Untertürkheimer Straße 6-10 . D-66117 Saarbrücken **RSC-Laboratory**

Phone: +49 (0) 681-598-0 Fax: -9075





Accredited testing-laboratory

DAR registration number: DAT-P-176/94-D1

Federal Motor Transport Authority (KBA) DAR registration number: KBA-P 00070-97

Recognized by the Federal Communications Commission Anechoic chamber registration no.: 90462 (FCC) Anechoic chamber registration no.: 3462C-1 (IC) **Certification ID: DE 0001 Accreditation ID: DE 0002**

Accredited Bluetooth[®] Test Facility (BQTF)
The Bluetooth word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Cetecom ICT is under license

Test report no. : 1-1523-01-03/09 Type identification: DTA200 / DTA201 : ifm electronic gmbh Applicant FCC ID : UN6DTS125MC IC Certification No: 6799A-DTS125MC Test standards : 47 CFR Part 15

RSS - 210 Issue 7

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Test report no.: 1-1523-01-03/09



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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test laboratory manager:

2009-08-04 Daniel Muyunga

Date Name Signature

Technical responsibility for area of testing:

2009-08-04 Stefan Bös

Date Name Signature

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1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10 66117 Saarbrücken

Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

e-mail: info@ICT.cetecom.de

Internet: http://www.cetecom-ict.de

State of accreditation: The test laboratory (area of testing) is accredited according to

DIN EN ISO/IEC 17025

DAR registration number: DAT-P-176/94-D1

Accredited by: Federal Motor Transport Authority (KBA)

DAR registration number: KBA-P 00070-97

Testing location, if different from CETECOM ICT Services GmbH:

Name : Street : Town : Country : Phone : Fax :

1.3 Details of applicant

Name: ifm electronic gmbh

Street: Teichstr. 4
Town: 45127 Essen
Country: GERMANY

Telephone: +49 (0) 7542 518 761 Fax: +49 (0) 7542 518 138

Contact: Christoph Ehrhart

E-mail: christoph.ehrhart@ifm.com

Telephone: +49 (0) 7542 518 761

1.4 Application details

Date of receipt of order: 2009-07-14

Date of receipt of test item: 2009-07-17

Date of start test: 2009-08-03

Date of end test 2009-08-04

Persons(s) who have been present during the test: -/-

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2 Test standard/s

47 CFR Part 15 2008-07 Title 47 of the Code of Federal Regulations; Chapter I-

Federal Communications Commission

subchapter A - general, Part 15-Radio frequency devices

RSS - 210 Issue 7 2007-06 Spectrum Management and Telecommunications - Radio

Standards Specification

Low-power Licence-exempt Radiocommunication Devices (All

Frequency Bands): Category I Equipment

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3 Technical tests

3.1 Details of manufacturer

Name:	ifm syntron gmbh
Street:	Waldesch 9
Town:	88069 Tettnang
Country:	GERMANY

3.2 Test Item

Kind of test item :	125 kHz RFID writing/reading device
Type identification :	DTA200 / DTA201
S/N serial number :	-/-
HW hardware status :	-/-
SW software status :	-/-
Frequency Range (or fixed frequency) :	125 kHz
Type of Modulation :	ASK (downlink)
Number of channels :	1
Antenna :	Internal antenna
Power Supply :	29.05 V DC by power supply
Temperature Range :	-20 °C to +55 °C

FCC ID: **UN6DTS125MC** IC: **6799A-DTS125MC**

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3.3 Test Item (Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	6799A-DTS125MC	
Model Name:	DTA200 / DTA201	
Details of Manufacturer		
Company :	ifm syntron gmbh	
Address :	Waldesch 9	
City :	88069 Tettnang	
Country :	GERMANY	
Details of EUT		
S/N serial number :	-/-	
HW hardware status :	-/-	
SW software status :	-/-	
Tested to Radio Standards Specification (RSS) No.:	RSS-210 Issue 7	
Open Area Test Site Industry Canada Number :	IC 3462C-1	
Frequency Range (or fixed frequency) :	125 kHz	
Field Strength (at what distance) :	6.50 dBµV/m at 300m	
Occupied Bandwidth (99% BW) :	3.78 kHz	
Emission designator :	3K78A1D (downlink)	
Number of channels :	1	
Antenna :	Internal antenna	
Transmitter Spurious (worst case) :	-4.66 dBµV/m at 30m	
Power Supply :	29.05 V DC by power supply	
Temperature Range :	-20 °C to +55 °C	

ATTESTATION: I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:

Date: 2009-08-04

Test engineer: Daniel Muyunga

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3.4 RF Technical Brief Cover Sheet acc. To RSS-102

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

1. COMPANY NUMBER:	6799A
2. MODEL NUMBER:	DTA200 / DTA201
3. MANUFACTURER:	ifm syntron gmbh
4. TYPE OF EVALUATION:	N/A
(c) RF Evaluation • Evaluated against exposure limit • Duty cycle used in evaluation: N • Standard used for evaluation: RS • Measurement distance: 0.2 m • RF value: N/A V/m □ A/m □ W/Measured □ Computed □ Calcu	SS-102 Issue 2 (2005-11)

/500 A

Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in this test report is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Name: Daniel Muyunga, Dipl.-Ing. (FH)

Title: Engineer

Company: Cetecom ICT Services GmbH

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3.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T_{nom}	°C	+23
Nominal Humidity	H_{nom}	%	50
Nominal Power Source	V_{nom}	V	29.05

Type of power source: DC by power supply

3.6 Additional informations

The model DTA201 is identical in hardware and in software to the model DTA200. The only difference between the two models is that the DTA200 is a read/write-device whereas the DTA201is a read-only device.

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4 Statement of Compliance

4.1 Summary of Measurement Results

- $oxed{oxed}$ No deviations from the technical specifications were ascertained
- ☐ There were deviations from the technical specifications ascertained

4.2 CFR 47 Part 15 Unintentional Radiators

Section in this Report	Test Name / Section FCC Part 15	Test Name / Section RSS 210	applicable	Verdict
4.1	§ 15.35 (c) Timing of the transmitter (Duty cycle correction factor)	6.5 Pulsed Operation	No	
4.2	§ 15.225 (a) FIELDSTRENGTH OF FUNDAMENTAL	Annex 2.6	YES	pass
4.3	§ 15.225 (b,c,d) FIELDSTRENGTH OF HARMONICS and SPURIOUS	Annex 2.6	YES	pass
4.4	§ 15.225 (e) Frequency tolerance	Annex 2.6	NO	
4.5	§ 15.107 / 15.207 Conducted Limits	Section 6.6, 7.4	NO	

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5 Measurements and results

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers or free field. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna 200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna >1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.209 and 15.207

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6 FCC Part 15 Subpart C

6.1 Timing of the transmitter

Not applicable

Reference

FCC:	CFR Part SUBCLAUSE § 15.35 (c)
IC:	RSS 210, Issue 7 6.5 PULSED OPERATION

Limits: § 15.35 (c)

(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

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6.2 Field strength of the fundamental

Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a)
IC:	RSS 210, Annex 2.6

The model DTA201 is identical in hardware and in software to the model DTA200. The only difference between the two models is that the DTA200 is a read/write-device whereas the DTA201is a read-only device.

TEST CONDITIONS		MAXIMUM FIELD STRENGTH (measured at 10 m)
Frequency DTA200/DTA201		125 kHz
$T_{nom} = +23 \text{ °C}$ $V_{nom} = 29.05 \text{ V}$		66.5 dBμV/m AV
Measurement uncertainty		±3dB

RBW/VBW: 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Limits SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental	Measurement Distance (meters)
	$(\mu V/m)$	
0.009 - 0.490	2400 / F (kHz)	300
0.490 - 1.705	24000 / F (kHz)	30
1.705 – 30.0	30 (29.5 dBµV/m)	30
30.0 - 88.0	100 (40 dBμv/m)	3
88 – 216	150 (43.5 dBμV/m)	3
216 – 960	$200 (46 dB\mu V/m)$	3

RBW/VBW: 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

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6.3 Field strength of the harmonics and the spurious

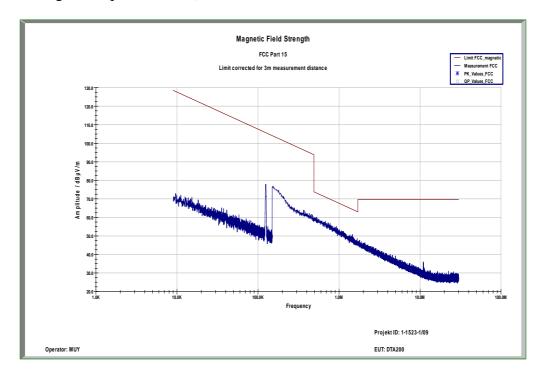
Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a)
IC:	RSS 210, Annex 2.6

The model DTA201 is identical in hardware and in software to the model DTA200. The only difference between the two models is that the DTA200 is a read/write-device whereas the DTA201is a read-only device.

Plot 1: DTA200

Part 15.209 Magnetics (peak detector)



Results

Results								
		EM	ISSION LIMITATI	ONS				
f (MHz)		amplitude of emission (dBµV/m)	limit max. allowed field strength	Distance (Meter)	results			
	No peaks detected							
Measurement uncertainty		± 3dB						

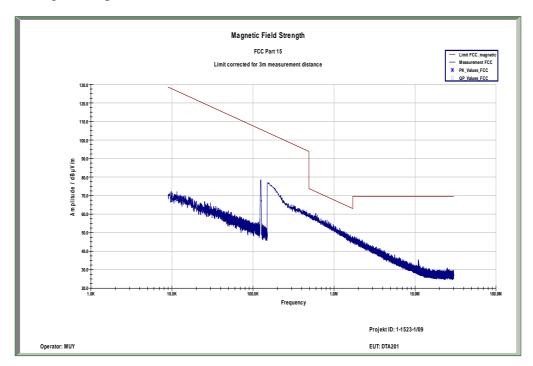
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Plot 2: DTA201

Part 15.209 Magnetics (peak detector)



	EMISSION LIMITATIONS								
f (MHz)	amplitude of emission (dBµV/m)	limit max. allowed field strength	Distance (Meter)	results					
		No peaks detected							
Me	easurement uncertainty		± 3dB						

Limits

SUBCLAUSE § 15.209 (a)

	Fundamental Frequency (MHz)	Field strength of Fundamental	Measurement Distance (meters)
		$(\mu V/m)$	
ĺ	0.009 - 0.490	2400 / F (kHz)	300
ĺ	0.490 - 1.705	24000 / F (kHz)	30
ĺ	1.705 - 30.0	$30 (29.5 \text{ dB}\mu\text{V/m})$	30
ĺ	30.0 - 88.0	100 (40 dBμv/m)	3
ĺ	88 – 216	150 (43.5 dBμV/m)	3
ĺ	216 – 960	200 (46 dBμV/m)	3

RBW/VBW: 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

(to convert the measuring distance from 10m to 30m and 30 to 300m a correction factor from 40 dB/decade was used. Here we use 60 dB to recalculate from 10m to 300m)

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6.4 Frequency tolerance

Not performed

Reference

FCC: CFR Part SUBCLAUSE § 15.225 (e)

IC: RSS 210, Annex 2.6

	Frequency tolerance							
Ove	Over temperature variation			r voltage variat				
T (°C)]	Frequency	result	Power voltage	Frequency	result	F [MHz]	Detector	Level [µV/m]
-20°								
-10°								
0°								
10°								
20°								
30°								
40°								
50°								
Measuren	Measurement uncertainty							

Limits

SUBCLAUSE § 15.225

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of $\pm 0.01\%$ degrees to $\pm 0.01\%$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

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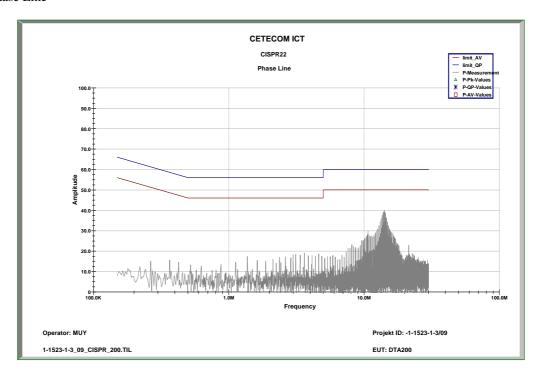


6.5 AC Line Conducted Limits

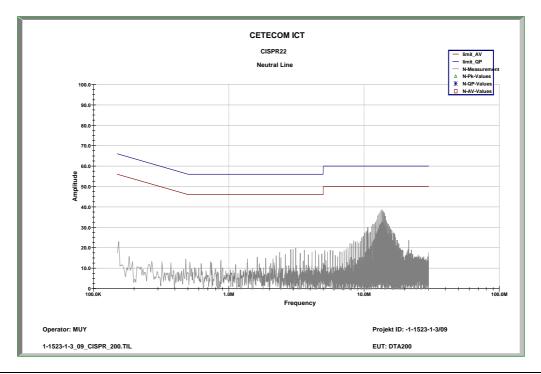
Reference

FCC: CFR Part 15.207, 15.107
IC: RSS 210, Issue 7, Section 6.6, 7.4

Plot 1: Phase Line



Plot 2: Neutral Line

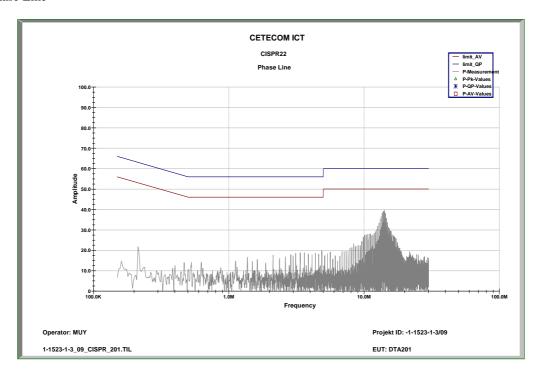


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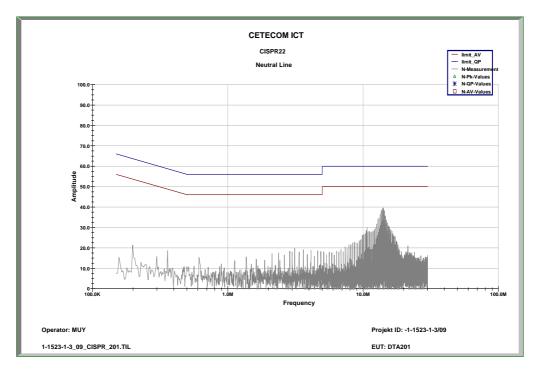
Test report no.: 1-1523-01-03/09



Plot 3: Phase Line



Plot 4: Neutral Line



Limits: § 15.107 / 15.207

Limits. § 15.107 / 15.207				
Frequency of Emission (MHz)	Conducted Limit (dBµV)			
	Quasi-peak	Average		
0.15 - 0.5	66 to 56 *	56 to 46 *		
0.5 - 5	56	46		
5 - 30	60	50		

^{*} Decreases with the logarithm of the frequency

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7 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.

Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.

All used devices are connected with a 10 MHz external reference.

According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

Anechoic chamber C:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Anechoic chamber	MWB	87400/02	300000996	Monthly verification		
2	System-Rack 85900	HP I.V.	*	300000222	n.a.		
3	Measurement System 1						
4	PSA-Spektrumanalysator 3 Hz - 26.5 GHz (E4440A)	Agilent	MY48250080	300003812	05.08.2008	24	05.08.2010
5	EMI Preselector 9 kHz - 1 GHz (N9039A)	Agilent	MY48260003	300003825	19.08.2008	24	19.08.2010
6	Microwave Analog Signal Generator (N5183A)	Agilent	MY47420220	300003813	06.08.2008	24	06.08.2010
7	PC	F+W			n.a.		
8	TILE	TILE			n.a.		
9	TRILOG Super Broadband Antenna (VULB9163)	Schwarzbeck	371	300003854	Monthly verifica	tion (System cal.))
10	Double Ridged Antenna 3115	EMCO	3088	300001032	Monthly verification (System cal.)		
11	Active Loop Antenna 6502	EMCO	2210	300001015	Monthly verification (System cal.)		
12	Switch / Control Unit 3488A	HP	2719A15013	300001156	n.a.		
13	Power Supply 6032A	HP	2818A03450	300001040	08.01.2009	36	08.01.2012
14	Busisolator	Kontron		300001056	n.a.		
15	Leitungsteiler 11850C	HP		300000997	Monthly verifica	tion (System cal.)
16	Power attenuator 8325	Byrd	1530	300001595	Monthly verifica	tion (System cal.))
17	Band reject filter WRCG1855/1910	Wainwright	7	300003350	Monthly verifica	tion (System cal.))
18	Band reject filter WRCG2400/2483	Wainwright	11	300003351	Monthly verifica	tion (System cal.))
19	Hochpassfilter WHK1.1/15G- 10SS	Wainwright	3	300003255	Monthly verification (System cal.)		
20	Hochpassfilter WHKX2.9/18G- 12SS	Wainwright	1	300003492	Monthly verification (System cal.)		
21	Hochpassfilter WHKX7.0/18G- 8SS	Wainwright	18	300003789	Monthly verification (System cal.))
22	Switch / Control Unit 3488A	HP	2605e08770	300001443	n.a.		
23	Trenntrafo RT5A	Grundig	9242	300001263	n.a.		
24	Relais Matrix PSU	R&S	890167/024	300001168	n.a.		
25	Netznachbildung ESH3-Z5	R&S	828576/020	300001210	n.a.		

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SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	300002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	300002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	300002681	n.a.		
4	19" Monitor		22759020-ED	300002681	n.a.		
5	Mouse		LZE 0095/6639	300002681	n.a.		
6	Keyboard		G00013834L461	300002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	300002681-0005	10.01.2008	24	10.01.2010
8	Tracking Generator FSIQ-B10	R&S	835107/015	300002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	300002681-0002	26.08.2008	36	26.08.2011
11	Modulation Coder SMIQ-B20	R&S	To 10	300002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	300002681	s.No.10		
13	RF Rear Connection SMIQ- B19	R&S	To 10	300002681	s.No.10		
14	Broadband horn antenna (1-18 GHz)	EMCO	9107-3696	300001604	16.04.2008	24	16.04.2010
15	Broadband horn antenna (1-18 GHz)	EMCO	9107-3697	300001605	21.08.2008	24	21.08.2010
16	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	300000486	n.a.		
17	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	300000487	n.a.		
18	Sleeve dipole antenna Model 3126-880	ETS- Lindgren	00040887	3000000	n.a.		
19	Fast CPU SM-B50	R&S	To 10	300002681	s.No.10		
20	FM Modulator SM-B5	R&S	835676/033	300002681	s.No.10		
21	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	300002681-0001	25.08.2008	36	25.08.2011
22	Modulation Coder SMIQ-B20	R&S	To 21	300002681	s.No.21		
23	Data Generator SMIQ-B11	R&S	To 21	300002681	s.No.21		
24	RF Rear Connection SMIQ- B19	R&S	To 21	300002681	s.No.21		
25	Fast CPU SM-B50	R&S	To 21	300002681	s.No.21		
26	FM Modulator SM-B5	R&S	836061/022	300002681	s.No.21		
27	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	300002681-0003	26.08.2008	36	26.08.2011
28	Attenuator SMP-B15	R&S	835136/014	300002681	S.No.27		
29	RF Rear Connection SMP-B19	R&S	834745/007	300002681	S.No.27		
30	Power Meter NRVD	R&S	835430/044	300002681-0004	26.08.2008	24	26.08.2010
31	Power Sensor NRVD-Z1	R&S	833894/012	300002681-0013	26.08.2008	24	26.08.2010
32	Power Sensor NRVD-Z1	R&S	833894/011	300002681-0010	26.08.2008	24	26.08.2010
33	Rubidium Standard RUB	R&S		300002681-0009	27.08.2008	24	27.08.2010
34	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	300002681-0006	Verified with pa	th compensation	
35	Laser Printer HP Deskjet 2100	HP	N/A	300002681-0011	n.a.		
36	19" Rack	R&S	11138363000004	300002681	n.a.		
37	RF-cable set	R&S	N/A	300002681	n.a.		
39	IEEE-cables	R&S	N/A	300002681	n.a.		
40	Sampling System FSIQ-B70	R&S	835355/009	300002681	s.No.7		
41	RSP programmable attenuator	R&S	834500/010	300002681-0007	26.08.2008	24	26.08.2010
42	Signalling Unit	R&S	838312/011	300002681	n.a.		
43	NGPE programmable Power Supply for EUT	R&S	192.033.41	300002681			
44	Power Splitter 6005-3	Inmet Corp.	none	300002841	n.a.		
45	SMA Cables SPS-1151-985- SPS	Insulated Wire	different	different	n.a.		
46	CBT32 with EDR Signaling	R&S					

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47	Coupling unit	Narda	N/A		n.a.	_	
48	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
49	RF-cable set	R&S	N/A	different	n.a.		
50	IEEE-cables	R&S	N/A		n.a.		

Note: 3000002681-00xx inventoried as a system

Anechoic chamber F:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna VULB 9163	Schwarzbeck	295	300003787	01.04.2008	24	01.04.2010
3	Amplifier - 0518C-138	Veritech Micro- wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2007	24	31.01.2009
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-

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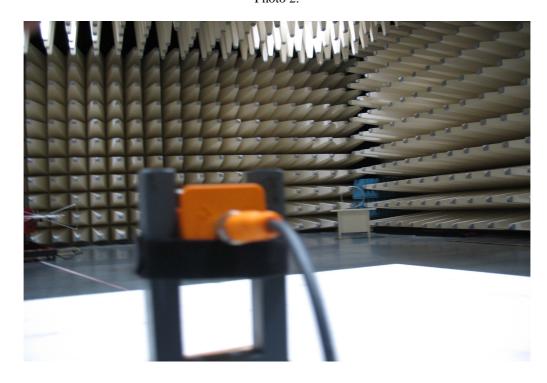
8 Photographs of the Test Set-up

Photo documentation

Photo 1:



Photo 2:



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Photo 3:



Photo 4:



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9 Photographs of the EUT

Photo documentation Photo 2:



Photo 4.1:



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Photo 3:



Photo 4:



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Photo 5:



Photo 6:



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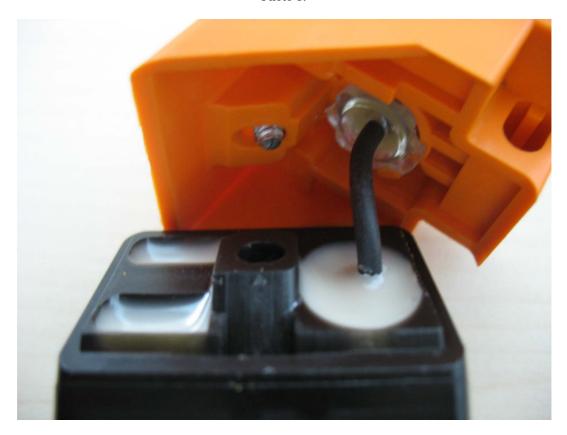
Test report no.: 1-1523-01-03/09



Photo 7:



Photo 8:



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Test report no.: 1-1523-01-03/09



Photo 9:

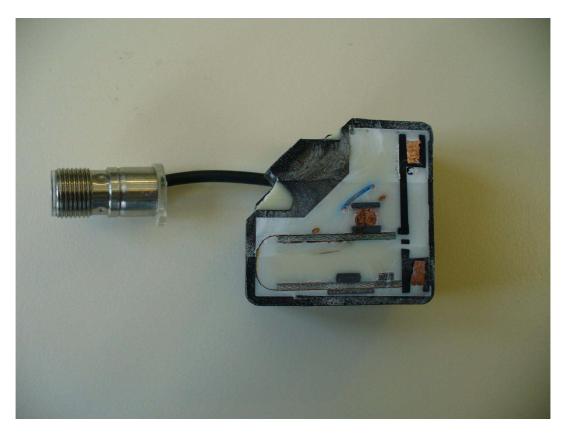
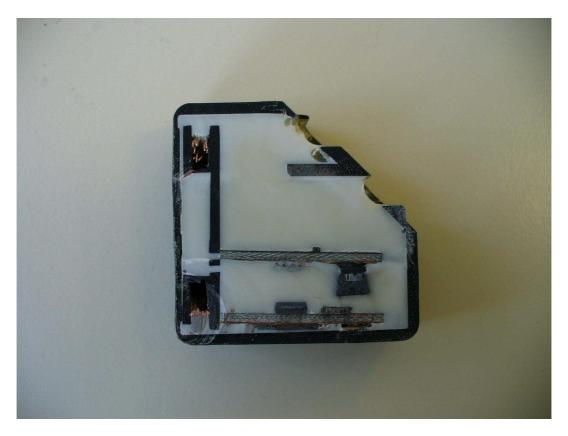


Photo 10:



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