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COMLAB
Accredited Testing and Certification
EMC, Radio and Telecommunications

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Pages : 16

Test report : 57474/4

Item tested : WorldPro 1000

Type of equipment : Mobile Earth Station 1,5 – 1,6 GHz

Client : Nera SatCom AS

Tested according to:

Part of

Federal Regulations TITLE 47 Volume 1 Telecommunication CHAPTER I FCC PART 1 Subpart I Sec. 1.1310 Radiofrequency radiation exposure limits

Date of issue : 21.12.2005

Authorised by : .....
Geir Antonsen
Verificator

.....
Egil Hauger
Test engineer

The results detailed in this test report are only valid for the particular sample/s tested with configuration as implemented during testing.

CONTENTS

1 GENERAL INFORMATION

1.1 Test Laboratory

Name :	Comlab
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Managing Director:	Jon I. Tidemann

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1.2 Client Information

Name :	Nera Satcom AS
Address :	Bergerveien 12, 1375 Billingstad Norway
Telephone :	+47 67 24 47 00
Fax :	+47 67 24 44 45

Contact:

Name :	Roy Uggerug
E-mail	

1.3 Manufacturer Information

Name :	Nera Satcom AS.

2 TEST INFORMATION

2.1 Test Item

Name :	BGAN
Model/version :	WordlPro 1000
Hardware identity:	0305080036
AC adapter:	AMPLUS 0055

Remarks

The tested equipment is Mobile Earth Station for Satellite Personal Communication Network in the 1,6 GHz band with integrated Bluetooth module in indoor unit (IDU).

See photo on fig 1.

2.2 Test Environment

2.2.1 Normal Test Conditions

Temperature:	20,5 - 20,6 ^{o}C
Relative humidity:	38,2 – 39,2 %
Normal test voltage:	240,0 – 240,6 V AC
Main frequency:	50 Hz

2.3 Test Period

Test item received date:	19.12.2005
Test period:	19.12.2005

2.4 Standards and Regulations

Federal Regulations TITLE 47 Volume 1 Telecommunication CHAPTER I FCC PART 1 Subpart I Sec. 1.1310 Radiofrequency radiation exposure limits.

2.5 Test Engineers

Egil Hauger

2.6 Additional information

2.6.1 Test Methods

Described in relevant standards.

2.6.2 Test Equipment

List of used test equipment, see Clause 5.

3 TEST REPORT SUMMARY

3.1 Abbreviations

P Passed, the equipment fulfils the requirement

F Failed, the equipment does not fulfil the requirement

NA Not applicable, the requirement is not applicable

NT Not tested, the test is not performed even though the requirement is relevant

3.2 Electric Field strength exposure

Standard	Parameter	Distance	Result
Table 1	Electric Field Strength	0.25 m	P

4 MEASUREMENT RESULTS

4.1 Antenna radiation pattern

Test site and test method.

The radiation pattern was performed in a semi-anechoic chamber with size 9x9x19 m with absorbers on walls and ceiling, see fig 1 and 2. The distance between EUT and receive antenna was 3 m.

The EUT antenna has circular polarization and the antenna pattern was therefore measured both for horizontal and vertical polarized E-field in the middle of the transmitter frequency band 1643.5 MHz.

The radiation patterns are given on fig 5 and 6. From the diagram we can see that maximum field is at antenna boresight.

The field strength is therefore measured at the antenna boresight, see fig 4.

Test Equipment Used: 1, 4

4.2 Field strength exposure

Because of the circular polarization of the transmitting antenna the E-field measurements are performed with linear antenna in 0 and 90 degree position to the EUT, horizontal and vertical, see fig 4.

The total E-field is now given as power sum of the two measurements: $E_{tot} = (E_v^2 + E_h^2)^{½}$

The TDMA structure of the transmitter when measuring E-field is given on fig 7 and 8, this gives as duty cycle of 98.1 %.

Measuring the E-field is done by using RMS reading power meter with integrating time 100 ms.

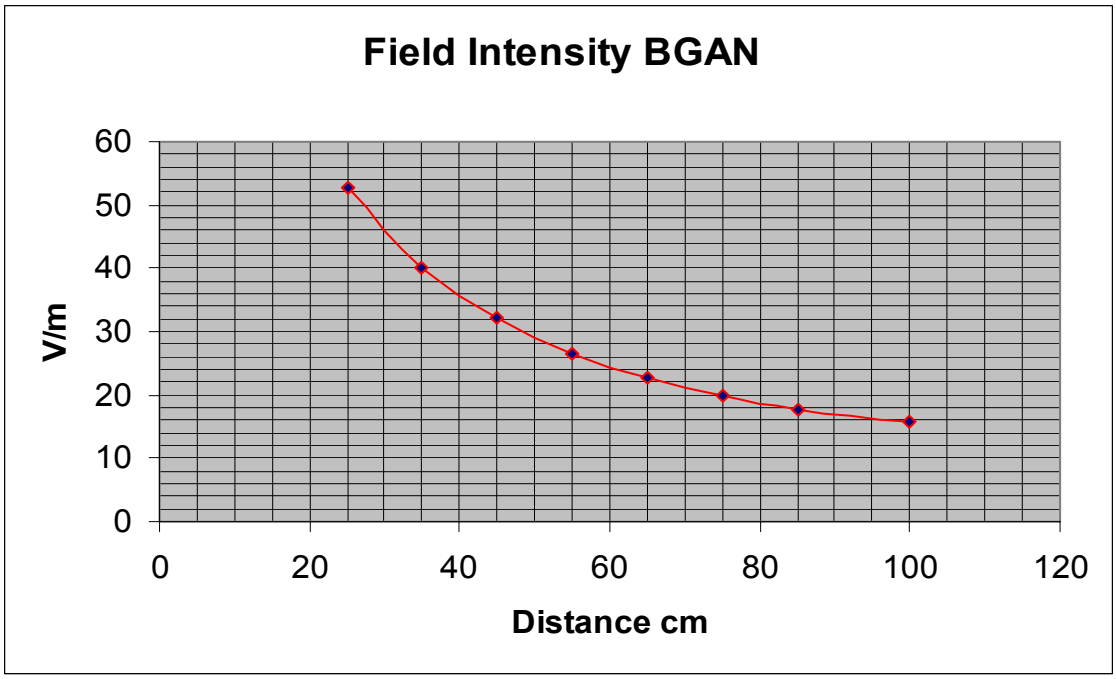
During test the transmitter was set to give maximum transmitting power.

The field is measured in the distance range from 25 cm to 100 cm from EUT.

Test results:

Distance cm	E-field V/m
25	52.6
35	40.0
45	32.2
55	26.6
65	22.7
75	20.1
85	17.7
100	15.7

Table 1



Graph 1

Test equipment used: 2, 3

Measurement uncertainty: ± 1,5 dB

The test antenna is EMCO 3115 with max opening of 0.245 m, this gives a far field distance from the test antenna of:

$d > 2 \times 0.245^2 / \lambda = 0.657$ m

Using the field of 1 m test distance the EIRP from EUT is

$EIRP = (15.7^2 \times 1^2)/30 = 8.2$ watt

The exposure limits according to Table 1 in Sec 1.1310 is 1.0 mW/cm^2. This is equivalent to 61.3 V/m for plane wave.

From table 1 we can see that at a distance of 25 cm the field intensity is < 1.0 mW/cm^2, (0.73 mW/cm^2)

If we calculate the distance using 61.3 V/m as parameter we have:

$d = (30^{½} \times 8.2^{½})/61.3$ **= 0.255 m**.

5 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for ralated tests, each item of test equipment and ancillaries are identified (numbered by the Test Laboratory.

No	Instrument/Ancillary	Type	Manufacturer	Ref. No.
1	Spectrum analyzer	FSEK	R&S	LR 1337
2	Power meter	NRVD	R&S	LR 1347
3	Antenna	3115	EMCO	LR 1226
4	Antenna	3161-01	EMCO	LR 1178

6 PHOTO OF EUT AND TEST SET-UP

Fig 1 EUT

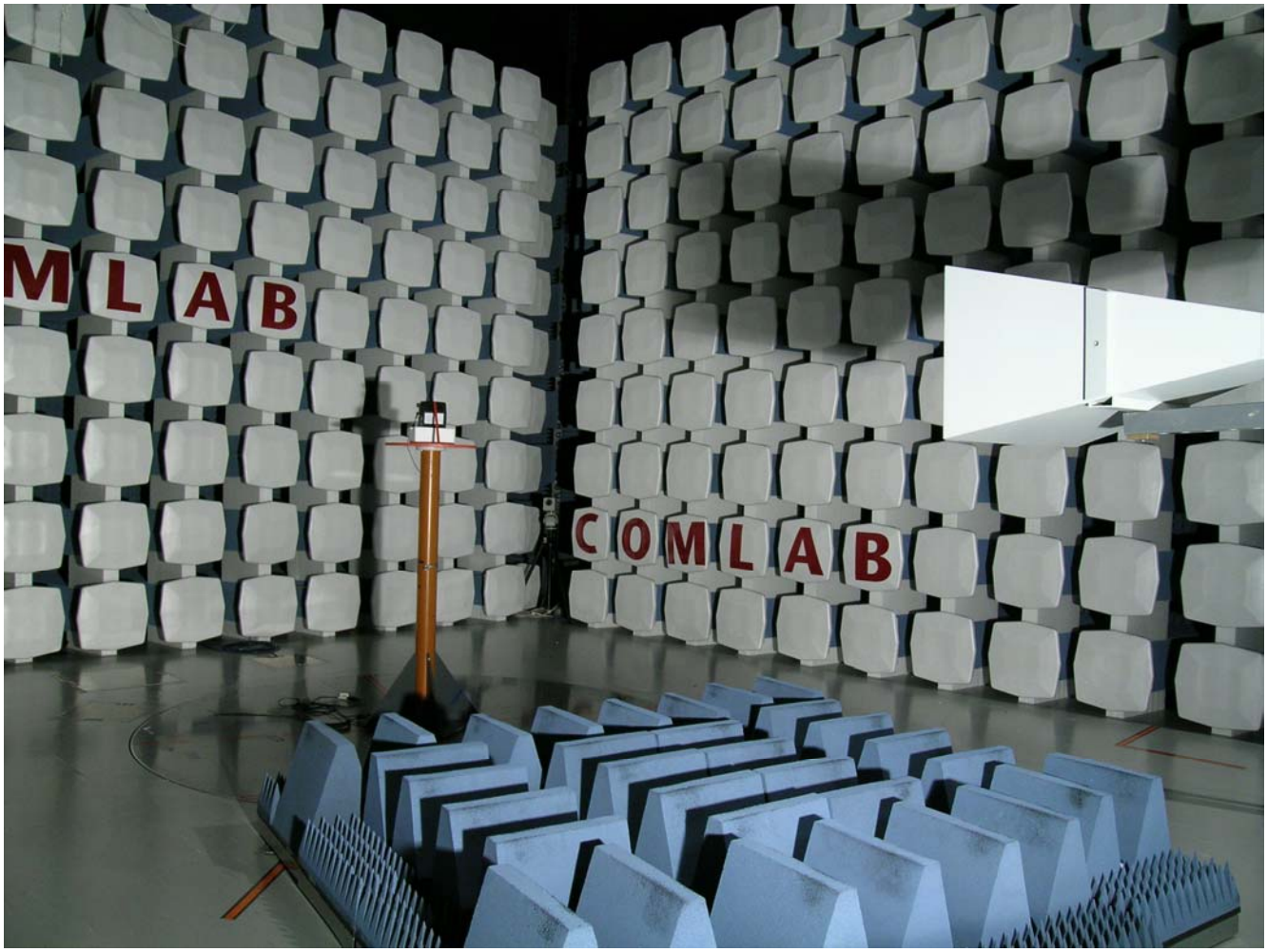


Fig 2 Test set-up for antenna radiation pattern.

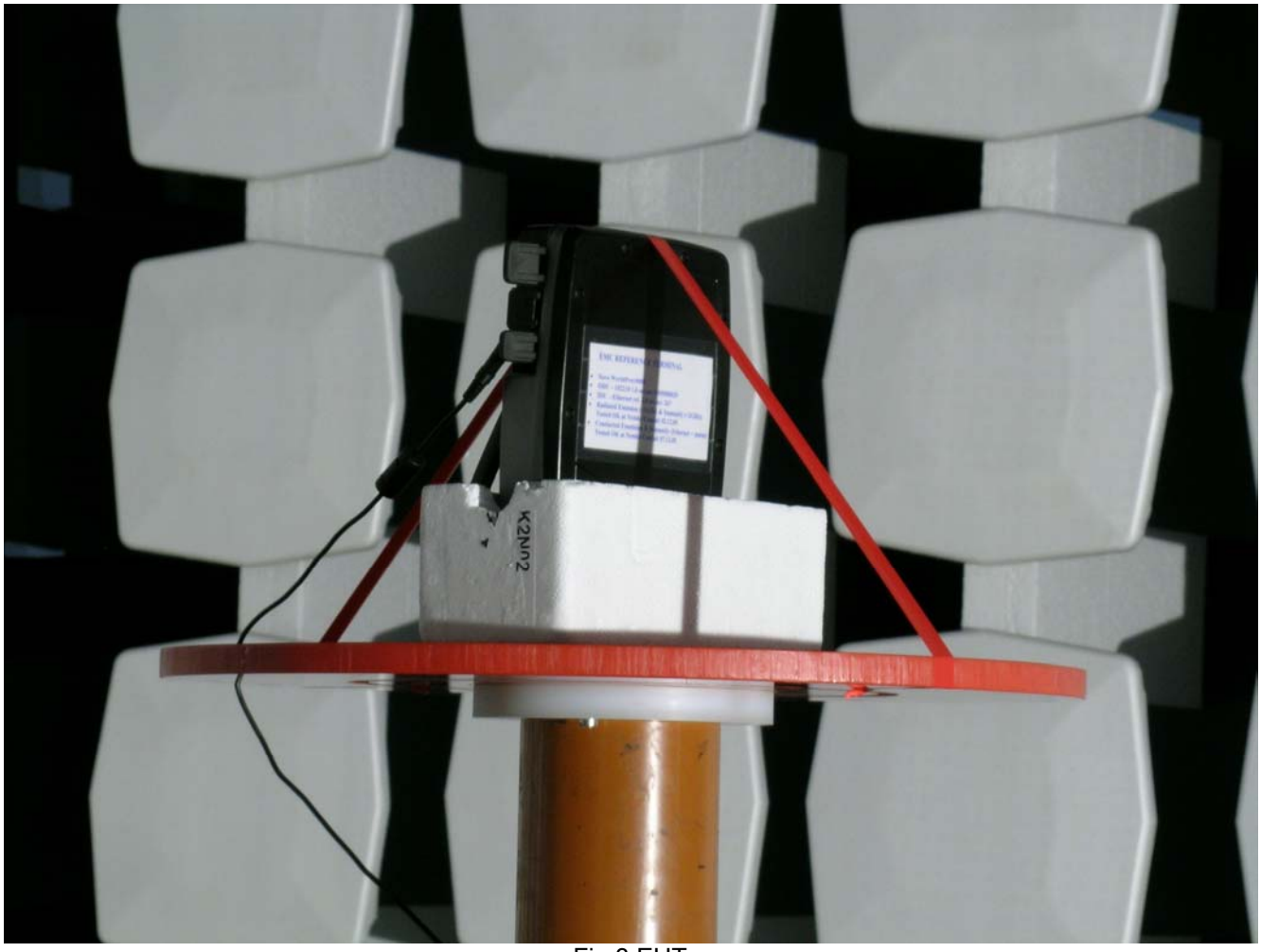


Fig 3 EUT

Fig 4 Test set-up when measuring electric field strength

7 ANTENNA PATTERN, DUTY CYCLE

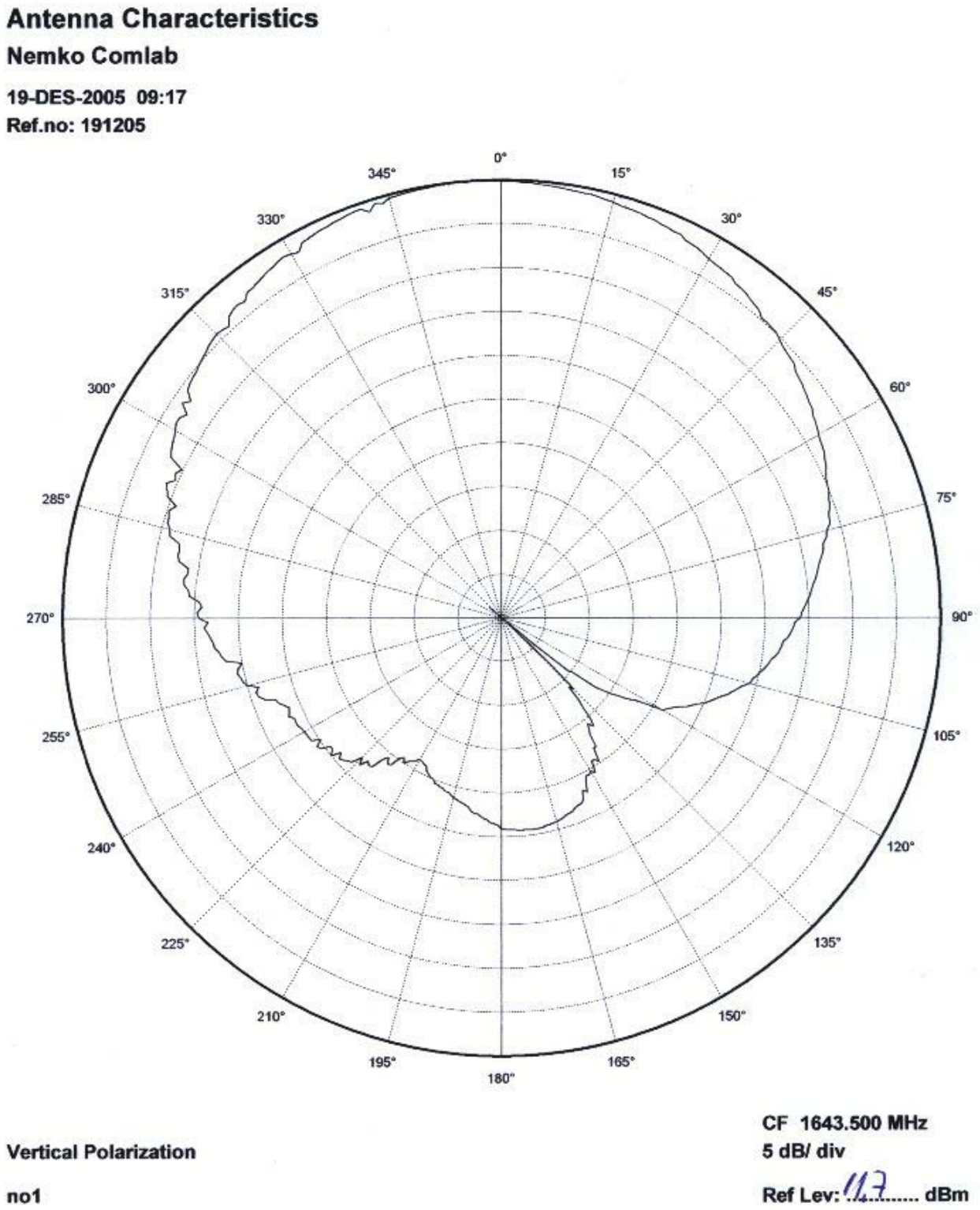


Fig 5 Antenna pattern Vertical polarization

Antenna Characteristics

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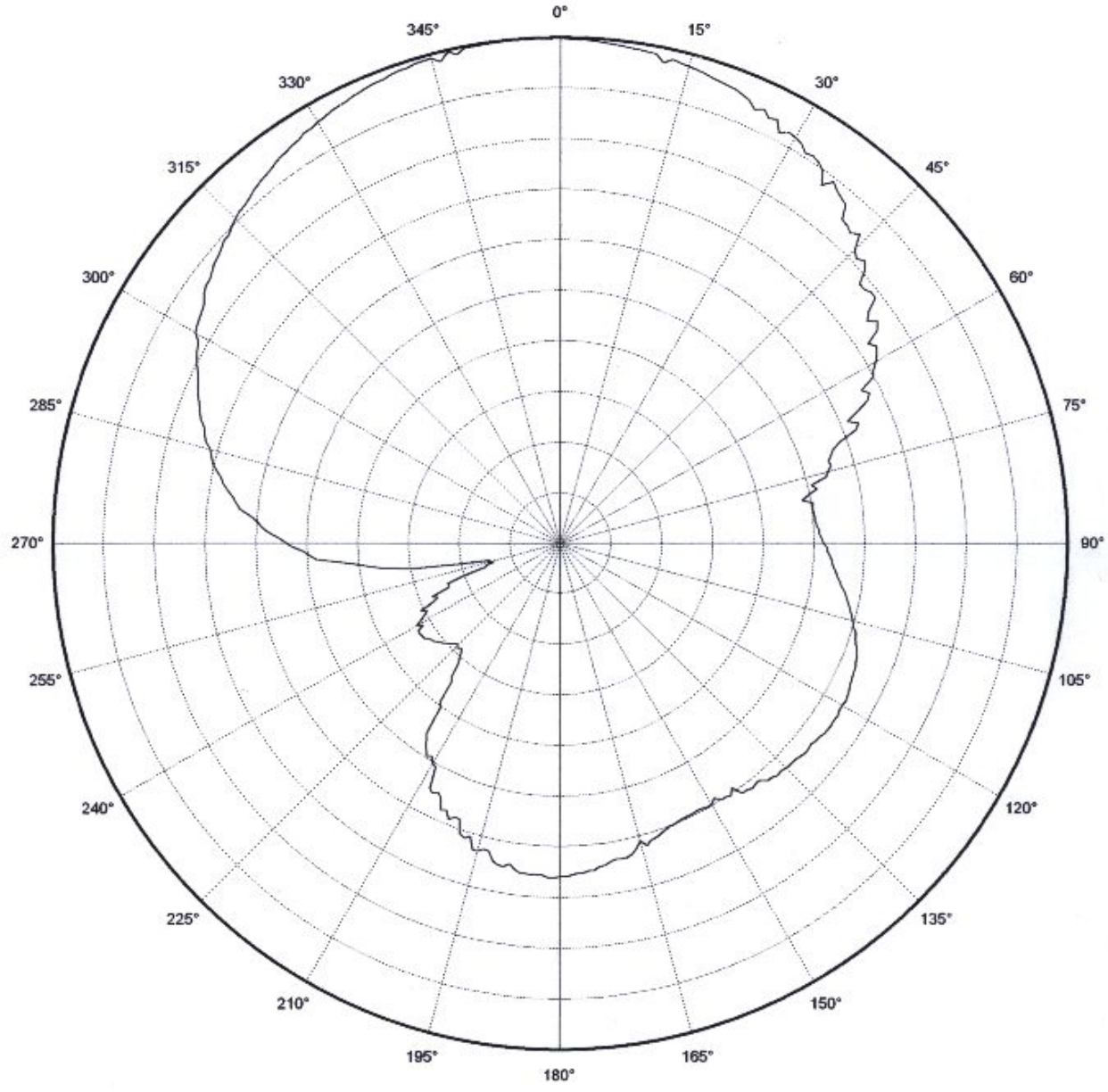

Horisontal Polarization

no1

CF 1643.500 MHz
5 dB/ div
Ref Lev: 9,4 dBm

Fig 6 Antenna pattern Horizontal polarization

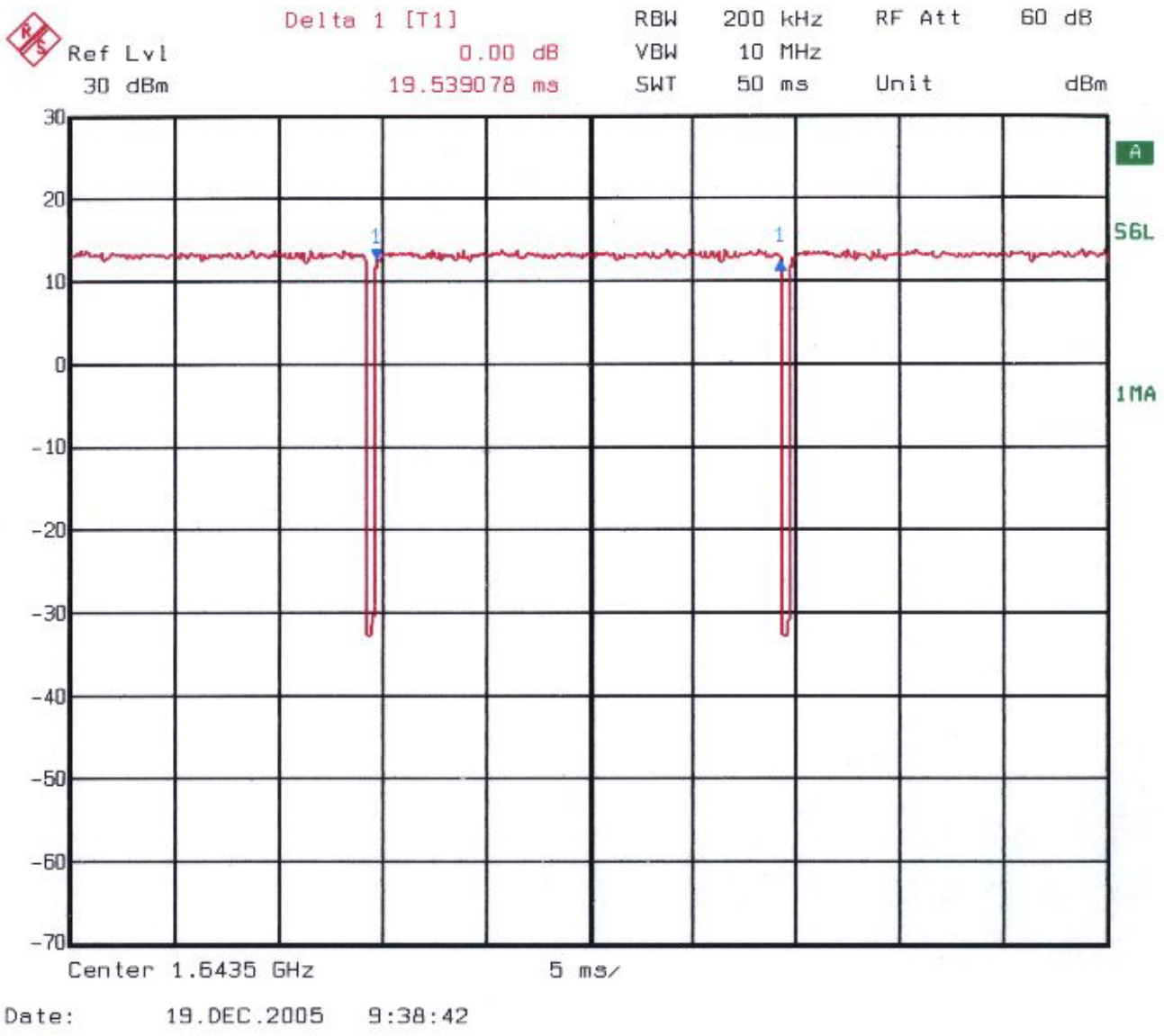

Fig 7 Duty cycle

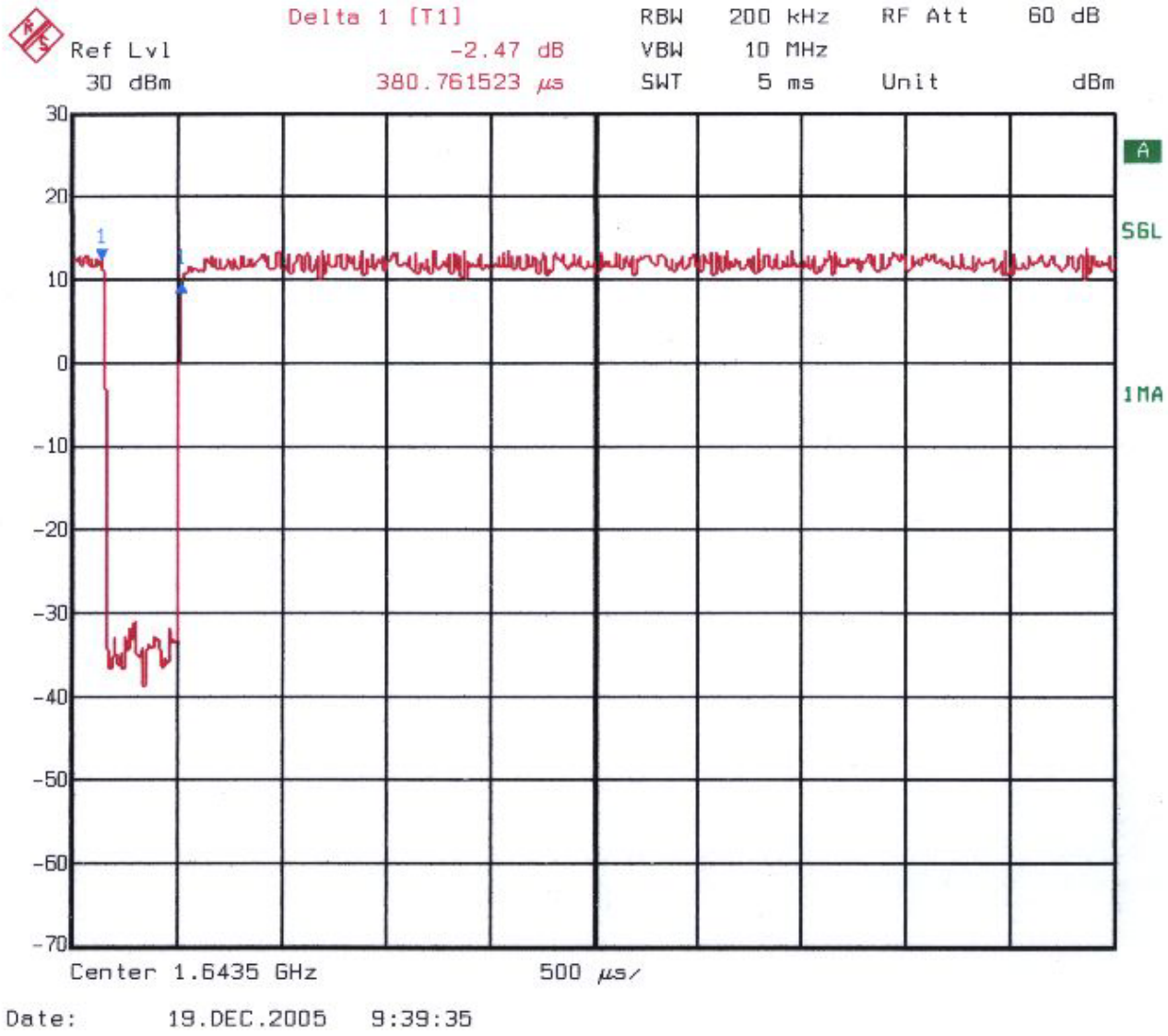

Fig 8 Duty cycle