

# InterLab®

## Final Report on

### Parrot MINIKIT Neo 2 HD

### FCC ID RKXMYNOS6

### IC: 5119A-MYNOS6

**Report Reference:** MDE\_PARRO\_1417\_FCCb  
According to:  
FCC 47 CFR Ch.1 Part 15 Subpart B

**Date:** October 24, 2014

**Test Laboratory:**

7Layers AG  
Borsigstr. 11  
40880 Ratingen  
Germany

**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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Aufsichtsratsvorsitzender •  
Chairman of the Supervisory Board:  
Peter Mertel  
Vorstand • Board:  
Dr. H.-J. Meckelburg  
Dr. H. Ansorge



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:* Imad Hjije  
*Date Of Test Report:* 2014/10/24  
*Date of first test:* 2014/09/10  
*Date of last test:* 2014/09/22

### 1.2 Applicant Data

*Company Name:* Parrot S.A.  
*Street:* 174 Quai de Jemmapes  
*City:* 75010 Paris  
*Country:* France  
*Contact Person:* Mr. Imad Benyacoub  
*Fax:* +33 1 48 03 70 08  
*E-Mail:* imad.benyacoub@parrot.com

### 1.3 Test Laboratory Data

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

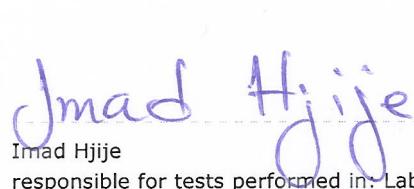
#### 7 layers DE

<i>Company Name :</i>	7 layers AG
<i>Street :</i>	Borsigstrasse 11
<i>City :</i>	40880 Ratingen
<i>Country :</i>	Germany
<i>Contact Person :</i>	Mr. Michael Albert
<i>Phone :</i>	+49 2102 749 201
<i>Fax :</i>	+49 2102 749 444
<i>E Mail :</i>	Michael.Albert@7Layers.com

#### Laboratory Details

Lab ID	Identification	Responsible	Accreditation Info
Lab 1	Conducted Emissions	Mr. Andreas Petz Mr. Wolfgang Richter	DAkkS-Registration no. D-PL-12140-01-01
Lab 2	Radiated Emissions	Mr. Marco Kullik Mr. Robert Machulec	DAkkS-Registration no. D-PL-12140-01-01

### 1.4 Signature of the Testing Responsible

  
Imad Hjije  
responsible for tests performed in: Lab 1, Lab 2



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, Lab 2



# 7layers

7layers AG, Bornscheid 11  
40880 Ratingen, Germany  
Phone +49 (0)2102 745 0

## 2 Test Object Data

### 2.1 General OUT Description

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

#### OUT: Parrot MINIKIT Neo 2 HD

Type / Model / Family:

Parrot MINIKIT Neo 2 HD  
FCC ID RKXMYNOS6  
IC: 5119A-MYNOS6

**Manufacturer:**

Company Name:

See applicant Data:

Contact Person:

-

#### Parameter List:

Parameter name

Value

AC Power Supply

120 (V)

Antenna Gain

-7.25 (dBi)

DC Power Supply

3.7 (V)

## 2.2 Detailed Description of OUT Samples

### Sample : aa02

<i>OUT Identifier</i>	Parrot MINIKIT Neo 2 HD		
<i>Sample Description</i>	Radiated sample		
<i>Serial No.</i>	PI040316D24G000154		
<i>HW Status</i>	HW06		
<i>SW Status</i>	V1.00		
<i>Low Voltage</i>	3.3 V	<i>Low Temp.</i>	0 °C
<i>High Voltage</i>	4.2 V	<i>High Temp.</i>	60 °C
<i>Nominal Voltage</i>	3.7 V	<i>Normal Temp.</i>	23 °C

### **Parameter List:**

<i>Parameter Description</i>	<i>Value</i>
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#### **Parameter for Scope FCC\_v2**

Antenna Gain	-7.25	(dBi)
Frequency_high	2480	(MHz)
Frequency_low	2402	(MHz)
Frequency_mid	2441	(MHz)

### Sample : ad02

<i>OUT Identifier</i>	Parrot MINIKIT Neo 2 HD		
<i>Sample Description</i>	Standard sample		
<i>Low Voltage</i>	3.3 V	<i>Low Temp.</i>	0 °C
<i>High Voltage</i>	4.2 V	<i>High Temp.</i>	60 °C
<i>Nominal Voltage</i>	3.7 V	<i>Normal Temp.</i>	23 °C

### **Parameter List:**

<i>Parameter Description</i>	<i>Value</i>
------------------------------	--------------

#### **Parameter for Scope FCC\_v2**

Antenna Gain	-7.25	(dBi)
Frequency_high	2480	(MHz)
Frequency_low	2402	(MHz)
Frequency_mid	2441	(MHz)

## 2.3 OUT Features

### Features for OUT: Parrot MINIKIT Neo 2 HD

Designation	Description	Allowed Values	Supported Value(s)
<b>Features for scope: FCC_v2</b>			
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		
BTLE	Support of Bluetooth Low Energy		
DC	The OUT is powered by or connected to DC		
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		
TantC	temporary antenna connector, which may be only built-in for testing, designed as an example part of the equipment		

## 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.

Setup No.	List of OUT samples		List of auxiliary equipment	
	Sample No.	Sample Description	AE No.	AE Description
<b>Setup_aa02</b>				
	Sample: aa02	Radiated sample	AE AUX2	USB cable
			AE AUX6	EMC KEYBOARD 1
			AE AUX1	Car Charger adapter 12V & 24V
			AE AUX4	Laptop RE
			AE AUX3	EMC TFT 2
			AE AUX5	EMC MOUSE 1
			AE AUX7	AC Adapter 2 Laptop RE
<b>Setuü_ad02</b>				
	Sample: ad02	Standard sample	AE AUX2	USB cable
			AE AUX6	EMC KEYBOARD 1
			AE AUX1	Car Charger adapter 12V & 24V
			AE AUX4	Laptop RE
			AE AUX3	EMC TFT 2
			AE AUX5	EMC MOUSE 1
			AE AUX7	AC Adapter 2 Laptop RE

### 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:**

1. All tests are performed under environmental conditions within the requirements of the specifications. Environmental conditions are available at the laboratory.
2. The device is a hands-free kit containing a BT and BTLE Transceiver operating in the 2.4 GHz ISM band.

#### 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>	<b>FCC part 2 and 15</b>
<i>Version</i>	10-1-13 Edition
<i>Title:</i>	PART 2 - GENERAL RULES AND REGULATIONS PART 15 - RADIO FREQUENCY DEVICES

### 3.4 Summary

<i>Test Case Identifier / Name</i>		<i>Result</i>	<i>Date of Test</i>	<i>Lab Ref.</i>	<i>Setup</i>
<b>15b.1 Conducted Emissions (AC Power Line) §15.107</b>					
15b.1; Mode = powered via Car charger adapter and generating a high power consumption	Passed	2014/09/22	Lab 1	Setup_aa02	
15b.1; Mode = powered via Laptop and generating a high power consumption	Passed	2014/09/22	Lab 1	Setup_aa02	
<b>15b.2 Spurious Radiated Emissions §15.109</b>					
15b.2; Mode = powered via Car charger adapter and generating a high power consumption	Passed	2014/09/17	Lab 2	Setup_aa02	
15b.2; Mode = powered via Laptop and generating a high power consumption	Passed	2014/09/10	Lab 2	Setüü_ad02	

### 3.5 Detailed Results

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

**Test: 15b.1; Mode = powered via Car charger adapter and generating a high power consumption**

*Result:* Passed

*Setup No.:* Setup\_aa02

*Date of Test:* 2014/09/22 17:50

*Body:* FCC47CFRChIPART15bRADIO FREQUENCY DEVICES

*Test Specification:* FCC part 2 and 15

## Detailed Results:

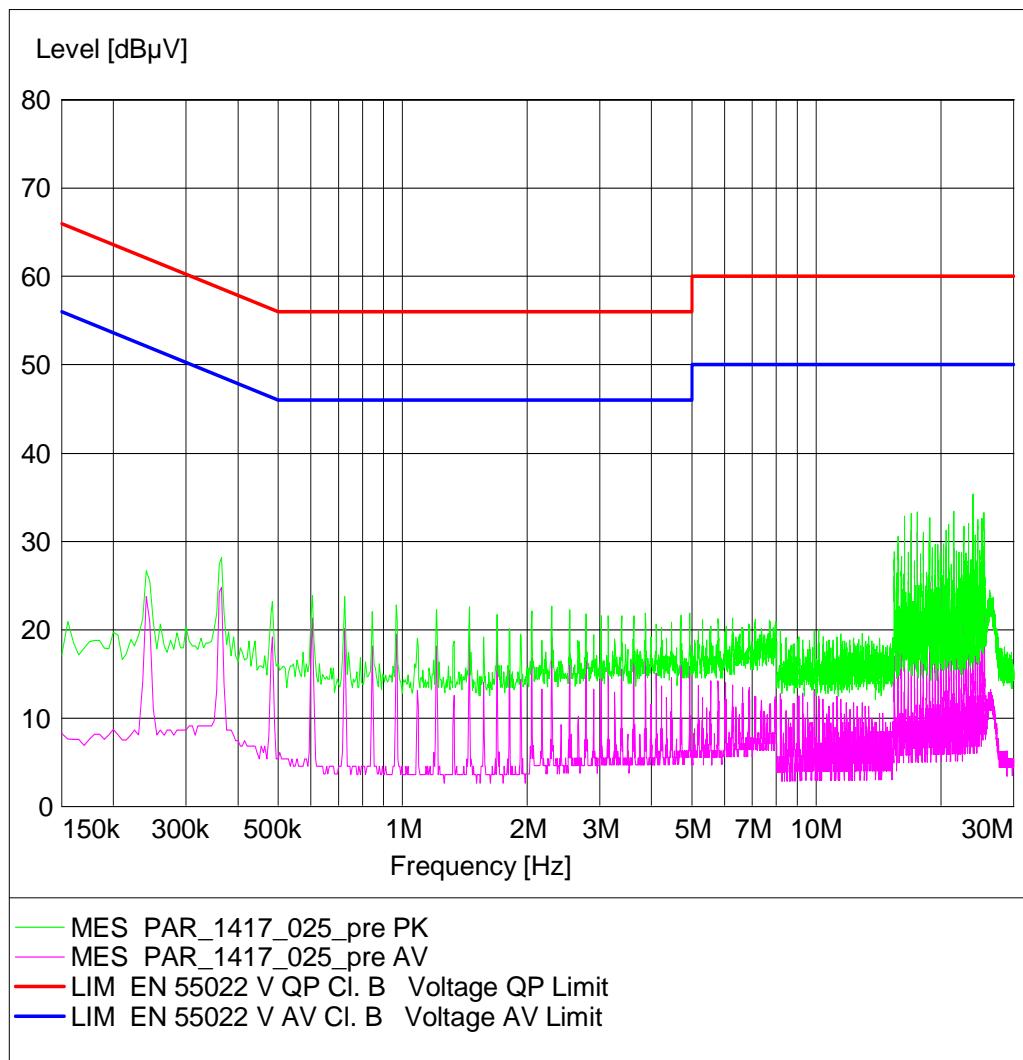
### EMI CONDUCTED TEST

Diagram.: 1.02

EUT: (DE1018003aa02)  
 Manufacturer: Parrot  
 Operating Condition: powered by 12 V DC; BT TX on 2441 MHz ; Car Charger  
 Test Site: 7 layers, Ratingen  
 Operator: Name  
 Test Specification: EN 55022 Class B for FCC 15b  
 Comment: - -> GND  
 Start of Test: 22.09.2014 / 20:52:46

### SCAN TABLE: "EN 55022 DC"

Short Description:			EN 55022 Voltage			
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF	Transducer
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	20.0 ms	9 kHz	ESH3-Z6
			Average			



**Test: 15b.1; Mode = powered via Laptop and generating a high power consumption**

*Result:* Passed

*Setup No.:* Setup\_aa02

*Date of Test:* 2014/09/22 17:53

*Body:* FCC47CFRChIPART15bRADIO FREQUENCY DEVICES

*Test Specification:* FCC part 2 and 15

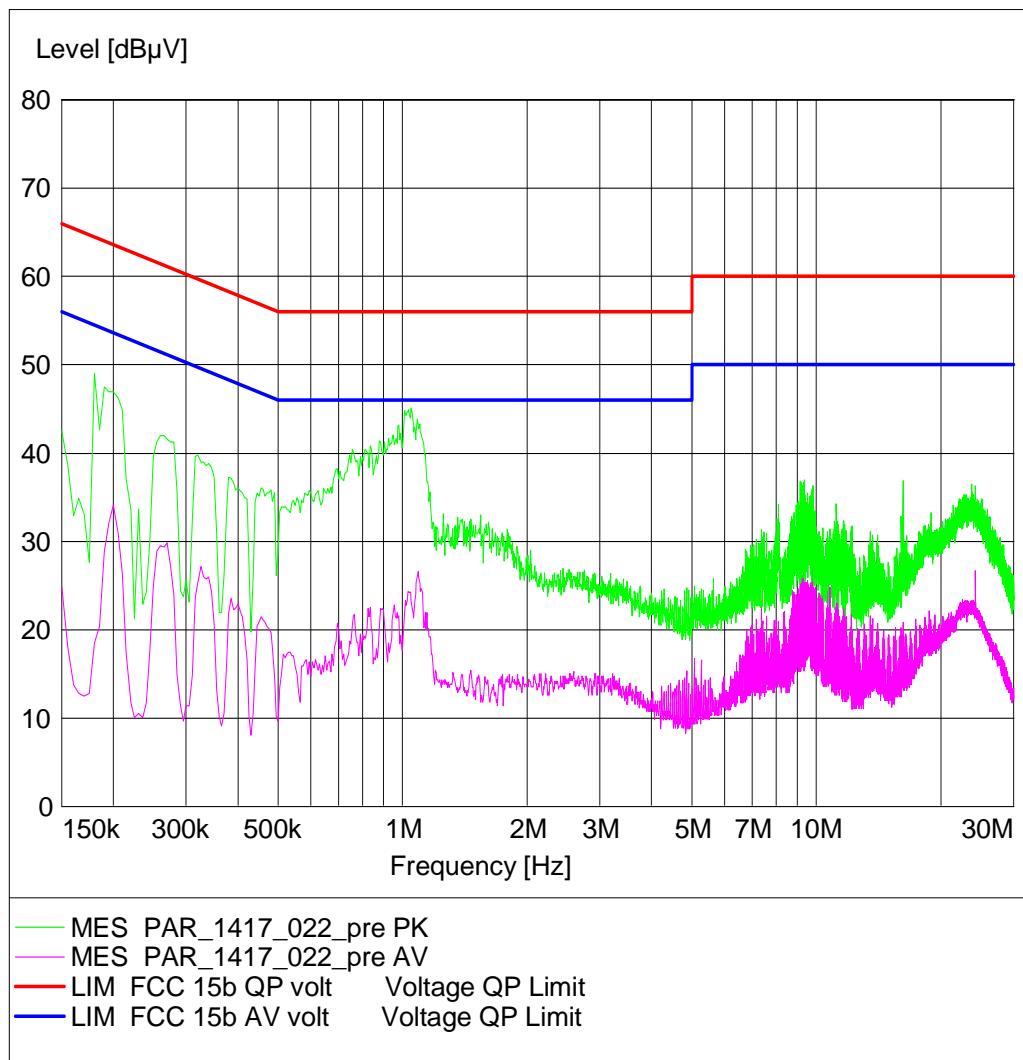
## Detailed Results:

### AC MAINS CONDUCTED

EUT: (DE1018003aa02)  
 Manufacturer: Parrot  
 Operating Condition: USB traffic via Laptop  
 Test Site: 7 layers Ratingen  
 Operator: URO  
 Test Specification: ANSI C63.4; FCC 15.107 / 15.207  
 Comment: computer peripheral setup ; 120 V / 60 Hz  
 Start of Test: 22.09.2014 / 19:27:05

### SCAN TABLE: "FCC Voltage"

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



### **3.5.2 15b.2 Spurious Radiated Emissions §15.109**

#### **Test: 15b.2; Mode = powered via Car charger adapter and generating a high power consumption**

*Result:* Passed  
*Setup No.:* Setup\_aa02  
*Date of Test:* 2014/09/17 17:42  
*Body:* FCC47CFRChIPART15bRADIO FREQUENCY DEVICES  
*Test Specification:* FCC part 2 and 15

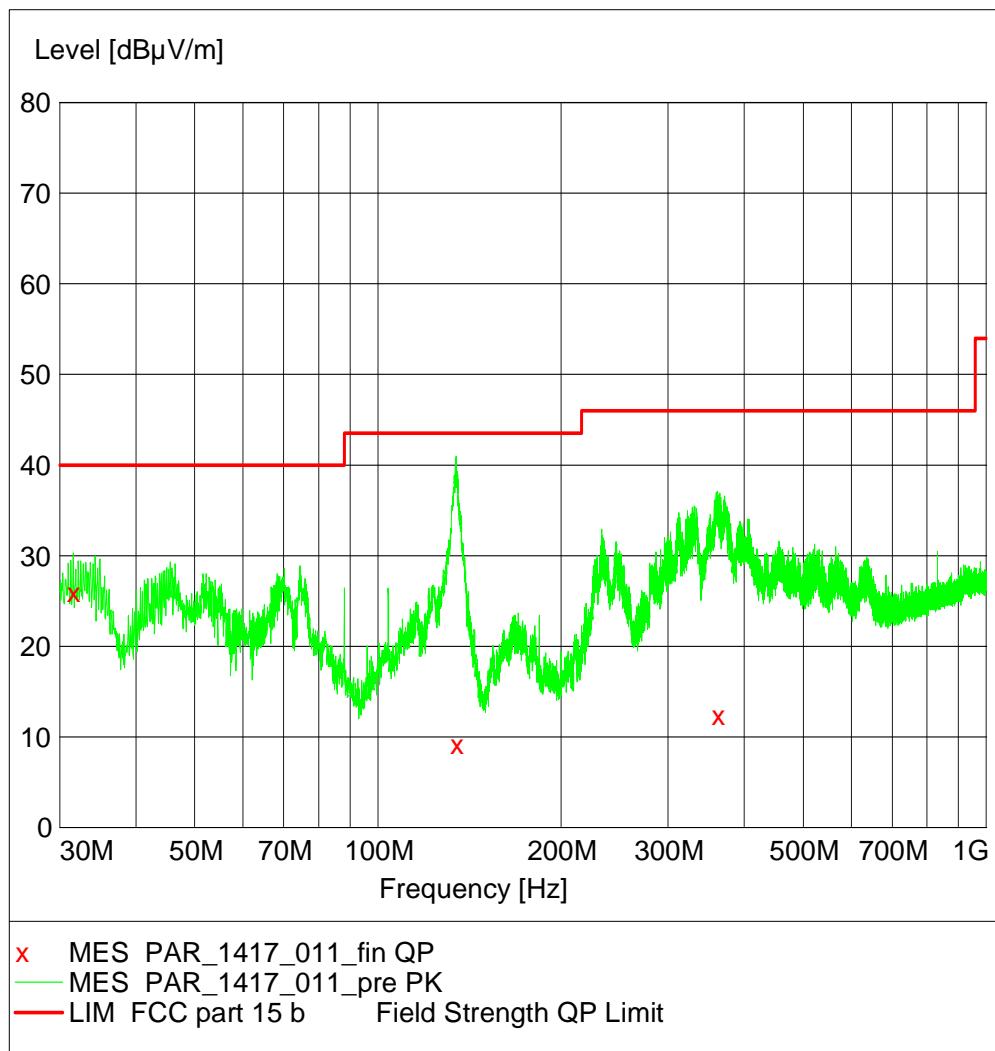
## Detailed Results:

### EMI RADIATED TEST

EUT: (DE1018003aa02) with DC car charger  
 Manufacturer: Parrot  
 Operating Condition: BT TX on 2441 MHz, 1-DH1, 120V/60Hz  
 Test Site: 7 layers, Ratingen  
 Operator: Doe  
 Test Specification: FCC part 15 b  
 Comment: Horizontal EUT position  
 Start of Test: 11.09.2014 / 02:40:03

### SCAN TABLE: "FCC part 15 b"

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



**MEASUREMENT RESULT: "PAR\_1417\_011\_fin\_QP"**

11.09.2014 03:20

Frequency Polarisation	Level	Transd	Limit	Margin	Height	Azimuth
MHz	dB $\mu$ V/m	dB	dB $\mu$ V/m	dB	cm	deg
31.560000 VERTICAL	26.00	20.2	40.0	14.0	101.0	22.00
134.580000 HORIZONTAL	9.20	11.0	43.5	34.3	225.0	157.00
361.980000 HORIZONTAL	12.40	14.6	46.0	33.6	175.0	22.00

**Test: 15b.2; Mode = powered via Laptop and generating a high power consumption**

Result: Passed

Setup No.: Setuü\_ad02

Date of Test: 2014/09/10 17:46

Body: FCC47CFRChIPART15bRADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

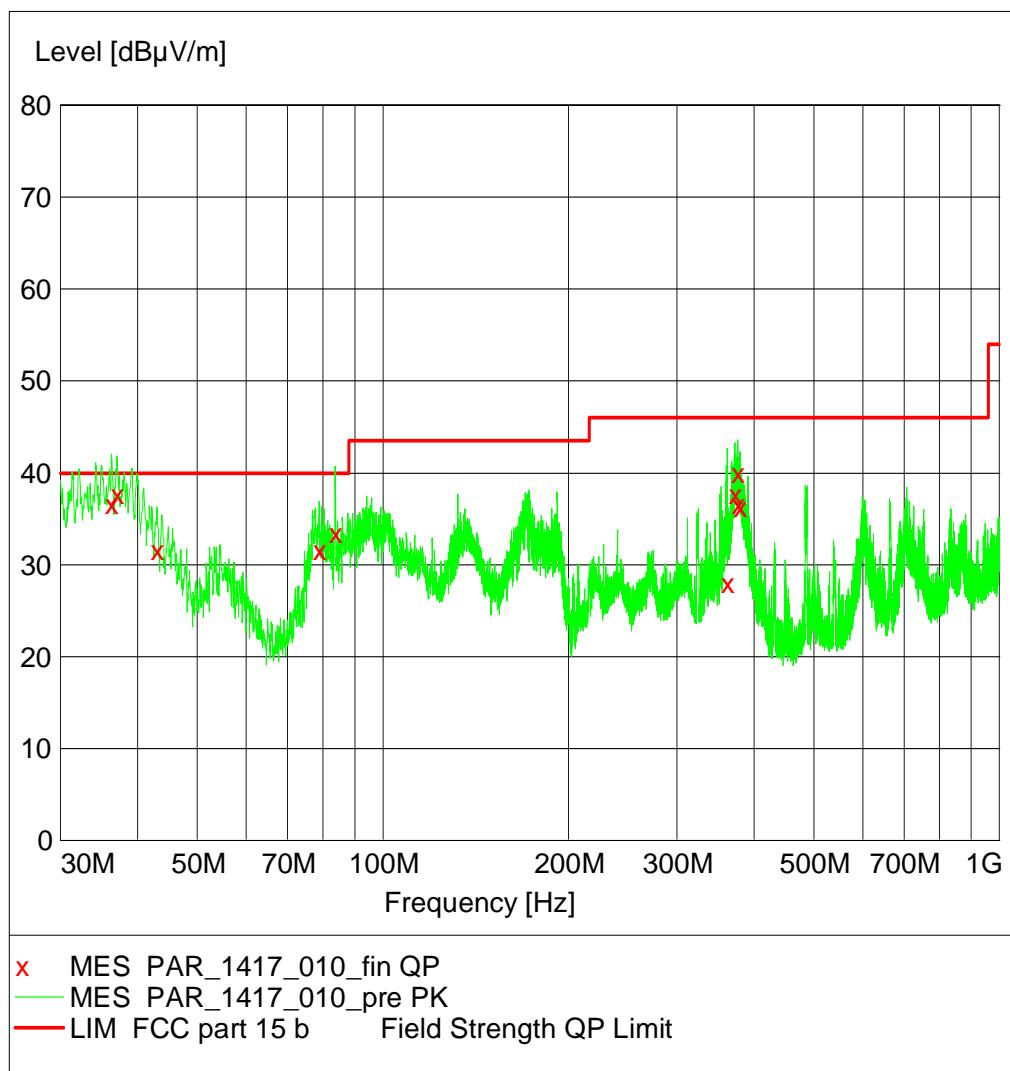
## Detailed Results:

### EMI RADIATED TEST

EUT: (DE1018003ad02)  
 Manufacturer: Parrot  
 Operating Condition: USB traffic, computer peripheral setup, 120V/60HZ  
 Test Site: 7 layers, Ratingen  
 Operator: Doe  
 Test Specification: FCC part 15 b  
 Comment: Horizontal EUT position  
 Start of Test: 10.09.2014 / 20:16:55

### SCAN TABLE: "FCC part 15 b"

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



**MEASUREMENT RESULT: "PAR\_1417\_010\_fin\_QP"**

10.09.2014 21:10

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
36.300000	36.60	17.8	40.0	3.4	100.0	67.00	VERTICAL
37.020000	37.60	17.4	40.0	2.4	100.0	22.00	VERTICAL
42.960000	31.50	14.2	40.0	8.5	100.0	67.00	VERTICAL
78.840000	31.50	10.4	40.0	8.5	124.0	292.00	VERTICAL
83.640000	33.40	10.7	40.0	6.6	117.0	338.00	VERTICAL
362.220000	28.00	14.6	46.0	18.0	115.0	0.00	HORIZONTAL
372.540000	37.60	14.8	46.0	8.4	102.0	338.00	HORIZONTAL
375.480000	40.00	14.9	46.0	6.0	100.0	338.00	HORIZONTAL
376.500000	36.60	15.0	46.0	9.4	108.0	347.00	HORIZONTAL
379.020000	36.30	15.0	46.0	9.7	100.0	316.00	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	Last Execution	Next Exec.
Manufacturer:	Frankonia		
Description:	Anechoic Chamber for radiated testing		
Type:	10.58x6.38x6.00 m <sup>3</sup>		
	<i>Calibration Details</i>		
	NSA (FCC)	2014/01/09	2017/01/09

#### 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 <sup>3</sup>	none	Frankonia
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	FCC listing 96716 3m Part15/18		2014/01/09 2017/01/08
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:**

**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
Impedance Stabilization Network	ISN T800	36159	Teseq GmbH
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2014/02/06 2016/02/28
Impedance Stabilization Network, Coupling Decoupling Network	ISN/CDN ENY41	100002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2013/03/01 2015/03/31
Impedance Stabilization Network, Coupling Decoupling Network	ISN/CDN ST08	36292	Teseq GmbH
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2014/01/10 2016/01/31
Impedance Stabilization Network, Coupling Decoupling Network	ISN/CDN T8-Cat6	32187	Teseq GmbH
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2014/01/08 2016/01/31
One-Line V-Network	ESH 3-Z6	100489	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	standard calibration		2014/06/18 2017/11/30
One-Line V-Network	ESH 3-Z6	100570	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2013/11/25 2016/11/24
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standart Calibration		2013/03/01 2015/02/28
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>
	Standard Calibration		2013/03/01 2015/02/28

**Test Equipment Auxiliary Equipment for Radiated emissions**
**Lab ID:**

Description:

Serial Number:

**Lab 2**

Equipment for emission measurements

see single devices

**Single Devices for Auxiliary Equipment for Radiated emissions**

Single Device Name	Type	Serial Number	Manufacturer
Antenna mast	AM 4.0	AM4.0/180/11920 513	Maturo GmbH
Biconical Broadband Antenna	SBA 9119	9119-005	Schwarzbeck
Biconical dipole	VUBA 9117 <i>Calibration Details</i>	9117-108	Schwarzbeck <i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2012/01/18   2015/01/17
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32-5P	849785	Miteq
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4	-	Miteq
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P	896037	Miteq
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01-2+W38.01-2	Kabel Kusch
Cable "ESI to Horn Antenna"	UFB311A+UFB293C	W18.02-2+W38.02-2	Rosenberger Micro-Coax
Double-ridged horn	HF 906 <i>Calibration Details</i>	357357/001	Rohde & Schwarz GmbH & Co. KG <i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2012/05/18   2015/05/17
Double-ridged horn	HF 906 <i>Calibration Details</i>	357357/002	Rohde & Schwarz GmbH & Co. KG <i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2012/06/26   2015/06/25
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic
High Pass Filter	WHKX 7.0/18G-8SS	09	Wainwright
Horn Antenna Schwarzbeck 15-26 GHz BBHA 9170	BBHA 9170		
Log.-per. Antenna	HL 562 Ultralog <i>Calibration Details</i>	100609	Rohde & Schwarz GmbH & Co. KG <i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2012/12/18   2015/12/17
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz GmbH & Co. KG
Loop Antenna	HFH2-Z2 <i>Calibration Details</i>	829324/006	Rohde & Schwarz GmbH & Co. KG <i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2011/10/27   2014/10/26
Pyramidal Horn Antenna 26,5 GHz	3160-09	00083069	EMCO Elektronik GmbH

**Single Devices for Auxiliary Equipment for Radiated emissions (continued)**

Single Device Name	Type	Serial Number	Manufacturer
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
Broadband Power Divider N (Aux)	1506A / 93459	LM390	Weinschel Associates
Broadband Power Divider SMA	WA1515	A855	Weinschel Associates
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	Fluke Europe B.V.
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Customized calibration		2013/12/04 2015/12/03
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
Signal Analyzer	FSV30	103005	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard		2014/02/10 2016/02/09
Spectrum Analyser	FSP3	836722/011	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard		2012/06/13 2015/06/12
Spectrum Analyser	FSU26	200418	Rohde & Schwarz GmbH & Co.KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2014/07/29 2015/07/28
Vector Signal Generator	SMIQ 03B	832492/061	Rohde & Schwarz GmbH & Co.KG

**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
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2011/11/24 2014/11/23
CMW500	CMW500	107500	Rohde & Schwarz GmbH & Co.KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2014/01/27 2016/01/26
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		2011/11/28 2014/11/27
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz GmbH & Co. KG
	<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		
	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		2011/12/07 2014/12/06
	<i>HW/SW Status</i>		<i>Date of Start</i> <i>Date of End</i>
	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

**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 Meter	NRVD	828110/016	Rohde & Schwarz GmbH & Co.KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2014/05/13 2015/05/12
Sensor Head A	NRV-Z1	827753/005	Rohde & Schwarz GmbH & Co.KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2014/05/13 2015/05/12
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG
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		2014/01/07 2016/01/31
	<i>HW/SW Status</i>		<i>Date of Start</i> <i>Date of End</i>
	Firmware-Update 4.34.4 from 3.45 during calibration		2009/12/03

**Test Equipment Shielded Room 02**

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

**Test Equipment T/A Logger 13**

**Lab ID:** **Lab 1, Lab 2**  
**Description:** Lufft Opus10 TPR  
**Type:** Opus10 TPR  
**Serial Number:** 13936

**Single Devices for T/A Logger 13**

Single Device Name	Type	Serial Number	Manufacturer
ThermoAirpressure Datalogger 13 (Environ)	Opus10 TPR (8253.00)	13936	Lufft Mess- und Regeltechnik GmbH
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Customized calibration		2013/02/07 2015/02/06

**Test Equipment T/H Logger 02**

**Lab ID:** **Lab 1**  
*Description:* Lufft Opus10  
*Serial Number:* 7489

**Single Devices for T/H Logger 02**

Single Device Name	Type	Serial Number	Manufacturer
ThermoHygro Datalogger 02 (Environ)	Opus10 THI (8152.00)	7489	Lufft Mess- und Regeltechnik GmbH
<i>Calibration Details</i>			
	Customized calibration		<i>Last Execution</i> 2013/02/07 <i>Next Exec.</i> 2015/02/06

**Test Equipment T/H Logger 12**

**Lab ID:** **Lab 2**  
*Description:* Lufft Opus10  
*Serial Number:* 12482

**Single Devices for T/H Logger 12**

Single Device Name	Type	Serial Number	Manufacturer
ThermoHygro Datalogger 12 (Environ)	Opus10 THI (8152.00)	12482	Lufft Mess- und Regeltechnik GmbH
<i>Calibration Details</i>			
	Customized calibration		<i>Last Execution</i> 2013/01/07 <i>Next Exec.</i> 2015/01/06

**5 Annex**

**5.1 Additional Information for Report**



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Reference: MDE\_PARRO\_1417\_FCCb  
According to:  
FCC 47 CFR Ch.1 Part 15 Subpart B

#### Test Description

#### Conducted emissions (AC power line)

#### Standard FCC Part 15 Subpart B

The test was performed according to: ANSI C 63.4, 2009

#### Test Description

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2009. 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 connected to a 50  $\mu$ H || 50 Ohm Line Impedance Stabilization Network (LISN), which meets the requirements of ANSI C63.4-2009, Annex B, in the frequency range of the measurements. The LISN's unused connections were terminated with 50 Ohm loads. AC Power supply voltage for EUT: 120 V 60 Hz (if not stated within the measurement plot and/or test result).

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 $\mu$ V)	AV Limit (dB $\mu$ 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 (dB $\mu$ V)	AV Limit (dB $\mu$ V)
0.15 - 0.5	79	66
0.5 - 30	73	60

Used conversion factor: Limit (dB $\mu$ V) = 20 log (Limit ( $\mu$ V)/1 $\mu$ V).

**NOTES:**

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.

The chosen operating mode is selected as representative mode to generate "worst-case" conditions, i.e. high power consumption.

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Spurious radiated emissions

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Standard FCC Part 15, Subpart B

The test was performed according to: ANSI C 63.4, 2009

**Test Description**

Measurement below 1 GHz:

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2009.

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 influence of the EUT support table that is used between 30-1000 MHz was evaluated.

The test was performed at the distance of 3 m between the EUT and the receiving antenna. The measurement procedure is implemented into the EMI test software ES-K1 from R&S. The radiated emissions measurements were made in a typical installation configuration. Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is performed at 2 axes. A pre-check is also performed while the EUT is powered from both AC and DC (battery) power in order to find the worst-case operating condition. AC Power supply voltage for EUT: 120 V 60 Hz (if not stated within the measurement plot and/or test result).

**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  $\mu$ s
- Turntable angle range: -180° to +180°
- Turntable step size: 90°
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarization: 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
- Polarizations: 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: -0.25 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 $\mu$ 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 $\mu$ V/m) / @ 3 m!
30 - 88	49.5
88 - 216	54.0
216 - 960	56.9
above 960	60.0

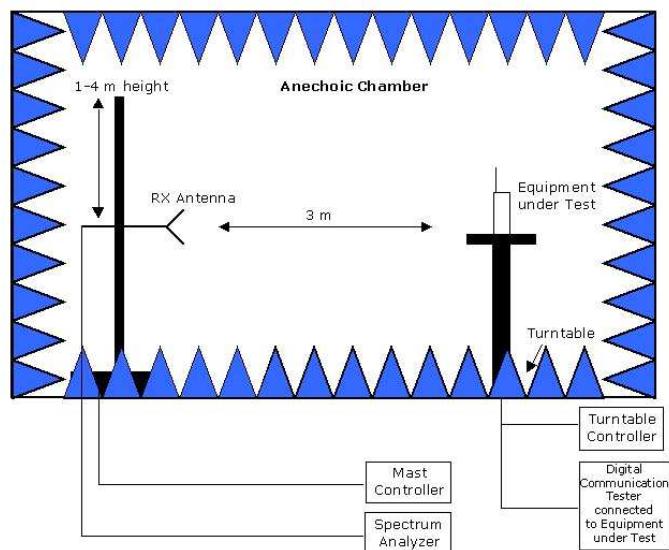
#### §15.35(b)

..., 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....

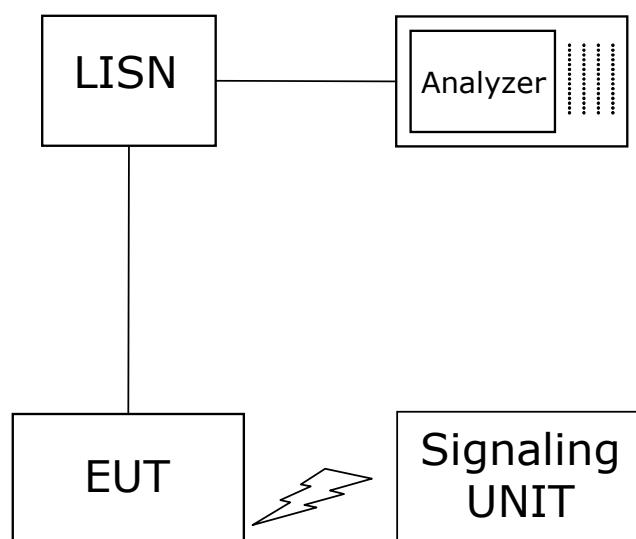
Used conversion factor: Limit (dB $\mu$ V/m) = 20 log (Limit ( $\mu$ V/m)/1 $\mu$ V/m)

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.



Setup in the shielded room for conducted measurements at AC mains port

## Correlation of measurement requirements from FCC and IC

Measurement	FCC reference	IC reference
Conducted Emissions (AC Power Line)	§15.107	ICES-001 Issue 4 or ICES-003 Issue 5 or RSS- Gen Issue 3
Radiated Spurious Emissions	§15.109	ICES-001 Issue 4 or ICES-003 Issue 5 or RSS- Gen Issue 3

**Remarks:**

1. FCC Part 15 subpart B, ICES 003 and CISPR 22 contain different definitions of Class A and Class B limits, i.e. which class is applicable to which kind of EUT. ICES 003 and CISPR 22 distinguish between the location where the EUT is intended to operate whilst FCC refers to the method of commercial distribution (distributive trades).
2. The correct assignment of the appropriate class to the concrete EUT is not scope of this test report!
3. A radio apparatus that is specifically subject to an Industry Canada Radio Standard Specification (RSS) and which contains an ITE is not subject to ICES-003 provided the ITE is used only to enable operation of the radio apparatus and the ITE does not control additional functions or capabilities.
4. ISM (Industrial, Scientific or Medical) radio frequency generators, though they may contain ITE, are excluded from the definition of ITE and are not subject to ICES-003. They are instead subject to the Interference-Causing Equipment Standard ICES-001, which specifically addresses ISM radio frequency generators.
5. The kind of EUT (ITE, ISM, Radio) determines which IC Standard is applicable.

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