

# Radioframe Networks, Inc.

**GSM NA BV Release 1.0**

**December 01, 2004**

**Report No. RAFN0043.1 Rev 01**

Report Prepared By



[www.nwemc.com](http://www.nwemc.com)  
1-888-EMI-CERT

© 2004 Northwest EMC, Inc

**EMC Test Report**



22975 NW Evergreen Parkway  
Suite 400  
Hillsboro, Oregon 97124

**Certificate of Test**  
**Issue Date: December 01, 2004**  
**Radioframe Networks, Inc.**  
**Model: GSM NA BV Release 1.0**

Specification	Emissions		
	Test Method	Pass	Fail
FCC 15.107 AC Powerline Conducted Emissions (Receive Mode):2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.109 Radiated Emissions (Receive Mode):2004	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.111 Spurious Conducted Emissions - Cellular Band Receive Mode	ANSI C63.4:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 22H & 24E Frequency Stability:2004	TIA/EIA-603:2001	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 22H & 24E Effective Radiated Power:2004	TIA/EIA-603:2001	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 22H & 24E Occupied Bandwidth:2004	TIA/EIA-603:2001	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 2.1046 Output Power:2004	TIA/EIA-603:2001	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 22H & 24E Spurious Conducted Emissions:2004	TIA/EIA-603:2001	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 22H & 24E Spurious Radiated Emissions:2004	TIA/EIA-603:2001	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 22H & 24E Spurious Radiated (Simultaneous Transmit) Emissions:2004	TIA/EIA-603:2001	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Modifications made to the product**

See the Modifications section of this report

**Test Facility**

- The measurement facility used to collect the data is located at:  
Northwest EMC, Inc.; 22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124  
Phone: (503) 844-4066 Fax: 844-3826  
This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Don Facteau, IS Manager

*This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.*

*Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.*

<b>Revision Number</b>	<b>Description</b>	<b>Date</b>	<b>Page Number</b>
01	Revised EUT Description	3/2/05	9
01	Added Test Description, Data, Photos for Spurious Conducted Emissions	3/2/05	68-91
01	Added headers to Effective Radiated Power Test Description	3/2/05	40-42

**FCC:** Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities, have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



**NVLAP:** Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada. Accreditation has been granted to Northwest EMC, Inc. under Certificate Numbers: 200629-0, 200630-0, and 200676-0.



**Industry Canada:** Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.



**CAB:** Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement



**TÜV Product Service:** Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0401C



**TÜV Rheinland:** Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



**NEMKO:** Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



**Technology International:** Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



**Australia/New Zealand:** The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body. (NVLAP)



**VCCI:** Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration Nos. - Hillsboro: C-1071 and R-1025, Irvine: C-2094 and R-1943, Newberg: C-1877 and R-1760, Sultan: R-871, C-1784 and R-1761*)



**BSMI:** Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.



**GOST:** Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



## SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/scope.asp>

### What is measurement uncertainty?

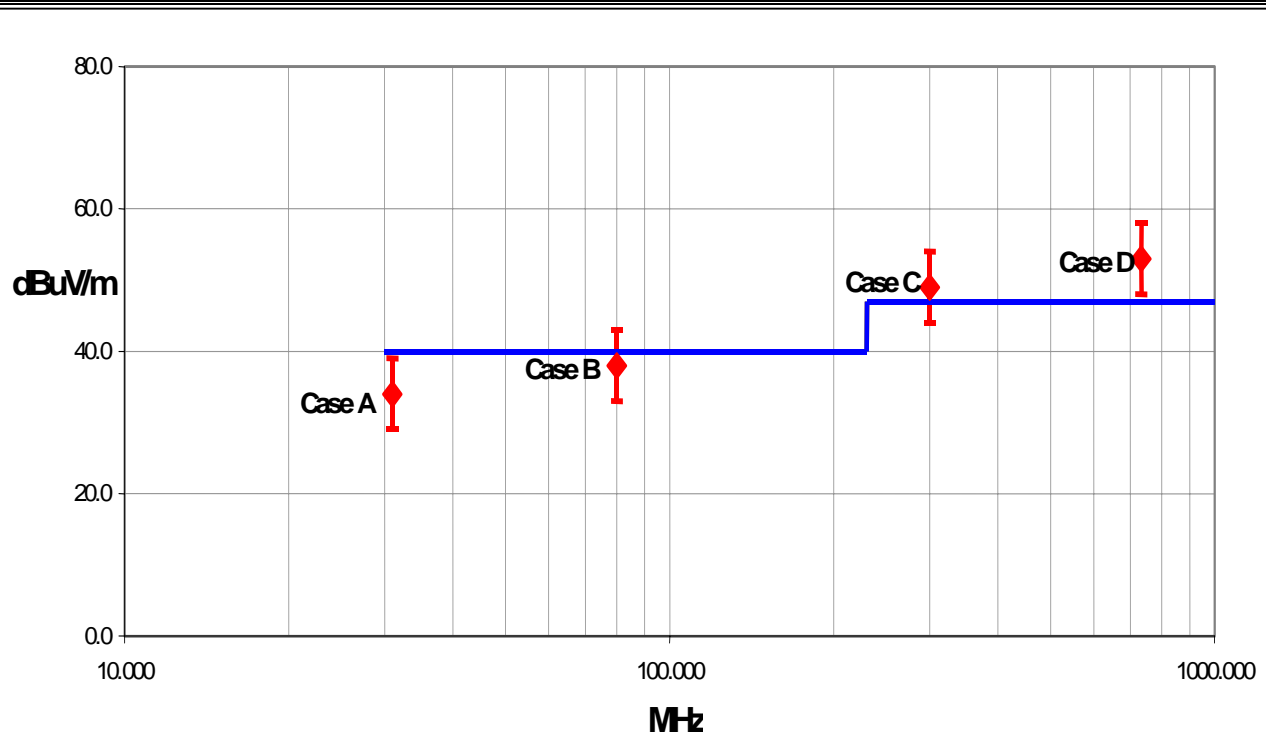
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- "ISO Guide to the Expression of Uncertainty in Measurements", October 1993
- "NIS81: The Treatment of Uncertainty in EMC Measurements", May 1994
- "IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques", December 2000

### How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and - measurement uncertainty, then test results can be interpreted from the diagram below.



#### Test Result Scenarios:

**Case A:** Product complies.

**Case B:** Product conditionally complies. It is not possible to say with 95% confidence that the product complies.

**Case C:** Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.

**Case D:** Product does not comply.

**Radiated Emissions ≤ 1 GHz**

Value (dB)

Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna	
		3m	10m	3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.86	+ 1.82	+ 2.23	+ 1.29	+ 1.31	+ 1.25
		- 1.88	- 1.87	- 1.41	- 1.26	- 1.27	- 1.25
Expanded uncertainty $U$ (level of confidence ≈ 95%)	normal (k=2)	+ 3.72	+ 3.64	+ 4.46	+ 2.59	+ 2.61	+ 2.49
		- 3.77	- 3.73	- 2.81	- 2.52	- 2.55	- 2.49

**Radiated Emissions > 1 GHz**

Value (dB)

Test Distance	Probability Distribution	Without High Pass Filter		With High Pass Filter	
		3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.29	+ 1.29	+ 1.38	+ 1.38
		- 1.25	- 1.25	- 1.35	- 1.35
Expanded uncertainty $U$ (level of confidence ≈ 95%)	normal (k=2)	+ 2.57	+ 2.57	+ 2.76	+ 2.76
		- 2.51	- 2.51	- 2.70	- 2.70

**Conducted Emissions**

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.48
Expanded uncertainty $U$ (level of confidence ≈ 95 %)	normal (k = 2)	2.97

**Radiated Immunity**

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty $U$ (level of confidence ≈ 95 %)	normal (k = 2)	2.11

**Conducted Immunity**

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty $U$ (level of confidence ≈ 95 %)	normal (k = 2)	2.10

**Legend**

$u_c(y)$  = square root of the sum of squares of the individual standard uncertainties

$U$  = combined standard uncertainty multiplied by the coverage factor:  $k$ . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then  $k=3$  (CL of 99.7%) can be used. Please note that with a coverage factor of one,  $u_c(y)$  yields a confidence level of only 68%.





**California**

**Orange County Facility**

41 Tesla Ave.  
Irvine, CA 92618  
(888) 364-2378  
FAX (503) 844-3826



**Oregon**

**Evergreen Facility**

22975 NW Evergreen Pkwy.,  
Suite 400  
Hillsboro, OR 97124  
(503) 844-4066  
FAX (503) 844-3826



**Oregon**

**Trails End Facility**

30475 NE Trails End Lane  
Newberg, OR 97132  
(503) 844-4066  
FAX (503) 537-0735



**Washington**

**Sultan Facility**

14128 339<sup>th</sup> Ave. SE  
Sultan, WA 98294  
(888) 364-2378  
FAX (360) 793-2536



**Party Requesting the Test**

<b>Company Name:</b>	Radioframe Networks, Inc.
<b>Address:</b>	1120 112th Ave NE, Suite 600
<b>City, State, Zip:</b>	Bellevue, WA 98004
<b>Test Requested By:</b>	Dean Busch
<b>Model:</b>	GSM NA BV Release 1.0
<b>First Date of Test:</b>	11/11/2004
<b>Last Date of Test:</b>	11/16/2004
<b>Receipt Date of Samples:</b>	11/09/2004
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No visual damage.

**Information Provided by the Party Requesting the Test**

<b>Clocks/Oscillators:</b>	5 and 50 MHz
<b>I/O Ports:</b>	Ethernet, SMA

**Functional Description of the EUT (Equipment Under Test):**

GSM radio blade designed for cellular and PCS band operation while installed in a RadioFrame pico-basestation.

**Client Justification for EUT Selection:**

The product is a representative production sample.

**Client Justification for Test Selection:**

These tests satisfy the FCC 22H and 24E requirements for the GSM radio blade.

**EUT Photo**

<b>Equipment modifications</b>					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Spurious Radiated Emissions – Stand Alone	11/11/2004	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
2	Effective Radiated Power	11/11/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
3	Frequency Stability	11/12/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
4	Spurious Conducted Emissions	11/15/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
5	Conducted Output Power	11/15/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
6	Occupied Bandwidth	11/15/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
7	Spurious Conducted Emissions - Cellular Band Receive Mode	11/15/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.
8	AC Power line Conducted Emissions	11/16/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.	EUT remained at Northwest EMC.

**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low

Mid

High

**Operating Modes Investigated:**

GSM Cellular Receive Mode

**Output Power Setting(s) Investigated:**

Maximum

**Power Input Settings Investigated:**

120 VAC, 60 Hz.

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Backplane	Radio Frame Networks	RFU	N/A
802.11(b/g) Radio Blade (EUT)	RadioFrame Networks, Inc.	iRAP	192168200215
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
PC	Dell	Inspiron 1100	07899029300023
BCU	RadioFrame Networks, Inc	N/A	E0032
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
LAN	No	2.5	No	EUT	ACU
LAN	No	5.0	No	BCU	ACU

**Measurement Equipment**

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
LISN	Solar	9252-50-R-24-BNC	LIO	04/30/2004	12 mo
High Pass Filter	TTE	H97-100k-50-720B	HFC	02/01/2004	13 mo

**Test Description**

**Requirement:** Per 47 15.107(d), if the EUT is connected to the AC power line indirectly, obtaining its power from another device that is connected to the AC power line, then it should be tested to demonstrate compliance with the conducted limits of 15.107.

**Configuration:** The EUT will be powered from a device that could be connected to the AC power line. Therefore, the measurements were made on the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.4-1992.

**Completed by:**


EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Bush	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.107 AC Powerline Conducted Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

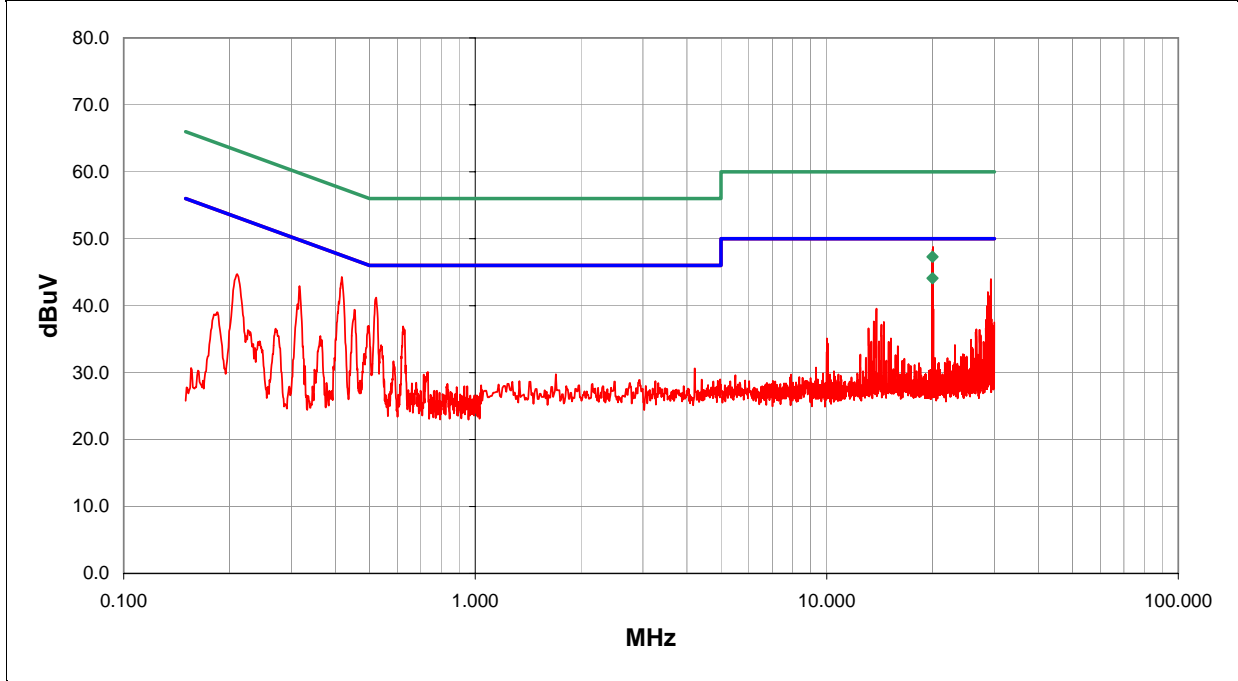
**EUT OPERATING MODES**  
 Low channel, GSM Cellular receive mode

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Line	Run #
Pass	L1	10

Other

  
 Tested By:



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
19.999	22.7	0.0	1.4	20.0	AV	44.1	50.0	-5.9
20.002	25.9	0.0	1.4	20.0	QP	47.3	60.0	-12.7
20.064	27.4	0.0	1.3	20.0		48.7	50.0	-1.3
20.052	27.4	0.0	1.3	20.0		48.7	50.0	-1.3
20.012	27.1	0.0	1.3	20.0		48.4	50.0	-1.6
20.001	26.3	0.0	1.3	20.0		47.6	50.0	-2.4
0.417	24.1	0.0	0.2	20.0		44.3	47.5	-3.2
20.023	25.0	0.0	1.3	20.0		46.3	50.0	-3.7
0.523	21.0	0.0	0.2	20.0		41.2	46.0	-4.8
29.296	22.3	0.0	1.7	20.0		44.0	50.0	-6.0
0.317	22.8	0.0	0.1	20.0		42.9	49.8	-6.9
0.453	19.2	0.0	0.2	20.0		39.4	46.8	-7.4
28.746	20.4	0.0	1.6	20.0		42.0	50.0	-8.0
0.210	24.6	0.0	0.1	20.0		44.7	53.2	-8.5
29.164	19.8	0.0	1.7	20.0		41.5	50.0	-8.5
20.034	20.1	0.0	1.3	20.0		41.4	50.0	-8.6
0.497	16.8	0.0	0.2	20.0		37.0	46.0	-9.0
0.623	16.7	0.0	0.2	20.0		36.9	46.0	-9.1
28.614	18.3	0.0	1.6	20.0		39.9	50.0	-10.1

# CONDUCTED EMISSIONS DATA SHEET

EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Bush	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.107 AC Powerline Conducted Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

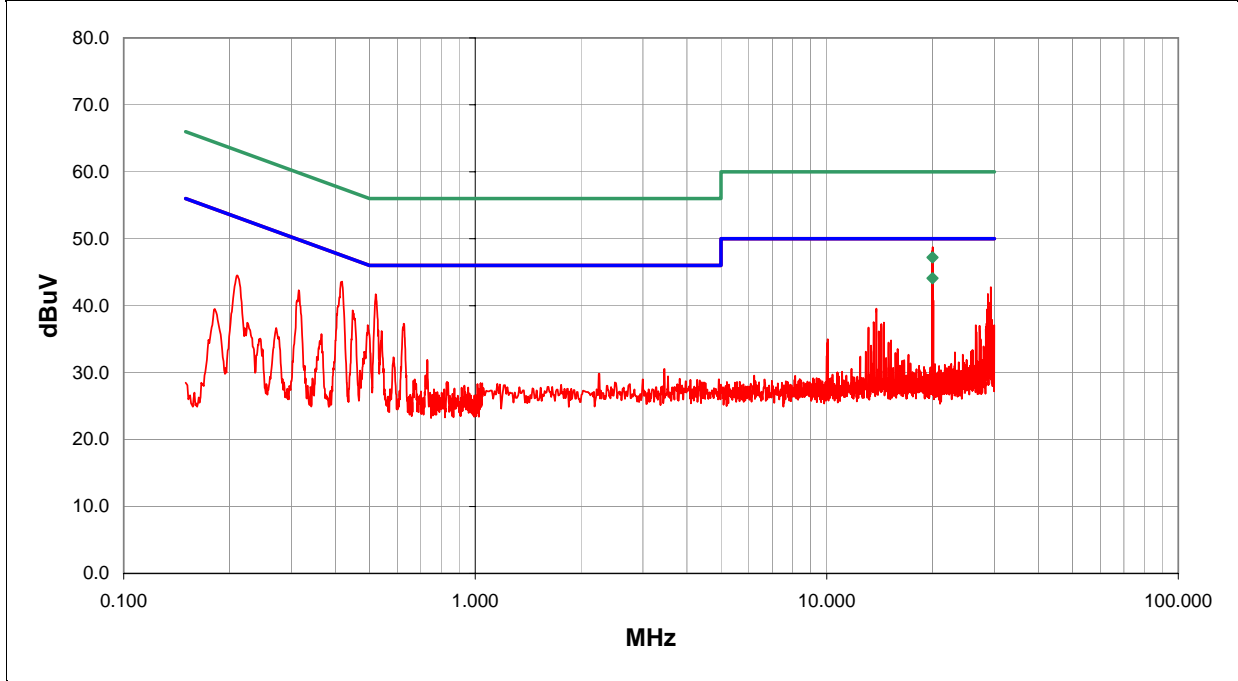
**EUT OPERATING MODES**  
 Low channel, GSM Cellular receive mode

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Line	Run #
Pass	N	11

Other

  
 Tested By:



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
19.999	22.7	0.0	1.4	20.0	AV	44.1	50.0	-5.9
20.002	25.8	0.0	1.4	20.0	QP	47.2	60.0	-12.8
20.012	27.4	0.0	1.3	20.0		48.7	50.0	-1.3
20.064	27.1	0.0	1.3	20.0		48.4	50.0	-1.6
20.052	27.0	0.0	1.3	20.0		48.3	50.0	-1.7
20.001	26.9	0.0	1.3	20.0		48.2	50.0	-1.8
0.418	23.4	0.0	0.2	20.0		43.6	47.5	-3.9
20.023	24.6	0.0	1.3	20.0		45.9	50.0	-4.1
0.521	21.5	0.0	0.2	20.0		41.7	46.0	-4.3
29.296	21.1	0.0	1.7	20.0		42.8	50.0	-7.2
0.315	22.2	0.0	0.1	20.0		42.3	49.8	-7.5
0.448	19.1	0.0	0.2	20.0		39.3	46.9	-7.6
28.746	20.1	0.0	1.6	20.0		41.7	50.0	-8.3
20.034	20.3	0.0	1.3	20.0		41.6	50.0	-8.4
0.210	24.4	0.0	0.1	20.0		44.5	53.2	-8.7
0.626	17.1	0.0	0.2	20.0		37.3	46.0	-8.7
0.495	16.9	0.0	0.2	20.0		37.1	46.1	-9.0
20.088	19.5	0.0	1.3	20.0		40.8	50.0	-9.2
20.076	19.5	0.0	1.3	20.0		40.8	50.0	-9.2

EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Bush	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.107 AC Powerline Conducted Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

<b>SAMPLE CALCULATIONS</b>	
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation	
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator	

**COMMENTS**

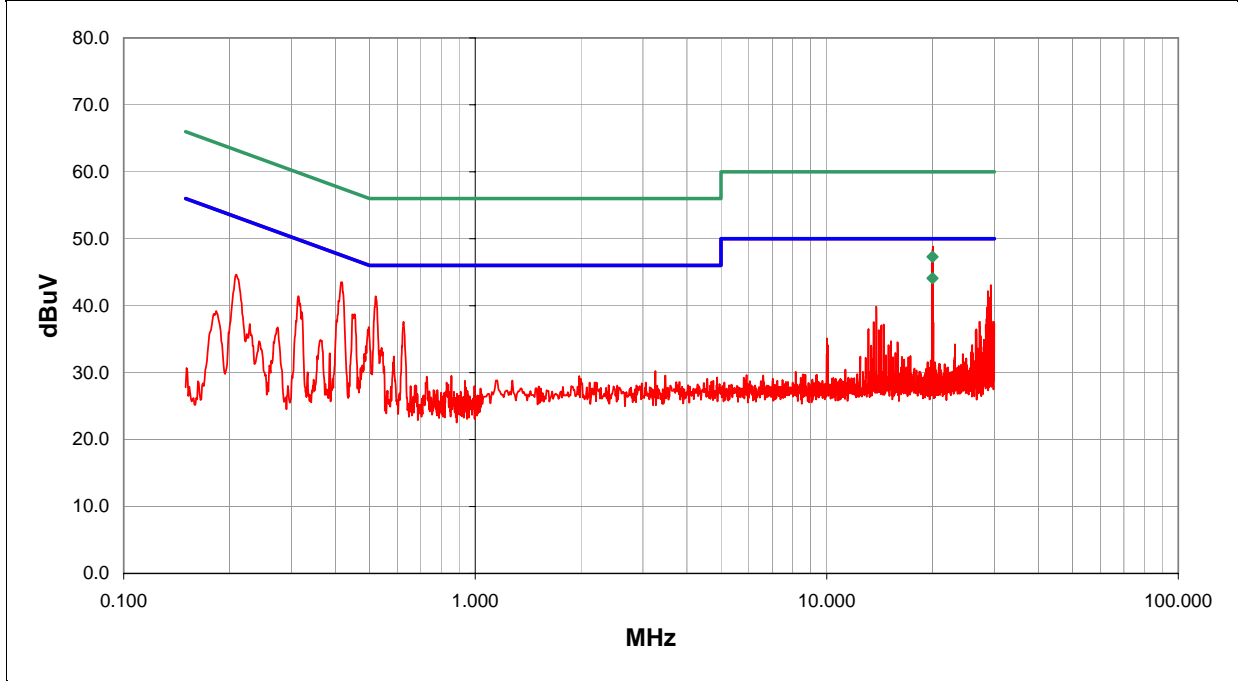
**EUT OPERATING MODES**  
Mid channel, GSM Cellular receive mode

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

<b>RESULTS</b>	Line	Run #
Pass	L1	12

Other

  
 Tested By:



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
20.002	22.7	0.0	1.4	20.0	AV	44.1	50.0	-5.9
20.002	25.9	0.0	1.4	20.0	QP	47.3	60.0	-12.7
20.052	27.5	0.0	1.3	20.0		48.8	50.0	-1.2
20.064	27.3	0.0	1.3	20.0		48.6	50.0	-1.4
20.012	27.1	0.0	1.3	20.0		48.4	50.0	-1.6
20.001	26.6	0.0	1.3	20.0		47.9	50.0	-2.1
20.034	25.1	0.0	1.3	20.0		46.4	50.0	-3.6
20.023	25.1	0.0	1.3	20.0		46.4	50.0	-3.6
0.416	23.3	0.0	0.2	20.0		43.5	47.5	-4.0
0.521	21.2	0.0	0.2	20.0		41.4	46.0	-4.6
29.296	21.4	0.0	1.7	20.0		43.1	50.0	-6.9
28.735	20.5	0.0	1.6	20.0		42.1	50.0	-7.9
0.447	18.5	0.0	0.2	20.0		38.7	46.9	-8.2
0.625	17.4	0.0	0.2	20.0		37.6	46.0	-8.4
0.314	21.3	0.0	0.1	20.0		41.4	49.9	-8.5
0.209	24.5	0.0	0.1	20.0		44.6	53.2	-8.6
29.164	19.6	0.0	1.7	20.0		41.3	50.0	-8.7
0.498	16.6	0.0	0.2	20.0		36.8	46.0	-9.2
19.990	18.7	0.0	1.3	20.0		40.0	50.0	-10.0



EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Bush	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.107 AC Powerline Conducted Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

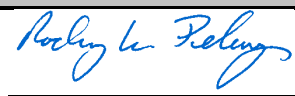
**COMMENTS**

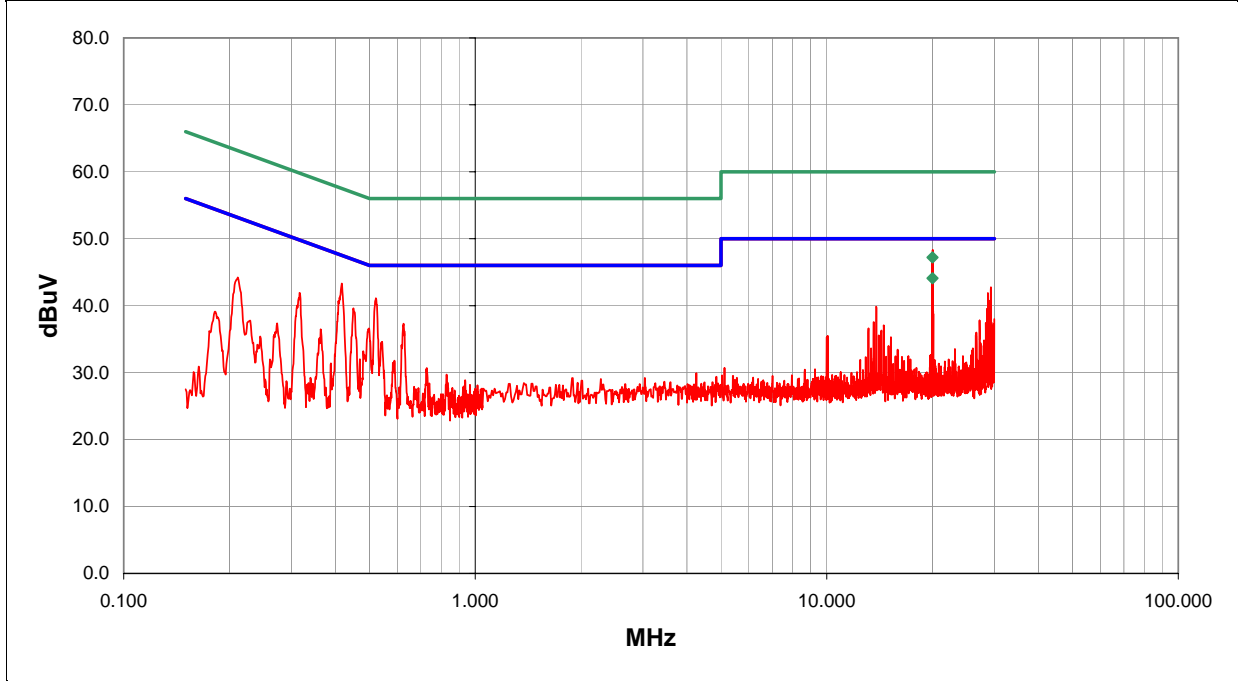
**EUT OPERATING MODES**  
 Mid channel, GSM Cellular receive mode

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Line	Run #
Pass	N	13

Other

  
 \_\_\_\_\_  
 Tested By:



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
20.002	22.7	0.0	1.4	20.0	AV	44.1	50.0	-5.9
20.002	25.8	0.0	1.4	20.0	QP	47.2	60.0	-12.8
20.012	27.0	0.0	1.3	20.0		48.3	50.0	-1.7
20.064	26.9	0.0	1.3	20.0		48.2	50.0	-1.8
20.052	26.7	0.0	1.3	20.0		48.0	50.0	-2.0
20.001	26.3	0.0	1.3	20.0		47.6	50.0	-2.4
20.023	25.6	0.0	1.3	20.0		46.9	50.0	-3.1
0.417	23.1	0.0	0.2	20.0		43.3	47.5	-4.2
0.522	20.9	0.0	0.2	20.0		41.1	46.0	-4.9
20.034	22.3	0.0	1.3	20.0		43.6	50.0	-6.4
29.296	21.1	0.0	1.7	20.0		42.8	50.0	-7.2
0.451	19.4	0.0	0.2	20.0		39.6	46.9	-7.3
0.317	21.8	0.0	0.1	20.0		41.9	49.8	-7.9
28.735	20.2	0.0	1.6	20.0		41.8	50.0	-8.2
0.625	17.1	0.0	0.2	20.0		37.3	46.0	-8.7
0.211	24.1	0.0	0.1	20.0		44.2	53.2	-8.9
29.175	19.1	0.0	1.7	20.0		40.8	50.0	-9.2
0.498	16.4	0.0	0.2	20.0		36.6	46.0	-9.4
13.824	18.8	0.0	1.1	20.0		39.9	50.0	-10.1

EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Bush	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.107 AC Powerline Conducted Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

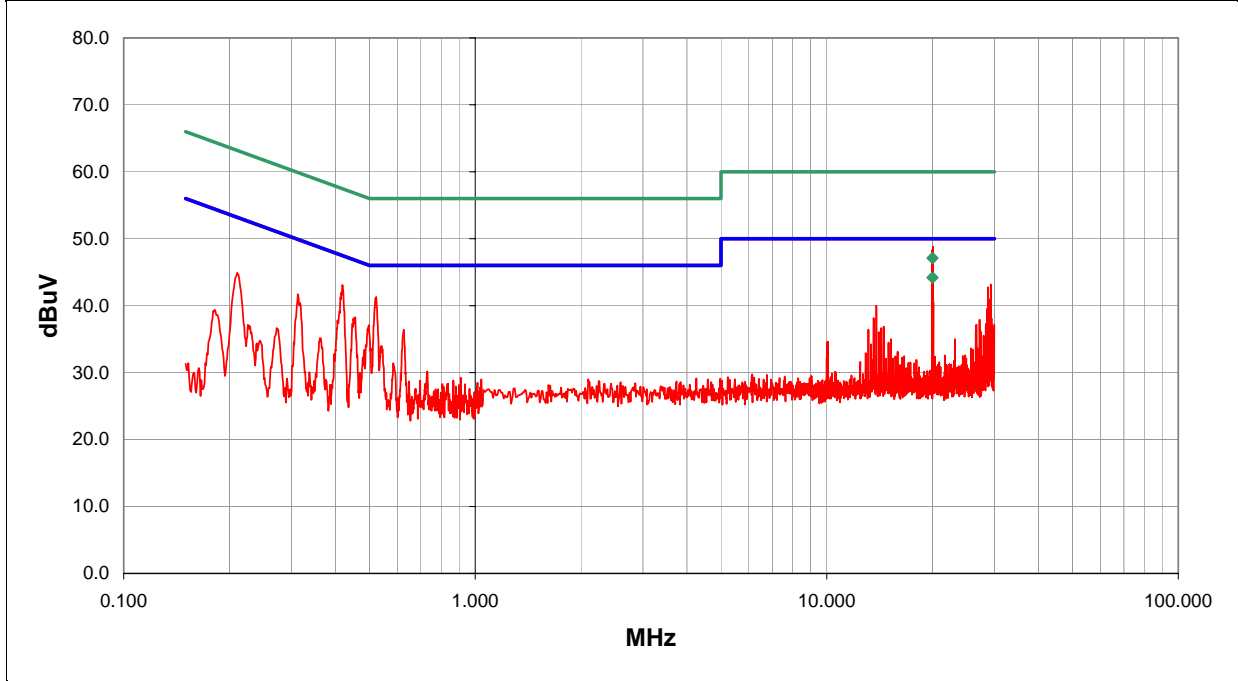
**EUT OPERATING MODES**  
 High channel, GSM Cellular receive mode

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Line	Run #
Pass	L1	14

Other

  
 Tested By:



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
20.001	22.8	0.0	1.4	20.0	AV	44.2	50.0	-5.8
20.001	25.7	0.0	1.4	20.0	QP	47.1	60.0	-12.9
20.064	27.5	0.0	1.3	20.0		48.8	50.0	-1.2
20.012	27.1	0.0	1.3	20.0		48.4	50.0	-1.6
20.001	27.0	0.0	1.3	20.0		48.3	50.0	-1.7
20.052	26.7	0.0	1.3	20.0		48.0	50.0	-2.0
0.419	22.9	0.0	0.2	20.0		43.1	47.5	-4.4
0.523	21.1	0.0	0.2	20.0		41.3	46.0	-4.7
20.023	23.8	0.0	1.3	20.0		45.1	50.0	-4.9
29.296	21.5	0.0	1.7	20.0		43.2	50.0	-6.8
28.746	21.1	0.0	1.6	20.0		42.7	50.0	-7.3
20.034	21.2	0.0	1.3	20.0		42.5	50.0	-7.5
0.313	21.6	0.0	0.1	20.0		41.7	49.9	-8.2
19.990	20.5	0.0	1.3	20.0		41.8	50.0	-8.2
0.210	24.8	0.0	0.1	20.0		44.9	53.2	-8.3
0.455	18.1	0.0	0.2	20.0		38.3	46.8	-8.5
20.076	19.8	0.0	1.3	20.0		41.1	50.0	-8.9
0.498	16.9	0.0	0.2	20.0		37.1	46.0	-8.9
29.175	19.3	0.0	1.7	20.0		41.0	50.0	-9.0

EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Bush	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.107 AC Powerline Conducted Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

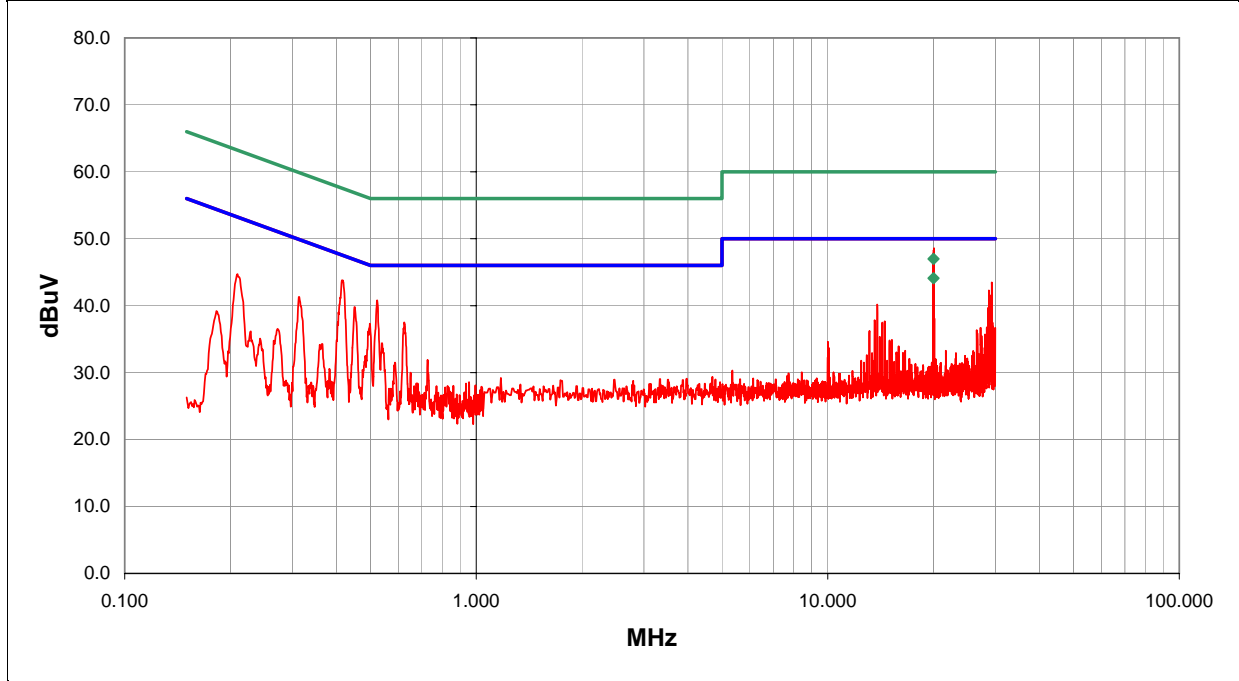
**EUT OPERATING MODES**  
 High channel, GSM Cellular receive mode

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Line	Run #
Pass	N	15

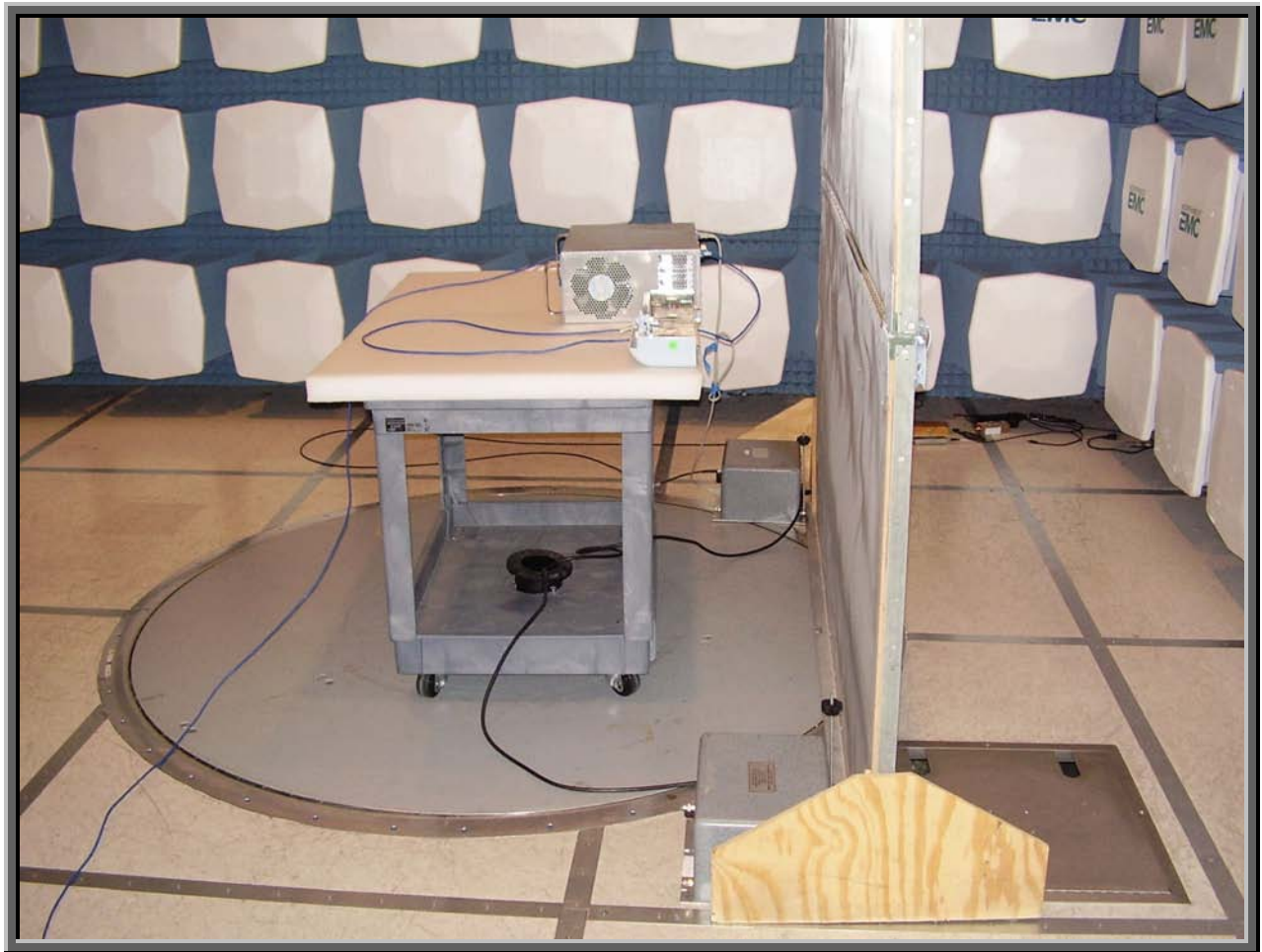
Other

  
 Tested By:



Freq (MHz)	Amplitude (dBuV)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
19.998	22.7	0.0	1.4	20.0	AV	44.1	50.0	-5.9
19.998	25.6	0.0	1.4	20.0	QP	47.0	60.0	-13.0
20.064	27.3	0.0	1.3	20.0		48.6	50.0	-1.4
20.052	27.0	0.0	1.3	20.0		48.3	50.0	-1.7
20.012	27.0	0.0	1.3	20.0		48.3	50.0	-1.7
20.023	26.6	0.0	1.3	20.0		47.9	50.0	-2.1
20.001	26.3	0.0	1.3	20.0		47.6	50.0	-2.4
0.415	23.6	0.0	0.2	20.0		43.8	47.6	-3.8
0.523	20.6	0.0	0.2	20.0		40.8	46.0	-5.2
29.285	21.8	0.0	1.7	20.0		43.5	50.0	-6.5
20.034	22.0	0.0	1.3	20.0		43.3	50.0	-6.7
0.451	19.6	0.0	0.2	20.0		39.8	46.9	-7.1
28.735	20.6	0.0	1.6	20.0		42.2	50.0	-7.8
29.164	19.9	0.0	1.7	20.0		41.6	50.0	-8.4
0.624	17.3	0.0	0.2	20.0		37.5	46.0	-8.5
0.209	24.6	0.0	0.1	20.0		44.7	53.2	-8.5
0.314	21.2	0.0	0.1	20.0		41.3	49.9	-8.6
0.498	17.1	0.0	0.2	20.0		37.3	46.0	-8.7
13.824	19.1	0.0	1.1	20.0		40.2	50.0	-9.8







**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. All of the EUT parameters listed below were investigated. This includes, but may not be limited to, CPU speeds, video resolution settings, operational modes, and input voltages.

**Operating Modes Investigated:**

GSM (low band) receive mode

**Channels in Specified Band Investigated:**

Low

Mid

High

**Power Input Settings Investigated:**

120 VAC, 60 Hz

**Frequency Range Investigated**

<b>Start Frequency</b>	30 MHz	<b>Stop Frequency</b>	5 GHz
------------------------	--------	-----------------------	-------

**Software\Firmware Applied During Test**

<b>Exercise software</b>	Plat_Maint	<b>Version</b>	1.5.048
--------------------------	------------	----------------	---------

**Description**

The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.

**EUT and Peripherals in Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Backplane	Radio Frame Networks	RFU	N/A
GSM Radio Blade (EUT)	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	12104320038

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
BCU	Radio Frame Networks	Digital Chassis Unit	E0032
Clock source	Motorola	X516	CAF 030LT00

Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary.

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
LAN	No	1.5	No	Backplane	BCU

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

**Measurement Equipment**

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo

**Test Description**

The final radiated emissions test was performed using the parameters described above as worst case. That final test was conducted at a facility that meets the ANSI C63.4 NSA requirements. The frequency range noted in the data sheets was scanned/tested at that facility. Emissions were maximized as specified, by maximizing table azimuth, antenna height, and cable manipulation.

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

*Note: The specified distance is the horizontal separation between the closest periphery of the EUT and the center of the axis of the elements of the receiving antenna. However, if the receiving antenna is a log-periodic array, the specified distance shall be the distance between the closest periphery of the EUT and the front-to-back center of the array of elements.*

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 1 meter, 3 meters, 5 meters, 10 meters, or 30 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

**Measurement Bandwidths**

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

**Measurements were made using the bandwidths and detectors specified. No video filter was used.**

**Completed by:**




EUT:	GSM NA BV Release 1.0	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Bush	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>			
Specification:	FCC 15.109	Year:	2004
Method:	ANSI C63.4	Year:	2003

<b>SAMPLE CALCULATIONS</b>			
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation			
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator			

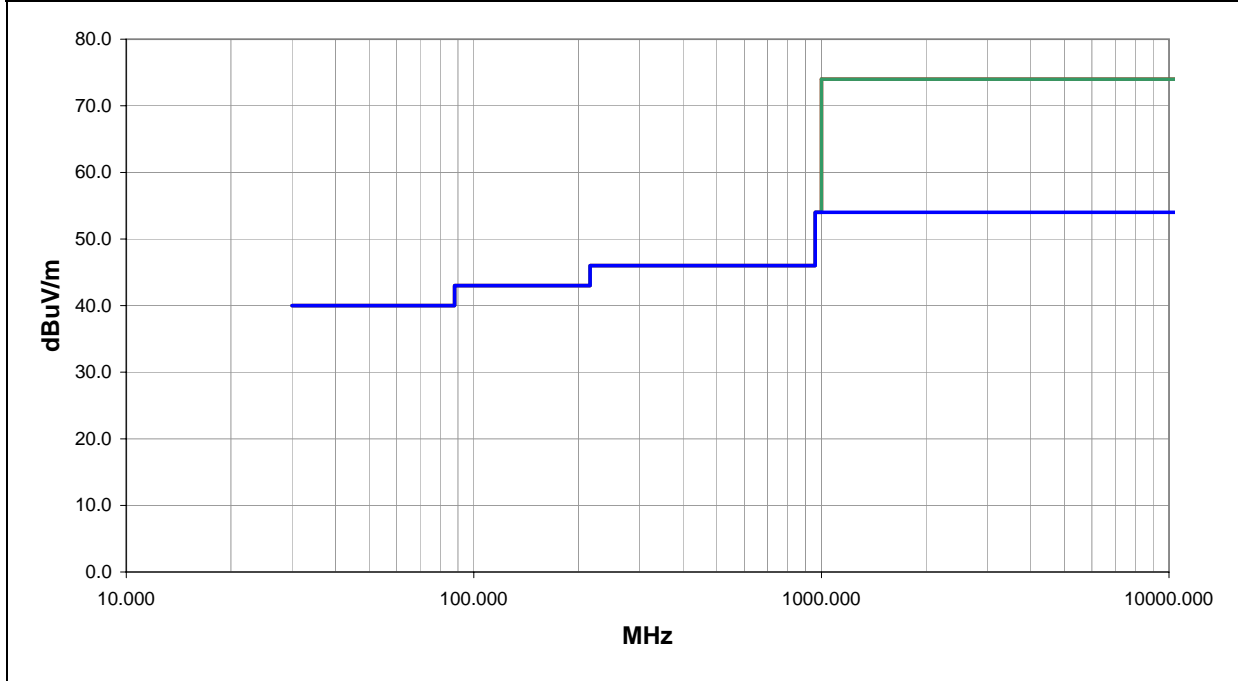
<b>COMMENTS</b>			
ACU & BCU remote			

<b>EUT OPERATING MODES</b>			
GSM Cellular receive mode			

<b>DEVIATIONS FROM TEST STANDARD</b>			
No deviations.			

<b>RESULTS</b>			<b>Run #</b>
N/A			17

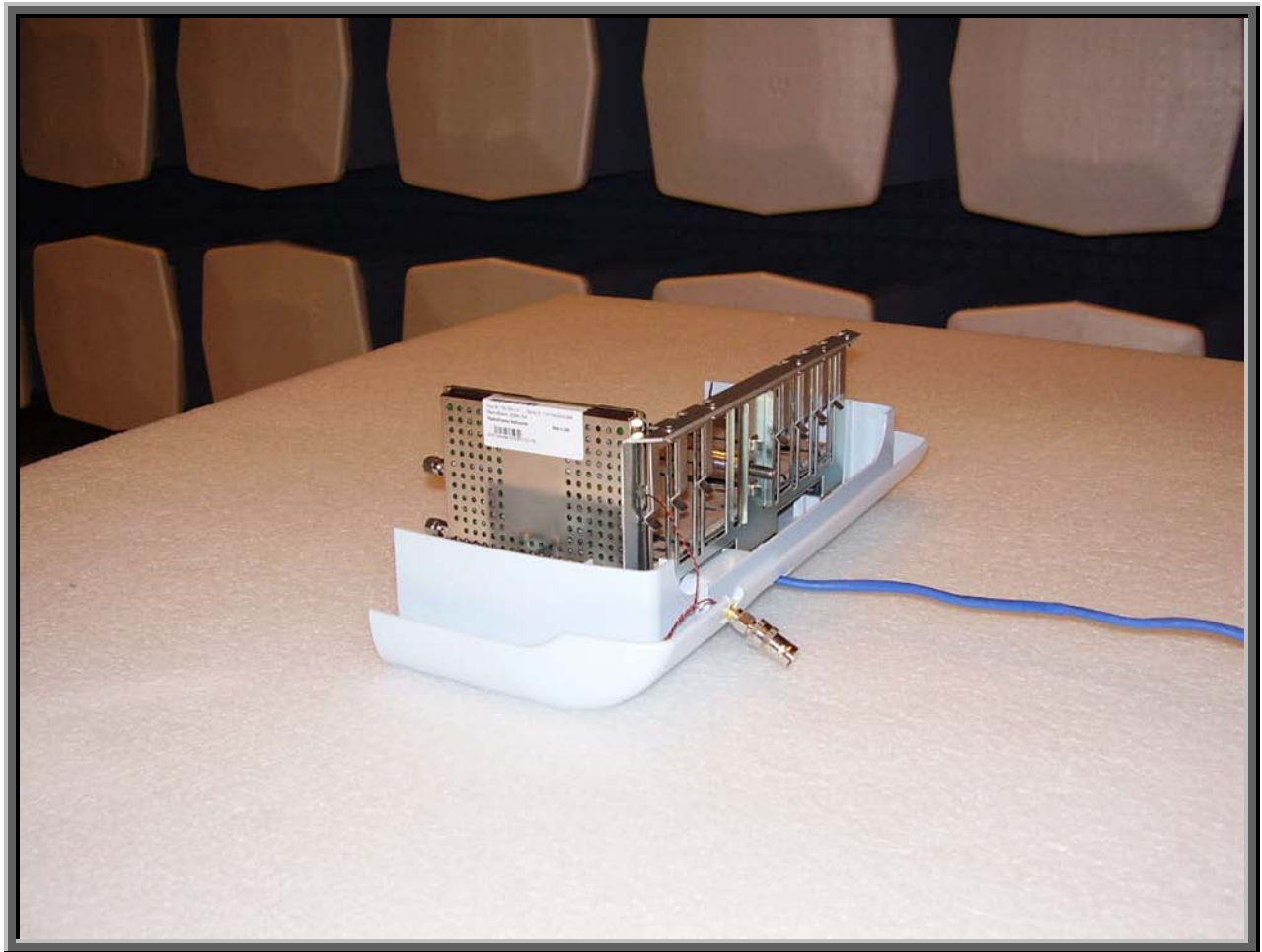
Other	 Tested By: _____
-------	--



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
------------	------------------	-------------	-------------------	-----------------	-------------------	---------------------------	----------	----------	--------------------------	-----------------	--------------------	------------------------

No emissions detected from receiver.





**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low
Mid
High

**Operating Modes Investigated:**

GSM Low Band (Cellular) – Receive Mode
--

**Power Input Settings Investigated:**

120 VAC, 60 Hz.
-----------------

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Backplane	Radio Frame Networks	RFU	N/A
GSM Radio Blade (EUT)	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	12104320038

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

## Measurement Equipment

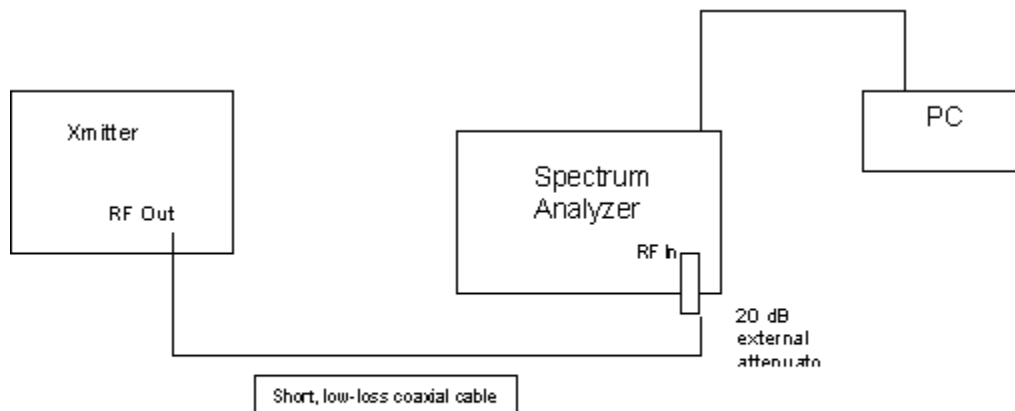
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

## Test Description

**Requirement:** Per 47 CFR 15.111, receivers that operate (tune) in the frequency range 30 to 960 MHz that provide terminals for the connection of an external receiving antenna may be tested to demonstrate compliance with the provisions of Section 15.109 with the antenna terminals terminated, provided the conducted power at the antenna terminals at any frequency within the range of measurements specified in Section 15.33 (30 MHz to 5 GHz for cellular receiver) does not exceed 2.0 nW (-57 dBm).

**Configuration:** A spectrum analyzer was used to scan from 30 to 5 GHz. A 100 kHz resolution bandwidth was used. No video filtering was employed. A 20dB external attenuator was used on the RF input of the spectrum analyzer.

## Test Setup Diagram



Completed by:

*A. U. K. P.*

# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.111(a)	Year: 2004	Method: ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

**COMMENTS**

**EUT OPERATING MODES**

Receive Mode

**DEVIATIONS FROM TEST STANDARD**

None

**REQUIREMENTS**

The power at the antenna terminal at any frequency within 30 MHz to 5 GHz shall not exceed 2.0 nW (-57 dBm)

**RESULTS**

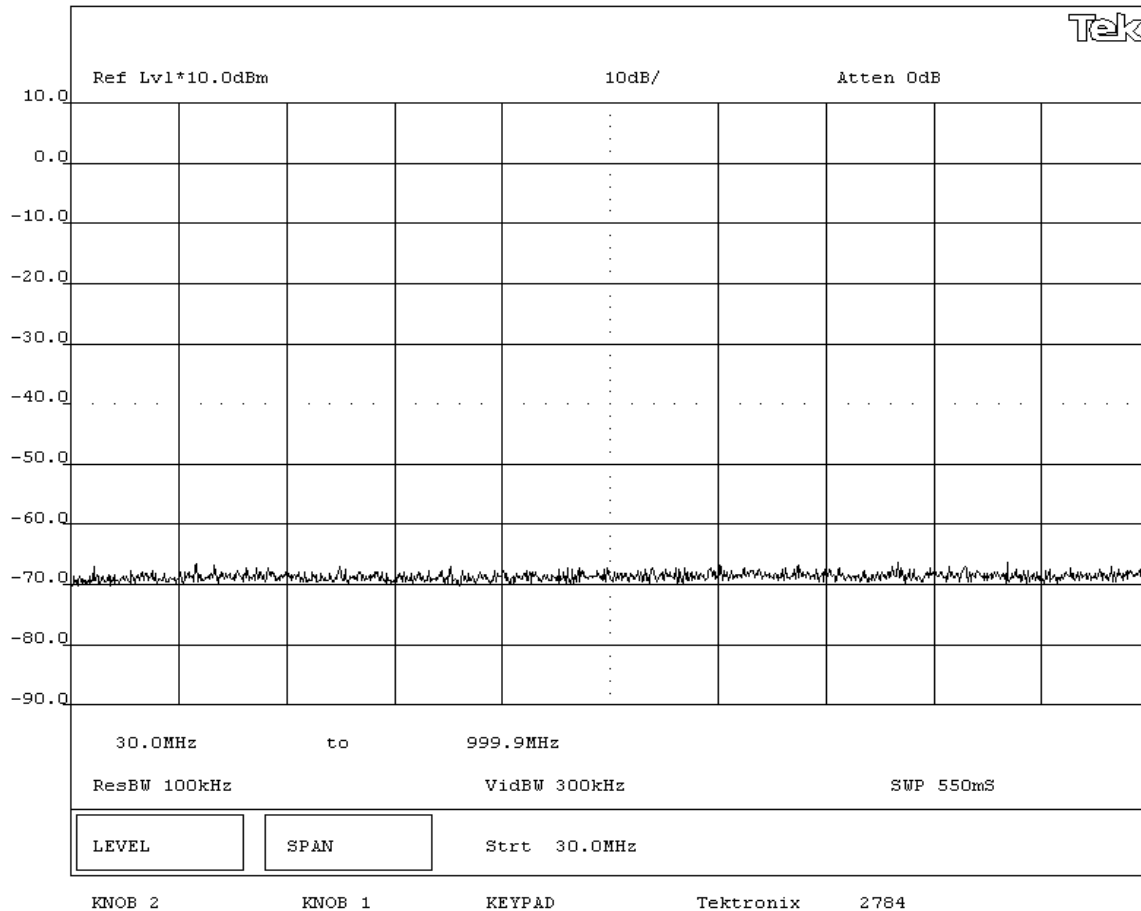
Pass

**SIGNATURE**

Tested By: *Greg Kiemel*

**DESCRIPTION OF TEST**

**Spurious Conducted Emissions - Low Channel - Cellular Band**



EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz
Tested by: Greg Kiemel	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.111(a)	Year: 2004	Method: ANSI C63.4	Year: 2003

**SAMPLE CALCULATIONS**

**COMMENTS**

**EUT OPERATING MODES**

Receive Mode

**DEVIATIONS FROM TEST STANDARD**

None

**REQUIREMENTS**

The power at the antenna terminal at any frequency within 30 MHz to 5 GHz shall not exceed 2.0 nW (-57 dBm)

**RESULTS**

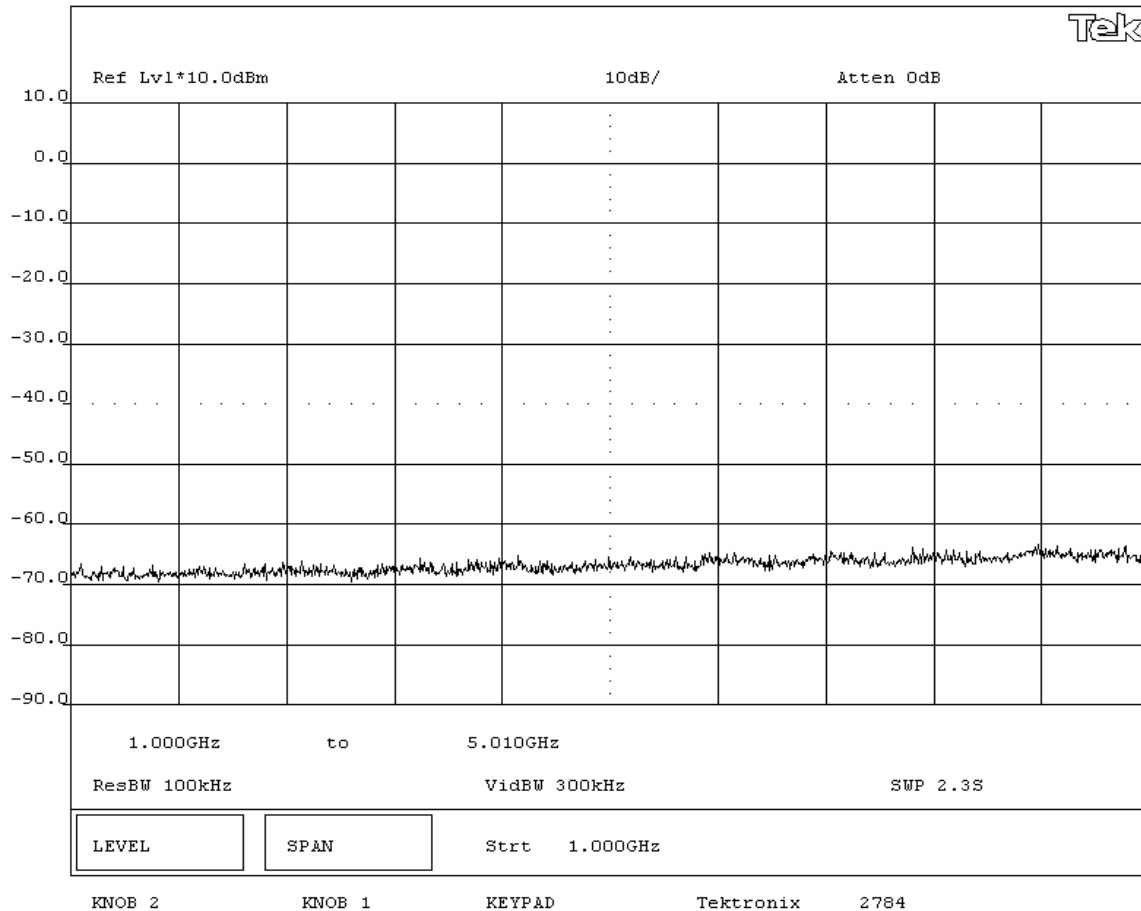
Pass

**SIGNATURE**

Tested By: *Greg Kiemel*

**DESCRIPTION OF TEST**

**Spurious Conducted Emissions - Low Channel - Cellular Band**







# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043	
Serial Number: 12104320038		Date: 11/15/04	
Customer: RadioFrame Networks, Inc.		Temperature: 73 F	
Attendees: Dean Busch		Humidity: 41%	
Customer Ref. No.: N/A	Tested by: Greg Kiemel	Job Site: EV06	
Power: 120VAC/60Hz			

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.111(a)	Year: 2004	Method: ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Receive Mode			

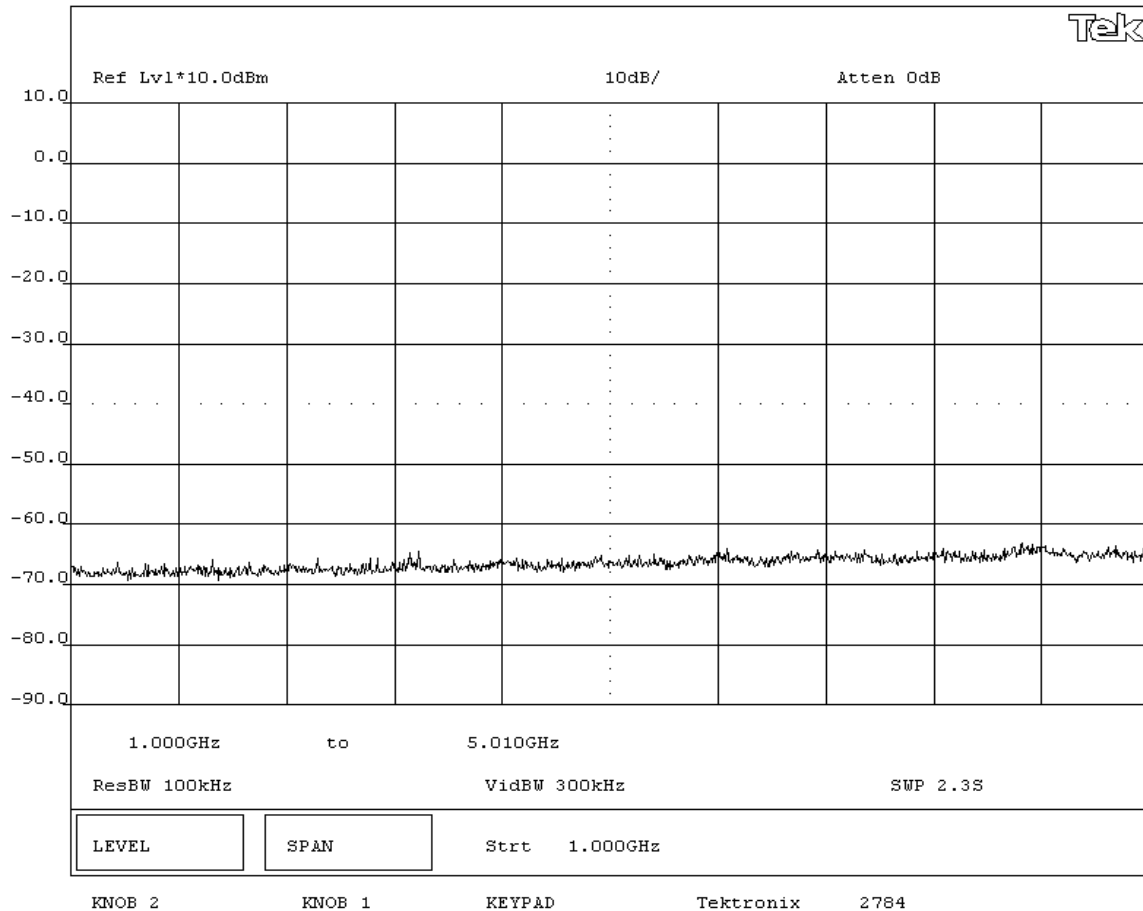
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The power at the antenna terminal at any frequency within 30 MHz to 5 GHz shall not exceed 2.0 nW (-57 dBm)			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Mid Channel - Cellular Band</b>			



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.111(a)	Year: 2004	Method: ANSI C63.4	Year: 2003

**SAMPLE CALCULATIONS**

**COMMENTS**

**EUT OPERATING MODES**

Receive Mode

**DEVIATIONS FROM TEST STANDARD**

None


**REQUIREMENTS**

The power at the antenna terminal at any frequency within 30 MHz to 5 GHz shall not exceed 2.0 nW (-57 dBm)

**RESULTS**

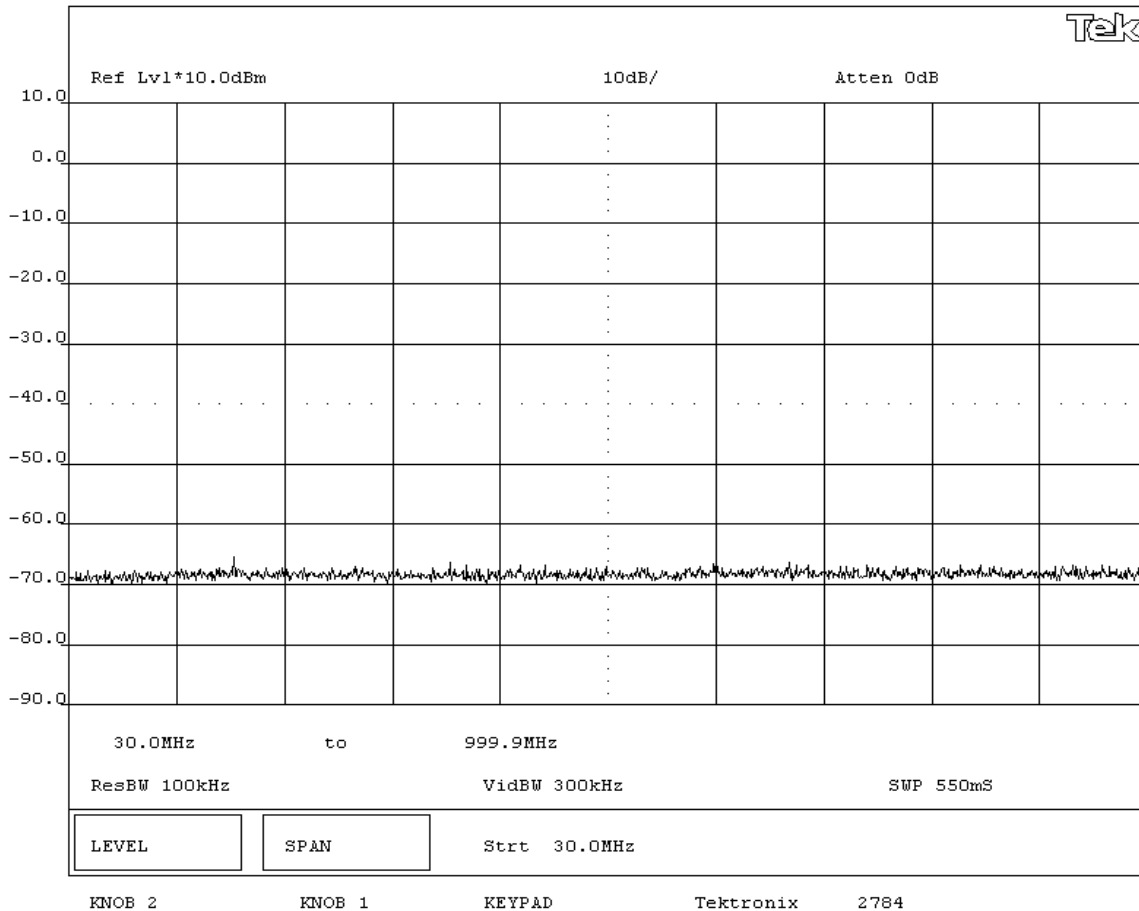
Pass

**SIGNATURE**

Tested By: 

**DESCRIPTION OF TEST**

**Spurious Conducted Emissions - High Channel - Cellular Band**



EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz
Tested by: Greg Kiemel	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.111(a)	Year: 2004	Method: ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>

<b>COMMENTS</b>

<b>EUT OPERATING MODES</b>
Receive Mode

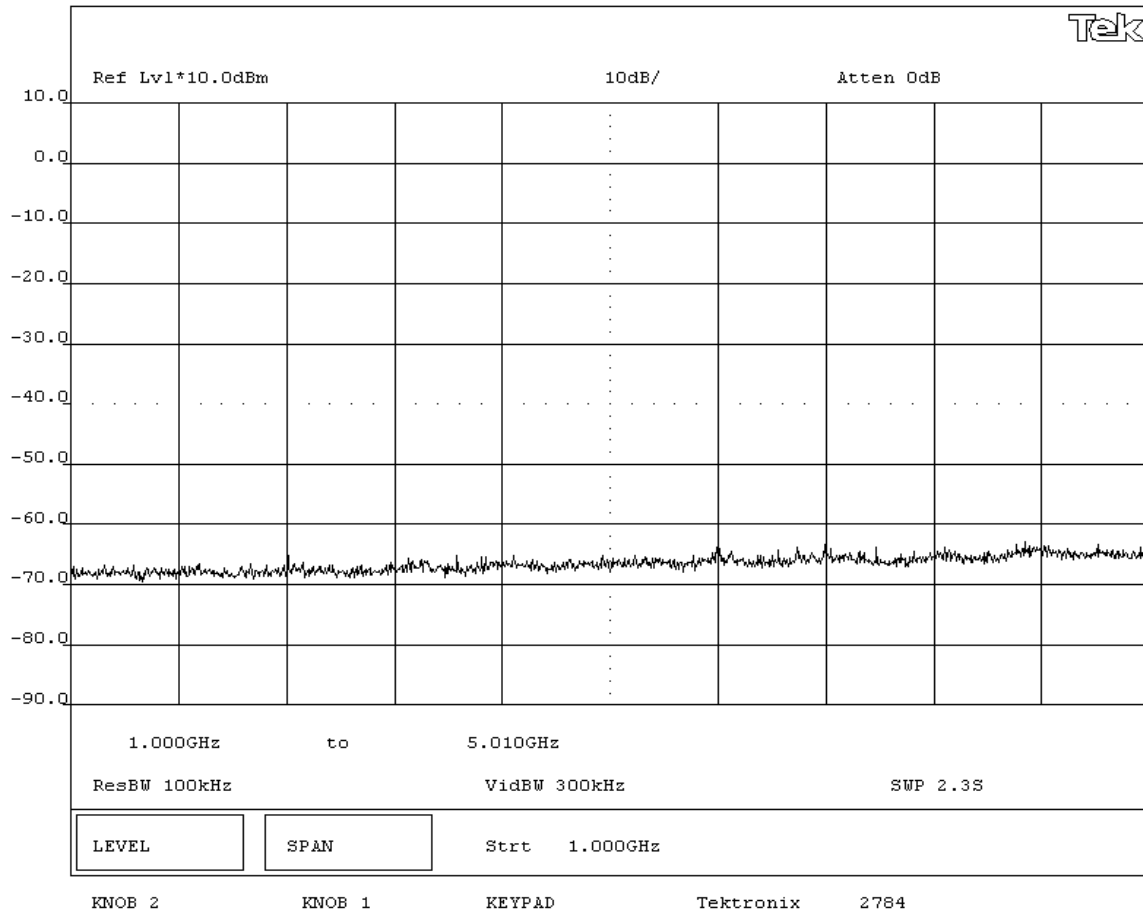
<b>DEVIATIONS FROM TEST STANDARD</b>
None

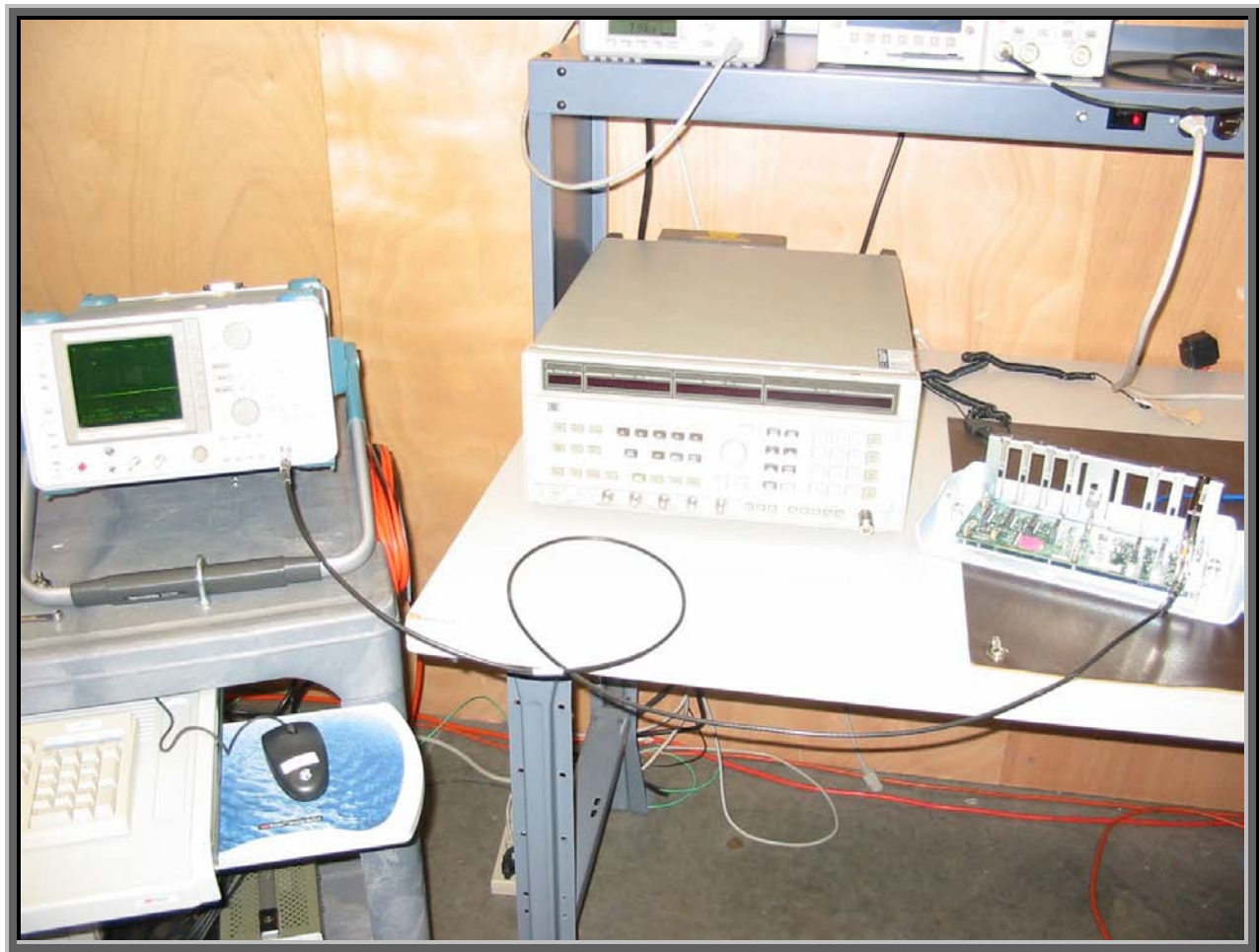
<b>REQUIREMENTS</b>
The power at the antenna terminal at any frequency within 30 MHz to 5 GHz shall not exceed 2.0 nW (-57 dBm)

<b>RESULTS</b>
Pass

<b>SIGNATURE</b>
 Tested By: _____

<b>DESCRIPTION OF TEST</b>
<b>Spurious Conducted Emissions - High Channel - Cellular Band</b>





**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Mid

**Operating Modes Investigated:**

GSM Low Band (Cellular)

GSM High Band (PCS)

**Data Rates Investigated:**

Maximum

**Output Power Setting(s) Investigated:**

Maximum

**Power Input Settings Investigated:**

120 VAC, 60 Hz.

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

## Description

The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
GSM Radio Blade (EUT)	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	none
Backplane	Radio Frame Networks	RFU	N/A

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

Measurement Equipment					
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZH-32-2-2-H/AC	TBA	09/07/2004	12 mo
Multimeter	Tektronix	DMM912	MMH	05/27/2004	12 mo
Single Phase Transformer	Staco Energy Products Co.	Type 2520C	SPT	NCR	NA

### Test Description

**Requirement:** Per 47 CFR 2.1055 and 24.235, the frequency stability shall be measured with variation of ambient temperature and primary supply voltage. A spectrum analyzer or frequency counter can be used to measure the frequency stability. If using a spectrum analyzer, it must have a precision frequency reference that exceeds the stability requirement of the transmitter. A temperature / humidity chamber is required.

#### **Configuration:**

##### Variation of AC Mains Supply Voltage

The primary supply voltage was varied from 85% to 115% of nominal. A variable transformer was used to vary the supply voltage from 115% to 85% of 120 V, 60 Hz. The voltage was measured at the EUT's power input with a multimeter.

##### Variation of Battery Supply Voltage


The EUT is not operated from batteries.

##### Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30° to +60° C) and at 10°C intervals.

Measurements were made at mid frequency in both the cellular and PCS bands. A direct connection was made between the RF output of the EUT and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Completed by:





EUT:	GSM NA BV Release 1.0		Work Order:	RAFNO043	
Serial Number:			Date:	11/12/04	
Customer:	Radioframe Networks, Inc.		Temperature:	See below	
Attendees:	Dean Busch	Tested by:	Greg Kiemel	Humidity:	35%
Customer Ref. No.:	N/A	Power:	see below	Job Site:	EV09

<b>TEST SPECIFICATIONS</b>							
Specification:	47 CFR 2.1055	Year:	Most Current	Method:	TIA/EIA - 603	Year:	2001

<b>SAMPLE CALCULATIONS</b>				

<b>COMMENTS</b>				

<b>EUT OPERATING MODES</b>				
Transmitting mid band				

<b>DEVIATIONS FROM TEST STANDARD</b>				
None				

<b>REQUIREMENTS</b>				
Minimum frequency stability of 2.5 parts per million (ppm) for variations of temperature and supply voltage.				

<b>RESULTS</b>	<b>MINIMUM FREQUENCY STABILITY</b>			
Pass	1.83 ppm			

<b>SIGNATURE</b>				
 Tested By: _____				

<b>DESCRIPTION OF TEST</b>				
<b>Frequency Stability</b>				

**Frequency Stability with Variation of Ambient Temperature (Primary Supply = 120V, 60Hz)**

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
-30	880.40000	880.398390	1.83	2.5
-20	880.40000	880.398710	1.47	2.5
-10	880.40000	880.398735	1.44	2.5
0	880.40000	880.398685	1.49	2.5
10	880.40000	880.398655	1.53	2.5
20	880.40000	880.398760	1.41	2.5
30	880.40000	880.398675	1.50	2.5
40	880.40000	880.398855	1.30	2.5
50	880.40000	880.398765	1.40	2.5
60	880.40000	880.398840	1.32	2.5

**Frequency Stability with Variation of Primary Supply Voltage (Ambient Temperature = 20°C)**

Voltage (VAC, 60Hz)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
138 (115%)	880.40000	880.398655	1.53	2.5
132 (110%)	880.40000	880.398655	1.53	2.5
126 (105%)	880.40000	880.398655	1.53	2.5
120 (100%)	880.40000	880.398655	1.53	2.5
114 (95%)	880.40000	880.398655	1.53	2.5
108 (90%)	880.40000	880.398655	1.53	2.5
102 (85%)	880.40000	880.398655	1.53	2.5

EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:		Date:	11/12/04
Customer:	Radioframe Networks, Inc.	Temperature:	See below
Attendees:	Dean Busch	Tested by:	Greg Kiemel
Customer Ref. No.:	N/A	Power:	see below
		Humidity:	35%
		Job Site:	EV09

<b>TEST SPECIFICATIONS</b>			
Specification:	47 CFR 2.1055 , 24.235	Year:	Most Current
		Method:	TIA/EIA - 603
		Year:	2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Transmitting mid band			

<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
Minimum frequency stability of 2.5 parts per million (ppm) for variations of temperature and supply voltage.			

<b>RESULTS</b>	<b>MINIMUM FREQUENCY STABILITY</b>
Pass	1.95 ppm

<b>SIGNATURE</b>	
Tested By: 	_____

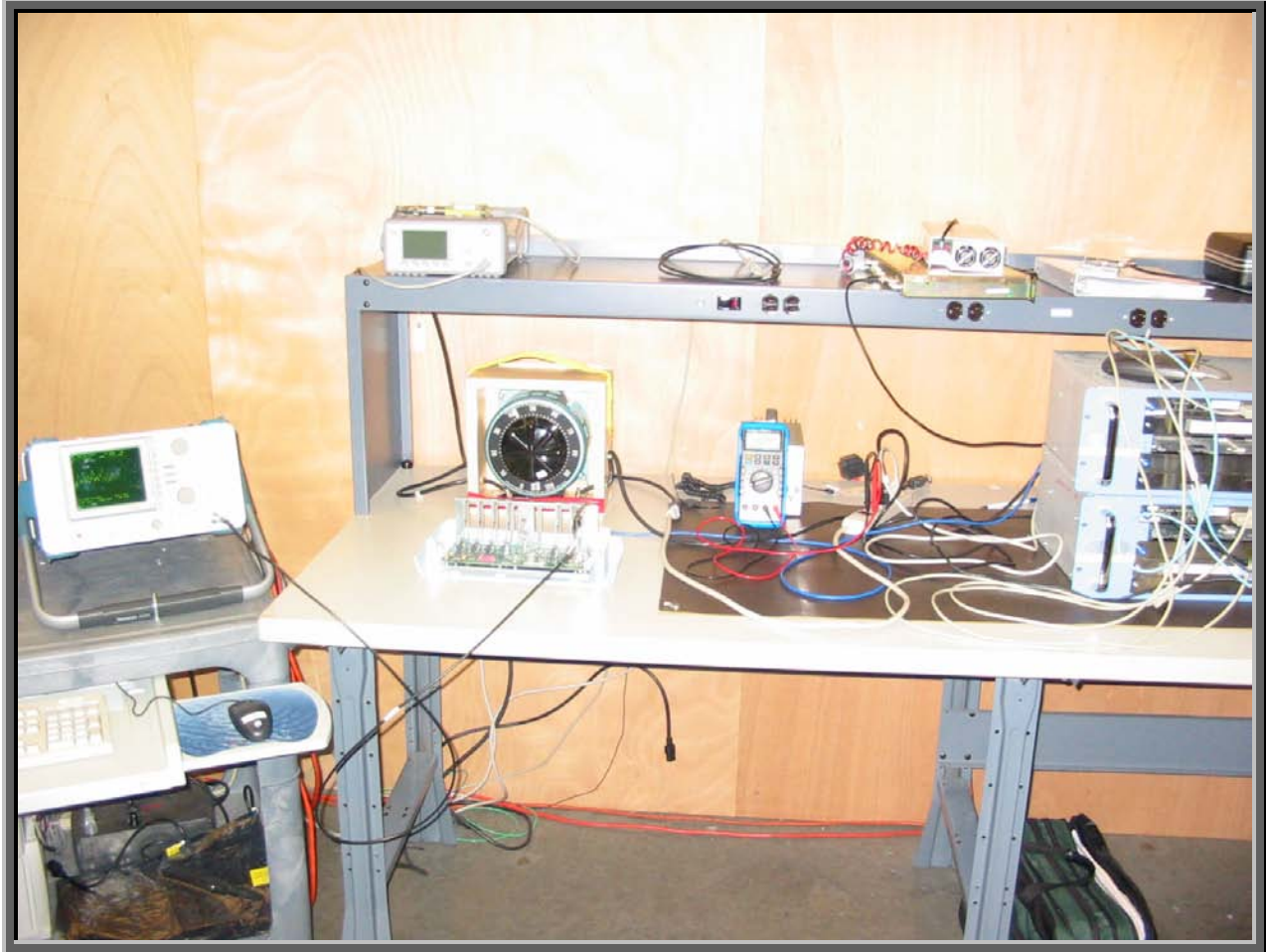
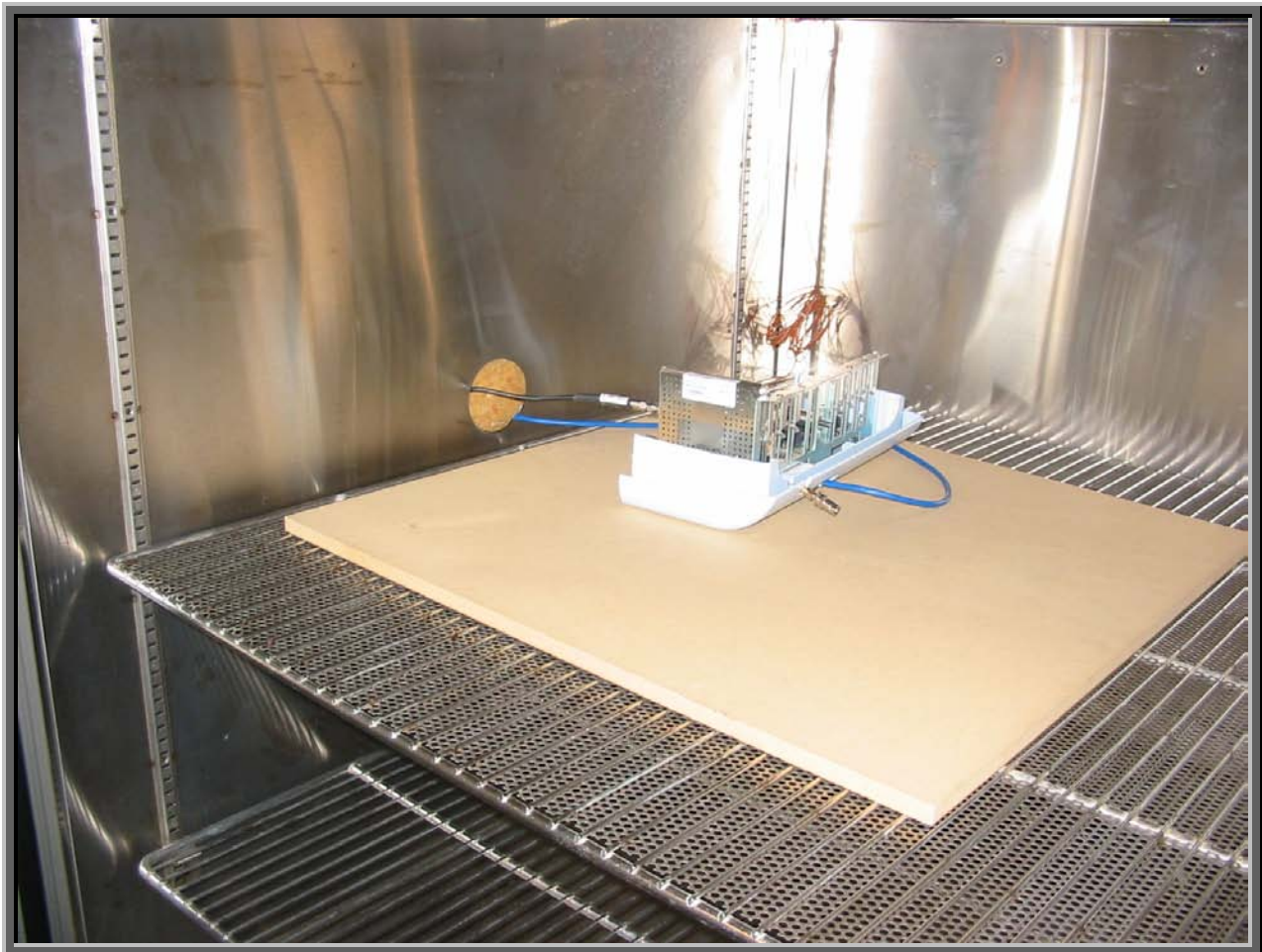
<b>DESCRIPTION OF TEST</b>	
<b>Frequency Stability</b>	

**Frequency Stability with Variation of Ambient Temperature (Primary Supply = 120V, 60Hz)**

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
-30	1960.00000	1959.996175	1.95	2.5
-20	1960.00000	1959.996340	1.87	2.5
-10	1960.00000	1959.996625	1.72	2.5
0	1960.00000	1959.996505	1.78	2.5
10	1960.00000	1959.996490	1.79	2.5
20	1960.00000	1959.996350	1.86	2.5
30	1960.00000	1959.996630	1.72	2.5
40	1960.00000	1959.996550	1.76	2.5
50	1960.00000	1959.996670	1.70	2.5
60	1960.00000	1959.996540	1.77	2.5

**Frequency Stability with Variation of Primary Supply Voltage (Ambient Temperature = 20°C)**

Voltage (VAC, 60Hz)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
138 (115%)	1960.00000	1959.996350	1.86	2.5
132 (110%)	1960.00000	1959.996350	1.86	2.5
126 (105%)	1960.00000	1959.996350	1.86	2.5
120 (100%)	1960.00000	1959.996350	1.86	2.5
114 (95%)	1960.00000	1959.996350	1.86	2.5
108 (90%)	1960.00000	1959.996350	1.86	2.5
102 (85%)	1960.00000	1959.996350	1.86	2.5



**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low
Mid
High

**Operating Modes Investigated:**

GSM Low Band
GSM High Band

**Data Rates Investigated:**

Maximum
---------

**Output Power Setting(s) Investigated:**

Maximum
---------

**Power Input Settings Investigated:**

120 VAC, 60 Hz.
-----------------

**Software\Firmware Applied During Test**

<b>Exercise software</b>	Intersil cTxRx tool	<b>Version</b>	3893MTFW
<b>Description</b>			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Antenna	LINX	ANT-2.4-RCT-SS	N/A
Backplane	Radio Frame Networks	RFU	N/A
EUT- Transceiver	RadioFrame Networks, Inc.	RadioBlade, GSM NA	12104320038

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001

Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

**Measurement Equipment**

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/08/2003	12 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	10/08/2003	12 mo
Attenuator		2082-6148-20	ATE	02/03/2004	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

## Test Description

**Requirement:** Per 2.1046, the peak power of the modulated carrier was measured. The applicable limits are 22.913(a) for the cellular band, and 24.232(b) for the PCS band.

Per 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Per 24.232(b), Mobile/portable stations are limited to 2 Watts e.i.r.p. peak power.

**Configuration:** Spectrum analyzer, signal generator, and linearly polarized antennas were used to measure the fundamental emissions. The orientation of the EUT was varied in 3 orthogonal axes to maximize the level of emissions. The EUT was configured to transmit at the highest output at low, mid, and high channels. The EUT was tested with each antenna. Only one antenna can be used at a time.

The substitution method as described in TIA/EIA-603 Section 2.2.12 was used.

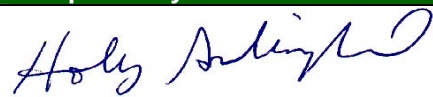
**Test Methodology:** For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is placed on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole that is successively tuned to each of the highest emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain; the power (ERP or e.i.r.p) is determined for each radiated emission.

Bandwidths Used for Measurements			
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

*Measurements were made using the bandwidths and detectors specified. No video filter was used.*

Completed by:





# Effective Radiated Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/11/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 22.917(e)	Year:	2003
Method:	TIA/EIA-603	Year:	1998

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**

GSM Lowband, Low Channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

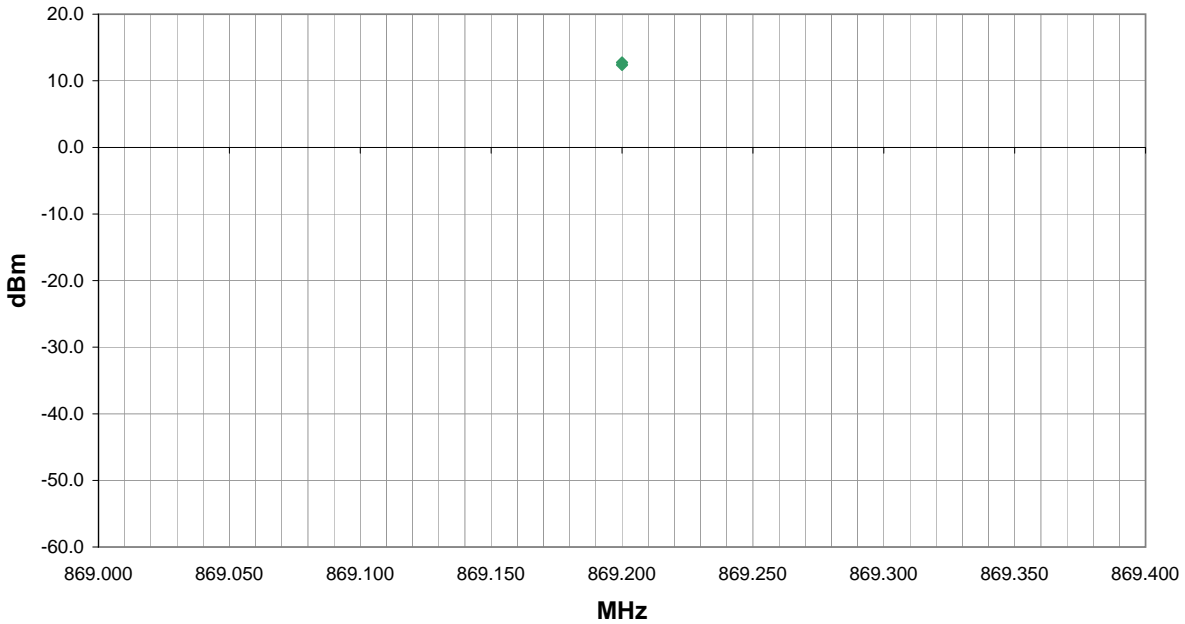
**RESULTS**

Pass	Run #	10
------	-------	----

Other

*Holly Ashkannejhad*

Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	ERP (dBm)	ERP (Watts)
869.200	154.0	1.1	V-Bilog	PK	12.8	0.018859
869.200	259.0	2.0	H-Bilog	PK	12.4	0.017284

EUT:	RadioBlade, GSM NA	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/11/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 22.917(e)	Year:	2003
Method:	TIA/EIA-603	Year:	1998

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**

GSM Lowband, Mid Channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

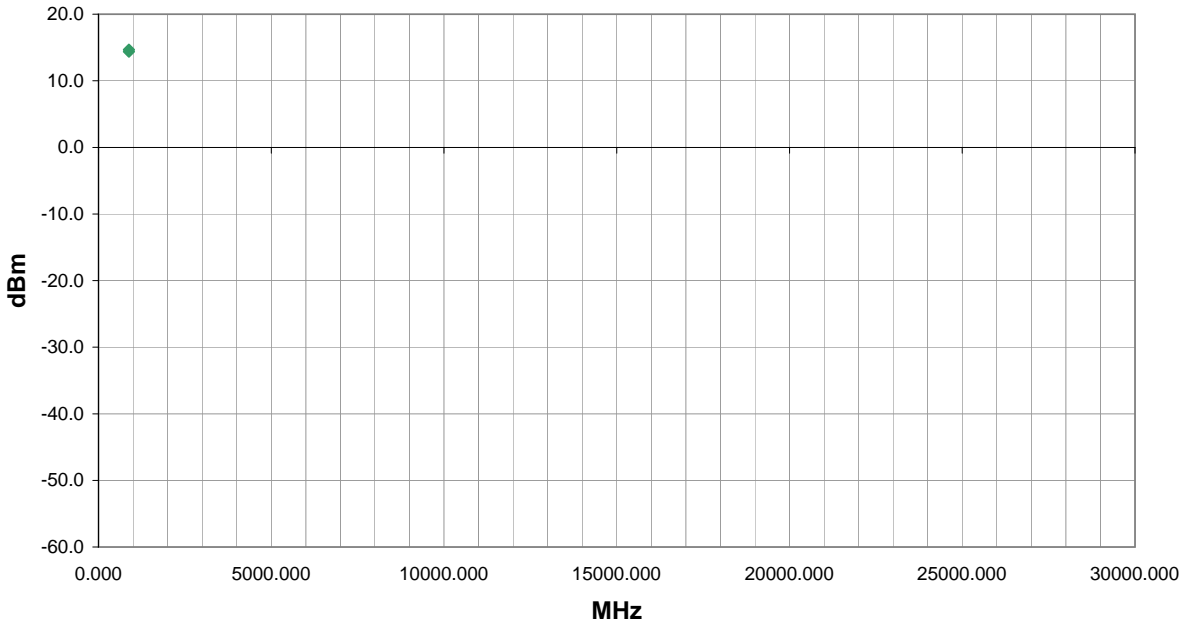
**RESULTS**

Pass	Run #
	11

Other

*Holly Ashkannejhad*

Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	ERP (dBm)	ERP (Watts)
880.400	231.0	1.3	H-Bilog	PK	14.7	0.029299
880.400	288.0	1.1	V-Bilog	PK	14.4	0.027443



EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/11/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 22.917(e)
Method:	TIA/EIA-603
Year:	2003
Year:	1998

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**

GSM Lowband/Highband, See comments for channel

**DEVIATIONS FROM TEST STANDARD**

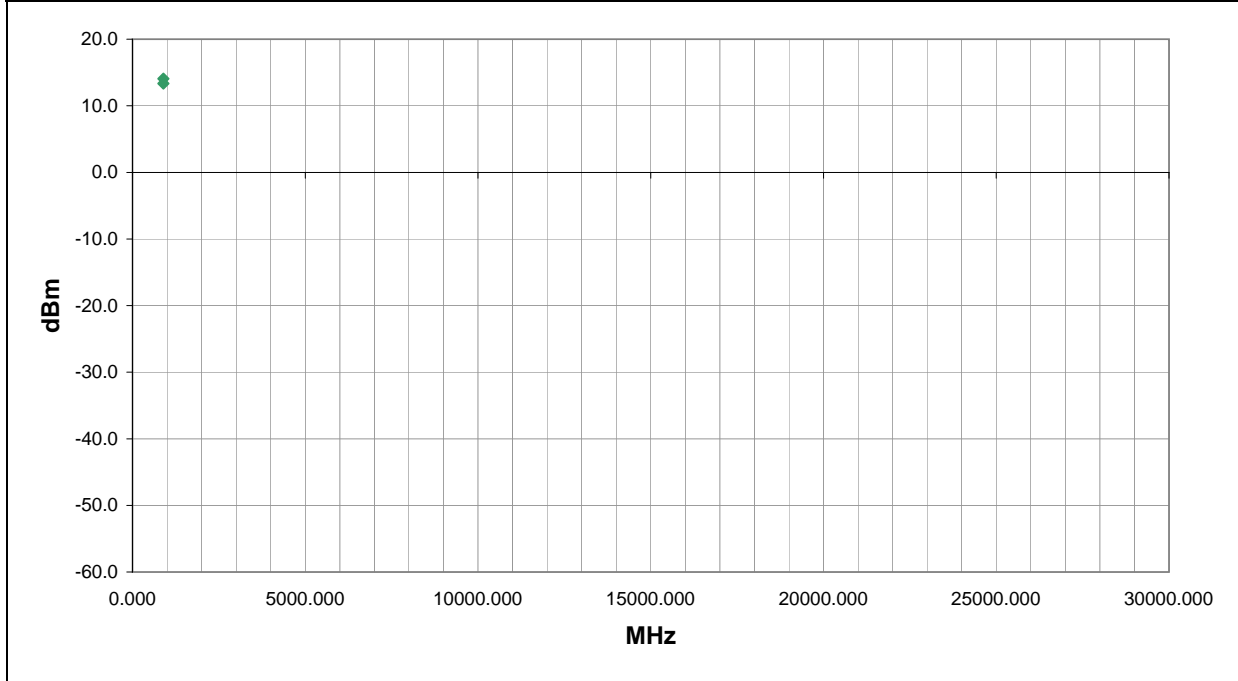
No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	13

Other



Tested By: \_\_\_\_\_



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	ERP (dBm)	EIRP (Watts)
893.800	315.0	1.3	H-Bilog	PK	14.1	0.025464
893.800	52.0	1.2	V-Bilog	PK	13.3	0.021562

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	70
Attendees:	Dean Bush	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 24.238(a)	Year:	2003
Method:	TIA/EIA-603	Year:	1998

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Standalone Configuration

**EUT OPERATING MODES**

GSM Highband (PCS) Mid Channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

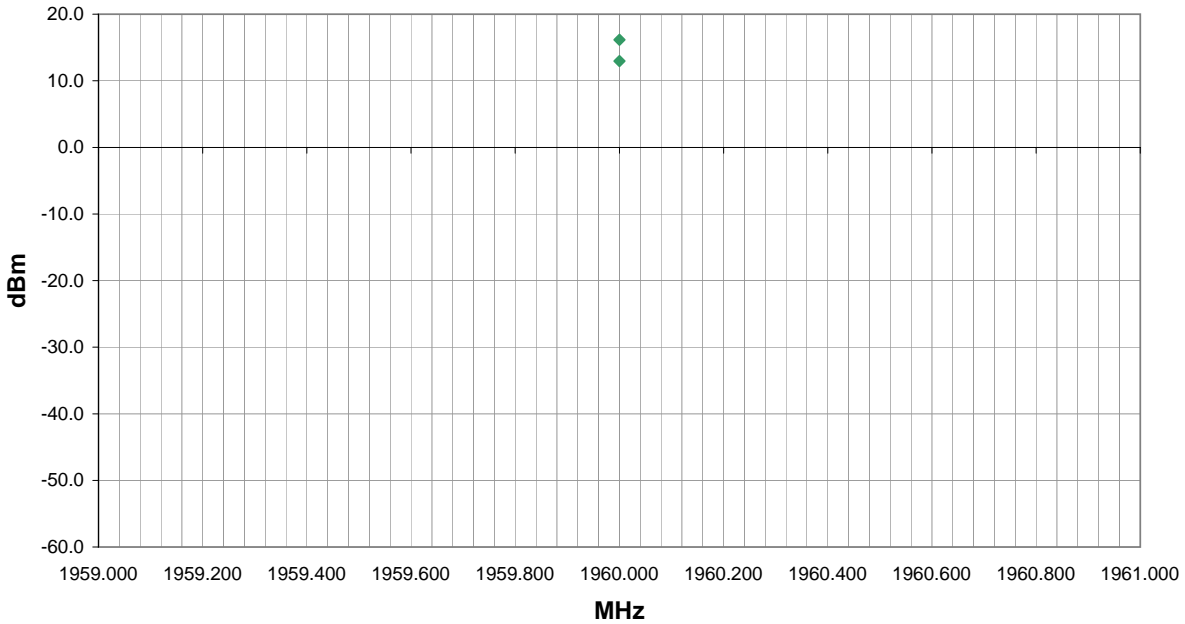
**RESULTS**

Pass	Run #
	18

Other

*Holly Ashkannejhad*

Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	EIRP (Watts)
1960.000	147.0	1.9	V-Horn	PK	16.1	0.041171
1960.000	296.0	1.7	H-Horn	PK	13.0	0.019779

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	70
Attendees:	Dean Bush	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 24.238(a)	Year:	2003
Method:	TIA/EIA-603	Year:	1998

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Standalone Configuration

**EUT OPERATING MODES**

GSM Highband (PCS) High Channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

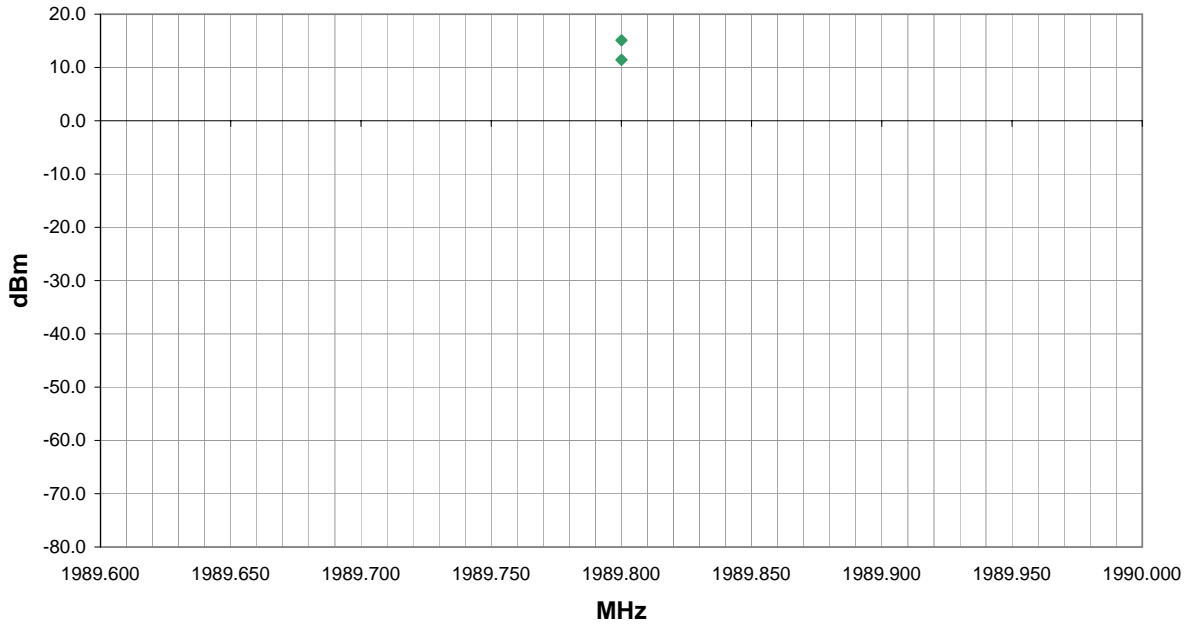
**RESULTS**

Pass	Run #
	19

Other

*Holly Ashkannejhad*

Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	EIRP (Watts)
1989.800	143.0	1.4	V-Horn	PK	15.1	0.0324
1989.800	297.0	1.3	H-Horn	PK	11.4	0.0139

# Effective Radiated Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/17/04
Customer:	Radioframe Networks, Inc.	Temperature:	70
Attendees:	Dean Bush	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.17
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 24.238	Year:	2004
Method:	TIA/EIA-603	Year:	1998

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Standalone Configuration

**EUT OPERATING MODES**

GSM Highband (PCS)

**DEVIATIONS FROM TEST STANDARD**

No deviations.

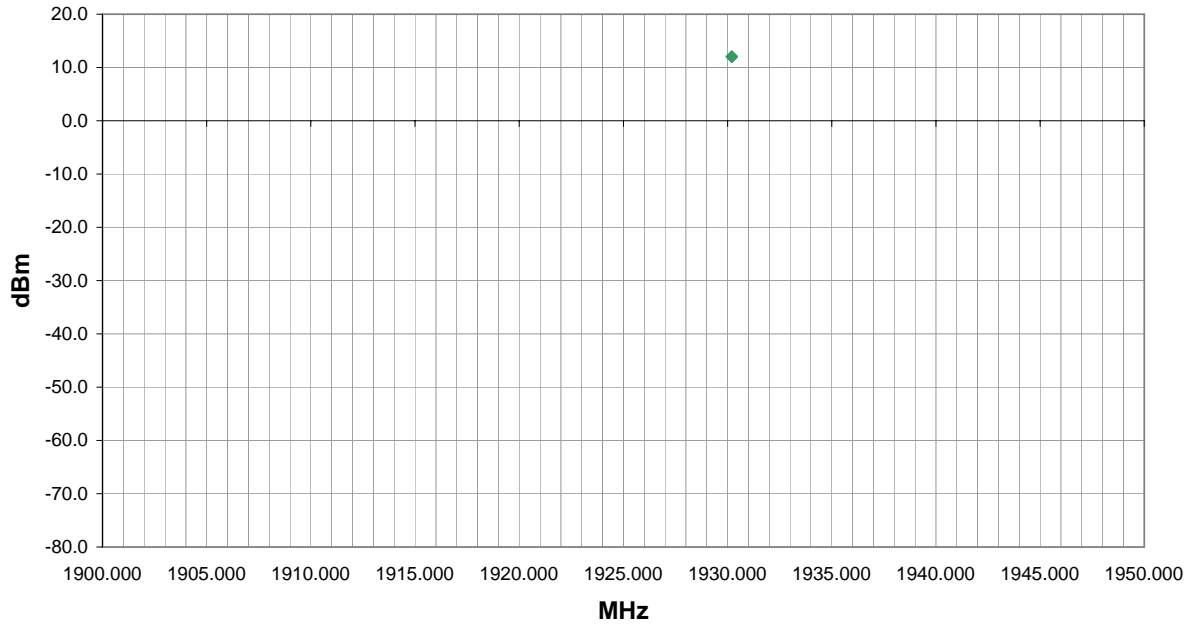
**RESULTS**

Pass	Run #	23
------	-------	----

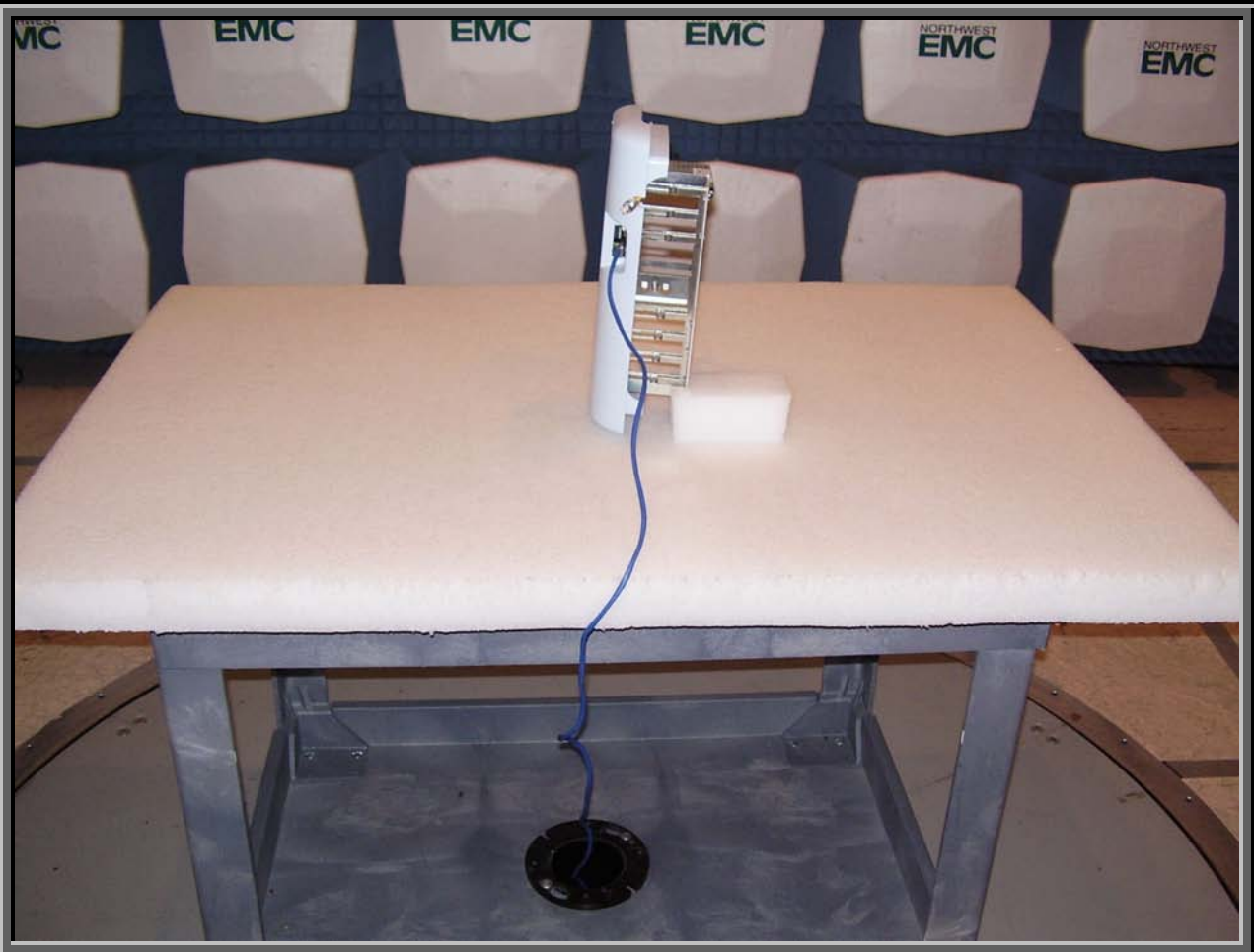
Other

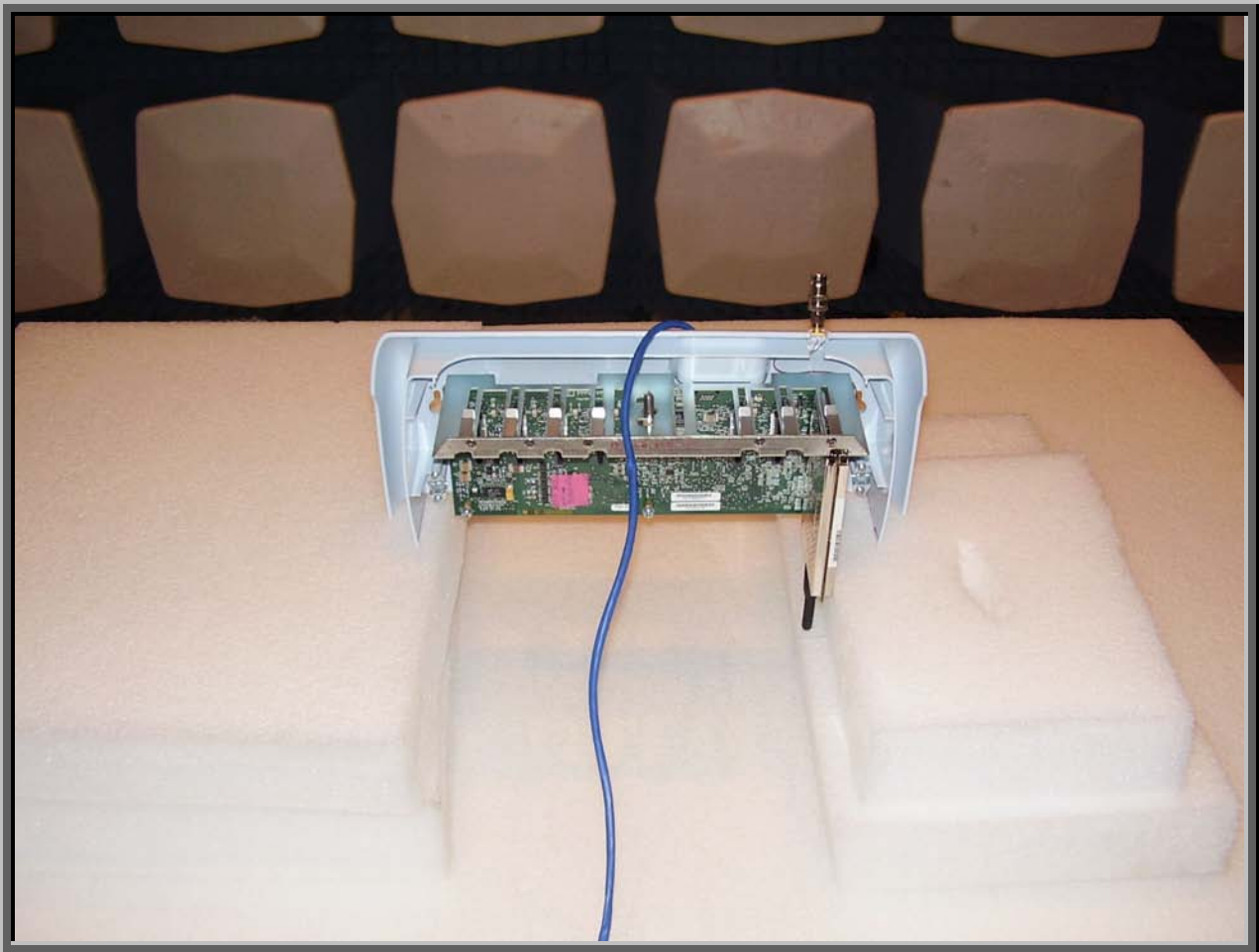


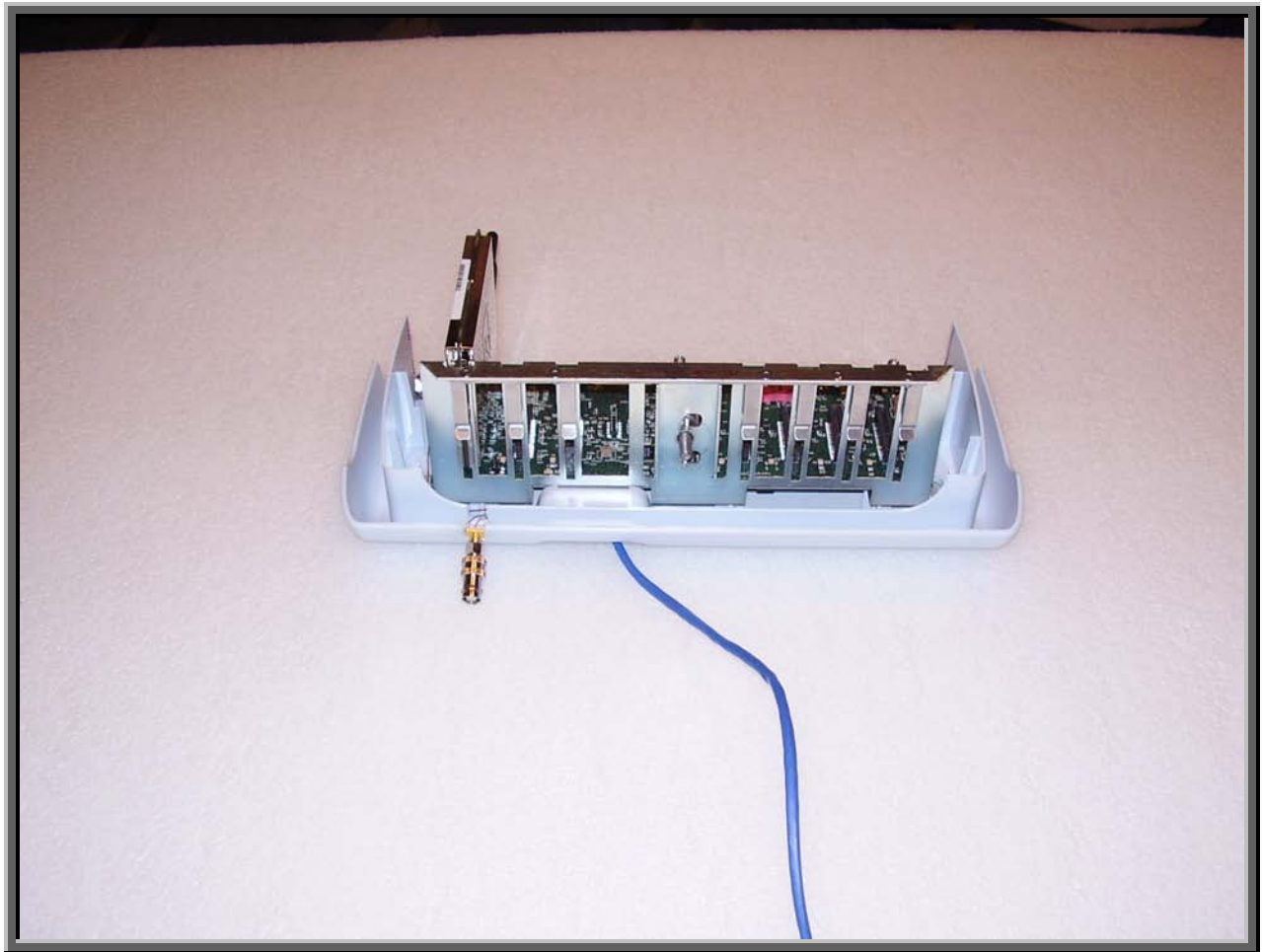
Tested By:



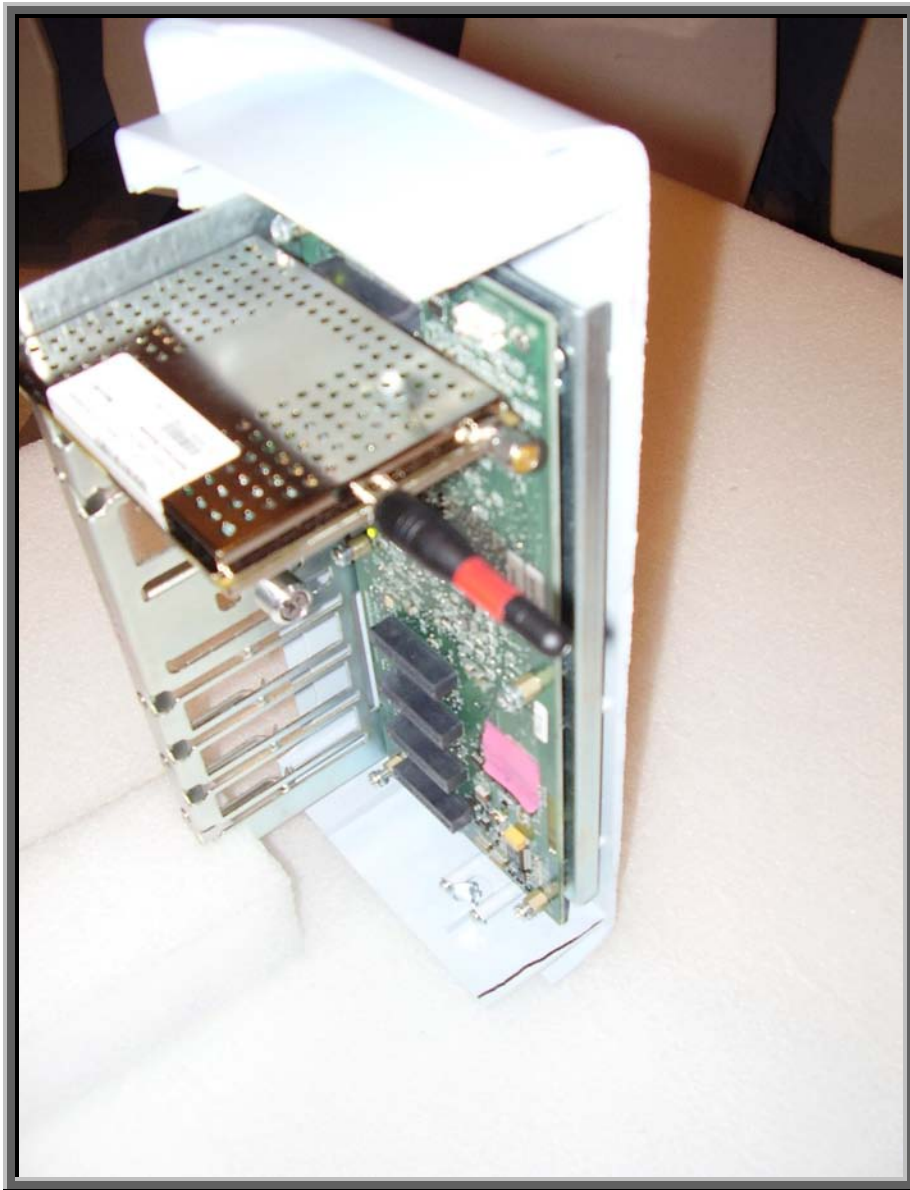
Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	EIRP (Watts)
1930.200	217.0	1.4	H-Horn	PK	12.1	0.0162
1930.200	138.0	1.5	V-Horn	PK	12.0	0.0158













**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low
Mid
High

**Operating Modes Investigated:**

GSM Low Band (Cellular)
GSM High Band (PCS)

**Data Rates Investigated:**

Maximum
---------

**Output Power Setting(s) Investigated:**

Maximum
---------

**Power Input Settings Investigated:**

120 VAC, 60 Hz.
-----------------

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Backplane	Radio Frame Networks	RFU	N/A
GSM Radio Blade (EUT)	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	12104320038

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

## Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

## Measurement Equipment

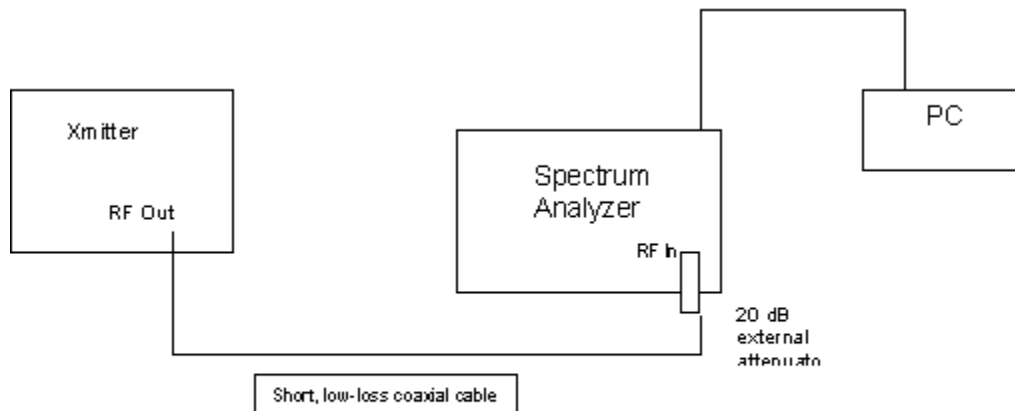
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

## Test Description

**Requirement:** Per 47 CFR 22.917, and 24.238, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10\log(P)$  dB. Per 47 CFR 2.1049, the occupied bandwidth was measured at the RF output terminals with analyzer plots made for each band.

**Configuration:** A spectrum analyzer was used to measure the occupied bandwidth. A 20dB external attenuator was used on the RF input of the spectrum analyzer. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter was employed. The nominal carrier frequency was adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits. The emission power was measured relative to a reference baseline of the transmitter power.

## Test Setup Diagram



## Completed by:

*A. J. U. K. P.*

# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: 120VAC/60Hz
	Humidity: 41%
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at maximum data rate, at maximum output power.

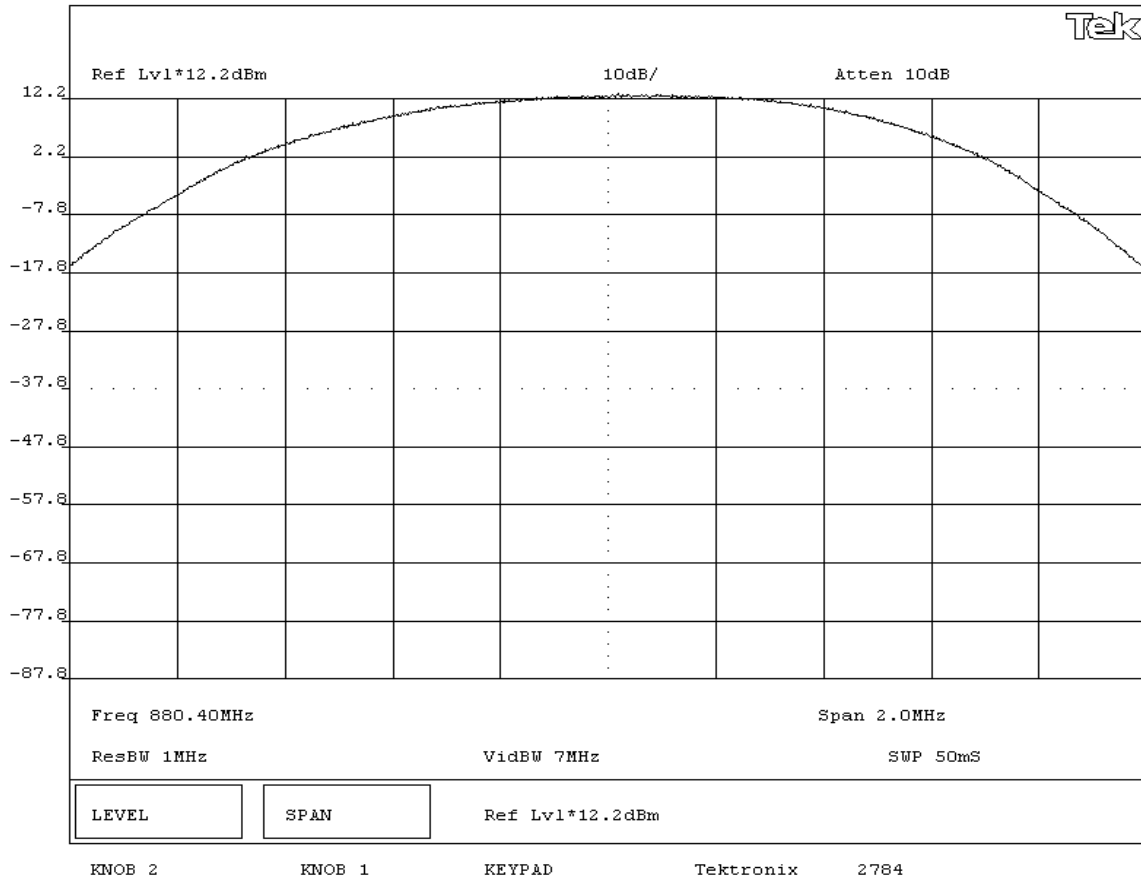
DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10\log(P)$ dB.

RESULTS
Pass

SIGNATURE
 Tested By: _____

DESCRIPTION OF TEST
<b>Occupied Bandwidth - Reference Level Plot - Cellular Band</b>



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043	
Serial Number: 12104320038		Date: 11/15/04	
Customer: RadioFrame Networks, Inc.		Temperature: 73 F	
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%	
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06	

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS			

COMMENTS			

EUT OPERATING MODES			
Modulated by PRBS at maximum data rate, at maximum output power.			

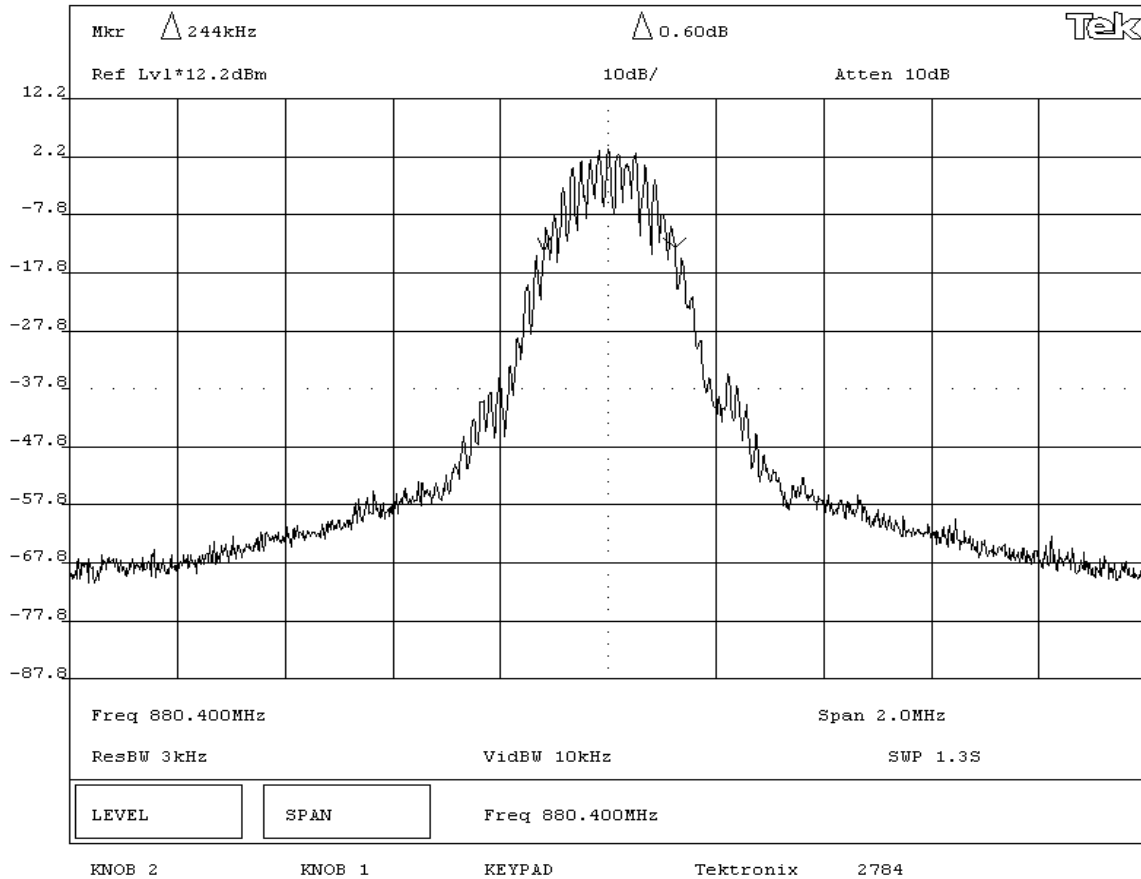
DEVIATIONS FROM TEST STANDARD			
None			

REQUIREMENTS			
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10\log(P)$ dB.			

RESULTS	OCCUPIED BANDWIDTH
Pass	244 kHz

SIGNATURE	
 Tested By: _____	

DESCRIPTION OF TEST	
<b>Occupied Bandwidth - Mid Channel - Cellular Band</b>	



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: 120VAC/60Hz
	Humidity: 41%
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at maximum data rate, at maximum output power.

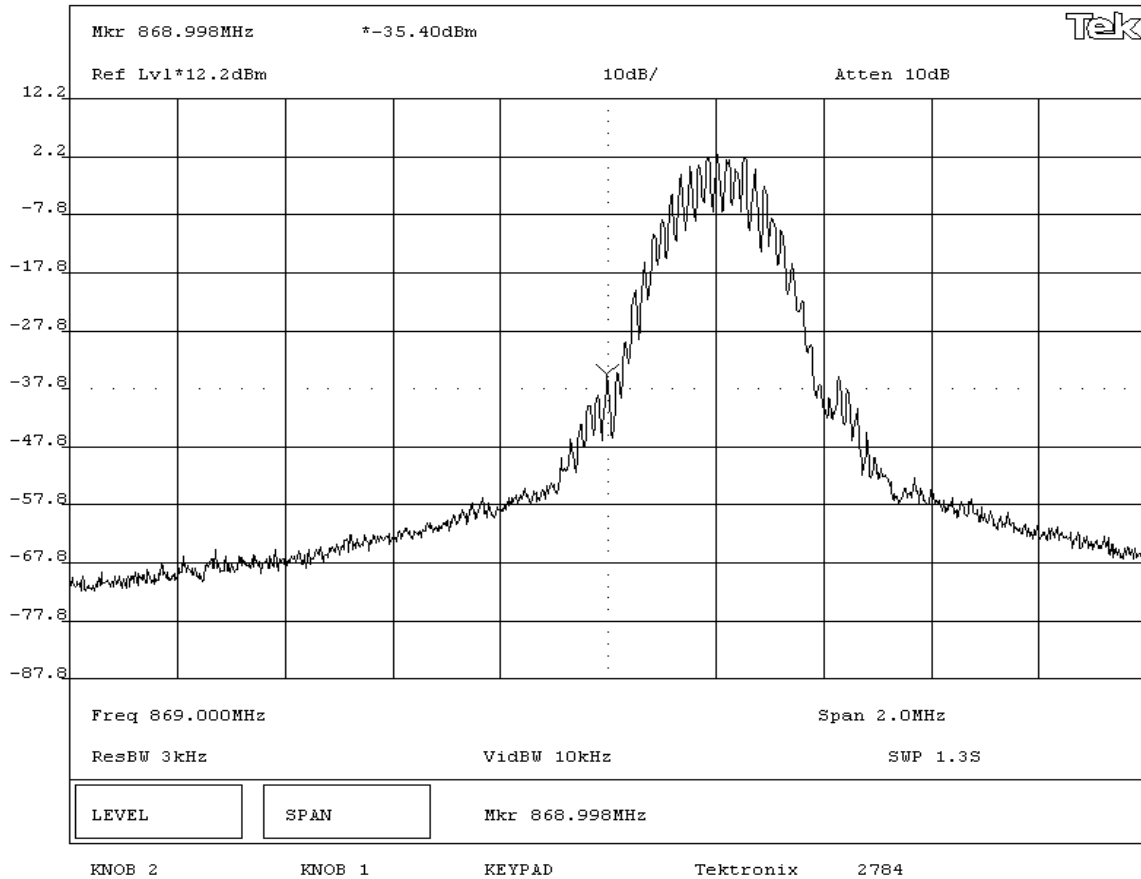
DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10\log(P)$ dB.

RESULTS
Pass

SIGNATURE
 Tested By: _____

DESCRIPTION OF TEST
<b>Occupied Bandwidth - Lower Band Edge - Cellular Band</b>



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043	
Serial Number: 12104320038		Date: 11/15/04	
Customer: RadioFrame Networks, Inc.		Temperature: 73 F	
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%	
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06	

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS			

COMMENTS			

EUT OPERATING MODES			
Modulated by PRBS at maximum data rate, at maximum output power.			

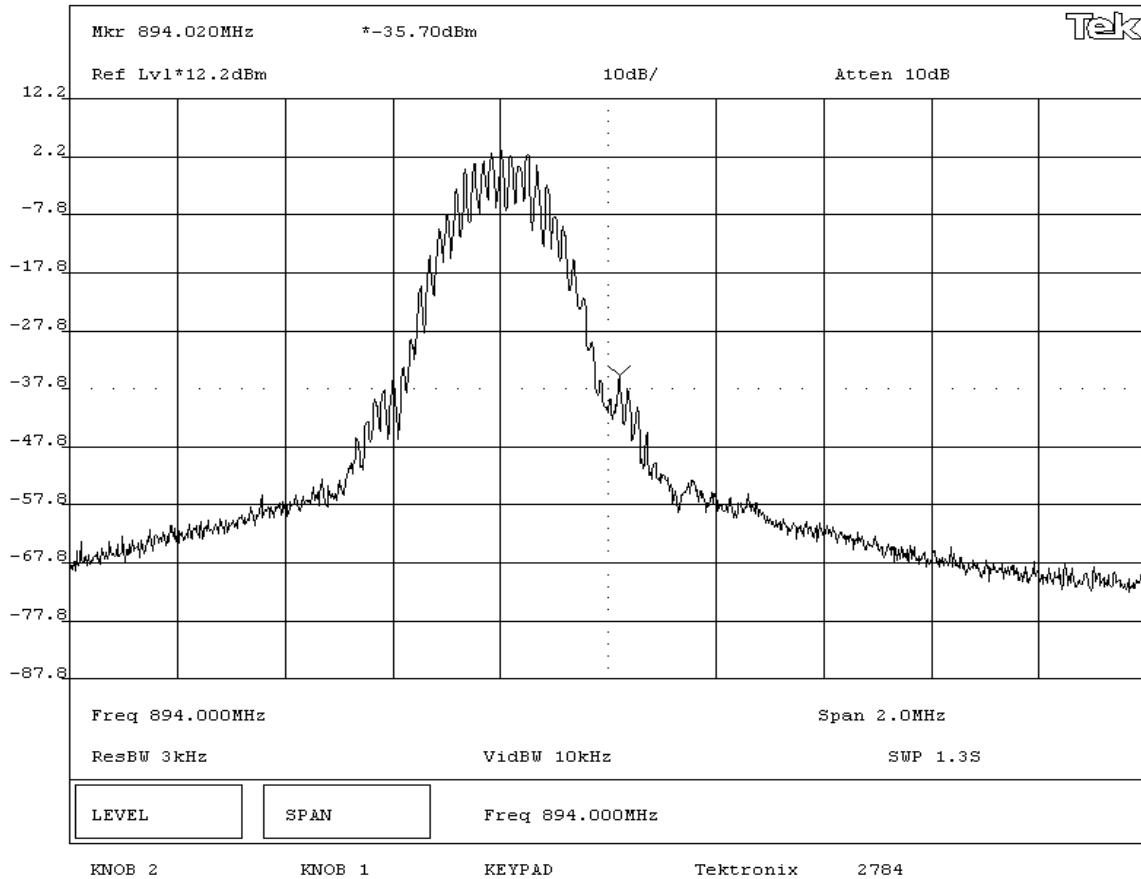
DEVIATIONS FROM TEST STANDARD			
None			

REQUIREMENTS			
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10log(P) dB.			

RESULTS			
Pass			

SIGNATURE			
 Tested By: _____			

DESCRIPTION OF TEST			
<b>Occupied Bandwidth - Upper Band Edge - Cellular Band</b>			



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: 120VAC/60Hz
	Humidity: 41%
	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>

<b>COMMENTS</b>

<b>EUT OPERATING MODES</b>
Modulated by PRBS at maximum data rate, at maximum output power.

<b>DEVIATIONS FROM TEST STANDARD</b>
None

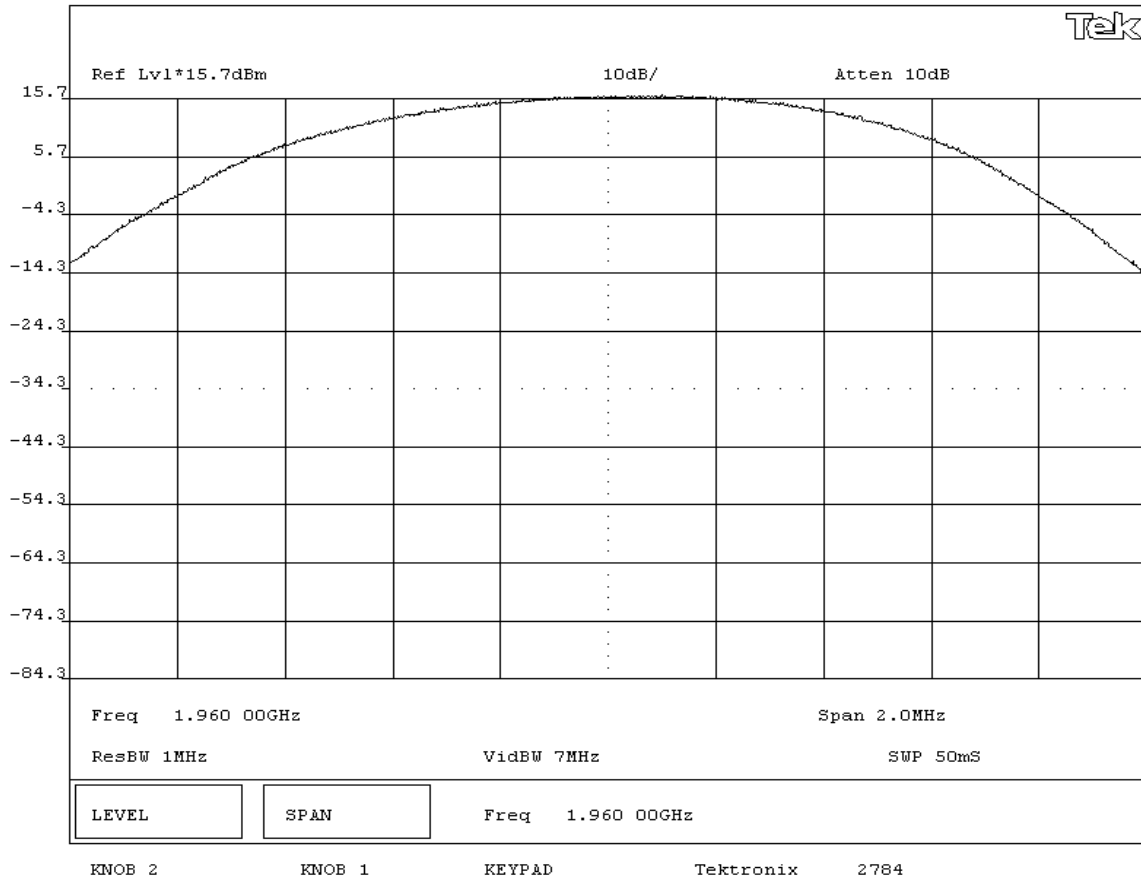
<b>REQUIREMENTS</b>
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10\log(P)$ dB.

<b>RESULTS</b>
Pass

<b>SIGNATURE</b>
 Tested By: _____

**DESCRIPTION OF TEST**

**Occupied Bandwidth - Reference Level Plot - PCS Band**



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043	
Serial Number: 12104320038		Date: 11/15/04	
Customer: RadioFrame Networks, Inc.		Temperature: 73 F	
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%	
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06	

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS			

COMMENTS			

EUT OPERATING MODES			
Modulated by PRBS at maximum data rate, at maximum output power.			

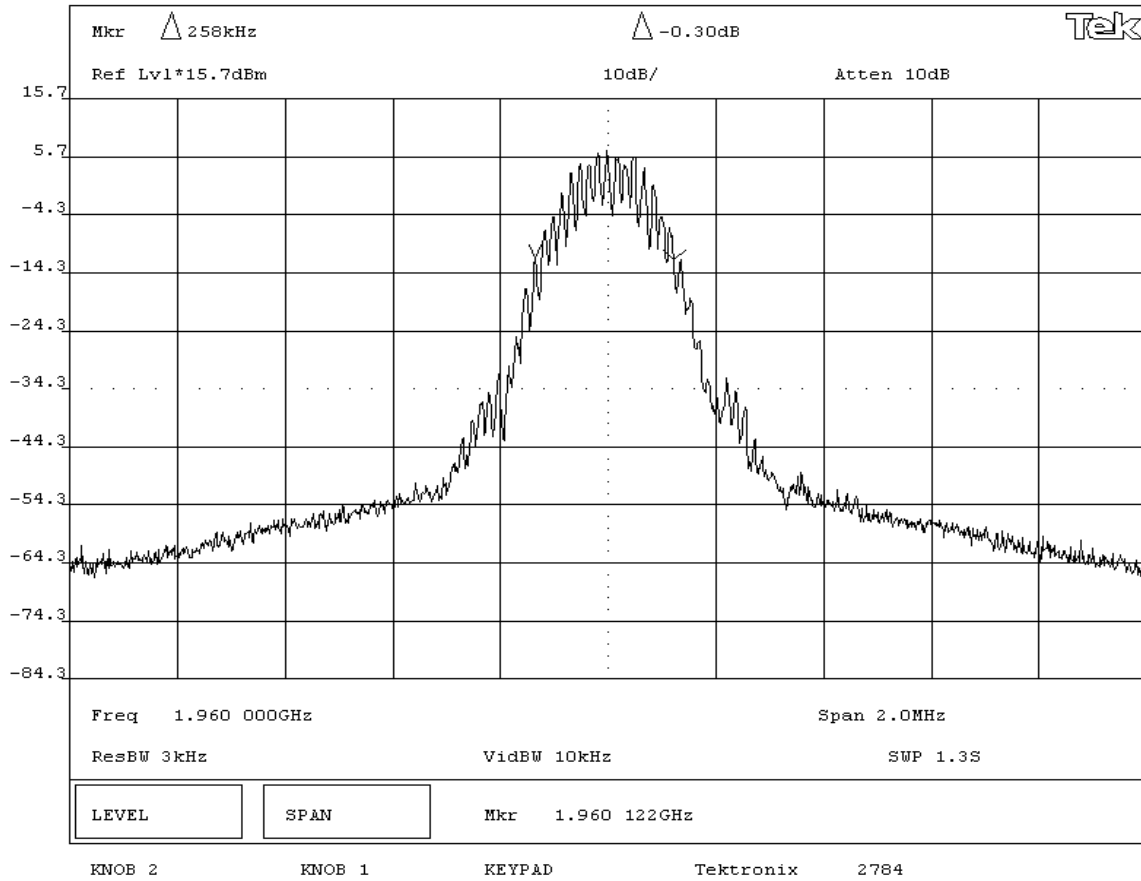
DEVIATIONS FROM TEST STANDARD			
None			

REQUIREMENTS			
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10log(P) dB.			

RESULTS	OCCUPIED BANDWIDTH
Pass	258 kHz

SIGNATURE	
 Tested By: _____	

DESCRIPTION OF TEST	
<b>Occupied Bandwidth - Mid Channel - PCS Band</b>	





# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: 120VAC/60Hz
	Humidity: 41%
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at maximum data rate, at maximum output power.

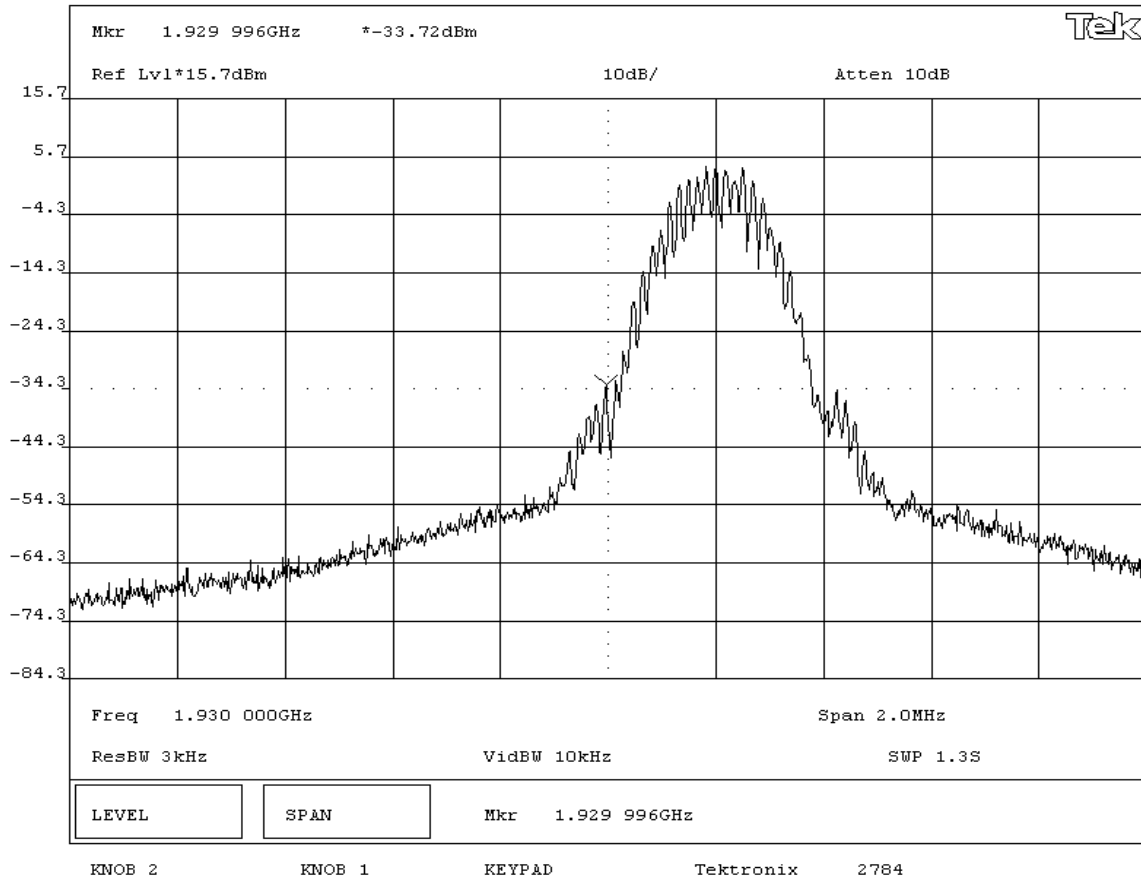
DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10\log(P)$ dB.

RESULTS
Pass

SIGNATURE
 Tested By: _____

DESCRIPTION OF TEST
<b>Occupied Bandwidth - Lower Band Edge - PCS Band</b>



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: 120VAC/60Hz
	Humidity: 41%
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1049, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at maximum data rate, at maximum output power.

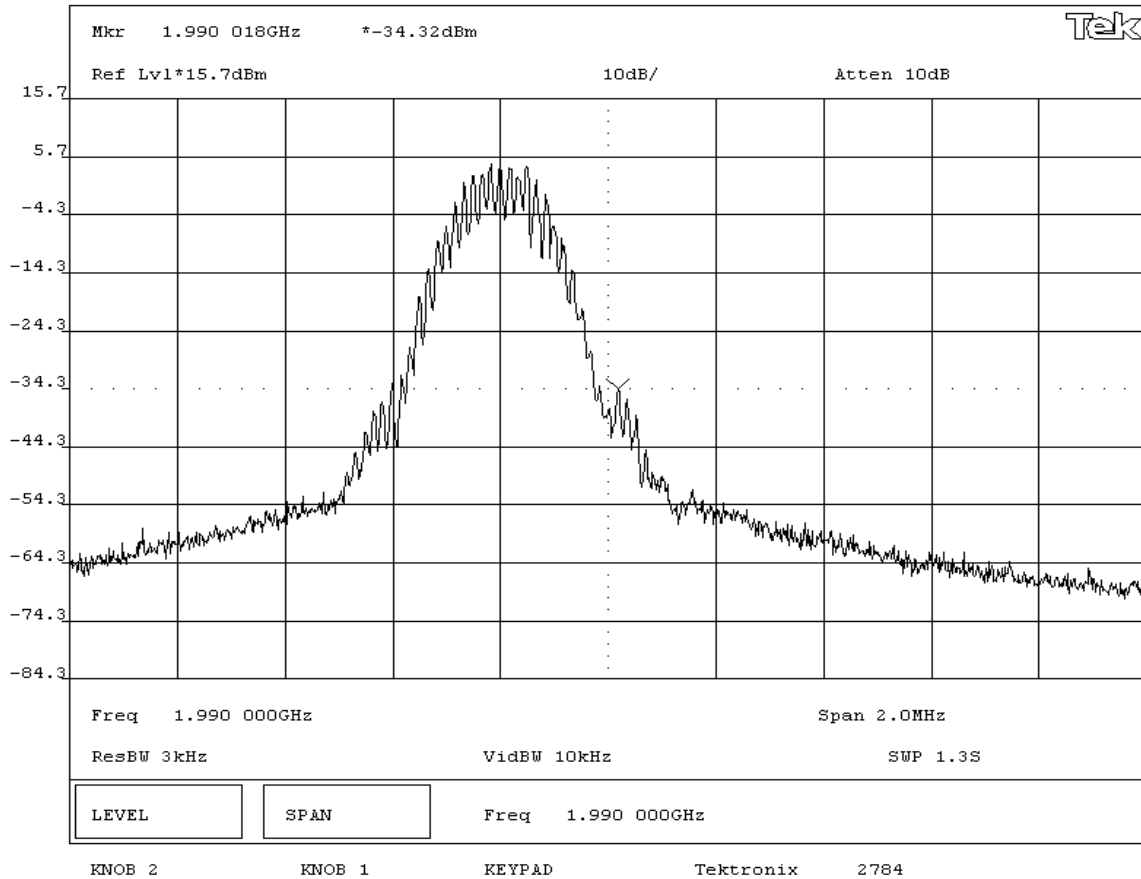
DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10\log(P)$ dB.

RESULTS
Pass

SIGNATURE
 Tested By: _____

DESCRIPTION OF TEST
<b>Occupied Bandwidth - Upper Band Edge - PCS Band</b>





**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low
Mid
High

**Operating Modes Investigated:**

GSM Low Band (Cellular)
GSM High Band (PCS)

**Data Rates Investigated:**

Maximum
---------

**Output Power Setting(s) Investigated:**

Maximum
---------

**Power Input Settings Investigated:**

120 VAC, 60 Hz.
-----------------

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Backplane	Radio Frame Networks	RFU	N/A
GSM Radio Blade (EUT)	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	12104320038

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

**Measurement Equipment**

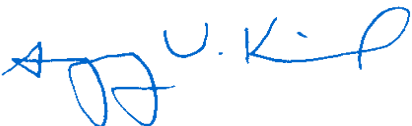
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Power Meter	Hewlett Packard	E4418A	SPA	07/23/2004	24 mo
Power Sensor	Hewlett-Packard	8481H	SPB	07/23/2004	24 mo
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	NA
Oscilloscope	Tektronix	TDS 3052	TOF	07/21/2004	12 mo
Signal Generator	Hewlett Packard	8341B	TGN	01/23/2004	13 mo

**Test Description**

**Requirement:** Per 47 CFR 2.1046, the conducted power output was measured at the RF output terminals after the tune-up procedure.

**Configuration:** The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The peak measurement was made using a direct connection between the RF output of the EUT and a RF detector diode. The output of the diode was measured with the oscilloscope. The signal generator, tuned to the transmit frequency, was then substituted for the EUT. The CW output of the signal generator was adjusted until the output of the RF detector diode match the level produced when connected to the EUT. The power meter and sensor were then used to measure the output power level of the signal generator.

Completed by:



EUT:	GSM NA BV Release 1.0	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/15/04
Customer:	RadioFrame Networks, Inc.	Temperature:	73 F
Attendees:	Dean Busch	Tested by:	Greg Kiemel
Customer Ref. No.:	N/A	Power:	120VAC/60Hz
		Humidity:	41%
		Job Site:	EV06

## TEST SPECIFICATIONS

Specification:	47 CFR 2.1046	Year:	Most Current	Method:	TIA / EIA 603	Year:	2001
----------------	---------------	-------	--------------	---------	---------------	-------	------

## SAMPLE CALCULATIONS

## COMMENTS

## EUT OPERATING MODES

Modulated by PRBS at maximum data rate, at maximum output power.

## DEVIATIONS FROM TEST STANDARD

None

## REQUIREMENTS

Maximum peak conducted output power is measured.

## RESULTS

## AMPLITUDE

Pass 16.44 mW (Cellular band), 36.98 mW (PCS band)

## SIGNATURE

Tested By: 

## DESCRIPTION OF TEST

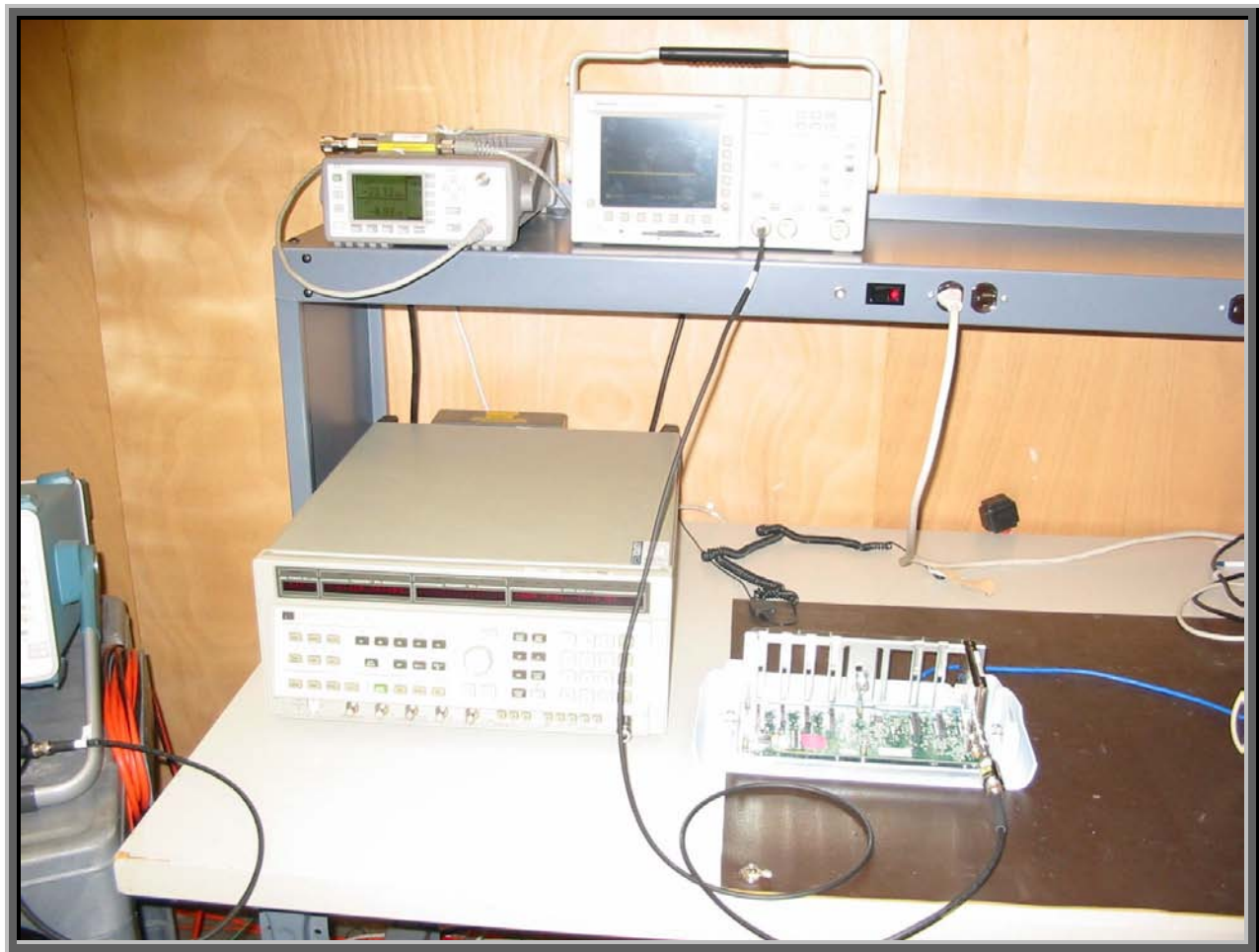
Output Power - Low, Mid, & High Channels

## Cellular Band

Frequency (MHz)	Power (mW)
869.20	13.58
880.40	16.44
893.80	15.60

## PCS Band

Frequency (MHz)	Power (mW)
1930.20	22.70
1960.00	36.98
1989.80	26.67



**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low

Mid

High

**Operating Modes Investigated:**

GSM Low Band (Cellular)

GSM High Band (PCS)

**Data Rates Investigated:**

Maximum

**Output Power Setting(s) Investigated:**

Maximum

**Power Input Settings Investigated:**

120 VAC, 60 Hz.

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Backplane	Radio Frame Networks	RFU	N/A
GSM Radio Blade (EUT)	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	12104320038

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			



**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

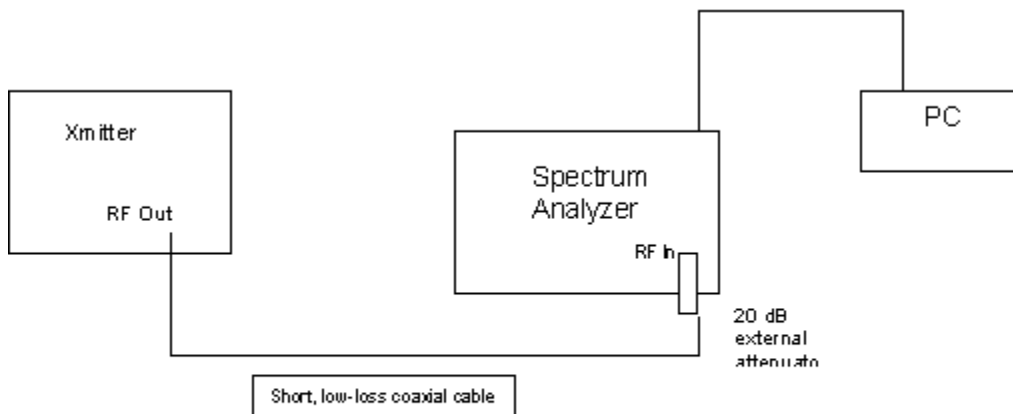
**Measurement Equipment**

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

**Test Description**

**Requirement:** Per 47 CFR 22.917, and 24.238, the peak conducted power of spurious emissions, up to the 10<sup>th</sup> harmonic of the transmit frequency, must be less than or equal to -13 dBm. Per 47 CFR 2.1051, the spurious emissions were measured at the RF output terminals with analyzer plots made for each modulation type.

**Configuration:** A spectrum analyzer was used to scan from 0 to 20 GHz. A 1MHz resolution bandwidth was used. No video filtering was employed. A 20dB external attenuator was used on the RF input of the spectrum analyzer.

**Test Setup Diagram****Completed by:**

*[Handwritten signature]*

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

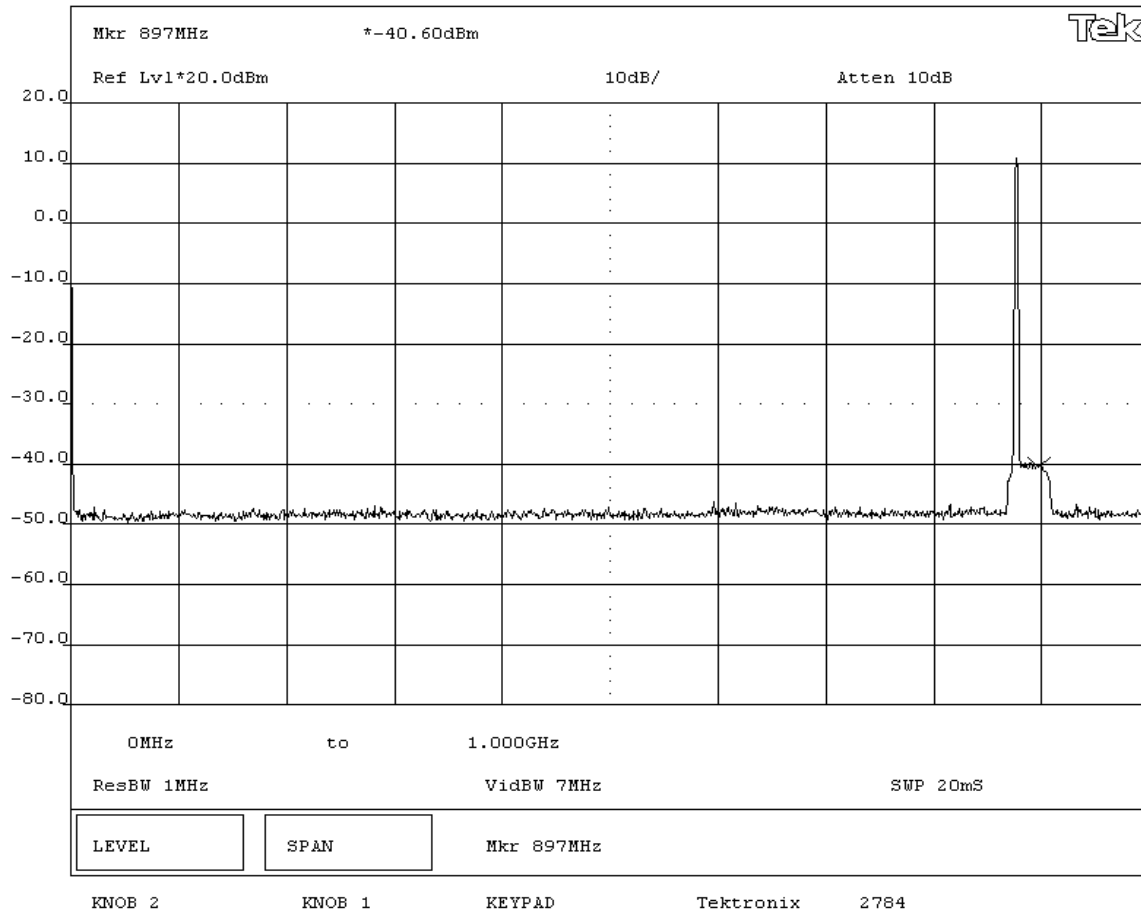
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Low Channel - Cellular Band</b>			



EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

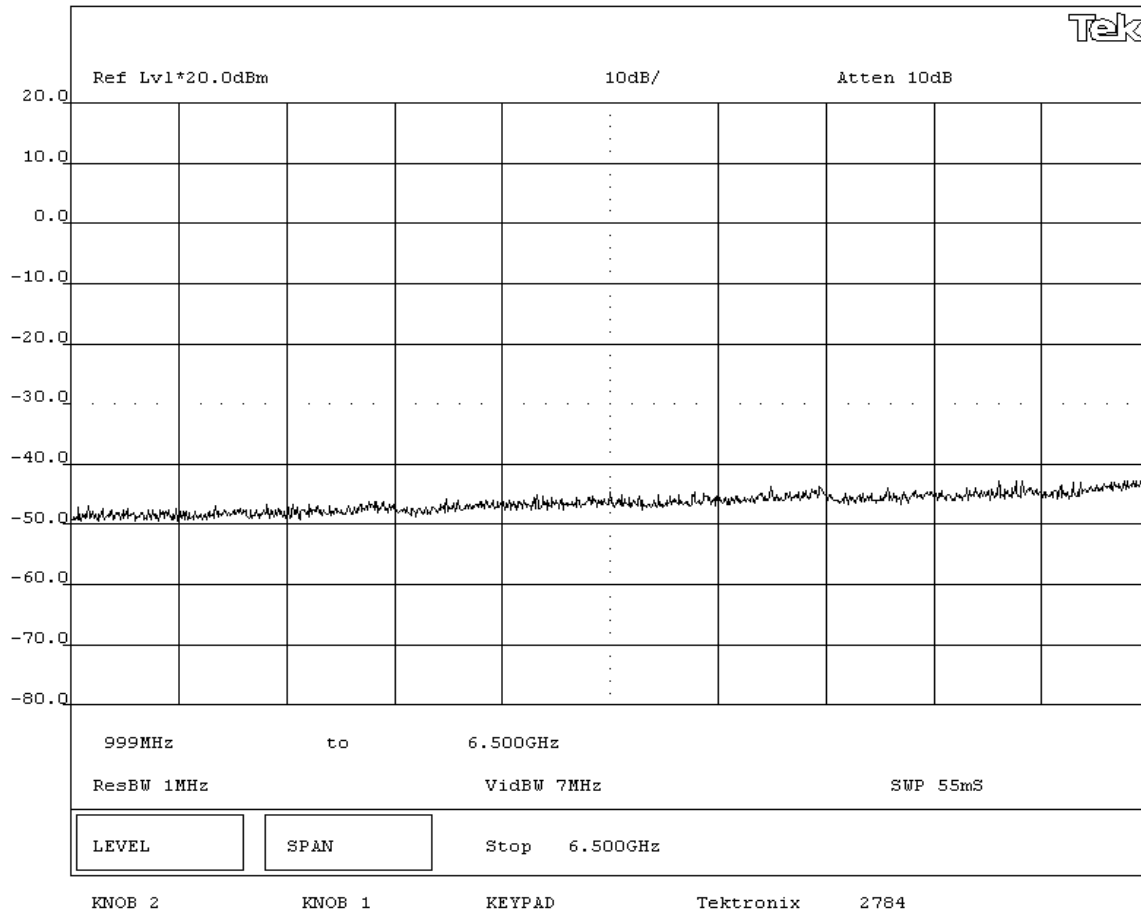
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Low Channel - Cellular Band</b>			



EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

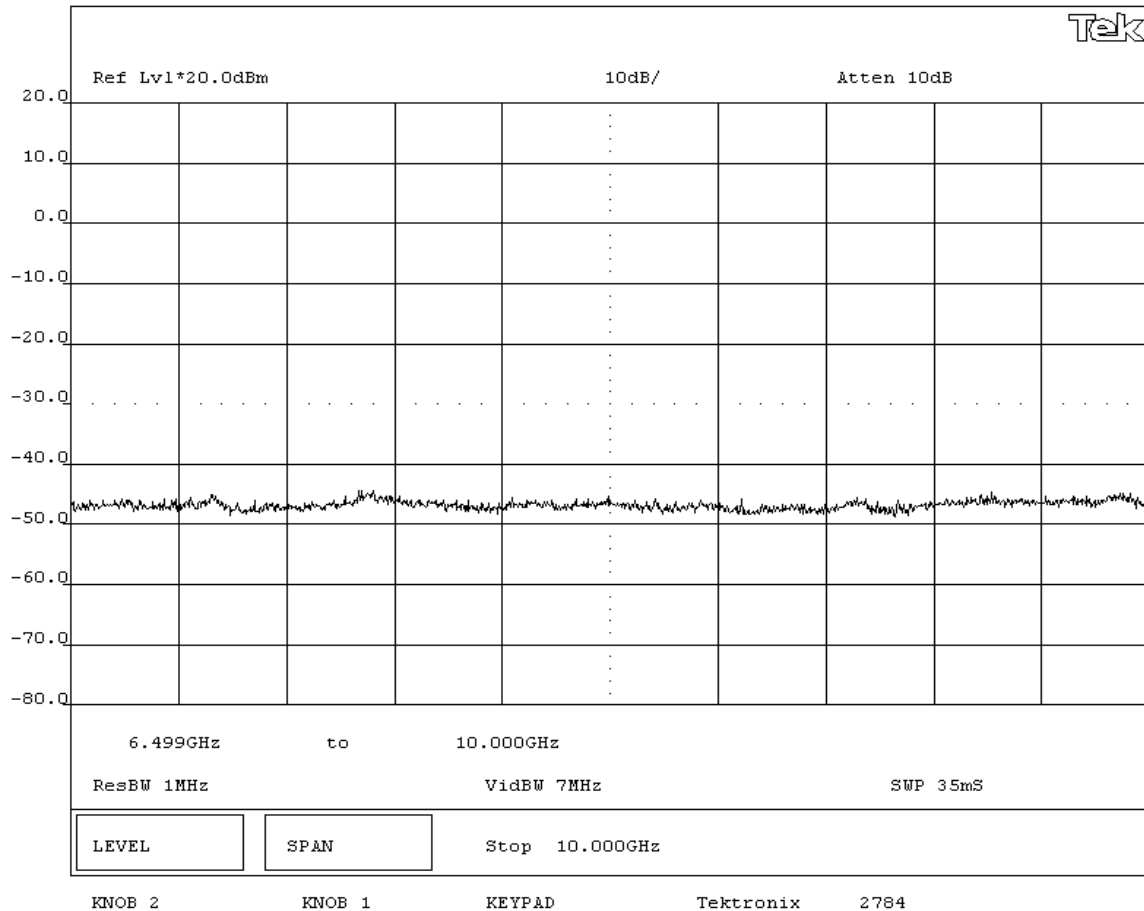
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Low Channel - Cellular Band</b>			



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

**COMMENTS**

**EUT OPERATING MODES**

Modulated by PRBS at maximum data rate, at maximum output power.

**DEVIATIONS FROM TEST STANDARD**

None

**REQUIREMENTS**

The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm

**RESULTS**

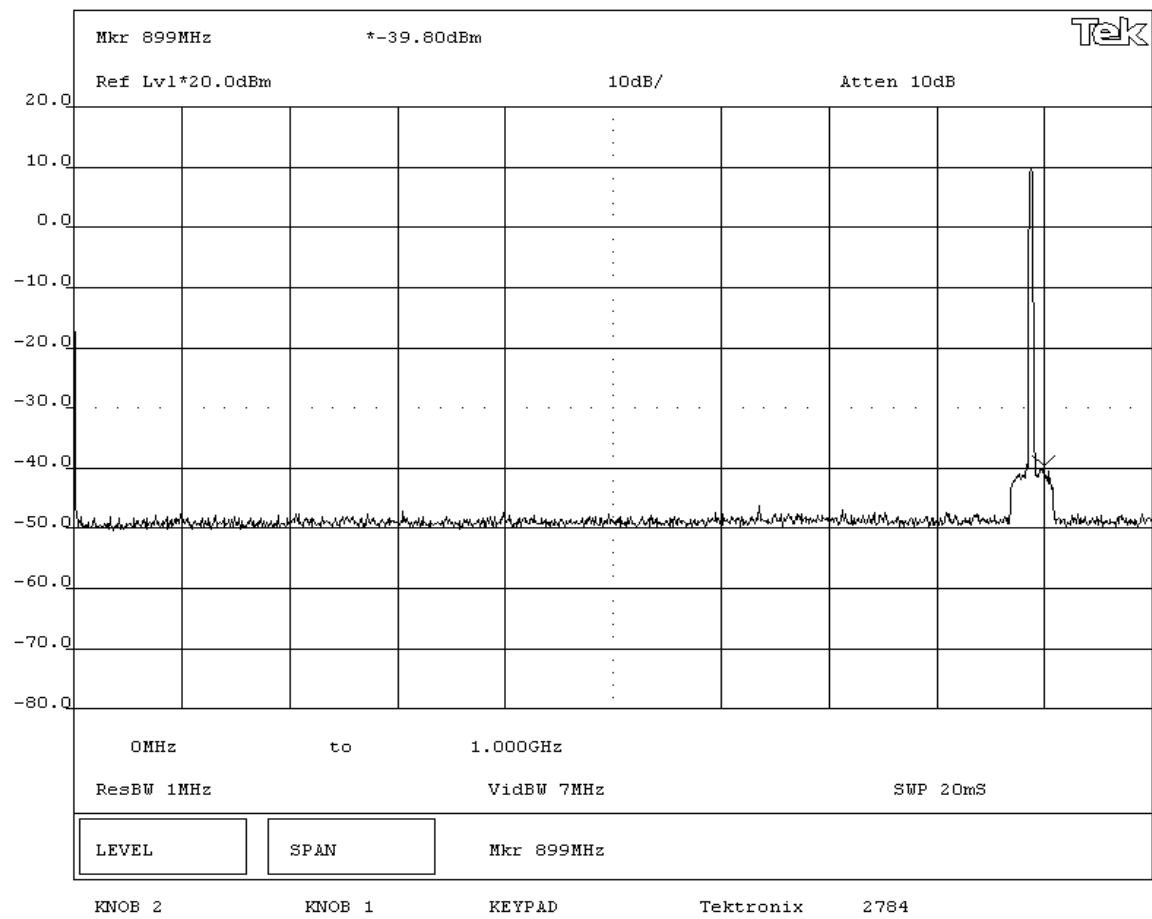
Pass

**SIGNATURE**

Tested By: *Greg Kiemel*

**DESCRIPTION OF TEST**

**Spurious Conducted Emissions - Mid Channel - Cellular Band**



EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

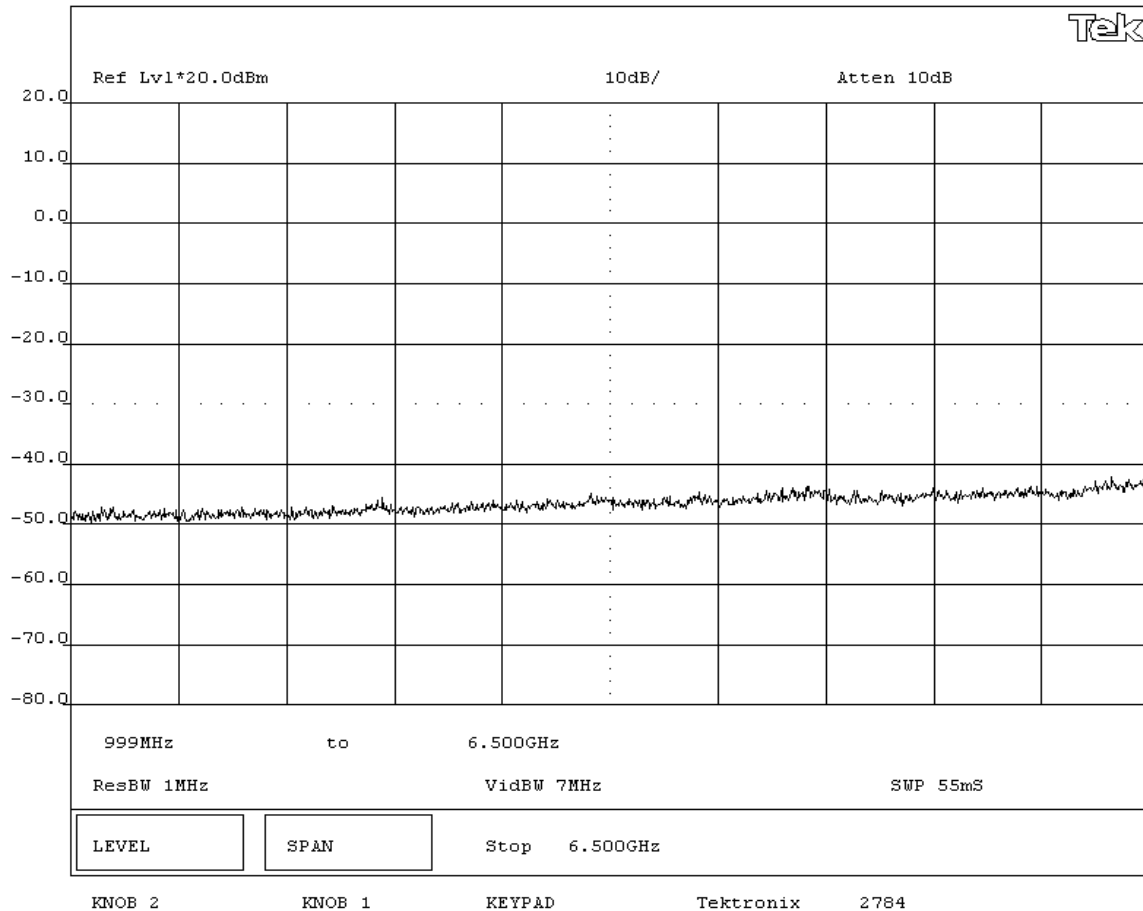
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Mid Channel - Cellular Band</b>			



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz
Tested by: Greg Kiemel	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

**COMMENTS**

**EUT OPERATING MODES**

Modulated by PRBS at maximum data rate, at maximum output power.

**DEVIATIONS FROM TEST STANDARD**

None


**REQUIREMENTS**

The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm

**RESULTS**

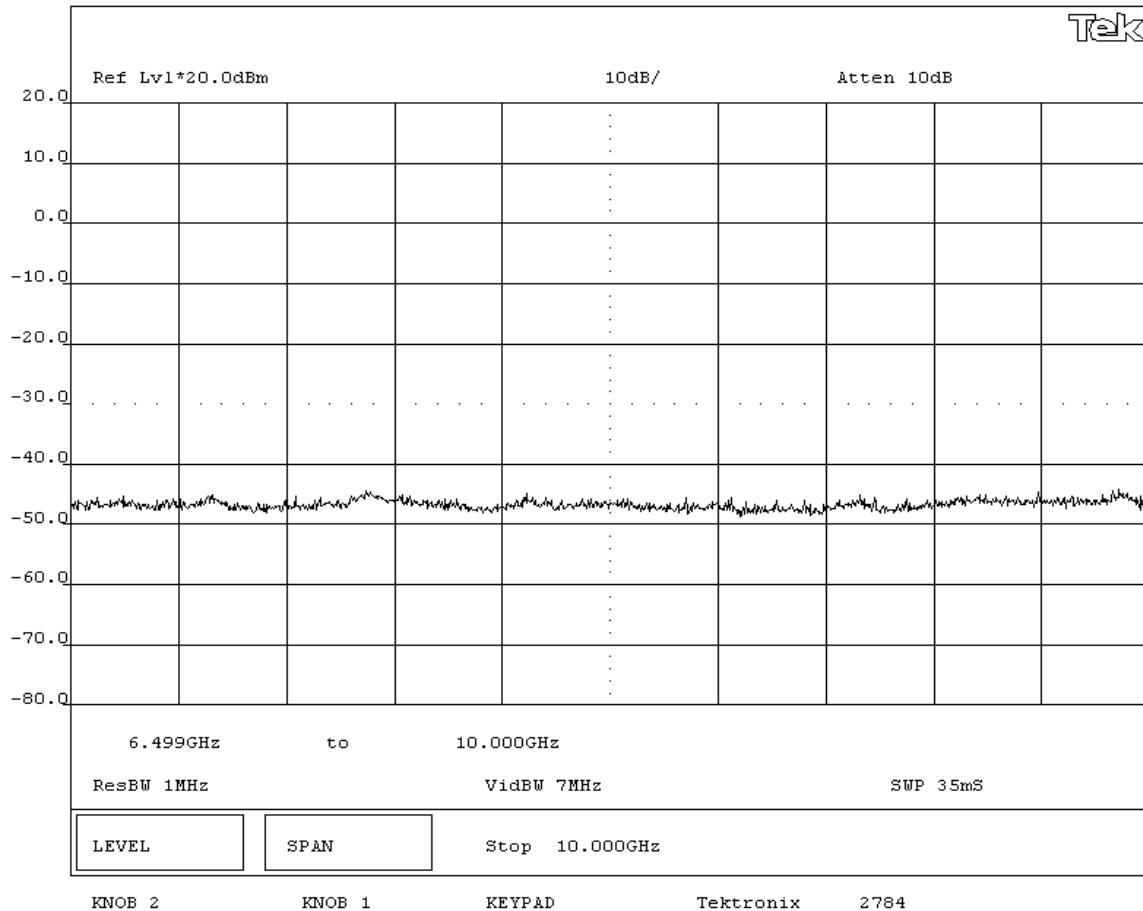
Pass

**SIGNATURE**

Tested By: 

**DESCRIPTION OF TEST**

**Spurious Conducted Emissions - Mid Channel - Cellular Band**



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

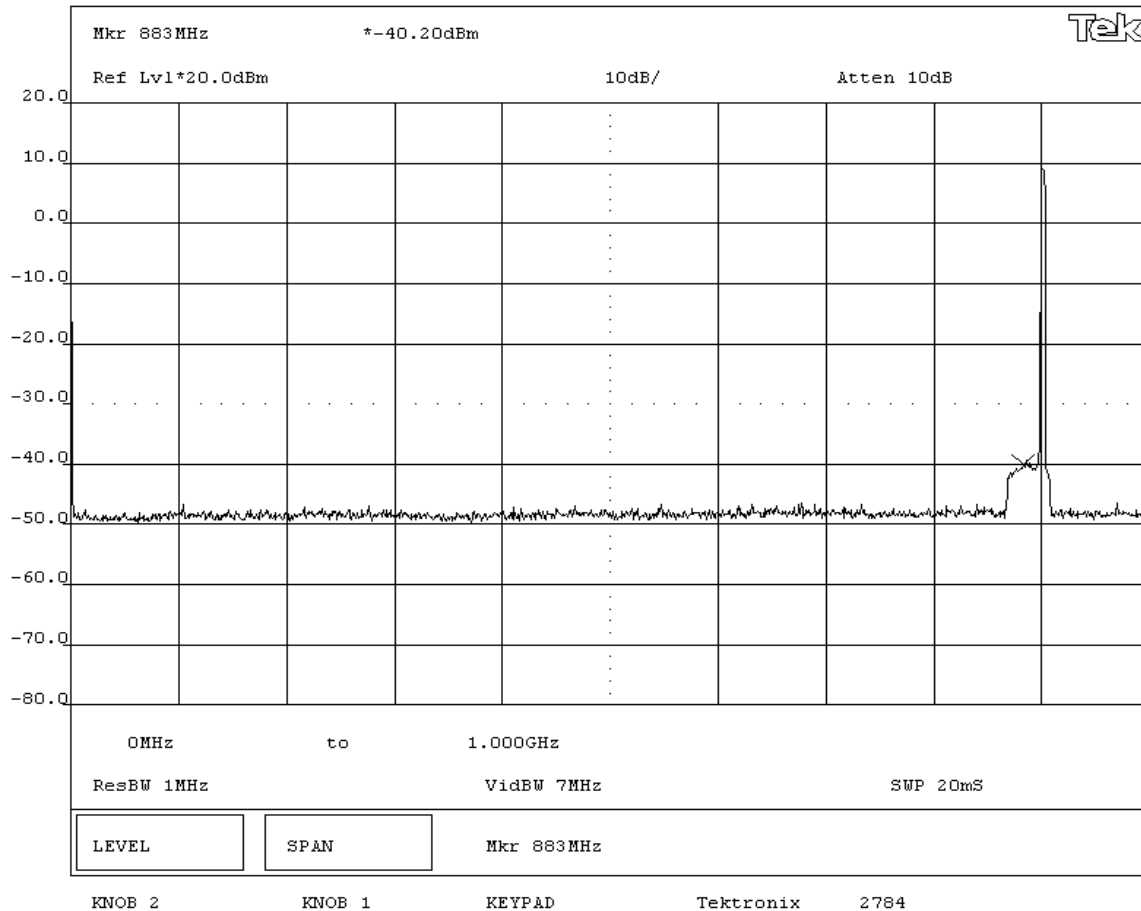
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - High Channel - Cellular Band</b>			





# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043	
Serial Number: 12104320038		Date: 11/15/04	
Customer: RadioFrame Networks, Inc.		Temperature: 73 F	
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%	
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06	

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

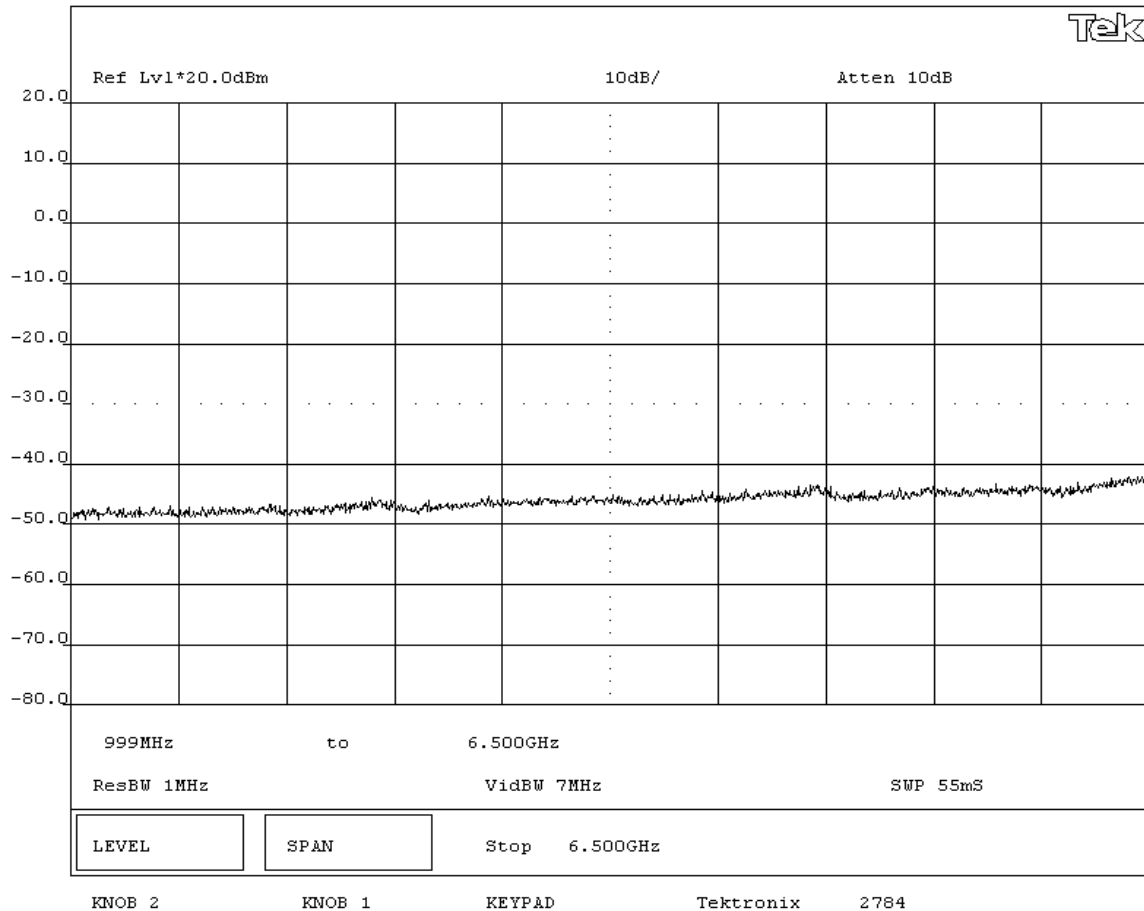
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - High Channel - Cellular Band</b>			



NORTHWEST  
EMC

# EMISSIONS DATA SHEET

Rev BETA  
01/30/01

EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: 120VAC/60Hz
	Humidity: 41%
	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

**SAMPLE CALCULATIONS**

**COMMENTS**

**EUT OPERATING MODES**  
Modulated by PRBS at maximum data rate, at maximum output power.

**DEVIATIONS FROM TEST STANDARD**  
None

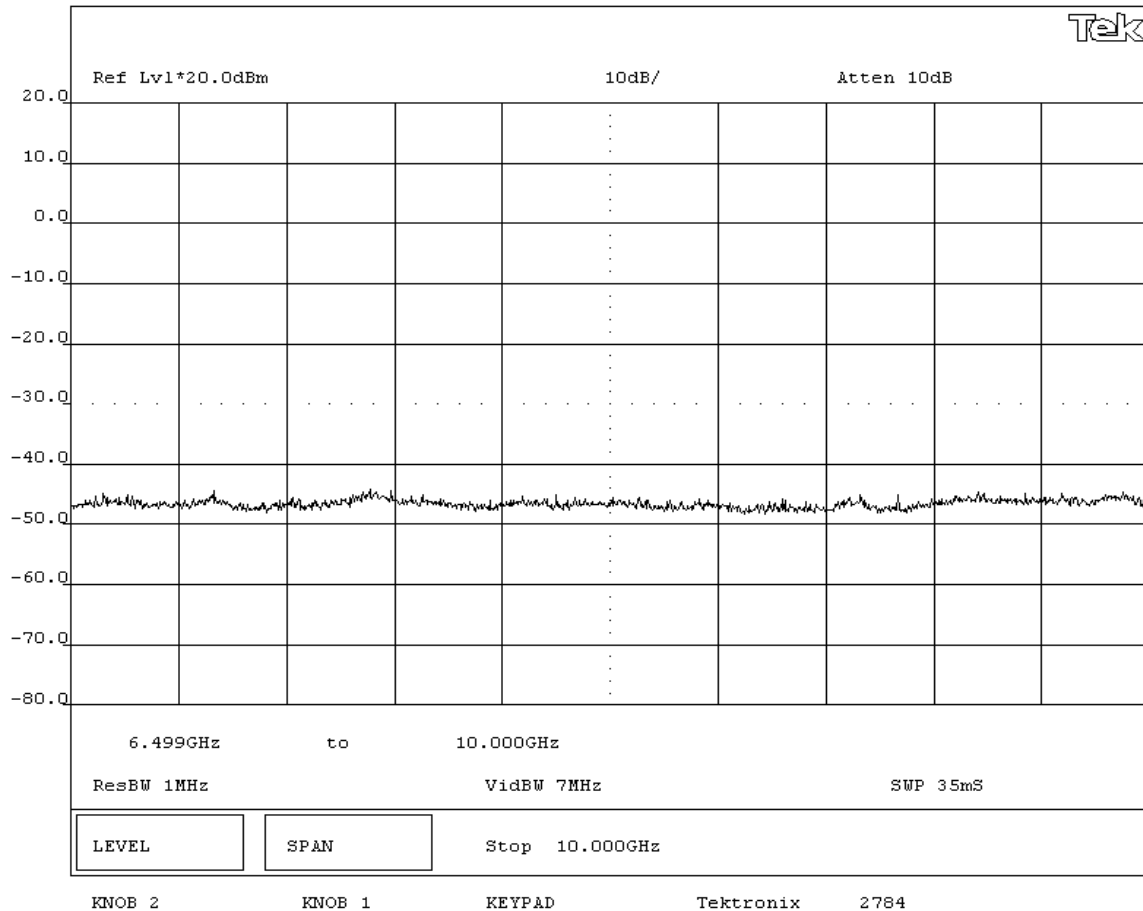
**REQUIREMENTS**  
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm

**RESULTS**  
Pass

**SIGNATURE**

Tested By: 

**DESCRIPTION OF TEST**  
**Spurious Conducted Emissions - High Channel - Cellular Band**



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

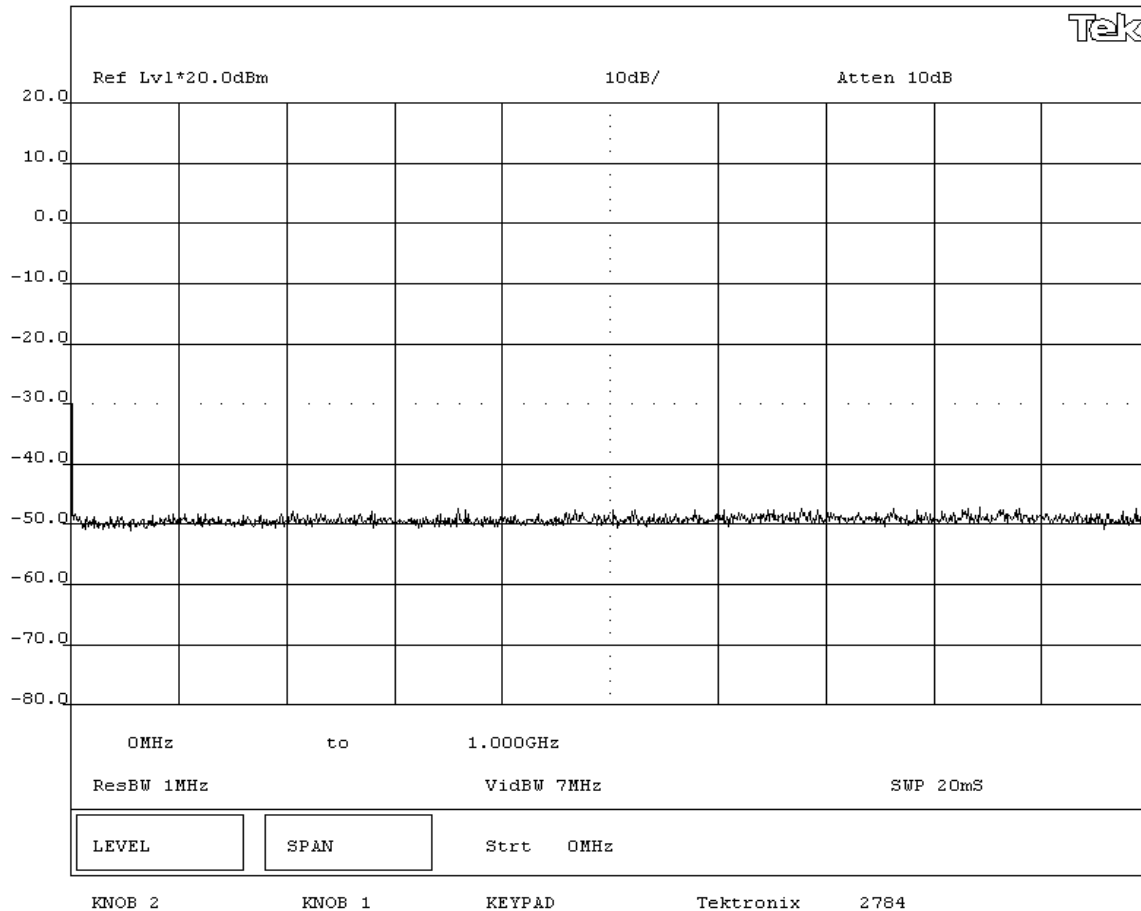
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Low Channel - PCS Band</b>			



EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

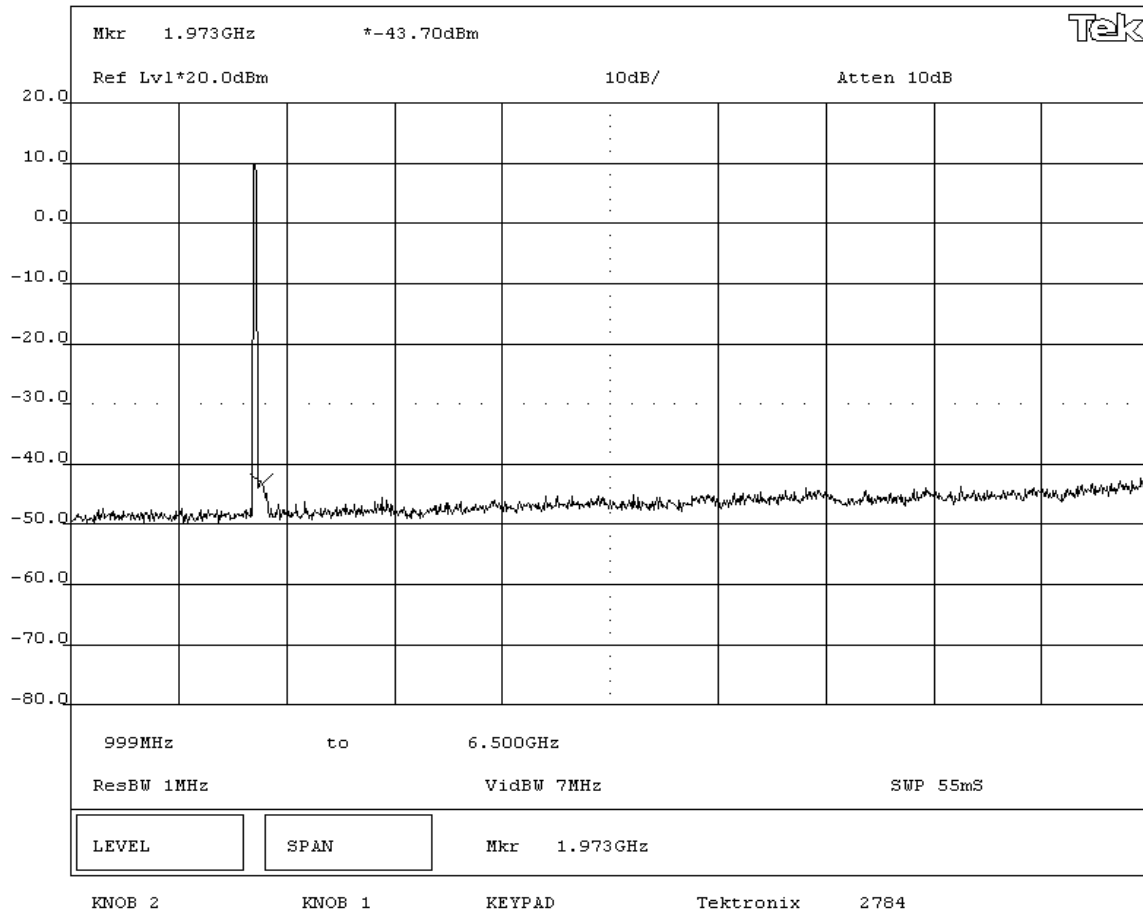
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Low Channel - PCS Band</b>			



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

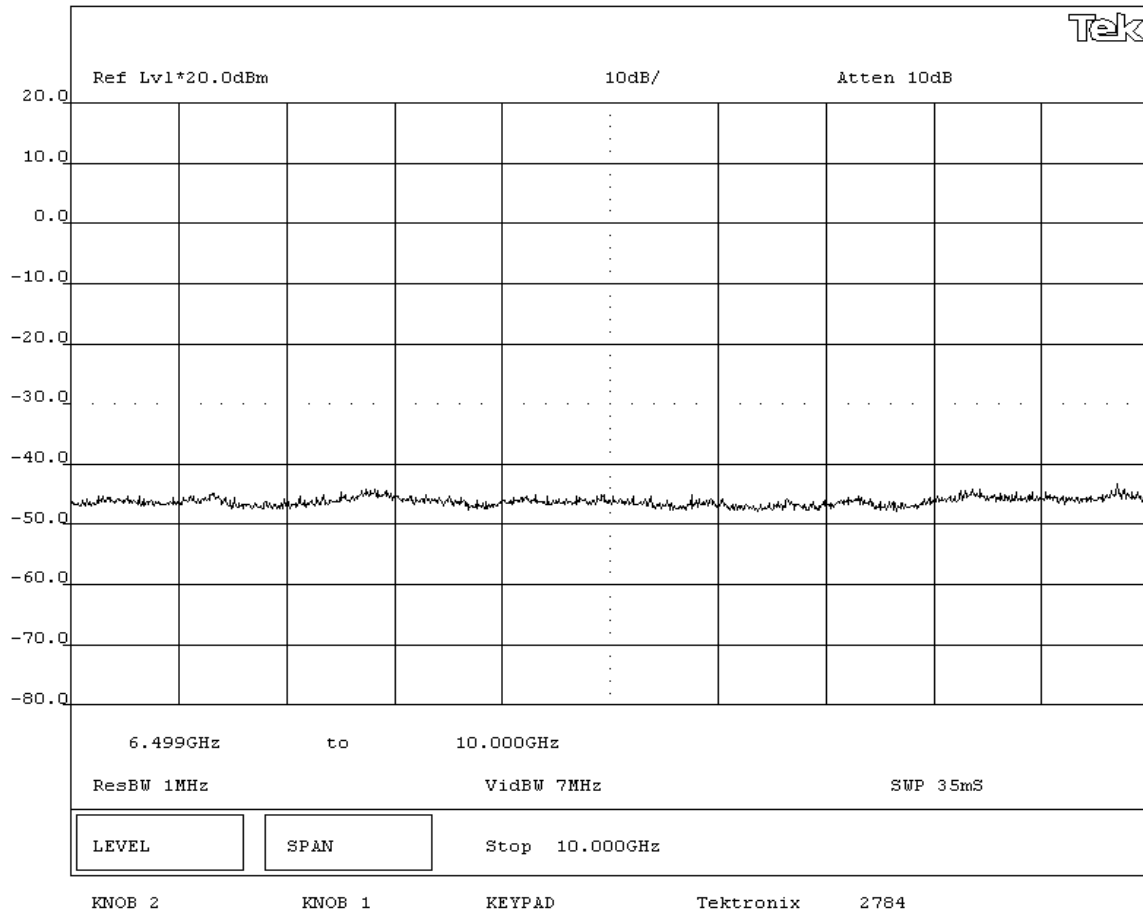
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Low Channel - PCS Band</b>			





EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at maximum data rate, at maximum output power.

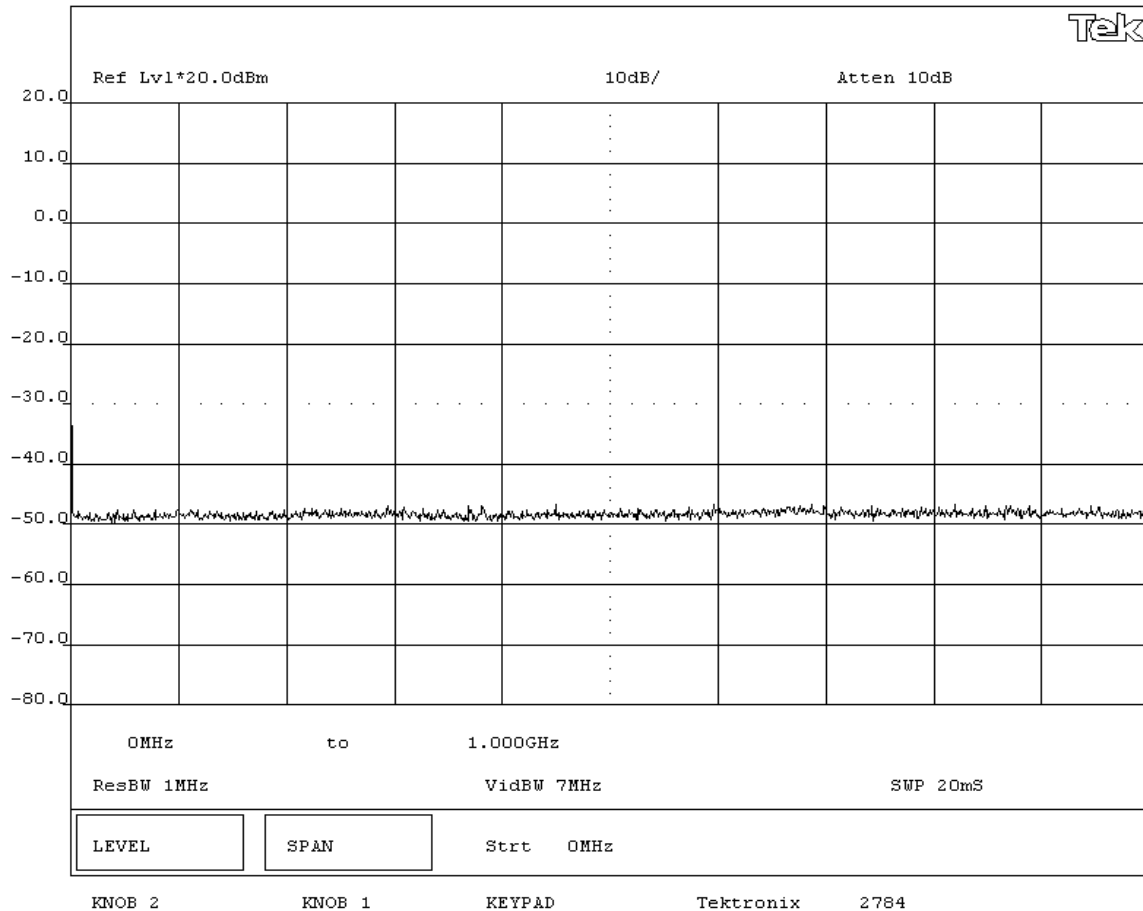
DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm

RESULTS
Pass

SIGNATURE
 Tested By: _____

DESCRIPTION OF TEST
<b>Spurious Conducted Emissions - Mid Channel - PCS Band</b>



EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

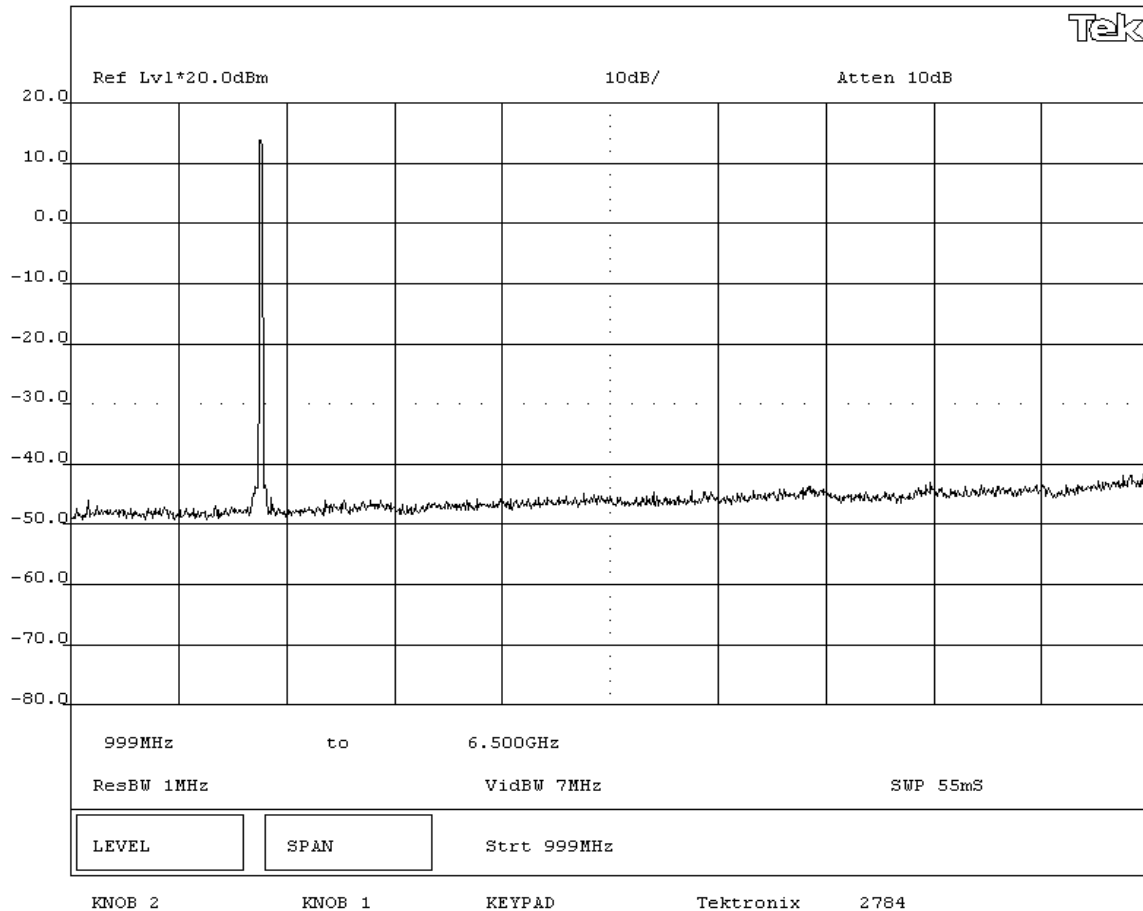
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Mid Channel - PCS Band</b>			





EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

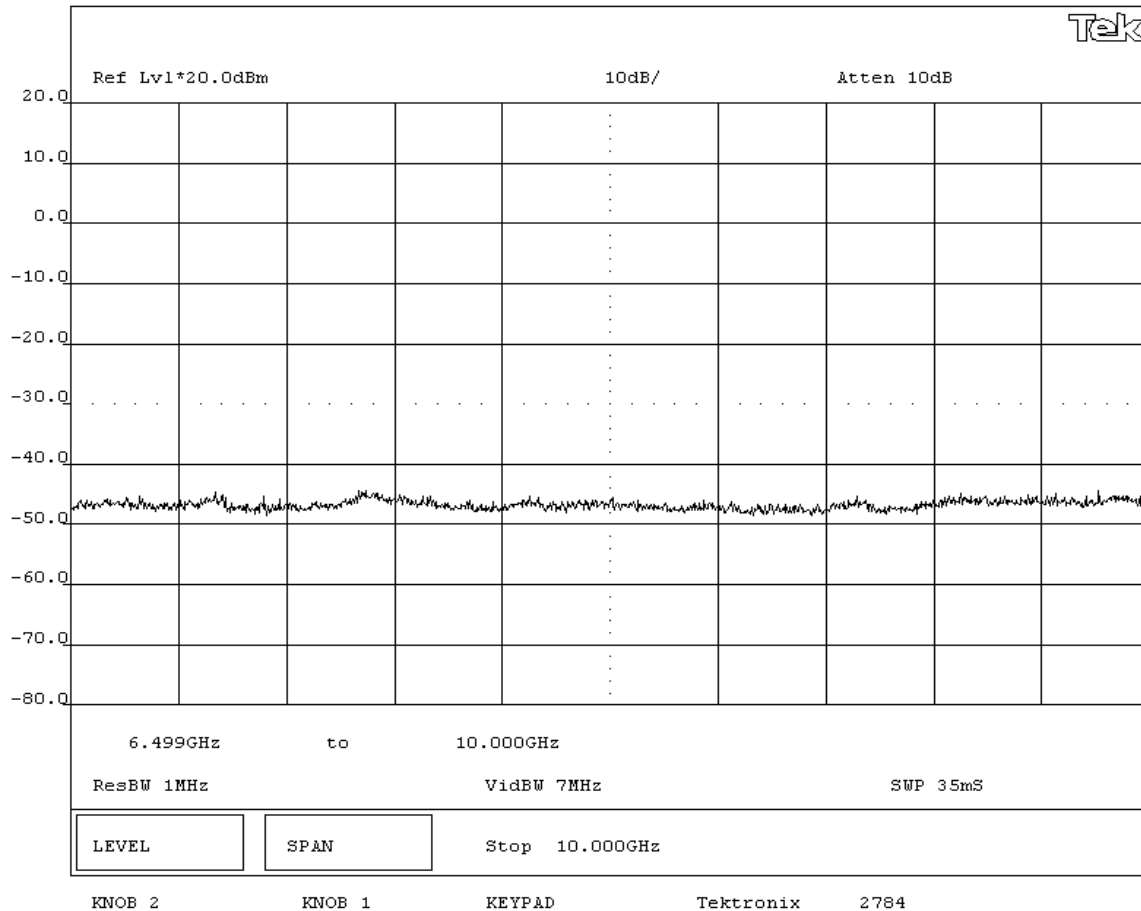
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Mid Channel - PCS Band</b>			



EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

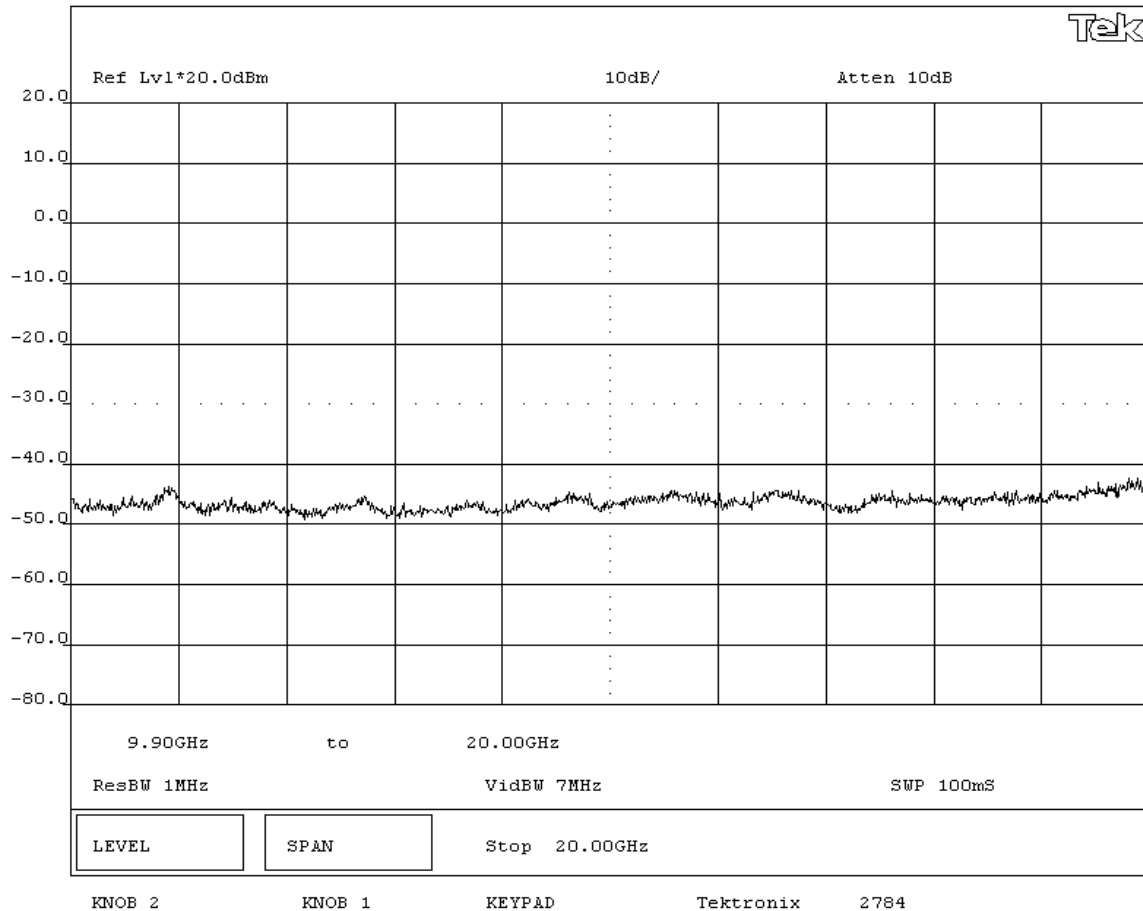
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - Mid Channel - PCS Band</b>			



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04	
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

**SAMPLE CALCULATIONS**

**COMMENTS**

**EUT OPERATING MODES**  
Modulated by PRBS at maximum data rate, at maximum output power.

**DEVIATIONS FROM TEST STANDARD**  
None

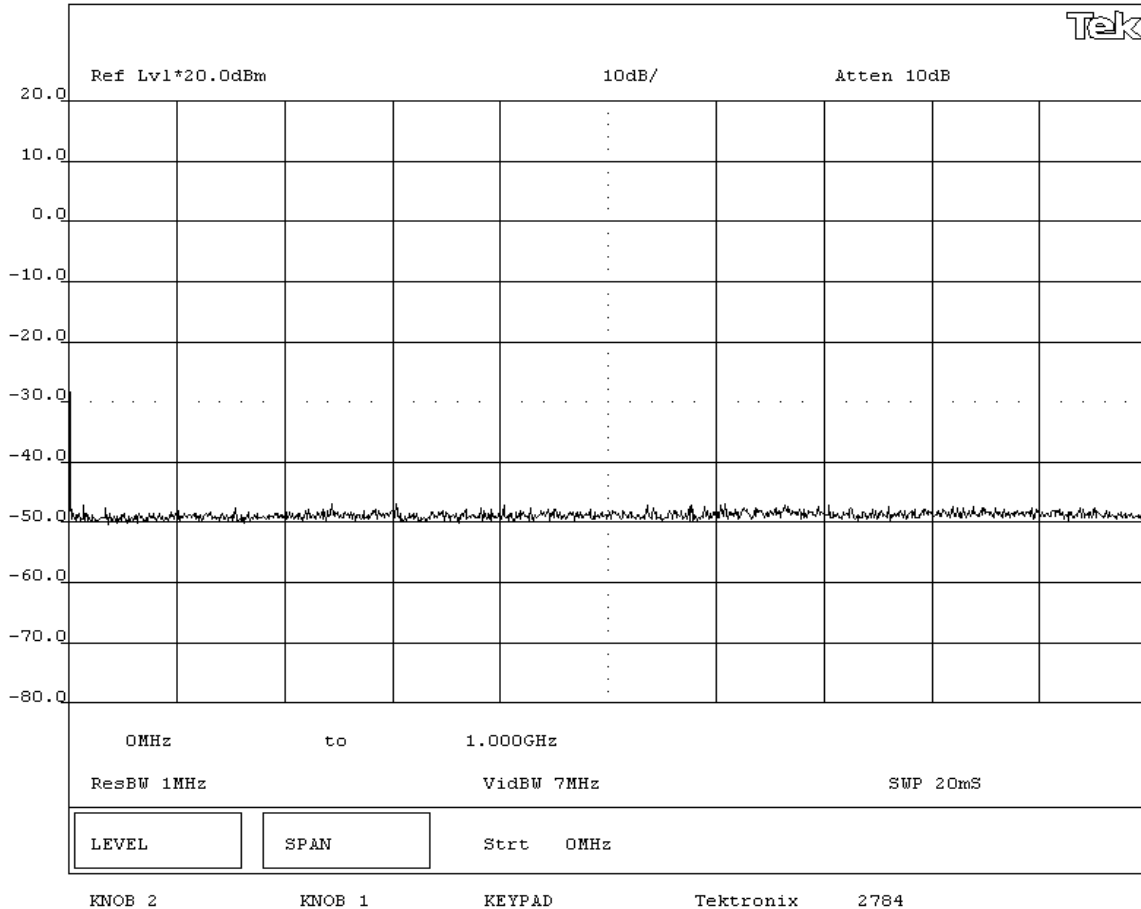
**REQUIREMENTS**  
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm

**RESULTS**  
Pass

**SIGNATURE**

Tested By: \_\_\_\_\_

**DESCRIPTION OF TEST**  
**Spurious Conducted Emissions - High Channel - PCS Band**



EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

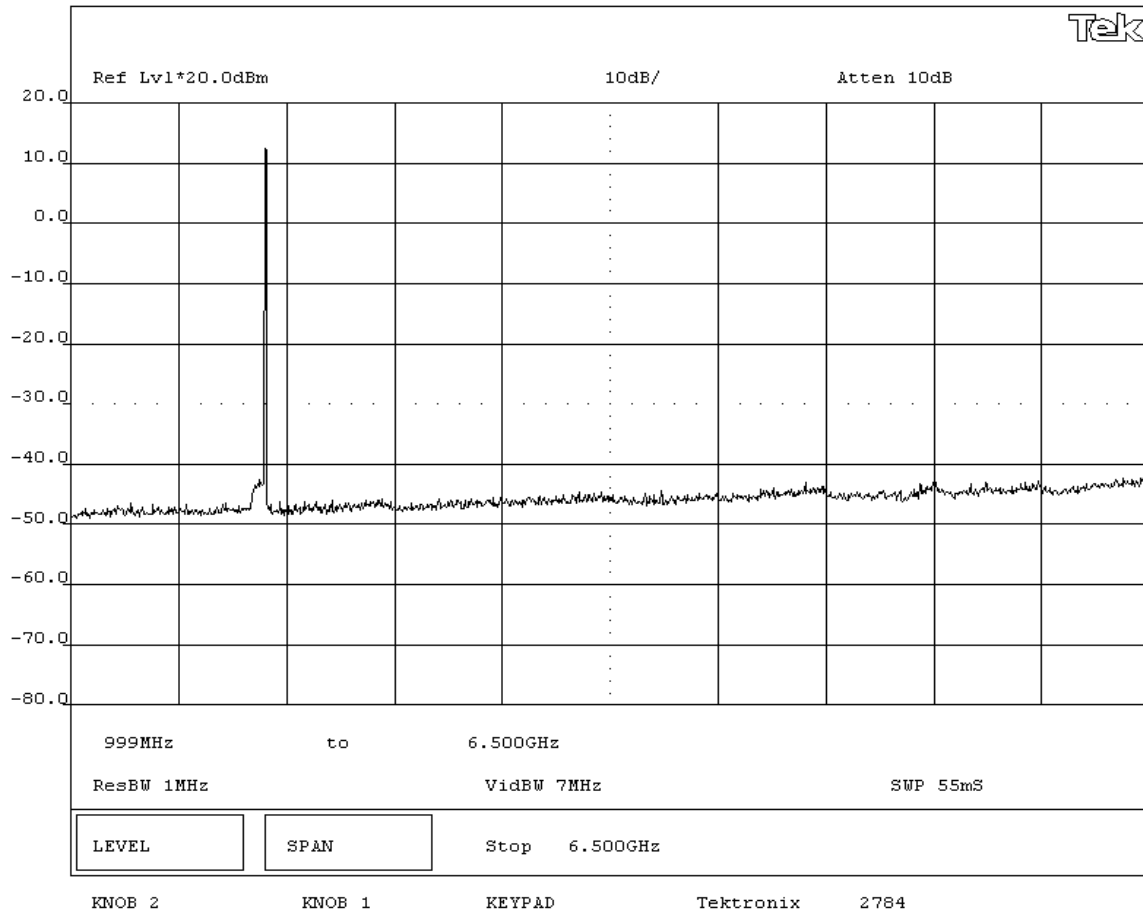
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - High Channel - PCS Band</b>			



EUT: GSM NA BV Release 1.0	Work Order: RAFN0043
Serial Number: 12104320038	Date: 11/15/04
Customer: RadioFrame Networks, Inc.	Temperature: 73 F
Attendees: Dean Busch	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz
Tested by: Greg Kiemel	Job Site: EV06

**TEST SPECIFICATIONS**

Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001
--	--------------------	-----------------------	------------

**SAMPLE CALCULATIONS**

--	--	--	--

**COMMENTS**

**EUT OPERATING MODES**

Modulated by PRBS at maximum data rate, at maximum output power.

**DEVIATIONS FROM TEST STANDARD**

None

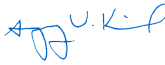
**REQUIREMENTS**

The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm

**RESULTS**

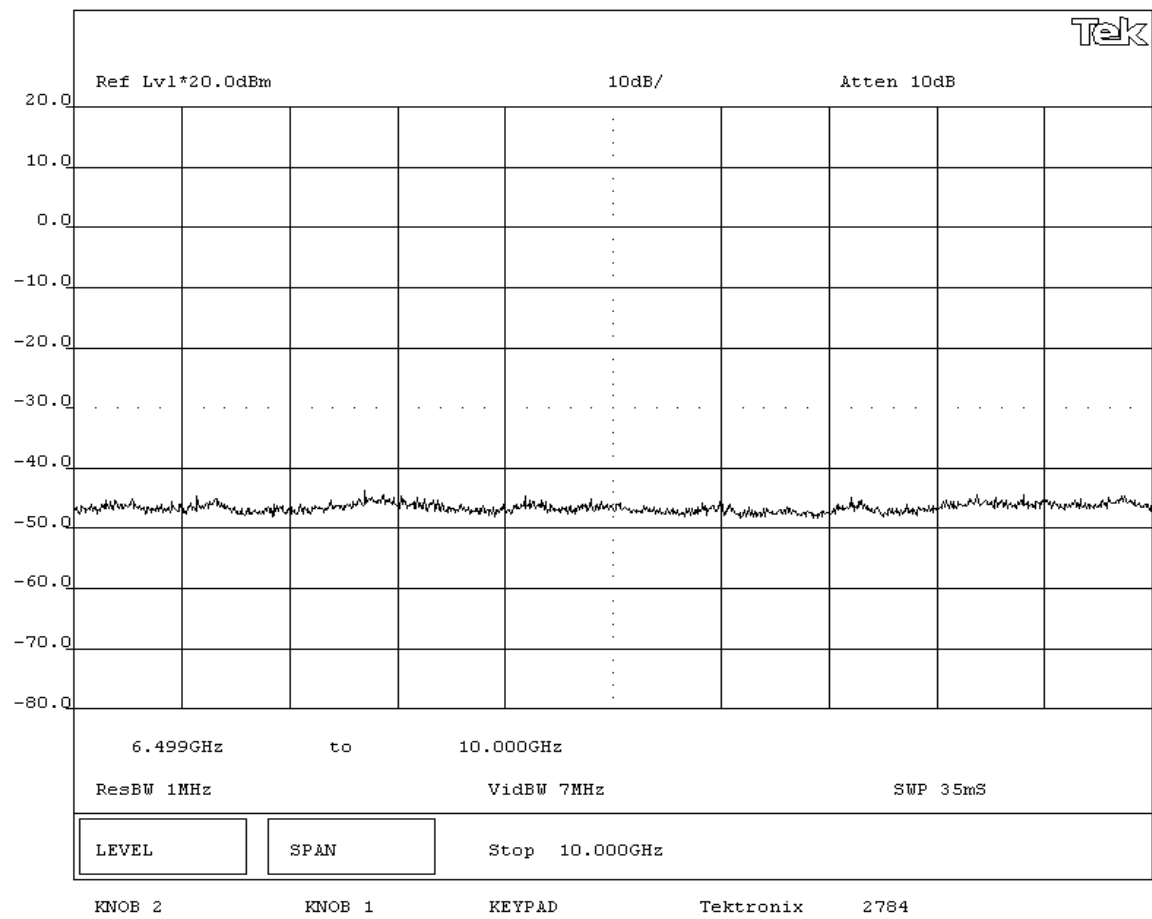
Pass

**SIGNATURE**

Tested By: 

**DESCRIPTION OF TEST**

**Spurious Conducted Emissions - High Channel - PCS Band**



# EMISSIONS DATA SHEET

EUT: GSM NA BV Release 1.0		Work Order: RAFN0043
Serial Number: 12104320038		Date: 11/15/04
Customer: RadioFrame Networks, Inc.		Temperature: 73 F
Attendees: Dean Busch	Tested by: Greg Kiemel	Humidity: 41%
Customer Ref. No.: N/A	Power: 120VAC/60Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 2.1051, 22.917, 24.238	Year: Most Current	Method: TIA / EIA 603	Year: 2001

<b>SAMPLE CALCULATIONS</b>			

<b>COMMENTS</b>			

<b>EUT OPERATING MODES</b>			
Modulated by PRBS at maximum data rate, at maximum output power.			

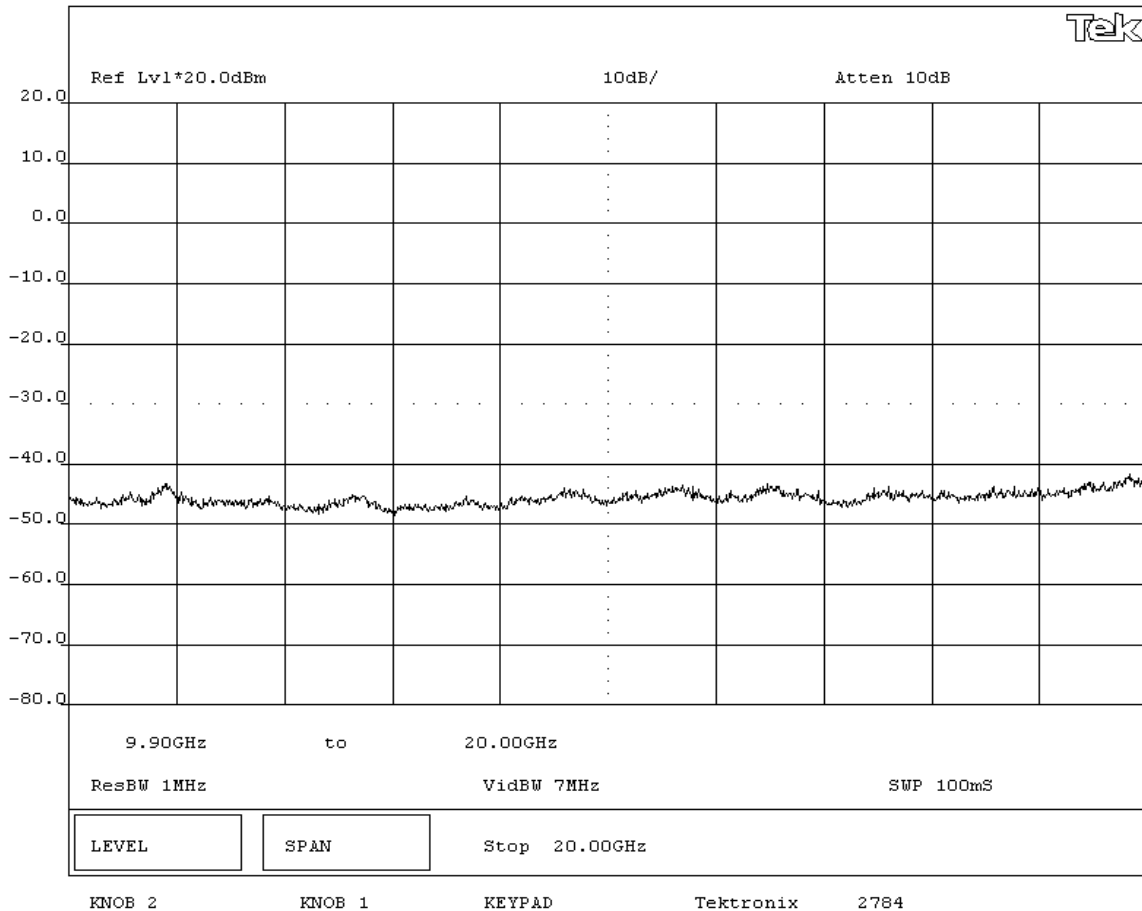
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			

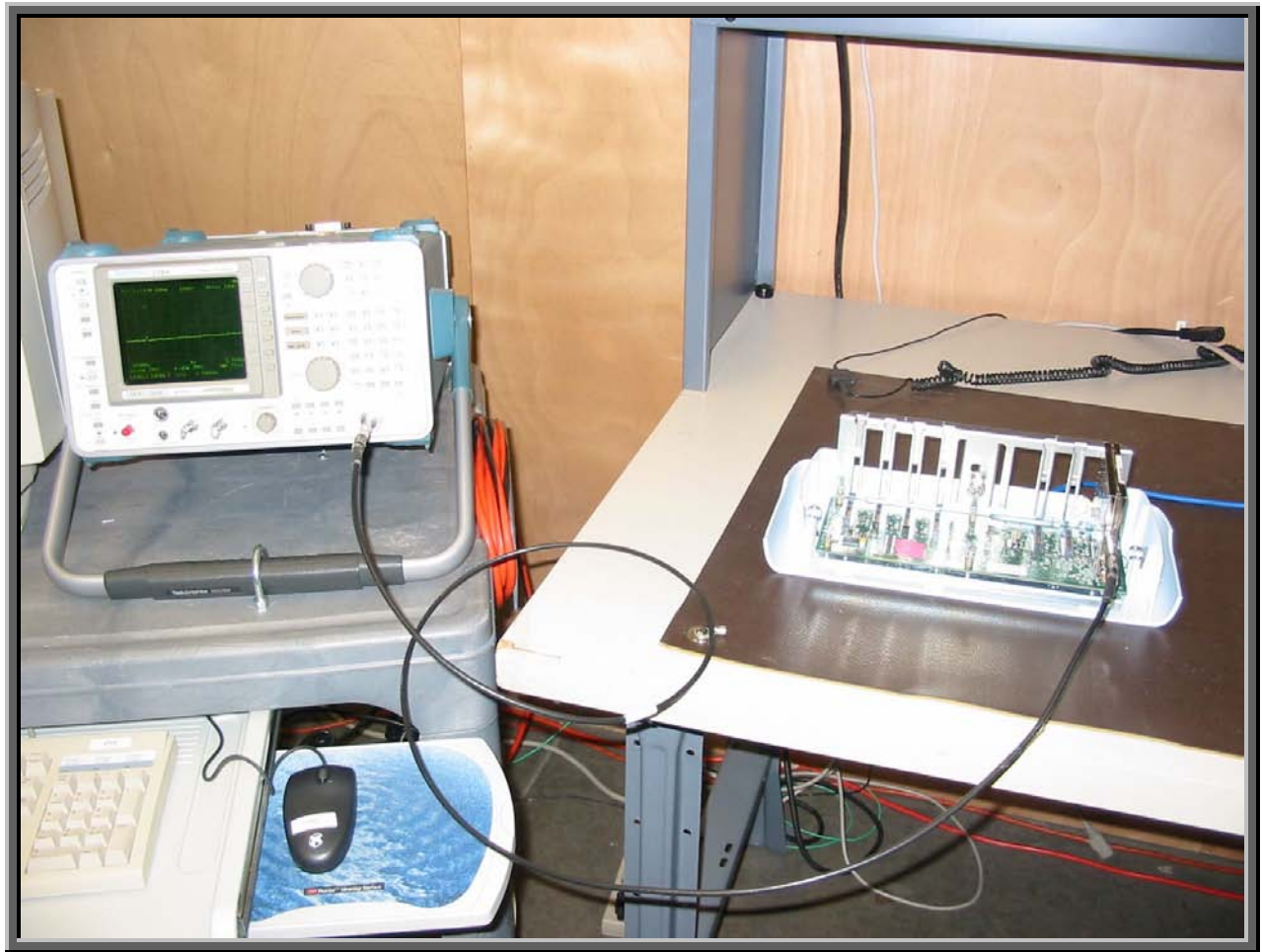
<b>REQUIREMENTS</b>			
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, must be less than or equal to -13 dBm			

<b>RESULTS</b>			
Pass			

<b>SIGNATURE</b>			
 Tested By: _____			

<b>DESCRIPTION OF TEST</b>			
<b>Spurious Conducted Emissions - High Channel - PCS Band</b>			





**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low

Mid

High

**Operating Modes Investigated:**

GSM Low Band (Cellular)

GSM High Band (PCS)

**Data Rates Investigated:**

Maximum

**Output Power Setting(s) Investigated:**

Maximum

**Power Input Settings Investigated:**

120 VAC, 60 Hz.

**Other Settings Investigated:**

Antennas ports terminated

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Antenna	LINX	ANT-2.4-RCT-SS	N/A
Backplane	Radio Frame Networks	RFU	N/A
GSM Radio Blade (EUT)	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	12104320038



## Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

## Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

## Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/08/2003	12 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	10/08/2003	12 mo
Attenuator		2082-6148-20	ATE	02/03/2004	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

## Test Description

**Requirement:** Per 2.1053, the field strength of spurious radiation was measured in the far-field at an FCC Listed semi-anechoic chamber up to 25 GHz. The applicable limits are 22.917(e) for the cellular band, and 24.238(a) for the PCS band.

Per 22.917(e), the mean power of out of band emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log (P)$  dB. (-13 dBm).

Per 24.238(a), on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. (-13 dBm).

**Configuration:** Spectrum analyzer, signal generator, and linearly polarized antennas were used to measure radiated harmonics and spurious emissions. The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions. The EUT was configured to transmit at the highest output at low, mid, and high channels.

The substitution method as described in TIA/EIA-603 Section 2.2.12 was used for the highest spurious emissions. The EUT was tested individually, then while simultaneously transmitting with a co-located radio.

**Test Methodology:** For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is placed on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a  $\frac{1}{2}$  wave dipole that is successively tuned to each of the highest emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain; the power (ERP or e.i.r.p) is determined for each radiated emission.

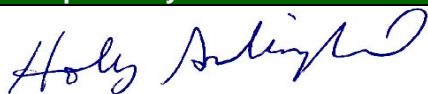
For the purposes of preliminary measurements, the field strength of the spurious emissions can be measured and compared with a 3 meter limit. The final measurements must be made utilizing the substitution method described above. The 3 meter limit was calculated to be 84.3 dBuV/m at 3 meters. This was based upon an output power of 0.224 W.

The spectrum was scanned throughout the specified range. While scanning, emissions from the radios were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antennas in three orthogonal axes, and adjusting the measurement antenna height and polarization (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

Bandwidths Used for Measurements			
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

*Measurements were made using the bandwidths and detectors specified. No video filter was used.*

Completed by:



# Apparent Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/11/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 22.917(e)
Method:	TIA/EIA-603
Year:	2003
Year:	2001

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**  
 Stand alone configuration.

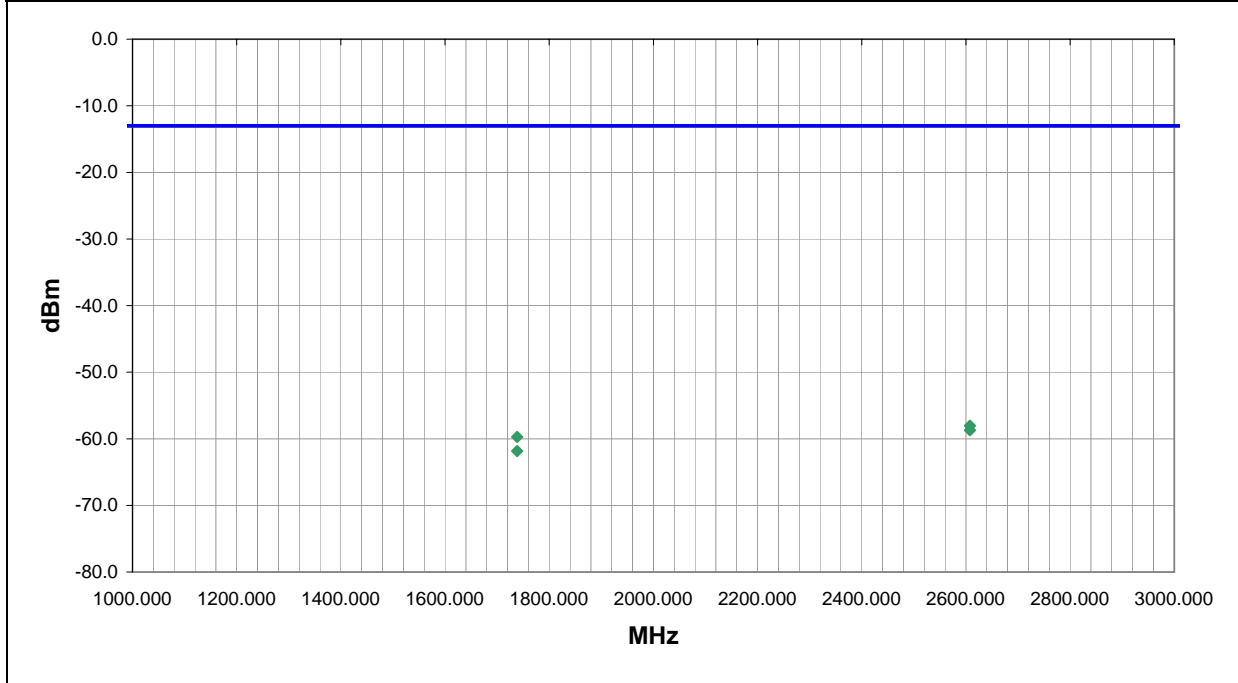
**EUT OPERATING MODES**  
 GSM Lowband, Channel

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Run #
Pass	8

Other

  
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
2607.600	52.0	1.3	V-Horn	PK	-58.0	-13.0	-45.0
2607.600	167.0	1.1	H-Horn	PK	-58.7	-13.0	-45.7
1738.400	41.0	1.1	V-Horn	PK	-59.7	-13.0	-46.7
1738.400	281.0	1.1	H-Horn	PK	-61.8	-13.0	-48.8

# Apparent Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFNO043
Serial Number:	12104320038	Date:	11/11/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 22.917(e)
Method:	TIA/EIA-603
Year:	2003
Year:	2001

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**  
 Stand alone configuration.

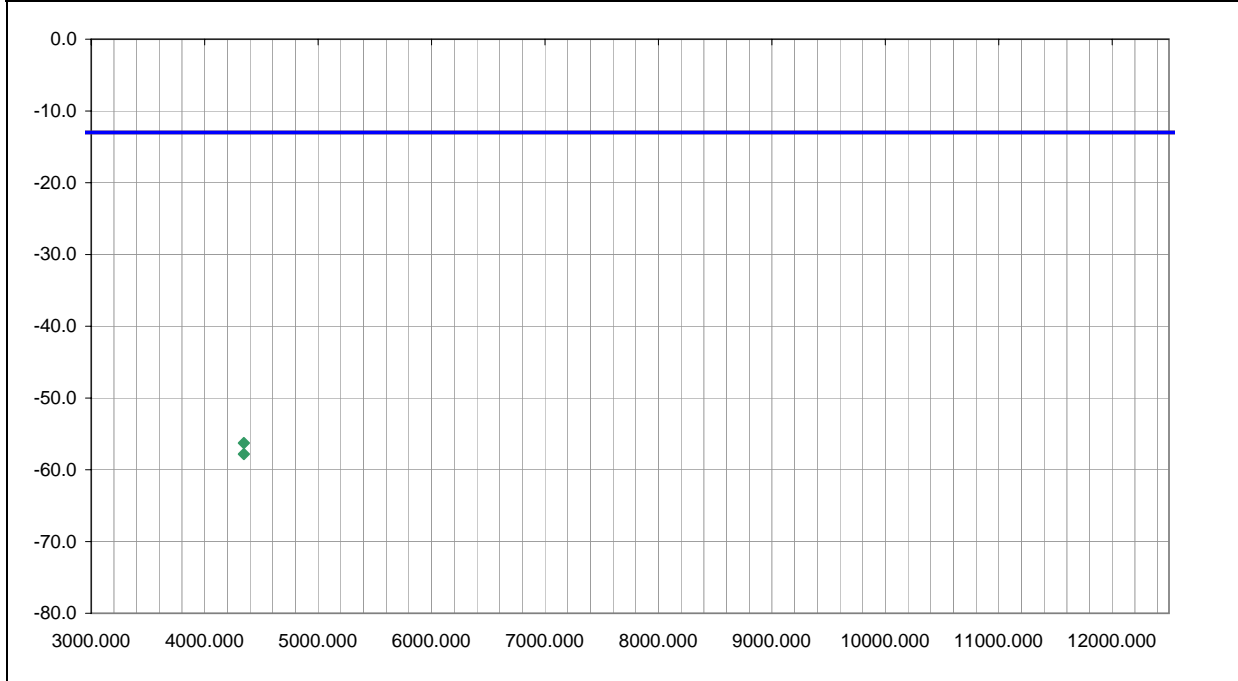
**EUT OPERATING MODES**  
 GSM Lowband, Channel

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	Run #
Pass	9

Other

  
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
4346.000	250.0	1.0	V-Horn	PK	-56.3	-13.0	-43.3
4346.000	159.0	1.0	H-Horn	PK	-57.8	-13.0	-44.8

# Apparent Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/11/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 22.917(e)	Year:	2003
Method:	TIA/EIA-603	Year:	2001

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**

GSM Lowband, Mid Channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

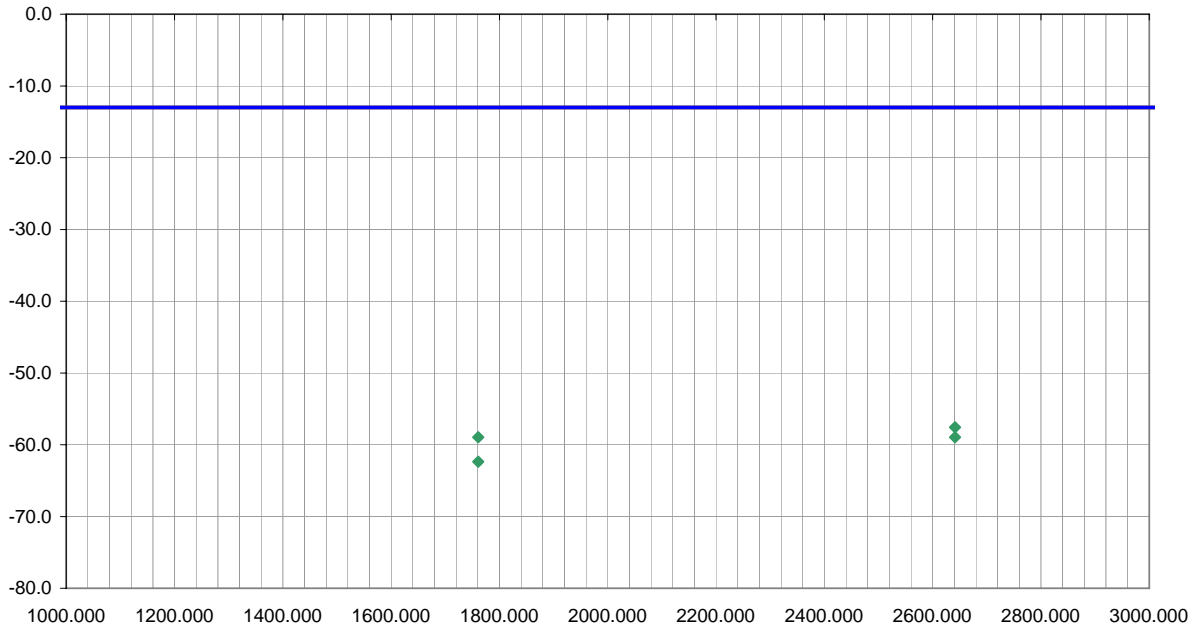
**RESULTS**

Pass	Run #	12
------	-------	----

Other



Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
2641.200	299.0	1.5	V-Horn	PK	-57.6	-13.0	-44.6
2641.200	202.0	1.0	H-Horn	PK	-58.9	-13.0	-45.9
1760.800	289.0	1.3	V-Horn	PK	-59.0	-13.0	-46.0
1760.800	204.0	1.2	H-Horn	PK	-62.4	-13.0	-49.4

# Apparent Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/11/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 22.917(e)	Year:	2003
Method:	TIA/EIA-603	Year:	2001

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**

GSM Lowband, High Channel.

**DEVIATIONS FROM TEST STANDARD**

No deviations.

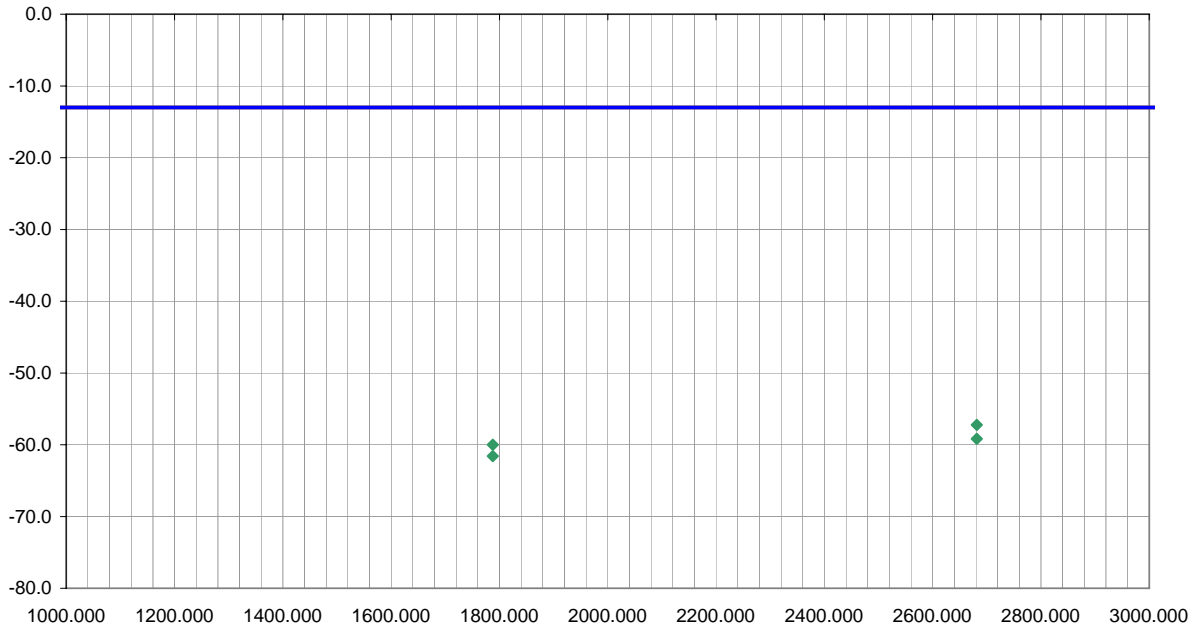
**RESULTS**

Pass	Run #	14
------	-------	----

Other

*Holly Ashkannejhad*

Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
2681.400	320.0	1.3	V-Horn	PK	-57.2	-13.0	-44.2
2681.400	235.0	1.1	H-Horn	PK	-59.2	-13.0	-46.2
1787.600	307.0	1.7	V-Horn	PK	-60.0	-13.0	-47.0
1787.600	-3.0	1.2	H-Horn	PK	-61.6	-13.0	-48.6

# Apparent Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/12/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	34%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	2001

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**


GSM Highband, Low Channel

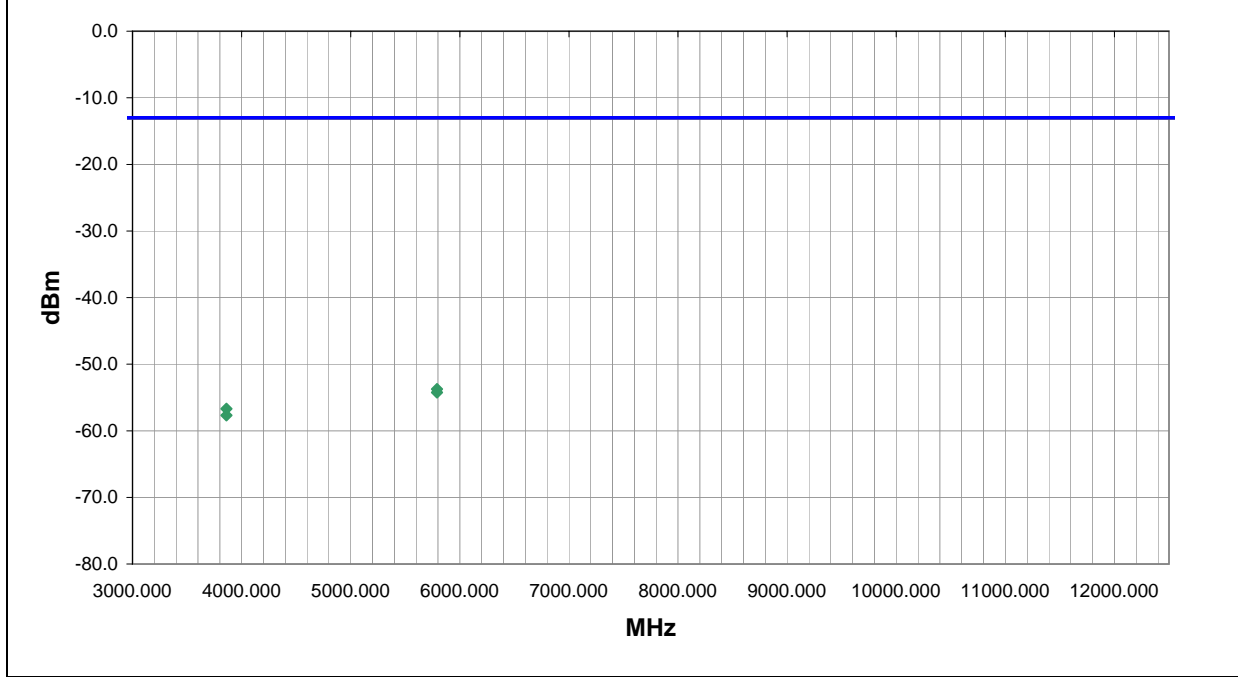
**DEVIATIONS FROM TEST STANDARD**

No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	16

Other

  
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
5790.600	194.0	1.3	H-Horn	PK	-53.7	-13.0	-40.7
5790.600	43.0	2.3	V-Horn	PK	-54.2	-13.0	-41.2
3860.400	120.0	3.0	V-Horn	PK	-56.7	-13.0	-43.7
3860.400	281.0	2.9	H-Horn	PK	-57.7	-13.0	-44.7

# Apparent Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	70
Attendees:	Dean Busch	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	2001

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**


GSM Highband, High Channel

**DEVIATIONS FROM TEST STANDARD**

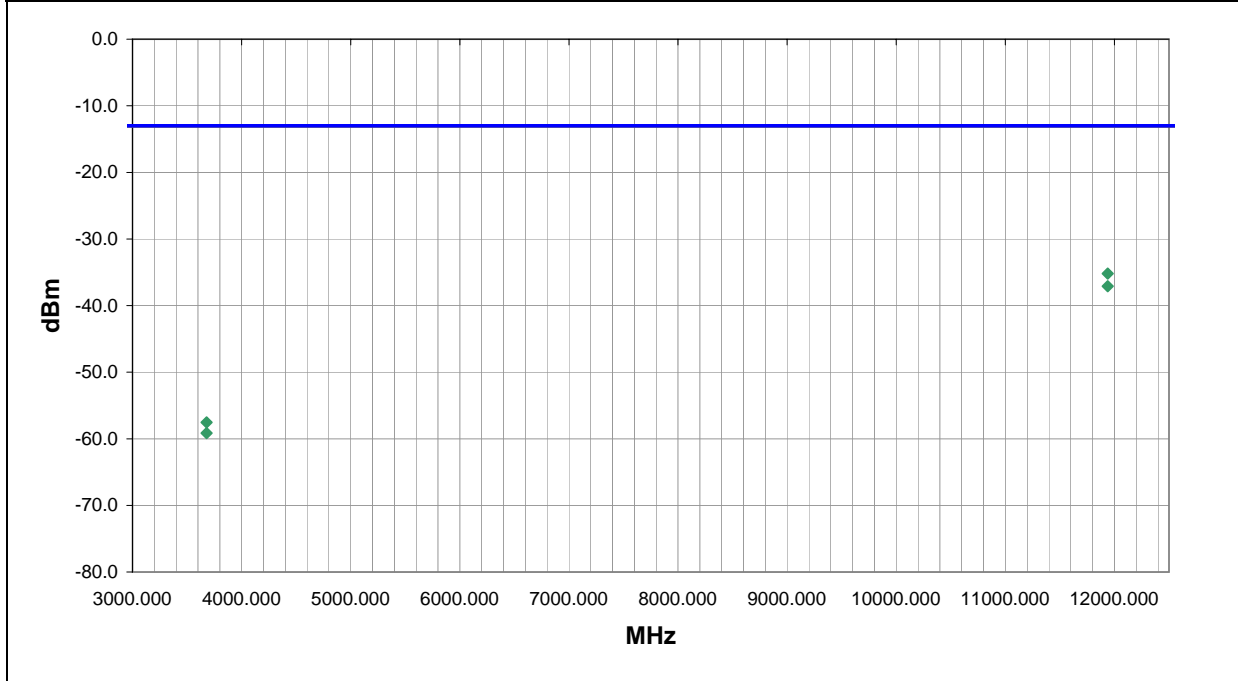
No deviations.

<b>RESULTS</b>	Run #
Pass	20

Other



Tested By: \_\_\_\_\_



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
11938.800	127.0	1.3	H-Horn	PK	-35.2	-13.0	-22.2
11938.800	289.0	1.2	V-Horn	PK	-37.1	-13.0	-24.1
3679.600	334.0	2.9	V-Horn	PK	-57.5	-13.0	-44.5
3679.600	218.0	1.3	H-Horn	PK	-59.2	-13.0	-46.2



# Apparent Power Data Sheet

EUT:	RadioBlade, GSM NA	Work Order:	RAFN0043
Serial Number:	12104320038	Date:	11/16/04
Customer:	Radioframe Networks, Inc.	Temperature:	70
Attendees:	Dean Busch	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	2001

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

Stand alone configuration.

**EUT OPERATING MODES**


GSM Highband, Mid Channel

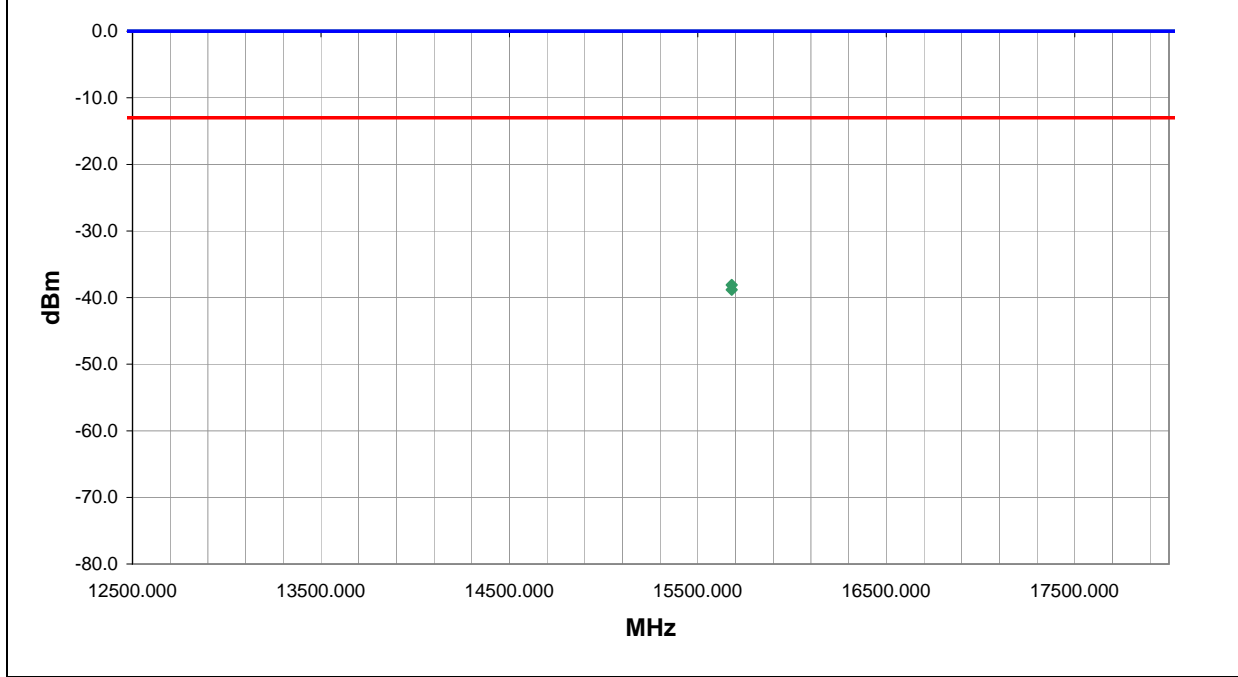
**DEVIATIONS FROM TEST STANDARD**

No deviations.

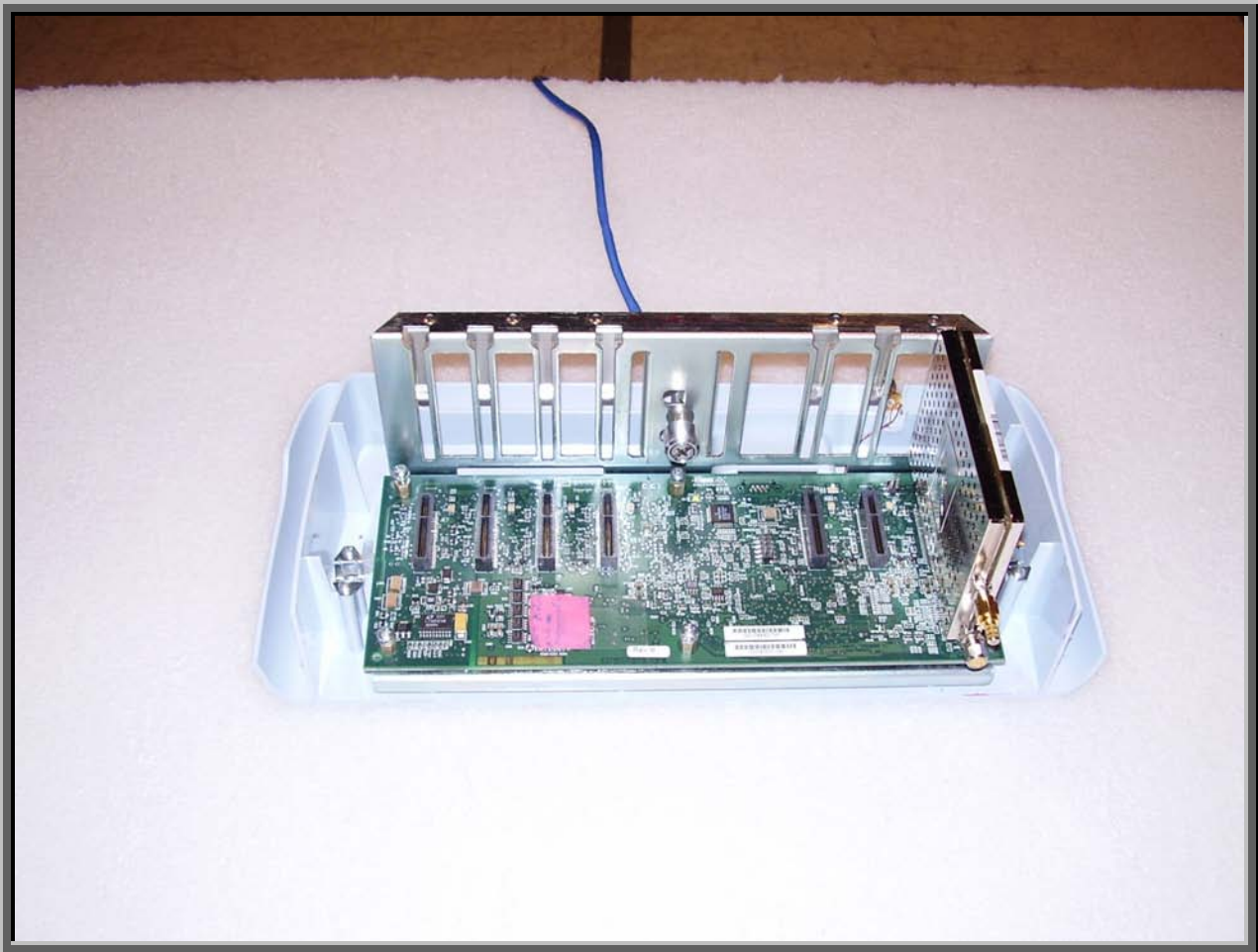
<b>RESULTS</b>	<b>Run #</b>
Pass	21

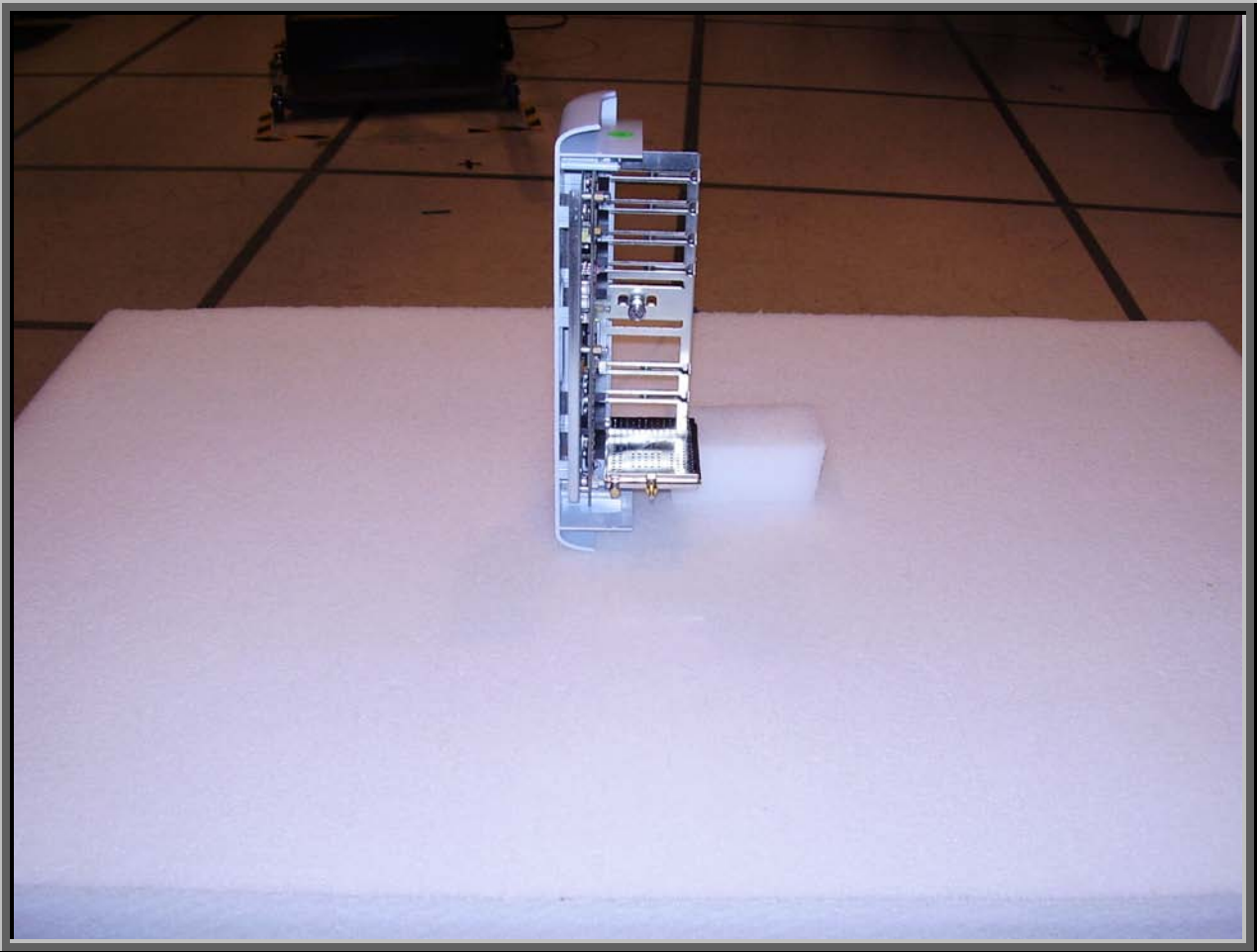
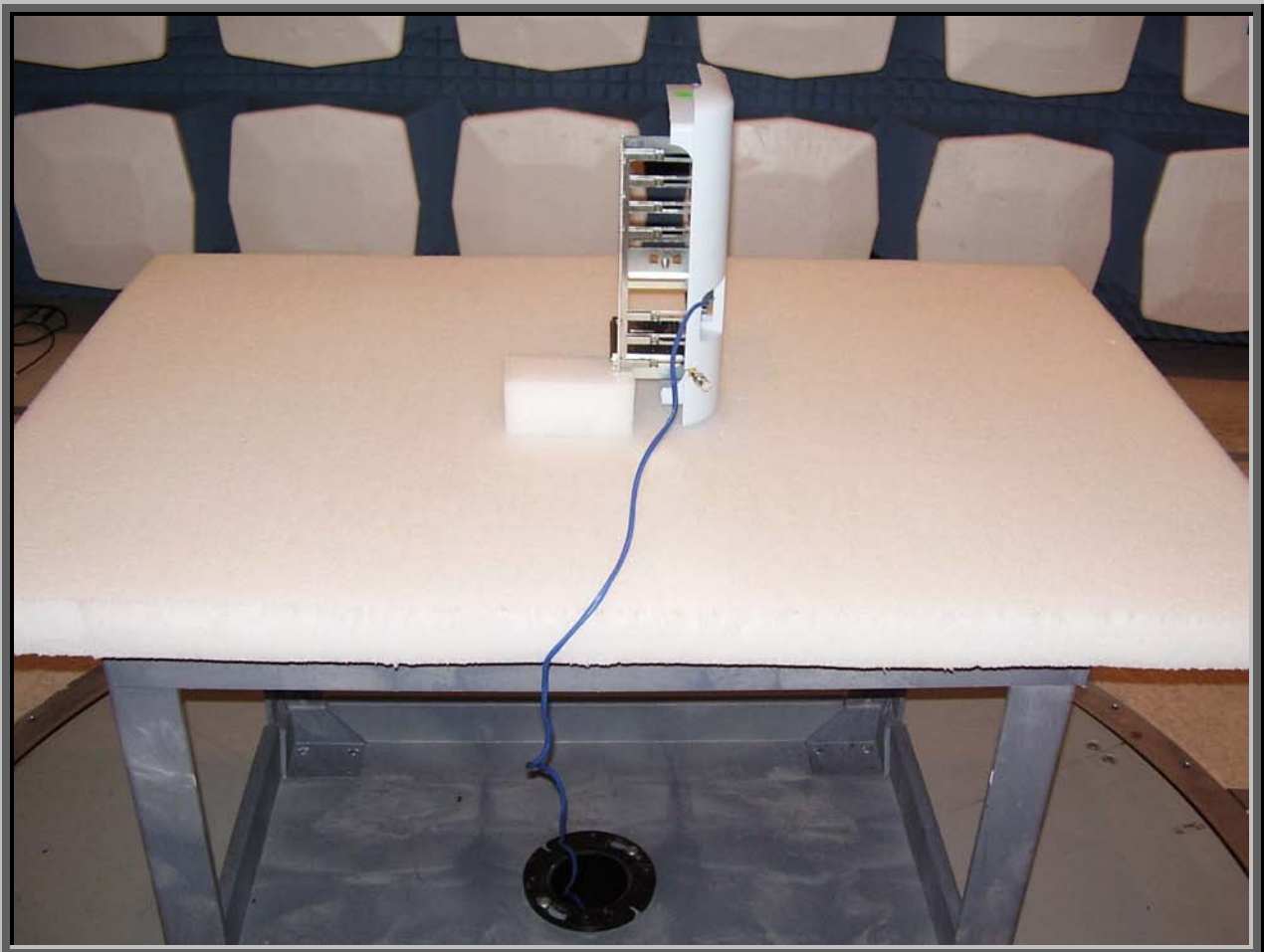
Other

  
 Tested By: \_\_\_\_\_



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
15680.000	295.0	1.2	V-Horn	PK	-38.1	-13.0	-25.1
15680.000	30.0	2.5	H-Horn	PK	-38.8	-13.0	-25.8





**Justification**

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

**Channels in Specified Band Investigated:**

Low (1)

High (11)

**Operating Modes Investigated:**

GSM channels 128, 184, 210, 251 : 802.11(b) channel 11

GSM Highband (PCS) channels 512, 610, 710, 810 - 802.11b/g Channel 11

GSM Highband (PCS) channels 512, 610, 710, 810 - 802.11b/g Channel 1

**Data Rates Investigated:**

Maximum

**Output Power Setting(s) Investigated:**

Maximum

**Power Input Settings Investigated:**

120 VAC, 60 Hz.

**Software\Firmware Applied During Test**

Exercise software	Plat_Maint	Version	1.5.048
Description			
The system was tested using special software developed to test all functions of the device during the test. The software allowed the transmit channel, modulation type, and data rate to be selected.			

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
Antenna	LINX	ANT-2.4-RCT-SS	N/A
Backplane	Radio Frame Networks	RFU	N/A
(4) GSM Radio Blade	RadioFrame Networks, Inc.	GSM NA BV Release 1.0	none
802.11 b/g Radio	RadioFrame Networks, Inc.	iRAP	192168200215

**Remote Equipment Outside of Test Setup Boundary**

Description	Manufacturer	Model/Part Number	Serial Number
DCU	Radio Frame Networks	Digital Chassis Unit	E0032
PC	Dell	Inspiron 1100	07899029300023
ACU	Radio Frame Networks	Airlink Chassis Unit	E0001
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	1.0	No	PC	DCU
LAN	No	1	No	DCU	ACU
LAN	No	2.5	No	EUT	ACU

**Measurement Equipment**

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/08/2003	12 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	10/08/2003	12 mo
Attenuator		2082-6148-20	ATE	02/03/2004	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

**Test Description**

**Requirement:** Per 2.1053, the field strength of spurious radiation was measured in the far-field at an FCC Listed semi-anechoic chamber up to 25 GHz. The applicable limits are 22.917(e) for the cellular band, and 24.238(a) for the PCS band.

Per 22.917(e), the mean power of out of band emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log (P)$  dB. (-13 dBm).

Per 24.238(a), on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. (-13 dBm).

**Configuration:** Spectrum analyzer, signal generator, and linearly polarized antennas were used to measure radiated harmonics and spurious emissions. The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions. The EUT was configured to transmit at the highest output at low, mid, and high channels.



The substitution method as described in TIA/EIA-603 Section 2.2.12 was used for the highest spurious emissions. The EUT was tested individually, then while simultaneously transmitting with a co-located radio.

**Test Methodology:** For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is placed on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole that is successively tuned to each of the highest emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain; the power (ERP or e.i.r.p) is determined for each radiated emission.

For the purposes of preliminary measurements, the field strength of the spurious emissions can be measured and compared with a 3 meter limit. The final measurements must be made utilizing the substitution method described above. The 3 meter limit was calculated to be 84.3 dBuV/m at 3 meters. This was based upon an output power of 0.224 W.

The spectrum was scanned throughout the specified range. While scanning, emissions from the radios were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antennas in three orthogonal axes, and adjusting the measurement antenna height and polarization (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

Bandwidths Used for Measurements			
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
<i>Measurements were made using the bandwidths and detectors specified. No video filter was used.</i>			

Completed by:



# Apparent Power Data Sheet

EUT:	GSM NA BV Release 1.0 & iRAP simultaneous transmit	Work Order:	RAFN0043
Serial Number:	various	Date:	11/17/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	37%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 22.917(e)
Method:	TIA/EIA-603
Year:	2004
Year:	2001

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator


**COMMENTS**  
 One 802.11(b/g) radio blade, four GSM radio blades

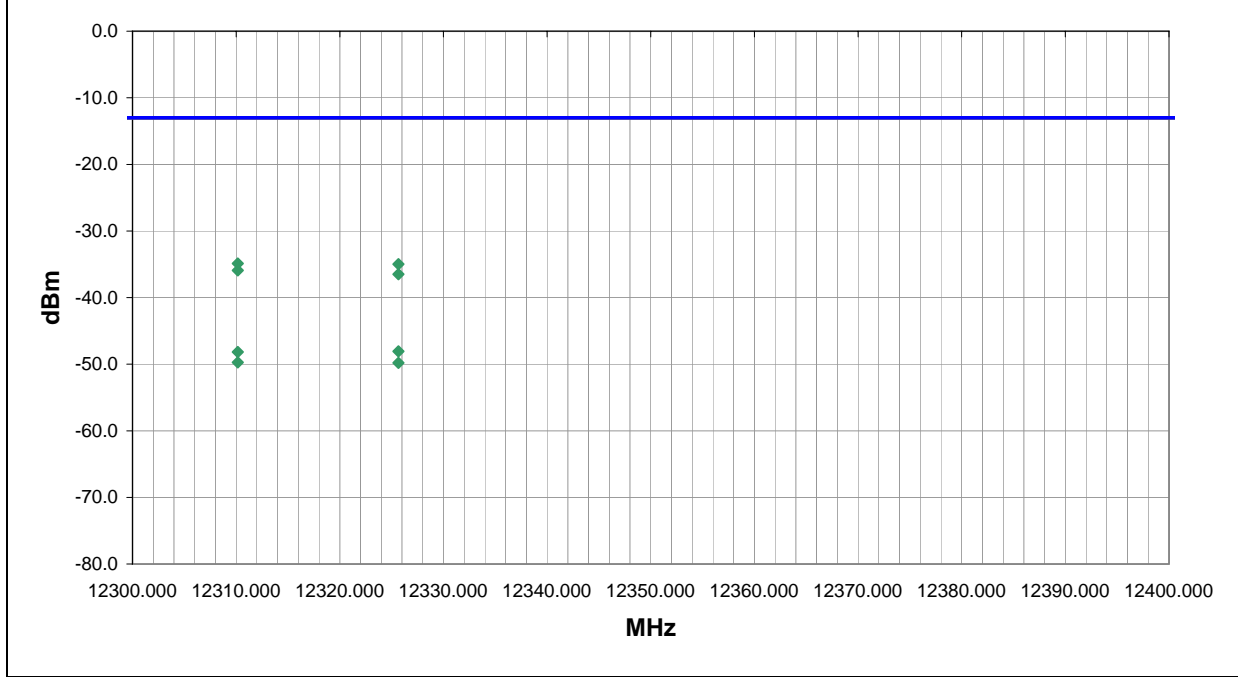
**EUT OPERATING MODES**  
 GSM channels 128, 184, 210, 251 : 802.11(b) channel 1

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	22

Other

  
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
12310.150	142.0	1.3	H-Horn	PK	0.0000	-34.9	-13.0	-21.9
12325.660	78.0	2.7	H-Horn	PK	0.0000	-35.0	-13.0	-22.0
12310.150	228.0	1.2	V-Horn	PK	0.0000	-35.9	-13.0	-22.9
12325.660	99.0	1.2	V-Horn	PK	0.0000	-36.5	-13.0	-23.5
12325.660	78.0	2.7	H-Horn	AV	0.0000	-48.1	-13.0	-35.1
12310.150	142.0	1.3	H-Horn	AV	0.0000	-48.2	-13.0	-35.2
12310.150	228.0	1.2	V-Horn	AV	0.0000	-49.7	-13.0	-36.7
12325.660	99.0	1.2	V-Horn	AV	0.0000	-49.8	-13.0	-36.8

# Apparent Power Data Sheet

EUT:	GSM NA BV Release 1.0 & iRAP simultaneous transmit	Work Order:	RAFN0043
Serial Number:	various	Date:	11/17/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	37%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 22.917(e)
Method:	TIA/EIA-603
Year:	2004
Year:	2001

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**  
 One 802.11(b/g) radio blade, four GSM radio blades

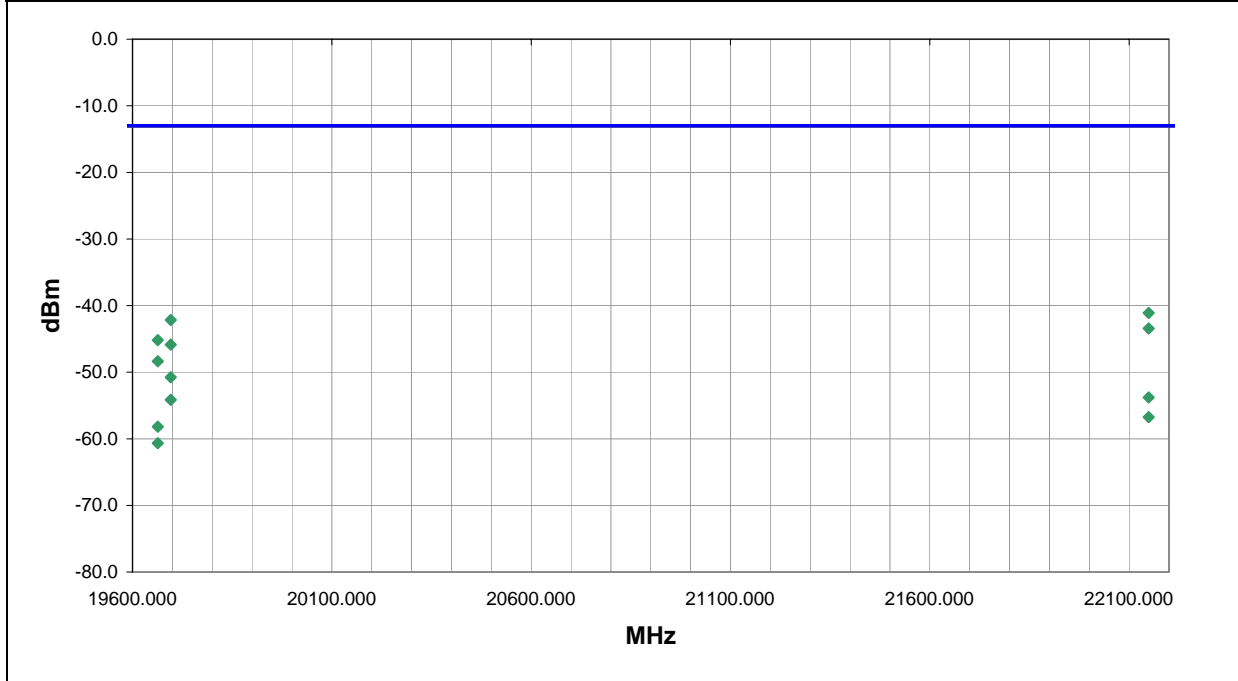
**EUT OPERATING MODES**  
 GSM channels 128, 184, 210, 251 : 802.11(b) channel 11

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	40

Other

  
 \_\_\_\_\_  
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
22149.000	-1.0	1.0	V-High Horr	PK	0.0000	-41.1	-13.0	-28.1
19696.000	228.0	1.3	V-High Horr	PK	0.0000	-42.2	-13.0	-29.2
22149.000	6.0	1.0	H-High Horr	PK	0.0000	-43.4	-13.0	-30.4
19663.600	-2.0	1.0	V-High Horr	PK	0.0000	-45.2	-13.0	-32.2
19696.000	280.0	1.3	H-High Horr	PK	0.0000	-45.9	-13.0	-32.9
19663.600	360.0	1.0	H-High Horr	PK	0.0000	-48.4	-13.0	-35.4
19696.000	228.0	1.3	V-High Horr	AV	0.0000	-50.8	-13.0	-37.8
22149.000	-1.0	1.0	V-High Horr	AV	0.0000	-53.8	-13.0	-40.8
19696.000	280.0	1.3	H-High Horr	AV	0.0000	-54.2	-13.0	-41.2
22149.000	6.0	1.0	H-High Horr	AV	0.0000	-56.7	-13.0	-43.7
19663.600	-2.0	1.0	V-High Horr	AV	0.0000	-58.2	-13.0	-45.2
19663.600	360.0	1.0	H-High Horr	AV	0.0000	-60.7	-13.0	-47.7



# Apparent Power Data Sheet

EUT:	GSM NA BV Release 1.0 & iRAP simultaneous transmit	Work Order:	RAFNO043
Serial Number:	various	Date:	11/17/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	37%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	2001

**SAMPLE CALCULATIONS**  
 Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**  
 One 802.11(b/g) radio blade, four GSM radio blades

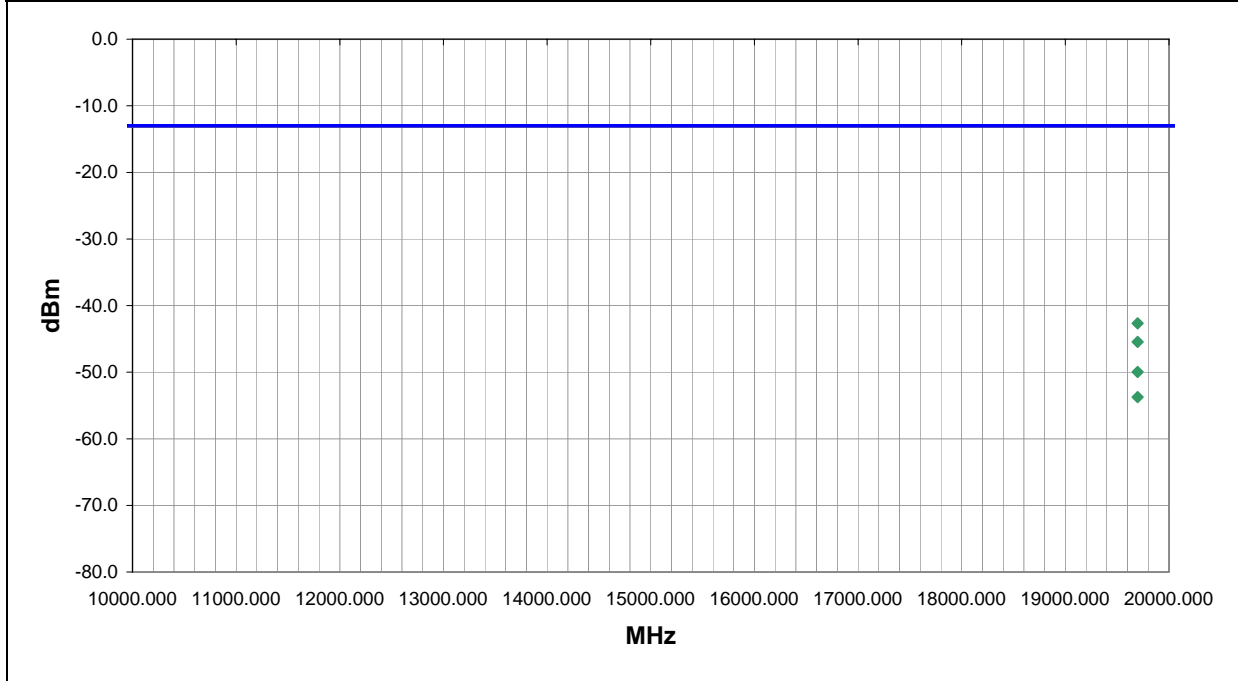
**EUT OPERATING MODES**  
 GSM channels 512, 610, 710, 810 : 802.11(b) channel 11

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	24

Other

  
 \_\_\_\_\_  
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
19697.000	257.0	1.5	V-High Horr	PK	0.0000	-42.7	-13.0	-29.7
19697.000	315.0	1.3	H-High Horr	PK	0.0000	-45.5	-13.0	-32.5
19697.000	257.0	1.5	V-High Horr	AV	0.0000	-50.0	-13.0	-37.0
19697.000	315.0	1.3	H-High Horr	AV	0.0000	-53.8	-13.0	-40.8

# Apparent Power Data Sheet

EUT:	GSM NA BV Release 1.0 & iRAP simultaneous transmit	Work Order:	RAFN0043
Serial Number:	various	Date:	11/17/04
Customer:	Radioframe Networks, Inc.	Temperature:	73
Attendees:	Dean Busch	Humidity:	37%
Cust. Ref. No.:		Barometric Pressure:	30.15
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	2001

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation  
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

One 802.11(b/g) radio blade, four GSM radio blades

**EUT OPERATING MODES**

GSM channels 512, 610, 710, 810 : 802.11(b) channel 1

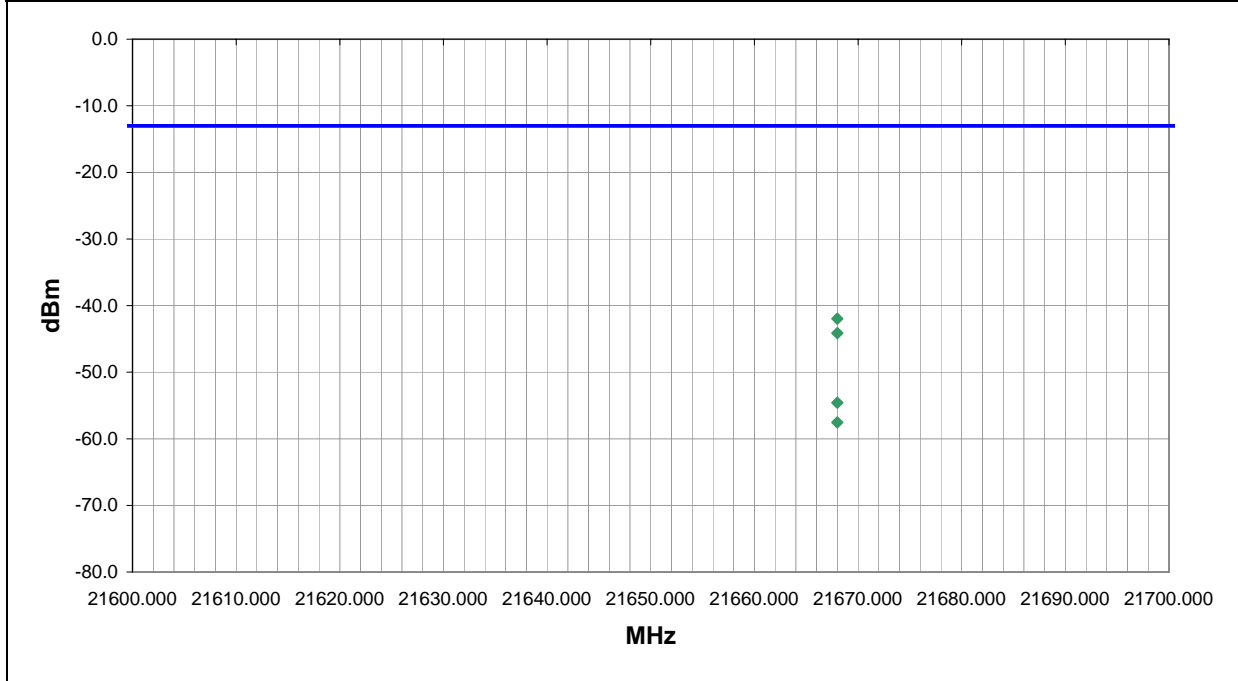
**DEVIATIONS FROM TEST STANDARD**

No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	25

Other

  
 \_\_\_\_\_  
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
21668.000	-1.0	1.0	V-High Horr	PK	0.0000	-42.0	-13.0	-29.0
21668.000	-2.0	1.0	H-High Horr	PK	0.0000	-44.1	-13.0	-31.1
21668.000	-1.0	1.0	V-High Horr	AV	0.0000	-54.6	-13.0	-41.6
21668.000	-2.0	1.0	H-High Horr	AV	0.0000	-57.5	-13.0	-44.5

