



Class II Change Report

AIR-RM1252A-A-K9

5GHz 802.11a MIMO Radio Module

FCC ID: LDK102061

IC: 2461B-102061

Against the following Specifications:

CFR47 Part 15.247

CFR47 Part 15.407

RSS210

Cisco Systems

170 West Tasman Drive

San Jose, CA 95134



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 LEGACY OFDM, SINGLE ANTENNA, 6 TO 54 MBPS

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 LEGACY OFDM, DUAL ANTENNAS, 6 TO 54 MBPS

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 LEGACY OFDM , DUAL ANTENNAS WITH BEAM FORMING, 6 TO 54 MBPS

5

 HT- 20 MHZ, DUAL ANTENNAS, MCS0 TO MCS15.....

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 DUPLICATE 2X20 MHZ, DUAL ANTENNAS, 6 MBPS

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 HT- 40 MHZ, DUAL ANTENNAS, MCS0 TO MCS15.....

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TESTING LABORATORY: CISCO SYSTEMS, INC., 170 WEST TASMAN DRIVE, SAN JOSE, CA 95134,
USA

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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 15.247	N/A
CFR47 Part 15.407	
RSS210	

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%)

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2.2 Date of start of testing

13-July-2009

2.3 Report Issue Date

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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-RM1252A-A-K9 5GHz 802.11a MIMO Radio Module.

2.6 EUT Description

The AIR-RM1252A-A-K9 5GHz 802.11a MIMO radio module operates in the AIR-AP1250 series access point, and may operate simultaneously with the AIR-RM1252G-A-K9 2.4GHz 802.11b/g MIMO radio module. The following modes of operation are supported. The modes are further defined in the radio Theory of Operation. The modes included in this report represent the worst case data for all modes.

Legacy OFDM, Single Antenna, 6 to 54 Mbps
Legacy OFDM, Dual Antennas, 6 to 54 Mbps
Legacy OFDM , Dual Antennas with Beam Forming, 6 to 54 Mbps
HT- 20 MHz, Dual Antennas, MCS0 to MCS15
Duplicate 2x20 MHz, Dual Antennas, 6 Mbps
HT- 40 MHz, Dual Antennas, MCS0 to MCS15

This report adds the following antenna:

AIR-ANT5160NP-R 6 dBi MIMO Patch Antenna with RP-TNC Connectors



Section 4: 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.

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

Sample No.	Equipment Details	Part Number	Manufacturer	Hardware Rev.	Firmware Rev.	Software Rev.	Serial Number
S01	AIR-RM1252A-A-K9	73-10425-05	Cisco Systems	NA	NA	NA	RFD1041 0051
S02	AIR-AP1250	800-270630-05	Cisco Systems	NA	NA	NA	FOC1039 1YLB
S03	AIR-ANT5160NP-R	NA	Cisco Systems	NA	NA	NA	NA
S04	AIR-PWR-SPLY1	341-0211-01	Cisco Systems	NA	NA	NA	DTH1030 902Z

4.2 System Details

System #	Description	Samples
1	EUT	S01, S02, S03 and S04

4.3 Mode of Operation Details

Mode#	Description	Comments
1	Continuous Transmitting	Continuous Transmitting

Appendix B: Emission Test Results

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

Radiated Bandedge

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

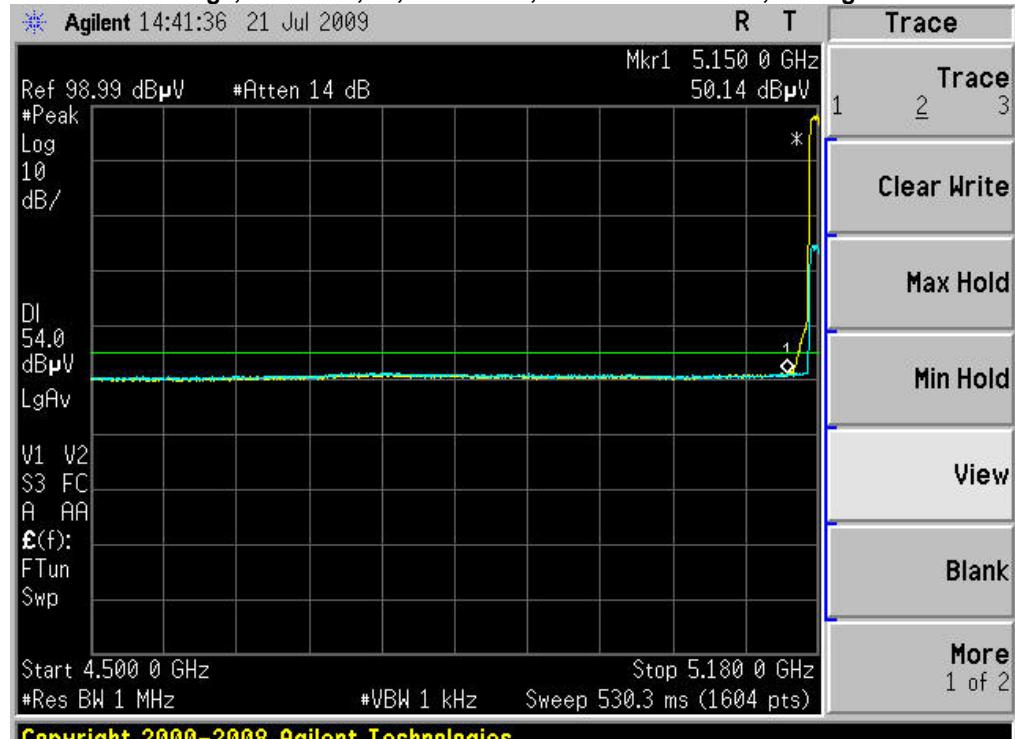
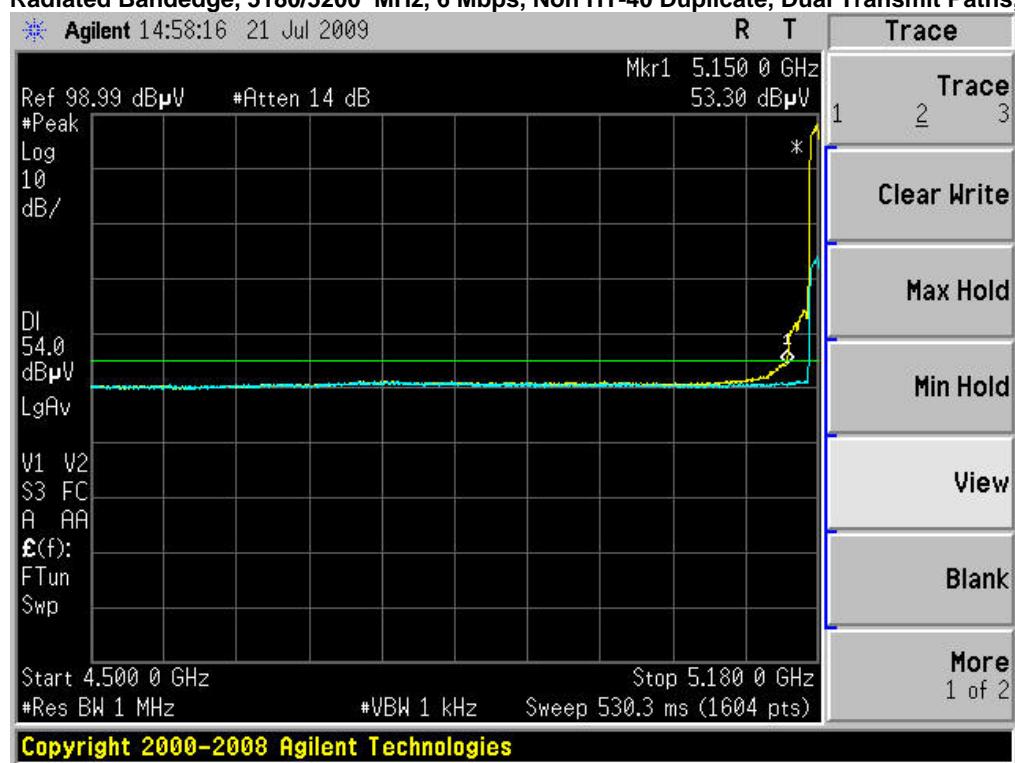
Reference Level:	110 dBuV
Attenuation:	20 dB
Sweep Time:	Coupled
Resolution Bandwidth:	1MHz
Video Bandwidth:	1 MHz for peak, 10 Hz for average
Detector:	Peak

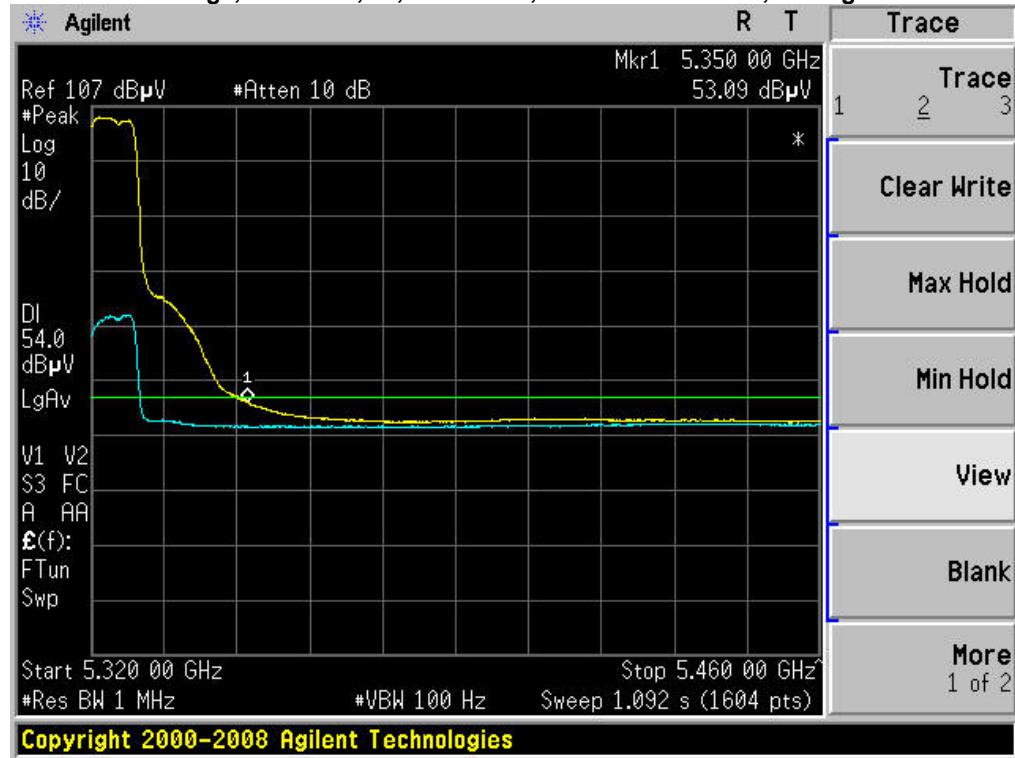
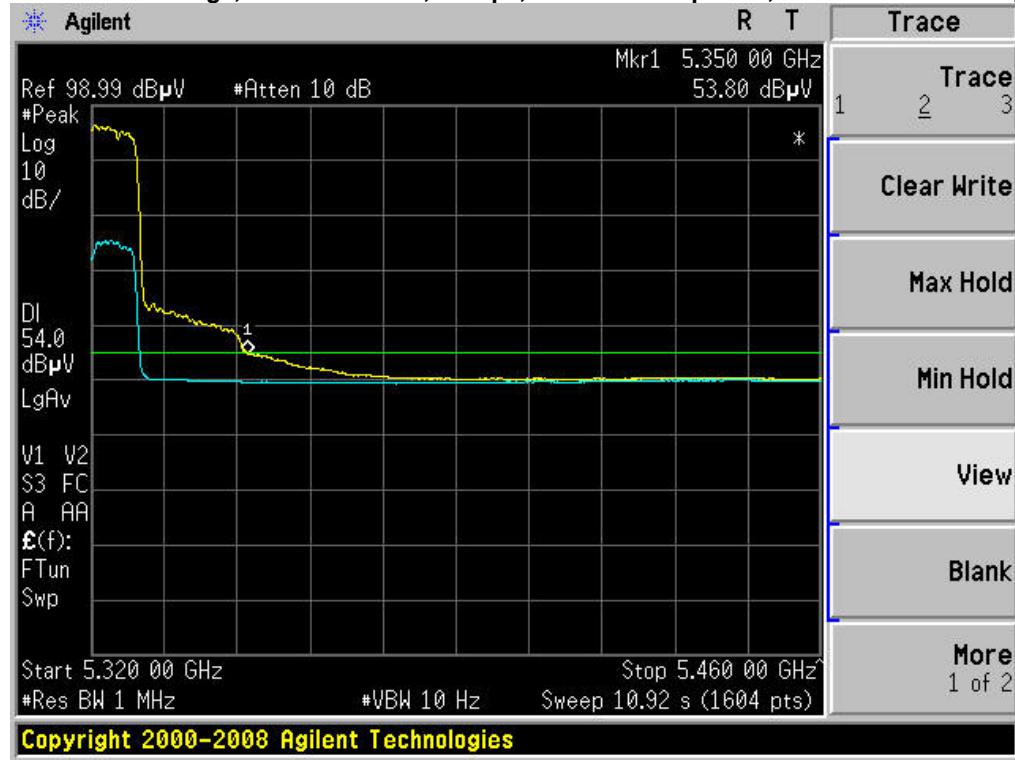
Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

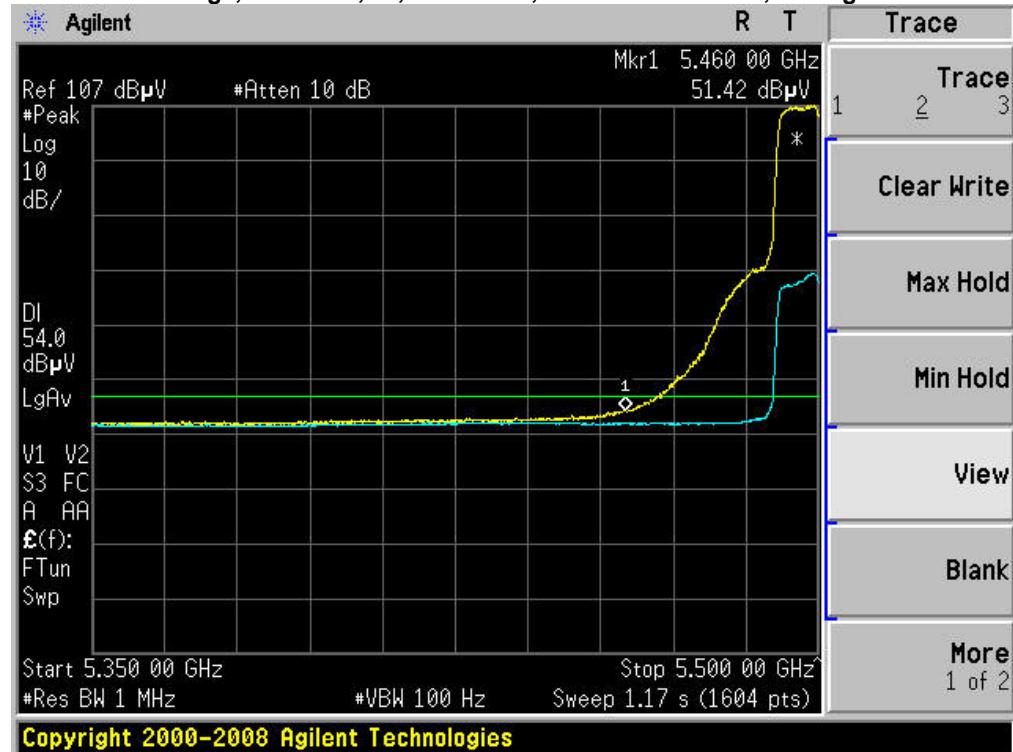
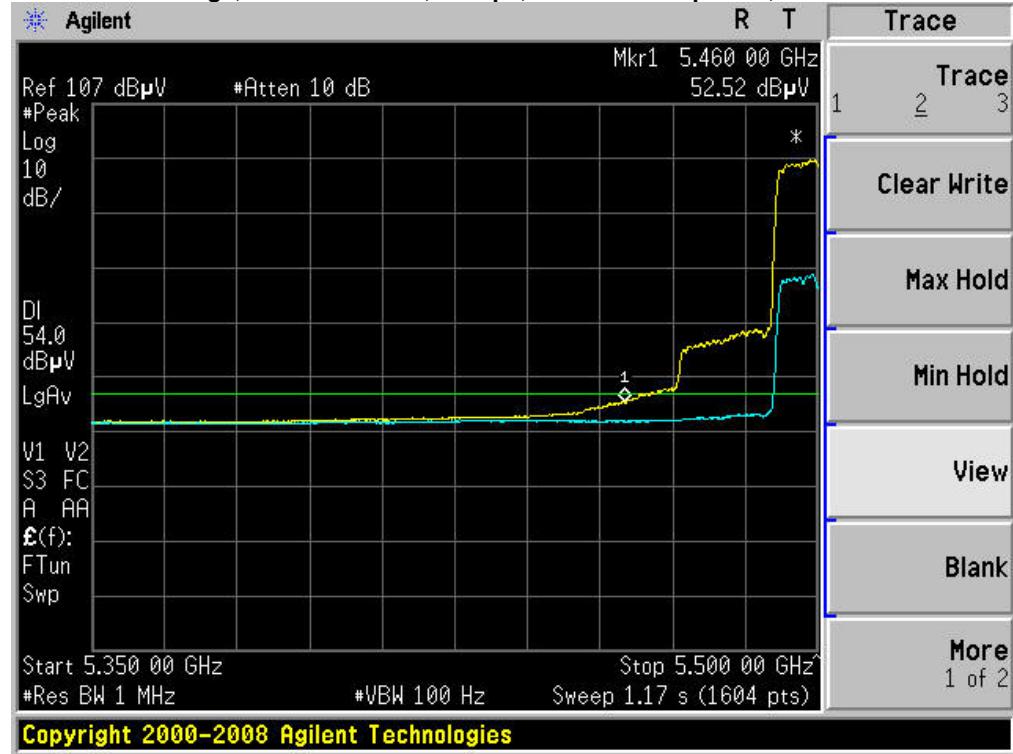
Save 2 plots: 1) Average Plot (Vertical and Horizontal), Limit= 54dBuV @3m
 2) Peak plot (Vertical and Horizontal), Limit = 74dBuV @3m

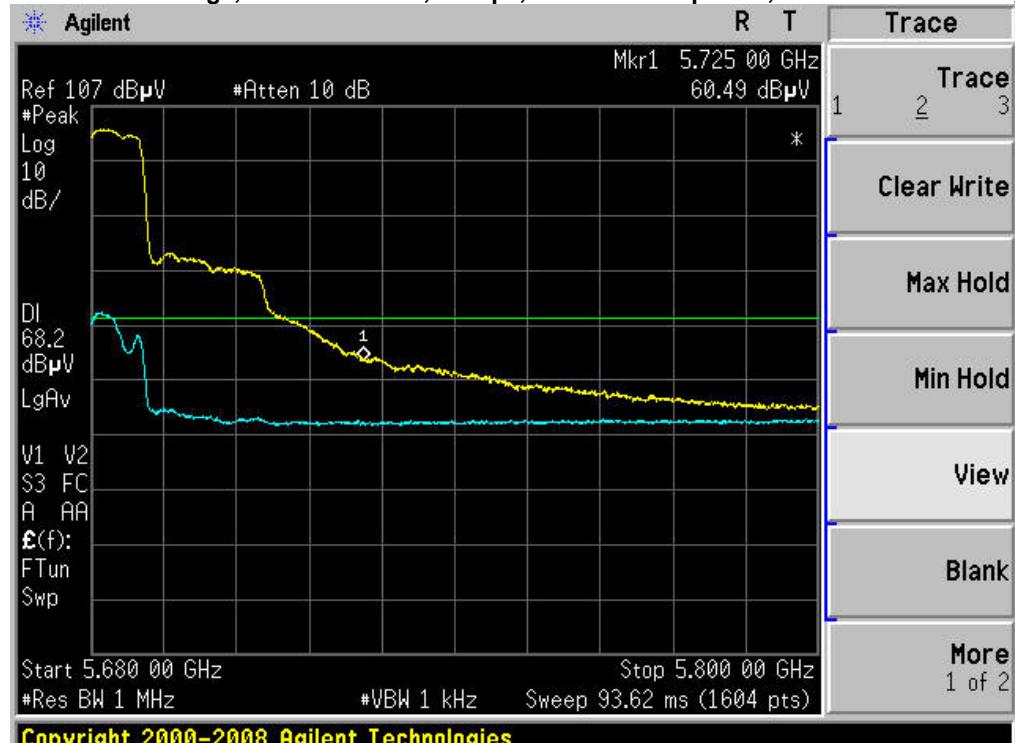
Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands.

Frequency (MHz)	Mode	Data Rate (Mbps)	Radiated Band Edge Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5180	Dual	54	50.1	54	3.86
5180/5200	Duplicate	6	53.3	54	0.7
5320	Dual	54	53.1	54	0.91
5300/5320	Duplicate	6	53.8	54	0.2
5500	Dual	54	51.4	54	2.58
5500/5520	Duplicate	6	52.5	54	1.48
5660/5680	Duplicate	6	60.5	68.2	7.71
5700	Dual	54	59.3	68.2	8.86
5745	Dual BF	54	67.5	78.2	10.67
5745/5765	Duplicate	6	73.3	78.2	4.92
5785/5805	Duplicate	6	61.6	78.2	16.62
5825	Dual BF	54	53.4	78.2	24.85

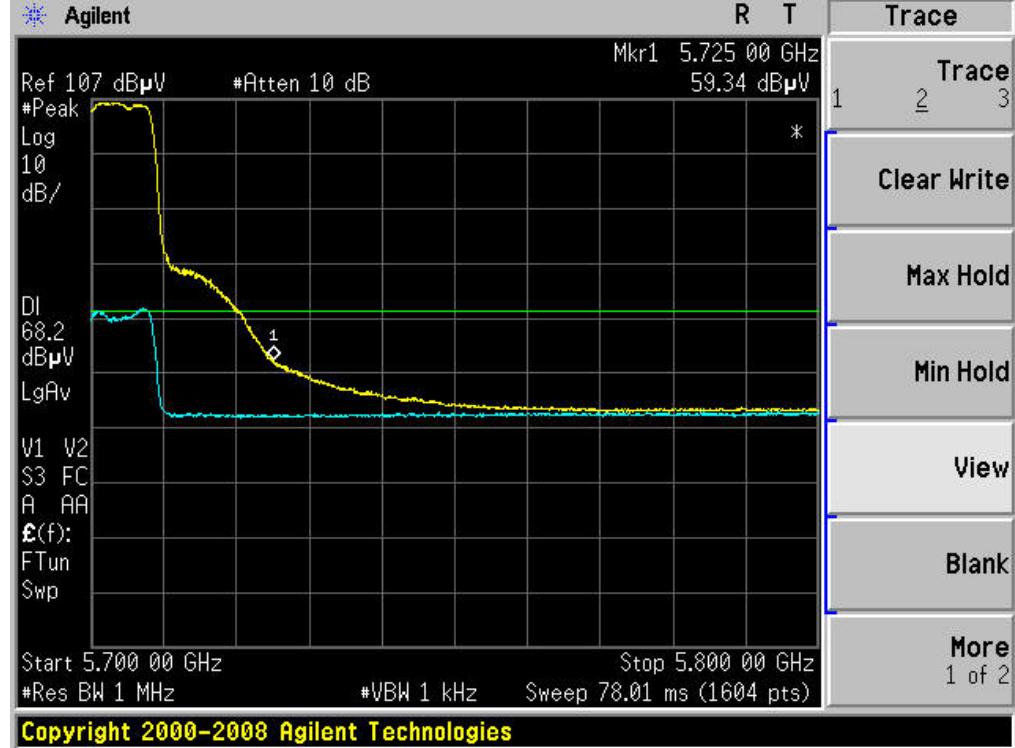
Radiated Bandedge, 5180 MHz, 54, Non HT-20, Dual Transmit Path, Average**Radiated Bandedge, 5180/5200 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Average**

Radiated Bandedge, 5320 MHz, 54, Non HT-20, Dual Transmit Path, Average**Radiated Bandedge, 5300/5320 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Average**

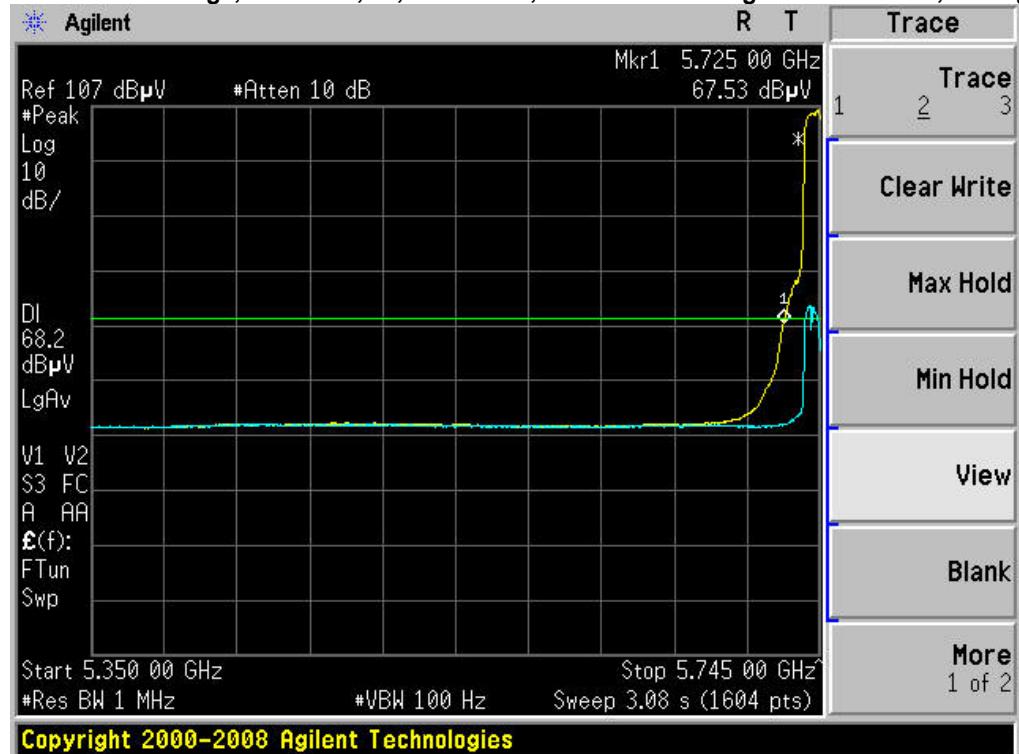
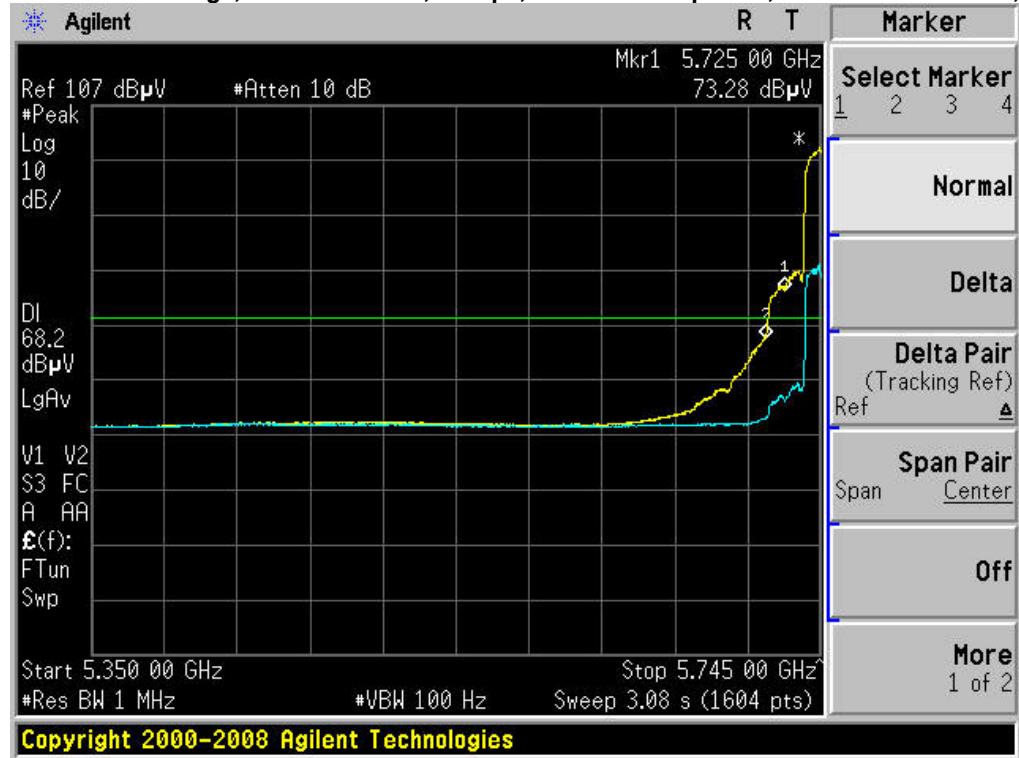
Radiated Bandedge, 5500 MHz, 54, Non HT-20, Dual Transmit Path, Average**Radiated Bandedge, 5500/5520 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Average**

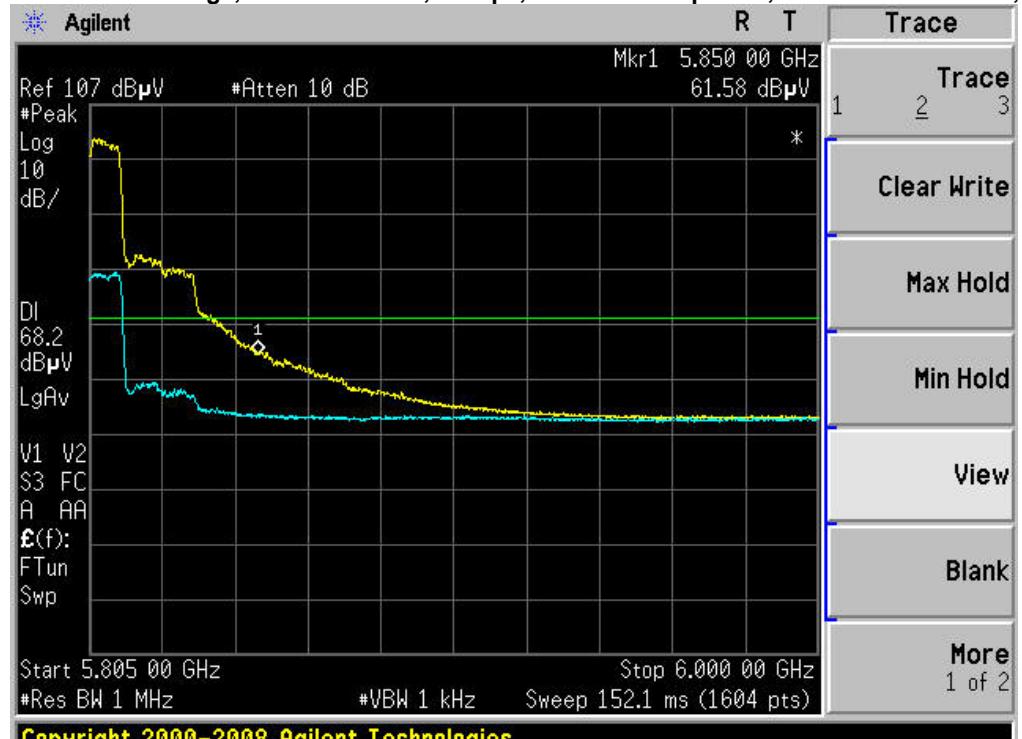
Radiated Bandedge, 5560/5680 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Average

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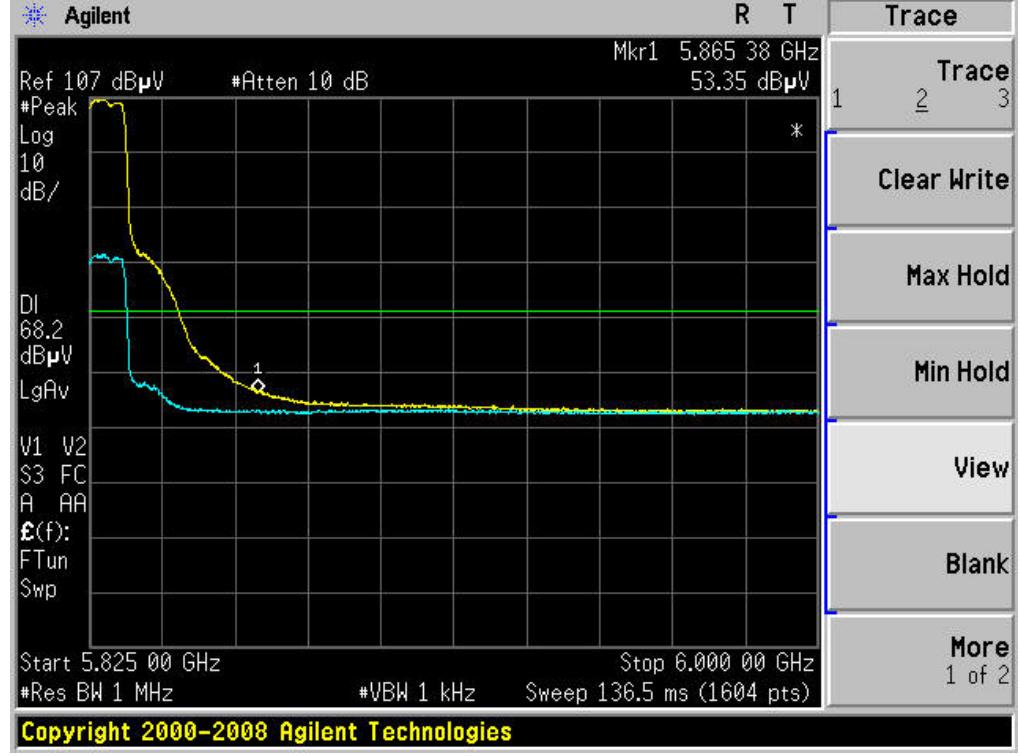
Radiated Bandedge, 5700 MHz, 54, Non HT-20, Dual Transmit Path, Average

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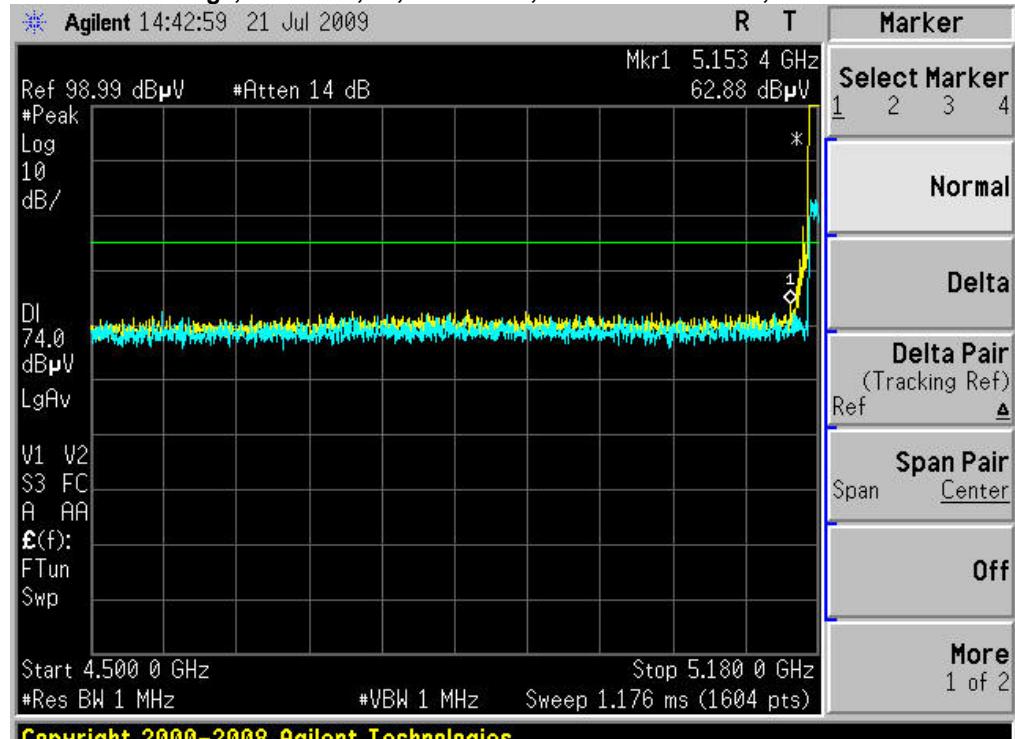
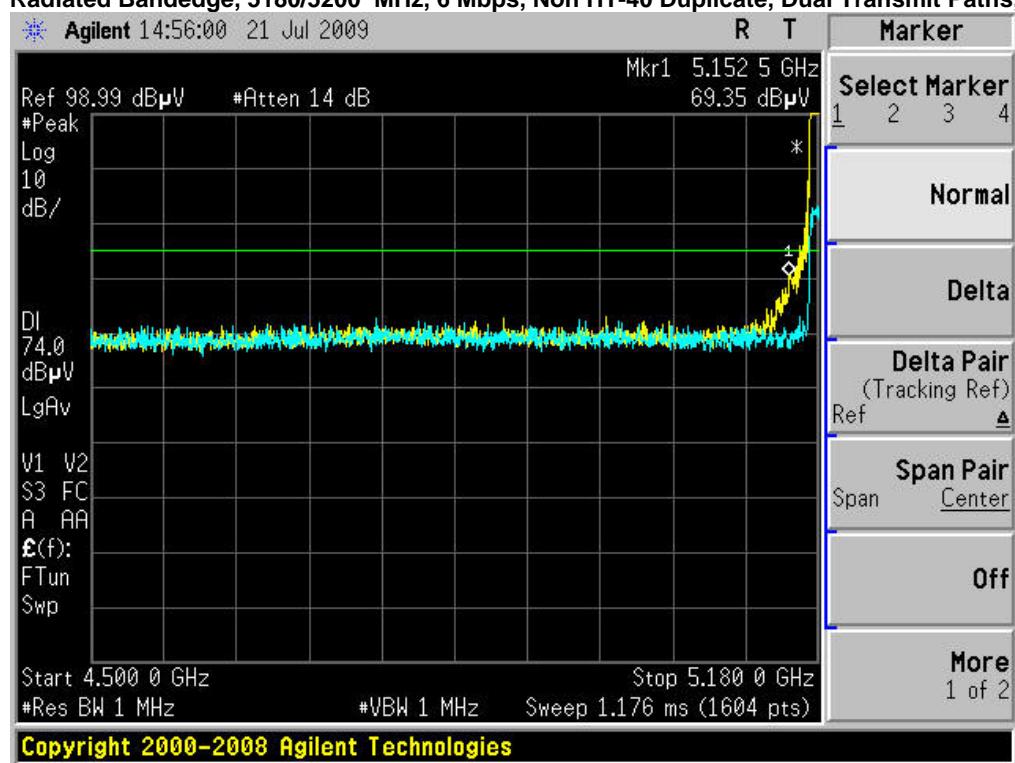
Radiated Bandedge, 5745 MHz, 54, Non HT-20, Dual Beamforming Transmit Paths, Average**Radiated Bandedge, 5745/5765 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Average**

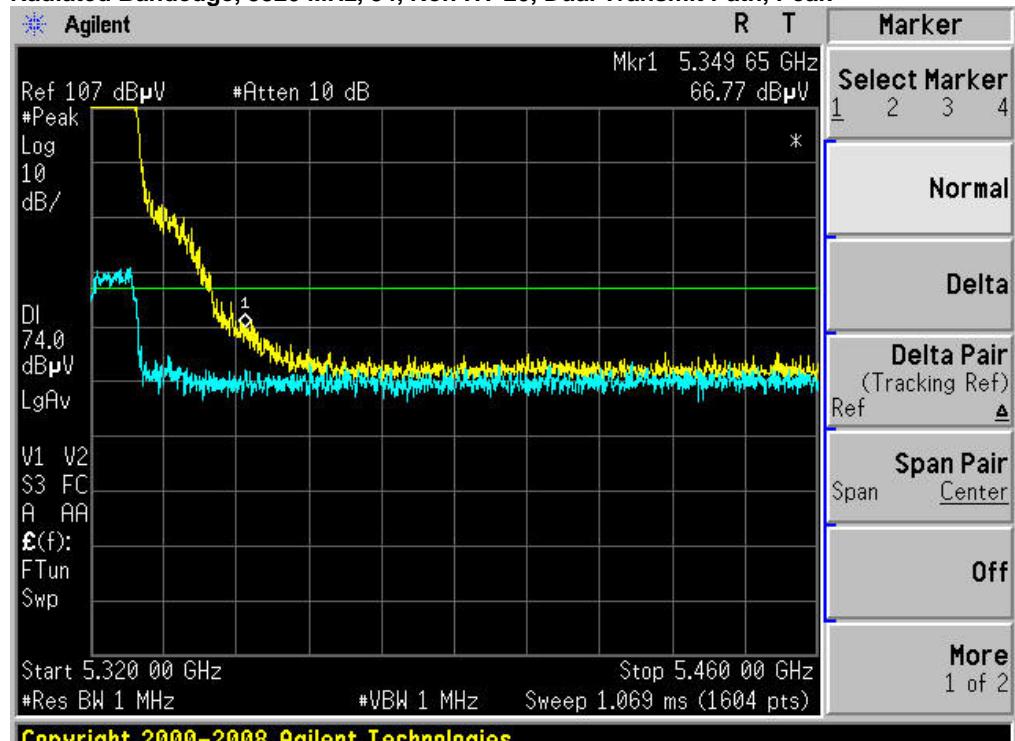
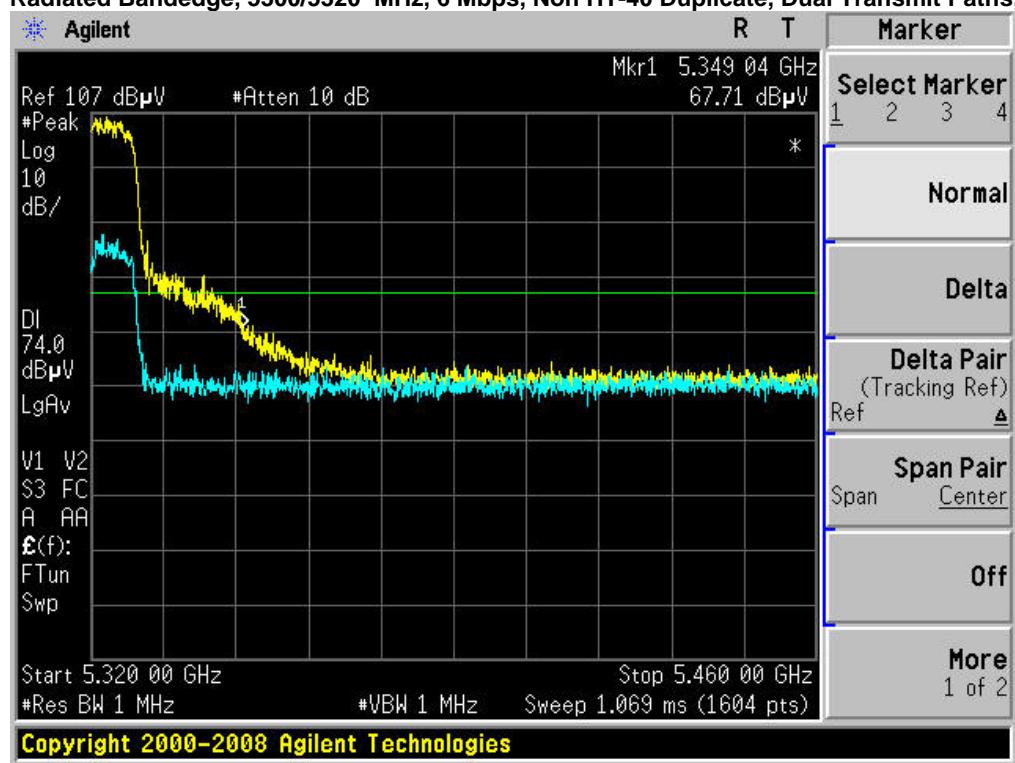
Radiated Bandedge, 5785/5805 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Average

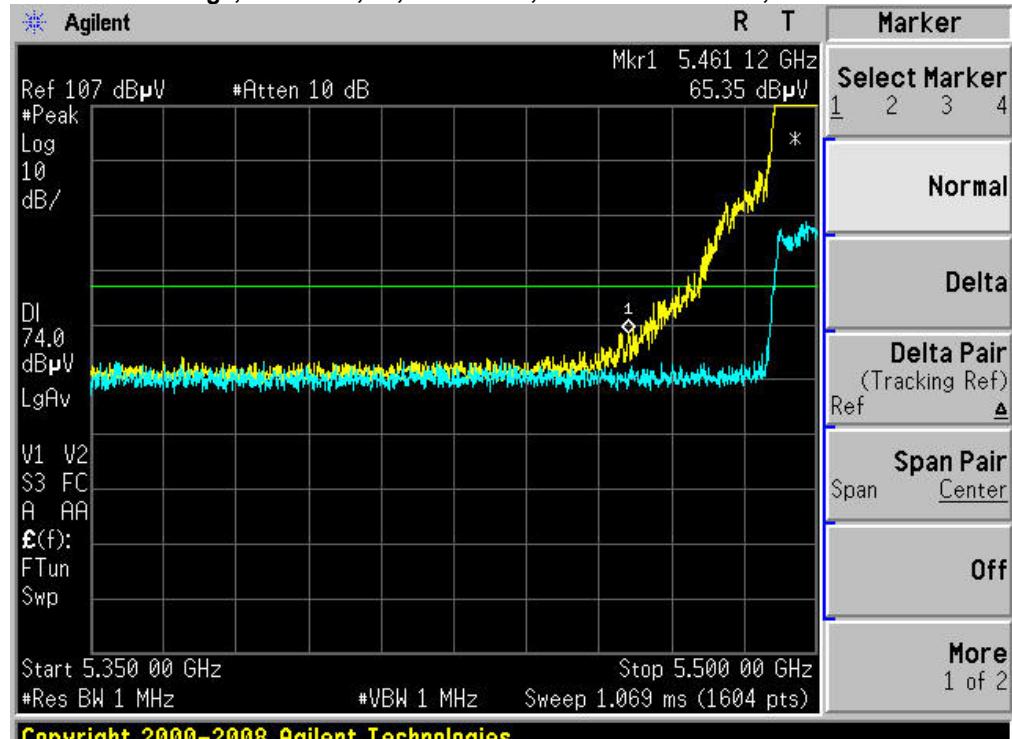
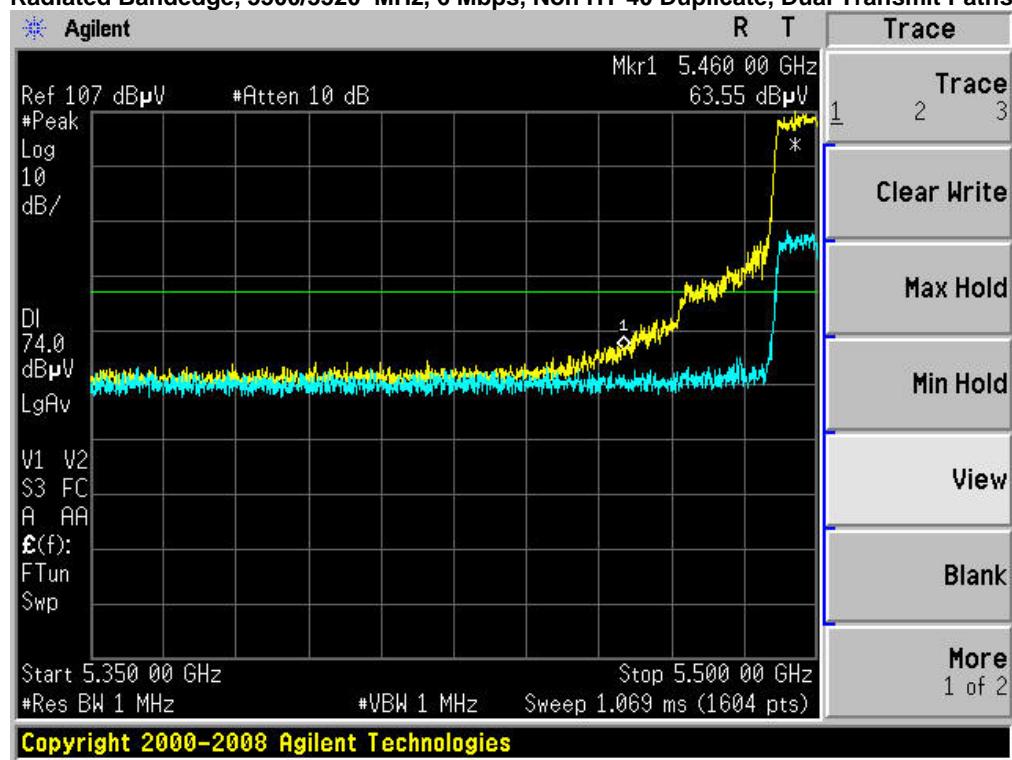
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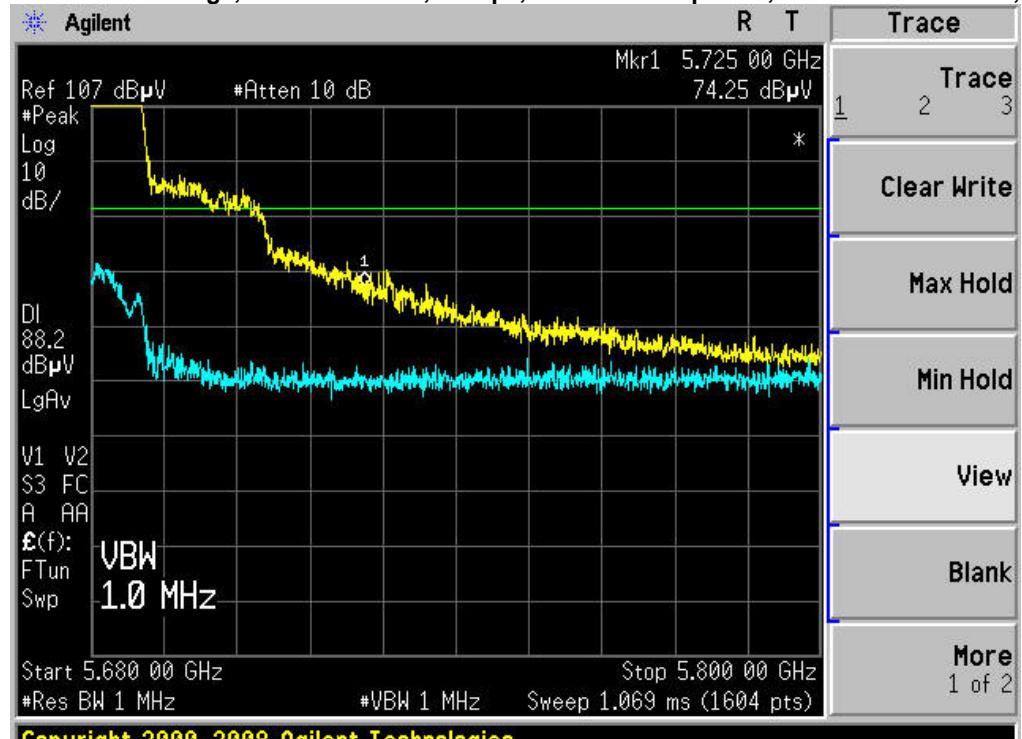
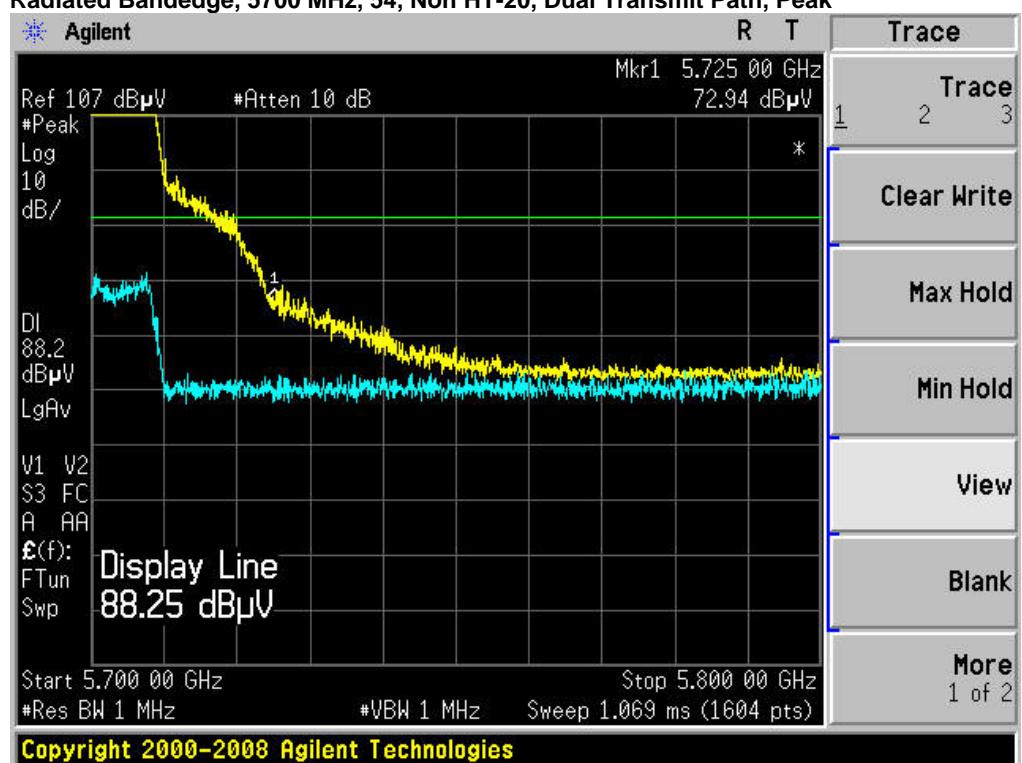
Radiated Bandedge, 5825 MHz, 54, Non HT-20, Dual Beamforming Transmit Path, Average

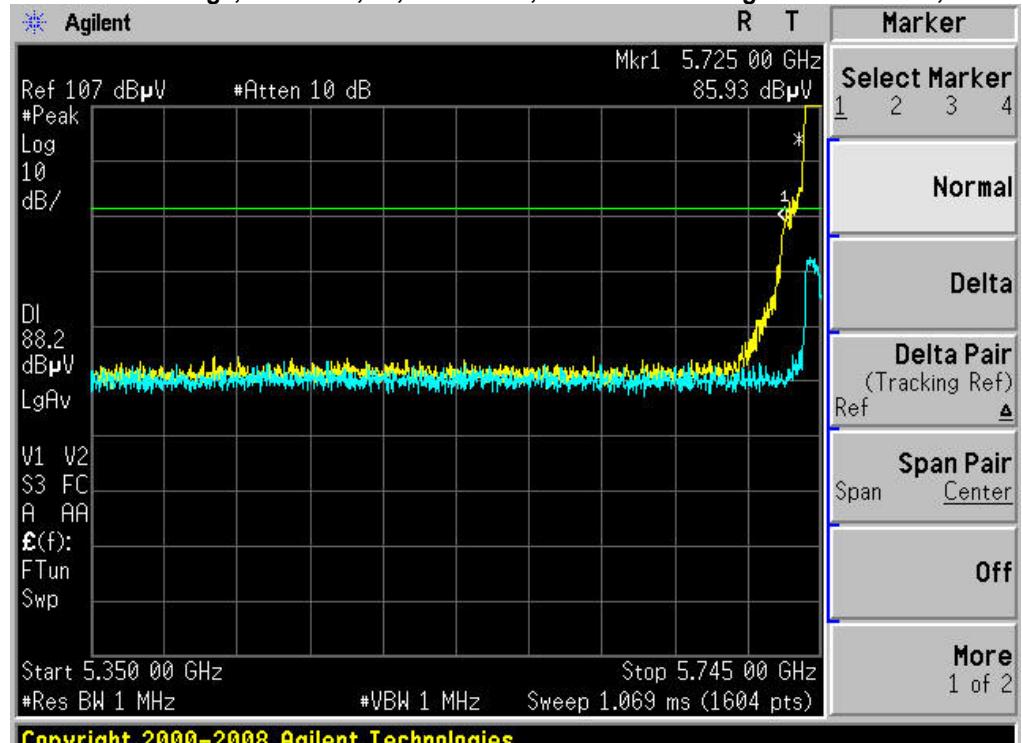
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Radiated Bandedge, 5180 MHz, 54, Non HT-20, Dual Transmit Path, Peak**Radiated Bandedge, 5180/5200 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Peak**

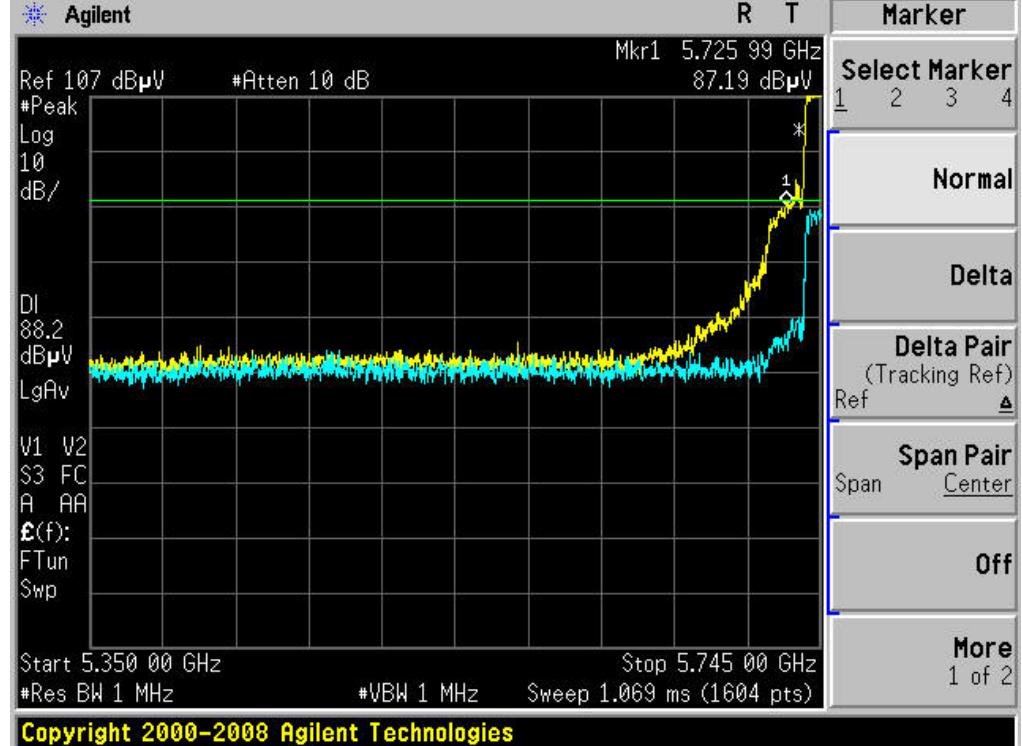
Radiated Bandedge, 5320 MHz, 54, Non HT-20, Dual Transmit Path, Peak**Radiated Bandedge, 5300/5320 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Peak**

Radiated Bandedge, 5500 MHz, 54, Non HT-20, Dual Transmit Path, Peak**Radiated Bandedge, 5500/5520 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Peak**

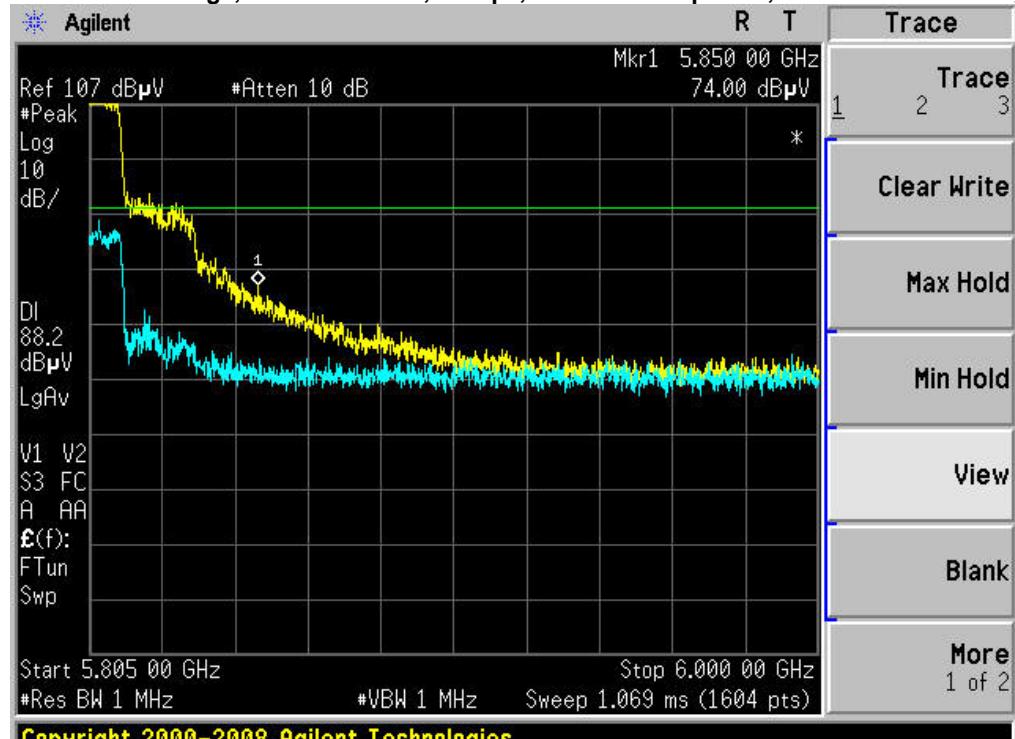
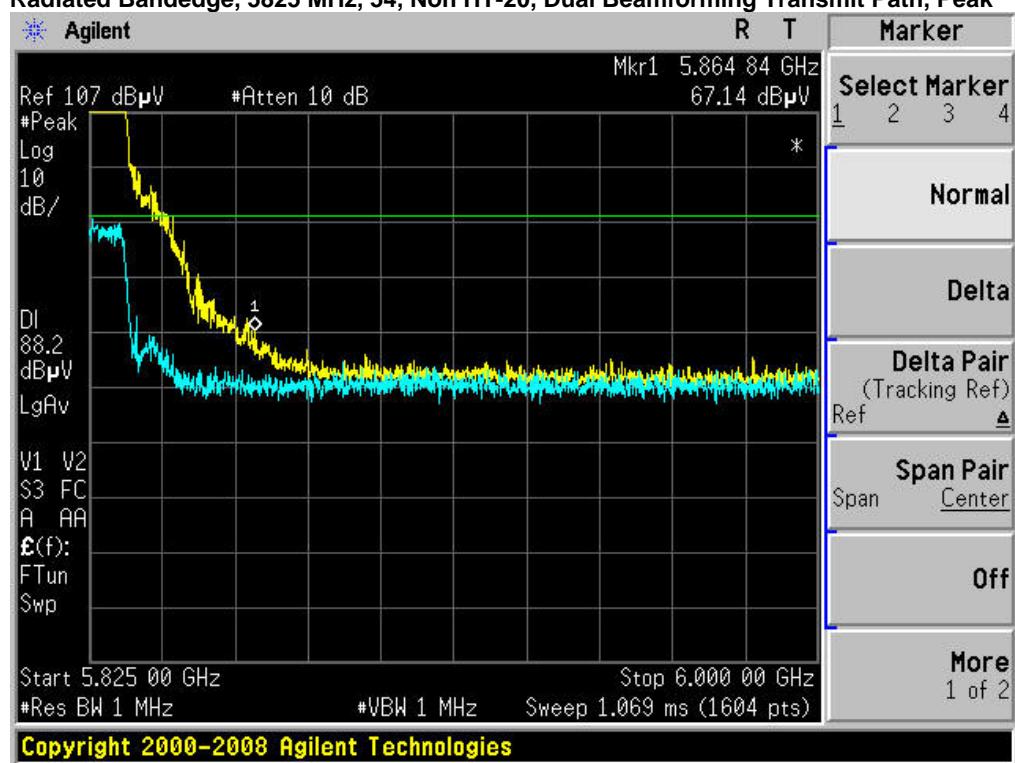
Radiated Bandedge, 5560/5680 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Peak**Radiated Bandedge, 5700 MHz, 54, Non HT-20, Dual Transmit Path, Peak**

Radiated Bandedge, 5745 MHz, 54, Non HT-20, Dual Beamforming Transmit Paths, Peak

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Radiated Bandedge, 5745/5765 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Peak

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Radiated Bandedge, 5785/5805 MHz, 6 Mbps, Non HT-40 Duplicate, Dual Transmit Paths, Peak**Radiated Bandedge, 5825 MHz, 54, Non HT-20, Dual Beamforming Transmit Path, Peak**



Radiated Spurs / Harmonics

The Radiated Spurious Emissions and Harmonics data included in the original filing continue to represent the worst case values for all supported modes and antennas.


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

Equip #	Manufacturer	Model	Description	Last Cal	Next Due
CIS040603	Agilent	E4440A	Precision Spectrum Analyzer	19-Aug-08	19-Aug-09
CIS020975	Micro-Coax	UFB311A-0-1344-520520	RF Coaxial Cable, to 18GHz, 134.4 in	6-Mar-09	6-Mar-10
CIS030559	Micro-Coax	UFB311A-1-0950-504504	RF Coaxial Cable, to 18GHz, 95 in	6-Mar-09	6-Mar-10
CIS036716	Cisco	RF Coaxial Cable-SMA	Radio Test Cable, SMA-SMA	11-Dec-08	11-Dec-09
CIS002119	EMC Test Systems	3115	Double Ridged Guide Horn Antenna	10-Jun-09	10-Jun-10
CIS035038	Micro-Tronics	BRC50703-02	Notch Filter, SB:5.150-5.350GHz, to 11GHz	13-Jul-09	13-Jul-10
CIS035605	Micro-Tronics	BRC50704-02	Notch Filter, SB:5.470-5.725GHz, to 12GHz	15-Jul-09	15-Jul-10
CIS031700	Micro-Tronics	BRC50705	Notch Filter, SB:5.725-5.875GHz, to 12 GHz	8-Jun-09	8-Jun-10
CIS034972	Midwest Microwave	ATT-0640-20-29M-02	Attenuator, 20dB, DC-40GHz	13-May-09	13-May-10
CIS005691	Miteq	NSP1800-25-S1	Broadband Preamplifier (1-18GHz)	9-Oct-08	9-Oct-09