

Straubing, Oktober 20, 2006

TEST - REPORT

No. 50530-060898-1 (Edition 1)

for

RCL03 / RCL04

Remote Control Receiver

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 :	RCL03 / RCL04
Parts ² :	
Serial number(s):	EMC Test Sample 1
Manufacturer:	ELDAT Gesellschaft für Elektronik und Datentechnik mbH
Type of equipment:	Remote Control Receiver
Version:	As delivered
FCC ID:	NKPRCL04
Additional parts/accessories:	

Technical data of EUT									
Application frequency range:	N/A								
Frequency range:	315 MHz								
Operating frequency:	315 MHz								
Type of modulation:	ASK								
Pulse train:	N/A								
Pulse width:	N/A								
Number of RF-channels:	1								
Channel spacing:	Wideband								
Designation of emissions ³ :	N/A								
Type of antenna:	Wire								
Size/length of antenna:	32 cm								
Connection of antenna:	☐ detachable ☒ not detachable								
Type of power supply:	AC supply								
Specifications for power supply:	<table> <tr> <td>nominal voltage:</td><td>N/A V</td></tr> <tr> <td>minimum voltage:</td><td>12 V</td></tr> <tr> <td>maximum voltage:</td><td>24 V</td></tr> <tr> <td>nominal frequency:</td><td>AC or DC</td></tr> </table>	nominal voltage:	N/A V	minimum voltage:	12 V	maximum voltage:	24 V	nominal frequency:	AC or DC
nominal voltage:	N/A V								
minimum voltage:	12 V								
maximum voltage:	24 V								
nominal frequency:	AC or DC								

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 D-15711 Zeesen
Contact person:	Marina Brüsse
Contract identification:	P. O. 46133 OF
Receipt of EUT:	18 October 2006
Date(s) of test:	19 October 2006
Note(s):	---

Report details	
Report number:	50530-060898-1
Edition:	1
Issue date:	Oktober 20, 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. Johann Roidt

Responsible for test report:

Mr. Johann Roidt

5 Operation Mode and Configuration of EUT

Operation Mode(s)

Normal operation, supply voltage 18 V DC

Configuration(s) of EUT

Tests were performed in stand alone configuration

List of ports and cables

<i>Port</i>	<i>Description</i>	<i>Classification⁴</i>	<i>Cable type</i>	<i>Cable length</i>
1	Power supply input	dc power	Unshielded	

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>
1	None			

List of support devices

<i>Item</i>	<i>Description</i>	<i>Type Designation</i>	<i>Serial no. or ID</i>	<i>Manufacturer</i>
1	None			

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:

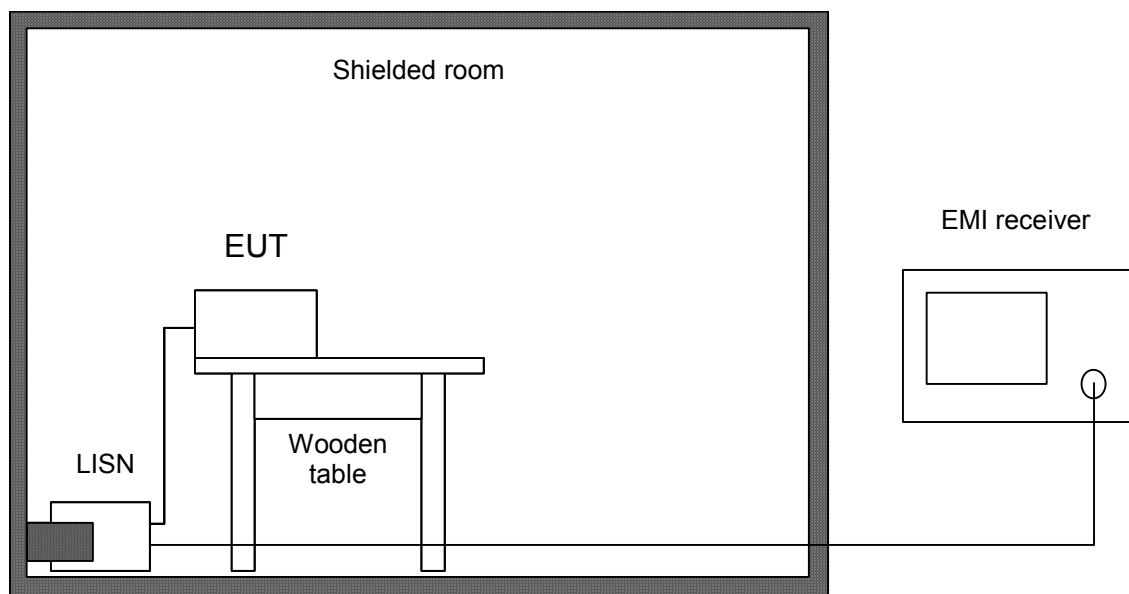
Rules and specifications: CFR 47 Part 15, section 15.107 (Class B)
 IC RSS-Gen Issue 1, section 7.2.2

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.

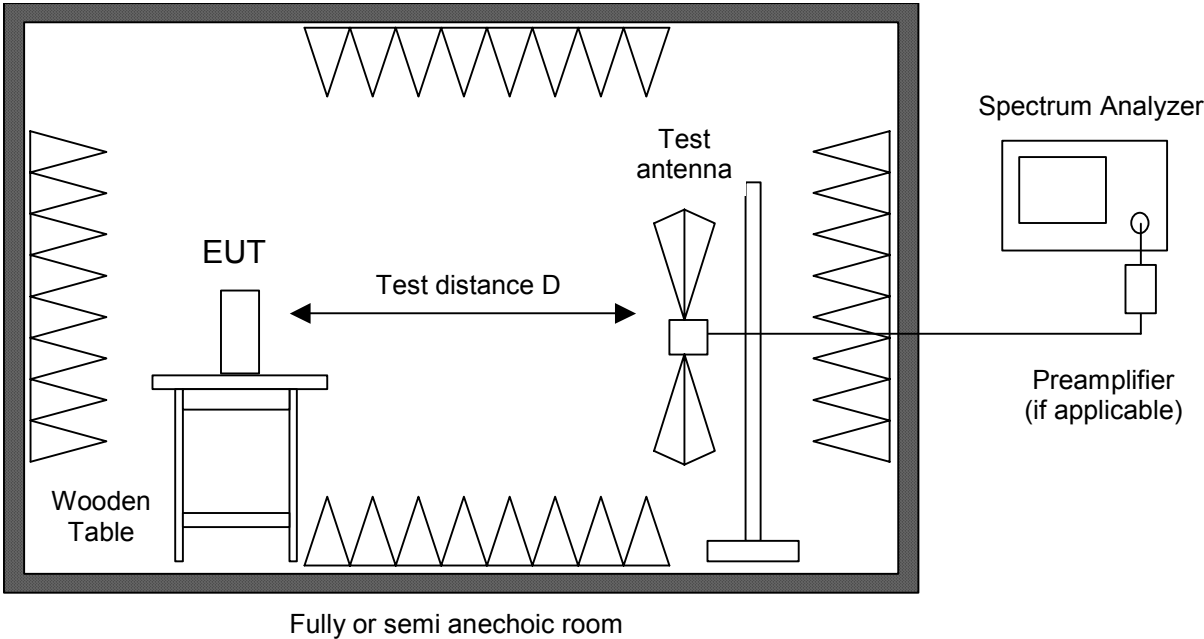


Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
☒	EMI receiver	ESHS 10	860043/016	Rohde & Schwarz
☒	LISN	ESH3-Z5	862770/021	Rohde & Schwarz
☐	LISN	ESH3-Z5	830952/025	Rohde & Schwarz
☐	Artificial mains network	ESH 2-Z5	842966/004	Rohde & Schwarz
☐	Shielded room	No. 1	1451	Albatross Projects
☒	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
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. 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). 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. 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. 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. 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. 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. 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.	

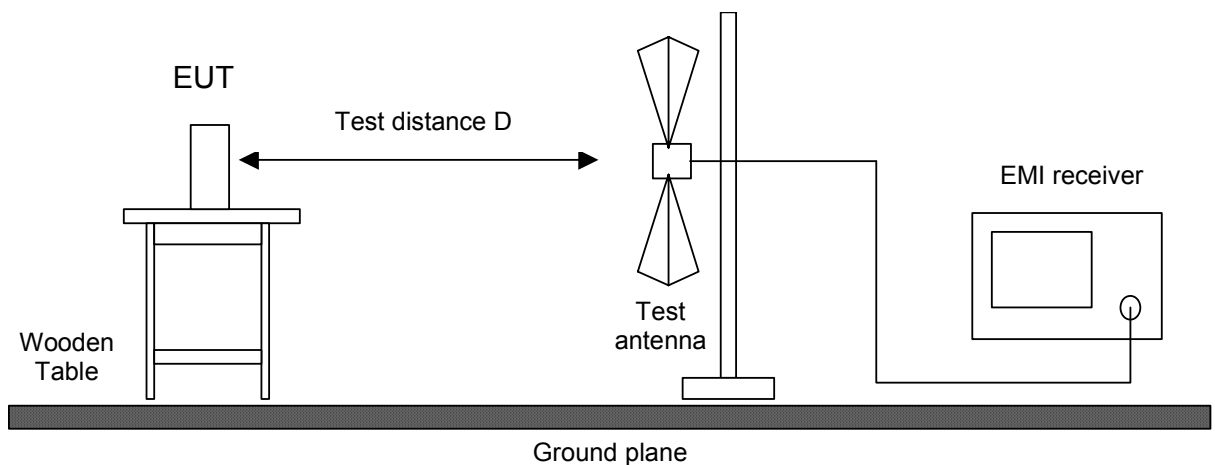


Test instruments used:

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



Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
☒	EMI receiver	ESVP	881120/024	Rohde & Schwarz
☒	Biconical antenna	EG 1 HK 116	842204/001	Rohde & Schwarz
☒	Log. per. antenna	EG 1 HL 223	841516/023	Rohde & Schwarz
☒	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)**



8 Test Results

FCC CFR 47 Part 15			
Section(s)	Test	Page	Result
15.107	Conducted AC powerline emission 150 kHz to 30 MHz	16	Test passed
15.109	Radiated emission 30 MHz to 3.5 GHz	17	Test passed
15.111(a)	Antenna power conduction emission of receivers 9 kHz to 3.5 GHz	---	Not applicable

IC RSS-Gen Issue 1			
Section(s)	Test	Page	Result
7.2.2	Transmitter AC power lines conducted emissions 150 kHz to 30 MHz	16	Test passed
6(a), 7.2.3.2	Receiver spurious emissions (radiated) 30 MHz to 3.5 GHz	17	Test passed
6(b), 7.2.3.1	Receiver spurious emissions (antenna conducted) 9 kHz to 3.5 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:	19 October 2006
Test site:	Shielded room, cabin no. 1

Test Result:	Test passed
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Tested on:	Linecord DC input port / plus
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Frequency (MHz)	Detector	Reading Value (dBµV)	Correction Factor (dB)	Final Value (dBµV)	Limit (dBµV)	Margin (dB)
0.150-30	No emissions above noise floor detected					

Tested on:	Linecord DC input port / minus
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Frequency (MHz)	Detector	Reading Value (dBµV)	Correction Factor (dB)	Final Value (dBµV)	Limit (dBµV)	Margin (dB)
0.150-30	No emissions above noise floor detected					

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 3.5 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 (µV/m)	Field Strength (dBµV/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:	18 October 2006 Frequencies ≤ 1 GHz: Open field test site Frequencies > 1 GHz: Fully anechoic room, cabin no. 2
Date of test:	
Test site:	
Test distance:	3 meters

Test Result:	Test passed
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Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBµV)	Correction Factor (dB/m)	Final Value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30-3500	No emissions above noise floor detected						

Sample calculation of field final values:

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

9 Referenced Regulations

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

☒	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
☒	CFR 47 Part 15	Code of Federal Regulations Part 15 (Radio Frequency Devices) of the Federal Communication Commission (FCC)	September 19, 2005
☒	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)
☒	RSS-Gen	Radio Standards Specification RSS-Gen Issue 1 containing General Requirements and Information for the Certification of Radiocommunication Equipmpment, published by Industry Canada	September 2005
☒	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
☐	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
☐	RSS-102	Radio Standards Specification RSS-102 Issue 2: Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)	November 2005
☐	ICES-003	Interference-Causing Equipment Standard ICES-003 Issue 4 for Digital Apparatus, published by Industry Canada	February 7, 2004
☐	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
☐	CAN/CSA-CEI/IEC CISPR 22	Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment	2002
☐	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 EN 55022 Class B / CISPR 22

Model:
RCL 03 / RCL 04

Serial no.:
Sample no. 1

Applicant:
Eldat GmbH

Test site:
Shielded room, cabin no. 4

Tested on:
Linecord dc input port
Plus

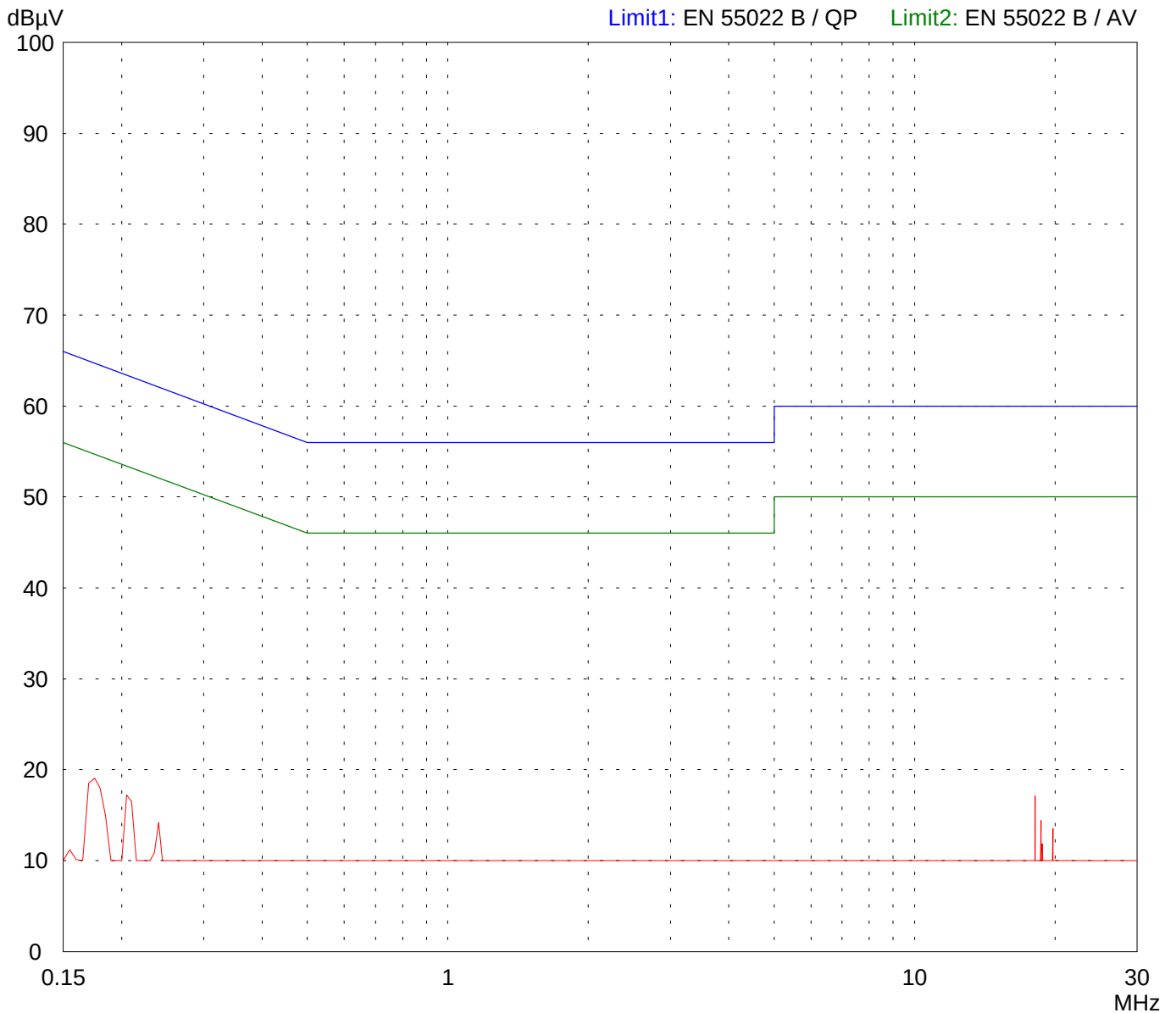
Date of test: 10/19/2006
Operator: R. Heller

Test performed: automatically
File name:

Mode:
- Supply Voltage 18 V DC

Detector:
Peak / Final Results: QP

Final results:
Selected by hand



Result:
Limit kept

Project file:
50530-060898

Conducted Emission Test 150 kHz - 30 MHz according to EN 55022 Class B / CISPR 22

Model:
RCL 03 / RCL 04

Serial no.:
Sample no. 1

Applicant:
Eldat GmbH

Test site:
Shielded room, cabin no. 4

Tested on:
Linecord dc input port
Minus

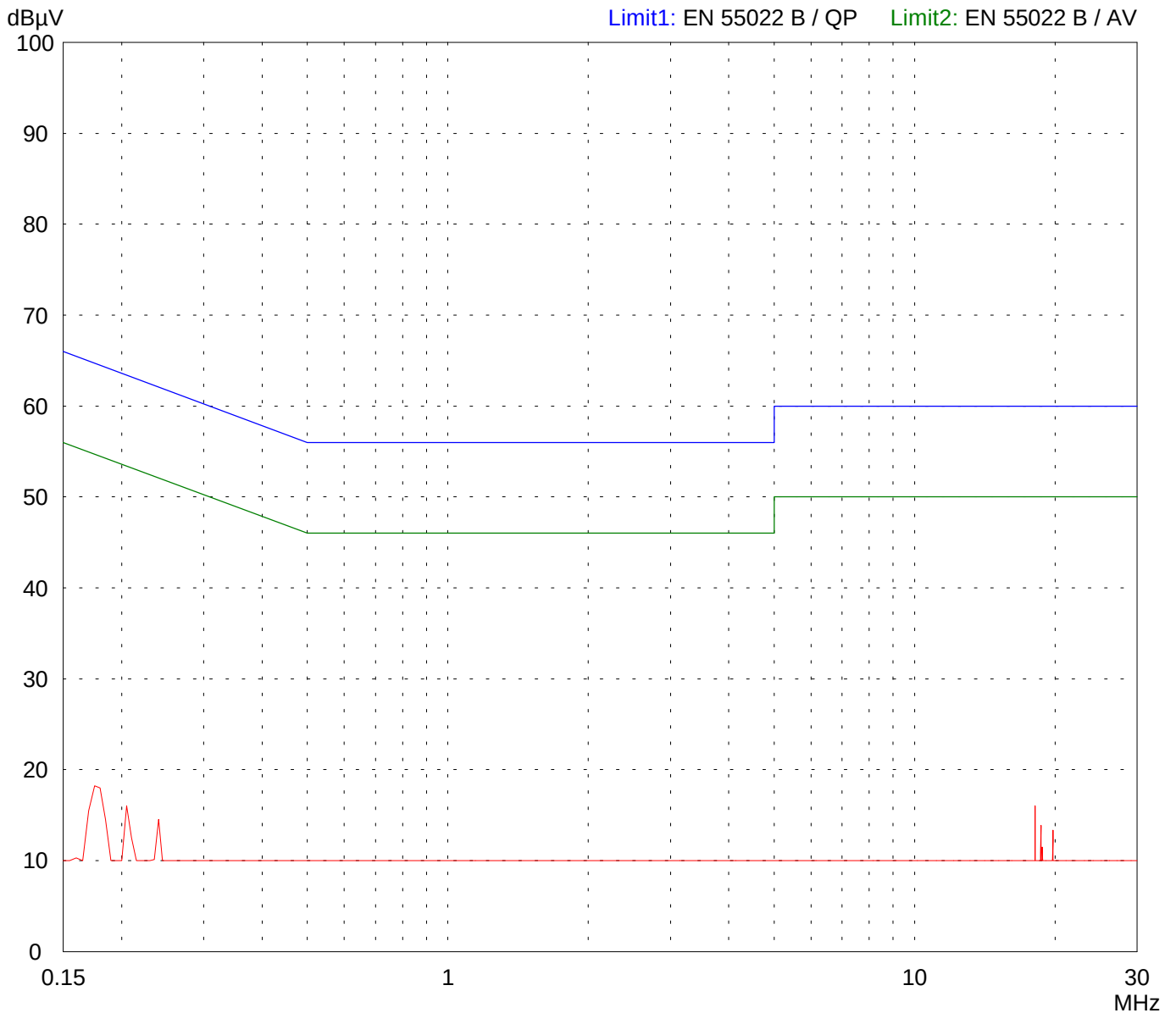
Date of test: 10/19/2006
Operator: R. Heller

Test performed: automatically
File name:

Mode:
- Supply Voltage 18 V DC

Detector:
Peak / Final Results: QP

Final results:
Selected by hand



Result:
Limit kept

Project file:
50530-060898

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

Model:
RCL 03 / RCL 04

Serial no.:
Sample no. 1

Applicant:
Eldat GmbH

Test site:
Shielded room, cabin no. 4

Tested on:
Linecord dc input port
Plus

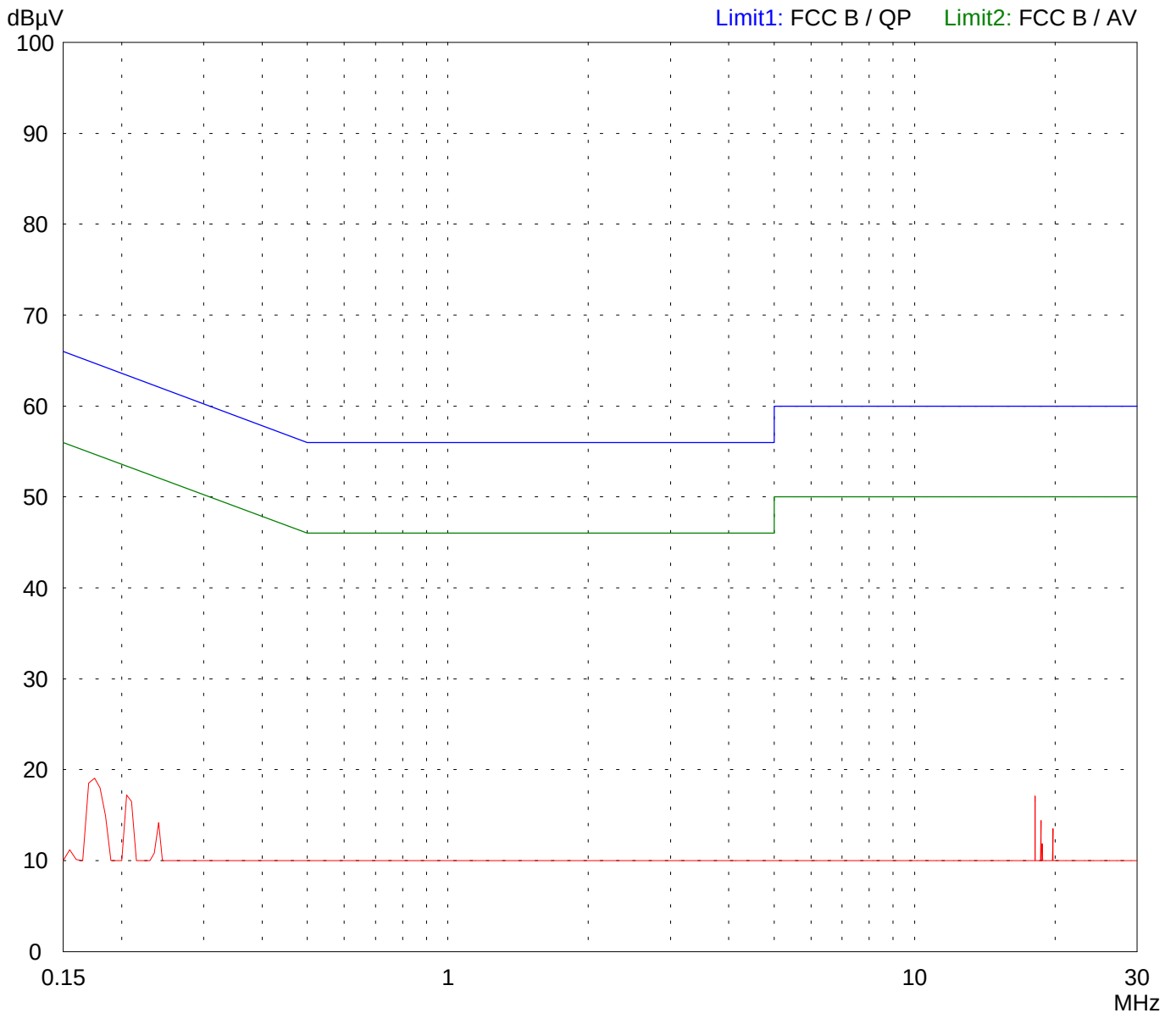
Date of test: 10/19/2006
Operator: R. Heller

Test performed:
automatically
File name:

Mode:
- Supply Voltage 18 V DC

Detector:
Peak / Final Results: QP

Final results:
20 dB Margin 25 Subranges



Result:
Limit kept

Project file:
50530-060898

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

Model:
RCL 03 / RCL 04

Serial no.:
Sample no. 1

Applicant:
Eldat GmbH

Test site:
Shielded room, cabin no. 4

Tested on:
Linecord dc input port
Minus

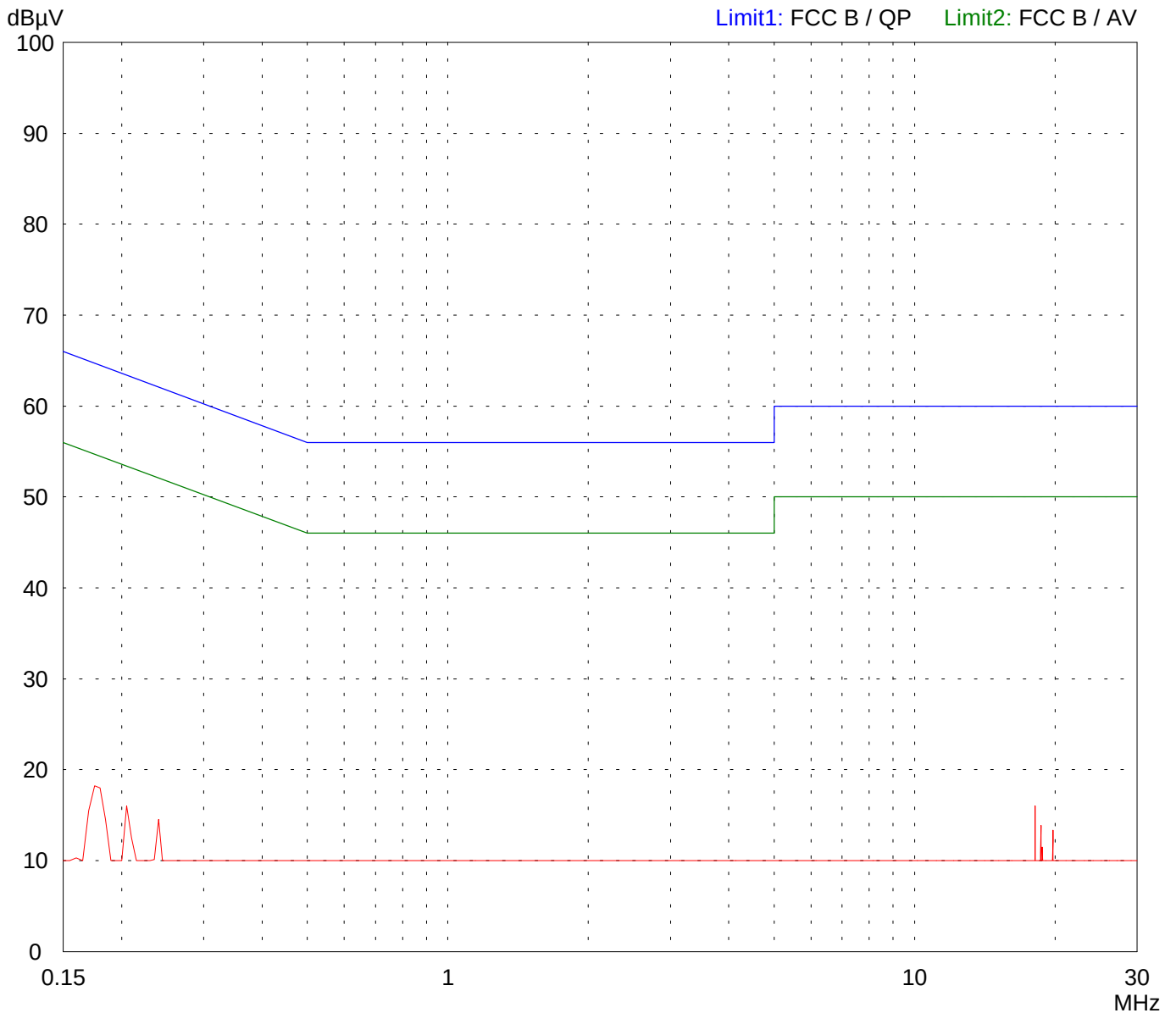
Date of test: 10/19/2006
Operator: R. Heller

Test performed: automatically
File name:

Mode:
- Supply Voltage 18 V DC

Detector:
Peak / Final Results: QP

Final results:
20 dB Margin 25 Subranges



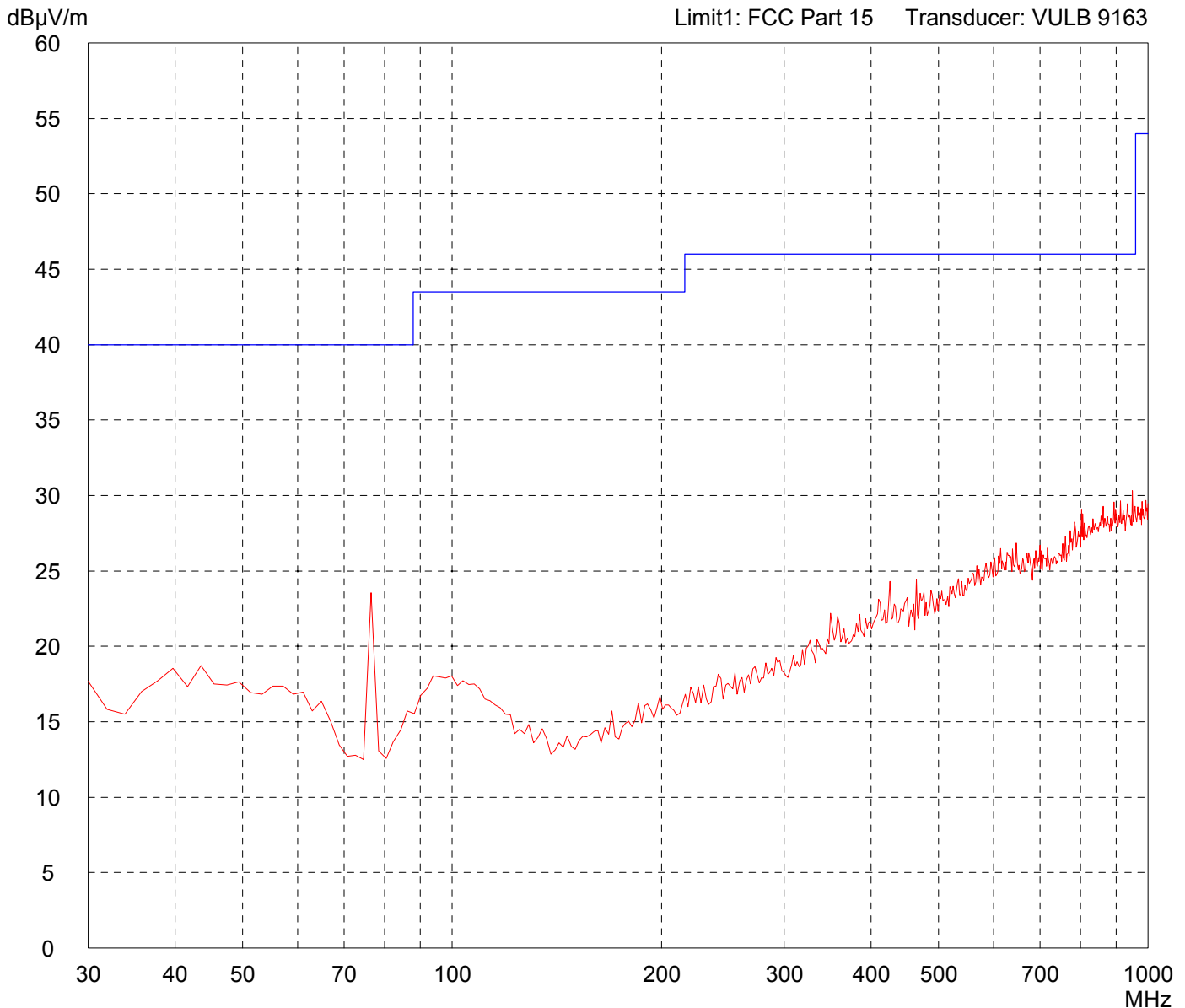
Result:
Limit kept

Project file:
50530-060898

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

Model: RCL 03 / RCL 04	Comment: - Supply Voltage 18 V DC
Serial no.: Test Sample #1	
Applicant: Eldat GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Horizontal Polarization	
Date of test: 10/18/2006	
Operator: J. Roidt	
Test performed: automatically	File name: default.emi

Detector: Peak	List of values: 10 dB Margin 50 Subranges
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Result: Prescan	Project file: 50530-60898
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Radiated Emission Test 30 MHz - 1 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model:
RCL 03 / RCL 04

Serial no.:
Test Sample #1

Applicant:
Eldat GmbH

Test site:
Fully anechoic room, cabin no. 2

Tested on:
Test distance 3 metres
Vertical Polarization

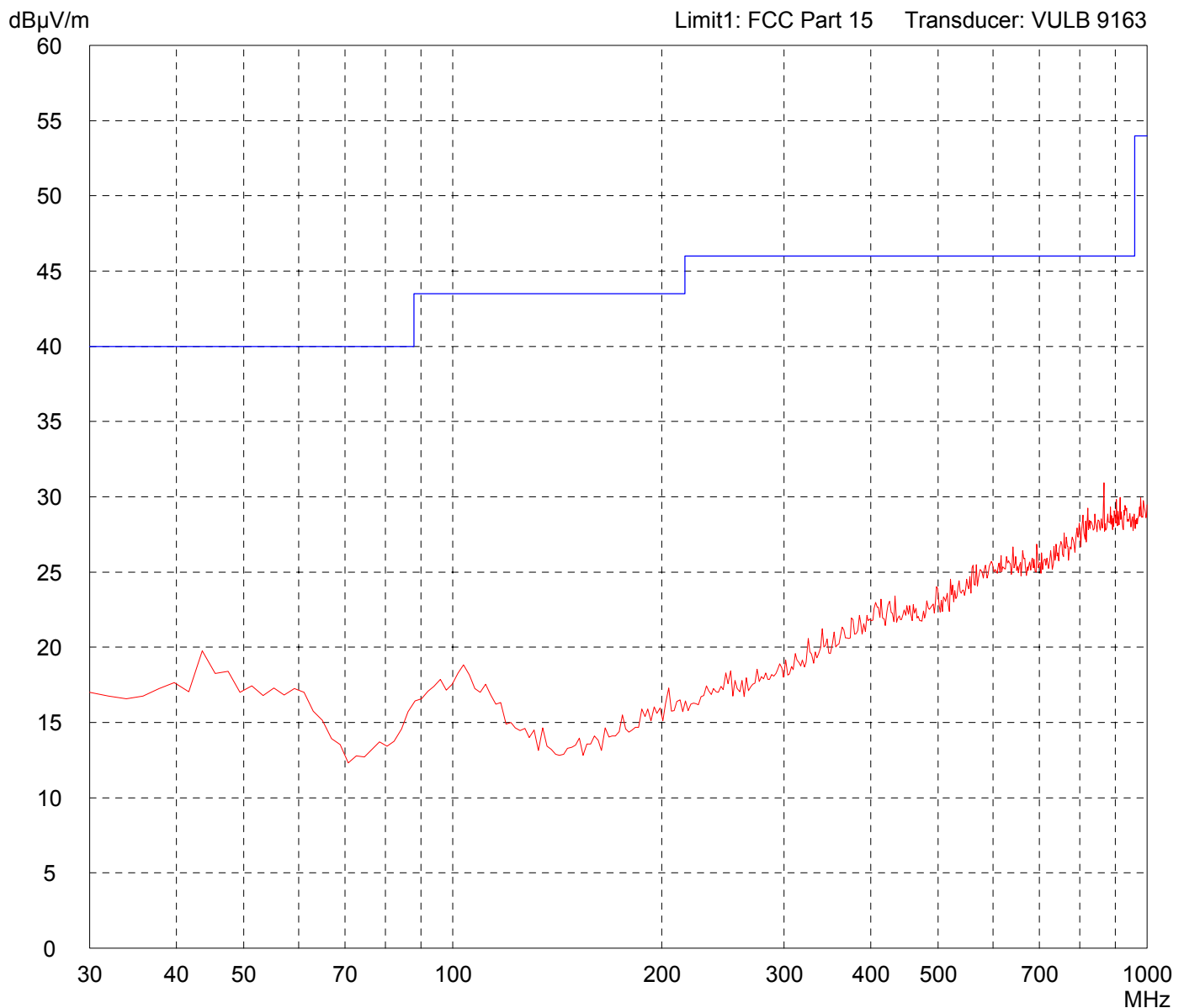
Date of test: 10/18/2006
Operator: J. Roidt

Test performed: automatically
File name: default.emi

Comment:
- Supply Voltage 18 V DC

Detector:
Peak

List of values:
10 dB Margin 50 Subranges



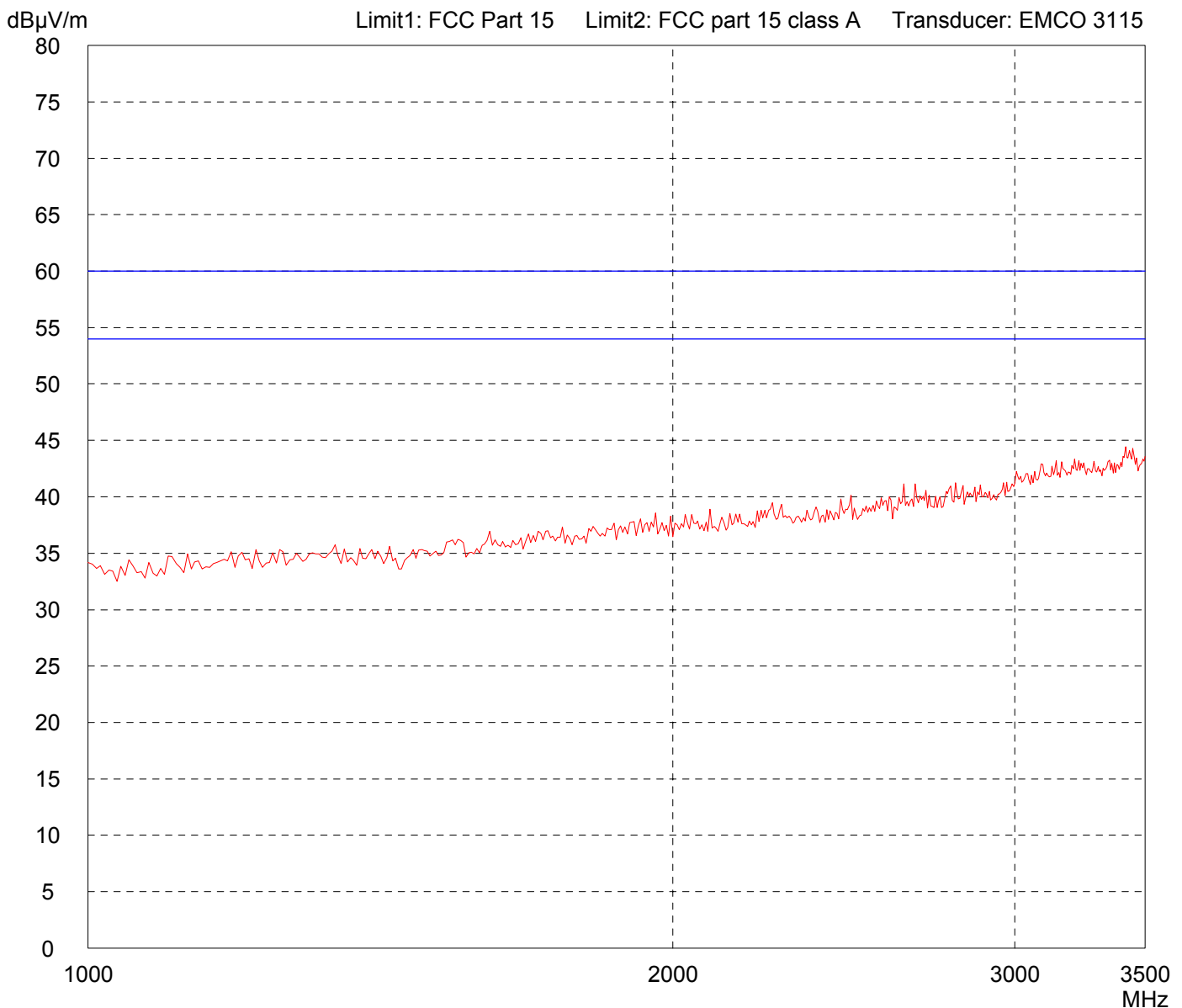
Result:
Prescan

Project file:
50530-60898

Radiated Emission Test 1 GHz - 3.5 GHz acc. to FCC Part 15 (EMCO 3115)

Model: RCL 03 / RCL 04		Comment: - Supply Voltage 18 V DC	
Serial no.: Test Sample #1			
Applicant: Eldat GmbH			
Test site: Fully anechoic room, cabin no. 2			
Tested on: Test distance 3 metres Horizontal Polarization			
Date of test: 10/18/2006	Operator: J. Roidt		
Test performed: automatically	File name: default.emi		

Detector: Peak	List of values: 10 dB Margin 50 Subranges
--------------------------	--

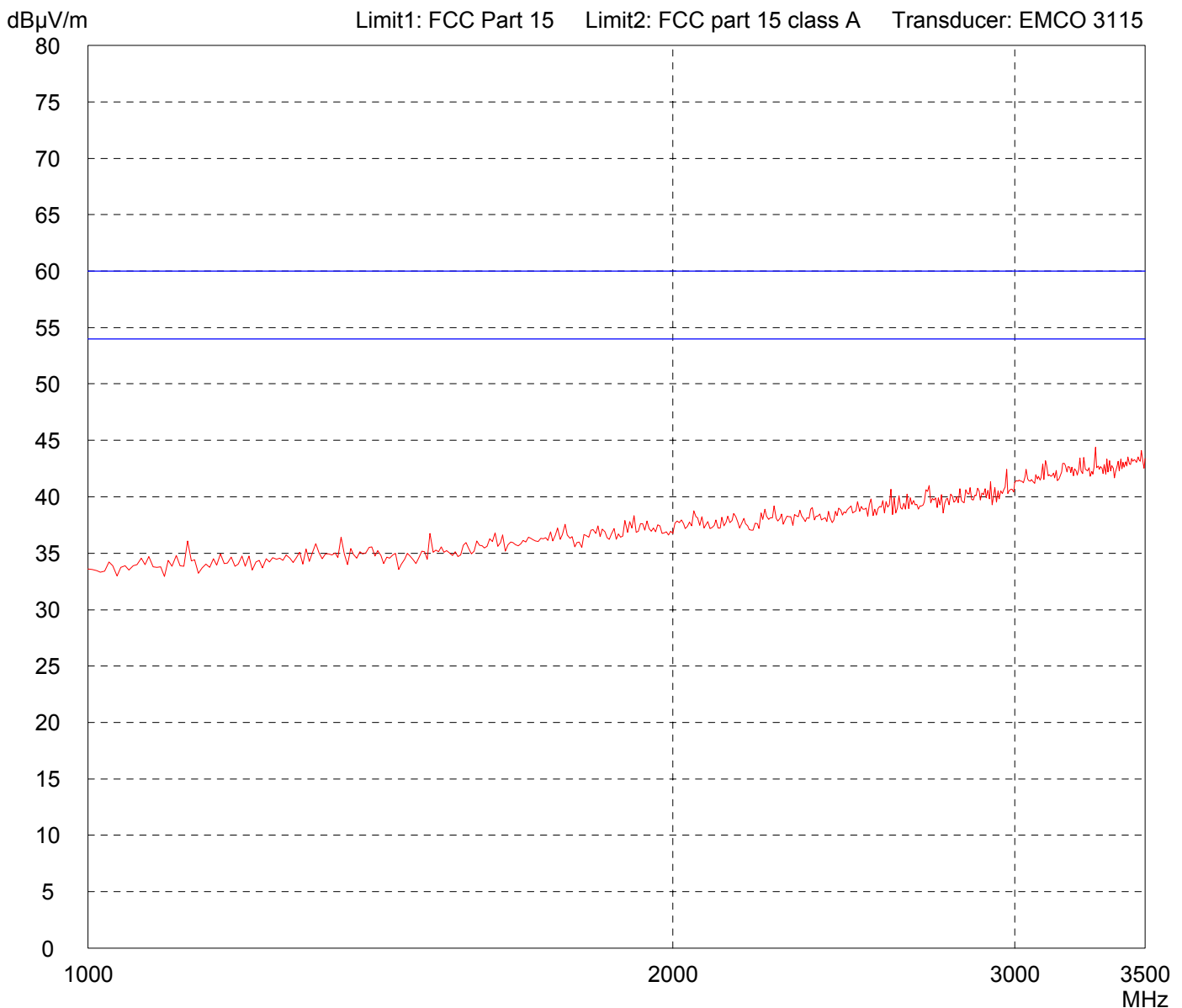


Result: Limit kept	Project file: 50530-60898
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Radiated Emission Test 1 GHz - 3.5 GHz acc. to FCC Part 15 (EMCO 3115)

Model: RCL 03 / RCL 04	Comment: - Supply Voltage 18 V DC
Serial no.: Test Sample #1	
Applicant: Eldat GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 10/18/2006	
Operator: J. Roidt	
Test performed: automatically	File name: default.emi

Detector: Peak	List of values: 10 dB Margin 50 Subranges
--------------------------	--



Result: Limit kept	Project file: 50530-60898
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