4.9 GHz Test Report

AIR-RM1520A-A-K9 802.11a Radio Module

FCC ID: LDK102063

Against the following Specifications:

90.1215

Cisco Systems

170 West Tasman Drive

San Jose, CA 95134

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

1.1 Test Summary

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

Emission	Immunity
CFR47 Part 90.1215 CFR47 Part 15: 2005 CFR47 Part 15: 2005 (CAN/CSA-CISPR 22-02)	N/A

The specifications listed above represent actual tests performed to demonstrate compliance against the specifications and basic standards listed on the front cover of this report. This list is not a one to one match to the front cover for one or more of the following reasons.

1. Basic standards call up many different test phenomena specifications such as the 61000-4-X series. The basic standards define which elements and levels shall be applied from these specifications and as such it is not appropriate to list the individual specifications on the front cover.
2. A Standard listed on the front cover may be required in a particular country but is not appropriate for the particular technologies included in the equipment under test. E.g. You cannot test a DC product to the mains Harmonics requirements in EN61000-3-2. See section 3.2.
3. Test results against a particular standard or specification may be included in a different test report. See section 3.2 for an EDCS reference of this data.
4. 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.
5. 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.
6. Testing may have been performed to an equivalent test that satisfies the requirements of the standards and specifications listed on the front cover of the report. See section 3.2.
7. Where radiated emissions testing has been performed to EN55022/CISPR22 the additional requirements of VCCI: V- 3/2006.04, EN55022: 1994 +A1/2 and CAN/CSA- CISPR 22-02 have also been evaluated unless otherwise stated.
8. Testing to the requirements of CFR47 Part 15 was performed against the CISPR22 limits. The results are therefore deemed satisfactory evidence of compliance with Industry Canada Interference Causing Equipment Standard ICES-003.
9. Where assessment has been performed to CISPR24, all the applicable test requirements may have not been covered. Refer to the results section for the tests performed.

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.

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. The testing was performed by and for the use of Cisco systems Inc:

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 60 Hz (+/-20%)
220V 50 Hz (+/-20%)

2.2 Date of start of testing

06-Mar-2007

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.,	Cisco Systems, Inc.
4125 Highlander Parkway	170 West Tasman Drive
Richfield, OH 44286	San Jose, CA 95134
USA	USA

Test Engineers

James Nicholson

2.5 Equipment Assessed (EUT)

AIR-RM1520A-A-K9 802.11a Radio Module.

2.6 EUT Description

The AIR-RM1520A-A-K9 802.11a radio module operates exclusively in the AIR-LAP1520 series access point, and may operate simultaneously with the AIR-RM1520G-A-K9 802.11b/g radio module.

The following antennas are supported by this product.

AIR-ANT5180V-N	4900-5850 MHz	8.0 dBi Omni-directional
AIR-ANT5114P-N	4900 -5850 MHz	14.0 dBi Patch
AIR-ANT5117S-N	4900 -5850 MHz	17.0 dBi 90-degree Sector

Section 3: Sample Details

Sample No.	Equipment Details	Part Number	Manufacturer	Hardware Rev.	Firmware Rev.	Software Rev.	Serial Number
S01	802.11a Radio Module	AIR-RM1520A-A-K9	Cisco Systems	NA	NA	NA	NA
S02	Mesh Access Point	AIR-LAP1522AG-A-K9	Cisco Systems	NA	NA	NA	NA
S03	8.0 dBi Omni Antenna	AIR-ANT5180V-N	Cisco Systems	NA	NA	NA	NA
S04	14 dBi Patch Antenna	AIR-ANT5114P-N	Cisco Systems	NA	NA	NA	NA
S05	17dBi Patch Antenna	AIR-ANT5117S-N	Cisco Systems	NA	NA	NA	NA

Appendix A: Emission Test Results
Testing Laboratory: Cisco Systems, Inc., 4125 Highlander Parkway, Richfield, OH, USA

Average Output Power

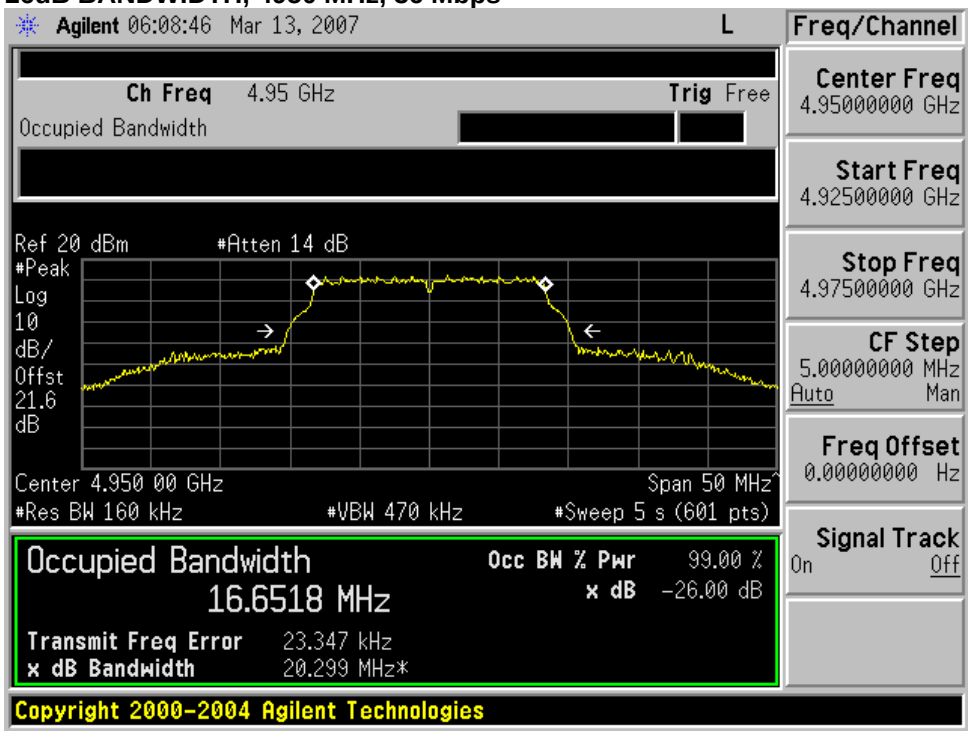
Average Power with up to 8, 14, and 17 dBi Antennas

Frequency (MHz)	Data Rate (Mbps)	Antenna Gain (dBi)	Target Power Level (dBm)	Actual Power Level (dBm)
4950	36	8,14,17	20	21.0
4965	36	8,14,17	20	21.1
5300	36	8,14,17	20	21.0

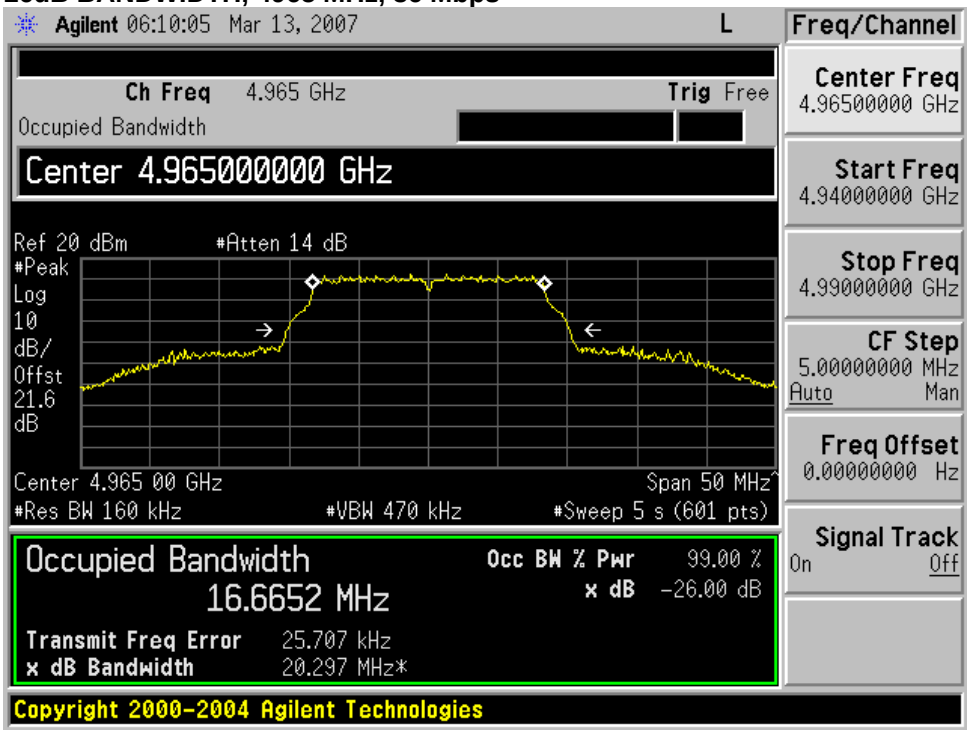
99% and 26dB Bandwidth

Frequency (MHz)	Data Rate (Mbps)	26dB BW (MHz)	99% BW (MHz)
4950	36	20.3	16.7
4965	36	20.3	16.7
4980	36	20.2	16.7

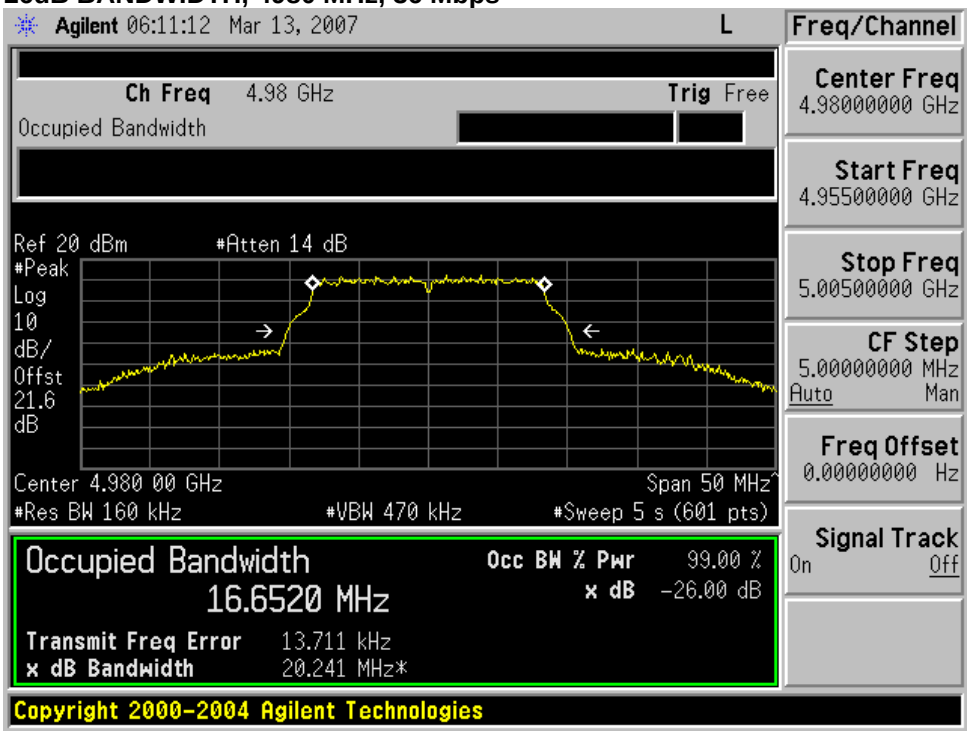
26dB BANDWIDTH, 4950 MHz, 36 Mbps



26dB BANDWIDTH, 4965 MHz, 36 Mbps



26dB BANDWIDTH, 4980 MHz, 36 Mbps

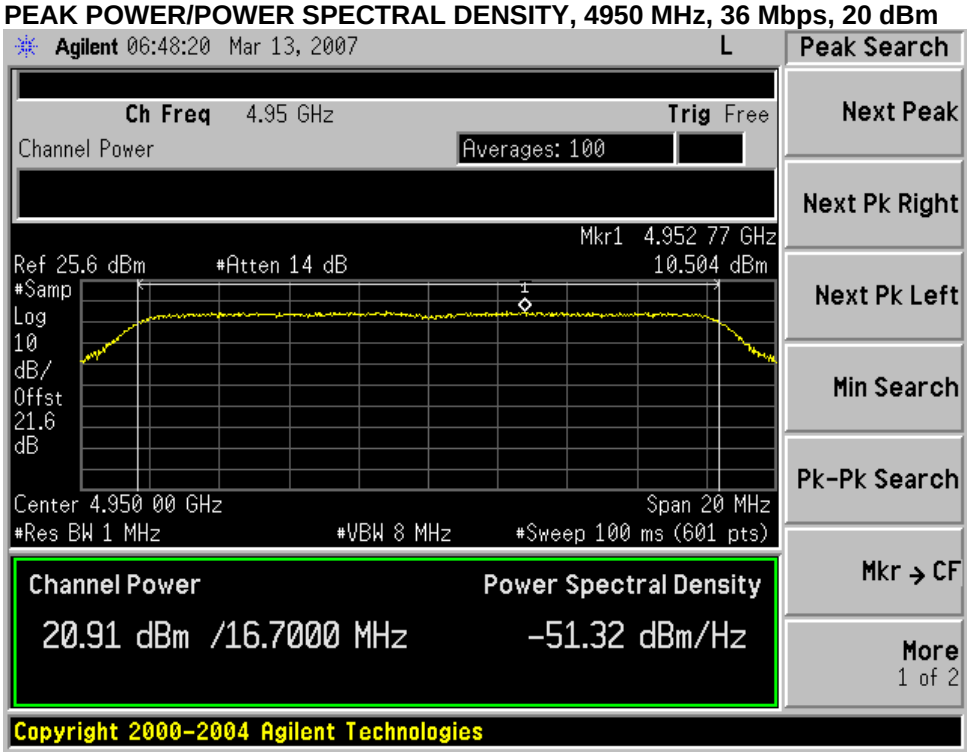


Peak Output Power/Power Spectral Density

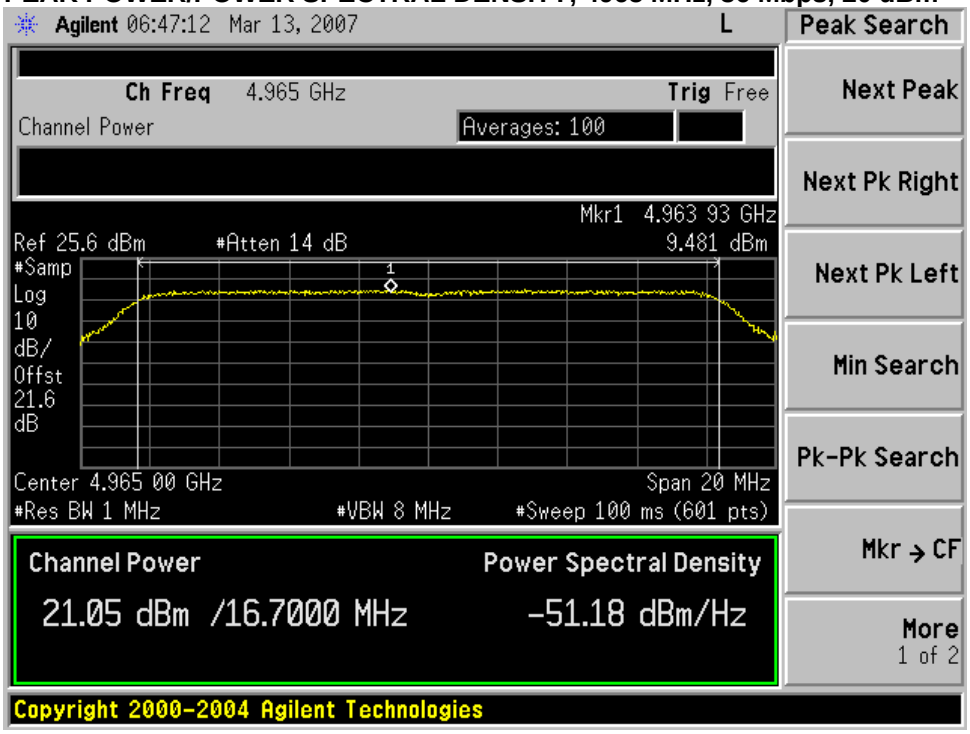
90.1215: The transmitting power of stations operating in the 4940–4990 MHz band must not exceed 33 dBm for a 20MHz high power device using antennas up to 9dBi gain. High power devices are also limited to a peak power spectral density of 21 dBm per one MHz. If transmitting antennas of directional gain greater than 9 dBi are used, both the peak transmit power and the peak power spectral density should be reduced by the amount in decibels that the directional gain of the antenna exceeds 9 dBi. However, high power point-to-point or point-to-multipoint operation (both fixed and temporary-fixed rapid deployment) may employ transmitting antennas with directional gain up to 26 dBi without any corresponding reduction in the transmitter power or spectral density. Corresponding reduction in the peak transmit power and peak power spectral density should be the amount in decibels that the directional gain of the antenna exceeds 26 dBi.

Frequency (MHz)	Data Rate (Mbps)	Antenna Gain (dBi)	Peak Power (dBm)	Limit (dBm)	Margin (dB)	PSD (dBm/MHz)	Limit (dBm)	Margin (dB)
4950	36	8,14,17	20.9	33.0	12.1	10.5	21.0	10.5
4965	36	8,14,17	21.1	33.0	11.9	9.5	21.0	11.5
4980	36	8,14,17	20.9	33.0	12.1	10.4	21.0	10.6

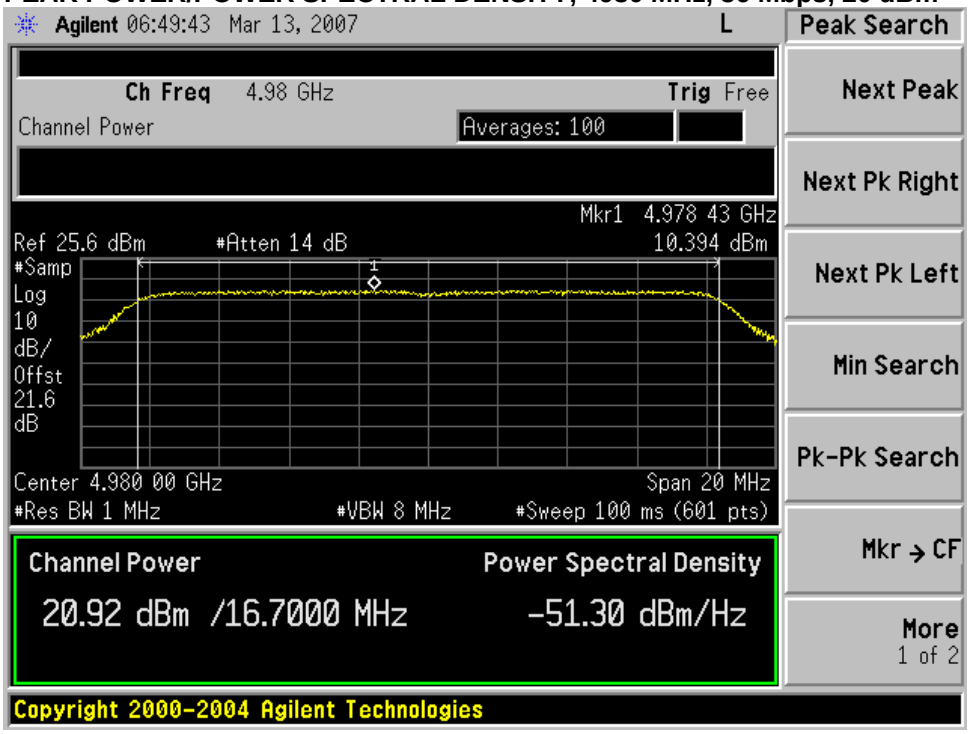
PEAK POWER/POWER SPECTRAL DENSITY, 4950 MHz, 36 Mbps, 20 dBm



PEAK POWER/POWER SPECTRAL DENSITY, 4965 MHz, 36 Mbps, 20 dBm



PEAK POWER/POWER SPECTRAL DENSITY, 4980 MHz, 36 Mbps, 20 dBm



Frequency Stability

Frequency Stability over Temperature
The frequency stability shall be measured with variation of ambient temperature from -40[deg] to +55[deg] centigrade. (Frequency variation listed in parts per million)

Freq (Mhz)	-40C	-30C	-20C	-10C	+1C	+10C	+20C	+30C	+40C	+50C	+55C
4950	-2.92	-1.01	2.26	2.73	1.61	-0.70	-4.67	-1.56	-2.05	-3.62	-2.99
4965	-2.43	-0.52	2.80	3.18	2.03	-0.29	-4.28	-1.25	-1.67	-3.2	-2.52
4980	-3.07	-1.19	2.18	2.48	1.30	-1.05	-5.06	-2.07	-2.43	-3.91	-3.20

Frequency Stability over Primary Supply Voltage (100-240 Vac)
The frequency stability shall be measured with variation of primary supply voltage from 85 to 115 percent of the nominal value. (Frequency variation listed in parts per million)

Freq (Mhz)	85 VAC	115 VAC	276 VAC
4950	1.26	1.72	1.29
4965	1.63	1.95	1.63
4980	0.91	1.10	0.91

Conducted Spurious Emissions

90.210: For high power transmitters (greater that 20 dBm) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0-45% of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45-50% of the authorized bandwidth: 568 log (% of (BW)/45) dB.

(3) On any frequency removed from the assigned frequency between 50-55% of the authorized bandwidth: 26 + 145 log (% of BW/50) dB.

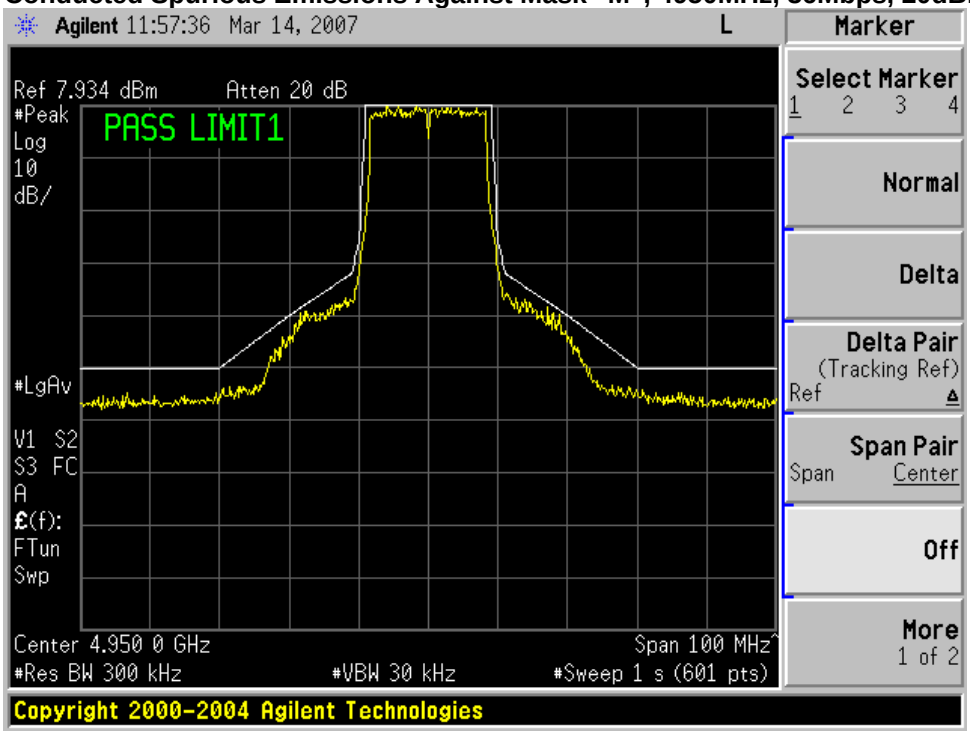
(4) On any frequency removed from the assigned frequency between 55-100% of the authorized bandwidth: 32 + 31 log (% of (BW)/55) dB.

(5) On any frequency removed from the assigned frequency between 100-150% of the authorized bandwidth: 40 + 57 log (% of (BW)/100) dB.

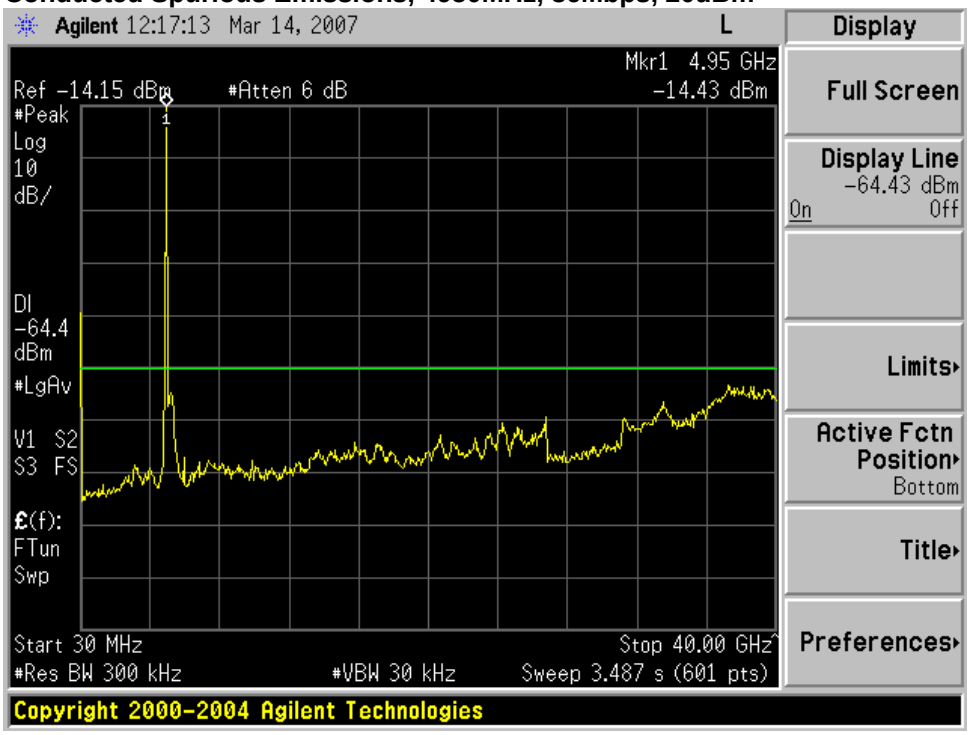
(6) On any frequency removed from the assigned frequency between above 150% of the authorized bandwidth: 50 dB or 55 + 10 log (P) dB, whichever is the lesser attenuation.

(7) The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

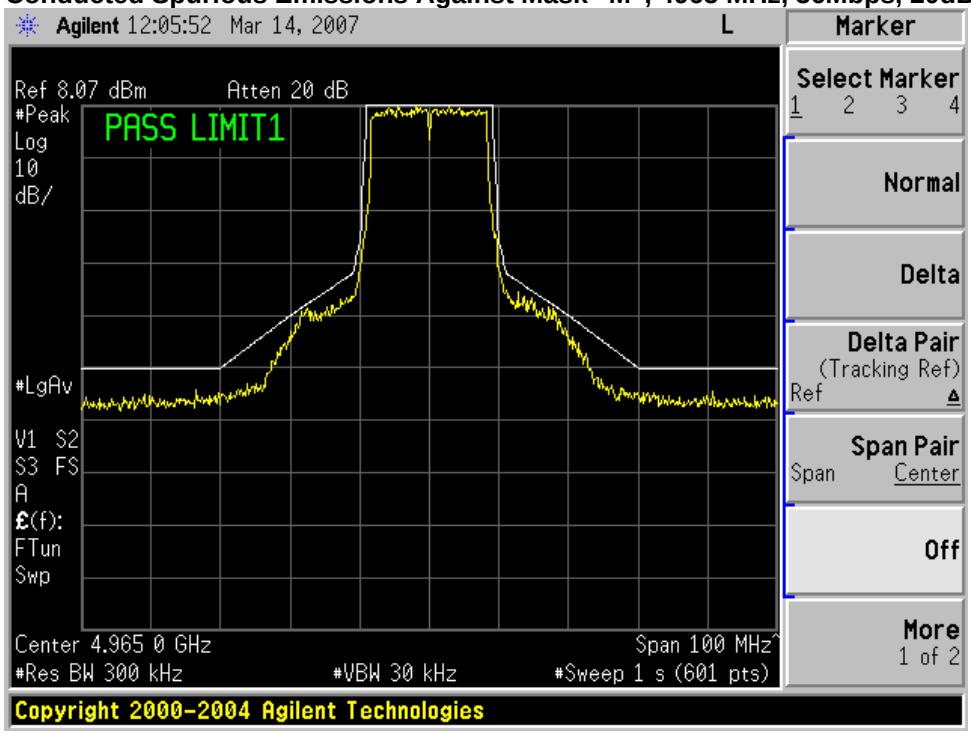
Conducted Spurious Emissions Against Mask "M", 4950MHz, 36Mbps, 20dBm



Conducted Spurious Emissions, 4950MHz, 36Mbps, 20dBm

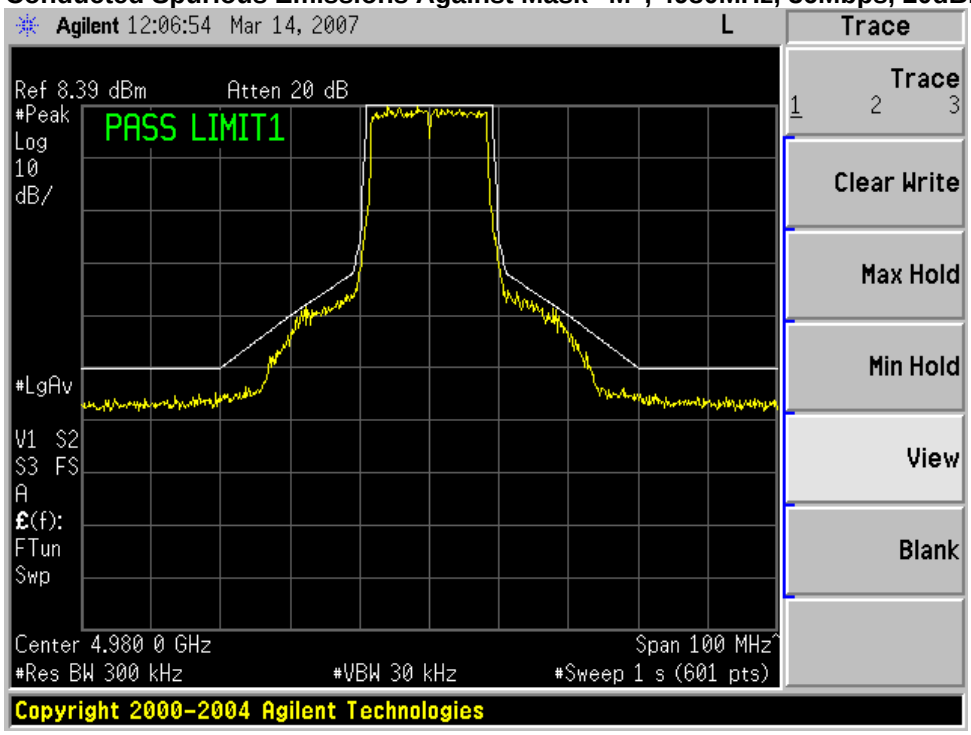


Conducted Spurious Emissions Against Mask "M", 4965 MHz, 36Mbps, 20dBm

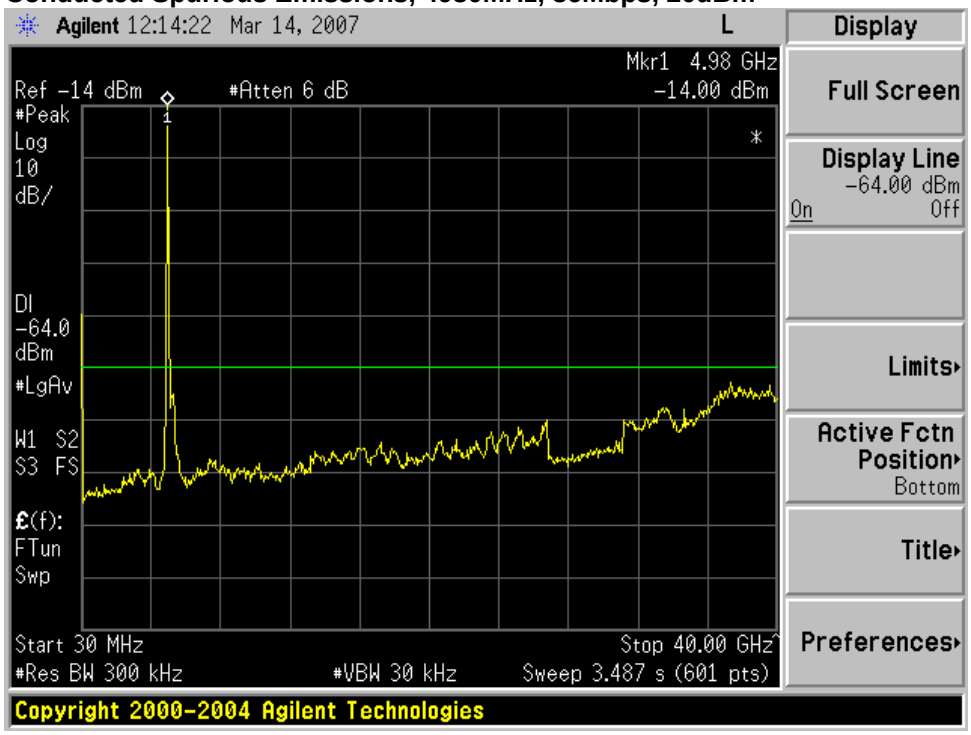


Conducted Spurious Emissions, 4965 MHz, 36Mbps, 20dBm

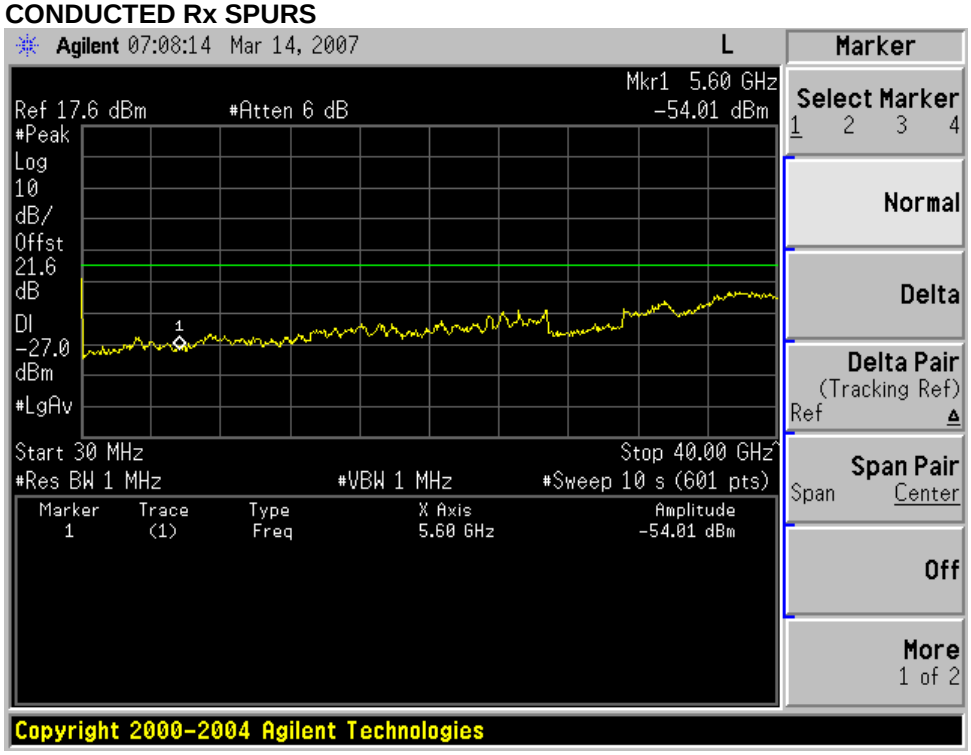
Conducted Spurious Emissions Against Mask "M", 4980MHz, 36Mbps, 20dBm



Conducted Spurious Emissions, 4980MHz, 36Mbps, 20dBm



CONDUCTED Rx SPURS



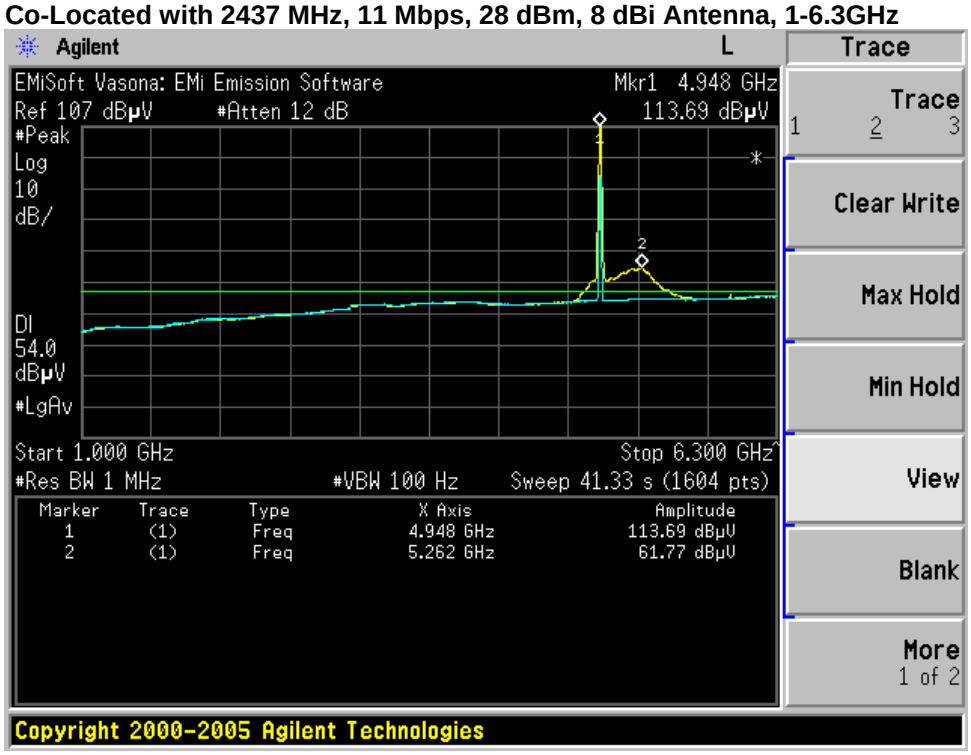
Appendix B: Emission Test Results
Testing Laboratory: Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134, USA

Radiated Transmitter Spurious Emissions

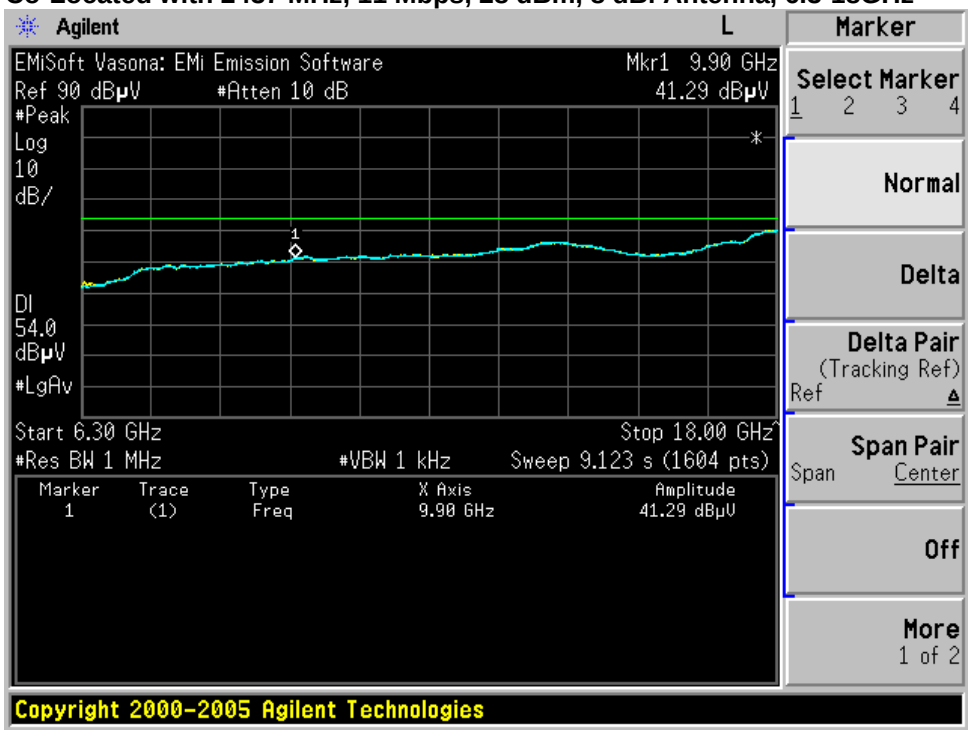
There were no measurable emissions above 18GHz for any of the channel/antenna combinations. The data is a worst case representation of all configurations. The limit for any out of band spurs is 50dB below the peak of the carrier.

Frequency (MHz)	Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4950	113.2		
5262	61.8	63.2	1.4
4965	113.2		
5262	61.2	63.2	2.0
4980	113.1		
5272	61.1	63.1	2.0

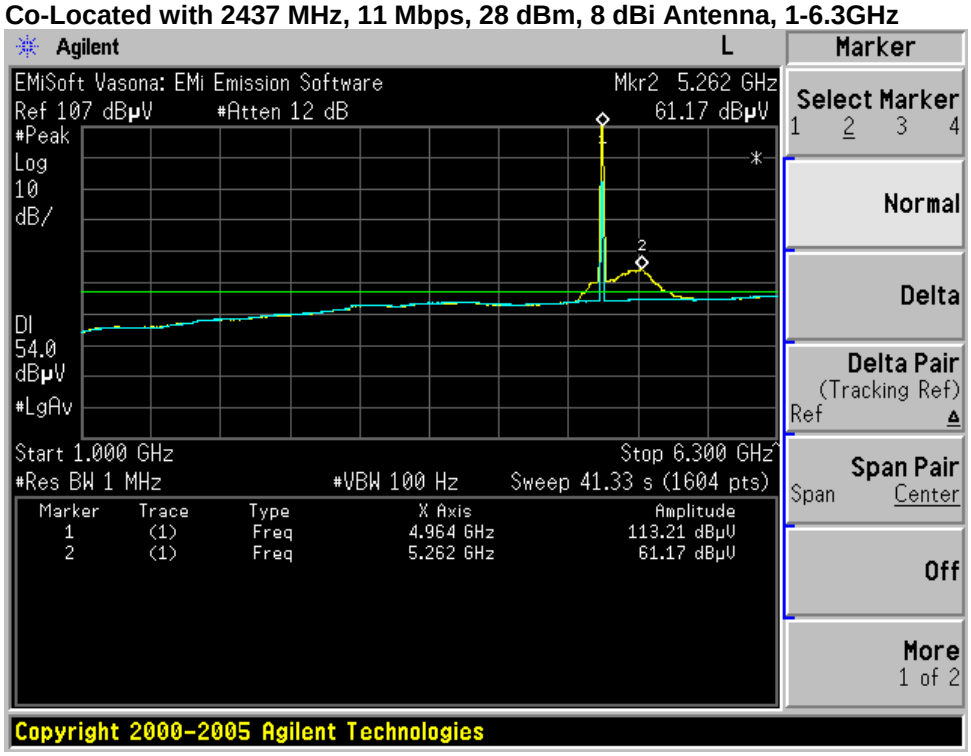
Radiated Spurious Emissions, 4950 MHz, 36 Mbps, 20 dBm, 17 dBi Antenna Co-Located with 2437 MHz, 11 Mbps, 28 dBm, 8 dBi Antenna, 1-6.3GHz



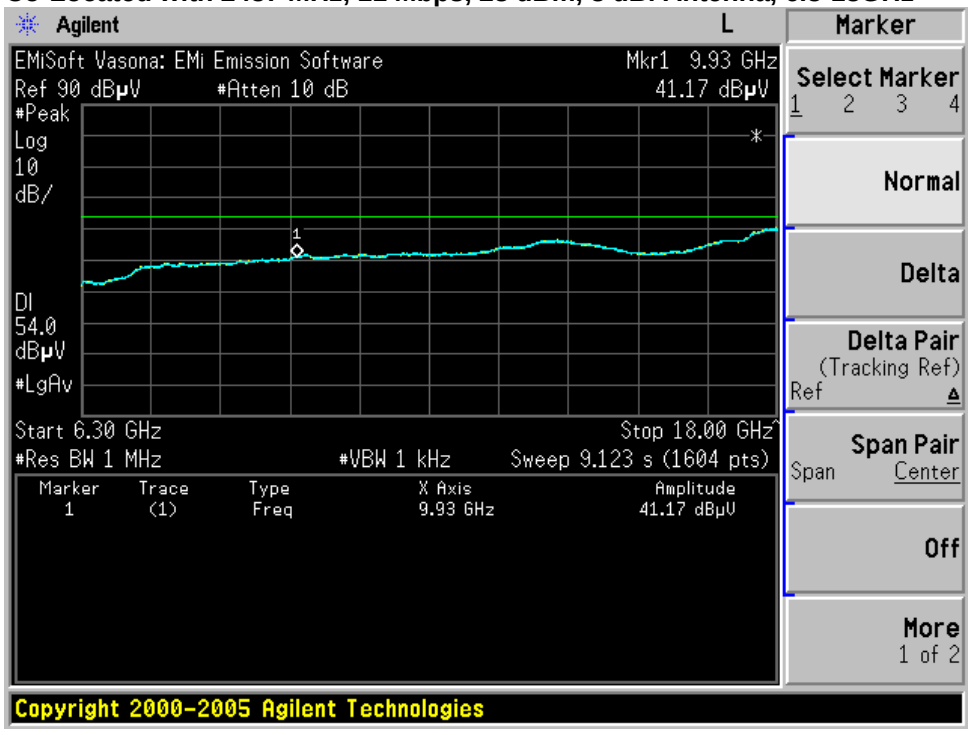
Radiated Spurious Emissions, 4950 MHz, 36 Mbps, 20 dBm, 17 dBi Antenna Co-Located with 2437 MHz, 11 Mbps, 28 dBm, 8 dBi Antenna, 6.3-18GHz



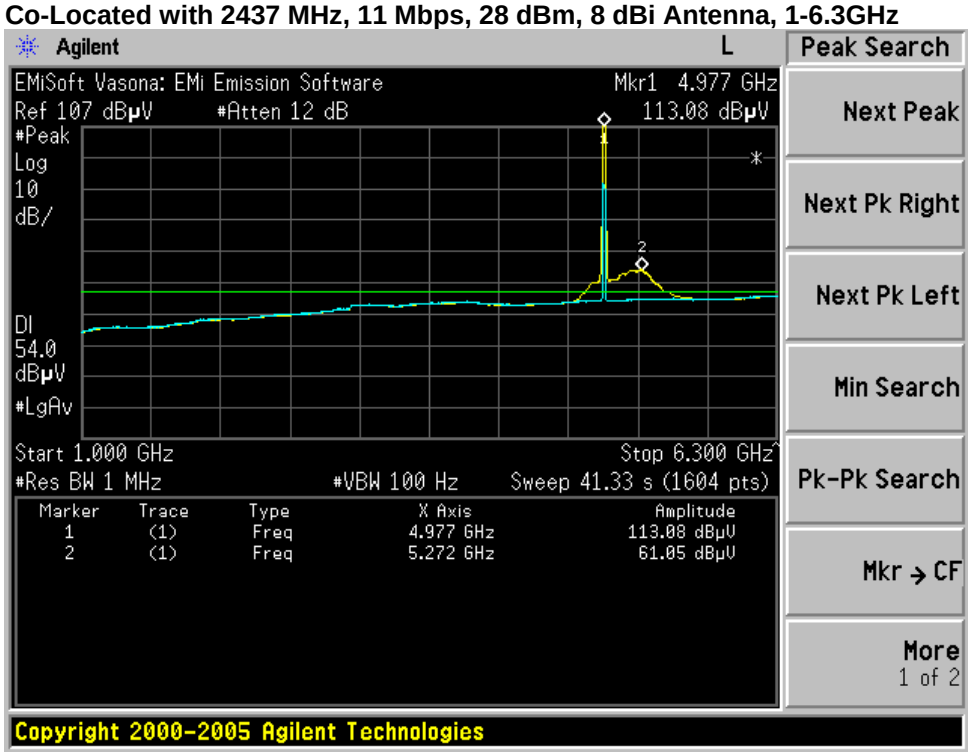
Radiated Spurious Emissions, 4965 MHz, 36 Mbps, 20 dBm, 17 dBi Antenna Co-Located with 2437 MHz, 11 Mbps, 28 dBm, 8 dBi Antenna, 1-6.3GHz



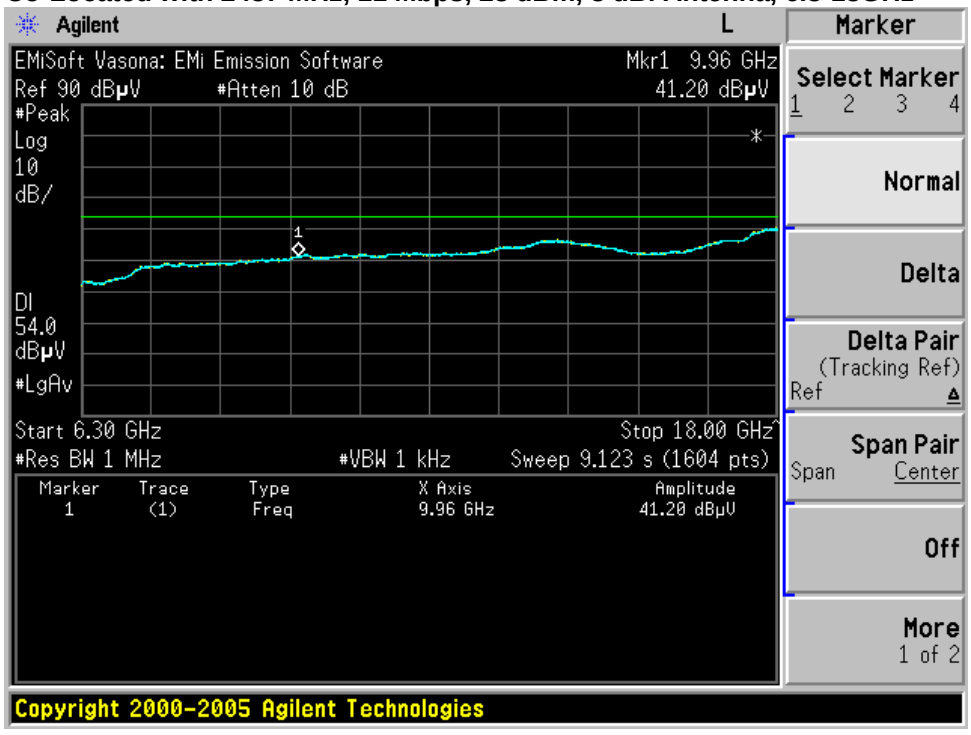
Radiated Spurious Emissions, 4965 MHz, 36 Mbps, 20 dBm, 17 dBi Antenna Co-Located with 2437 MHz, 11 Mbps, 28 dBm, 8 dBi Antenna, 6.3-18GHz



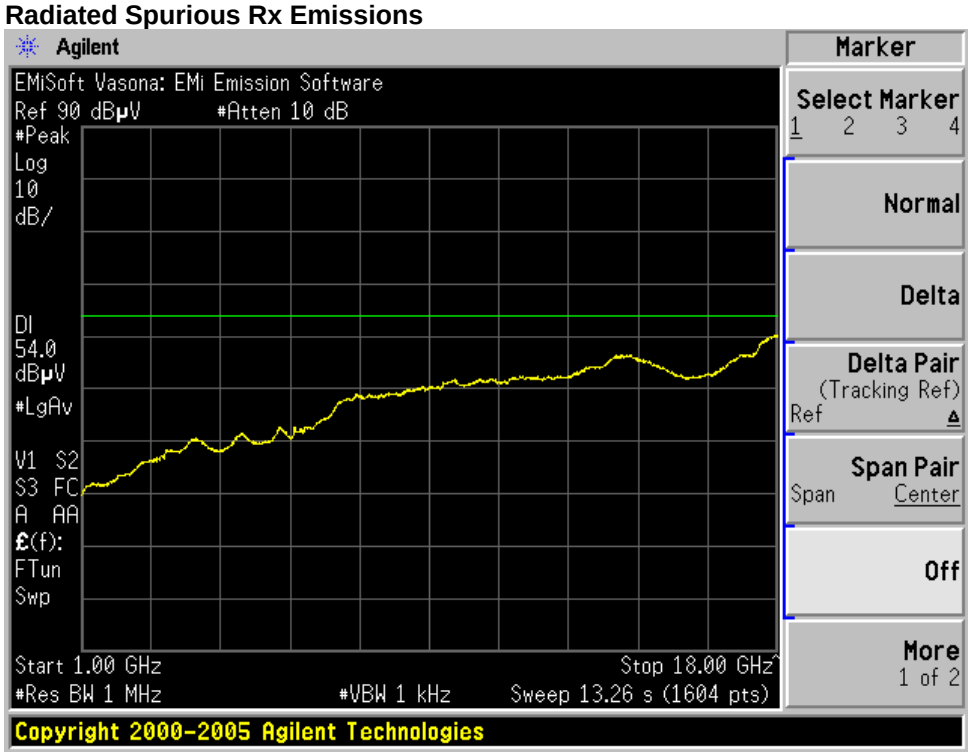
Radiated Spurious Emissions, 4980 MHz, 36 Mbps, 20 dBm, 17 dBi Antenna Co-Located with 2437 MHz, 11 Mbps, 28 dBm, 8 dBi Antenna, 1-6.3GHz



Radiated Spurious Emissions, 4980 MHz, 36 Mbps, 20 dBm, 17 dBi Antenna Co-Located with 2437 MHz, 11 Mbps, 28 dBm, 8 dBi Antenna, 6.3-18GHz



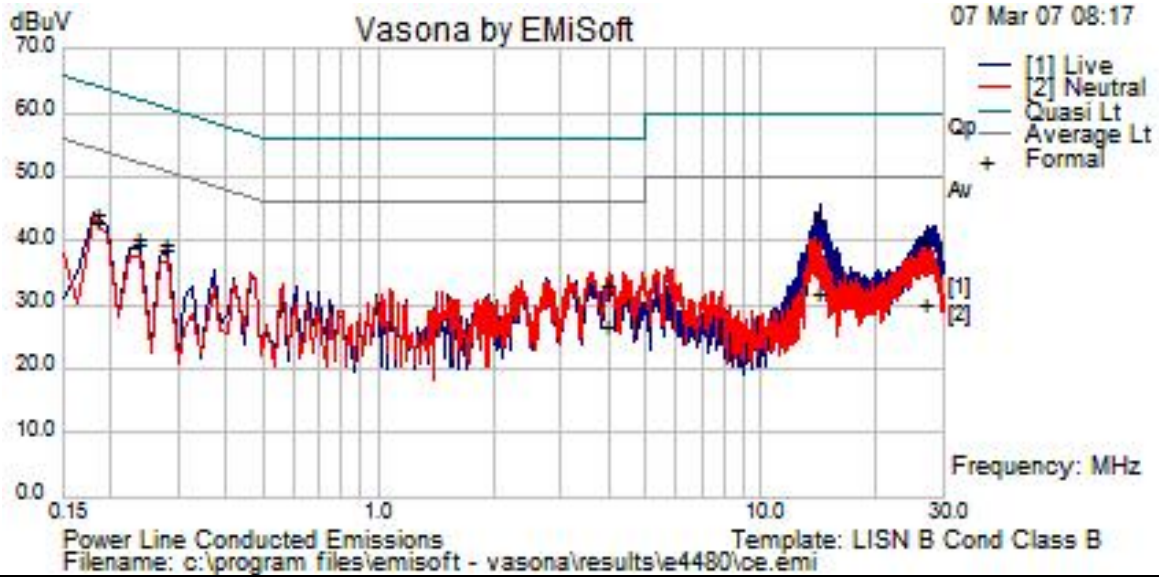
Radiated Spurious Rx Emissions



Powerline Conducted emissions

Test Number: 26067 **Spec ID:** 484				
Basic Standard	**Applied to**	**Class**	**Freq Range**	**Test Details / Comments**
CFR47 Part 15.207 (LP0002 2.2.3, RSS210)	AC Power Line	B	0.150MHz - 30MHz	
Operating Mode	**Mode :** 1, Continuous			
Power Input	110, 60Hz (+/-20%)			
Overall Result	Pass			
Comments	No further comments			
Deviation	There were no deviations from the specification			

Subtest Number: 26067 - 1	**Subtest Date:** 07-Mar-2007
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Line Under Test	Power Input
Transducer	LISN
Subtest Result	Pass
Highest Frequency	30.0
Lowest Frequency	0.15
Comments on the above Test Results	No further comments



Title: N/A

Test Results Table

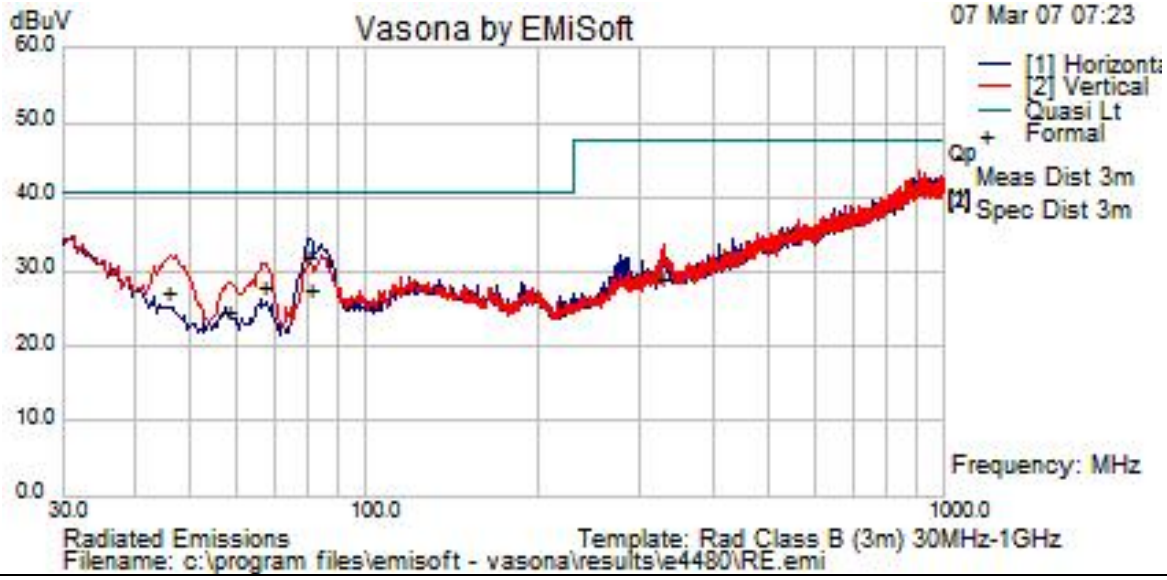
Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.187	20.2	20.3	0.2	40.8	Av	L	54.2	-13.4	Pass	
0.187	21.5	20.3	0.2	42	Qp	L	64.2	-22.1	Pass	
0.236	17.8	20.2	0.1	38.2	Qp	L	62.2	-24	Pass	
0.236	16.9	20.2	0.1	37.3	Av	L	52.2	-14.9	Pass	
0.283	17.2	20.2	0.1	37.6	Qp	L	60.7	-23.2	Pass	
0.283	16.4	20.2	0.1	36.6	Av	L	50.7	-14.1	Pass	
4.03	10.9	20	0.1	31	Qp	N	56	-25	Pass	
4.03	4.3	20	0.1	24.4	Av	N	46	-21.6	Pass	
14.338	20.9	20.2	0.2	41.3	Qp	L	60	-18.7	Pass	
14.338	9.3	20.2	0.2	29.7	Av	L	50	-20.3	Pass	
27.091	16.1	20.5	1.2	37.8	Qp	L	60	-22.2	Pass	
27.091	6.3	20.5	1.2	28	Av	L	50	-22	Pass	

Unintentional Radiated emissions

Subtest Number: 26044 - 1	**Subtest Date:** 07-Mar-2007
Engineer	James Nicholson
Lab Information	Building P, 10m Anechoic
Subtest Results	
Subtest Title	RE
Subtest Result	Pass
Highest Frequency	1000.0
Lowest Frequency	30.0
Comments on the above Test Results	No further comments

Graphical Test Results

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



Title: N/A

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
46.162	16.9	0.7	7.8	25.4	Qp	V	138	216	40.5	-15.1	Pass	
58.599	16.5	0.7	5.6	22.7	Qp	V	105	241	40.5	-17.8	Pass	
67.554	19	0.7	6.2	26	Qp	V	103	212	40.5	-14.4	Pass	
80.113	23.4	0.8	5.8	30.1	Qp	H	233	249	40.5	-10.4	Pass	
80.778	19.4	0.8	5.8	25.9	Qp	V	107	56	40.5	-14.6	Pass	
328.239	12.5	1.7	13.3	27.4	Qp	V	115	204	47.5	-20.1	Pass	

Maximum Permissible Exposure (MPE) Calculations

4.9GHz devices are subject to the radio frequency radiation exposure requirements specified in Sec. 1.1307(b), Sec. 2.1091 and Sec. 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a ``general population/uncontrolled'' environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Given

$E=\sqrt{(30*P*G)/d}$ 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:

$d=\sqrt{((30*P*G)/(3770*S))}$

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

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

yields

$d=100*\sqrt{((30*(P/1000)*G)/(3770*S))}$

$d=0.282*\sqrt{(P*G/S)}$

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

$d=0.282*10^{((P+G)/20)}/\sqrt{S}$ 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 are 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. Using the peak power levels and antenna gains 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)
4950	36	1	20.9	17	22.14	20	-2.14
4965	36	1	21.1	17	22.66	20	-2.66
4980	36	1	20.9	17	22.14	20	-2.14

MPE Calculations

To maintain compliance, installations will assure a separation distance of at least 50cm.

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)
4950	36	20	20.9	17	1.23	1	-0.23
4965	36	20	21.1	17	1.28	1	-0.28
4980	36	20	20.9	17	1.23	1	-0.23

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 E: Test Equipment/Software Used to perform the test

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due	Test Number(s)
004883	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	19-APR-06	19-APR-07	[26022], [26032], [26044]
005568	HP/ 8449B	PreAmplifier (1-26.5GHz)	08-SEP-06	08-SEP-07	[26044]
005691	Miteq/ NSP1800-25-S1	Broadband Preamplifier (1-18GHz)	09-OCT-06	09-OCT-07	[26022], [26032], [26044]
008136	Huber + Suhner/ SF106A	7m Sucoflex cable	05-JAN-07	05-JAN-08	[26044]
008370	Andrew/ F4A-PNMNM	49 ft Heliax Cable	16-MAR-06	16-MAR-07	[26067]
008591	Fischer Custom Communications/ FCC-RFM2F-520R	LISN AC Adaptor - Std 120V outlet	16-MAR-06	16-MAR-07	[26067]
019209	TTE/ H785-150K-50-21378	Hi Pass Filter 150KHz	02-JAN-07	02-JAN-08	[26067]
020975	Micro-Coax/ UFB311A-0-1344-520520	RF Coaxial Cable, to 18GHz, 134.4 in	16-MAR-06	16-MAR-07	[26022], [26032], [26044]
024905	Agilent/ E4440A	Precision Spectrum Analyzer	14-FEB-07	14-FEB-08	[26022], [26032], [26044]
025640	Micro-Coax/ UFB311A-0-2720-520520	RF Coaxial Cable, to 18GHz, 272 in	05-JAN-07	05-JAN-08	[26044]
025655	Micro-Coax/ UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	17-MAR-06	17-MAR-07	[26022], [26032], [26044]
025657	Micro-Coax/ UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	19-AUG-06	19-AUG-07	[26022], [26032], [26044], [26067]
025660	Micro-Coax/ UFB311A-1-0840-504504	Coaxial Cable, 84.0 in. to 18GHz	05-JAN-07	05-JAN-08	[26044]
030495	Agilent/ 8761B	SPDT RF Switch, to 18GHz	07-APR-06	07-APR-07	[26022], [26032], [26044]
030496	Agilent/ 8761B	SPDT RF Switch, to 18GHz	08-SEP-06	08-SEP-07	[26044]
030563	Micro-Coax/ UFB311A-1-0950-504504	RF Coaxial Cable, to 18GHz, 95 in	05-JAN-07	05-JAN-08	[26044]
030652	Sunol Sciences/ JB1	Combination Antenna, 30MHz-2GHz	06-JUL-06	06-JUL-07	[26044]
032455	Midwest Microwave/ CSY-MNMN-82-273001	RF Coaxial Cable to 18 GHz	11-SEP-06	11-MAR-07	[26022], [26032], [26044]

032801	ETS-Lindgren/ 3117	Double Ridged Waveguide Horn Antenna	28-JUL-06	28-JUL-07	[26044]
034188	Micro-Tronics/ BRC50703-02	Notch Filter, SB:5.150-5.350GHz, to 11GHz	17-JUL-06	17-JUL-07	[26044]
034189	Micro-Tronics/ BRC50704-02	Notch Filter, SB:5.470-5.725GHz, to 12GHz	17-JUL-06	17-JUL-07	[26044]
034304	Micro-Tronics/ BRM50702-02	Notch Filter, SB:2.4-2.5GHz, to 18GHz	17-JUL-06	17-JUL-07	[26044]
034974	Midwest Microwave/ ATT-0640-20-29M-02	Attenuator, 20dB, DC-40GHz	09-MAY-06	09-MAY-07	[26022], [26032]
035040	Micro-Tronics/ HPM50112-02	High pass Filter, 6.4-18GHz	17-JUL-06	17-JUL-07	[26044]
035624	Rohde & Schwarz/ ESCI	EMI Test Receiver	28-JUN-06	28-JUN-07	[26044], [26067]
036716	Cisco/ RF Coaxial Cable-SMA	Radio Test Cable, SMA-SMA	11-DEC-06	11-DEC-07	[26022], [26032], [26044]
038396	Micro-Coax/ UFB293C-Q-1200-50U50L	RF Coaxial Cable, 120 Inches, to 18GHz	13-JUL-06	13-JUL-07	[26044]