



M. Flom Associates, Inc. - Global Compliance Center

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Date of Report: May 29, 2003
Date of Submission: June 4, 2003

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Telonics Inc.
Equipment: MK9A
FCC ID: JYLMK9A
FCC Rules: 90, 95J, Confidentiality

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'M. Flom P. Eng.' The signature is written in a cursive style with a horizontal line underneath the name.

Morton Flom, P. Eng.

enclosure(s)
cc: Applicant
MF/cva

LIST OF EXHIBITS
(FCC **CERTIFICATION** (TRANSMITTERS) - REVISED 9/28/98)

APPLICANT: Telonics Inc.

FCC ID: JYLMK9A

BY APPLICANT:

1. LETTER OF AUTHORIZATION	x
2. IDENTIFICATION DRAWINGS, 2.1033(c) (11)	
<input checked="" type="checkbox"/> LABEL	
<input checked="" type="checkbox"/> LOCATION OF LABEL	
<input checked="" type="checkbox"/> COMPLIANCE STATEMENT	
<input checked="" type="checkbox"/> LOCATION OF COMPLIANCE STATEMENT	
3. PHOTOGRAPHS, 2.1033(c) (12)	x
4. DOCUMENTATION: 2.1033(c)	
(3) USER MANUAL	x
(9) TUNE UP INFO	x
(10) SCHEMATIC DIAGRAM	x
(10) CIRCUIT DESCRIPTION	x
BLOCK DIAGRAM	x
ACTIVE DEVICES	x
5. REQUEST FOR CONFIDENTIALTY	x
6. MPE CALCULATED REPORT	x

BY M.F.A. INC.

- A. TESTIMONIAL & STATEMENT OF CERTIFICATION
- B. STATEMENT OF QUALIFICATIONS



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T R A N S M I T T E R C E R T I F I C A T I O N

of

FCC ID: JYLMK9A
MODEL: MK9A

to

FEDERAL COMMUNICATIONS COMMISSION

Rule Part(s) 90, 95J, Confidentiality

DATE OF REPORT: May 29, 2003

ON THE BEHALF OF THE APPLICANT:

Telonics Inc.

AT THE REQUEST OF:

P.O. 52842

Telonics Inc.
932 E. Impala Avenue
Mesa, AZ 85204-6699

Attention of:

David Beaty, Managing Director
email: dave@telonics.com
(480) 892-4444 ext. 122; FAX: -9139
and/or Timo Hansen, Electrical Engineer
email: timo@telonics.com
(480) 892-4444 ext. 135; FAX: -9139

SUPERVISED BY:



Morton Flom, P. Eng.

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

TABLE OF CONTENTS

<u>RULE</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
	Test Report	1
2.1033(c)	General Information Required	2
2.1033(c) (14)	Rule Summary	5
	Standard Test Conditions and Engineering Practices	6
2.1046(a)	ERP Carrier Power (Radiated)	7
2.1053(a)	Field Strength of Spurious Radiation	8
2.1049(c) (1)	Emission Masks (Occupied Bandwidth)	12
2.1055(a) (1)	Frequency Stability (Temperature Variation)	14
2.202(g)	Necessary Bandwidth and Emission Bandwidth	17

PAGE NO.

1 of 17.

Required information per ISO/IEC Guide 25-1990, paragraph 13.2:

a) TEST REPORT

b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0350066

d) Client: Telonics Inc.
932 E. Impala Avenue
Mesa, AZ 85204-6699

e) Identification: MK9A
EUT Description: FCC ID: JYLMK9A
Non-broadcast Transmitter

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: May 29, 2003
EUT Received: May 14, 2003

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:


Morton Flom, P. Eng.

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

PAGE NO.

2 of 17.

LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATIONIN ACCORDANCE WITH FCC RULES AND REGULATIONS,
VOLUME II, PART 2 AND TO

90, 95J, Confidentiality

Sub-part 2.1033

(c) (1): NAME AND ADDRESS OF APPLICANT:Telonics Inc.
932 E. Impala Avenue
Mesa, AZ 85204-6699MANUFACTURER:

Applicant

(c) (2): FCC ID: JYLMK9AMODEL NO: MK9A(c) (3): INSTRUCTION MANUAL(S):

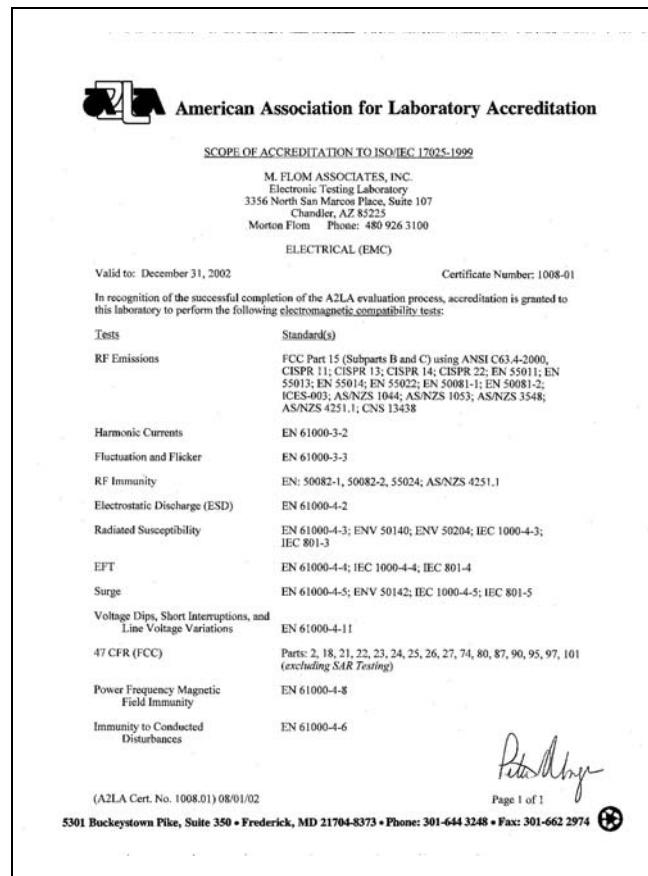
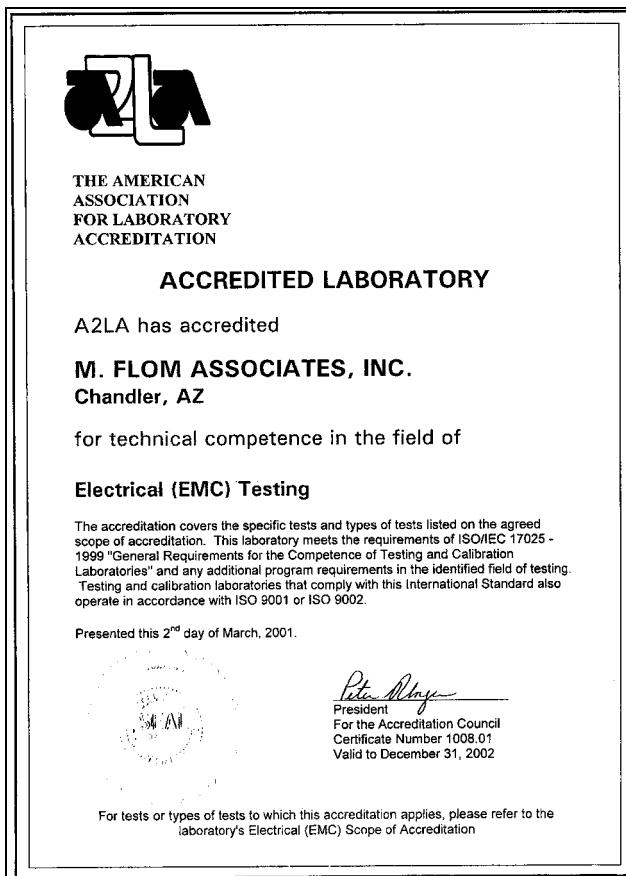
PLEASE SEE ATTACHED EXHIBITS

(c) (4): TYPE OF EMISSION: 6K25F1D(c) (5): FREQUENCY RANGE, MHz:
151.820
151.880
151.940
154.570
154.600(c) (6): POWER RATING, Watts:
 Switchable Variable N/A (Fixed)(c) (7): MAXIMUM POWER RATING, Watts: 2 ERP
(47 CFR FCC Rule 95.639)DUT RESULTS: Passes Fails

PAGE NO.

3 of 17.

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below.



"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not be covered by this laboratory's A2LA accreditation.

PAGE NO.

4 of 17.

Subpart 2.1033 (continued)

(c) (8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE,
INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual
COLLECTOR VOLTAGE, Vdc = per manual
SUPPLY VOLTAGE, Vdc = 3.5

(c) (9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(c) (10): CIRCUIT DIAGRAM/CIRCUIT DESCRIPTION:

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

PLEASE SEE ATTACHED EXHIBITS

(c) (11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c) (12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c) (13): DIGITAL MODULATION DESCRIPTION:

 ATTACHED EXHIBITS
x N/A

(c) (14): TEST AND MEASUREMENT DATA:

FOLLOWS

PAGE NO.

5 of 17.

Sub-part

2.1033(c) (14) :TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 and the following individual Parts:

- ____ 21 - Domestic Public Fixed Radio Services
- ____ 22 - Public Mobile Services
- ____ 22 Subpart H - Cellular Radiotelephone Service
- ____ 22.901(d) - Alternative technologies and auxiliary services
- ____ 23 - International Fixed Public Radiocommunication services
- ____ 24 - Personal Communications Services
- ____ 74 Subpart H - Low Power Auxiliary Stations
- ____ 80 - Stations in the Maritime Services
- ____ 80 Subpart E - General Technical Standards
- ____ 80 Subpart F - Equipment Authorization for Compulsory Ships
- ____ 80 Subpart K - Private Coast Stations and Marine Utility Stations
- ____ 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
- ____ 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
- ____ 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
- ____ 80 Subpart V - Emergency Position Indicating Radiobeacons (EPIRB'S)
- ____ 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- ____ 80 Subpart X - Voluntary Radio Installations
- ____ 87 - Aviation Services
- ____ x 90 - Private Land Mobile Radio Services
- ____ 94 - Private Operational-Fixed Microwave Service
- ____ 95 Subpart A - General Mobile Radio Service (GMRS)
- ____ 95 Subpart C - Radio Control (R/C) Radio Service
- ____ 95 Subpart D - Citizens Band (CB) Radio Service
- ____ 95 Subpart E - Family Radio Service
- ____ 95 Subpart F - Interactive Video and Data Service (IVDS)
- ____ x 95 Subpart J -
- ____ 97 - Amateur Radio Service
- ____ 101 - Fixed Microwave Services

PAGE NO.

6 of 17.

STANDARD TEST CONDITIONS
and
ENGINEERING PRACTICES

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992/2000 Draft, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurements.

PAGE NO.

7 of 17.

NAME OF TEST:

ERP Carrier Power (Radiated)

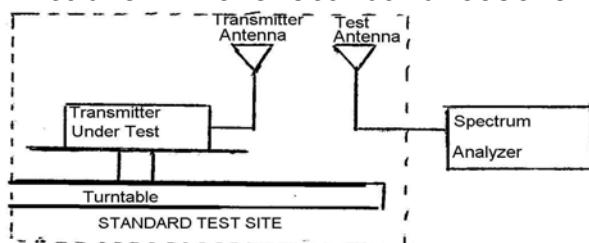
SPECIFICATION:

TIA/EIA 603A (Substitution Method)

2.2.17.1 Definition: The average radiated power of a licensed device is the equivalent power required, when delivered to a half-wave dipole or horn antenna, to produce at a distant point the same average received power as produced by the licensed device.

2.2.17.2 Method of Measurement:

a) Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.



b) Raise and lower the test antenna from 1m to 6 m with the transmitter facing the antenna and record the highest received signal in dB as LVL.

c) Repeat step b) for seven additional readings at 45° interval positions of the turntable.

d) Replace the transmitter under test with a half-wave or horn vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output power and record the path loss in dB or LOSS.

e) Calculate the average radiated output power from the readings in step c) and d) by the following:

$$\text{average radiated power} = 10 \log_{10} \sum 10(LVL - LOSS) / 10 \text{ (dBm)}$$

RESULTS

	151.82 MHz		154.6 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	11.3	-1.8	11.4	-1.8
45°	10.1	-1.8	11.6	-1.8
90°	9.6	-1.8	11.1	-1.8
135°	10.6	-1.8	11.6	-1.8
180°	10.7	-1.8	11.6	-1.8
225°	10.6	-1.8	11.7	-1.8
270°	10.2	-1.8	11.1	-1.8
315°	11.1	-1.8	10.6	-1.8
Av. Radiated Power:		151.82 MHz	154.6 MHz	
		12.33 dbm	13.14 dbm	

PAGE NO. 8 of 17.

NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

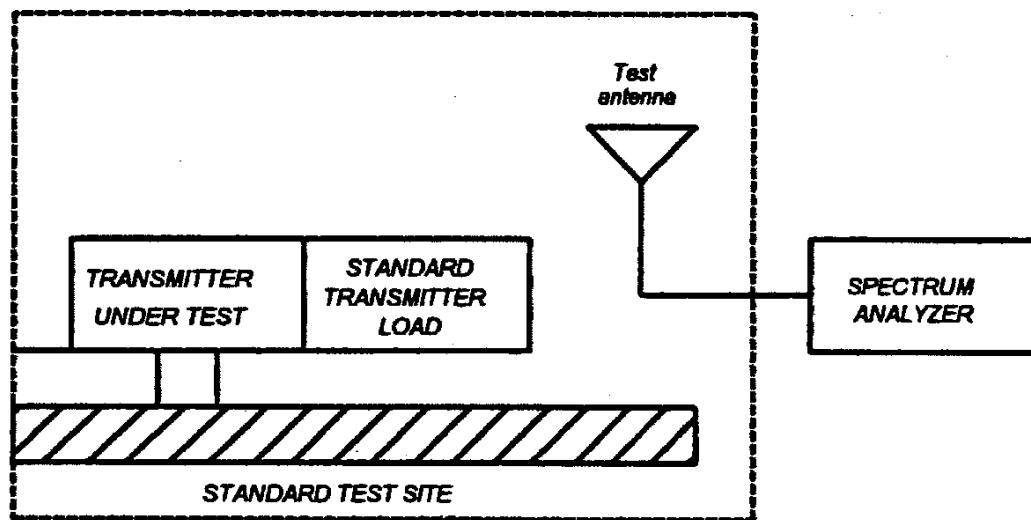
GUIDE: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

MEASUREMENT PROCEDURE

1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

1.2.12.2 Method of Measurement

- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
 - 2) Video Bandwidth \geq 3 times Resolution Bandwidth, or 30 kHz (22.917)
 - 3) Sweep Speed \leq 2000 Hz/second
 - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.



PAGE NO.

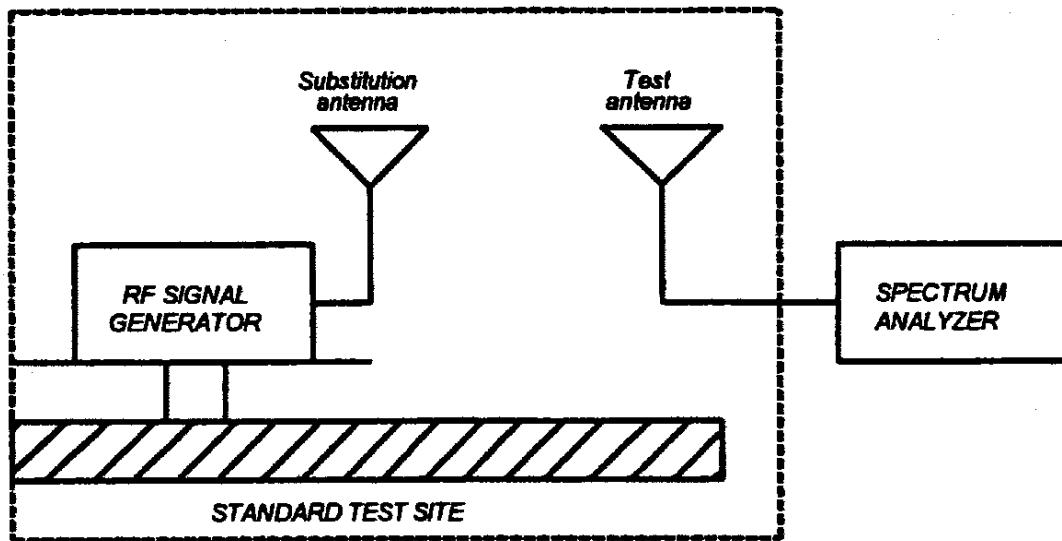
9 of 17.

NAME OF TEST: Field Strength of Spurious Radiation (Cont.)

D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to \pm the test bandwidth (see section 1.3.4.4).

E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



G) Reconnect the equipment as illustrated.

H) Keep the spectrum analyzer adjusted as in step B).

I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

PAGE NO.

10 of 17.

NAME OF TEST: Field Strength of Spurious Radiation (Cont.)

J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

K) Repeat step J) with both antennas vertically polarized for each spurious frequency.

L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.

M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB =
 $10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step l})$

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment:

Asset	Description (as applicable)	s/n	Cycle	Last Cal
			Per ANSI C63.4-1992/2000 Draft, 10.1.4	
<u>TRANSDUCER</u>				
i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-02
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-02
i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-02
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-02
<u>AMPLIFIER</u>				
i00028	HP 8449A	2749A00121	12 mo.	Mar-03
<u>SPECTRUM ANALYZER</u>				
i00029	HP 8563E	3213A00104	12 mo.	Jan-03
i00033	HP 85462A	3625A00357	12 mo.	Jan-03
i00048	HP 8566B	2511AD1467	6 mo.	Jan-03
<u>MICROPHONE, ANTENNA PORT, AND CABLING</u>				
Microphone		No		
Antenna Port Terminated		N/A	Antenna Gain <u>0 dBd</u>	
All Ports Terminated by Load		N/A		

PAGE NO.

11 of 17.

NAME OF TEST: Field Strength of Spurious Radiation

g0350147: 2003-May-19 Mon 09:35:00

STATE: 2:High Power

AMBIENT TEMPERATURE: 22 °C ± 3 °C

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	ERP, dBm	ERP, dbc
154.600000	309.198800	-27.2	≤ -40.2
154.600000	463.805000	-26.7	≤ -40.2
154.600000	618.397500	-36.2	≤ -40.2
154.600000	773.007500	-35.8	≤ -40.2
154.600000	927.601300	-50.3	≤ -40.2
154.600000	1082.196300	-29.8	≤ -40.2
154.600000	1236.792500	-39.5	≤ -40.2
154.600000	1391.395000	-34.5	≤ -40.2
154.600000	1546.003800	-42.8	≤ -40.2

SUPERVISED BY:

David Lee



PAGE NO. 12 of 17.

NAME OF TEST: Emission Masks (Occupied Bandwidth)

SPECIFICATION: 47 CFR 2.1049(c) (1)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
2. For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for $\pm 2.5/\pm 1.25$ kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
5. MEASUREMENT RESULTS: ATTACHED

PAGE NO.

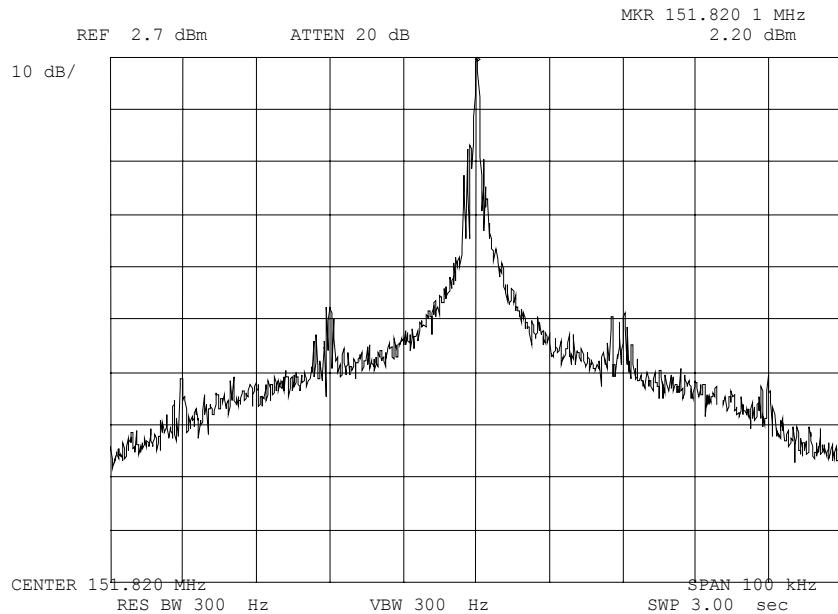
13 of 17.

NAME OF TEST:

Emission Masks (Occupied Bandwidth)

STATE:

AMBIENT TEMPERATURE: 22°C ± 3



POWER:

HIGH

MODULATION:

Pulsed

Loose Coupled

PERFORMED BY:

David Lee

PAGE NO. 14 of 17.

NAME OF TEST: Frequency Stability (Temperature Variation)

SPECIFICATION: 47 CFR 2.1055(a)(1)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

TEST CONDITIONS: As Indicated

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

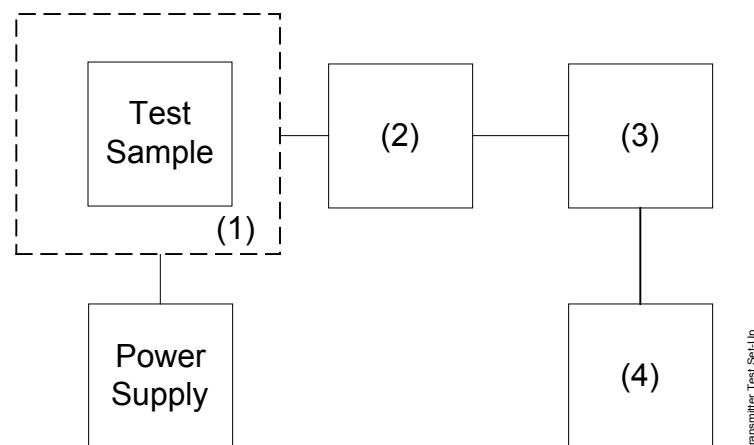
1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The temperature tests were performed for the worst case.
5. MEASUREMENT RESULTS: ATTACHED

PAGE NO.

15 of 17.

TRANSMITTER TEST SET-UP

TEST A. OPERATIONAL STABILITY
 TEST B. CARRIER FREQUENCY STABILITY
 TEST C. OPERATIONAL PERFORMANCE STABILITY
 TEST D. HUMIDITY
 TEST E. VIBRATION
 TEST F. ENVIRONMENTAL TEMPERATURE
 TEST G. FREQUENCY STABILITY: TEMPERATURE VARIATION
 TEST H. FREQUENCY STABILITY: VOLTAGE VARIATION



Transmitter Test Set Up

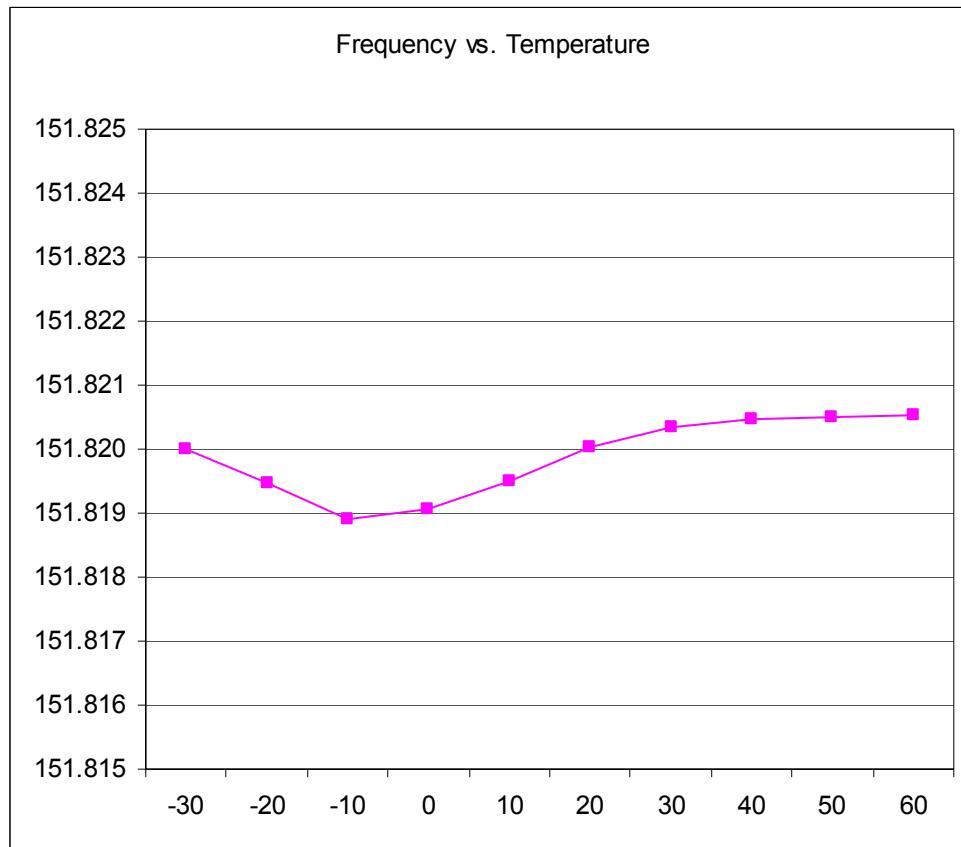
Asset Description (as applicable)		s/n
(1) TEMPERATURE, HUMIDITY, VIBRATION		
i00027 Tenney Temp. Chamber		9083-765-234
i00 Weber Humidity Chamber		
i00 L.A.B. RVH 18-100		
(2) COAXIAL ATTENUATOR		
i00122 NARDA 766-10		7802
i00123 NARDA 766-10		7802A
i00113 SIERRA 661A-3D		1059
i00069 BIRD 8329 (30 dB)		10066
(3) R.F. POWER		
i00014 HP 435A POWER METER		1733A05839
i00039 HP 436A POWER METER		2709A26776
i00020 HP 8901A POWER MODE		2105A01087
(4) FREQUENCY COUNTER		
i00042 HP 5383A		1628A00959
i00019 HP 5334B		2704A00347
i00020 HP 8901A		2105A01087

PAGE NO.

16 of 17.

NAME OF TEST:

Frequency Stability (Temperature Variation)

AMBIENT TEMPERATURE: $22^{\circ}\text{C} \pm 3$ 

PERFORMED BY:

David Lee

PAGE NO. 17 of 17.

NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 6K25F1D

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz	= 0
MAXIMUM DEVIATION (D), kHz	= 3
CONSTANT FACTOR (K)	= 1
NECESSARY BANDWIDTH (B _N), kHz	= (2xM) + (2xDxK)
	= 6K25

PERFORMED BY:

David Lee



END OF TEST REPORT

TESTIMONIAL
AND
STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

1. THAT the application was prepared either by, or under the direct supervision of, the undersigned.
2. THAT the technical data supplied with the application was taken under my direction and supervision.
3. THAT the data was obtained on representative units, randomly selected.
4. THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

CERTIFYING ENGINEER:



Morton Flom, P. Eng.