RADIO TEST REPORT

No. 311781

EQUIPMENT UNDER TEST

Equipment :	TA-CMI (Measurement Unit and Instrument Unit)
Type / model :	52198-003
Manufacturer :	Tour & Andersson AB
Tested by request of :	PartnerTech Åtvidaberg

SUMMARY

The equipment complies with the requirements of the following standards:

FCC, Part 15, Subpart B (2002) and Subpart C (2002);

Date of issue: December 18, 2003

Tested by: Linda Heikurainen Approved by: Björn Rosenquist

Linda Heikurainen

Intertek Semko AB
Torshamnsgatan 43, Box 1103, SE-164 22 Kista, Sweden
Telephone +46 8 750 00 00, Fax +46 8 750 60 30, www.sweden.intertek-etlsemko.com
Registered in Sweden: No SE556024059901, Registered office: As address

CONTENTS

1. CLIENT INFORMATION

The EUT has been tested by request of

Company:	PartherTech Åtvidaberg AB 597 80 Åtvidaberg Sweden
Name of contact:	Ramin Fardi

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT according to the manufacturer/client declaration

Equipment:	TA-CMI (Measurement Unit and Instrument Unit)
Type/Model:	52198-003
Manufacturer:	Tour & Andersson AB Box 6281 SE-40060 Göteborg
Rating/Supplying voltage:	5 V DC
Rating RF output power:	0 dBm
Antenna gain:	-3 dBi
External antenna connector:	NO
Operating temperature range:	0 to +40 °C
Frequency range:	916 - 920 MHz
Number of channels:	5
Modulation characteristics:	FSK
Stand by mode supported:	Yes

2.2 Additional hardware information about the EUT

The EUT consists of an instrument unit and a measurement unit.
The EUT was set to transmitting mode with modulation during the tests.
The internal batteries are rechargeable by a external 5 V DC power supply.
All the tests in this report have been performed in the presence of modulation.

The EUT consists of the following unit:

Unit	Type and version
Instrument unit	52198-003
Measurement unit	52198-003

2.3 Additional software information about the EUT

During the tests the EUT supported the following software:

Software	Version
Software Instrument unit nr. 21008423	P15E
Software Measurement unit nr. 21008460	P1B

2.4 Modifications during the test

No modifications have been made during the tests.

3. TEST SPECIFICATIONS

3.1 Standards

FCC part 15 (2002): Subpart B – Unintentional radiators and Subpart C – Intentional Radiators; §15.249 for operation in the bands 902-928 MHz, 2400-2483,5 MHz, 5725 – 5875 MHz and 24,0-24,25 GHz.

3.2 Additions, deviations and exclusions from standards

No additions, deviations or exclusions have been made from standards.

3.3 Operating environment

If not additionally specified, the tests were performed under the following environmental conditions:

Air temperature:	20 - 24	°C
Relative humidity:	20 - 30	%

4. TEST SUMMARY

The results in this report apply only to the sample tested.

FCC reference	Test	Result	Note
15.249 (a)	Peak output power	Pass	
15.249 (a)	Band edge compliance	Pass	
15.109 (a)	Out of band spurious emissions, radiated	Pass	
15.249(c)	Out of band spurious emissions, radiated	Pass	

5. PEAK OUTPUT POWER

5.1 Test protocol

Date of test: December 2, 2003

EUT mode of operation: Transmitting.

Spectrum analyzer settings:

Span: 27 MHz
RBW: 100 kHz
VBW: 100 kHz
Sweep time: 7 ms
Detector: Peak
Trace: Max Hold

Instrument unit:

Channel (MHz)	Field strength (mV/m)	Limit value (mV/m)
916 920	9,4 20,5	50

Measurement unit:

Channel (MHz)	Field strength (mV/m)	Limit value (mV/m)
916 920	7,0 5,4	50

The measurement results are corrected for attenuation in the set-up configuration.

6. BAND EDGE COMPLIANCE

6.1 Test protocol

Date of test: December 2, 2003

EUT mode of operation: Transmitting.

Spectrum analyzer settings:

Span: 27 MHz
RBW: 100 kHz
VBW: 100 kHz
Sweep time: 7 ms
Detector: Peak
Trace: Max Hold

Instrument unit:
Channel 1:

Frequency [MHz]	RBW [kHz]	Measured Level Peak [µV/m]	Limit Peak [µV/m]	Note
902	100	< 35	500	
928	100	< 35	500	

Channel 5:

Frequency [MHz]	RBW [kHz]	Measured Level Peak [µV/m]	Limit Peak [µV/m]	Note
902	100	< 20	500	
928	100	< 20	500	

Measurement unit:
Channel 1:

Frequency [MHz]	RBW [kHz]	Measured Level Peak [µV/m]	Limit Peak [µV/m]	Note
902	100	< 20	500	
928	100	< 20	500	

Channel 5:

Frequency [MHz]	RBW [kHz]	Measured Level Peak [µV/m]	Limit Peak [µV/m]	Note
902	100	< 35	500	
928	100	< 35	500	

The measurement results are corrected for attenuation in the set-up configuration.

This measurement does not include the field strength of fundamental, see section 5 (Peak output power).

RADIATED SPURIOUS EMISSIONS

6.2 Operating environment

Temperature:	20 - 24	°C	(15 - 35 °C)
Relative Humidity:	20 - 30	%	(20 - 75 %)

6.3 Measurement uncertainty

Radiated disturbance electric field intensity, 30 – 1000 MHz:	± 4,6 dB
Radiated disturbance electric field intensity, 1000 – 18000 MHz:	± 6,0 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.

Measurement uncertainty is calculated in accordance with EA-4/02-1997.
The measurement uncertainty is given with a confidence of 95%.

6.4 Test equipment

Equipment	Manufacturer	Type	SEMKO No.
Test site: Semi-anechoic shielded chamber, 10 x 20 x 8,5 m (W x L x H)			30300
Software:	Rohde & Schwarz	ES-K1, V1.60	
Measurement receiver:	Rohde & Schwarz	ESAI	2973/2974
Antenna amplifier:	SEMKO		7992/7993
Antenna, bilog:	Chase	CBL6111A	1550
Test site: Bluetooth anechoic shielded chamber, 3,7 x 7,0 x 2,4 m (W x L x H)			12285
Software:	Rohde & Schwarz	ES-K1, V1.60	
Signal analyser:	Rohde & Schwarz	FSIQ 40	9192
Preamplifier:	MITEQ	AFS6/AFS44	12335
Preamplifier:	Hewlett & Packard	8447D	7061
Antennas:			
Log-periodic	Rohde & Schwarz	HUF-Z3	3132
Double Ridge Guide Horn:	EMCO	3115	4936

6.5 Measurement set-up

Test site: Semi-anechoic shielded chamber (30 – 1000 MHz)

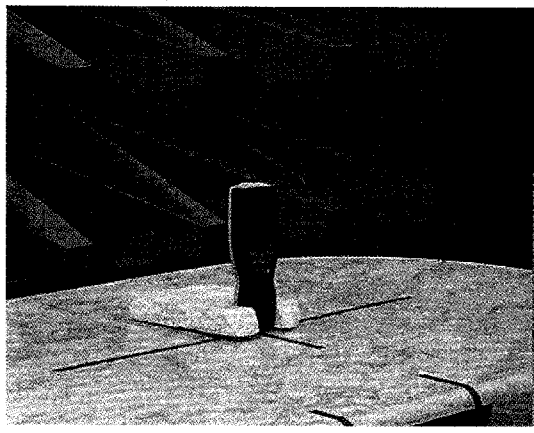
The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 10 m and the EUT was placed on a non-metallic table, 0,8 m above the reference ground plane. The specified test mode was enabled. Test set-up photo is given below.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1,5 m, 2,5 m and 3,5 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps.

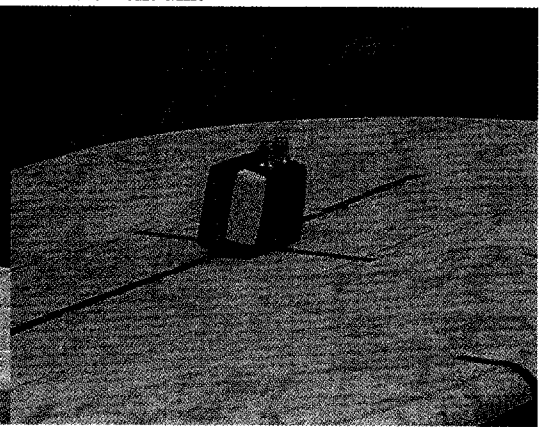
At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out.

Test set-up photo:

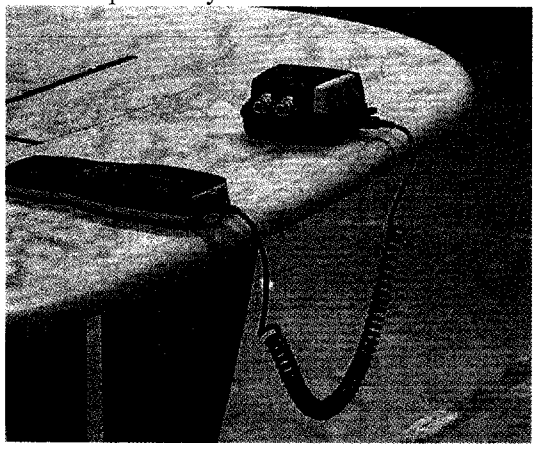
Instrument unit



Measurement unit



Test set-up stand by mode:



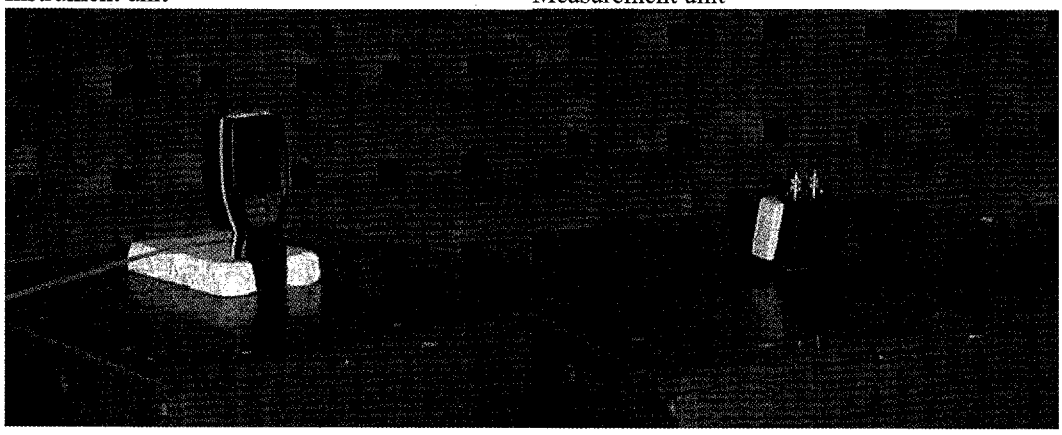
Test site: Bluetooth anechoic shielded chamber (1 – 26 GHz)

In the Bluetooth anechoic chamber the EUT was placed on a non-metallic table, 1,4 m above the floor. The radiated disturbance electric field intensity was measured at a distance of 3 m. The specified test mode was enabled.

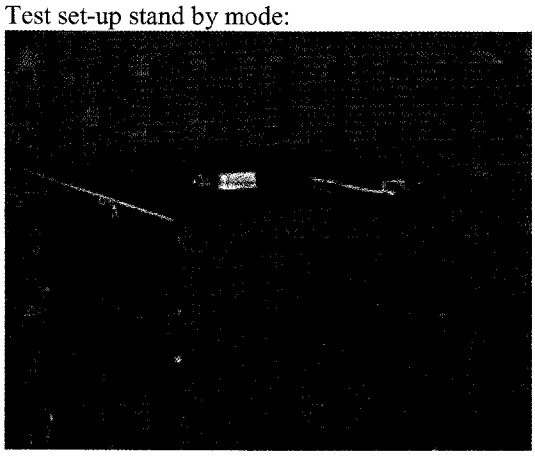
An overview sweep with peak detection of the electric field intensity was performed with the spectrum analyser in max-hold and with the antenna placed 1,4 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps. If necessary, the sweep was repeated with average detection. Test set-up photo is shown below.

Test set-up photo:

Instrument unit Measurement unit



Test set-up stand by mode:

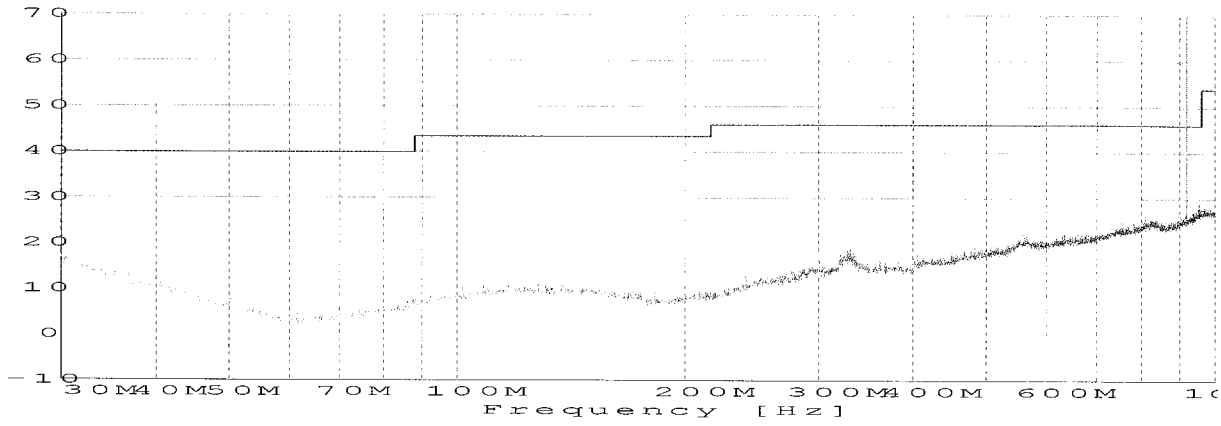


6.6 Test protocol

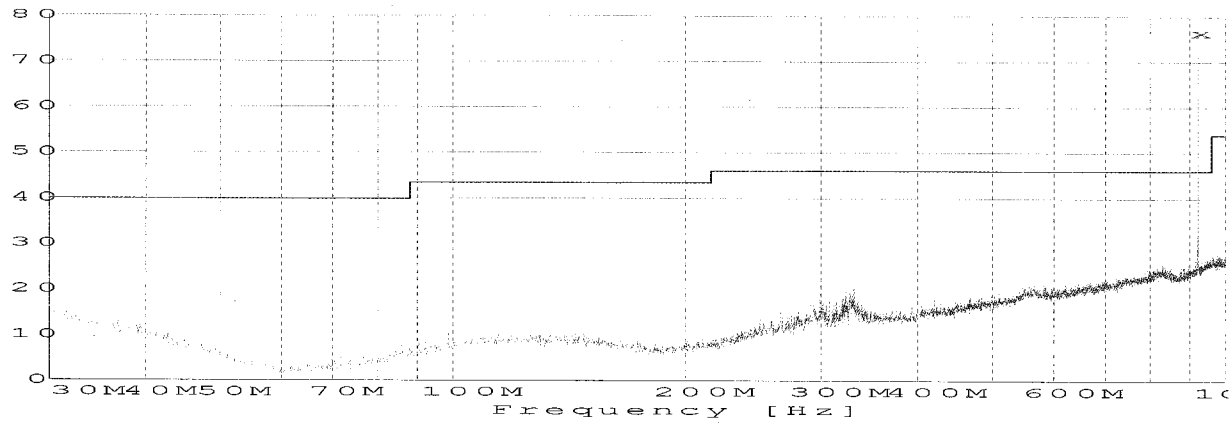
Semi-anechoic shielded chamber

Date of test: November 19, 2003

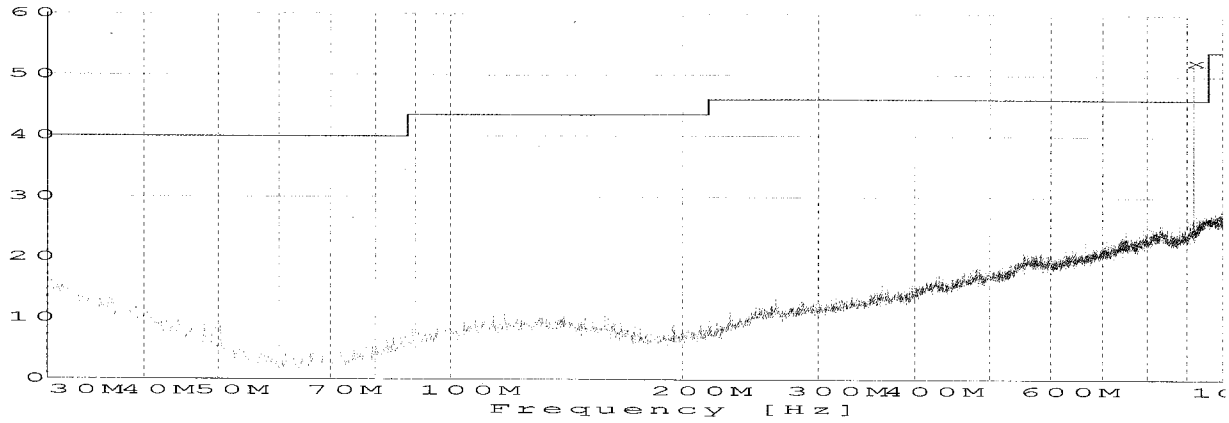
30 – 1000 MHz, max peak at a distance of 10 m on the Instrument unit lower TX channel



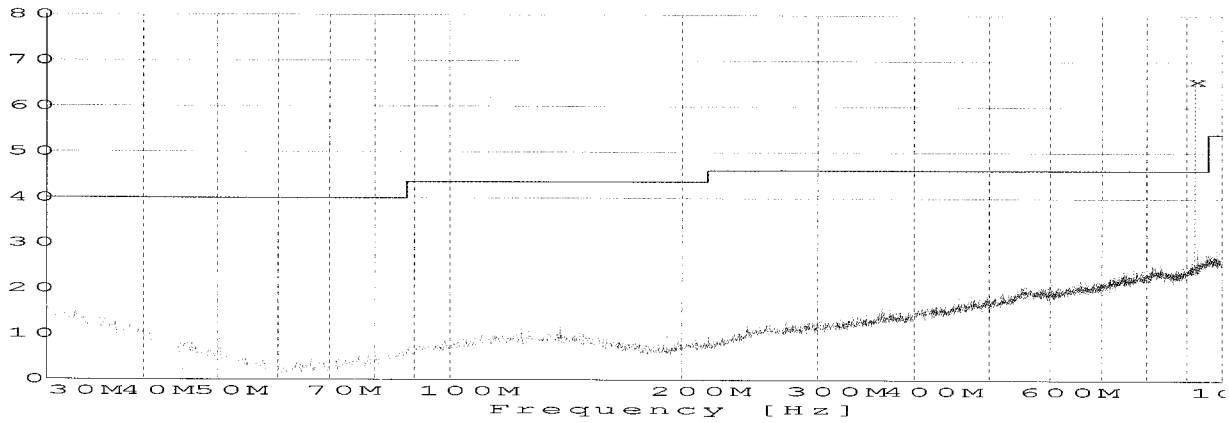
30 – 1000 MHz, max peak at a distance of 10 m on the Instrument unit upper TX channel



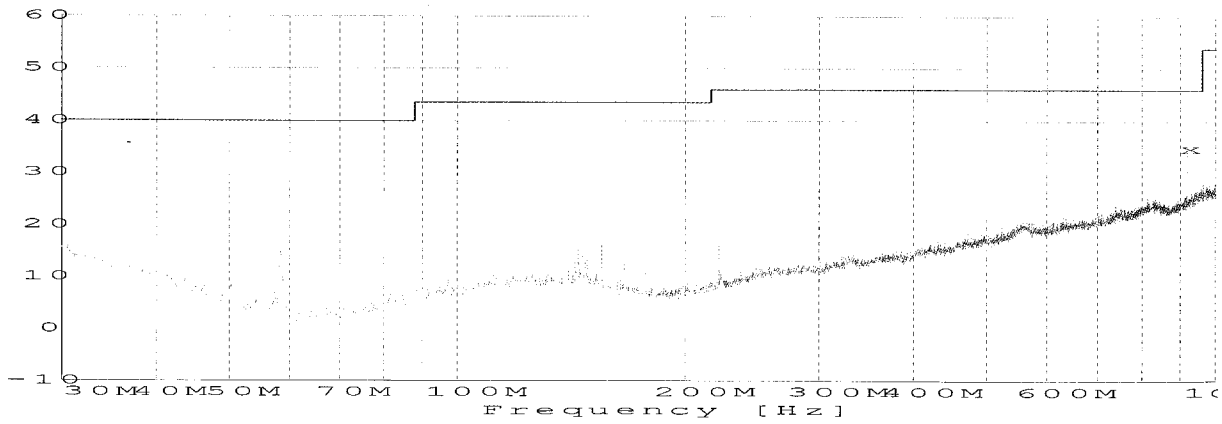
30 – 1000 MHz, max peak at a distance of 10 m on the Measurement unit lower TX channel



30 – 1000 MHz, max peak at a distance of 10 m on the Measurement unit upper TX channel



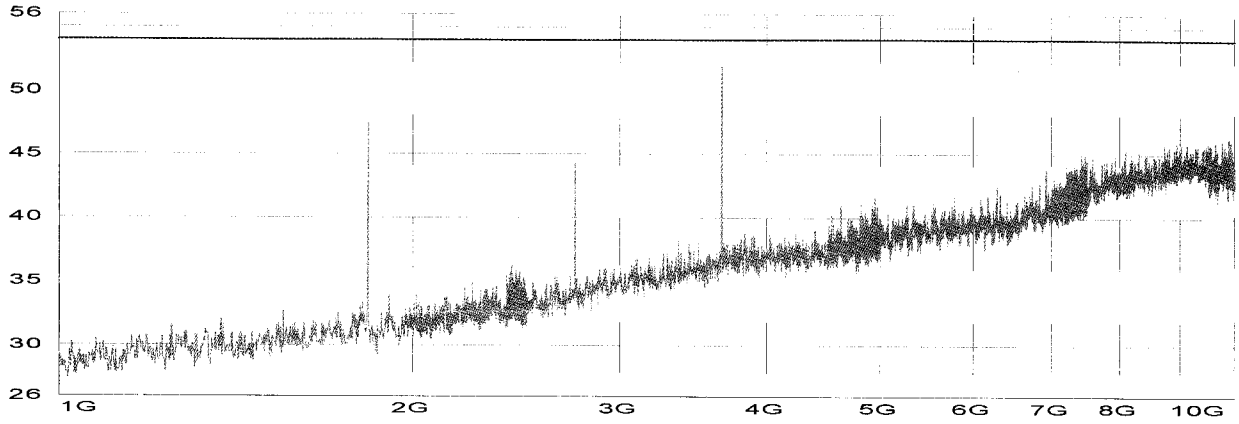
30 – 1000 MHz, max peak at a distance of 10 m in the stand by mode



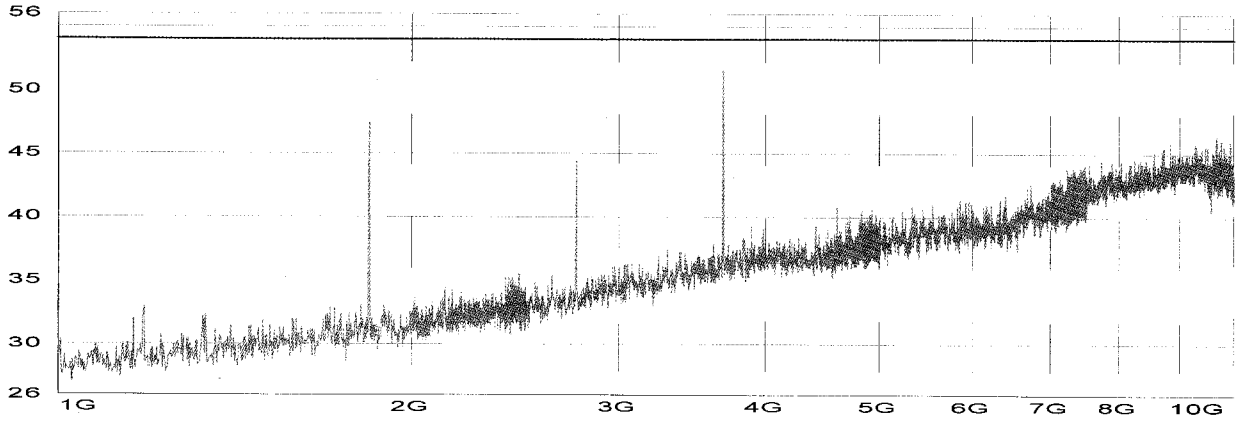
Bluetooth anechoic shielded chamber

Date of test: November 26, 2003

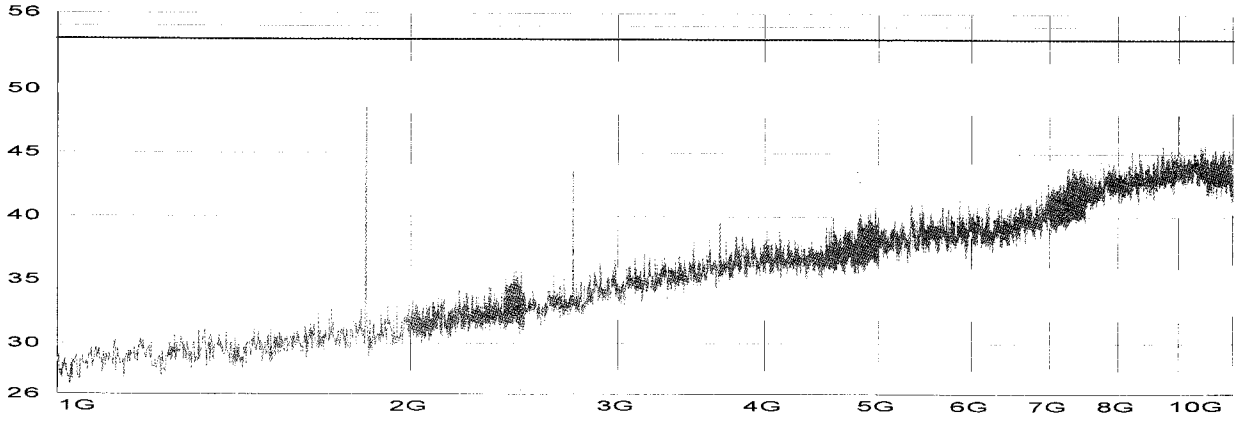
1000 – 10000 MHz, max peak at a distance of 3 m on the Measurement unit lower TX channel



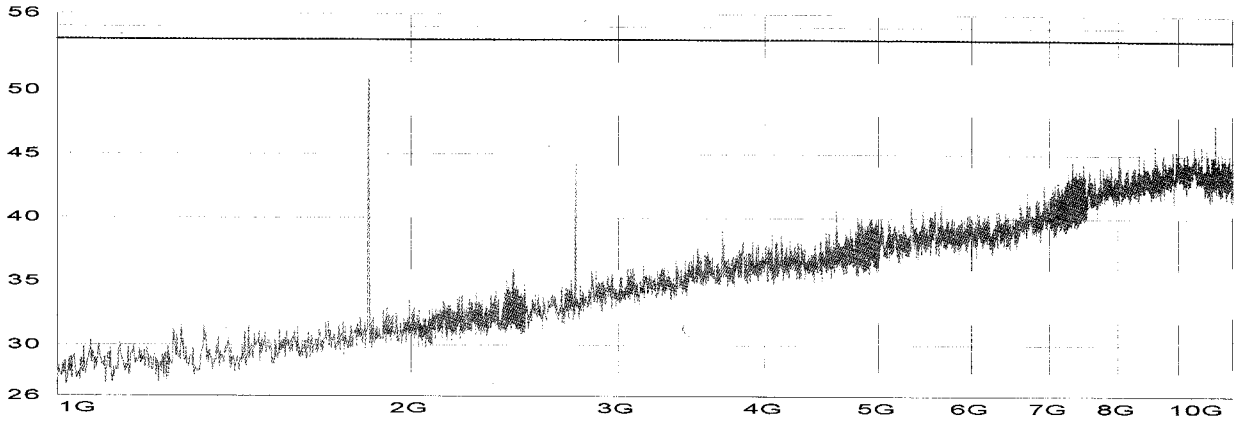
1000 – 10000 MHz, max peak at a distance of 3 m on the Measurement unit upper TX channel



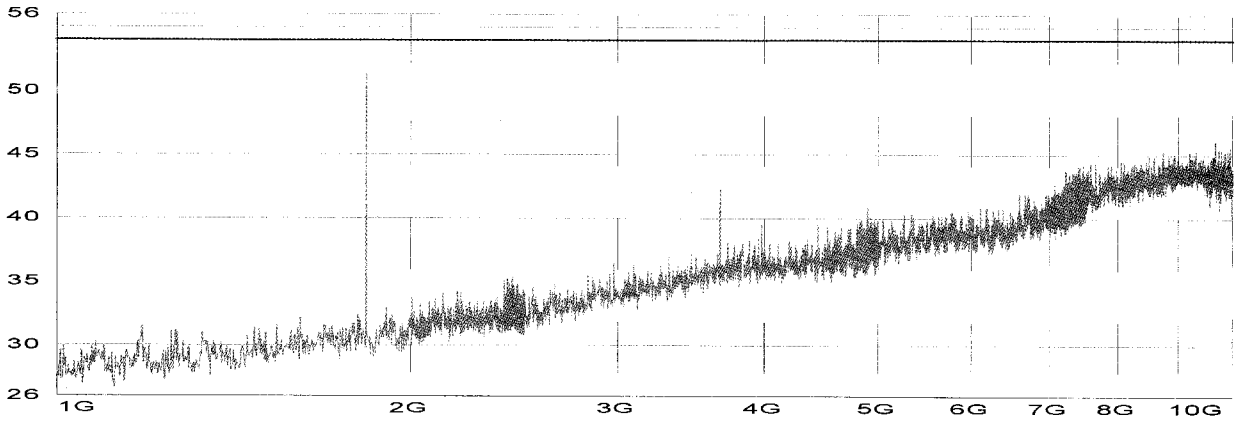
1000 – 10000 MHz, max peak at a distance of 3 m on the Instrument unit lower TX channel



1000 – 10000 MHz, max peak at a distance of 3 m on the Instrument unit upper TX channel



1000 – 13000 MHz, max peak at a distance of 3 m in the stand by mode



Data summary Measurement unit channel 1.

Field strength of spurious emissions						
Frequency	RBW	Measured level		Limit		Note
		Peak	QP/AV	Peak	QP/AV	
[MHz]	[kHz]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	
30 – 88	120	< 18		-	29,5	10 m distance
88 – 216	120	< 12		-	33	"
216 – 960	120	< 25		-	35,6	"
960 – 1000	120	< 30		-	43,5	"
1832	1000	-	43,6	74	54	3 m distance
2748	1000	-	42,2	74	54	"
3664	1000	-	40,7	74	54	"

Data summary Measurement unit channel 5.

Field strength of spurious emissions						
Frequency	RBW	Measured level		Limit		Note
		Peak	QP/AV	Peak	QP/AV	
[MHz]	[kHz]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	
30 – 88	120	< 18		-	29,5	10 m distance
88 – 216	120	< 12		-	33	"
216 – 960	120	< 25		-	35,6	"
960 – 1000	120	< 30		-	43,5	"
1840	1000	-	43,6	74	54	3 m distance
2760	1000	-	41,5	74	54	"
3680	1000	-	41,3	74	54	"

Data summary Instrument unit channel 1.

Field strength of spurious emissions						
Frequency	RBW	Measured level		Limit		Note
		Peak	QP/AV	Peak	QP/AV	
[MHz]	[kHz]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	
30 – 88	120	< 18		-	29,5	10 m distance
88 – 216	120	< 12		-	33	"
216 – 960	120	< 25		-	35,6	"
960 – 1000	120	< 30		-	43,5	"
1832	1000	-	50,6	74	54	3 m distance
2748	1000	-	43,4	74	54	"

Data summary Instrument unit channel 5.

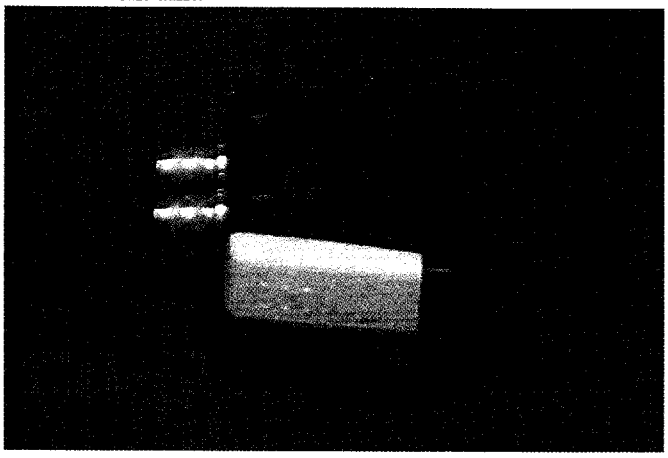
Field strength of spurious emissions						
Frequency	RBW	Measured level		Limit		Note
		Peak	QP/AV	Peak	QP/AV	
[MHz]	[kHz]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	
30 – 88	120	< 18		-	29,5	10 m distance
88 – 216	120	< 12		-	33	"
216 – 960	120	< 25		-	35,6	"
960 – 1000	120	< 30		-	43,5	"
1840	1000	-	52,8	74	54	3 m distance
2760	1000	-	44,7	74	54	"

Data summary Stand by mode, Instrument unit and Measurement unit.

Field strength of spurious emissions						
Frequency	RBW	Measured level		Limit		Note
		Peak	QP/AV	Peak	QP/AV	
[MHz]	[kHz]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	[dB(µV/m)]	
30 – 88	120	< 18	-	-	29,5	10 m distance
88 – 216	120	< 18	-	-	33	"
216 – 960	120	< 26	-	-	35,6	"
960 – 1000	120	< 28	-	-	43,5	"
1834	1000	-	36,1	74	54	3 m distance

APPENDIX – PHOTOS OF THE EUT

Measurement unit:



Instrument unit: