

Masimo

Rad-87

Report No. MASI0009.1 Rev 01

Report Prepared By



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

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EMC Test Report

Certificate of Test

Last Date of Testing: September 18, 2008

Masimo

Model: Rad-87

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Radiated Spurious Emissions	FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002	Pass
Peak Transmit Power	FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002	Pass
Peak Power Spectral Density	FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002	Pass
Frequency Stability	FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002	Pass
AC Powerline Conducted Emissions	FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002	Pass
Emissions Bandwidth	FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002	Pass
Peak Excursion of the Modulation Envelope	FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002	Pass

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.
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 Facticeau, IS Manager



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 Number	Description	Date	Page Number
01	Corrected cable information	9/24/08	12

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 200629-0
 NVLAP LAB CODE 200630-0
 NVLAP LAB CODE 200676-0
 NVLAP LAB CODE 200761-0

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*)



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



TÜV Product Service: Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories, available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0604C.



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, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294.*)



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



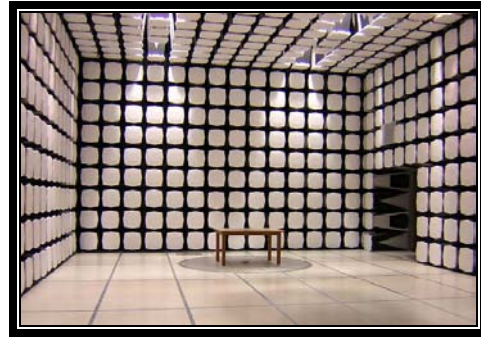
MIC: Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157*)



SCOPE

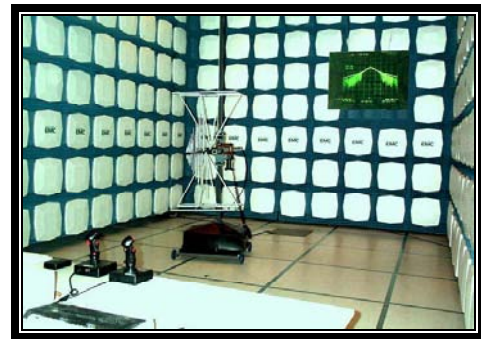
For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



**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

Party Requesting the Test

Company Name:	Masimo
Address:	40 Parker
City, State, Zip:	Irvine, CA 92618
Test Requested By:	Paul Lewandowski
Model:	Rad-87
First Date of Test:	September 3, 2008
Last Date of Test:	September 18, 2009
Receipt Date of Samples:	September 2, 2008
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 Pulse Oximeter that will be connected to hospital wireless network.

Testing Objective:

Seeking to demonstrate compliance under FCC 15E for operation in the 5.2 band.

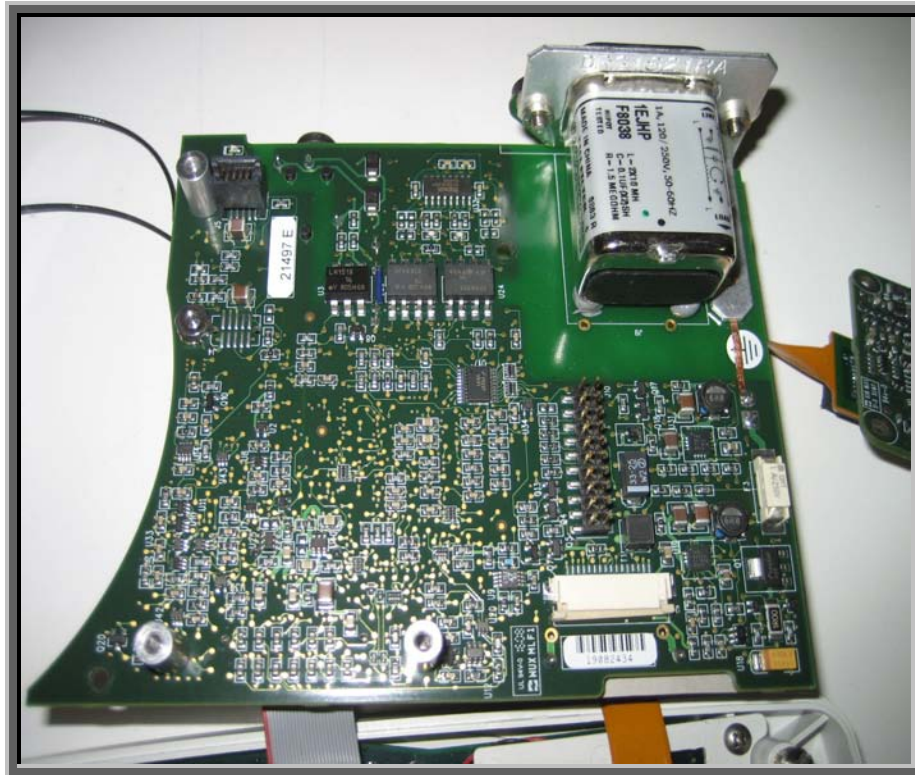
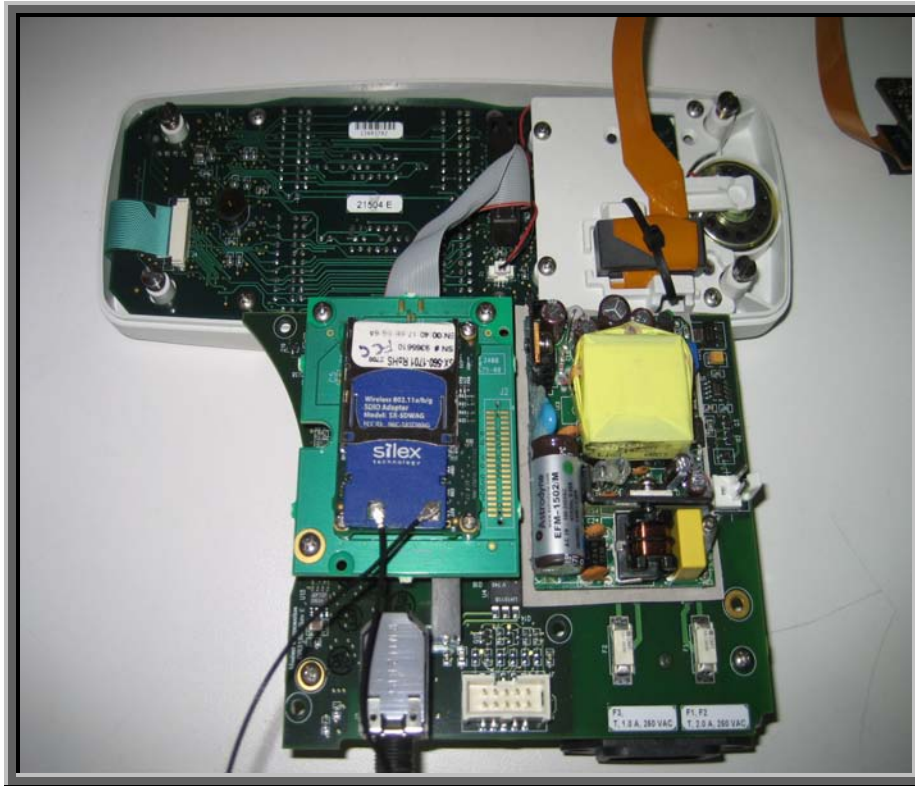
EUT Photo











CONFIGURATION 1 MASI0009**Software/Firmware Running during test**

Description	Version
RadioCfg SX-560	1.0.0.1

EUT

Description	Manufacturer	Model/Part Number	Serial Number
Pulse CO-Oximeter	Masimo Corporation	RAD-87	J00073

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Cable	Yes	4.0m	No	Pulse CO-Oximeter	AC Mains
MX-1 Compatible cable	No	2.0m	No	Pulse CO-Oximeter	Unterminated
Serial Cable	Yes	1.8m	No	Pulse CO-Oximeter	Laptop
Ground Cable	Yes	2.0m	No	Pulse CO-Oximeter	Ground
Nurse Call Cable	Yes	4.6m	No	Pulse CO-Oximeter	Unterminated

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

CONFIGURATION 2 MASI0009**Software/Firmware Running during test**

Description	Version
RadioCfg SX-560	1.0.0.1

EUT

Description	Manufacturer	Model/Part Number	Serial Number
Pulse CO-Oximeter	Masimo Corporation	RAD-87	J00073

Peripherals in test setup boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop	IBM	ThinkPAD 2647	78-NZZ08

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Cable	Yes	4.0m	No	Pulse CO-Oximeter	AC Mains
Serial Cable	Yes	1.8m	No	Pulse CO-Oximeter	Laptop

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

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	9/3/2008	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	9/3/2008	Spurious Radiated 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.
3	9/8/2008	Emissions Bandwidth	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.
4	9/9/2008	Frequency Stability	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.
5	9/17/2008	Peak Transmit Power	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.
6	9/18/2008	Peak Excursion of the Modulation Envelope	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.
7	9/18/2008	Peak Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was complete.

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

Transmitting 802.11(a), 6, 36, 54 Mbps

CHANNELS TESTED

Channel 36

Channel 48

POWER SETTINGS INVESTIGATED

120VAC/60Hz

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	40 GHz
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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
Pre-Amplifier	Miteq	JS4-26004000-50-5A	AON	7/14/2008	13
Antenna, Horn	EMCO	3160-10	AHI	NCR	0
EV01 Cables		26-40GHz Standard Gain Horn Cable	EVE	7/14/2008	13
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	3/3/2008	13
Antenna, Horn	EMCO	3160-09	AHN	NCR	0
OC10 SMA cable for 18026 GHz			OCK	3/3/2008	13
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	2/8/2008	13
Antenna, Horn	EMCO	3160-08	AHK	NCR	0
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	2/8/2008	13
Antenna, Horn	ETS	3160-07	AHX	10/25/2007	12
OC11 8-18 GHz Cables a-b-c-e			OCS	2/7/2008	13
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	4/25/2008	13
Antenna, Horn	EMCO	3115	AHB	8/31/2007	24
OC11 1-8 GHz Cables a-b-c-d			OCR	2/7/2008	13
Spectrum Analyzer	Agilent	E4440A	AAX	10/1/2007	12

MEASUREMENT BANDWIDTHS

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

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

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 only antenna to be used with the EUT were tested. The EUT was configured for the lowest, a middle, and the highest transmit frequency in each operational band. For each configuration, the spectrum was scanned throughout the specified range. Measurements were made to satisfy the three requirements of 47 CFR 15.407: Field strength under 1GHz, Restricted Bands of 47 CFR 15.205, and EIRP of 47 CFR 15.407. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.4:2003). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

EUT: Rad-87	Work Order: MASI0009
Serial Number: J00073	Date: 09/03/08
Customer: Masimo Corporation	Temperature: 21.88
Attendees: Eugene Kim	Humidity: 53%
Project: None	Barometric Pres.: 1011.7
Tested by: Jaemi Suh	Power: 120VAC/60Hz
	Job Site: OC11

TEST SPECIFICATIONS	Test Method
FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS	
Antenna Height(s) (m) 1 - 4	Test Distance (m) 3

COMMENTS
Channel 36. 6 Mbps.

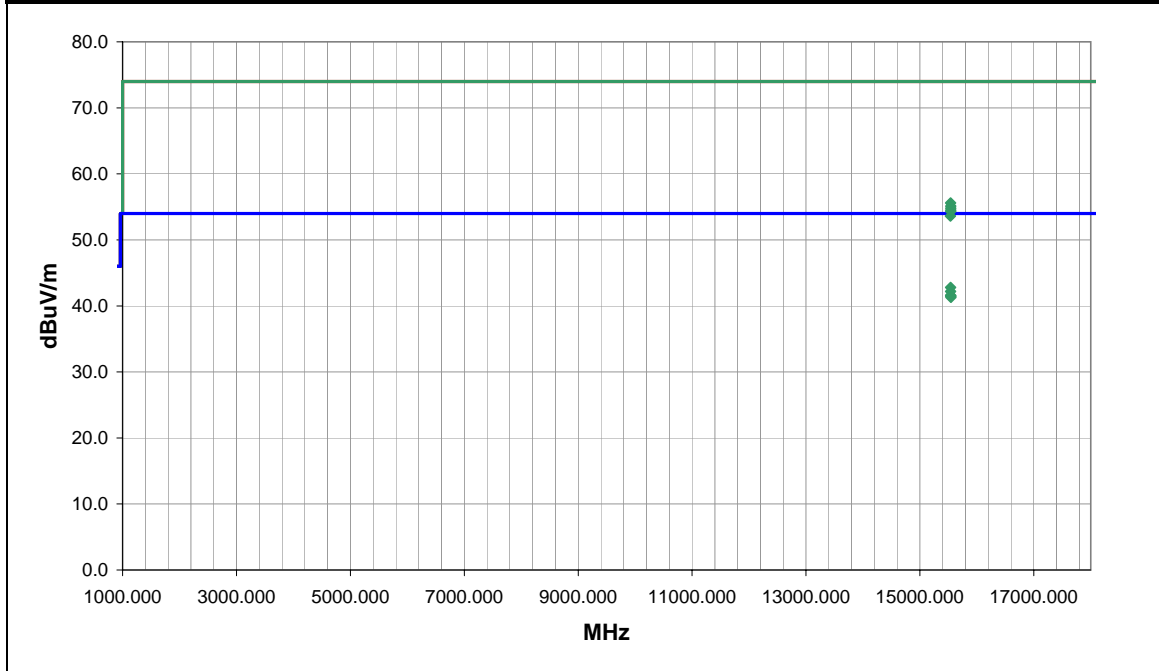
EUT OPERATING MODES

Transmit Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	32	Signature 
Configuration #	1	
Results	Pass	



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)	Comments
15539.670	24.6	18.2	188.0	1.4	0.0	0.0	H-Horn	AV	0.0	42.8	54.0	-11.2	36 Mbps
15540.030	24.0	18.2	208.0	1.3	0.0	0.0	H-Horn	AV	0.0	42.2	54.0	-11.8	54 Mbps
15538.730	23.4	18.2	259.0	1.4	0.0	0.0	H-Horn	AV	0.0	41.6	54.0	-12.4	6 Mbps
15541.930	23.3	18.2	171.0	1.4	0.0	0.0	V-Horn	AV	0.0	41.5	54.0	-12.5	6 Mbps
15543.110	23.3	18.2	246.0	1.3	0.0	0.0	V-Horn	AV	0.0	41.5	54.0	-12.5	36 Mbps
15545.650	23.1	18.2	179.0	1.3	0.0	0.0	V-Horn	AV	0.0	41.3	54.0	-12.7	54 Mbps
15538.260	37.4	18.2	188.0	1.4	0.0	0.0	H-Horn	PK	0.0	55.6	74.0	-18.4	36 Mbps
15540.400	36.9	18.2	171.0	1.4	0.0	0.0	V-Horn	PK	0.0	55.1	74.0	-18.9	6 Mbps
15542.160	36.6	18.2	208.0	1.3	0.0	0.0	H-Horn	PK	0.0	54.8	74.0	-19.2	54 Mbps
15540.450	36.3	18.2	259.0	1.4	0.0	0.0	H-Horn	PK	0.0	54.5	74.0	-19.5	6 Mbps
15541.600	36.1	18.2	246.0	1.3	0.0	0.0	V-Horn	PK	0.0	54.3	74.0	-19.7	36 Mbps
15537.100	35.4	18.2	179.0	1.3	0.0	0.0	V-Horn	PK	0.0	53.6	74.0	-20.4	54 Mbps

EUT:	Rad-87	Work Order:	MASI0009
Serial Number:	J00073	Date:	09/03/08
Customer:	Masimo Corporation	Temperature:	21.88
Attendees:	Eugene Kim	Humidity:	53%
Project:	None	Barometric Pres.:	1011.7
Tested by:	Jaemi Suh	Power:	120VAC/60Hz
		Job Site:	OC11

TEST SPECIFICATIONS	Test Method
FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002

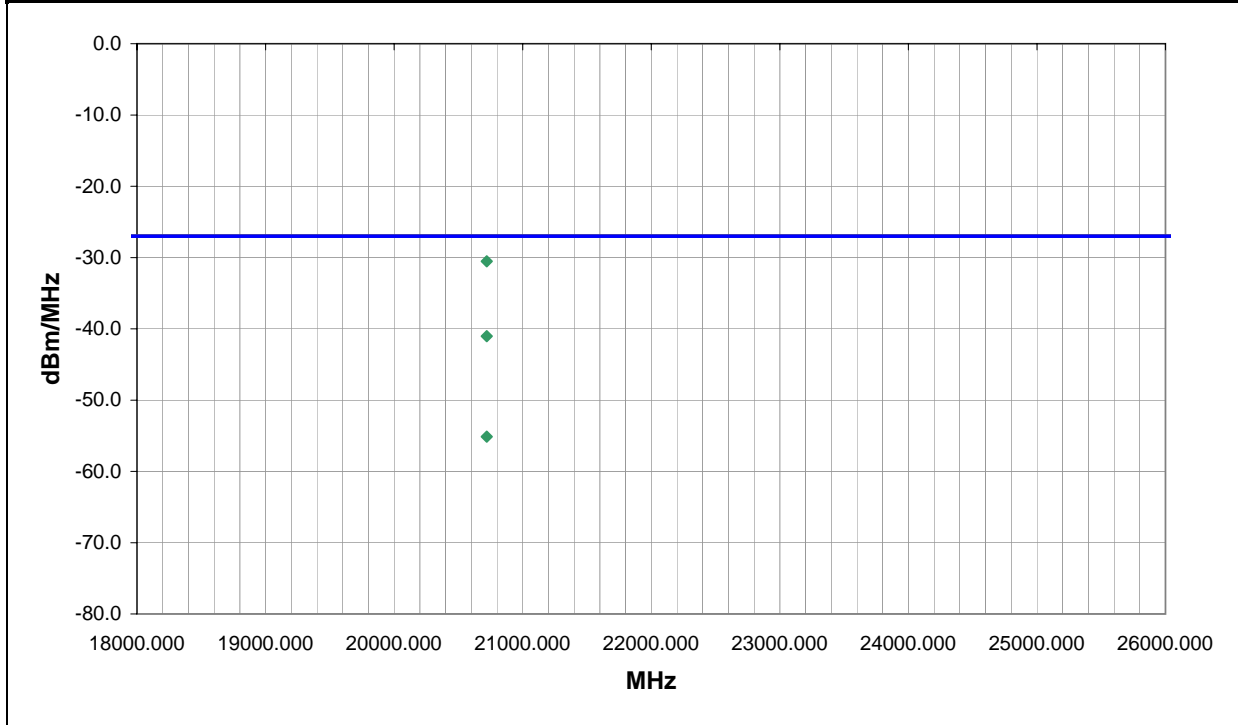
TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	1

COMMENTS
Channel 36. 6 Mbps

EUT OPERATING MODES
Transmit Mode.

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	30	<i>Signature</i>
Configuration #	1	
Results	Pass	



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts/MHz)	EIRP (dBm/MHz)	Spec. Limit (dBm/MHz)	Compared to Spec. (dB)
20720.000	259.0	1.0	H-High Horr	PK	8.85E-07	-30.5	-27.0	-3.5
20720.000	273.0	1.0	V-High Horr	PK	7.89E-08	-41.0	-27.0	-14.0
20720.000	273.0	1.0	V-High Horr	AV	3.07E-09	-55.1	-27.0	-28.1

EUT:	Rad-87	Work Order:	MASI0009
Serial Number:	J00073	Date:	09/03/08
Customer:	Masimo Corporation	Temperature:	21.88
Attendees:	Eugene Kim	Humidity:	53%
Project:	None	Barometric Pres.:	1011.7
Tested by:	Jaemi Suh	Power:	120VAC/60Hz
		Job Site:	OC11

TEST SPECIFICATIONS Test Method

FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002
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TEST PARAMETERS

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

Channel 48 6 Mbps.

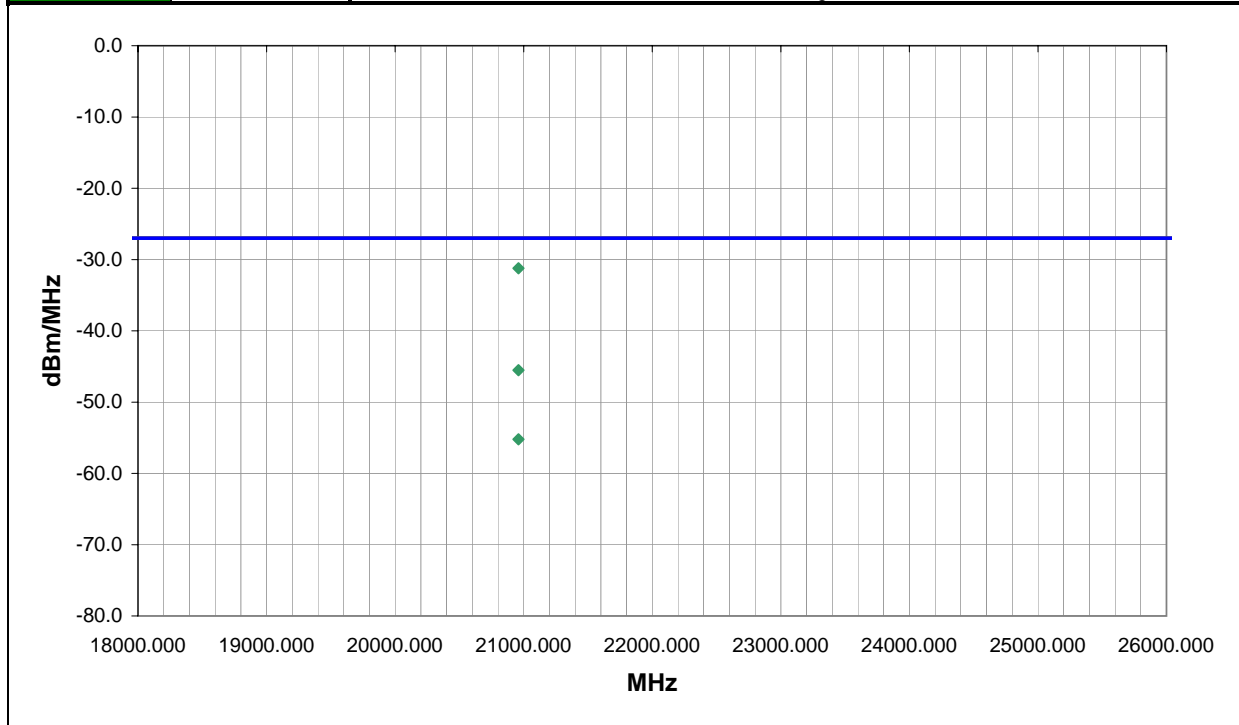
EUT OPERATING MODES

Transmit Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	31	<i>Signature</i>
Configuration #	1	
Results	Pass	



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts/MHz)	EIRP (dBm/MHz)	Spec. Limit (dBm/MHz)	Compared to Spec. (dB)
20960.000	262.0	1.0	H-High Horr	PK	7.54E-07	-31.2	-27.0	-4.2
20960.000	273.0	1.0	V-High Horr	PK	2.80E-08	-45.5	-27.0	-18.5
20960.000	273.0	1.0	V-High Horr	AV	3.00E-09	-55.2	-27.0	-28.2

EUT: Rad-87	Work Order: MASI0009
Serial Number: J00073	Date: 09/03/08
Customer: Masimo Corporation	Temperature: 21.88
Attendees: Eugene Kim	Humidity: 53%
Project: None	Barometric Pres.: 1011.7
Tested by: Jaemi Suh	Power: 120VAC/60Hz
	Job Site: OC11

TEST SPECIFICATIONS	Test Method
FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS
Antenna Height(s) (m) 1 - 4 Test Distance (m) 3

COMMENTS

Channel 48.

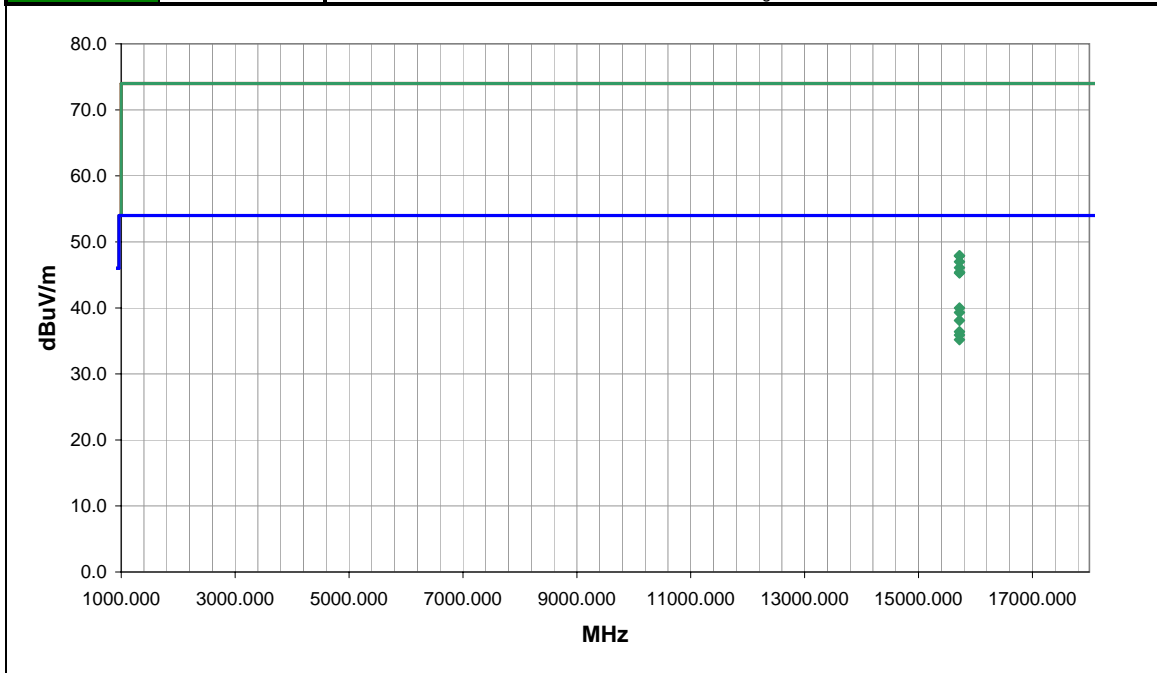
EUT OPERATING MODES

Transmit Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	33	 Signature
Configuration #	1	
Results	Pass	



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)	Comments
15719.800	21.6	18.4	194.0	1.0	0.0	0.0	H-Horn	AV	0.0	40.0	54.0	-14.0	6 Mbps
15719.800	20.9	18.4	226.0	1.0	0.0	0.0	H-Horn	AV	0.0	39.3	54.0	-14.7	54 Mbps
15719.790	19.7	18.4	230.0	1.0	0.0	0.0	H-Horn	AV	0.0	38.1	54.0	-15.9	36 Mbps
15719.790	18.0	18.4	278.0	1.0	0.0	0.0	V-Horn	AV	0.0	36.4	54.0	-17.6	6 Mbps
15719.790	17.5	18.4	276.0	1.0	0.0	0.0	V-Horn	AV	0.0	35.9	54.0	-18.1	36 Mbps
15719.790	16.8	18.4	252.0	1.0	0.0	0.0	V-Horn	AV	0.0	35.2	54.0	-18.8	54 Mbps
15719.770	29.5	18.4	194.0	1.0	0.0	0.0	H-Horn	PK	0.0	47.9	74.0	-26.1	6 Mbps
15719.850	29.5	18.4	230.0	1.0	0.0	0.0	H-Horn	PK	0.0	47.9	74.0	-26.1	36 Mbps
15719.750	28.6	18.4	226.0	1.0	0.0	0.0	H-Horn	PK	0.0	47.0	74.0	-27.0	54 Mbps
15719.960	27.7	18.4	252.0	1.0	0.0	0.0	V-Horn	PK	0.0	46.1	74.0	-27.9	54 Mbps
15720.360	27.0	18.4	278.0	1.0	0.0	0.0	V-Horn	PK	0.0	45.4	74.0	-28.6	6 Mbps
15719.750	26.9	18.4	276.0	1.0	0.0	0.0	V-Horn	PK	0.0	45.3	74.0	-28.7	36 Mbps





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

Transmitting, Channel 36, 6 Mbps
 Transmitting, Channel 48, 6 Mbps

POWER SETTINGS INVESTIGATED

120V/60Hz

CONFIGURATIONS INVESTIGATED

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-R-24-BNC	LIC	2/6/2008	13 mo
OC06 Cables B and C			OCM	1/10/2008	13 mo
Receiver	Rohde & Schwarz	ESCI	ARF	12/14/2007	13 mo

MEASUREMENT BANDWIDTHS

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

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

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 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.

EMC

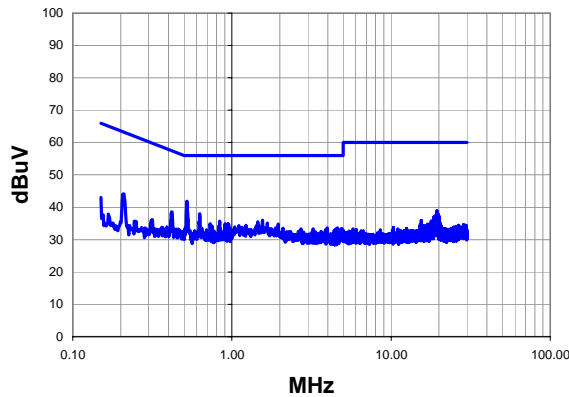
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	MASI0009	Date:	09/03/08	
Project:	None	Temperature:	21.88	
Job Site:	OC06	Humidity:	53.1	
Serial Number:	J00073	Barometric Pres.:	1011.7	
EUT:	Rad-87			
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Eugene Kim			
EUT Power:	120V/60Hz			
Operating Mode:	Transmitting.			
Deviations:	No deviations.			
Comments:	Channel 36. 6 Mbps			

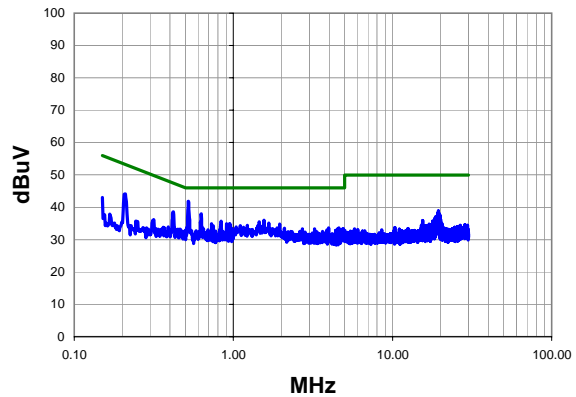
Test Specifications FCC 15.407:2007	Test Method ANSI C63.4:2003 DA 02-2138:2002
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Run #	15	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.522	21.0	20.8	41.8	56.0	-14.2
0.628	17.2	20.8	38.0	56.0	-18.0
0.419	17.6	21.0	38.6	57.5	-18.9
0.208	22.8	21.4	44.2	63.3	-19.1
1.560	15.4	20.6	36.0	56.0	-20.0
0.838	15.1	20.6	35.7	56.0	-20.3
1.456	14.9	20.6	35.5	56.0	-20.5
1.672	14.5	20.6	35.1	56.0	-20.9
0.944	14.4	20.5	34.9	56.0	-21.1
0.730	14.2	20.7	34.9	56.0	-21.1
0.905	14.3	20.6	34.9	56.0	-21.1
19.440	17.7	21.2	38.9	60.0	-21.1
0.954	14.3	20.5	34.8	56.0	-21.2
1.952	14.2	20.6	34.8	56.0	-21.2
1.224	13.9	20.5	34.4	56.0	-21.6
1.104	13.8	20.5	34.3	56.0	-21.7
19.340	17.1	21.2	38.3	60.0	-21.7
0.748	13.5	20.7	34.2	56.0	-21.8
19.570	16.9	21.2	38.1	60.0	-21.9
19.770	16.5	21.2	37.7	60.0	-22.3

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.522	21.0	20.8	41.8	46.0	-4.2
0.628	17.2	20.8	38.0	46.0	-8.0
0.419	17.6	21.0	38.6	47.5	-8.9
0.208	22.8	21.4	44.2	53.3	-9.1
1.560	15.4	20.6	36.0	46.0	-10.0
0.838	15.1	20.6	35.7	46.0	-10.3
1.456	14.9	20.6	35.5	46.0	-10.5
1.672	14.5	20.6	35.1	46.0	-10.9
0.944	14.4	20.5	34.9	46.0	-11.1
0.730	14.2	20.7	34.9	46.0	-11.1
0.905	14.3	20.6	34.9	46.0	-11.1
19.440	17.7	21.2	38.9	50.0	-11.1
0.954	14.3	20.5	34.8	46.0	-11.2
1.952	14.2	20.6	34.8	46.0	-11.2
1.224	13.9	20.5	34.4	46.0	-11.6
1.104	13.8	20.5	34.3	46.0	-11.7
19.340	17.1	21.2	38.3	50.0	-11.7
0.748	13.5	20.7	34.2	46.0	-11.8
19.570	16.9	21.2	38.1	50.0	-11.9
19.770	16.5	21.2	37.7	50.0	-12.3

EMC

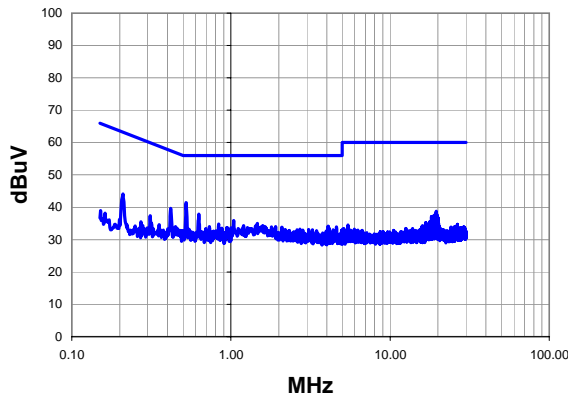
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	MASI0009	Date:	09/03/08	 Tested by: Mark Baytan
Project:	None	Temperature:	21.88	
Job Site:	OC06	Humidity:	53.1	
Serial Number:	J00073	Barometric Pres.:	1011.7	
EUT:	Rad-87			
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Eugene Kim			
EUT Power:	120V/60Hz			
Operating Mode:	Transmitting.			
Deviations:	No deviations.			
Comments:	Channel 36. 6 Mbps			

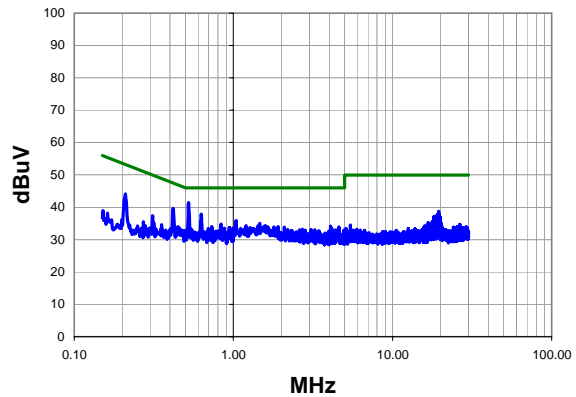
Test Specifications FCC 15.407:2007	Test Method ANSI C63.4:2003 DA 02-2138:2002
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Run #	16	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.522	20.6	20.8	41.4	56.0	-14.6
0.419	18.7	21.0	39.7	57.5	-17.8
0.628	17.1	20.8	37.9	56.0	-18.1
0.210	22.8	21.3	44.1	63.2	-19.1
1.040	15.4	20.5	35.9	56.0	-20.1
1.464	14.4	20.6	35.0	56.0	-21.0
0.837	14.2	20.6	34.8	56.0	-21.2
19.470	17.6	21.2	38.8	60.0	-21.2
1.200	13.8	20.5	34.3	56.0	-21.7
4.080	13.4	20.7	34.1	56.0	-21.9
0.731	13.3	20.7	34.0	56.0	-22.0
1.912	13.4	20.6	34.0	56.0	-22.0
19.370	16.8	21.2	38.0	60.0	-22.0
4.608	13.2	20.7	33.9	56.0	-22.1
2.088	13.2	20.6	33.8	56.0	-22.2
0.942	13.2	20.6	33.8	56.0	-22.2
19.690	16.5	21.2	37.7	60.0	-22.3
19.170	16.5	21.2	37.7	60.0	-22.3
0.878	12.9	20.6	33.5	56.0	-22.5
0.312	16.3	21.1	37.4	59.9	-22.5

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.522	20.6	20.8	41.4	46.0	-4.6
0.419	18.7	21.0	39.7	47.5	-7.8
0.628	17.1	20.8	37.9	46.0	-8.1
0.210	22.8	21.3	44.1	53.2	-9.1
1.040	15.4	20.5	35.9	46.0	-10.1
1.464	14.4	20.6	35.0	46.0	-11.0
0.837	14.2	20.6	34.8	46.0	-11.2
19.470	17.6	21.2	38.8	50.0	-11.2
1.200	13.8	20.5	34.3	46.0	-11.7
4.080	13.4	20.7	34.1	46.0	-11.9
0.731	13.3	20.7	34.0	46.0	-12.0
1.912	13.4	20.6	34.0	46.0	-12.0
19.370	16.8	21.2	38.0	50.0	-12.0
4.608	13.2	20.7	33.9	46.0	-12.1
2.088	13.2	20.6	33.8	46.0	-12.2
0.942	13.2	20.6	33.8	46.0	-12.2
19.690	16.5	21.2	37.7	50.0	-12.3
19.170	16.5	21.2	37.7	50.0	-12.3
0.878	12.9	20.6	33.5	46.0	-12.5
0.312	16.3	21.1	37.4	49.9	-12.5

EMC

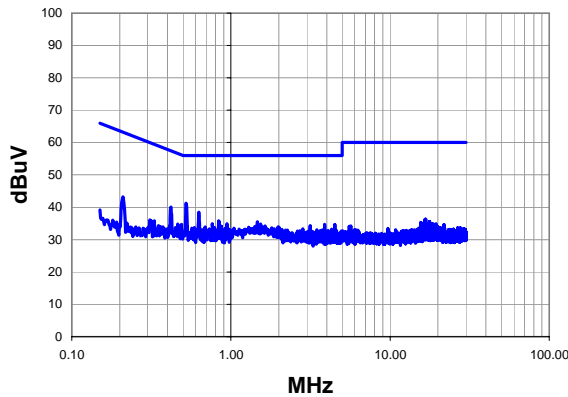
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	MASI0009	Date:	09/03/08	
Project:	None	Temperature:	21.88	
Job Site:	OC06	Humidity:	53.1	
Serial Number:	J00073	Barometric Pres.:	1011.7	
EUT:	Rad-87			
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Eugene Kim			
EUT Power:	120V/60Hz			
Operating Mode:	Transmitting.			
Deviations:	No deviations.			
Comments:	Channel 48. 6 Mbps			

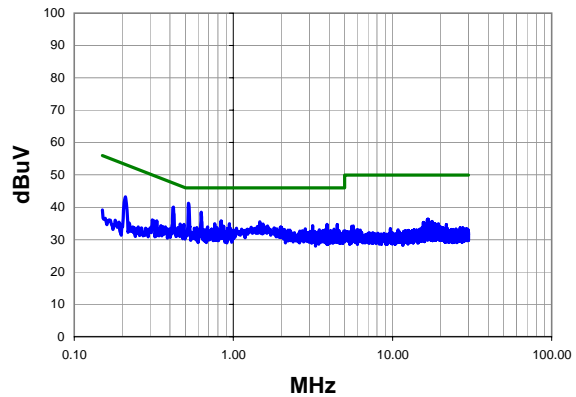
Test Specifications FCC 15.407:2007	Test Method ANSI C63.4:2003 DA 02-2138:2002
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Run #	17	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.522	20.4	20.8	41.2	56.0	-14.8
0.420	19.1	21.0	40.1	57.4	-17.3
0.628	17.7	20.8	38.5	56.0	-17.5
0.210	21.9	21.3	43.2	63.2	-20.0
0.837	15.2	20.6	35.8	56.0	-20.2
1.464	14.9	20.6	35.5	56.0	-20.5
0.944	14.4	20.5	34.9	56.0	-21.1
0.764	14.2	20.7	34.9	56.0	-21.1
1.536	14.2	20.6	34.8	56.0	-21.2
3.880	14.0	20.7	34.7	56.0	-21.3
4.496	13.9	20.7	34.6	56.0	-21.4
0.488	13.8	20.9	34.7	56.2	-21.5
3.144	13.7	20.6	34.3	56.0	-21.7
0.463	13.8	21.0	34.8	56.6	-21.9
0.869	13.5	20.6	34.1	56.0	-21.9
0.689	13.2	20.8	34.0	56.0	-22.0
1.992	13.3	20.6	33.9	56.0	-22.1
0.589	12.9	20.9	33.8	56.0	-22.2
0.789	13.0	20.7	33.7	56.0	-22.3
0.568	12.7	20.9	33.6	56.0	-22.4

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.522	20.4	20.8	41.2	46.0	-4.8
0.420	19.1	21.0	40.1	47.4	-7.3
0.628	17.7	20.8	38.5	46.0	-7.5
0.210	21.9	21.3	43.2	53.2	-10.0
0.837	15.2	20.6	35.8	46.0	-10.2
1.464	14.9	20.6	35.5	46.0	-10.5
0.944	14.4	20.5	34.9	46.0	-11.1
0.764	14.2	20.7	34.9	46.0	-11.1
1.536	14.2	20.6	34.8	46.0	-11.2
3.880	14.0	20.7	34.7	46.0	-11.3
4.496	13.9	20.7	34.6	46.0	-11.4
0.488	13.8	20.9	34.7	46.2	-11.5
3.144	13.7	20.6	34.3	46.0	-11.7
0.463	13.8	21.0	34.8	46.6	-11.9
0.869	13.5	20.6	34.1	46.0	-11.9
0.689	13.2	20.8	34.0	46.0	-12.0
1.992	13.3	20.6	33.9	46.0	-12.1
0.589	12.9	20.9	33.8	46.0	-12.2
0.789	13.0	20.7	33.7	46.0	-12.3
0.568	12.7	20.9	33.6	46.0	-12.4

EMC

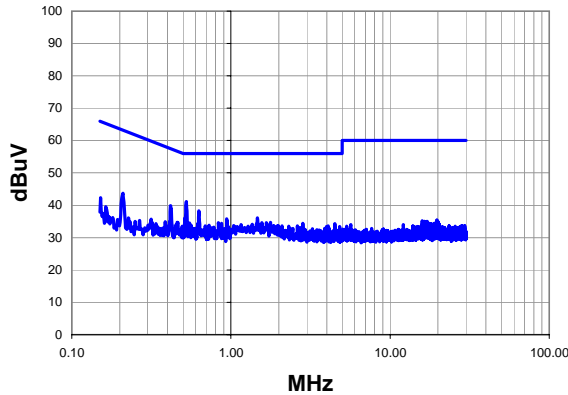
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	MA5I0009	Date:	09/03/08	
Project:	None	Temperature:	21.88	
Job Site:	OC06	Humidity:	53.1	
Serial Number:	J00073	Barometric Pres.:	1011.7	
				Tested by: Mark Baytan
EUT:	Rad-87			
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Eugene Kim			
EUT Power:	120V/60Hz			
Operating Mode:	Transmitting.			
Deviations:	No deviations.			
Comments:	Channel 48, 6 Mbps			

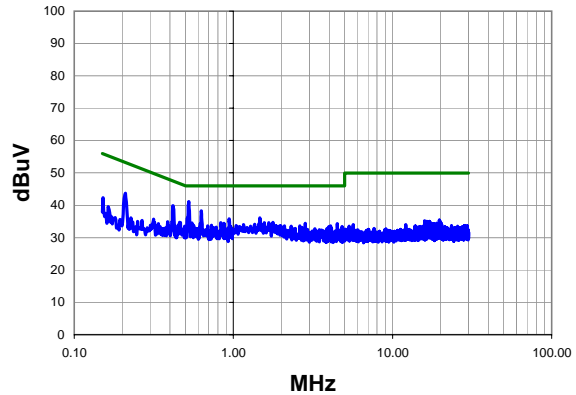
Test Specifications FCC 15.407:2007	Test Method ANSI C63.4:2003 DA 02-2138:2002
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Run #	18	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit

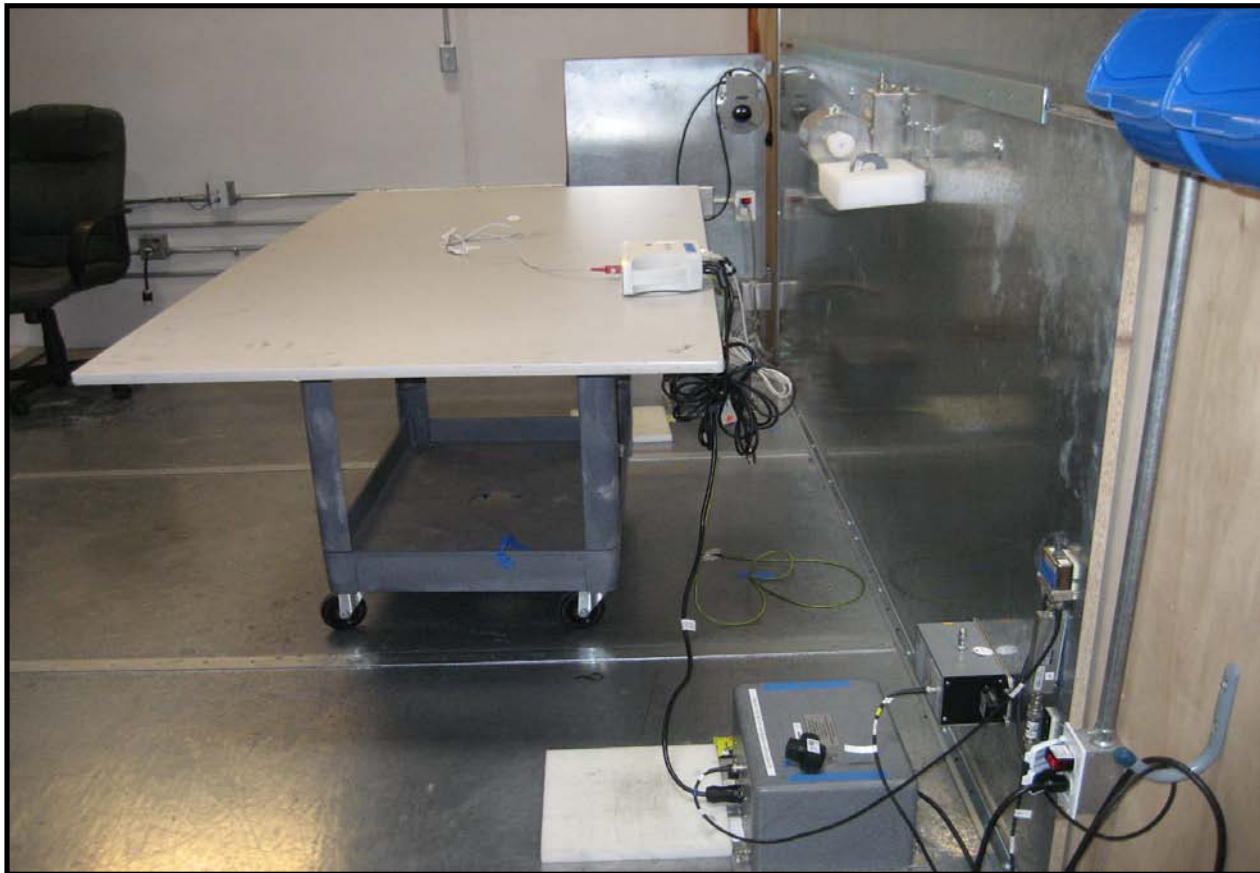


Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.524	20.3	20.8	41.1	56.0	-14.9
0.417	18.9	21.0	39.9	57.5	-17.6
0.629	17.5	20.8	38.3	56.0	-17.7
0.210	22.4	21.3	43.7	63.2	-19.5
0.514	15.3	20.8	36.1	56.0	-19.9
1.464	15.5	20.6	36.1	56.0	-19.9
0.942	15.3	20.6	35.9	56.0	-20.1
1.776	14.1	20.6	34.7	56.0	-21.3
0.835	14.0	20.6	34.6	56.0	-21.4
1.672	14.0	20.6	34.6	56.0	-21.4
1.568	14.0	20.6	34.6	56.0	-21.4
0.550	13.7	20.9	34.6	56.0	-21.4
0.874	13.8	20.6	34.4	56.0	-21.6
2.832	13.8	20.6	34.4	56.0	-21.6
4.504	13.6	20.7	34.3	56.0	-21.7
0.459	13.7	21.0	34.7	56.7	-22.0
0.563	13.0	20.9	33.9	56.0	-22.1
0.539	13.0	20.8	33.8	56.0	-22.2
0.728	13.1	20.7	33.8	56.0	-22.2
0.691	12.9	20.8	33.7	56.0	-22.3

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.524	20.3	20.8	41.1	46.0	-4.9
0.417	18.9	21.0	39.9	47.5	-7.6
0.629	17.5	20.8	38.3	46.0	-7.7
0.210	22.4	21.3	43.7	53.2	-9.5
0.514	15.3	20.8	36.1	46.0	-9.9
1.464	15.5	20.6	36.1	46.0	-9.9
0.942	15.3	20.6	35.9	46.0	-10.1
1.776	14.1	20.6	34.7	46.0	-11.3
0.835	14.0	20.6	34.6	46.0	-11.4
1.672	14.0	20.6	34.6	46.0	-11.4
1.568	14.0	20.6	34.6	46.0	-11.4
0.550	13.7	20.9	34.6	46.0	-11.4
0.874	13.8	20.6	34.4	46.0	-11.6
2.832	13.8	20.6	34.4	46.0	-11.6
4.504	13.6	20.7	34.3	46.0	-11.7
0.459	13.7	21.0	34.7	46.7	-12.0
0.563	13.0	20.9	33.9	46.0	-12.1
0.539	13.0	20.8	33.8	46.0	-12.2
0.728	13.1	20.7	33.8	46.0	-12.2
0.691	12.9	20.8	33.7	46.0	-12.3



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	E4440A	AAX	10/1/2007	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

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the lowest, a medium, and the highest channels in each band. The transmit power was set to its default maximum. The EUT's only data rate was measured. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

The spectrum analyzer settings were as follows:

- Span = approximately 1.5 to 2 times the emission bandwidth, centered on the transmit channel.
- RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process where an exact match of 1% may not be achieved. The largest value of RBW that came close to 1% of the emission bandwidth was used.
- A peak detector was used.
- The marker-delta function was then used to measure 26 dB emission bandwidth.

EMC

Emission Bandwidth

EUT: Rad-87	Work Order: MASI0009
Serial Number: J00073	Date: 09/08/08
Customer: Masimo Corporation	Temperature: 21.88°C
Attendees: Eugene Kim	Humidity: 53%
Project: None	Barometric Pres.: 1011.7
Tested by: Jaemi Suh	Power: 120V/60Hz
	Job Site: OC11

TEST SPECIFICATIONS	Test Method
FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002

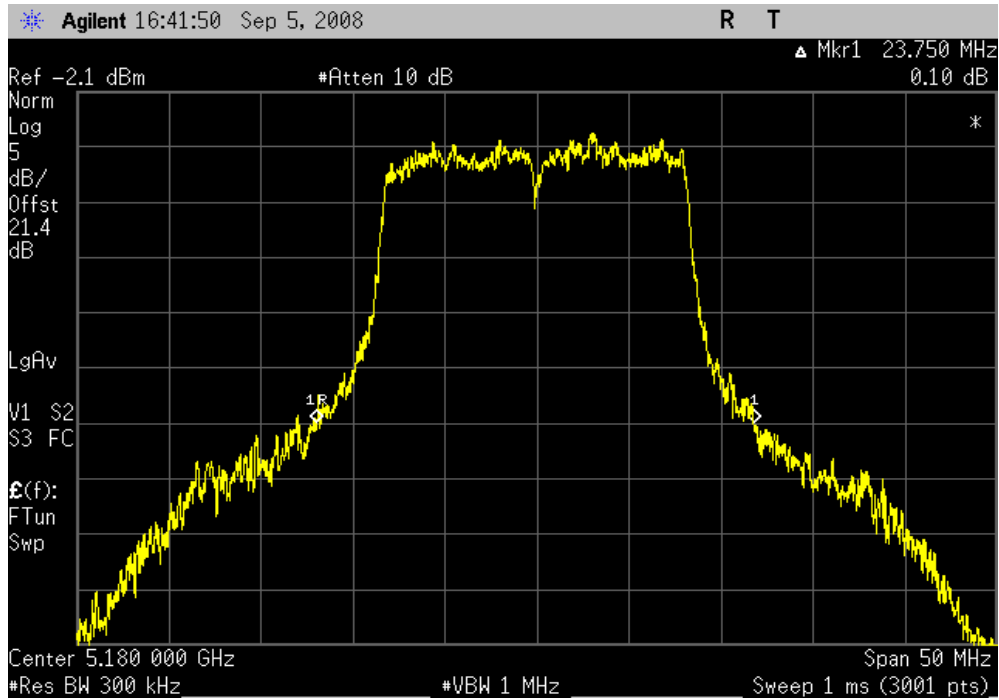
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

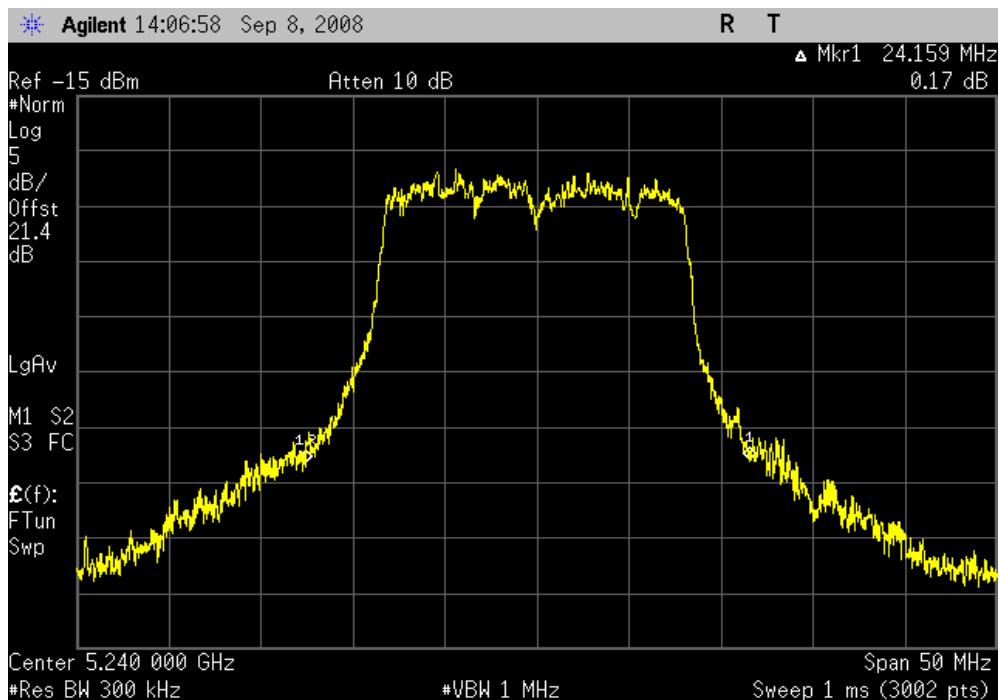
Configuration #	2	<i>Signature</i> 
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		Value	Limit	Results
Channel 36, 5180 MHz				
	6 Mbps	24.471 MHz	N/A	N/A
	36 Mbps	23.767 MHz	N/A	N/A
	54 Mbps	23.750 MHz	N/A	N/A
Channel 48, 5240 MHz				
	6 Mbps	24.159 MHz	N/A	N/A
	36 Mbps	24.042 MHz	N/A	N/A
	54 Mbps	24.558 MHz	N/A	N/A

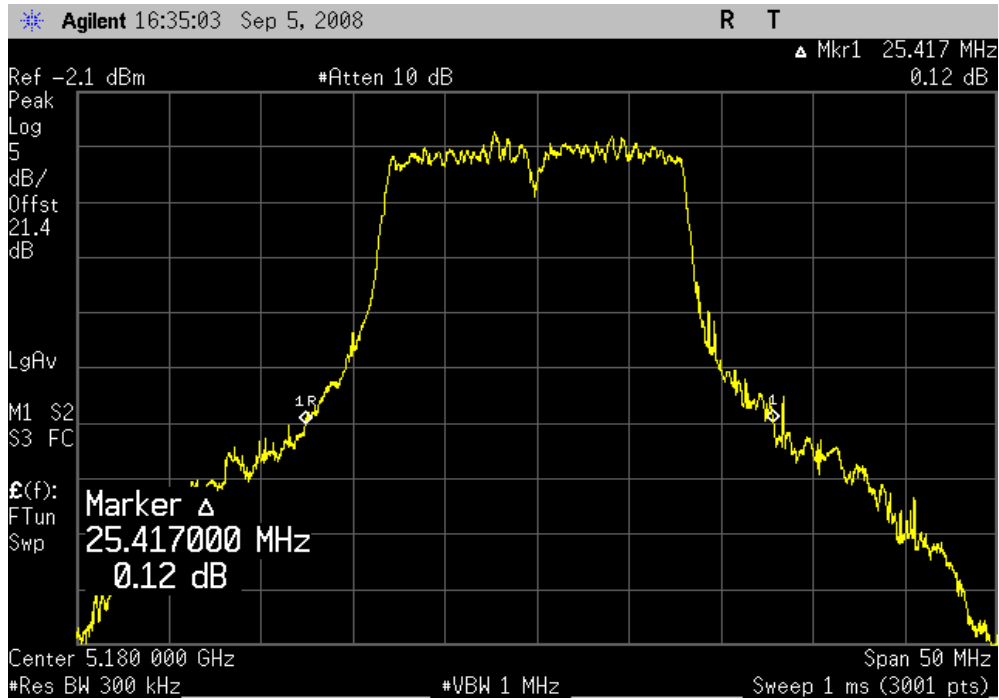
Channel 36, 5180 MHz, 54 Mbps		
Result: N/A	Value: 23.750 MHz	Limit: N/A



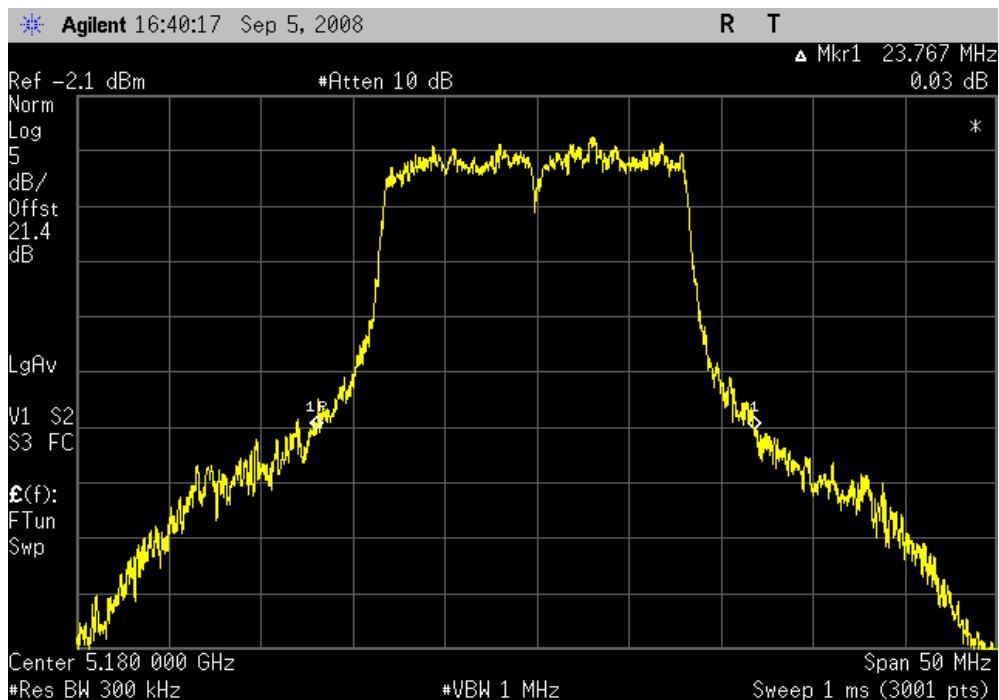
Channel 48, 5240 MHz, 6 Mbps		
Result: N/A	Value: 24.159 MHz	Limit: N/A



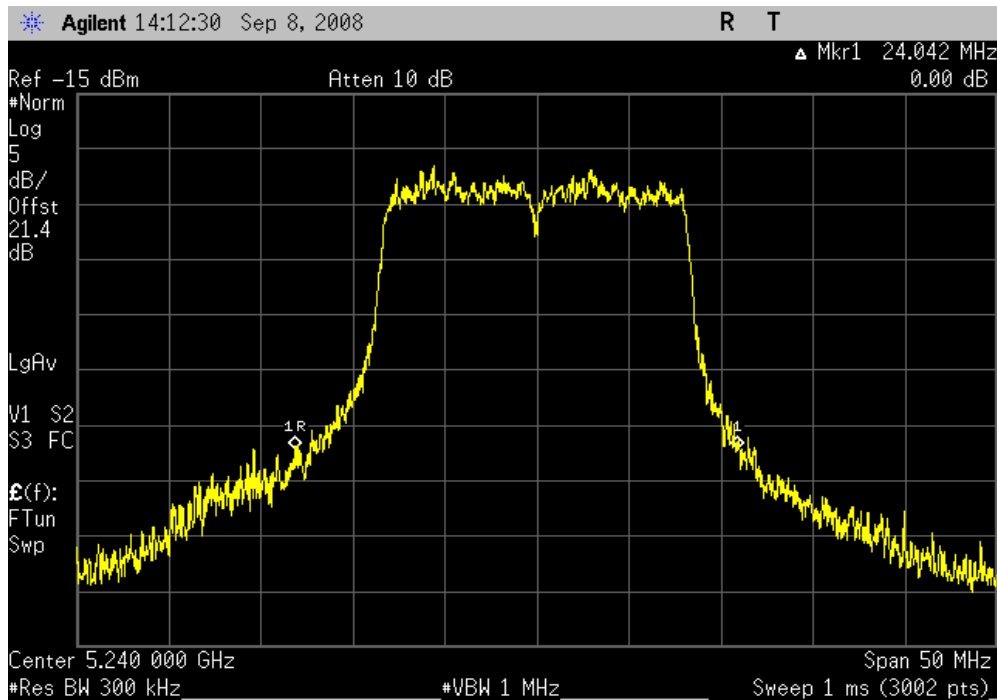
Channel 36, 5180 MHz, 6 Mbps		
Result: N/A	Value: 24.471 MHz	Limit: N/A



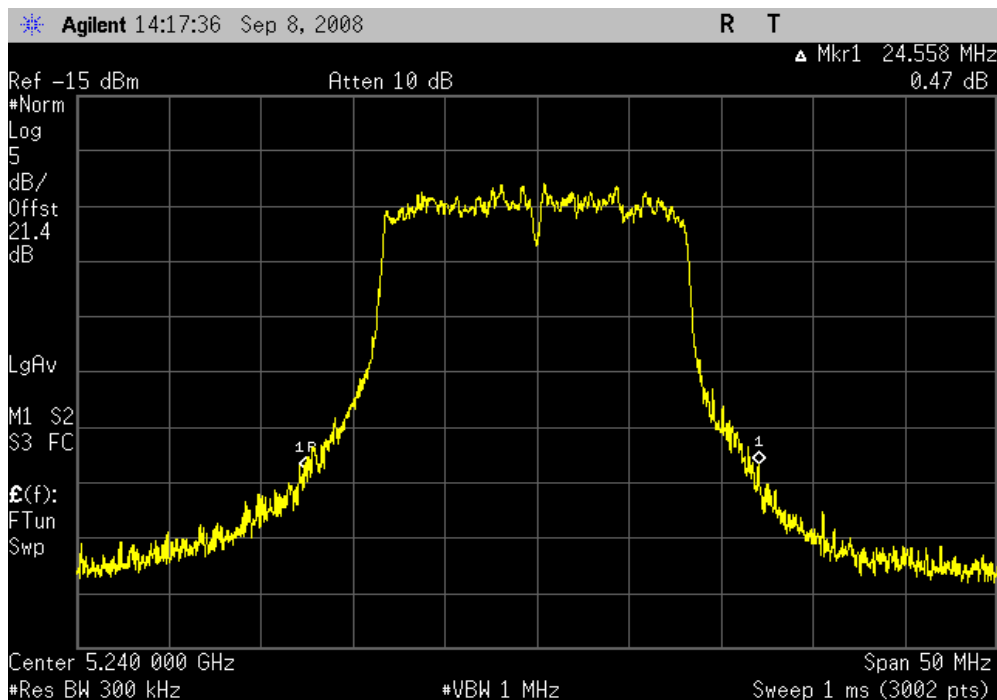
Channel 36, 5180 MHz, 36 Mbps		
Result: N/A	Value: 23.767 MHz	Limit: N/A

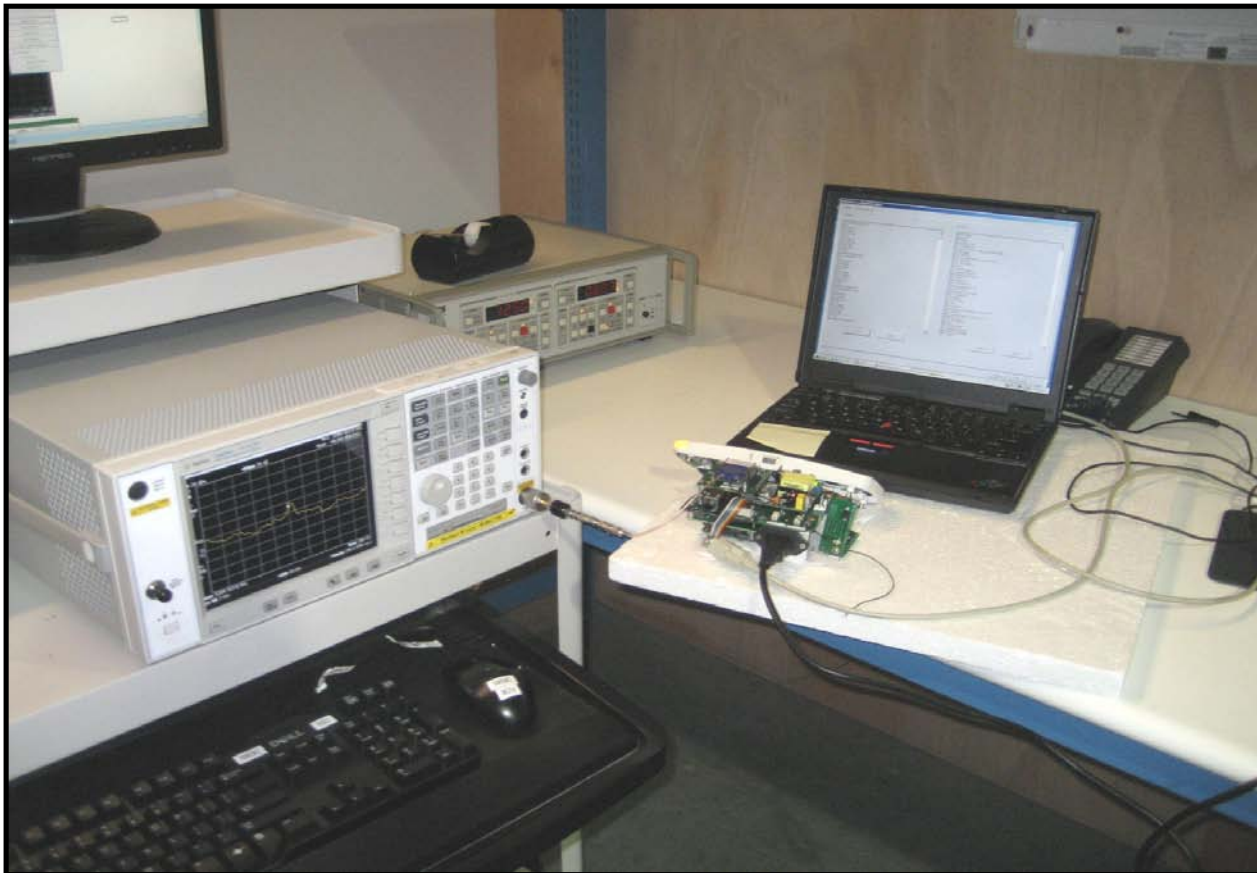
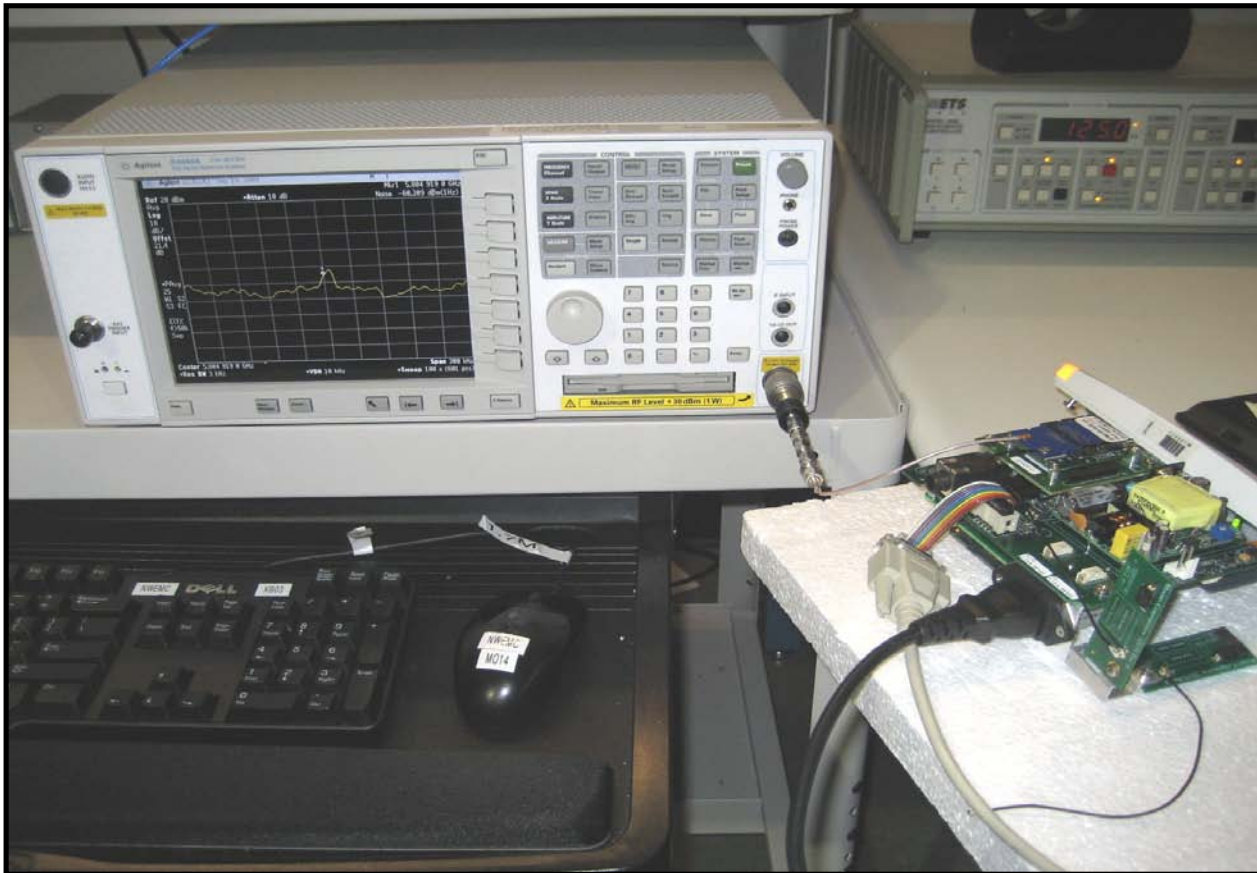


Channel 48, 5240 MHz, 36 Mbps		
Result: N/A	Value: 24.042 MHz	Limit: N/A



Channel 48, 5240 MHz, 54 Mbps		
Result: N/A	Value: 24.558 MHz	Limit: 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
Spectrum Analyzer	Agilent	E4440A	AAX	10/1/2007	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

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the lowest, a medium, and the highest channels in each band. The transmit power was set to its default maximum. The EUT's only data rate was measured. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input. The amplitude accuracy of the spectrum analyzer was further enhanced by calibrating the setup using the power meter and synthesized signal generator.

Prior to measuring peak power spectral density, the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring peak power spectral density. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report. The transmission pulse duration (T) was measured across a constant amplitude pulse using an RF detector diode and an oscilloscope. The scope photos are found with the peak power measurement data elsewhere in this report.

Method #2 found in FCC Public Notice DA02-2138 was used because the analyzer sweep time was less than or equal to T.

The spectrum analyzer settings were as follows:

- The span was set to encompass entire emission bandwidth (B), centered on the transmit channel.
- RBW = 1 MHz, VBW \geq 3 MHz because the emission bandwidth (B) is greater than 1 MHz
- Sample detector mode because the bin width (span / number of spectral points) $<$ 0.5 RBW.
- Trace average 100 traces in power averaging mode (not video averaging).

The peak power spectral density (PPSD) was determined to be the highest level found across the emission in any 1 MHz band after 100 sweeps of power averaging (not video averaging).

EMC

Peak Power Spectral Density

EUT: Rad-87	Work Order: MASI0009
Serial Number: J00073	Date: 09/18/08
Customer: Masimo Corporation	Temperature: 21.88°C
Attendees: Eugene Kim	Humidity: 53%
Project: None	Barometric Pres.: 1011.7mb
Tested by: Jaemi Suh	Power: 120V/60Hz
	Job Site: OC11

TEST SPECIFICATIONS	Test Method
FCC 15.407:2007	ANSI C63.4:2003 DA 02-2138:2002

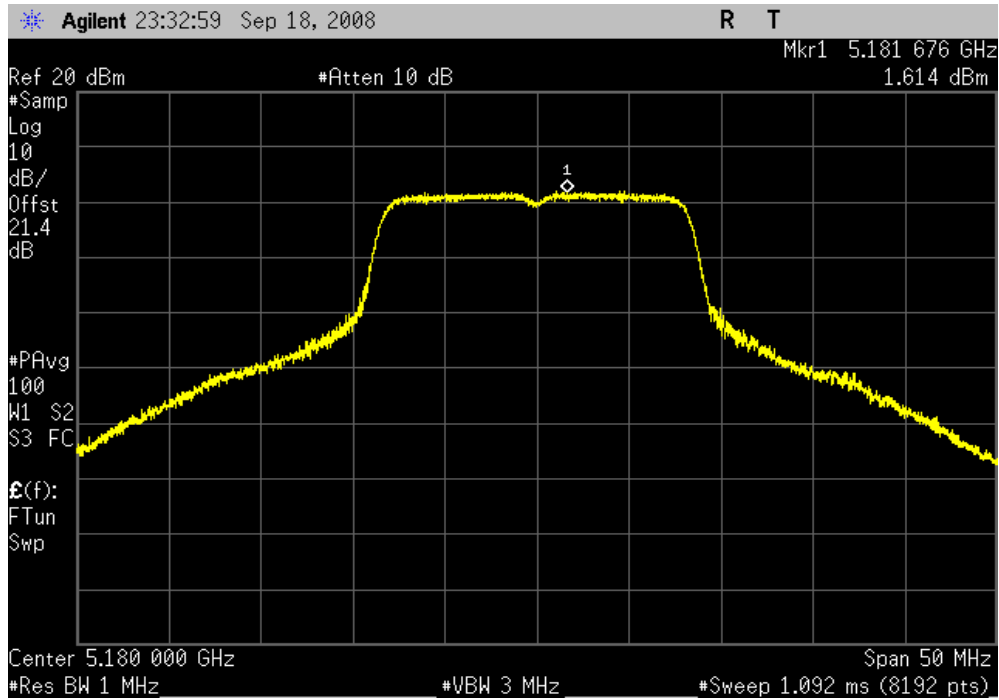
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations.

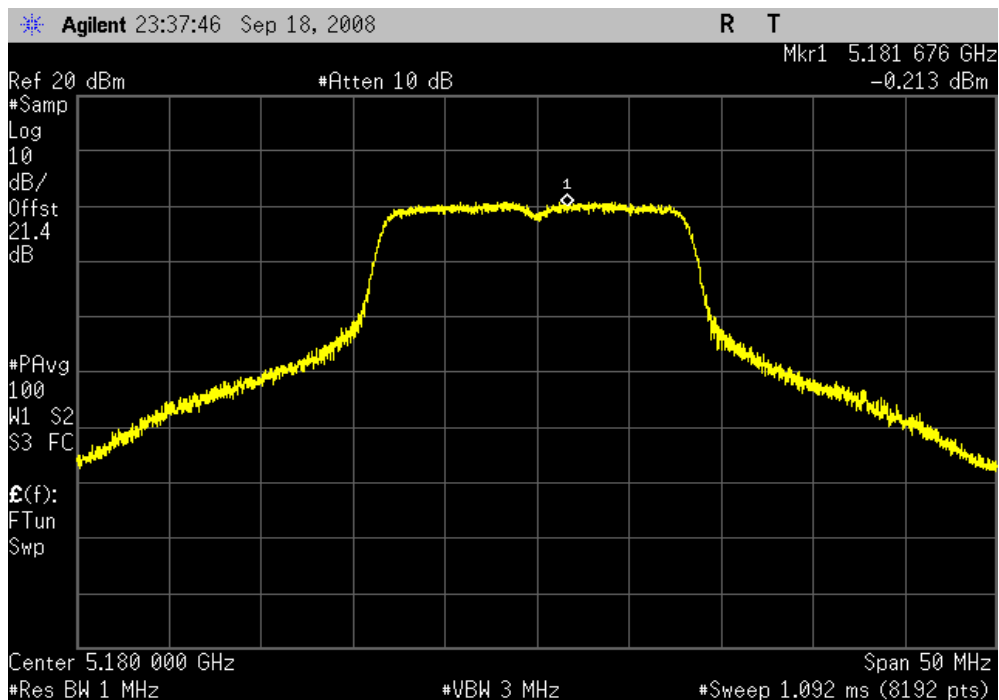
Configuration #	2	Signature 
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	Value	Limit	Results
Channel 36, 5180 MHz			
6 Mbps	-1.614 dBm	4 dBm	Pass
36 Mbps	-0.213 dBm	4 dBm	Pass
54 Mbps	-0.788 dBm	4 dBm	Pass
Channel 48, 5240 MHz			
6 Mbps	1.607 dBm	4 dBm	Pass
36 Mbps	1.888 dBm	4 dBm	Pass
54 Mbps	1.888 dBm	4 dBm	Pass

Channel 36, 5180 MHz, 6 Mbps
Result: Pass **Value:** -1.614 dBm **Limit:** 4 dBm

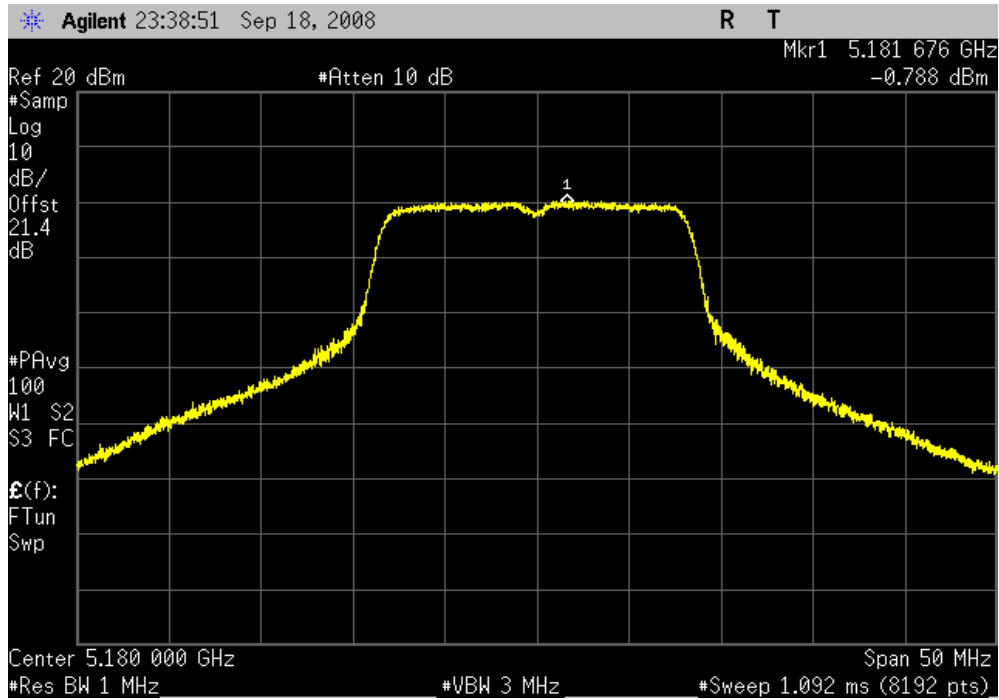


Channel 36, 5180 MHz, 36 Mbps
Result: Pass **Value:** -0.213 dBm **Limit:** 4 dBm

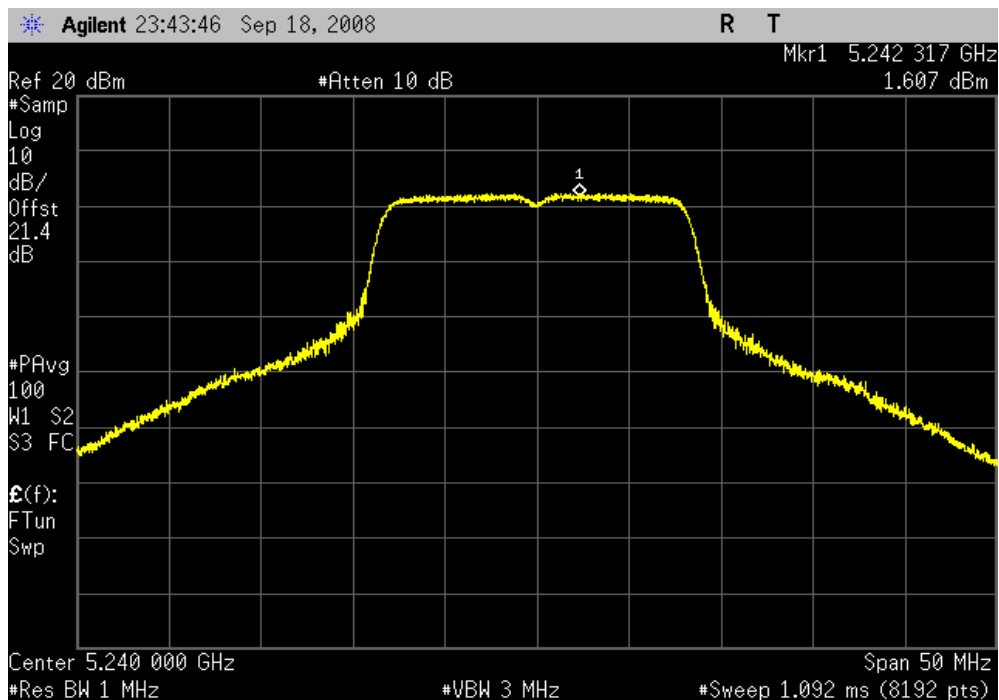


Peak Power Spectral Density

Channel 36, 5180 MHz, 54 Mbps
Result: Pass **Value:** -0.788 dBm **Limit:** 4 dBm

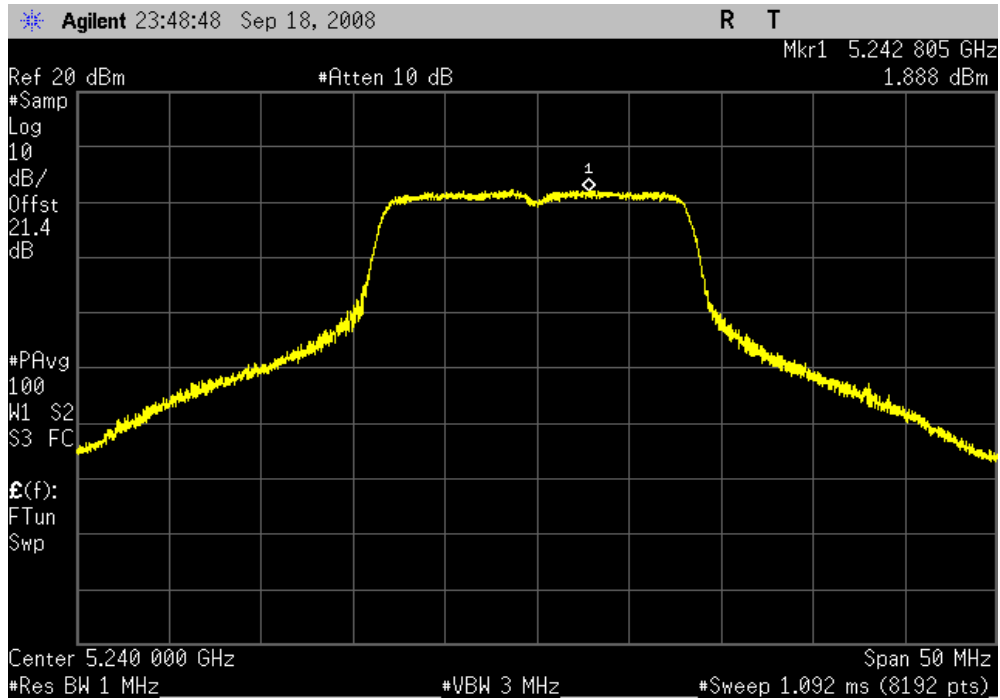


Channel 48, 5240 MHz, 6 Mbps
Result: Pass **Value:** 1.607 dBm **Limit:** 4 dBm

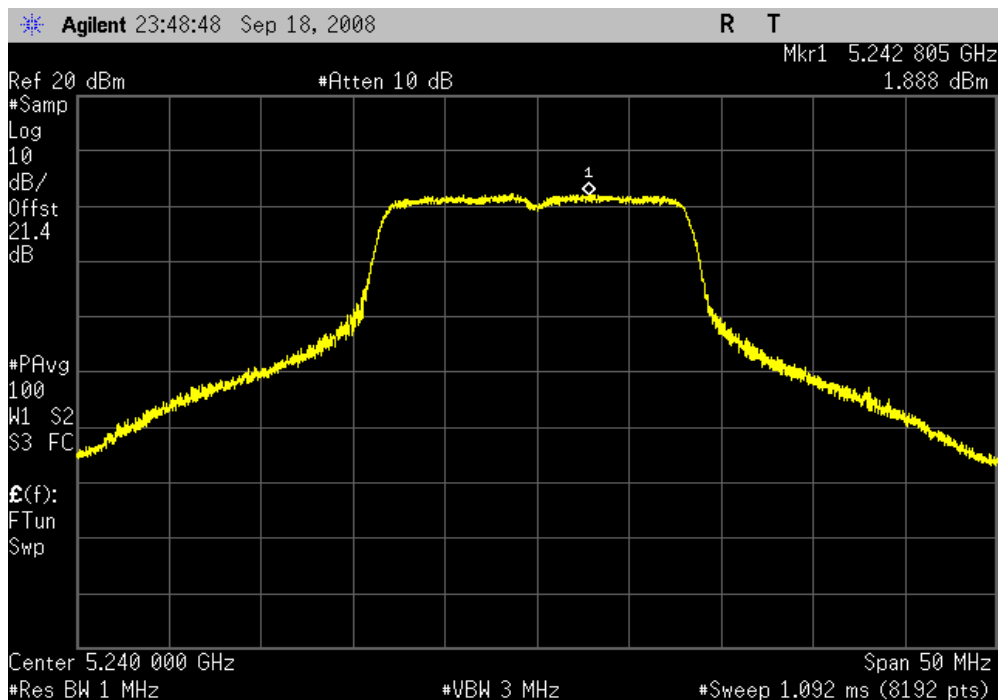


Peak Power Spectral Density

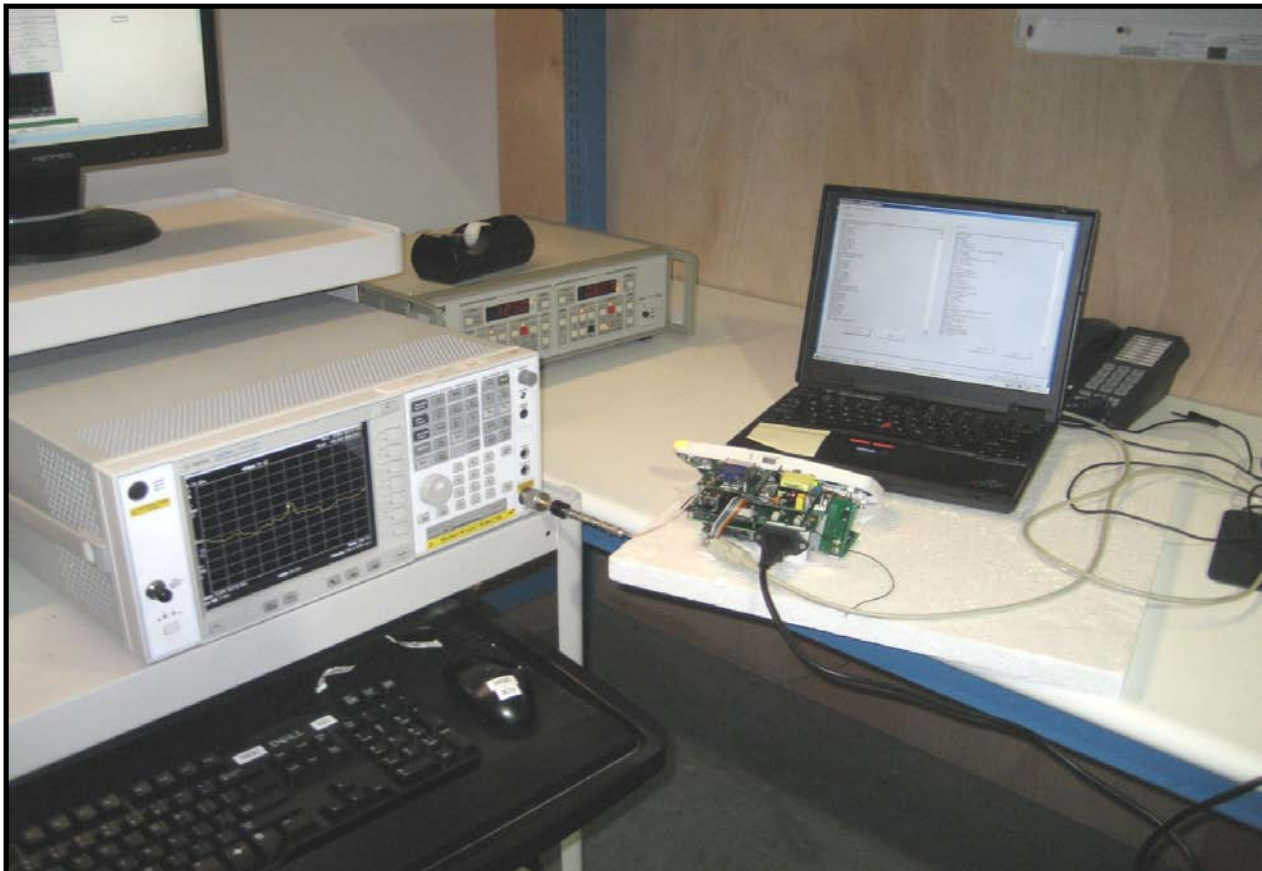
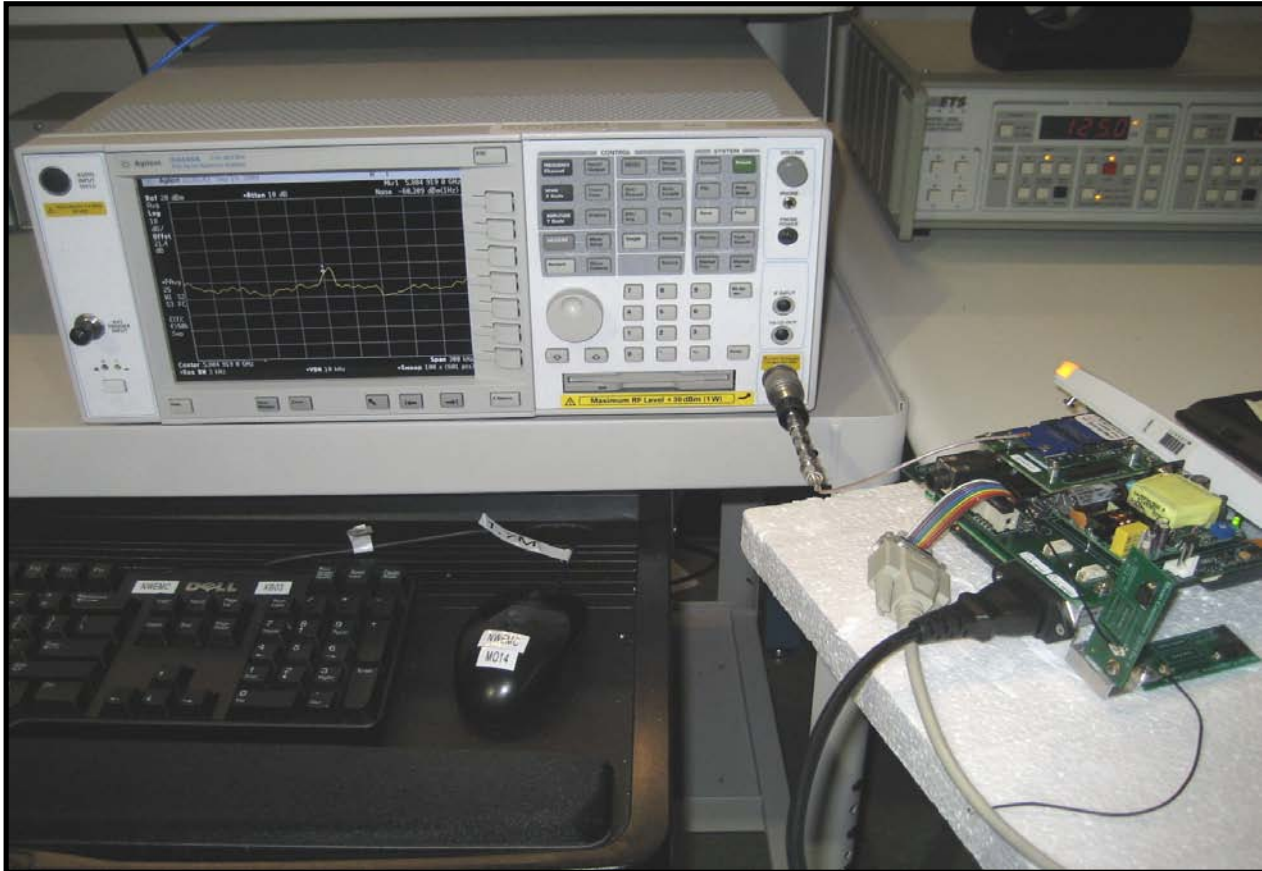
Channel 48, 5240 MHz, 36 Mbps
Result: Pass **Value:** 1.888 dBm **Limit:** 4 dBm



Channel 48, 5240 MHz, 54 Mbps
Result: Pass **Value:** 1.888 dBm **Limit:** 4 dBm



Peak Power Spectral Density





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	E4440A	AAX	10/1/2007	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

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the lowest, a medium, and the highest channels in each band. The transmit power was set to its default maximum. The EUT's only data rate was measured. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

The spectrum analyzer settings were as follows:

- Span set to encompass the entire emission bandwidth (B), centered on the transmit channel.
- Using the marker delta function, the largest difference between the following two traces was measured:
 - 1st Trace: RBW = 1 MHz, VBW \geq 3 MHz with peak detector and max-hold settings.
 - 2nd Trace: Use same settings as were used for peak conducted transmit power.

EMC

Peak Excursion of the Modulation Envelope

EUT: Rad-87	Work Order: MASI0009
Serial Number: J00073	Date: 09/18/08
Customer: Masimo Corporation	Temperature: 21.88°C
Attendees: Eugene Kim	Humidity: 53%
Project: None	Barometric Pres.: 1011.7mb
Tested by: Jaemi Suh	Power: 120V/60Hz
	Job Site: OC11

TEST SPECIFICATIONS	Test Method
FCC 15.407:2006	ANSI C63.4:2003 DA 02-2138:2002

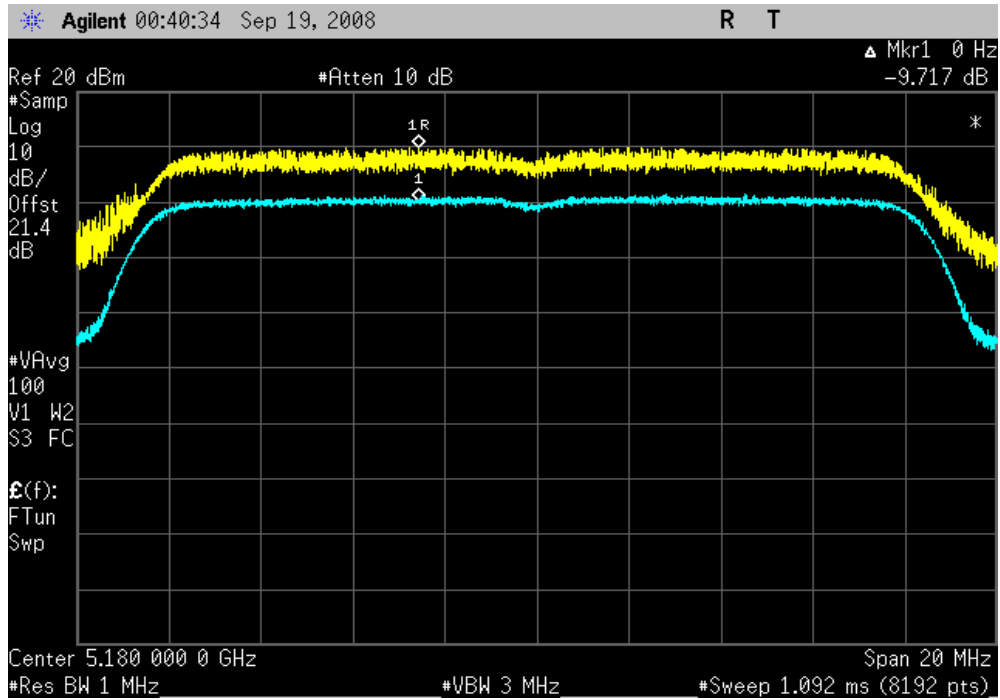
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

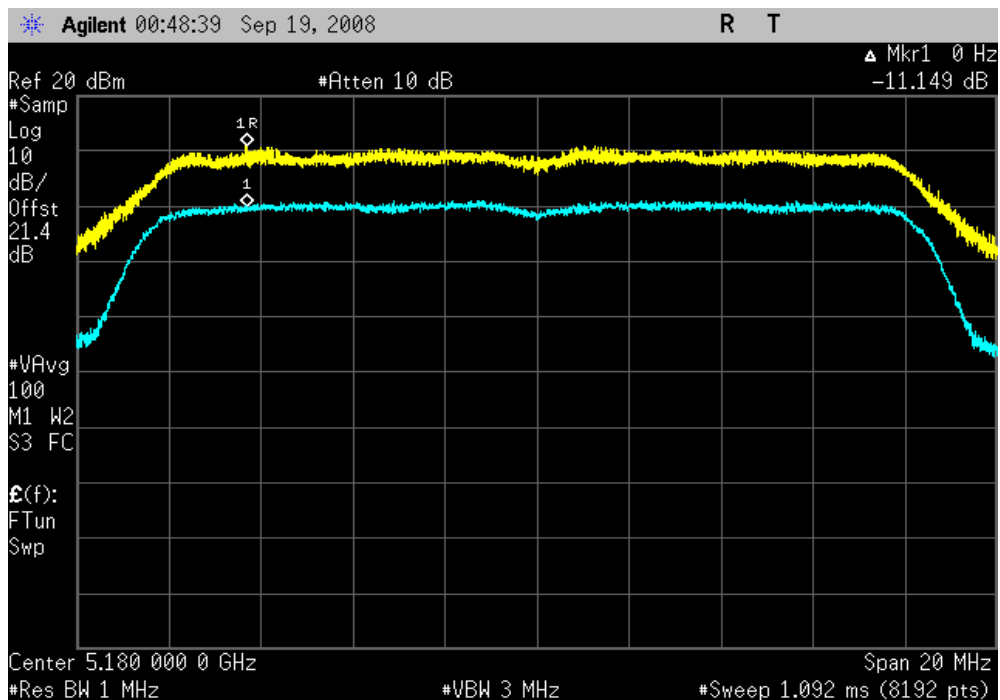
Configuration #	2	Signature 
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	Value	Limit	Results
Channel 36, 5180 MHz			
6 Mbps	9.72 dB	≤ 13 dB	Pass
36 Mbps	11.15 dB	≤ 13 dB	Pass
54 Mbps	10.85 dB	≤ 13 dB	Pass
Channel 48, 5240 MHz			
6 Mbps	9.49 dB	≤ 13 dB	Pass
36 Mbps	11.24 dB	≤ 13 dB	Pass
54 Mbps	10.55 dB	≤ 13 dB	Pass

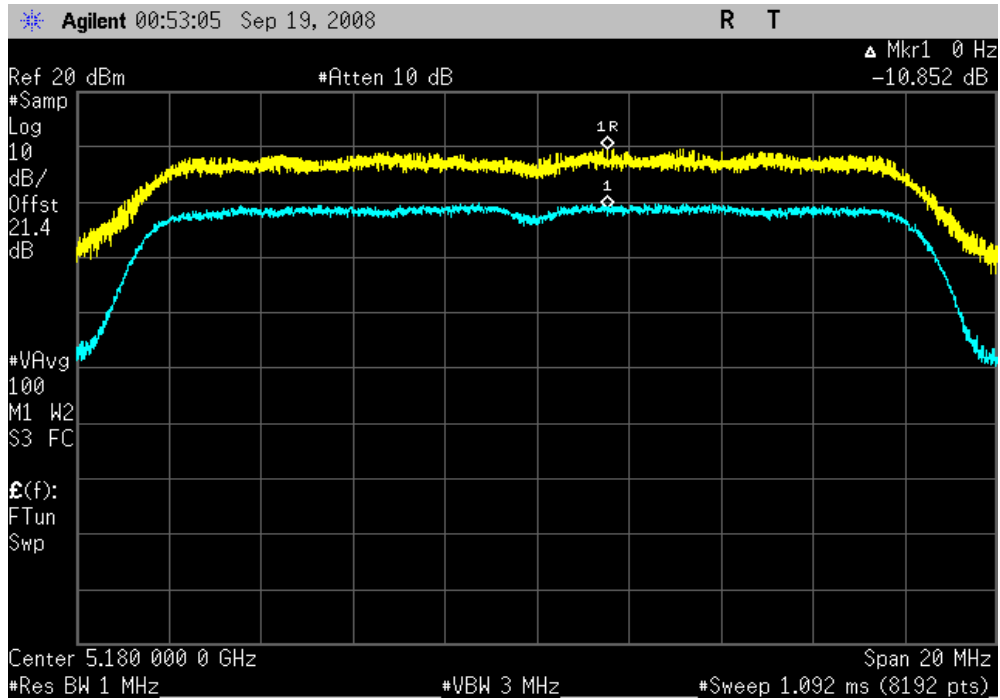
Channel 36, 5180 MHz, 6 Mbps
Result: Pass **Value:** 9.72 dB **Limit:** ≤ 13 dB



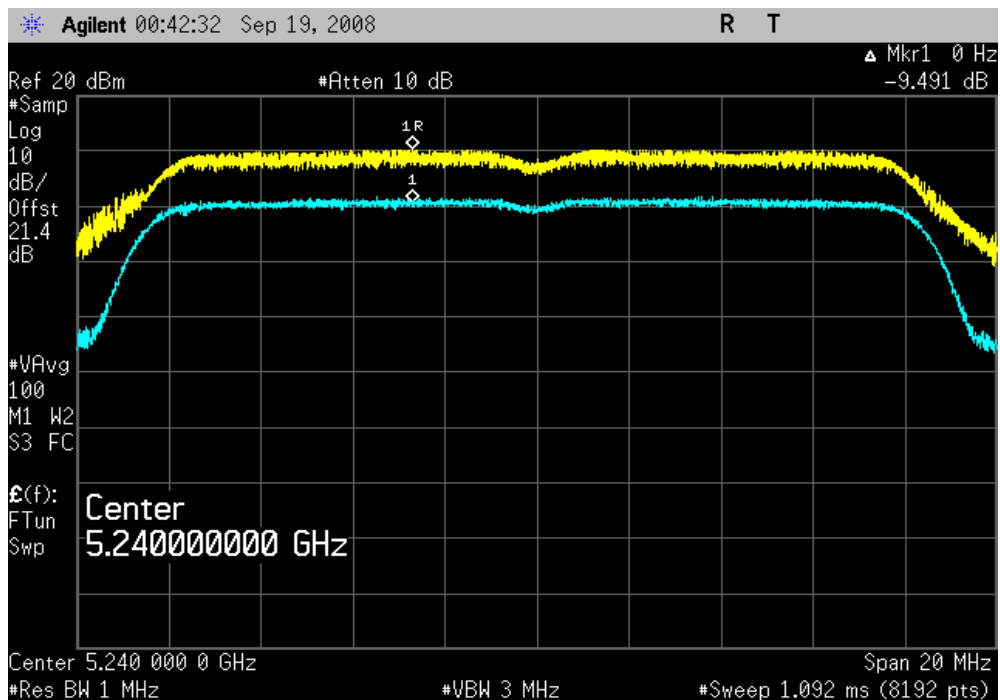
Channel 36, 5180 MHz, 36 Mbps
Result: Pass **Value:** 11.15 dB **Limit:** ≤ 13 dB



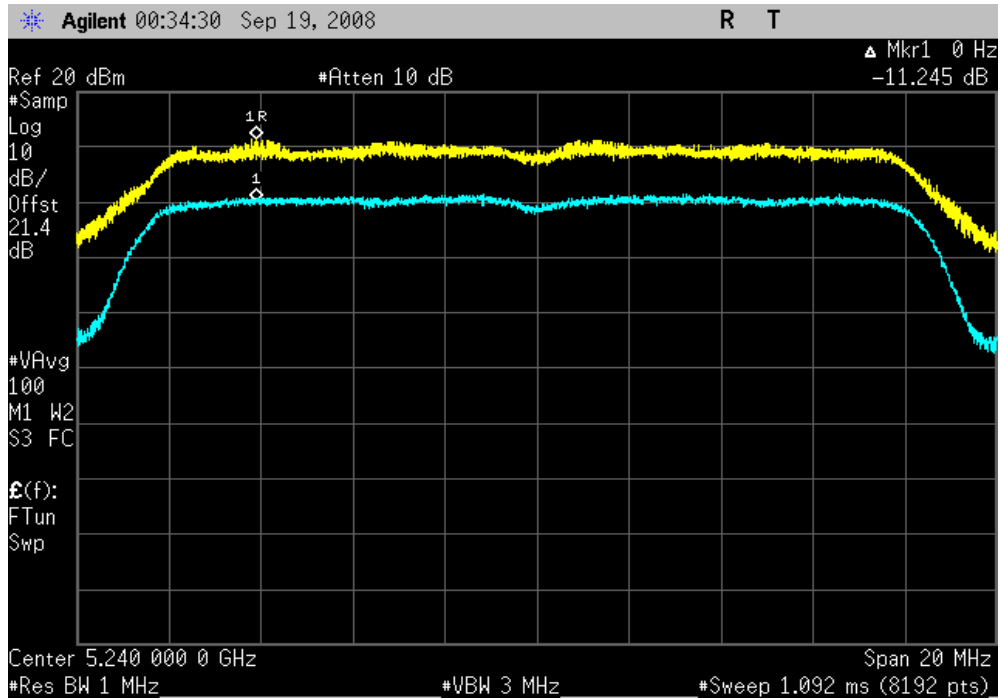
Channel 36, 5180 MHz, 54 Mbps
Result: Pass **Value: 10.85 dB** **Limit: ≤ 13 dB**



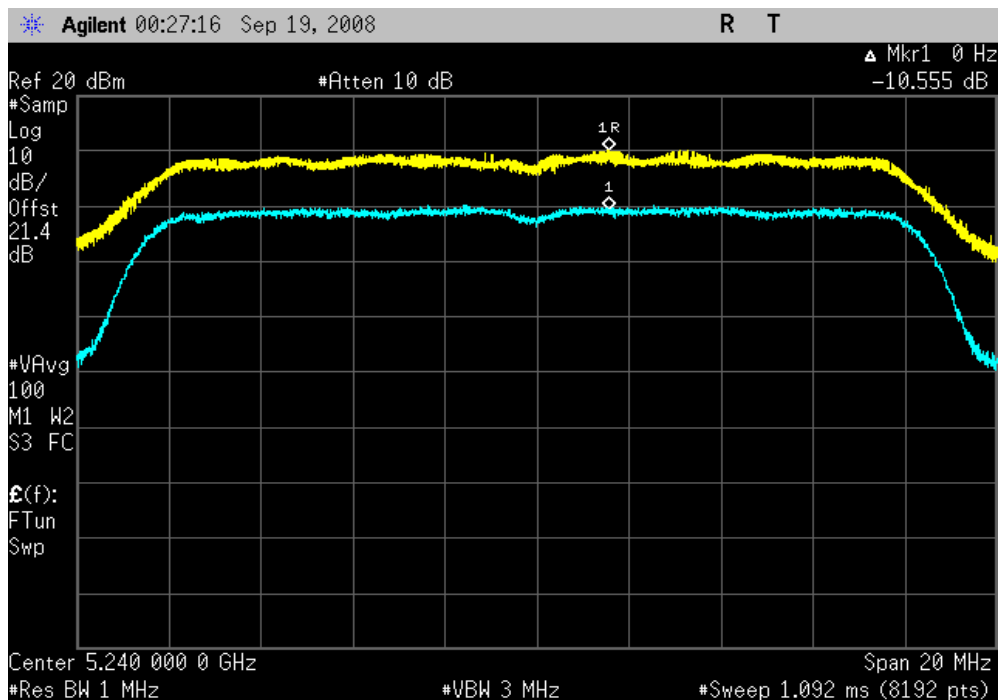
Channel 48, 5240 MHz, 6 Mbps
Result: Pass **Value: 9.49 dB** **Limit: ≤ 13 dB**

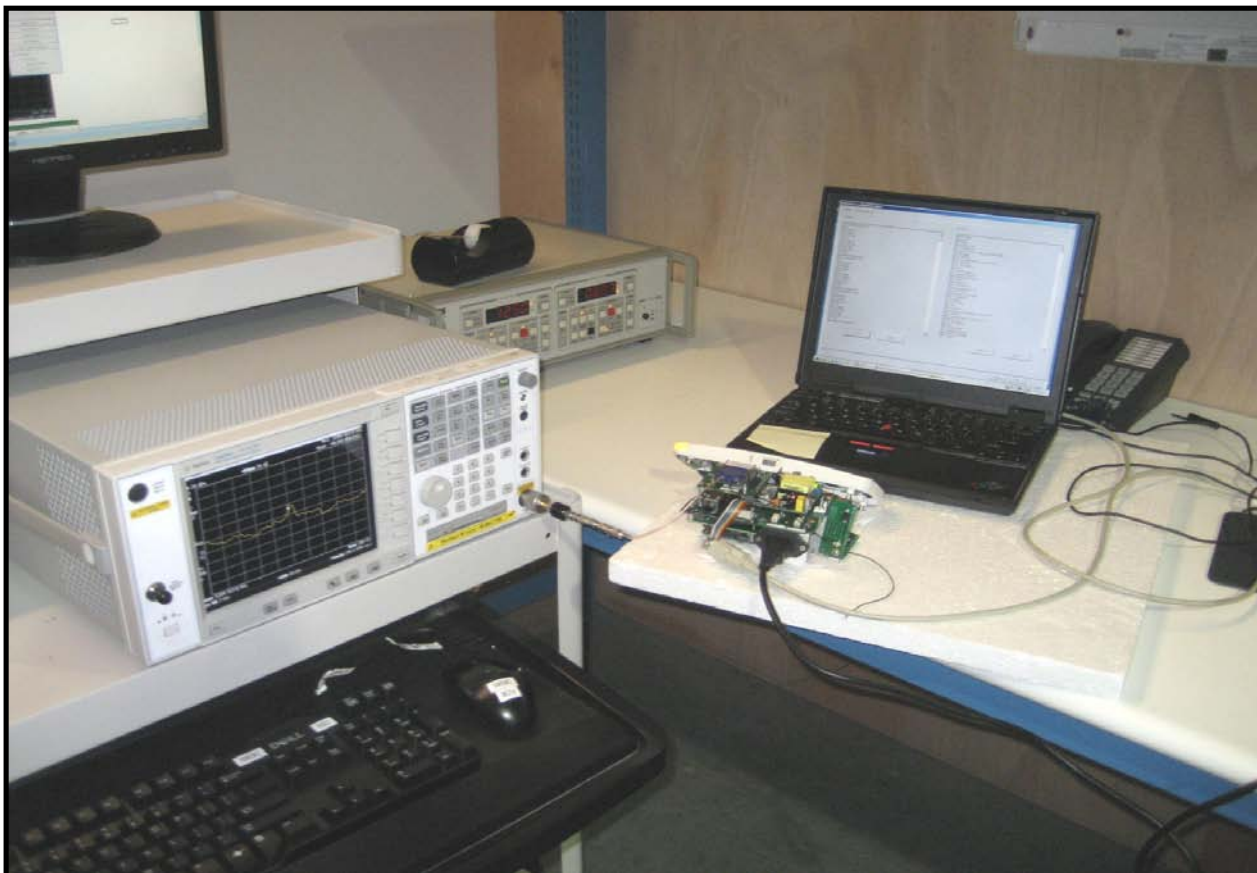
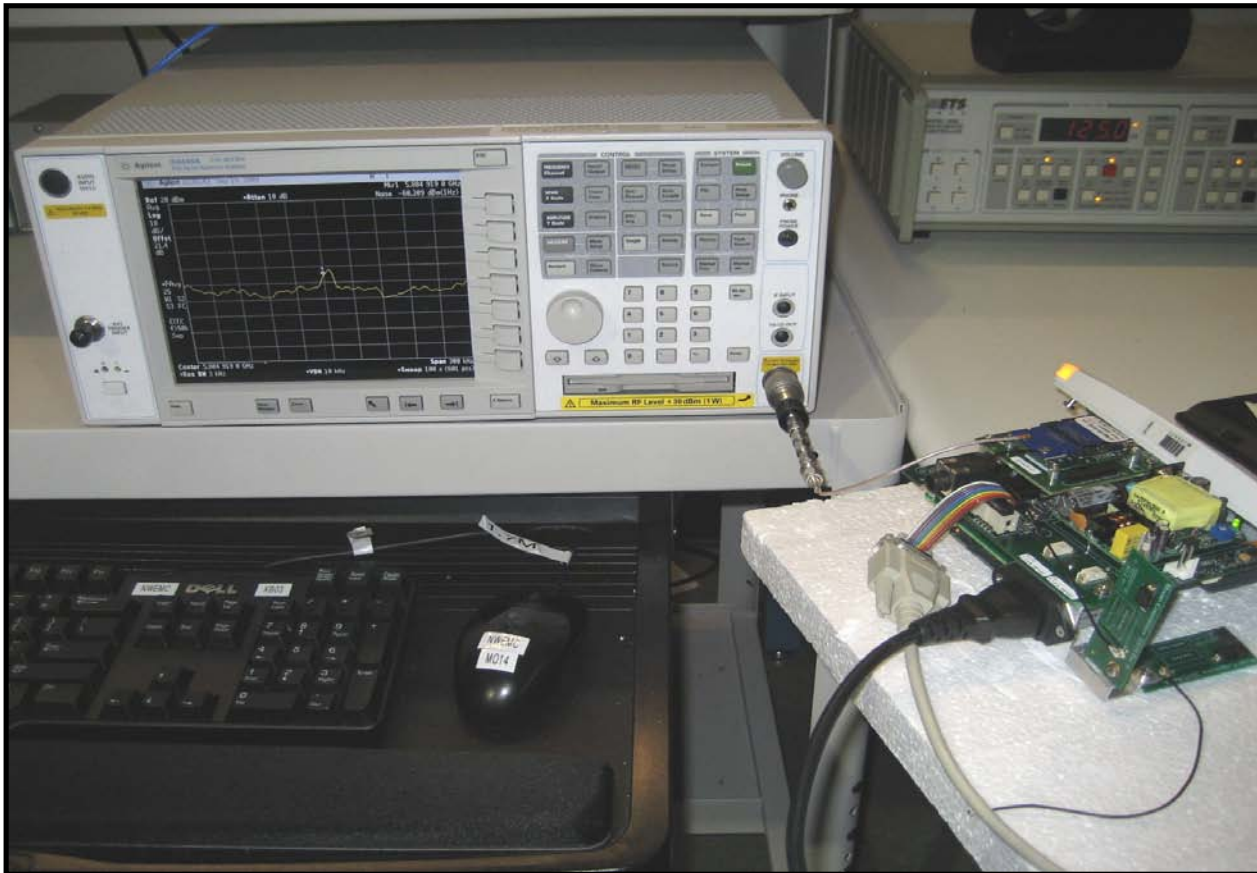


Channel 48, 5240 MHz, 36 Mbps
Result: Pass **Value:** 11.24 dB **Limit:** ≤ 13 dB



Channel 48, 5240 MHz, 54 Mbps
Result: Pass **Value:** 10.55 dB **Limit:** ≤ 13 dB





Peak Excursion of the Modulation Envelope



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	E4440A	AAX	10/1/2007	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

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the lowest, a medium, and the highest channels in each band. The transmit power was set to its default maximum. The EUT's only data rate was measured. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input. The amplitude accuracy of the spectrum analyzer was further enhanced by calibrating the setup using the power meter and synthesized signal generator.

Prior to measuring peak transmit power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Peak Transmit Power. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report.

Method #1 found in FCC Public Notice DA02-2138 was used because the analyzer sweep time was less than or equal to T.

The spectrum analyzer settings were as follows:

- The span was set to encompass entire emission bandwidth (B), centered on the transmit channel.
- The RBW = 1 MHz, VBW \geq 3 MHz
- Sample detector mode because the bin width (span / number of spectral points) < 0.5 RBW.
- Trace average 100 traces in power averaging mode (not video averaging).
- Power was integrated across "B", by using the channel power function of the analyzer.

EMC

Peak Transmit Power

EUT: Rad-87	Work Order: MASI0009
Serial Number: J00073	Date: 09/17/08
Customer: Masimo Corporation	Temperature: 22.8°C
Pass: Eugene Kim	Humidity: 53%
Project: None	Barometric Pres.: 1011.7mb
Tested by: Jaemi Suh	Power: 120V/60Hz
	Job Site: OC11

TEST SPECIFICATIONS		Test Method
FCC 15.407:2007		ANSI C63.4:2003 DA 02-2138:2002

COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

Configuration #	2	Signature 
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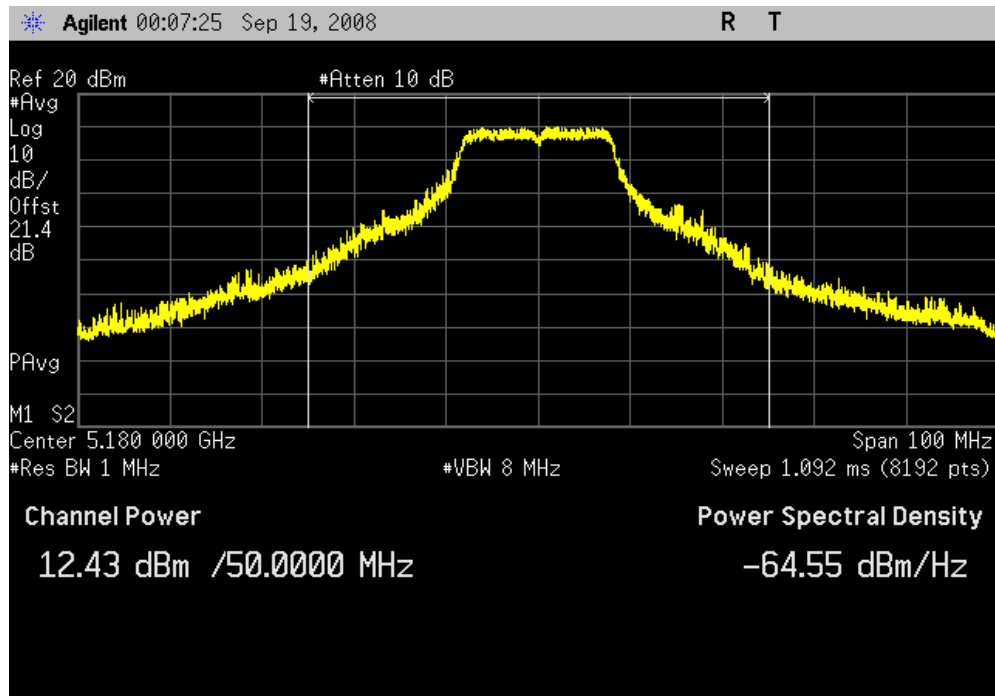
	Value	Limit	Results
Channel 36, 5180 MHz			
6 Mbps	12.43 dBm	17 dBm	Pass
36 Mbps	12.31 dBm	17 dBm	Pass
54 Mbps	11.87 dBm	17 dBm	Pass
Channel 48, 5240 MHz			
6 Mbps	12.84 dBm	17 dBm	Pass
36 Mbps	12.75 dBm	17 dBm	Pass
54 Mbps	12.08 dBm	17 dBm	Pass

Channel 36, 5180 MHz, 6 Mbps

Result: Pass

Value: 12.43 dBm

Limit: 17 dBm

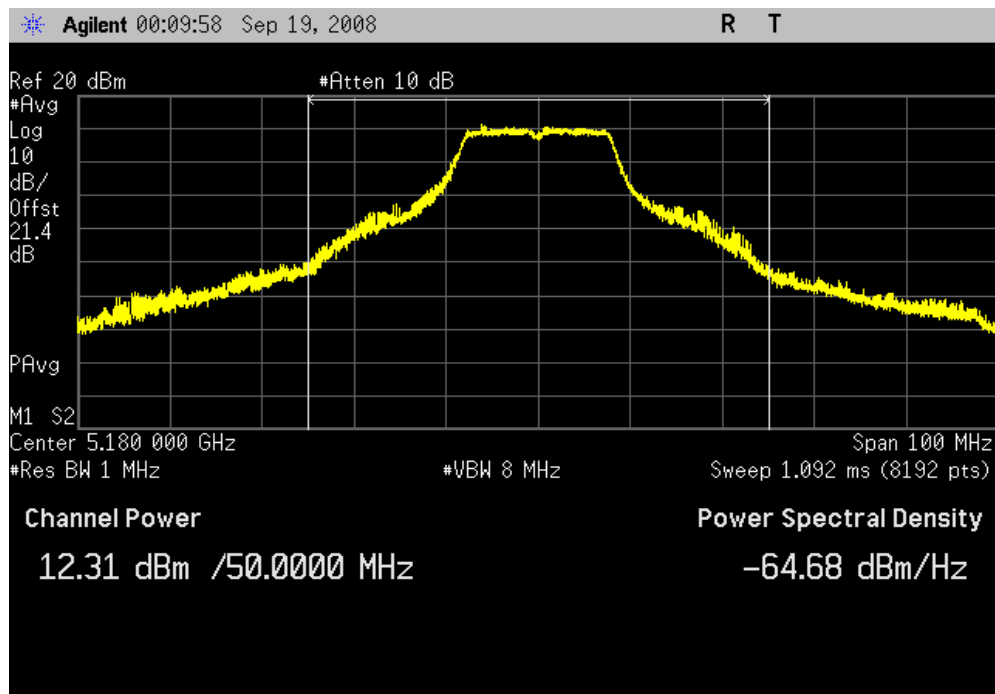


Channel 36, 5180 MHz, 36 Mbps

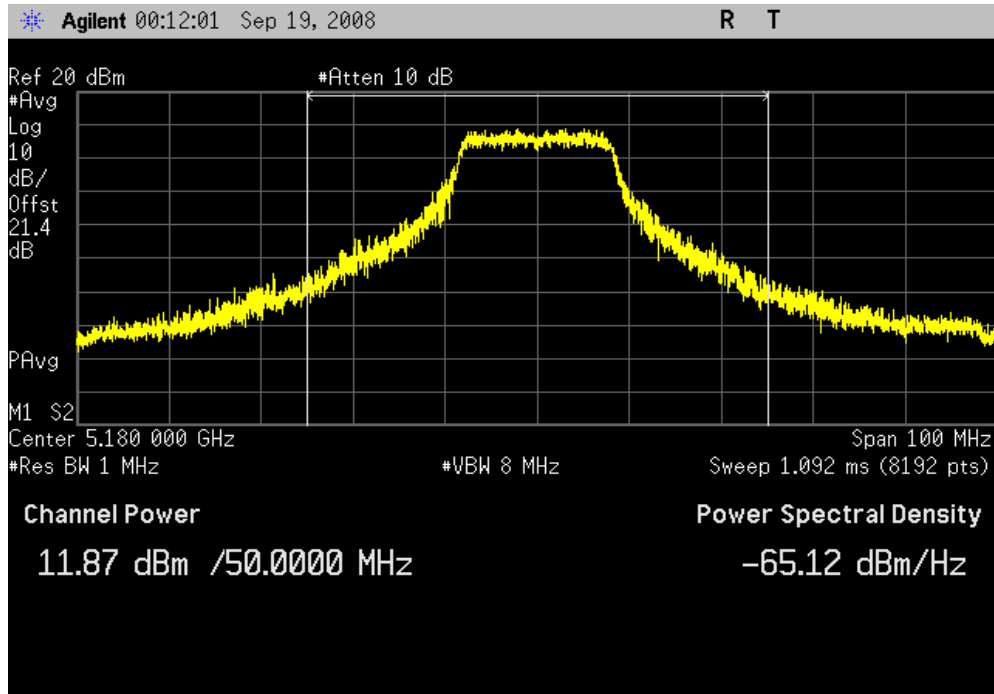
Result: Pass

Value: 12.31 dBm

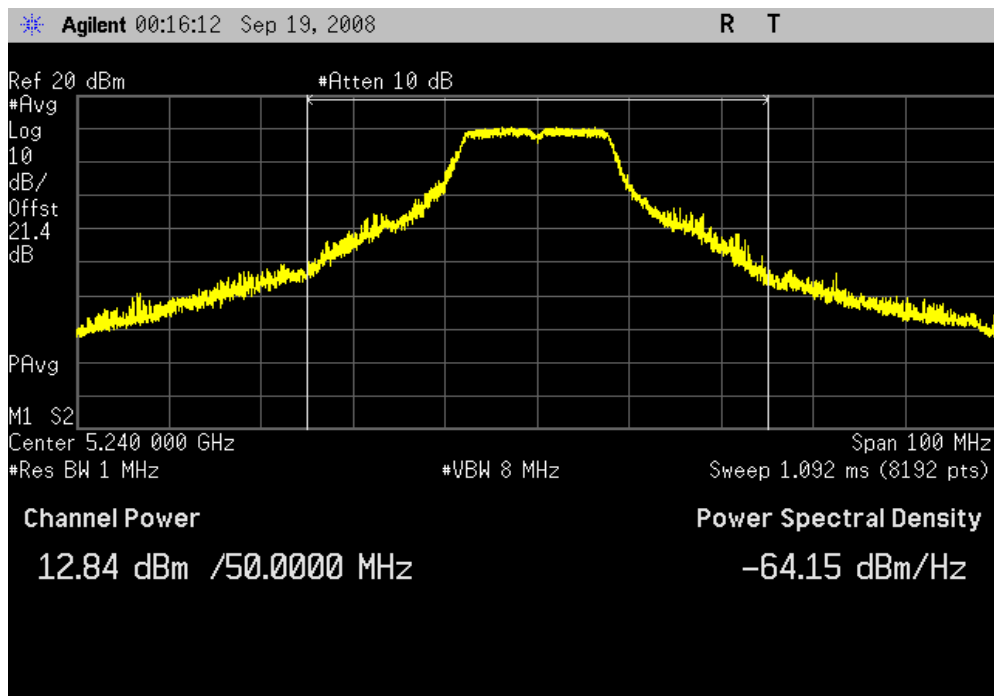
Limit: 17 dBm



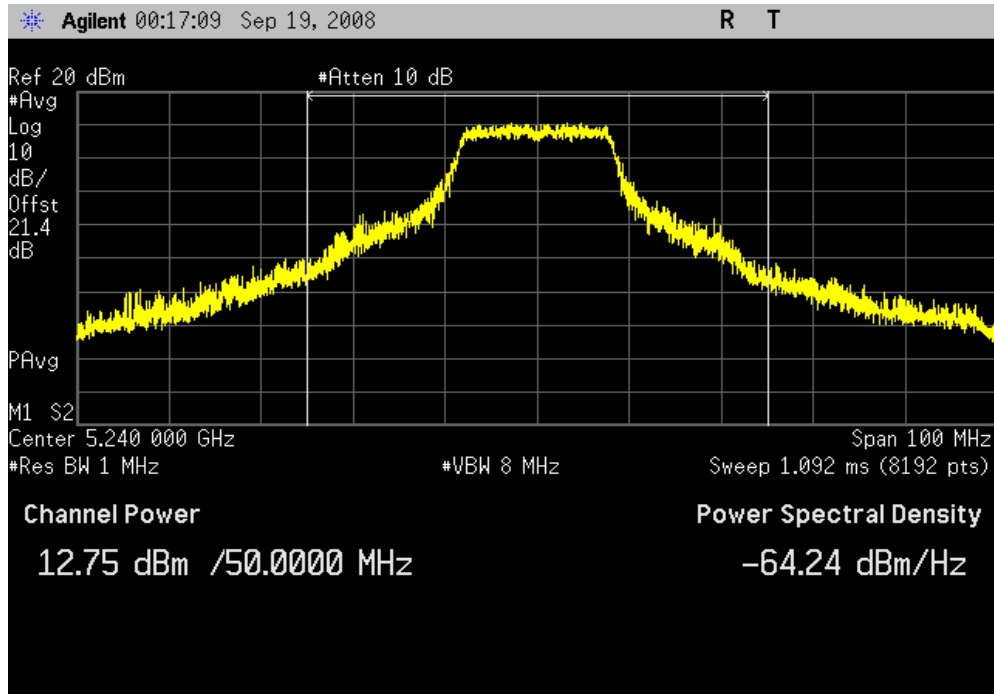
Channel 36, 5180 MHz, 54 Mbps		
Result: Pass	Value: 11.87 dBm	Limit: 17 dBm



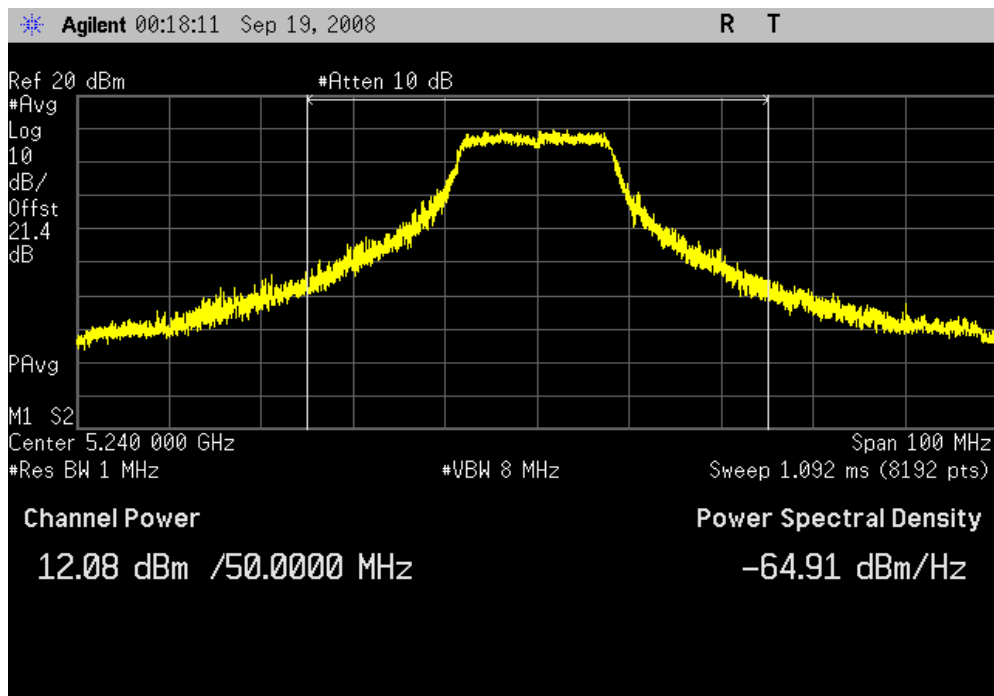
Channel 48, 5240 MHz, 6 Mbps		
Result: Pass	Value: 12.84 dBm	Limit: 17 dBm

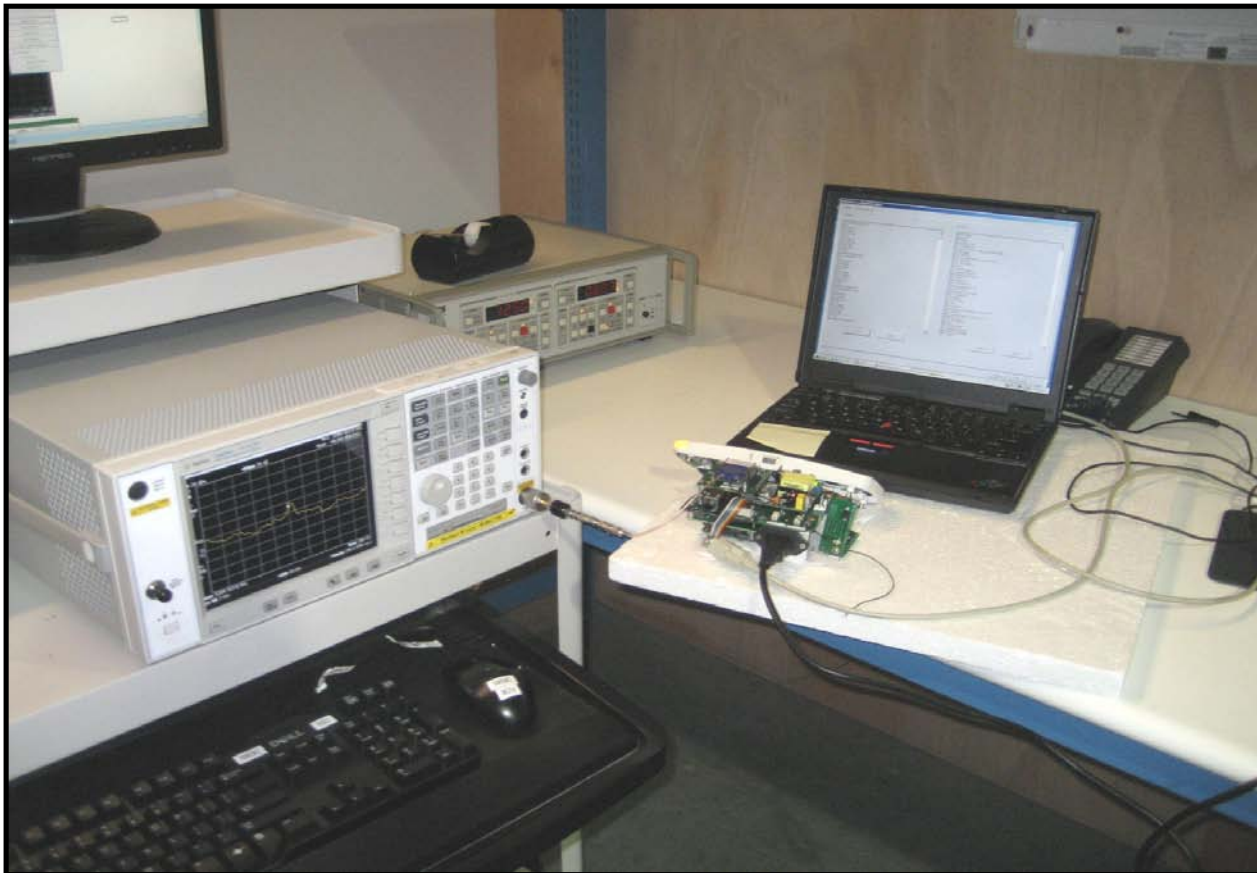
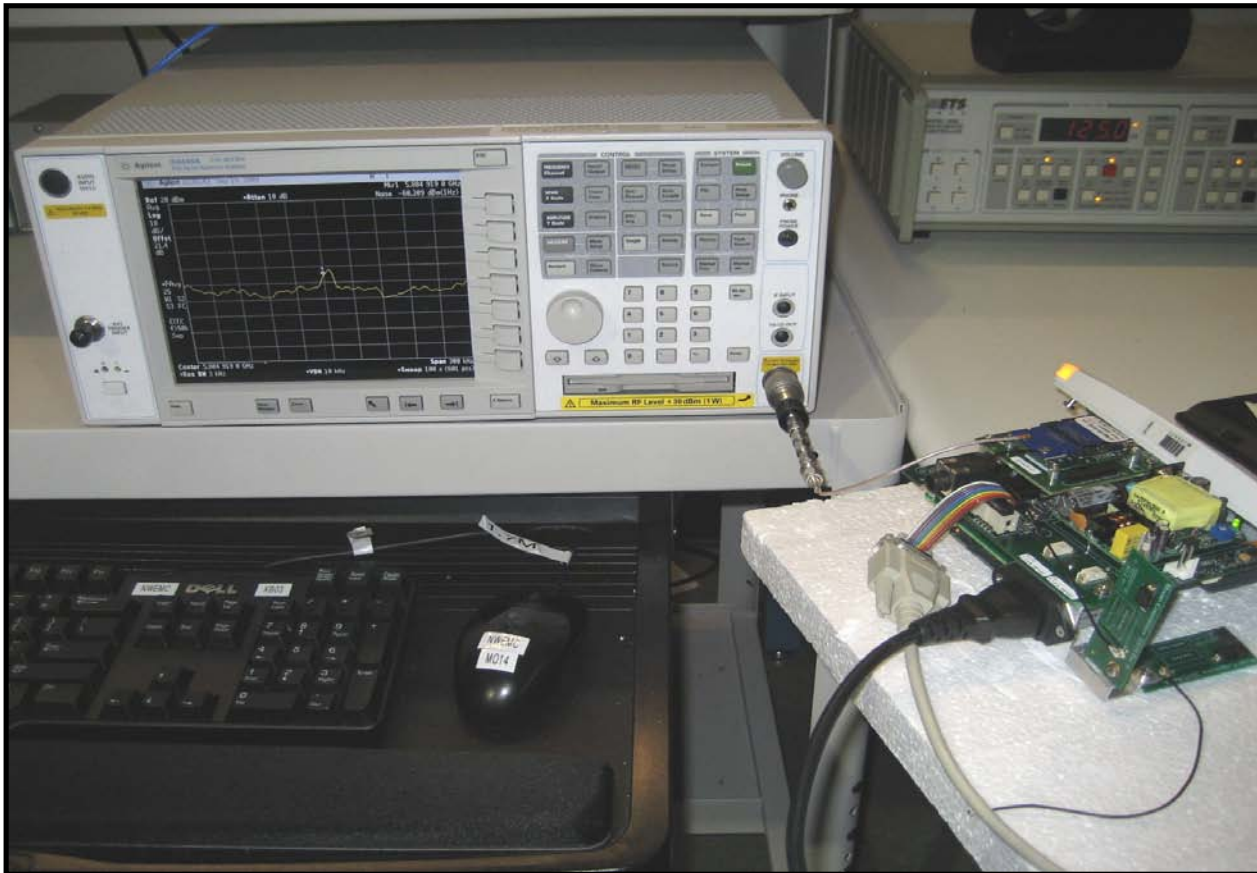


Channel 48, 5240 MHz, 36 Mbps		
Result: Pass	Value: 12.75 dBm	Limit: 17 dBm



Channel 48, 5240 MHz, 54 Mbps		
Result: Pass	Value: 12.08 dBm	Limit: 17 dBm







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
Chamber, Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPHS-32-3.5-SCT/AC	TBE	5/22/2008	13
Spectrum Analyzer	Hewlett Packard	8593E	AAP	12/14/2007	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


Variation of Supply Voltage

The primary supply voltage was varied over the range specified by the client. Per the client, the chip only works over this voltage range; it will shut off if the voltage is outside the specified range.

Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

A direct connect measurement was made between the EUT's antenna cable and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT. Measurements were made at the mid channel of each band to determine frequency stability. If the frequency variation is less than 100 ppm, the EUT will meet the requirement of 15.407(g), that the emissions are maintained within the band of operation.

NORTHWEST EMC		Frequency Stability		XMit 2007.06.13	
EUT: Rad-87			Work Order: MASI0002		
Serial Number: J00073			Date: 09/09/08		
Customer: Masimo Corporation			Temperature: 21.88°C		
Attendees: Eugene Kim			Humidity: 53%		
Project: None			Barometric Pres.: 1011.7		
Tested by: Mark Baytan		Power: 120 V/60Hz		Job Site: OC11	
TEST SPECIFICATIONS					
FCC 15.407:2007			Test Method		
ANSI C63.4:2003 DA 02-2138:2002					
COMMENTS					
None					
DEVIATIONS FROM TEST STANDARD					
No Deviations					
Configuration #		2		Signature 	

Normal Test Conditions

Temp (°C)	Power (Vdc)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
24	120.0	5200.000000	5200.000249	0.05	100

Extreme power source conditions

Power (Vdc)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
102.0	5200.000000	5200.000500	0.10	100

Power (Vdc)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
138.00	5200.000000	5199.999800	0.04	100

Extreme temperature conditions

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
-30	5200.000000	5199.999146	0.16	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
-20	5200.000000	5200.001400	0.27	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
-10	5200.000000	5200.000887	0.17	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
0	5200.000000	5199.998038	0.38	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
10	5200.000000	5199.998350	0.32	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
20	5200.000000	5199.999725	0.05	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
30	5200.000000	5200.000470	0.09	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
40	5200.000000	5199.999990	0.00	100

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)
50	5200.000000	5199.999913	0.02	100

