

**MFA** **M. Flom Associates, Inc. - Global Compliance Center**  
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176  
www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

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Date: August 2, 2000

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Nokia Mobile Phones, Inc.  
Equipment: 3390, Type NPB-1NB  
FCC ID: GMLNPB-1NB  
FCC Rules: 24E, Confidentiality

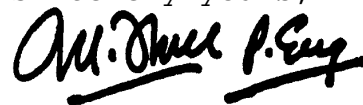
Gentlemen:

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,



Morton Flom, P. Eng.

enclosure(s)  
cc: Applicant  
MF/cvr

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

APPLICANT: Nokia Mobile Phones, Inc.

FCC ID: GMLNPB-1NB

BY APPLICANT:

1. LETTER OF AUTHORIZATION
2. IDENTIFICATION DRAWINGS, 2.1033(c)(11)
  - \_\_\_ ID LABEL
  - \_\_\_ LOCATION OF LABEL
  - \_\_\_ COMPLIANCE STATEMENT
  - \_\_\_ LOCATION OF COMPLIANCE STATEMENT
3. PHOTOGRAPHS, 2.1033(c)(12)
4. CONFIDENTIALITY REQUEST: 0.457 and 0.459
5. DOCUMENTATION: 2.1033(c)
  - (3) USER MANUAL
  - (9) TUNE UP INFO
  - (10) SCHEMATIC DIAGRAM
  - (10) CIRCUIT DESCRIPTION
  - BLOCK DIAGRAM
  - PARTS LIST
  - ACTIVE DEVICES

BY M.F.A. INC.

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

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Sub-part  
2.1033 (c) :

EQUIPMENT IDENTIFICATION

FCC ID: GMLNPB-1NB

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.


LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

August 2, 2000

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.

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*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 85224
- c) Report Number: d0080012
- d) Client: Nokia Mobile Phones  
6000 Connection Drive  
Irving, TX 75039
- e) Identification: 3390, Type NPB-1NB  
FCC ID: GMLNPB-1NB  
Description: UHF FM Handheld Transceiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: August 2, 2000  
EUT Received: July 10, 2000
- 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.

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LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,  
VOLUME II, PART 2 AND TO

24E, Confidentiality

Sub-part 2.1033(c) (1): NAME AND ADDRESS OF APPLICANT:

Nokia Mobile Phones, Inc.  
6200 Courtney Campbell Causeway, Suite 900  
P.O. Box 30730  
Tampa, Florida 33630-3730

MANUFACTURER:

Nokia Mobile Phones Manufacturing (USA), Inc.  
5650 Alliance Gateway  
Fort Worth, TX 76178

(c) (2): FCC ID: GMLNPB-1NBMODEL NO: 3390, Type NPB-1NB(c) (3): INSTRUCTION MANUAL(S):  
PLEASE SEE ATTACHED EXHIBITS(c) (4): TYPE OF EMISSION: 256KGXW(c) (5): FREQUENCY RANGE, MHz: 1850 to 1910(c) (6): POWER RATING, Watts: 1.35 EIRP  
    Switchable                Variable                x N/A

FCC GRANT NOTE:

(c) (7): MAXIMUM POWER RATING, Watts: 1

PAGE NO. 3 of 22.

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 = 3.6

(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  
   N/A

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

FOLLOWS



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



**THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION**

**ACCREDITED LABORATORY**

A2LA has accredited


**M. FLOM ASSOCIATES, INC.**  
Chandler, AZ

for technical competence in the field of

**Electrical (EMC) Testing**


The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 24<sup>th</sup> day of November, 1998.



*Peter Abney*  
President  
For the Accreditation Council  
Certificate Number 1008.01  
Valid to December 31, 2000

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



**American Association for Laboratory Accreditation**

SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990 AND EN 45001

M. FLOM ASSOCIATES, INC.  
Electronic Testing Laboratory  
3356 North San Marcos Place, Suite 107  
Chandler, AZ 85225  
Morton Flom Phone: 480 926 3100

**ELECTRICAL (EMC)**

Valid to: December 31, 2000 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

Tests	Standard(s)
RF Emissions	FCC Part 15 (Subparts B and C) using ANSI C63 4-1992; CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; FCC Part 18; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438
RF Immunity	EN 50082-1; EN 50082-2; AS/NZS 4251.1
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
ESD	EN 61000-4-2; IEC 1000-4-2; IEC 801-2
EFT	EN 61000-4-4; IEC 1000-4-4; IEC 801-4
Surge	EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5
47 CFR (FCC)	2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97

Revised 2/2/2000

*Peter Abney*

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8370 • Phone: 301 644 3248 • Fax: 301 662 2974

"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 covered by this laboratory's A2LA accreditation.

PAGE NO.

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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
- x\_\_\_\_\_ 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
- \_\_\_\_\_ 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)
- \_\_\_\_\_ 97 - Amateur Radio Service
- \_\_\_\_\_ 101 - Fixed Microwave Services

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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, 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.

FOR PCS EQUIPMENT:

Pursuant to Section 24.51(d), the EUT complies with IEEE C95.1-1991, "IEEE Standards for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz."

The EUT uses digital modulation, as such, measurements of the modulation characteristics are not applicable. The applicant has provided a description of the modulation particular to the EUT.

Pursuant to Section 24.238(c), the EUT was tested at it's lowest and highest possible tuned frequencies.

GUIDES:

This device was tested using the following Guide(s):

TIA/EIA/IS-95A-1995

PAGE NO. 7 of 22.

NAME OF TEST: Carrier Output Power (Radiated)

SPECIFICATION: 47 CFR 2.1046(a), 24.232(b)

GUIDE: As indicated on page 6

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE (RADIATED)

1. The EUT was placed on an open-field site and its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading was calculated from the equation  $P_t = ((E \times R)^2 / 30)$  watts, where  $R = 3m$ .
2. Measurement accuracy is  $\pm 1.5$  dB.

MEASUREMENT RESULTS

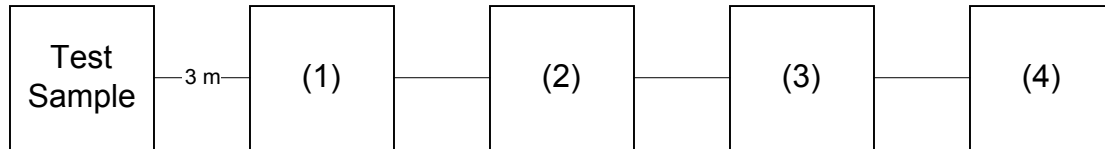
<u>FREQUENCY TUNED, MHz</u>	<u>FREQUENCY EMISSION, MHz</u>	<u>METER, dBuV/m</u>	<u>CF, dB</u>	<u>EIRP, dBm</u>	<u>EIRP, Watts</u>
1850.200000	1850.316667	95.33	30.28	30.4	1.1
1880.000000	1879.916667	96.17	30.39	31.3	1.35
1909.800000	1909.691667	94.67	30.49	29.9	0.97

SUPERVISED BY:



Morton Flom, P. Eng.

TRANSMITTER RADIATED MEASUREMENTS



Transmitter Radiated Measurements


Asset Description (as applicable)	s/n
<u>(1) TRANSDUCER</u>	
i00091 Emco 3115	001469
i00089 Aprel Log Periodic	001500
<u>(2) HIGH PASS FILTER</u>	
i00 Narda $\mu$ PAD (In-Band Only)	
i00 Trilithic (Out-Of-Band Only)	
<u>(3) PREAMP</u>	
i00028 HP 8449 (+30 dB)	2749A00121
<u>(4) SPECTRUM ANALYZER</u>	
i00048 HP 8566B	2511A01467
i00043 HP 8558B	2004A02076
i00057 HP 8557A	1531A00191
i00029 HP 8563E	3213A00104

PAGE NO. 9 of 22.  
NAME OF TEST: Transmitter Conducted Measurements  
SPECIFICATION: 2.1049(c), 24.238(b): Occupied Bandwidth  
24: Emissions at Band Edges  
GUIDE: As indicated on page 6  
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

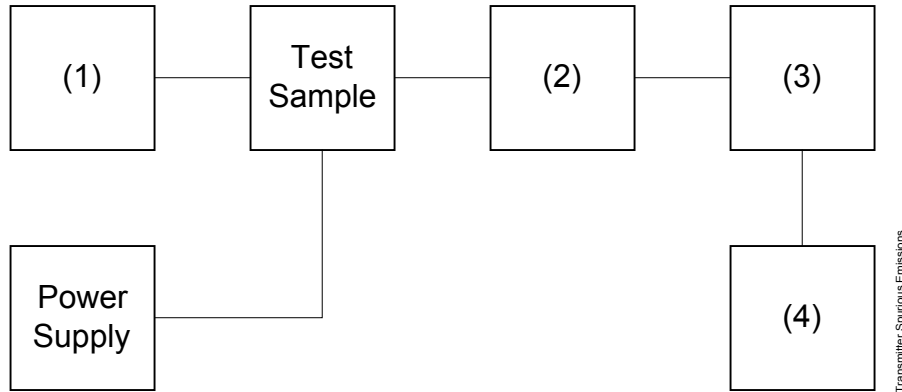
1. The EUT and test equipment were set up as shown on the following page with the Spectrum Analyzer connected.
2. The low and high channels for all RF powers within the designated frequency block(s) were measured.
3. MEASUREMENT RESULTS: ATTACHED

SUPERVISED BY:

  
Morton Flom, P. Eng.

TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)  
 TEST B. OUT-OF-BAND SPURIOUS



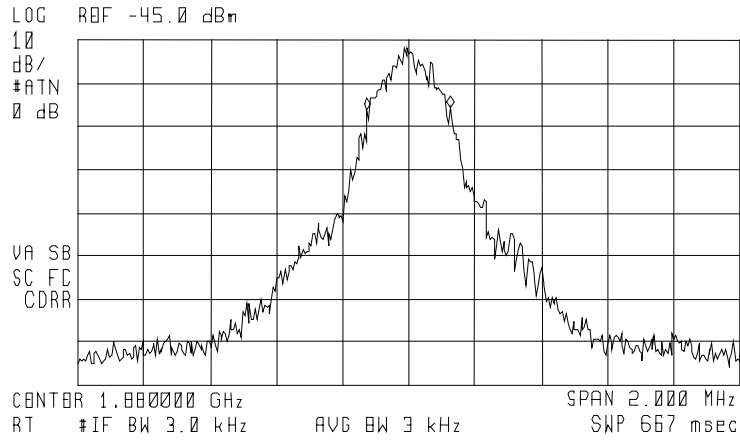
Asset Description (as applicable)	s/n
<u>(1) AUDIO OSCILLATOR/GENERATOR</u>	
i00010 HP 204D	1105A04683
i00017 HP 8903A	2216A01753
i00012 HP 3312A	1432A11250
<u>(2) COAXIAL ATTENUATOR</u>	
i00122 Narda 766-10	7802
i00123 Narda 766-10	7802A
i00069 Bird 8329 (30 dB)	1006
i00113 Sierra 661A-3D	1059
<u>(3) FILTERS; NOTCH, HP, LP, BP</u>	
i00126 Eagle TNF-1	100-250
i00125 Eagle TNF-1	50-60
i00124 Eagle TNF-1	250-850
<u>(4) SPECTRUM ANALYZER</u>	
i00048 HP 8566B	2511A01467
i00029 HP 8563E	3213A00104

PAGE NO. 11 of 22.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0070563: 2000-Jul-11 Tue 13:51:00  
STATE: 2:High Power



ACTV DET: PBAK  
MEAS DET: PBAK QP AVG  
MKRΔ 250 kHz  
.37 dB



POWER: HIGH  
MODULATION: GSM  
99% POWER BANDWIDTH CH. 661

SUPERVISED BY:

Morton Flom, P. Eng.

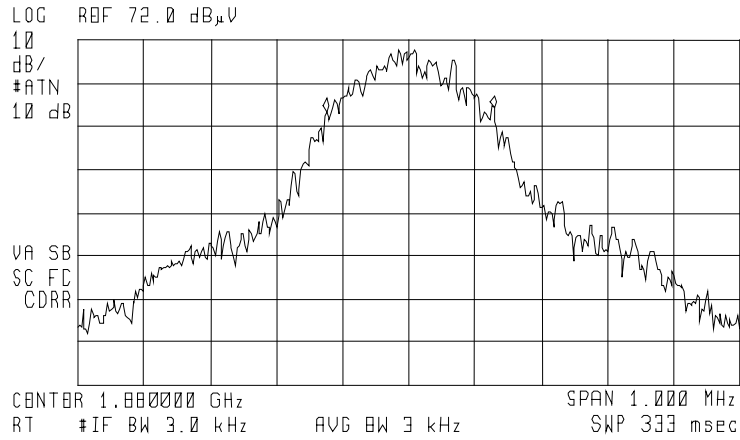


PAGE NO. 12 of 22.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0070564: 2000-Jul-11 Tue 15:05:00  
STATE: 2:High Power



ACTV DET: PBAK  
MEAS DET: PBAK QP AVG  
MKR Δ 253 kHz  
.83 dB



POWER: HIGH  
MODULATION: GSM  
99% POWER BANDWIDTH CH. 661

SUPERVISED BY:

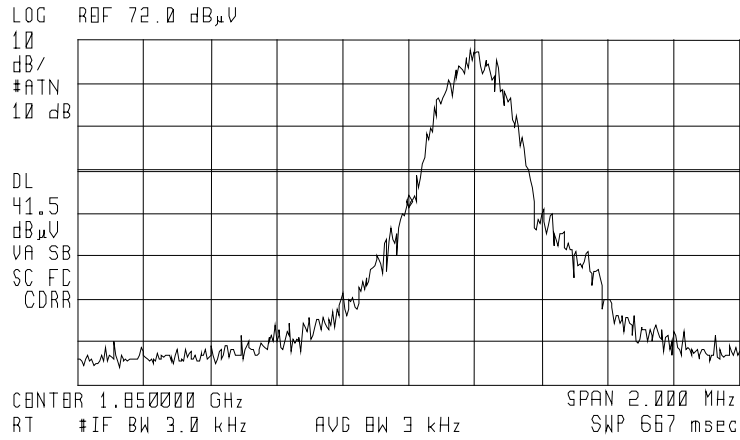
Morton Flom, P. Eng.

PAGE NO. 13 of 22.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0070565: 2000-Jul-11 Tue 15:09:00  
STATE: 2:High Power



ACTV DET: PBAK  
MEAS DET: PBAK QP AVG  
MKA 1.850000 GHz  
32.88 dBμV



POWER: HIGH  
MODULATION: GSM  
LOWER BANDEDGE CH 512

SUPERVISED BY:

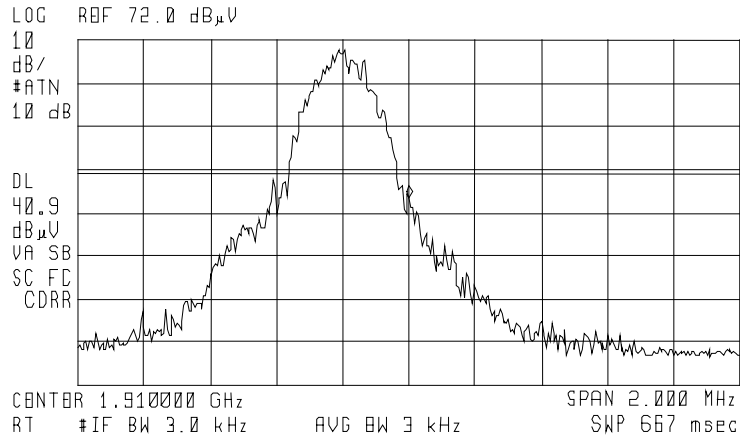
Morton Flom, P. Eng.

PAGE NO. 14 of 22.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0070566: 2000-Jul-11 Tue 15:15:00  
STATE: 2:High Power



ACTV DET: PBAK  
MEAS DET: PBAK QP AVG  
MKA 1.910000 GHz  
35.37 dBμV



POWER: HIGH  
MODULATION: GSM  
UPPER BANDEDGE CH 810

SUPERVISED BY:

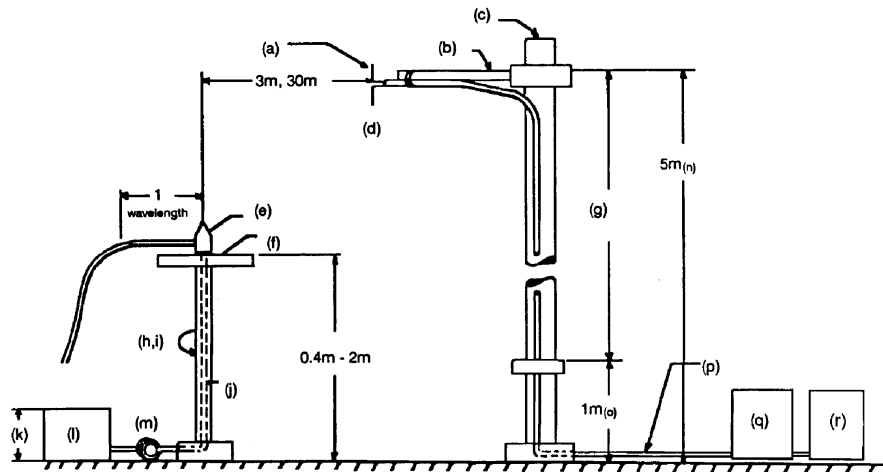
Morton Flom, P. Eng.

PAGE NO. 15 of 22.  
NAME OF TEST: Field Strength of Spurious Radiation  
SPECIFICATION: 47 CFR 2.1053(a)  
GUIDE: As indicated on page 6  
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. A description of the measurement facilities was filed with the FCC and was found to be in compliance with the requirements of Section 15.38, by letter from the FCC dated March 3, 1997, FILE 31040/SIT. All pertinent changes will be reported to the Commission by up-date prior to March 2000.
2. At first, in order to locate all spurious frequencies and approximate amplitudes, and to determine proper equipment functioning, the test sample was set up at a distance of three meters from the test instrument. Valid spurious signals were determined by switching the power on and off.
3. In the field, the test sample was placed on a wooden turntable above ground at three (or thirty) meters away from the search antenna. Excess power leads were coiled near the power supply.  
  
The cables were oriented in order to obtain the maximum response. At each emission frequency, the turntable was rotated and the search antennas were raised and lowered vertically.
4. The emission was observed with both a vertically polarized and a horizontally polarized search antenna and the worst case was used.
6. The field strength of each emission within 20 dB of the limit was recorded and corrected with the appropriate cable and transducer factors.
7. The worst case for all channels is shown.
8. Measurement results: ATTACHED FOR WORST CASE

RADIATED TEST SETUP



NOTES:

- (a) Search Antenna - Rotatable on boom
- (b) Non-metallic boom
- (c) Non-metallic mast
- (d) Adjustable horizontally
- (e) Equipment Under Test
- (f) Turntable
- (g) Boom adjustable in height.
- (h) External control cables routed horizontally at least one wavelength.
- (i) Rotatable
- (j) Cables routed through hollow turntable center
- (k) 30 cm or less
- (l) External power source
- (m) 10 cm diameter coil of excess cable
- (n) 25 cm (V), 1 m-7 m (V, H)
- (o) 25 cm from bottom end of 'V', 1m normally
- (p) Calibrated Cable at least 10m in length
- (q) Amplifier (optional)
- (r) Spectrum Analyzer

Asset Description (as applicable)	s/n	Cycle	Last Cal
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Per ANSI C63.4-1992, 10.1.4

TRANSDUCER

i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-99
i00089	Aprél 2001 200MHz-1GHz	001500	12 mo.	Sep-99
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-99
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-99

AMPLIFIER

i00028	HP 8449A	2749A00121	12 mo.	Mar-00
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SPECTRUM ANALYZER

i00029	HP 8563E	3213A00104	12 mo.	Aug-99
i00033	HP 85462A	3625A00357	12 mo.	May-00
i00048	HP 8566B	2511AD1467	6 mo.	May-00

PAGE NO. 17 of 22.

NAME OF TEST: Field Strength of Spurious Radiation  
g0070116: 2000-Jul-10 Mon 11:06:00  
STATE: 2:High Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	EIRP, dBm	MARGIN, dB
1880.000000	3758.050000	29.17	6.61	-59.4	-46.4
1880.000000	5637.983333	28.5	10.4	-56.3	-43.3
1880.000000	7514.374999	28.5	13.48	-53.2	-40.2
1880.000000	9392.458332	27.83	15.5	-51.9	-38.9
1880.000000	11268.391665	29.67	17.4	-48.2	-35.1
1880.000000	13149.058331	30	17.61	-47.6	-34.6
1880.000000	15025.591664	33	18.2	-44	-31
1880.000000	16903.408331	32.33	19.62	-43.3	-30.3

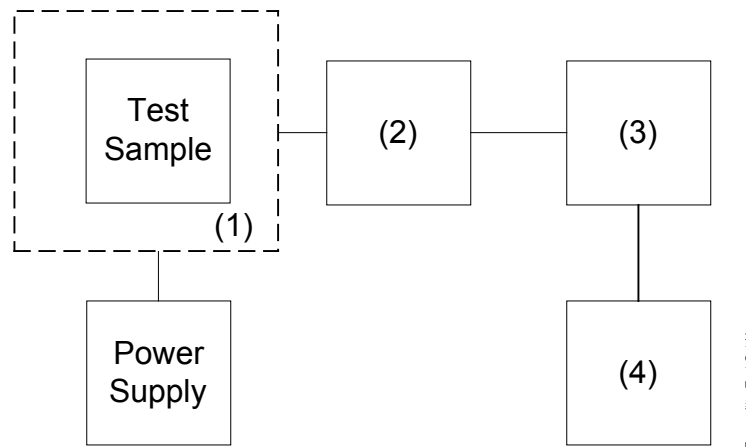
PAGE NO. 18 of 22.  
NAME OF TEST: Frequency Stability (Temperature Variation)  
SPECIFICATION: 47 CFR 2.1055(a)(1), 24.235  
GUIDE: As indicated on page 6  
TEST CONDITIONS: As Indicated  
TEST EQUIPMENT: As per previous page

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

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



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



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NAME OF TEST: Frequency Stability (Temperature Variation)

<u>TEMPERATURE ° C</u>	<u>CHANGE IN Hz</u>	<u>CHANGE IN PPM</u>
-30	35	<0.025
-20	-26	<0.025
-10	21	<0.025
0	32	<0.025
10	-45	<0.025
20	-40	<0.025
25	0	<0.025
30	26	<0.025
40	24	<0.025
50	29	<0.025

SUPERVISED BY:



Morton Flom, P. Eng.

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NAME OF TEST: Frequency Stability (Voltage Variation)  
SPECIFICATION: 47 CFR 2.1055(b)(1)  
GUIDE: As indicated on page 6  
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT was placed in a temperature chamber at 25±5°C and connected as for "Frequency Stability - Temperature Variation" test.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

RESULTS: Frequency Stability (Voltage Variation)

LIMIT: Must remain within authorized frequency block.

<u>% of STV</u>	<u>Voltage</u>	<u>Change, Hz</u>
85	3.06	-180
0	3.6	0
115	4.14	180
Battery End Point:	3.0	-180

SUPERVISED BY:

Morton Flom, P. Eng.

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NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 256KGXW

NECESSARY BANDWIDTH:

NECESSARY BANDWIDTH ( $B_N$ ), kHz = 256  
(measured at the 99.75% power bandwidth)

SUPERVISED BY:



Morton Flom, P. Eng.

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.