FCC Test Report: EDCS - 511378

For

AIR-RM1251G-A-K9 2.4GHz Radio Module
(FCC ID: LDK102060)

Against the following Specifications :

FCC CFR 47 Part 15.247

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 Parts 15.247 ,15.249

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.

2.2 Date of start of testing

06-Feb-2006

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-RM1251G-A-K9 2.4GHz 802.11g Radio Module

2.6 EUT Description

The AIR-RM23G-A-K9 5GHz radio module operates in the AIR-AP1250 series access point, and may operate simultaneously with the AIR-RM23A-A-K9 5GHz radio module (FCC ID; LDK102059), to provide data rates up to 54 Mbps in accordance with IEEE 802.11g standard.

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	+/- 2.7 dB (using CVP-1)
150 KHz - 30 MHz	+/1 2.7 dB (using TISN)

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(Photographs of the test samples, where appropriate can be found in appendix H)

Sample No.	Equipment Details	Part Number	Manufacturer	Hardware Rev.	Firmware Rev.	Software Rev.	Serial Number
S01	AIR-RM23G-A-K9	NA	Cisco Systems	NA	NA	NA	NA
S02	AIR-AP1250	NA	Cisco Systems	NA	NA	NA	NA
S03	5.2 dBi Omnidirectional Antenna	NA	Cisco Systems	NA	NA	NA	NA
S04	9.0 dBi Patch Antenna	NA	Cisco Systems	NA	NA	NA	NA
S05	10.0 dBi Yagi Antenna	NA	Cisco Systems	NA	NA	NA	NA

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-ANT2485P-R	2.4 GHz, 9.0 dBi Patch
AIR-ANT2012	2.4 GHz, 6.5 dBi Diversity Patch
AIR-ANT2465P-R	2.4 GHz, 6.5 dBi Diversity Patch
AIR-ANT1729	2.4 GHz, 6.0 dBi Patch
AIR-ANT2460P-R	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	2.4GHz Radio Moduled installed in host Access Point with 5.2dBi Omnidirectional Antenna	S01, S02 and S03
2	2.4GHz Radio Moduled installed in host Access Point with 9.0dBi Patch Antenna	S01, S02 and S04
3	2.4GHz Radio Moduled installed in host Access Point with 10.0dBi Yagi Antenna	S01, S02 and S05

3.3 Mode of Operation Details

Mode#	Description	Comments
1	IOS Test Interface	The various radio parameters will be invoked in the IOS test interface via either a telnet session or serial interface.

Appendix A: Formal Emission Test Results

Average Output Power

2.4GHz Average Power with up to 10.0dBi Antennas

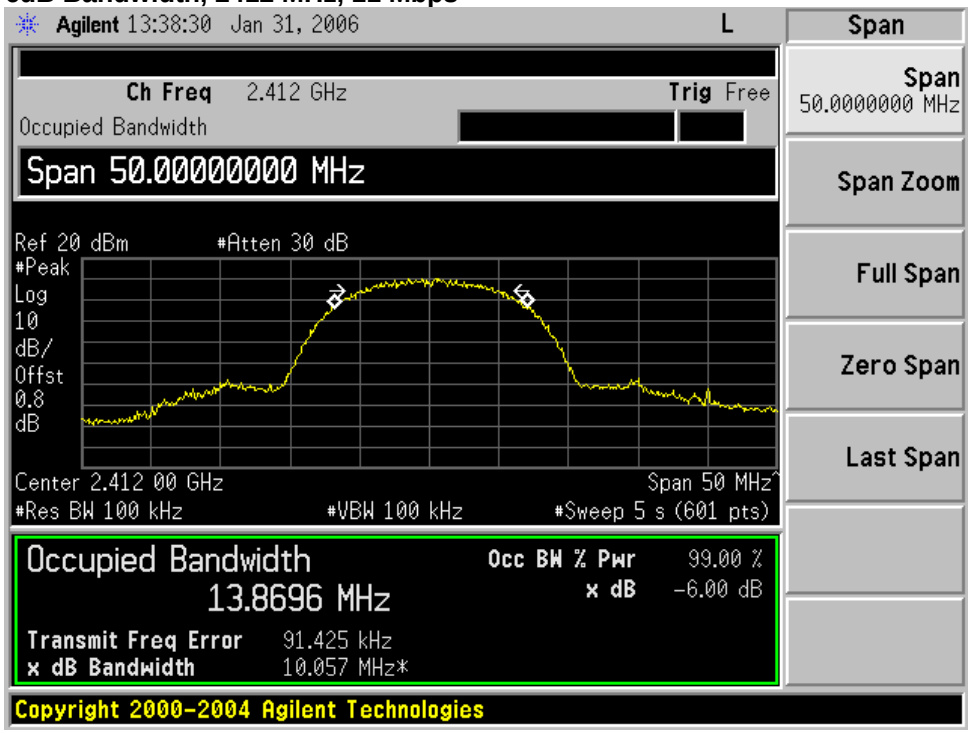
Frequency (MHz)	Data Rate (Mbps)	Target Power (dBm)	Measured Power (dBm)
2412	11	20	20.5
2437	11	20	20.4
2462	11	20	20.4
2412	54	17	17.5
2437	54	17	17.2
2462	54	17	17.5

6dB Bandwidth

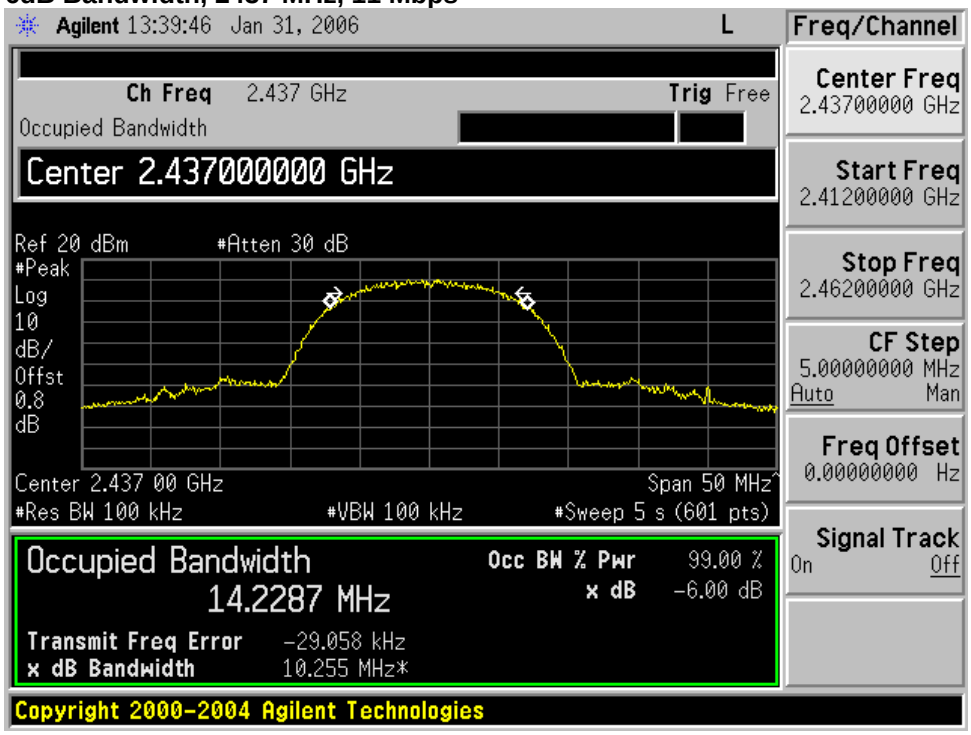
15.247: Systems using digital modulation techniques may operate in the 2400-2483.5MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
2412	11	10057	500	9557
2437	11	10555	500	10055
2462	11	9750	500	9250
2412	54	16415	500	15915
2437	54	16494	500	15994
2462	54	15839	500	15339

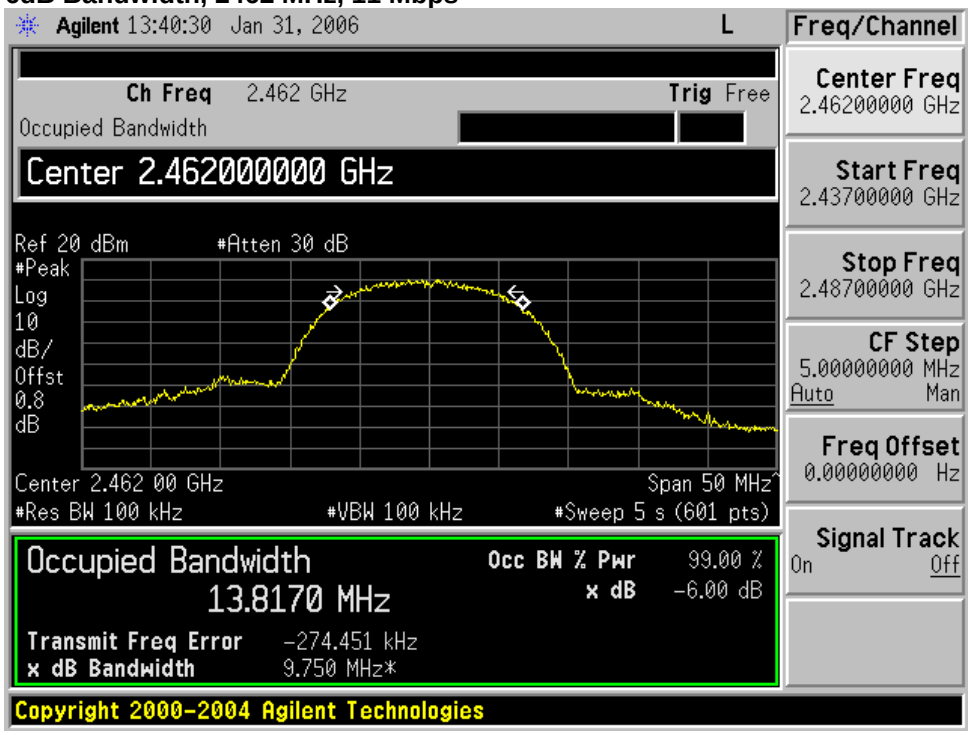
6dB Bandwidth, 2412 MHz, 11 Mbps



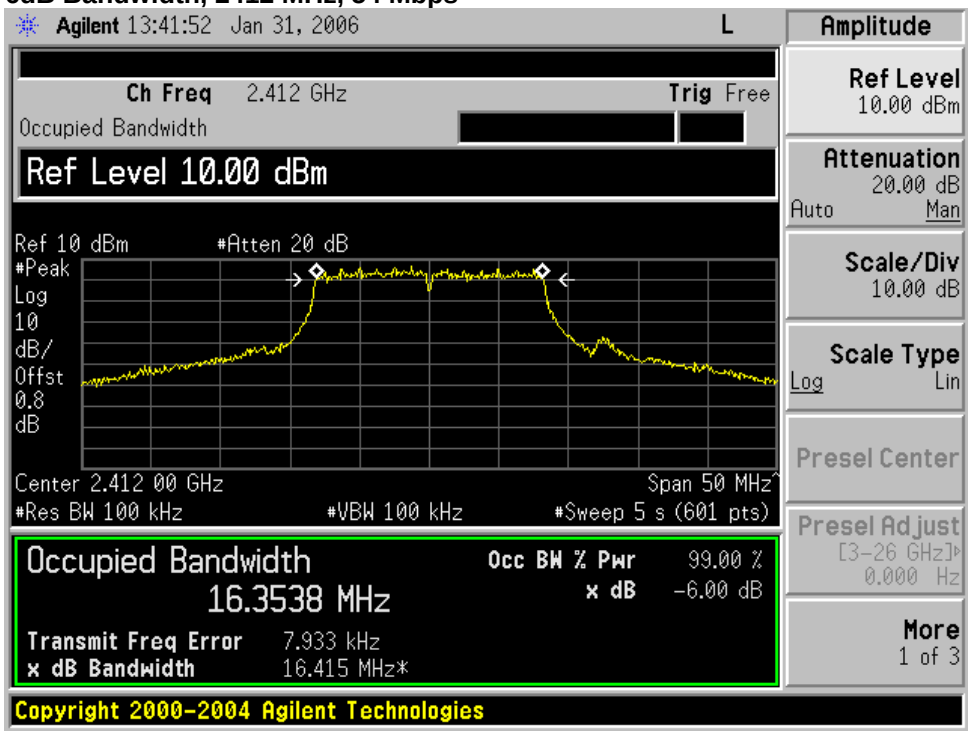
6dB Bandwidth, 2437 MHz, 11 Mbps



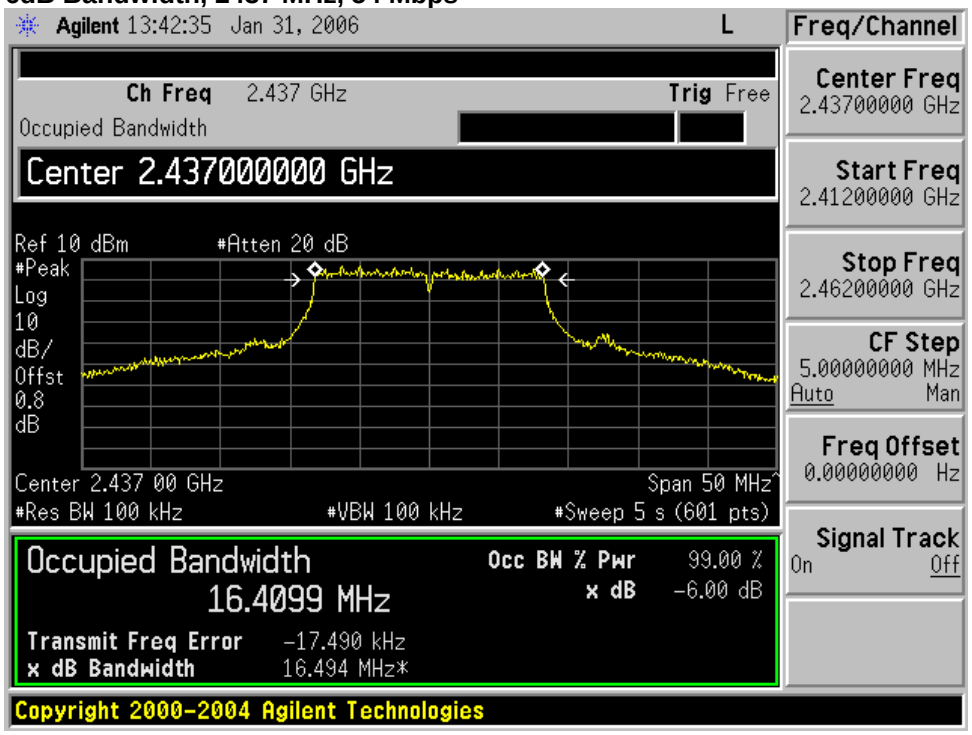
6dB Bandwidth, 2462 MHz, 11 Mbps



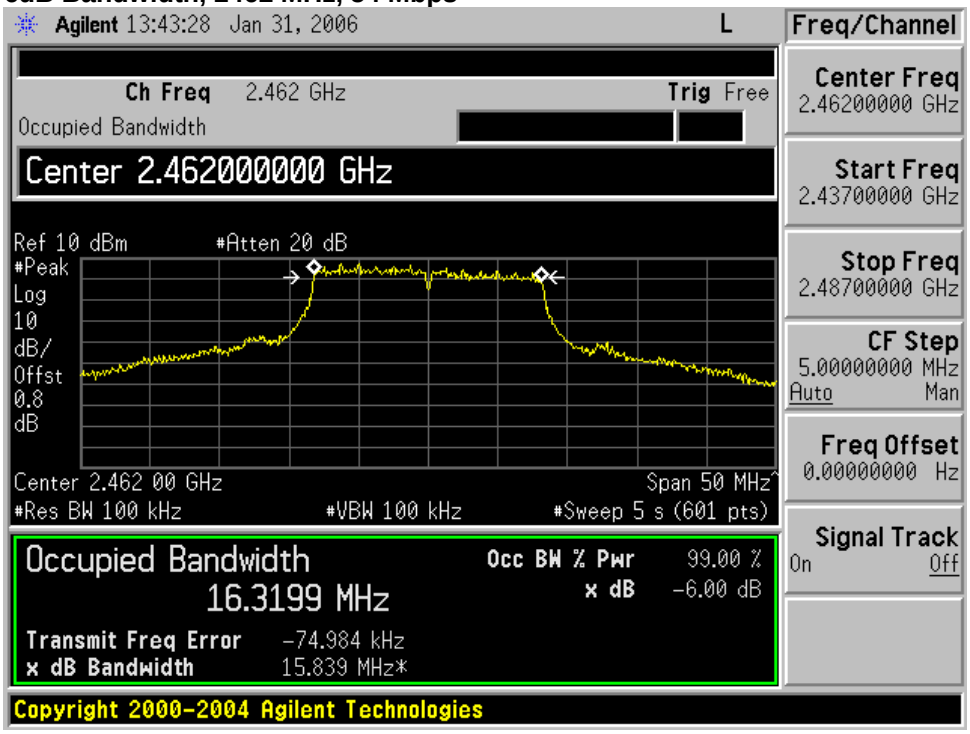
6dB Bandwidth, 2412 MHz, 54 Mbps



6dB Bandwidth, 2437 MHz, 54 Mbps



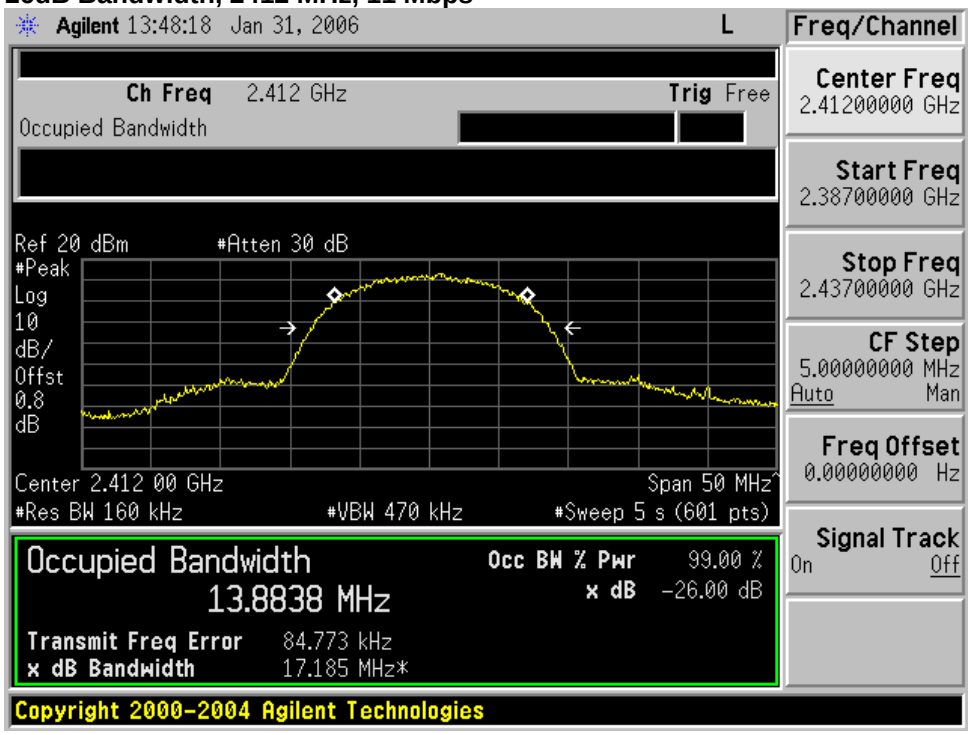
6dB Bandwidth, 2462 MHz, 54 Mbps



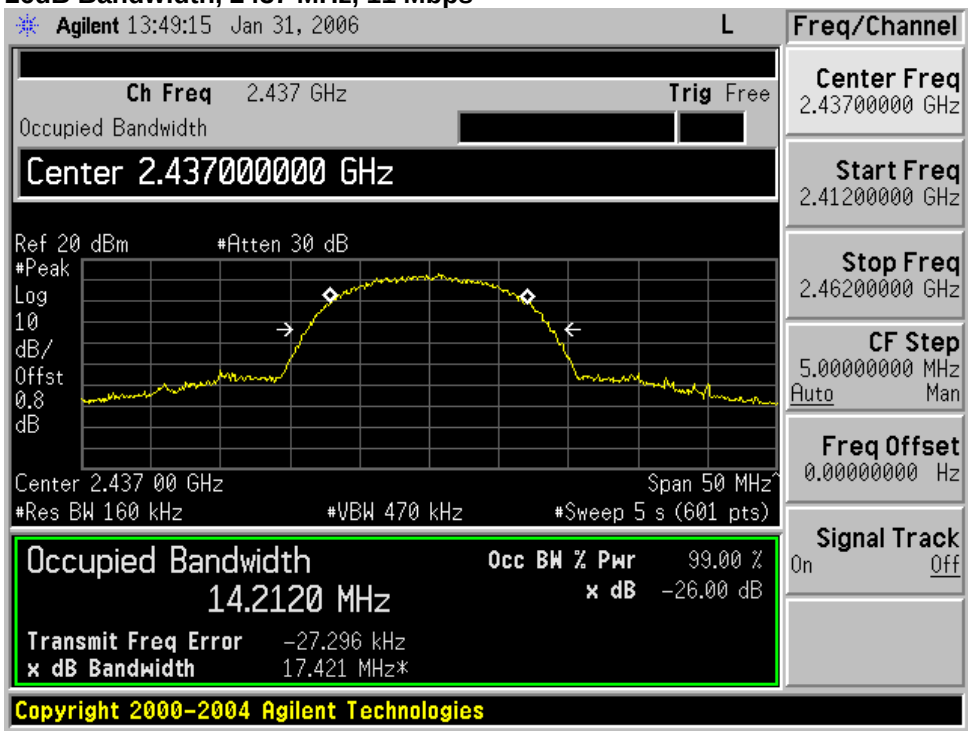
26dB Bandwidth

Frequency (MHz)	Data Rate (Mbps)	26dB Bandwidth (MHz)
2412	11	17.18
2437	11	17.42
2462	11	17.28
2412	54	18.25
2437	54	18.53
2462	54	18.21

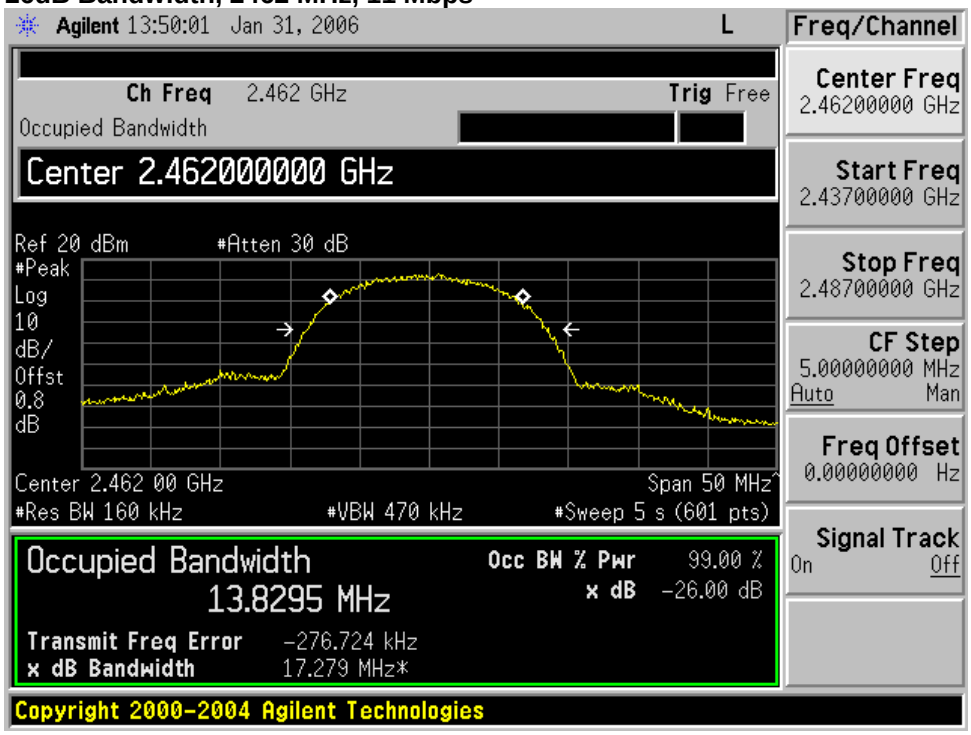
26dB Bandwidth, 2412 MHz, 11 Mbps



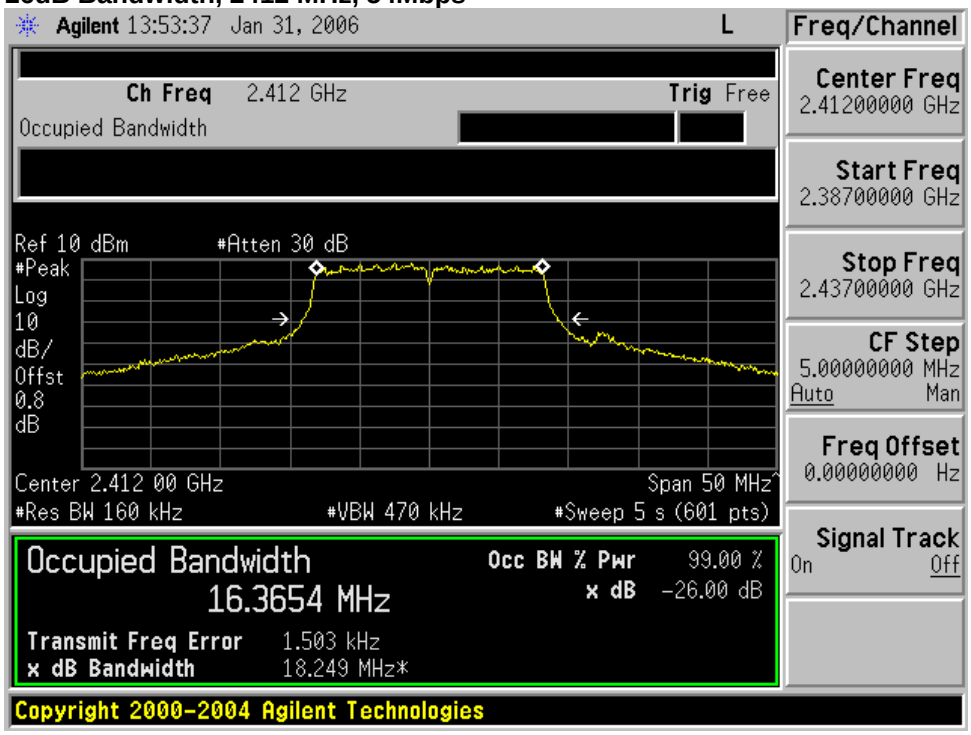
26dB Bandwidth, 2437 MHz, 11 Mbps



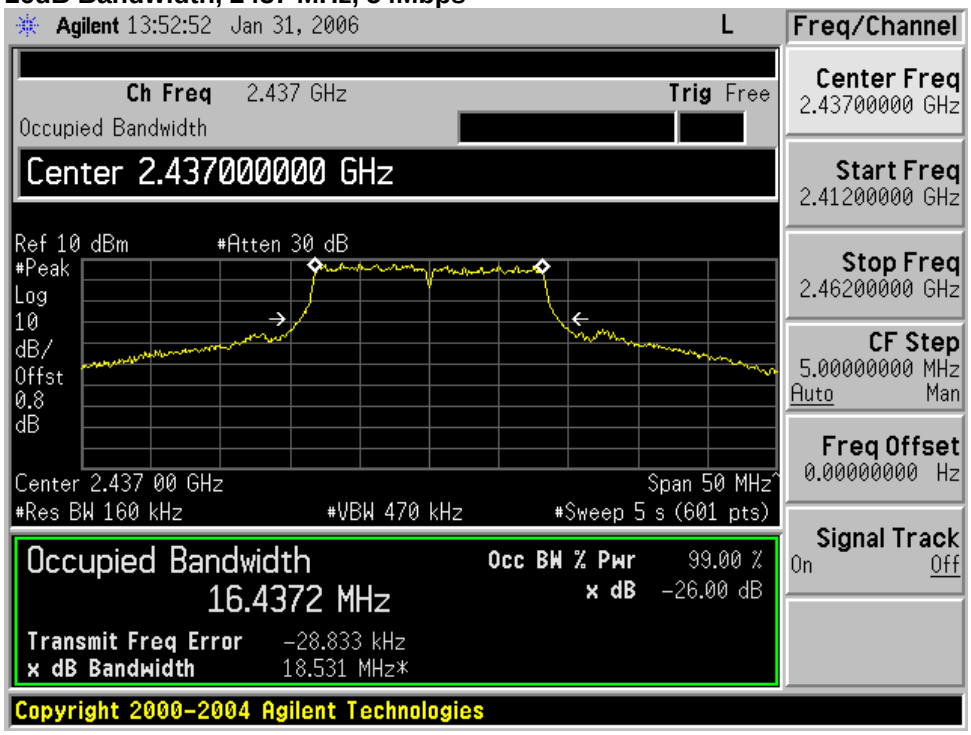
26dB Bandwidth, 2462 MHz, 11 Mbps



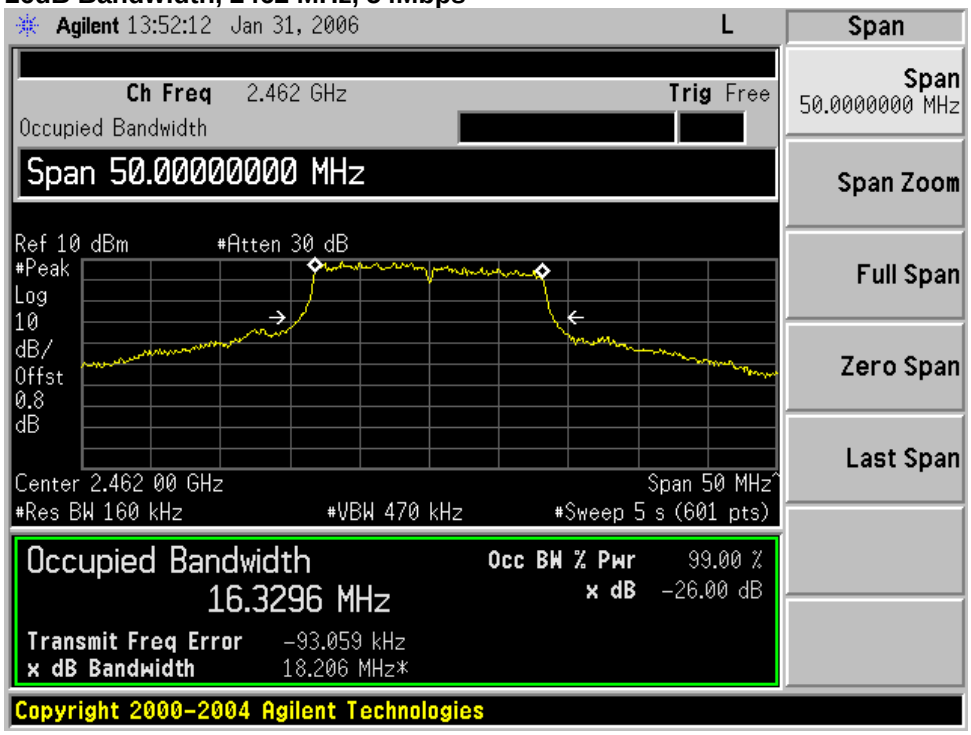
26dB Bandwidth, 2412 MHz, 54Mbps



26dB Bandwidth, 2437 MHz, 54Mbps



26dB Bandwidth, 2462 MHz, 54Mbps



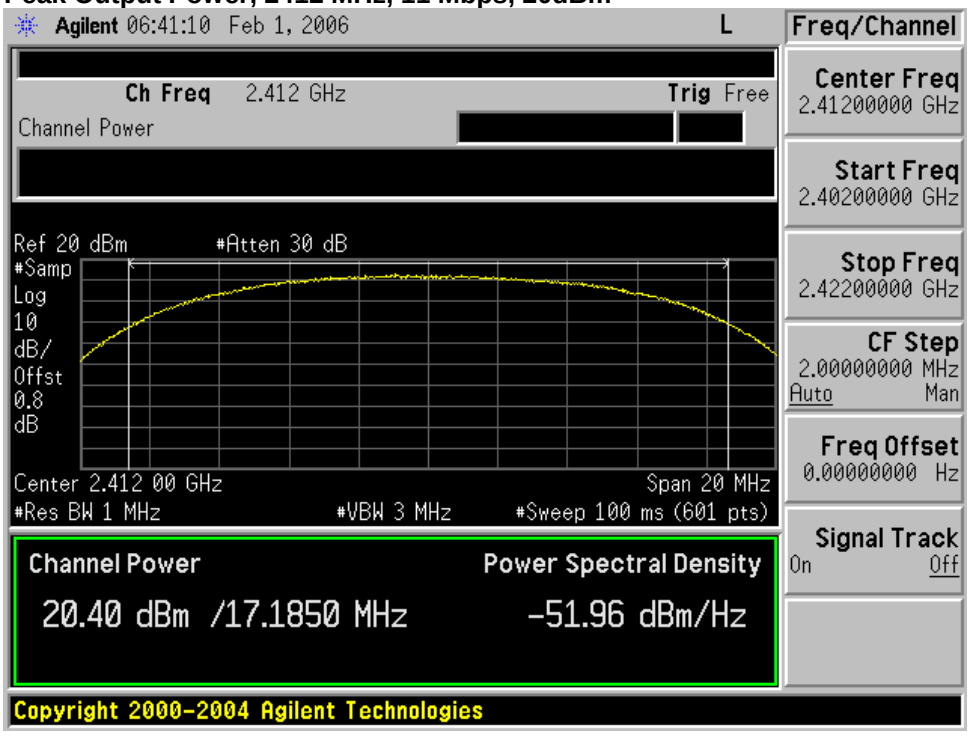
Peak Output Power

15.247: The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

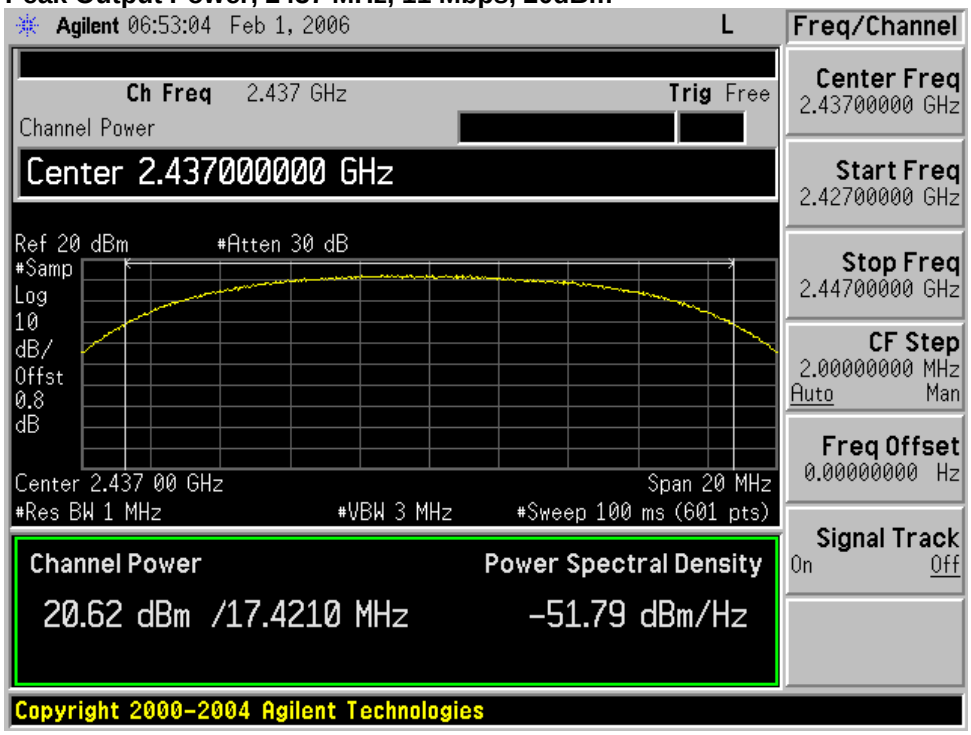
The maximum supported antenna gain is 10dBi. Therefore the maximum allowable output power for all bands must be reduced by 10dBi-6dbi = 4dBi.

Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
2412	11	20.4	26	5.6
2437	11	20.6	26	5.4
2462	11	20.6	26	5.4
2412	54	17.5	26	8.5
2437	54	17.4	26	8.6
2462	54	17.0	26	9.0

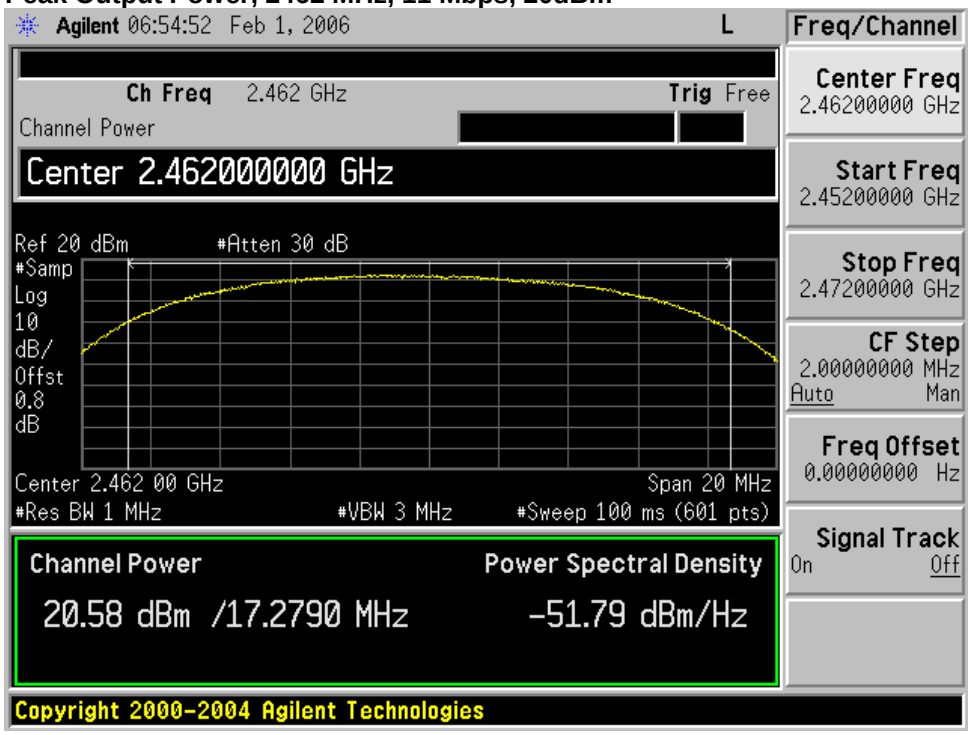
Peak Output Power, 2412 MHz, 11 Mbps, 20dBm



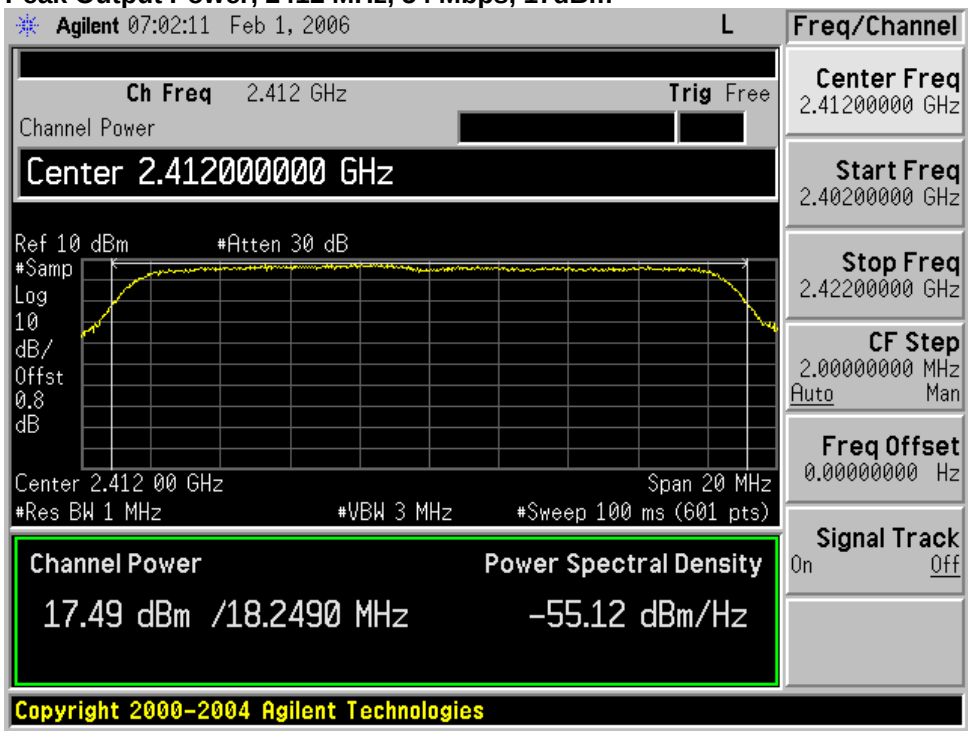
Peak Output Power, 2437 MHz, 11 Mbps, 20dBm



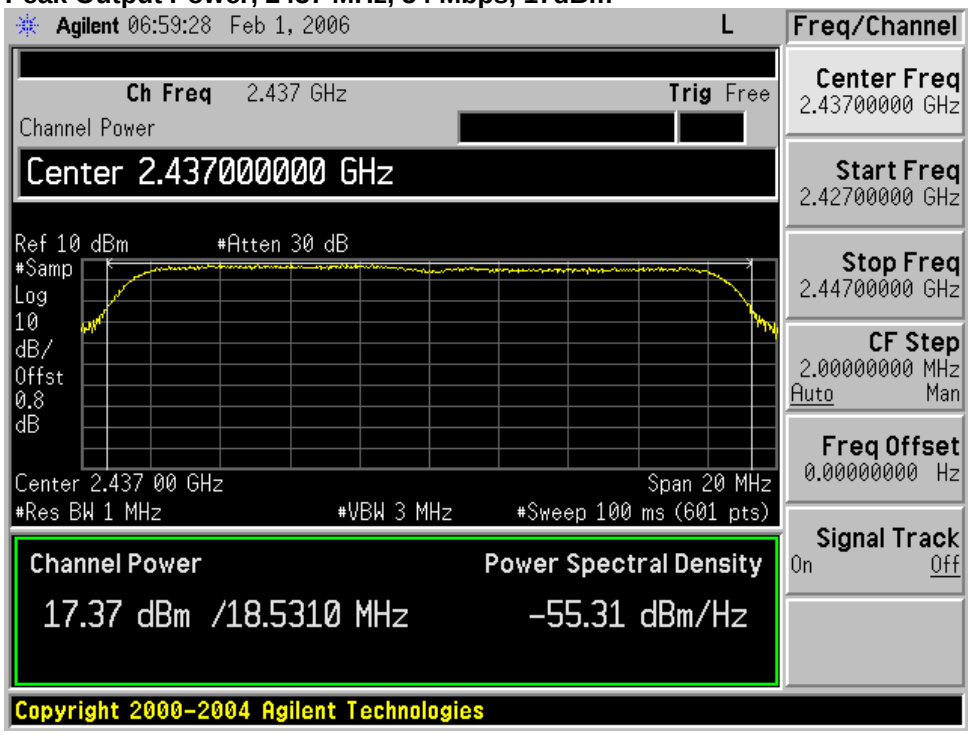
Peak Output Power, 2462 MHz, 11 Mbps, 20dBm



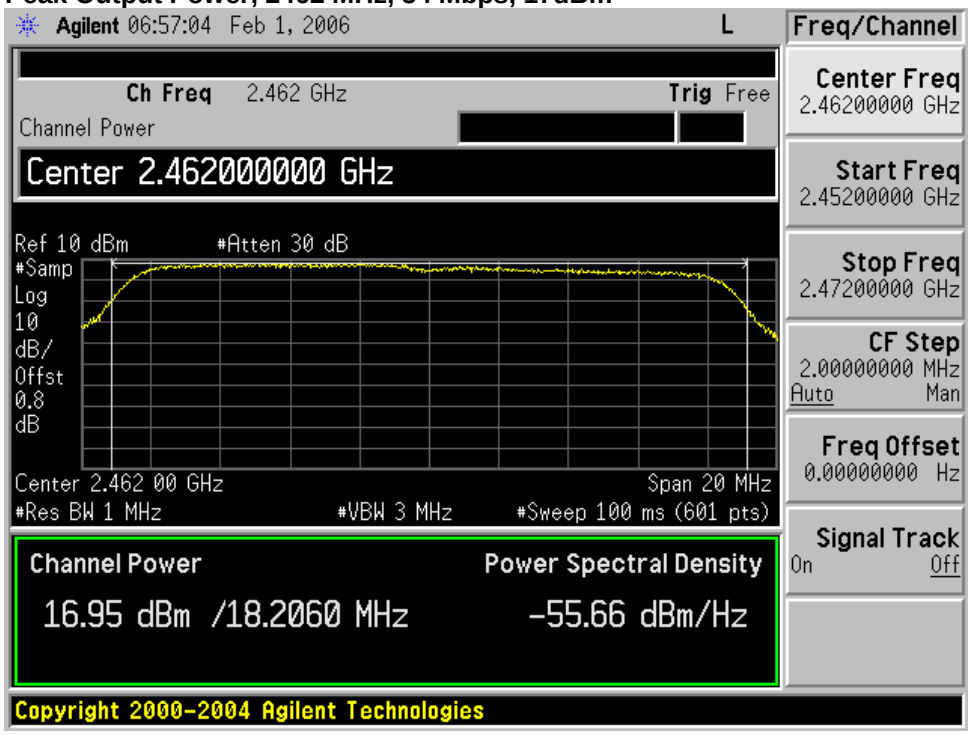
Peak Output Power, 2412 MHz, 54 Mbps, 17dBm



Peak Output Power, 2437 MHz, 54 Mbps, 17dBm



Peak Output Power, 2462 MHz, 54 Mbps, 17dBm

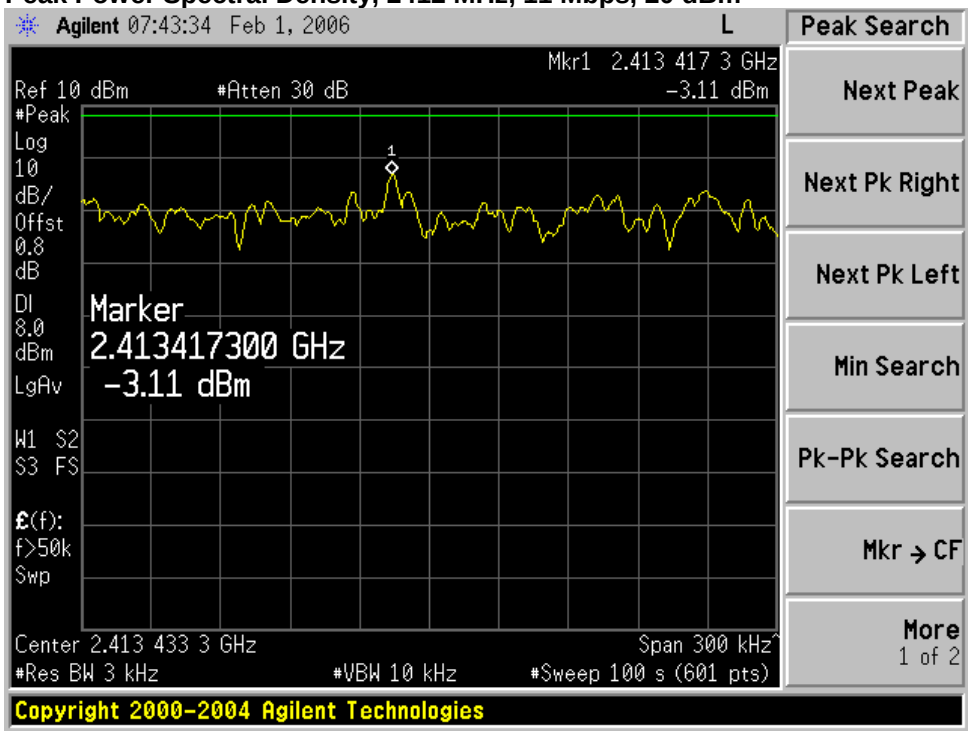


Peak Power Spectral Density

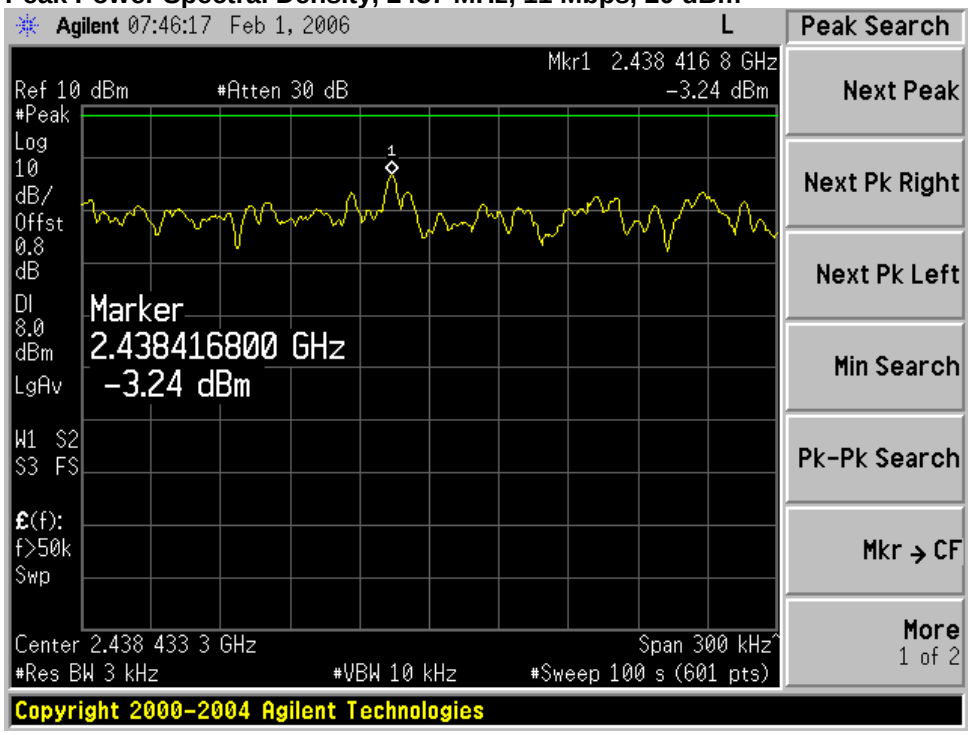
15.247: For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Frequency (MHz)	Data Rate (Mbps)	Peak Power Spectral Density (dBm/3kHz)	Limit (dBm)	Margin (dB)
2412	11	-3.1	8	11.1
2437	11	-3.2	8	11.2
2462	11	-3.3	8	11.3
2412	54	-6.3	8	14.3
2437	54	-7.0	8	15.0
2462	54	-6.7	8	14.7

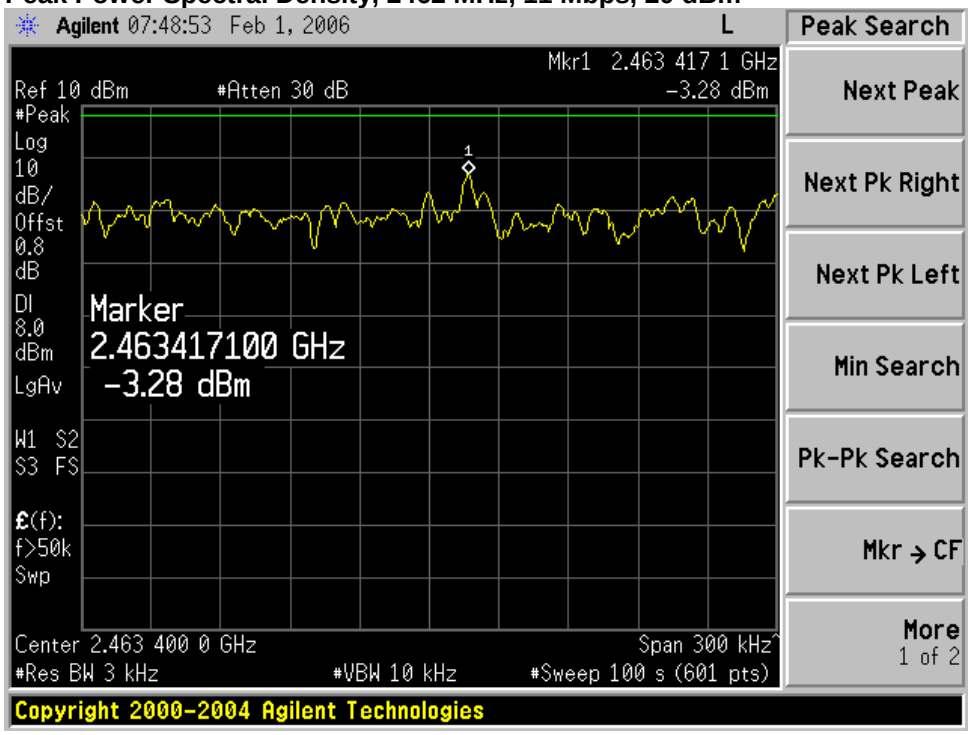
Peak Power Spectral Density, 2412 MHz, 11 Mbps, 20 dBm



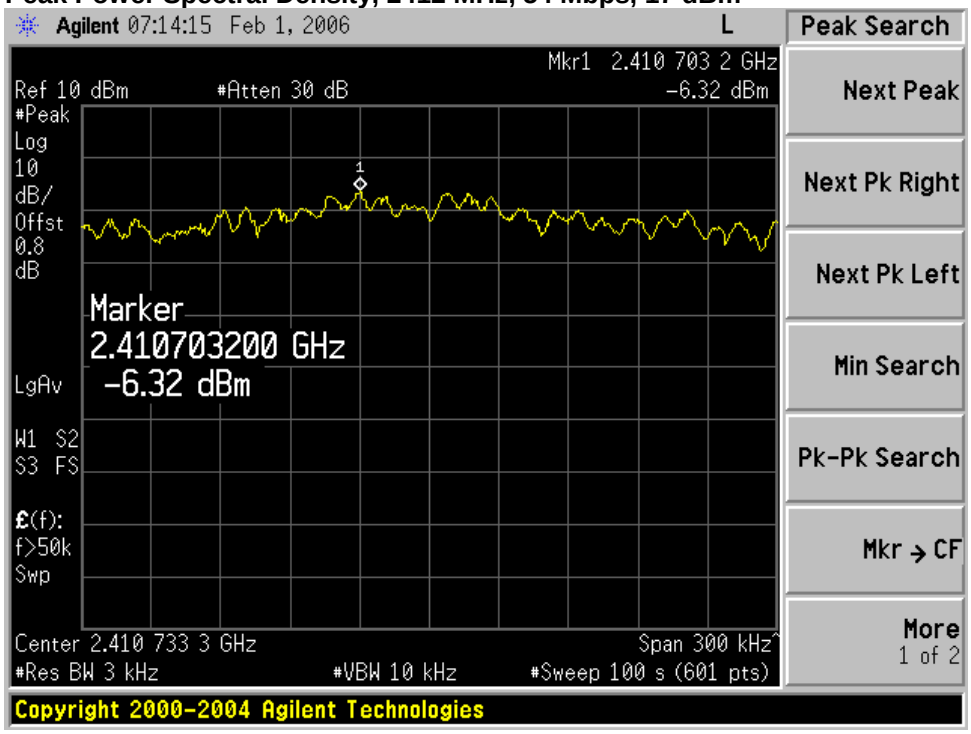
Peak Power Spectral Density, 2437 MHz, 11 Mbps, 20 dBm



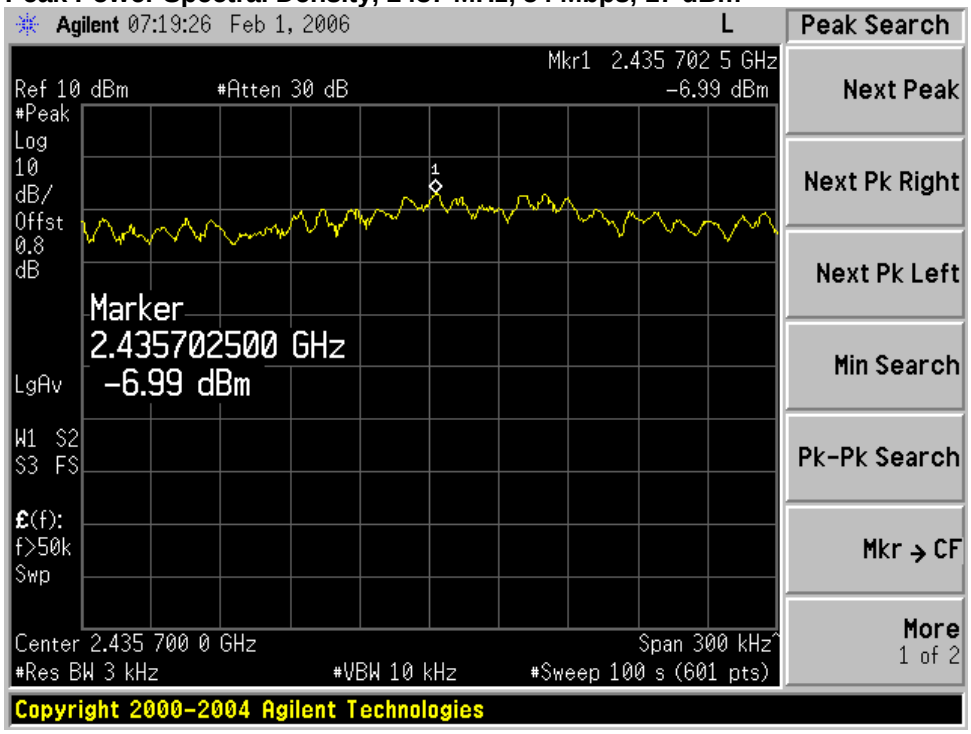
Peak Power Spectral Density, 2462 MHz, 11 Mbps, 20 dBm



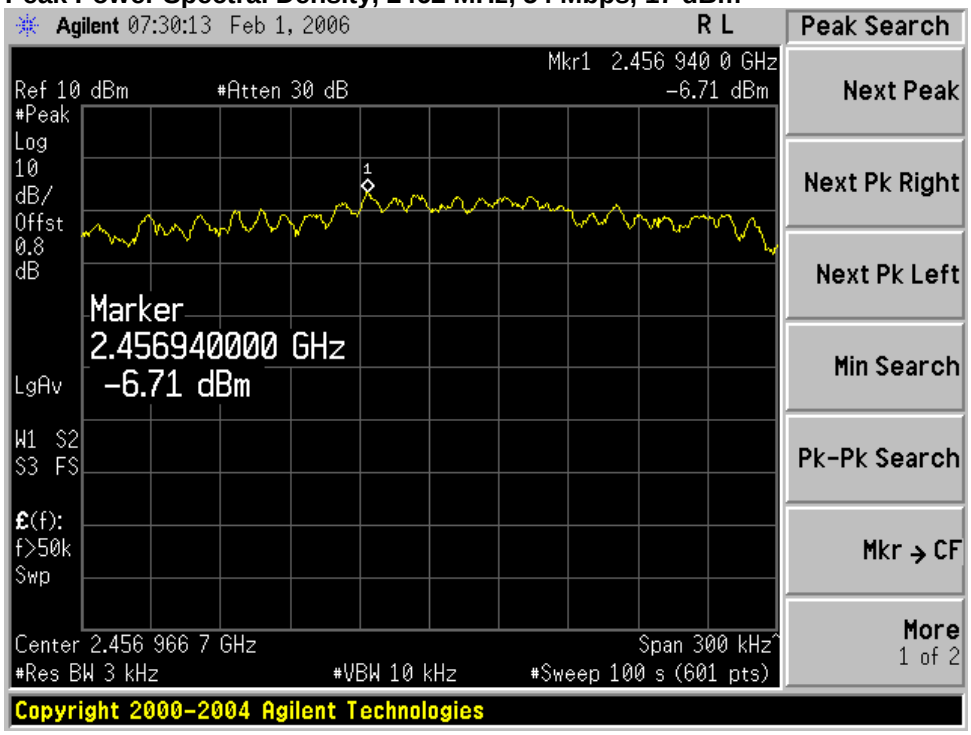
Peak Power Spectral Density, 2412 MHz, 54 Mbps, 17 dBm



Peak Power Spectral Density, 2437 MHz, 54 Mbps, 17 dBm



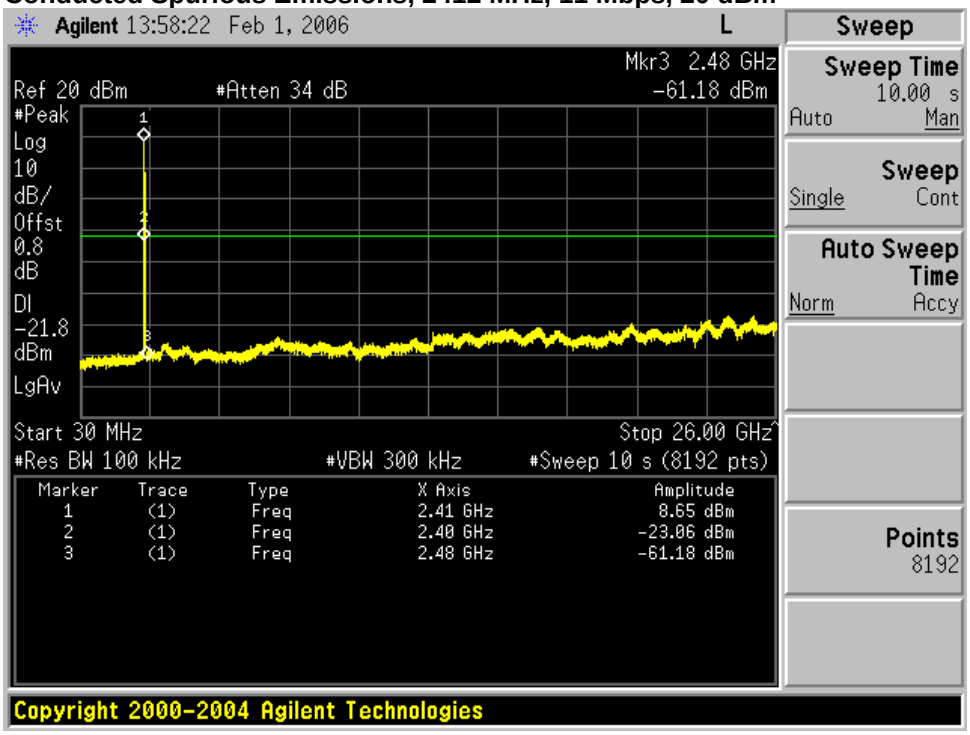
Peak Power Spectral Density, 2462 MHz, 54 Mbps, 17 dBm



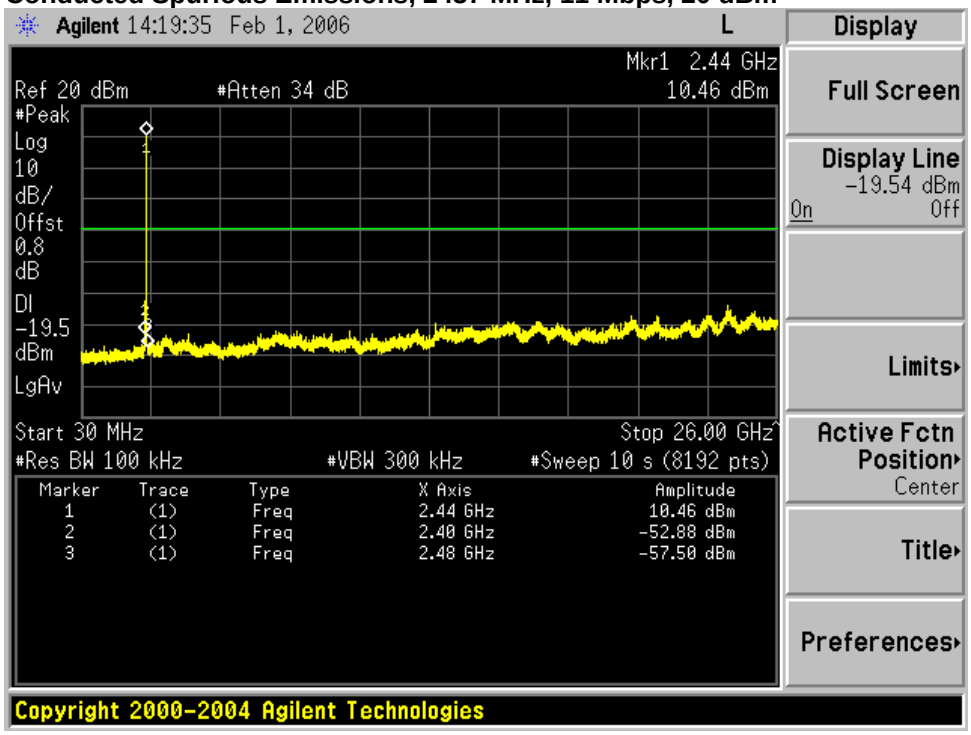
Conducted Spurious Emissions

15.247: In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

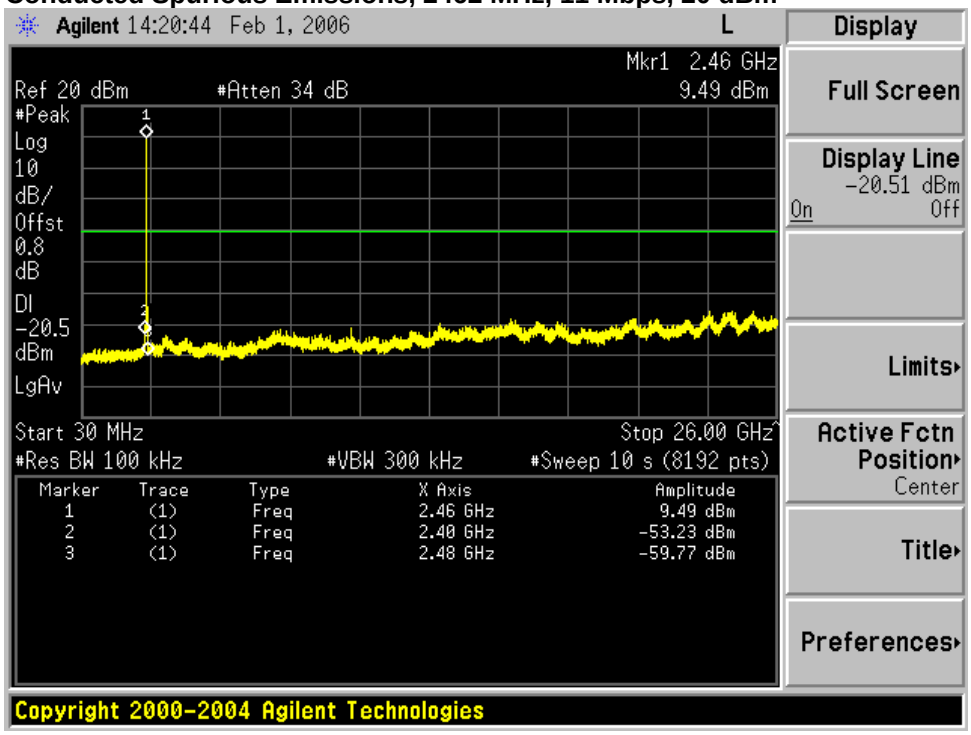
Conducted Spurious Emissions, 2412 MHz, 11 Mbps, 20 dBm



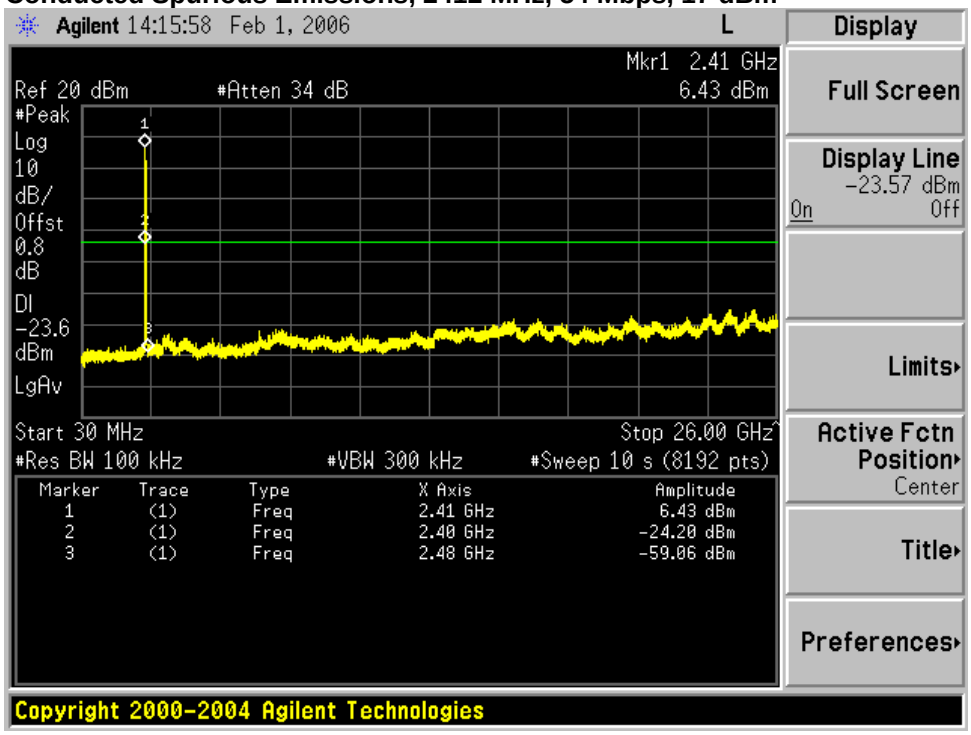
Conducted Spurious Emissions, 2437 MHz, 11 Mbps, 20 dBm



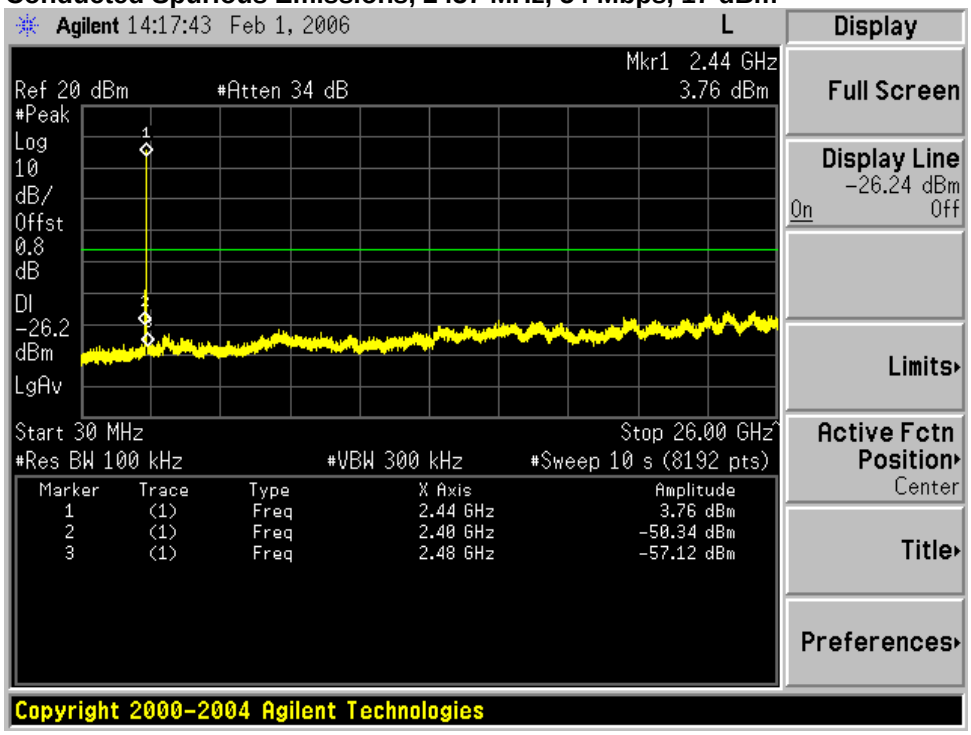
Conducted Spurious Emissions, 2462 MHz, 11 Mbps, 20 dBm



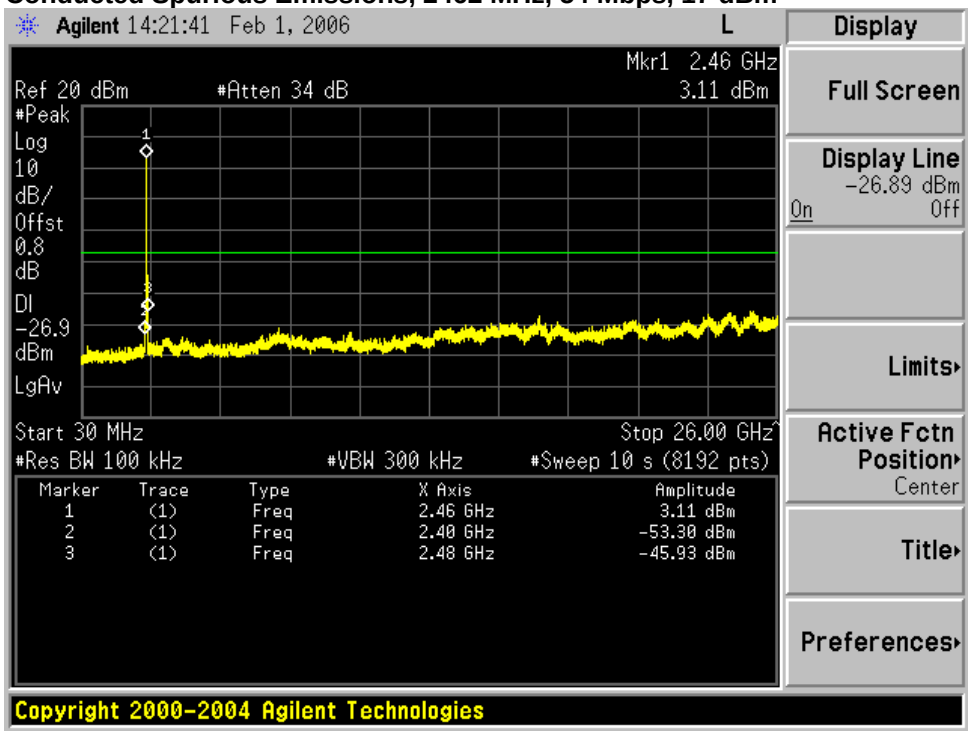
Conducted Spurious Emissions, 2412 MHz, 54 Mbps, 17 dBm



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



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



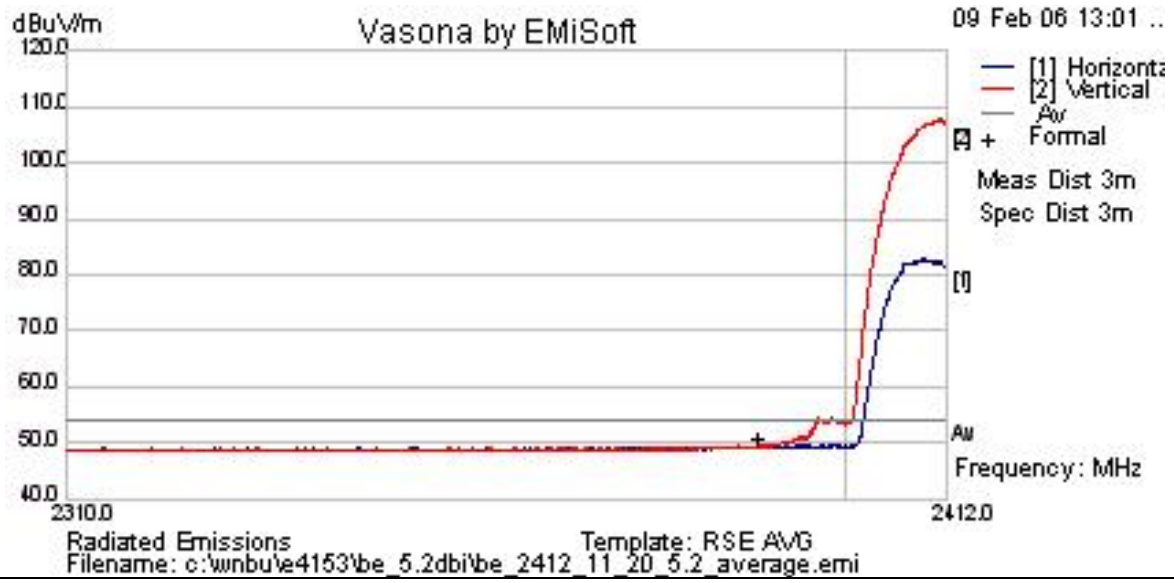
Radiated Transmitter Spurious Emissions

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).

Radiated Bandedge with 5.2 dBi Omni-directional Antenna

Subtest Number: 20162 - 1	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412 MHz, 11 Mbps, 20 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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

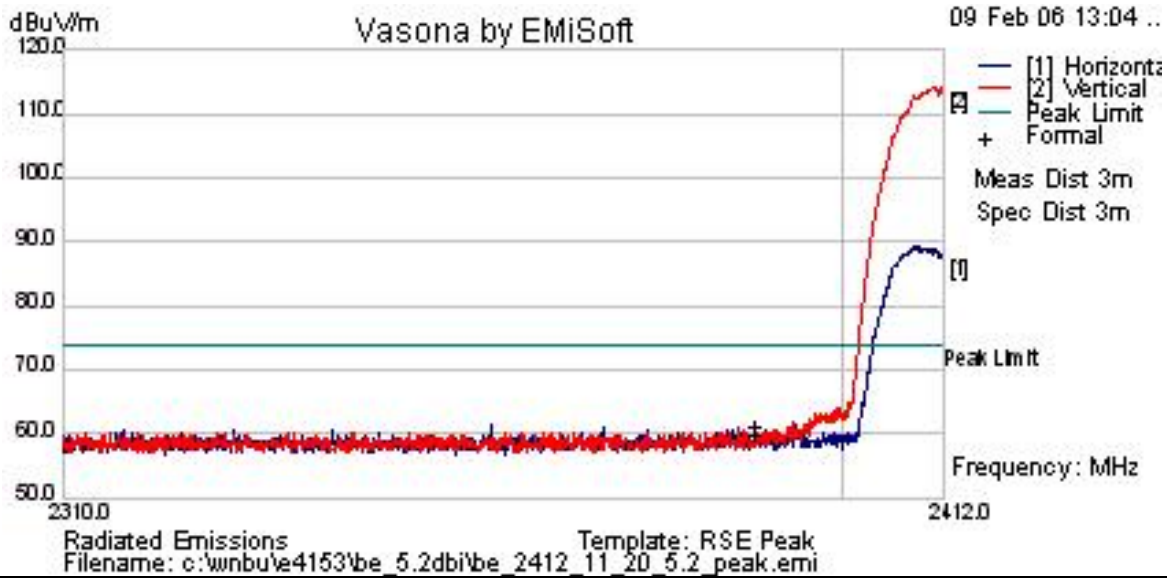
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	26.5	23.9	-1.7	48.6	Av	V	166	178	54	-5.4	Pass	
2390	26.4	23.9	-1.7	48.5	Av	H	166	178	54	-5.5	Pass	

Subtest Number: 20162 - 2	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412 MHz, 11 Mbps, 20 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

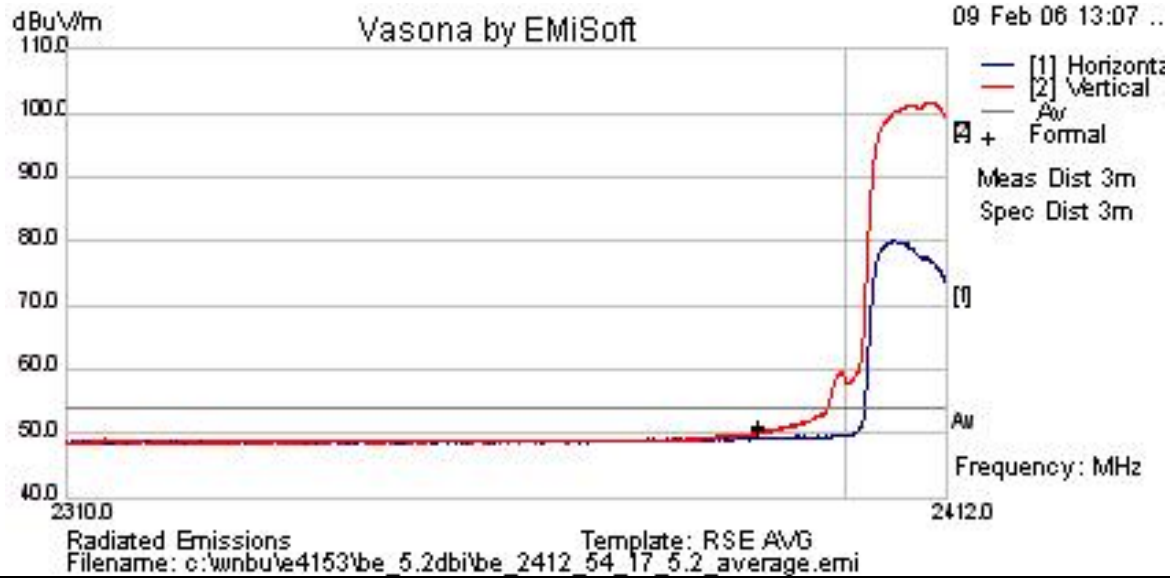
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	35.7	23.9	-1.7	57.9	Pk	V	166	178	74	-16.1	Pass	
2390	36.8	23.9	-1.7	59	Pk	H	166	178	74	-15	Pass	

Subtest Number: 20162 - 3	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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

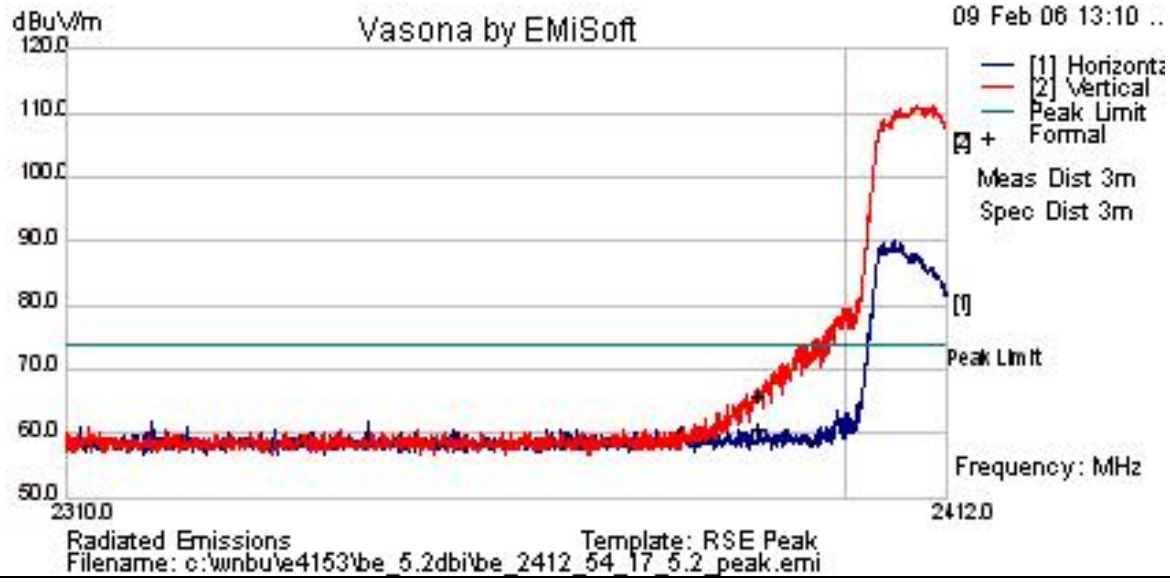
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	27.1	23.9	-1.7	49.2	Av	V	166	178	54	-4.8	Pass	
2390	26.4	23.9	-1.7	48.5	Av	H	166	178	54	-5.5	Pass	

Subtest Number: 20162 - 4	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

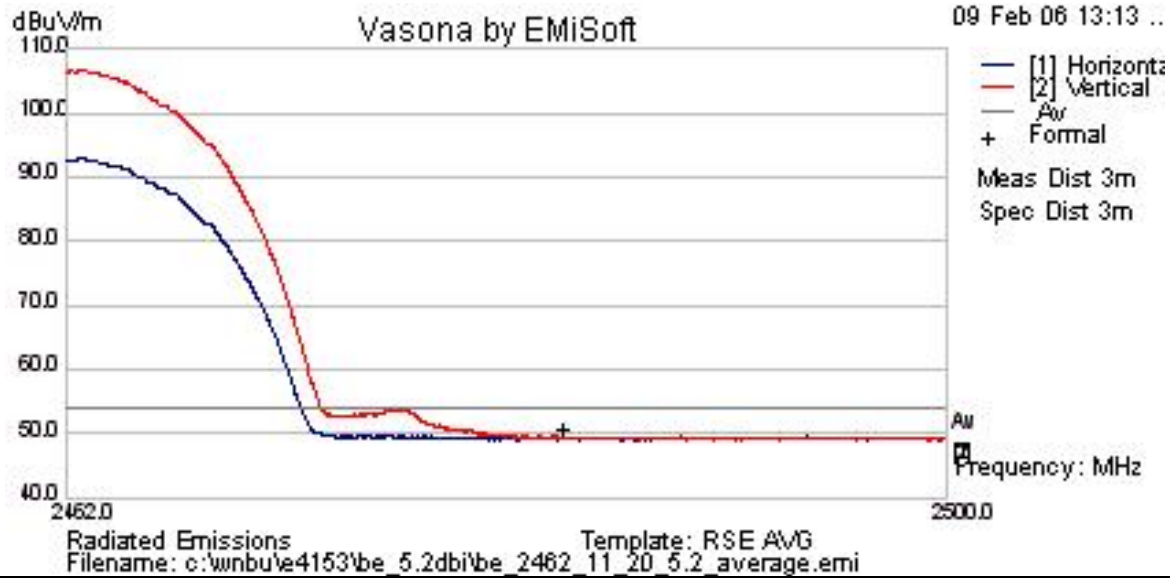
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	41.6	23.9	-1.7	63.8	Pk	V	166	178	74	-10.2	Pass	
2390	36.6	23.9	-1.7	58.7	Pk	H	166	178	74	-15.3	Pass	

Subtest Number: 20162 - 5	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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

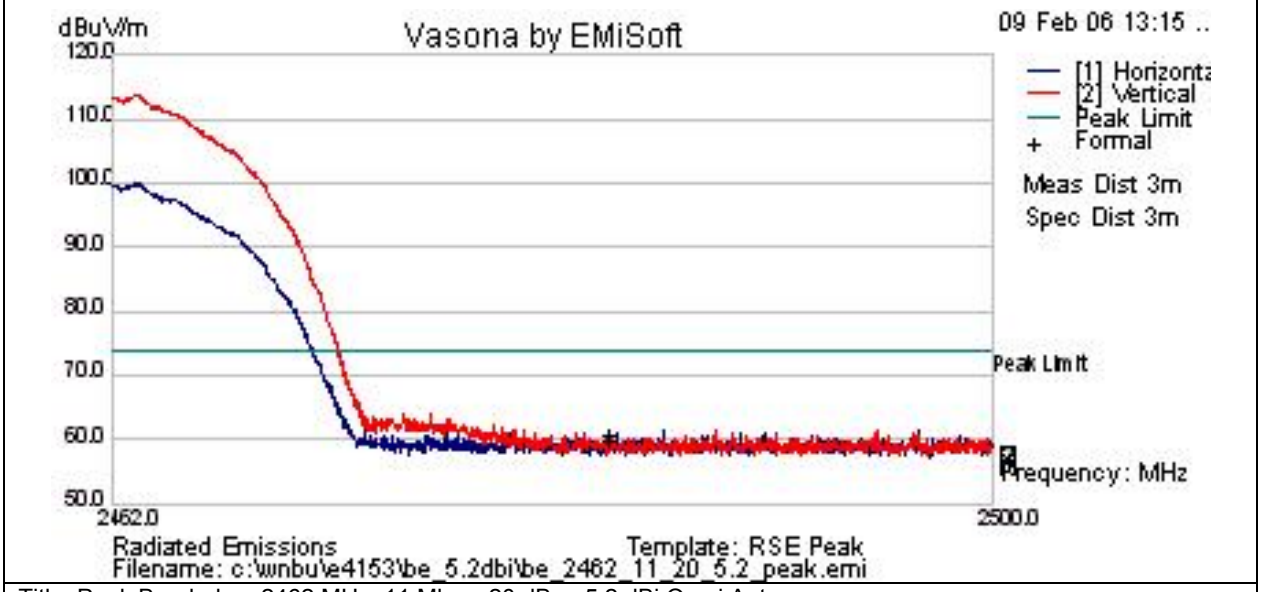
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	26.3	23.9	-1.7	48.6	Av	V	166	178	54	-5.4	Pass	
2483.5	26.2	23.9	-1.7	48.5	Av	H	166	178	54	-5.5	Pass	

Subtest Number: 20162 - 6	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

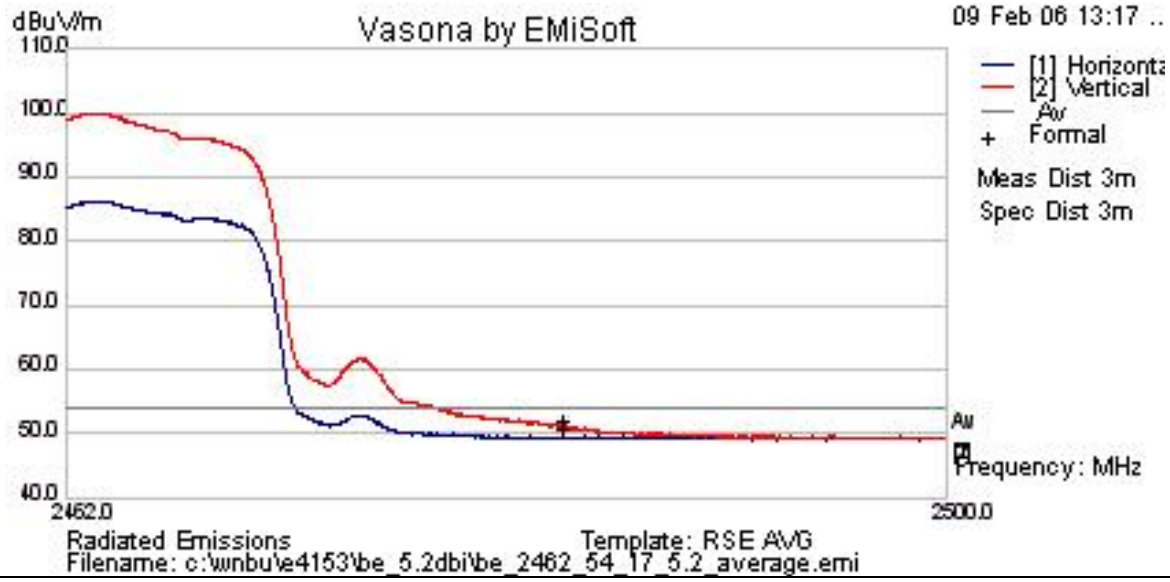
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	36.6	23.9	-1.7	58.8	Pk	V	166	178	74	-15.2	Pass	
2483.5	35.7	23.9	-1.7	58	Pk	H	166	178	74	-16	Pass	

Subtest Number: 20162 - 7	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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

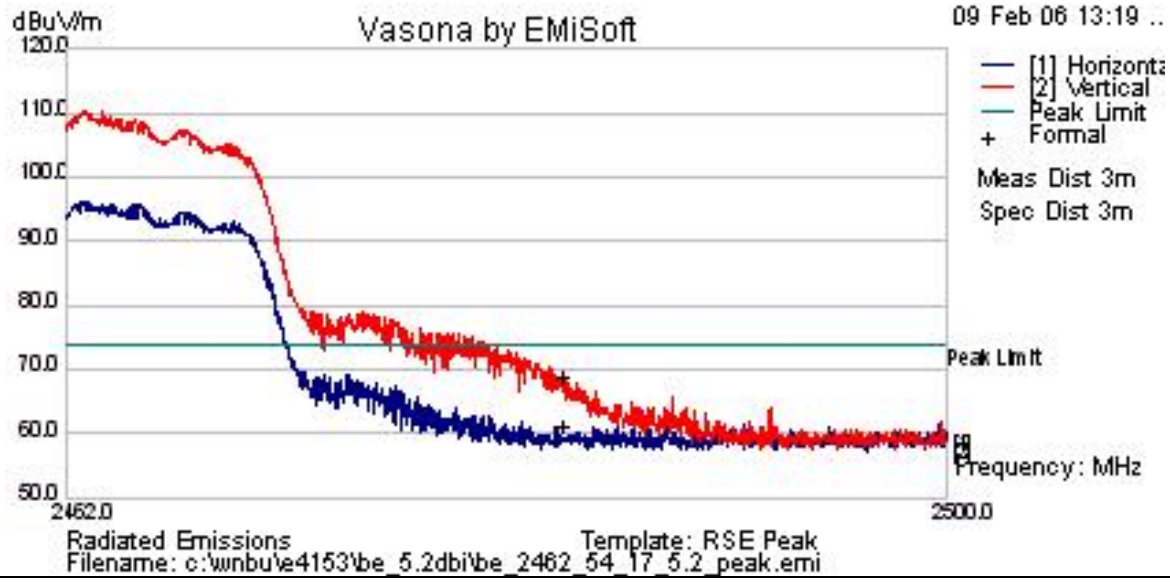
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	27.9	23.9	-1.7	50.1	Av	V	166	178	54	-3.9	Pass	
2483.5	26.3	23.9	-1.7	48.5	Av	H	166	178	54	-5.5	Pass	

Subtest Number: 20162 - 8	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 5.2 dBi Omni Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	44.6	23.9	-1.7	66.8	Pk	V	166	178	74	-7.2	Pass	
2483.5	36.9	23.9	-1.7	59.2	Pk	H	166	178	74	-14.8	Pass	

Physical Test arrangement Photograph:

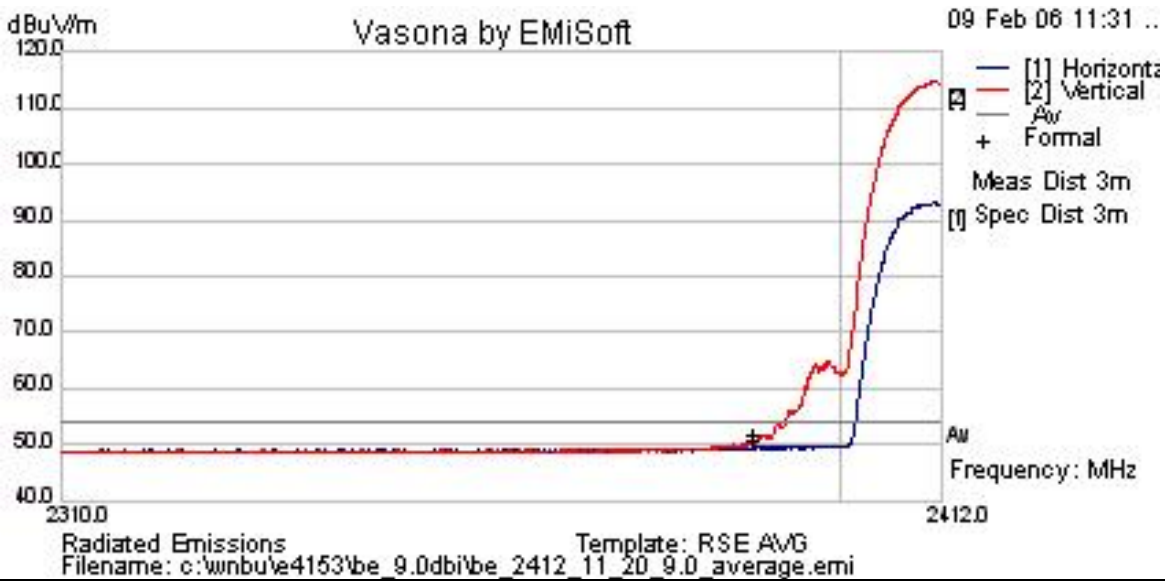
Title: 5.2dBi Omni Antenna Test Setup

Radiated Bandedge with 9.0 dBi Patch Antenna

Subtest Number: 20161 - 5	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Bandedge, 2412 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna

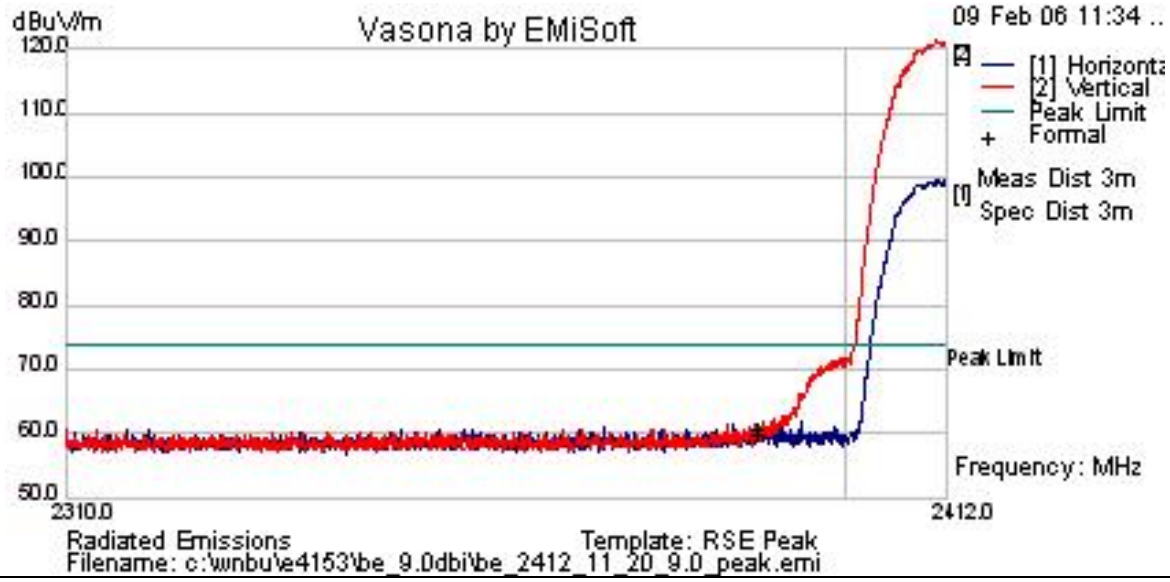
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	27.4	23.9	-1.7	49.5	Av	V	166	178	54	-4.5	Pass	
2390	26.5	23.9	-1.7	48.7	Av	H	166	178	54	-5.3	Pass	

Subtest Number: 20161 - 6	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Bandedge, 2412 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna

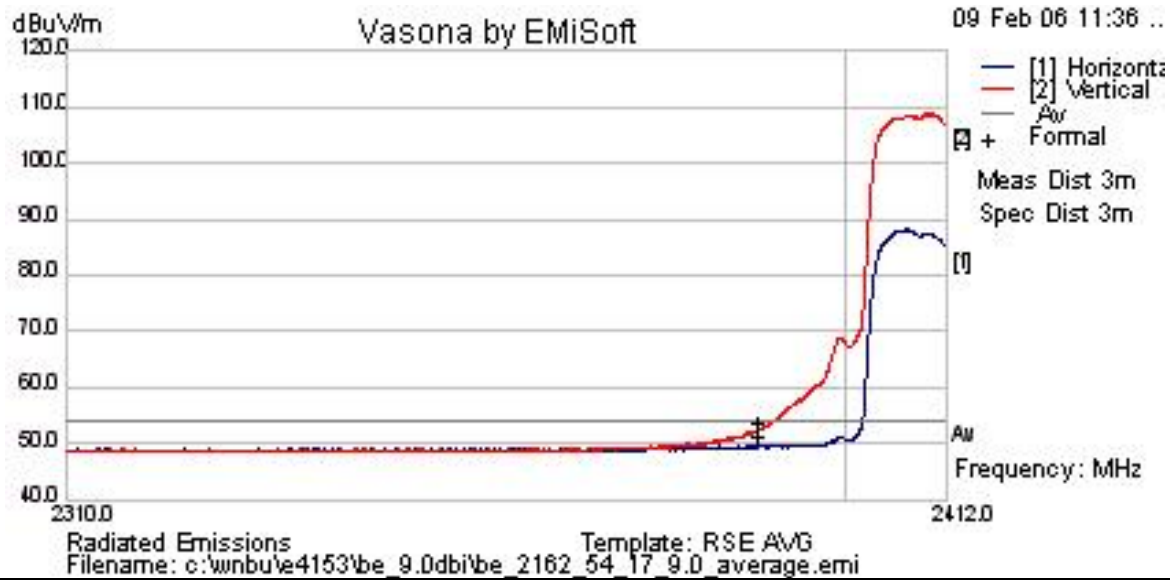
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	36.6	23.9	-1.7	58.7	Pk	V	166	178	74	-15.3	Pass	
2390	35.7	23.9	-1.7	57.9	Pk	H	166	178	74	-16.1	Pass	

Subtest Number: 20161 - 7	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna

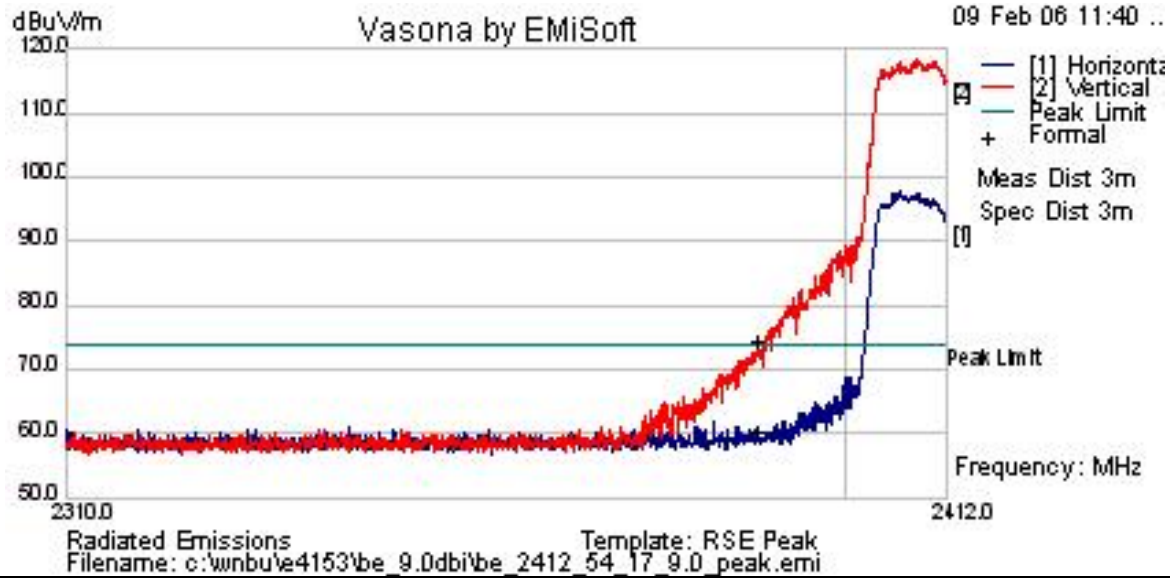
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	29.4	23.9	-1.7	51.5	Av	V	166	178	54	-2.5	Pass	
2390	26.6	23.9	-1.7	48.7	Av	H	166	178	54	-5.3	Pass	

Subtest Number: 20161 - 8	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna

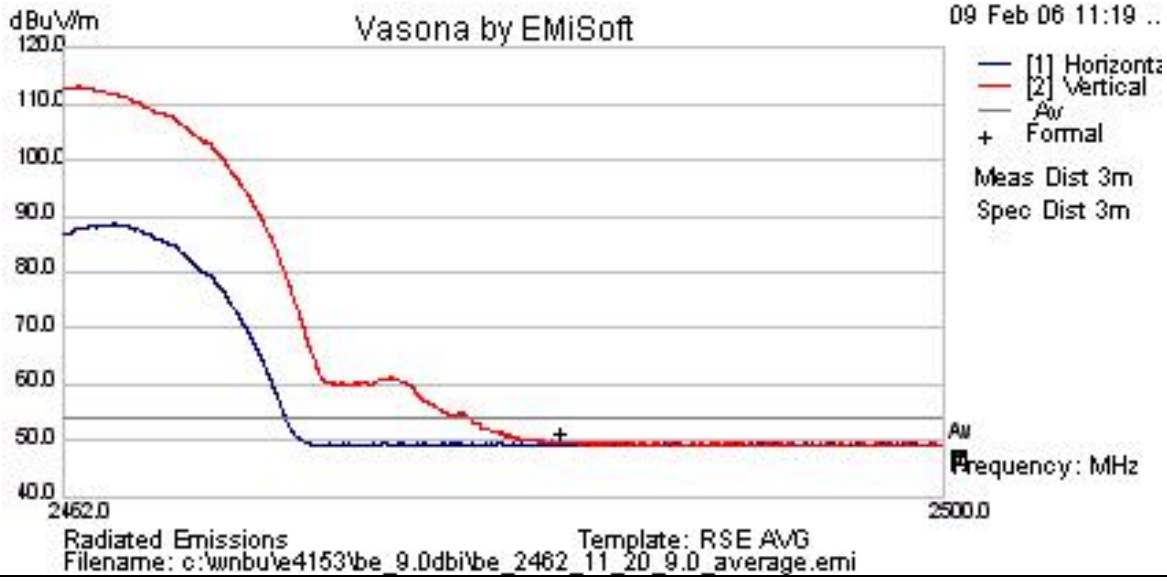
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	50.1	23.9	-1.7	72.2	Pk	V	166	178	74	-1.8	Pass	
2390	36.1	23.9	-1.7	58.3	Pk	H	166	178	74	-15.7	Pass	

Subtest Number: 20161 - 1	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna

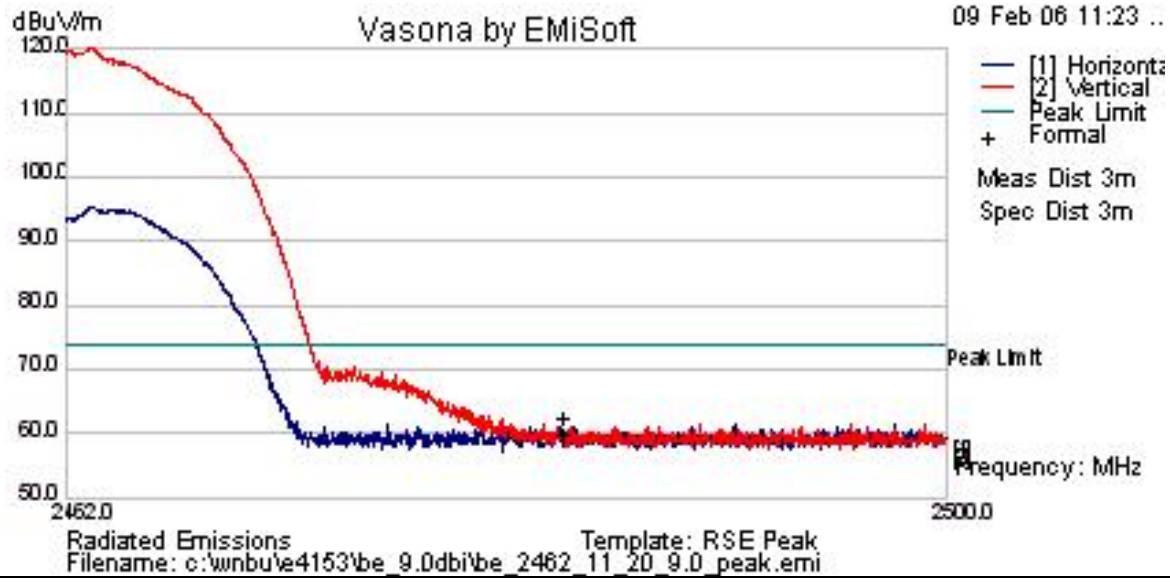
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	26.6	23.9	-1.7	48.8	Av	V	166	178	54	-5.2	Pass	
2483.5	26.6	23.9	-1.7	48.8	Av	H	166	178	54	-5.2	Pass	

Subtest Number: 20161 - 2	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 9.0 dBi Patch Antenna

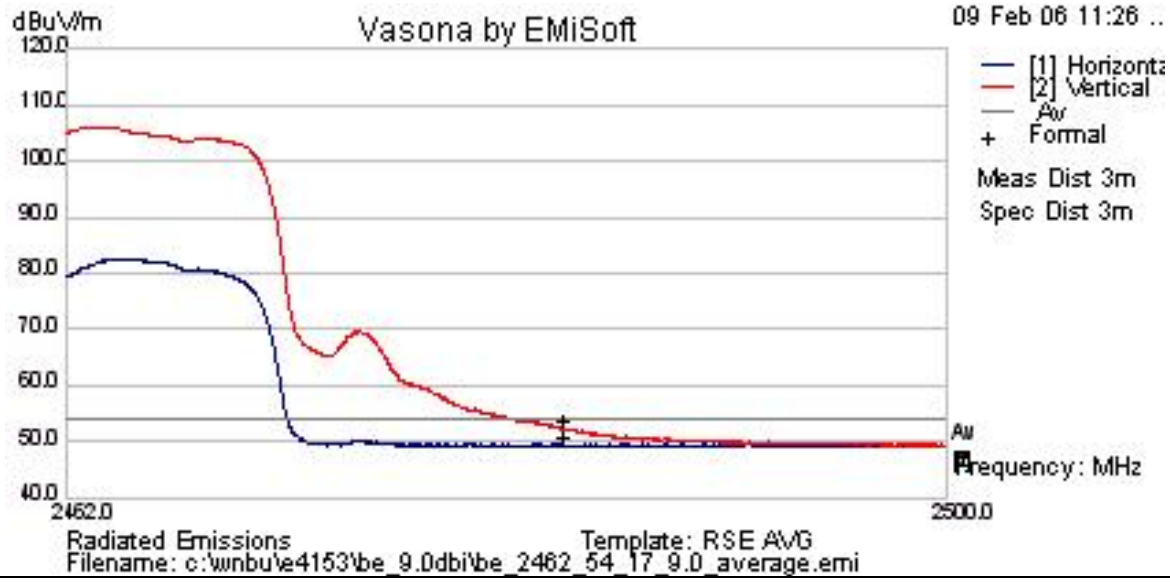
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	38	23.9	-1.7	60.3	Pk	V	166	178	74	-13.7	Pass	
2483.5	35.5	23.9	-1.7	57.7	Pk	H	166	178	74	-16.3	Pass	

Subtest Number: 20161 - 3	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna

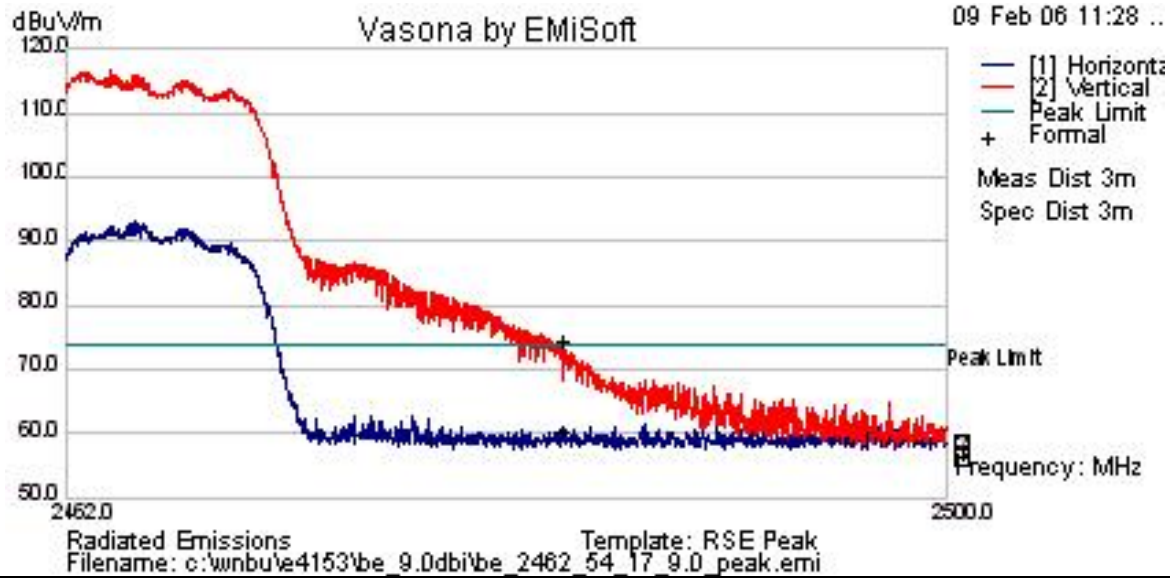
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	29	23.9	-1.7	51.3	Av	V	166	178	54	-2.7	Pass	
2483.5	26.3	23.9	-1.7	48.6	Av	H	166	178	54	-5.4	Pass	

Subtest Number: 20161 - 4	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

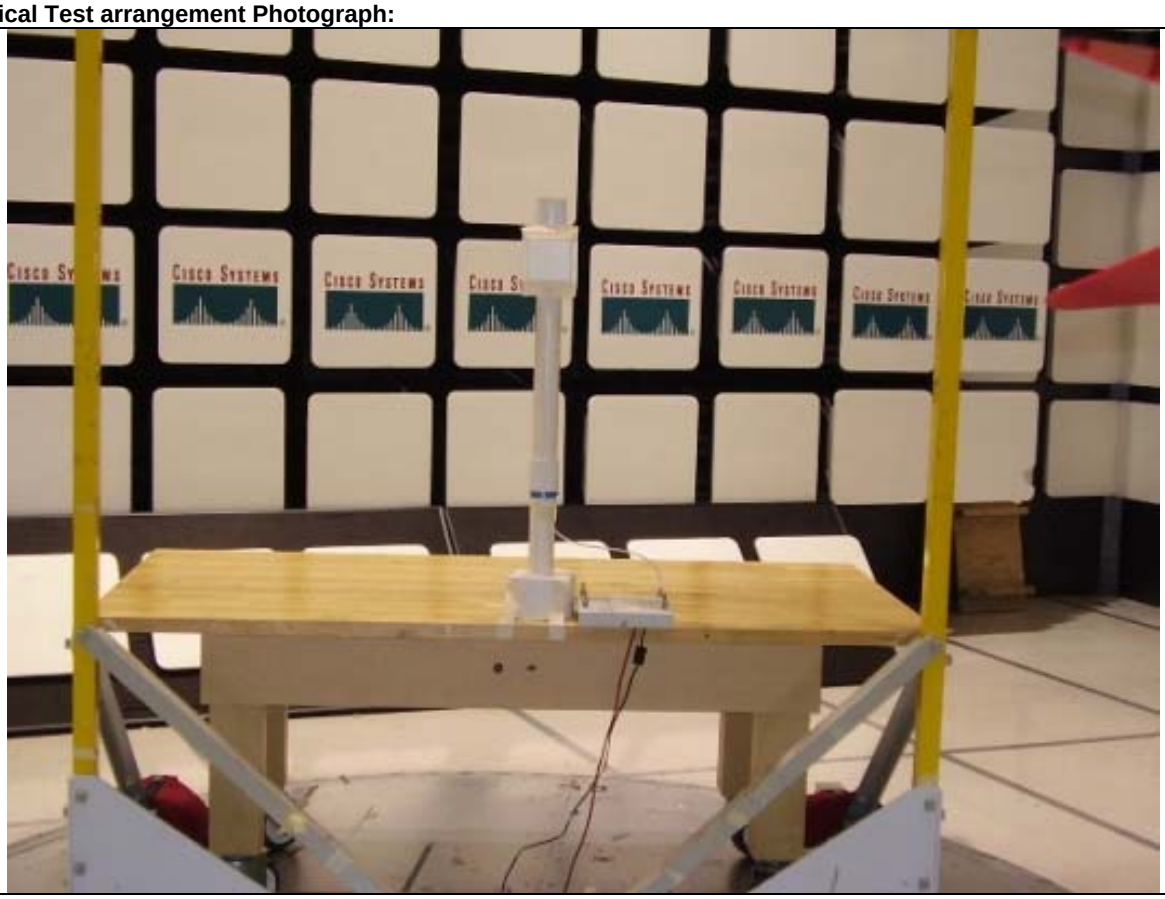


Title: Peak Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 9.0 dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	50.1	23.9	-1.7	72.4	Pk	V	166	178	74	-1.6	Pass	
2483.5	36	23.9	-1.7	58.2	Pk	H	166	178	74	-15.8	Pass	

Physical Test arrangement Photograph:



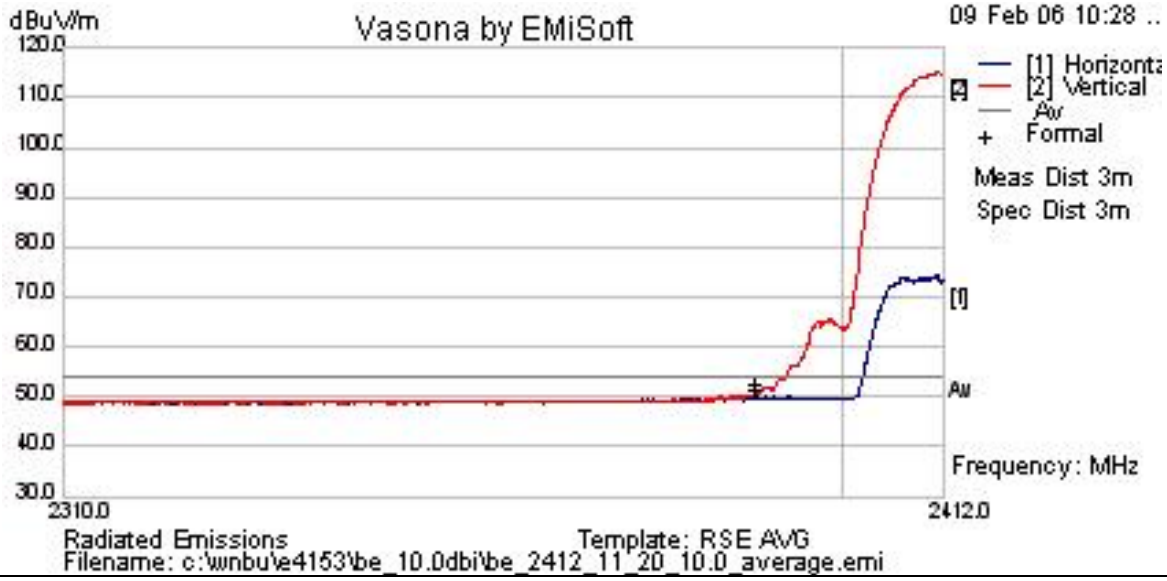
Title: 9.5dBi Patch Antenna Bandedge Setup

Radiated Bandedge with 10.0 dBi Yagi Antenna

Subtest Number: 20152 - 1	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 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	1 MHz RBW, 10 Hz VBW

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

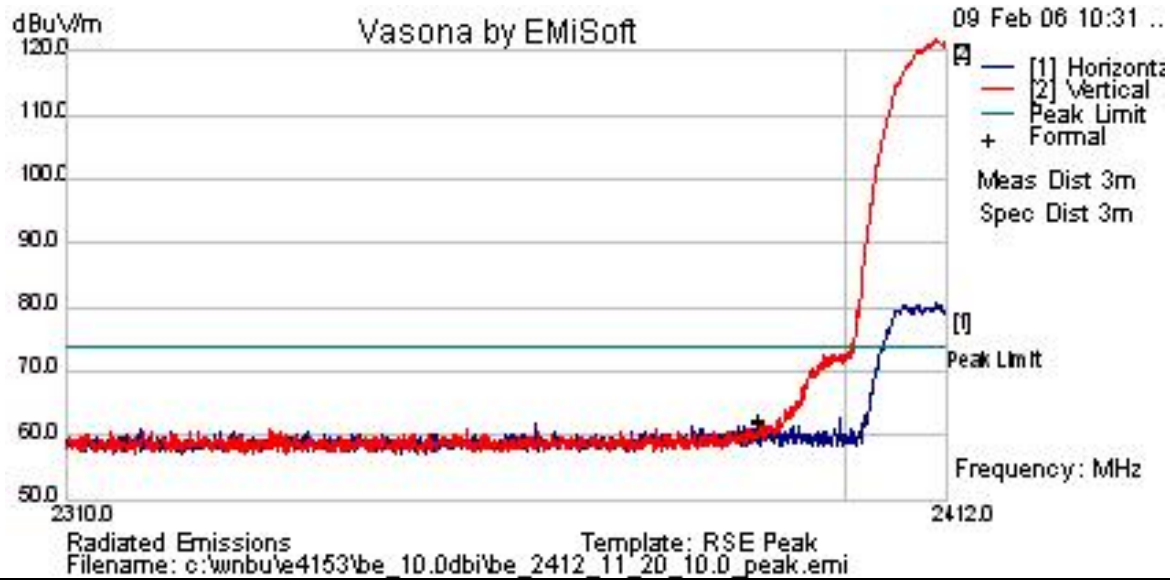
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	27.6	23.9	-1.7	49.8	Av	V	166	178	54	-4.2	Pass	
2390	26.8	23.9	-1.7	48.9	Av	H	166	178	54	-5.1	Pass	

Subtest Number: 20152 - 2	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 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	1 MHz RBW, 1 MHz VBW

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

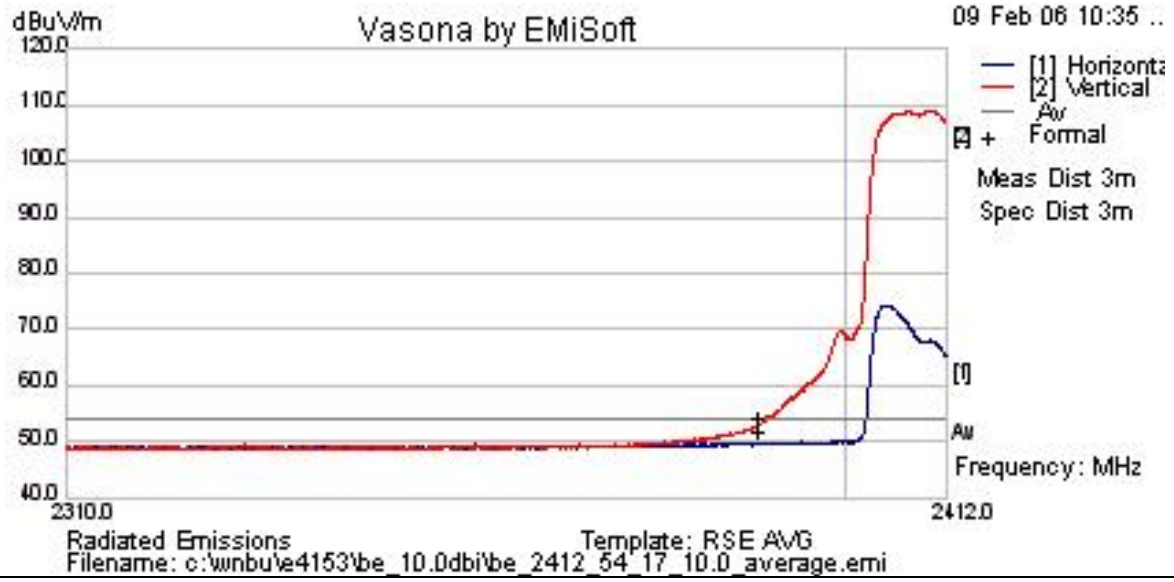
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	38.2	23.9	-1.7	60.3	Pk	V	166	178	74	-13.7	Pass	
2390	37.7	23.9	-1.7	59.8	Pk	H	166	178	74	-14.2	Pass	

Subtest Number: 20152 - 3	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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

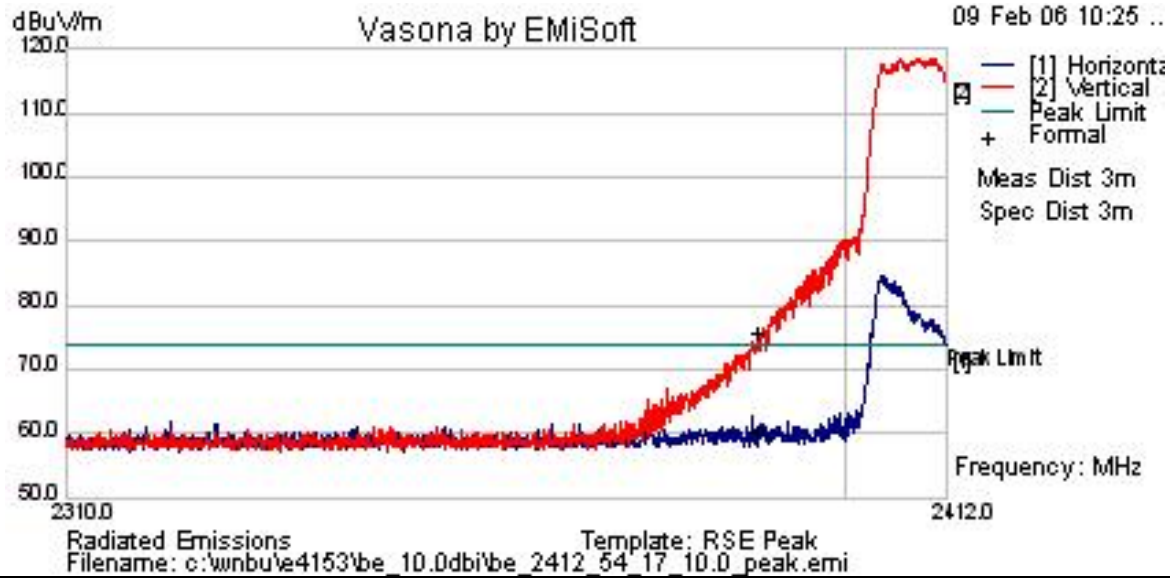
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	29.6	23.9	-1.7	51.8	Peak(Scan)	V	166	178	54	-2.2	Pass	
2390	27.4	23.9	-1.7	49.5	Peak(Scan)	H	166	178	54	-4.5	Pass	

Subtest Number: 20152 - 4	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2412 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2412.0
Lowest Frequency	2310.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

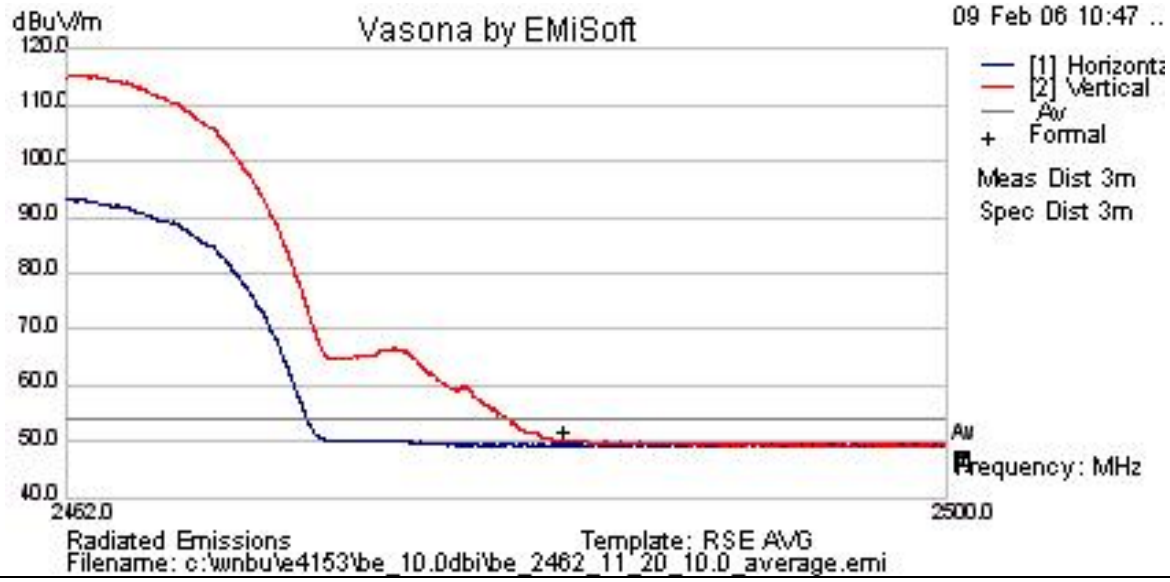
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2390	51.6	23.9	-1.7	73.7	Pk	V	166	178	74	-0.3	Pass	
2390	35.9	23.9	-1.7	58.1	Pk	H	166	178	74	-15.9	Pass	

Subtest Number: 20152 - 5	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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

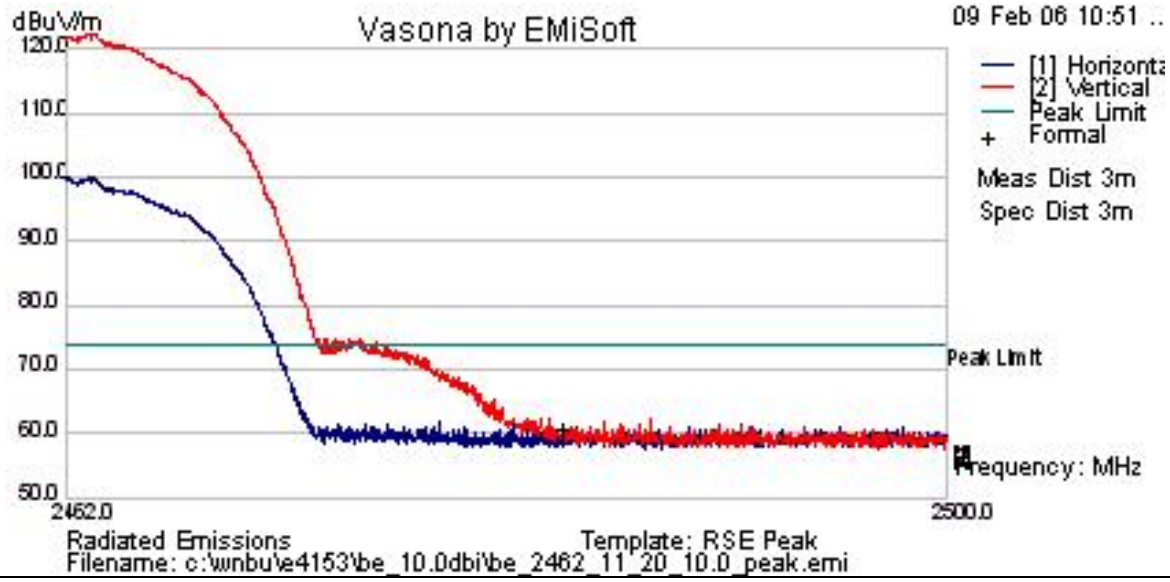
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	27.1	23.9	-1.7	49.4	Av	V	166	178	54	-4.6	Pass	
2483.5	27.1	23.9	-1.7	49.3	Av	H	166	178	54	-4.7	Pass	

Subtest Number: 20152 - 6	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

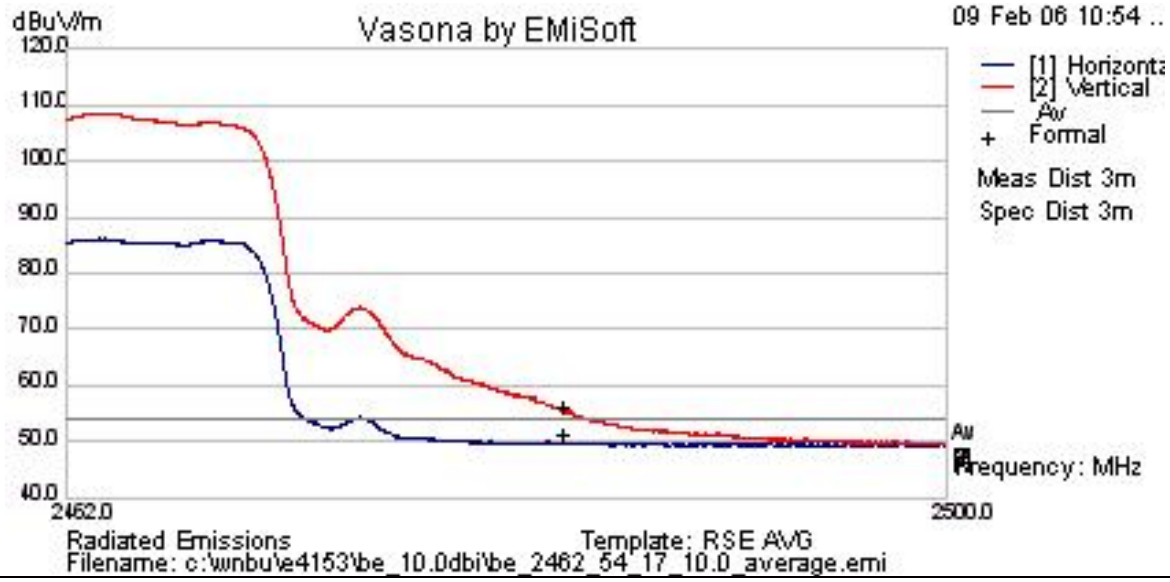
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	36.3	23.9	-1.7	58.6	Pk	V	166	178	74	-15.4	Pass	
2483.5	36.4	23.9	-1.7	58.6	Pk	H	166	178	74	-15.4	Pass	

Subtest Number: 20152 - 7	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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

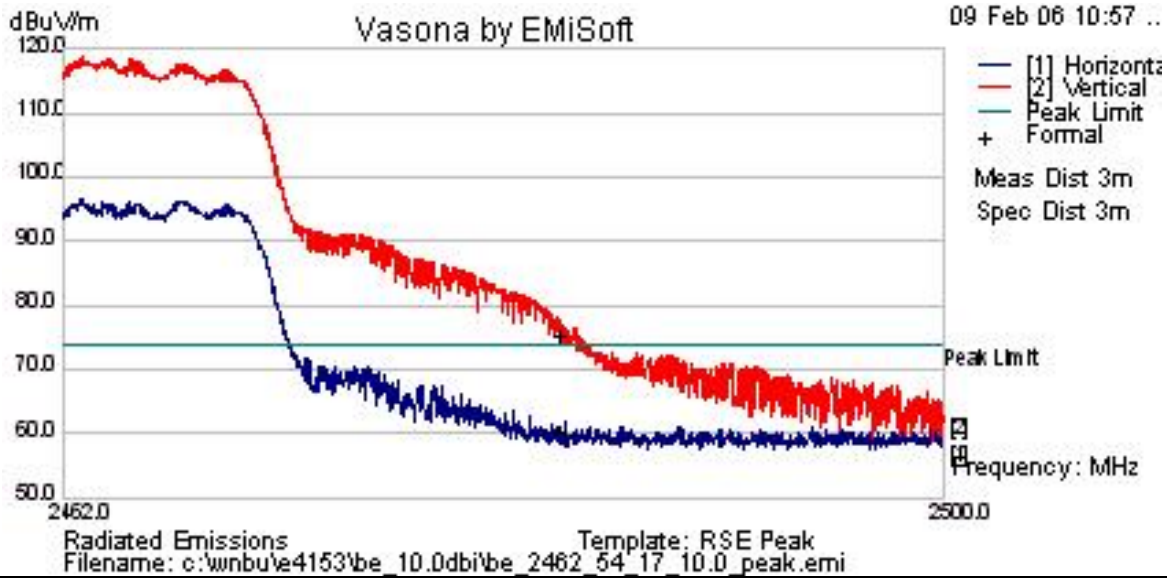
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	31.6	23.9	-1.7	53.8	Av	V	166	178	54	-0.1	Pass	
2483.5	26.6	23.9	-1.7	48.8	Av	H	166	178	54	-5.2	Pass	

Subtest Number: 20152 - 8	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Bandedge, 2462 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	2500.0
Lowest Frequency	2462.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2483.5	50.8	23.9	-1.7	73.1	Pk	V	166	178	74	-0.9	Pass	
2483.5	35.8	23.9	-1.7	58.1	Pk	H	166	178	74	-15.9	Pass	

Physical Test arrangement Photograph:

Title: 10dBi Band Edge Test Setup

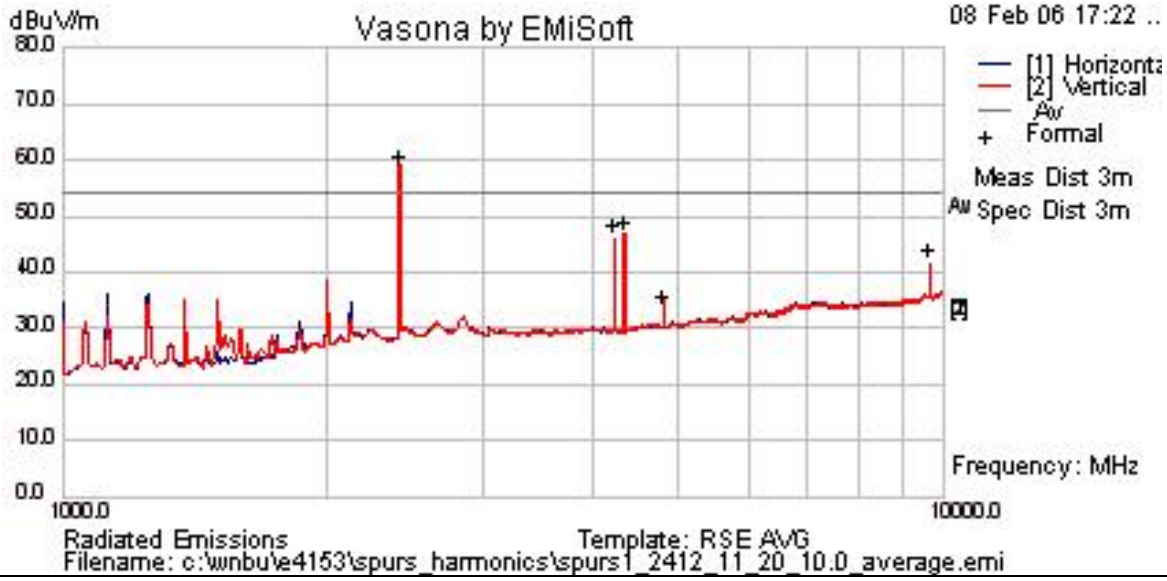
Radiated Spurs and Harmonics with All Antennas (1-18GHz)

There were no measurable emissions above 18GHz for any of the channel/antenna combinations.

Subtest Number: 20147 - 3	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Spurs , 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Spurs , 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, All Antennas

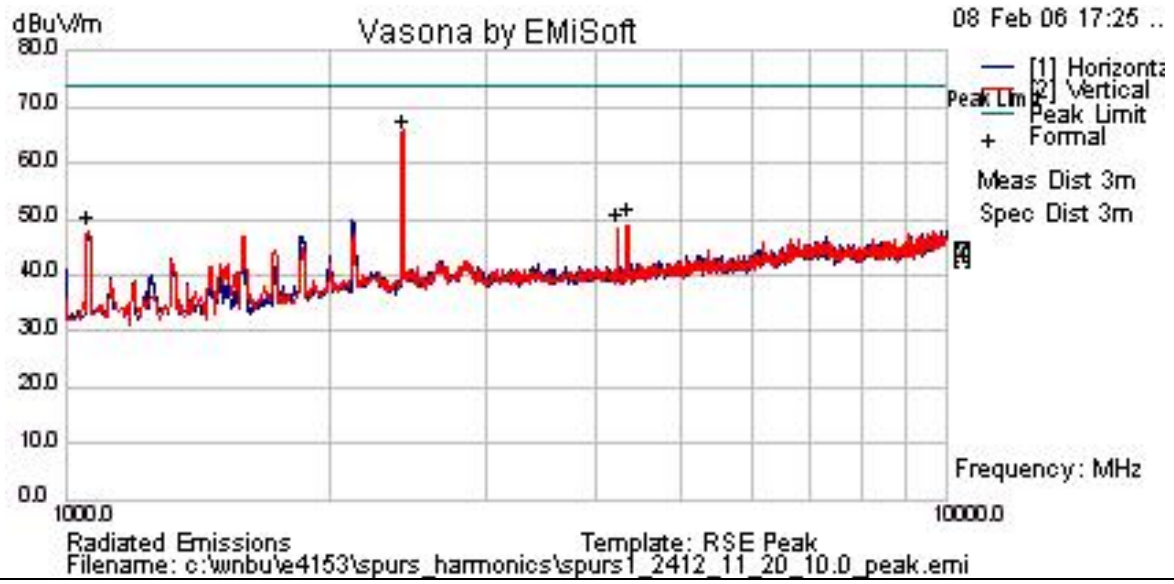
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2412	59.8	9	-10.3	58.4	Av	V	164	134	54	4.4	Fail	Notched Carrier
4242.65	46.9	7.9	-8.6	46.1	Av	V	164	134	54	-7.9	Pass	
4343.4	47.2	8	-8.5	46.7	Av	V	164	134	54	-7.3	Pass	
4824.1	32.9	8.6	-8	33.5	Av	V	164	134	54	-20.5	Pass	
9648.07	32.4	12	-2.8	41.5	Av	V	164	134	54	-12.5	Pass	

Subtest Number: 20147 - 4	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Spurs , 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Spurs , 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, All Antennas

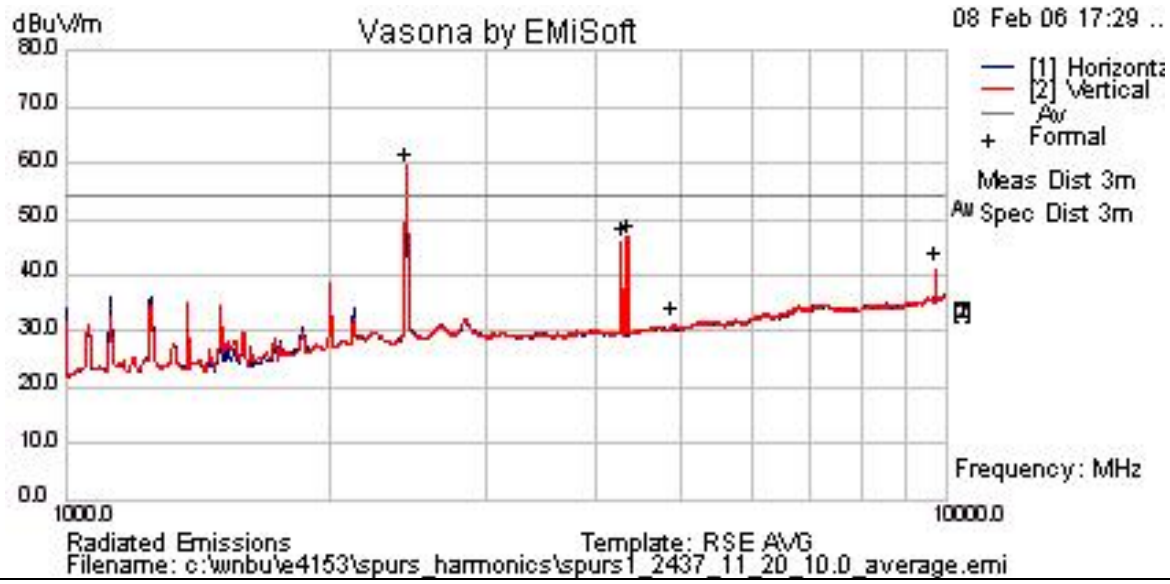
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1059.85	58	4.1	-14.2	47.9	Pk	V	164	134	74	-26.1	Pass	
2412	66.8	9	-10.3	65.4	Pk	V	164	134	74	-8.6	Pass	Notched Carrier
4242.58	49.3	7.9	-8.6	48.5	Pk	V	164	134	74	-25.5	Pass	
4343.17	50	8	-8.5	49.6	Pk	V	164	134	74	-24.4	Pass	

Subtest Number: 20147 - 5	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Spurs , 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Spurs , 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, All Antennas

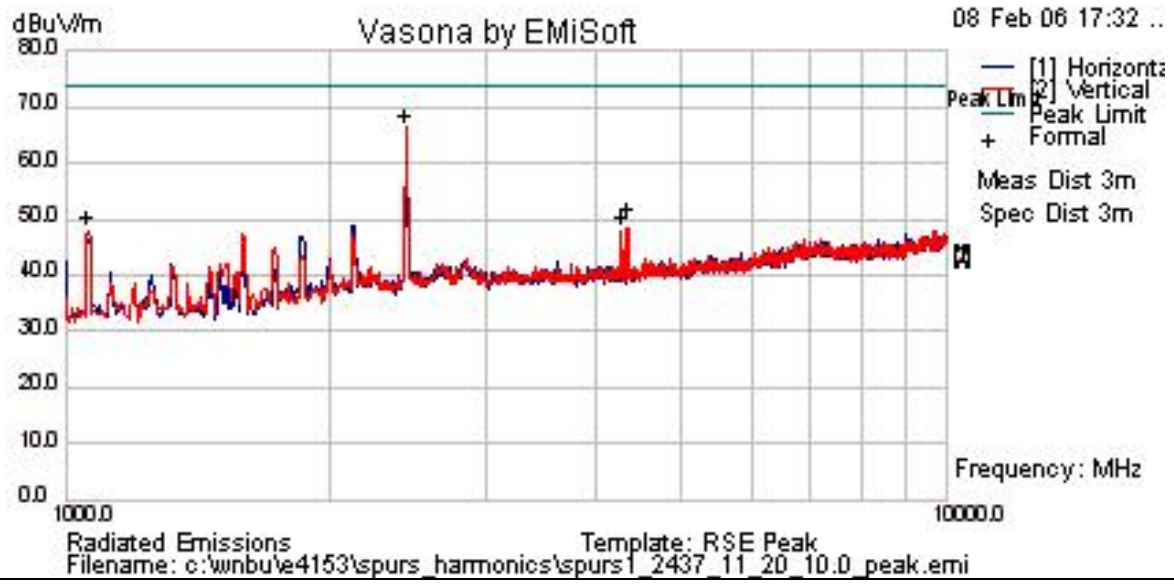
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2437	60.6	9	-10.2	59.4	Av	V	164	134	54	5.4	Fail	Notched Carrier
4275.96	46.7	8	-8.7	46	Av	V	164	134	54	-8	Pass	
4343.36	47.2	8	-8.5	46.7	Av	V	164	134	54	-7.3	Pass	
4873.94	31.4	8.6	-8	32.1	Av	V	164	134	54	-21.9	Pass	
9747.88	32.2	12.1	-2.7	41.6	Av	V	164	134	54	-12.4	Pass	

Subtest Number: 20147 - 6	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Spurs , 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Spurs , 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, All Antennas

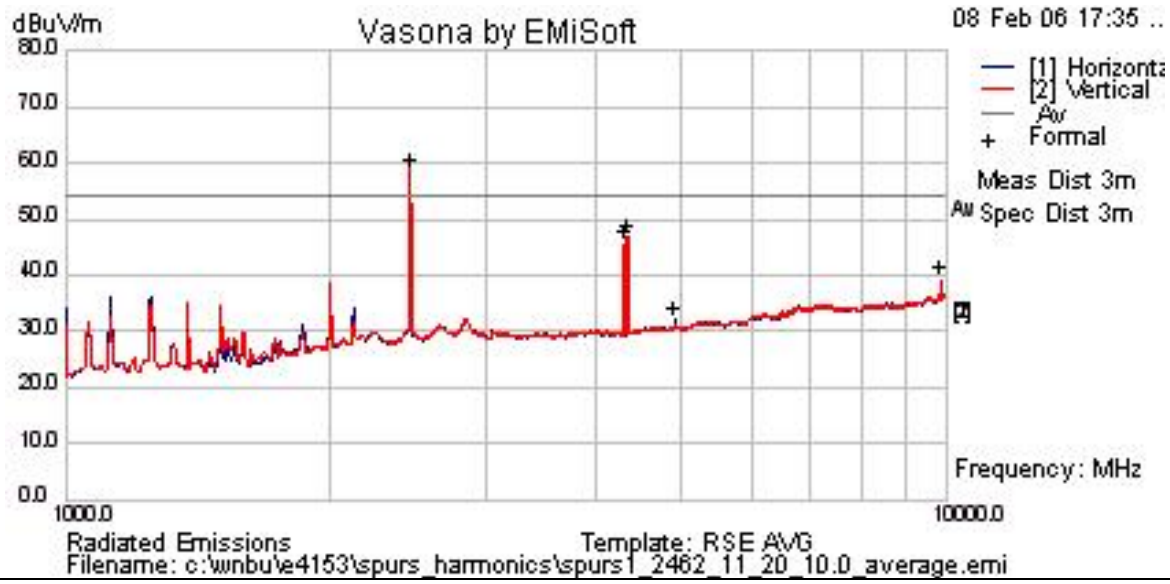
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1059.85	58	4.1	-14.2	47.9	Pk	V	164	134	74	-26.1	Pass	
2437	67.5	9	-10.2	66.3	Pk	V	164	134	74	-7.7	Pass	Notched Carrier
4276.04	48.9	8	-8.7	48.1	Pk	V	164	134	74	-25.9	Pass	
4343.17	50	8	-8.5	49.6	Pk	V	164	134	74	-24.4	Pass	

Subtest Number: 20147 - 7	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Spurs , 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Spurs , 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, All Antennas

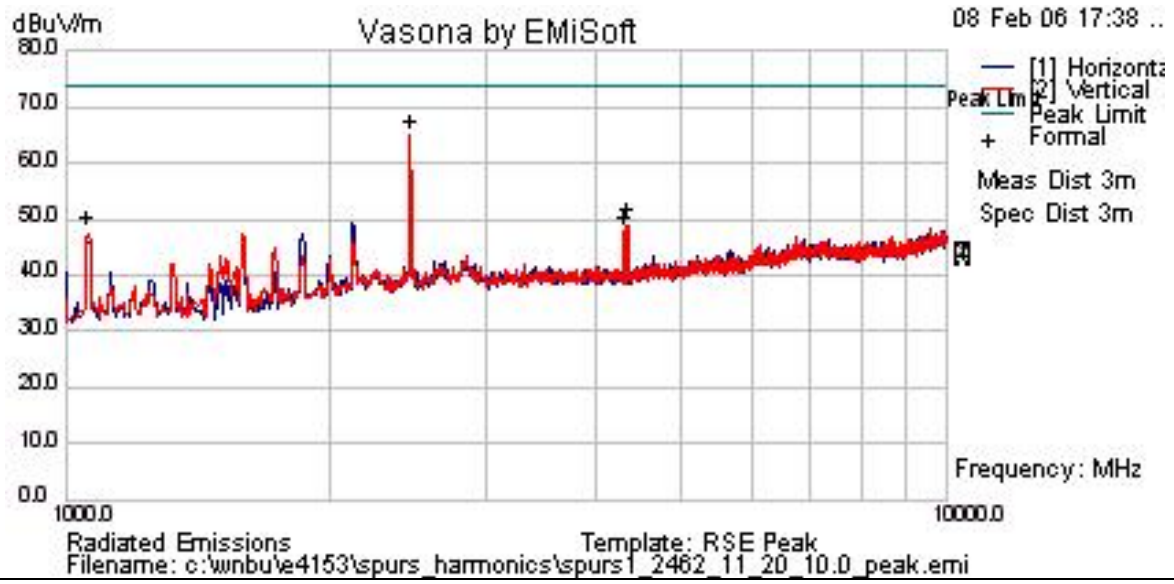
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2462	59.5	9.1	-10	58.6	Av	V	164	134	54	4.6	Fail	Notched Carrier
4309.32	46.4	8	-8.7	45.6	Av	V	164	134	54	-8.4	Pass	
4343.36	47.2	8	-8.5	46.7	Av	V	164	134	54	-7.3	Pass	
4923.93	31.4	8.7	-8.1	32.1	Av	V	164	134	54	-21.9	Pass	
9847.86	29.8	12.2	-2.6	39.4	Av	V	164	134	54	-14.6	Pass	

Subtest Number: 20147 - 8	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Spurs , 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Spurs , 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, All Antennas

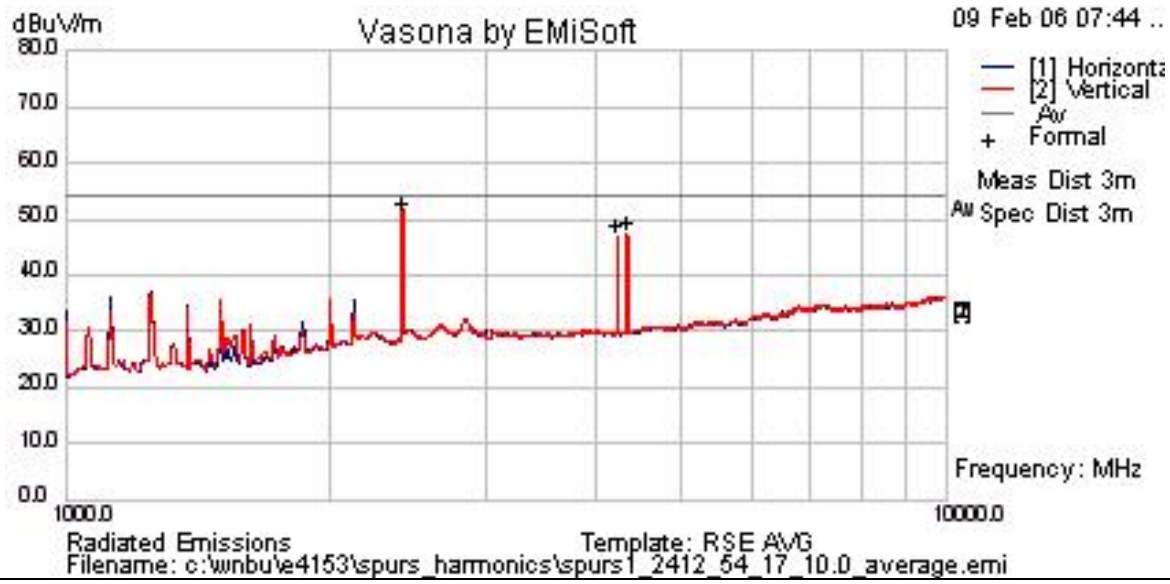
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1059.85	58	4.1	-14.2	47.9	Pk	V	164	134	74	-26.1	Pass	
2462	66.3	9.1	-10	65.4	Pk	V	164	134	74	-8.6	Pass	Notched Carrier
4309.45	49	8	-8.7	48.2	Pk	V	164	134	74	-25.8	Pass	
4343.17	50	8	-8.5	49.6	Pk	V	164	134	74	-24.4	Pass	

Subtest Number: 20147 - 9	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Spurs , 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Spurs , 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, All Antennas

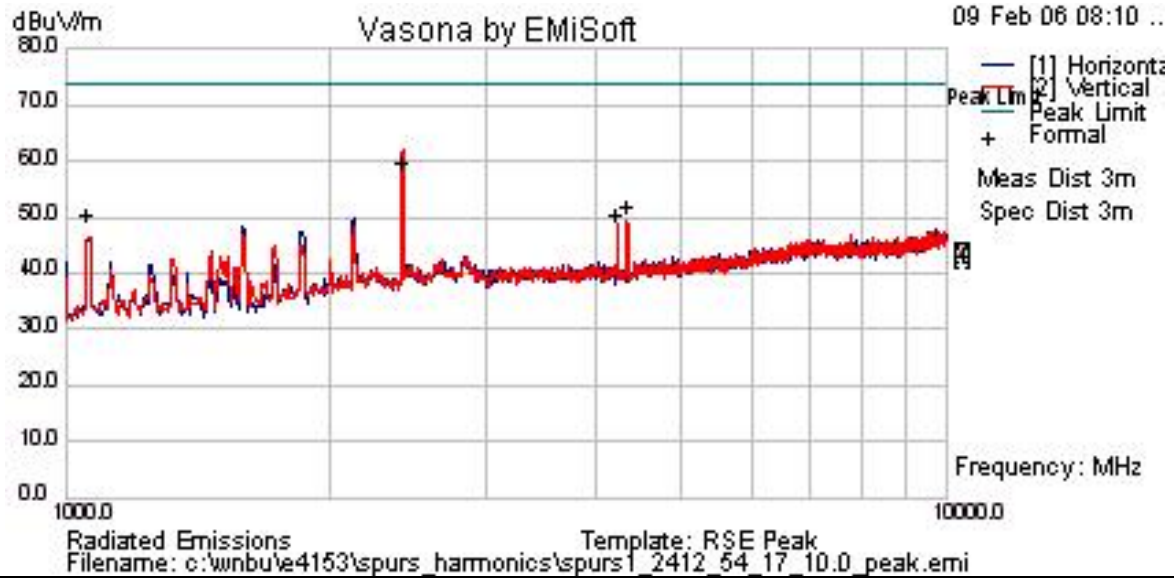
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2411.99	52	9	-10.3	50.7	Av	V	164	134	54	-3.3	Pass	Notched Carrier
4242.6	47.4	7.9	-8.6	46.7	Av	V	164	134	54	-7.3	Pass	
4343.43	47.4	8	-8.5	47	Av	V	164	134	54	-7	Pass	

Subtest Number: 20147 - 10	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Spurs , 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Spurs , 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, All Antennas

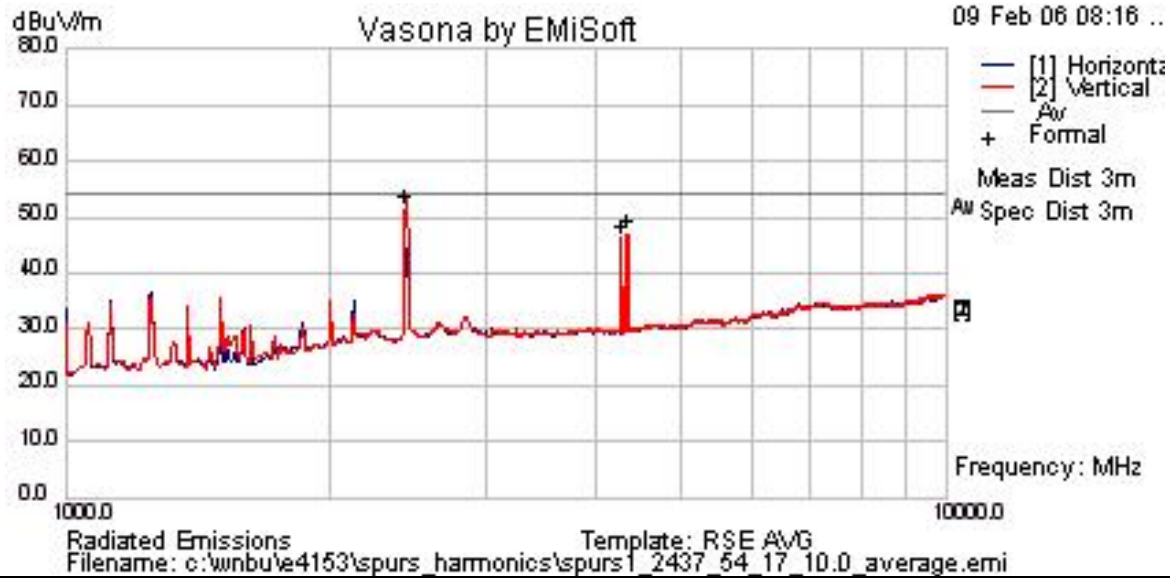
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1059.85	58	4.1	-14.2	47.9	Pk	V	164	134	74	-26.1	Pass	
2412	59	9	-10.3	57.6	Pk	V	164	134	74	-16.4	Pass	Notched Carrier
4242.5	48.7	7.9	-8.6	48	Pk	V	164	134	74	-26	Pass	
4343.36	50.3	8	-8.5	49.8	Pk	V	164	134	74	-24.2	Pass	

Subtest Number: 20147 - 11	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Spurs , 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Spurs , 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, All Antennas

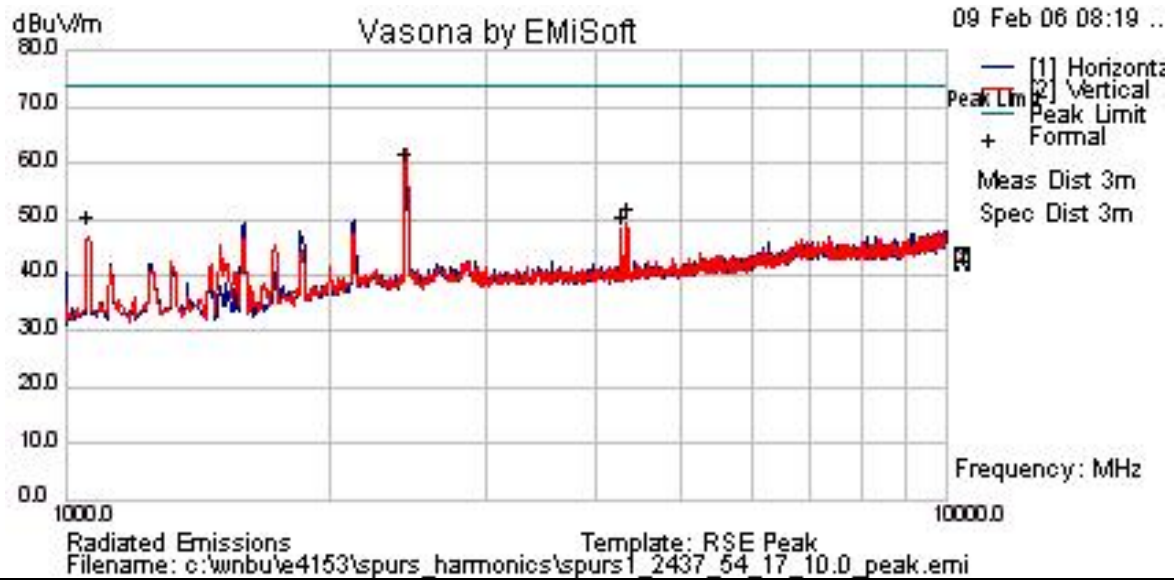
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2437	52.8	9	-10.2	51.6	Av	V	164	134	54	-2.4	Pass	Notched Carrier
4276	47.2	8	-8.7	46.4	Av	V	164	134	54	-7.6	Pass	
4343.43	47.4	8	-8.5	47	Av	V	164	134	54	-7	Pass	

Subtest Number: 20147 - 12	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Spurs , 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Spurs , 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, All Antennas

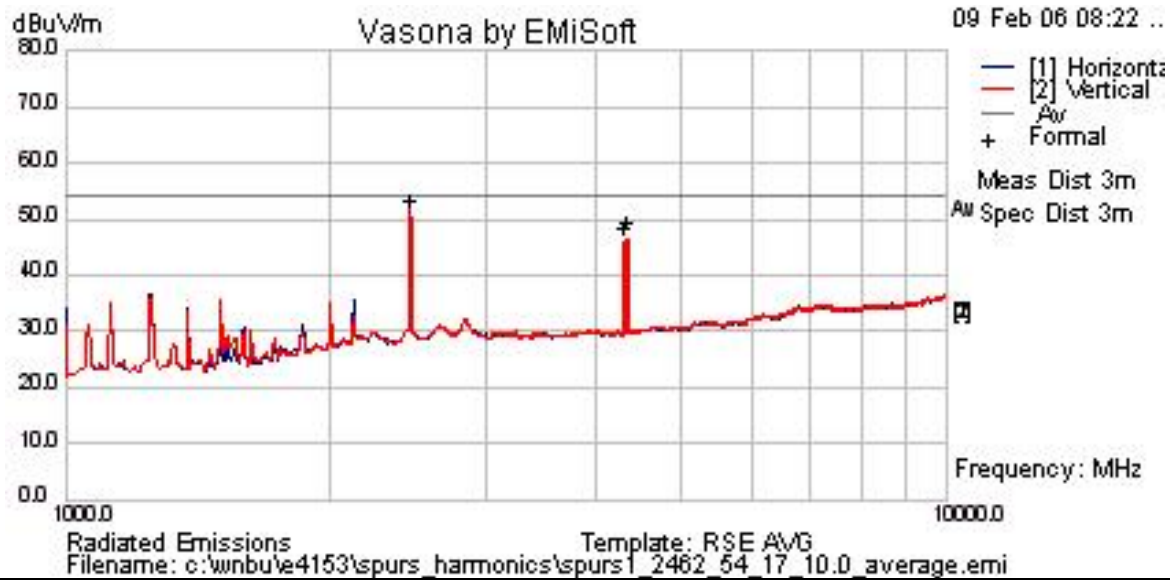
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1059.85	58	4.1	-14.2	47.9	Pk	V	164	134	74	-26.1	Pass	
2437	60.3	9	-10.2	59.2	Pk	V	164	134	74	-14.8	Pass	Notched Carrier
4276.01	48.9	8	-8.7	48.1	Pk	V	164	134	74	-25.9	Pass	
4343.36	50.3	8	-8.5	49.8	Pk	V	164	134	74	-24.2	Pass	

Subtest Number: 20147 - 13	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Spurs , 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Spurs , 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, All Antennas

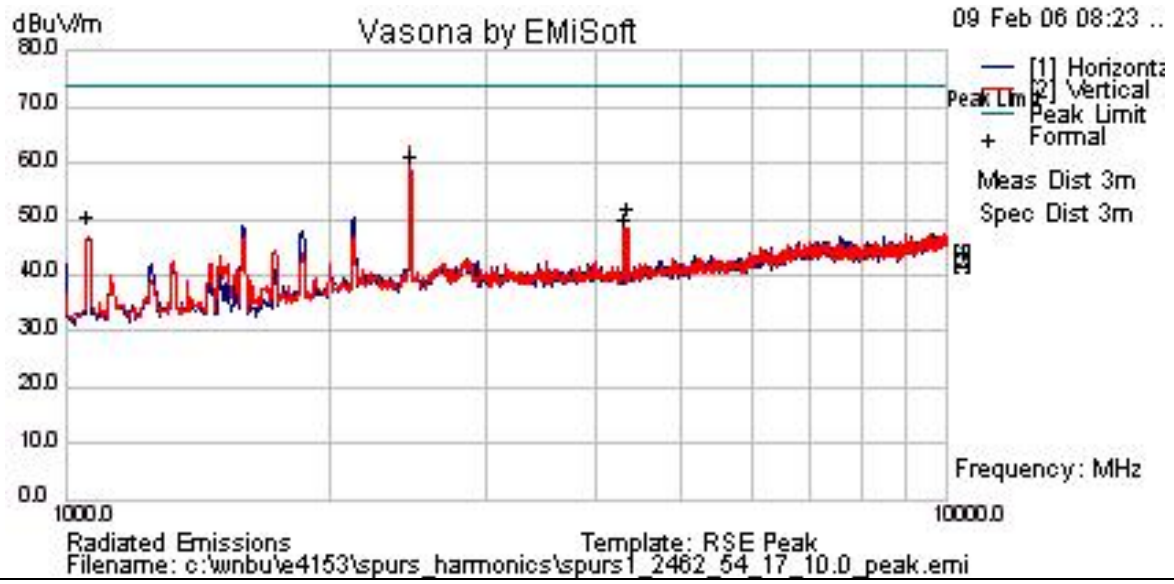
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2462	52.1	9.1	-10	51.2	Av	V	164	134	54	-2.8	Pass	Notched Carrier
4309.31	46.7	8	-8.7	45.9	Av	V	164	134	54	-8.1	Pass	
4343.43	47.4	8	-8.5	47	Av	V	164	134	54	-7	Pass	

Subtest Number: 20147 - 14	**Subtest Date:** 09-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Spurs , 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, All Antennas
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Spurs , 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, All Antennas

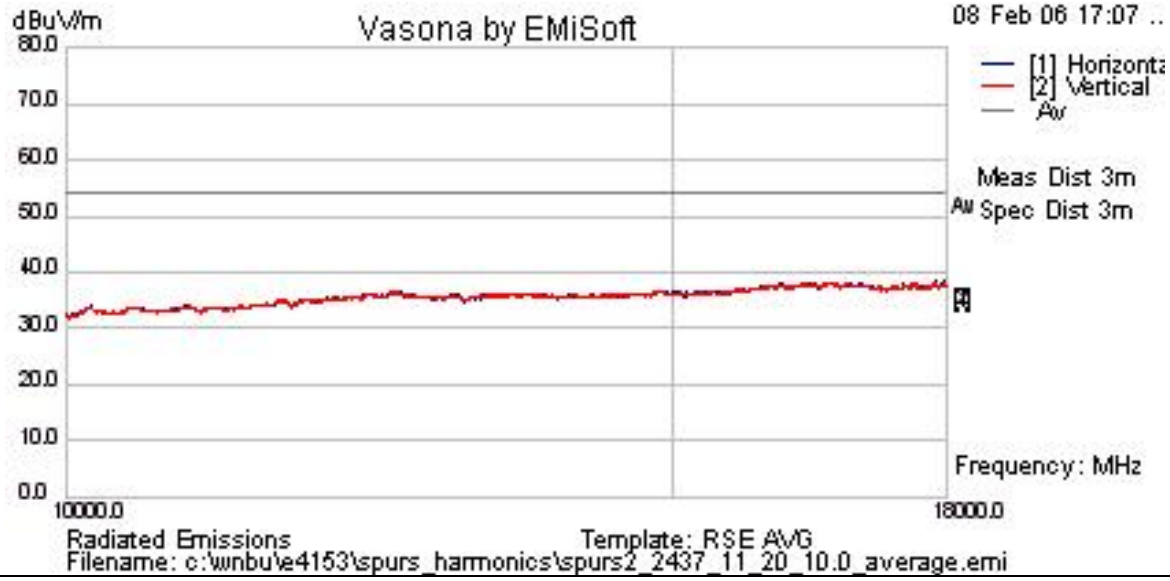
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1059.85	58	4.1	-14.2	47.9	Pk	V	164	134	74	-26.1	Pass	
2462	59.7	9.1	-10	58.8	Pk	V	164	134	74	-15.2	Pass	Notched Carrier
4309.47	48.3	8	-8.7	47.6	Pk	V	164	134	74	-26.4	Pass	
4343.36	50.3	8	-8.5	49.8	Pk	V	164	134	74	-24.2	Pass	

Subtest Number: 20147 - 1	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Spurs , 10 to 18 GHz, All channels, data rates, power levels, and antennas
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	10000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBW

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: Average Spurs , 10 to 18 GHz, All channels, data rates, power levels, and antennas

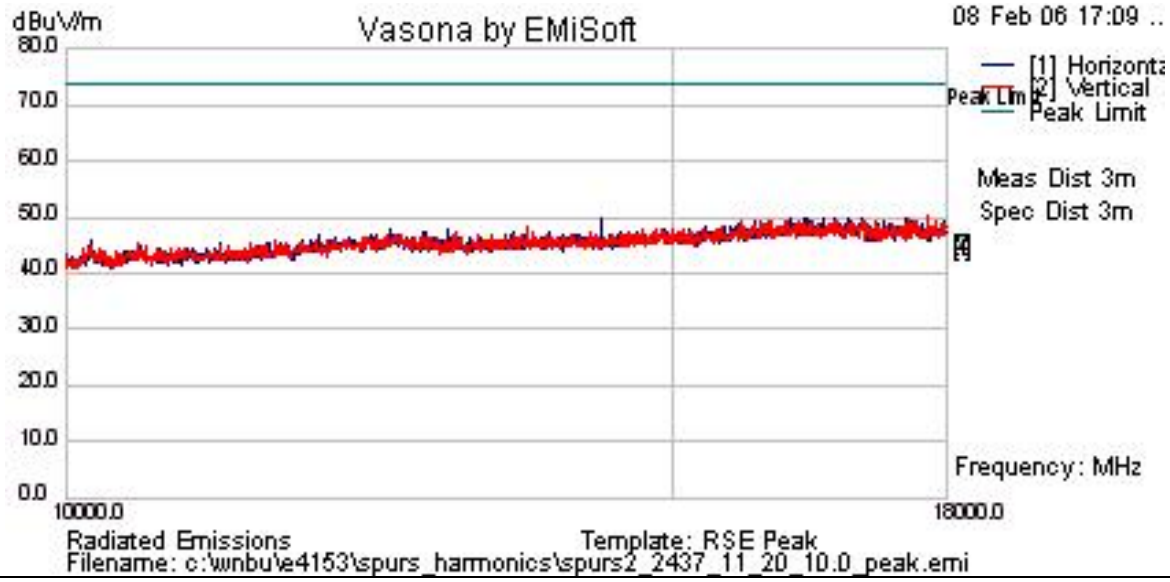
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
0	0	0	0	0	NA	U	0	0	0	0		

Subtest Number: 20147 - 2	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Spurs , 10 to 18 GHz, All channels, data rates, power levels, and antennas
Subtest Result	Pass
Highest Frequency	18000.0
Lowest Frequency	10000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBW

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: Peak Spurs , 10 to 18 GHz, All channels, data rates, power levels, and antennas

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
0	0	0	0	0	NA	U	0	0	0	0		

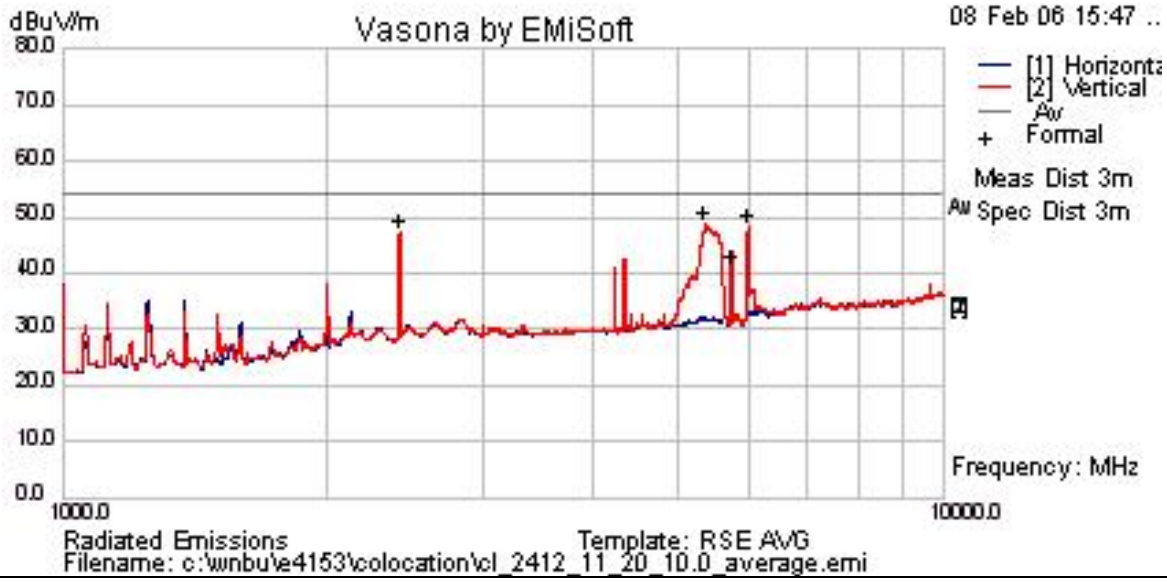
Radiated Transmitter Co-Located Spurious Emissions (Co-Located with AIR-1251G-A-K9)

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).

Subtest Number: 20139 - 1	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Colocation Spurs, 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Average Colocation Spurs, 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna

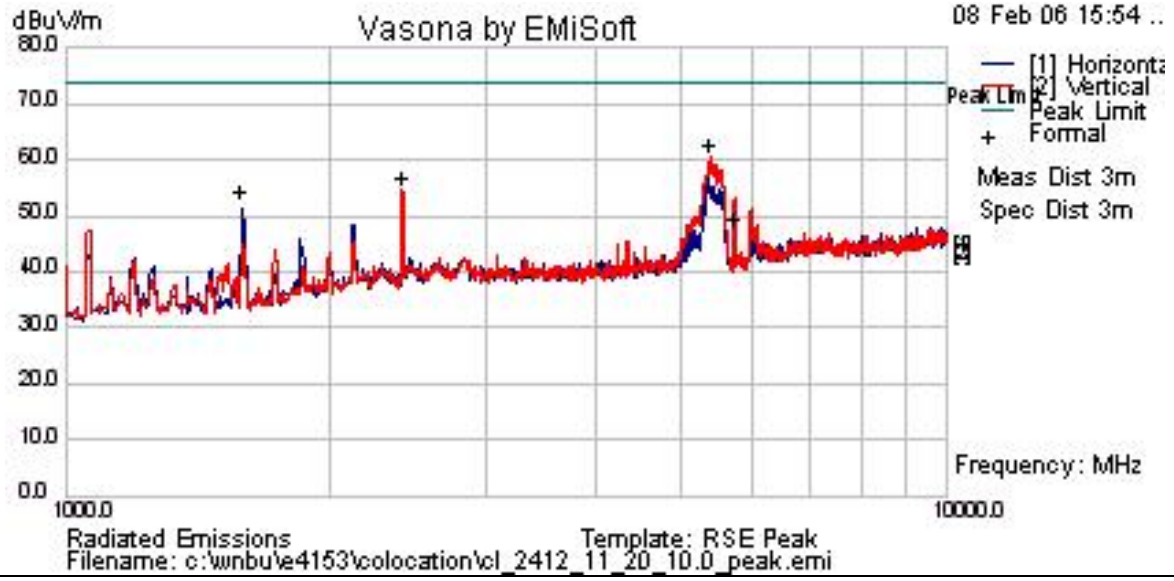
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2412	48.5	9	-10.3	47.2	Av	V	166	124	54	-6.8	Pass	2.4GHz Carrier
5375	46.8	9.4	-7.4	48.8	Av	V	166	124	54	-5.2	Pass	
5745	37.2	10.2	-6.5	40.9	Av	V	166	124	54	-13.1	Pass	5GHz Carrier
5999.93	43.7	10.4	-5.8	48.3	Av	V	166	124	54	-5.7	Pass	

Subtest Number: 20139 - 2	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Colocation Spurs, 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Peak Colocation Spurs, 1 to 10 GHz, 2412 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna

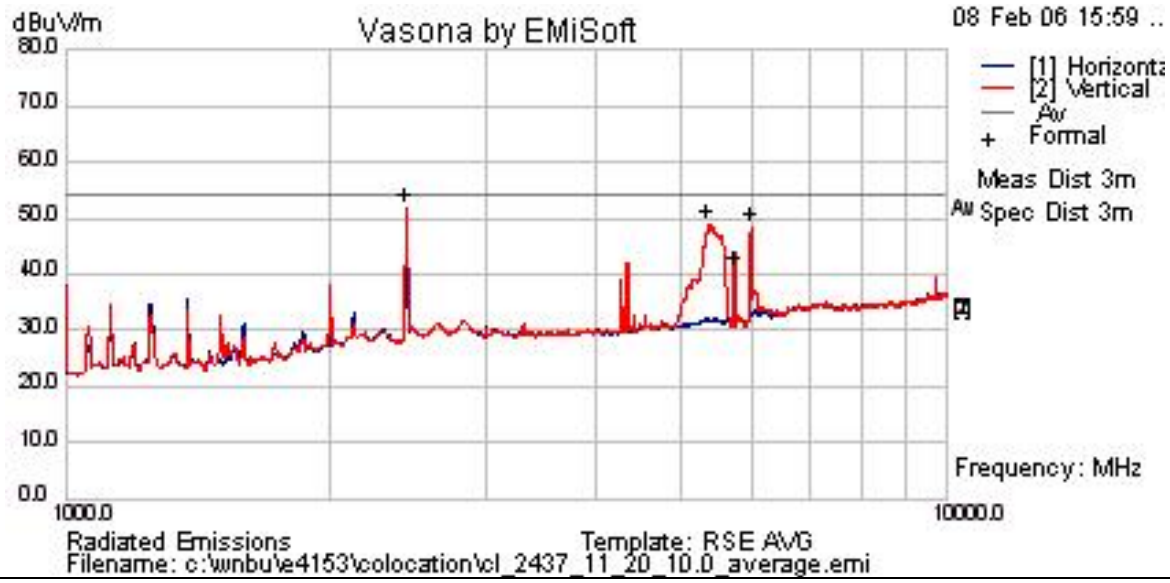
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1584.33	60.9	5.2	-14.2	51.8	Pk	H	166	124	74	-22.2	Pass	
2412	55.7	9	-10.3	54.4	Pk	V	166	124	74	-19.6	Pass	2.4GHz Carrier
5406.5	58.4	9.5	-7.4	60.6	Pk	V	166	124	74	-13.4	Pass	
5745	43.6	10.2	-6.5	47.4	Pk	V	166	124	74	-26.7	Pass	5GHz Carrier

Subtest Number: 20139 - 3	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Colocation Spurs, 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Average Colocation Spurs, 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna

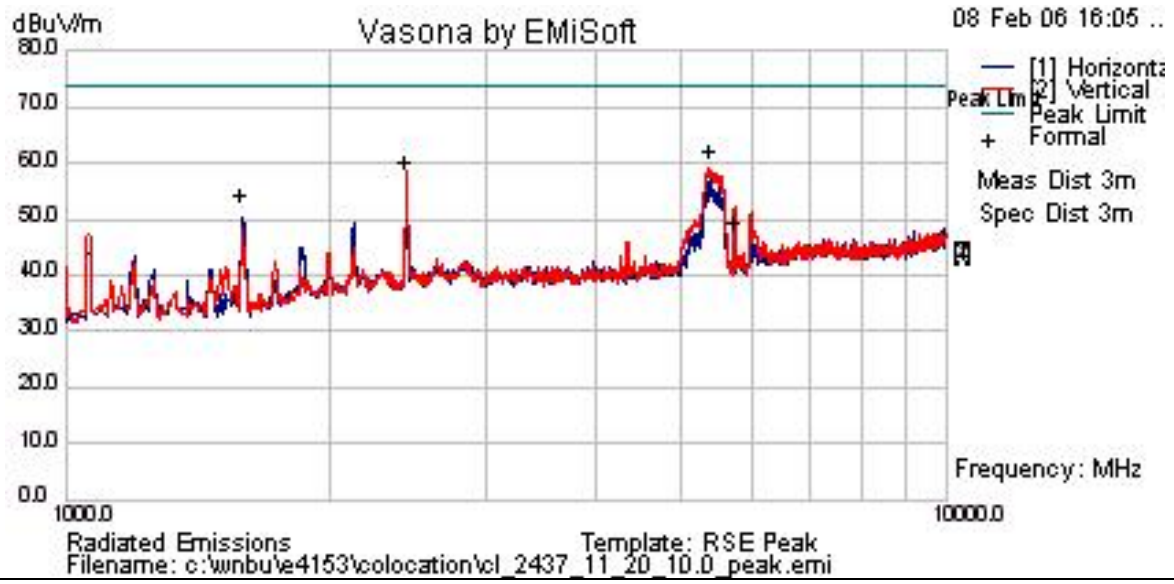
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2437	53	9.2	-10.2	52	Av	V	166	124	54	-2.1	Pass	2.4GHz Carrier
5372.5	46.9	9.4	-7.4	48.9	Av	V	166	124	54	-5.1	Pass	
5745	37.2	10.2	-6.5	40.9	Av	V	166	124	54	-13.1	Pass	5GHz Carrier
6000.02	44	10.4	-5.8	48.5	Av	V	166	124	54	-5.5	Pass	

Subtest Number: 20139 - 4	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Colocation Spurs, 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Peak Colocation Spurs, 1 to 10 GHz, 2437 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna

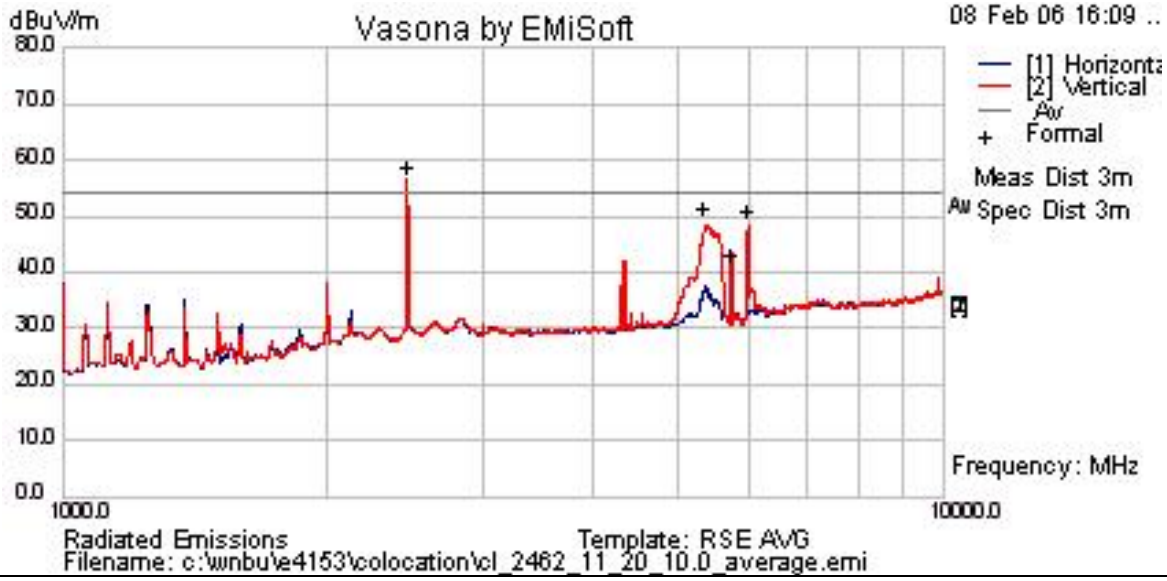
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1584.33	60.9	5.2	-14.2	51.8	Pk	H	166	124	74	-22.2	Pass	
2437	58.9	9.2	-10.2	57.9	Pk	V	166	124	74	-16.1	Pass	2.4GHz Carrier
5414.8	57.5	9.5	-7.4	59.7	Pk	V	166	124	74	-14.3	Pass	
5745	43.6	10.2	-6.5	47.4	Pk	V	166	124	74	-26.7	Pass	5GHz Carrier

Subtest Number: 20139 - 5	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Colocation Spurs, 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Average Colocation Spurs, 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna

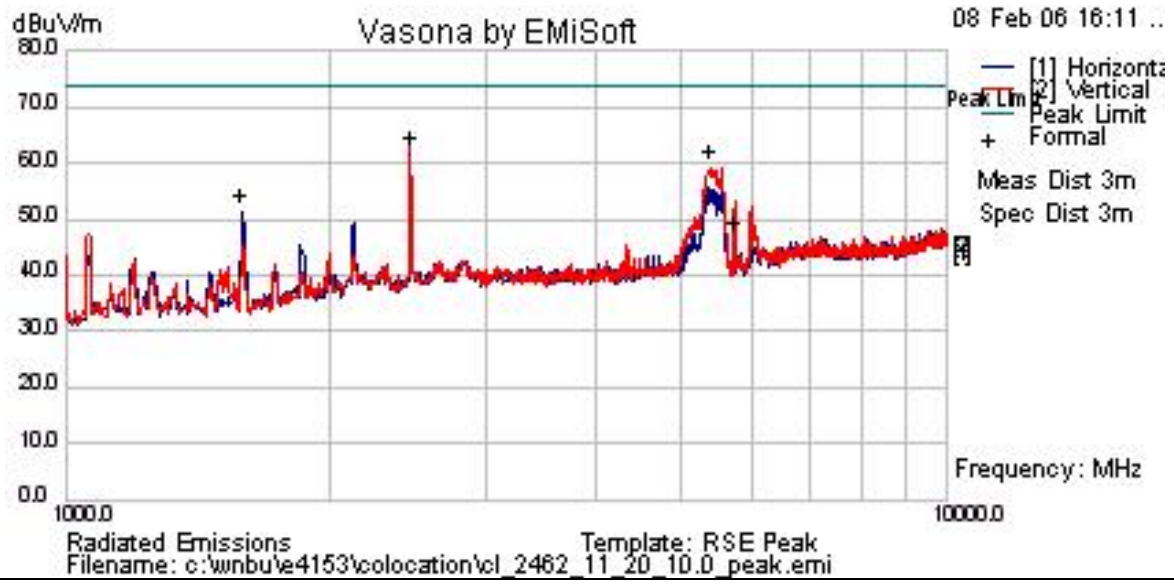
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2462	57.1	9.2	-10	56.3	Av	V	166	124	54	2.3	Fail	2.4GHz Carrier
5372.5	46.9	9.4	-7.4	48.9	Av	V	166	124	54	-5.1	Pass	
5745	37.2	10.2	-6.5	40.9	Av	V	166	124	54	-13.1	Pass	5GHz Carrier
6000.02	44	10.4	-5.8	48.5	Av	V	166	124	54	-5.5	Pass	

Subtest Number: 20139 - 6	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Colocation Spurs, 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Peak Colocation Spurs, 1 to 10 GHz, 2462 MHz, 11 Mbps, 20 dBm, 10 dBi Yagi Antenna

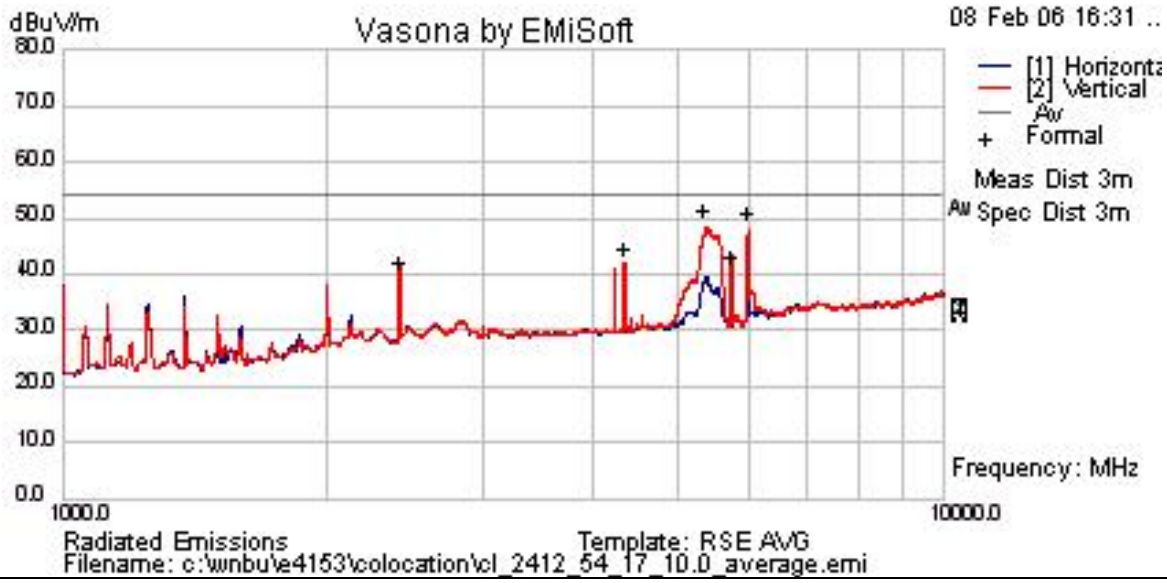
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1584.33	60.9	5.2	-14.2	51.8	Pk	H	166	124	74	-22.2	Pass	
2462	63.1	9.2	-10	62.3	Pk	V	166	124	74	-11.7	Pass	2.4GHz Carrier
5414.8	57.5	9.5	-7.4	59.7	Pk	V	166	124	74	-14.3	Pass	
5745	43.6	10.2	-6.5	47.4	Pk	V	166	124	74	-26.7	Pass	5GHz Carrier

Subtest Number: 20139 - 11	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Colocation Spurs, 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Average Colocation Spurs, 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna

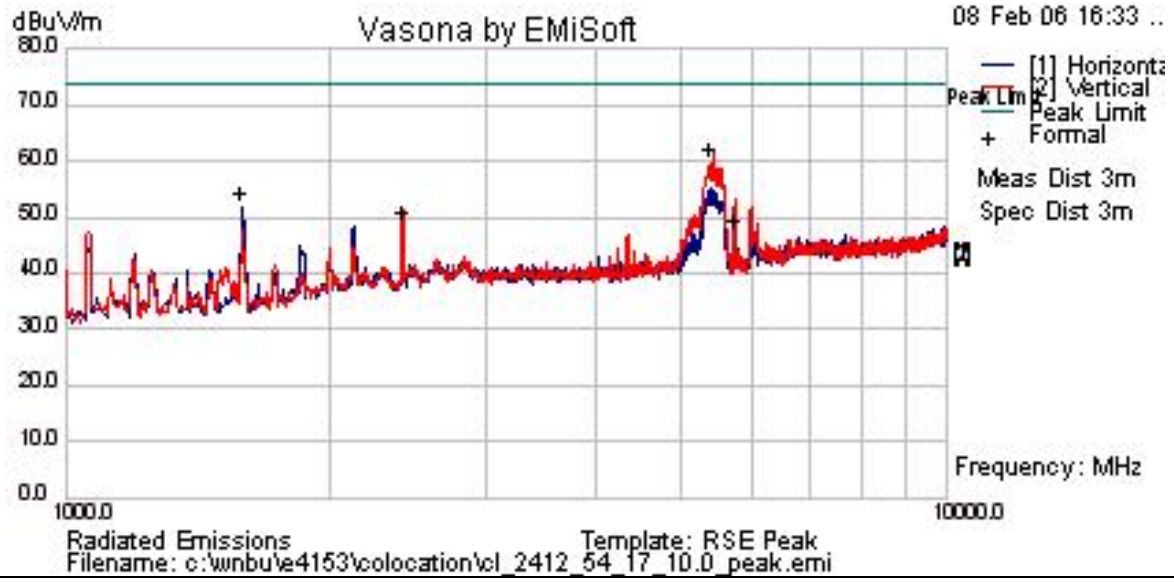
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2412	41.2	9	-10.3	39.9	Av	V	166	124	54	-14.1	Pass	2.4GHz Carrier
4343.37	42.4	8.2	-8.5	42	Av	V	166	124	54	-12	Pass	
5372.5	46.9	9.4	-7.4	48.9	Av	V	166	124	54	-5.1	Pass	
5745	37.2	10.2	-6.5	40.9	Av	V	166	124	54	-13.1	Pass	5GHz Carrier
6000.02	44	10.4	-5.8	48.5	Av	V	166	124	54	-5.5	Pass	

Subtest Number: 20139 - 12	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Colocation Spurs, 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Peak Colocation Spurs, 1 to 10 GHz, 2412 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna

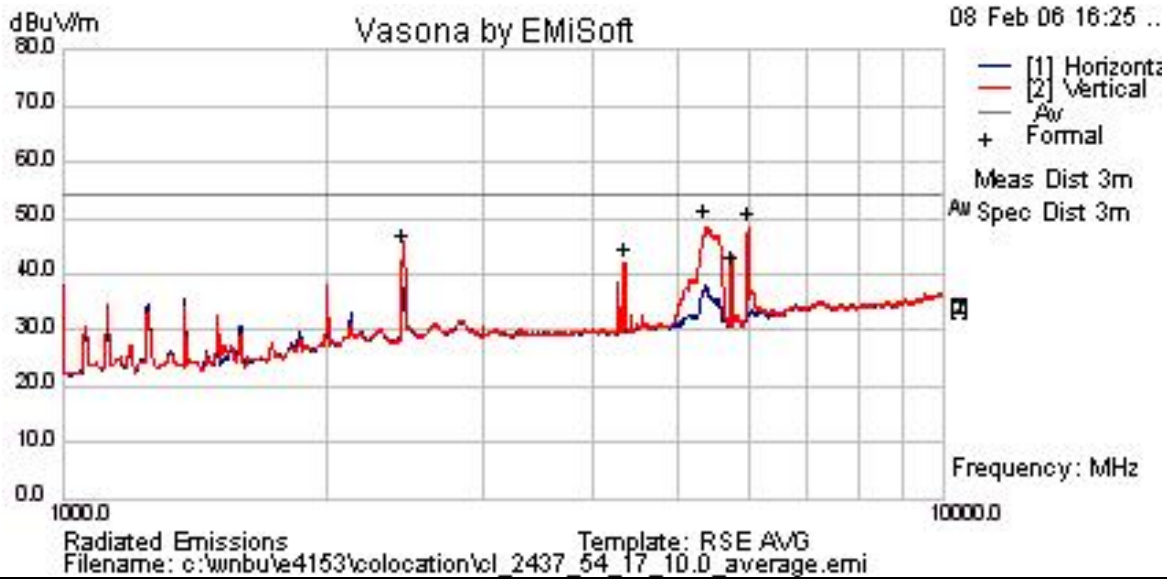
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1584.33	60.9	5.2	-14.2	51.8	Pk	H	166	124	74	-22.2	Pass	
2412	49.8	9	-10.3	48.5	Pk	V	166	124	74	-25.5	Pass	2.4GHz Carrier
5414.8	57.5	9.5	-7.4	59.7	Pk	V	166	124	74	-14.3	Pass	
5745	43.6	10.2	-6.5	47.4	Pk	V	166	124	74	-26.7	Pass	5GHz Carrier

Subtest Number: 20139 - 9	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Colocation Spurs, 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Average Colocation Spurs, 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna

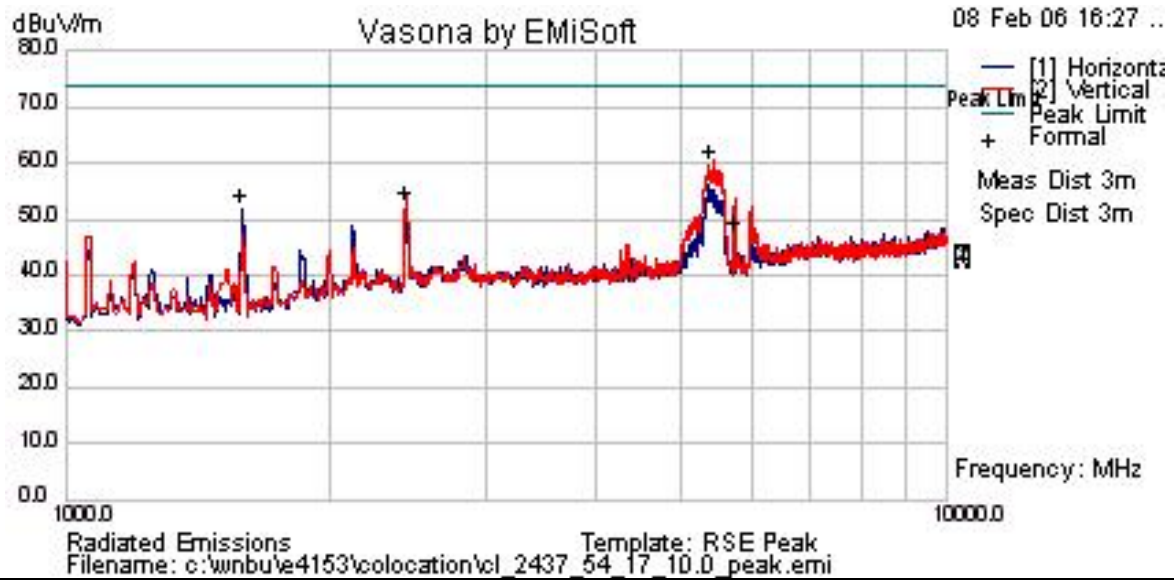
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2437	45.5	9.2	-10.2	44.5	Av	V	166	124	54	-9.5	Pass	2.4GHz Carrier
4343.38	42.5	8.2	-8.5	42.1	Av	V	166	124	54	-11.9	Pass	
5372.5	46.9	9.4	-7.4	48.9	Av	V	166	124	54	-5.1	Pass	
5745	37.2	10.2	-6.5	40.9	Av	V	166	124	54	-13.1	Pass	5GHz Carrier
6000.02	44	10.4	-5.8	48.5	Av	V	166	124	54	-5.5	Pass	

Subtest Number: 20139 - 10	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Colocation Spurs, 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Peak Colocation Spurs, 1 to 10 GHz, 2437 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna

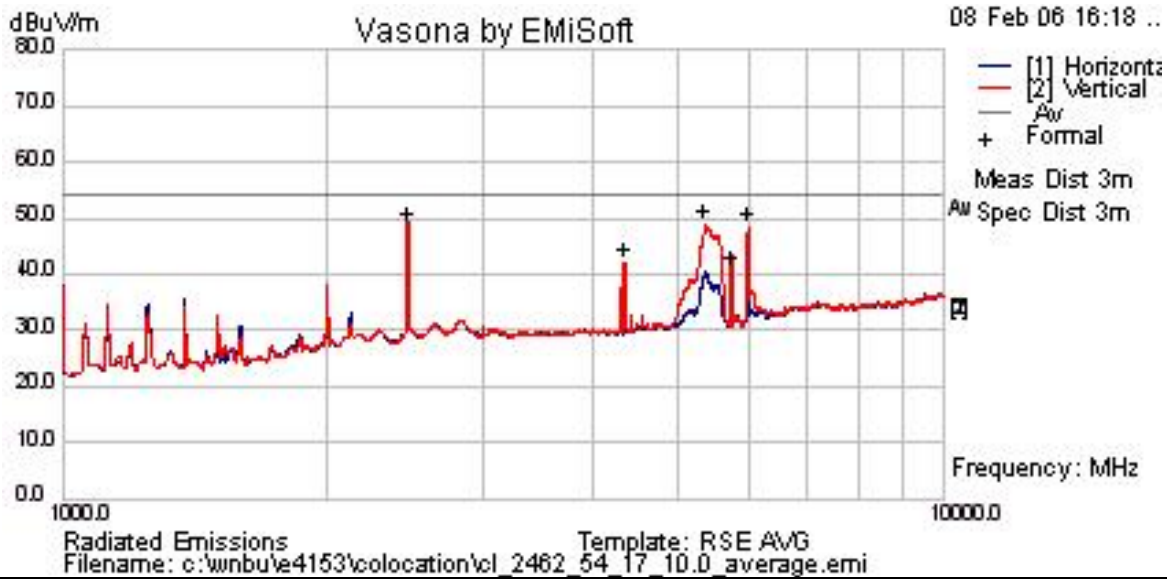
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1584.33	60.9	5.2	-14.2	51.8	Pk	H	166	124	74	-22.2	Pass	
2437	53.5	9.2	-10.2	52.5	Pk	V	166	124	74	-21.5	Pass	2.4GHz Carrier
5414.8	57.5	9.5	-7.4	59.7	Pk	V	166	124	74	-14.3	Pass	
5745	43.6	10.2	-6.5	47.4	Pk	V	166	124	74	-26.7	Pass	5GHz Carrier

Subtest Number: 20139 - 7	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Average Colocation Spurs, 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 10 Hz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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: Average Colocation Spurs, 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna

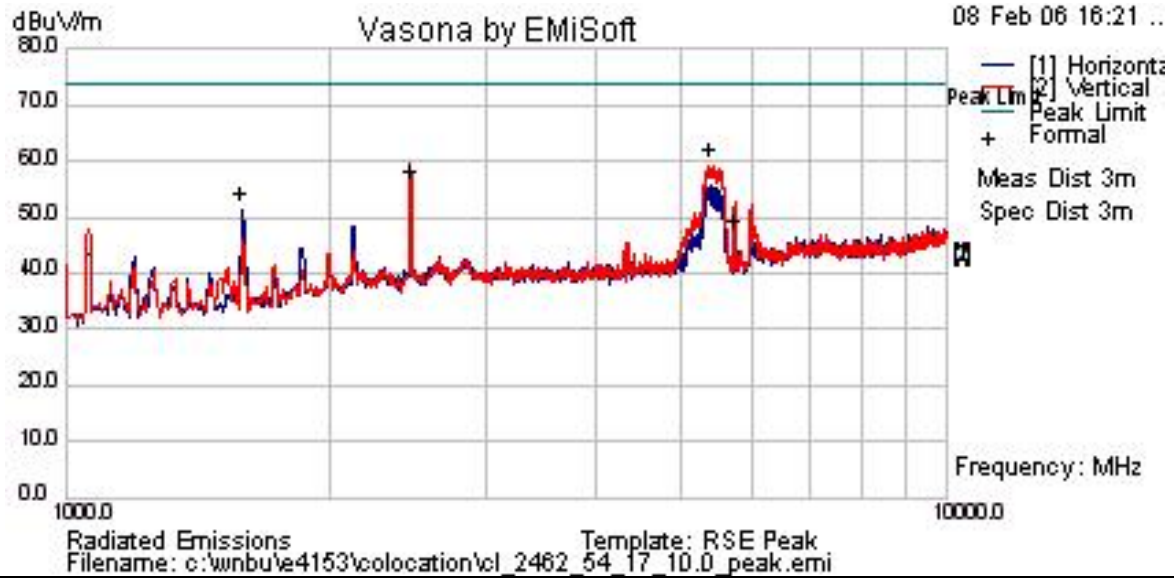
Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
2462	49.6	9.2	-10	48.8	Av	V	166	124	54	-5.2	Pass	2.4GHz Carrier
4343.38	42.5	8.2	-8.5	42.1	Av	V	166	124	54	-11.9	Pass	
5372.5	46.9	9.4	-7.4	48.9	Av	V	166	124	54	-5.1	Pass	
5745	37.2	10.2	-6.5	40.9	Av	V	166	124	54	-13.1	Pass	5GHz Carrier
6000.02	44	10.4	-5.8	48.5	Av	V	166	124	54	-5.5	Pass	

Subtest Number: 20139 - 8	**Subtest Date:** 08-Feb-2006
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	Peak Colocation Spurs, 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna
Subtest Result	Pass
Highest Frequency	10000.0
Lowest Frequency	1000.0
Comments on the above Test Results	1 MHz RBW, 1 MHz VBWColocated with 5745MHz, 54 Mbps, 17 dBm, 9.5 dBi Patch Antenna

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

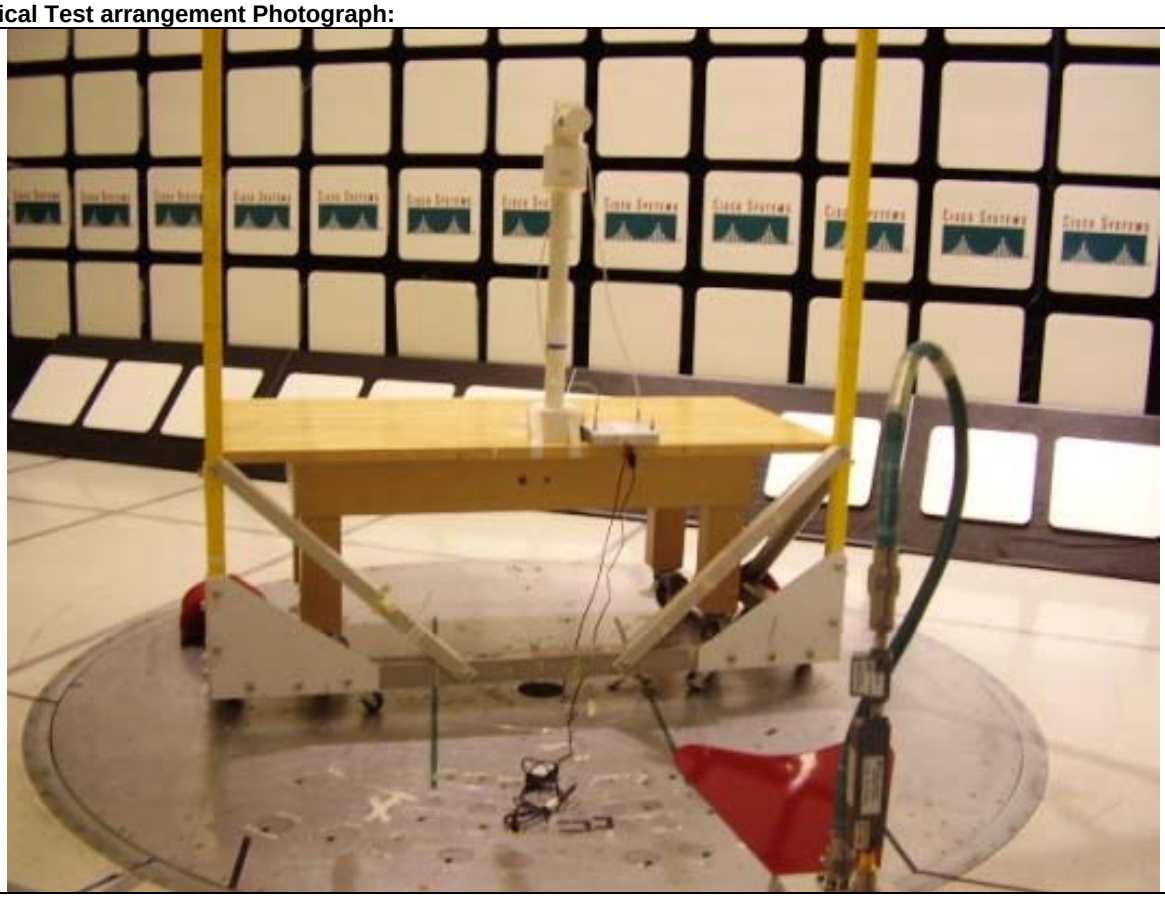


Title: Peak Colocation Spurs, 1 to 10 GHz, 2462 MHz, 54 Mbps, 17 dBm, 10 dBi Yagi Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1584.33	60.9	5.2	-14.2	51.8	Pk	H	166	124	74	-22.2	Pass	
2462	56.6	9.2	-10	55.8	Pk	V	166	124	74	-18.2	Pass	2.4GHz Carrier
5414.8	57.5	9.5	-7.4	59.7	Pk	V	166	124	74	-14.3	Pass	
5745	43.6	10.2	-6.5	47.4	Pk	V	166	124	74	-26.7	Pass	5GHz Carrier

Physical Test arrangement Photograph:



Title: Colocation Test Configuration

Maximum Permissible Exposure (MPE) Calculations

15.247: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See Sec. 1.1307(b)(1) of this chapter.

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)

and

s=((0.282*10^((P+G)/20))/d)^2 Equation (2)

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 8 dBi, the highest 4.9GHz antenna gain supported is 6 dBi, and the highest 5 GHz antenna gain is 20 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	20.4	10	9.34	20	10.66
2437	11	1	20.6	10	9.56	20	10.44
2462	11	1	20.6	10	9.56	20	10.44
2412	54	1	17.5	10	6.69	20	13.31
2437	54	1	17.4	10	6.61	20	13.39
2462	54	1	17.0	10	6.31	20	13.69

MPE Calculations

To maintain compliance, installations will assure a separation distance of at least 20cm.

Using Equation 2, the MPE levels (s) at 20 cm are calculated as follows:

Frequency (MHz)	Bit Rate (Mbps)	MPE Distance (cm)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Margin (mW/cm^2)
2412	11	20	20.4	10	0.22	1	0.78
2437	11	20	20.6	10	0.23	1	0.77
2462	11	20	20.6	10	0.23	1	0.77
2412	54	20	17.5	10	0.11	1	0.89
2437	54	20	17.4	10	0.11	1	0.89
2462	54	20	17.0	10	0.10	1	0.90

When operating as a dual-band co-located 2.4/5GHz system (with AIR-MP1251A-A-K9; FCC ID: LDK102059), the worst case MPE occurs at 2437MHz, 11Mbps, 20dBm power, 10dBi antenna and 5260MHz, 54Mbps, 17dBm power, 9.5dBi antenna. The MPE in this scenario is 0.2mW/cm^2 + 0.09mW/cm^2 = 0.29mW/cm^2.

Frequency (MHz)	Bit Rate (Mbps)	MPE Distance (cm)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Margin (mW/cm^2)
2437	11	20	20.6	10	0.23	1	0.77
5260	54	20	17	9.5	0.09	1	0.91

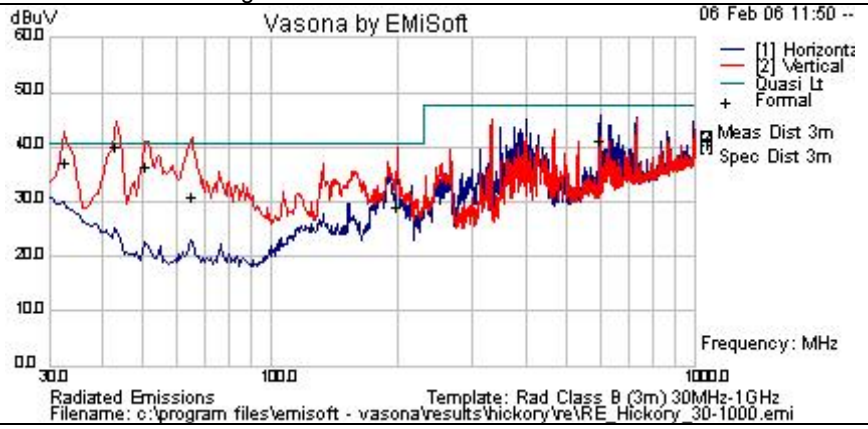
30MHz-1GHz Radiated Spurious Emissions

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).

Subtest Number: 20069 - 2	**Subtest Date:** 06-Feb-2006
Engineer	Jose Aguirre
Lab Information	Building P, 5m 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	

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

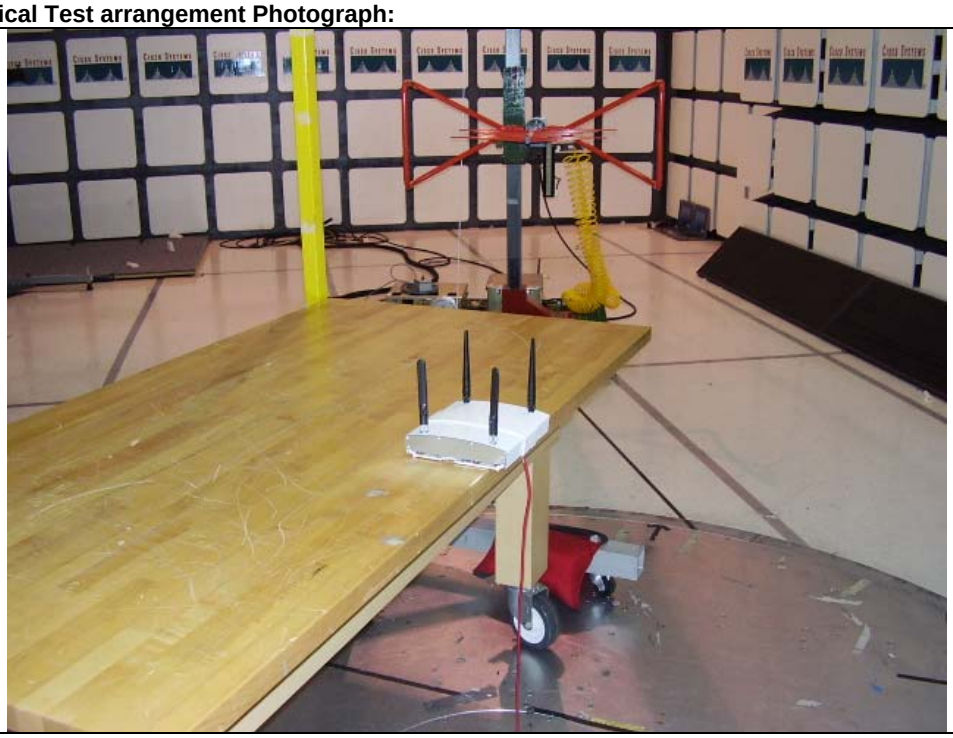


Title: 30-1000MHz

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
43.083	26.1	0.8	11.6	38.4	Qp	V	98	92	40.5	-2.1	Pass	
32.638	15.8	0.7	18.7	35.2	Qp	V	103	354	40.5	-5.3	Pass	
65.036	20.3	1	7.9	29.1	Qp	V	178	217	40.5	-11.4	Pass	
50.953	26.1	0.8	7.8	34.8	Qp	V	98	93	40.5	-5.8	Pass	
199.044	13.6	1.7	12.1	27.4	Qp	V	105	213	40.5	-13.1	Pass	
596.963	18.1	2.8	18.4	39.3	Qp	H	118	22	47.5	-8.2	Pass	

Physical Test arrangement Photograph:



Title: Radiated Setup

Comments on the above Photograph:

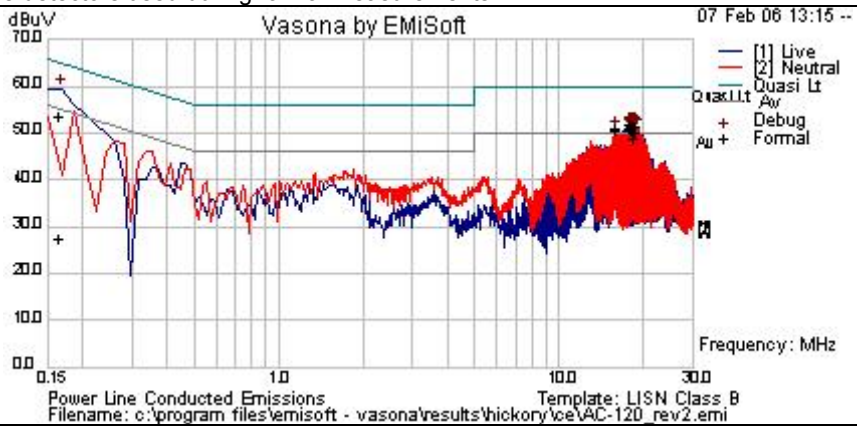
Bilog antenna in background used to measure 30Mhz to 1Ghz range.

AC Mains .150-30MHz Conducted Emissions

Subtest Number: 20113 - 2	**Subtest Date:** 07-Feb-2006
Engineer	Jose Aguirre
Lab Information	Building P, 5m Anechoic
Subtest Results	
Line Under Test	AC/DC Power Brick , 110v (+/-10%), 60Hz
Transducer	LISN
Subtest Result	Pass
Highest Frequency	30.0
Lowest Frequency	0.15
Comments on the above Test Results	rev 2 board

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

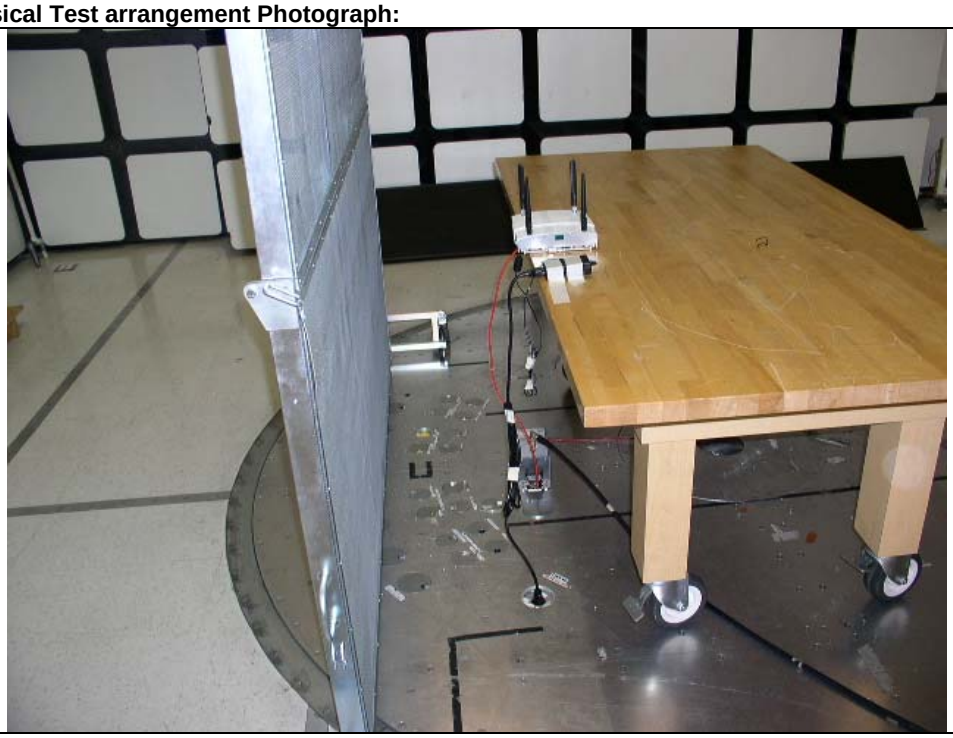


Title: conducted emissions

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
18.015	27.9	20.7	0.3	48.9	Av	L	50	-1.1	Pass	
16.031	28	20.6	0.1	48.8	Av	N	50	-1.2	Pass	
18.32	27.3	20.7	0.4	48.4	Av	N	50	-1.6	Pass	
18.775	27.1	20.7	0.4	48.2	Av	L	50	-1.8	Pass	
18.624	25.8	20.7	0.4	46.9	Av	L	50	-3.1	Pass	
18.015	28.6	20.7	0.3	49.6	Qp	L	60	-10.4	Pass	
18.624	28.3	20.7	0.4	49.4	Qp	L	60	-10.6	Pass	
18.775	28.3	20.7	0.4	49.3	Qp	L	60	-10.7	Pass	
18.32	28.2	20.7	0.4	49.3	Qp	N	60	-10.7	Pass	
16.031	27.9	20.6	0.1	48.7	Qp	N	60	-11.3	Pass	
0.165	30.8	20.4	0.2	51.4	Qp	L	65.2	-13.8	Pass	
0.165	4.6	20.4	0.2	25.2	Av	L	55.2	-30	Pass	

Physical Test arrangement Photograph:



Title: conducted emissions setup

Comments on the above Photograph:

Power supply plugged into LISN mounted under Turntable.

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: Test Procedures

Test procedures are summarized below

6dB Bandwidth	EDCS # - 422115
26dB Bandwidth	EDCS # - 422115
Average Output Power	EDCS # - 422117
Co-Located Transmitter	EDCS # - 422118
Conducted Spurious Test	EDCS # - 422119
Peak Transmit Power Measurement	EDCS # - 422123
Power Spectral Density	EDCS # - 422113
Peak Excursion Test	EDCS # - 422121
Radiated Band Edge	EDCS # - 422124
Radiated Spurious Test	EDCS # - 422125
Extreme Test Condition	EDCS # - 450056
Equivalent Isotropic Radiated Power	EDCS # - 450047
Frequency Tolerance	EDCS # - 462996
Power per MHz	EDCS # - 463000

Appendix G: 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:	GR 1089, Issue 3 (2002): Sections 2 to 4 (excluding section 4.6.10-17, 4.8) CISPR 22 (1997) CISPR 22, KN 22 (RRL No. 2004-69, September 22, 2004) EN 55022 (1998) EN 55022 CNS 13438 AS/NZS CISPR22 CFR 47, Part 15, Subpart B, using ANSI C63.4 (RRL No. 2004-70, September 22, 2004) IEC 61000-4-2, KN 61000-4-2 IEC 61000-4-3, KN 61000-4-3 IEC 61000-4-4, KN 61000-4-4 IEC 61000-4-5, KN 61000-4-5 IEC 61000-4-6 (2001), KN 61000-4-6 IEC 61000-4-8, KN 61000-4-8 IEC 61000-4-11 (1995), KN 61000-4-11 (A2LA Cert. No. 1178.01) 10/04/05 Page 5 of 6
Building 16:	GR 1089: Issue 3 (2002): Sections 2 to 4 (excluding section 3.2.1 below 30 MHz, 4.6.10-17, 4.8) CISPR 22 (1997) CISPR 22, KN 22 EN 55022 (1998) EN 55022 CNS 13438 (conducted emissions only) AS/NZS CISPR 22 CFR 47, Part 15, Subpart B, using ANSI C63.4 IEC 61000-4-2, KN 61000-4-2 IEC 61000-4-3, KN 61000-4-3 IEC 61000-4-4, KN 61000-4-4 IEC 61000-4-5, KN 61000-4-5 IEC 61000-4-6 (2001), KN 61000-4-6 IEC 61000-4-8, KN 61000-4-8 IEC 61000-4-11 (1995), KN 61000-4-11
Building N, I & 7:	GR 1089: Issue 3 (2002): Sections 2 to 4 (excluding section 3.2.1 below 30 MHz, 3.3.1, 4.6.10-17 & 4.8) CISPR 22 (1997)

CISPR 22, KN 22
EN 55022 (1998)
EN 55022
CNS 13438 (conducted emissions only)
AS/NZS CISPR 22
CFR 47, Part 15, Subpart B, using ANSI C63.4
(RRL No. 2004-70, September 22, 2004)
IEC 61000-4-2, KN 61000-4-2
IEC 61000-4-3, KN 61000-4-3
IEC 61000-4-4, KN 61000-4-4
IEC 61000-4-5, KN 61000-4-5
IEC 61000-4-6 (2001), KN 61000-4-6
IEC 61000-4-8, KN 61000-4-8
IEC 61000-4-11 (1995), KN 61000-4-11

Building B**:**

GR 1089: Issue 3 (2002): Sections 2 to 4 (excluding section 3.2.1, 3.3.1, 4.6.10-17 & 4.8)
CISPR 22 (1997)(conducted emissions only)
CISPR 22 (conducted emissions only), KN 22
EN 55022 (1998)(conducted emissions only)
EN 55022 (conducted emissions only)
CNS 13438 (conducted emissions only)
AS/NZS CISPR 22 (conducted emissions only)
CFR 47, Part 15, Subpart B, using ANSI C63.4 (conducted emissions only)
(RRL No. 2004-70, September 22, 2004)
IEC 61000-4-2, KN 61000-4-2
IEC 61000-4-3, KN 61000-4-3
IEC 61000-4-4, KN 61000-4-4
IEC 61000-4-5, KN 61000-4-5
IEC 61000-4-6 (2001), KN 61000-4-6
(A2LA Cert. No. 1178.01) 10/04/05 Page 6 of 6
IEC 61000-4-8, KN 61000-4-8
IEC 61000-4-11 (1995), KN 61000-4-11

On the following products or types of products :

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

Appendix H: Test Equipment/Software Used to perform the test

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due	Test Number(s)
025001	Micro-Coax/ UFB197C-1-0240-5 04504	RF Coaxial Cable, to 18GHz, 24 in	06-MAY-200 5	06-MAY-200 6	[20076], [20097], [20100], [20121]
025654	Micro-Coax/ UFB311A-1-0840-5 04504	RF Coaxial Cable, to 18GHz, 84 in	28-MAR-200 5	28-MAR-200 6	[20076], [20097], [20100], [20121]
030442	Micro-Coax/ UFB311A-0-4800-5 20520	RF Coaxial Cable, to 18GHz, 480 In.	28-MAR-200 5	28-MAR-200 6	[20076], [20097], [20100], [20121]
030565	Micro-Coax/ UFB311A-1-3510-5 04504	Rf Coaxial Cable to 18GHz	28-MAR-200 5	28-MAR-200 6	[20076], [20097], [20100], [20121]
031700	Micro-Tronics/ BRC50705	Notch Filter, SB:5.725-5.875GHz, to 12 GHz	07-FEB-2006	07-FEB-2007	[20100], [20121]
032671	Cisco/ TH0118	Mast Mount Preamplifier Array, 1-18GHz	20-JUN-2005	20-JUN-2006	[20076], [20097], [20100], [20121]
034188	Micro-Tronics/ BRC50703-02	Notch Filter, SB:5.150-5.350GHz, to 11GHz	22-JUN-2005	22-JUN-2006	[20100], [20121]
034189	Micro-Tronics/ BRC50704-02	Notch Filter, SB:5.470-5.725GHz, to 12GHz	22-JUN-2005	22-JUN-2006	[20100], [20121]
034304	Micro-Tronics/ BRM50702-02	Notch Filter, SB:2.4-2.5GHz, to 18GHz	22-JUN-2005	22-JUN-2006	[20121]
034972	Midwest Microwave/ ATT-0640-20-29M-0 2	Attenuator, 20dB, DC-40GHz	06-APR-2005	06-APR-2006	[20076], [20097]
035040	Micro-Tronics/ HPM50112-02	High pass Filter, 6.4-18GHz	22-JUN-2005	22-JUN-2006	[20100], [20121]
035267	Agilent/ E4440A	Precision Spectrum Analyzer	08-APR-2005	08-APR-2006	[20076], [20097], [20100], [20121]
035285	ETS-Lindgren/ 3117	Double Ridged Waveguide Horn Antenna	20-MAY-200 5	20-MAY-200 6	[20076], [20097], [20100], [20121]
037065	Midwest Microwave/ ADT-2588-MF-NNN -02	Port Saver	Cal Not Required	N/A	[20076], [20097], [20100], [20121]

Software used in the tests

A:Vasona File Version

Vasona File Version	Used in Subtests
4.194	[20097 - 1, 20097 - 2, 20097 - 3, 20097 - 4, 20097 - 5, 20097 - 6, 20097 - 7, 20097 - 8, 20097 - 9, 20097 - 10, 20097 - 11, 20097 - 12, 20097 - 13, 20097 - 14, 20100 - 1, 20100 - 2, 20100 - 3, 20100 - 4, 20100 - 5, 20100 - 6, 20100 - 7, 20100 - 8, 20100 - 9, 20100 - 10, 20100 - 11, 20100 - 12, 20100 - 13, 20100 - 14, 20100 - 15, 20100 - 16, 20100 - 17, 20100 - 18, 20100 - 19, 20100 - 20, 20100 - 21, 20100 - 22, 20100 - 23, 20100 - 24, 20100 - 25, 20100 - 26, 20100 - 27, 20100 - 28, 20100 - 29, 20100 - 30, 20100 - 31, 20100 - 32, 20100 - 33, 20100 - 34, 20100 - 35, 20100 - 36, 20100 - 37, 20100 - 38, 20100 - 39, 20100 - 40, 20100 - 41, 20100 - 42, 20076 - 1, 20076 - 2, 20076 - 3, 20076 - 4, 20076 - 5, 20076 - 6, 20076 - 7, 20076 - 8, 20076 - 9, 20076 - 10, 20076 - 11, 20076 - 12, 20076 - 13, 20076 - 14, 20121 - 1, 20121 - 2, 20121 - 3, 20121 - 4, 20121 - 5, 20121 - 6, 20121 - 7, 20121 - 8, 20121 - 9, 20121 - 10, 20121 - 11, 20121 - 12, 20121 - 13, 20121 - 14, 20121 - 15, 20121 - 16, 20121 - 17, 20121 - 18, 20121 - 19, 20121 - 20]

B:Other Software Used

Software Name	Version	Vendor	Description	Start Date	End Date
ECAT - BurstWare	4.23	Thermo Keytek	EFT/Burst Test Software	01-JAN-2000	Current
ECAT - PQFWare	2.1.3	Thermo Keytek	Voltage Dips and Interrupts Test Software	01-JAN-1997	Current
ECAT - SurgeWare	4.23	Thermo Keytek	Surge Test Software	01-JAN-2000	Current
ECAT - SurgeWare	5.30	Thermo Keytek	Voltage Protection Coordination Software	04-FEB-2004	Current
HFTS	B.00.01	Agilent Technologies	Harmonics/Flicker Test System Software	02-JUL-2001	Current
CTS	3.0.19	California Instruments	Harmonics/Flicker Test System Software	26-APR-2004	Current
CEWare32	4.00	Thermo Keytek	EMC Pro surge, EFT/B, VDI, Mag Immunity test software.	21-JUL-2004	Current