

TABLE OF CONTENTS

Application Form 731
Label Format

- 1.0** Introduction
- 1.1** Summary
- 2.0** Description of Equipment Under Test (EUT)
- 3.0** Test Configuration
- 4.0** Conducted Emissions Scheme
- 5.0** Radiated Emissions Scheme

TABLES

Table 1. Measurement Equipment

EXHIBITS

- Exhibit 1. EUT Photographs
- Exhibit 2. Schematics
- Exhibit 3. User Manual

1.0 Introduction

This report has been prepared on behalf of TeleRadio AB to support the attached Application for Certification of a Part 15 Unintentional Radiator. The Equipment Under Test was the TeleRadio *System 460 Receiver*.

Radio-Noise Emissions tests were performed according to ANSI C63.4-1992 "*Methods of Measurement of RFI from Low-Voltage Electronic Equipment in the Range of 9 KHz - 40 GHz*". The measuring equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

Testing was performed at National Certification Laboratory in Ellicott City, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch. FCC acceptance was granted on May 26, 1993.

1.1 Summary

The *System 460 Receiver* complies with the Part 15 Radio Limits for an Unintentional Radiator.

2.0 Description of Equipment Under Test (EUT)

The EUT Features:

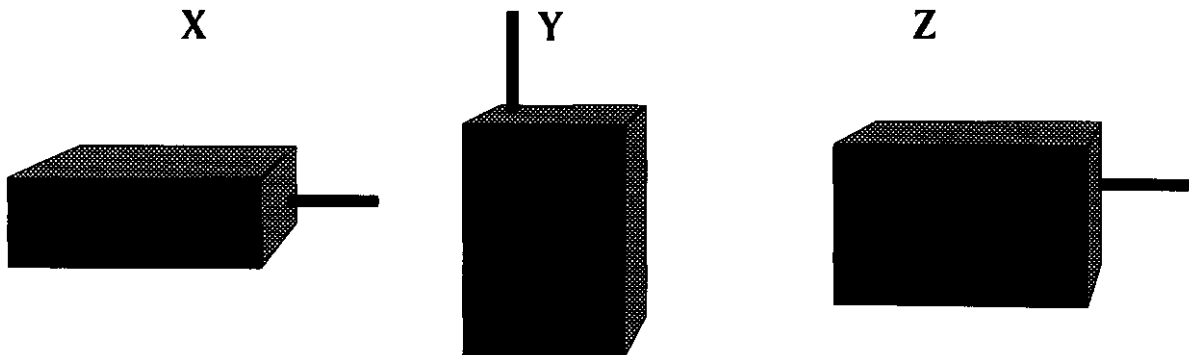
<u>FEATURES</u>	<u>FREQUENCY</u>
Relay Activation	433.92 MHz
Superheterodyne Design	
PCM Decoding	
ON/OFF Switching Control	

3.0 Test Configuration

The EUT was setup on the test table in a manner which follows the general guidelines of ANSI C63.4, Section 6 "General Operating Conditions and Configurations".

An RF signal generator was used to cohere the spectral components of the emissions, as prescribed in ANSI C63.4, Section 12.1.1.1. An output level of -20 dBm at 433.92 MHz (CW) was fed into a 10 inch whip antenna in order to create a field level sufficient to accomplish this.

The EUT was configured in 3 orthogonal positions to determine the maximum RF level at each emission frequency. The data tables give the EUT position designation that produces worst-case field strength, in an X, Y, Z system. This is described below:



4.0 Conducted Emissions Scheme

The EUT is placed on an 80 cm high 1 X 1.5 m non-conductive table. Power to the EUT is provided through a Solar Corporation 50 Ω /50 μ H Line Impedance Stabilization Network bonded to a 2.2 X 2 meter horizontal ground plane, and a 2.2 X 2 meter vertical ground plane. The LISN has its AC input supplied from a filtered AC power source. A separate LISN provides AC power to the peripheral equipment. I/O cables are moved about to obtain maximum emissions.

The 50 Ω output of the LISN is connected to the input of the spectrum analyzer and emissions in the frequency range of 450 kHz to 30 MHz are searched. The detector function is set to quasi-peak and the resolution bandwidth is set at 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth for final measurements. All emissions within 20 dB of the limit are recorded in the data tables.

5.0 Radiated Emissions Scheme

The EUT was initially scanned in the frequency range 30 to 2000 MHz indoors, at a distance of 1 meter to determine its emissions profile. The EUT was then placed on an 80 cm high 1 X 1.5 meter non-conductive motorized turntable for radiated testing on the 3-meter open area test site. The emissions from the EUT are measured continuously at every azimuth by rotating the turntable. Waveguide horn and log periodic broadband antennas are mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna is varied between 1 and 4 meters. Cables are varied in position to produce maximum emissions. Both the horizontal and vertical field components are measured.

The output from the antenna is connected to the input of the spectrum analyzer. The detector function is set to **PEAK**. The resolution bandwidth of the spectrum analyzer system is set at 120 kHz, for measurements in the range 30 MHz -1 GHz, and 1 MHz for measurements in the range of 1 - 2 GHz, with all post-detector filtering no less than 10 times the resolution bandwidth. All emissions within 20 dB of the limit are recorded in the data tables.

To convert the spectrum analyzer reading into a quantified E-field level to allow comparison with the FCC limits, it is necessary to account for various calibration factors. These factors include cable loss (CL) and antenna factors (AF). The AF/CL in dB/m is algebraically added to the Spectrum Analyzer Voltage in $\text{dB}\mu\text{V}$ to obtain the Radiated Electric Field in $\text{dB}\mu\text{V}/\text{m}$. This level is then compared with the FCC limit.

Example:

Spectrum Analyzer Volt: $\text{VdB}\mu\text{V}$

Composite Factor: $\text{AF/CLdB}/\text{m}$

Electric Field: $\text{EdB}\mu\text{V}/\text{m} = \text{VdB}\mu\text{V} + \text{AF/CLdB}/\text{m}$

Linear Conversion: $\text{EuV}/\text{m} = \text{Antilog} (\text{EdB}\mu\text{V}/\text{m}/20)$

FCC CLASS B RADIATED EMISSIONS DATA

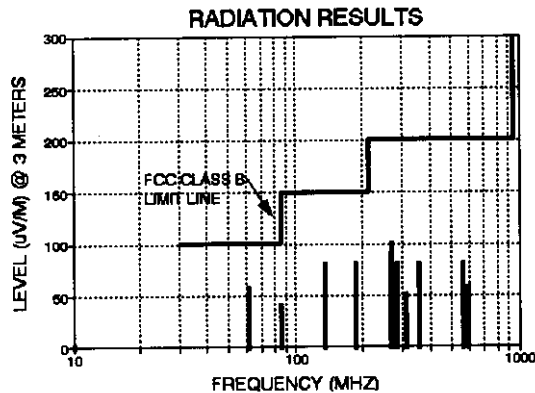
FCC ID: ONF460RX404A-D

CLIENT: TELERADIO
 EUT: 460 RX
 FREQ: 433.92 MHZ

3-METER TEST		QP LVL	DATE: 8/8/99				
FREQ MHz	POL H/V	SPEC A dBuV	AF/CL dB/m	E-FIELD dBuV/m	E-FIELD uV/m	LIMIT uV/m	MRG dB
61.47	H	27.0	8.0	35.0	56.2	100.0	-5.0
85.88	H	23.0	9.0	32.0	39.8	100.0	-8.0
135.37	H	23.0	15.0	38.0	79.4	150.0	-5.5
186.09	H	19.0	19.0	38.0	79.4	150.0	-5.5
266.25	H	17.0	22.0	39.0	89.1	200.0	-7.0
269.92	V	18.0	22.0	40.0	100.0	200.0	-6.0
285.46	H	15.0	23.0	38.0	79.4	200.0	-8.0
313.25	H	18.0	16.0	34.0	50.1	200.0	-12.0
354.23	V	20.0	18.0	38.0	79.4	200.0	-8.0
565.69	H	17.0	21.0	38.0	79.4	200.0	-8.0
591.45	V	14.0	21.0	35.0	56.2	200.0	-11.0

TEST ENGINEER


 STEVEN DAYHOFF



FCC CLASS B CONDUCTED EMISSIONS DATA

FCC ID: ONF460RX404A-D

CLIENT: TELERADIO
 EUT: 460 RX
 CPU: 433.92 MHZ

LINE 1 - NEUTRAL

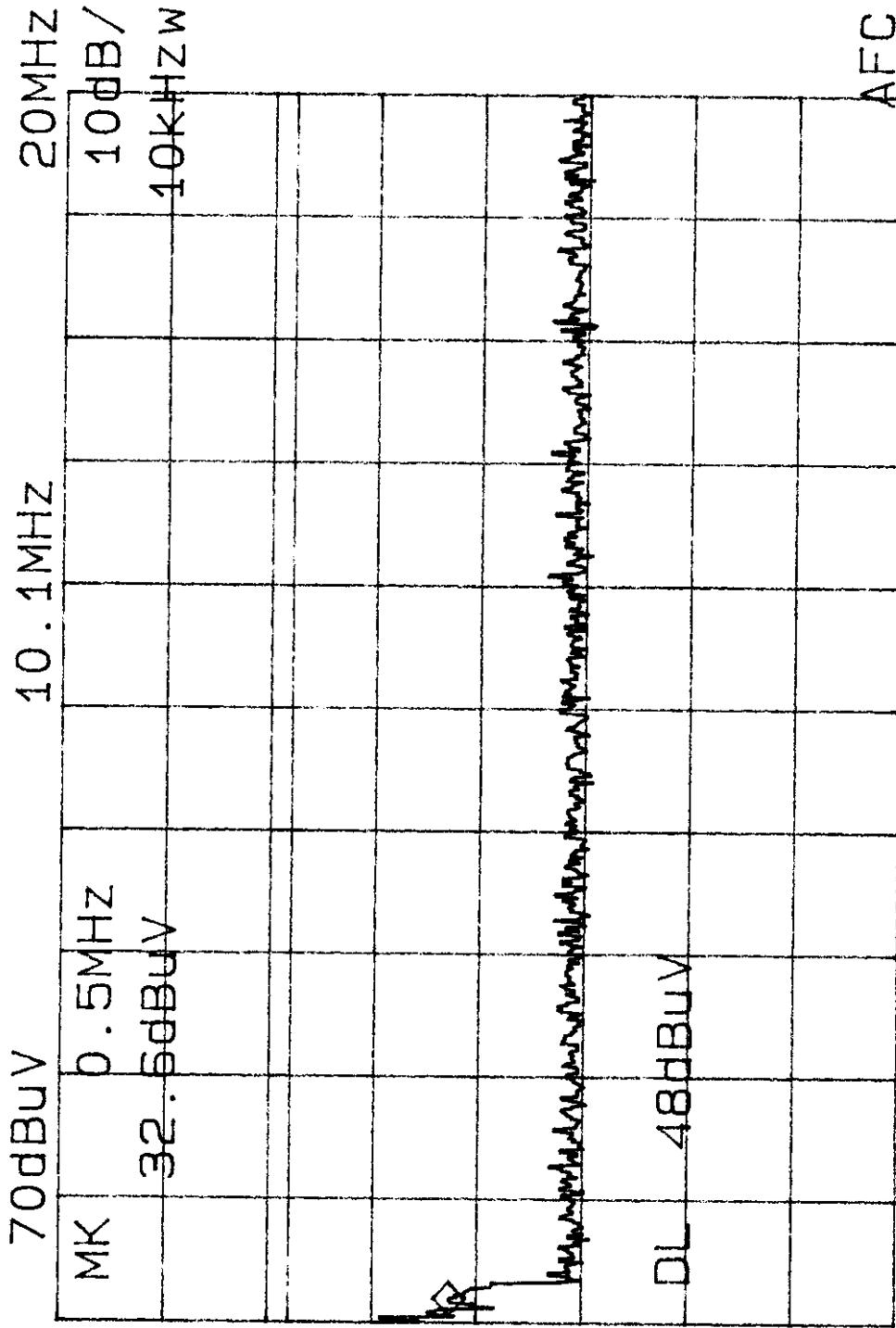
FREQ MHz	VOLTAGE dBuV	QP LEVEL	FCC LIMIT uV	MARGIN dB
		VOLTAGE uV		
0.514	32.6	42.7	250	-15.4

LINE 2 - PHASE

FREQ MHz	VOLTAGE dBuV	QP LEVEL	FCC LIMIT uV	MARGIN dB
		VOLTAGE uV		
0.514	32.8	43.7	250	-15.2

A.C. LINE CONDUCTED EMISSIONS - L1

MODULATED 70dBuV 20 MHz SPAN 10 KHZ RES. BW



ST 50ms/ VF 100kHz ATT 10dB

A.C. LINE CONDUCTED EMISSIONS - L2

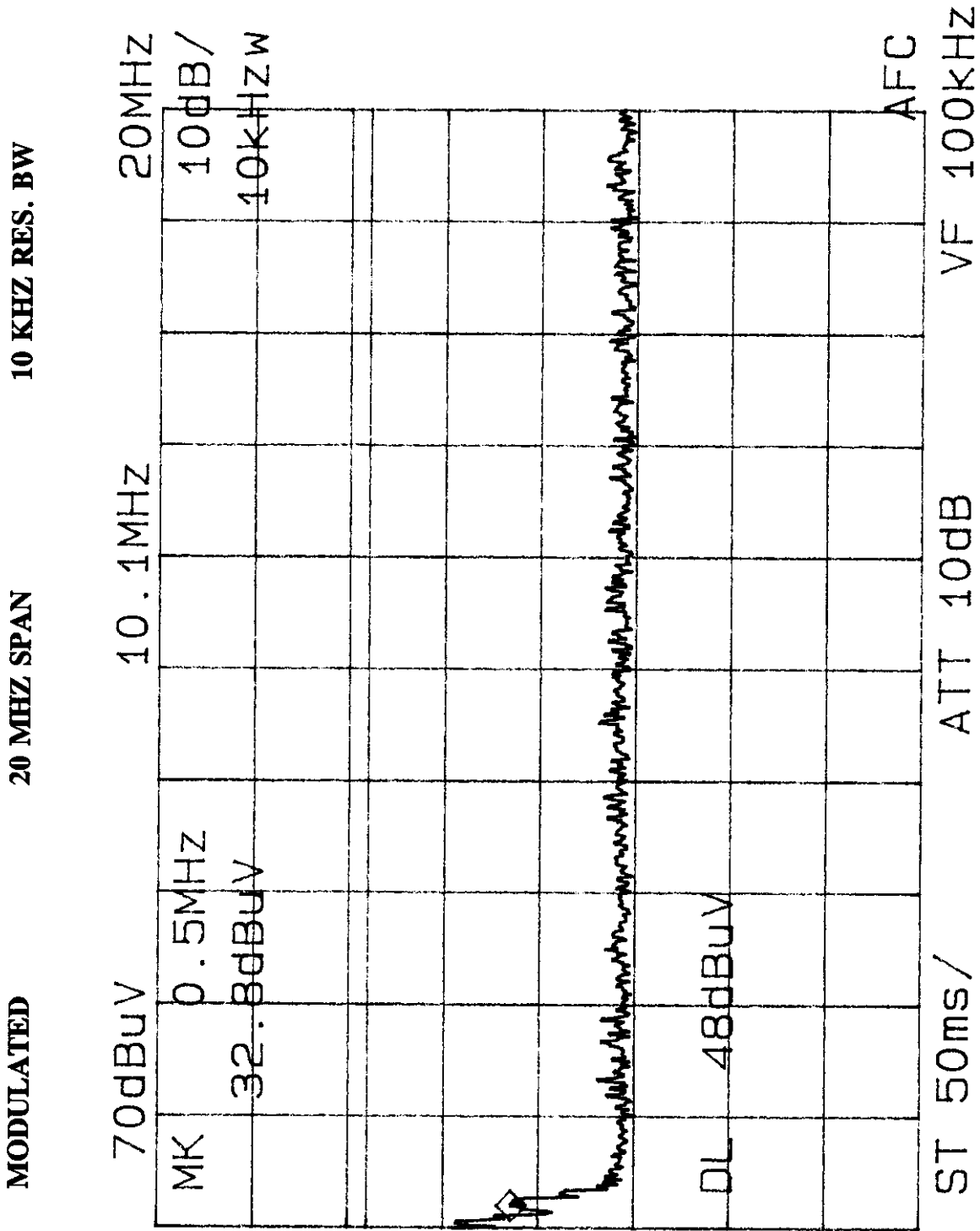


Table 1

Measurement Equipment Used

The following equipment is used to perform measurements:

EQUIPMENT	SERIAL NUMBER
Wavetek 2410A 1100 MHz Signal Generator	1362016
HP Model 8449B Preamplifier	12A533-A
EMCO Model 3146 Log Periodic Antenna	1222
Solar 8012-50-R-24-BNC LISN	924867
Advantest Model R4131D Spectrum Analyzer	54378A
EMCO Model 3115 Ridge Horn Antenna	1238
4 Meter Antenna Mast	None
Motorized Turntable	None
RG-233U 50 ohm coax Cable	None

EXHIBIT 1

EUT PHOTOGRAPHS