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

Transmitter Certification

of

FCC ID: LJPRH-31
Model: RH-31

Serial Number of Unit Tested: 001004/00/116804/7

to

Federal Communications Commission

Rule Part(s) 22E, 24H, Confidentiality

Date Of Report: August 15, 2003

On the Behalf of the Applicant:

Nokia Corporation

At the Request of: P.O. K. Oksanen 08/04/2003

Nokia Corporation
Elektroniikkatie 10
Fin-90570
Oulu, Finland

Attention of: Kare Oksanen, TCC Oulu
kare.oksanen@nokia.com
011 358 7180 08000; FAX: 011 358 7180 47222

Supervised By: Morton Flom, P. Eng.

The applicant has been cautioned as to the following:

15.21 Information to User.

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

15.27(a) Special Accessories.

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

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

Table of Contents

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: d0380019

d) Client: Nokia Corporation
Elektroniikkatie 10
Fin-90570
Oulu, Finland

e) Identification: RH-31
FCC ID: LJPRH-31
Description: GSM850/1800/1900/FM Radio

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

g) Report Date: August 15, 2003
EUT Received: August 04, 2003

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

i) Sampling method: No sampling procedure used.

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

m) Supervised by:

Morton Flom, P. Eng.

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

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

Accessories Used During Testing:

Type	**Model**	**Serial Number**	**Specimen**
EUT	RH-31	001004/00/116804/7	S00824
Battery	BLD-3	N/A	S00826
Charger	ACP-12U	N/A	S01275
Charger	ACP-7U	N/A	S01248
Charger	ACP-8U	N/A	S01250
Desktop Stand	DCV-14	N/A	S00729
Music Stand	DT-1	N/A	
Stereo Headset	HDS-3	N/A	

List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and to

22E, 24H, Confidentiality

Sub-Part 2.1033
(c)(1): **Name and Address of Applicant**:

Nokia Corporation
Elektroniikkatie 10
Fin-90570
Oulu, Finland

Manufacturer:

Nokia TMC., Ltd.
Yangduck-Dong 973-6
Hwe won-Ku, Masan, Korea

(c)(2): **FCC ID**: LJPRH-31

Model Number: RH-31

(c)(3): **Instruction Manual(s)**:

Please See Attached Exhibits

(c)(4): **Type of Emission**: 300KGXW, 300KG7W

(c)(5): **FREQUENCY RANGE, MHz**: 824.2 to 848.8 GSM850
1850.2 to 1909.8 GSM1900

(c)(6): **Power Rating, Watts**: 1.288 ERP (850)
1.318 EIRP (1900)

___ Switchable x Variable ___ N/A

(c)(7): **Maximum Power Rating, Watts**: 2 GSM 850
1 GSM 1900

Subpart 2.1033 (continued)

(c)(8): Voltages & Currents in All Elements in Final RF Stage, Including Final Transistor or Solid State Device:

Collector Current, A	=	per manual
Collector Voltage, Vdc	=	per manual
Supply Voltage, Vdc	=	3.9

(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

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

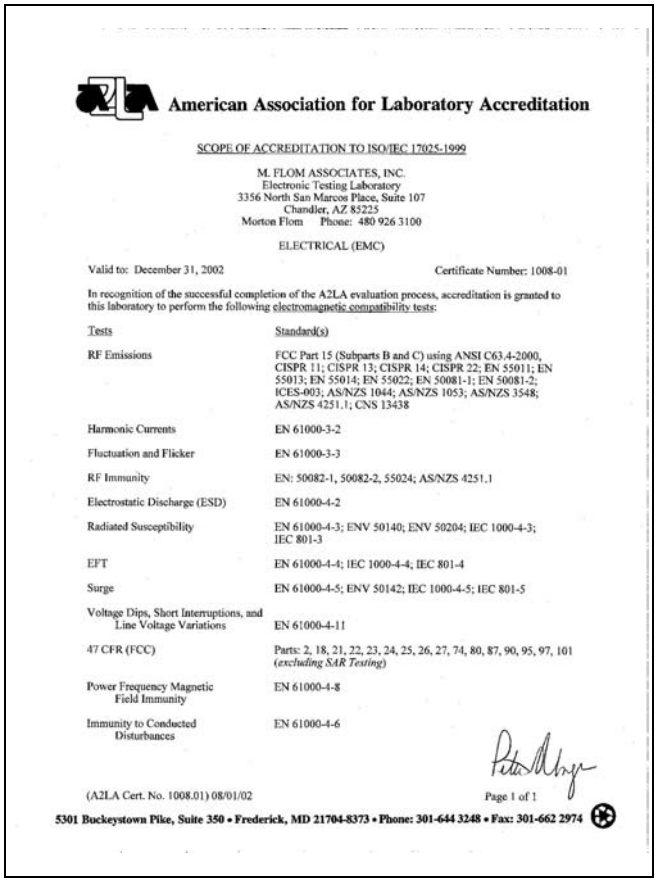
Electrical (EMC) Testing

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 C63.4-2000, 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, 55024; 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)	Parts: 2, 18, 21, 22, 23, 24, 25, 26, 27, 74, 80, 87, 90, 95, 97, 101 *(excluding SAR Testing)*
Power Frequency Magnetic Field Immunity	EN 61000-4-8
Immunity to Conducted Disturbances	EN 61000-4-6

(A2LA Cert. No. 1008.01) 08/01/02 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.

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
x 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

General Information

1. Prior to testing, the deviation for audio modulation and each of the respective SAT + ST tones were set as close as possible to the required limit.

2. Except for audio modulation, which was applied externally, Wideband Data SAT, ST and all other tones and operational modes were provided by a test control unit incorporating appropriate software. Worst case repetition rate for Wideband Data was 10 kb/s.

3. Spurious radiation was measured at three (3) meters.

4. The two cellular frequency bands are available to the user automatically. Please refer to the manual contained in the documentation.

5. The normal modes of modulation are:

   _x_ (a) GSM/GPRS 850

   _X_ (b) EGPRS 850

   _x_ (c) GSM/GPRS 1900

   _x_ (d) EGPRS 1900

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, 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.

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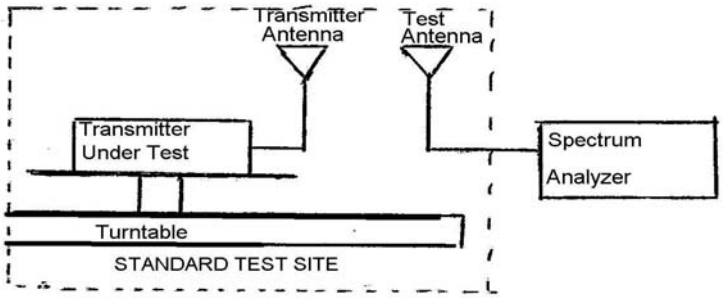
Name of Test: ERP/EIRP Carrier Power (Radiated)

Specification: TIA/EIA 603A (Substitution Method)

Definition: The average radiated power of device is the equivalent power required, when delivered to a substitution antenna, to produce at a distant point the same average received power as produced by the licensed device.

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 4m and rotate turntable from 0° to 360°. Record the highest received signal in dB as E_T.

c) Replace the transmitter under test with a substitution 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 level using the same modulation as with the transmitter. Raise and lower the test antenna like in step b) and record the highest received signal in dB as E_S.

d) Calculate radiated power as following:
Radiated power = Level + E_T – E_S + $Gain_{Ant}$

E_T Signal level received from transmitter
E_S Signal level received from substitution antenna

Results Attached

Test Results For: ERP/EIRP Carrier Power (Radiated)

Freq MHz	Level dBm	Antenna Gain dBi	$E_T - E_S$ dBm	Pol	Radiated P Out dbm	Radiated P Out Watts
GSM850/GPRS850						
824.2	30.8	-0.9dBd	97.5-98.0	V	29.4 ERP	0.871
836.4	31.1	-0.6dBd	97.0-97.7	V	29.8 ERP	0.955
848.8	31.3	-0.2dBd	97.0-97.0	V	31.1 ERP	1.288
EGPRS850						
824.2	24.4	-0.9dBd	93.2-95.2	V	21.5 ERP	0.141
836.4	24.7	-0.6dBd	94.2-94.0	V	24.3 ERP	0.269
848.8	24.8	-0.2dBd	94.0-93.8	V	24.8 ERP	0.302
GSM1900/GPRS1900						
1850.2	25.6	+0.2dBi	97.0-92.2	H	31.2 EIRP	1.318
1880.0	25.8	-0.5dBi	96.7-91.5	H	28.9 EIRP	0.776
1909.8	26.1	-0.8dBi	97.0-93.5	H	25.9 EIRP	0.389
EGPRS1900						
1850.2	20.7	+0.2dBi	93.7-90.2	H	25.8 EIRP	0.380
1880.0	20.7	-0.5dBi	94.3-89.5	H	24.4 EIRP	0.275
1909.8	20.4	-0.8dBi	94.8-91.3	H	20.7 EIRP	0.117

SAMPLE CALCULATION:

P ANT OUT + ANT GAIN + $E_T - E_S$ = P.O. RADIATED

30.8 - 0.9 + 97.5 – 98.0 = 29.4 dbm ERP

= 0.871 W ERP

ANTENNAS: EMCO 3125-870 dipole s/n 1017 cal. May 02
EMCO 3125-1880 dipole s/n 1010 cal. Oct 02

Name of Test: Emission Masks (Occupied Bandwidth)

Specification: 47 CFR 2.1049(c)(1), 22

Test Equipment: As per previous page

Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.

2. For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for ±2.5 kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.

3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.

4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

5. Measurement Results: Attached

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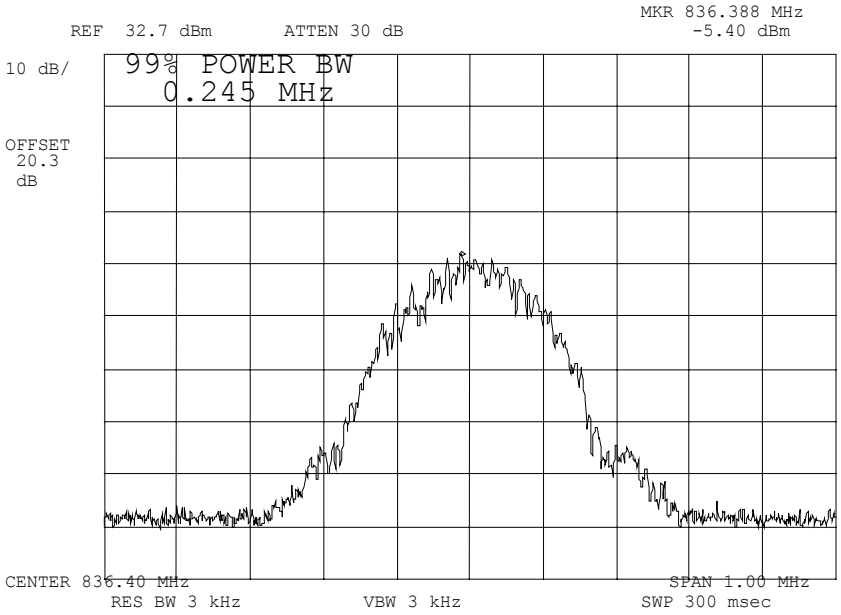
Name of Test: Emission Masks (Occupied Bandwidth)
g0380048: 2003-Aug-06 Wed 14:20:00
State: 1:Low Power



Power: LOW
Modulation: GSM/GPRS850
99% BANDWIDTH

Performed By: David Lee

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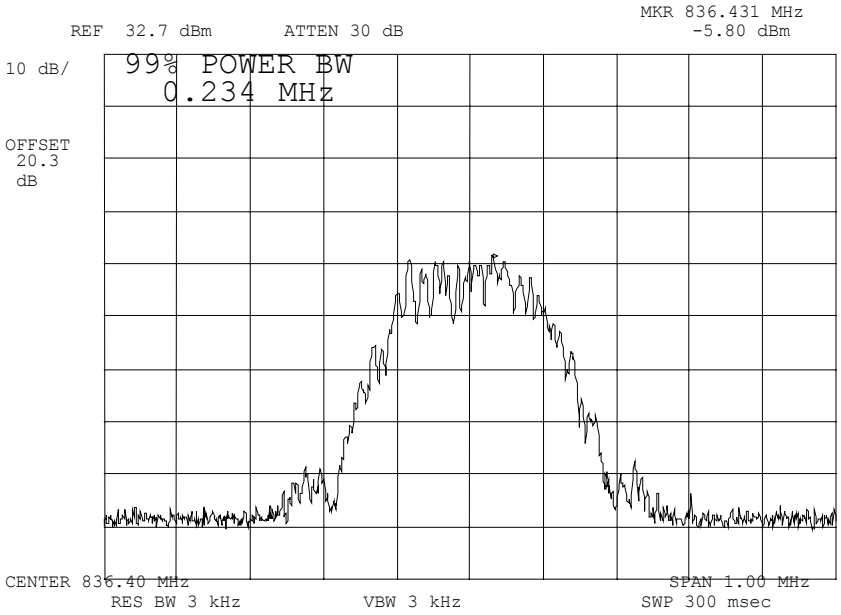
Name of Test: Emission Masks (Occupied Bandwidth)
g0380049: 2003-Aug-06 Wed 14:21:00
State: 1:Low Power

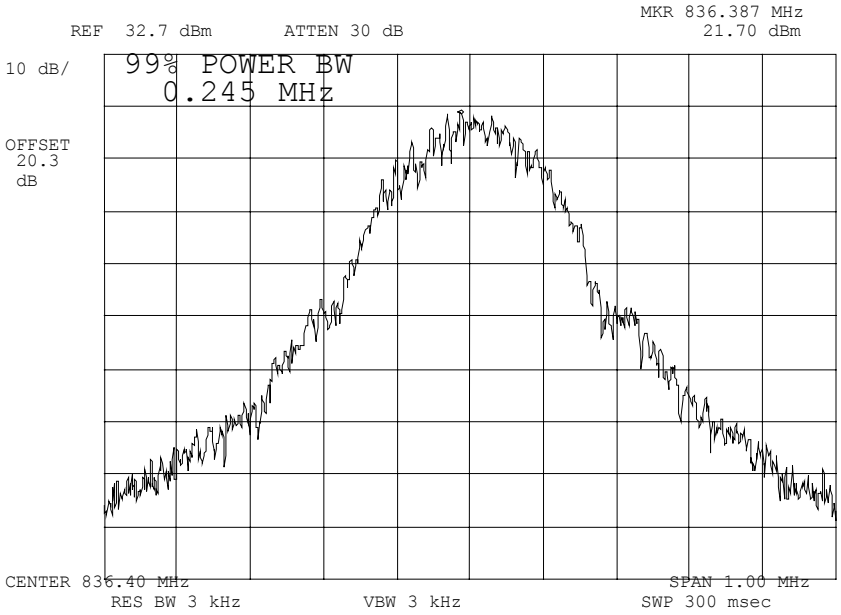


Power: LOW
Modulation: EGPRS850
99% BANDWIDTH

Performed By: David Lee

Page Number 13 of 69.

Name of Test: Emission Masks (Occupied Bandwidth)
g0380018: 2003-Aug-05 Tue 11:27:00
State: 2:High Power

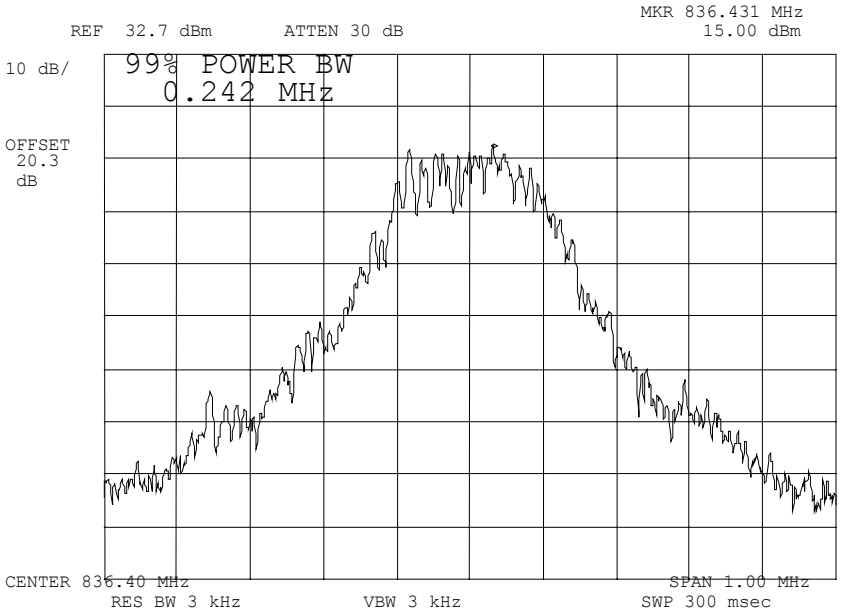


Power: HIGH
Modulation: GSM/GPRS850
99% BANDWIDTH

Performed By: David Lee

Page Number 14 of 69.

Name of Test: Emission Masks (Occupied Bandwidth)
g0380019: 2003-Aug-05 Tue 11:30:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS850
99% BANDWIDTH

Performed By: David Lee

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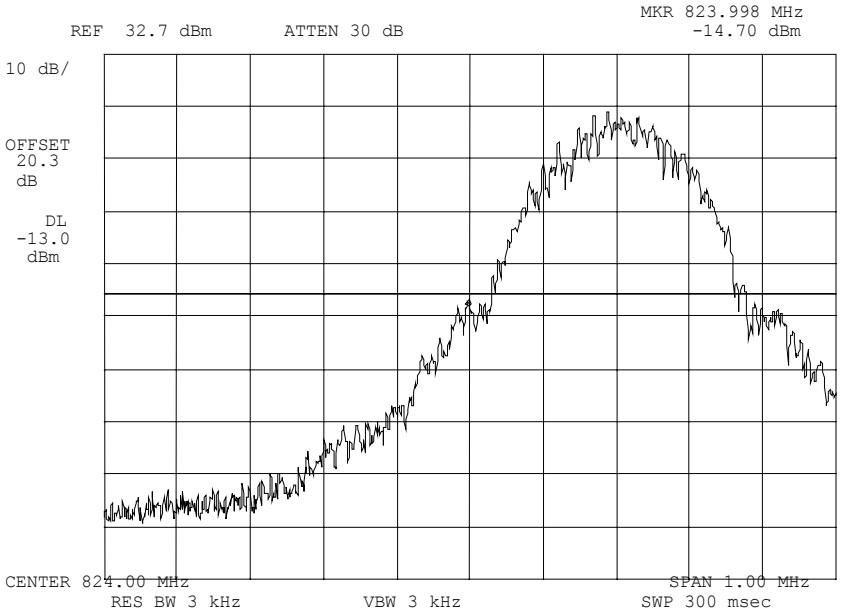
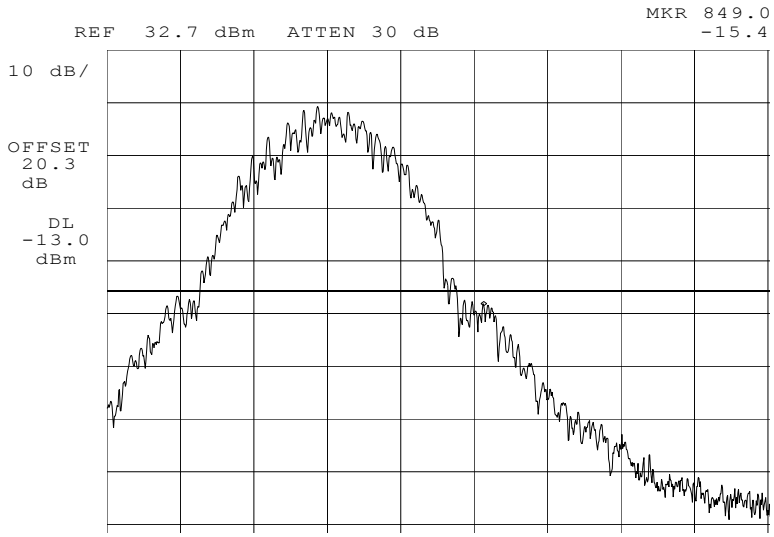
Name of Test: Emission Masks (Occupied Bandwidth)
g0380020: 2003-Aug-05 Tue 11:32:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
A LOWER BAND EDGE

Performed By: David Lee

Name of Test: Emission Masks (Occupied Bandwidth)
g0380028: 2003-Aug-05 Tue 11:45:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
UPPER BAND EDGE

Performed By: David Lee

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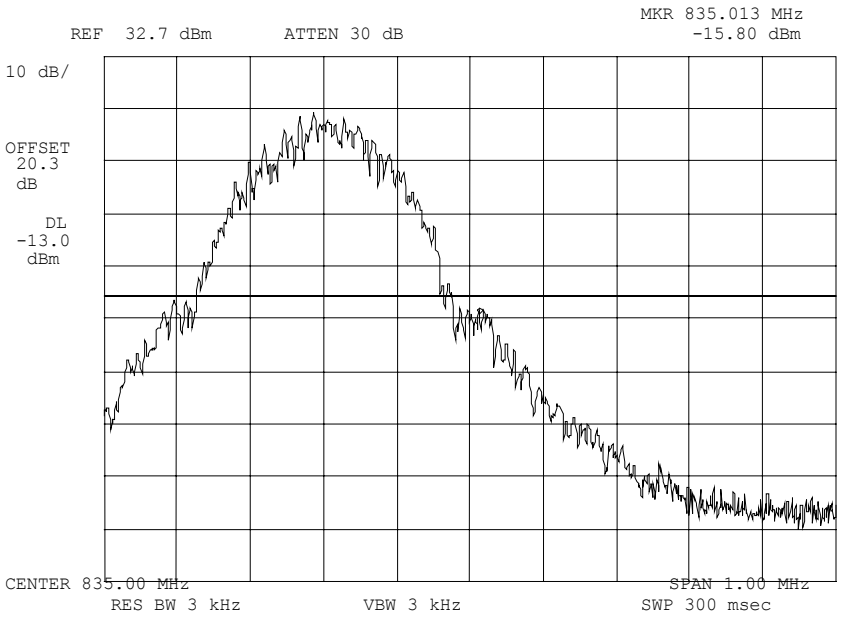
Name of Test: Emission Masks (Occupied Bandwidth)
g0380021: 2003-Aug-05 Tue 11:35:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
A1 UPPER BAND EDGE

Performed By: David Lee

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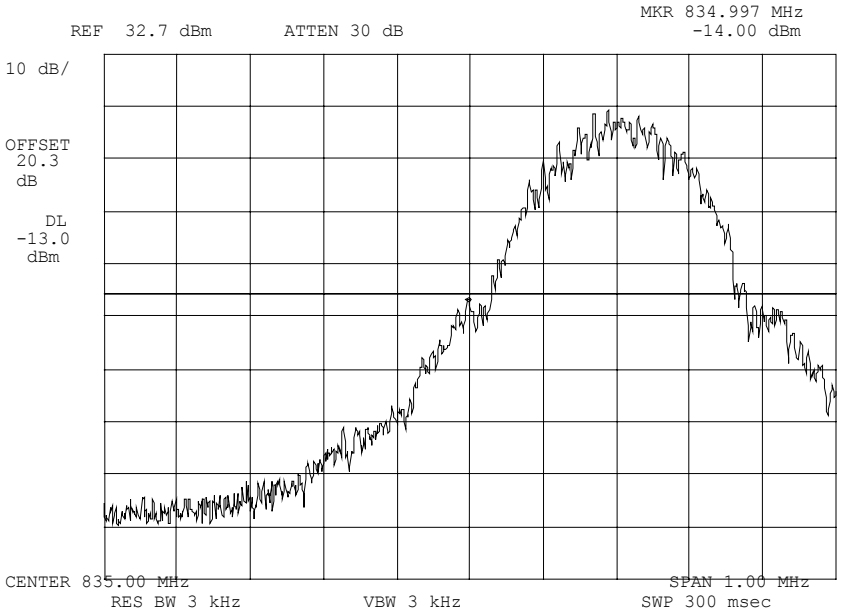
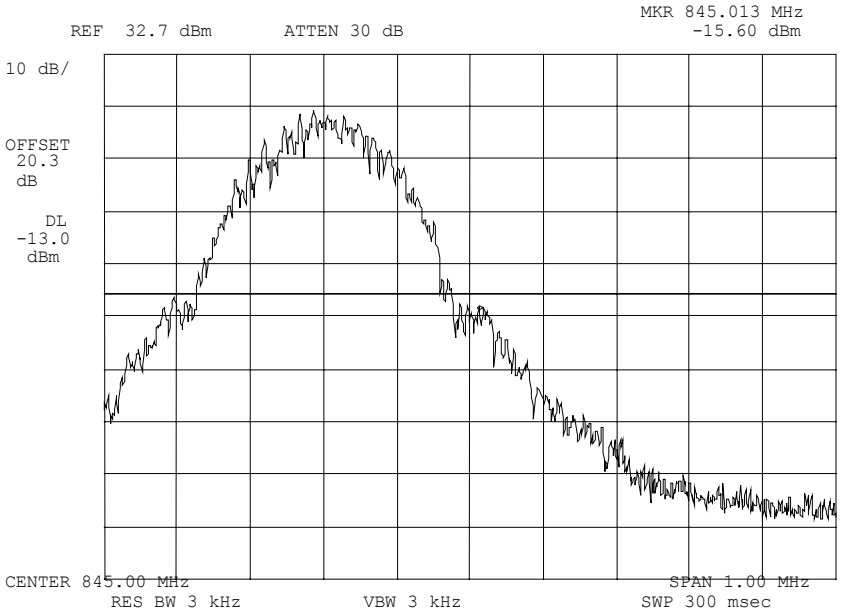
Name of Test: Emission Masks (Occupied Bandwidth)
g0380022: 2003-Aug-05 Tue 11:36:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
B1 LOWER BAND EDGE

Performed By: David Lee

Name of Test: Emission Masks (Occupied Bandwidth)
g0380023: 2003-Aug-05 Tue 11:38:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
B1 UPPER BAND EDGE

Performed By: David Lee

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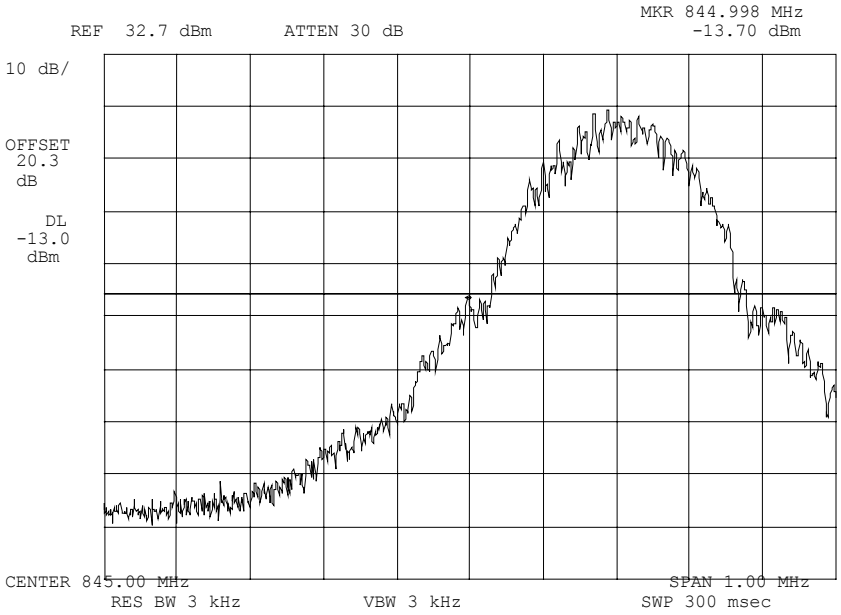
Name of Test: Emission Masks (Occupied Bandwidth)
g0380024: 2003-Aug-05 Tue 11:40:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
A2 LOWER BAND EDGE

Performed By: David Lee

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Name of Test: Emission Masks (Occupied Bandwidth)
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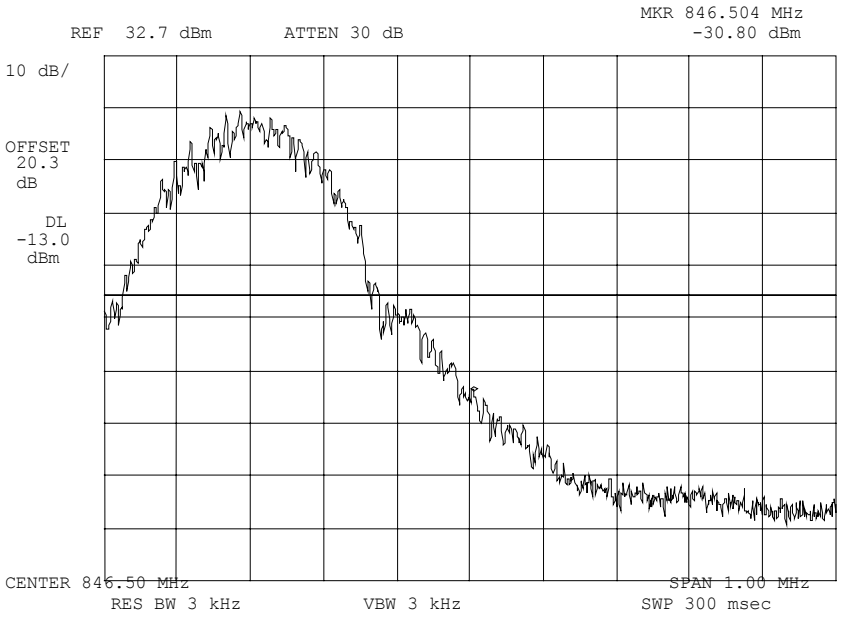
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
A2 UPPER BAND EDGE

Performed By: David Lee

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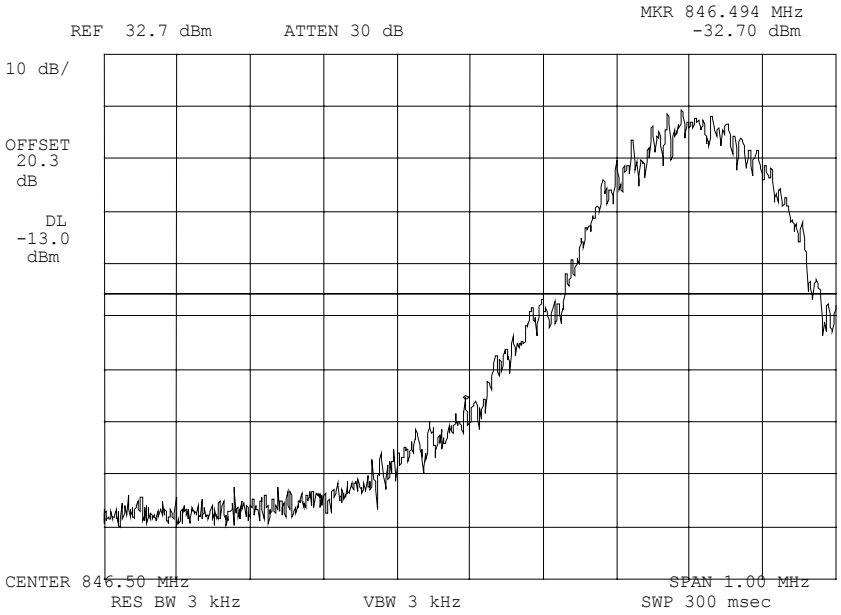
Name of Test: Emission Masks (Occupied Bandwidth)
g0380027: 2003-Aug-05 Tue 11:44:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS850
B2 LOWER BAND EDGE

Performed By: David Lee

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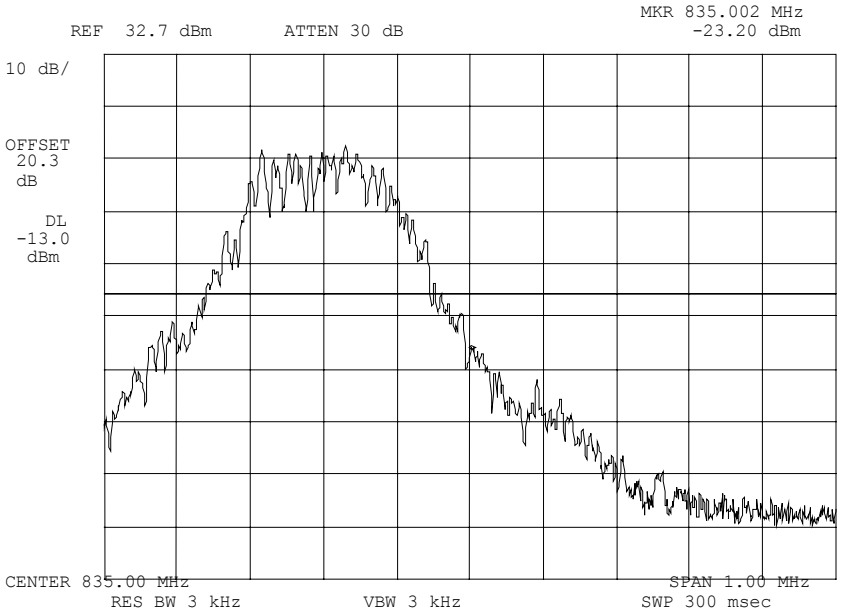
Name of Test: Emission Masks (Occupied Bandwidth)
g0380030: 2003-Aug-05 Tue 11:48:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS 850
A1 UPPER BAND EDGE

Performed By: David Lee

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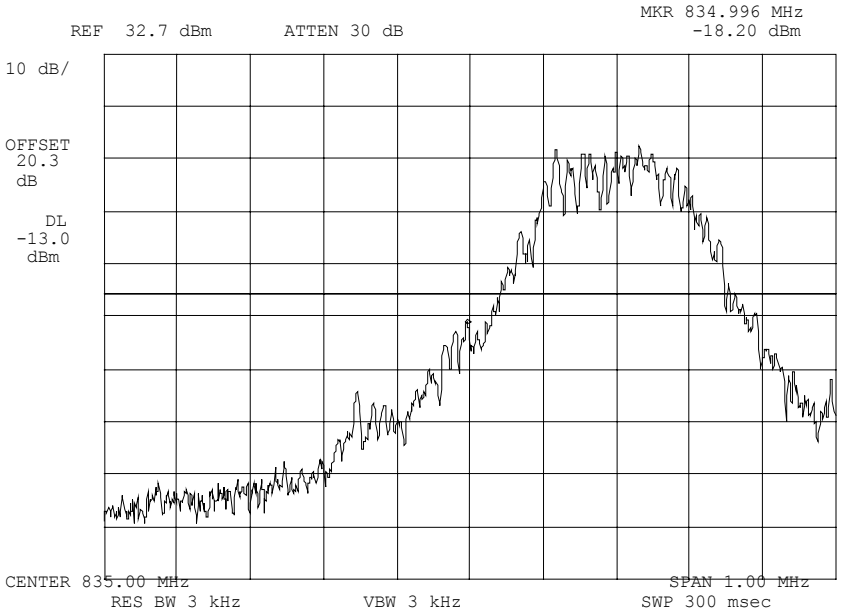
Name of Test: Emission Masks (Occupied Bandwidth)
g0380031: 2003-Aug-05 Tue 11:48:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS850
B1 LOWER BAND EDGE

Performed By: David Lee

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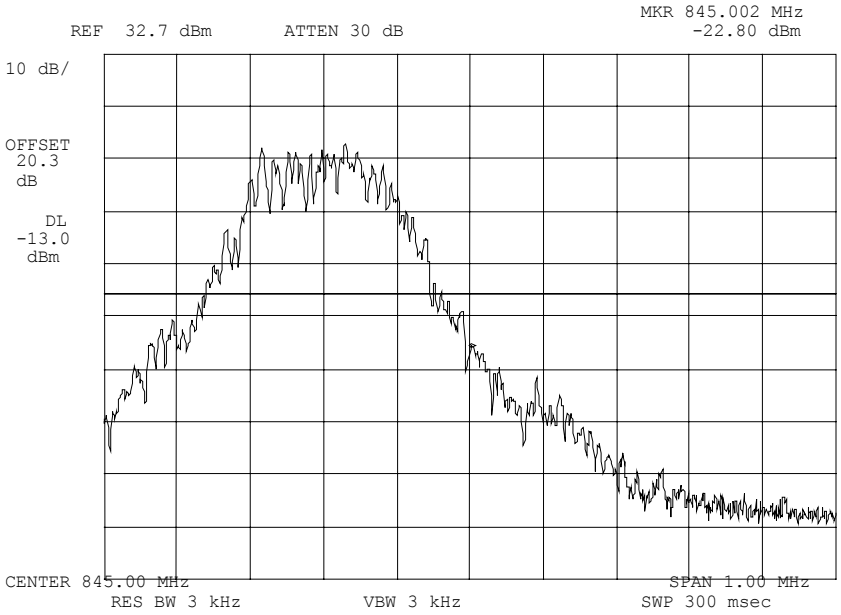
Name of Test: Emission Masks (Occupied Bandwidth)
g0380032: 2003-Aug-05 Tue 11:49:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS850
B1 UPPER BAND EDGE

Performed By: David Lee

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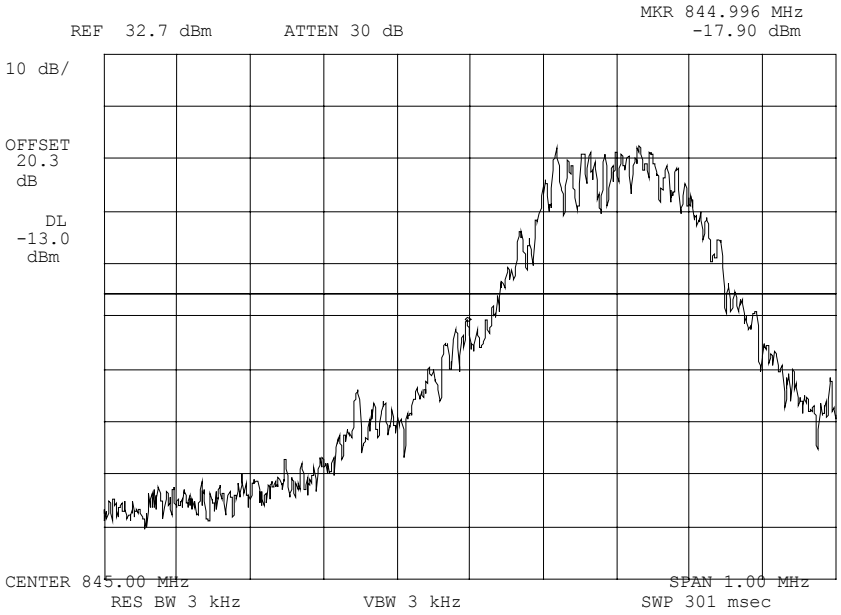
Name of Test: Emission Masks (Occupied Bandwidth)
g0380033: 2003-Aug-05 Tue 11:51:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS850
A2 LOWER BAND EDGE

Performed By: David Lee

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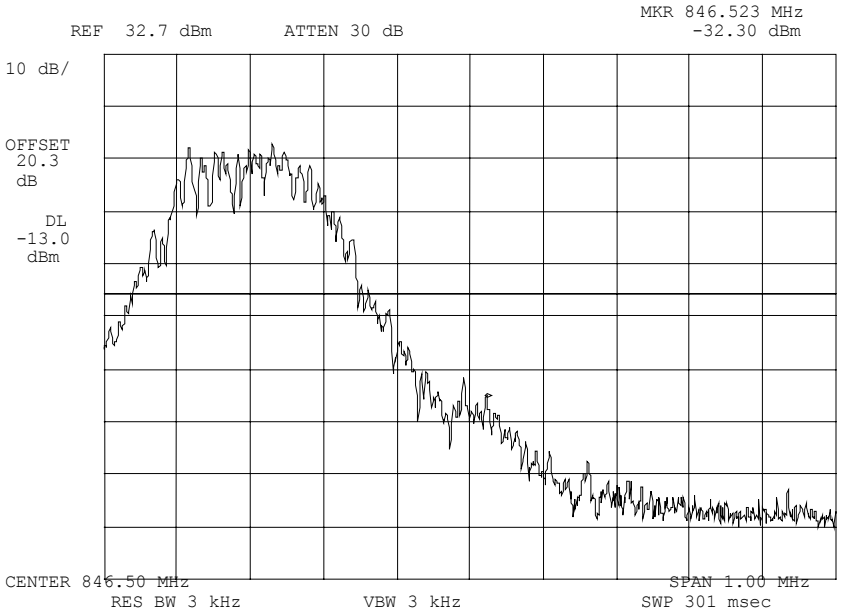
Name of Test: Emission Masks (Occupied Bandwidth)
g0380034: 2003-Aug-05 Tue 11:52:00
State: 2:High Power

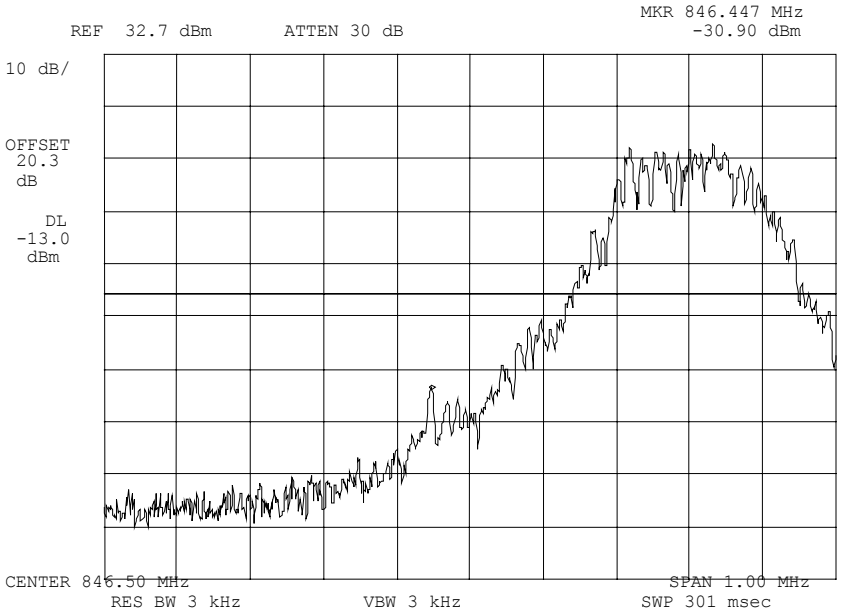


Power: HIGH
Modulation: EGPRS850
A2 UPPER BAND EDGE

Performed By: David Lee

Page Number 28 of 69.

Name of Test: Emission Masks (Occupied Bandwidth)
g0380035: 2003-Aug-05 Tue 11:53:00
State: 2:High Power

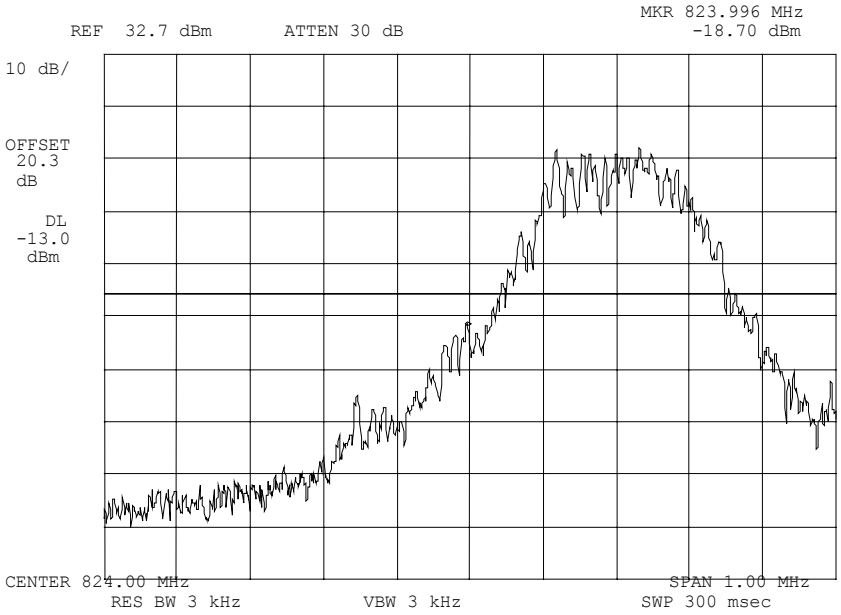


Power: HIGH
Modulation: EGPRS850
B2 LOWER BAND EDGE

Performed By: David Lee

Page Number 29 of 69.

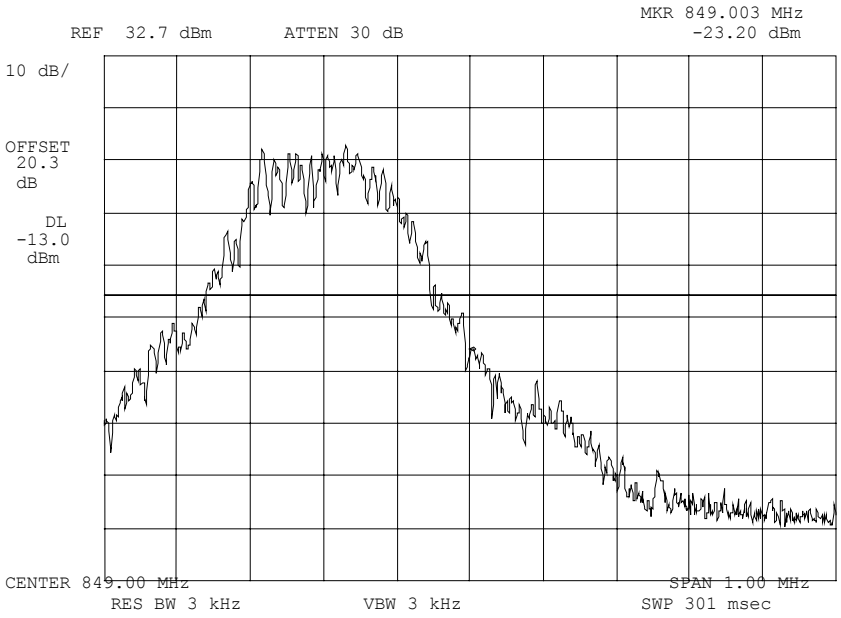
Name of Test: Emission Masks (Occupied Bandwidth)
g0380029: 2003-Aug-05 Tue 11:47:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS850
LOWER BAND EDGE

Performed By: David Lee

Name of Test: Emission Masks (Occupied Bandwidth)
g0380036: 2003-Aug-05 Tue 11:57:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS850
UPPER BAND EDGE

Performed By: David Lee

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.

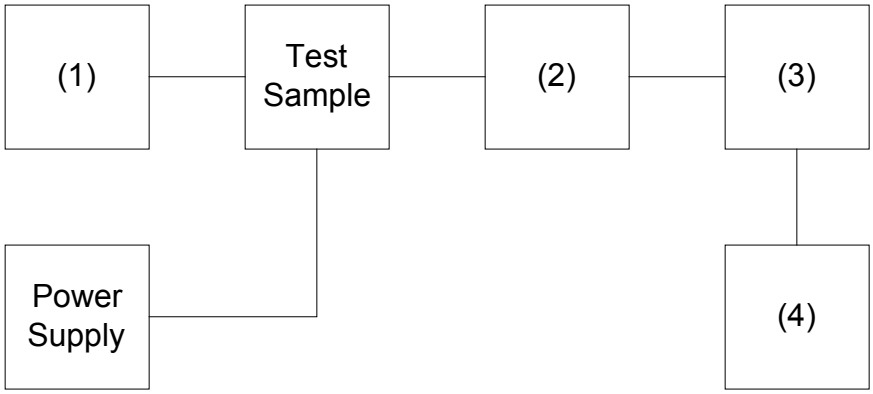
2. The low and high channels for all RF powers within the designated frequency block(s) were measured.

3. Measurement Results: Attached

Performed By: David Lee

Transmitter Spurious Emission

Test A. Occupied Bandwidth (In-Band Spurious)
Test B. Out-of-Band Spurious



Transmitter Test Set Up

Asset (as applicable)	Description	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

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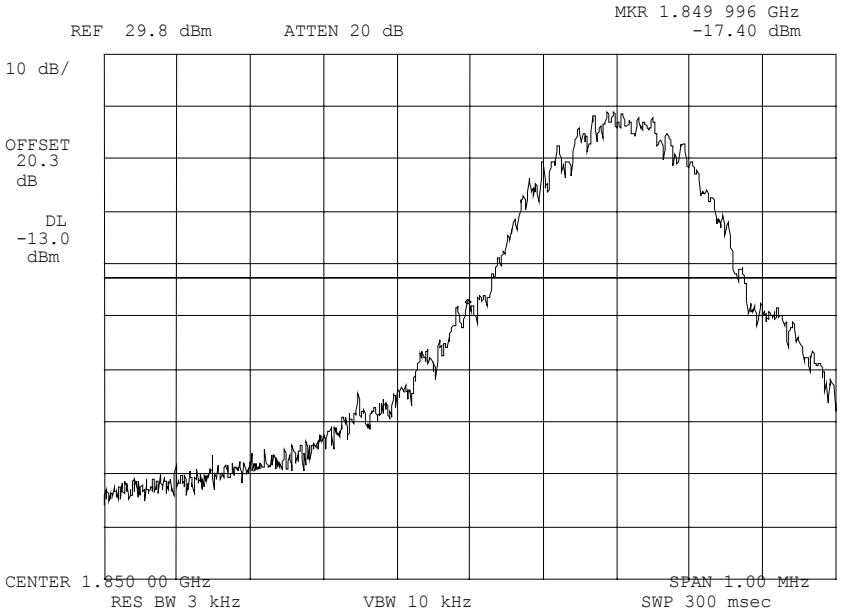
Name of Test: Emission Masks (Occupied Bandwidth)
g0380221: 2003-Aug-04 Mon 15:53:00
State: 2:High Power

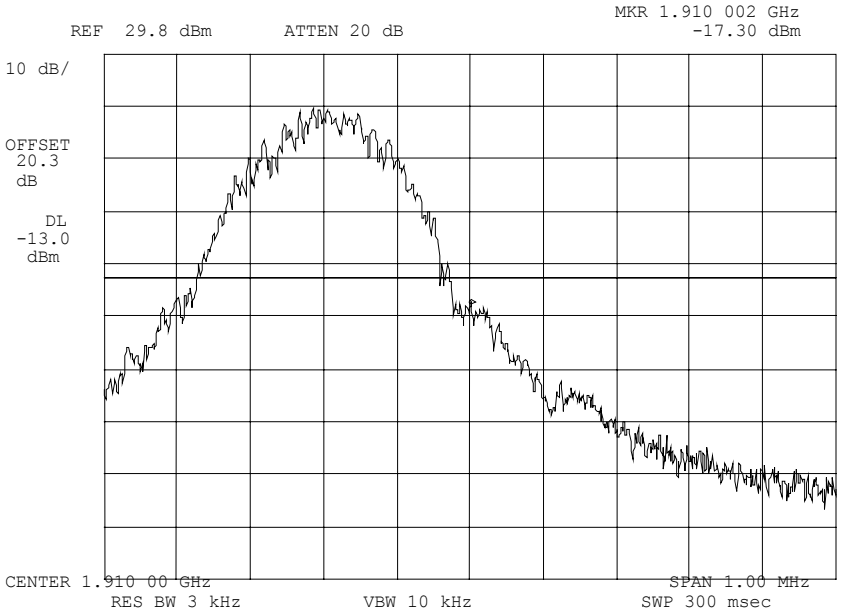


Power: HIGH
Modulation: GSM/GPRS1900
LOWER BAND EDGE

Performed By: David Lee

Page Number 34 of 69.

Name of Test: Emission Masks (Occupied Bandwidth)
g0380232: 2003-Aug-04 Mon 16:08:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
UPPER BAND EDGE

Performed By: David Lee

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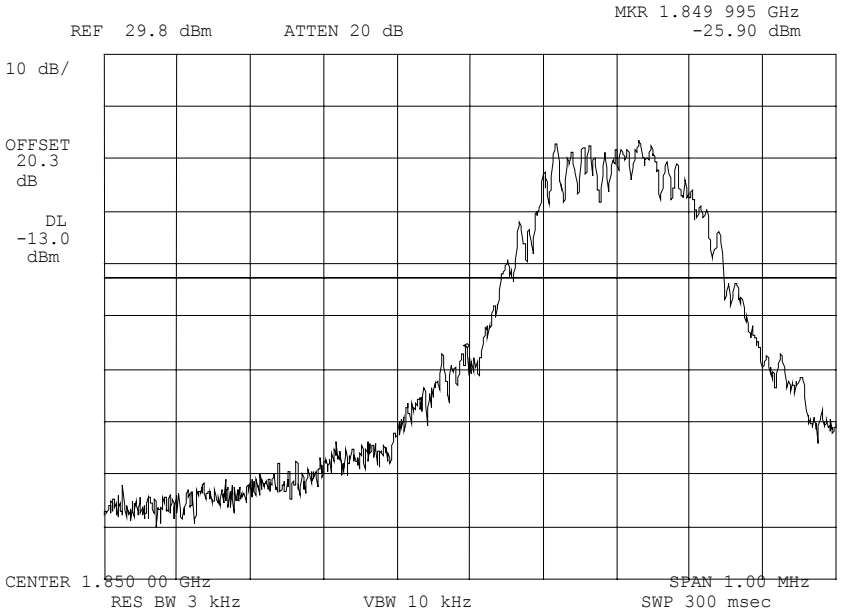
Name of Test: Emission Masks (Occupied Bandwidth)
g0380236: 2003-Aug-04 Mon 16:14:00
State: 2:High Power

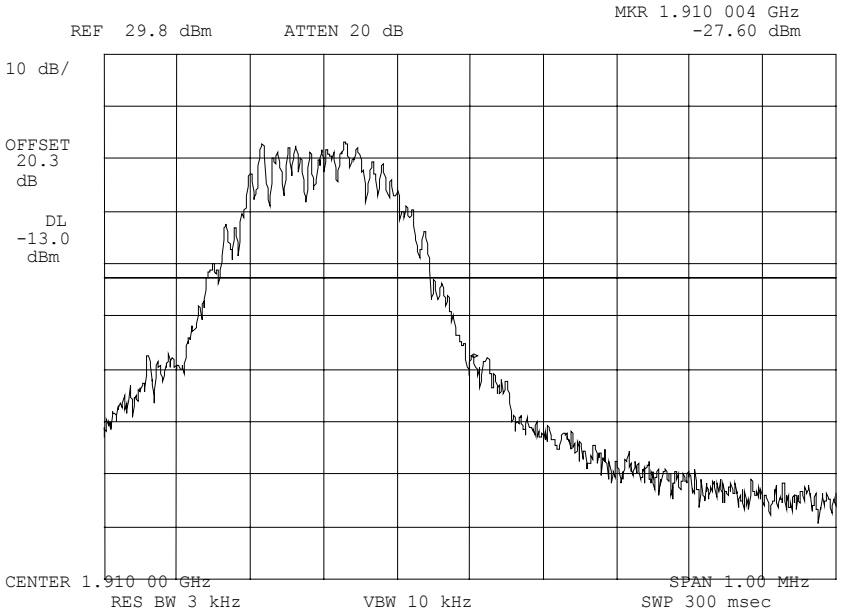


Power: HIGH
Modulation: EGPRS1900
LOWER BAND EDGE

Performed By: David Lee

Page Number 36 of 69.

Name of Test: Emission Masks (Occupied Bandwidth)
g0380247: 2003-Aug-04 Mon 16:23:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
UPPER BAND EDGE

Performed By: David Lee

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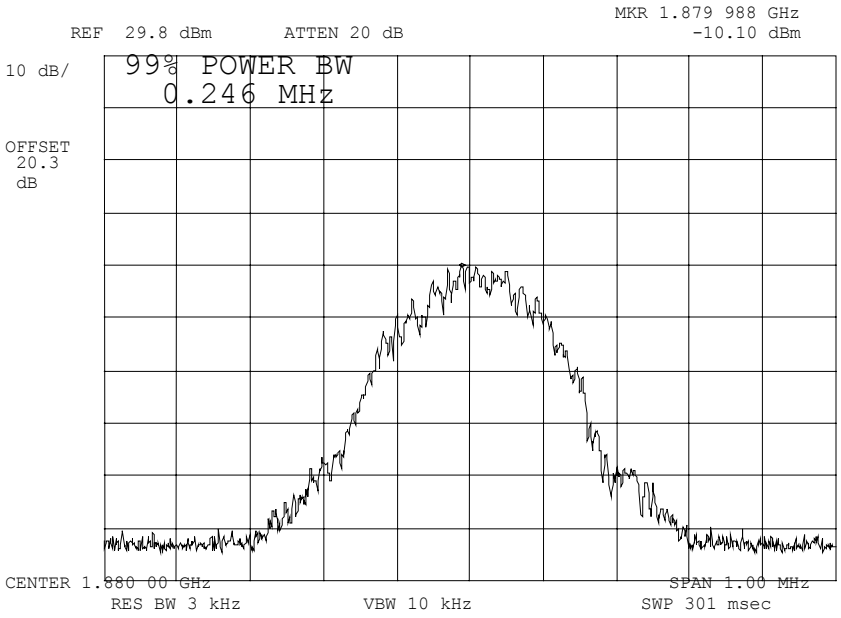
Name of Test: Emission Masks (Occupied Bandwidth)
g0380044: 2003-Aug-06 Wed 14:11:00
State: 1:Low Power

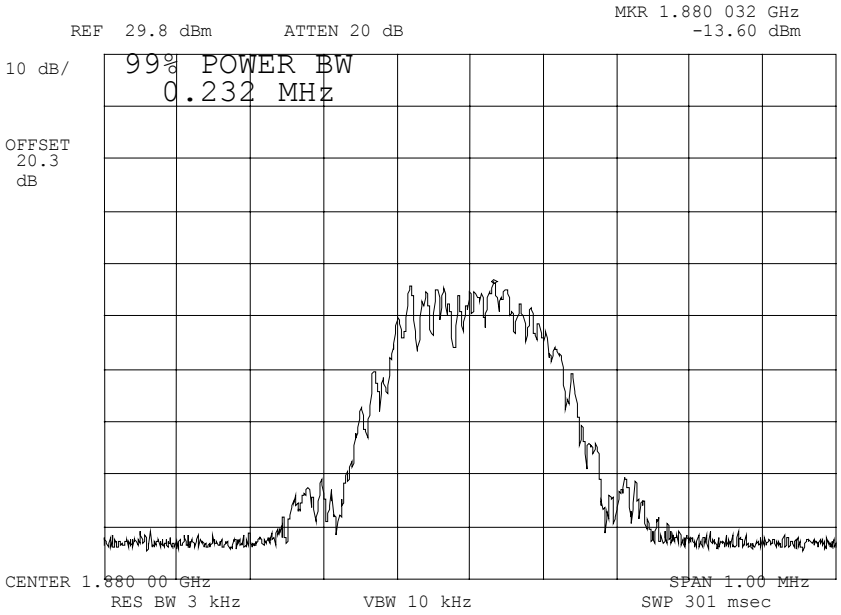


Power: LOW
Modulation: GSM/GPRS1900
99% BANDWIDTH

Performed By: David Lee

Page Number 38 of 69.

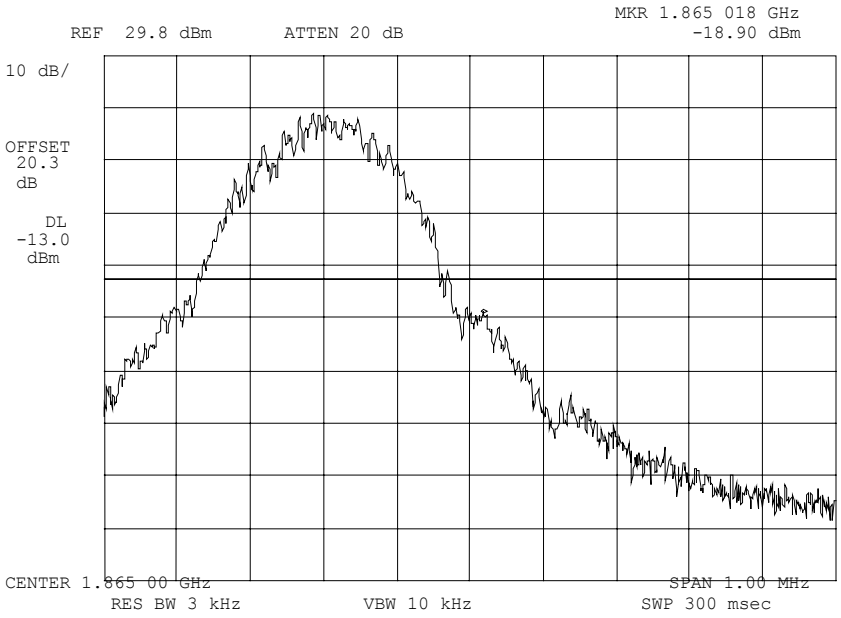
Name of Test: Emission Masks (Occupied Bandwidth)
g0380045: 2003-Aug-06 Wed 14:12:00
State: 1:Low Power



Power: LOW
Modulation: EGPRS1900
99% BANDWIDTH

Performed By: David Lee

Name of Test: Emission Masks (Occupied Bandwidth)
g0380222: 2003-Aug-04 Mon 15:54:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
A UPPER BAND EDGE

Performed By: David Lee

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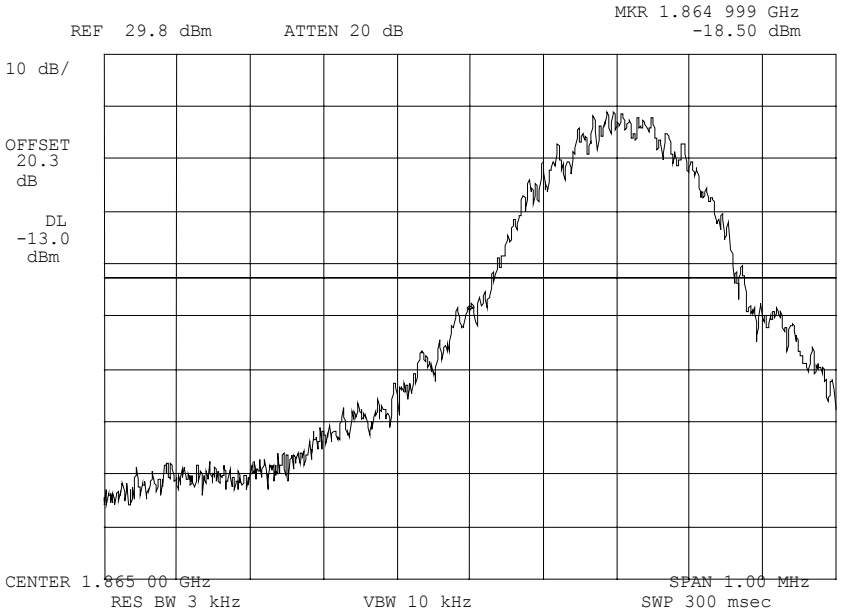
Name of Test: Emission Masks (Occupied Bandwidth)
g0380223: 2003-Aug-04 Mon 15:55:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
D LOWER BAND EDGE

Performed By: David Lee

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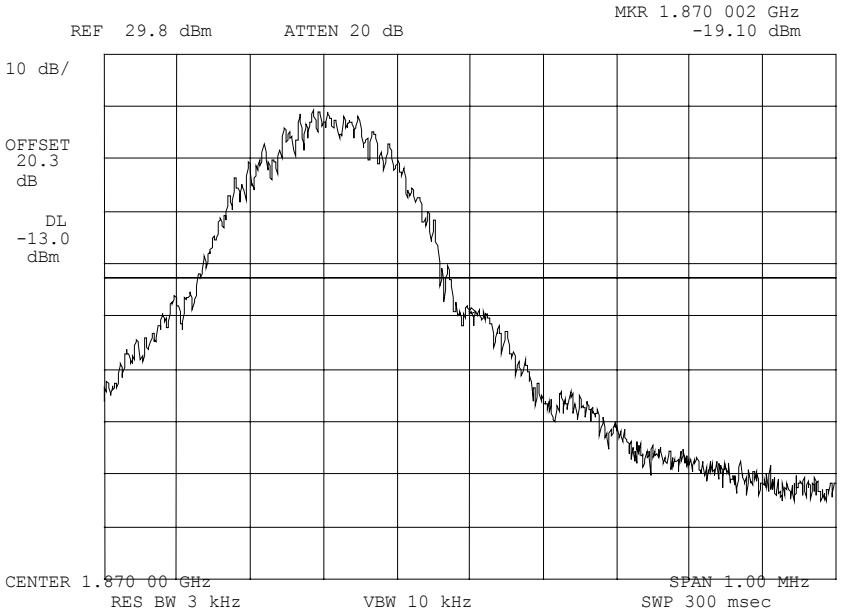
Name of Test: Emission Masks (Occupied Bandwidth)
g0380224: 2003-Aug-04 Mon 16:01:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
D UPPER BAND EDGE

Performed By: David Lee

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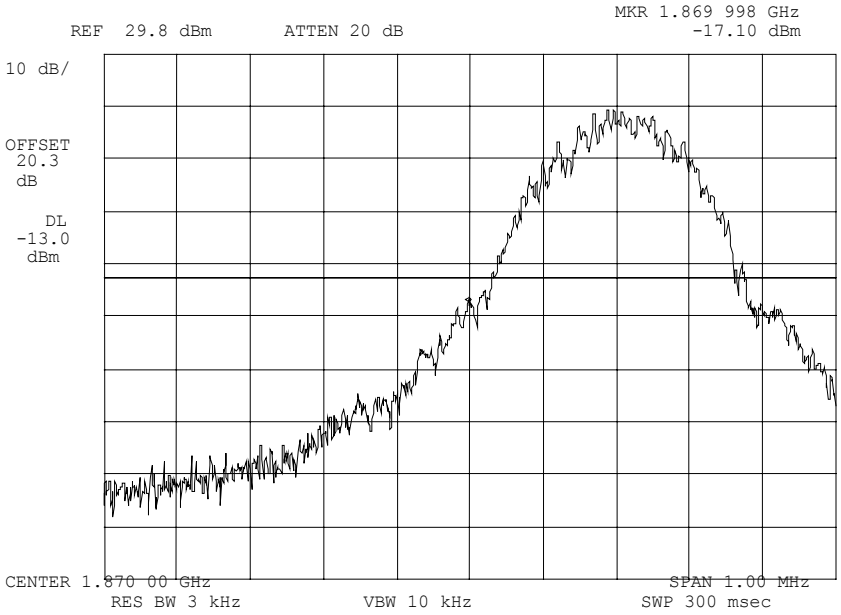
Name of Test: Emission Masks (Occupied Bandwidth)
g0380225: 2003-Aug-04 Mon 16:02:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
B LOWER BAND EDGE

Performed By: David Lee

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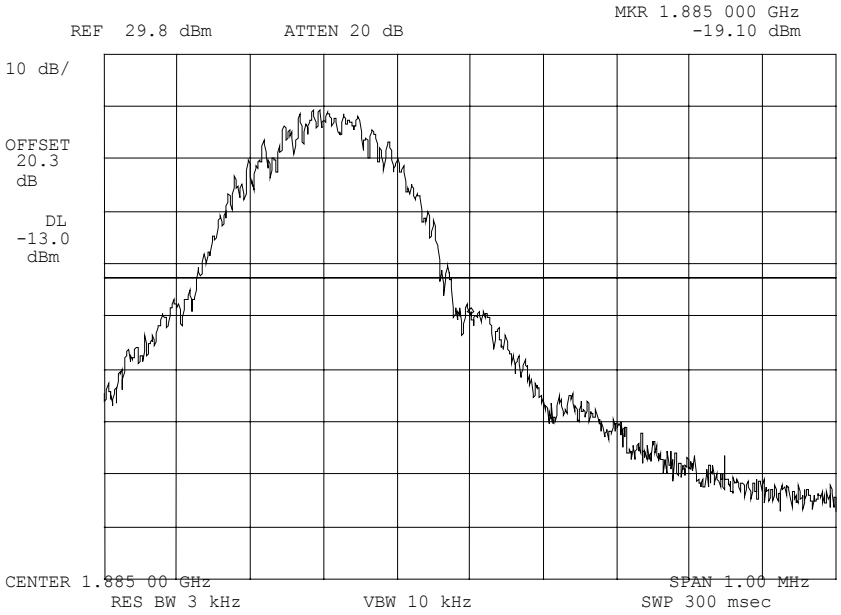
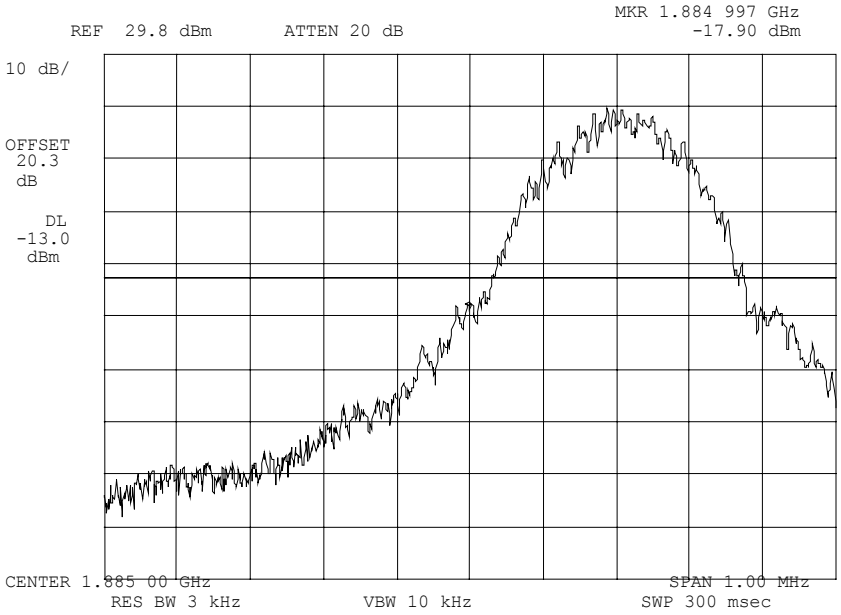
Name of Test: Emission Masks (Occupied Bandwidth)
g0380226: 2003-Aug-04 Mon 16:03:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
B UPPER BAND EDGE

Performed By: David Lee

Name of Test: Emission Masks (Occupied Bandwidth)
g0380227: 2003-Aug-04 Mon 16:04:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
E LOWER BAND EDGE

Performed By: David Lee

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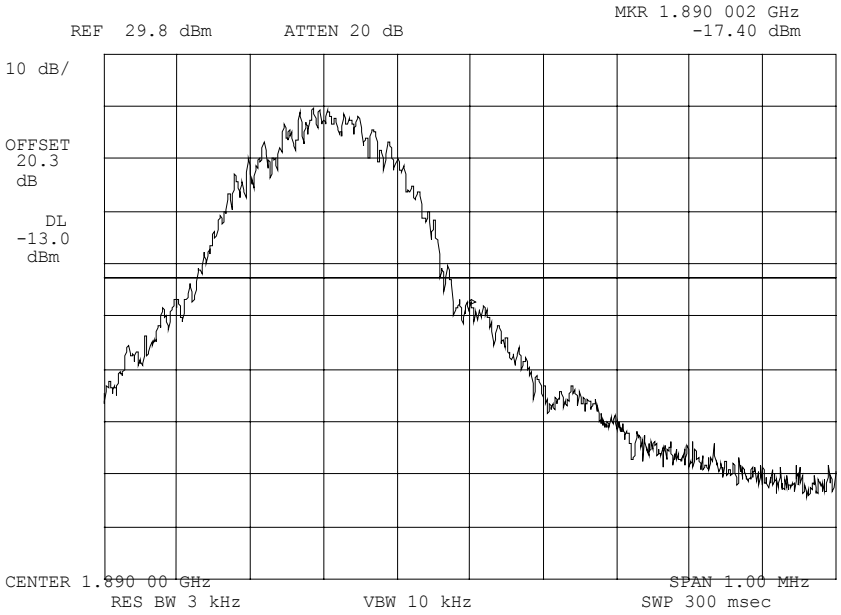
Name of Test: Emission Masks (Occupied Bandwidth)
g0380228: 2003-Aug-04 Mon 16:05:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
E UPPER BAND EDGE

Performed By: David Lee

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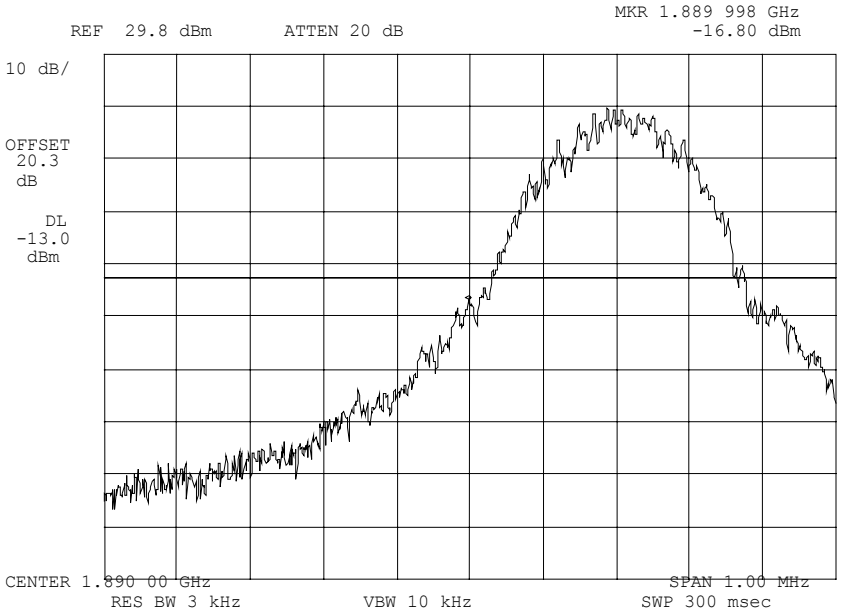
Name of Test: Emission Masks (Occupied Bandwidth)
g0380229: 2003-Aug-04 Mon 16:06:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
F LOWER BAND EDGE

Performed By: David Lee

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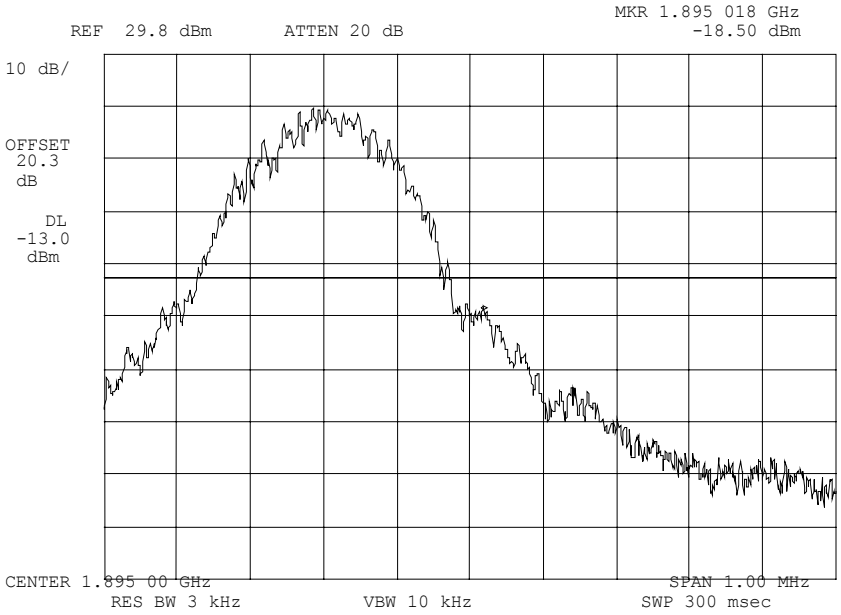
Name of Test: Emission Masks (Occupied Bandwidth)
g0380230: 2003-Aug-04 Mon 16:07:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
F UPPER BAND EDGE

Performed By: David Lee

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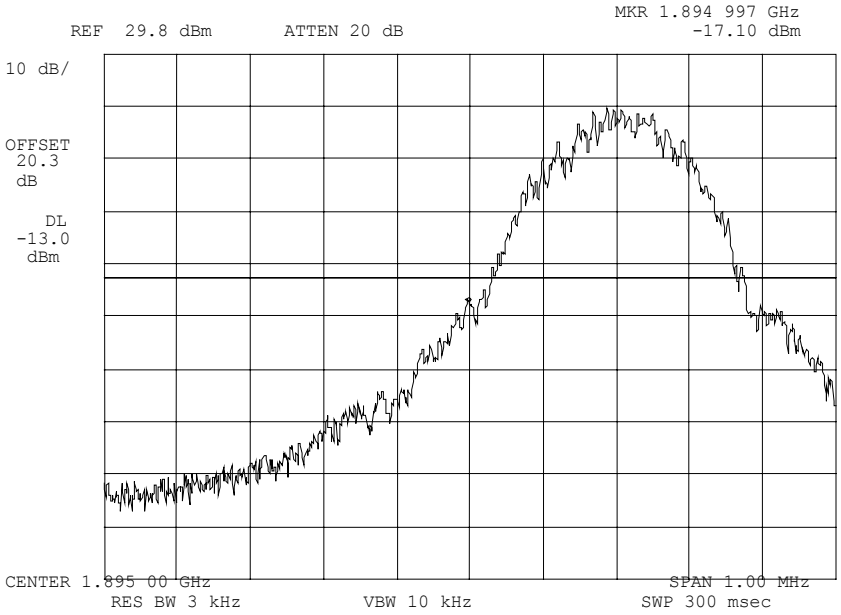
Name of Test: Emission Masks (Occupied Bandwidth)
g0380231: 2003-Aug-04 Mon 16:08:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
C LOWER BAND EDGE

Performed By: David Lee

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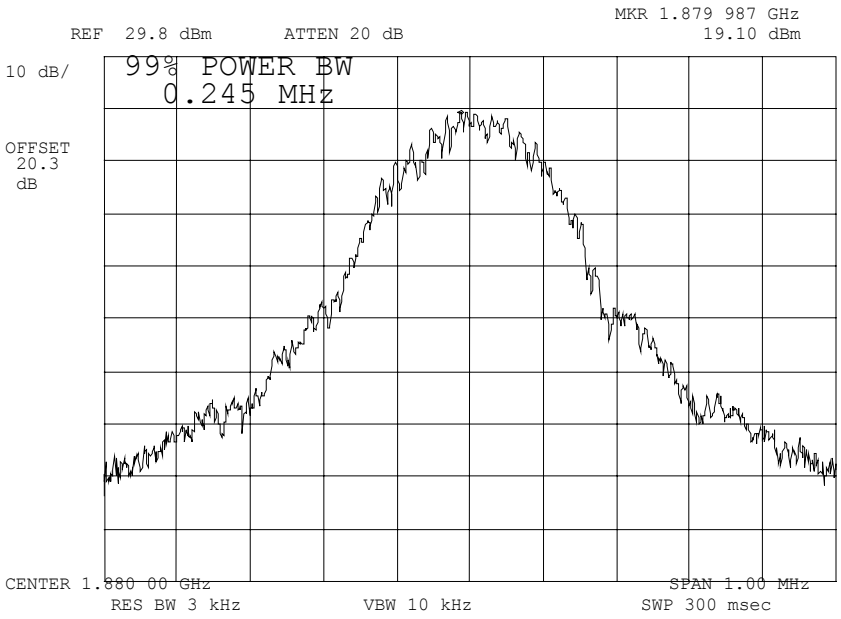
Name of Test: Emission Masks (Occupied Bandwidth)
g0380234: 2003-Aug-04 Mon 16:11:00
State: 2:High Power



Power: HIGH
Modulation: GSM/GPRS1900
99% BANDWIDTH

Performed By: David Lee

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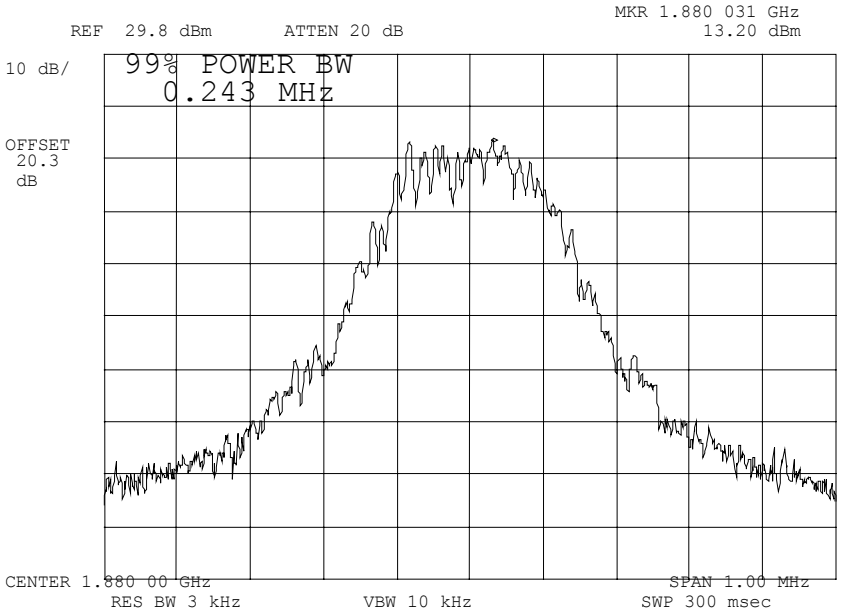
Name of Test: Emission Masks (Occupied Bandwidth)
g0380235: 2003-Aug-04 Mon 16:12:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
99% BANDWIDTH

Performed By: David Lee

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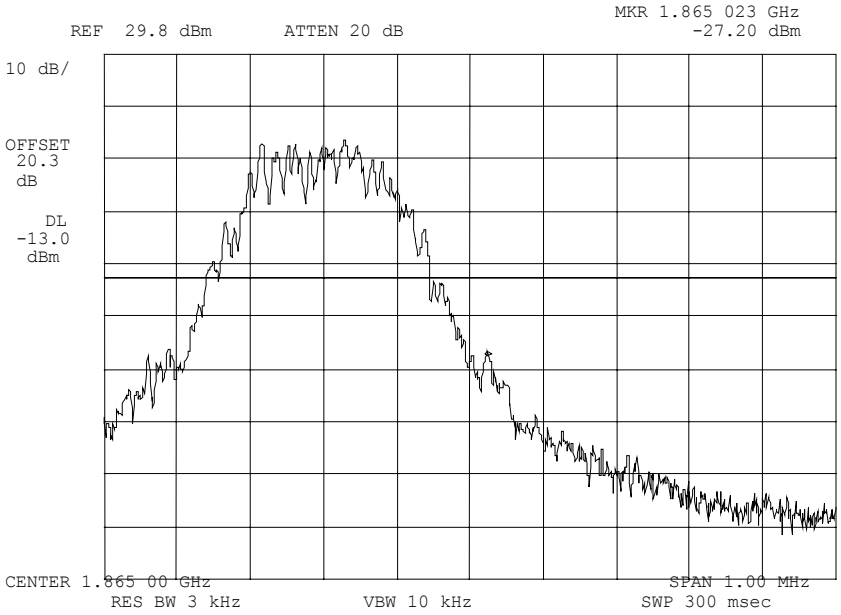
Name of Test: Emission Masks (Occupied Bandwidth)
g0380237: 2003-Aug-04 Mon 16:14:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
A UPPER BAND EDGE

Performed By: David Lee

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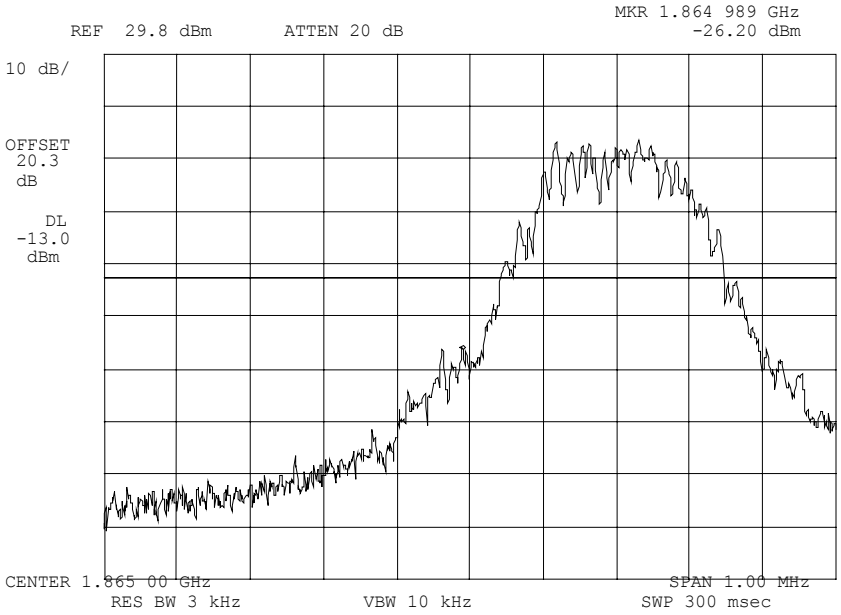
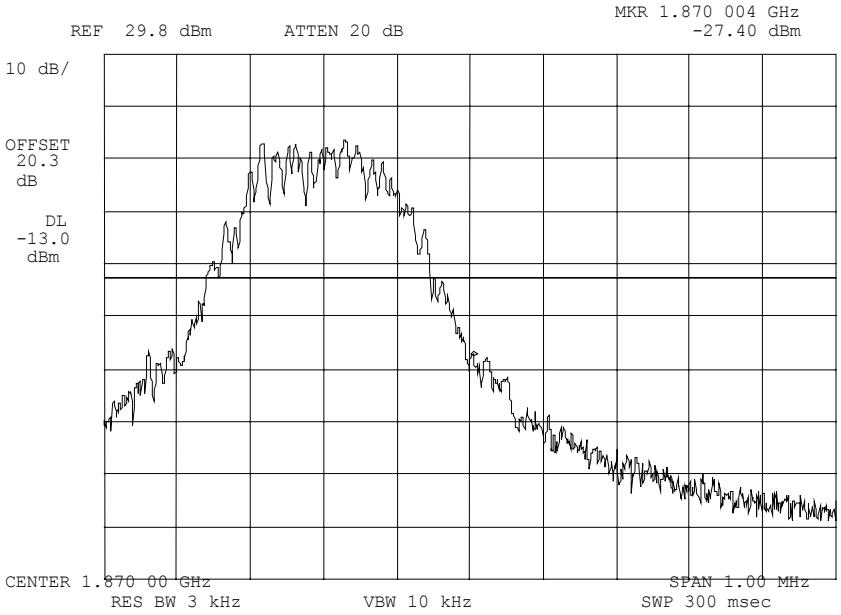
Name of Test: Emission Masks (Occupied Bandwidth)
g0380238: 2003-Aug-04 Mon 16:15:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
D LOWER BAND EDGE

Performed By: David Lee

Name of Test: Emission Masks (Occupied Bandwidth)
g0380239: 2003-Aug-04 Mon 16:16:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
D UPPER BAND EDGE

Performed By: David Lee

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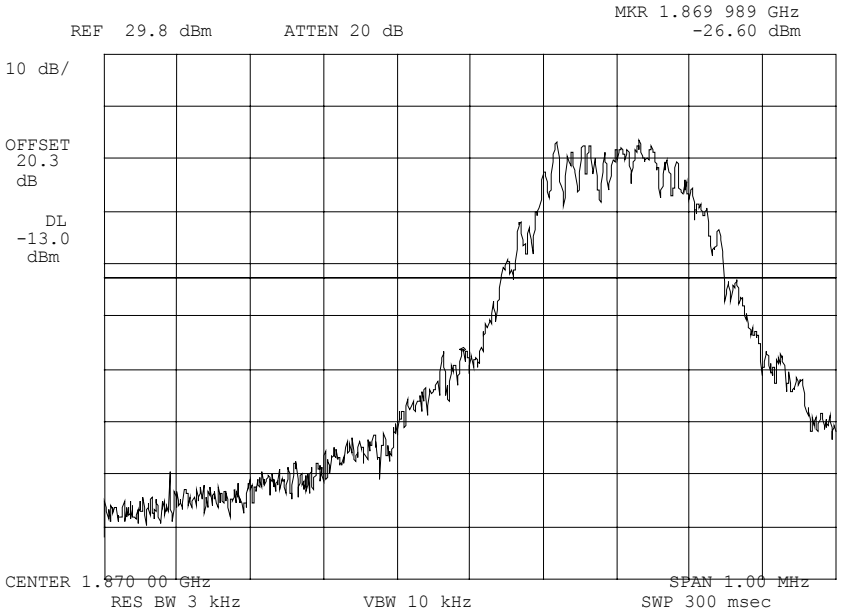
Name of Test: Emission Masks (Occupied Bandwidth)
g0380240: 2003-Aug-04 Mon 16:17:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
B LOWER BAND EDGE

Performed By: David Lee

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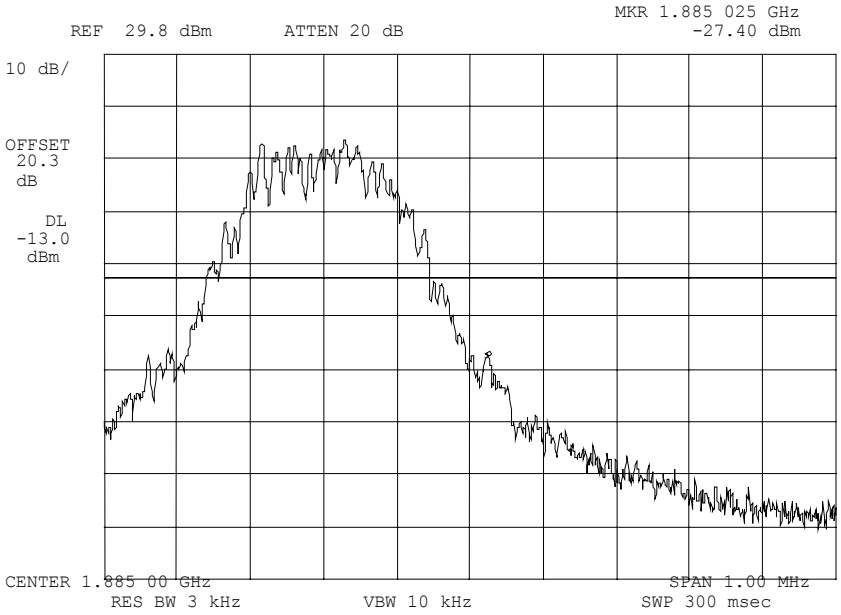
Name of Test: Emission Masks (Occupied Bandwidth)
g0380241: 2003-Aug-04 Mon 16:17:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
B UPPER BAND EDGE

Performed By: David Lee

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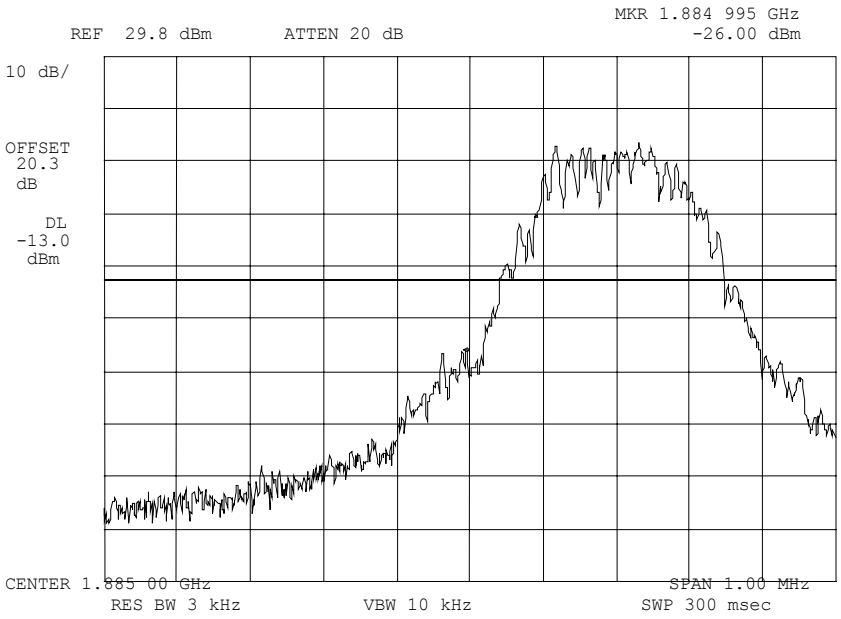
Name of Test: Emission Masks (Occupied Bandwidth)
g0380242: 2003-Aug-04 Mon 16:18:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
E LOWER BAND EDGE

Performed By: David Lee

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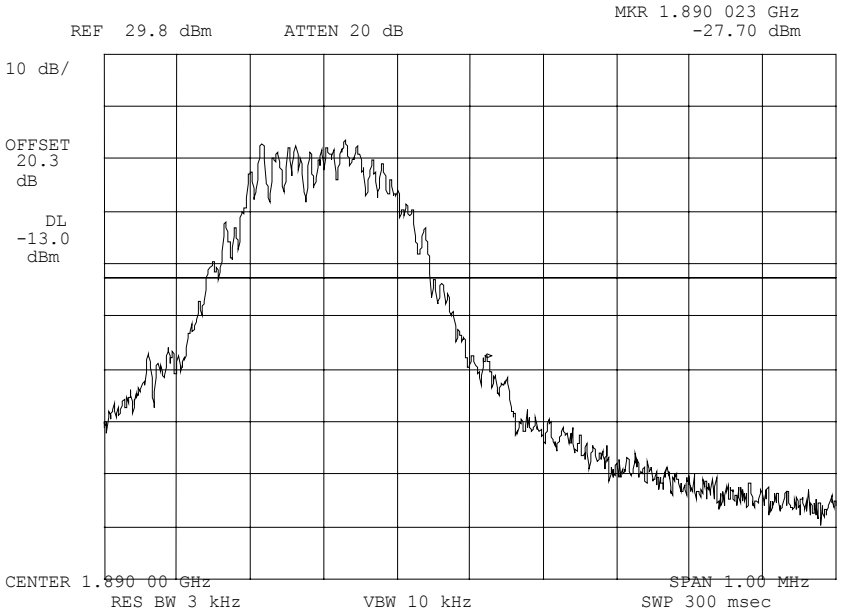
Name of Test: Emission Masks (Occupied Bandwidth)
g0380243: 2003-Aug-04 Mon 16:19:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
E UPPER BAND EDGE

Performed By: David Lee

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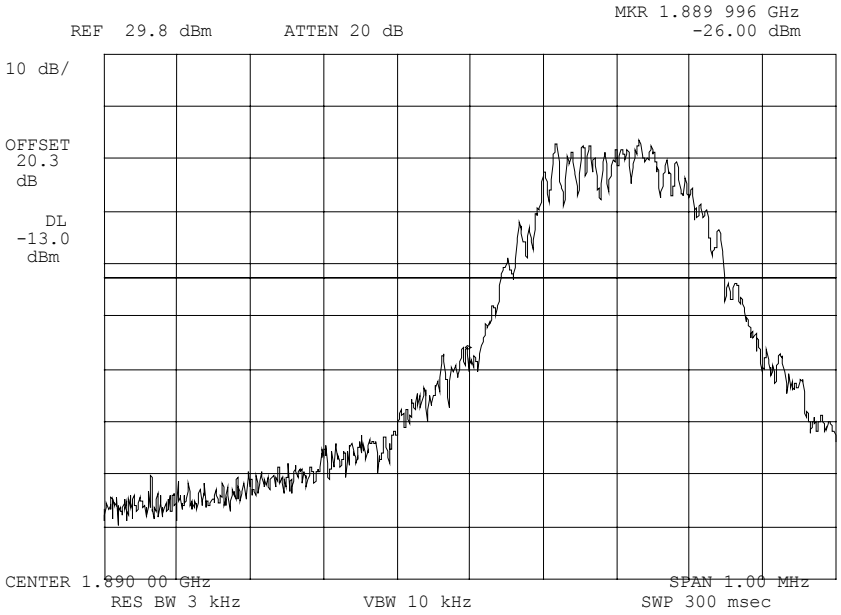
Name of Test: Emission Masks (Occupied Bandwidth)
g0380244: 2003-Aug-04 Mon 16:20:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
F LOWER BAND EDGE

Performed By: David Lee

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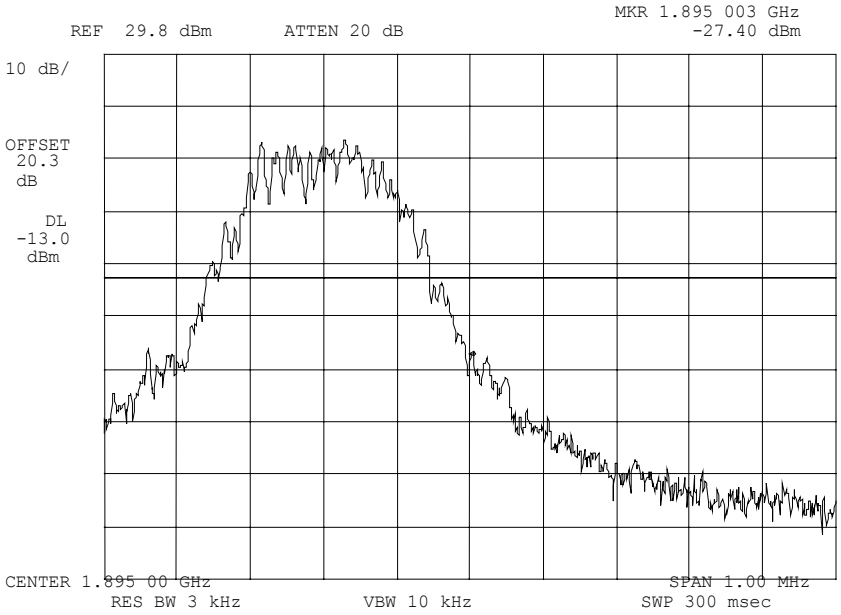
Name of Test: Emission Masks (Occupied Bandwidth)
g0380245: 2003-Aug-04 Mon 16:21:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
F UPPER BAND EDGE

Performed By: David Lee

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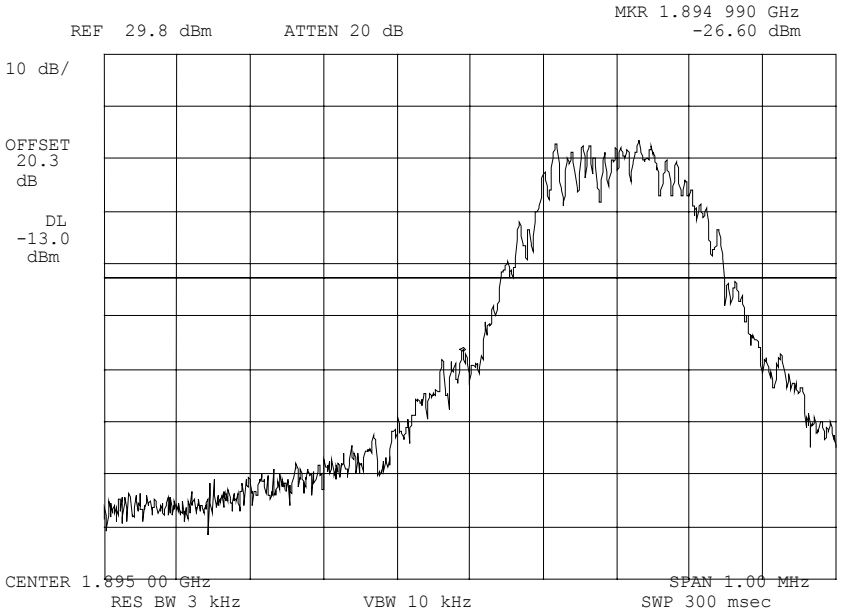
Name of Test: Emission Masks (Occupied Bandwidth)
g0380246: 2003-Aug-04 Mon 16:22:00
State: 2:High Power



Power: HIGH
Modulation: EGPRS1900
C LOWER BAND EDGE

Performed By: David Lee

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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

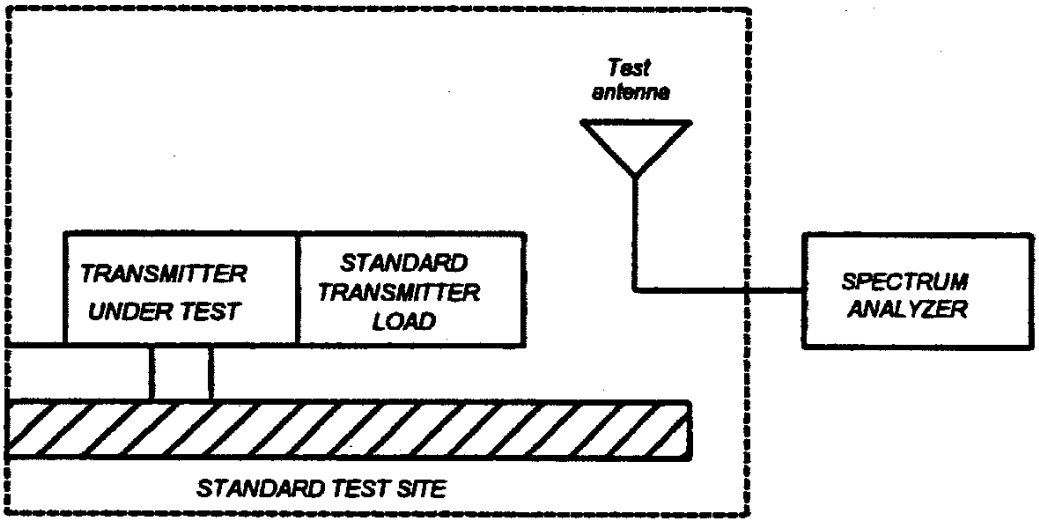
1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

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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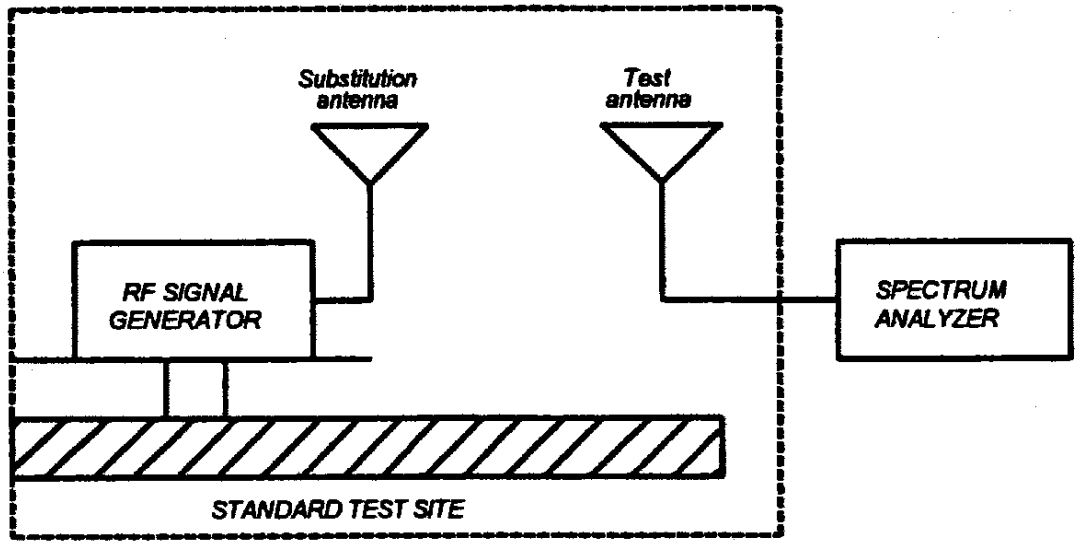
Name of Test: Field Strength of Spurious Radiation (Cont.)

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.

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-02
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-02
i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-02
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-02
Amplifier				
i00028	HP 8449A	2749A00121	12 mo.	Mar-03
Spectrum Analyzer				
i00029	HP 8563E	3213A00104	12 mo.	Jan-03
i00033	HP 85462A	3625A00357	12 mo.	Jan-03
i00048	HP 8566B	2511AD1467	6 mo.	Jul-03

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Name of Test: Field Strength of Spurious Radiation

GSM850 g0380011: 2003-Aug-04 Mon 13:23:00

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dbc
836.400000	1672.751667	-28.6	-59.7
836.400000	2509.151667	-37.6	-68.7
836.400000	3345.551667	-56.1	-87.2
836.400000	4181.951667	-55	-86.1
836.400000	5018.351667	-55.2	-86.3
836.400000	5854.751667	-54.1	-85.2
836.400000	6691.151667	-52.1	-83.2
836.400000	7527.551667	-50.5	-81.4
836.400000	8363.951667	-49.2	-80.3

EGPRS850 g0380012: 2003-Aug-04 Mon 14:16:00

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dbc
836.400000	1672.816667	-30.9	-62
836.400000	2509.216667	-31.9	-63
836.400000	3345.616667	-28.7	-59.8
836.400000	4182.016667	-27.5	-58.6
836.400000	5018.416667	-27.1	-58.2
836.400000	5854.816667	-53.1	-84.2
836.400000	6691.216667	-52.4	-83.5
836.400000	7527.616667	-49	-80.1
836.400000	8364.016667	-48.9	-80

GSM1900 g0380010: 2003-Aug-04 Mon 12:41:00

Frequency Tuned, MHz	Frequency Emission, MHz	EIRP, dBm	EIRP, dbc
1880.000000	3760.003333	-41.8	-73
1880.000000	5640.003333	-51.6	-82.8
1880.000000	7519.735000	-39.9	-71.1
1880.000000	9400.003333	-46.6	-77.8
1880.000000	11280.003333	-44	-75.2
1880.000000	13160.003333	-43.2	-74.4
1880.000000	15040.003333	-41.2	-72.4

EGPRS1900 g0380041: 2003-Aug-04 Mon 14:24:00

Frequency Tuned, MHz	Frequency Emission, MHz	EIRP, dBm	EIRP, dbc
1880.000000	3760.001667	-48.3	-79.5
1880.000000	5640.001667	-51.6	-82.8
1880.000000	7520.001667	-47.2	-78.4
1880.000000	9400.001667	-45.5	-76.7
1880.000000	11280.001667	-44.3	-75.5
1880.000000	13160.001667	-42.7	-73.9
1880.000000	15040.001667	-39.4	-70.6
1880.000000	16920.001667	-39.6	-70.8

Name of Test: Frequency Stability (Temperature Variation)

Specification: 47 CFR 2.1055(a)(1)

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.

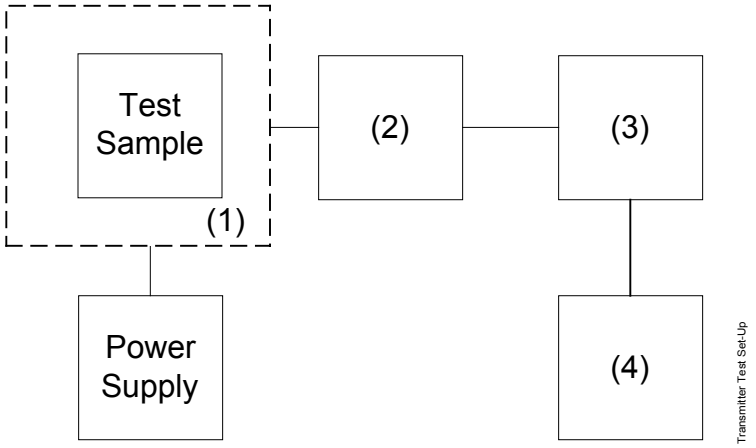
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.

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



Transmitter Test Set-Up

Asset (as applicable)	Description	s/n
(1)	**Temperature, Humidity, Vibration**	
i00027	Tenney Temp. Chamber	9083-765-234
i00	Weber Humidity Chamber	
i00	L.A.B. RVH 18-100	
(2)	**Coaxial Attenuator**	
i00122	NARDA 766-10	7802
i00123	NARDA 766-10	7802A
i00113	SIERRA 661A-3D	1059
i00069	BIRD 8329 (30 dB)	10066
(3)	**RF 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)

GSM/GPRS/EGPRS CELLULAR BAND

°C	Change, Hz	Change, ppm
-30	17.2	0.0
-20	21.9	0.0
-10	11.3	0.0
0	9.6	0.0
10	19.9	0.0
20	20.2	0.0
30	21.6	0.0
40	12.0	0.0
50	18.5	0.0

GSM/GPRS/EGPRS PCS BAND

°C	Change, Hz	Change, ppm
-30	5.3	0.0
-20	10.0	0.0
-10	-5.9	0.0
0	16.0	0.0
10	2.6	0.0
20	-16.0	0.0
30	10.7	0.0
40	14.8	0.0
50	16.1	0.0

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Name of Test: Frequency Stability (Voltage Variation)

Specification: 47 CFR 2.1055 (b)(1)

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)

GSM/GPRS/EGPRS CELLULAR BAND

BATTERY END POINT (Voltage) = 3.35

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
100	3.9	836.4000202	20.2	0.0
B.E.P.	3.25	836.4000101	10.1	0.0

GSM/GPRS/EGPRS PCS BAND

BATTERY END POINT (Voltage) = 3.25

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
100	3.9	1879.9999840	-16.0	0.0
B.E.P.	3.25	1880.0000076	7.6	0.0

Limit: Must remain within authorized frequency block.

Performed By: David Lee

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Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = 300KGXW

Necessary Bandwidth:

Necessary Bandwidth (B_N), kHz = 300
(measured at the 99.75% power bandwidth)

Modulation = 300KG7W

Necessary Bandwidth:

Necessary Bandwidth (B_N), kHz = 300
(measured at the 99.75% power bandwidth)

Performed By: David Lee

END OF TEST REPORT

Testimonial and Statement of Certification

This is to certify that:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.

2. **That** the technical data supplied with the application was taken under my direction and supervision.

3. **That** the data was obtained on representative units, randomly selected.

4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

Certifying Engineer: Morton Flom, P. Eng.