

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point

To: FCC Part 15.247: 2006 (Subpart C)

Test Report Serial No:
RFI/RPTE1/RP48954JD16A

This Test Report Is Issued Under The Authority
Of Michael Derby, Wireless Group Leader Radio Performance:

A handwritten signature in black ink, appearing to read 'Michael Derby'.

Tested By: Jamie Huckerby

A handwritten signature in black ink, appearing to read 'J Huckerby'.

Checked By: Tony Henriques

A handwritten signature in black ink, appearing to read 'Tony Henriques'.

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Issue Date: 04 April 2007

Test Dates: 23 March 2007 to 26 March 2007

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1. Client Information

Company Name:	Zinwave Ltd
Address:	Harston Mill Harston Cambridge CB2 5GG
Contact Name:	Mr A Bell

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2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification of Equipment Under Test (EUT)

Description:	Hub Unit (HU)
Brand Name:	Zinwave
Model Name or Number:	2700
Serial Number:	0005256380
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	165
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	0702007
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	06120001
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

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Identification of Equipment Under Test (EUT) (Continued)

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	07020005
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	07020004
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	07020001
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	07020003
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

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Identification of Equipment Under Test (EUT) (Continued)

Description:	Antenna Unit (AU)
Brand Name:	Zinwave
Model Name or Number:	2765
Serial Number:	07020006
FCC ID Number:	UPO2765
Country of Manufacture:	England
Date of Receipt:	23 March 2007

Description:	Access Point
Brand Name:	Cisco
Model Name or Number:	Aironet 1200 Series
Serial Number:	FTX1037R0AJ
Country of Manufacture:	USA
Date of Receipt:	23 March 2007

Description:	Access Point
Brand Name:	Cisco
Model Name or Number:	Aironet 1200 Series
Serial Number:	FTX1037E0DD
Country of Manufacture:	USA
Date of Receipt:	23 March 2007

Description:	Access Point
Brand Name:	Cisco
Model Name or Number:	Aironet 1200 Series
Serial Number:	FTX1037E0DF
Country of Manufacture:	USA
Date of Receipt:	23 March 2007

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2.2. Description of EUT

The equipment under test is an 802.11g Access Point and a Distributed Antenna System (DAS). The DAS can handle a multitude of technologies, in this instance the technology is an 802.11g signal. The focus of the testing was for the Access Point and DAS to work solely over the frequency range of 2.4 GHz to 2.4835 GHz which covers the 802.11g band.

2.3. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

2.4. Additional Information Related to Testing

Power Supply Requirement:	Nominal 110 V, 60 Hz AC Mains Supply		
Intended Operating Environment:	Residential, Commercial, Light & heavy industry		
Equipment Category:	Wireless LAN Access Point with Distributed Antenna System (DAS)		
Type of Unit:	Base Station (Fixed use)		
Transmit Frequency Range:	2412.0 MHz to 2462.0 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1	2412.0
	Middle	7	2442.0
	Top	11	2462.0
Maximum Peak Power Output (EIRP)	28.2 dBm (measured)		
Average Power Output (Conducted)	12.0 dBm (measured)		
Antenna Gain	8.0 dBi		

2.5. Port Identification

Port	Description
1	4 x Input Ports (HU)
2	4 x Output Ports (HU)
3	Ethernet Port (HU)
4	Serial Port (HU)
5	AC Mains (HU)
6	8 x Fibre Optic I/O Ports (HU)
7	8 x Output Ports (AU)
8	8 x Input Ports (AU)
9	POE Mains (AU)

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2.6. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Laptop
Brand Name:	Dell
Model Name or Number:	Inspiron 1300
Serial Number:	CN-0RJ272-70166-67M-06MU
Cable Length and Type:	CAT 5 2m
Connected to Port:	Ethernet Port

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3. Test Specification, Methods & Procedures

Reference:	FCC Part 15.247: 2006 Subpart C
Title:	Code of Federal Regulations, Part 15.247 (47CFR15) (Intentional Radiators operating within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz)

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003

Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.2. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

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4. Deviations from the Test Specification

No deviations from the test specification.

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5. Operation of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated.

Operating at maximum output power with all gain settings set to maximum.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

The WLAN 802.11 b/g device is capable of operating in the following modulation schemes (OFDM): BPSK; QPSK; 16 QAM and 64 QAM. For the purposes of testing, only the highest modulation scheme was tested for worse case operation.

The system was set to run in the following modes:

- 1- Running 1x2 configuration with 1x802.11g signal – For all test cases
- 2- Running 4x8 configuration with 3x802.11g signals – For Radiated and Conducted Emissions (Fully loaded) testing only

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6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Compliance Status
Transmitter AC Conducted Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2005 Section 15.207	AC Mains	Complied
Transmitter Minimum 6 dB Bandwidth	C.F.R. 47 FCC Part 15: 2005 Section 15.247(a)(2)	Antenna Terminals	Complied
Transmitter 20 dB Bandwidth*	C.F.R. 47 FCC Part 2: 2005 Section 2.1049	Antenna Terminals	Complied
Transmitter Peak Power Spectral Density	C.F.R. 47 FCC Part 15: 2005 Section 15.247(e)	Antenna Terminals	Complied
Transmitter Maximum Peak Output Power	C.F.R. 47 FCC Part 15: 2005 Section 15.247(b)(3)	Antenna Terminals	Complied
Transmitter Conducted Emissions	C.F.R. 47 FCC Part 15: 2005 Section 15.247 (d)	Antenna Terminals	Complied
Transmitter Radiated Emissions	C.F.R. 47 FCC Part 15: 2005 Sections 15.247(d) & 15.209(a)	Antenna	Complied
Transmitter Band Edge Conducted Emissions	C.F.R. 47 FCC Part 15: 2005 Section 15.247(d)	Antenna Terminals	Complied
Transmitter Band Edge Radiated Emissions	C.F.R. 47 FCC Part 15: 2005 Sections 15.247(d) & 15.209(a)	Antenna	Complied
Intermodulation	C.F.R 47 FCC Part 22: 2004 Section 15.247 / 2.1053	Antenna Terminals	Complied
Out-of-Band Rejection	*For reference purposes*	Antenna Terminals	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ.

FCC Site Registration Number: 90895

IC Site Registration Number: 3485

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7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

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7.2. Test Results

7.2.1. Transmitter AC Conducted Spurious Emissions: Section 15.207 - Hub Unit (HU)

The EUT was configured as for ac conducted emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum emission levels present on the ac mains line of the EUT.

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

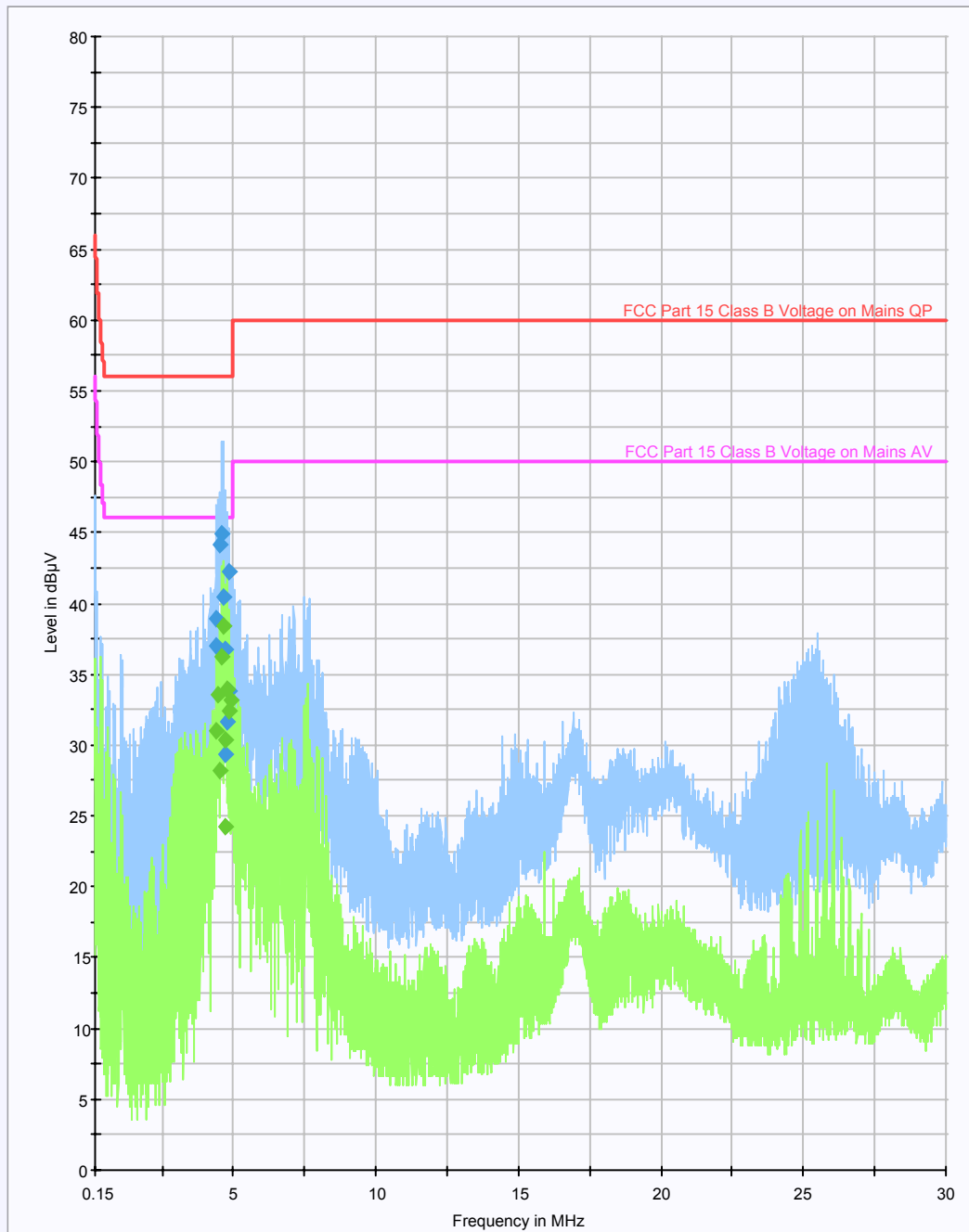
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
4.366000	Live	37.0	56.0	19.0	Complied
4.426000	Live	38.9	56.0	17.1	Complied
4.518000	Live	44.1	56.0	11.9	Complied
4.570000	Live	44.9	56.0	11.1	Complied
4.626000	Live	40.4	56.0	15.6	Complied
4.690000	Neutral	36.8	56.0	19.2	Complied
4.742000	Live	29.3	56.0	26.7	Complied
4.794000	Live	31.6	56.0	24.4	Complied
4.822000	Live	42.2	56.0	13.8	Complied
4.846000	Live	33.8	56.0	22.2	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
4.422000	Live	31.0	46.0	15.0	Complied
4.486000	Live	33.5	46.0	12.5	Complied
4.538000	Neutral	28.2	46.0	17.8	Complied
4.570000	Neutral	36.3	46.0	9.7	Complied
4.622000	Neutral	38.5	46.0	7.5	Complied
4.686000	Live	30.3	46.0	15.7	Complied
4.738000	Neutral	24.2	46.0	21.8	Complied
4.770000	Neutral	33.9	46.0	12.1	Complied
4.826000	Live	32.4	46.0	13.6	Complied
4.886000	Live	33.2	46.0	12.8	Complied

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Transmitter AC Conducted Spurious Emissions: Section 15.207 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

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7.2.2. Transmitter AC Conducted Spurious Emissions: Section 15.207 - Antenna Unit (AU)

The EUT was configured as for ac conducted emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum emission levels present on the ac mains line of the EUT.

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

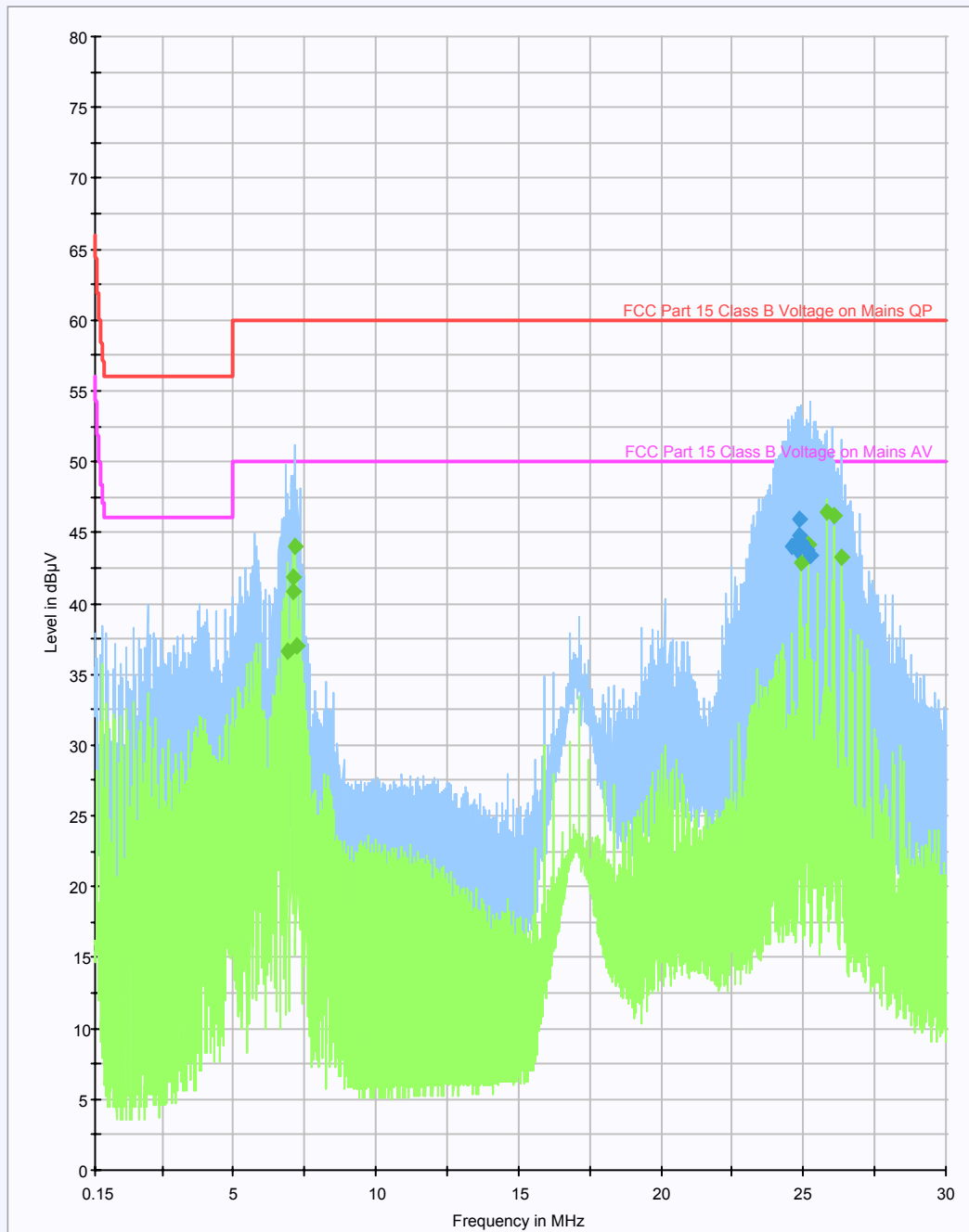
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
6.910000	Live	36.6	50.0	13.4	Complied
7.082000	Live	41.8	50.0	8.2	Complied
7.130000	Neutral	40.9	50.0	9.1	Complied
7.150000	Neutral	44.0	50.0	6.0	Complied
7.254000	Neutral	37.0	50.0	13.0	Complied
24.886000	Live	42.8	50.0	7.2	Complied
25.190000	Live	44.2	50.0	5.8	Complied
25.798000	Live	46.5	50.0	3.5	Complied
26.098000	Live	46.1	50.0	3.9	Complied
26.326000	Live	43.2	50.0	6.8	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
24.582000	Live	44.0	60.0	16.0	Complied
24.718000	Live	44.1	60.0	15.9	Complied
24.742000	Neutral	44.1	60.0	15.9	Complied
24.794000	Neutral	43.7	60.0	16.3	Complied
24.850000	Live	44.8	60.0	15.2	Complied
24.882000	Live	45.9	60.0	14.1	Complied
24.902000	Live	44.2	60.0	15.8	Complied
24.938000	Live	44.1	60.0	15.9	Complied
25.122000	Live	43.7	60.0	16.3	Complied
25.234000	Live	43.4	60.0	16.6	Complied

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Transmitter AC Conducted Spurious Emissions: Section 15.207 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

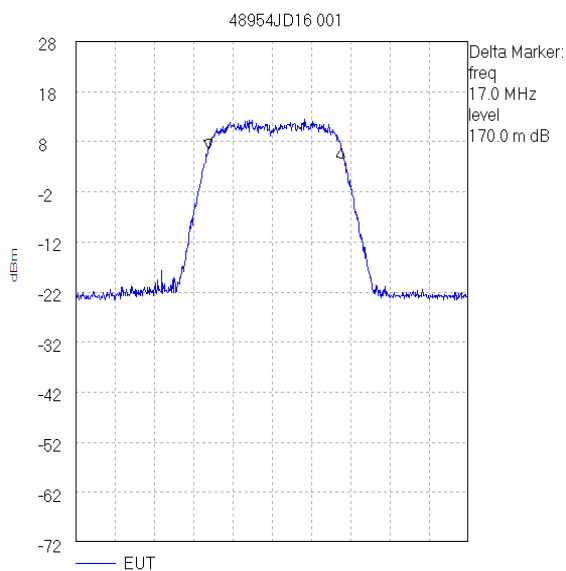
Test of: Zinwave Ltd
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7.2.3. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

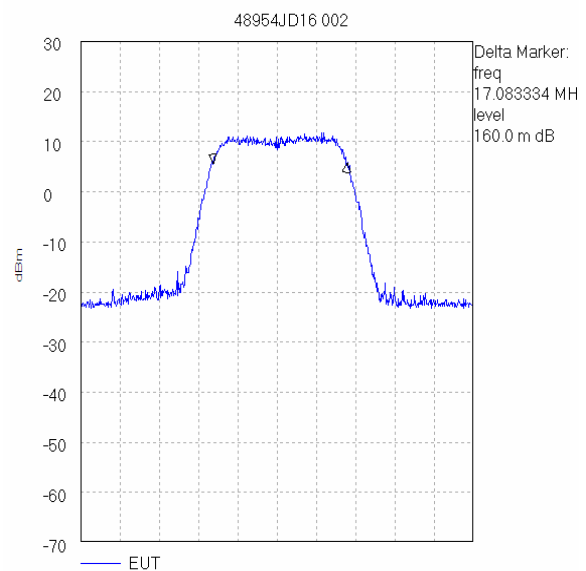
The EUT was configured for 6 dB bandwidth measurements as described in section 9 of this report. Tests were performed to identify the 6 dB bandwidth.

Results:

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.000	≥0.5	16.500	Complied
Middle	17.083	≥0.5	16.583	Complied
Top	16.917	≥0.5	16.417	Complied

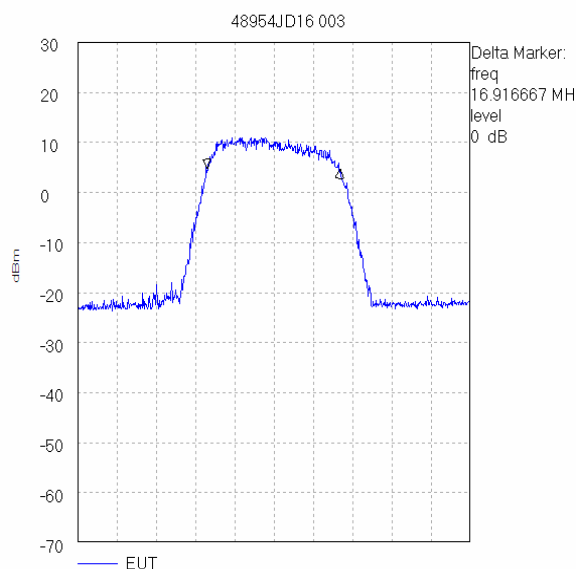


Centre 2.412 GHz; Span 50.0 MHz
Ref 28 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 30 dB; Swp 50.0 mS
Marker 2.403833 GHz, 6.5 dBm
Delta 2.420833 GHz, 6.67 dBm
Tested by jph 23/03/2007 13:55:29



Centre 2.442 GHz; Span 50.0 MHz
Ref 30 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 30 dB; Swp 50.0 mS
Marker 2.433833 GHz, 5.67 dBm
Delta 2.4509167 GHz, 5.83 dBm
Tested by jph 23/03/2007 13:58:33

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Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2) (Continued)

Centre 2.462 GHz; Span 50.0 MHz
Ref 30 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 30 dB; Swp 50.0 mS
Marker 2.4535 GHz, 4.67 dBm
Delta 2.4704167 GHz, 4.67 dBm
Tested by jph 23/03/2007 14:02:06

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7.2.4. Transmitter 20 dB Bandwidth: Section 2.1049

The EUT was configured for 20 dB bandwidth measurements as described in section 9 of this report.

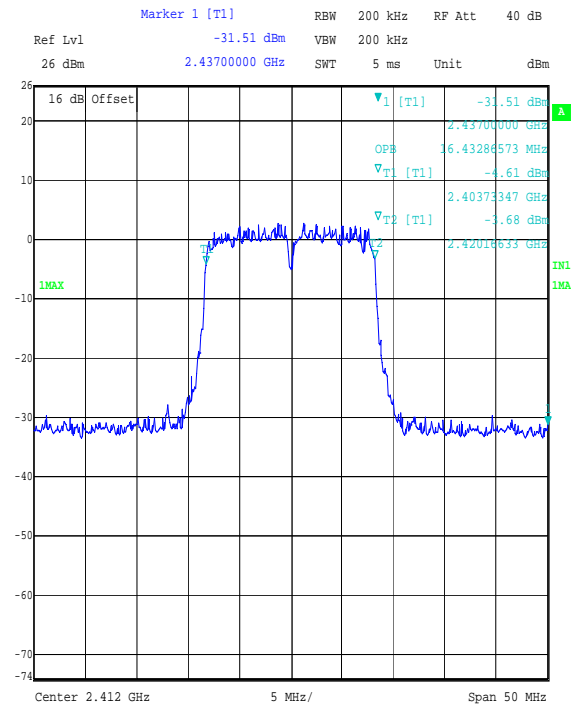
Tests were performed to identify the 20 dB bandwidth.

Results:

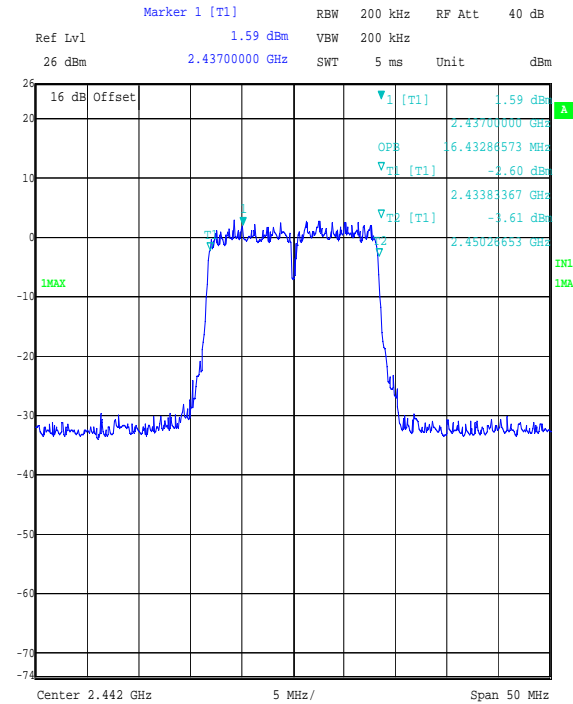
Channel	Frequency (MHz)	Transmitter 20 dB Bandwidth (kHz) (Output of AP, before DAS)	Transmitter 20 dB Bandwidth (kHz) (After DAS)	Result
Bottom	2412	16433	16433	Complied
Middle	2442	16433	16433	Complied
Top	2462	16433	16433	Complied

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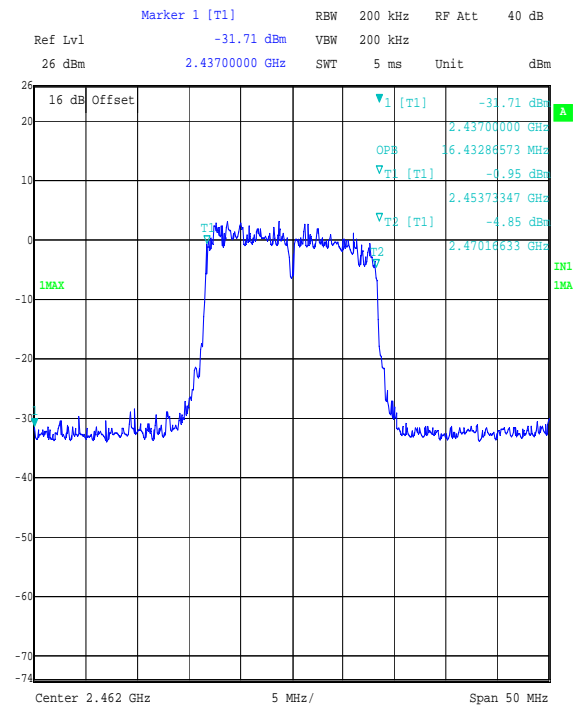
Transmitter 20 dB Bandwidth: Section 2.1049 (Continued)



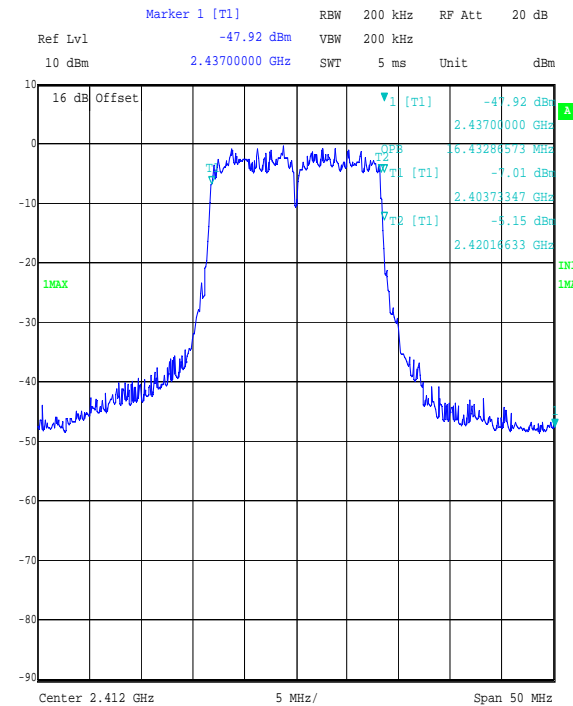
Date: 23.MAR.2007 16:13:48



Date: 23.MAR.2007 16:14:29



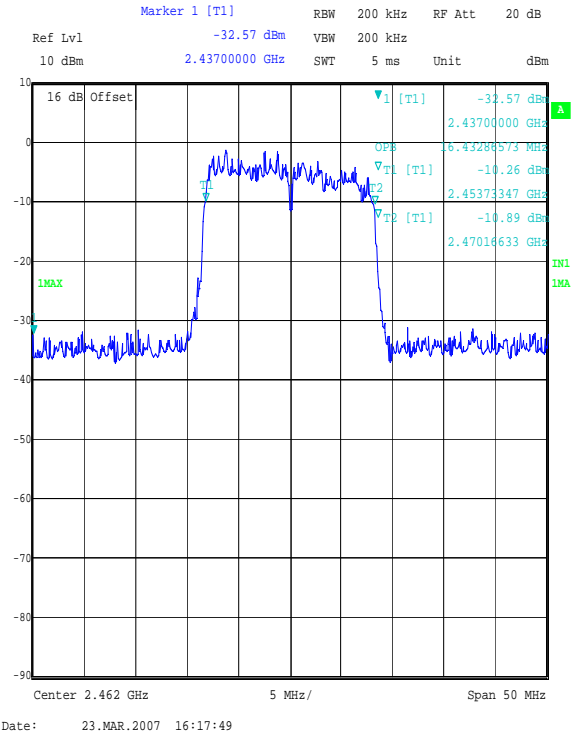
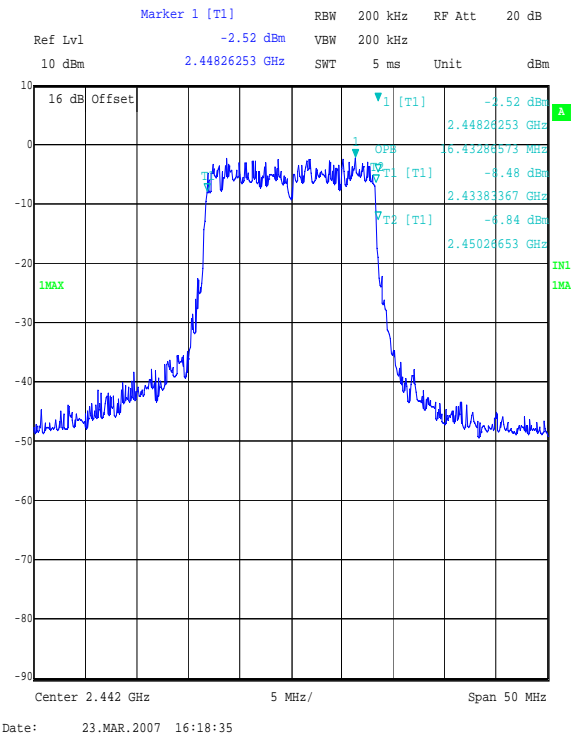
Date: 23.MAR.2007 16:15:41



Date: 23.MAR.2007 16:19:29

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Transmitter 20 dB Bandwidth: Section 2.1049 (Continued)



Test of: Zinwave Ltd
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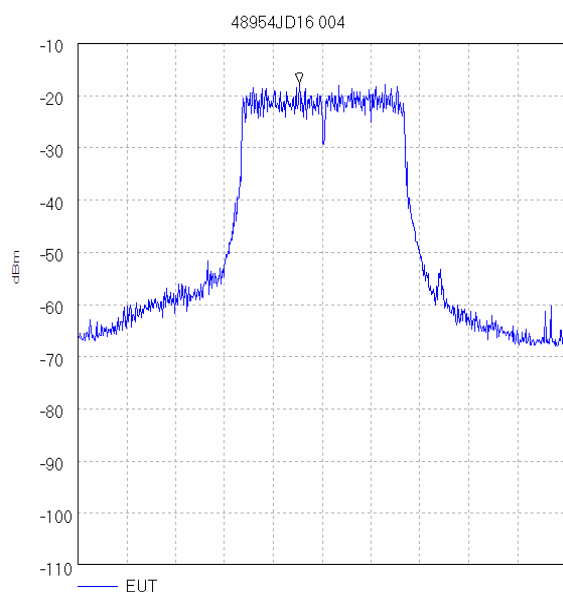
7.2.5. Transmitter Peak Power Spectral Density: Section 15.247(e)

The EUT was configured for transmitter peak power spectral density measurements as described in section 9 of this report.

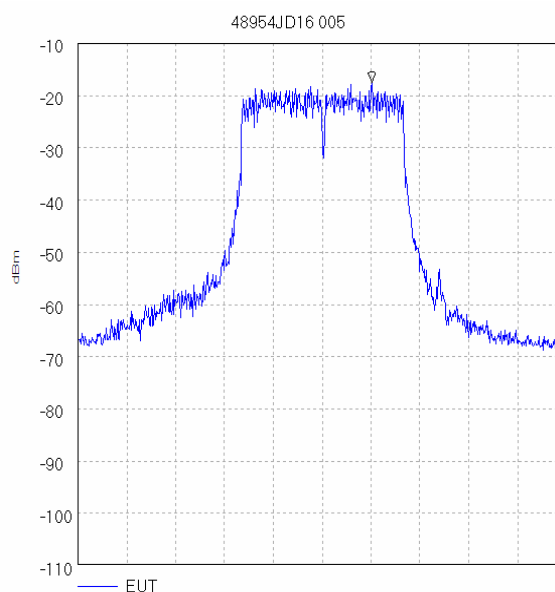
Tests were performed to identify the transmitter peak power spectral density.

Results:

Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-17.5	8.0	25.5	Complied
Middle	-17.7	8.0	25.7	Complied
Top	-17.2	8.0	25.2	Complied



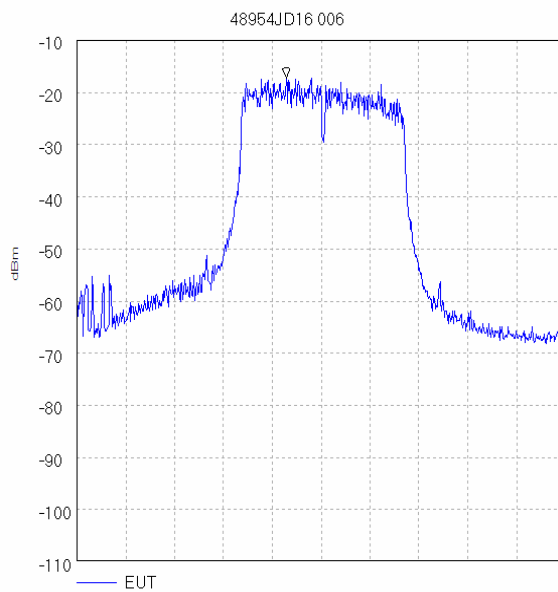
Centre 2.442 GHz; Span 50.0 MHz
Ref -10 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 3.0 kHz; VBW 3.0 kHz; Att 10 dB; Swp 14.0 S
Peak 2.4396667 GHz, -17.67 dBm
Tested by jph 23/03/2007 14:12:30



Centre 2.412 GHz; Span 50.0 MHz
Ref -10 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 3.0 kHz; VBW 3.0 kHz; Att 10 dB; Swp 14.0 S
Peak 2.4170833 GHz, -17.5 dBm
Tested by jph 23/03/2007 14:38:42

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Transmitter Peak Power Spectral Density: Section 15.247(e) (Continued)



Centre 2.462 GHz; Span 50.0 MHz
Ref -10 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 3.0 kHz; VBW 3.0 kHz; Att 10 dB; Swp 14.0 S
Peak 2.4584167 GHz, -17.17 dBm
Tested by jph 23/03/2007 14:54:08

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7.2.6. Transmitter Maximum Peak Output Power: Section 15.247(b)(3)

The EUT was configured for transmitter peak output power measurements as described in section 9 of this report.

Tests were performed to identify the transmitter maximum peak output power (ERP) of the EUT.

Results:

AC Powered Devices

Channel	Input Voltage (AC)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	93.5	19.0	8.0	27.0	30.0	3.0	Complied
Bottom	110.0	19.6	8.0	27.6	30.0	2.4	Complied
Bottom	126.5	19.4	8.0	27.4	30.0	2.6	Complied
Middle	93.5	20.2	8.0	28.2	30.0	1.8	Complied
Middle	110.0	19.1	8.0	27.1	30.0	2.9	Complied
Middle	126.5	19.6	8.0	27.6	30.0	2.4	Complied
Top	93.5	20.1	8.0	28.1	30.0	1.9	Complied
Top	110.0	19.8	8.0	27.8	30.0	2.2	Complied
Top	126.5	19.4	8.0	27.4	30.0	2.6	Complied

Note(s):

- As per the method stated in section 15.247(b)(3), the standard antenna gain of the EUT is 8 dBi which, added to the highest (worst case) measured conducted output power of 20.2 dBm (from the table above) gives a de facto EIRP of 28.2 dBm. This is in compliance with the requirements of section 15.247(b)(3) for de facto EIRP limitation i.e. 1 Watt (30 dBm).

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

7.2.7. Transmitter Conducted Emissions: Section 15.247(d)

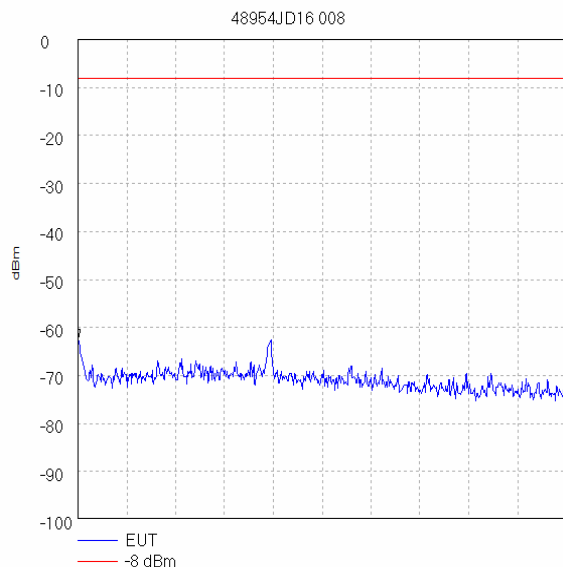
The EUT was configured for radiated emission testing as described in section 9 of this report.

Tests were performed to identify the maximum transmitter radiated emission levels.

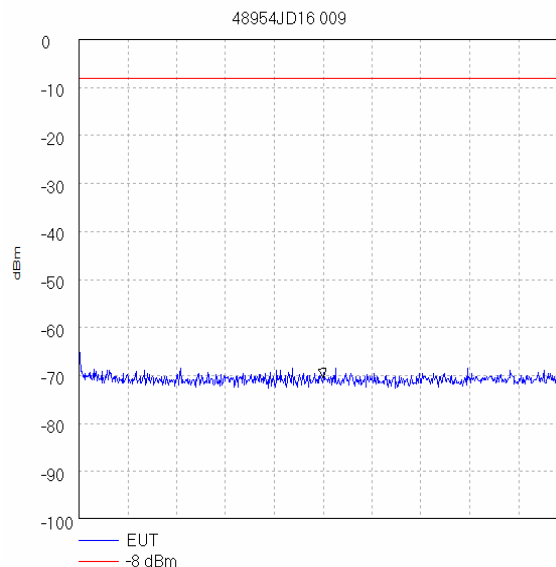
Results:**Fully Loaded**

Frequency (MHz)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
2313.300	-35.8	-47.8	-20.0	27.8	Complied
4826.700	-35.0	-47.0	-20.0	27.0	Complied

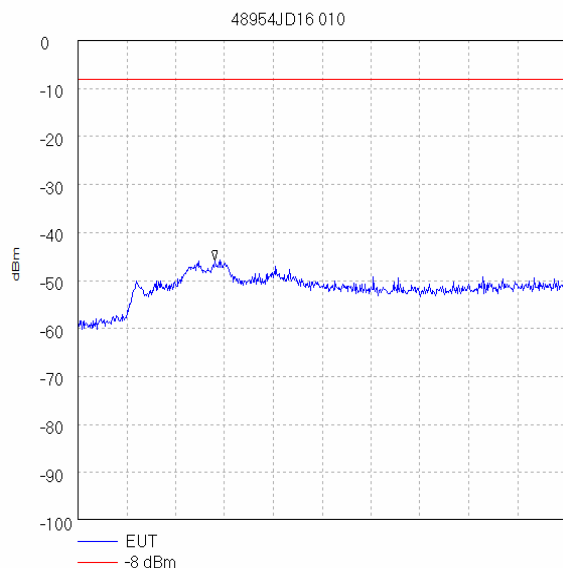
Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Conducted Emissions: Section 15.247(d) (Continued)

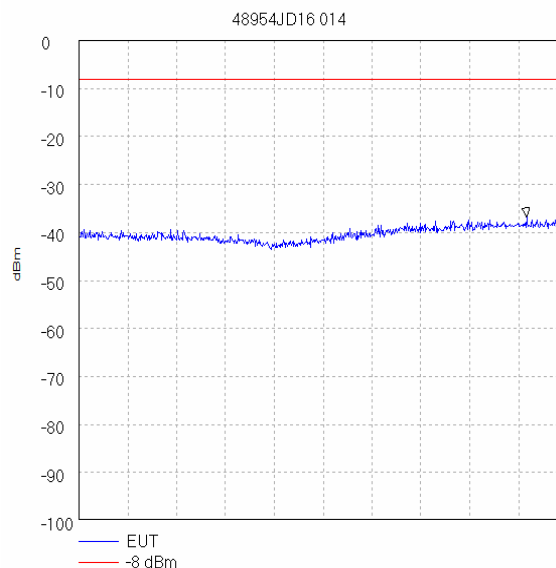
Start 9.0 kHz; Stop 150.0 kHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 kHz; VBW 1.0 kHz; Att 10 dB; Swp 360.0 mS
Peak 9.0 kHz, -62.33 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:23:29



Start 150.0 kHz; Stop 30.0 MHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 10.0 kHz; VBW 10.0 kHz; Att 10 dB; Swp 750.0 mS
Peak 15.075 MHz, -70.5 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:24:02



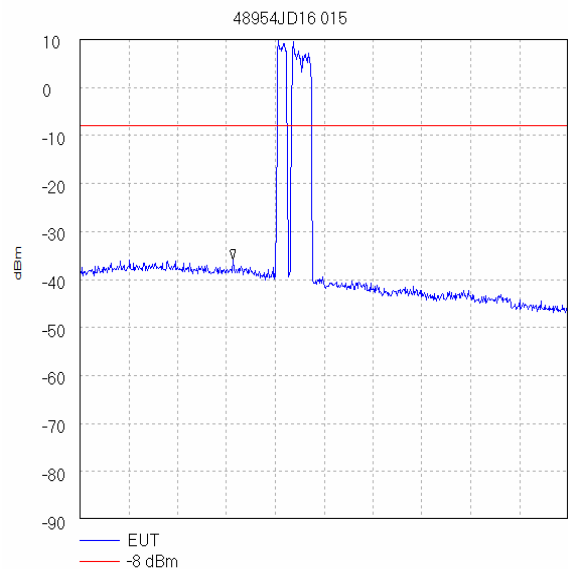
Start 30.0 MHz; Stop 1.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 250.0 mS
Peak 301.6 MHz, -45.83 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:24:31



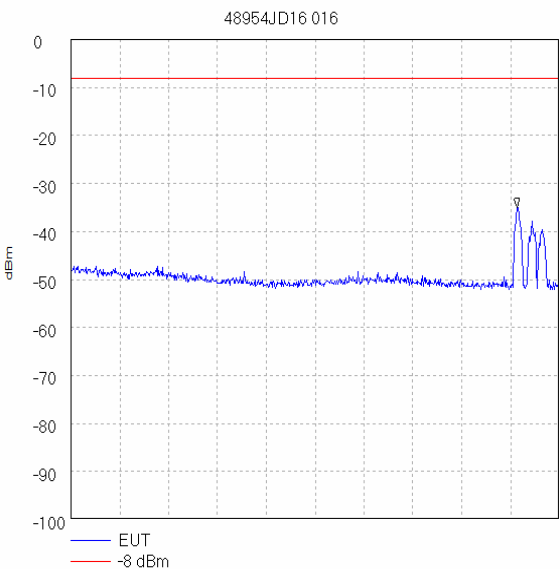
Start 1.0 GHz; Stop 2.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 1.916667 GHz, -36.83 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:27:47

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Conducted Emissions: Section 15.247(d) (Continued)



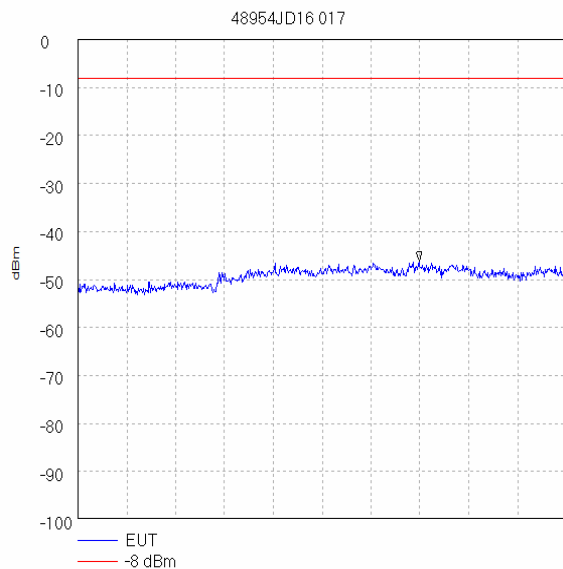
Start 2.0 GHz; Stop 3.0 GHz
Ref 10 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Marker 2.313333 GHz, -35.83 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:28:32



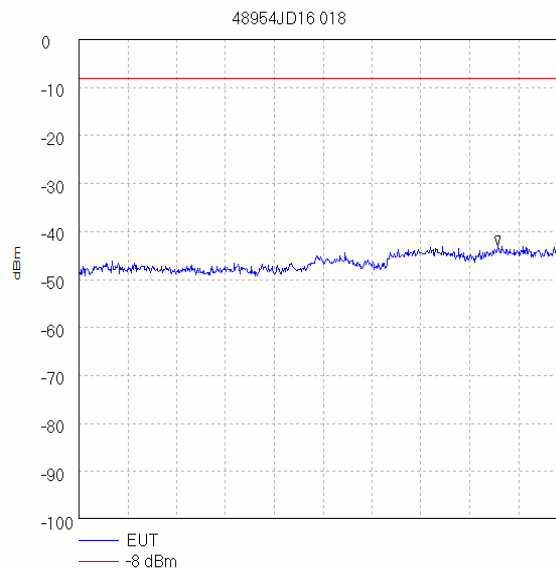
Start 3.0 GHz; Stop 5.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 4.826667 GHz, -35.0 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:29:32

Carriers exempt from measurements

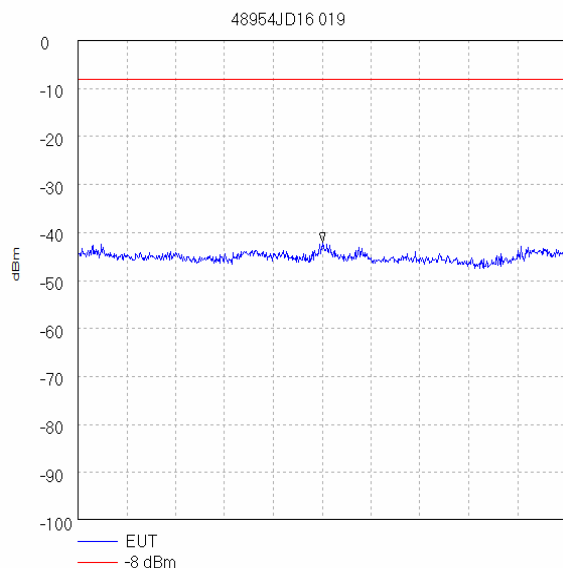
Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Conducted Emissions: Section 15.247(d) (Continued)

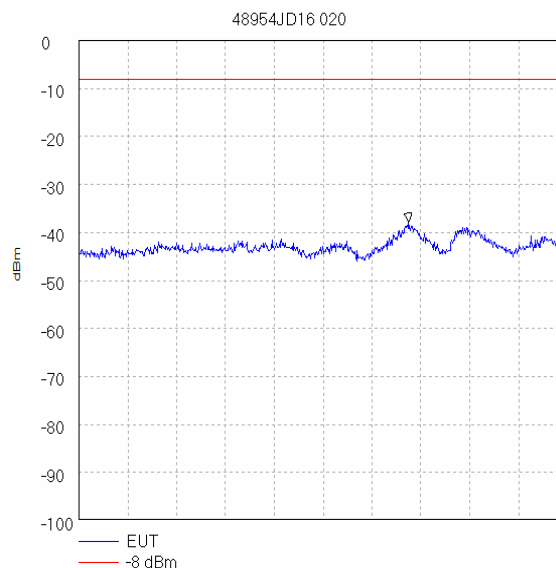
Start 5.0 GHz; Stop 10.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 100.0 mS
Peak 8.4916667 GHz, -46.17 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:29:57



Start 10.0 GHz; Stop 15.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 100.0 mS
Peak 14.2916667 GHz, -43.0 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:30:39



Start 15.0 GHz; Stop 20.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 100.0 mS
Peak 17.5083333 GHz, -42.0 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:31:10



Start 20.0 GHz; Stop 26.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 120.0 mS
Peak 24.05 GHz, -37.83 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:31:37

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

7.2.8. Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

The EUT was configured for radiated emission testing as described in section 9 of this report.

Tests were performed to identify the maximum transmitter radiated emission levels.

Results:**Electric Field Strength Measurements: 30 to 1000 MHz
(emissions occurring in the restricted bands)****Top Channel**

Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
74.980	Vertical	39.8	40.0	0.2	Complied
131.142	Vertical	26.8	40.0	13.2	Complied

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

7.2.9. Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

The EUT was configured for radiated emission testing as described in section 9 of this report.

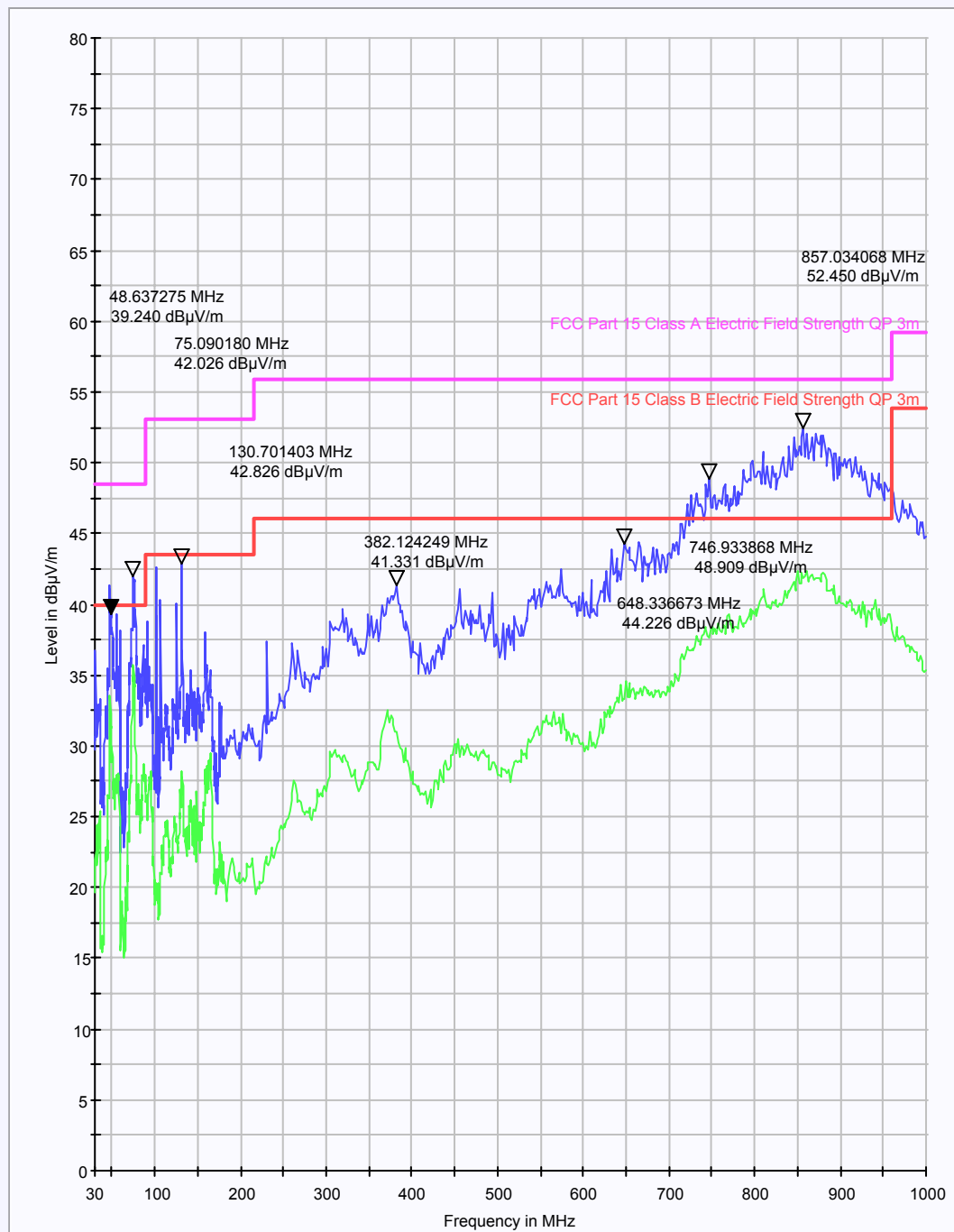
Tests were performed to identify the maximum transmitter radiated emission levels.

Results:**Electric Field Strength Measurements: 30 to 1000 MHz
(emissions outside the restricted bands)****Top Channel**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	-20 dBc Limit (dB μ V/m)	Margin (dB)	Result
48.407	Vertical	38.6	103.4	64.8	Complied
382.004	Vertical	34.3	103.4	69.1	Complied
650.541	Vertical	48.4	103.4	55.0	Complied
746.734	Vertical	45.5	103.4	57.9	Complied
857.034	Vertical	48.1	103.4	55.3	Complied

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

7.2.10. Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

The EUT was configured for radiated emission testing as described in section 9 of this report.

Tests were performed to identify the maximum transmitter radiated emission levels.

Results:**Electric Field Strength Measurements (Frequency Range: 1 to 26 GHz)
(emissions occurring in the restricted bands)****Highest Peak Level:**

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1.162	Vertical	64.75	-0.45	64.3	74.0	9.7	Complied
1.407	Vertical	59.47	1.13	60.6	74.0	13.4	Complied
2.329	Horizontal	64.05	1.95	66.0	74.0	8.0	Complied
2.673	Vertical	53.31	2.09	55.4	74.0	18.6	Complied
4.874	Vertical	50.30	4.80	55.1	74.0	18.9	Complied
12.139	Vertical	43.42	7.48	50.9	74.0	23.1	Complied
18.673	Vertical	47.10	-1.20	48.3	74.0	25.7	Complied

Highest Average Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1.162	Vertical	50.25	-0.45	49.8	54.0	4.2	Complied
1.407	Vertical	49.57	1.13	50.7	54.0	3.3	Complied
2.329	Horizontal	51.65	1.95	53.6	54.0	0.4	Complied
2.673	Vertical	45.71	2.09	47.8	54.0	6.2	Complied
4.874	Vertical	40.90	4.80	45.7	54.0	8.3	Complied
12.139	Vertical	38.02	7.48	45.5*	54.0	8.5	Complied
18.673	Vertical	49.50	-1.20	48.3*	54.0	5.7	Complied

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)**Highest Peak Level:**

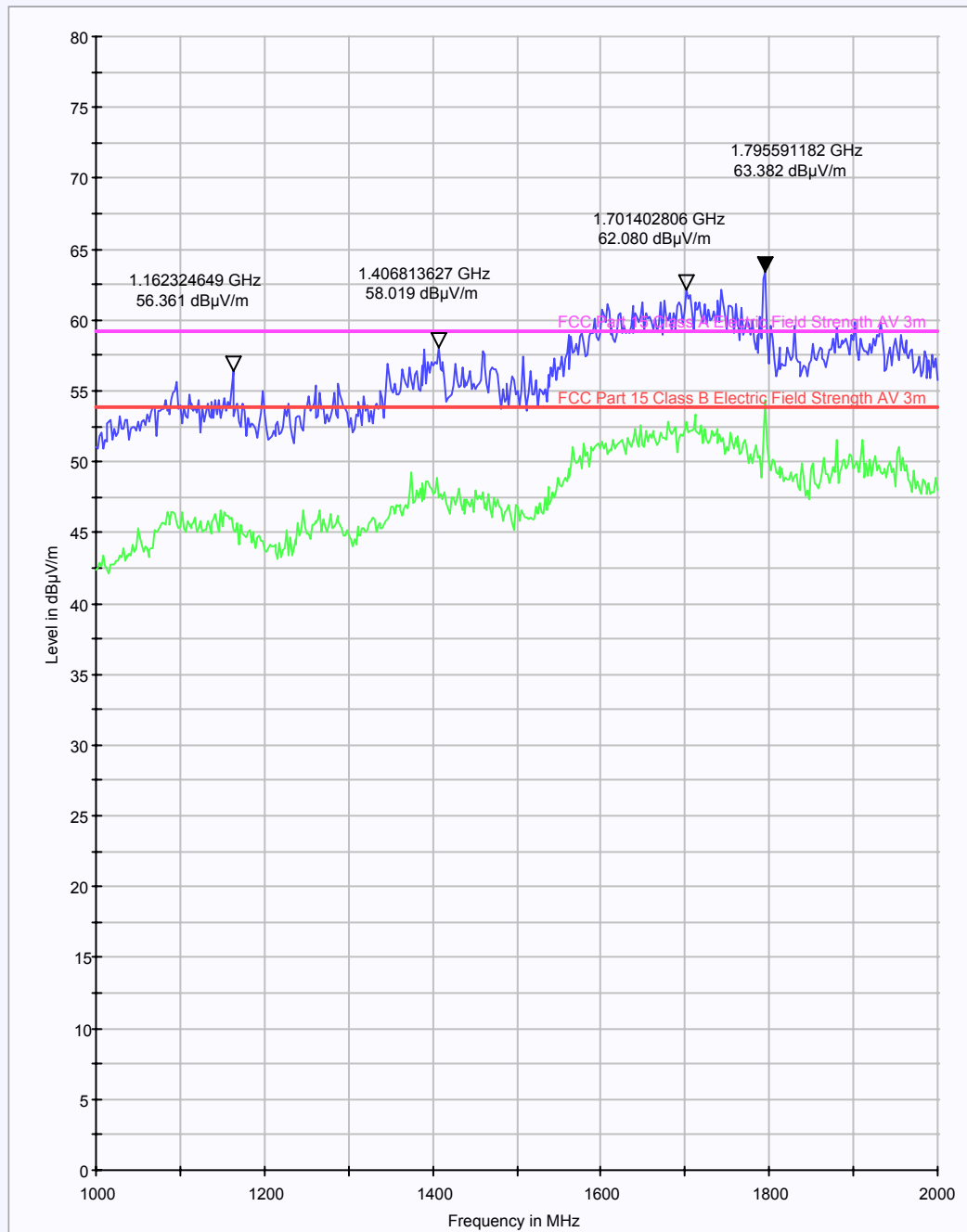
Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
1.701	Vertical	65.17	1.13	66.3	103.4	37.1	Complied
1.796	Vertical	67.87	1.13	69.0	103.4	34.4	Complied
2.561	Vertical	57.31	2.09	59.4	103.4	44.0	Complied
6.978	Vertical	35.10	4.80	39.9	103.4	63.5	Complied
16.578	Vertical	45.72	5.18	50.9	103.4	52.5	Complied

Note(s):

1. Results marked with a * were only measured with a peak detector if the final value was below the average limit.

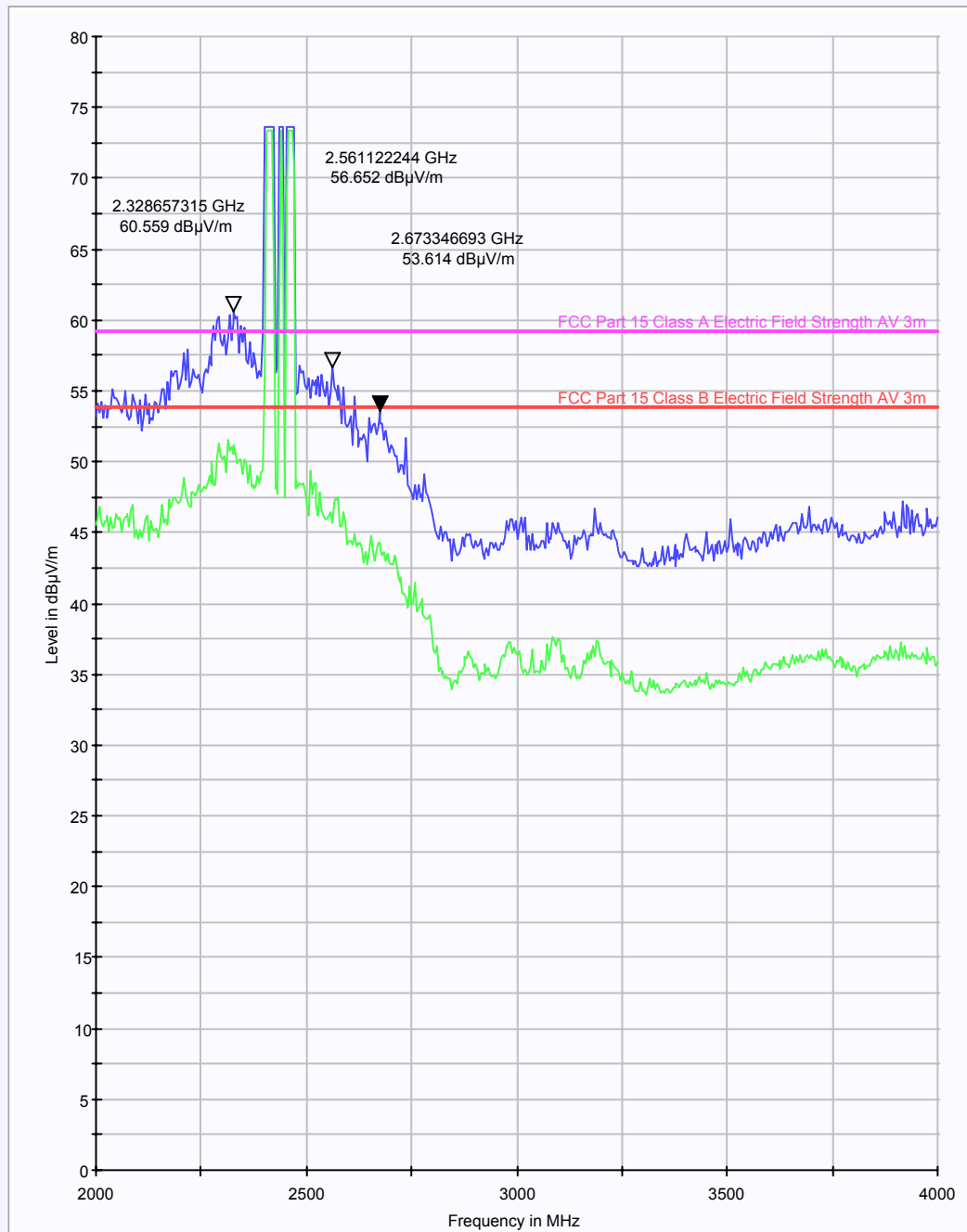
Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)



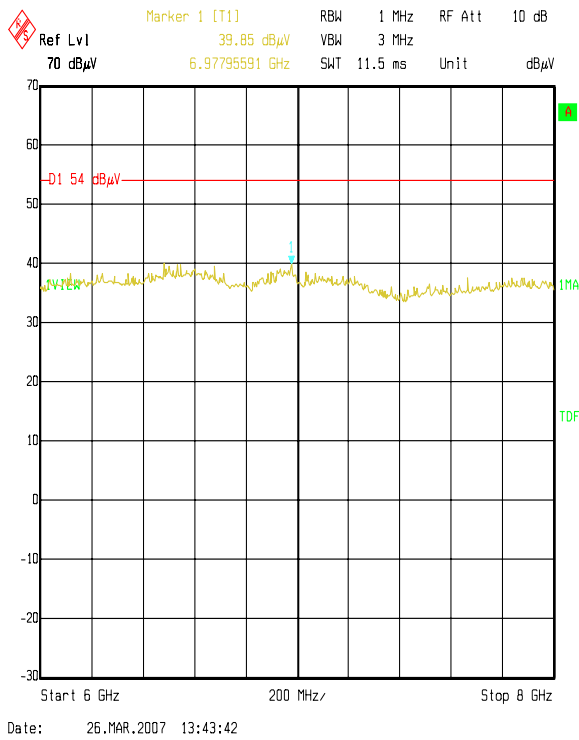
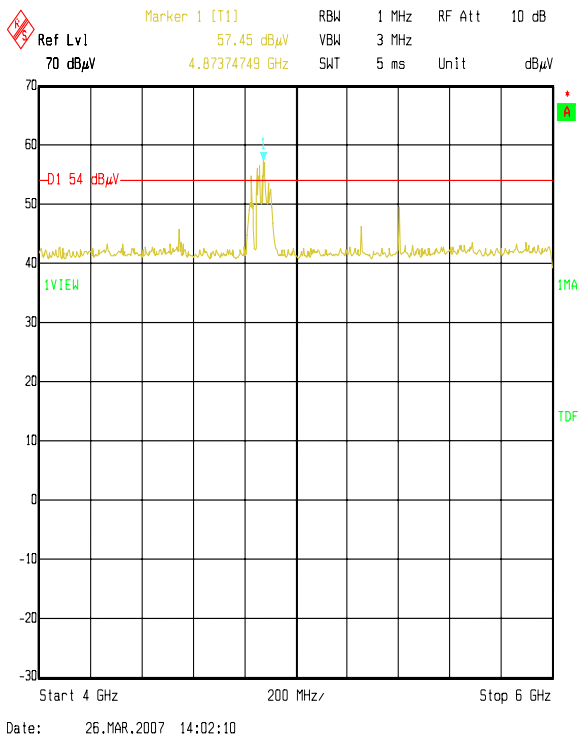
Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)



Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

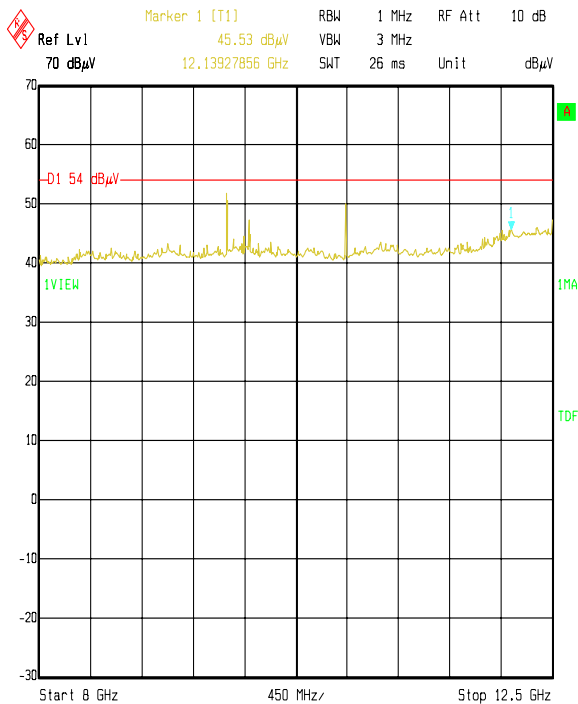
Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)



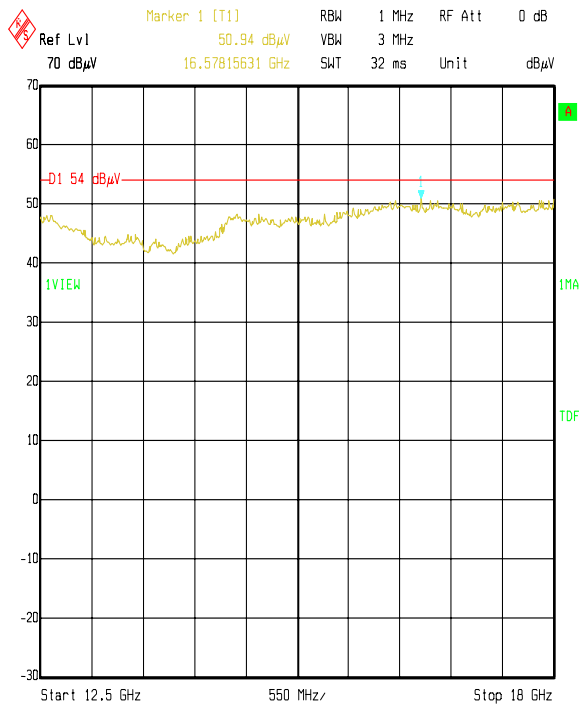
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

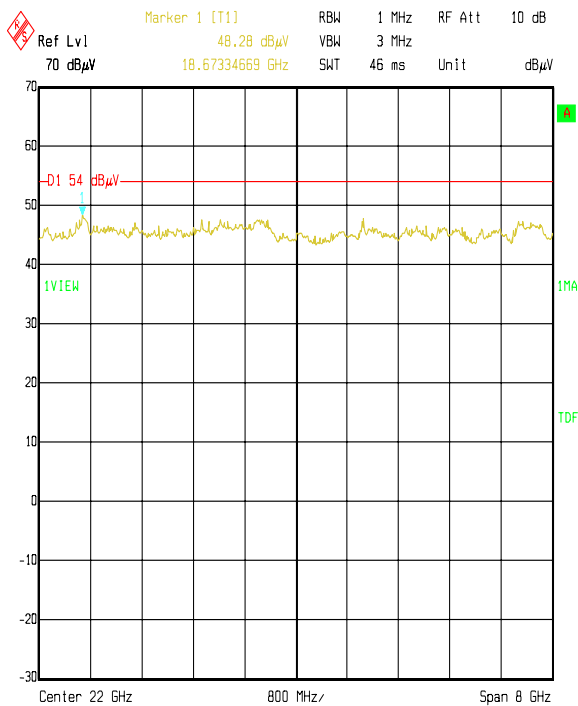
Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)



Date: 26.MAR.2007 13:30:21



Date: 26.MAR.2007 13:10:43



Date: 26.MAR.2007 13:05:16

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

7.2.11. Transmitter Band Edge Conducted Emissions: Section 15.247(d)

The EUT was configured for transmitter conducted emissions measurements as described in section 9 of this report.

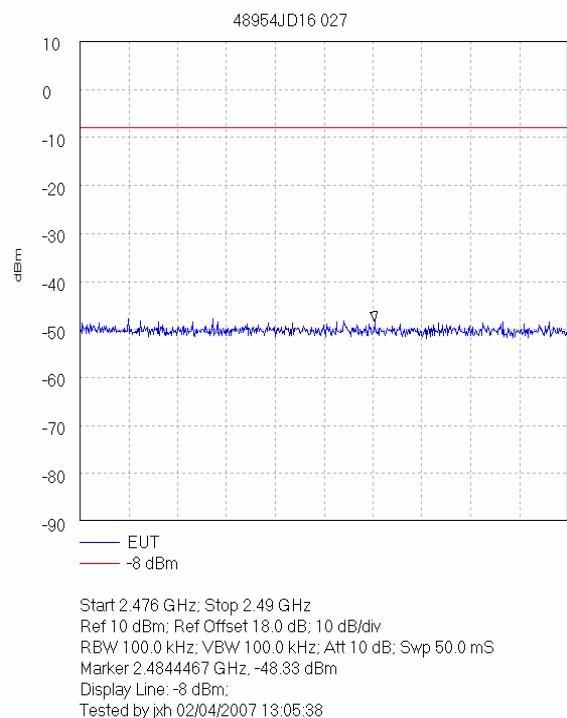
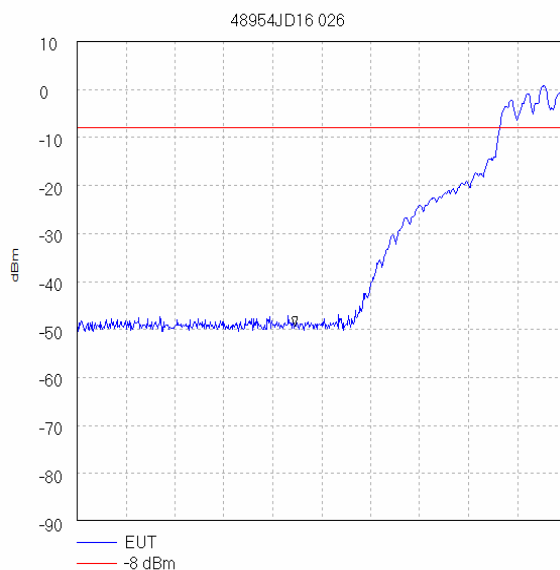
Tests were performed to identify the maximum conducted band edge emission levels.

The limit lines shown in the plots below are set to a level 20 dB below the measured fundamental peak averaging power of the channels closest to the lower and upper band edge.

Results:

Peak Power Level:

Frequency (MHz)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
2399.885	-47.2	-59.2	-20.0	39.2	Complied
2484.450	-48.3	-60.3	-20.0	40.3	Complied



Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

7.2.12. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

The EUT was configured for band edge compliance of radiated emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum radiated band edge emissions.

Results:

Electric Field Strength Measurements

Peak Power Level:

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4000	Vertical	71.2	-11.4	59.8	73.7*	13.9	Complied
2.4835	Vertical	77.6	-11.4	66.2	74.0	7.8	Complied

* -20 dBc limit

Average Power Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Vertical	64.2	-11.4	52.8	54.0	1.2	Complied

* -20 dBc limit

Note(s):

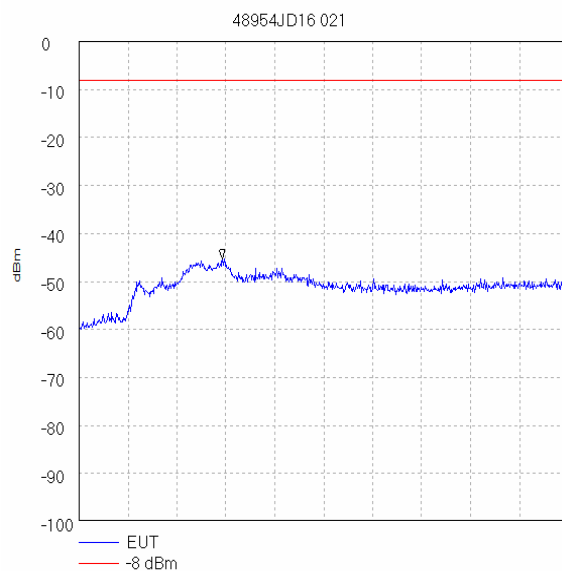
1. Peak measurements were performed on the band edge frequency 2.4835 GHz and compared to the general limits of 15.209 because it lies within a restricted band.

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

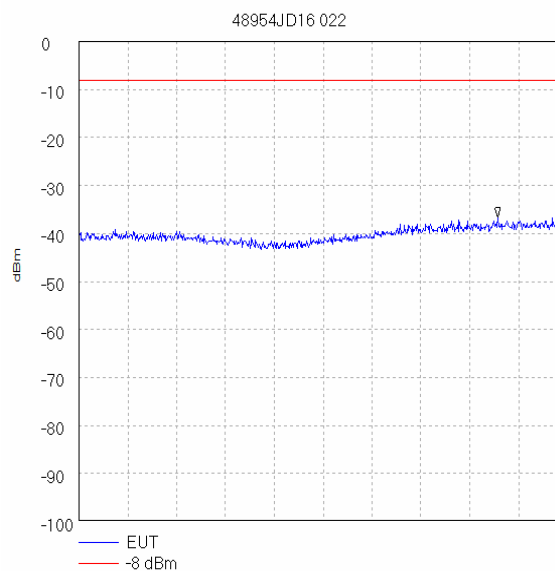
7.2.13. Intermodulation: Section 15.247 / 2.1053**Results:****Fully Loaded**

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
314.533	-45.3	-8.0	37.3	Complied
1858.300	-36.7	-8.0	28.7	Complied
2400.000	-27.3	-8.0	19.3	Complied
2490.670	-31.8	-8.0	23.8	Complied
4883.300	-38.2	-8.0	30.2	Complied

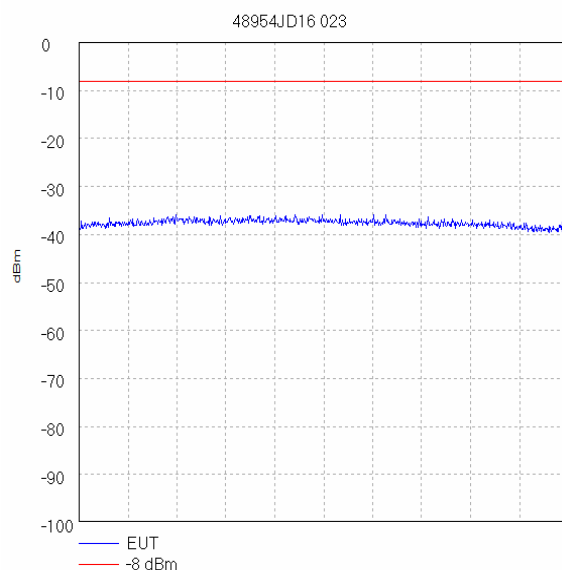
Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Intermodulation: Section 15.247 / 2.1053 (Continued)

Start 30.0 MHz; Stop 1.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 250.0 mS
Peak 314.533333 MHz, -45.33 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:32:39



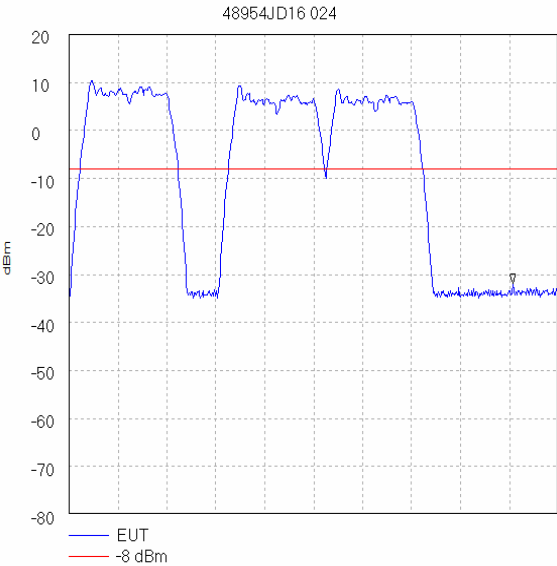
Start 1.0 GHz; Stop 2.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 1.858333 GHz, -36.67 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:33:07



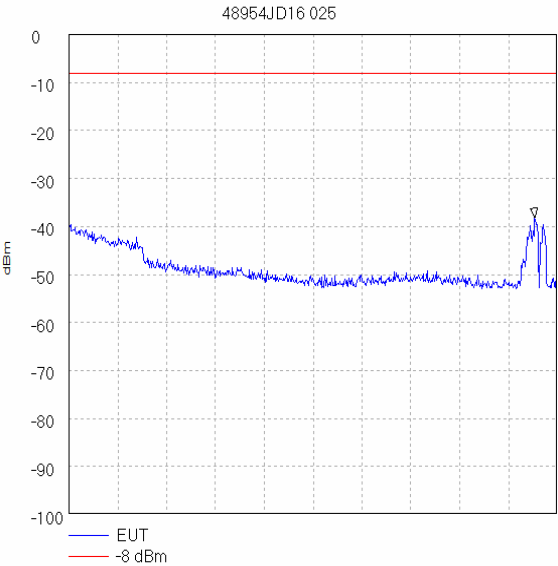
Start 2.0 GHz; Stop 2.4 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 2.4 GHz, -27.33 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:34:00

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

Intermodulation: Section 15.247 / 2.1053 (Continued)



Start 2.4 GHz; Stop 2.5 GHz
Ref 20 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 20 dB; Swp 50.0 mS
Marker 2.4906667 GHz, -31.83 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:35:10

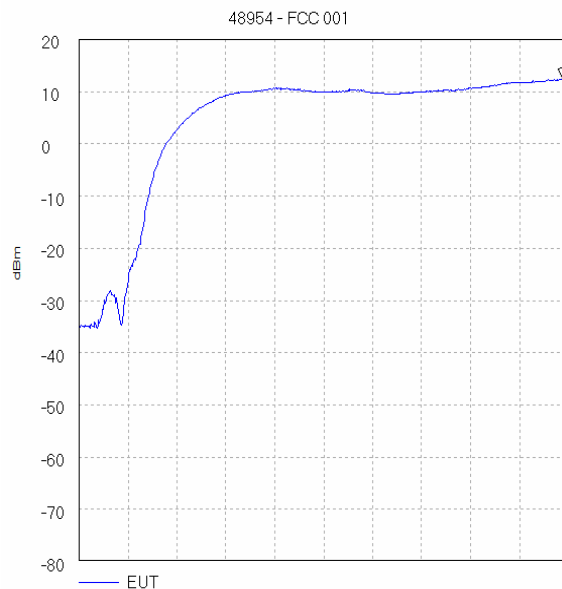


Start 2.5 GHz; Stop 5.0 GHz
Ref 0 dBm; Ref Offset 18.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 10 dB; Swp 50.0 mS
Peak 4.8833333 GHz, -38.17 dBm
Display Line: -8 dBm; Limit Test Passed
Tested by jph 02/04/2007 10:36:07

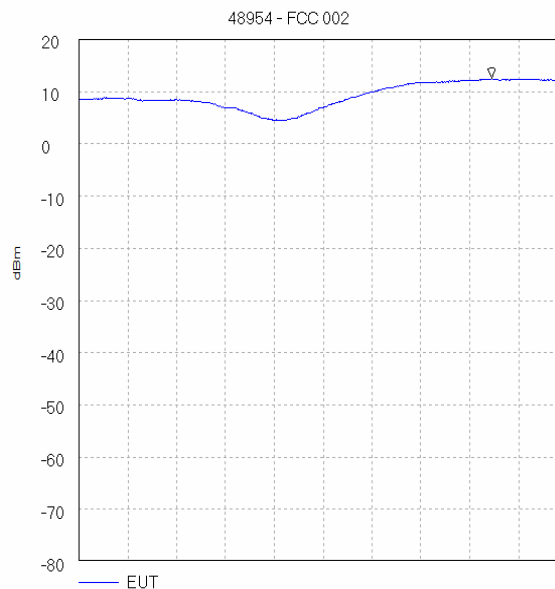
Carriers exempt from measurements

Test of: Zinwave Ltd
2765 DAS with Cisco Aironet 1200 Access Point
To: FCC Part 15.247: 2006 (Subpart C)

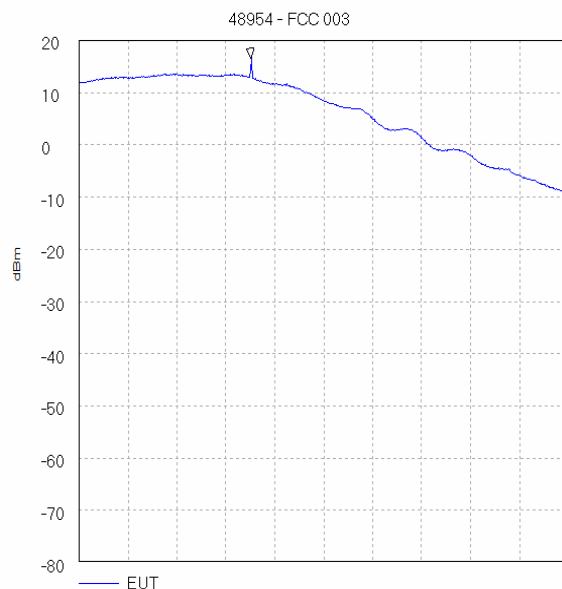
Out-of-Band Rejection



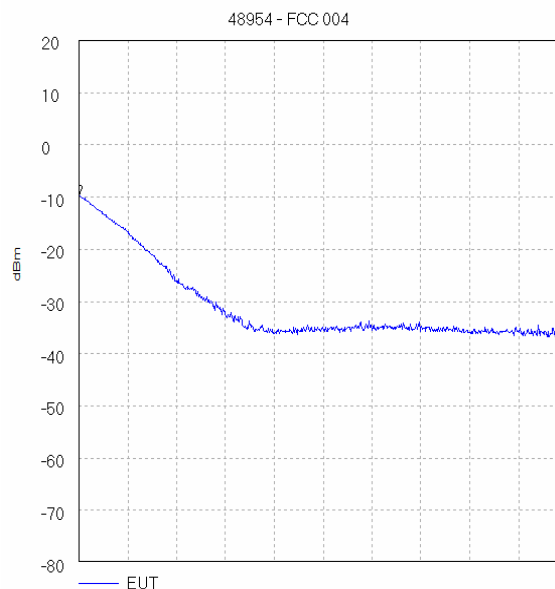
Start 30.0 MHz; Stop 1.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 50.0 mS
Peak 988.683333 MHz, 12.5 dBm
Tested by jph 15/03/2007 11:59:23



Start 1.0 GHz; Stop 2.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 50.0 mS
Peak 1.845 GHz, 12.5 dBm
Tested by jph 15/03/2007 12:16:16

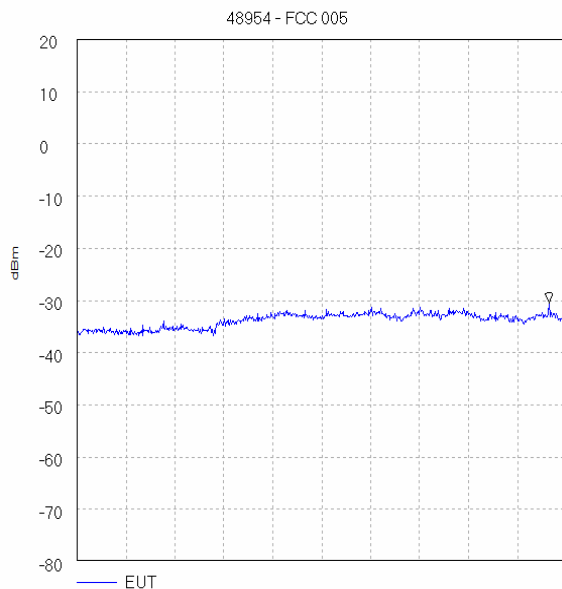


Start 2.0 GHz; Stop 3.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 50.0 mS
Peak 2.3516667 GHz, 16.5 dBm
Tested by jph 15/03/2007 13:38:40

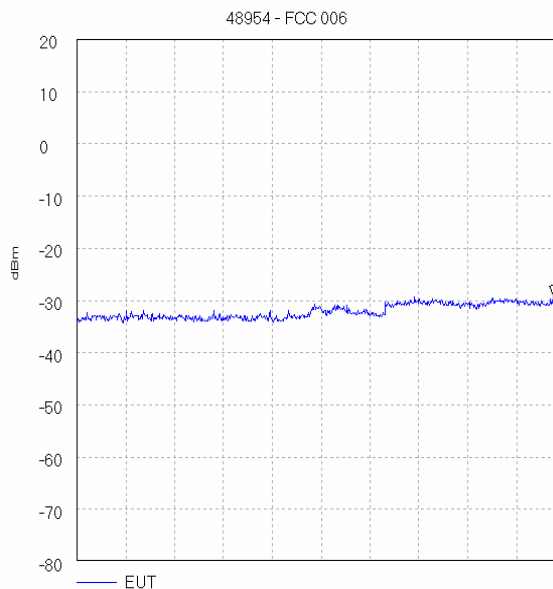


Start 3.0 GHz; Stop 5.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 50.0 mS
Peak 3.0 GHz, -9.83 dBm
Tested by jph 15/03/2007 14:00:04

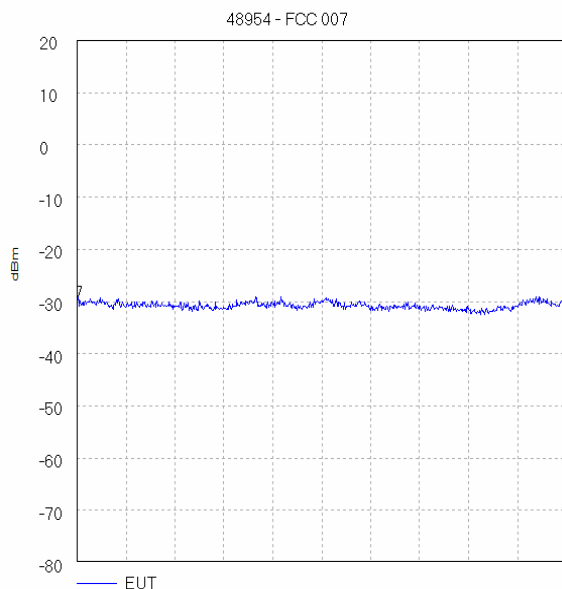
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Out-of-Band Rejection (Continued)

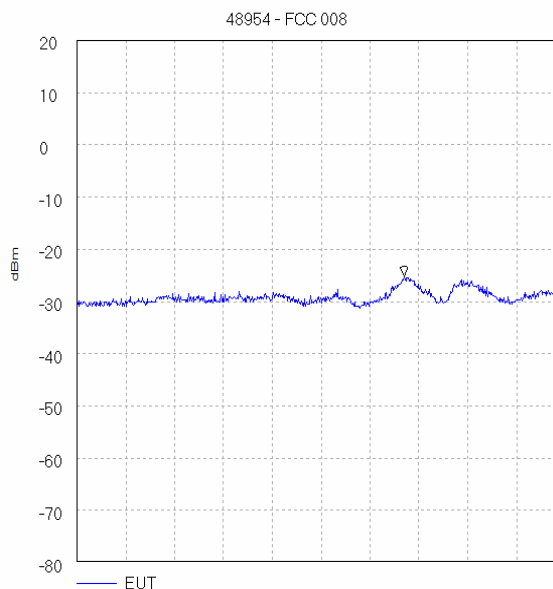
Start 5.0 GHz; Stop 10.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 100.0 mS
Peak 9.825 GHz, -30.5 dBm
Tested by jph 15/03/2007 14:26:34



Start 10.0 GHz; Stop 15.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 100.0 mS
Peak 14.875 GHz, -29.0 dBm
Tested by jph 15/03/2007 14:37:48



Start 15.0 GHz; Stop 20.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 100.0 mS
Peak 15.0083333 GHz, -29.0 dBm
Tested by jph 15/03/2007 14:40:21



Start 20.0 GHz; Stop 26.0 GHz
Ref 20 dBm; Ref Offset 16.0 dB; 10 dB/div
RBW 2.0 MHz; VBW 3.0 MHz; Att 20 dB; Swp 120.0 mS
Peak 24.02 GHz, -25.33 dBm
Tested by jph 15/03/2007 14:41:48

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8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.72 dB
Carrier Output Power	Not applicable	95%	±0.28 dB
Conducted Emissions	9 kHz to 26 GHz	95%	±0.46 dB
Conducted Emissions Antenna Port	30 MHz to 40 GHz	95%	±0.28 dB
Frequency Stability	Not applicable	95%	±0.121 ppm
Minimum Bandwidth	Not applicable	95%	±0.12 %
Occupied Bandwidth	824 to 849 MHz	95%	±0.12 %
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz to 26 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

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9. Measurement Methods

AC Mains Conducted Emissions

AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered with 110V 60 Hz AC mains supplied via a Line Impedance Stabilisation Network (LISN).

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements
Detector Type:	Peak	Quasi-Peak (CISPR)/Average
Mode:	Max Hold	Not applicable
Bandwidth:	10 kHz	9 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

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Radiated Emissions

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. Any emission within 20 dB of the limit were then measured on the open area test site, except in cases where the noise floor was within 20 dB of the limit, in these cases the highest point of the noise floor was measured.

Where an emission fell inside a restricted band, measurements were made at the appropriate test distance using a measuring receiver with a Quasi-Peak detector for measurements below 1000 MHz and an Average and Peak detector for measurements above 1000 MHz. A peak detector was used for all other measurements.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2001 Clause 5.4.

All measurements on the open area test site were performed using broadband antennas.

On the open area test site, at each frequency where a signal was to be measured, the trace was maximised by rotating a turntable through 360°. The angle at which the maximum signal was observed was locked out. For frequencies below 1000 MHz the test antenna was varied in height between 1 m and 4 m in order to further maximise the target emission.

For frequencies above 1000 MHz where a horn antenna was used, height searching was performed to locate the optimal height of the horn with respect to the EUT. At this point the horn was locked off and the turntable was again rotated through 360° to maximise the target signal. It should be noted that the received signal from the EUT would diminish very quickly after it exits the beam width of the horn antenna, for this reason it may not be necessary to fully height search with the horns.

At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

Scans were performed to the upper frequency limits as stated in Section 15.33

The final field strength was determined as the indicated level in dB μ V plus cable loss and antenna factor.

The test equipment settings for radiated emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements Below 1 GHz	Final Measurements Above 1 GHz
Detector Type:	Peak	Quasi-Peak (CISPR)	Peak / Average
Mode:	Max Hold	Not applicable	Max Hold
Bandwidth:	(120 kHz < 1 GHz) (1 MHz > 1 GHz)	120 kHz	1 MHz
Amplitude Range:	100 dB	100 dB	100 dB
Step Size:	Continuous sweep	Not applicable	Not applicable
Sweep Time:	Coupled	Not applicable	Not applicable

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Conducted Antenna Port Emissions

Conducted antenna port emissions measurements were performed using a 100 kHz bandwidth in accordance with the standard against the appropriate limits.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequency range. For each measurement range the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the losses in the measurement set up.

Initial measurements covering the entire measurement band in the form of swept scans were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which final measurements were necessary. To make the final measurements a peak detector was used in conjunction with the appropriate detector IF measuring bandwidth.

Repetitive scans were performed to allow for emissions with low repetition rates.

Scans were performed to the upper frequency limits as stated in 15.33(a)(1)

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Minimum 6 dB Bandwidth

The EUT and spectrum analyser were configured as for conducted antenna port emissions. The 6 dB Bandwidth was measured using the built in occupied bandwidth function of the Rohde and Schwarz FSEB or ESIB spectrum analyser. It was set to measure the bandwidth where 75% (6 dB) of the signal power was contained. The analyser settings were set as per those outlined in the spectrum analyser user manual for this measurement, i.e. RBW \geq 1% of occupied bandwidth. A value of 200 kHz was used.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequencies. For each frequency the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the losses in the measurement set up.

To determine the 6 dB bandwidth, a resolution bandwidth of 200 kHz was used, which is approximates to 1% of the 6 dB bandwidth. A video bandwidth of 200 kHz was used. The analyser was set to a span of greater than twice the 6 dB bandwidth and for a maximum hold scan to capture the profile of the signal. The peak level was then determined, and a reference established 6 dB below the peak level. The bandwidth was determined at the points where the 6 dB reference crossed the profile of the emission.

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Transmitter 20 dB Bandwidth

The EUT and spectrum analyser was configured as for transmitter conducted antenna port emissions. The Occupied Bandwidth was measured using the built in occupied bandwidth function of the Rohde and Schwarz FSEB or ESIB spectrum analyser. It was set to measure the bandwidth where 99% of the signal power was contained. The analyser settings were set as per those outlined in the spectrum analyser user manual for this measurement, i.e. RBW \geq 1% of occupied bandwidth. A value of 2000 kHz was used.

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Spectral Power Density

The EUT and spectrum analyser were configured as for conducted antenna port emissions measurements.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequencies. For each frequency the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the losses in the measurement set up.

Prior to the measurement being taken the spectrum analyser was tuned to the fundamental frequency of the EUT.

A resolution bandwidth of 3 kHz was selected and the analyser was set to a span of greater than twice the 6 dB bandwidth. The trace was max held and a reading was taken at the peak point of the trace.

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Peak Output Power

The EUT and spectrum analyser were configured as for conducted antenna port emissions measurements.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequencies. For each frequency to be measured, the calibrated level of the attenuator and cable were entered as an offset into a spectrum analyser to compensate for the measurement set up.

To determine the transmitter output power, the EUT was operated at maximum power and a result was obtained using a wideband peak power meter.

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Band Edge Compliance of RF Radiated Emissions

The EUT and spectrum analyser were configured as for radiated measurements.

To determine band edge compliance, the analyser resolution bandwidth was set to $\geq 1\%$ of the analyser span. The video bandwidth was set to be \geq to the resolution bandwidth. The sweep was set to auto and the detector to peak. The trace was set to max hold and a trace was produced.

A plot of the lower band edge of the allocated frequency band was produced. A marker was set to the level of the highest in band emission with a limit line set to 20 dB below this. The marker was then placed on the highest out of band emission (the specification states that either the band edge level must be measured or the highest out of band emission, whichever is the greater). The plots show that the highest out of band emission complies with the 20 or -30 dBc Limit.

The above procedure was then repeated for the upper band edge except that, as the upper band edge fell on a restricted band edge (as defined in Section 15.205(a)), the limit for the restricted band was applied instead of the 20 or -30 dBc limit i.e. the general limits defined in Section 15.209(a).

Final measurements were performed on the worst-case configuration as described in Part 15.31(i).

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A028	Horn Antenna	Eaton	91888-2	304	08 Jun 2006	36
A031	Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	27 Mar 2006	12
A1227	Pre Amp	Agilent	8449B	3008A01566	30 Aug 2006	12
A1534	Preamplifier	Hewlett Packard	8449B OPT H02	3008A00405	Cal Before Use	N/A
A1536	Variable Attenuator	Hewlett Packard	9494B & 9496B	3308A30801 & 3308A19649	Cal Before Use	N/A
A1738	Attenuator	Atlantic Microwave	BBS40-10	R1379	05 May 2006	12
A1747	Attenuator	Atlantic Microwave	BBS40-06	R7016	26 May 2006	12
A1818	Antenna	EMCO	3115	00075692	3 Nov 2006	12
A1829	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100671	8 Jan 2007	12
A253	Horn Antenna	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	Horn Antenna	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	Horn Antenna	Flann Microwave	16240-20	519	17 Nov 2006	36
A256	Horn Antenna	Flann Microwave	18240-20	400	17 Nov 2006	36
A436	Horn Antenna	Flann	20240-20	330	24 Apr 2006	36
M023	Test Receiver	Rohde & Schwarz	ESVP	872 991/027	10 Apr 2006	12
M1009	RF Power Meter	Hewlett Packard	437B	3125U13706	30 Oct 2006	12
M1175	Power Sensor	HP	8485A	2942A10299	03 Nov 2006	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986_022	08 Sep 2006	12
M1253	Spectrum Analyser	HP	8564E	3442A00262	30 Oct 2006	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	20 Feb 2007	12
M1379	Test Receiver	Rhode & Schwarz	ESIB7	100330	3 July 2006	12
S201	3m OATS	RFI	1	None	18 July 2006	12
S202	3m OATS	RFI	2	None	17 Nov 2006	12

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

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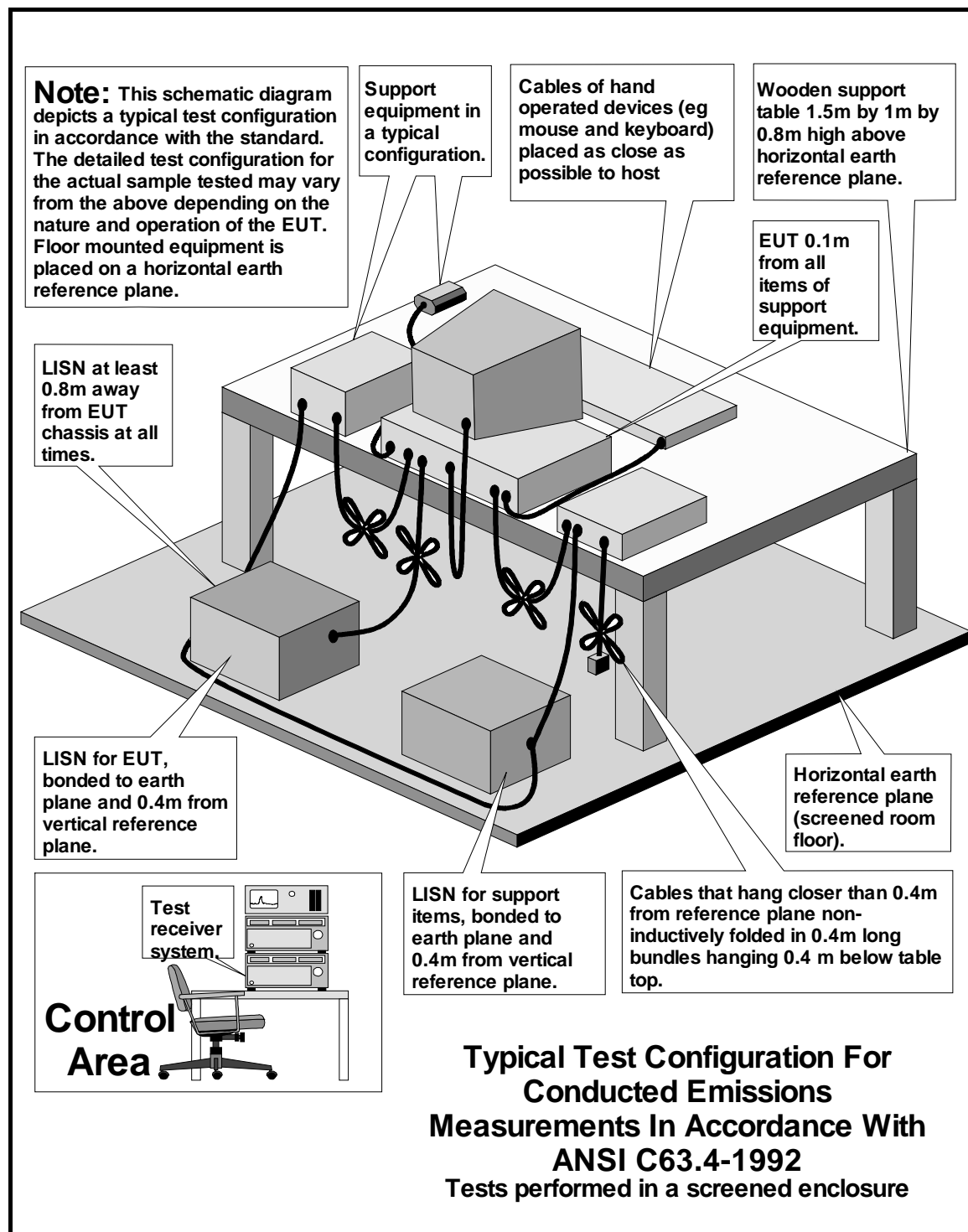
Appendix 2. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\48954JD16\EMICON	Test configuration for measurement of conducted emissions.
DRG\48954JD16\EMIRAD	Test configuration for measurement of radiated emissions.

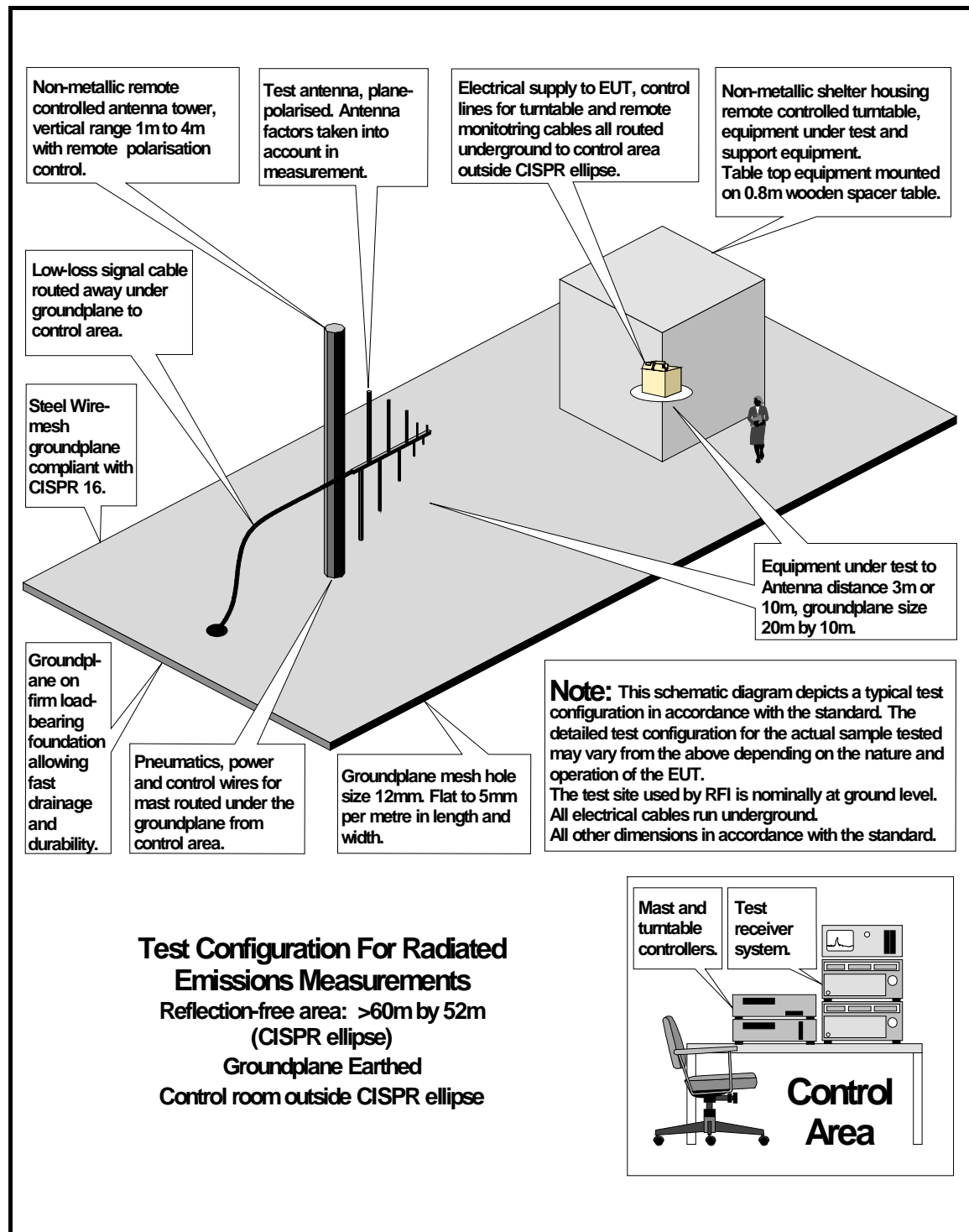
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DRG\48954JD16\EMICON



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DRG\48954JD16\EMIRAD



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