



M. Flom Associates, Inc. - Global Compliance Center

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Transmitter Certification

of

FCC ID: LJPRH-30

Model: RH-30

Serial Numbers Of Unit Tested:

004400/18/168990/0

to

Federal Communications Commission

Rule Part(s) 24H, Confidentiality

Date Of Report: August 13, 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:

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

Morton Flom, P. Eng.

The applicant has been cautioned as to the following:

15.21 Information to User.

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

15.27(a) Special Accessories.

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

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

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

a)

Test Report

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

c) Report Number: d0380017

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

e) Identification: RH-30
FCC ID: LJPRH-30
Description: GSM900/1800/1900/FM Radio

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

g) Report Date: August 13, 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-30	004400/18/168990/0	S00825
Battery	BLD-3	N/A	S00827
Headset	HDS-3	N/A	S00828
Charger	ACP-12U	N/A	S01275
Charger	ACP-7U	N/A	S01248
Charger	ACP-8U	N/A	S01250
Desktop Stand	DCV-14	N/A	S00728

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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

Manufacturers:

Nokia Komarom kft.2900 Komarom
Nokia u. 1. Hungary

Beijing Capital Mobile Telecommunications Ltd.
Beijing Economic & Technological Development
Area No. 5
Zhonglu, Beijing
100176 P.R. China

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

(c)(2): **FCC ID:** LJPRH-30

Model Number: RH-30

(c)(3): **Instruction Manual(s):** Please See Attached Exhibits

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

(c)(5): **FREQUENCY RANGE, MHz:** 1850.2 – 1909.8

(c)(6): **Power Rating, Watts:** 1.318 EIRP
 ___ Switchable ___ x Variable ___ N/A

(c)(7): **Maximum Power Rating, Watts:** 1

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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
☒ N/A

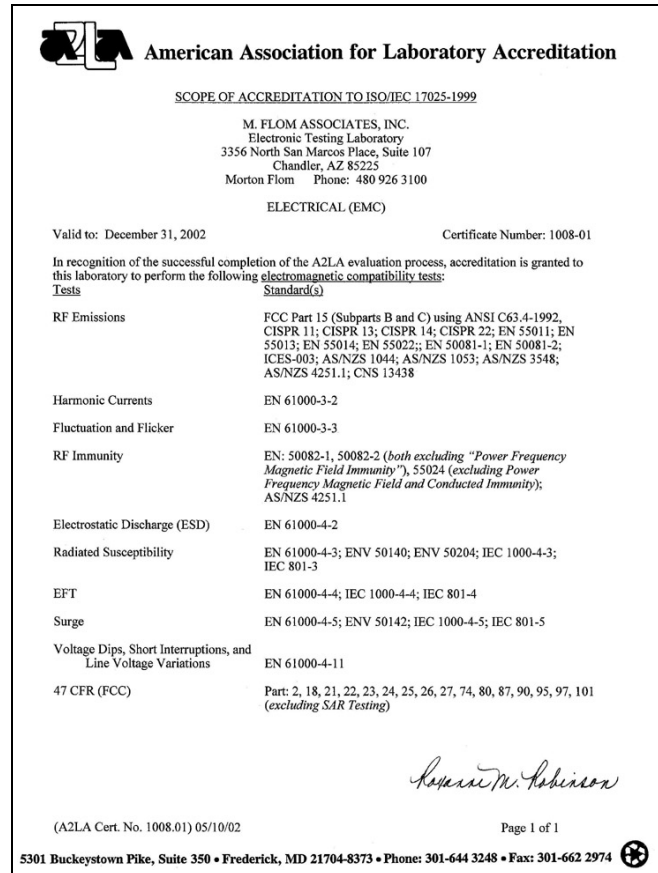
(c)(14): **Test and Measurement Data:**

Follows

Page Number

4 of 47.

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (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.

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Sub-part

2.1033(c)(14):**Test and Measurement Data**

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

- ☐ 21 – Domestic Public Fixed Radio Services
- ☐ 22 – Public Mobile Services
- ☐ 22 Subpart H - Cellular Radiotelephone Service
- ☐ 22.901(d) - Alternative technologies and auxiliary services
- ☐ 23 – International Fixed Public Radiocommunication services
- ☒ 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):

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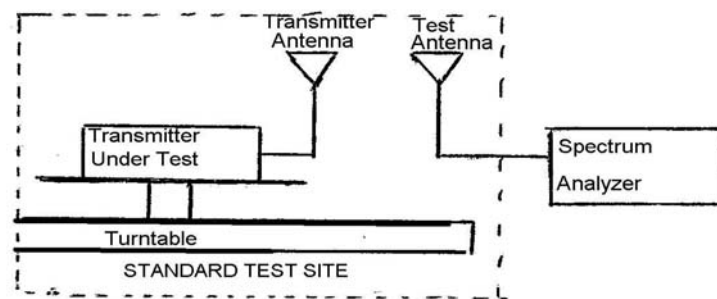
Name of Test: EIRP Carrier Power (Radiated)

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:

$$\text{Radiated power} = \text{Level} + E_T - E_S + \text{Gain}_{\text{Ant}}$$

E_T Signal level received from transmitter

E_S Signal level received from substitution antenna

Results Attached

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Test Results For: EIRP Carrier Power (Radiated)

Freq MHz	Level dBm	Antenna Gain dBi	$E_T - E_S$ dBm	P ol	Radiated P Out dbm	Radiated P Out Watts
GSM1900/GPRS1900						
1850.2	25.6	+0.2	97.6-92.2	H	31.2 EIRP	1.318
1880.0	25.8	-0.5	95.1-91.5	H	28.9 EIRP	0.776
1909.8	26.1	-0.8	94.1-93.5	H	25.9 EIRP	0.389
EGPRS1900						
1850.2	20.7	+0.2	95.1-90.2	H	25.8 EIRP	0.380
1880.0	20.7	-0.5	93.7-89.5	H	24.4 EIRP	0.275
1909.8	20.4	-0.8	90.4-89.3	V	20.7 EIRP	0.117

Sample Calculation:

$$P_{\text{ANT OUT}} + \text{ANT GAIN} + E_T - E_S = P.O. \text{ RADIATED}$$

$$25.6 + 0.2 + 97.6 - 92.2 = 31.2 \text{ dbm EIRP}$$

$$= 1.318 \text{ W EIRP}$$

Antenna: EMCO 3125-1880 dipole s/n 1010 cal. 21-Oct-02

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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

Guide: As indicated on page 6

Test Equipment: As per attached page

Measurement Procedure

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



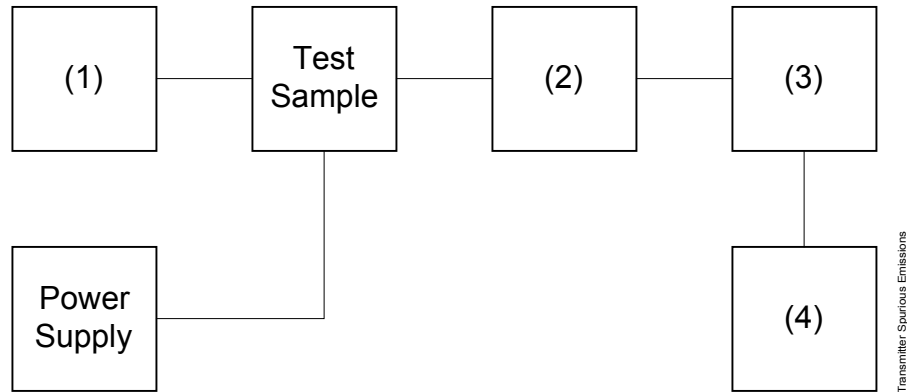
Performed By:

David Lee

Transmitter Spurious Emission

Test A. Occupied Bandwidth (In-Band Spurious)

Test B. Out-of-Band Spurious

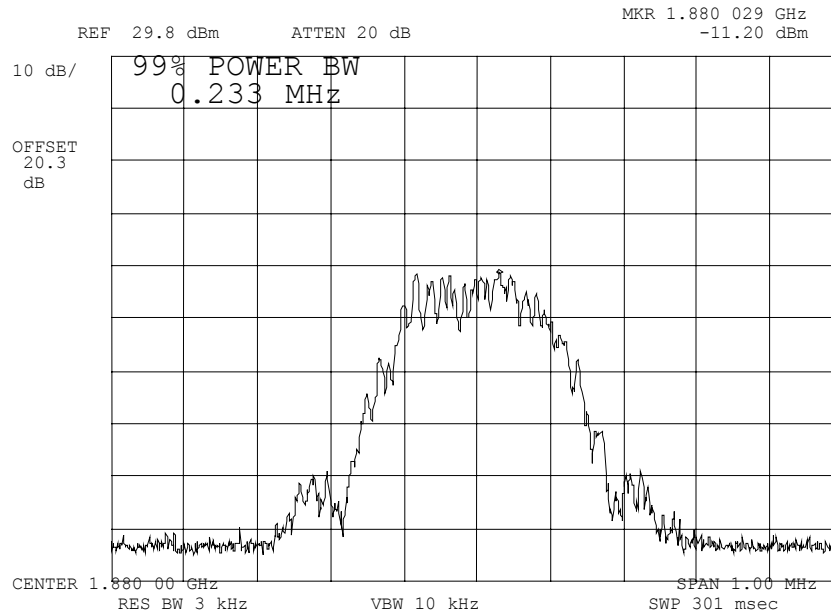


Asset	Description (as applicable)	s/n
(1)	Audio Oscillator/Generator	
i00010	HP 204D	1105A04683
i00017	HP 8903A	2216A01753
i00012	HP 3312A	1432A11250
(2)	Coaxial Attenuator	
i00122	Narda 766-10	7802
i00123	Narda 766-10	7802A
i00069	Bird 8329 (30 dB)	1006
i00113	Sierra 661A-3D	1059
(3)	Filters; Notch, 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

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Name of Test: Emission Masks (Occupied Bandwidth)
g0380128: 2003-Aug-06 Wed 14:02:00
State: 1:Low Power



Power:
Modulation:

LOW
EGPRS 1900
99% BANDWIDTH

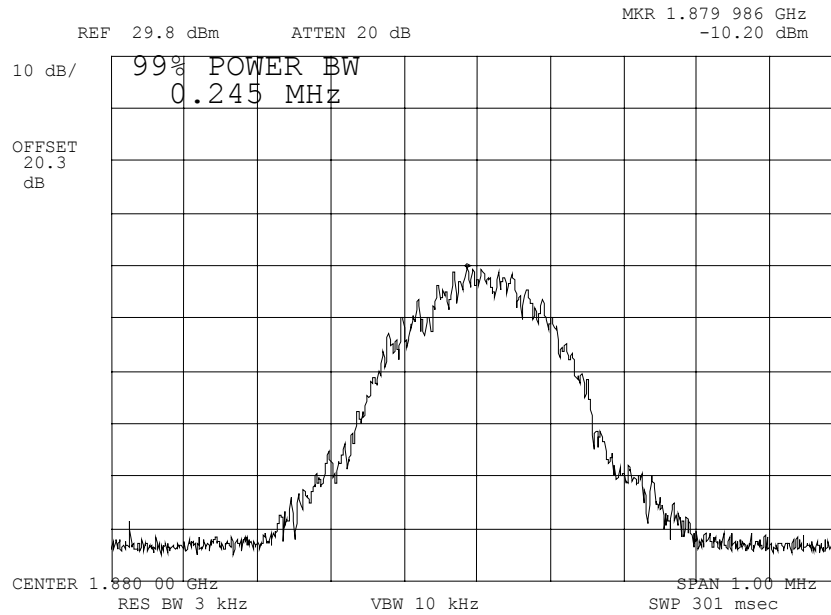
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Name of Test: Emission Masks (Occupied Bandwidth)
g0380129: 2003-Aug-06 Wed 14:05:00
State: 1:Low Power



Power:
Modulation:

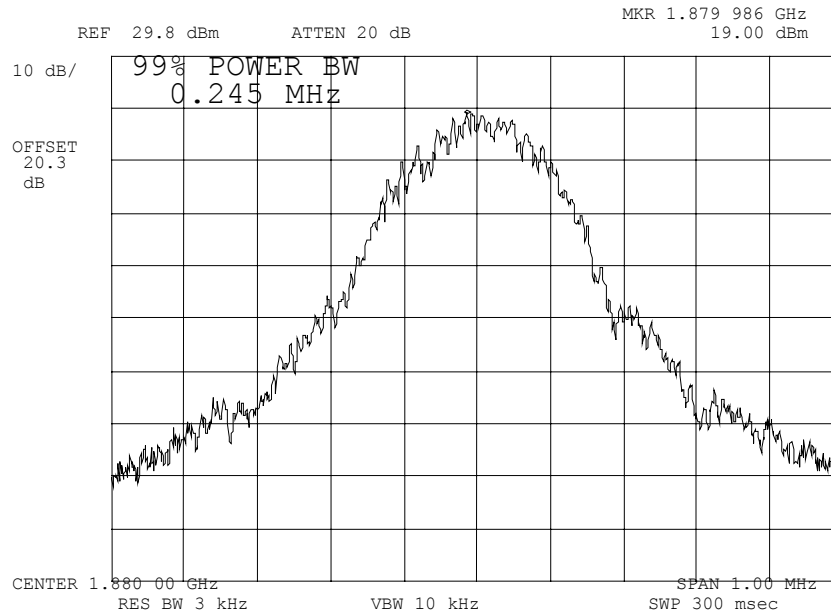
LOW
GSM/GPRS 1900
99% BANDWIDTH

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Name of Test: Emission Masks (Occupied Bandwidth)
g0380091: 2003-Aug-04 Mon 14:18:00
State: 2:High Power



Power:
Modulation:

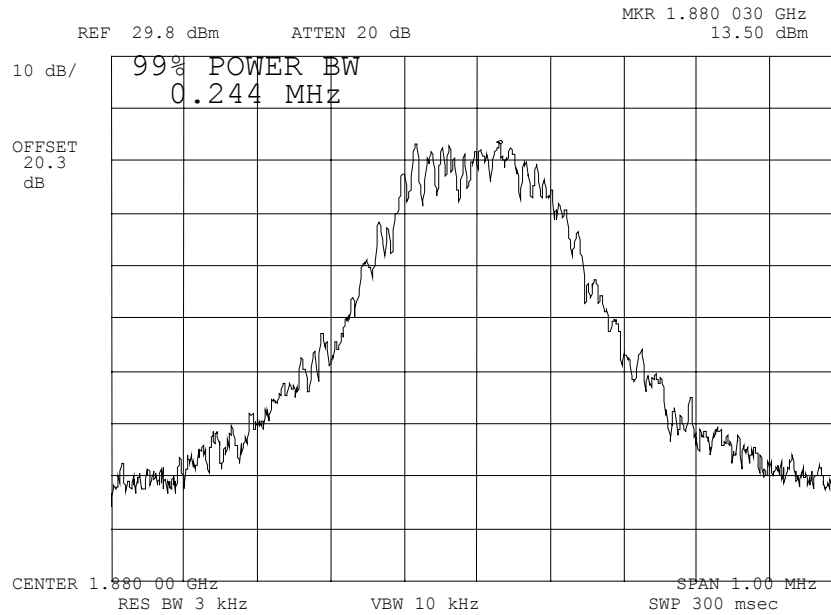
HIGH
GSM/GPRS

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Name of Test: Emission Masks (Occupied Bandwidth)
g0380095: 2003-Aug-04 Mon 14:25:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900



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Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

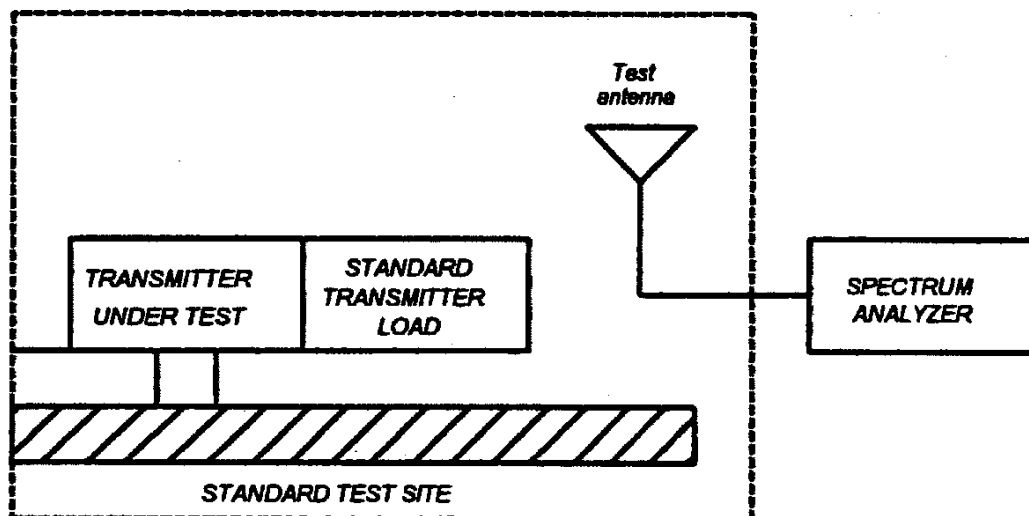
Guide: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

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.

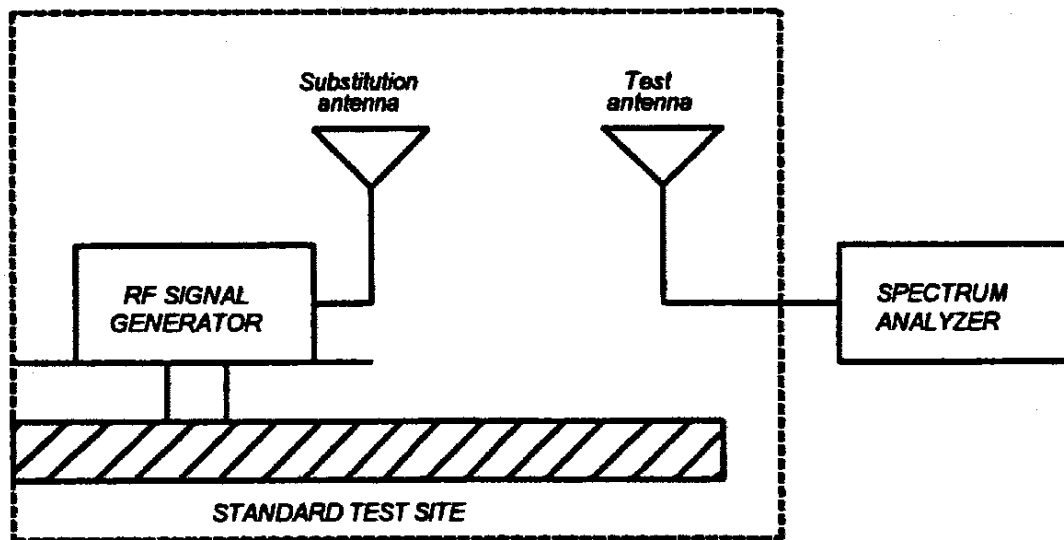
1.2.12.2 Method of Measurement

- 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.



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.

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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:

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

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

Test Equipment:

Asset (as applicable)	Description	s/n	Cycle	Last Cal
Per ANSI C63.4-1992/2000 Draft, 10.1.4				
Transducer				
i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-02
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-02
i00089	Apriel 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

GSM1900

State: 2:High Power g0380090: 2003-Aug-04 Mon 11:30:00

Frequency Tuned, MHz	Frequency Emission, MHz	EIRP, dBm	EIRP, dbc
1880.000000	3760.001667	-43.8	-74.99
1880.000000	5640.001667	-50.2	-81.39
1880.000000	7520.251667	-40	-71.19
1880.000000	9400.251667	-44.6	-75.79
1880.000000	11280.251667	-43.5	-74.69
1880.000000	13160.251667	-41.8	-72.99
1880.000000	15040.001667	-40.6	-71.79
1880.000000	16920.001667	-38.9	-70.09

EGPRS1900

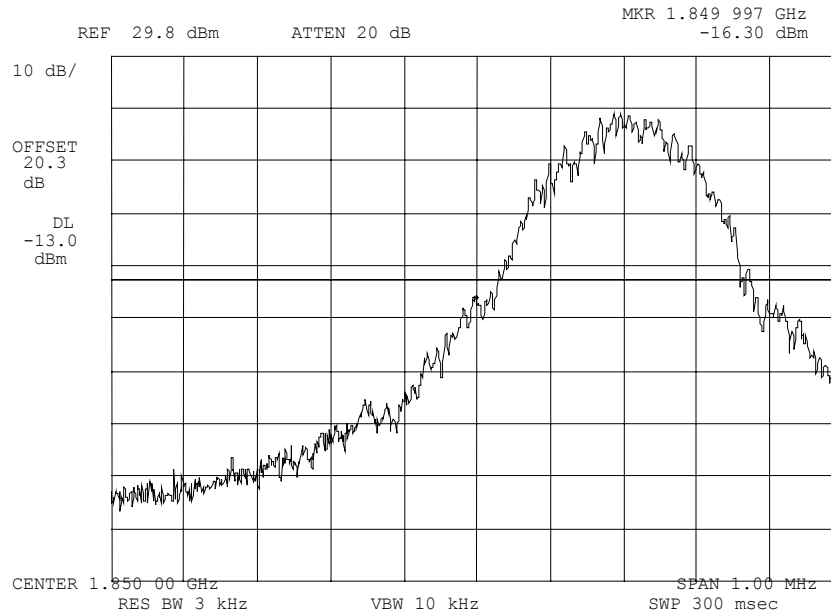
State: 2:High Power g0380120: 2003-Aug-05 Tue 10:50:00

Frequency Tuned, MHz	Frequency Emission, MHz	EIRP, dBm	EIRP, dbc
1880.000000	3760.018333	-48.1	-79.29
1880.000000	5640.018333	-50.4	-85.59
1880.000000	7520.018333	-42.3	-73.49
1880.000000	9400.018333	-40.1	-71.29
1880.000000	11280.018333	-38.4	-65.59
1880.000000	13160.018333	-36.6	-67.79
1880.000000	15040.018333	-32.9	-64.09
1880.000000	16920.018333	-31	-62.19

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Name of Test: Emission at Band Edges
g0380096: 2003-Aug-04 Mon 14:48:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
LOWER BAND EDGE

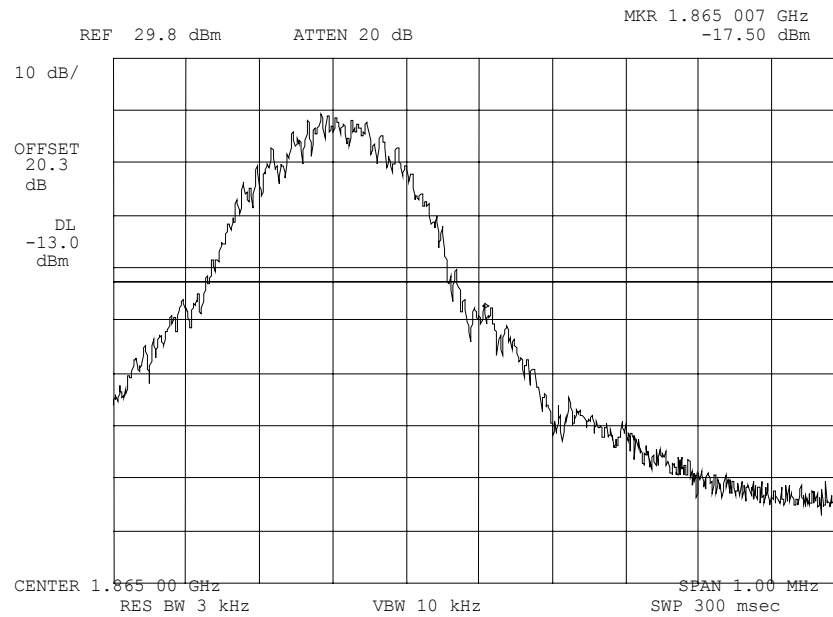
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Name of Test: Emission at Band Edges
g0380098: 2003-Aug-04 Mon 14:52:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
A UPPER BAND EDGE

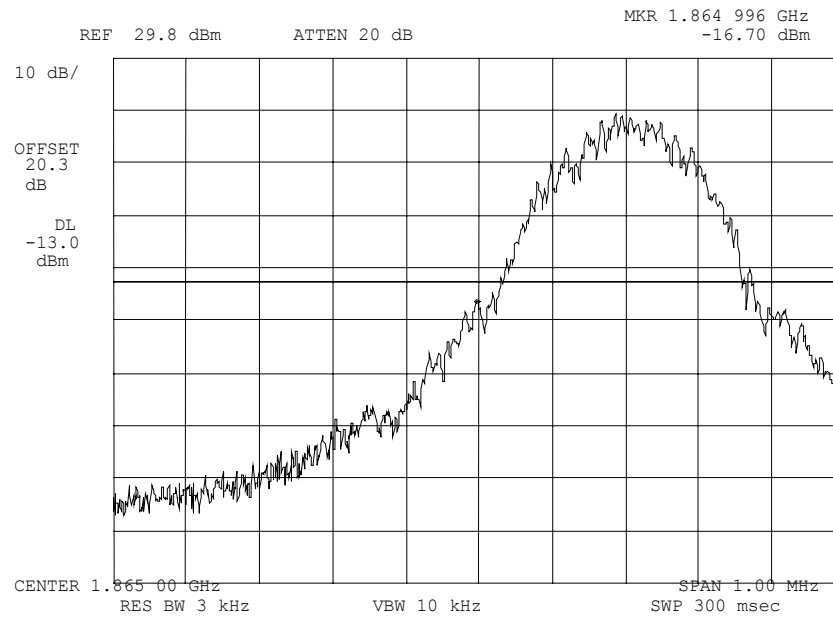
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Name of Test: Emission at Band Edges
g0380099: 2003-Aug-04 Mon 14:54:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
D LOWER BAND EDGE

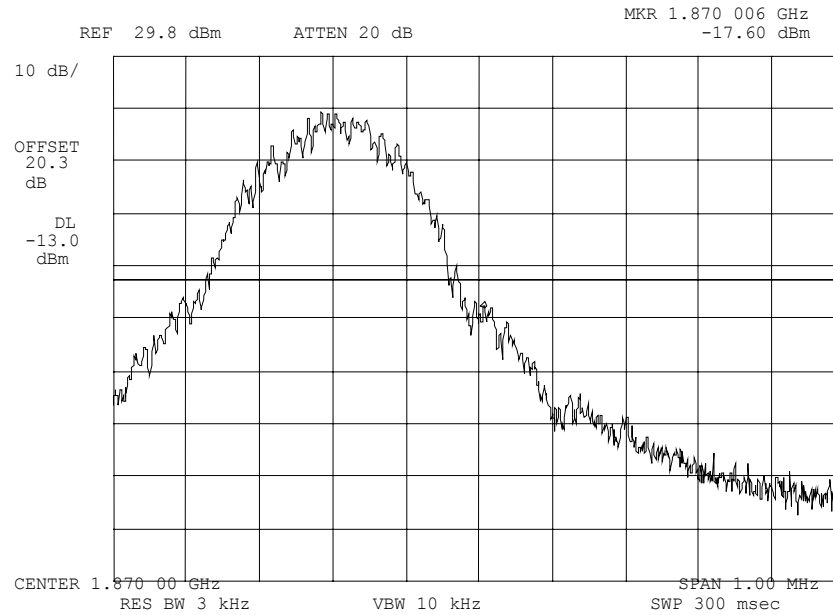
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Name of Test: Emission at Band Edges
g0380100: 2003-Aug-04 Mon 14:55:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
D UPPER BAND EDGE

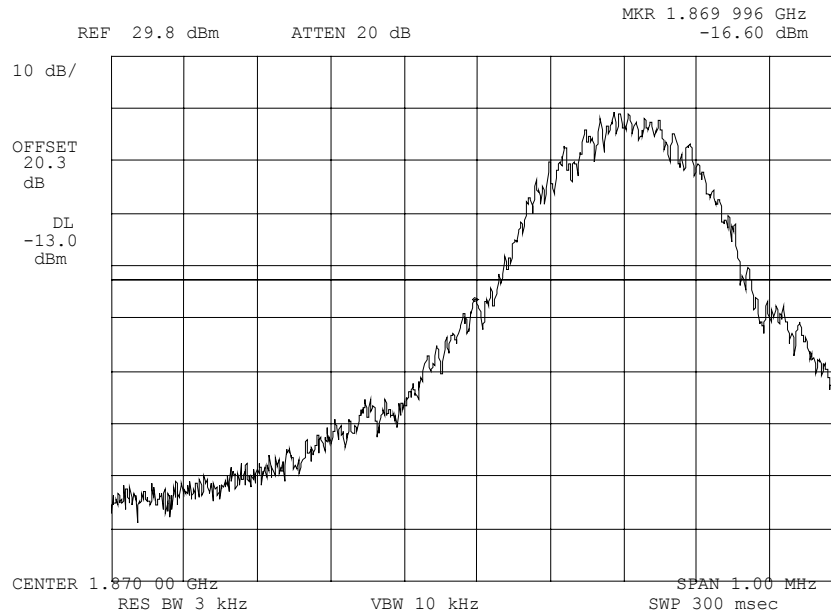
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Name of Test: Emission at Band Edges
g0380101: 2003-Aug-04 Mon 14:57:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
B LOWER BAND EDGE

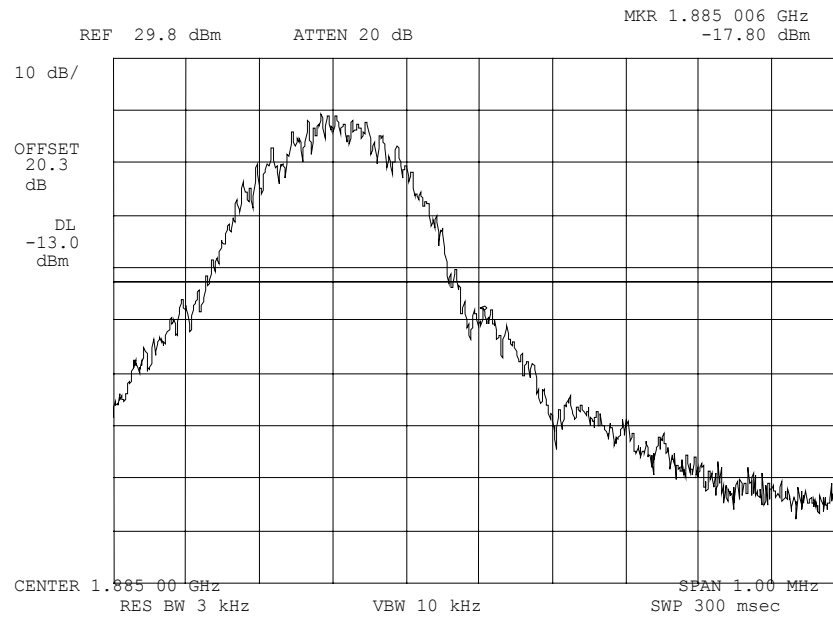
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Name of Test: Emission at Band Edges
g0380102: 2003-Aug-04 Mon 14:58:00
State: 2:High Power



Power:
Modulation:

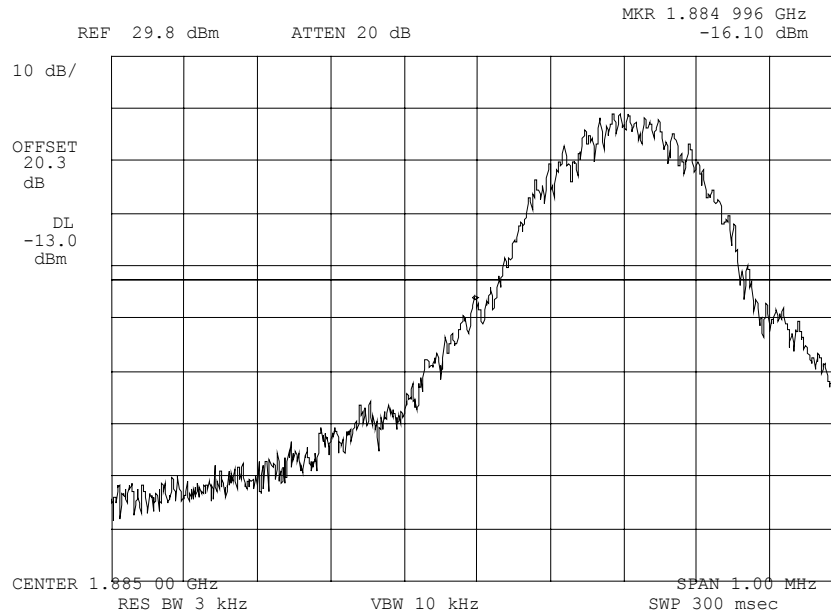
HIGH
GSM/GPRS
B UPPER BAND EDGE

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Name of Test: Emission at Band Edges
g0380103: 2003-Aug-04 Mon 14:59:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
E LOWER BAND EDGE

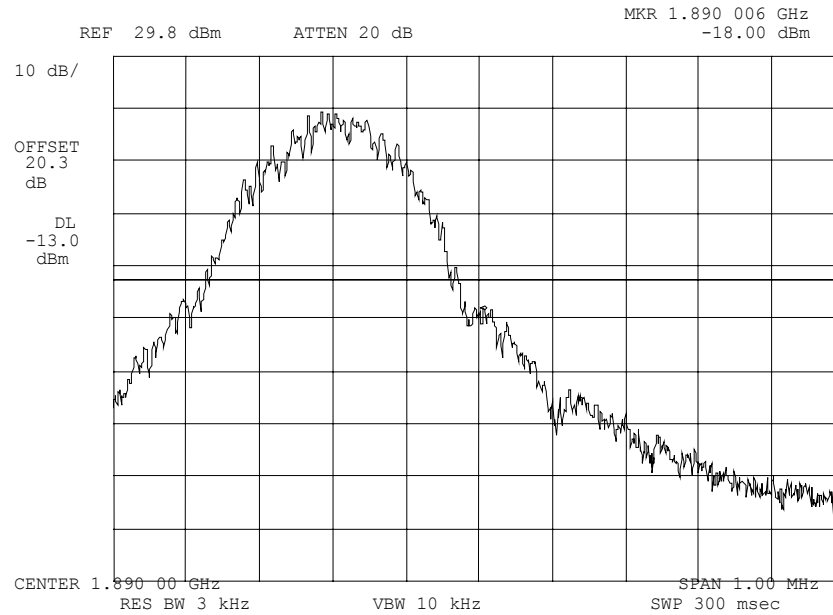
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380104: 2003-Aug-04 Mon 15:00:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
E UPPER BAND EDGE

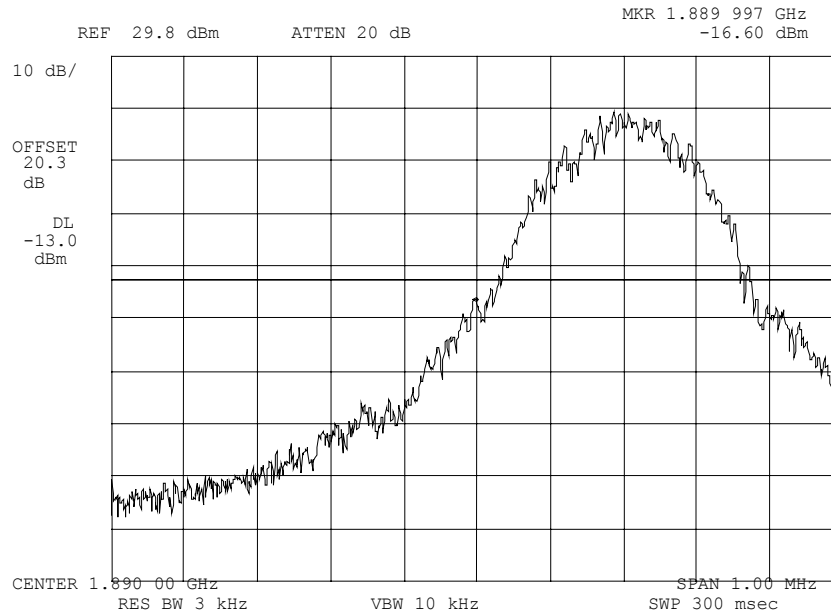
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380105: 2003-Aug-04 Mon 15:02:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
F LOWER BAND EDGE

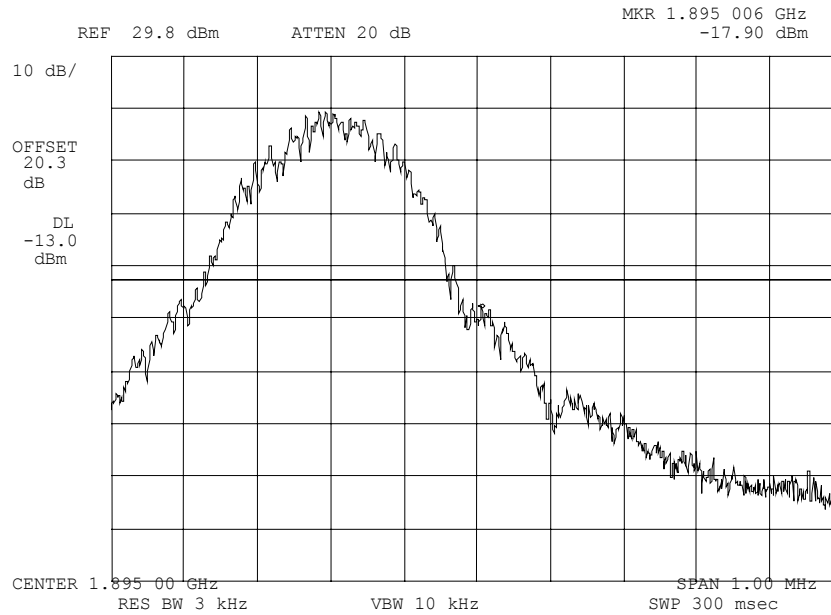
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380106: 2003-Aug-04 Mon 15:06:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
F UPPER BAND EDGE

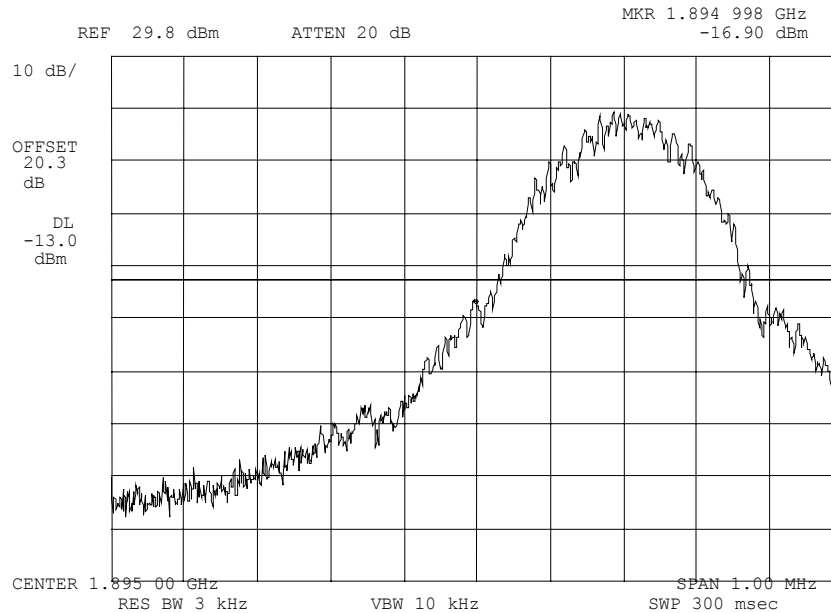
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380119: 2003-Aug-04 Mon 15:25:00
State: 2:High Power



Power:
Modulation:

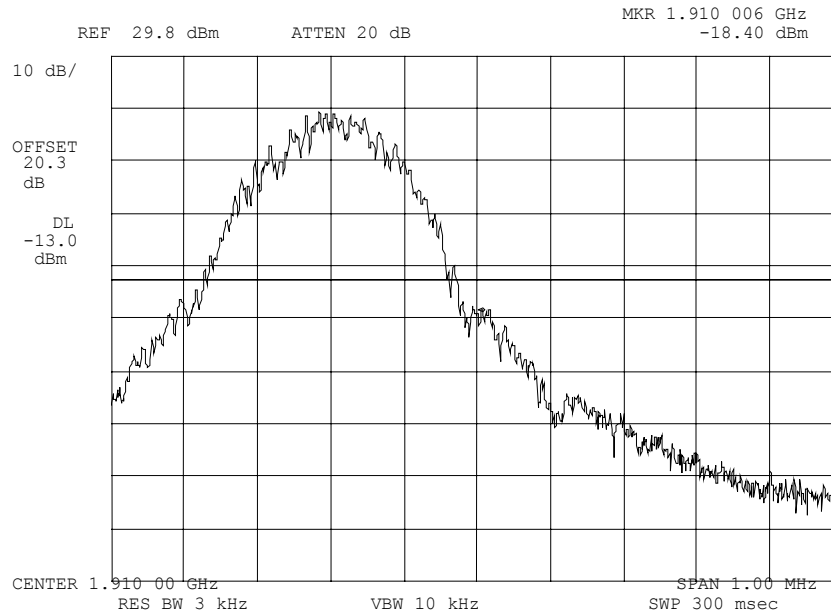
HIGH
GSM/GPRS
C LOWER BAND EDGE

Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380107: 2003-Aug-04 Mon 15:07:00
State: 2:High Power



Power:
Modulation:

HIGH
GSM/GPRS
UPPER BAND EDGE

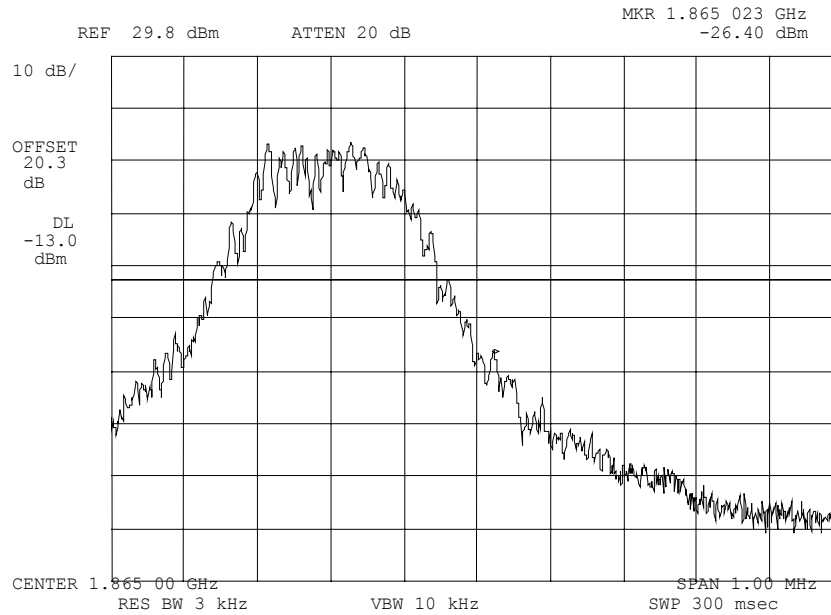
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380109: 2003-Aug-04 Mon 15:10:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900
A UPPER BAND EDGE



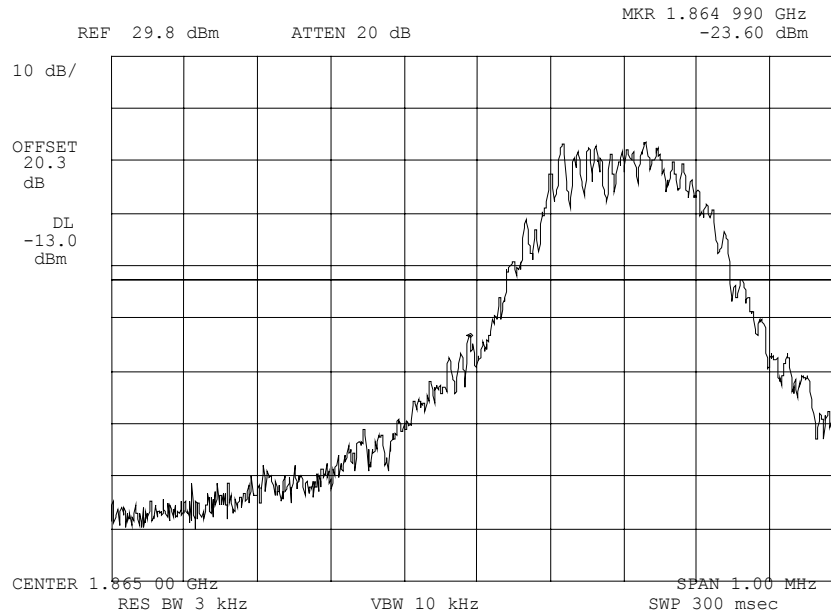
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380110: 2003-Aug-04 Mon 15:11:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900
D LOWER BAND EDGE



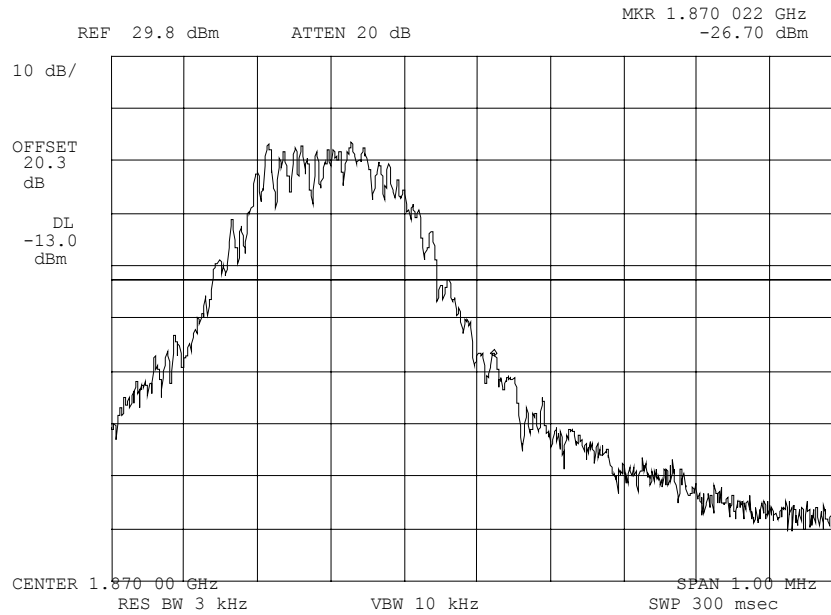
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380111: 2003-Aug-04 Mon 15:12:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900
D UPPER BAND EDGE



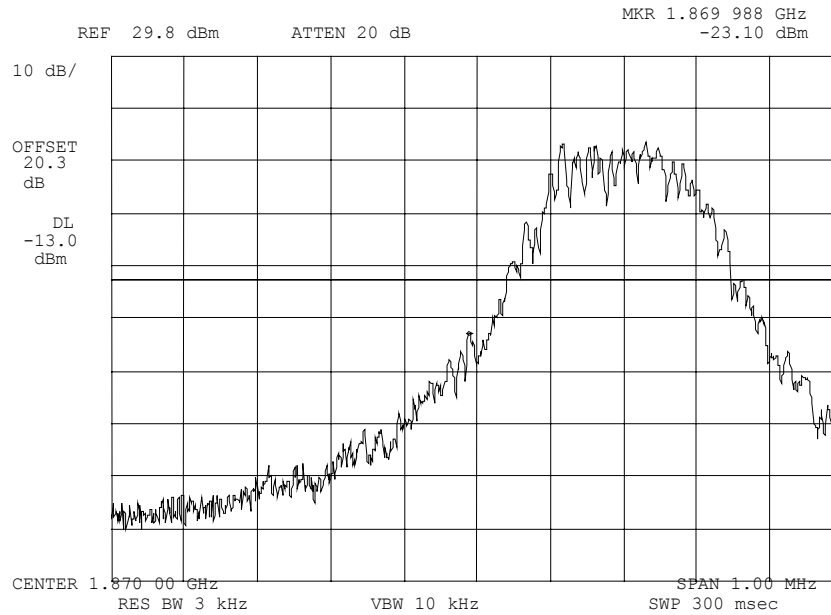
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380112: 2003-Aug-04 Mon 15:13:00
State: 2:High Power



Power:
Modulation:

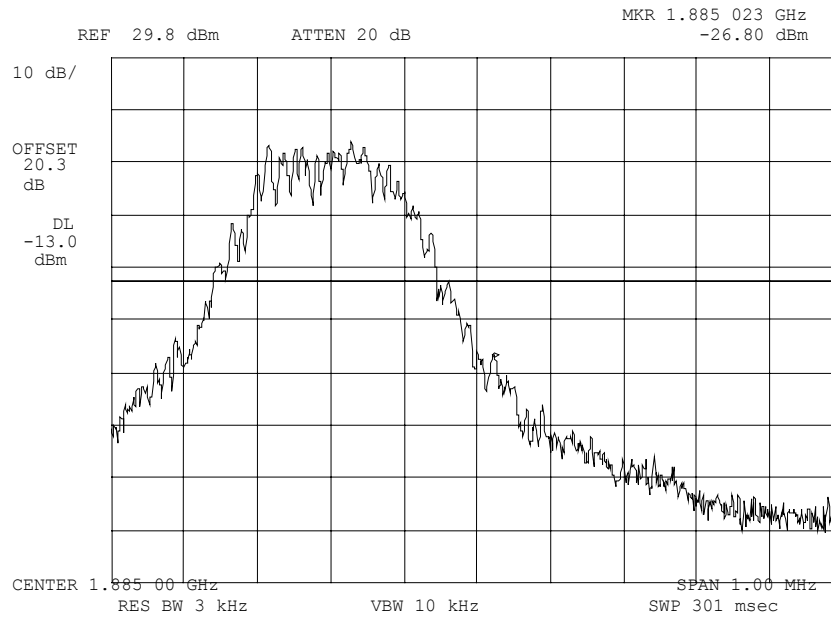
HIGH
EGPRS 1900
B LOWER BAND EDGE

Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380124: 2003-Aug-06 Wed 13:48:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900
B UPPER BAND EDGE

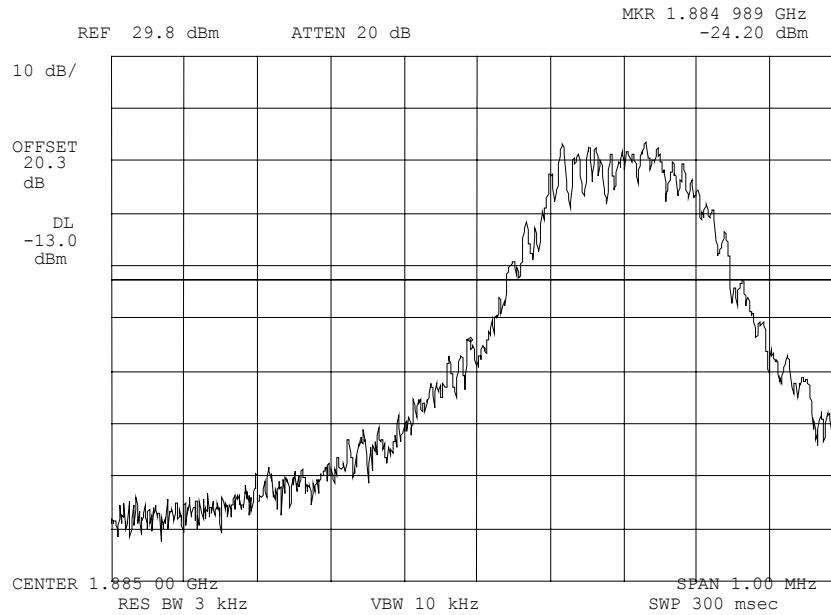
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380113: 2003-Aug-04 Mon 15:15:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900
E LOWER BAND EDGE

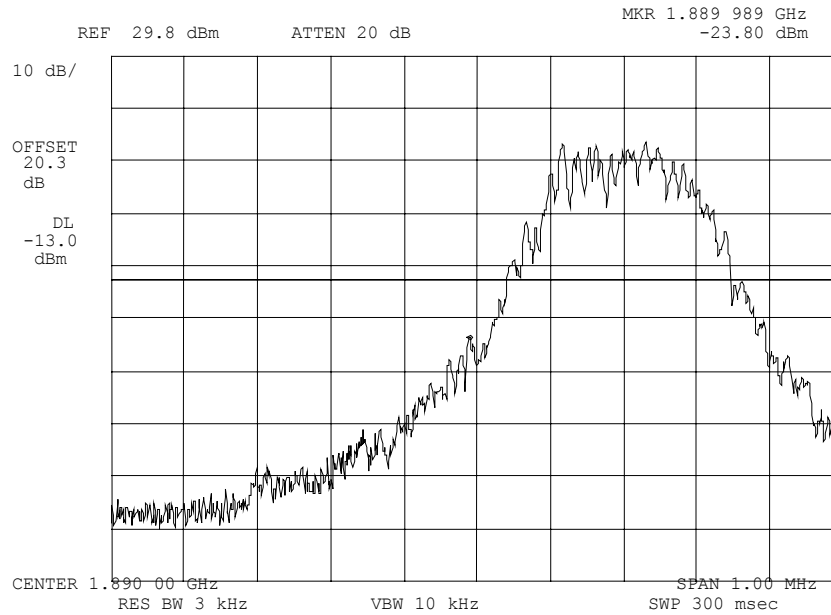
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380115: 2003-Aug-04 Mon 15:18:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900
F LOWER BAND EDGE

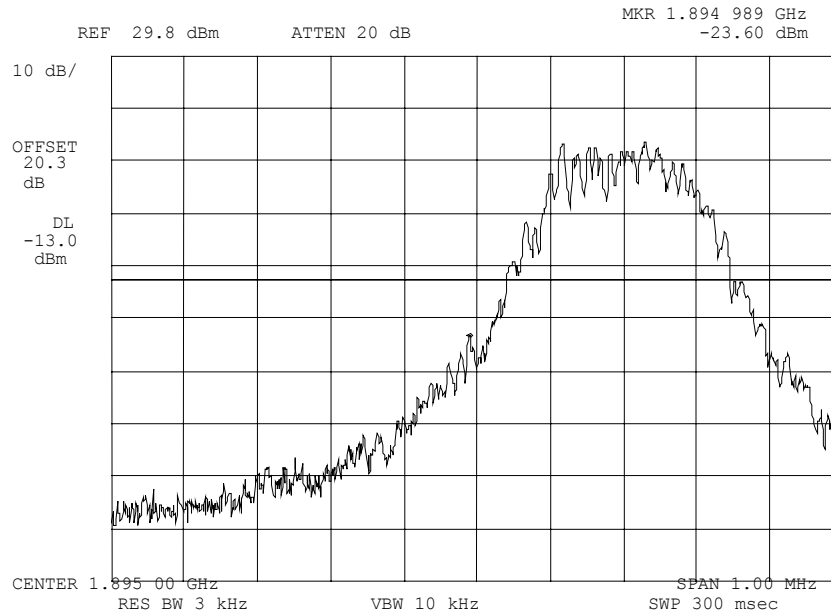
Performed By:

David Lee

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Name of Test: Emission at Band Edges
g0380117: 2003-Aug-04 Mon 15:22:00
State: 2:High Power



Power:
Modulation:

HIGH
EGPRS 1900
C LOWER BAND EDGE

Performed By:

David Lee

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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 6

Test Conditions: As Indicated

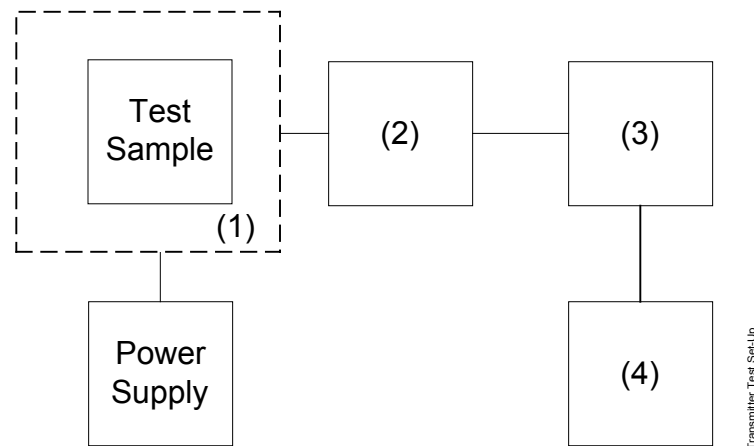
Test Equipment: As per previous page

Measurement Procedure

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

Transmitter Test Set-Up

Test A. Operational Stability
 Test B. Carrier Frequency Stability
 Test C. Operational Performance Stability
 Test D. Humidity
 Test E. Vibration
 Test F. Environmental Temperature
 Test G. Frequency Stability: Temperature Variation
 Test H. Frequency Stability: Voltage Variation



Asset (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)

°C	Change, Hz	Change, ppm
-30	19.3	0.0
-20	-8.6	0.0
-10	-3.1	0.0
0	-10.2	0.0
10	28.7	0.0
20	23.3	0.0
30	0.3	0.0
40	15.3	0.0
50	10.2	0.0

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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)

State:

Limit: Must remain within authorized frequency block.

Battery End Point (Voltage) = 3.25

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
100	3.9	1880.0000233	23.3	0.0
B.E.P.	3.25	1880.0000270	27.0	0.0

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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:
END

OF

David Lee
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:

A handwritten signature in black ink, appearing to read "M. Flom P. Eng.", with a horizontal line drawn underneath the signature.

Morton Flom, P. Eng.