



EMC Test Report: EDCS - 451964

For

AIR-AP1000 Series
Cisco Airespace Dual Band 2.4/5 GHz Access Point

Against the following Specifications :

CFR47 Part 15.247

CFR47 Part 15.407

RSS-210

Cisco Systems

EMC Laboratory

170 West Tasman Drive

San Jose, CA 95134



Certificate Number : 1178-01

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Approved By:

Title:



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Section 1: Overview

Test Summary

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

Emissions:

CFR47 Part 15.247

CFR47 Part 15.407

RSS-210

Immunity:

N/A

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.

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2.2 Date of start of testing

25-May-2005

2.3 Report Issue Date

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

2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

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

Test Engineers

James Nicholson

2.5 Equipment Assessed (EUT)

AIR-AP1000 Series Dual Band 2.4/5 GHz access point configured for use in the United States and Canada

2.6 EUT Description

The AIR-AP1000 series access point operates simultaneously in both the 2.4 and 5 GHz spectrum, to provide data rates up to 54 Mbps in each band in accordance with IEEE 802.11a and 802.11g standards, including backwards compatibility to 802.11b.

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:

$$\text{Emission level [dBuV]} = \text{Indicated voltage level [dBuV]} + \text{Cable Loss [dB]} + \text{Other correction factors [dB]}$$

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:-

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(X \text{ dBuV/m})/20] = Y \text{ uV/m}$$

2.9 Measurement Uncertainty

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

Radiated emissions (expanded uncertainty, confidence interval 95%)

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

Conducted emissions (expanded uncertainty, confidence interval 95%)

4 kHz - 30 MHz	+/- 2.2 dB (using Current Probe)
9 kHz - 150 kHz	+/- 4.1 dB (using LISN)
10 kHz - 30 MHz	+/- 2.6 dB (using Current Probe)
150 kHz - 30 MHz	+/- 3.7 dB (using LISN)
150 kHz - 30 MHz	+/- 3.1 dB (using CDN)
150 kHz - 30 MHz	Under Consideration (Using CVP-1)

Conducted Immunity (expanded uncertainty, confidence interval 95%)

10 kHz - 30 MHz	+/- 0.9 dB (using bulk current injection)
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Radiated Immunity (expanded uncertainty, confidence interval 95%)

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

ESD, EFT/B and Surge tests

The tests are performed within the tolerance specified by IEC61000-4-2, IEC61000-4-3 and IEC61000-4-5 respectively

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

2.10 Report Template Revision No.

Revision: CRA 12.0



Section 3: Sample Details

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

3.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	AIR-AP1020-A-K9		
S02	AIR-ANT2012		
S03	AIR-ANT1728		
S04	AIR-ANT5160V-R		
S06	Power Supply		

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-ANT2012	2.4 GHz 6.5 dBi Diversity Patch
AIR-ANT1729	2.4 GHz 6.0 dBi Patch
AIR-ANT5135D-R	5 GHz 3.5 dBi Omnidirectional
AIR-ANT5160V-R	5 GHz 6.0 dBi Omnidirectional

3.2 System Details

System #	Description	Samples
1	AIR-AP1020-A-K9 with 2.4GHz 6.5dBi Patch Antenna	S01, S02 and S06
2	AIR-AP1020-A-K9 with 2.4GHz 5.2dBi Omnidirectional Antenna	S01, S03 and S06
3	AIR-AP1020-A-K9 with 5GHz 6dBi Omnidirectional Antenna	S01, S04 and S06

3.3 Mode of Operation Details

Mode#	Description	Comments
1	2.4GHz Spurious	2.4GHz Spurs, Harmonics, and Bandedge
2	5GHz Spurious	5GHz Spurs, Harmonics, and Bandedge



Appendix A: Formal Emission Test Results

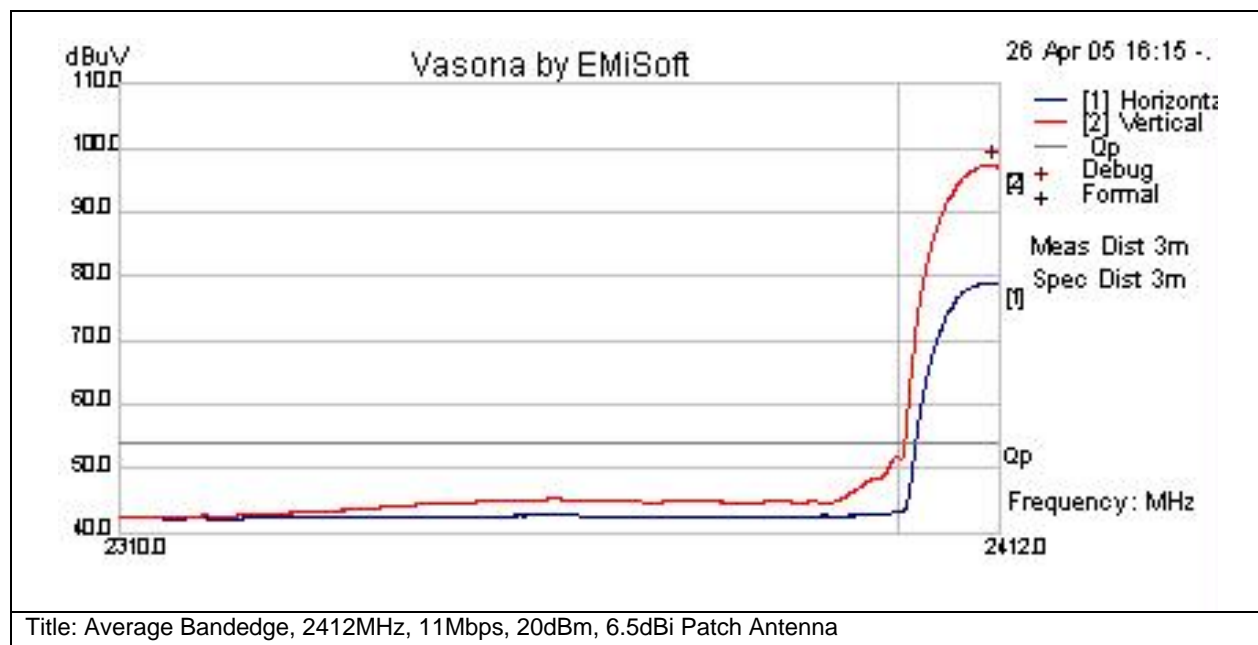
2.4GHz Radiated Emissions with 6.5dBi Patch Antenna

Test Number: 16559				
Basic Standard	Applied to	Class	Freq Range	Test Details / Comments
CFR47 Part 15.247	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	Mode : 1, 2.4GHz Spurious			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
1	AIR-AP1020-A-K9 with 2.4GHz 6.5dBi Patch Antenna	S01, S02 and S06	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Subtest Number: 16559 - 1		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2412MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

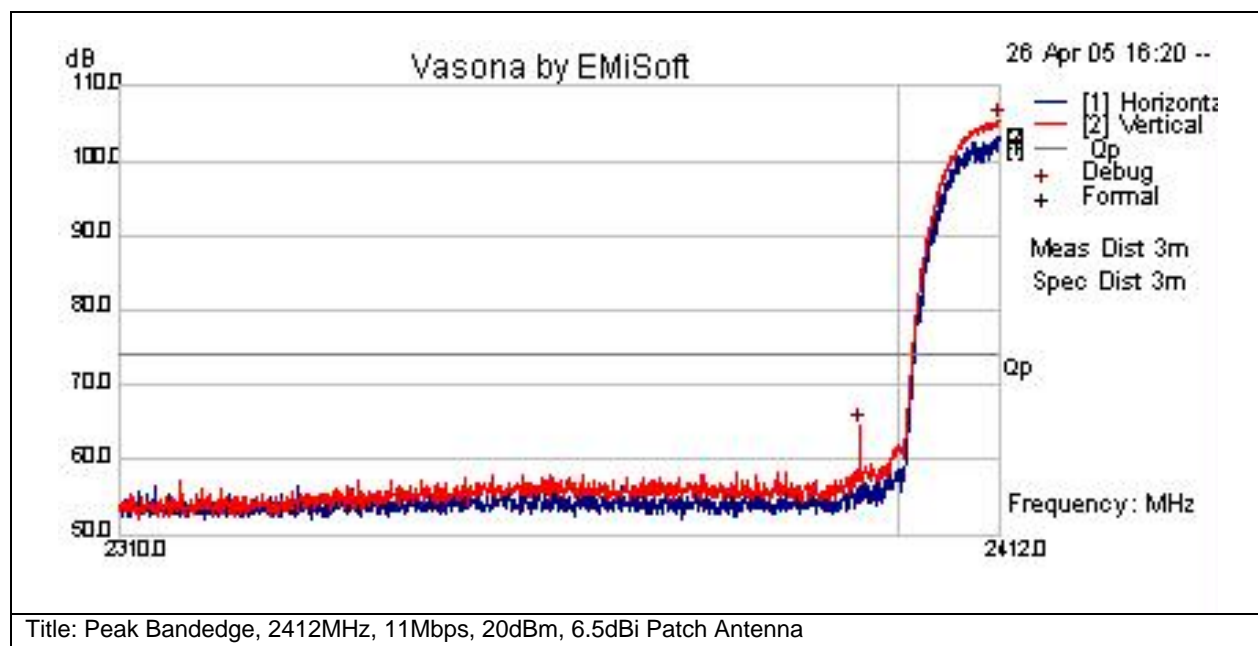


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2359.91	26	25.1	-5.7	45.4	Peak(Scan)	V	139	287	54	-8.6	Pass	
2361.25	23.4	25.1	-5.7	42.7	Peak(Scan)	H	139	287	54	-11.3	Pass	



Subtest Number: 16559 - 2		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

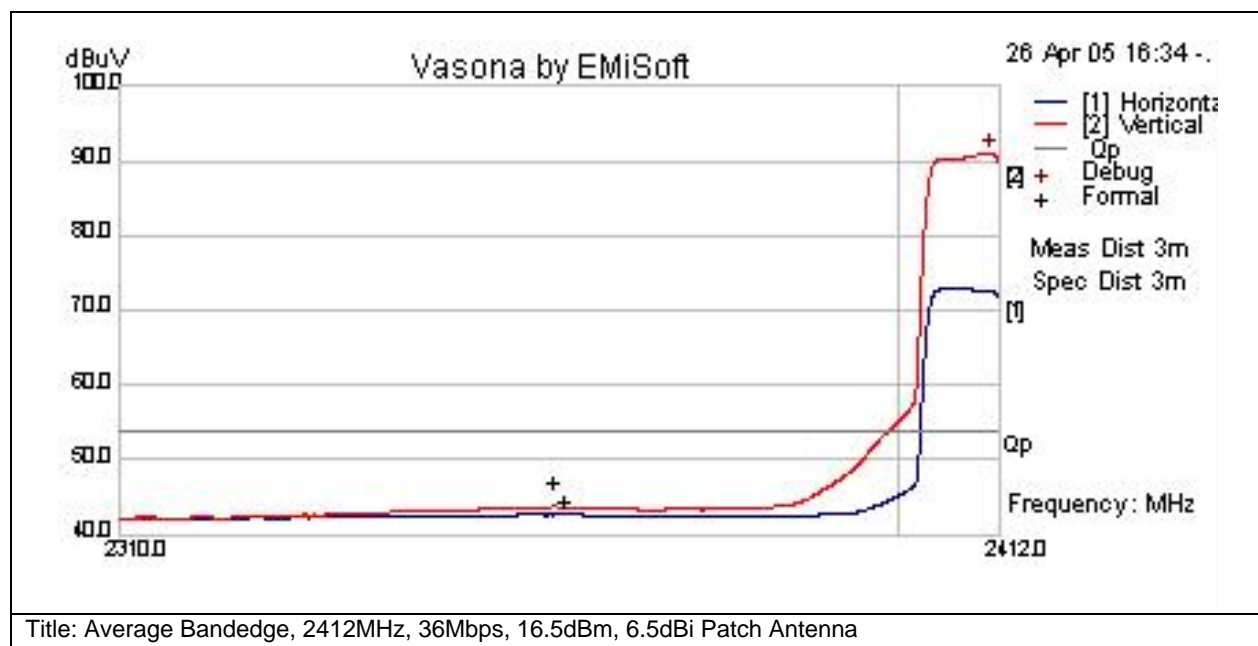


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2350.72	49	25.1	-5.8	68.3	Peak(Scan)	V	189	250	74	-5.7	Pass	
2358.86	37	25.1	-5.7	56.3	Peak(Scan)	H	139	287	74	-17.7	Pass	



Subtest Number: 16559 - 3		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2412MHz, 36Mbps, 16.5dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

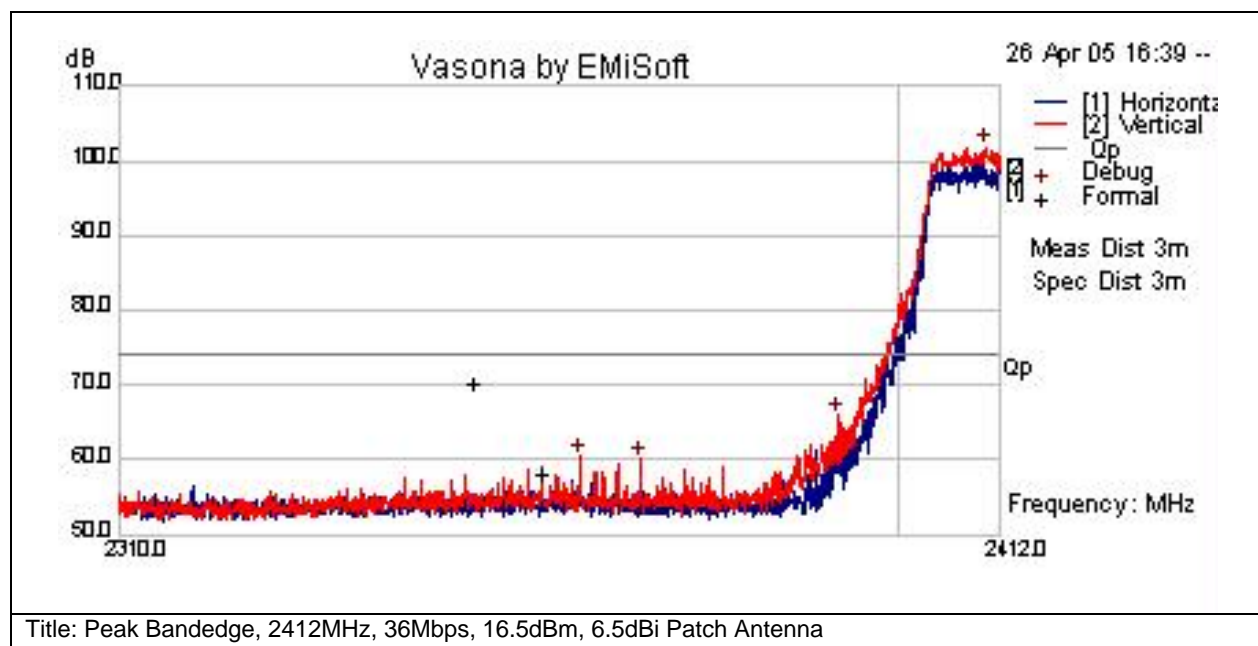


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2390	25.8	25.1	-5.8	45.1	Peak(Scan)	V	139	287	54	-8.9	Pass	
2358.26	23.3	25.1	-5.7	42.7	Peak(Scan)	H	139	287	54	-11.3	Pass	



Subtest Number: 16559 - 4		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2412MHz, 36Mbps, 16.5dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

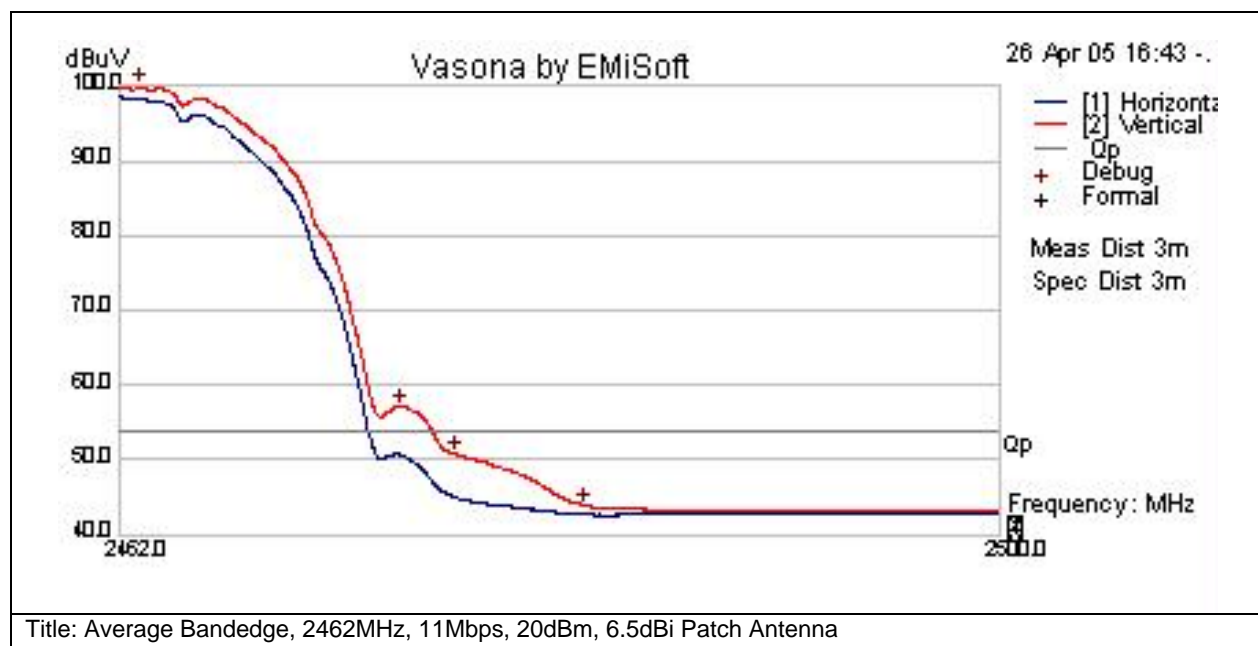


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2390	49	25.1	-5.8	68.3	Peak(Scan)	V	189	250	74	-5.7	Pass	
2357.96	37.6	25.1	-5.7	56.9	Peak(Scan)	H	139	287	74	-17.1	Pass	



Subtest Number: 16559 - 5		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2462MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

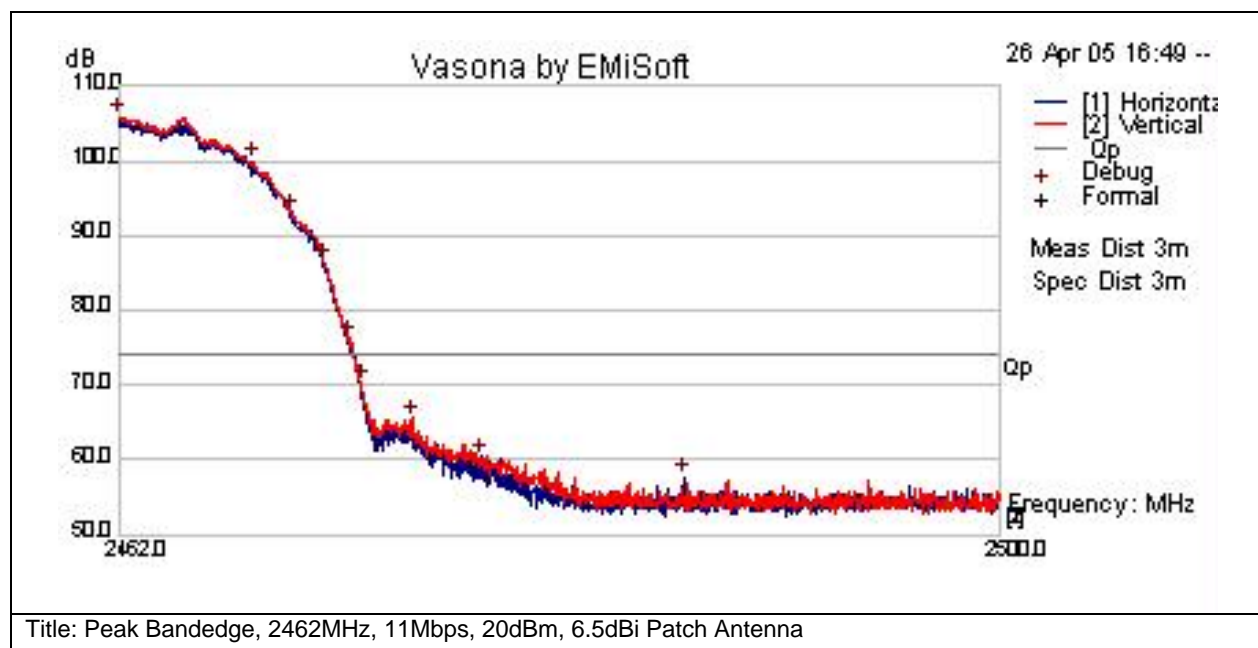


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.93	25.6	25.2	-5.7	45.1	Peak(Scan)	V	139	287	54	-8.9	Pass	
2492.61	23.2	25.2	-5.7	42.7	Peak(Scan)	H	139	287	54	-11.3	Pass	



Subtest Number: 16559 - 6		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

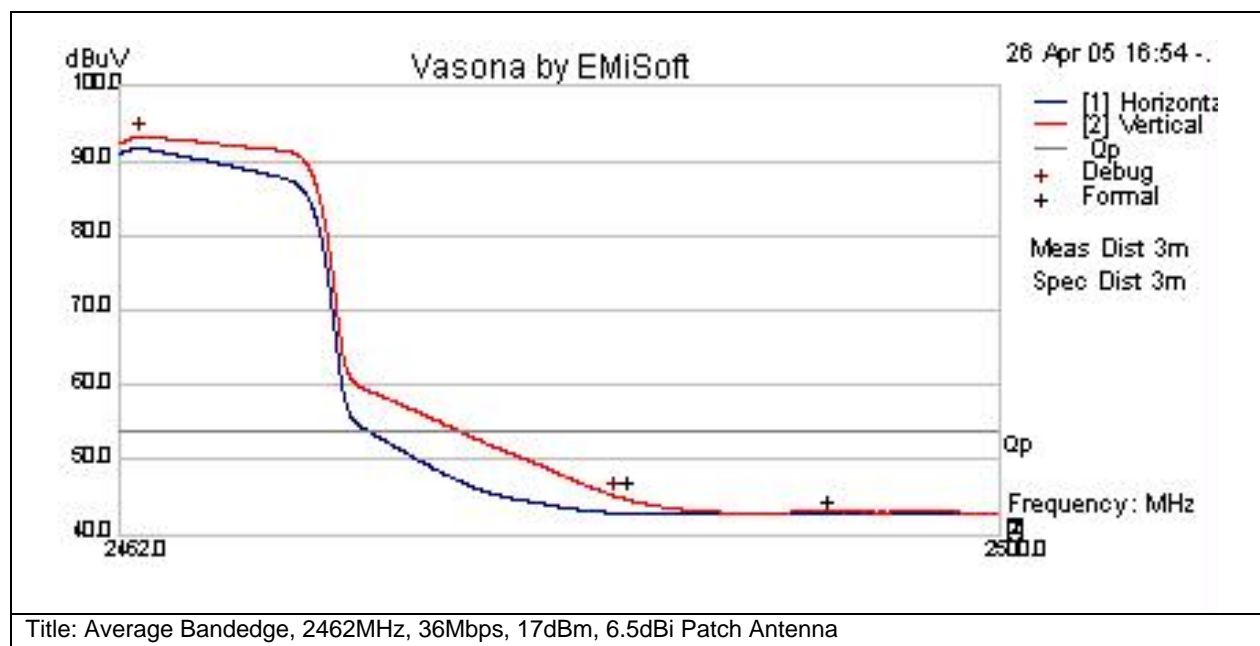


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2485.98	48.8	25.2	-5.7	68.3	Peak(Scan)	V	189	250	74	-5.7	Pass	
2492.67	36.8	25.2	-5.7	56.4	Peak(Scan)	H	139	287	74	-17.6	Pass	



Subtest Number: 16559 - 7		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2462MHz, 36Mbps, 17dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

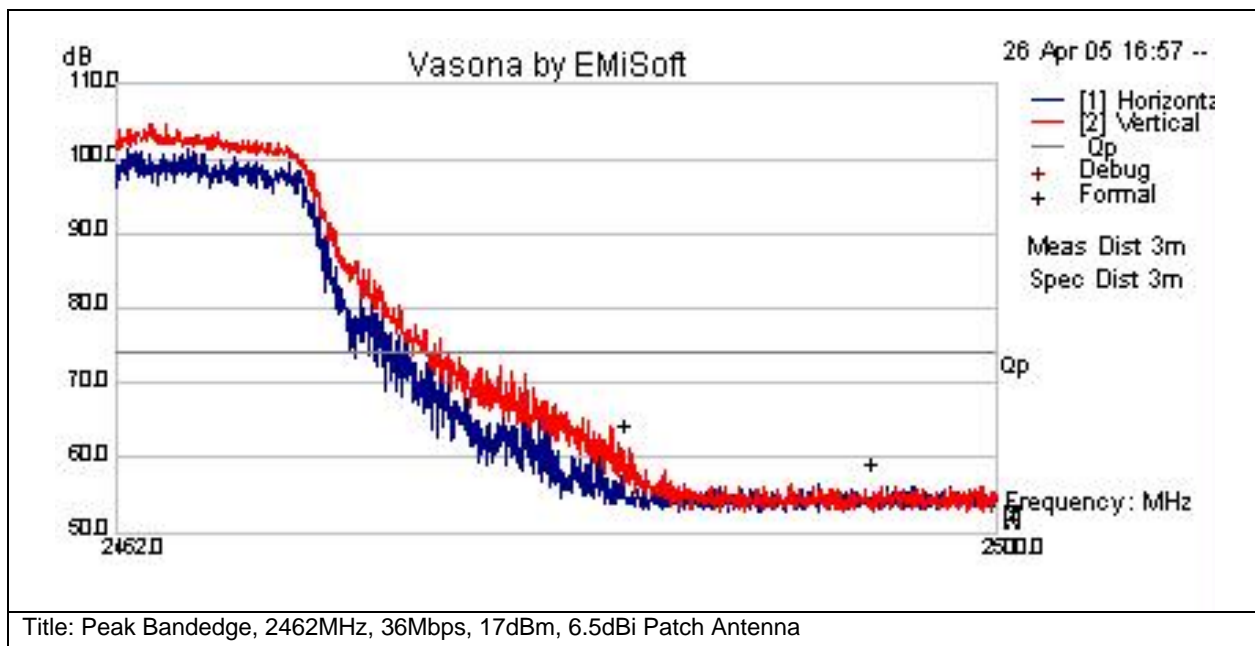


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.5	25.4	25.2	-5.7	44.9	Peak(Scan)	V	139	287	54	-9.1	Pass	
2483.64	23.4	25.2	-5.7	42.9	Peak(Scan)	H	139	287	54	-11.1	Pass	



Subtest Number: 16559 - 8		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2462MHz, 36Mbps, 17dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

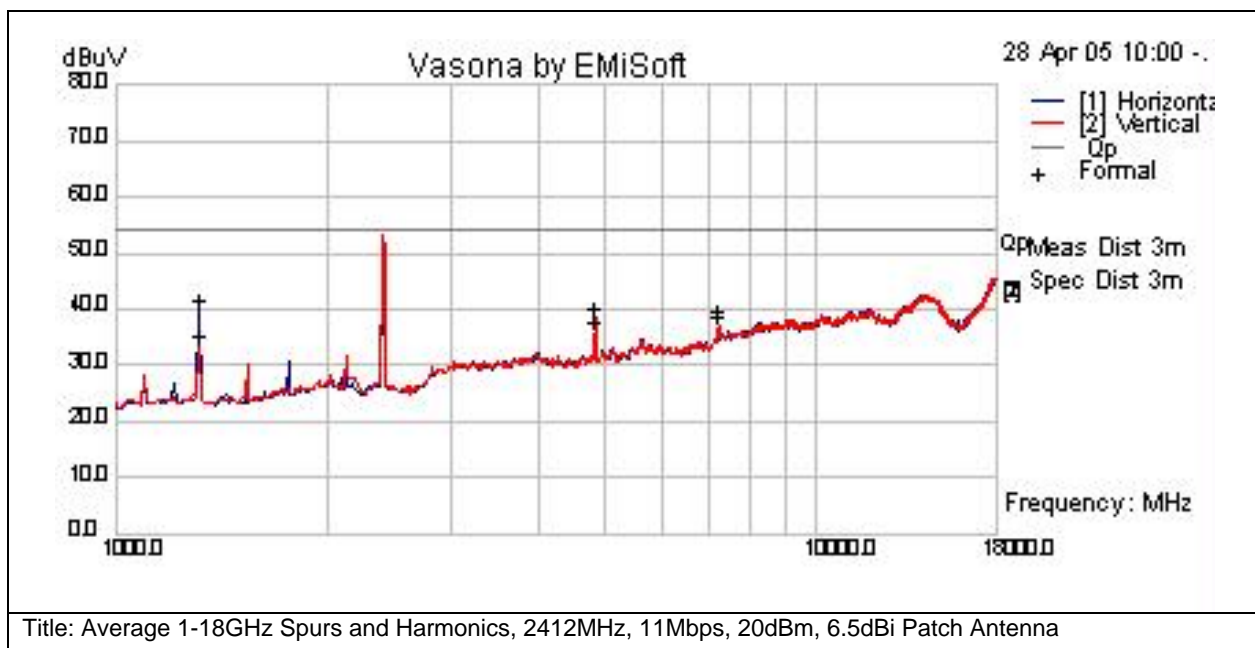


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.95	42.9	25.2	-5.7	62.4	Peak(Scan)	V	139	287	74	-11.6	Pass	
2494.66	37.8	25.2	-5.6	57.4	Peak(Scan)	H	139	287	74	-16.6	Pass	



Subtest Number: 16559 - 9		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2412MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

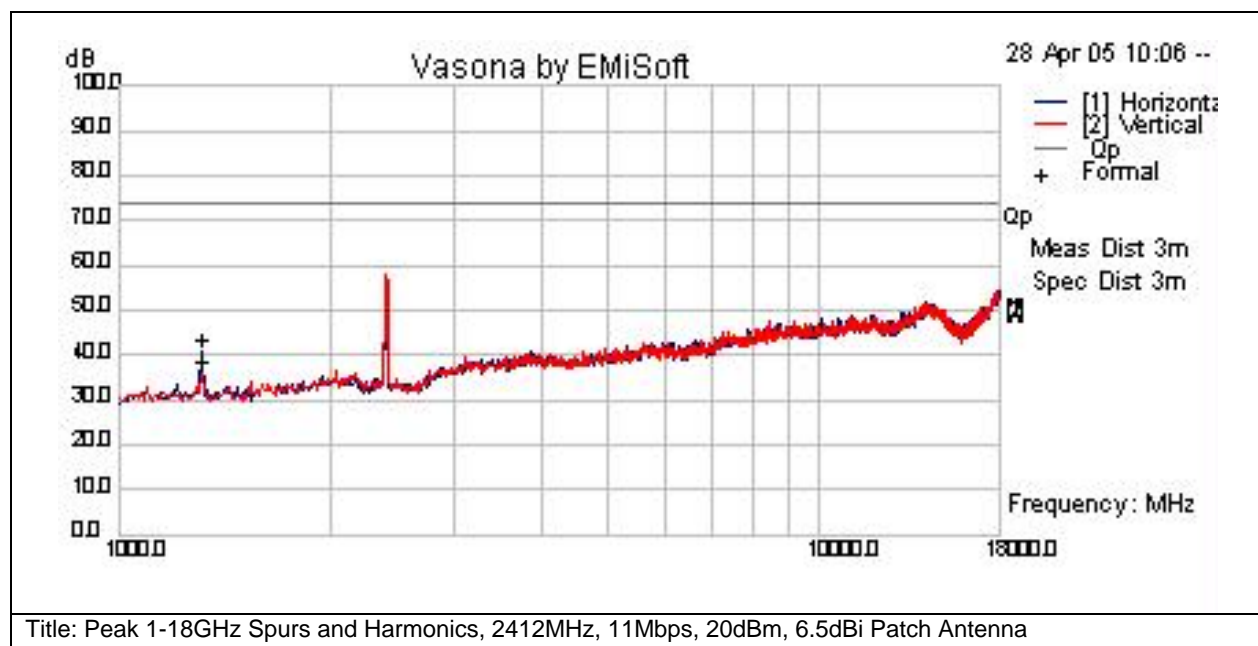


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1319.99	42.7	4.3	-7.6	39.4	Av	H	168	275	54	-14.6	Pass	
1320.04	36.2	4.3	-7.6	32.8	Av	V	168	275	54	-21.2	Pass	
4823.88	31.4	7.8	-3.8	35.3	Av	H	168	275	54	-18.7	Pass	
4824.06	34	7.8	-3.8	37.9	Av	V	168	275	54	-16.1	Pass	
7238.59	26.4	9.2	0.5	36.2	Av	H	168	275	54	-17.8	Pass	
7239.71	27.3	9.2	0.6	37.1	Av	V	168	275	54	-16.9	Pass	



Subtest Number: 16559 - 10		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2412MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

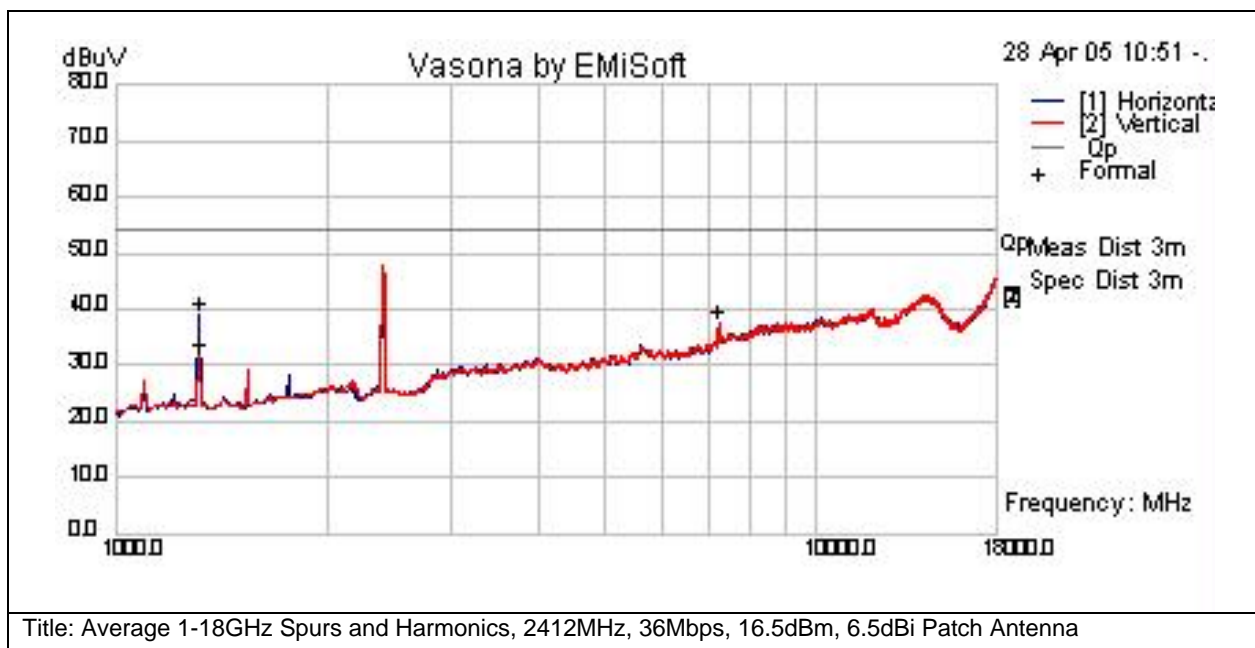


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1320.02	43.6	4.3	-7.6	40.3	Pk	H	168	275	74	-33.7	Pass	
1320.05	38.9	4.3	-7.6	35.6	Pk	V	168	275	74	-38.4	Pass	



Subtest Number: 16559 - 11		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2412MHz, 36Mbps, 16.5dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

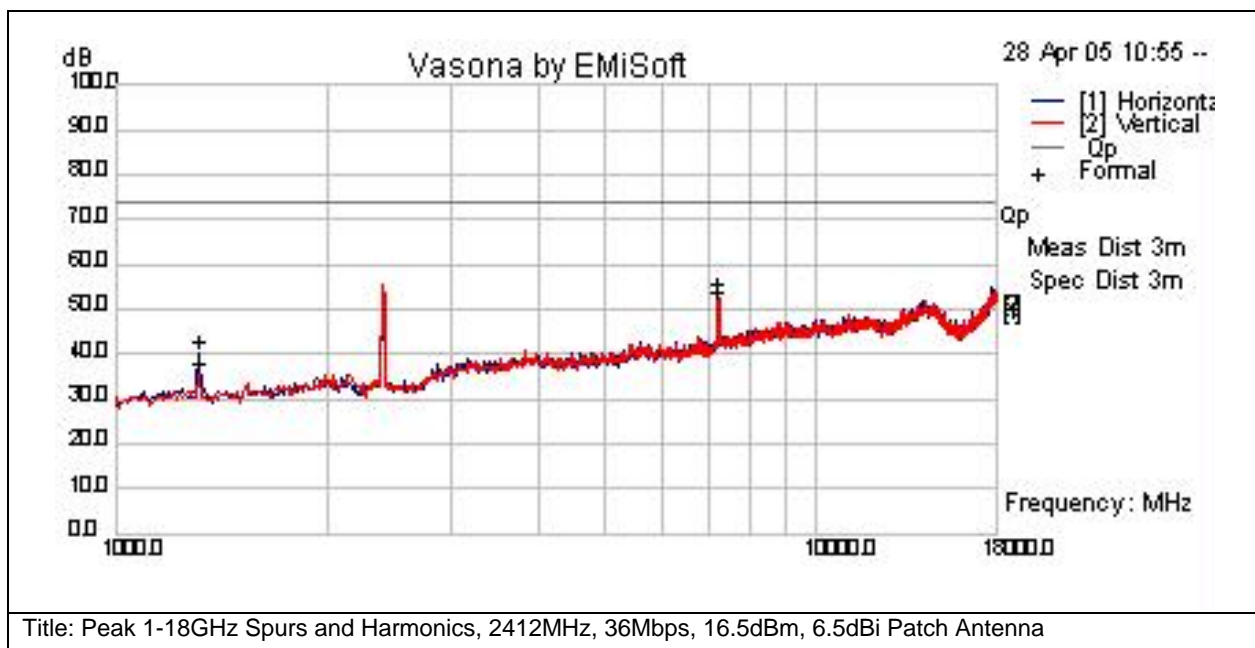


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1320.01	34.6	4.3	-7.6	31.3		Av	V	168	275	54	-22.7	Pass
1320.02	42.3	4.3	-7.6	39		Av	H	168	275	54	-15	Pass
7238.134	27.6	9.2	0.5	37.4		Av	H	168	275	54	0	N/A
7246.08	27.4	9.3	0.6	37.3		Av	V	168	275	54	-16.7	Pass



Subtest Number: 16559 - 12		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2412MHz, 36Mbps, 16.5dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

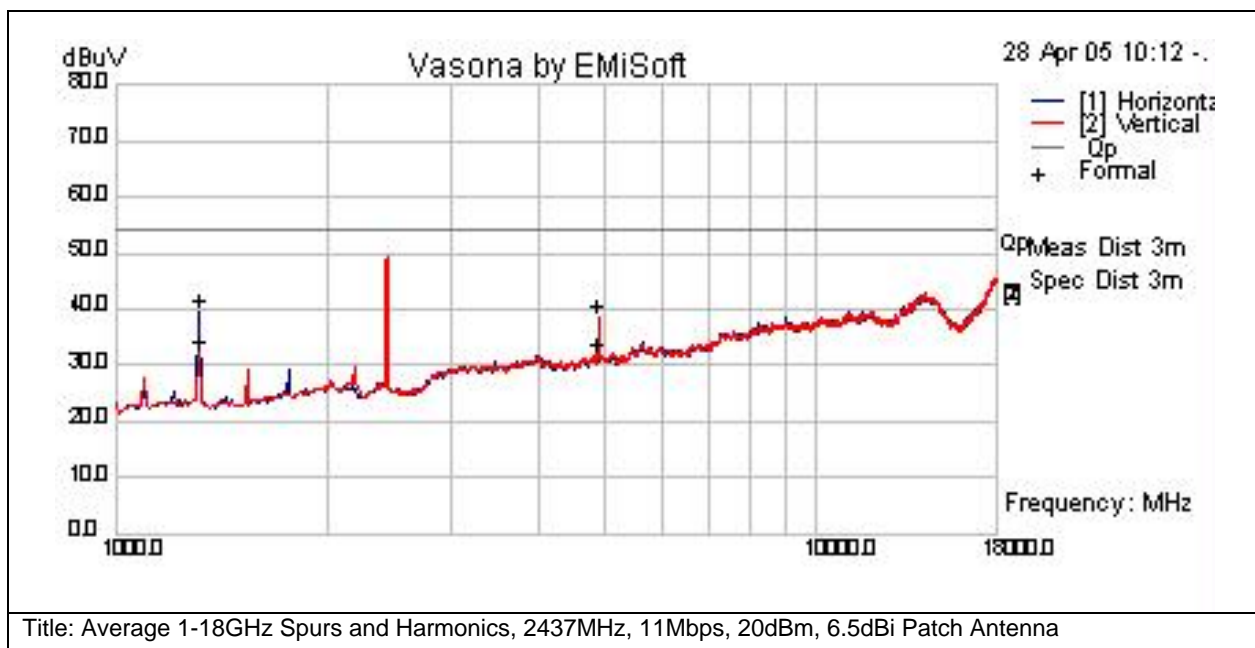


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1319.81	43.3	4.3	-7.6	40	Pk	H	168	275	74	-34	Pass	
1320.18	38.3	4.3	-7.6	35	Pk	V	168	275	74	-39	Pass	
7231.7	41.1	9.2	0.5	50.8	Pk	H	168	275	74	-23.2	Pass	
7236.21	43.2	9.2	0.5	53	Pk	V	168	275	74	-21	Pass	



Subtest Number: 16559 - 13		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2437MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

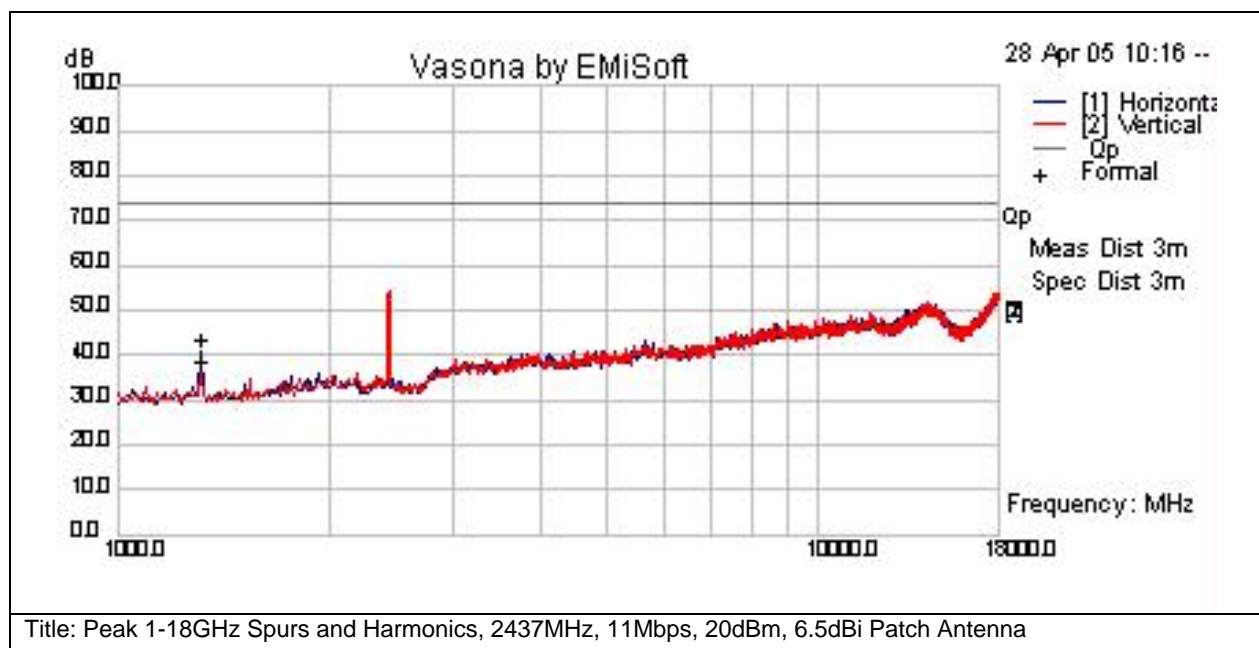


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1319.93	35	4.3	-7.6	31.7	Av	V	168	275	54	-22.3	Pass	
1319.93	42.6	4.3	-7.6	39.3	Av	H	168	275	54	-14.7	Pass	
4873.96	34.1	7.9	-3.8	38.2	Av	V	168	275	54	-15.8	Pass	
4873.98	27.3	7.9	-3.8	31.3	Av	H	168	275	54	-22.7	Pass	



Subtest Number: 16559 - 14		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2437MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

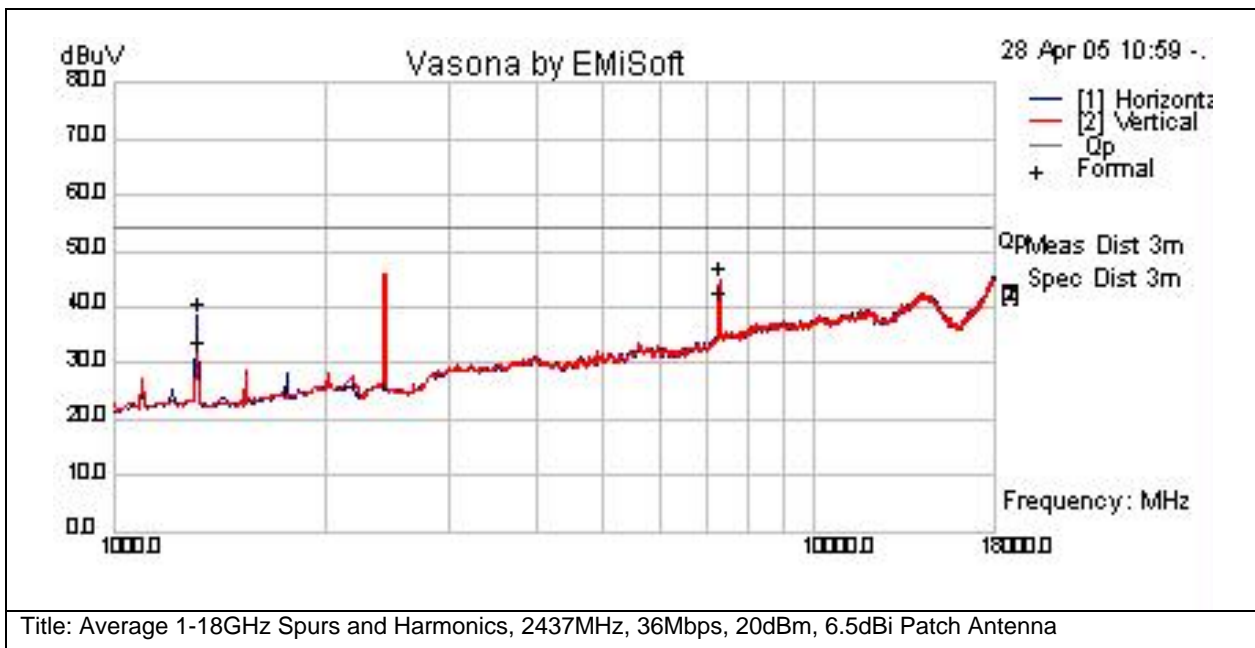


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1319.8	38.8	4.3	-7.6	35.4	Pk	V	168	275	74	-38.6	Pass	
1319.97	44.1	4.3	-7.6	40.8	Pk	H	168	275	74	-33.2	Pass	



Subtest Number: 16559 - 15		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2437MHz, 36Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

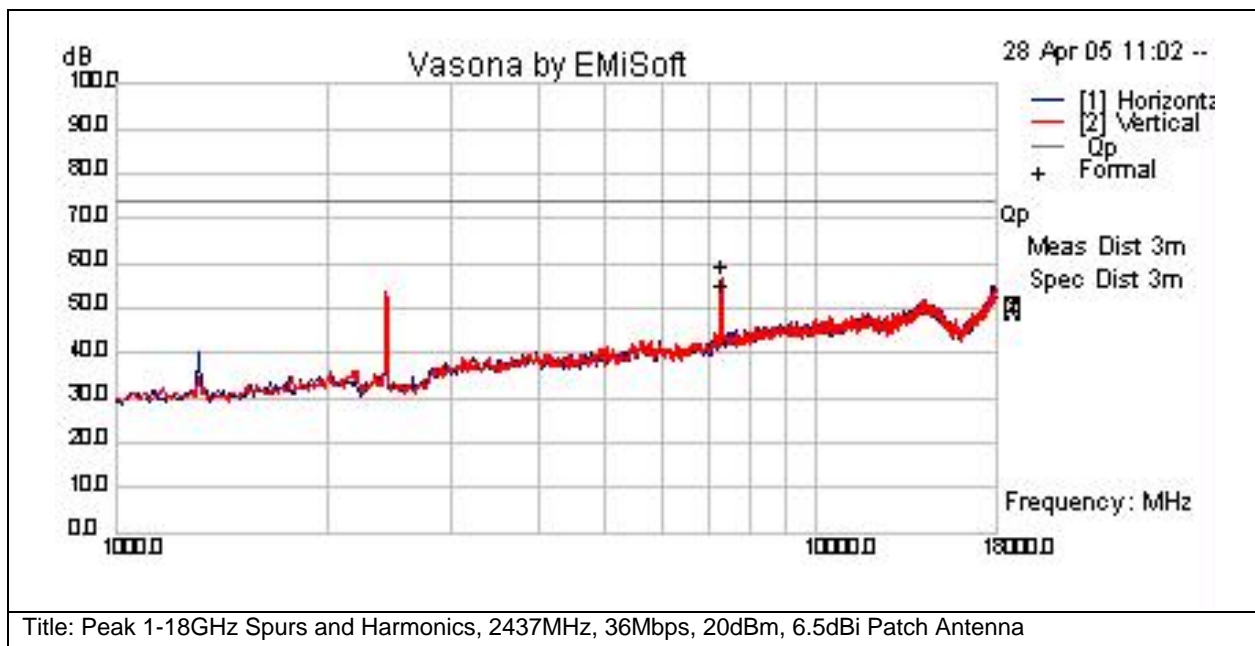


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1319.95	41.7	4.3	-7.6	38.4	Av	H	168	275	54	-15.6	Pass	
1319.96	35	4.3	-7.6	31.7	Av	V	168	275	54	-22.3	Pass	
7310.793	29.9	9.3	1	40.2	Av	H	168	275	54	-13.8	Pass	
7312.833	34.3	9.3	1	44.6	Av	V	168	275	54	-9.4	Pass	



Subtest Number: 16559 - 16		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2437MHz, 36Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

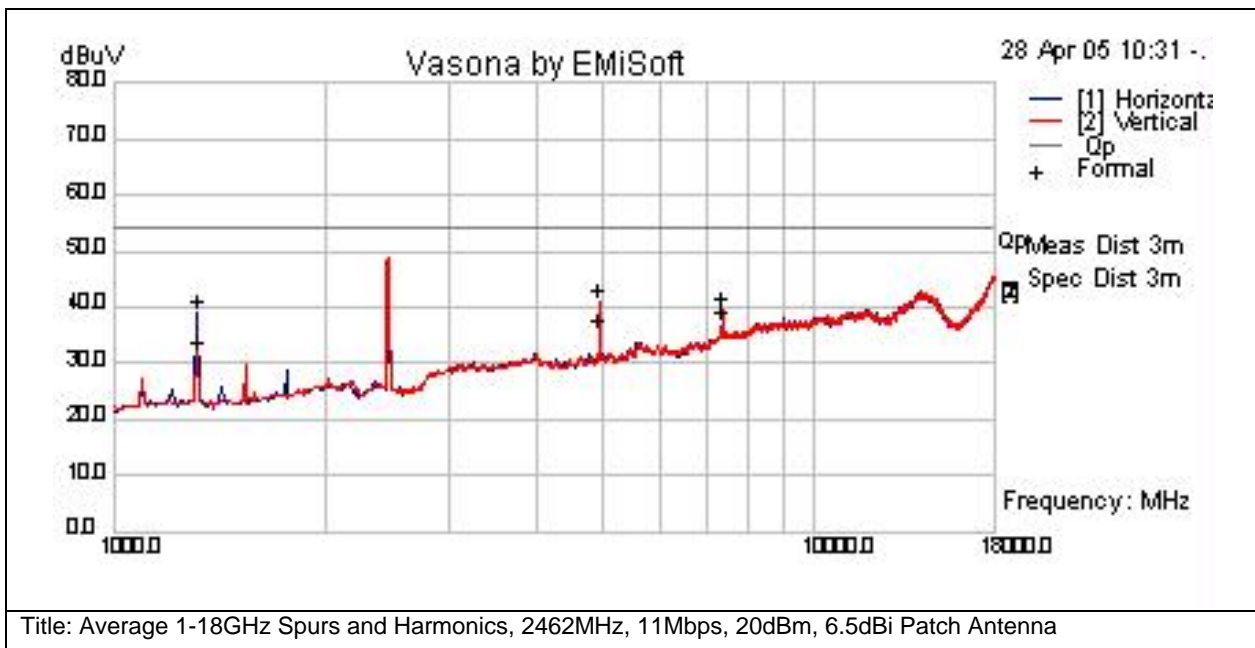


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
7309.54	42	9.3	1	52.3	Pk	H	168	275	74	-21.7	Pass	
7315.46	46.2	9.3	1	56.5	Pk	V	168	275	74	-17.5	Pass	



Subtest Number: 16559 - 17		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2462MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

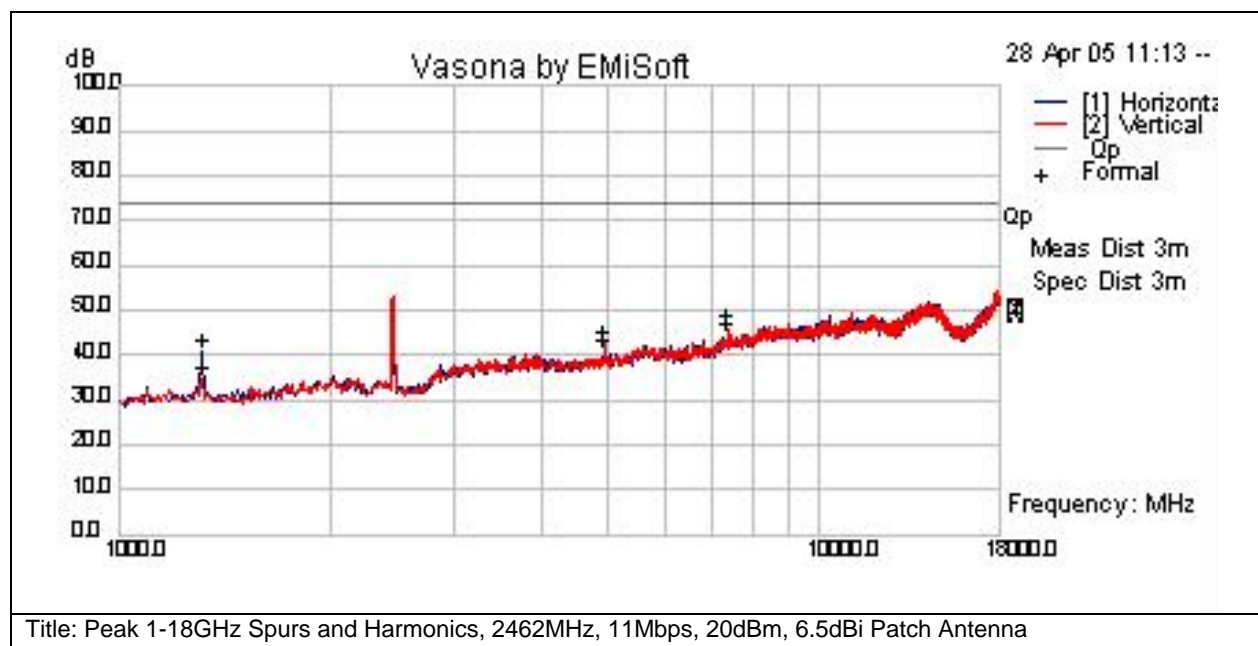


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1320.04	34.9	4.3	-7.6	31.6	Av	V	168	275	54	-22.4	Pass	
1320.1	42.1	4.3	-7.6	38.7	Av	H	168	275	54	-15.3	Pass	
4923.85	31.2	7.8	-3.9	35.1	Av	H	168	275	54	-18.9	Pass	
4924.08	37	7.8	-3.9	41	Av	V	168	275	54	-13	Pass	
7382.26	28.7	9.3	1.3	39.3	Av	V	168	275	54	-14.7	Pass	
7388.83	26	9.3	1.3	36.6	Av	H	168	275	54	-17.4	Pass	



Subtest Number: 16559 - 18		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2462MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		



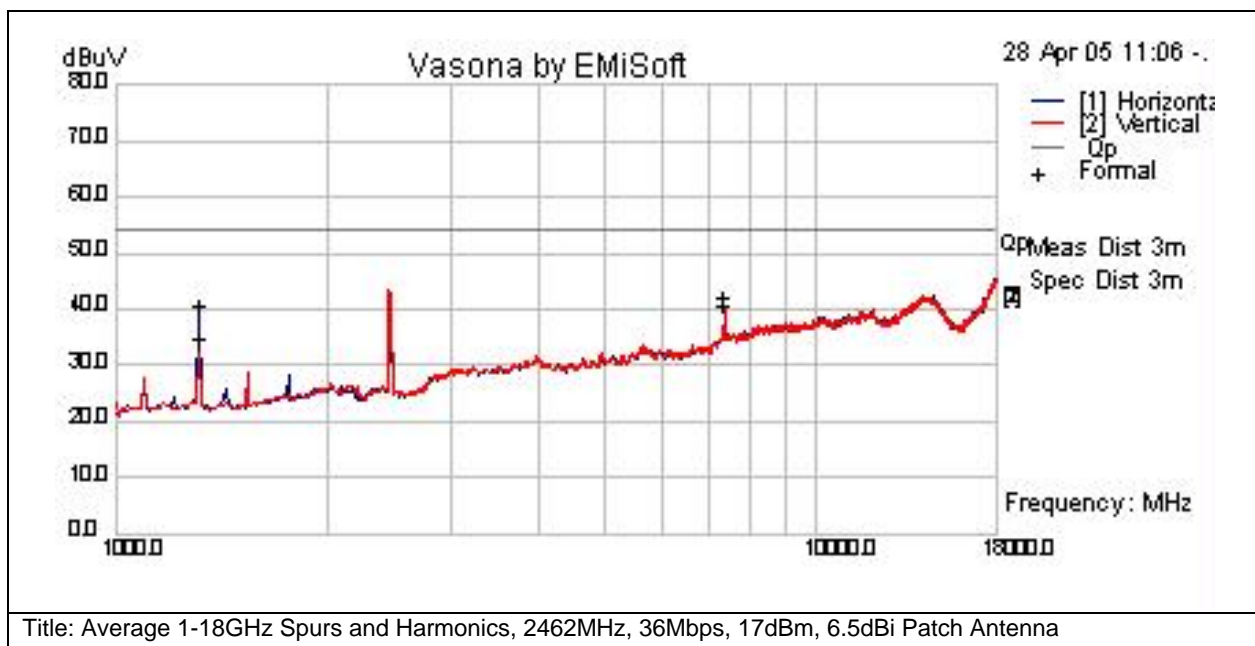
Title: Peak 1-18GHz Spurs and Harmonics, 2462MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1319.93	37.6	4.3	-7.6	34.3	Pk	V	168	275	74	-39.7	Pass	
1319.95	43.7	4.3	-7.6	40.3	Pk	H	168	275	74	-33.7	Pass	
4923.86	38.6	7.8	-3.9	42.6	Pk	V	168	275	74	-31.4	Pass	
4923.88	36.5	7.8	-3.9	40.4	Pk	H	168	275	74	-33.6	Pass	
7386.14	35.3	9.3	1.3	45.9	Pk	V	168	275	74	-28.1	Pass	
7390.13	33.7	9.3	1.3	44.4	Pk	H	168	275	74	-29.6	Pass	



Subtest Number: 16559 - 19		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2462MHz, 36Mbps, 17dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

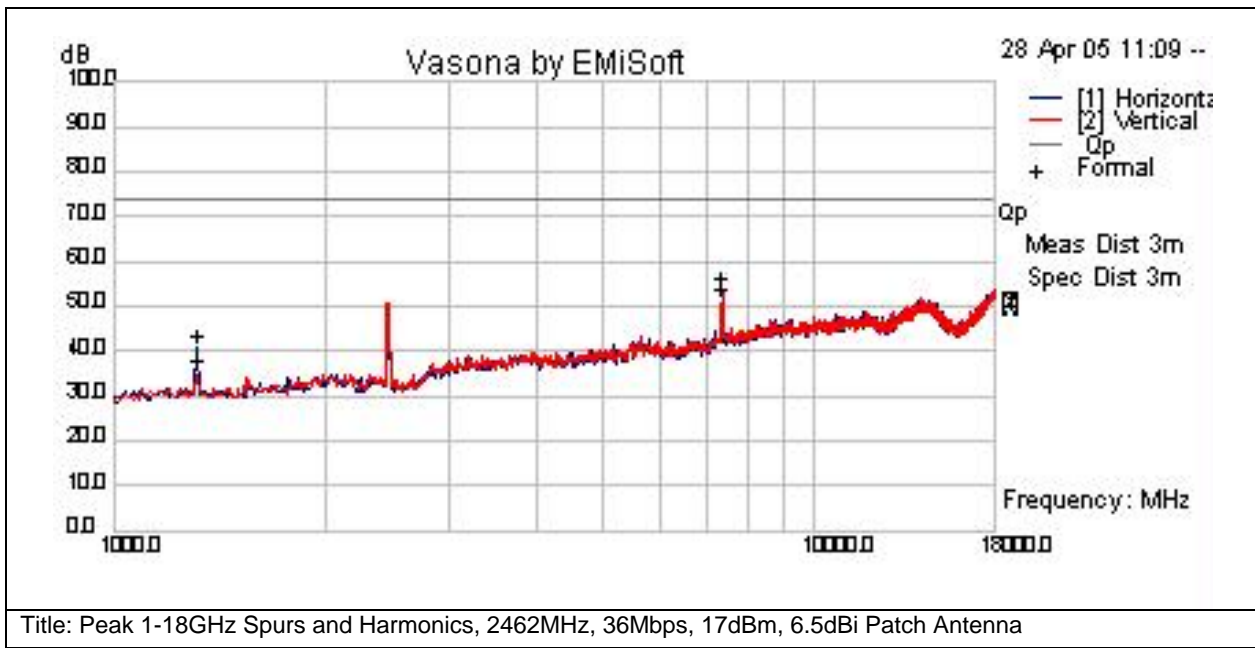


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1320.04	35.6	4.3	-7.6	32.2	Av	V	168	275	54	-21.8	Pass	
1320.04	41.8	4.3	-7.6	38.5	Av	H	168	275	54	-15.5	Pass	
7383.881	29.2	9.3	1.3	39.8	Av	V	168	275	54	-14.2	Pass	
7385.278	27.6	9.3	1.3	38.2	Av	H	168	275	54	-15.8	Pass	



Subtest Number: 16559 - 20		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2462MHz, 36Mbps, 17dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

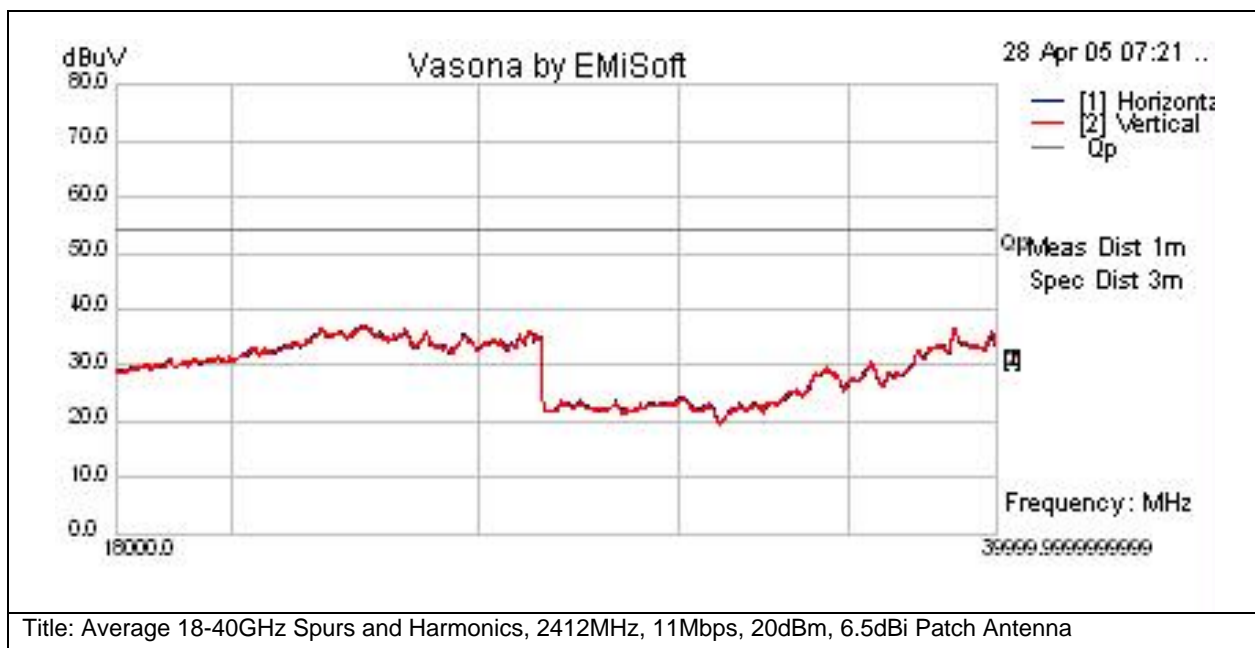


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1320	38.2	4.3	-7.6	34.9	Pk	V	168	275	74	-39.1	Pass	
1320.04	43.9	4.3	-7.6	40.6	Pk	H	168	275	74	-33.4	Pass	
7373.651	40.2	9.3	1.2	50.7	Pk	H	168	275	74	-23.3	Pass	
7385.211	42.7	9.3	1.3	53.3	Pk	V	168	275	74	-20.7	Pass	



Subtest Number: 16559 - 21		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 18-40GHz Spurs and Harmonics, 2412MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	40000.0		
Lowest Frequency	18000.0		
Comments on the above Test Results	Results are identical for all frequencies, power levels, data rates, and antenna gains		

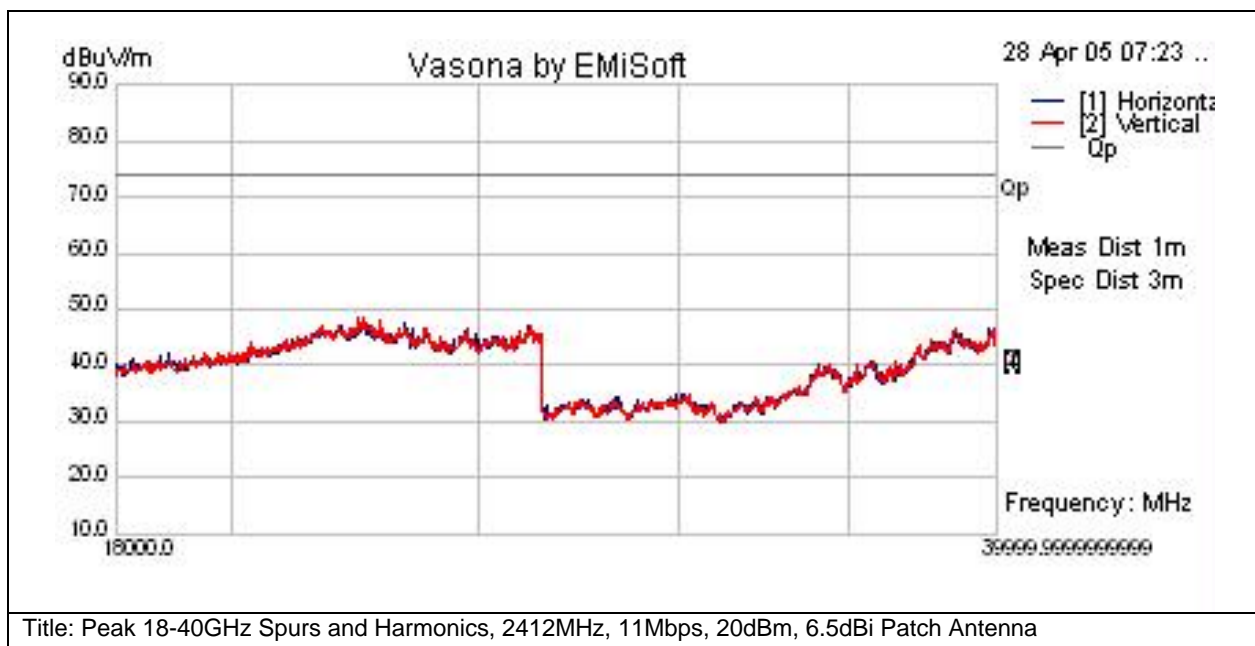


Test Results Table

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



Subtest Number: 16559 - 22		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 18-40GHz Spurs and Harmonics, 2412MHz, 11Mbps, 20dBm, 6.5dBi Patch Antenna		
Subtest Result	Pass		
Highest Frequency	40000.0		
Lowest Frequency	18000.0		
Comments on the above Test Results	Results are identical for all frequencies, power levels, data rates, and antenna gains		



Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	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		

Physical Test arrangement Photograph:



Title: 2.4GHz 6.5dBi Patch Antenna Radiated Test Setup



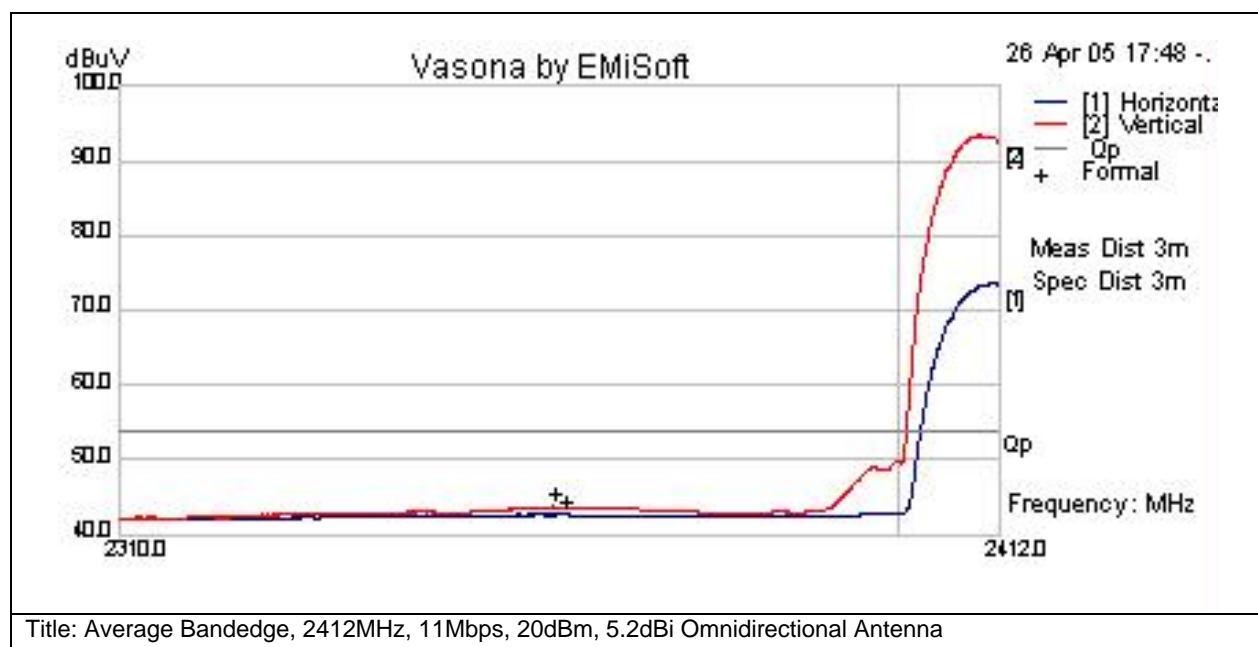
2.4GHz Radiated Emissions with 5.2dBi Omnidirectional Antenna

Test Number: 16560				
Basic Standard	Applied to	Class	Freq Range	Test Details / Comments
CFR47 Part 15.247	Enclosure	N/A	1GHz - 26GHz	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).
Operating Mode	Mode : 1, 2.4GHz Spurious			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
2	AIR-AP1020-A-K9 with 2.4GHz 5.2dBi Omnidirectional Antenna	S01, S03 and S06	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Subtest Number: 16560 - 1		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

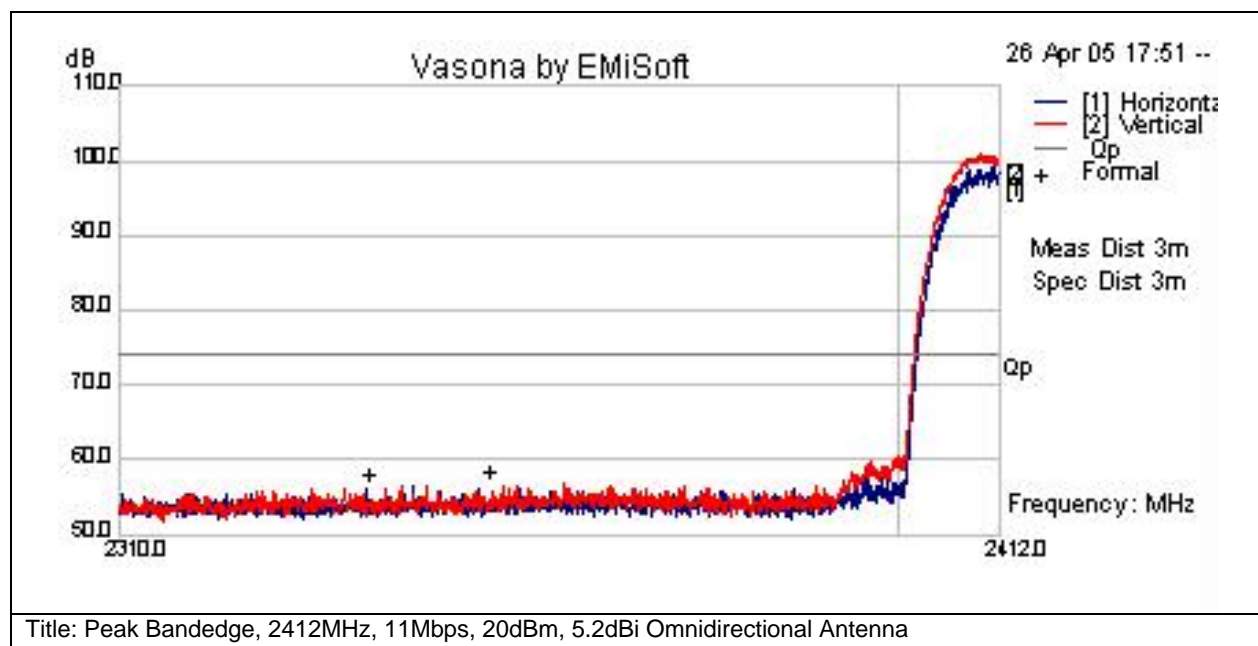


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2360.16	24.3	25.1	-5.7	43.7	Peak(Scan)	V	142	68	54	-10.3	Pass	
2361.65	23.3	25.1	-5.7	42.7	Peak(Scan)	H	142	68	54	-11.3	Pass	



Subtest Number: 16560 - 2		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

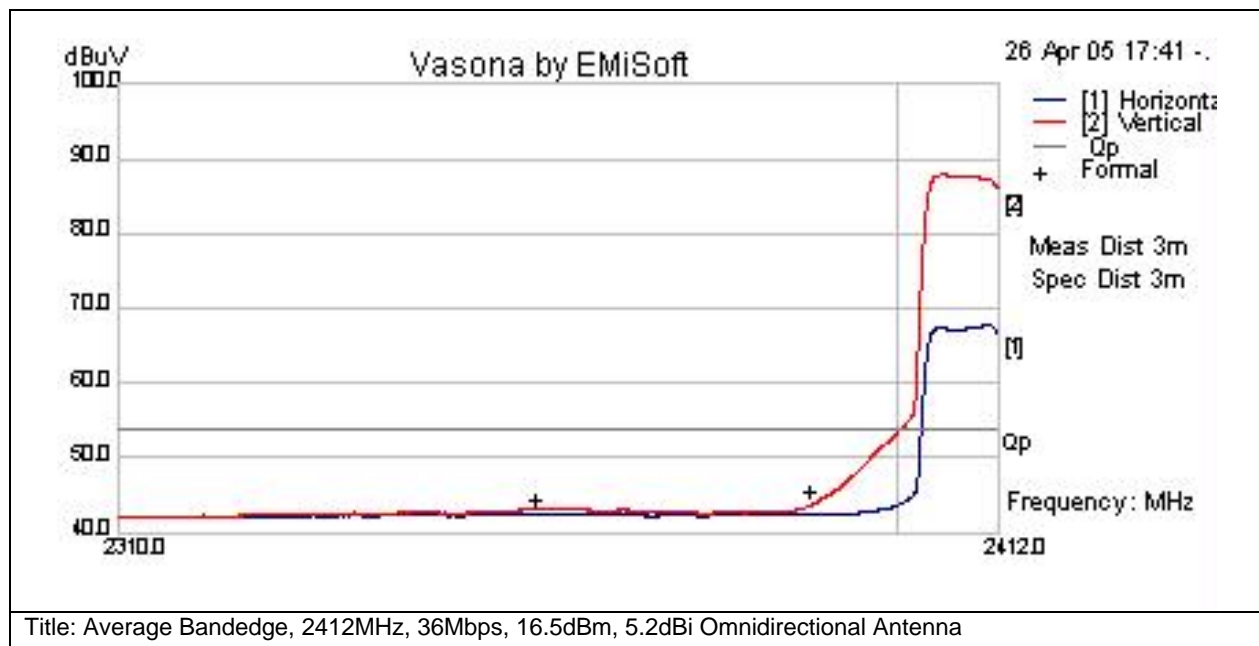


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2352.77	37.3	25.1	-5.8	56.6	Peak(Scan)	V	142	68	74	-17.4	Pass	
2338.9	37.2	25	-5.9	56.3	Peak(Scan)	H	142	68	74	-17.7	Pass	



Subtest Number: 16560 - 3		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2412MHz, 36Mbps, 16.5dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

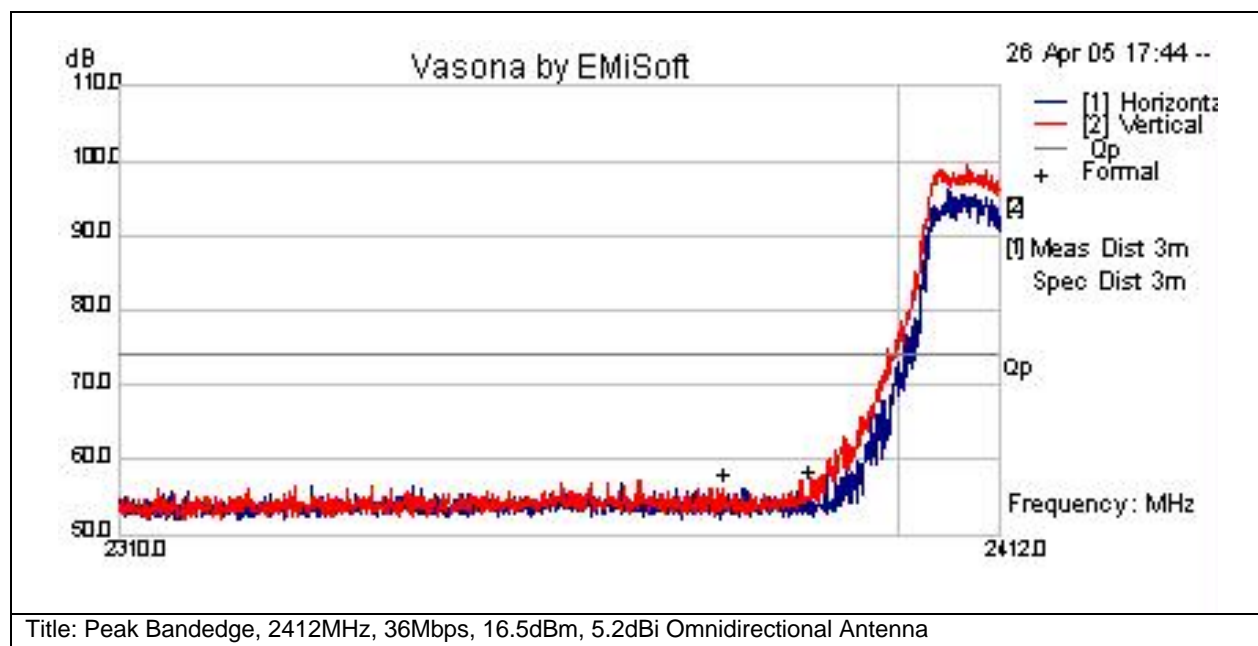


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2390	24.4	25.1	-5.8	43.7	Peak(Scan)	V	142	68	54	-10.3	Pass	
2358.11	23.2	25.1	-5.7	42.6	Peak(Scan)	H	142	68	54	-11.4	Pass	



Subtest Number: 16560 - 4		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2412MHz, 36Mbps, 16.5dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2412.0		
Lowest Frequency	2310.0		
Comments on the above Test Results	No further comments		

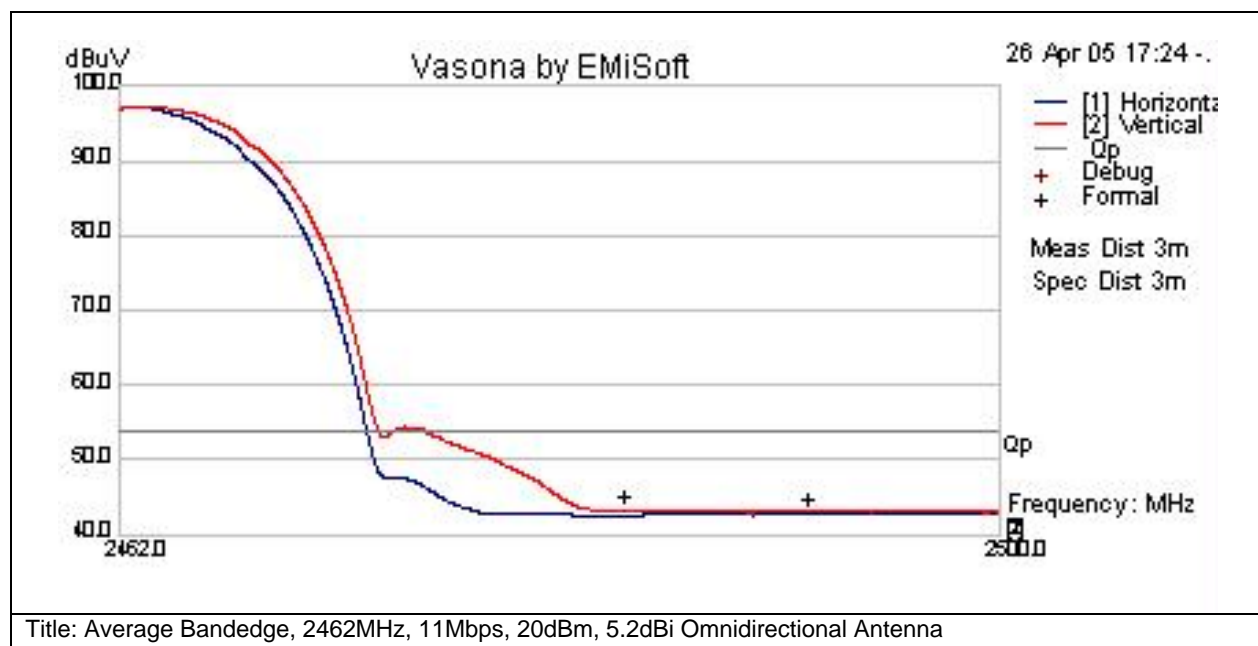


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2389.7	37.3	25.1	-5.8	56.6	Peak(Scan)	V	142	68	74	-17.4	Pass	
2379.77	37	25.1	-5.9	56.2	Peak(Scan)	H	142	68	74	-17.8	Pass	



Subtest Number: 16560 - 5		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

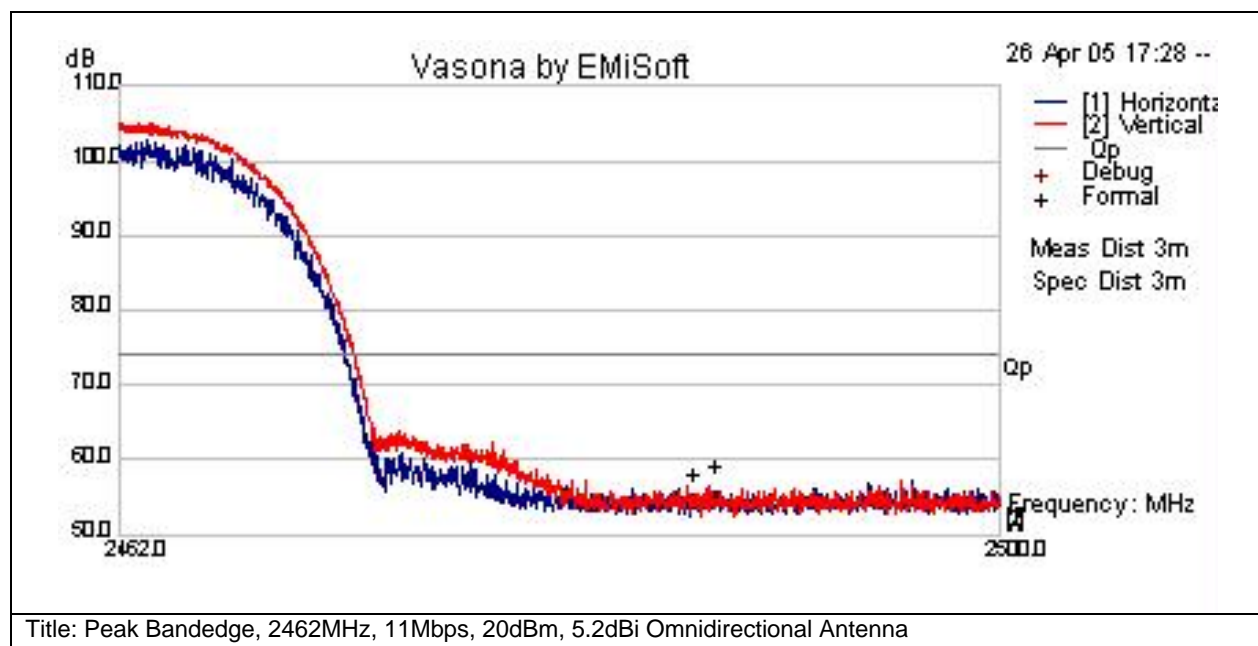


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.82	23.7	25.2	-5.7	43.2	Peak(Scan)	V	142	68	54	-10.8	Pass	
2491.79	23.4	25.2	-5.7	42.9	Peak(Scan)	H	142	68	54	-11.1	Pass	



Subtest Number: 16560 - 6		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

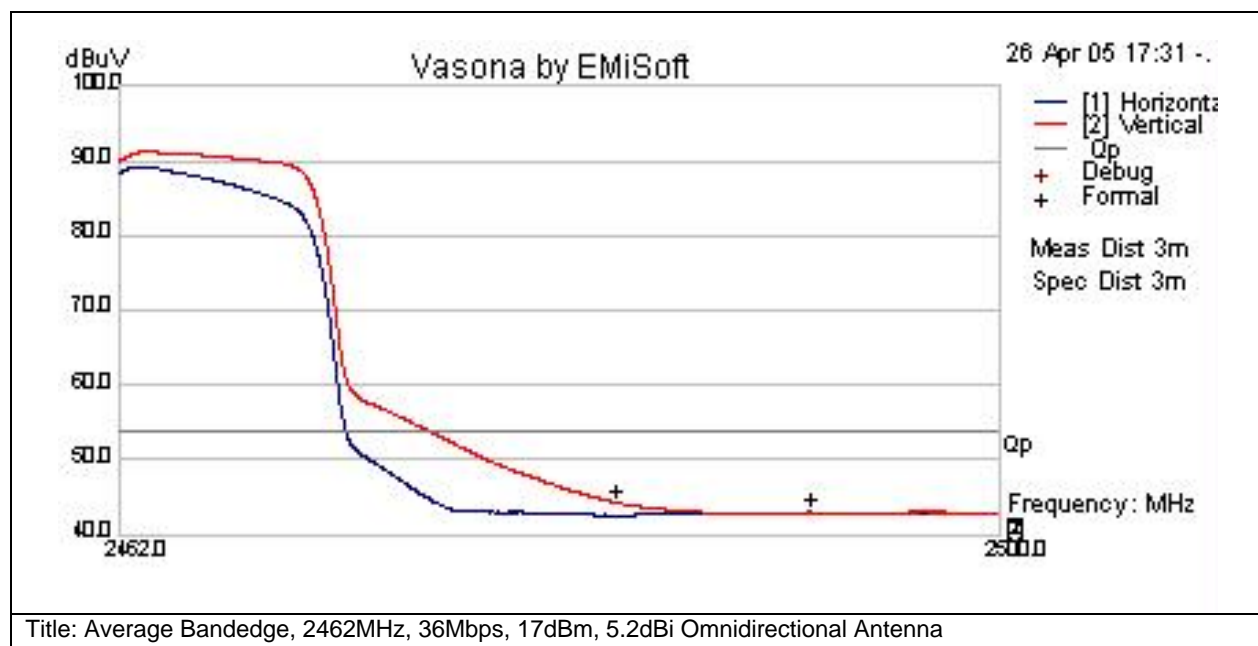


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2487.79	38	25.2	-5.7	57.5	Peak(Scan)	V	142	68	74	-16.5	Pass	
2486.79	36.8	25.2	-5.7	56.3	Peak(Scan)	H	142	68	74	-17.7	Pass	



Subtest Number: 16560 - 7		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 2462MHz, 36Mbps, 17dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

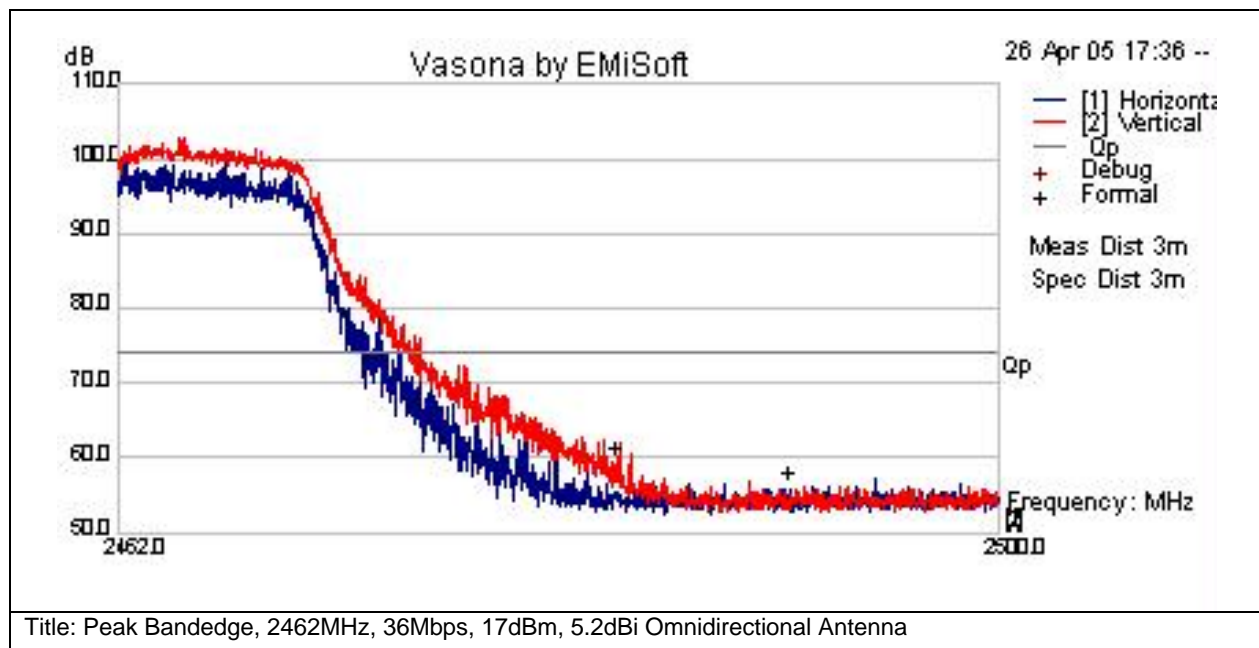


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2483.51	24.7	25.2	-5.7	44.2	Peak(Scan)	V	142	68	54	-9.8	Pass	
2491.86	23.4	25.2	-5.7	42.9	Peak(Scan)	H	142	68	54	-11.1	Pass	



Subtest Number: 16560 - 8		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 2462MHz, 36Mbps, 17dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	2500.0		
Lowest Frequency	2462.0		
Comments on the above Test Results	No further comments		

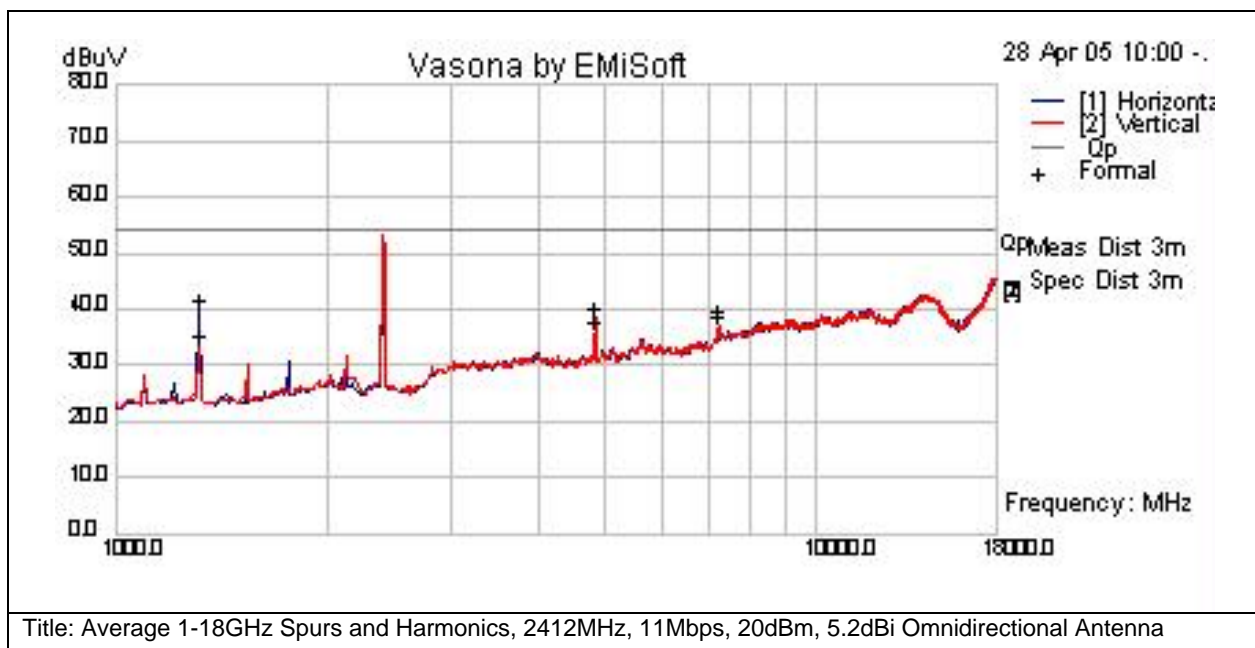


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
2483.53	40.2	25.2	-5.7	59.7	Peak(Scan)	V	142	68	74	-14.3	Pass	
2491.01	36.6	25.2	-5.7	56.2	Peak(Scan)	H	142	68	74	-17.8	Pass	



Subtest Number: 16560 - 9		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

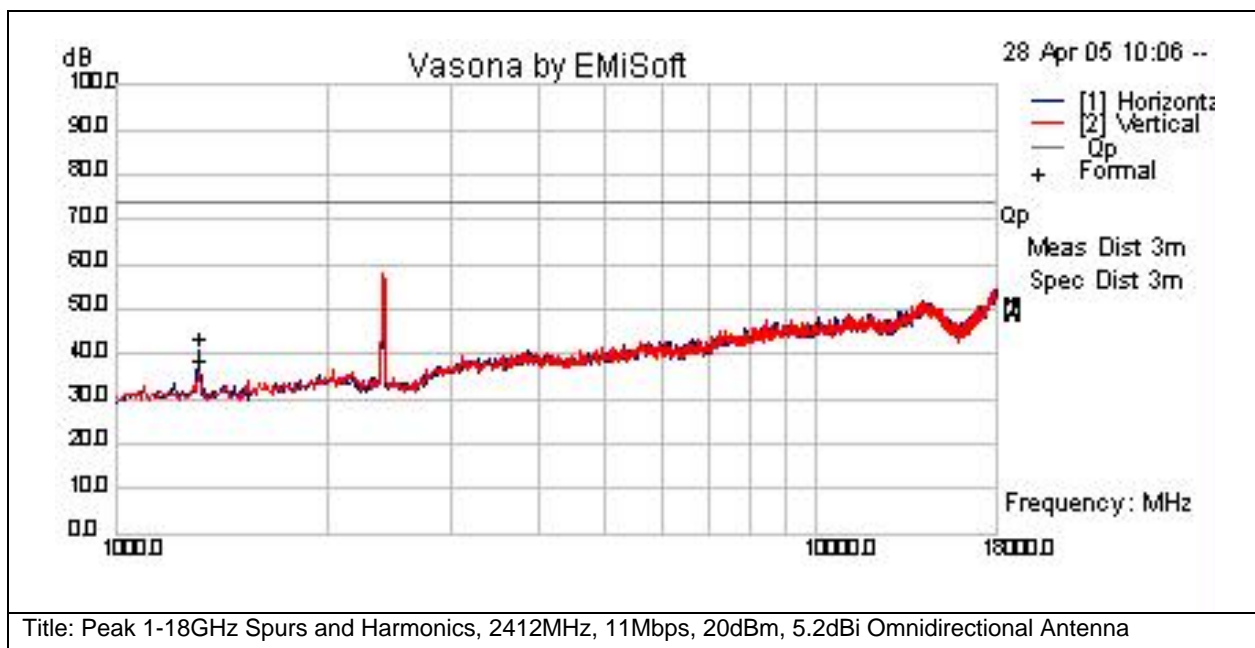


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1319.99	42.7	4.3	-7.6	39.4	Av	H	168	275	54	-14.6	Pass	
1320.04	36.2	4.3	-7.6	32.8	Av	V	168	275	54	-21.2	Pass	
4823.88	31.4	7.8	-3.8	35.3	Av	H	168	275	54	-18.7	Pass	
4824.06	34	7.8	-3.8	37.9	Av	V	168	275	54	-16.1	Pass	
7238.59	26.4	9.2	0.5	36.2	Av	H	168	275	54	-17.8	Pass	
7239.71	27.3	9.2	0.6	37.1	Av	V	168	275	54	-16.9	Pass	



Subtest Number: 16560 - 10		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2412MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

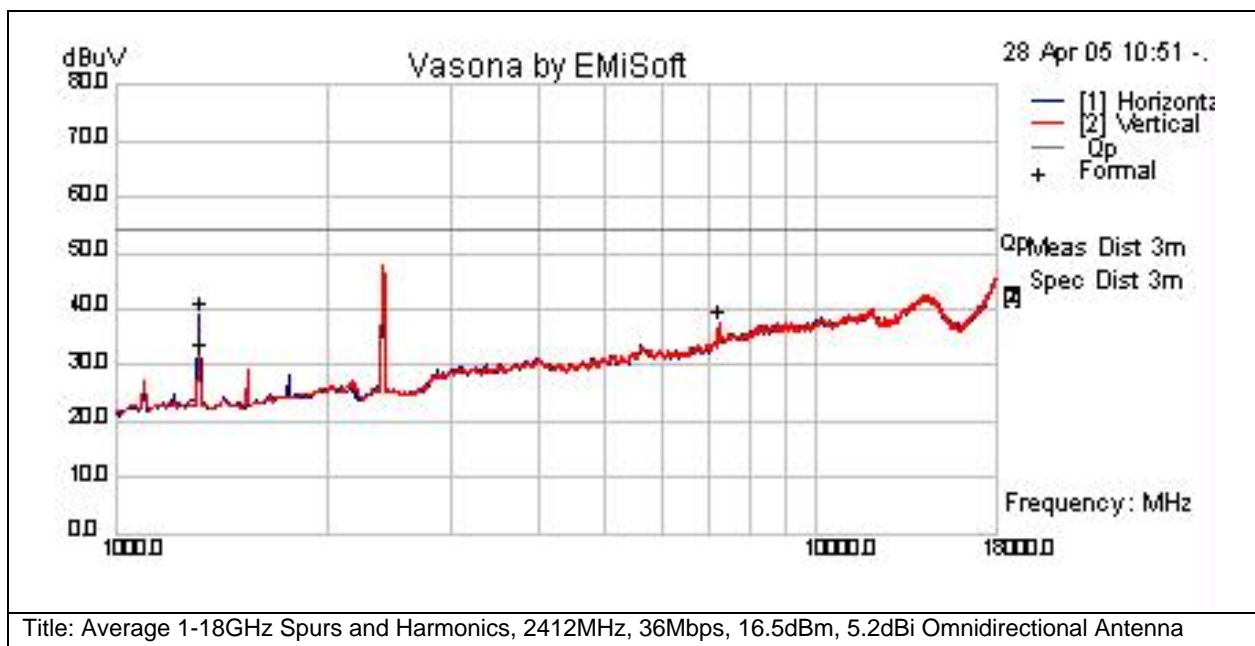


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1320.02	43.6	4.3	-7.6	40.3	Pk	H	168	275	74	-33.7	Pass	
1320.05	38.9	4.3	-7.6	35.6	Pk	V	168	275	74	-38.4	Pass	



Subtest Number: 16560 - 11		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2412MHz, 36Mbps, 16.5dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

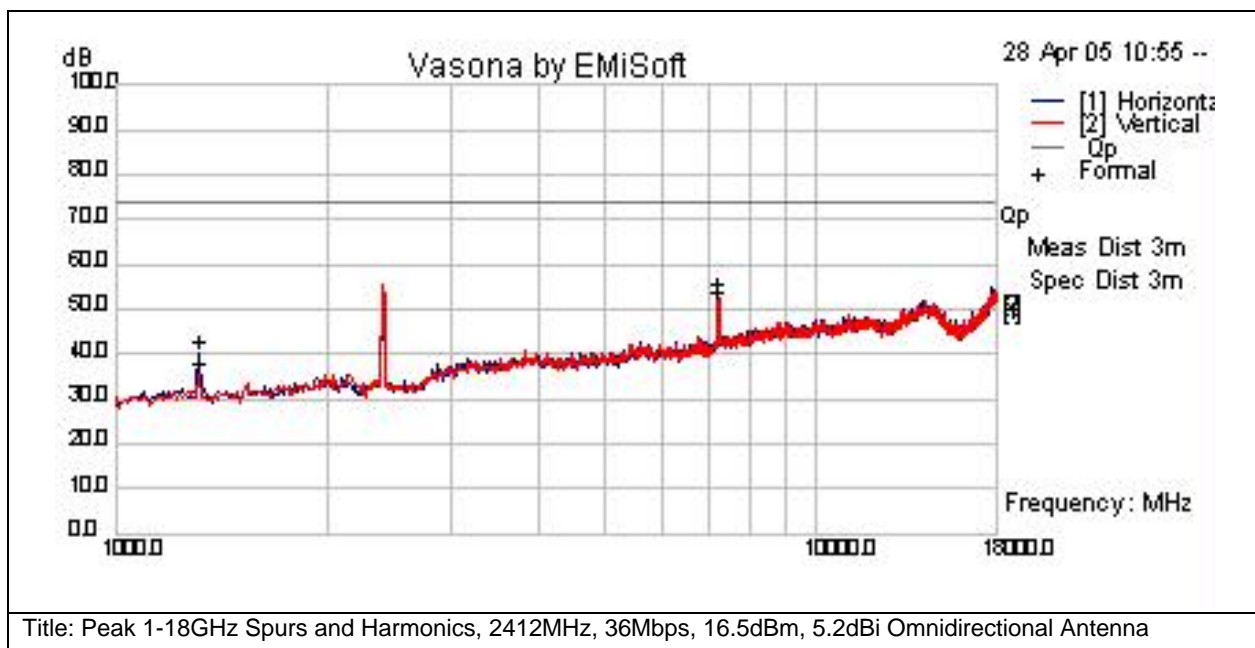


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1320.01	34.6	4.3	-7.6	31.3	Av	V	168	275	54	-22.7	Pass	
1320.02	42.3	4.3	-7.6	39	Av	H	168	275	54	-15	Pass	
7238.134	27.6	9.2	0.5	37.4	Av	H	168	275	54	0	N/A	
7246.08	27.4	9.3	0.6	37.3	Av	V	168	275	54	-16.7	Pass	



Subtest Number: 16560 - 12		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2412MHz, 36Mbps, 16.5dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		



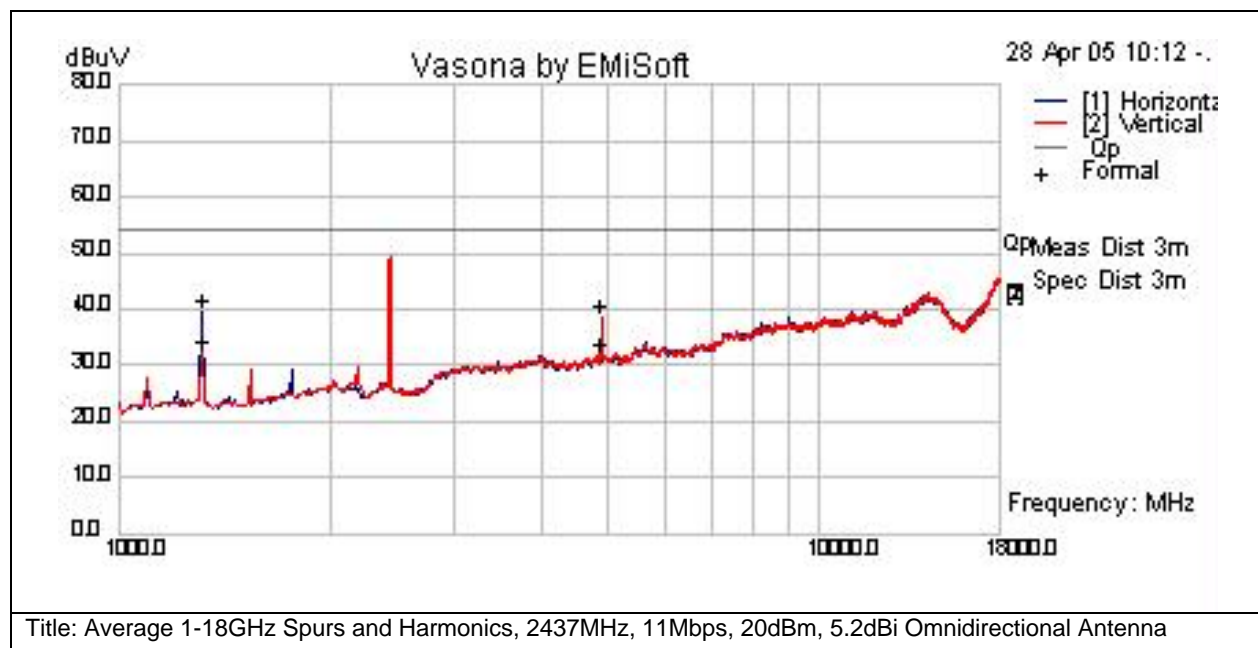
Title: Peak 1-18GHz Spurs and Harmonics, 2412MHz, 36Mbps, 16.5dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1319.81	43.3	4.3	-7.6	40	Pk	H	168	275	74	-34	Pass	
1320.18	38.3	4.3	-7.6	35	Pk	V	168	275	74	-39	Pass	
7231.7	41.1	9.2	0.5	50.8	Pk	H	168	275	74	-23.2	Pass	
7236.21	43.2	9.2	0.5	53	Pk	V	168	275	74	-21	Pass	



Subtest Number: 16560 - 13		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2437MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

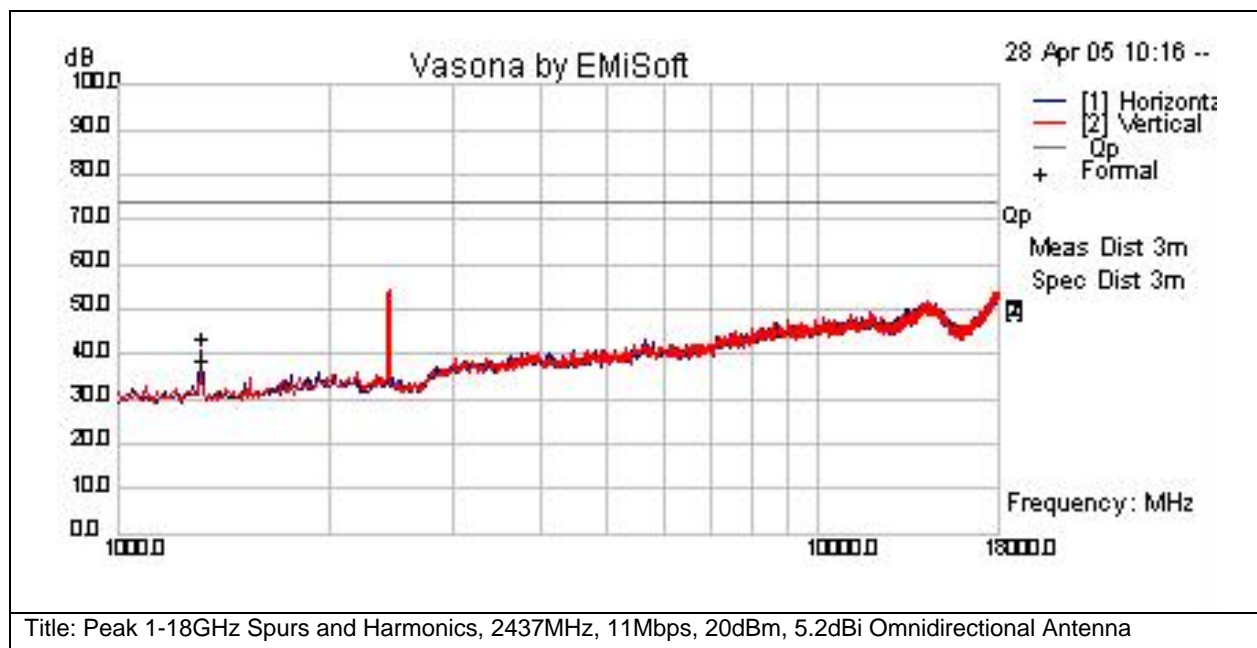


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1319.93	35	4.3	-7.6	31.7	Av	V	168	275	54	-22.3	Pass	
1319.93	42.6	4.3	-7.6	39.3	Av	H	168	275	54	-14.7	Pass	
4873.96	34.1	7.9	-3.8	38.2	Av	V	168	275	54	-15.8	Pass	
4873.98	27.3	7.9	-3.8	31.3	Av	H	168	275	54	-22.7	Pass	



Subtest Number: 16560 - 14		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2437MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

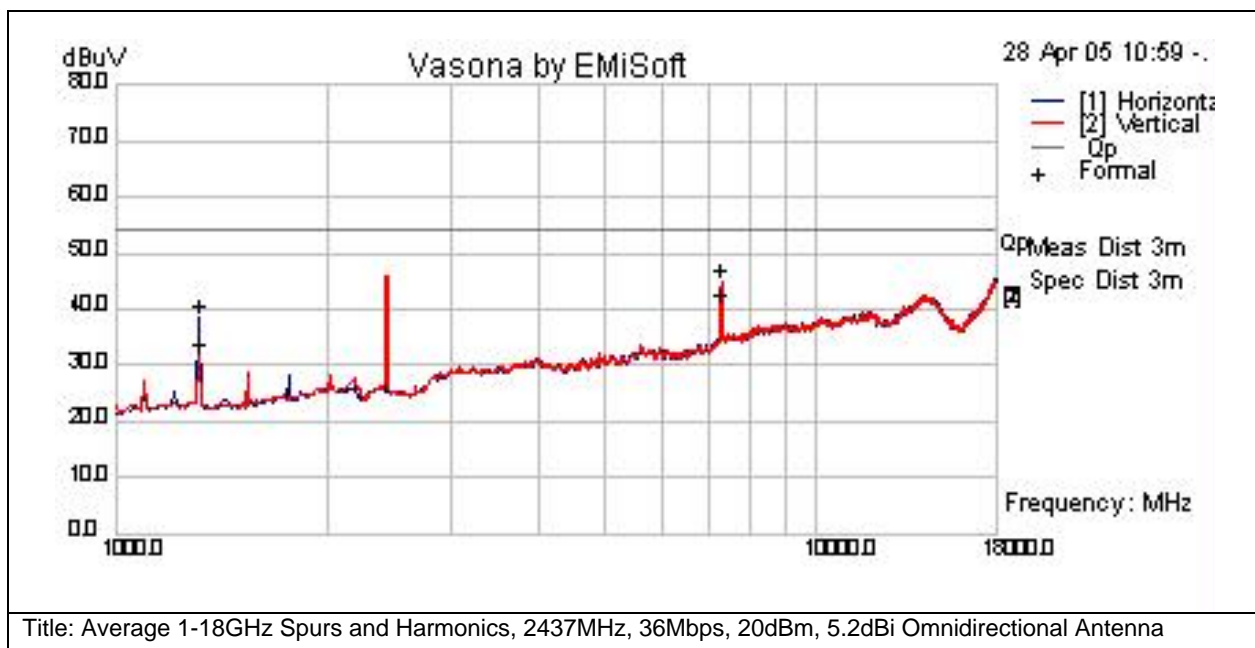


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1319.8	38.8	4.3	-7.6	35.4	Pk	V	168	275	74	-38.6	Pass	
1319.97	44.1	4.3	-7.6	40.8	Pk	H	168	275	74	-33.2	Pass	



Subtest Number: 16560 - 15		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2437MHz, 36Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

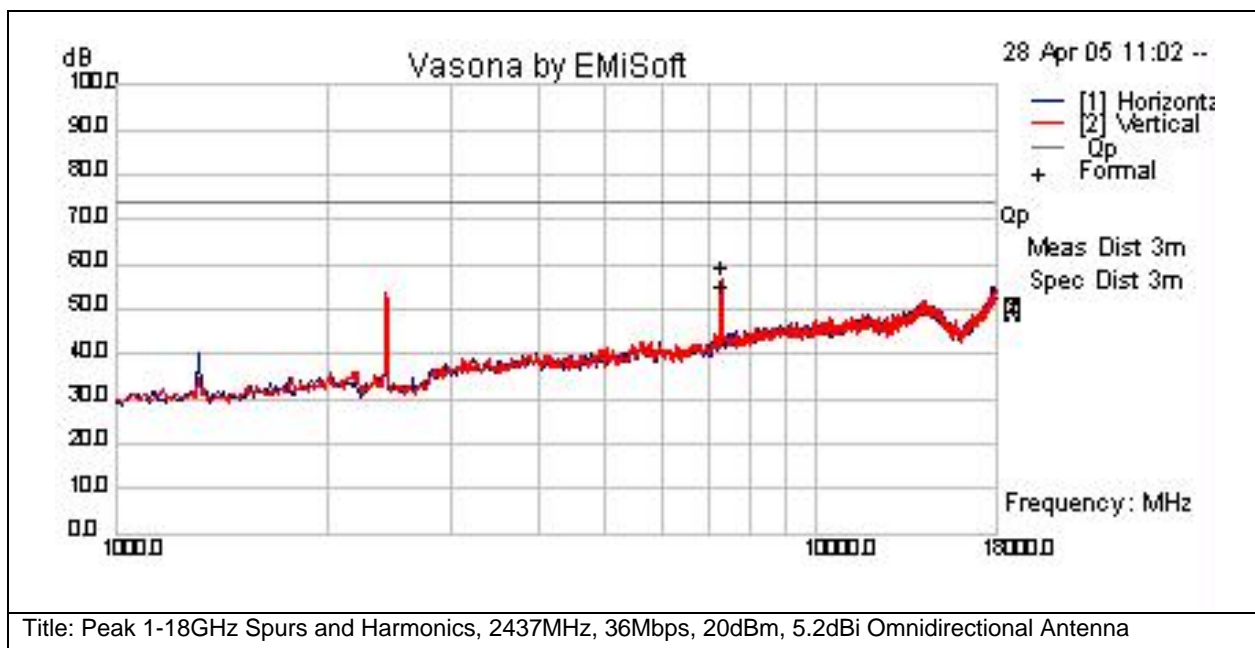


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1319.95	41.7	4.3	-7.6	38.4	Av	H	168	275	54	-15.6	Pass	
1319.96	35	4.3	-7.6	31.7	Av	V	168	275	54	-22.3	Pass	
7310.793	29.9	9.3	1	40.2	Av	H	168	275	54	-13.8	Pass	
7312.833	34.3	9.3	1	44.6	Av	V	168	275	54	-9.4	Pass	



Subtest Number: 16560 - 16		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2437MHz, 36Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

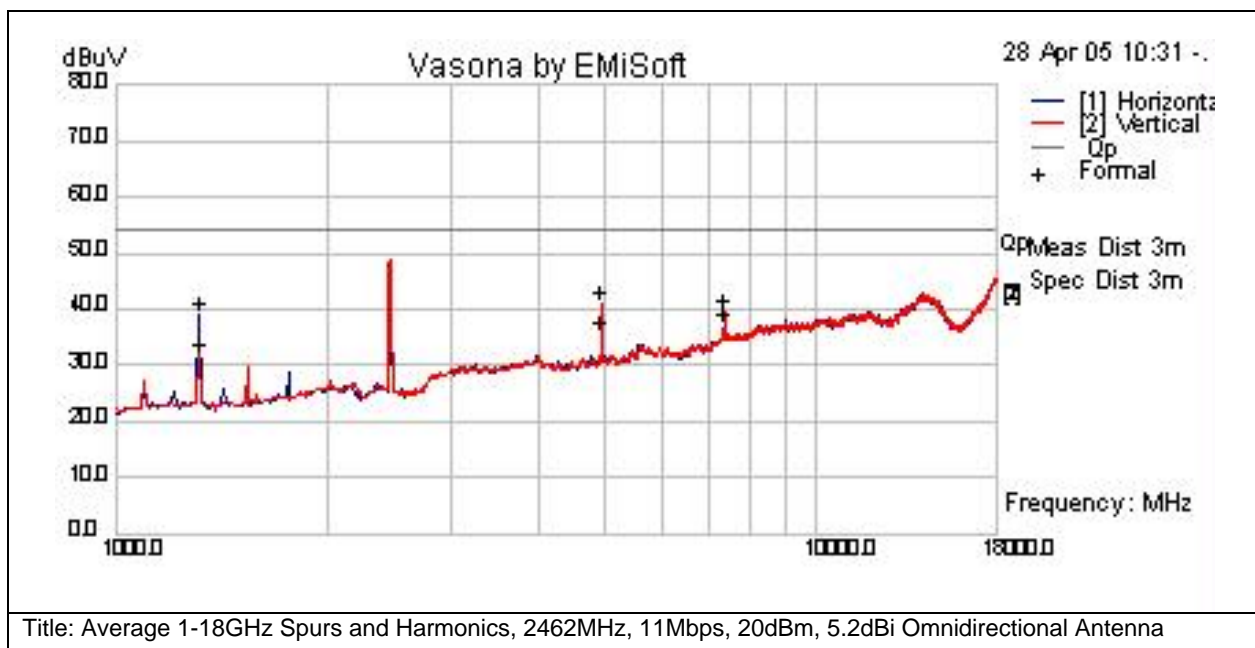


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
7309.54	42	9.3	1	52.3	Pk	H	168	275	74	-21.7	Pass	
7315.46	46.2	9.3	1	56.5	Pk	V	168	275	74	-17.5	Pass	



Subtest Number: 16560 - 17		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

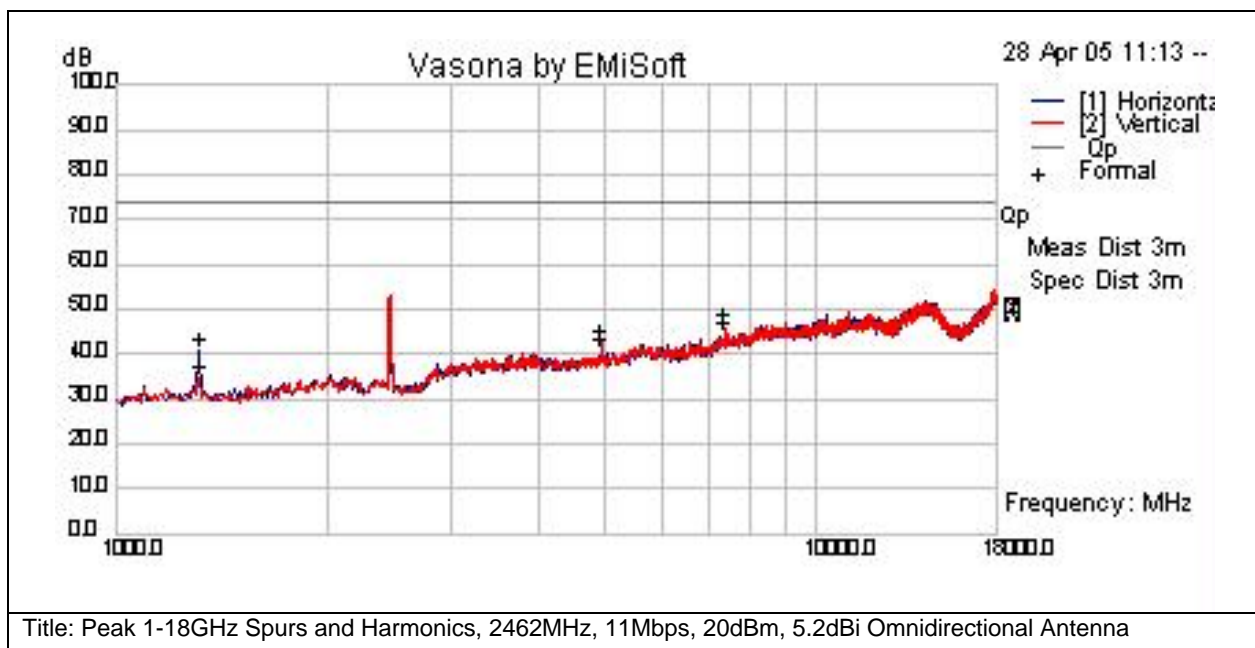


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1320.04	34.9	4.3	-7.6	31.6	Av	V	168	275	54	-22.4	Pass	
1320.1	42.1	4.3	-7.6	38.7	Av	H	168	275	54	-15.3	Pass	
4923.85	31.2	7.8	-3.9	35.1	Av	H	168	275	54	-18.9	Pass	
4924.08	37	7.8	-3.9	41	Av	V	168	275	54	-13	Pass	
7382.26	28.7	9.3	1.3	39.3	Av	V	168	275	54	-14.7	Pass	
7388.83	26	9.3	1.3	36.6	Av	H	168	275	54	-17.4	Pass	



Subtest Number: 16560 - 18		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		



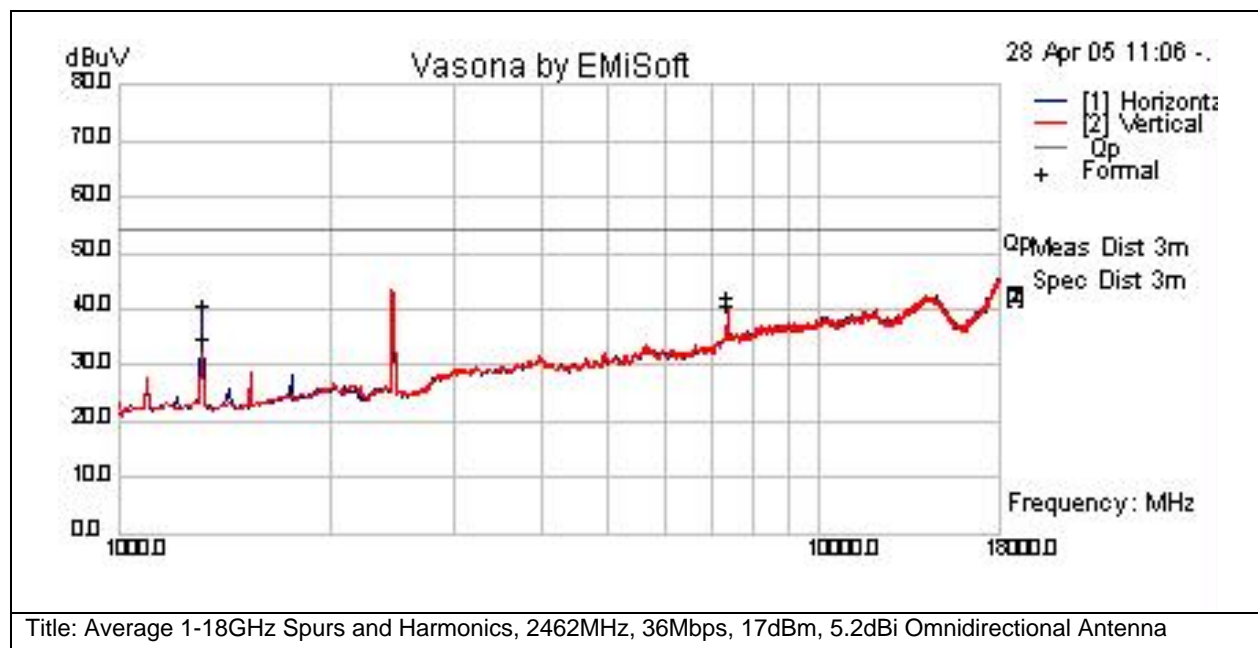
Title: Peak 1-18GHz Spurs and Harmonics, 2462MHz, 11Mbps, 20dBm, 5.2dBi Omnidirectional Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1319.93	37.6	4.3	-7.6	34.3	Pk	V	168	275	74	-39.7	Pass	
1319.95	43.7	4.3	-7.6	40.3	Pk	H	168	275	74	-33.7	Pass	
4923.86	38.6	7.8	-3.9	42.6	Pk	V	168	275	74	-31.4	Pass	
4923.88	36.5	7.8	-3.9	40.4	Pk	H	168	275	74	-33.6	Pass	
7386.14	35.3	9.3	1.3	45.9	Pk	V	168	275	74	-28.1	Pass	
7390.13	33.7	9.3	1.3	44.4	Pk	H	168	275	74	-29.6	Pass	



Subtest Number: 16560 - 19		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 2462MHz, 36Mbps, 17dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

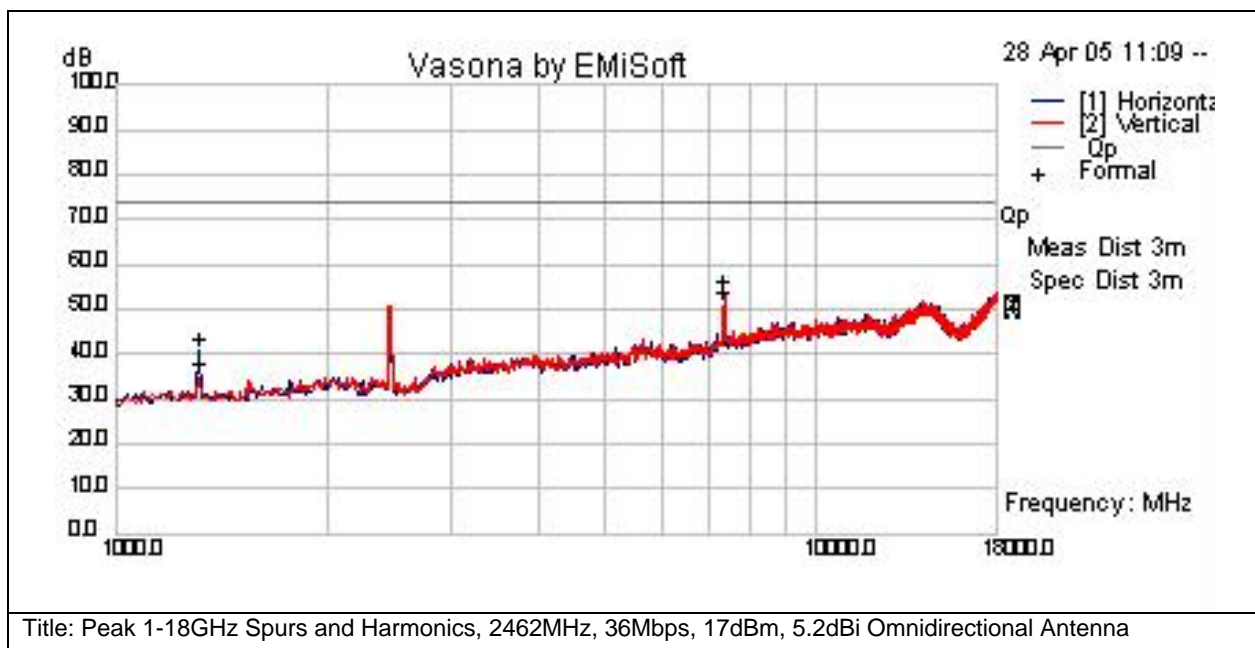


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1320.04	35.6	4.3	-7.6	32.2	Av	V	168	275	54	-21.8	Pass	
1320.04	41.8	4.3	-7.6	38.5	Av	H	168	275	54	-15.5	Pass	
7383.881	29.2	9.3	1.3	39.8	Av	V	168	275	54	-14.2	Pass	
7385.278	27.6	9.3	1.3	38.2	Av	H	168	275	54	-15.8	Pass	



Subtest Number: 16560 - 20		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 2462MHz, 36Mbps, 17dBm, 5.2dBi Omnidirectional Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		



Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
1320	38.2	4.3	-7.6	34.9	Pk	V	168	275	74	-39.1	Pass	
1320.04	43.9	4.3	-7.6	40.6	Pk	H	168	275	74	-33.4	Pass	
7373.651	40.2	9.3	1.2	50.7	Pk	H	168	275	74	-23.3	Pass	
7385.211	42.7	9.3	1.3	53.3	Pk	V	168	275	74	-20.7	Pass	

Physical Test arrangement Photograph:



Title: 2.4GHz 5.2dBi Omnidirectional Antenna Test Setup



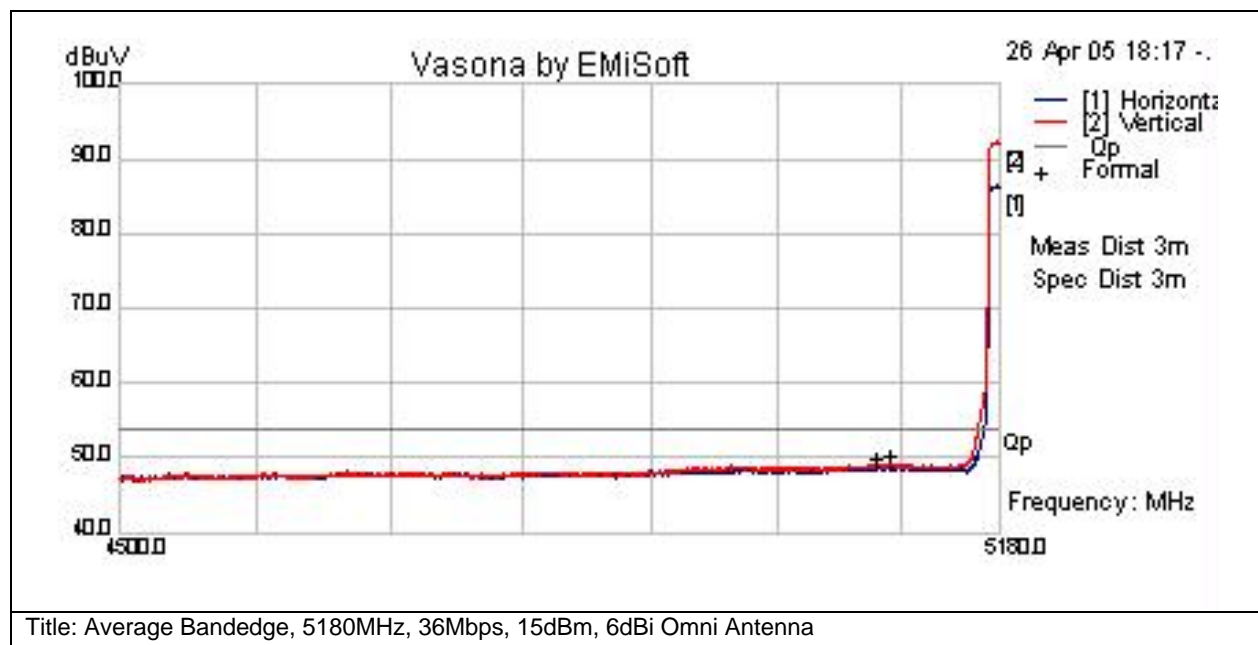
5GHz Radiated Emissions with 6dBi Omnidirectional Antenna

Test Number: 16561				
Basic Standard	Applied to	Class	Freq Range	Test Details / Comments
CFR47 Part 15.407	Enclosure	N/A	1GHz - 40GHz	The peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits: The provisions of Sec. 15.205 apply to intentional radiators operating under this section. When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.
Operating Mode	Mode : 2, 5GHz Spurious			
Power Input	110v (+/-10%), 60Hz			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

System Number	Description	Samples	System under test	Support equipment
3	AIR-AP1020-A-K9 with 5GHz 6dBi Omnidirectional Antenna	S01, S04 and S06	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Subtest Number: 16561 - 1		Subtest Date: 25-May-2005
Engineer	James Nicholson	
Lab Information	Building P, 5m Anechoic	
Subtest Results		
Subtest Title	Average Bandedge, 5180MHz, 36Mbps, 15dBm, 6dBi Omni Antenna	
Subtest Result	Pass	
Highest Frequency	5180.0	
Lowest Frequency	4500.0	
Comments on the above Test Results	No further comments	

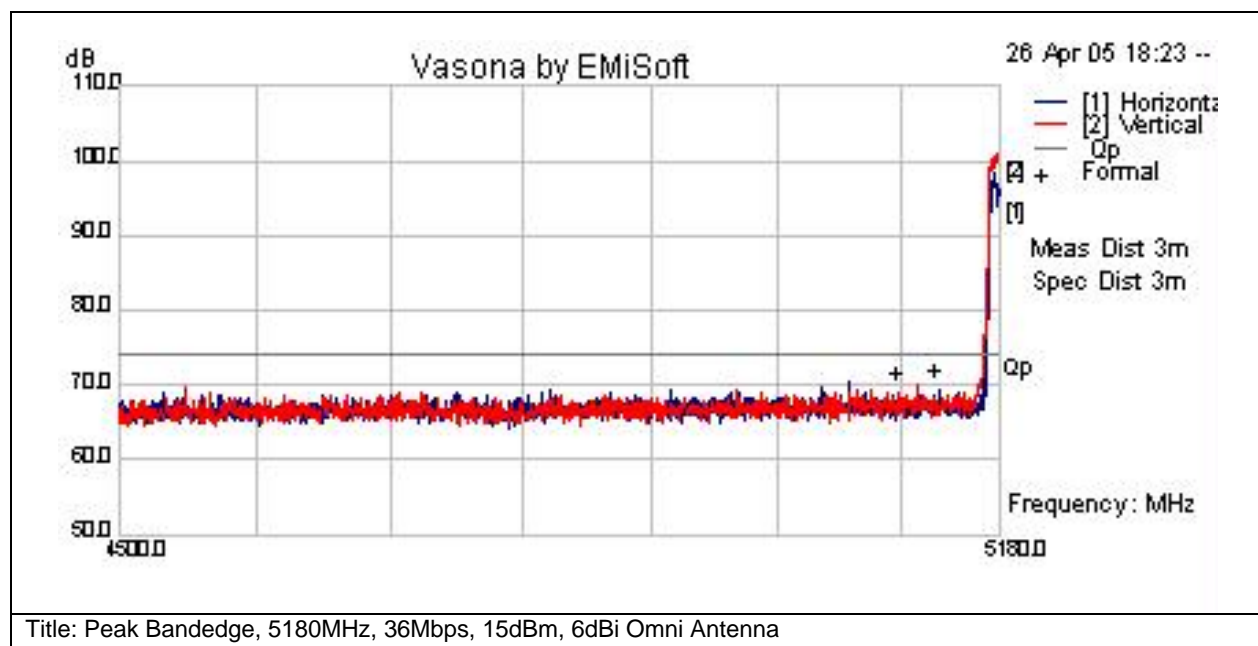


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5092.5	24.7	27.5	-3.8	48.4	Peak(Scan)	V	164	174	54	-5.6	Pass	
5080.5	24.3	27.5	-3.8	48.1	Peak(Scan)	H	164	174	54	-5.9	Pass	



Subtest Number: 16561 - 2		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 5180MHz, 36Mbps, 15dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	5180.0		
Lowest Frequency	4500.0		
Comments on the above Test Results	No further comments		

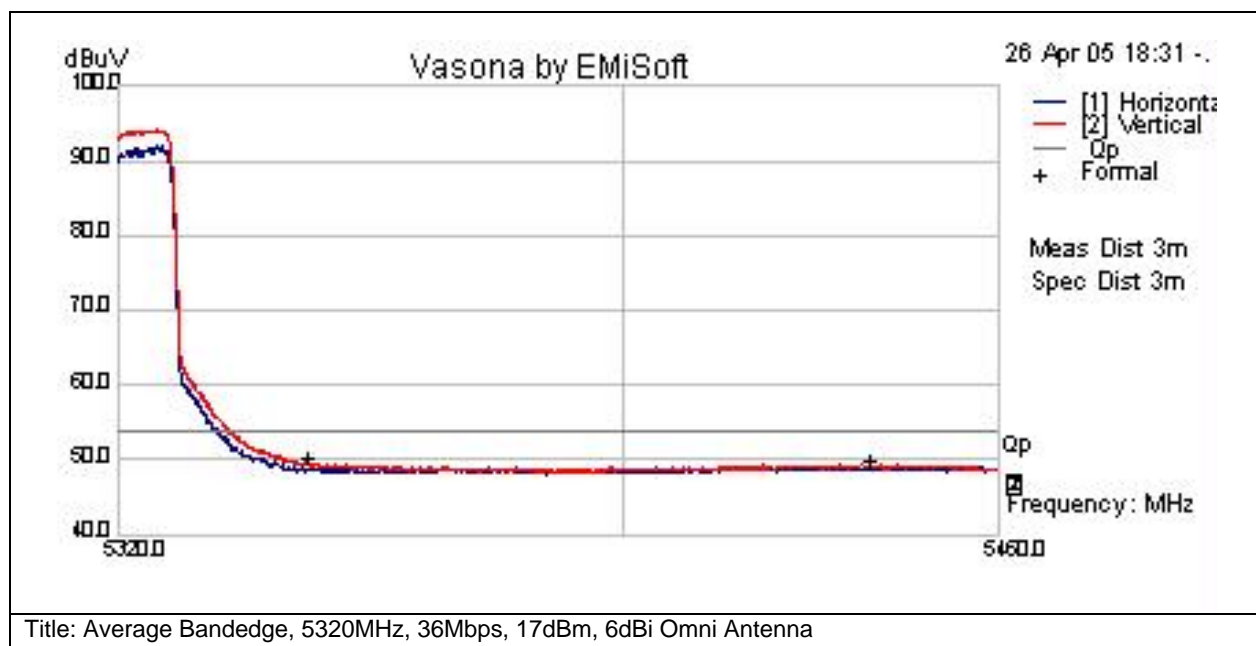


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
5096.3	46.1	27.5	-3.8	69.8	Peak(Scan)	V	165	176	74	-4.2	Pass	
5127.5	46.5	27.6	-3.8	70.2	Peak(Scan)	H	165	176	74	-3.8	Pass	



Subtest Number: 16561 - 3		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 5320MHz, 36Mbps, 17dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	5460.0		
Lowest Frequency	5320.0		
Comments on the above Test Results	No further comments		

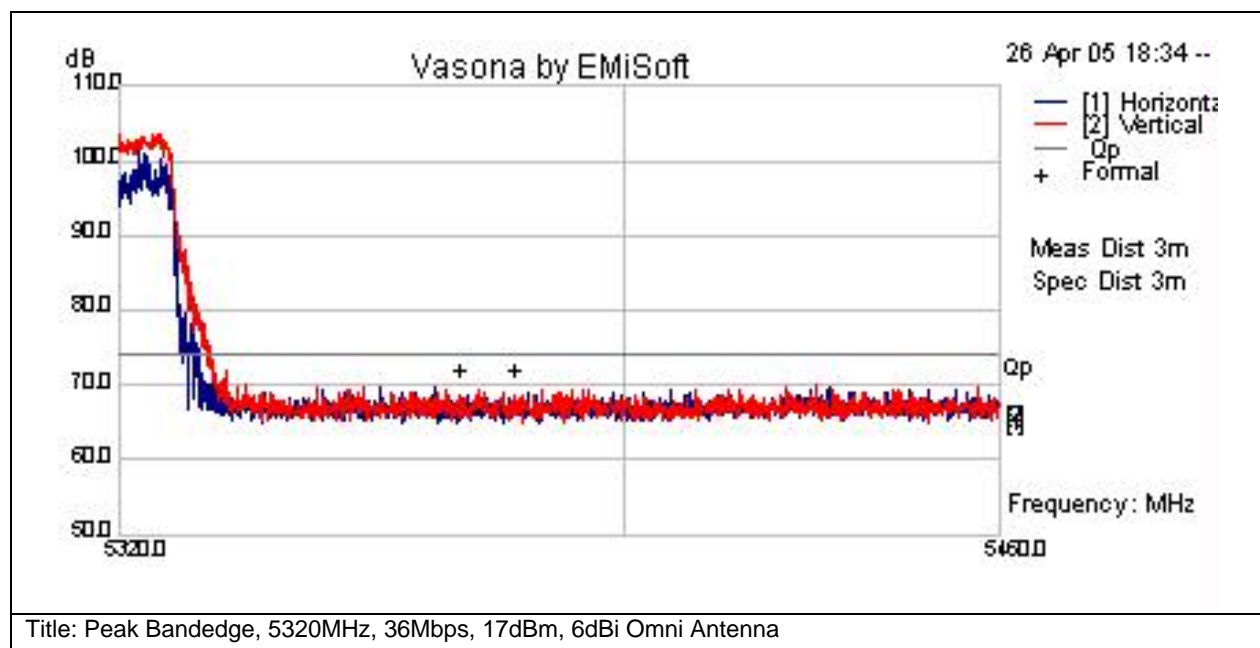


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5350.1	24.8	27.7	-3.8	48.7	Peak(Scan)	V	165	176	54	-5.3	Pass	
5439.9	24.2	27.8	-3.7	48.2	Peak(Scan)	H	165	176	54	-5.8	Pass	



Subtest Number: 16561 - 4		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 5320MHz, 36Mbps, 17dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	5460.0		
Lowest Frequency	5320.0		
Comments on the above Test Results	No further comments		

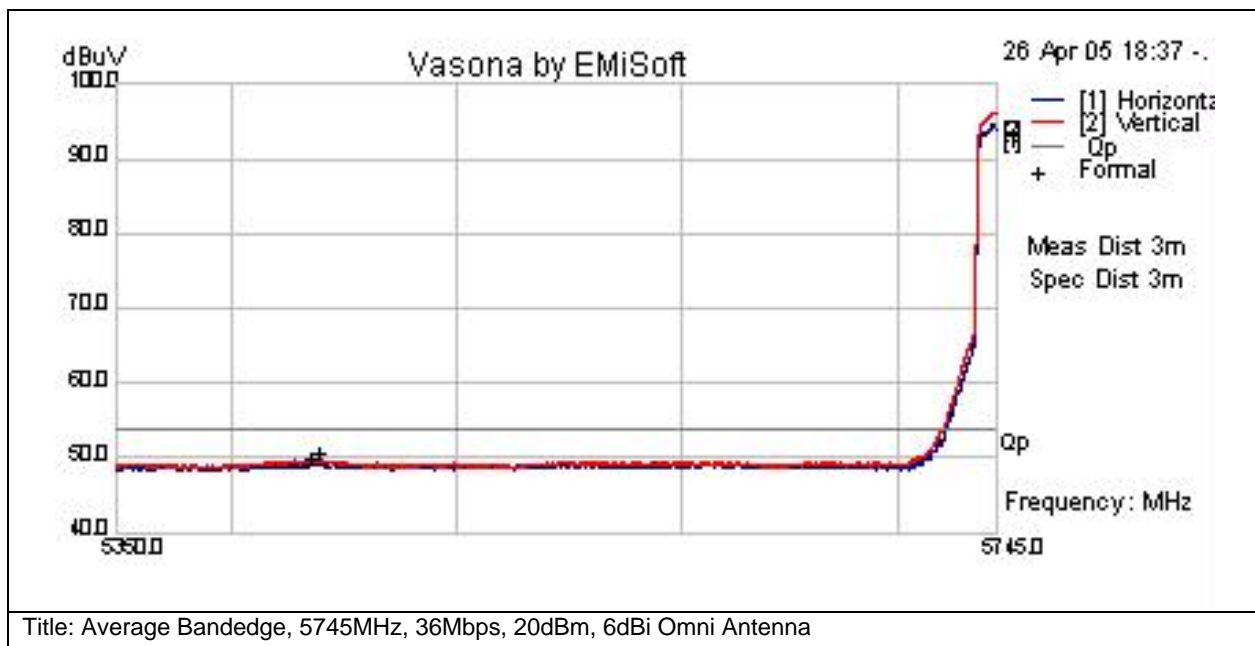


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
5382.7	46.2	27.7	-3.8	70.1	Peak(Scan)	V	165	176	74	-3.9	Pass	
5373.9	46.4	27.7	-3.8	70.4	Peak(Scan)	H	165	176	74	-3.6	Pass	



Subtest Number: 16561 - 5		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 5745MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	5745.0		
Lowest Frequency	5350.0		
Comments on the above Test Results	No further comments		

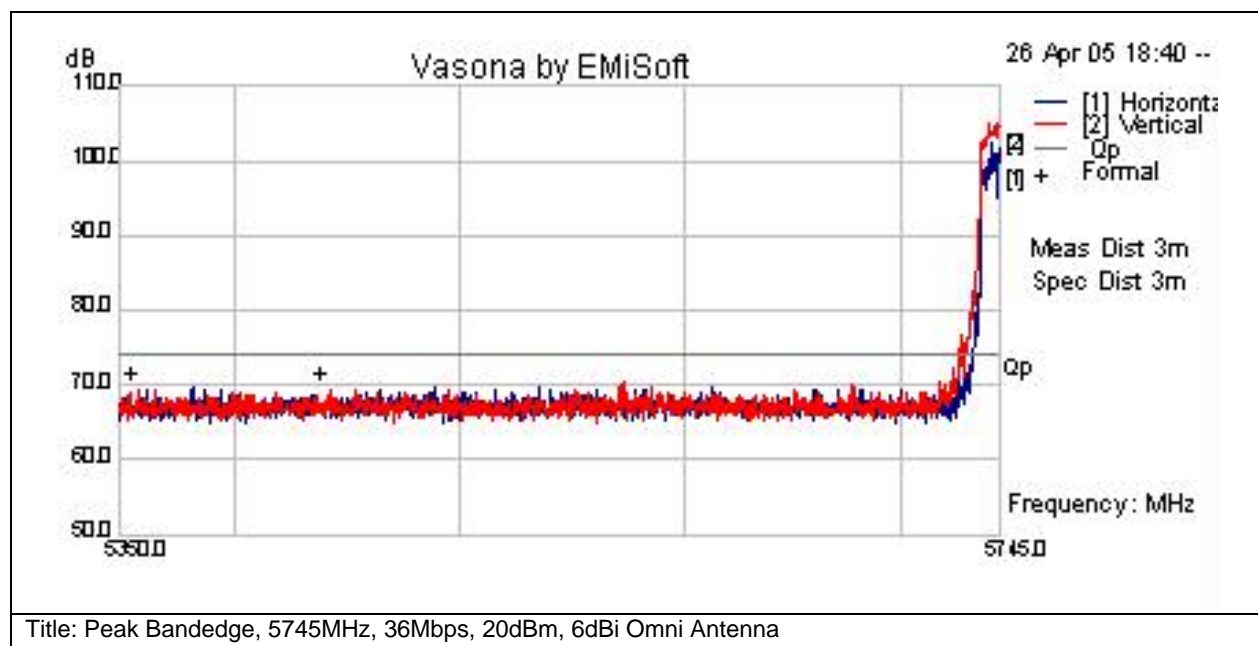


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5439.9	24.8	27.8	-3.7	48.9	Peak(Scan)	V	165	176	54	-5.1	Pass	
5436.6	24.2	27.8	-3.7	48.2	Peak(Scan)	H	165	176	54	-5.8	Pass	



Subtest Number: 16561 - 6		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 5745MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	5745.0		
Lowest Frequency	5350.0		
Comments on the above Test Results	No further comments		

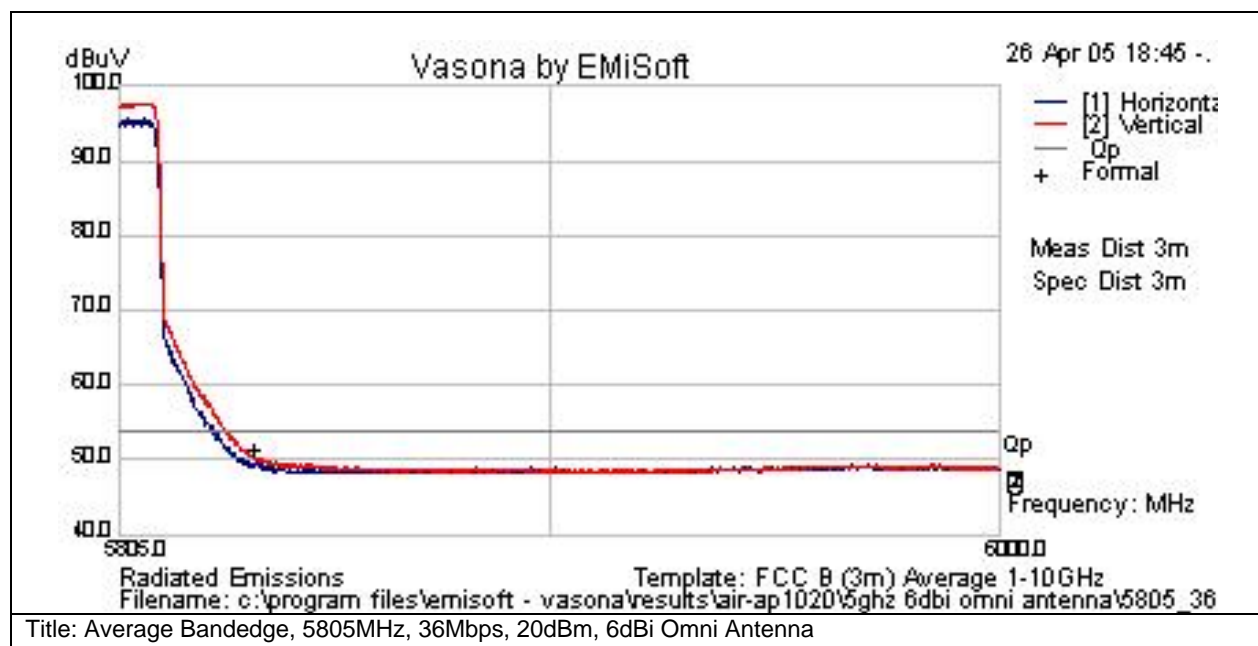


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
5356	45.9	27.7	-3.8	69.8	Peak(Scan)	V	165	176	74	-4.2	Pass	
5438.5	45.8	27.8	-3.7	69.9	Peak(Scan)	H	165	176	74	-4.1	Pass	



Subtest Number: 16561 - 7		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average Bandedge, 5805MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	6000.0		
Lowest Frequency	5805.0		
Comments on the above Test Results	No further comments		

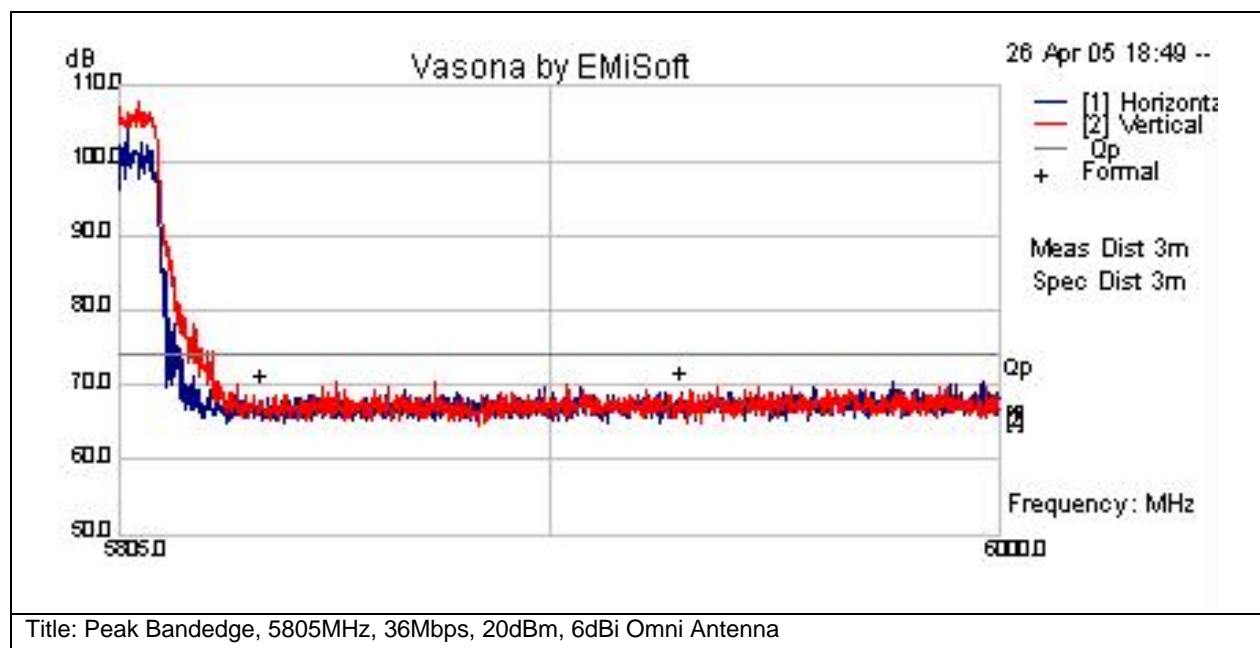


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5835	25.8	28	-4.3	49.5	Peak(Scan)	V	165	176	54	-4.5	Pass	
5835	25.8	28	-4.3	49.5	Peak(Scan)	H	165	176	54	-4.5	Pass	



Subtest Number: 16561 - 8		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak Bandedge, 5805MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	6000.0		
Lowest Frequency	5805.0		
Comments on the above Test Results	No further comments		

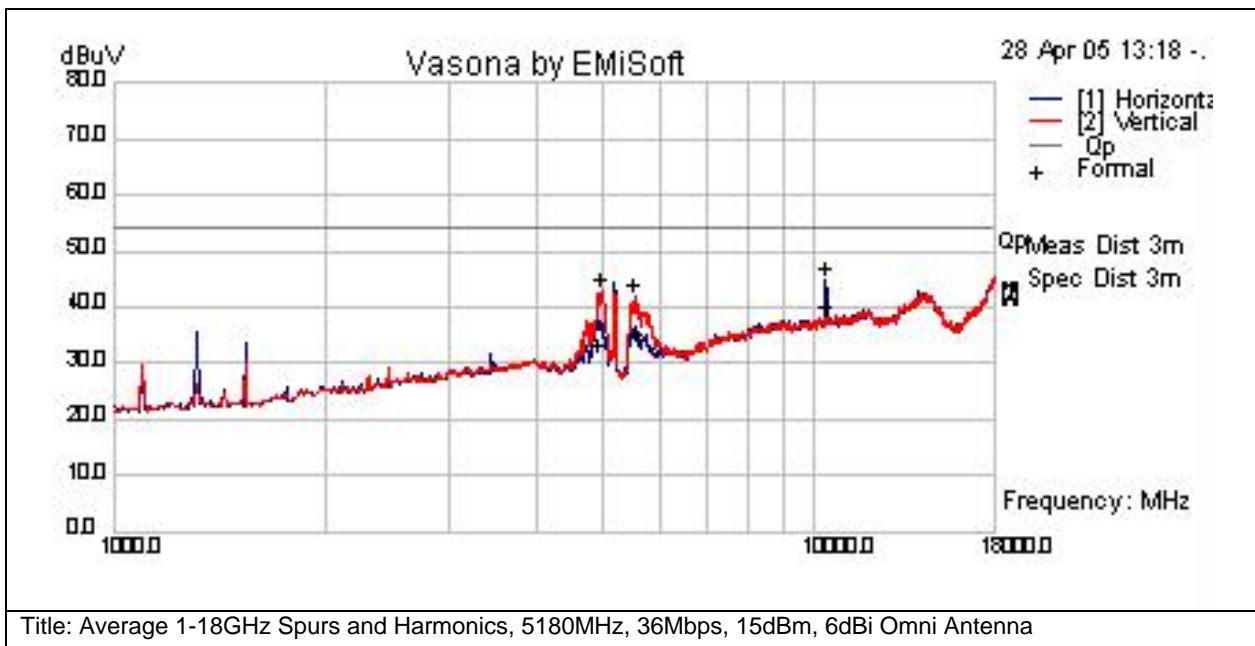


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
5836.3	45.8	28	-4.3	69.6	Peak(Scan)	V	165	176	74	-4.4	Pass	
5928.7	45.9	28.1	-4.1	69.9	Peak(Scan)	H	165	176	74	-4.1	Pass	



Subtest Number: 16561 - 9		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 5180MHz, 36Mbps, 15dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

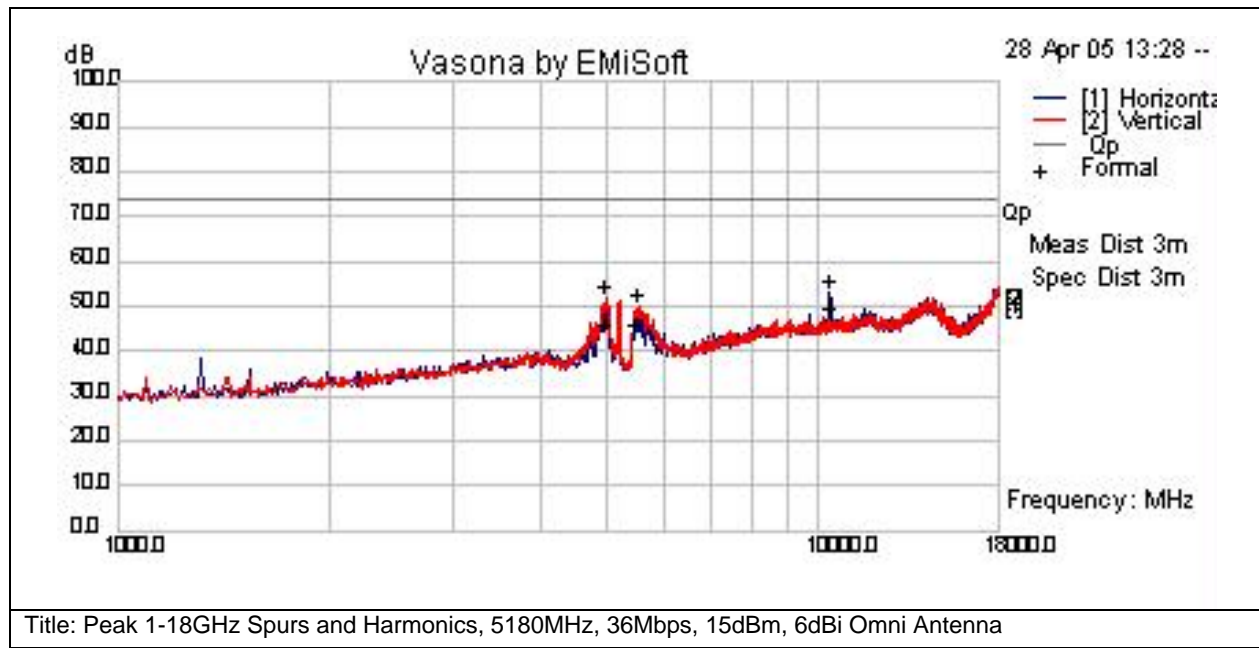


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4906.99	27.1	7.7	-4	30.8	Av	H	137	306	54	-23.2	Pass	
4971.22	39.2	7.9	-3.9	43.2	Av	V	137	306	54	-10.8	Pass	
5553.52	36.6	9	-3.8	41.8	Av	V	137	306	54	-12.2	Pass	
5573.82	27.9	9	-4	32.9	Av	H	137	306	54	-21.1	Pass	
10350.3	21.9	11.4	4.5	37.8	Av	V	137	306	54	-16.2	Pass	
10359	28.7	11.5	4.5	44.6	Av	H	137	306	54	-9.4	Pass	



Subtest Number: 16561 - 10		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 5180MHz, 36Mbps, 15dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

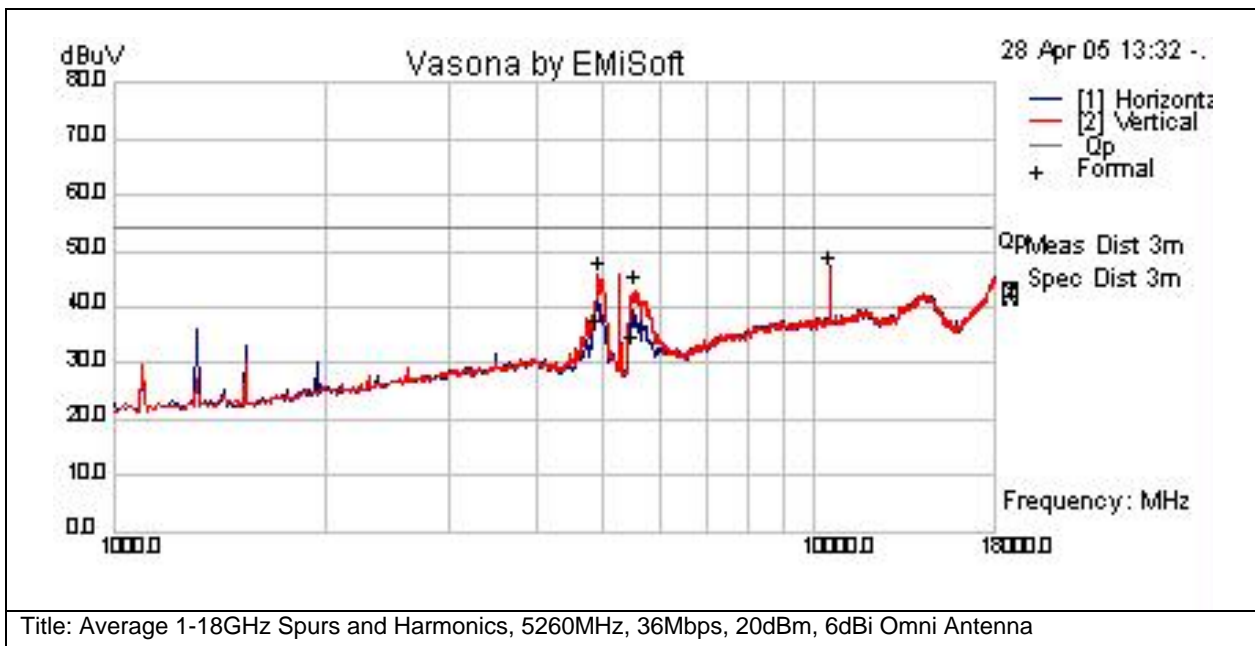


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
4969.88	38.9	7.9	-3.9	42.9	Pk	H	137	306	74	-31.1	Pass	
4973.61	49.4	7.9	-3.8	53.4	Pk	V	137	306	74	-20.6	Pass	
5476.5	38.1	8.5	-3.7	42.9	Pk	H	137	306	74	-31.1	Pass	
5541.95	45.9	8.8	-3.8	50.9	Pk	V	137	306	74	-23.1	Pass	
10347.7	31	11.4	4.5	46.9	Pk	V	137	306	74	-27.1	Pass	
10358.1	37.1	11.5	4.5	53	Pk	H	137	306	74	-21	Pass	



Subtest Number: 16561 - 11		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 5260MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		



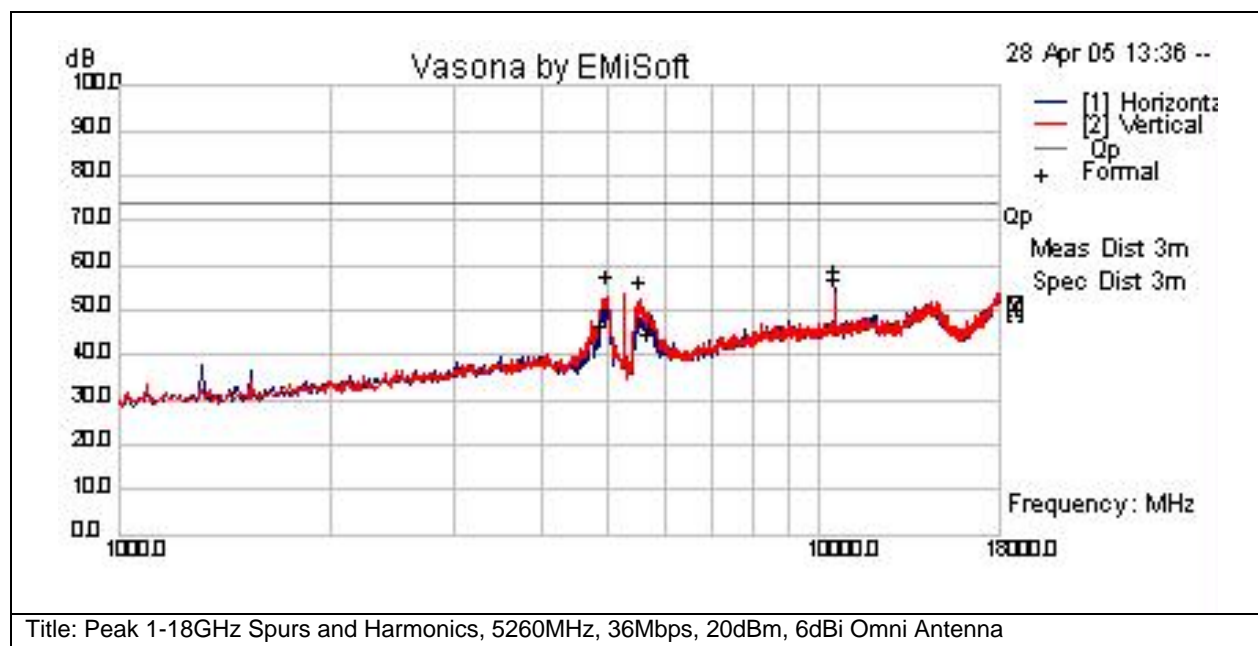
Title: Average 1-18GHz Spurs and Harmonics, 5260MHz, 36Mbps, 20dBm, 6dBi Omni Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4898.82	31.5	7.8	-4	35.3	Av	H	137	306	54	-18.7	Pass	
4907.61	42.2	7.7	-4	45.9	Av	V	137	306	54	-8.1	Pass	
5481.09	27.7	8.5	-3.6	32.6	Av	H	137	306	54	-21.4	Pass	
5544.7	38.6	8.8	-3.8	43.7	Av	V	137	306	54	-10.3	Pass	
10517.9	30.3	11.6	4.8	46.7	Av	H	137	306	54	-7.3	Pass	
10519.1	30.2	11.6	4.8	46.7	Av	V	137	306	54	-7.3	Pass	



Subtest Number: 16561 - 12		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 5260MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

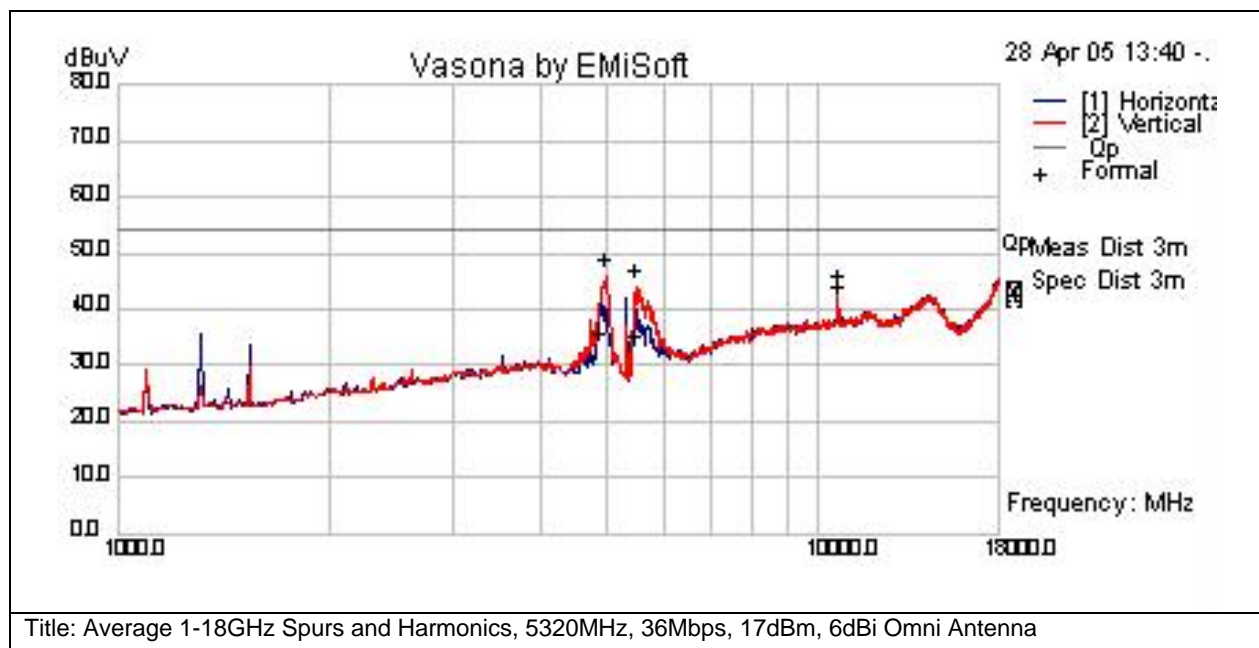


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
4899.66	40	7.8	-4	43.8	Pk	H	137	306	74	-30.2	Pass	
4968.64	50.5	7.9	-3.9	54.4	Pk	V	137	306	74	-19.6	Pass	
5540.5	48.3	8.8	-3.8	53.2	Pk	V	137	306	74	-20.8	Pass	
5688.2	36.8	9.1	-4.1	41.8	Pk	H	137	306	74	-32.2	Pass	
10517.7	37.5	11.6	4.8	53.9	Pk	H	137	306	74	-20.1	Pass	
10519.4	39.2	11.6	4.8	55.6	Pk	V	137	306	74	-18.4	Pass	



Subtest Number: 16561 - 13		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 5320MHz, 36Mbps, 17dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

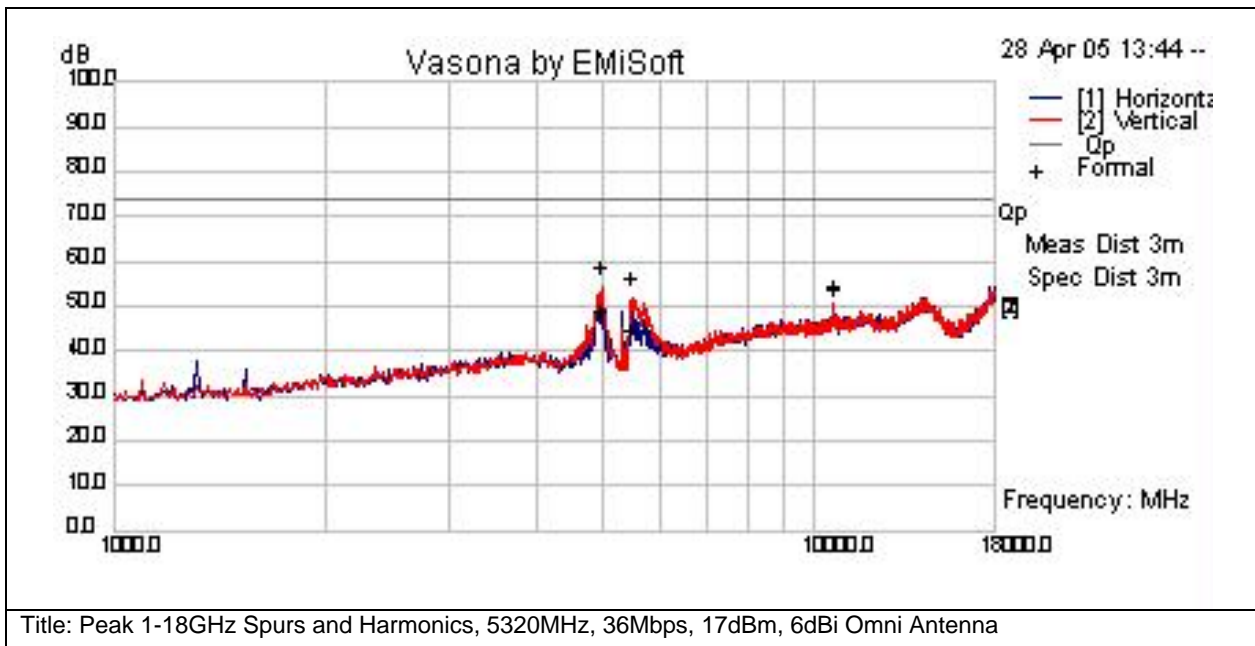


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
4895.19	29.6	7.8	-4	33.4	Av	H	137	306	54	-20.6	Pass	
4966.79	42.5	7.8	-3.9	46.5	Av	V	137	306	54	-7.5	Pass	
5481.11	28	8.5	-3.6	32.9	Av	H	137	306	54	-21.1	Pass	
5483.11	39.6	8.5	-3.6	44.5	Av	V	137	306	54	-9.5	Pass	
10639.9	27	11.7	4.8	43.5	Av	H	137	306	54	-10.5	Pass	
10646.7	25.4	11.7	4.8	41.9	Av	V	137	306	54	-12.1	Pass	



Subtest Number: 16561 - 14		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 5320MHz, 36Mbps, 17dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

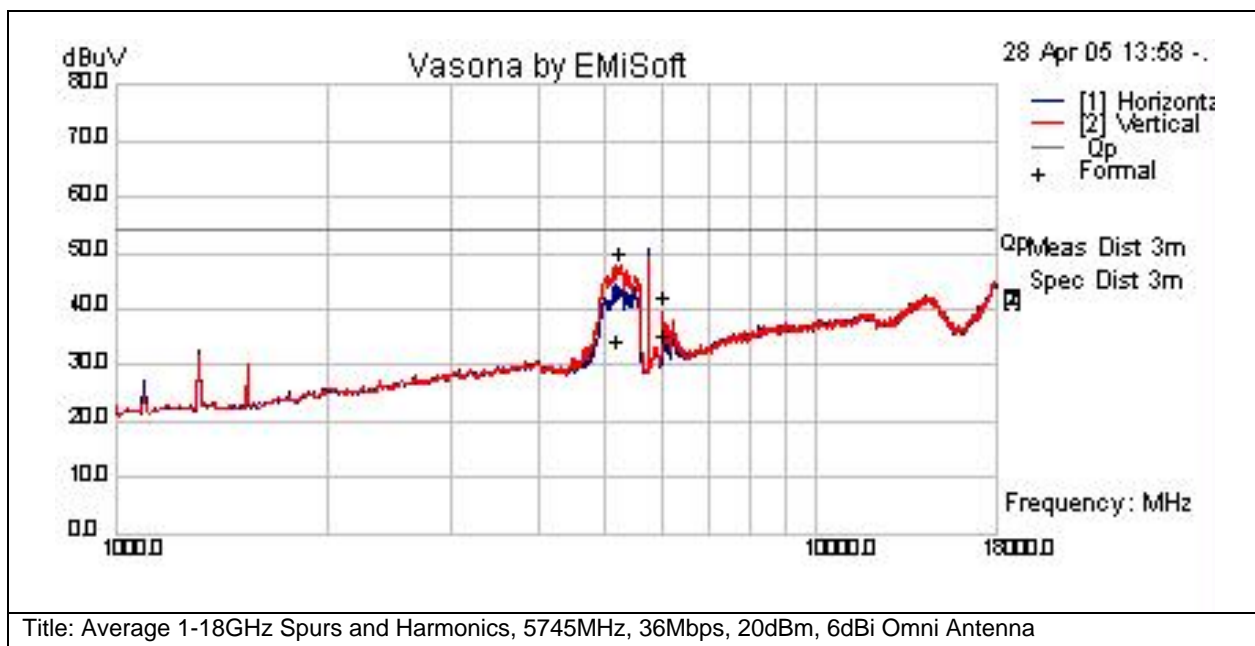


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
4961.91	42	7.8	-3.9	45.9	Pk	H	137	306	74	-28.1	Pass	
4967.45	51.9	7.8	-3.9	55.8	Pk	V	137	306	74	-18.2	Pass	
5470.67	37.3	8.5	-3.8	42	Pk	H	137	306	74	-32	Pass	
5485.81	48.3	8.6	-3.6	53.2	Pk	V	137	306	74	-20.8	Pass	
10641.5	35.2	11.7	4.8	51.7	Pk	H	137	306	74	-22.3	Pass	
10649.3	34.2	11.7	4.8	50.8	Pk	V	137	306	74	-23.2	Pass	



Subtest Number: 16561 - 15		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 5745MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

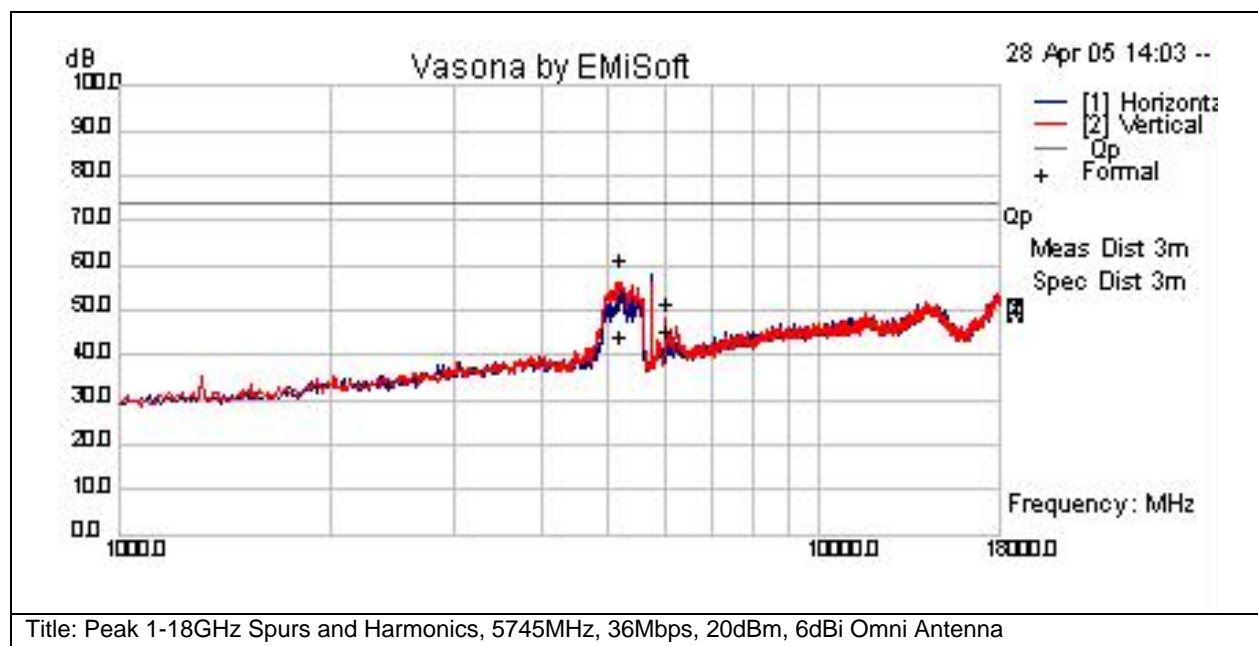


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5196.16	27.6	8.1	-3.9	31.8	Av	H	137	270	54	-22.2	Pass	
5259.75	43.4	8.1	-3.9	47.6	Av	V	137	270	54	-6.4	Pass	
6031.53	34.1	9.4	-3.8	39.7	Av	V	137	270	54	-14.3	Pass	
6032.67	27.4	9.4	-3.8	33	Av	H	137	270	54	-21	Pass	



Subtest Number: 16561 - 16		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 5745MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

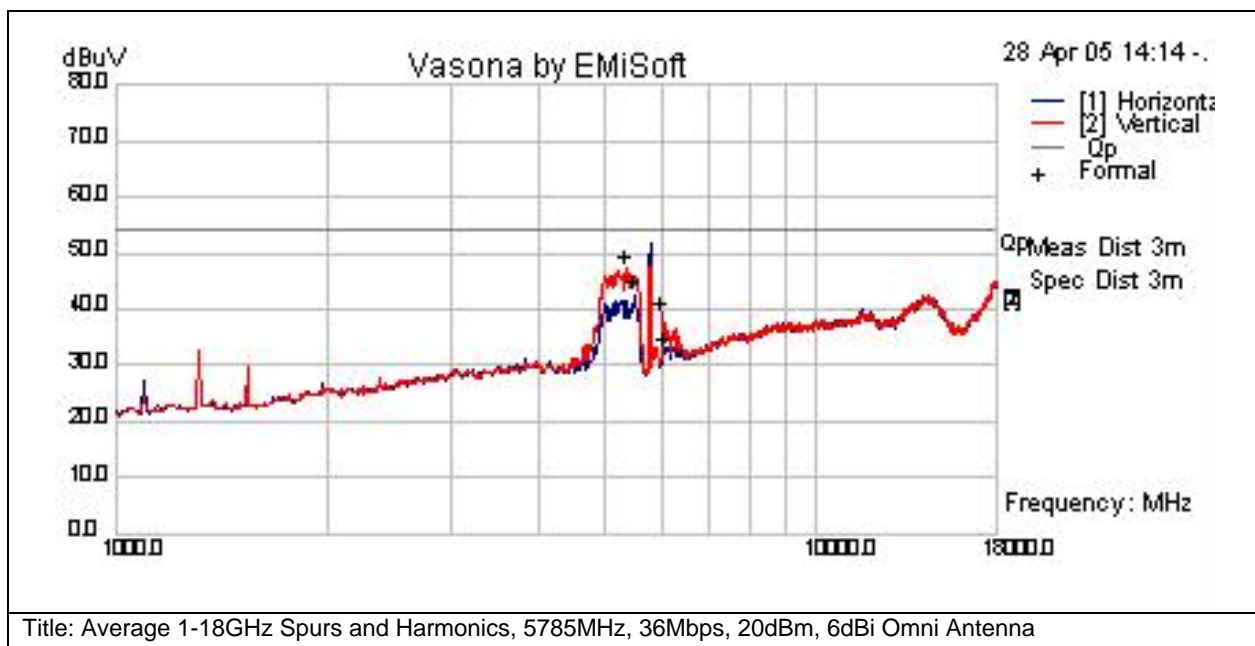


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
5201.33	36.9	8.1	-3.9	41.1	Pk	H	137	270	74	-32.9	Pass	
5201.71	54.4	8.1	-3.9	58.6	Pk	V	137	270	74	-15.4	Pass	
6029.58	42.8	9.4	-3.8	48.4	Pk	V	137	270	74	-25.6	Pass	
6036.09	37	9.4	-3.8	42.6	Pk	H	137	270	74	-31.4	Pass	



Subtest Number: 16561 - 17		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 5785MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

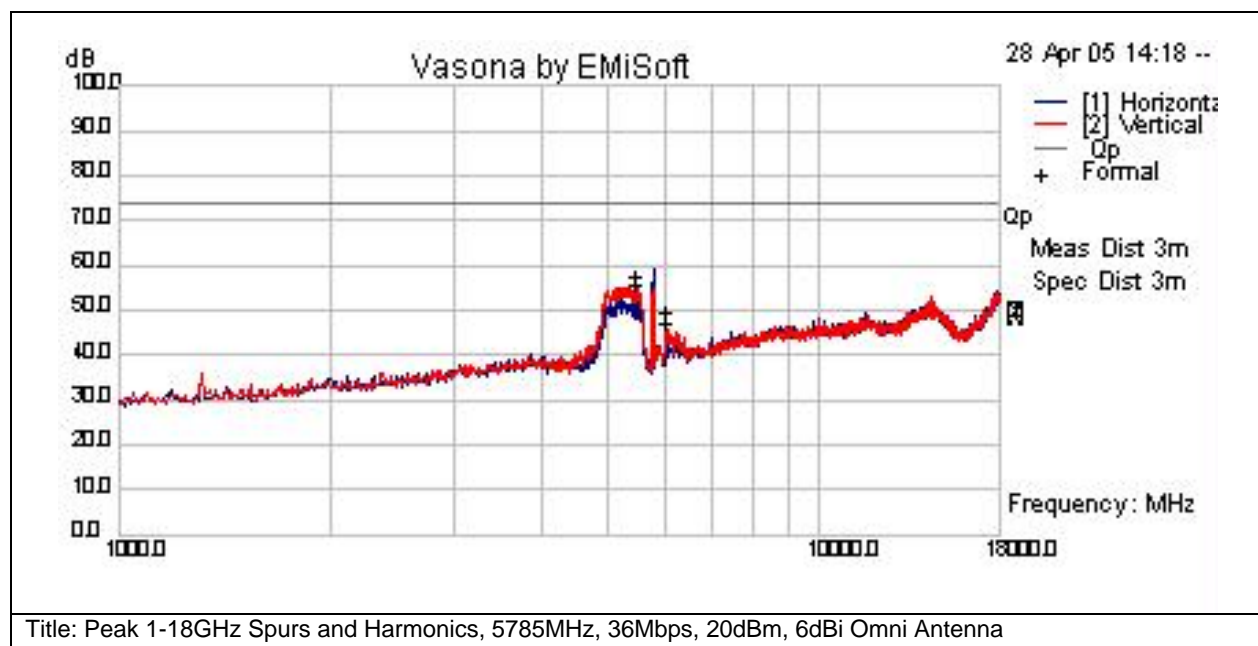


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5352.42	42.7	8.2	-3.8	47.1	Av	V	137	270	54	-6.9	Pass	
5501.9	37.6	8.6	-3.8	42.5	Av	H	137	270	54	-11.5	Pass	
6028.99	33.4	9.4	-3.8	39	Av	V	137	270	54	-15	Pass	
6050.58	27.2	9.2	-3.7	32.7	Av	H	137	270	54	-21.3	Pass	



Subtest Number: 16561 - 18		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 5785MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		



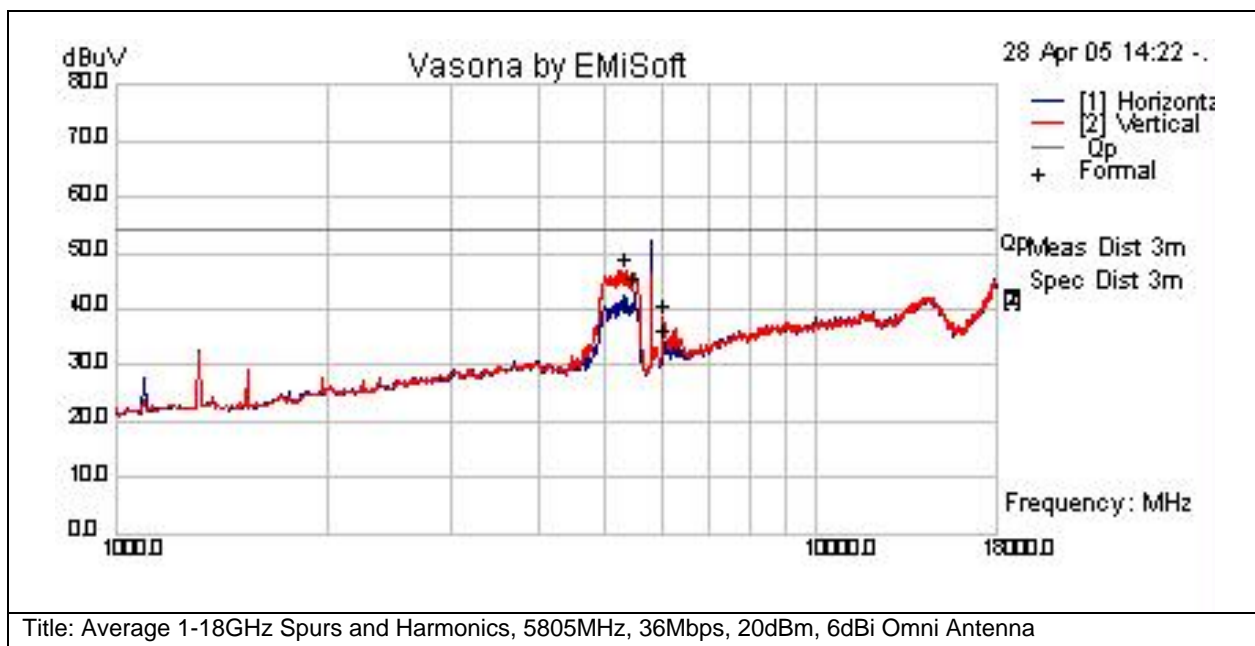
Title: Peak 1-18GHz Spurs and Harmonics, 5785MHz, 36Mbps, 20dBm, 6dBi Omni Antenna

Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
5468.66	48.1	8.4	-3.8	52.8	Pk	H	137	270	74	-21.2	Pass	
5487.21	49.8	8.6	-3.6	54.7	Pk	V	137	270	74	-19.3	Pass	
6030.59	41	9.4	-3.8	46.7	Pk	V	137	270	74	-27.3	Pass	
6034.34	38.7	9.4	-3.8	44.3	Pk	H	137	270	74	-29.7	Pass	



Subtest Number: 16561 - 19		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 1-18GHz Spurs and Harmonics, 5805MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

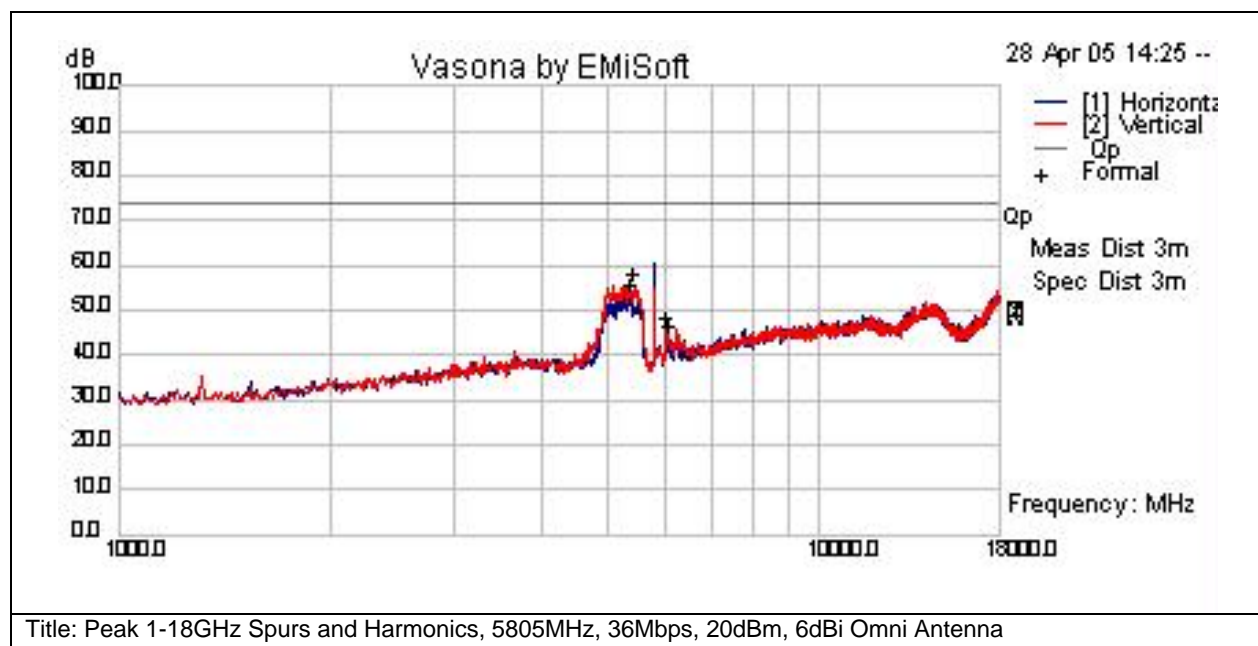


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5354.29	42.4	8.2	-3.8	46.8	Av	V	137	270	54	-7.2	Pass	
5502.55	38.2	8.7	-3.8	43.1	Av	H	137	270	54	-10.9	Pass	
6037.68	32.8	9.4	-3.8	38.5	Av	V	137	270	54	-15.5	Pass	
6055.43	28.4	9.2	-3.7	33.9	Av	H	137	270	54	-20.1	Pass	



Subtest Number: 16561 - 20		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 1-18GHz Spurs and Harmonics, 5805MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	18000.0		
Lowest Frequency	1000.0		
Comments on the above Test Results	No further comments		

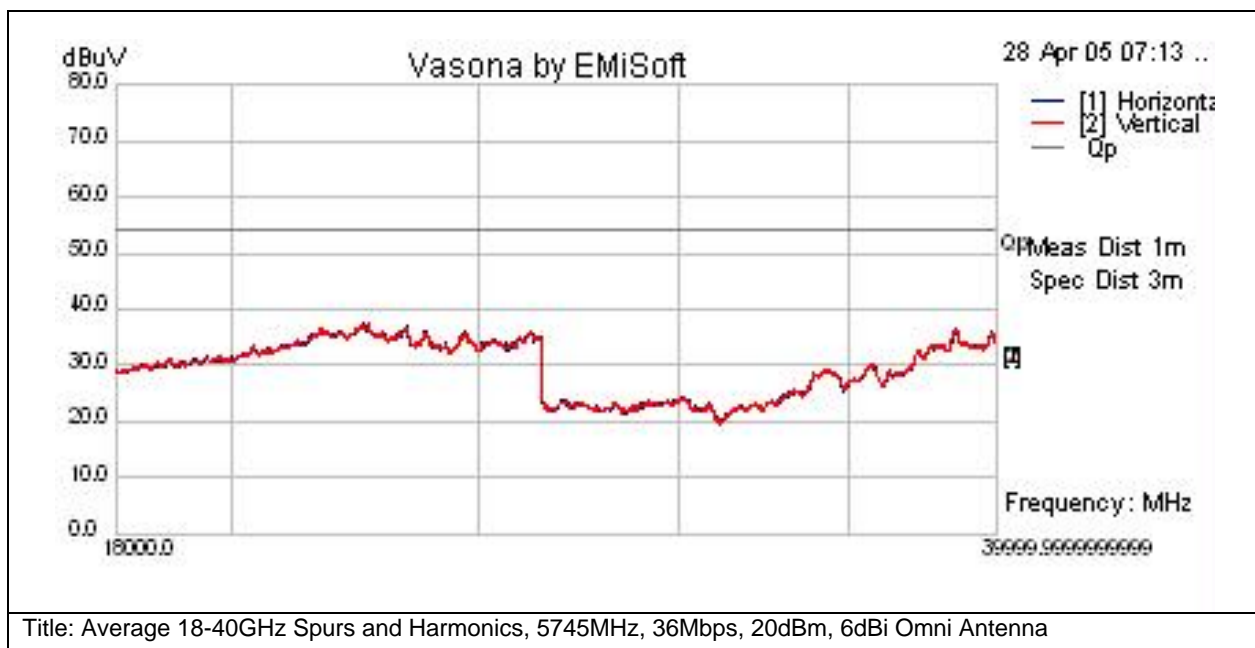


Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Type	Pol	Hgt cm	Azt Deg	Limit dB	Margin dB	Pass /Fail	Comments
5389.37	48.4	8.3	-3.8	52.9	Pk	H	137	270	74	-21.1	Pass	
5446.42	50.5	8.4	-3.7	55.2	Pk	V	137	270	74	-18.8	Pass	
6038.27	39.7	9.4	-3.8	45.3	Pk	V	137	270	74	-28.7	Pass	
6119.4	37.8	9	-3.6	43.3	Pk	H	137	270	74	-30.7	Pass	



Subtest Number: 16561 - 21		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Average 18-40GHz Spurs and Harmonics, 5745MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	40000.0		
Lowest Frequency	18000.0		
Comments on the above Test Results	Results are identical for all frequencies, power levels, data rates, and antenna gains		

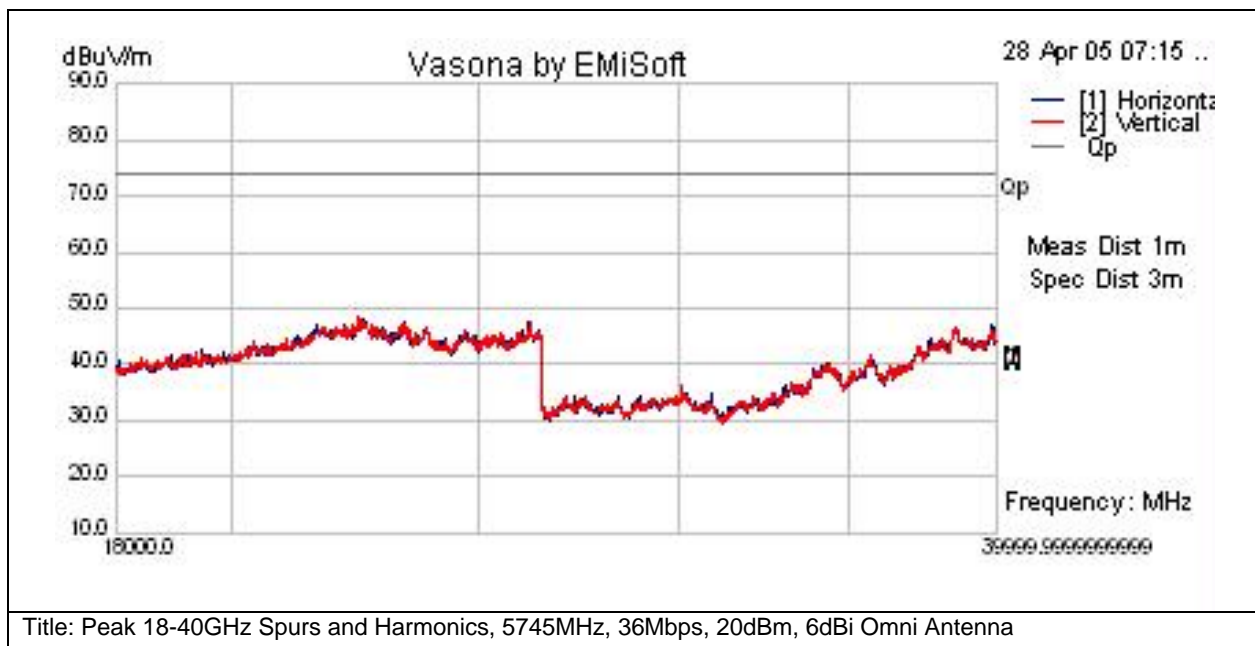


Test Results Table

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



Subtest Number: 16561 - 22		Subtest Date: 25-May-2005	
Engineer	James Nicholson		
Lab Information	Building P, 5m Anechoic		
Subtest Results			
Subtest Title	Peak 18-40GHz Spurs and Harmonics, 5745MHz, 36Mbps, 20dBm, 6dBi Omni Antenna		
Subtest Result	Pass		
Highest Frequency	40000.0		
Lowest Frequency	18000.0		
Comments on the above Test Results	Results are identical for all frequencies, power levels, data rates, and antenna gains		



Test Results Table

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	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		

Physical Test arrangement Photograph:



Title: 5GHz 6dBi Omnidirectional Antenna Test Setup



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 11 on the remaining lines.
13. Identify all emissions that fail to meet the most stringent limit. These emissions should be formally measured.



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

Formal Testing:

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

1. Each emission identified in the pre-assessment phase should be measured against the appropriate Specification limit with a Quasi-Peak detector.
2. The emissions should be observed for a sufficient period of time to allow the EUT to undergo a full exercising routine.
3. Where the emission varies in amplitude with respect to the Specification limit the emission should be observed for an extended time period (normally 15 seconds). The highest level observed within this 15 second period should be recorded with the exception of any brief isolated transients.
4. If the EUT meets the most stringent limit (e.g. the average limit) with the Quasi-Peak detector, measurements with an average detector are not necessary.
5. If the EUT fails to meet the most stringent limit with the Quasi-Peak detector the emission should be measured with an Average detector.
6. Repeat the measurements on all available power supply conductors.
7. If the results are within 3dB of the Specification when measured at 120V 60HZ AC measurements should also be performed at 100V 60/50Hz AC to satisfy VCCI requirements.
8. If the EUT fails to meet the Specification, investigations should be undertaken to ensure that the EUT has sufficient isolation from its support equipment and/ or ambient interference.
9. If the EUT fails to meet the CFR47 limit, investigations should be undertaken to determine if the emission is a broadband in nature. If the difference between the results obtained with the average detector and the results obtained with quasi peak detector are >6dB the emission is deemed to be broadband and the quasi peak reading can be reduced by a factor of 13dB.



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

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

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

Summary:

EMC/EMI

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



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

On the following products or types of products :

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



Appendix G: Test Equipment Used to perform the test

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due	Test Number(s)
003003	HP/ 83731B	Synthesized Signal Generator	21-JAN-2005	21-JAN-2006	[16559], [16560], [16561]
004883	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	11-APR-2005	11-APR-2006	[16559], [16560], [16561]
005691	Miteq/ NSP1800-25-S1	Broadband Preamplifier (1-18GHz)	07-OCT-2004	07-OCT-2005	[16559], [16560], [16561]
007221	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	Cal Not Required	N/A	[16559], [16560], [16561]
008123	Huber + Suhner/ SF106A	1m Sucoflex Cable	03-SEP-2004	03-SEP-2005	[16559], [16560], [16561]
008166	HP/ 8491B Opt 010	10dB Attenuator	19-JAN-2005	19-JAN-2006	[16559], [16560], [16561]
008168	HP/ 8491B Opt 010	10dB Attenuator	19-JAN-2005	19-JAN-2006	[16559], [16560], [16561]
008448	Cisco/ NSA 5m Chamber	NSA 5m Chamber	03-JAN-2005	03-JAN-2006	[16559], [16560], [16561]
019630	Rohde & Schwarz/ ESI 40	EMI Test Receiver, 20Hz - 40GHz	21-OCT-2004	21-OCT-2005	[16559], [16560], [16561]
020666	EMC Test Systems/ 3160-10	Standard Gain Horn Antenna, 26.5-40GHz	Cal Not Required	N/A	[16559], [16560], [16561]
020821	Micro-Coax/ UFB142A-1-1572-200200	RF Coaxial Cable, to 40GHz, 157.2 in	23-SEP-2004	23-SEP-2005	[16559], [16560], [16561]
021117	Micro-Coax/ UFB311A-0-2484-520520	RF Coaxial Cable, to 18GHz, 248.4 in	19-AUG-2004	19-AUG-2005	[16559], [16560], [16561]
025657	Micro-Coax/ UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	19-AUG-2004	19-AUG-2005	[16559], [16560], [16561]
025666	Micro-Coax/ UFB142A-1-0720-200504	RF Coaxial Cable, to 40GHz, 72 in	23-SEP-2004	23-SEP-2005	[16559], [16560], [16561]
026860	Cisco/ 1840	18-40GHz EMI Test Head/Verification Fixture	23-SEP-2004	23-SEP-2005	[16559], [16560], [16561]
030265	Agilent/ 11713A	Attenuator/Switch Driver	Cal Not Required	N/A	[16559], [16560], [16561]
030498	Agilent/ 8761B	SPDT RF Switch, to 18GHz	07-APR-2005	07-APR-2006	[16559], [16560], [16561]



030562	Micro-Coax/ UFB311A-1-0950- 504504	RF Coaxial Cable, to 18GHz	19-AUG- 2004	19-AUG- 2005	[16559], [16560], [16561]
031700	Micro-Tronics/ BRC50705	Notch Filter, SB:5.725- 5.875GHz, to 12 GHz	06-OCT-2004	06-OCT- 2005	[16559], [16560], [16561]
033599	Midwest Microwave/ CSY-NMNM-80- 273001	RF Coaxial Cable, 27ft. to 18GHz	09-MAY- 2005	09-AUG- 2005	[16559], [16560], [16561]
034064	Micro-Coax/ UFB293C-2-0840- 300504	RF Coaxial Cable, 7ft to 18GHz	28-OCT-2004	28-OCT- 2005	[16559], [16560], [16561]
034075	Schaffner/ RSG 2000	Reference Spectrum Generator, 1-18GHz	12-AUG- 2004	12-AUG- 2005	[16559], [16560], [16561]
034188	Micro-Tronics/ BRC50703-02	Notch Filter, SB:5.150- 5.350GHz, to 11GHz	26-APR-2005	26-APR-2006	[16559], [16560], [16561]
034189	Micro-Tronics/ BRC50704-02	Notch Filter, SB:5.470- 5.725GHz, to 12GHz	26-APR-2005	26-APR-2006	[16559], [16560], [16561]
034304	Micro-Tronics/ BRM50702-02	Band Reject Filter	26-APR-2005	26-APR-2006	[16559], [16560], [16561]
035040	Micro-Tronics/ HPM50112-02	Hi Pass Filter	26-APR-2005	26-APR-2006	[16559], [16560], [16561]
035268	Agilent/ E4440A	Precision Spectrum Analyzer	12-APR-2005	12-APR-2006	[16559], [16560], [16561]