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APPLICANT: KACE ELECTRONICS (ASIA) INC.

FCC ID: MUDFR-140

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GENERAL INFORMATION REQUIRED
FOR TYPE ACCEPTANCE

2.983 (a,b,c) KACE ELECTRONICS (ASIA) INC. will manufacture the
FCCID: MUDFR-140 FAMILY RADIO SERVICES 14 CHANNEL
TRANSCIVER in quantity, for use under FCC RULES
PART 95.

2.983 (d) TECHNICAL DESCRIPTION

2.983 (d) (1) Type of Emission: 8K8F3E
95.629

$$B_n = 2M + 2DK$$

$$M = 3000$$

$$D = 2.2K$$

$$B_n = 2(3.0) + 2(1.4) = 8.80K$$

Authorized Bandwidth 12.5KHz

2.983 (d) (2) 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

2.983 (d) (3) Power Output shall not exceed 0.500Watts effective
95.637 radiated power. There can be no provisions for
95.647 increasing the power.

2.983 (d) (4) Maximum Output Power Rating: 300 milliWatts
95.637 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.

2.983 (d) (5) DC Voltages and Current into Final Amplifier:

FINAL AMPLIFIER ONLY

Vce = 4.5 Volts DC Ice = 0.31A.

Pin = 1.42 Watts

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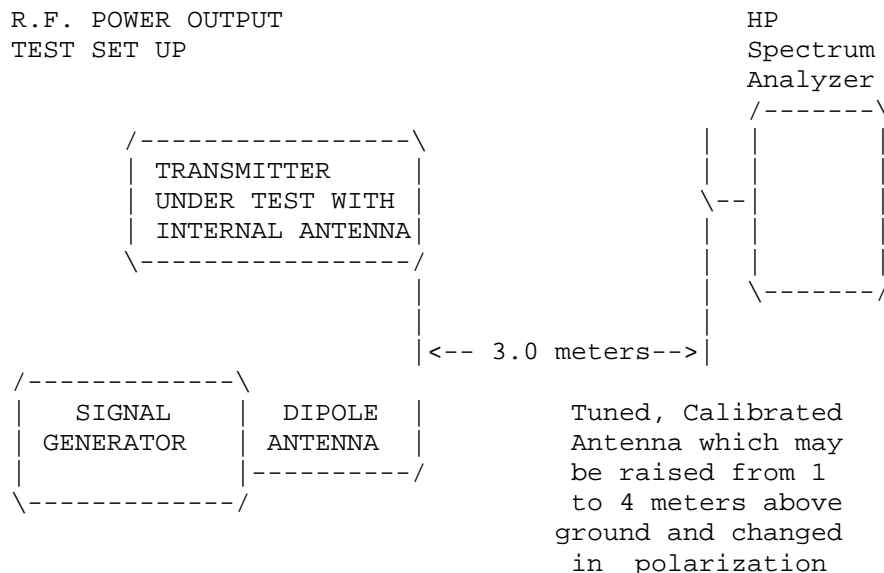
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2.985(a) RF power output.

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 = 300 milliWatts ERP

R.F. POWER OUTPUT
TEST SET UP



Equipment placed 1 meter above ground
on a rotatable platform.

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2.991 Not Applicable, no antenna terminal allowed.

2.993(a)(b) 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.
462.56	102.00	1.60	18.44	122.04	0.00	0.00	V
925.10	42.00	2.90	24.10	69.00	53.04	13.05	V
1387.70	41.00	1.00	25.55	67.55	54.49	14.50	V
1850.00	45.50	1.01	27.40	73.91	48.13	8.14	V
2312.80	48.50	1.08	28.78	78.36	43.68	3.69	V
2775.40	31.50	1.15	29.94	62.58	59.45	19.46	V
3237.90	28.40	1.22	31.09	60.71	61.33	21.34	H
3700.50	27.00	1.29	32.25	60.54	61.50	21.51	H
4163.00	28.90	1.35	33.18	63.44	58.60	18.61	V
4625.00	23.80	1.42	33.70	58.93	63.11	23.12	H

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

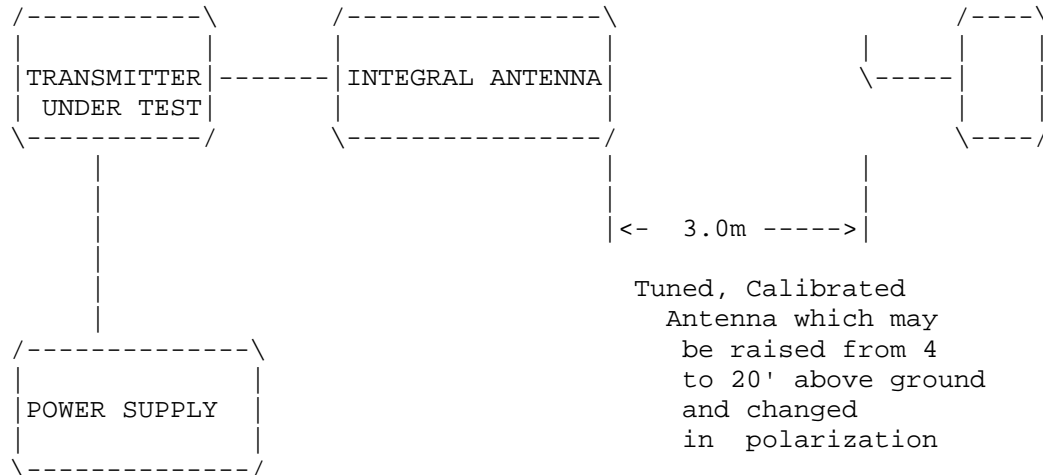
METHOD OF MEASUREMENT: The procedure used was C63.4-1992 for intentional radiators. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer, an Eaton model 94455-1 Biconical Antenna, ElectroMetrics antennas models TDA, TDS-25-1, TDS-25-2 and RGA-180. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 6051 N.W. 19th Lane, Gainesville, FL. 32605.

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2.993(a)(b) UNWANTED RADIATION:
95.631(b)(8)(9)

Method of Measuring Radiated Spurious Emissions

Hewlett Packard
Spectrum
Analyzer
HP8566B



Equipment placed 4' above ground
on a rotatable platform.

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2.995(a)(b)(d) 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): 462.562 500

TEMPERATURE oC	FREQUENCY MHz	PPM
REFERENCE_____	462.562 500	00.00
-20_____	462.562 050	-0.09
-10_____	462.563 200	+0.15
0_____	462.563 700	+0.26
+10_____	462.563 600	+0.24
+20_____	462.563 100	+0.13
+30_____	462.562 470	-0.01
+40_____	462.562 040	-0.10
+50_____	462.561 800	-0.15

20c BATT. End-Point 4.5V/dc 462.562 750 +0.05

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -.15 to + .26 ppm. The maximum frequency variation with voltage was +0.25ppm.

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2.999 Measurement Procedures for Type Acceptance:

Measurement techniques have been in accordance with EIA specifications and the FCC requirements.

2.909 Certification of Technical Data by Engineers

We, the undersigned, certify that the enclosed measurements and enclosed data are true and correct.

S.S. Sanders
Engineer

LIST OF TEST EQUIPMENT

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/ preselector 85685A, & Quasi-Peak Adapter HP 85650A, & HP 8449B - OPT H02 Cal. 7/6/99
2. Signal Generator, Hewlett Packard 8640B, cal. 9/23/99
3. Signal Generator, HP 8614A Serial No.2015A07428 cal. 5/27/99
3. Eaton Biconnical Antenna Model 94455-1
20-200 MHz Serial No. 0997 Cal. 10/30/98
4. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/31/98
5. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 4/27/99
6. Electro-Metric Antennas Model TDA-30/1-4, Cal. 10/15/98
7. Electro-Metric Line Impedance Stabilization Network Model
No. EM-7821, Serial No. 101; 100KHz-30MHz 50uH. Cal.11/19/98
8. Electro-Metric Line Impedance Stabilization Network Model
No. EM-7820, Serial No. 2682; 10KHz-30MHz 50uH. Cal. 11/19/98
9. Special low loss cable was used above 1 GHz
10. Tenney Temperature Chamber
11. AC Voltmeter, HP 400FL, Serial No 2213A14499. Cal. 9/21/99
12. Digital Multimeter, Fluke 8010A/12A, Serial No. 4810047.
Cal 9/21/99
13. Digital Multimeter, Fluke 77, Serial No. 43850817. Cal 9/21/99
14. Oscilloscope, Tektronix 2230, Serial No. 300572. Cal 9/23/99

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