

Straubing, August 04, 1998

**TEST - REPORT**

**No. 51905-80639-0**

**for**

**SLG 72  
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 72  
Type of equipment: MOBY Component  
Parts / accessories: N.A.  
Serial Number: N.A.  
Version of EUT: N.A.

FCC-ID:

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

Contract Identification: N.A.

Contact person: Mr. Sperber

Manufacturer: N.A.

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Receipt of EUT: July 06, 1998

Date of Test: August 03, 1998

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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**

- Continously 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

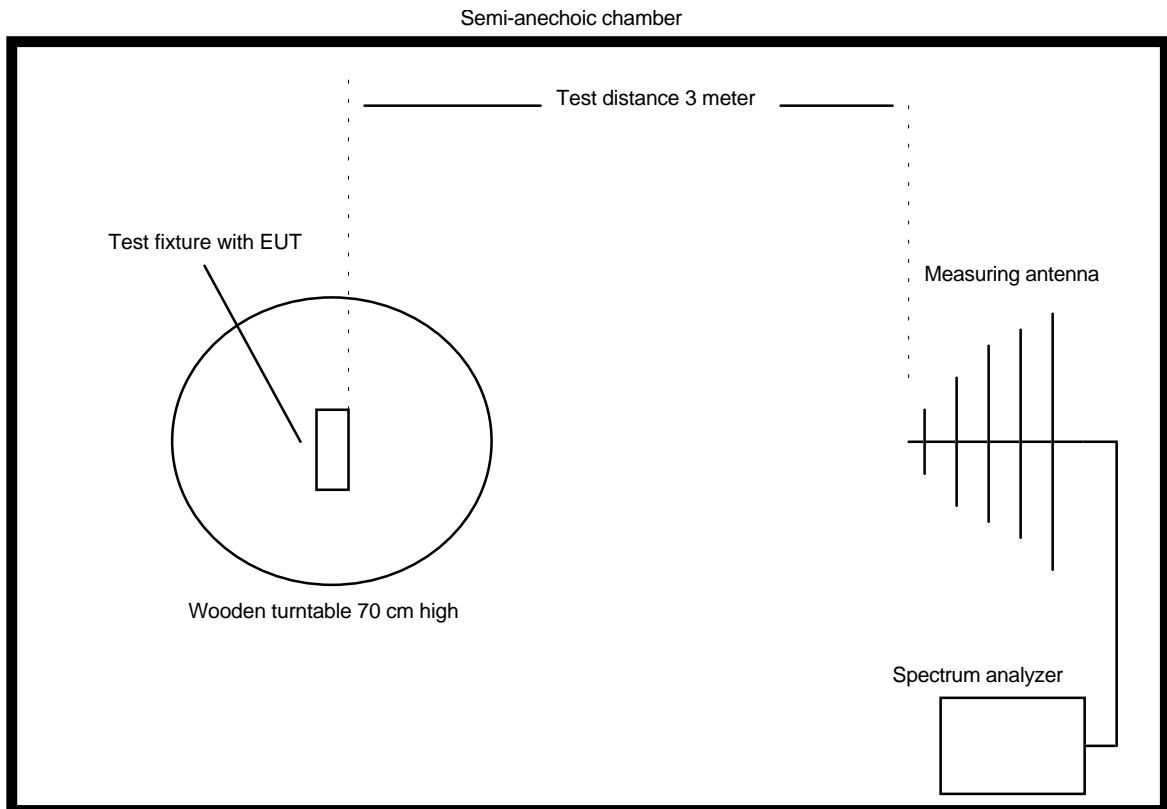
### Transmitter Parameter TestS (§15.209)

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.

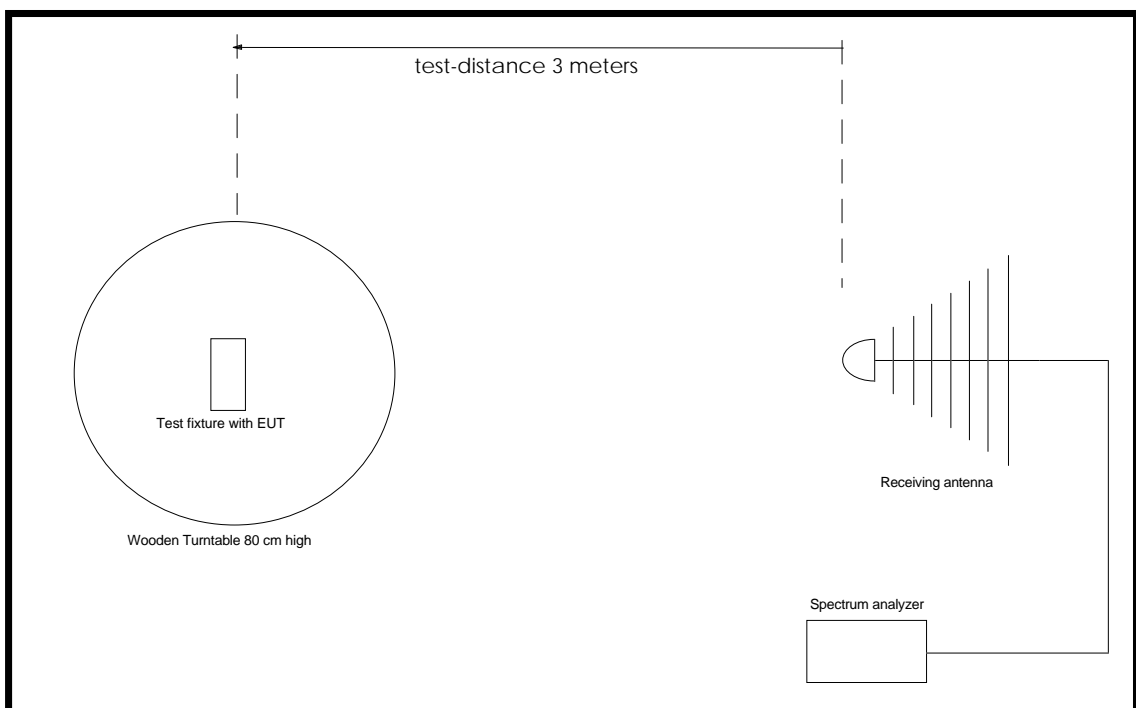
According to section 15.209 (d) final measurement is performed with the detector set to Quasi Peak except for the frequency bands 9 – 90 kHz and 110 – 490 kHz where average detector is employed.

## 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.



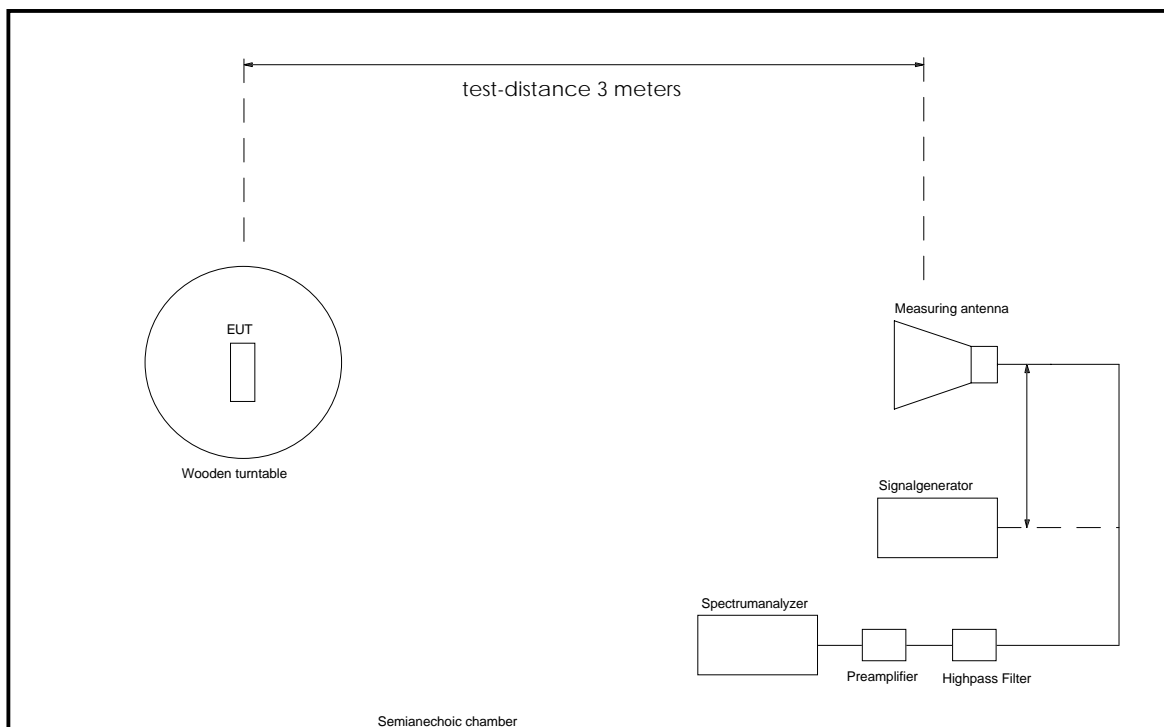
## Radiated Emissions above 1 GHz

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 $\mu$ 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**

<b>FCC Part 15 Subpart C</b>			
<b>Section(s):</b>	<b>Test</b>	<b>Page</b>	<b>Result</b>
	:		
<b>§15.207.a</b>	Conducted emissions		Not applicable
<b>§15.209.c</b>	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 72  
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 (dB $\mu$ V)	Correction Factor (dB)	Field Strength (dB $\mu$ V/m)	Limit dB $\mu$ V/m	Margin dB
13.56	QP	---	36.5	20	56.5	80	<b>23.5</b>

### Sample calculation of field strength values:

Field Strength (dB $\mu$ V/m) = Analyzer Reading (dB $\mu$ V) + Correction Factor (dB)

Limit is calculated by the level in Section 15.225(a)

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 72  
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 27, 1998

Frequency (MHz)	Detector	Antenna Polarization	Analyzer Reading (dB $\mu$ V)	Correction Factor (dB)	Field Strength (dB $\mu$ V/m)	Limit dB $\mu$ V/m	Margin dB
176.2	QP	Horizontal	17.6	16.2	33.8	43.5	9.7
176.2	QP	Vertical	8.6	16.2	24.8	43.5	18.7

\*\*\* = No emissions above noise floor detected

### Sample calculation of field strength values:

Field Strength (dB $\mu$ V/m) = Analyzer Reading (dB $\mu$ V) + Correction Factor (dB)

Test equipment used (see equipment list for details):

02, 13, 14, 16, 38, 40, 42, 57, 64, 67

**Frequency tolerance according to FCC Rules,  
Part 15, Subpart C, Section 15.225  
Frequency Band 13.553 – 13.567 MHz**

Model: SLG 72  
Type: N.A.  
Serial No. N.A.  
Applicant: Siemens AG  
Test Site: Temperature test chamber  
Distance:  
Date of Test: August, 06 1998

Normal supply voltage (V)	Maximal supply voltage (V)	Minimal supply voltage (V)	Operating Frequency (MHz)	Limit maximal frequency (MHz)	Limit Minimal frequency (MHz)	Maximal frequency (MHz)	Minimal frequency (MHz)
DC 24.00	DC 26.7	DC 20.4	13.56	13.558644	13.561356	13.559892	13.559870

**Mode:**

Supply voltage variation: 85% to 115%

Temperature variation: -20 degrees to +50 degrees C

Frequency tolerance: +/- 0.01%

Test equipment used (see equipment list for details):  
02,37,51,54,55

## 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