



M. Flom Associates, Inc. - Global Compliance Center

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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: P7QNP-7

MODEL: MMII

to

FEDERAL COMMUNICATIONS COMMISSION

Rule Part(s) 24E

DATE OF REPORT: June 7, 2002

ON THE BEHALF OF THE APPLICANT:

Vertu Ltd.

AT THE REQUEST OF:

P.O. E38-4355478

Vertu Ltd.
Nokia House, Building 3, Floor 1,
Summit Avenue
Farnborough, Hampshire GU14 ONG, UK

Attention of:

Mark Pope, Manager - Test and Type Approvals
+44 1252 867587; FAX: -865680
mark.pope@vertu.com

SUPERVISED BY:

A handwritten signature in black ink, reading 'M. Flom P. Eng.', is positioned above the printed name.

Morton Flom, P. Eng.

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

APPLICANT: Vertu Ltd.

FCC ID: P7QNP-7

BY APPLICANT:

- | | |
|--|---|
| 1. LETTER OF AUTHORIZATION | X |
| 2. IDENTIFICATION DRAWINGS, 2.1033(c)(11) | |
| ☒ ID LABEL | |
| ☒ LOCATION OF LABEL | |
| ☒ COMPLIANCE STATEMENT | |
| ☒ LOCATION OF COMPLIANCE STATEMENT | |
| 3. PHOTOGRAPHS, 2.1033(c)(12) | X |
| 4. CONFIDENTIALITY REQUEST: 0.457 and 0.459 | X |
| 5. DOCUMENTATION: 2.1033(c) | |
| (3) USER MANUAL | X |
| (9) TUNE UP INFO | X |
| (10) SCHEMATIC DIAGRAM | X |
| (10) CIRCUIT DESCRIPTION | X |
| BLOCK DIAGRAM | X |
| PARTS LIST | X |
| ACTIVE DEVICES | X |
| 6. SAR Report by Nokia Finland | X |

BY M.F.A. INC.

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

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
2.1051, 2.1049(c), 24, 24.238(b)		
	Transmitter Conducted Measurements	9
2.1053(a)	Field Strength of Spurious Radiation	16
2.1055(a)(1), 24.235		
	Frequency Stability (Temperature Variation)	21
2.1055(b)(1)	Frequency Stability (Voltage Variation)	24
2.202(g)	Necessary Bandwidth and Emission Bandwidth	25

PAGE NO.

1 of 25.

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: d0220021

d) Client: Vertu Ltd.
Nokia House, Building 3, Floor 1, Summit
Avenue
Farnborough, Hampshire GU14 ONG, UK

e) Identification: MMII
FCC ID: P7QNP-7
Description: Cell phone

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

g) Report Date: June 7, 2002
EUT Received: February 18, 2002

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.

p) Special Notes: Results contained herein apply to cases made for either Stainless Steel, Platinum or Gold.
The following accessories were used during the test program:

ACV-A Charger
BLZ-2 Battery
HSV-A Headset
BH2-AL01 Belt Holster
DLV-A Data Cable
DTV-A Desk Stand

PAGE NO. 2 of 25.

LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

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

24E

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:

Vertu Ltd.
Nokia House, Building 3, Floor 1,
Summit Avenue
Farnborough, Hampshire GU14 ONG, UK

MANUFACTURER:

Applicant

(c)(2): FCC ID: P7QNPM-7

MODEL NO: MMII

(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 256KGXW

(c)(5): FREQUENCY RANGE, MHz: 1850.2 to 1909.8

(c)(6): POWER RATING, Watts: 1.0715 EIRP
___ Switchable ___ x Variable ___ N/A

FCC GRANT NOTE:

BC - The output power is continuously variable from the value listed in this entry to 5%-10% of the value listed.

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

PAGE NO. 3 of 25.

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
 X N/A

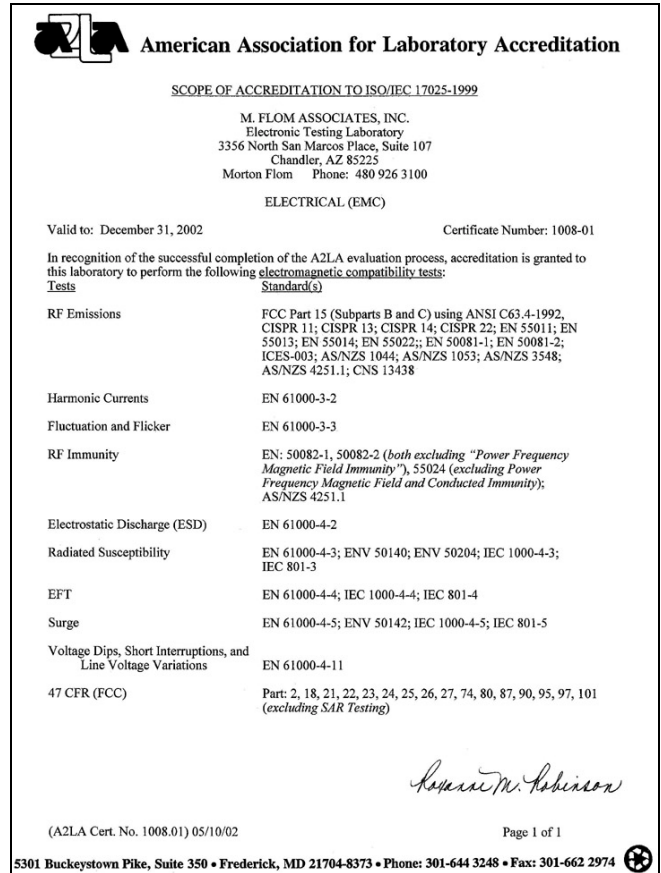
(c)(14): TEST AND MEASUREMENT DATA:

FOLLOWS

PAGE NO.

4 of 25.

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 covered by this laboratory's A2LA accreditation.

PAGE NO.

5 of 25.

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

PAGE NO.

6 of 25.

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.

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):

N/A

PAGE NO. 7 of 25.

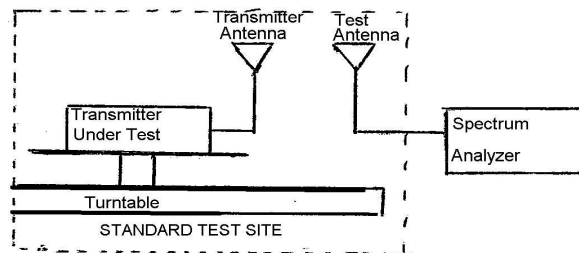
NAME OF TEST: ERP Carrier Power (Radiated)

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:

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

Results attached

PAGE NO.

8 of 25.

NAME OF TEST:

ERP Carrier Power (Radiated)

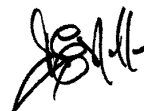
RESULTSAntenna Position: Fully Retracted

	1850.2 MHz		1880 MHz		1909.8 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	26.1	-0.8	28.3	-0.1	27.5	+0.1
45°	14.7	-0.8	18.9	-0.1	20.4	+0.1
90°	19.9	-0.8	19.4	-0.1	18.7	+0.1
135°	15.7	-0.8	25.3	-0.1	20.1	+0.1
180°	17.7	-0.8	18.6	-0.1	18.1	+0.1
225°	23.4	-0.8	24.7	-0.1	24.7	+0.1
270°	17.6	-0.8	21.1	-0.1	20.7	+0.1
315°	21.2	-0.8	18.9	-0.1	25.1	+0.1
Av. Radiated Power:	1850.2 MHz 20.34 dbm		1880 MHz 22.0 dbm		1909.8 MHz 21.9 dbm	

Antenna Position: Fully Extended

	1850.2 MHz		1880 MHz		1909.8 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	30.2	-0.8	30.3	-0.1	29.2	+0.1
45°	28.1	-0.8	27.8	-0.1	27.2	+0.1
90°	28.6	-0.8	29.6	-0.1	27.5	+0.1
135°	30.1	-0.8	29.1	-0.1	27.6	+0.1
180°	28.3	-0.8	28.6	-0.1	27.2	+0.1
225°	27.9	-0.8	28.2	-0.1	26.3	+0.1
270°	29.4	-0.8	28.4	-0.1	27.8	+0.1
315°	29.2	-0.8	29.3	-0.1	27.1	+0.1
Av. Radiated Power:	1850.2 MHz 29.78 dbm		1880 MHz 29.01 dbm		1909.8 MHz 27.39 dbm	

Note: Results are the same for case formed from Stainless Steel and/or Platinum and/or Gold.



PERFORMED BY:

Doug Noble, B.A.S. E.E.T.

PAGE NO. 9 of 25.

NAME OF TEST: Transmitter Conducted Measurements

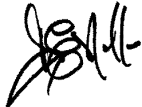
SPECIFICATION: 47 CFR 2.1051: Unwanted (spurious) Emissions
2.1049(c), 24.238(b): Occupied Bandwidth
24: Emissions at Band Edges

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

PERFORMED BY:

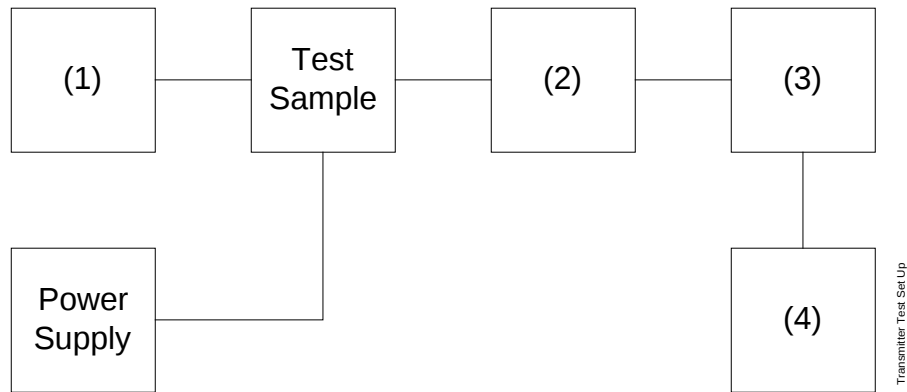

Doug Noble, B.A.S. E.E.T.

PAGE NO.

10 of 25.

TRANSMITTER SPURIOUS EMISSION

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

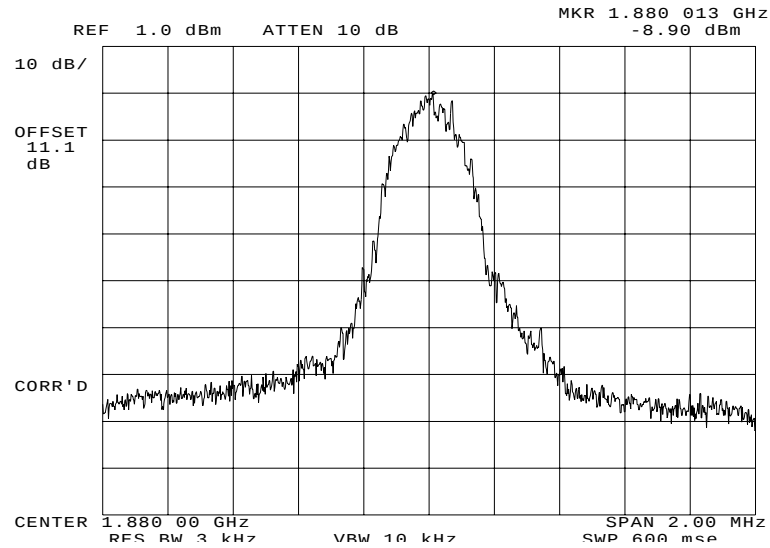


Asset Description (as applicable)	s/n
(1) <u>AUDIO OSCILLATOR/GENERATOR</u>	
i00010 HP 204D	1105A04683
i00017 HP 8903A	2216A01753
i00012 HP 3312A	1432A11250
(2) <u>COAXIAL ATTENUATOR</u>	
i00122 Narda 766-10	7802
i00123 Narda 766-10	7802A
i00069 Bird 8329 (30 dB)	1006
i00113 Sierra 661A-3D	1059
(3) 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

PAGE NO.

11 of 25.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0220072: 2002-Feb-20 Wed 14:16:00
STATE: 1:Low Power



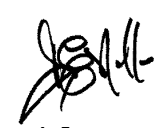
POWER:

LOW

MODULATION:

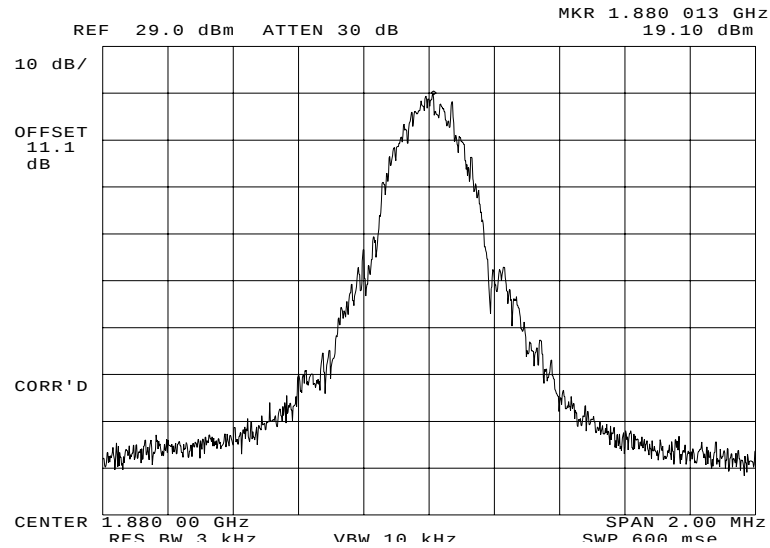
GSM

PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

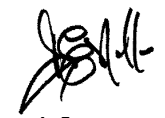
PAGE NO. 12 of 25.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0220071: 2002-Feb-20 Wed 14:13:00
STATE: 2:High Power



POWER: HIGH
MODULATION: GSM

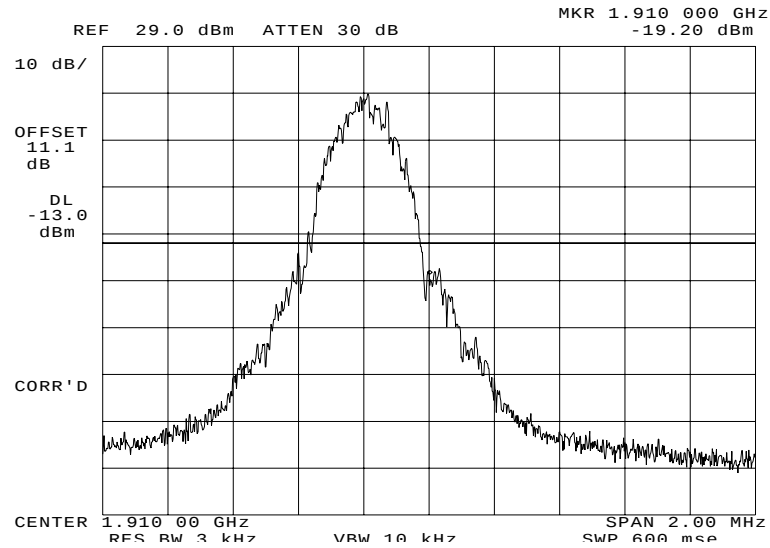
PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

PAGE NO.

13 of 25.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0220073: 2002-Feb-20 Wed 14:18:00
 STATE: 2:High Power



POWER:
 MODULATION:

HIGH
 GSM
 UPPER BANDEDGE CH 810

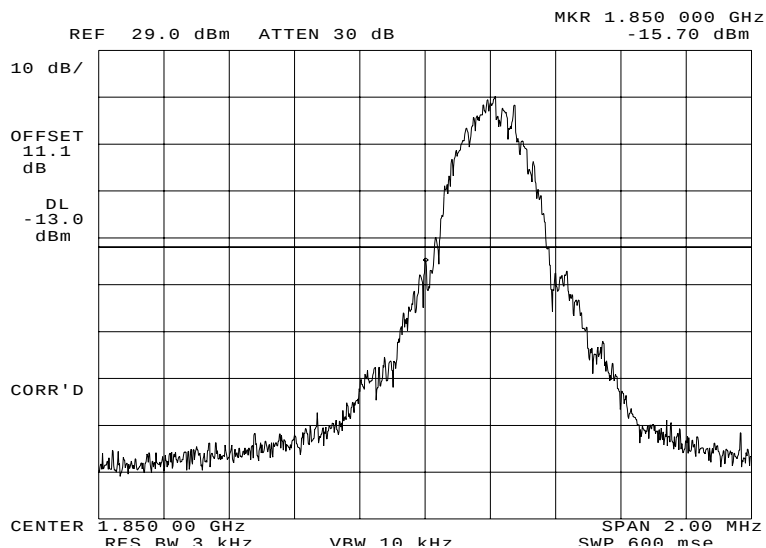
PERFORMED BY:


 Doug Noble, B.A.S. E.E.T.

PAGE NO.

14 of 25.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0220074: 2002-Feb-20 Wed 14:23:00
STATE: 2:High Power



POWER:

MODULATION:

HIGH

GSM

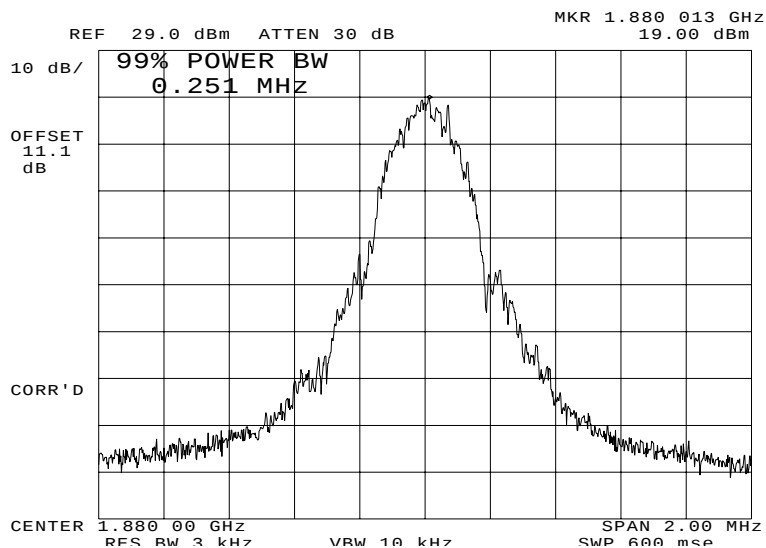
LOWER BANDEDGE CH 810

PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

PAGE NO. 15 of 25.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0220075: 2002-Feb-20 Wed 14:25:00
 STATE: 1:High Power



POWER: HIGH
 MODULATION: GSM
 99 % POWER BANDWIDTH

PERFORMED BY:

Doug Noble, B.A.S. E.E.T.

PAGE NO. 16 of 25.

NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

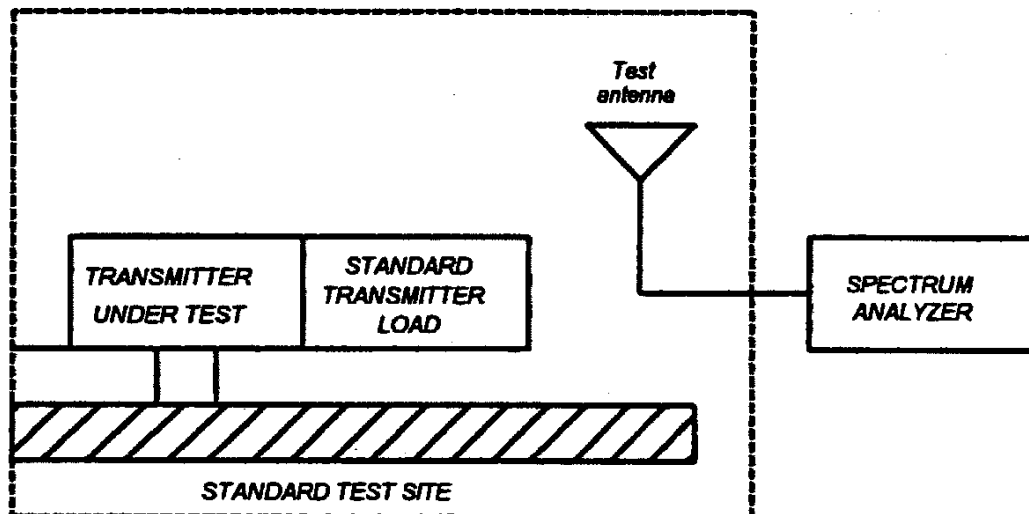
GUIDE: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

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

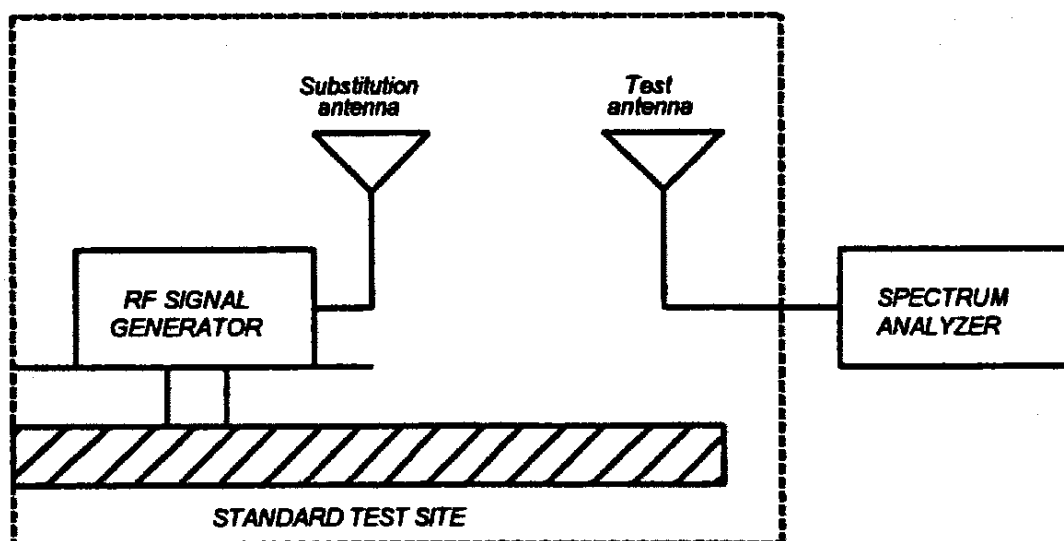
- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth 10 kHz (<1 GHz), 1 MHz (> 1GHz).
 - 2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz (22.917)
 - 3) Sweep Speed ≤ 2000 Hz/second
 - 4) Detector Mode = Mean or 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. 17 of 25.

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. 18 of 25.

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 EMC0 3109-B 25MHz-300MHz	2336	12 mo.	Sep-01
i00065 EMC0 3301-B Active Monopole	2635	12 mo.	Sep-01
i00089 Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-01
i00103 EMC0 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-01
<u>AMPLIFIER</u>			
i00028 HP 8449A	2749A00121	12 mo.	Mar-01
<u>SPECTRUM ANALYZER</u>			
i00029 HP 8563E	3213A00104	12 mo.	Jan-02
i00033 HP 85462A	3625A00357	12 mo.	Jan-02
i00048 HP 8566B	2511AD1467	6 mo.	Jan-02

PAGE NO. 19 of 25.

NAME OF TEST: Field Strength of Spurious Radiation
 g0220066: 2002-Feb-19 Tue 13:40:00
 STATE: ANTENNA FULLY RETRACTED

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	EIRP, dBm	EIRP, dbc
1850.200000	3700.269166	-32.1	≤ -62.61
1880.000000	3759.831667	-35.3	≤ -62.61
1909.800000	3819.393333	-35.3	≤ -62.61
1850.200000	5550.405833	-40.3	≤ -62.61
1880.000000	5639.611667	-39	≤ -62.61
1909.800000	5729.373333	-41.3	≤ -62.61
1850.200000	7400.304166	-33.6	≤ -62.61
1880.000000	7520.013001	-35.2	≤ -62.61
1909.800000	7638.699033	-31.6	≤ -62.61
1850.200000	9250.567499	-34	≤ -62.61
1880.000000	9399.458834	-35.7	≤ -62.61
1909.800000	9548.745699	-31.8	≤ -62.61
1850.200000	11100.685165	-32.2	≤ -62.61
1880.000000	11279.598134	-37.2	≤ -62.61
1909.800000	11458.390366	-33.3	≤ -62.61
1850.200000	12951.015165	-33.7	≤ -62.61
1880.000000	13159.529576	-37.3	≤ -62.61
1909.800000	13368.190366	-33	≤ -62.61
1850.200000	14801.191832	-31.3	≤ -62.61
1880.000000	15039.528743	-36.1	≤ -62.61
1909.800000	15277.990366	-32.8	≤ -62.61
1850.200000	16651.391832	-30.6	≤ -62.61
1880.000000	16919.529576	-35.9	≤ -62.61
1909.800000	17187.790366	-30.8	≤ -62.61

Note: Results are the same for case formed
 from Stainless Steel and/or Platinum and/or Gold.

PAGE NO.

20 of 25.

NAME OF TEST: Field Strength of Spurious Radiation
 g0220067: 2002-Feb-19 Tue 16:20:00
 STATE: ANTENNA FULLY EXTRACTED

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	EIRP, dBm	EIRP, dbc
1850.200000	3700.391666	-35.6	≤ -70.21
1880.000000	3759.950667	-34.3	≤ -70.21
1909.800000	3819.584334	-34.2	≤ -70.21
1850.200000	5550.386500	-41	≤ -70.21
1880.000000	5639.709500	-41	≤ -70.21
1909.800000	5729.221834	-43	≤ -70.21
1850.200000	7400.501500	-35.7	≤ -70.21
1880.000000	7519.771167	-35.7	≤ -70.21
1909.800000	7638.932835	-39.2	≤ -70.21
1850.200000	9250.671833	-35.7	≤ -70.21
1880.000000	9399.664500	-35.7	≤ -70.21
1909.800000	9548.657835	-33.4	≤ -70.21
1850.200000	11100.861833	-35	≤ -70.21
1880.000000	11279.671167	-34.2	≤ -70.21
1909.800000	11458.467835	-35.8	≤ -70.21
1850.200000	12951.061833	-35.9	≤ -70.21
1880.000000	13159.677834	-34.4	≤ -70.21
1909.800000	13368.282835	-31.9	≤ -70.21
1850.200000	14801.261833	-32.6	≤ -70.21
1880.000000	15039.664500	-33.2	≤ -70.21
1909.800000	15278.082835	-33	≤ -70.21
1850.200000	16651.461833	-31.4	≤ -70.21
1880.000000	16919.664500	-33.4	≤ -70.21
1909.800000	17187.869502	-32.1	≤ -70.21

PAGE NO. 21 of 25.
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

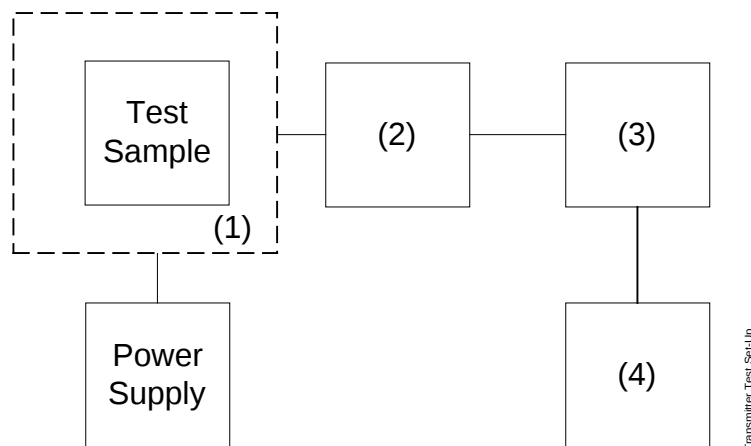
1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature 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

PAGE NO.

22 of 25.

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

PAGE NO.

23 of 25.

NAME OF TEST:

Frequency Stability (Temperature Variation)

Temperature (°C)	EGSM900 Frequency Error (Hz) Limit = +/- 89 Hz			PCS1900 Frequency Error (Hz) Limit = +/- 185 Hz		
	ch 975	ch 38	ch 124	ch 512	ch 661	ch 810
-30	18.21	8.20	-2.71	-14.98	-23.76	-36.94
-20	21.63	36.21	17.82	-13.04	-31.83	-15.95
-10	-22.99	-7.55	6.97	-19.63	-35.58	-50.17
0	-9.17	-13.43	8.59	-37.90	11.88	-14.14
10	15.88	7.75	-14.72	-22.21	-24.21	-29.38
20	11.43	8.59	10.07	16.79	13.82	18.21
30	-12.98	-9.17	-11.36	21.50	-39.00	24.28
40	-13.69	-21.11	-17.82	11.24	12.14	10.85
50	-14.46	-16.27	-7.30	25.05	19.11	-39.45

PAGE NO. 24 of 25.

NAME OF TEST: Frequency Stability (Voltage Variation)

SPECIFICATION: 47 CFR 2.1055(d)(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 $25\pm 5^{\circ}\text{C}$ 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)

Voltage (%)	Voltage (V)	EGSM900 Frequency Error (Hz) Limit = +/- 89 Hz			PCS1900 Frequency Error (Hz) Limit = +/- 185 Hz		
		ch 975	ch 38	ch 124	ch 512	ch 661	ch 810
End Point	<3.2	Tx off	Tx off	Tx off	Tx off	Tx off	Tx off
Nominal	3.8	-5.94	-21.11	-6.72	30.41	-29.32	25.25
115% Nominal	4.4	-11.88	20.28	-35.77	22.34	-38.94	19.44
85% Nominal	3.2	-10.85	-8.98	-9.62	-22.54	-22.02	-21.89

PAGE NO. 25 of 25.

NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

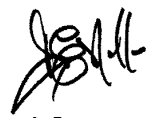
MODULATION = 256KGXW

NECESSARY BANDWIDTH:

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

PERFORMED BY:
END

OF


Doug Noble, B.A.S. E.E.T.
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.