



Inter**Lab**[®]

Final Report on EYE-02

Report Reference: MDE_JABLO_0902_FCCa

Date: February 05, 2010

Test Laboratory:

7 layers AG
Borsigstr. 11
40880 Ratingen
Germany



DGA-PL-192/99-02

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: Yao Jing
Date Of Test Report: 2010/02/05
Date of first test: 2010/02/02
Date of last test: 2010/02/04

1.2 Applicant Data

Company Name: JabloCOM s.r.o.
Street: V Nivách 12
City: 466 01 Jablonec nad Nisou
Country: Czech Republic
Contact Person: Mr. Ing. Filip Kopriva
Function: Hardware Engineer
Phone: +420 483 559 711
Fax: +420 483 559 713
E-Mail: kopriva@jablocom.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
E Mail : michael.albert@7Layers.de

Laboratory Details

Lab ID	Identification	Responsible	Accreditation Info
Lab 1	Conducted Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAR-Registration no. DGA-PL-192/99-02
Lab 2	Radiated Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAR-Registration no. DGA-PL-192/99-02

1.4 Signature of the Testing Responsible

Andreas Petz
responsible for tests performed in: Lab 1, Lab 2

1.5 Signature of the Accreditation Responsible



Accreditation scope responsible person *MACHULEC*
responsible for Lab 1, Lab 2



7 layers AG, Borsigstr. 11
40880 Ratingen, Germany
Phone +49 (0)2102 749 0

2 Test Object Data

2.1 General OUT Description

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

OUT: EYE-02

<i>Product Category:</i>	Camera and Video
Manufacturer:	
<i>Company Name:</i>	JabloCOM s.r.o.
<i>Street:</i>	V Nivách 12
<i>City:</i>	466 01 Jablonec nad Nisou
<i>Country:</i>	Czech Republic
<i>Company URL:</i>	http://www.jablocom.com
<i>Contact Person:</i>	Mr. Ing. Filip Kopriva
<i>Function:</i>	Hardware Engineer
<i>Phone:</i>	+420 483 559 711
<i>Fax:</i>	+420 483 559 713
<i>E-Mail:</i>	kopriva@jablocom.com

Parameter List:

<i>Parameter name</i>	<i>Value</i>
AC Power Supply	dedicated AC/DC adapter
Antenna gain 1900 band	Max. +2.5 (dBi)
Antenna gain 850 band	Max. +2.5 (dBi)
DC Power Supply	6 (V)
highest channel	251 (848.8MHz) for GSM850, 810 (1909.8MHz) for GSM1900, 4233 (846.6MHz) for FDD5, 9538 (1907.6MHz) for FDD2, 1513 (1752.6MHz) for FDD4
lowest channel	128 (824.2MHz) for GSM850, 512 (1850.2MHz) for GSM1900, 4132 (826.4MHz) for FDD5, 9262 (1852.4MHz) for FDD2, 1312 (1712.4MHz) for FDD4
mid channel	190 (836.6MHz) for GSM850, 661 (1880.0MHz) for GSM1900, 4183 (836.6MHz) for FDD5, 9400 (1880MHz) for FDD2, 1412 (1732.4MHz)/1450 (1740.0MHz) for FDD4
SRD antenna	type: integral, frequency: 868 (MHz)
SRD transceiver	868 (MHz)

Ancillary Equipment: Adapter

<i>Type / Model / Family:</i>	Accessory Made by UMEC
<i>Product Category:</i>	Others

Parameter List:

<i>Parameter name</i>	<i>Value</i>
AC mains Voltage	AC 120V

Ancillary Equipment: External GSM antenna

<i>Type / Model / Family:</i>	Accessory
<i>Product Category:</i>	Mobile Phone Accessory

Parameter List:

<i>Parameter name</i>	<i>Value</i>
Antenna gain 1900 band	2.5 (dBi)
Antenna gain 850 band	2.5 (dBi)

Ancillary Equipment: USB

Type / Model / Family: Accessory
Product Category: Others

2.2 Detailed Description of OUT Samples

Sample : a05

OUT Identifier	EYE-02
Sample Description	Camera
Serial No.	000000042126
HW Status	JR12004-4
SW Status	JR601.1.5.8.f6_9
Nominal Voltage	6 V DC

Sample : ADA_a01

OUT Identifier	Adapter
Sample Description	UMEC AC adapter
Serial No.	CJ122J776 52G
HW Status	UP0121A-06PE

Sample : Ant01

OUT Identifier	External GSM antenna
Sample Description	external GSM antenna
Serial No.	-
HW Status	-
SW Status	-

Sample : USB_a01

OUT Identifier	USB
Sample Description	USB cable

2.3 OUT Features

Features for OUT: EYE-02

Designation	Description	Allowed Values	Supported Value(s)
Features for scope: FCC_v2			
DC	The OUT is powered by or connected to DC Mains		
GSM850	EUT supports GSM850 band 824MHz - 849MHz		
Iant	Integral Antenna: permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment		
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		
SRD	EUT is a short range device		

2.4 Auxiliary Equipment

AE No.	Type Designation	Serial No.	HW Status	SW Status	Description
AE monitor	Flatron L1740BQ	509WANF1W607	-	-	TFT Monitor LG
AE comp2	lenovo 90W 20V	11S92P1103Z1ZB Rev 05	-	-	Power Supply lenovo
AE comp2	lenovo R60 9461-54G	EF7161JH L3-AA471 06/10	-	WinXP Prof. Engl.	Laptop IBM
AE mouse	M-BB48	LZC90505478	-	-	Mouse Logitech
AE comp2	PA3378E-3AC3	- (P/N: G71C0006R310)	-	-	Power Supply Toshiba
AE keybrd	RS 6000	G 0000273 2P28	-	-	Keyboard CHERRY
AE comp1	Tecra M9	87060248H	-	WinXP Prof. Ger.	Laptop Toshiba

2.5 Operating Mode(s)

Ref.-No.	Description
TCH190	Sample is transmitting on channel TCH 190 GSM850 (836.6 MHz), connected to a computer via USB while transferring a video stream (1 fps), transmitting test signal on 868.5 MHz AM 105 kHz 14% mod. depth, charging from AC mains.
TCH661	Sample is transmitting on channel TCH 661 GSM1900 (1880.0 MHz), connected to a computer via USB while transferring a video stream (1 fps), transmitting test signal on 868.5 MHz AM 105 kHz 14% mod. depth, charging from AC mains.

2.6 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.

Setup No.	List of OUT samples	List of auxiliary equipment
Sample No.	Sample Description	AE No. AE Description
conducted_A05 (FCC 15B cond. setup)		
Sample: ADA_a01	UMEC AC adapter	AE monitor TFT Monitor LG
Sample: Ant01	external GSM antenna	AE comp2 Power Supply lenovo
Sample: USB_a01	USB cable	AE comp2 Laptop IBM
Sample: a05	Camera	AE mouse Mouse Logitech
		AE keybrd Keyboard CHERRY
radiated_A05 (FCC 15B rad. setup)		
Sample: ADA_a01	UMEC AC adapter	AE monitor TFT Monitor LG
Sample: Ant01	external GSM antenna	AE mouse Mouse Logitech
Sample: USB_a01	USB cable	AE comp2 Power Supply Toshiba
Sample: a05	Camera	AE keybrd Keyboard CHERRY
		AE comp1 Laptop Toshiba

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.

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

<i>Test Specification:</i>	FCC part 2 and 15
<i>Date / Version</i>	2009/03/26 Version: 10-1-09 Edition
<i>Title:</i>	PART 2 - GENERAL RULES AND REGULATIONS PART 15 - RADIO FREQUENCY DEVICES

3.4 Summary

Test Case Identifier / Name	Result	Date of Test	Lab	
Test (condition)			Ref.	Setup
15b.1 Conducted Emissions (AC Power Line) §15.107				
15b.1; Mode = transmit	Passed	2010/02/02	Lab 1	conducted_A05
	operating mode: TCH190			
15b.2 Spurious Radiated Emissions §15.109				
15b.2; Mode = transmit	Passed	2010/02/04	Lab 2	radiated_A05
	operating mode: TCH661			



3.5 Detailed Results

3.5.1 15b.1 Conducted Emissions (AC Power Line) §15.107

Test: 15b.1; Mode = transmit

<i>Result:</i>	Passed
<i>Setup No.:</i>	conducted_A05
<i>Date of Test:</i>	2010/02/02 14:15
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

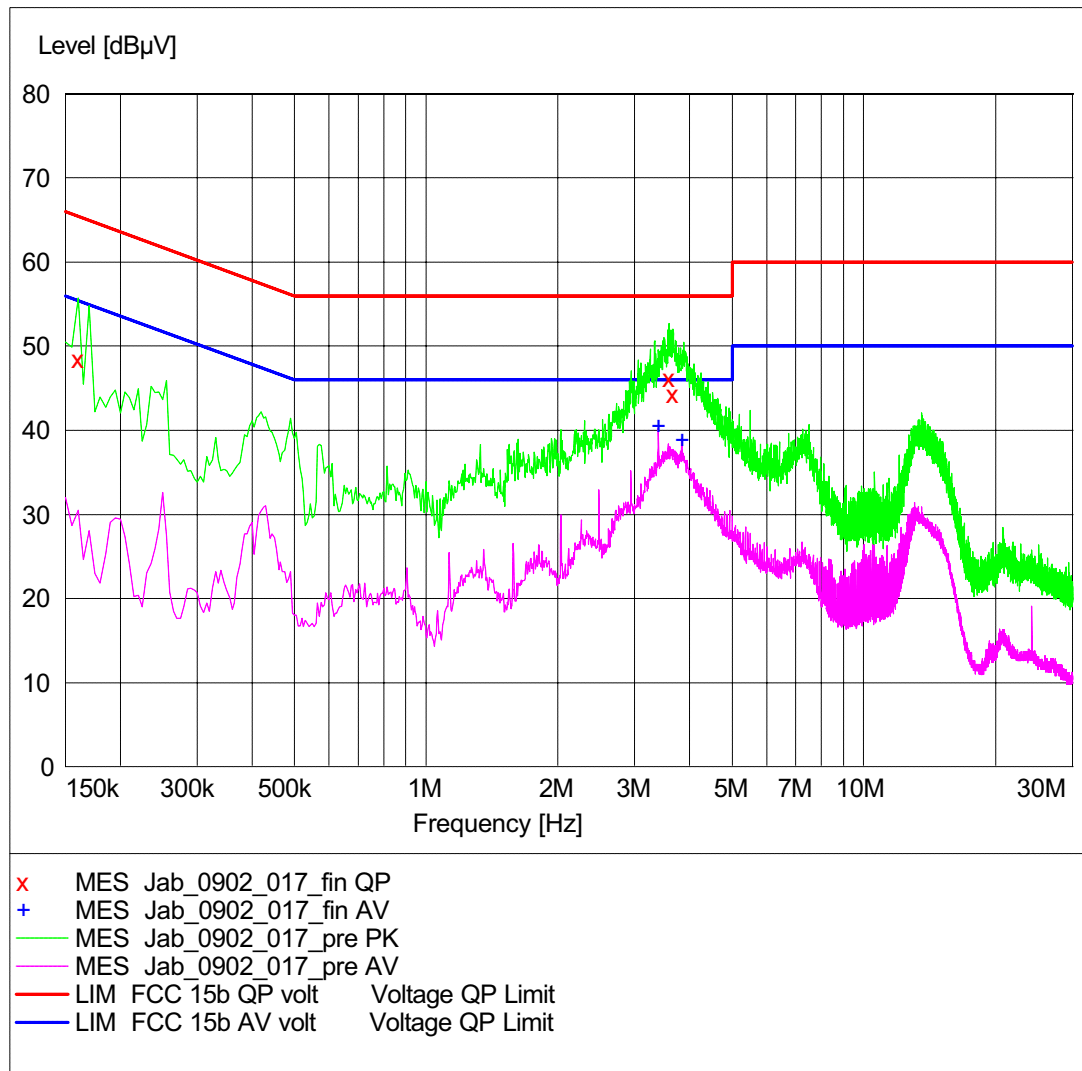
Detailed Results:

AC MAINS CONDUCTED

EUT: EYE-02 (EN001a05)
 Manufacturer: JabloCom
 Operating Condition: GSM1900 TCH661
 Test Site: 7 layers Ratingen
 Operator: Doe
 Test Specification: ANSI C63.4; FCC 15.107 / 15.207
 Comment:
 Start of Test: 02.02.2010 / 14:07:11

SCAN TABLE: "FCC Voltage"

Short Description:	FCC Voltage	Meas.	IF	Transducer
Start Stop Step	Detector	Time	Bandw.	
Frequency Frequency Width				
150.0 kHz 30.0 MHz 5.0 kHz	MaxPeak	20.0 ms	9 kHz	ESH3-Z5
	Average			



MEASUREMENT RESULT: "Jab_0902_017_fin QP"

02.02.2010 14:12

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.160000	48.40	10.0	66	17.0	N	FLO
3.600000	46.20	10.2	56	9.8	N	FLO
3.660000	44.30	10.2	56	11.7	L1	GND

MEASUREMENT RESULT: "Jab_0902_017_fin AV"

02.02.2010 14:12

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
3.390000	40.50	10.1	46	5.5	N	GND
3.840000	38.90	10.2	46	7.1	N	GND



3.5.2 15b.2 Spurious Radiated Emissions §15.109

Test: 15b.2; Mode = transmit

<i>Result:</i>	Passed
<i>Setup No.:</i>	radiated_A05
<i>Date of Test:</i>	2010/02/04 13:15
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

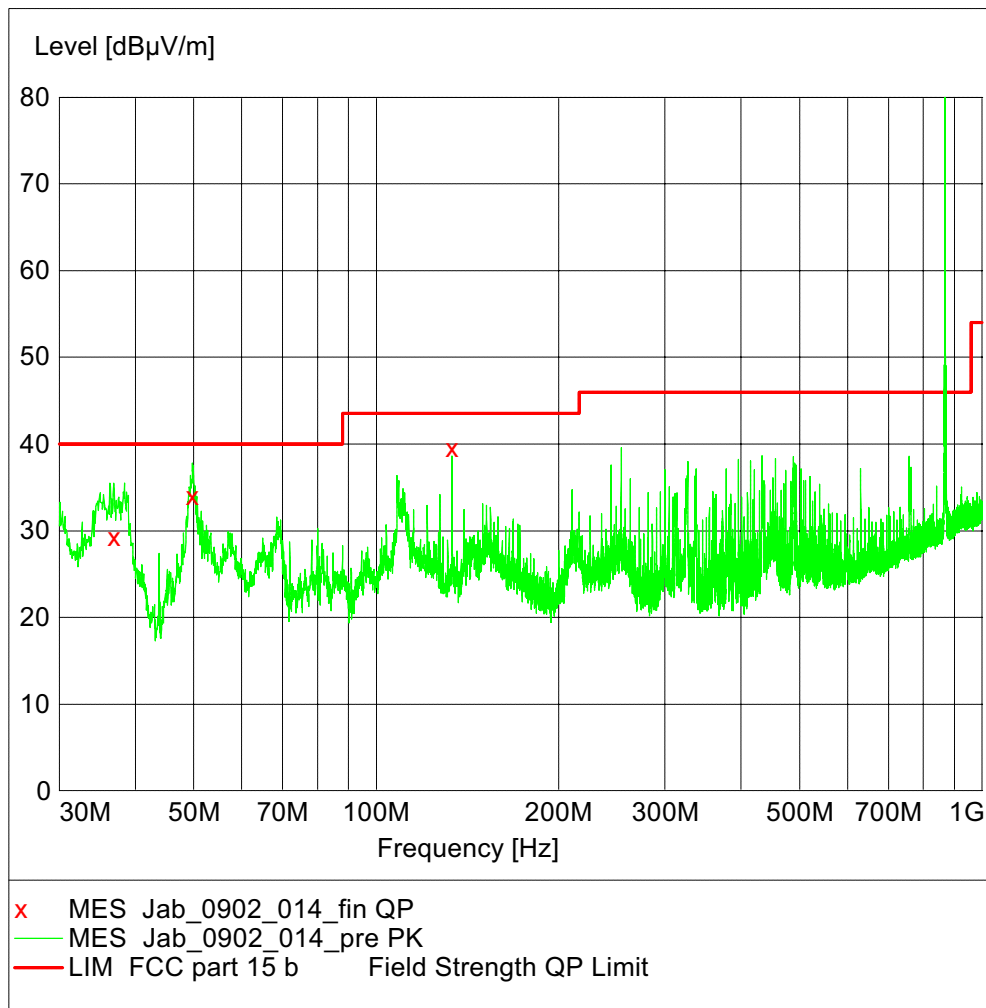
Detailed Results:

TEST

EUT: EYE-02 (EN001a05) + AC/DC adapter + USB cable / link to PC Toshiba
 Manufacturer: JabloCOM s.r.o.
 Operating Condition: GSM 1900 TCH 661, CW 868 MHz
 Test Site: 7 layers, Ratingen
 Operator: MAC
 Test Specification: FCC 15b
 Comment:
 Start of Test: 02.02.2010 / 12:10:26

SCAN TABLE: "FCC part 15 b"

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	MaxPeak	1.0 ms	120 kHz	HL562



MEASUREMENT RESULT: "Jab_0902_014_fin QP"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
36.900000	29.20	16.8	40.0	10.8	107.0	247.00	VERTICAL
49.740000	34.00	9.2	40.0	6.0	100.0	0.00	VERTICAL
133.440000	39.40	10.3	43.5	4.1	349.0	202.00	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 2		
Manufacturer:	Frankonia		
Description:	Anechoic Chamber for radiated testing		
Type:	10.58x6.38x6		
	<i>Calibration Details</i>	<i>Last Execution</i>	<i>Next Exec.</i>
	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 Conducted emissions

Lab ID:	Lab 1
Manufacturer:	Rohde & Schwarz GmbH & Co.KG
Description:	EMI Conducted Auxiliary Equipment

Single Devices for Auxiliary Equipment for Conducted emissions

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber&Suhner
Coupling-Decoupling- Network	CDN ENY41	100002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2008/03/06 2011/03/05
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz GmbH & Co. KG
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	DKD calibration		2008/10/13 2011/10/12

Test Equipment Auxiliary Equipment for Radiated emissions

Lab ID: Lab 2
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Auxiliary Equipment for Radiated emissions

Single Device Name	Type	Serial Number	Manufacturer
Antenna mast	AS 620 P		HD GmbH
Biconical dipole	VUBA 9117	9117108	Schwarzbeck
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2008/10/27 2013/10/26
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32-5P	849785	Miteq
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4	-	Miteq
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P	896037	Miteq
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01- 2+W38.01-2	Kabel Kusch
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
Cable "ESI to Horn Antenna"	UFB311A+UFB293C	W18.02- 2+W38.02-2	Rosenberger Micro-Coax
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2009/04/16 2012/04/15
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<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	9942011	Trilithic
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2009/11/16 2010/05/15
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2009/05/27 2012/05/26

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

Single Device Name	Type	Serial Number	Manufacturer
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 2
Manufacturer:	see single devices
Description:	Single Devices for various Test Equipment
Type:	various
Serial Number:	none

Single Devices for Auxiliary Test Equipment

Single Device Name	Type	Serial Number	Manufacturer
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.
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard calibration		2009/10/07 2011/10/06
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	FSIQ26	840061/005	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	calibration		2008/10/02 2010/10/01
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
Vector Signal Generator	SMIQ B3	832492/061	

Test Equipment Digital Signalling Devices

Lab ID: Lab 1, Lab 2
Description: Signalling equipment for various wireless technologies.

Single Devices for Digital Signalling Devices

Single Device Name	Type	Serial Number	Manufacturer
Bluetooth Signalling Unit CBT	CBT	100589	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		Last Execution Next Exec.
	Standard Calibration		2008/08/14 2011/08/13
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		Last Execution Next Exec.
	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
	Calibration Details		Last Execution Next Exec.
	Standard calibration		2009/02/16 2011/02/15
	HW/SW Status		Date of Start Date of End
	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
	Calibration Details		Last Execution Next Exec.
	Standard calibration		2008/12/01 2011/11/30
	HW/SW Status		Date of Start Date of End
	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		2008/11/03
Vector Signal Generator	SMU200A	100912	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		Last Execution Next Exec.
	Standard calibration		2008/10/28 2011/10/27

Test Equipment Emission measurement devices

Lab ID: Lab 1, Lab 2
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Emission measurement devices

Single Device Name	Type	Serial Number	Manufacturer
Personal Computer	Dell	30304832059	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	2009/12/03 2011/12/02

Test Equipment Shielded Room 02

Lab ID: Lab 1
Manufacturer: Frankonia
Description: Shielded Room for conducted testing
Type: 12 qm
Serial Number: none

4.2 Laboratory Environmental Conditions

Laboratory	Date	Temperature	Humidity	Air Pressure
Lab 1	2010/02/02	21 °C	34 %	1001 hPa
Lab 2	2010/02/04	24 °C	31 %	1001 hPa

5 Annex

5.1 Additional Information for Test Plan

setup for radiated tests (see Test Setup Photo_FCCa)



setup for conducted tests (see Test Setup Photos_FCCa)



5.2 Additional Information for Report

Test Description

Conducted emissions (AC power line)

Standard FCC Part 15
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, 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 $\pm 22.5^\circ$ 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 $+22.5^\circ$ around the determined value
- Height variation range: -0.25 m to $+0.25$ m 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 (dB μ V/m)

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

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

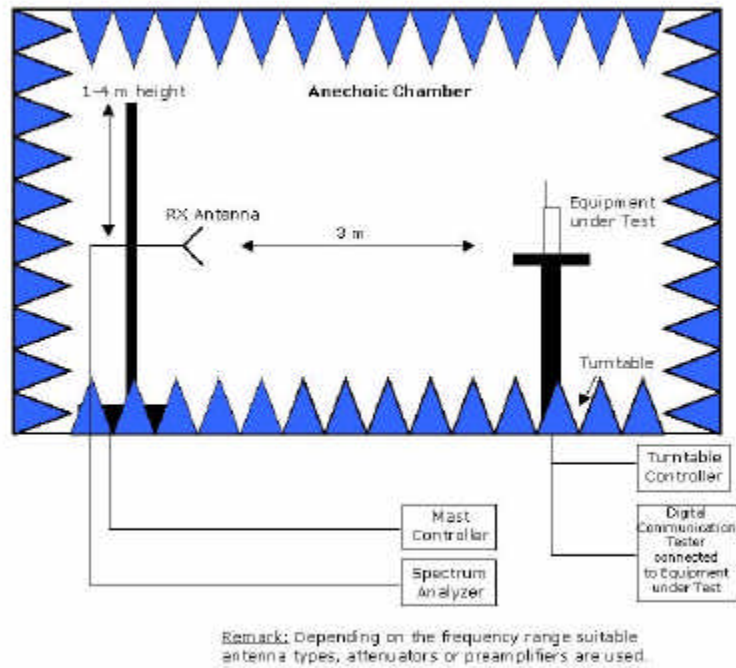
§15.35(b)

..., 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 (dB μ V/m) = $20 \log (\text{Limit } (\mu\text{V/m})/1\mu\text{V/m})$

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



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

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