SENTON

■ EMV-Prüfzentrum ■ EMI/EMC-Testcenter ■

Straubing, November 19, 2004

T E S T - R E P O R T

No. 51905-40556-2

for

MOBY E MIFARE SLG75

Inductive TAG Reader
ANT4

Applicant:	Siemens AG, Fürth
Purpose of testing:	To show compliance with FCC Code of Federal Regulations, CFR 47, Part 15, Subpart C, Section 15.225

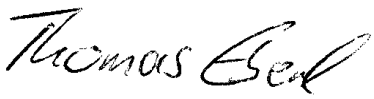
Table of Contents

1. Administrative Data

Test item (EUT)	
Type designation	MOBY E MIFARE SLG75
Model name of antenna:	ANT4
Serial number(s):	---
Type of equipment:	Inductive Tag Reader Antenna
Parts/accessories:	
FCC-ID:	NXWMOBYE-SLG75
Technical data	
Frequency range	13.553 - 13.567 MHz
Operational frequencies	13.560 MHz
Type of modulation	425KA1D
Pulse frequency	N/A
Pulse width	N/A
Antenna	Inductive loop
Power supply	DC
Applicant: (full address)	Siemens AG, Fürth Würzburger Straße 121 D-90766 Fürth
Contract identification:	Order no. 45156114
Contact person:	Mr Franz
Manufacturer:	Siemens AG, Fürth
Application details	
Receipt of EUT:	08 September 2004
Date of test:	08 September to 18 November 2004
Note:	---

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. DAT-P-171/94-02
FCC TEST SITE LISTING	90926
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:	 Mr. Thomas Eberl
RESPONSIBLE FOR TEST REPORT:	Mr. Thomas Eberl

3. Summary of test results

The tested sample complies with the requirements set forth in the

Code of Federal Regulations 47, Part 15, Subpart C, Section 15.225

of the Federal Communication Commission (FCC) and the

Radio Standards Specification RSS-210 Issue 5, Section 6.2.2(e) for Low Power Licence-Exempt Radiocommunication Devices

of Industry Canada (IC).

4. Operation Mode of EUT

Transmit mode

5. Configuration

Configuration of the EUT

Cables connected to the EUT
Antenna cable - shielded DC Power cable to RF device

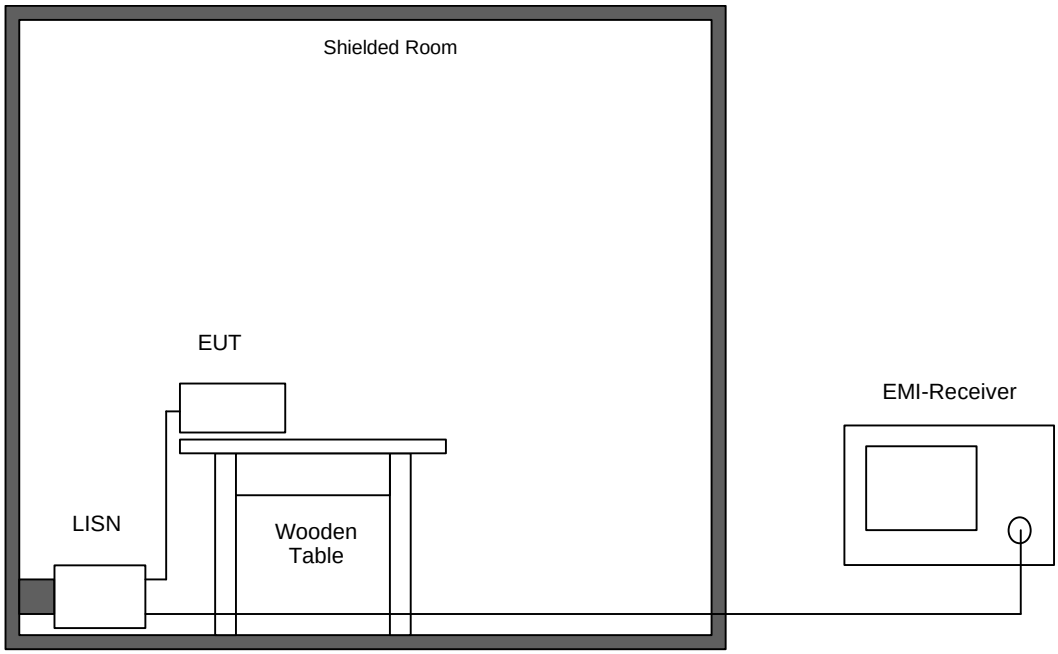
Peripheral devices connected to the EUT
SLG 75 RF Device DASM IF Box Fujitsu Liteline Notebook HP Printer 2225

6. Measuring Methods

6.1. Conducted powerline emissions

Rules and Specifications:	Section 15.207
Guide:	ANSI C63.4

Measurement Procedure:
In general conducted emission tests in the frequency range 0.15 - 30 MHz are required to be performed with quasi-peak and average detector. To simplify testing the following procedure is used: First the whole spectrum of emission caused by equipment under test (EUT) is recorded with detector set to peak. After that all emission levels having less margin than 20 dB to or exceeding the appropriate limit (in general average limit is 10 dB lower than quasi-peak limit) are retested with detector set to quasi-peak. If average limit is kept 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 has to be recorded.



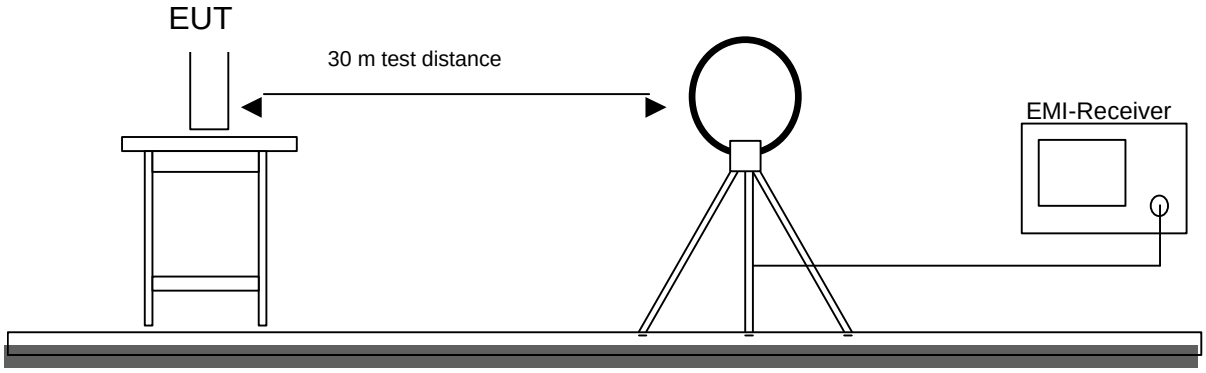
Test instruments used:

Used	Type	Model	Serial Number	Manufacturer
☒	EMI receiver	ESHS 10	860043/016	Rohde & Schwarz
☒	LISN	ESH3-Z5	862770/021	Rohde & Schwarz
☐	LISN	ESH-3-Z5	830952/025	Rohde & Schwarz
☐	Shielded room	No. 1	1451	Albatross
☒	Shielded room	No. 4	3FD-100 544	Euroshield

6.2. Radiated Emission Measurement 9 kHz – 30 MHz

Rules and Specifications:	Sections 15.209, 15.225(a)(b)(c)(d)
Guide:	ANSI C63.4

Measurement Procedure:
Radiated emissions in the frequency range 9 kHz – 30 MHz are measured initially at a distance of 3 meters in a fully anechoic room with the detector of the spectrum analyzer or EMI Receiver set to peak. 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. Final measurement is then performed at 30 meters distance 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 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 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.



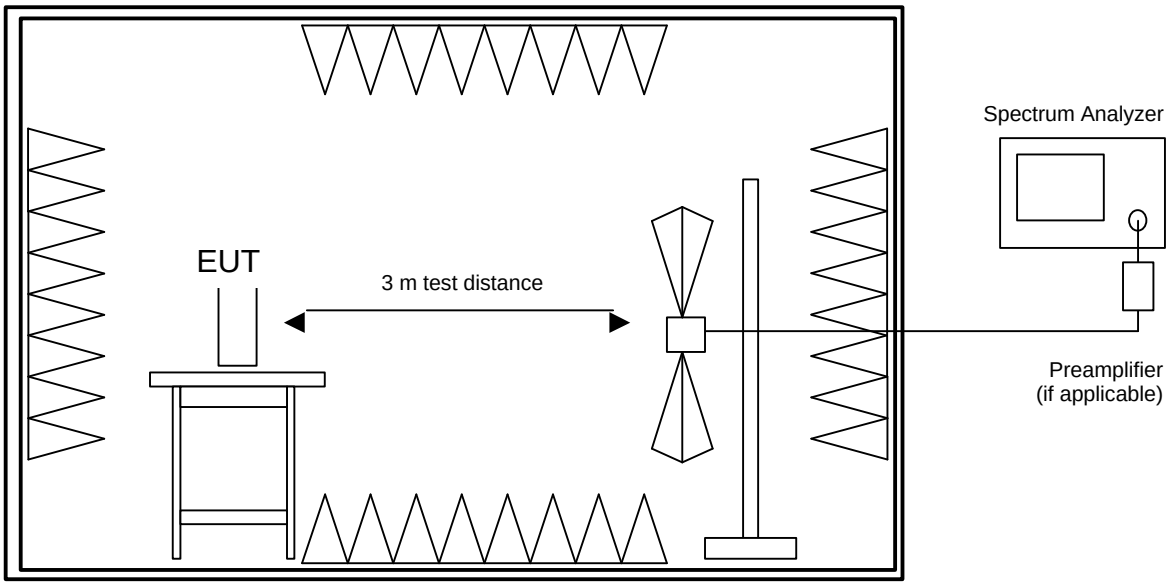
Test instruments used:

Used	Type	Model	Serial Number	Manufacturer
☒	Test receiver	ESHS 10	860043/016	Rohde & Schwarz
☒	Loop antenna	HFH2-Z2	882964/1	Rohde & Schwarz
☒	Fully anechoic room	No. 2	1452	Albatross Projects
☒	Open field test site	EG 1	1450	Senton

6.3. Radiated Emission Measurement in Fully Anechoic Room

Rules and Specifications:	Section 15.209
Guide:	ANSI C63.4

Measurement Procedure:
Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz or the 10th harmonic of the maximum frequency of the EUT, whichever is higher. Measurements are made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with detector function set to peak and resolution bandwidth set to 100 kHz up to 1 GHz and to 1 MHz above. All tests are 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. For final testing an open-area test-site is used. During the tests the EUT is rotated all around to find the maximum levels of emissions. The cables and equipment are placed and moved within the range of position likely to find their maximum emissions.



Fully anechoic room

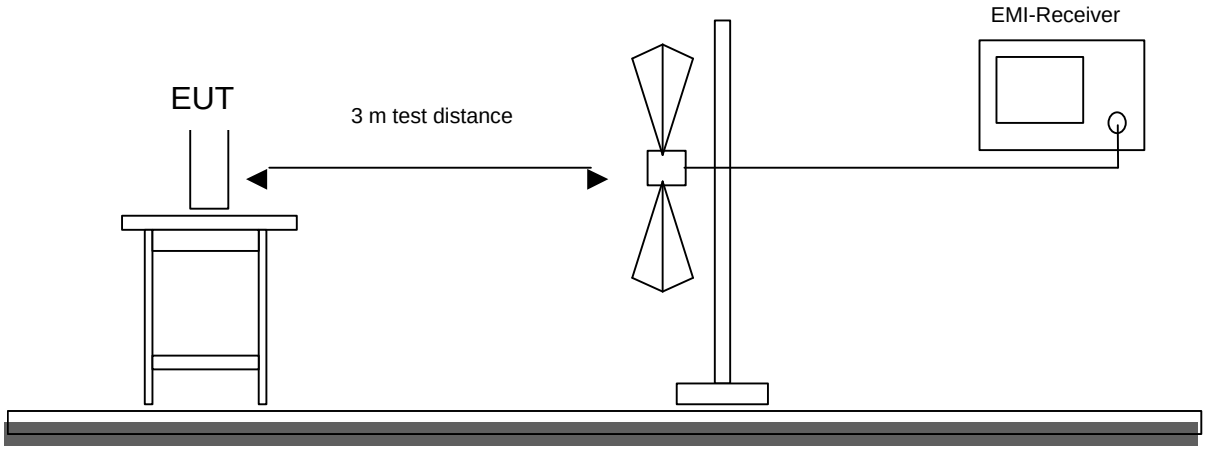
Test instruments used:

Used	Type	Model	Serial Number	Manufacturer
☒	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
☒	Preamplifier	CPA9231A	3393	Schaffner
☒	Trilog antenna (Chamber 2)	VULB 9163	9163-188	Schwarzbeck
☐	Horn antenna	3115	9508-4553	EMCO
☐	Horn antenna set	3160-03/-09	9112-1003	EMCO
☐	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
☐	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
☒	Fully anechoic room	No. 2	1452	Albatross Projects

6.4. Radiated Emission Measurement at Open Field Test Site

Rules and Specifications:	Section 15.209
Guide:	ANSI C63.4

Measurement Procedure:
Radiated emissions at open field test site are measured in the frequency range 30 MHz to 1 GHz. with detector of the test receiver set to quasi-peak. Pretests in a fully anechoic room are performed to find the critical emission levels. With hand-held or body-worn devices prescans are recorded with EUT rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit. The worst case setup is used for final testing. During test 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.



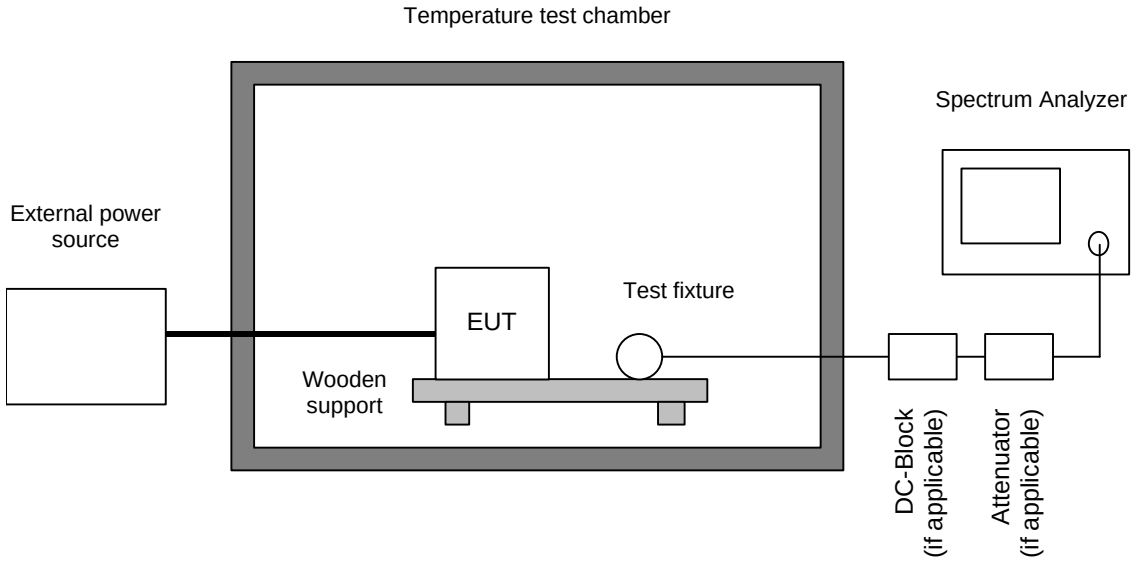
Test instruments used:

Used	Type		Model	Serial Number	Manufacturer
☒	EMI receiver		ESVP	881414/009	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		No. 1	N/A	Senton

6.5. Frequency tolerance of the carrier signal

Rules and Specifications:	Section 15.225(e)
Guide:	ANSI C63.4

Measurement Procedure:
The frequency tolerance of the carrier signal is measured over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the test is performed using a new battery.



Test instruments used:

Used	Type	Model	Serial Number	Manufacturer
☒	Temperature test chamber	HT4010	07065550	Heraeus
☒	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
☐	EMI test receiver	ESPI7	836914/0002	Rohde & Schwarz
☐	DC-block	7006	A2798	Weinschel
☐	Attenuator	4776-10	9412	Narda
☒	Test probe	TP01	001	Senton
☒	DC power supply	NGSM 32/10	203	Rohde & Schwarz
☐	Isolating transformer	RT 5A	10387	Grundig
☐	Isolating transformer	RT 5A	10416	Grundig

7. Photographs of Test Setups

Photos No. 7.1 and 7.2
Test Setup for Conducted Emission 150 kHz - 30 MHz

Photos No. 7.3
Test Setup for Conducted Emission 150 kHz - 30 MHz