average	H	29.01	6.27	44.58	54.00	-9.42
	2764.22	12.5	Peak	V	33.70	9.68	55.88	54.00	1.88
	2764.22	3.7	Average	H	33.70	9.68	47.08	54.00	-6.92

Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by:  / Project Engineer



6. Field Strength Calculation

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

**7. LIST OF TEST EQUIPMENT**

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	NOV/02	12 MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/03	12 MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	MAY/03	12 MONTH	■
4.	Spectrum analyzer	HP	8568B	3109A05456	MAY/03	12 MONTH	■
5.	RF preselector	HP	85685A	3107A01264	MAY/03	12 MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	MAY/03	12 MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/03	12 MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/03	12 MONTH	
		Schwarzbeck	VHA9103	9109-4444 91031852	JUL/03 AUG/03		■
9.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	AUG/03 JUL/03 MAY/03	12 MONTH	
		Schwarzbeck	9108-A(494)	62281001	AUG/03		■
10.	Horn Antenna	Schwarzbeck	BBHA9170 BBHA9170 BBHA9120D BBHA9120D	BBHA9170178 BBHA9170179 BBHA9120D294 BBHA9120D295	JUNE/03 JUNE/03 JUNE/03 JUNE/03	24 MONTH	■
11.	Microwave System Preamplifier	Agilent	83051A	3950M00201	JUNE/03	12 MONTH	■
12.	RF Amplifier	HP	8347A	3307A01354	JUNE/03	12 MONTH	
13.	LISN	EMCO	3825/2	9109-1867 9109-1869	AUG/03 OCT/02	12 MONTH	■
14.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
15.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
16.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■