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TEST REPORT

Test Report Reference: R30496 Edition 1

Equipment under Test: OISL 77LA04/2 - SER

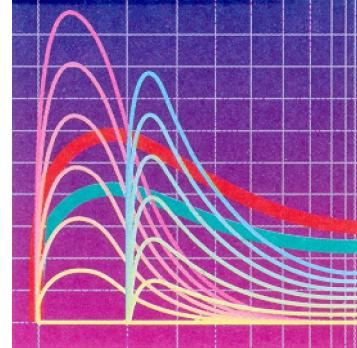
Serial Number:

FCC ID: PNTOIS-LSRSER

Applicant: Baumer Ident GmbH

Manufacturer: Baumer Ident GmbH

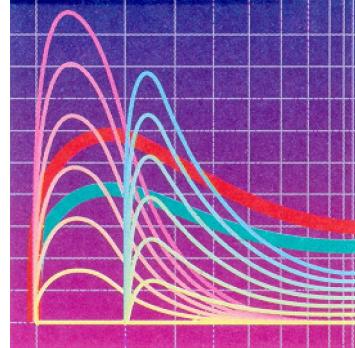
**Test Laboratory
(CAB)
accredited by
DATech e.V.
in compliance with DIN EN ISO/IEC 17025
under the
Reg. No. TTI-P-G071/94-11
and listed by
FCC 31040/SIT1300F2**



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1 IDENTIFICATION

1.1 APPLICANT

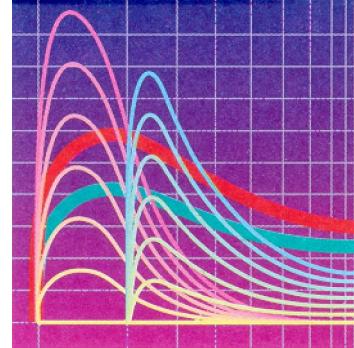
Name:	Baumer Ident GmbH
Address:	Hertzstraße 10 69469 Weinheim
Country:	Germany
Name for contact purposes:	Mr. Günther Meuthen
Phone:	+ 49 62 01 99 57-20
Fax:	+ 49 62 01 99 57-99
Mail address:	gmeuthen@baumerident.com
Applicant represented during the test by the following person:	Mr. Günther Meuthen

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:	----

1.3 DATES

Date of receipt of test sample:	30 June 2003
Start of test:	03 July 2003
End of test:	09 July 2003



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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

Signature

10 July 2003

Date

Test report checked:

Bernd STEINER

Name

Signature

10 July 2003

Date

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.

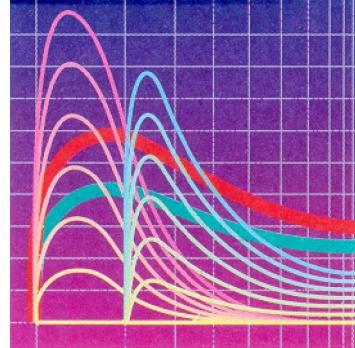
1.6 NORMATIVE REFERENCES

[1] **ANSI C63.4-1992** American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

[2] **FCC 47 CFR Part 15 (July 2002)** Radio Frequency Devices

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.



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2 TECHNICAL DATA OF EQUIPMENT

2.1 DEVICE UNDER TEST

Type of equipment:	Short range inductive identification system
Type designation:	OISL 77LA04/2 – SER
Serial No.:	BI 0326 / 0520
FCC ID:	PNTOIS-LSRSER
Antenna type:	AN.77.SR.03.01 (OIS-L 77LS03), two pieces

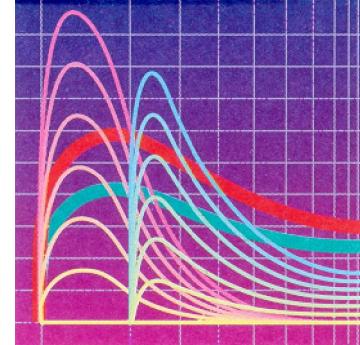
The following external I/O cables were used:

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

2.2 PERIPHERY DEVICES

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

- 1 Personal computer with test software.



TEST REPORT REFERENCE: R30496 Edition 1

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).

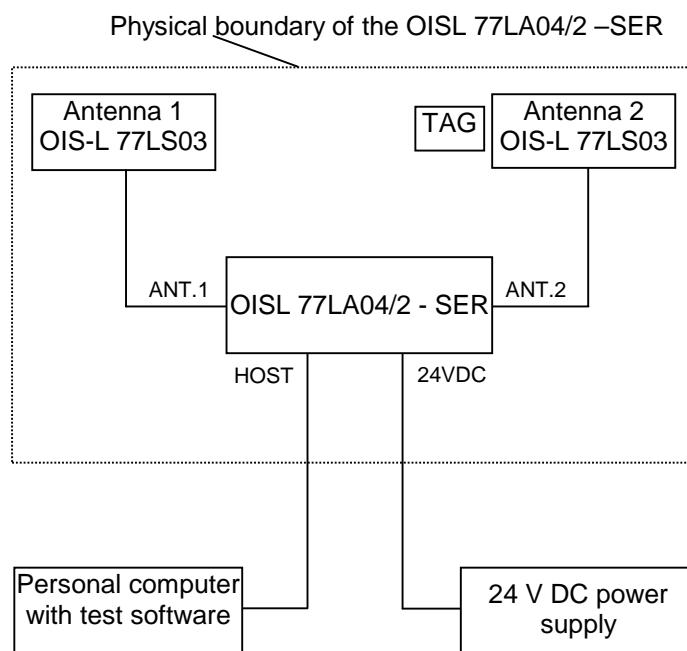
During the test the OIS-L 77LA04/4-DP was monitored by a computer, which showed the TAG ID continuously.

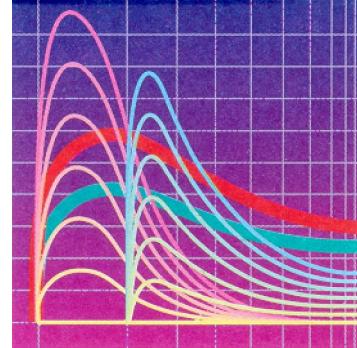
The monitoring computer and the software were provided by the applicant.

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.





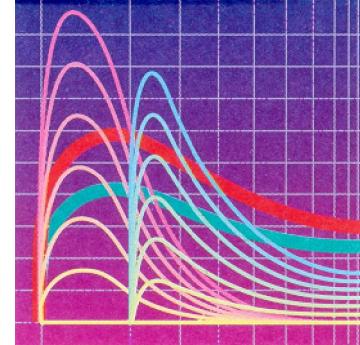
TEST REPORT REFERENCE: R30496 Edition 1

4 TEST OVERVIEW

4.1 EMISSION

Radiated emissions FCC 47 CFR Part 15 section 15.109 [2], Class B					
Application	Frequency range	Limits (quasi peak)	Reference standard	Remark	Status
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 54.0 dB μ V/m at 3 m	ANSI C63.4 (1992);	-	---
Radiated emissions FCC 47 CFR Part 15 section 15.209 [2]					
Application	Frequency range	Limits (microvolts/meter)	Reference standard	Remark	Status
Intentional radiator	0.009 to 0.49 MHz 0.490 to 1.705 MHz 1.705 to 30.0 MHz 30 to 88 MHz 88 to 216 MHz 216 to 960 MHz 960 to 1000 MHz	2400/f(kHz) at 300 m 24000/f(kHz) at 30 m 30 dB μ V/m at 30 m 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 54.0 dB μ V/m at 3 m	ANSI C63.4 (1992);	-	Passed
Conducted emissions FCC 47 CFR Part 15 section 15.207 (a)[2]					
Frequency range	Conducted limits [dB μ V]		Reference standard	Remark	Status
	Quasi-peak	Average			
0.15 MHz to 0.5 MHz 0.5 MHz to 5 MHz 5 MHz to 30 MHz	66 to 56 * 56 60	56 to 46 * 46 50	ANSI C63.4 (1992);	-	Passed

* Decreases with the logarithm of the frequency



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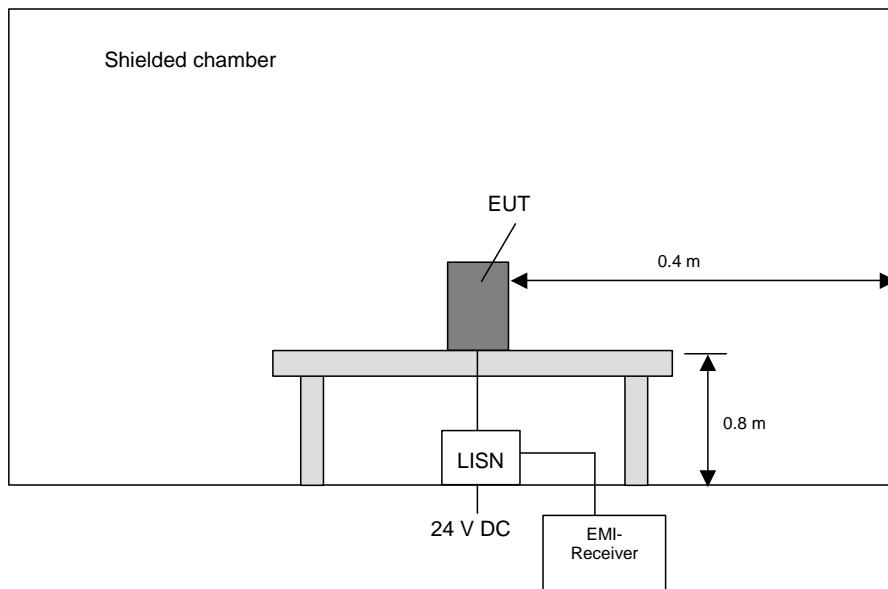
5 METHOD OF MEASUREMENT

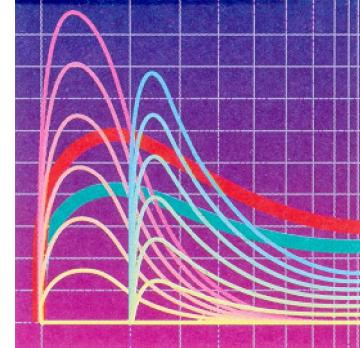
5.1 CONDUCTED EMISSIONS ON AC MAINS (150 kHz to 30 MHz)

This test will be carried out in a shielded chamber. Tabletop devices will be set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm above the ground plane. Floor-standing devices will be placed directly on the ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-1992 [1].

The frequency range 150 kHz to 30 MHz will be measured with an EMI Receiver set to MAX Hold mode with peak and average detector and a resolution bandwidth of 9 kHz. A scan will be carried out on the phase of the AC mains network. If levels detected 10 dB below the appropriate limit, this emission will be measured with the average and quasi-peak detector on all lines.

Frequency range	Resolution bandwidth
150 kHz to 30 MHz	9 kHz





TEST REPORT REFERENCE: R30496 Edition 1

5.2 RADIATED EMISSIONS 9 kHz to 30 MHz

The radiated emission measurement is divided into two stages.

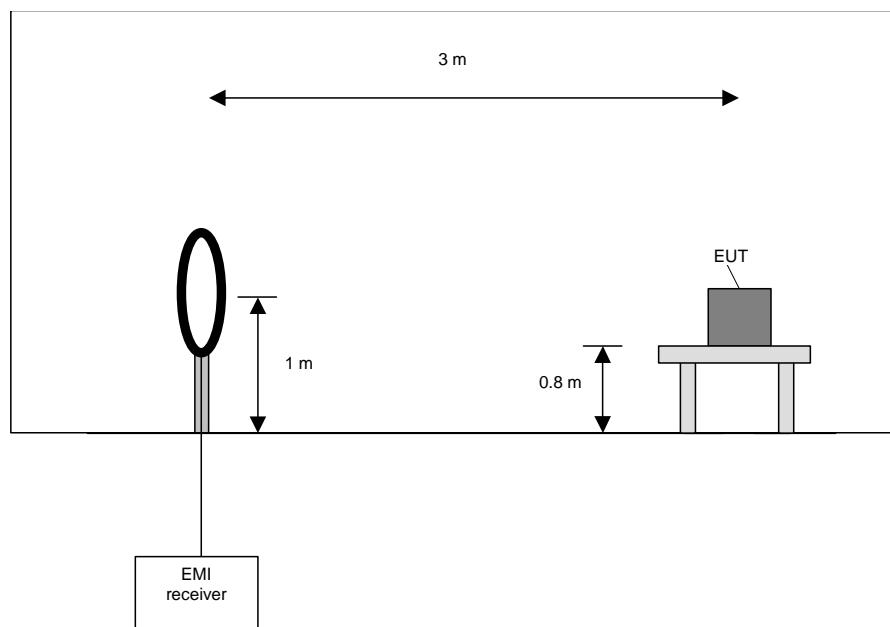
Preliminary measurement:

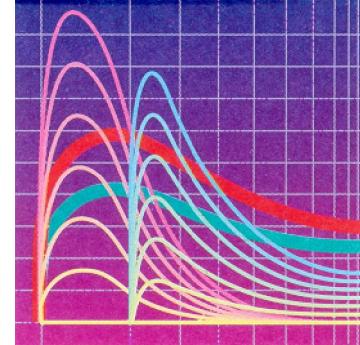
In the first stage a preliminary measurement will be performed in a shielded room with a measuring distance of 3 meters. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-1992 [1].

The frequency range 9 kHz to 30 MHz will be monitored with a spectrum analyser while the system and its cables will be manipulated to find out the configuration with the maximum emission levels if applicable. The EMI Receiver will be set to MAX Hold mode. The EUT and the measuring antenna will be rotated around their vertical axis to found the maximum emissions.

The resolution bandwidth of the spectrum analyser will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 200 kHz	200 Hz
200 kHz to 30 MHz	10 kHz





TEST REPORT REFERENCE: R30496 Edition 1

Preliminary measurement procedure:

Prescans were performed in the frequency range 9 kHz to 30 MHz.

The following procedure will be used:

- 1) Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
- 2) Manipulate the system cables within the range to produce the maximum level of emission.
- 3) Rotate the EUT by 360 ° to maximize the detected signals.
- 4) Make a hardcopy of the spectrum.
- 5) Measure the frequencies of highest detected emission with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 6) Repeat steps 1) to 4) with the other orthogonal axes of the EUT if applicable (handheld equipment).
- 7) Rotate the measuring antenna and repeat steps 1) to 5).

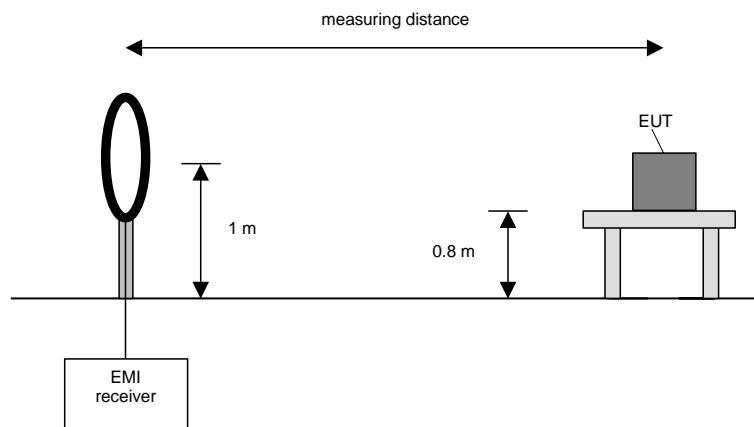
Final measurement:

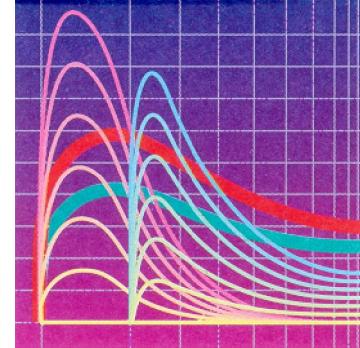
In the second stage a final measurement will be performed on an open area test site with no conducting ground plane in a measuring distances of 3 m, 10 m and 30 m. In the case where larger measuring distances are required the results will be extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with a EMI Receiver set to Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where an average detector will be used according Section 15.209 (d) [2].

On the during the preliminary measurement detected frequencies the final measurement will be performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum value is found.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz





TEST REPORT REFERENCE: R30496 Edition 1

Final measurement procedure:

The following procedure will be used:

- 1) Monitor the frequency range with the measuring antenna at vertical orientation parallel to the EUT at an azimuth of 0 °.
- 2) Rotate the EUT by 360 ° to maximize the detected signals and note the azimuth and orientation.
- 3) Rotate the measuring antenna to find the maximum and note the value.
- 4) Rotate the measuring antenna and repeat steps 1) to 3) until the maximum value is found.
- 5) Repeat steps 1) to 4) with the other orthogonal axes of the EUT if applicable (handheld equipment).

5.3 RADIATED EMISSIONS 30 MHz to 1 GHz

The radiated emission measurement is divided into two stages.

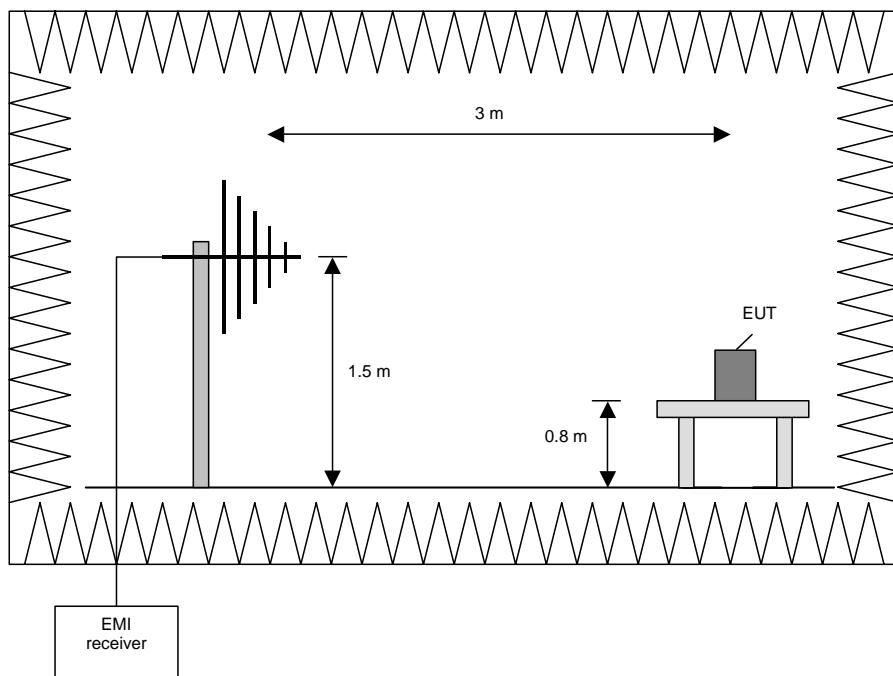
Preliminary measurement:

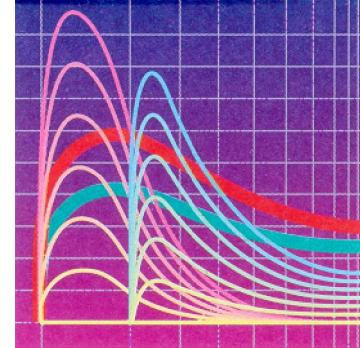
In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-1992 [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 120 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 230 GHz	100 kHz
230 MHz to 1 GHz	100 kHz





TEST REPORT REFERENCE: R30496 Edition 1

Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 1 GHz.

The following procedure will be used:

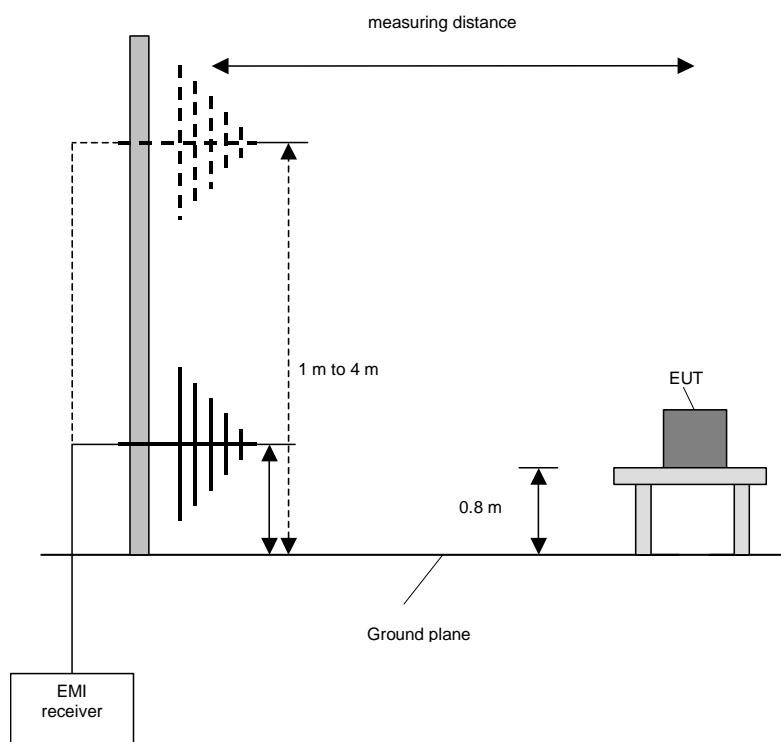
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °
2. Manipulate the system cables within the range to produce the maximum level of emission
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum
5. Measure the frequency of 3 highest detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6. Repeat steps 1) to 4) with the other orthogonal axes of the EUT if handheld equipment
7. Repeat steps 1) to 5) with the vertical polarisation of the measuring antenna

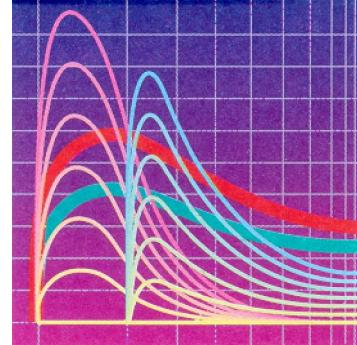
Final Measurement:

In the second stage a final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of 0 ° to 360 °, the measuring antenna will be set to horizontal and vertical polarisation and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



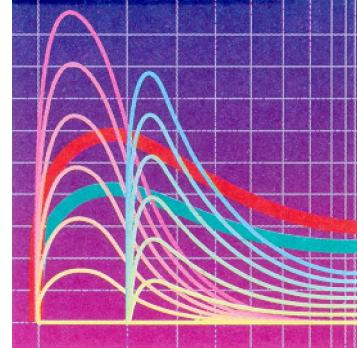


TEST REPORT REFERENCE: R30496 Edition 1

Procedure final measurement:

The following procedure will be used:

- 1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °
- 2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
- 3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
- 4) Repeat 1) to 3) for the other orthogonal antenna polarization.
- 5) Move the antenna and the turntable to the position where the maximum value is detected.
- 6) Measure while moving the antenna slowly +/- 1 m
- 7) Set the antenna to the position where the maximum value is found
- 8) Measure while moving the turntable +/- 45 °
- 9) Set the turntable to the azimuth where the maximum value is found
- 10) Measure with Final detector (QP or AV) and note the value
- 11) Repeat 5) to 10) for each frequency
- 12) Repeat 1) to 11) for each orthogonal axes of the EUT if handheld equipment



TEST REPORT REFERENCE: R30496 Edition 1

6 TEST RESULTS EMISSION TEST

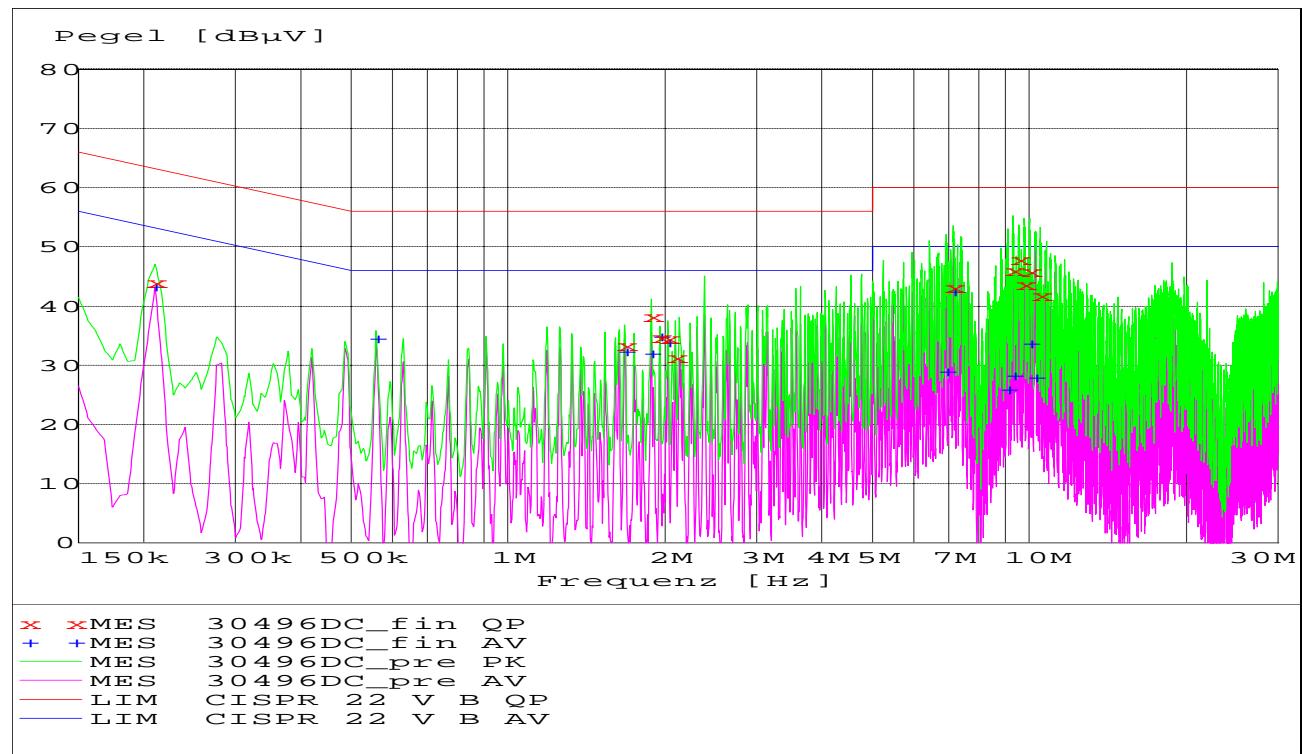
6.1 CONDUCTED EMISSION MEASUREMENT ON AC MAINS (150 kHz to 30 MHz)

Ambient temperature	20 °C	Relative humidity	50 %
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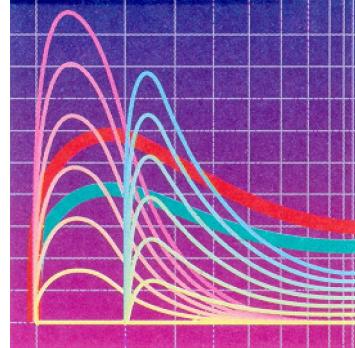
Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m.

Cable guide: The 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 (transmit mode without reading a TAG). All results are shown in the following.



Data record name: 30496DC



TEST REPORT REFERENCE: R30496 Edition 1

Result measured with the quasi-peak detector:

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

Frequency MHz	Level dB μ V	Transducer dB	Limit dB μ V	Margin dB	Phase	PE
0.209850	44.00	1.0	63.2	19.2	+	FLO
1.675050	33.30	0.7	56.0	22.7	+	GND
1.882680	38.20	0.7	56.0	17.8	-	FLO
1.955490	34.70	0.7	56.0	21.3	-	GND
2.024790	34.50	0.8	56.0	21.5	-	GND
2.094630	31.40	0.7	56.0	24.6	-	GND
7.144440	43.10	1.1	60.0	16.9	-	GND
9.315150	46.00	1.3	60.0	14.0	+	GND
9.553290	47.90	1.3	60.0	12.1	-	FLO
9.780630	43.60	1.3	60.0	16.4	-	GND
10.020570	45.80	1.3	60.0	14.2	+	GND
10.497210	41.80	1.4	60.0	18.2	-	GND

Data record name: 30496DC_fin QP

Result measured with the average detector:

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

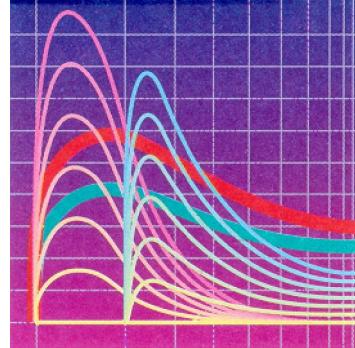
Frequency MHz	Level dB μ V	Transducer dB	Limit dB μ V	Margin dB	Phase	PE
0.209580	43.30	1.0	53.2	9.9	+	GND
0.558960	34.50	0.9	46.0	11.5	+	GND
1.676490	32.40	0.7	46.0	13.6	-	GND
1.881240	31.90	0.7	46.0	14.1	+	GND
1.956660	34.80	0.7	46.0	11.2	-	GND
2.026500	33.80	0.8	46.0	12.2	-	GND
6.921150	29.00	1.1	50.0	21.0	+	FLO
7.154340	42.50	1.1	50.0	7.5	-	GND
9.068280	25.90	1.3	50.0	24.1	+	GND
9.309030	28.30	1.3	50.0	21.7	-	GND
10.024080	33.70	1.3	50.0	16.3	-	FLO
10.263390	27.80	1.4	50.0	22.2	+	FLO

Data record name: 30496DC_fin AV

Test: Passed

TEST EQUIPMENT USED:

1, 2, 5, 6, 42



TEST REPORT REFERENCE: R30496 Edition 1

6.2 PRELIMINARY RADIATED EMISSION TEST (9 KHZ TO 30 MHZ)

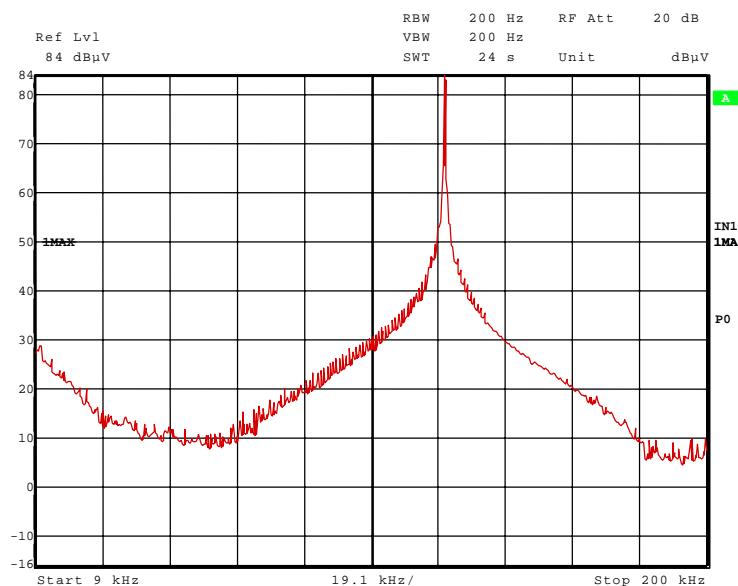
Ambient temperature	20 °C	Relative humidity	62 %
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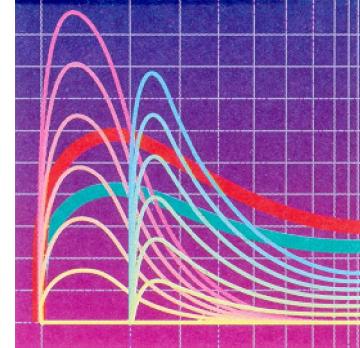
Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

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.

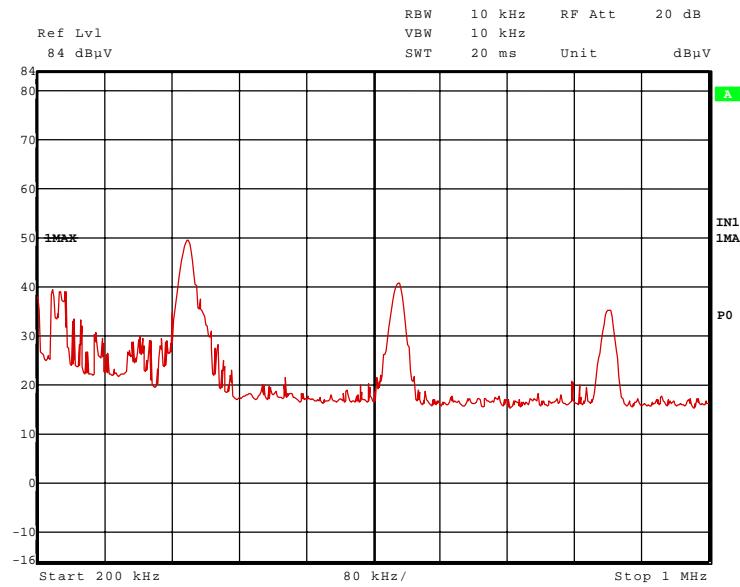
30496_3.wmf (9 kHz to 200 kHz):



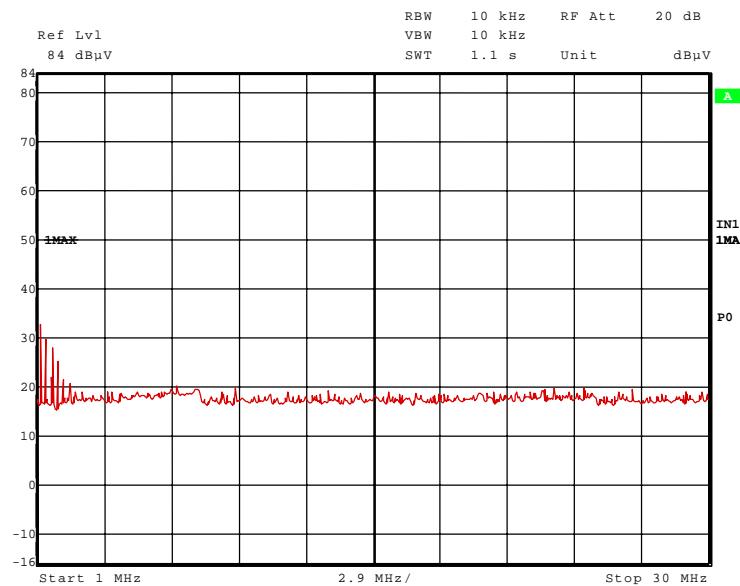


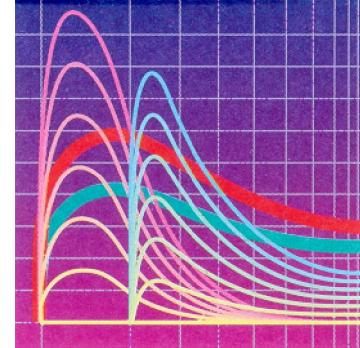
TEST REPORT REFERENCE: R30496 Edition 1

30496_4.wmf (200 kHz to 1 MHz):



30496_5.wmf (1 MHz to 30 MHz):





TEST REPORT REFERENCE: R30496 Edition 1

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

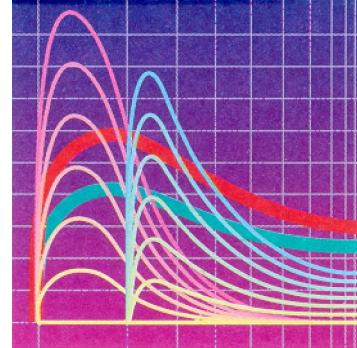
- 125.406 kHz;
- 223.463 kHz;
- 376.144 kHz;
- 626.946 kHz;
- 877.711 kHz;
- 1.129 MHz;
- 1.381 MHz;
- 1.631 MHz;
- 1.881 MHz.

No frequencies were found inside the restricted bands according to FFC 47 CFR Part 15 section 15.205 [2].

These frequencies have to be measured on the outdoor test site. The results of this final measurement are shown in clause 6.4 of this test report.

TEST EQUIPMENT USED THE TEST:

29, 31 - 33, 41



TEST REPORT REFERENCE: R30496 Edition 1

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

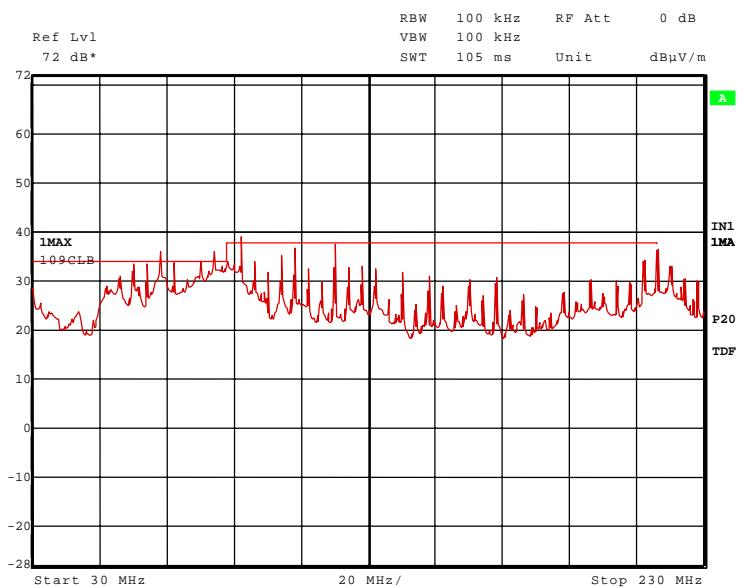
Ambient temperature	21 °C	Relative humidity	67 %
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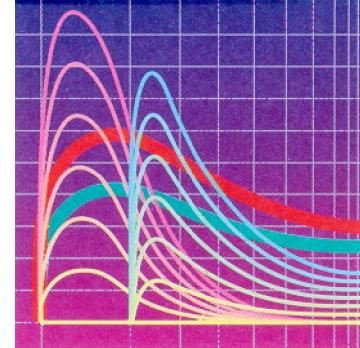
Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

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.

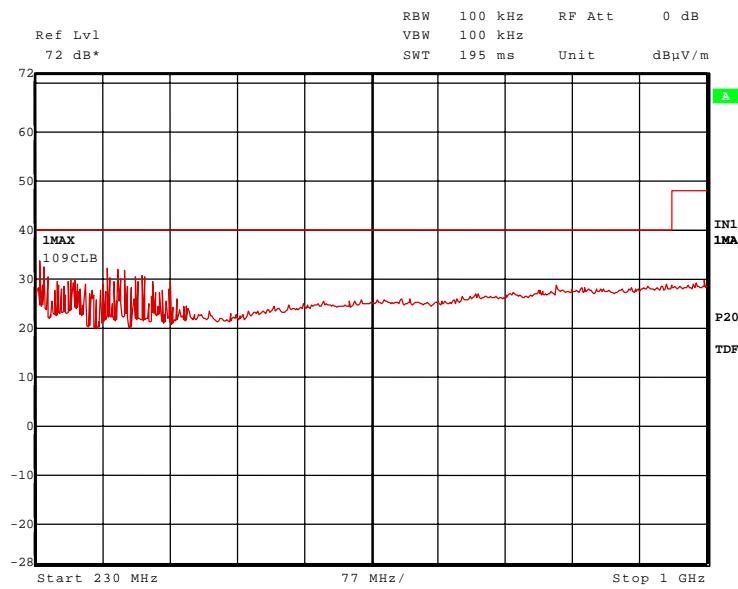
30496_1.wmf (30 MHz to 230 MHz):





TEST REPORT REFERENCE: R30496 Edition 1

30496_2.wmf (230 MHz to 1 GHz):



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

- 60.003 MHz;
- 64.003 MHz;
- 68.003 MHz;
- 80.003 MHz;
- 84.003 MHz;
- 92.005 MHz;
- 212.003 MHz;
- 216.003 MHz;
- 236.008 MHz.

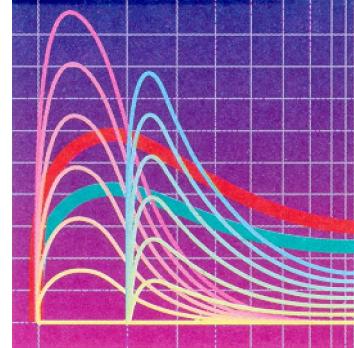
The following frequencies were found inside the restricted bands according to FFC 47 CFR Part 15 section 15.205 [2].

- 108.001 MHz;
- 120.003 MHz;

These frequencies have to be measured on the open area test site. The results of this final measurement are shown in subclause 6.5 of this test report.

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 35, 37, 38



TEST REPORT REFERENCE: R30496 Edition 1

6.4 FINAL RADIATED EMISSION TEST (9 kHz to 30 MHz)

Ambient temperature	23 °C	Relative humidity	40 %
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Position of EUT:
distance

The EUT was set-up on a non-conducting 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.

Limits:

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

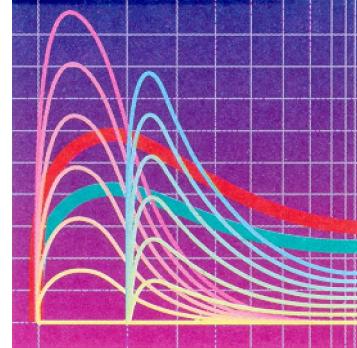
Supply voltage:

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 results:

The test results were calculated with the following formula:

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



TEST REPORT REFERENCE: R30496 Edition 1

Measuring results (distance 3 m):

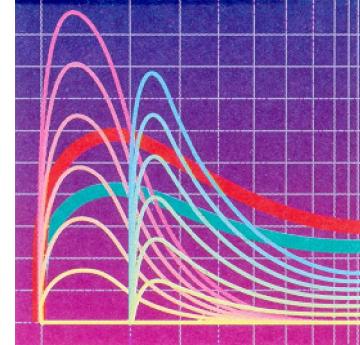
Fundamental frequency						
Frequency kHz	Result dB μ V/m	Limit dB μ V/m	Margin dB	Detector	Readings dB μ V	Antenna factor * dB/m
0.1254	91.0	105.7	14.7	AV	71	20.0
Three highest spurious emissions						
Frequency kHz	Result dB μ V/m	Limit dB μ V/m	Margin dB	Detector	Readings dB μ V	Antenna factor * dB/m
0.6269	52.0	71.7	19.7	QP	32.0	20.0
0.8777	44.3	68.7	24.4	QP	24.3	20.0
1.129	48.0	66.6	18.6	QP	28.0	20.0
Highest spurious emissions in restricted bands						
Frequency kHz	Result dB μ V/m	Limit dB μ V/m	Margin dB	Detector	Readings dB μ V	Antenna factor * dB/m
-	-	-	-	-	-	-
Other spurious emissions						
Frequency kHz	Result dB μ V/m	Limit dB μ V/m	Margin dB	Detector	Readings dB μ V	Antenna factor * dB/m
0.2235	51.1	100.6	49.5	AV	31.1	20.0
0.3761	61.4	96.1	34.7	AV	41.4	20.0
1.381	34.3	64.8	30.5	QP	14.3	20.0
1.631	37.3	63.4	26.1	QP	17.3	20.0
1.881	39.8	70	30.2	QP	19.8	20.0

*: Cable loss included

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

40, 41, 43



TEST REPORT REFERENCE: R30496 Edition 1

6.5 FINAL RADIATED EMISSION TEST (30 MHz to 1 GHz)

Ambient temperature	24 °C	Relative humidity	42 %
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Position of EUT:
distance

The EUT was set-up on a non-conducting 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.

Supply voltage:

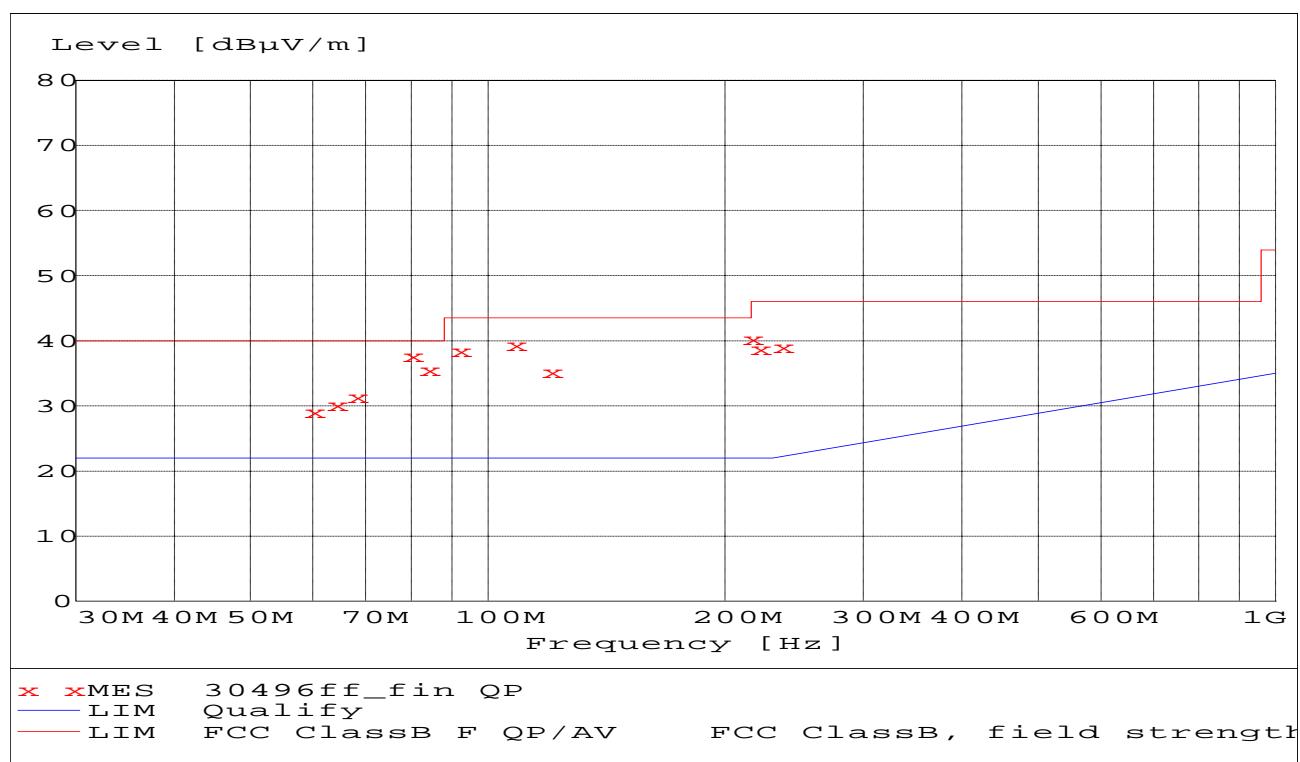
During all measurements the EUT was supplied by nominal supply voltage.

Test results:

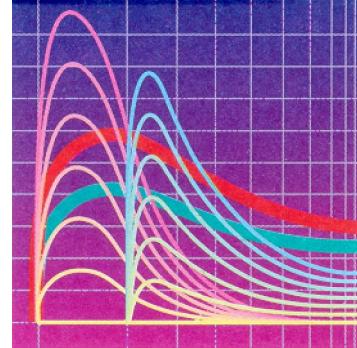
The test results were calculated with the following formula:

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

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 final measurement on the open area test site.



Data record name: 30496ff



TEST REPORT REFERENCE: R30496 Edition 1

The results of the standard final 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.

Result measured with the quasi-peak detector:

Three highest spurious emissions									
Frequency	Result	Limit	Margin	Readings	Antenna factor	Cable loss	Height	Azimuth	Pol.
MHz	dB μ V/m	dB μ V/m	dB	dB μ V	1/m	dB	cm	deg	
80.003	37.7	40.0	2.3	30.2	7.0	0.5	127.0	333.0	VERT.
84.003	35.5	40.0	4.5	27.9	7.0	0.6	125.0	338.0	VERT.
221.003	38.7	43.5	4.8	28.6	9.2	0.9	125.0	45.0	VERT.
Highest spurious emissions in restricted bands									
Frequency	Result	Limit	Margin	Readings	Antenna factor	Cable loss	Height	Azimuth	Pol.
MHz	dB μ V/m	dB μ V/m	dB	dB μ V	1/m	dB	cm	deg	
108.001	39.4	43.5	4.1	26.9	11.9	0.6	145.0	306.0	VERT.
120.003	35.3	43.5	8.2	22.1	12.5	0.7	112.0	120.0	VERT.
Other spurious emissions									
Frequency	Result	Limit	Margin	Readings	Antenna factor	Cable loss	Height	Azimuth	Pol.
MHz	dB μ V/m	dB μ V/m	dB	dB μ V	1/m	dB	cm	deg	
60.003	29.1	40.0	10.9	21.6	7.0	0.5	125.0	22.0	VERT.
64.003	30.2	40.0	9.8	23.0	6.7	0.5	130.0	17.0	VERT.
68.003	31.4	40.0	8.6	24.3	6.6	0.5	205.0	76.0	VERT.
92.005	38.5	43.5	5.0	28.9	9.0	0.6	100.0	20.0	VERT.
216.003	40.3	46.0	5.7	30.3	9.1	0.9	101.0	19.0	HOR.
236.008	39.0	46.0	6.0	28.7	9.3	1.0	115.0	27.0	HOR.

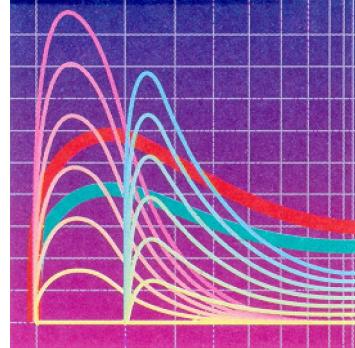
The test results were calculated with the following formula:

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

Test: Passed

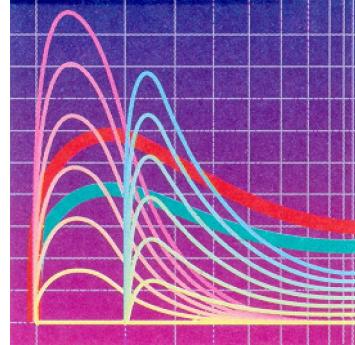
TEST EQUIPMENT USED FOR THE TEST:

14 – 20



TEST REPORT REFERENCE: R30496 Edition 1

7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

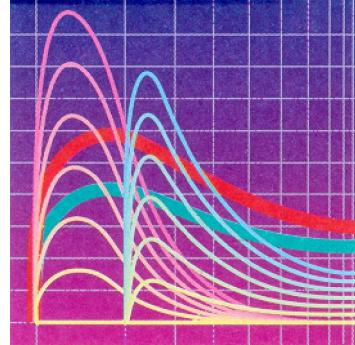


TEST REPORT REFERENCE: R30496 Edition 1

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

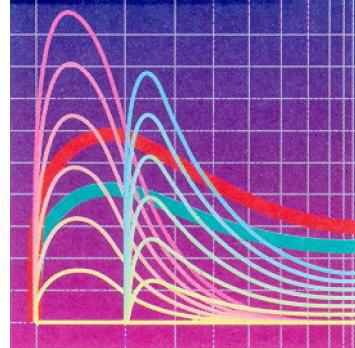


TEST REPORT REFERENCE: R30496 Edition 1

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

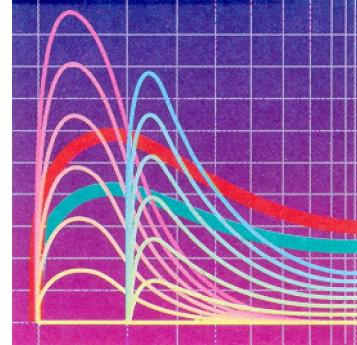
Ancillary equipment used for testing					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
40	Outdoor test site	-	Phoenix Test-Lab	-	480293
41	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059



TEST REPORT REFERENCE: R30496 Edition 1

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
44	Signal generator	SMHU	Rohde & Schwarz	844170/017	480266
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

All used measurement equipment was calibrated (if necessary). The calibration intervals and the calibration history will be given out on request.



TEST REPORT REFERENCE: R30496 Edition 1

8 LIST OF ANNEXES

ANNEX A	PHOTOGRAPHS OF THE TEST SET-UPS:	5 pages
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	OISL 77LA04/2-SER test set-up preliminary emission measurement	30496_2.jpg
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	OISL 77LA04/2-SER test set-up outdoor test site	30496_7.jpg
	OISL 77LA04/2-SER test set-up open area test site	30496_5.jpg
ANNEX B	EXTERNAL PHOTOGRAPHS OF THE TEST SAMPLE:	6 pages
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	OISL 77LA04/2-SER rear view	30496_a.jpg
	OISL 77LA04/2-SER type plate	30496_d.jpg
	OISL 77LA04/2-SER FCC label	30496_c.jpg
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ANNEX C	INTERNAL PHOTOGRAPHS OF THE TEST SAMPLE:	4 pages
	OISL 77LA04/2-SER analogue board, top view	30496_f.jpg
	OISL 77LA04/2-SER analogue board, bottom view	30496_g.jpg
	OISL 77LA04/2-SER COM and CPU board, top view	30496_i.jpg
	OISL 77LA04/2-SER COM and CPU board, bottom view	30496_j.jpg