SENTON

EMV-Prüfzentrum ■ EMI/EMC-Testcenter ■

Straubing, March 19, 2009

T E S T - R E P O R T

No. 50530-30221 (Edition 3)

for

FHS 20/21 Typ 2 ASK 315 MHz

Remote Control Transmitter

Applicant:	Eldat GmbH
Test Specification:	FCC Code of Federal Regulations, Part 15 Subpart C, Section 15.231

Table of Contents

1. Administrative Data

Test item (EUT)	
Type designation	FHS 20/21 Typ 2 ASK 315 MHz
Serial number(s):	001
Type of equipment:	Remote Control Transmitter
Parts/accessories:	
FCC-ID:	
Technical data	
Frequency range	N/A
Operational frequency	315 MHz
Type of modulation	10K0A1D
Pulse frequency	N/A
Pulse width	N/A
Antenna	Integrated
Power supply	3 V Lithium Battery
Applicant: (full address)	ELDAT GmbH Gesellschaft für Elektronik und Daten Im Gewerbepark 14 15711 Zeesen
Contract identification:	---
Contact person:	Andreas Eidam
Manufacturer:	Eldat GmbH
Application details	
Receipt of EUT:	8 April 2003
Date of test:	April 2003 Februar 2009 (Periodic Operation Requirements)
Note:	
Responsible for testing:	Martin Steindl
Responsible for test report:	Martin Steindl

2. Identification of Test Laboratory

DETAILS OF THE TEST LABORATORY	
COMPANY NAME:	Senton GmbH EMI/EMC Test Center
ADDRESS:	Aeussere Fruehlingsstrasse 45 D-94315 Straubing Germany
LABORATORY ACCREDITATION:	DAR-Registration No. TTI-P-G 062/94-01
FCC TEST SITE LISTING	
INDUSTRY CANADA TEST SITE REGISTRATION	IC 3050
NAME FOR CONTACT PURPOSES:	Mr. Johann Roidt
TELEPHONE: (+49) (0)9421 5522-0	FAX: (+49) (0)9421 5522-99

PERSONNEL INVOLVED IN THIS TEST REPORT	
LABORATORY MANAGER:	..... Mr. Johann Roidt
RESPONSIBLE FOR TESTING:	Steindl Martin ..... Mr. Martin Steindl
RESPONSIBLE FOR TEST REPORT:	Mr. Martin Steindl

SUMMARY OF TEST RESULTS
The tested sample complies with the requirements set forth in the **FCC Code of Federal Regulations** **Part 15, Subpart C, Section 15.231**

3. Operation Mode of EUT

While one button is pressed, the transmitter continuously sends the corresponding datagram. When the button is released, the transmitter stops working instantly.

4. Configuration

Configuration of the EUT
Not applicable

Cables connected to the EUT
Not applicable

Peripheral devices connected to the EUT
Not applicable

5. Measuring Methods

Radiated Emission Measurement 9 kHz to 30 MHz

Measurement Procedure:	
Rules and specifications:	CFR 47 Part 15, sections 15.215(b) and 15.231(b)(3) IC RSS-210 Issue 7, section A1.1.2(b)
Guide:	ANSI C63.4

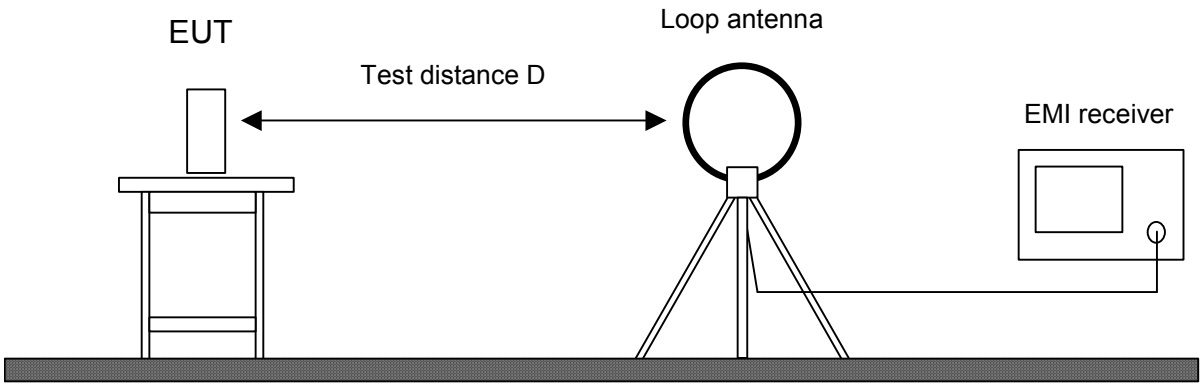
Radiated emission in the frequency range 9 kHz to 30 MHz is measured using an active loop antenna. First the whole spectrum of emission caused by the equipment is recorded at a distance of 3 meters in a fully or semi anechoic room with the detector of the spectrum analyzer or EMI receiver set to peak. This configuration is also used for recording the spectrum of intentional radiators.

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.

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.
If worst case emission of the EUT cannot be recorded with EUT in standard position and loop antenna in vertical polarization the EUT (or the radiating part of the EUT) is rotated by 90 degrees instead of changing the loop antenna to horizontal polarization. This procedure is selected to minimize the influence of the environment (e.g. effects caused by the floor especially with longer distances).

Final measurement is performed at a test distance D of 30 meters using an open field test site. In case the regulation requires testing at other distances, the result is extrapolated by either making measurements at an additional distance D of 10 meters to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). In cases of very low emissions measurements are performed at shorter distances and results are extrapolated to the required distance. The provisions of CFR 47 Part 15 sections 15.31(d) and (f)(2) apply. According to CFR 47 Part 15 section 15.209(d) final measurement is performed with detector function set to quasi-peak except for the frequency bands 9 to 90 kHz and 110 to 490 kHz where, for non-pulsed operation, average detector is employed.

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.



Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
☒	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
☐	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
☒	Test receiver	ESHS 10	860043/016	Rohde & Schwarz
☐	Preamplifier	CPA9231A	3393	Schaffner
☒	Loop antenna	HFH2-Z2	882964/1	Rohde & Schwarz
☒	Fully anechoic room	No. 2	1452	Albatross Projects
☐	Semi-anechoic room	No. 3	1453	Siemens
☒	Open field test site	EG 1	1450	Senton

6. Measuring Methods

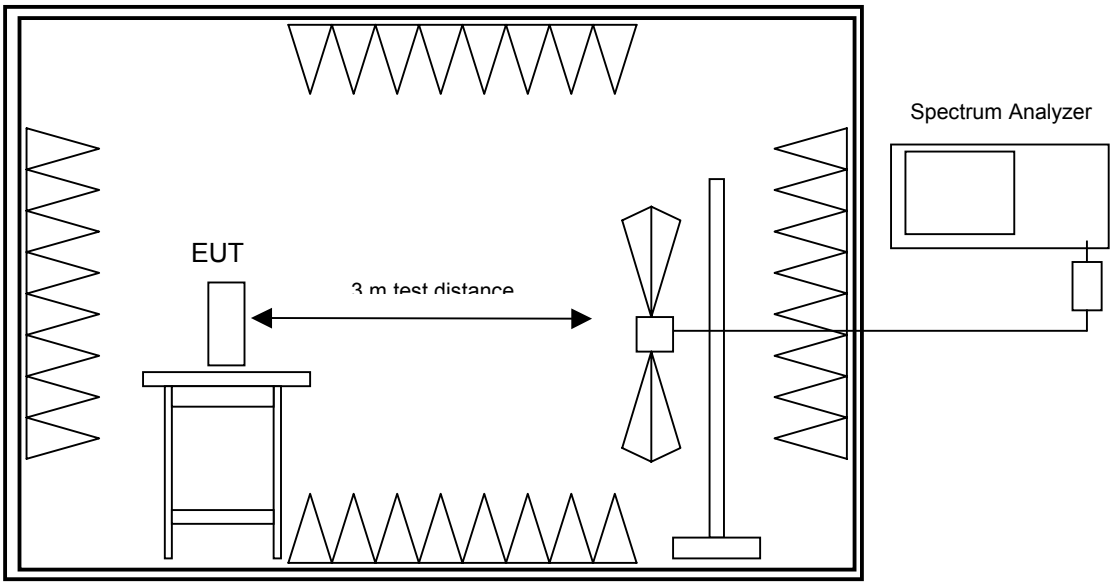
6.1. Field Strength of Emissions, Prescans in a fully-anechoic room (30 MHz – 1 GHz)

Rules and Specifications:	Sections 15.109 & 15.231
Guide:	ANSI C63.4 1997

Measurement Procedure:

Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz.

Measurements were 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 bandwidth set to 100 kHz. All tests were performed at a test-distance of 3 meters. 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.



Fully anechoic chamber

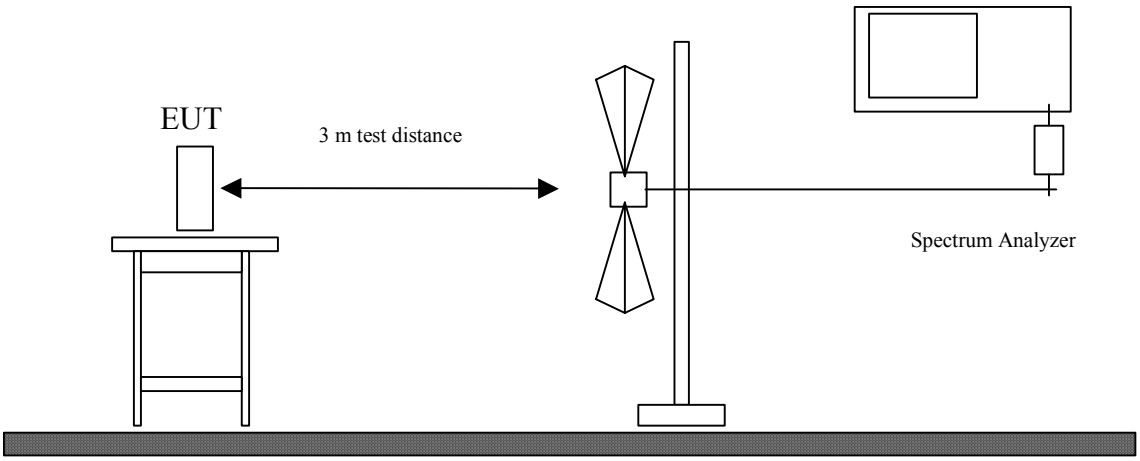
Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
113	Preamplifier	CPA9231A	3393	Schaffner
141	Biconical antenna	HK 116	829708/006	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
003	Fully anechoic room	No. 2	1452	Albatross Projects

6.2. Fieldstrength of Emissions, Measurement at Open Area Test Site (30 MHz – 1 GHz)

Rules and Specifications:	Sections 15.109 & 15.231
Guide:	ANSI C63.4 1997

Measurement Procedure:
Measurement Procedure: For final testing an open-area test-side was used. Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz. Measurements were made in both the horizontal and vertical planes of polarisation at a open area test side using a spectrum analyser with the detector function set to CISPR. All test were performed at a test distance of 3 meters. During the tests the EUT is rotated all around, and the receiving-antenna is rased and lowered from 1m to 4m to find the maximum levels of emissions. The cables and equipment were placed and moved within the range of position likely to find their maximum emissions.



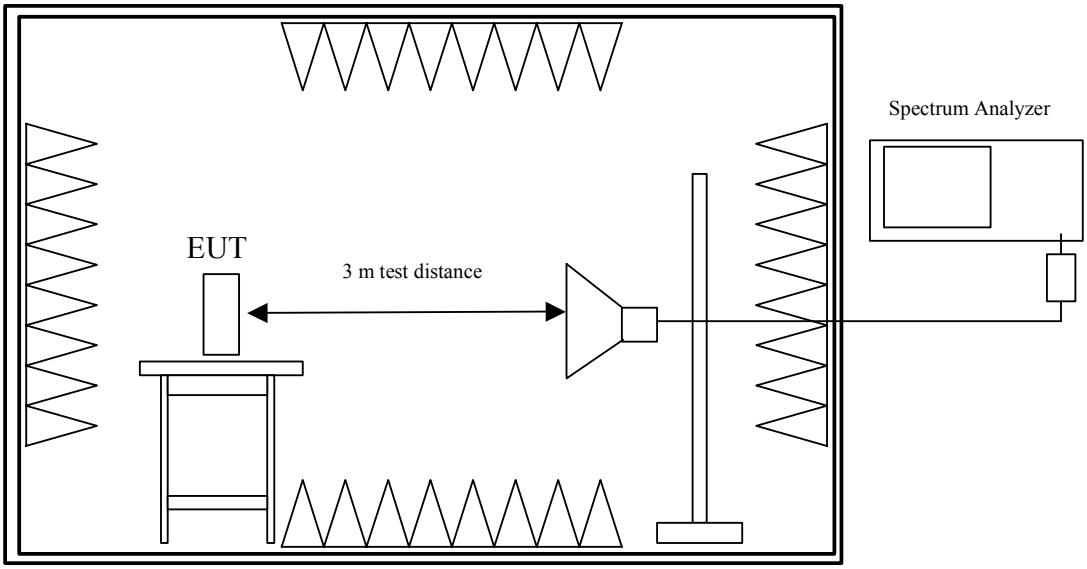
Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	EMI Receiver	ESVP	881414/009	Rohde & Schwarz
141	Biconical antenna	HK 116	829708/006	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
003	Open Field Test Site	No. 1	N/A	Senton

6.3. Fieldstrength of Emissions above 1 GHz

Rules and Specifications:	Sections 15.109 & 15.209
Guide:	ANSI C63.4 1997

Measurement Procedure:
Radiated emissions are measured in the frequency range 1 GHz to the 10th harmoic of the maximum frequency of the EUT. Resolution and video bandwidth of the spectrum analyzer are set to 1 MHz. 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. Additional measurements are performed at critical frequencies with reduced span. EUT is rotated all around and receiving antenna is raised and lowered to find the maximum levels of emission. The cables and equipment are placed and moved within the range of position likely to find their maximum emissions. All tests are performed in a fully-anechoic chamber with a test-distance of 3 meters. If required preamplifiers are used for the whole frequency range. Special care is taken to avoid overload in transmit mode (using appropriate attenuators and filters if necessary).



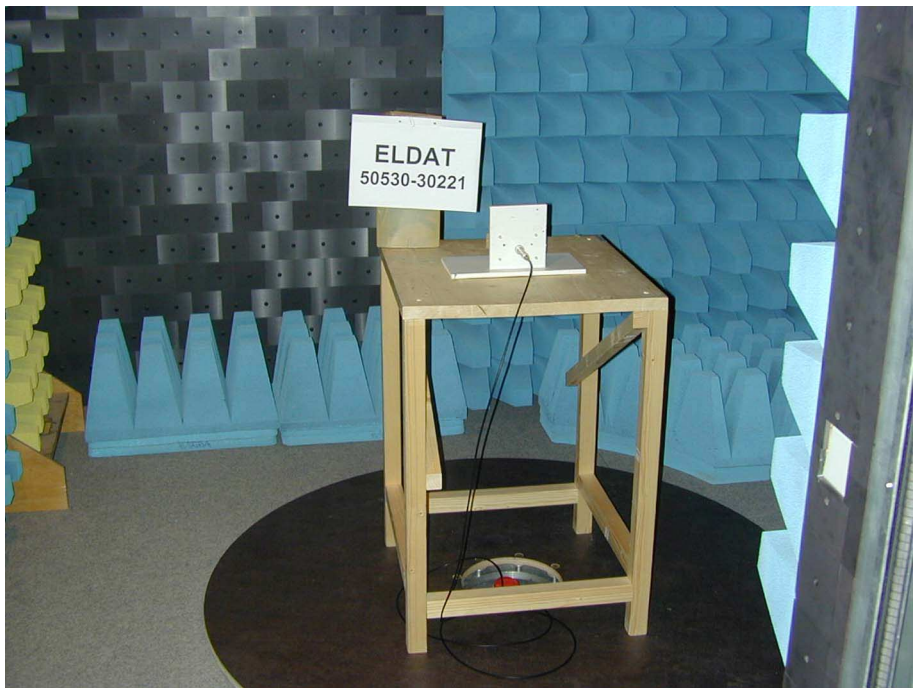
Fully anechoic

Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
145	Horn antenna	3115	9508-4553	EMCO
146	Horn antenna set	3160-03/-09	9112-1003	EMCO
114	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
115	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT

7. Photographs Taken During Testing

Test setup for radiated emission measurement (fully anechoic room)



Test setup for radiated emission measurement (open-area test-side)

8. List of Measurements

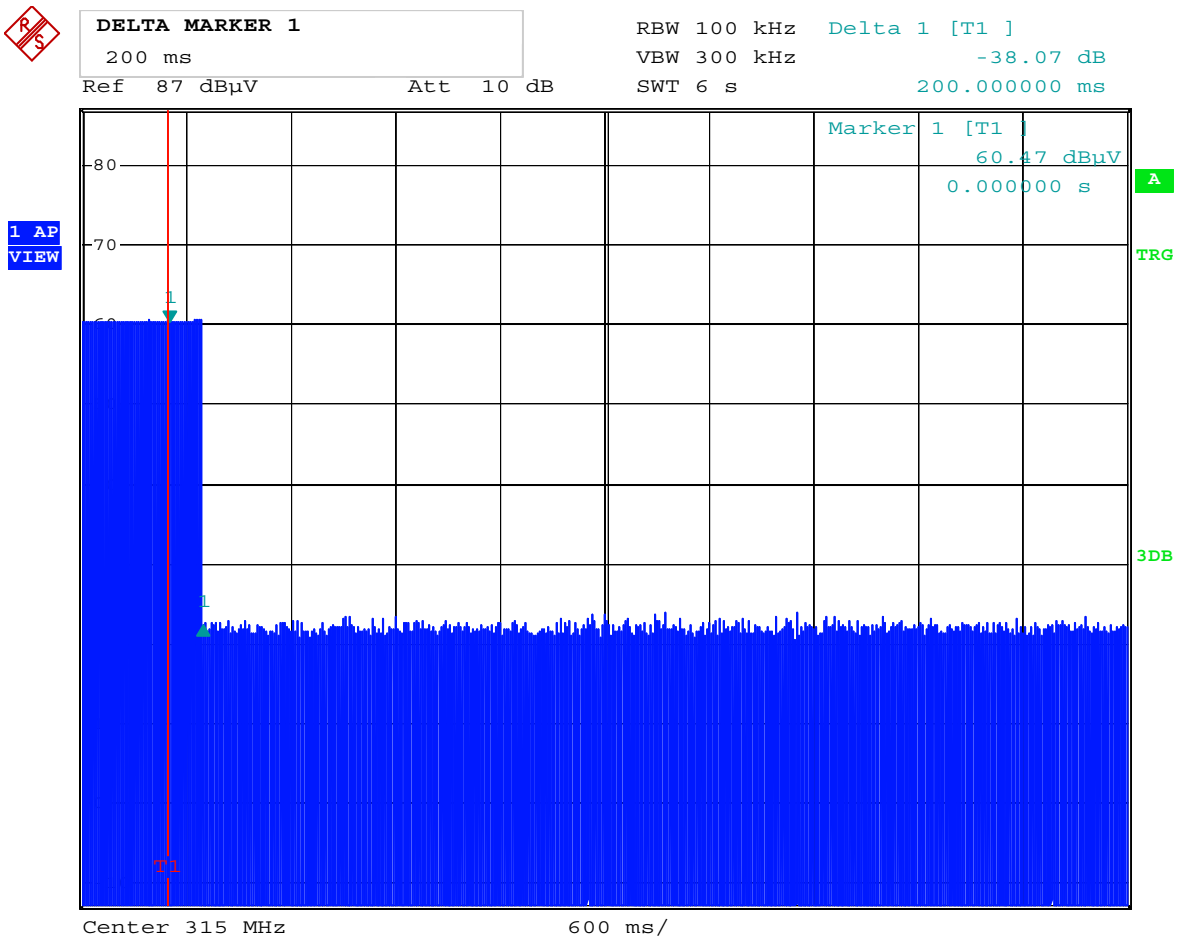
FCC Part 15			
Section(s):	**Test**	**Page(s)**	**Result**
15.205	Restricted Bands		Pass
15.231 (a) (1)	Periodic operation		Pass
15.231 (b)	Duty cycle correction		
15.205 (b) **15.231 (b)**	Radiated emission 9 kHz - 30 MHz		Passed
15.231 (b)	Field strength of emissions		Pass
15.231 (c)	Bandwidth of emissions		Pass

Periodic Operation Requirements

Rules and specifications:	CFR 47 Part 15, section 15.231(a) IC RSS-210 Issue 7, section A1.1.1
Guide:	---

Periodic operation requirements	Applicable	Declared by applicant	Test performed	Passed
The transmitter is used for				
☐ security or safety applications ☐ other applications		☒		
The transmitter is operated				
☐ manually ☐ automatically		☒		
Periodic operation according to				
☒ CFR 47 Part 15, section 15.231(a) / IC RSS-210 Issue 7, section A1.1.1				
Only control signals are sent and there is no continuous transmission	☒	☐	☐	☒
A manually operated transmitter employs a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released	☒	☐	☐	☒
A transmitter activated automatically ceases transmission within 5 seconds after activation	☐	☐	☐	☐
Periodic transmissions at regular predetermined intervals are ☐ not performed ☐ performed with total transmission time of two seconds per hour or less (for polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications)	☐	☐	☐	☐
☐ CFR 47 Part 15, section 15.231(e) / IC RSS-210 Issue 7, section A1.1.5				
The device is provided with a means for automatically limiting operation so that the duration of each transmission is not greater than one second and the silent period between transmissions is at least 30 times the duration of the transmission but in no case less than 10 seconds.	☐	☐	☐	☐

Note: Result may be based on the appropriate declaration of the applicant (i.e. no test is performed). However, in this case there is no verification by the test laboratory.

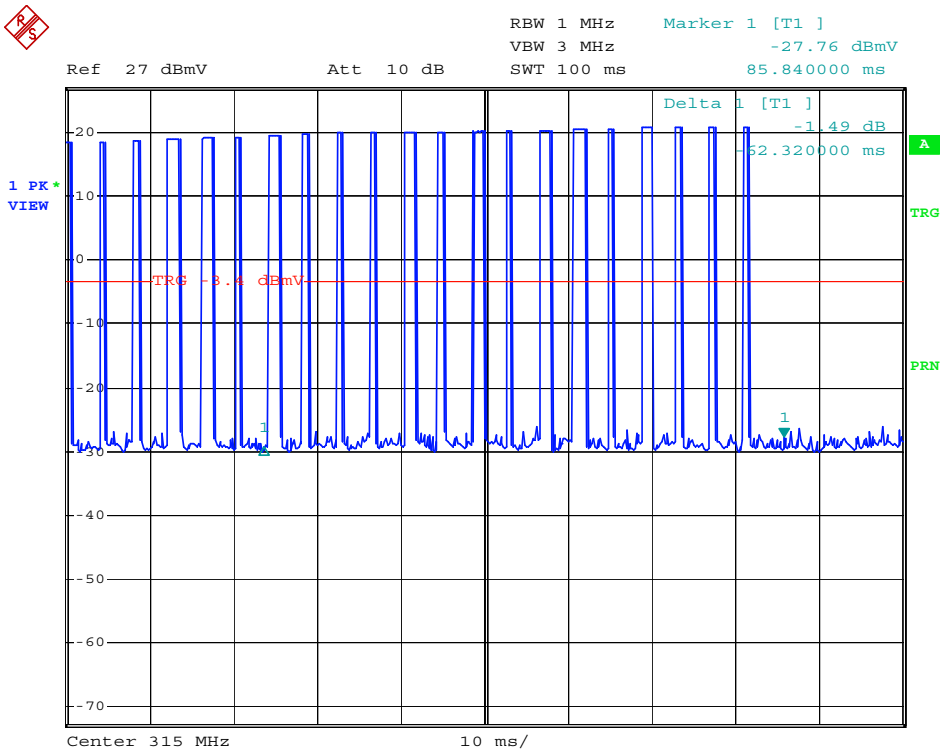


Date: 4.FEB.2009 14:59:41

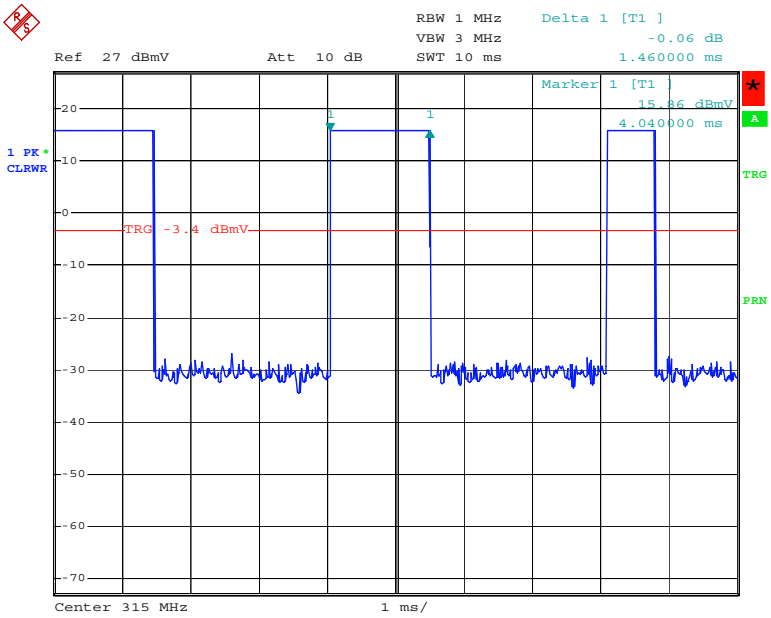
Duty Cycle Correction

Rules and Specifications:	15.231 (b) (2) Limits on the Field Strength of Emissions
Guide:	ANSI C63.4
ANSI C63.4 4.2	When average detector function limits are specified for a pulse modulated transmitter, the average level of emissions may be found by measuring the peak levels of the emissions and correcting them with the duty cycle according to ANSI C64.4, section I4 (10)

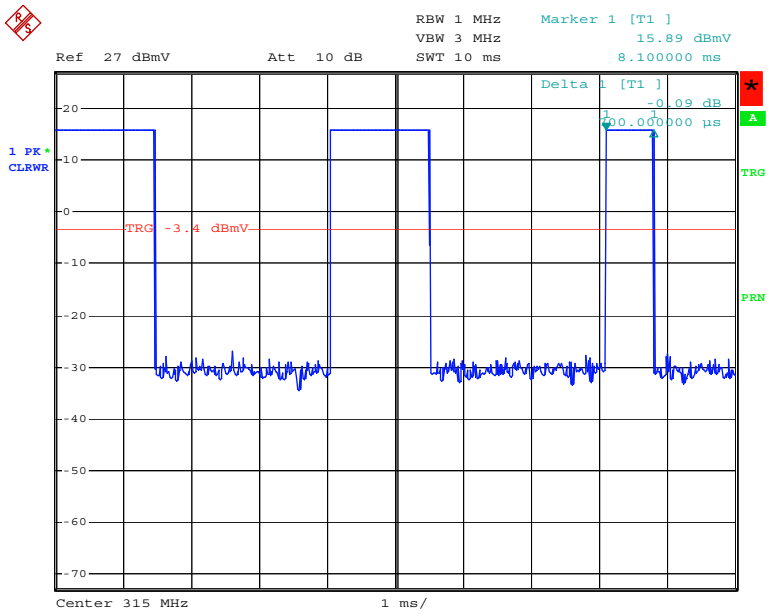
$$Duty\,Cycle\,Correction\,[dB] = 20 \cdot \log\left(\frac{13 \cdot 0{,}7ms + 8 \cdot 1.4ms}{100ms}\right) = -13.85\,dB$$



Comment A: ELD30237 - Duty Cycle
Date: 9.MAY.2003 14:16:20



Comment A: ELD30237 - Duty Cycle
Date: 9.MAY.2003 14:19:03



Comment A: ELD30237 - Duty Cycle
Date: 9.MAY.2003 14:19:40

Radiated Emission Measurement 9 kHz to 30 MHz

Rules and specifications:	CFR 47 Part 15, sections 15.215(b) and 15.231(b)(3)			
Guide:	ANSI C63.4			
Limit:	Frequency of Emission (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance d (meters)
	0.009 - 0.490	2400/F(kHz)	67.6 - 20 · log(F(kHz))	300
	0.490 - 1.705	24000/F(kHz)	87.6 - 20 · log(F(kHz))	30
	1.705 - 30.000	30	29.5	30
	Additionally, the level of any unwanted emissions shall not exceed the level of the fundamental emission.			

Comment:	
Date of test:	May 9, 2003
Test site:	Open field test site

Test Result:	Test passed

No emissions above noise level detected

Sample calculation of final values:

Extrapolation Factor (dB) = (Log(d) - Log(d_1)) · Extrapolation Factor (dB/decade)

Final Value (dBµV/m) = Reading Value d_1 (dBµV) + Correction Factor (dB/m) + Extrapolation Factor (dB) + Pulse Train Correction (dB)

Note: Extrapol

Field strength of emissions

Rules and Specifications:	15.231 Radiated Emission Limits
Guide:	ANSI C63.4
Limit:	In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under Section 15.231 shall not exceed the following:

Frequency of Emission (MHz)	Field Strength (microvolts/meter)
40.66 – 40.70	225
70 – 130	125
130 - 174	125 to 375 **
174 - 260	375
260 – 470	375 to 1250 **
above 470	1250

** linear interpolation

Test Site:	Open Area Test Site (< 1 GHz), Fully anechoic chamber (> 1 GHz)
Distance:	3 Meter

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBµV)	Correction Factor (dB/m)	Pulse Train Correction (dB)	Final Value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
315.000	horizontal	Peak	64.2	15.8	-13.9	66.2	75.6	9.5
630.013	horizontal	Quasi-Peak	23.7	23.2		46.9	55.6	**8.7**
629.994	vertical	Peak	25.9	23.2	-13.9	35.3	55.6	20.4
2206.000	vertical	Peak	14.0	31.5	-13.9	31.6	54.0	22.4
2524.000	horizontal	Peak	12.7	32.3	-13.9	31.1	55.6	24.5
2836.000	horizontal	Peak	12.0	33.6	-13.9	31.7	54.0	22.3
3154.000	vertical	Peak	14.5	34.8	-13.9	35.4	55.6	20.2
3304.000	horizontal	Peak	11.7	35.3	-13.9	33.2	55.6	22.4
3466.000	vertical	Peak	12.1	35.8	-13.9	34.0	55.6	21.6
3784.000	vertical	Peak	15.4	36.8	-13.9	38.3	54.0	15.7
3820.000	vertical	Peak	9.4	36.9	-13.9	32.4	54.0	21.6
3832.000	horizontal	Peak	9.5	36.9	-13.9	32.5	54.0	21.5
3850.000	horizontal	Peak	13.1	36.9	-13.9	36.2	54.0	17.8
3952.000	horizontal	Peak	7.5	37.2	-13.9	30.9	54.0	23.1
3982.000	vertical	Peak	7.3	37.3	-13.9	30.7	54.0	23.3
3988.000	vertical	Peak	7.3	37.3	-13.9	30.8	54.0	23.2

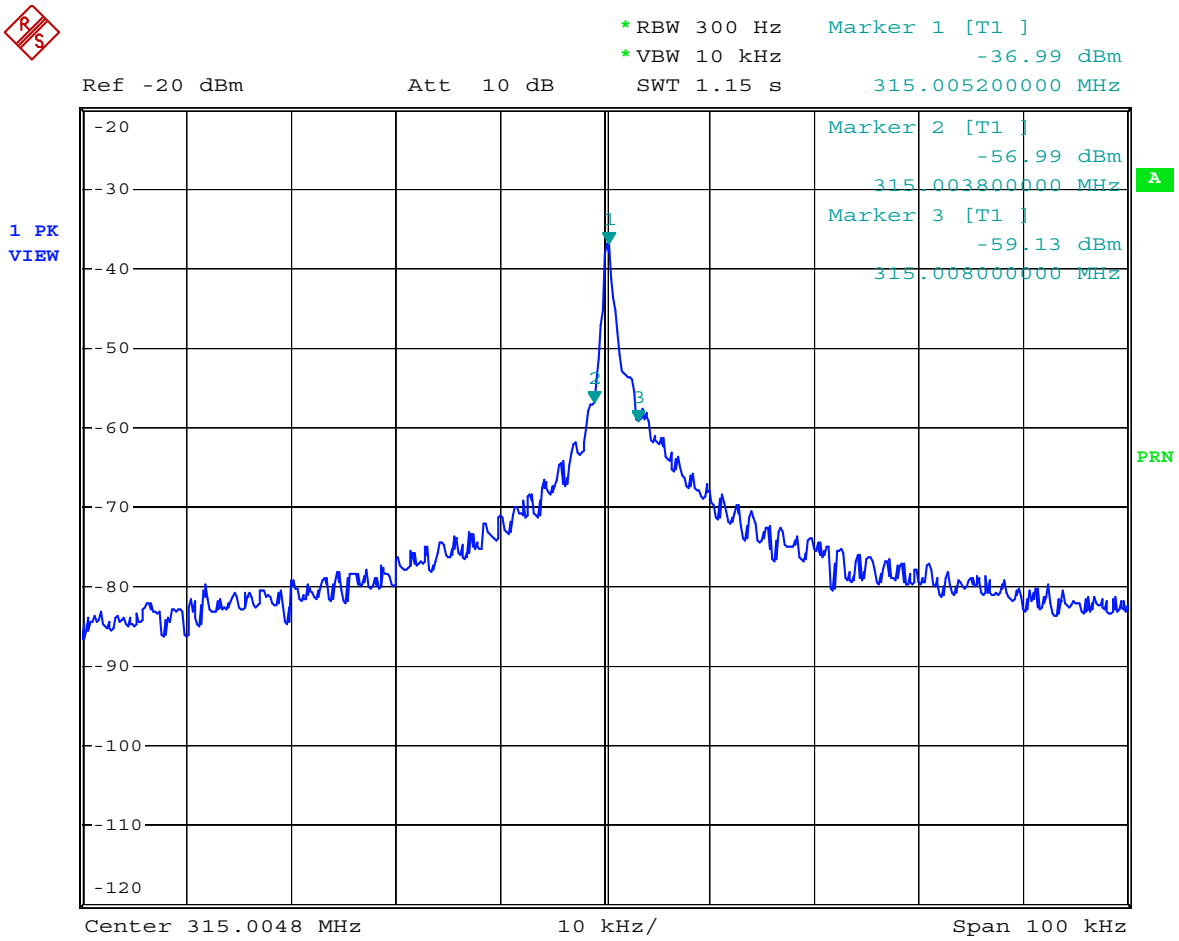
Sample calculation of final values:

Final Value (dBµV/m) = Reading Value (dBµV) + Correction Factor (dB/m) + Pulse Train Correction (dB)

Test Results:	Pass	

Bandwidth of Emission

Rules and Specifications:	15.231 (c) Bandwidth of Emissions
Guide:	ANSI C63.4
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB from the modulated carrier



Comment A: ELD30237 - Bandwidth of emission
Date: 9.MAY.2003 15:11:32

Bandwidth of emission at –20 dB points is 4.2 kHz. Limit is 787.5 kHz

Test Results:	Pass	

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 1, 2007
☒	CFR 47 Part 15	Code of Federal Regulations Part 15 (Radio Frequency Devices) of the Federal Communication Commission (FCC)	September 20, 2007
☒	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 2 containing General Requirements and Information for the Certification of Radiocommunication Equimpment, published by Industry Canada	June 2007
☐	RSS-210	Radio Standards Specification RSS-210 Issue 7 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, published by Industry Canada	June 2007
☐	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

Revision History:

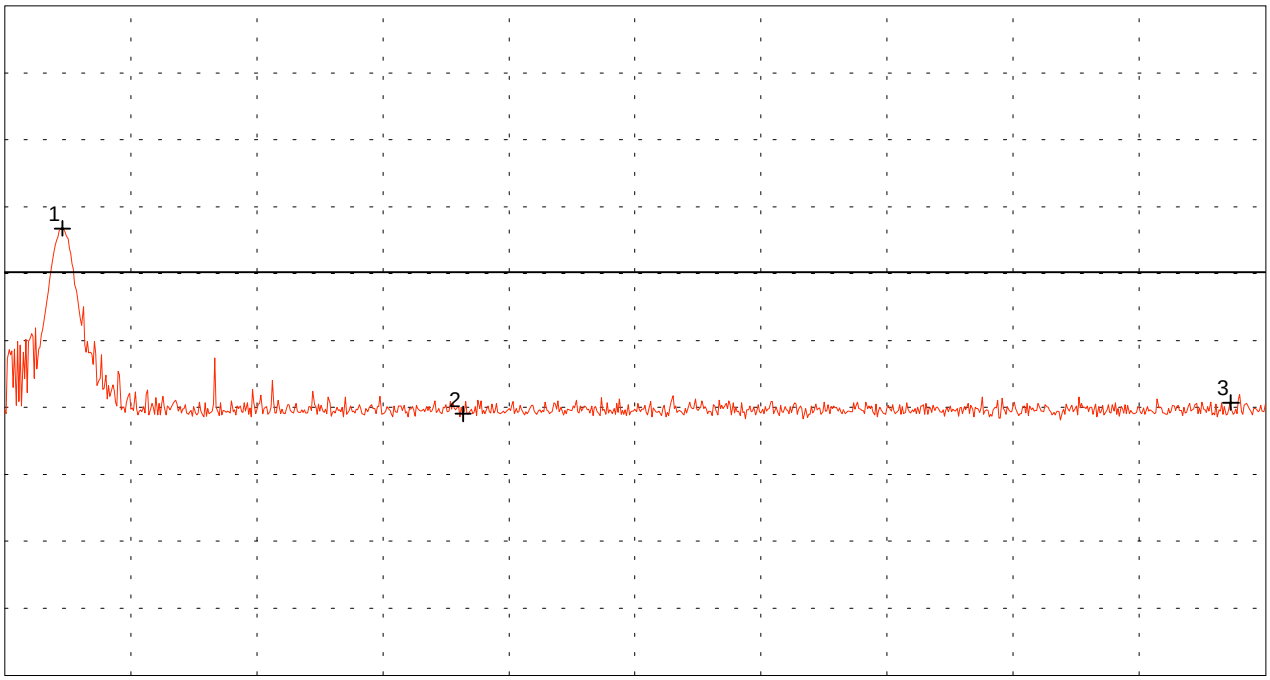
Edition	Date	Issued by	Note
01	08.05.2003	M. Steindl	First edition
02	19.11.2008	C. Jäger	Edition 2 required for FCC-Certification Test Report updated.
03	19.03.2009	C. Jäger	Edition 3 required for FCC-Certification Page 3: Date of retest added Page 8: Loop antenna selected Page 21: Field strength of emission updated

Charts taken during testing

Restricted bands requirement acc. FCC 15 Part C

Model: FHS 20/21 Typ2 ASK 315 MHz	Mode: - DC 3 V lithium battery supply - - sending pulsed
Serial No.: test sample	
Applicant: Eldat GmbH	

Ref.Level 115.4 dBµV/m ATT 20 dB Ref. Offset 18.4 dB
10 dB/Div.



Start 314.000 MHz Stop 336.000 MHz
RBW 219 kHz VBW 300 kHz SWP 20 ms

Multi Marker List

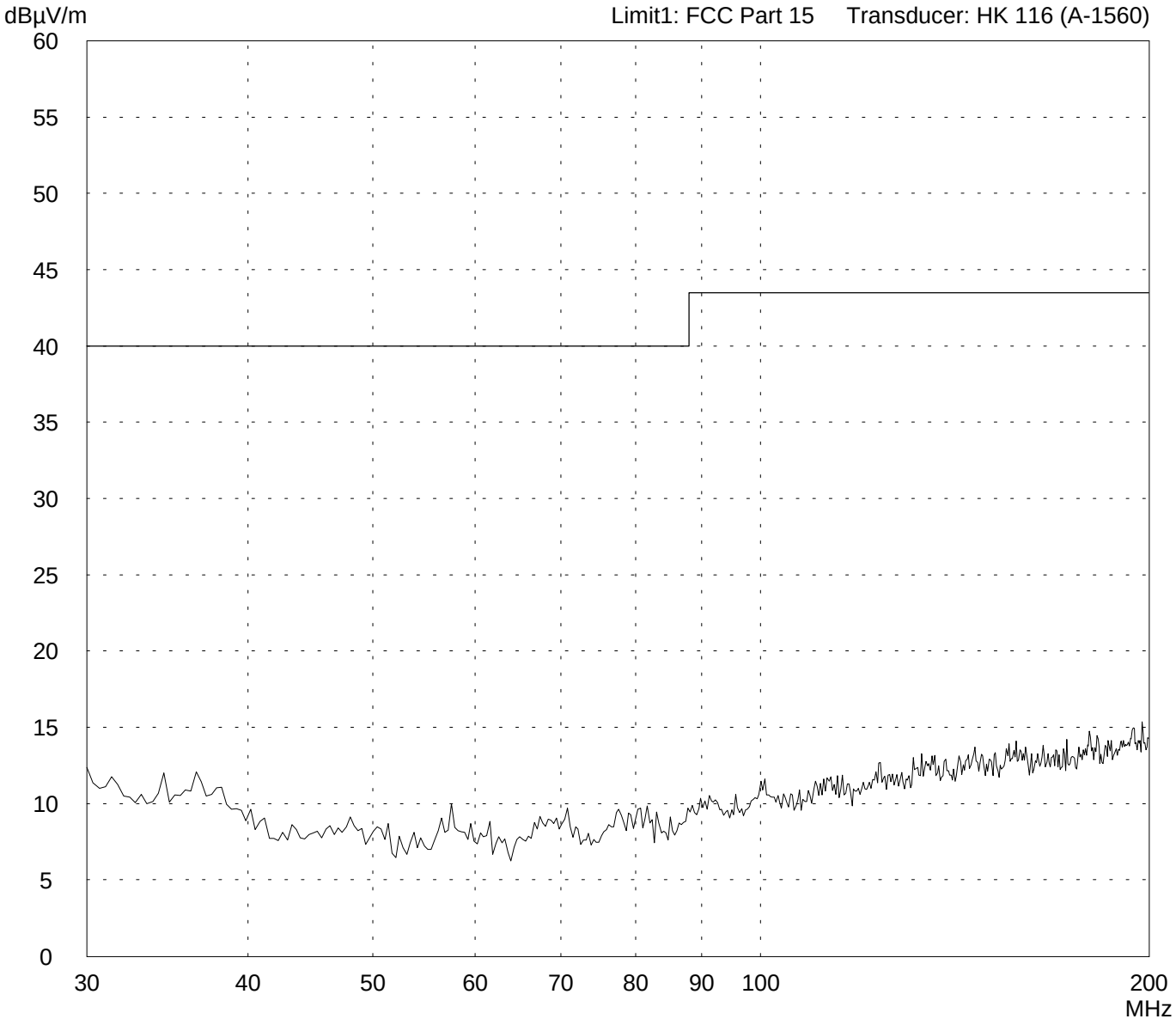
No. 1	315.002222 MHz	82.14 dBµV/m
No. 2	322.000000 MHz	54.43 dBµV/m
No. 3	335.400000 MHz	56.11 dBµV/m

Tested by: M. Steindl	Project-No.: 50530-30221
Date: 04/25/2003	Page of pages

Radiated Emission Test 30 MHz - 200 MHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating z-axis) - sending pulsed
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: 04/24/2003 — Operator: M. Steindl	
Test performed: automatically — File name: default.emi	

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

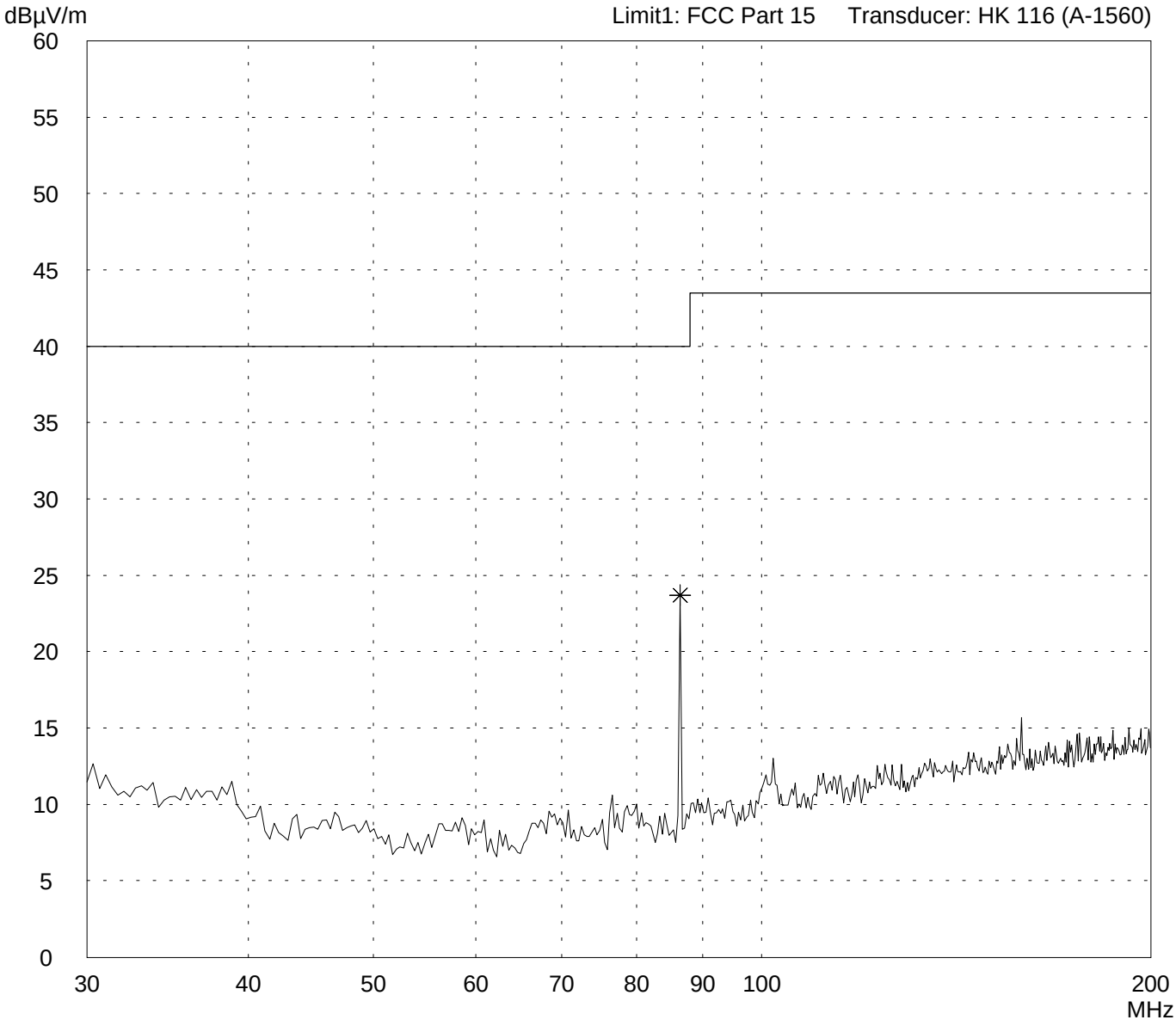


Result: Prescan	Project file: 50530-30221 — Page of Pages

Radiated Emission Test 30 MHz - 200 MHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating y-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

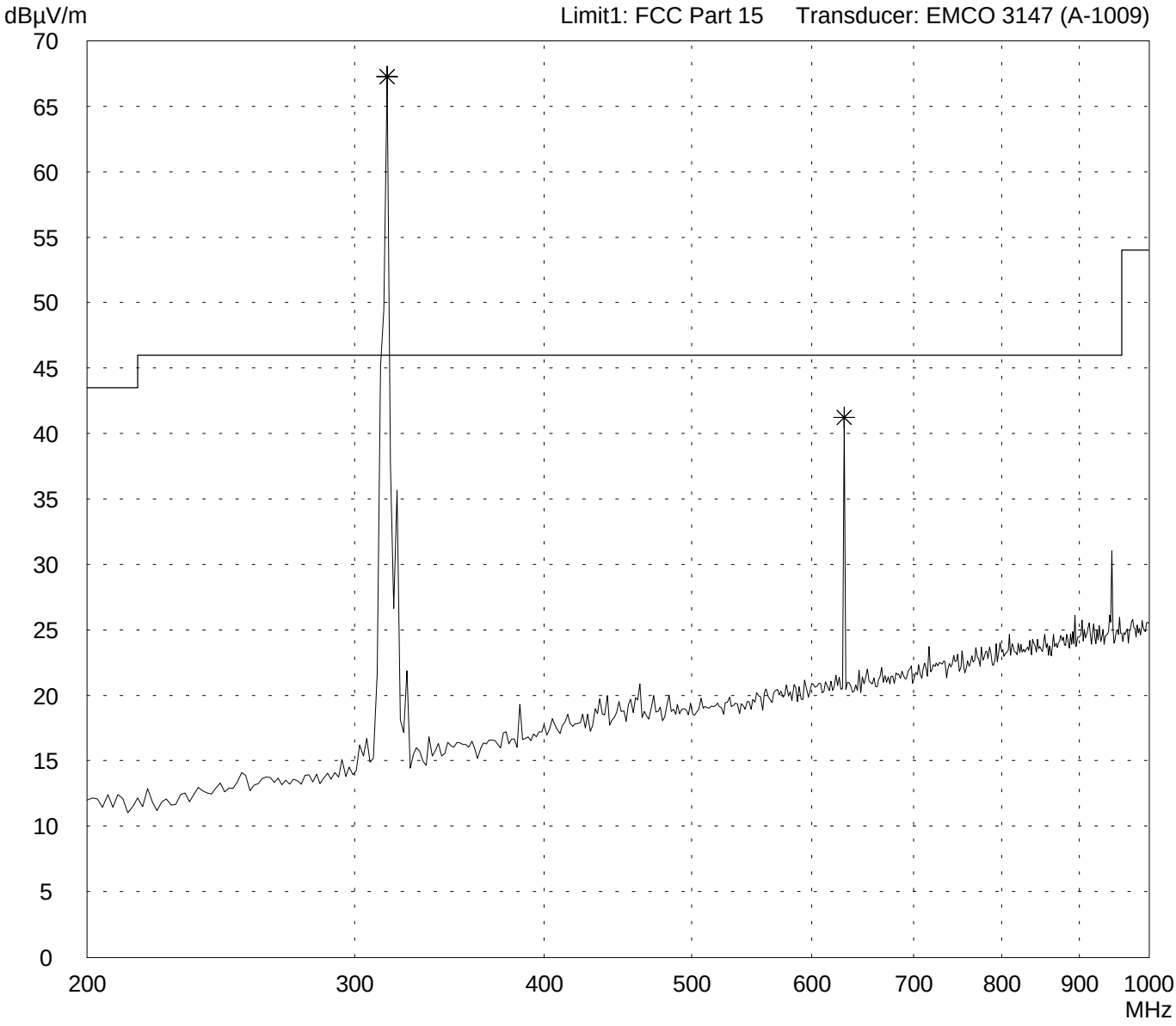
Detector: Peak	List of values: Selected by hand



Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 200 MHz - 1 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

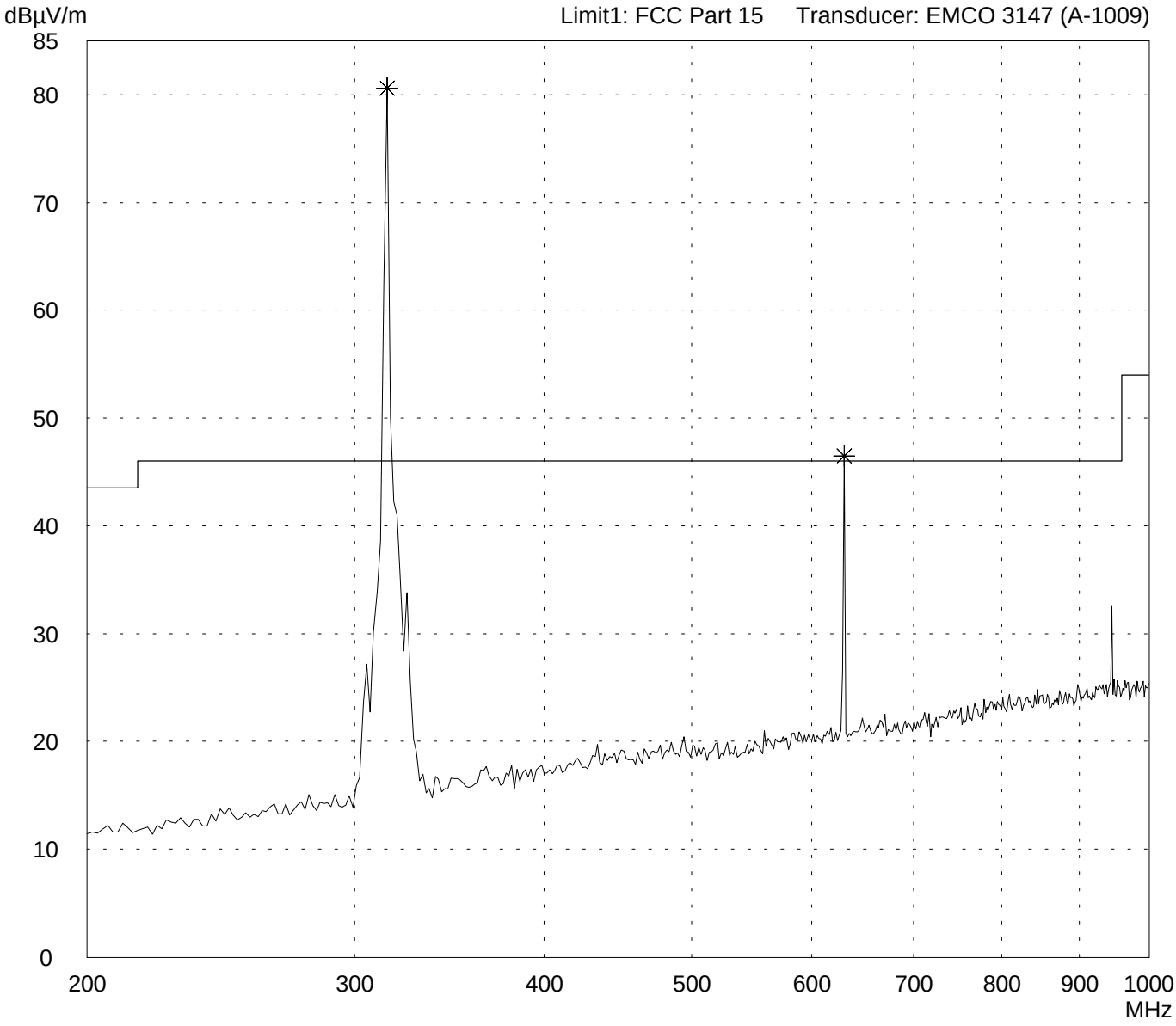
Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating y-axis) - sending pulsed
Serial no.: test sample 1	
Applicant: Eldat GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Horizontal Polarization	
Date of test: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	
Detector: Peak	List of values: Selected by hand



Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 200 MHz - 1 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating y-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	
Detector: Peak	List of values: Selected by hand

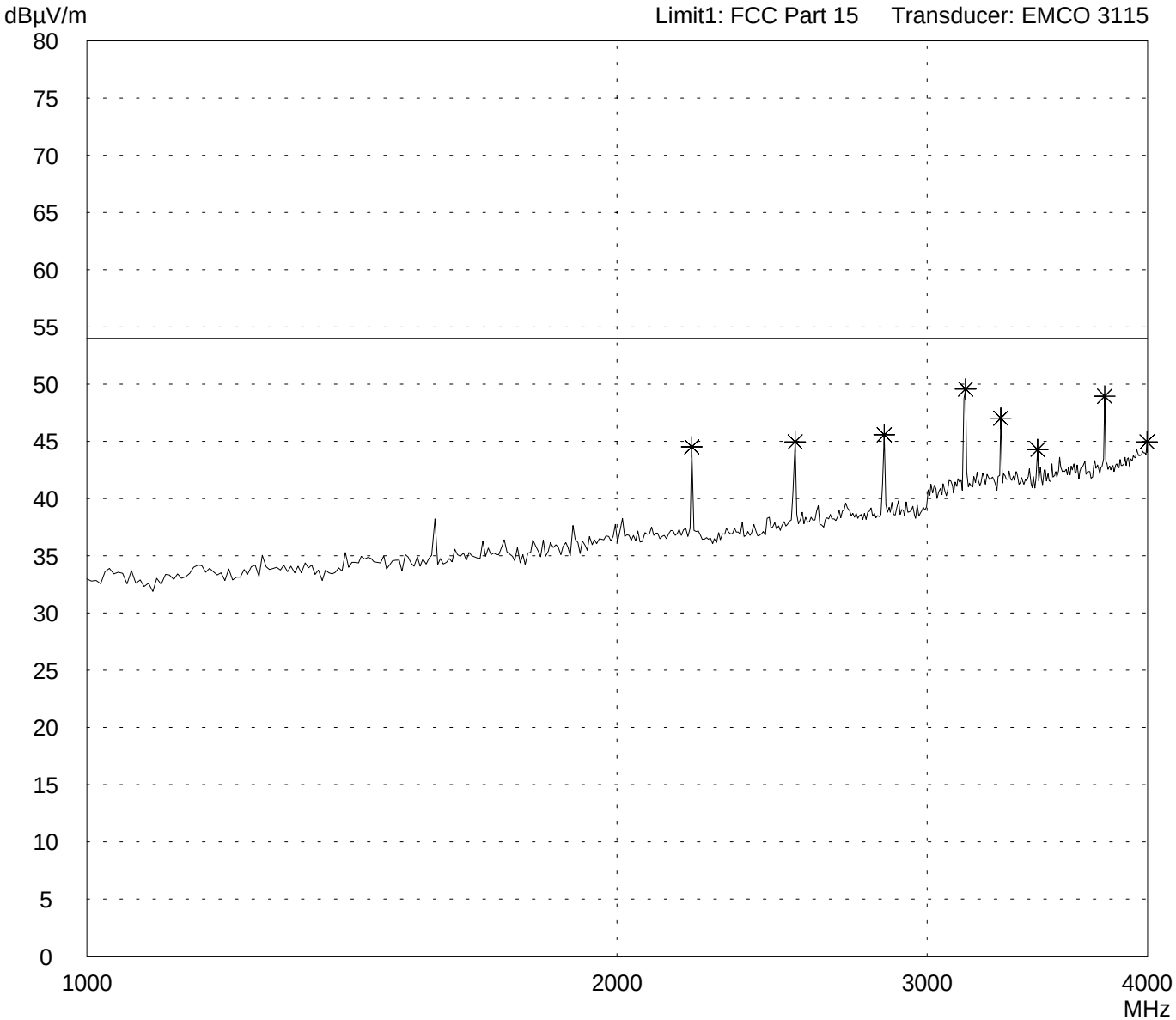


Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 1 GHz - 4 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating y-axis) - sending pulsed - with WHKS1000-10SS high pass filter
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

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

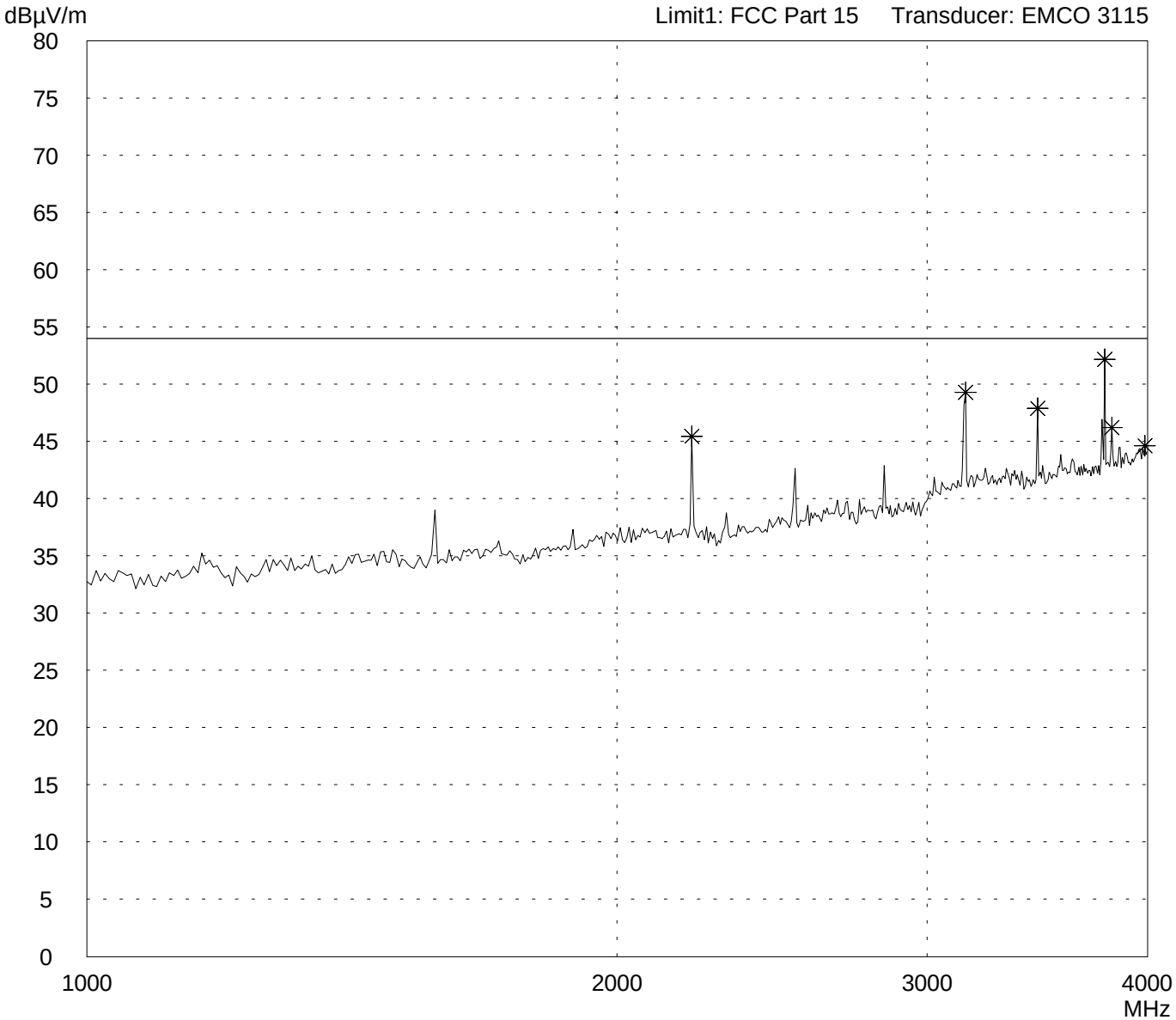


Result: Limit kept	Project file: 50530-30221 Page of Pages

Radiated Emission Test 1 GHz - 4 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating y-axis) - sending pulsed - with WHKS1000-10SS high pass filter
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

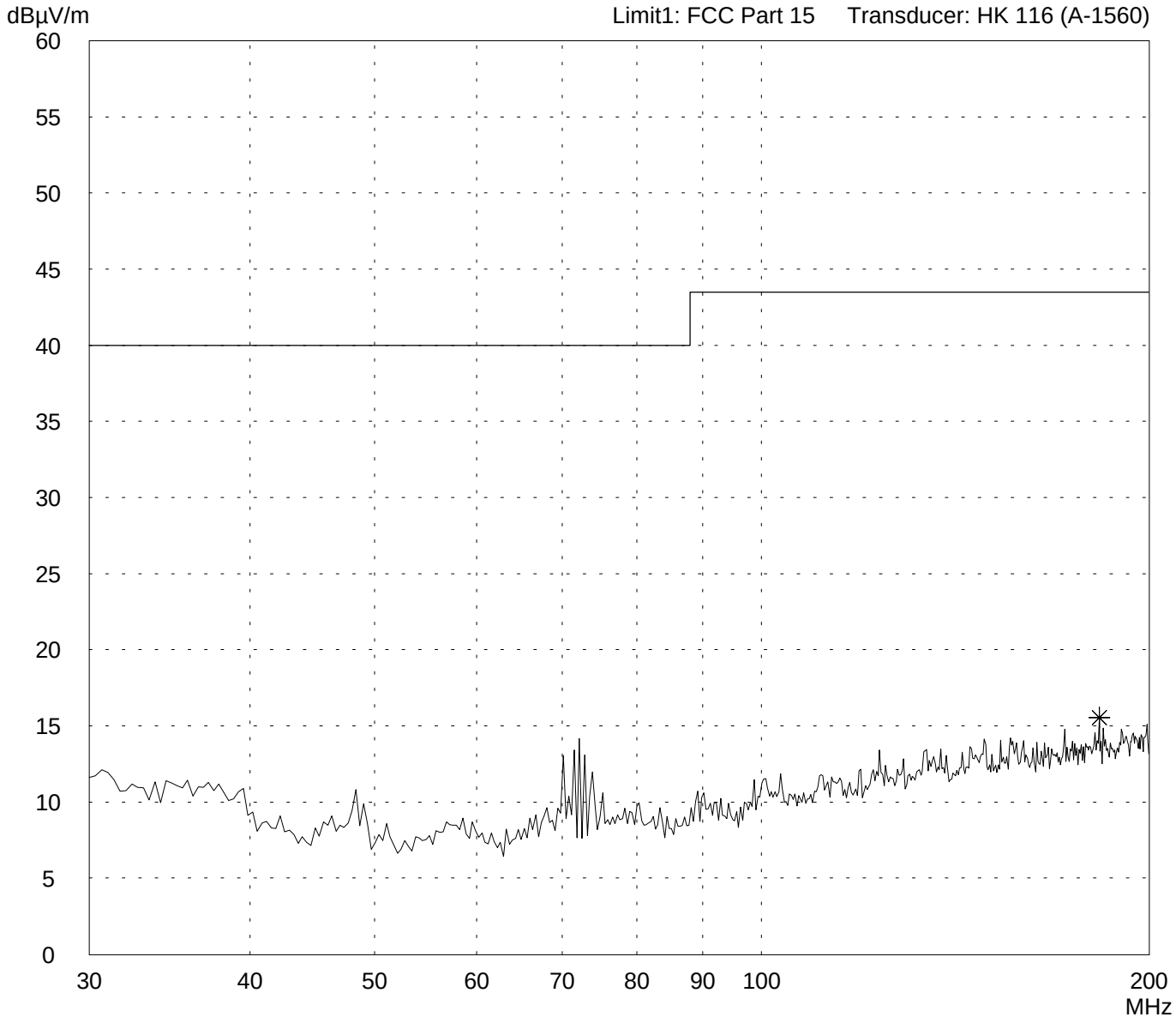
Detector: Peak	List of values: 10 dB Margin / 50 Subranges



Result: Limit kept	Project file: 50530-30221 Page of Pages

Radiated Emission Test 30 MHz - 200 MHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating y-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	
Detector: Peak	List of values: Selected by hand

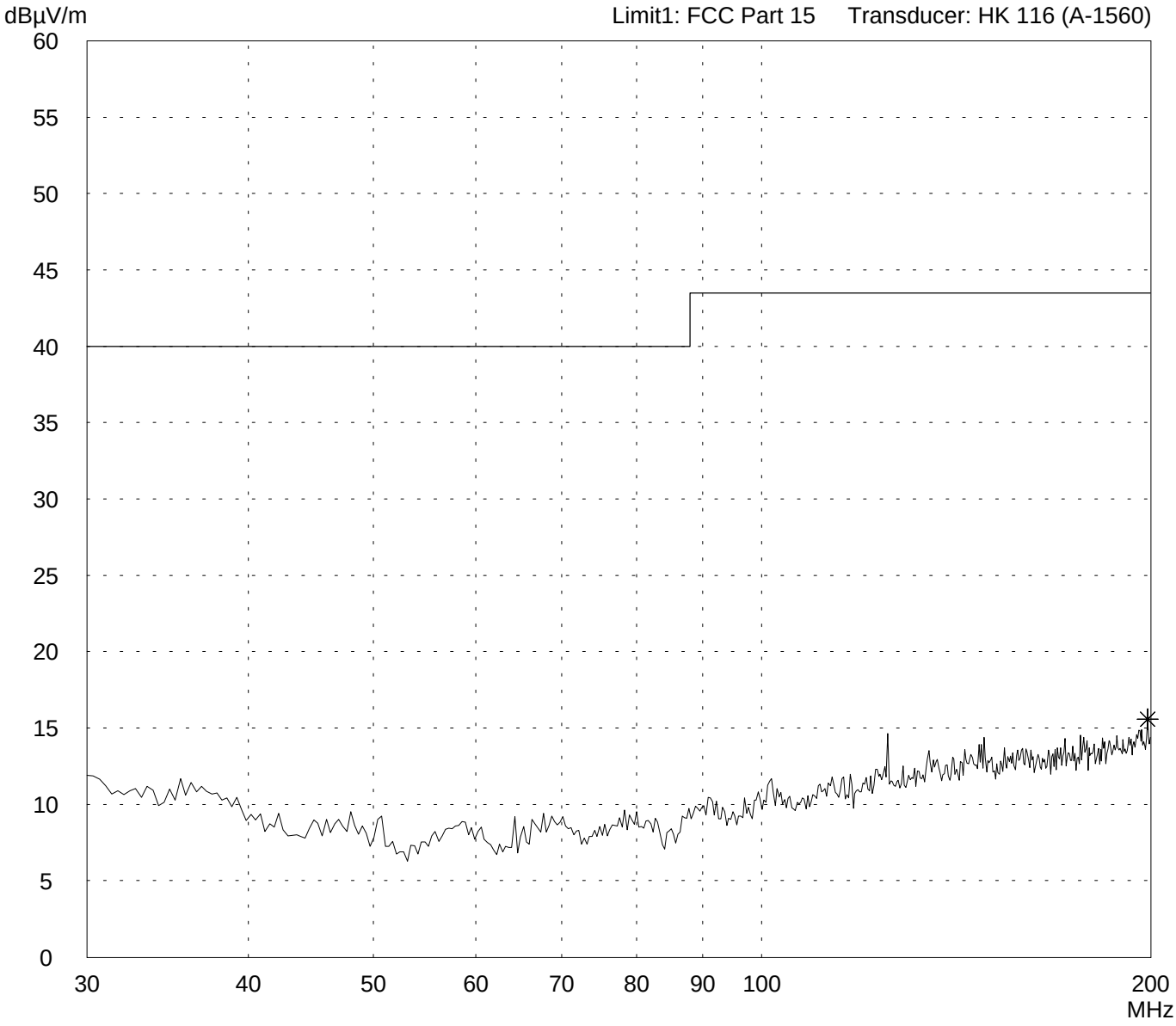


Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 30 MHz - 200 MHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating z-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

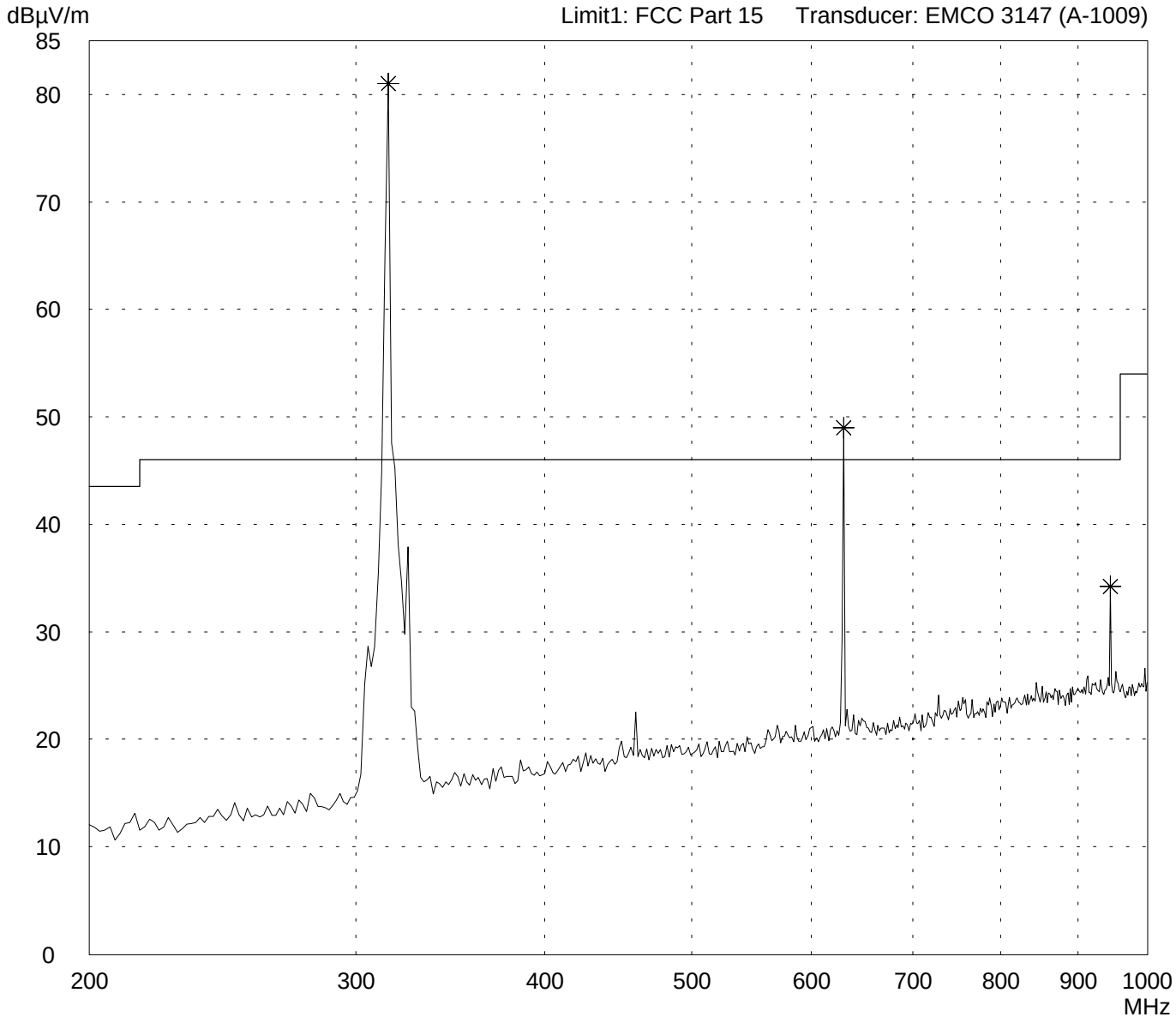
Detector: Peak	List of values: Selected by hand



Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 200 MHz - 1 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating z-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	
Detector: Peak	List of values: Selected by hand

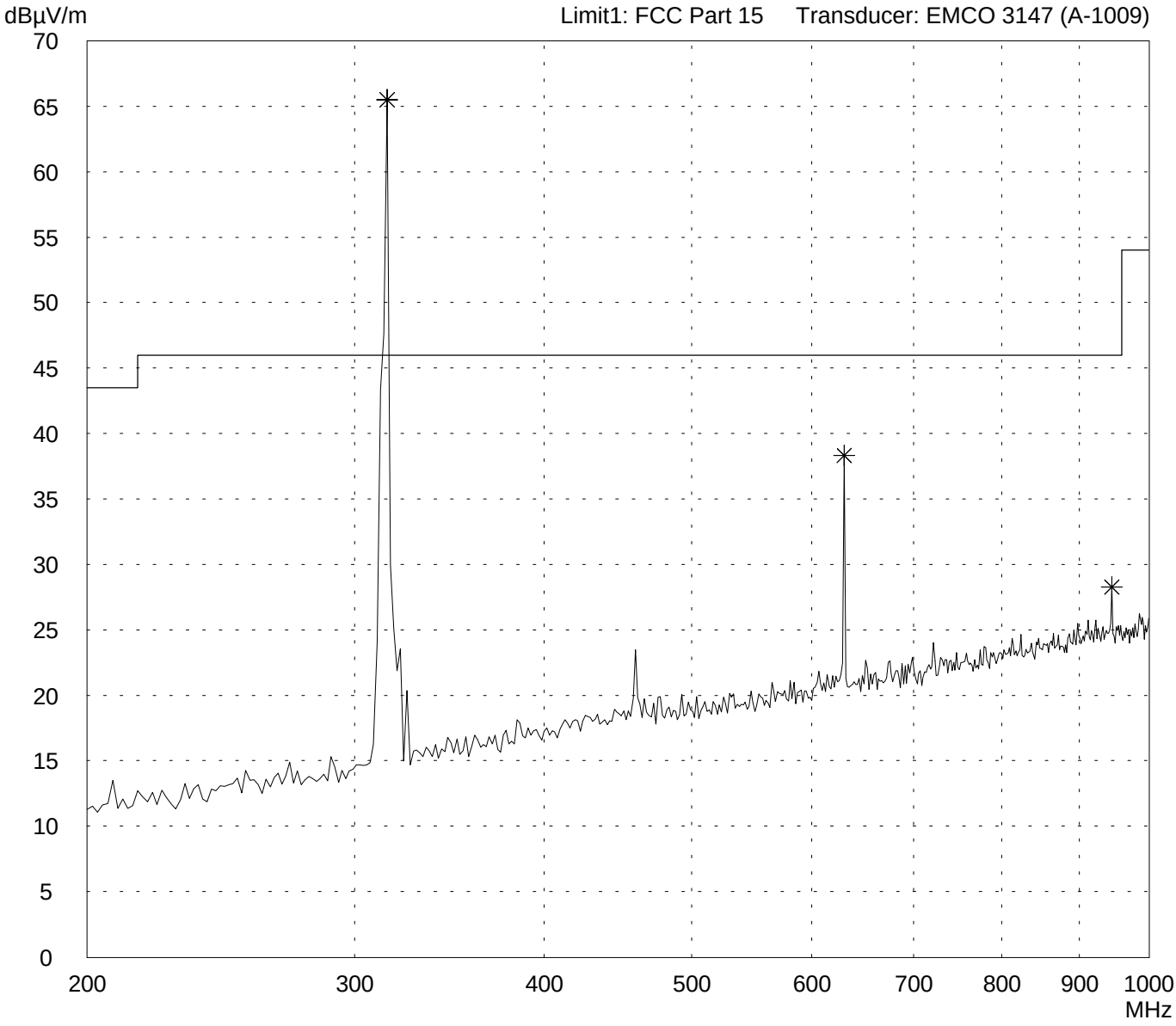


Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 200 MHz - 1 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating z-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

Detector: Peak	List of values: Selected by hand

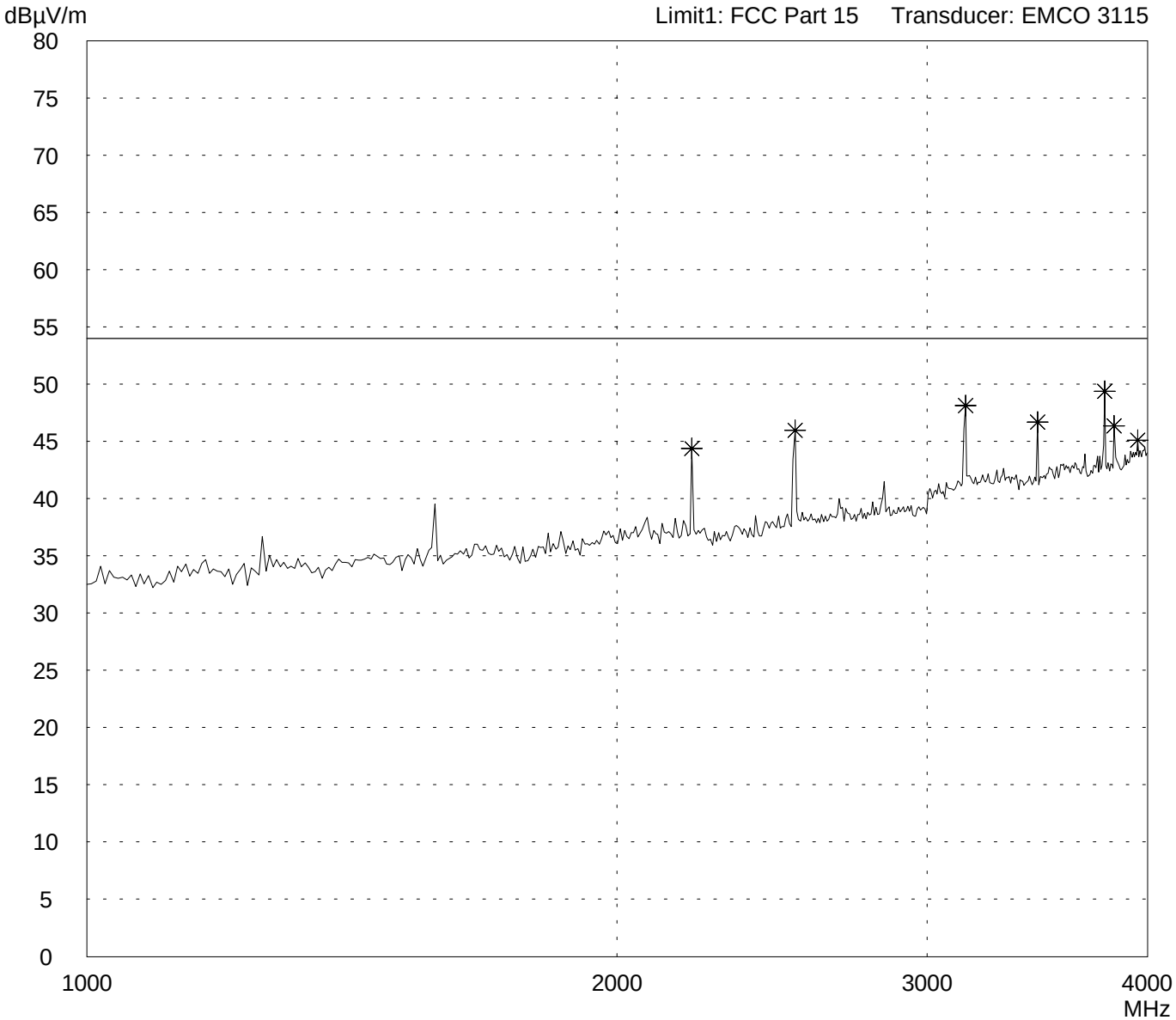


Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 1 GHz - 4 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating z-axis) - sending pulsed - with WHKS1000-10SS high pass filter
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: 04/24/2003 — Operator: M. Steindl	
Test performed: automatically — File name: default.emi	

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

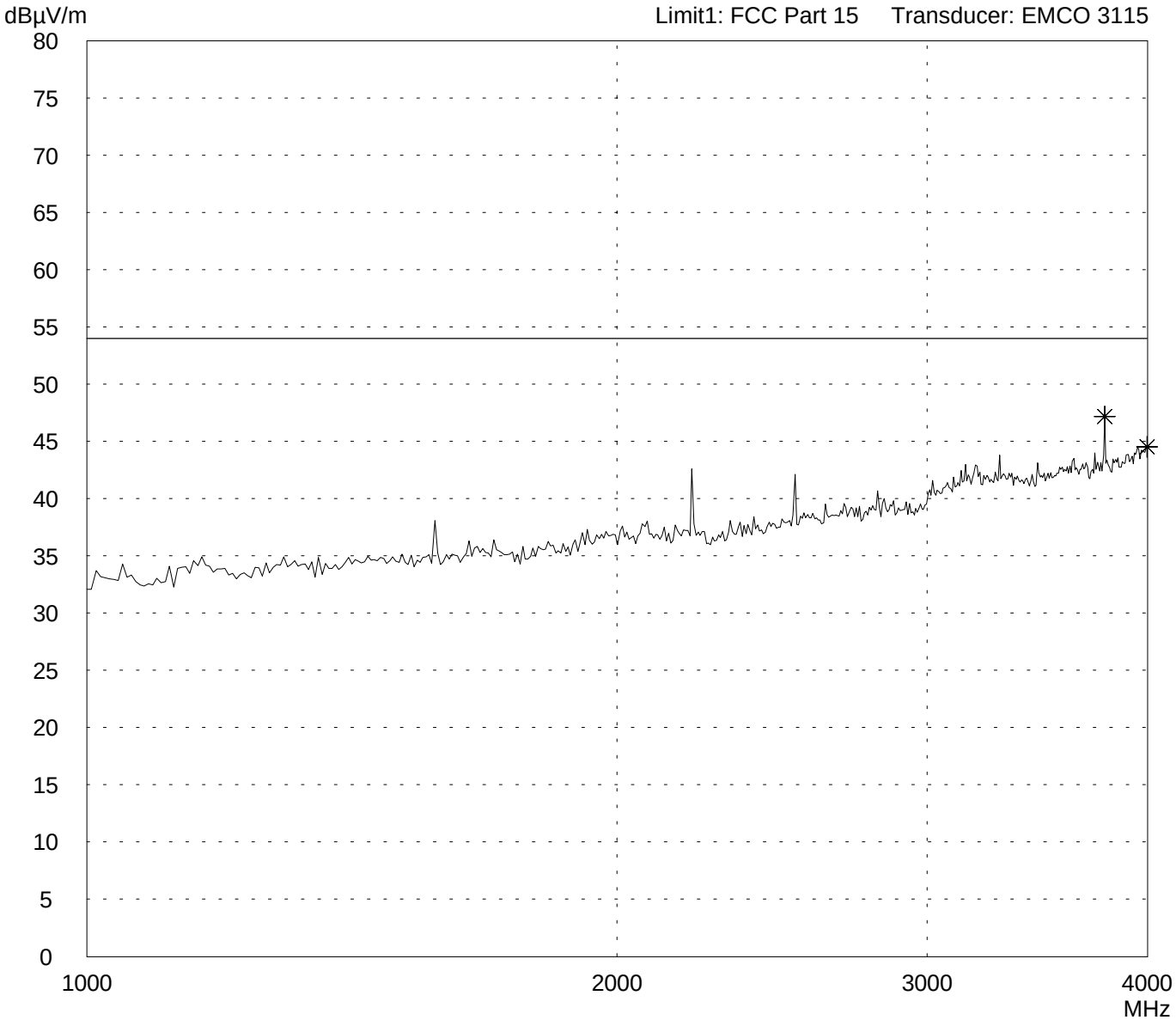


Result: Limit kept	Project file: 50530-30221 — Page of Pages

Radiated Emission Test 1 GHz - 4 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating z-axis) - sending pulsed - with WHKS1000-10SS high pass filter
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

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

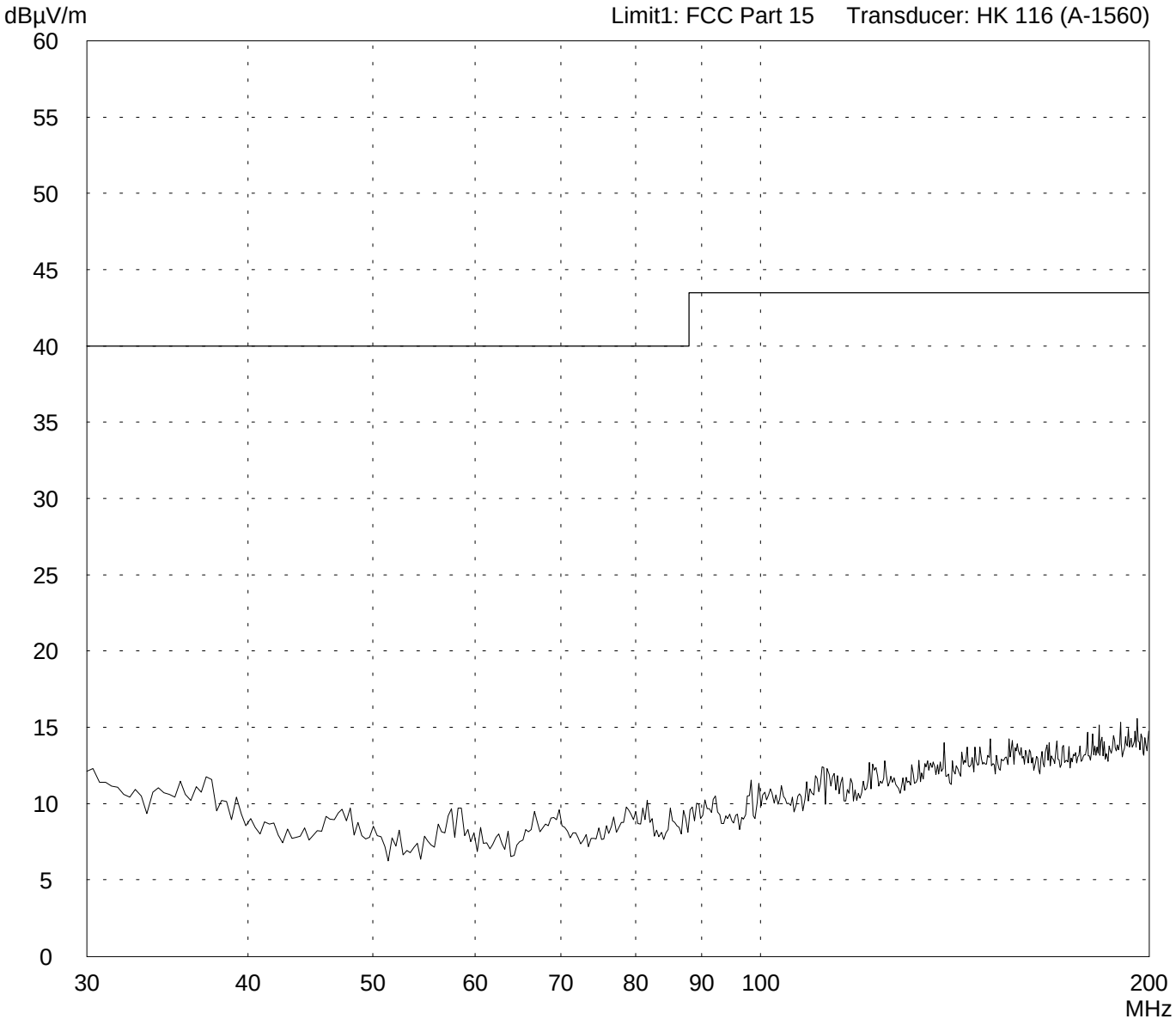


Result: Limit kept	Project file: 50530-30221 Page of Pages

Radiated Emission Test 30 MHz - 200 MHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating x-axis) - sending pulsed
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: 04/24/2003 — Operator: M. Steindl	
Test performed: automatically — File name: default.emi	

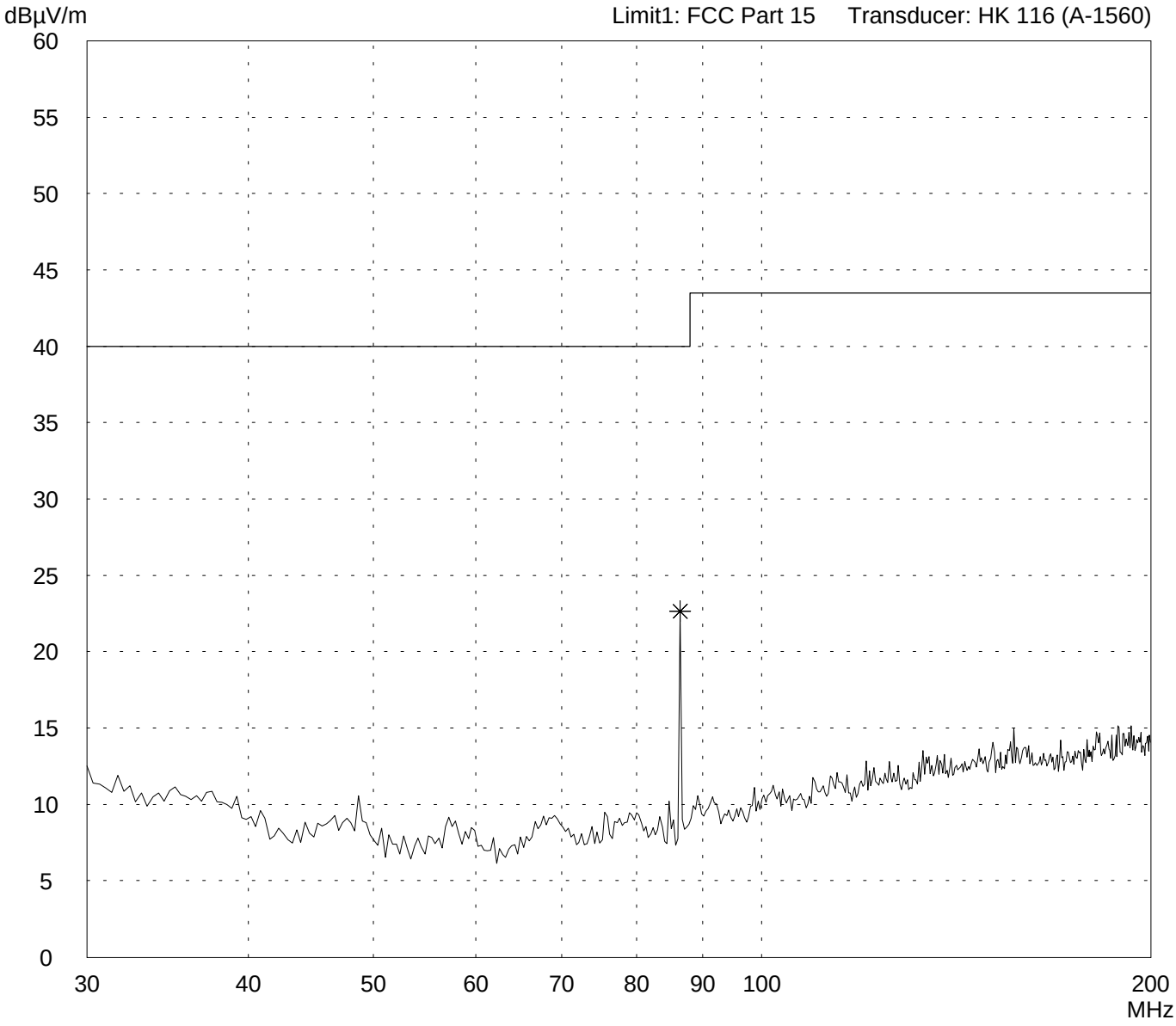
Detector: Peak	List of values: 10 dB Margin — 50 Subranges



Result: Prescan	Project file: 50530-30221 — Page of Pages

Radiated Emission Test 30 MHz - 200 MHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

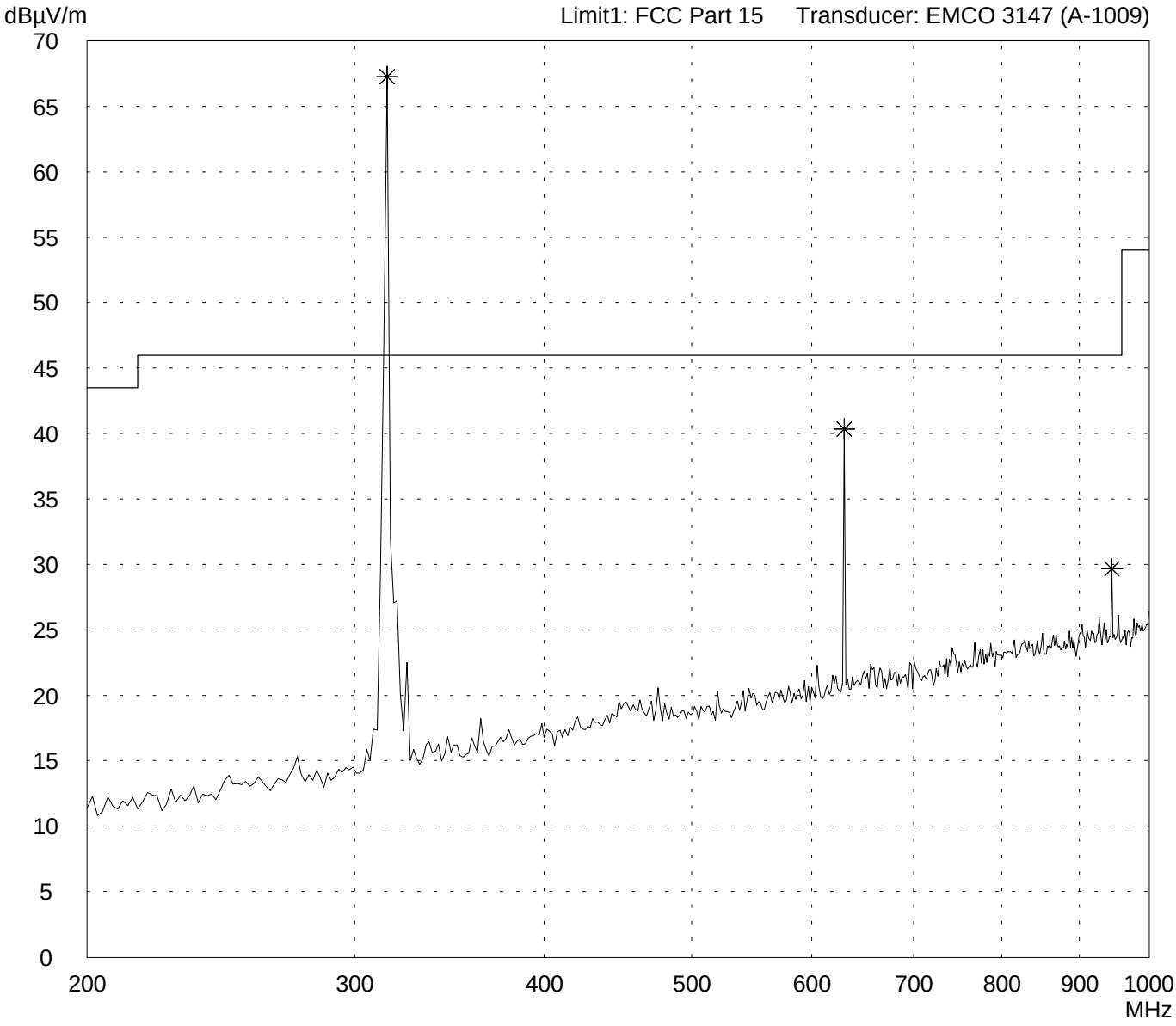
Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating x-axis) - sending pulsed
Serial no.: test sample 1	
Applicant: Eldat GmbH	
Test site: Fully anechoic room, cabin no. 2	
Tested on: Test distance 3 metres Vertical Polarization	
Date of test: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	
Detector: Peak	List of values: Selected by hand



Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 200 MHz - 1 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating x-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	
Detector: Peak	List of values: Selected by hand

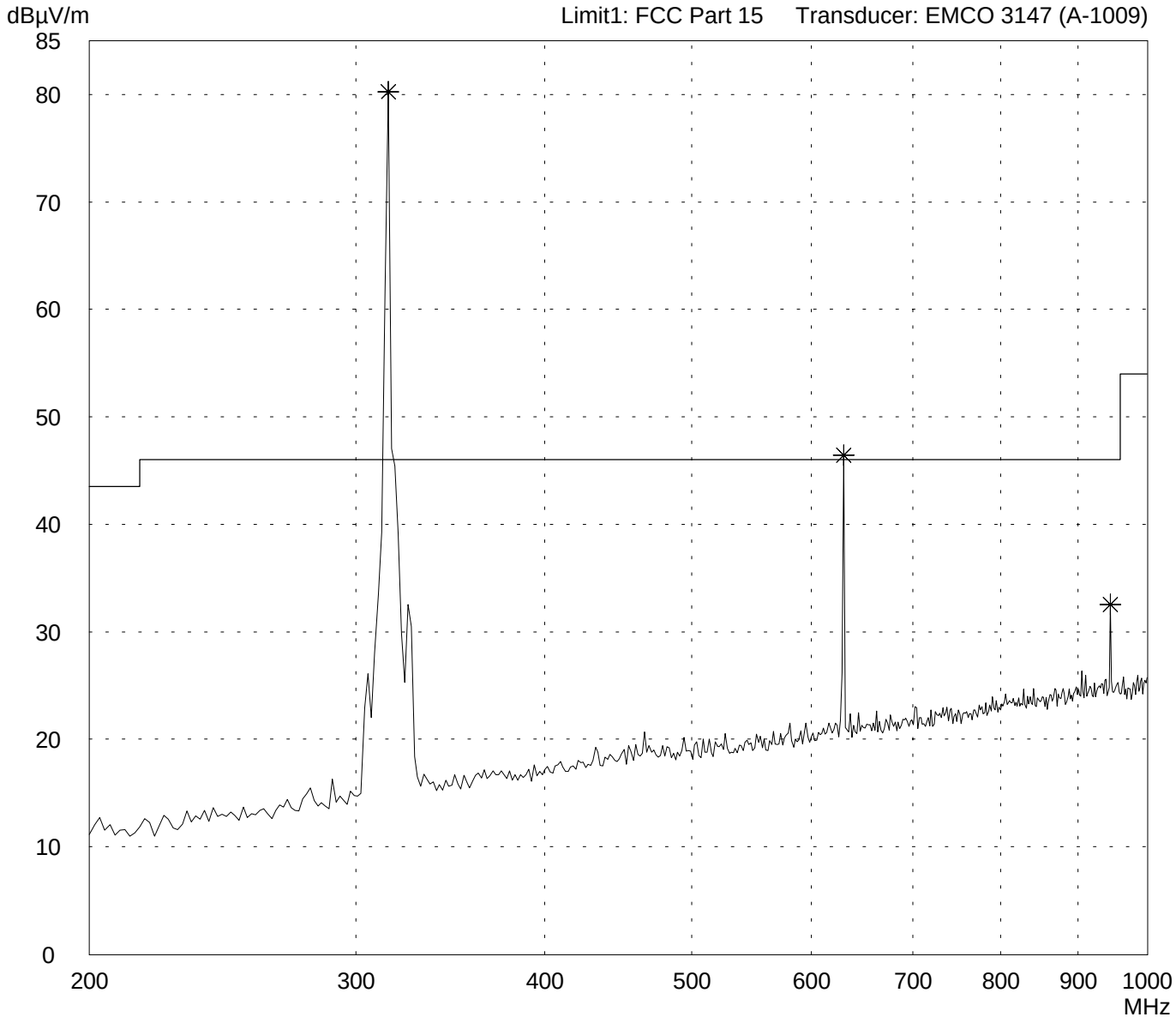


Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 200 MHz - 1 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating x-axis) - sending pulsed
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

Detector: Peak	List of values: Selected by hand

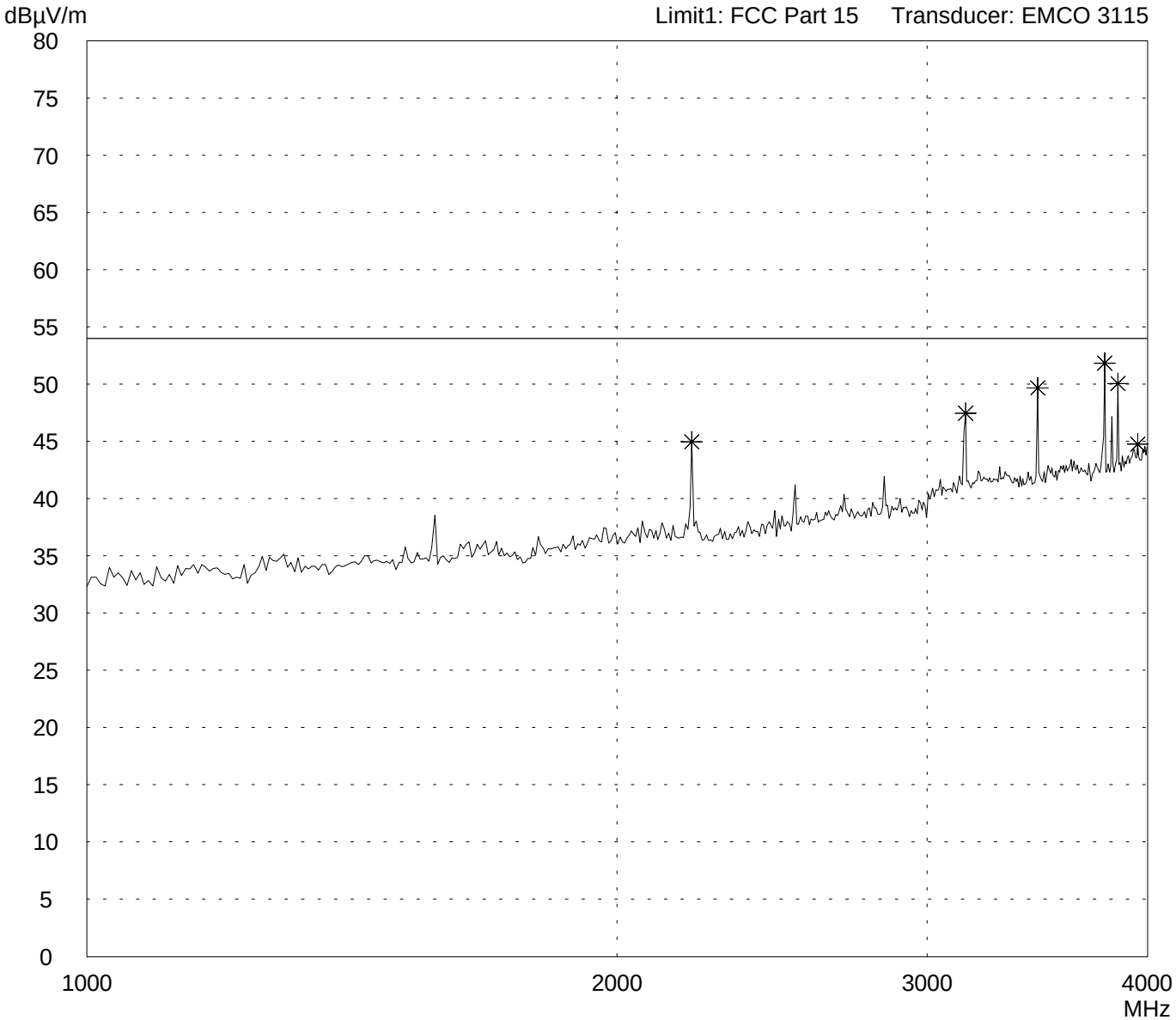


Result: Prescan	Project file: 50530-30221 Page of Pages

Radiated Emission Test 1 GHz - 4 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating x-axis) - sending pulsed - with WHKS1000-10SS high pass filter
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

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

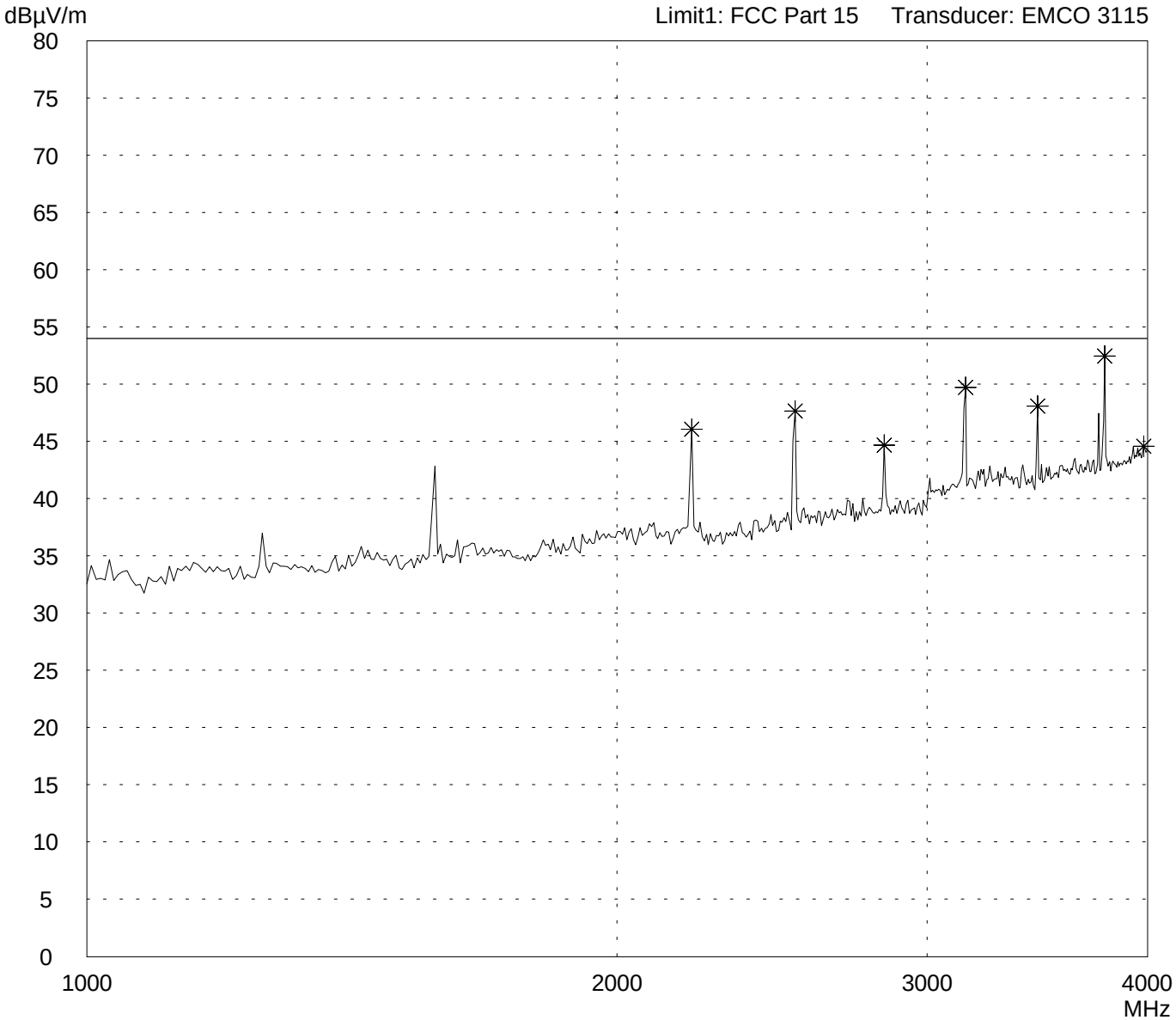


Result: Limit kept	Project file: 50530-30221 Page of Pages

Radiated Emission Test 1 GHz - 4 GHz
acc. to FCC Part 15 (Fully Anechoic Chamber)

Model: FHS 20/21 Typ 2 ASK 315 MHz	Comment: - DC 3 V lithium battery supply - EUT mouted in test fixture (rotating x-axis) - sending pulsed - with WHKS1000-10SS high pass filter
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: 04/24/2003 / Operator: M. Steindl	
Test performed: automatically / File name: default.emi	

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



Result: Limit kept	Project file: 50530-30221 Page of Pages