

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Ezurio Ltd
Wireless LAN Module

To: FCC Part 15.247: 2006 (Subpart C)
(Requested Parts Only)

Test Report Serial No:
RFI/RPTE1/RP48844JD05A

**This Test Report Is Issued Under The Authority
Of Andrew Brown, Operations Manager:**

pp.

A handwritten signature in blue ink, appearing to read 'A. Brown', enclosed within a faint blue oval.

Tested By: Petr Hajek

pp

A handwritten signature in blue ink, appearing to read 'P. Hajek', enclosed within a faint blue oval.

Checked By: Michael Derby

A handwritten signature in blue ink, appearing to read 'M. Derby', enclosed within a faint blue oval.

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Issue Date: 12 December 2006

Test Dates: 28 November 2006 to 30 November 2006

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Registered in England and Wales. Company number: 2117901

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1. Client Information

Company Name:	Ezurio Ltd
Address:	Saturn House Mercury Park Wycome Lane Woodburn Green Bucks HP10 0HH UK
Contact Name:	Mr T Wheatley

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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:	Wireless LAN Module
Brand Name:	WISM
Model Name or Number:	WISMC01BI
Hardware Revision:	01
Software Revision:	1.3.6.3
FCC ID Number:	PI405W
Country of Manufacturer:	None stated
Date of Receipt:	28 November 2006

2.2. Description of EUT

The equipment under test is a module that provides WLAN connectivity for machine to machine communication.

The module has a UART interface that allows control of the WLAN functionality and is used to transfer data to and from the host system.

2.3. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

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2.4. Support Equipment

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

Description:	Interface Test Board
Brand Name:	Ezurio
Model Name or Number:	B47DR05
Serial Number:	REV 02
Cable Length and Type:	15 cm, Multicore
Connected to Port:	Multipin connector on EUT

Description:	Serial Cable
Brand Name:	None Stated
Model Name or Number:	None Stated
Serial Number:	None Stated
Cable Length and Type:	2.0 m, RS232
Connected to Port:	RS232 port on test board, to RS232-USB cable

Description:	RS232-USB cable
Brand Name:	None Stated
Model Name or Number:	None Stated
Serial Number:	None Stated
Cable Length and Type:	1.0m, shielded multicore
Connected to Port:	RS232 cable to Laptop USB port

Description:	Laptop PC
Brand Name:	IBM
Model Name or Number:	R50E
Serial Number:	L3-PVGM5 05/05
Cable Length and Type:	1.0 m USB-RS232 cable
Connected to Port:	USB port to RS232 cable

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

Description:	DC power supply
Brand Name:	Alpha Micro
Model Name or Number:	LMP043
Serial Number:	None stated
Cable Length and Type:	2.0m, unshielded 2-core
Connected to Port:	DC Input of the Interface Test Board

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2.5. Additional Information Related to Testing

Power Supply Requirement:	DC Supply of 3.6 V		
Intended Operating Environment:	Commercial		
Equipment Category:	802.11b 802.11g		
Type of Unit:	Mobile (Vehicular Use, powered via vehicle regulated supply) Portable (Standalone battery powered device) Transceiver		
Transmit Frequency Range:	2.412 GHz to 2.472 GHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (GHz)
	Bottom	1	2.412
	Middle	6	2.437
	Top	11	2.462
Receive Frequency Range:	2.412 GHz to 2.472 GHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (GHz)
	Bottom	1	2.412
	Middle	6	2.437
	Top	11	2.462
Maximum Peak Power Output (EIRP):	18 dBm (802.11b) 16 dBm (80211g)		

2.6. Port Identification

Port	Description	Type/Length	Applicable
1	Main Connector	40 Way Hirose	Yes

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3. Test Results

Reference:	FCC Part 15.247: 2005 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

At the request of the client, only the spurious emissions tests were performed.

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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:

The module was supplied and tested with manufacturing test firmware which allows control of modulation, output power and duty cycle.

The module had been previously tested and from the previous tests, the client was able to state that 802.11b operation with BPSK modulation gave the worst case emissions. For this reason, the client requested that we perform these emissions tests in that mode.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

The EUT was tested stand-alone, connected to a test jig board by a communication cable of greater than 10 cm in length. A laptop was used to configure the mode of operation before making measurements.

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6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Compliance Status
Idle Mode AC Conducted Emissions	Section 15.107	AC Mains	Complied
Idle Mode Radiated Spurious Emissions	Section 15.109	Antenna	Complied
Transmitter AC Conducted Emissions	Section 15.207	AC Mains	Complied
Transmitter Radiated Emissions	Sections 15.247(d) & 15.209(a)	Antenna	Complied
Transmitter Band Edge Radiated Emissions	Sections 15.247(d) & 15.209(a)	Antenna	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.

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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. Receiver AC Conducted Spurious Emissions: Section 15.107

The EUT was configured 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
0.154	Neutral	36.0	65.8	29.8	Complied
0.186	Neutral	33.7	64.2	30.5	Complied
0.198	Neutral	33.3	63.7	30.4	Complied
0.254	Neutral	31.7	61.6	29.9	Complied
0.270	Neutral	31.2	61.1	29.9	Complied
0.298	Neutral	30.0	60.3	30.3	Complied
0.346	Neutral	28.3	59.1	30.8	Complied
0.642	Neutral	23.9	56.0	32.1	Complied
0.714	Neutral	24.1	56.0	31.9	Complied
0.746	Neutral	23.3	56.0	32.7	Complied

Average Detector Measurements on Live and Neutral Lines

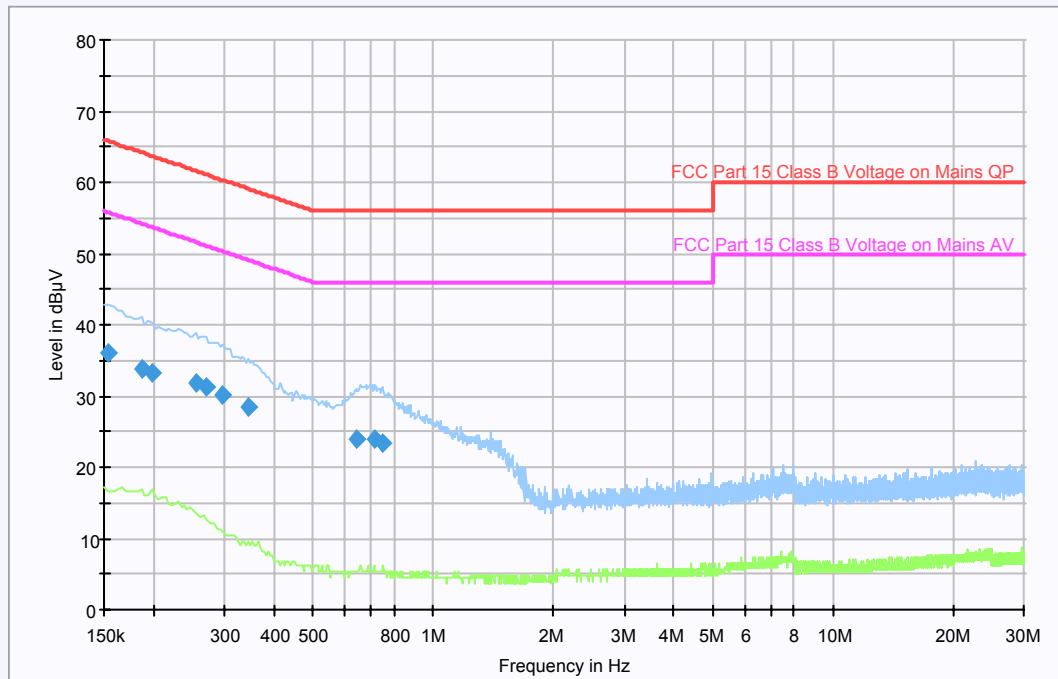
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
See Note 1 Below					

Note(s):

1. All quasi-peak levels were below the average limit.
2. 802.11b, BPSK mode tested.

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Receiver AC Conducted Spurious Emissions: Section 15.107 (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. Receiver Radiated Spurious Emissions: Section 15.109

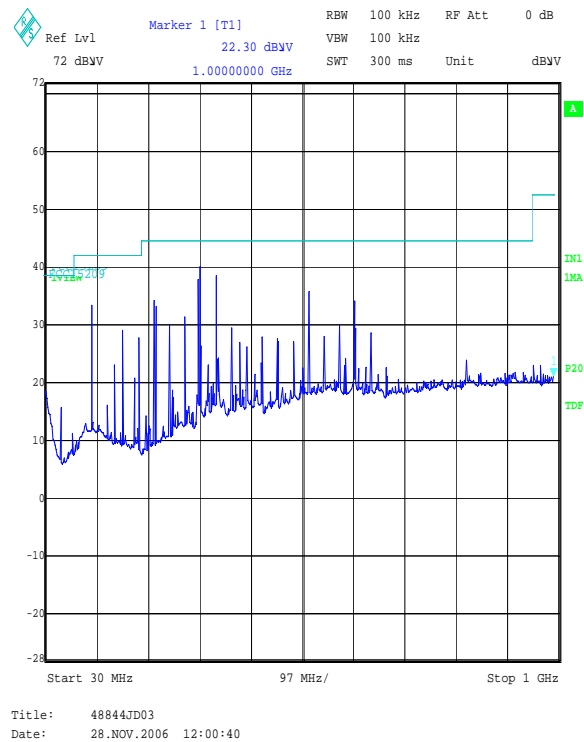
The EUT was configured for radiated emission testing, as described in section 9 of this report.

Tests were performed to identify the maximum receiver or standby radiated emission levels.

Results:**Electric Field Strength Measurements (Frequency Range: 30 MHz to 1000 MHz)**

Frequency (MHz)	Antenna Polarity	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
117.970	Vertical	27.2	43.5	16.3	Complied
159.990	Vertical	23.5	43.5	20.0	Complied
176.940	Horizontal	31.3	43.5	12.2	Complied
206.440	Horizontal	29.5	43.5	14.0	Complied
235.930	Horizontal	29.7	46.0	16.3	Complied
239.980	Vertical	31.0	46.0	15.0	Complied
294.900	Horizontal	30.0	46.0	16.0	Complied
320.010	Horizontal	33.3	46.0	12.7	Complied
324.410	Horizontal	33.8	46.0	12.2	Complied
353.860	Horizontal	33.2	46.0	12.8	Complied
383.380	Horizontal	33.4	46.0	12.6	Complied
530.890	Vertical	38.9	46.0	7.1	Complied

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Receiver Radiated Spurious Emissions: Section 15.109 (Continued)

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

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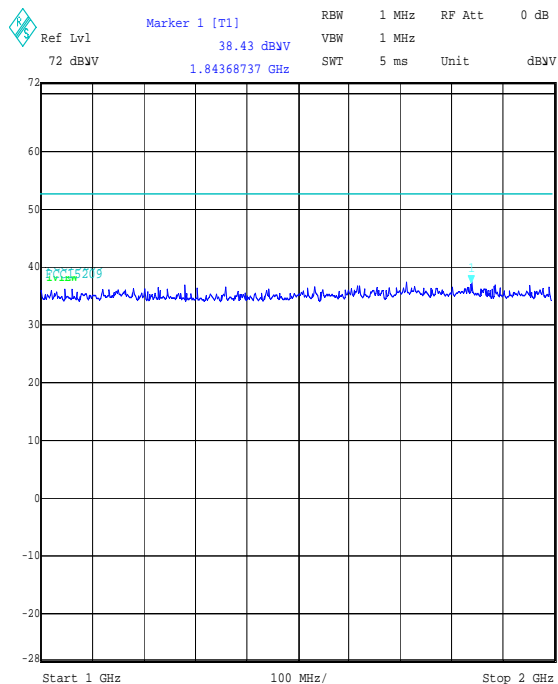
7.2.3. Receiver Radiated Spurious Emissions: Section 15.109**Results:****Electric Field Strength Measurements (Frequency Range: 1 GHz to 12.5 GHz)****Highest Peak Level:**

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
12.42786	Vertical	39.8	4.1	43.9	54.0	10.1	Complied

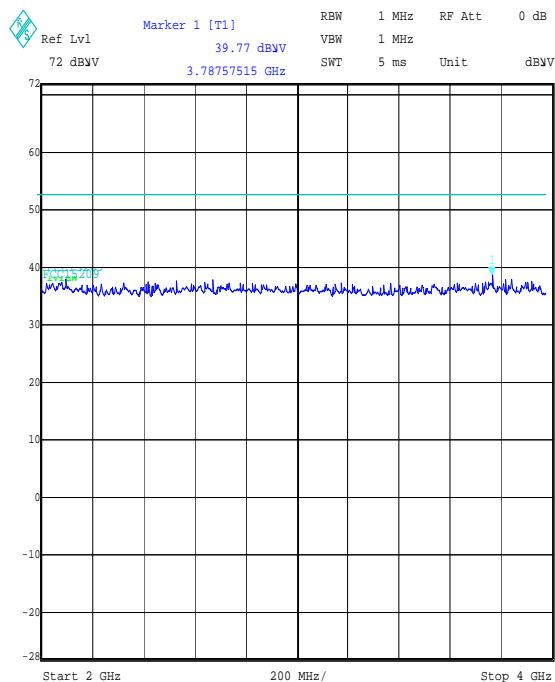
Note(s):

- No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.*
- 802.11b, BPSK mode tested.*
- All emissions were more than 10 dB below the limit.*

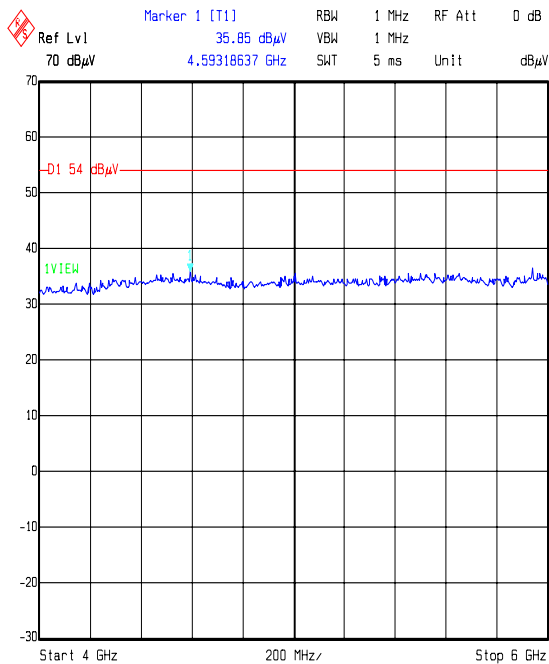
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Receiver Radiated Spurious Emissions: Section 15.109 (Continued)

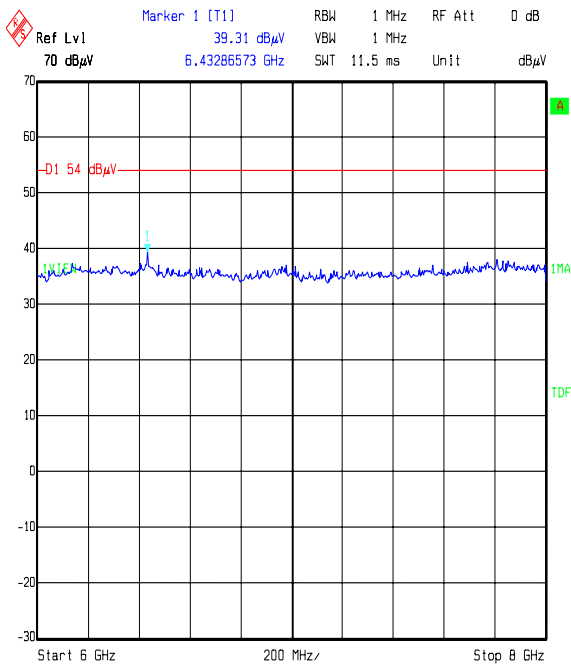
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Date: 28.NOV.2006 12:27:45

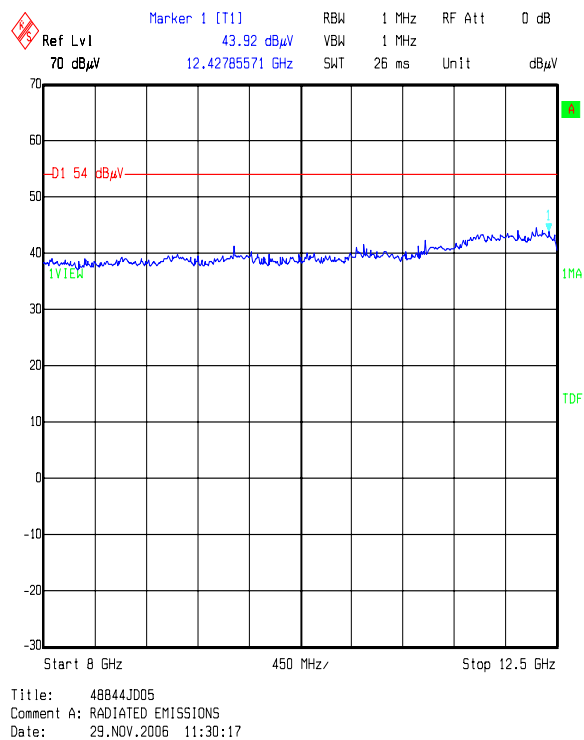


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Comment A: RADIATED EMISSIONS
Date: 29.NOV.2006 11:46:54



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Comment A: RADIATED EMISSIONS
Date: 29.NOV.2006 11:37:12

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Receiver Radiated Spurious Emissions: Section 15.109 (Continued)

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

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7.2.4. Transmitter AC Conducted Spurious Emissions: Section 15.207

The EUT was configured 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
0.154	Neutral	39.8	65.8	26.0	Complied
0.178	Neutral	37.8	64.6	26.8	Complied
0.206	Neutral	36.9	63.4	26.5	Complied
0.246	Neutral	35.7	61.9	26.2	Complied
0.262	Neutral	35.1	61.4	26.3	Complied
0.298	Neutral	33.7	60.3	26.6	Complied
0.346	Neutral	31.9	59.1	27.2	Complied
0.382	Neutral	29.5	58.2	28.7	Complied
0.630	Neutral	26.8	56.0	29.2	Complied
0.710	Neutral	27.2	56.0	28.8	Complied

Average Detector Measurements on Live and Neutral Lines

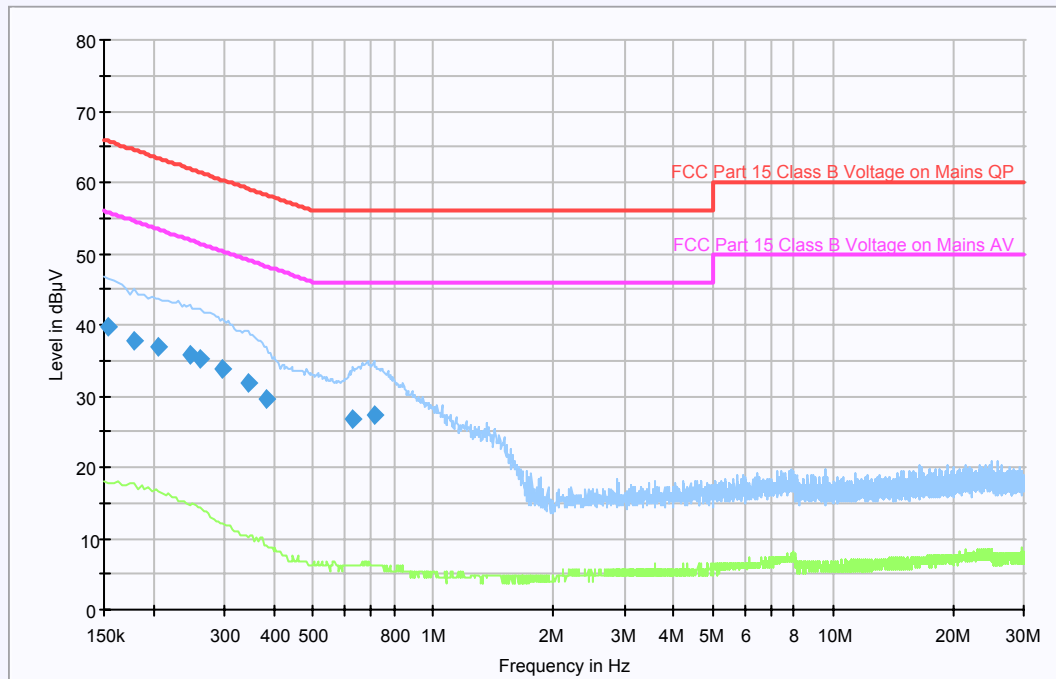
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
See Note 3 Below					

Note(s):

1. All quasi-peak levels were below the average limit

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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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7.2.5. 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 MHz 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
117.470	Vertical	24.5	43.5	19.0	Complied
239.930	Vertical	32.1	46.0	13.9	Complied
265.110	Horizontal	33.2	46.0	12.8	Complied
280.760	Vertical	30.1	46.0	15.9	Complied
323.520	Horizontal	33.2	46.0	12.8	Complied

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7.2.6. 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.

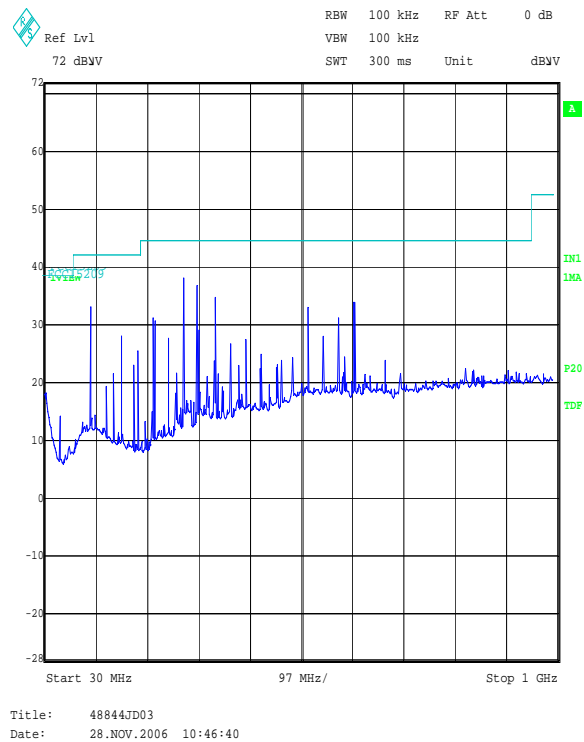
Results:**Electric Field Strength Measurements: 30 MHz to 1000 MHz
(emissions outside the restricted bands)****Top Channel**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	-20 dBc Limit (dB μ V/m)	Margin (dB)	Result
159.990	Vertical	32.8	71.2	38.4	Complied
176.950	Horizontal	31.7	71.2	39.5	Complied
200.010	Horizontal	28.3	71.2	42.9	Complied
206.420	Vertical	29.5	71.2	41.7	Complied
235.940	Horizontal	30.4	71.2	40.8	Complied
294.910	Vertical	32.5	71.2	38.7	Complied
320.000	Horizontal	32.5	71.2	38.7	Complied
353.880	Horizontal	33.5	71.2	37.7	Complied
383.370	Vertical	33.5	71.2	37.7	Complied
412.870	Horizontal	34.5	71.2	36.7	Complied
530.820	Vertical	39.8	71.2	31.4	Complied

Note(s):

1. 802.11b, BPSK mode tested.

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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.

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

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 GHz to 26 GHz)
(emissions occurring in the restricted bands)****Highest Peak Level: Bottom Channel**

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
4.8240	Vertical	53.8	-6.5	47.3	74.0	26.7	Complied

Highest Average Level: Bottom Channel

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
4.8240	Vertical	47.6	-6.5	41.1	54.0	12.9	Complied

Highest Peak Level: Middle Channel

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
4.8739	Vertical	55.7	-6.5	49.2	74.0	24.8	Complied

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

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
4.8739	Vertical	50.0	-6.5	43.5	54.0	10.5	Complied

Highest Peak Level: Top Channel

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
4.9240	Vertical	58.7	-5.8	52.9	74.0	21.1	Complied

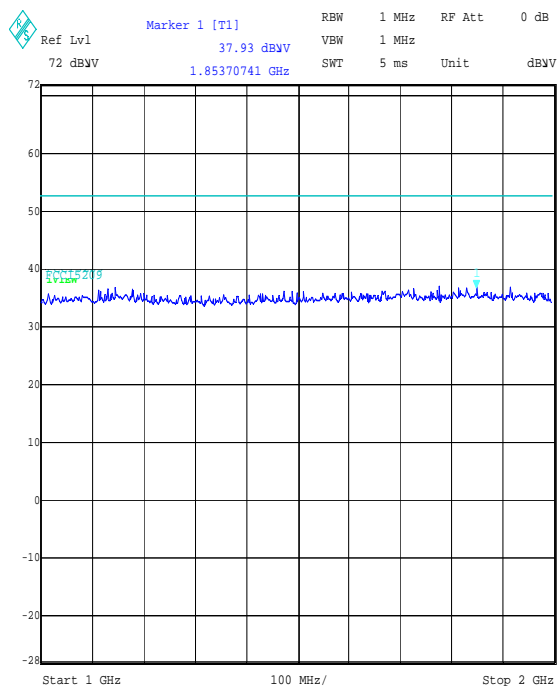
Highest Average Level: Top Channel

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
4.9240	Vertical	53.7	-5.8	47.9	54.0	6.1	Complied

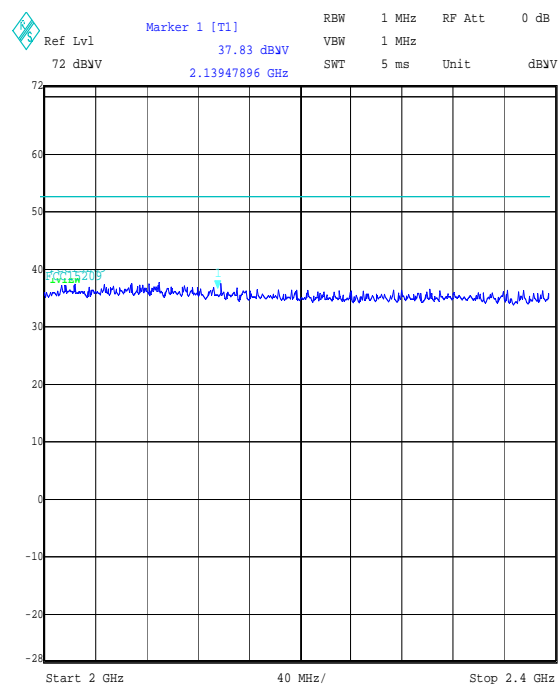
Note(s):

1. 802.11b, BPSK mode tested.

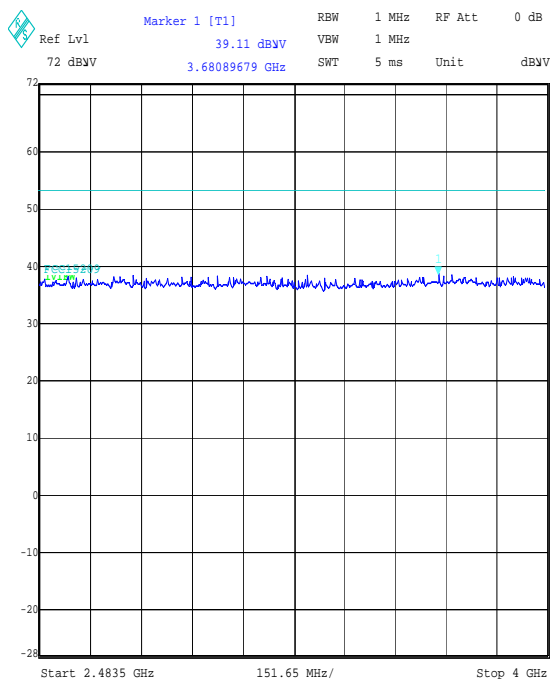
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Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

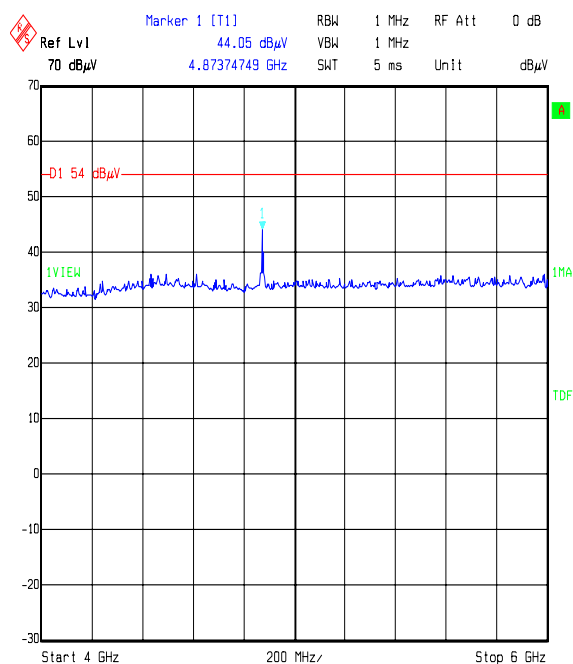
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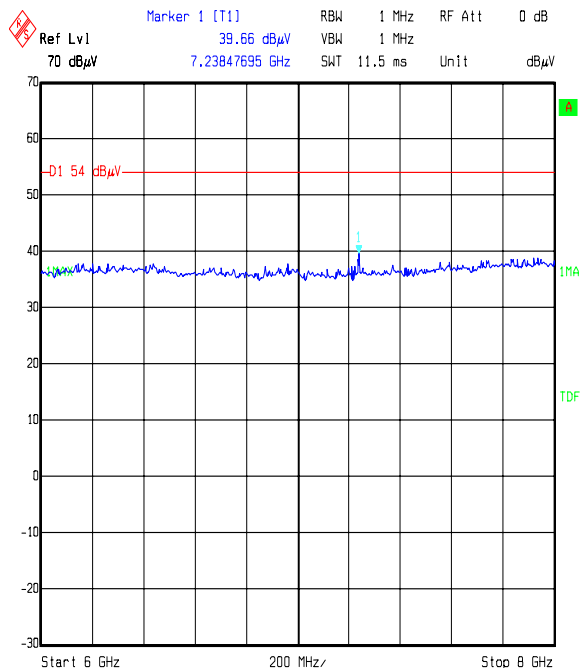
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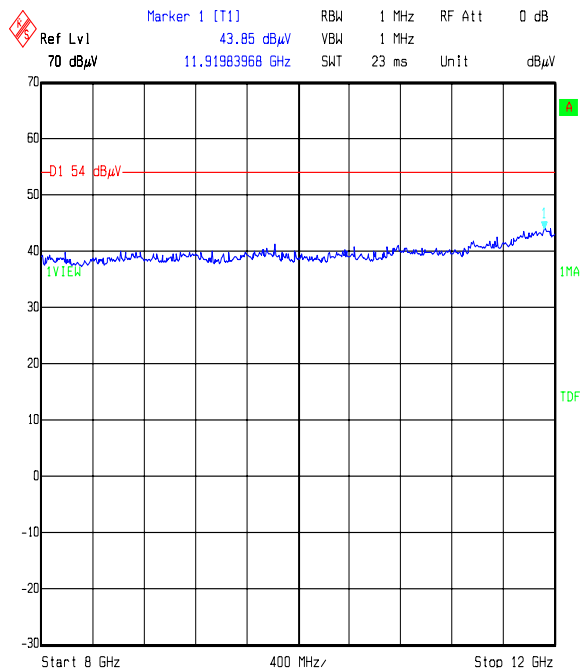
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Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

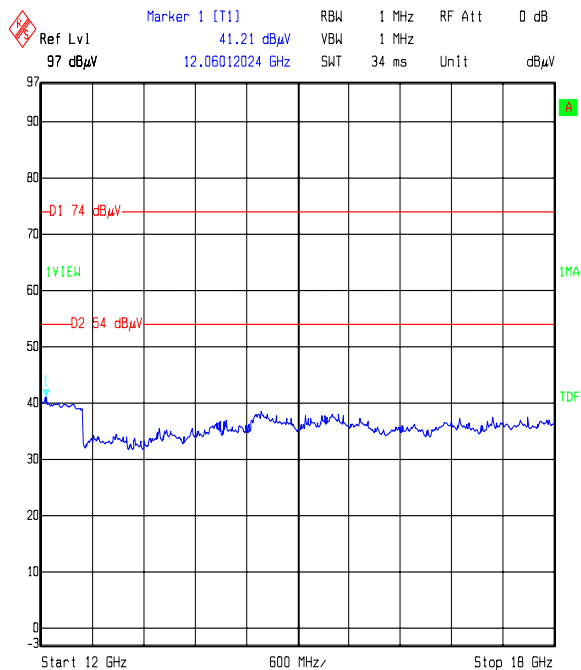
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Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

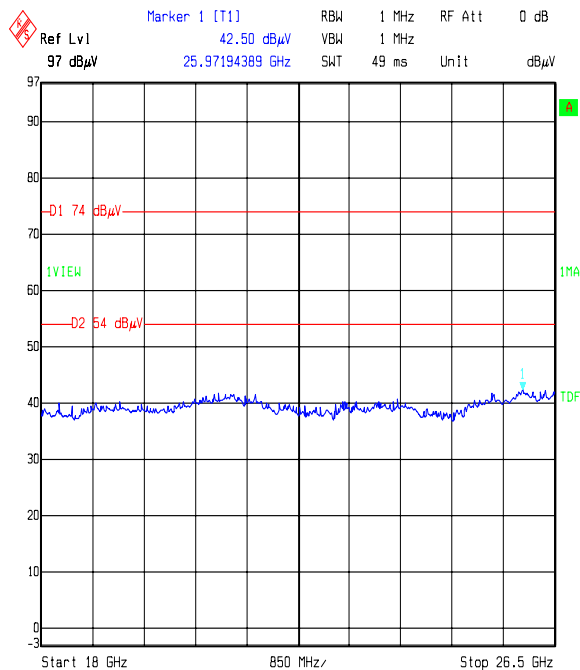
Title: 48844JD05
Comment A: RADIATED EMISSIONS
Date: 29.NOV.2006 11:05:14



Title: 48844JD05
Comment A: RADIATED EMISSIONS
Date: 29.NOV.2006 11:21:06



Title: 48844JD05
Comment A: EMISSIONS
Date: 29.NOV.2006 13:10:10



Title: 48844JD05
Comment A: EMISSIONS
Date: 29.NOV.2006 13:15:58

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

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7.2.8. 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 (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
2.4000	Vertical	63.3	-11.4	51.9	71.2*	19.3	Complied
2.4835	Vertical	54.6	-11.0	43.6	74.0	10.4	Complied

Note(s):

1. * -20 dBc limit.
2. The band edge level at 2.4835 GHz lies within a restricted band.
3. 802.11b, BPSK mode tested

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

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 average radiated band edge emissions.

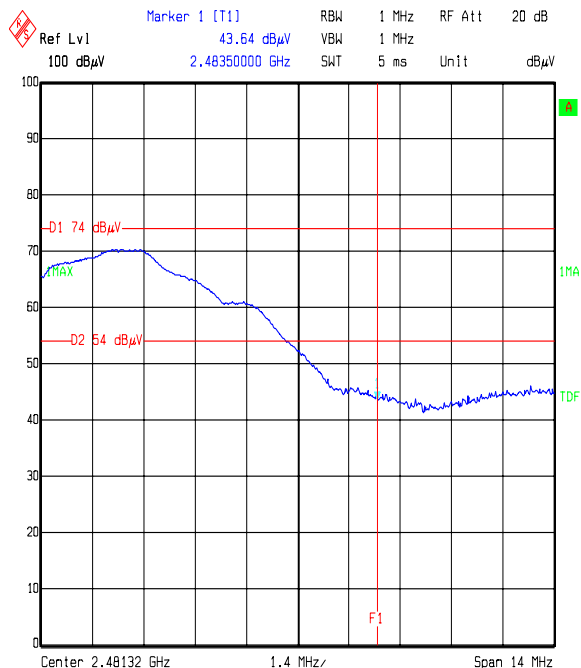
Results:**Average Power Level Static Mode:**

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	42.8	-11.0	31.8	54.0	22.2	Complied

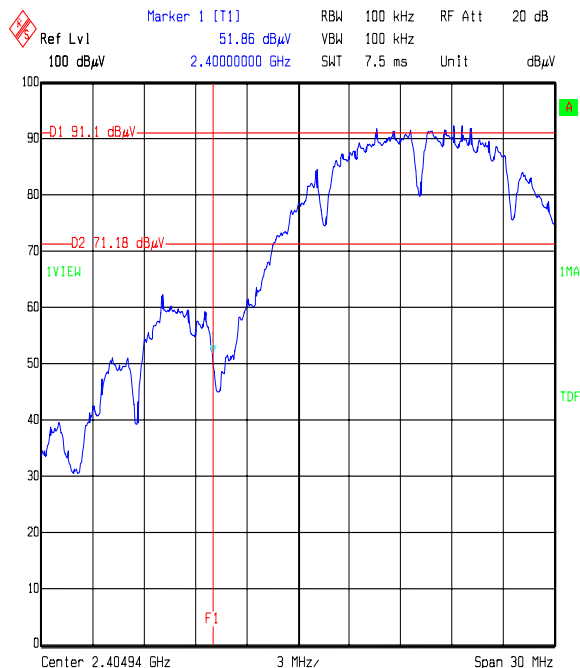
Note(s):

1. The band edge level at 2.4835 GHz lies within a restricted band.
2. 802.11b, BPSK mode tested

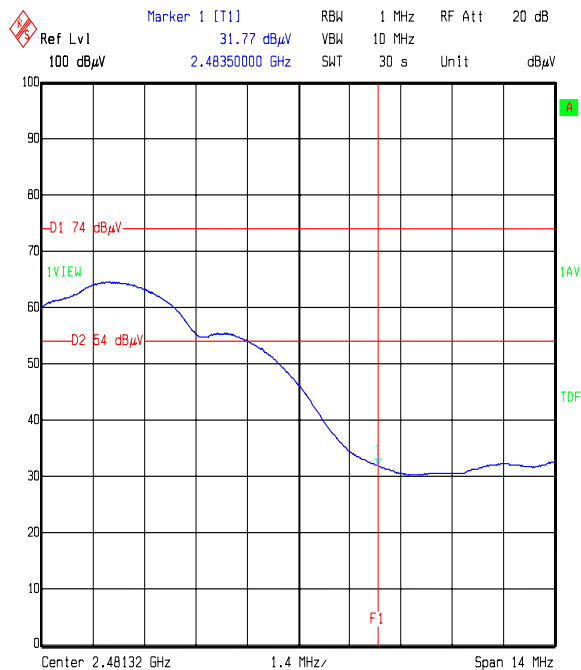
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Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Title: 48844JD05
Comment A: EMISSIONS
Date: 29.NOV.2006 12:44:47



Title: 48844JD05
Comment A: RADIATED EMISSIONS
Date: 29.NOV.2006 12:37:50



Title: 48844JD05
Comment A: EMISSIONS
Date: 29.NOV.2006 12:49:07

Note: The Band Edge plot at 2.4835 GHz shows a channel side band, not the transmit channel itself, thus the shape.

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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
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz to 40 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

9.1. 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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9.2. 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 – 2003 Clause 5.4.

All measurements on the open area test site were performed using broadband antennas in both vertical and horizontal polarisations.

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.

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Radiated Emissions (Continued)

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 <1 GHz	Final Measurements ≥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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9.3. 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 and a limit line set to 20 dB below this. The marker was then placed at the band edge.

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, 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
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1069	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	837469/012	31 Jan 2006	12
A1360	ESH3-Z2 Pulse Limiter	Rohde & Schwarz	ESH3-Z2	A1360-20112003	06 Sep 2006	12
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	29 Jul 2006	12
A259	Bilog Antenna	Chase	CBL6111	1513	03 Mar 2006	12
C1082	UFA210A Rosenberger Cable	Rosenberger	FA210A10 20M5050	28463-1	Cal before use	-
C1167	3m N-Type Cable	Rosenberger Micro-Coax	FA210A10 30007070	43190-01	Cal before use	-
C363	Cable	Rosenberger	RG142	None	29 Jan 2006	12
C461	DC to 18GHz Rosenberger Cable	Rosenberger	UFA210A-1-1182-704704	98H0305	30 Jan 2006	12
C468	10m Cable	Rosenberger	UFA210A-1-3937-504504	98L0440	29 Jan 2006	12
C475	Cable				Cal before use	-
M024	EZM Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Cal before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	08 Sep 2006	12
M1263	EMI Test Receiver	Rohde & Schwarz	ESIB7	100265	12 Jan 2006	12

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

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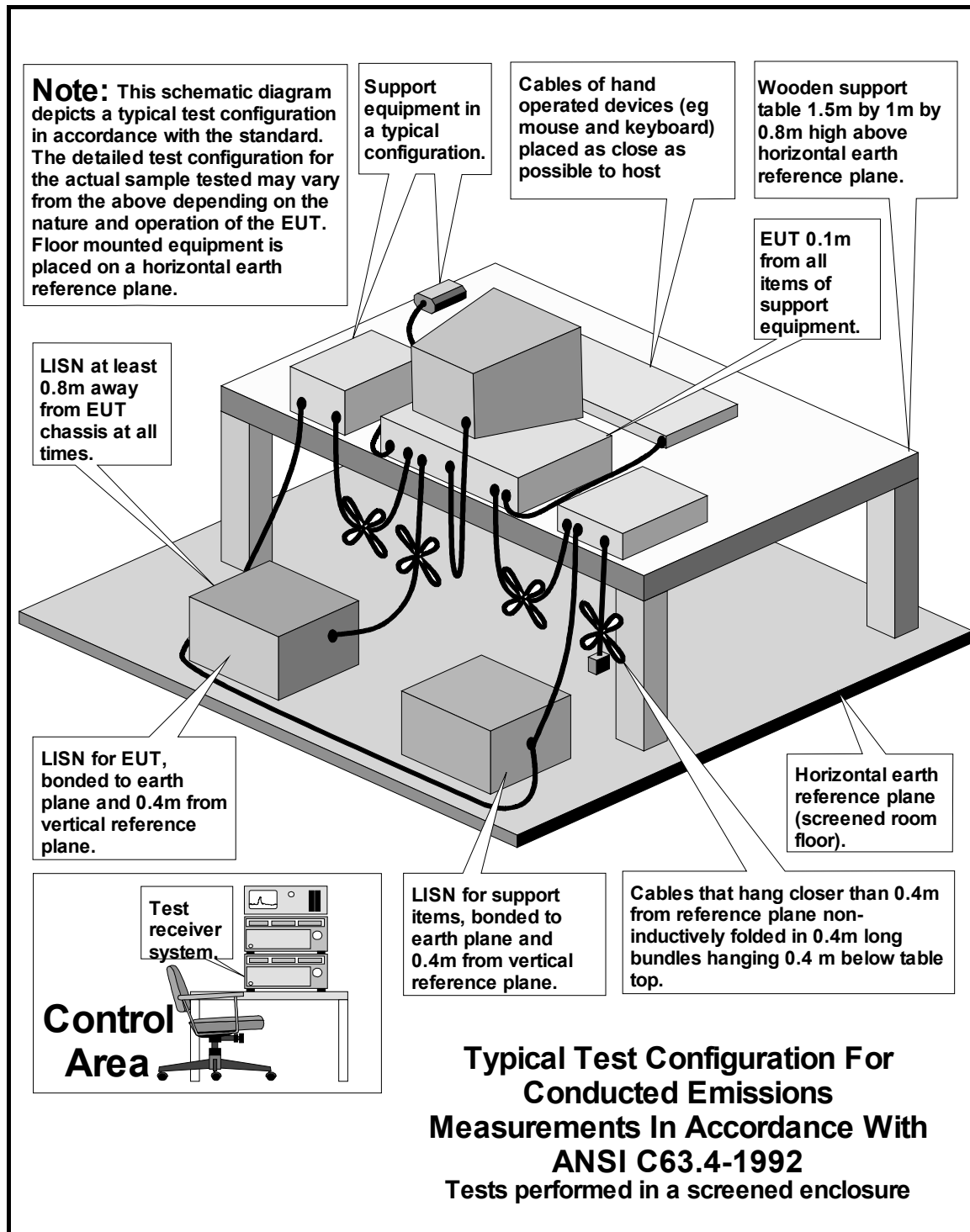
Appendix 2. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\48844JD05A\EMICON	Test configuration for measurement of conducted emissions.
DRG\48844JD05A\EMIRAD	Test configuration for measurement of radiated emissions.

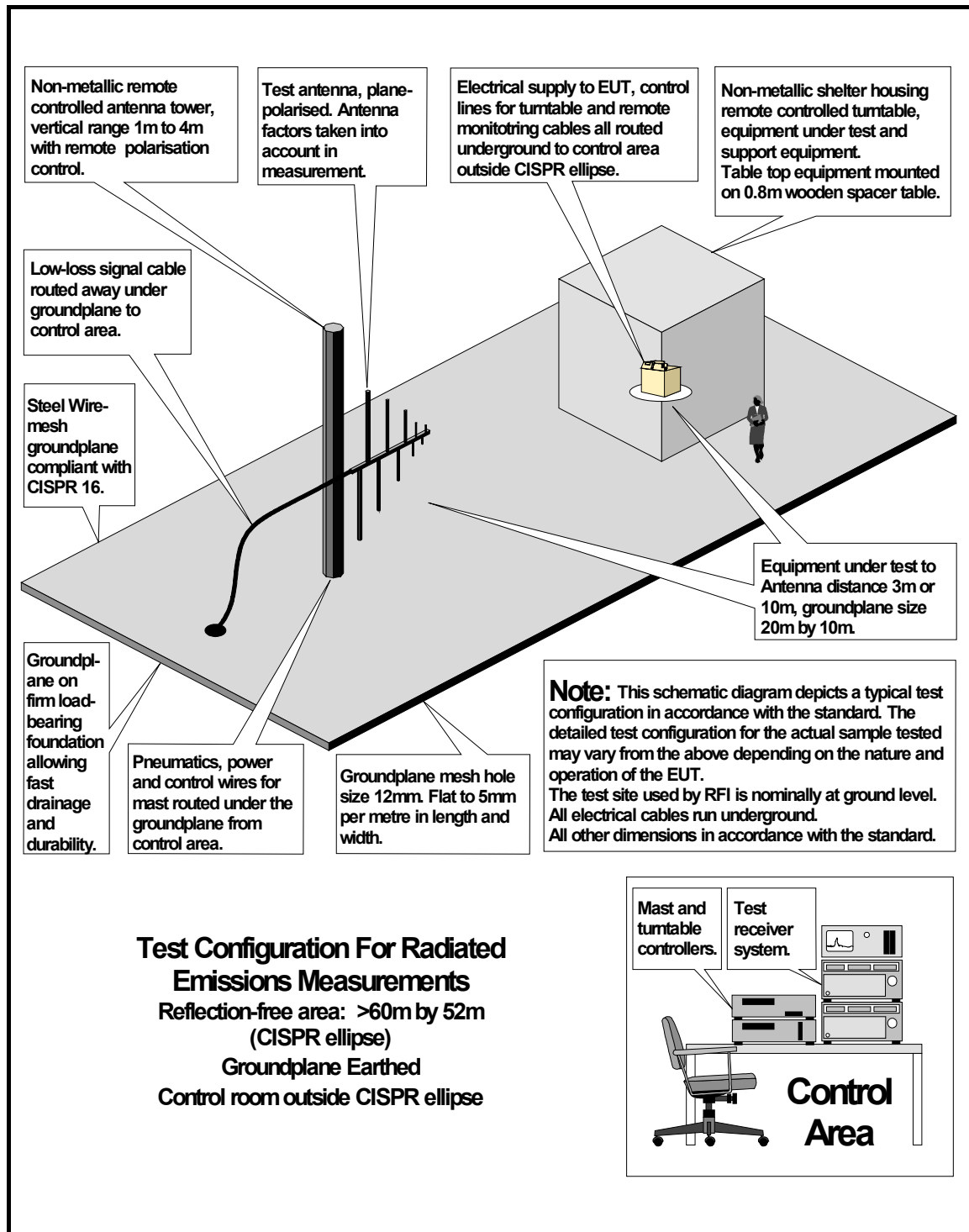
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DRG\48844JD05A\EMICON



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