

Date: ESPOO 24.10.2006Page: 1 (13)Appendices -Number:
No. 1 / 1**72519R1b**

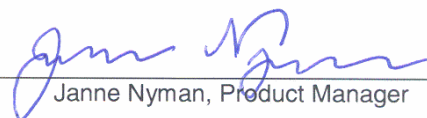
Date of handing in: 18.08.2006

Tested by:



Timo Hietala, Test Engineer

Reviewed by:



Janne Nyman, Product Manager

SORT OF EQUIPMENT:

Remote control

MARKETING NAME:

RC917FH/TR02 917 MHz Transceiver with single antenna

TYPE:

RC917FH/TR02

MANUFACTURER:

Scanreco Industrielektronik

CLIENT:

Scanreco Industrielektronik

ADDRESS:

Årsta Skolgränd 22, S-100 74 Stockholm, SWEDEN

TELEPHONE:

+46 8 556 32 000

TEST LABORATORY:

Nemko Oy

FCC REG. NO.

91087 August 24, 2004

IC FILE NO.

IC 4627-1 October 10, 2006**SUMMARY:**

In regard to the performed tests the equipment under test fulfils the requirements defined in the test specifications, see page 2 for details.

This report supersedes test report no. 72519R1 dated 06.09.2006.

The test results are valid for the tested unit only. Without a written permission of Nemko Oy it is allowed to copy this report as a whole, but not partially.

Summary of performed tests and test results

Emission tests according to the test specification FCC 47 CFR Part 15, Subpart B, Class B (2005) and ICES-003 Issue 4 (2004)

Emission test	Test method	Conclusion
Radiated disturbance 30-10000 MHz	ANSI C63.4-2003 CISPR 22(1997)	Pass, Class B

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1. General

The equipment under test (EUT) was a remote control. The purpose of the performed tests was to see if in regard to these tests the EUT fulfils the EMC requirements defined in the FCC 47 CFR PART 15, SUBPART B, CLASS B (2005). The tests were performed according to the test specifications CISPR 22 (1997) and ANSI C63.4 – 2003 and FCC 47 CFR PART 15, SUBPART B, CLASS B (2005) (radiated disturbances).

The highest internal frequency of the EUT was 898.5 MHz.

2. System Configuration

2.1 Test set-up

Equipment under test (EUT):

- Remote control: Transceiver RC917FH/TR02, S/N:---

Cables:

From	To	Type	Length [m]
Battery pack	EUT	DC cable, unshielded	0.2

Operating voltage of the EUT during the tests:

- Rechargeable battery pack 7.2 VDC.

2.2 Operating conditions of the EUT

Emission tests:

For the duration of the tests the EUT was set to a receiving mode of operation. The device was powered off a fresh battery during the tests.

2.3 Channels of the EUT

<i>EUT Channel</i>	<i>Frequency (MHz)</i>
Lowest	915.000
Highest	919.900

3. Test procedures

3.1 Emission tests

3.1.1 Radiated emissions

<i>Site name</i>	Nemko / Perkkaa
<i>Date of testing</i>	21-23.10.2006
<i>Test equipment</i>	350, 338, 566, 564, 544, 188, 542, 184
<i>Test conditions</i>	23 °C, 40 % RH
<i>Test result</i>	PASS

The test was performed in a semi-anechoic shielded room. The EUT was placed on a non-conductive 0.8 m high table standing on the turntable (photographs 1 and 2). During the test in the frequency range 30-10000 MHz the distance from the EUT to the measuring antenna was 3 m. In order to find the maximum levels of the disturbance radiation the angle of the turntable, the height of the measuring antenna and the lay-out of the EUT cables were varied during the tests. The test was performed with the measuring antenna being both in horizontal and vertical polarizations. The measurements were performed the EUT at all three orthogonal planes.

Vertical and horizontal polarizations in the frequency range 30 – 1000 MHz were measured by using the peak detector. During the peak detector scan the turntable was rotated from 0° to 360° with 30° step with the antenna heights 1.0 m and 3.0 m. The highest levels of the radiated interference field strength measured by using the quasi-peak detector were recorded.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak and quasi-peak detection measurements.

Vertical and horizontal polarizations in the frequency range 1000 – 10000 MHz were measured by using the peak detector. During the measurement the turntable was rotated from 0° to 360° and the height of the antenna was varied between 1.0 m and 4.0 m.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The CFR 47 Part 15, Subpart B, Class B limit of 500 $\mu\text{V/m}$ has been calculated to correspond 54 $\text{dB}(\mu\text{V/m})$ as follows: $[\text{dB}(\mu\text{V/m})]=20\log[\mu\text{V/m}]$.

FCC 15.109, a Class B limit (3m measuring distance)

<i>Frequency band MHz</i>	<i>Quasi-peak limit dB($\mu\text{V/m}$)</i>
30 - 88	40
88 - 216	43.5
216 - 960	46.0
960 - 1000	54

Class B limit (3m measuring distance)

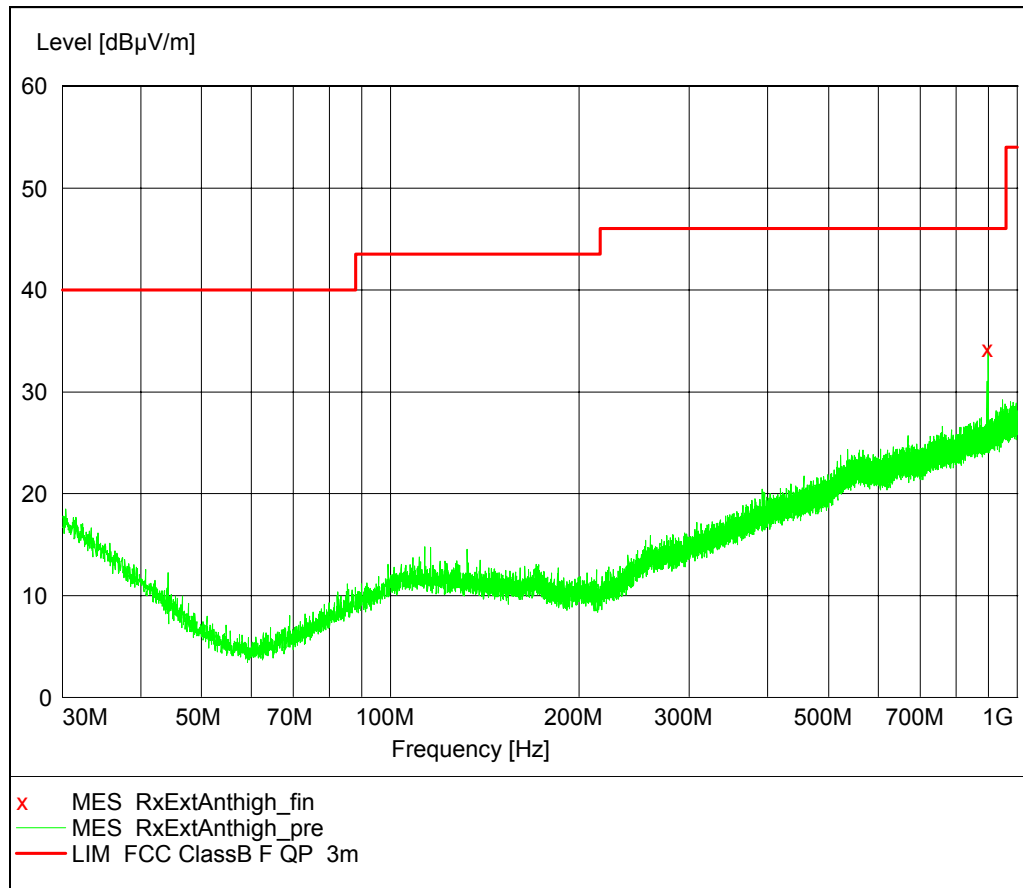
<i>Frequency band MHz</i>	<i>Average limit dB($\mu\text{V/m}$)</i>	<i>Peak limit dB($\mu\text{V/m}$)</i>
1000 - 10000	54	74

4. Test results

4.1 Emission tests

4.1.1 Radiated emissions

The EUT has two possible receiving antennas.
The following data is from External $\lambda/4$ antenna.

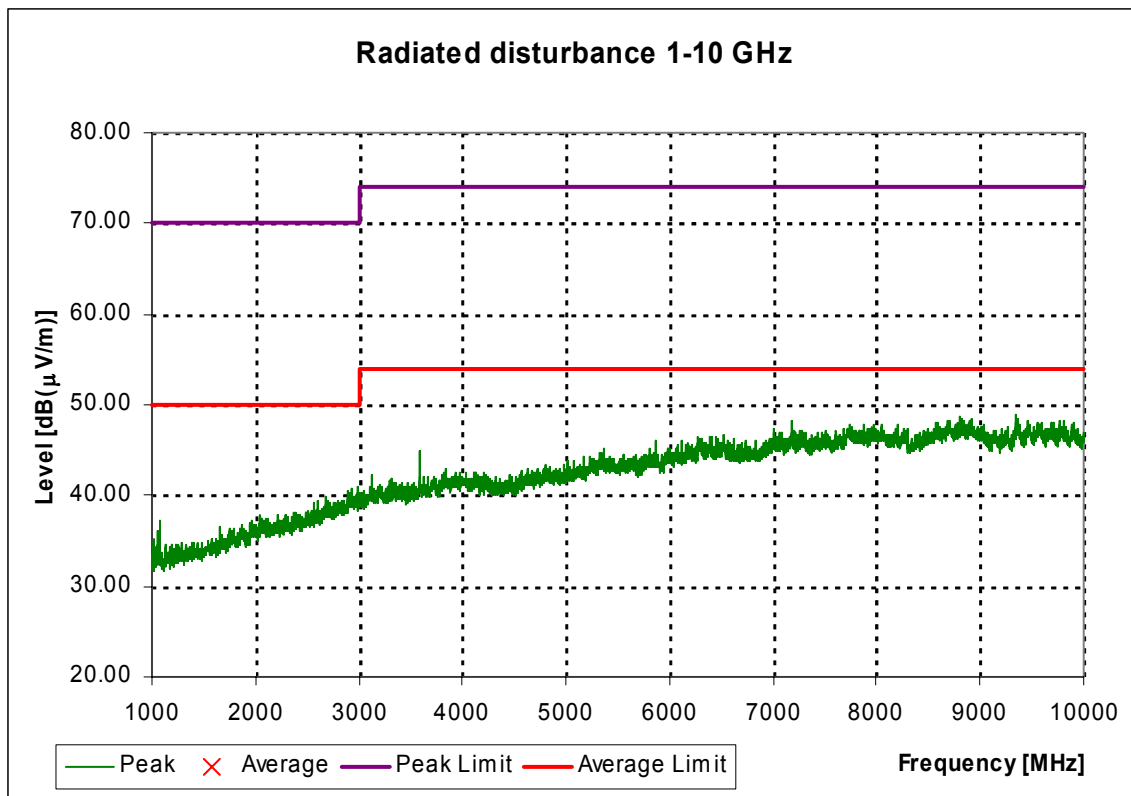


Highest emissions (Quasi-peak detector):
EUT channel: lowest

Frequency	Level	Transducer	Limit	Margin
MHz	dBµV/m	dB	dBµV/m	dB
893.60	35.2	-0.7	46.0	10.80

EUT channel: highest

Frequency	Level	Transducer	Limit	Margin
MHz	dBµV/m	dB	dBµV/m	dB
898.50	34.2	-0.7	46.0	11.80



Horizontal and vertical polarizations in the frequency range 1000 - 10000 MHz measured by using the peak detector. The highest levels of the radiated interference field strength measured by using the peak and average detector were recorded.

MEASUREMENT RESULTS

EUT channel: lowest

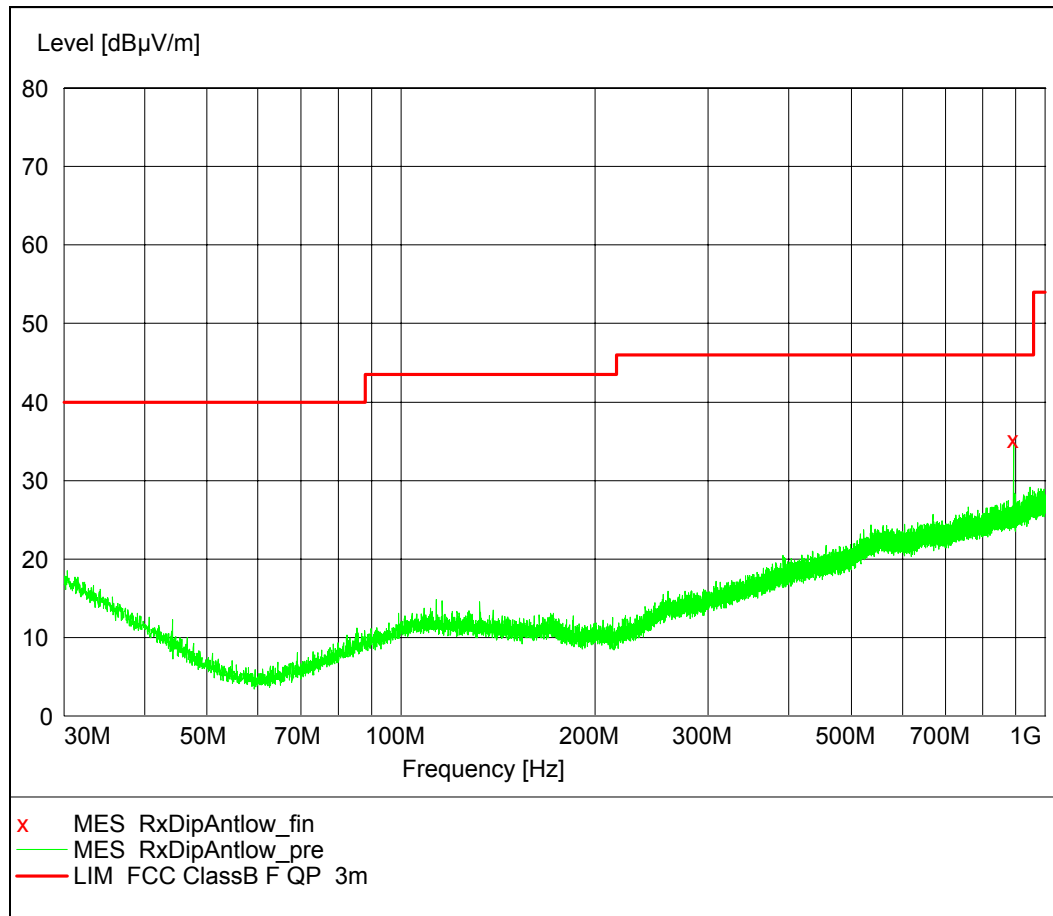
Frequency MHz	Level (Pk) dB μ V/m	Level (Avg) dB μ V/m	Limit dB μ V/m	Margin dB	Polarization Hor/Ver
3574.4	44.0	-	54.0	10.0	VERTICAL

MEASUREMENT RESULTS

EUT channel: highest

Frequency MHz	Level (Pk) dB μ V/m	Level (Avg) dB μ V/m	Limit dB μ V/m	Margin dB	Polarization Hor/Ver
3589.1	46.5	-	54.0	7.5	VERTICAL

The EUT has two possible receiving antennas.
The following data is from internal $\lambda/2$ dipole antenna.



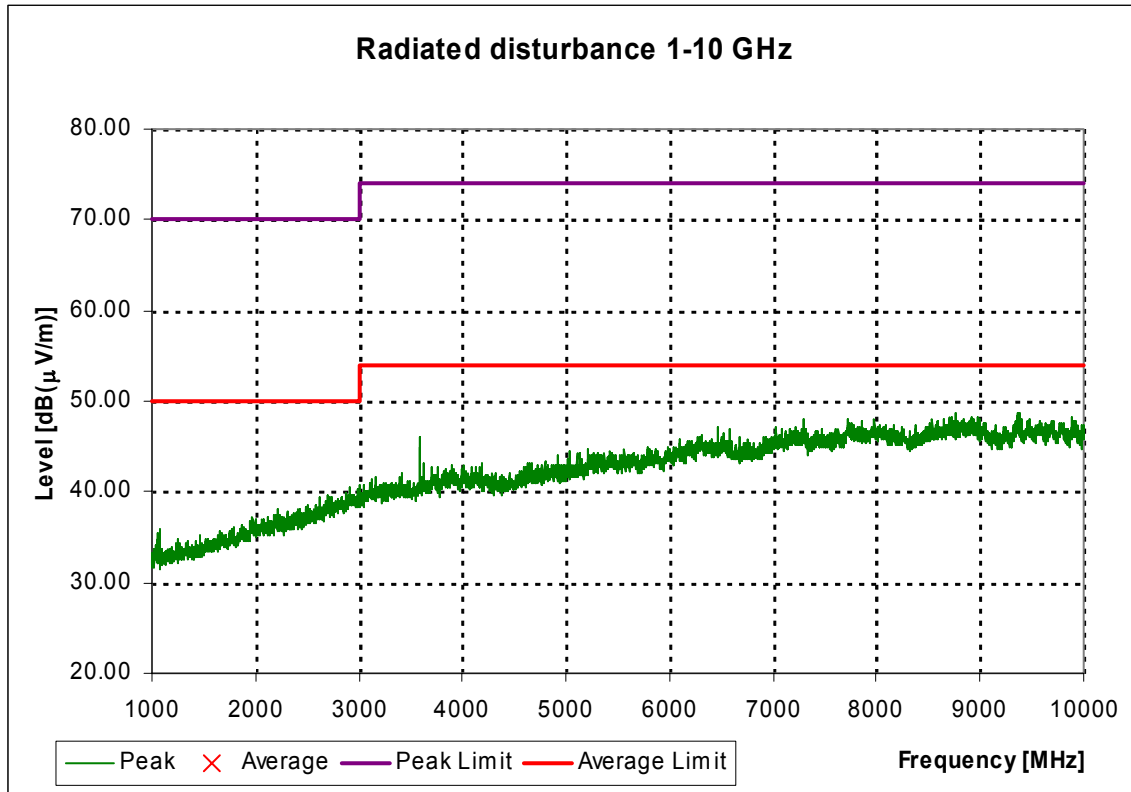
Highest emissions (Quasi-peak detector):
EUT channel: lowest

Frequency	Level	Transducer	Limit	Margin
MHz	dBµV/m	dB	dBµV/m	dB
893.60	35.0	-0.7	46.0	11.0

EUT channel: highest

Frequency	Level	Transducer	Limit	Margin
MHz	dBµV/m	dB	dBµV/m	dB
898.50	34.2	-0.7	46.0	11.8

The EUT has two possible receiving antennas.
The following data is from internal $\lambda/2$ dipole antenna.



Horizontal and vertical polarizations in the frequency range 1000 - 10000 MHz measured by using the peak detector. The highest levels of the radiated interference field strength measured by using the peak and average detector were recorded.

MEASUREMENT RESULTS

EUT channel: lowest

Frequency MHz	Level (Pk) dB μ V/m	Level (Avg) dB μ V/m	Limit dB μ V/m	Margin dB	Polarization Hor/Ver
3574.4	44.2	-	54.0	9.8	VERTICAL

MEASUREMENT RESULTS

EUT channel: highest

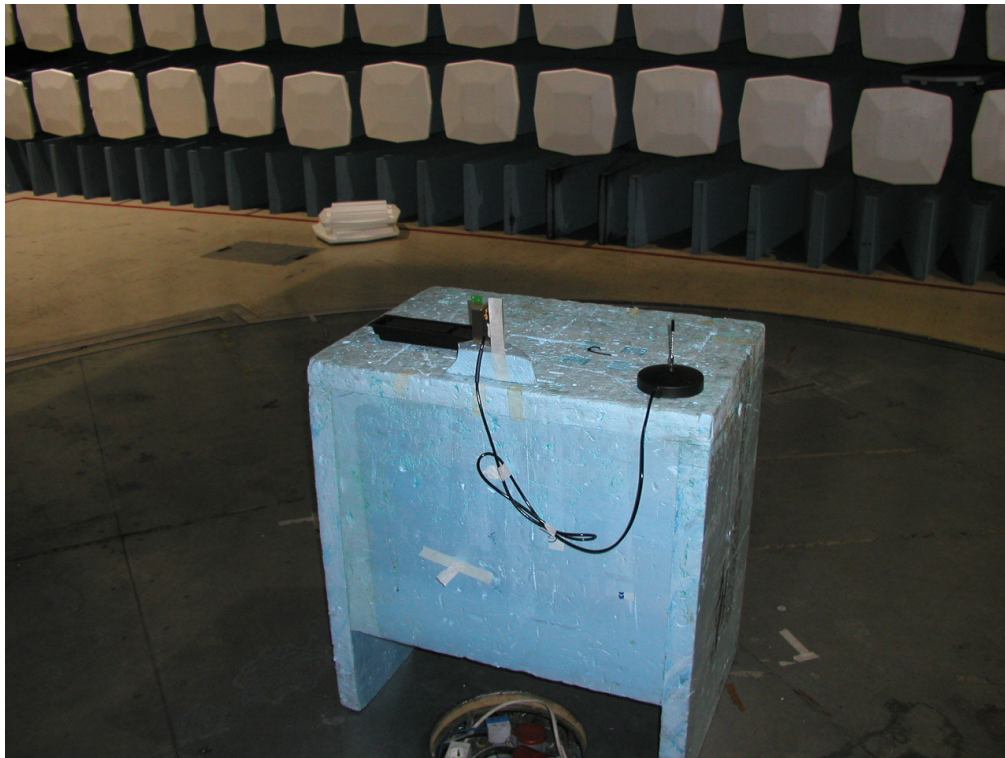
Frequency MHz	Level (Pk) dB μ V/m	Level (Avg) dB μ V/m	Limit dB μ V/m	Margin dB	Polarization Hor/Ver
3589.1	47.1	-	54.0	6.9	VERTICAL

5. List of test equipment

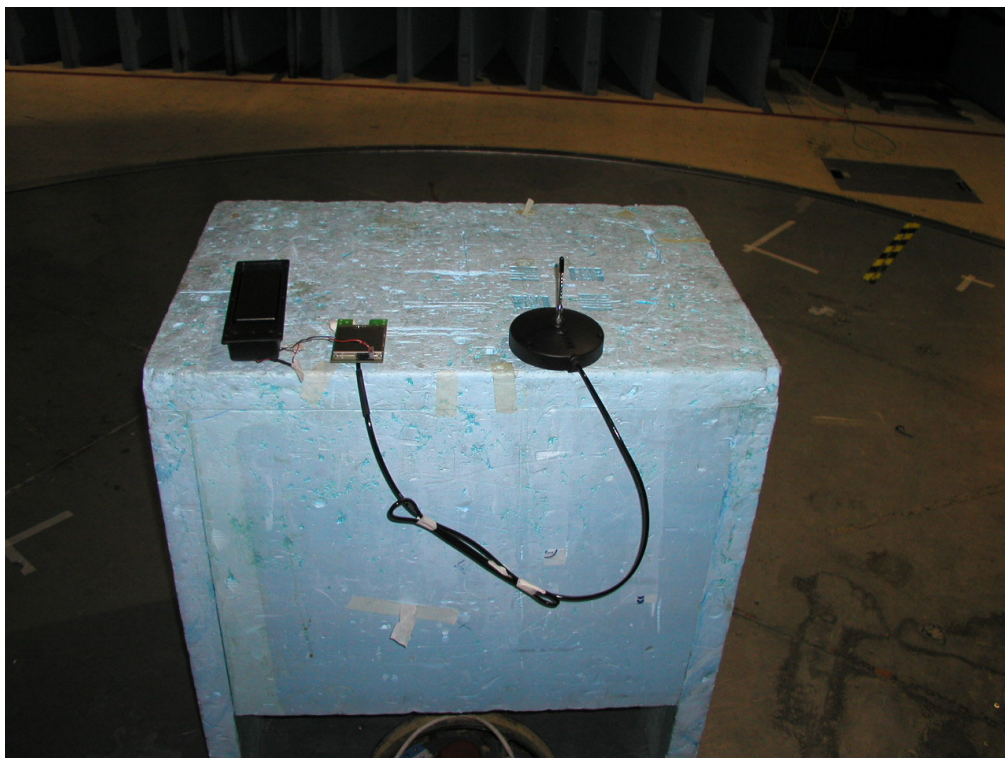
Each active test equipment is calibrated once a year, antennas every 18 months and other passive equipment every 24 months.

Nr.	Equipment	Type	Manufacturer	Serial number
5	Test receiver	ESH-3	Rohde & Schwarz	894718/015
338	Test receiver	ESS	Rohde & Schwarz	847151/009
42	Spectrum analyzer	8566B	Hewlett Packard	2637A04102
544	RF-amplifier	ZFL-2000VH2	Mini-Circuits	D01080
564	RF-amplifier	CA018-4010	CIAO Wireless	101
168	Artificial Mains	NSLK 8127	Schwartzbeck	8127162
343	Artificial Mains	NSLK8128	Schwartzbeck	-
188	Antenna	CBL6111	Chase	1028
319	Antenna	CBL6112	Chase	2018
525	Double-Ridged Horn	3115	Emco	6691
542	Double-Ridged Horn	3115	Emco	00023905
184	Temp. & humidity meter	H MI 32	Vaisala	63837
348	Shielded room	RFSD-100	Euroshield Oy	1320
350	Semianechoic shielded room	RFD-F-100	Euroshield Oy	1327
371	AC Power source	500i-400	California Instr.	HK 52064
566	Spectrum analyzer	E4448A	Agilent	US42510236

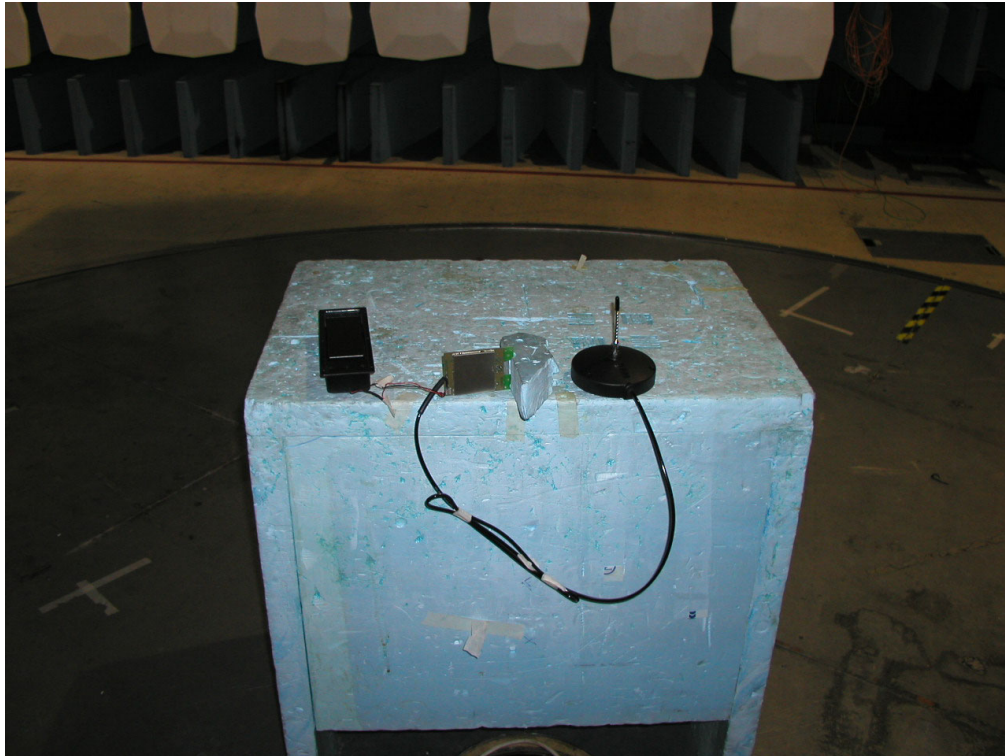
6. Photographs



Photograph 1 Radiated emissions test setup



Photograph 2 Radiated emissions test setup



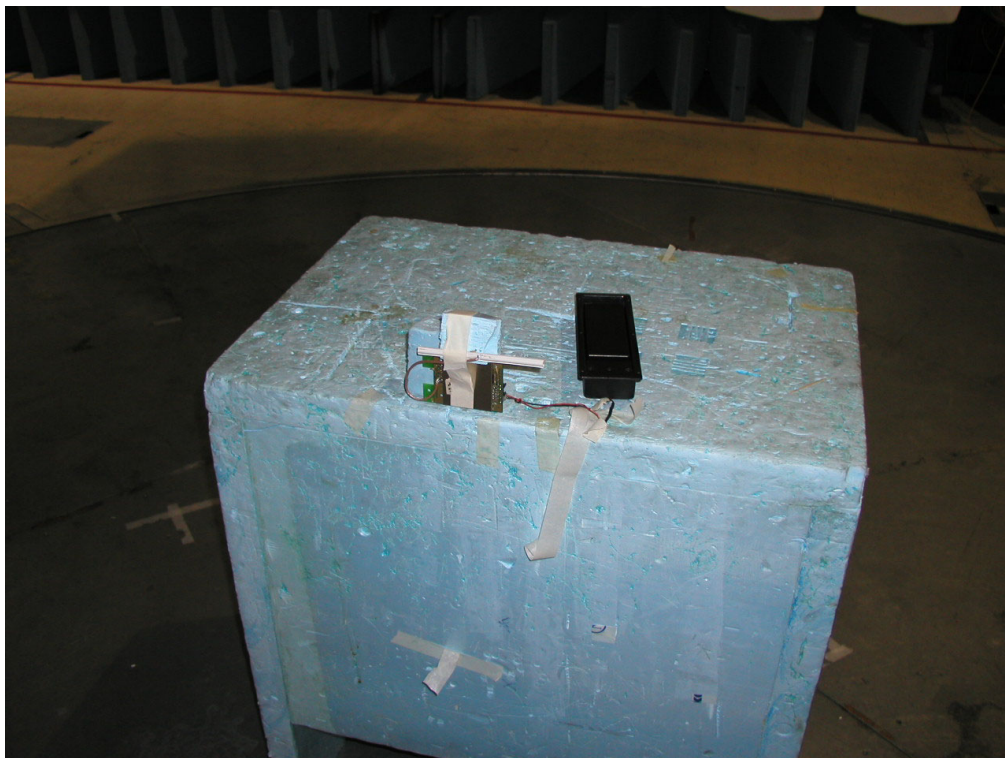
Photograph 3 Radiated emissions test setup



Photograph 4 Radiated emissions test setup



Photograph 5 Radiated emissions test setup



Photograph 6 Radiated emissions test setup