Assessment of Compliance

for

FCC Rules & Regulations Part 2, 22 (Subpart H) and 24 (Subpart E)

GSM 850/PCS 1900 cellular phone with GPRS WDP318

Wireless Dynamics Inc..

December 2004

APREL Project No.: WDIB-WDP318 GSM Cell Phone(EMC)-5089

51 Spectrum Way Nepean ON K2R 1E6
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Engineering Report

Subject: **Assessment of Compliance with Respect to FCC Rules & Regulations Parts 2, 22 (SUBPART H) and 24 (SUBPART E)**

FCC ID: **SHFWDP318**

Product: **GSM 850/PCS 1900 cellular phone with GPRS**

Model: **WDP318**

Client: **WIRELESS DYNAMICS INC.**

Address: 220, 3636-23rd Street NE
Calgary, AB T2E 8Z5
CANADA

Project #: WDIB-WDP318 GSM Cell Phone (EMC)-5089

Prepared By: APREL Laboratories,
Regulatory Compliance Division

Written by: Jay Sarkar Date: Feb. 10, 2005
Jay Sarkar
Director, Standards & Certification

Approved by: Jay Sarkar Date: Feb. 10, 2005
Jay Sarkar
Director, Standards & Certification

Released by: Date: Feb 10/05
Dr. J.J. Wojcik , P.Eng.

51 Spectrum Way
Nepean, Ontario
K2R 1E6, Canada

Tel. (613) 820 2730
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e-mail: info@aprel.com

FCC ID: **SHFWDP318**
Applicant: Wireless Dynamics Inc.
Equipment: **GSM 850/PCS 1900 cellular phone with GPRS**
Model: **WDP318**
Standard: FCC Rules and Regulations Parts 2, 22 (SUBPART H) and 24 (SUBPART E) (Transmitter)

ENGINEERING SUMMARY

This report contains the results of the engineering evaluation performed on a **GSM 850/PCS 1900 cellular phone with GPRS.** The evaluation and analysis were conducted in accordance with FCC Rules and Regulations Parts: 2, 22 (Subpart H) and 24 (Subpart E). Additionally, FCC Part 15, Subpart B, unintentional radiator tests were also performed and the results are included in this report.

Based on the test results, it is certified that the product meets the applicable requirements as set forth in the above specifications for Certification.

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GSM 850/PCS 1900 cellular phone with GPRS
WDP318
Summary of the Results

Test Description	Exhibit No.	Page No.	Test Set-up Figure No.	Results Summary
Effective Radiated Power (ERP) Ref. FCC Parts 2.1046 and 22.913 (a)	2	7	1	**Passed**
Equivalent Isotropic Radiated Power (EIRP) Ref. FCC Parts 2.1046 and 24.232(b)	2	14	2	**Passed**
Occupied Bandwidth Ref. FCC Parts 2.1049, 22.917(b) and 24.238(b)	2	22	3	**Passed**
Out of Band Emission at Antenna Terminal Ref. FCC Parts 2.1051, 22.917 (a) and 24.238 (a)	2	53	4	**Passed**
Field Strength of Spurious Radiation Ref. FCC Parts 2.1053, 22.917(a) and 24.238(a)	2	75	5a	**Passed**
Frequency Stability Ref. Paragraph 2.1055	2	92	6	**Passed**
Compliance FCC Part 15, Subpart B, Class B, Unintentional Radiator	2	101	Figure 1 & 2a of this Section	**Passed**

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FCC SUBMISSION INFORMATION

FCC ID:	**SHFWDP318**
Equipment:	**GSM 850/PCS 1900 cellular phone with GPRS**
Model:	**WDP318**
For:	Certification
Applicant:	WIRELESS DYNAMICS INC. 220, 3636-23rd Street NE Calgary, AB T2E 8Z5 CANADA
Manufacturer:	WIRELESS DYNAMICS INC. 220, 3636-23rd Street NE Calgary, AB T2E 8Z5 CANADA
Test Laboratory:	APREL Laboratories 51 Spectrum Way Nepean, Ontario Canada K2R 1E6

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MANUFACTURER'S DATA

Equipment Type:	**GSM 850/PCS 1900 cellular phone with GPRS**
Model:	**WDP318**
Manufacturer:	WIRELESS DYNAMICS INC.
Development Stage of Unit:	Production

GENERAL SPECIFICATIONS

Transmitter or Tranceiver:	Tranceiver
Frequency Range:	Cellular Band (Part 22), PCS Band (Part 24)
Antenna Type:	Stub monopole
Antenna Gain:	-0.5dBi @ 850 MHz, -1.6dBi @ 1900 MHz
Modulation Type:	GMSK
Receiver Type:	Super Heterodyne
Description:	GSM 850/PCS 1900 cellular phone with GPRS
ERP (Highest)	29.27 dBm = 0.845 w (at 824.2 MHz)
EIRP (Highest)	28.20 dBm = 0.660 w (at 1850.2 MHz)

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INTRODUCTION

General

This report describes the results of selected tests conducted on a **GSM 850/PCS 1900 cellular phone with GPRS**, model **WDP318** manufactured by WIRELESS DYNAMICS INC.

Test Facility

The tests were performed for WIRELESS DYNAMICS INC., by APREL Laboratories at APREL's EMI facility located in Nepean, Ontario, Canada. The laboratory operates an (3m and 10m) Open Area Test Site (OATS). The measurement facility is calibrated in accordance with ANSI C63.4-1992.

A description of the measurement facility in accordance with the radiated and AC line conducted test site criteria in ANSI C63.4-1992 is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations.

APREL's FCC registration number is 90416.

APREL is accredited by Standards Council of Canada under ISO 17025. All equipment used is calibrated or verified. APREL is also accredited by Industry Canada Under the terms of the MRA between NVLAP and SCC, APREL is acceptable by FCC to perform Declaration of Conformity (DoC) testing under the FCC rules.

Standard

The evaluation and analysis were conducted in accordance with FCC Rules and Regulations Parts: 2, 22 (Subpart H) and 24 (Subpart E). Additionally, FCC Part 15, Subpart B, unintentional radiator tests were also performed and the results are included in this report.

Test Equipment

The test equipment used during the evaluation is listed in Appendix A. Calibration of all test equipment are performed at 12 month intervals or otherwise noted.

Environmental Conditions

Measurements were conducted under normal laboratory conditions including open area test site.

- Temperature: 23 °C ± 2
- Relative Humidity: 30 - 50 %
- Air Pressure: 101 kPa ± 3

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TEST RESULTS

RF POWER OUTPUT (ERP)
GSM 850/PCS 1900 CELLULAR PHONE
GSM/GPRS

WDP318

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Test: **Effective Radiated Power Output**

Test Mode: **GSM 850/PCS 1900 Cellular Phone**
GSM/GPRS

Ref.: **FCC Part 2 paragraph 2.1046 and Part 22 paragraph 22.913(a)**

Criteria: The effective radiated power of the mobile transmitter must not exceed 7 Watts. The equipment must employ means to limit the power to the minimum necessary to maintain successful communications.

Set-up: See Figure No. 1.

Environmental Conditions: Temperature: 23 °C ± 2.
Air pressure:101 ± 3 kPa

Equipment: See Page 11 of this section.

Procedure: Effective Radiated Power Measurement:

The radiated RF power measurements were taken using substitution method at APREL Laboratory's open area test site (OATS) measurement facility. This open area test site is calibrated to ANSI C63.4 document and a description of the measurement facility is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations. (FCC File No.: 90416).

The test was set-up as illustrated in Fig. 1. The mobile was configured to operate at maximum power with appropriate mode of operation. The equipment under test was placed on a turntable positioned 3 meters away from the receiving antenna, which in turn was connected to the spectrum analyzer.

For each transmitter frequency, the received signal was maximized by rotating the turntable and adjusting the height of the receiving antenna. To obtain the actual ERP, the mobile was replaced by a half-wave dipole antennas resonating at transmit frequency vertically polarized, RF power amplifier and a signal generator. The centre of the dipole antenna was placed in the same location as the mobile. The signal generator level was adjusted until the reading on the spectrum analyzer was identical to that obtained when the mobile was on the turntable. The output of power amplifier was disconnected from the dipole and connected to an RF power meter. The effective radiated power (ERP) was read directly from the power meter.

Results: **PASSED.** See Tables: 1 and 2 of this section, page 10.

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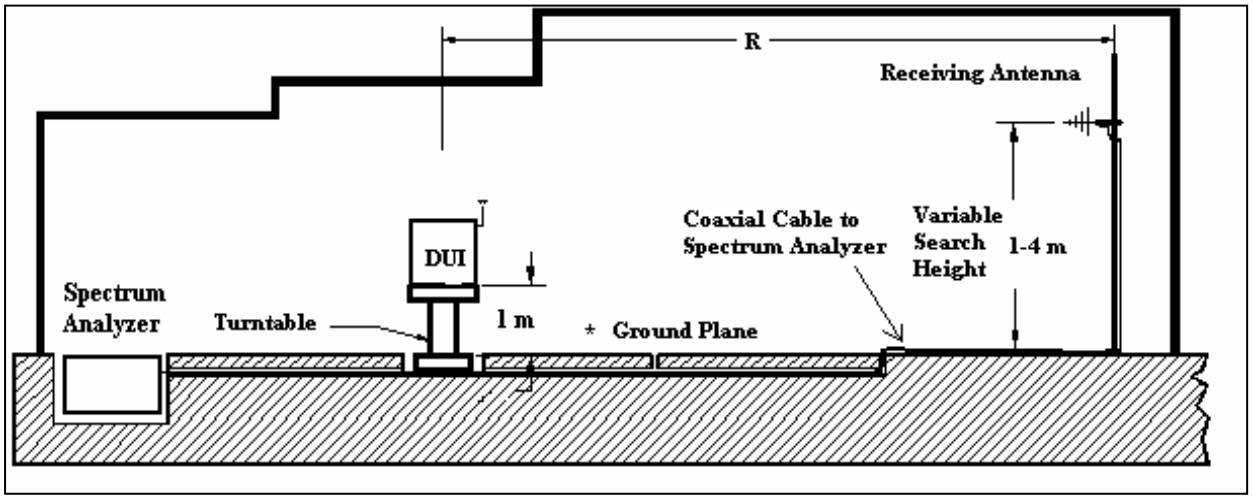
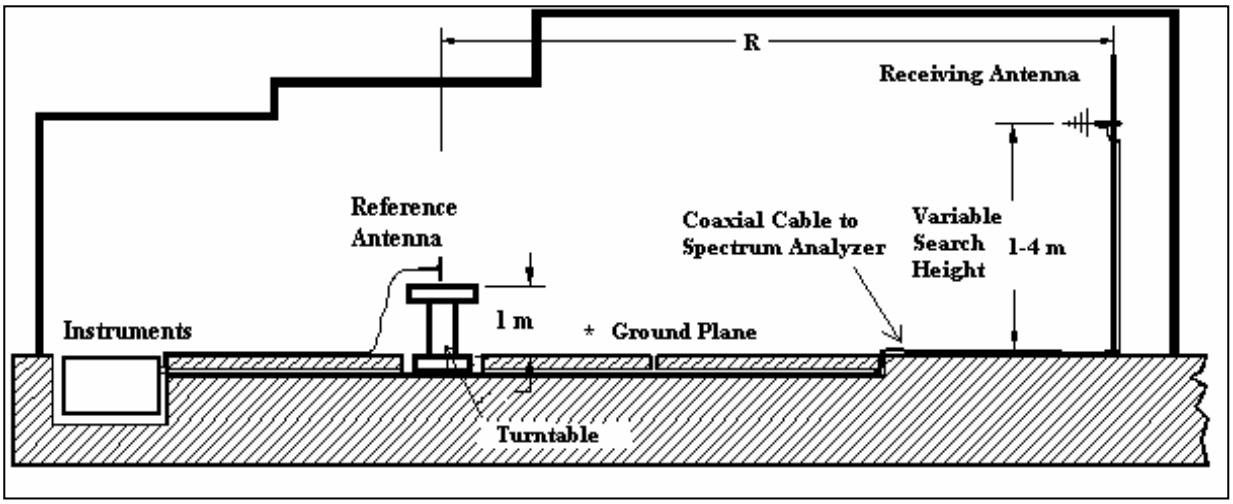
Set Up Figure 1
Effective Radiated Power (ERP)





Note:
R=3 meter.
Instruments: Spectrum Analyzer, Signal Generator, RF Power Amplifier.
Receiving Antenna: Log-Periodic.
RF absorbing materials were used on the ground plane between transmitting and receiving antenna.
Reference Antenna is a half wave dipole (800 MHz).

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GSM 850/PCS 1900 Cellular Phone

TABLE 1
Effective Radiated Power (ERP)
Cellular 850 MHz
GSM

Channel #	Nominal Transmitting Frequency (MHz)	Measured ERP (dBm)	Measured ERP (W)	Limit (dBm)	Limit (W)	Margin (dB)
128	824.2	29.27	0.845	38.45	7.000	9.18
190	836.6	28.52	0.711	38.45	7.000	9.93
251	848.8	29.14	0.820	38.45	7.000	9.31

TABLE 2
Effective Radiated Power (ERP)
Cellular 850 MHz
GPRS

Channel #	Nominal Transmitting Frequency (MHz)	Measured ERP (dBm)	Measured ERP (W)	Limit (dBm)	Limit (W)	Margin (dB)
128	824.2	29.19	0.831	38.45	7.000	9.26
190	836.6	28.46	0.701	38.45	7.000	9.99
251	848.8	29.15	0.821	38.45	7.000	9.31

Test performed by: [signature] **Date:** December, 2004

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List of Test Equipment

Description	Range	Manufacturer	Model #	APREL Asset #	Cal. Due Date
Spectrum Analyzer	9 kHz - 3 GHz	Anritsu	MS2661C	301330	March 25, 2005
Spectrum Analyzer	9 kHz - 30 GHz	Anritsu	MS2667C	301386	Sept. 5, 2005
Attenuator	20 dB	NARDA	9779-20	301533	August 15, 2005
Attenuator	3 dB	Bird	n/a	100889	October 5, 2005
RF Power Meter	10 MHz - 18 GHz	Giga-tronics	8541C	301393	Oct.16, 2005
RF Power Sensor	10 MHz - 18 GHz	Giga-tronics	80601A	301394	Oct.16, 2005
Biconical Antenna	20 MHz - 200 MHz	Eaton	94455-1	100890	July 18, 2005
Log - Periodic Antenna	200 MHz -1.0 GHz	Eaton	ALP-1	100063	July 31, 2005
Horn Antenna	1 – 18 GHz	APREL Inc.	AA – 118	100400	June 17, 2005
Horn Antenna	1 – 18 GHz	APREL Inc.	AA – 118	100553	June 17, 2005
Anechoic Shielded Room	10 kHz - 10 GHz	APREL Inc.	ALP-AnSh	301329	May 22, 2007
Reference Half -wave Dipole Antenna	835 MHz	APREL Inc.	D-835M-B	301482	July 3, 2005
Reference Half -wave Dipole Antenna	1.85 GHz	APREL Inc.	D-1.85G	301557	July 3, 2005
OATS	30 MHz – 1 GHz	APREL Inc.	3 m & 10 m	N/A	March 20, 2006

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ERP MEASUREMENT

PHOTOGRAPHS OF THE TEST SETUP

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GSM 850/PCS Cellular Phone WDP318 tested for ERP

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TEST RESULTS

RF POWER OUTPUT (EIRP)
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

WDP318

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Test: **Equivalent Isotropic Radiated Power (EIRP)**

Test Mode: **GSM 850/PCS 1900 Cellular Phone**
GSM/GPRS
Ref.: **FCC Parts 2.1046 and 24 Subpart E, Paragraph 24.232**

Criteria: Portable stations are limited to 2 Watts e.r.i.p peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

Peak transmit power must be measured over any interval of continuous transmission using instruments calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Set-up: See Figure No. 2 of this section..

Environmental
Conditions: Temperature: 23 °C ± 2.
Air pressure:101 ± 3 kappa

Equipment: See Page 19 of this section.

Procedure: **Equivalent Isotropic Radiated Power (EIRP):**

The Equivalent Isotropic Radiated Power measurements were taken using substitution method at APREL Laboratory's open area test site (OATS) measurement facility. This open area test site is calibrated to ANSI C63.4 document and a description of the measurement facility is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations. (FCC File No.: 90416).

The test was set-up as illustrated in Fig. 1. The mobile was configured to operate at maximum power with appropriate mode of operation. The equipment under test was placed on a turntable positioned 3 meters away from the receiving antenna, which in turn was connected to the spectrum analyzer.

For each transmitter frequency, the received signal was maximized by rotating the turntable and adjusting the height of the receiving antenna. To obtain the actual EIRP, the mobile was replaced by a half-wave dipole antenna resonating at 1900 MHz vertically polarized, RF power amplifier and signal generator. The canter of the dipole antenna was placed in the same location as the mobile. The signal

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generator level was adjusted until the reading on the spectrum analyzer was identical to that obtained when the mobile was on the turntable.

The output of power amplifier was disconnected from the dipole and connected to an RF power meter. The effective radiated power was read directly from the power meter and then converted to e.i.r.p. value, i.e, with respect to isotropic antenna.

Results: **PASSED.** See Table 1 and 2, page 18, of this section.

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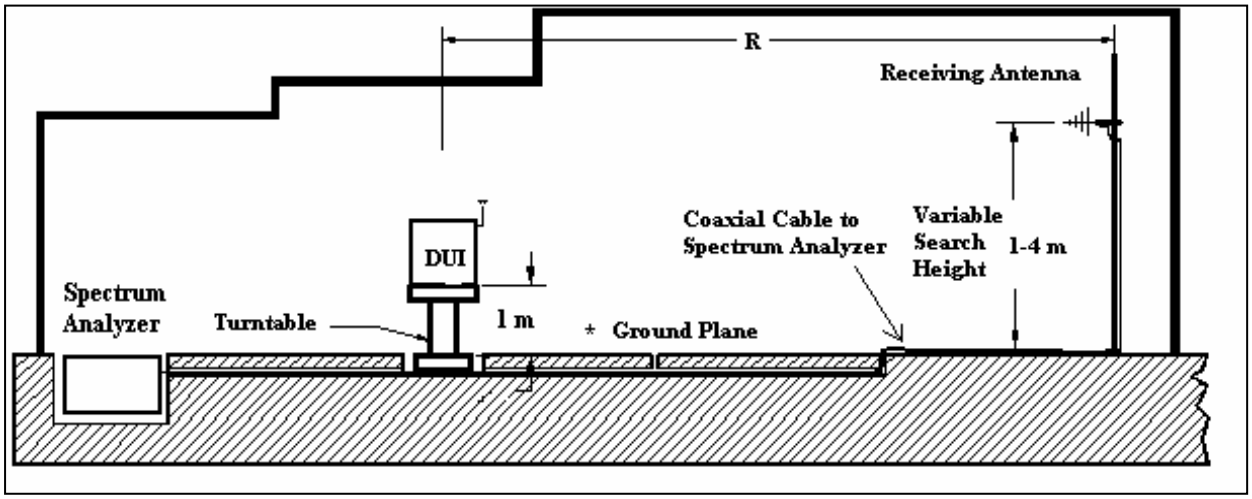
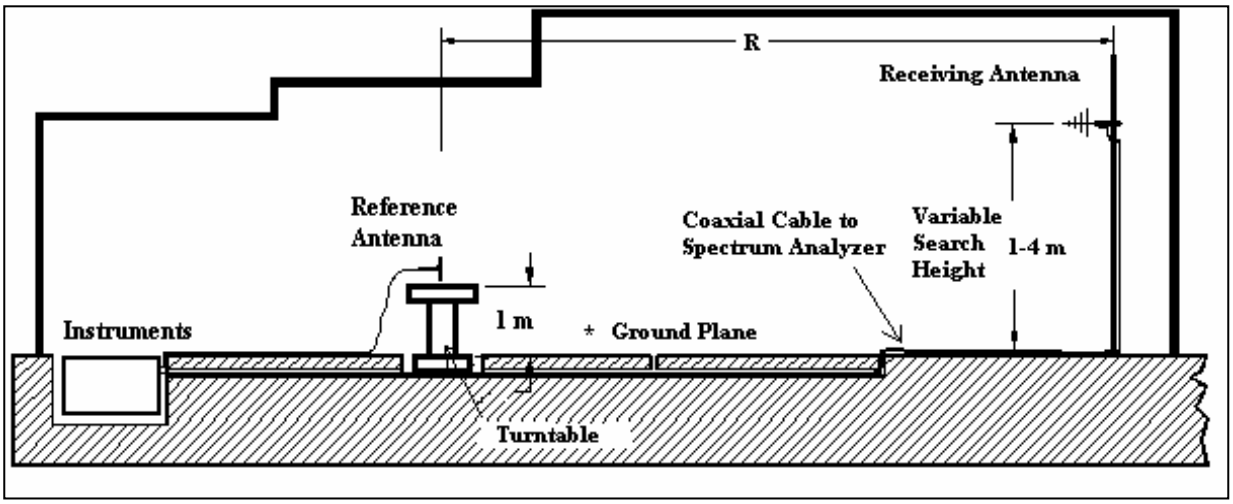
Set Up Figure 2
Equivalent Isotropically Radiated Power (e.i.r.p)





Note:

R=3 meter.
Instruments: Spectrum Analyzer, Signal Generator, RF Power Amplifier.
Receiving Antenna: Double Ridged Horn .
RF absorbing materials were used on the ground plane between transmitting and receiving antenna.
Reference Antenna is a half wave dipole (1900 MHz).

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GSM 850/PCS 1900 Cellular Phone

TABLE 1
Equivalent Isotropic Radiated Power (EIRP)
PCS 1900 MHz
GSM

Channel #	Nominal Transmitting Frequency (MHz)	Measured EIRP (dBm)	Measured EIRP (W)	Limit (dBm)	Limit (W)	Margin (dB)
512	1850.2	28.12	0.649	40.62	11.537	12.50
661	1880.0	26.86	0.485	40.62	11.537	13.76
810	1909.8	25.60	0.363	40.62	11.537	15.02

TABLE 2
Equivalent Isotropic Radiated Power (EIRP)
PCS 1900 MHz
GPRS

Channel #	Nominal Transmitting Frequency (MHz)	Measured EIRP (dBm)	Measured EIRP (W)	Limit (dBm)	Limit (W)	Margin (dB)
512	1850.2	28.20	0.660	40.62	11.537	12.42
661	1880.0	26.77	0.475	40.62	11.537	13.85
810	1909.8	25.64	0.367	40.62	11.537	14.98

Test performed by: Kalek Roman **Date:** December, 2004

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List of Test Equipment

Description	Range	Manufacturer	Model #	APREL Asset #	Cal. Due Date
Spectrum Analyzer	9 kHz - 3 GHz	Anritsu	MS2661C	301330	March 25, 2005
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RF Power Sensor	10 MHz - 18 GHz	Giga-tronics	80601A	301394	Oct.16, 2005
Biconical Antenna	20 MHz - 200 MHz	Eaton	94455-1	100890	July 18, 2005
Log - Periodic Antenna	200 MHz -1.0 GHz	Eaton	ALP-1	100063	July 31, 2005
Horn Antenna	1 – 18 GHz	APREL Inc.	AA – 118	100400	June 17, 2005
Horn Antenna	1 – 18 GHz	APREL Inc.	AA – 118	100553	June 17, 2005
Anechoic Shielded Room	10 kHz - 10 GHz	APREL Inc.	ALP-AnSh	301329	May 22, 2007
Reference Half -wave Dipole Antenna	835 MHz	APREL Inc.	D-835M-B	301482	July 3, 2005
Reference Half -wave Dipole Antenna	1.85 GHz	APREL Inc.	D-1.85G	301557	July 3, 2005
OATS	30 MHz – 1 GHz	APREL Inc.	3 m & 10 m	N/A	March 20, 2006

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EIRP MEASUREME3NT

PHOTOGRAPHS OF THE TEST SETUP

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GSM 850/PCS 1950 Cellular PhoneWDP318 tested for EIRP

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Test result

OCCUPIED BANDWIDTH
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

WDP318

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Test: **Occupied Bandwidth**
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

Ref.: **FCC Part 2.1049, FCC Part 22.917(b), FCC Part 24.238(b)**

Criteria: The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 db below the transmitter power.

The occupied bandwidth is also defined as the 99% power bandwidth.

Set-up: See Figure No.3

Environmental Conditions: Temperature: 23 °C ± 2.
Air pressure: 101 ± 3 kPa

Equipment: See page 50 of this section.

Procedure: The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The occupied bandwidth was measured with the Spectrum Analyzer at the centre frequency of the band under measurement.

Spectrum Analyzer Resolution Bandwidth Set-up: Set at 100 kHz or Greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one. percent of the mission bandwidth of the fundamental emission of the transmitter may be employed

A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the full required measurement band width, 100 kHz or 1 percent of emission bandwidth.

Occupied bandwidth was measured with Anritsu MS2667C Spectrum Analyzer which has a built in feature that provides direct measurement-reading of both 99% and -26dBc occupied bandwidth.

Results: **PASSED, see table page 25** of this section**..**

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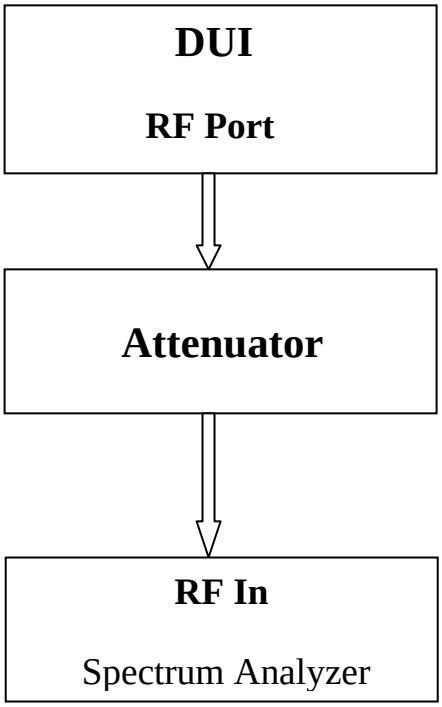
Occupied Bandwidth Measurement



Set up Figure 3

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Test Results
Occupied Bandwidth

Test Mode	CH	Frequency (MHz)	Bandwidth 99 %	Bandwidth -26 dBc
GSM 850	128	824.2	246 kHz	316 kHz
	190	836.6	242 kHz	316 kHz
	251	848.8	246 kHz	314 kHz
GPRS 850	128	824.2	240 kHz	306 kHz
	190	836.6	244 kHz	316 kHz
	251	848.8	244 kHz	310 kHz

Test Mode	CH	Frequency (MHz)	Bandwidth 99 %	Bandwidth -26 dBc
GSM 1900	512	1850.2	246 kHz	316 kHz
	661	1880.0	244 kHz	308 kHz
	810	1909.8	242 kHz	314 kHz
GPRS 1900	512	1850.2	244 kHz	316 kHz
	661	1880.0	240 kHz	314 kHz
	810	1909.8	246 kHz	312 kHz

Test performed by: _____ Date: December, 2004

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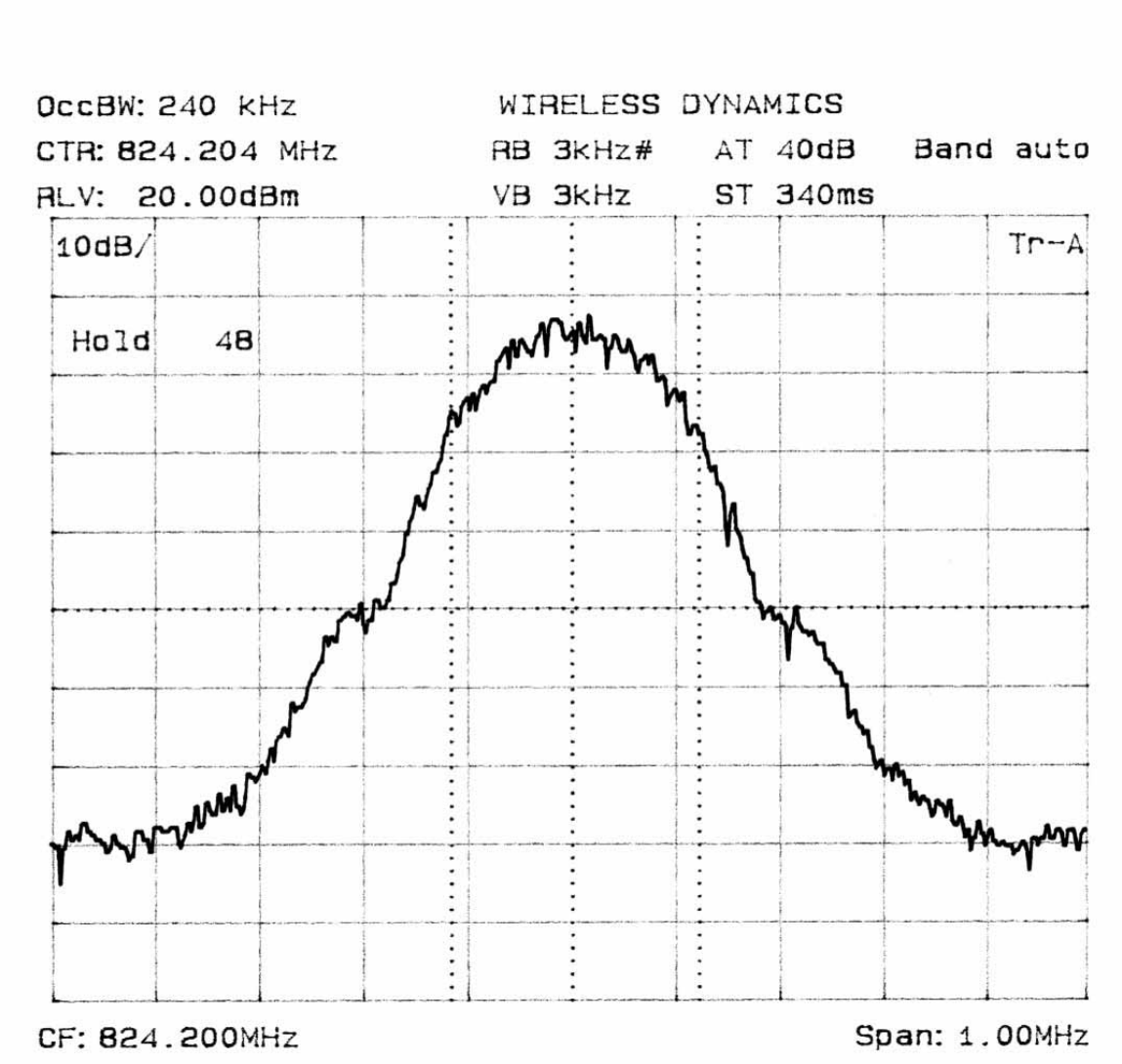
Test Plot
Occupied Bandwidth
Frequency: 824.2 MHz
99% Bandwidth
GPRS



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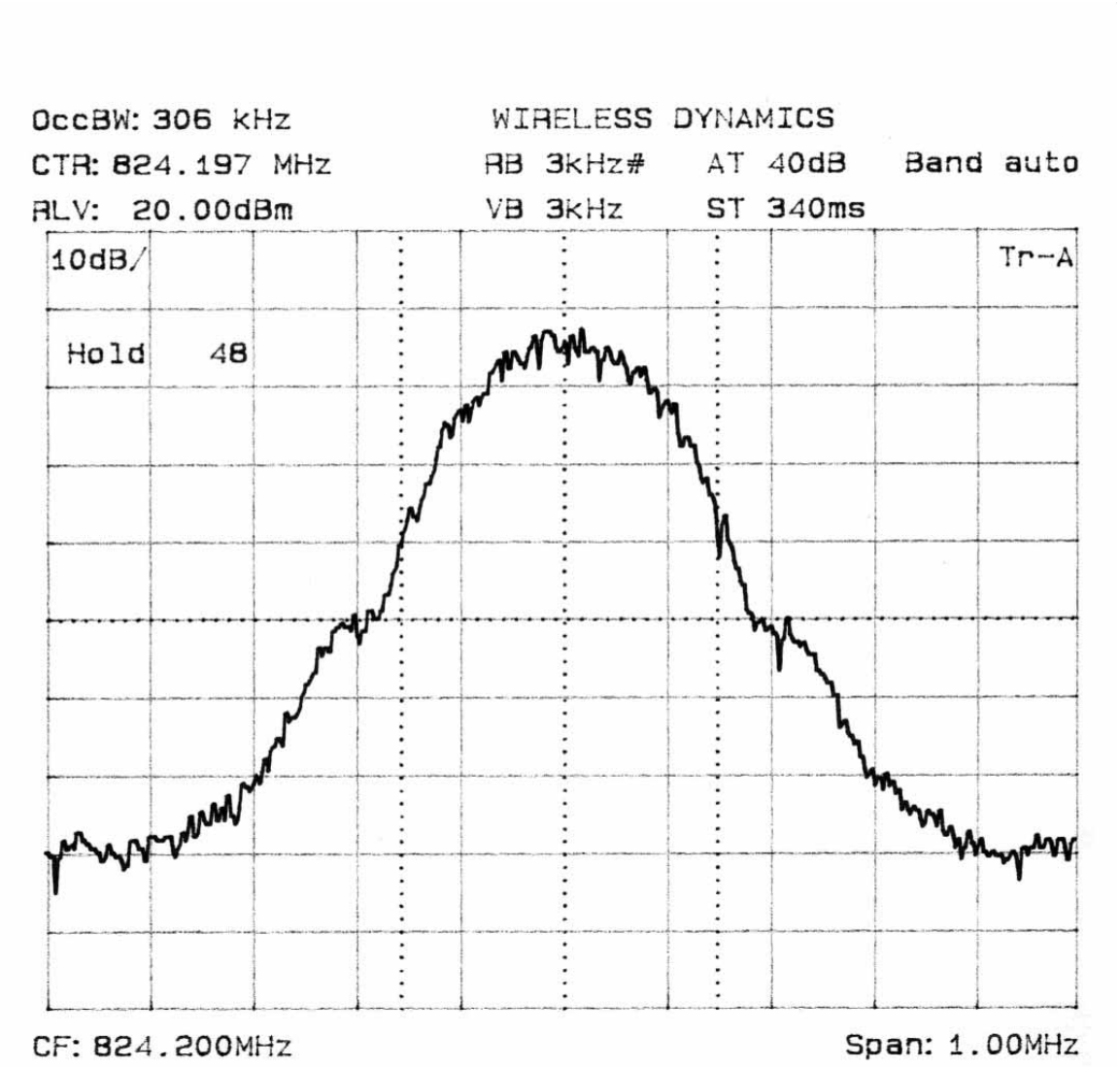
Test Plot
Occupied Bandwidth
Frequency: 824.2 MHz
-26 dBc Bandwidth
GPRS



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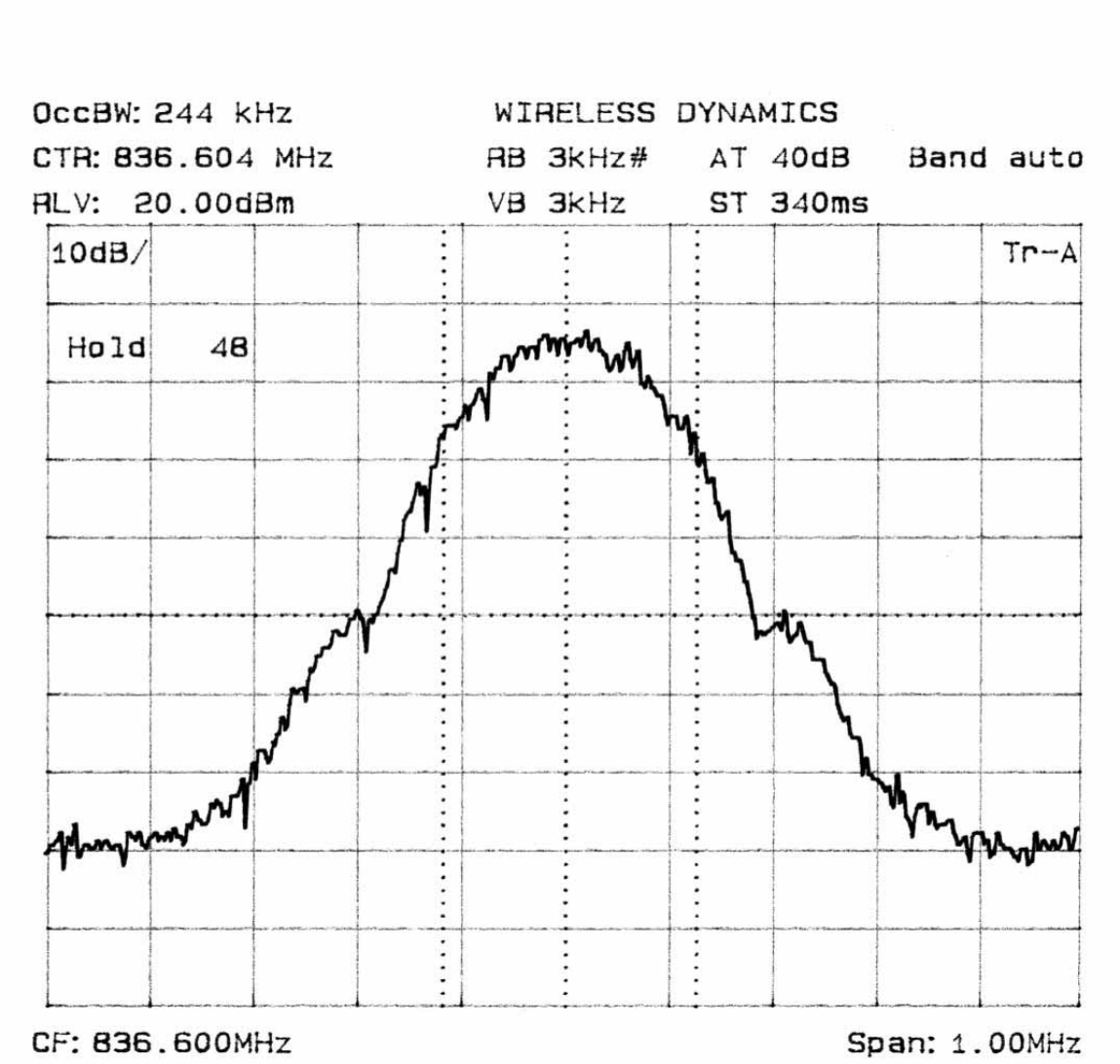
Test Plot
Occupied Bandwidth
Frequency: 836.6 MHz
99% bandwidth
GPRS



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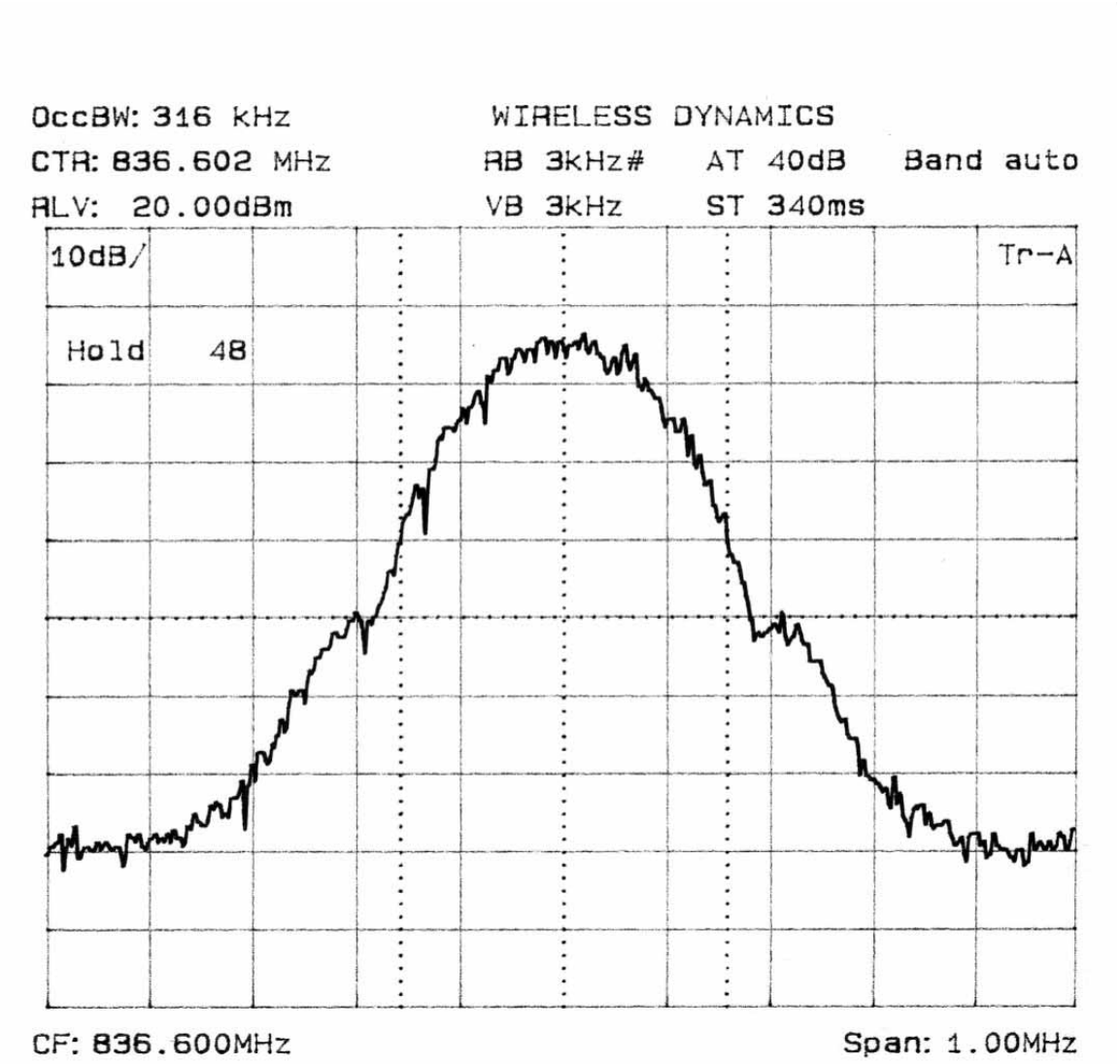
Test plot
Occupied Bandwidth
Frequency: 836.6 MHz
-26 dBc Bandwidth
GPRS



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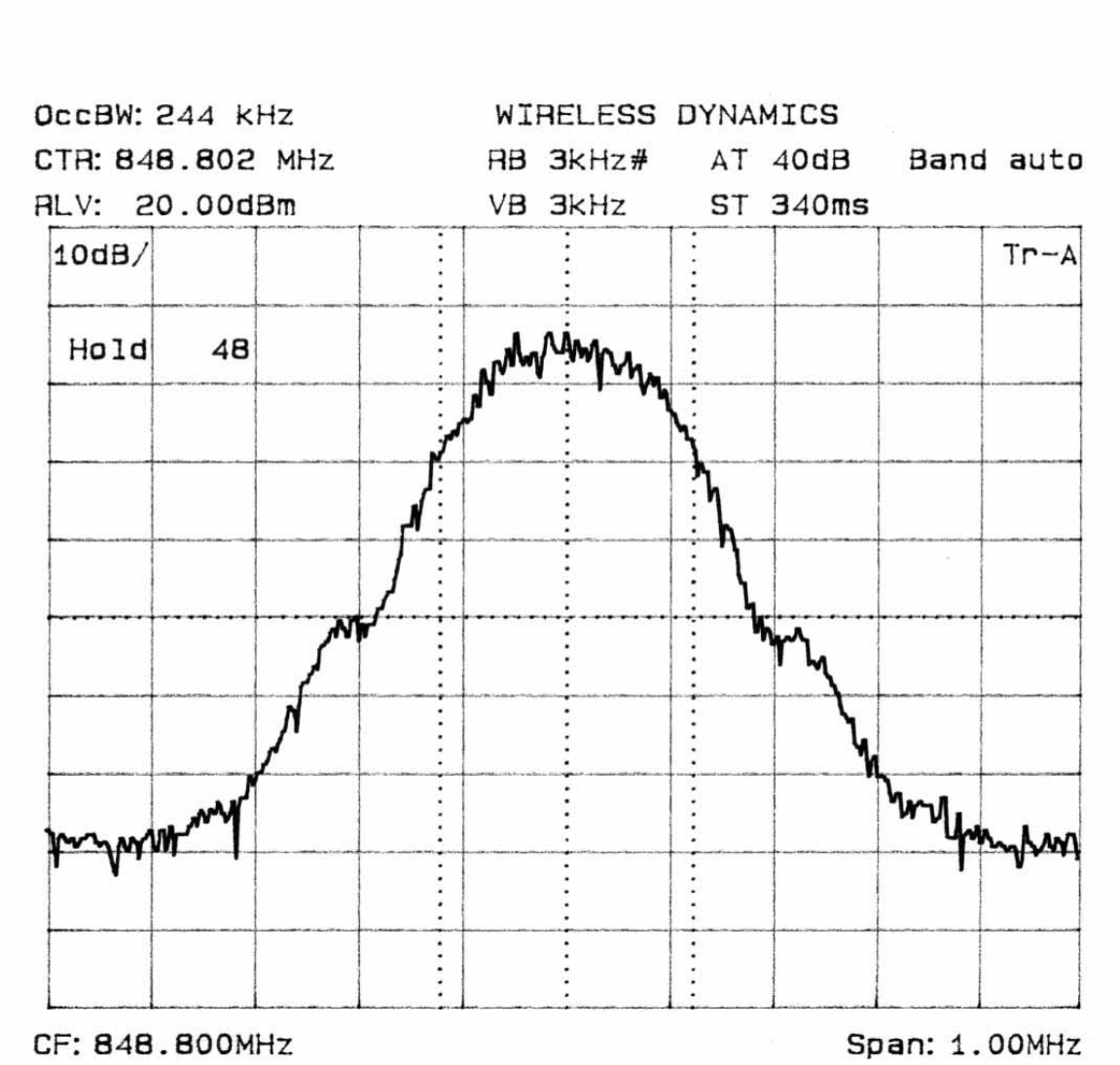
Test Plot
Occupied Bandwidth
Frequency: 848.8 MHz
99% Bandwidth
GPRS



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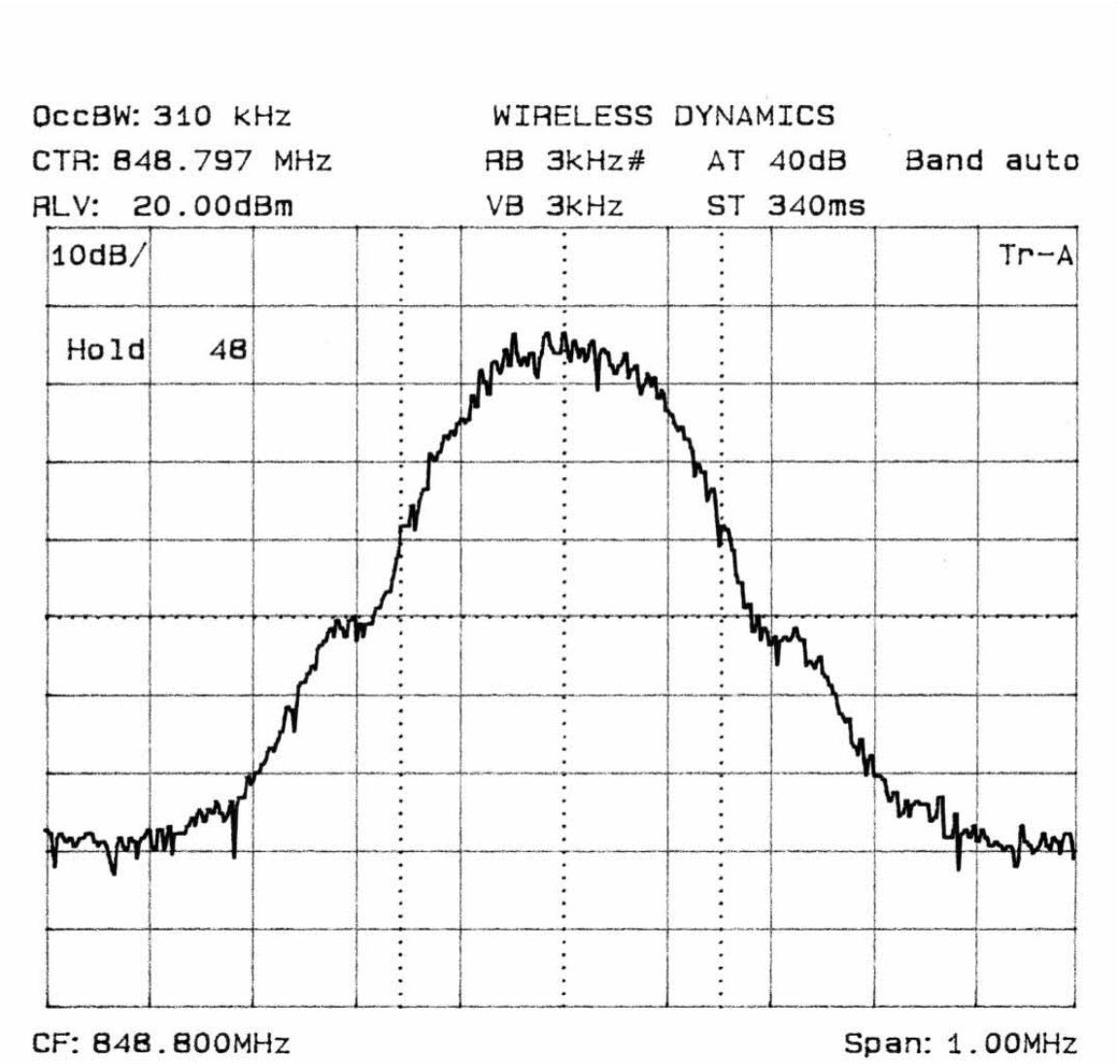
Test Plot
Occupied Bandwidth
Frequency: 848.8 MHz
-26 dBc Bandwidth
GPRS



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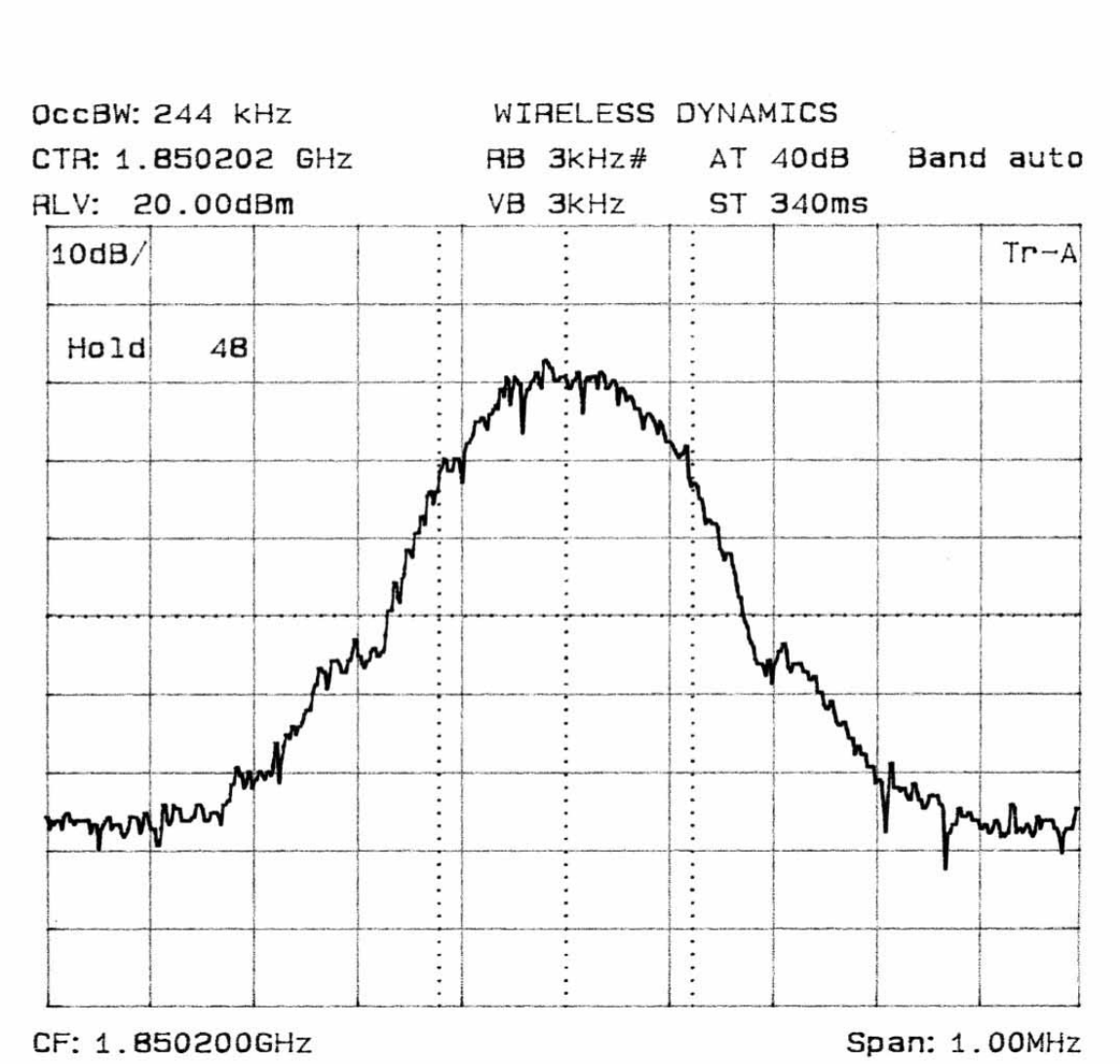
Test Plot
Occupied Bandwidth
Frequency: 1850.2 MHz
99% Bandwidth
GPRS



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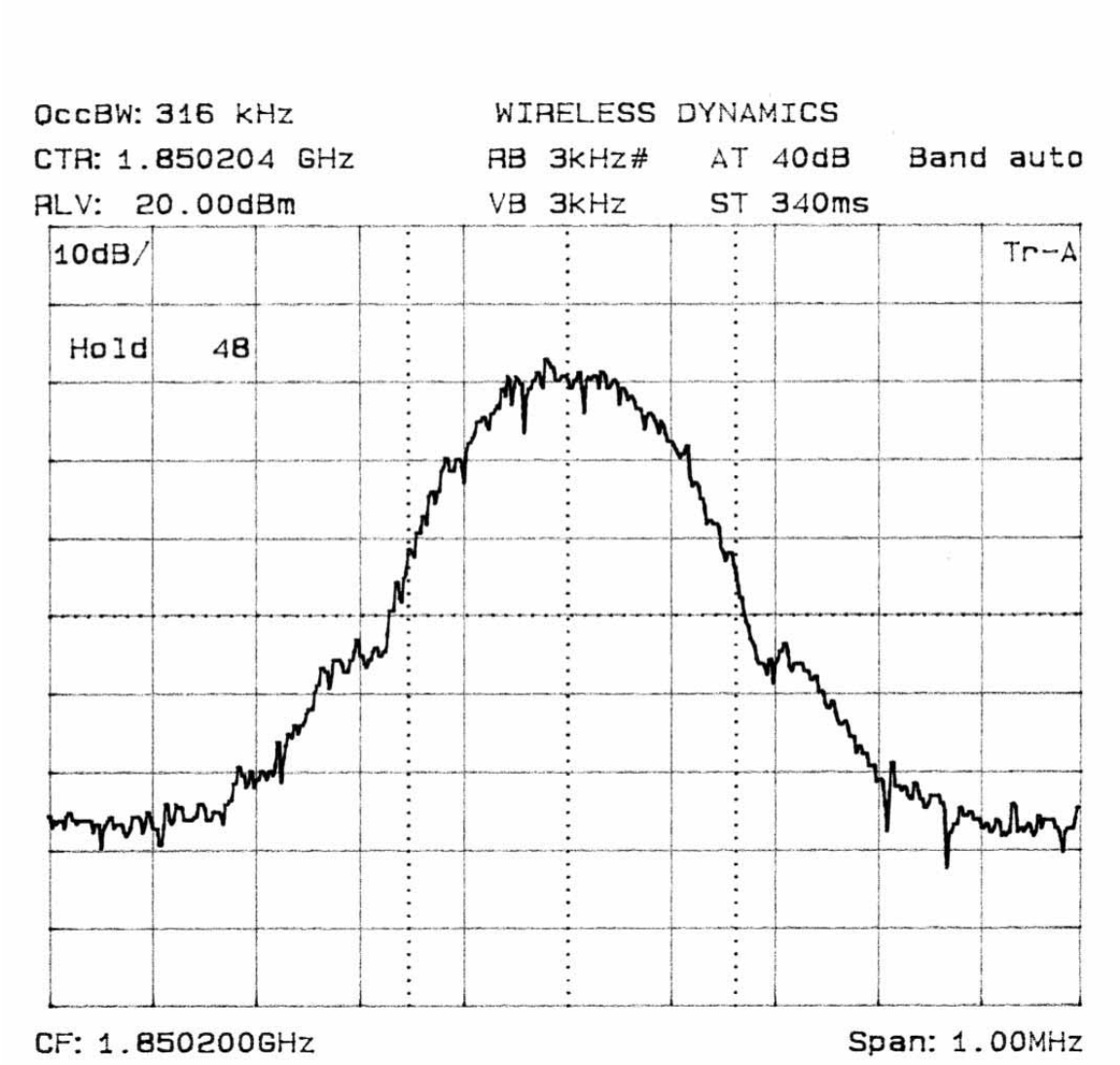
Test Plot
Occupied Bandwidth
Frequency: 1850.2 MHz
-26 dBc Bandwidth
GPRS



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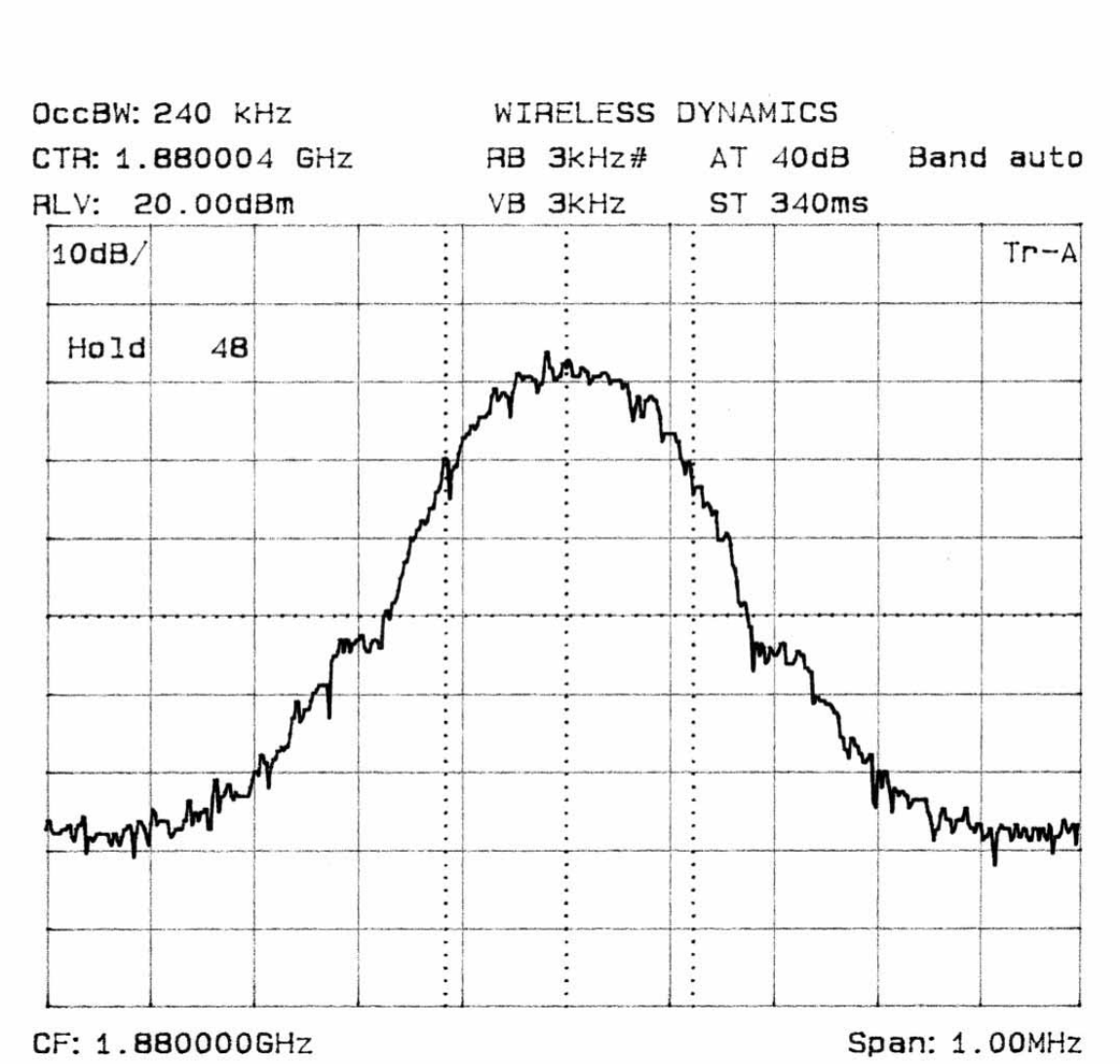
Test Plot
Occupied Bandwidth
Frequency: 1880.0 MHz
99% Bandwidth
GPRS



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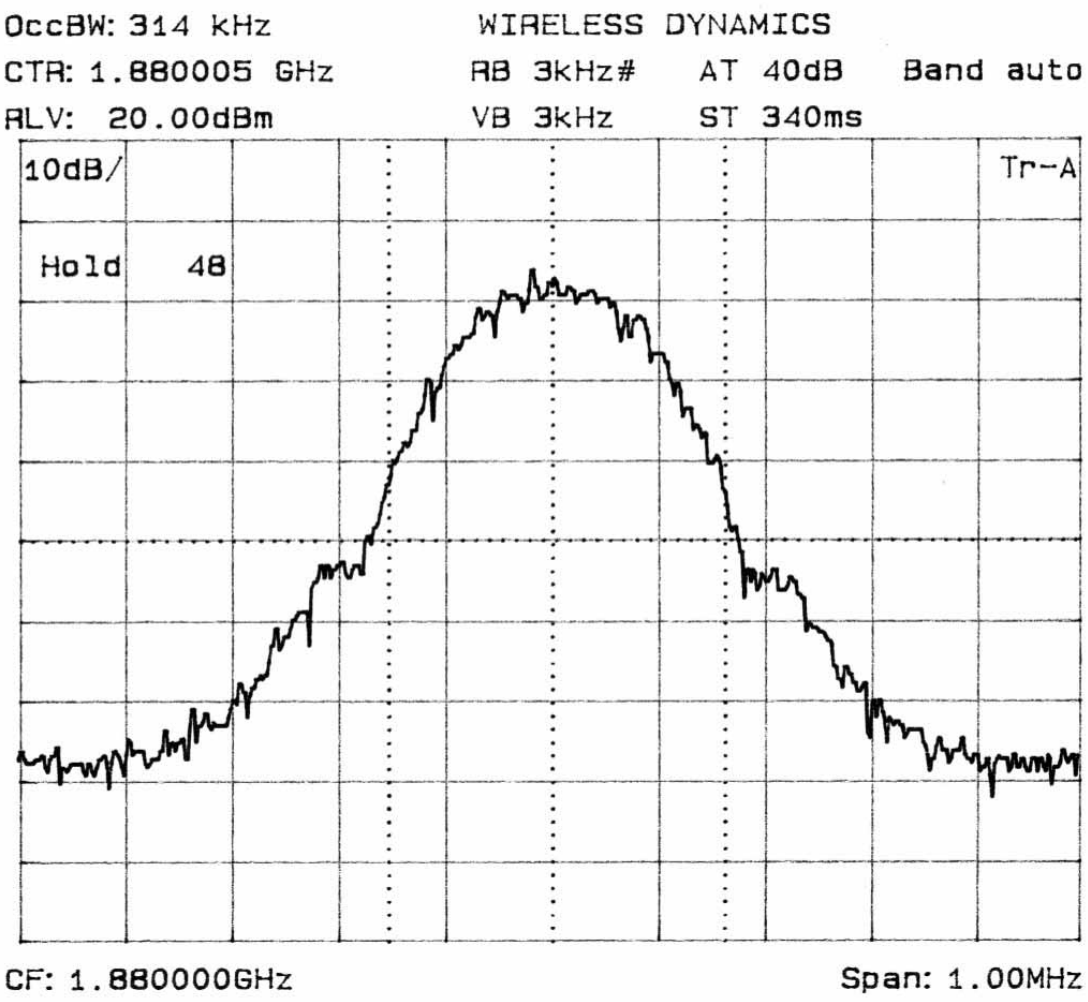
Test Plot
Occupied Bandwidth
Frequency: 1880.0 MHz
-26 dBc Bandwidth
GPRS



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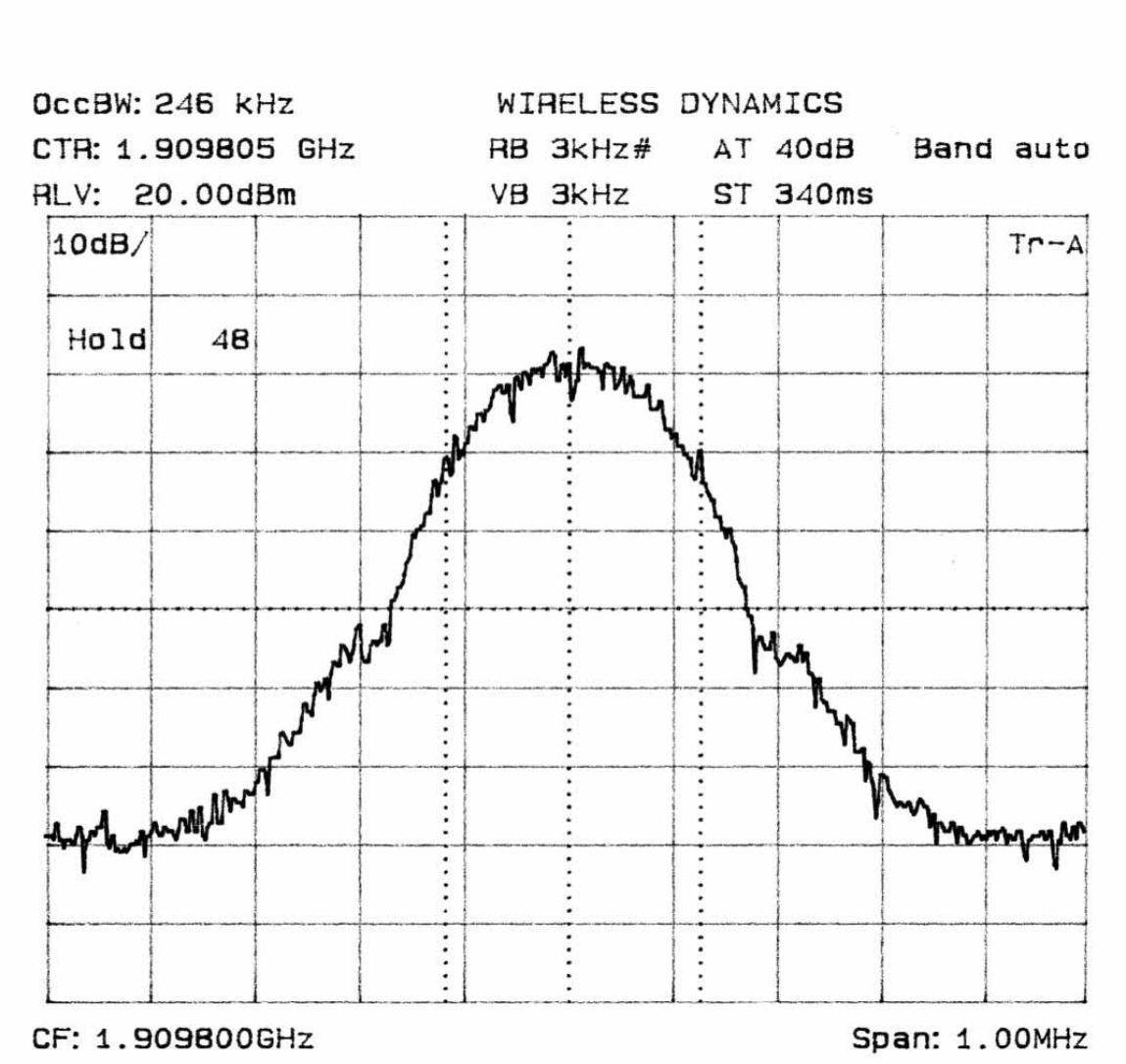
Test Plot
Occupied Bandwidth
Frequency: 1909.8 MHz
99 % Bandwidth
GPRS



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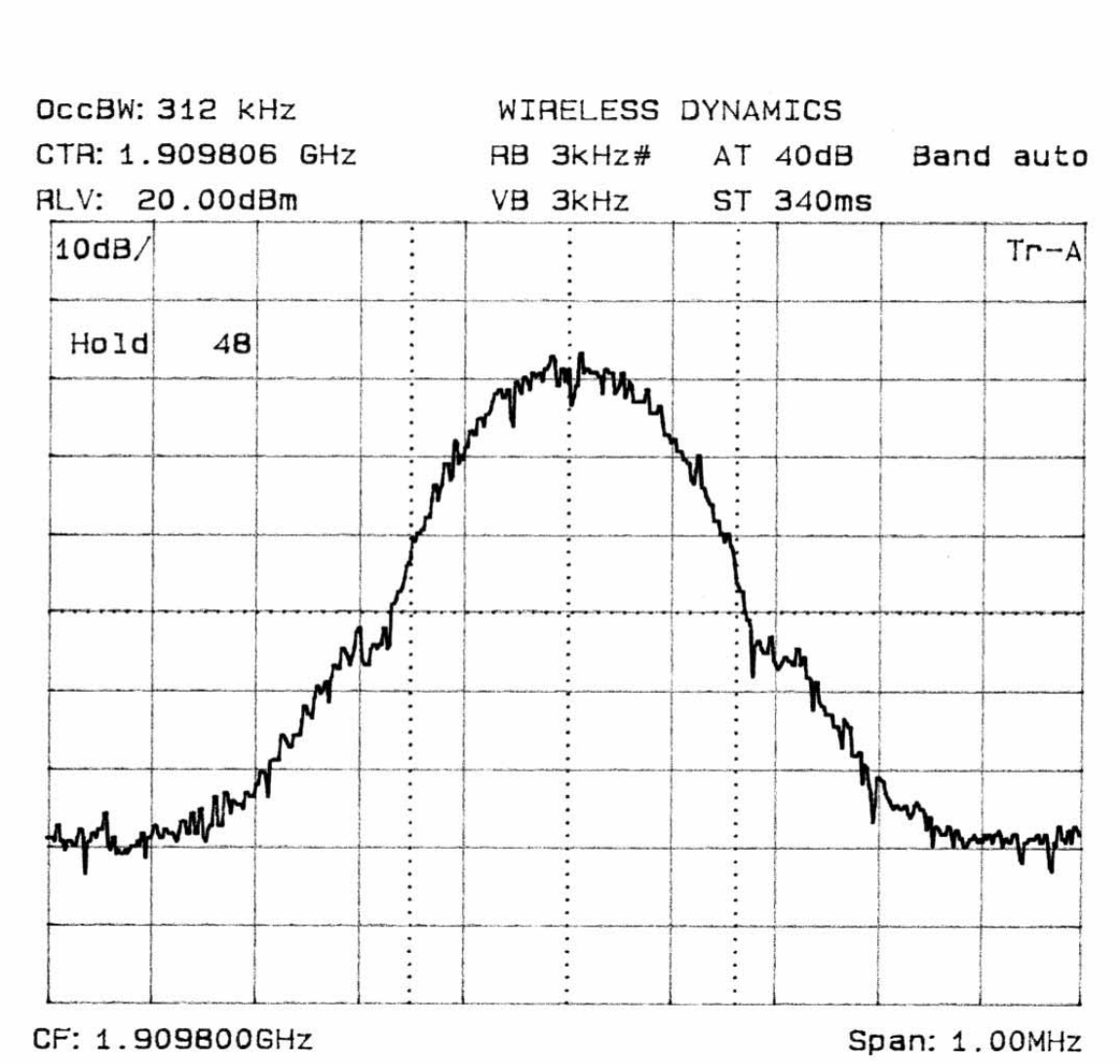
Test Plot
Occupied Bandwidth
Frequency: 1909.8 MHz
-26 dBc Bandwidth
GPRS



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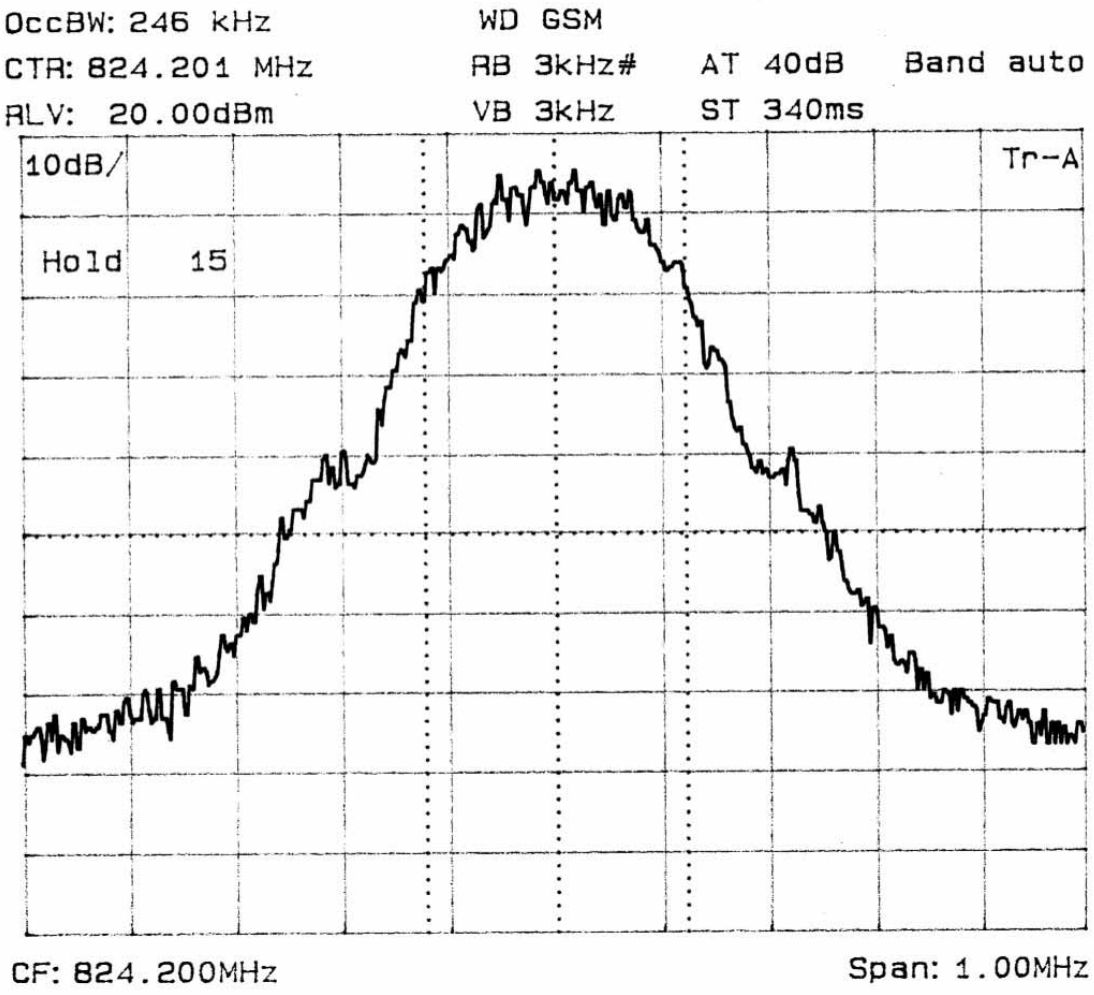
Test Plot
Occupied Bandwidth
Frequency: 824.2 MHz
99% Bandwidth

GSM



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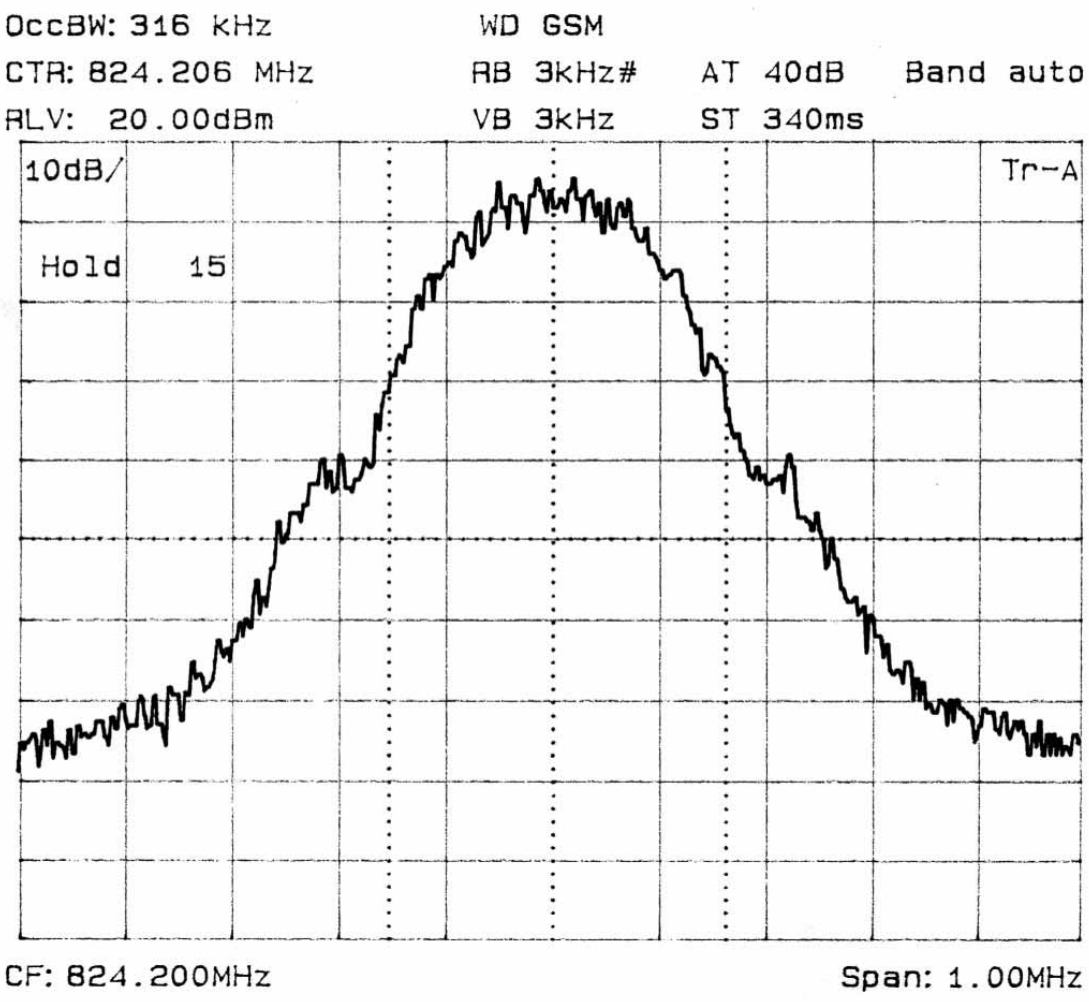
Test Plot
Occupied Bandwidth
Frequency: 824.20 MHz
-26 dBc Bandwidth

GSM



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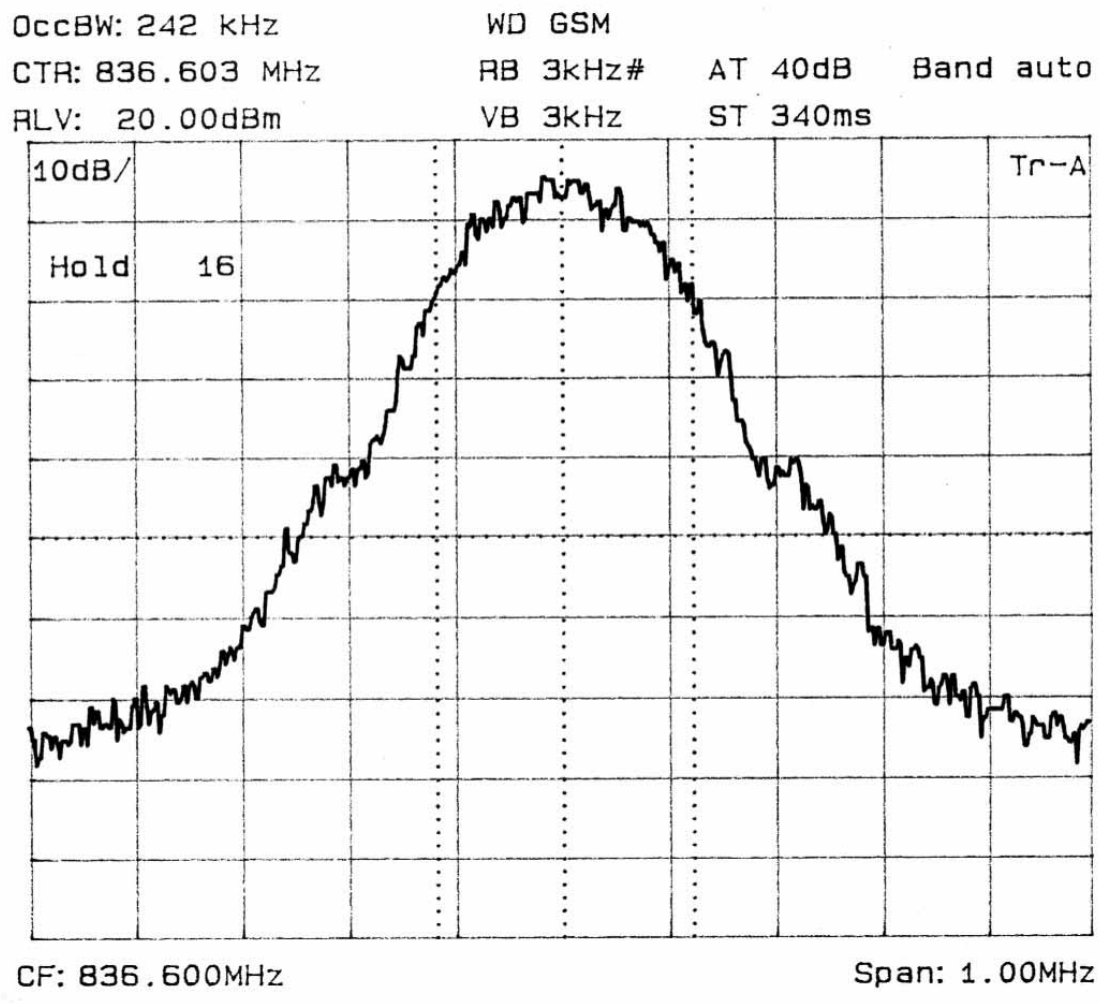
Test Plot
Occupied Bandwidth
Frequency: 836.6 MHz
99% Bandwidth

GSM



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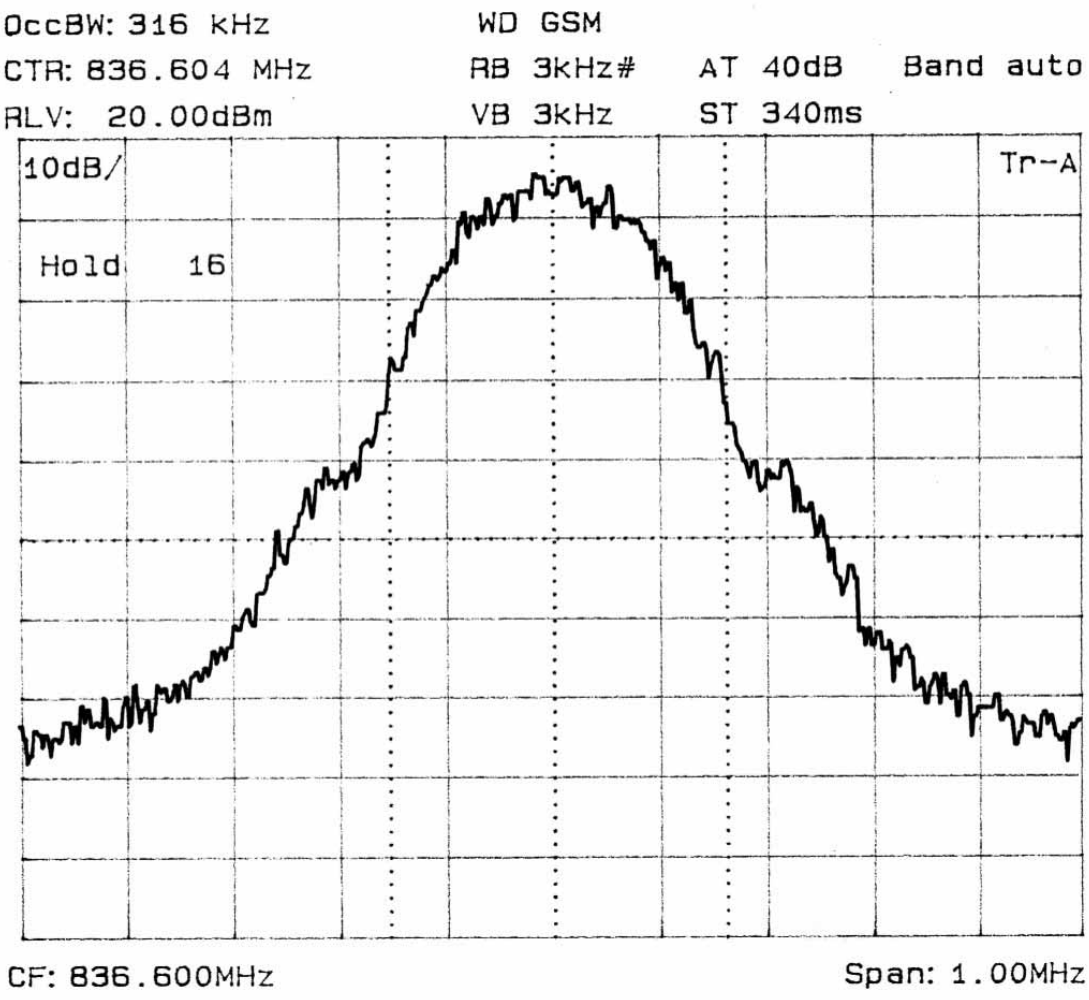
Test Plot
Occupied Bandwidth
Frequency: 836.6 MHz
-26 dBc Bandwidth

GSM



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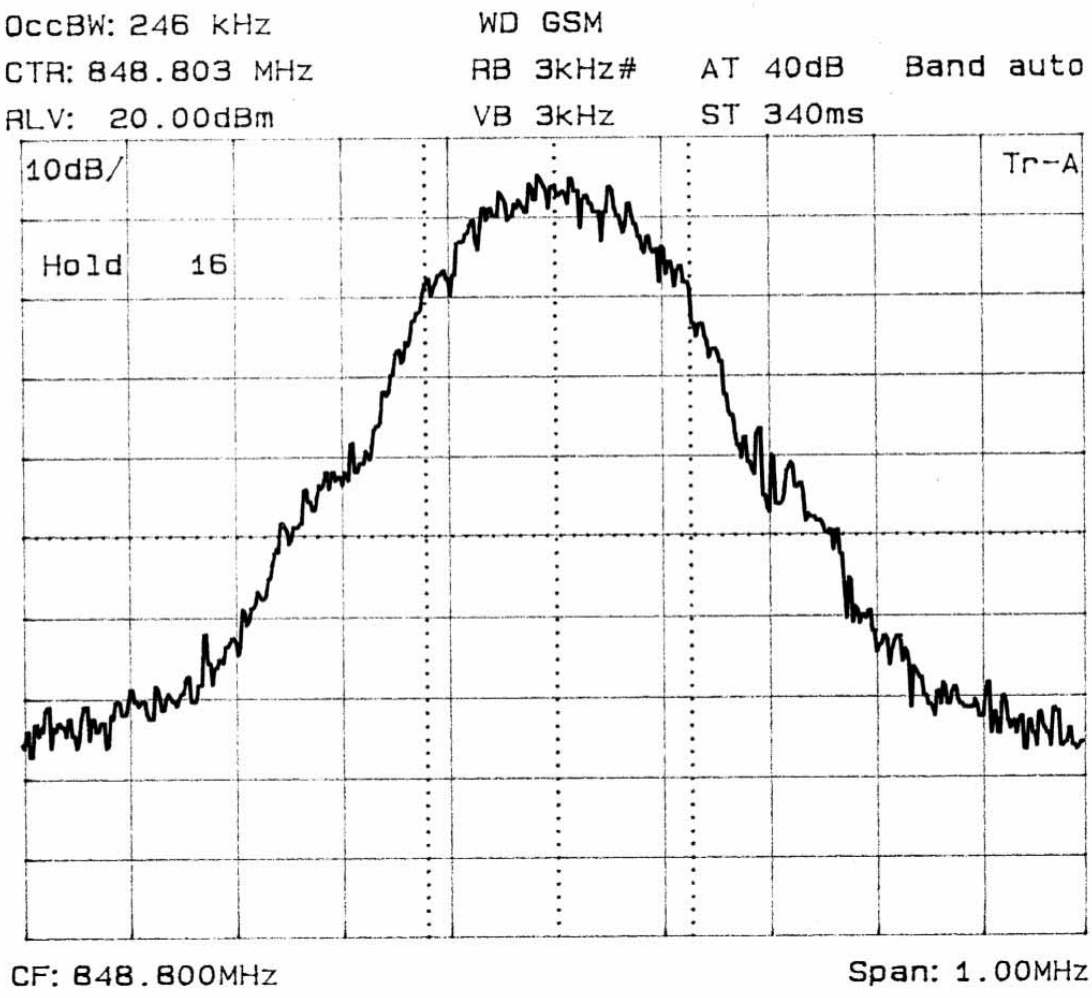
Test Plot
Occupied Bandwidth
Frequency: 848.8 MHz
99% Bandwidth

GSM



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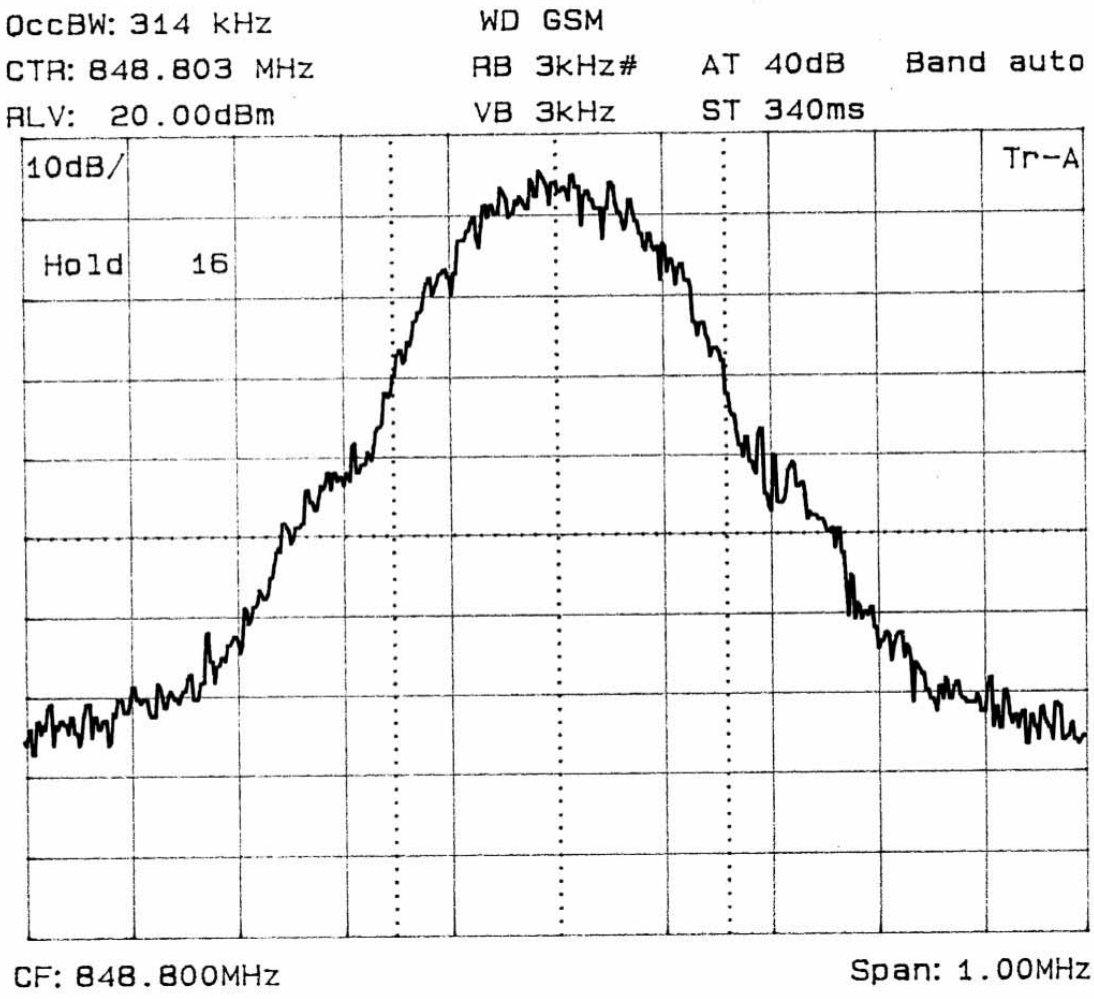
Test Plot
Occupied Bandwidth
Frequency: 848.8 MHz
-26 dBc Bandwidth

GSM



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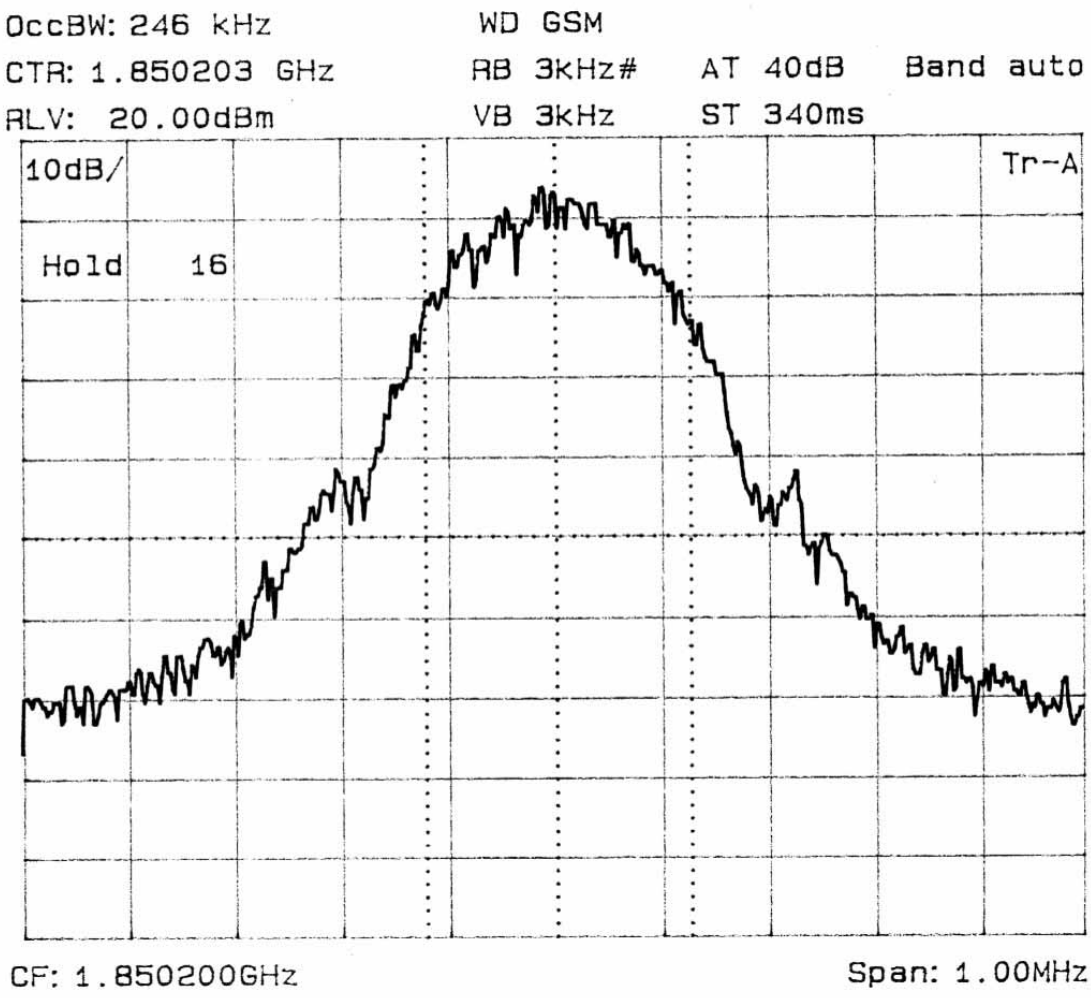
Test Plot
Occupied Bandwidth
Frequency: 1850.2 MHz
99% Bandwidth

GSM



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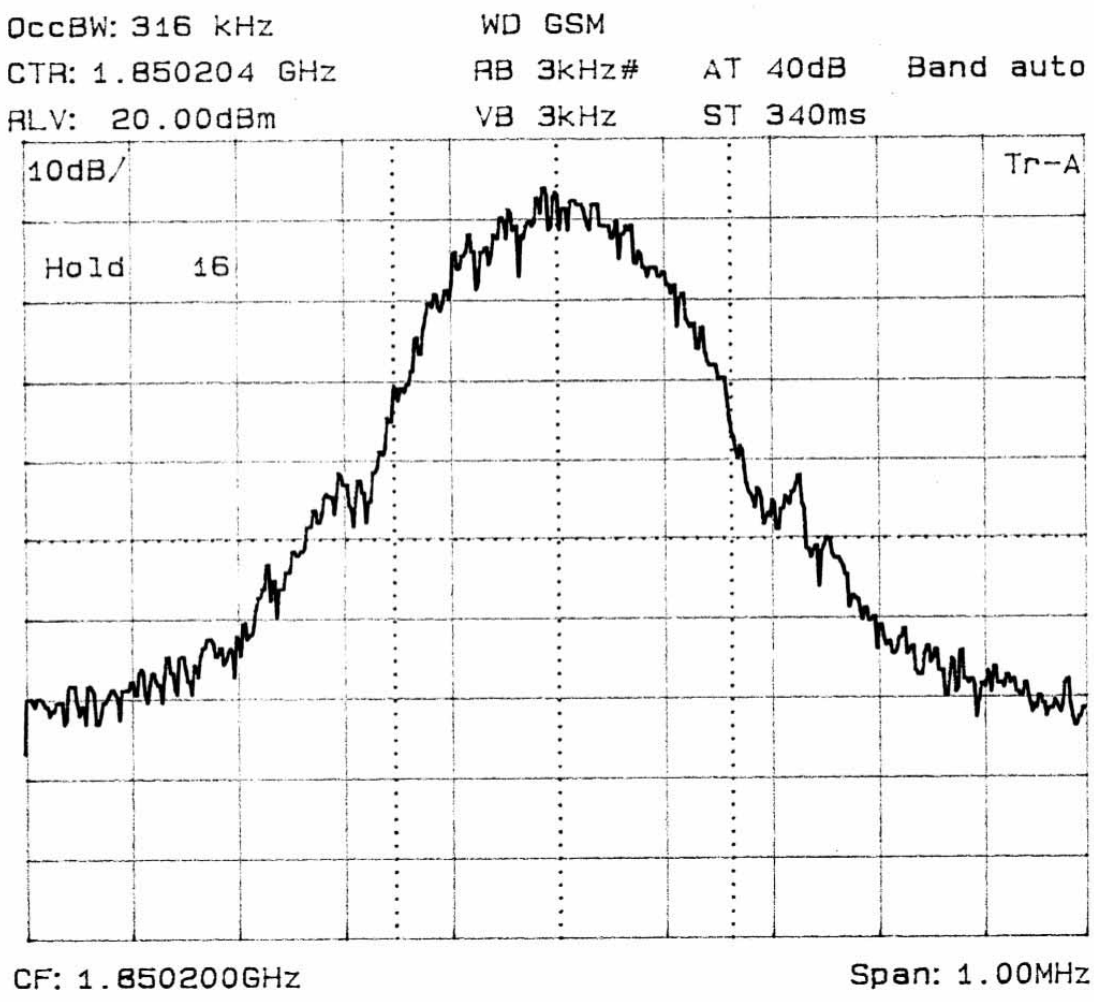
Test Plot
Occupied Bandwidth
Frequency: 1850.2 MHz
-26 dBc Bandwidth

GSM



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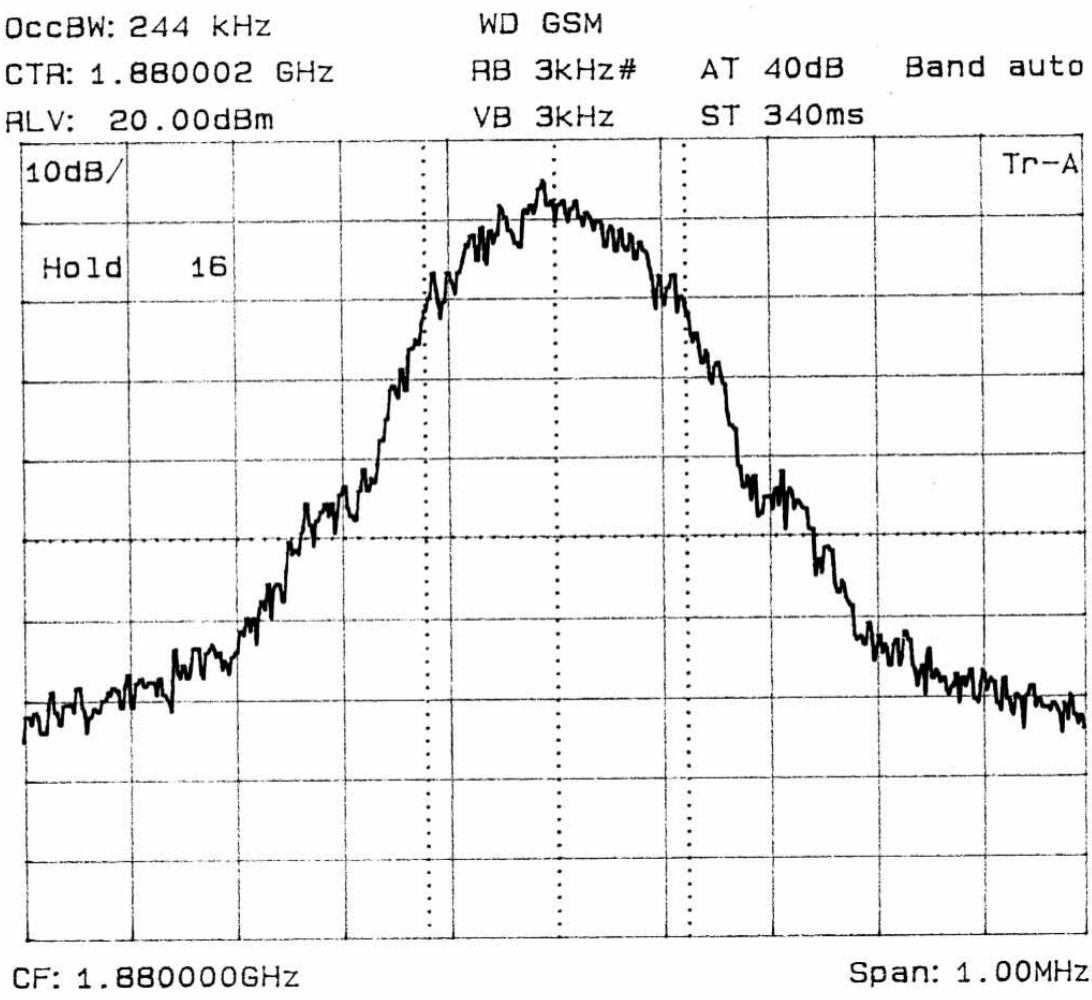
Test Plot
Occupied Bandwidth
Frequency: 1880.0 MHz
99% Bandwidth

GSM



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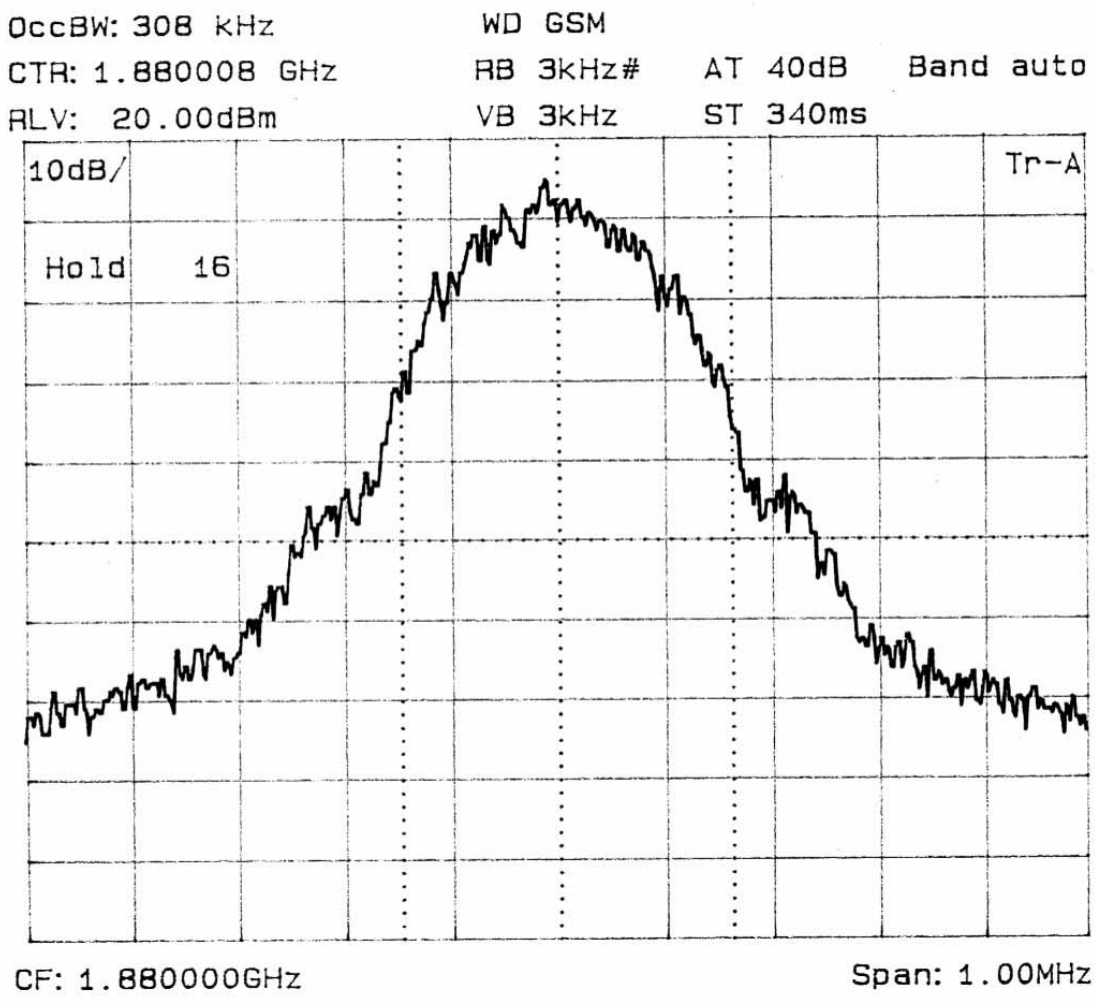
Test Plot
Occupied Bandwidth
Frequency: 1880.0 MHz
-26 dBc Bandwidth

GSM



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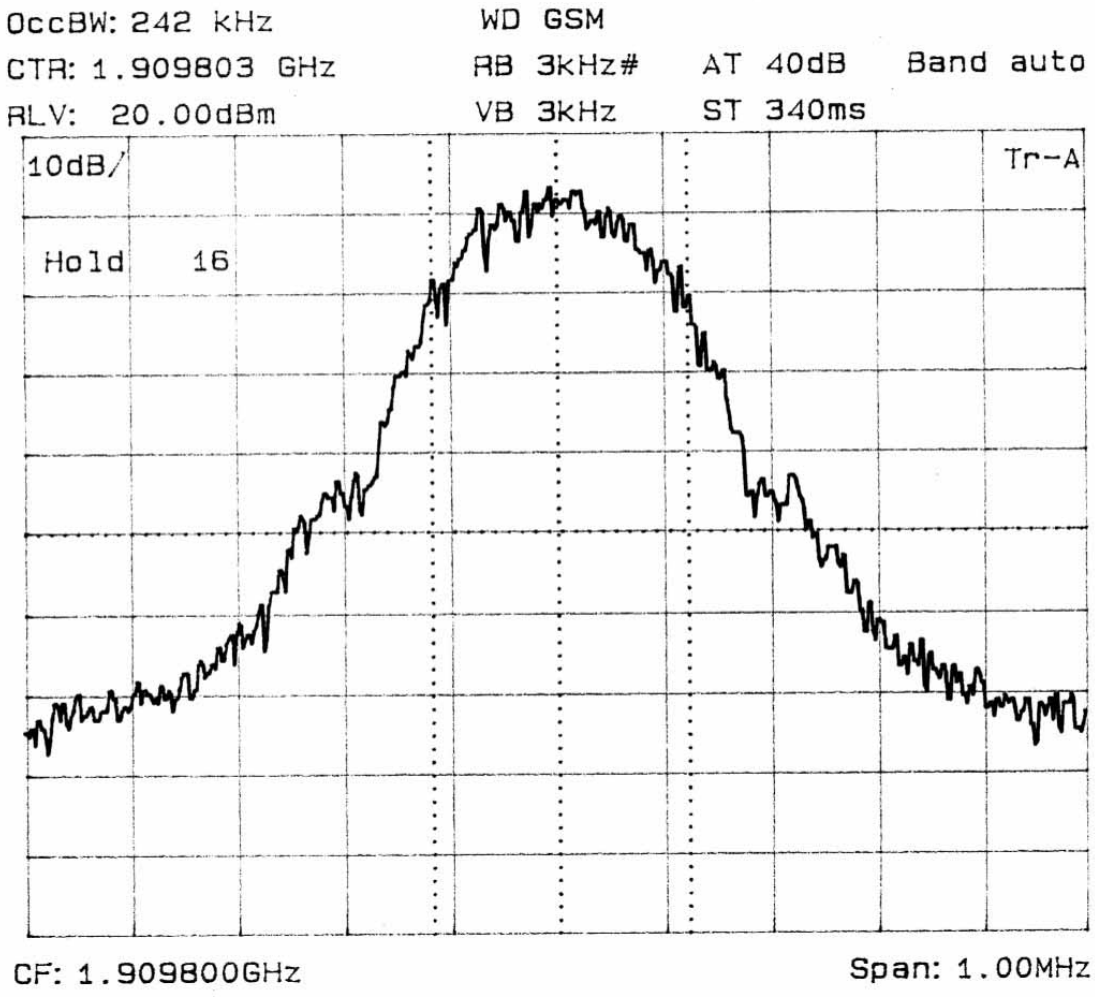
Test Plot
Occupied Bandwidth
Frequency: 1909.8 MHz
99% Bandwidth

GSM



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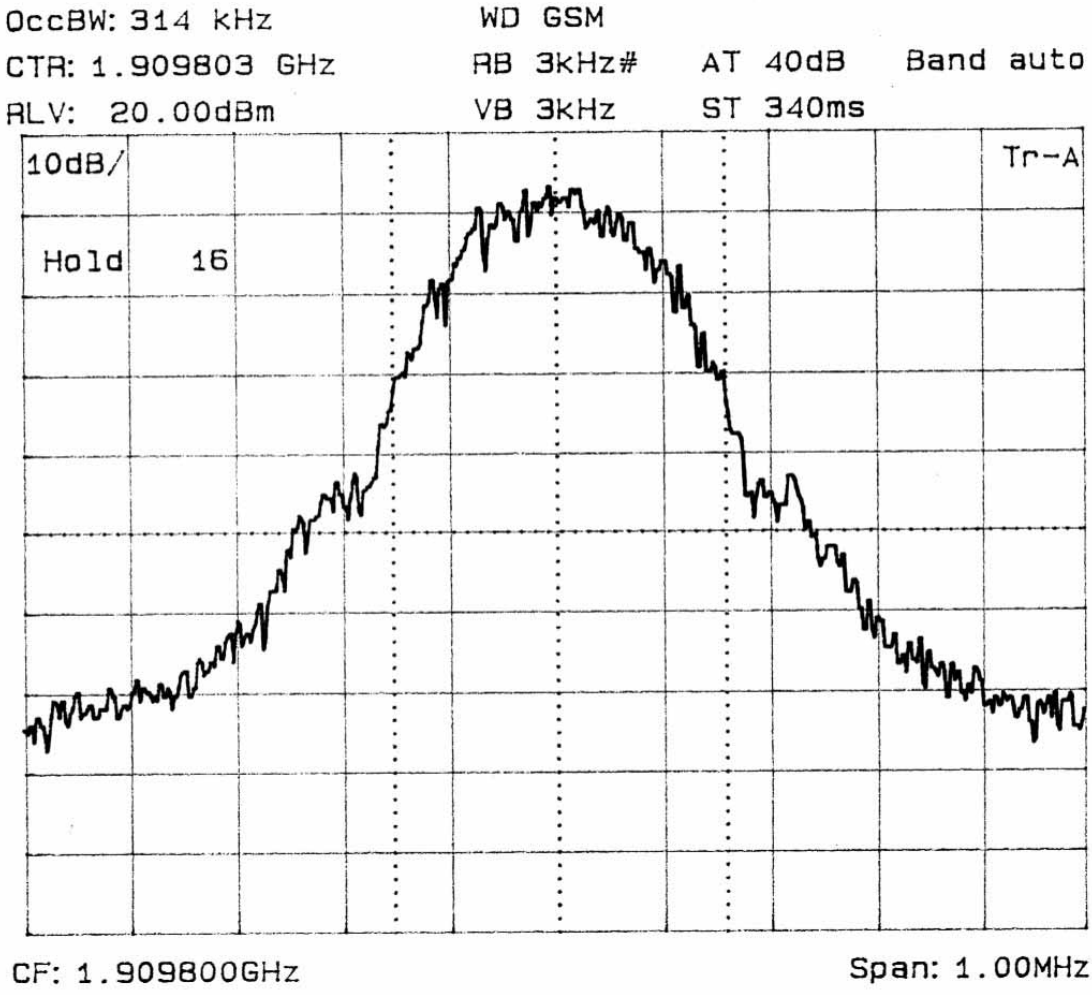
Test Plot
Occupied Bandwidth
Frequency: 1909.8 MHz
-26 dBc Bandwidth

GSM



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List of Test Equipment

Description	Range	Manufacturer	Model #	APREL Asset #	Cal. Due Date
Spectrum Analyzer	9 kHz - 3 GHz	Anritsu	MS2661C	301330	March 25, 2005
Spectrum Analyzer	9 kHz - 30 GHz	Anritsu	MS2667C	301386	Sept. 5, 2005
RF Signal Generator	10 MHz – 26.5 GHz	Hewlett Packard	HP 8340 B	100955	Oct 5, 2005
Low Noise Antenna Pre-amplifier	30-1000 MHz	APREL Inc.	LNA-1	301415	August 27,2005
Preamplifier	1 – 26.5 GHz	Hewlett Packard	8449B	301462	June 16, 2005
Attenuator	20 dB	NARDA	9779-20	301533	August 15, 2005
Attenuator	3 dB	Bird		100889	October 5, 2005
Notch Filter	DC - 6 GHz	Microwavefilter Co.	6367	301055	CBT
High Pass Filter	3 GHz	Anaren	KPMC 03SJ0	301560	August 15, 2005
RF Power Meter	10 MHz - 18 GHz	Giga-tronics	8541C	301393	Oct.16, 2005
RF Power Sensor	10 MHz - 18 GHz	Giga-tronics	80601A	301394	Oct.16, 2005

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OCCUPIED BANDWIDTH MEASUREMENT

PHOTOGRAPHS OF THE TEST SETUP

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Measurement of Occupied Bandwidth on
GSM 850/ PCS 1900 Cellular Phone

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Test Results

Out of Band Emission at Antenna Terminal
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

WDP318

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Test: **Out of Band Emission at Antenna Terminal**
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

Ref.: **FCC Part 2.1051, FCC Part 2.2917(f), FCC Part 22.917(f), FCC part 24.238(a)**

Criteria: **Out of Band Emissions:** The mean power of emission must be attenuated below the mean power of the un-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43 + 10 log P dB (-13 dBm).

Set-up: See Figure No.**4.**

Environmental Conditions: Temperature: 23 °C ± 2.
Air pressure: 101 ± 3 kPa.

Equipment: See page 70 of this section.

Procedure: The mobile was configured to operate at maximum power and applicable modulation applied to the transmitter. This was coupled to the spectrum analyzer through an attenuator and a cable directly to the spectrum analyzer. The spectrum was searched from 9 kHz to the 10th harmonic of the operating frequency.

The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

Part 2.1051: Measurements required — Spurious emissions at antenna terminals — The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded. Curves or

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equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in paragraph 2.989 as appropriate.

Part 2.1057: Frequency Spectrum to be investigated — In all of the spurious emissions measurements of spurious emissions at antenna terminals and Field Strength of Spurious Emissions, the Spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least to the 10^{th} harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower if the equipment operates below 10 GHz (the mobile under test operates below 10 GHz).

The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be reported.

Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

Measurements shown contain spectrum analyzer reading, correction factor, and final reading. The final spurious emission levels are derived from the analyzer measurement and the correction factor (attenuator and cable loss) as shown in the following example:

Sample Calculation:

A. Spectrum analyzer reading (Direct measurement)

At 1648.4 MHz a spurious level of –50.26 dBm is measured.

B. Correction factor (attenuator 6 dB nominal and cable loss, HP-filter not included on this frequency)

Total Correction Factor: 6.60 dB

C. Spurious Emission Level (Spurious Emissions at Antenna Terminal)

C = A+B = –50.26 dBm + 6.60 dB = –43.66 dBm
C= –43.66 dBm

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D. The criteria level is derived from the following equation:

P_{TX} is the conducted power of the unmodulated carrier: 1.603 Watts (32.05 dBm)

$D = P_{TX} – [43 + (10 \cdot \log P_{TX(W)})]$
$D = 32.05 \text{ dBm} – [43 + (10 \cdot \log 1.603 \text{ W})]$
$D = 32.05 \text{ dBm} – 45.05 \text{ dB}$
$D = -13.00 \text{ dBm}$

Criteria (reference) level is: –13.00 dBm.

E = Margin (spurious emission below the reference level)

$E = D - C$
$E = (-13.00 \text{ dBm}) – (–43.66 \text{ dBm})$
$E = 30.66 \text{ dB}$

Results: **PASSED.** See Tables 1 to 12, pages 58 to 69 of this section.

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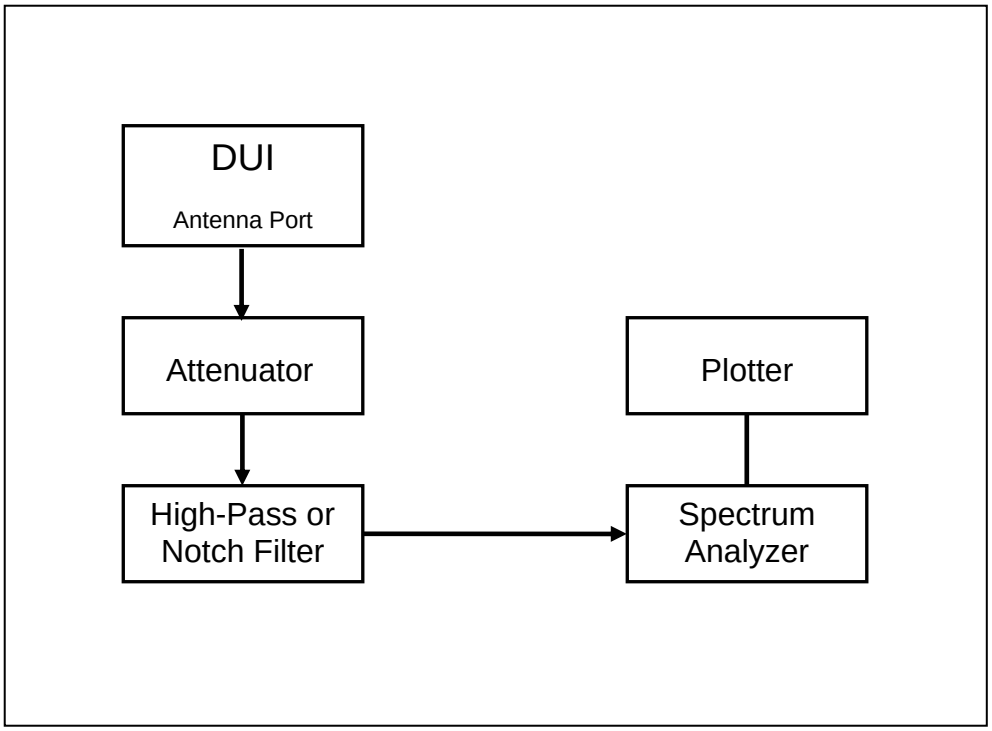

FIGURE 4: SET UP
Spurious Emissions at Antenna Terminal

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Table 1
Out of Band Emission at Antenna Terminal
850 MHz GSM
Channel 128, f_{TX} = 824.2 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	824.2	15.70	16.35	32.05	38.45	6.40
2	1648.4	-50.26	6.60	-43.66	-13.00	30.66
3	2472.6	-45.34	6.93	-38.41	-13.00	25.41
4	3296.8	-70.26	8.65	-61.61	-13.00	48.61
5	4121.0	-67.18	6.19	-60.99	-13.00	47.99
6	4945.2	-73.21	7.48	-65.73	-13.00	52.73
7	5769.4	-79.20	8.03	-71.17	-13.00	58.17
8	6593.6	-78.90	6.42	-72.48	-13.00	59.48
9	7417.8	-78.60	7.94	-70.66	-13.00	57.66
10	8242.0	-63.85	8.25	-55.60	-13.00	42.60

No other signals were detected.

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Table 2
Out of Band Emission at Antenna Terminal
850 MHz GSM
Channel 190, f_{TX} = 836.6 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	836.6	15.61	16.44	32.05	38.45	6.40
2	1673.2	-49.33	7.18	-42.15	-13.00	29.15
3	2509.8	-47.84	7.68	-40.16	-13.00	27.16
4	3346.4	-71.09	7.00	-64.09	-13.00	51.09
5	4183.0	-64.78	8.06	-56.72	-13.00	43.72
6	5019.6	-77.38	8.22	-69.16	-13.00	56.16
7	5856.2	-79.45	7.00	-72.45	-13.00	59.45
8	6692.8	-78.60	5.95	-72.65	-13.00	59.65
9	7529.4	-78.60	7.15	-71.45	-13.00	58.45
10	8366.0	-61.74	7.70	-54.04	-13.00	41.04

No other signals were detected.

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Table 3
Out of Band Emission at Antenna Terminal
850 MHz GSM
Channel 251, f_{TX} = 848.8 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	848.8	15.70	16.49	32.19	38.45	6.26
2	1697.6	-47.05	6.99	-40.06	-13.00	27.06
3	2546.4	-50.61	9.12	-41.49	-13.00	28.49
4	3395.2	-69.81	8.50	-61.31	-13.00	48.31
5	4244.0	-60.58	6.88	-53.70	-13.00	40.70
6	5092.8	-77.80	7.64	-70.16	-13.00	57.16
7	5941.6	-78.70	7.04	-71.66	-13.00	58.66
8	6790.4	-78.30	6.36	-71.94	-13.00	58.94
9	7639.2	-76.60	6.94	-69.66	-13.00	56.66
10	8488.0	-58.96	6.60	-52.36	-13.00	39.36

No other signals were detected.

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Table 4
Out of Band Emission at Antenna Terminal
1900 MHz GSM
Channel 512, f_{TX} = 1850.2 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	1850.2	11.12	17.60	28.72	38.45	9.73
2	3700.4	-69.50	7.44	-62.06	-13.00	49.06
3	5550.6	-73.49	7.77	-65.72	-13.00	52.72
4	7400.8	-64.65	7.92	-56.73	-13.00	43.73
5	9251.0	-51.75	7.83	-43.93	-13.00	30.93
6	11101.2	-65.00	8.10	-56.90	-13.00	43.90
7	12951.4	-73.74	10.07	-63.67	-13.00	50.67
8	14801.6	-65.99	10.89	-55.10	-13.00	42.10
9	16651.8	-71.03	9.89	-61.14	-13.00	48.14
10	18502.0	-74.14	7.48	-66.66	-13.00	53.66

No other signals were detected.

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Table 5
Out of Band Emission at Antenna Terminal
1900 MHz GSM
Channel 661, f_{TX} = 1880.0 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	1880.0	11.12	17.87	28.99	38.45	9.46
2	3760.0	-58.47	7.03	-51.44	-13.00	38.44
3	5640.0	-73.01	7.54	-65.48	-13.00	52.48
4	7520.0	-65.19	7.09	-58.10	-13.00	45.10
5	9400.0	-51.30	7.09	-44.21	-13.00	31.21
6	11280.0	-70.45	10.03	-60.42	-13.00	47.42
7	13160.0	-63.59	9.07	-54.52	-13.00	41.52
8	15040.0	-65.14	10.74	-54.40	-13.00	41.40
9	16920.0	-76.51	13.99	-62.52	-13.00	49.52
10	18800.0	-74.33	9.62	-64.71	-13.00	51.71

No other signals were detected.

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Table 6
Out of Band Emission at Antenna Terminal
1900 MHz GSM
Channel 810, f_{TX} = 1909.8 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	1909.8	11.59	17.99	29.58	38.45	8.87
2	3819.6	-57.09	7.01	-50.08	-13.00	37.08
3	5729.4	-74.72	6.32	-68.40	-13.00	55.40
4	7639.2	-69.37	8.08	-61.28	-13.00	48.28
5	9549.0	-52.91	10.03	-42.88	-13.00	29.88
6	11458.8	-53.43	9.07	-44.37	-13.00	31.37
7	13368.6	-64.31	6.85	-57.46	-13.00	44.46
8	15278.4	-63.82	8.81	-55.01	-13.00	42.01
9	17188.2	-74.32	12.40	-61.92	-13.00	48.92
10	19098.0	-79.07	15.42	-63.65	-13.00	50.65

No other signals were detected.

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Table 7
Out of Band Emission at Antenna Terminal
850 MHz GPRS
Channel 128, f_{TX} = 824.2 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	824.2	15.03	16.71	31.74	38.45	6.71
2	1648.4	-50.55	17.28	-33.27	-13.00	20.27
3	2472.6	-54.55	18.43	-36.12	-13.00	23.12
4	3296.8	-65.51	7.95	-57.56	-13.00	44.56
5	4121.0	-61.34	6.67	-54.67	-13.00	41.67
6	4945.2	-69.59	7.08	-62.51	-13.00	49.51
7	5769.4	-84.47	7.97	-76.50	-13.00	63.50
8	6593.6	-76.68	7.93	-68.75	-13.00	55.75
9	7417.8	-75.64	6.73	-68.91	-13.00	55.91
10	8242.0	-58.48	7.89	-50.59	-13.00	37.59

No other signals were detected.

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Table 8
Out of Band Emission at Antenna Terminal
850 MHz GPRS
Channel 190, f_{TX} = 836.6 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	836.6	15.18	16.57	31.75	38.45	6.70
2	1673.2	-52.49	17.54	-34.95	-13.00	21.95
3	2509.8	-58.36	18.47	-39.89	-13.00	26.89
4	3346.4	-66.93	7.17	-59.76	-13.00	46.76
5	4183.0	-59.96	7.57	-52.39	-13.00	39.39
6	5019.6	-72.73	7.09	-65.64	-13.00	52.64
7	5856.2	-82.91	7.31	-75.60	-13.00	62.60
8	6692.8	-83.40	7.31	-76.09	-13.00	63.09
9	7529.4	-74.98	7.42	-67.56	-13.00	54.56
10	8366.0	-57.43	6.38	-51.05	-13.00	38.05

No other signals were detected.

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Table 9
Out of Band Emission at Antenna Terminal
850 MHz GPRS
Channel 251, f_{TX} = 848.8 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	848.8	15.17	16.27	31.44	38.45	7.01
2	1697.6	-52.37	17.49	-34.88	-13.00	21.88
3	2546.4	-58.14	18.77	-39.37	-13.00	26.37
4	3395.2	-68.93	7.90	-61.03	-13.00	48.03
5	4244.0	-59.96	7.27	-52.69	-13.00	39.69
6	5092.8	-72.97	7.84	-65.14	-13.00	52.14
7	5941.6	-80.95	7.24	-73.71	-13.00	60.71
8	6790.4	-76.16	7.34	-68.82	-13.00	55.82
9	7639.2	-69.63	8.30	-61.34	-13.00	48.34
10	8488.0	-53.22	6.90	-46.32	-13.00	33.32

No other signals were detected.

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Table 10
Out of Band Emission at Antenna Terminal
1900 MHz GPRS
Channel 512, f_{TX} = 1850.2 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	1850.2	10.62	17.83	28.45	38.45	10.00
2	3700.4	-68.83	7.55	-61.28	-13.00	48.28
3	5550.6	-72.36	7.93	-64.43	-13.00	51.43
4	7400.8	-63.61	8.14	-55.47	-13.00	42.47
5	9251.0	-50.18	0.15	-50.03	-13.00	37.03
6	11101.2	-63.54	8.42	-55.12	-13.00	42.12
7	12951.4	-71.19	10.45	-60.74	-13.00	47.74
8	14801.6	-63.84	11.32	-52.52	-13.00	39.52
9	16651.8	-68.89	10.38	-58.51	-13.00	45.51
10	18502.0	-71.72	8.02	-63.70	-13.00	50.70

No other signals were detected.

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Table 11
Out of Band Emission at Antenna Terminal
1900 MHz GPRS
Channel 661, f_{TX} = 1880.0 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	1880.0	10.47	18.31	28.78	38.45	9.67
2	3760.0	-57.80	7.14	-50.66	-13.00	37.66
3	5640.0	-71.92	7.70	-64.22	-13.00	51.22
4	7520.0	-64.00	7.31	-56.69	-13.00	43.69
5	9400.0	-49.79	7.31	-42.48	-13.00	29.48
6	11280.0	-68.51	10.35	-58.16	-13.00	45.16
7	13160.0	-61.74	9.45	-52.29	-13.00	39.29
8	15040.0	-63.13	11.17	-51.97	-13.00	38.97
9	16920.0	-74.13	14.48	-59.65	-13.00	46.65
10	18800.0	-72.10	10.16	-61.94	-13.00	48.94

No other signals were detected.

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Table 12
Out of Band Emission at Antenna Terminal
1900 MHz GPRS
Channel 810, f_{TX} = 1909.8 MHz

Harmonic	Frequency (MHz)	Measured Level (dBm) "A"	Correction Factor (dB) "B"	Spurious Emission Level (dBm) "C"	Criteria Level (Limit) (dBm) "D"	Margin (dB) "E
1	1909.8	10.85	17.99	28.84	38.45	9.61
2	3819.6	-55.92	7.12	-48.80	-13.00	35.80
3	5729.4	-73.63	6.48	-67.15	-13.00	54.15
4	7639.2	-68.23	8.30	-59.94	-13.00	46.94
5	9549.0	-50.76	10.30	-40.46	-13.00	27.46
6	11458.8	-51.37	9.39	-41.98	-13.00	28.98
7	13368.6	-62.54	7.23	-55.31	-13.00	42.31
8	15278.4	-61.85	9.24	-52.61	-13.00	39.61
9	17188.2	-71.91	12.89	-59.02	-13.00	46.02
10	19098.0	-76.78	15.96	-60.82	-13.00	47.82

No other signals were detected.

Test performed by: Kelen Rolman Date: December, 2004

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List of Test Equipment

Description	Range	Manufacturer	Model #	APREL Asset #	Cal. Due Date
Spectrum Analyzer	9 kHz - 3 GHz	Anritsu	MS2661C	301330	March 25, 2005
Spectrum Analyzer	9 kHz - 30 GHz	Anritsu	MS2667C	301386	Sept. 5, 2005
RF Signal Generator	10 MHz – 26.5 GHz	Hewlett Packard	HP 8340 B	100955	Oct 5, 2005
Low Noise Antenna Pre-amplifier	30-1000 MHz	APREL Inc.	LNA-1	301415	August 27,2005
Preamplifier	1 – 26.5 GHz	Hewlett Packard	8449B	301462	June 16, 2005
Attenuator	20 dB	NARDA	9779-20	301533	August 15, 2005
Attenuator	3 dB	Bird		100889	October 5, 2005
Notch Filter	DC - 6 GHz	Microwavefilter Co.	6367	301055	CBT
High Pass Filter	3 GHz	Anaren	KPMC 03SJ0	301560	August 15, 2005
RF Power Meter	10 MHz - 18 GHz	Giga-tronics	8541C	301393	Oct.16, 2005
RF Power Sensor	10 MHz - 18 GHz	Giga-tronics	80601A	301394	Oct.16, 2005

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Out of Band Emission at Antenna Terminal

PHOTOGRAPHS OF THE TEST SETUP

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GSM 850/PCS 1900 Cellular Phone WDP318
Testing Out of Band Emissions at the Antenna Port

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GSM 850/PCS 1900 Cellular Phone WDP318
Testing Out of Band Emissions at the Antenna Port using Notch Filter

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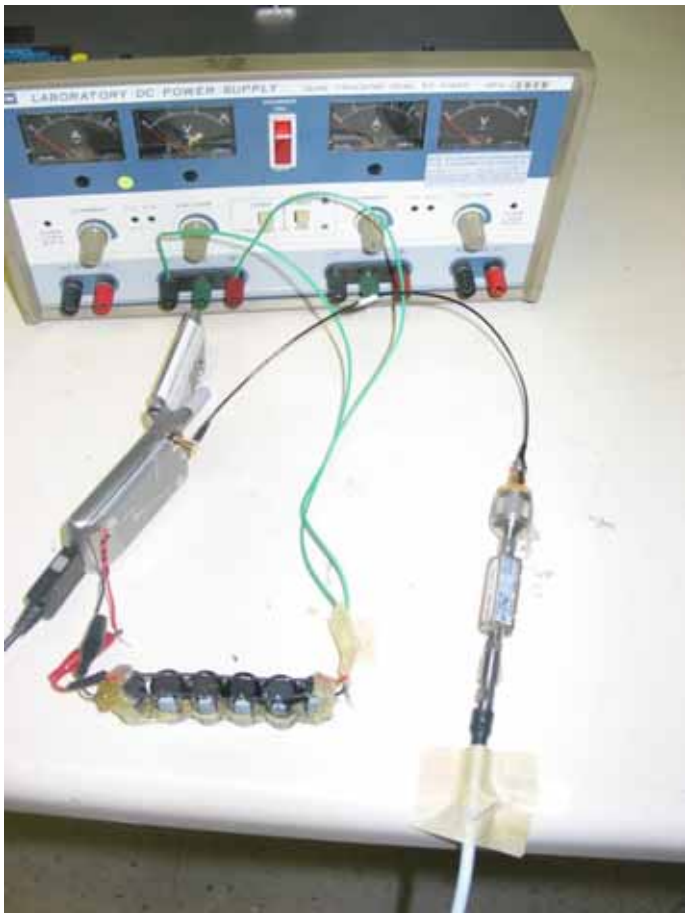

GSM 850/PCS 1900 Cellular Phone WDP318
Testing Out of Band Emissions at the Antenna Port

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TEST RESULTS

FIELD STRENGTH OF TRANSMITTER SPURIOUS RADIATION
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

WDP318

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Test: **Field Strength of Spurious Radiation**
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

Ref: **FCC Part 2.1053, FCC Part 22.917(a), FCC Part 24.238(a)**

Criteria: *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

Set-up: See Figure 5.a of this section.

Environmental Conditions:

Equipment: See page 88 of this section.

Methodology: **Measurement by Substitution Method (Radiated):**

The DUI was tested for spurious radiated emissions using the substitution method.

Test site: The radiated RF measurement was taken at APREL Laboratory's open area test site (OATS). This open area test site is calibrated to ANSI C63.4 document and a description of the measurement facility is on file with the Federal Communications Commission and is in compliance with the requirement of Section 2.948 of the Commissions rules and regulations. (FCC File No.: 90416)

The test was set-up as illustrated in Fig.1. The DUI was configured to operate at maximum power. The equipment under test was placed on a turntable positioned 3 m away from the calibrated receiving antenna, which in turn was connected to the spectrum analyzer.

A set of two reference dipoles, a horn antenna and a signal generator to duplicate the signal were used. Signals radiated from the DUI on the fundamental frequency as well as second and third harmonic were evaluated by comparing to the signals transmitted from the reference dipoles. For testing the higher frequencies, fourth to 10^{th} harmonics, a calibrated horn antenna with known gain was used as a replacement source of radiation thus substituting the DUI. The duplicated reading (taken in dBm designated as ERP) was then referenced to the dipole.

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For each transmitter frequency, the received signal was **maximised** by rotating the turntable and adjusting the height of the receiving antenna. To obtain the actual ERP, the DUI was replaced by a vertically polarised half-wave dipole antenna resonant to that frequency and fed by a RF power amplifier and signal generator. The center of the dipole antenna was placed precisely in the same location as the DUI. It was ensured that the orientation of the rotating table and the height of the receiving antenna were unmoved. The signal generator level was adjusted until the peak reading on the spectrum analyzer was identical to that obtained when the DUI was on the turntable. The two signals were matched by superimposing one signal to the other on the spectrum analyzer screen. The output of power amplifier was disconnected from the substitute dipole antenna and connected to a RF power meter. **The effective radiated power was read directly from the power meter**.

Criteria level: The criteria level was calculated to be: – 13.0 dBm in the frequency band 824.0 – 850.0 MHz.

This level was obtained by using the following expression:

$$\mathbf{Criteria_{Limit\ (dBm)} = ERP_{Carrier\ (dBm)} - [43 + 10 * \log_{10} ERP_{(W)}]}$$

Example: $\mathbf{Criteria}_{\text{Limit(dBm)}} = 29.27\ \text{dBm} - [43 + 10 * \log_{10}(0.845\ \text{W})]$

$\mathbf{Criteria}_{\text{Limit(dBm)}} = 29.27\ \text{dBm} - (43 - 0.73)\ \text{dB} = -13.0\ \text{dBm}$

It can also be shown using the above calculation that the criteria level using substitution method is also –13.0 dBm in the frequency band 1850.0 – 1910.0 MHz.

Results: **Passed; See Tables 1 to 8, pages 79 to 86 of this section..**

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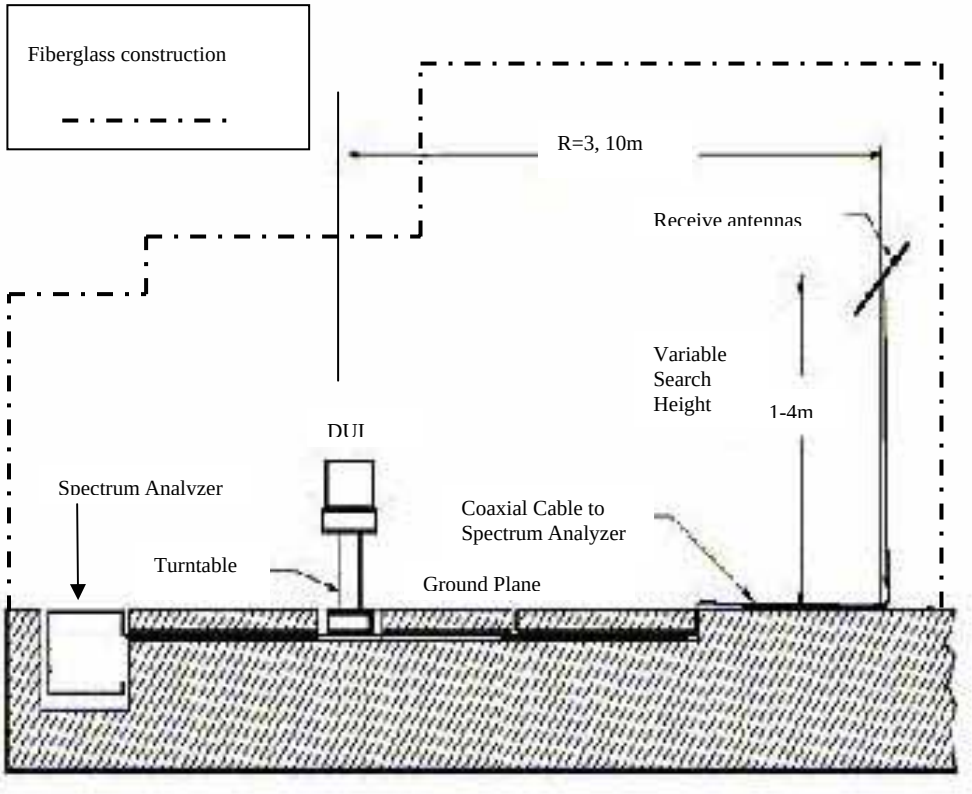

Figure 5.a: Test set up for the radiated emission measurement in OATS (not to scale)

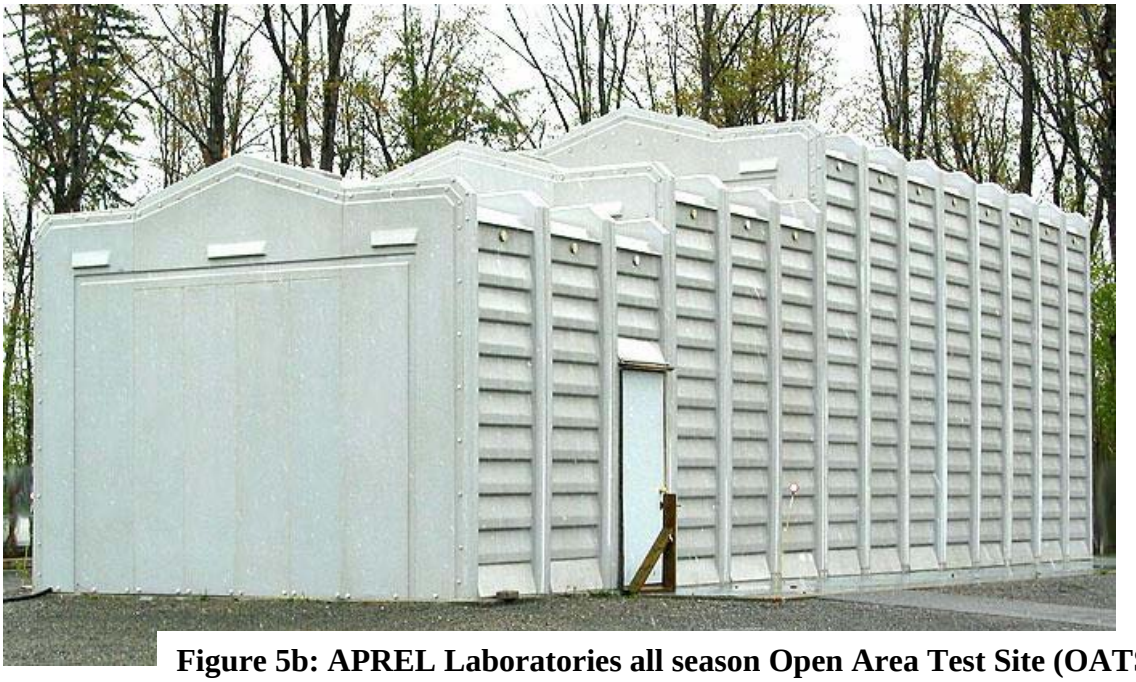

Figure 5b: APREL Laboratories all season Open Area Test Site (OATS)

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Table 1

Field Strength of Spurious Radiation

850 MHz GSM

Antenna Polarization: **Vertical**

SUBSTITUTION METHOD AS RADIATED

Frequency	ERP_V	Limit	Margin
MHz	**dBm**	**dBm**	**dB**
Channel 128 - Transmitting Frequency: 824.2 MHz (Fundamental)			
824.2	29.27	-	-
1648.4	-30.21	-13.00	17.21
2472.6	-51.17 nf	-13.00	38.17
3296.8	-51.38	-13.00	38.38
4121.0	-47.90	-13.00	34.90
4945.2	-43.31	-13.00	30.31
5769.4	-82.57 nf	-13.00	69.57
6593.6	-77.41 nf	-13.00	64.41
7417.8	-76.68 nf	-13.00	63.68
8242.0	-72.90 nf	-13.00	59.90
Channel 190 - Transmitting Frequency: 836.6 MHz (Fundamental)			
836.6	28.52	-	-
1673.2	-29.96	-13.00	16.96
2509.8	-51.17	-13.00	38.17
3346.4	-53.66	-13.00	40.66
4183.0	-43.08	-13.00	30.08
5019.6	-46.83	-13.00	33.83
5856.2	-82.29 nf	-13.00	69.29
6692.8	-77.42 nf	-13.00	64.42
7529.4	-77.22 nf	-13.00	64.22
8366.0	-72.96 nf	-13.00	59.96
Channel 251 - Transmitting Frequency: 848.8 MHz (Fundamental)			
848.8	29.14	-	-
1697.6	-29.71	-13.00	16.71
2546.4	-51.13 nf	-13.00	38.13
3395.2	-51.34	-13.00	38.34
4244.0	-40.89	-13.00	27.89
5092.8	-46.86	-13.00	33.86
5941.6	-82.16 nf	-13.00	69.16
6790.4	-77.45 nf	-13.00	64.45
7639.2	-75.09 nf	-13.00	62.09
8488.0	-70.52 nf	-13.00	57.52

*nf – noise floor

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Table 2

Field Strength of Spurious Radiation

850 MHz GSM

Antenna Polarization: **Horizontal**

SUBSTITUTION METHOD AS RADIATED

Frequency	ERP_H	Limit	Margin
MHz	**dBm**	**dBm**	**dB**
Channel 128 - Transmitting Frequency: 824.2 MHz (Fundamental)			
824.2	16.78	-	-
1648.4	-61.12 nf	-13.00	48.12
2472.6	-57.35 nf	-13.00	44.35
3296.8	-46.82	-13.00	33.82
4121.0	-46.51	-13.00	33.51
4945.2	-39.43	-13.00	26.43
5769.4	-50.66	-13.00	37.66
6593.6	-47.26	-13.00	34.26
7417.8	-76.24 nf	-13.00	63.24
8242.0	-73.17 nf	-13.00	60.17
Channel 190 - Transmitting Frequency: 836.6 MHz (Fundamental)			
836.6	16.52	-	-
1673.2	-61.30	-13.00	48.30
2509.8	-57.73	-13.00	44.73
3346.4	-49.39	-13.00	36.39
4183.0	-41.56	-13.00	28.56
5019.6	-43.36	-13.00	30.36
5856.2	-50.26	-13.00	37.26
6692.8	-47.74	-13.00	34.74
7529.4	-77.37 nf	-13.00	64.37
8366.0	-72.98 nf	-13.00	59.98
Channel 251 - Transmitting Frequency: 848.8 MHz (Fundamental)			
848.8	18.95	-	-
1697.6	-61.17 nf	-13.00	48.17
2546.4	-57.22 nf	-13.00	44.22
3395.2	-47.09	-13.00	34.09
4244.0	-39.58	-13.00	26.58
5092.8	-43.03	-13.00	30.03
5941.6	-50.29	-13.00	37.29
6790.4	-47.54	-13.00	34.54
7639.2	-76.40 nf	-13.00	63.40
8488.0	-73.32 nf	-13.00	60.32

*nf – noise floor

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Table 3
Field Strength of Spurious Radiation
1900 MHz GSM
Antenna Polarization: **Vertical**
SUBSTITUTION METHOD AS RADIATED

Frequency MHz	ERP_V dBm	Limit dBm	Margin dB
Channel 512 - Transmitting Frequency: 1850.2 MHz (Fundamental)			
1850.2	25.95	-	-
3700.4	-47.79	-13.00	34.79
5550.6	-36.29	-13.00	23.29
7400.8	-44.50	-13.00	31.50
9251.0	-56.14	-13.00	43.14
11101.2	-60.53	-13.00	47.53
12951.4	-77.46 nf	-13.00	64.46
14801.6	-69.31 nf	-13.00	56.31
16651.8	-59.28 nf	-13.00	46.28
18502.0	-54.37 nf	-13.00	41.37
Channel 661 - Transmitting Frequency: 1880.0 MHz (Fundamental)			
1880.0	24.69	-	-
3760.0	-36.77	-13.00	23.77
5640.0	-35.15	-13.00	22.15
7520.0	-46.83	-13.00	33.83
9400.0	-47.11	-13.00	34.11
11280.0	-66.84 nf	-13.00	53.84
13160.0	-78.80 nf	-13.00	65.80
15040.0	-68.65 nf	-13.00	55.65
16920.0	-57.29 nf	-13.00	44.29
18800.0	-51.22 nf	-13.00	38.22
Channel 810 - Transmitting Frequency: 1909.8 MHz (Fundamental)			
1909.8	23.43	-	-
3819.6	-35.92	-13.00	22.92
5729.4	-37.94	-13.00	24.94
7639.2	-49.84	-13.00	36.84
9549.0	-44.88	-13.00	31.88
11458.8	-60.25	-13.00	47.25
13368.6	-77.88 nf	-13.00	64.88
15278.4	-70.96 nf	-13.00	57.96
17188.2	-59.67 nf	-13.00	46.67
19098.0	-50.16 nf	-13.00	37.16

*nf – noise floor

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Table 4

Field Strength of Spurious Radiation

1900 MHz GSM

Antenna Polarization: **Horizontal**

SUBSTITUTION METHOD AS RADIATED

Frequency	ERP_H	Limit	Margin
MHz	**dBm**	**dBm**	**dB**
Channel 512 - Transmitting Frequency: 1850.2 MHz (Fundamental)			
1850.2	11.05	-	-
3700.4	-49.62	-13.00	36.62
5550.6	-38.50	-13.00	25.50
7400.8	-44.59	-13.00	31.59
9251.0	-54.74	-13.00	41.74
11101.2	-30.52	-13.00	17.52
12951.4	-77.76 nf	-13.00	64.76
14801.6	-70.51 nf	-13.00	57.51
16651.8	-58.44 nf	-13.00	45.44
18502.0	-51.23 nf	-13.00	38.23
Channel 661 - Transmitting Frequency: 1880.0 MHz (Fundamental)			
1880.0	18.08	-	-
3760.0	-39.08	-13.00	26.08
5640.0	-37.44	-13.00	24.44
7520.0	-46.64	-13.00	33.64
9400.0	-46.02	-13.00	33.02
11280.0	-36.52	-13.00	23.52
13160.0	-77.48 nf	-13.00	64.48
15040.0	-67.51 nf	-13.00	54.51
16920.0	-56.93 nf	-13.00	43.93
18800.0	-50.68 nf	-13.00	37.68
Channel 810 - Transmitting Frequency: 1909.8 MHz (Fundamental)			
1909.8	23.28	-	-
3819.6	-38.13	-13.00	25.13
5729.4	-40.47	-13.00	27.47
7639.2	-49.63	-13.00	36.63
9549.0	-42.98	-13.00	29.98
11458.8	-29.78	-13.00	16.78
13368.6	-73.93 nf	-13.00	60.93
15278.4	-69.93 nf	-13.00	56.93
17188.2	-59.21 nf	-13.00	46.21
19098.0	-51.35 nf	-13.00	38.35

*nf – noise floor

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Table 5
Field Strength of Spurious Radiation
850 MHz GPRS
Antenna Polarization: **Vertical**
SUBSTITUTION METHOD AS RADIATED

Frequency	ERP_V	Limit	Margin
MHz	**dBm**	**dBm**	**dB**
Channel 128 - Transmitting Frequency: 824.2 MHz (Fundamental)			
824.2	29.19	-	-
1648.4	-30.67	-13.00	17.67
2472.6	-51.74 nf	-13.00	38.74
3296.8	-52.22	-13.00	39.22
4121.0	-49.28	-13.00	36.28
4945.2	-45.24	-13.00	32.24
5769.4	-84.77 nf	-13.00	71.77
6593.6	-79.98 nf	-13.00	66.98
7417.8	-79.66 nf	-13.00	66.66
8242.0	-76.33 nf	-13.00	63.33
Channel 190 - Transmitting Frequency: 836.6 MHz (Fundamental)			
836.6	28.46	-	-
1673.2	-30.15	-13.00	17.15
2509.8	-51.74	-13.00	38.74
3346.4	-54.69	-13.00	41.69
4183.0	-44.50	-13.00	31.50
5019.6	-48.85	-13.00	35.85
5856.2	-84.53 nf	-13.00	71.53
6692.8	-80.14 nf	-13.00	67.14
7529.4	-80.41 nf	-13.00	67.41
8366.0	-76.34 nf	-13.00	63.34
Channel 251 - Transmitting Frequency: 848.8 MHz (Fundamental)			
848.8	29.15	-	-
1697.6	-29.69	-13.00	16.69
2546.4	-51.57 nf	-13.00	38.57
3395.2	-52.36	-13.00	39.36
4244.0	-42.19	-13.00	29.19
5092.8	-48.68	-13.00	35.68
5941.6	-84.50 nf	-13.00	71.50
6790.4	-80.12 nf	-13.00	67.12
7639.2	-78.16 nf	-13.00	65.16
8488.0	-74.02 nf	-13.00	61.02

*nf – noise floor

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Table 6

Field Strength of Spurious Radiation

850 MHz GPRS

Antenna Polarization: **Horizontal**

SUBSTITUTION METHOD AS RADIATED

Frequency	ERP_H	Limit	Margin
MHz	**dBm**	**dBm**	**dB**
Channel 128 - Transmitting Frequency: 824.2 MHz (Fundamental)			
824.2	16.88	-	-
1648.4	-61.53 nf	-13.00	48.53
2472.6	-57.75 nf	-13.00	44.75
3296.8	-47.91	-13.00	34.91
4121.0	-47.81	-13.00	34.81
4945.2	-41.38	-13.00	28.38
5769.4	-52.65	-13.00	39.65
6593.6	-49.98	-13.00	36.98
7417.8	-79.11 nf	-13.00	66.11
8242.0	-76.33 nf	-13.00	63.33
Channel 190 - Transmitting Frequency: 836.6 MHz (Fundamental)			
836.6	16.90	-	-
1673.2	-61.40	-13.00	48.40
2509.8	-58.44	-13.00	45.44
3346.4	-50.38	-13.00	37.38
4183.0	-43.03	-13.00	30.03
5019.6	-44.99	-13.00	31.99
5856.2	-52.41	-13.00	39.41
6692.8	-50.14	-13.00	37.14
7529.4	-80.36 nf	-13.00	67.36
8366.0	-76.39 nf	-13.00	63.39
Channel 251 - Transmitting Frequency: 848.8 MHz (Fundamental)			
848.8	19.00	-	-
1697.6	-61.22 nf	-13.00	48.22
2546.4	-58.07 nf	-13.00	45.07
3395.2	-48.05	-13.00	35.05
4244.0	-40.72	-13.00	27.72
5092.8	-44.82	-13.00	31.82
5941.6	-52.38	-13.00	39.38
6790.4	-50.12	-13.00	37.12
7639.2	-79.11 nf	-13.00	66.11
8488.0	-76.75 nf	-13.00	63.75

*nf – noise floor

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Table 7
Field Strength of Spurious Radiation
1900 MHz GPRS
Antenna Polarization: **Vertical**
SUBSTITUTION METHOD AS RADIATED

Frequency	ERP_V	Limit	Margin
MHz	dBm	dBm	dB
Channel 512 - Transmitting Frequency: 1850.2 MHz (Fundamental)			
1850.2	26.03	-	-
3700.4	-48.00	-13.00	35.00
5550.6	-36.68	-13.00	23.68
7400.8	-45.55	-13.00	32.55
9251.0	-57.61	-13.00	44.61
11101.2	-62.47	-13.00	49.47
12951.4	-79.81 nf	-13.00	66.81
14801.6	-72.08 nf	-13.00	59.08
16651.8	-61.96 nf	-13.00	48.96
18502.0	-57.60 nf	-13.00	44.60
Channel 661 - Transmitting Frequency: 1880.0 MHz (Fundamental)			
1880.0	24.60	-	-
3760.0	-37.24	-13.00	24.24
5640.0	-35.82	-13.00	22.82
7520.0	-47.64	-13.00	34.64
9400.0	-48.67	-13.00	35.67
11280.0	-68.44 nf	-13.00	55.44
13160.0	-80.80 nf	-13.00	67.80
15040.0	-71.42 nf	-13.00	58.42
16920.0	-60.38 nf	-13.00	47.38
18800.0	-54.71 nf	-13.00	41.71
Channel 810 - Transmitting Frequency: 1909.8 MHz (Fundamental)			
1909.8	23.47	-	-
3819.6	-36.08	-13.00	23.08
5729.4	-38.53	-13.00	25.53
7639.2	-50.87	-13.00	37.87
9549.0	-46.03	-13.00	33.03
11458.8	-61.82	-13.00	48.82
13368.6	-79.95 nf	-13.00	66.95
15278.4	-73.70 nf	-13.00	60.70
17188.2	-62.66 nf	-13.00	49.66
19098.0	-53.57 nf	-13.00	40.57

*nf – noise floor

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Table 8
Field Strength of Spurious Radiation
1900 MHz GPRS
Antenna Polarization: **Horizontal**
SUBSTITUTION METHOD AS RADIATED

Frequency	ERP_V	Limit	Margin
MHz	**dBm**	**dBm**	**dB**
Channel 512 - Transmitting Frequency: 1850.2 MHz (Fundamental)			
1850.2	11.23	-	-
3700.4	-50.00	-13.00	37.00
5550.6	-39.08	-13.00	26.08
7400.8	-45.46	-13.00	32.46
9251.0	-56.16	-13.00	43.16
11101.2	-32.30	-13.00	19.30
12951.4	-80.01 nf	-13.00	67.01
14801.6	-72.91 nf	-13.00	59.91
16651.8	-61.21 nf	-13.00	48.21
18502.0	-54.80 nf	-13.00	41.80
Channel 661 - Transmitting Frequency: 1880.0 MHz (Fundamental)			
1880.0	18.41	-	-
3760.0	-39.24	-13.00	26.24
5640.0	-38.22	-13.00	25.22
7520.0	-47.55	-13.00	34.55
9400.0	-47.22	-13.00	34.22
11280.0	-38.27	-13.00	25.27
13160.0	-79.85 nf	-13.00	66.85
15040.0	-70.25 nf	-13.00	57.25
16920.0	-59.63 nf	-13.00	46.63
18800.0	-53.91 nf	-13.00	40.91
Channel 810 - Transmitting Frequency: 1909.8 MHz (Fundamental)			
1909.8	23.42	-	-
3819.6	-38.08	-13.00	25.08
5729.4	-40.93	-13.00	27.93
7639.2	-50.78	-13.00	37.78
9549.0	-44.58	-13.00	31.58
11458.8	-31.65	-13.00	18.65
13368.6	-75.90 nf	-13.00	62.90
15278.4	-72.53 nf	-13.00	59.53
17188.2	-61.91 nf	-13.00	48.91
19098.0	-54.57 nf	-13.00	41.57

*nf – noise floor

Test performed by: Kelen Rolnan **Date:** December, 2004

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APPENDIX A
List of Test Equipment

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Radiated Spurious Emissions
List of Equipment

Description	Range	Manufacturer	Model #	APREL Asset #	Cal. Due Date
Spectrum Analyzer	9 kHz - 3 GHz	Anritsu	MS2661C	301330	March 25, 2005
Spectrum Analyzer	9 kHz - 30 GHz	Anritsu	MS2667C	301386	Sept. 5, 2005
RF Signal Generator	10 MHz – 26.5 GHz	Hewlett Packard	HP 8340 B	100955	Oct 5, 2005
Low Noise Antenna Pre-amplifier	30-1000 MHz	APREL Inc.	LNA-1	301415	August 27,2005
High Pass Filter	3.0 GHz	Anaren	KPMC 03SJ0	301560	August 15, 2005
Attenuator	20 dB	NARDA	9779-20	301533	August 15, 2005
Notch Filter	DC - 6 GHz	Microwave filter Co.	6367	301055	CBT
RF Power Meter	10 MHz - 18 GHz	Giga-tronics	8541C	301393	Oct.16, 2005
RF Power Sensor	10 MHz - 18 GHz	Giga-tronics	80601A	301394	Oct.16, 2005
Biconical Antenna	20 MHz - 200 MHz	Eaton	94455-1	100890	July 18, 2005
Log - Periodic Antenna	200 MHz -1.0 GHz	Eaton	ALP-1	100063	July 31, 2005
Horn Antenna	1 – 18 GHz	APREL Inc.	AA – 118	100400	June 17, 2005
Anechoic Shielded Room	10 kHz - 10 GHz	APREL Inc.	ALP-AnSh	301329	May 22, 2007
Reference Half -wave Dipole Antenna	770 MHz	APREL Inc.	ALP-DA1/2W	100157	July 3, 2005
Reference Half -wave Dipole Antenna	2300.00 MHz	APREL Inc.	ALP-DA1/2W	301550	July 3, 2005
OATS	30 MHz – 1 GHz	APREL Inc.	3 m & 10 m	N/A	March 20, 2006

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APPENDIX B
PHOTOGRAPHS

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GSM 850/PCS 1900 Cellular Phone WDP318

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GSM 850/PCS 1900 Cellular Phone WDP318
TESTING RADIATED SPURIOUS EMISSIONS

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TEST RESULTS

FREQUENCY STABILITY
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS
WDP318

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Test: **Frequency Stability**
GSM 850/PCS 1900 Cellular Phone
GSM/GPRS

Ref.: **FCC Part 2 paragraph 2.1055**

Criteria: ± 2.5 ppm

Set-up: See Figure No. 6.

Environmental Conditions: Temperature: Paragraph 2.1055(a) (1), (b) and (d) (2)
Air pressure: 101 ± 3 kPa

Equipment: See page 97 of this section.

Procedure: Temperature

The frequency of the transmitter, operating at room ambient temperature (+20°C), was adjusted to the nominal assigned frequency, as per the manufacturer's instructions.

The transceiver was placed in an environmental chamber, with the primary power turned off. The temperature of the chamber was varied over the range of -30°C to +50°C stabilising the temperature every 10°C. At each 10°C step the transmitter was keyed on, at full power. The transmitter frequency was measured every minute for a period of 10 minutes or until sufficient measurements were obtained to indicate clearly that the frequency had stabilised. The test set-up for frequency stability measurements is shown in Figure 6.

Vary the primary supply voltage from 85 to 115 percent of the norminal value for other than hand carried battery equipment.

For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

Results: **PASSED.** See Tables 1 and 2, pages 95 and 96, of this section.
Frequency Stability: -2.2×10^{-5} ppm

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Set Up Figure 6
Transmitter Test Under Environmental Conditions

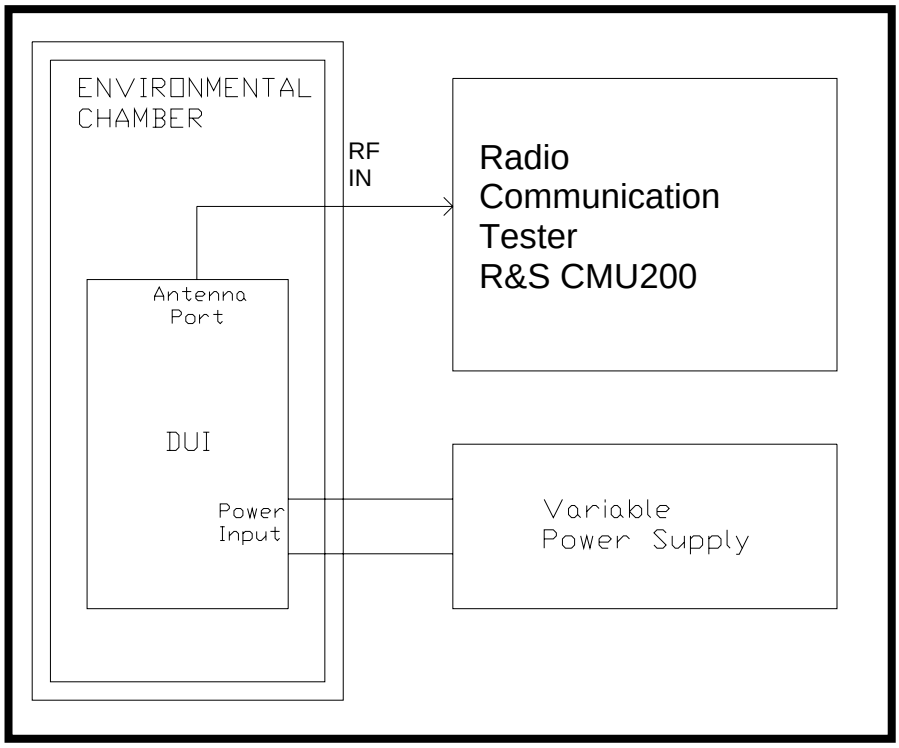

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Table 1
Frequency Stability over Temperature and Voltage
Channel No.: 661
Transmitter Frequency: 836.60 MHz
Reference Voltage: 3.8 VDC
Deviation Limit: 2.5 ppm

VDC	Voltage	Temperature	Deviation (Hz) Average	Deviation (Hz) Maximum
3.80 reference	100%	+20 °C (reference)	-11	-20
3.80	100%	-30 °C	-26	-37
3.80	100%	-20 °C	-20	-32
3.80	100%	-10 °C	-18	-26
3.80	100%	0 °C	-14	-25
3.80	100%	+10 °C	-12	-22
3.80	100%	+20 °C	-10	-18
3.80	100%	+25 °C	-7	-16
3.80	100%	+30 °C	-8	-16
3.80	100%	+40 °C	-6	-14
3.80	100%	+50 °C	+2	+10
3.80	100%	+60 °C	+3	+12
3.23	85%	+20 °C	-10	-20
3.30	Battery Endpoint	+20 °C	-8	-15

Frequency Stability of the reference: -2.2×10^{-5} ppm

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Table 2
Frequency Stability over Temperature and Voltage
Channel No.: 661
Transmitter Frequency: 1880 MHz
Reference Voltage: 3.8 VDC
Deviation Limit: 2.5 ppm

VDC	Voltage	Temperature	Deviation (Hz) Average	Deviation (Hz) Maximum
3.80 reference	100%	+20 °C (reference)	+4	+20
3.80	100%	-30 °C	+2	+25
3.80	100%	-20 °C	+7	+26
3.80	100%	-10 °C	+3	+19
3.80	100%	0 °C	+7	+23
3.80	100%	+10 °C	+3	+18
3.80	100%	+20 °C	+3	+19
3.80	100%	+25 °C	+3	+20
3.80	100%	+30 °C	+3	+17
3.80	100%	+40 °C	-2	-20
3.80	100%	+50 °C	+3	+16
3.80	100%	+60 °C	0	+13
3.23	85%	+20 °C	+1	+13
3.30	Battery Endpoint	+20 °C	+4	+20

Frequency Stability of the reference: -2.2×10^{-5} ppm

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List of Test Equipment

Description	Range	Manufacturer	Model #	APREL Asset #	Cal. Due Date
Spectrum Analyzer	9 kHz - 30 GHz	Anritsu	MS2667C	301386	Sept. 5, 2005
Radio-communication Tester	10 MHz – 2200 MHz	Rohde & Schwarz	CMU 200	Wireless Dynamics	10 September 2005
Environmental Chamber	-73 °C – +177 °C	Tenney Engineering Inc.	Tenney 14	100636	March 8, 2005
Oven Temperature Stabilized 10 MHz Reference Oscillator	10 MHz	APREL	n/a	100964	May 12, 2005
Variable Power Supply	0 – 20 V	Hewlett Packard	E3611A	301385	March 29, 2005
Laboratory Dual Tracking DC Power Supply	0 – 30 V	GW	GPQ-3020	301484	Dec. 23, 2005
Digital Multimeter	DC – 500 kHz	Fluke	8505A	100655	Nov. 6, 2005

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FREQUENCY STABILITY

PHOTOGRAPHS OF THE TEST SETUP

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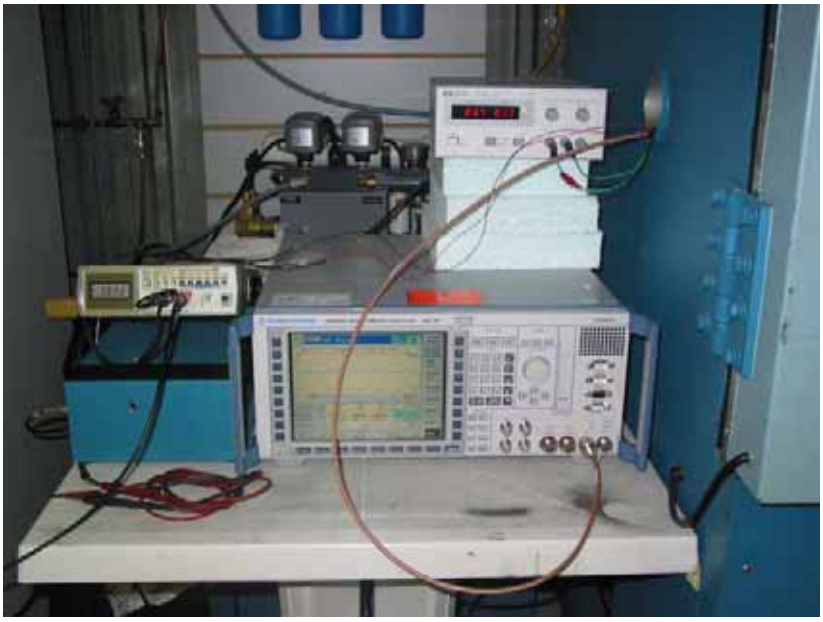

Frequency Stability Test Setup

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GSM 850/PCS 1900 Cellular Phone WDP318
tested for Frequency Stability

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COMPLIANCE

FCC Part 15, Subpart B, Class B Digital Devices

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SUMMARY

This report describes the Electromagnetic Interference evaluation performed on a **GSM 850/PCS 1900 Cellular Phone, model WDP318**, referred to as DUI (Device Under Investigation).

The evaluation was performed for the purpose of verification of compliance with the requirements of FCC Part 15, Subpart B, Class B Digital Devices.

The DUI was evaluated for both conducted and radiated emissions. The ANSI C63.4-1992 document "Method of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment" was used as a guideline for evaluation. The methodology is described in **Section 1, Conducted Signal Analysis** and **Section 2, Radiated Signal Analysis.**

The Equipment conforms to Class B limits.

Summary of Test Results

Specification	Test Type	Results
FCC CFR 47, Part 15, Subpart B	Class B	Pass

The results presented in this report relate only to the sample tested.

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INTRODUCTION

General

This report describes the results of the Electromagnetic Interference Analysis performed on a **GSM 850/PCS 1900 Cellular Phone, model WDP318.** APREL Laboratories performed the tests for Wireless Dynamics Inc. at APREL's EMI facility located in Nepean, Ontario, Canada. The laboratory operates a 3 and 10 meter Open Area Test Site (OATS) measurement facility. The test site is calibrated to ANSI C63.4-1992 document.

A description of the measurement facility in accordance with the radiated and AC line conducted test site criteria in ANSI C63.4-1992 is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations. APREL's registration number is **90416**. APREL's Open Area Test Site (OATS) is approved by Industry Canada (IC) under the certification number **IC 2068**.

APREL is accredited by Standard Council of Canada under ISO 17025. All equipment used is calibrated or verified. APREL is also accredited by Industry Canada and recognized by the Federal Communications Commission (FCC). ***Under the terms of the MRA between NVLAP and SCC, APREL is acceptable by FCC to perform Declaration of Conformity (DoC) testing under the FCC rules.***

Standard

The evaluation and analysis were conducted in accordance with FCC Part 15, Subpart B requirements for Class B Digital Devices.

Sample for Evaluation

The sample of the evaluation consisted of the following:

Description	Model No.	S/N
GSM 850/PCS 1900 Cellular Phone (FCC ID: SHFWDP318)	**WDP318**	**804390001024(3649RF)**
Leader Electronics ITE Power Supply/Charger, 100-240 VAC, 50/60 Hz, 0.15 A, 5.2 VDC-650mA	MU03-5052065-A1	n/a
TOSHIBA Laptop PC (Contains FCC ID: CJ6UPA3373WL)	Satellite A70	64318213K

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Product Description

It is a GSM 850/PCS 1900 Cellular Phone with GPRS and a built in camera and GPRS.

Test Equipment:

The test equipment used during the evaluation is listed in Appendix A of this section.

Environmental Conditions:

Measurements were conducted in shielded room and open area test site.

	Shielded Room	OATS
Temperature	23 ± 2 °C	19 ± 3 °C
Relative humidity	30-60 %	30-60 %
Air pressure	101 ± 3 kPa	101 ± 3 kPa

Measurement Repeatability Information:

The test data presented in this report was acquired using the guidelines set forth in ANSI C63.4-1992 and are valid only for the equipment identified herein under the test conditions described. Repeatability of these test results will only be achieved with identical measurement conditions. These conditions include the same test distance, DUI height, measurement site characteristics, and the same DUI and system components. The system must have the same interconnecting cables arranged in identical placement, with the system and/or DUI functioning in the identical mode of operation (i.e. software and so on) as on the date of the test. Any deviation from the test conditions and environment on the date of the test may result in measurement uncertainty which may be difficult to track.

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Uncertainty:

Radiated Emission Measurement:

Type of Uncertainty	Specific to	Uncertainty (dB)
DUI Stability	DUI	0.5
DUI Positioning	DUI	0.3
Antenna Factor	Setup	1.0
Antenna Positioning	Setup	0.3
Path Loss	Setup	0.5
Pre-amplifier Gain	Setup	0.5
Cable Loss	Setup	0.5
Spectrum Analyzer Readout	Setup	1.3
Other Setup Uncertainty (Ambient,,,)	Setup	0.5
Combined Uncertainty:		1.8 dB

Conducted Emissions Measurement: ±2dB

The combined standard uncertainty is determined from the root-sum-square combination of the standard uncertainties of the individual components.

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SECTION ONE

CONDUCTED SIGNAL ANALYSIS

Procedure

Measurement of conducted emission was carried out following the test procedure ANSI C63.4-1992 paragraph 7.2.

Conducted power-line measurements were made over the frequency range from 150 kHz to 30 MHz, to determine the line-to-ground radio noise voltage that is conducted from the DUI (Device Under Investigation) power-line input terminals that are directly (or indirectly via separate transformers or power supplies) connected to a public power network.

The power-input leads of the wall mount power supply were connected to the Line Impedance Stabilization Network (LISN) using the 50 Ω/50μH CISPR network. The LISN and the DUI were connected and positioned as shown in Figure 1.

Measurements were performed using the spectrum analyzer with quasi-peak function and 9 kHz resolution bandwidth. Specific peaks were measured from the continuous plots.

The rear of the DUI and peripherals were all aligned and flush with the rear of the table top. The rear of the table top was 40 cm removed from the vertical conducting (shielded room) wall.

Limit:

Frequency (MHz)	Conducted Limits for Class B	
	Quasi-peak (dBμV)	Average (dBμV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Decreases with the logarithm of the frequency

Test Data:

Test Data is tabulated in Tables 1 to 4 of this section.

Conclusion:

The DUI complies with ***Class B*** limit for conducted emissions. Only the highest or measurable

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readings are shown. The conducted tests were carried out with the charger but not with the laptop as they both can not be connected at the same time.

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SECTION TWO

RADIATED SIGNAL ANALYSIS

Procedure

Measurement of radiated emissions was carried out following the test procedure ANSI C63.4-1992 Paragraph 8.1. The Open Site arrangement is shown in Figure 2.

Radiated emission measurements were made over the frequency range 30 MHz to above 960 MHz following the radiated emission limits of Subpart B, Section 15.109, Paragraph A.

Preliminary radiated emissions from 30 MHz were scanned in a shielded enclosure using a broadband Biconical and Log-periodic Antenna in order to determine the characteristic frequencies of radiation. If it is found necessary, the scan for radiated emissions is performed above 1000 MHz, using broadband Double Ridged Guide Horn.

Based on this information, measurements were performed in the open area test site at these characteristic frequencies. APREL Open Area Test Site is calibrated to ANSI C63.4-1992 and is filed with FCC. The test site is characteristically flat, free of reflecting structures. All reflecting objects, including test personnel, lie outside the perimeter of the ellipse (defined in ANSI C63.4-1992) or below the ground plane level. The horizontal and vertical site attenuation measurements are within ± 4 dB of the theoretical site attenuation of an ideal site. The DUI was placed on a turntable positioned 3 meters away from the receiving antenna, which in turn was connected to the spectrum analyzer. The DUI was operated in a manner that produced the highest emissions.

For each identified characteristic frequency, the received signal was maximized by appropriate positioning of the turntable and the height of the receiving antenna. The height of the antenna was adjusted between 1 m and 4 m in height above the ground plane. The turntable was rotated 360° from a remote control to maximize the emissions. The process was repeated for both horizontal and vertical polarization. All cables were arranged for maximum emission.

Radiated RF emission levels measured were identified as having been emitted by the DUI. Measurements were performed using the spectrum analyzer employing a CISPR quasi-peak detector function and 120 kHz bandwidth on frequencies from 30 MHz to 1000 MHz, and for frequencies above 1000 MHz employing an average detector function and 1 MHz resolution bandwidth. All measurements were performed at discrete frequencies.

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Limit:

According to FCC Part 15, Subpart B, Section 15.109, Paragraph B, radiated emission measurement, maximum allowable field strength for Class B Digital Devices at a distance of 3 meters is100μV/m (40.0 dBμV/m) for the frequency range of 30 to 88 MHz, 150μV/m (43.5 dBμV/m) for 88 to 216 MHz, 200 μV/m (46.0 dBμV/m) for 216 to 960 MHz, and 500 μV/m (54.0 dBμV/m) for frequencies above 960 MHz.

All measurements were performed using Quasi-peak function of the spectrum analyzer with 120 kHz bandwidth up to 1000 MHz and above 1000 MHz averaging detector function and 1 MHz resolution bandwidth were used.

Test Results:

Test data is tabulated in Tables 5 to 6.of this section.

Conclusion:

Only the highest or measurable readings are shown. Signals from the local oscillators and their harmonics were more than 20 dB below the limit. Radiated tests were performed using both charger and the laptop. The test results are given for only the laptop as it showed the worst case scenario.

THE DUI COMPLIES WITH *CLASS B* LIMIT FOR RADIATED EMISSIONS.

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TABLE 1
CONDUCTED R.F. EMISSION LEVELS
QUASI-PEAK DETECTION (RB: 9kHz)
Line: LIVE

Frequency	Measured Level		Criteria Class B		Margin to Class B
(MHz)	(dBµV) "A1"	(µV)	(dBµV) "A2"	(µV)	(dB) "A3"
2.9352	53.14	453.9	56.0	631	2.9
4.8336	48.65	270.7	56.0	631	7.4
6.4598	41.87	124.0	60.0	1000	18.1
9.0510	43.59	151.2	60.0	1000	16.4
11.3842	42.53	133.8	60.0	1000	17.5
28.3132	37.14	71.9	60.0	1000	22.9

Margin to class B is: A3 = A2-A1 (in dB)

TABLE 2
CONDUCTED R.F. EMISSION LEVELS
QUASI-PEAK DETECTION (RB: 9kHz)
Line: NEUTRAL

Frequency	Measured Level		Criteria Class B		Margin to Class B
(MHz)	(dBµV) "A1"	(µV)	(dBµV) "A2"	(µV)	(dB) "A3"
2.7830	51.58	379.3	56.0	631	4.4
4.7516	45.30	184.1	56.0	631	10.7
7.9290	35.88	62.2	60.0	1000	24.1
9.0940	40.32	103.8	60.0	1000	19.7
11.1980	40.23	102.7	60.0	1000	19.8
28.6572	33.30	46.2	60.0	1000	26.7

Margin to class B is: A3 = A2-A1 (in dB)

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TABLE 3
CONDUCTED R.F. EMISSION LEVELS
Average Detection
Line: LIVE

Frequency	Measured Level		Criteria Class B		Margin to Class B
(MHz)	(dBµV) "A1"	(µV)	(dBµV) "A2"	(µV)	(dB) "A3"
2.9264	39.03	89.4	46.0	200	7.0
4.8280	33.06	45.0	46.0	200	12.9
6.4856	25.84	19.6	50.0	316	24.2
9.1204	25.45	18.7	50.0	316	24.6
11.3850	24.55	16.9	50.0	316	25.5
28.3310	20.37	10.4	50.0	316	29.6

Margin to class B is: A3 = A2-A1 (in dB)

TABLE 4
CONDUCTED R.F. EMISSION LEVELS
Average Detection
Line: NEUTRAL

Frequency	Measured Level		Criteria Class B		Margin to Class B
(MHz)	(dBµV) "A1"	(µV)	(dBµV) "A2"	(µV)	(dB) "A3"
2.7684	33.68	48.3	46.0	200	12.3
4.6820	28.46	26.5	46.0	200	17.5
7.9190	20.48	10.6	50.0	316	29.5
9.0882	22.71	13.7	50.0	316	27.3
11.2402	23.12	14.3	50.0	316	26.9
28.6536	18.30	8.2	50.0	316	31.7

Margin to class B is: A3 = A2-A1 (in dB)

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RADIATED R.F. EMISSION LEVELS

TABLE 5
FCC PART 15 CLASS B
QUASI-PEAK DETECTION, RB: 120 kHz
ANTENNA POLARIZATION: VERTICAL

Frequency	Measured Level at 3m	Correction Factor	Field Strength at 3m		Criteria Class B at 3m		Margin to Class B
(MHz)	(dBμV) "B1"	(dB/m) "B2"	(dBμV/m) "B3"	(μV/m)	(dBμV/m) "B5"	(μV/m)	(dB) "B7"
179.960	31.34	-13.7	17.6	7.6	43.5	150.0	25.9
260.500	28.65	-10.8	17.8	7.8	46.0	200.0	28.2
299.840	38.02	-9.5	28.5	26.7	46.0	200.0	17.5
319.840	37.27	-9.2	28.1	25.3	46.0	200.0	17.9
440.500	28.45	-5.1	23.3	14.7	46.0	200.0	22.7
481.000	34.20	-3.8	30.4	33.2	46.0	200.0	15.6

B3 = B1 + B2;
Margin to class B (in dB) is: B7 = B5 - B3;
Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) -Amp.Gain (dB)

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TABLE 6
FCC PART 15 CLASS B
QUASI-PEAK DETECTION, RB: 120 kHz
ANTENNA POLARIZATION: HORIZONTAL

Frequency	Measured Level at 3m	Correction Factor	Field Strength at 3m		Criteria Class B at 3m		Margin to Class B
(MHz)	(dBμV) "B1"	(dB/m) "B2"	(dBμV/m) "B3"	(μV/m)	(dBμV/m) "B5"	(μV/m)	(dB) "B7"
301.000	48.94	-9.5	39.5	94.2	46.0	200.0	6.5
320.500	37.76	-9.2	28.6	26.8	46.0	200.0	17.4
361.000	37.23	-8.3	28.9	27.9	46.0	200.0	17.1
400.000	34.61	-6.3	28.3	26.1	46.0	200.0	17.7
440.500	33.10	-5.1	28.0	25.1	46.0	200.0	18.0
569.000	29.89	-1.9	28.0	25.0	46.0	200.0	18.0
620.500	30.94	-1.1	29.8	30.9	46.0	200.0	16.2
701.500	31.81	1.4	33.2	45.6	46.0	200.0	12.8
742.000	30.5	2.5	33.0	44.5	46.0	200.0	13.1

B3 = B1 + B2;
Margin to class B (in dB) is: B7 = B5 - B3;
Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) -Amp.Gain (dB)

Test performed by: Kulchai Rotwan **Date:** December, 2004

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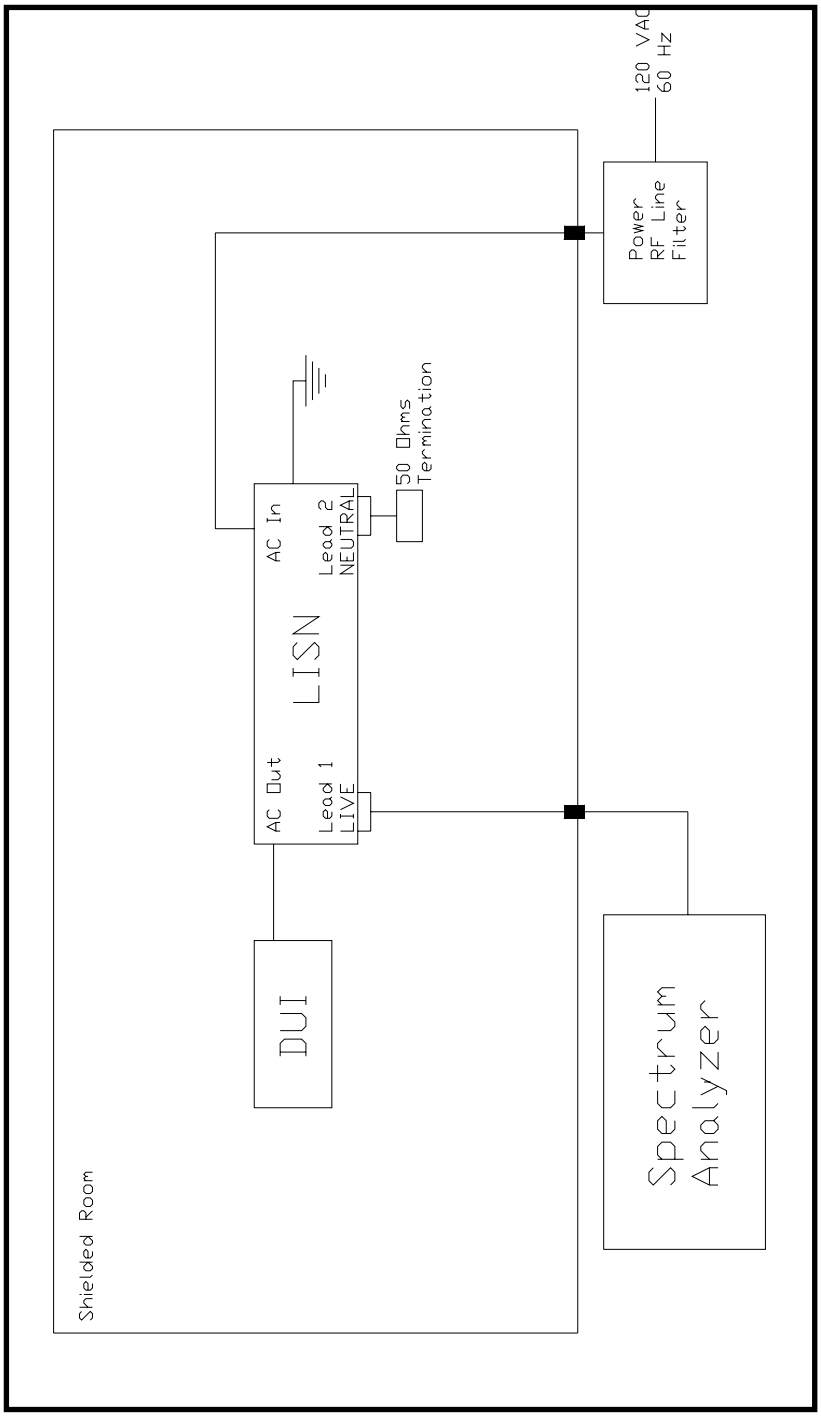

Fig. 1: Test set up for the power line conducted emission measurement.

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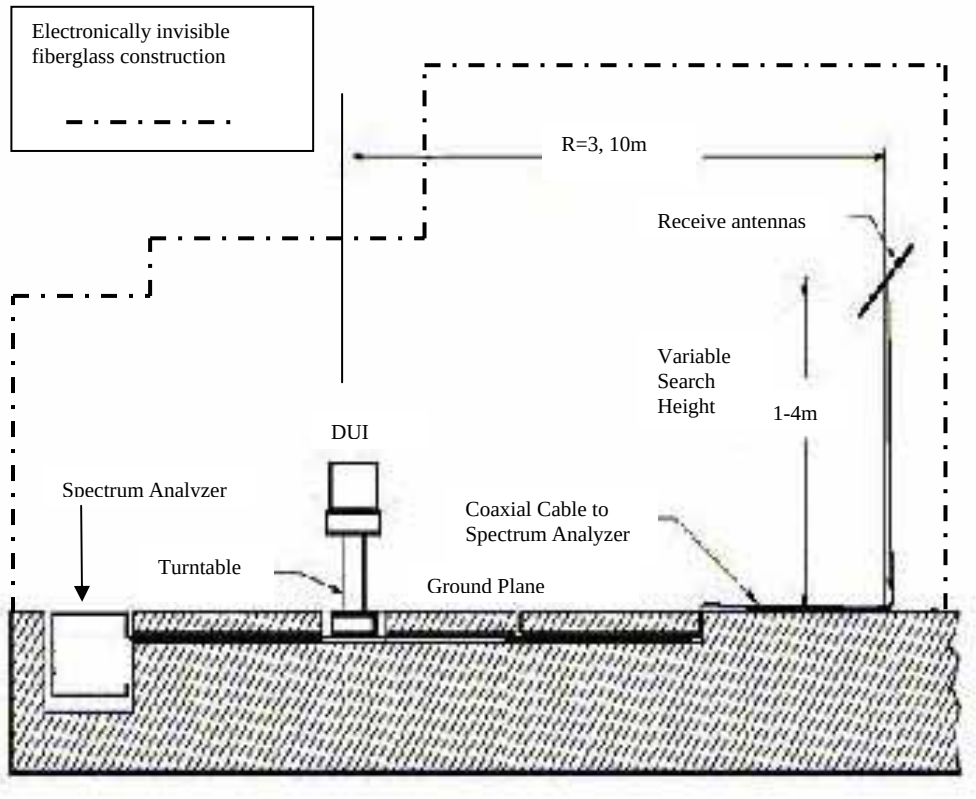

Figure 2.a: Test set up for the radiated emission measurement in OATS (not to scale)

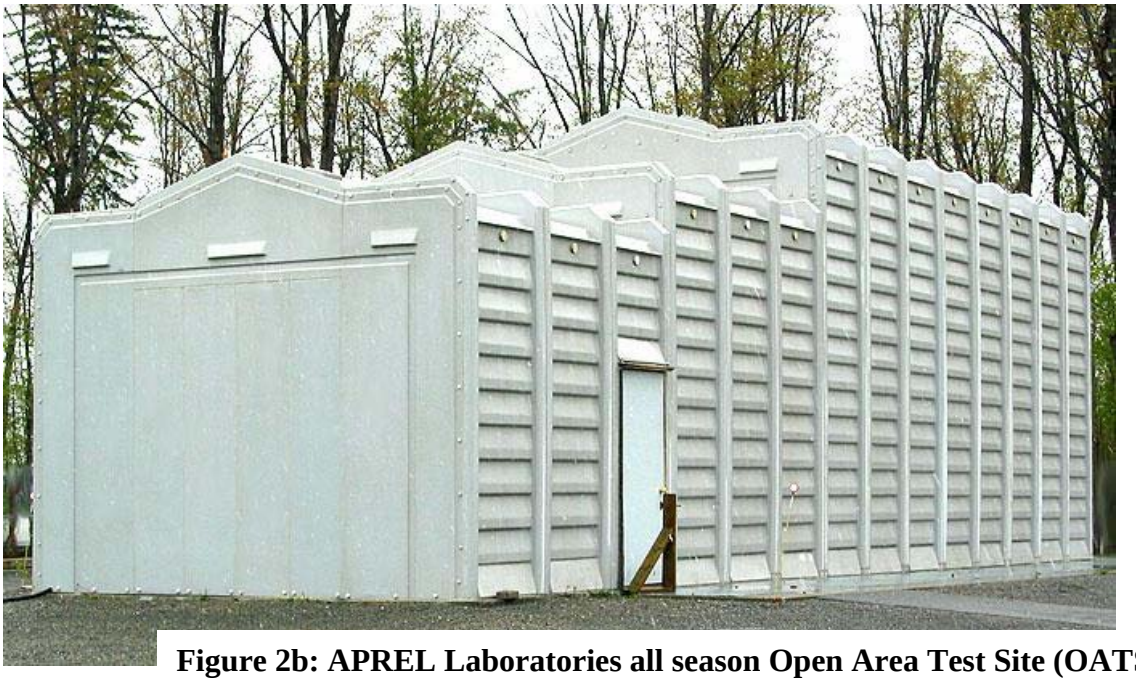

Figure 2b: APREL Laboratories all season Open Area Test Site (OATS)

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APPENDIX A

List of Equipment used for Evaluation of the DUI

Description	Range	Manufacturer	Model #	APREL Asset #	Cal. Due Date
Spectrum Analyzer	9 kHz-3 GHz	Anritsu	MS2661C	301330	September 11, 2005
Spectrum Analyzer	9 kHz – 30GHz	Anritsu	MS2667C	301386	September 5, 2005
Line Impedance Stabilization Network	10 kHz-1.0 GHz	APREL Inc.	—	301310	August 4, 2005
Bi-conical Antenna	20 MHz-200 MHz	Eaton	94455-1	100890	July 18, 2005
Log Periodic Antenna	200 MHz -1.0 GHz	Eaton	ALP-1	100063	July 31, 2005
Horn Antenna	1 GHz – 18 GHz	APREL Inc.	AA-118	100553	June 17, 2005
Mast with Controller	1 m - 4 m	EMCO	1051-12	100507	N/A
OATS	3m & 10 m	APREL Inc.	3 m & 10 m	N/A	N/A
Anichoic/Shielded Room	10 kHz - 10 GHz	APREL Inc.	—	301329	N/A
RF Antenna Pre-amplifier	30 MHz-1000MHz	APREL Inc.	LNA-1	301415	August 27, 2005
Microwave Pre-amplifier	1 GHz – 26.5 GHz	Hewlett-Packard	8449B	301462	June 16, 2005

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APPENDIX B
Photographs of DUI and Test-Setup

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Pictures of DUI (Wireless Dynamics Dual Mode GSM Cell Phone with Camera, Model: WDP318)

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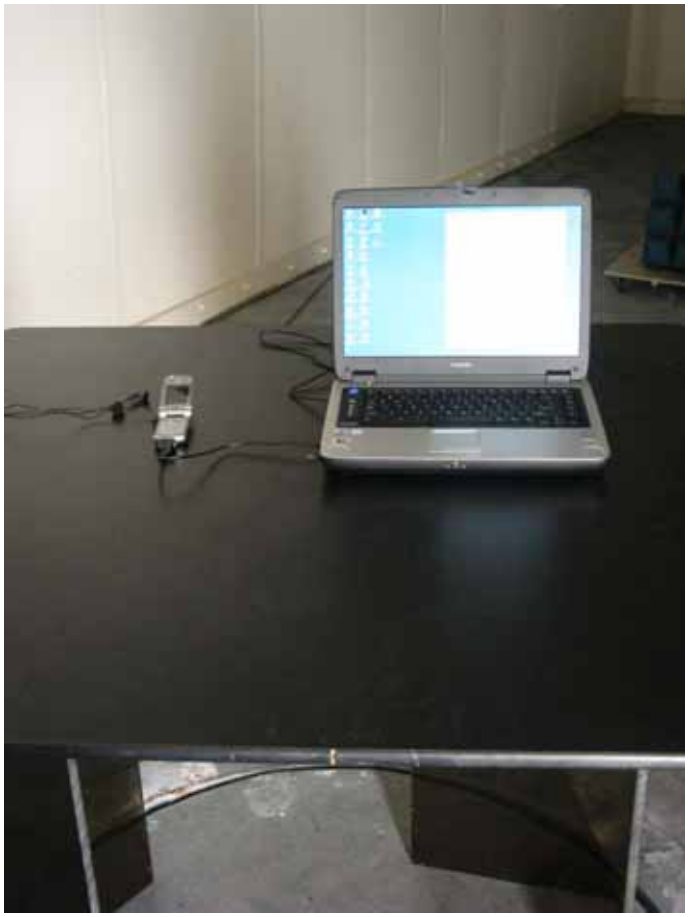

Radiated Emissions Measurement in Open Area Test Site
Testing setup: WDP318 connected to earphone and laptop PC

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Radiated Emissions Measurement in Open Area Test Site
Frequency range: 30 MHz – 200 MHz
Configuration: WDP318 connected to laptop PC and earphone

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Radiated Emissions Measurement in Open Area Test Site
Frequency range: 200 MHz – 1 GHz
Configuration: WDP318 connected to laptop PC and earphone

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Radiated Emissions Measurement in Open Area Test Site
Frequency range: 30 MHz – 200 MHz
Configuration: WDP318 connected to charger and earphone

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Radiated Emissions Measurement in Open Area Test Site
Frequency range: 200 MHz – 1 GHz
Configuration: WDP318 connected to charger and earphone

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