Test Report

Electromagnetic Compatibility

DAT- P-121 / 02-00

Test report file no:	**E-0053-1426-03 JP**
Applicant:	**Funkwerk Enterprise Communications GmbH** **Olgastrasse 152** **89073 Ulm** **Germany**
Contact person:	**Mr. Rolf Leukel**
Model:	**Core 11b**
FCC ID:	**SPT-CM11B-01**
Kind of Product:	**WLAN transmitter module**
Manufacturer:	**Same as applicant**
Test result Emission tests:	**Pay attention to page 7**
Date of issue:	**2005 December 06**

The testresult only responds to the tested sample.
It is not allowed to copy this report partly without the allowance of the test laboratory.

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DIRECTORY

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IDENTIFICATION OF THE TEST LABORATORY

Company name:	*emitel* AG
Address:	Ohmstrasse 1 D-94342 Strasskirchen Germany
Contact person:	Dieter Fröhlich
Contact address:	Phone: +49 9424 9482-774 Fax.: +49 9424 94-640 eMail: germany@emitel.de Homepage: www.emitel.de
FCC Registration number:	765810

DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT):

Date of receipt of test sample:	According to storage records of Emitel AG
Testing Start Date:	2005-December-05
Testing End Date:	2005-December-05

Number of received/tested samples:	1x Core module “Core11b” 1x Antenna “ANT-UFL.KS-EMB-2-5GHz-17,5cm” 1x Antenna “ANT-RSMA.KS-O-022-03-0,1m”
Serial Number:	none
FCC-ID:	SPT-CM11B-01
Voltage consumption:	3.3V DC
Product status:	☐ Development Sample ☐ Preproduction Sample ☒ Production Sample
Dimensions:	**Core11b** **L x W x H: 50.95 mm x 59.75 mm x 8 mm** **ANT-UFL.KS-EMB-2-5GHz-17,5cm** **L x W x H: 59 mm x 6 mm x 0.5 mm** **ANT-RSMA.KS-O-022-03-0,1m** **L x W x H: 70 mm x 18 mm x 6 mm**

Following system devices are parts of the EUT and were connected during the measurement:

Antenna “ANT-UFL.KS-EMB-2-5GHz-17,5cm”, cable length: 15cm
Antenna “ANT-RSMA.KS-O-022-03-0,1m”, cable length: 10cm

Following equipment were connected/used during the measurement:

Laboratory Power Supply; PS-302A; Conrad Electronic; Emitel Equipment ID: 01-05/04-01-003
WLAN Device; CPI-b-E-HO-PAC; artem GmbH; SN: 306000013; PN: 200180
Laptop; SP4600; Thoshiba; SN: 11129435G SS460-0; FCC ID: CJ6PS460WL
Mouse; Mouse 2.0; Microsoft; SN: 01729374; PN: 45717; FCC ID: C3KAZB1

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OPERATION MODES

OPERATION MODES:

TX&RX-mode at:	CH6	middle channel	2437 MHz

EUT MONITORING

Data transfer between Laptop and EUT observed at Laptop screen.

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ENVIRONMENTAL CONDITIONS

Temperature	20 °C
Humidity	50 %
Atmosperheric pressure:	860-1060 mbar

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report according to NIS 81 /5.1994 „The Treatment of Uncertainty in EMC Measurements“ and is documented in the emitel quality system according to EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

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TEST SPECIFICATION

The tests were performed according to the following specifications:

☒	FCC Part 15 Subpart A	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)	September, 2005
☒	FCC Part 15 Subpart C	Code of Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Federal Communication Commission (FCC)	September, 2005
☒	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz - 40 GHz	2003

FCC Part 15 Subpart C

Specification	Result	Remarks
§15.207 Conducted emission (150kHz-30MHz)	Not performed	None
§15.209 Radiated emission (150kHz-26GHz)	limit kept	None
§15.247 Operation within the band 2400GHz-2483.5GHz	Not performed	None

REMARK:
This testreport is only valid with emitel testsreport no: E-0053-1426-02 JP

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SUMMARY:

This testreport is only valid with emitel testsreport no: E-0053-1426-02 JP

FINAL JUDGEMENT

Strasskirchen, 2005 December 06

emitel AG

Dieter Fröhlich
Dipl. Ing. (FH)
Director

Test engineer:

Jürgen Pessinger

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Radiated emission

(30 MHz – 1000 MHz)

TEST CONDITIONS AND RESULTS:

Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz. The bandwidth of the EMI-receiver is set to 120 kHz and the detector-function is set to CISPR quasi-peak.
The test setup is made in accordance with ANSI C63.4-2001. Measurements are made in both the horizontal and vertical planes of polarization. Preliminary scans are taken in a full-anechoic room using a spectrum analyzer with the detector function set to peak. This preliminary scans were performed at the lowest, middle and highest channel to find the worst case. Final measurement was performed with in this worst case. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.
All tests are performed at a test-distance of 3 meters. For final testing an open-area test-site is used. During the tests the EUT is rotated all around and the receiving-antenna is raised and lowered from 1 meter to 4 meters to find the maximum levels of emissions. The cables and equipment is placed and moved within the range of position likely to find their maximum emissions.

☐ Test not applicable

Test location: ☒ A3, Pretest
☒ OATS 3, Final test

Antenna EuT distance: ☒ 3 m, Pretest
☒ 3 m, Final test

Used test instruments and test accessories:

Test instrument	Type	Manufacturer	ID - No.
Spectrum Analyser	FSP 30	Rohde & Schwarz	01-01/01-01-063
Antenna	3142 B	EMCO	01-01/01-01-067
HF-Cable	RG 213	Suhner	01-05/02-01-043
HF-Cable	RG 213	Emitel	01-05/02-01-038
Preamplifier	TVV 695	MTS	01-05/02-01-016
Receiver	ESVP	Rohde & Schwarz	01-01/01-01-035
Antenna	VULB 9163	Schwarzbeck	01-01/01-01-059
HF-Cable	RG 217	Suhner	01-05/02-01-048
HF-Cable	RG 214	Emitel	01-05/02-01-050

TEST RESULTS:

The requirements are: ☒ MET ☐ NOT MET

Remarks: _____

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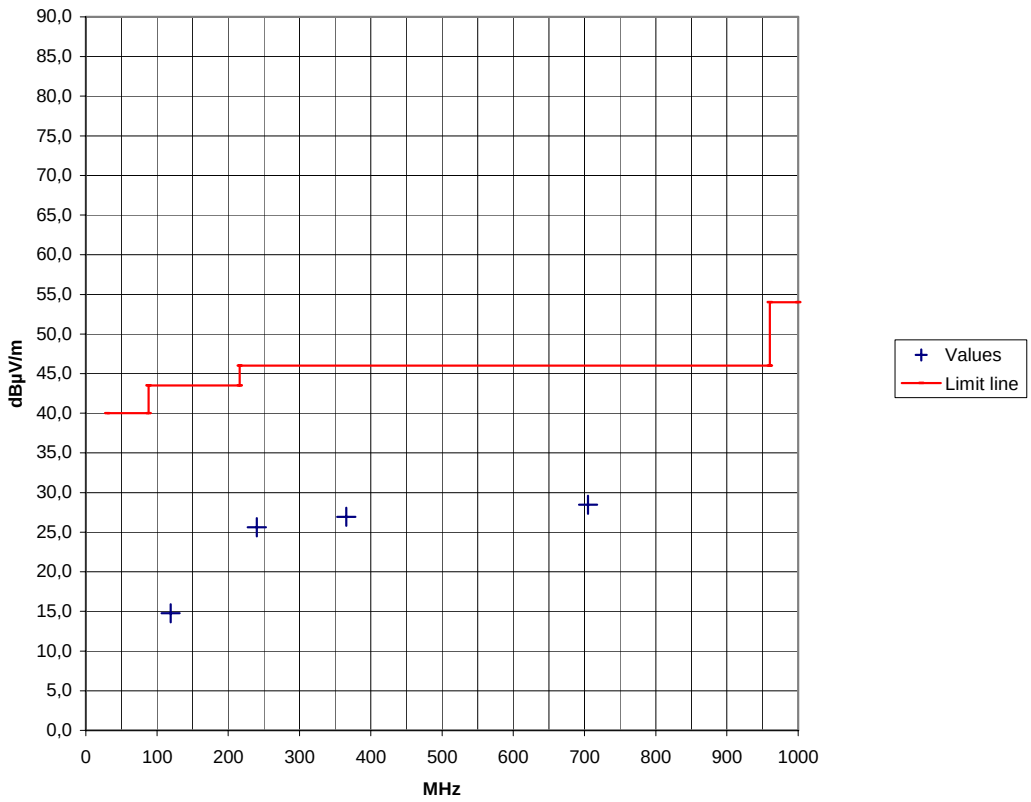
FINAL TEST RADIATED EMISSIONS:

Horizontal Antenna Polarization Test distance: 3 m

Project file:	E-0053-1426-03	**Mode:**	
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
		ANT-UFL.KS-EMB-2-5GHz-17,5cm	

Detector: QuasiPeak
Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Horizontal Polarization**



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FINAL TEST RADIATED EMISSION (TABLE):

Horizontal Antenna Polarization Test distance: 3 m

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Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
		ANT-UFL.KS-EMB-2-5GHz-17,5cm	

Detector: QuasiPeak
Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Horizontal Polarization**

Frequency [MHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
119,2	3,4	11,4	14,8	43,5	
240,0	10,9	14,7	25,6	46,0	
365,6	8,4	18,5	26,9	46,0	
705,1	3,3	25,1	28,4	46,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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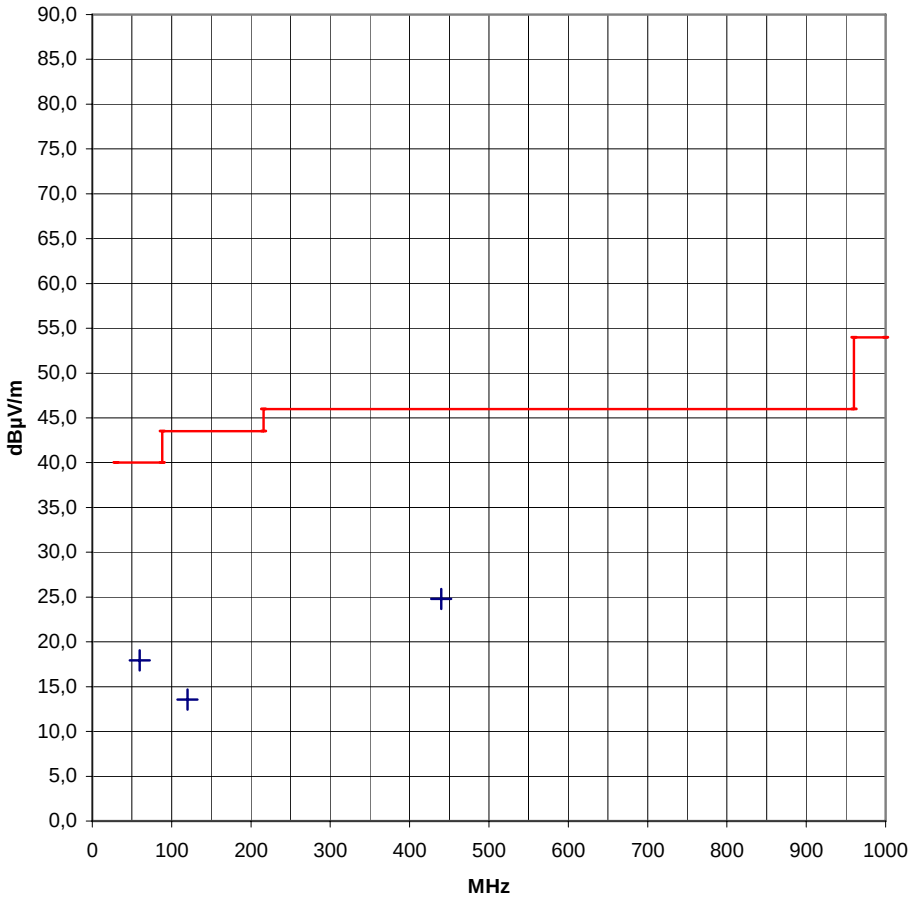
FINAL TEST RADIATED EMISSION:

Vertical Antenna Polarization Test distance: 3 m

Project file:	E-0053-1426-03	**Mode:**	
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
		ANT-UFL.KS-EMB-2-5GHz-17,5cm	

Detector: QuasiPeak
Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Vertical Polarization**



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FINAL TEST RADIATED EMISSIONS (TABLE):

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Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
		ANT-UFL.KS-EMB-2-5GHz-17,5cm	

Detector: QuasiPeak
Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Vertical Polarization**

Frequency [MHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
60,0	5,3	12,6	17,9	40,0	
120,2	2,4	11,2	13,6	43,5	
439,8	4,3	20,5	24,8	46,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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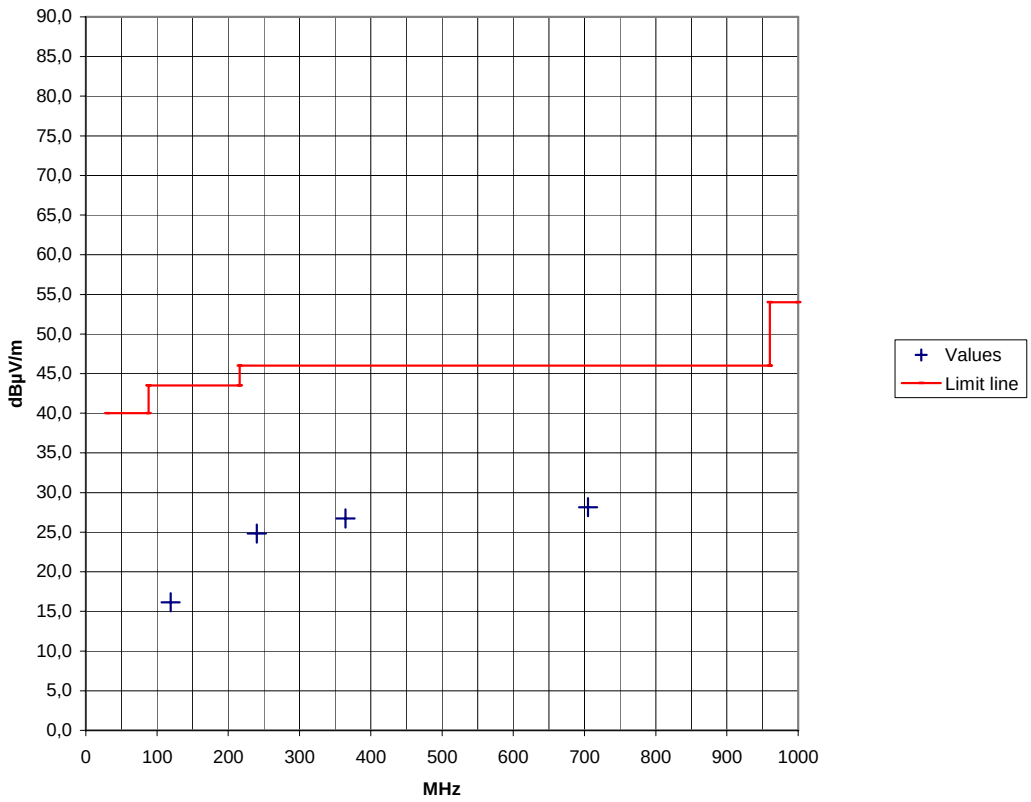
FINAL TEST RADIATED EMISSIONS:

Horizontal Antenna Polarization Test distance: 3 m

Project file:	E-0053-1426-03	**Mode:**	
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
		ANT-RSMA.KS-O-022-03-0,1m	

Detector: QuasiPeak
Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Horizontal Polarization**



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FINAL TEST RADIATED EMISSION (TABLE):

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Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
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Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Horizontal Polarization**

Frequency [MHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
119,2	4,8	11,4	16,2	43,5	
240,0	10,1	14,7	24,8	46,0	
364,6	8,2	18,5	26,7	46,0	
705,1	3,0	25,1	28,1	46,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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FINAL TEST RADIATED EMISSION:

Vertical Antenna Polarization Test distance: 3 m

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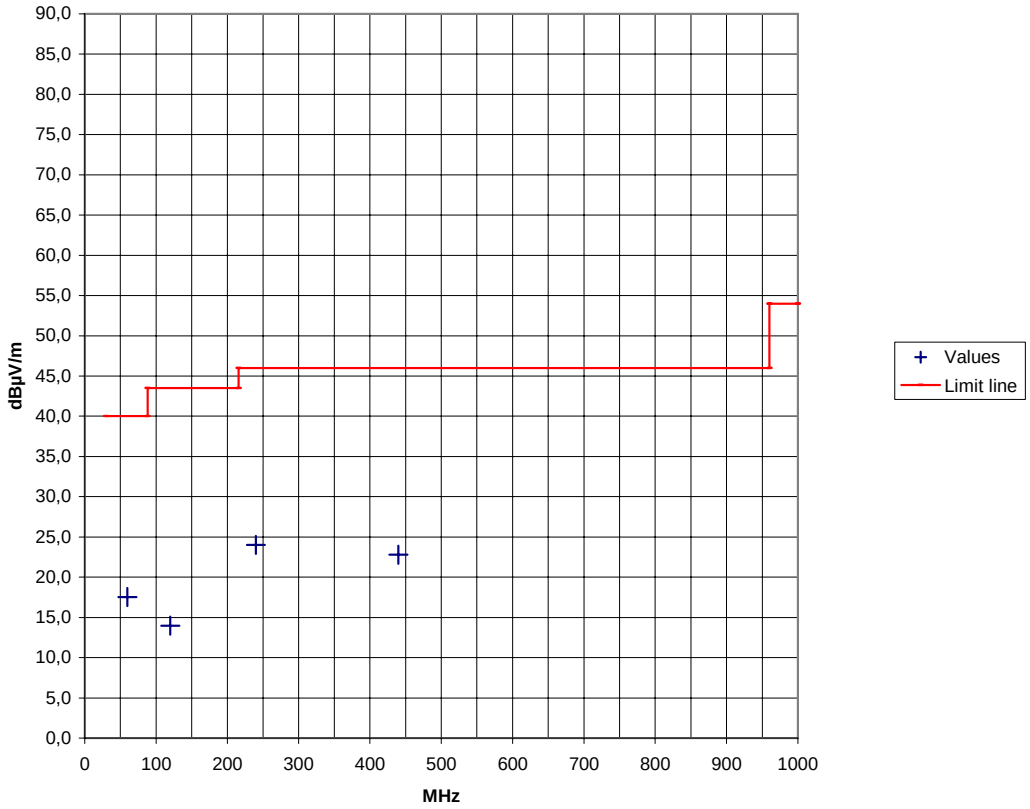
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
		ANT-RSMA.KS-O-022-03-0,1m	

Detector: QuasiPeak
Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Vertical Polarization**



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FINAL TEST RADIATED EMISSIONS (TABLE):

Vertical Antenna Polarization Test distance: 3 m

Project file:	E-0053-1426-03	**Mode:**	
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
		Antenna:	
		ANT-RSMA.KS-O-022-03-0,1m	

Detector: QuasiPeak
Result: Limit kept

FCC Part 15 **Subpart C, Limit QP** **Vertical Polarization**

Frequency [MHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
60,0	4,9	12,6	17,5	40,0	
120,0	2,8	11,2	14,0	43,5	
240,0	9,3	14,7	24,0	46,0	
439,8	2,3	20,5	22,8	46,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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Radiated emission

(1 GHz – 26 GHz)

TEST CONDITIONS AND RESULTS:

Radiated emissions are measured over the frequency range from 1 GHz to 26 GHz. The bandwidth of the spectrum analyser is set to 1 MHz and the detector-function is set to average.
The test setup is made in accordance with ANSI C63.4-2001. Measurements are made in both the horizontal and vertical planes of polarization. Preliminary scans and final testing are performed in a full-anechoic room using a spectrum analyzer with the detector function set to peak. The preliminary scans were performed at the lowest, middle and highest channel to find the worst case. Final measurement was performed with this worst case. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.
All tests are performed at a test-distance of 3 meters. The cables and equipment is placed and moved within the range of position likely to find their maximum emissions.

☐ Test not applicable

Test location: ☒ A3

Antenna EuT distance: ☒ 3 m

Used test instruments and test accessories:

Test instrument	Type	Manufacturer	ID - No.
Spectrum Analyser	FSP 30	Rohde & Schwarz	01-01/01-01-063
Preamplifier	AMF-40-005-180-24-10P	MITEQ Inc.	01-02/01-02-005
Antenna Horn 1-18GHz	3115	ETS EMC Systems LP	01-01/01-01-062
Antenna Horn 18-26,5GHz	3160-09	ETS EMC Systems LP	01-05/02-01-002
HF-cable	FA210A0050M	Anritsu GmbH	01-05/02-01-034

TEST RESULTS:

The requirements are: ☒ MET ☐ NOT MET

Remarks: _____

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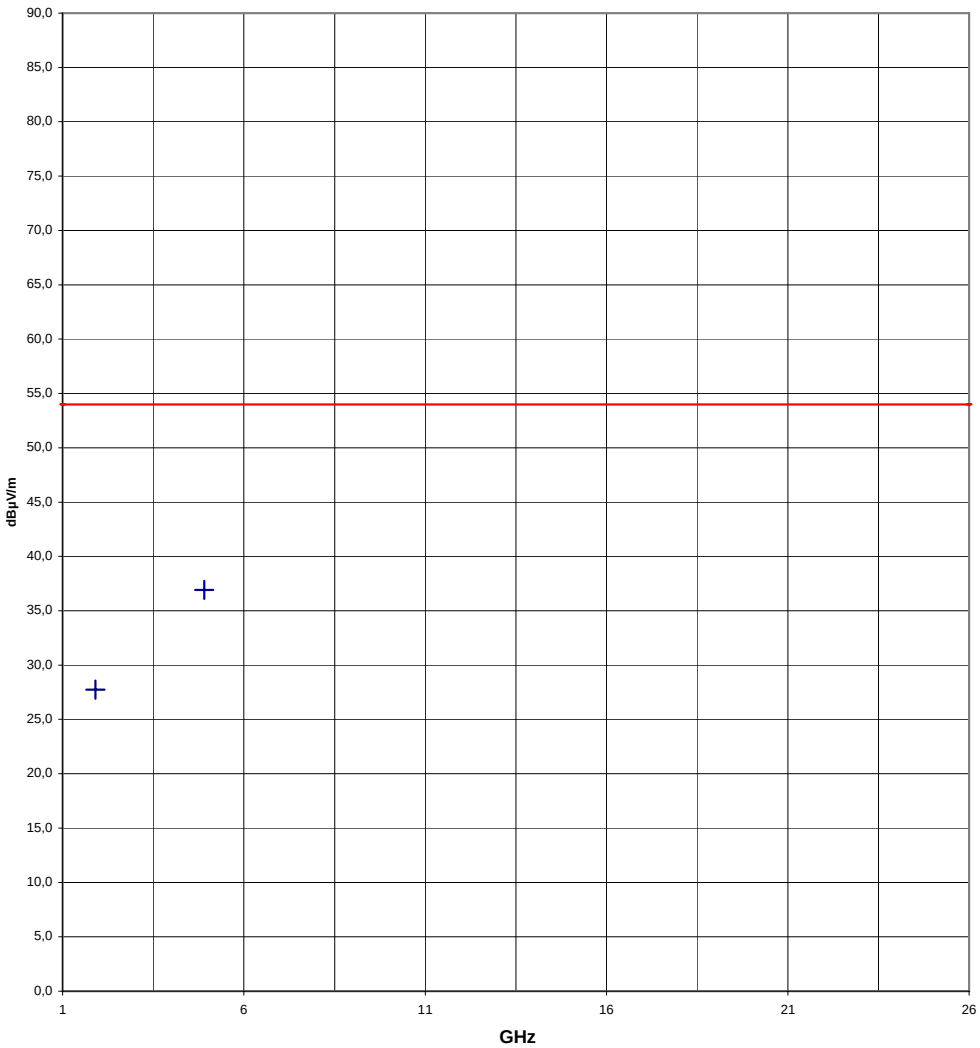
FINAL TEST RADIATED EMISSIONS:

Horizontal Antenna Polarization Test distance: 3 m

Project file:	E-0053-1426-03	**Mode:**	
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-UFL.KS-EMB-2-5GHz-17,5cm	

FCC Part 15 Subpart C, Limit AV **Horizontal Polarization**



Subpart C, Limit AV

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FINAL TEST RADIATED EMISSION (TABLE):

Horizontal Antenna Polarization Test distance: 3 m

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Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-UFL.KS-EMB-2-5GHz-17,5cm	

FCC Part 15 Subpart C, Limit AV **Horizontal Polarization**

Frequency [GHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
1,9	33,3	-5,6	27,7	54,0	
4,9	31,7	5,2	36,9	54,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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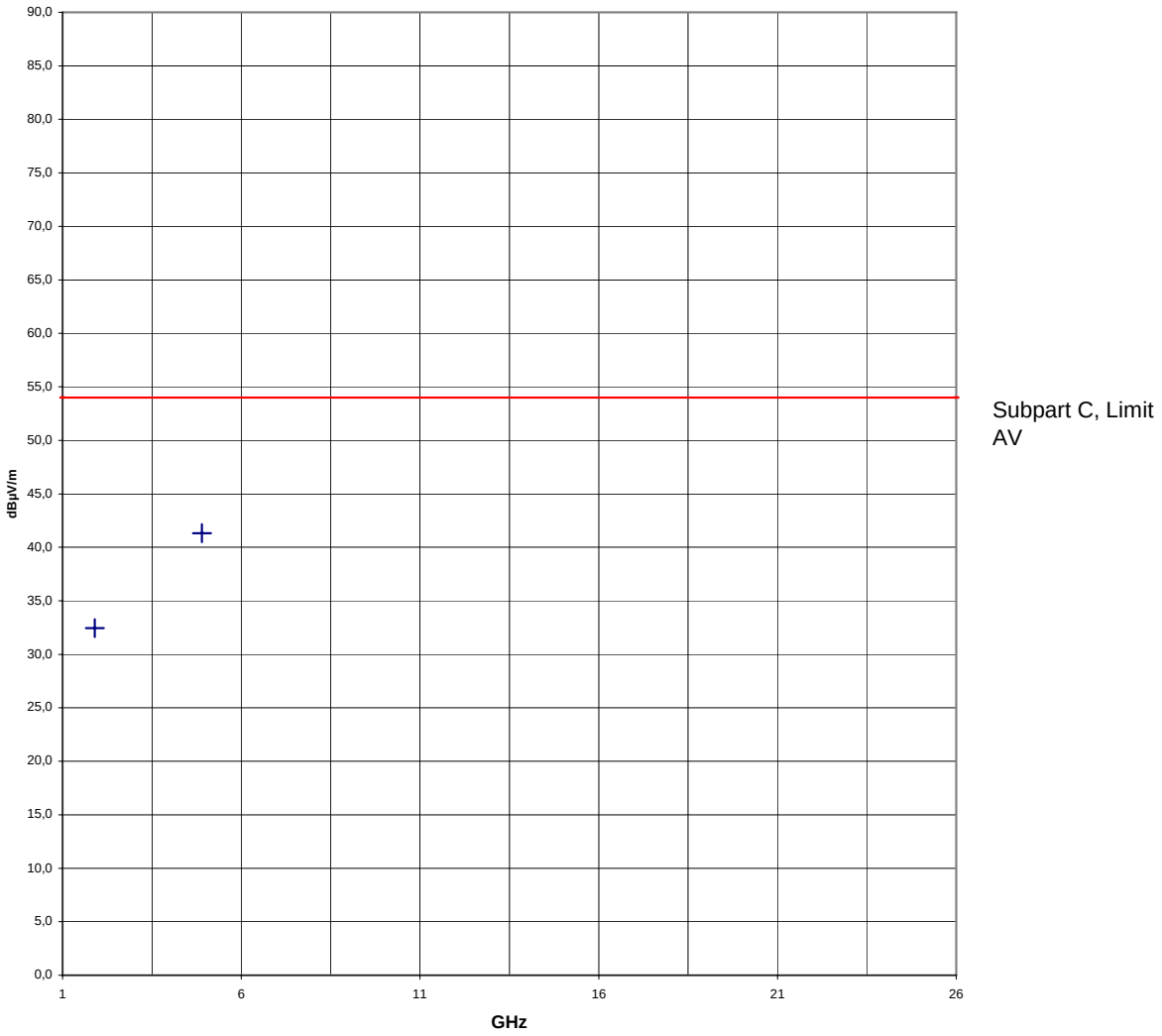
FINAL TEST RADIATED EMISSION:

Vertical Antenna Polarization Test distance: 3 m

Project file:	E-0053-1426-03	**Mode:**	
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-UFL.KS-EMB-2-5GHz-17,5cm	

FCC Part 15 Subpart C, Limit AV **Vertical Polarization**



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FINAL TEST RADIATED EMISSIONS (TABLE):

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Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-UFL.KS-EMB-2-5GHz-17,5cm	

FCC Part 15 Subpart C, Limit AV **Vertical Polarization**

Frequency [GHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
1,9	38,0	-5,6	32,4	54,0	
4,9	36,1	5,2	41,3	54,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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FINAL TEST RADIATED EMISSIONS:

Horizontal Antenna Polarization Test distance: 3 m

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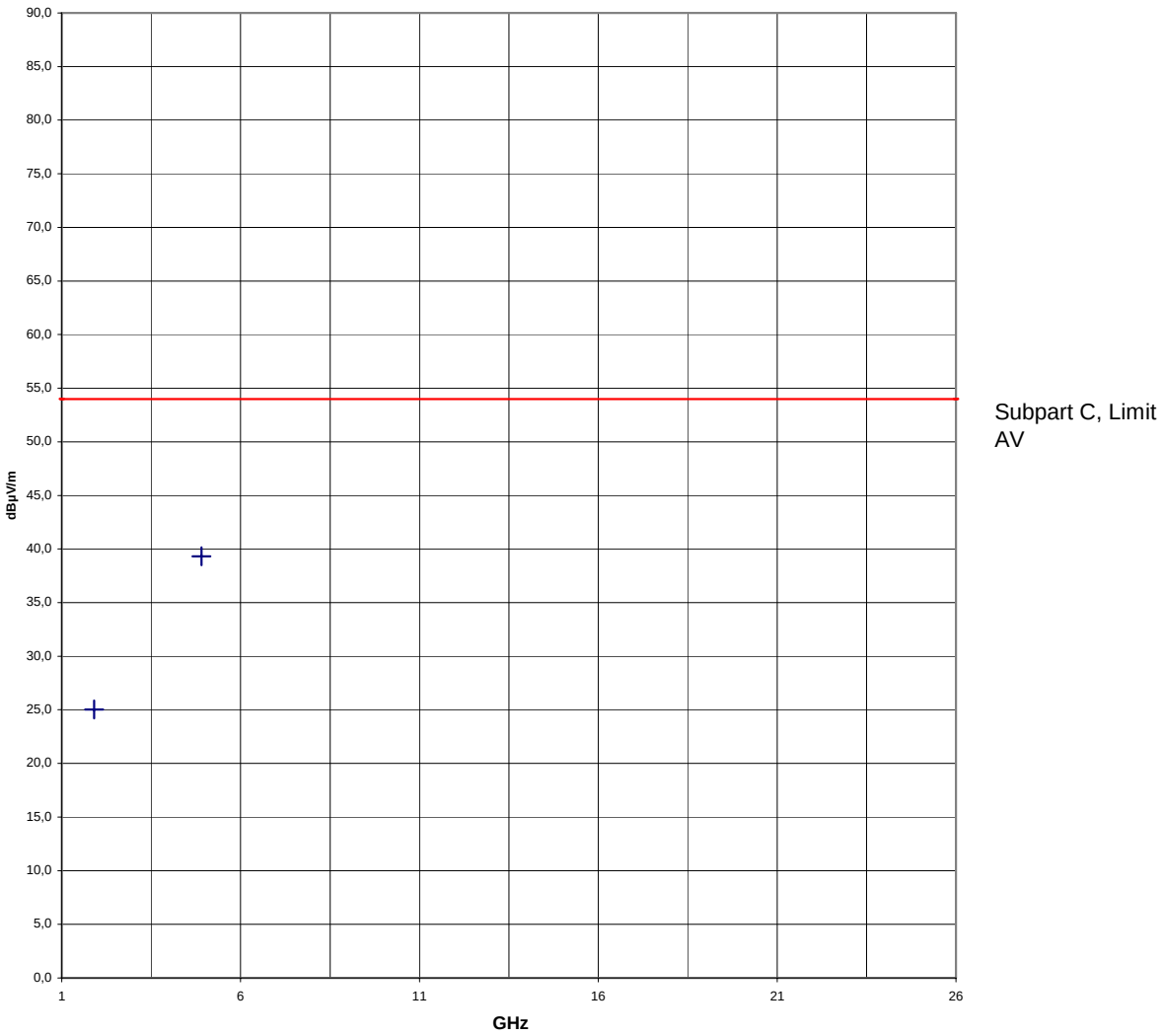
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-RSMA.KS-O-022-03-0,1m	

FCC Part 15 Subpart C, Limit AV **Horizontal Polarization**



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Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-RSMA.KS-O-022-03-0,1m	

FCC Part 15 Subpart C, Limit AV **Horizontal Polarization**

Frequency [GHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
1,9	30,6	-5,6	25,0	54,0	
4,9	34,1	5,2	39,3	54,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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FINAL TEST RADIATED EMISSION:

Vertical Antenna Polarization Test distance: 3 m

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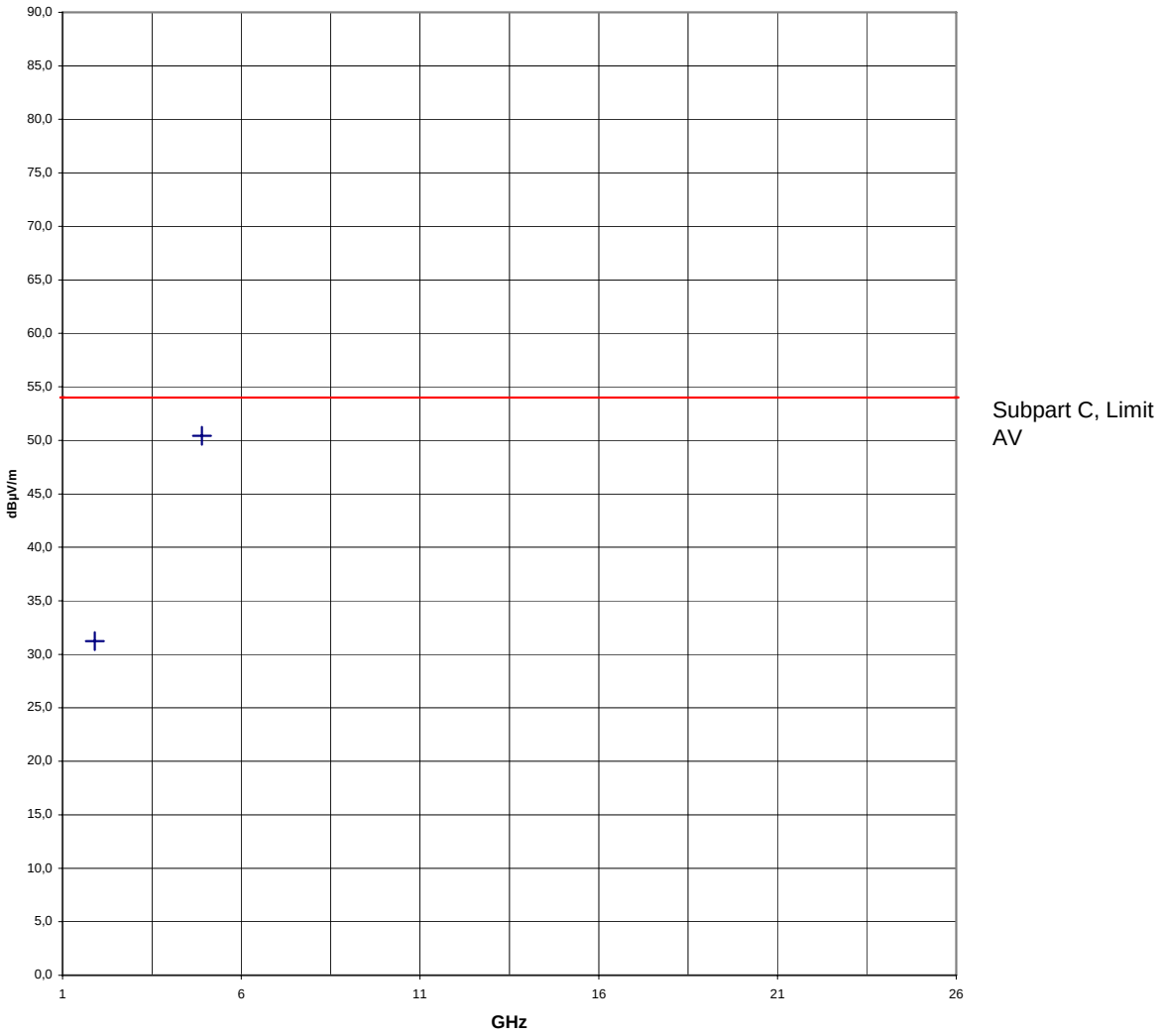
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-RSMA.KS-O-022-03-0,1m	

FCC Part 15 Subpart C, Limit AV **Vertical Polarization**



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FINAL TEST RADIATED EMISSIONS (TABLE):

Vertical Antenna Polarization Test distance: 3 m

Project file:	E-0053-1426-03	**Mode:**	
Applicant:	Funkwerk GmbH	TX- & RX-mode	
Model:	Core11b	CH06	
Date of test:	05.12.2005	worst case situation	
Operator:	Jürgen Pessinger	115V/60Hz	
Detector:	AV	Antenna:	
Result:	Limit kept	ANT-RSMA.KS-O-022-03-0,1m	

FCC Part 15 Subpart C, Limit AV **Vertical Polarization**

Frequency [GHz]	Reading [dBµV]	Correction [dB]	Value [dBµV/m]	Limit [dBµV/m]	Limit exceeded [dB]
1,9	36,8	-5,6	31,2	54,0	
4,9	45,2	5,2	50,4	54,0	

Remarks: Frequencies which are not listed have a margin more than 6dB to the limit.

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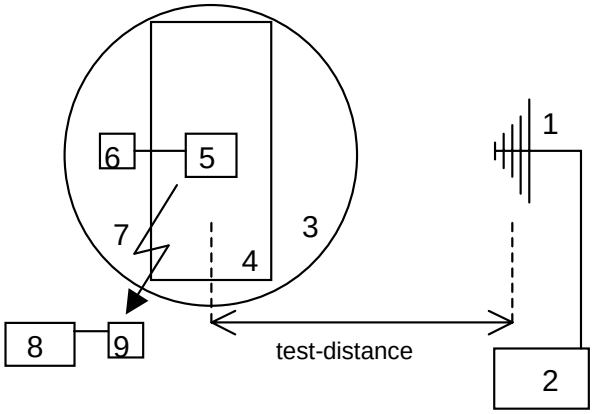
MEASUREMENT SETUP RADIATED EMISSIONS



1 Measurement antenna
2 Test receiver
3 Turn table
4 Wooden table
5 EUT
6 3.3V DC Powersupply
7 Observed data transmission
8 Laptop
9 WLAN Device

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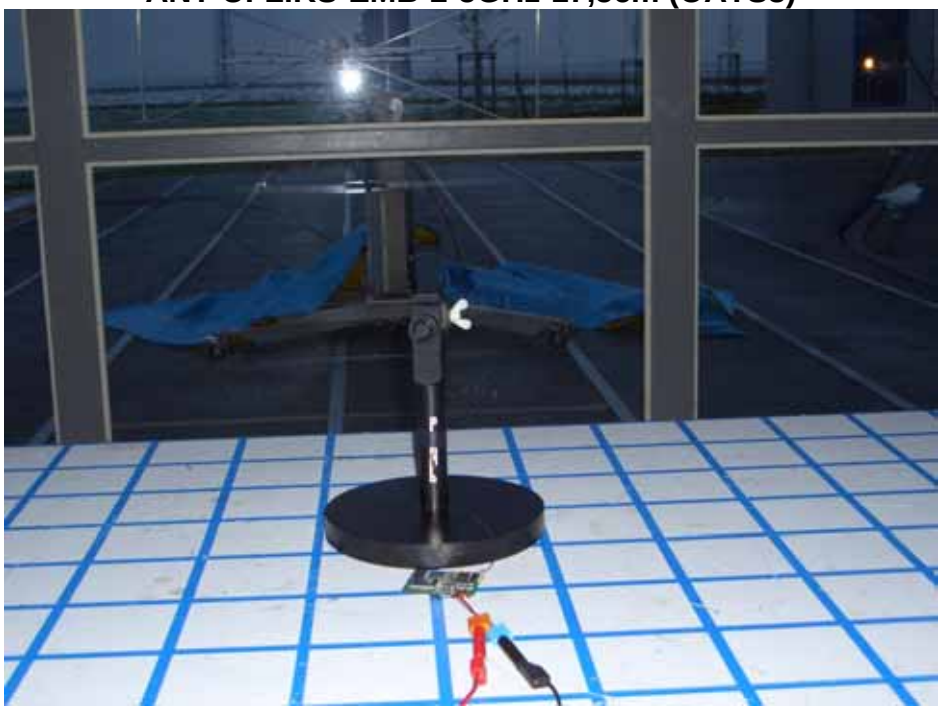
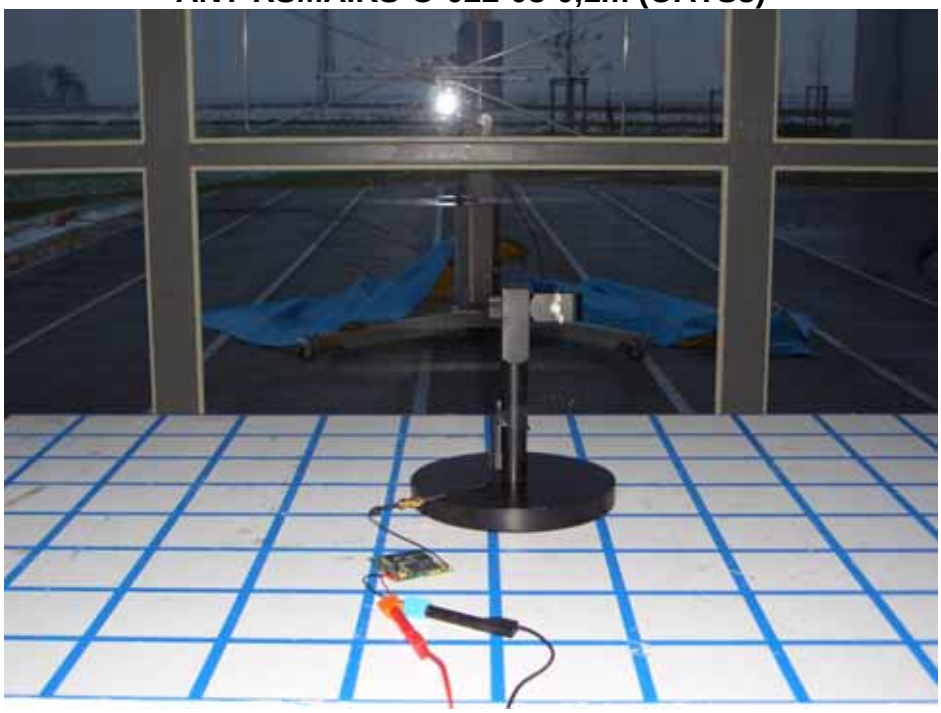
PHOTO TESTSETUP RADIATED EMISSION

ANT-UFL.KS-EMB-2-5GHz-17,5cm (OATS3)



ANT-RSMA.KS-O-022-03-0,1m (OATS3)



ANT-UFL.KS-EMB-2-5GHz-17,5cm (A3)

ANT-RSMA.KS-O-022-03-0,1m (A3)

PHOTOS OF THE EUT

EUT TOPVIEW

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EUT BOTTOMVIEW

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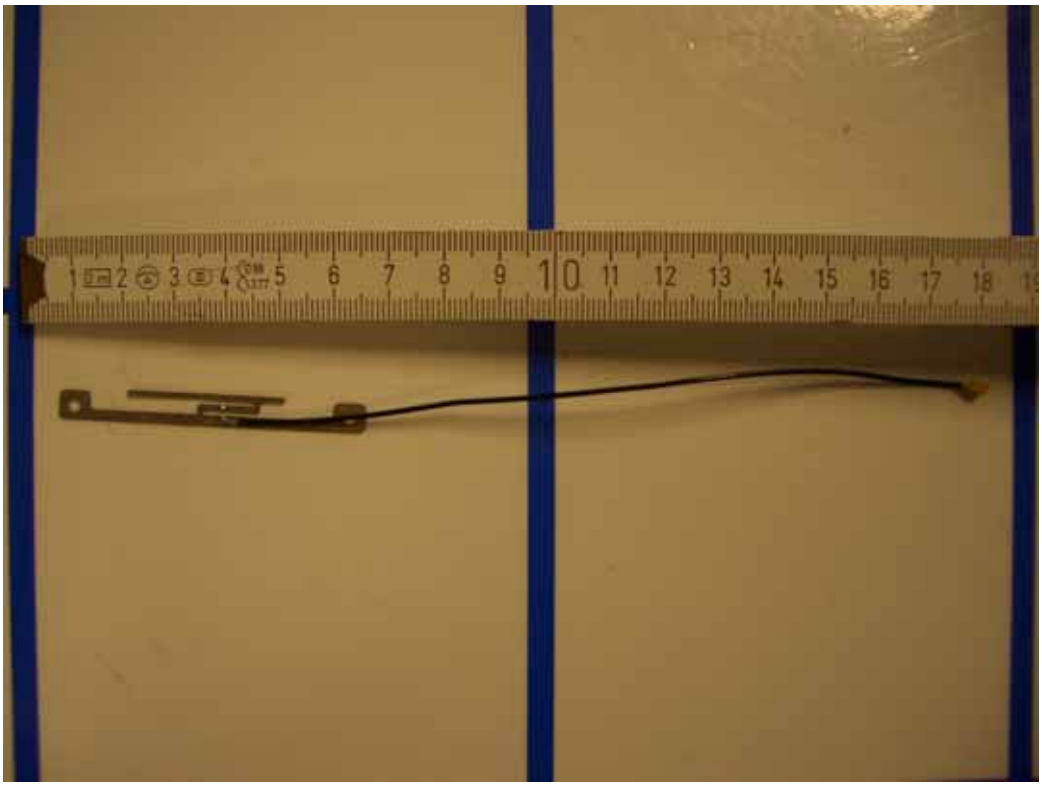
ANTENNA: ANT-UFL.KS-EMB-2-5GHz-17,5cm



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ANTENNA: ANT-RSMA.KS-O-022-03-0,1m

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