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

CLASS II PERMISSIVE CHANGE

of

FCC ID: P7QNPM-7
MODEL: MMII
Serial Numbers of units tested: 178021/7 and 178194/2

to

FEDERAL COMMUNICATIONS COMMISSION

Rule Part(s) 24E, CONFIDENTIALITY

DATE OF REPORT: June 25, 2002

ON THE BEHALF OF THE APPLICANT:

Vertu Ltd.

AT THE REQUEST OF: P.O. E16-4427255

Vertu Ltd.
Beacon Hill Road
Church Crookham, Hampshire GU52 8DY UK

Attention of: Mark Pope, Manager - Test and Type Approvals
+44 1252 611135; FAX: -611302
mobile: +44 7774 8158594
mark.pope@vertu.com

SUPERVISED BY: Morton Flom, P. Eng.

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

APPLICANT: Vertu Ltd.

FCC ID: P7QNPM-7

BY APPLICANT:

1. LETTER OF AUTHORIZATION x

2. IDENTIFICATION DRAWINGS, 2.1033(c)(11)
   - x ID LABEL
   - x LOCATION OF LABEL
   - x COMPLIANCE STATEMENT
   - x 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)
   - SCHEMATIC DIAGRAM x
   - PARTS LIST x
   - USER MANUAL x

6. LETTER BY APPLICANT DESCRIBING CHANGES 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.

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	Standard Test Conditions and Engineering Practices	7
2.1046(a)	ERP Carrier Power (Radiated)	8
2.1051, 24, 24.238(b)		
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PAGE NO. 1 of 30.

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: d0260040

d) Client: Vertu Ltd.
Beacon Hill Road
Church Crookham, Hampshire GU52 8DY UK

e) Identification: MMII
FCC ID: P7QNPM-7
Description: Licensed portable held to ear

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

g) Report Date: June 25, 2002
EUT Received: June 17, 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.

ACCESSORIES USED DURING TESTING:

Type	Model	MFA #
Battery	BLZ-2	s00426
Battery	BLZ-2	s00428
Battery (Spare)	BLZ-2	s00429
Battery (Spare)	BLZ-2	s00430
Headset	HSV-A	s00431
Desk Stand/Pedestal	DTV-A	s00432
AC Charger	ACP-8UV	s00433
AC Charger	ACP-8UV	s00434
Data Cable	DLV-A	s01304
Laptop	IBM Thinkpad 600E	s00435

EXPOSITORY STATEMENT
PERMISSIVE CHANGE

APPLICANT: Vertu Ltd.

FCC ID: P7QNPM-7

The applicant has made design changes/improvements to the originally FCC approved equipment.

Data contained herein confirms that a Permissive Change to the unit has been effected and that the performance of the unit is at or better than the levels originally reported to the commission.

The following changes/improvements have been made:

A re-tolerancing of the Antenna assembly (fundamentally of the same design, but retuned for improved/more consistent field performance).

An improvement the 1900 Band receiver filtering, located on the Engine board

An improved layout and grounding arrangement of the printed flexy circuit within the phone to, improve Audio Quality. The flexy circuit provides the interconnections between the Engine Board (TX/RX sections), the Keypad and Transducers. Flexy materials etc are unchanged as is the concept of the fully screened engine board.

Some changes to the Keypad arrangement to improve tactility, function and provide additional ESD immunity.

Mechanical enhancements for improved assembly, and tolerance adjustments for improved fit and corresponding alignment adjustments.

As changes are essentially fine-tuning, and in many instances fine measurement might be needed to identify any changes.

The concept of the fully screened Engine module and use of specialist materials remains unchanged.

The previous submission demondstrated the performance of the P7QNPM-7 phone in its cosmetic variants:Stainless Steel, Platinum and Gold and combinations of these materials.

These tests upgrade the performance of all cosmetic variants, the upgrade replaces the original P7QNPM-7 which ceases to be marketed. In addition White Gold is added as a further cosmetic variant. Compliance is therefore demondstrated for cosmetic variants Stainless Steel, Platinum, Yellow Gold, White Gold and combinations of these finishes.

A revised charger acp-8uv and improved HSV-A headset are also included.

PAGE NO. 3 of 30.

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: 1.00 EIRP
___ Switchable ___ Variable _x_ 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. 4 of 30.

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. 5 of 30.

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

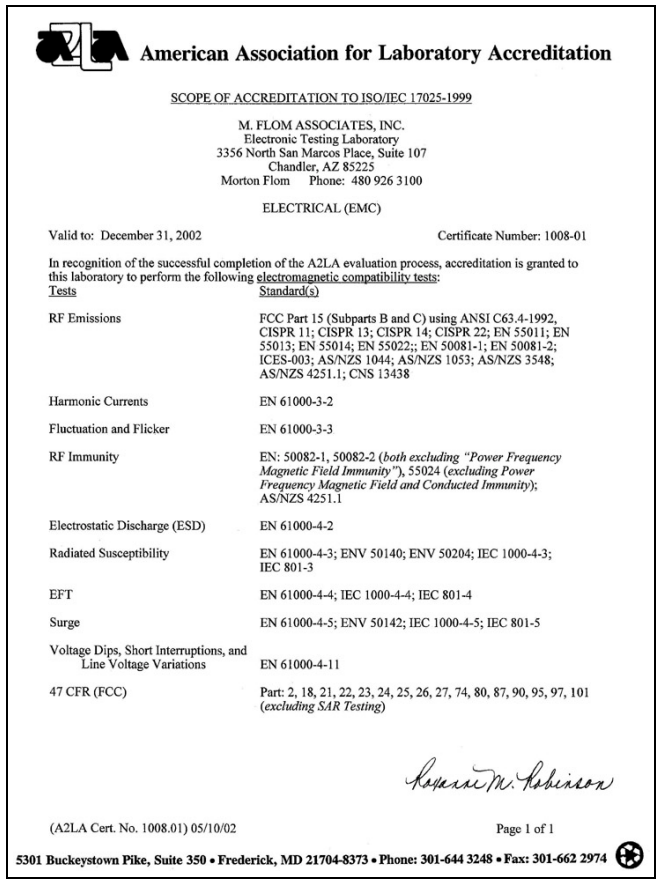
Electrical (EMC) Testing

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 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002.

Presented this 2nd day of March, 2001.

President
For the Accreditation Council
Certificate Number 1008.01
Valid to December 31, 2002

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 17025-1999

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, 2002 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; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438
Harmonic Currents	EN 61000-3-2
Fluctuation and Flicker	EN 61000-3-3
RF Immunity	EN: 50082-1, 50082-2 (*both excluding "Power Frequency Magnetic Field Immunity"*), 55024 (*excluding Power Frequency Magnetic Field and Conducted Immunity*); AS/NZS 4251.1
Electrostatic Discharge (ESD)	EN 61000-4-2
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
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
Voltage Dips, Short Interruptions, and Line Voltage Variations	EN 61000-4-11
47 CFR (FCC)	Part: 2, 18, 21, 22, 23, 24, 25, 26, 27, 74, 80, 87, 90, 95, 97, 101 (*excluding SAR Testing*)

(A2LA Cert. No. 1008.01) 05/10/02 Page 1 of 1

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • 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. 6 of 30.

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

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

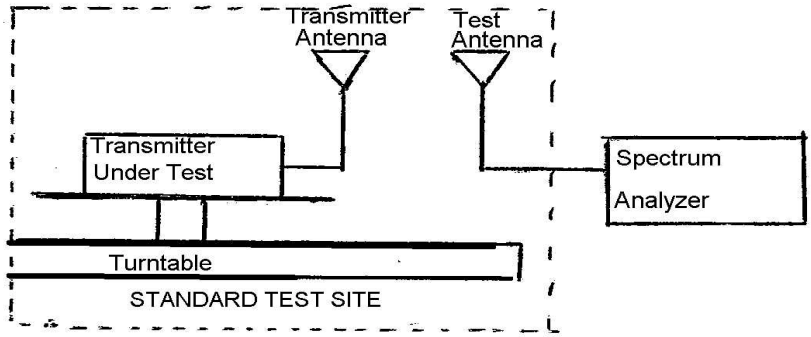
PAGE NO. 8 of 30.

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:

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

RESULTS: ATTACHED

PAGE NO. 9 of 30.

RESULTS: EIRP Carrier Power (Radiated) – ANTENNA RETRACTED

STEEL CASE

	1850.2 MHz		1880 MHz		1909.8 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0˚	18.2	-0.8	19.7	-0.1	17.6	0.1
45˚	20.6	-0.8	20.7	-0.1	16.0	0.1
90˚	20.7	-0.8	22.3	-0.1	14.3	0.1
135˚	20.7	-0.8	22.9	-0.1	18.0	0.1
180˚	22.3	-0.8	21.8	-0.1	16.1	0.1
225˚	20.2	-0.8	21.4	-0.1	20.2	0.1
270˚	20.7	-0.8	22.4	-0.1	20.2	0.1
315˚	19.7	-0.8	18.8	-0.1	21.8	0.1

	1850.2 MHZ	1880 MHz	1909.8 MHz
Av. Radiated Power:	21.2 dbm	21.4 dbm	17.9 dbm

WHITE GOLD CASE

	1850.2 MHz		1880 MHz		1909.8 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0˚	18.4	-0.8	20.1	-0.1	18.1	0.1
45˚	20.4	-0.8	20.3	-0.1	17.7	0.1
90˚	20.2	-0.8	20.8	-0.1	19.2	0.1
135˚	22.2	-0.8	22.9	-0.1	18.5	0.1
180˚	19.6	-0.8	20.7	-0.1	15.8	0.1
225˚	20.2	-0.8	20.9	-0.1	14.1	0.1
270˚	20.1	-0.8	17.4	-0.1	20.1	0.1
315˚	16.4	-0.8	19.7	-0.1	22.5	0.1

	1850.2 MHZ	1880 MHz	1909.8 MHz
Av. Radiated Power:	20.5 dbm	20.5 dbm	18.2 dbm

PAGE NO. 10 of 30.

RESULTS: EIRP Carrier Power (Radiated) – ANTENNA EXTENDED

STEEL CASE

	1850.2 MHz		1880 MHz		1909.8 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0˚	28.2	-0.8	26.5	-0.1	25.6	0.1
45˚	28.4	-0.8	26.5	-0.1	26.9	0.1
90˚	27.6	-0.8	27.2	-0.1	24.1	0.1
135˚	29.2	-0.8	28.7	-0.1	24.7	0.1
180˚	27.0	-0.8	24.7	-0.1	27.0	0.1
225˚	28.4	-0.8	27.1	-0.1	26.9	0.1
270˚	28.8	-0.8	25.4	-0.1	24.6	0.1
315˚	28.8	-0.8	24.7	-0.1	28.4	0.1

	1850.2 MHZ	1880 MHz	1909.8 MHz
Av. Radiated Power:	29.1 dbm	26.5 dbm	25.9 dbm

WHITE GOLD CASE

	1850.2 MHz		1880 MHz		1909.8 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0˚	29.0	-0.8	25.9	-0.1	26.0	0.1
45˚	27.7	-0.8	27.2	-0.1	26.9	0.1
90˚	27.7	-0.8	29.0	-0.1	24.1	0.1
135˚	26.5	-0.8	26.5	-0.1	24.7	0.1
180˚	27.8	-0.8	27.8	-0.1	27.0	0.1
225˚	29.1	-0.8	24.5	-0.1	26.9	0.1
270˚	29.2	-0.8	26.2	-0.1	24.6	0.1
315˚	29.0	-0.8	28.0	-0.1	28.4	0.1

	1850.2 MHZ	1880 MHz	1909.8 MHz
Av. Radiated Power:	29.1 dbm	27 dbm	26.5 dbm

PAGE NO. 11 of 30.

NAME OF TEST: Transmitter Conducted Measurements

SPECIFICATION: 24.238(b): Occupied Bandwidth
24: Emissions at Band Edges

GUIDE: As indicated on page 7

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.

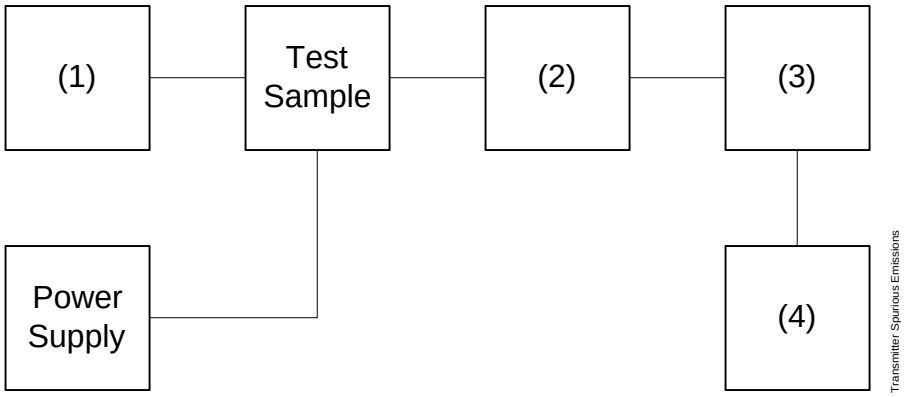
3. MEASUREMENT RESULTS: ATTACHED

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 12 of 30.

TRANSMITTER SPURIOUS EMISSION

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

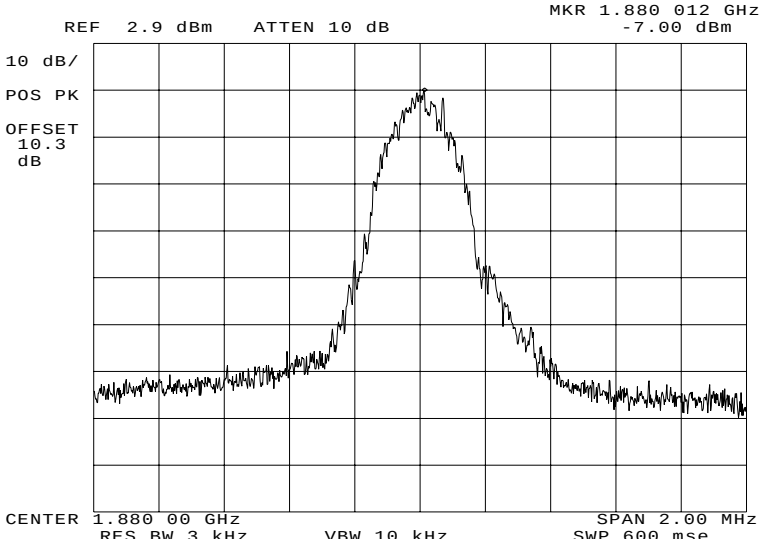


Transmitter Spurious Emissions

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

PAGE NO. 13 of 30.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0260058: 2002-Jun-19 Wed 10:56:00
STATE: 1:Low Power

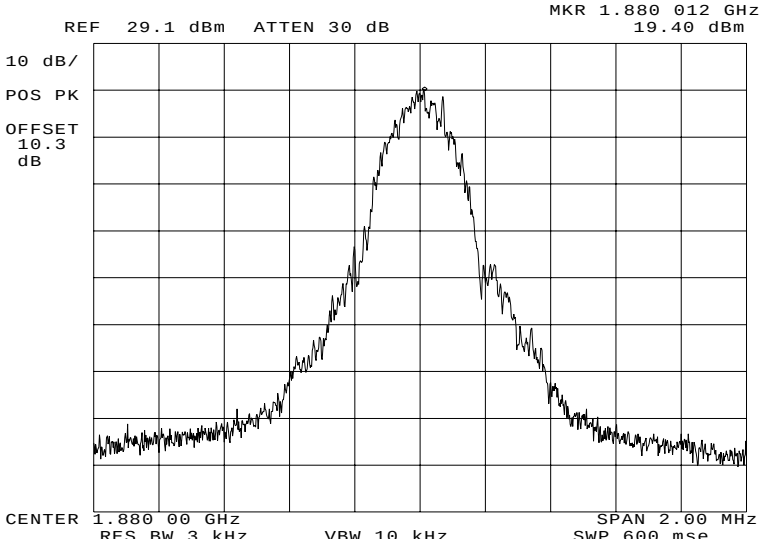


POWER: LOW
MODULATION: GSM PCS BAND

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 14 of 30.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0260054: 2002-Jun-19 Wed 10:48:00
STATE: 2:High Power

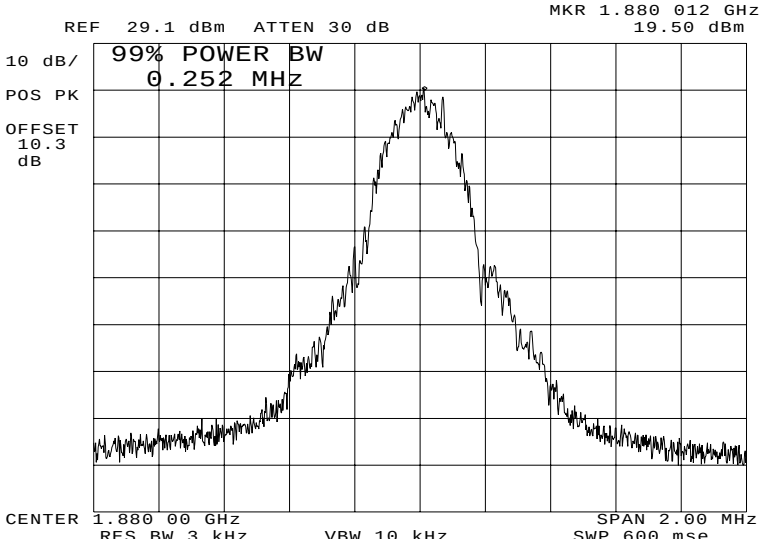


POWER: HIGH
MODULATION: GSM PCS BAND

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 15 of 30.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0260055: 2002-Jun-19 Wed 10:50:00
STATE: 2:High Power

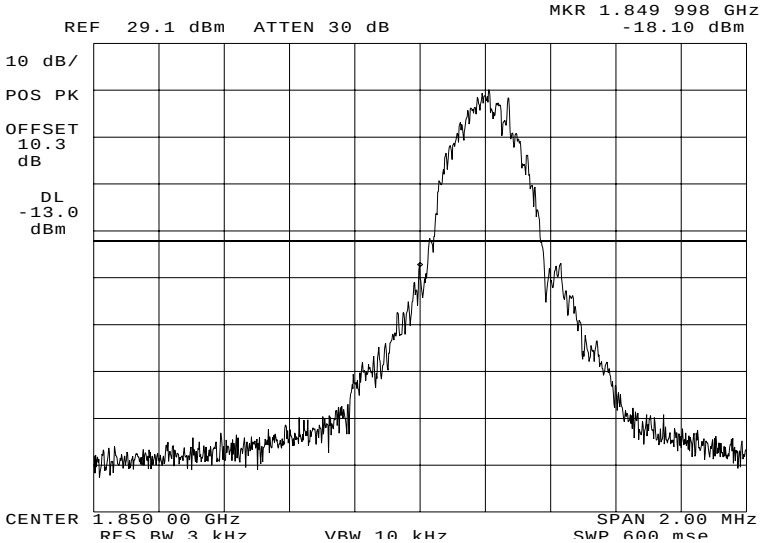


POWER: HIGH
MODULATION: GSM PCS BAND
99 % POWER BANDWIDTH

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 16 of 30.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0260056: 2002-Jun-19 Wed 10:52:00
STATE: 2:High Power

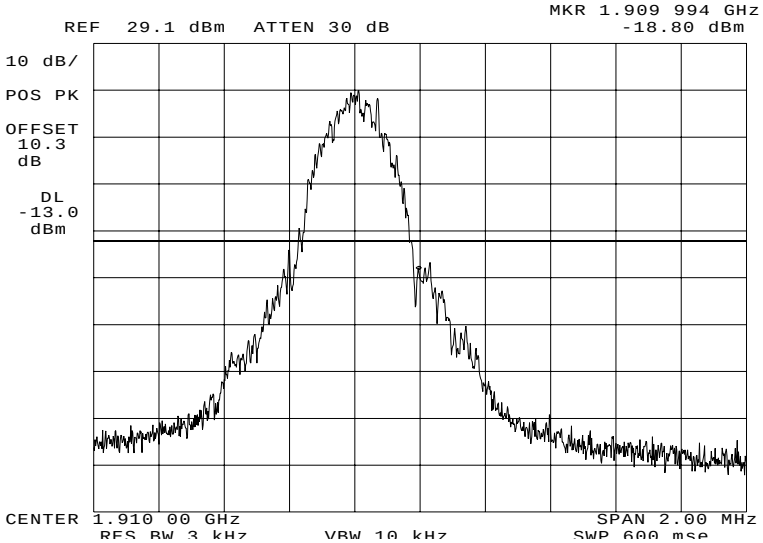


POWER: HIGH
MODULATION: GSM PCS BAND
LOWER BANDEDGE CH 512

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 17 of 30.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0260057: 2002-Jun-19 Wed 10:53:00
STATE: 2:High Power



POWER: HIGH
MODULATION: GSM PCS BAND
UPPER BANDEDGE CH 810

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 18 of 30.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)

SPECIFICATION: 47 CFR 2.1051

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

TEST EQUIPMENT: As per attached page

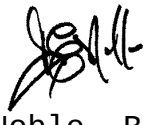
MEASUREMENT PROCEDURE

1. The emissions were measured for the worst case as follows:
   (a): within a band of frequencies defined by the carrier frequency plus and minus one channel.
   (b): from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.

2. The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.

3. MEASUREMENT RESULTS: ATTACHED FOR WORST CASE

FREQUENCY OF CARRIER, MHz	=	1880, 1850.2, 1909.8
SPECTRUM SEARCHED, GHz	=	0 to 10 x F_C
MAXIMUM RESPONSE, Hz	=	N/A
ALL OTHER EMISSIONS	=	≥ 20 dB BELOW LIMIT



PERFORMED BY: Doug Noble, B.A.S. E.E.T.

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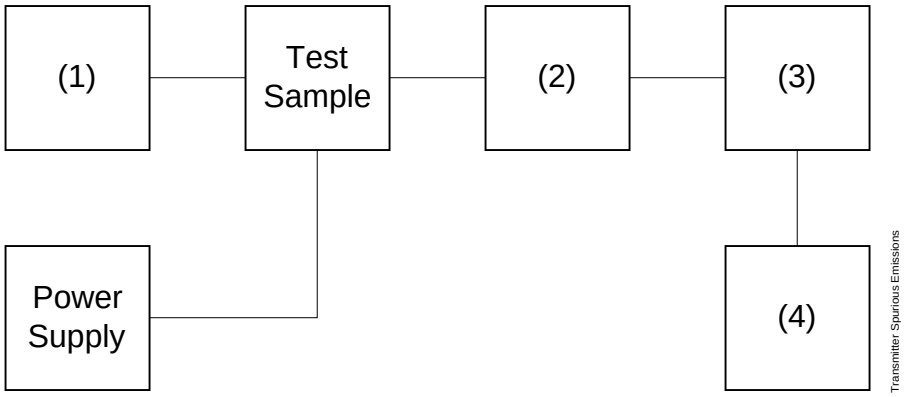
TRANSMITTER SPURIOUS EMISSION

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



Transmitter Spurious Emissions

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

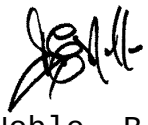
PAGE NO. 20 of 30.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)

LIMIT(S), dBc: -(43+10xLOG P) = -43.3 (1 Watts)
-(43+10xLOG P) = -15.3 (2 mWatts)

STATE: 1:Low Power g0260063: 2002-Jun-19 Wed 13:30:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
1850.200000	3700.494500	-75.5	-78.4	-62.5
1880.000000	3760.122000	-74.6	-77.5	-61.6
1909.800000	3819.729500	-75.9	-78.8	-62.9
1850.200000	5550.426500	-75.1	-78	-62.1
1880.000000	5639.911000	-73.9	-76.8	-60.9
1909.800000	5729.205500	-74.7	-77.6	-61.7
1850.200000	7400.721000	-68.6	-71.5	-55.6
1880.000000	7520.105000	-68.9	-71.8	-55.9
1909.800000	7639.380500	-68	-70.9	-55
1850.200000	9251.085500	-69.1	-72	-56.1
1880.000000	9400.232500	-68.8	-71.7	-55.8
1909.800000	9549.171000	-68.4	-71.3	-55.4
1850.200000	11101.386500	-67.4	-70.3	-54.4
1880.000000	11280.094500	-69.2	-72.1	-56.2
1909.800000	11458.671000	-68.6	-71.5	-55.6
1850.200000	12951.388000	-63.6	-66.5	-50.6
1880.000000	13159.786500	-63.7	-66.6	-50.7
1909.800000	13368.714500	-63.6	-66.5	-50.6
1850.200000	14801.758000	-62.4	-65.3	-49.4
1880.000000	15040.247000	-61.4	-64.3	-48.4
1909.800000	15278.347800	-63.4	-66.3	-50.4
1850.200000	16651.738800	-61.9	-64.8	-48.9
1880.000000	16920.032200	-61.5	-64.4	-48.5
1909.800000	17188.194000	-61.9	-64.8	-48.9
1850.200000	18502.036800	-61.6	-64.5	-48.6
1880.000000	18800.149800	-57.2	-60.1	-44.2
1909.800000	19097.918900	-56.1	-59	-43.1
1850.200000	20352.235300	-55.6	-58.5	-42.6
1880.000000	20679.917700	-55.9	-58.8	-42.9
1909.800000	21007.599900	-54.7	-57.6	-41.7



PERFORMED BY: Doug Noble, B.A.S. E.E.T.

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)

LIMIT(S), dBc: -(43+10xLOG P) = -43.3 (1 Watts)
-(43+10xLOG P) = -15.3 (2 mWatts)

STATE: 2:High Power g0260062: 2002-Jun-19 Wed 13:27:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
1850.200000	3700.377500	-54.5	-83.6	-41.5
1880.000000	3760.095000	-54.3	-83.4	-41.3
1909.800000	3819.609500	-54.5	-83.6	-41.5
1850.200000	5550.736500	-55.1	-84.2	-42.1
1880.000000	5639.878000	-54.9	-84	-41.9
1909.800000	5729.638000	-54.6	-83.7	-41.6
1850.200000	7400.867000	-47.6	-76.7	-34.6
1880.000000	7520.001500	-48.3	-77.4	-35.3
1909.800000	7639.402500	-48.4	-77.5	-35.4
1850.200000	9251.037000	-49.1	-78.2	-36.1
1880.000000	9399.948500	-49.6	-78.7	-36.6
1909.800000	9549.222500	-48.1	-77.2	-35.1
1850.200000	11101.373500	-47.6	-76.7	-34.6
1880.000000	11279.848500	-48.4	-77.5	-35.4
1909.800000	11458.991000	-48	-77.1	-35
1850.200000	12951.381600	-44	-73.1	-31
1880.000000	13160.043500	-43.3	-72.4	-30.3
1909.800000	13368.563400	-43.8	-72.9	-30.8
1850.200000	14801.769000	-43	-72.1	-30
1880.000000	15040.221100	-43.3	-72.4	-30.3
1909.800000	15278.568200	-43.5	-72.6	-30.5
1850.200000	16651.934500	-43.5	-72.6	-30.5
1880.000000	16919.860600	-41.7	-70.8	-28.7
1909.800000	17188.365200	-41.9	-71	-28.9
1850.200000	18501.826100	-40.8	-69.9	-27.8
1880.000000	18799.835300	-37.8	-66.9	-24.8
1909.800000	19097.773700	-38.1	-67.2	-25.1
1850.200000	20352.018600	-35.3	-64.4	-22.3
1880.000000	20679.836800	-35.8	-64.9	-22.8
1909.800000	21007.827700	-35	-64.1	-22

PERFORMED BY: Doug Noble, B.A.S. E.E.T.

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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

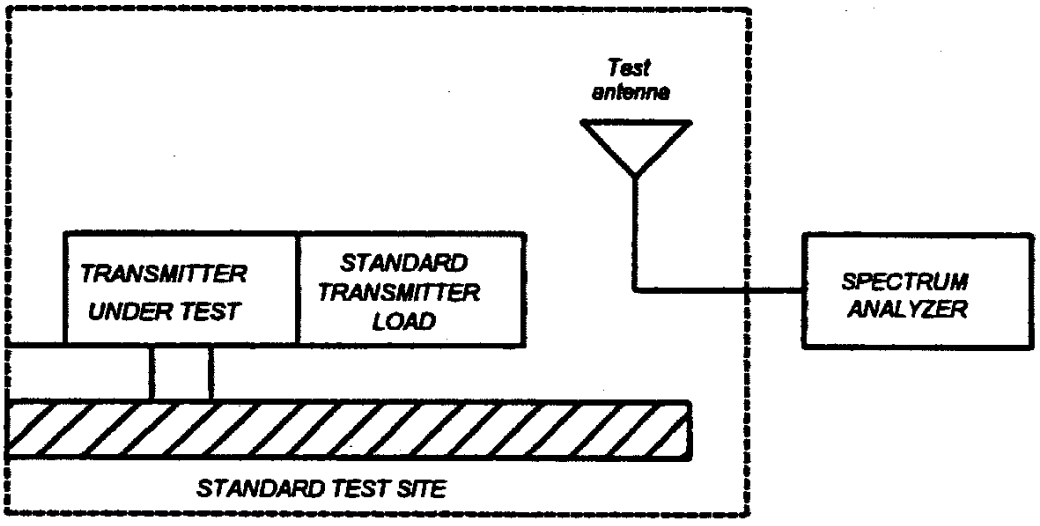
1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

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 ≥ 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.



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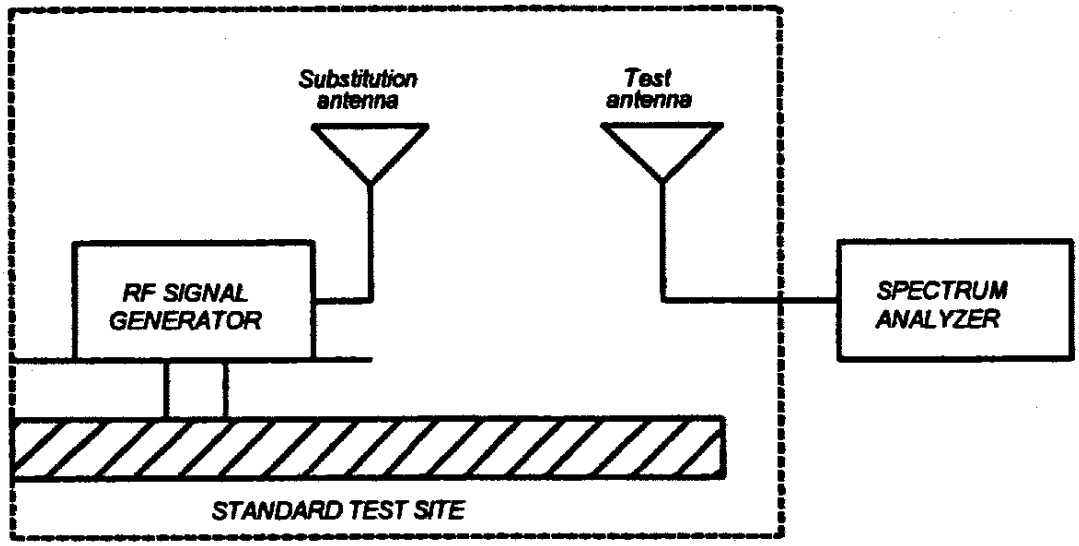
NAME OF TEST: Field Strength of Spurious Radiation (Cont.)

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 ± 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. 24 of 30.

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 =
$10\log_{10}$(TX power in watts/0.001) – the levels in step l)

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

Test Equipment:

Asset (as applicable)	Description	s/n	Cycle (Per ANSI C63.4-1992/2000 Draft, 10.1.4)	Last Cal
TRANSDUCER				
i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-01
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-01
i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-01
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-01
AMPLIFIER				
i00028	HP 8449A	2749A00121	12 mo.	Mar-02
SPECTRUM ANALYZER				
i00029	HP 8563E	3213A00104	12 mo.	Jan-02
i00033	HP 85462A	3625A00357	12 mo.	Jan-02
i00048	HP 8566B	2511AD1467	6 mo.	Jan-02

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NAME OF TEST: Field Strength of Spurious Radiation

STEEL CASE: RETRACTED ANTENNA
g0260053: 2002-Jun-19 Wed 11:27:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	EIRP, dBm	EIRP, Watts
1880.000000	3759.903501	68.17	5.85	-21.2	≤ -51.2
1880.000000	5639.535734	44.67	9.83	-40.7	≤ -51.2
1880.000000	7519.696400	44.83	13.73	-36.7	≤ -51.2
1880.000000	9399.505558	42.23	16.23	-36.8	≤ -51.2
1880.000000	11279.871641	42.57	16.76	-35.9	≤ -51.2
1880.000000	13160.009975	39.73	20.06	-35.4	≤ -51.2
1880.000000	15040.009975	39.07	17.09	-39.1	≤ -51.2
1880.000000	16920.009975	38.57	22.88	-33.8	≤ -51.2

STEEL CASE: EXTENDED ANTENNA
g0260052: 2002-Jun-19 Wed 09:24:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	EIRP, dBm	EIRP, Watts
1880.000000	3759.856667	62.83	5.85	-26.5	≤ -51.2
1880.000000	5639.633000	45.5	9.83	-39.9	≤ -51.2
1880.000000	7519.826333	44.33	13.72	-37.2	≤ -51.2
1880.000000	9399.735834	41.83	16.23	-37.2	≤ -51.2
1880.000000	11280.180168	42.5	16.76	-36	≤ -51.2
1880.000000	13160.016834	39.33	20.06	-35.8	≤ -51.2
1880.000000	15039.993501	41.5	17.09	-36.6	≤ -51.2
1880.000000	16919.993501	39.33	22.88	-33	≤ -51.2

WHITE GOLD CASE: RETRACTED ANTENNA
g0260047: 2002-Jun-18 Tue 15:52:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	EIRP, dBm	EIRP, Watts
1880.000000	3759.771666	66.33	5.85	-23	≤ -51.2
1880.000000	5639.744075	45.57	9.83	-39.8	≤ -51.2
1880.000000	7519.818741	45.9	13.72	-35.6	≤ -51.2
1880.000000	9399.663174	42.4	16.23	-36.6	≤ -51.2
1880.000000	11280.019774	42.07	16.76	-36.4	≤ -51.2
1880.000000	13160.014774	39.23	20.06	-35.9	≤ -51.2
1880.000000	15040.021441	41.4	17.09	-36.7	≤ -51.2
1880.000000	16920.033108	40.23	22.88	-32.1	≤ -51.2

WHITE GOLD CASE: EXTENDED ANTENNA
g0260046: 2002-Jun-18 Tue 14:15:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	EIRP, dBm	EIRP, Watts
1880.000000	3759.910001	60.67	5.85	-28.7	≤ -51.2
1880.000000	5639.776667	46.17	9.83	-39.2	≤ -51.2
1880.000000	7519.779334	46.33	13.73	-35.2	≤ -51.2
1880.000000	9399.806834	42	16.23	-37	≤ -51.2
1880.000000	11279.879168	43	16.76	-35.5	≤ -51.2
1880.000000	13160.005835	39.33	20.06	-35.8	≤ -51.2
1880.000000	15039.940835	40.83	17.09	-37.3	≤ -51.2
1880.000000	16919.934169	38.5	22.88	-33.8	≤ -51.2

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NAME OF TEST: Frequency Stability (Temperature Variation)

SPECIFICATION: 47 CFR 2.1055(a)(1), 24.235

GUIDE: As indicated on page 7

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.

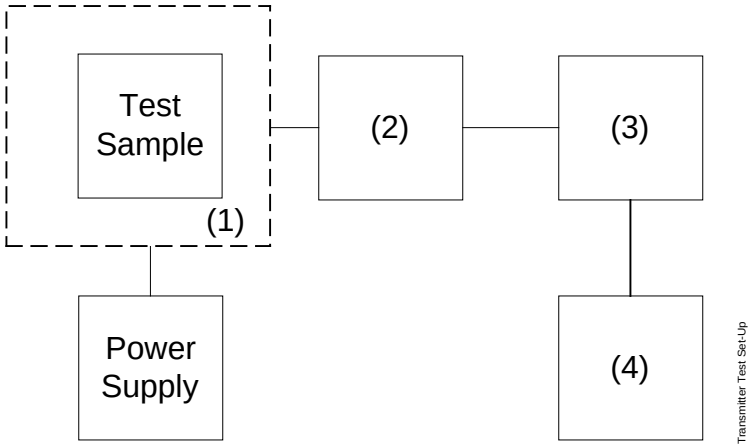
4. The temperature tests were performed for the worst case.

5. MEASUREMENT RESULTS: ATTACHED

PAGE NO. 27 of 30.

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	s/n
(as applicable)		
(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

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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	13.42	2.34	-12.50	-23.54	-32.84	-27.52
-20	8.63	25.63	16.39	-39.63	-32.30	-28.34
-10	2.53	-8.47	-14.23	-27.52	-28.57	-35.21
0	-10.13	11.94	7.56	-28.36	-22.35	-24.37
10	17.45	12.74	-3.14	-32.67	-21.86	32.15
20	13.24	3.62	15.90	25.93	25.84	24.37
30	-12.54	5.17	12.64	22.58	25.83	39.84
40	-11.87	-14.62	-14.95	14.74	28.58	21.54
50	-23.21	-19.36	-21.35	28.62	26.34	24.56

PAGE NO. 29 of 30.

NAME OF TEST: Frequency Stability (Voltage Variation)

SPECIFICATION: 47 CFR 2.1055(d)(1)

GUIDE: As indicated on page 7

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)

STATE:

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	7.56	-15.23	-5.94	25.67	-24.17	-22.91
115% Nominal	4.4	-4.65	9.64	-21.82	24.19	-28.38	-32.47
85% Nominal	3.2	-12.83	-2.61	-10.16	-23.17	-18.69	-22.85

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.

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.