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Environmental Assessment

for

Mobiles/Fixed Base Station

for

FCC ID: FCC ID: ALH35583110

Model:TKR-851-1

to

Federal Communications Commission

47 Cfr 1.1310 (MPE)

Radiofrequency Radiation Exposure Limits

Date Of Report: January 14, 2004

On the Behalf of the Applicant:

Kenwood USA Corporation

At the Request of:

P.O. JB-F-006

Kenwood USA Corporation
Communications Division
3975 Johns Creek Court, Suite 300
Suwanee, GA 30024

Attention of:

Joel E. Berger, Research & Development
JBerger@kenwoodusa.com
(678) 474-4722; FAX: -4731

Supervised By:

A handwritten signature in black ink that reads 'M. Flom P. Eng.' with a stylized underline.

Morton Flom, P. Eng.

Table of Contents

Rule	Description	Page
	Test Report	1
	Identification of the Equipment Under Test	2
	Standard Test Conditions and Engineering Practices	4
1.1310	Environmental Assessment	5

Page Number 1 of 7.

Required information per ISO/IEC Guide 25-1990, paragraph 13.2:

a) **Test Report (Supplemental)**

b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0410018

d) Client: Kenwood USA Corporation
Communications Division
3975 Johns Creek Court, Suite 300
Suwanee, GA 30024

e) Identification: TKR-851-1
FCC ID: ALH35583110
Description: UHF FM Repeater

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: January 14, 2004
EUT Received: December 18, 2003

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:



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n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

Page Number

2 of 7.

Identification of the Equipment Under Test (EUT)**Name and Address of Applicant:**

Kenwood USA Corporation
 Communications Division
 3975 Johns Creek Court, Suite 300
 Suwanee, GA 30024

Manufacturer:

Kenwood Electronics Technologies PTE Ltd.
 1 Ang Mo Kio Street 63
 Singapore 569110

FCC ID: ALH35583110

Model Number: TKR-851-1

Description: UHF FM Repeater

Type of Emission: 16K0F3E, 11K0F3E

Frequency Range, MHz: 450 to 480

Power Rating, Watts: 1 to 25
 ___ Switchable x Variable ___ N/A

Modulation:
 ___ AMPS
 ___ TDMA
 ___ CDMA
 x OTHER

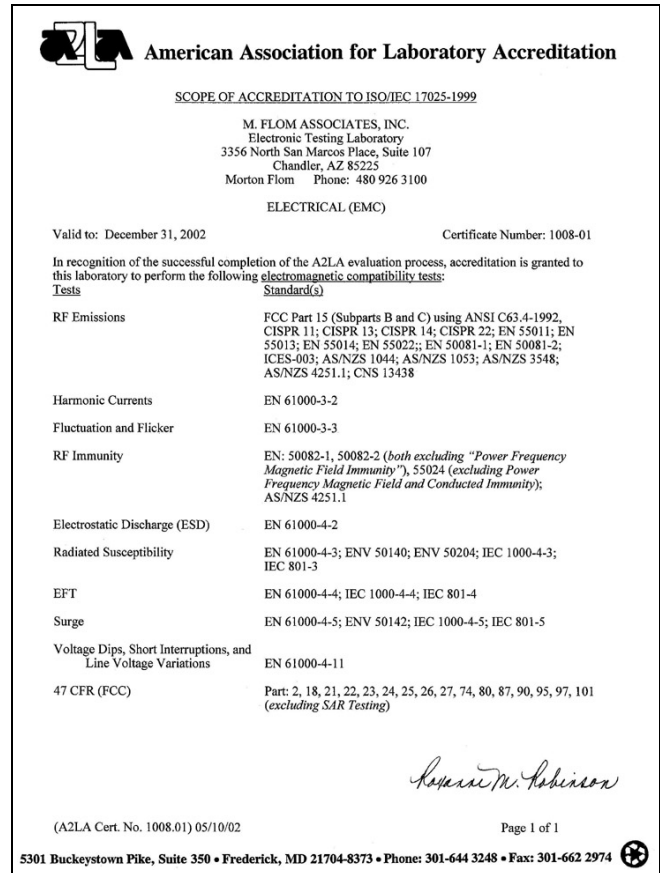
Antenna:
 ___ Helical
 ___ Monopole
 ___ Whip
 x Other

Note: For RF Safety test antenna gain taken at the upper range of expected gain (i.e. 0 dBd) and RF Power set to highest nominal power across all channels.

Page Number

3 of 7.

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below.



"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.

**Standard Test Conditions
and
Engineering Practices**

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992/2000, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.

Page Number 5 of 7.

Name of Test: Environmental Assessment

Specification: FCC: 47 CFR 1.1310

Measurement Guide: ANSI/IEEE C95.1 1992

Test Equipment: Maximum Permissible Exposure (MPE) measurement system, consisting of:
Narda 8717-1174R, Radiation meter
Narda 8761D, E-field probe (300 kHz – 3 GHz)
(Calibrated Nov-98)

Measurement Procedure:

1. The following measurements were performed with a Narda probe using ANSI/IEEE C95.1 as a guide.
2. Prior to making any measurements, the measurements system was calibrated in accordance with the manufacturer's procedures.
3. The EUT's radiating element (antenna) was placed on a 1 m tall table for ease of testing. For equipment normally operated on a metal surface, a ground plane was used.
4. The remaining equipment necessary to operate the EUT was maintained at a distance from the measurement arrangement suitable to minimize interference with the measurements.
5. The minimum safe distance was calculated from the formula $\text{Power Density} = \text{EIRP} / 4\pi R^2$ (Peak Watts/m²). The calculation is shown with the measurement data.
6. With the EUT operating at maximum power, a search was initiated for worst case emissions with the probe raised and lowered over a range of 0.2 to 2 meters in height and over a horizontal plane of 0° to 360°.
7. Average values were calculated for the whole body (0.2-2.0m), lower body (0.2-0.8m) and upper body (1.0-2.0m).

Results: Attached.

Page Number 6 of 7.

Test Setup: Maximum Permissible Exposure (MPE)



Page Number 7 of 7.

Name of Test: R.F. Radiation Exposure

FCC Rules: 1.1307, 1.1310, 1.1311, 2.1091
Description, EUT: See page 2 of Test Report

Limits: Controlled Exposure	0.3-3.0 MHz:	Limit [mW/cm ²] = 100
47 CFR 1.1310	3.0-30 MHz:	Limit [mW/cm ²] = (900/f ²)
Table 1, (A)	30-300 MHz:	Limit [mW/cm ²] = 1.0
	300-1500 MHz	Limit [mW/cm ²] = f/300
	1500-100,000 MHz:	Limit [mW/cm ²] = 5.0

Instruments Narda 8717-1174R, Radiation Meter
Narda 8760B, E-field probe (300 kHz – 1 GHz)
Narda 8761D, E-field probe (300 kHz – 3 GHz)

Test Frequencies, MHz	450	465	480
Power, Conducted, W	= 25		
Power + Ant. Gain	= 25 W (50% duty cycle)		
Limit: Controlled Exposure	= 0.3, 0.31, 0.32 mW/cm ²		
Antenna Gain	= 0 dB		
Antenna Model	¼ Wave Whip		

Results at tested distances	Probe Height, m	Power Density, mW/cm ²		
		Freq. 450 MHz Distance 79 cm	Freq. 465 MHz Distance 79 cm	Freq. 480 MHz Distance 79 cm
	2.0	0.05	0.02	0.07
	1.8	0.07	0.06	0.06
	1.6	0.08	0.08	0.06
	1.4	0.05	0.05	0.07
	1.2	0.08	0.04	0.08
	1.0	0.11	0.09	0.19
	0.8	0.17	0.2	0.319
	0.6	0.13	0.16	0.31
	0.4	0.06	0.1	0.27
	0.2	0.02	0.03	0.11

Power Density Calculations: The measured power density readings were summed and the results divided by the number of readings to calculate the average.

	450 MHz	465 MHz	480 MHz
Whole body average (0.2 - 0.8 m, mW/cm ²) =	0.082	0.083	0.154
Lower body average (0.2 - 0.8 m, mW/cm ²) =	0.095	0.123	0.252
Upper body average (1.0 - 2.0 m, mW/cm ²) =	0.073	0.057	0.088

Supervised By:

Morton Flom, P. Eng.

(The following will be placed in the Instruction Manual)

Mandatory Safety Instructions to Installers & Users

Use only manufacturer or dealer supplied antenna.

Antenna Minimum Safe Distance: 79 cm, 50% Duty Cycle.

Antenna Gain: zero dBd referenced to a dipole.

The Federal Communications Commission has adopted a safety standard for human exposure to RF (Radio Frequency) energy which is below the OSHA (Occupational Safety and Health Act) limits.

Antenna Mounting: The antenna supplied by the manufacturer or radio dealer must not be mounted at a location such that during radio transmission, any person or persons can come closer than the above indicated minimum safe distance to the antenna i.e. 79 cm, 50% Duty Cycle.

To comply with current FCC RF Exposure limits, the antenna must be installed at or exceeding the minimum safe distance shown above, and in accordance with the requirements of the antenna manufacturer or supplier.

Base Station Installation: The antenna should be fixed-mounted on an outdoor permanent structure. RF Exposure compliance must be addressed at the time of installation.

Antenna Substitution: Do not substitute any antenna for the one supplied or recommended by the manufacturer or radio dealer. You may be exposing person or persons to excess radio frequency radiation. You may contact your radio dealer or the manufacturer for further instructions.

Warning: Maintain a separation distance from the antenna to a person(s) of at least 79 cm, 50% Duty Cycle.

You, as the qualified end-user of this radio device must control the exposure conditions of bystanders to ensure the minimum separation distance (above) is maintained between the antenna and nearby persons for satisfying RF Exposure compliance. The operation of this transmitter must satisfy the requirements of Occupational/Controlled Exposure Environment, for work-related use. Transmit only when person(s) are at least the minimum distance from the properly installed, externally mounted antenna.

**Testimonial
and
Statement of Certification**

This is to certify that:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

Certifying Engineer:

A handwritten signature in black ink, appearing to read "M. Flom P. Eng.", with a horizontal line drawn underneath the signature.

Morton Flom, P. Eng.