



InterLab[®]
Final Report on
MKi9000 - eBox4R2
and
MKi9100 - eBox4R2
and
MKi9200 - eBox4R2

Report Reference: MDE_PARRO_0907_FCCc
FCC Part 15b

Date: December 07, 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.

7 layers AG
Borsigstrasse 11
40880 Ratingen, Germany
Phone: +49 (0) 2102 749 0
Fax: +49 (0) 2102 749 350
www.7Layers.com

Aufsichtsratsvorsitzender •
Chairman of the Supervisory Board:
Markus Becker
Vorstand • Board:
Dr. Hermann Buitkamp
Wilfried Klassmann

Registergericht • registered in:
Düsseldorf, HRB 44096
USt-IdNr • VAT No.:
DE 203159652
TAX No. 147/5869/0385

1 Administrative Data

1.1 Project Data

Project Responsible: Carsten Steinröder
Date Of Test Report: 2009/12/07
Date of first test: 2009/10/21
Date of last test: 2009/10/21

1.2 Applicant Data

Company Name: PARROT S.A.
Street: 174 Quai de Jemmapes
City: 75010 Paris
Country: France
Contact Person: Mr. Ludovic Legeay
Phone: Tel : +33 (0)1 48 03 73 25
Fax: Fax : +33 (0)1 48 03 74 00
E-Mail: ludovic.legeay@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	Radiated Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAR-Registration no. DAT-P-192/99-01

1.4 Signature of the Testing Responsible



Carsten Steinröder
responsible for tests performed in: Lab 1

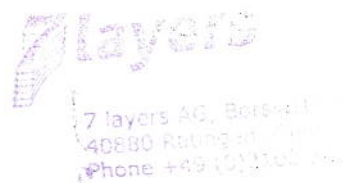


7 layers AG, Borsigstr. 11
40880 Ratingen, Germany
Phone +49 (0)2102 749 0

1.5 Signature of the Accreditation Responsible



Accreditation scope responsible person
responsible for Lab 1



2 Test Object Data

2.1 General OUT Description

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

OUT: MKi9000 - eBox4R2

Product Category: Mobile Phone Accessory

Manufacturer:

Company Name: Parrot SA

Street: 174 Quai de Jemmapes

City: 75010 Paris

Country: France

Contact Person: Mr. Ludovic Legeay

Phone: +33 (0)1 48 03 73 25

Fax: +33 (0)1 48 03 73 00

E-Mail: ludovic.legeay@parrot.com

Parameter List:

Parameter name	Value
----------------	-------

Parameter for Scope FCC_v2:

Antenna Gain	1.29 (dBi)
DC Power Supply	12 (V)
highest channel	2480 (MHz)
lowest channel	2402 (MHz)
mid channel	2441 (MHz)

OUT: MKi9100 - eBox4R2

Product Category: Mobile Phone Accessory

Manufacturer:

Company Name: Parrot SA

Street: 174 Quai de Jemmapes

City: 75010 Paris

Country: France

Contact Person: Mr. Ludovic Legeay

Phone: +33 (0)1 48 03 73 25

Fax: +33 (0)1 48 03 73 00

E-Mail: ludovic.legeay@parrot.com

Parameter List:

Parameter name	Value
----------------	-------

Parameter for Scope FCC_v2:

Antenna Gain	1.29 (dBi)
DC Power Supply	12 (V)
highest channel	2480 (MHz)
lowest channel	2402 (MHz)
mid channel	2441 (MHz)

OUT: MKi9200 - eBox4R2

Product Category: Mobile Phone Accessory

Manufacturer:

Company Name: Parrot SA

Street: 174 Quai de Jemmapes
City: 75010 Paris
Country: France

Contact Person: Mr. Ludovic Legeay
Phone: +33 (0)1 48 03 73 25
Fax: +33 (0)1 48 03 73 00
E-Mail: ludovic.legeay@parrot.com

Parameter List:

Parameter name	Value
----------------	-------

Parameter for Scope FCC_v2:

Antenna Gain	1.29 (dBi)
DC Power Supply	12 (V)
highest channel	2480 (MHz)
lowest channel	2402 (MHz)
mid channel	2441 (MHz)

Ancillary Equipment: Cable Harness**Manufacturer:**

Company Name: see applicant

Ancillary Equipment: Color Display**Manufacturer:**

Company Name: see applicant

Ancillary Equipment: iPod/USB/Audio Jack cable**Manufacturer:**

Company Name: see applicant

Ancillary Equipment: Microphone**Manufacturer:**

Company Name: see applicant

Ancillary Equipment: OLED Display**Manufacturer:**

Company Name: see applicant

2.2 Detailed Description of OUT Samples

Sample : a01

<i>OUT Identifier</i>	MKi9000 - eBox4R2		
<i>Sample Description</i>	Radiated Sample in Test Mode		
<i>Serial No.</i>	PI040195PV9I000075		
<i>HW Status</i>	HW00		
<i>SW Status</i>	1.27 RC1		
<i>Date of Receipt</i>	2009/10/09		
<i>Low Voltage</i>	9 V	<i>Low Temp.</i>	-40 °C
<i>High Voltage</i>	16 V	<i>High Temp.</i>	+85 °C
<i>Nominal Voltage</i>	12 V	<i>Normal Temp.</i>	+20 °C

Sample : b01

<i>OUT Identifier</i>	MKi9100 - eBox4R2		
<i>Sample Description</i>	Radiated Sample in Test Mode		
<i>Serial No.</i>	PI040195PV9I000083		
<i>HW Status</i>	HW00		
<i>SW Status</i>	1.27 RC1		
<i>Date of Receipt</i>	2009/10/09		
<i>Low Voltage</i>	9 V	<i>Low Temp.</i>	-40 °C
<i>High Voltage</i>	16 V	<i>High Temp.</i>	+85 °C
<i>Nominal Voltage</i>	12 V	<i>Normal Temp.</i>	+20 °C

Sample : c01

<i>OUT Identifier</i>	MKi9200 - eBox4R2		
<i>Sample Description</i>	Radiated Sample in Test Mode		
<i>Serial No.</i>	PI040195PV9I000100		
<i>HW Status</i>	HW00		
<i>SW Status</i>	1.27 RC1		
<i>Date of Receipt</i>	2009/10/09		
<i>Low Voltage</i>	9 V	<i>Low Temp.</i>	-40 °C
<i>High Voltage</i>	16 V	<i>High Temp.</i>	+85 °C
<i>Nominal Voltage</i>	12 V	<i>Normal Temp.</i>	+20 °C

Sample : IC01

<i>OUT Identifier</i>	Microphone
<i>Sample Description</i>	Microphone
<i>Date of Receipt</i>	2009/10/09

Sample : LED01

<i>OUT Identifier</i>	OLED Display
<i>Sample Description</i>	OLED Display
<i>Date of Receipt</i>	2009/10/09



Sample : OL01

<i>OUT Identifier</i>	Color Display
<i>Sample Description</i>	Color Display
<i>Date of Receipt</i>	2009/10/09

Sample : OW01

<i>OUT Identifier</i>	Cable Harness
<i>Sample Description</i>	Cable Harness
<i>Date of Receipt</i>	2009/10/09

Sample : UD01

<i>OUT Identifier</i>	iPod/USB/Audio Jack cable
<i>Sample Description</i>	iPod/USB/Audio Jack cable
<i>Date of Receipt</i>	2009/10/09

2.3 OUT Features

Features for OUT: MKi9000 - eBox4R2

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
Features for scope: FCC_v2			
BT	EUT supports Bluetooth data rate of 1 Mbps with GFSK modulation in the band 2400 MHz - 2483.5 MHz		
DC	The OUT is powered by or connected to DC Mains		
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		
SRD	EUT is a short range device		

Features for OUT: MKi9100 - eBox4R2

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
Features for scope: FCC_v2			
BT	EUT supports Bluetooth data rate of 1 Mbps with GFSK modulation in the band 2400 MHz - 2483.5 MHz		
DC	The OUT is powered by or connected to DC Mains		
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		
SRD	EUT is a short range device		

Features for OUT: MKi9200 - eBox4R2

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
Features for scope: FCC_v2			
BT	EUT supports Bluetooth data rate of 1 Mbps with GFSK modulation in the band 2400 MHz - 2483.5 MHz		
DC	The OUT is powered by or connected to DC Mains		
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		
SRD	EUT is a short range device		

2.4 Operating Mode(s)

<i>Ref.-No.</i>	<i>Description</i>
-----------------	--------------------

01	Bluetooth Traffic Mode & 433 MHz Receiver active
----	--

2.5 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.</i>

<i>AE Description</i>

9000_FCC_A01 (Radiated Test Setup)

<i>Sample:</i> IC01	Microphone
<i>Sample:</i> OW01	Cable Harness
<i>Sample:</i> UD01	iPod/USB/Audio Jack cable
<i>Sample:</i> a01	Radiated Sample in Test Mode

9100_FCC_B01 (Radiated Test Setup)

<i>Sample:</i> IC01	Microphone
<i>Sample:</i> LED01	OLED Display
<i>Sample:</i> OW01	Cable Harness
<i>Sample:</i> UD01	iPod/USB/Audio Jack cable
<i>Sample:</i> b01	Radiated Sample in Test Mode

9200_FCC_C01 (Radiated Test Setup)

<i>Sample:</i> IC01	Microphone
<i>Sample:</i> OL01	Color Display
<i>Sample:</i> OW01	Cable Harness
<i>Sample:</i> UD01	iPod/USB/Audio Jack cable
<i>Sample:</i> c01	Radiated Sample in Test Mode

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:

The MKi9x00 is for vehicular use only and powered by DC (car battery). Therefore the test "Conducted emissions (AC power line) §15.207" is not applicable. The MKi9x00 contains a Bluetooth transceiver and a 433 MHz receiver (to enable remote control functionality).
This test report replaces the following test report: "MDE_PARRO_0907_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 2009/03/26 Version: 10-1-08 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 considerd	00/3/1	Public Notice: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems



3.4 Summary

Test Case Identifier / Name
Test (condition)

Result

Date of Test

Lab
Ref.

Setup

15b.2 Spurious Radiated Emissions §15.109

15b.2; Mode = transmit

Passed	2009/10/21	Lab 1	9000_FCC_A01
operating mode: 01			
Passed	2009/10/21	Lab 1	9100_FCC_B01
operating mode: 01			
Passed	2009/10/21	Lab 1	9200_FCC_C01
operating mode: 01			



3.5 Detailed Results

3.5.1 15b.2 Spurious Radiated Emissions §15.109

Test1: 15b.2; Mode = transmit

<i>Result:</i>	Passed
<i>Setup No.:</i>	9200_FCC_C01
<i>Date of Test:</i>	2009/10/21 8:09
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

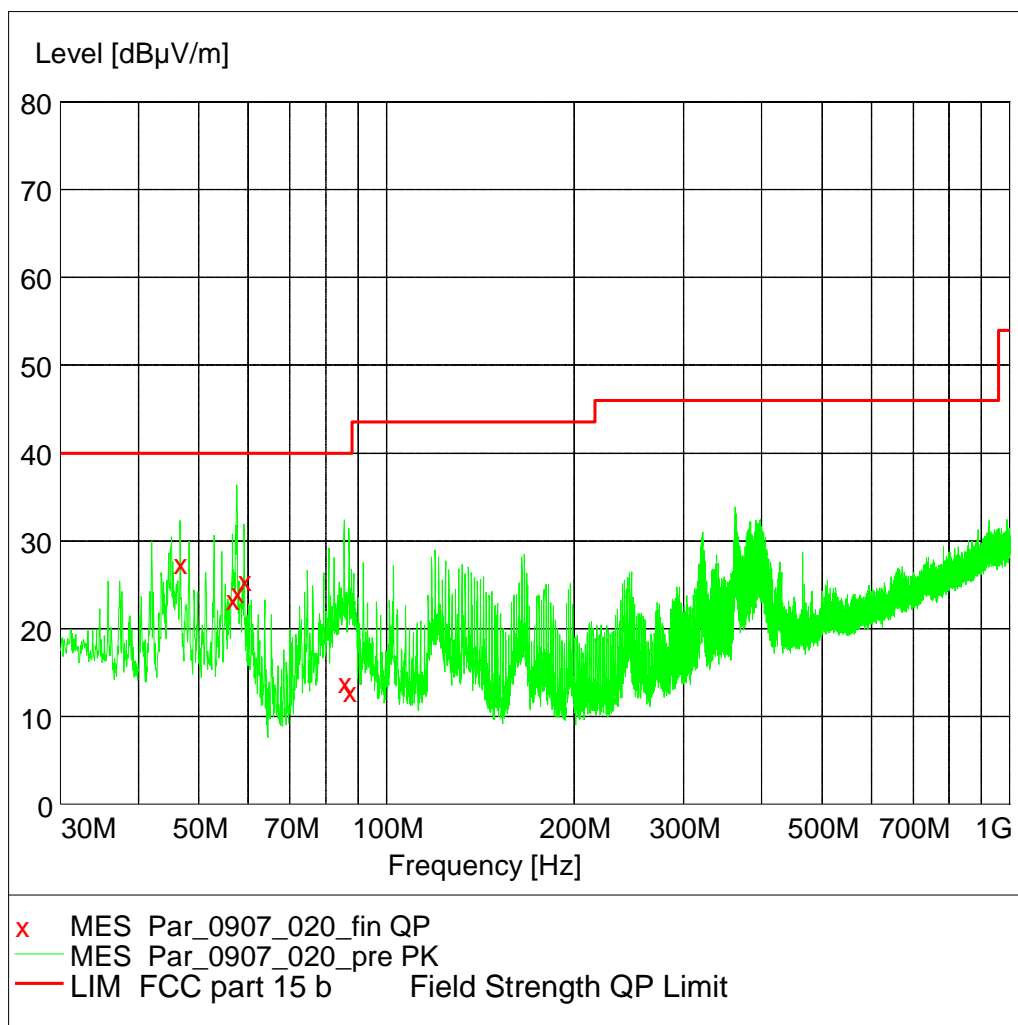
Detailed Results:

SPURIOUS EMISSION RADIATED

EUT: MKi9200 (EBoxR2) (CX055c01)
 Manufacturer: Parrot SA
 Operating Condition: Bluetooth TX on 2441 MHz (DH-1), 433MHz Receiver active
 Test Site: 7 layers, Ratingen
 Operator: Gal
 Test Specification: FCC 15b
 Comment: vertical + horizontal polarisation
 Start of Test: 20.10.2009 / 14:06:43

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: "Par_0907_020_fin QP"

20.10.2009 15:01

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Height cm	Azimuth deg	Polarisation
46.620000	27.60	10.8	40.0	12.4	101.0	158.00	VERTICAL
56.580000	23.50	4.7	40.0	16.5	214.0	247.00	VERTICAL
57.540000	24.30	4.5	40.0	15.7	271.0	23.00	VERTICAL
59.100000	25.70	4.3	40.0	14.3	225.0	157.00	VERTICAL
85.560000	14.00	9.6	40.0	26.0	211.0	22.00	HORIZONTAL
87.120000	13.10	9.7	40.0	26.9	225.0	338.00	HORIZONTAL



Reference: MDE_PARRO_0907_FCCc
FCC Part 15b

Test1: 15b.2; Mode = transmit

<i>Result:</i>	Passed
<i>Setup No.:</i>	9100_FCC_B01
<i>Date of Test:</i>	2009/10/21 8:12
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

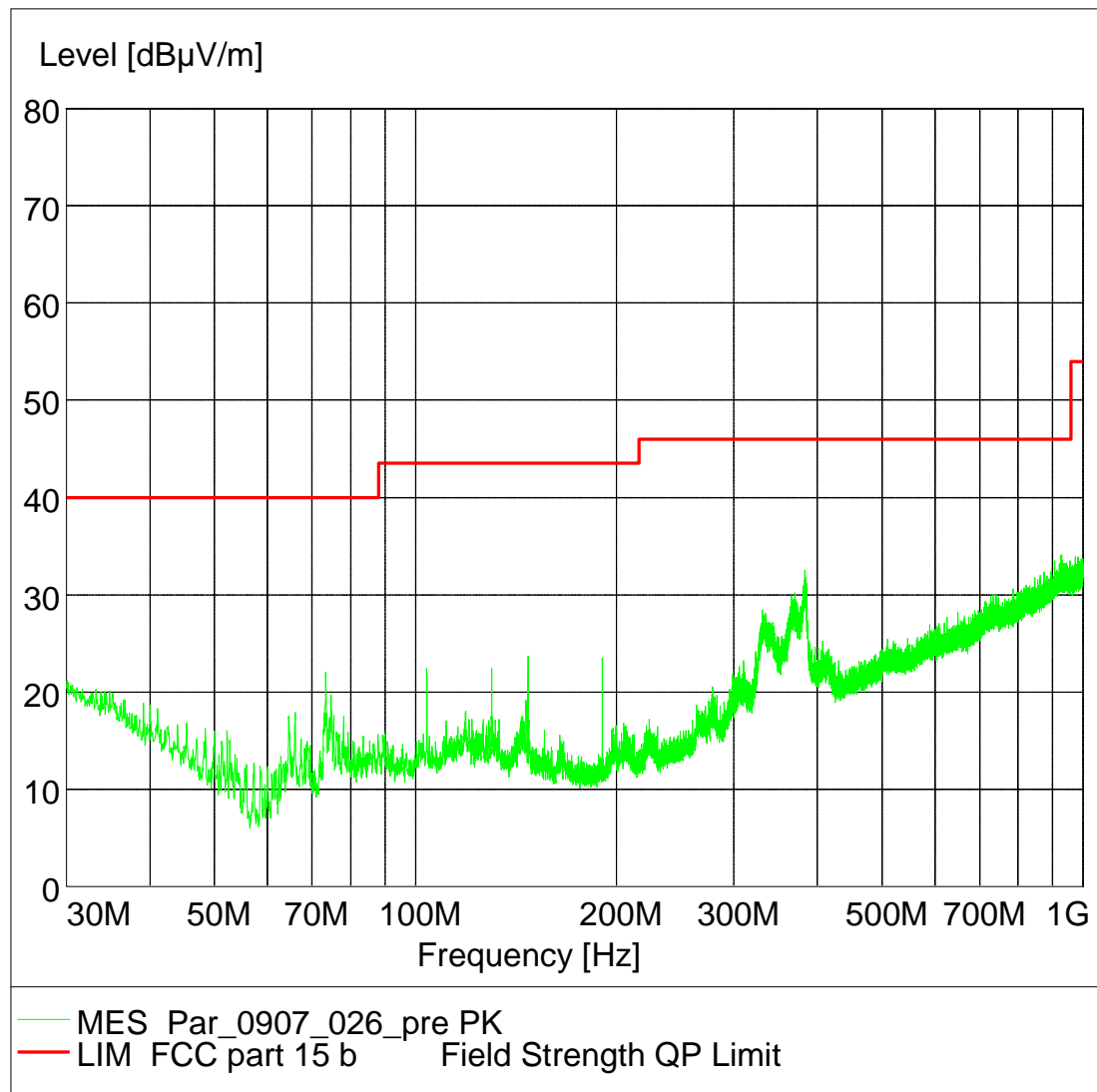
Detailed Results:

EMI RADIATED TEST

EUT: MKi9100 (EBoxR2)
 Manufacturer: Parrot SA
 Operating Condition: Bluetooth TX on 2441 MHz (DH-1), 433MHz Receiver active
 Test Site: 7 layers, Ratingen
 Operator: MAC
 Test Specification: FCC 15b
 Comment: vertical + horizontal polarisation
 Start of Test: 21.10.2009 / 06:55:48

SCAN TABLE: "FCC part 15 b"

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





Reference: MDE_PARRO_0907_FCCc
FCC Part 15b

Test1: 15b.2; Mode = transmit

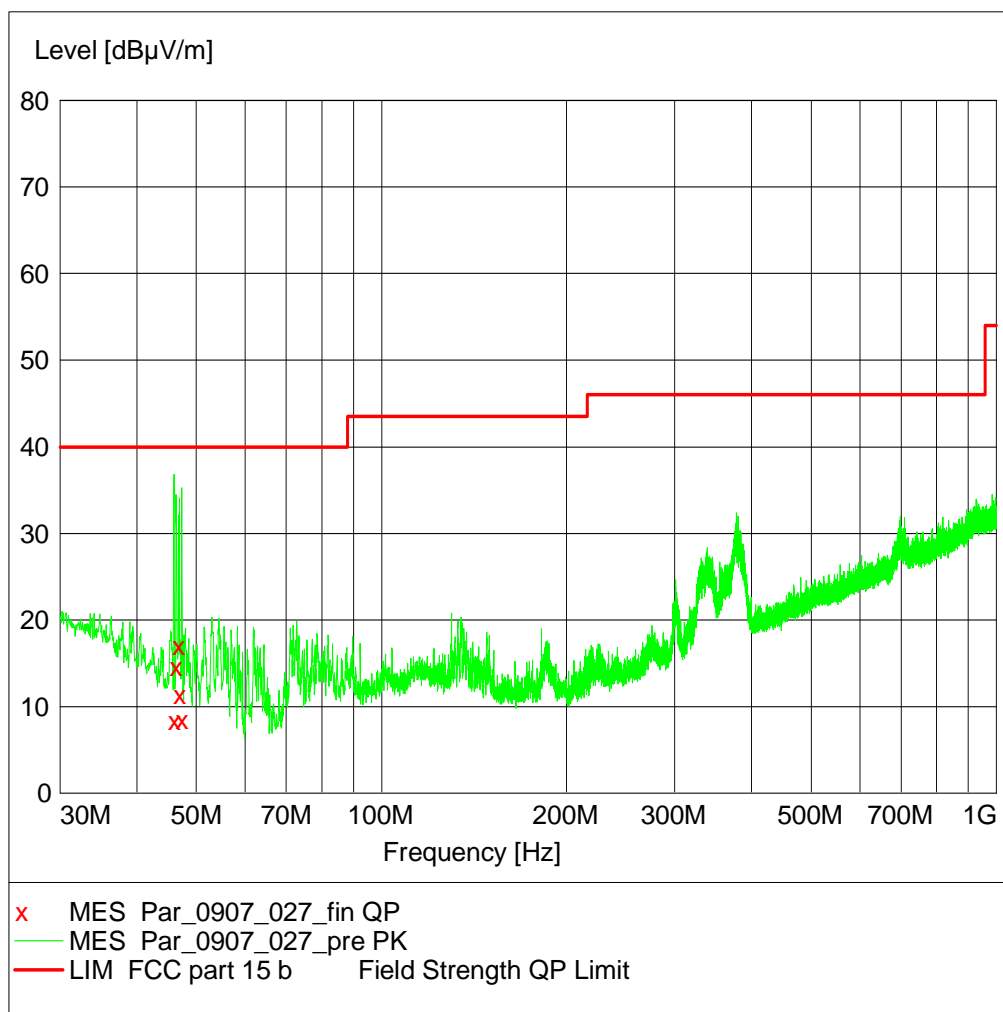
<i>Result:</i>	Passed
<i>Setup No.:</i>	9000_FCC_A01
<i>Date of Test:</i>	2009/10/21 8:15
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

Detailed Results:

EMI RADIATED TEST

EUT: MKi9000 (EBoxR2)
 Manufacturer: Parrot SA
 Operating Condition: Bluetooth TX on 2441 MHz (DH-1), 433MHz Receiver active
 Test Site: 7 layers, Ratingen
 Operator: MAC
 Test Specification: FCC 15b
 Comment: vertical + horizontal polarisation
 Start of Test: 21.10.2009 / 07:21:44
SCAN TABLE: "FCC part 15 b"

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



MEASUREMENT RESULT: "Par_0907_027_fin QP"

21.10.2009 08:10

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
45.960000	8.40	11.6	40.0	31.6	102.0	22.00	VERTICAL
46.320000	14.60	11.4	40.0	25.4	102.0	292.00	VERTICAL
46.800000	17.00	11.1	40.0	23.0	100.0	112.00	VERTICAL
46.920000	11.40	11.0	40.0	28.6	197.0	247.00	VERTICAL
47.280000	8.50	10.8	40.0	31.5	126.0	22.00	VERTICAL

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	CO2000/328/124 70406/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

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

Single Device Name	Type	Serial Number	Manufacturer
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: B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B56V14, B68 3v04, PCMCIA, U65V04		2007/07/16
	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		
Universal Radio Communication Tester	Firmware: µP1 8v50 02.05.06		

	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>
Universal Radio Communication Tester	HW options: B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B54V14, B56V14, B68 3v04, B95, PCMCIA, U65V02		2007/01/02
	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
	<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

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 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 Next Exec.</i>
		Standard Calibration	2007/12/06 2009/12/05

4.2 Laboratory Environmental Conditions

Laboratory	Date	Temperature	Humidity	Air Pressure
Lab 1	2009/10/21	26 °C	32 %	1004 hPa

5 Annex

5.1 Additional Information for Sample Description



Photo: MKi9000, radiated sample (top side)



Photo: MKi9000, radiated sample (all connectors visible)



Photo: MKi9100, radiated sample (top side)



Photo: MKi9200, radiated sample (all connectors visible)



Photo: MKi9200, radiated sample (top side)



Photo: MKi9200, radiated sample (bottom side)



Photo: MKi9200, radiated sample (all connectors visible)



Photo: iPod / USB / Audio Jack cable

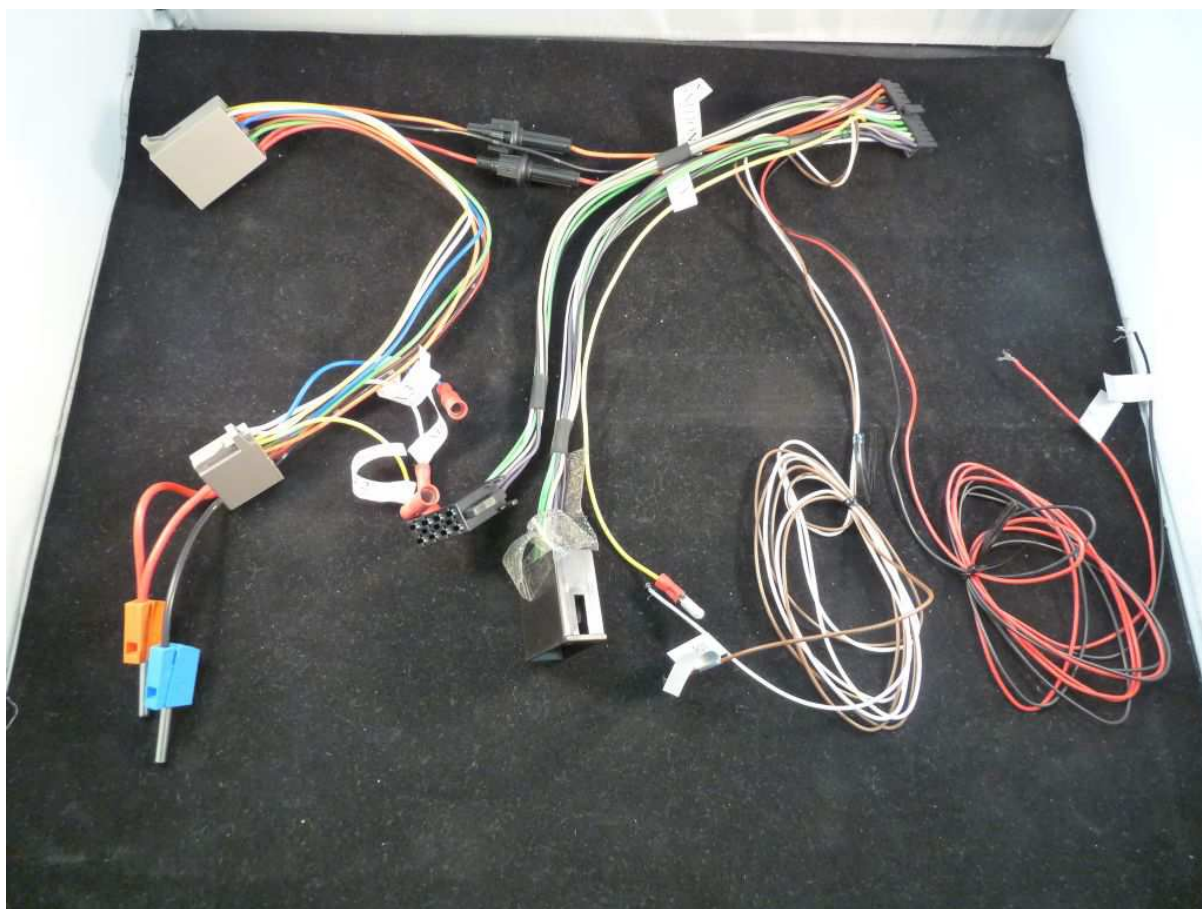


Photo Cable Harness (for MKi9000, 9100, 9200)



Photo Microphone (for MKi 9200, 9100, 9000)

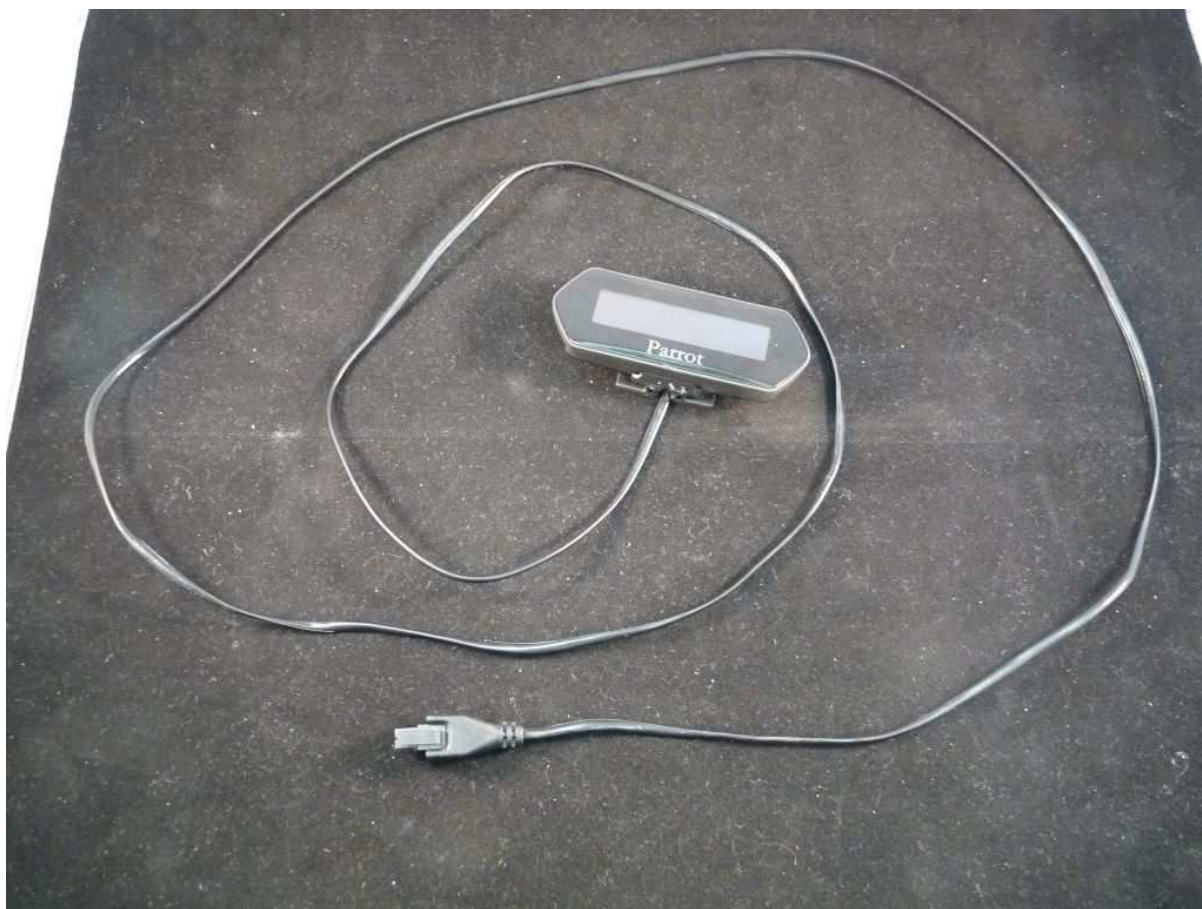
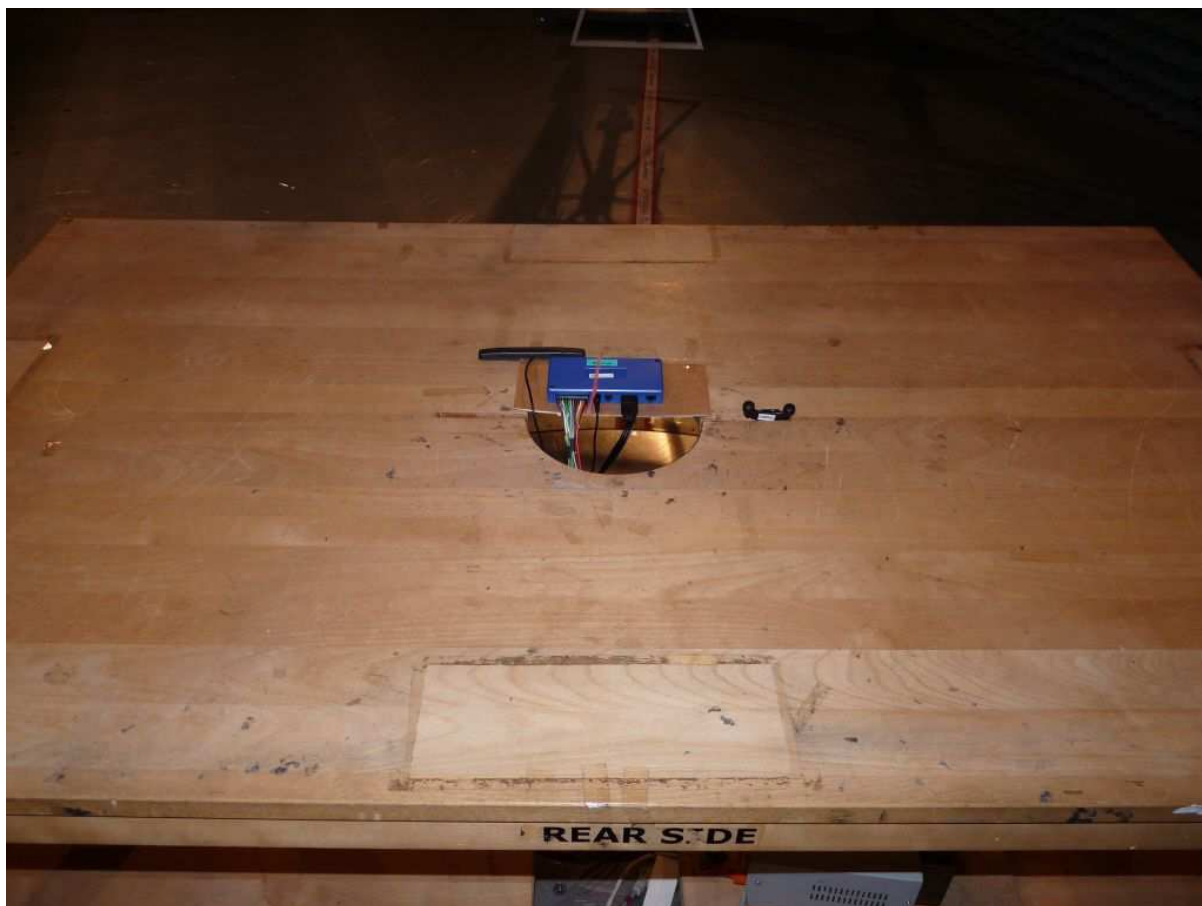


Photo OLED Display (for MKi9100 only)



Photo Color Display (for MKi9200 only)

5.2 Additional Information for Report



Test Setup Photo: MKi9000, radiated measurement



Test Setup Photo: MKi9100, radiated measurement



Test Setup Photo: MKi9200, radiated measurement

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 $\pm 22.5^\circ$ 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(< 1 GHz)
- 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

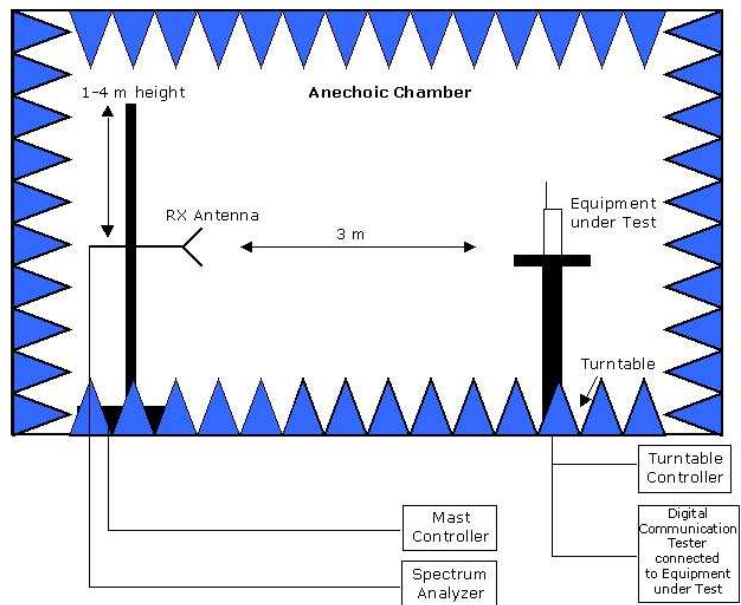
§15.35(b)

..., 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 (Limit (μ V/m)/1 μ 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



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.

6 Index

1 Administrative Data	2
1.1 Project Data	2
1.2 Applicant Data	2
1.3 Test Laboratory Data	2
1.4 Signature of the Testing Responsible	2
1.5 Signature of the Accreditation Responsible	3
2 Test Object Data	4
2.1 General OUT Description	4
2.2 Detailed Description of OUT Samples	6
2.3 OUT Features	8
2.4 Operating Mode(s)	9
2.5 Setups used for Testing	9
3 Results	10
3.1 General	10
3.2 List of the Applicable Body	10
3.3 List of Test Specification	10
3.4 Summary	11
3.5 Detailed Results	12
3.5.1 15b.2 Spurious Radiated Emissions §15.109	12
4 Test Equipment Details	18
4.1 List of Used Test Equipment	18
4.2 Laboratory Environmental Conditions	22
5 Annex	23
5.1 Additional Information for Sample Description	23
5.2 Additional Information for Report	35
6 Index	42