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Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: 3463 (IC)
TCB ID: DE 0001



Accredited by the
German Accreditation Council
DAR-Registration Number
DAT-P-176/94-D1



Independent ETSI
compliance test house



Accredited Bluetooth® Test Facility (BQTF)

Test report no.	:	2-4189-02-02/05
Applicant	:	Siemens Home and Office Communication
Type	:	Gigaset S450IP
Test Standard	:	FCC Part 15.319 RSS-213 Issue 2
FCC ID	:	TVU-S455
Certification No. IC	:	267U-S455

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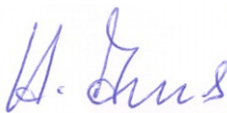
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1. Administrative data

1.1. Administrative data of the test facility

1.1.1 Identification of the testing laboratory

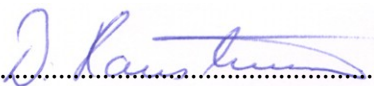
Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF)
Responsible for testing laboratory:	Dirk Hausknecht Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de



Responsible for testing
(Harro Ames)

1.1.2 Organizational items

Reference No.:	2-4189-02-02/05
Order No.:	
Receipt of EUT:	2006-08-22
Date(s) of test:	2006-08-22 to 2006-08-24
Date of report:	2006-08-24
Number of report pages:	33
Number of diagram pages (annex):	
Version of template:	1.8



Responsible for laboratory
(Dirk Hausknecht)

Note:

The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

During the test no hardware and software changes are allowed to be performed at the EUT.

1.1.3 Applicant's details

Name : Siemens Home and Office Communication Devices GmbH & Co KG
Address : Frankenstr. 2
City : 46395 Bocholt
Country : Germany
Phone : +49-2871-912857
Fax : +49-2871-9162857
Contact : Mr. Uwe Alt
Phone : +49-2871-912857
Fax : +49-2871-9162857
e-mail : uwe.alt@siemens.com

1.2 Administrative data of manufacturer / member

Name : Siemens Home and Office Communication Devices GmbH & Co KG
Address : Frankenstr. 2
City : 46395 Bocholt
Country : Germany

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

Product name : Gigaset S450IP
Description : UPCS Base station according to FCC part15.319 with VoIP functionality
S/N serial number : -
HW hardware status : -
SW software status : -
Frequency Band [MHz] : 1921.536 – 1928.448 MHz
Type of Modulation : TDMA
Number of channels : 5
Antenna : 2 printed antennas
Power Supply : 115 V AC via external power supply
Temperature Range : -20°C - +50°C

Max. power radiated: 21.5 dBm

Max. power conducted: n.a.

FCC ID: TVU-S455

IC: 267U-S455

1.3.2 Technical specifications

The technical specifications of this device are listed below:

Specification	Value
Operating Standard	DECT
Operating Mode	TDMA
Frame Period	10ms
Time Slot Length	416.67µs
Slots per Frame	24 slots / 12 RX, 12 TX
Slot Structure	6 active duplex pairs per frame
Bit Rate	1.152Mbit
Bit Period	868.1ns
Number of Frequency Channels	5
Frequency Band	1920 – 1930 MHz
Peak Transmission Power	21.5 dBm maximal radiated
Emission Bandwidth	2.3 MHz maximal
Gaussian Frequency Shift Keying	B*T = 0.5 nominal
Deviation	400KHz nominal
Speech Codec	32kBit/s ADPCM
Receiver Sensitivity	-93dBm for BER of 1.10exp-3

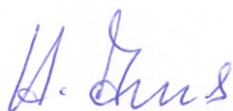
Frequency Channel	Frequency
CH1	1921.536MHz
CH2	1923.264MHz
CH3	1924.992MHz
CH4	1926.720MHz
CH5	1928.448MHz

1.3.3 Additional EUT information - Test Report Cover Sheet/Performance Test Data

Company Number:	267U
Certification Number:	267U-S455
Model Name:	Gigaset S450IP
Manufacturer:	Siemens Home and Office Communication Devices GmbH & Co KG Frankenstr. 2 46395 Bocholt Germany
Tested to Radio Standards Specification (RSS) No.:	RSS-213 Issue 2 / December 2005
Open Area Test Site Industry Canada Number:	3463
Frequency Range (or fixed frequency) [MHz]:	1921.536 – 1928.448 MHz
RF: Power [W] (max):	Rad. EIRP: 21.5 dBm, 141.3 mW
Antenna Type:	2 printed board antenna
Occupied Bandwidth (99% BW) [kHz]:	2.3 MHz
Type of Modulation:	GFSK
Emission Designator (TRC-43):	2M30FXD
Transmitter Spurious (worst case) [μ V/m in 3m]:	>20 dB below limit
Receiver Spurious (worst case) [μ V/m in 3m]:	>20 dB below limit

ATTESTATION: I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all the applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Date: 2006-08-24

Testengineer: Harro Ames

2. Teststandard & summary list of all performed test cases

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 - CANADA RSS-213 Draft ANSI-C63.17-2005	PASS	2006-08-24	PASS

2.1 Test and evaluation results:

General Requirements				
Requirement	FCC Part / IC Part	Test Procedure (Section numbers refer to ANSI C63.17 unless otherwise noted)	Result	Detailed Results
Conducted Emissions	15.315 & 15.207 / RSS-213 Clause 10.0	ANSI C63.4	PASS	4.2
Power adjustment for antenna gain	15.319 (e)	4	Attestation	4.3

Isochronous Requirements				
Requirement	FCC Part	Test Procedure (Section numbers refer to ANSI C63.17 unless otherwise noted)	Result	Detailed Results
Radiated Out of Band Emissions	15.309 (b) & FCC Part 15 Subpart B, 15.109 and 15.209 / RSS-213 Clause 6.2		PASS	4.4

2.2 Additional information about the sample

The tested sample is a base station for a Wireless Phone according to FCC part15, subpart D (UPCS) and additional VoIP functionality

The product has the same RF-part as the older product Gigaset S455, tested in our house (Test report number 2-4189-01-03/05)

We tested only the radiated emissions, the radiated output power and the conducted emissions to AC-lines.

The complete test report for the dedicated handset S45 is 2-4189-01-04/05 from our house.

3. Description of test set-up

3.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in an anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2003 clause 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

9 kHz - 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn

The EUT is powered by a dedicated power supply with nominal voltage.

A dedicated description of test setups can be found at the related tests.

4 Detailed Test Procedures and Results

4.1 Conducted Emissions

4.1.1 Test Criteria

§ 15.315 Conducted limits.

An unlicensed PCS device that is designed to be connected to the public utility (AC) power line must meet the limits specified in § 15.207.

§ 15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30

MHz, shall not exceed the limits in the following table, as measured using a 50

µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

***Decreases with the logarithm of the frequency.**

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

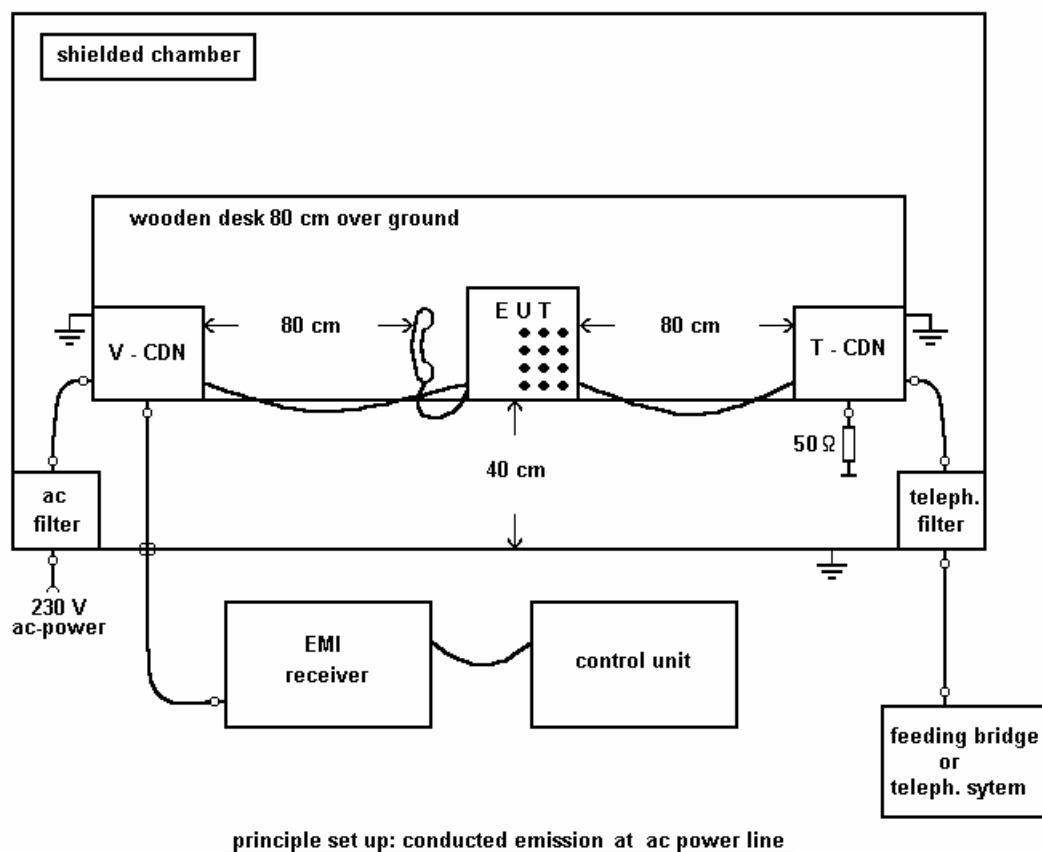
- (1) For carrier current system containing their fundamental emission within the frequency band 535–1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.
- (2) For all other carrier current systems: 1000 µV within the frequency band 535–1705 kHz, as measured using a 50 µH/50 ohms LISN.
- (3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in § 15.205, § 15.209, § 15.221, § 15.223, or § 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

4.1.2 Test Procedure

This test is performed according to ANSI C63.4.

Principle setup for Conducted Emissions at ac power line:

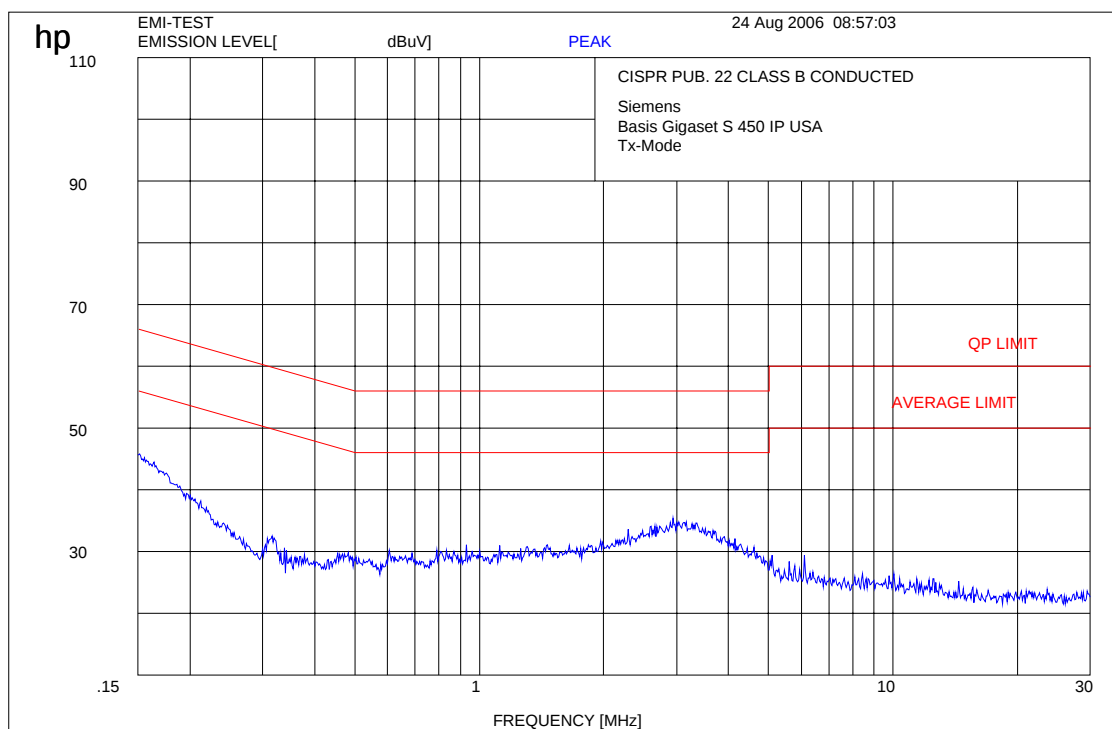


The following test procedure is applied:

Setup	Test Procedure
1	The EUT was connected to a PBX via CDN-T and filter unit.
2	The power supply was connected to a CDN-M2. During measuring at the CDN-M2, the CDN-T was terminated with 50 ohm.
3	A communication link is setup. (Operating Mode)
4	The EUT is set into Standby mode. (Standby Mode)

4.1.3 Test Results

Measured in operating and stand-by mode, max hold



All emissions are below the limits.

Result: Pass

4.2 Power adjustment for antenna gain

4.2.1 Test Criteria

§ 15.319 General technical requirements.

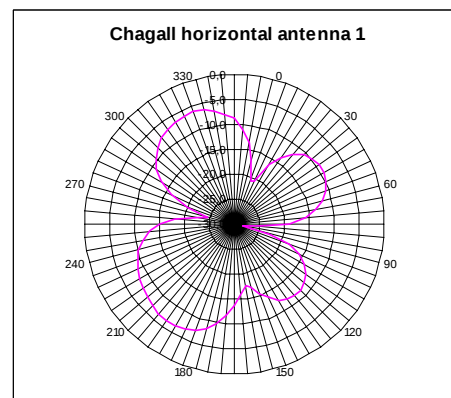
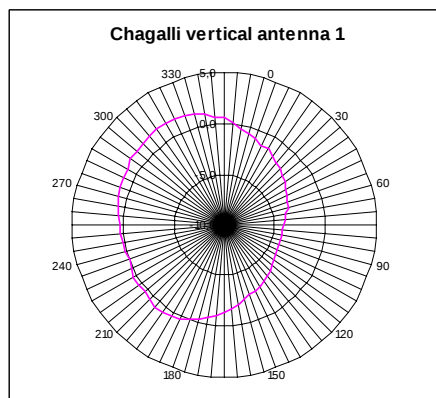
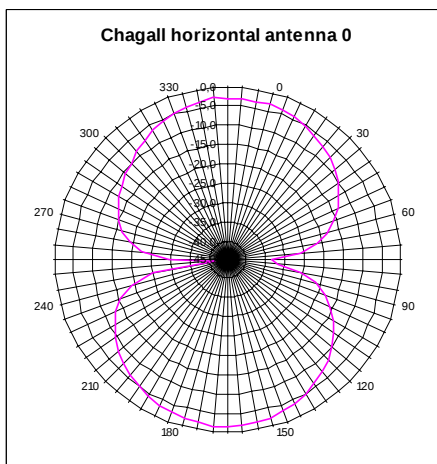
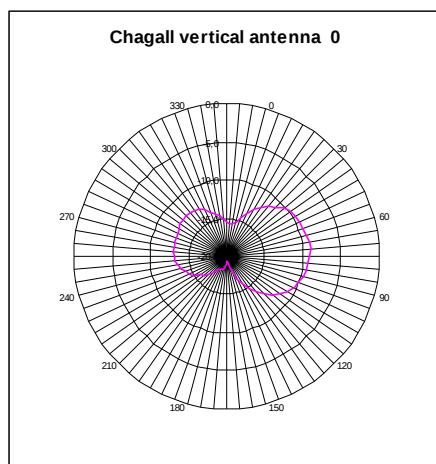
(e) The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

4.2.2 Test Procedure

The antenna gain of the BS is measured in an anechoic room.

4.2.3 Test Results

	Vertical Antenna 0	Horizontal Antenna 0	Vertical Antenna 1	Horizontal Antenna 1
Min (dB)	-19,3	-41,5	-4,3	-28,2
Max (dB)	-9,0	-1,8	1,5	-6,1



Result: The maximum antenna gain is < 3dBi.

4.3 Radiated emissions

4.3.1 Test Criteria

Radiated emissions according to 15.109 and 15.209.
Measured for TX and RX

4.3.2 Test Procedure

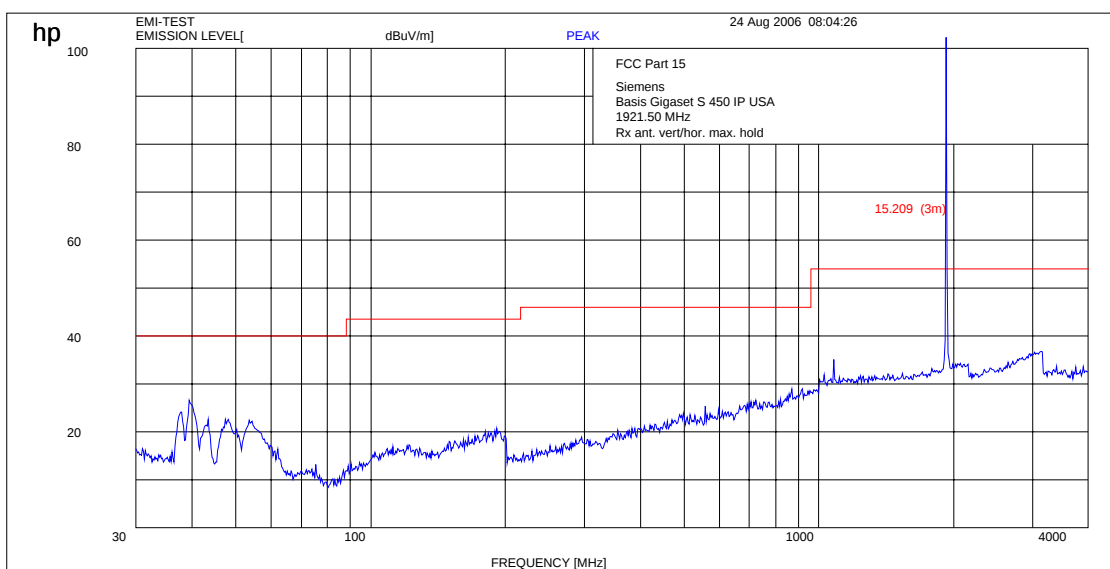
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas conform with ANSI C63.2-1996 item 15.

9 kHz - 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.
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200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna
>1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn

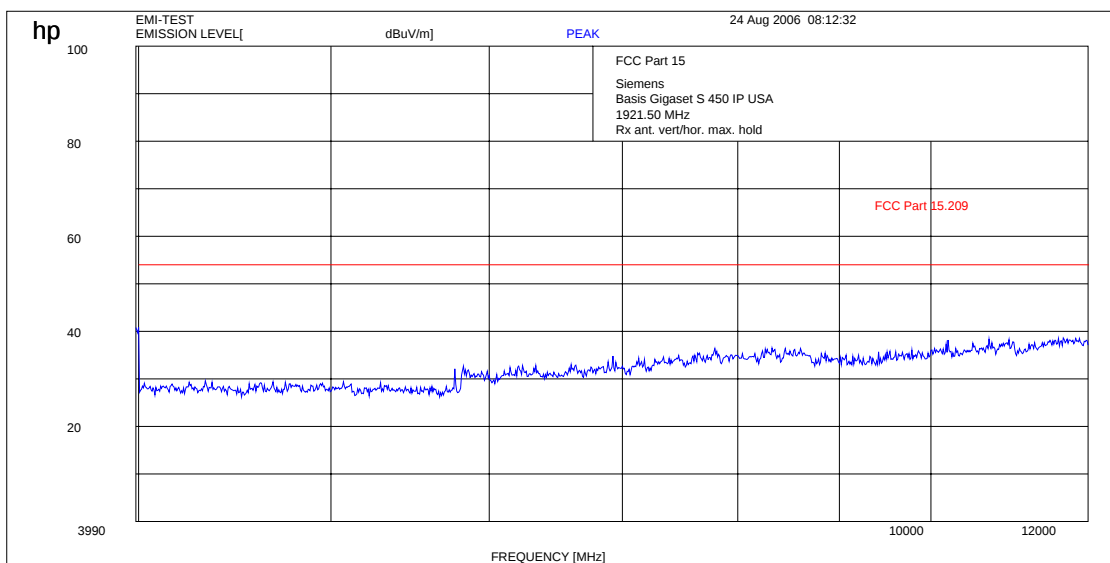
4.3.3 Test Results

S450IP CH1 up to 4 GHz Traffic mode

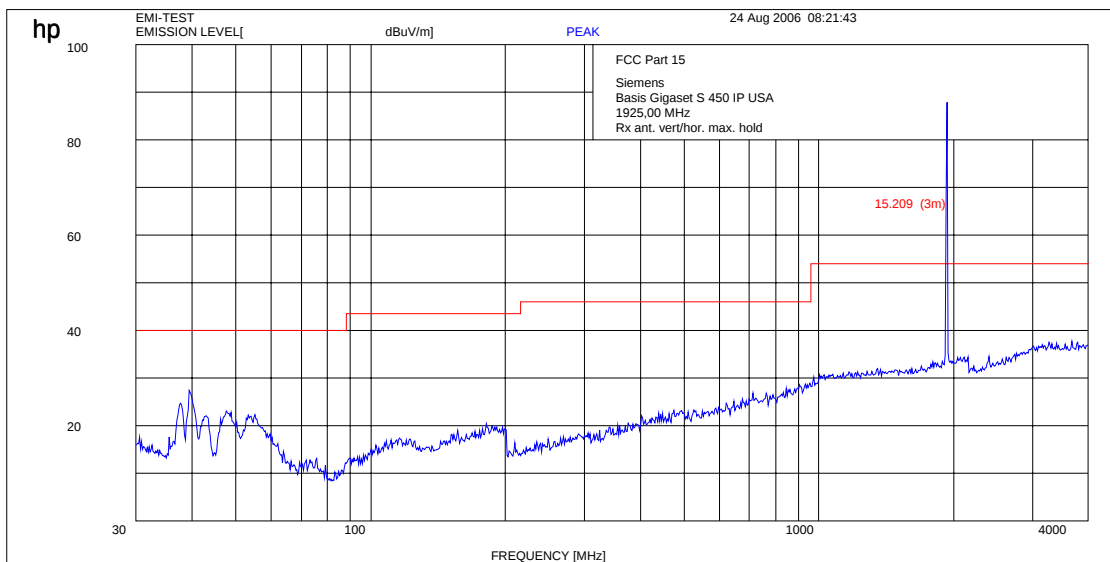


radiated output power: 21.5 dBm

S450IP CH1 4 to 12 GHz Traffic mode

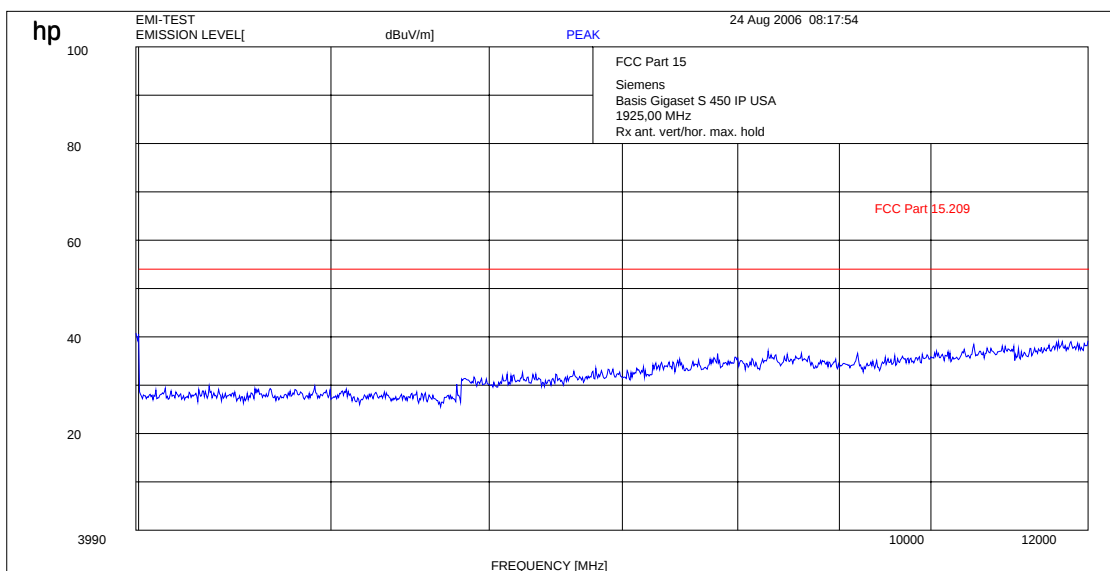


S450IP CH3 up to 4 GHz Traffic mode

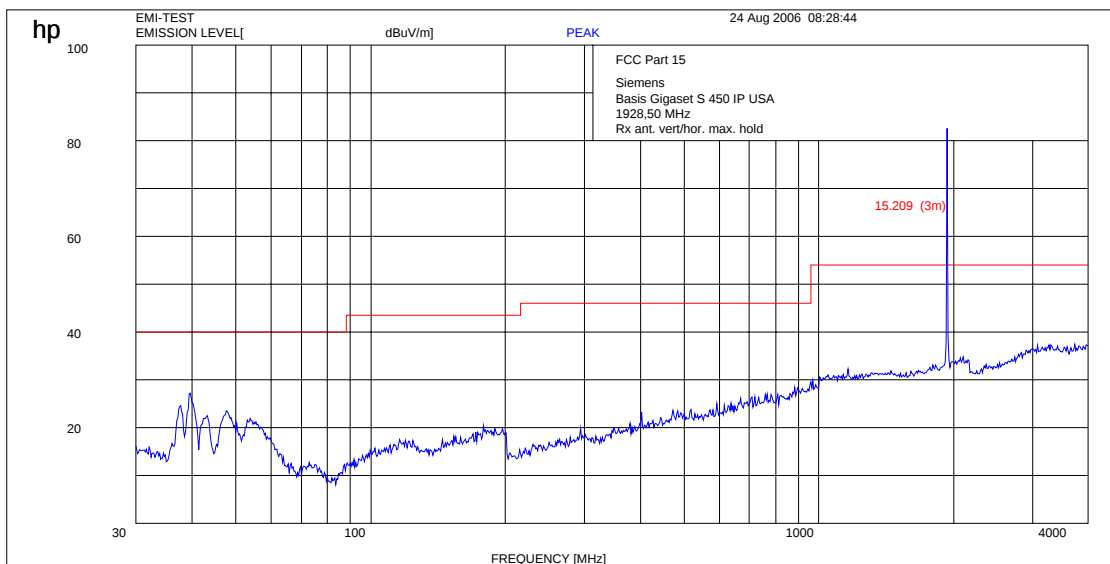


radiated output power: 21.0 dBm

S450IP CH3 4 to 12 GHz Traffic mode

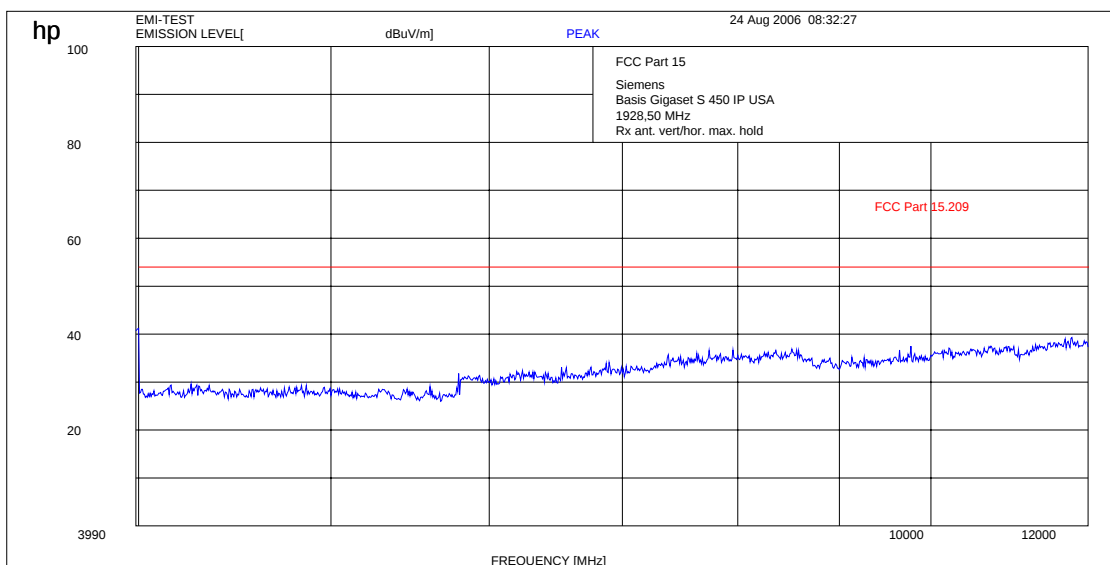


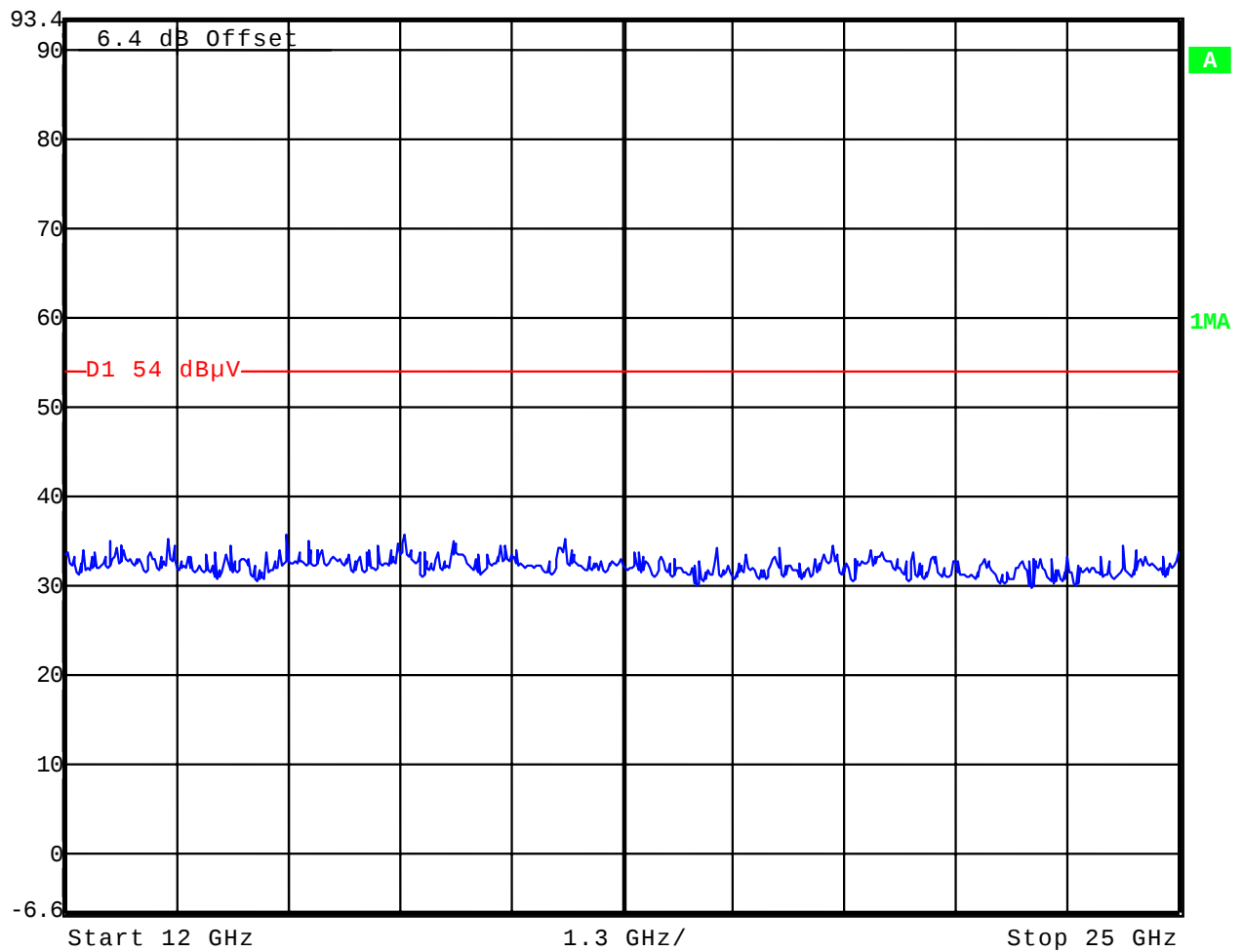
S450IP CH5 up to 4 GHz Traffic mode



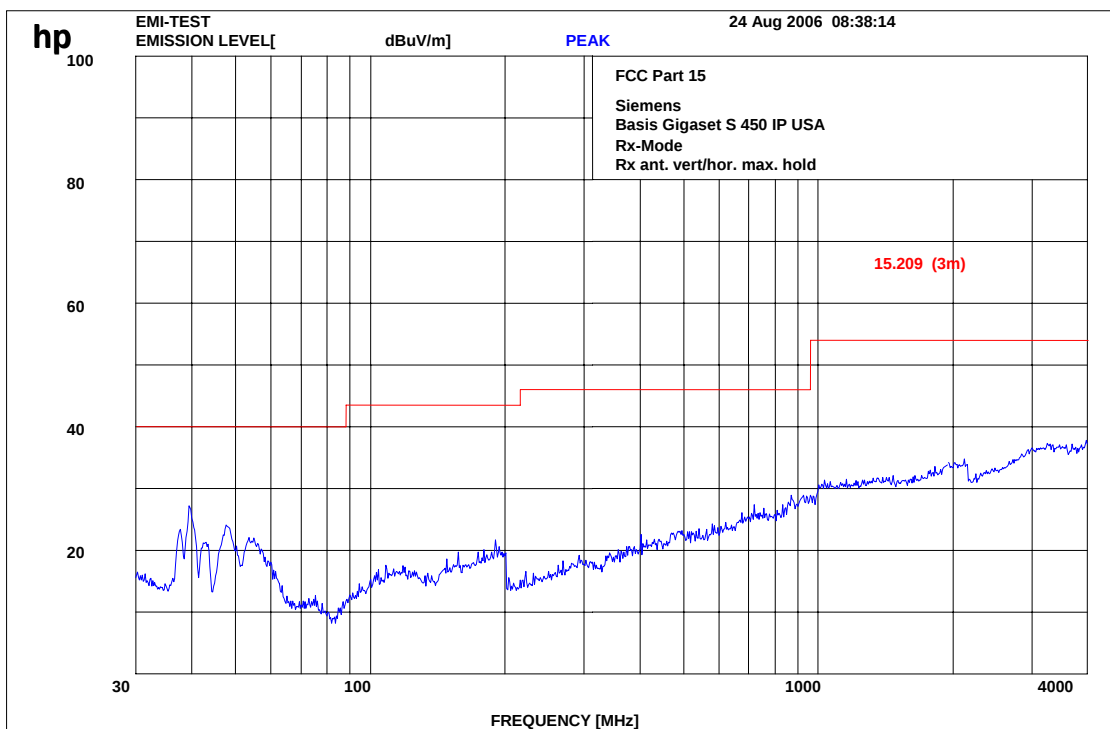
radiated output power: 20.8 dBm

S450IP CH5 4 to 12 GHz Traffic mode

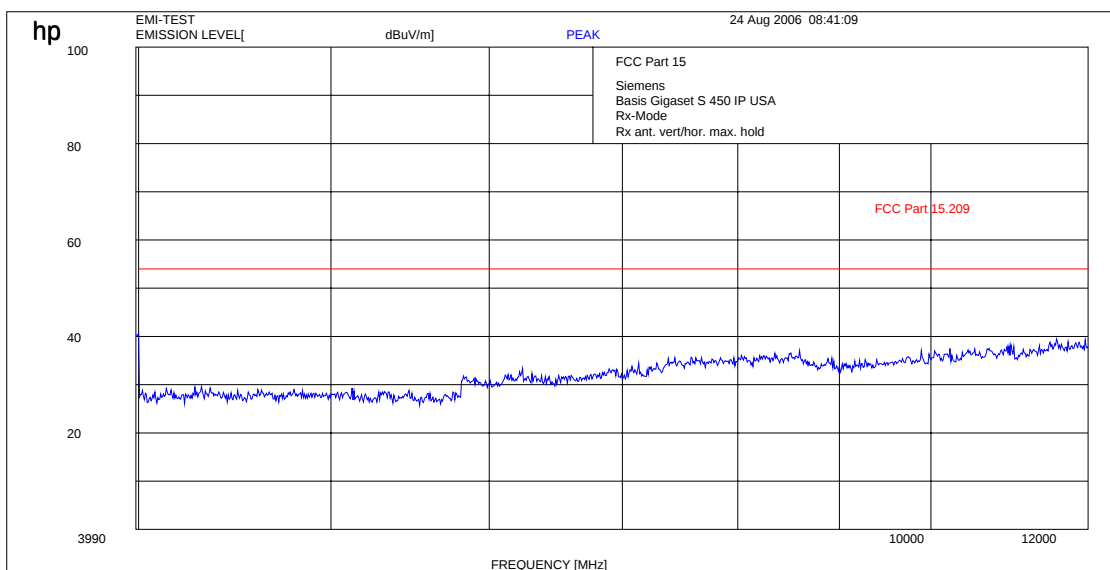




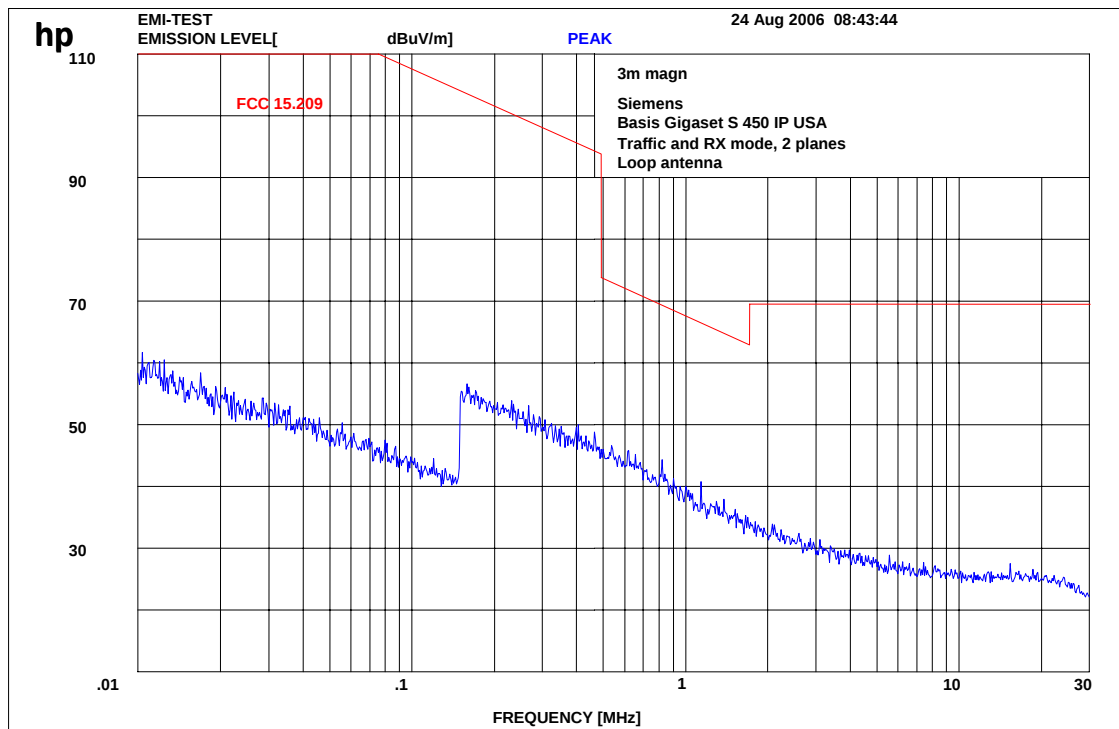
S450IP up to 4 GHz RX only



S450IP 4 to 12 GHz RX only



S450IP CH3 9 kHz to 30 MHz, valid for all three channels , Traffic and RX only mode



4.4 RF Exposure

RF EXPOSURE INFO

Environmental evaluation measurements of Maximum Permissible Exposure (MPE) to radio frequency (RF) radiation from transmitting devices for compliance with the technical rules and regulations of the U.S. Federal Communications Commission and Industry Canada.

Description of EUT

Model: UPCS Base Station S455IP

- 1) The probe was positioned on a table at a separation distance of 20 cm from the radiating antenna and at a starting height of 5 cm to the center of the probe.
- 2) The table was positioned so that the initial start angle was 0 degrees.
- 3) The EUT was powered on and allowed sufficient time to stabilize. The EUT was operated at full power on a desired frequency.
- 4) The analyzer and the field probe was set for maximum hold, and set on the appropriate power range.
- 5) The table was rotated 360 degrees and the maximum reading was obtained for that elevation.
- 6) The antennas were lifted and lowered at maximum value in the horizontal plane to find the maximum in vertical position.

Result:

The max measured MPE value on a distance of 20 cm is:

0.32 mW/cm² by measurement with the analyzer
0.34 mW/cm² by measurement with the field probe

MPE System Specification:

- Electromagnetic Radiation Field probe, PMM Model 8053
Frequency Range: 1 MHz to 40 GHz
Calibration date: 05/2005
- Signal analyzer FSIQ26 from R&S
Frequency range: 10 Hz to 26.5 GHz
Calibration date: 02/2005



Limit:

1mW/ cm ² is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.

4.5 Used Test Equipment

Anechoic chamber :

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Spektrum Analyser	HP	8566B	2747A05306	300001000
Spektrum Analyser Display	HP	85662A	2816A16541	300002297
Quasi-Peak-Adapter	HP	85650A	2811A01131	300000999
Power Supply	HP	6032A	2818A03450	300001040
Power Attenuator	Byrd	8325	1530	300001595
Bikonical Antenna	EMCO	3104	3758	300001602
Log. Period. Antenna	EMCO	3146	2130	300001603
Double Ridged Antenna	EMCO	HP 3115P	3088	300001032
Active Loop Antenna	EMCO	6502	2210	300001015
Antenna VDE/FCC		HP11965B		300002298
SRM-Drive	HP	9144A	2823e46556	300001044
Software	HP	EMI		300000983
Busisolator	Kontron			300001056
Absorberhalle	MWB		87400/02	300000996
Salzsäule	Kontron			300001055
Antenna	R&S	HMO20	832211/003	300002243
Indukt. Tast Antenna	R&S	HFH 2 Z4	881468/026	300001464
System-Rack	HP I.V.	85900	*	300000222
Spectrum Analyzer	HP	8566B	2747A05275	300000219
Quasi-Peak-Adapter	HP	85650A	2811A01135	300000216
RF-Preselector	HP	85685A	2837A00779	300000218
Rahmen Antenne	R&S	HFH2-Z2	891847-35	300001169
Leitungsteiler	HP	11850C		300000997
Breitband-Hornantenne EMI	HP	35155P		300002300
PC	HP	Vectra VL		300001688
VHF Meßantenne	Schwarzbeck	VHA 9103		300001778
Spectrum Analyzer Display	HP	85662A	2816A16497	300001690
VHF Meßantenna	Schwarzbeck	VHA 9103		300001780
Biconical Antenna	EMCO	3104 C	9909-4868	300002590

SRD Laboratory: (Bluetooth System)

No	Equipment/Type	Manufact.	Serial Nr.	Inv. No. Cetecom
1	System Controller PSM 12	R&S	835259/007	3000002681
2	Memory Extension PSM-K10	R&S	To 1	3000002681
3	Operating Software PSM-B2	R&S	To 1	3000002681
4	19'' Monitor		22759020-ED	3000002681
5	Mouse		LZE 0095/6639	3000002681
6	Keyboard		G00013834L461	3000002681
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681
12	Data Generator SMIQ-B11	R&S	To 10	3000002681
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681
14	Fast CPU SM-B50	R&S	To 10	3000002681
15	FM Modulator SM-B5	R&S	835676/033	3000002681
16	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681
17	Modulation Coder SMIQ-B20	R&S	To 16	3000002681
18	Data Generator SMIQ-B11	R&S	To 16	3000002681
19	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681
20	Fast CPU SM-B50	R&S	To 16	3000002681
21	FM Modulator SM-B5	R&S	836061/022	3000002681
22	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681
23	Attenuator SMP-B15	R&S	835136/014	3000002681
24	RF Rear Connection SMP-B19	R&S	834745/007	3000002681
25	Power Meter NRVD	R&S	835430/044	3000002681
26	Power Sensor NRVD-Z1	R&S	833894/012	3000002681
27	Power Sensor NRVD-Z1	R&S	833894/011	3000002681
28	Rubidium Standard RUB	R&S	6197	3000002681
29	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681
30	Laser Printer HP Deskjet 2100	HP	N/A	3000002681
31	19'' Rack	R&S	11138363000004	3000002681
32	RF-cable set	R&S	N/A	3000002681
33	IEEE-cables	R&S	N/A	3000002681
34	Sampling System FSIQ-B70	R&S	835355/009	3000002681
35	RSP programmable attenuator	R&S	834500/010	3000002681
36	Signalling Unit	R&S	838312/011	3000002681
37	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681

SRD Laboratory:

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Climatic box	Heraeus Vötsch	VT 4002	--	300003019
Signaling Unit	R&S	CMU200	832221/0055	300002862
Power Splitter	Inmet Corp.	6005-3	none	300002841
SMA Cables	Insulated Wire	SPS-1151-985-SPS	different	different
Spectrum analyzer	Tektronix	2882	B020259	300001401
Frequency counter	HP	5386A	-	300000998
Digitising Scope	Tektronix	TDS520	-	300001436

5 Photographs of Test Set-up

Photo 1: Radiated Emissions



Photo 2: Radiated Emissions

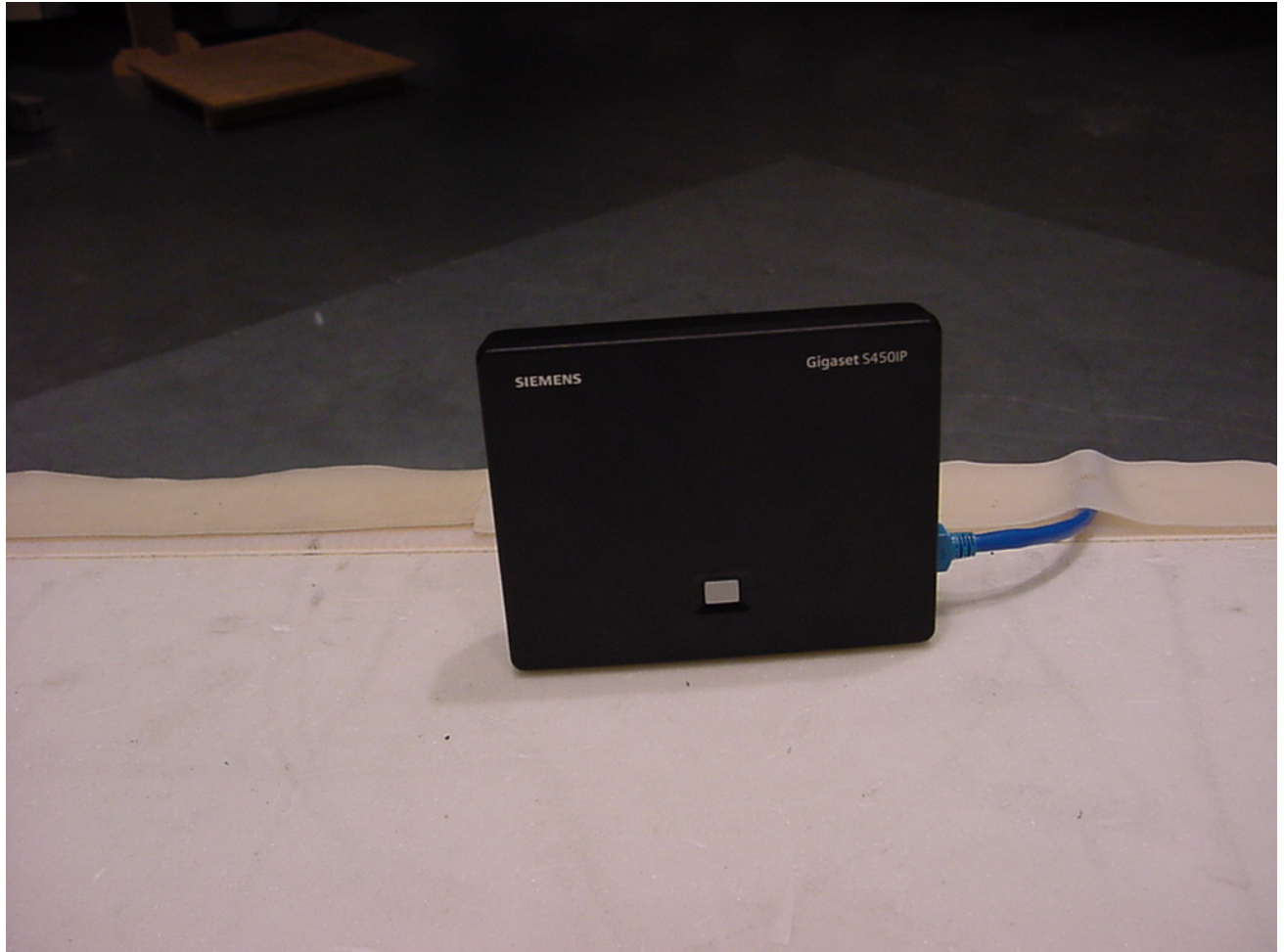
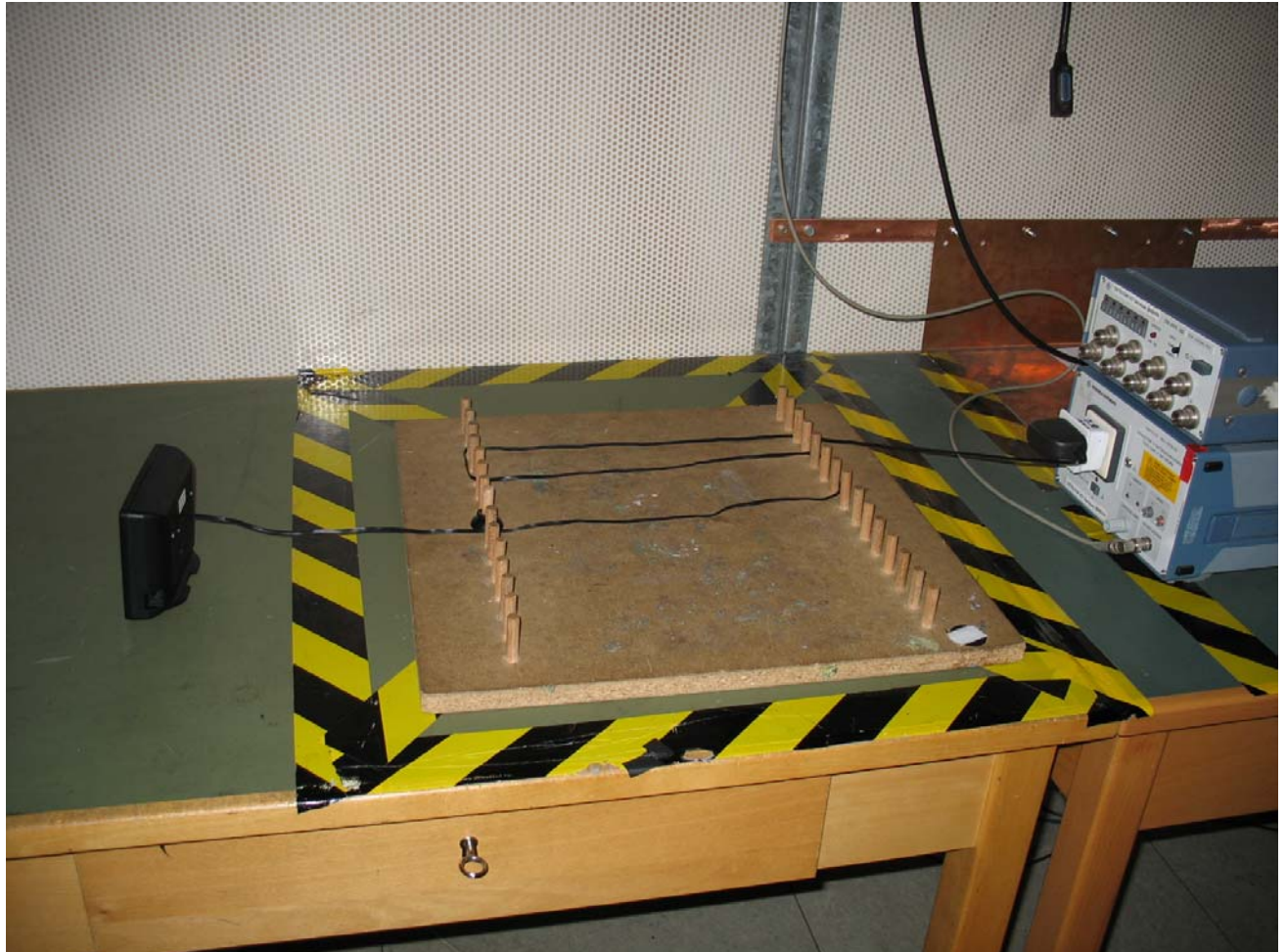


Photo 3: Conducted Emissions



6 Photographs of EUT

Photo 1: S450IP



Photo 2:



Photo 3:



Photo 4:

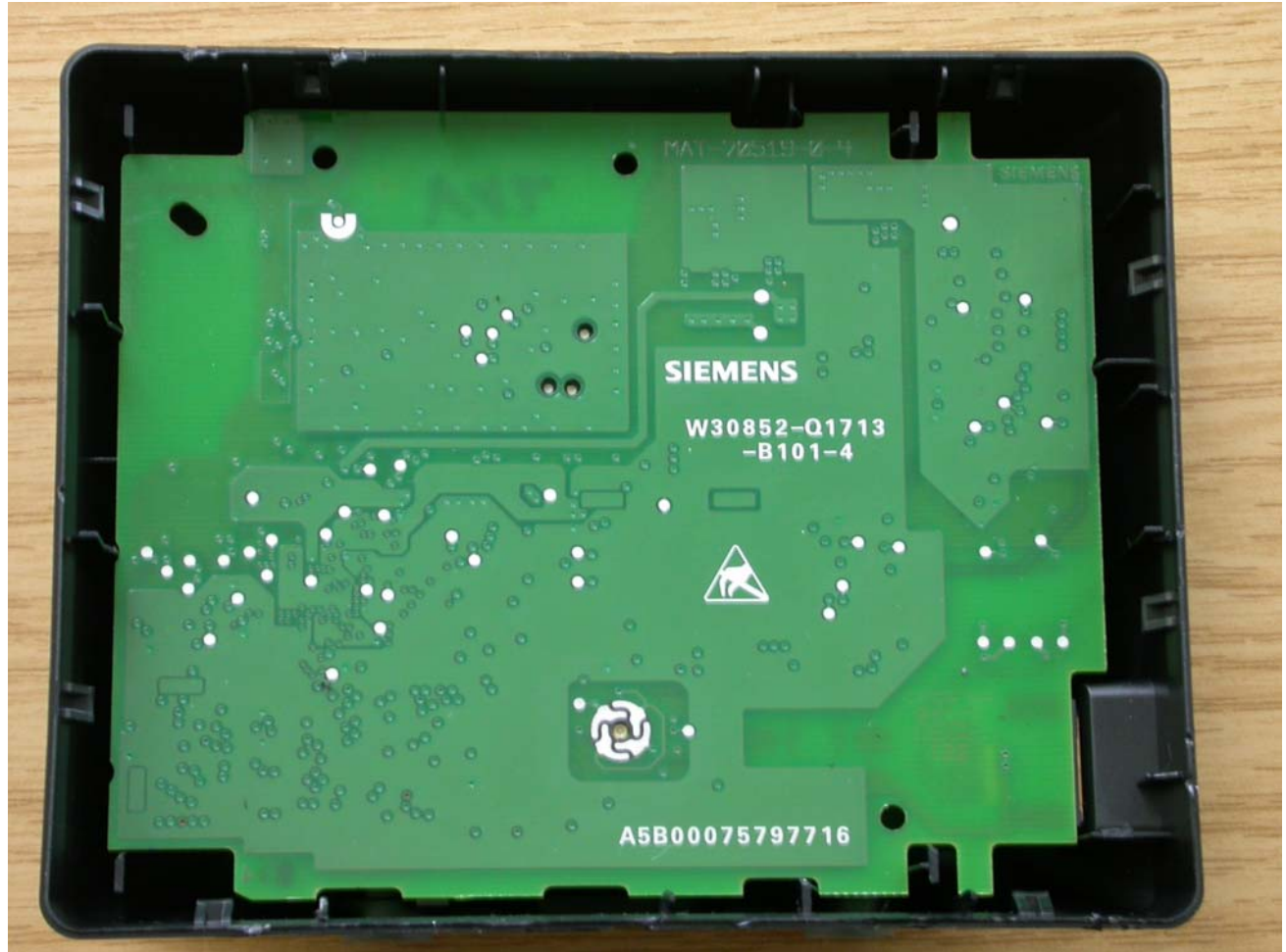


Photo 5:

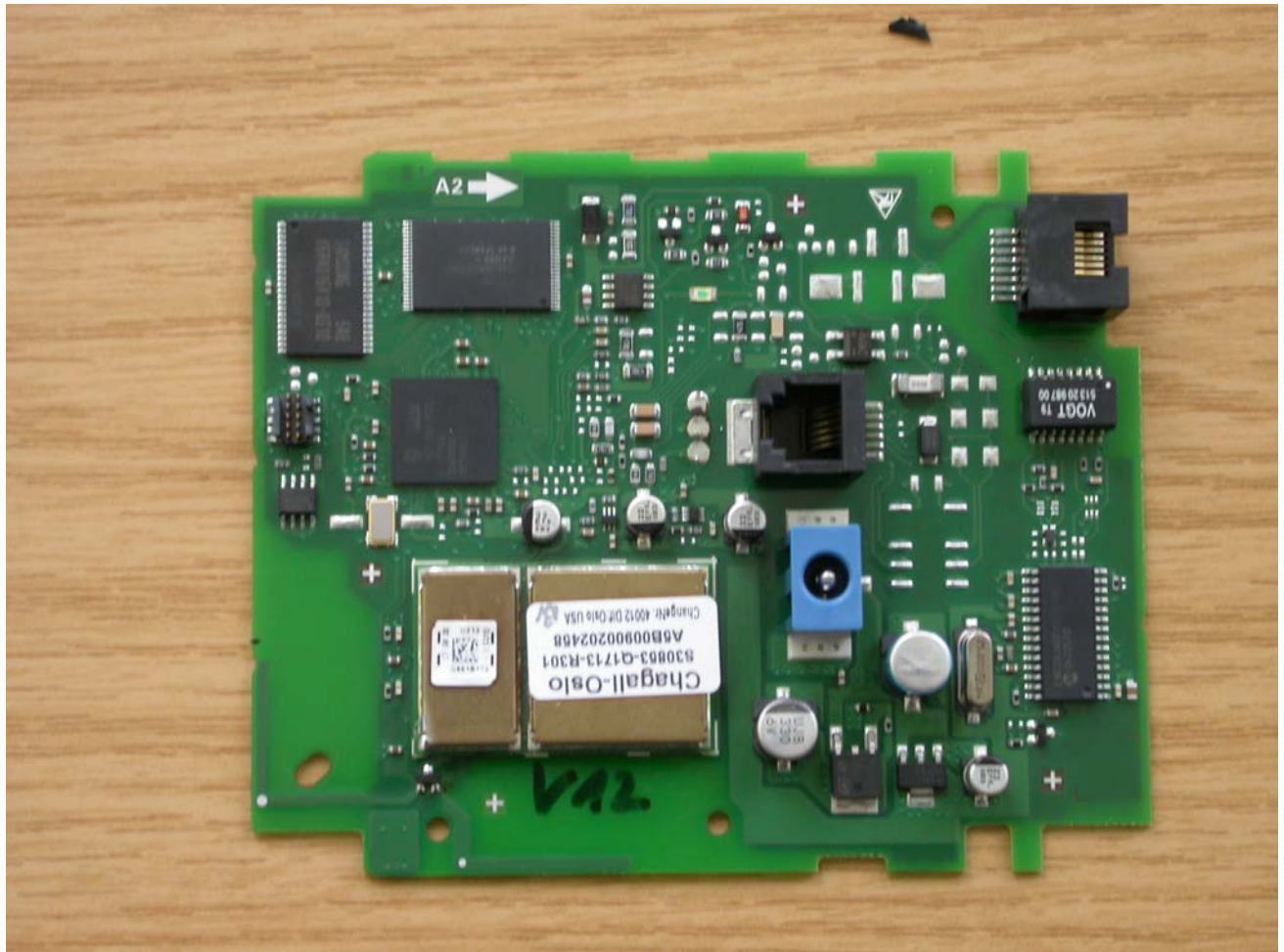


Photo 6:



Photo 7:

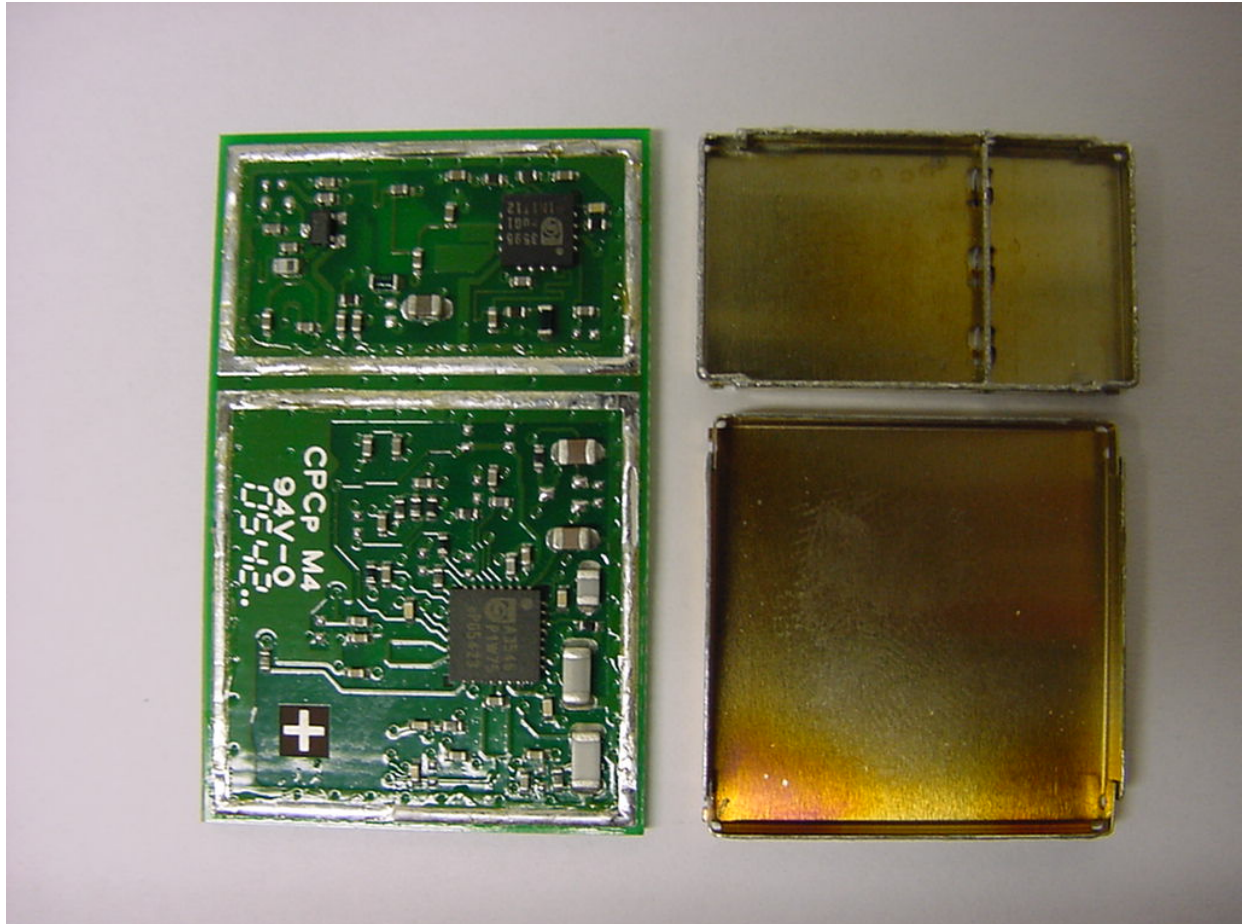


Photo 8:

