RADIO TEST REPORT

No. 608317R1

EQUIPMENT UNDER TEST

Equipment:	Basestation
Type / model:	EGO Basestation
Manufacturer:	Teleca System Design AB
Tested by request of:	Teleca System Design AB

SUMMARY

The equipment complies with the requirements of the following standards:

FCC, Part 15, Subpart B (2005) and Subpart C (2005);

Date of issue: September 10, 2006

Tested by: Björn Utermöhl Approved by: Lars-Olov Johansson

This test report replaces our previous issued test report with same number, dated 6 July 2006

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1. CLIENT INFORMATION

The EUT has been tested by request of

Company:	Teleca System Design AB Telegrafgatan 8A 169 84 Stockholm Sweden
Name of contact:	Holger Tiberg

2. EQUIPMENT UNDER TEST (EUT)

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

Equipment:	Basestation
Type/Model:	EGO Basestation
Brand name:	EGO
FCC ID	--
Serial number:	--
Manufacturer:	Wooyoung Telecom CO LTD, Gyeonggi-Do, Korea
Rating/Supplying voltage:	12 VDC
Rating RF output power:	1 W e.i.r.p.
Antenna gain:	6 dBi
External antenna connector:	Yes
Operating temperature range:	0 - 40 deg C
Frequency range:	902 - 923 MHz, Frequency hopping within a 2.5 MHz band that is possible to set within the frequency range.
Number of channels:	50
Channel separation:	50 kHz
Modulation characteristics:	FHSS
Stand by mode supported:	Yes

2.2 Additional software information about the EUT

During the tests the EUT supported the following software:

Software	Version	Comment
Microsoft Windows CE with additional application developed for this product	--	--

2.3 Peripheral equipment

Peripheral equipment is defined as equipment needed for correct operation of the EUT during the tests, but not included as a part of the testing and evaluation of the EUT.

Equipment	Manufacturer / Type	Serial number
AC/DC adapter	Nordic Power SA 125A 1220 G-S Input : 100–240 V~, 50–60 Hz Output: 12 V DC, 2A	-

2.4 Modifications during the test

No modifications have been made during the tests.

3. TEST SPECIFICATIONS

3.1 Standards

FCC 47 CFR part 15 (2005) Subpart B – Unintentional radiators
FCC 47 CFR part 15 (2005) Subpart C – Intentional Radiators; §15.247 Operation within the bands 902-928 MHz, 2400 – 2483.5 MHz and 5725 – 5850 MHz.

Measurements methods according to ANSI C63.4-2003

3.2 Additions, deviations and exclusions from standards

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

3.3 Test set-up

Measurement set-ups for the test of conducted disturbance voltage in the frequency range 0,15-30 MHz and out-of-band spurious emissions test are described in corresponding sections. During other tests the EUT was connected to the spectrum analyser by cable.

3.4 Operating environment

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

Air temperature:	22 – 23	°C
Relative humidity:	23 – 53	%

4. TEST SUMMARY

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

FCC reference	Test	Result	Note
15.247(b)	Peak output power	Pass	
15.247(a)	20 dB Bandwidth	Pass	
15.247(a)	Carrier frequency separation	Pass	
15.247(a)	Number of hopping frequencies (channels)	Pass	
15.247(a)	Time of occupancy (dwell time)	Pass	
15.247	Band edge compliance	Pass	
15.247(d)	Out of band spurious emissions, radiated	Pass	
15.247(d)	Out of band spurious emissions, conducted	Pass	
15B	Out of band spurious emissions, radiated	Pass	
15B	Conducted emission at AC port	Pass	

NA = Not Applicable

5. PEAK OUTPUT POWER

5.1. Test protocol

Date of test: July 4, 2006

EUT mode of operation: TX, hopping on one channel.

Spectrum analyser settings:

Span: 10 MHz
RBW: 3 MHz
VBW: 3 MHz
Sweep time: 5 ms
Detector: Peak
Trace: Max Hold
85% of 120 V ac is 102 V ac, 115% of 120 V ac is 138 V ac

Output power level, mW	Measured value, dBm						Limit, dBm
	903 MHz		915 MHz		922 MHz		
	102 V ac	138 V ac	102 V ac	138 V ac	102 V ac	138 V ac	
1000	29,2	28,6	29,2	29,0	28,6	28,8	30

6. 20 dB BANDWIDTH

6.1 Test protocol

Date of test: July 4, 2006

EUT mode of operation: TX, hopping on one channel.

Spectrum analyser settings:

Span: 200 kHz
RBW: 10 kHz
VBW: 10 kHz
Sweep time: 5 ms
Detector: Peak
Trace: Max Hold

Channel (MHz)	20 dB Bandwidth (kHz)	Limit value (kHz)
903	43	< 250
915	44	
922	43	

7. CARRIER FREQUENCY SEPARATION

7.1 Test protocol

Date of test: July 4, 2006

EUT mode of operation: TX and hopping on.

Spectrum analyser settings:

Span: 150 kHz
RBW: 20 kHz
VBW: 20 kHz
Sweep time: Auto
Detector: Peak
Trace: Max Hold

Channel (MHz)	Carrier frequency separation from the next channel		Limit value (kHz)
	To the right (kHz)	To the left (kHz)	
903	50,9	-	> 43
915	50,9	50,9	> 44
922	-	51,1	> 43

Limit = Result from the 20 dB Bandwidth measurements

8. NUMBER OF HOPPING CHANNELS

8.1 Test protocol

Date of test: July 4, 2006

EUT mode of operation: TX and hopping on.

Spectrum analyser settings:

RBW: 20 kHz
VBW: 20 kHz
Sweep time: Auto
Detector: Peak
Trace: Max Hold

Frequency band	Number of hopping channels	Limit value
903 MHz	50	≥ 50
915 MHz	50	≥ 50
922 MHz	50	≥ 50

9. TIME OF OCCUPANCY (DWELL TIME)

9.1 Test protocol

Date of test: July 4, 2006

EUT mode of operation: TX and hopping on.

Spectrum analyzer settings:

Determination of transmitting time **T**

Span: 0 Hz
RBW: 1 MHz
VBW: 1 MHz
Sweep time: 400 ms
Continuous sweep
Detector: Peak
Trace: Clear/Write
Trigger: Video

Determination of the number of times ***n*** *the channel is active during the sweep time of 20 s*

RBW: 30 kHz
VBW: 30 kHz
Sweep time: 20 s
Single sweep

Test parameters	Channel (MHz)			Limit value (s)
	903	915	922	
T (ms)	58	57	57	-
n	1	1	1	-
Dwell time (s) = T · n	0.058	0.057	0.057	< 0,4

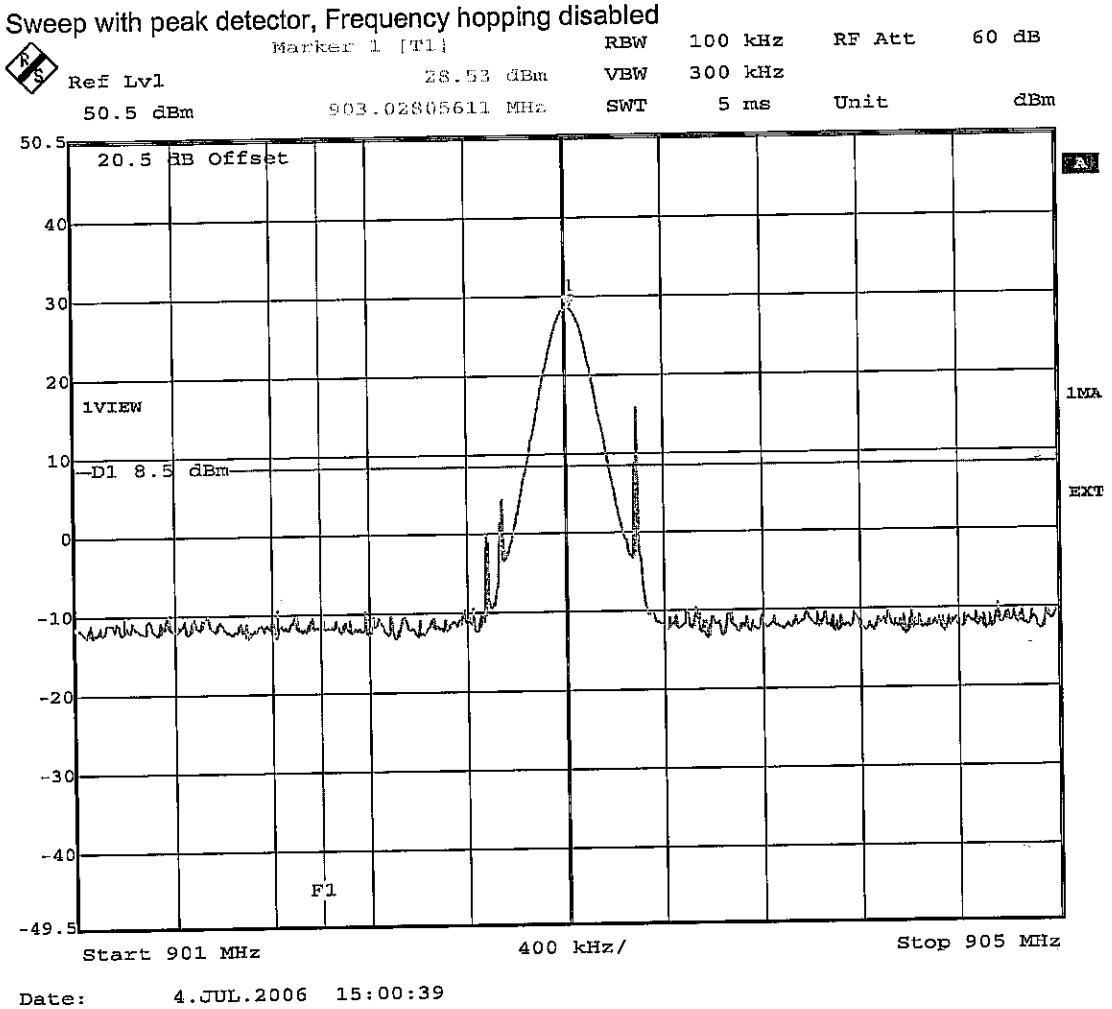
10. BAND EDGE COMPLIANCE

10.1 Test protocol

Date of test: July 4, 2006

Band edge compliance at 903 MHz

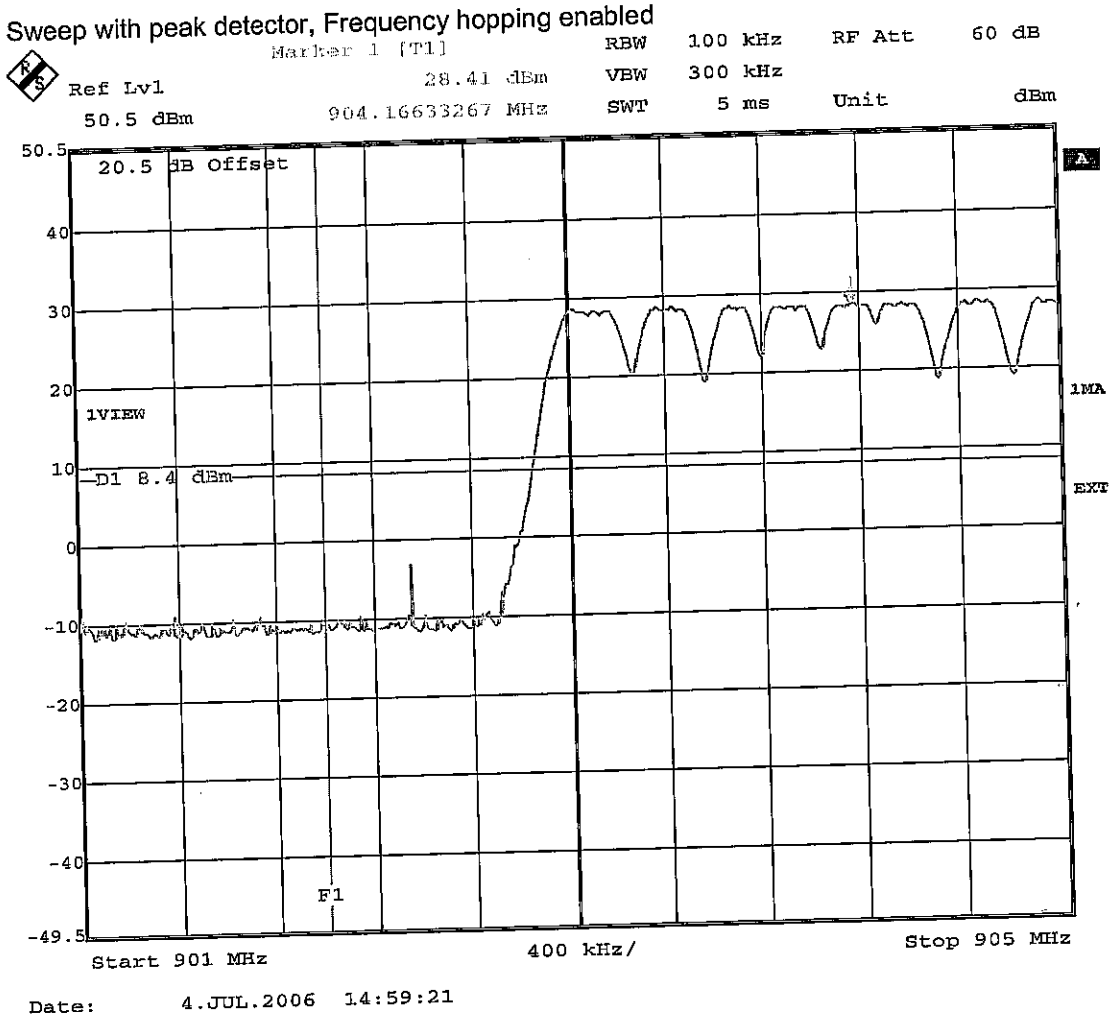
Sweep with peak detector, Frequency hopping disabled



Date: 4.JUL.2006 15:00:39

Limit = Red line D1 corresponds to 20 dBc.

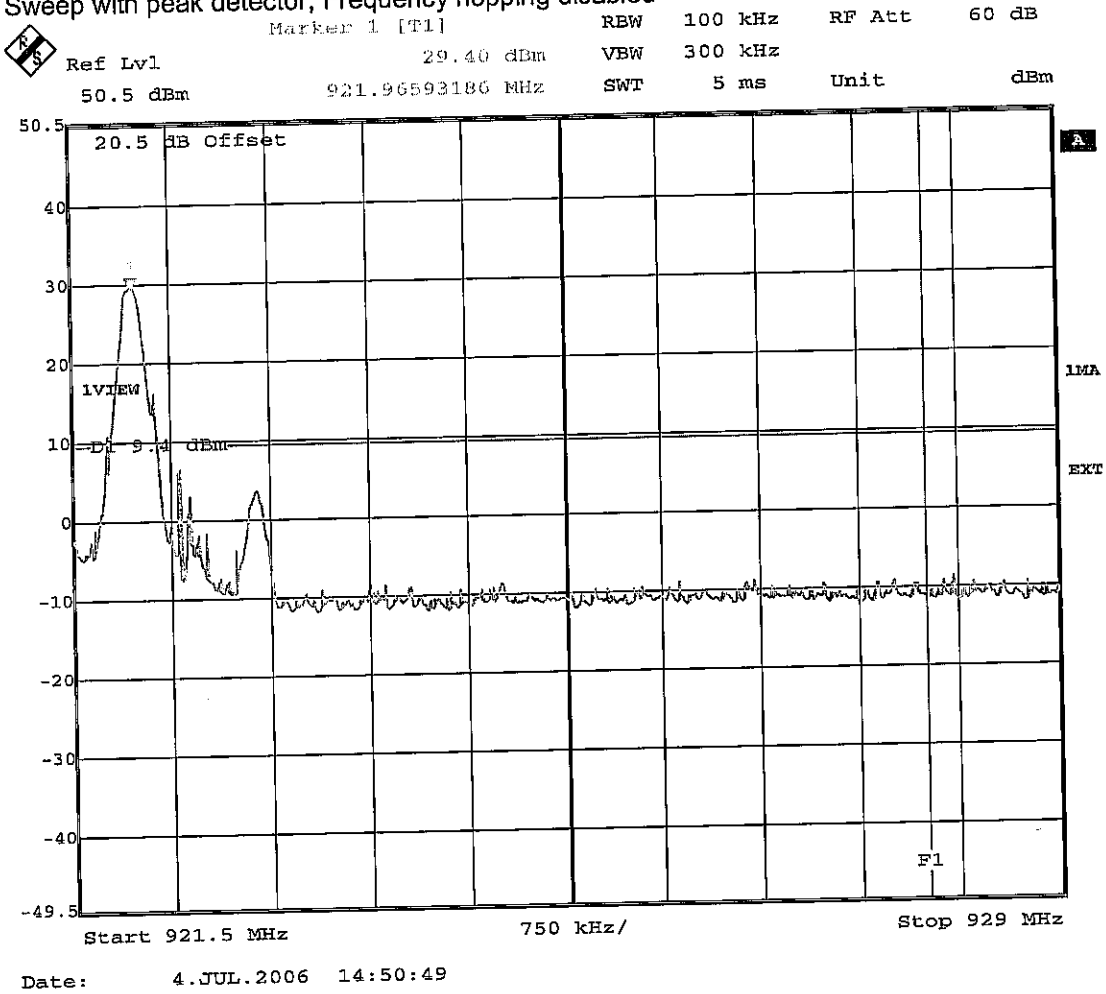
Sweep with peak detector, Frequency hopping enabled



Limit = Line D1 corresponds to 20 dBc.

Band edge compliance at 922 MHz

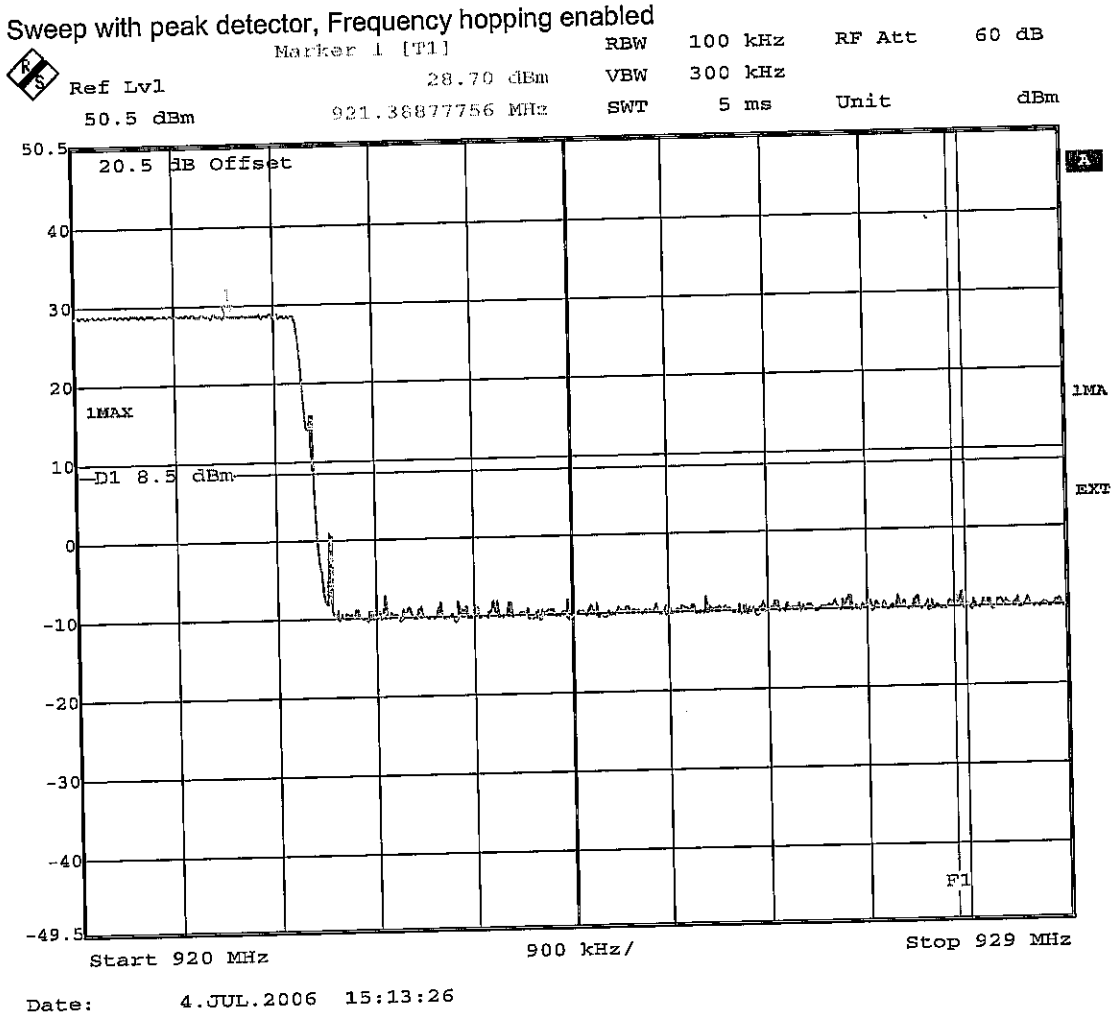
Sweep with peak detector, Frequency hopping disabled



Date: 4.JUL.2006 14:50:49

Limit = Line D1 corresponds to 20 dBc.

Sweep with peak detector, Frequency hopping enabled



Date: 4.JUL.2006 15:13:26

Limit = Line D1 corresponds to 20 dBc.

11. RADIATED SPURIOUS EMISSIONS

11.1 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%.

11.2 Test equipment

Equipment	Manufacturer	Type	SEMKO No.
Test site: Semi-anechoic shielded chamber, 6 x 9 x 6 m (W x L x H)			30900, 30901
Software:	Rohde & Schwarz	EMC 32	
Measurement receiver:	Rohde & Schwarz	ESCI	12798
Antenna, bilog:	Rohde & Schwarz	HL-562	30711
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, V1.70	
Signal analyser:	Rohde & Schwarz	FSIQ 40	40023
Preamplifier:	MITEQ	AFS6/AFS44	12335
Antennas:			
Double Ridge Guide Horn:	EMCO	3115	4936
Horn antenna:	EMCO	3160-08	30099
Horn antenna:	EMCO	3160-09	30101
High pass filter	K & L	11SH10-1300-U4000-0/0	5133
Band rejection filter	K & L	3TNF-800/1000-0.2-N/N	12389
Transformer	Tufvassons	AFM-1500	30317

11.3 Measurement set-up

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

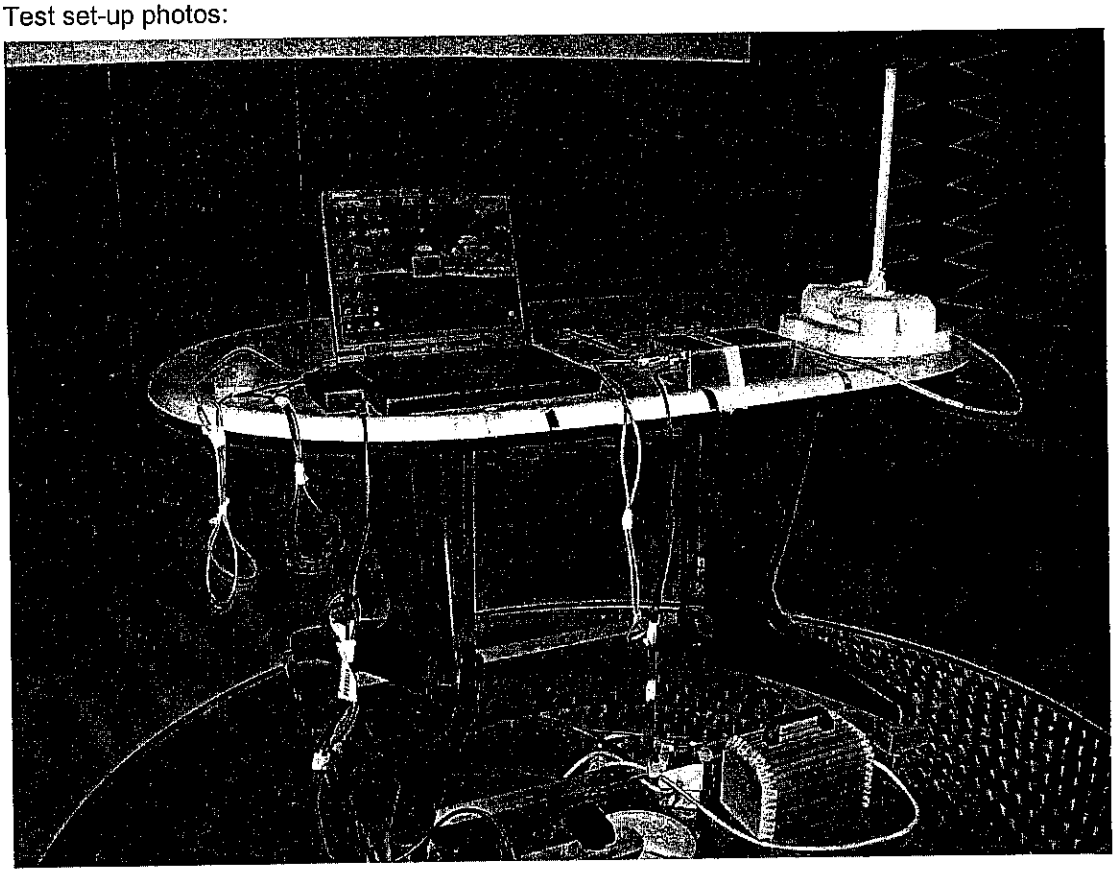
The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 3 m and the EUT was placed on a non-metallic table, 0,8 m above the reference ground plane. The specified test mode was enabled. Test set-up photos are given below.

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 with quasi-peak detector were carried out.

The EUT was supplied with 120 V AC (60 Hz) during the stand by test.

Test set-up photos:



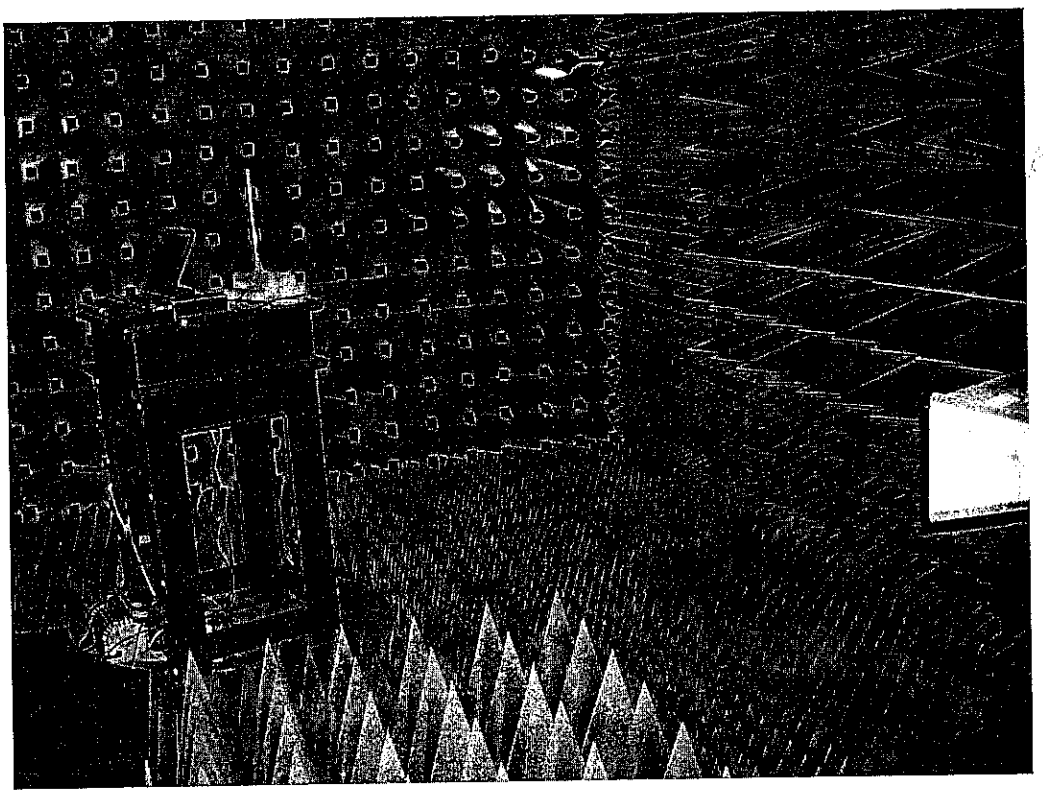
Test site: Radio anechoic shielded chamber (1 – 10 GHz)

In the Radio 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.

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 with peak and average detectors were carried out.

The EUT was supplied by 120 V AC (60 Hz) during the stand by test.
Test set-up photo:

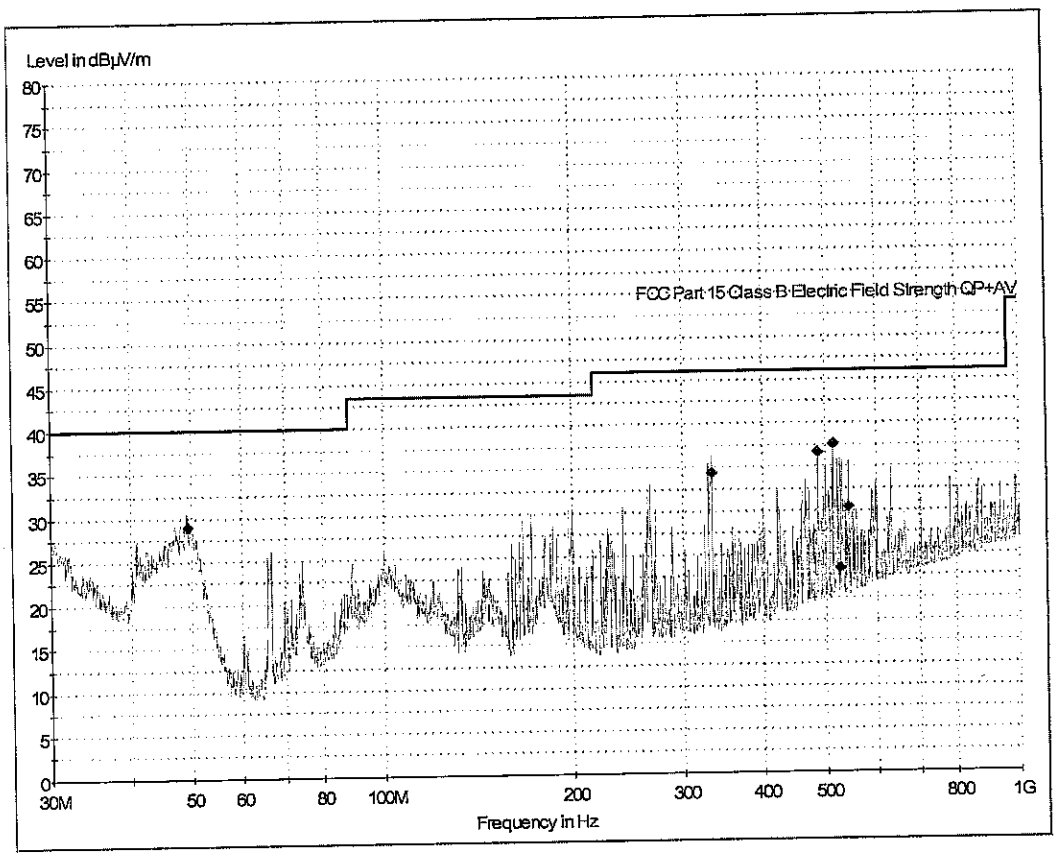


11.4 Test protocol

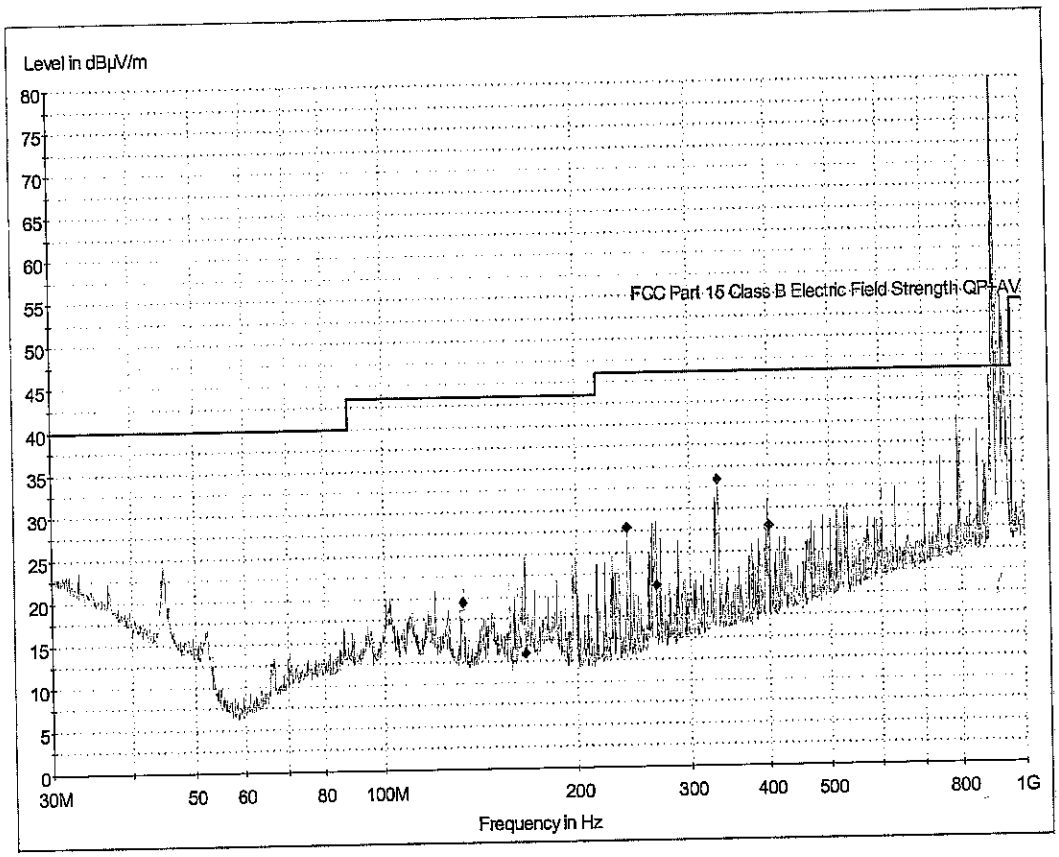
Semi-anechoic shielded chamber

Date of test: June 29, 2006

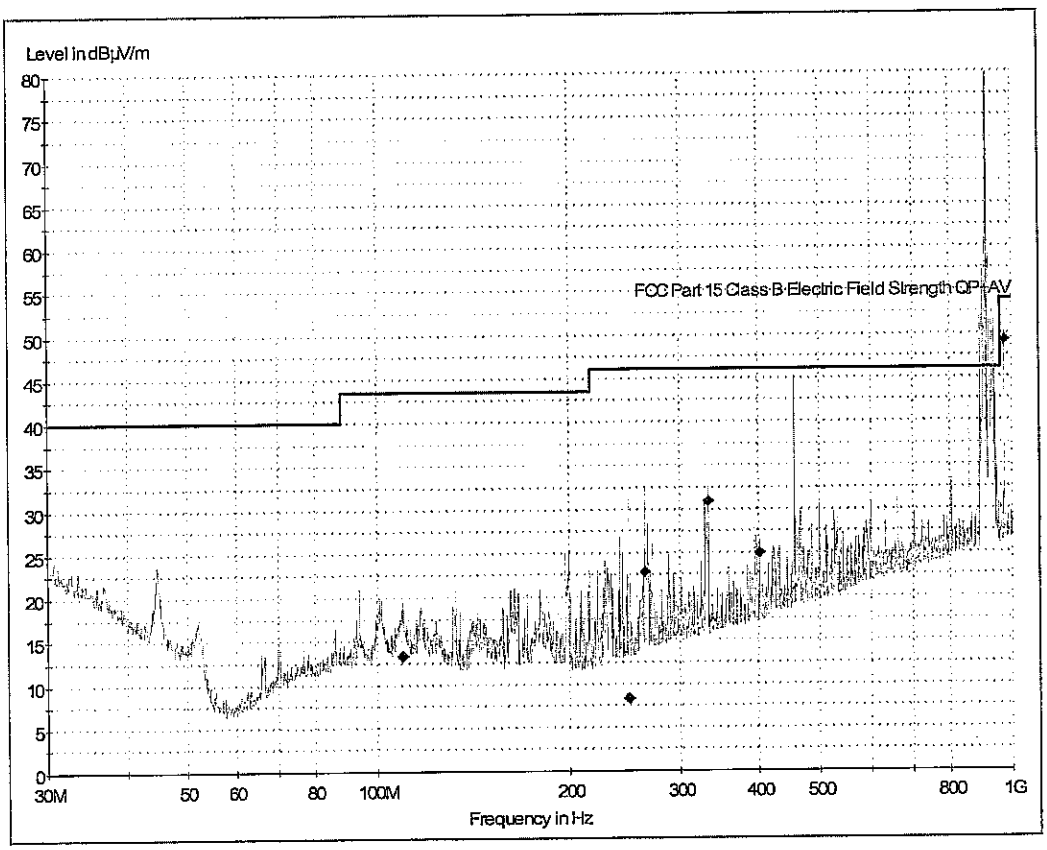
30 – 1000 MHz, max peak at a distance of 3 m in stand by mode/charging mode



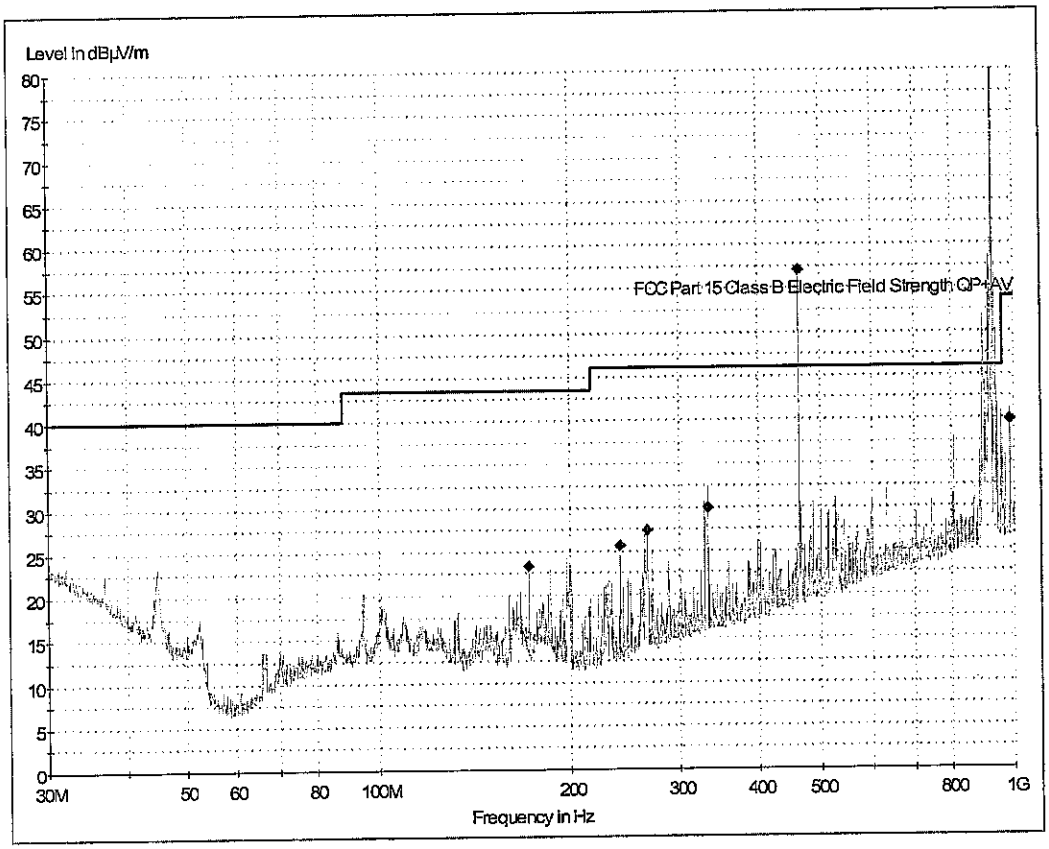
30 – 1000 MHz, max peak at a distance of 3 m on the lower TX channel
Carrier is attenuated by band rejection filter K&L 3TNF-800/1000-0.2-N/N
A 6 dB attenuator was used to avoid overload of the measurement receiver



30 – 1000 MHz, max peak at a distance of 3 m on the middle TX channel
Carrier is attenuated by band rejection filter K&L 3TNF-800/1000-0.2-N/N
A 6 dB attenuator was used to avoid overload of the measurement receiver



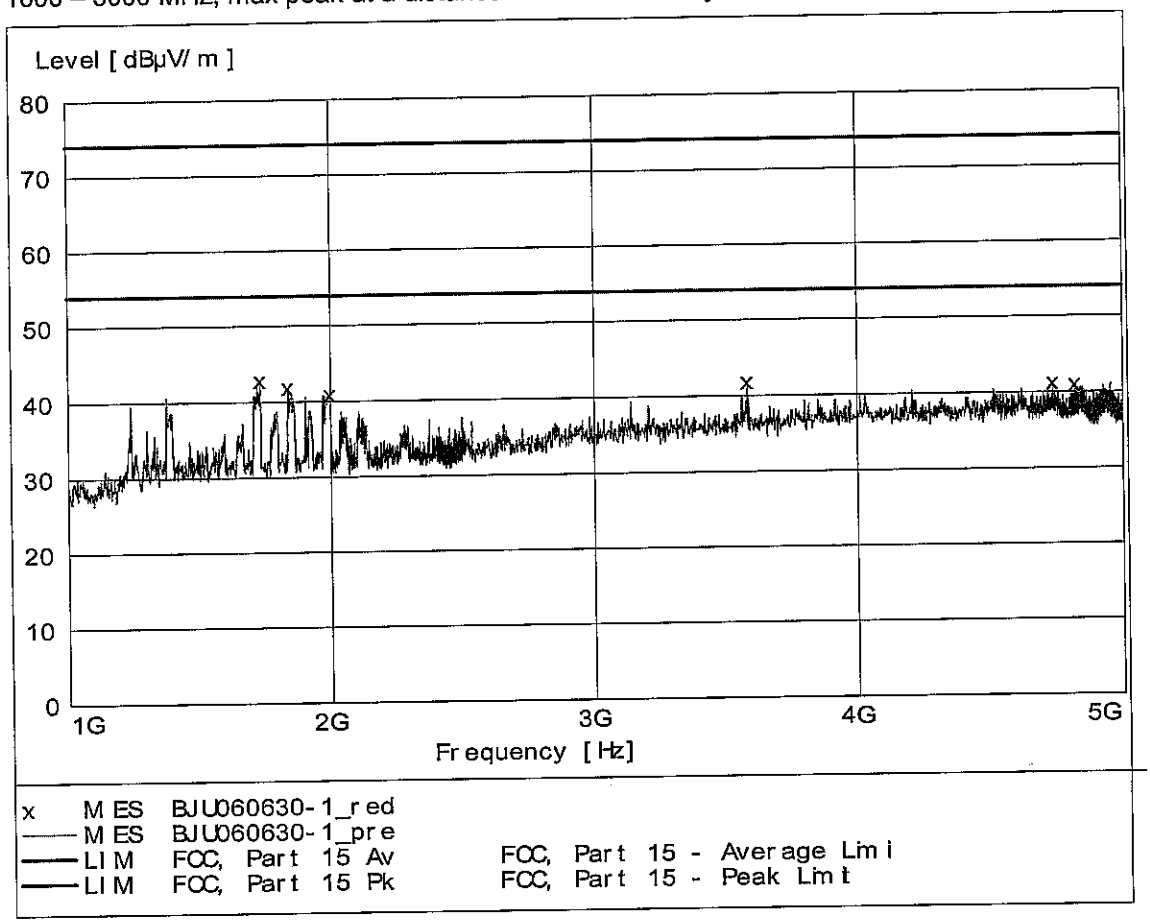
30 – 1000 MHz, max peak at a distance of 3 m on the upper TX channel
Carrier is attenuated by band rejection filter K&L 3TNF-800/1000-0.2-N/N
A 6 dB attenuator was used to avoid overload of the measurement receiver



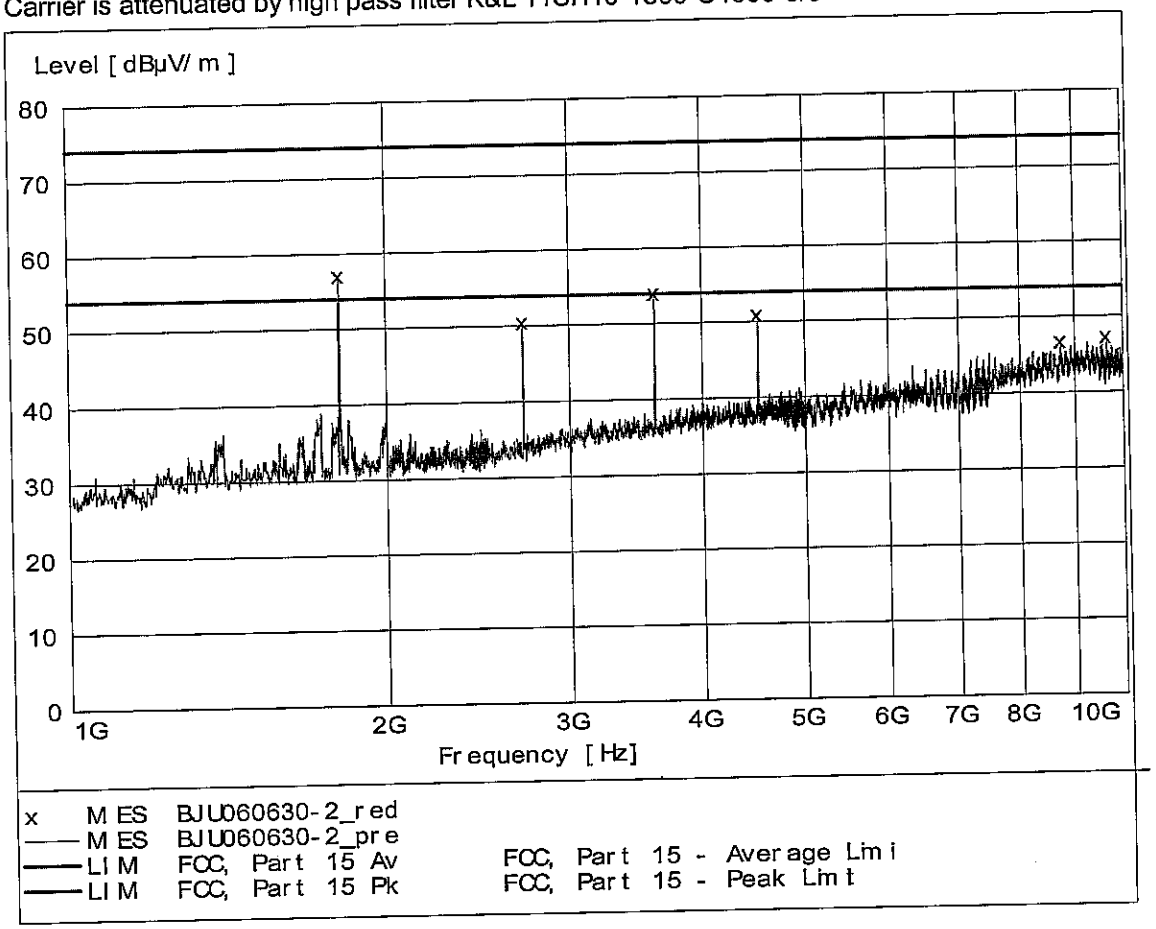
Radio anechoic shielded chamber

Date of test: June 30, 2006

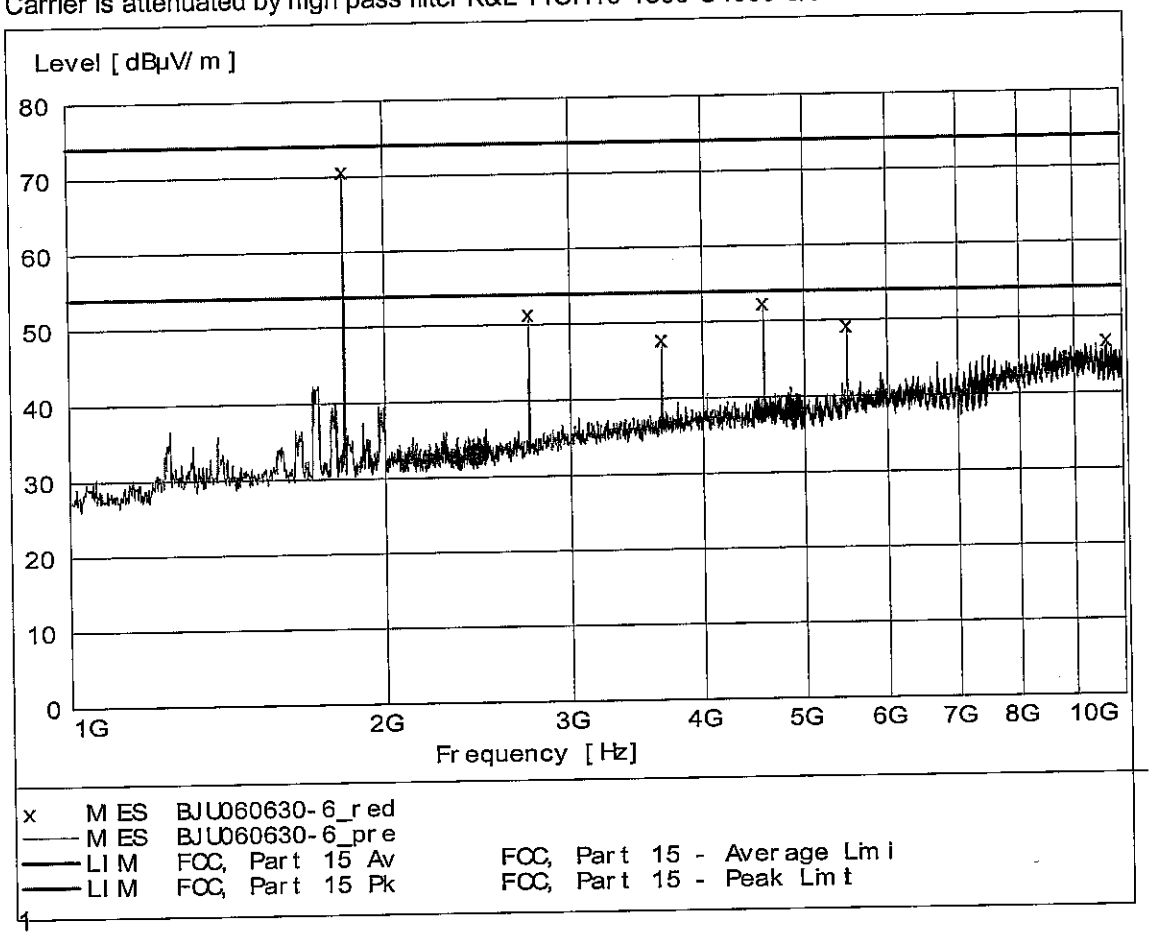
1000 – 5000 MHz, max peak at a distance of 3 m in stand by mode/charging mode



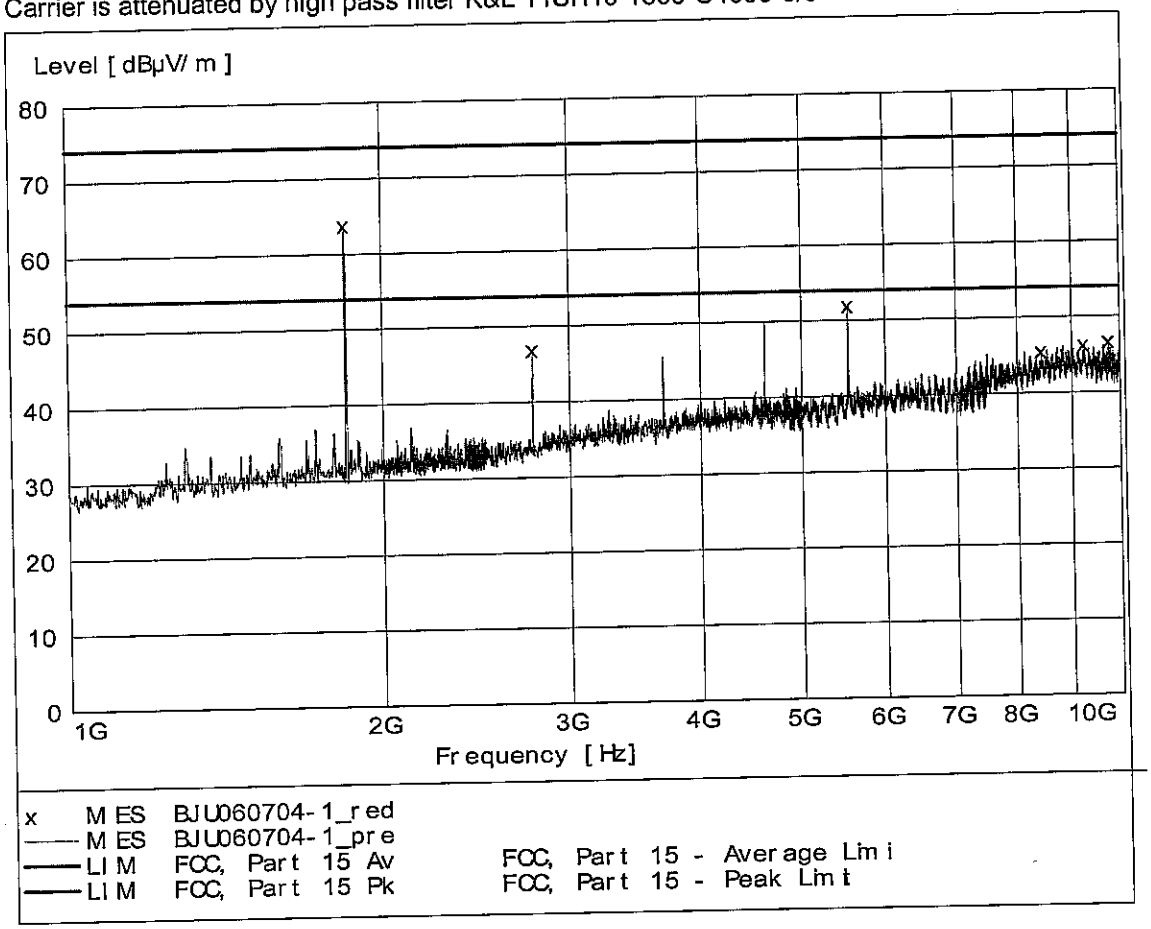
1000 – 10 000 MHz, max peak at a distance of 3 m on the low TX channel.
Carrier is attenuated by high pass filter K&L 11SH10-1300-U4000-0/0



1000 – 10 000 MHz, max peak at a distance of 3 m on the middle TX channel.
Carrier is attenuated by high pass filter K&L 11SH10-1300-U4000-0/0



000 – 10 000 MHz, max peak at a distance of 3 m on the upper TX channel.
Carrier is attenuated by high pass filter K&L 11SH10-1300-U4000-0/0



Data summary

Stand by mode

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)]	
49,2	120	--	28,9	--	40	
332,9	120	--	34,4	--	46	
486,8	120	--	36,7	--	46	
515,4	120	--	37,6	--	46	
544,1	120	--	30,3	--	46	
1240,5	1000	50,0	--	74	54	
1378,8	1000	44,0	--	74	54	
1733,5	1000	42,5	--	74	54	
1841,7	1000	46,2	--	74	54	
1998,0	1000	48,1	--	74	54	
3586,2	1000	47,1	--	74	54	

Low channel

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)]	
133,1	120	--	25,5	--	43,5	Restricted band
240,0	120	--	33,9	--	46	Restricted band
266,4	120	--	27,2	--	46	Restricted band
332,9	120	--	39,4	--	46	Restricted band
399,5	120	--	33,9	127	--	*20 dBc
1806,0	1000	65,1	--	127	--	*20 dBc
2708,9	1000	57,2	51,5	74	54	Restricted band
3612,2	1000	56,6	50,8	74	54	Restricted band
4515,0	1000	56,9	52,3	74	54	Restricted band
6320,1	1000	48,8	--	127	--	*20 dBc

* Output power measured with RBW 100 kHz, conducted, is 29,4 dBm = 127 dBuV/m @ 3 m

Mid channel

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)]	
262,9	120	--	28,8	--	46	Restricted band
332,9	120	--	36,8	--	46	Restricted band
401,1	120	--	31,0	--	46	Restricted band
973,1	120	--	38,4	--	46	Restricted band
1830,1	1000	79,9	--	127	--	*20 dBc
2745,0	1000	55,6	49,6	74	54	Restricted band
3660,0	1000	55,2	47,3	74	54	Restricted band
4575,1	1000	57,7	51,9	74	54	Restricted band
5490,2	1000	56,8	--	127	--	*20 dBc

* Output power measured with RBW 100 kHz, conducted, is 29,2 dBm = 127 dBuV/m @ 3 m

High channel

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)]	
172,0	120	--	29,3	--	43,5	Restricted band
240,0	120	--	31,6	--	46	Restricted band
266,2	120	--	33,3	--	46	Restricted band
332,9	120	--	35,9	--	46	Restricted band
463,5	120	--	63,1	126	--	*20 dBc
988,1	120	--	45,8	--	54	Restricted band
1845,6	1000	64,6	--	126	--	*20 dBc
2768,4	1000	52,1	--	74	54	Restricted band
3688,0	1000	44,0	--	74	54	Restricted band
4614,0	1000	53,2	--	74	54	Restricted band
5536,8	1000	54,7	--	126	--	*20 dBc
6459,6	1000	50,7	--	126	--	*20 dBc

* Output power measured with RBW 100 kHz, conducted, is 28,8 dBm = 126 dBuV/m @ 3 m

12. CONDUCTED SPURIOUS EMISSIONS AT ANTENNA PORT

12.1 Measurement uncertainty

Measurement uncertainty for conducted disturbances at the antenna port: ± 3,6 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 uncertainty is given with a level of confidence of approximately 95% (k=2).

12.2 Test protocol

Date of test: July 7, 2006

Low channel

Strength of conducted spurious emissions				
Frequency [MHz]	RBW [kHz]	Measured peak level [dBm]	Limit [dBm]	Note
0,009 – 30	100	< -8	9,4	Noise floor
30 – 100	100	< -8	9,4	Noise floor
100 – 902	100	< -8	9,4	Noise floor
928 – 2000	100	< -8	9,4	Noise floor
2000 – 5000	100	< -8	9,4	Noise floor
5000 – 10 000	100	< -8	9,4	Noise floor
6663	100	-2,0	9,4	
6993	100	-2,1	9,4	

Mid channel

Strength of conducted spurious emissions				
Frequency [MHz]	RBW [kHz]	Measured peak level [dBm]	Limit [dBm]	Note
0,009 – 30	100	< -8	9,2	Noise floor
30 – 100	100	< -8	9,2	Noise floor
100 – 902	100	< -8	9,2	Noise floor
928 – 2000	100	< -8	9,2	Noise floor
2000 – 5000	100	< -8	9,2	Noise floor
5000 – 10 000	100	< -8	9,2	Noise floor
6664	100	-2,1	9,2	
6983	100	-2,1	9,2	

High channel

Strength of conducted spurious emissions				
Frequency [MHz]	RBW [kHz]	Measured peak level [dBm]	Limit [dBm]	Note
0,009 – 30	100	< -8	8,8	Noise floor
30 – 100	100	< -8	8,8	Noise floor
100 – 902	100	< -8	8,8	Noise floor
928 – 2000	100	< -8	8,8	Noise floor
2000 – 5000	100	< -8	8,8	Noise floor
5000 – 10 000	100	< -8	8,8	Noise floor
6733	100	-2,1	8,8	
6984	100	-3,1	8,8	

Limit: In any 100 kHz bandwidth outside the operating frequency band (902 – 928 MHz), the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

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

13. CONDUCTED DISTURBANCE VOLTAGE IN THE FREQUENCY RANGE 0,15 - 30 MHZ

13.1 Measurement uncertainty

Conducted disturbance voltage, quasi-peak detection: ±2,0 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%.

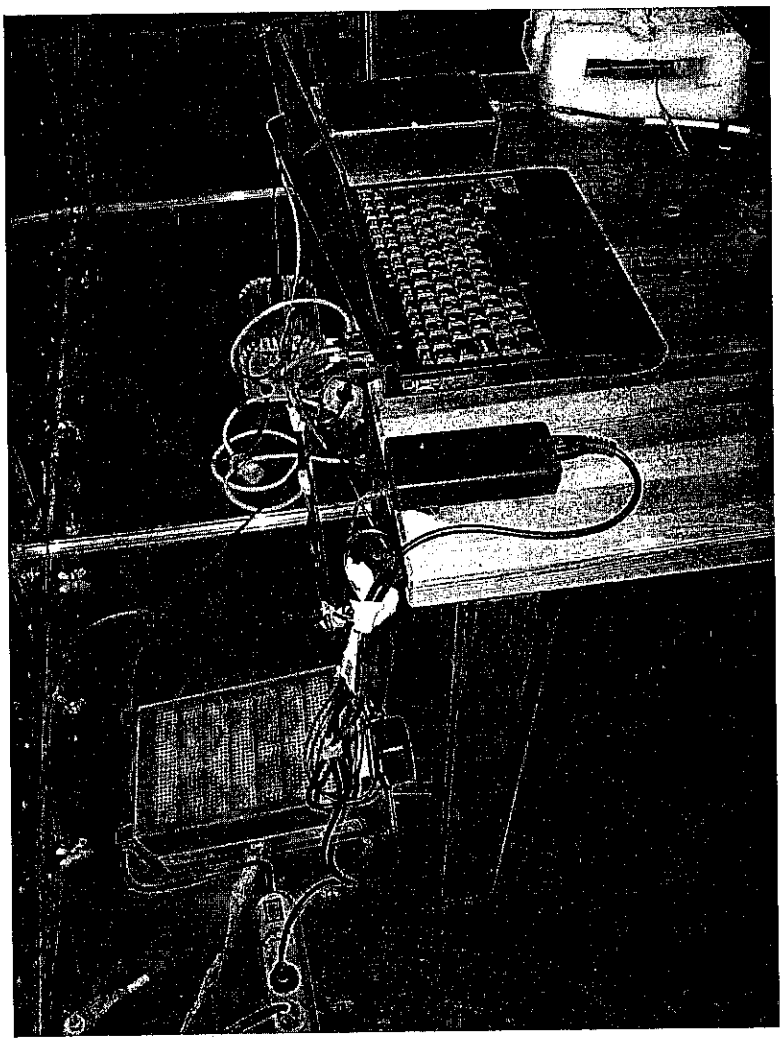
13.2 Test equipment

Test site:	FCC		
Equipment	Manufacturer	Type	SEMKO No.
Software:	Rohde & Schwarz	ES-K1 V1.60	
Measurement receiver:	Rohde & Schwarz	ESHS 30	4946
Artificial mains network:	Rohde & Schwarz	ESH3-Z5	2727
Transformer	Tufvassons	AFM-1500	30317

13.3 Measurement set-up

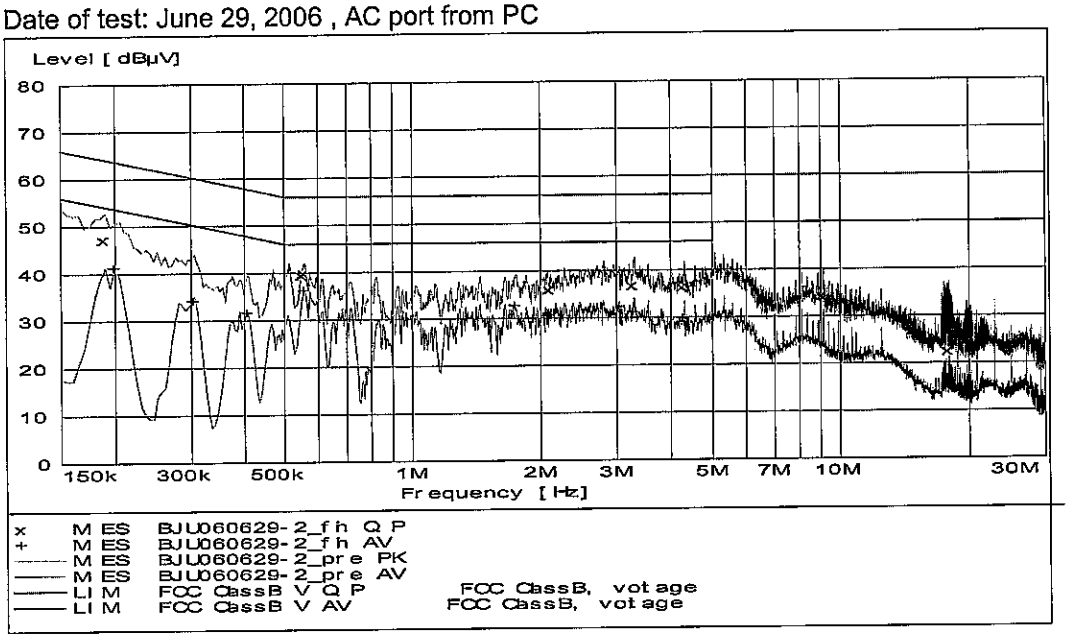
The mains terminal disturbance voltage was measured with the EUT located 0,8 m above the ground plane and 0,4 m from the vertical ground plane. The EUT was connected to an artificial mains network (AMN). The AMN was placed on the ground plane. Amplitude measurements were performed with a quasi-peak detector. The EUT was supplied by 120 VAC (60 Hz) during the standby test.

Test set-up photo:



13.4 Test protocol

Date of test: June 29, 2006 , AC port from PC

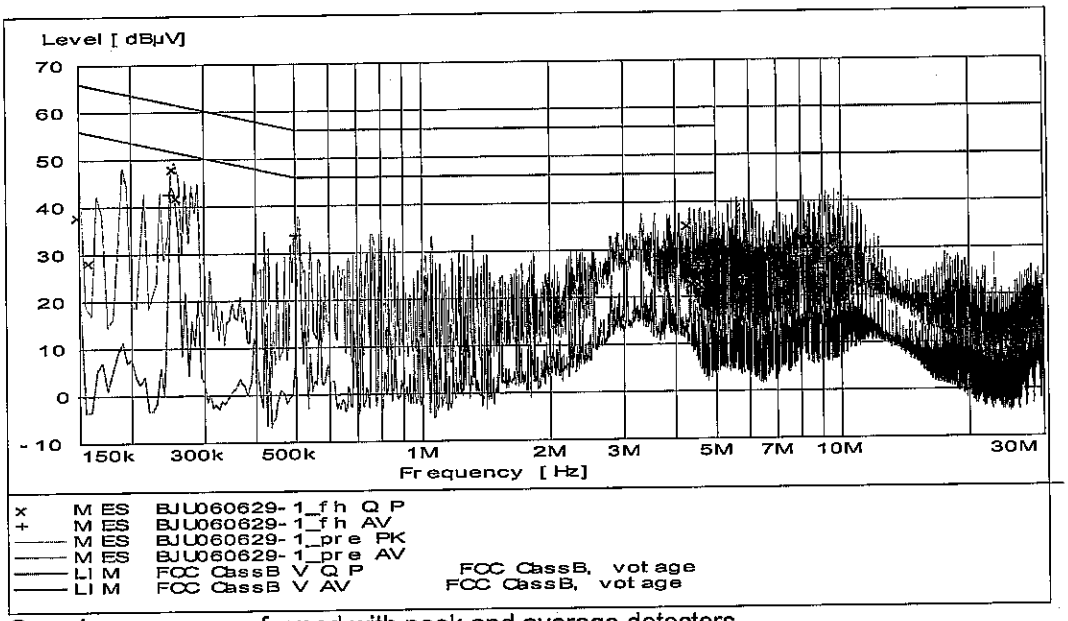


Overview sweeps performed with peak and average detectors

Frequency /MHz	Quasi-Peak Disturbance Level /dB(µV)	Permitted limit /dB(µV)
0,19	47,3	64
0,56	40,0	56
2,12	36,1	56
3,29	36,8	56
4,30	36,5	56
9,14	34,4	60
18,0	22,5	60

Frequency /MHz	Average Disturbance Level /dB(µV)	Permitted limit /dB(µV)
0,20	41,2	54
0,31	34,1	50
0,41	31,5	48
0,56	36,2	46
1,76	32,7	46
3,30	31,1	46
4,31	29,8	46

Date of test: June 29, 2006 , AC port from EUT (EGO Basestation)



Overview sweeps performed with peak and average detectors

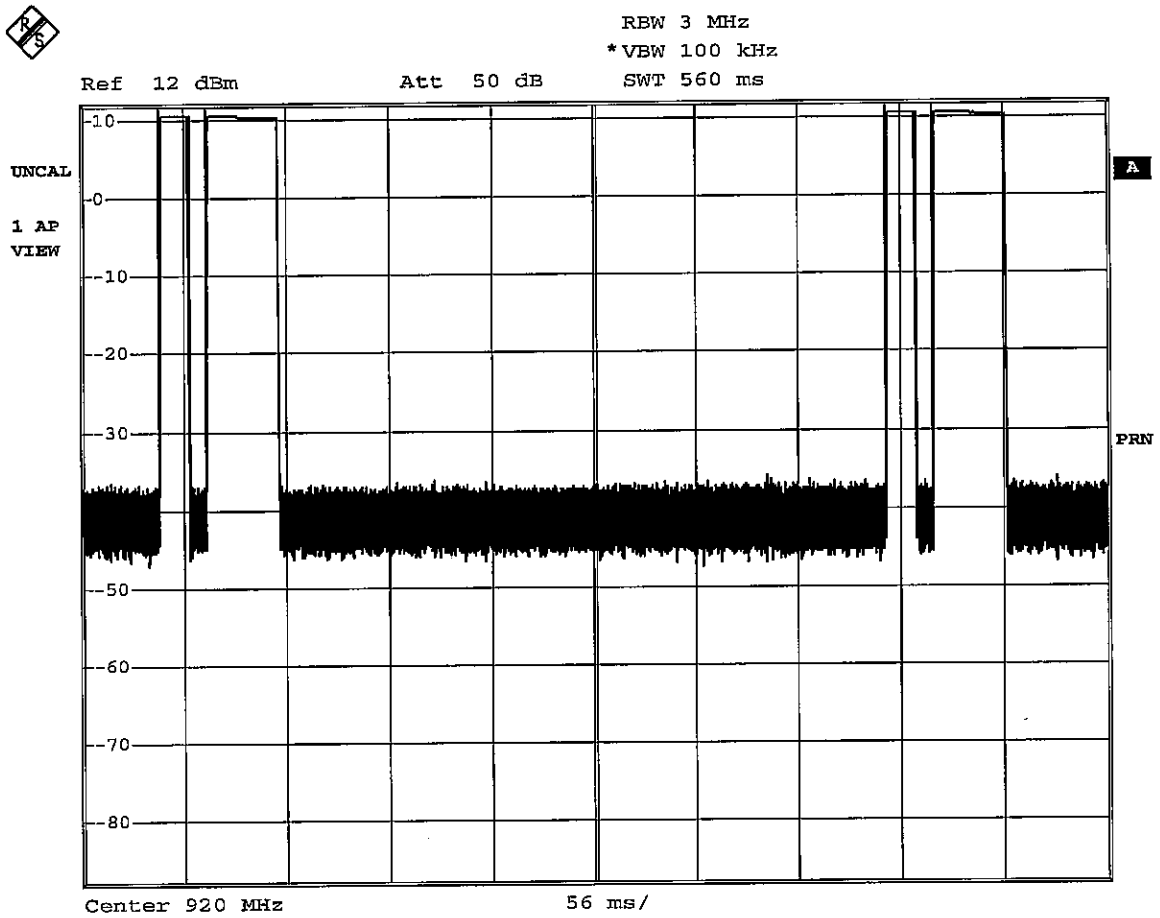
Frequency /MHz	Quasi-Peak Disturbance Level /dB(µV)	Permitted limit /dB(µV)
0,15	38,0	66
0,16	28,3	66
0,26	48,1	61
4,32	35,2	56
4,43	22,9	56
4,60	22,7	56
9,63	29,7	60

Frequency /MHz	Average Disturbance Level /dB(µV)	Permitted limit /dB(µV)
0,25	42,6	52
0,51	33,8	50
4,58	26,4	50
5,84	23,4	50
7,86	28,2	50
8,37	29,2	50
8,87	25,6	50

14. DUTY CYCLE

Date of test: September 8, 2006

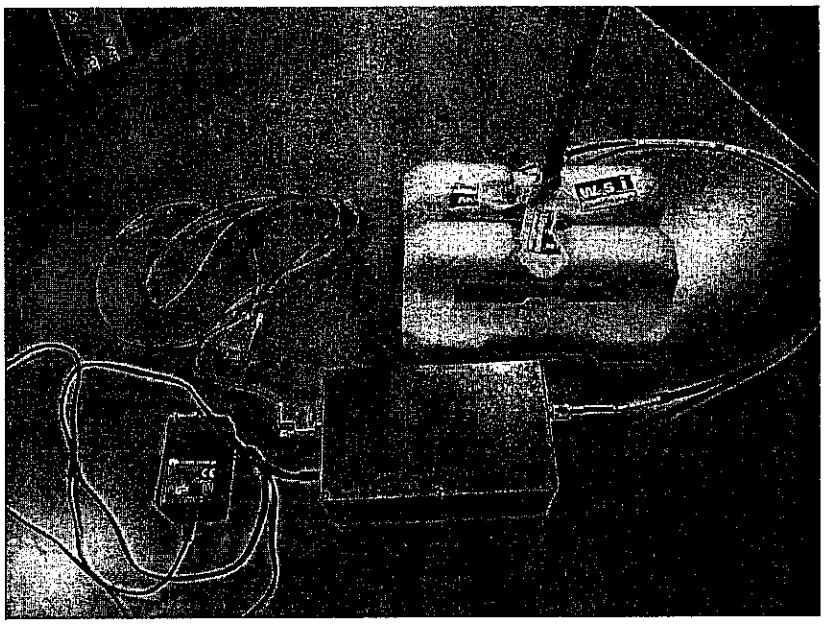
EUT mode of operation: Transmitting mode
Duty cycle is approx 14-15%

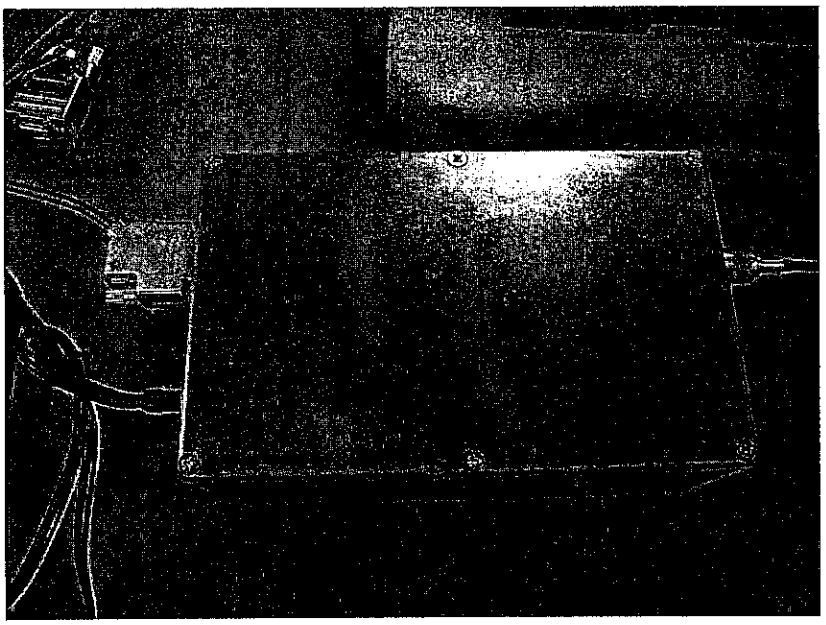


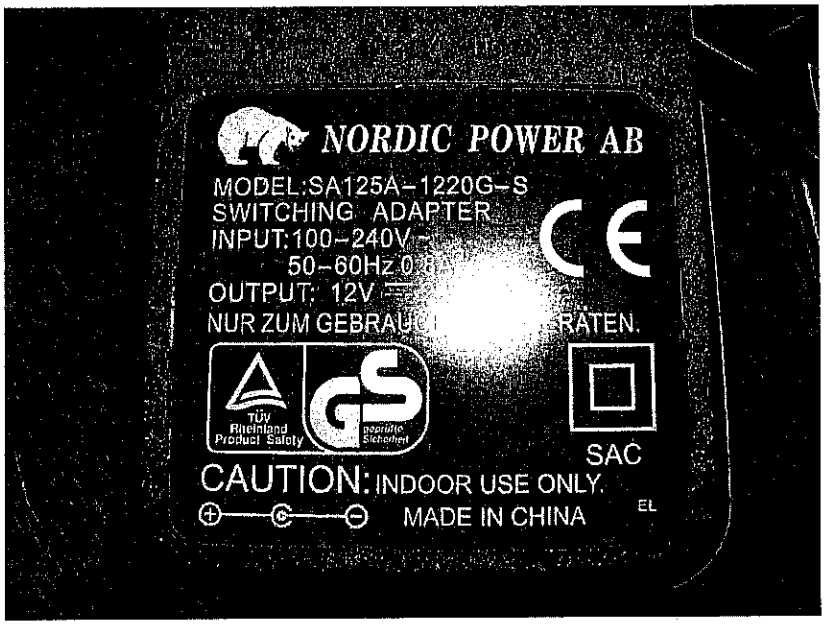
Date: 8.SEP.2006 15:02:17

APPENDIX I – PHOTOS OF THE EUT

General view






NORDIC POWER AB
MODEL:SA125A-1220G-S
SWITCHING ADAPTER
INPUT:100-240V
50-60Hz
OUTPUT: 12V
NUR ZUM GEBRAU
RATEN.
TÜV Rheinland Product Safety
SAC
CAUTION: INDOOR USE ONLY.
MADE IN CHINA
EL