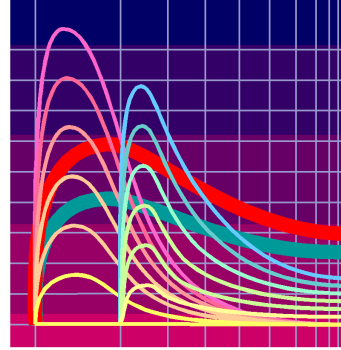




Königswinkel 10
32825 Blomberg
Germany
Phone +49 5235 9500-0
Fax +49 5235 9500-10

TEST REPORT

Test Report Reference: R20382 Edition 3

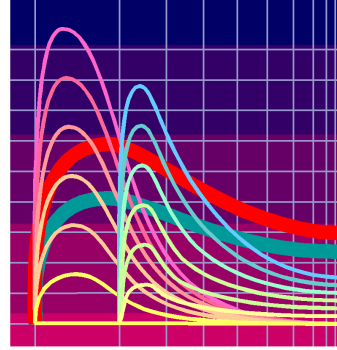
Equipment under Test: OISL 77LA04/2 - SER

Serial Number: BI 0211 / 0081

Applicant: Baumer Ident GmbH

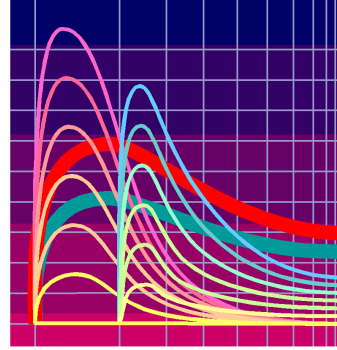
Manufacturer: Baumer Ident GmbH

**Test Laboratory
(CAB)
accredited by
DATech e.V.
in compliance with DIN EN 45001
under the
Reg. No. TTI-P-G071/94-00
and listed by
FCC 31040/SIT1300F2**



TEST REPORT REFERENCE: R20382 Edition 3

Contents:	Page
1 IDENTIFICATION	3
1.1 APPLICANT	3
1.2 MANUFACTURER.....	3
1.3 DATES.....	3
1.4 TEST LABORATORY	4
1.5 RESERVATION	4
1.6 METHOD OF MEASUREMENT	4
1.7 TEST RESULTS	4
2 TECHNICAL DATA OF EQUIPMENT	5
2.1 DEVICE UNDER TEST	5
2.2 PERIPHERY DEVICES	5
3 OPERATIONAL STATES AND PHYSICAL BOUNDARIES	6
4 LIST OF TEST MODULES	7
4.1 EMISSION	7
5 TEST RESULTS EMISSION TEST	8
5.1 PRELIMINARY RADIATED EMISSION TEST (9 kHz to 30 MHz)	8
5.2 PRELIMINARY RADIATED EMISSION TEST (30 MHz to 1 GHz)	11
5.3 SUBSEQUENT RADIATED EMISSION TEST (9 kHz to 30 MHz).....	13
5.4 SUBSEQUENT RADIATED EMISSION TEST (30 MHz to 1 GHz).....	15
6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS.....	18
7 LIST OF ANNEXES	22



1 IDENTIFICATION

1.1 APPLICANT

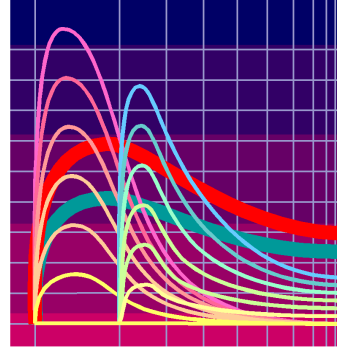
Name:	Baumer Ident GmbH
Address:	Hertzstraße 10 69469 Weinheim
Country:	Germany
Name for contact purposes:	Mr. Günther Meuthen
Phone:	+ 49 62 01 99 57-20
Fax:	+ 49 62 01 99 57-99
Mail address:	gmeuthen@baumerident.com
Applicant represented during the test by the following person:	Mr. Günther Meuthen

1.2 MANUFACTURER

Name:	Baumer Ident GmbH
Address:	Hertzstraße 10 69469 Weinheim
Country:	Germany
Name for contact purposes:	Mr. Günther Meuthen
Phone:	+ 49 62 01 99 57-20
Fax:	+ 49 62 01 99 57-99
Mail address:	gmeuthen@baumerident.com
Manufacturer represented during the test by the following person:	Mr. Günther Meuthen

1.3 DATES

Date of receipt of test sample:	07 June 2002
Start of test:	14 June 2002
End of test:	14 June 2002



TEST REPORT REFERENCE: R20382 Edition 3

1.4 TEST LABORATORY

The tests were carried out at:

PHOENIX TEST-LAB GmbH
Königswinkel 10
D-32825 Blomberg
Germany

Phone: +49 (0) 52 35 / 95 00-0
Fax: +49 (0) 52 35 / 95 00-10

Test engineer:

Thomas KÜHN

Name

26 June 2002

Test report checked by:

Bernd STEINER

Name

12 July 2002

Phoenix TEST-LAB GmbH
Königswinkel 10
32825 Blomberg
Tel. 0 52 35 / 95 00-0
Fax 0 52 35 / 95 00-10

Stamp

1.5 RESERVATION

This test report is only valid in its original form.

Any reproduction of its contents without written permission of the accredited test laboratory PHOENIX TEST-LAB GmbH is prohibited.

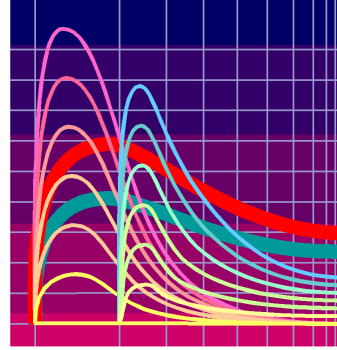
The test results herein refer only to the tested sample. PHOENIX TEST-LAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the PHOENIX TEST-LAB Logo and the TEST REPORT REFERENCE.

1.6 METHOD OF MEASUREMENT

Method of measurement according to **ANSI C 63.4 (1992)**.

1.7 TEST RESULTS

The requirements of this test document are fulfilled by the equipment under test. The complete test results are presented in the following.



2 TECHNICAL DATA OF EQUIPMENT

2.1 DEVICE UNDER TEST

Type of equipment:	Short range inductive identification system
Type designation:	OISL 77LA04/02 – SER
Serial No.:	BI 0211 / 0081
Antenna type:	OIS-L 77LS03 (two pieces)

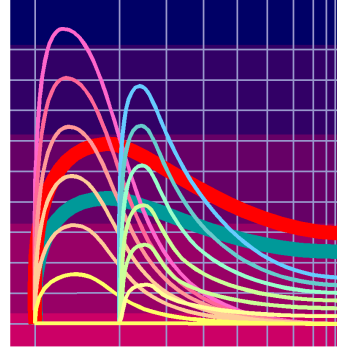
The following external I/O cables were used:

Cable	Length	Shielding	Connector
ANT.1	5.0 m	Yes	3 pin connector
ANT.2	5.0 m	Yes	3 pin connector
HOST	2.0 m	Yes	D-Sub
24VDC / Terminal / IO	2.0 m	Yes	D-Sub
Ground	2.0 m	No	Screw

2.2 PERIPHERY DEVICES

The following equipment was used as control unit and ancillary equipment:

- 1 Personal computer with test software.



3 OPERATIONAL STATES AND PHYSICAL BOUNDARIES

For all measurements the OISL 77LA04/2 - SER was tested in normal operation mode (READ-Mode in presence of TAG).

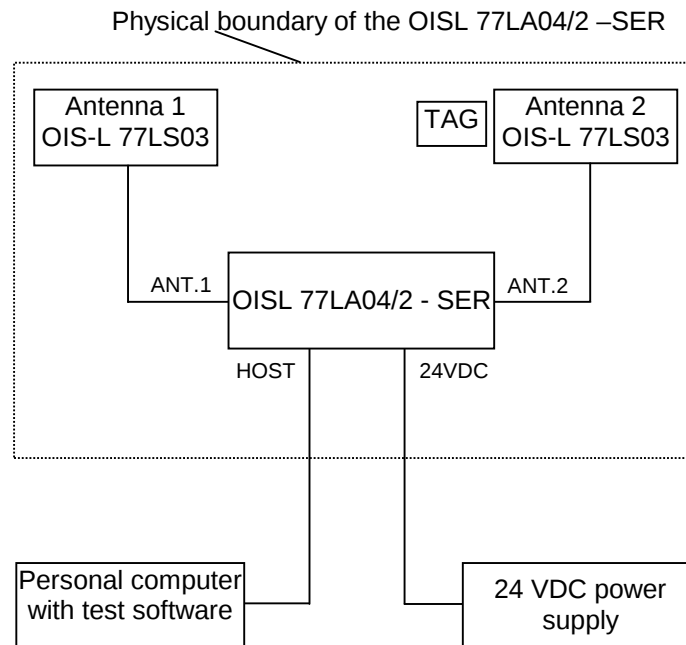
During the test the OIS-L 77LA04/4-DP was monitored by a computer, which showed the TAG ID continuously.

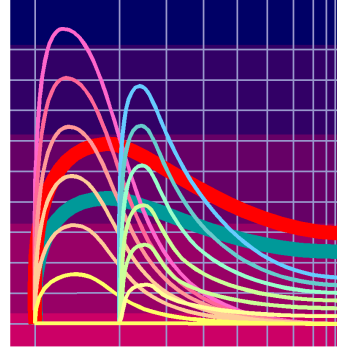
The monitoring computer and the software were provided by the applicant.

During all tests the EUT was supplied with 24 V DC $\pm 15\%$.

For the whole frequency range a preliminary measurement in a fully anechoic chamber with a measuring distance of 3 m was carried out to determine the frequencies, which were radiated by the EUT. The final measurements on the detected frequencies were carried out on an outdoor test site without ground plane (for the frequency range 9 kHz to 30 MHz) and on an open area test site with ground plane (for the frequency range 30 MHz to 1 GHz).

The physical boundaries of the Equipment Under Test are shown below.

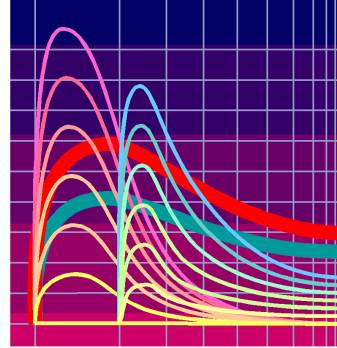




4 LIST OF TEST MODULES

4.1 EMISSION

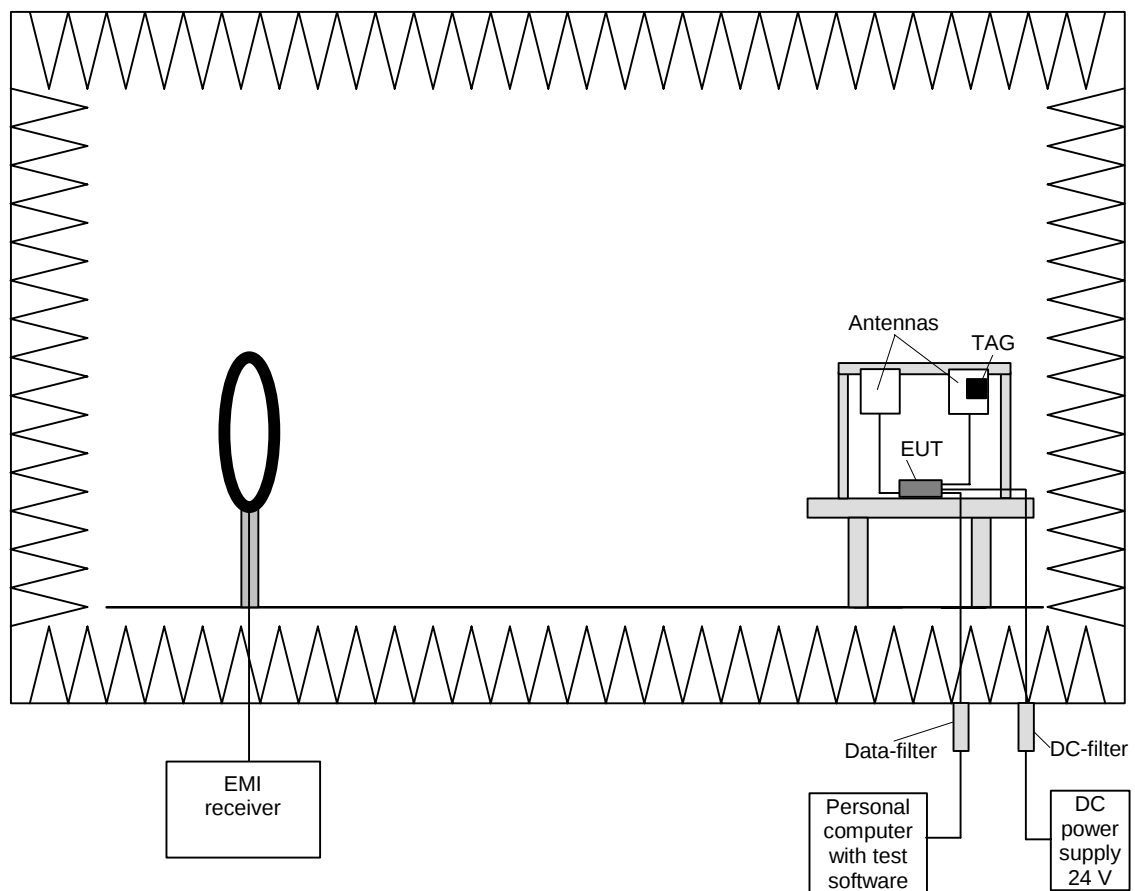
Radiated emissions 15.109, Class B						
No.	Application	Frequency range, 15.33	Limits (quasi peak)	Reference standard	Remark	Status
1	Unintentional radiator	30 to 88 MHz 88 to 216 MHz 216 to 960 MHz 960 to 1000 MHz	40.0 dB μ V/m at 3 m 43.5 dB μ V/m at 3 m 46.0 dB μ V/m at 3 m 53.9 dB μ V/m at 3 m	ANSI C 63.4 (1992);	All necessary cables were connected	Passed
Radiated emissions 15.209						
No.	Application	Frequency range	Limits (microvolts/meter)	Reference standard	Remark	Status
2	Intentional radiator	0.009 to 0.49 MHz 0.490 to 1.705 MHz 1.705 to 30.0 MHz	2400/f(kHz) at 300 m 24000/f(kHz) at 30 m 30 at 30 m	ANSI C 63.4 (1992);	All necessary cables were connected	Passed



5 TEST RESULTS EMISSION TEST

5.1 PRELIMINARY RADIATED EMISSION TEST (9 kHz to 30 MHz)

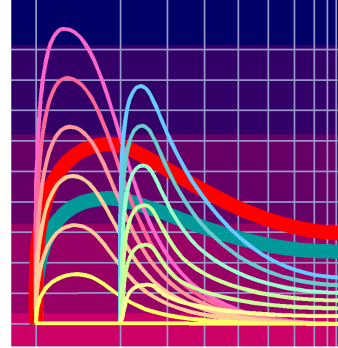
Test set-up: According to ANSI C 63.4 (1992).
The following diagram shows the test set-up schematically.
The receiving antenna was mounted at 1.0 m above the floor.



Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

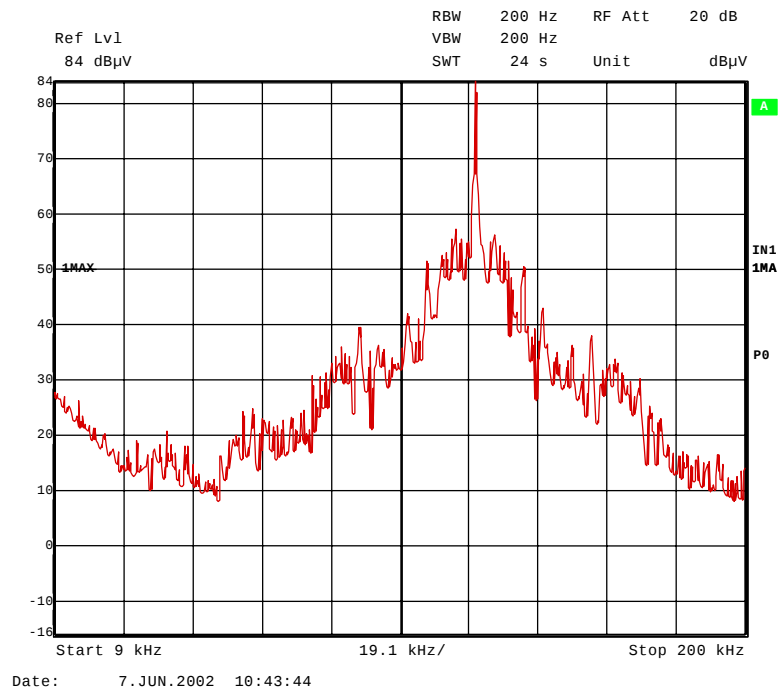
Cable guide: All cables of the EUT were fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test record: The test was carried out in normal operation mode of the EUT (reading TAG). All results are shown in the following.

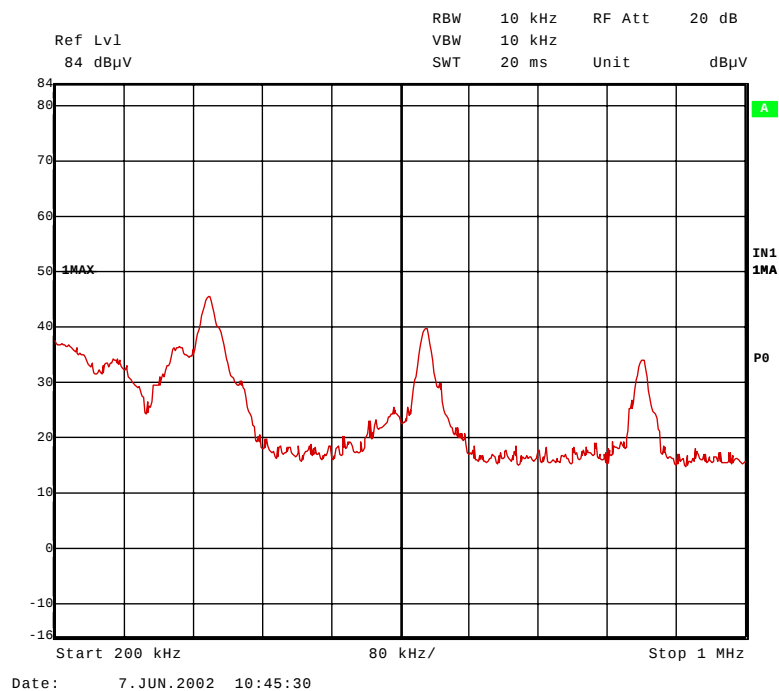


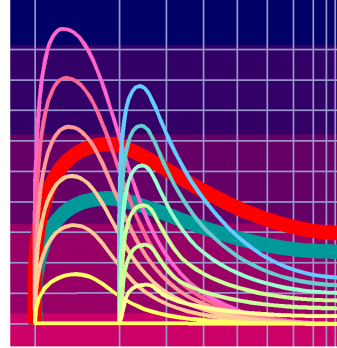
TEST REPORT REFERENCE: R20382 Edition 3

20382_2.wmf (9 kHz to 200 kHz):



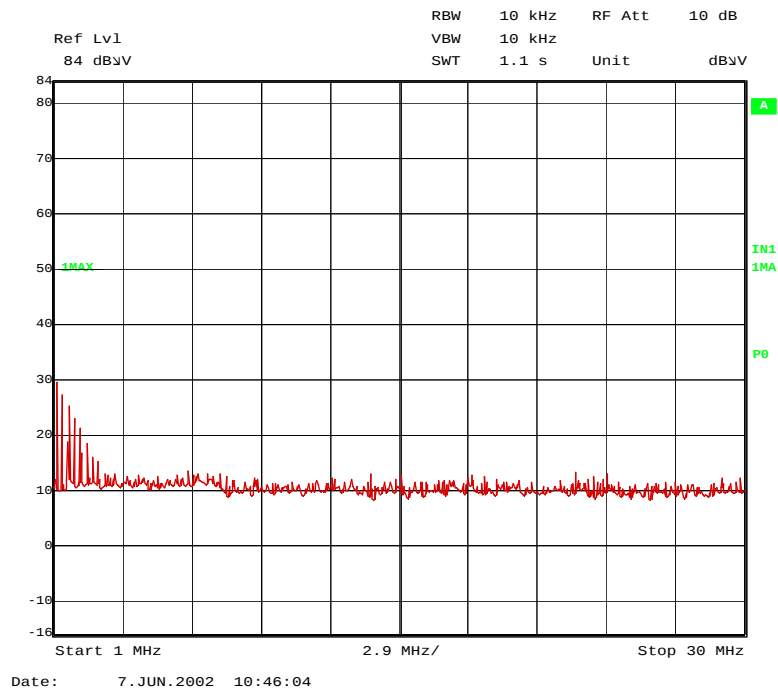
20382_3.wmf (200 kHz to 1 MHz):





TEST REPORT REFERENCE: R20382 Edition 3

20382_4.wmf (1 MHz to 30 MHz):



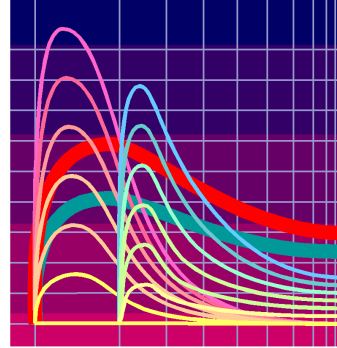
The following significant frequencies were found during the preliminary radiated emission test:

- 93.501 kHz;
- 125.421 kHz;
- 157.360 kHz;
- 376.449 kHz;
- 627.848 kHz;
- 876.848 kHz;
- 1.129 MHz;
- 1.881 MHz;
- 2.634 MHz.

These frequencies have to be measured on the outdoor test site. The results of this subsequent measurement are shown in subclause 5.3 of this TEST REPORT.

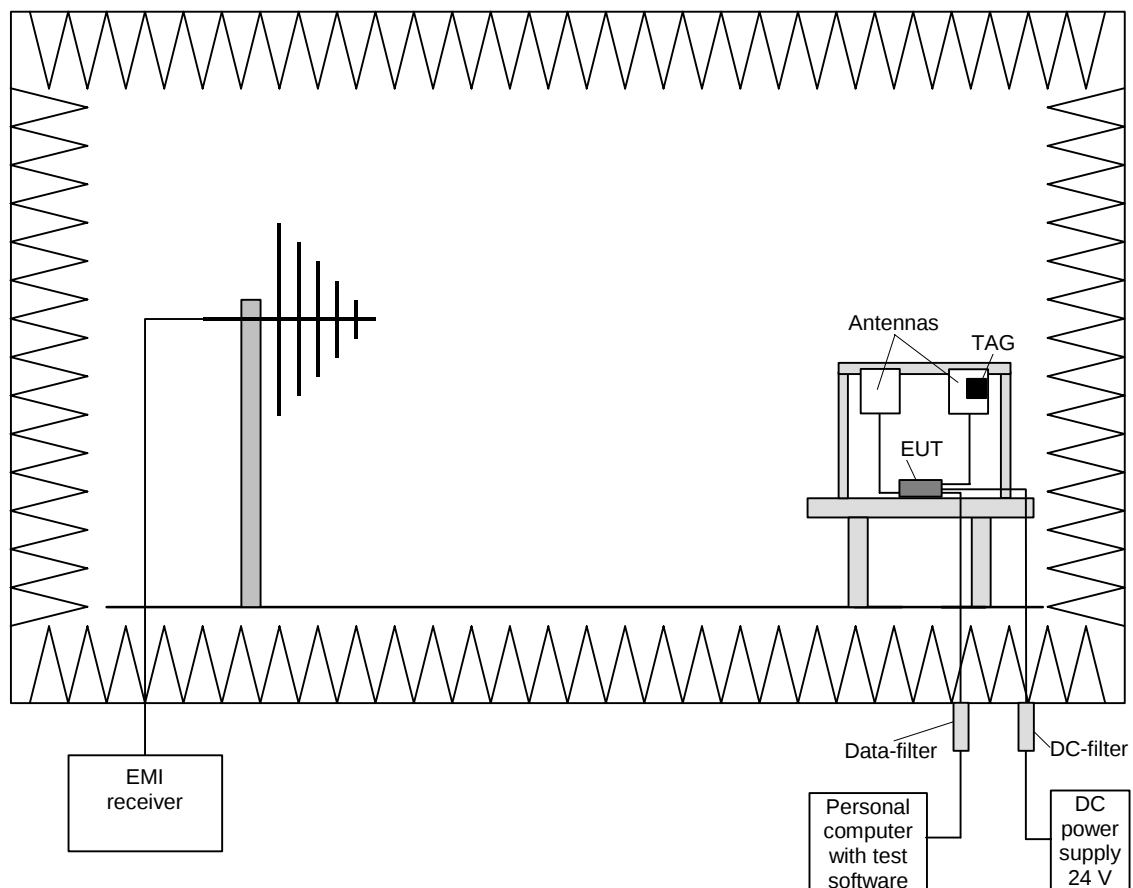
TEST EQUIPMENT USED THE TEST:

29, 31 - 33, 41, 42



5.2 PRELIMINARY RADIATED EMISSION TEST (30 MHz to 1 GHz)

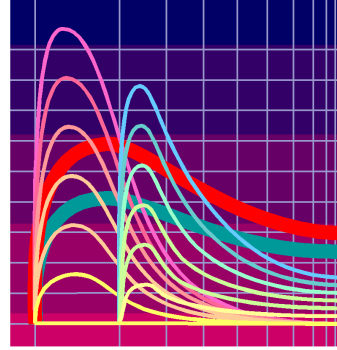
Test set-up: According to ANSI C 63.4 (1992).
The following diagram shows the test set-up schematically.
The receiving antenna was mounted at 1.5 m above the floor.



Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

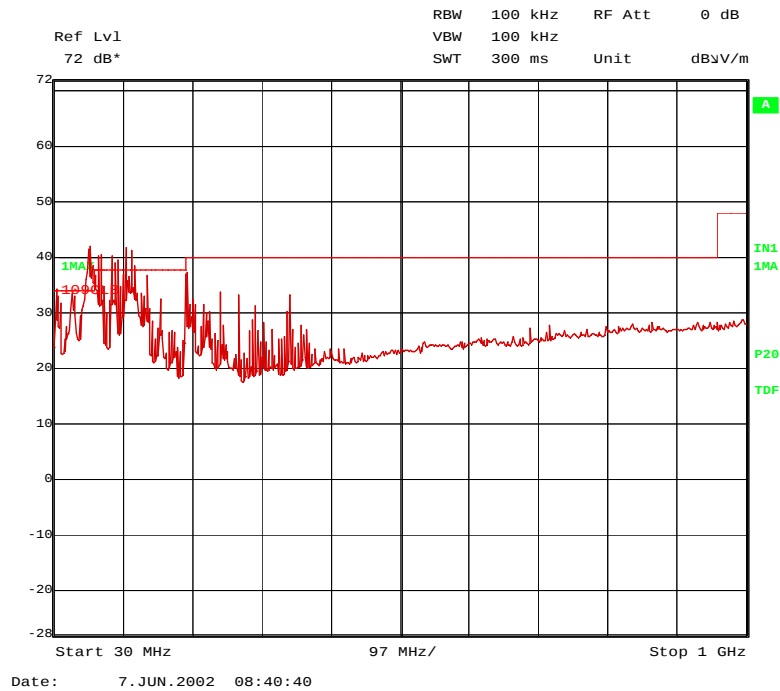
Cable guide: All cables of the EUT were fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test record: The test was carried out in normal operation mode of the EUT (reading TAG). All results are shown in the following.



TEST REPORT REFERENCE: R20382 Edition 3

20382_1.wmf (30 MHz to 1 GHz):



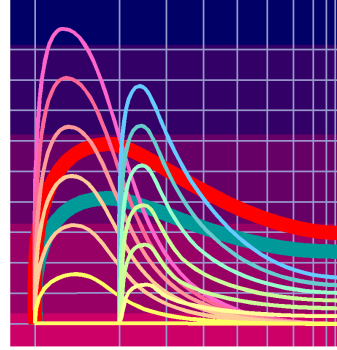
The following significant frequencies were found during the preliminary radiated emission test:

- 40.030 MHz;
- 60.050MHz;
- 79.990 MHz;
- 84.018 MHz;
- 96.002 MHz;
- 100.010 MHz;
- 111.994 MHz;
- 119.990 MHz;
- 139.990 MHz;
- 159.990 MHz;
- 215.981 MHz;
- 288.006 MHz.

These frequencies have to be measured on the open area test site. The results of this subsequent measurement are shown in subclause 5.4 of this TEST REPORT.

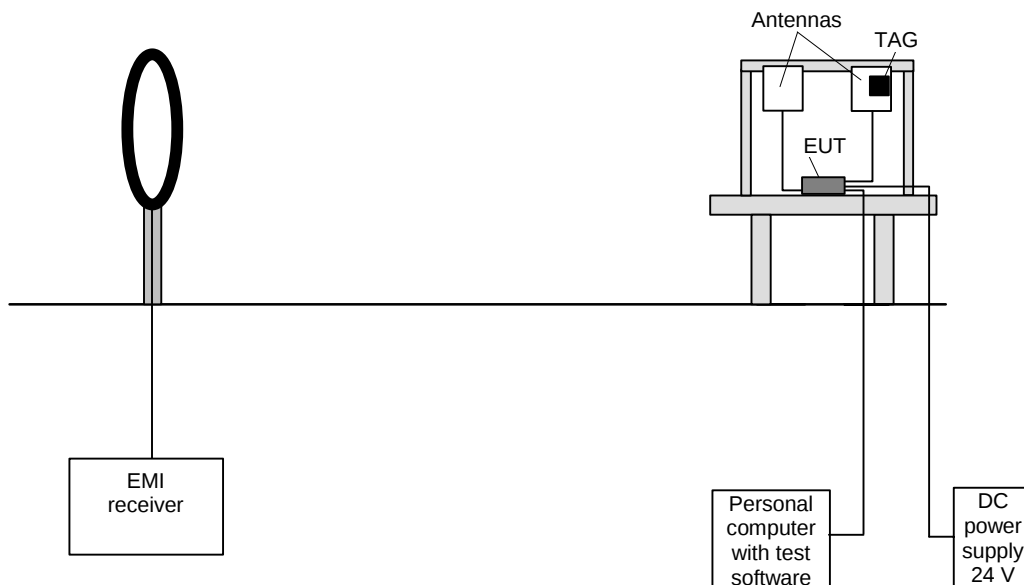
TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 35, 37, 42



5.3 SUBSEQUENT RADIATED EMISSION TEST (9 kHz to 30 MHz)

Test set-up: According to ANSI C 63.4 (1992).
The following diagram shows the test set-up schematically. The receiving antenna mounted in a height of 1.0 m above the floor.



Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

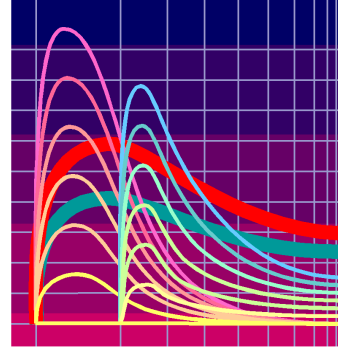
Cable guide: All cables of the EUT were fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test results: The test results were calculated with the following formula:
$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{antenna factor [dB/m]}$$

Limits: To calculate the limits according to the used measuring distances, the 40 dB/decade extrapolation method was used.

Supply voltage: For measuring the amplitude of the fundamental frequency (125 kHz) the supply voltage was varied for +/- 15 % (20.4 to 27.6 V DC). There was no changing of the amplitude for these supply voltages measurable.

Test record: The test was carried out in normal operation mode of the EUT (reading TAG). All results are shown in the following.



TEST REPORT REFERENCE: R20382 Edition 3

Results for measuring distance 3 m:

Frequency MHz	Result dB μ V/m	Limit ** dB μ V/m	Margin dB	Detector	Readings dB μ V	Antenna factor * dB/m
0.0935	42.0	108.2	66.2	QP	22	20.0
0.1254	91.0	105.7	14.7	AV	71	20.0
0.1573	43.2	103.7	60.5	AV	23.2	20.0
0.3764	56.4	96.1	39.7	AV	36.4	20.0
0.6278	54.0	78.2	24.2	QP	34.0	20.0
0.8768	42.3	67.4	25.1	QP	22.3	20.0
1.129	44.0	67.6	23.6	QP	24.0	20.0
1.881	37.8	70	32.2	QP	17.8	20.0
2.634	29.3	70	40.7	QP	9.3	20.0

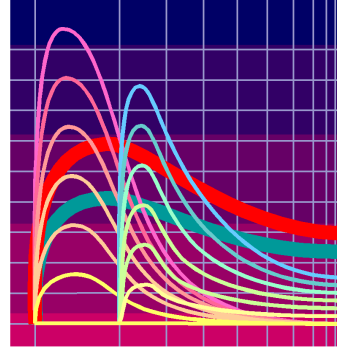
*: Cable loss included

** : To calculate the limits according to the used measuring distances, the 40 dB/decade extrapolation method was used.

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

40 -43

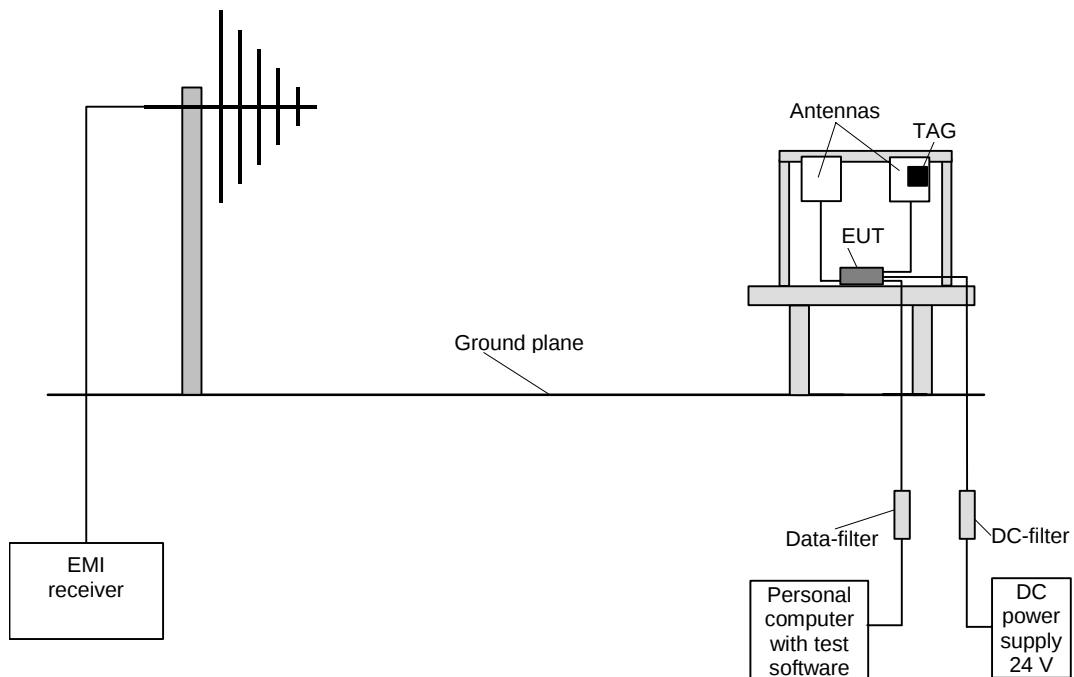


5.4 SUBSEQUENT RADIATED EMISSION TEST (30 MHz to 1 GHz)

Test set-up:

According to ANSI C 63.4 (1992).

The following diagram shows the test set-up schematically. The receiving antenna was varied in the height between 1 m to 4 m above the ground plane.



Position of EUT:

The EUT was set-up on a wooden table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide:

All cables of the EUT were fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.

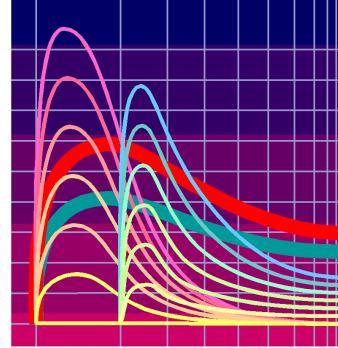
Test results:

The test results were calculated with the following formula:

$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{antenna factor [dB/m]}$$

Test record:

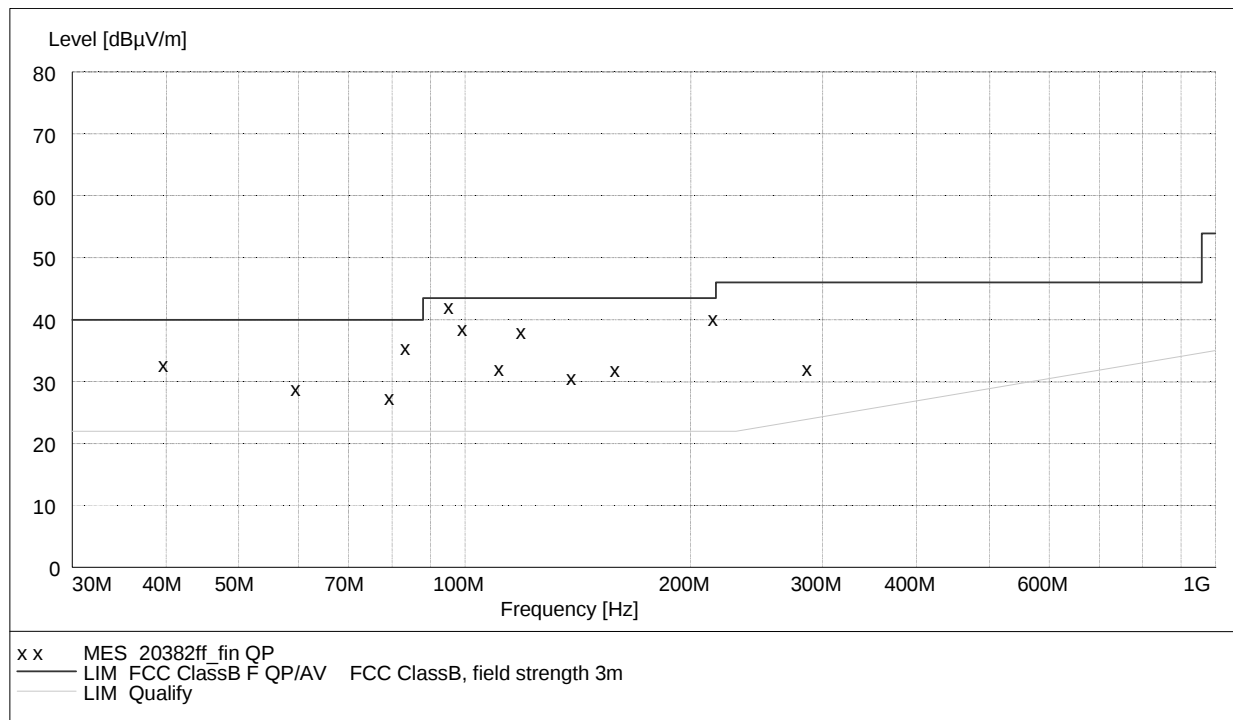
The test was carried out in normal operation mode of the EUT (reading TAG). All results are shown in the following.



TEST REPORT REFERENCE: R20382 Edition 3

Title: final measurement on 3m open area test site
according to CFR47 Part 15.109
EUT: OISL 77LA04/02-SER
Manufacturer: Baumer Ident GmbH
Operating Condition: Reading TAG
Test site: PHOENIX TEST-LAB BLOMBERG; open area test site M6
Operator: Th. KÜHN
Test Specification:

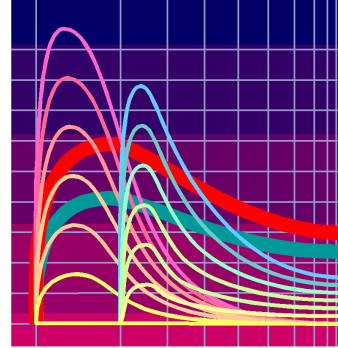
The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above-mentioned standard. The measured points marked with x are the measured results of the standard subsequent measurement on the open area test site.



Data record name: 20382ff of 25.06.02

The results of the standard subsequent measurement on the open area test site are indicated in the table below. The limits as well as the measured results (levels) refer to the above-mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

The measurement time with the quasi-peak measuring detector is 1 second.



TEST REPORT REFERENCE: R20382 Edition 3

Result measured with the quasi-peak detector:

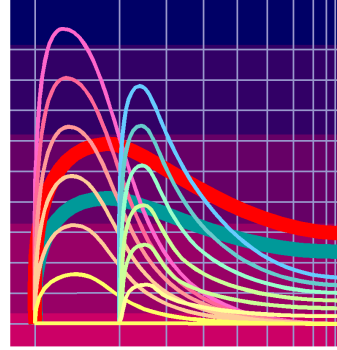
(These values are marked in the above diagram by x)

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Readings dBμV	Antenna factor 1/m	Cable loss dB	Height cm	Azimuth deg	Pol.
40.030	33.0	40.0	7.0	17.7	14.6	0.7	100.0	176.0	VERT
60.050	29.1	40.0	10.9	21.9	6.3	0.9	125.0	22.0	VERT
79.990	27.6	40.0	12.4	18.4	8.2	1.0	107.0	0.0	VERT
84.018	35.7	40.0	4.3	25.9	8.8	1.0	125.0	338.0	VERT
96.002	42.4	43.5	1.1	30.7	10.6	1.1	99.0	14.0	VERT
100.010	38.8	43.5	4.7	26.9	10.8	1.1	115.0	359.0	VERT
111.994	32.4	43.5	11.1	19.4	11.9	1.1	125.0	359.0	VERT
119.990	38.3	43.5	5.2	24.7	12.4	1.2	115.0	113.0	VERT
139.990	30.9	43.5	12.6	17.6	12.0	1.3	125.0	248.0	VERT
159.990	32.2	43.5	11.3	19.6	11.2	1.4	223.0	226.0	VERT
215.981	40.4	43.5	3.1	29.3	9.5	1.6	101.0	19.0	HOR
288.006	32.4	46.0	13.6	17.6	12.9	1.9	100.0	186.0	HOR

Test: Passed

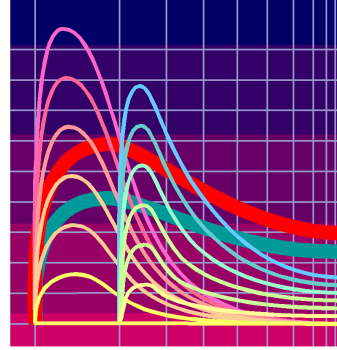
TEST EQUIPMENT USED FOR THE TEST:

14 – 20, 42



TEST REPORT REFERENCE: R20382 Edition 3

6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

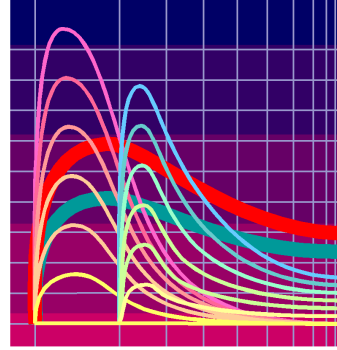


Emission measurement at AC mains and DC in / out ports at M4					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
1	Shielded chamber M4	-	Siemens	B83117S1-X158	480088
2	Measuring receiver	ESAI	Rohde & Schwarz	831953/001 833181/018	480025 480026
3	LISN	NSLK8128	Schwarzbeck	8128155	480058
4	DC-filter	B84266-A21-E13	Siemens	940164525	480099
5	AC-filter	B84299-D87-E3	Siemens	930262292	480097
6	EMI-Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M5					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
7	Fully anechoic chamber M5	-	Siemens	B83177-S1-X156	480073
8	Measuring receiver	ESVS30	Rohde & Schwarz	829673/012	480024
9	Controller	HD100	Deisel	100/324	480067
10	Antenna support	MA240	Deisel	228/314	480069
11	Turntable	DS412	Deisel	412/317	480070
12	Antenna	CBL6112C	Chase	2689	480327
13	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M6					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
14	Open area test site	-	Phoenix Test-Lab	-	480085
15	Measuring receiver	ESVS30	Rohde & Schwarz	829673/012	480024
16	Controller	HD100	Deisel	100/670	480139
17	Turntable	DS420HE	Deisel	420/620/80	480087
18	Antenna support	AS615P	Deisel	615/310	480086
19	Antenna	CBL6111 A	Chase	1643	480147
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111

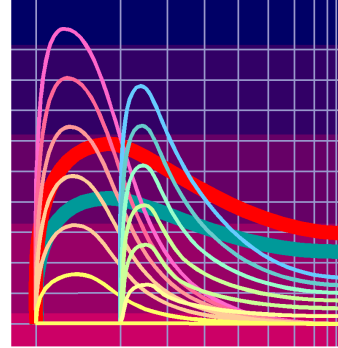
Radiated emission measurement at M8					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No



21	Fully anechoic chamber M8	-	Siemens	B83117-E7019-T231	480190
22	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180
23	Measuring receiver	ESCS 30	Rohde & Schwarz	828985/014	480270
24	Controller	HD100	Deisel	100/427	480181
25	Turntable	DS420	Deisel	420/435/97	480186
26	Antenna support	AS615P	Deisel	615/310	480187
27	Antenna	CBL6112 A	Chase	2034	480185
28	EMI Software	ES-K1	Rohde & Schwarz	-	480111

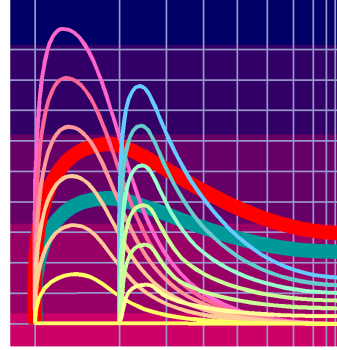
Radiated emission measurement at M20					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303
30	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355
32	Controller	HD100	Deisel	100/670	480326
33	Turntable	DS420HE	Deisel	420/620/80	480315
34	Antenna support	AS615P	Deisel	615/310	480187
35	Antenna	CBL6112 B	Chase	2688	480328
36	Antenna	3115 A	EMCO	9609-4918	480183
37	RF-cable No. 30	RTK 081	Rosenberger	-	410141
38	EMI Software	ES-K1	Rohde & Schwarz	-	480111
39	RF-cable No. 5	RTK 081	Rosenberger		410097

Ancillary equipment used for testing					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
40	Outdoor test site	-	Phoenix Test-Lab	-	480293
41	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
42	Power supply	TOE 8852	Toellner	51712	480233
43	EMI test receiver	ESPC	Rohde & Schwarz	843756/006	480150



TEST REPORT REFERENCE: R20382 Edition 3

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7 LIST OF ANNEXES

ANNEX A	PHOTOGRAPHS	16 pages
	PHOTOGRAPHS OF THE TEST SAMPLE:	
	OISL 77LA04/2-SER rear view	20382_3.jpg
	OISL 77LA04/2-SER front view	20382_4.jpg
	OISL 77LA04/2-SER type plate	20382_1.jpg
	OISL 77LA04/2-SER FCC-label	20382_2.jpg
	OISL 77LA04/2-SER antenna type OIS-L 77LS03	20382_5.jpg
	OISL 77LA04/2-SER antenna type OIS-L 77LS03, antenna type plate	20382_8.jpg
	OISL 77LA04/2-SER internal view	20382_10.jpg
	OISL 77LA04/2-SER analogue board, top view	20382_9.jpg
	OISL 77LA04/2-SER analogue board, bottom view	20382_6.jpg
	OISL 77LA04/2-SER COM and CPU board, top view	20382_7.jpg
	OISL 77LA04/2-SER COM and CPU board, bottom view	20382_11.jpg
	PHOTOGRAPHS OF THE TEST SET-UPS:	
	OISL 77LA04/2-SER test set-up preliminary emission test (9 kHz to 30 MHz)	20382_d.jpg
	OISL 77LA04/2-SER test set-up preliminary emission test (30 to 1000 MHz)	20382_f.jpg
	OISL 77LA04/2-SER detail view to test set-up	20382_e.jpg
	OISL 77LA04/2-SER test set-up outdoor test site	20382_b.jpg
	OISL 77LA04/2-SER test set-up open area test site	20382_g.jpg