

## TABLE OF CONTENTS LIST

APPLICANT: WOOIL TELCOM CO., LTD.

FCC ID: OIZ1010

TEST REPORT:

PAGE 1.....COVER SHEET - GENERAL INFORMATION & TECHNICAL DESCRIPTOR  
PAGE 2.....TECHNICAL DESCRIPTION CONTINUED & RF POWER OUTPUT  
PAGE 3.....MODULATION CHARACTERISTICS AND OCCUPIED BANDWIDTH  
PAGE 4.....METHOD OF MEASUREMENT OF OCCUPIED BANDWIDTH  
PAGE 5.....UNWANTED RADIATION  
PAGE 6.....METHOD OF MEASUREMENT OF UNWANTED RADIATION  
PAGE 7.....FREQUENCY STABILITY  
PAGE 8.....LIST OF TEST EQUIPMENT

EXHIBITS CONTAINING:

EXHIBIT 1.....FCC ID LABEL SAMPLE AND SKETCH OF LOCATION  
EXHIBIT 2A.....EXTERNAL FRONT VIEW PHOTOGRAPH  
EXHIBIT 2B.....EXTERNAL REAR VIEW PHOTOGRAPH  
EXHIBIT 2C.....EXTERNAL SIDE VIEW PHOTOGRAPH  
EXHIBIT 2D.....EXTERNAL TOP VIEW PHOTOGRAPH  
EXHIBIT 2E.....INTERNAL COMPONENT VIEW PHOTOGRAPH  
EXHIBIT 2F.....INTERNAL COPPER VIEW PHOTOGRAPH  
EXHIBIT 3.....BLOCK DIAGRAM  
EXHIBIT 4.....SCHEMATIC  
EXHIBIT 5A-5L.....USER'S MANUAL  
EXHIBIT 6A-6D.....THEORY OF OPERATION  
EXHIBIT 7A-7C.....TUNING PROCEDURE  
EXHIBIT 8.....MODULATION LIMITING 300 Hz  
EXHIBIT 9.....MODULATION LIMITING 1000 Hz  
EXHIBIT 10.....MODULATION LIMITING 3000 Hz  
EXHIBIT 11.....AUDIO FREQUENCY RESPONSE GRAPH  
EXHIBIT 12.....AUDIO LOW PASS FILTER  
EXHIBIT 13.....OCCUPIED BANDWIDTH CW PLOT  
EXHIBIT 14.....OCCUPIED BANDWIDTH PLOT  
EXHIBIT 15.....LETTER OF STATEMENT

APPLICANT: WOOIL TELCOM CO., LTD.

FCC ID: OIZ1010

REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT

PAGE: TABLE OF CONTENTS

GENERAL INFORMATION REQUIRED  
FOR TYPE ACCEPTANCE

2.1033(c)(1)(2) WOOIL TELCOM CO., LTD. will manufacture the  
FCCID: OIZ1010 FAMILY RADIO SERVICES 14 CHANNEL  
TRANSCEIVER in quantity, for use under FCC RULES  
PART 95.

WOOIL TELCOM CO., LTD.  
522-5, NUSAN-RI  
YANGCHON-MUEN, KIMPO CITY  
KOREA

2.1033 (c) TECHNICAL DESCRIPTION

2.1033(c)(3) Instruction book. A draft copy of the instruction  
manual is included as EXHIBITS 5A-5L.

2.1033(c) (4) Type of Emission: 10K0F3E  
95.629

Bn = 2M + 2DK  
M = 3000  
D = 2.0K  
Bn = 2(3.0)+2(2.0) = 10.0K

Authorized Bandwidth 12.5KHz

2.1033(c)(5) Frequency Range: 1. 462.5625 8. 467.5625  
95.627 2. 462.5875 9. 467.5875  
3. 462.6125 10. 467.6125  
4. 462.6375 11. 467.6375  
5. 462.6625 12. 467.6625  
6. 462.6875 13. 467.6875  
7. 462.7125 14. 467.7125 MHz

2.1033(c)(6)(7) Power Output shall not exceed 0.500Watts effective  
95.637 radiated power. There can be no provisions for  
95.647 increasing the power or varing the power. The Maximum  
Output Power Rating: 500 milliWatts  
effective radiated power.

95.645 The antenna is an intergral part to the unit, it cannot  
be removed without rendering the unit inoperative. In  
order to remove the antenna the case must unscrewed,  
then the PCB assemblies must be removed then the  
antenna can be removed.

2.1033(c)(8) DC Voltages and Current into Final Amplifier:  
FINAL AMPLIFIER ONLY  
Vce = 4.5 Volts DC Ice = 0.32A.  
Pin = 1.43 Watts

2.1033(c)(9) Tune-up procedure. The tune-up procedure is included  
7A-7C.

APPLICANT: WOOIL TELCOM CO., LTD.  
FCC ID: OIZ1010  
REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT  
PAGE #: 1

TECHNICAL DESCRIPTION CONT.'D  
RF POWER OUTPUT

2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 4 of this report. The block diagram are included as EXHIBIT 3 of this report.

2.1033(c)(11) A photograph or a drawing of the equipment identification label is included as exhibit No. 1.

2.1033(c)(12) Photographs(8"X10") of the equipment of sufficient clarity to reveal equipment construction and layout, including meters, labels for controls, including any view under shields. See Exhibits 2B-2F.

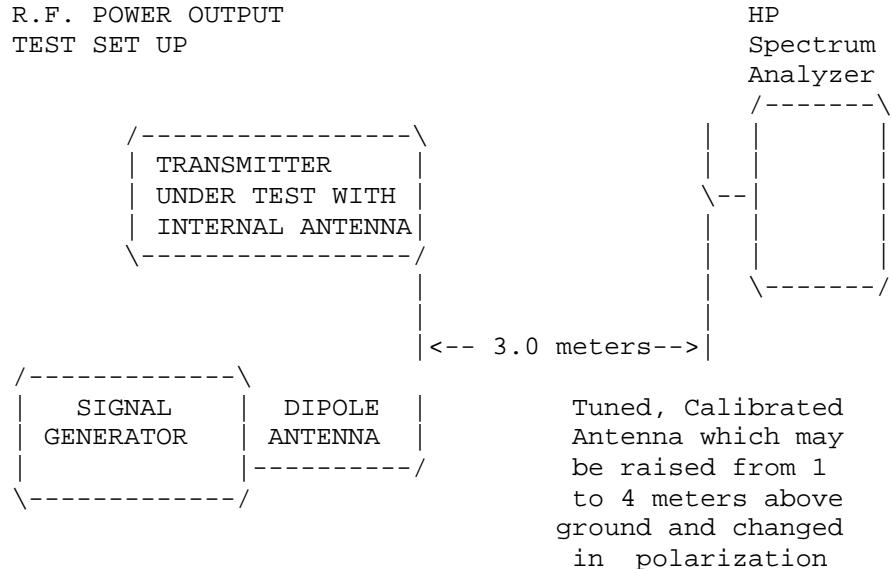
2.1033(c)(13) Digital modulation is not allowed.

2.1033(c)(14) The data required by 2.1046 through 2.1057 is submitted below.

2.1046(a) RF power output.

95.637 RF power is measured by measuring the radiated power at 3 meters and then replacing the transmitter with a signal generator to determine the effective radiated power. The ERP shall not exceed 0.500 Watts.

MEASURED POWER OUTPUT = 500 milliWatts ERP



Equipment placed 1 meter above ground  
on a rotatable platform.

APPLICANT: WOOIL TELCOM CO., LTD.  
FCC ID: OIZ1010  
REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT  
PAGE #: 2

MODULATION CHARACTERISTICS OF OCCUPIED BANDWIDTH

2.1047(a)(b) Modulation characteristics:

AUDIO FREQUENCY RESPONSE

The audio frequency response was measured in accordance with TIA/EIA Specification 603. The audio frequency response curve is shown on the next page. The audio signal was fed into a dummy microphone circuit and into the microphone connector. The input required to produce 30 percent modulation level was measured. See Exhibit 11.

2.1047(b) Audio input versus modulation

The audio input level needed for a particular percentage of modulation was measured in accordance with TIA/EIA Specification 603. The audio input curves versus modulation are on the following pages. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz. See Exhibits 8-10.

95.635(b) Post Limiter Filter The filter must be between the modulation limiter and the modulated stage. At any frequency between 3 & 20KHz the filter must have an attenuation of  $60\log(f/3)$  greater than the attenuation at 1KHz. See Exhibit 12.

2.989(c) EMISSION BANDWIDTH:

95.633(b)(1)(3)(7)

Data in the plots shows that the sidebands from greater than 50% to 100% of the authorized bandwidth must be attenuated by at least 25dB and from 100 to 250% the sidebands must be attenuated by at least 35dB. Beyond 250% the sidebands must be attenuated by at least  $43+\log_{10}(TP)$ . The transmitter was modulated with 2500 Hz, adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the unmodulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth PLOTS follow.

APPLICANT: WOOIL TELCOM CO., LTD.

FCC ID: OIZ1010

REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT

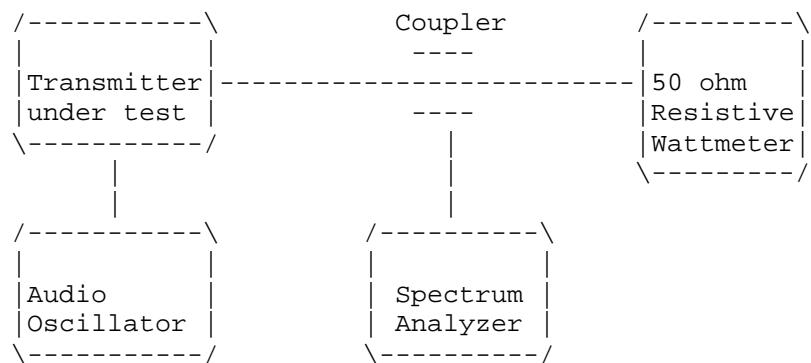
PAGE #: 3

METHOD OF MEASURMENT OF OCCUPIED BANDWIDTH

Radiotelephone transmitter with modulation limiter.

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT



APPLICANT: WOOIL TELCOM CO., LTD.  
FCC ID: OIZ1010  
REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT  
PAGE #: 4

## UNWANTED RADIATION

2.1051 Not Applicable, no antenna terminal allowed.

2.1053 UNWANTED RADIATION:  
95.635(b)(7)

REQUIREMENTS: Emissions must be attenuated by at least the following below the output of the transmitter.

$$43 + 10\log(TP) = 43 + 10\log(0.5) = 40.00\text{dB}$$

## TEST DATA:

EMISSION FREQ. MHz	METER READING @ 3m	COAX LOSS dB	ACF dB	FIELD STRNGTH dBuV/m	ATT. dBuV/m	MARGIN dB	ANT.
462.60	104.20	1.60	18.44	124.24	0.0	0.0	V
925.10	55.60	2.90	24.10	82.60	41.64	1.64	V
1387.72	46.60	1.00	25.55	73.15	51.09	11.09	V
1850.32	44.00	1.01	27.40	72.41	51.83	11.83	V
2312.84	41.00	1.08	28.78	70.86	53.38	13.38	V
2775.44	27.90	1.15	29.94	58.99	65.25	25.25	V
3237.94	42.00	1.22	31.09	74.31	49.93	9.93	V
3700.54	40.60	1.29	32.25	74.14	50.10	10.10	V
4163.06	27.10	1.35	33.18	61.64	62.60	22.60	H
4625.66	31.00	1.42	33.70	66.13	58.11	18.11	V

MARGIN = (Field strength of Fund - 40dB) - FS OF EMISSION

METHOD OF MEASUREMENT: The procedure used was C63.4-1992 for intentional radiators. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer, an Eaton model 94455-1 Biconical Antenna, ElectroMetrics antennas models TDA, TDS-25-1, TDS-25-2 and RGA-180. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.

APPLICANT: WOOIL TELCOM CO., LTD.  
FCC ID: OIZ1010  
REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT  
PAGE #: 5

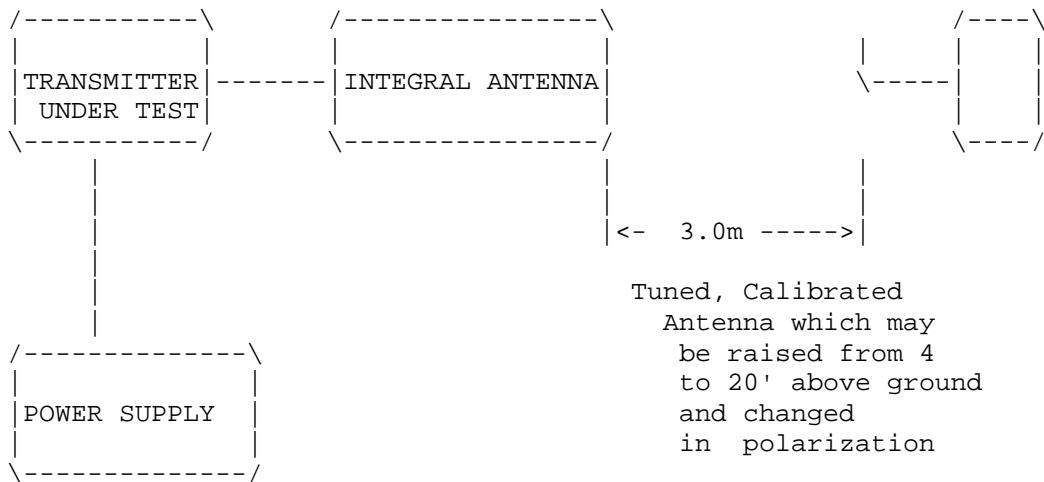
METHOD OF MEASURMENT OF UNWANTED RADIATION

2.1053  
95.631(b)(8)(9)

UNWANTED RADIATION:

Method of Measuring Radiated Spurious Emissions

Hewlett Packard  
Spectrum  
Analyzer  
HP8566B



Equipment placed 4' above ground  
on a rotatable platform.

APPLICANT: WOOIL TELCOM CO., LTD.  
FCC ID: OIZ1010  
REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT  
PAGE #: 6

## FREQUENCY STABILITY

2.1055

Frequency stability:

Temperature and voltage tests were performed to verify that the frequency remains within the 0.00025%, 2.5 ppm specification limit. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Readings were also taken at plus and minus 15% of the battery voltage of 4.5 VDC.

### MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 462.662 500

TEMPERATURE_C	FREQUENCY_MHz	PPM
REFERENCE_____	462.662 500	00.00
-20_____	462.662 328	-0.37
-10_____	462.663 507	+2.18
0_____	462.663 634	+2.45
+10_____	462.663 632	+2.44
+20_____	462.663 257	+1.64
+30_____	462.662 478	-0.05
+40_____	462.661 895	-1.31
+50_____	462.661 474	-2.21
-15% BATT. End-Point 5.1V/dc	462.662 564	+0.14
+15% BATT. End-Point 6.9V/dc	462.662 551	+0.11

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -2.21 to +2.45 ppm. The maximum frequency variation with voltage was +0.14ppm.

APPLICANT: WOOIL TELCOM CO., LTD.

FCC ID: OIZ1010

REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT

PAGE #: 7

APPLICANT: WOOIL TELCOM CO., LTD.  
FCC ID: OIZ1010

TEST EQUIPMENT LIST

1. X Spectrum Analyzer: HP 8566B-Opt 462, S/N 3138A07786, w/  
preselector HP 85685A, S/N 3221A01400, Quasi-Peak Adapter  
HP 85650A, S/N 3303A01690 & Preamplifier HP 8449B-OPT H02,  
S/N 3008A00372 Cal. 10/17/99
2. X Biconnical Antenna: Eaton Model 94455-1, S/N 1057
3. X Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632
4. X Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180,  
1-18 GHz, S/N 2319 Cal. 4/27/99
5.   Horn 40-60GHz: ATM Part #19-443-6R
6.   Line Impedance Stabilization Network: Electro-Metrics Model  
ANS-25/2, S/N 2604 Cal. 2/9/00
7. X Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7
8. X Frequency Counter: HP Model 5385A, S/N 3242A07460 Cal 10/6/99
9.   Peak Power Meter: HP Model 8900C, S/N 2131A00545 Cal 7/19/99
10. X Open Area Test Site #1-3meters Cal. 12/22/99
11.   Signal Generator: HP 8640B, S/N 2308A21464 Cal. 9/23/99
12.   Signal Generator: HP 8614A, S/N 2015A07428 Cal. 5/29/99
13.   Passive Loop Antenna: EMCO Model 6512, 9KHz to 30MHz, S/N  
9706-1211 Cal. 6/23/97
14.   Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153  
Cal. 11/24/99
15.   AC Voltmeter: HP Model 400FL, S/N 2213A14499 Cal. 9/21/99
16.   Digital Multimeter: Fluke Model 8012A, S/N 4810047 Cal 9/21/99
17.   Digital Multimeter: Fluke Model 77, S/N 43850817 Cal 9/21/99
18.   Oscilloscope: Tektronix Model 2230, S/N 300572 Cal 9/23/99

APPLICANT: WOOIL TELCOM CO., LTD.  
FCC ID: OIZ1010  
REPORT #: T:\CUS\W\WTC\197AK0\197AK0.RPT  
PAGE #: 8