

TABLE OF CONTENTS LIST

APPLICANT: MONICOR ELECTRONIC CORPORATION

FCC ID: GES4BAM2000T

TEST REPORT:

PAGE	1.....	COVER SHEET - GENERAL INFORMATION & TECHNICAL DESCR.
PAGE	2.....	TECHNICAL DESCRIPTION CONTD. & RF POWER OUTPUT
PAGE	3.....	RF POWER OUTPUT CONTD. & MODULATION CHARACTERISTICS
PAGE	4.....	OCCUPIED BANDWIDTH
PAGE	5.....	SPURIOUS EMISSIONS AT ANTENNA TERMINALS AND FIELD STRENGTH OF SPURIOUS EMISSIONS
PAGE	6.....	FREQUENCY STABILITY
PAGE	7.....	CERTIFICATION OF TECHNICAL DATA AND LIST OF TEST EQUIPMENT

EXHIBITS CONTAINING:

EXHIBIT	1.....	POWER OF ATTORNEY LETTER
EXHIBIT	2.....	FCC ID LABEL SAMPLE AND SKETCH OF LOCATION
EXHIBIT	3A.....	EXTERNAL FRONT VIEW PHOTOGRAPH
EXHIBIT	3B.....	EXTERNAL REAR VIEW PHOTOGRAPH
EXHIBIT	3C.....	INTERNAL COMPONENT SIDE PHOTOGRAPH
EXHIBIT	3D.....	INTERNAL SOLDER SIDE PHOTOGRAPH
EXHIBIT	3E.....	INTERNAL PHOTO - BOARDS IN CHASSIS
EXHIBIT	4.....	BLOCK DIAGRAM
EXHIBIT	5A-5C.....	PARTS LIST
EXHIBIT	6A.....	SCHEMATIC - DIGITAL BOARD
EXHIBIT	6B.....	SCHEMATIC - RF BOARD
EXHIBIT	7A-7B.....	TUNING PROCEDURE
EXHIBIT	8.....	CRYSTAL SPECIFICATION
EXHIBIT	9A-9G.....	CIRCUIT DESCRIPTION
EXHIBIT	10.....	USER'S MANUAL
EXHIBIT	11.....	OCCUPIED BANDWIDTH CW PLOT
EXHIBIT	12.....	OCCUPIED BANDWIDTH PLOT - 2400 Hz
EXHIBIT	13.....	OCCUPIED BANDWIDTH PLOT - 4800 Hz
EXHIBIT	14.....	POWERLINE CONDUCTED PLOT - LINE 1
EXHIBIT	15.....	POWERLINE CONDUCTED PLOT - LINE 2

APPLICANT: MONICOR ELECTRONIC CORPORATION

FCC ID: GES4BAM2000T

REPORT #: F:\CUS\M\MON\MON34U9.RPT

PAGE: TABLE OF CONTENTS

GENERAL_INFORMATION_REQUIRED
FOR_TYPE_ACCEPTANCE

2.983 (a,b,c) MONICOR ELECTRONIC CORPORATION will
sell the GES4BAM2000T, in
quantity, for use under FCC RULES PART 90.217(a).

2.983 (d) TECHNICAL_DESCRIPTION

(1) ALLOWED AUTHORIZED BANDWIDTH = 11.25KHz.
90.209(b)(5)

$$B_n = 2M + 2DK$$

$$M = 4800/2 = 2400$$

$$D = 2.0\text{KHz (Peak Deviation)}$$

$$K = 1$$

$$B_n = 2(2.4\text{K}) + 2(2.0\text{K})(1) = 4.8\text{K} + 4.0\text{K} = 8.8\text{K}$$

This transmitter uses MSK(MINIMUM SHIFT KEYING).

Type of Emission: 8K8F1D

(2) ALLOWED AUTHORIZED BANDWIDTH = 20.0KHz.
90.209(b)(5)

$$B_n = 2M + 2DK$$

$$M = 4800/2 = 2400$$

$$D = 4.0\text{KHz (Peak Deviation)}$$

$$K = 1$$

$$B_n = 2(2.4\text{K}) + 2(4.0\text{K})(1) = 4.8\text{K} + 8.0\text{K} = 12.8\text{K}$$

This transmitter is frequency modulated F2d using
two(2) different tones, 1900Hz & 3000Hz.

Type of Emission: 12K8F1D

(2) Frequency Range: Part 90: 432-470MHz

(3) Power Range and Controls: Power is has no controls.

(4) Maximum Output Power Rating: 120 Milli-Watts into a
50 ohm resistive load.

(5) DC Voltages and Current into Final Amplifier:
Not Applicable.

(6) Function of each electron tube or semiconductor
device or other active circuit device:

SEE EXHIBITS 6A-6C.

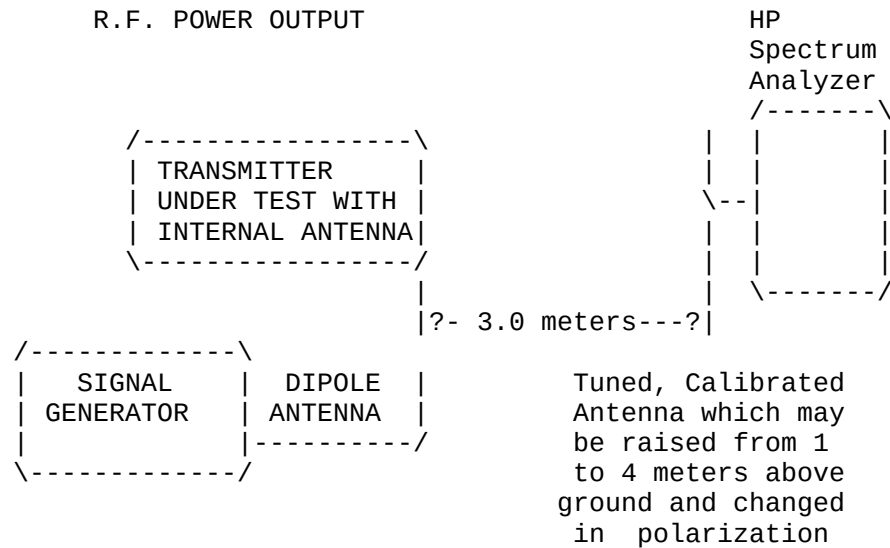
APPLICANT: MONICOR ELECTRONIC CORPORATION

FCC ID: GES4BAM2000T

REPORT #: F:\CUS\M\MON\MON34U9.RPT

PAGE #: 1

- 2.983(d) (7) Complete Circuit Diagrams: The circuit diagram is included as Exhibit 6A-6B. The block diagram is included as Exhibit 4. The part list is included as Exhibit 5A-5C.
- (8) Instruction book. The instruction manual is included as Exhibit 10.
- (9) Tune-up procedure. The tune-up procedure is given in Exhibit 7A-7B.
- (10) Description of all circuitry and devices provided for determining and stabilizing frequency.
- The transmitter frequency is controlled by a crystal, the crystal specifications are included in PAGE 20.
- (11) Description of any circuits or devices employed for suppression of spurious radiation, for limiting modulation, and for limiting power.
- This circuitry is described in PAGE 9A-9G.
- Limiting Modulation:
The transmitter audio circuitry is contained in IC101, and IC102.
- Limiting Power:
There is no provision for limiting power.
- (12) Digital modulation. This unit does use digital modulation.
- 2.983(e) The data required by 2.985 through 2.997 is submitted below.
- 2.985(a) RF_power_output.
- ERP was measured by connecting a signal generator to a dipole antenna and adjusting the level to produce the same field strength at the UUT.



Equipment placed 1 meter above ground on a rotatable platform. The center of the Dipole antenna at the center of the platform and the output of the signal generator adjusted to produce the same meter reading as measured for the fundamental in the radiated emissions test.

2.987(a)(b) Modulation_characteristics:

AUDIO_FREQUENCY_RESPONSE
Not required.

AUDIO_LOW_PASS_FILTER
Not required this part.

2.987(b) Audio_input_versus_modulation
Not applicable because there is no I/O port.

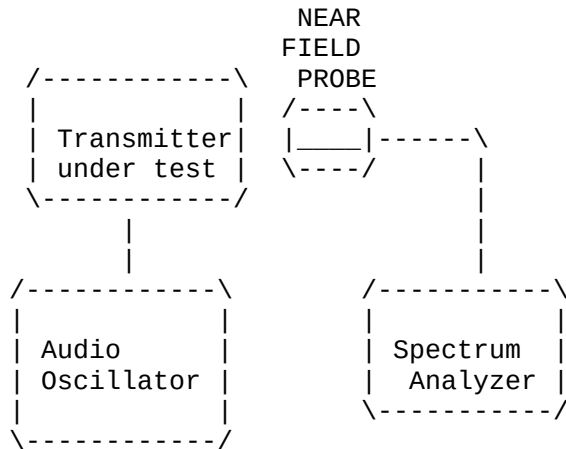
APPLICANT: MONICOR ELECTRONIC CORPORATION
 FCC ID: GES4BAM2000T
 REPORT #: F:\CUS\M\MON\MON34U9.RPT
 PAGE #: 3

2.989(c) Occupied_bandwidth:

Data in the plots show that the 30 dB occupied bandwidth is less than 20KHz. The plots show the transmitter modulated with the worst(greatest bandwidth) case combination of controls.

Test procedure diagram

OCCUPIED BANDWIDTH MEASUREMENT



REQUIREMENT: PART 90.217 EMISSION BANDWIDTH PLUS FREQUENCY STABILITY <40KHz AT 30dB.

APPLICANT: MONICOR ELECTRONIC CORPORATION
FCC ID: GES4BAM2000T
REPORT #: F:\CUS\M\MON\MON34U9.RPT
PAGE #: 4

2.991 Spurious_emissions_at_antenna_terminals(conducted):
 Not required because this unit does not have a
 connector.

2.993(a)(b) Field_strength_of_spurious_emissions:
S90.217(a)

REQUIREMENTS: Emissions must be 30dB below the mean power output
 of the transmitter.

30 dB below the unmodulated carrier

TEST DATA:

EMISSION FREQUENCY MHz	METER READING @ 3m dBuV	COAX LOSS dB	ACF dB	FIELD STRENGTH dBuV/m	ATT. LEVEL dB	MARGIN dB	ANT.
457.56	82.50	1.60	18.32	102.42	0.0	0.0	V
915.07	19.50	2.90	24.14	46.54	55.88	25.54	H
1372.63R	28.50	1.00	25.49	54.99	47.43	17.43	V
1830.15	40.80	1.00	27.32	69.13	33.29	3.29	V
2287.65R	30.50	1.07	28.72	60.29	42.13	12.13	V
2745.21R	26.50	1.14	29.86	57.50	44.92	14.92	H
3202.77	15.20	1.21	31.01	47.42	55.25	25.25	H
3600.33R	12.90	1.27	32.00	46.17	56.25	26.25	V
4117.84R	0.20	1.35	33.13	34.68	67.74	27.74	V
4575.40R	9.80	1.42	33.65	44.86	57.56	27.56	H

METHOD OF MEASUREMENT: The procedure used was C63.4-1992 operated into its own built-in antenna at a height of 1.5 meters above the ground plane. 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 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.

APPLICANT: MONICOR ELECTRONIC CORPORATION
FCC ID: GES4BAM2000T
REPORT #: F:\CUS\M\MON\MON34U9.RPT
PAGE #: 5

2.995(a)(b)(d) Frequency_stability:

Temperature and voltage tests were performed to verify that the frequency remains within the .0005%, (5 ppm), manufacturer's 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.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 457.537 250 MHz

TEMPERATURE_C	FREQUENCY_MHz	PPM
-30	457.537 790	+1.18
-20	457.537 610	+0.79
-10	457.537 620	+0.79
0	457.537 720	+1.02
10	457.537 770	+1.13
20	457.537 650	+0.87
30	457.537 530	+0.61
40	457.537 300	+0.11
50	457.537 110	-0.30

BATTERY END-POINT

25c END BATT. Volt(7.5)= 5.62VDC 457.537 320 + 0.15

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -0.30 to +1.18 ppm. The maximum frequency variation over the voltage range was +0.15 ppm.

APPLICANT: MONICOR ELECTRONIC CORPORATION
FCC ID: GES4BAM2000T
REPORT #: F:\CUS\M\MON\MON34U9.RPT
PAGE #: 6

- 2.983(f) Photo_or_Drawing_of_Label:
See PAGE 2.
- 2.983(g) Photos_of_Equipment:
See PAGES 3A-3E.
- 2.997 Frequency Spectrum Investigated The Spectrum was
investigated from 0.400 to 4.7GHz.
- 2.999 Measurement_Procedures_for_Type_Acceptance:

Measurement techniques have been in accordance
with ANSI & EIA specifications and the FCC re-
quirements.
- 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
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. 6/26/98
2. Signal Generator, Hewlett Packard 8640B, cal. 10/1/98
3. Eaton Biconnical Antenna Model 94455-1
20-200 MHz Serial No. 0997 Cal. 5/15/98
4. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/15/98
5. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 8/15/98
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

APPLICANT: MONICOR ELECTRONIC CORPORATION
FCC ID: GES4BAM2000T
REPORT #: F:\CUS\M\MON\MON34U9.RPT
PAGE #: 7