

Straubing, August 04, 1998

TEST - REPORT

No. 51905-80632-0

for

**SLG 40 S
MOBY Component**

Applicant: **Siemens AG**

Purpose of Testing: **To show compliance with
FCC Rules Part 15, Subpart C
section 15.209**

Note:

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

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Administrative Data

Equipment under Test: SLG 40 S
Type of equipment: MOBY Component
Parts / accessories: N.A.
Serial Number: N.A.
Version of EUT: N.A.
FCC-ID:

Applicant:
(full address) Siemens AG
Würzburger Str. 121
90766 Fürth

Contract Identification: N.A.

Contact person: Mr. Sperber

Manufacturer: N.A.

Receipt of EUT: July 06, 1998

Date of Test: August 03, 1998

Responsible for Testing: Karl Roidt

Responsible for Report: Johann Roidt (JR)

Summary of test Results

The tested sample fully complies with the requirements for intentional radiators set forth in the

**Code of Federal Regulations CFR 47
Part 15, Subpart C, Section 15.209
of the
Federal Communications Commission (FCC)**



Johann Roidt
Technical Director

Operation Mode of EUT

- Continuously reading a transponder

Changes made to the EUT during this certification test

No changes have been made to the EUT during this certification test.

Configuration of EUT and periperal devices

Configuration of cables connected to the EUT

Not applicable

Configuration of peripheral devices connected to the EUT

Simatic S7-300

Measuring Methods

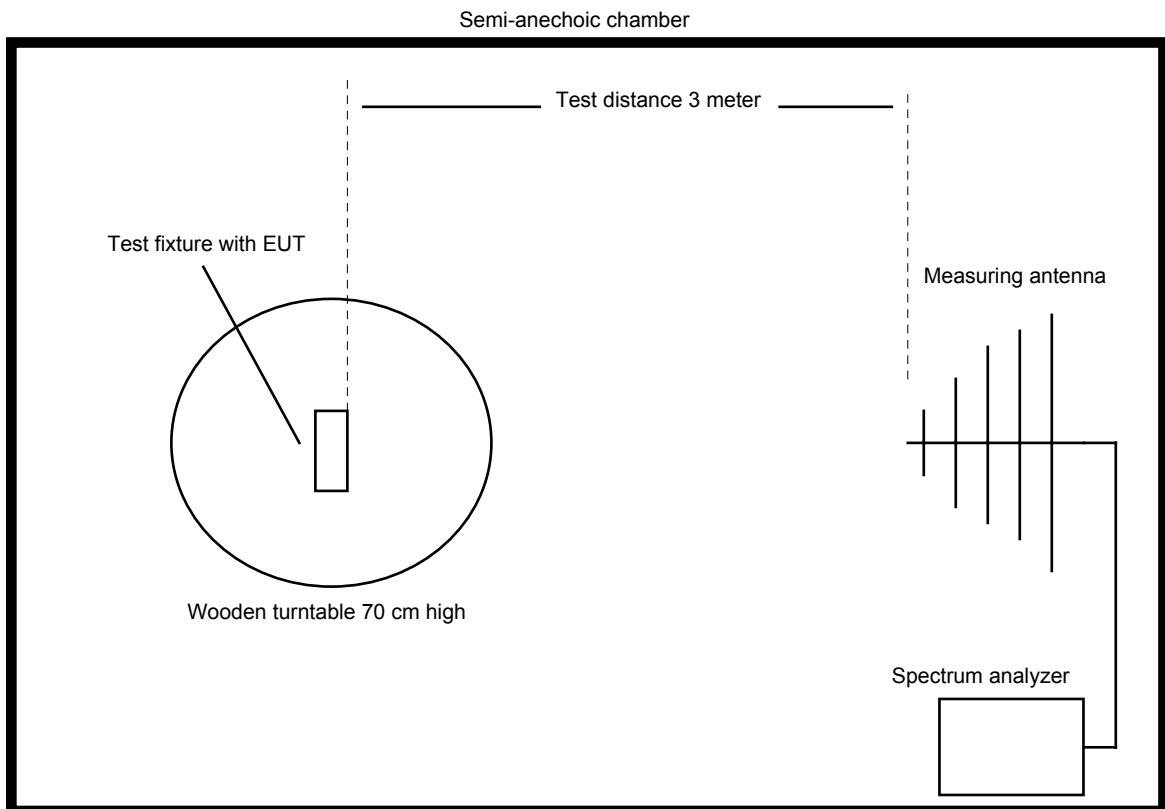
Transmitter Parameter TestS (§15.209)

All transmitter parameter radiated tests are performed at a test distance of 3 meters in a semianechoic chamber. During the tests the EUT will be rotated all around and the receiving antenna will be raised and lowered from 1 meter to 4 meter to find the maximum levels of emission. Cables and equipment will be placed and moved within the position likely to find their maximum emissions.

Measurements will be made in horizontal and vertical polarization of the receiving antenna.

The EUT was operating in transmit mode with its internal modulation.

The bandwidth of the emission will be measured with a spectrum analyzer. Resolution Bandwidth and Video Bandwidth will be set to 10 kHz.



Radiated Emissions 0.009 – 30 MHz

Radiated emissions in the frequency range 0.009 – 30 MHz will be measured initially at a distance of 3 meters. A prescan at 3 meter distance will be performed in a shielded room with the detector of the spectrum analyzer or EMI Receiver set to peak. Final measurement is then performed at 30 meter distance. In case the regulation requires testing at other distances, the result will be extrapolated. The extrapolation factor will be determined by making a second measurement at 10 meter distance. The provisions of 15.31 (d) apply.

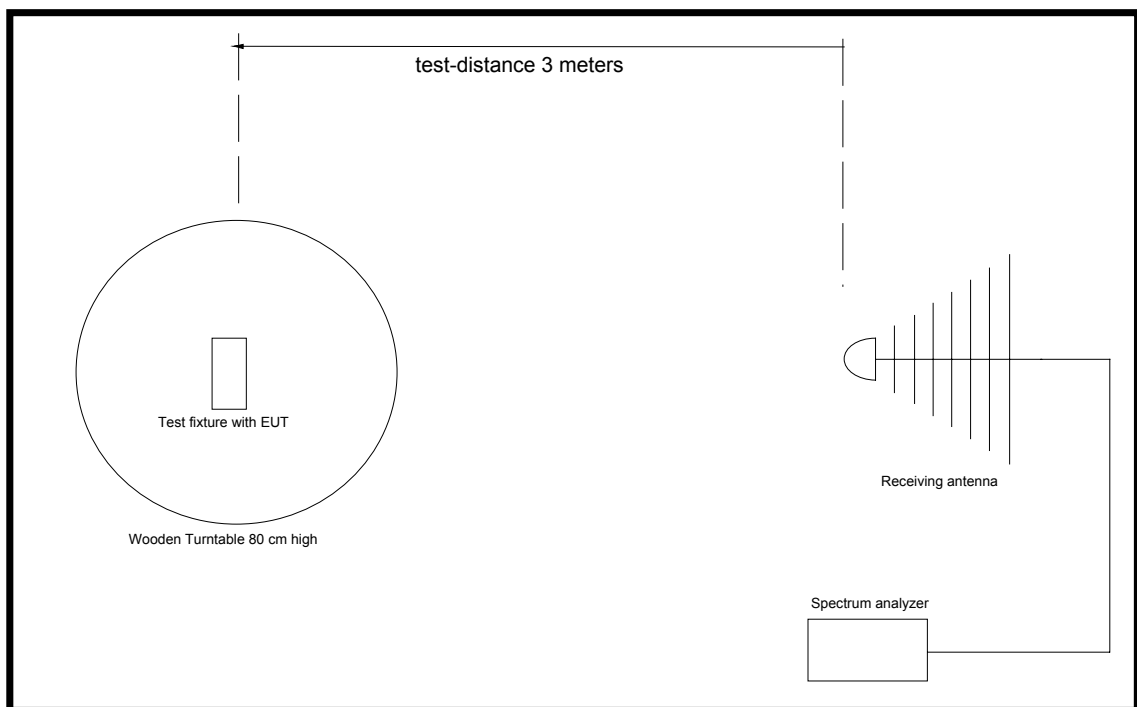
According to section 15.209 (d) final measurement is performed with the detector set to Quasi Peak except for the frequency bands 9 – 90 kHz and 110 – 490 kHz where average detector is employed.

Radiated Emissions 30 MHz – 1 GHz

Radiated emissions in the frequency range 30 – 1000 MHz will be measured at a distance of 3 meter. The bandwidth of the spectrum analyzer will be set to 100 kHz and the detector function set to Quasi Peak.

The test setup will be made in accordance with ANSI C.63.4-1992.

Measurements will be made in horizontal and vertical polarization of the receiving antenna. Prescans will be taken in a semianechoic chamber using a spectrum analyzer with the detector function set to peak. All tests will be performed at a test distance of 3 meters. For final testing an open field test site will be used. During the tests the EUT will be rotated all around and the receiving antenna will be raised and lowered from 1 meter to 4 meter to find maximum levels of emissions.



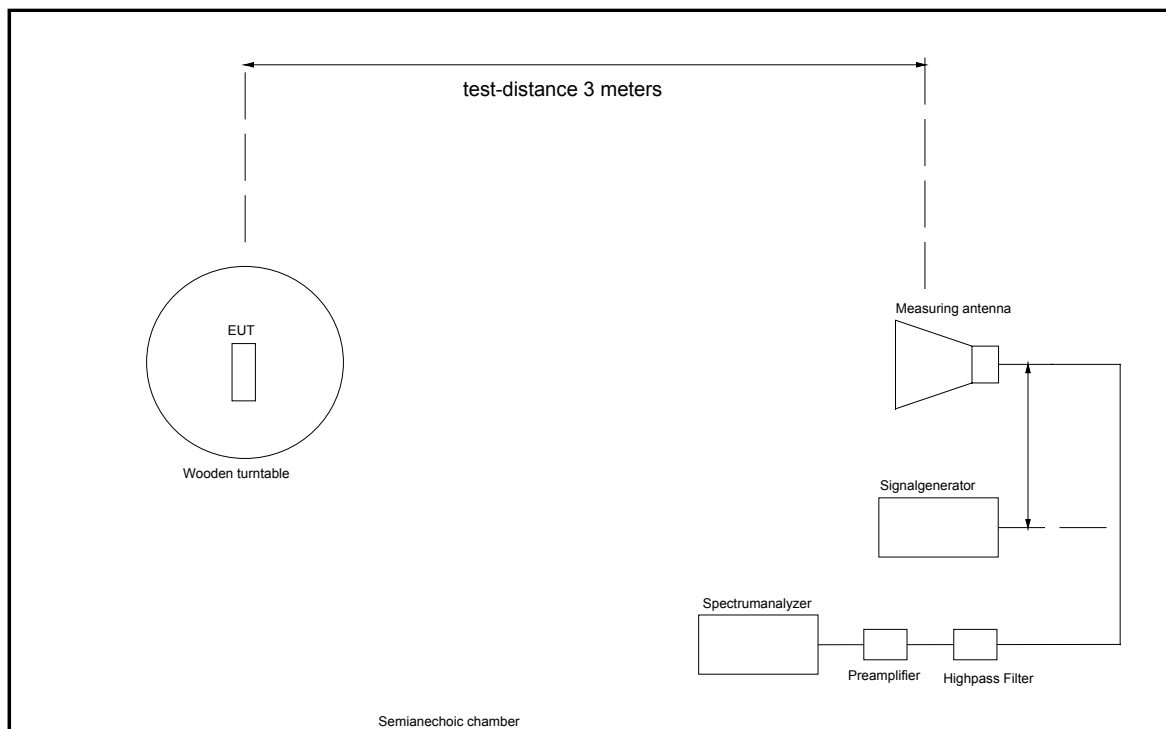
Radiated Emissions above 1 GHz

Radiated emissions were measured in the frequency range 1 GHz to 3.15 GHz in transmit mode. The resolution bandwidth and the video bandwidth of the spectrum analyzer was set to 1 MHz. Prescans with video bandwidth 1 MHz (peak mode) were taken to check out the highest levels (with reference to the limits), see 6.4 for details to prescan procedure. Final measurements were performed at the three highest emissions per band. EUT was rotated all around and receiving antenna was raised and lowered to find the maximum levels of emission. Cables and equipment were placed and moved within the range of position likely to find their maximum emissions. Measurements were made in horizontal and vertical polarization. All tests were performed in a semi-anechoic chamber with a test-distance of 3 meters.

To avoid overload in transmit mode a high pass filter was connected to the input of the preamplifier (in case when a preamplifier was necessary)). In this case a signal generator was used for substitution to eliminate the influence of filter and preamplifier.

Substitution was performed in the following steps:

- antenna cable was disconnected from receiving antenna and connected to signal generator output
- level of signal generator was increased until the reading value of the analyzer was the same as caused by EUT
- level of signal generator was noted
- final value was calculated by converting the signal generator level to dB μ V/m and adding the antenna correction factor.



Procedure for preliminary Radiated Emission Tests

The procedure for preliminary radiated emission tests follows section 13.4.1 of ANSI C63.4-1992.

In case the EUT is a handheld device preliminary emission measurements will be performed in three orthogonal axes of the EUT.

Prescans are made in the following frequency range:

0.009 – 30 MHz
30 – 230 MHz
230 – 1000 MHz
1000 – 2600 MHz
2600 – 3950 MHz
3950 – 5850 MHz
5850 – 8200 MHz
8200 – 12400 MHz
12400 – 18000 MHz
18000 – 26500 MHz
26500 – 40000 MHz

with the receiving antenna set to horizontal and vertical polarization.

The following step-by-step procedure will be used:

- 1) Monitor the frequency range at a fixed antenna height and EUT azimuth
- 2) Rotate the EUT by 360 degrees to maximize the suspected highest azimuth signals. Note the amplitude and frequency of the signals. Orient the EUT azimuth for maximum emission.
- 3) Move the antenna over its full allowed range of travel to maximize the emission. If the signal or another one at a different frequency is observed to exceed the previously noted highest amplitude signal by 1 dB or more, return to step 2) with the antenna fixed at this height. Otherwise move the antenna to the height that repeats the highest amplitude observation and proceed.
- 4) Identify at least the three highest emissions per band by using the multimarker function of the spectrum analyzer. Make a hardcopy of the spectrum.
- 5) Repeat steps 1) through 4) for the other orthogonal axes of the EUT.
- 6) Repeat steps 1) through 5) for other orthogonal antenna polarization.

Method for comparing spectrum analyzer output to the limit

The following procedure will be used:

- 1) Maximize the emission according to 6.4.
- 2) Set the spectrum analyzer to **Max Hold**
- 3) Wait until the noise is fully maximized.
- 4) Put the marker on top of the investigated signal.
- 5) Note frequency and level of the investigated signal
- 6) Add antenna correction and cable loss to this level and compare it with the limit.

Spectrum analyzer setting for final test

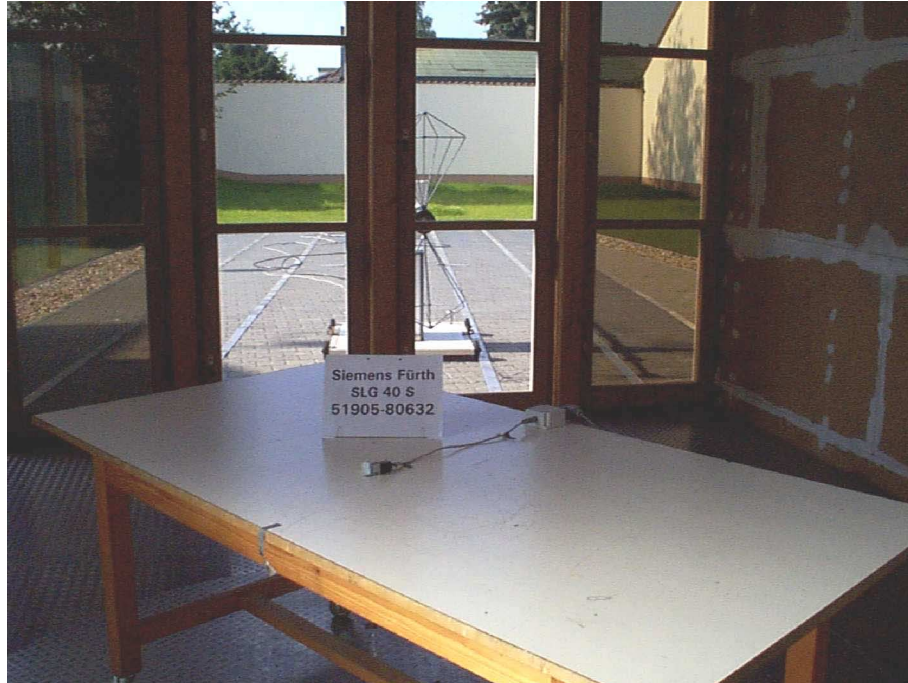
| Frequency range | Detector | Resolution Bandwidth | Video Bandwidth | Trace Mode |
|-----------------------------|------------|----------------------|-----------------|------------|
| 0.009 – 30 MHz | Quasi Peak | 10 kHz | 10 kHz | Max Hold |
| 9 – 90 kHz 110 – 490 kHz | Average | 10 kHz | 100 Hz | Max Hold |
| 30 – 1000 MHz | Quasi Peak | 100 kHz | 1 MHz | Max Hold |
| > 1000 MHz | Peak | 1 MHz | 1 MHz | Max Hold |
| > 1000 MHz | Average | 1 MHz | 1 kHz | Max Hold |

Photographs taken during testing

Radiated emission measurement < 30 MHz



Radiated emission measurement > 30 MHz



List of Measurements

| FCC Part 15 Subpart C | | | |
|------------------------------|-----------------------------|-------------|----------------|
| Section(s): | Test | Page | Result |
| | : | | |
| §15.207.a | Conducted emissions | | Not applicable |
| §15.209.c | Field strength of emissions | | passed |
| | | | |

Test Results

**Field Strength of Emissions according to FCC Rules,
 Part 15, Subpart C, Section 15.209
 Frequency Band 0.009 - 30 MHz**

Model: SLG 40 S
 Type: N.A.
 Serial No. N.A.
 Applicant: Siemens AG
 Test Site: Open Field Test Site (without Ground Plane)
 Distance: 30 Meter
 Date of Test: August 03, 1998

| Frequency (MHz) | Detector | Antenna Polarization | Analyzer Reading (dBµV) | Correction Factor (dB) | Field Strength (dBµV/m) | Limit dBµV/m | Margin dB |
|-----------------|----------|----------------------|-------------------------|------------------------|-------------------------|--------------|-------------|
| 0.135 | QP | --- | 5.5 | 20 | 25.5 | 65 | 39.5 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Sample calculation of field strength values:

Field Strength (dBµV/m) = Analyzer Reading (dBµV) + Correction Factor (dB)

Limit extrapolated by using the square of an inverse linear distance extrapolation factor (40 dB/decade)

Test equipment used (see equipment list for details):
 02, 13, 14, 16, 38, 40, 42, 57, 64, 67

**Field Strength of Emissions according to FCC Rules,
Part 15, Subpart C, Section 15.209
Frequency Band > 30 MHz**

Model: SLG 40 S
Type: N.A.
Serial No. N.A.
Applicant: Siemens AG
Test Site: Open Field Test Site (without Ground Plane)
Distance: 3 Meter
Date of Test: July 21, 1998

| Frequency (MHz) | Detector | Antenna Polarization | Analyzer Reading (dB μ V) | Correction Factor (dB) | Field Strength (dB μ V/m) | Limit dB μ V/m | Margin dB |
|-----------------|----------|----------------------|-------------------------------|------------------------|-------------------------------|--------------------|-----------|
| 245.4 | QP | Horizontal | 19.0 | 18.5 | 37.5 | 46.0 | 8.5 |
| 256.2 | QP | Horizontal | 20.6 | 19.3 | 39.9 | 46.0 | 6.1 |
| 259.9 | QP | Horizontal | 19.4 | 19.6 | 39.0 | 46.0 | 7 |
| 36.1 | QP | Vertical | 19.1 | 13.3 | 32.4 | 40 | 7.6 |
| 137.1 | QP | Vertical | 15.9 | 14.2 | 30.1 | 43.5 | 13.4 |
| 295.9 | QP | Vertical | 7.3 | 22.8 | 30.1 | 46.0 | 15.9 |

*** = No emissions above noise floor detected

Sample calculation of field strength values:

Field Strength (dB μ V/m) = Analyzer Reading (dB μ V) + Correction Factor (dB)

Test equipment used (see equipment list for details):
02, 13, 14, 16, 38, 40, 42, 57, 64, 67

Equipment List

To facilitate reference to test equipment used for related tests, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory.

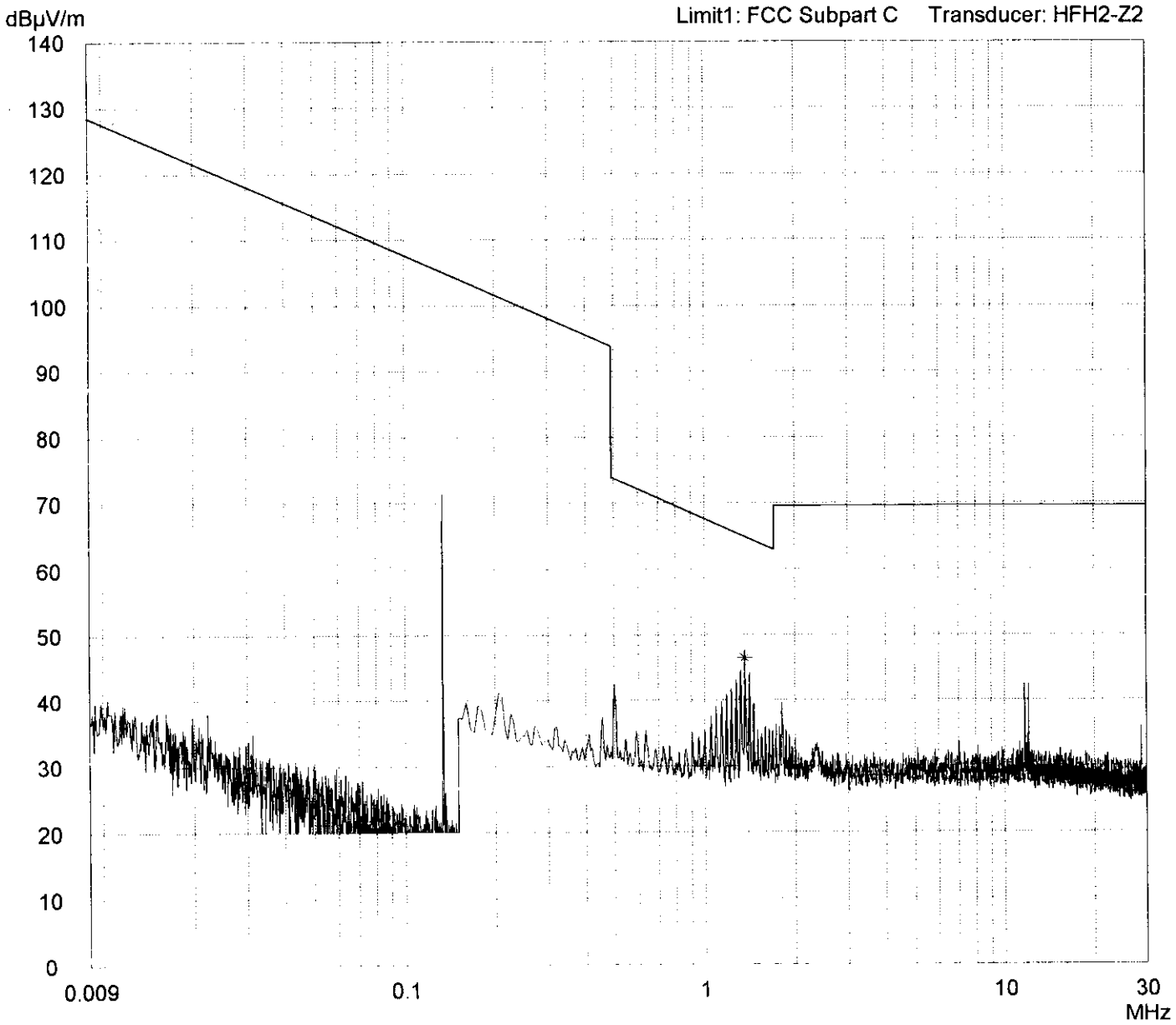
| No. | Type | Model | Serial Number | Manufacturer |
|-----|----------------------|--------------|---------------|-----------------|
| 01 | Spectrum Analyzer | R 3261 A | 91720155 | Advantest |
| 02 | Spectrum Analyzer | R 3271 | 05050023 | Advantest |
| 03 | Test Receiver | ESH 3 | 880112/032 | Rohde & Schwarz |
| 04 | Test Receiver | ESHS 10 | 860043/016 | Rohde & Schwarz |
| 05 | Test Receiver | ESV | 881414/009 | Rohde & Schwarz |
| 06 | Test Receiver | ESVP | 881120/024 | Rohde & Schwarz |
| 07 | Audio Analyzer | UPA | 862954 | Rohde & Schwarz |
| 08 | Power Meter | NRVS | 836856/015 | Rohde & Schwarz |
| 09 | Power Sensor | NRV-Z52 | 837901/030 | Rohde & Schwarz |
| 10 | Power Sensor | NRV-Z4 | 863828/015 | Rohde & Schwarz |
| 11 | Preamplifier | ESV-Z3 | 860907/004 | Rohde & Schwarz |
| 12 | Preamplifier | R14601 | | Advantest |
| 13 | Preamplifier | ACX/080-3030 | 32640 | CTT |
| 14 | Preamplifier | ACO/180-3530 | 32641 | CTT |
| 15 | Signal Generator | SMS | 872166/039 | Rohde & Schwarz |
| 16 | Signal Generator | HP 8673 D | 2930A00966 | Hewlett Packard |
| 17 | Waveform Generator | HP 33120 A | US34005375 | Hewlett Packard |
| 18 | UHF Attenuator Set | DPU | 300771/075 | Rohde & Schwarz |
| 19 | UHF Attenuator Set | DPU | 300788/006 | Rohde & Schwarz |
| 20 | Pulse Limiter | ESH 3-Z2 | 1144 | Rohde & Schwarz |
| 21 | Pulse Limiter | 11947 A | 3107A00566 | Hewlett Packard |
| 22 | V-Network | ESH 3-Z5 | 862770/018 | Rohde & Schwarz |
| 23 | V-Network | ESH 3-Z5 | 894785/005 | Rohde & Schwarz |
| 24 | V-Network | ESH 3-Z5 | 830952/025 | Rohde & Schwarz |
| 25 | V-Network | ESH 3-Z6 | 830722/010 | Rohde & Schwarz |
| 26 | V-Network | NSLK 8127 | 8127152 | Schwarzbeck |
| 27 | V-Network | NNLA 8119 | 8119148 | Schwarzbeck |
| 28 | V-Network | SE 01 | 01 | Senton |
| 29 | T-Network | ESH 3-Z4 | 890602/011 | Rohde & Schwarz |
| 30 | T-Network | ESH 3-Z4 | 890602/012 | Rohde & Schwarz |
| 31 | High Impedance Probe | TK 9416 | 01 | Schwarzbeck |
| 32 | High Impedance Probe | TK 9416 | 02 | Schwarzbeck |
| 33 | Current Probe | ESH 2-Z1 | 863366/18 | Rohde & Schwarz |
| 34 | Current Probe | ESV-Z1 | 862553/3 | Rohde & Schwarz |

| No. | Type | Model | Serial Number | Manufacturer |
|-----|--------------------------|------------|---------------|-----------------|
| 35 | Absorbing Clamp | MDS 21 | 80911 | Lüthi |
| 36 | Absorbing Clamp | MDS 21 | 79690 | Lüthi |
| 37 | Loop Antenna | HFH2-Z2 | 882964/1 | Rohde & Schwarz |
| 38 | Biconical Antenna | HK 116 | 836239/02 | Rohde & Schwarz |
| 39 | Biconical Antenna | BBA 9106 | A0379 324 | Schwarzbeck |
| 40 | Log. Periodic Antenna | HL 223 | 834408/12 | Rohde & Schwarz |
| 41 | Log. Periodic Antenna | UHALP 9107 | 9107150 | Schwarzbeck |
| 42 | Horn Antenna | 3115 | 9508-4553 | Emco |
| 43 | Horn Antenna | 3160-03 | 9112-1003 | Emco |
| 44 | Horn Antenna | 3160-04 | 9112-1001 | Emco |
| 45 | Horn Antenna | 3160-05 | 9112-1001 | Emco |
| 46 | Horn Antenna | 3160-06 | 9112-1001 | Emco |
| 47 | Horn Antenna | 3160-07 | 9112-1008 | Emco |
| 48 | Horn Antenna | 3160-08 | 9112-1002 | Emco |
| 49 | Horn Antenna | 3160-09 | 9403-1025 | Emco |
| 50 | Digital multimeter | 199 | 463386 | Keithley |
| 51 | DC Power Supply | NGSM 32/10 | 203 | Rohde & Schwarz |
| 52 | DC Power Supply | NGB | 2455 | Rohde & Schwarz |
| 53 | DC Power Supply | NGA | 386 | Rohde & Schwarz |
| 54 | Temperature Test Chamber | HT4010 | 07065550 | Heraeus |
| 55 | Cable | RG214 | 1309 | Senton |
| 56 | Cable | 150CM_001 | 1479 | Rosenberger |
| 57 | Cable | 150CM_002 | 1480 | Rosenberger |
| 58 | Cable Set EG1 | RG214 | 1189 - 1191 | Senton |
| 59 | Cable Set Cabine 1 | RG214 | | Senton |
| 60 | Cable Set Cabine 2 | RG214 | | Senton |
| 61 | Cable Set Cabine 3 | RG214 | | Senton |
| 62 | Shielded Room | Nr. 1 | 1451 | Senton |
| 63 | Shielded Room | Nr. 2 | 1452 | Senton |
| 64 | Semi-anechoic Chamber | Nr. 3 | 1453 | Siemens |
| 65 | Shielded Room | Nr. 4 | 1454 | Euroshield |
| 66 | Open Area Test Site | EG 1 | | Senton |
| 67 | High pass filter | | | AT & T |

Charts taken during Testing

Radiated Emission Test 9 kHz - 30 MHz according to FCC Part 15 Subpart C

| | |
|--|---|
| <p>Model: SLG 40 S</p> <p>Serial no.:</p> <p>Applicant: Siemens AG</p> <p>Test site: Shielded room, cabin no. 2</p> <p>Tested on: Test distance 3 metres</p> <p>Date of test: 07/06/1998</p> <p>Operator: J. Roidt</p> <p>Test performed: automatically</p> <p>File name:</p> | <p>Mode: without Transponder</p> |
| <p>Detector: Peak / Final Results: QP</p> | <p>Final results: 20 dB Margin 25 Subranges</p> |



| | |
|----------------|-------------------------------------|
| Result: | Project file: 00000-00000 |
| | Page of Pages |

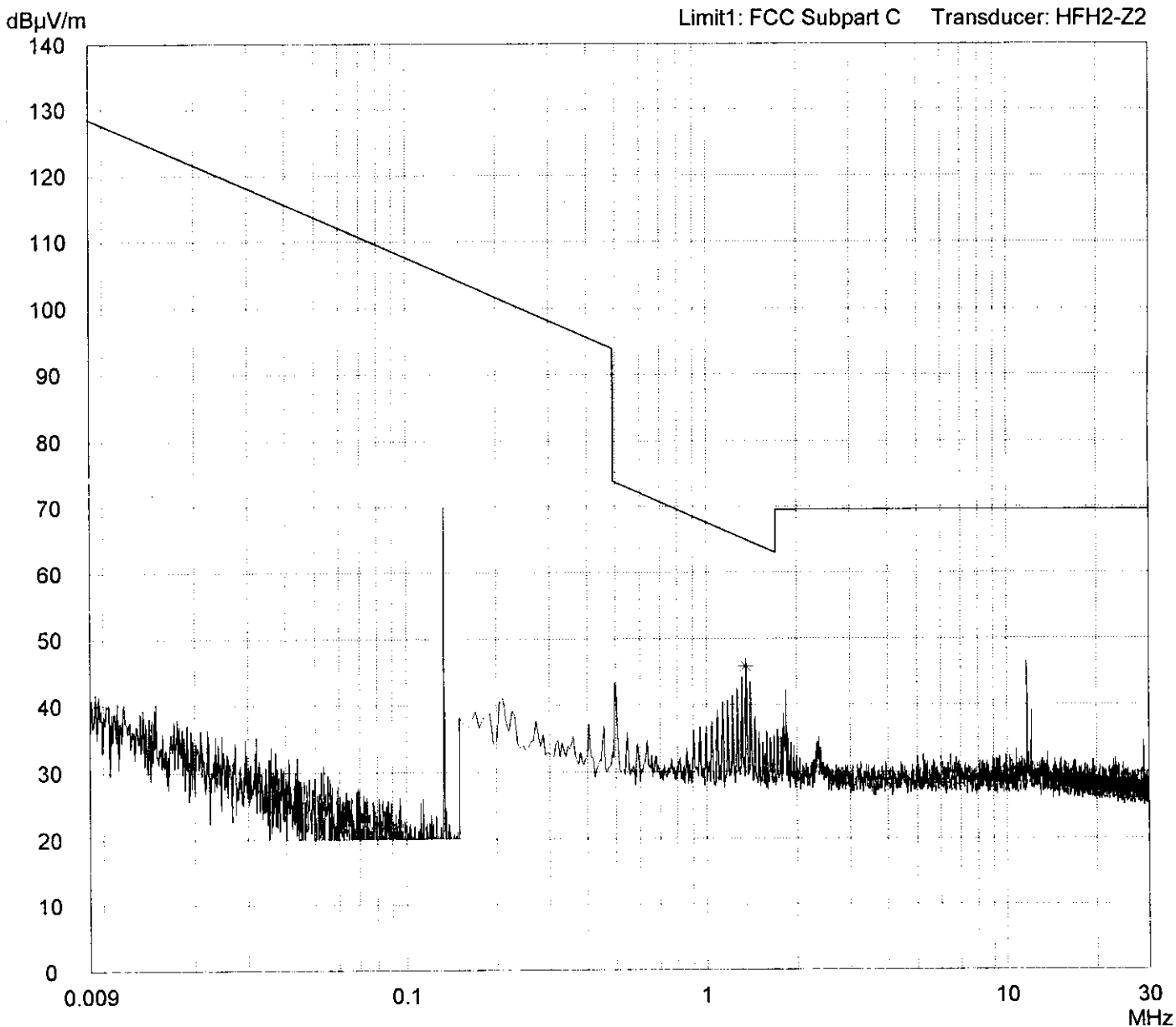
Radiated Emission Test 9 kHz - 30 MHz according to FCC Part 15 Subpart C

| | |
|---|------------------------------|
| Model: SLG 40 S | |
| Serial no.: | |
| Applicant: Siemens AG | |
| Test site: Shielded room, cabin no. 2 | |
| Tested on: Test distance 3 metres | |
| Date of test: 07/06/1998 | Operator: J. Roidt |
| Test performed: automatically | File name: |

| |
|----------------------------------|
| Mode: with Transponder |
|----------------------------------|

| |
|--|
| Detector: Peak / Final Results: QP |
|--|

| | |
|---------------------------------------|---------------------|
| Final results: 20 dB Margin | 25 Subranges |
|---------------------------------------|---------------------|



| |
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| Result: |
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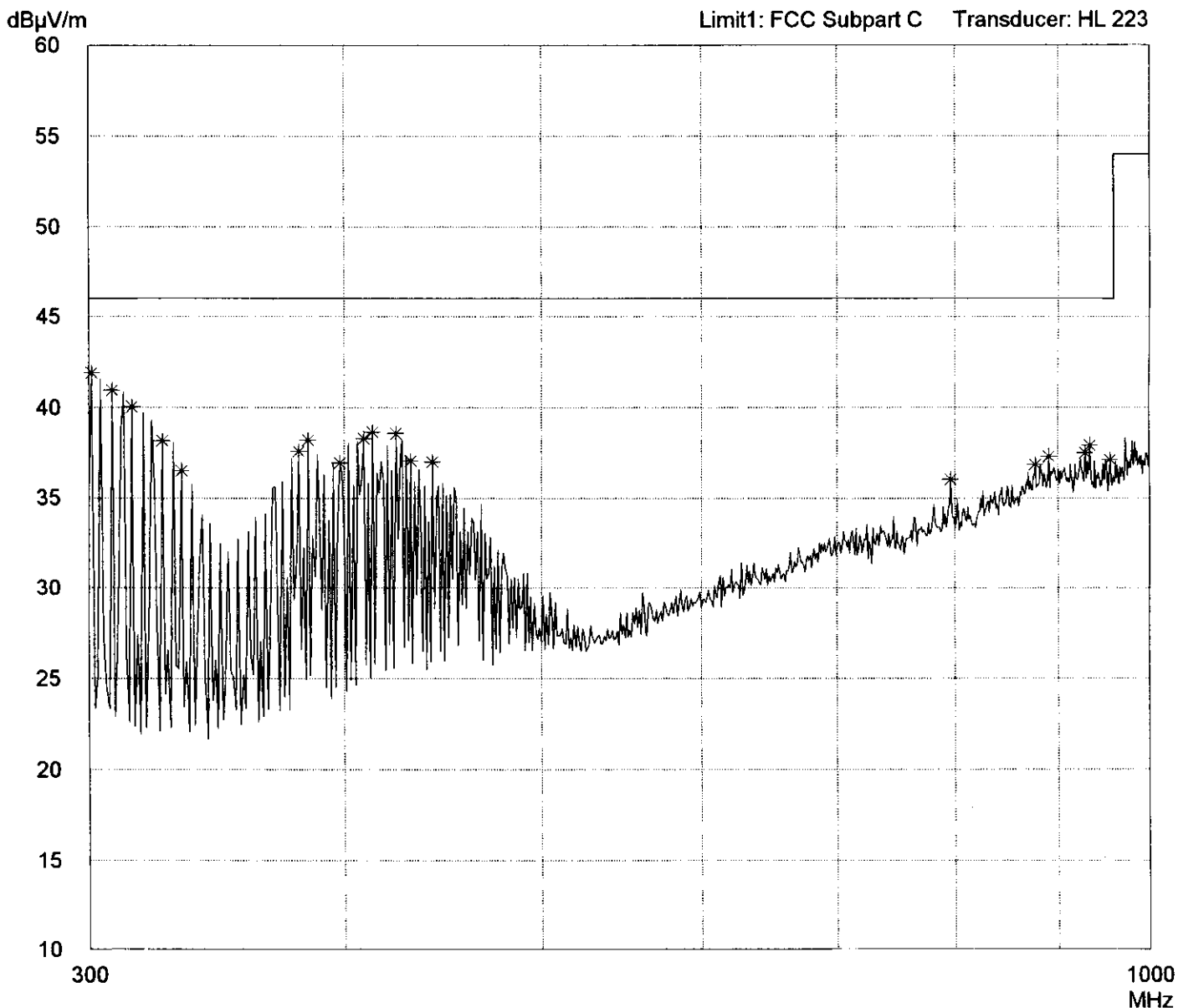
Radiated Emission Test 300 MHz - 1 GHz according to FCC Part 15 Subpart C

| | |
|---|------------------------------|
| Model: SLG 40 S | |
| Serial no.: -- | |
| Applicant: Siemens AG | |
| Test site: Semi anechoic room, cabin no. 3 | |
| Tested on: Test distance 3 meters Horizontal Polarization | |
| Date of test: 07/10/1998 | Operator: K. Roidt |
| Test performed: automatically | File name: |

| |
|----------------------------------|
| Mode: with Transponder |
|----------------------------------|

| |
|--------------------------|
| Detector: Peak |
|--------------------------|

| | |
|--|---------------------|
| List of values: 10 dB Margin | 50 Subranges |
|--|---------------------|



| |
|---------------------------|
| Result: Prescan |
|---------------------------|

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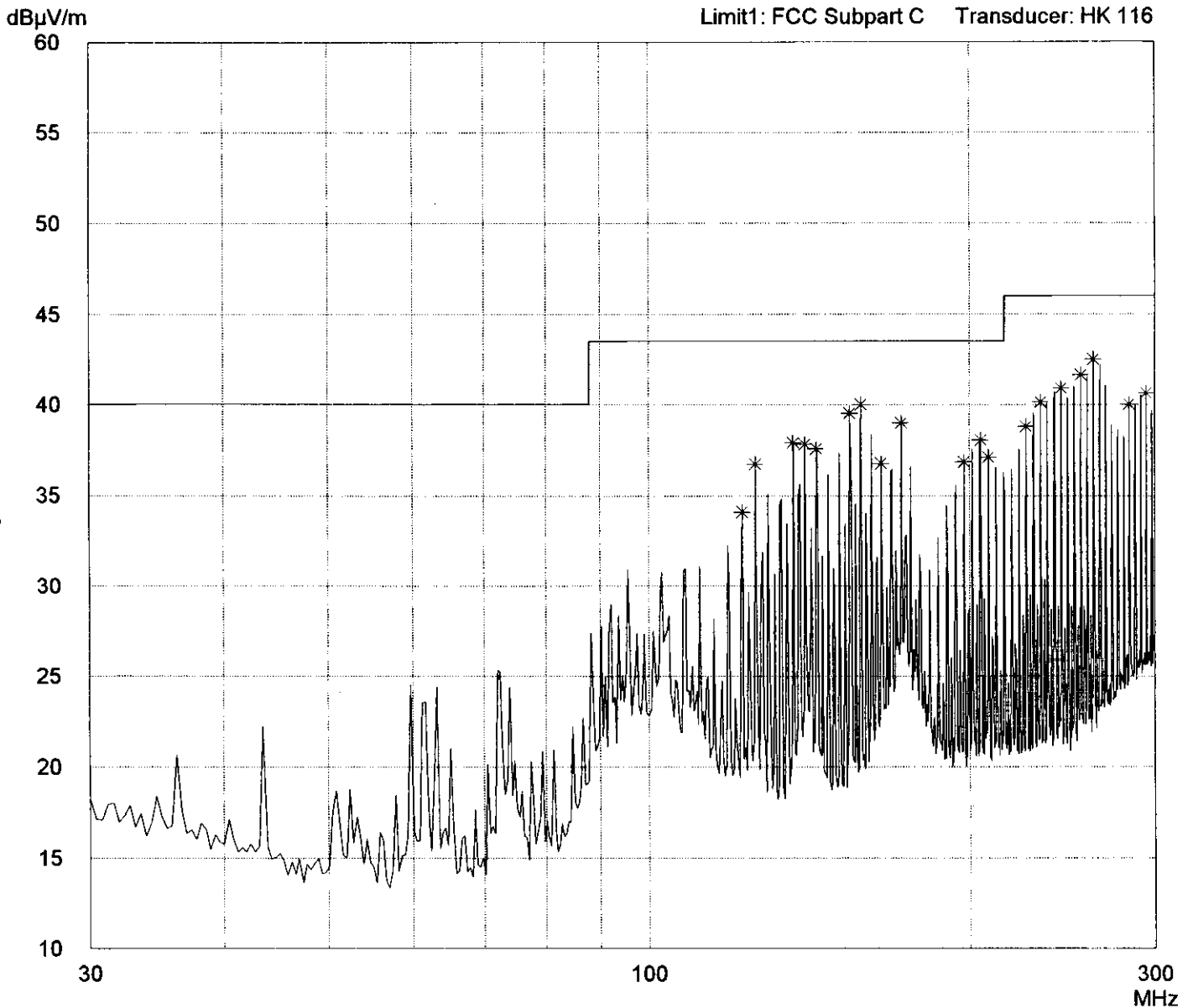
Radiated Emission Test 30 MHz - 300 MHz according to FCC Part 15 Subpart C

| | |
|---|------------------------------|
| Model: SLG 40 S | |
| Serial no.: -- | |
| Applicant: Siemens AG | |
| Test site: Semi anechoic room, cabin no. 3 | |
| Tested on: Test distance 3 meters Horizontal Polarization | |
| Date of test: 07/10/1998 | Operator: K. Roidt |
| Test performed: automatically | File name: |

| |
|----------------------------------|
| Mode: with Transponder |
|----------------------------------|

| |
|--------------------------|
| Detector: Peak |
|--------------------------|

| | |
|--|---------------------|
| List of values: 10 dB Margin | 50 Subranges |
|--|---------------------|



| |
|---------------------------|
| Result: Prescan |
|---------------------------|

| | |
|-------------------------------------|---------------------|
| Project file: 51905-80632 | Page of Pages |
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Radiated Emission Test 30 MHz - 300 MHz according to FCC Part 15 Subpart C

Model:
SLG 40 S

Serial no.:
--

Applicant:
Siemens AG

Test site:
Semi anechoic room, cabin no. 3

Tested on:
**Test distance 3 meters
Vertical Polarization**

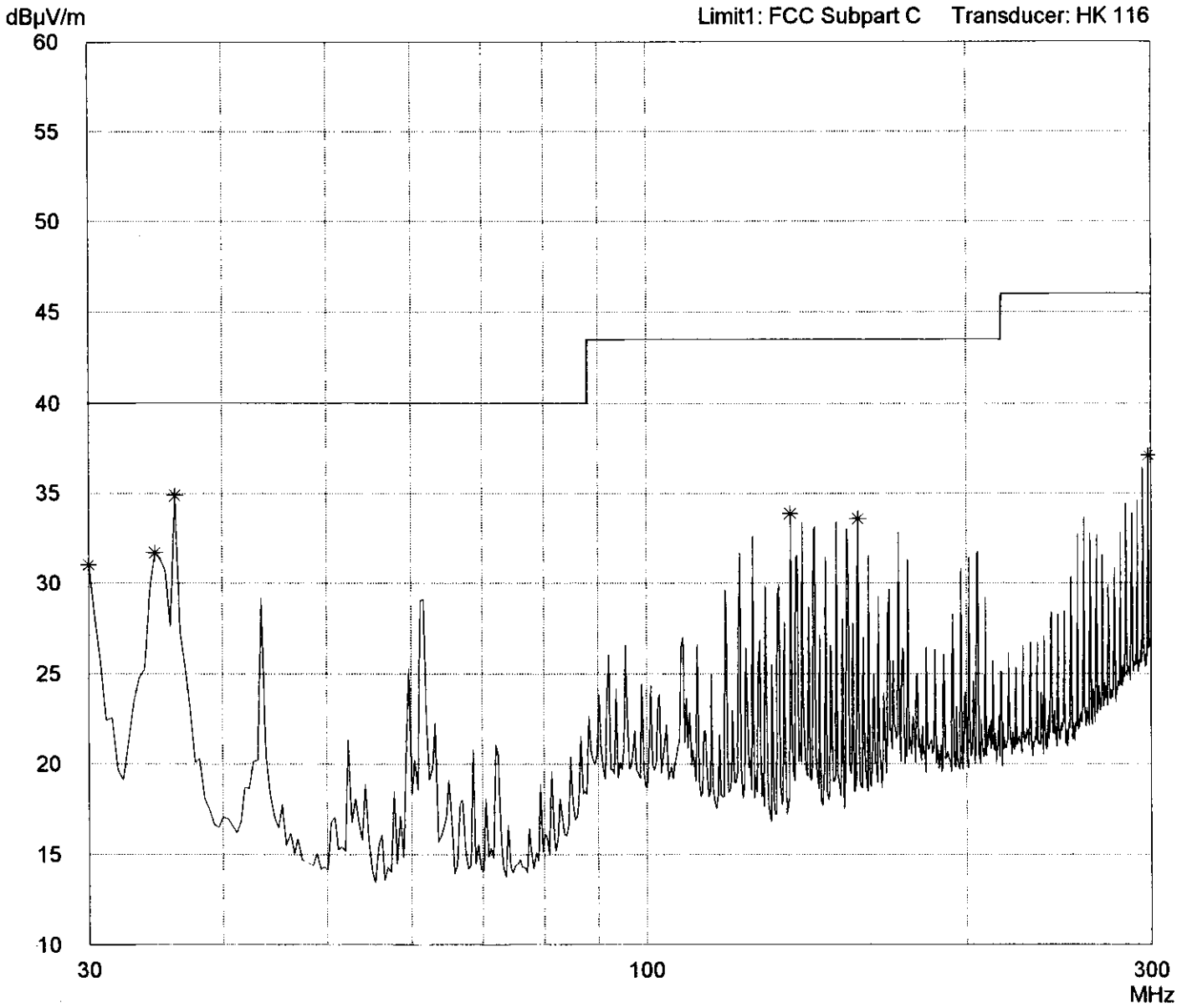
Date of test: **07/10/1998** Operator: **K. Roidt**

Test performed: **automatically** File name:

Mode:
with Transponder

Detector:
Peak

List of values:
10 dB Margin 50 Subranges



Result:
Prescan

Project file:
51905-80632 Page of Pages

Radiated Emission Test 300 MHz - 1 GHz according to FCC Part 15 Subpart C

| | |
|--|--|
| Model: SLG 40 S | Mode: with Transponder |
| Serial no.: -- | |
| Applicant: Siemens AG | |
| Test site: Semi anechoic room, cabin no. 3 | |
| Tested on: Test distance 3 meters Vertical Polarization | |
| Date of test: 07/10/1998 | Operator: K. Roidt |
| Test performed: automatically | File name: |
| Detector: Peak | List of values: 10 dB Margin 50 Subranges |

