



Inter**Lab**[®]

Final Report on

cRIO GXXX 3G MOBILE HSDPA Module

SW: 1.0.1 (SV15)

HW: 1.04

Report Reference: MDE_SEA_0901_FCCb
FCC part 15b

Date: November 19, 2009

Test Laboratory:

7 layers AG
Borsigstr. 11
40880 Ratingen
Germany



DAT-P-192/99-01

Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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1 Administrative Data

1.1 Project Data

Project Responsible: Holger Leutfeld
Date Of Test Report: 2009/11/12
Date of first test: 2009/09/10
Date of last test: 2009/09/10

1.2 Applicant Data

Company Name: S.E.A. Datentechnik GmbH
Street: Linder Höhe
51147 Köln
Country: Germany
Contact Person: Hr. Wolfram Koerver
Function: Director
Phone: +49 2203 98007-23
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E-Mail: wolfram.koerver@sea-gmbh.com

1.3 Test Laboratory Data

The following list shows all places and laboratories involved for test result generation:

7 layers DE

Company Name : 7 layers AG
Street : Borsigstrasse 11
City : 40880 Ratingen
Country : Germany
Contact Person : Mr. Michael Albert
Phone : +49 2102 749 201
Fax : +49 2102 749 444
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Laboratory Details

<i>Lab ID</i>	<i>Identification</i>	<i>Responsible</i>	<i>Accreditation Info</i>
Lab 1	Radiated Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAR-Registration no. DAT-P-192/99-01

1.4 Signature of the Testing Responsible



Andreas Petz
responsible for tests performed in: Lab 1



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1.5 Signature of the Accreditation Responsible



Accreditation scope responsible person
responsible for Lab 1



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2 Test Object Data

2.1 General OUT Description

The following section lists all OUTs (Object's Under Test) involved during testing.

OUT: cRIO GXXX 3G MOBILE HSDPA Module

<i>Type / Model / Family:</i>	cRIO GXXX 3G MOBILE HSDPA Module SW: 1.0.1 (SV15) HW: 1.04
<i>Product Category:</i>	Computer Accessory
Manufacturer:	
<i>Company Name:</i>	S.E.A. Datentechnik GmbH
<i>Street:</i>	Linder Höhe 51147 Köln
<i>Country:</i>	Germany
<i>Contact Person:</i>	Mr. Wolfram Koerver
<i>Function:</i>	Director
<i>Phone:</i>	+49 2203 98007-23
<i>E-Mail:</i>	wolfram.koerver@sea-gmbh.com

2.2 Detailed Description of OUT Samples

Sample : B01

<i>OUT Identifier</i>	cRIO GXXX 3G MOBILE HSDPA Module		
<i>Sample Description</i>			
<i>HW Status</i>	1.0.4		
<i>SW Status</i>	1.0.1 (SV15)		
<i>Low Voltage</i>	10 V	<i>Low Temp.</i>	-10 °C
<i>High Voltage</i>	30 V	<i>High Temp.</i>	55 °C
<i>Nominal Voltage</i>	12 V	<i>Normal Temp.</i>	21 °C

2.3 OUT Features

Features for OUT: cRIO GXXX 3G MOBILE HSDPA Module

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
Features for scope: FCC_v2			
Dant	removable antenna supplied and type tested with the radio equipment, designed as an example part of the equipment		
DC	The OUT is powered by or connected to DC Mains		
EDGE850	EUT supports EDGE in the band 824 MHz - 849 MHz		
EDGE1900	EUT supports EDGE in the band 1850 MHz - 1910 MHz		
FDD2	EUT supports UMTS FDD2 in the band 1850 MHz - 1910 MHz		
FDD5	EUT supports UMTS FDD5 in the band 824 MHz - 849 MHz		
GSM850	EUT supports GSM850 band 824MHz - 849MHz		
PantC	permanent fixed antenna connector, which may be built-in, designed as an indispensable part of the equipment		
PCS1900	EUT supports PCS1900 band 1850MHz - 1910MHz		

2.4 Setups used for Testing

For each setup a relation is given to determine if and which samples and auxiliary equipment is used. The left side list all OUT samples and the right side lists all auxiliary equipment for the given setup.

<i>Setup No.</i>	<i>List of OUT samples</i>	<i>List of auxiliary equipment</i>
<i>Sample No.</i>	<i>Sample Description</i>	<i>AE No. AE Description</i>

B01

Sample: B01

3 Results

3.1 General

Documentation of tested devices:

Available at the test laboratory.

Interpretation of the test results:

The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.

In cases where 'Declaration' is printed, the required documents are available in the manufacturers product documentation.

In cases where 'not applicable' is printed, the test case requirements are not relevant to the specific equipment implementation. EUT complies with the Class B limits of §15.107

3.2 List of the Applicable Body

(Body for Scope: FCC_v2)

<i>Designation</i>	<i>Description</i>
FCC47CFRChIPART15bRADIO FREQUENCY DEVICES	Part 15, Subpart B - Unintentional Radiators

3.3 List of Test Specification

Test Specification: **FCC part 2 and 15**
Date / Version 2009/03/26 Version: 10-1-08 Edition
Title: PART 2 - GENERAL RULES AND REGULATIONS
PART 15 - RADIO FREQUENCY DEVICES



3.4 Summary

<i>Test Case Identifier / Name</i> <i>Test (condition)</i>	<i>Result</i>	<i>Date of Test</i>	<i>Lab</i> <i>Ref.</i>	<i>Setup</i>
15b.2 Spurious Radiated Emissions §15.109 15b.2; Mode = transmit	Passed	2009/09/10	Lab 1	B01



3.5 Detailed Results

3.5.1 15b.2 Spurious Radiated Emissions §15.109

Test: 15b.2; Mode = transmit

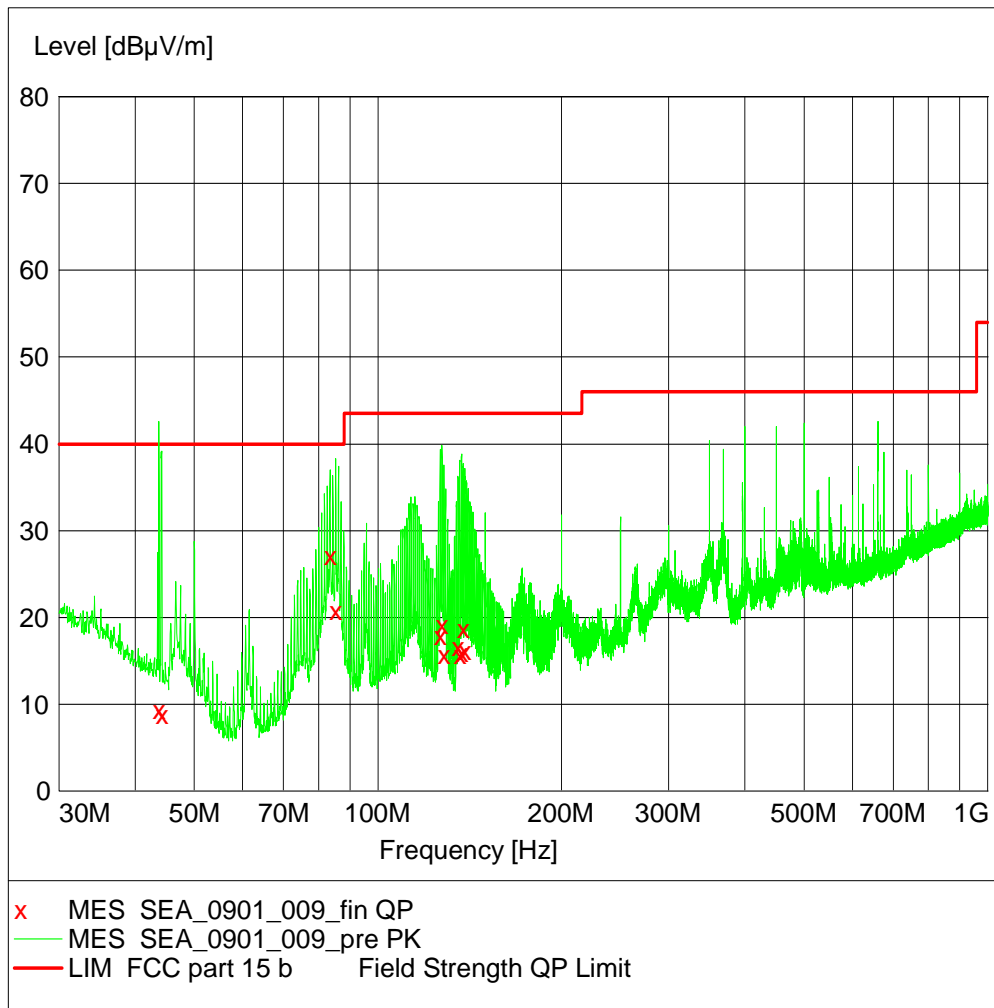
<i>Result:</i>	Passed
<i>Setup No.:</i>	B01
<i>Date of Test:</i>	2009/09/10 7:24
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

Detailed Results:

EMI RADIATED TEST

Diagram No.: 2.01

EUT: cRIO--Gxxx-3G (38130b01)
 Manufacturer: SEA Datentechnik GmbH
 Operating Condition: GPRS traffic
 Test Site: 7 layers, Ratingen
 Operator: MAC
 Test Specification: FCC 15 B
 Comment: Horizontal + vertical antenna polarisation
 Start of Test: 10.09.2009 / 10:51:56



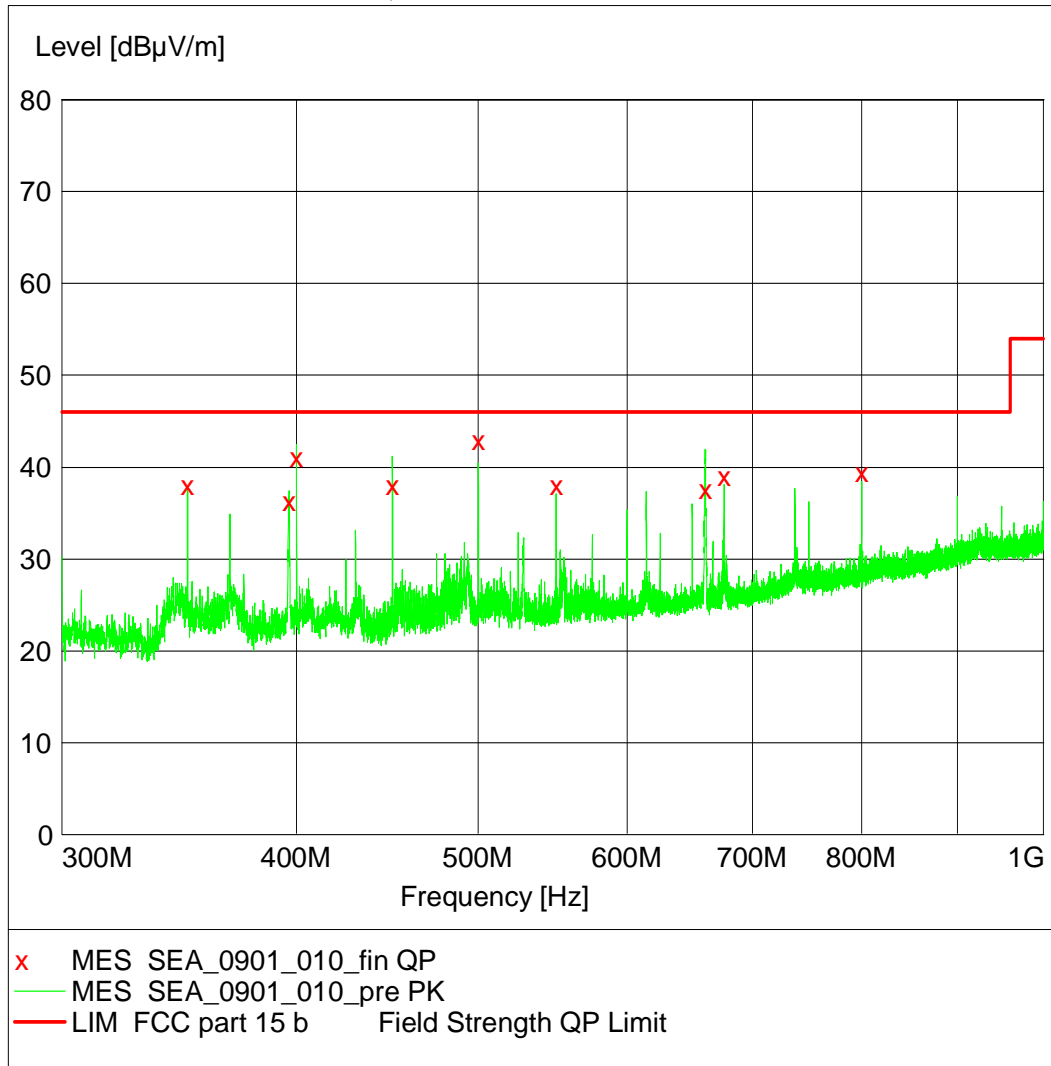
MEASUREMENT RESULT: "SEA_0901_009_fin QP"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
43.680000	9.40	13.0	40.0	30.6	125.0	112.00	VERTICAL
44.220000	8.80	12.7	40.0	31.2	101.0	124.00	HORIZONTAL
83.460000	27.10	10.0	40.0	12.9	124.0	157.00	VERTICAL
85.260000	20.80	10.1	40.0	19.2	111.0	191.00	VERTICAL
126.540000	17.90	10.7	43.0	25.1	106.0	157.00	VERTICAL
127.440000	19.10	10.6	43.0	23.9	100.0	193.00	VERTICAL
128.340000	15.70	10.6	43.0	27.3	125.0	247.00	VERTICAL
135.300000	16.60	10.2	43.0	26.4	105.0	157.00	VERTICAL
136.260000	15.70	10.2	43.0	27.3	100.0	157.00	VERTICAL
137.160000	15.90	10.1	43.0	27.1	105.0	157.00	VERTICAL
137.940000	18.70	10.0	43.0	24.3	100.0	157.00	VERTICAL
138.900000	16.20	10.0	43.0	27.8	100.0	165.00	VERTICAL

EMI RADIATED TEST

Diagram No.: 2.01b

EUT: cRIO--Gxxx-3G (38130b01)
 Manufacturer: SEA Datentechnik GmbH
 Operating Condition: GPRS traffic
 Test Site: 7 layers, Ratingen
 Operator: MAC
 Test Specification: FCC 15 B
 Comment: Horizontal + vertical antenna polarisation
 Start of Test: 10.09.2009 / 11:56:39



MEASUREMENT RESULT: "SEA_0901_010_fin QP"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
349.980000	38.10	15.5	47.0	8.9	106.0	112.00	HORIZONTAL
396.420000	36.30	16.8	47.0	10.7	102.0	149.00	HORIZONTAL
400.020000	41.10	16.9	47.0	5.9	111.0	112.00	HORIZONTAL
450.000000	38.10	18.4	47.0	8.9	100.0	158.00	HORIZONTAL
499.980000	43.00	19.6	47.0	4.0	155.0	192.00	HORIZONTAL
550.020000	38.00	20.6	47.0	9.0	105.0	158.00	VERTICAL
660.540000	37.60	22.8	47.0	9.4	100.0	0.00	HORIZONTAL
675.840000	39.00	22.8	47.0	8.0	100.0	230.00	HORIZONTAL
799.980000	39.40	25.3	47.0	7.6	110.0	235.00	HORIZONTAL

4 Test Equipment Details

4.1 List of Used Test Equipment

The calibration, hardware and software states are shown for the testing period.

Test Equipment Anechoic Chamber

Lab ID:	Lab 1		
Manufacturer:	Frankonia		
Description:	Anechoic Chamber for radiated testing		
Type:	10.58x6.38x6		
	<i>Calibration Details</i>	<i>Last Execution</i>	<i>Next Exec.</i>
	FCC renewal	2006/12/19	2009/12/19
	IC renewal	2009/01/21	2011/01/20
	FCC renewal	2009/01/07	2011/01/06

Single Devices for Anechoic Chamber

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Air compressor	none	-	Atlas Copco
Anechoic Chamber	10.58 x 6.38 x 6	none	Frankonia
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	FCC listing 96716 3m Part15/18		2009/01/07 2011/01/06
	ANSI C64.3 NSA		2009/01/21 2011/01/20
Controller Innco 2000	CO 2000	CO2000/328/1247 0406/L	Innco innovative constructions GmbH
EMC camera	CE-CAM/1	-	CE-SYS
EMC camera Nr.2	CCD-400E	0005033	Mitsubishi
Filter ISDN	B84312-C110-E1		Siemens&Matsushita
Filter Universal 1A	BB4312-C30-H3	-	Siemens&Matsushita

Test Equipment Auxiliary Equipment for Radiated emissions

Lab ID: Lab 1
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Auxiliary Equipment for Radiated emissions

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Antenna mast	AS 620 P		HD GmbH
Biconical dipole	VUBA 9117 <i>Calibration Details</i>	9117108	Schwarzbeck <i>Last Execution Next Exec.</i>
	Standard Calibration		2008/10/27 2013/10/26
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32-5P <i>Calibration Details</i>	849785	Miteq <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4 <i>Calibration Details</i>	-	Miteq <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P <i>Calibration Details</i>	896037	Miteq <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
Cable "ESI to EMI Antenna"	EcoFlex10 <i>Calibration Details</i>	W18.01- 2+W38.01-2	Kabel Kusch <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
Cable "ESI to Horn Antenna"	UFB311A+UFB293C <i>Calibration Details</i>	W18.02- 2+W38.02-2	Rosenberger Micro-Coax <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
Double-ridged horn	HF 906 <i>Calibration Details</i>	357357/001	Rohde & Schwarz GmbH & Co. KG <i>Last Execution Next Exec.</i>
	Standard Calibration		2009/04/16 2012/04/15
Double-ridged horn	HF 906 <i>Calibration Details</i>	357357/002	Rohde & Schwarz GmbH & Co. KG <i>Last Execution Next Exec.</i>
	Standard Calibration		2009/04/28 2012/04/27
Dreheinheit	DE 325		HD GmbH
High Pass Filter	4HC1600/12750-1.5-KK <i>Calibration Details</i>	9942011	Trilithic <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
High Pass Filter	5HC2700/12750-1.5-KK <i>Calibration Details</i>	9942012	Trilithic <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
High Pass Filter	5HC3500/12750-1.2-KK <i>Calibration Details</i>	200035008	Trilithic <i>Last Execution Next Exec.</i>
	Path Calibration		2009/05/18 2009/11/17
Log.-per. Antenna	HL 562 Ultralog <i>Calibration Details</i>	830547/003	Rohde & Schwarz GmbH & Co. KG <i>Last Execution Next Exec.</i>

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
	Standard Calibration		2009/05/27 2012/05/26
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	DKD calibration		2008/10/07 2011/10/06
Pyramidal Horn Antenna 26,5 GHz	3160-09	00083069	EMCO Elektronik GmbH
Pyramidal Horn Antenna 40 GHz	3160-10	00086675	EMCO Elektronik GmbH

Test Equipment Auxiliary Test Equipment

Lab ID: Lab 1
Manufacturer: see single devices
Description: Single Devices for various Test Equipment
Type: various
Serial Number: none

Single Devices for Auxiliary Test Equipment

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
AC Power Source	Chroma 6404	64040001304	Chroma ATE INC.
Broadband Power Divider N (Aux)	1506A / 93459	LM390	Weinschel Associates
Broadband Power Divider SMA	WA1515	A855	Weinschel Associates
Digital Multimeter 01 (Multimeter)	Voltcraft M-3860M	IJ096055	Conrad Electronics
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	Fluke Europe B.V.
Digital Oscilloscope [SA2] (Aux)	TDS 784C	B021311	Tektronix GmbH
Fibre optic link Satellite (Aux)	FO RS232 Link	181-018	Pontis
Fibre optic link Transceiver (Aux)	FO RS232 Link	182-018	Pontis
Isolating Transformer	LTS 604	1888	Thalheimer Transformatorenwerke GmbH
Notch Filter Ultra Stable (Aux)	WRCA800/960-6EEK	24	Wainwright
Spectrum Analyser	FSP3	836722/011	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	DKD calibration		2008/10/06 2011/10/05

Test Equipment Digital Signalling Devices

Lab ID: Lab 1
Description: Signalling equipment for various wireless technologies.

Single Devices for Digital Signalling Devices

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Bluetooth Signalling Unit CBT	CBT	100589	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2008/08/14 2011/08/13
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2008/10/07 2010/10/06
Digital Radio Test Set	6103E	2359	Racal Instruments, Ltd.
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2009/02/16 2011/02/15
	<i>HW/SW Status</i>		<i>Date of Start</i> <i>Date of End</i>
	Hardware:		2007/07/16
	B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B56V14, B68 3v04, PCMCIA, U65V04 Software: K21 4v21, K22 4v21, K23 4v21, K24 4v21, K42 4v21, K43 4v21, K53 4v21, K56 4v22, K57 4v22, K58 4v22, K59 4v22, K61 4v22, K62 4v22, K63 4v22, K64 4v22, K65 4v22, K66 4v22, K67 4v22, K68 4v22, K69 4v22 Firmware: µP1 8v50 02.05.06 ---		
Universal Radio Communication Tester	CMU 200	837983/052	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2008/12/01 2011/11/30
	<i>HW/SW Status</i>		<i>Date of Start</i> <i>Date of End</i>
	HW options:		2007/01/02
	B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B54V14, B56V14, B68 3v04, B95, PCMCIA, U65V02 SW options: K21 4v11, K22 4v11, K23 4v11, K24 4v11, K27 4v10, K28 4v10, K42 4v11, K43 4v11, K53 4v10, K65 4v10, K66 4v10, K68 4v10, Firmware: µP1 8v40 01.12.05 --- SW: K62, K69		
Vector Signal Generator	SMU200A	100912	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2008/10/28 2011/10/27

Test Equipment Emission measurement devices

Lab ID: Lab 1
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Emission measurement devices

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>	
Personal Computer	Dell		Dell	
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>	
	Standard Calibration		2007/12/05	2010/12/04
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>	
	Standard Calibration		2007/12/06	2009/12/05

4.2 Laboratory Environmental Conditions

<i>Laboratory</i>	<i>Date</i>	<i>Temperature</i>	<i>Humidity</i>	<i>Air Pressure</i>
Lab 1	2009/09/10	25 °C	38 %	1025 hPa



5 Annex
5.1 Additional Information for Report

Test Description

Conducted emissions (AC power line)

Standard FCC Part 15, 10-1-08
Subpart B

The test was performed according to: ANSI C 63.4, 2003

Test Description

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2003. The Equipment Under Test (EUT) was setup in a shielded room to perform the conducted emissions measurements in a typical installation configuration. The EUT was powered from 50 μ H || 50 Ohm Line Impedance Stabilization Network (LISN). The LISN's unused connections were terminated with 50 Ohm loads.

The measurement procedure consists of two steps. It is implemented into the EMI test software ES-K1 from R&S.

Step 1: Preliminary scan

Intention of this step is, to determine the conducted EMI-profile of the EUT.

EMI receiver settings:

- Detector: Peak - Maxhold
- Frequency range: 150 kHz – 30 MHz
- Frequency steps: 5 kHz
- IF-Bandwidth: 9 kHz
- Measuring time / Frequency step: 20 ms
- Measurement on phase + neutral lines of the power cords

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2: Final measurement

Intention of this step is, to determine the highest emissions with the settings defined in the test specification for the frequencies identified in step 1.

EMI receiver settings:

- Detector: Quasi-Peak
- IF - Bandwidth: 9 kHz
- Measuring time: 1 s / frequency

At each frequency determined in step 1, four measurements are performed in the following combinations:

- 1) Neutral lead - reference ground (PE grounded)
- 2) Phase lead - reference ground (PE grounded)
- 3) Neutral lead - reference ground (PE floating)
- 4) Phase lead - reference ground (PE floating)

The highest value is reported.

Test Requirements / Limits

If not stated within the measurement plot and/or test result, class B limits are applied.

FCC Part 15, Subpart B, §15.107, Class B Limit

Frequency Range (MHz)	QP Limit (dB μ V)	AV Limit (dB μ V)
0.15 – 0.5	66 to 56	56 to 46
0.5 – 5	56	46
5 – 30	60	50

FCC Part 15, Subpart B, §15.107, Class A Limit

Frequency Range (MHz)	QP Limit (dBµV)	AV Limit (dBµV)
0.15 - 0.5	79	66
0.5 - 30	73	60

Used conversion factor: Limit (dBµV) = 20 log (Limit (µV)/1µV).

NOTE: a missing result table in the corresponding test report section means, that no final measurement was performed because no relevant frequencies (peaks) were found in the preliminary scan.

Spurious radiated emissions

Standard FCC Part 15, 10-1-08, Subpart B

The test was performed according to: ANSI C 63.4, 2003

Test Description

Measurement below 1 GHz:

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2003.

The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.

The radiated emissions measurements were made in a typical installation configuration.

The measurement procedure is implemented into the EMI test software ES-K1 from R&S.

Step 1: Preliminary scan (test to identify the highest amplitudes relative to the limit)

Intention of this step is, to determine the radiated EMI-profile of the EUT.

Settings for step 1:

- Detector: Peak-Maxhold
- Frequency range: 30 – 1000 MHz
- Frequency steps: 60 kHz
- IF-Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 µs
- Turntable angle range: –180° to 180°
- Turntable step size: 90°
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2:

A further measurement will be performed on the frequencies determined in step 1. Intention of this step is, to find out the approximate turntable angle and antenna height for each frequency.

Settings for step 2:

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: –180° to 180°
- Turntable step size: 45°
- Height variation range: 1 – 4 m
- Height variation step size: 0.5 m
- Polarisation: horizontal + vertical

After this step the EMI test system has determined the following values for each frequency (of step 1):

- Frequency
- Azimuth value (of turntable)
- Antenna height

The last two values have now the following accuracy:

- Azimuth value (of turntable): 45°
- Antenna height: 0.5 m

Step 3: final measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.
For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will be slowly varied by +/- 22.5° around this value. During this action the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position the antenna height is also slowly varied by +/- 25 cm around the antenna height determined. During this action the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100ms
- Turntable angle range: -22.5° to + 22.5 ° around the determined value
- Height variation range: -0.25m to + 0.25m around the determined value

Step 4: Final measurement (with QP detector)

With the settings determined in step 3, the final measurement will be performed:

EMI receiver settings for step 4:

- Detector: Quasi-Peak(< 1GHz)
- Measured frequencies: in step 3 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

Measurement above 1 GHz:

The following modifications apply to the measurement procedure for the frequency range above 1 GHz: The measurement distance was reduced to 1 m. The results were extrapolated by the extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements, inverse-linear-distance-squared for the power density measurements). Due to the fact that in this frequency range a double ridged wave guided horn antenna (up to 18 GHz) and a horn antenna (18–25 GHz) are used, the steps 2-4 as described before, are omitted. Step 1 was performed at one height of the receiving antenna only.

Detector: Peak, Average (simultaneously)
RBW = VBW = 1 MHz; above 7 GHz 100 kHz

Test Requirements / Limits

If not stated within the measurement plot and/or test result, class B limits are applied.

FCC Part 15, Subpart B, §15.109, Radiated Emission Limits
Frequency Range (MHz): Class B Limit (dBµV/m)

Frequency Range (MHz)	Class B Limit (dBµV/m)
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
above 960	54.0

Frequency Range (MHz)	Class A Limit (dBµV/m) / @ 3m !
30 - 88	49.5
88 - 216	54.0
216 - 960	56.9
above 960	60.0

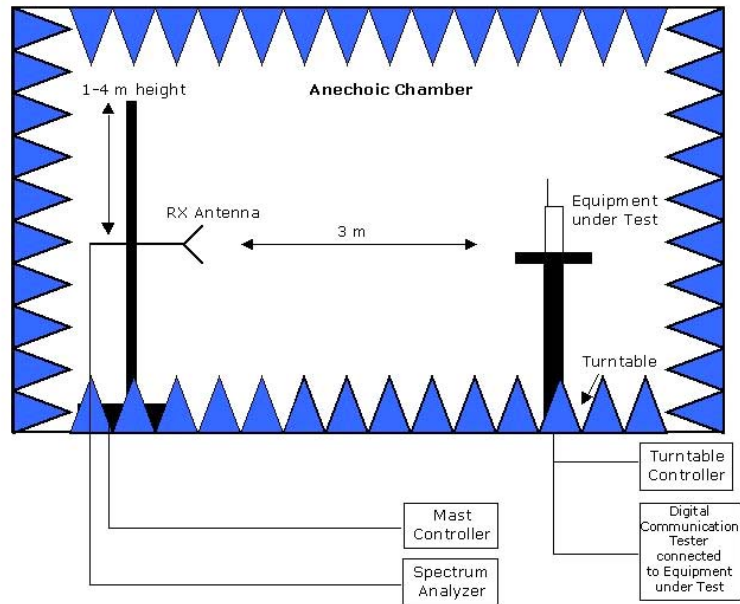
§15.35(b)

..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit...

Used conversion factor: Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)

NOTE: a missing result table in the corresponding test report section means, that no final measurement was performed because no relevant frequencies (peaks) were found in the preliminary scan.

Setup Drawings



Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Setup in the Anechoic chamber. For measurements below 1 GHz the ground was replaced by a conducting ground plane.



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