



# Electromagnetic Compatibility Test Report

Tests Performed on a Westell, Inc.

Dual Moca 4-port Ethernet WIFI Gateway, Model A90-9100EM15-10

Radiometrics Document RP-6478



<i>Product Detail:</i> FCC ID: CH8ULS3-C Equipment type: Digital Transmission System			
<i>Test Standards:</i> US CFR Title 47, Chapter I, FCC Part 15 Subpart C FCC Part 15 CFR Title 47: 2006 Industry Canada RSS-210, Issue 6 as required for Category I Equipment  This report concerns: Original Grant for Certification FCC Part 15.247			
<i>Tests Performed For:</i> <b>Westell, Inc.</b> 750 West Commons Dr. Aurora, IL 60504		<i>Test Facility:</i> <b>Radiometrics Midwest Corporation</b> 12 East Devonwood Romeoville, IL 60446	
<i>Test Date(s): (Month-Day-Year)</i> December 22, 2008 thru March 12, 2009			
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0	March 20, 2009		
1	March 26, 2009	All	Joseph Strzelecki

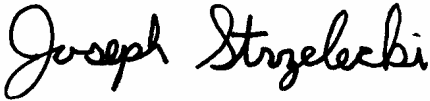
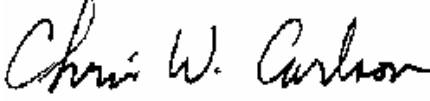
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<b>RADIOMETRICS MIDWEST CORPORATION - EMC Test Report</b>
Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

**1 ADMINISTRATIVE DATA**

<i>Equipment Under Test:</i> A Westell, Inc., Dual Moca 4-port Ethernet WIFI Gateway Model: A90-9100EM15-10 Serial Number: 029 This will be referred to as the EUT in this Report	
<i>Date EUT Received at Radiometrics: (Month-Day-Year)</i> December 22, 2008	<i>Test Date(s): (Month-Day-Year)</i> December 22, 2008 thru March 12, 2009
<i>Test Report Written By:</i> Joseph Strzelecki Senior EMC Engineer	<i>Test Witnessed By:</i> Burak Balkuv Westell, Inc.
<i>Radiometrics' Personnel Responsible for Test:</i> 	<i>Test Report Approved By</i> 
Joseph Strzelecki Senior EMC Engineer NARTE EMC-000877-NE	Chris W. Carlson Director of Engineering NARTE EMC-000921-NE

**2 TEST SUMMARY AND RESULTS**

The EUT (Equipment Under Test) is a Dual Moca 4-port Ethernet WIFI Gateway, Model A90-9100EM15-10 with H/W Rev. C, manufactured by Westell, Inc. The detailed test results are presented in a separate section. The following is a summary of the test results.

**Emissions Tests Results**

Environmental Phenomena	Frequency Range	Basic Standard	Test Result
RF Radiated Emissions	30 MHz to 25 GHz	FCC Part 15	Pass
Conducted Emissions, AC Mains	0.15 - 30 MHz	FCC Part 15	Pass

**Spread Spectrum Transmitter Requirements**

Environmental Phenomena	Frequency Range	FCC Section	Test Result
6 dB Bandwidth Test	2400 to 2483 MHz	15.247 a	Pass
Peak Output Power	2400 to 2483 MHz	15.247 b	Pass
Band-edge Compliance of RF Conducted Emissions	2400 to 2483 MHz	15.247 c	Pass
Spurious RF Conducted Emissions	30 MHz to 25 GHz	15.247 c	Pass
Spurious Radiated Emissions	30 MHz to 25 GHz	15.247 c	Pass
Power Spectral Density	2400 to 2483 MHz	15.247 d	Pass

**2.1 RF Exposure Compliance Requirements**

Since the peak power output is 832 mW, The EUT meets the FCC requirement for RF exposure. The detailed calculations for RF Exposure are presented in a separate document.

### 3 EQUIPMENT UNDER TEST (EUT) DETAILS

#### 3.1 EUT Description

The EUT is a Dual Moca 4-port Ethernet WIFI Gateway, Model A90-9100EM15-10, manufactured by Westell, Inc. The EUT operates in the 2412 to 2462 MHz range. The EUT was in good working condition during the tests, with no known defects.

##### 3.1.1 FCC Section 15.203 & RSS-GEN Antenna Requirements

The antenna is permanently attached to the PCB internal to the EUT. The connector is not readily available to public. Therefore, it meets the 15.203 Requirement.

#### 3.2 Related Submittals

Westell, Inc. is not submitting any other products simultaneously for equipment authorization related to the EUT.

### 4 TESTED SYSTEM DETAILS

#### 4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was placed on an 80-cm high, nonconductive test stand. The testing was performed in conditions as close as possible to installed conditions. Wiring was consistent with manufacturer's recommendations.

The EUT was tested as a remotely located device. Power was supplied at 115 VAC, 60 Hz single-phase to its external power supply. The identifications for all equipment, plus descriptions of all cables used in the tested system, are:

The identification for all equipment, plus descriptions of all cables used in the tested system, are:

**Tested System Configuration List**

Item	Description	Type*	Manufacturer	Model Number	Serial Number
1	Dual Moca 4-port Ethernet WIFI Gateway	E	Westell, Inc.	A90-9100EM15-10C	09AR03000059
2	Power Supply	E	Westell Mitra	585-200085 NPBS-12020000	None
3	MOCA Diplexer	S	Pulse	6098	None
4	Windows XP PC	S	Emachines/Gateway	MX3560	RH56635121101
5	Windows XP PC	S	Micron	A3LS10WLR	3339327-0001

\* Type: E = EUT, P = Peripheral, S = Support Equipment; H = Host Computer

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**List of System Cables**

QTY	Length (m)	Cable Description	Connected to	Shielded?
1	1.8	Low Voltage Power Cord	Power to EUT	No
4	10	Ethernet Cable	EUT and Laptop PC	No
1	10	Coax Cable	EUT and Diplexer	Yes

The coax and Ethernet cables were routed outside the test enclosure to the support equipment.

**4.2 Special Accessories**

No special accessories were used during the tests in order to achieve compliance.

**4.3 Equipment Modifications**

No modifications were made to the EUT during the tests in order to achieve compliance.

**5 TEST SPECIFICATIONS AND RELATED DOCUMENTS**

Document	Date	Title
FCC CFR Title 47	2006	Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices
ANSI C63.4-2003	2003	Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
IC RSS-210 Issue 7	2007	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) Category I Equipment
IC RSS-Gen Issue 2	2007	General Requirements and Information for the Certification of Radiocommunication Equipment (RSS-Gen)
FCC 558074	2005	Measurement of Digital Transmission Systems Operating under Section 15.247

The test procedures used are in accordance with the FCC 558074, Industry Canada RSS-212 and ANSI document C63.4-2003, "Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The specific procedures are described herein. Radiated testing was performed at an antenna to EUT distance of 3 meters. The antenna was raised and lowered from 1 to 4 meters.

**6 RADIOMETRICS' TEST FACILITIES**

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 1999 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site ([www.radiomet.com](http://www.radiomet.com)). Radiometrics accreditation status can be verified at A2LA's web site ([www.a2la2.org](http://www.a2la2.org)).

The following is a list of sites located in Romeoville, Illinois used for testing:

Chamber E: Is a custom made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorber. Pro-shield of Collinsville, Oklahoma manufactured the chamber.

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Test Station F: Is an area that measures 10' D X 12' W X 10' H. The floor and back wall are metal shielded. This area is used for conducted emissions measurements.

A separate ten-foot long, brass plated, steel ground rod attached via a 6 inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

Open Area Test Site (OATS): Is located on 8625 Helmar Road in Newark, Illinois, USA and measures 56' L X 24' W X 17' H. The entire open field test site has a metal ground screen. The FCC has accepted these sites as test site number US1065. The FCC test site Registration Number is 732175. Details of the site characteristics are on file with the Industry Canada as file number IC3124.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSS Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

### 7 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

### 8 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification. The results relate only to the EUT listed herein. Any modifications made to the EUT subsequent to the indicated test date will invalidate the data and void this certification.

### 9 TEST EQUIPMENT TABLE

RMC ID	Manufacturer	Description	Model No.	Serial No.	Frequency Range	Cal Period	Cal Date
AMP-05	RMC/Celeritek	Pre-amplifier	MW110G	1001	1.0-12GHz	12 Mo.	02/01/09
AMP-20	Avantek	Pre-amplifier	SF8-0652	15221	8-18GHz	12 Mo	02/01/09
AMP-22	Anritsu	Pre-amplifier	MH648A	M23969	0.1-1200MHz	12 Mo.	02/03/09
ANT-13	EMCO	Horn Antenna	3115	2502	1.0-18GHz	24 Mo.	10/22/08
ANT-44	Impossible Machine	Super Log Antenna	SL-20M2G	1002	20-2000MHz	24 Mo.	12/26/07
HPF-03	Mini-Circuits	High Pass Filter	VHP-39	HPF-03	3-10 GHz	12 Mo.	01/30/09
LSN-01	Electrometrics	50 uH LISN	FCC/VDE 50/2	1001	0.01-30MHz	24 Mo.	05/03/07
REC-03	Anritsu	Spectrum Analyzer	MS2601B	MT94589	0.01-2200MHz	12 Mo.	03/09/09
REC-01	HP / Agilent	Spectrum Analyzer	8566A	2106A02115, 2209A01349	30Hz-22GHz	12 Mo.	10/23/08
THM-02	Fluke	Temp/Humid Meter	971	93490471	N/A	12 Mo.	02/23/09

Note: All calibrated equipment is subject to periodic checks.

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**10 TEST SECTIONS**

**10.1 AC Conducted Emissions; Section 15.207**

A computer-controlled analyzer was used to perform the conducted emissions measurements. The frequency range was divided into 500 subranges equally spaced on a logarithmic scale. The computer recorded the peak of each subrange. This data was then plotted on semi-log graph paper generated by the computer and plotter. Adjusting the positions of the cables and orientation of the test system then maximizes the highest emissions.

Mains Conducted emission measurements were performed using a 50 Ohm/50 uH Line Impedance Stabilization Network (LISN) as the pick-up device. Measurements were repeated on both leads within the power cord. If the EUT power cord exceeded 80 cm in length, the excess length of the power cord was made into a 30 to 40 cm bundle near the center of the cord. The LISN was placed on the floor at the base of the test platform and electrically bonded to the ground plane.

Broadband conducted emissions may exceed the following limits by no more than 13 dB. An emission is defined as broadband if the average detector amplitude is 6 dB or more under the quasi-peak detector amplitude.

**FCC Limits of Conducted Emissions at the AC Mains Ports**

Frequency Range (MHz)	Class B Limits (dBuV)	
	Quasi-Peak	Average
0.150 - 0.50*	66 - 56	56 - 46
0.5 - 5.0	56	46
5.0 - 30	60	50
* The limit decreases linearly with the logarithm of the frequency in this range.		

The initial step in collecting conducted data is a peak detector scan and the plotting of the measurement range. Significant peaks are then marked as shown on the following table, and these signals are then measured with the quasi-peak detector. The following represents the worst case emissions from power cord, after testing all modes of operation and the three tested channels.

Test Date : 12/23/2008

The Amplitude is the final corrected value with cable and LISN Loss.

EUT Mode	Lead Tested	Frequency MHz	QP Amplitude	QP Limit	Average Amplitude	Average Limit
CH 1	AC Hot 120V	3.339	42.4 Q	56.0	37.5	46.0
CH 6	AC Hot 120V	3.305	42.8 Q	56.0	37.5	46.0
CH 11	AC Hot 120V	3.339	42.4 Q	56.0	37.5	46.0
CH1	Neutral 120V	3.306	44.2 Q	56.0	39.1	46.0
CH 6	Neutral 120V	3.451	45.2 Q	56.0	40.0	46.0
CH 11	Neutral 120V	0.199	46.4 Q	63.6	40.4	53.6
CH 11	Neutral 120V	0.398	45.3 Q	57.9	38.4	47.9
CH 11	Neutral 120V	3.451	45.3 Q	56.0	40.2	46.0

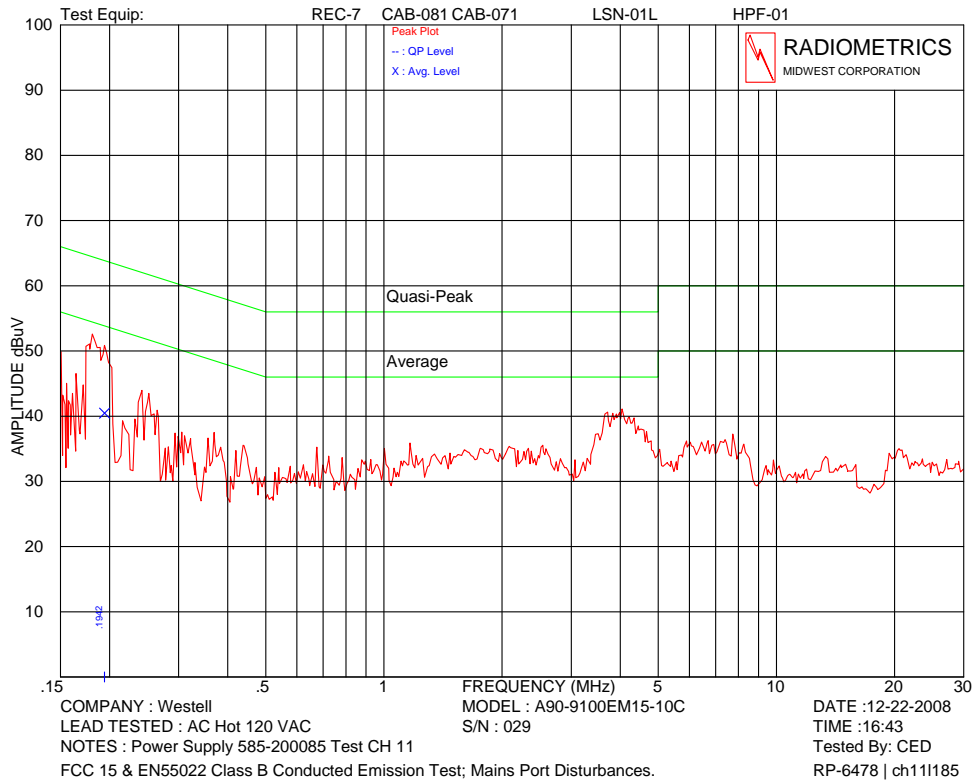
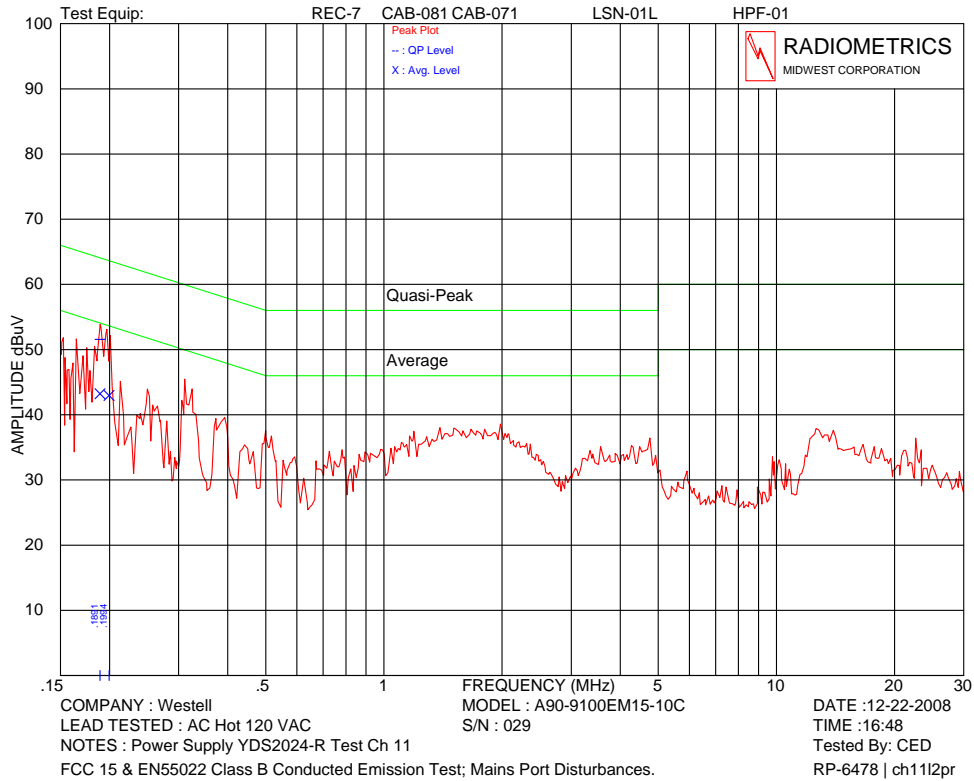
The above are the worst case results with three frequencies test for each EUT

\* QP readings are quasi-peak with a 9 kHz bandwidth and no video filter.

Judgment: Passed by dB

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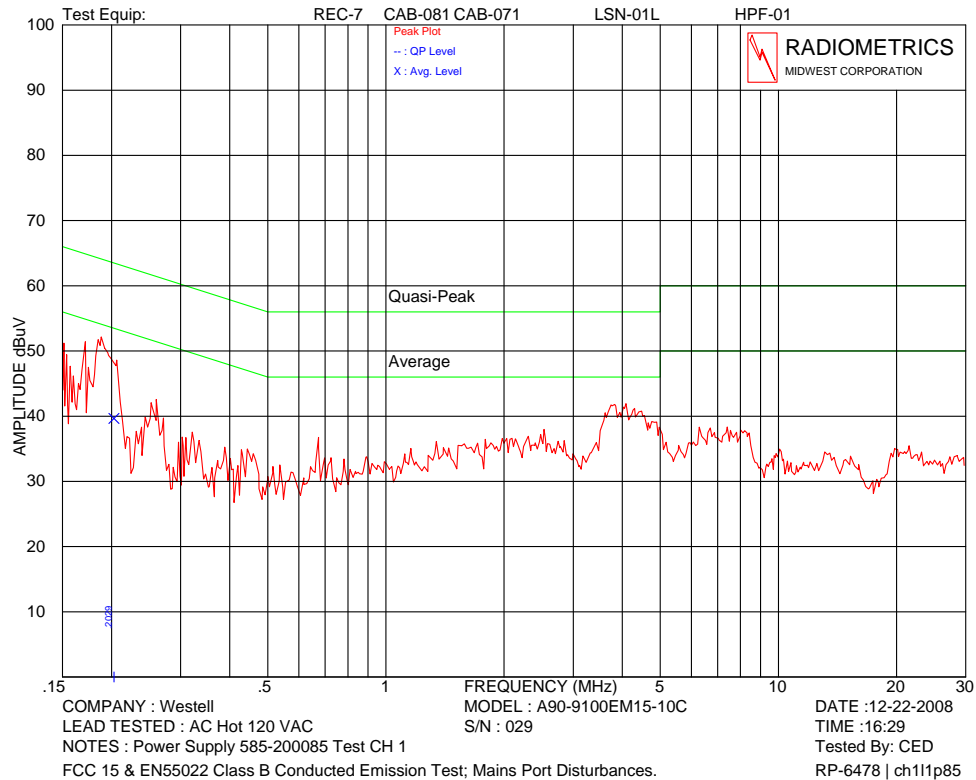
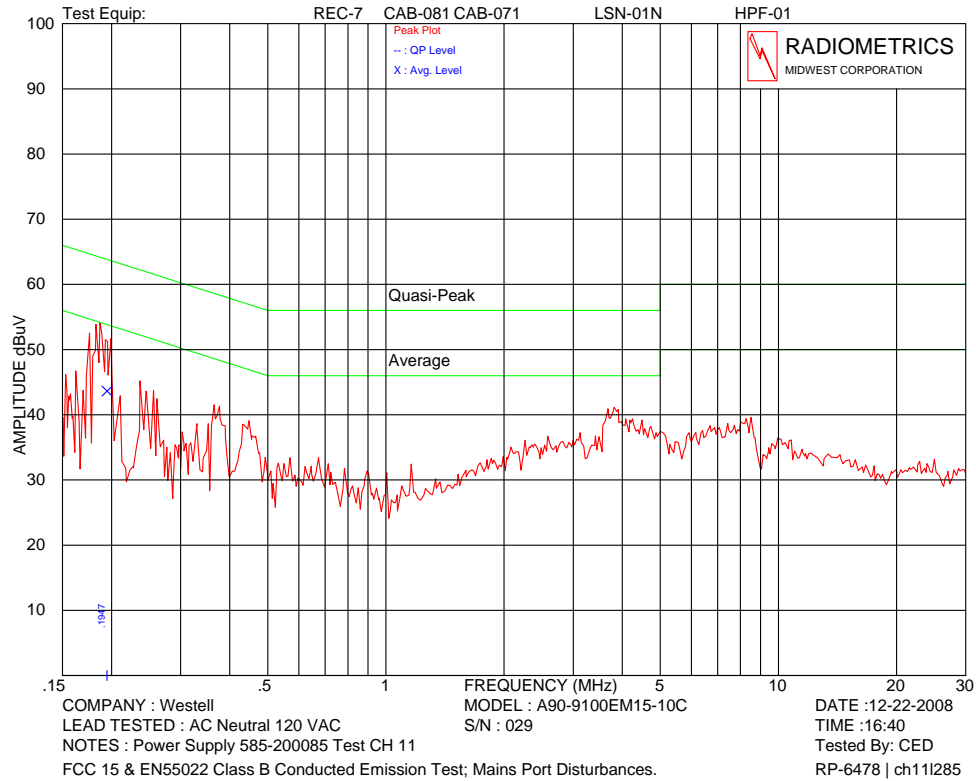
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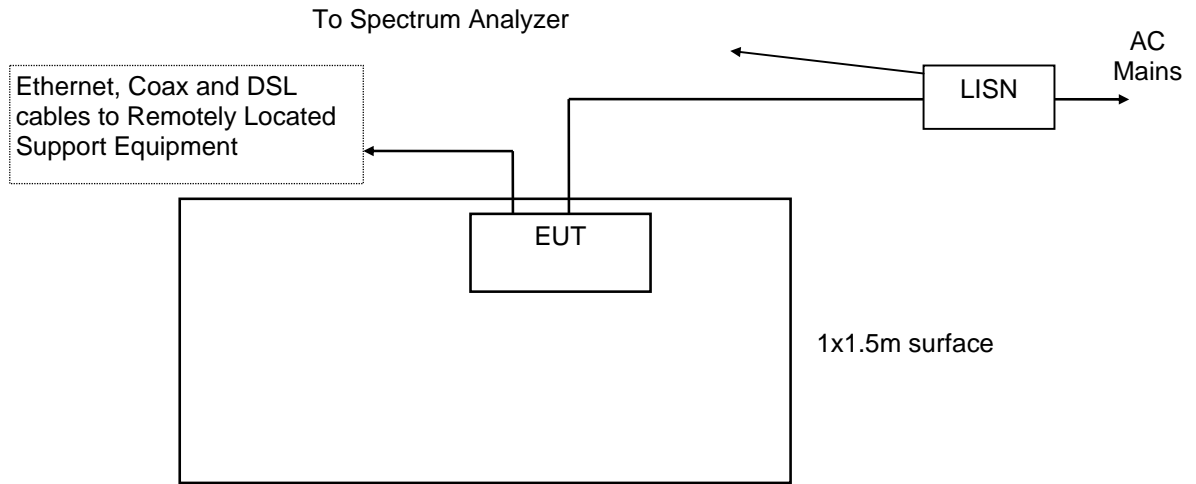
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## Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway





**Figure 1. Conducted Emissions Test Setup**



**Notes:**

- LISN's at least 80 cm from EUT chassis
- Vertical conductive plane 40 cm from rear of table top
- EUT power cord bundled

**10.2 Occupied Bandwidth (6 dB)**

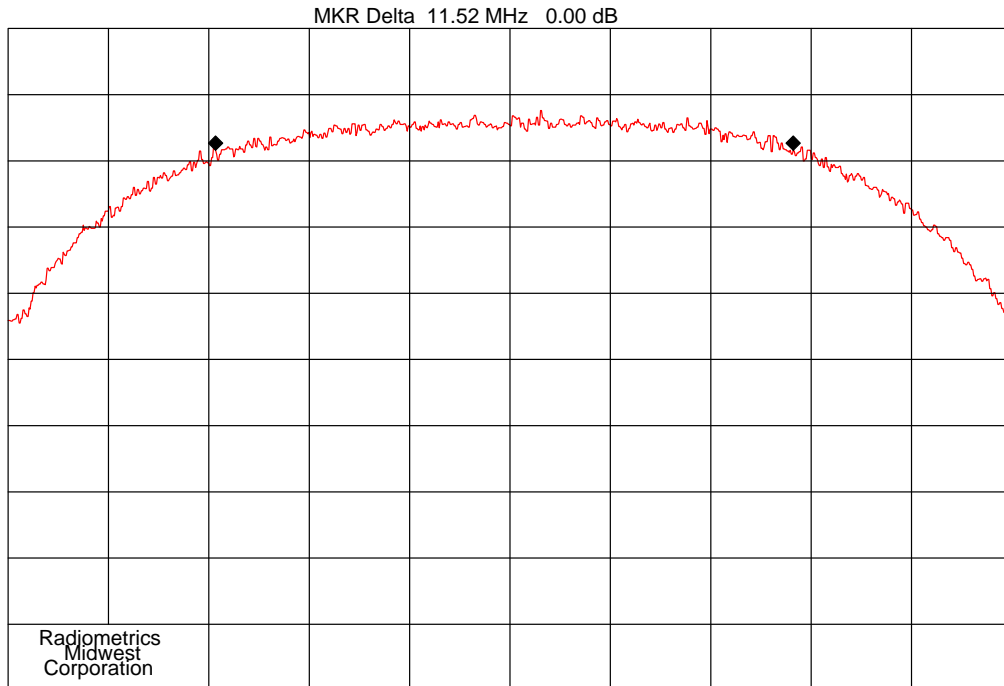
The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation. The EUT was transmitting at its maximum data rate. The trace was allowed to stabilize.

The marker-to-peak function was set to the peak of the emission. Then the marker-delta function was used to measure 6 dB down one side of the emission. The marker-delta function was reset and then moved to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission. The minimum occupied is required to be 0.5 MHz.

Channel	802.11b	802.11g
	6 dB EBW MHz	6 dB EBW MHz
1	11.52	16.34
6	12.52	16.52
11	12.14	16.58

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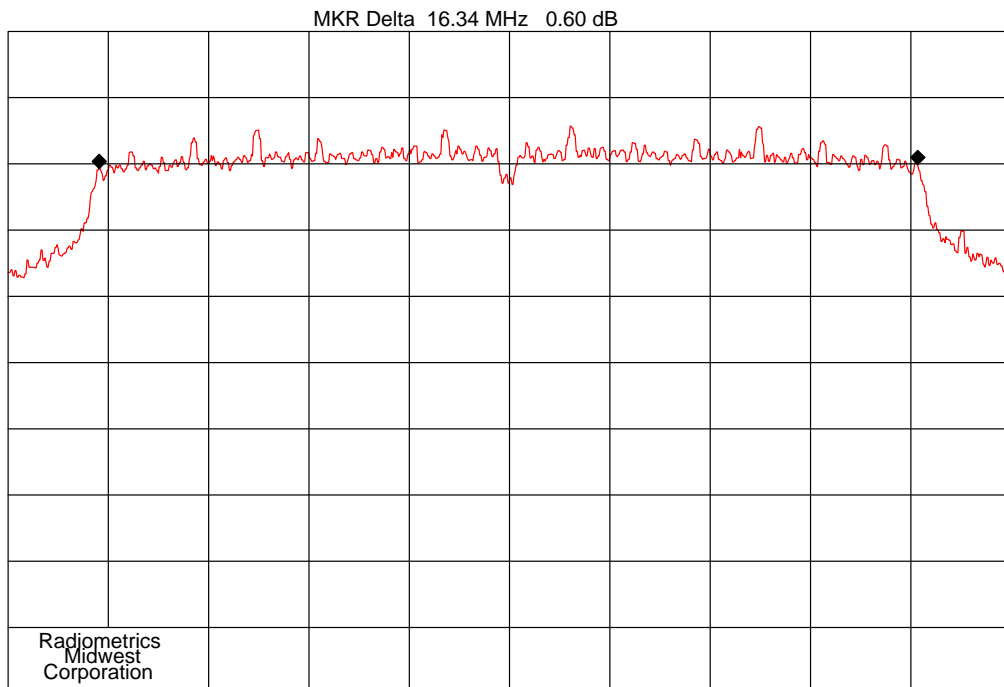
Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway



COMPANY : Westell  
CENTER 2.412 0 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : 6 dB Bandwith, 802.11b Ch 1

ITEM : A90-9100EM15-10  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 12:15

DATE : 03-12-2009  
SPAN 20.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec



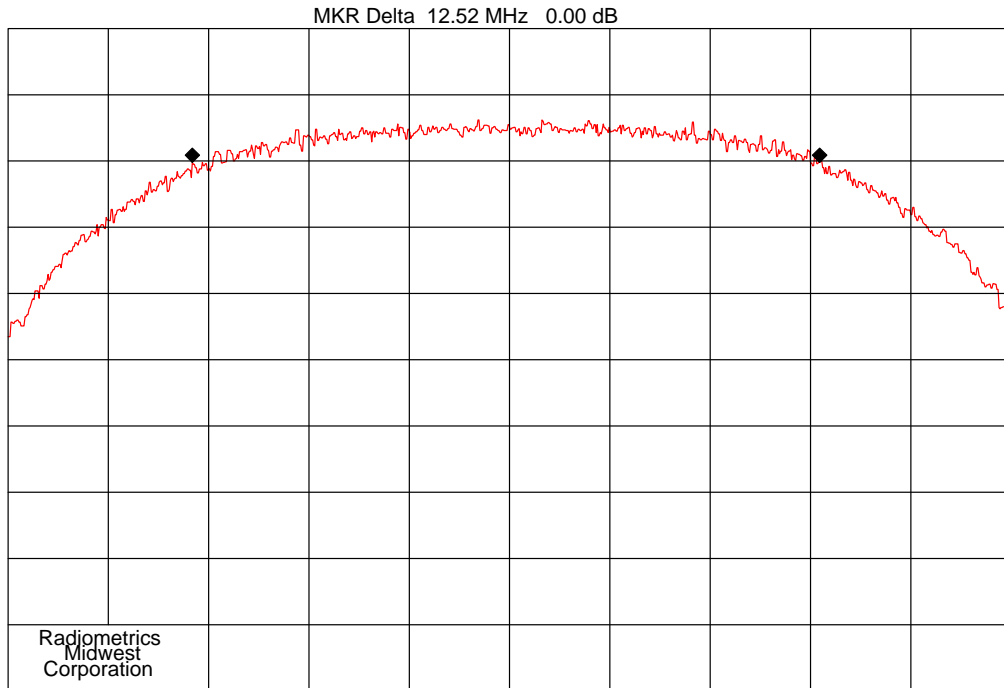
COMPANY : Westell  
CENTER 2.412 0 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : 6 dB Bandwith Test, 802.11g Ch 1

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 10:43

DATE : 03-12-2009  
SPAN 20.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

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Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

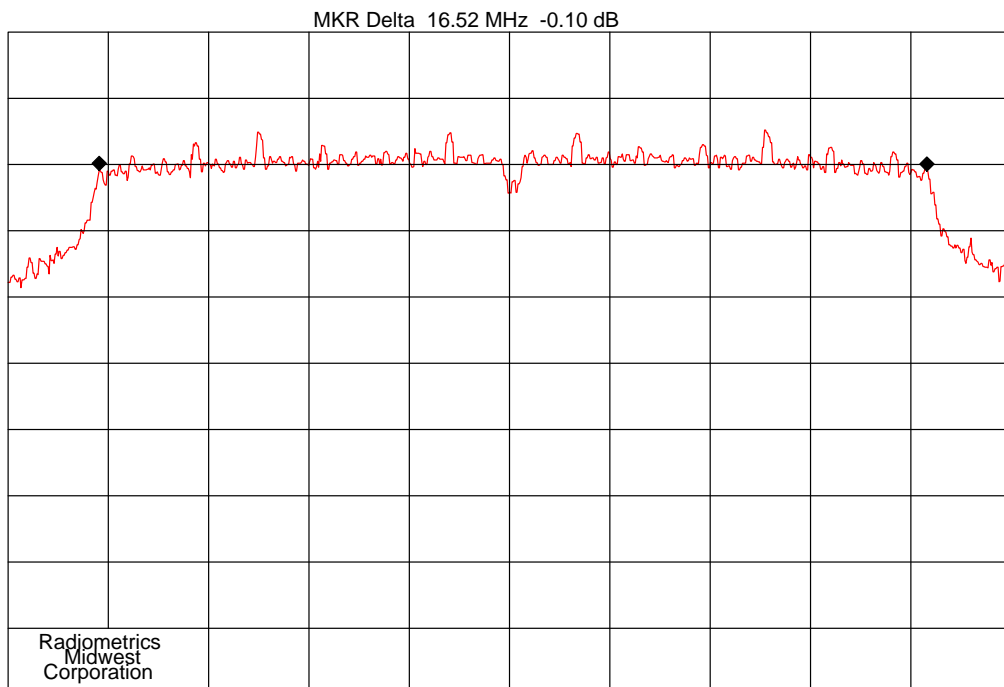


COMPANY : Westell  
CENTER 2.437 0 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 12:13

DATE : 03-12-2009  
SPAN 20.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

NOTES : 6 dB Bandwith, 802.11b Ch 6



COMPANY : Westell  
CENTER 2.437 0 GHz  
RES BW 100 kHz  
10 dB/

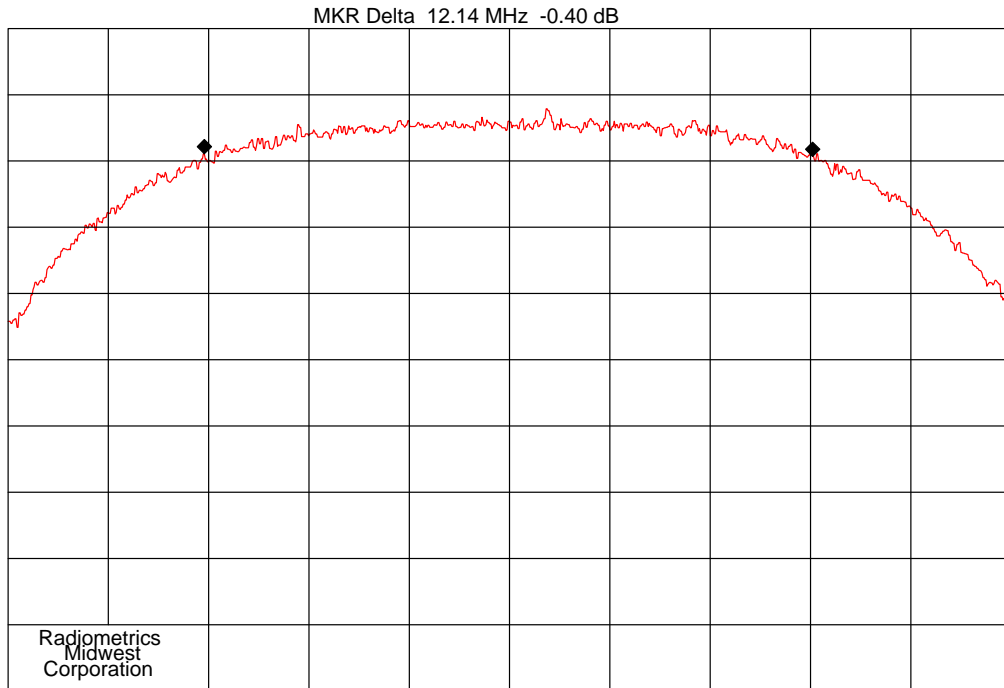
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REF 20.0 dBm  
VBW 300 kHz  
TIME : 11:22

DATE : 03-12-2009  
SPAN 20.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

NOTES : 6 dB Bandwith, 802.11g Ch 6

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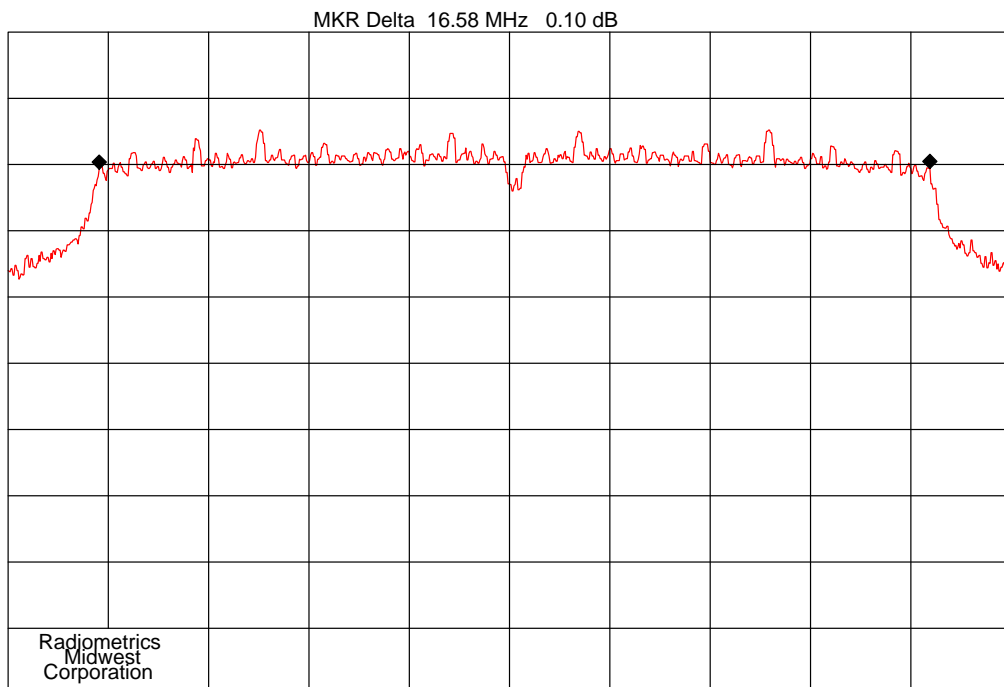


COMPANY : Westell  
CENTER 2.462 0 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 12:10

DATE : 03-12-2009  
SPAN 20.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

NOTES : 6 dB Bandwith, 802.11b Ch 11



COMPANY : Westell  
CENTER 2.462 0 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 11:26

DATE : 03-12-2009  
SPAN 20.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

NOTES : 6 dB Bandwith, 802.11g Ch 11

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### 10.3 Peak Output Power

The EUT antenna port was connected to the spectrum analyzer via a low loss coaxial cable. The power output option 2; Method #3 from FCC rules 558074 was used for this test. The spectrum analyzer was set to the following settings:

Span = 2 MHz; RBW = 1 MHz; VBW = 3 MHz; Sweep = auto  
 Detector function = peak; Trace = max hold

The trace was allowed to stabilize. The marker-to-peak function was used to measure the peak of the emission. The indicated level is the peak output power. The BW correction factor is  $10 \cdot \log(BW)$ . Note 30 dBm = 1 watt. Since the gain of the antenna is always less than 6 dB, the limit is not reduced.

Mode	Freq. (MHz)	Reading (dBm)	BW Corr Factor (dB)	Cable Loss (dB)	Total Power (dBm)		Limit (dBm)
					dBm	Watts	
802.11b	2412	14.8	10.6	0.3	25.7	0.373	30
802.11b	2437	15	11.0	0.3	26.3	0.424	30
802.11b	2462	15.2	10.8	0.3	26.3	0.431	30
802.11g	2412	14.2	12.1	0.3	26.6	0.459	30
802.11g	2437	14.6	12.2	0.3	27.1	0.510	30
802.11g	2462	14.7	12.2	0.3	27.2	0.525	30

Judgement pass by 2.8 dB

### 10.4 Power Spectral Density

PSD option 1 was used for this test. No external attenuator was used. The spectrum analyzer was set to the following settings:

Span = 500 kHz RBW = 3 kHz; VBW = 10 kHz; Sweep = 167 seconds  
 Detector function = Peak

Mode	Frequency (MHz)	Reading dBm	Cable Loss (dB)	3 kHz Spectral Density (dBm)	Limit (dBm)
802.11b	2412	-4.0	0.3	-3.7	8.0
802.11b	2437	-4.2	0.3	-3.9	8.0
802.11b	2462	-3.9	0.3	-3.6	8.0
802.11g	2412	-8.9	0.3	-8.6	8.0
802.11g	2437	-8.9	0.3	-8.6	8.0
802.11g	2462	-8.1	0.3	-7.8	8.0

Judgement pass by 11.6 dB

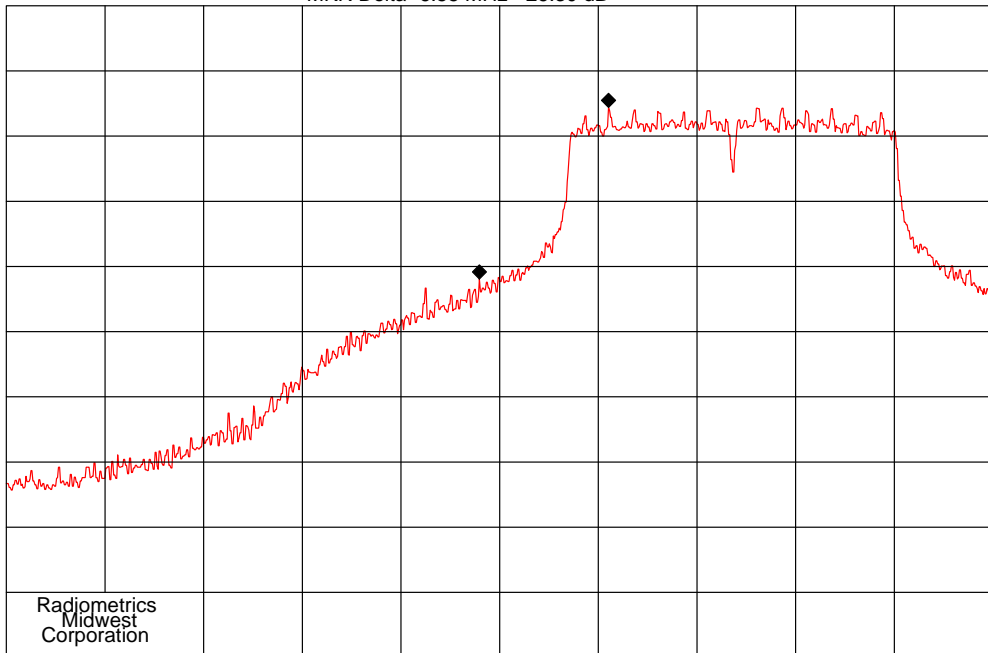
### 10.5 Band-edge Compliance of RF Conducted Emissions

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation at the band-edge, with the EUT set to the lowest frequency. The trace was allowed to stabilize. The delta is required to be at least 20 dB.

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MKR Delta -6.55 MHz -26.30 dB



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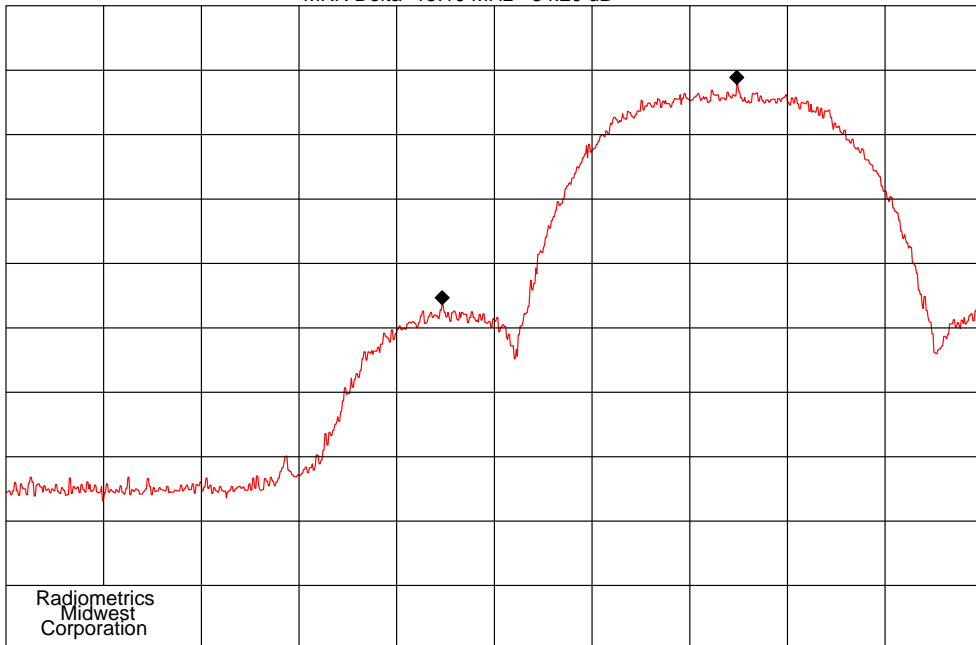
COMPANY : Westell  
CENTER 2.400 0 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 13:50

DATE : 03-12-2009  
SPAN 50.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

NOTES : Band Edge Test, 802.11g Ch 1

MKR Delta -15.10 MHz -34.20 dB



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Corporation

COMPANY : Westell  
CENTER 2.400 0 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 13:45

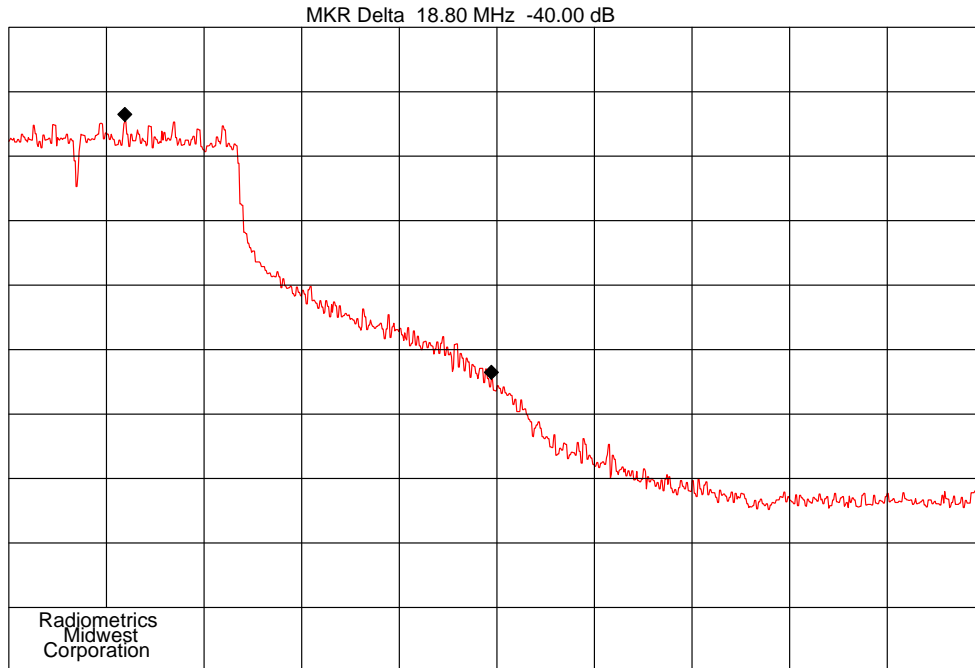
DATE : 03-12-2009  
SPAN 50.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

NOTES : Band Edge Test, 802.11b Ch 1



**RADIOMETRICS MIDWEST CORPORATION - EMC Test Report**

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

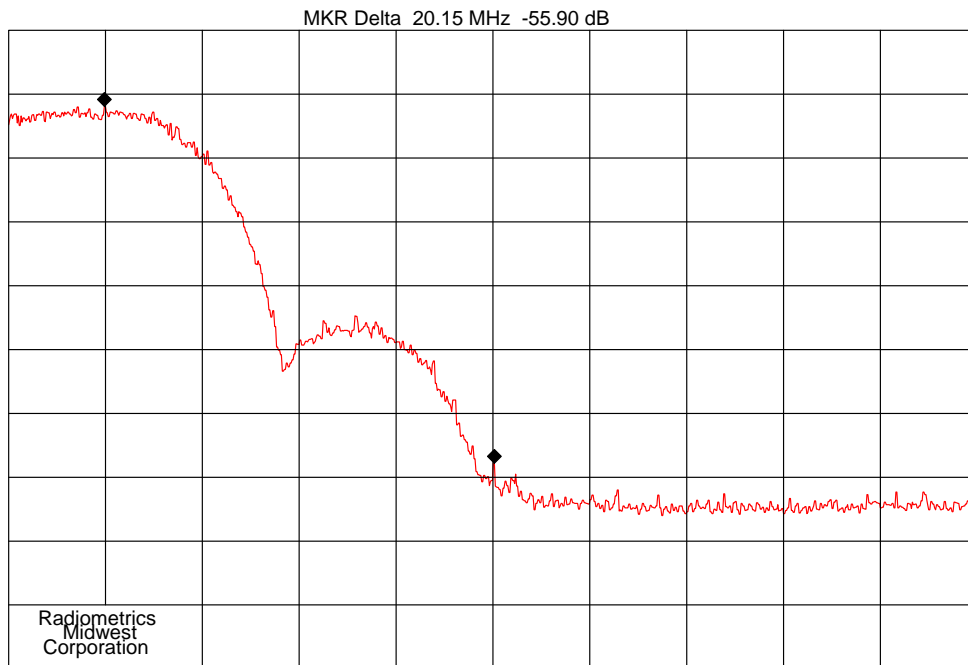


Radometrics  
Midwest  
Corporation

COMPANY : Westell  
CENTER 2.483 5 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : Band Edge Test, 802.11g Ch 11

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 13:48

DATE : 03-12-2009  
SPAN 50.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec



Radometrics  
Midwest  
Corporation

COMPANY : Westell  
CENTER 2.483 5 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : Band Edge Test, 802.11b Ch 11

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 13:47

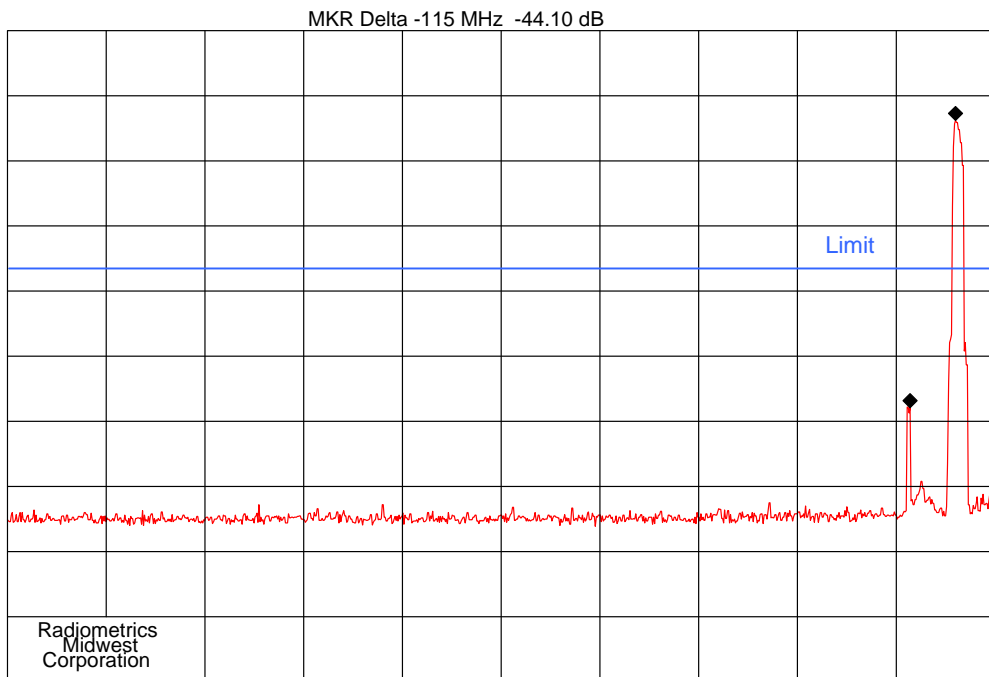
DATE : 03-12-2009  
SPAN 50.0 MHz  
ATTEN 30 dB  
SWP 20.0 msec

Judgement: pass by 6.3 dB

### 10.6 Spurious RF Conducted Emissions

The spectrum analyzer was set to the MAX HOLD mode to record all spurious emissions from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. The trace was allowed to stabilize. The first two plots were made while stepping through three frequencies (Low middle and high). Each frequency was on for 30 seconds.

The limits are closer to the top of the scale for the 18-25 GHz plots because the reference level is lower for these plots.

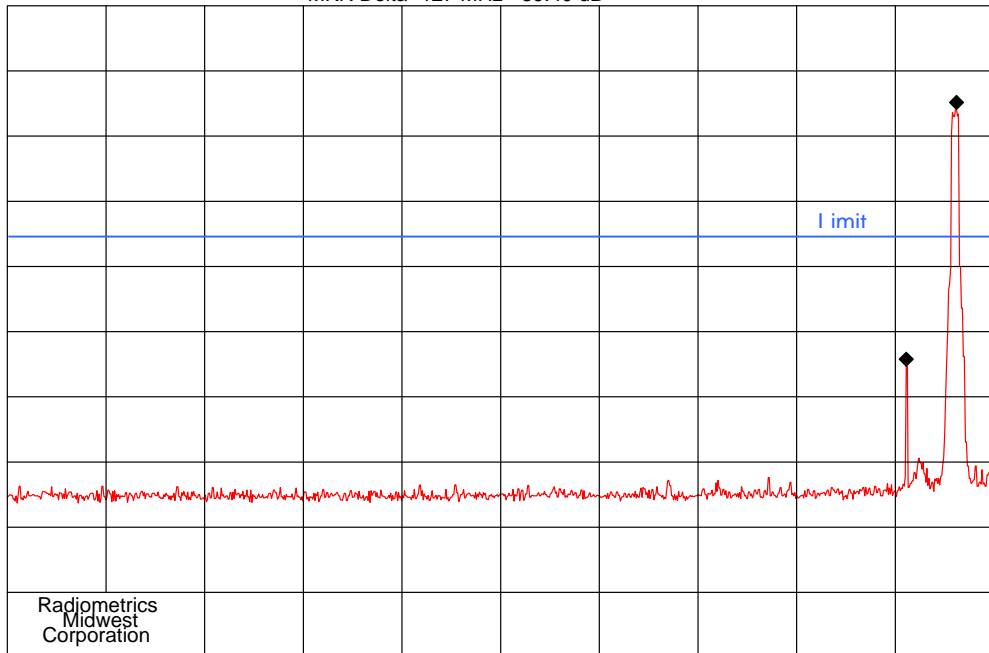


COMPANY : Westell	ITEM : A90-9100EM15-10C	DATE : 03-12-2009
START 1 MHz	REF 20.0 dBm	STOP 2.50 GHz
RES BW 100 kHz	VBW 300 kHz	ATTEN 30 dB
10 dB/	TIME : 14:07	SWP 750 msec
NOTES : Ant Spurious Emissions, 802.11b Ch 1		

# RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

MKR Delta -127 MHz -39.40 dB

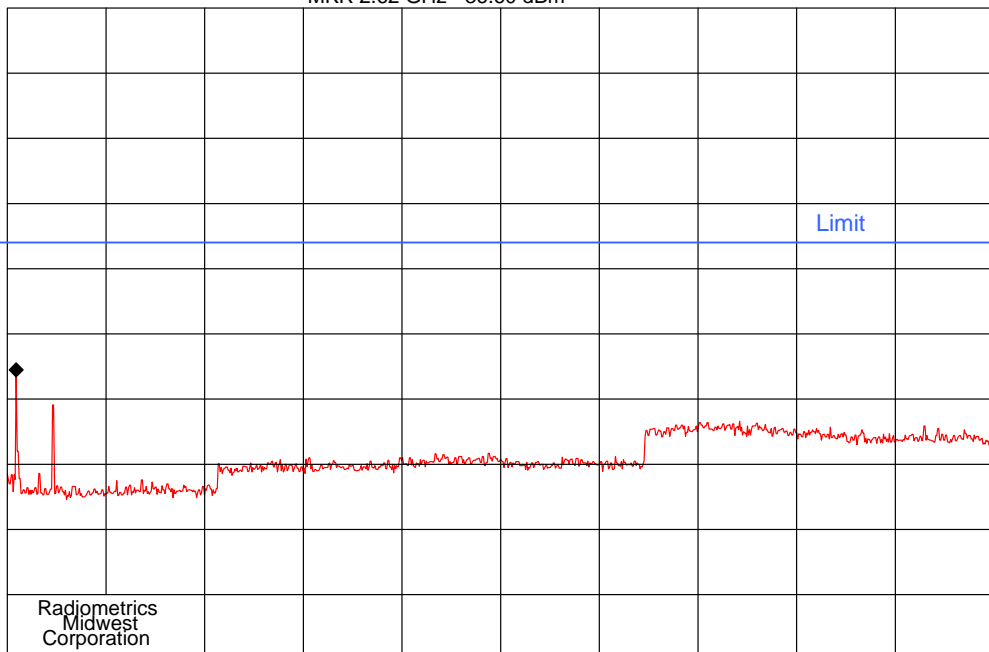


COMPANY : Westell  
 START 1 MHz  
 RES BW 100 kHz  
 10 dB/  
 NOTES : Ant Spurious Emissions, 802.11g Ch 1

ITEM : A90-9100EM15-10C  
 REF 20.0 dBm  
 VBW 300 kHz  
 TIME : 13:55

DATE : 03-12-2009  
 STOP 2.50 GHz  
 ATTEN 30 dB  
 SWP 750 msec

MKR 2.62 GHz -36.60 dBm



COMPANY : Westell  
 START 2.5 GHz  
 RES BW 100 kHz  
 10 dB/  
 NOTES : Ant Spurious Emissions, 802.11g Ch 1

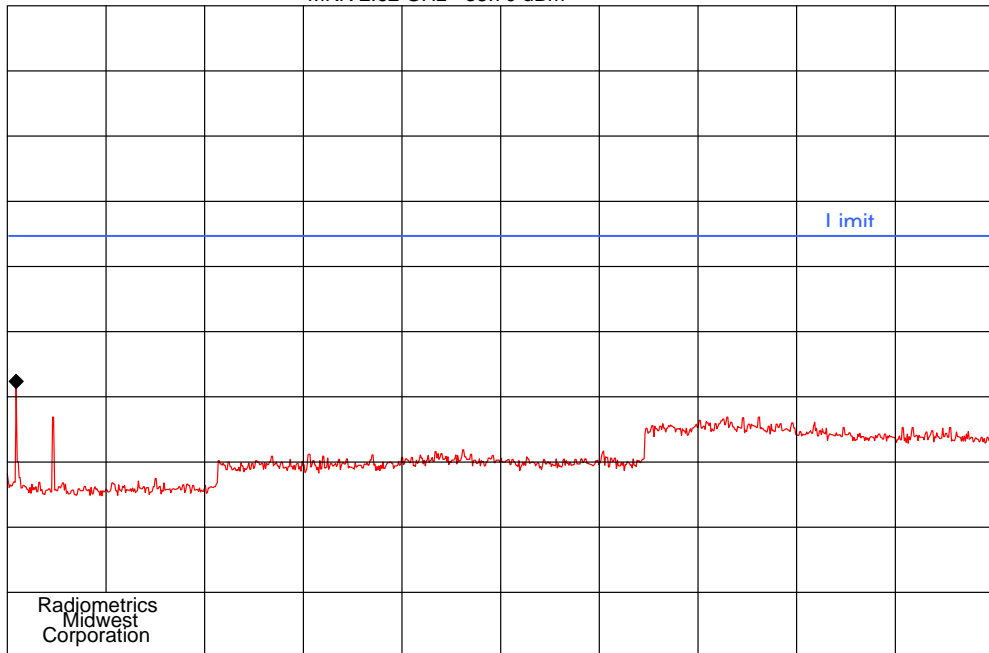
ITEM : A90-9100EM15-10C  
 REF 20.0 dBm  
 VBW 300 kHz  
 TIME : 14:20

DATE : 03-12-2009  
 STOP 18.0 GHz  
 ATTEN 30 dB  
 SWP 4.65 sec

**RADIOMETRICS MIDWEST CORPORATION - EMC Test Report**

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

MKR 2.62 GHz -38.70 dBm



Radiometrics  
Midwest  
Corporation

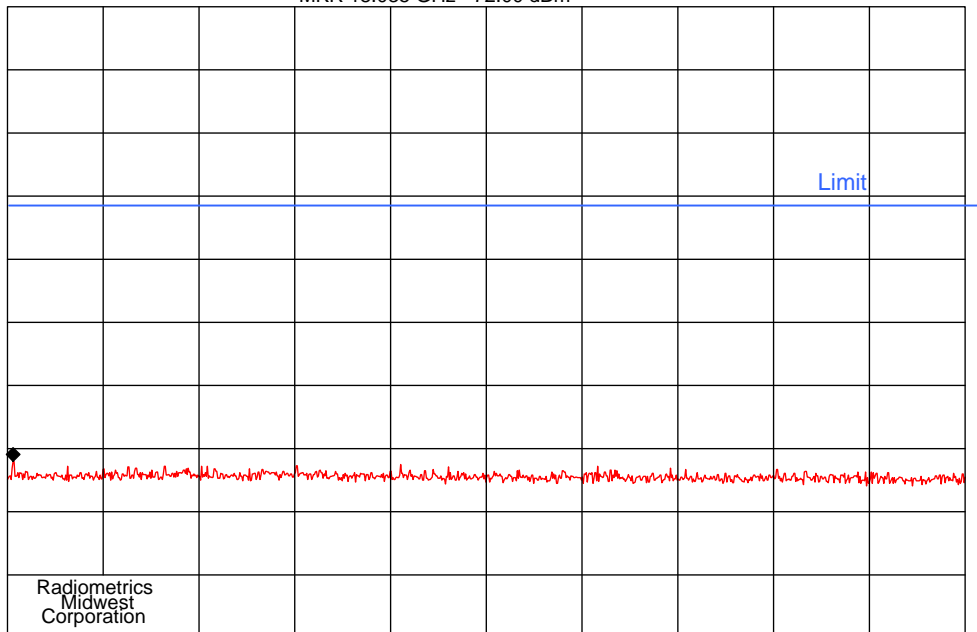
COMPANY : Westell  
START 2.5 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 14:09

DATE : 03-12-2009  
STOP 18.0 GHz  
ATTEN 30 dB  
SWP 4.65 sec

NOTES : Ant Spurious Emissions, 802.11b Ch 1

MKR 18.035 GHz -72.00 dBm



Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 18.00 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 0.0 dBm  
VBW 300 kHz  
TIME : 14:53

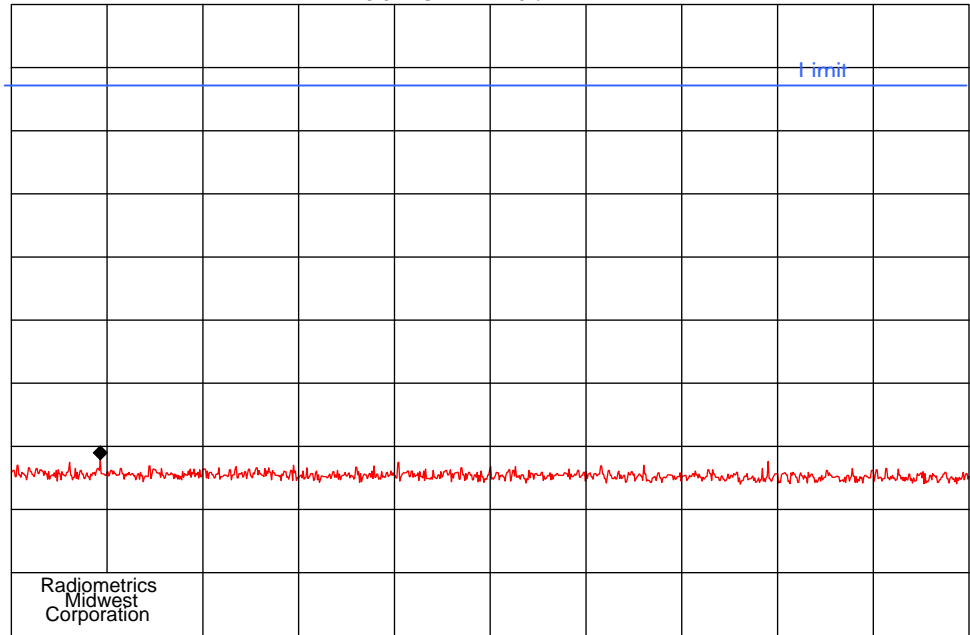
DATE : 03-12-2009  
STOP 25.00 GHz  
HARMONIC 6  
SWP 2.10 sec

NOTES : Ant Spurious Emissions, 802.11b Ch 1

**RADIOMETRICS MIDWEST CORPORATION - EMC Test Report**

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

MKR 18.644 GHz -72.10 dBm



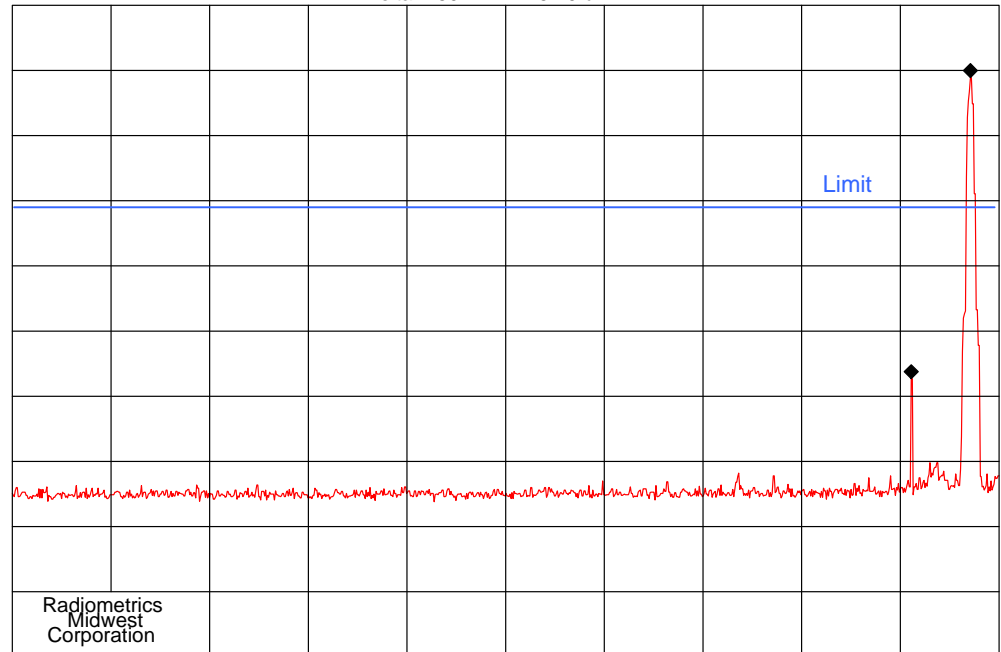
Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 18.00 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11g Ch 1

ITEM : A90-9100EM15-10C  
REF 0.0 dBm  
VBW 300 kHz  
TIME : 14:55

DATE : 03-12-2009  
STOP 25.00 GHz  
HARMONIC 6  
SWP 2.10 sec

MKR Delta -150 MHz -46.20 dB



Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 1 MHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11b Ch 6

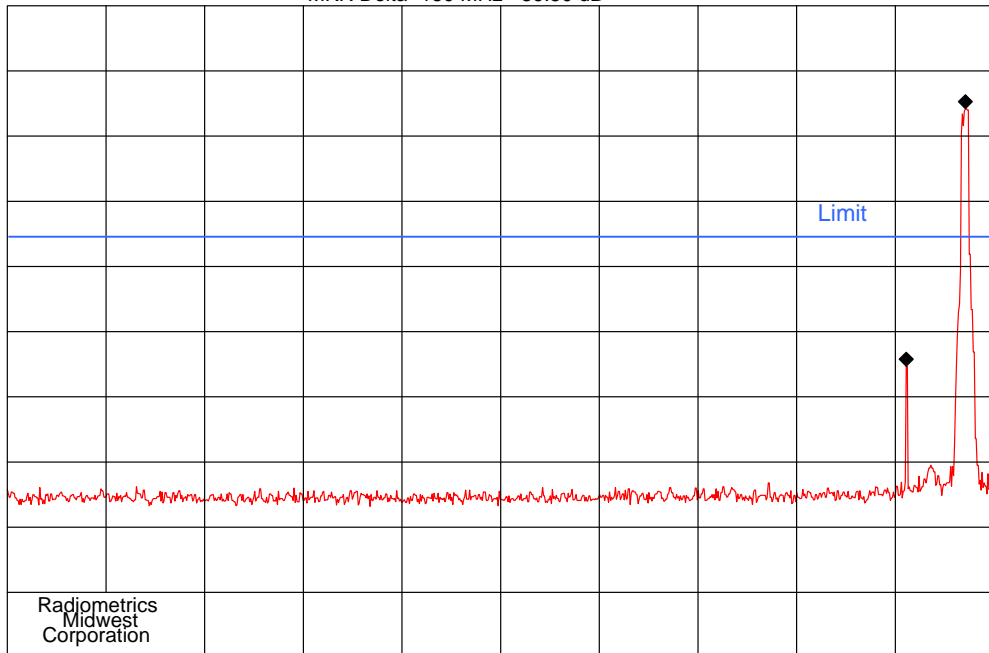
ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 14:05

DATE : 03-12-2009  
STOP 2.50 GHz  
ATTEN 30 dB  
SWP 750 msec

# RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

MKR Delta -150 MHz -39.50 dB



Radiometrics  
Midwest  
Corporation

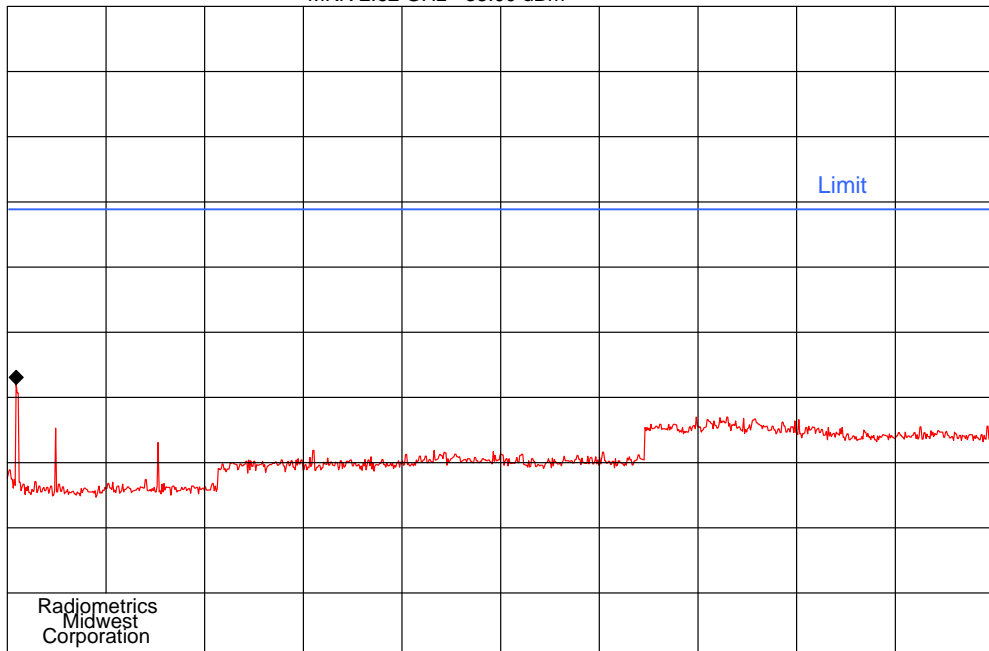
COMPANY : Westell  
START 1 MHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 13:58

DATE : 03-12-2009  
STOP 2.50 GHz  
ATTEN 30 dB  
SWP 750 msec

NOTES : Ant Spurious Emissions, 802.11g Ch 6

MKR 2.62 GHz -38.00 dBm



Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 2.5 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 14:11

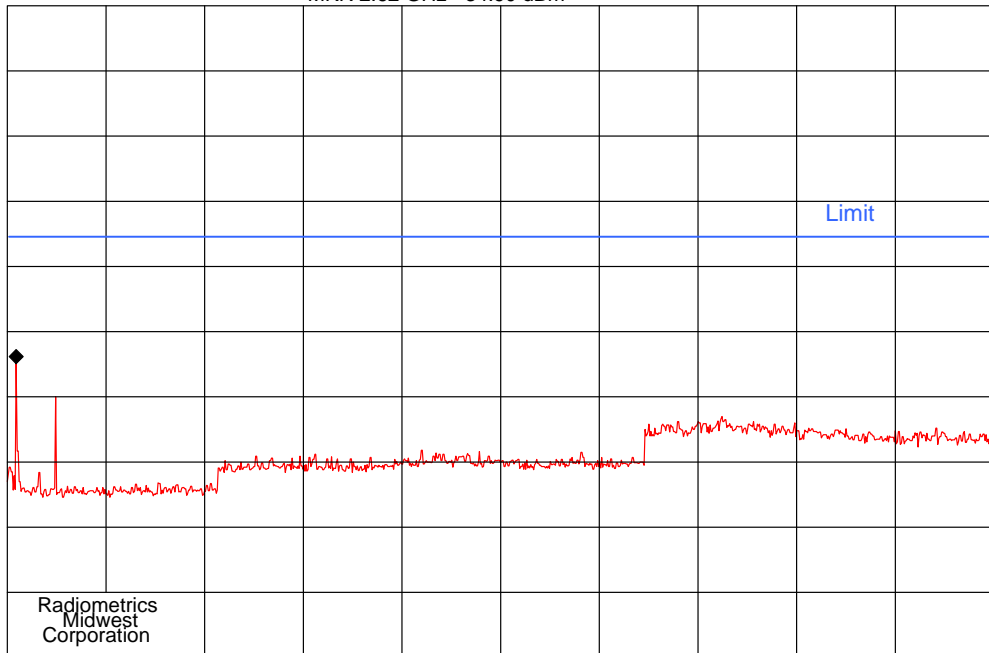
DATE : 03-12-2009  
STOP 18.0 GHz  
ATTEN 30 dB  
SWP 4.65 sec

NOTES : Ant Spurious Emissions, 802.11b Ch 6

## RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

MKR 2.62 GHz -34.90 dBm



Radiometrics  
Midwest  
Corporation

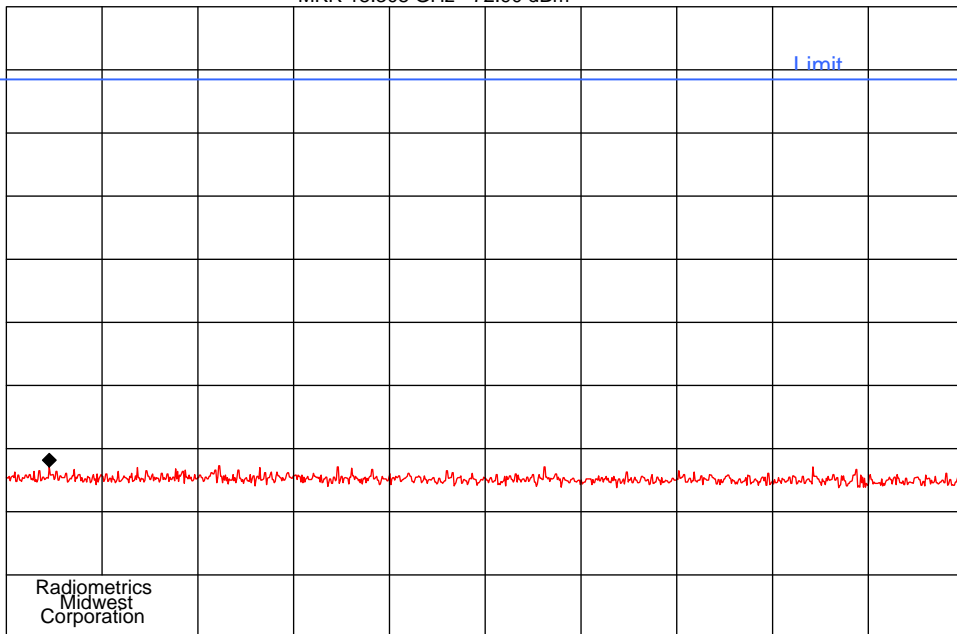
COMPANY : Westell  
START 2.5 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 14:17

DATE : 03-12-2009  
STOP 18.0 GHz  
ATTEN 30 dB  
SWP 4.65 sec

NOTES : Ant Spurious Emissions, 802.11g Ch 6

MKR 18.308 GHz -72.90 dBm



Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 18.00 GHz  
RES BW 100 kHz  
10 dB/

ITEM : A90-9100EM15-10C  
REF 0.0 dBm  
VBW 300 kHz  
TIME : 14:52

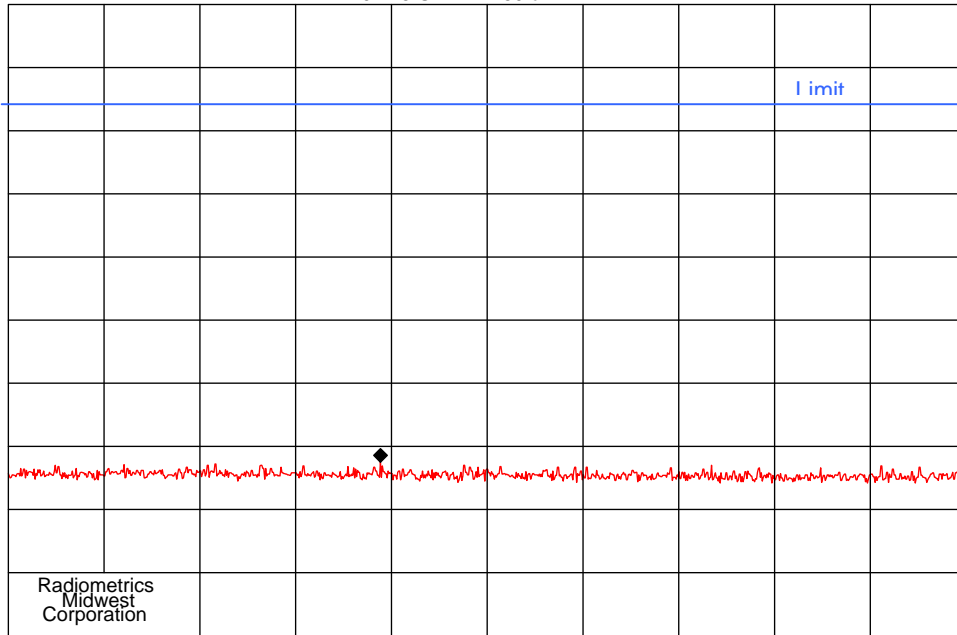
DATE : 03-12-2009  
STOP 25.00 GHz  
HARMONIC 6  
SWP 2.10 sec

NOTES : Ant Spurious Emissions, 802.11b Ch 6

RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

MKR 20.716 GHz -72.50 dBm



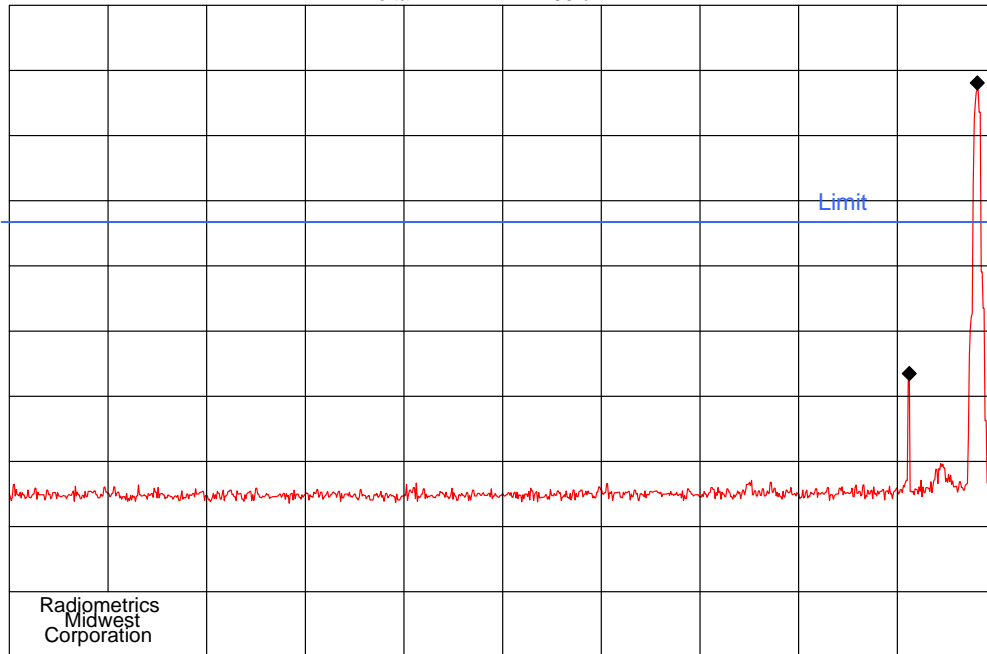
Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 18.00 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11g Ch 6

ITEM : A90-9100EM15-10C  
REF 0.0 dBm  
VBW 300 kHz  
TIME : 14:56

DATE : 03-12-2009  
STOP 25.00 GHz  
HARMONIC 6  
SWP 2.10 sec

MKR Delta -172 MHz -44.60 dB



Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 1 MHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11b Ch 11

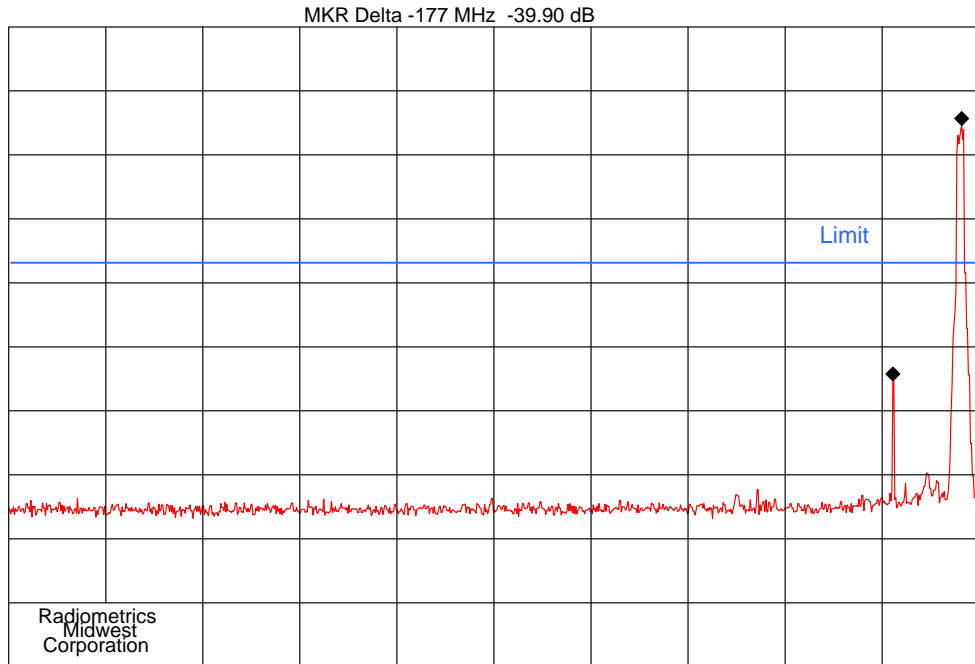
ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 14:02

DATE : 03-12-2009  
STOP 2.50 GHz  
ATTEN 30 dB  
SWP 750 msec



# RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

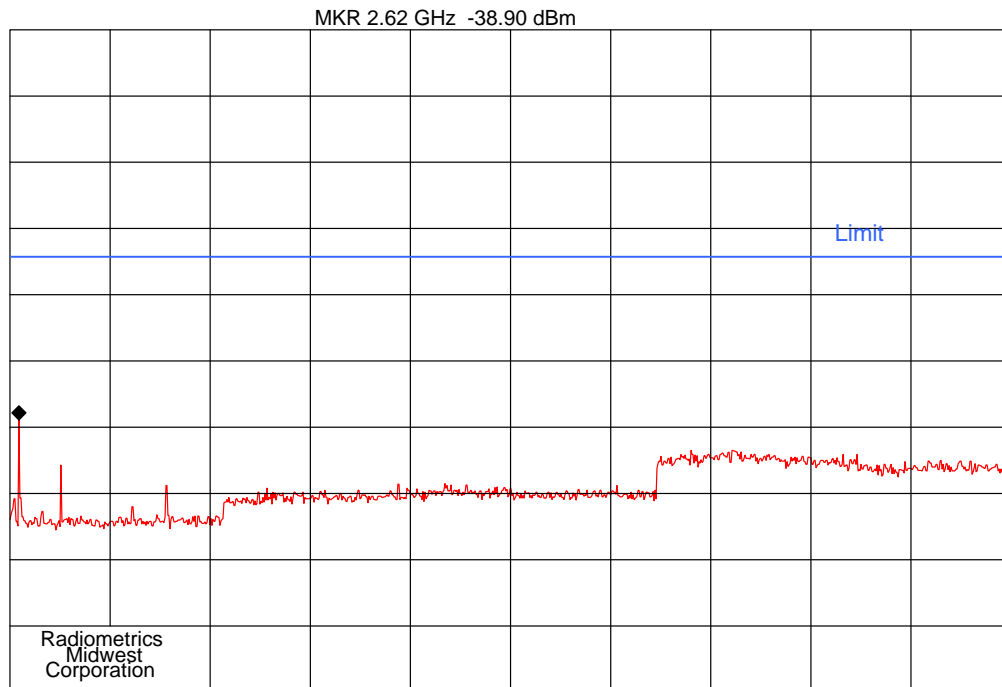
Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway



COMPANY : Westell  
START 1 MHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11g Ch 11

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 13:59

DATE : 03-12-2009  
STOP 2.50 GHz  
ATTEN 30 dB  
SWP 750 msec



COMPANY : Westell  
START 2.5 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11b Ch 11

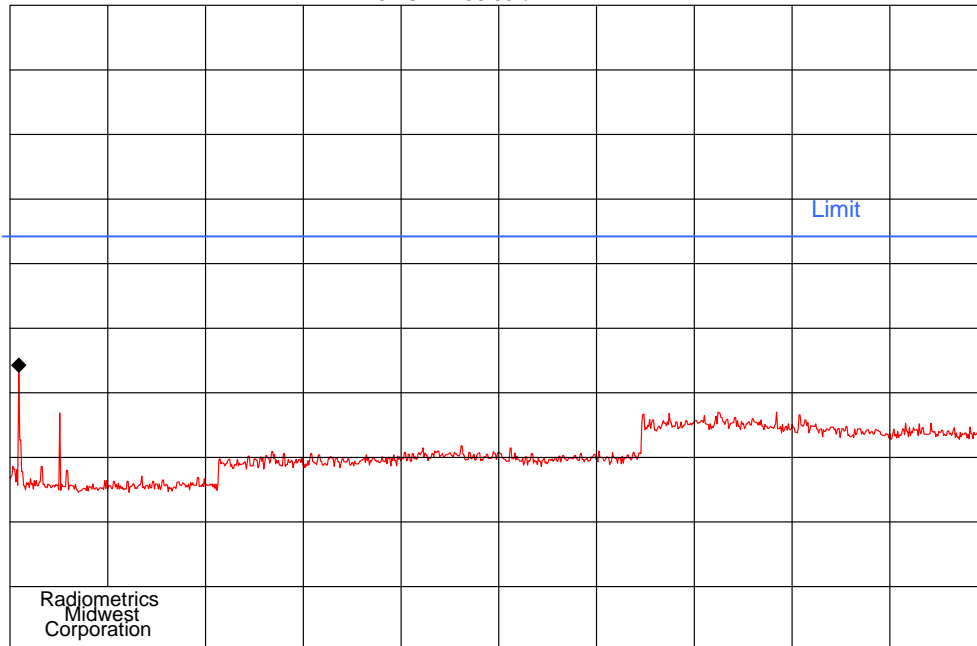
ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 14:13

DATE : 03-12-2009  
STOP 18.0 GHz  
ATTEN 30 dB  
SWP 4.65 sec

**RADIOMETRICS MIDWEST CORPORATION - EMC Test Report**

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

MKR 2.62 GHz -36.80 dBm



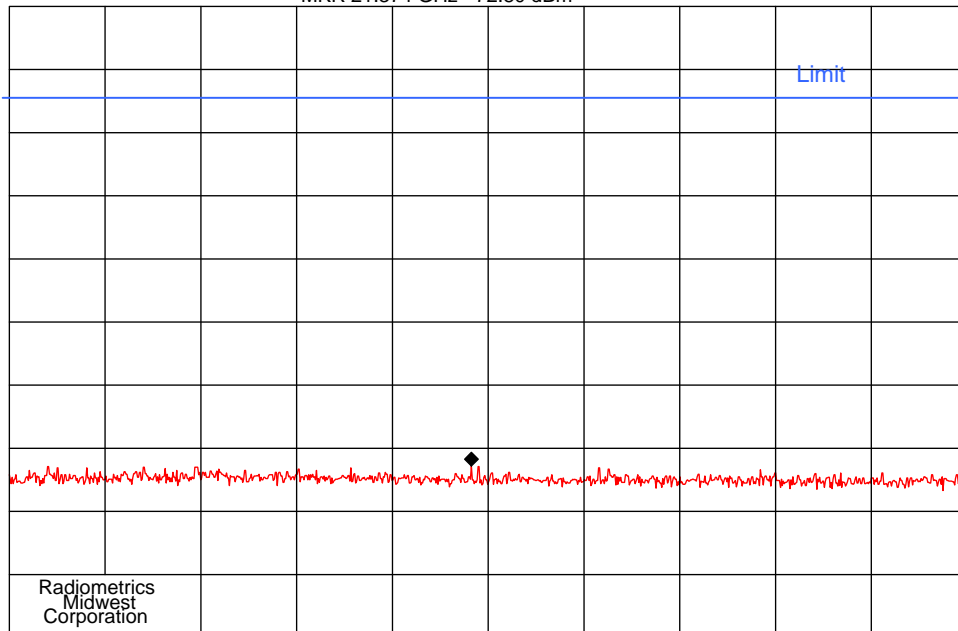
Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 2.5 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11g Ch 11

ITEM : A90-9100EM15-10C  
REF 20.0 dBm  
VBW 300 kHz  
TIME : 14:16

DATE : 03-12-2009  
STOP 18.0 GHz  
ATTEN 30 dB  
SWP 4.65 sec

MKR 21.374 GHz -72.80 dBm

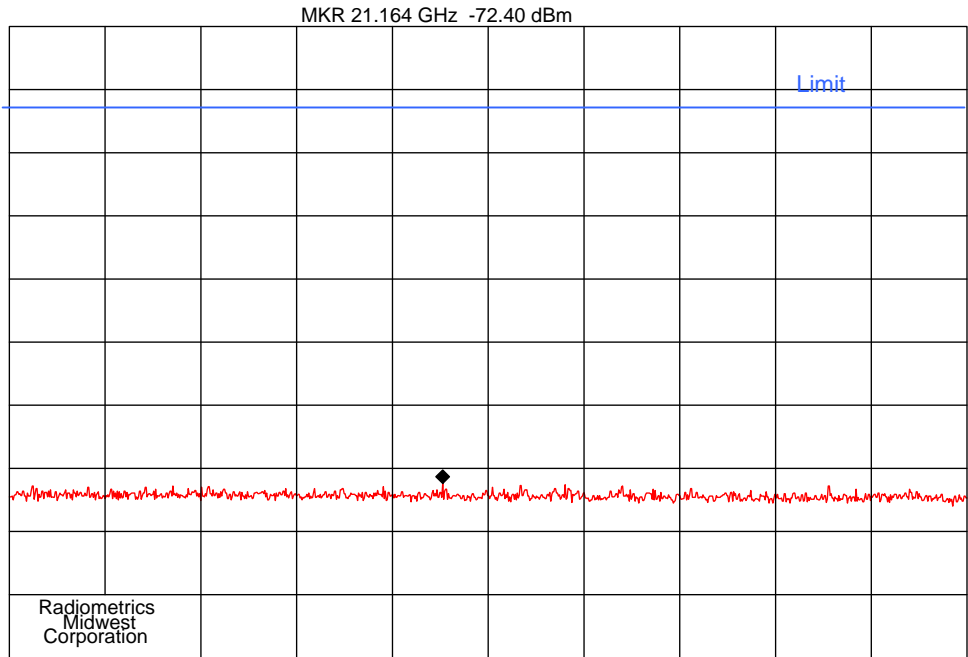


Radiometrics  
Midwest  
Corporation

COMPANY : Westell  
START 18.00 GHz  
RES BW 100 kHz  
10 dB/  
NOTES : Ant Spurious Emissions, 802.11g Ch 11

ITEM : A90-9100EM15-10C  
REF 0.0 dBm  
VBW 300 kHz  
TIME : 14:58

DATE : 03-12-2009  
STOP 25.00 GHz  
HARMONIC 6  
SWP 2.10 sec



Radiometrics Midwest Corporation COMPANY : Westell START 18.00 GHz RES BW 100 kHz 10 dB/ NOTES : Ant Spurious Emissions, 802.11b Ch 11	ITEM : A90-9100EM15-10C REF 0.0 dBm VBW 300 kHz TIME : 14:51	DATE : 03-12-2009 STOP 25.00 GHz HARMONIC 6 SWP 2.10 sec
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### 10.7 Spurious Radiated Emissions (Restricted Band)

Radiated emission measurements in the restricted bands were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. Below 1 GHz, when a radiated emission is detected approaching the specification limit, the measurement of the emission is repeated using a tuned dipole antenna with a Roberts Balun. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded.

From 30 to 1000 MHz, an Anritsu spectrum analyzer and a preamplifier with a 10 dB attenuator connected to the input were used. The out of band emissions and the ambient emissions were below the level of input overload (80 dBuV).

For tests from 1 to 25 GHz, an HP8566 spectrum analyzer was used with a preamplifier. The out of band emissions and the ambient emissions were below the level of input overload (72 dBuV). In addition, a high pass filter was used to reduce the fundamental emission.

Preliminary radiated emission tests were performed inside of an anechoic chamber. The frequency range from 30 to 25000 MHz was scanned and plotted using the peak detector function. The results of the preliminary scans were only used to identify the frequencies being emitted from the EUT and were not used to determine compliance with the test specification. Radiated emission measurements are performed with linearly polarized broadband antennas.

Final radiated emissions measurements were performed in the open area test site at a test distance of 3 meters. The open area test site used to collect the radiated data is located on 8625 Helmar Road in Newark, Illinois. The open field test site has a metal ground screen. All other tests are performed at 12 East Devonwood Ave. Romeoville, Illinois EMI test lab.

### 10.7.1 Radiated Emissions Field Strength Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation is as follows:

$$FS = RA + AF + CF - AG$$

Where: FS = Field Strength

RA = Receiver Amplitude

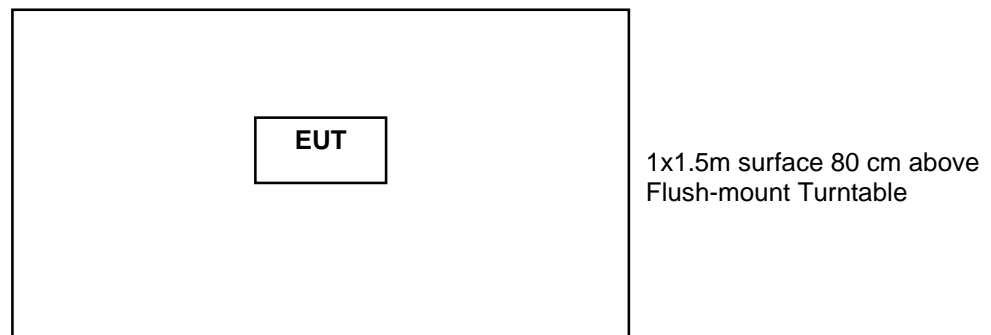
AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

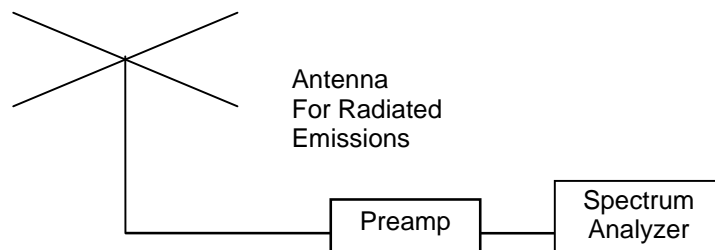
HPF = High pass Filter Loss

**Figure 2. Drawing of Radiated Emissions Setup**



**Notes:**

- AC outlet with low-pass filter at the base of the turntable
- Antenna height varied from 1 to 4 meters
- Distance from antenna to tested system is 3 meters
- Not to Scale



<b>RADIOMETRICS MIDWEST CORPORATION - EMC Test Report</b>
Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

**10.7.2 Spurious Radiated Emissions Test Results (2 to 25 GHz)**

The following spectrum analyzer settings were used.  
 Span = wide enough to fully capture the emission being measured  
 RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz  
 VBW = 1 MHz for peak and 100 Hz for Average  
 Sweep = auto; Detector function = peak; Trace = max hold

Manufacturer	Westell, Inc.	Specification	FCC Part 15 Subpart C & RSS-210
Model	A90-9100EM15-10	Test Date	
Serial Number	09AR03000059	Test Distance	3 Meters
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; BC = Biconical (ANT-3); LP = Log-Periodic (ANT-6); HN = Horn (ANT-13) P = peak; Q = QP		
Notes	Corr. Factors = Cable Loss – Preamp Gain – Duty Cycle Factor + HP Filter Loss		

Emissions above 1 GHz

hrm	Tx	802.11b		802.11g		802.11b		802.11g		Corr.	EUT Emission	Peak	Ave	Peak	Ave	Margin
		Peak	Ave	Peak	Ave	Peak	Ave	Peak	Ave							
#	Freq	Vertical Polarization				Horizontal Polarization				Fact.	Freq MHz	dBuV/m		dBuV/m		Limit
1	2412	95.1	88.7	94.9	85.5	93.9	87.7	93.9	85.7	2	2412	103.1	96.7	N/A	N/A	N/A
be	2412	43.0	36.6	44.7	35.3	41.8	35.6	43.7	35.5	3.5	2389	54.2	46.1	74	54	7.9
2	2412	35.1	25.1	50.6	31.0	35.7	25.6	40.8	30.1	9.4	4824	60.0	40.4	74	54	13.6
3	2412	38.3	28.5	52.4	35.0	38.3	27.7	49.5	35.1	16.7	7236	69.1	51.8	94	54	2.2
4	2412	38.4	28.5	58.4	36.6	38.6	28.4	48.2	37.7	22.3	9648	80.7	60.0	94	74	13.3
5	2412	39.4	28.5	38.7	28.4	38.5	28.4	38.8	28.2	15.8	12060	55.2	44.3	74	54	9.7
6	2412	43.1	27.3	42.8	26.4	45.2	27.6	43.4	28.0	24	14472	69.2	52.0	94	74	22.0
7	2412	42.6	32.1	42.9	31.9	42.6	32.1	42.3	32.1	20.6	16884	63.5	52.7	94	74	21.3
1	2437	95.9	N/A	96.5	N/A	96.7	N/A	94.8	N/A	3.7	2437	106.4	N/A	N/A	N/A	N/A
2	2437	39.0	30.3	40.5	26.9	34.6	24.7	49.3	31.3	9.4	4874	58.7	40.7	74	54	13.3
3	2437	38.3	28.5	38.5	28.7	38.3	28.3	46.7	35.1	16.7	7311	63.4	51.8	74	54	2.2
4	2437	38.7	28.1	38.6	28.3	38.3	28.4	38.5	28.0	22	9748	60.7	50.4	94	74	23.6
5	2437	38.8	29.0	40.2	28.9	39.3	28.7	39.7	28.5	15.9	12185	56.1	44.9	74	54	9.1
6	2437	43.0	32.9	43.6	33.0	43.3	33.2	43.2	33.0	23.9	14622	67.5	57.1	94	74	16.9
7	2437	41.9	31.9	42.3	31.8	41.8	31.9	41.6	31.9	21.6	17059	63.9	53.5	94	74	20.5
1	2462	92.0	86.0	95.0	82.6	97.2	88.5	94.6	84.6	3.8	2462	107.0	98.3	N/A	N/A	N/A
be	2462	41.3	35.3	51.7	39.3	46.5	37.8	51.3	41.3	3.8	2483.5	61.5	51.1	74	54	2.9
2	2462	34.9	28.2	41.2	26.5	34.9	24.3	38.4	24.8	9.4	4924	50.6	37.6	74	54	16.4
3	2462	39.1	28.5	41.2	29.0	38.4	28.5	40.9	28.9	16.9	7386	58.1	45.9	74	54	8.1
4	2462	38.3	27.9	40.2	28.0	38.9	28.3	40.3	27.8	22.1	9848	62.4	50.4	94	74	23.6
5	2462	38.7	28.8	39.0	28.7	38.7	28.8	39.3	28.9	16.1	12310	55.4	45.0	74	54	9.0
6	2462	42.7	32.8	42.7	32.8	43.1	32.9	42.7	32.8	23.5	14772	66.6	56.4	94	74	17.6
7	2462	41.7	32.0	41.8	32.0	42.0	31.9	43.2	32.0	22.7	17234	65.9	54.7	94	74	19.3
Column numbers (see below for explanations)																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

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Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway
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Notes on Columns:

- Column #1. hrm = Harmonic; BE = Band Edge emissions
- Column #2. Frequency of Transmitter.
- Column #3. Columns 3 to 10 are the uncorrected readings from the spectrum analyzer
- Column #11. Corr. Factors = Cable Loss – Preamp Gain + Antenna Factor + High pass filter (for harmonics only)
- Column #12. Frequency of Tested Emission
- Column #13. Highest peak field strength at listed frequency.
- Column #14. Highest Average field strength at listed frequency.
- Column #15. Peak Limit. Non restricted bands limits set to 94 dBuV/m. The fundamental was tested with a direct connect so there is no radiated emissions limit.
- Column #16. Average Limit. Non restricted bands limits set to 74 dBuV/m. There is no fundamental average limit.
- Column #17. The margin (last column) is the worst case margin under the peak or average limits for that row.

No other emissions were detected above 2 GHz.

Judgment: Passed by 2.2 dB

**RADIOMETRICS MIDWEST CORPORATION - EMC Test Report**

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

**10.7.3 Radiated Emissions Below 2 GHz**

Company	Westell, Inc.	Specification	FCC Part 15; Subpart B; Class B
Model	A90-9100EM15-10	Test Date	03-12-2009
Serial Number	09AR03000059	Test Distance	3 Meters
Test Personnel	Joseph Strzelecki	Test Location	Chamber E
Notes	Corr. Factors = cable loss - preamp gain - distance factor.		
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal		
Notes	This is the worst case emissions from the different transmit frequencies		

All emissions Below 2 GHz.

Freq. MHz	Meter Reading dBuV	Antenna		Corr. Factors dB	Field Strength dBuV/m		Margin Under Limit dB
		Factor dB	Pol/ID#		EUT	Limit	
62.8	44.3 P	10.1	H/44	-27.6	26.9	40.0	13.1
65.6	43.6 P	8.8	H/44	-27.5	24.9	40.0	15.1
104.8	40.7 P	11.0	H/44	-27.2	24.6	43.5	18.9
133.6	46.0 P	13.7	H/44	-26.9	32.7	43.5	10.8
150.0	54.0 Q	10.3	H/44	-26.8	37.5	43.5	6.0
163.1	50.6 Q	10.4	H/44	-26.7	34.3	43.5	9.2
165.6	52.0 P	10.3	H/44	-26.7	35.5	43.5	8.0
174.5	50.3 Q	9.4	H/44	-26.7	32.9	43.5	10.6
175.0	50.1 Q	9.4	H/44	-26.7	32.8	43.5	10.7
199.2	48.8 P	10.3	H/44	-26.5	32.6	43.5	10.9
227.8	48.1 P	11.7	H/44	-26.2	33.6	46.0	12.4
250.2	48.1 P	12.5	H/44	-26.1	34.5	46.0	11.5
279.4	47.2 P	13.0	H/44	-26.1	34.1	46.0	11.9
300.6	48.9 P	13.9	H/44	-26.0	36.8	46.0	9.2
350.5	50.3 P	14.9	H/44	-25.5	39.7	46.0	6.3
375.1	45.1 P	15.7	H/44	-25.4	35.4	46.0	10.6
399.8	40.6 P	15.8	H/44	-25.2	31.2	46.0	14.8
449.6	45.0 P	16.7	H/44	-24.5	37.2	46.0	8.8
500.0	44.7 P	17.3	H/44	-24.2	37.8	46.0	8.2
550.0	39.4 P	18.4	H/44	-23.5	34.3	46.0	11.7
650.0	44.5 Q	19.8	H/44	-22.8	41.6	46.0	4.4
700.0	36.6 P	20.4	H/44	-22.9	34.1	46.0	11.9
750.0	39.9 P	20.8	H/44	-22.2	38.4	46.0	7.6
849.0	38.4 P	21.8	H/44	-21.7	38.5	46.0	7.5
899.0	35.5 P	22.6	H/44	-21.4	36.7	46.0	9.3
949.0	35.0 P	22.8	H/44	-21.5	36.4	46.0	9.6
1200.0	35.6 P	24.1	H/44	-21.5	38.2	54.0	15.8
1249.0	36.1 P	24.5	H/44	-21.2	39.4	54.0	14.6
1348.0	36.6 P	25.3	H/44	-20.8	41.1	54.0	12.9
1398.0	35.0 P	25.3	H/44	-20.6	39.7	54.0	14.3
44.0	44.6 P	14.3	V/44	-27.8	31.1	40.0	8.9
50.0	48.5 Q	13.4	V/44	-27.7	34.2	40.0	5.8
50.4	48.9 P	13.3	V/44	-27.7	34.5	40.0	5.5
61.9	54.2 Q	9.3	V/44	-27.6	35.9	40.0	4.1

**RADIOMETRICS MIDWEST CORPORATION - EMC Test Report**

Testing of the Westell, Model A90-9100EM15-10, Dual Moca 4-port Ethernet WIFI Gateway

Freq. MHz	Meter Reading dBuV	Antenna		Corr. Factors dB	Field Strength dBuV/m		Margin Under Limit dB
		Factor dB	Pol/ID#		EUT	Limit	
62.4	54.2 Q	9.2	V/44	-27.6	35.8	40.0	4.2
67.5	54.5 Q	7.2	V/44	-27.5	34.2	40.0	5.8
68.9	54.0 Q	6.8	V/44	-27.5	33.3	40.0	6.7
71.2	54.9 P	6.6	V/44	-27.5	34.1	40.0	5.9
74.0	53.3 P	6.5	V/44	-27.4	32.4	40.0	7.6
81.6	53.7 P	7.3	V/44	-27.4	33.7	40.0	6.3
98.4	54.0 P	10.2	V/44	-27.2	37.0	43.5	6.5
102.0	48.3 P	10.8	V/44	-27.2	31.9	43.5	11.6
106.8	51.0 P	11.9	V/44	-27.1	35.7	43.5	7.8
138.0	51.9 P	12.3	V/44	-26.9	37.3	43.5	6.2
149.6	52.8 P	10.7	V/44	-26.8	36.7	43.5	6.8
174.8	51.0 P	9.7	V/44	-26.7	34.0	43.5	9.5
184.4	51.7 P	9.5	V/44	-26.7	34.5	43.5	9.0
199.2	52.3 P	10.1	V/44	-26.5	35.9	43.5	7.6
218.0	48.7 P	11.5	V/44	-26.3	33.9	46.0	12.1
239.6	46.8 P	12.5	V/44	-26.1	33.2	46.0	12.8
250.2	48.3 P	12.5	V/44	-26.1	34.7	46.0	11.3
293.4	45.7 P	13.0	V/44	-26.1	32.6	46.0	13.4
300.6	45.5 P	13.4	V/44	-26.0	32.9	46.0	13.1
375.1	49.6 P	15.7	V/44	-25.4	39.9	46.0	6.1
399.8	46.3 P	15.5	V/44	-25.2	36.6	46.0	9.4
449.6	47.0 P	16.4	V/44	-24.5	38.9	46.0	7.1
460.2	42.7 P	16.4	V/44	-24.4	34.6	46.0	11.4
500.0	44.1 P	16.8	V/44	-24.2	36.7	46.0	9.3
550.0	40.9 P	17.6	V/44	-23.5	35.0	46.0	11.0
572.0	40.1 P	18.2	V/44	-23.5	34.8	46.0	11.2
650.0	44.0 Q	19.3	V/44	-22.8	40.5	46.0	5.5
750.0	35.2 P	20.1	V/44	-22.2	33.0	46.0	13.0
800.0	34.2 P	20.7	V/44	-22.1	32.8	46.0	13.2
899.0	35.3 P	21.5	V/44	-21.4	35.4	46.0	10.6
949.0	37.2 P	21.6	V/44	-21.5	37.3	46.0	8.7
999.0	38.0 P	22.4	V/44	-21.5	38.9	54.0	15.1
1150.0	38.1 P	23.3	V/44	-21.7	39.7	54.0	14.3
1150.0	37.0 P	23.3	V/44	-21.7	38.5	54.0	15.5
1200.0	39.8 P	23.6	V/44	-21.5	41.9	54.0	12.1
1249.0	36.4 P	23.9	V/44	-21.2	39.1	54.0	14.9
1299.0	37.0 P	24.0	V/44	-21.0	40.0	54.0	14.0
1398.0	40.0 P	24.5	V/44	-20.6	43.9	54.0	10.1
1448.0	38.5 P	25.0	V/44	-20.5	43.0	54.0	11.0
1497.0	35.5 P	25.4	V/44	-20.3	40.7	54.0	13.3
1500.0	36.5 P	25.4	V/44	-20.3	41.6	54.0	12.4
1550.0	35.8 P	25.6	V/44	-20.0	41.3	54.0	12.7
1600.0	34.5 P	26.0	V/44	-19.8	40.7	54.0	13.3
1650.0	34.1 P	26.5	V/44	-19.6	41.0	54.0	13.0

Judgment: Passed by 4.1 dB