Masimo Corporation

Radical 7C+

Report No. MASI0057

Report Prepared By



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

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22975 NW Evergreen Parkway Suite 400 Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: May 5, 2010 Masimo Corporation Model: Radical 7C+

Emissions										
Test Description	Specification	Test Method	Pass/Fail							
Spurious Radiated Emissions	FCC 15.247:2010	ANSI C63.10:2009	Pass							
AC Powerline Conducted Emissions	FCC 15.207:2010	ANSI C63.10:2009	Pass							

Modifications made to the product
Modifications made to the product
See the Modifications section of this report
dee the modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc. 41 Tesla Ave. Irvine, CA 92618

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 (Site filing #2834B-2).

Approved By:

Don Facteau, IS Manager

QAIVN

NVLAP Lab Code: 200676-0

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 History

Revision 06/29/09

Revision Number	Description	Date	Page Number
00	None		



Accreditations and Authorizations

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 2004/108/EC, and ANSI C63.4. 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.



NVLAP LAB CODE 200881-0

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-Gen, Issue 2 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. (Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1)



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.



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).





Accreditations and Authorizations

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, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).



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 (US0017). 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



KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157)



VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.



SCOPE

For details on the Scopes of our Accreditations, please visit: http://www.nwemc.com/accreditations/



Northwest EMC Locations





Oregon Labs EV01-EV12 22975 NW Evergreen Pkwy Suite 400 Hillsboro, OR 97124 (503) 844-4066 California Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918 Minnesota Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281 Washington Labs SU01-SU07 14128 339th Ave. SE Sultan, WA 98294 (360) 793-8675 New York Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796







Party Requesting the Test

Company Name:	Masimo Corporation
Address:	40 Parker
City, State, Zip:	Irvine, CA 92618
Test Requested By:	Paul Lewandowski
Model:	Radical 7C+
First Date of Test:	May 3, 2010
Last Date of Test:	May 5, 2010
Receipt Date of Samples:	May 3, 2010
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

One 802.11a/b/g radio module installed in a medical monitoring device that will be connected to hospital wireless network.

Testing Objective:

Seeking to demonstrate compliance under FCC 15.247 for operation in the 2.4 an 5.8 GHz bands

EUT Photo







Configurations

Revision 9/21/05

CONFIGURATION 1 MASI0057

EUT											
Description	Manufacturer	Model/Part Number	Serial Number								
Pulse Oximeter	Masimo	Radical 7C+	E00680								

Peripherals in test setup boundary											
Description	Description Manufacturer Model/Part Number Serial Number										
SpO2 Cable Adapter	Masimo	None	E09H383								

Cables											
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2						
Patient Cable	No	4.7m	No	SpO2 Cable Adapter	Unterminated						
Patient Cable	No	4.0m	No	SpO2 Cable Adapter	Unterminated						
AC Cable	No	1.8m	No	EUT	AC Mains						
PA = Cable i	is permanent	ly attached to the de	vice. Shieldi	ng and/or presence of ferrite may	be unknown.						

Revision 4/28/03

	Equipment modifications											
Item	Date	Test	Modification	Note	Disposition of EUT							
1	5/3/2010	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.							
2	5/5/2010	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.							

SPURIOUS 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.

CHANNELS INVESTIGATED

Channel 1, 2412 MHz Channel 6, 2437 MHz

Channel 11, 2462 MHz

Channel 149, 5745 MHz

Channel 157, 5785 MHz

Channel 165, 5825 MHz

DATA RATES INVESTIGATED

1 Mbps, 11 Mbps, 6 Mbps, 36 Mbps, 54 Mbps

AXIS INVESTIGATED

X -Axis Y -Axis

Z -Axis

MODE USED FOR FINAL DATA

Channels 1, 6, 11. 1 Mbps, Z-Axis

Channels 149, 157, 165. 6 Mbps, Z-Axis

POWER SETTINGS INVESTIGATED

120VAC/60Hz

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 40 GHz

CLOCKS AND OSCILLATORS

2412 MHz, 2437 MHz, 2462 MHz, 5745 MHz, 5785 MHz, 5825 MHz

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	
High Pass Filter	Micro-Tronics	HPM50111	HGC	11/20/2009	13	
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	5/3/2010	13	
Antenna, Horn	EMCO	3160-09	AHN	NCR	0	
OC floating Cable	N/A	18-26GHz RE Cables	OCK	5/3/2010	13	
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	12/21/2009	13	
Antenna, Horn	EMCO	3160-08	AHK	NCR	0 13	
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	4/11/2010 NCR		
Antenna, Horn	ETS	3160-07	AHX		0	
OC11 Cables	N/A	12-18GHz RE Cables	ocs	4/11/2010	13	
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	9/10/2009	13	
Antenna, Horn	EMCO	3115	AHB	9/11/2009	24	
OC11 Cables	N/A	1-8GHz RE Cables	OCR	3/19/2010	13	
Pre-Amplifier	Miteq	AM-1551	AOU	2/11/2009	24	

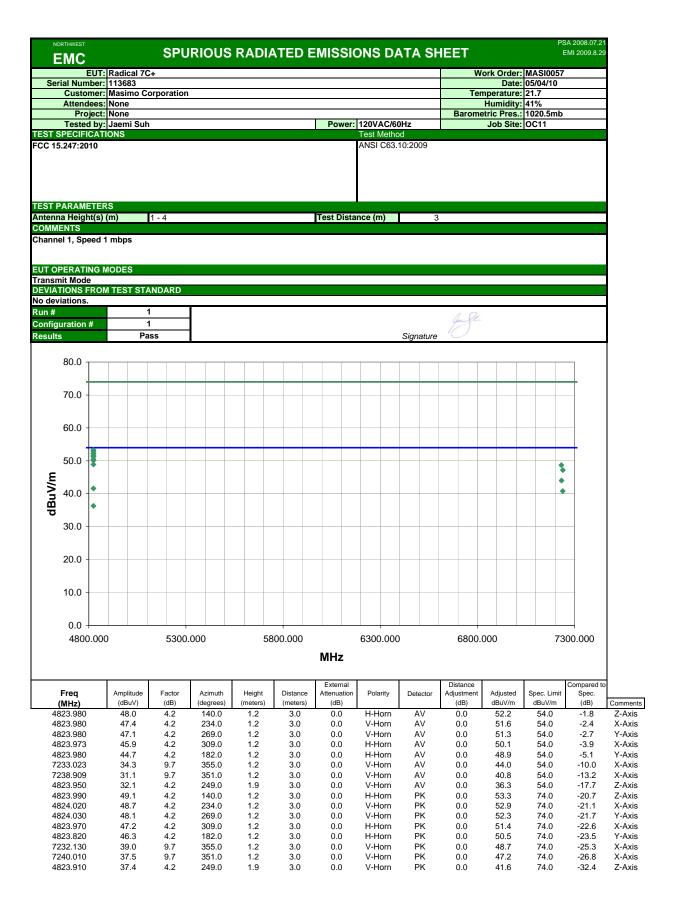
MEASUREMENT BANDWIDTHS												
Frequency Range	Peak Data	Quasi-Peak Data	Average Data									
(MHz)	(kHz)	(kHz)	(kHz)									
0.01 - 0.15	1.0	0.2	0.2									
0.15 - 30.0	10.0	9.0	9.0									
30.0 - 1000	100.0	120.0	120.0									
Above 1000	1000.0	N/A	1000.0									
Measurements were ma	ade using the bandwidths and de	tectors specified. No video filte	r was used.									

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation is available upon request.

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.



	THWEST				S	PU	RIOUS	RADIA	ATED E	MISSIC	DNS DA	ATA SI	HEET			SA 2008.07 EMI 2009.8
		EUT:	Radi	cal 70										ork Order	MASI0057	
Seria	ıl Num				· T								•		05/04/10	
					orporat	ion							Tei	mperature:		
	Attend	lees: ject:											Barome	Humidity:	41% 1020.5mb	
-	Tested									Power:	120VAC/6	0Hz	Daronn	Job Site:		
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OMME		IL(S) (111)		1 - 4					Test Dista	nce (m))			
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										MHz						
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(N	Hz)		(dE	BuV)	(dB))	(degrees)	(meters)	(meters)	(dB)	-		(dB)	dBuV/m	dBuV/m	(dB)
	3.981			4.8 4.5	4.3 4.3		299.0 228.0	1.2 1.2	3.0 3.0	0.0 0.0	H-Horn V-Horn	AV AV	0.0 0.0	49.1 48.8	54.0 54.0	-4.9 -5.2
	7.876			+.5 2.6	10.0		344.0	1.7	3.0	0.0	V-Horn V-Horn	AV	0.0	48.8 42.6	54.0 54.0	-5.2 -11.4
730	8.197		31	1.6	10.0)	72.0	1.2	3.0	0.0	H-Horn	AV	0.0	41.6	54.0	-12.4
	9.200			2.7	10.0		344.0	1.7	3.0	0.0	V-Horn	PK	0.0	52.7	74.0	-21.3
487	3.850			3.3 7.7	4.3 4.3		299.0 228.0	1.2 1.2	3.0 3.0	0.0 0.0	H-Horn V-Horn	PK PK	0.0 0.0	52.6 52.0	74.0 74.0	-21.4 -22.0
487					7.0		220.0	1.4								

	ORTHWEST			SPU	JRIOUS	RADIA	ATED I	EMISSI	ONS DA	ATA SH	IEET			SA 2008.07.21 EMI 2009.8.29
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	5.247:20								ANSI C63.					
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								MHz						
	Freq (MHz)		Amplitud (dBuV) (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)
	923.966		41.0		230.0	1.2	3.0	0.0	V-Horn	AV	0.0	45.5	54.0	-8.5
	923.989		38.4		99.0	1.2	3.0	0.0	H-Horn	AV	0.0	42.9	54.0	-11.1
	383.164		30.1	10.1	165.0	1.2	3.0	0.0	H-Horn	AV	0.0	40.2	54.0	-13.8
	383.011 385.740		29.5 41.7		345.0 165.0	1.2 1.2	3.0 3.0	0.0 0.0	V-Horn H-Horn	AV PK	0.0 0.0	39.7 51.8	54.0 74.0	-14.3 -22.2
	386.400		41.7		345.0	1.2	3.0	0.0	V-Horn	PK PK	0.0	51.8	74.0 74.0	-22.2 -22.5
	924.010		46.1	4.5	230.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.6	74.0	-22.5
	923.820		44.5		99.0	1.2	3.0	0.0	H-Horn	PK	0.0	49.0	74.0	-25.0
,	4923.820		. 1.0	1.0	55.0		0.0	0.0			0.0			_0.0

	RTHWEST			SPU	RIOUS	RADIA	ATED E	MISSIC	ONS DA	ATA SH	IEET			SA 2008.07.21 EMI 2009.8.29
		_	Radical 7C	+							W	ork Order:		
Ser	ial Numb										_		05/04/10	
	Attende		Masimo Co	rporation							Ten	nperature: Humidity:		
			None								Barome	tric Pres.:	1020.5mb	
			Jaemi Suh					Power:	120VAC/6	0Hz	24.5	Job Site:	OC11	
TEST S	PECIFIC								Test Metho	od				
	.247:201								ANSI C63.	10:2009				
	ARAME							Tare Distan	()					
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	70.0													
	60.0													
Ε	50.0													
dBuV/m	40.0		•											
	30.0		•											
	20.0													
	10.0													
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	10000	.000	·					MHz					1000	
(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)
	185.970 064.290		34.9 35.3	-8.4 -8.8	1.0 198.0	1.3 1.0	0.0 0.0	0.0 0.0	H-Horn H-Horn	AV AV	0.0 0.0	26.5 26.5	54.0 54.0	-27.5 -27.5
	182.810		34.8	-8.4	149.0	1.0	0.0	0.0	V-Horn	AV	0.0	26.4	54.0	-27.5 -27.6
	063.920		35.3	-8.9	78.0	1.0	0.0	0.0	V-Horn	AV	0.0	26.4	54.0	-27.6
123	309.110		34.0	-8.0	201.0	4.0	0.0	0.0	V-Horn	AV	0.0	26.0	54.0	-28.0
	311.450		34.1	-8.1	218.0	1.0	0.0	0.0	H-Horn	AV	0.0	26.0	54.0	-28.0
	059.190		48.3	-8.9	78.0	1.0	0.0	0.0	V-Horn	PK	0.0	39.4	74.0	-34.6
	062.140 186.320		47.7 46.5	-8.9 -8.4	198.0 149.0	1.0 1.0	0.0 0.0	0.0 0.0	H-Horn V-Horn	PK PK	0.0 0.0	38.8 38.1	74.0 74.0	-35.2 -35.9
	187.320		46.5 46.5	-8.4 -8.4	1.0	1.0	0.0	0.0	v-Horn H-Horn	PK PK	0.0	38.1	74.0 74.0	-35.9 -35.9
	311.180		45.9	-8.1	218.0	1.0	0.0	0.0	H-Horn	PK	0.0	37.8	74.0	-36.2
	312.470		45.8	-8.1	201.0	4.0	0.0	0.0	V-Horn	PK	0.0	37.7	74.0	-36.3

SPURIOUS RADIATED EMISSIONS DATA SHEET EMC EUT: Radical 7C+ Work Order: MASI0057 Serial Number: 113683 Date: 05/04/10 Customer: Masimo Corporation Temperature: 21.7 Humidity: 41% Barometric Pres.: 1020.5mb Attendees: None Project: None Tested by: Jaemi Suh TEST SPECIFICATIONS Power: 120VAC/60Hz Job Site: OC11 FCC 15.247:2010 TEST PARAMETERS Test Distance (m) Antenna Height(s) (m) 1 - 4 COMMENTS

EUT OPERATING MODES

Transmit Mode

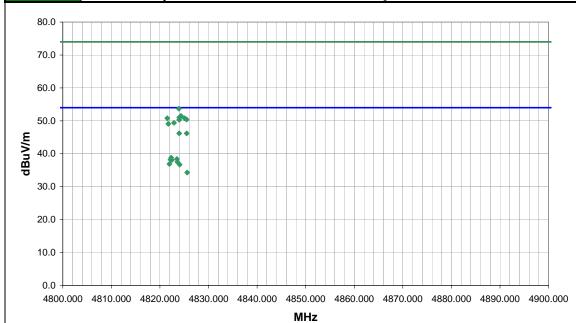
DEVIATIONS FROM TEST STANDARD

Channel 1, Speed 1 mbps. Worst case mode, worst case frequency.

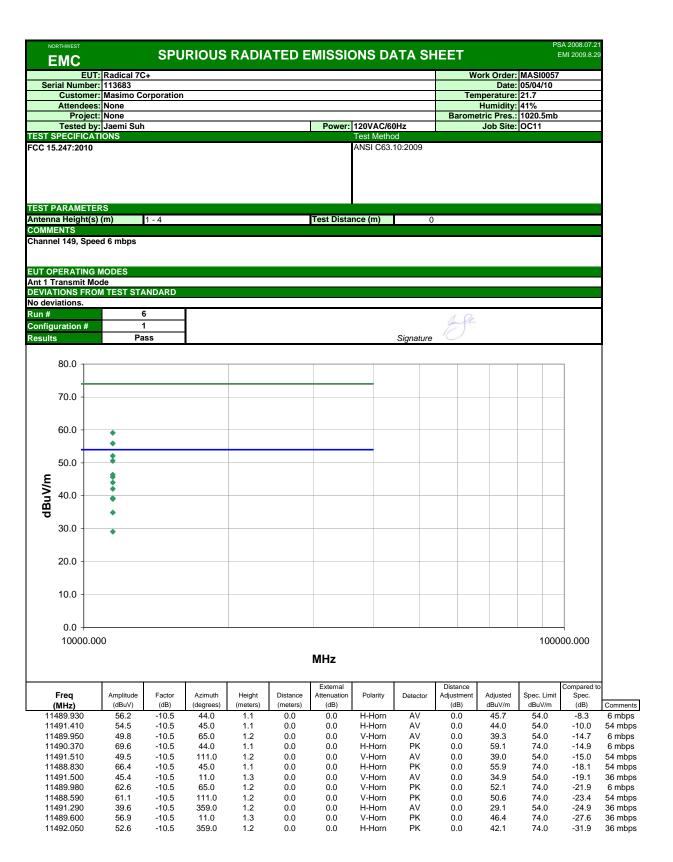
No deviations.

Run # 5
Configuration # 1
Results Pass

Signature

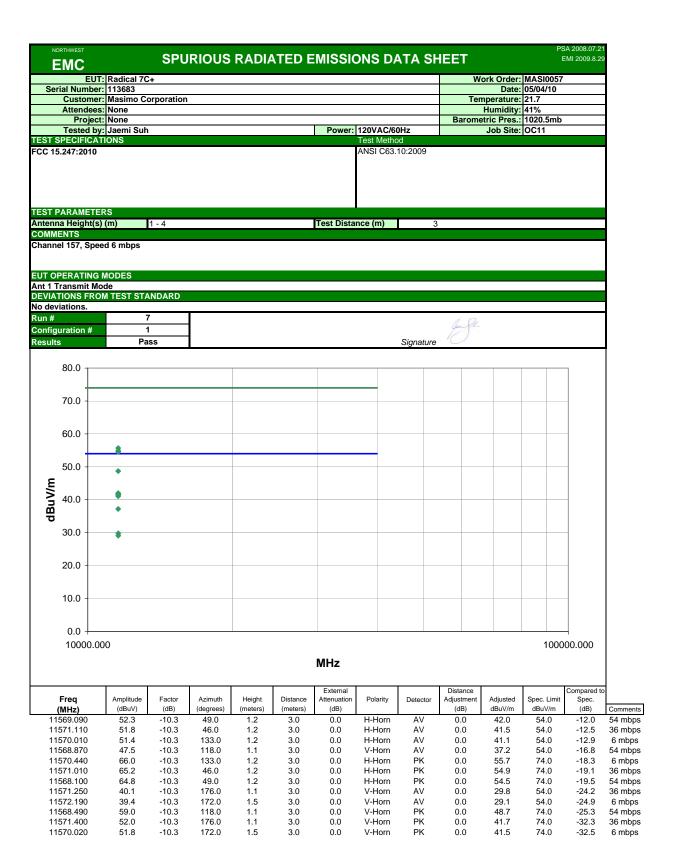


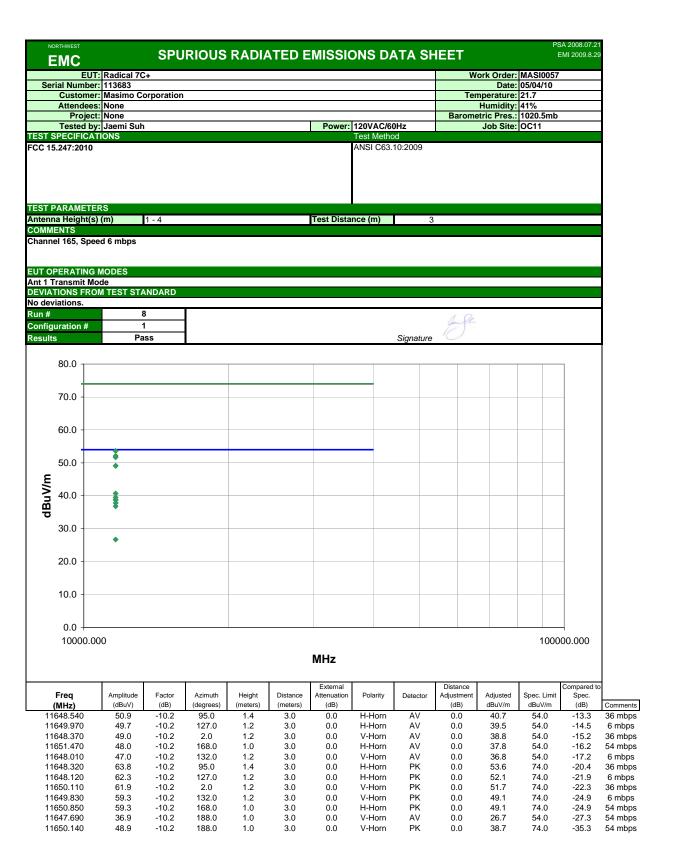
						External			Distance			Compared to	1
Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	Spec.	
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)	Comments
4823.980	46.8	4.2	178.0	1.1	3.0	0.0	H-Horn	AV	0.0	51.0	54.0	-3.0	1 Mbps
4823.970	42.0	4.2	271.0	1.1	3.0	0.0	V-Horn	AV	0.0	46.2	54.0	-7.8	1 Mbps
4822.320	34.6	4.2	186.0	1.0	3.0	0.0	H-Horn	AV	0.0	38.8	54.0	-15.2	36 Mbps
4823.500	34.2	4.2	310.0	1.1	3.0	0.0	V-Horn	AV	0.0	38.4	54.0	-15.6	11 Mbps
4822.170	34.0	4.2	325.0	1.0	3.0	0.0	V-Horn	AV	0.0	38.2	54.0	-15.8	36 Mbps
4822.440	33.9	4.2	76.0	1.0	3.0	0.0	V-Horn	AV	0.0	38.1	54.0	-15.9	54 Mbps
4823.600	33.3	4.2	178.0	1.1	3.0	0.0	H-Horn	AV	0.0	37.5	54.0	-16.5	11 Mbps
4821.960	32.7	4.2	70.0	1.1	3.0	0.0	V-Horn	AV	0.0	36.9	54.0	-17.1	6 Mbps
4824.060	32.5	4.2	202.0	1.0	3.0	0.0	H-Horn	AV	0.0	36.7	54.0	-17.3	6 Mbps
4825.610	30.1	4.2	152.0	1.3	3.0	0.0	H-Horn	AV	0.0	34.3	54.0	-19.7	54 Mbps
4823.900	49.5	4.2	178.0	1.1	3.0	0.0	H-Horn	PK	0.0	53.7	74.0	-20.3	1 Mbps
4824.320	47.3	4.2	310.0	1.1	3.0	0.0	V-Horn	PK	0.0	51.5	74.0	-22.5	11 Mbps
4824.040	46.8	4.2	325.0	1.0	3.0	0.0	V-Horn	PK	0.0	51.0	74.0	-23.0	36 Mbps
4821.510	46.6	4.2	186.0	1.0	3.0	0.0	H-Horn	PK	0.0	50.8	74.0	-23.2	36 Mbps
4825.060	46.6	4.2	178.0	1.1	3.0	0.0	H-Horn	PK	0.0	50.8	74.0	-23.2	11 Mbps
4825.500	46.2	4.2	76.0	1.0	3.0	0.0	V-Horn	PK	0.0	50.4	74.0	-23.6	54 Mbps
4823.970	46.1	4.2	271.0	1.1	3.0	0.0	V-Horn	PK	0.0	50.3	74.0	-23.7	1 Mbps
4822.900	45.2	4.2	70.0	1.1	3.0	0.0	V-Horn	PK	0.0	49.4	74.0	-24.6	6 Mbps
4821.730	44.9	4.2	202.0	1.0	3.0	0.0	H-Horn	PK	0.0	49.1	74.0	-24.9	6 Mbps
4825 510	42 0	42	152 0	1.3	3.0	0.0	H-Horn	PK	0.0	46.2	74 0	-27 8	54 Mhns

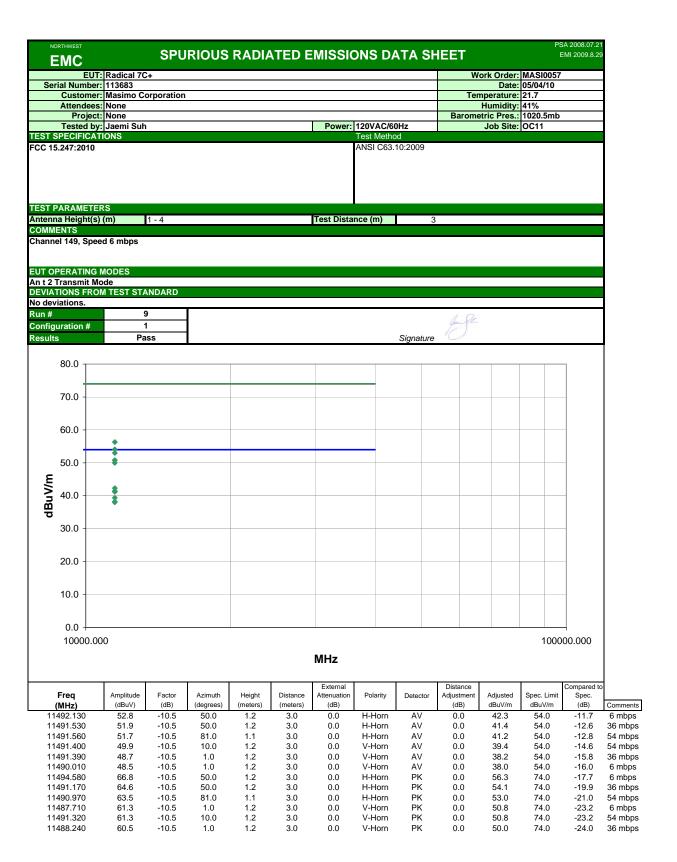


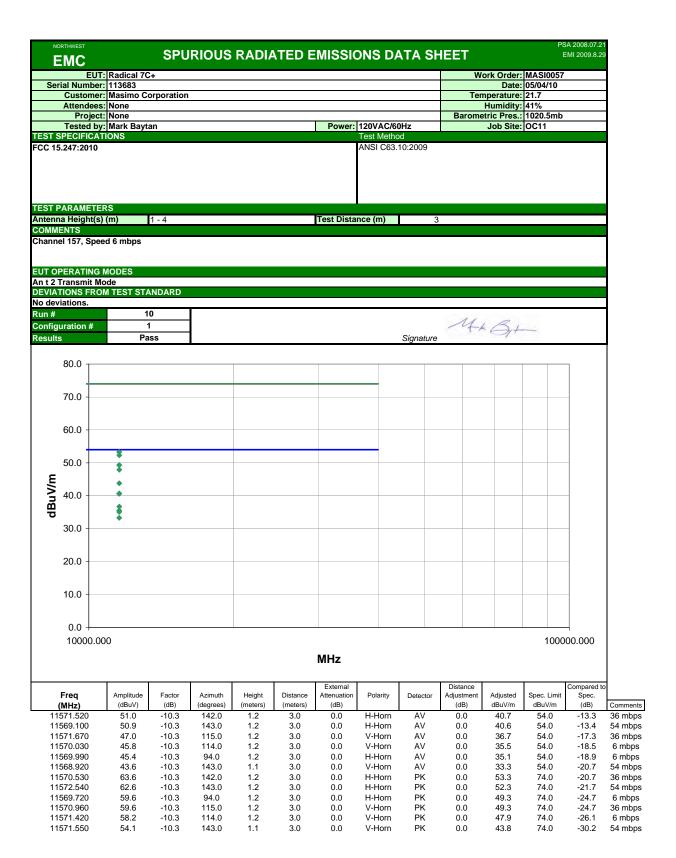
### North Order: MASI8057 Date: 0505010 ### Customer: Masismo Corporation Temperature; 21.7 ### Arrelitates None	NORTHWEST			SPL	JRIOUS	RAD	IA.	TEC	ÞΕ	MISSI	ONS D	ATA SE	IEET _			SA 2008.0 EMI 2009.
Date:	EMC					1010	·			mileoi (4174 01				
Temperature 21.7 Attendess None				+									W			
Attendes: None				ornoration	`								Tei			
Project: None				orporation									101			
Power: 20VROHz Job Site: OC11													Barom			
FPARAMETERS			ni Suh							Power:				Job Site:	OC11	
PARAMETERS 1 - 4												od				
Test Distance (m) 3 3 3 3 3 3 3 3 4 4	C 15.247(a) Spi	urious	Kadia	tea Emiss	sions						2005-9					
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April Apri	enna Height(s)) (m)		1 - 4						Test Dista	nce (m)	3				
### Programmer Mode Miles Miles	MMENTS															
15	T OPERATING	MODE	S													
Signature 1 1 1 1 1 1 1 1 1	deviations.															
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80.0 70.0 60.0 50.0 50.0 60.0 10.0 10.0 10.0 10.0 10.0 10.0 1													1			
70.0 60.0 50.0 40.0 20.0 10.0 4800.000 5800.000 6800.000 7800.000 8800.000 9800.000 10800.000 11800.000 11800.000 MHz Freq (M)	ults		Pa	SS								Signature				
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Freq Amplitude Factor (dB) (degrees) (meters) (dB)	_															
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Section Polarity Detector Adjustment Adjusted Spec. Limit Compa MHz																
Section Polarity Detector Adjustment Adjusted Spec. Limit Compa MHz																
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20.0 10.0 4800.000 5800.000 6800.000 7800.000 8800.000 9800.000 10800.000 11800.000 MHz Freq (MHz) (dBuV) (dB) (degrees) (meters) (meters) (meters) (dB) (dB) (dB) (dB) (dB) (dB) (dB) (dB	30.0															
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Amplitude Factor Azimuth Height Distance (MHz) (dB) (dB)																
Freq Amplitude Factor Azimuth Height Distance (meters) (meters) (meters) (dB)	0.0			+++				+						+++	+++	ш
Freq Amplitude Factor Azimuth Height Distance (meters) (meters) (meters) (dB)	4800.00	00	580	00.00	6800.00	00	780	00.00	00	8800	.000	9800.000	1080	00.000	11800.0	00
Freq (MHz)																
Freq (MHz) Amplitude (dBuV) Factor (dB) Azimuth (degrees) Height (meters) Distance (meters) Attenuation (dB) Polarity Detector (dB) Adjustment (dB) Adjusted dBuV/m Spec. Limit dBuV/m No. 1 29.3 9.7 251.0 1.2 3.0 0.0 V-Horn AV 0.0 38.7 54.0										IVITIZ						
Freq (MHz) Amplitude (dBuV) Factor (dB) Azimuth (degrees) Height (meters) Distance (meters) Attenuation (dB) Polarity (dB) Detector (dB) Adjustment (dB) Adjustment dBuV/m Spec. Limit dBuV/m No. 1 2 9.3 9.7 251.0 1.2 3.0 0.0 V-Horn AV 0.0		1	- 1		1		-1			External	1	1	Distance			Compa
4823.984 44.3 4.2 256.0 1.2 3.0 0.0 H-Horn AV 0.0 48.5 54.0 -5. 4823.971 42.5 4.2 205.0 1.2 3.0 0.0 V-Horn AV 0.0 46.7 54.0 -7. 7238.757 29.3 9.7 251.0 1.2 3.0 0.0 V-Horn AV 0.0 39.0 54.0 -15 7231.975 29.0 9.7 277.0 1.2 3.0 0.0 V-Horn AV 0.0 38.7 54.0 -15	Freq	Amp	litude	Factor	Azimuth	Height		Distan	ice		Polarity	Detector			Spec. Limit	Spe
4823.971 42.5 4.2 205.0 1.2 3.0 0.0 V-Horn AV 0.0 46.7 54.0 -7. 7238.757 29.3 9.7 251.0 1.2 3.0 0.0 V-Horn AV 0.0 39.0 54.0 -15 7231.975 29.0 9.7 277.0 1.2 3.0 0.0 V-Horn AV 0.0 38.7 54.0 -15)		-							
7238.757 29.3 9.7 251.0 1.2 3.0 0.0 V-Horn AV 0.0 39.0 54.0 -15 7231.975 29.0 9.7 277.0 1.2 3.0 0.0 V-Horn AV 0.0 38.7 54.0 -15	4823.984															
7231.975 29.0 9.7 277.0 1.2 3.0 0.0 V-Horn AV 0.0 38.7 54.0 -15	4823.971															
4823.730 48.2 4.2 256.0 1.2 3.0 0.0 H-Horn PK 0.0 52.4 74.0 -21	7231.975 4823.730			9.7 4.2		1.2 1.2						AV PK				-15 -21

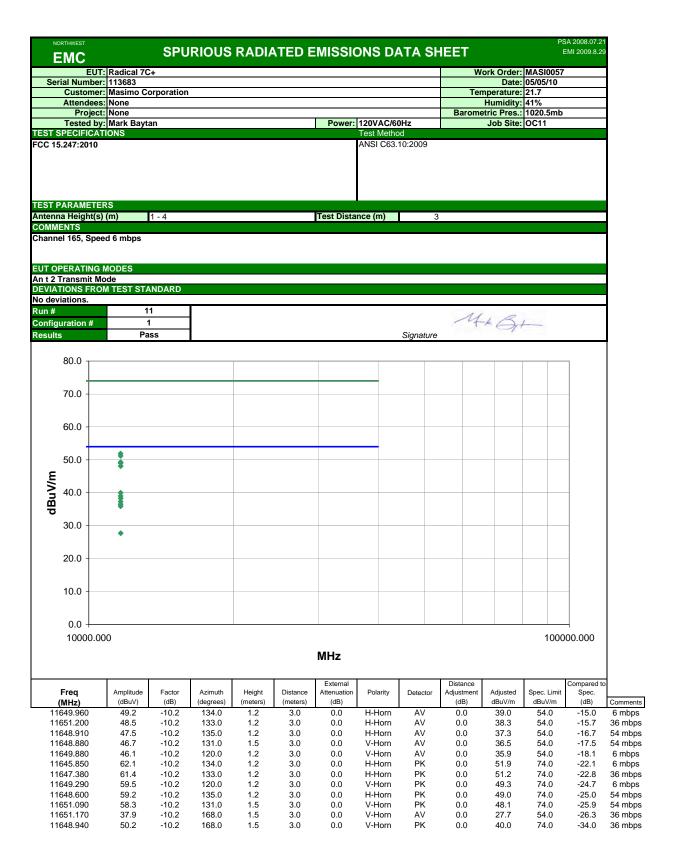
						External			Distance			Compared to
Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	Spec.
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	dBuV/m	dBuV/m	(dB)
4823.984	44.3	4.2	256.0	1.2	3.0	0.0	H-Horn	AV	0.0	48.5	54.0	-5.5
4823.971	42.5	4.2	205.0	1.2	3.0	0.0	V-Horn	AV	0.0	46.7	54.0	-7.3
7238.757	29.3	9.7	251.0	1.2	3.0	0.0	V-Horn	AV	0.0	39.0	54.0	-15.0
7231.975	29.0	9.7	277.0	1.2	3.0	0.0	V-Horn	AV	0.0	38.7	54.0	-15.3
4823.730	48.2	4.2	256.0	1.2	3.0	0.0	H-Horn	PK	0.0	52.4	74.0	-21.6
7240.170	41.5	9.7	251.0	1.2	3.0	0.0	V-Horn	PK	0.0	51.2	74.0	-22.8
4823.910	46.7	4.2	205.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.9	74.0	-23.1
7231.580	41.1	9.7	277.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.8	74.0	-23.2
12056.900	35.2	-8.9	359.0	1.0	3.0	0.0	H-Horn	AV	0.0	26.3	54.0	-27.7
12059.940	35.1	-8.8	42.0	1.0	3.0	0.0	V-Horn	AV	0.0	26.3	54.0	-27.7
12062.650	47.0	-8.9	42.0	1.0	3.0	0.0	V-Horn	PK	0.0	38.1	74.0	-35.9
12057.040	46.7	-8.9	359.0	1.0	3.0	0.0	H-Horn	PK	0.0	37.8	74.0	-36.2











NORTHWEST EMC	SPURIOUS RADIATED EMISSIONS DATA SHEET										
EUT:	Radical 7C+		Work Order:	MASI0057							
Serial Number:	113683		Date:	05/05/10							
Customer:	Masimo Corporation		Temperature:	21.7							
Attendees:	None		Humidity:	41%							
Project:	None		Barometric Pres.:	1020.5mb							
Tested by:	Jaemi Suh	Power: 120V/60Hz	Job Site:	OC11							
TEST SPECIFICAT	ONS	Test Method									

FCC 15.247:2010

ANSI C63.10:2009

TEST PARAMETERS

Antenna Height(s) (m) 1 - 4 Test Distance (m)

COMMENTS

Channels 149, 157, 165. 6 Mbps.

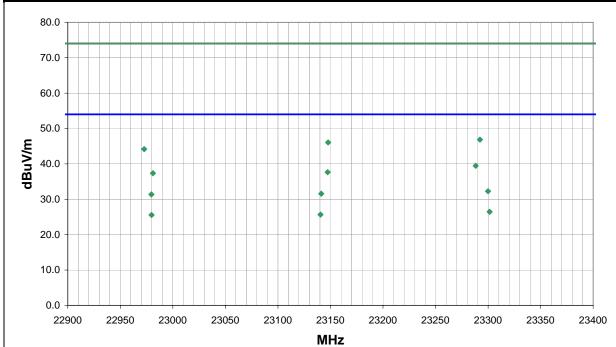
EUT OPERATING MODES

Transmit Mode
DEVIATIONS FROM TEST STANDARD

No deviations.

Run#	17
Configuration #	1
Results	Pass

Signature



_						External			Distance			Compared to
Freq	Amplitude	Factor	Azimuth	Height	Distance	Attenuation	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	(dB)			(dB)	unknown	unknown	(dB)
										units	units	
23299.92	42.2	-0.4	104.0	1.0	1.0	0.0	H-High Horr	AV	-9.5	32.3	54.0	-21.7
23141.17	41.5	-0.4	103.0	1.0	1.0	0.0	H-High Horr	AV	-9.5	31.6	54.0	-22.4
22979.6	41.2	-0.3	106.0	1.0	1.0	0.0	V-High Horr	AV	-9.5	31.4	54.0	-22.6
23292.25	56.8	-0.4	104.0	1.0	1.0	0.0	H-High Horr	PK	-9.5	46.9	74.0	-27.1
23301.5	36.4	-0.4	59.0	1.0	1.0	0.0	√-High Horr	AV	-9.5	26.5	54.0	-27.5
23147.75	56.0	-0.4	103.0	1.0	1.0	0.0	H-High Horr	PK	-9.5	46.1	74.0	-27.9
23140.5	35.6	-0.4	58.0	1.0	1.0	0.0	√-High Horr	AV	-9.5	25.7	54.0	-28.3
22979.68	35.4	-0.3	36.0	1.0	1.0	0.0	√-High Horr	AV	-9.5	25.6	54.0	-28.4
22972.68	54.0	-0.3	106.0	1.0	1.0	0.0	√-High Horr	PK	-9.5	44.2	74.0	-29.8
23288.25	49.5	-0.5	59.0	1.0	1.0	0.0	√-High Horr	PK	-9.5	39.5	74.0	-34.5
23147.33	47.6	-0.4	58.0	1.0	1.0	0.0	√-High Horr	PK	-9.5	37.7	74.0	-36.3
22981.02	47.2	-0.3	36.0	1.0	1.0	0.0	√-High Horr	PK	-9.5	37.4	74.0	-36.6



AC POWERLINE 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.

CHANNELS INVESTIGATED

Channel 1, 2412 MHz Channel 6, 2437 MHz

Channel 11, 2462 MHz

Channel 149, 5745 MHz

Channel 157, 5785 MHz

Channel 165, 5825 MHz

DATA RATES INVESTIGATED

1, 6, Mbps

POWER SETTINGS INVESTIGATED

120V/60Hz

CONFIGURATIONS INVESTIGATED

MASI0057 - 1

SAMPLE CALCULATIONS

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

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-24-BNC	LIA	4/29/2009	13 mo
Attenuator	Pasternack	6N10W-20	AWC	1/27/2010	13 mo
High Pass Filter	TTE	H97-100K-50-720B	HFP	3/8/2010	13 mo
OC06 Cables	N/A	CE Cables	OCM	3/8/2010	13 mo
Receiver	Rohde & Schwarz	ESCI	ARF	3/30/2010	13 mo

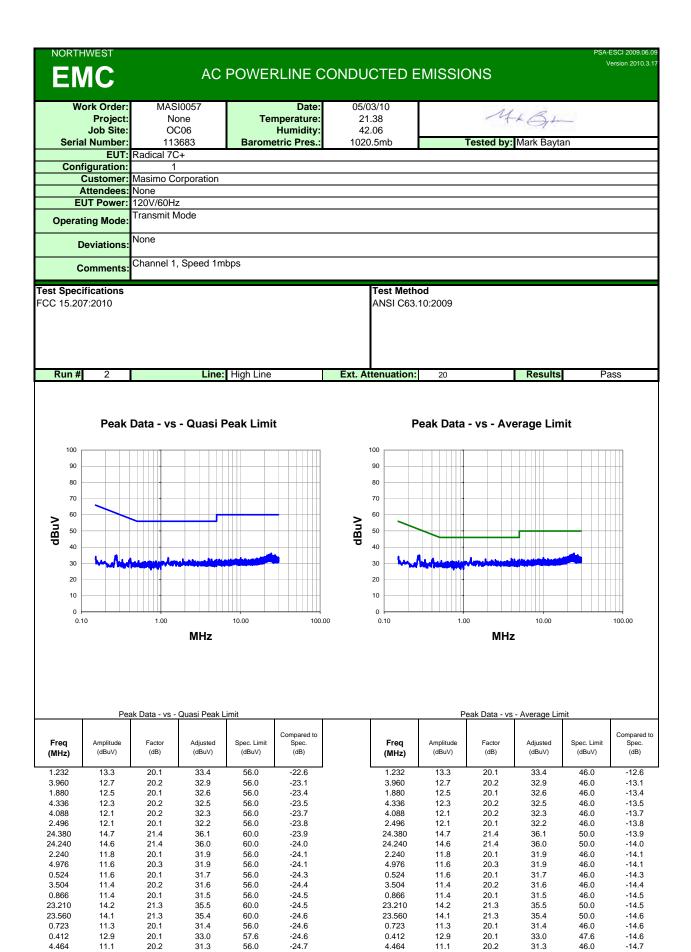
Frequency Rar	ige Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are 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 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm.



22.940

22.450

14.0

13.9

21.3

21.3

35.3

35.2

60.0

60.0

-24.7

-24.8

22.940

22.450

14.0

13.9

21.3

21.3

35.3

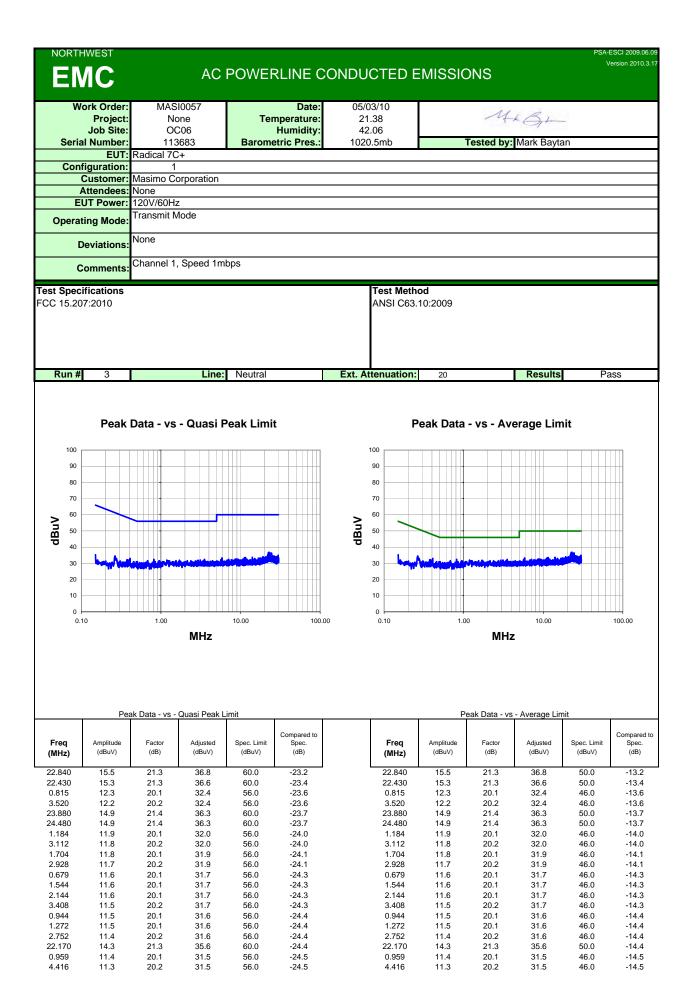
35.2

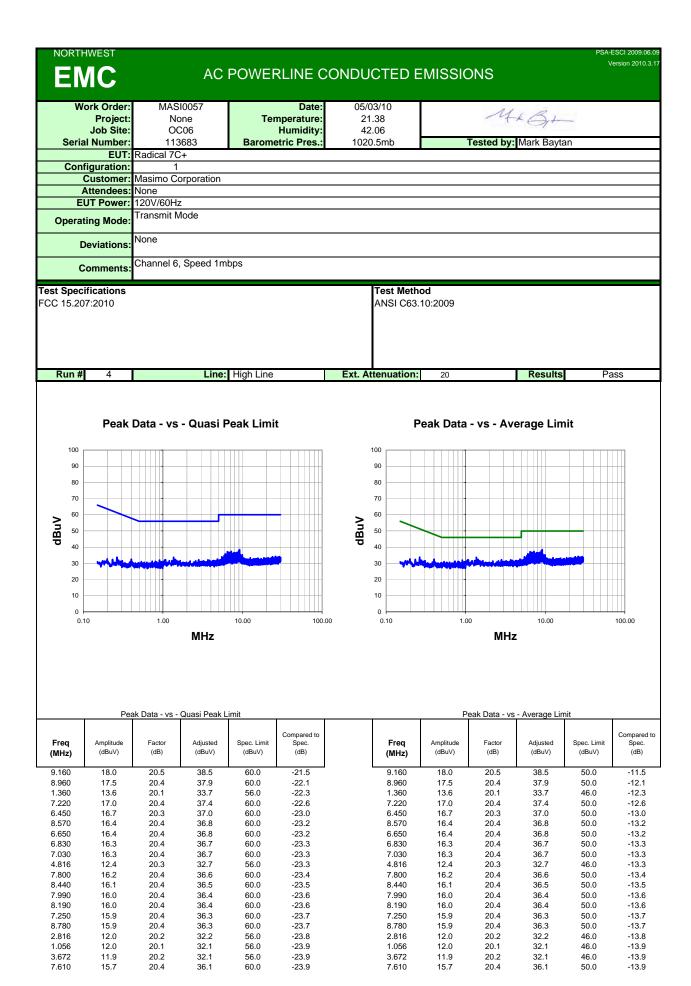
50.0

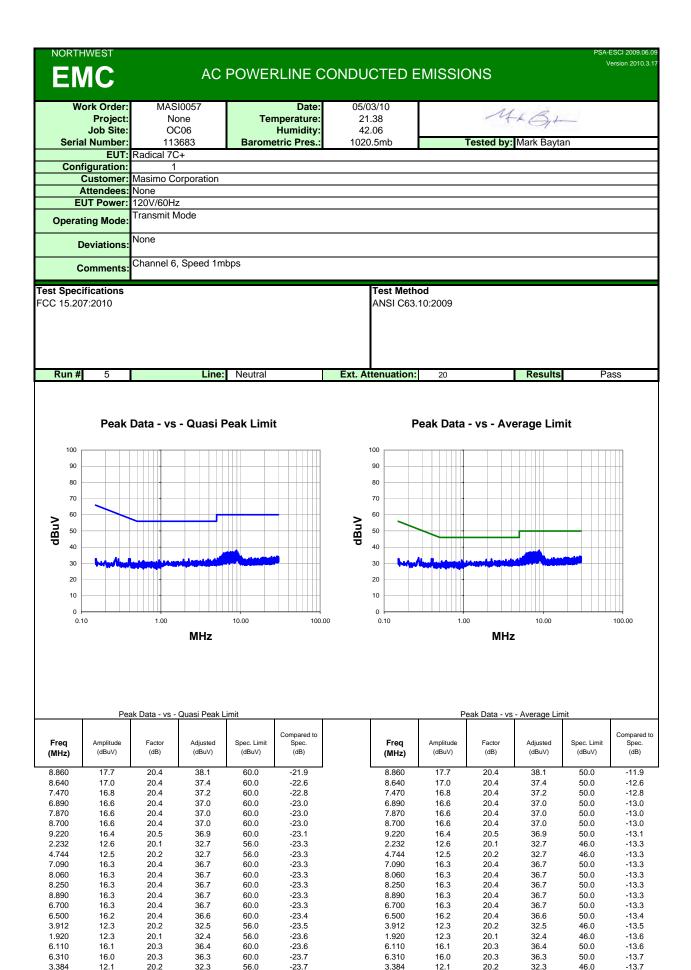
50.0

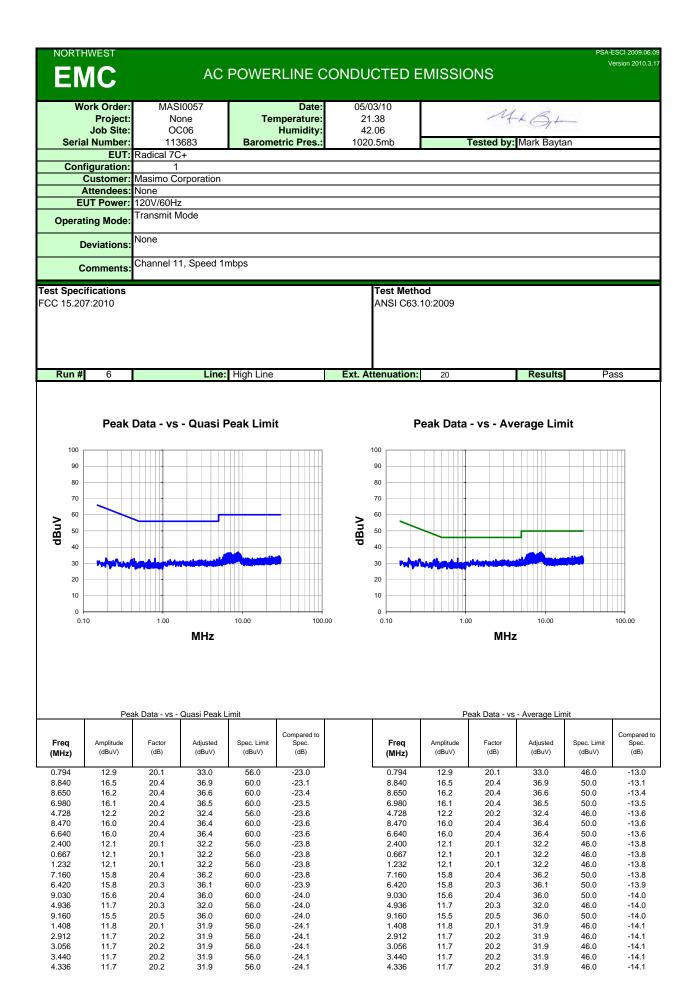
-14.7

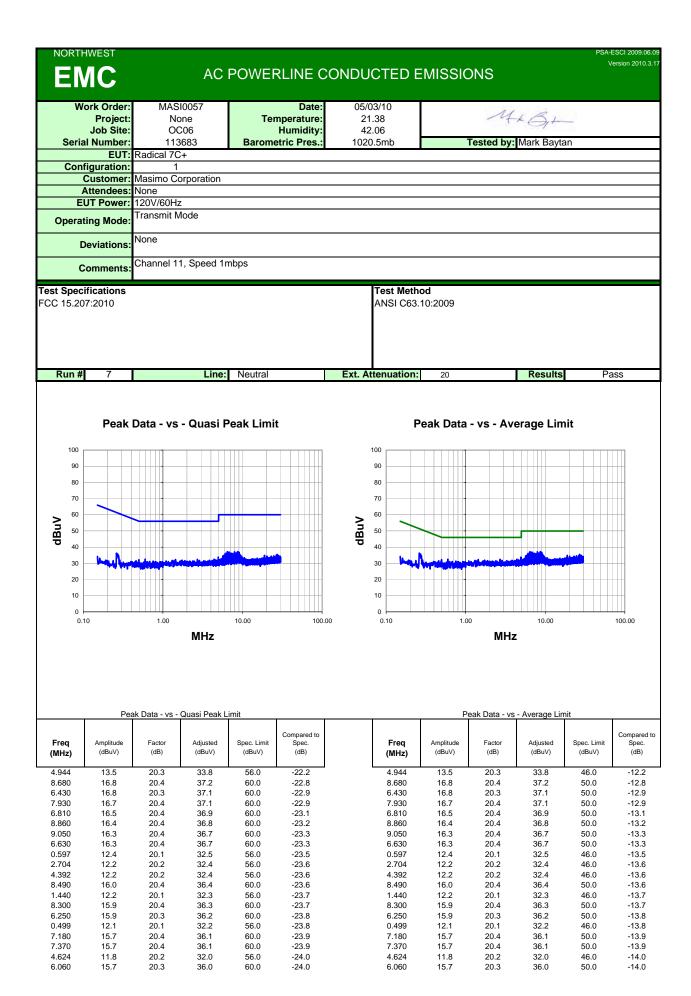
-14.8

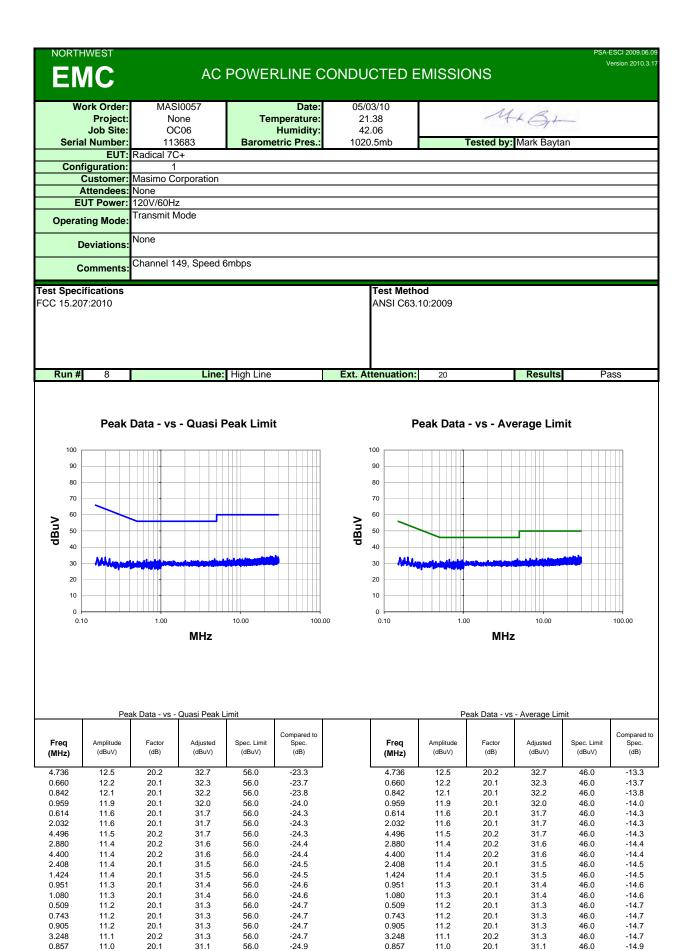












0.796

0.534

10.8

10.7

20.1

20.1

30.9

30.8

56.0

56.0

-25.1

-25.2

0.796

0.534

10.8

10.7

20.1

20.1

30.9

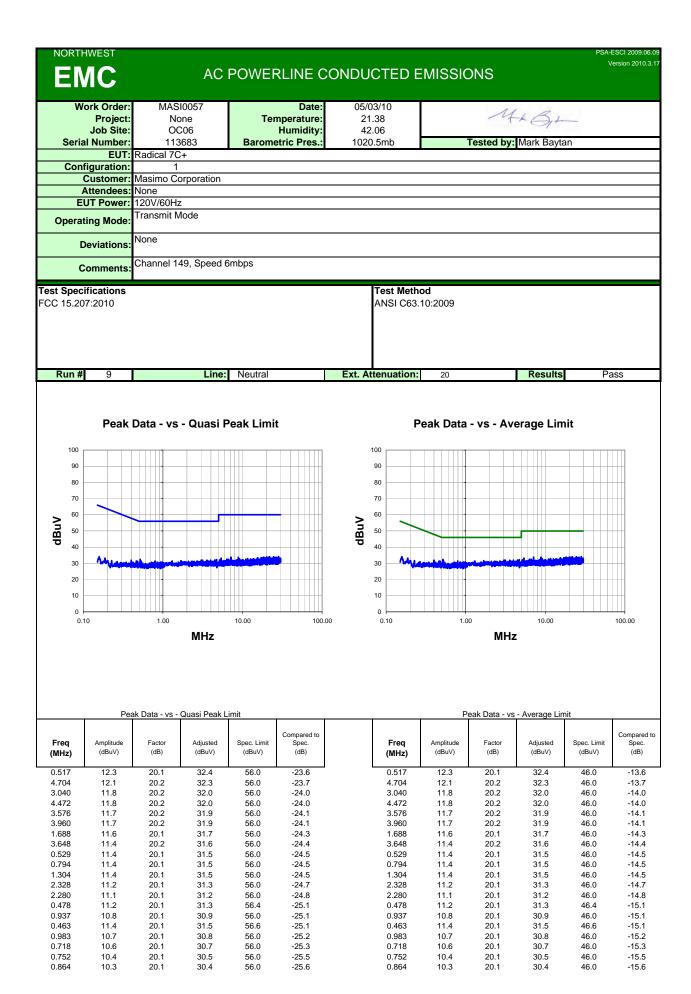
30.8

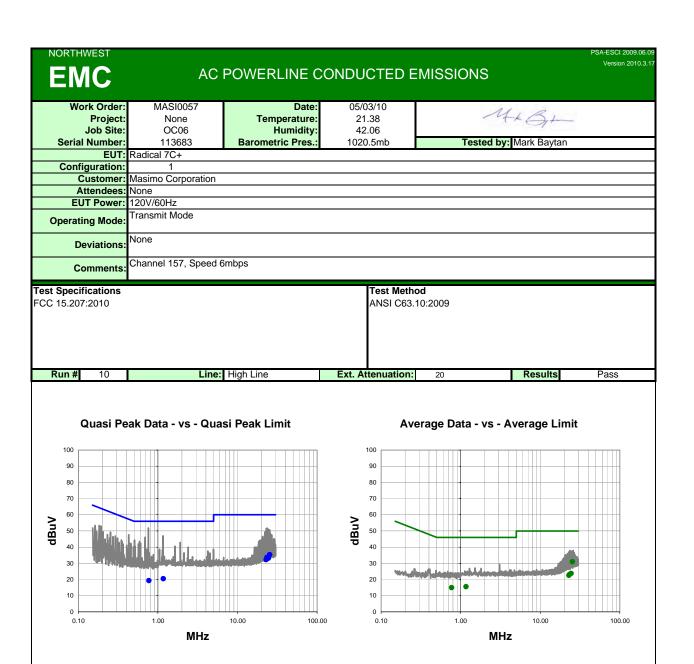
46.0

46.0

-15.1

-15.2

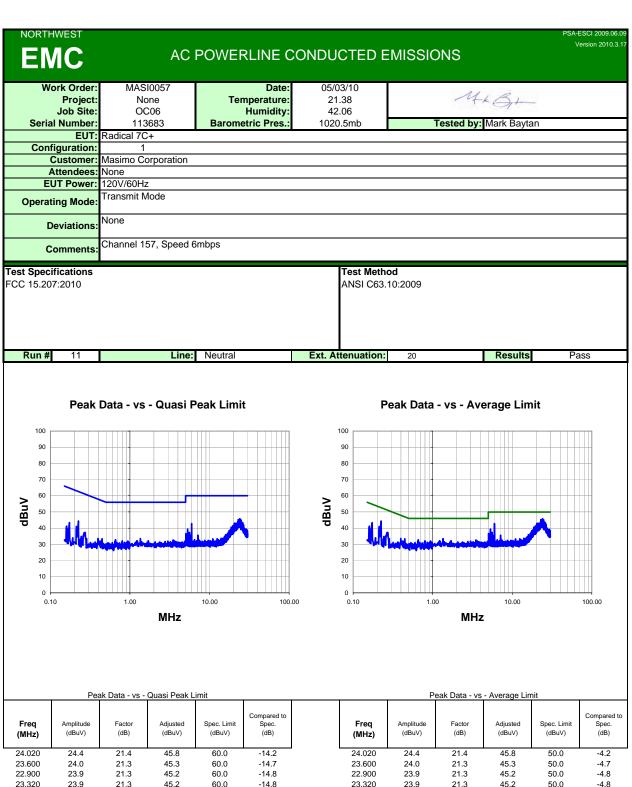




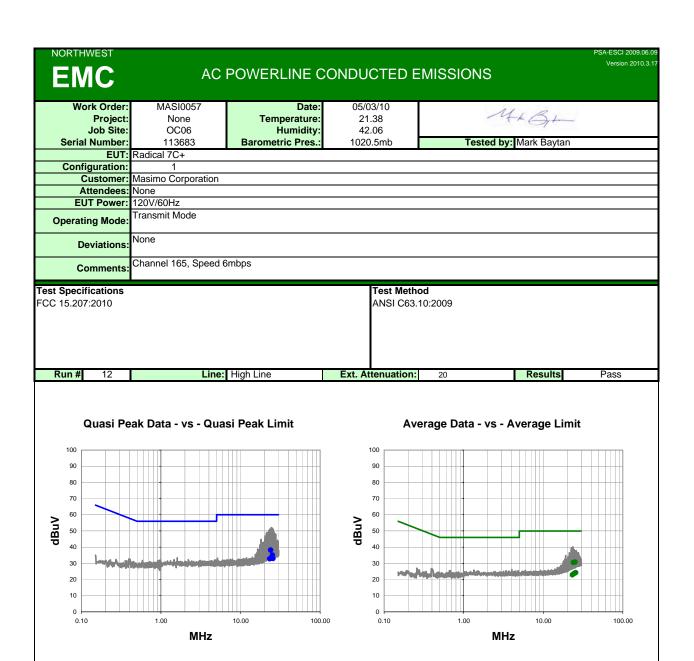
Quasi Peak Data - vs - Quasi Peak Limit

Average	Data - vs -	Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)	Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
25.422	2 14.0	21.3	35.3	60.0	-24.7	25.422	9.6	21.3	30.9	50.0	-19.1
23.454	1 12.3	21.3	33.6	60.0	-26.4	24.532	2.4	21.4	23.8	50.0	-26.2
24.532	2 11.8	21.4	33.2	60.0	-26.8	23.454	1.8	21.3	23.1	50.0	-26.9
22.928	3 10.9	21.3	32.2	60.0	-27.8	22.928	1.3	21.3	22.6	50.0	-27.4
1.168	0.4	20.1	20.5	56.0	-35.5	1.168	-4.6	20.1	15.5	46.0	-30.5
0.769	-0.8	20.1	19.3	56.0	-36.7	0.769	-5.2	20.1	14.9	46.0	-31.1



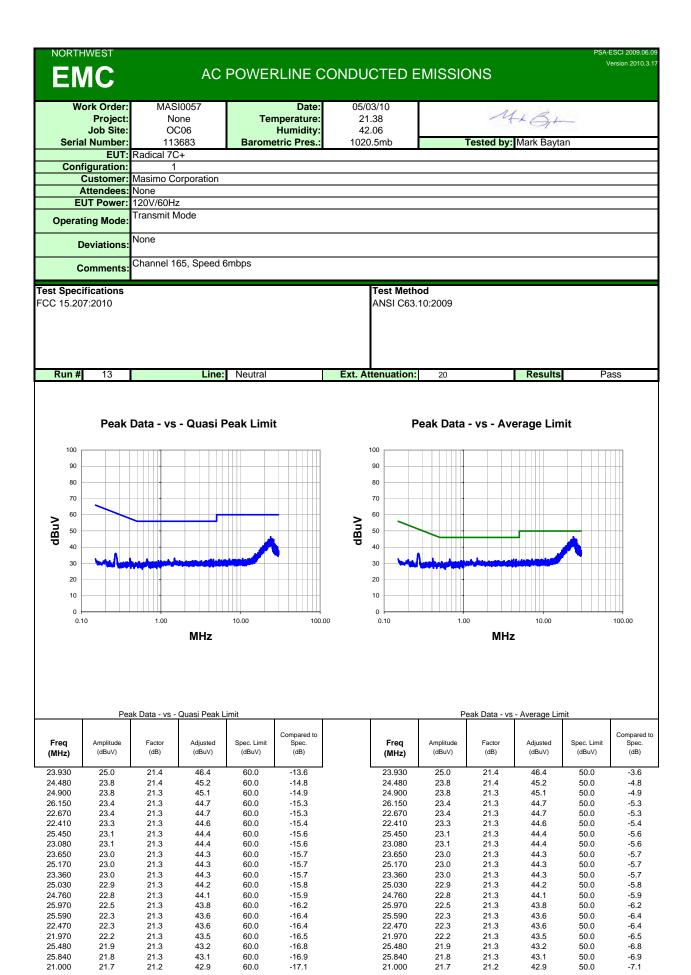
Fred (MHz		Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)		Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
24.02	0 24.4	21.4	45.8	60.0	-14.2	_	24.020	24.4	21.4	45.8	50.0	-4.2
23.60	0 24.0	21.3	45.3	60.0	-14.7		23.600	24.0	21.3	45.3	50.0	-4.7
22.90	0 23.9	21.3	45.2	60.0	-14.8		22.900	23.9	21.3	45.2	50.0	-4.8
23.32	0 23.9	21.3	45.2	60.0	-14.8		23.320	23.9	21.3	45.2	50.0	-4.8
24.84	0 23.7	21.3	45.0	60.0	-15.0		24.840	23.7	21.3	45.0	50.0	-5.0
23.72	.0 23.5	21.3	44.8	60.0	-15.2		23.720	23.5	21.3	44.8	50.0	-5.2
24.79	0 23.2	21.3	44.5	60.0	-15.5		24.790	23.2	21.3	44.5	50.0	-5.5
24.57	0 23.1	21.4	44.5	60.0	-15.5		24.570	23.1	21.4	44.5	50.0	-5.5
24.98	0 23.1	21.3	44.4	60.0	-15.6		24.980	23.1	21.3	44.4	50.0	-5.6
22.75	0 22.7	21.3	44.0	60.0	-16.0		22.750	22.7	21.3	44.0	50.0	-6.0
23.93	0 22.5	21.4	43.9	60.0	-16.1		23.930	22.5	21.4	43.9	50.0	-6.1
24.28	0 22.5	21.4	43.9	60.0	-16.1		24.280	22.5	21.4	43.9	50.0	-6.1
26.03	0 22.1	21.3	43.4	60.0	-16.6		26.030	22.1	21.3	43.4	50.0	-6.6
25.41	0 21.8	21.3	43.1	60.0	-16.9		25.410	21.8	21.3	43.1	50.0	-6.9
21.06	0 21.7	21.2	42.9	60.0	-17.1		21.060	21.7	21.2	42.9	50.0	-7.1
22.17	0 21.6	21.3	42.9	60.0	-17.1		22.170	21.6	21.3	42.9	50.0	-7.1
5.97	22.5	20.3	42.8	60.0	-17.2		5.970	22.5	20.3	42.8	50.0	-7.2
20.40	0 21.6	21.2	42.8	60.0	-17.2		20.400	21.6	21.2	42.8	50.0	-7.2
20.74	0 21.6	21.2	42.8	60.0	-17.2		20.740	21.6	21.2	42.8	50.0	-7.2
21.59	0 21.5	21.3	42.8	60.0	-17.2		21.590	21.5	21.3	42.8	50.0	-7.2



Quasi Peak Data - vs - Quasi Peak Limit

Average	Data - vs -	Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)	Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
23.928	16.8	21.4	38.2	60.0	-21.8	25.222	9.4	21.3	30.7	50.0	-19.3
25.222	13.8	21.3	35.1	60.0	-24.9	23.928	9.1	21.4	30.5	50.0	-19.5
24.382	12.0	21.4	33.4	60.0	-26.6	25.694	2.9	21.3	24.2	50.0	-25.8
24.950	11.7	21.3	33.0	60.0	-27.0	24.950	2.5	21.3	23.8	50.0	-26.2
25.694	11.6	21.3	32.9	60.0	-27.1	24.382	2.3	21.4	23.7	50.0	-26.3
23.296	11.4	21.3	32.7	60.0	-27.3	23.296	1.5	21.3	22.8	50.0	-27.2



AC Powerline Conducted Emissions

