Radioframe Networks, Inc.

MC-Series iDEN Microcell High Power

November 18, 2006

Report No. RAFN0067

Report Prepared By



www.nwemc.com 1-888-EMI-CERT

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Certificate of Test Issue Date: November 18, 2006 Radioframe Networks, Inc. Model: MC-Series iDEN Microcell High Power

Emissions					
Test Description	Specification	Test Method	Pass	Fail	
Radiated Emissions	FCC 15.109:2006	ANSI C63.4:2003	\boxtimes		
Conducted Emissions	FCC 15.107:2006	ANSI C63.4:2003	\boxtimes		
Frequency Stability	FCC 90I:2005	ANSI/TIA/EIA-603-B:2002	\boxtimes		
Field Strength of Spurious Radiation	FCC 90I:2005	ANSI/TIA/EIA-603-B:2002	\boxtimes		
Emission Mask	FCC 901:2005	ANSI/TIA/EIA-603-B:2002	\boxtimes		
Output Power	FCC 90I:2005	ANSI/TIA/EIA-603-B:2002	\square		
Spurious Emissions at Antenna Terminal	FCC 90I:2005	ANSI/TIA/EIA-603-B:2002	\boxtimes		

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:
ADU.K.P
Greg Kiemel, Director of Engineering

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.



Revision Number	Description	Date	Page Number
00	None		



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 accredited under the United States Department of Commerce, National Institute of Standards and Technology, and 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.

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.

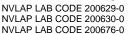
CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

TÜV Product Service: Included in TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories, available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV'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).

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 Numbers. - Hillsboro: C-1071, R-1025, and R-2318, Irvine: C-2094 and R-1943, 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

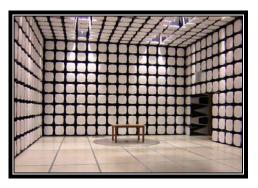












California – Orange County Facility Labs OC01 – OC13

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





Oregon – Evergreen Facility Labs EV01 – EV11

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





Washington – Sultan Facility Labs SU01 – SU07

14128 339th Ave. SE Sultan, WA 98294 (888) 364-2378



Rev 11/17/06

Party Requesting the Test

Company Name:	Radioframe Networks, Inc.	
Address:	9461 Willows Road NE, Suite 100	
City, State, Zip:	Redmond, WA 98052	
Test Requested By:	Dean Busch	
Model:	MC-Series iDEN Microcell High Power	
First Date of Test:	March 21, 2006	
Last Date of Test:	November 10, 2006	
Receipt Date of Samples:	March 21, 2006	
Equipment Design Stage:	Preproduction	
Equipment Condition:	No Damage	

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

Dual band operation: 851.0125 to 868.9875, 935.01875 to 939.98125. The RadioFrame MC-Series is used in locations where cellular coverage and capacity can be a challenge, such as NASCAR events, hotels, convention centers, manufacturing facilities, sports stadiums and more, including macro coverage.

Testing Objective:

FCC Certification of higher power microcell basestation. Radio blade portion has been previously tested and certified in other lower powered basestation configurations. This configuration uses a higher power amplifier.



Configurations

CONFIGURATION 1 RAFN0067

Software/Firmware Running during test		
Description	Version	
System Manager		

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
EUT	Radioframe Networks, Inc.	MC-Series iDEN Microcell High Power	Engineering Unit

Remote Equipment Outside of Test Setup Boundary				
Description	Manufacturer	Model/Part Number	Serial Number	
DC Power Supply	Electronics Measurements, Inc.	TCR	95F-0824	
IC Simulator	Radioframe Networks, Inc.	ASY-0550-05	02103250121	
Site Controller	Motorola	X516	CAF030LTCY	

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC (x2)	No	30 ft.	No	EUT	Power Supply
Ethernet (x2)	No	50 ft.	No	EUT	IC Simulator
BNC	Yes	30 ft.	No	EUT	Site Controller
BNC	Yes	10 ft.	No	IC Simulator	Site Controller
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 RAFN0067

Software/Firmware Running during test	
Description	Version
System Manager	

EUT			
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Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Dual Directional Coupler	Amplifier Research	DC7154	IRD	2/23/2006	13
Spectrum Analyzer	Agilent	E4407B	AAU	9/20/2006	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

Configuration: The peak measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The occupied bandwidth / emission mask was measured with the EUT set to low; medium, and high transmit frequencies. At each channel, measurements were made at low, mid, and high power output settings

FCC Interpretation Regarding Emission Mask and 90.691

----Original Message----From: Andrew Leimer [mailto:ALEIMER@fcc.gov] Sent: Wednesday, May 14, 2003 12:21 PM To: rwacs@att.net Subject: Re: Part 90 rules

Hello Dean,

How are you doing? I have not heard from you in a while! The following explanation is from the archives. The basic question was if emissions mask g would ever be used. I hope it answers your question:

I found that footnote 3 was added to Section 90.210 as a result of the First R&O, Eighth R&O and 2nd FNPRM in PR Docket 93-144 (FCC 95-501), adopted 12/15/95. Footnote 3 initially said "Equipment in this band licensed to EA systems shall comply with the emission mask provisions of Section 90.691." Note here that this R&O dealt principally with the upper 200 MHz SMR channels

which were auctioned in contiguous segments/blocks. Consequently, providing more flexibility in the emission mask that required protection of the "outer"

channels in those blocks and to any interior channels in those blocks used by incumbents made sense.

When the Commission subsequently dealt with auctioning the lower 80 channels (non-contiguous channels in each block) and the General Category channels (contiguously allocated channels by block for auction purposes but originally

allocated on a single channel basis for site-specific licensing purposes), the consideration of emission mask caused footnote 3 to be modified as it exists today. Specifically, the Second R&O in PR Docket 93-144 (FCC 97-223), adopted

6/23/97 @ para 80 reasons that applying the same emission mask standards to the lower 230 channels (lower 80 channels and 150 General Category channels) as to the upper 200 channels facilitates the use of common equipment and the combining of all such channels. It further states that Section 90.691 (the emission mask) would apply to "outer" channels used by a licensee "that create

out-of-band emissions that affect another licensee". The MO&O on reconsideration of the 800 MHz 1st R&O (FCC 97-224, adopted 6/23/97) at para 76 agreed with Erricson's recommendation to expand the emission mask provision

of Section 90.691 to "non-EA 800 MHz Part 90 CMRS systems". The decision was

based ostensibly on extending the flexibility of the 90.691 emission mask to incumbent licensees (non-EA licensees or non-auction winners) and to those non-SMR channels used by CMRS operators. The paragraph closes by stating that

neither Ericsson or Motorola believe that such relaxation will increase the amount of interference to adjacent channel licensees.

You'll note that there is some similarity between emission mask G (applicable

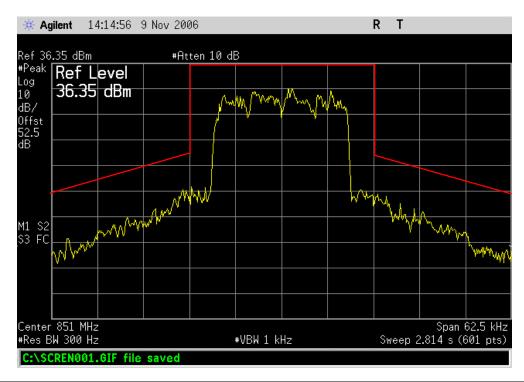
to equipment without audio low pass filters) under Section 90.210 and the emission mask required by Section 90.691. It is my interpretation that footnote 3 under Section 90.210 (the applicability of the emission mask under

Section 90.691) was intended principally for Part 90 CMRS systems in the 800 MHz band to provide flexbility and consistency to those operators. As Section

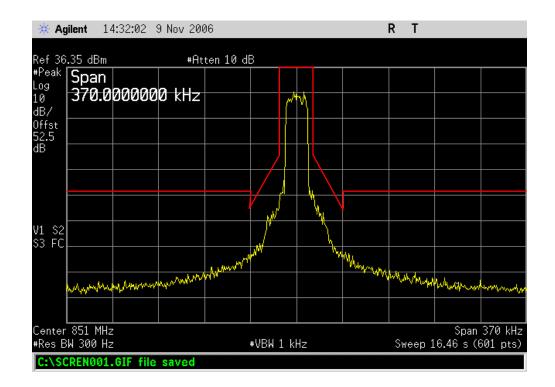
90.210 is written, however, I don't see how we could legally prevent any 800 MHz licensee from using the more flexibile emission mask under Section 90.691.

NORTHWEST				XMit 2006.0
EMC		EMISSION MASK		
	I: MC-Series iDEN Microcell High Power		Work Order: RAFN0	067
	Serial Number: Engineering unit		Date: 11/09/0	
	r: Radioframe Networks, Inc.		Temperature: 21°C	
	s: Erin Duleba		Humidity: 38%	
	t: None		Barometric Pres.: 30.11	
Tested by	y: Holly Ashkannejhad	Power: -48VDC	Job Site: EV06	
EST SPECIFICA	TIONS	Test Method		
CC 901:2005		ANSI/TIA/EIA-603-B:2002		
OMMENTS				
round strap ins	talled as will be used in typical installations.			
EVIATIONS FRO	DM TEST STANDARD			
f i	1	1 A LiAD		
onfiguration #	1	Holy Juny		
	Sign	ature Holy Aligh		
		Valu	ue Limit	Resul
w Channel		Var		Kesui
ow Channel	High Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Mid Power		Occ Table	1 433
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Low Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
id Channel				
	High Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Mid Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Low Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
gh Channel				
	High Power		Or a Tabla	Dees
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Mid Power	N/A	See Table	Boos
	< 37.5 kHz Fc			Pass
	> 37.5 kHz Fc Low Power	N/A	See Table	Pass
	< 37.5 kHz Fc	N/A	See Table	Pass
		N/A	See raple	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass

	Low Channel, High Power, < 37	.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



	Low Channel, High Power, > 37	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



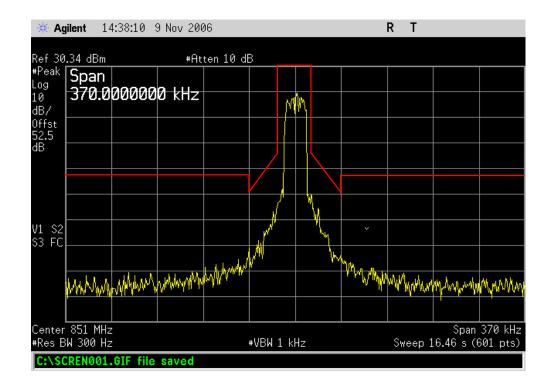
EMC

Result

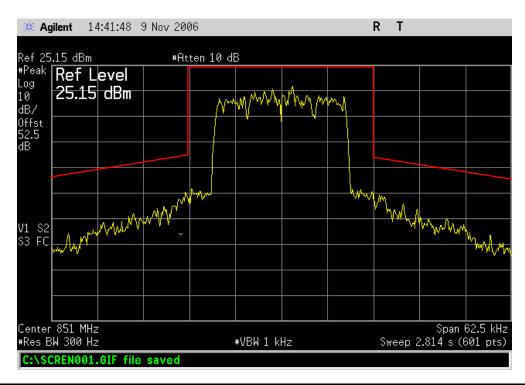
	Low Channel, Mid Power, < 37	7.5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



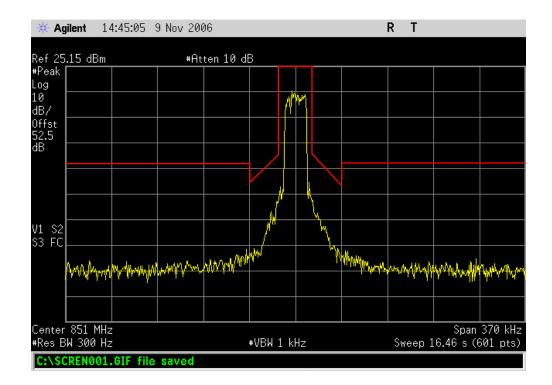
	Low Channel, Mid Power, > 37.5	5 kHz Fc	
t: Pass	Value: N/A	Limit: See Table	



	Low Channel, Low Power, < 37	7.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



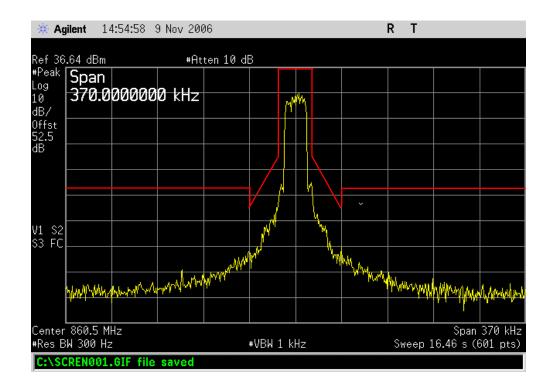
	Low Channel, Low Power, > 37.5	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



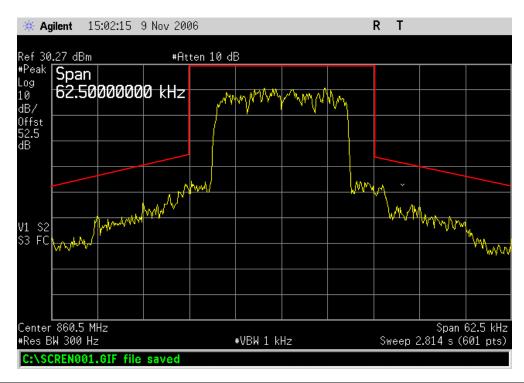
	Mid Channel, High Power, < 37.	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



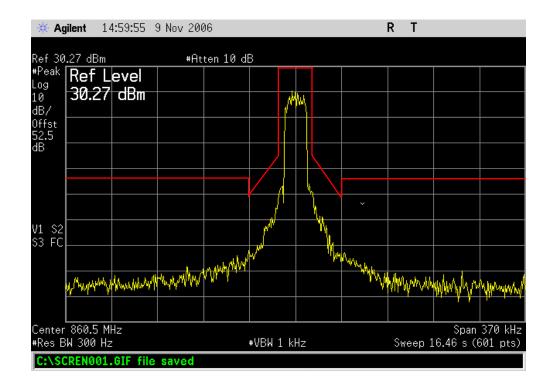
	Mid Channel, High Power, > 37	.5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



	Mid Channel, Mid Power, < 37.5	5 kHz Fc	
Result: Pass	Value: N/A	Limit:	See Table



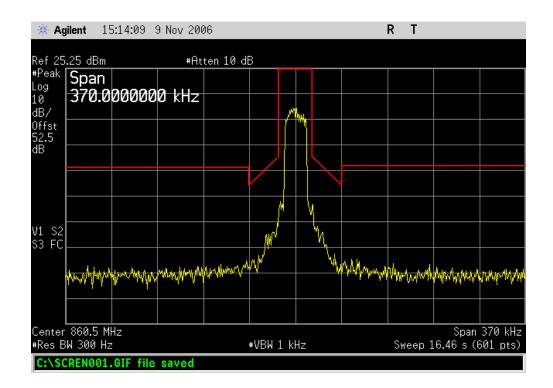
	Mid Channel, Mid Power, > 37.5	5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



	Mid Channel, Low Power, < 37.	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



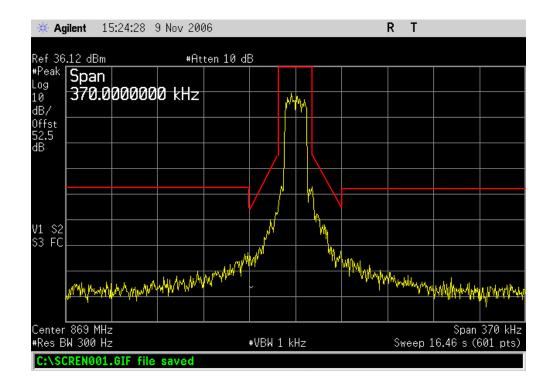
	Mid Channel, Low Power, > 37.	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



	High Channel, High Power, < 37.5	kHz Fc		
Result: Pass	Value: N/A	Limit:	See Table	



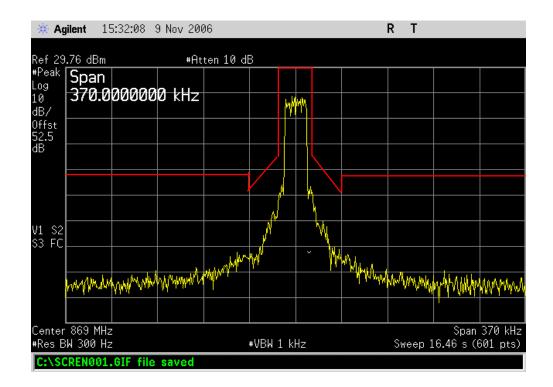
	High Channel, High Power, > 37.	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



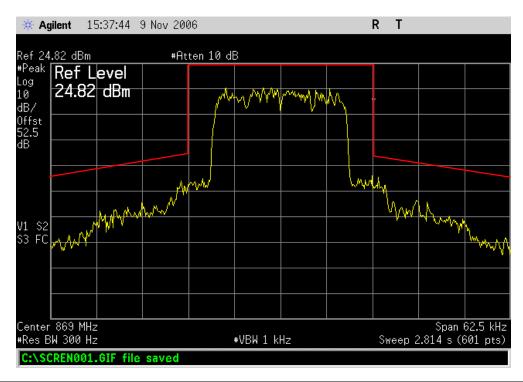
	High Channel, Mid Power, < 37.	5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



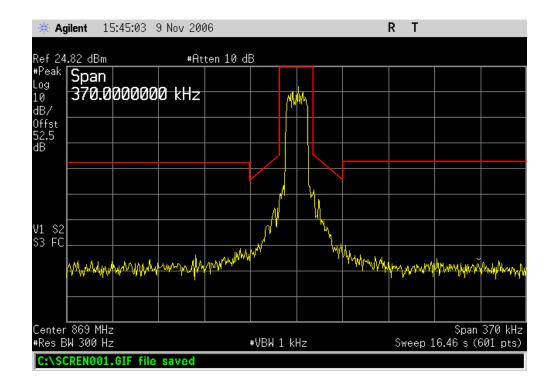
	High Channel, Mid Power, > 37.5	kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



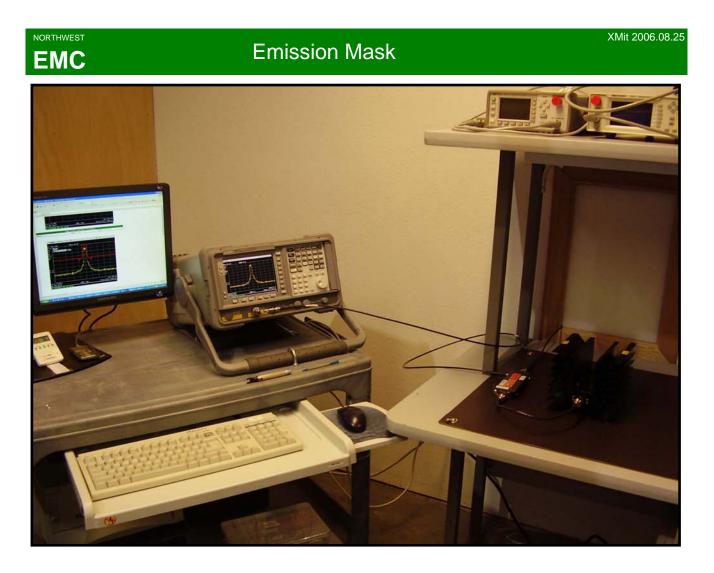
	High Channel, Low Power, < 3	37.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



	High Channel, Low Power, > 37.	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See	Fable



Frequency	Output Power	Power (P)	Attenuation for the range 12.5 kHz to 37.5 kHz from fc (dBc)		rom fc	Attenuation >37.5 kl (dBc)	Hz from fc	
(MHz)	(dBm)	Watts	50 + (10*log P)	116*log f = 12.5 kHz	g(f/6.1) f = 37.5 kHz	80	43 + (10*log P)	80
	36.35	4.32E+00	56.4	36.14	91.49	80	49.4	80
851.0125	30.34	1.08E+00	50.3	36.14	91.49	80	43.3	80
	25.15	3.27E-01	45.2	36.14	91.49	80	38.2	80
	36.64	4.61E+00	56.6	36.14	91.49	80	49.6	80
860.5125	30.27	1.06E+00	50.3	36.14	91.49	80	43.3	80
	25.25	3.35E-01	45.3	36.14	91.49	80	38.3	80
	36.12	4.09E+00	56.1	36.14	91.49	80	49.1	80
868.9875	29.76	9.46E-01	49.8	36.14	91.49	80	42.8	80
	24.82	3.03E-01	44.8	36.14	91.49	80	37.8	80



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Spectrum Analyzer	Agilent	E4407B	AAU	9/20/2006	12

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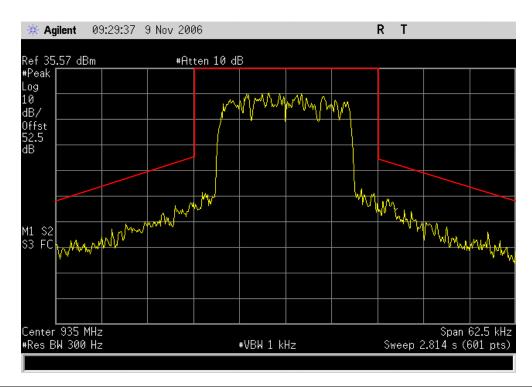
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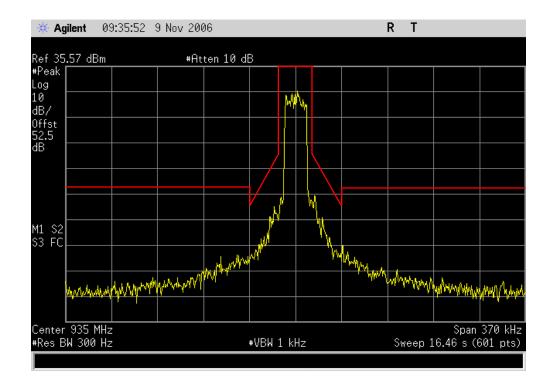
90.210 is written, however, I don't see how we could legally prevent any 800 MHz licensee from using the more flexibile emission mask under Section 90.691.

		EMISSION MASK		XMit 2006.0
EMC				
	T: MC-Series iDEN Microcell High Power		Work Order: RAFN0	
	r: Engineering unit r: Radioframe Networks, Inc.		Date: 11/09/0 Temperature: 21°C	Ď
	s: Erin Duleba		Humidity: 38%	
	t: None		Barometric Pres.: 30.11	
	y: Greg Kiemel	Power: -48VDC	Job Site: EV06	
EST SPECIFICA		Test Method	000 010. 2100	
CC 901:2005		ANSI/TIA/EIA-603-B-	-2002	
OMMENTS				
round strap ins	talled as will be used in typical installation	IS.		
EVIATIONS FRO	OM TEST STANDARD			
onfiguration #	1	ATTU.K.P		
		Signature		
w Channel			Value Limit	Resu
W Channel	High Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Mid Power		000 10010	1 400
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Low Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
id Channel				
	High Power	N1/A	0 7 1	5
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc Mid Power	N/A	See Table	Pass
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A N/A	See Table	Pass
	Low Power		Oce Table	1 433
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
gh Channel				
-	High Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Mid Power			
	< 37.5 kHz Fc	N/A	See Table	Pass
	> 37.5 kHz Fc	N/A	See Table	Pass
	Low Power			_
		N/A N/A	See Table See Table	Pass Pass

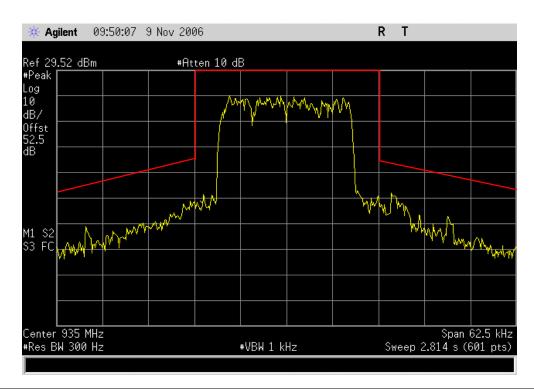
	Low Channel, High Power, < 3	7.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



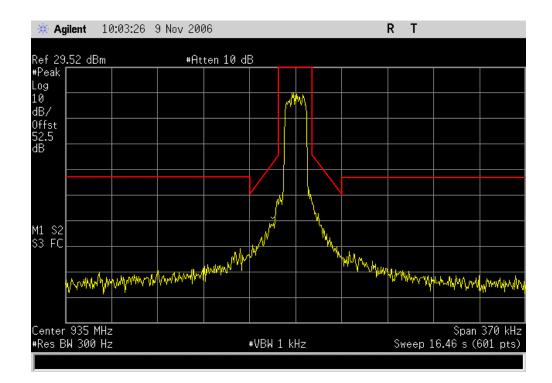
	Low Channel, High Power, > 37.5	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



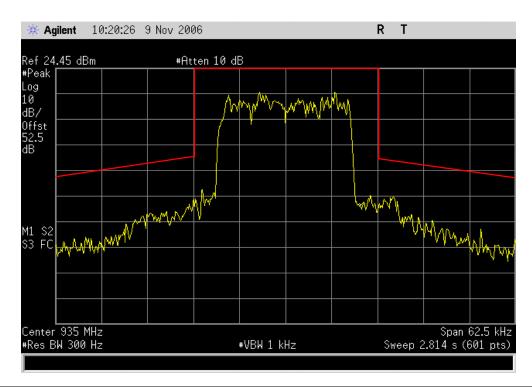
	Low Channel, Mid Power, < 37	í.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



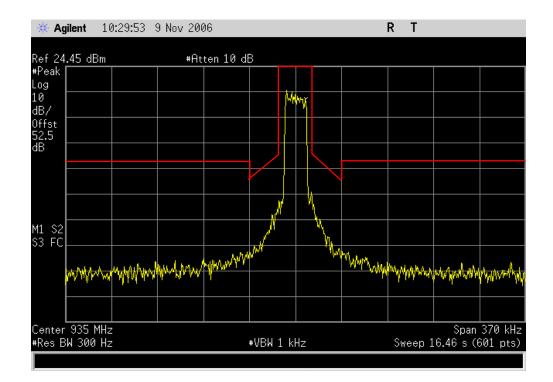
	Low Channel, Mid Power, > 37.5	5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



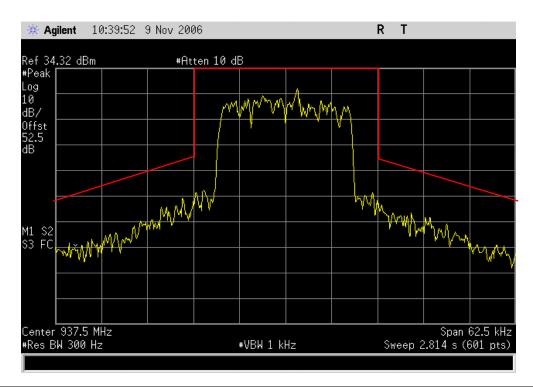
	Low Channel, Low Power, < 37	.5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



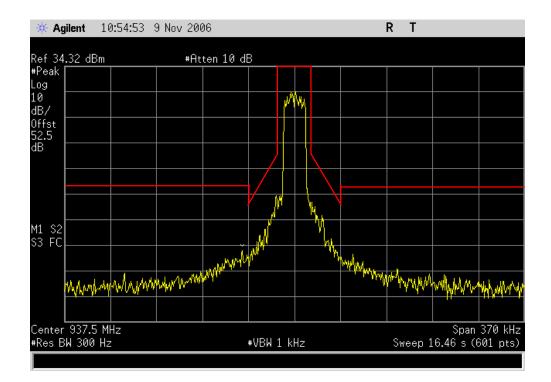
	Low Channel, Low Power, > 37.	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



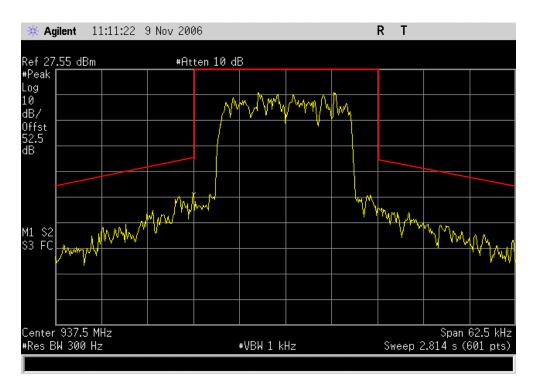
	Mid Channel, High Power, < 37	7.5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



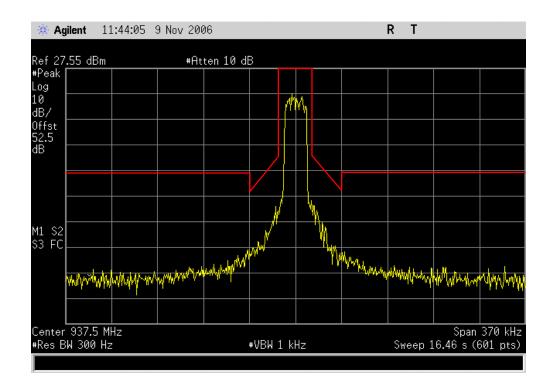
	Mid Channel, High Power, > 37.5	kHz Fc		
Result: Pass	Value: N/A	Limit:	See Table	



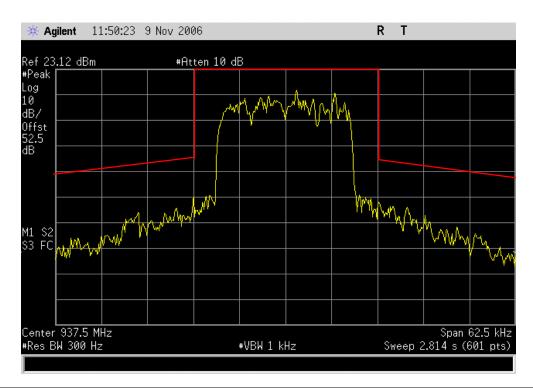
	Mid Channel, Mid Power, < 37.5	5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



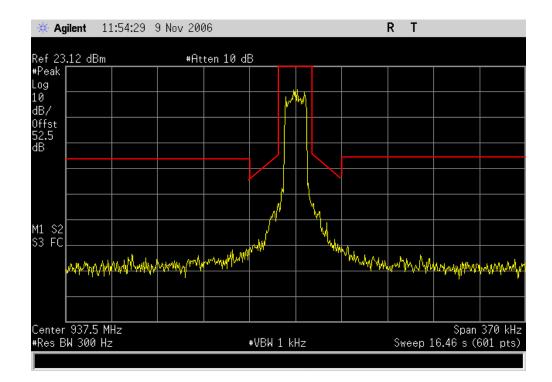
	Mid Channel, Mid Power, > 37.5 kHz Fo	С	
Result: Pass	Value: N/A	Limit:	See Table



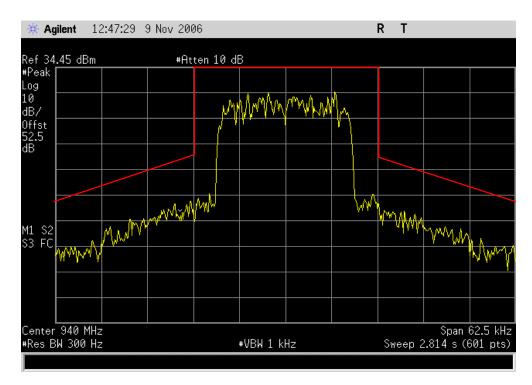
	Mid Channel, Low Power, < 37	7.5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



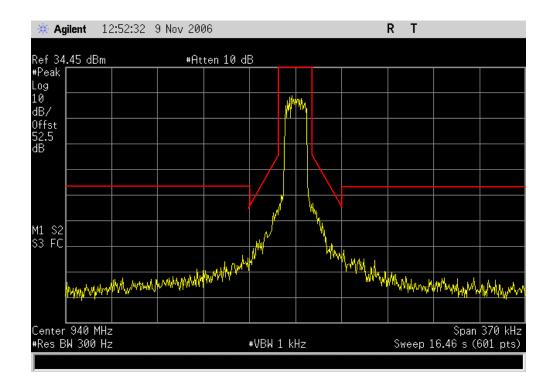
	Mid Channel, Low Power, > 37.	5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



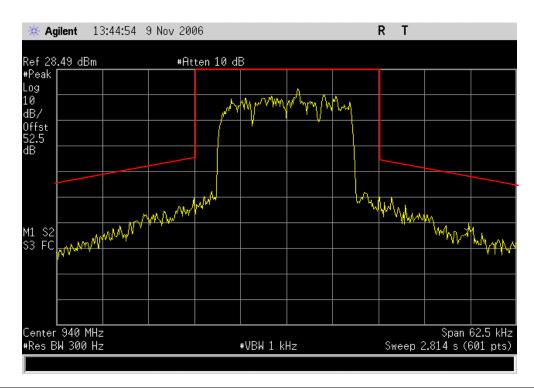
	High Channel, High Power, < 37	7.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



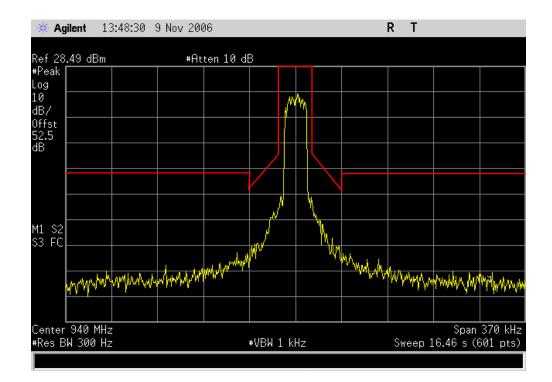
	High Channel, High Power, > 37	.5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



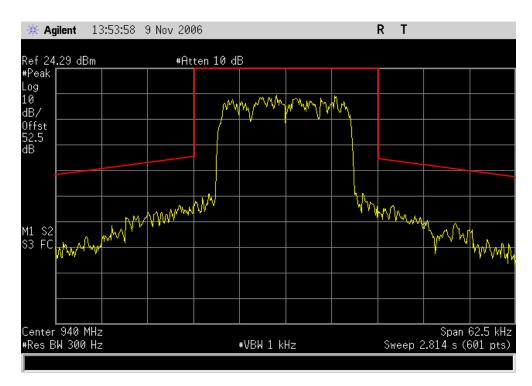
	High Channel, Mid Power, < 37	.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



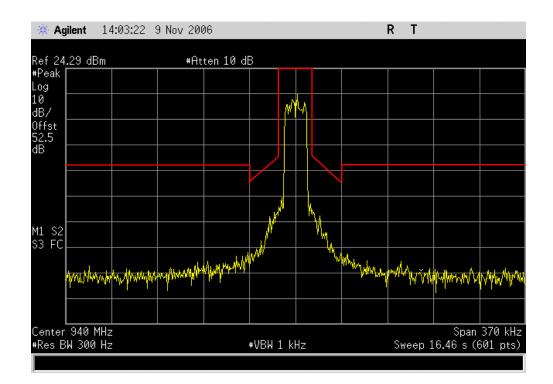
	High Channel, Mid Power, > 37.5	kHz Fc		
Result: Pass	Value: N/A	Limit:	See Table	



	High Channel, Low Power, < 37	7.5 kHz Fc	
Result: Pass	Value: N/A	Limit: See Table	



	High Channel, Low Power, > 37	.5 kHz Fc
Result: Pass	Value: N/A	Limit: See Table



Frequency	Output Power	Power (P)	Attenuation for the range 12.5 kHz to 37.5 kHz from fc (dBc)			Attenuation >37.5 kHz from fc (dBc)		
(MHz)	(dBm)	Watts	50 + (10*log P)	116*log f = 12.5 kHz	g(f/6.1) f = 37.5 kHz	80	43 + (10*log P)	80
	30.28	1.07E+00	50.3	36.14	91.49	80	43.3	80
935.01875	25.52	3.56E-01	45.5	36.14	91.49	80	38.5	80
	19.62	9.16E-02	39.6	36.14	91.49	80	32.6	80
937.49375	30.30	1.07E+00	50.3	36.14	91.49	80	43.3	80
	25.04	3.19E-01	45.0	36.14	91.49	80	38.0	80
	18.62	7.28E-02	38.6	36.14	91.49	80	31.6	80
939.98175	29.67	9.27E-01	49.7	36.14	91.49	80	42.7	80
	25.60	3.63E-01	45.6	36.14	91.49	80	38.6	80
	18.80	7.59E-02	38.8	36.14	91.49	80	31.8	80





NORTHWEST

OUTPUT POWER

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4407B	AAU	9/20/2006	12
Dual Directional Coupler	Amplifier Research	DC7154	IRD	2/23/2006	13
Power Sensor	Gigatronics	80701A	SPL	9/19/2006	12
Power Meter	Gigatronics	8651A	SPM	9/19/2006	12
Signal Generator	Hewlett-Packard	8648D	TGC	1/27/2006	13

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

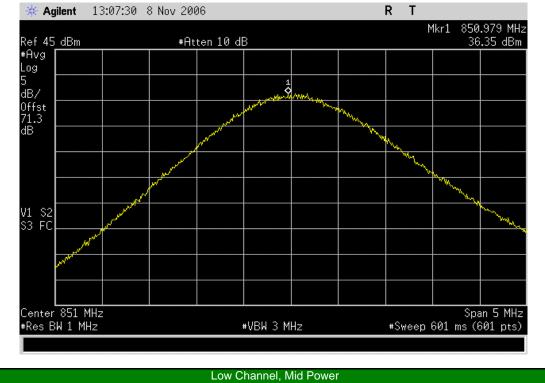
TEST DESCRIPTION

The output power was measured with the EUT set to low, medium, and high transmit frequencies within the allowable band, and three power levels (lowest, mid, and highest available). The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer through a directional coupler and attenuator to prevent analyzer overload. The measurement was made with an RMS average detector.

NORTHWEST							XMit 2006.08.25
EMC		00	TPUT POW	ER			
EU.	T: MC-Series iDEN Microcell H	igh Power			V	Vork Order: RAFN0067	
Serial Numbe	r: Engineering unit					Date: 11/08/06	
Custome	r: Radioframe Networks, Inc.				Te	emperature: 22°C	
Attendee	s: Erin Duleba					Humidity: 43%	
	t: None				Barom	netric Pres.: 29.98	
	y: Rod Peloquin		Power:	-48VDC		Job Site: EV06	
TEST SPECIFICA	TIONS			Test Method			
FCC 901:2005				ANSI/TIA/EIA-603-B:200	2		
COMMENTS							
800 Band							
200 24.14							
DEVIATIONS FRO	OM TEST STANDARD						
			10120	•			
Configuration #	1	/	Coling to Reling	2			
, The second sec		Signature	\mathcal{O}	~			
				V	alue	Limit	Results
Low Channel							
	High Power			36.3	5 dBm	N/A	Pass
	Mid Power			30.3	4 dBm	N/A	Pass
	Low Power			25.1	5 dBm	N/A	Pass
Mid Channel							
	High Power			36.6	4 dBm	N/A	Pass
	Mid Power			30.2	7 dBm	N/A	Pass
	Low Power			25.2	5 dBm	N/A	Pass
High Channel							
0	High Power			36.1	2 dBm	N/A	Pass
	Mid Power				6 dBm	N/A	Pass
	Low Power				2 dBm	N/A	Pass

N/A

	Low Channel, High Pow	er
Result: Pass	Value: 36.35 dBm	Limit:



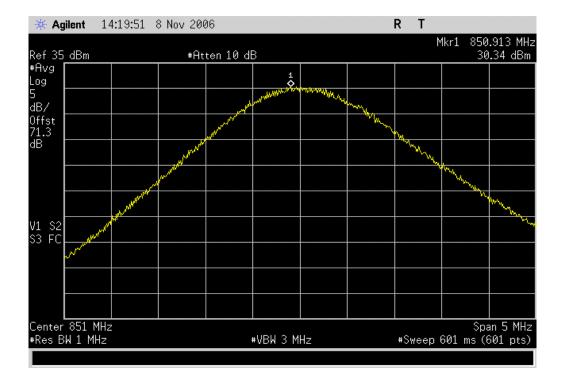
Result: Pass

Value:

30.34 dBm

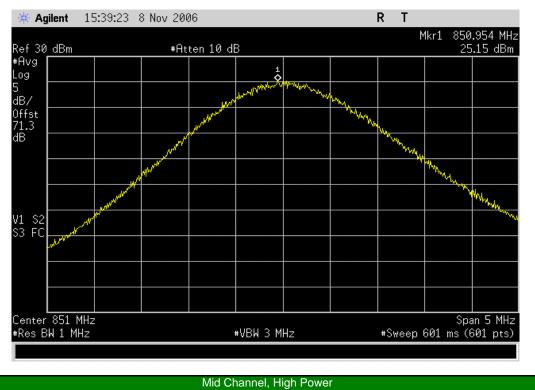
Limit:

N/A



N/A

		Low Channel, Low Power			
lt:	Pass	Value:	25.15 dBm	Limit:	



Descult	Dese	
IResult.	Pass	

Value:

36.64 dBm

Limit:

N/A

🔆 🔆 Ag	ilent 1	3:12:57	8 Nov 200)6				RT		
Ref 45	dBm		#At	ten 10 di	3			٢	1kr1 860 36	.471 MHz .64 dBm
#Avg Log 5										
dB/					1	mound				
Offst 71.3 dB				Maria		¥	My Martin			
				Jenne				WW WWWWWWWWWWWWWW		
			Jon Con					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	have a second	
V1 S2		- A A A A A A A A A A A A A A A A A A A								Mu.
\$3 FC		and the second sec								
	provide Mart									
Center	860.5 N	lHz							Spa	in 5 MHz
#Res B	W 1 MHz				ŧVBW 3 M	HZ		#З₩еер	601 ms (6	001 pts)

Result

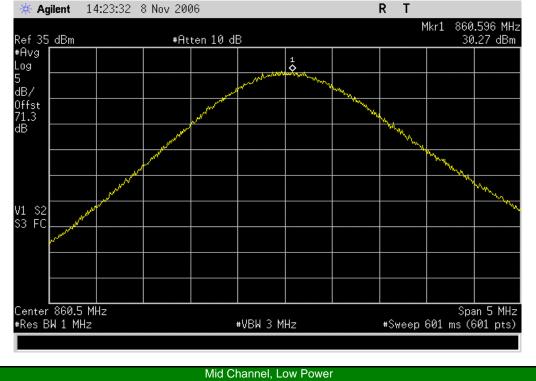
Mid Channel, Mid Power Result: Pass Value: 30.27 dBm

Limit:

Limit:

N/A

N/A



Result: Pass

Value:

25.25 dBm

🔆 🔆 Agilent 👘 14	4:47:32	8 Nov 200	16				RΤ		
Ref 30_dBm		#At	ten 10 df	3			1		.546 MHz .25 dBm
#Avg Log					1 \$				
5 dB/				and really addeed	and a first a state	an a			
Offst 71.3 dB			and the start of t			Markey Mary			
dB		Maria					Mary Mary		
	, I.	Survey Walt						Martin and	
	however								Mary Work L
V1 S2	4								March .
and And									
Center 860.5 M #Res BW 1 MHz	Hz			¥VBW 3 M	Hz		#Sweep	Spa 601 ms (6	an 5 MHz 301 pts)

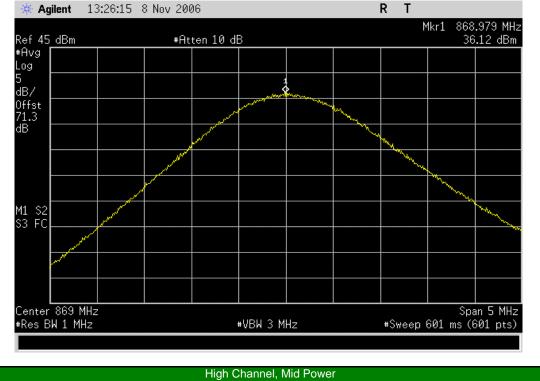
High Channel, High Power Result: Pass Value: 36.12 dBm

Limit:

Limit:

N/A

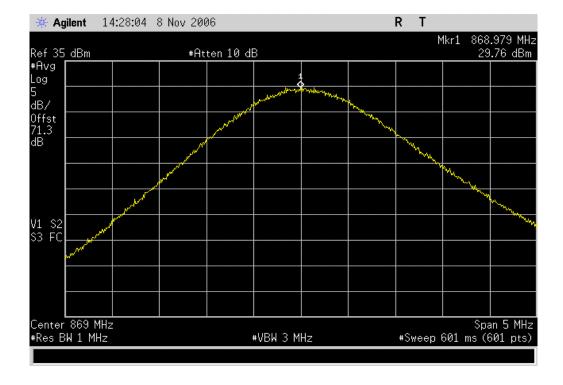
N/A



Door	
	Dace

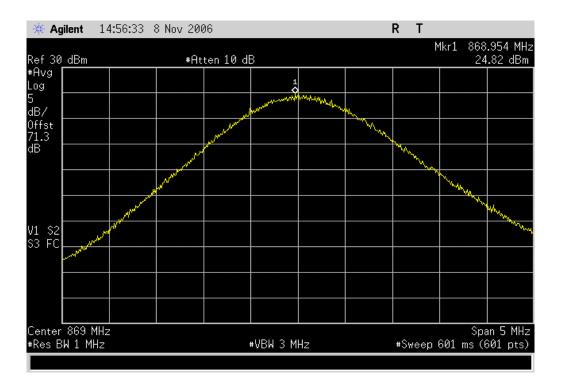
Value:

29.76 dBm



N/A

High Channel, Low Power			
Result: Pass	Value: 24.82 dBm	Limit:	











NORTHWEST

OUTPUT POWER

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4407B	AAU	9/20/2006	12
Dual Directional Coupler	Amplifier Research	DC7154	IRD	2/23/2006	13
Power Sensor	Gigatronics	80701A	SPL	9/19/2006	12
Power Meter	Gigatronics	8651A	SPM	9/19/2006	12
Signal Generator	Hewlett-Packard	8648D	TGC	1/27/2006	13

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

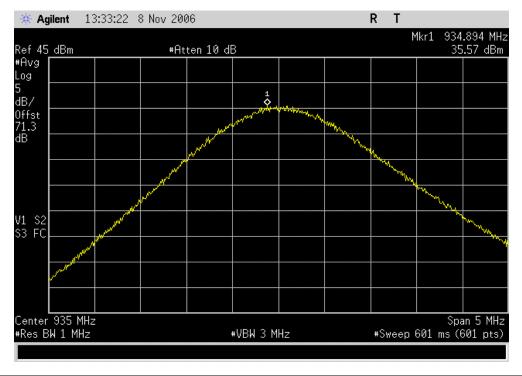
The output power was measured with the EUT set to low, medium, and high transmit frequencies within the allowable band, and three power levels (lowest, mid, and highest available). The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer through a directional coupler and attenuator to prevent analyzer overload. The measurement was made with an RMS average detector.

NORTHWEST								XMit 2006.08.25
EMC		OU	TPUT F	POWE	ER			
	T: MC-Series iDEN Microcell H	ligh Power					Work Order: RAFN006	7
	r: Engineering unit	light offer					Date: 11/08/06	
	r: Radioframe Networks, Inc.					-	Temperature: 22°C	
	s: Erin Duleba						Humidity: 43%	
	t: None					Baro	metric Pres.: 29.98	
	y: Rod Peloquin			Power:	-48VDC	24.0	Job Site: EV06	
TEST SPECIFICA	TIONS				Test Method			
FCC 901:2005				1	ANSI/TIA/EIA-603-B:20	12		
						2		
COMMENTS								
900 Band								
Soo Bana								
DEVIATIONS FRO	OM TEST STANDARD							
			101-	\mathcal{D}				
Configuration #	1	/	locky le 3	eling	•			
		Signature	\mathcal{O}	\mathcal{O}				
					۱ ۱	/alue	Limit	Results
Low Channel								
	High Power				35.	57 dBm	N/A	Pass
	Mid Power				29.	52 dBm	N/A	Pass
	Low Power				24.	45 dBm	N/A	Pass
Mid Channel								
	High Power				34.	32 dBm	N/A	Pass
	Mid Power				27.	55 dBm	N/A	Pass
	Low Power				23.	12 dBm	N/A	Pass
High Channel								
	High Power				34.	45 dBm	N/A	Pass
	Mid Power				28.	49 dBm	N/A	Pass
	Low Power				24.	29 dBm	N/A	Pass

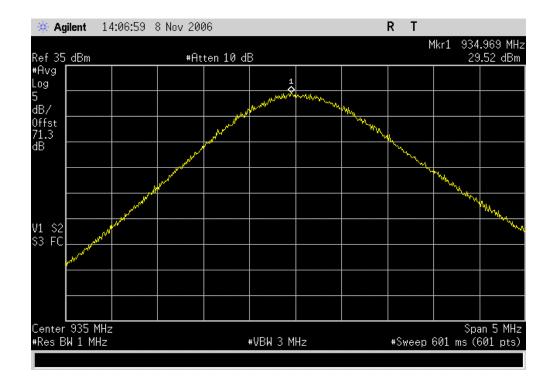
Result: Pass

Low Channel, High Power Value: 35.57 dBm

Limit: N/A



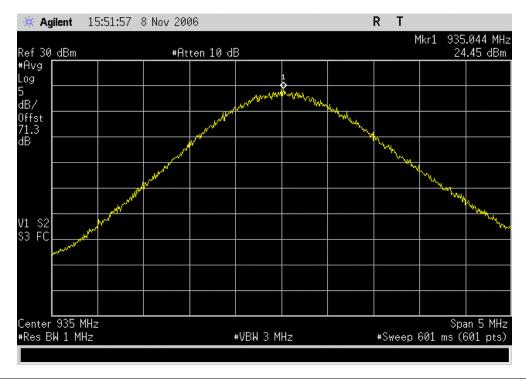
	Low Channel, Mid Power		
Result: Pass	Value: 29.52 dBm	Limit:	N/A



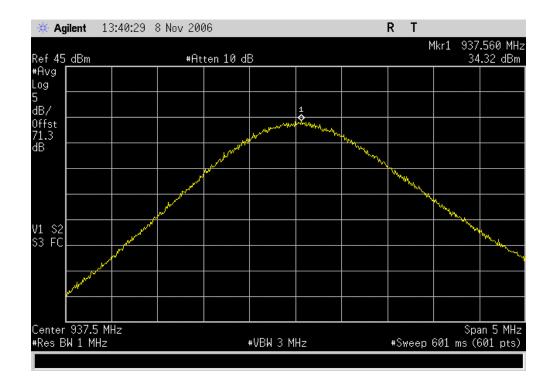
EMC

OUTPUT POWER

	Low Channel, Low Power		
Result: Pass	Value: 24.45 dBm	Limit:	N/A



	Mid Channel, High Power		
Result: Pass	Value: 34.32 dBm	Limit:	N/A



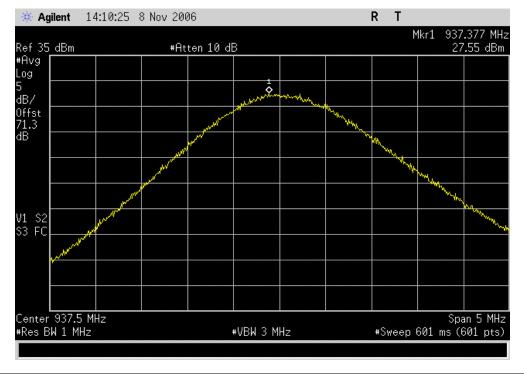
EMC

OUTPUT POWER

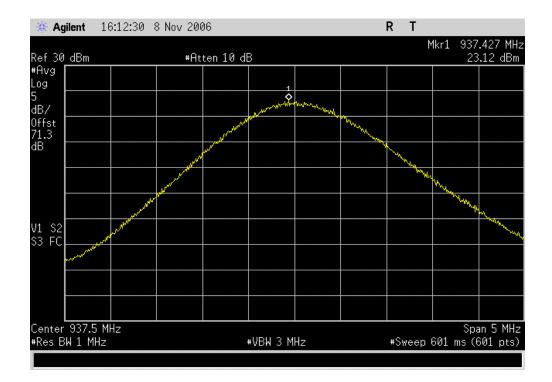
Result: Pass

Mid Channel, Mid Power Value: 27.55 dBm

Limit: N/A



Mid Channel, Low Power					
Result: Pass	Value: 23.12 dBm	Limit:	N/A		



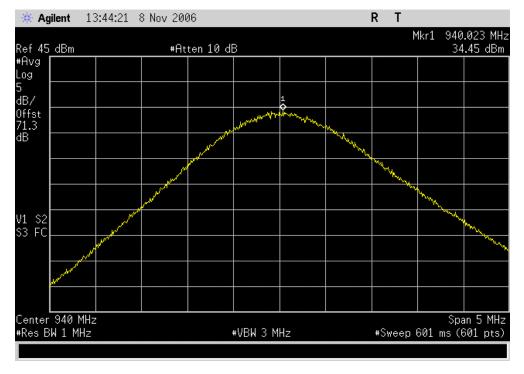
EMC

OUTPUT POWER

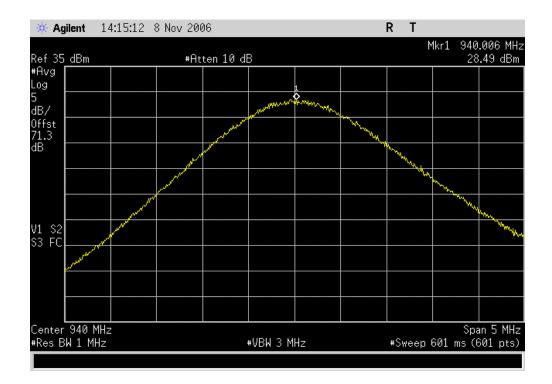
High Chann Result: Pass Value: 34.

High Channel, High Power Value: 34.45 dBm

Limit: N/A



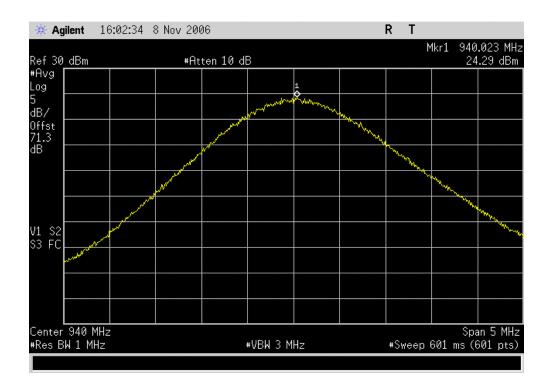
	High Channel, Mid Power		
Result: Pass	Value: 28.49 dBm	Limit:	N/A



EMC

Result: Pass

High C	hannel, Low Power		
Value:	24.29 dBm	Limit:	N/A













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:

Single channels within the center of the allowable 800MHz and 900MHz bands

Operating Modes Investigated:

Typical

Data Rates Investigated:

96 kBps at 64-QAM

Output Power Setting(s) Investigated:

Maximum ~ 14 dBm

Power Input Settings Investigated: -48Vdc

Software\Firmware Applied During Test							
Exercise software	Vx Works	Version	N/A				
Description							
The system was tested using standard operating production software to exercise the functions of the							
device during the testing.							



EUT and Peripherals

		Model/Part	
Description	Manufacturer	Number	Serial Number
EUT- Multi-Channel RadioBlade (MCRB	Radioframe Networks, Inc.	176-0860-00	14106110148
EUT- Multi-Channel RadioBlade (MCRB	Radioframe Networks, Inc.	176-0860-00	14106110160
EUT- Multi-Channel RadioBlade (MCRB	Radioframe Networks, Inc.	176-0860-00	14106110151
EUT- Multi-Channel RadioBlade (MCRB	Radioframe Networks, Inc.	176-0860-00	14106110146
EUT- Multi-Channel RadioBlade (MCRB	Radioframe Networks, Inc.	176-0860-00	14106110173
EUT- Multi-Channel RadioBlade (MCRB	Radioframe Networks, Inc.	176-0860-00	14106110174
MC-15 SERIES DUAL BAND SYSTEM (3 SE	Radioframe Networks, Inc.	176-7970-xx	14106050325
FRU, DUAL BAND RF SHELF	Radioframe Networks, Inc.	176-0970-xx	14105510109
FRU, DUAL BAND RF SHELF	Radioframe Networks, Inc.	176-0970-xx	14105510110
FRU, DUAL BAND RF SHELF	Radioframe Networks, Inc.	176-0970-xx	14105510113
RadioBlade Shelf (RBS)	Radioframe Networks, Inc.	176-0535-xx	14106030127
MC-15 BTS Interface Chassis (BIC)	Radioframe Networks, Inc.	176-0900-xx	14106050474
MC Common RadioFrame Interface Card	Radioframe Networks, Inc.	176-7540-xx	041053919XV
MC Common RadioFrame Interface Card	Radioframe Networks, Inc.	176-7540-xx	041053919W3
Base Processing Card (BPC)	Radioframe Networks, Inc.	176-7570-xx	04105411HGM
Base Processing Card (BPC)	Radioframe Networks, Inc.	176-7570-xx	04105401GP1
Base Processing Card (BPC)	Radioframe Networks, Inc.	176-7570-xx	04105421JKZ
MC-15 Airlink Interface Chassis (Al	Radioframe Networks, Inc.	176-0800-xx	14106050522
BPC W/ LC SPAM	Radioframe Networks, Inc.	176-7565-xx	04105411HC0
SPAM	Radioframe Networks, Inc.	176-7510-xx	Unknown
SPAM	Radioframe Networks, Inc.	176-7510-xx	Unknown
BPC W/ LC SPAM	Radioframe Networks, Inc.	176-7565-xx	04105411HJX
SPAM	Radioframe Networks, Inc.	176-7510-xx	Unknown
SPAM	Radioframe Networks, Inc.	176-7510-xx	Unknown
BPC W/ LC SPAM	Radioframe Networks, Inc.	176-7565-xx	04105411HLH
SPAM	Radioframe Networks, Inc.	176-7510-xx	Unknown
SPAM	Radioframe Networks, Inc.	176-7510-xx	Unknown
Ethernet Rear Transition Module (ER	Radioframe Networks, Inc.	176-7562-xx	14105320204
Ethernet Rear Transition Module (ER	Radioframe Networks, Inc.	176-7562-xx	14105320203
Coaxial RMII Transceiver Card (CRTC	Radioframe Networks, Inc.	176-0820-xx	14105480250

Remote Equipment Outside of Test Setup Boundary						
Description	Manufacturer	Model/Part Number	Serial Number			
Site Simulator	Radioframe Networks, Inc.	N/a	N/a			
Site Controller	Motorola, Inc.	CCN1008N	CAF030LTC4			
GPS Antenna	Hewlett-Packard	8532A	901			
DC Power Supply	Electronic Measurements, Inc.	EMS 60-33	20K11738			

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
DC Power	No	8.0	No	MC-15 SERIES DUAL BAND SYSTEM	DC Supply
BNC	Yes	30.0	No	ERTM	Site Simulator
BNC	Yes	30.0	No	Site Controller	Site Simulator
BNC	Yes	3.0	No	GPS Antenna	Site Controller
Ethernet	No	3.0	No	Site Controller	ERTM

Measurement Equipment					
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8593E	AAN	01/25/2006	13 mo
Multimeter	Tektronix	DMM912	MMH	12/08/2005	13 mo
DC Power Supply	Sorensen	DCR60-45B	TPB	NCR	NA
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZH-32-2-2-H/AC	ТВА	08/24/2005	12 mo
Chamber Temp. & Humidity Controller	ESZ / Eurotherm	Dimension II	TBC	08/24/2005	12 mo

Test Description

<u>Requirement:</u> Per 47 CFR 15.255, 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 Supply Voltage

The primary supply voltage was varied from 85% to 115% of nominal. The EUT can only be operated from the public AC mains, so an DC lab supply was used to vary the supply voltage from 115% to 85% -48V DC.

Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-20° to +50° C) and at 10°C intervals.

Measurements were made at the single transmit frequency. The antenna is integral to the EUT, so a radiated measurement was made using a spectrum analyzer and a near field probe. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Completed by:	
Rocky le	Peling

NORTHWEST								
EMC		FREQUENC	Y STABIL	ITY			Rev BETA	
							01/30/01	
EUT:	MC-Series				Work Order:	RAFN0060		
Serial Number:	Various				Date:	03/21/06		
Customer:	Radioframe Networks, Inc.				Temperature:	21°C		
Attendees:	Dean Busch		Tested by:	Rod Pelgouin	Humidity:	32%		
Customer Ref. No.:	None		Power:	-48 Vdc	Job Site:	Off-site		
TEST SPECIFICATION	IS							
Specification:	FCC 90I	Year: 2005	Method:	ANSI/TIA/EIA-603-B	Year:	2002		
SAMPLE CALCULATIO	ONS							
COMMENTS								
EUT OPERATING MOD	DES							
Transmitting mid band	1							
DEVIATIONS FROM T								
None								
REQUIREMENTS								
	tability of 1 part per million (ppm)	for variations of temperature and	supply voltage (DC)					
RESULTS			MINIMUM FREQUENC	Y STABILITY				
Pass			0.3 ppm					
SIGNATURE								
Porting ter Reling								
Tested By:								
DESCRIPTION OF TES								
		E reau ere	au Ctability					
		Frequen	cy Stability					

Frequency Stability with Variation of Ambient Temperature (Primary Supply = 48 Vdc)

Temp	Assigned Frequency	Measured Frequency	Tolerance	Specification
(°C)	(MHz)	(MHz)	(ppm)	(ppm)
50	860.55000	860.550037	0.04	1
40	860.55000	860.550062	0.07	1
30	860.55000	860.550037	0.04	1
20	860.55000	860.550037	0.04	1
10	860.55000	860.550250	0.29	1
0	860.55000	860.550037	0.04	1
-10	860.55000	860.550049	0.06	1
-20	860.55000	860.550049	0.06	1
-30	860.55000	860.550049	0.06	1

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

Voltage (Vdc)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
55.2 (115%)	860.55000	860.550062	0.07	1
52.8 (110%)	860.55000	860.550037	0.04	1
50.4 (105%)	860.55000	860.550050	0.06	1
48 (100%)	860.55000	860.550037	0.04	1
45.6 (95%)	860.55000	860.550050	0.06	1
43.2 (90%)	860.55000	860.550000	0.00	1
40.8 (85%)	860.55000	860.55000	0.00	1

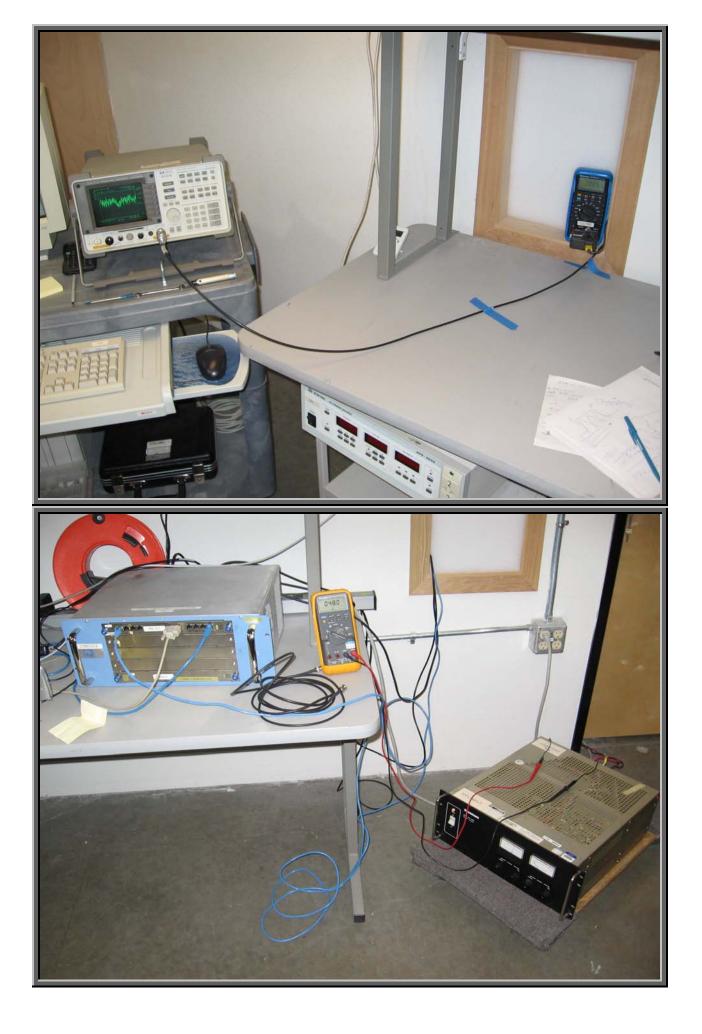
NORTHWEST					
EMC		FRFOUFN			Rev BETA
					01/30/01
EUT:	MC-Series			Work Order:	RAFN0060
Serial Number:	Various			Date:	03/21/06
Customer:	Radioframe Networks, Inc.			Temperature:	21°C
Attendees:	Dean Busch		Tested by: Rod Pelgouin	Humidity:	32%
Customer Ref. No.:	None		Power: -48 Vdc	Job Site:	EV06 & EV09
TEST SPECIFICATION	IS				
Specification:	FCC 90I	Year: 2005	Method: ANSI/TIA/EIA-603-B	Year:	2002
SAMPLE CALCULATION	ONS				
COMMENTS					
EUT OPERATING MO	DES				
Transmitting mid 900	MHz band				
DEVIATIONS FROM T					
None					
REQUIREMENTS					
	tability of 1 part per million (ppm)	for variations of temperature	and supply voltage (DC)		
RESULTS			MINIMUM FREQUENCY STABILITY		
Pass			0.05 ppm		
SIGNATURE					
	10:00				
	Porty le Reling				
Tested By:					
	27				
DESCRIPTION OF TES	51				
		Frequ	ency Stability		

Frequency Stability with Variation of Ambient Temperature (Primary Supply = -48 Vdc)

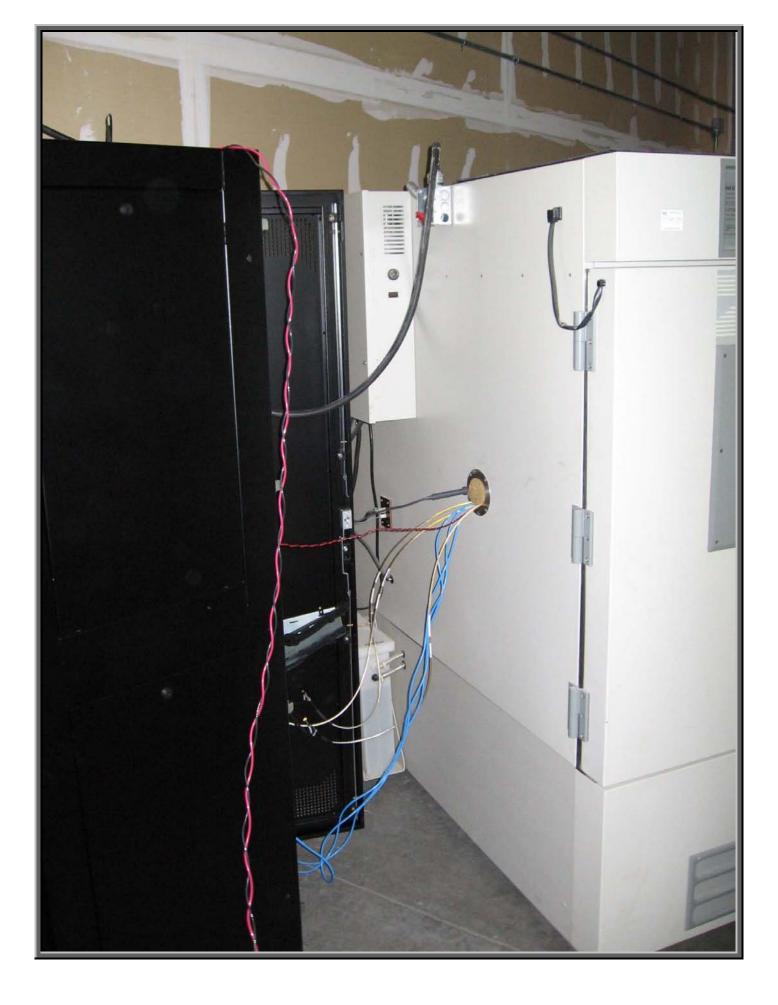
Temp	Assigned Frequency	Measured Frequency	Tolerance	Specification
(°C)	(MHz)	(MHz)	(ppm)	(ppm)
50	937.46875	937.468775	0.03	1
40	937.46875	937.468800	0.05	1
30	937.46875	937.468800	0.05	1
20	937.46875	937.468787	0.04	1
10	937.46875	937.468763	0.01	1
0	937.46875	937.468787	0.04	1
-10	937.46875	937.468763	0.01	1
-20	937.46875	937.468763	0.01	1
-30	937.46875	937.468775	0.03	1

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

Voltage (Vdc)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
55.2 (115%)	937.46875	937.468738	0.01	1
52.8 (110%)	937.46875	937.468763	0.01	1
50.4 (105%)	937.46875	937.468763	0.01	1
48 (100%)	937.46875	937.468775	0.03	1
45.6 (95%)	937.46875	937.468775	0.03	1
43.2 (90%)	937.46875	937.468775	0.03	1
40.8 (85%)	937.46875	937.468775	0.03	N/A









Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Dual Directional Coupler	Amplifier Research	DC7154	IRD	2/23/2006	13
Spectrum Analyzer	Agilent	E4407B	AAU	9/20/2006	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

A spectrum analyzer was used to scan from 0 to 9 GHz. A 100 kHz resolution bandwidth was used. No video filtering was employed. A directional coupler was used on the RF input of the spectrum analyzer.

Testing also included the three carrier intermodulation test specified by the FCC. Two modulated carriers near the start of the operational band are transmitting at full power, and one near the opposite end of the band is also transmitting at full power.

NORTHWEST EMC	SPURIOUS EMIS	SSIONS AT ANTENNA TE			XMit 2006.08
	MC-Series iDEN Microcell High Power		Work	Order: RAFN00	67
Serial Number	: Engineering unit			Date: 11/10/06	-
Customer	: Radioframe Networks, Inc.		Tempe	rature: 22°C	
Attendees	Erin Duleba		Hu	midity: 34%	
	t: None			: Pres.: 29.89	
	: Greg Kiemel	Power: -48VDC	Jo	b Site: EV06	
EST SPECIFICA	TIONS	Test Method			
CC 901:2005		ANSI/TIA/EIA-603-	B:2002		
OMMENTS					
00 MHz band					
EVIATIONS FRO	M TEST STANDARD				
Configuration #	1 Signa	ture APU. K.P			
			Value	Limit	Results
ow Channel					
	In Band	<-25			Pass
	0-1GHz	<-25			Pass
	995MHz-2.8GHz	<-25			Pass
	2.795GHz-4.5GHz	<-25			Pass
	4.495GHz-6GHz	<-25			Pass
	5.995GHz-7.5GHz	<-25			Pass
	7.495GHz-9GHz	<-25	dBm ≤-13	dBm	Pass
lid Channel					
	In Band	<-25			Pass
	0-1GHz	<-25			Pass
	995MHz-2.8GHz	<-25			Pass
	2.795GHz-4.5GHz	<-25			Pass
	4.495GHz-6GHz	<-25			Pass
	5.995GHz-7.5GHz	<-25			Pass
	7.495GHz-9GHz	<-25	dBm ≤-13	dBm	Pass
igh Channel					
	In Band	<-25			Pass
	0-1GHz	<-25			Pass
	995MHz-2.8GHz	<-25			Pass
	2.795GHz-4.5GHz	<-25			Pass
	4.495GHz-6GHz	<-25			Pass
	5.995GHz-7.5GHz	<-25			Pass
0	7.495GHz-9GHz	<-25	dBm ≤-13	dBm	Pass
Channel Intermod	ds In Band	<-25	dBm ≤-13 (dBm	Pass
	0-1GHz	<-25			Pass
	995MHz-2.8GHz	<-25			Pass
	2.795GHz-4.5GHz	<-25			Pass
	4.495GHz-6GHz	<-25			Pass
		<-25	dBm ≤-13	dBm	Pass
	5.995GHz-7.5GHz 7.495GHz-9GHz	<-25			Pass

	Low Channel, In Band		
Result: Pass	Value: <-25 dBm	Limit:	≤-13 dBm

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	Low Channel, 995MHz-2.8GHz		
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	Low Channel, 2.795GHz-4.5GHz		
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	Low Channel, 4.495GHz-6GHz		
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	Low Channel, 5.995GHz-7.5GHz		
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	Low Channel, 7.495GHz-9GHz		
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XMit 2006.08.25

	Mid Channel, 0-1GHz	
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	Mid Channel, 995MHz-2.8GHz		
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Result:

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

	Mid Chann	el, 2.795GHz-4.5GHz		
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	Mid Channel, 4.495GHz-6GHz		
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	Mid Channel, 5.995GHz-7.5GHz		
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	Mid Channel, 7.495GHz-9GHz		
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	High Channel, In Band	
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	High Channel, 0-1GHz		
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	High Channel, 995MHz-2.8GHz			
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	High Channel, 2.795GHz-4.5GHz		
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	High Channel, 4.495GHz-6GHz	
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	High Channel, 7.495GHz-9GHz		
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	3 Channel Intermods, 0-1GHz		
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	3 Channel Intermods, 995MHz-2.8GHz		
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	3 Channel Intermods, 2.795GHz-4.5GHz	Z	
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	3 Channel Intermods, 5.995GHz-7.	5GHz
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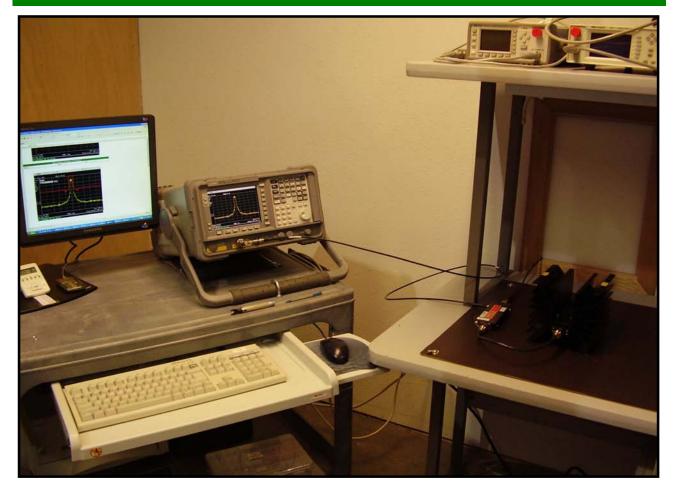
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NORTHWEST

SPURIOUS EMISSIONS AT ANTENNA TERMINALS



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Dual Directional Coupler	Amplifier Research	DC7154	IRD	2/23/2006	13
Spectrum Analyzer	Agilent	E4407B	AAU	9/20/2006	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

A spectrum analyzer was used to scan from 0 to 9.5 GHz. A 100 kHz resolution bandwidth was used. No video filtering was employed. A directional coupler was used on the RF input of the spectrum analyzer.

Testing also included the three carrier intermodulation test specified by the FCC. Two modulated carriers near the start of the operational band are transmitting at full power, and one near the opposite end of the band is also transmitting at full power.

NORTHWEST EMC	SPUR	LIOUS EMISSIONS AT ANT	ENNA TERMINAL	S	XMit 2006.08
	MC-Series iDEN Microcell	High Power		Work Order: RAFN0	067
	: Engineering unit	ingi i owei		Date: 11/10/0	
	: Radioframe Networks, Inc			Temperature: 22°C	.
	: Erin Duleba			Humidity: 34%	
	t: None			Barometric Pres.: 29.89	
	/: Greg Kiemel	Power:	-48VDC	Job Site: EV06	
EST SPECIFICAT			Test Method		
CC 901:2005			ANSI/TIA/EIA-603-B:2002		
OMMENTS 00 MHz Band					
EVIATIONS FRO	M TEST STANDARD				
Configuration #	1	Signature			
			Value	Limit	Results
ow Channel					_
	In Band		<-25 dBm	≤-13 dBm	Pass
	0-1GHz		<-25 dBm	≤-13 dBm	Pass
	995MHz-2.8GHz		<-25 dBm	≤-13 dBm	Pass
	2.795GHz-4.5GHz		<-25 dBm	≤-13 dBm	Pass
	4.495GHz-6GHz		<-25 dBm	≤-13 dBm	Pass
	5.995GHz-7.5GHz		<-25 dBm	≤-13 dBm	Pass
	7.495 GHz-9.5 GHz		<-25 dBm	≤-13 dBm	Pass
lid Channel					
	In Band		<-25 dBm	≤-13 dBm	Pass
	0-1GHz		<-25 dBm	≤-13 dBm	Pass
	995MHz-2.8GHz		<-25 dBm	≤-13 dBm	Pass
	2.795GHz-4.5GHz		<-25 dBm	≤-13 dBm	Pass
	4.495GHz-6GHz		<-25 dBm	≤-13 dBm	Pass
	5.995GHz-7.5GHz		<-25 dBm	≤-13 dBm	Pass
	7.495 GHz-9.5 GHz		<-25 dBm	≤-13 dBm	Pass
igh Channel					
	In Band		<-25 dBm	≤-13 dBm	Pass
	0-1GHz		<-25 dBm	≤-13 dBm	Pass
	995MHz-2.8GHz		<-25 dBm	≤-13 dBm	Pass
	2.795GHz-4.5GHz		<-25 dBm	≤-13 dBm	Pass
	4.495GHz-6GHz		<-25 dBm	≤-13 dBm	Pass
	5.995GHz-7.5GHz		<-25 dBm	≤-13 dBm	Pass
	7.495 GHz-9.5 GHz		<-25 dBm	≤-13 dBm	Pass
Channel Intermod					
	In Band		<-25 dBm	≤-13 dBm	Pass
	0-1GHz		<-25 dBm	≤-13 dBm	Pass
	995MHz-2.8GHz		<-25 dBm	≤-13 dBm	Pass
	2.795GHz-4.5GHz		<-25 dBm	≤-13 dBm	Pass
	4.495GHz-6GHz		<-25 dBm	≤-13 dBm	Pass
	5.995GHz-7.5GHz 7.495 GHz-9.5 GHz		<-25 dBm	≤-13 dBm	Pass

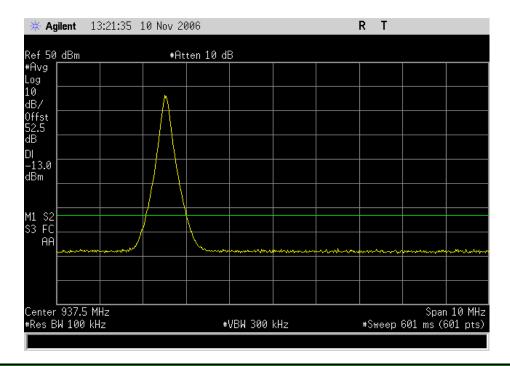
2006.08.25

Result: Pass

Result: Pass

Low Channel, In Band Value: <-25 dBm

Limit: ≤-13 dBm



Low Channel, 0-1GHz Value: <-25 dBm

Limit:	≤-13 dBm	

🔆 Agilent	10.2	10 Nov 20					RT		
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tart Ø Hz								Sto	p 1 GH:
Res BW 100	kHz		#	VBW 300	kHz		#Sweep	601 ms (6	001 pts,

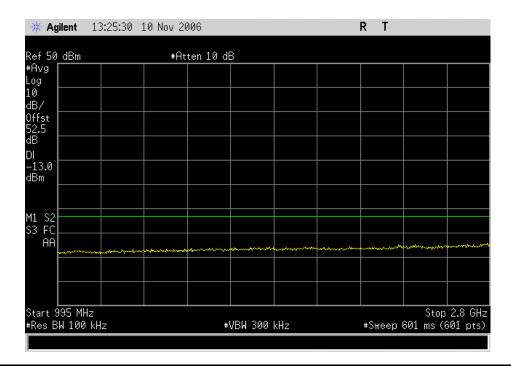
2006.08.25

Result: Pass

Result: Pass

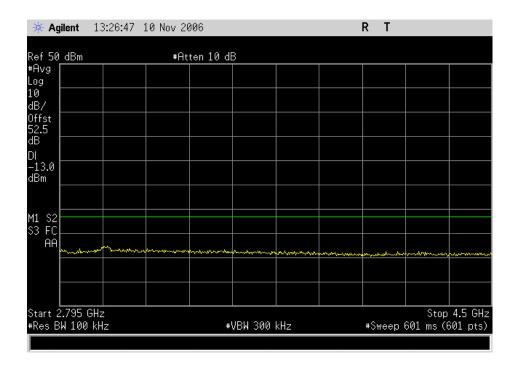
Low Channel, 995MHz-2.8GHz Value: <-25 dBm

Limit: ≤-13 dBm



Low Channel, 2.795GHz-4.5GHz Value: <-25 dBm

Limit: ≤-13 dBm



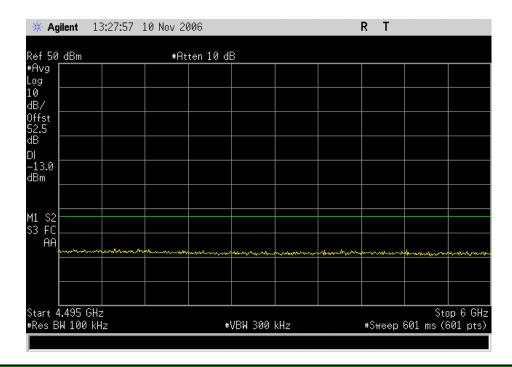
2006.08.25

Result: Pass

Result: Pass

Low Channel, 4.495GHz-6GHz Value: <-25 dBm

Limit: ≤-13 dBm



Low Channel, 5.995GHz-7.5GHz Value: <-25 dBm

Limit:	≤-13 dBm	

ef 50 dBm		#At	ten 10 di	В				
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art 5.995 I	GHz						Stop	7.5 GH

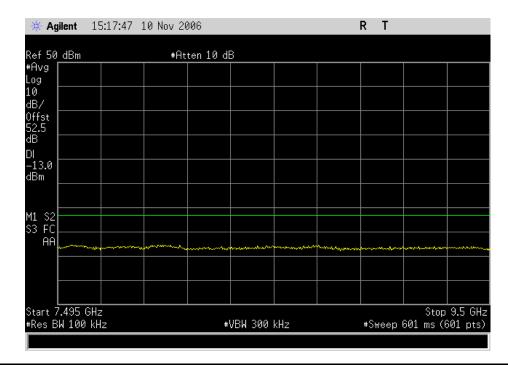
2006.08.25

Result: Pass

Result: Pass

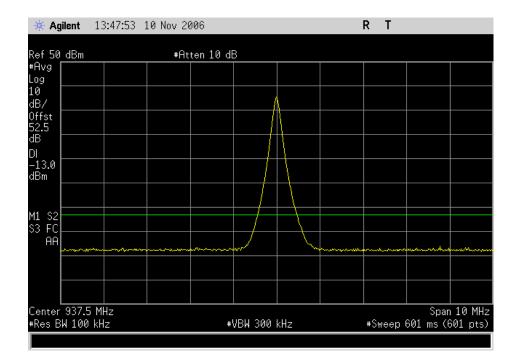
Low Channel, 7.495 GHz-9.5 GHz Value: <-25 dBm

Limit: ≤-13 dBm



Mid Channel, In Band Value: <-25 dBm

Limit: ≤-13 dBm



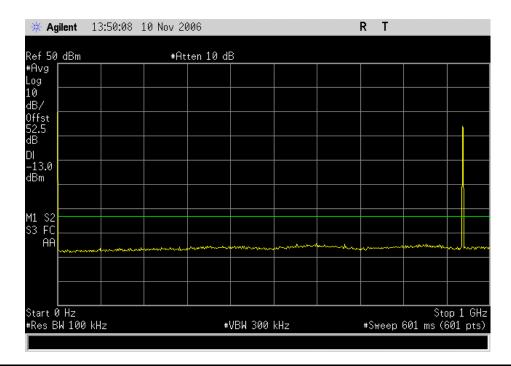
2006.08.25

Result: Pass

Result: Pass

Mid Channel, 0-1GHz Value: <-25 dBm

Limit: ≤-13 dBm



Mid Channel, 995MHz-2.8GHz Value: <-25 dBm

Limit:	≤-13 dBm	

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art 9 <mark>95 M</mark> ⊦ ≷es BW 100	lz kHz		#	VBW 300	kHz		#Sweep	Stop 601 ms (6	2.8 GH 301 pts

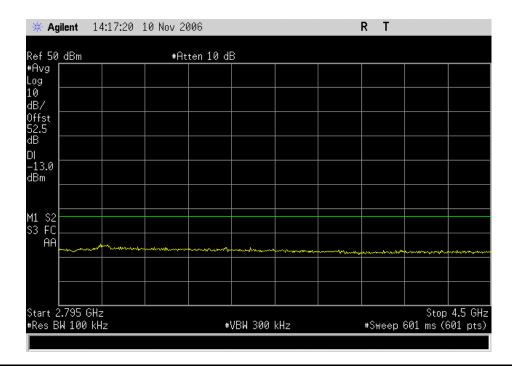
2006.08.25

Result: Pass

Result: Pass

Mid Channel, 2.795GHz-4.5GHz Value: <-25 dBm

Limit: ≤-13 dBm



Mid Channel, 4.495GHz-6GHz Value: <-25 dBm

Limit:	≤-13 dBm	

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art <mark>4.4</mark> 95 es BW 100	GHz			VBW 300				Sto 601 ms (6	op 6 GH

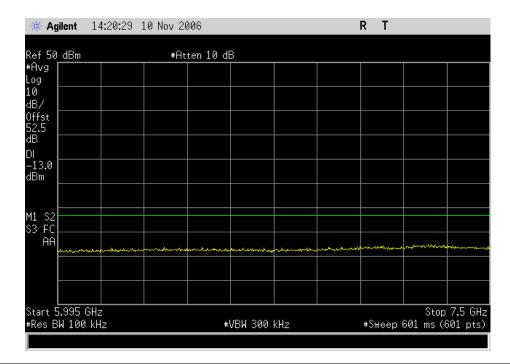
2006.08.25

Result: Pass

Result: Pass

Mid Channel, 5.995GHz-7.5GHz Value: <-25 dBm

Limit: ≤-13 dBm



Mid Channel, 7.495 GHz-9.5 GHz Value: <-25 dBm

Limit:	≤-13 dBm

* Agilent 15:23:07 10	lov 2006	RT
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ffst 2.5 B		
DI -13.0 IBm		
11 S2		
AA		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
tart <mark>7.495</mark> GHz Res BW 100 kHz	#VBW 300 kHz	Stop 9.5 GH #Sweep 601 ms (601 pts

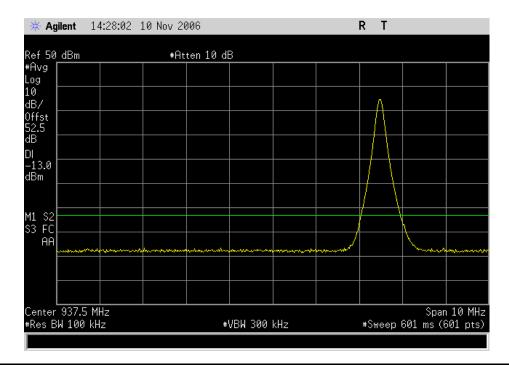
2006.08.25

Result: Pass

Result: Pass

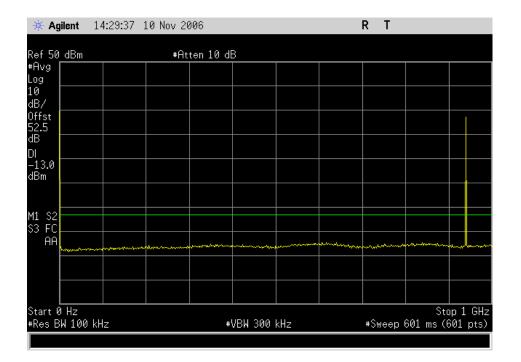
High Channel, In Band Value: <-25 dBm

Limit: ≤-13 dBm



High Channel, 0-1GHz Value: <-25 dBm

Limit: ≤-13 dBm



EMC

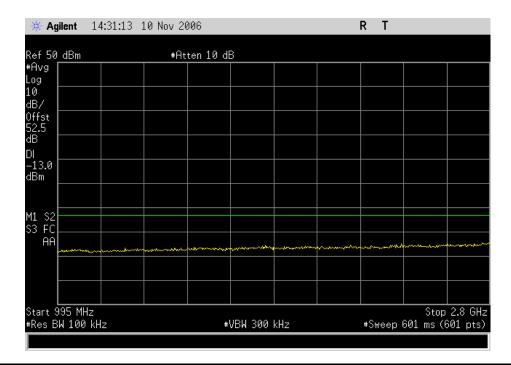
2006.08.25

Result: Pass

Result: Pass

High Channel, 995MHz-2.8GHz Value: <-25 dBm

Limit: ≤-13 dBm



High Channel, 2.795GHz-4.5GHz Value: <-25 dBm

Limit:	≤-13 dBm	

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tart 2.795 GHz						#	VBW 300	kHz	#Sweep	Stop 601 ms (1	4.5 GHz 601 pts)

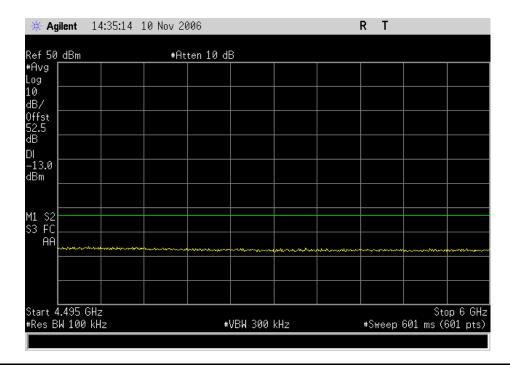
2006.08.25

Result: Pass

Result: Pass

High Channel, 4.495GHz-6GHz Value: <-25 dBm

Limit: ≤-13 dBm



High Channel, 5.995GHz-7.5GHz . Value: <-25 dBm

Limit:	≤-13 dBm	

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iHz								7.5 GH
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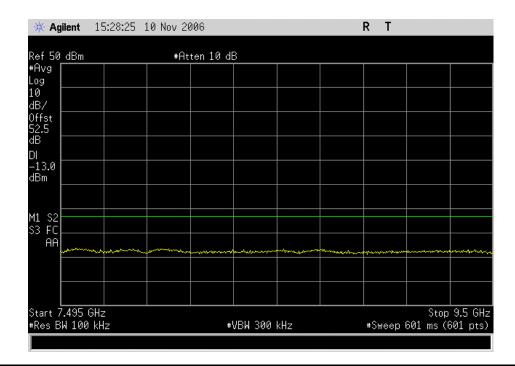
2006.08.25

Result: Pass

Result: Pass

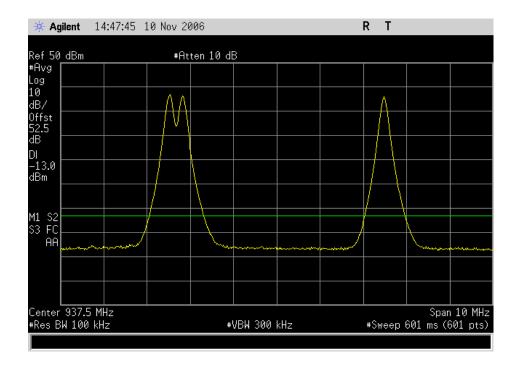
High Channel, 7.495 GHz-9.5 GHz Value: <-25 dBm

Limit: ≤-13 dBm



3 Channel Intermods, In Band Value: <-25 dBm

Limit:	≤-13 dBm



### EMC

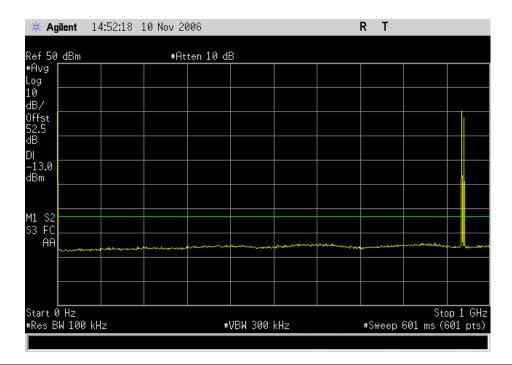
2006.08.25

Result: Pass

Result: Pass

3 Channel Intermods, 0-1GHz Value: <-25 dBm

Limit: ≤-13 dBm



3 Channel Intermods, 995MHz-2.8GHz Value: <-25 dBm

**Limit:** ≤-13 dBm

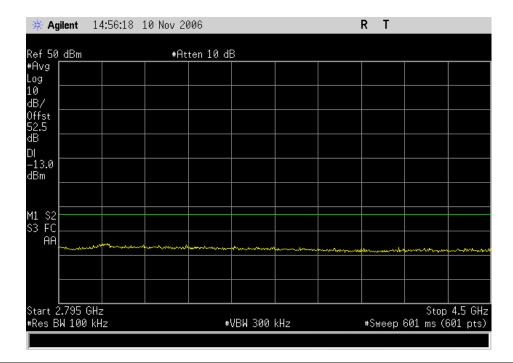
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art 995 MHz						Stop	2.8 GI

2006.08.25

	3 Channel Intermods, 2.795GF
Result: Pass	Value: <-25 dBm

Hz-4.5GHz

Limit: ≤-13 dBm



3 Channel Intermods, 4.495GHz-6GHz

|--|

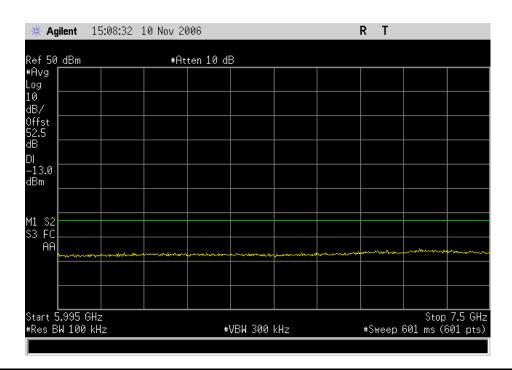
Value: <-25 dBm

Limit: ≤-13 dBm

han and and and and and and and and and a		 ****
		Stop 6 GH
	Ayaya	

2006.08.25

	3 Channel Intermods, 5.995GHz-7.50	GHz	
Result: Pass	Value: <-25 dBm	Limit:	≤-13 dBm



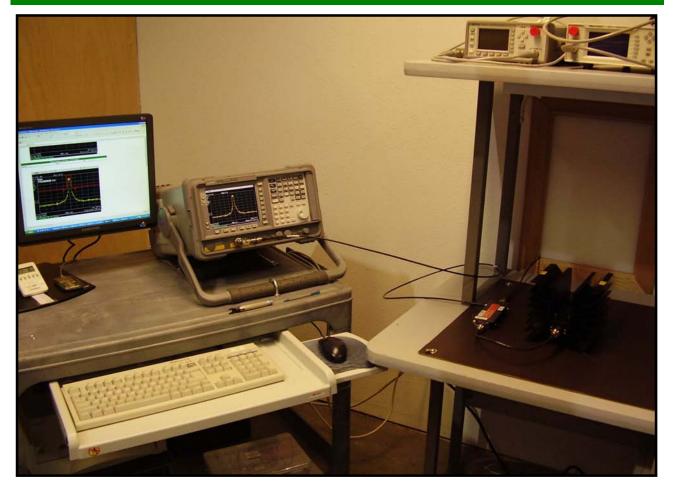
3 Channel Intermods, 7.495 GHz-9.5 GHz Value: <-25 dBm

Result: Pass

JI 12-0.0 OI 12		
	Limit:	≤-13 dBm

ef 50 dBm		<b>#</b> 0+	ten 10 di	>				
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13.0 3m								
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me	- 11	manne		-		 an an a		
art 7.495	GHz						Ston	9.5 GH
es BW 10	0 kHz		#	VBW 300	kHz	#Sween	601 ms (6	601 n±9

XMit 2006.08.25



#### EMC Field Strength of Spurious Radiation

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

PSA 2006.04.2

MODES OF OPERATION									
Transmitting typical sector configuration, 800 and 900MHz bands									
POWER SETTINGS INVESTIGATED -48Vdc									
FREQUENCY RANGE IN									
Start Frequency	30 MHz	Stop Frequency	10 GHz						

#### SAMPLE CALCULATIONS

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

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
EV01 cables g,h,j			EVB	7/6/2006	13
EV01 cables c,g, h			EVA	7/6/2006	13
High Pass Filter 1.2 - 18 GHz	Micro-Tronics	HPM50108	HFV	11/28/2005	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	7/6/2006	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	7/6/2006	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	12
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
Signal Generator	Hewlett Packard	8341B	TGN	1/26/2006	13
Antenna, Horn	EMCO	3115	AHJ	5/20/2005	24
Spectrum Analyzer	Agilent	E4446A	AAT	4/4/2006	12

Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(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

#### MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

#### TEST DESCRIPTION

Per 2.1053 and 90.691, the Field Strength of Spurious Radiation was measured in the far-field at an FCC Listed OATS up to 10 GHz. 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 power into a dummy load at low, mid, and high frequencies for both the 800MHz and 900MHz bands.

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 spurious emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is place 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 spurious 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 spurious 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 (dBm) into an ideal ½ wave dipole antenna is determined for each radiated spurious 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 3 meter limit was calculated to be 82.5 dBuV/m at 3 meters. The final measurements must be made utilizing the substitution method described above.

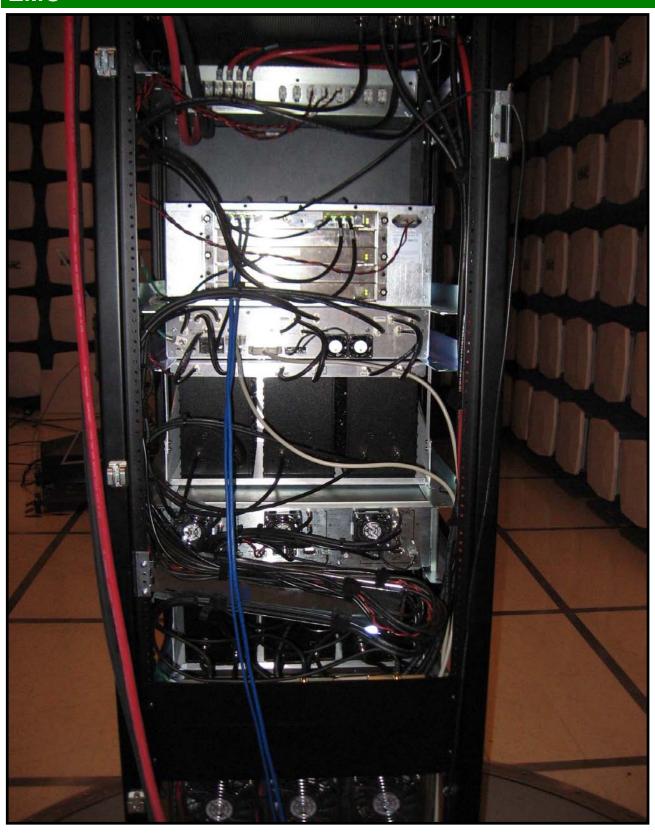
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	Radioframe		ks. Inc.									Ten	nperature		
	Erin Duleba		,										Humidity		
Project:												Barome	tric Pres.		
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TEST SPECIFICAT FCC 901:2005	IONS								Test Me		A-603-B:2	2002			
TEST PARAMETER	25								,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
Antenna Height(s)		- 4					Test D	ista	nce (m)		3				
COMMENTS	. , .	·							, <i>,</i> ,						
Antenna ports tern	ninated.														
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Transmitting typic DEVIATIONS FROM			on, 800 an	d 900MHz	bands										
No deviations. Run #	2		1												
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1100.284			202.0	2.3 1.0					V-Horr		PK	2.80E-08 2.80E-08	-45.5 -45.5	-13.0	-32.5 -32.5
1124.967			126.0	1.0					V-Horr		PK	2.61E-08	-45.8	-13.0	-32.8
1049.917			171.0	1.0					V-Horr		PK	1.28E-08	-48.9	-13.0	-35.9
1124.981			147.0	1.0					H-Horr		PK	1.22E-08	-49.1	-13.0	-36.1
1100.097			82.0	1.9					H-Horr		PK	1.06E-08	-49.7	-13.0	-36.7
1049.557			130.0	1.0					H-Hori	n	PK	1.02E-08	-49.9	-13.0	-36.9

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	1200	0.000	:	2200.0	00 32	200.000	4200.000	520	00.000	620	00.000	7200.000	8200.00	0 920	0.000	
										-						
									MH	Z						
L																
	Free					Azimuth	Hojaht				Polorit	Data -t	FIDD	EIDD	Spec Limit	Compared to
1 .	Freq (MHz)					Azimuth (degrees)	Height (meters)				Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Spec. (dB)
	(MHZ) 422.678					144.0	1.0		-		H-Horn	PK	6.27E-07	-32.0	-13.0	-19.0
	875.977					90.0	1.0				H-Horn		4.65E-07	-33.3	-13.0	-20.3
	876.163					158.0	1.0				V-Horn		2.55E-07	-35.9	-13.0	-22.9
	879.629					229.0	1.0				H-Horn	PK	1.77E-07	-37.5	-13.0	-24.5
18	879.589					161.0	1.0				V-Horn	PK	8.07E-08	-40.9	-13.0	-27.9
	422.304					113.0	1.0				V-Horn	PK	5.09E-08	-42.9	-13.0	-29.9
	466.459					342.0	1.0				V-Horn		2.08E-08	-46.8	-13.0	-33.8
	201.633					110.0	1.5				V-Horn		1.89E-08	-47.2	-13.0	-34.2
	853.050					152.0	1.0				H-Horn		1.57E-08	-48.0	-13.0	-35.0
	853.283					169.0	1.0				V-Horn		1.40E-08	-48.5	-13.0	-35.5
	201.966					342.0	1.0				H-Horn		9.49E-09	-50.2	-13.0	-37.2
	719.723					130.0	1.0				H-Horn		8.65E-09	-50.6	-13.0	-37.6
	466.519					3.0	1.0				H-Horn		5.21E-09	-52.8	-13.0	-39.8
17	720.037					177.0	1.1				V-Horn	PK	4.44E-09	-53.5	-13.0	-40.5

NORTHWEST

## Field Strength of Spurious Radiation

PSA 2006.10.30



NORTHWEST EMC

## Field Strength of Spurious Radiation



## NORTHWEST

### **RADIATED EMISSIONS**

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data

MODES OF OPERATION			
Typical operating mode with	n transceivers disabled and p	preamps on.	
POWER SETTINGS INVES	TIGATED		
-48VDC			
FREQUENCY RANGE INVI	ESTIGATED		
Start Frequency	30 MHz	Stop Frequency	10 GHz

#### SAMPLE CALCULATIONS

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

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
EV01 cables g,h,j			EVB	7/6/2006	13
EV01 cables c,g, h			EVA	7/6/2006	13
Spectrum Analyzer	Agilent	E4446A	AAT	4/4/2006	12
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	7/6/2006	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	7/6/2006	13
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
Antenna, Horn	EMCO	3115	AHC	8/30/2005	12

MEASUREMEN [®]	T BANDWIDTHS			
	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(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
Μ	easurements were made us	ing the bandwidths and deter	ctors specified. No video filte	er was used.

#### **MEASUREMENT UNCERTAINTY**

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

#### TEST DESCRIPTION

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.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna 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 3 meters or 10 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.

PSA 2006.10.30

	DRTHWEST		RA	DIAT	ED El	MISS	IONS	DATA	A SHE	ET			SA 2006.10.30 EMI 2006.7.11
	EUT	MC-Series	iDEN Mic	rocell High	Power					W	ork Order:	RAFN006	7
Ser		: Engineerin										11/07/06	
		Radiofram		ks, Inc.						Ter	nperature:		
	Attendees	Erin Duleb	ba							Barama	Humidity: etric Pres.:		
		Holly Ash	kanneihad				Power:	-48VDC		Daronie	Job Site:		
TEST S	PECIFICAT							Test Metho	od		000 01101		
FCC 15	5.109:2006							ANSI C63.	4:2003				
	PARAMETE a Height(s)		1 - 4				Test Dista	ince (m)	3				
сомм	ENTS												
		figuration w	vith anten	na ports te	rminated. (	Ground st	rap installe	d as will be	e used in ty	pical insta	Illations.		
EUT OI Typica	PERATING	MODES mode with t M TEST ST#	ransceive	rs disabled	d and prear	nps on.							
	iations.	MIESISIA	ANDARD										
Run #	lations.	1	1	r – –								1.11%	-
	uration #	2								11 0	Λ /	in 1 -	2
Results		Pa		NVLAP La	b Code 200	630-0			Sianature	Holy	, Al	-y-	
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	70.0												_
	60.0												
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dBuV/m									•				
n'	40.0							•				•	
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•	20.0					•							
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							MHz						
<u> </u>		1			,		External			Distance			Compared to
	Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	Spec.
	(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)
	00.042	48.3	6.0	117.0	1.0	3.0	0.0	H-Bilog	QP	0.0	54.3	56.9	-2.6
	20.045	56.2	-6.5	265.0	1.0	3.0	0.0	H-Bilog	QP	0.0	49.7	54.0	-4.3
	00.042 00.021	45.8 47.3	6.0 4.2	64.0 259.0	1.2 1.8	3.0 3.0	0.0 0.0	V-Bilog V-Bilog	QP QP	0.0 0.0	51.8 51.5	56.9 56.9	-5.1 -5.4
	50.020	53.1	-5.4	17.0	1.0	3.0	0.0	H-Bilog	QP	0.0	47.7	54.0	-5.4 -6.3
	75.005	42.6	7.9	265.0	1.0	3.0	0.0	H-Bilog	QP	0.0	50.5	56.9	-6.4
	00.067	40.0	10.5	75.0	1.5	3.0	0.0	H-Bilog	QP	0.0	50.5	56.9	-6.4
	93.255	50.0	-3.0	292.0	1.7	3.0	0.0	V-Bilog	QP	0.0	47.0	54.0	-7.0
	50.017	52.3	-5.4	119.0	2.2	3.0	0.0	V-Bilog	QP	0.0	46.9	54.0	-7.1
	50.005	44.8	4.9	128.0	1.0	3.0	0.0	H-Bilog	QP	0.0	49.7	56.9	-7.2
	20.046	53.2	-6.5	83.0	3.0	3.0	0.0	V-Bilog	QP	0.0	46.7	54.0	-7.3
	50.012	44.6	4.9	174.0	1.0	3.0	0.0	V-Bilog	QP QP	0.0	49.5	56.9	-7.4
	50.031 60.136	46.4 45.8	2.5 2.8	36.0 128.0	1.0 1.2	3.0 3.0	0.0 0.0	V-Bilog H-Bilog	QP QP	0.0 0.0	48.9 48.6	56.9 56.9	-8.0 -8.3
	50.008	49.1	-0.7	131.0	1.2	3.0	0.0	V-Bilog	QP	0.0	48.4	56.9	-8.5
	00.003	47.7	0.4	164.0	1.8	3.0	0.0	H-Bilog	QP	0.0	48.1	56.9	-8.8
	93.253	47.9	-3.0	135.0	1.0	3.0	0.0	H-Bilog	QP	0.0	44.9	54.0	-9.1
4	00.024	43.4	4.2	90.0	1.0	3.0	0.0	H-Bilog	QP	0.0	47.6	56.9	-9.3
	50.014	45.0	2.5	280.0	1.0	3.0	0.0	H-Bilog	QP	0.0	47.5	56.9	-9.4
2	50.008	47.6	-0.7	37.0	1.0	3.0	0.0	H-Bilog	QP	0.0	46.9	56.9	-10.0

_		_				External			Distance			Compared to
Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	Spec.
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)
575.004	38.2	7.9	169.0	1.0	3.0	0.0	V-Bilog	QP	0.0	46.1	56.9	-10.8
197.755	45.4	-2.4	132.0	1.2	3.0	0.0	V-Bilog	QP	0.0	43.0	54.0	-11.0
525.011	37.9	7.1	269.0	1.0	3.0	0.0	H-Bilog	QP	0.0	45.0	56.9	-11.9
700.037	34.1	10.5	127.0	1.8	3.0	0.0	V-Bilog	QP	0.0	44.6	56.9	-12.3
565.045	36.5	7.5	117.0	1.5	3.0	0.0	H-Bilog	QP	0.0	44.0	56.9	-12.9
555.007	36.5	7.4	141.0	1.2	3.0	0.0	V-Bilog	QP	0.0	43.9	56.9	-13.0
45.006	39.4	-3.3	153.0	1.0	3.0	0.0	V-Bilog	QP	0.0	36.1	49.5	-13.4
181.246	44.6	-4.2	91.0	3.0	3.0	0.0	H-Bilog	QP	0.0	40.4	54.0	-13.6
50.009	39.6	-4.7	221.0	1.8	3.0	0.0	V-Bilog	QP	0.0	34.9	49.5	-14.6
875.016	27.7	12.4	241.0	1.3	3.0	0.0	V-Bilog	QP	0.0	40.1	56.9	-16.8
70.005	39.4	-7.7	164.0	1.7	3.0	0.0	V-Bilog	QP	0.0	31.7	49.5	-17.8
55.002	35.5	-5.5	76.0	3.5	3.0	0.0	H-Bilog	QP	0.0	30.0	49.5	-19.5

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		UT:	MC-S	Series	iDEN	Mic	crocell	liał	ι Ρον	ver															Wo	rk O	rde	: R/	AFN	0067	,
Serial								J	-	-																	Date				
						wor	ks, Inc.																	Т			ture				
A	ttende	ees: iect:			Ja																		B	aror			idity Pres				
т	ested				kanne	jhac	ł							l	Powe	er:	-48	VDC	;					<u></u>			Site				
TEST SP		CATIO	ONS															st Me													
FCC 901:2			~														AN	SIC	:63.	4:20	03										
TEST PA			-		1 - 4									Tes	st Di	sta	nce	(m)	)			3									
COMMEN	ITS		,		1 4											orta		(,	,			0									
EUT in ty	pical		-		with a	nten	na port	s te	rmin	ated.	Gro	ound	l sti	rap i	insta	illeo	d as	s wil	ll be	e us	ed ir	n typ	oica	l ins	tall	atio	ns.				
EUT OPE Typical o DEVIATIO	perati	ina m	ode	with	transo	ceive	ers disa	ble	d and	d pre	amp	is on	۱.																		
No deviat	tions.																														
Run #					3																					^			1	(	7
Configura	ation	#			2																		11	l	5	10	M	in	r	-	
Results				Pa	ISS		NVLA	P La	ıb Co	de 20	0063	30-0								Sig	natu	re 7	7	0	0	/	5	1		9	
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	eq Hz)		Ampl (dB		Fac (d		Azimi (degre			eight eters)		Distan (mete			xterna enuati (dB)		Ρ	olarit	ty	D	etecto	or	Adju	tance stme dB)			usted uV/m		pec. I dBuV		Compared to Spec. (dB)
4853	3.449		36	6.4	8.	5	172	.0	<u>ــــــــــــــــــــــــــــــــــــ</u>	1.2		3.0	)		0.0			-Hoi		L	AV		C	0.0		44	4.9		60.	0	-15.1
	6.606			.6	-2		348			1.0		3.0			0.0			-Hoi			AV			0.0			2.1		60.		-17.9
	5.043 3.449		44 32	.7 • 4	-3 8.		182 159			1.0 1.0		3.0 3.0			0.0 0.0			-Hoi -Hoi			AV AV			).0 ).0			1.1 ).9		60. 60.		-18.9 -19.1
	5.449 5.122			4 3.4	-3		184			1.0 1.0		3.0			0.0			-но -Но			AV			).0 ).0			).9 ).4		60.		-19.1
1500	0.201		41	.3	-2	.5	343	.0		1.0		3.0	)		0.0		V	-Hoi	rn		AV		C	0.0		38	8.8		60.	0	-21.2
	5.028			.2	-3		162			1.2		3.0			0.0			-Hoi			AV			0.0			3.2		60.		-21.8
	0.185 5.168			).0 ).6	-2 -3		204 256			1.0 2.0		3.0 3.0			0.0 0.0			-Hoi -Hoi			AV AV			).0 ).0			7.5 7.0		60. 60.		-22.5 -23.0
	5.216		40 55		-3 -3		182			2.0 1.0		3.0			0.0			-но -Но			PK			).0 ).0			1.8		80.		-23.0 -28.2
4853	3.679		42	2.0	8.	5	172	.0		1.2		3.0	)		0.0		V	-Hoi	rn		ΡK		C	0.0		50	0.5		80.	0	-29.5
	4.871			3.3	-3		184			1.0		3.0			0.0			-Hoi			PK			0.0			0.3		80.		-29.7
	6.581			2.5	-2		7.0			1.0		3.0			0.0			-Hoi			AV			0.0			0.0		60.		-30.0
	6.542			.8 8	-2		348			1.0		3.0			0.0			-Hoi -Hoi			PK PK			0.0			9.3 3 8		80. 80		-30.7 -31.2
	4.861 3.233		51 40	.8 .0	-3 8.		162 159			1.2 1.0		3.0 3.0			0.0 0.0			-Hoi -Hoi			PK			).0 ).0			3.8 3.5		80. 80.		-31.2 -31.5
	0.328			).2	-2		204			1.0		3.0			0.0			-Hoi			PK			).0 ).0			5.5 6.7		80.		-33.3
1499	9.995		48	8.0	-2	.5	343	.0		1.0		3.0	)		0.0		V	-Hoi	rn		ΡK			0.0		4	5.5		80.		-34.5
	5.349			.4	-3		256			2.0		3.0			0.0			-Hoi			PK			0.0			3.8		80.		-36.2
1466	6.422		43	3.1	-2	.5	7.0	)		1.0		3.0	)		0.0		Н	-Hoi	rn		PK		C	0.0		4(	0.6		80.	0	-39.4



### Radiated Emissions



# NORTHWEST

### Radiated Emissions





### Radiated Emissions



### NORTHWEST

### **CONDUCTED EMISSIONS**

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

#### MODES OF OPERATION

BCU and LNAs operating only

#### **POWER SETTINGS INVESTIGATED**

-48VDC

#### SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	4/4/2006	12
LISN	Solar	9233-50-TS-50-N	LIH	4/21/2006	13
LISN	Solar	9233-50-TS-50-N	LII	4/21/2006	13
High Pass Filter	TTE	H97-100K-50-720B	HFX	8/22/2006	13
Attenuator	Tektronix	011-0059-02	ATC	12/19/2005	13
EV01 cables g,h,e,f			EVC	3/17/2006	13

MEASUREMENT BANDWIDTHS										
	Frequency Range	Peak Data	Quasi-Peak Data	Average Data						
	(MHz)	(kHz)	(kHz)	(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						
Me	easurements were made us	ing the bandwidths and deter	ctors specified. No video filt	er was used.						

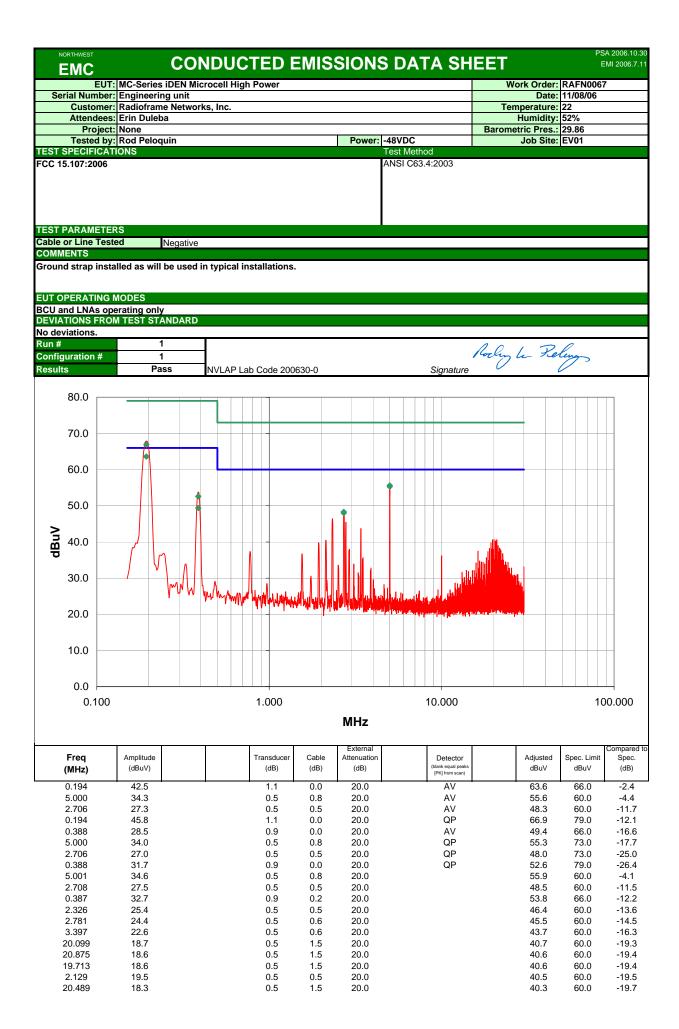
#### MEASUREMENT UNCERTAINTY

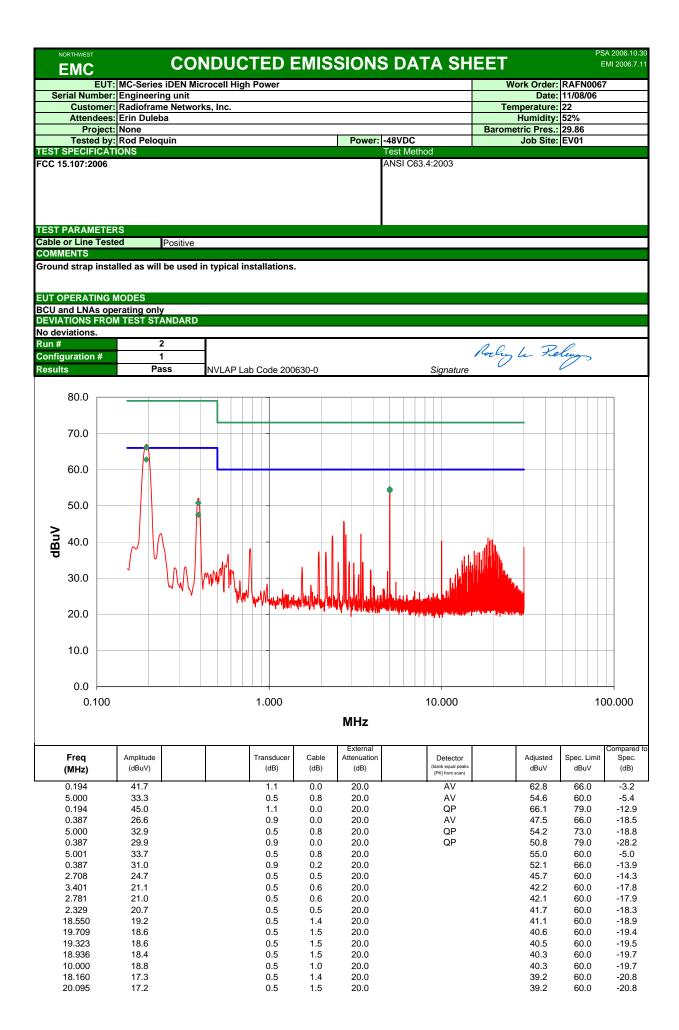
Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

#### TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50  $\Omega$  measuring port is terminated by a 50  $\Omega$  EMI meter or a 50  $\Omega$  resistive load. All 50  $\Omega$  measuring ports of the LISN are terminated by 50 $\Omega$ .

PSA 2006.10.30







### Conducted Emissions







### Conducted Emissions

