AIR-AP1242AG-A-K9

Cisco Aironet 1242AG Series IEEE 802.11a/b/g Access Point

Against the following Specifications :

CFR47 Parts 15.247

RSS-210

Cisco Systems

EMC Laboratory

170 West Tasman Drive

San Jose, CA 95134

ACCREDITED

Certificate Number : 1178-01

Author: James Nicholson

Approved By:

Title:

This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

Section 1: Overview

Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following standards:

Emissions:
CFR47 Part 15.247
CFR47 Part 15.407
RSS-210

Notes:

1) Where a specification listed on the front cover of this report has deviations from the basic standards listed above, the additional technical requirements of the specification were also assessed.
2) Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
3) Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.
4) For Radiated and Conducted emissions results refer to section 2.9 for measurement uncertainty considerations
5) Where applicable, details of the precise distance used when performing radiated immunity measurements can be found in Cisco document EDCS-221012.
6) Where testing has been performed to EN61000-4-3, additional measurements were conducted to establish the field strength at a 40cm height in both the horizontal and vertical antenna polarities (applies to floor standing EUT's only). This field strength data can be found in Cisco document ENG-72588.

Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on the samples submitted.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal Government.

This report may contain data that are not covered by the A2LA accreditation (Certificate number 1178-01). Please refer to Appendix F for further details.

With regard to this assessment, the following points should be noted:

a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.

b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.

c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).

d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%

*[Where applicable] For ESD testing the humidity limits used were 30% to 60% and for EFT/B tests the humidity limits used were 25% to 75%.

e) All AC testing was performed at one or more of the following supply voltages:
110V (+/-10%) 60Hz
220V (+/-10%) 50 or 60Hz

f) Cisco Systems Inc., are accredited by the American Association for Laboratory Accreditation (A2LA). For the specific scope of accreditation under certificate number 1178-01.see appendix F for further details.

This report must not be reproduced except in full, without written approval of Cisco Systems.

2.2 Date of start of testing

25-Apr-2005

2.3 Report Issue Date

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.,
170 West Tasman Drive
San Jose, CA 95134,
USA

Test Engineers

James Nicholson

2.5 Equipment Assessed (EUT)

AIR-AP1242AG-x-K9 Cisco Aironet 1242AG Series IEEE 802.11a/b/g Access Point

2.6 EUT Description

The AIR-AP1242AG-x-K9 access point operates simultaneously in both the 2.4 and 5 GHz spectrum, to provide data rates up to 54 Mbps in each band in accordance with IEEE 802.11a and 802.11g standards, including backwards compatibility to 802.11b. AIR-AP1242AG-x-K9 supports both inline power and local power, and ships with a power supply brick.

2.7 Scope of Assessment

Tests have been performed in accordance with the relevant Test and Assessment Plan (TAP), a copy of which is contained in Appendix H of this report, and the relevant Cisco EMC compliance test procedures (ENG-23438). This test report may not cover all of the tests highlighted in the test plan.

2.8 Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, these are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in dBuV and current in dBuA.

As an example, the basic calculation for all measurements is as follows:

Emission level [dBuV] = Indicated voltage level [dBuV] + Cable Loss [dB] + Other correction factors [dB]

The components of factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss, Current Probe Factors.

Note: to convert the results from dBuV/m to uV/m use the following formula:-

Level in uV/m = Common Antilogarithm [(X dBuV/m)/20] = Y uV/m

2.9 Measurement Uncertainty

Where relevant measurement uncertainty levels have been estimated for tests performed on the apparatus. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Radiated emissions (expanded uncertainty, confidence interval 95%)

10kHz - 30 MHz	+/- 2.8 dB (E Field)
10kHz - 30 MHz	+/- 2.8 dB (H Field)
30 MHz - 300 MHz	+/- 3.8 dB
300 MHz - 1000 MHz	+/- 4.3 dB
1 GHz - 10 GHz	+/- 4.0 dB
10 GHz - 18GHz	+/- 8.2 dB
18GHz - 26.5GHz	+/- 4.1 dB
26.5GHz - 40GHz	+/- 3.9 dB

Conducted emissions (expanded uncertainty, confidence interval 95%)

4 kHz - 30 MHz	+/- 2.2 dB (using Current Probe)
9 kHz - 150 kHz	+/- 4.1 dB (using LISN)

10 kHz - 30 MHz	+/- 2.6 dB (using Current Probe)
150 kHz - 30 MHz	+/- 3.7 dB (using LISN)
150 kHz - 30 MHz	+/- 3.1 dB (using CDN)
150 kHz - 30 MHz	Under Consideration (Using CVP-1)

Conducted Immunity (expanded uncertainty, confidence interval 95%)

10 kHz - 30 MHz	+/- 0.9 dB (using bulk current injection)

Radiated Immunity (expanded uncertainty, confidence interval 95%)

10 kHz - 30 MHz	+/- 2.0 dB
30 MHz - 80 MHz	+/- 2.8 dB
80 MHz - 1000 MHz	+/- 2.9 dB
1 GHz - 10.0 GHz	+/- 4.1 dB

ESD, EFT/B and Surge tests
The tests are performed within the tolerance specified by IEC61000-4-2, IEC61000-4-3 and IEC61000-4-5 respectively

A product is considered to comply with a requirement if the nominal measured value is below the limit line. The product is considered to not be in compliance in case the nominal measured value is above the limit line. For further explanation refer to Cisco Systems Inc Measurement Uncertainty Document: ENG-4001 8

2.10 Report Template Revision No.

Revision: CRA 12.0

Section 3: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the "Justification for worst Case test Configuration" section of this report for further details on the selection of EUT samples.

3.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	AIR-AP1242AG-A-K9	FHH0916W088	
S02	AIR-ANT2410Y-R		
S03	AIR-ANT3549		
S04	AIR-ANT1728		
S07	34-1977-03		

The following antennas are included in this filing:

AIR-ANT1728	2.4 GHz 5.2 dBi Omnidirectional
AIR-ANT2506	2.4 GHz 5.2 dBi Omnidirectional
AIR-ANT3213	2.4 GHz 5.2 dBi Diversity Omnidirectional
AIR-ANT4941	2.4 GHz 2.2 dBi Dipole
AIR-ANT5959	2.4 GHz 2.0 dBi Diversity Omnidirectional
AIR-ANT3549	2.4 GHz 9.0 dBi Patch
AIR-ANT2012	2.4 GHz 6.5 dBi Diversity Patch
AIR-ANT1729	2.4 GHz 6.0 dBi Patch
AIR-ANT2410Y-R	2.4 GHz 10.0 dBi Yagi

3.2 System Details

System #	Description	Samples
1	AIR-AP1242AG-A-K9 with 2.4GHz 10dBi Yagi Antenna	S01, S02 and S07
2	AIR-AP1242AG-A-K9 with 2.4GHz 9dBi Patch Antenna	S01, S03 and S07
3	AIR-AP1242AG-A-K9 with 2.4GHz 5.2dBi Omnidirectional Antenna	S01, S04 and S07
7	AIR-AP1242AG-A-K9	S01 and S07

3.3 Mode of Operation Details

Mode#	Description	Comments
1	2.4GHz Band Edge	2.4 GHz Band edge tests
2	2.4GHz Spurious	2.4GHz Spurious Emissions Tests
6	Conducted Tests	Radio parameter conducted tests

Appendix A: Formal Emission Test Results

2.4GHz Average Output Power

Test Number: 16395				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
FCC Average Output Power	RF Ports	N/A	2400-2483.5MHz	Average Output Power
Operating Mode	**Mode :** 6, Conducted Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
7	AIR-AP1242AG-A-K9	S01 and S07	☑	☐

Subtest Number: 16395 - 1	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Average Power, 2412MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Comments on the above Test Results	Actual Average Power - 19.6dBm

Subtest Number: 16395 - 2	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Average Power, 2412MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Comments on the above Test Results	Actual Average Power - 16.8dBm

Subtest Number: 16395 - 3	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Average Power, 2437MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Comments on the above Test Results	Actual Average Power - 19.7dBm

Subtest Number: 16395 - 4	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Average Power, 2437MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Comments on the above Test Results	Actual Average Power - 16.8dBm

Subtest Number: 16395 - 5	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Average Power, 2462MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Comments on the above Test Results	Actual Average Power - 19.6dBm

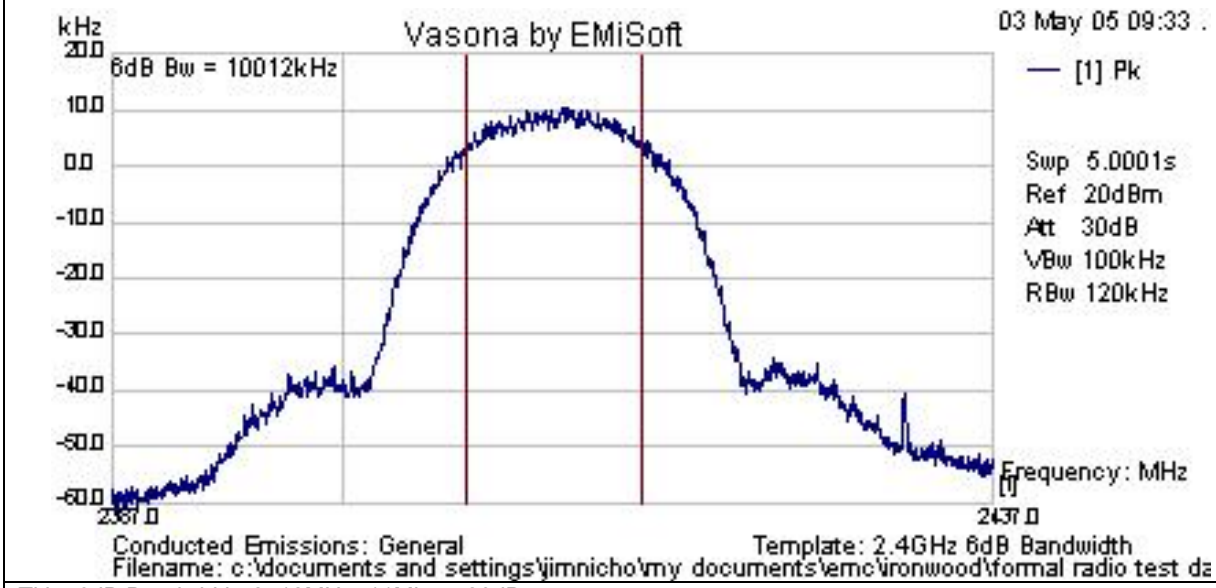
Subtest Number: 16395 - 6	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Average Power, 2462MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Comments on the above Test Results	Actual Average Power - 16.8dBm

2.4GHz 6dB Bandwidth

Test Number: 16405				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247(a) 2	RF Ports	N/A	2400-2483.5MHz	Systems using digital modulation techniques may operate in the 2400-2483.5 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.
Operating Mode	**Mode :** 6, Conducted Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
7	AIR-AP1242AG-A-K9	S01 and S07	☑	☐

Subtest Number: 16405 - 1	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	6dB Bandwidth, 2412MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2437.0
Lowest Frequency	2387.0
Comments on the above Test Results	No further comments

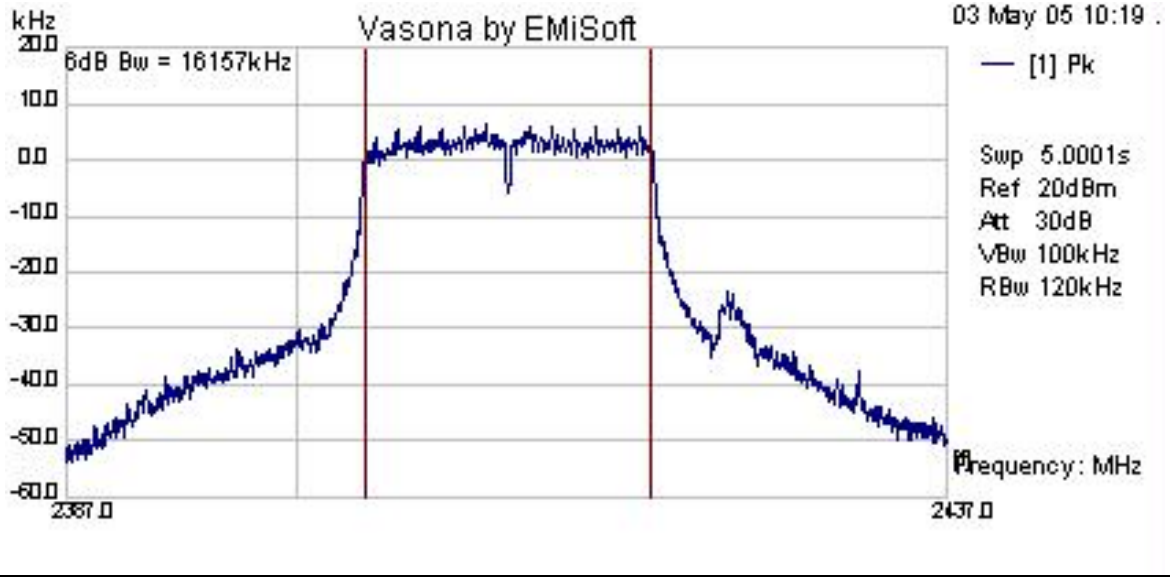


Title: 6dB Bandwidth, 2412MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	6dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2412	9.8	0.6	0	10.4	6dB Bw	10012	RF	500	-9512.5	Pass	at 2412.`

Subtest Number: 16405 - 2	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	6dB Bandwidth, 2412MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2437.0
Lowest Frequency	2387.0
Comments on the above Test Results	No further comments

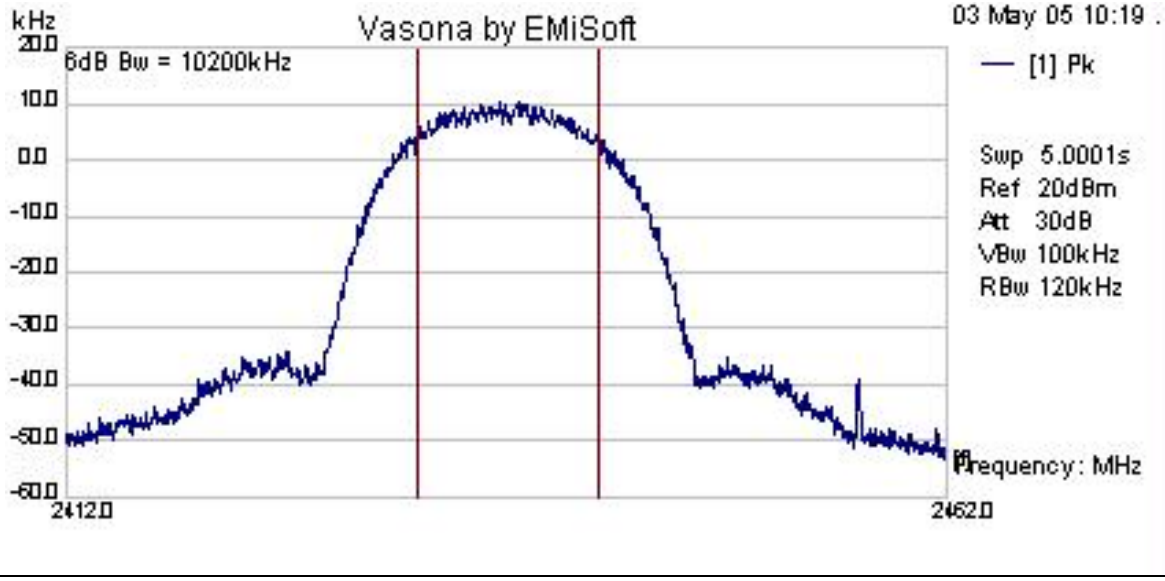


Title: 6dB Bandwidth, 2412MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	6dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2412	6	0.6	0	6.6	6dB Bw	16157	RF	500	-15657.2	Pass	at 2412.`

Subtest Number: 16405 - 3	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	6dB Bandwidth, 2437MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2462.0
Lowest Frequency	2412.0
Comments on the above Test Results	No further comments

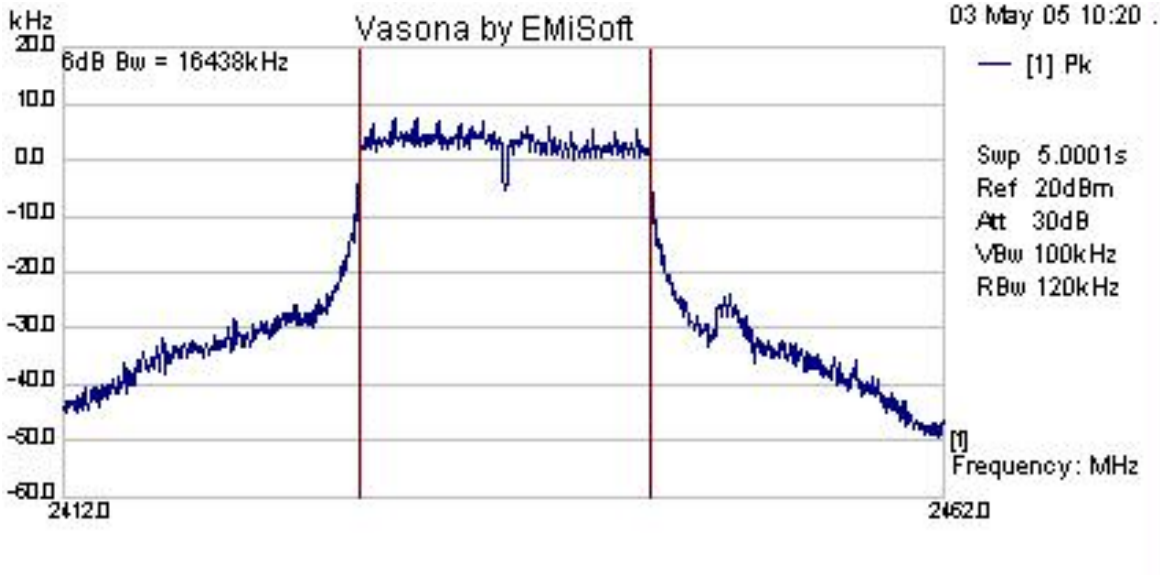


Title: 6dB Bandwidth, 2437MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	6dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2437	9.6	0.6	0	10.2	6dB Bw	10200	RF	500	-9699.6	Pass	at 2437.`

Subtest Number: 16405 - 4	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	6dB Bandwidth, 2437MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2462.0
Lowest Frequency	2412.0
Comments on the above Test Results	No further comments

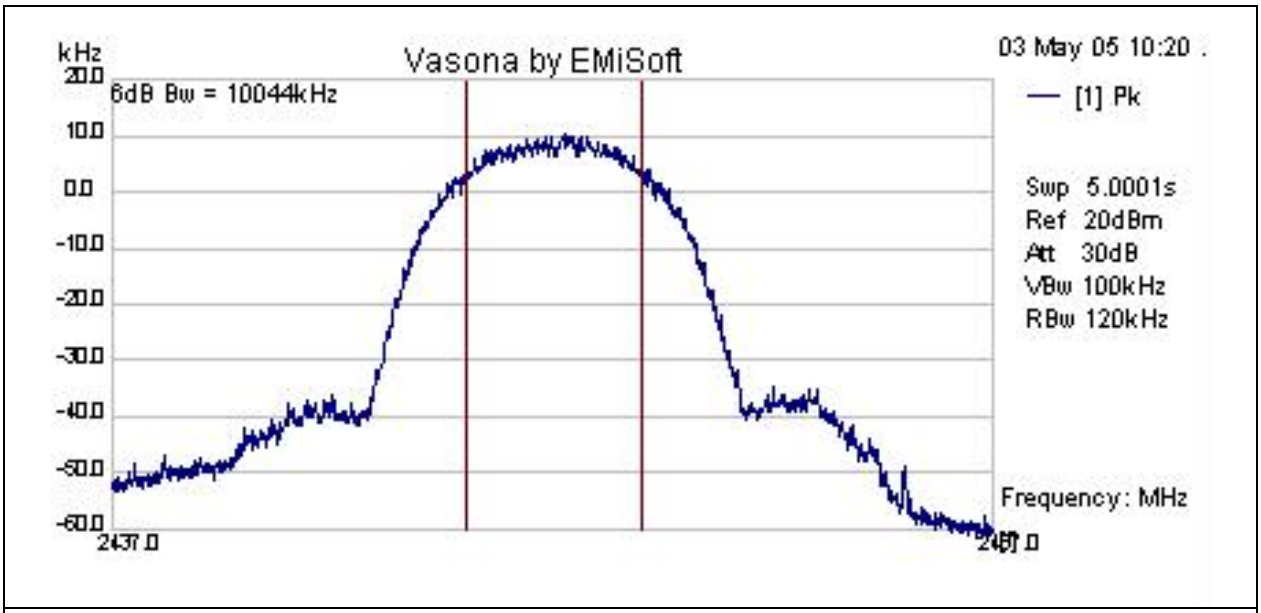


Title: 6dB Bandwidth, 2437MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	6dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2437	6.9	0.6	0	7.4	6dB Bw	16438	RF	500	-15937.9	Pass	at 2437.`

Subtest Number: 16405 - 5	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	6dB Bandwidth, 2462MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2487.0
Lowest Frequency	2437.0
Comments on the above Test Results	No further comments

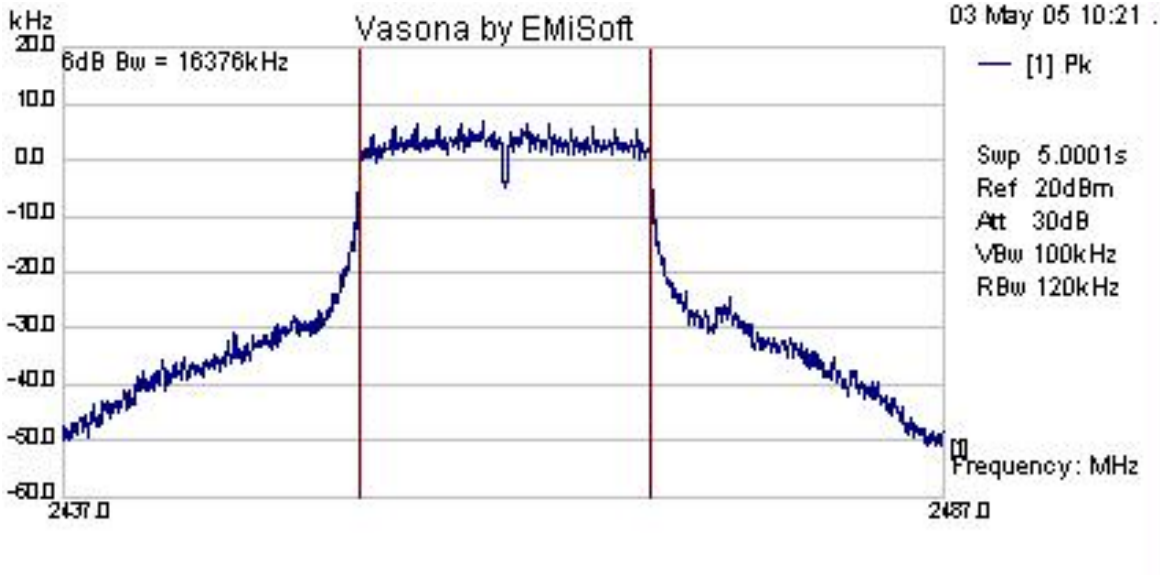


Title: 6dB Bandwidth, 2462MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	6dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2462	9.6	0.6	0	10.1	6dB Bw	10044	RF	500	-9543.7	Pass	at 2462.`

Subtest Number: 16405 - 6	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	6dB Bandwidth, 2462MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2487.0
Lowest Frequency	2437.0
Comments on the above Test Results	No further comments



Title: 6dB Bandwidth, 2462MHz, 54Mbps, 17dBm

Test Results Table

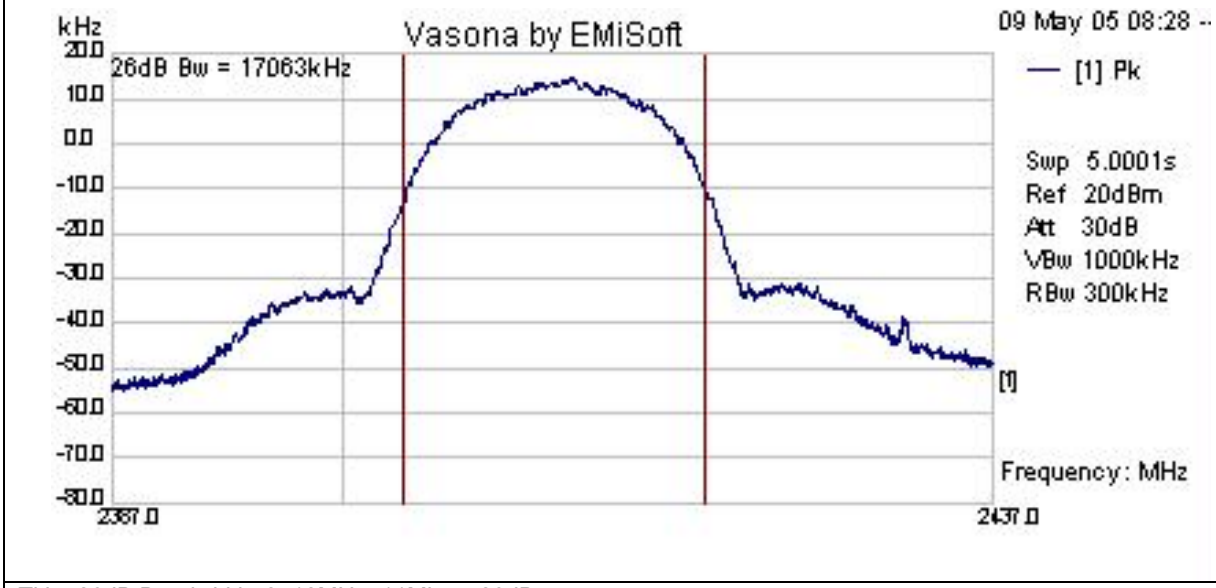
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	6dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2462	6.2	0.6	0	6.8	6dB Bw	16376	RF	500	-15875.6	Pass	at 2462.`

2.4GHz 26dB Bandwidth

Test Number: 16409				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	RF Ports	N/A	2400-2483.5MHz	26dB bandwidth
Operating Mode	**Mode :** 6, Conducted Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
7	AIR-AP1242AG-A-K9	S01 and S07	☑	☐

Subtest Number: 16409 - 1	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	26dB Bandwidth, 2412MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2437.0
Lowest Frequency	2387.0
Comments on the above Test Results	No further comments

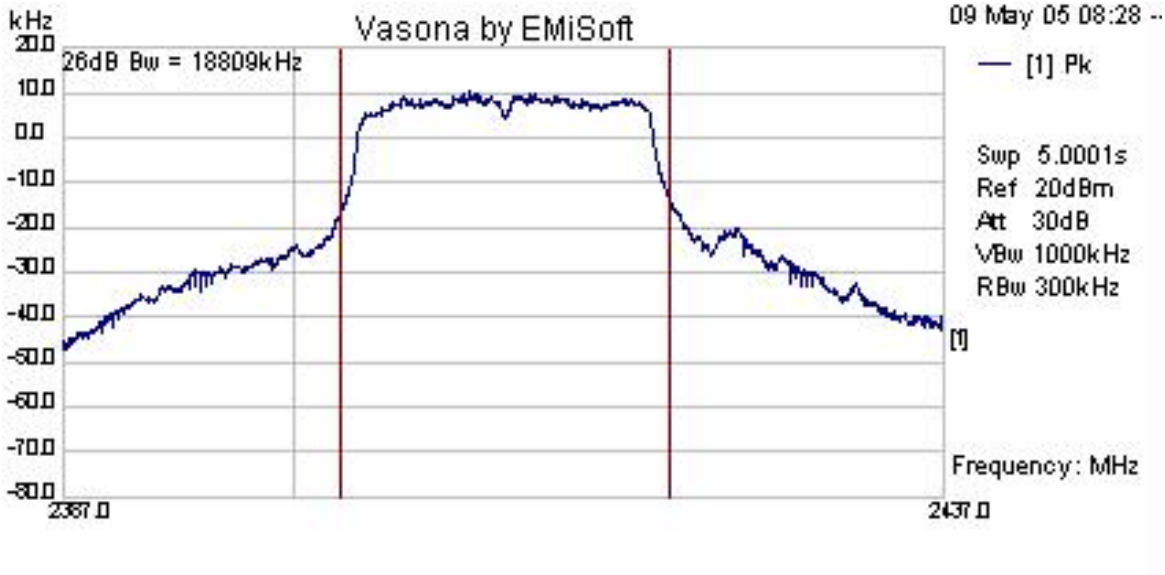


Title: 26dB Bandwidth, 2412MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	26dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2412	14.1	0.6	0	14.7	26dB BW	17063	RF	500	-16563	Pass	at 2412.`

Subtest Number: 16409 - 2	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	26dB Bandwidth, 2412MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2437.0
Lowest Frequency	2387.0
Comments on the above Test Results	No further comments

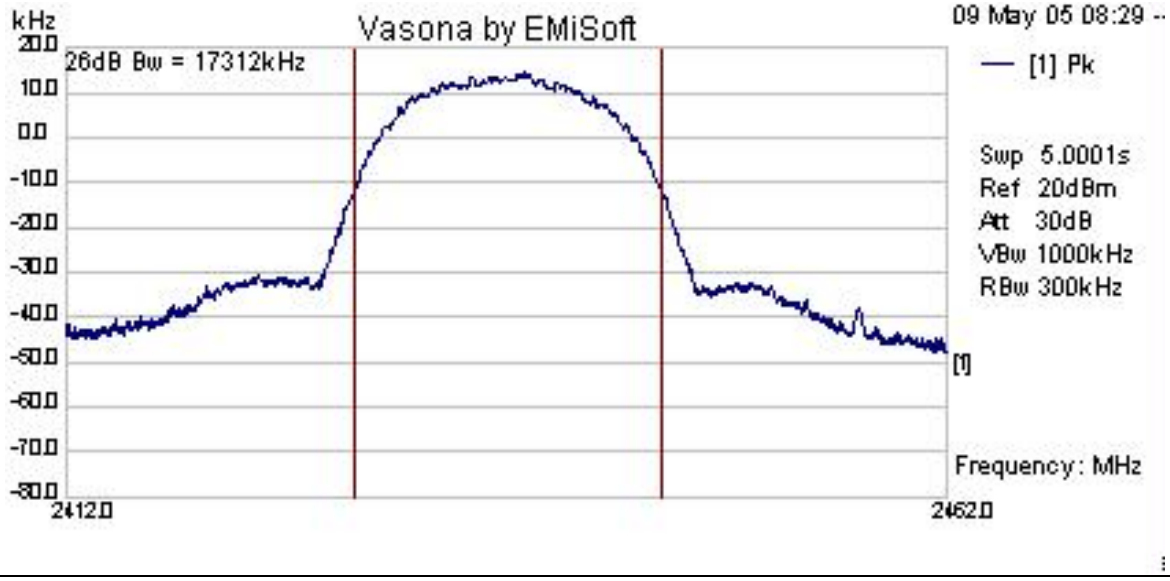


Title: 26dB Bandwidth, 2412MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	26dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2412	9.6	0.6	0	10.2	26dB BW	18809	RF	500	-18309	Pass	at 2412.`

Subtest Number: 16409 - 3	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	26dB Bandwidth, 2437MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2462.0
Lowest Frequency	2412.0
Comments on the above Test Results	No further comments

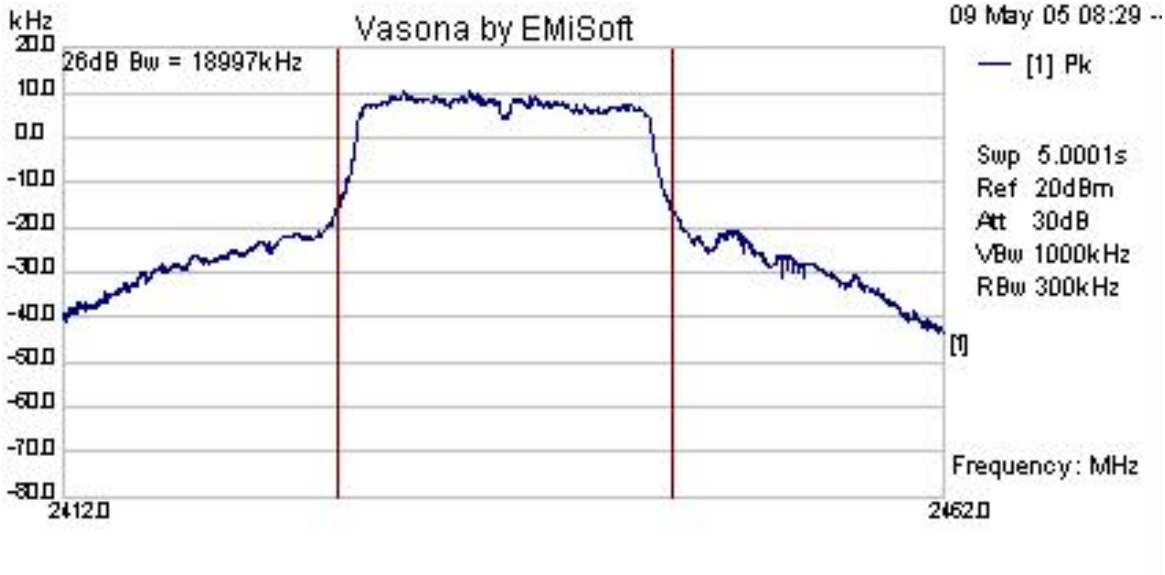


Title: 26dB Bandwidth, 2437MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	26dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2437	13.9	0.6	0	14.5	26dB BW	17312	RF	500	-16812	Pass	at 2437.`

Subtest Number: 16409 - 4	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	26dB Bandwidth, 2437MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2462.0
Lowest Frequency	2412.0
Comments on the above Test Results	No further comments

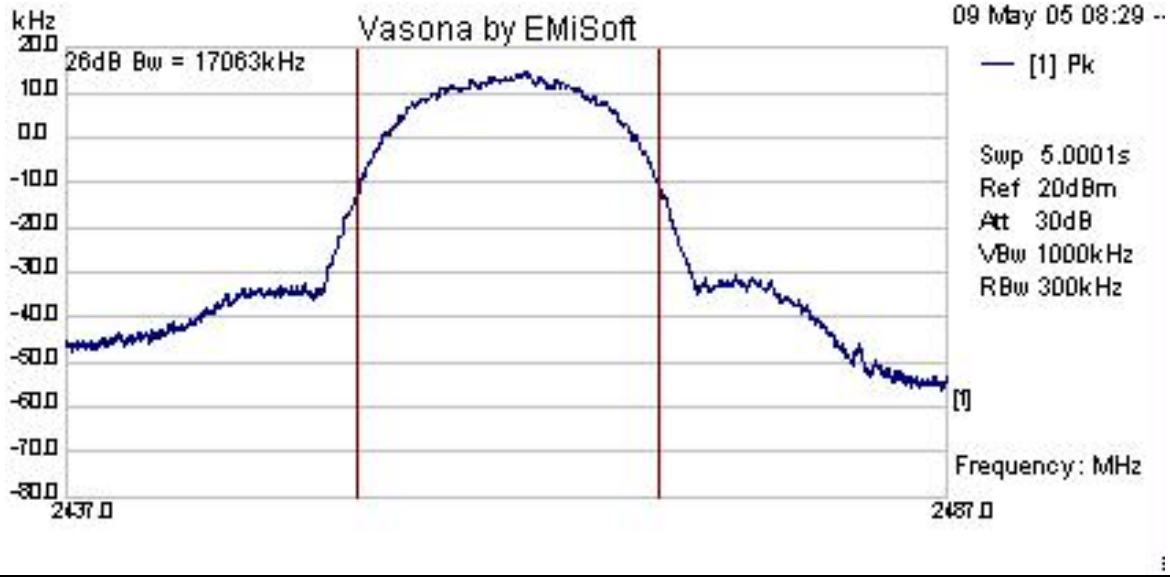


Title: 26dB Bandwidth, 2437MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	26dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2437	9.6	0.6	0	10.2	26dB BW	18997	RF	500	-18497	Pass	at 2437.`

Subtest Number: 16409 - 5	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	26dB Bandwidth, 2462MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2487.0
Lowest Frequency	2437.0
Comments on the above Test Results	No further comments

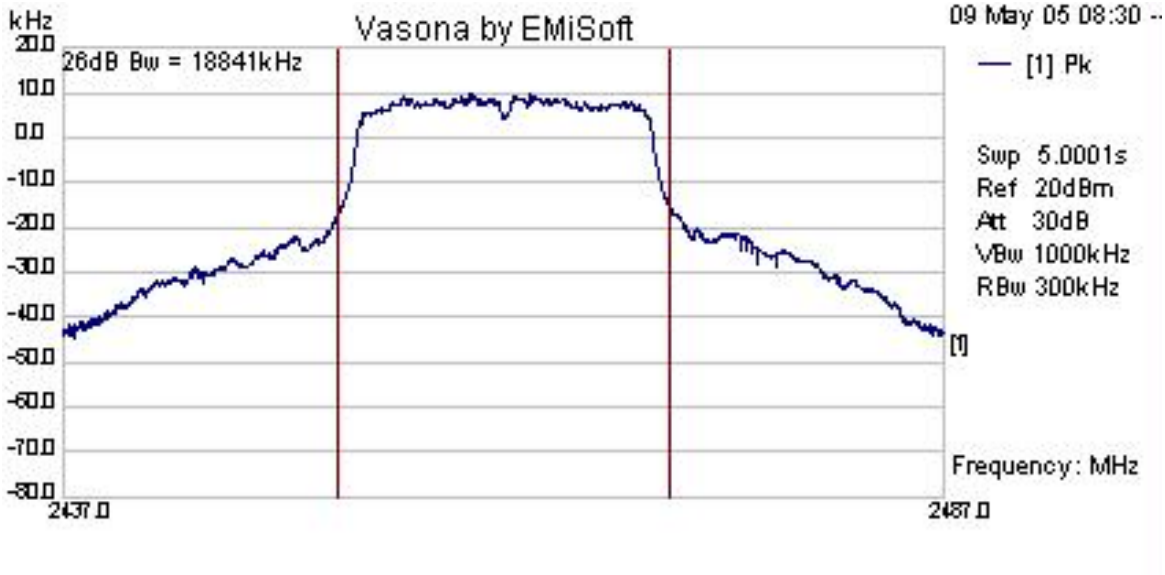


Title: 26dB Bandwidth, 2462MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	26dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2462	14	0.6	0	14.6	26dB BW	17063	RF	500	-16563	Pass	at 2462.`

Subtest Number: 16409 - 6	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	26dB Bandwidth, 2462MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2487.0
Lowest Frequency	2437.0
Comments on the above Test Results	No further comments



Title: 26dB Bandwidth, 2462MHz, 54Mbps, 17dBm

Test Results Table

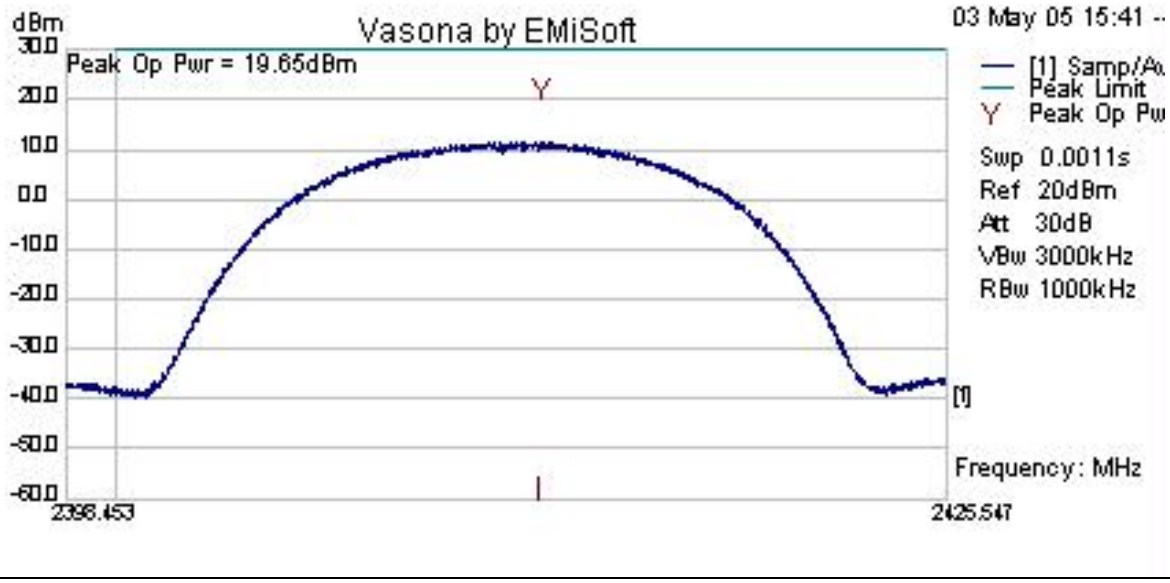
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	26dB Bw kHz	Line	Limit kHz	Margin kHz	Pass /Fail	Comments
2462	9.2	0.6	0	9.8	26dB BW	18841	RF	500	-18341	Pass	at 2462.`

2.4GHz Peak Transmit Power

Test Number: 16410				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.47	RF Ports	N/A	2400-2483.5MHz	The maximum peak output power of the intentional radiator for systems using digital modulation in the 2400-2483.5 MHz band shall not exceed 1 Watt.
Operating Mode	**Mode :** 6, Conducted Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
7	AIR-AP1242AG-A-K9	S01 and S07	☑	☐

Subtest Number: 16410 - 1	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Peak Transmit Power, 2412MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2425.547
Lowest Frequency	2398.453
Comments on the above Test Results	Peak Transmit Power Limit =30dBm-(10dBi-6dBi)= 26dBm

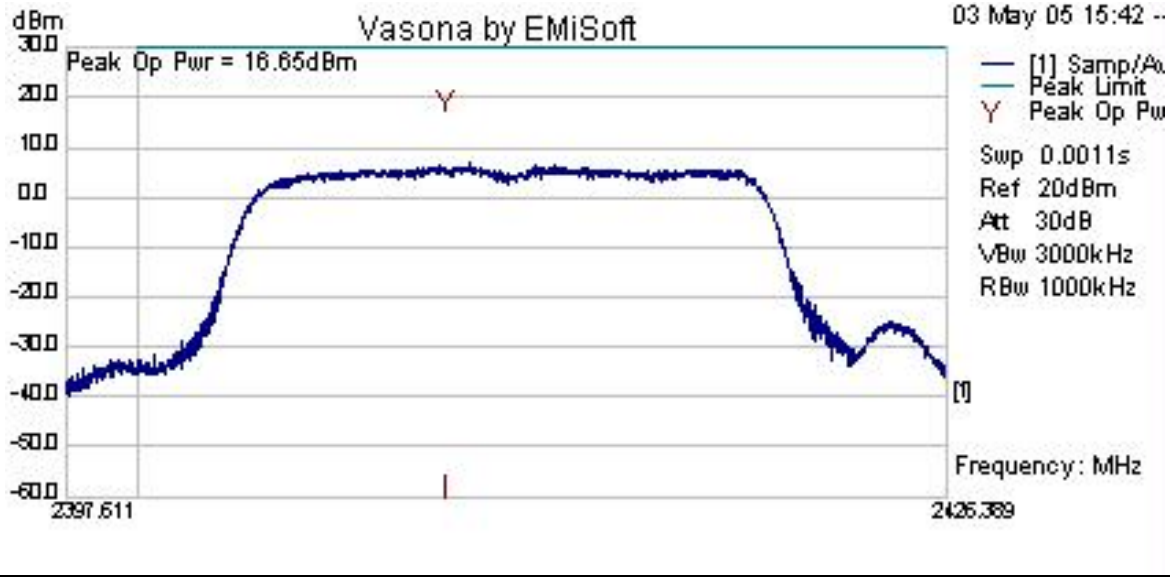


Title: Peak Transmit Power, 2412MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Peak Op Pwr dBm	Measurement Type	26dB Bw kHz	Line	Limit dBm	Margin dBm	Pass /Fail	Comments
2412.98	19.65	Peak Op	17094	RF	30	-10.4	Pass	at 2412.`

Subtest Number: 16410 - 2	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Peak Transmit Power, 2412MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2426.389
Lowest Frequency	2397.611
Comments on the above Test Results	Peak Transmit Power Limit =30dBm-(10dBi-6dBi)= 26dBm

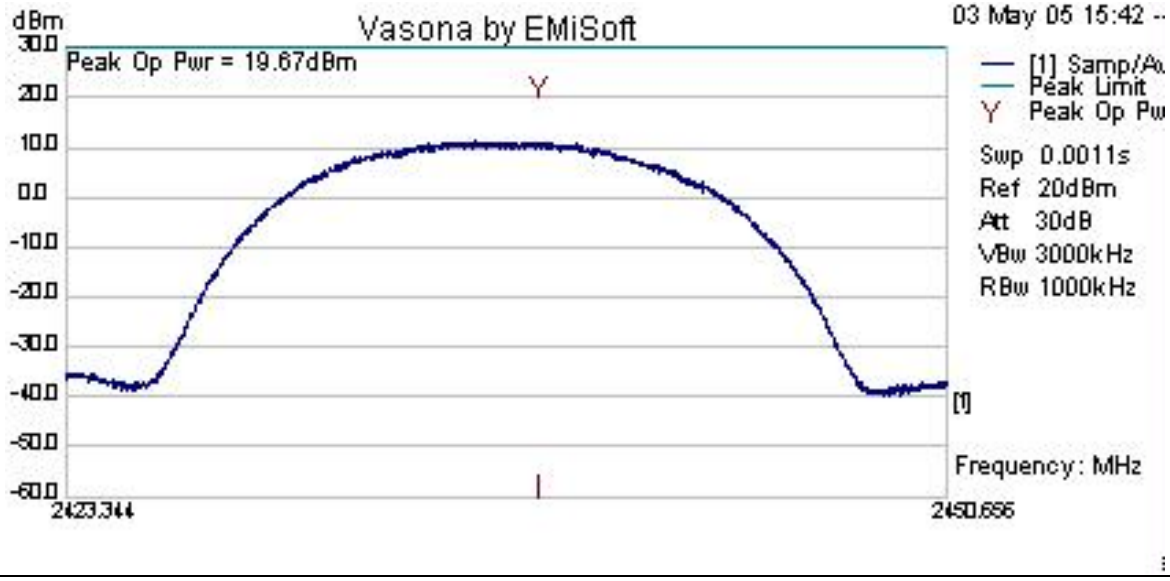


Title: Peak Transmit Power, 2412MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Peak Op Pwr dBm	Measurement Type	26dB Bw kHz	Line	Limit dBm	Margin dBm	Pass /Fail	Comments
2409.96	16.65	Peak Op	18778	RF	30	-13.4	Pass	at 2412.`

Subtest Number: 16410 - 3	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Peak Transmit Power, 2437MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2450.656
Lowest Frequency	2423.344
Comments on the above Test Results	Peak Transmit Power Limit =30dBm-(10dBi-6dBi)= 26dBm

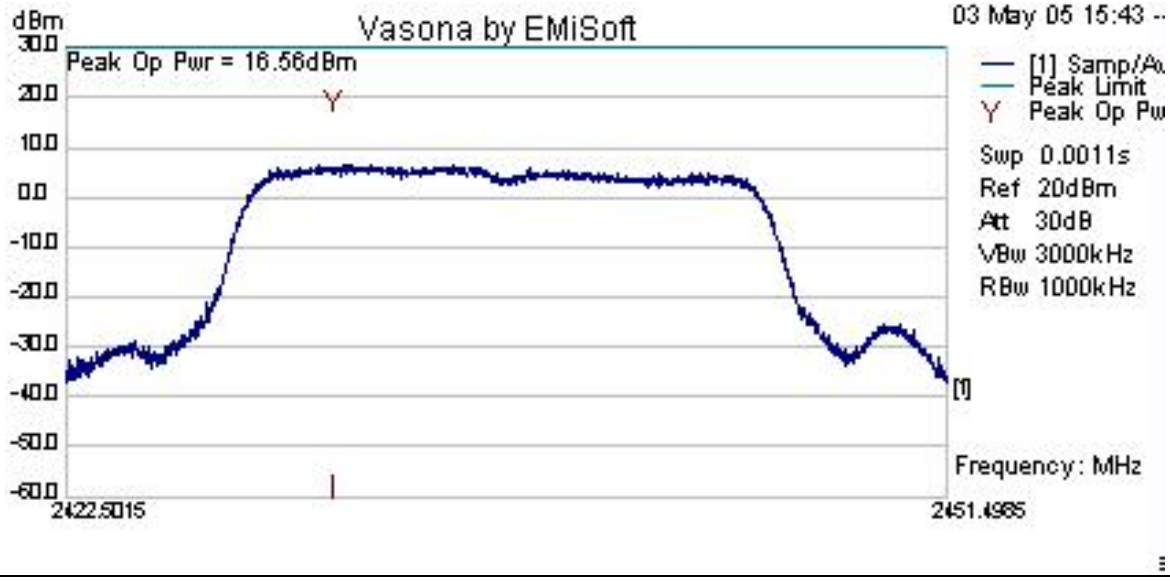


Title: Peak Transmit Power, 2437MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Peak Op Pwr dBm	Measurement Type	26dB Bw kHz	Line	Limit dBm	Margin dBm	Pass /Fail	Comments
2437.98	19.67	Peak Op	17312	RF	30	-10.3	Pass	at 2437.`

Subtest Number: 16410 - 4	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Peak Transmit Power, 2437MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2451.499
Lowest Frequency	2422.502
Comments on the above Test Results	Peak Transmit Power Limit =30dBm-(10dBi-6dBi)= 26dBm

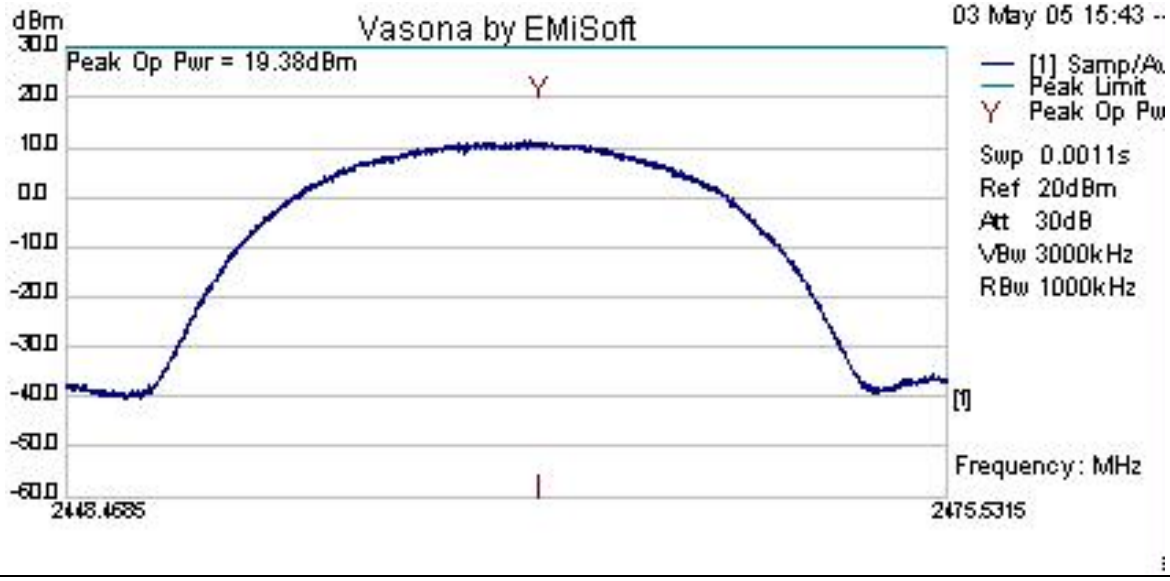


Title: Peak Transmit Power, 2437MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Peak Op Pwr dBm	Measurement Type	26dB Bw kHz	Line	Limit dBm	Margin dBm	Pass /Fail	Comments
2431.25	16.56	Peak Op	18997	RF	30	-13.4	Pass	at 2437.`

Subtest Number: 16410 - 5	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Peak Transmit Power, 2462MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2475.532
Lowest Frequency	2448.469
Comments on the above Test Results	Peak Transmit Power Limit =30dBm-(10dBi-6dBi)= 26dBm

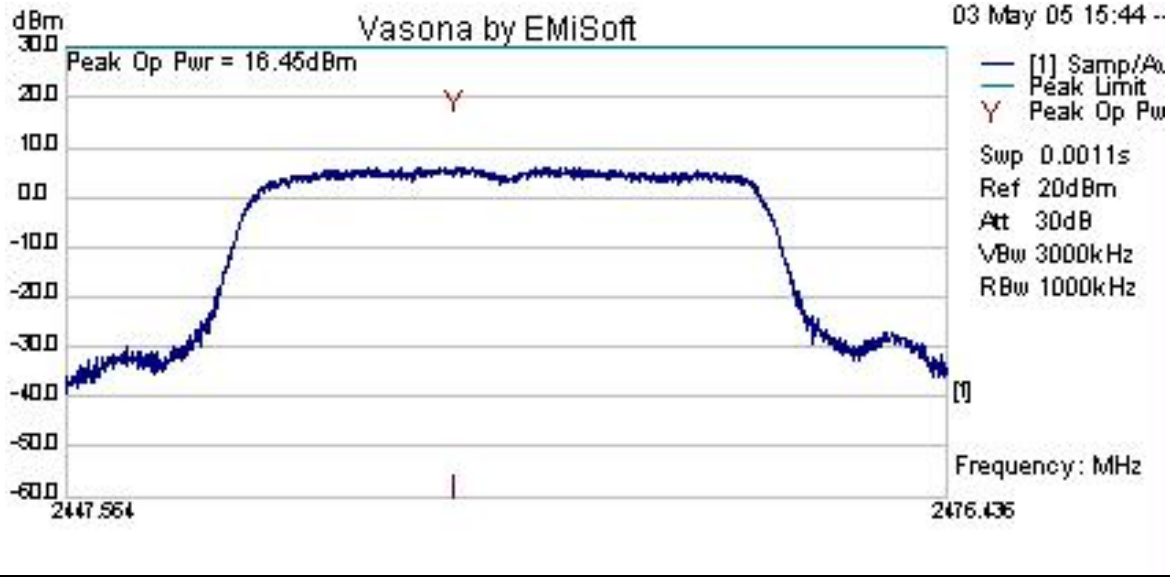


Title: Peak Transmit Power, 2462MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Peak Op Pwr dBm	Measurement Type	26dB Bw kHz	Line	Limit dBm	Margin dBm	Pass /Fail	Comments
2462.95	19.38	Peak Op	17063	RF	30	-10.6	Pass	at 2462.`

Subtest Number: 16410 - 6	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Peak Transmit Power, 2462MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2476.436
Lowest Frequency	2447.564
Comments on the above Test Results	Peak Transmit Power Limit =30dBm-(10dBi-6dBi)= 26dBm



Title: Peak Transmit Power, 2462MHz, 54Mbps, 17dBm

Test Results Table

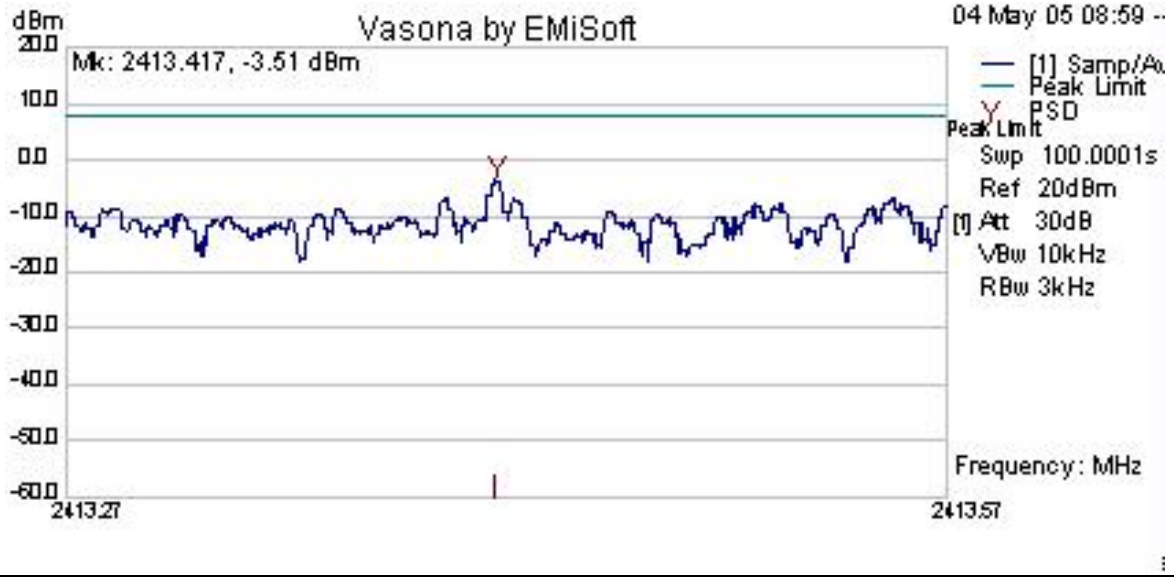
Frequency MHz	Peak Op Pwr dBm	Measurement Type	26dB Bw kHz	Line	Limit dBm	Margin dBm	Pass /Fail	Comments
2460.21	16.45	Peak Op	18872	RF	30	-13.6	Pass	at 2462.`

2.4GHz Power Spectral Density

Test Number: 16411				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	RF Ports	N/A	2400-2483.5MHz	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
Operating Mode	**Mode :** 6, Conducted Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	**Description**	**Samples**	**System under test**	**Support equipment**
7	AIR-AP1242AG-A-K9	S01 and S07	☑	☐

Subtest Number: 16411 - 1	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Power Spectral Density, 2412MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2413.57
Lowest Frequency	2413.27
Comments on the above Test Results	No further comments

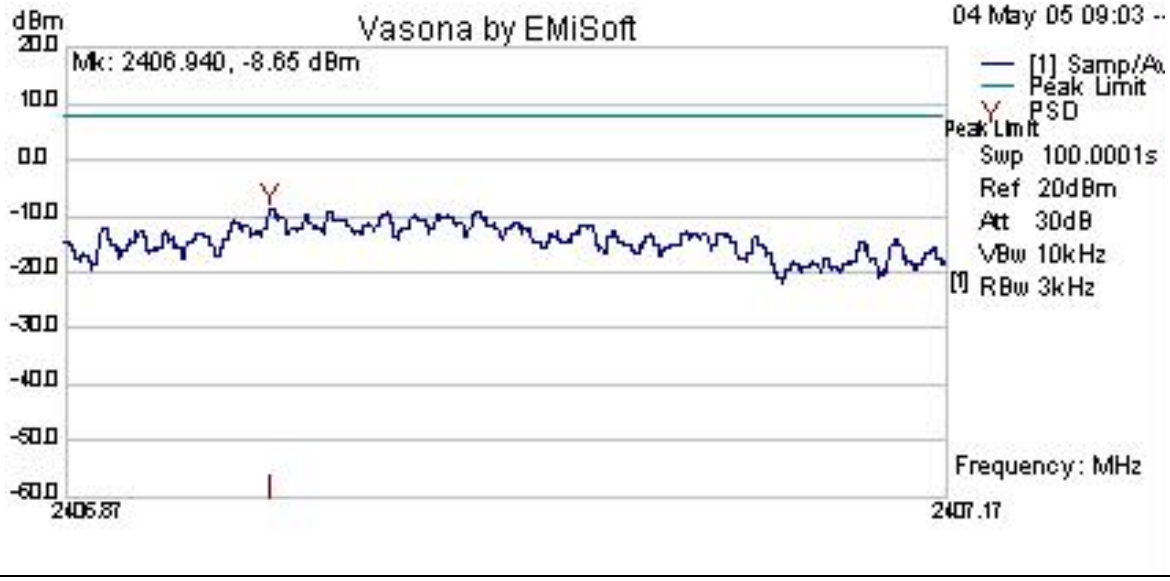


Title: Power Spectral Density, 2412MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2413.417	-4.1	0.6	0	-3.5	PSD	RF	8	-11.5	Pass	at 2412.`

Subtest Number: 16411 - 2	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Power Spectral Density, 2412MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2407.17
Lowest Frequency	2406.87
Comments on the above Test Results	No further comments



Title: Power Spectral Density, 2412MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2406.94	-9.2	0.6	0	-8.6	PSD	RF	8	-16.6	Pass	at 2412.`

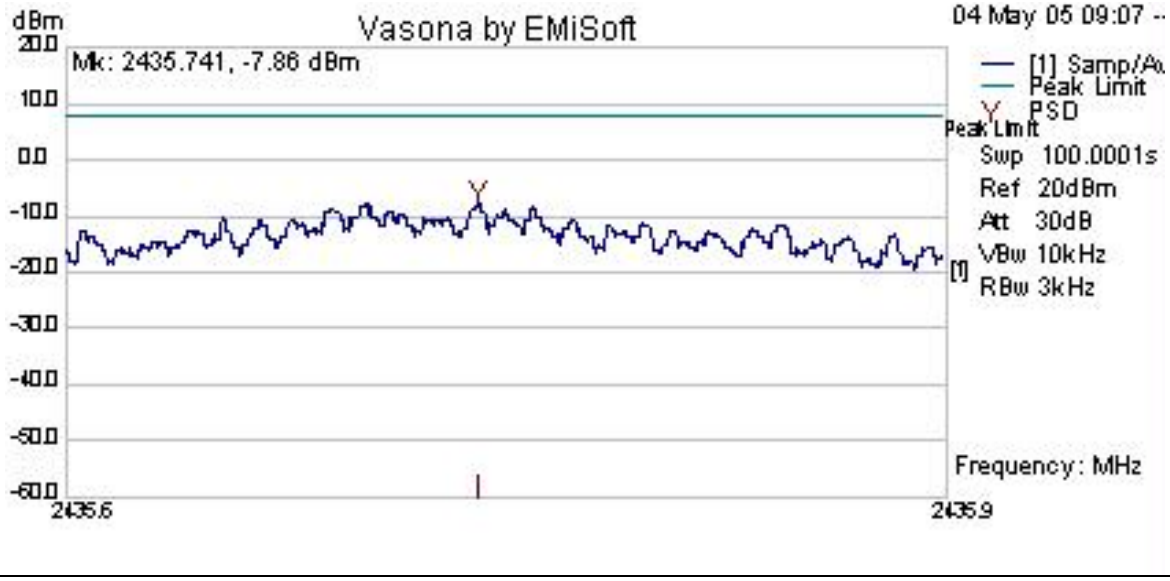
Subtest Number: 16411 - 3	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Power Spectral Density, 2437MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2437.41
Lowest Frequency	2437.11
Comments on the above Test Results	No further comments

Title: Power Spectral Density, 2437MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2437.252	-5.2	0.6	0	-4.6	PSD	RF	8	-12.6	Pass	at 2437.`

Subtest Number: 16411 - 4	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Power Spectral Density, 2437MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2435.9
Lowest Frequency	2435.6
Comments on the above Test Results	No further comments

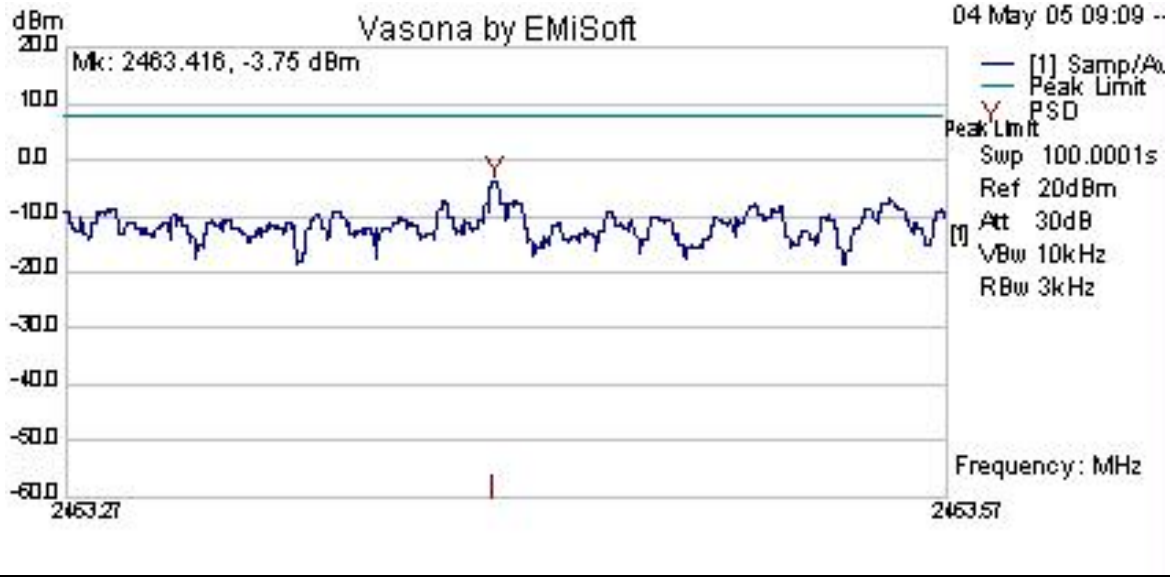


Title: Power Spectral Density, 2437MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2435.741	-8.4	0.6	0	-7.9	PSD	RF	8	-15.9	Pass	at 2437.`

Subtest Number: 16411 - 5	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Power Spectral Density, 2462MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2463.57
Lowest Frequency	2463.27
Comments on the above Test Results	No further comments

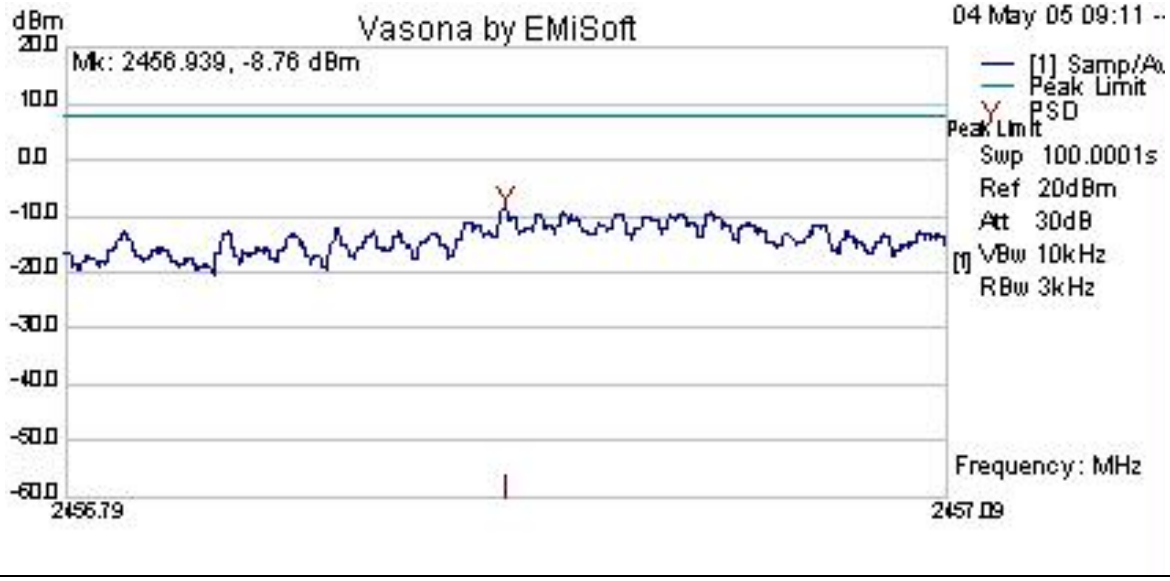


Title: Power Spectral Density, 2462MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2463.416	-4.3	0.6	0	-3.8	PSD	RF	8	-11.8	Pass	at 2462.`

Subtest Number: 16411 - 6	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Power Spectral Density, 2462MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	2457.09
Lowest Frequency	2456.79
Comments on the above Test Results	No further comments



Title: Power Spectral Density, 2462MHz, 54Mbps, 17dBm

Test Results Table

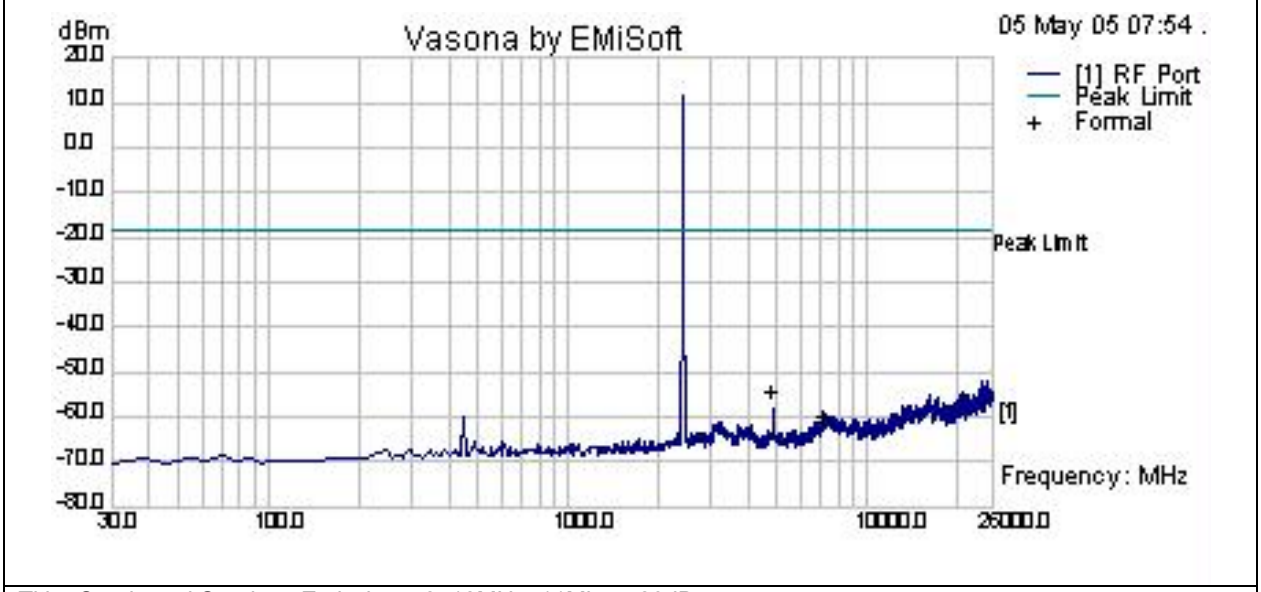
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
2456.939	-9.4	0.6	0	-8.8	PSD	RF	8	-16.8	Pass	at 2462.`

2.4GHz Conducted Spurious Emissions

Test Number: 16412				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	RF Ports	N/A	1GHz- 26GHz	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
Operating Mode	**Mode :** 6, Conducted Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
7	AIR-AP1242AG-A-K9	S01 and S07	☑	☐

Subtest Number: 16412 - 1	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Conducted Spurious Emissions, 2412MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	26000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments

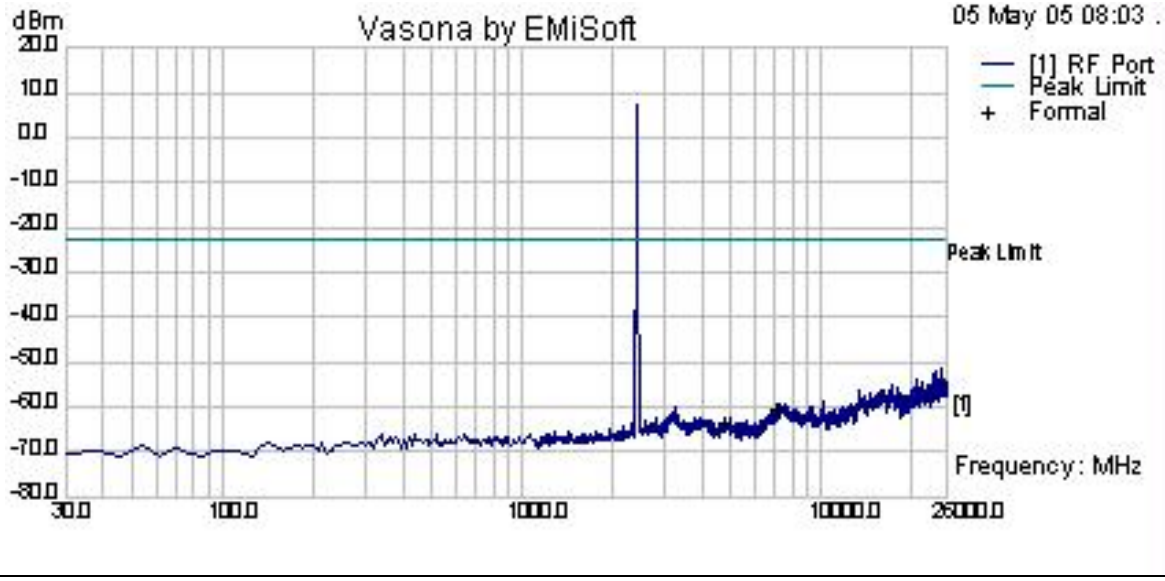


Title: Conducted Spurious Emissions, 2412MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
4823.98	-58	0.8	0	-57.2	Peak(Scan)	RF	-18.6	-38.6	Pass	
7235.99	-63.6	1	0	-62.5	Peak(Scan)	RF	-18.6	-43.9	Pass	

Subtest Number: 16412 - 2	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Conducted Spurious Emissions, 2412MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	26000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments

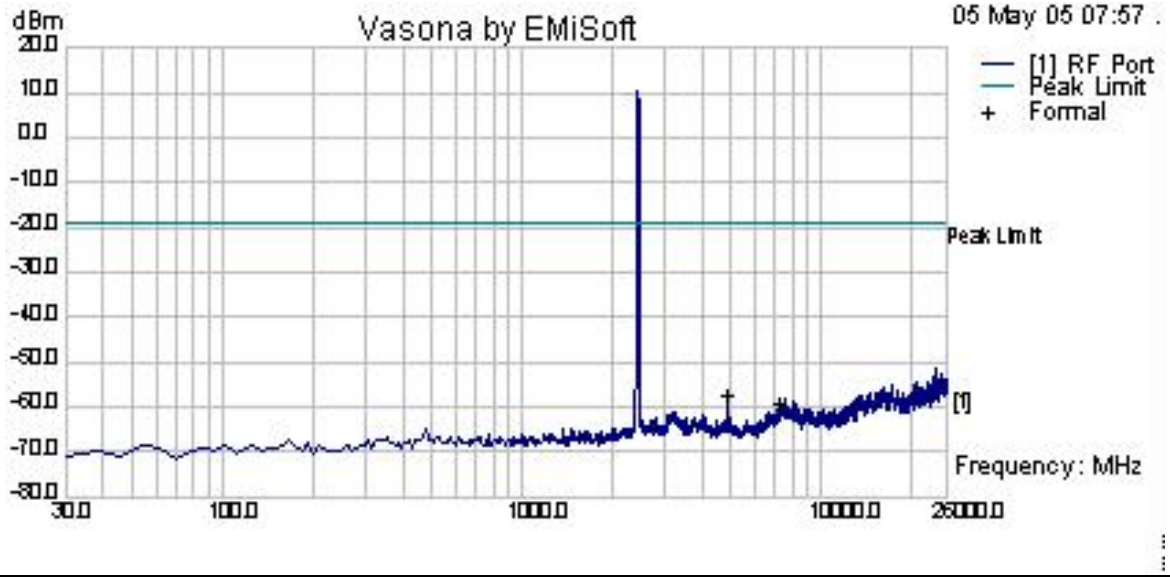


Title: Conducted Spurious Emissions, 2412MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
4823.99	-67.1	0.8	0	-66.3	Peak(Scan)	RF	-22.9	-43.4	Pass	
7235.99	-64.6	1	0	-63.6	Peak(Scan)	RF	-22.9	-40.6	Pass	

Subtest Number: 16412 - 3	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Conducted Spurious Emissions, 2437MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	26000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments

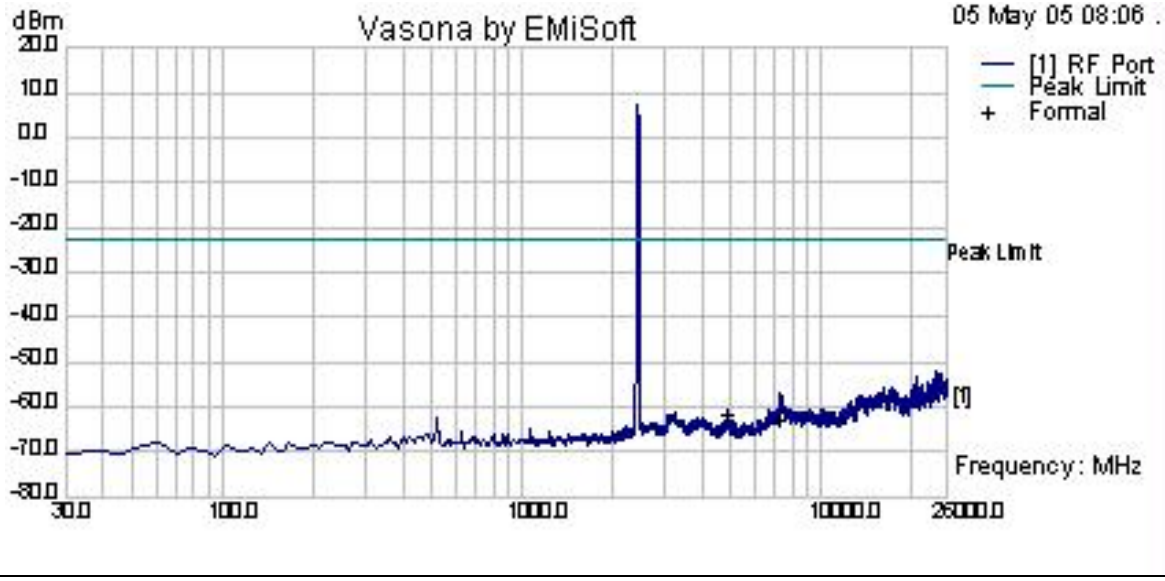


Title: Conducted Spurious Emissions, 2437MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
4873.99	-61	0.8	0	-60.1	Peak(Scan)	RF	-19.3	-40.8	Pass	
7310.99	-63.1	1	0	-62	Peak(Scan)	RF	-19.3	-42.7	Pass	

Subtest Number: 16412 - 4	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Conducted Spurious Emissions, 2437MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	26000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments

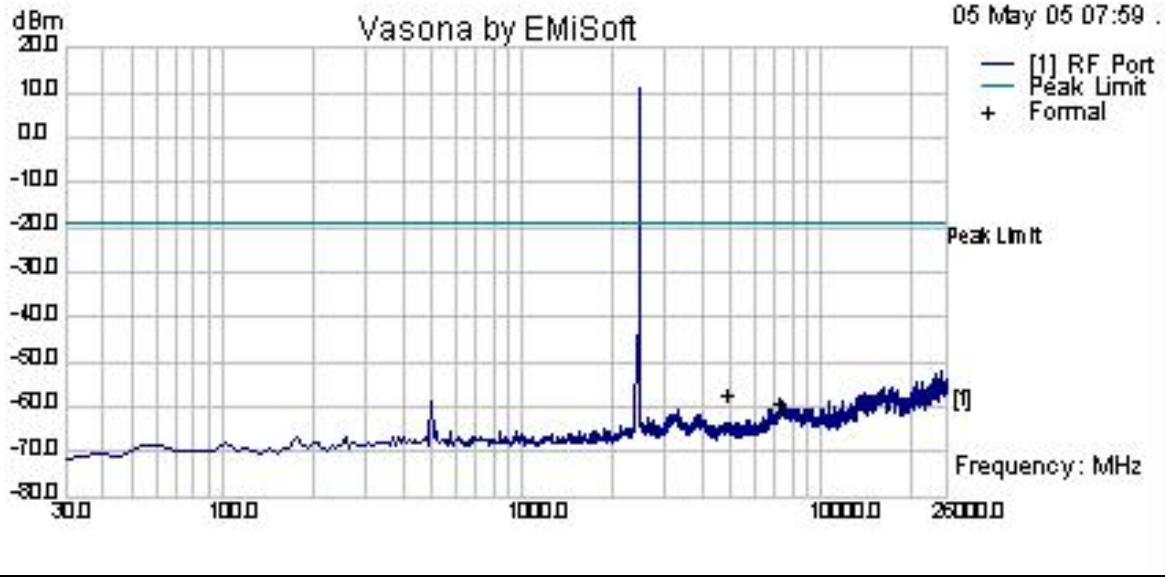


Title: Conducted Spurious Emissions, 2437MHz, 54Mbps, 17dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
4873.99	-65.4	0.8	0	-64.6	Peak(Scan)	RF	-22.7	-41.9	Pass	
7310.99	-67	1	0	-66	Peak(Scan)	RF	-22.7	-43.3	Pass	

Subtest Number: 16412 - 5	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Conducted Spurious Emissions, 2462MHz, 11Mbps, 20dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	26000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments

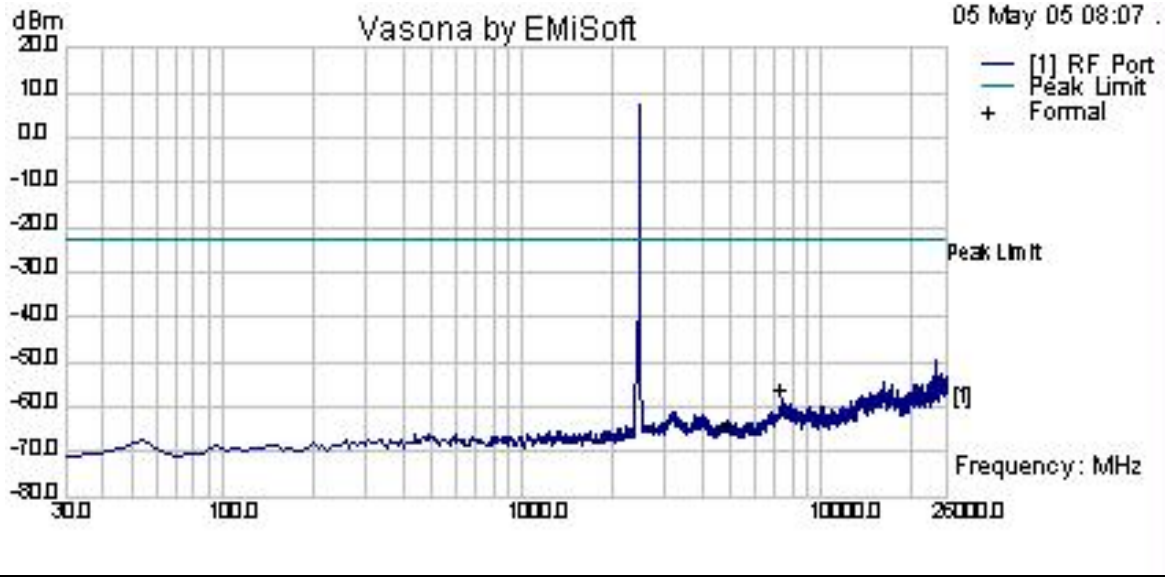


Title: Conducted Spurious Emissions, 2462MHz, 11Mbps, 20dBm

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
4923.99	-63.8	0.8	0	-63	Peak(Scan)	RF	-19.2	-43.8	Pass	
7385.99	-61.5	1	0	-60.5	Peak(Scan)	RF	-19.2	-41.3	Pass	

Subtest Number: 16412 - 6	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, Shield Room 1
Subtest Results	
Line Under Test	Conducted Spurious Emissions, 2462MHz, 54Mbps, 17dBm
Transducer	Direct
Subtest Result	Pass
Highest Frequency	26000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments



Title: Conducted Spurious Emissions, 2462MHz, 54Mbps, 17dBm

Test Results Table

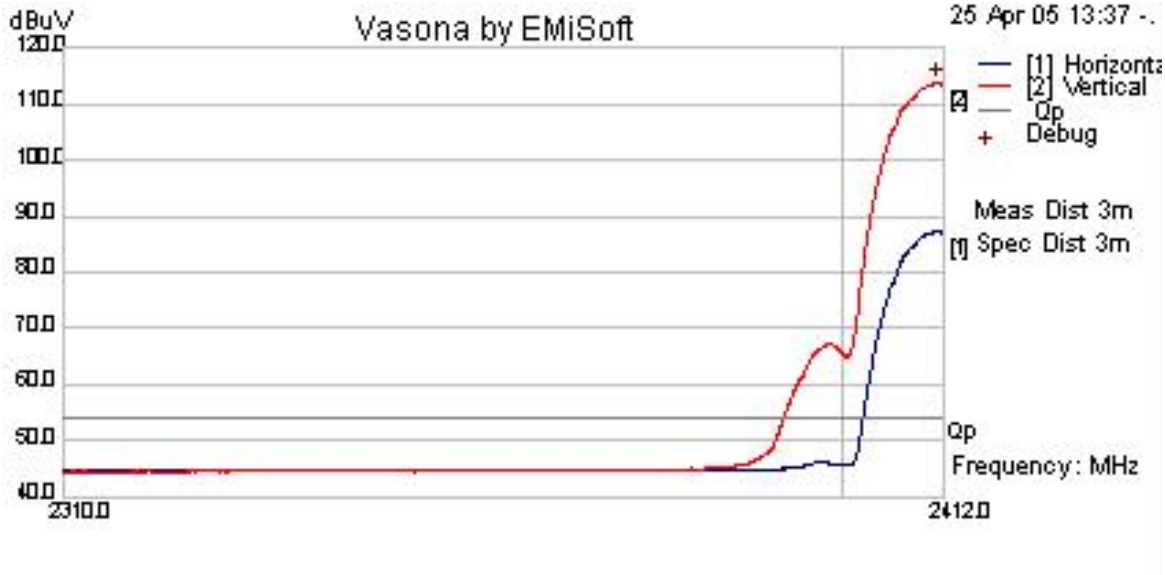
Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
4923.99	-67.9	0.8	0	-67.1	Peak(Scan)	RF	-22.4	-44.7	Pass	
7385.99	-60.2	1	0	-59.2	Peak(Scan)	RF	-22.4	-36.8	Pass	

2.4GHz Radiated Bandedge with 10dBi Yagi Antenna

Test Number: 16118				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247(d)	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	**Mode :** 1, 2.4GHz Band Edge			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
1	AIR-AP1242AG-A-K9 with 2.4GHz 10dBi Yagi Antenna	S01, S02 and S07	☑	☐

Subtest Number: 16118 - 1	**Subtest Date:** 25-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Band Edge, 2412 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

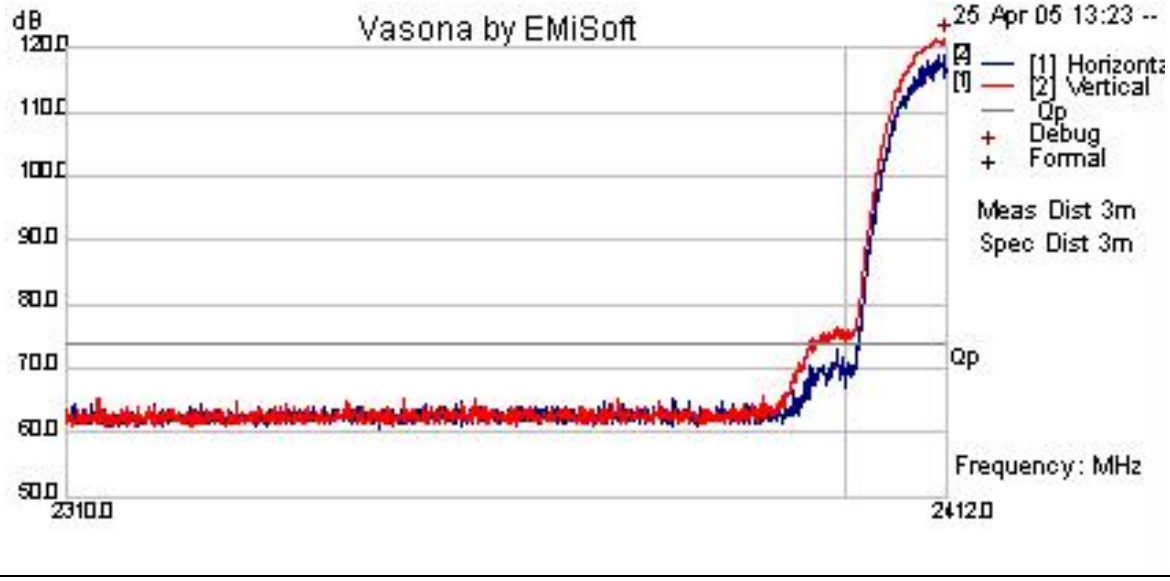


Title: Average Band Edge, 2412 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2389.99	27.3	25.1	-5.8	46.6	Peak(Scan)	V	150	287	54	-7.4	Pass	
2389.99	25.5	25.1	-5.8	44.9	Peak(Scan)	H	150	287	54	-9.1	Pass	

Subtest Number: 16118 - 2	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi AntennaN/A
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

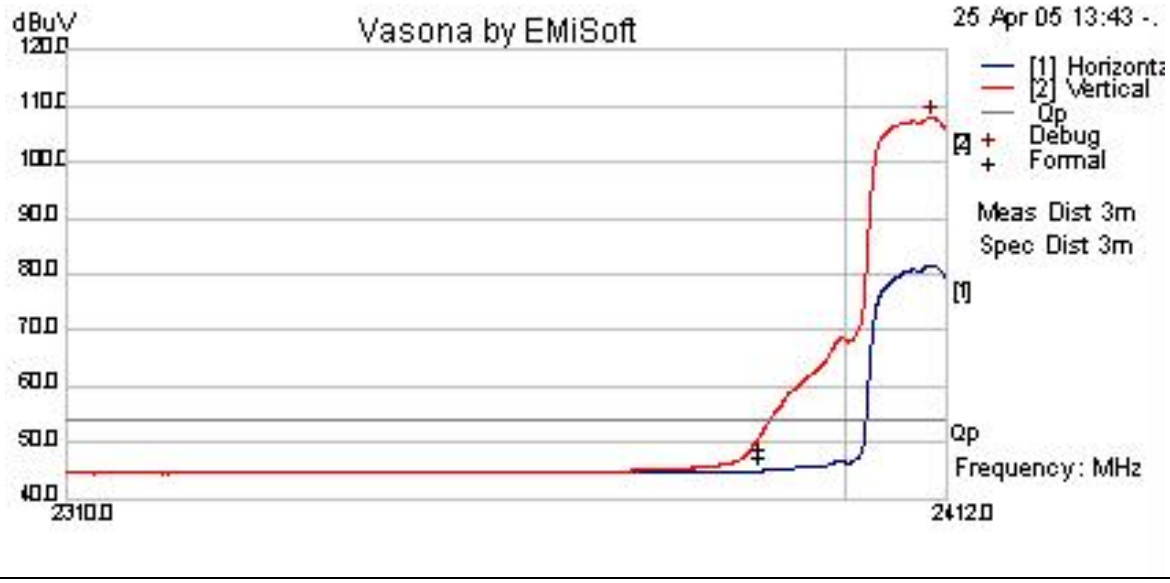


Title: Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2389.99	44.7	25.1	-5.8	64	Peak(Scan)	V	150	287	74	-10	Pass	
2389.99	44.2	25.1	-5.8	63.5	Peak(Scan)	H	150	287	74	-10.5	Pass	

Subtest Number: 16118 - 3	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

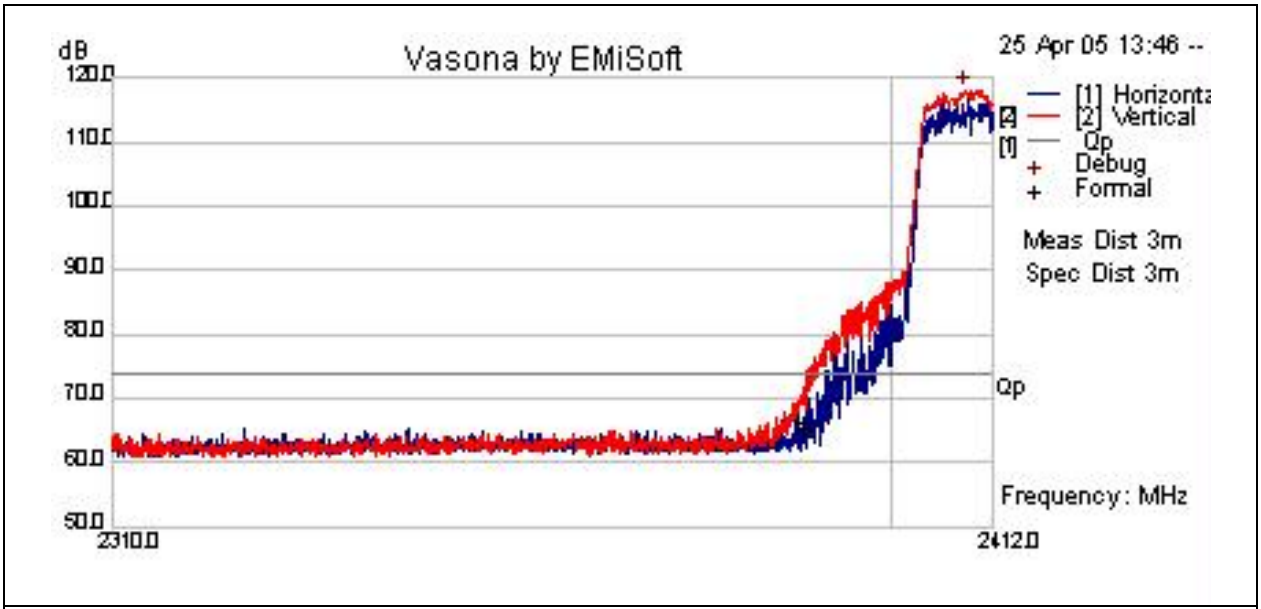


Title: Average Bandedge, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2389.97	31.5	25.1	-5.8	50.8	Peak(Scan)	V	150	287	54	-3.2	Pass	
2389.97	25.6	25.1	-5.8	44.9	Peak(Scan)	H	150	287	54	-9.1	Pass	

Subtest Number: 16118 - 4	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

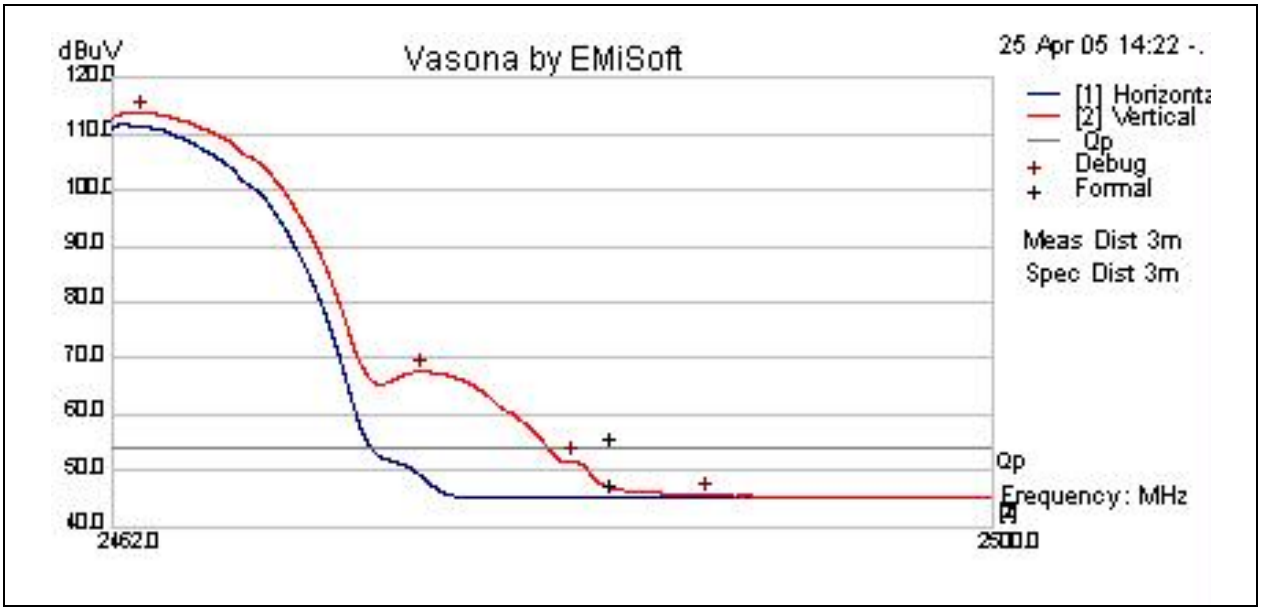


Title: Peak Bandedge, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2389.97	52.2	25.1	-5.8	71.5	Peak(Scan)	V	150	287	74	-2.5	Pass	
2389.98	42.4	25.1	-5.8	61.8	Peak(Scan)	H	150	287	74	-12.2	Pass	

Subtest Number: 16118 - 5	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

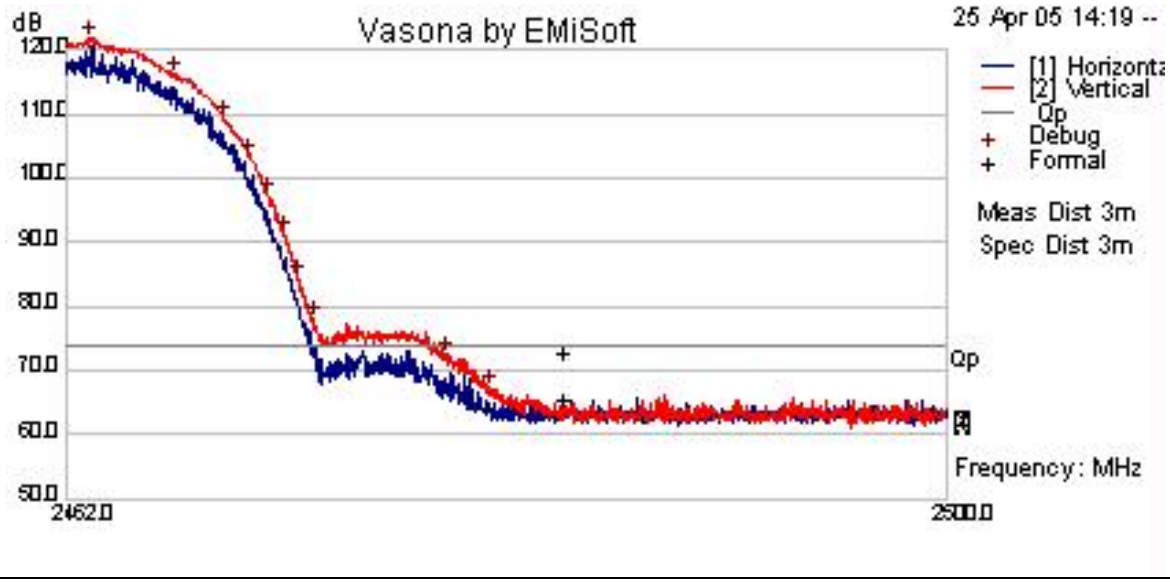


Title: Average Bandedge, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.49	27.5	25.2	-5.7	47	Peak(Scan)	V	143	279	54	-7	Pass	
2483.49	25.7	25.2	-5.7	45.2	Peak(Scan)	H	143	279	54	-8.8	Pass	

Subtest Number: 16118 - 6	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

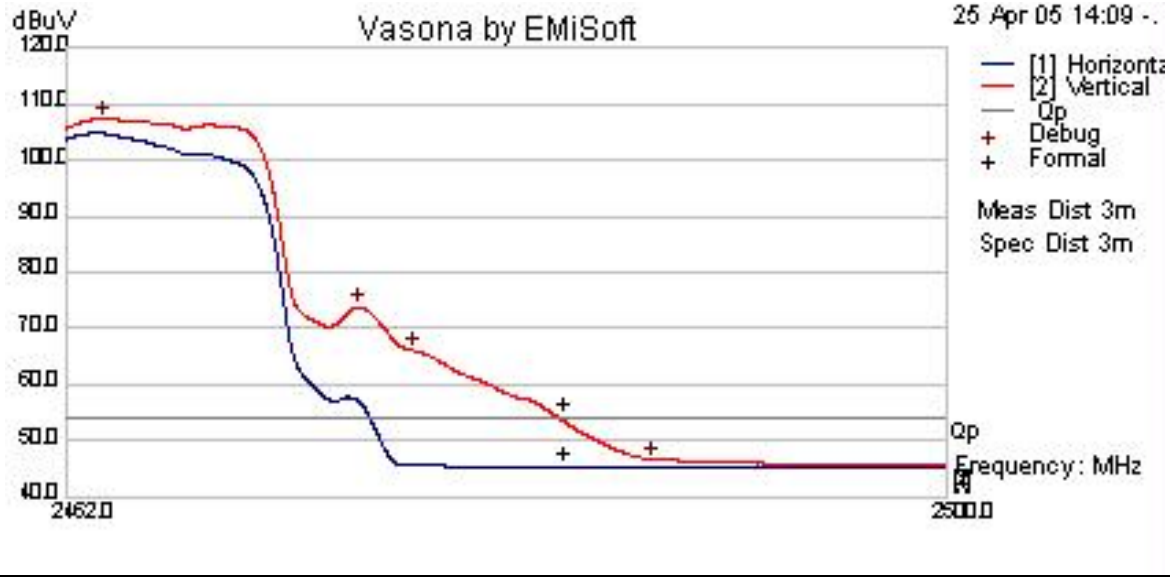


Title: Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.49	51.2	25.2	-5.7	70.6	Peak(Scan)	V	143	279	74	-3.4	Pass	
2483.49	44.1	25.2	-5.7	63.6	Peak(Scan)	H	143	279	74	-10.4	Pass	

Subtest Number: 16118 - 7	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

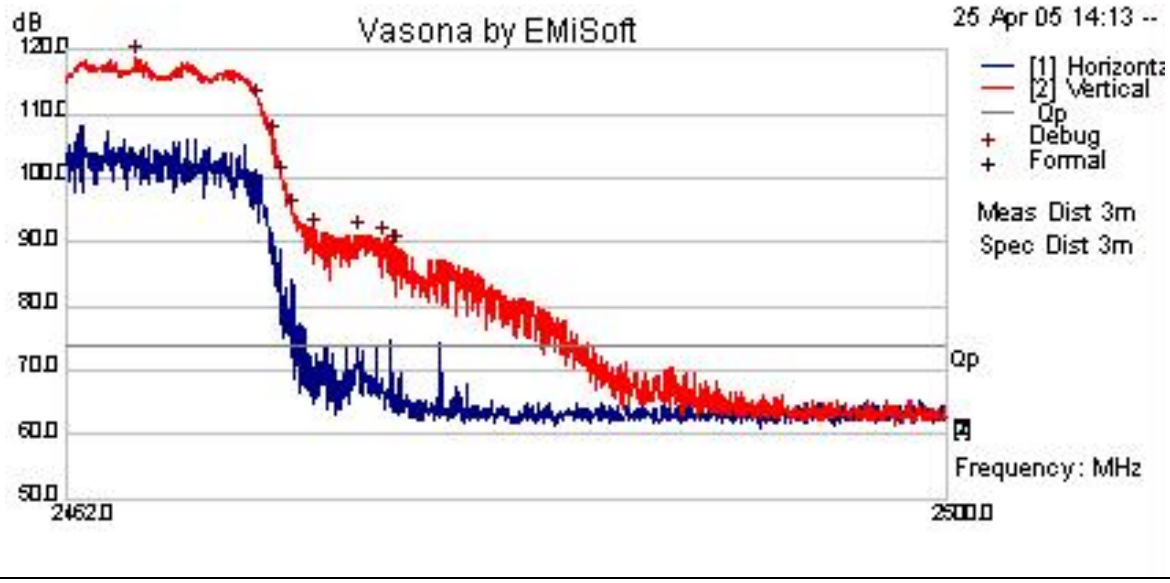


Title: Average Bandedge, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.49	33.8	25.2	-5.7	53.3	Peak(Scan)	V	143	279	54	-0.7	Pass	
2483.49	25.7	25.2	-5.7	45.2	Peak(Scan)	H	143	279	54	-8.8	Pass	

Subtest Number: 16118 - 8	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments



Title: Peak Bandedge, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

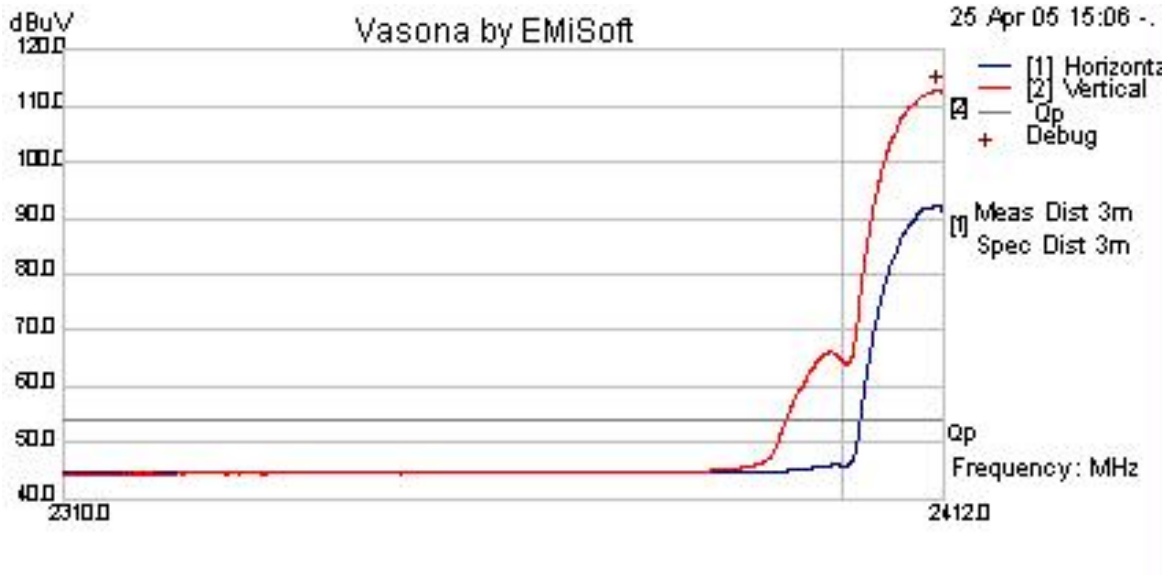
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.49	51.2	25.2	-5.7	70.6	Peak(Scan)	V	143	279	74	-3.4	Pass	
2483.49	44.1	25.2	-5.7	63.6	Peak(Scan)	H	143	279	74	-10.4	Pass	

2.4GHz Radiated Bandedge with 9dBi Patch Antenna

Test Number: 16140				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	**Mode :** 1, 2.4GHz Band Edge			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	**Description**	**Samples**	**System under test**	**Support equipment**
2	AIR-AP1242AG-A-K9 with 2.4GHz 9dBi Patch Antenna	S01, S03 and S07	☑	☐

Subtest Number: 16140 - 1	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

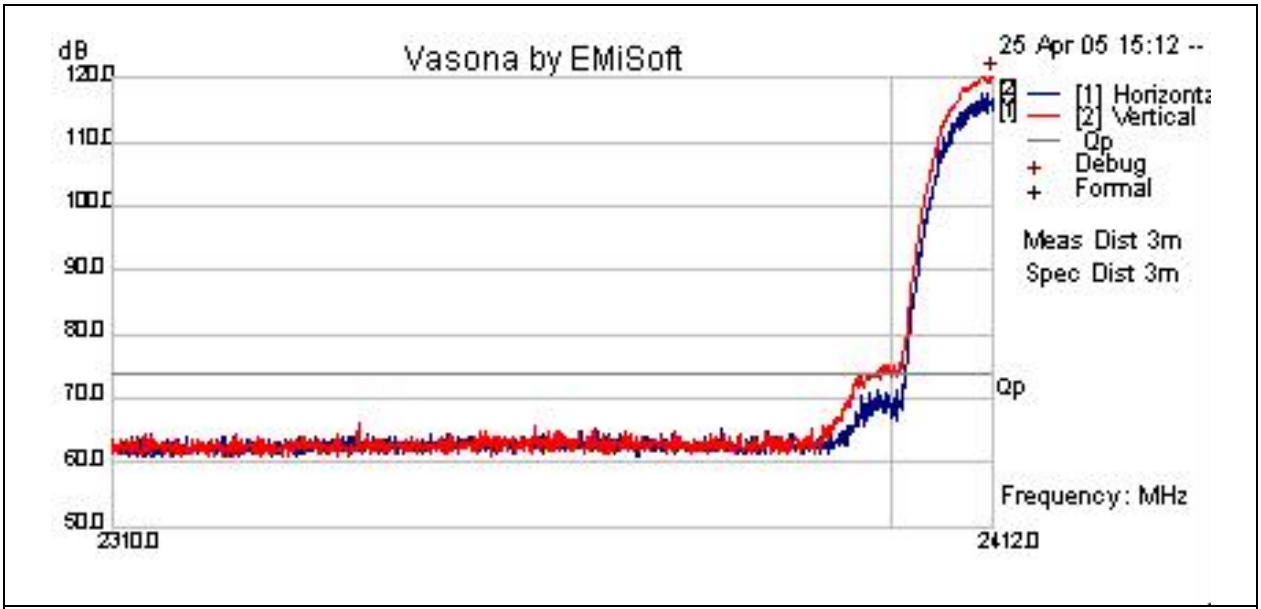


Title: Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2389.99	26.7	25.1	-5.8	46	Peak(Scan)	V	147	276	54	-8	Pass	
2389.99	25.5	25.1	-5.8	44.8	Peak(Scan)	H	147	276	54	-9.2	Pass	

Subtest Number: 16140 - 2	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

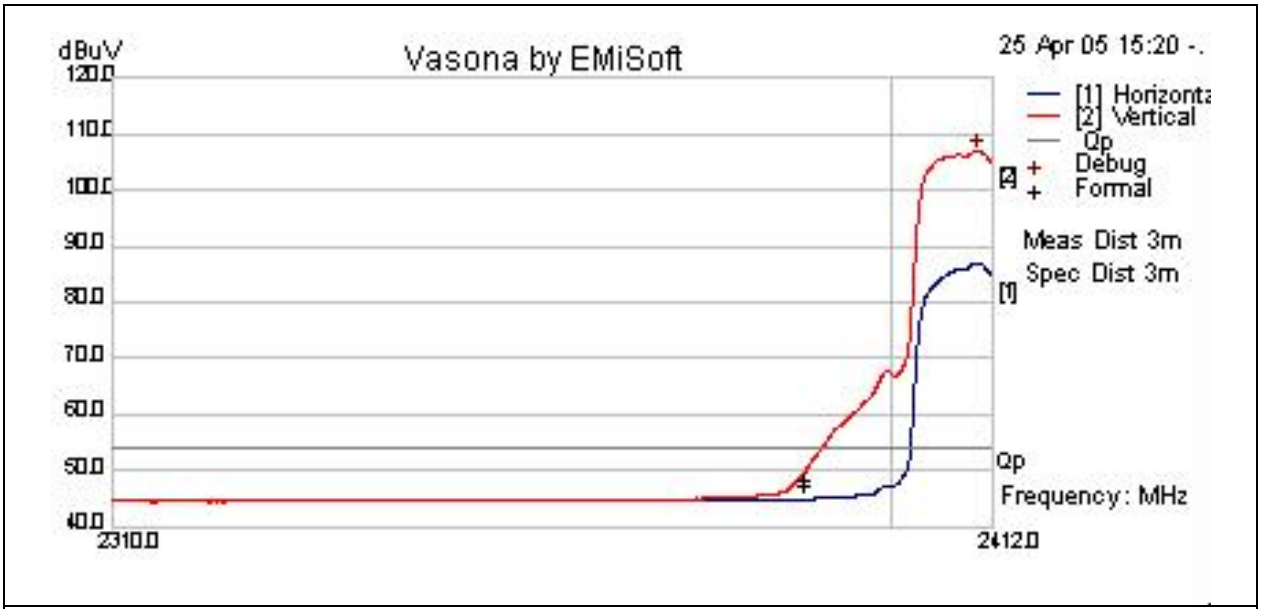


Title: Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2389.98	42.7	25.1	-5.8	62	Peak(Scan)	V	147	276	74	-12	Pass	
2389.98	41.5	25.1	-5.8	60.8	Peak(Scan)	H	147	276	74	-13.2	Pass	

Subtest Number: 16140 - 3	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

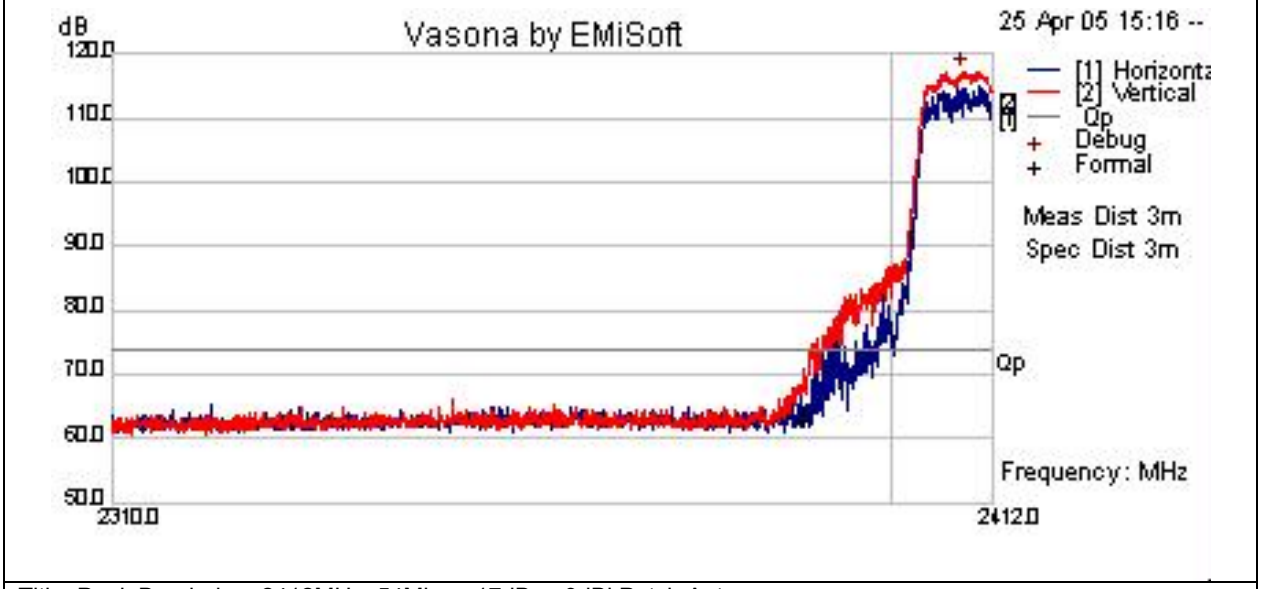


Title: Average Bandedge, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2389.99	30.4	25.1	-5.8	49.8	Peak(Scan)	V	147	276	54	-4.2	Pass	
2389.99	25.6	25.1	-5.8	44.9	Peak(Scan)	H	147	276	54	-9.1	Pass	

Subtest Number: 16140 - 4	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

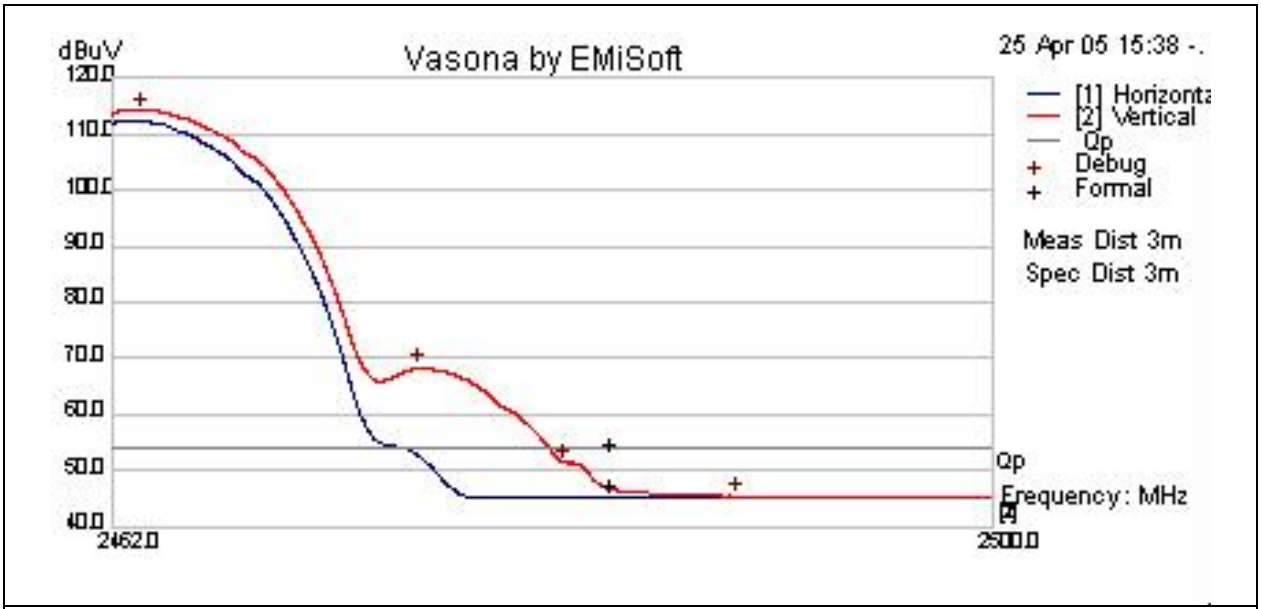


Title: Peak Bandedge, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2389.99	47.9	25.1	-5.8	67.2	Peak(Scan)	V	147	276	74	-6.8	Pass	
2389.99	41.6	25.1	-5.8	61	Peak(Scan)	H	147	276	74	-13	Pass	

Subtest Number: 16140 - 5	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

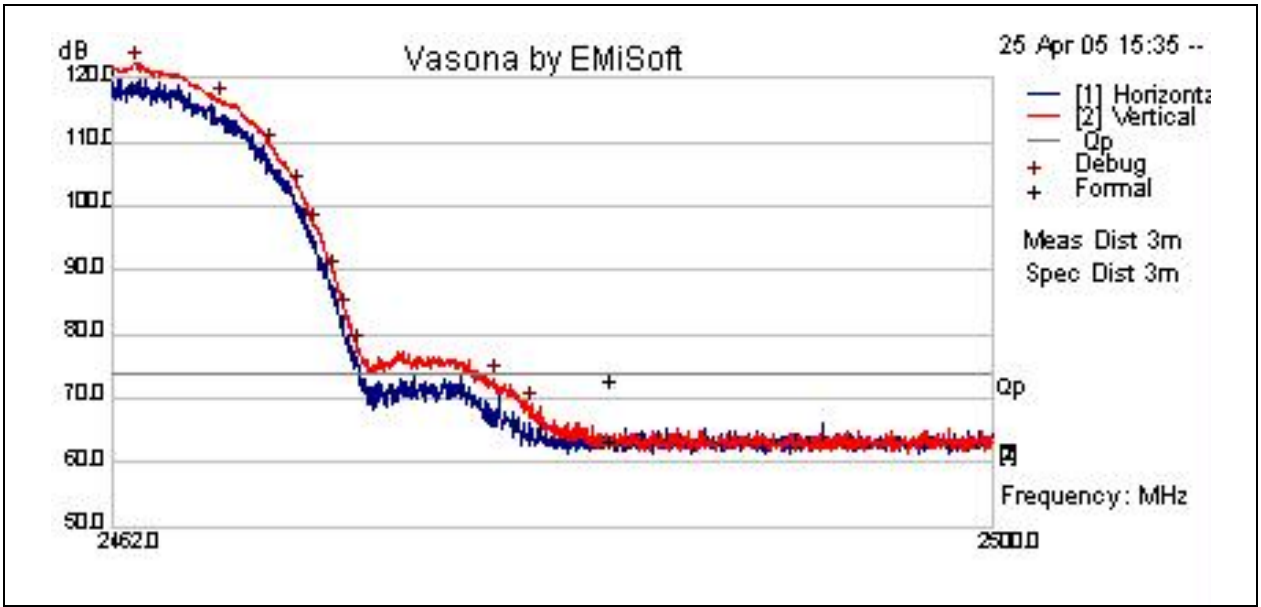


Title: Average Bandedge, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.49	27.2	25.2	-5.7	46.7	Peak(Scan)	V	148	272	54	-7.3	Pass	
2483.49	25.7	25.2	-5.7	45.2	Peak(Scan)	H	148	272	54	-8.8	Pass	

Subtest Number: 16140 - 6	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

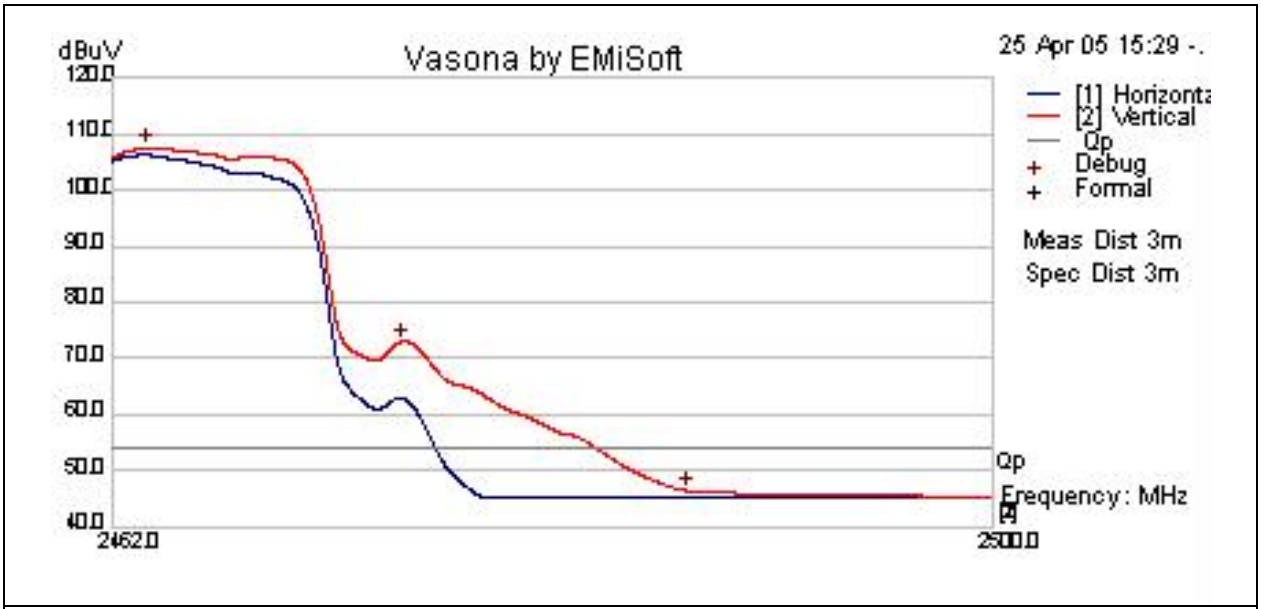


Title: Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.49	43.6	25.2	-5.7	63.1	Peak(Scan)	V	148	272	74	-10.9	Pass	
2483.49	42.4	25.2	-5.7	61.9	Peak(Scan)	H	148	272	74	-12.1	Pass	

Subtest Number: 16140 - 7	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

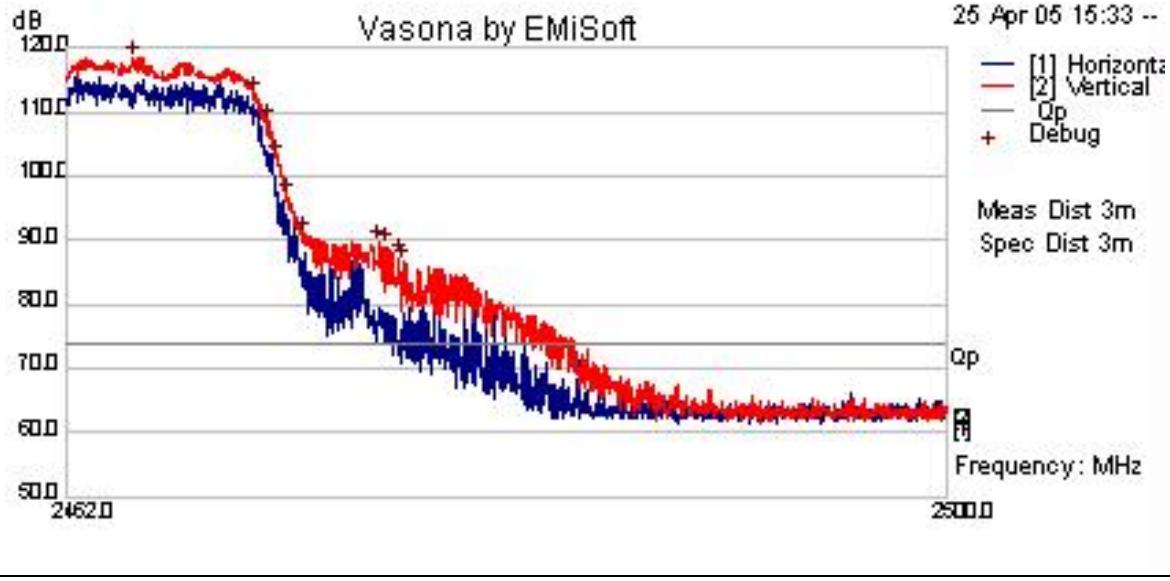


Title: Average Bandedge, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.49	32.7	25.2	-5.7	52.2	Peak(Scan)	V	148	272	54	-1.8	Pass	
2483.49	25.7	25.2	-5.7	45.2	Peak(Scan)	H	148	272	54	-8.8	Pass	

Subtest Number: 16140 - 8	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments



Title: Peak Bandedge, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

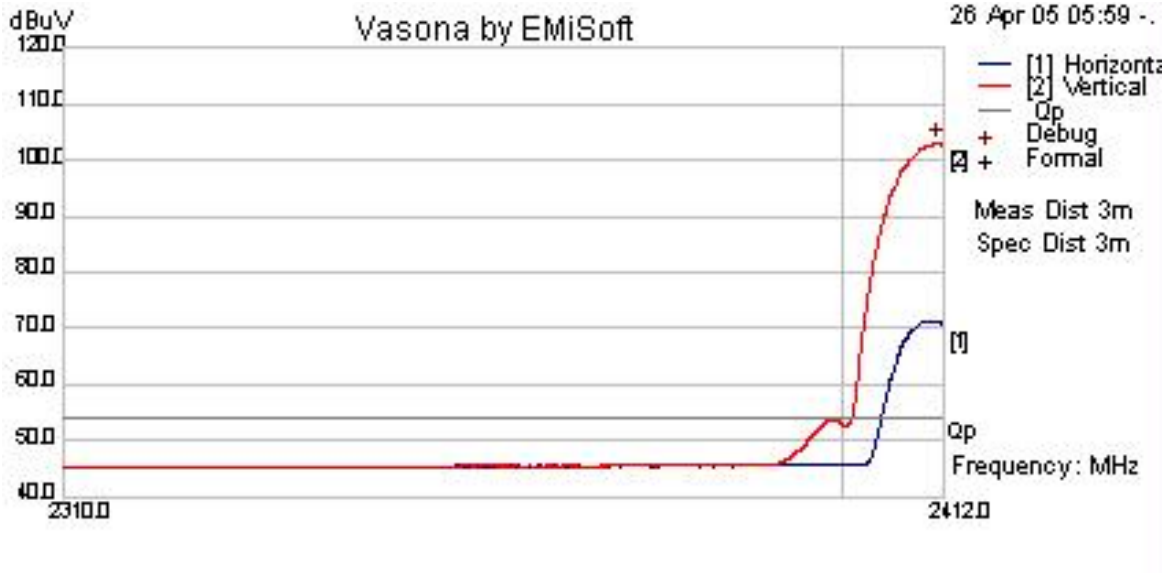
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.49	51.1	25.2	-5.7	70.6	Peak(Scan)	V	148	272	74	-3.4	Pass	
2483.49	41.9	25.2	-5.7	61.4	Peak(Scan)	H	148	272	74	-12.6	Pass	

2.4GHz Radiated Bandedge Emissions with 5.2dBi Omnidirectional Antenna

Test Number: 16145				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a)
Operating Mode	**Mode :** 1, 2.4GHz Band Edge			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
3	AIR-AP1242AG-A-K9 with 2.4GHz 5.2dBi Omnidirectional Antenna	S01, S04 and S07	☑	☐

Subtest Number: 16145 - 1	**Subtest Date:** 26-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

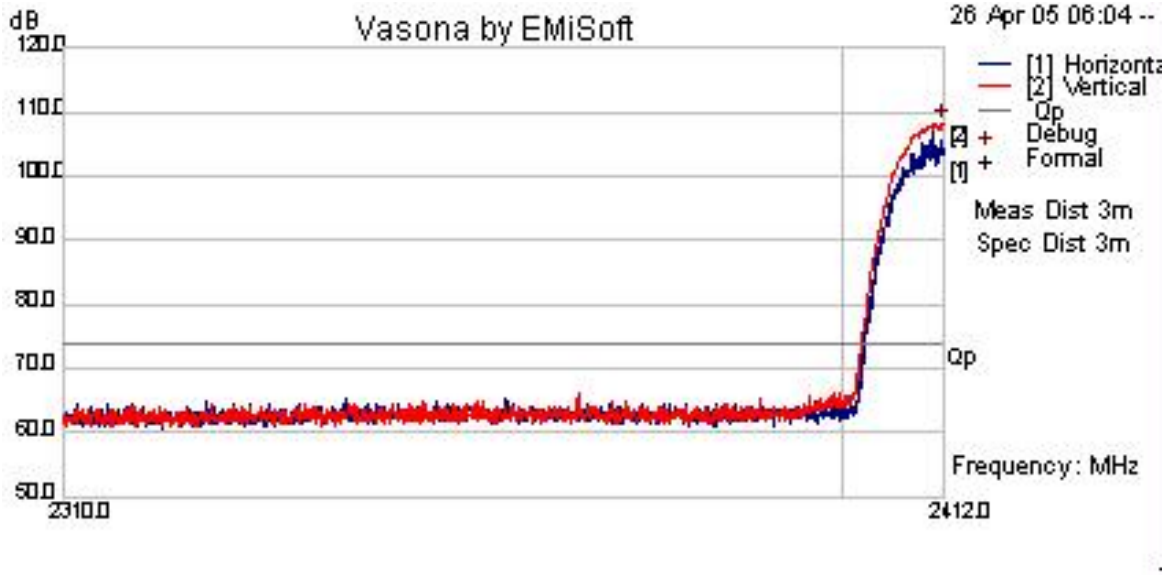


Title: Average Bandedge, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2389.99	26.1	25.1	-5.8	45.4	Peak(Scan)	V	162	74	54	-8.6	Pass	
2389.98	26	25.1	-5.8	45.3	Peak(Scan)	H	162	74	54	-8.7	Pass	

Subtest Number: 16145 - 2	**Subtest Date:** 27-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

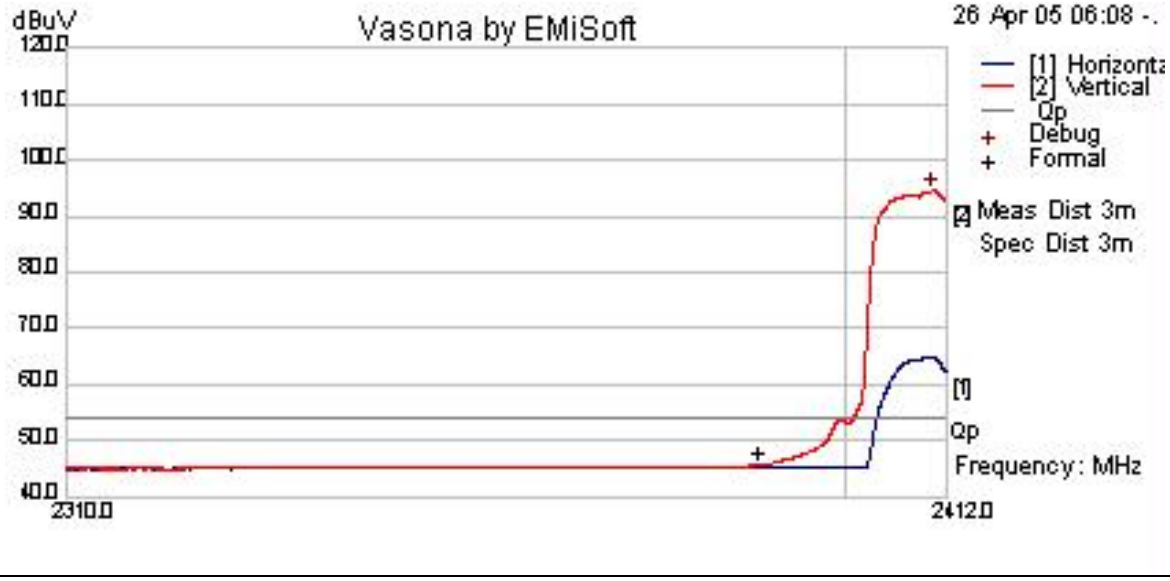


Title: Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2389.99	42.8	25.1	-5.8	62.1	Peak(Scan)	V	162	74	74	-11.9	Pass	
2389.99	41.8	25.1	-5.8	61.1	Peak(Scan)	H	162	74	74	-12.9	Pass	

Subtest Number: 16145 - 3	**Subtest Date:** 27-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

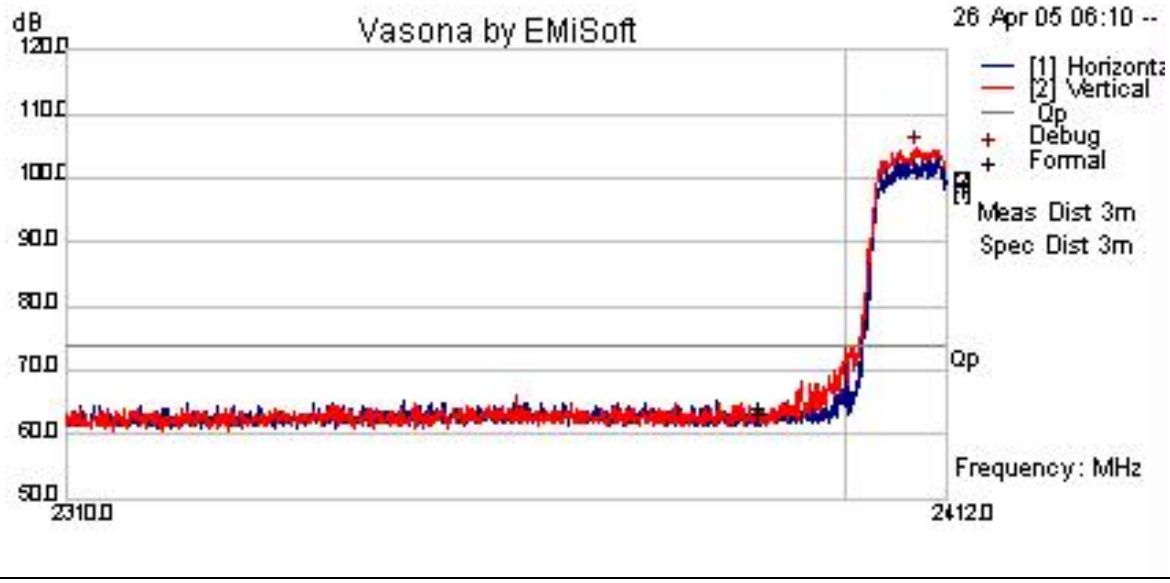


Title: Average Bandedge, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2389.99	26.2	25.1	-5.8	45.6	Peak(Scan)	V	162	74	54	-8.4	Pass	
2389.99	25.9	25.1	-5.8	45.2	Peak(Scan)	H	162	74	54	-8.8	Pass	

Subtest Number: 16145 - 4	**Subtest Date:** 27-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	No further comments

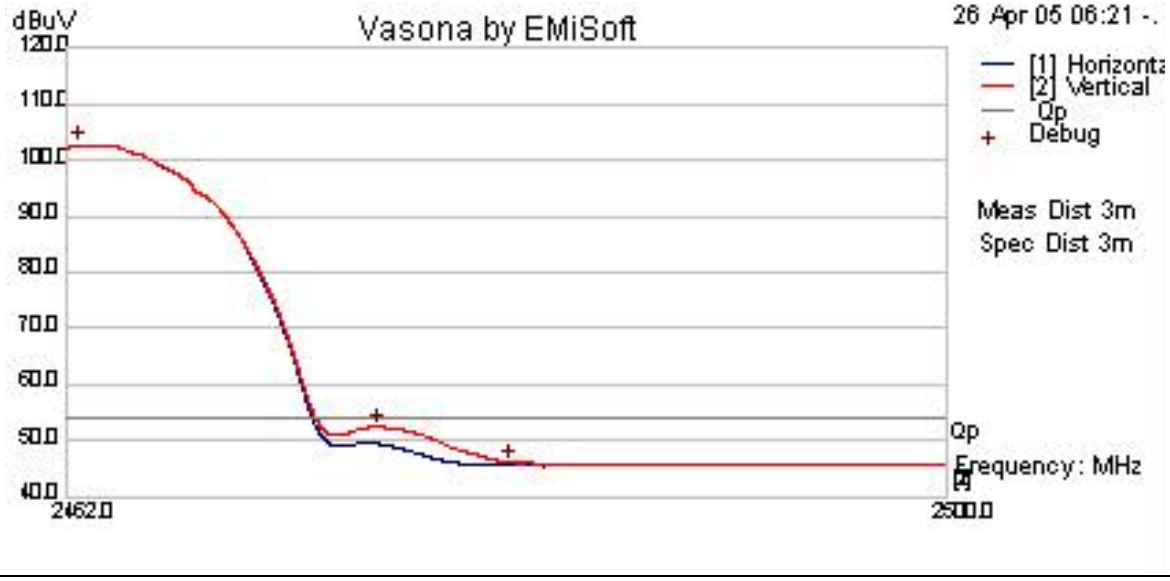


Title: Peak Bandedge, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2389.99	42.7	25.1	-5.8	62	Peak(Scan)	V	162	74	74	-12	Pass	
2389.99	40.9	25.1	-5.8	60.2	Peak(Scan)	H	162	74	74	-13.8	Pass	

Subtest Number: 16145 - 5	**Subtest Date:** 27-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

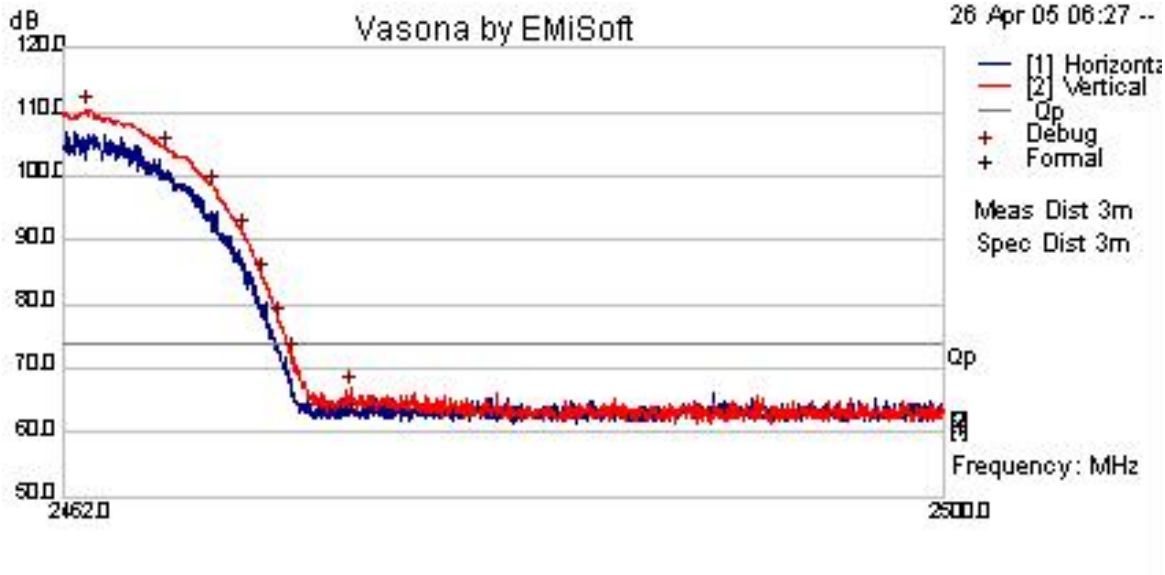


Title: Average Bandedge, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.49	25.9	25.2	-5.7	45.4	Peak(Scan)	H	155	105	54	-8.6	Pass	
2483.47	26	25.2	-5.7	45.5	Peak(Scan)	H	155	105	54	-8.5	Pass	

Subtest Number: 16145 - 6	**Subtest Date:** 27-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

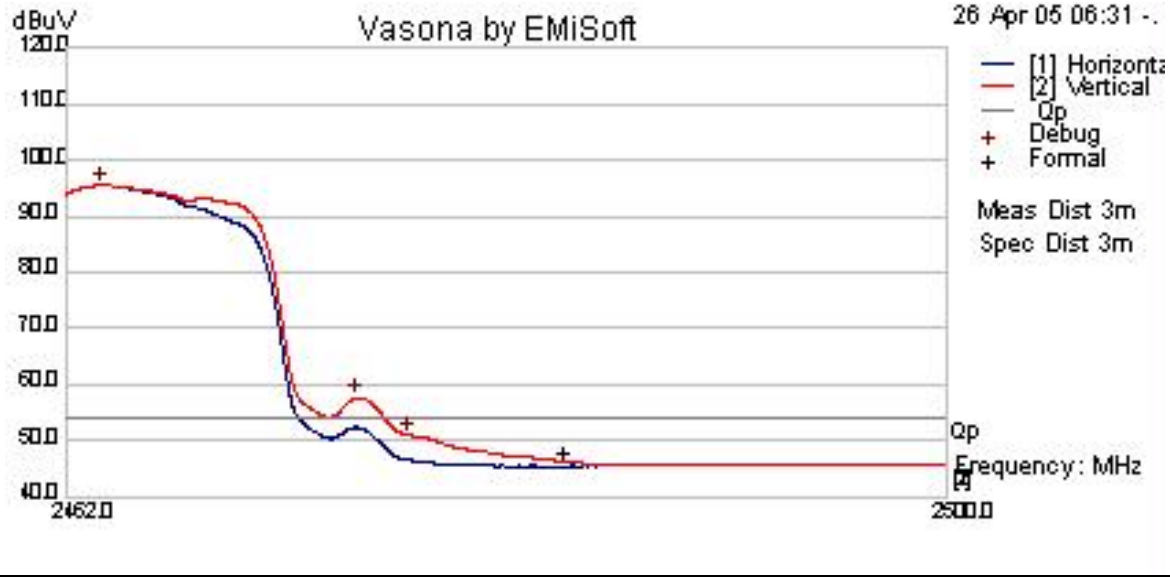


Title: Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.49	42.1	25.2	-5.7	61.6	Peak(Scan)	V	155	105	74	-12.4	Pass	
2483.49	42.5	25.2	-5.7	62	Peak(Scan)	H	155	105	74	-12	Pass	

Subtest Number: 16145 - 7	**Subtest Date:** 27-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments

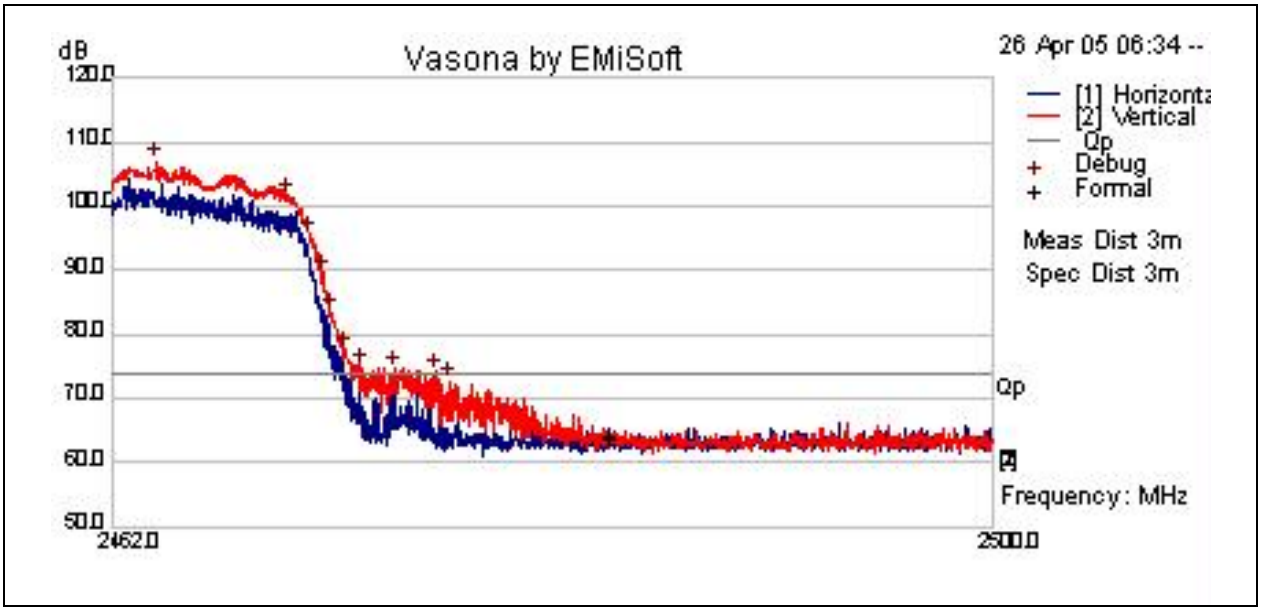


Title: Average Bandedge, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.49	26.7	25.2	-5.7	46.2	Peak(Scan)	V	155	105	54	-7.8	Pass	
2483.48	25.9	25.2	-5.7	45.4	Peak(Scan)	H	155	105	54	-8.6	Pass	

Subtest Number: 16145 - 8	**Subtest Date:** 27-Apr-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	No further comments



Title: Peak Bandedge, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

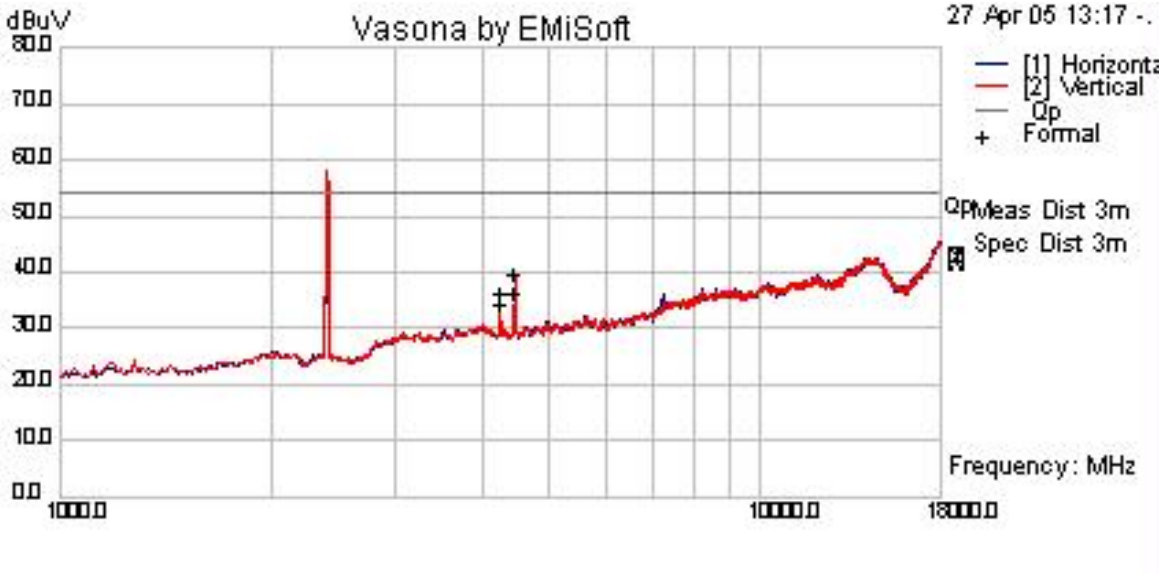
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.49	43.4	25.2	-5.7	62.9	Peak(Scan)	V	155	105	74	-11.1	Pass	
2483.49	42.1	25.2	-5.7	61.6	Peak(Scan)	H	155	105	74	-12.4	Pass	

2.4GHz Radiated Spurs and Harmonics with 10dBi Yagi Antenna

Test Number: 16366				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	**Mode :** 2, 2.4GHz Spurious			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
1	AIR-AP1242AG-A-K9 with 2.4GHz 10dBi Yagi Antenna	S01, S02 and S07	☑	☐

Subtest Number: 16366 - 1	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

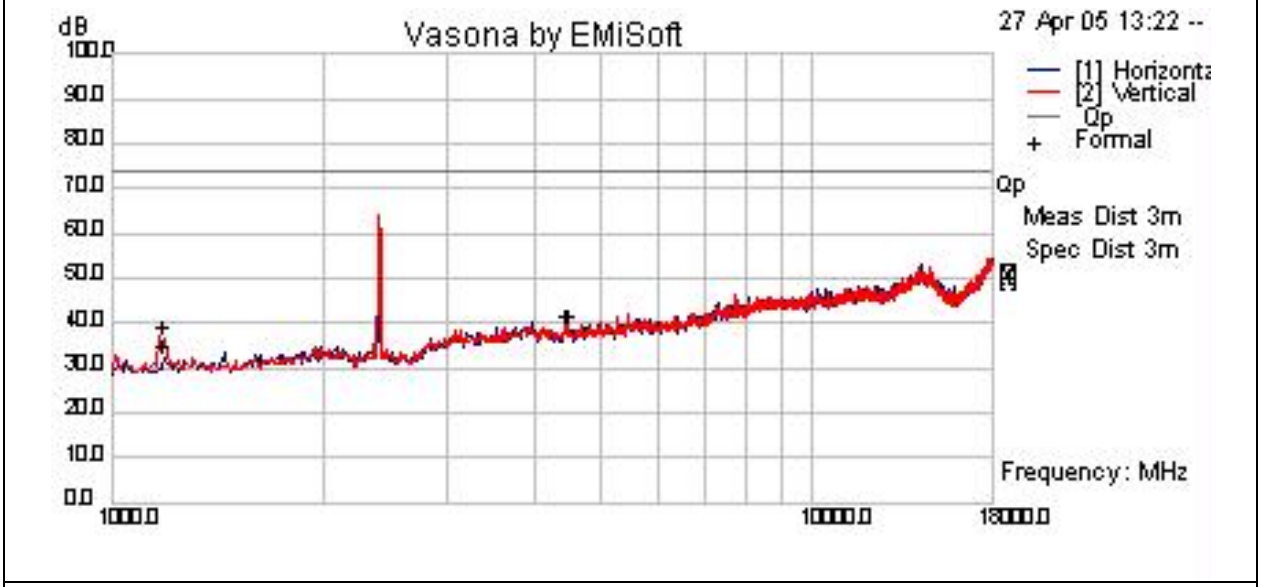


Title: Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4244.912	29	7	-4	32	Av	H	146	268	54	-22	Pass	
4244.912	31	7	-4	34	Av	V	146	268	54	-20	Pass	
4459.28	30.7	7.1	-4.1	33.7	Av	H	146	268	54	-20.3	Pass	
4459.28	34.2	7.1	-4.1	37.3	Av	V	146	268	54	-16.7	Pass	

Subtest Number: 16366 - 2	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

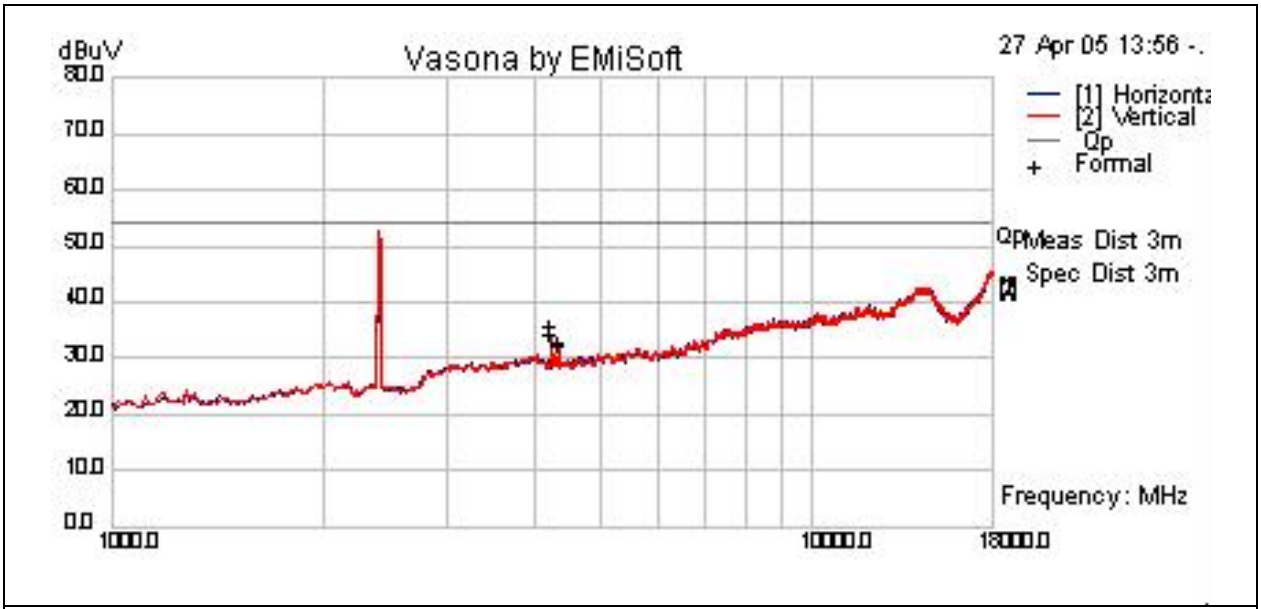


Title: Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1189.368	40.4	4	-8	36.4	Peak(Scan)	V	146	268	74	-37.6	Pass	
1190.927	36.2	3.9	-7.9	32.2	Peak(Scan)	H	146	268	74	-41.8	Pass	
4468.242	35.4	7.1	-4.1	38.5	Peak(Scan)	V	146	268	74	-35.5	Pass	
4480.568	35.7	7.1	-4.1	38.7	Peak(Scan)	H	146	268	74	-35.3	Pass	

Subtest Number: 16366 - 3	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

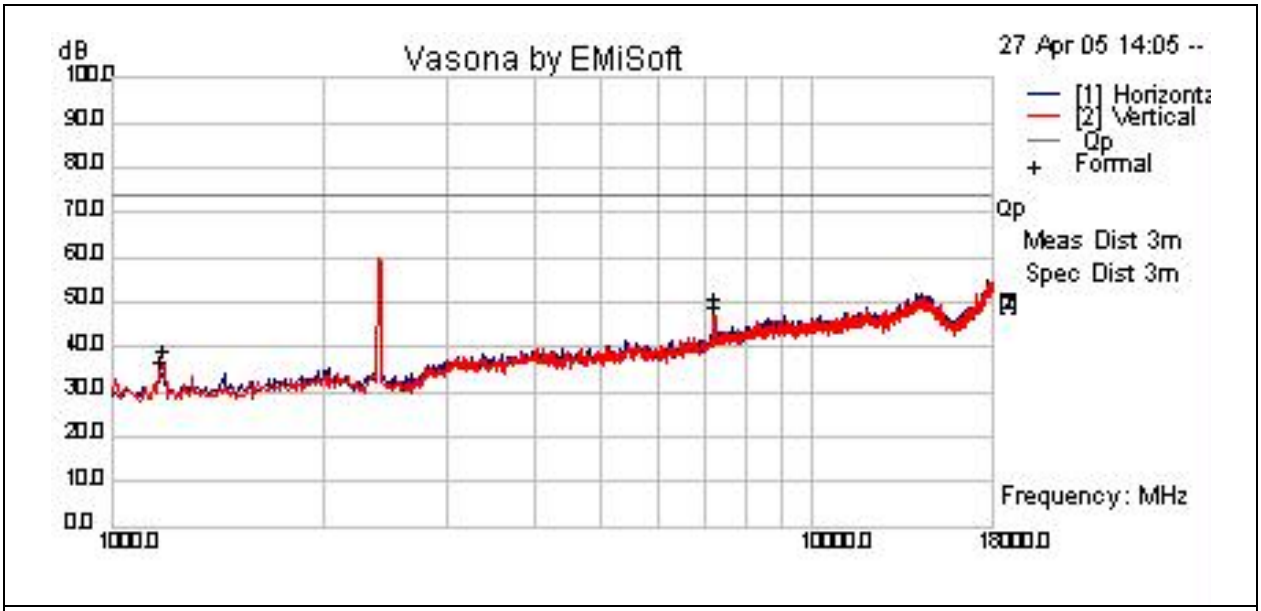


Title: Average Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4242.68	30.4	7	-4	33.4	Av	V	146	268	54	-20.6	Pass	
4242.81	29.1	7	-4	32.1	Av	H	146	268	54	-21.9	Pass	
4343.27	27.4	7.1	-4	30.4	Av	V	146	268	54	-23.6	Pass	
4343.38	26.8	7.1	-4	29.8	Av	H	146	268	54	-24.2	Pass	

Subtest Number: 16366 - 4	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

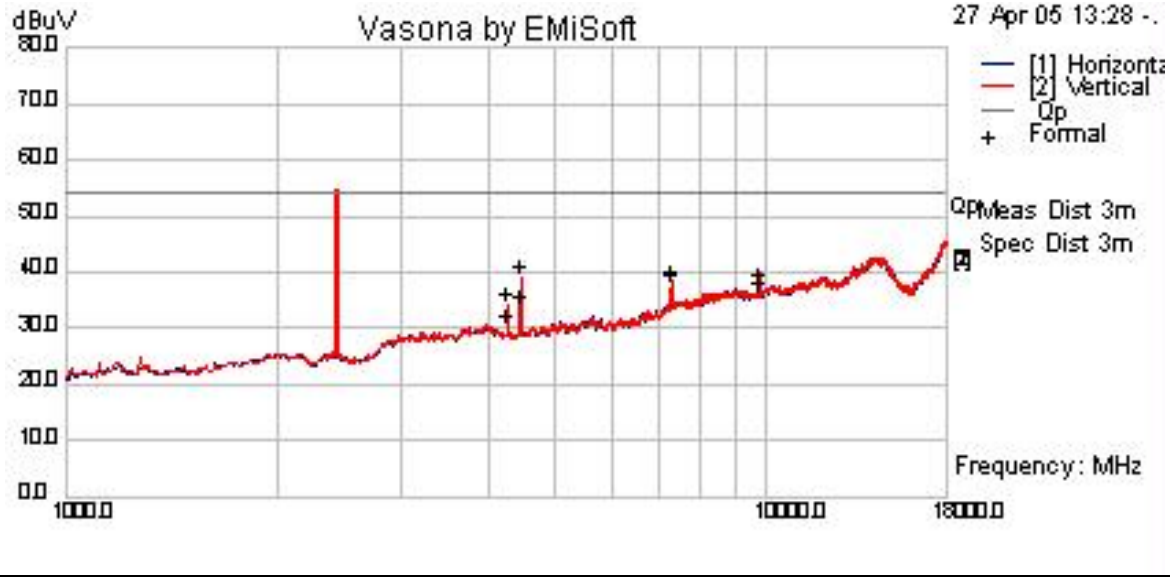


Title: Peak Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1173.32	38	4	-8.1	34	Pk	H	146	268	74	-40	Pass	
1184.47	40.1	4	-8	36.1	Pk	V	146	268	74	-37.9	Pass	
7231.18	38.4	8.9	0.5	47.9	Pk	V	146	268	74	-26.1	Pass	
7231.54	36.3	8.9	0.5	45.8	Pk	H	146	268	74	-28.2	Pass	

Subtest Number: 16366 - 5	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

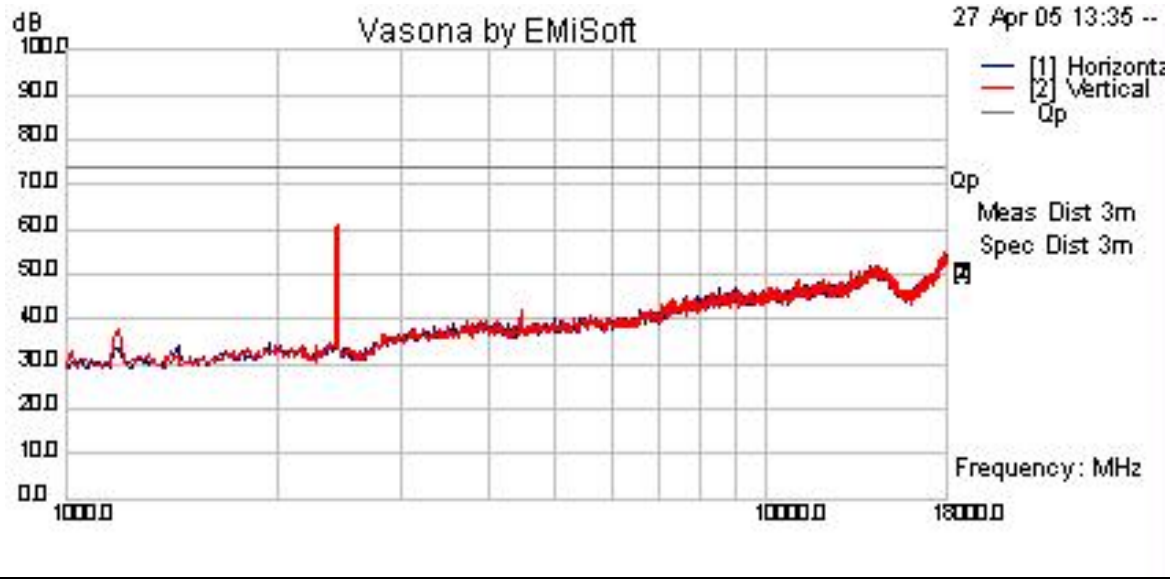


Title: Average Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4275.94	30.9	7	-4	33.9	Peak(Scan)	V	146	268	54	-20.1	Pass	
4276.11	27	7	-4	30	Peak(Scan)	H	146	268	54	-24	Pass	
4460.01	35.6	7.1	-4.1	38.7	Peak(Scan)	V	146	268	54	-15.3	Pass	
4460.12	30.2	7.1	-4.1	33.2	Peak(Scan)	H	146	268	54	-20.8	Pass	
7309.99	27.5	9	1	37.5	Peak(Scan)	V	146	268	54	-16.5	Pass	
7311.12	28	9	1	38	Peak(Scan)	H	146	268	54	-16	Pass	
9748.04	22.9	10.5	4	37.4	Peak(Scan)	V	146	268	54	-16.6	Pass	
9748.04	21.6	10.5	4	36.1	Peak(Scan)	H	146	268	54	-17.9	Pass	

Subtest Number: 16366 - 6	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

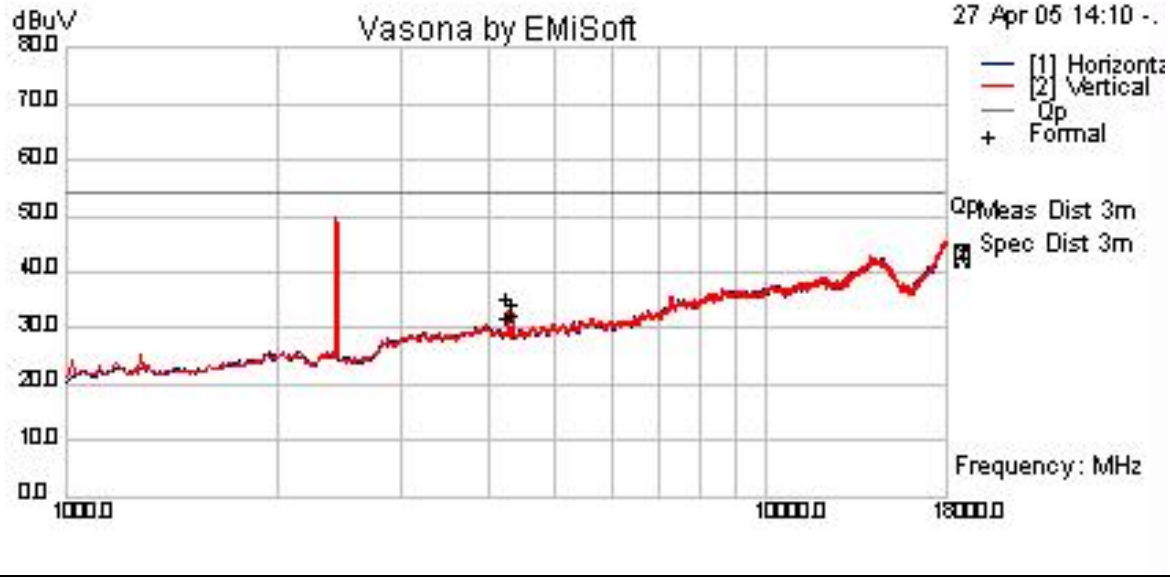


Title: Peak Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1187.66	37.6	4	-8	33.6	Peak(Scan)	H	146	268	74	-40.4	Pass	
1188.61	41.4	4	-8	37.4	Peak(Scan)	V	146	268	74	-36.6	Pass	
4459.89	36.1	7.1	-4.1	39.1	Peak(Scan)	V	146	268	74	-34.9	Pass	
4460.09	35	7.1	-4.1	38.1	Peak(Scan)	H	146	268	74	-35.9	Pass	

Subtest Number: 16366 - 7	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

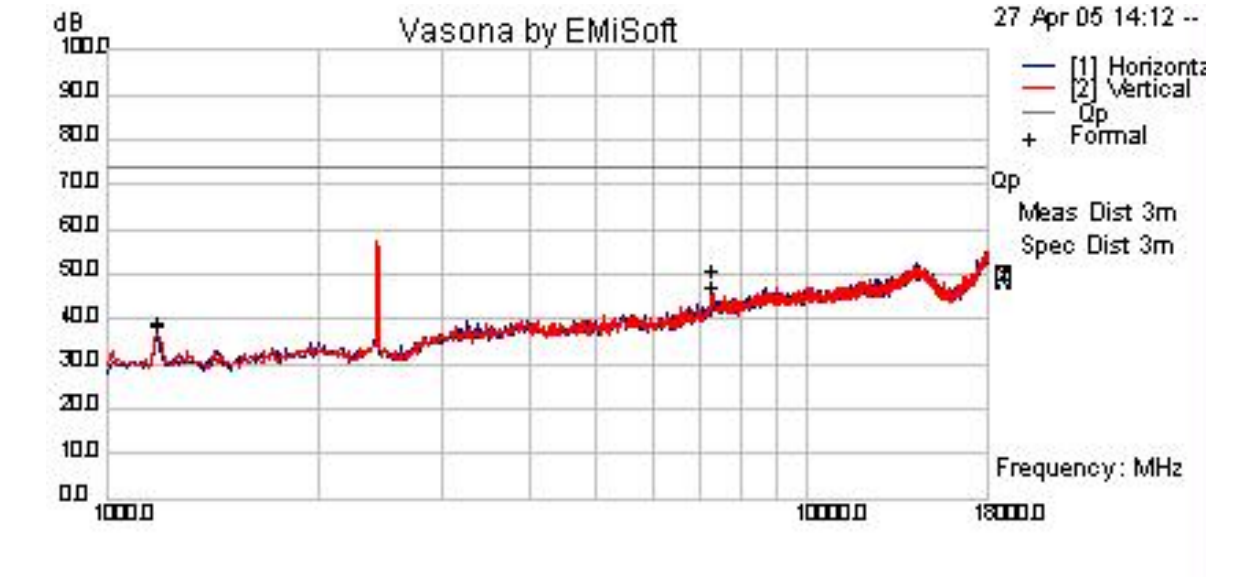


Title: Average Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4275.72	26.5	7	-4	29.5	Av	H	146	268	54	-24.5	Pass	
4276.1	29.9	7	-4	32.9	Av	V	146	268	54	-21.1	Pass	
4343.28	26.9	7.1	-4	29.9	Av	H	146	268	54	-24.1	Pass	
4343.35	28.9	7.1	-4	31.9	Av	V	146	268	54	-22.1	Pass	

Subtest Number: 16366 - 8	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

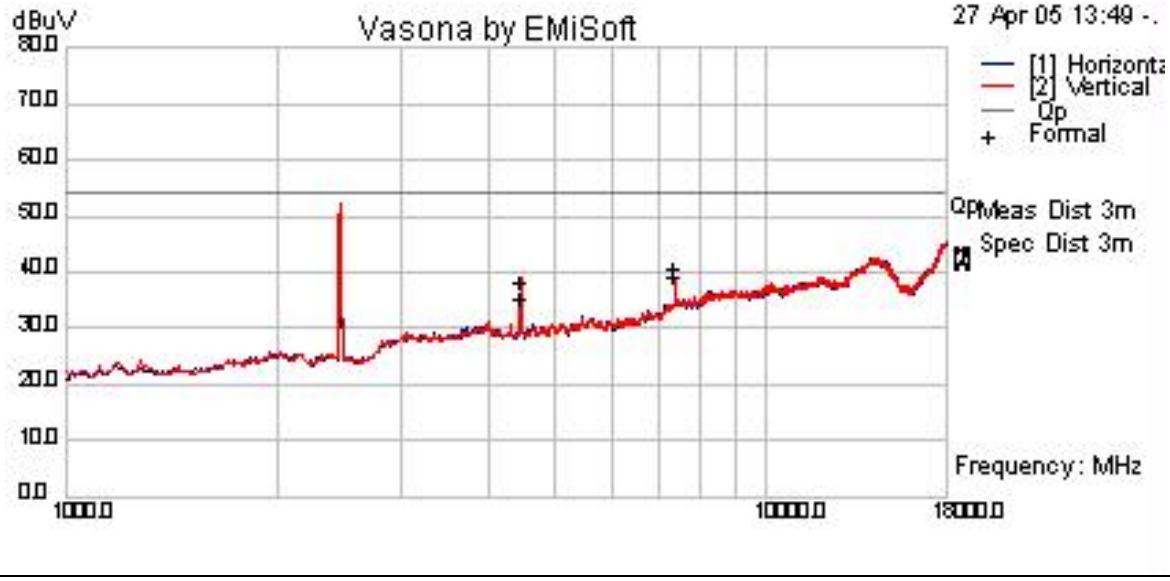


Title: Peak Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1183.3	39.6	4	-8	35.6	Pk	H	146	268	74	-38.4	Pass	
1183.69	40.3	4	-8	36.2	Pk	V	146	268	74	-37.8	Pass	
7306.95	37.8	9	1	47.7	Pk	V	146	268	74	-26.3	Pass	
7322.46	34.5	9	1	44.5	Pk	H	146	268	74	-29.5	Pass	

Subtest Number: 16366 - 9	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

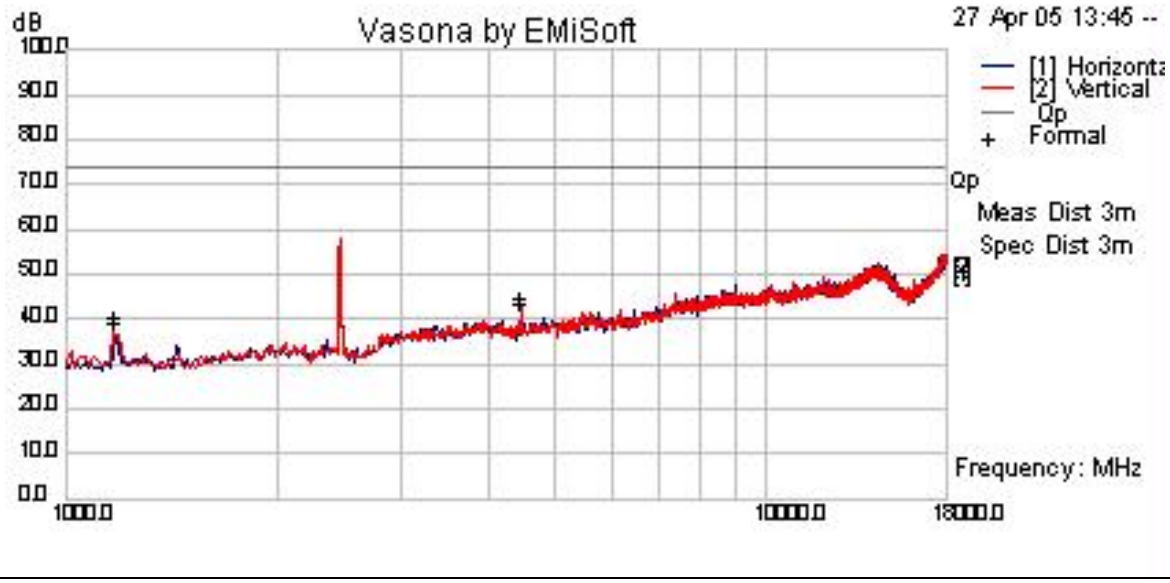


Title: Average Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4459.96	33	7.1	-4.1	36	Av	V	146	268	54	-18	Pass	
4460.17	29.8	7.1	-4.1	32.9	Av	H	146	268	54	-21.1	Pass	
7386.89	26.6	9	1.3	36.9	Av	H	146	268	54	-17.1	Pass	
7387.1	28.2	9	1.3	38.5	Av	V	146	268	54	-15.5	Pass	

Subtest Number: 16366 - 10	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments



Title: Peak Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1175.02	40.5	4	-8.1	36.4	Pk	H	146	268	74	-37.6	Pass	
1180.1	41.2	4	-8	37.2	Pk	V	146	268	74	-36.8	Pass	
4460.05	38.9	7.1	-4.1	42	Pk	V	146	268	74	-32	Pass	
4460.18	37.3	7.1	-4.1	40.4	Pk	H	146	268	74	-33.6	Pass	

Subtest Number: 16366 - 11	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

Title: Average Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4343.2	26.9	7.1	-4	29.9	Av	H	146	268	54	-24.1	Pass	
4343.52	27.3	7.1	-4	30.4	Av	V	146	268	54	-23.6	Pass	

Subtest Number: 16366 - 12	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

Title: Peak Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 10dBi Yagi Antenna

Test Results Table

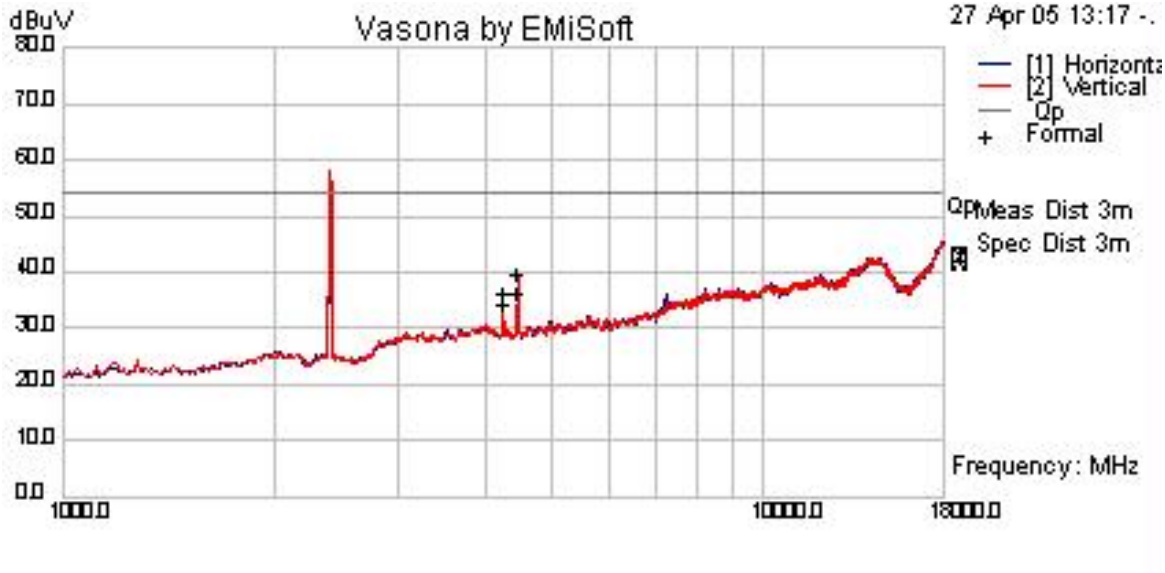
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1167.53	39.7	4	-8.1	35.6	Pk	V	146	268	74	-38.4	Pass	
1170.62	38.3	4	-8.1	34.2	Pk	H	146	268	74	-39.8	Pass	
7383.08	35.7	9	1.3	46	Pk	H	146	268	74	-28	Pass	
7386.97	34.4	9	1.3	44.7	Pk	V	146	268	74	-29.3	Pass	

2.4GHz Radiated Spurs and Harmonics with 9dBi Patch Antenna

Test Number: 16367				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	**Mode :** 2, 2.4GHz Spurious			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
2	AIR-AP1242AG-A-K9 with 2.4GHz 9dBi Patch Antenna	S01, S03 and S07	☑	☐

Subtest Number: 16367 - 1	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

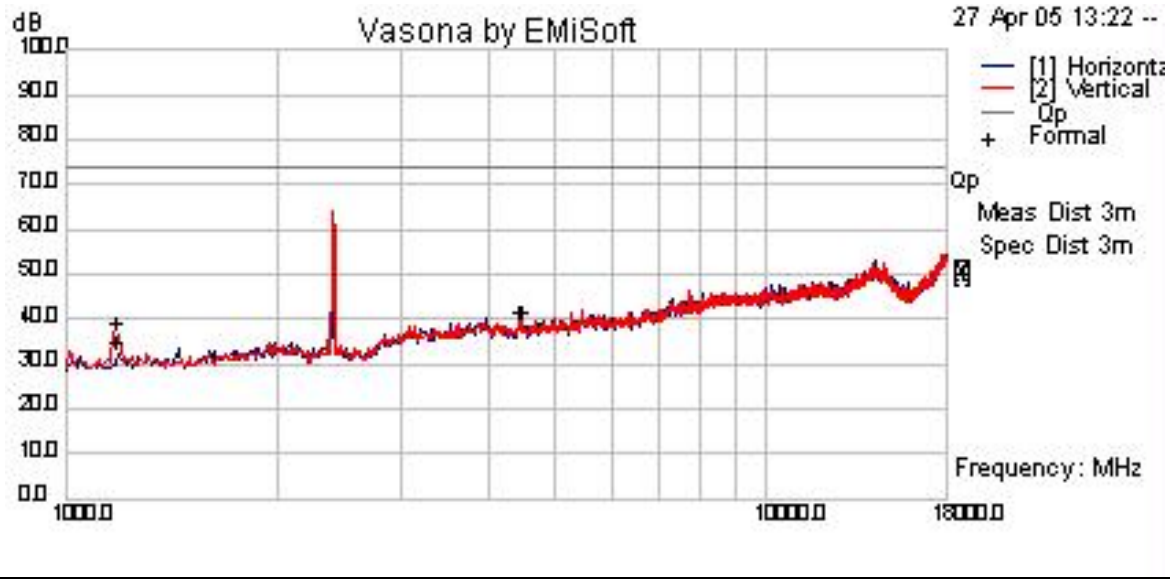


Title: Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4244.912	29	7	-4	32	Av	H	146	268	54	-22	Pass	
4244.912	31	7	-4	34	Av	V	146	268	54	-20	Pass	
4459.28	30.7	7.1	-4.1	33.7	Av	H	146	268	54	-20.3	Pass	
4459.28	34.2	7.1	-4.1	37.3	Av	V	146	268	54	-16.7	Pass	

Subtest Number: 16367 - 2	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

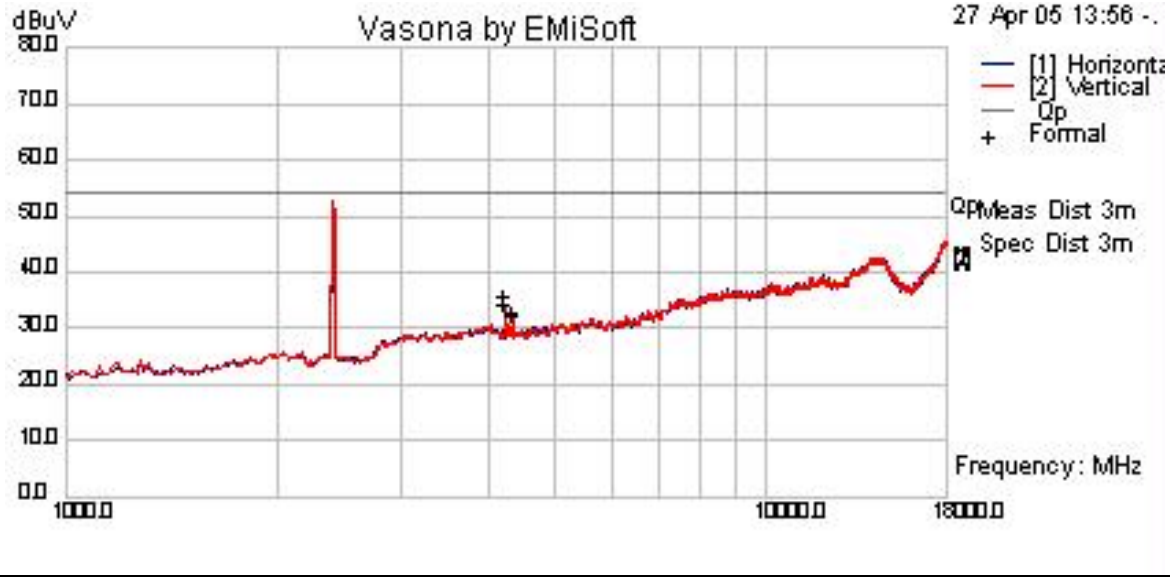


Title: Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1189.368	40.4	4	-8	36.4	Peak(Scan)	V	146	268	74	-37.6	Pass	
1190.927	36.2	3.9	-7.9	32.2	Peak(Scan)	H	146	268	74	-41.8	Pass	
4468.242	35.4	7.1	-4.1	38.5	Peak(Scan)	V	146	268	74	-35.5	Pass	
4480.568	35.7	7.1	-4.1	38.7	Peak(Scan)	H	146	268	74	-35.3	Pass	

Subtest Number: 16367 - 3	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

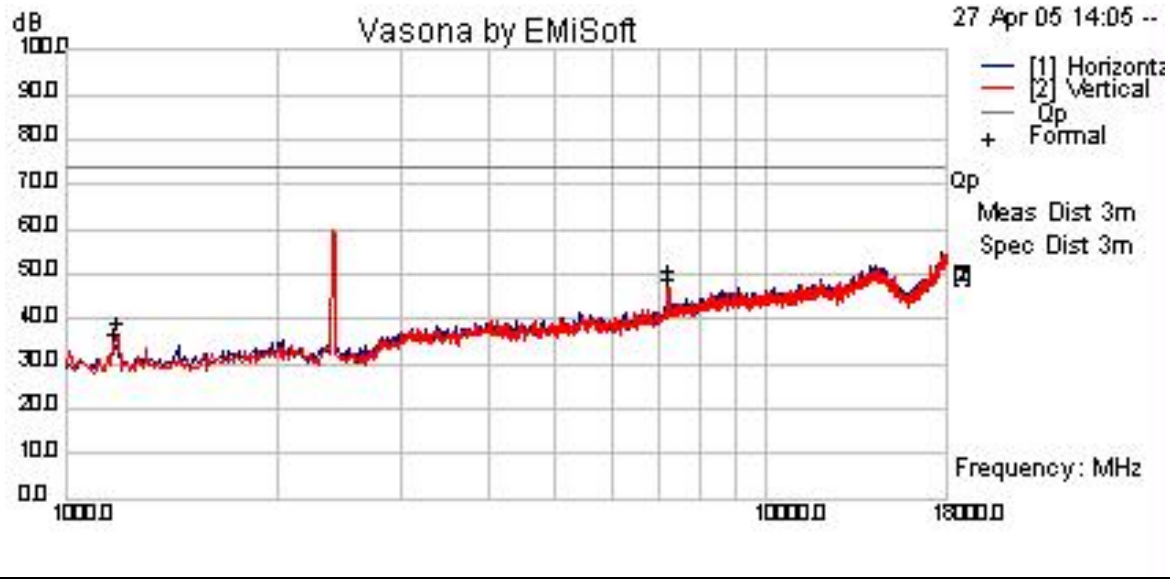


Title: Average Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4242.68	30.4	7	-4	33.4	Av	V	146	268	54	-20.6	Pass	
4242.81	29.1	7	-4	32.1	Av	H	146	268	54	-21.9	Pass	
4343.27	27.4	7.1	-4	30.4	Av	V	146	268	54	-23.6	Pass	
4343.38	26.8	7.1	-4	29.8	Av	H	146	268	54	-24.2	Pass	

Subtest Number: 16367 - 4	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

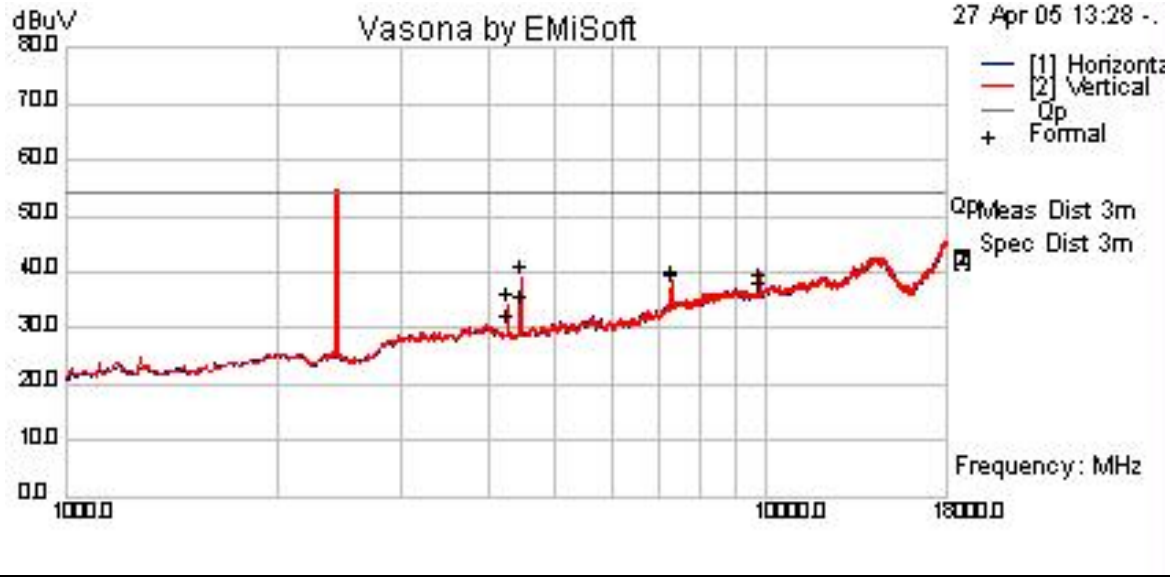


Title: Peak Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1173.32	38	4	-8.1	34	Pk	H	146	268	74	-40	Pass	
1184.47	40.1	4	-8	36.1	Pk	V	146	268	74	-37.9	Pass	
7231.18	38.4	8.9	0.5	47.9	Pk	V	146	268	74	-26.1	Pass	
7231.54	36.3	8.9	0.5	45.8	Pk	H	146	268	74	-28.2	Pass	

Subtest Number: 16367 - 5	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

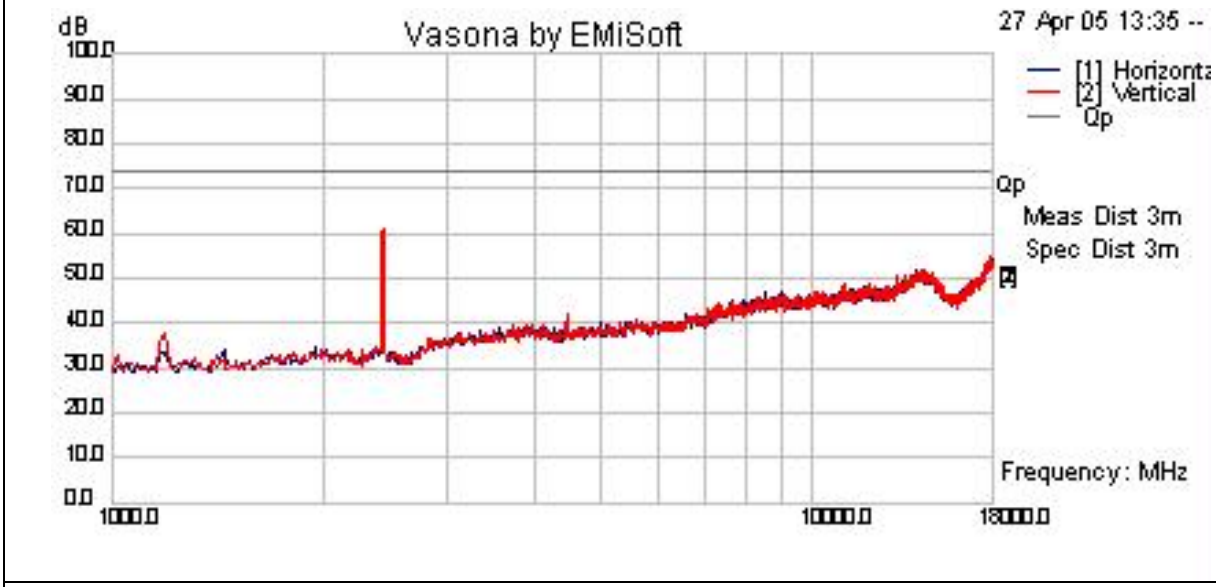


Title: Average Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4275.94	30.9	7	-4	33.9	Peak(Scan)	V	146	268	54	-20.1	Pass	
4276.11	27	7	-4	30	Peak(Scan)	H	146	268	54	-24	Pass	
4460.01	35.6	7.1	-4.1	38.7	Peak(Scan)	V	146	268	54	-15.3	Pass	
4460.12	30.2	7.1	-4.1	33.2	Peak(Scan)	H	146	268	54	-20.8	Pass	
7309.99	27.5	9	1	37.5	Peak(Scan)	V	146	268	54	-16.5	Pass	
7311.12	28	9	1	38	Peak(Scan)	H	146	268	54	-16	Pass	
9748.04	22.9	10.5	4	37.4	Peak(Scan)	V	146	268	54	-16.6	Pass	
9748.04	21.6	10.5	4	36.1	Peak(Scan)	H	146	268	54	-17.9	Pass	

Subtest Number: 16367 - 6	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

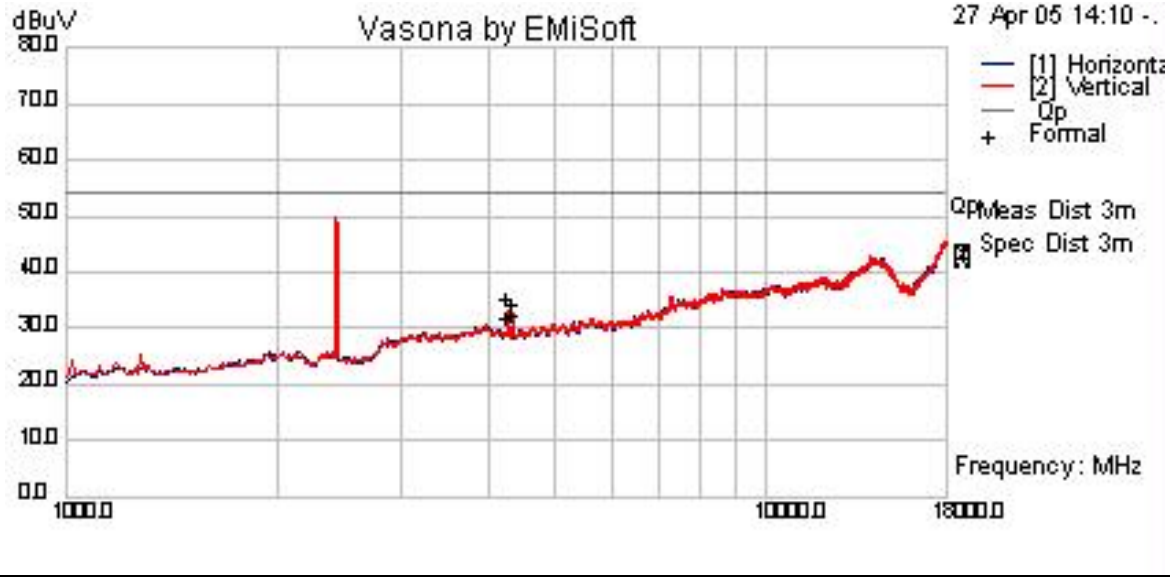


Title: Peak Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1187.66	37.6	4	-8	33.6	Peak(Scan)	H	146	268	74	-40.4	Pass	
1188.61	41.4	4	-8	37.4	Peak(Scan)	V	146	268	74	-36.6	Pass	
4459.89	36.1	7.1	-4.1	39.1	Peak(Scan)	V	146	268	74	-34.9	Pass	
4460.09	35	7.1	-4.1	38.1	Peak(Scan)	H	146	268	74	-35.9	Pass	

Subtest Number: 16367 - 7	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

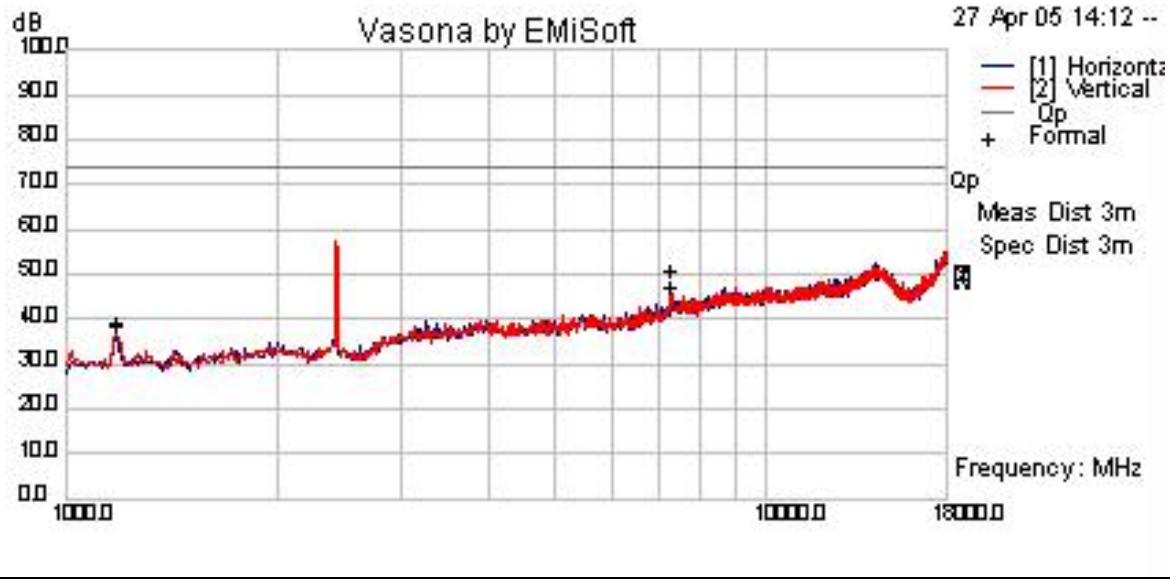


Title: Average Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4275.72	26.5	7	-4	29.5	Av	H	146	268	54	-24.5	Pass	
4276.1	29.9	7	-4	32.9	Av	V	146	268	54	-21.1	Pass	
4343.28	26.9	7.1	-4	29.9	Av	H	146	268	54	-24.1	Pass	
4343.35	28.9	7.1	-4	31.9	Av	V	146	268	54	-22.1	Pass	

Subtest Number: 16367 - 8	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

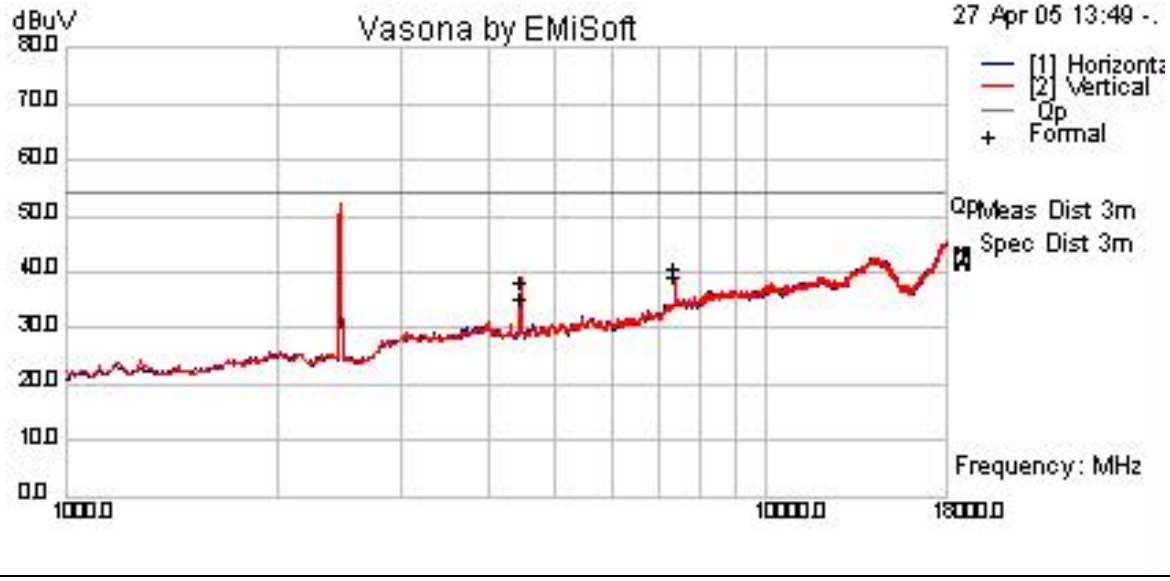


Title: Peak Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1183.3	39.6	4	-8	35.6	Pk	H	146	268	74	-38.4	Pass	
1183.69	40.3	4	-8	36.2	Pk	V	146	268	74	-37.8	Pass	
7306.95	37.8	9	1	47.7	Pk	V	146	268	74	-26.3	Pass	
7322.46	34.5	9	1	44.5	Pk	H	146	268	74	-29.5	Pass	

Subtest Number: 16367 - 9	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

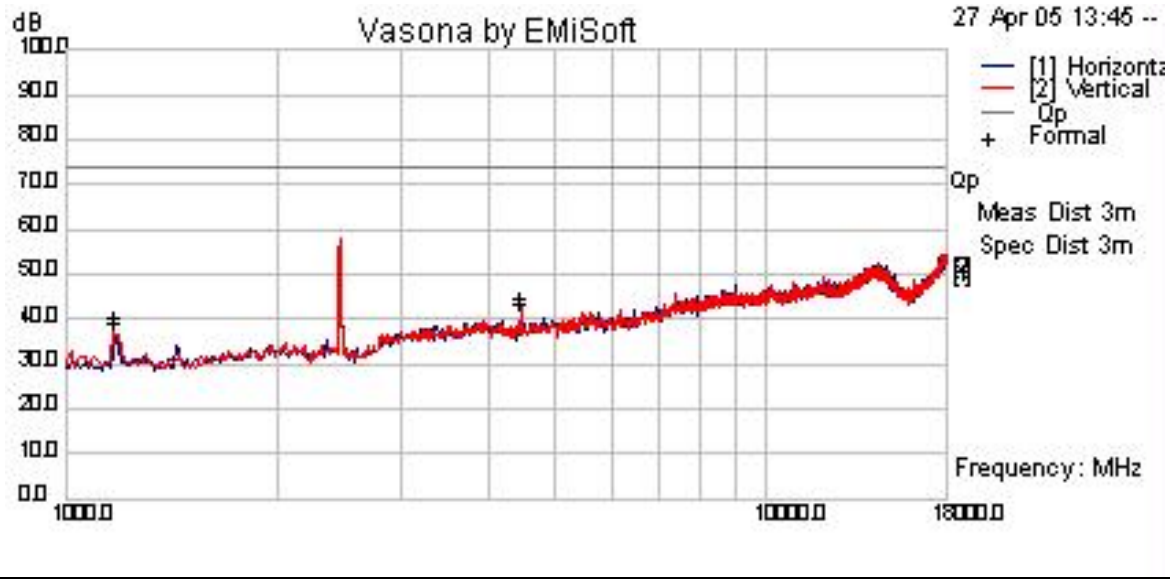


Title: Average Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4459.96	33	7.1	-4.1	36	Av	V	146	268	54	-18	Pass	
4460.17	29.8	7.1	-4.1	32.9	Av	H	146	268	54	-21.1	Pass	
7386.89	26.6	9	1.3	36.9	Av	H	146	268	54	-17.1	Pass	
7387.1	28.2	9	1.3	38.5	Av	V	146	268	54	-15.5	Pass	

Subtest Number: 16367 - 10	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments



Title: Peak Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1175.02	40.5	4	-8.1	36.4	Pk	H	146	268	74	-37.6	Pass	
1180.1	41.2	4	-8	37.2	Pk	V	146	268	74	-36.8	Pass	
4460.05	38.9	7.1	-4.1	42	Pk	V	146	268	74	-32	Pass	
4460.18	37.3	7.1	-4.1	40.4	Pk	H	146	268	74	-33.6	Pass	

Subtest Number: 16367 - 11	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

Title: Average Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4343.2	26.9	7.1	-4	29.9	Av	H	146	268	54	-24.1	Pass	
4343.52	27.3	7.1	-4	30.4	Av	V	146	268	54	-23.6	Pass	

Subtest Number: 16367 - 12	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

Title: Peak Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 9dBi Patch Antenna

Test Results Table

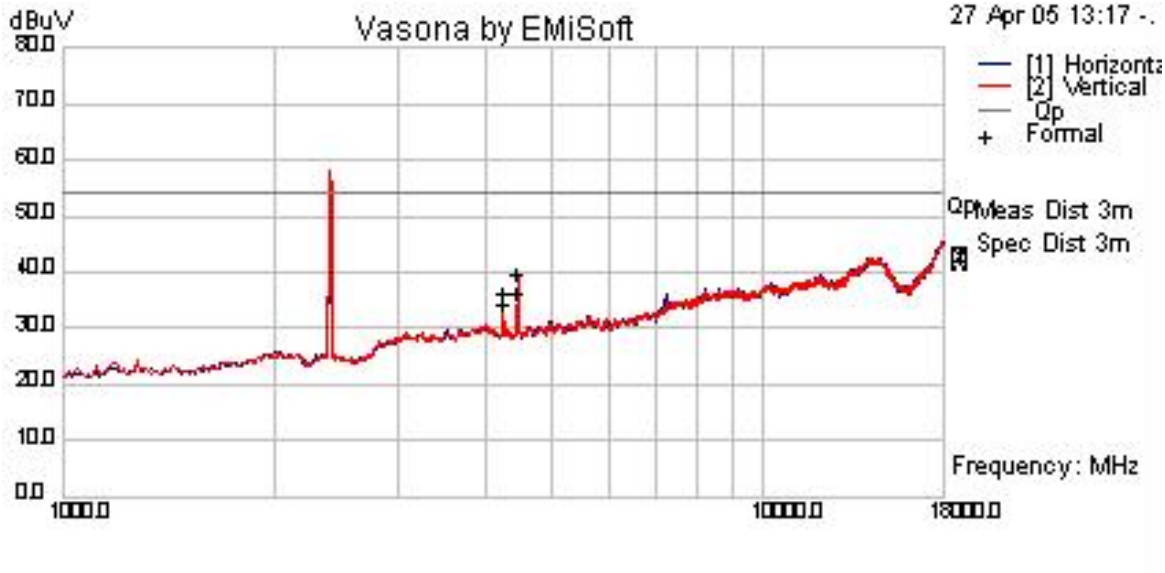
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1167.53	39.7	4	-8.1	35.6	Pk	V	146	268	74	-38.4	Pass	
1170.62	38.3	4	-8.1	34.2	Pk	H	146	268	74	-39.8	Pass	
7383.08	35.7	9	1.3	46	Pk	H	146	268	74	-28	Pass	
7386.97	34.4	9	1.3	44.7	Pk	V	146	268	74	-29.3	Pass	

2.4GHz Radiated Spurs and Harmonics with 5.2dBi Omnidirectional Antenna

Test Number: 16368				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	**Mode :** 2, 2.4GHz Spurious			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
3	AIR-AP1242AG-A-K9 with 2.4GHz 5.2dBi Omnidirectional Antenna	S01, S04 and S07	☑	☐

Subtest Number: 16368 - 1	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

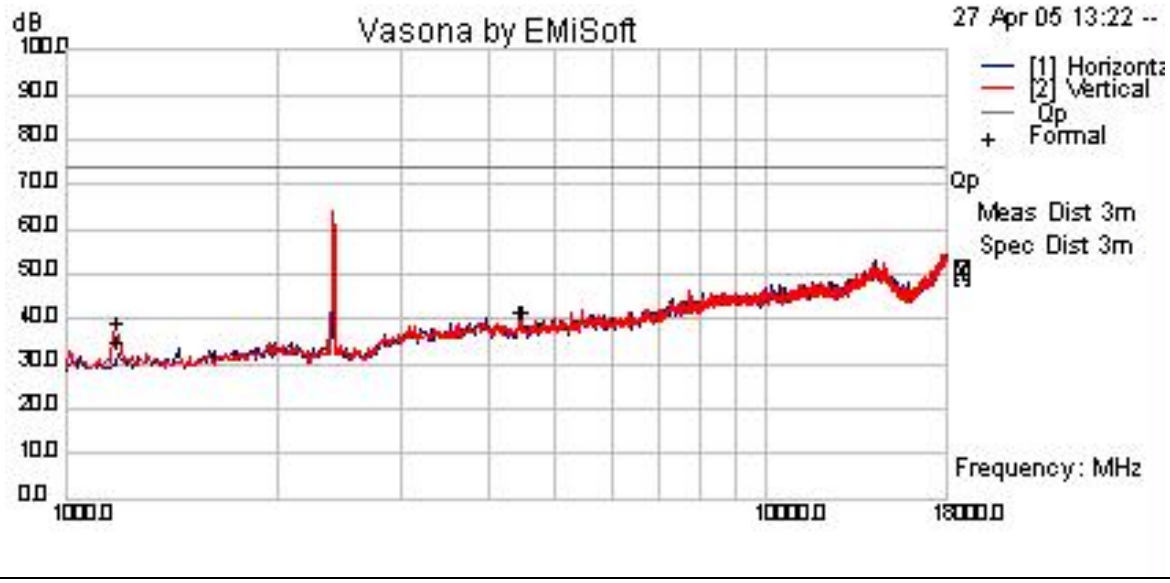


Title: Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4244.912	29	7	-4	32	Av	H	146	268	54	-22	Pass	
4244.912	31	7	-4	34	Av	V	146	268	54	-20	Pass	
4459.28	30.7	7.1	-4.1	33.7	Av	H	146	268	54	-20.3	Pass	
4459.28	34.2	7.1	-4.1	37.3	Av	V	146	268	54	-16.7	Pass	

Subtest Number: 16368 - 2	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

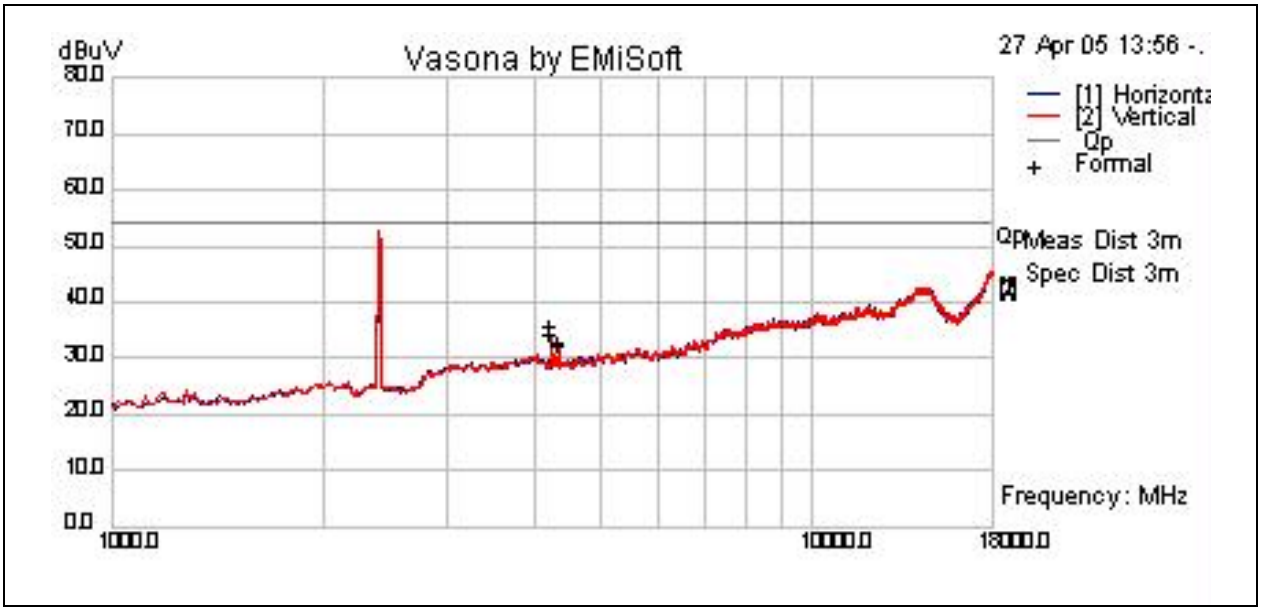


Title: Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1189.368	40.4	4	-8	36.4	Peak(Scan)	V	146	268	74	-37.6	Pass	
1190.927	36.2	3.9	-7.9	32.2	Peak(Scan)	H	146	268	74	-41.8	Pass	
4468.242	35.4	7.1	-4.1	38.5	Peak(Scan)	V	146	268	74	-35.5	Pass	
4480.568	35.7	7.1	-4.1	38.7	Peak(Scan)	H	146	268	74	-35.3	Pass	

Subtest Number: 16368 - 3	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

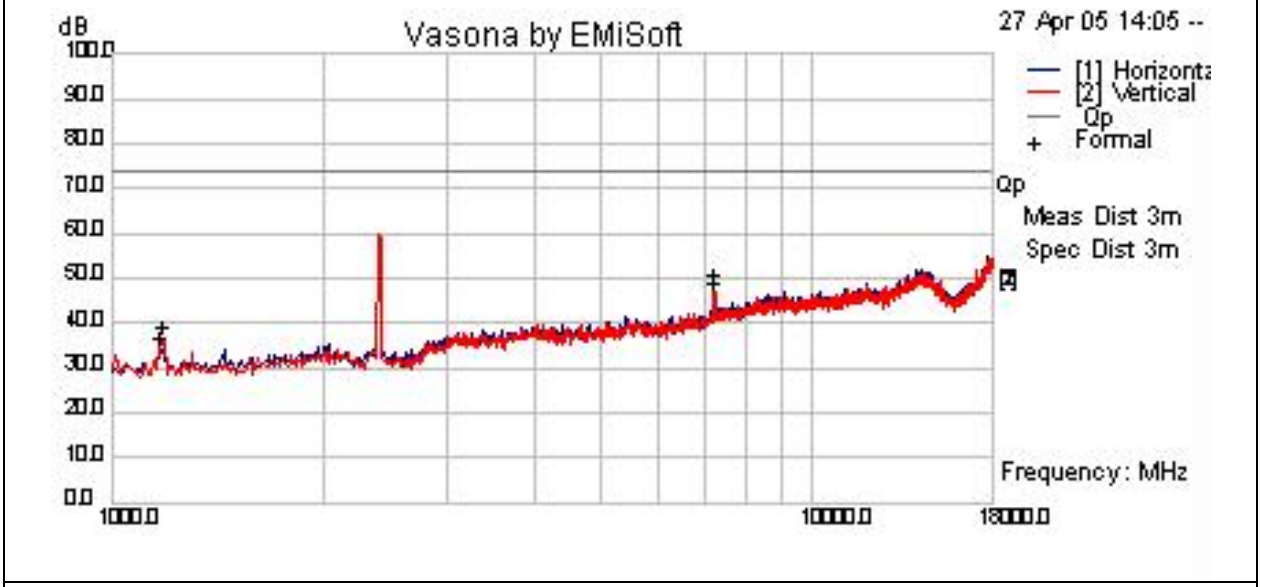


Title: Average Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4242.68	30.4	7	-4	33.4	Av	V	146	268	54	-20.6	Pass	
4242.81	29.1	7	-4	32.1	Av	H	146	268	54	-21.9	Pass	
4343.27	27.4	7.1	-4	30.4	Av	V	146	268	54	-23.6	Pass	
4343.38	26.8	7.1	-4	29.8	Av	H	146	268	54	-24.2	Pass	

Subtest Number: 16368 - 4	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

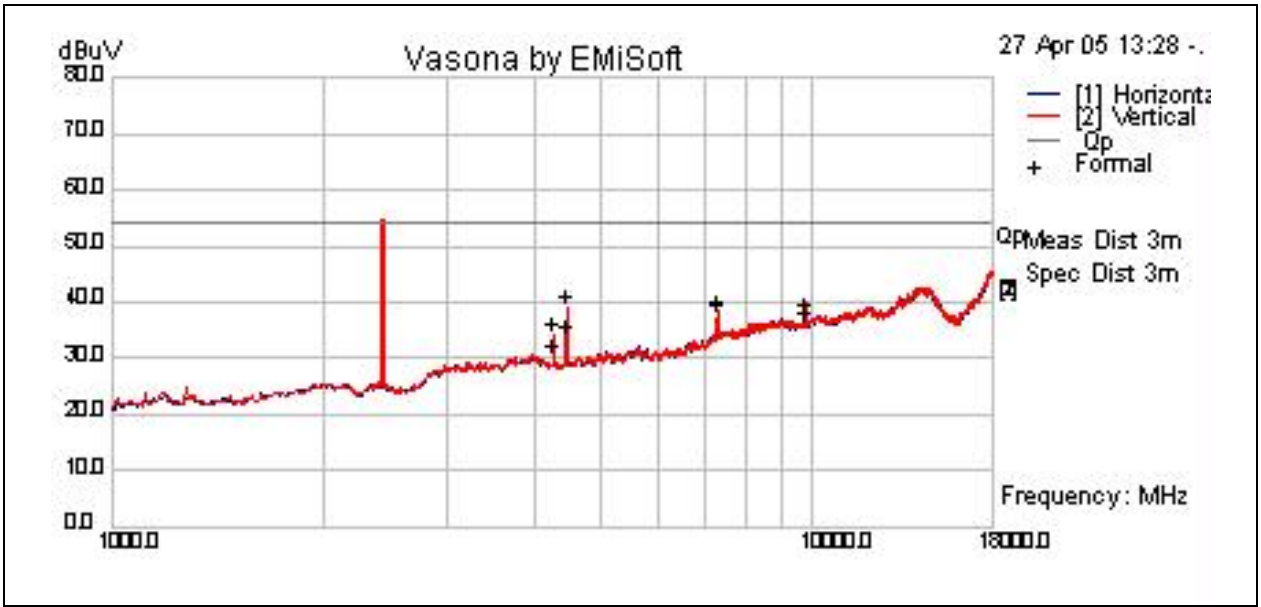


Title: Peak Spurs/Harmonics, 2412MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1173.32	38	4	-8.1	34	Pk	H	146	268	74	-40	Pass	
1184.47	40.1	4	-8	36.1	Pk	V	146	268	74	-37.9	Pass	
7231.18	38.4	8.9	0.5	47.9	Pk	V	146	268	74	-26.1	Pass	
7231.54	36.3	8.9	0.5	45.8	Pk	H	146	268	74	-28.2	Pass	

Subtest Number: 16368 - 5	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

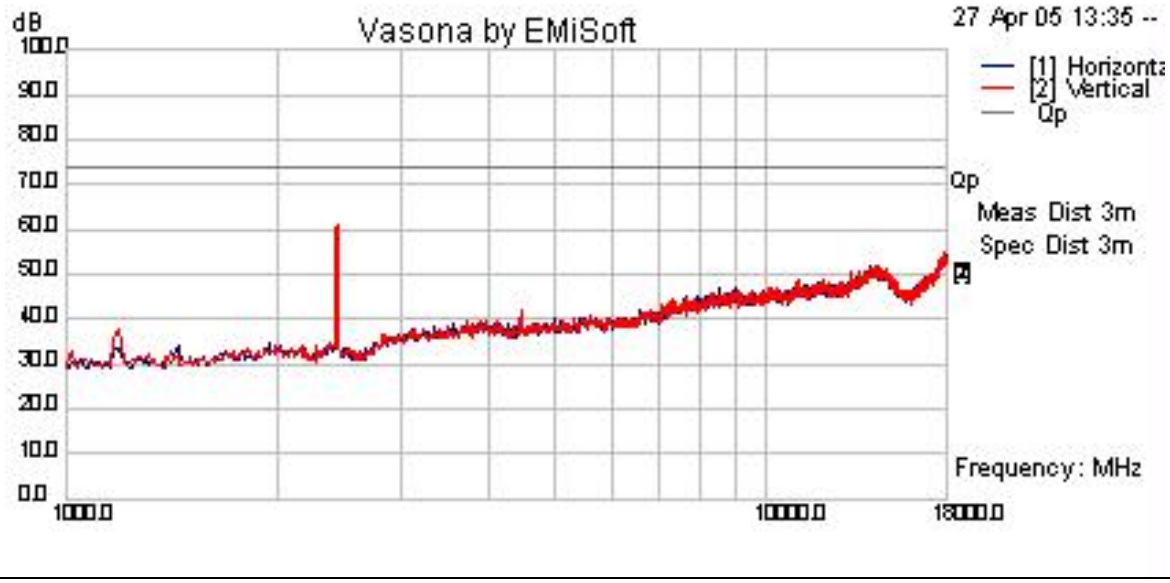


Title: Average Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4275.94	30.9	7	-4	33.9	Peak(Scan)	V	146	268	54	-20.1	Pass	
4276.11	27	7	-4	30	Peak(Scan)	H	146	268	54	-24	Pass	
4460.01	35.6	7.1	-4.1	38.7	Peak(Scan)	V	146	268	54	-15.3	Pass	
4460.12	30.2	7.1	-4.1	33.2	Peak(Scan)	H	146	268	54	-20.8	Pass	
7309.99	27.5	9	1	37.5	Peak(Scan)	V	146	268	54	-16.5	Pass	
7311.12	28	9	1	38	Peak(Scan)	H	146	268	54	-16	Pass	
9748.04	22.9	10.5	4	37.4	Peak(Scan)	V	146	268	54	-16.6	Pass	
9748.04	21.6	10.5	4	36.1	Peak(Scan)	H	146	268	54	-17.9	Pass	

Subtest Number: 16368 - 6	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

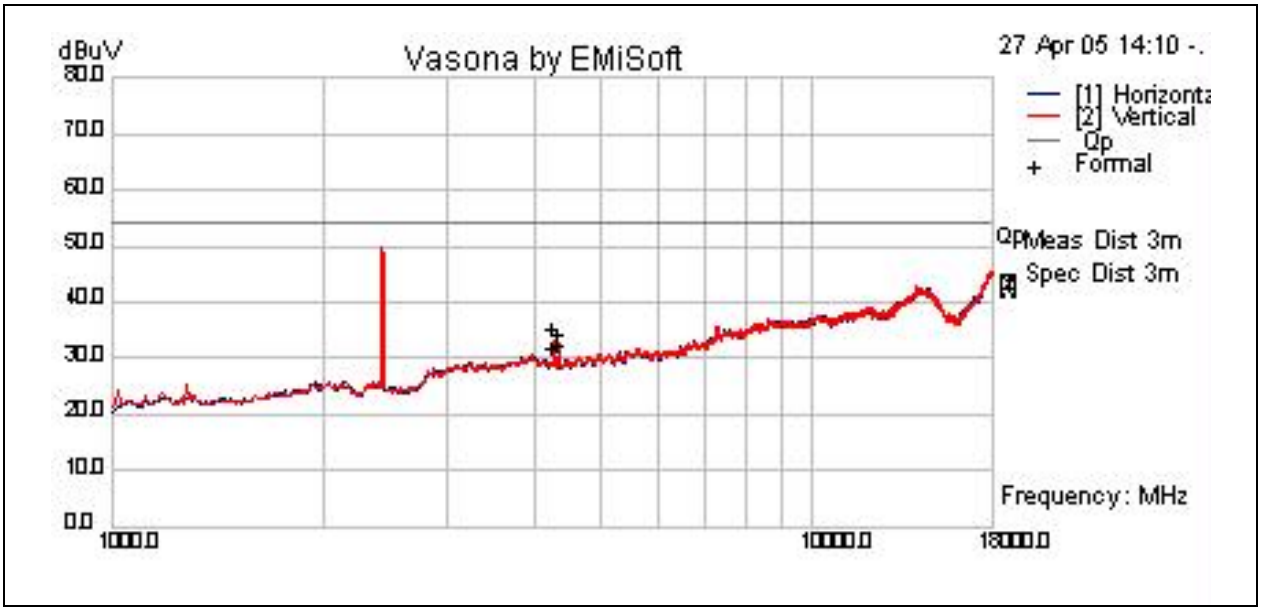


Title: Peak Spurs/Harmonics, 2437MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1187.66	37.6	4	-8	33.6	Peak(Scan)	H	146	268	74	-40.4	Pass	
1188.61	41.4	4	-8	37.4	Peak(Scan)	V	146	268	74	-36.6	Pass	
4459.89	36.1	7.1	-4.1	39.1	Peak(Scan)	V	146	268	74	-34.9	Pass	
4460.09	35	7.1	-4.1	38.1	Peak(Scan)	H	146	268	74	-35.9	Pass	

Subtest Number: 16368 - 7	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

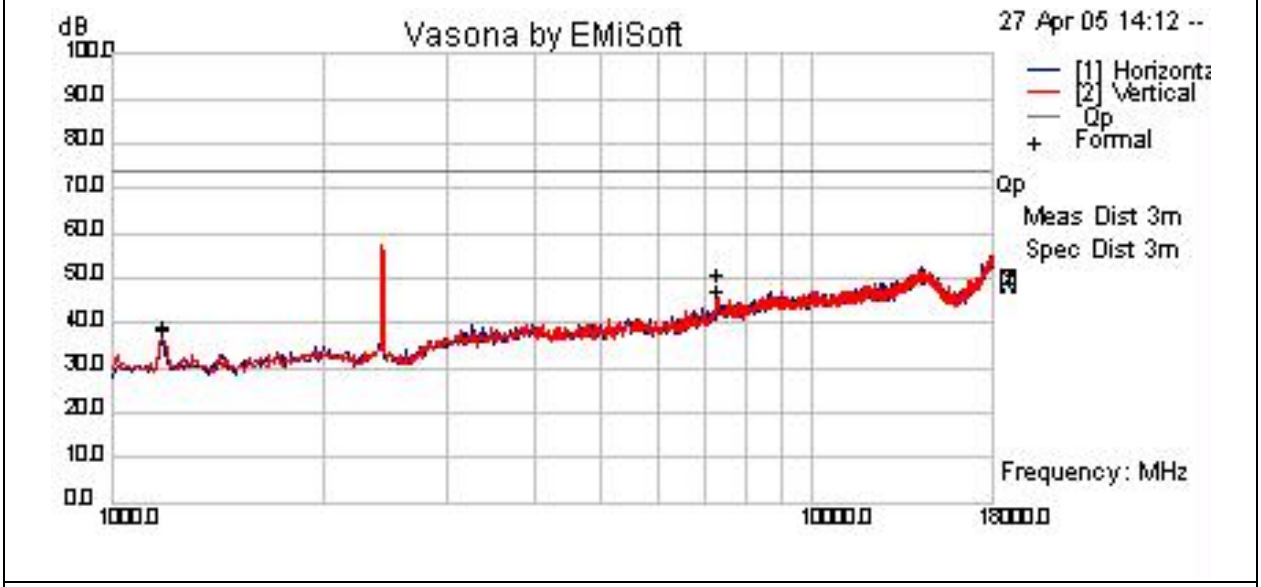


Title: Average Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4275.72	26.5	7	-4	29.5	Av	H	146	268	54	-24.5	Pass	
4276.1	29.9	7	-4	32.9	Av	V	146	268	54	-21.1	Pass	
4343.28	26.9	7.1	-4	29.9	Av	H	146	268	54	-24.1	Pass	
4343.35	28.9	7.1	-4	31.9	Av	V	146	268	54	-22.1	Pass	

Subtest Number: 16368 - 8	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

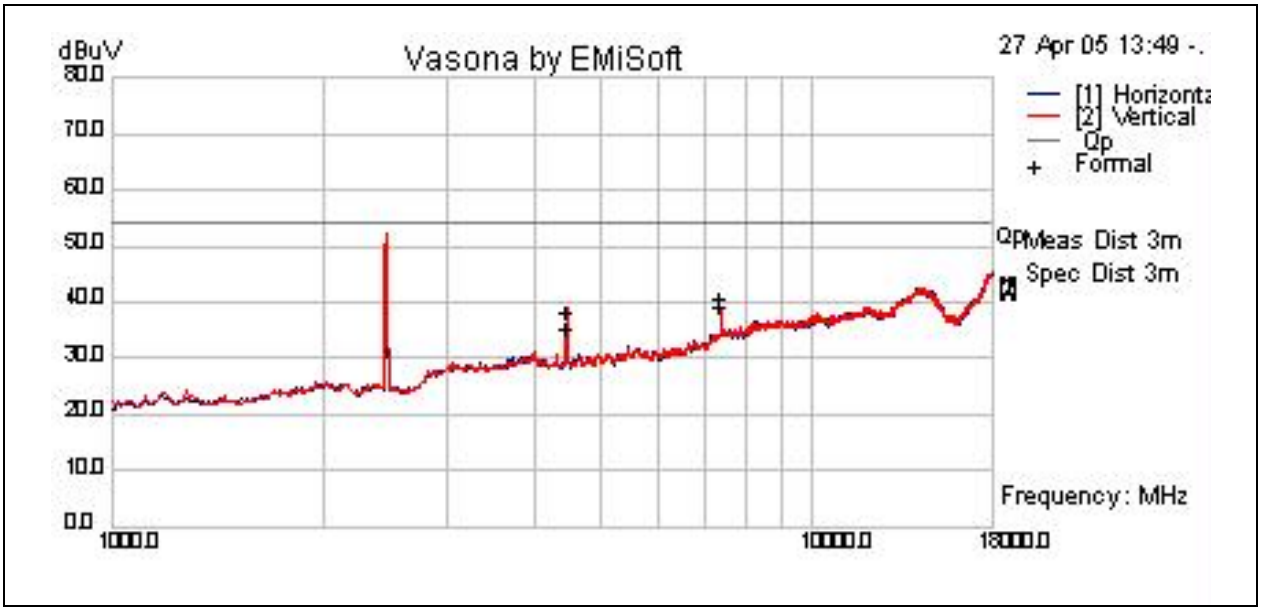


Title: Peak Spurs/Harmonics, 2437MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1183.3	39.6	4	-8	35.6	Pk	H	146	268	74	-38.4	Pass	
1183.69	40.3	4	-8	36.2	Pk	V	146	268	74	-37.8	Pass	
7306.95	37.8	9	1	47.7	Pk	V	146	268	74	-26.3	Pass	
7322.46	34.5	9	1	44.5	Pk	H	146	268	74	-29.5	Pass	

Subtest Number: 16368 - 9	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

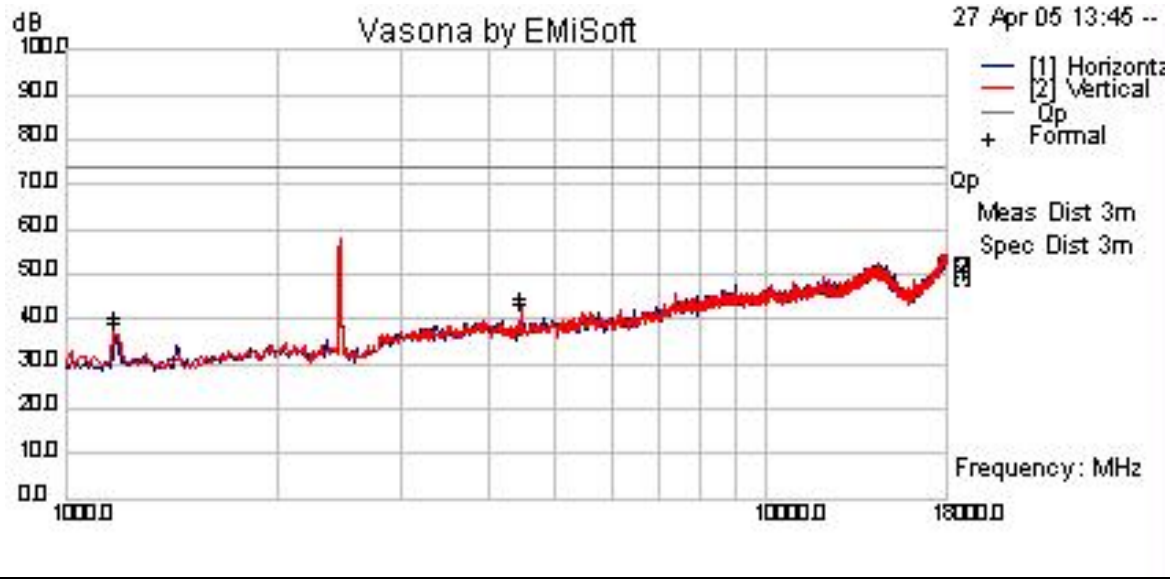


Title: Average Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4459.96	33	7.1	-4.1	36	Av	V	146	268	54	-18	Pass	
4460.17	29.8	7.1	-4.1	32.9	Av	H	146	268	54	-21.1	Pass	
7386.89	26.6	9	1.3	36.9	Av	H	146	268	54	-17.1	Pass	
7387.1	28.2	9	1.3	38.5	Av	V	146	268	54	-15.5	Pass	

Subtest Number: 16368 - 10	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

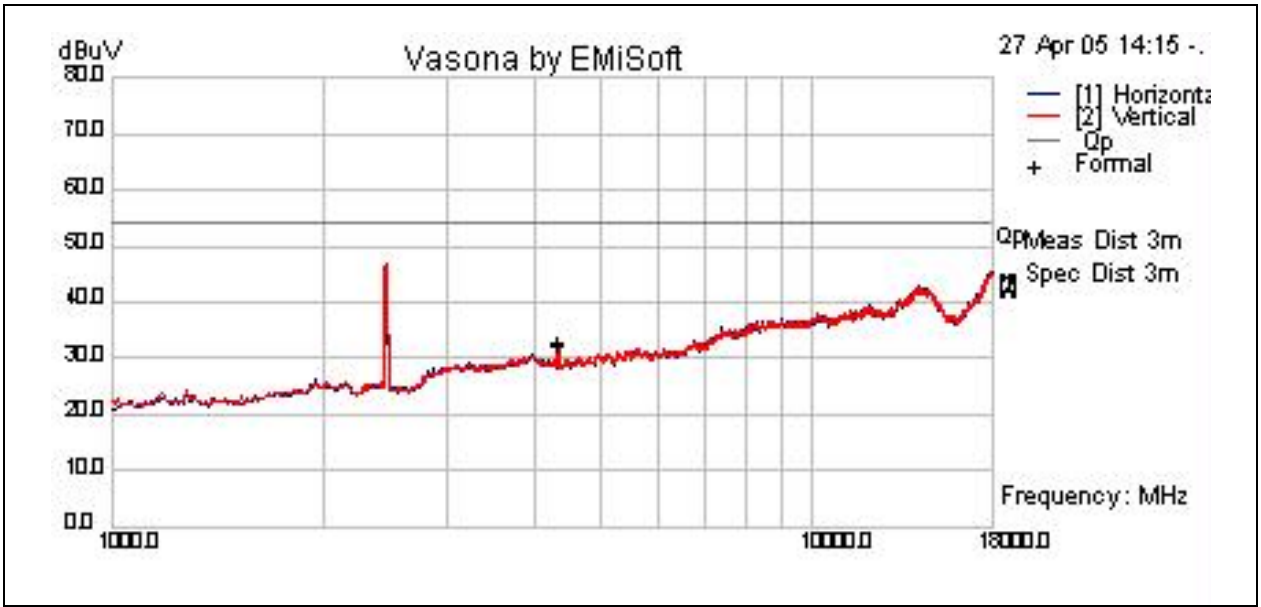


Title: Peak Spurs/Harmonics, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1175.02	40.5	4	-8.1	36.4	Pk	H	146	268	74	-37.6	Pass	
1180.1	41.2	4	-8	37.2	Pk	V	146	268	74	-36.8	Pass	
4460.05	38.9	7.1	-4.1	42	Pk	V	146	268	74	-32	Pass	
4460.18	37.3	7.1	-4.1	40.4	Pk	H	146	268	74	-33.6	Pass	

Subtest Number: 16368 - 11	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments



Title: Average Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4343.2	26.9	7.1	-4	29.9	Av	H	146	268	54	-24.1	Pass	
4343.52	27.3	7.1	-4	30.4	Av	V	146	268	54	-23.6	Pass	

Subtest Number: 16368 - 12	**Subtest Date:** 11-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	1000.0
Comments on the above Test Results	No further comments

Title: Peak Spurs/Harmonics, 2462MHz, 54Mbps, 17dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1167.53	39.7	4	-8.1	35.6	Pk	V	146	268	74	-38.4	Pass	
1170.62	38.3	4	-8.1	34.2	Pk	H	146	268	74	-39.8	Pass	
7383.08	35.7	9	1.3	46	Pk	H	146	268	74	-28	Pass	
7386.97	34.4	9	1.3	44.7	Pk	V	146	268	74	-29.3	Pass	

2.4GHz 18-40GHz Radiated Emissions with 10dBi Yagi Antenna

Test Number: 16387				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.247	Enclosure	N/A	18GHz - 26GHz	In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a)
Operating Mode	**Mode :** 2, 2.4GHz Spurious			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
1	AIR-AP1242AG-A-K9 with 2.4GHz 10dBi Yagi Antenna	S01, S02 and S07	☑	☐

Subtest Number: 16387 - 1	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	40000.0
Lowest Frequency	18000.0
Comments on the above Test Results	Results shown were identical at 2437MHz and 2462 MHz, with 9dBi Patch and 5.2dBi Omni antennas, and at all data rates.

Title: Average Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Subtest Number: 16387 - 2	**Subtest Date:** 12-May-2005
Engineer	James Nicholson
Lab Information	Building P, 5m Anechoic
Subtest Results	
Subtest Title	Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	40000.0
Lowest Frequency	18000.0
Comments on the above Test Results	Results shown were identical at 2437MHz and 2462 MHz, with 9dBi Patch and 5.2dBi Omni antennas, and at all data rates.

Title: Peak Spurs/Harmonics, 2412MHz, 11Mbps, 20dBm, 10dBi Yagi Antenna

Maximum Permissible Exposure (MPE) Calculations

Given

E=√(30*P*G)/d and S=E^2/3770

where

E=Field Strength in Volts/meter
P=Power in Watts
G=Numeric Antenna Gain
d=Distance in meters
S=Power Density in mW/cm^2

Combine equations and rearrange the terms to express the distance as a function of the remaining variables:

d=√((30*P*G)/(3770*S))

Changing to units of power in mW and distance in cm, using:

P(mW)=P(W)/1000 d(cm)=100*d(m)

yields

d=100*√((30*(P/1000)*G)/(3770*S))
d=0.282*√(P*G/S)

where

d=Distance in cm
P=Power in mW
G=Numerica Antenna Gain
S=Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

P(mW)=10^(P(dBm)/10) G(numeric)=10^(G(dBi)/10)

yields

d=0.282*10^((P+G)/20)/√S Equation (1)

where

d=MPE distance in cm
P=Power in dBm
G=Antenna Gain in dBi
S=Power Density in mW/cm^2

Equation (1) and the measured peak power is used to calculate the MPE distance. Note that for mobile or fixed location transmitters such as an access point, the minimum separation distance is 20 cm even if the calculations indicate that the MPE distance may be less.

S=1mW/cm^2 maximum. The highest 2.4GHz antenna gain supported is 10 dBi. Using the peak power levels recorded in the test report along with Equation 1 above, the MPE distances are calculated as follows.

Frequency (MHz)	Bit Rate (Mbps)	Power Density (mW/cm^2)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)	Limit (cm)	Margin (cm)
2412	11	1	20	10	8.92	20	11.08
2437	11	1	20	10	8.92	20	11.08
2462	11	1	20	10	8.92	20	11.08
2412	54	1	17	10	6.31	20	13.69
2437	54	1	17	10	6.31	20	13.69
2462	54	1	17	10	6.31	20	13.69

2.4GHz MPE Calculations

Radiated Emissions 30-1000MHz

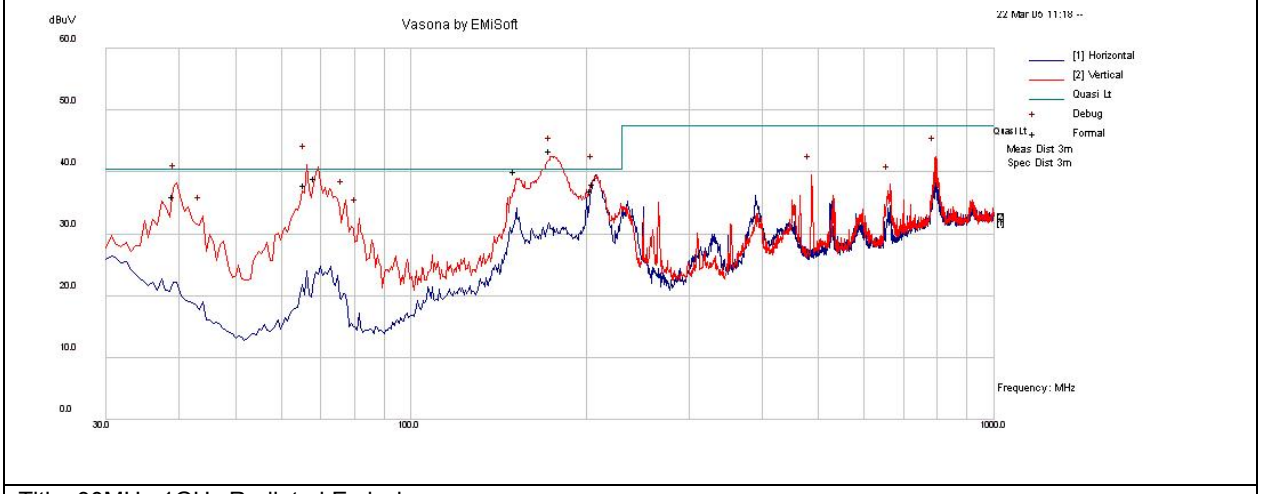
Test Number: 16441				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.209	Enclosure	B	30MHz-1.0GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	**Mode :** 3, Colocation Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
6	AIR-AP1242AG-A-K9 with 2.4GHz 10dBi Yagi and 5GHz 9.5dBi Patch Antennas	S01, S02, S05 and S07	☑	☐

Subtest Number: 16441 - 1	**Subtest Date:** 13-May-2005
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	30MHz-1GHz Radiated Emissions
Subtest Result	Pass
Highest Frequency	1000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments

Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: 30MHz-1GHz Radiated Emissions

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
175	24.5	1.3	11.9	37.8	Qp	V	98	246	40.5	-2.7	Pass	
152.496	22.5	1.3	13.2	37	Qp	V	98	244	40.5	-3.5	Pass	
69.02	26.5	0.9	8.5	35.8	Qp	V	98	191	40.5	-4.6	Pass	
208.322	20.9	1.5	12.6	34.9	Qp	V	117	226	40.5	-5.6	Pass	
66.285	25.8	0.9	8.1	34.8	Qp	V	118	142	40.5	-5.7	Pass	
206.513	19.7	1.5	12.7	33.9	Qp	H	112	122	40.5	-6.6	Pass	
39.46	18.1	0.7	14.2	33	Qp	V	106	244	40.5	-7.5	Pass	

AC Mains Conducted emissions

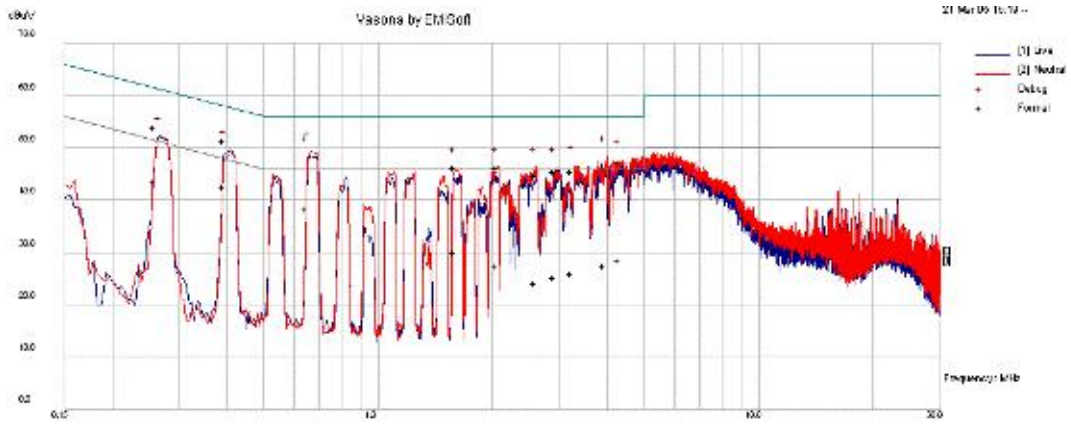
Test Number: 16440				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.207	AC Power Line	B	0.150-30MHz	AC Mains Conducted Emissions
Operating Mode	**Mode :** 3, Colocation Tests			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	**Description**	**Samples**	**System under test**	**Support equipment**
6	AIR-AP1242AG-A-K9 with 2.4GHz 10dBi Yagi and 5GHz 9.5dBi Patch Antennas	S01, S02, S05 and S07	☑	☐

Subtest Number: 16440 - 1	**Subtest Date:** 13-May-2005
Engineer	James Nicholson
Lab Information	Building B, Shield Room
Subtest Results	
Line Under Test	AC Mains
Transducer	LISN
Subtest Result	Pass
Highest Frequency	30.0
Lowest Frequency	0.15
Comments on the above Test Results	No further comments

Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: AC Mains Conducted Emissions

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.656	28.3	19.9	0.1	48.3	Qp	N	56	-7.7	Pass	
0.397	19.1	20	0.1	39.2	Av	L	47.9	-8.8	Pass	
0.397	27.7	20	0.1	47.7	Qp	L	57.9	-10.2	Pass	
0.262	30.2	20.1	0.1	50.4	Qp	L	61.4	-11	Pass	
0.262	19.8	20.1	0.1	40	Av	L	51.4	-11.3	Pass	
0.656	14.7	19.9	0.1	34.6	Av	N	46	-11.4	Pass	
4.356	23.7	20	0.1	43.8	Qp	N	56	-12.2	Pass	
3.993	23.2	20	0.1	43.2	Qp	N	56	-12.8	Pass	
1.61	22.8	19.9	0.1	42.8	Qp	N	56	-13.2	Pass	
2.065	22.8	19.9	0.1	42.7	Qp	N	56	-13.3	Pass	
3.274	21.9	20	0.1	42	Qp	N	56	-14	Pass	
2.959	21.9	20	0.1	41.9	Qp	N	56	-14.1	Pass	
2.623	21.3	19.9	0.1	41.3	Qp	N	56	-14.7	Pass	
1.61	6.3	19.9	0.1	26.2	Av	N	46	-19.8	Pass	
4.356	5	20	0.1	25	Av	N	46	-21	Pass	
3.993	4	20	0.1	24	Av	N	46	-22	Pass	
2.065	4	19.9	0.1	24	Av	N	46	-22	Pass	
3.274	2.3	20	0.1	22.4	Av	N	46	-23.6	Pass	
2.959	1.5	20	0.1	21.5	Av	N	46	-24.5	Pass	
2.623	0.5	19.9	0.1	20.5	Av	N	46	-25.5	Pass	

Appendix C: Abbreviation Key and Definitions

The following table defines abbreviations used within this test report.

Abbreviation	Description	Abbreviation	Description
EMC	Electro Magnetic Compatibility	°F	Degrees Fahrenheit
EMI	Electro Magnetic Interference	°C	Degrees Celsius
EUT	Equipment Under Test	Temp	Temperature
ITE	Information Technology Equipment	S/N	Serial Number
TAP	Test Assessment Schedule	Qty	Quantity
ESD	Electro Static Discharge	emf	Electromotive force
EFT	Electric Fast Transient	RMS	Root mean square
EDCS	Engineering Document Control System	Qp	Quasi Peak
Config	Configuration	Av	Average
CIS#	Cisco Number (unique identification number for Cisco test equipment)	Pk	Peak
Cal	Calibration	kHz	Kilohertz ($1x10^3$)
EN	European Norm	MHz	MegaHertz ($1x10^6$)
IEC	International Electro technical Commission	GHz	Gigahertz ($1x10^9$)
CISPR	International Special Committee on Radio Interference	H	Horizontal
CDN	Coupling/Decoupling Network	V	Vertical
LISN	Line Impedance Stabilization Network	dB	decibel
PE	Protective Earth	V	Volt
GND	Ground	kV	Kilovolt ($1x10^3$)
L1	Line 1	µV	Microvolt ($1x10^{-6}$)
L2	Line2	A	Amp
L3	Line 3	µA	Micro Amp ($1x10^{-6}$)
DC	Direct Current	mS	Milli Second ($1x10^{-3}$)
RAW	Uncorrected measurement value, as indicated by the measuring device	µS	Micro Second ($1x10^{-6}$)
RF	Radio Frequency	µS	Micro Second ($1x10^{-6}$)
SLCE	Signal Line Conducted Emissions	m	Meter
Meas dist	Measurement distance	Spec dist	Specification distance
N/A or NA	Not Applicable	SL	Signal Line (or Telecom Line)
P	Power Line	L	Live Line
N	Neutral Line	R	Return
S	Supply	AC	Alternating Current

Appendix D: Radiated Emissions Test Procedure

The following is a summary of the actual test procedure used by Cisco Systems (**Doc No:** ENG-36583)

Pre-Assessment

The object of the Pre-Assessment Testing is to identify emissions that must be evaluated against the specification limit, under conditions called out in the applicable specification. During this type of testing the repeatability of the test setup and the worst-case layout of the EUT are also determined..

1. Arrange the EUT in the chamber as defined in the configuration section of ENG-36583, the TAP and the appropriate specification.
2. Where the EUT cannot be configured in accordance with the specification then carry out the following:
    i. Set the equipment up as close as possible to the requirements.
    ii. Note within the logbook any deviations from the ard.
    iii. Use only non-metallic supports.
    iv. Ensure that the set up used is repeatable.
    v. Evaluate the effect of the configuration upon the test results.
3. Set the antenna to EUT distance to the appropriate test distance.
4. An initial scan of the frequency ranges should be undertaken to ensure that all emissions emanate from the EUT and are not ambient (from mobile phones, support equipment etc).
5. The EUT should be evaluated in the mode(s) of operation defined in the TAP.
6. Measure the emissions profile of the EUT over the required frequency range using the Automated test software
7. Once an initial preview scan has been performed the emissions profile of the EUT should be maximized in accordance with the specification.
8. Repeat the preview scan after maximizing (unless the overhead cable rack has been utilized). Compare the results with the initial scan to ensure that the worst-case profile has been obtained. *IMPORTANT* If the obtained profiles are considerably different an investigation should be undertaken to ensure that there is not an intermittent problem with the EUT or its cabling.
9. If the obtained profiles are similar all emissions within 6dB of the test specification should be identified for formal measurements. If the test software is used to do this then the results must be confirmed manually. Where there are <6 emissions within 6dB of the specification, the worst six emissions should be identified.
10. Where the frequencies of emissions are close together care must be taken to ensure that the actual worst case emission has been chosen for the formal measurement. This can usually only be confirmed by

maximizing the emission profile. If in doubt identify both (or all) suspect emissions near the center frequency identified by the preview software.

11. During testing the overload indicator of the test Rx should be monitored to ensure that the testing is valid. Where an overload condition is suspected this can normally be confirmed by the use of an external attenuator or the Rx linearity function.

12. If no signals are within 20dB of the specification limit no formal measurements are required. If this happens the equipment setup should be re-checked to ensure that that it has not developed a fault. When testing to CNS13438 the worst 6 emissions should be recorded regardless

13. Repeat the preceding for the remaining Modes and Configurations defined by the TAP or until a worst-case configuration has been obtained. Plots must be made of the worst case emission profile for inclusion in the test report. Plots may also be taken of other representative profiles.

Formal Testing:
The object of Formal/Final measurements is to formally measure the emissions highlighted during the pre-assessment phase against the appropriate specification limits. Maximization of the configuration of the EUT should not be performed during this phase as maximizing the profile at one frequency may change the profile at another and as such invalidate the preview results

1. In the **worst case configuration** each emission identified in the pre-assessment phase should be measured against the appropriate specification limit with the appropriate detector:

    i. Quasi-Peak detector for emissions from 30 MHz to 1GHz

    ii. Peak detector and average detector for emissions above 1GHz

2. Fine Tune the frequency of the emission.

3. The emissions should be observed for a sufficient period of time to allow the EUT to undergo a full exercising routine.

4. Maximize the amplitude of the emission by rotating the EUT, changing the antenna polarity and scanning the receive antenna height.

5. If the emission varies in amplitude with respect to the specification limit, the emission should be observed for at least 15 seconds and the highest reading shall be recorded, with the exception of any brief isolated high reading.

6. During testing the overload indicator of the test Rx should be monitored to ensure that the testing is valid., where an overload condition is suspected this can normally be confirmed by the use of external attenuation or the Rx linearity function.

7. If the EUT fails to meet the specification, investigations should be undertaken to ensure that the EUT has sufficient isolation from its support equipment and/ or ambient interference.

8. Above 1GHz Emissions that do not meet the average specification limit with a peak detector should be compared against the peak limit and re-measured with an Average detector.

9. Repeat steps 2 to 8 on the remaining emissions identified in the pre-assessment phase.
10. Record all relevant data in the eRAT.

Appendix E: Conducted Emissions Test Procedure

The following is a summary of the actual test procedure used by Cisco Systems (**Doc No:** ENG-36541)

Pre-Assessment

The object of the Pre-Assessment Testing is to identify emissions that must be evaluated against the specification limit, under conditions called out in the applicable standard. During this type of testing the repeatability of the test setup and the worst-case layout of the EUT are also determined..

1. Arrange the EUT in the chamber as defined in the configuration section of ENG-36541, the TAP and the appropriate Specification
2. If drive/support equipment is located outside of the shielded enclosure, care must be taken to adequately filter cables coming into the chamber to reduce any potential ambient noise.
3. An initial investigation should be undertaken to ensure that ambient interference from external sources or support equipment are not affecting the measured results of the EUT.
4. The EUT should be connected to the LISN via an appropriate length of mains power cord as defined in the Specification.
5. Investigations should be made to assess possible effects of I/O cables on the measured emission profile. Such investigations should remain within the boundaries of acceptable configurations defined in the Specification. The main purpose of this investigation is to check for cabling problems and for repeatability. I/O cables should not come within 80cm of the LISN (AMN) This information should be recorded in JLS.
6. Ensure that there is a pulse limiter in the measurement path to the input of the spectrum analyzer. Ensure that unused ports of the LISN are terminated in 50 ohms.
7. The emission profile of the EUT should be measured across the required frequency range.
8. Maximize the emission profile of the EUT over the entire frequency range. The following issues should be considered during the maximization process:
   i. Cable placement and EUT location (within the boundaries of the Specification)
   ii. EUT operating modes (allow for full EUT Cycle times)
9. Once the maximum configuration has been discovered, the emission profile should be compared with the most stringent limit from the appropriate Specification.
10. If no signals are within 20dB of the Specification limit no formal measurements are required. If this happens the equipment setup should be re-checked to ensure that that it has not developed a fault. When testing to CNS13438 the worst 6 emissions should be recorded regardless.
11. Make a Plot of the entire emission profile.
12. Repeat steps 9 to 11on the remaining lines.
13. Identify all emissions that fail to meet the most stringent limit. These emissions should be formally measured.

14. Where the emission profile meets the most stringent limit, the six worst-case emissions should be identified for formal measurements. If the emission profile is broadband in Nature (i.e. switch mode PSU noise) it may be necessary to identify more than 6 emissions to adequately assess the EUT.

Formal Testing:

The object of Formal/Final measurements is to formally measure the emissions highlighted during the pre-assessment phase against the appropriate Specification limits.

1. Each emission identified in the pre-assessment phase should be measured against the appropriate Specification limit with a Quasi-Peak detector.

2. The emissions should be observed for a sufficient period of time to allow the EUT to undergo a full exercising routine.

3. Where the emission varies in amplitude with respect to the Specification limit the emission should be observed for an extended time period (normally 15 seconds). The highest level observed within this 15 second period should be recorded with the exception of any brief isolated transients.

4. If the EUT meets the most stringent limit (e.g. the average limit) with the Quasi-Peak detector, measurements with an average detector are not necessary.

5. If the EUT fails to meet the most stringent limit with the Quasi-Peak detector the emission should be measured with an Average detector.

6. Repeat the measurements on all available power supply conductors.

7. If the results are within 3dB of the Specification when measured at 120V 60HZ AC measurements should also be performed at 100V 60/50Hz AC to satisfy VCCI requirements.

8. If the EUT fails to meet the Specification, investigations should be undertaken to ensure that the EUT has sufficient isolation from its support equipment and/ or ambient interference.

9. If the EUT fails to meet the CFR47 limit, investigations should be undertaken to determine if the emission is a broadband in nature. If the difference between the results obtained with the average detector and the results obtained with quasi peak detector are >6dB the emission is deemed to be broadband and the quasi peak reading can be reduced by a factor of 13dB.

Appendix F: Scope of Accreditation: A2LA certificate number 1178-01

The Cisco Systems Scope of Accreditation for EMC testing can be found on the following web page:

http://www.a2la2.net/scopepdf/1178-01.pdf

Summary:

EMC/EMI

Building P:	GR1089, Issue 2 (1999): Sections 2 to 4 (excluding sections 4.5.11-16, 4.6) GR1089, Issue 3 (2002): Sections 2 to 4 (excluding sections 4.6.7.1, 4.6.10-17, 4.8) CISPR 22 EN 55022 CNS 13438 AS/NZS 3548 CFR 47, Part 15 using ANSI C63.4-2001 IEC 61000-4-2 IEC 61000-4-4
Building 16:	GR1089, Issue 2 (1999): Sections 2 to 4 (excluding sections 3.2.2, 4.5.11-16, 4.6, radiated emissions below 30 MHz) GR1089, Issue 3 (2002): Sections 2 to 4 (excluding sections 3.2.1.2, 4.6.7.1, 4.6.10-17, 4.8) CISPR 22 EN 55022 CNS 13438 AS/NZS 3548 CFR 47, Part 15 using ANSI C63.4-2001 IEC 61000-4-2 IEC 61000-4-4
Building N: Building I: Building 7:	GR1089, Issue 2 (1999): Sections 2 to 4 (excluding sections 3.2.2, 3.3.1-2, 4.5.11-16, 4.6, radiated emissions below 30 MHz) GR1089, Issue 3 (2002): Sections 2 to 4 (excluding sections 3.2.1.2, 3.3.1-2, 4.6.7.1, 4.6.10-17 & 4.8) CISPR 22 EN 55022 CNS 13438 AS/NZS 3548 CFR 47, Part 15 using ANSI C63.4-2001 IEC 61000-4-2 IEC 61000-4-4
Building B:	GR1089, Issue 2 (1999): Sections 2 to 4 (excluding sections 3.2.1-2, 3.3.1-2, 4.5.11-16, 4.6, radiated emissions below 30 MHz) GR1089, Issue 3 (2002): Sections 2 to 4 (excluding sections 3.2.1, 3.3.1,

4.6.7.1, 4.6.10-17 & 4.8)
CISPR 22
EN 55022
CNS 13438
AS/NZS 3548
CFR 47, Part 15 using ANSI C63.4-2001
IEC 61000-4-2
IEC 61000-4-4

On the following products or types of products :

Information Technology Equipment (ITE), Telecommunications Network Equipment (TNE)

Appendix G: Test Equipment Used to perform the test

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due	Test Number(s)
000513	Gigatronics/ 8542C	Universal Power Meter	21-JAN-2005	21-JAN-2006	[16395], [16402]
000514	Gigatronics/ 80420A	Power Sensor, 0.01-18GHz	11-JAN-2005	11-JAN-2006	[16395], [16402]
000579	Megaphase/ SF26 S1S1 36	RF Coaxial Cable, to 26GHz, 36in	15-FEB-2005	15-FEB-2006	[16405], [16409], [16410], [16411], [16412], [16413], [16435], [16436], [16437], [16439]
000590	Agilent/ E4448A	Spectrum Analyzer	02-FEB-2005	02-FEB-2006	[16405], [16409], [16410], [16411], [16412], [16413], [16435], [16436], [16437], [16439]
000599	Weinschel Corp./ 69-20-12	20dB Attenuator	20-DEC-2004	20-DEC-2005	[16395], [16402]
001229	HP/ 85460A	RF Filter Section	06-DEC-2004	06-DEC-2005	[16441]
001230	HP/ 85462A	EMI Receiver RF Section	06-DEC-2004	06-DEC-2005	[16441]
003003	HP/ 83731B	Synthesized Signal Generator	21-JAN-2005	21-JAN-2006	[16387], [16388]
004883	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	11-APR-2005	11-APR-2006	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
005685	HP/ 85462A	EMI Receiver RF Section	07-JUN-2004	07-JUN-2005	[16441]

005691	Miteq/ NSP1800-25-S1	Broadband Preamplifier (1-18GHz)	07-OCT-2004	07-OCT-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
007036	HP/ E7401A	Spectrum Analyzer	23-JUL-2004	23-JUL-2005	[16440]
007221	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	Cal Not Required	N/A	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
008097	Huber + Suhner/ RG-223	RG-233 Cable 9m	29-JUL-2004	29-JUL-2005	[16440]
008123	Huber + Suhner/ SF106A	1m Sucoflex Cable	03-SEP-2004	03-SEP-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
008166	HP/ 8491B Opt 010	10dB Attenuator	19-JAN-2005	19-JAN-2006	[16118], [16140], [16145], [16317], [16318], [16391]
008168	HP/ 8491B Opt 010	10dB Attenuator	19-JAN-2005	19-JAN-2006	[16118], [16140], [16145], [16317], [16318], [16391]
008188	Fischer Custom Communications/ FCC-450B-2.4-N	Instrumentation Limiter	07-JUL-2004	07-JUL-2005	[16440]
008189	Fischer Custom Communications/ FCC-450B-2.4-N	Instrumentation Limiter	07-JUL-2004	07-JUL-2005	[16440]
008197	TTE/ H613-150K-50-21378	Hi Pass Filter - 150KHz cutoff	29-MAR-2005	29-MAR-2006	[16440]

008447	Cisco/ NSA 10m Chamber	NSA 10m Chamber	21-JAN-2005	21-JAN-2006	[16441]
008448	Cisco/ NSA 5m Chamber	NSA 5m Chamber	03-JAN-2005	03-JAN-2006	[16317], [16318], [16366], [16367], [16368], [16385], [16386], [16387], [16388], [16391]
018719	Rohde & Schwarz/ ESCS 30	EMI Test Receiver, 9kHz-2.75GHz	13-SEP-2004	13-SEP-2005	[16440]
019630	Rohde & Schwarz/ ESI 40	EMI Test Receiver, 20Hz - 40GHz	21-OCT-2004	21-OCT-2005	[16387], [16388]
020666	EMC Test Systems/ 3160-10	Standard Gain Horn Antenna, 26.5-40GHz	Cal Not Required	N/A	[16387], [16388]
020821	Micro-Coax/ UFB142A-1-1572-200200	RF Coaxial Cable, to 40GHz, 157.2 in	23-SEP-2004	23-SEP-2005	[16387], [16388]
020975	Micro-Coax/ UFB311A-0-1344-520520	RF Coaxial Cable, to 18GHz, 134.4 in	28-MAR-2005	28-MAR-2006	[16441]
021117	Micro-Coax/ UFB311A-0-2484-520520	RF Coaxial Cable, to 18GHz, 248.4 in	19-AUG-2004	19-AUG-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
021382	Solar Electronics Company/ 9252-50-24-BNC	LISN	26-APR-2005	26-APR-2006	[16440]
025654	Micro-Coax/ UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	28-MAR-2005	28-MAR-2006	[16441]
025657	Micro-Coax/ UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	19-AUG-2004	19-AUG-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
025666	Micro-Coax/ UFB142A-1-0720-200504	RF Coaxial Cable, to 40GHz, 72 in	23-SEP-2004	23-SEP-2005	[16387], [16388]
026860	Cisco/ 1840	18-40GHz EMI Test Head/Verification Fixture	23-SEP-2004	23-SEP-2005	[16387], [16388]

030265	Agilent/ 11713A	Attenuator/Switch Driver	Cal Not Required	N/A	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
030495	Agilent/ 8761B	SPDT RF Switch, to 18GHz	28-MAR-2005	28-MAR-2006	[16441]
030498	Agilent/ 8761B	SPDT RF Switch, to 18GHz	07-APR-2005	07-APR-2006	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
030560	Micro-Coax/ UFB311A-1-0950-504504	RF Coaxial Cable, to 18GHz	28-MAR-2005	28-MAR-2006	[16441]
030562	Micro-Coax/ UFB311A-1-0950-504504	RF Coaxial Cable, to 18GHz	19-AUG-2004	19-AUG-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
030563	Micro-Coax/ UFB311A-1-0950-504504	RF Coaxial Cable, to 18GHz	28-MAR-2005	28-MAR-2006	[16441]
030569	Micro-Coax/ UFB311A-1-3510-504504	RF Coaxial Cable, to 18GHz	28-MAR-2005	28-MAR-2006	[16441]
030652	Sunol Sciences/ JB1	Combination Antenna, 30MHz-2GHz	25-JUN-2004	25-JUN-2005	[16441]
031700	Micro-Tronics/ BRC50705	Notch Filter, SB:5.725-5.875GHz, to 12 GHz	06-OCT-2004	06-OCT-2005	[16366], [16367], [16368], [16385], [16386], [16391]

033599	Midwest Microwave/ CSY-NMNM-80-273001	RF Coaxial Cable, 27ft. to 18GHz	09-MAY-2005	09-AUG-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
033599	Midwest Microwave/ CSY-NMNM-80-273001	RF Coaxial Cable, 27ft. to 18GHz	10-FEB-2005	09-AUG-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
034064	Micro-Coax/ UFB293C-2-0840-300504	RF Coaxial Cable, 7ft to 18GHz	28-OCT-2004	28-OCT-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
034075	Schaffner/ RSG 2000	Reference Spectrum Generator, 1-18GHz	12-AUG-2004	12-AUG-2005	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]
034188	Micro-Tronics/ BRC50703-02	Notch Filter, SB:5.150-5.350GHz, to 11GHz	26-APR-2005	26-APR-2006	[16366], [16367], [16368], [16385], [16386]
034189	Micro-Tronics/ BRC50704-02	Notch Filter, SB:5.470-5.725GHz, to 12GHz	26-APR-2005	26-APR-2006	[16366], [16367], [16368], [16385], [16386]

034304	Micro-Tronics/ BRM50702-02	Band Reject Filter	26-APR-2005	26-APR-2006	[16366], [16367], [16368], [16385], [16386], [16391]
035040	Micro-Tronics/ HPM50112-02	Hi Pass Filter	26-APR-2005	26-APR-2006	[16366], [16367], [16368], [16385], [16386]
035268	Agilent/ E4440A	Precision Spectrum Analyzer	12-APR-2005	12-APR-2006	[16118], [16140], [16145], [16317], [16318], [16366], [16367], [16368], [16385], [16386], [16391]