



Masimo Corporation

RDS7A/ROOT V2

FCC 15.207:2014

FCC 15.407:2014

Report # MASI0237 Rev. 1



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. This Report may only be duplicated in its entirety

Last Date of Test: September 16, 2014
Masimo Corporation
Model: RDS7A/ROOT V2

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2014	ANSI C63.10:2009
FCC 15.407:2014	ANSI C63.10:2009

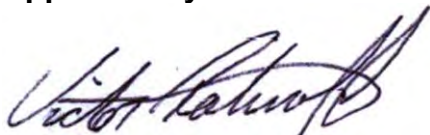
Results

Method Clause	Test Description	Applied	Results	Comments
6.2	AC Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.7	Band Edge Compliance	No	N/A	Not required, 5GHz band (ch 100-140) not used
6.8	Frequency Stability	Yes	Pass	
6.9.1	Emission Bandwidth	Yes	Pass	
6.10.3	Peak Transmit Power	Yes	Pass	
6.10.4	Peak Excursion of the Modulation Envelope	Yes	Pass	
6.11.1	Peak Power Spectral Density	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Victor Ratnoff, Operations Manager

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. 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 Number	Description	Date	Page Number
00	None		
01	Revised test description	01/23/2015	16

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIP / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFTA – Recognized by OFTA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

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

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

Measurement Uncertainty

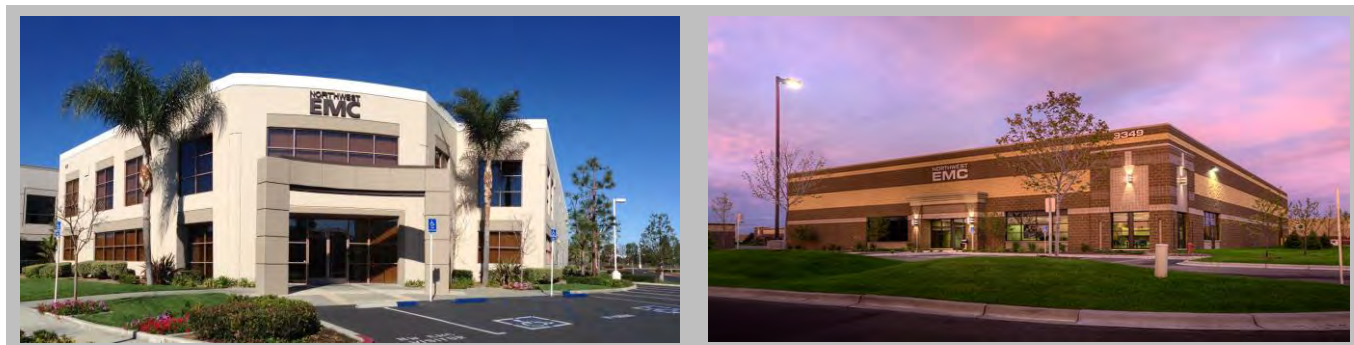
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

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 (K=2) for each test is listed below. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-1 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	3.80	-3.80
AC Powerline Conducted Emissions (dB)	2.94	-2.94

FACILITIES



California Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 9801 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Industry Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110



Client and Equipment Under Test (EUT) Information

Company Name:	Masimo Corporation
Address:	40 Parker
City, State, Zip:	Irvine, CA 92618
Test Requested By:	Michael Clark
Model:	RDS7A/ROOT V2
First Date of Test:	January 29, 2014
Last Date of Test:	September 16, 2014
Receipt Date of Samples:	January 19, 2014
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

The device is a Pulse Co-Oximeter incorporating an 802.11a wireless radio assembly. Masimo radio assembly part number = 24514.

Client Justification:

The radio contained within Model RAD7A/Radical 7 V2 is Identical to the radio contained within Model RDS7A/ROOT V2

Testing Objective:

To demonstrate compliance under FCC 15.407 for operation in the 5.2 GHz band(s).

Configuration MASI0151- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Pulse Co-Oximeter	Masimo Corporation	RAD7A/Radical 7	1000000349
Wireless Radio	Broadcom	BCM 4334/Azurewave AW-AH634	36235C

Configuration MASI0151- 3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Pulse Co-Oximeter	Masimo Corporation	RAD7A/Radical 7	1000000349
Wireless Radio	Broadcom	BCM 4334/Azurewave AW-AH634	24514

Configuration MASI0237- 1

Software/Firmware Running during test	
Description	Version
putty	0.62.0.0

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless Docking Station	Masimo Corporation	RDS7A/ROOT V2 (v1.1.3.6 i)	1000000020
Wireless Radio	Broadcom	BCM 4334/Azurewave AW-AH634	24514

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Pulse Co-Oximeter	Masimo Corporation	RAD7A/Radical 7 (v1.3.0.6 i-EN)	1000031805
Patient Sensor	Masimo Corporation	DCI	4A175
SedLine	Masimo Corporation	None	6001730
USB Memory Stick #1	Lexar	3813S	LJDV20-8GB-000-101A
USB Memory Stick #2	Lexar	3813S	LJDV20-8GB-000-103A

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Remote Laptop	Hewlett Packard	Probook 4420s	CNF0335MJG
Ethernet Router	Netgear	WGR614v10	28T1027D25470
AC/DC Power Supply	Netgear	AD661F	3010181421011408RR
AC Adapter	Hewlett Packard	PPP014H-S	4016-7021468F5-001

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Cable	No	3.0m	No	RDS7A/ROOT V2	AC Mains
Patient Sensor Cable	No	4.5m	No	RAD7A/Radical 7	Patient Sensor
Ethernet Cable (x4)	No	0.9m	No	RDS7A/ROOT V2	Terminated
Nurse Call Cable	Yes	1.8m	No	RDS7A/ROOT V2	Unterminated
SedLine Cable	No	5.0m	No	RDS7A/ROOT V2	Terminated
Ethernet Cable	No	10.0m	No	RDS7A/ROOT V2	Ethernet Router
Ethernet Cable	No	1.0m	No	Ethernet Router	Remote Laptop
DC Cable	No	1.6m	No	Ethernet Router	AC/DC Power Supply (AC Mains)
DC Cable	No	1.4m	Yes	Remote Laptop	AC Adapter
AC Cable	No	1.6m	No	AC Adapter	AC Mains

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	01/29/2014	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.
2	01/29/2014	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.
3	01/29/2014	Peak Power Spectral Density	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	01/29/2014	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.
5	01/29/2014	Duty Cycle	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	08/25/2014	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.
7	09/16/2014	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.
8	09/16/2014	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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

Continuously Transmitting 802.11a: High Channel 48, 5240 MHz
Continuously Transmitting 802.11a: Low Channel 36, 5180 MHz

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

MASI0237 - 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	4/22/2014	12 mo
Attenuator	Pasternack	6N10W-20	AWC	1/3/2014	12 mo
HP Filter	TTE	H97-100K-50-720B	HFP	3/1/2012	36 mo
OC06 Cables	N/A	Telecom Cables	OCP	8/15/2014	12 mo
Receiver	Rohde & Schwarz	ESCI	ARG	5/13/2014	12 mo

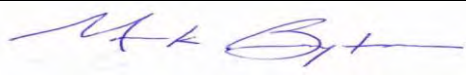
MEASUREMENT BANDWIDTHS

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.

TEST DESCRIPTION

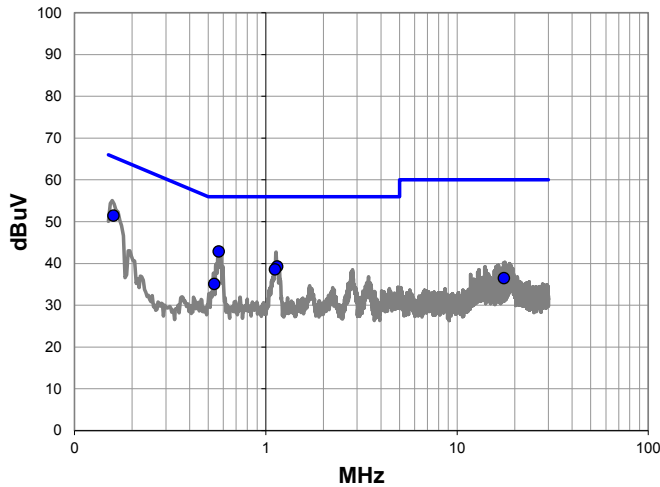
The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

Work Order:	MASI0237	Date:	09/16/14	
Project:	None	Temperature:	27.1 °C	
Job Site:	OC06	Humidity:	38.9% RH	
Serial Number:	1000000020	Barometric Pres.:	1011 mbar	
EUT:		RDS7A/ROOT V2		
Configuration:		1		
Customer:		Masimo Corporation		
Attendees:		Michael Clark		
EUT Power:		120VAC/60Hz		
Operating Mode:		Continuously Transmitting 802.11a: Low Channel 36, 5180 MHz		
Deviations:		None		
Comments:		Using Max Power Setting 90. RDS7A, p/n: 24514, p/n: 24412.		

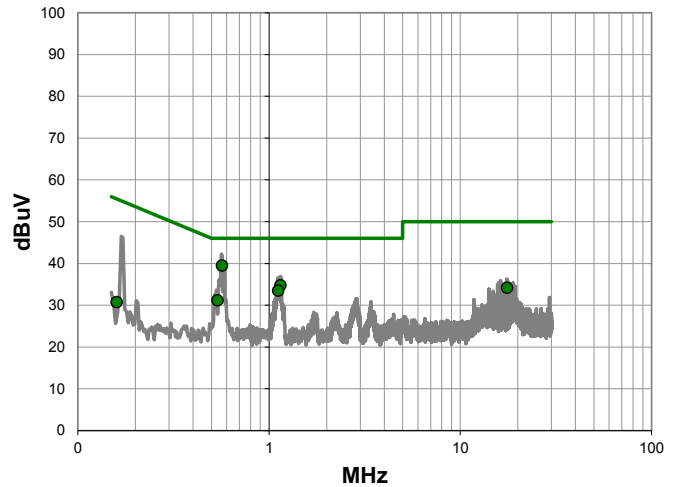
Test Specifications	Test Method
FCC 15.207:2014	ANSI C63.10:2009

Run #	7	Line:	High Line	Ext. Attenuation:	20	Results	Pass
-------	---	-------	-----------	-------------------	----	---------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit

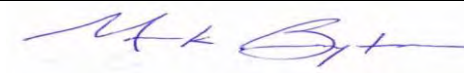


Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.567	22.7	20.2	42.9	56.0	-13.1
0.160	31.0	20.5	51.5	65.5	-14.0
1.147	19.1	20.2	39.3	56.0	-16.7
1.116	18.4	20.2	38.6	56.0	-17.4
0.537	14.9	20.2	35.1	56.0	-20.9
17.544	15.4	21.1	36.5	60.0	-23.5

Average Data - vs - Average Limit

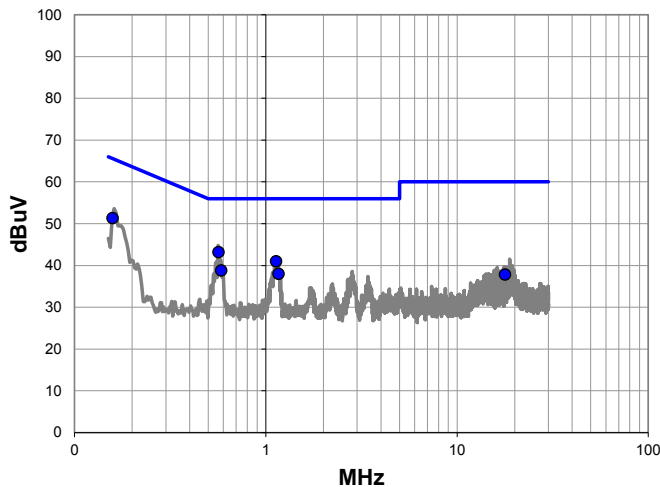
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.567	19.3	20.2	39.5	46.0	-6.5
1.147	14.6	20.2	34.8	46.0	-11.2
1.116	13.3	20.2	33.5	46.0	-12.5
0.537	11.0	20.2	31.2	46.0	-14.8
17.544	13.1	21.1	34.2	50.0	-15.8
0.160	10.3	20.5	30.8	55.5	-24.7

Work Order:	MAI0237	Date:	09/16/14		
Project:	None	Temperature:	27.1 °C		
Job Site:	OC06	Humidity:	38.9% RH		
Serial Number:	1000000020	Barometric Pres.:	1011 mbar	Tested by:	Mark Baytan
EUT:	RDS7A/ROOT V2				
Configuration:	1				
Customer:	Masimo Corporation				
Attendees:	Michael Clark				
EUT Power:	120VAC/60Hz				
Operating Mode:	Continuously Transmitting 802.11a: Low Channel 36, 5180 MHz				
Deviations:	None				
Comments:	Using Max Power Setting 90. RDS7A, p/n: 24514, p/n: 24412.				

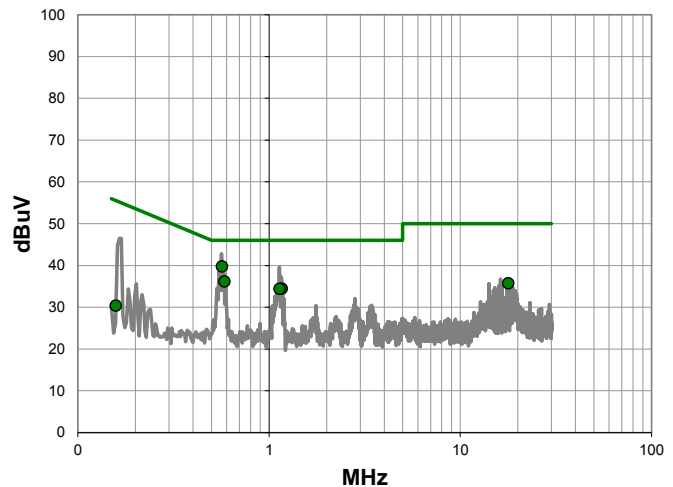
Test Specifications	Test Method
FCC 15.207:2014	ANSI C63.10:2009

Run #	8	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
-------	---	-------	---------	-------------------	----	---------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit




Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.566	23.0	20.2	43.2	56.0	-12.8
0.158	30.9	20.5	51.4	65.6	-14.2
1.132	20.8	20.2	41.0	56.0	-15.0
0.584	18.6	20.2	38.8	56.0	-17.2
1.163	17.8	20.2	38.0	56.0	-18.0
17.809	16.7	21.2	37.9	60.0	-22.1

Average Data - vs - Average Limit

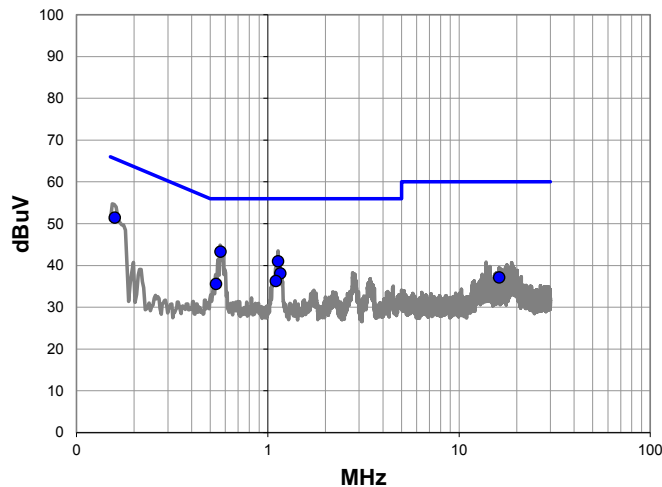
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.566	19.6	20.2	39.8	46.0	-6.2
0.584	16.0	20.2	36.2	46.0	-9.8
1.163	14.3	20.2	34.5	46.0	-11.5
1.132	14.2	20.2	34.4	46.0	-11.6
17.809	14.6	21.2	35.8	50.0	-14.2
0.158	9.9	20.5	30.4	55.6	-25.2

Work Order:	MAI0237	Date:	09/16/14		
Project:	None	Temperature:	27.1 °C		
Job Site:	OC06	Humidity:	38.9% RH		
Serial Number:	1000000020	Barometric Pres.:	1011 mbar	Tested by:	Mark Baytan
EUT:	RDS7A/ROOT V2				
Configuration:	1				
Customer:	Masimo Corporation				
Attendees:	Michael Clark				
EUT Power:	120VAC/60Hz				
Operating Mode:	Continuously Transmitting 802.11a: High Channel 48, 5240 MHz				
Deviations:	None				
Comments:	Using Max Power Setting 90. RDS7A, p/n: 24514, p/n: 24412.				

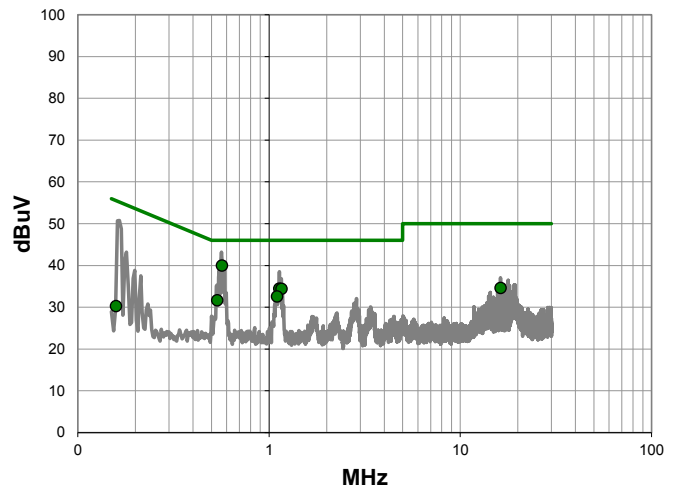
Test Specifications	Test Method
FCC 15.207:2014	ANSI C63.10:2009

Run #	9	Line:	High Line	Ext. Attenuation:	20	Results	Pass
-------	---	-------	-----------	-------------------	----	---------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit

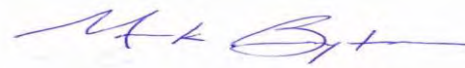


Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.566	23.1	20.2	43.3	56.0	-12.7
0.158	31.0	20.5	51.5	65.6	-14.1
1.131	20.8	20.2	41.0	56.0	-15.0
1.162	17.9	20.2	38.1	56.0	-17.9
1.101	16.1	20.2	36.3	56.0	-19.7
0.536	15.4	20.2	35.6	56.0	-20.4
16.215	16.1	21.0	37.1	60.0	-22.9

Average Data - vs - Average Limit

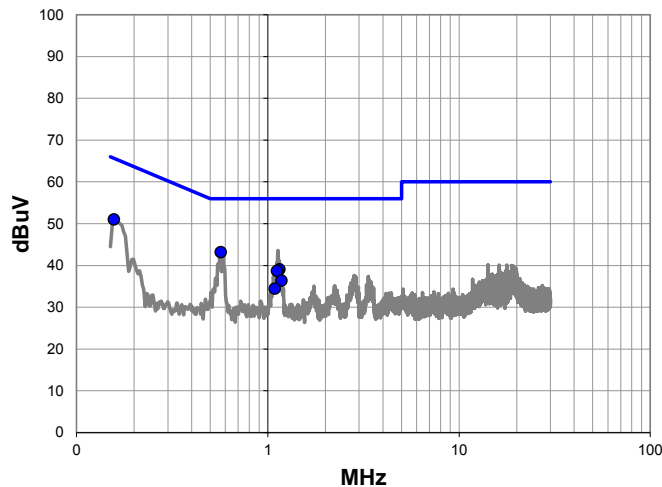
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.566	19.8	20.2	40.0	46.0	-6.0
1.131	14.3	20.2	34.5	46.0	-11.5
1.162	14.2	20.2	34.4	46.0	-11.6
1.101	12.4	20.2	32.6	46.0	-13.4
0.536	11.5	20.2	31.7	46.0	-14.3
16.215	13.6	21.0	34.6	50.0	-15.4
0.158	9.8	20.5	30.3	55.6	-25.3

Work Order:	MAI0237	Date:	09/16/14	
Project:	None	Temperature:	27.1 °C	
Job Site:	OC06	Humidity:	38.9% RH	
Serial Number:	1000000020	Barometric Pres.:	1011 mbar	Tested by: Mark Baytan
EUT:	RDS7A/ROOT V2			
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Michael Clark			
EUT Power:	120VAC/60Hz			
Operating Mode:	Continuously Transmitting 802.11a: High Channel 48, 5240 MHz			
Deviations:	None			
Comments:	Using Max Power Setting 90. RDS7A, p/n: 24514, p/n: 24412.			

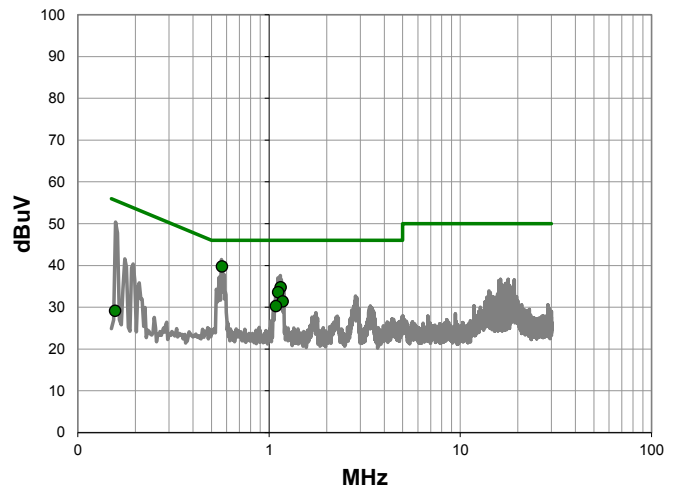
Test Specifications	Test Method
FCC 15.207:2014	ANSI C63.10:2009

Run #	10	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
-------	----	-------	---------	-------------------	----	---------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.566	23.0	20.2	43.2	56.0	-12.8
0.157	30.6	20.5	51.1	65.6	-14.6
1.148	18.9	20.2	39.1	56.0	-16.9
1.116	18.5	20.2	38.7	56.0	-17.3
1.177	16.2	20.2	36.4	56.0	-19.6
1.085	14.3	20.2	34.5	56.0	-21.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.566	19.6	20.2	39.8	46.0	-6.2
1.148	14.6	20.2	34.8	46.0	-11.2
1.116	13.4	20.2	33.6	46.0	-12.4
1.177	11.2	20.2	31.4	46.0	-14.6
1.085	10.1	20.2	30.3	46.0	-15.7
0.157	8.7	20.5	29.2	55.6	-26.5

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Continuously Transmitting at High Channel 48, 5240 MHz

Continuously Transmitting at Low Channel 36, 5180 MHz

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

MA5I0237 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz

Stop Frequency 40000 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
Cable	Fairview Microwave	SCA1814-0505-72	OC2	6/23/2014	12 mo
Low Pass Filter 0-1000 MHz	Micro-Tronics	LPM50004	LFC	11/27/2012	24 mo
Attenuator	Coaxicom	66702 3910AF-20	TKI	4/28/2014	12 mo
5.15-5.35 Notch Filter	Micro-Tronics	BRC50703	HGH	6/13/2013	24 mo
Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVQ	1/10/2014	12 mo
Antenna, Horn	ETS	3160-10	AIX	NCR	0 mo
Cable	ESM Cable Corp.	KMKM-72	OC1	1/9/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	1/10/2014	12 mo
Antenna, Horn	EMCO	3160-09	AHN	NCR	0 mo
OC floating Cable	N/A	18-26GHz RE Cables	OCK	2/6/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	10/24/2013	12 mo
Antenna, Horn	ETS	3160-08	AHT	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	10/24/2013	12 mo
Antenna, Horn	ETS	3160-07	AHR	NCR	0 mo
OC 10 Cables	N/A	8-18GHz RE Cables	OCO	10/24/2013	12 mo
Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6/17/2014	12 mo
Antenna, Horn	EMCO	3115	AHB	3/10/2014	24 mo
OC10 Cables	N/A	1-8GHz RE Cables	OCJ	6/17/2014	12 mo
Antenna, Biconilog	EMCO	3142	AXB	6/2/2013	24 mo
OC10 Cables	N/A	10kHz-1GHz RE Cables	OCH	4/28/2014	12 mo
Pre-Amplifier	Miteq	AM-1064-9079	AOO	4/28/2014	12 mo
Spectrum Analyzer	Agilent	E4440A	AAW	2/21/2013	24 mo

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT were tested. The EUT was configured for the lowest and the highest transmit frequency in the 5150 - 5250 MHz 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.

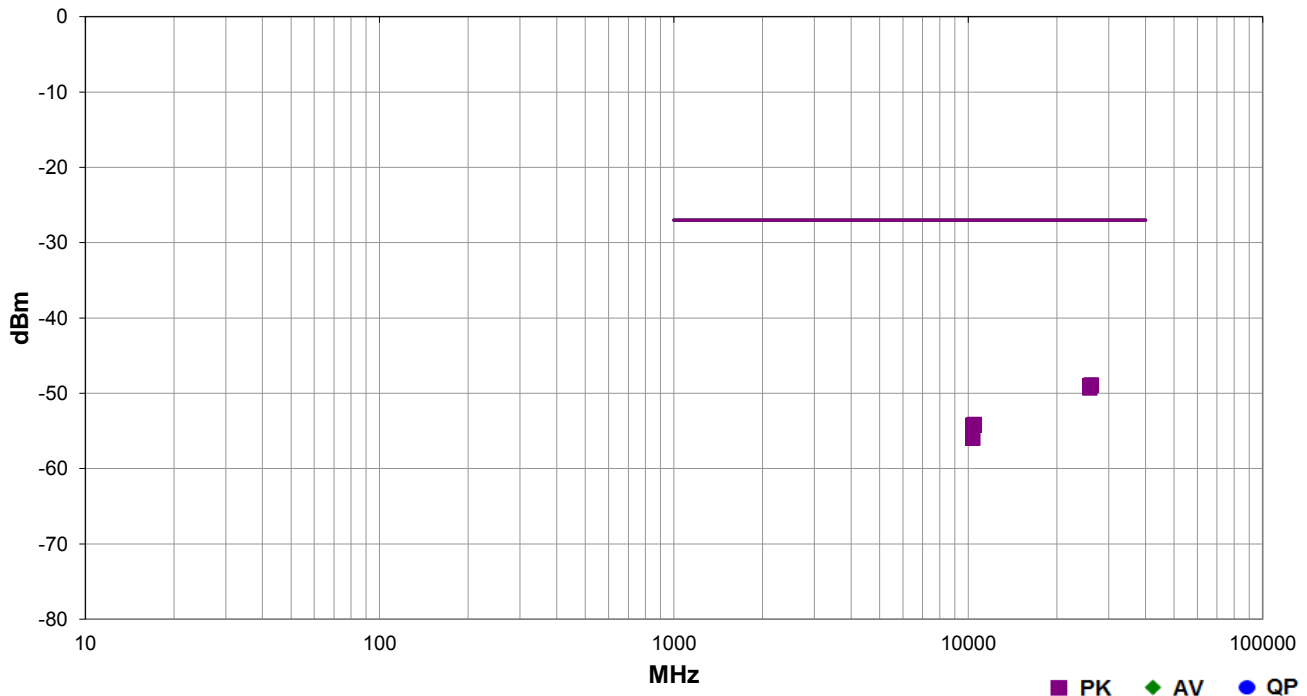
While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10:2009). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS


Work Order:	MAI0237	Date:	09/11/14	
Project:	None	Temperature:	24.6 °C	
Job Site:	OC07	Humidity:	45.2% RH	
Serial Number:	1000000020	Barometric Pres.:	1011 mbar	
EUT:		RDS7A/ROOT V2		
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Michael Clark			
EUT Power:	120VAC/60Hz			
Operating Mode:	Continuously Transmitting at Ch. 36annel 36, 5180 MHz & Ch. 48annel 48, 5240 MHz			
Deviations:	None			
Comments:	Using Max Power Setting 90. RDS7A, p/n: 24514, p/n: 24412.			

Test Specifications	Test Method
FCC 15.407:2014	ANSI C63.10:2009

Run #	16	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
-------	----	-------------------	---	-------------------	-----------	---------	------

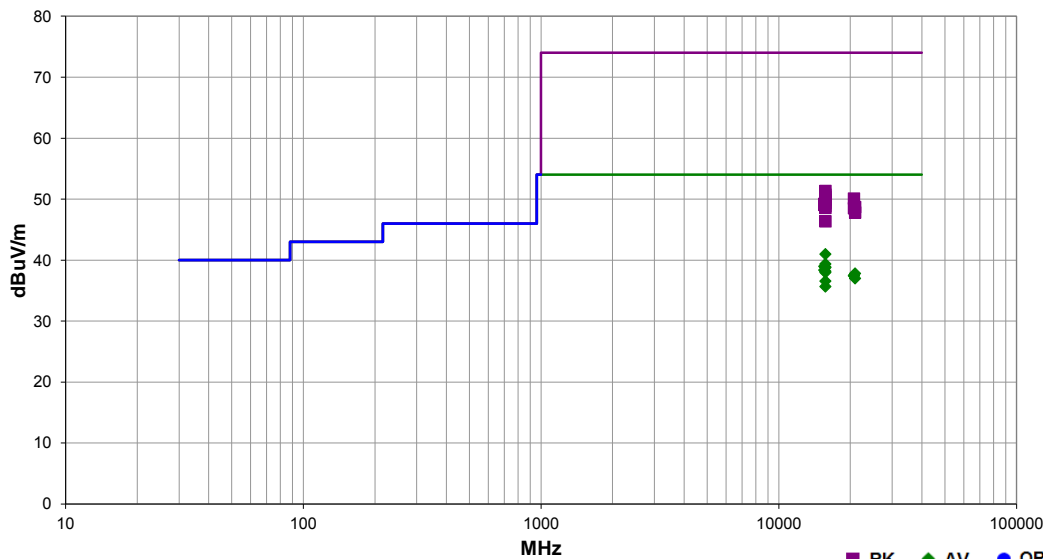


	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
	26200.130	1.1	145.0	Vert	PK	1.28E-08	-48.9	-27.0	-21.9	Ch. 48, 6Mbps, EUT on Side
	26199.880	1.1	262.0	Horz	PK	1.28E-08	-48.9	-27.0	-21.9	Ch. 48, 6Mbps, EUT on Side
	25899.270	1.1	359.0	Horz	PK	1.26E-08	-49.0	-27.0	-22.0	Ch. 36, 6Mbps, EUT on Side
	25899.470	1.1	182.0	Vert	PK	1.18E-08	-49.3	-27.0	-22.3	Ch. 36, 6Mbps, EUT on Side
	10482.650	1.0	150.0	Vert	PK	3.86E-09	-54.1	-27.0	-27.1	Ch. 48, 6Mbps, EUT on Side
	10479.030	1.0	135.0	Horz	PK	3.77E-09	-54.2	-27.0	-27.2	Ch. 48, 6Mbps, EUT on Side
	10361.280	1.0	283.0	Horz	PK	3.77E-09	-54.2	-27.0	-27.2	Ch. 36, 6Mbps, EUT on Side
	10356.400	1.0	127.0	Vert	PK	2.55E-09	-55.9	-27.0	-28.9	Ch. 36, 6Mbps, EUT on Side


Work Order:	MA5I0237	Date:	09/11/14	
Project:	None	Temperature:	24.6 °C	
Job Site:	OC07	Humidity:	45.2% RH	
Serial Number:	100000020	Barometric Pres.:	1011 mbar	
EUT:	RDS7A/ROOT V2			Tested by: Johnny Candelas
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Michael Clark			
EUT Power:	120VAC/60Hz			
Operating Mode:	Continuously Transmitting at Ch. 36annel 36, 5180 MHz & Ch. 48annel 48, 5240 MHz			
Deviations:	None			
Comments:	Using Max Power Setting 90. RDS7A, p/n: 24514, p/n: 24412.			

Test Specifications	FCC 15.407:2014	Test Method	ANSI C63.10:2009
---------------------	-----------------	-------------	------------------

Run #	16	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
-------	----	-------------------	---	-------------------	-----------	---------	------

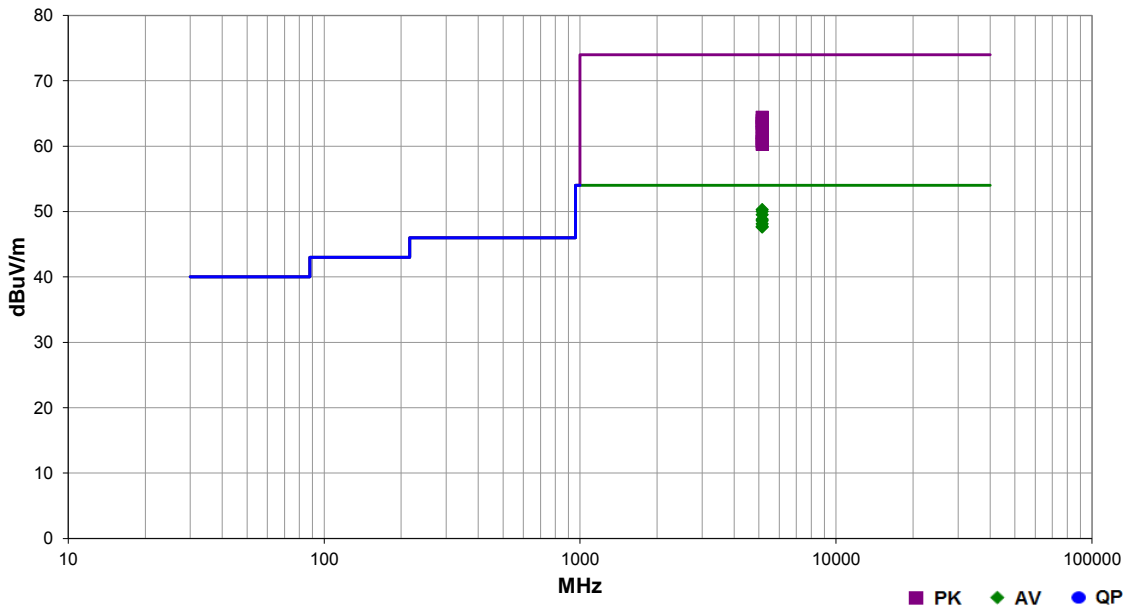


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
15719.370	37.5	3.5	1.0	226.0	3.0	0.0	Vert	AV	0.0	41.0	54.0	-13.0	Ch. 48, 6Mbps, EUT on Side
15717.550	35.9	3.5	1.0	275.0	3.0	0.0	Horz	AV	0.0	39.4	54.0	-14.6	Ch. 48, 6Mbps, EUT on Side
15543.630	36.0	3.0	1.0	226.0	3.0	0.0	Vert	AV	0.0	39.0	54.0	-15.0	Ch. 36, 6Mbps, EUT on Side
15720.420	35.4	3.5	1.0	349.0	3.0	0.0	Vert	AV	0.0	38.9	54.0	-15.1	Ch. 48, 6Mbps, EUT Horiz
15720.860	35.3	3.5	1.0	226.0	3.0	0.0	Vert	AV	0.0	38.8	54.0	-15.2	Ch. 48, 36Mbps, EUT on Side
15539.950	35.4	3.0	1.0	138.0	3.0	0.0	Horz	AV	0.0	38.4	54.0	-15.6	Ch. 36, 6Mbps, EUT on Side
15718.220	34.7	3.5	1.0	258.0	3.0	0.0	Horz	AV	0.0	38.2	54.0	-15.8	Ch. 48, 6Mbps, EUT Horiz
15720.120	34.5	3.5	1.0	219.0	3.0	0.0	Horz	AV	0.0	38.0	54.0	-16.0	Ch. 48, 6Mbps, EUT Vert
20959.880	37.8	0.0	1.1	239.0	3.0	0.0	Horz	AV	0.0	37.8	54.0	-16.2	Ch. 48, 6Mbps, EUT on Side
20718.720	37.5	0.0	1.1	268.0	3.0	0.0	Horz	AV	0.0	37.5	54.0	-16.5	Ch. 36, 6Mbps, EUT on Side
20719.170	37.4	0.0	1.1	98.0	3.0	0.0	Vert	AV	0.0	37.4	54.0	-16.6	Ch. 36, 6Mbps, EUT on Side
20959.960	37.0	0.0	1.1	264.0	3.0	0.0	Vert	AV	0.0	37.0	54.0	-17.0	Ch. 48, 6Mbps, EUT on Side
15719.930	33.1	3.5	1.0	136.0	3.0	0.0	Vert	AV	0.0	36.6	54.0	-17.4	Ch. 48, 6Mbps, EUT Vert
15719.760	32.2	3.5	1.0	226.0	3.0	0.0	Vert	AV	0.0	35.7	54.0	-18.3	Ch. 48, 54Mbps, EUT on Side
15719.270	47.9	3.5	1.0	226.0	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6	Ch. 48, 6Mbps, EUT on Side
15715.180	47.3	3.4	1.0	349.0	3.0	0.0	Vert	PK	0.0	50.7	74.0	-23.3	Ch. 48, 6Mbps, EUT Horiz
15722.670	46.9	3.5	1.0	219.0	3.0	0.0	Horz	PK	0.0	50.4	74.0	-23.6	Ch. 48, 6Mbps, EUT Vert
20720.870	50.1	0.0	1.1	98.0	3.0	0.0	Vert	PK	0.0	50.1	74.0	-23.9	Ch. 36, 6Mbps, EUT on Side
15719.630	46.4	3.5	1.0	275.0	3.0	0.0	Horz	PK	0.0	49.9	74.0	-24.1	Ch. 48, 6Mbps, EUT on Side
15721.280	45.9	3.5	1.0	226.0	3.0	0.0	Vert	PK	0.0	49.4	74.0	-24.6	Ch. 48, 36Mbps, EUT on Side
15536.350	46.3	2.9	1.0	226.0	3.0	0.0	Vert	PK	0.0	49.2	74.0	-24.8	Ch. 36, 6Mbps, EUT on Side
15539.470	46.1	3.0	1.0	138.0	3.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	Ch. 36, 6Mbps, EUT on Side
15719.030	45.4	3.5	1.0	258.0	3.0	0.0	Horz	PK	0.0	48.9	74.0	-25.1	Ch. 48, 6Mbps, EUT Horiz
20960.130	48.7	0.0	1.1	239.0	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	Ch. 48, 6Mbps, EUT on Side
15717.000	45.1	3.5	1.0	136.0	3.0	0.0	Vert	PK	0.0	48.6	74.0	-25.4	Ch. 48, 6Mbps, EUT Vert
20719.770	48.5	0.0	1.1	268.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5	Ch. 36, 6Mbps, EUT on Side
20960.770	47.8	0.0	1.1	264.0	3.0	0.0	Vert	PK	0.0	47.8	74.0	-26.2	Ch. 48, 6Mbps, EUT on Side
15719.500	42.9	3.5	1.0	226.0	3.0	0.0	Vert	PK	0.0	46.4	74.0	-27.6	Ch. 48, 54Mbps, EUT on Side

Work Order:	MASI0237	Date:	09/16/14	
Project:	None	Temperature:	25.5 °C	
Job Site:	OC07	Humidity:	44.7% RH	
Serial Number:	100000020	Barometric Pres.:	1008 mbar	Tested by: Johnny Candelas
EUT:	RDS7A/ROOT V2			
Configuration:	1			
Customer:	Masimo Corporation			
Attendees:	Michael Clark			
EUT Power:	120VAC/60Hz			
Operating Mode:	Continuously Transmitting at Ch. 36annel 36, 5180 MHz			
Deviations:	None			
Comments:	Using Max Power Setting 90. RDS7A, p/n: 24514, p/n: 24412.			

Test Specifications	Test Method
FCC 15.407:2014	ANSI C63.10:2009

Run #	78	Test Distance (m)	1	Antenna Height(s)	1 to 3.9(m)	Results	Pass
-------	----	-------------------	---	-------------------	-------------	---------	------



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
5149.742	24.9	34.9	1.0	142.0	1.0	0.0	Vert	AV	-9.5	50.3	54.0	-3.7	Ch. 36, 6Mbps, EUT on Side
5149.863	24.6	34.9	1.0	142.0	1.0	0.0	Vert	AV	-9.5	50.0	54.0	-4.0	Ch. 36, 36Mbps, EUT on Side
5149.912	24.1	34.9	1.0	142.0	1.0	0.0	Vert	AV	-9.5	49.5	54.0	-4.5	Ch. 36, 54Mbps, EUT on Side
5149.998	23.4	34.9	1.0	0.0	1.0	0.0	Horz	AV	-9.5	48.8	54.0	-5.2	Ch. 36, 6Mbps, EUT Horiz
5149.790	23.2	34.9	1.0	117.0	1.0	0.0	Vert	AV	-9.5	48.6	54.0	-5.4	Ch. 36, 6Mbps, EUT Vert
5149.680	22.7	34.9	1.0	208.0	1.0	0.0	Horz	AV	-9.5	48.1	54.0	-5.9	Ch. 36, 6Mbps, EUT Vert
5149.963	22.3	34.9	1.0	359.0	1.0	0.0	Vert	AV	-9.5	47.7	54.0	-6.3	Ch. 36, 6Mbps, EUT Horiz
5149.920	22.2	34.9	1.0	125.0	1.0	0.0	Horz	AV	-9.5	47.6	54.0	-6.4	Ch. 36, 6Mbps, EUT on Side
5149.253	39.0	34.9	1.0	142.0	1.0	0.0	Vert	PK	-9.5	64.4	74.0	-9.6	Ch. 36, 6Mbps, EUT on Side
5149.428	38.5	34.9	1.0	142.0	1.0	0.0	Vert	PK	-9.5	63.9	74.0	-10.1	Ch. 36, 36Mbps, EUT on Side
5149.369	38.1	34.9	1.0	142.0	1.0	0.0	Vert	PK	-9.5	63.5	74.0	-10.5	Ch. 36, 54Mbps, EUT on Side
5149.762	37.6	34.9	1.0	117.0	1.0	0.0	Vert	PK	-9.5	63.0	74.0	-11.0	Ch. 36, 6Mbps, EUT Vert
5149.047	36.7	34.9	1.0	0.0	1.0	0.0	Horz	PK	-9.5	62.1	74.0	-11.9	Ch. 36, 6Mbps, EUT Horiz
5149.113	35.7	34.9	1.0	125.0	1.0	0.0	Horz	PK	-9.5	61.1	74.0	-12.9	Ch. 36, 6Mbps, EUT on Side
5149.380	35.3	34.9	1.0	359.0	1.0	0.0	Vert	PK	-9.5	60.7	74.0	-13.3	Ch. 36, 6Mbps, EUT Horiz
5149.622	34.9	34.9	1.0	208.0	1.0	0.0	Horz	PK	-9.5	60.3	74.0	-13.7	Ch. 36, 6Mbps, EUT Vert

FREQUENCY STABILITY

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 (mos)
MultiMeter	Fluke	79 III	MMD	2/4/2013	36
Power Meter	Amplifier Research	PM2002	SQA	3/14/2014	12
Power Sensor	Hewlett Packard	8481	SQP	3/3/2014	12
Signal Generator	Agilent	E8257D	TGU	2/1/2012	36
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2014	12
OC13 Cables	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Spectrum Analyzer	Agilent	E4446A	AAY	2/22/2013	24

TEST DESCRIPTION

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 edges of the main transmit bands as called out on the data sheets. Testing was done with an absence of modulation in a CW mode of operation.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage 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.

Per the requirements of FCC 15.407:


"Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual."

No specific limits are provided in either FCC 15.407, the product specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. While there are no limits called out, any results less than 100ppm will still allow the radio to be operating within the band.

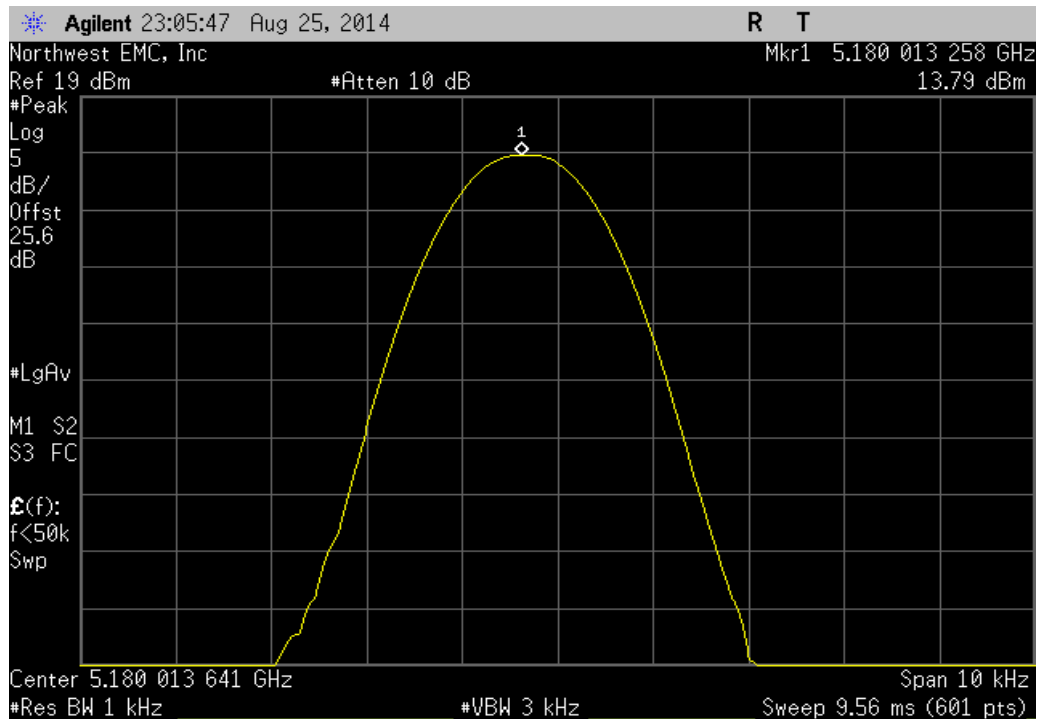


FREQUENCY STABILITY

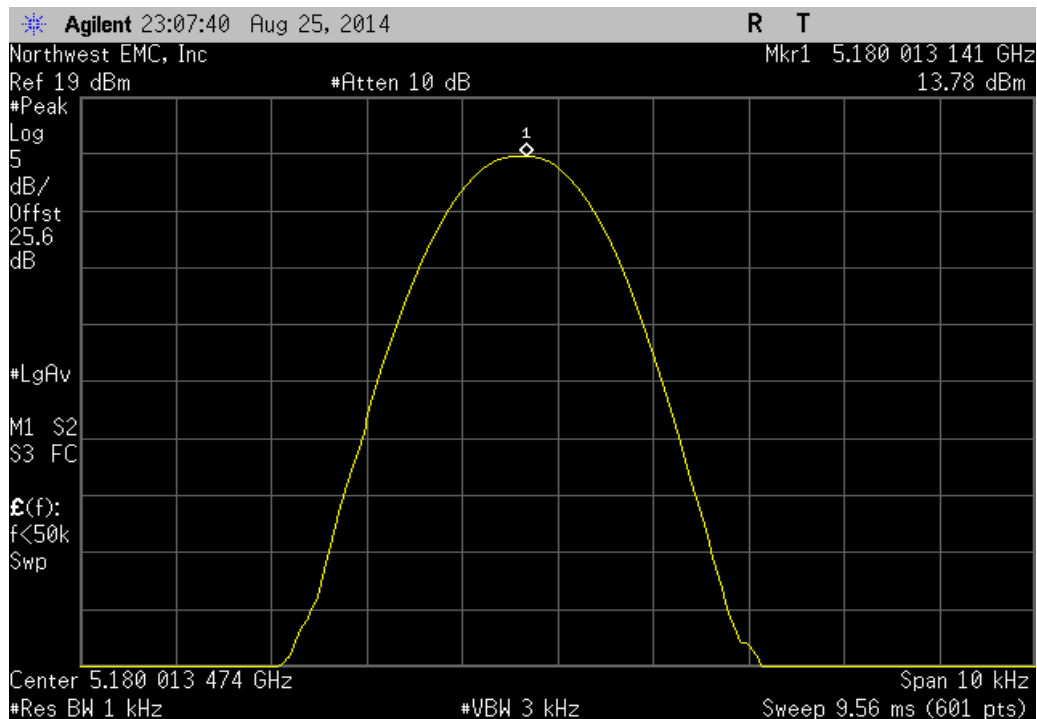
XMIT 2014.02.07
NweTx 2014.07.18.3

EUT: RAD7A/Radical 7		Work Order: MASI0151				
Serial Number: 1000000349		Date: 08/25/14				
Customer: Masimo Corporation		Temperature: 25.1°C				
Attendees: Michael Clark		Humidity: 42%				
Project: None		Barometric Pres.: 1011				
Tested by: Mark Baytan		Power: 120VAC/60Hz				
		Job Site: OC13				
TEST SPECIFICATIONS		Test Method				
FCC 15.407:2014		ANSI C63.10:2009				
COMMENTS						
TX Power = 30						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	3	Signature 				
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
5150 MHz - 5250 MHz - Low Channel, Ch. 36, 5180 MHz						
Voltage: 115%		5180.013258	5180	2.6	100	Pass
Voltage: 100%		5180.013141	5180	2.5	100	Pass
Voltage: 85%		5180.012506	5180	2.4	100	Pass
Temperature: +50°		5180.010461	5180	2	100	Pass
Temperature: +40°		5180.008757	5180	1.7	100	Pass
Temperature: +30°		5180.008724	5180	1.7	100	Pass
Temperature: +20°		5180.01606	5180	3.1	100	Pass
Temperature: +10°		5180.02165	5180	4.2	100	Pass
Temperature: 0°		5180.021231	5180	4.1	100	Pass
Temperature: -10°		5180.020549	5180	4	100	Pass
Temperature: -20°		5180.020899	5180	4	100	Pass
Temperature: -30°		5180.021699	5180	4.2	100	Pass

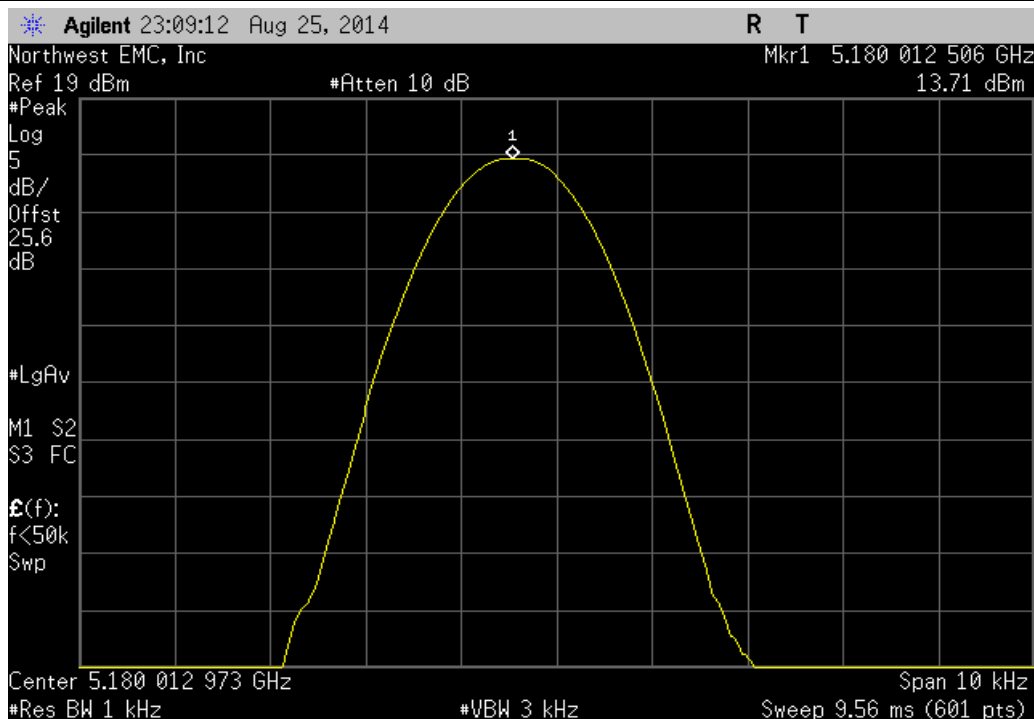
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.013258	5180	2.6	100	Pass



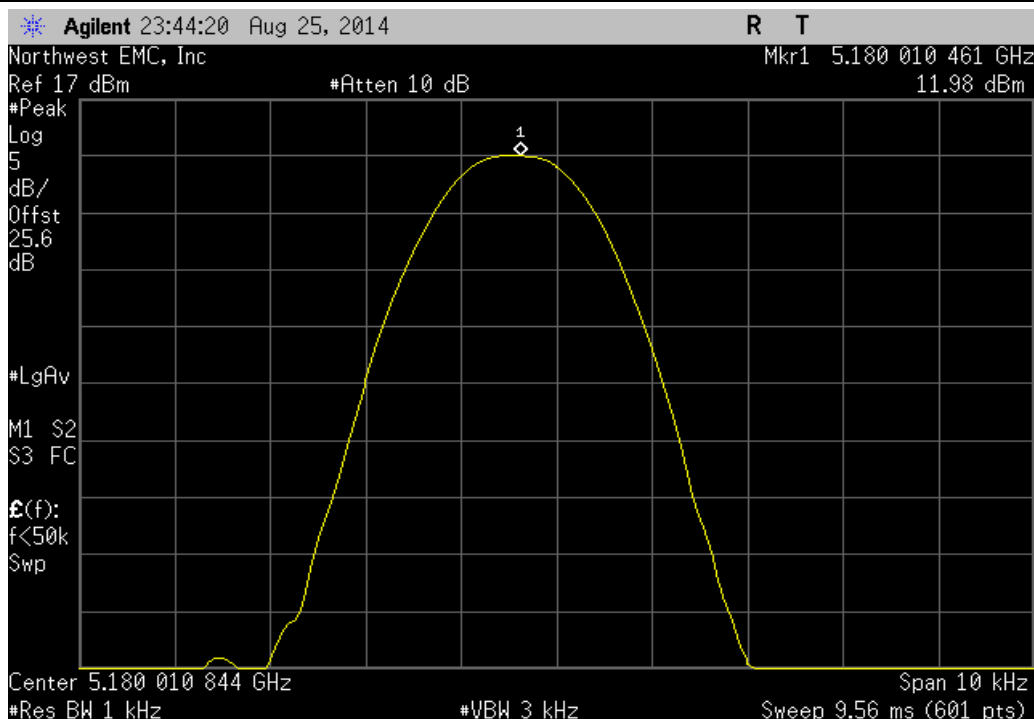
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.013141	5180	2.5	100	Pass



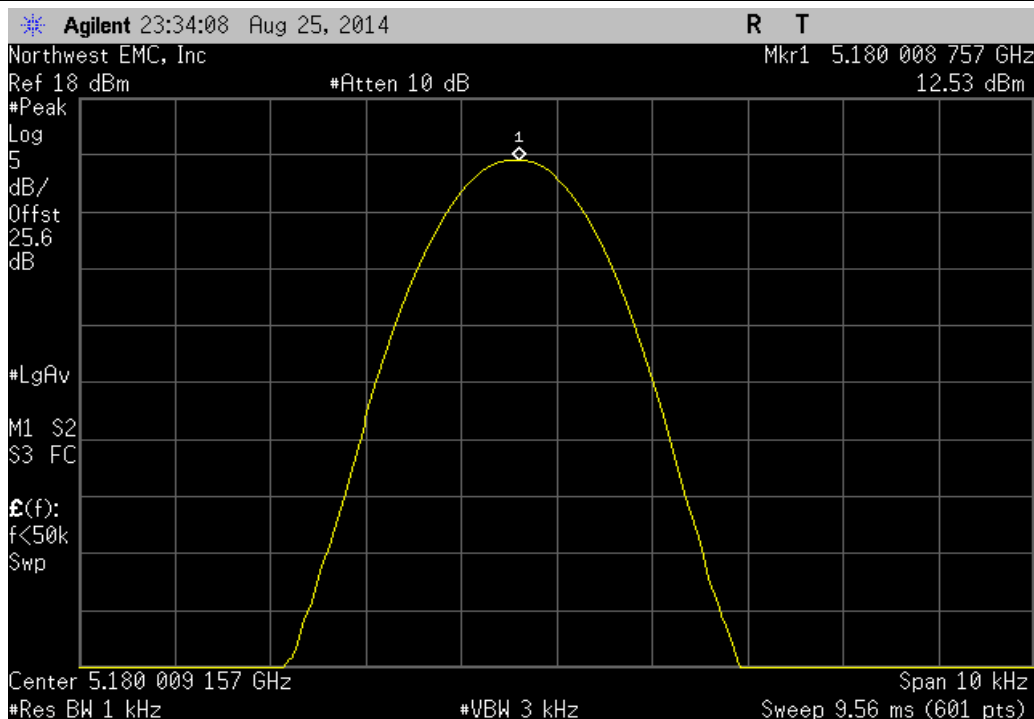
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.012506	5180	2.4	100	Pass



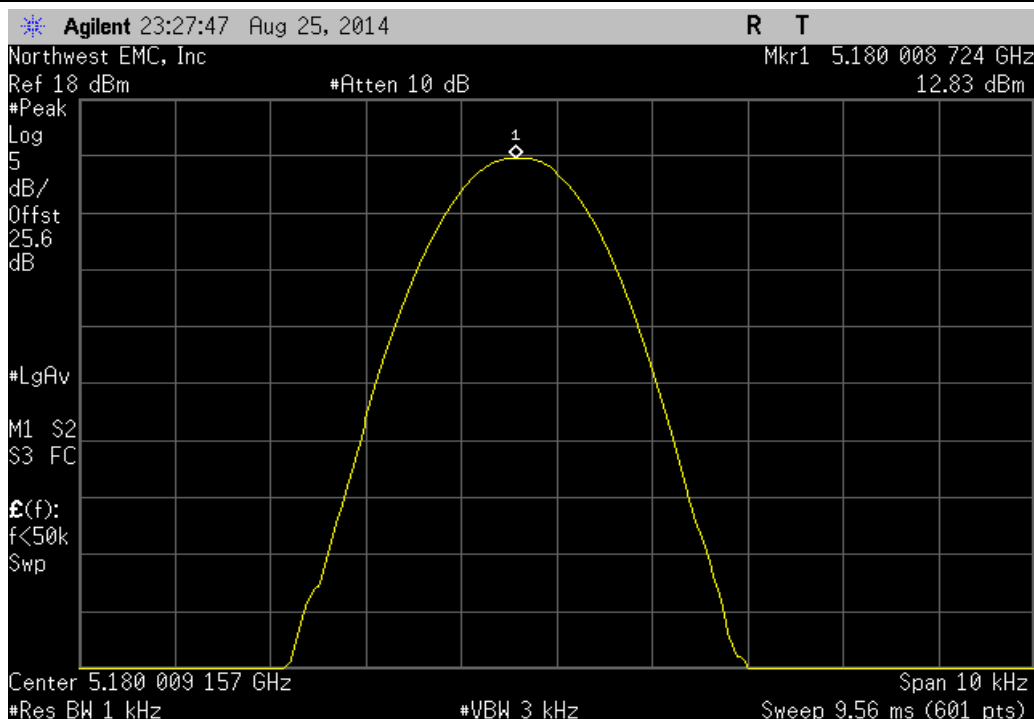
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.010461	5180	2	100	Pass



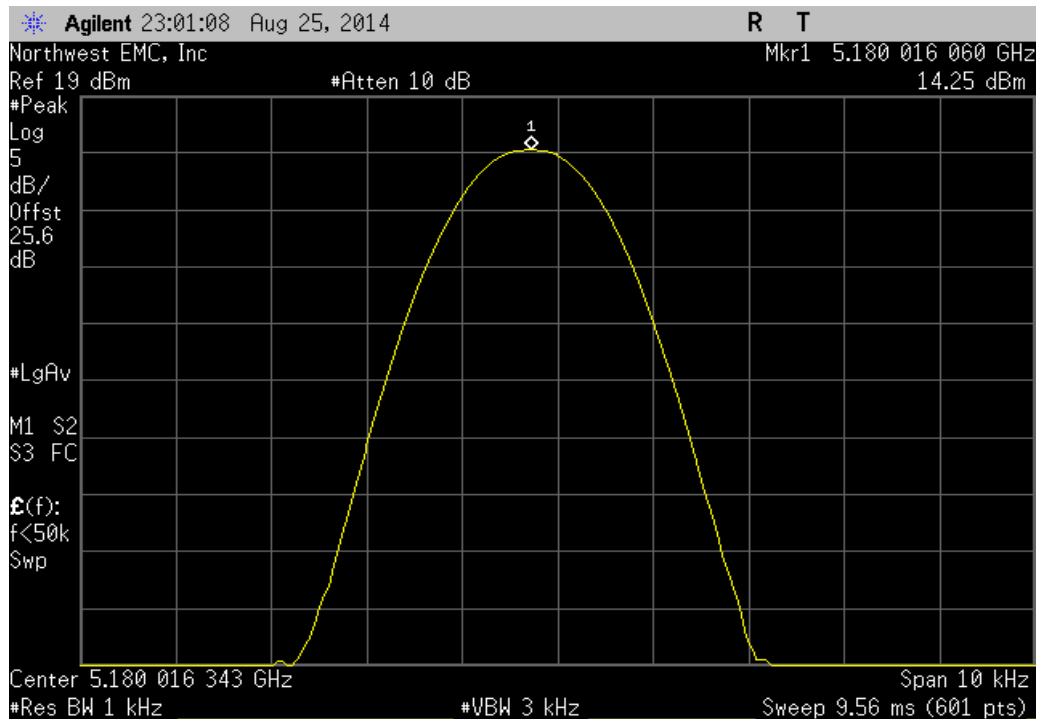
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.008757	5180	1.7	100	Pass



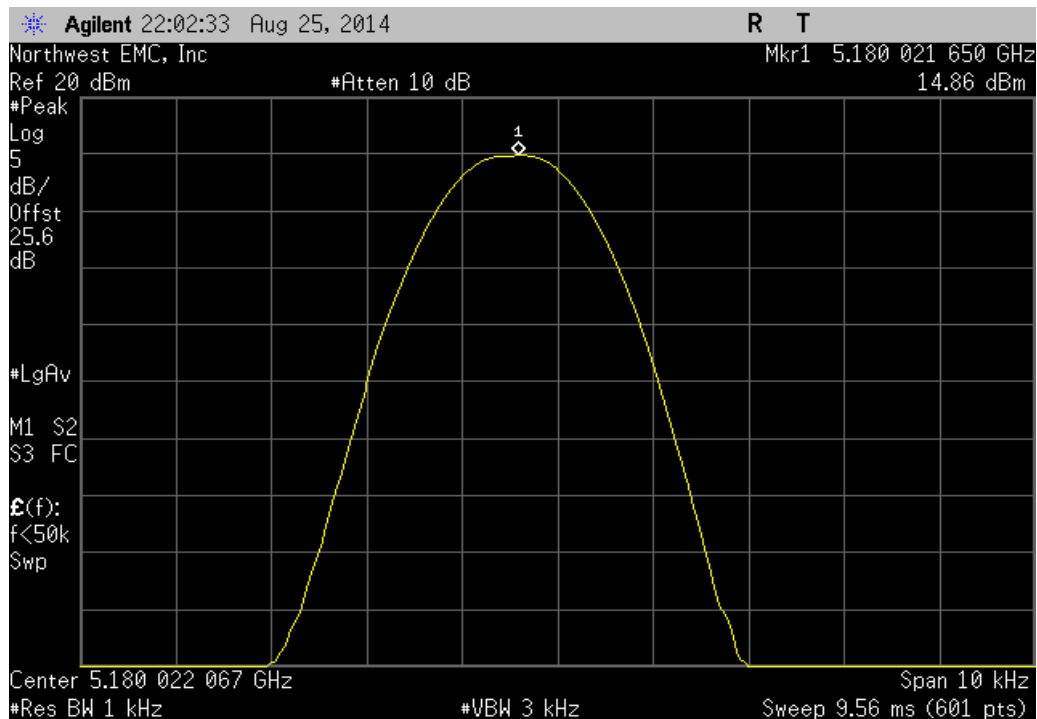
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.008724	5180	1.7	100	Pass



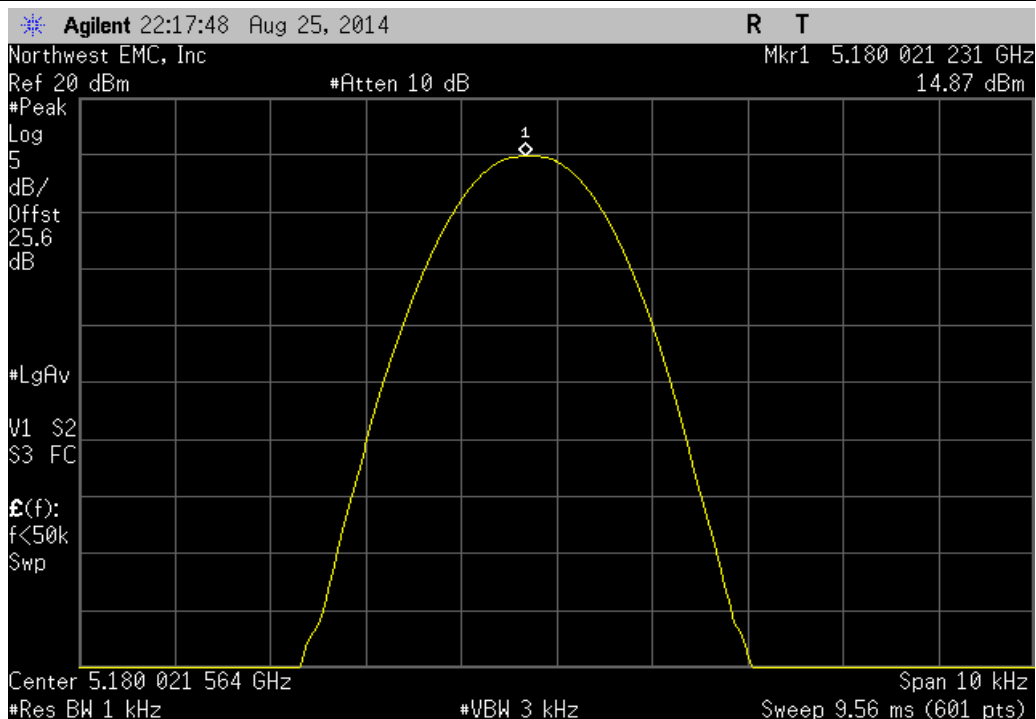
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.01606	5180	3.1	100	Pass



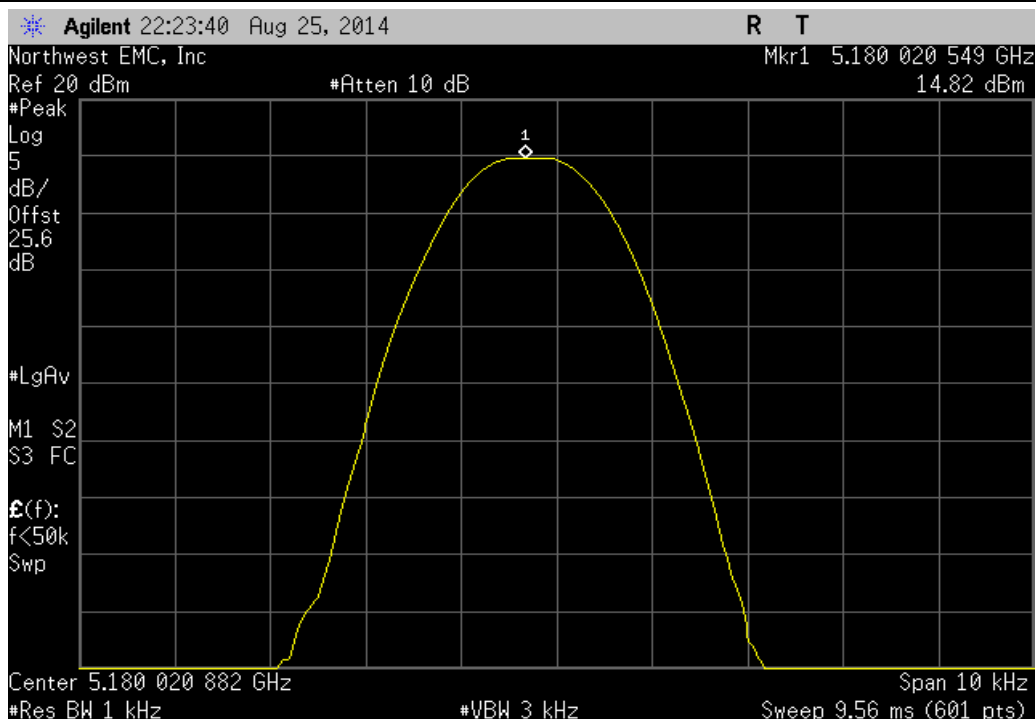
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.02165	5180	4.2	100	Pass



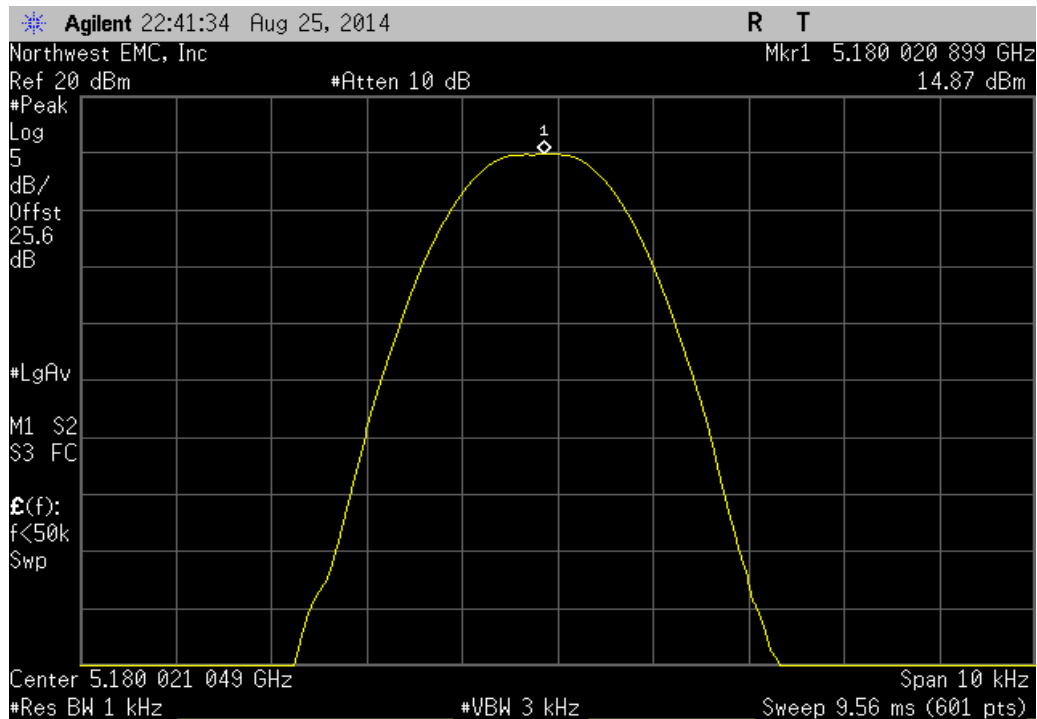
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.021231	5180	4.1	100	Pass



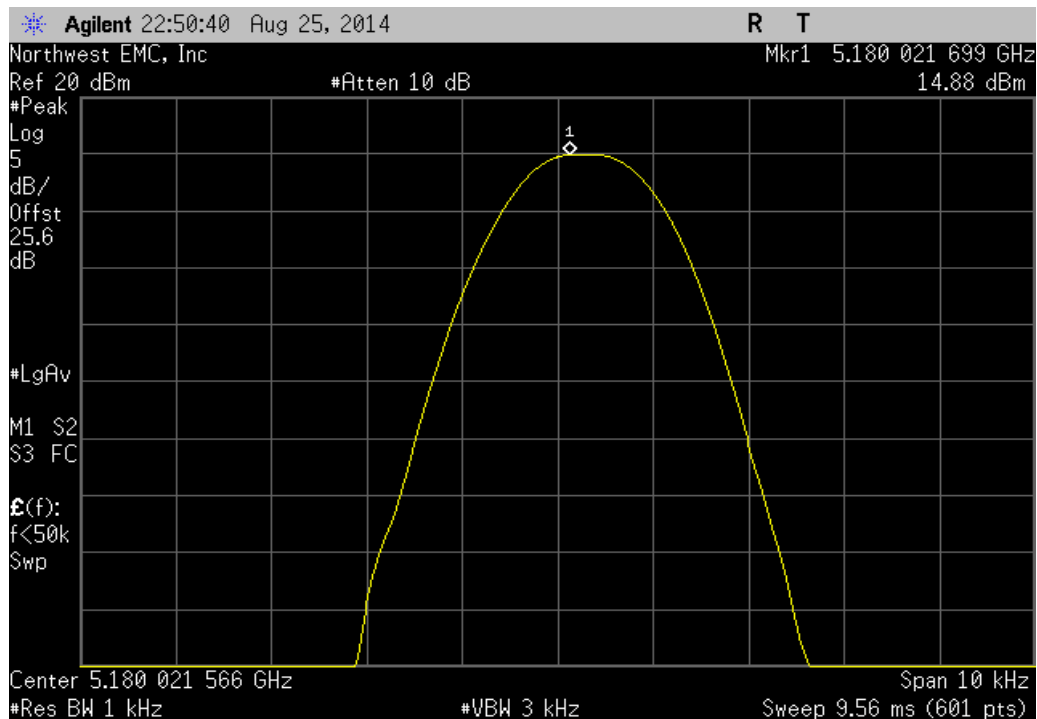
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.020549	5180	4	100	Pass



5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.020899	5180	4	100	Pass



5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5180.021699	5180	4.2	100	Pass



EMISSION BANDWIDTH

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 (mos)
Spectrum Analyzer	Agilent	E4446A	AAZ	2/22/2013	24
OC13 Cables	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator, 20db, 'SMA'	Weinschel Corp	4H-20	AWB	6/7/2013	12
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Signal Generator	Agilent	E8257D	TGU	2/1/2012	36
Power Meter	Hewlett Packard	E4418A	SPA	4/11/2012	24
Power Sensor	Agilent	E4412A	SQE	4/11/2012	24

TEST DESCRIPTION

FCC KDB 789033 D01 General UNII Test Procedures were followed.

The transmit frequencies and data rates listed in the datasheet were measured in each band utilized by the radio. The transmit power was set to its default maximum.

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:

- RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process to determine the RBW based on the emissions bandwidth (B).
- VBW = > RBW
- A peak detector was used
- Trace max hold.


The spectrum analyzer occupied bandwidth measurement function was then used to measure 26 dB emission bandwidth.

There is no required limit to be met in the rule part for this test. The purpose of the test is to both report the results as required by the KDB, and to utilize the emission bandwidth for setting the channel power integration bandwidth during conducted output power testing.



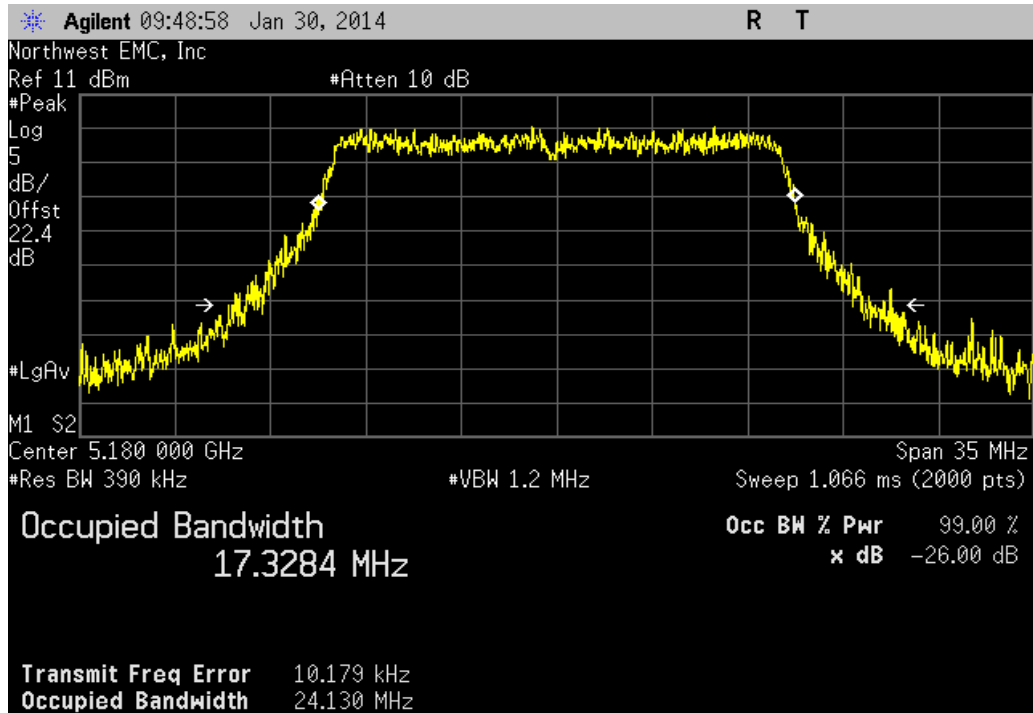
EMISSION BANDWIDTH

XMIT 2013.08.15
PsaTx 2013.10.23

EUT: RAD7A/Radical 7 V2		Work Order: MASI0151	
Serial Number: 1000000349		Date: 01/29/14	
Customer: Masimo Corporation		Temperature: 24.3°C	
Attendees: Mike Clark		Humidity: 41%	
Project: None		Barometric Pres.: 1011	
Tested by: Jaemi Suh		Power: Battery	
		Job Site: OC13	
TEST SPECIFICATIONS		Test Method	
FCC 15.407:2014		ANSI C63.10:2009	
COMMENTS			
Channel 36/48 power level is set to 30.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Value	Limit
802.11(a) 6 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		24.13 MHz	> 500 kHz
Channel 48, High Channel		23.448 MHz	> 500 kHz
802.11(a) 36 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		22.193 MHz	> 500 kHz
Channel 48, High Channel		22.33 MHz	> 500 kHz
802.11(a) 54 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		22.423 MHz	> 500 kHz
Channel 48, High Channel		22.359 MHz	> 500 kHz

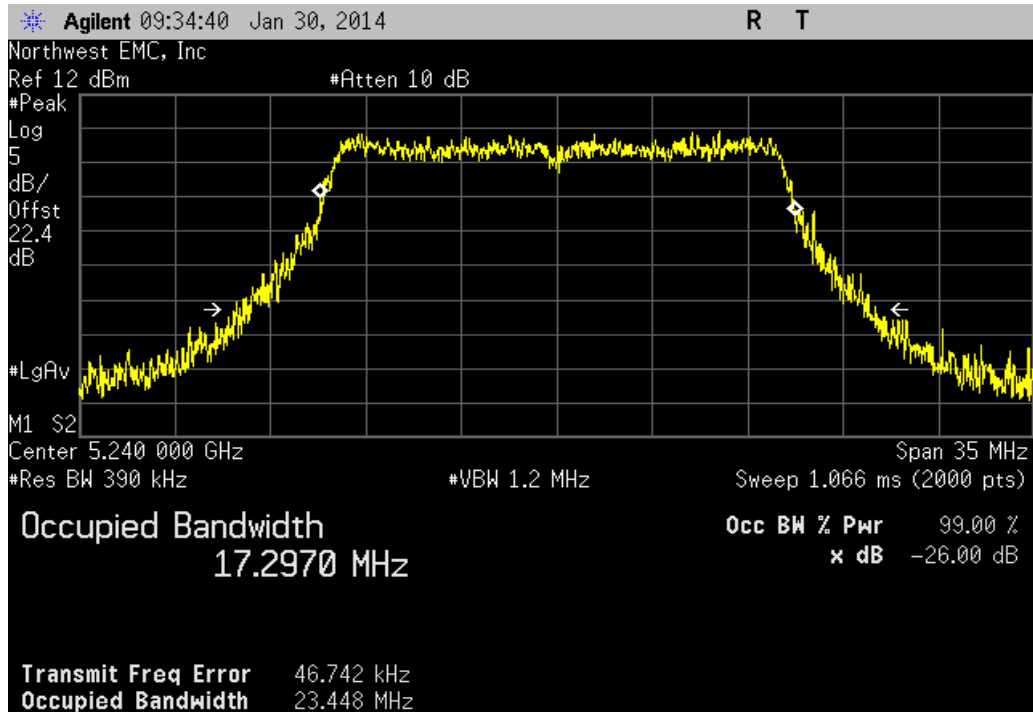
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

	Value	Limit	Result
	24.13 MHz	> 500 kHz	Pass



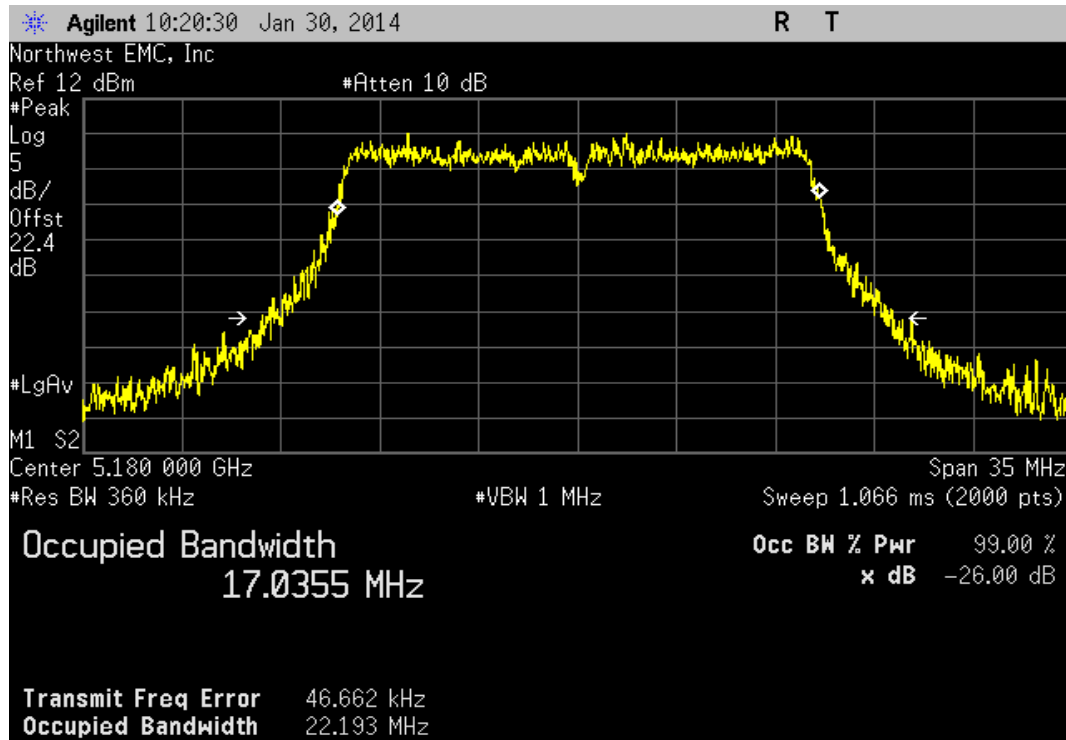
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	23.448 MHz	> 500 kHz	Pass



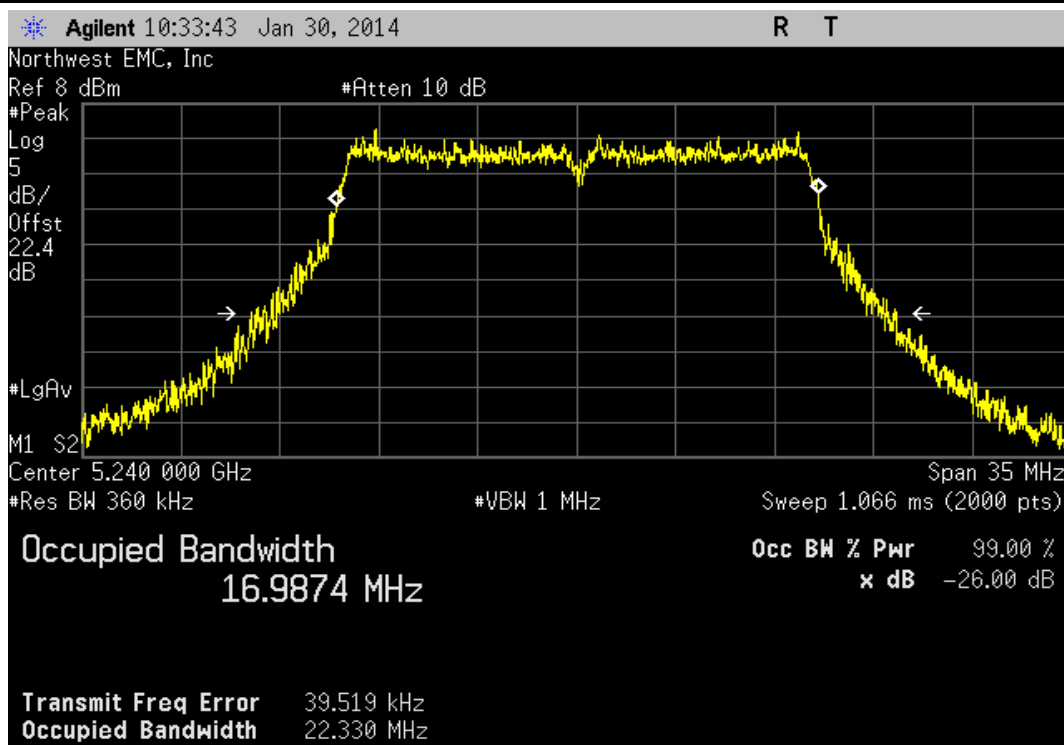
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				22.193 MHz	> 500 kHz	Pass



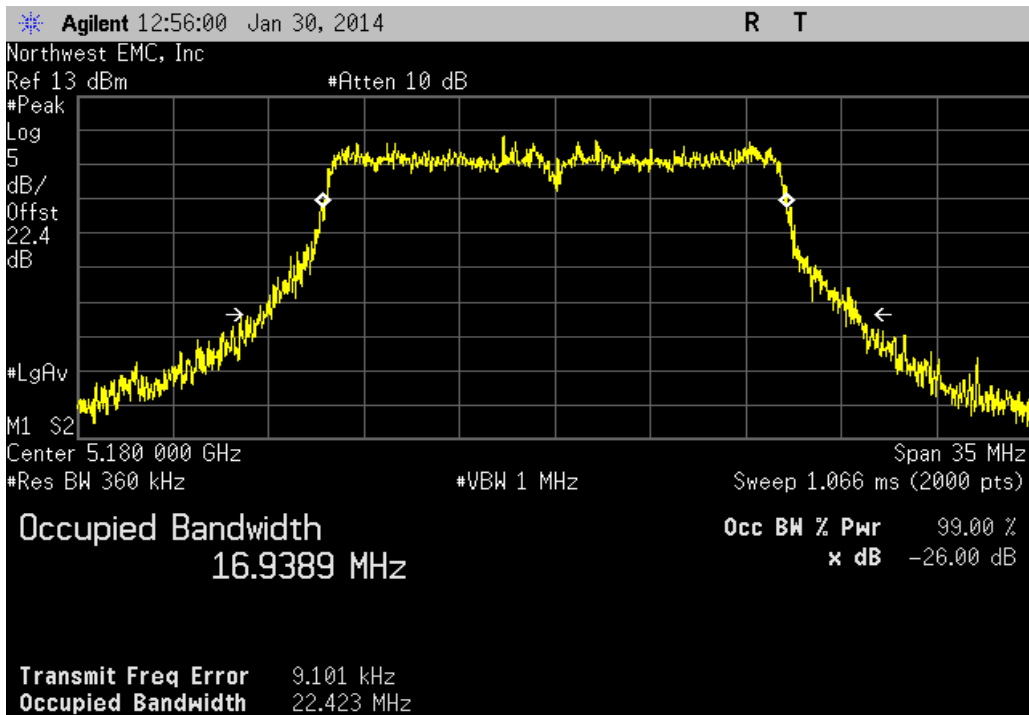
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	22.33 MHz	> 500 kHz	Pass



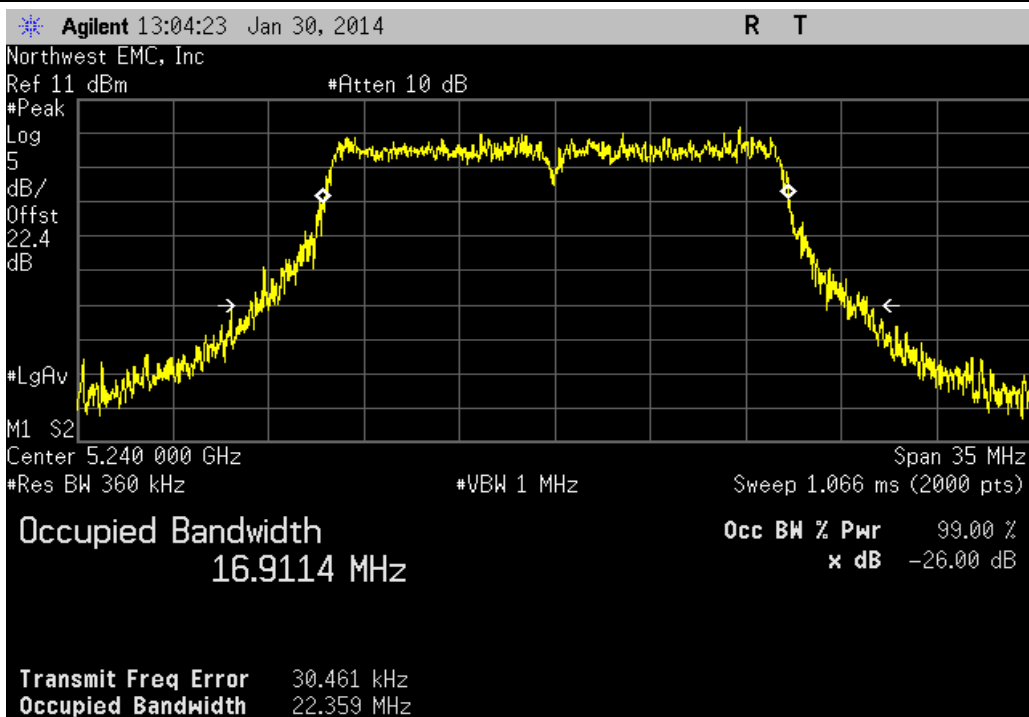
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

	Value	Limit	Result
	22.423 MHz	> 500 kHz	Pass



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	22.359 MHz	> 500 kHz	Pass



PEAK TRANSMIT POWER

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mos)
Spectrum Analyzer	Agilent	E4446A	AAY	2/22/2013	24
OC13 Cables	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator, 20db, 'SMA'	Weinschel Corp	4H-20	AWB	6/7/2013	12
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Power Meter	Hewlett Packard	E4418A	SPA	4/11/2012	24
Power Sensor	Agilent	E4412A	SQE	4/11/2012	24
Signal Generator	Agilent	E8257D	TGU	2/1/2012	36

TEST DESCRIPTION

FCC KDB 789033 D01 General UNII Test Procedures Section C was followed. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. 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.

Prior to measuring peak transmit power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. 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 using a zero span on the spectrum analyzer to see the pulses in the time domain.

Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep) was used for this test.


The spectrum analyzer settings were set per the guidance as well as the following specifics:

- RBW = 1 MHz, VBW = 3 MHz
- Sample Detector
- The number of points was set to 601. This satisfied the requirement of being $> 2 * \text{span} / \text{RBW}$
- Trace average 100 traces in power averaging mode.
- Power was integrated across "B", by using the channel power function of the analyzer.



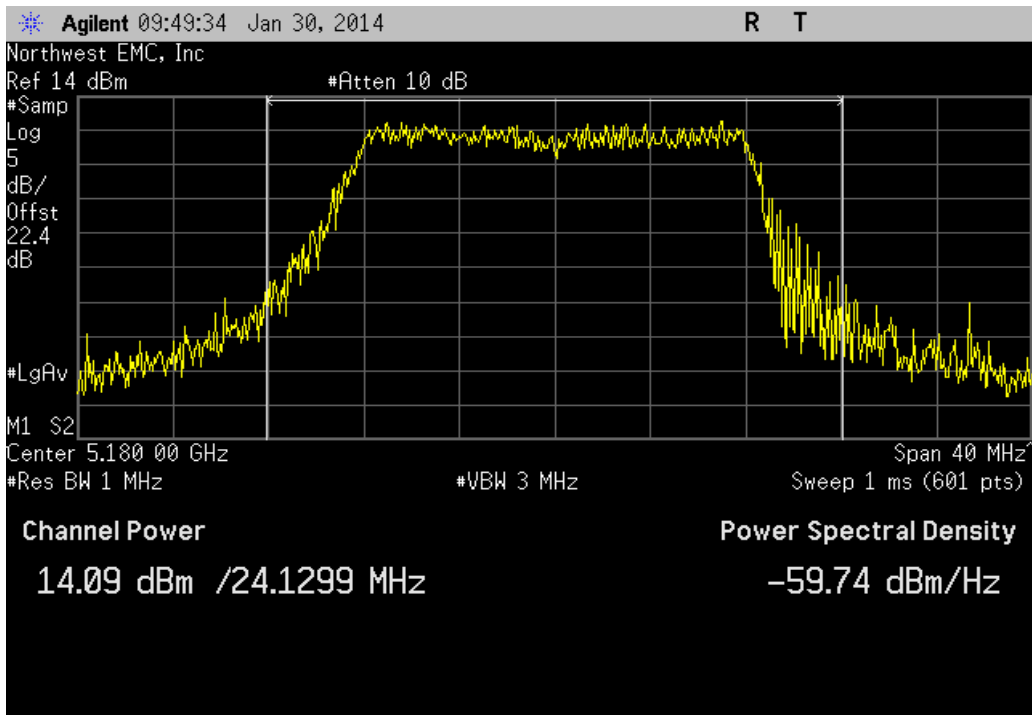
PEAK TRANSMIT POWER

XMIT 2013.08.15
PsaTx 2013.10.23

EUT: RAD7A/Radical 7		Work Order: MASI0151	
Serial Number: 1000000349		Date: 01/29/14	
Customer: Masimo Corporation		Temperature: 24.3°C	
Attendees: Mike Clark		Humidity: 41%	
Project: None		Barometric Pres.: 1011	
Tested by: Jaemi Suh		Power: 110 VAC	
		Job Site: OC13	
TEST SPECIFICATIONS		Test Method	
FCC 15.407:2014		ANSI C63.10:2009	
COMMENTS			
Channel 36/48 power level is set to 30.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Value	Limit
802.11(a) 6 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		14.086 dBm	< 17 dBm
Channel 48, High Channel		14.286 dBm	< 17 dBm
802.11(a) 36 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		13.322 dBm	< 17 dBm
Channel 48, High Channel		10.663 dBm	< 17 dBm
802.11(a) 54 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		12.846 dBm	< 17 dBm
Channel 48, High Channel		10.438 dBm	< 17 dBm

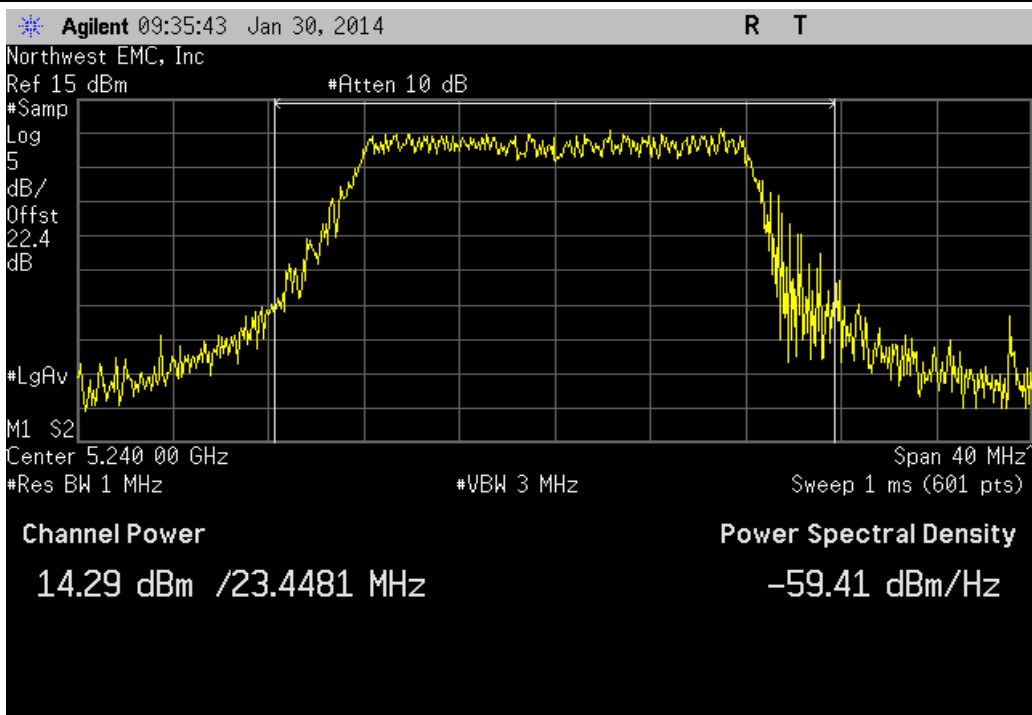
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

	Value	Limit	Result
	14.086 dBm	< 17 dBm	Pass



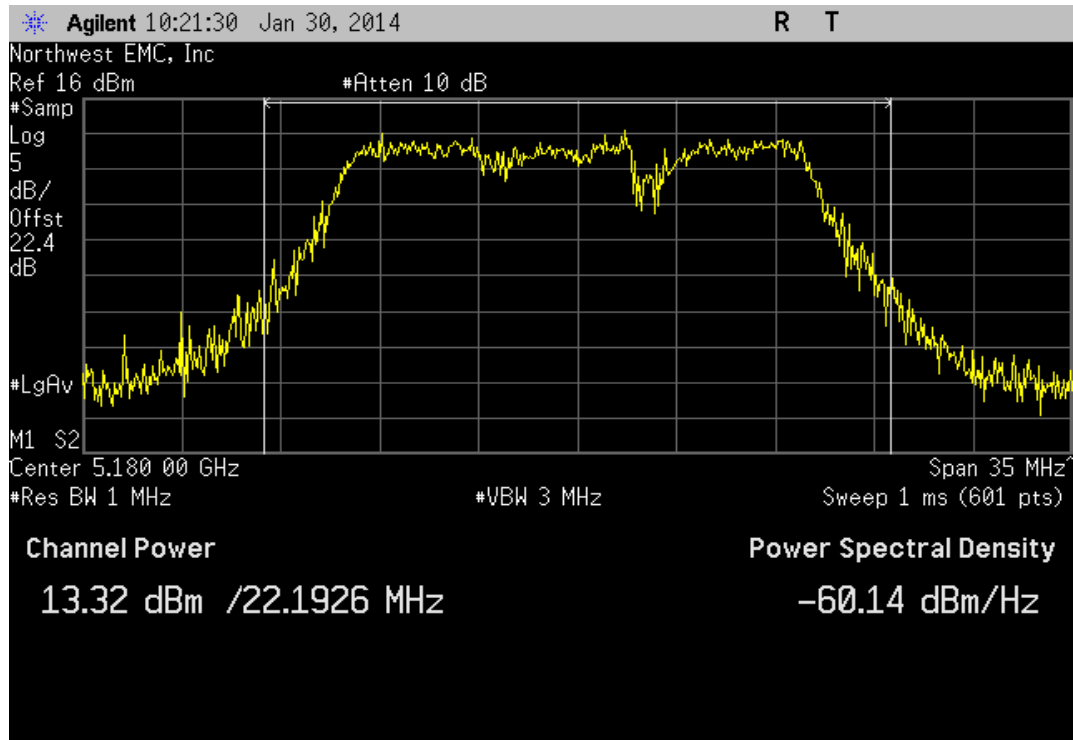
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	14.286 dBm	< 17 dBm	Pass



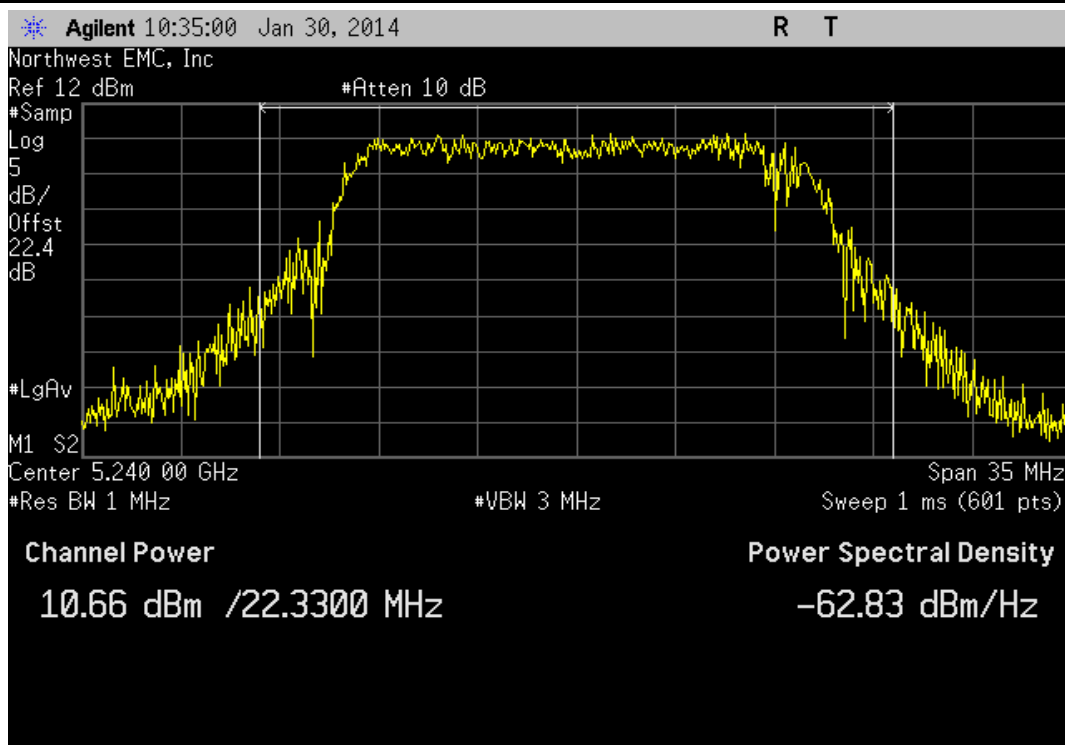
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

	Value	Limit	Result
	13.322 dBm	< 17 dBm	Pass



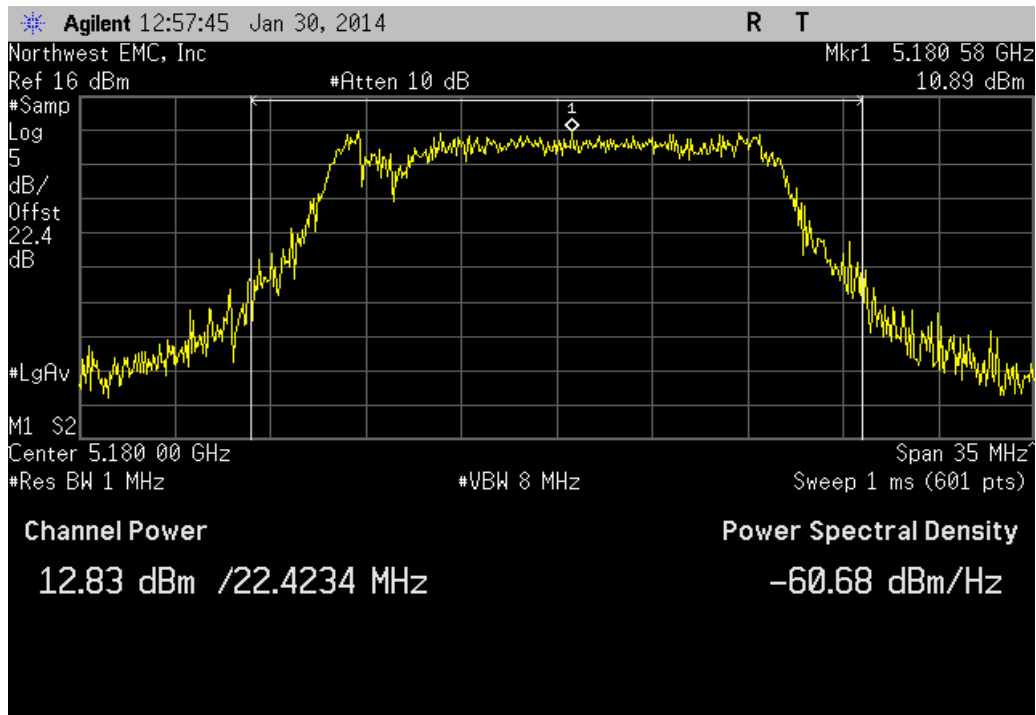
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	10.663 dBm	< 17 dBm	Pass



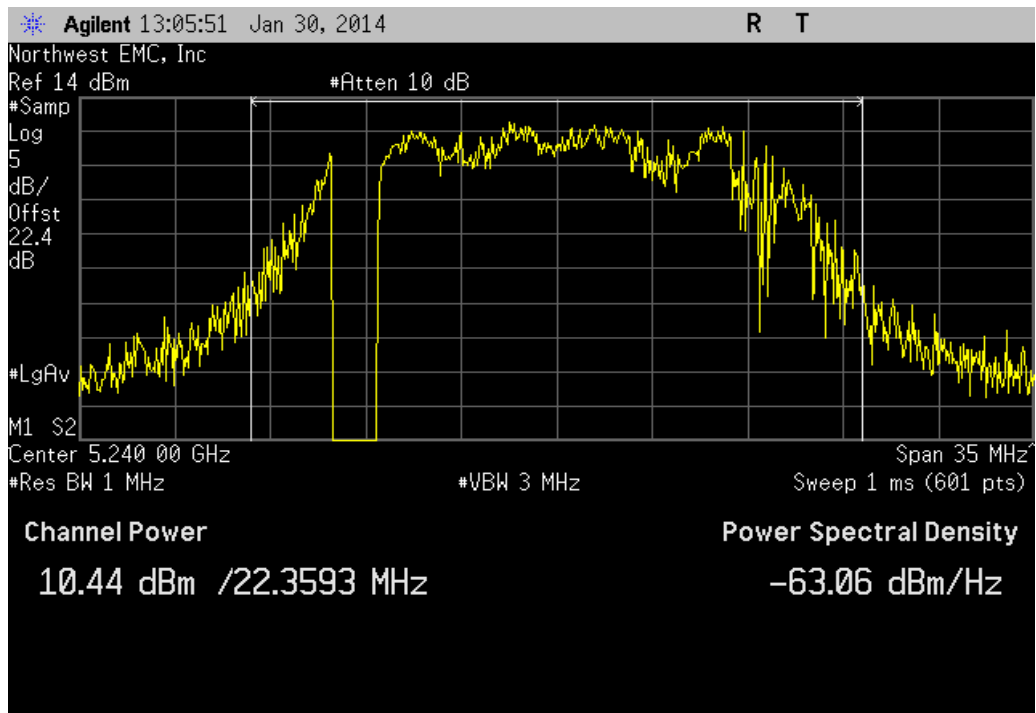
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

	Value	Limit	Result
	12.846 dBm	< 17 dBm	Pass



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	10.438 dBm	< 17 dBm	Pass



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 (mos)
Spectrum Analyzer	Agilent	E4446A	AAY	2/22/2013	24
OC13 Cables	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator, 20db, 'SMA'	Weinschel Corp	4H-20	AWB	6/7/2013	12
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Power Meter	Hewlett Packard	E4418A	SPA	4/11/2012	24
Power Sensor	Agilent	E4412A	SQE	4/11/2012	24
Signal Generator	Agilent	E8257D	TGU	2/1/2012	36

TEST DESCRIPTION

FCC KDB 789033 D01 General UNII Test Procedures Section F was followed to show that the ratio of the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dBm.

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. 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 >= 3 MHz with peak detector and trace max-hold..

➤ 2nd Trace: The same procedure and settings as was used for peak power spectral density



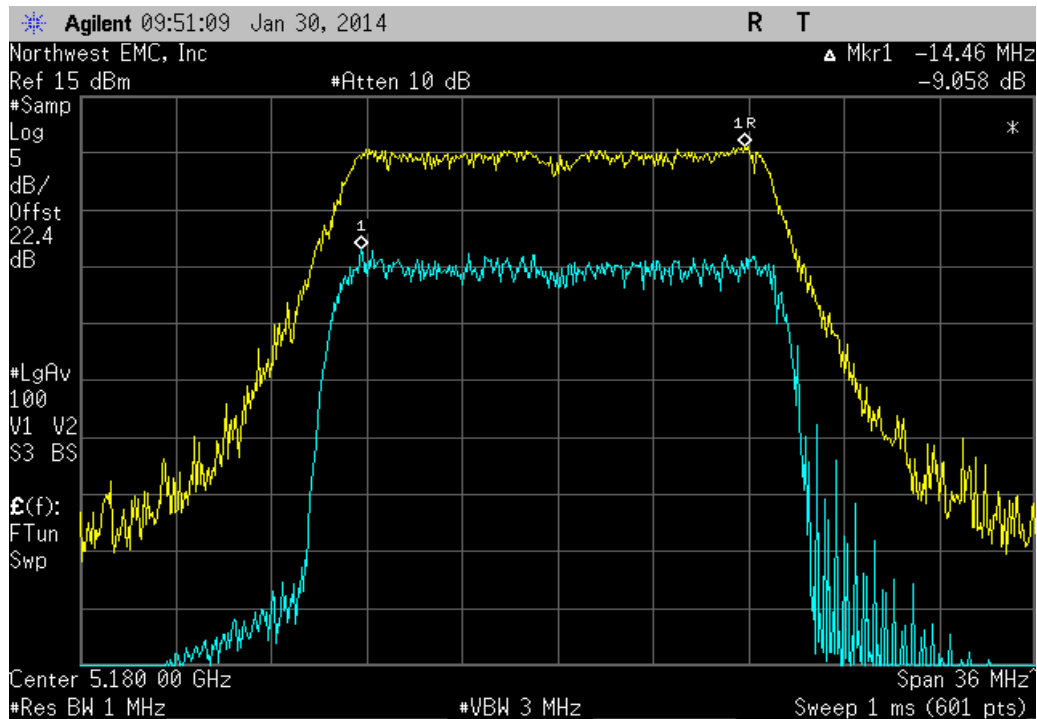
PEAK EXCURSION OF THE MODULATION ENVELOPE

XMI 2013.08.15
PsaTx 2013.10.23

EUT: RAD7A/Radical 7		Work Order: MASI0151					
Serial Number: 1000000349		Date: 01/29/14					
Customer: Masimo Corporation		Temperature: 24.3°C					
Attendees: Mike Clark		Humidity: 41%					
Project: None		Barometric Pres.: 1011					
Tested by: Jaemi Suh		Power: Battery					
		Job Site: OC13					
TEST SPECIFICATIONS		Test Method					
FCC 15.407:2014		ANSI C63.10:2009					
COMMENTS							
Channel 36/48 power level is set to 30							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	1	Signature 					
		Value	Limit	Result			
802.11(a) 6 Mbps							
5150 - 5250 MHz Band							
Channel 36, Low Channel					9.058 dB	≤ 13 dB	Pass
Channel 48, High Channel					10.08 dB	≤ 13 dB	Pass
802.11(a) 36 Mbps							
5150 - 5250 MHz Band							
Channel 36, Low Channel					9.959 dB	≤ 13 dB	Pass
Channel 48, High Channel					7.919 dB	≤ 13 dB	Pass
802.11(a) 54 Mbps							
5150 - 5250 MHz Band							
Channel 36, Low Channel					9.255 dB	≤ 13 dB	Pass
Channel 48, High Channel					7.377 dB	≤ 13 dB	Pass

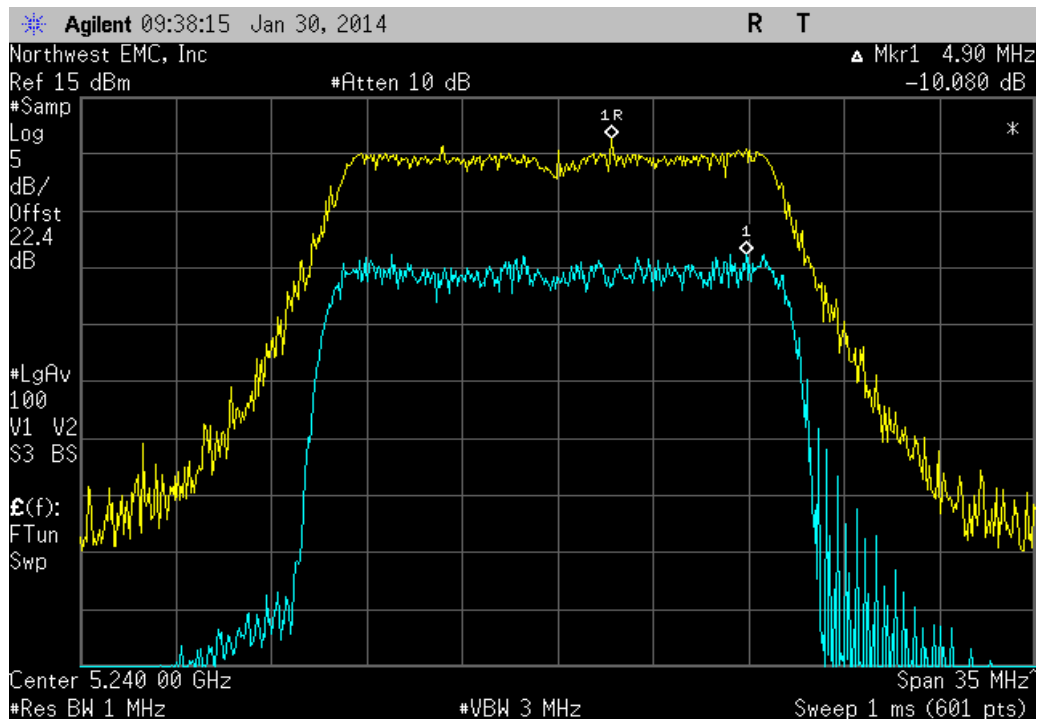
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

	Value	Limit	Result
	9.058 dB	≤ 13 dB	Pass



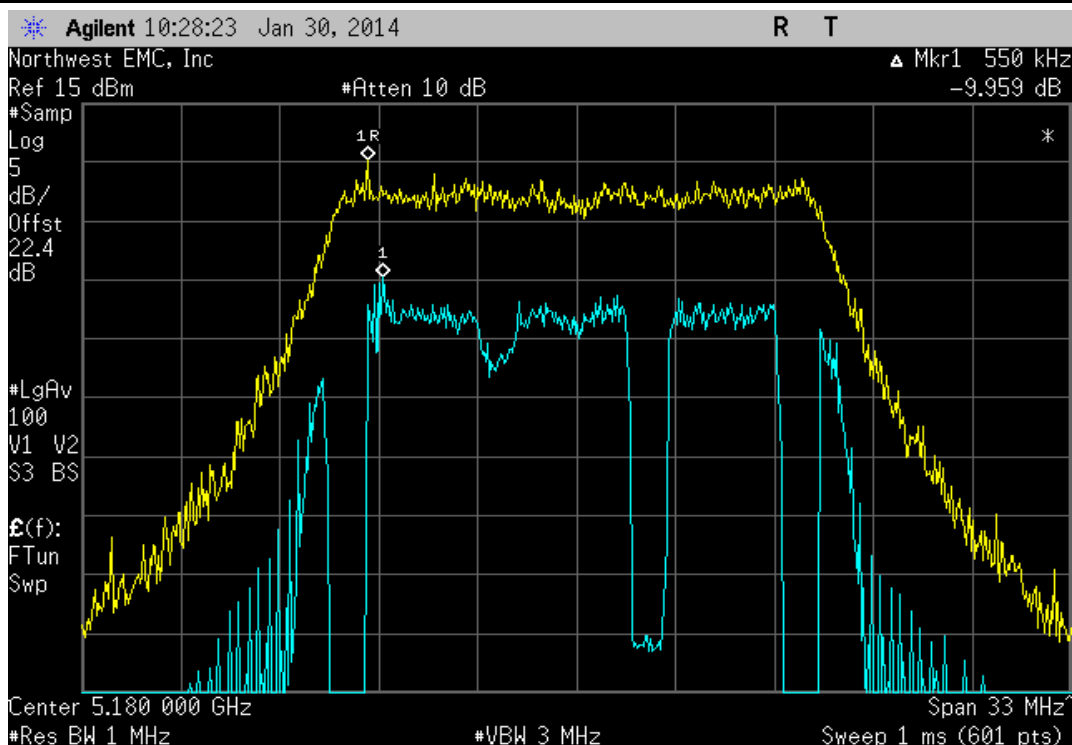
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	10.08 dB	≤ 13 dB	Pass



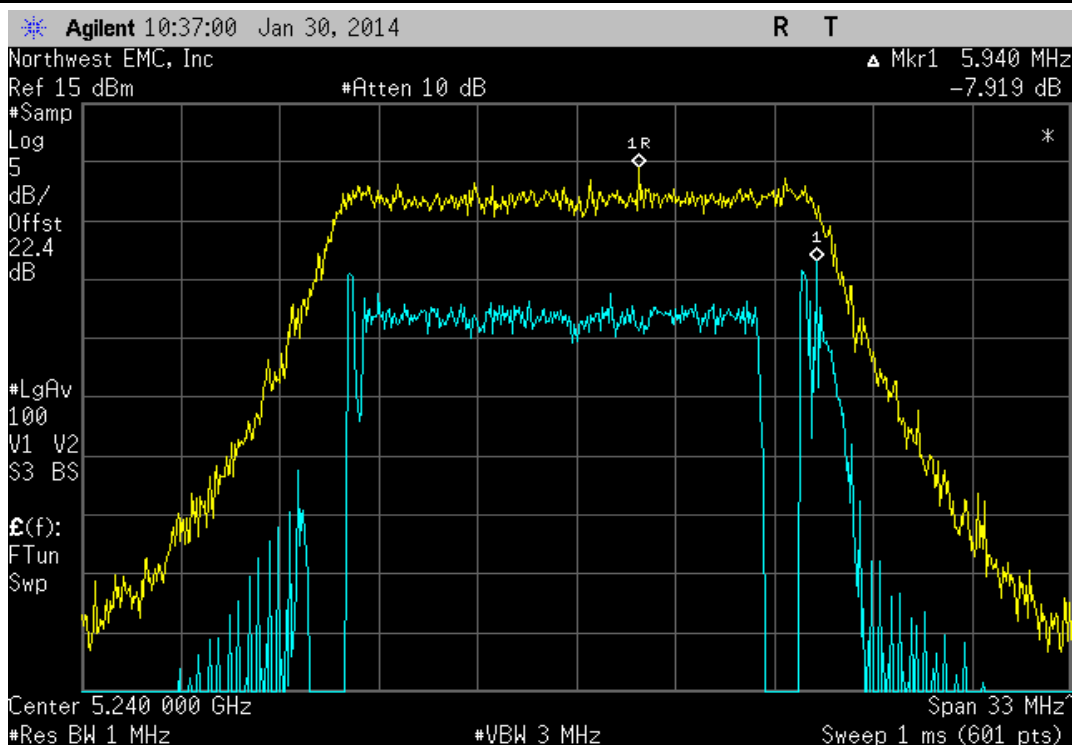
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				9.959 dB	≤ 13 dB	Pass



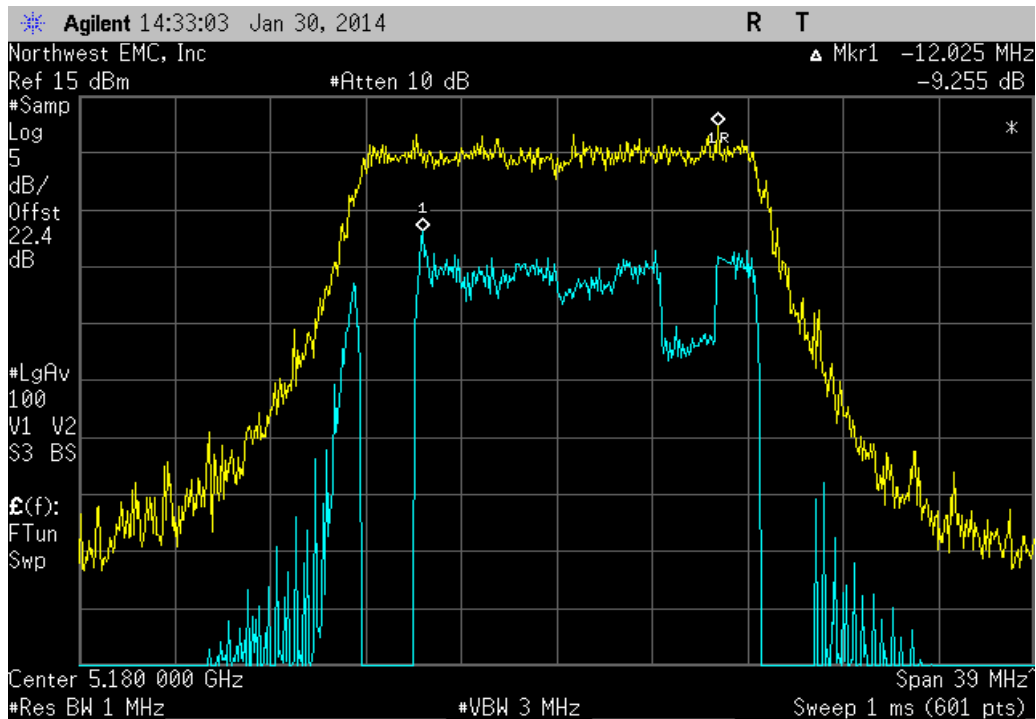
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	7.919 dB	≤ 13 dB	Pass



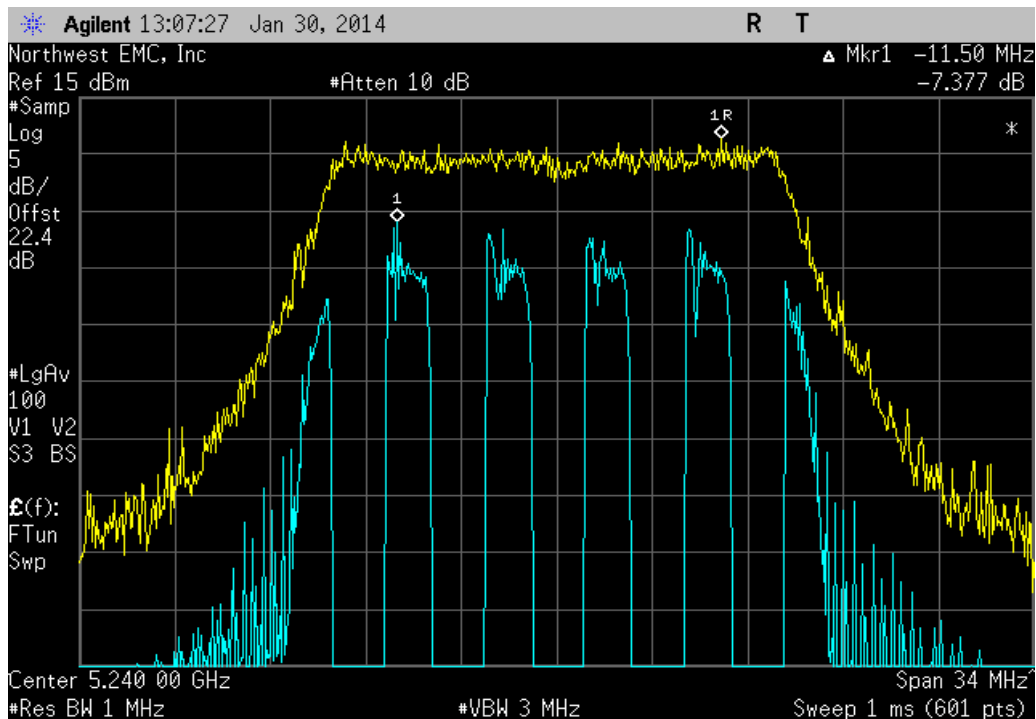
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

	Value	Limit	Result
	9.255 dB	≤ 13 dB	Pass



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

	Value	Limit	Result
	7.377 dB	≤ 13 dB	Pass



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 (mos)
Spectrum Analyzer	Agilent	E4446A	AAY	2/22/2013	24
OC13 Cables	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator, 20db, 'SMA'	Weinschel Corp	4H-20	AWB	6/7/2013	12
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Power Meter	Hewlett Packard	E4418A	SPA	4/11/2012	24
Power Sensor	Agilent	E4412A	SQE	4/11/2012	24
Signal Generator	Agilent	E8257D	TGU	2/1/2012	36

TEST DESCRIPTION

FCC KDB 789033 D01 General UNII Test Procedures Section E was followed. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The data rate(s) listed in the datasheet were tested. 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.

Prior to measuring peak power spectral density, the transmission pulse duration (T) was measured. The transmission pulse duration and the associated data are found elsewhere in this test report.

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 ≥ 3 MHz
- Sample detector was used because Method SA-1 Alternate was used to measure the Maximum Conducted Output Power.
- 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).

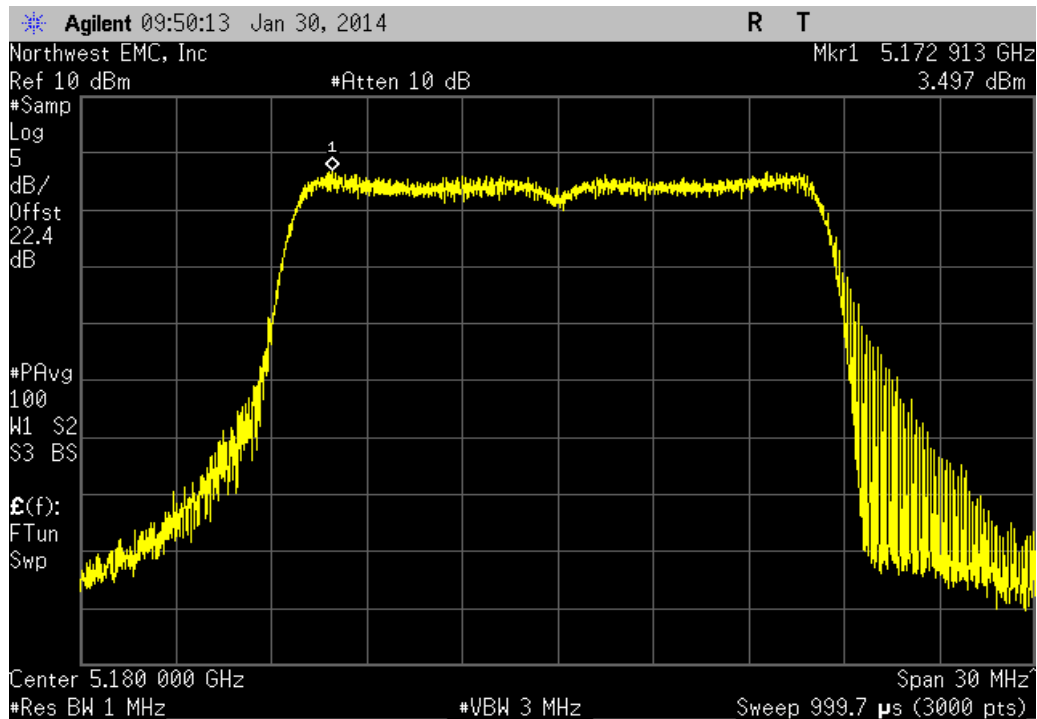


PEAK POWER SPECTRAL DENSITY

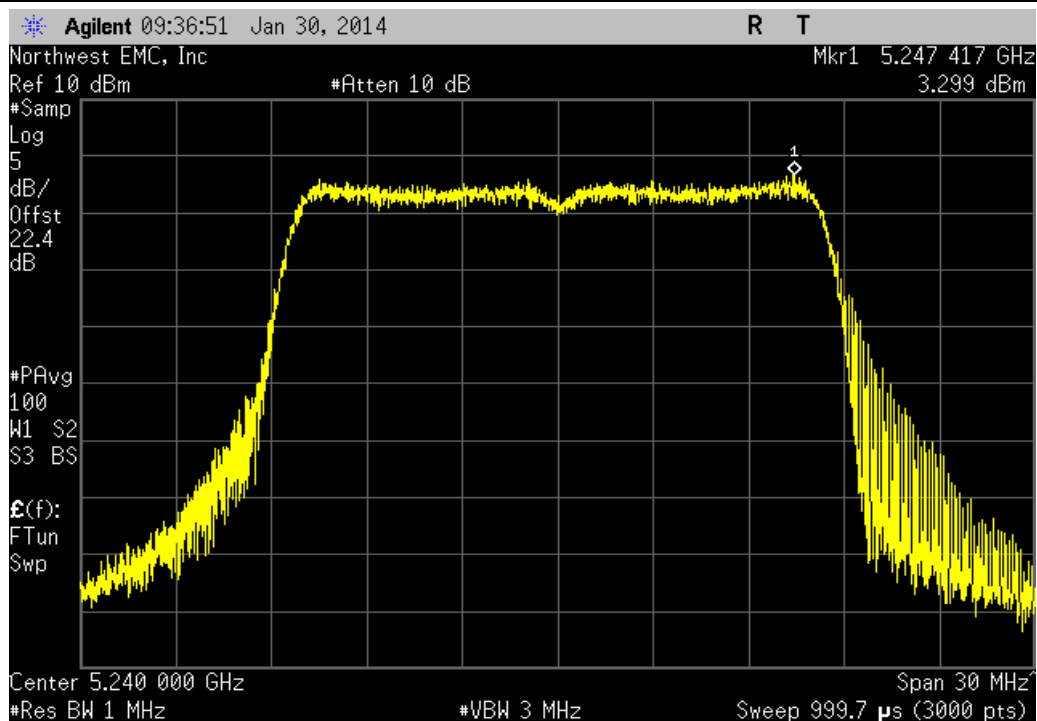
XMIT 2013.08.15
PsaTx 2013.10.23

EUT: RAD7A/Radical 7		Work Order: MASI0151	
Serial Number: 1000000349		Date: 01/29/14	
Customer: Masimo Corporation		Temperature: 24.3°C	
Attendees: Mike Clark		Humidity: 41%	
Project: None		Barometric Pres.: 1011	
Tested by: Jaemi Suh		Power: 3.7 VDC	
		Job Site: OC13	
TEST SPECIFICATIONS		Test Method	
FCC 15.407:2014		ANSI C63.10:2009	
COMMENTS			
Channel 36/48 power level is set to 30.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Value (dBm / MHz)	Limit (dBm / MHz)
Result			
802.11(a) 6 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		3.497	4
Channel 48, High Channel		3.299	4
			Pass
802.11(a) 36 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		3.394	4
Channel 48, High Channel		3.106	4
			Pass
802.11(a) 54 Mbps			
5150 - 5250 MHz Band			
Channel 36, Low Channel		3.503	4
Channel 48, High Channel		3.791	4
			Pass

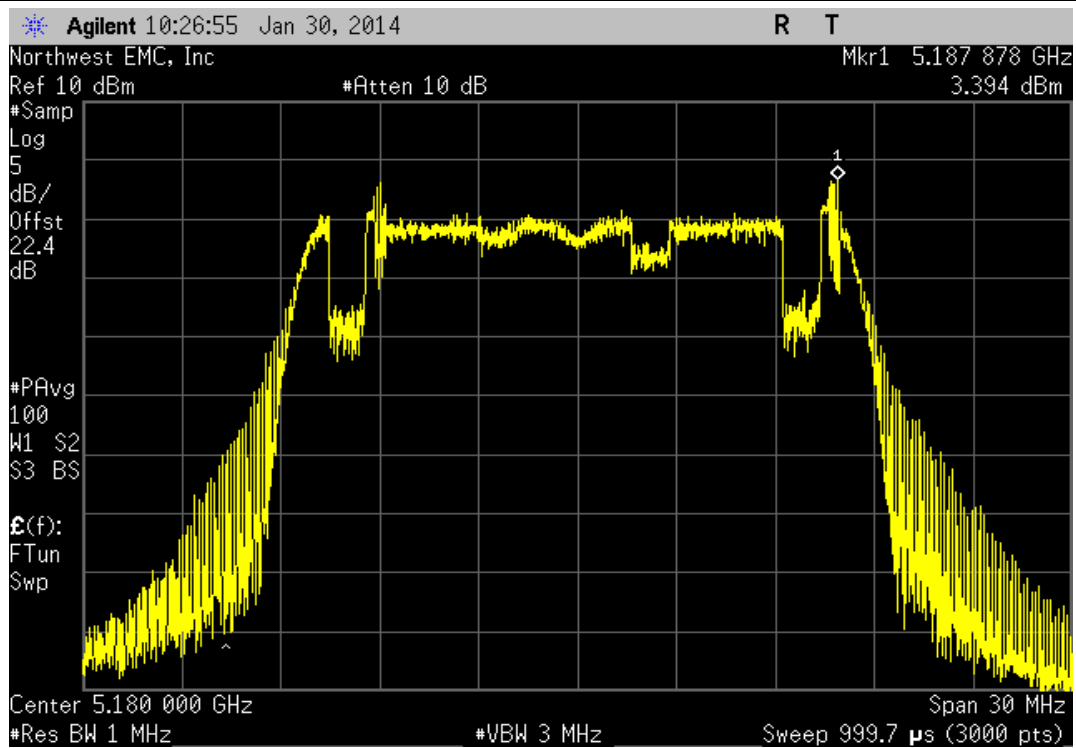
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel			
	Value (dBm / MHz)	Limit (dBm / MHz)	Result
	3.497	4	Pass



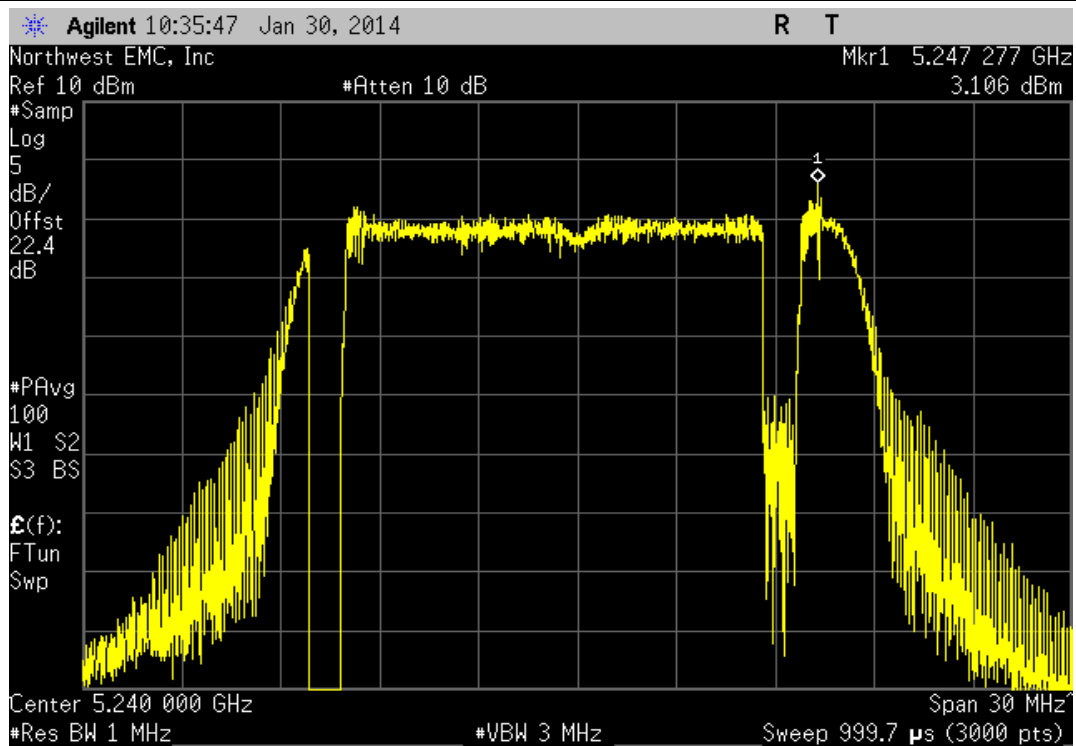
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel			
	Value (dBm / MHz)	Limit (dBm / MHz)	Result
	3.299	4	Pass



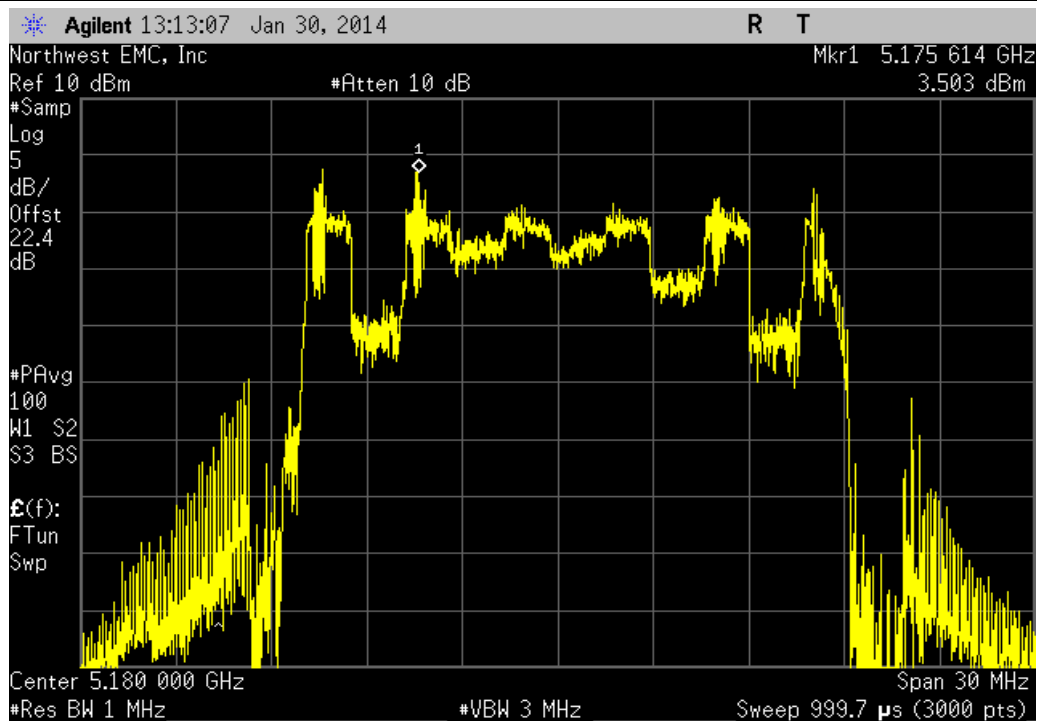
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.394	4	Pass



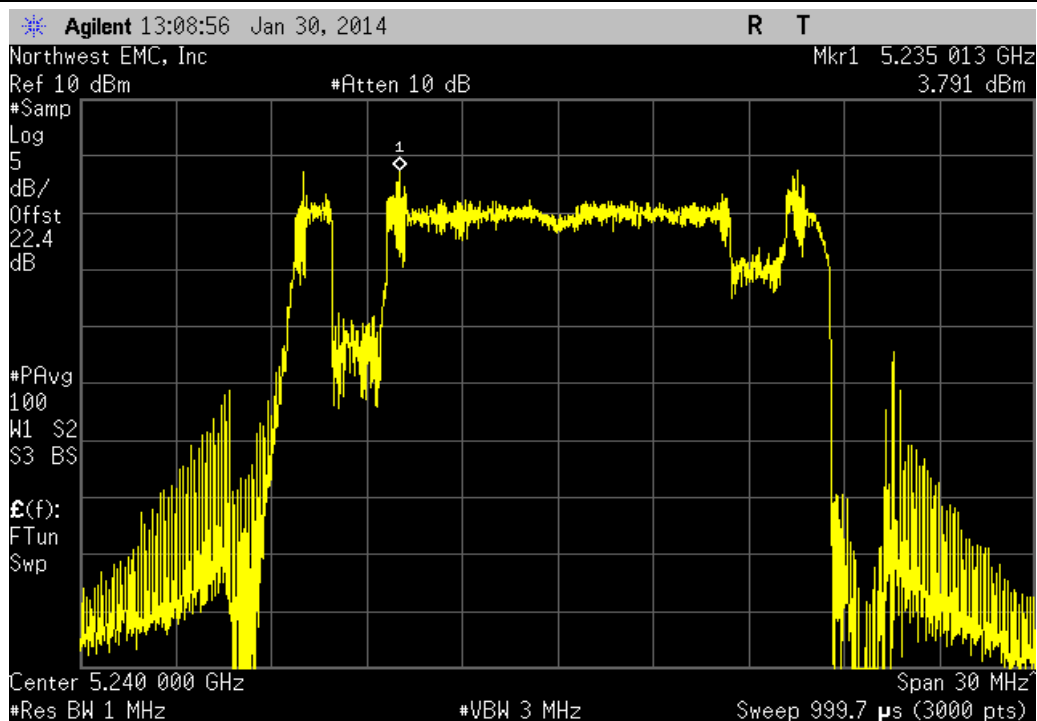
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.106	4	Pass



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel			
	Value (dBm / MHz)	Limit (dBm / MHz)	Result
	3.503	4	Pass



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel			
	Value (dBm / MHz)	Limit (dBm / MHz)	Result
	3.791	4	Pass



DUTY CYCLE

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 (mos)
Spectrum Analyzer	Agilent	E4446A	AAY	2/22/2013	24
OC13 Cables	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	0
Attenuator, 20db, 'SMA'	Weinschel Corp	4H-20	AWB	6/7/2013	12
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Signal Generator	Agilent	E8257D	TGU	2/1/2012	36
Power Meter	Hewlett Packard	E4418A	SPA	4/11/2012	24
Power Sensor	Agilent	E4412A	SQE	4/11/2012	24

TEST DESCRIPTION

The transmission pulse duration (T) and Duty Cycle (x) were measured for each of the EUT operating modes per the FCC KDB 789033 D01 General UNII Test Procedures.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used


The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

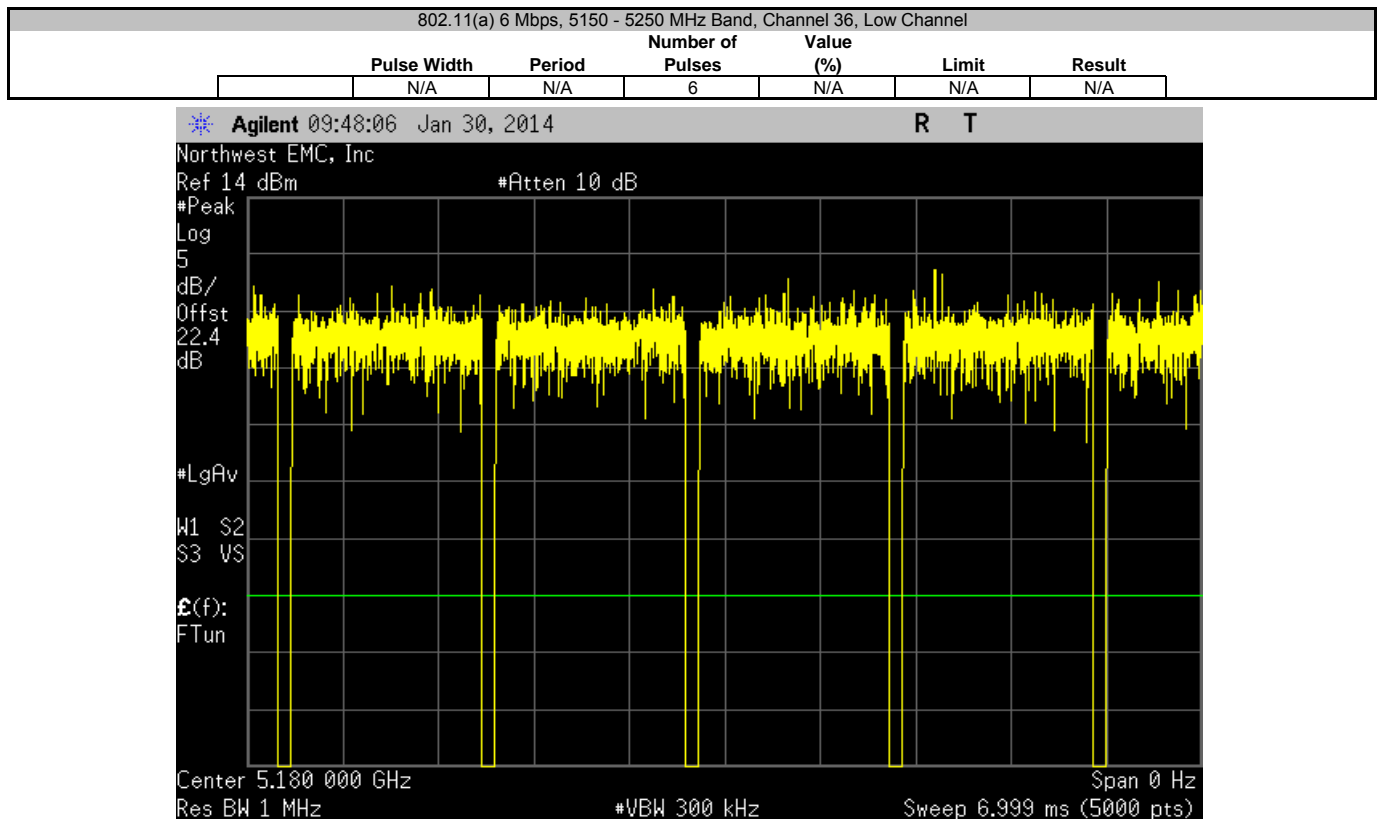
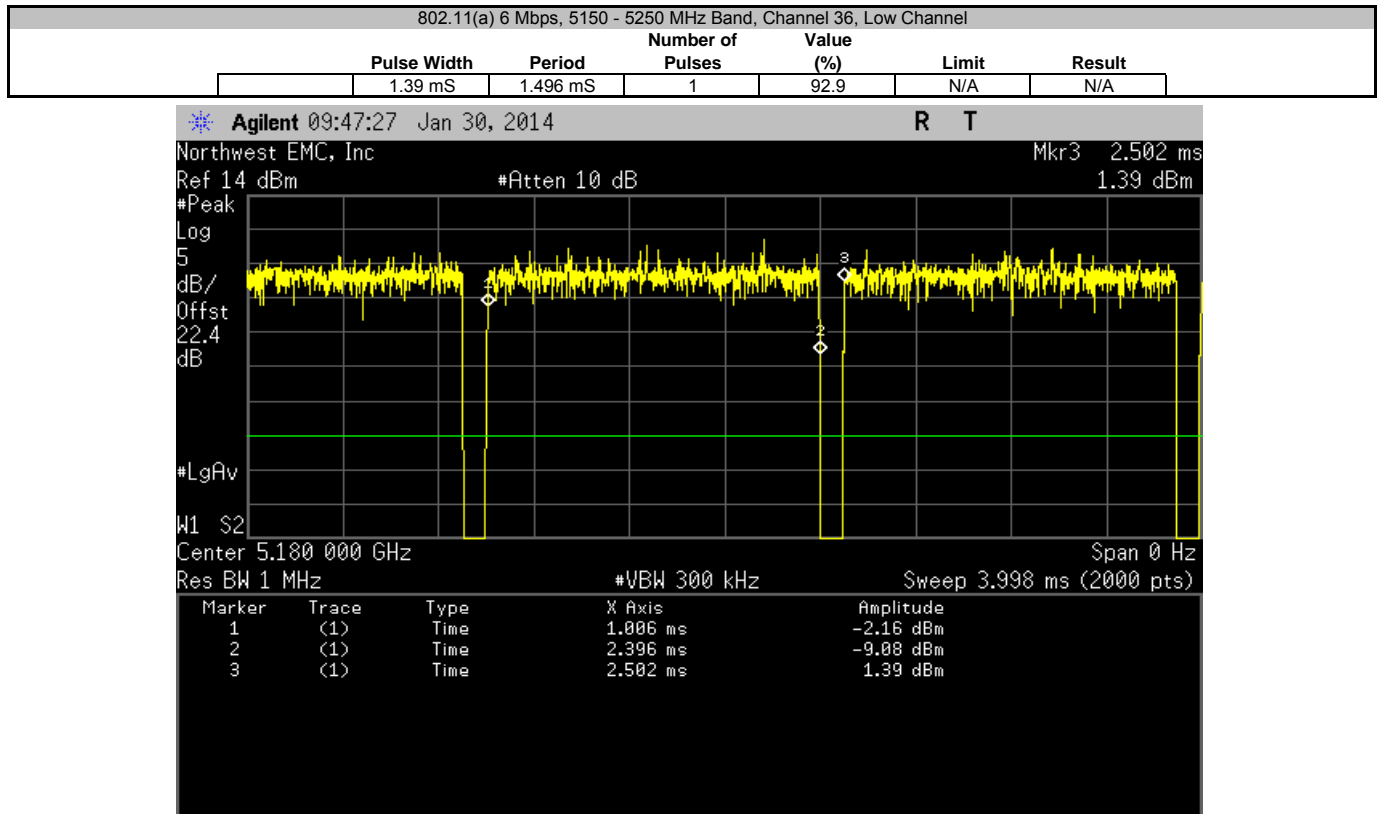
If the transmit duty cycle < 98 percent, burst gating was used during some of the other tests in this report only measure during the burst duration.



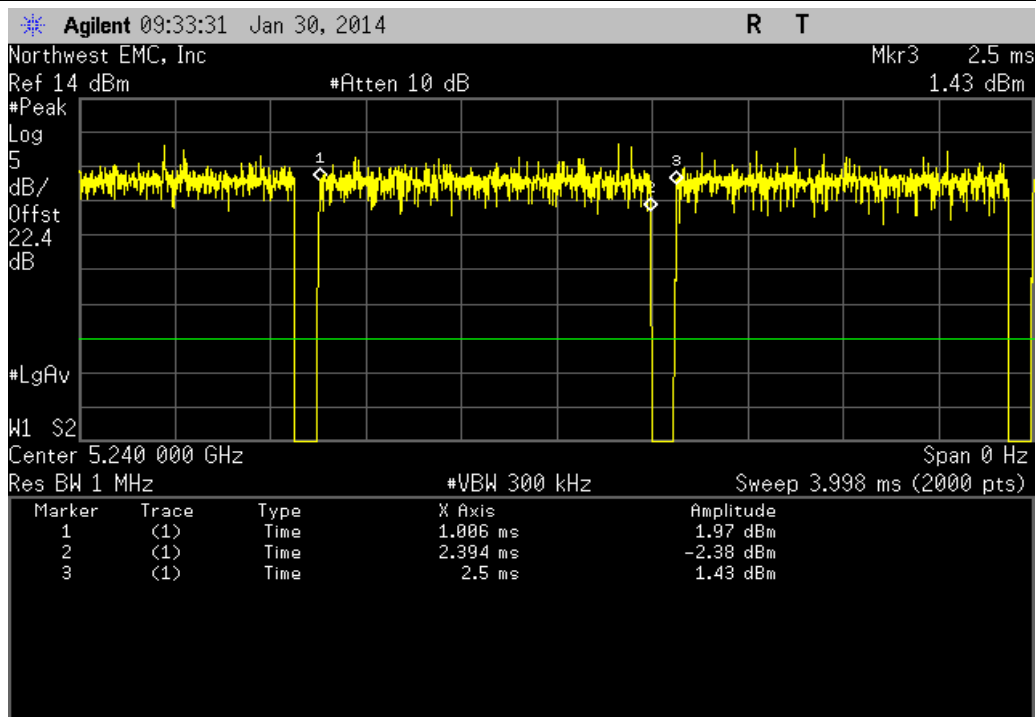
DUTY CYCLE

XMI 2013.08.15
PsaTx 2013.10.23

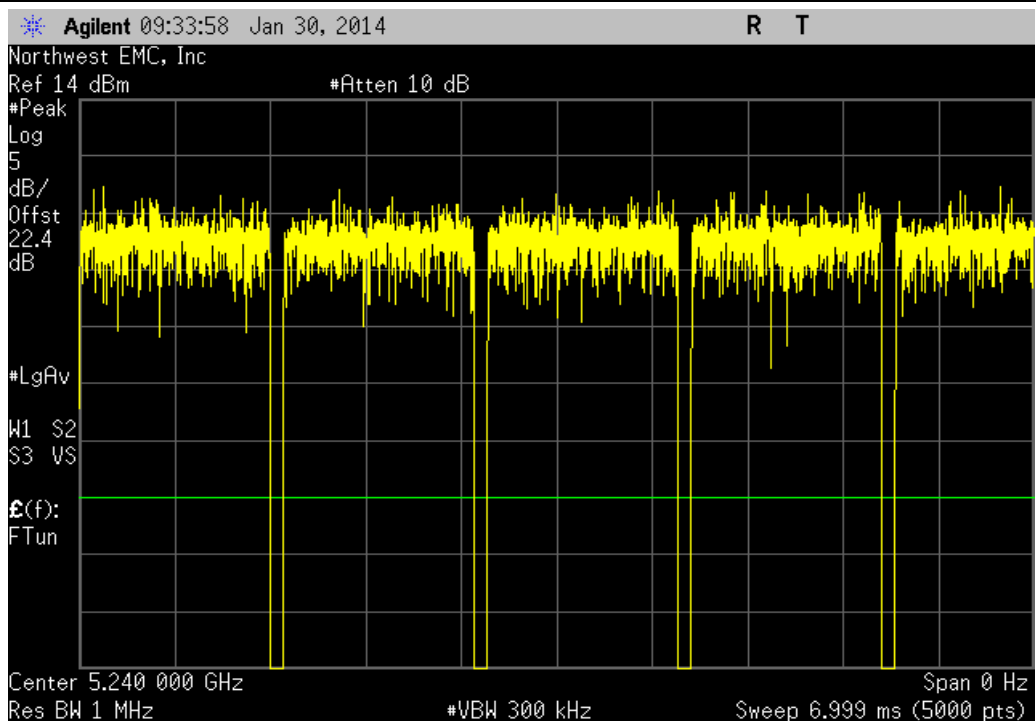
EUT: RAD7A/Radical 7 V2		Work Order: MASI0151					
Serial Number: 1000000349		Date: 01/29/14					
Customer: Masimo Corporation		Temperature: 24.3°C					
Attendees: Mike Clark		Humidity: 41%					
Project: None		Barometric Pres.: 1011					
Tested by: Jaemi Suh		Power: Battery					
		Job Site: OC13					
TEST SPECIFICATIONS		Test Method					
FCC 15.407:2014		ANSI C63.10:2009					
COMMENTS							
Channel 36/48 power level is set to 30.							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	1	Signature 					
		Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
802.11(a) 6 Mbps							
5150 - 5250 MHz Band							
Channel 36, Low Channel		1.39 mS	1.496 mS	1	92.9	N/A	N/A
Channel 36, Low Channel		N/A	N/A	6	N/A	N/A	N/A
Channel 48, High Channel		1.388 mS	1.494 mS	1	92.9	N/A	N/A
Channel 48, High Channel		N/A	N/A	5	N/A	N/A	N/A
802.11(a) 36 Mbps							
5150 - 5250 MHz Band							
Channel 36, Low Channel		245 uS	350 uS	1	70	N/A	N/A
Channel 36, Low Channel		N/A	N/A	5	N/A	N/A	N/A
Channel 48, High Channel		245 uS	350 uS	1	70	N/A	N/A
Channel 48, High Channel		N/A	N/A	5	N/A	N/A	N/A
802.11(a) 54 Mbps							
5150 - 5250 MHz Band							
Channel 36, Low Channel		168 uS	274 uS	1	61.3	N/A	N/A
Channel 36, Low Channel		N/A	N/A	5	N/A	N/A	N/A
Channel 48, High Channel		167 uS	274 uS	1	60.9	N/A	N/A
Channel 48, High Channel		N/A	N/A	5	N/A	N/A	N/A

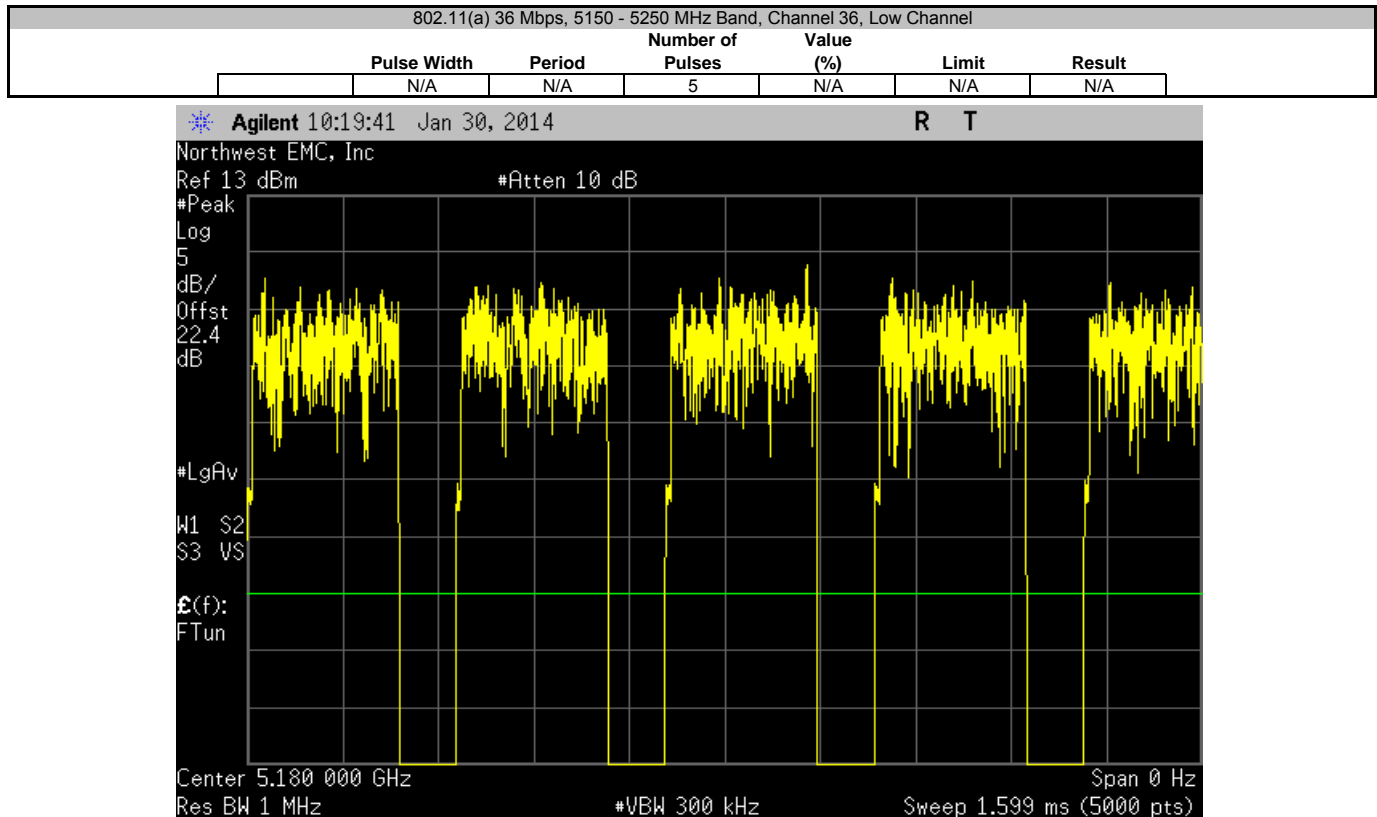
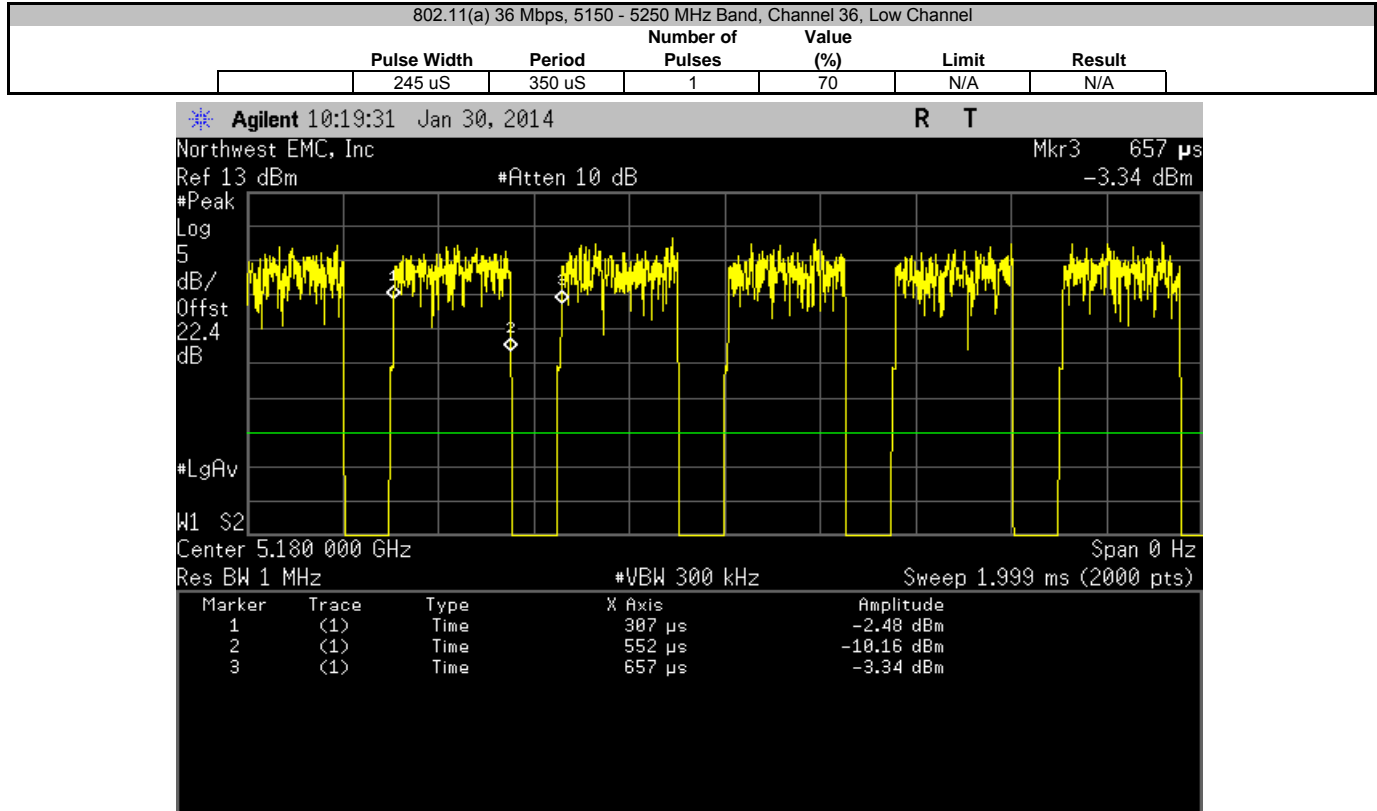


802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
1.388 mS	1.494 mS	1	92.9	N/A	N/A	

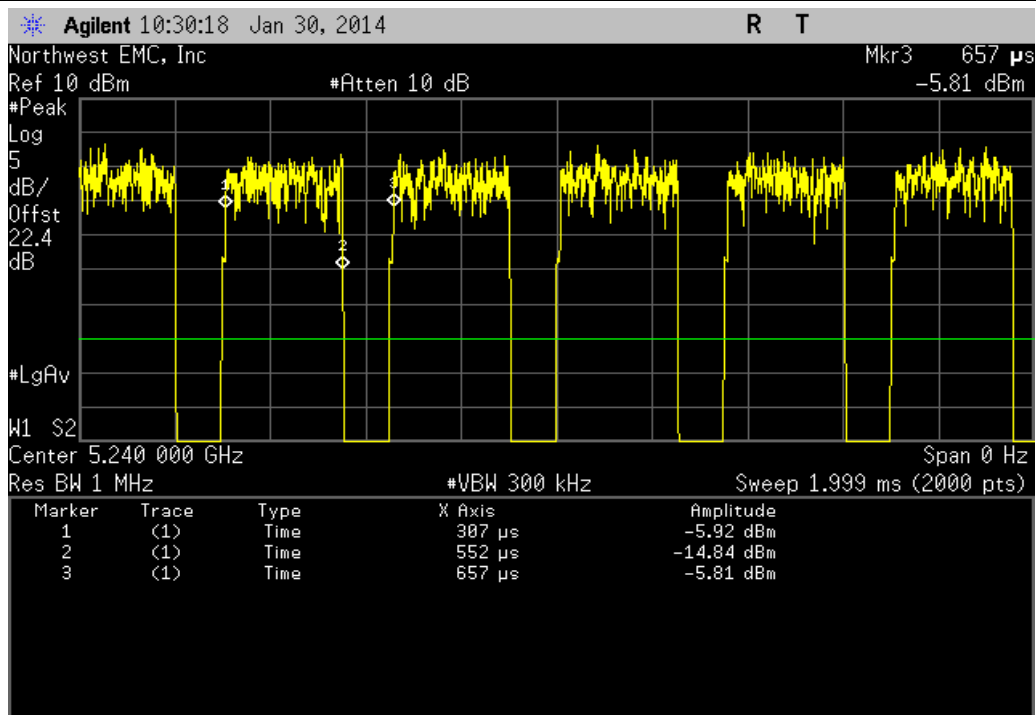


802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	

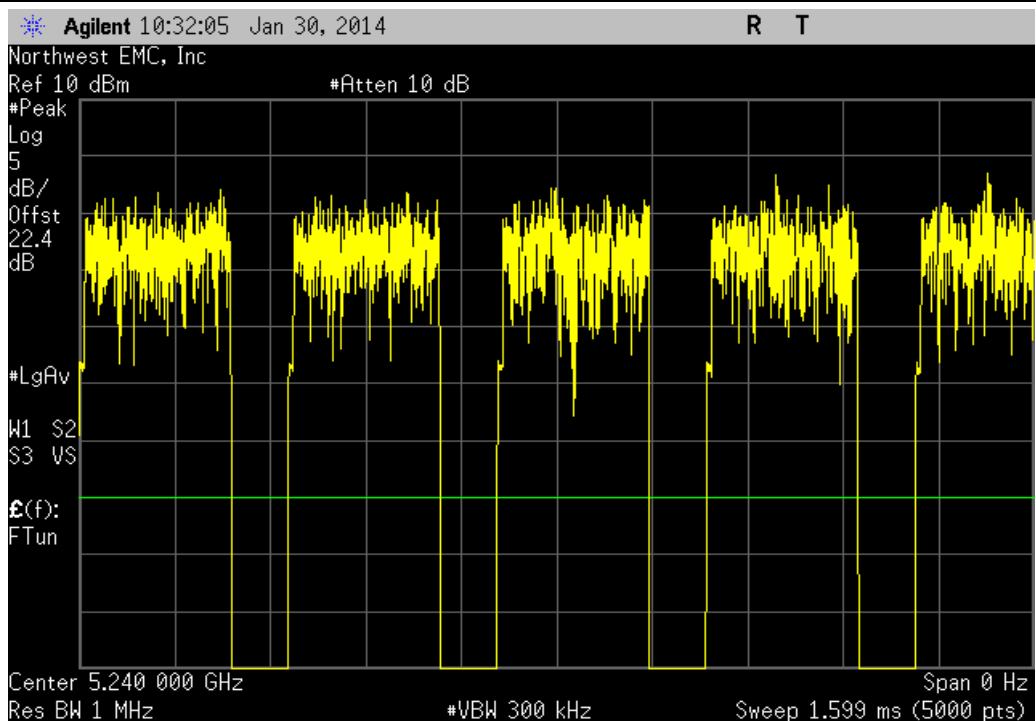


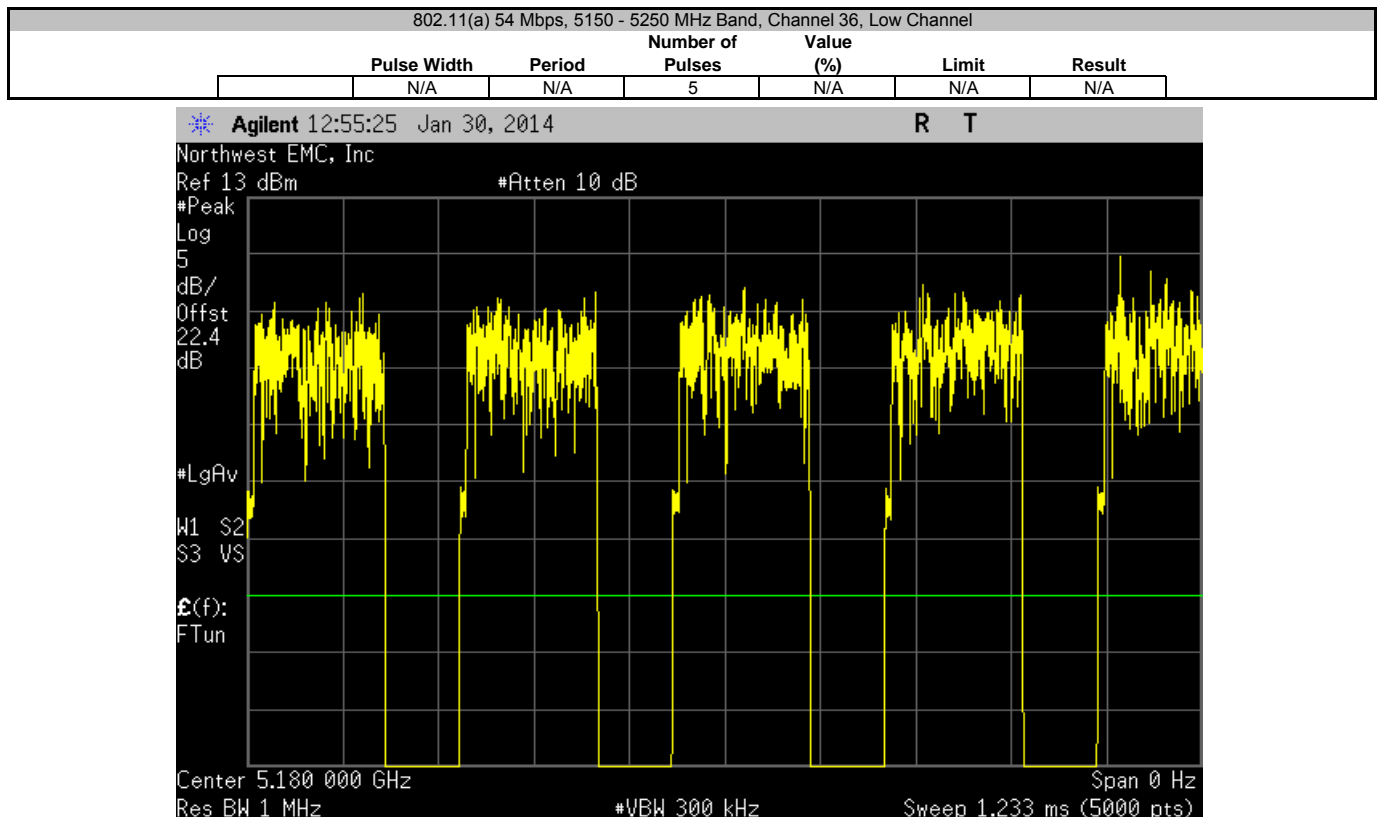
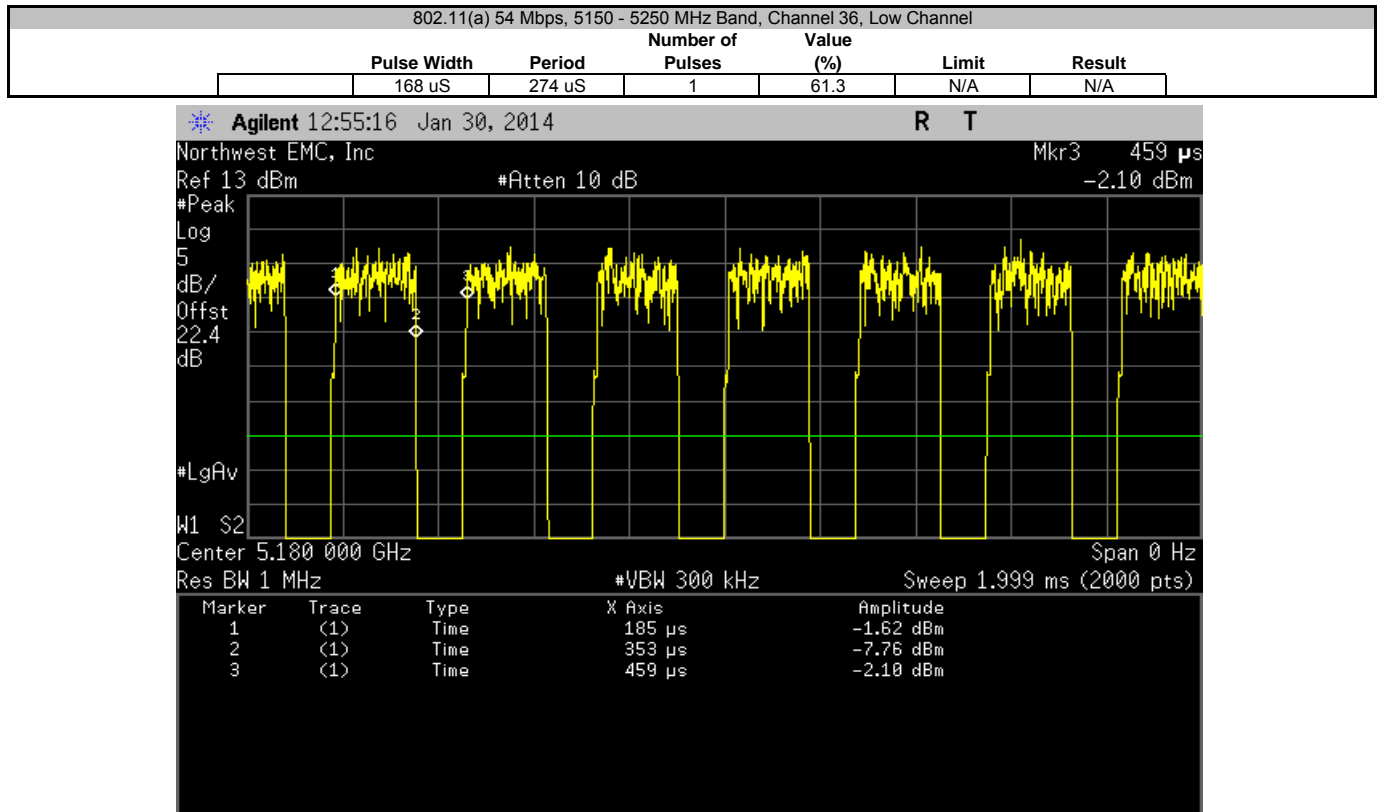


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
245 uS	350 uS	1	70	N/A	N/A	

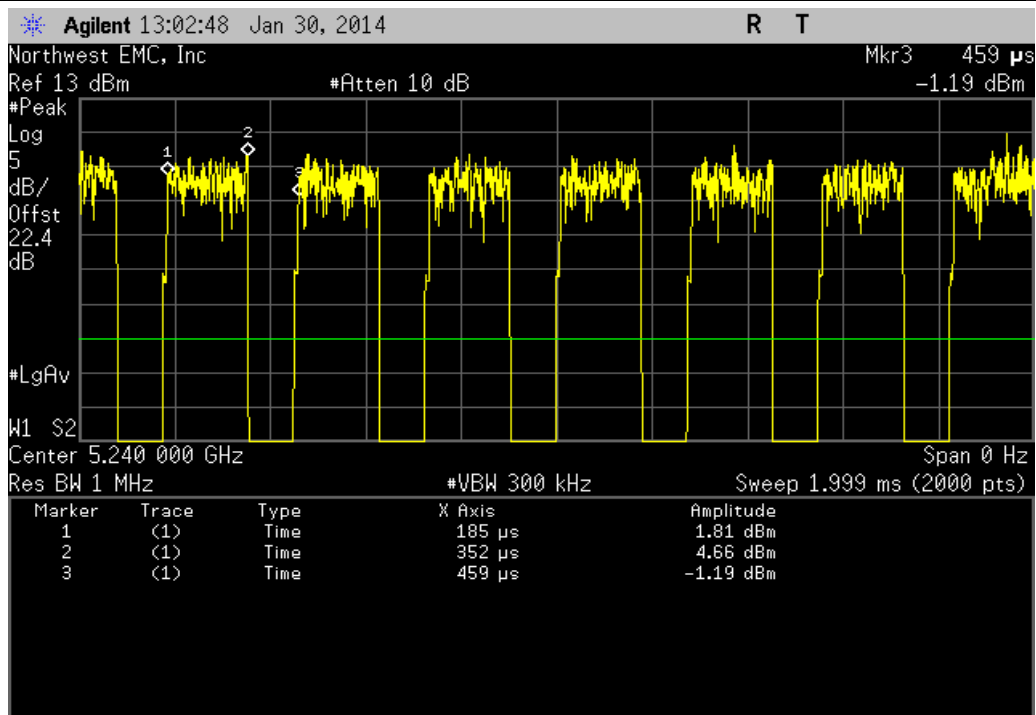


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	





802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
167 uS	274 uS	1	60.9	N/A	N/A	



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	

