

TABLE OF CONTENTS LIST

APPLICANT: KACE ELECTRONICS (ASIA) INC.

FCC ID: MUDKF-2100

TEST REPORT:

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

EXHIBITS CONTAINING:

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

APPLICANT: KACE ELECTRONICS (ASIA) INC.

FCC ID: MUDKF-2100

REPORT #: T:\CUS\K\KACE\KAC96A0\96A0.RPT

PAGE: TABLE OF CONTENTS

GENERAL INFORMATION REQUIRED
FOR TYPE ACCEPTANCE

2.1033(c)(1)(2) KACE ELECTRONICS (ASIA) INC. will manufacture the FCCID: MUDKF-2100 FAMILY RADIO SERVICES 14 CHANNEL TRANSCEIVER in quantity, for use under FCC RULES PART 95.

2.1033 (c) TECHNICAL DESCRIPTION

2.1033(c)(3) Instruction book. A draft copy of the instruction manual is included as EXHIBIT 10.

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

Bn = 2M + 2DK

M = 3000

D = 2.2K

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 = 0.12A.

Pin = 0.54 Watts

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

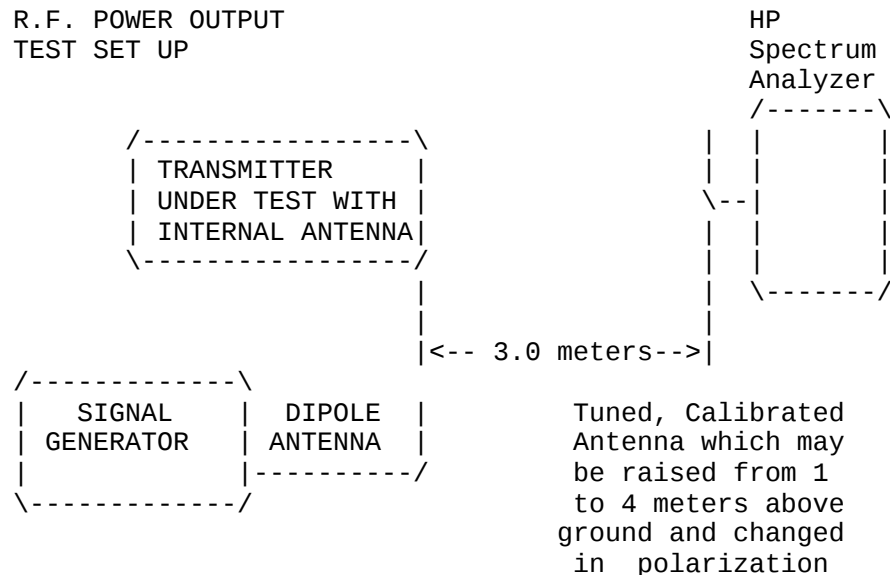
TECHNICAL DESCRIPTION CONTINUED

- 2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 6 of this report. The block diagrams are included as EXHIBIT 5 of this report.
- 2.1033(c)(11) A photograph or a drawing of the equipment identification label is included as exhibit No. 2.
- 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.
- 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

R.F. POWER OUTPUT
TEST SET UP



Equipment placed 1 meter above ground on a rotatable platform.

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.

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.

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 the proceeding page.

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: KACE ELECTRONICS (ASIA) INC.

FCC ID: MUDKF-2100

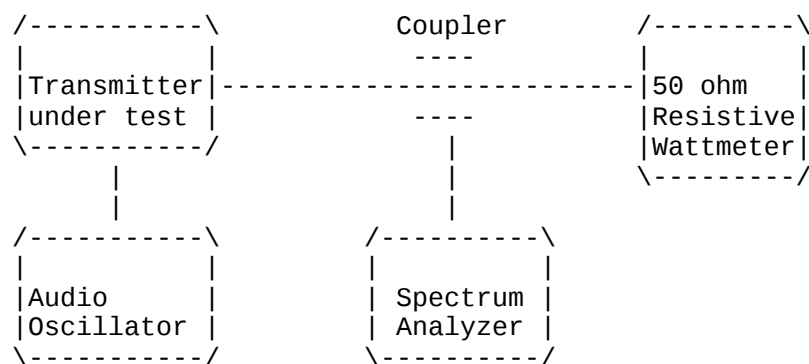
REPORT #: T:\CUS\K\KACE\KAC96A0\96A0.RPT

PAGE #: 3

Radiotelephone transmitter with modulation limiter.

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT



APPLICANT: KACE ELECTRONICS (ASIA) INC.

FCC ID: MUDKF-2100

REPORT #: T:\CUS\K\KACE\KAC96A0\96A0.RPT

PAGE #: 4

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 dBuV	COAX LOSS dB	ACF dB	FIELD STRNGTH dBuV/m	ATT. dBuV/m	MARGIN dB	ANT.
462.70	104.30	1.60	18.44	124.34	0.00	0.03	V
925.40	44.40	2.90	24.10	71.40	52.94	12.94	V
1388.00R	44.40	1.00	25.55	70.95	53.39	13.39	V
1850.80	50.10	1.01	27.40	78.51	45.83	5.83	V
2313.60R	42.70	1.08	28.78	72.56	51.78	11.78	V
2776.30R	37.30	1.15	29.94	68.39	55.95	15.95	V
3239.00	41.70	1.22	31.10	74.01	50.33	10.33	V
3701.70R	33.70	1.29	32.25	67.24	57.10	17.10	V
4164.40R	23.60	1.36	33.18	58.14	66.16	16.16	H
4627.10R	25.50	1.42	33.71	60.63	63.71	23.71	H

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.

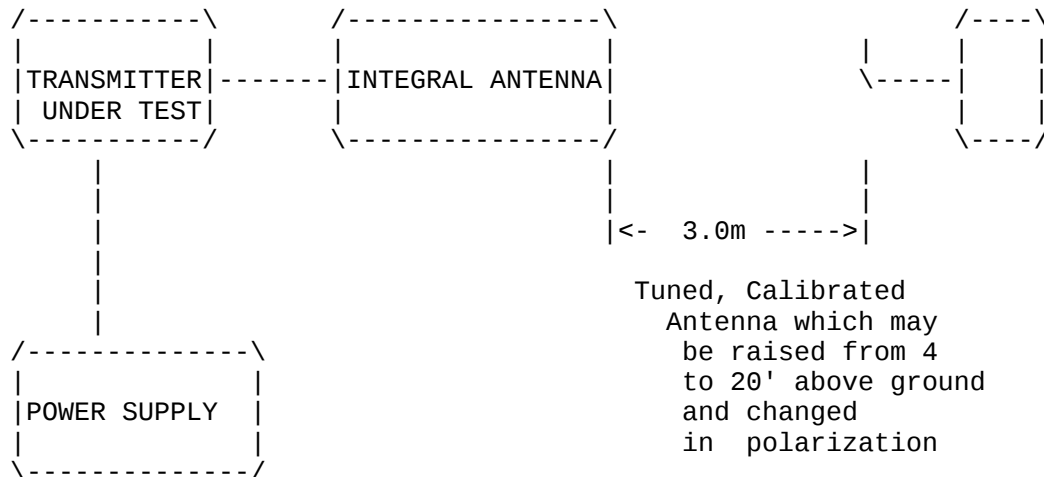
APPLICANT: KACE ELECTRONICS (ASIA) INC.
FCC ID: MUDKF-2100
REPORT #: T:\CUS\K\KACE\KAC96A0\96A0.RPT
PAGE #: 5

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: KACE ELECTRONICS (ASIA) INC.
FCC ID: MUDKF-2100
REPORT #: T:\CUS\K\KACE\KAC96A0\96A0.RPT
PAGE #: 6

APPLICANT: KACE ELECTRONICS (ASIA) INC.
FCC ID: MUDKF-2100

TEST EQUIPMENT LIST

1. ☒ 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. ☐ Signal Generator: HP 8640B, S/N 2308A21464 Cal. 9/23/99
3. ☐ Signal Generator: HP 8614A, S/N 2015A07428 Cal. 5/29/99
4. ☐ Passive Loop Antenna: EMC0 Model 6512, 9KHz to 30MHz, S/N
9706-1211 Cal. 6/23/97
5. ☒ Biconnical Antenna: Eaton Model 94455-1, S/N 1057
6. ☒ Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632
7. ☐ Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153
Cal. 11/24/99
8. ☒ Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180,
1-18 GHz, S/N 2319 Cal. 4/27/99
9. ☐ Horn 40-60GHz: ATM Part #19-443-6R
10. ☐ Line Impedance Stabilization Network: Electro-Metrics Model
ANS-25/2, S/N 2604 Cal. 11/30/99
11. ☐ Line Impedance Stabilization Network: Electro-Metrics Model
EM-7820, S/N 2682 Cal. 12/1/99
12. ☒ Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7
13. ☐ AC Voltmeter: HP Model 400FL, S/N 2213A14499 Cal. 9/21/99
14. ☐ Digital Multimeter: Fluke Model 8012A, S/N 4810047 Cal 9/21/99
15. ☐ Digital Multimeter: Fluke Model 77, S/N 43850817 Cal 9/21/99
16. ☐ Oscilloscope: Tektronix Model 2230, S/N 300572 Cal 9/23/99
17. ☒ Frequency Counter: HP Model 5385A, S/N 3242A07460 Cal 10/6/99

APPLICANT: KACE ELECTRONICS (ASIA) INC.
FCC ID: MUDKF-2100
REPORT #: T:\CUS\K\KACE\KAC96A0\96A0.RPT
PAGE #: 8