

Straubing, 13 December 2006

TEST - REPORT

No. 50530-050682 (Edition 3)

for

RCD16 315 MHz / RC315-06 315 MHz / M5-831 315 MHz

Receiver Module for Garage Door Control

Applicant: ELDAT Gesellschaft für Elektronik und
Datentechnik mbH

Test Specifications: FCC Code of Federal Regulations,
CFR 47, Part 15,
Sections 15.107 and 15.109 (Class B)

Industry Canada Radio Standards
Specification RSS-Gen Issue 1,
Sections 7.2.2, 7.2.3 (Category I Receiver)

Note:

The test data of this report is related only to the individual item which has been tested. This report shall not be reproduced except in full extent without the written approval of the testing laboratory.

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1 Description of the Equipment Under Test (EUT)

General data of EUT	
Type designation ¹ :	RCD16 315 MHz / RC315-06 315 MHz / M5-831 315 MHz
Parts ² :	2
Serial number(s):	0001
Manufacturer:	ELDAT Gesellschaft für Elektronik und Datentechnik mbH
Type of equipment:	Receiver Module for Garage Door Control
Version:	As delivered
FCC ID:	NKPRC315-0624SPC
Additional parts/accessories:	GDO Elite 2007

Technical data of EUT	
Application frequency range:	314.2 - 315.8 MHz
Frequency range:	314.2 – 315.8 MHz
Operating frequency:	315 MHz
Type of modulation:	N/A
Pulse train:	---
Pulse width:	---
Number of RF-channels:	1
Channel spacing:	---
Designation of emissions ³ :	Not Applicable
Type of antenna:	Wire Antenna
Size/length of antenna:	35 cm
Connection of antenna:	<input type="checkbox"/> detachable <input checked="" type="checkbox"/> not detachable
Type of power supply:	DC supply
Specifications for power supply:	nominal voltage: 24 V

¹ Type designation of the system if EUT consists of more than one part.

² Type designations of the parts of the system, if applicable.

³ Also known as "Class of Emission".

2 Administrative Data

Application details	
Applicant (full address):	ELDAT Gesellschaft für Elektronik und Datentechnik mbH Im Gewerbepark 14 15711 Zeesen Deutschland
Contact person:	Herr Klaus Puppel
Contract identification:	Order No. 36292 0F
Receipt of EUT:	31 October 2005
Date(s) of test:	November 2005
Note(s):	---

Report details	
Report number:	50530-050682 (Edition 3)
Issue date:	13 December 2006

3 Identification of the Test Laboratory

Details of the Test Laboratory	
Company name:	Senton GmbH EMI/EMC Test Center
Address:	Aeussere Fruehlingstrasse 45 D-94315 Straubing Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-171/94-02
FCC test site registration number	90926
Industry Canada test site registration:	IC 3050
Contact person:	Mr. Johann Roidt
	Phone: (+49) (0)9421 5522-0 Fax: (+49) (0)9421 5522-99

4 Summary

Summary of test results

The tested sample complies with the requirements set forth in the

Code of Federal Regulations CFR 47, Part 15, Sections 15.107 and 15.109 (Class B)

of the Federal Communication Commission (FCC) and the

Radio Standards Specification RSS-Gen Issue 1, Sections 7.2.2, 7.2.3 (Category I Receiver)

of Industry Canada (IC).

Personnel involved in this report

Laboratory Manager:



Mr. Johann Roidt

Responsible for testing:



Mr. Martin Steindl

Responsible for test report:

Mr. Martin Steindl

5 Operation Mode and Configuration of EUT

Operation Mode

Normal operating mode – waiting for signal

Configuration(s) of EUT

The EUT was configured as a receiver module of a “GDO Elite 2007” garage door opener

List of ports and cables

<i>Port</i>	<i>Description</i>	<i>Classification⁴</i>	<i>Cable type</i>	<i>Cable length</i>
1	DC supply	dc power	Unshielded	Internal
2	Control	signal/control port	Unshielded	Internal
3	AC power supply	ac power	Shielded	> 3 m
4	Motor lines	ac power signal/control port	Shielded	> 3 m

List of devices connected to EUT

<i>Item</i>	<i>Description</i>	<i>Type Designation</i>	<i>Serial no. or ID</i>	<i>Manufacturer</i>
	Not Applicable			

List of support devices

<i>Item</i>	<i>Description</i>	<i>Type Designation</i>	<i>Serial no. or ID</i>	<i>Manufacturer</i>
1	GDO Elite 2007	Garage Door Opener		

⁴ Ports shall be classified as ac power, dc power or signal/control port

6 Measurement Procedures

6.1 Conducted AC Powerline Emission

Measurement Procedure:

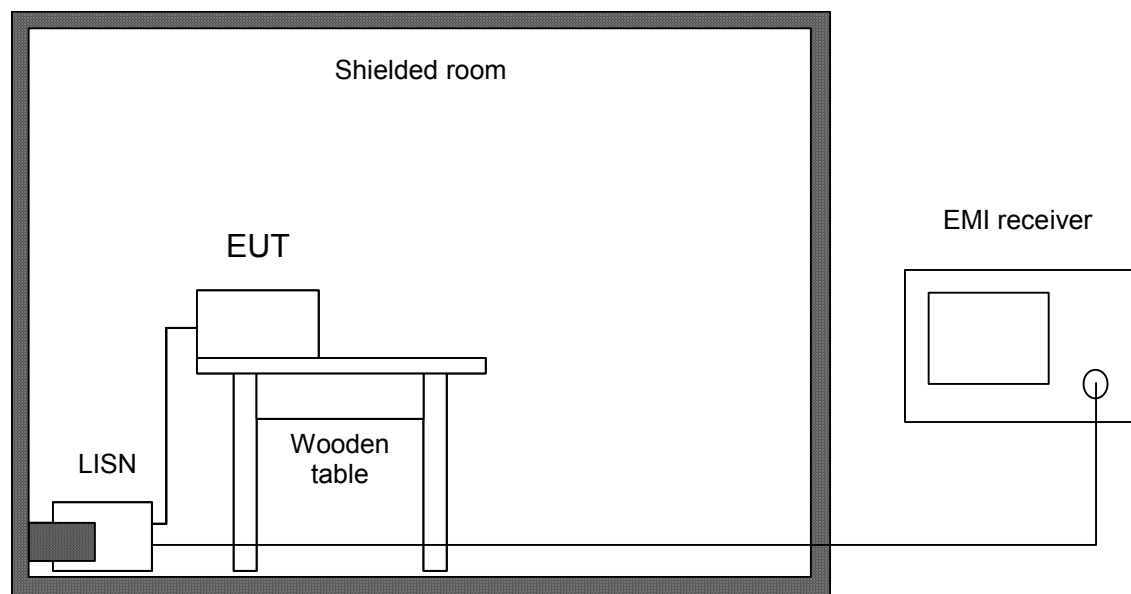
Rules and specifications: CFR 47 Part 15, section 15.107 (Class B)
 IC RSS-Gen Issue 1, section 7.2.2

Guide: ANSI C63.4 / CISPR 22

Conducted emission tests in the frequency range 150 kHz to 30 MHz are performed using Line Impedance Stabilization Networks (LISNs). To simplify testing with quasi-peak and average detector the following procedure is used:

First the whole spectrum of emission caused by the equipment under test (EUT) is recorded with detector set to peak using CISPR bandwidth of 10 kHz. After that all emission levels having less margin than 10 dB to or exceeding the average limit are retested with detector set to quasi-peak.

If average limit is kept with quasi-peak levels no additional scan with average detector is necessary. In cases of emission levels between quasi-peak and average limit an additional scan with detector set to average is performed.

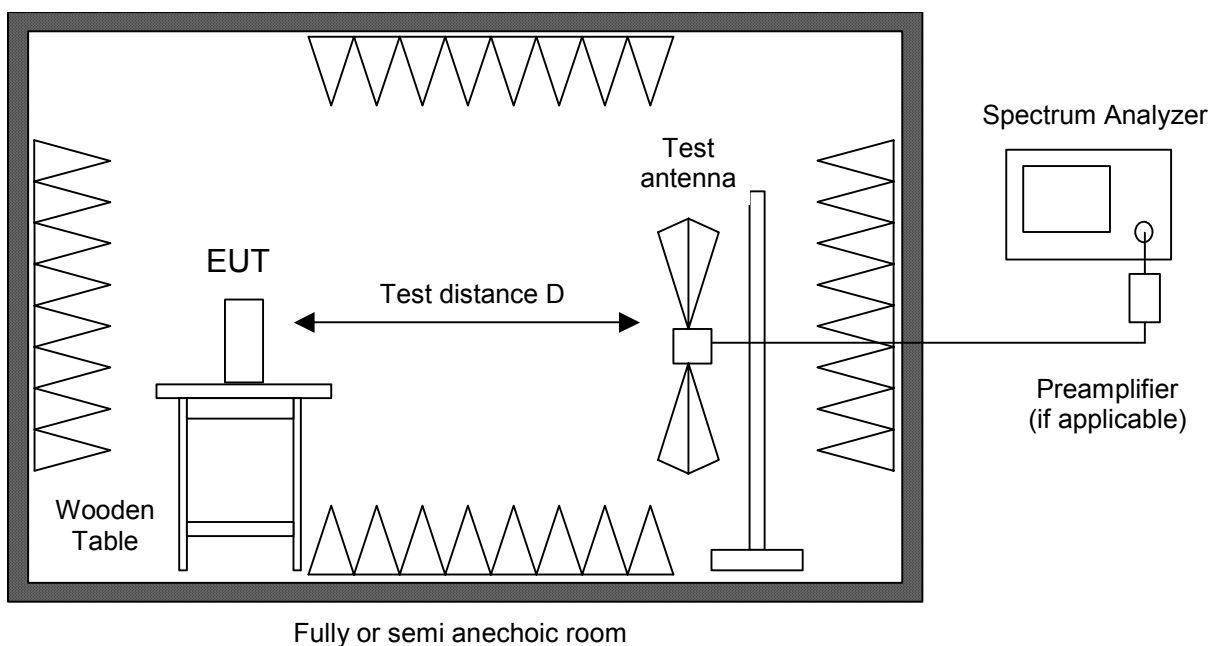


Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	EMI receiver	ESHS 10	860043/016	Rohde & Schwarz
<input checked="" type="checkbox"/>	LISN	ESH3-Z5	862770/021	Rohde & Schwarz
<input type="checkbox"/>	LISN	ESH3-Z5	830952/025	Rohde & Schwarz
<input type="checkbox"/>	Artificial mains network	ESH 2-Z5	842966/004	Rohde & Schwarz
<input type="checkbox"/>	Shielded room	No. 1	1451	Albatross Projects
<input checked="" type="checkbox"/>	Shielded room	No. 4	3FD-100 544	Euroshield

6.2 Radiated Emission in Fully or Semi Anechoic Room

Measurement Procedure:	
Rules and specifications:	CFR 47 Part 15, section 15.109 (Class B) IC RSS-Gen Issue 1, sections 6(a) and 7.2.3.2
Guide:	ANSI C63.4
<p>Radiated emission in fully or semi anechoic room is measured in the frequency range from 30 MHz to the maximum frequency as specified in CFR 47 Part 15 section 15.33.</p> <p>Measurements are made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution as well as video bandwidth set to 100 kHz (below 1 GHz) or 1 MHz (above 1 GHz).</p> <p>Testing up to 1 GHz is performed with a linear polarized logarithmic periodic antenna combined with a 4:1 broadband dipole ("Trilog broadband antenna"). For testing above 1 GHz horn antennas are used.</p> <p>All tests below 18 GHz are performed at a test distance D of 3 meters. For higher frequencies the test distance is reduced (e.g. to 1 meter) due to the sensitivity of the measuring instrument(s) and the test results are calculated according to CFR 47 Part 15 section 15.31(f)(1) using an extrapolation factor of 20 dB/decade. If required, preamplifiers are used for the whole frequency range. Special care is taken to avoid overload, using appropriate attenuators and filters, if necessary.</p> <p>If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value.</p> <p>Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.</p> <p>During testing the EUT is rotated all around to find the maximum levels of emissions. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.</p> <p>For final testing below 1 GHz an open field test-site is used and the plots recorded in the fully or semi anechoic room are indicated as prescans.</p>	

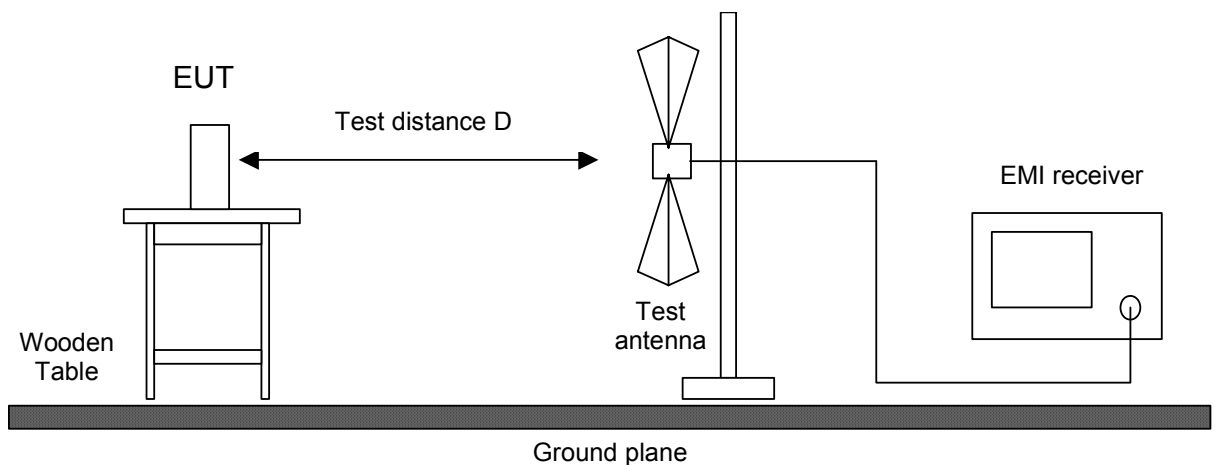


Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
<input type="checkbox"/>	Spectrum analyzer	R 3271	05050023	Advantest
<input type="checkbox"/>	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
<input checked="" type="checkbox"/>	Preamplifier	CPA9231A	3393	Schaffner
<input type="checkbox"/>	Preamplifier	R14601		Advantest
<input type="checkbox"/>	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
<input type="checkbox"/>	Preamplifier 0.5-8 GHz	AMF-4D-005080-25-13P	860149	Miteq
<input type="checkbox"/>	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
<input type="checkbox"/>	External Mixer	WM782A	845881/005	Tektronix
<input type="checkbox"/>	Harmonic Mixer	FS-Z30	843389/007	Rohde & Schwarz
	Accessories			
<input checked="" type="checkbox"/>	Trilog broadband antenna	VULB 9163	9163-188	Schwarzbeck
<input type="checkbox"/>	Horn antenna	3115	9508-4553	EMCO
<input type="checkbox"/>	Horn antenna	3160-03	9112-1003	EMCO
<input type="checkbox"/>	Horn antenna	3160-04	9112-1001	EMCO
<input type="checkbox"/>	Horn antenna	3160-05	9112-1001	EMCO
<input type="checkbox"/>	Horn antenna	3160-06	9112-1001	EMCO
<input type="checkbox"/>	Horn antenna	3160-07	9112-1008	EMCO
<input type="checkbox"/>	Horn antenna	3160-08	9112-1002	EMCO
<input type="checkbox"/>	Horn antenna	3160-09	9403-1025	EMCO
<input type="checkbox"/>	Horn antenna	3160-10	399185	EMCO
<input checked="" type="checkbox"/>	Fully anechoic room	No. 2	1452	Albatross Projects
<input type="checkbox"/>	Semi-anechoic room	No. 3	1453	Siemens

6.3 Radiated Emission at Open Field Test Site

Measurement Procedure:	
Rules and specifications:	CFR 47 Part 15, section 15.109 (Class B) IC RSS-Gen Issue 1, sections 6(a) and 7.2.3.2
Guide:	ANSI C63.4
<p>Radiated emission at open field test site is measured in the frequency range 30 MHz to 1 GHz using a biconical antenna up to 300 MHz and a logarithmic periodic antenna above. The measurement bandwidth of the test receiver is set to 120 kHz with quasi-peak detector selected.</p> <p>If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value.</p> <p>Hand-held or body-worn devices are tested in the position producing the highest emission relative to the limit as verified by prescans in the fully anechoic room. EUT is rotated all around and receiving antenna is raised and lowered within 1 meter to 4 meters to find the maximum levels of emission. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.</p> <p>For measuring emissions of intentional radiators and receivers a test distance D of 3 meters is selected. Testing of unintentional radiators is performed at a distance of 10 meters. If limits specified for 3 meters shall be used for measurements performed at 10 meters distance the limits are calculated according to CFR 47 Part 15 section 15.31(d) and (f)(1) using an inverse linear-distance extrapolation factor of 20 dB/decade.</p>	

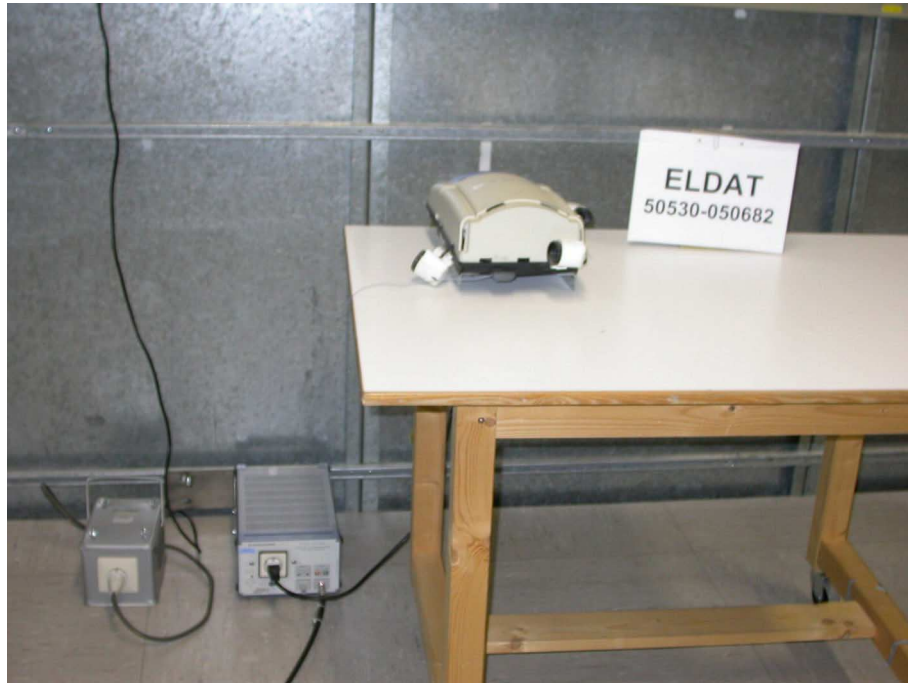


Test instruments used:

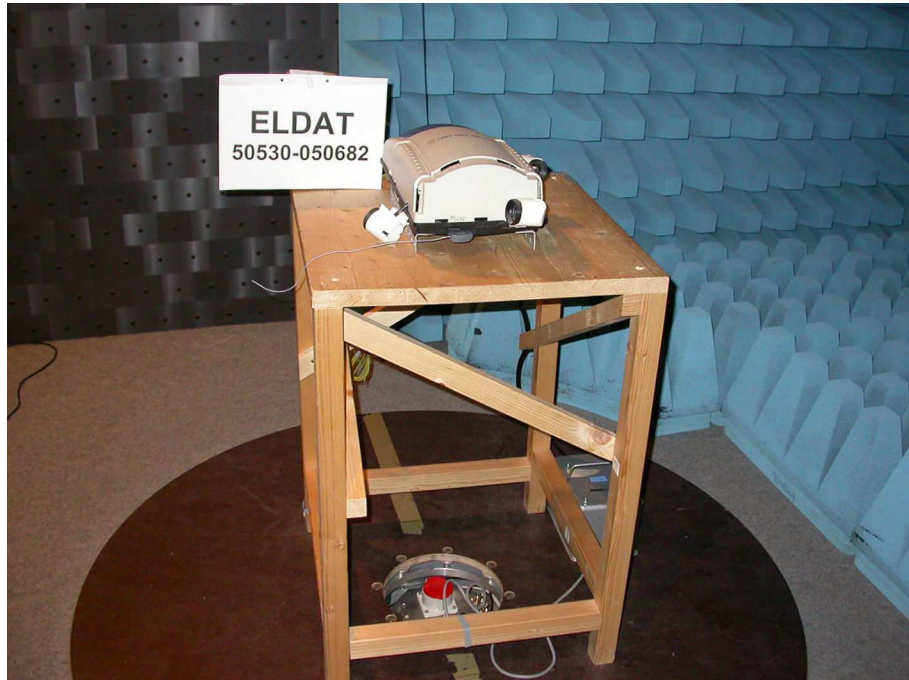
Used	Type	Model	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	EMI receiver	ESVP	881414/009	Rohde & Schwarz
<input checked="" type="checkbox"/>	Biconical antenna	EG 1 HK 116	842204/001	Rohde & Schwarz
<input checked="" type="checkbox"/>	Log. per. antenna	EG 1 HL 223	841516/023	Rohde & Schwarz
<input checked="" type="checkbox"/>	Open field test site	EG 1	1450	Senton

7 Photographs Taken During Testing

Test setup for conducted AC powerline emission measurement



**Test setup for radiated emission measurement
(fully anechoic room)**



**Test setup for radiated emission measurement
(open field test site)**



8 Test Results

FCC CFR 47 Part 15			
<i>Section(s)</i>	<i>Test</i>	<i>Page</i>	<i>Result</i>
15.107	Conducted AC powerline emission 150 kHz to 30 MHz	17	Test passed
15.109	Radiated emission 30 MHz to 1.6 GHz	18	Test passed
15.111(a)	Antenna power conduction emission of receivers 9 kHz to 1.6 GHz	---	Not applicable

IC RSS-Gen Issue 1			
<i>Section(s)</i>	<i>Test</i>	<i>Page</i>	<i>Result</i>
7.2.2	Transmitter AC power lines conducted emissions 150 kHz to 30 MHz	17	Test passed
6(a), 7.2.3.2	Receiver spurious emissions (radiated) 30 MHz to 1.6 GHz	18	Test passed
6(b), 7.2.3.1	Receiver spurious emissions (antenna conducted) 9 kHz to 1.6 GHz	---	Not applicable

8.1 Conducted Powerline Emission Measurement 150 kHz to 30 MHz

Rules and specifications:	CFR 47 Part 15, section 15.107 IC RSS-Gen Issue 1, section 7.2.2		
Guide:	ANSI C63.4 / CISPR 22		
Limit:	Frequency of Emission (MHz)	Conducted Limit (dBµV)	
		Quasi-peak	Average
	0.15 - 0.5	66 to 56	56 to 46
	0.5 - 5	56	46
	5 - 30	60	50
Measurement procedure:	Conducted AC Powerline Emission (6.1)		

Comment:	
Date of test:	7 November 2005
Test site:	Shielded room, cabin no. 1

Test Result:	Test passed
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Tested on:	L1
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Frequency (MHz)	Detector	Reading Value (dBµV)	Correction Factor (dB)	Final Value (dBµV)	Limit (dBµV)	Margin (dB)
0.150	Quasi-Peak	52.3	0.0	52.3	66.0	13.7
0.195	Quasi-Peak	47.0	0.0	47.0	63.8	16.8
0.230	Quasi-Peak	39.7	0.0	39.7	62.4	22.7

Tested on:	N
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Frequency (MHz)	Detector	Reading Value (dBµV)	Correction Factor (dB)	Final Value (dBµV)	Limit (dBµV)	Margin (dB)
0.155	Quasi-Peak	52.1	0.0	52.1	65.7	13.6
0.190	Quasi-Peak	48.1	0.0	48.1	64.0	15.9
0.230	Quasi-Peak	39.7	0.0	39.7	62.4	22.7

Sample calculation of final values:

$$\text{Final Value (dBµV)} = \text{Reading Value (dBµV)} + \text{Correction Factor (dB)}$$

8.2 Radiated Emission Measurement 30 MHz to 1.6 GHz

Rules and specifications:	CFR 47 Part 15, section 15.109 (Class B) IC RSS-Gen Issue 1, sections 6(a) and 7.2.3.2		
Guide:	ANSI C63.4		
Limit:	Frequency of Emission (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Field Strength ($\text{dB}\mu\text{V}/\text{m}$)
	30 - 88	100	40.0
	88 - 216	150	43.5
	216 - 960	200	46.0
	Above 960	500	54.0
Measurement procedures:	Radiated Emission in Fully or Semi Anechoic Room (6.2) Radiated Emission at Open Field Test Site (6.3)		

Comment:	7 November 2005		
Date of test:			
Test site:	Frequencies ≤ 1 GHz: Open field test site Frequencies > 1 GHz: Fully anechoic room, cabin no. 2		
Test distance:	3 meters		

Test Result:	Test passed
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No measurements above noise floor detected

Sample calculation of field final values:

$$\text{Final Value (dB}\mu\text{V}/\text{m)} = \text{Reading Value (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

9 Referenced Regulations

All tests were performed with reference to the following regulations and standards:

<input type="checkbox"/>	CFR 47 Part 2	Code of Federal Regulations Part 2 (Frequency allocation and radio treaty matters; General rules and regulations) of the Federal Communication Commission (FCC)	October 10, 2004
<input checked="" type="checkbox"/>	CFR 47 Part 15	Code of Federal Regulations Part 15 (Radio Frequency Devices) of the Federal Communication Commission (FCC)	September 19, 2005
<input checked="" type="checkbox"/>	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	December 11, 2003 (published on January 30, 2004)
<input checked="" type="checkbox"/>	RSS-Gen	Radio Standards Specification RSS-Gen Issue 1 containing General Requirements and Information for the Certification of Radiocommunication Equipmment, published by Industry Canada	September 2005
<input checked="" type="checkbox"/>	RSS-210	Radio Standards Specification RSS-210 Issue 6 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, published by Industry Canada	September 2005
<input type="checkbox"/>	RSS-310	Radio Standards Specification RSS-310 Issue 1 for Low Power Licence-Ecempt Radiocommunicaton Devices (All Frequency Bands): Category II Equipment, published by Industry Canada	September 2005
<input type="checkbox"/>	RSS-102	Radio Standards Specification RSS-102 Issue 1: Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields, published by Industry Canada	September 25, 1999
<input type="checkbox"/>	ICES-003	Interference-Causing Equipment Standard ICES-003 Issue 4 for Digital Apparatus, published by Industry Canada	February 7, 2004
<input checked="" type="checkbox"/>	CISPR 22	Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement"	1997
<input type="checkbox"/>	CAN/CSA-CEI/IEC CISPR 22	Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment	2002
<input type="checkbox"/>	TRC-43	Notes Regarding Designation of Emission (Including Necessary Bandwidth and Classification), Class of Station and Nature of Service, published by Industry Canada	October 9, 1982

10 Charts taken during testing

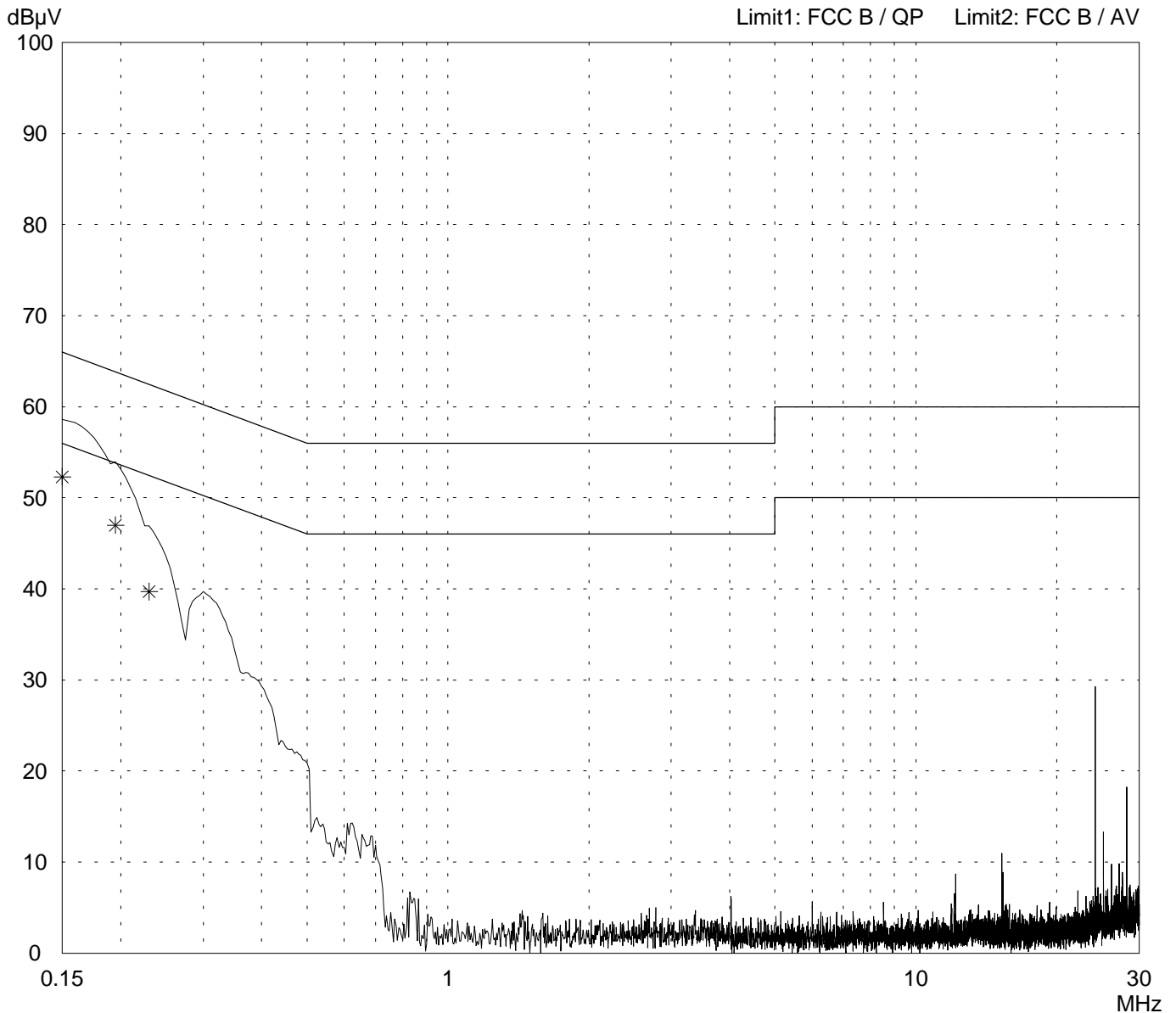
Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart B Class B

Model: RCD16	
Serial no.: 0001	
Applicant: Eldat GmbH	
Test site: Shielded room, cabin no. 4	
Tested on: Linecord Phase L1	
Date of test: 11/07/2005	Operator: M. Steindl
Test performed: semi automatically	File name:

Mode: - AC 115 V power supply - EUT within "GDO Elite 2007" (24V)	
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Detector: Peak / Final Results: QP

Final results: 20 dB Margin	25 Subranges
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Result: Limit kept

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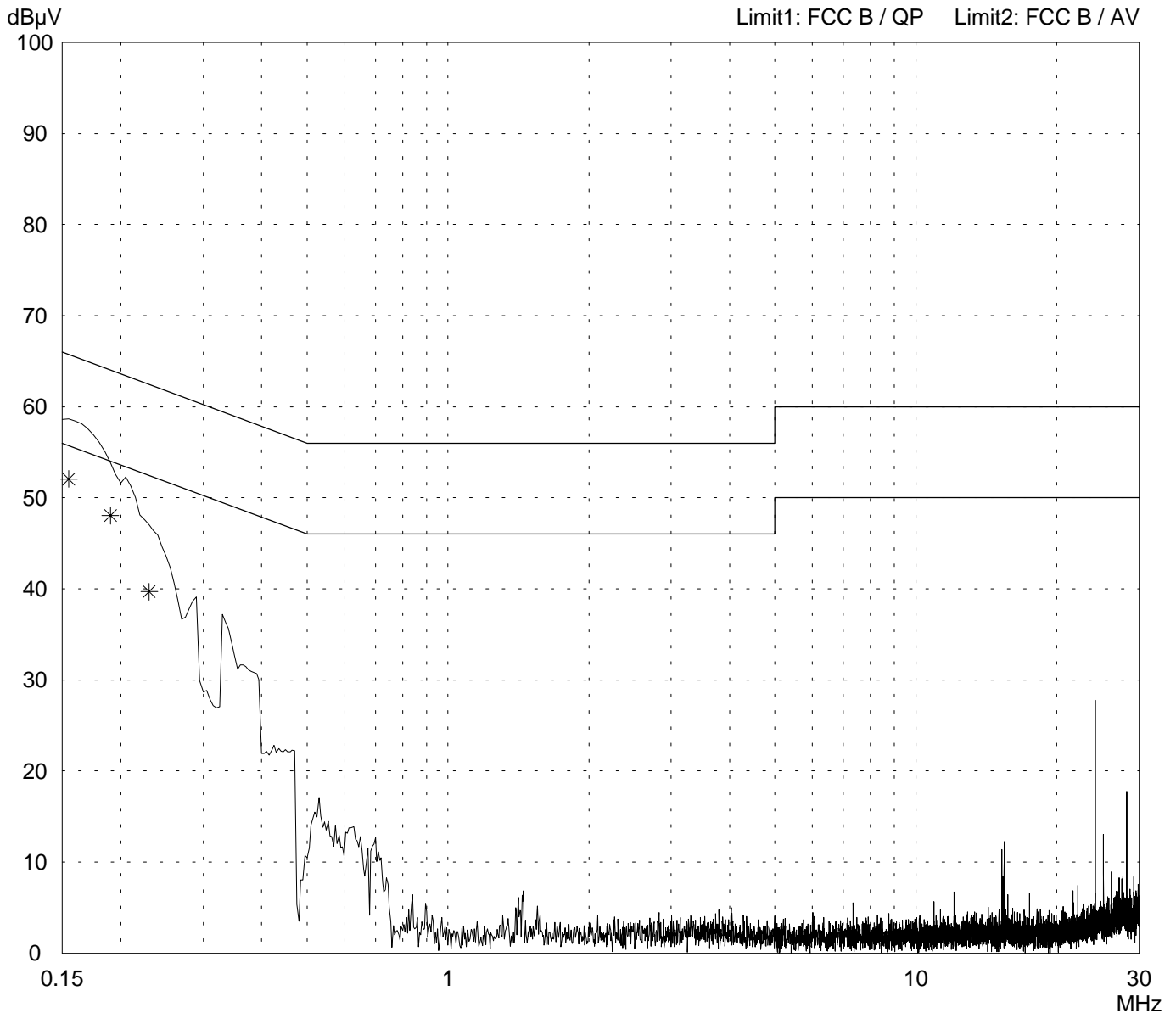
Conducted Emission Test 150 kHz - 30 MHz according to FCC Part 15 Subpart B Class B

Model: RCD16	
Serial no.: 0001	
Applicant: Eldat GmbH	
Test site: Shielded room, cabin no. 4	
Tested on: Linecord Phase N	
Date of test: 11/07/2005	Operator: M. Steindl
Test performed: semi automatically	File name:

Mode: - AC 115 V power supply - EUT within "GDO Elite 2007" (24V)	
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Detector: Peak / Final Results: QP

Final results: 20 dB Margin	25 Subranges
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Result: Limit kept

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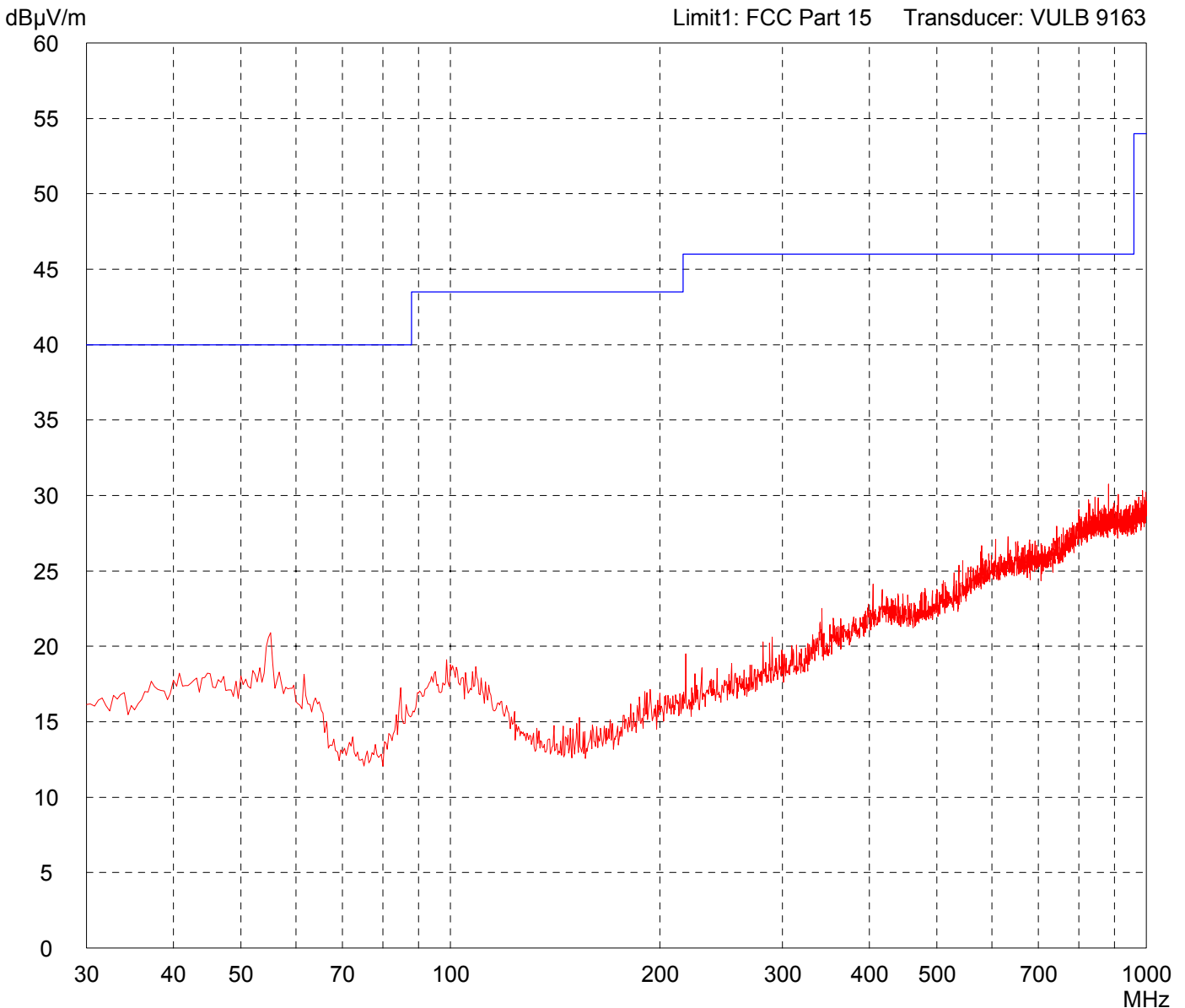
Radiated Emission Test 30 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: RCD16	
Serial no.: 0001	
Applicant: Eldat GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Horizontal Polarization	
Date of test: 11/07/2005	Operator: M. Steindl
Test performed: automatically	File name: default.emi

Comment:
 - AC 115 V power supply
 - EUT within "GDO Elite 2007" (24 V)

Detector:
Peak

List of values:
 10 dB Margin 50 Subranges



Result:
Prescan

Project file:
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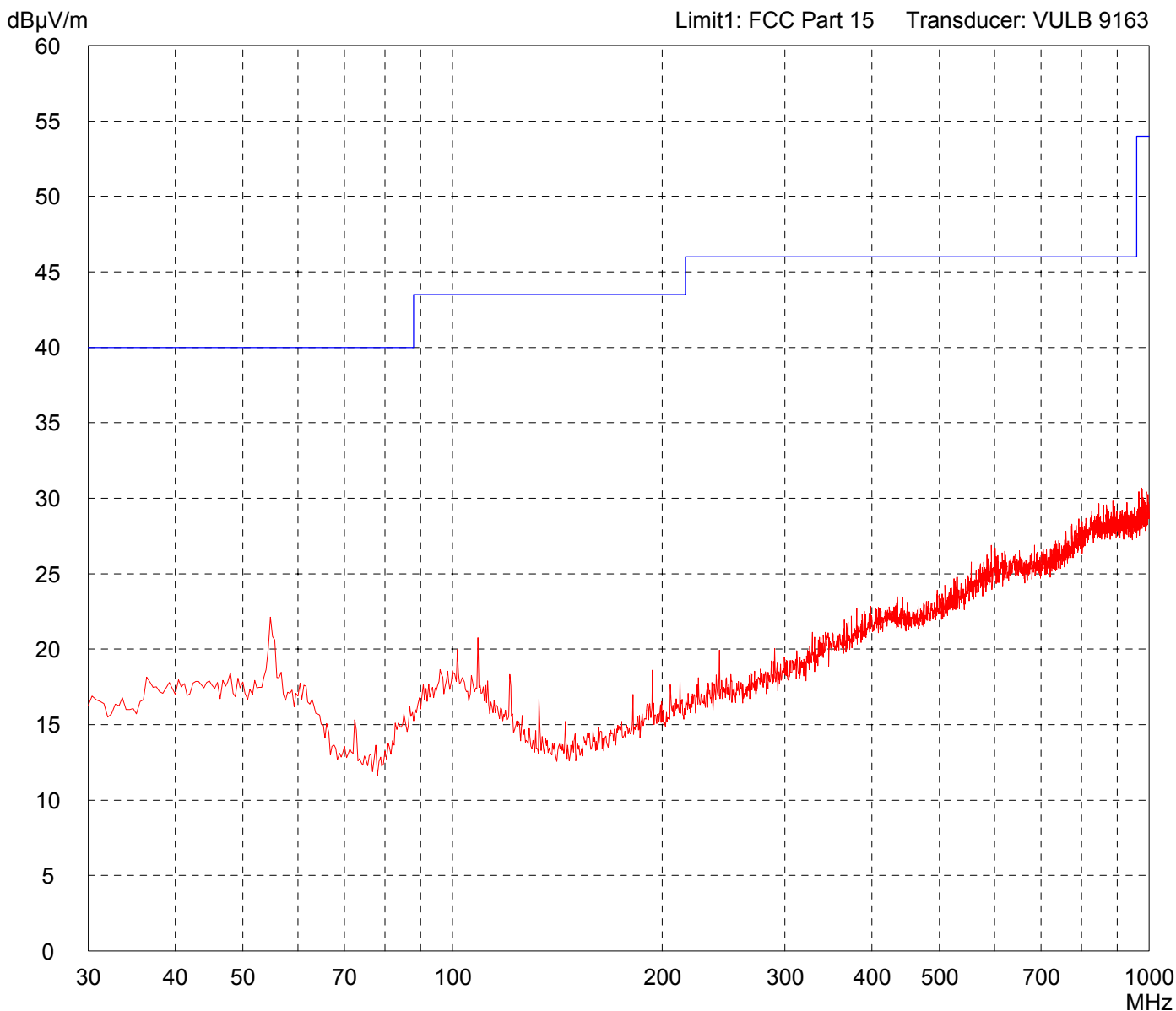
Radiated Emission Test 30 MHz - 1 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: RCD16	
Serial no.: 0001	
Applicant: Eldat GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 11/07/2005	Operator: M. Steindl
Test performed: automatically	File name: default.emi

Comment:
 - AC 115 V power supply
 - EUT within "GDO Elite 2007" (24 V)

Detector:
Peak

List of values:
 10 dB Margin 50 Subranges



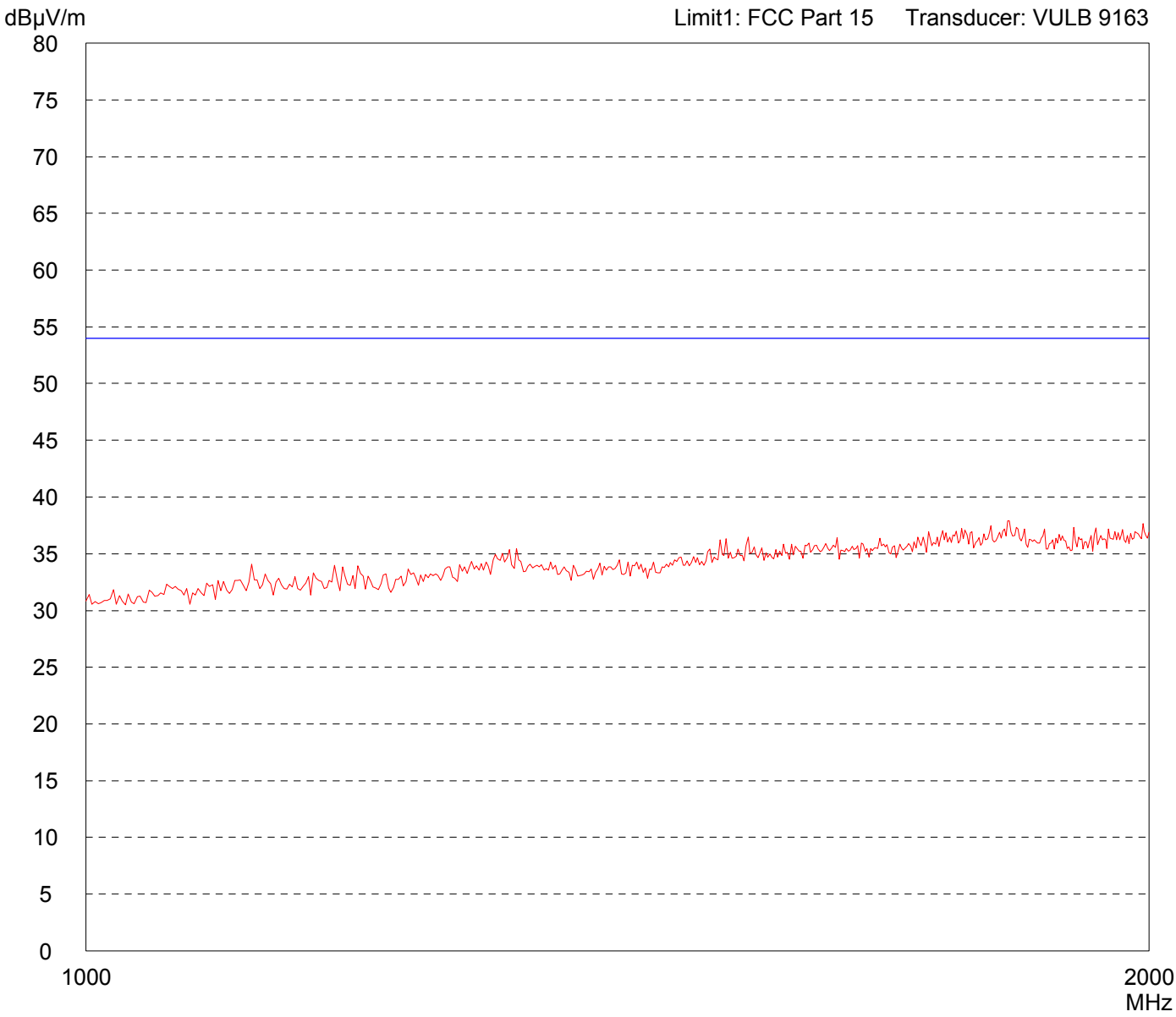
Result:
Prescan

Project file:
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Radiated Emission Test 1 GHz - 2 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

<p>Model: RCD16</p> <p>Serial no.: 0001</p> <p>Applicant: Eldat GmbH</p> <p>Test site: Fully anechoic room, cabin no. 2</p> <p>Tested on: Test distance 3 metres Horizontal Polarization</p> <p>Date of test: 11/07/2005 Operator: M. Steindl</p> <p>Test performed: automatically File name: default.emi</p>	<p>Comment: - AC 115 V power supply - EUT within "GDO Elite 2007" (24 V)</p>
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<p>Detector: Peak</p>	<p>List of values: 10 dB Margin 50 Subranges</p>
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<p>Result: Limit kept</p>	<p>Project file: 50530-50682</p> <p style="text-align: right;">Page of Pages</p>
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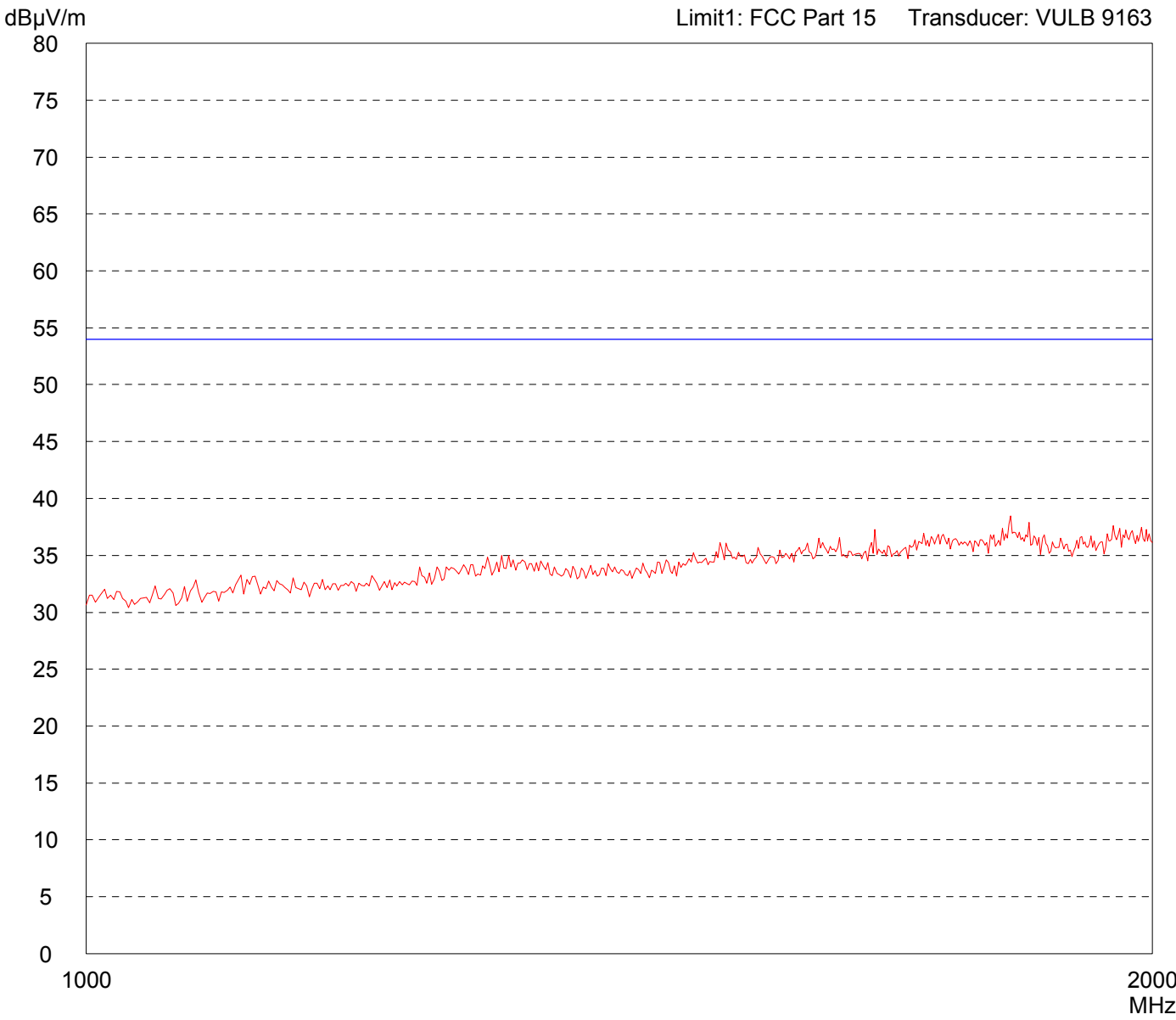
Radiated Emission Test 1 GHz - 2 GHz acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: RCD16	
Serial no.: 0001	
Applicant: Eldat GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 11/07/2005	Operator: M. Steindl
Test performed: automatically	File name: default.emi

Comment: - AC 115 V power supply - EUT within "GDO Elite 2007" (24 V)	
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Detector: Peak

List of values: 10 dB Margin	50 Subranges
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Result: Limit kept

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