



Inter**Lab**[®]

Final Report on

DIA - Digital Picture Frame
Internal name "OKIA"

Report Reference: MDE_PARRO_1019_FCCd

Date: January 14, 2011

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: Carsten Steinröder
Date Of Test Report: 2011/01/14
Date of first test: 2010/12/16
Date of last test: 2010/12/20

1.2 Applicant Data

Company Name: PARROT S.A.
Street: 174 Quai de Jemmapes
City: 75010 Paris
Country: France
Contact Person: Mr. Arezki Guerrab
Fax: Fax : +33 (0)1 48 03 74 00
E-Mail: arezki.guerrab@parrot.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

Carsten Steinröder
responsible for tests performed in: Lab 1, Lab 2

1.5 Signature of the Accreditation Responsible



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40880 Ratingen, Germany
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Accreditation scope responsible person
responsible for Lab 1, Lab 2

[A. Petz]

2 Test Object Data

2.1 General OUT Description

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

OUT: DIA - Digital Picture Frame

Type / Model / Family: DIA - Digital Picture Frame
Internal name "OKIA"
Product Category: Home Environment Equipment
Manufacturer:
Company Name: please see applicant
Contact Person: please see applicant

Parameter List:

Parameter name	Value
Parameter for Scope FCC_v2:	
AC Mains Test Voltage	120 V (60 Hz)
AC Power Supply	100 - 240 (V)
DC Input Voltage	12 (V)

Ancillary Equipment: AC/DC Power Supply

Manufacturer:
Company Name: please see applicant
Contact Person: please see applicant

2.2 Detailed Description of OUT Samples

Sample : b01

OUT Identifier	DIA - Digital Picture Frame		
Sample Description	Sample with int.Antenna		
Serial No.	LFOK0K003KCA		
HW Status	HW 1.0		
SW Status	V0.0.3		
Date of Receipt	2010/12/13		
Low Voltage	11.4 V	Low Temp.	0 °C
High Voltage	12.6 V	High Temp.	40 °C
Nominal Voltage	12.0 V	Normal Temp.	20 °C

Parameter List:

Parameter Description	Value
Parameter for Scope FCC_v2	
Antenna Gain (Bluetooth Antenna)	5.1 (dBi)
Frequency_high	2480 (MHz)
Frequency_low	2402 (MHz)
Frequency_mid	2441 (MHz)

Sample : AC01

OUT Identifier	AC/DC Power Supply
Sample Description	AC/DC Power Supply
Date of Receipt	2010/12/13

2.3 OUT Features

Features for OUT: DIA - Digital Picture Frame

Designation	Description	Allowed Values	Supported Value(s)
Features for scope: FCC_v2			
AC	The OUT is powered by or connected to AC Mains		
BT	EUT supports Bluetooth data rate of 1 Mbps with GFSK modulation in the band 2400 MHz - 2483.5 MHz		
EDR2	EUT supports Bluetooth using data rate of 2 Mbps with PI/4 DQPSK modulation in the band 2400 MHz - 2483.5 MHz		
EDR3	EUT supports Bluetooth using data rate of 3 Mbps with 8DPSK modulation in the band 2400 MHz - 2483.5 MHz		
Iant	Integral Antenna: permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment		

2.4 Auxiliary Equipment

AE No.	Type Designation	Serial No.	HW Status	SW Status	Description
AE 05	Cherry RS-6000	G 0000273 2P28			Keyboard
AE 01	LG Flatron L1740BQ	509WANF1W607			TFT 1 (FCC ID: BEJL17NU)
AE 04	Logitech M-BB48	LZC90505478			Mouse
AE 03	Toshiba PA3378E-3AC3	G71C0006R310			Adaptor 1
AE 02	Toshiba Tecra M9	87060248H			Laptop 1

2.5 Operating Mode(s)

Ref.-No.	Description
1	Bluetooth: TX-Mode (2402MHz, GFSK (DH1)) WLAN: TX-Mode (2462MHz, 11Mbps)

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
B01_15b_cond (Conducted test setup)			
Sample: AC01	AC/DC Power Supply	AE 05	Keyboard
Sample: b01	Sample with int.Antenna	AE 01	TFT 1 (FCC ID: BEJL17NU)
		AE 04	Mouse
		AE 03	Adaptor 1
		AE 02	Laptop 1
B01_15b_rad (Radiated test setup)			
Sample: AC01	AC/DC Power Supply	AE 05	Keyboard
Sample: b01	Sample with int.Antenna	AE 01	TFT 1 (FCC ID: BEJL17NU)
		AE 04	Mouse
		AE 03	Adaptor 1
		AE 02	Laptop 1

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.

Note:

This test report replaces the report referenced by: MDE_PARRO_1019_FCCb.

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 10-1-09 Edition

Title: PART 2 - GENERAL RULES AND REGULATIONS
PART 15 - RADIO FREQUENCY DEVICES

<i>Applicable Errata</i>	<i>Activate Date</i>	<i>Comment</i>
ANSI C63.4-2003	04/1/30	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and electronic Equipment in the Range of 9 kHz to 40 GHz
DA 00-705 considered	00/3/1	Public Notice: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems



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.1 Conducted Emissions (AC Power Line) §15.107				
15b.1; Mode = transmit	Passed	2010/12/20	Lab 1	B01_15b_cond
	operating mode: 1			
15b.2 Spurious Radiated Emissions §15.109				
15b.2; Mode = transmit	Passed	2010/12/16	Lab 2	B01_15b_rad
	operating mode: 1			

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>	B01_15b_cond
<i>Date of Test:</i>	2010/12/20 6:28
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

Test Equipment Environmental Conditions

<i>Temperature:</i>	21°C
<i>Air Pressure:</i>	998hPa
<i>Rel. Humidity:</i>	30%

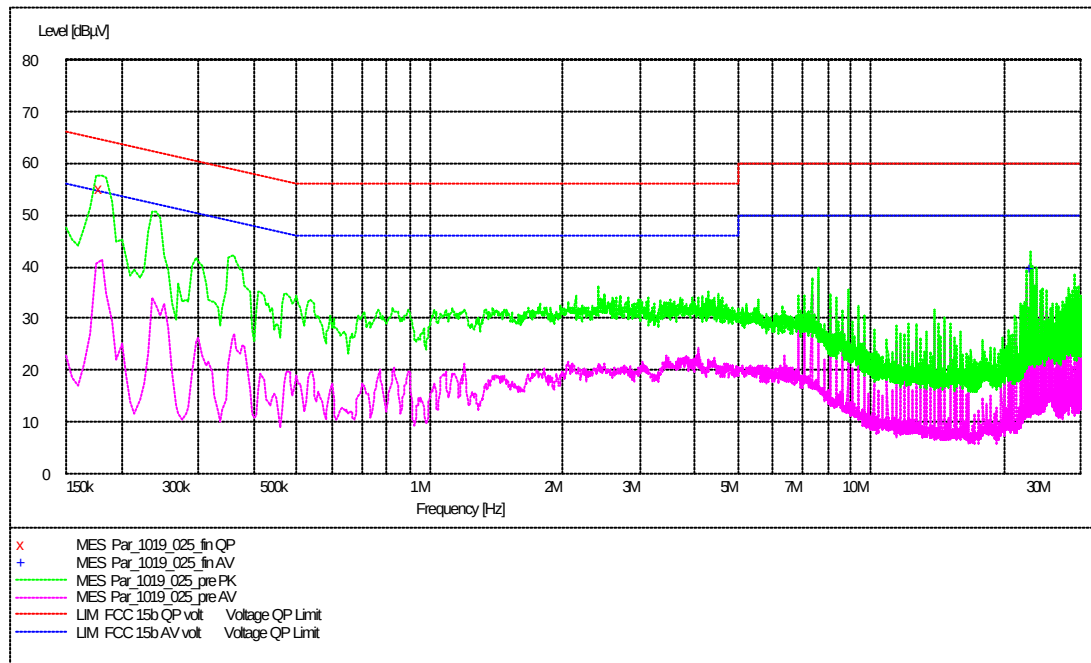
Detailed Results:

AC MAINS CONDUCTED

EUT: OKIA (CX190b01) / 20.12.2010
 Manufacturer: Parrot SA
 Operating Condition: BT TX on 2402 MHz DH1, WLAN TX on 2462 MHz 11Mbps
 Test Site: 7 layers Ratingen
 Operator: Doe
 Test Specification: ANSI C63.4; FCC 15.107 / 15.207
 Comment:
 Start of Test: 20.12.2010 / 15:26:21

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 Average	20.0 ms	9 kHz	ESH3-Z5



MEASUREMENT RESULT: "Par_1019_025_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.180000	55.30	9.9	65	9.2	N	GND

MEASUREMENT RESULT: "Par_1019_025_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
23.060000	39.60	10.6	50	10.4	N	FLO

3.5.2 15b.2 Spurious Radiated Emissions §15.109

Test: 15b.2; Mode = transmit

<i>Result:</i>	Passed
<i>Setup No.:</i>	B01_15b_rad
<i>Date of Test:</i>	2010/12/16 6:30
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15
<i>Test Equipment Environmental Conditions</i>	
<i>Temperature:</i>	22°C
<i>Air Pressure:</i>	998hPa
<i>Rel. Humidity:</i>	34%

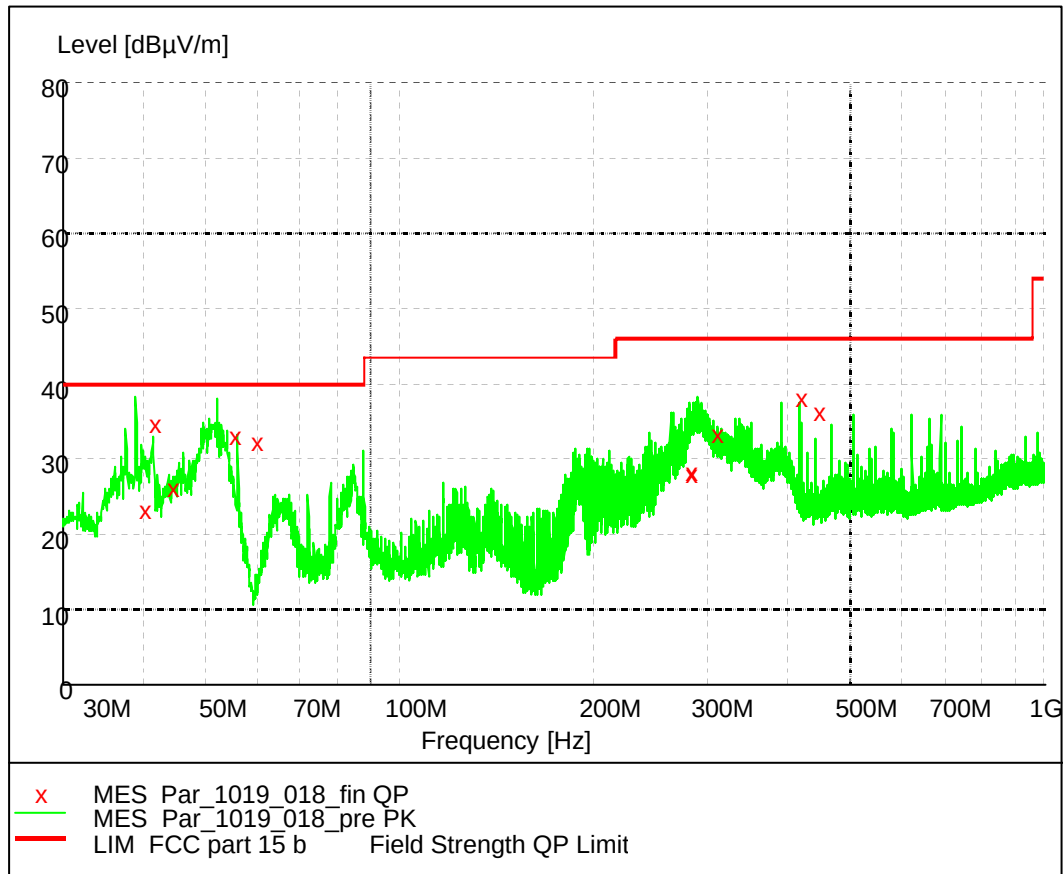
Detailed Results:

EMI RADIATED TEST

EUT: OKIA (CX190b01) / 17.12.2010
 Manufacturer: Parrot SA
 Operating Condition: BT TX on 2402 MHz DH1, WLAN TX on 2462 MHz 11Mbps
 Test Site: 7 layers, Ratingen
 Operator: MAC
 Test Specification: FCC part 15 b
 Comment: Horizontal EUT position
 Start of Test: 17.12.2010 / 07:40:38

SCAN TABLE: "FCC part 15 b"

Short Description: FCC part 15 b
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 30.0 MHz 1.0 GHz 60.0 kHz MaxPeak 1.0 ms 120 kHz HL562



MEASUREMENT RESULT: "Par_1019_018_fin QP"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
37.620000	23.90	16.3	40.0	16.1	123.0	202.00	VERTICAL
39.000000	35.50	15.5	40.0	4.5	103.0	248.00	VERTICAL
41.340000	27.00	14.2	40.0	13.0	107.0	22.00	VERTICAL
51.900000	33.70	7.5	40.0	6.3	100.0	157.00	VERTICAL
55.980000	32.90	5.1	40.0	7.1	250.0	67.00	VERTICAL
264.000000	29.00	11.6	46.0	17.0	110.0	337.00	HORIZONTAL
264.720000	28.70	11.7	46.0	17.3	100.0	338.00	HORIZONTAL
290.580000	34.20	12.6	46.0	11.8	100.0	338.00	HORIZONTAL
390.000000	38.80	15.4	46.0	7.2	100.0	224.00	HORIZONTAL
415.980000	37.00	16.0	46.0	9.0	100.0	176.00	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 m ³
Calibration Details	
IC renewal	2009/01/21 2011/01/20
FCC renewal	2009/01/07 2011/01/06

Single Devices for Anechoic Chamber

Single Device Name	Type	Serial Number	Manufacturer
Air compressor	none	-	Atlas Copco
Anechoic Chamber	10.58 x 6.38 x 6.00 m ³	none	Frankonia
Calibration Details			Last Execution Next Exec.
FCC listing 96716 3m Part15/18			2009/01/07 2011/01/06
ANSI C64.3 NSA			2009/01/21 2011/01/20
Controller Maturo	MCU	961208	Maturo 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

Single Device Name	Type	Serial Number	Manufacturer
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber&Suhner
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
Calibration Details			Last Execution Next Exec.
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	9117-108	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		2010/11/06 2011/05/05
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4	-	Miteq
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2010/11/06 2011/05/05
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P	896037	Miteq
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2010/11/06 2011/05/05
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		2010/11/06 2011/05/05
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		2010/11/06 2011/05/05
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
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2010/11/06 2011/05/05
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2010/11/06 2011/05/05
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2010/11/06 2011/05/05
High Pass Filter	WHKX 7.0/18G-8SS	09	Wainwright
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2010/11/06 2011/05/05
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz GmbH & Co. KG

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

Single Device Name	Type	Serial Number	Manufacturer
Loop Antenna	Calibration Details		Last Execution Next Exec.
	Standard Calibration		2009/05/27 2012/05/26
	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG
Network Analyzer	Calibration Details		Last Execution Next Exec.
	DKD calibration		2008/10/07 2011/10/06
	E5071B	MY42200813	Agilent
Pyramidal Horn Antenna 26,5 GHz	Calibration Details		Last Execution Next Exec.
	Standard Calibration		2010/11/09 2011/11/09
	3160-09	00083069	EMCO Elektronik GmbH
Pyramidal Horn Antenna 40 GHz	3160-10	00086675	EMCO Elektronik GmbH
Tilt device Maturo (Rohacell)	Antrieb TD1.5-10kg	TD1.5-10kg/024/3790709	Maturo 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
Fibre optic link Satellite (Aux)	FO RS232 Link	181-018	Pontis
Fibre optic link Transceiver (Aux)	FO RS232 Link	182-018	Pontis
Notch Filter Ultra Stable (Aux)	WRCA800/960-6EEK	24	Wainwright
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
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		

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
Power Sensor	NRV-Z1	836219/005	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		Last Execution Next Exec.
	Standard Calibration		2009/10/20 2011/04/19
Powermeter	NRVS	836333/064	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		Last Execution Next Exec.
	Standard calibration		2009/10/15 2011/10/14
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		Last Execution Next Exec.
	Standard Calibration		2009/12/03 2011/12/02

Test Equipment Shielded Room 02

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

5 Annex

5.1 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 +/- 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

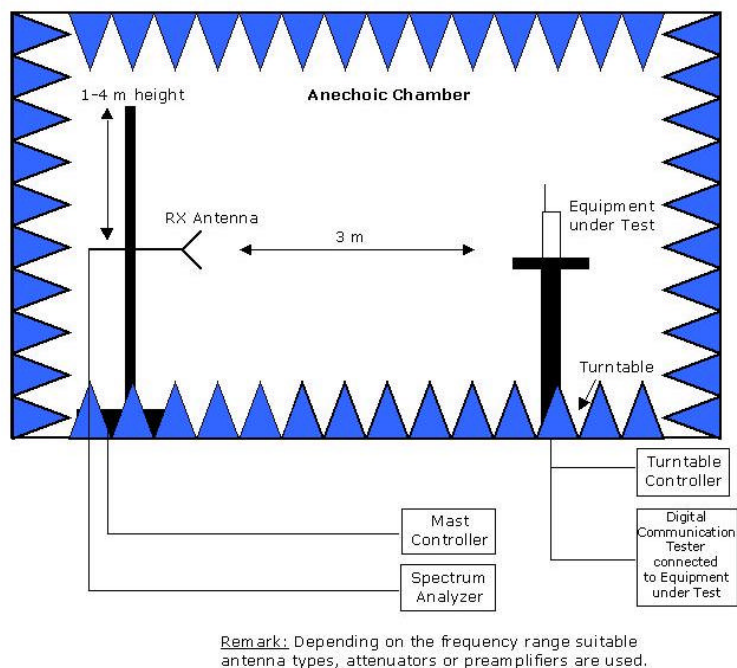
§15.35(b)

..., 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



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

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