



Inter**Lab**[®]

FCC Measurement/Technical Report on

GSM/UMTS ExpressCard
GlobeTrotter Express HSUPA E
GE0311

Report Reference: MDE_Opti_0723_FCCc

Test Laboratory:

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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 testing laboratory.

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0 Summary

0.1 Technical Report Summary

Type of Authorization

Certification for an Unintentional Radiator (Class B digital device)

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 (10-1-06 Edition) and 15 (10-1-06 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 15, Subpart A – General

§ 15.31 Measurement standards

§ 15.33 Frequency range of radiated measurements

Part 15, Subpart B – Unintentional Radiators

§ 15.101 Equipment authorization of unintentional radiators

§ 15.107 Conducted limits

§ 15.109 Radiated emission limits

Note:

None.

Summary Test Results:

The EUT complied with all performed tests as listed in chapter 0.2 Measurement Summary.

0.2 Measurement Summary

FCC Part 15, Subpart B

§ 15.107

Conducted Emissions (AC power line)

The measurement was performed according to ANSI C63.4

2003

OP-Mode

Setup

Port

Final Result

op-mode 1

Setup_01

AC Port (power line)

passed

FCC Part 15, Subpart B

§ 15.109

Spurious Radiated Emissions

The measurement was performed according to ANSI C63.4

2003

OP-Mode

Setup

Port

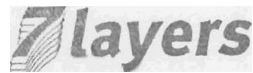
Final Result

op-mode 1

Setup_02

Enclosure

passed



7

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Responsible for
Accreditation Scope:



Responsible
for Test Report:





1 Administrative Data

1.1 Testing Laboratory

Company Name: 7 Layers AG

Address Borsigstr. 11
40880 Ratingen
Germany

This facility has been fully described in a report submitted to the FCC and accepted under the registration number 96716.

The test facility is also accredited by the following accreditation organisation:
- Deutscher Akkreditierungs Rat DAR-Registration no. DAT-P-192/99-01

Responsible for Accreditation Scope: Dipl.-Ing. Bernhard Retka
Dipl.-Ing. Robert Machulec
Dipl.-Ing. Thomas Hoell

Report Template Version: 2007-07-16

1.2 Project Data

Responsible for testing and report: Dipl.-Ing. Andreas Petz

Date of Test(s): 2007-10-23 to 2007-10-28
Date of Report: 2007-11-28

1.3 Applicant Data

Company Name: Option NV

Address: Gaston Geenslaan 14
3001 Leuven
Belgium

Contact Person: Mr. Lodeweyckx

1.4 Manufacturer Data

Company Name: please see applicant data

Address:

Contact Person:



2 Product labelling

2.1 FCC ID label

At the time of the report there was no FCC label available.

2.2 Location of the label on the EUT

see above

3 Test object Data

3.1 General EUT Description

Equipment under Test:	GSM/UMTS ExpressCard
Type Designation:	GlobeTrotter Express HSUPA E, GE0311
Kind of Device:	GSM 850/900/1800/1900 + UTRA FDD I/II/V
(optional)	including HSDPA + HSUPA
Voltage Type:	DC
Nominal Voltage:	3.5 V
Maximum Voltage:	3.5 V
Minimum Voltage:	3.15 V

General product description:

The Equipment Under Test (EUT) is a data card and supports GSM/EDGE 850/900/1800/1900 and FDD I, II and V with HSDPA and HSUPA.

The EUT provides the following ports:

Ports

Enclosure
AC Port (power line)

The main components of the EUT are listed and described in Chapter 3.2

3.2 EUT Main components

Type, S/N, Short Descriptions etc. used in this Test Report

Short Description	Equipment under Test	Type Designation	Serial No.	HW Status	SW Status	Date of Receipt
EUT A (Code: 37232A01) Remark: none	GlobeTrotter Express HSUPA E	GE0311	EM447A2030	4.1	2.5.0	2007-10-19
EUT B (Code: 37232B01) Remark: none	GlobeTrotter Express HSUPA E	GE0311	EM447A2039	4.1	2.5.0	2007-10-19

NOTE: The short description is used to simplify the identification of the EUT in this test report.

3.3 Ancillary Equipment

For the purposes of this test report, ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Ancillary Equipment can influence the test results.

Short Description	Equipment under Test	Type Designation	HW Status	SW Status	Serial no.	FCC ID
AE1	Laptop	Fujitsu Siemens C1410	-	-	YK5T053249	-
AE2	AC Adapter	ADP-80NB A	-	CP293661-01	-	-
AE3	TFT	LG Flatron L1740 BQ	-	-	509WANF1 W607	BEJL17NU
AE4	Mouse	Logitech M-BB48	-	-	LZC9050547 8	-
AE5	Keyboard	RS 6000 USB ON	-	-	G 0000273 2P28	-
AE6	Printer	EPSON Stylus C84	-	-	FBPT048906	-
AE7	TFT	Dell 1907FPt	-	-	CN-0GU620-71618-6c3-ADS7	-

3.4 EUT Setups

This chapter describes the combination of EUTs and ancillary equipment used for testing.

Setup No.	Combination of EUTs	Description
Setup_01	EUT A + AE1 + AE2 + AE3 + AE4 + AE5 + AE6	setup for conducted measurements
Setup_02	EUT A + AE1 + AE2 + AE4 + AE5 + AE6 + AE7	setup for radiated measurements



3.5 Operating Modes

This chapter describes the operating modes of the EUTs used for testing.

Op. Mode	Description of Operating Modes	Remarks
op-mode 1	Call established on Traffic Channel (TCH) 661, Carrier Frequency 1880 MHz	661 is a mid channel PCS data call



4 Test Results

4.1 Conducted emissions (AC power line)

Standard FCC Part 15, 10-1-06
 Subpart B

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

4.1.1 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.

4.1.2 Test Requirements / Limits

FCC Part 15, Subpart B, §15.107

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

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

4.1.3 Test Protocol

Temperature: 23 °C
Air Pressure: 1025 hPa
Humidity: 33 %

Op. Mode	Setup	Port
op-mode 1	Setup_01	AC Port (power line)

Power line	Frequency MHz	Measured value dBμV	Delta to limit dBμV	Remarks
-	-	-	-	-

Remark: Please see annex for the measurement plot.

An empty table means that no final measurement was performed because no relevant frequencies (peaks) were found during the preliminary scan.

4.1.4 Test result: Conducted emissions (AC power line)

FCC Part 15, Subpart B	Op. Mode	Result
	op-mode 1	passed

4.2 Spurious radiated emissions

Standard FCC Part 15, 10-1-06
 Subpart B

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

4.2.1 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 μ s
- 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: -0.25m 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

4.2.2 Test Requirements / Limits

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

§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)

4.2.3 Test Protocol

Temperature: 24 °C
Air Pressure: 1025 hPa
Humidity: 31 %

Op. Mode	Setup	Port
op-mode 1	Setup_02	Enclosure

Polarisation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical	47.82	27.80	-	-	40.00	-	-	12.20	-
Vertical	66.78	29.50	-	-	40.00	-	-	10.50	-
Vertical	78.90	34.30	-	-	40.00	-	-	5.70	-
Vertical	84.90	36.20	-	-	40.00	-	-	3.80	-
Vertical	86.46	25.00	-	-	40.00	-	-	15.00	-
Vertical	90.96	33.50	-	-	43.50	-	-	10.00	-
Vertical	121.32	31.70	-	-	43.50	-	-	11.80	-
Vertical	133.44	37.90	-	-	43.50	-	-	5.60	-
Vertical	139.50	33.70	-	-	43.50	-	-	9.80	-
Vertical	663.60	34.50	-	-	46.00	-	-	11.50	-

Remark: Please see annex for the measurement plot. The measurement was performed up to 1GHz.
For tests below 1 GHz an empty table means that no final measurement was performed because no relevant frequencies (peaks) were found during the preliminary scan.

4.2.4 Test result: Spurious radiated emissions

FCC Part 15, Subpart B		Op. Mode	Result
		op-mode 1	passed

5 Test Equipment

EUT Digital Signalling System

Equipment	Type	Serial No.	Manufacturer
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz
Signalling Unit for Bluetooth Spurious Emissions	PTW60	100004	Rohde & Schwarz
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz
Universal Radio Communication Tester	CMU 200	837983/052	Rohde & Schwarz
Bluetooth Signalling Unit	CBT (1153.9000.35)	100302	Rohde & Schwarz

EMI Test System

Equipment	Type	Serial No.	Manufacturer
Comparison Noise Emitter	CNE III	99/016	York
EMI Analyzer	ESI 26	830482/004	Rohde & Schwarz
Signal Generator	SMR 20	846834/008	Rohde & Schwarz

EMI Radiated Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer
Antenna mast 4m	MA 240	240/492	HD GmbH H. Deisel
Biconical dipole	VUBA 9117	9117108	Schwarzbeck
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32	849785	Miteq
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35	896037	Miteq
Broadband Amplifier 45MHz-27GHz	JS4-00102600-42	619368	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-Microcoax
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic
KUEP pre amplifier	Kuep 00304000	001	7layers
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz
Pyramidal Horn Antenna 26.5 GHz	Model 3160-09	9910-1184	EMCO

EMI Conducted Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber+Suhner
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz

Auxiliary Test Equipment

Equipment	Type	Serial No.	Manufacturer
Broadband Resist. Power Divider N	1506A / 93459	LM390	Weinschel
Broadband Resist. Power Divider SMA	1515 / 93459	LN673	Weinschel
Digital Multimeter 01	Voltcraft M-3860M	IJ096055	Conrad
Digital Multimeter 02	Voltcraft M-3860M	IJ095955	Conrad
Digital Oscilloscope	TDS 784C	B021311	Tektronix
Fibre optic link Satellite	FO RS232 Link	181-018	Pontis
Fibre optic link Transceiver	FO RS232 Link	182-018	Pontis
I/Q Modulation Generator	AMIQ-B1	832085/018	Rohde & Schwarz
Notch Filter ultra stable	WRCA800/960-6E	24	Wainwright
Spectrum Analyzer 9 kHz to 3 GHz	FSP3	838164/004	Rohde & Schwarz
Temperature Chamber	VT 4002	58566002150010	Vötsch
Temperature Chamber	KWP 120/70	59226012190010	Weiss
ThermoHygro Datalogger 03	Opus10 THI (8152.00)	7482	Lufft Mess- und Regeltechnik GmbH

Anechoic Chamber

Equipment	Type	Serial No.	Manufacturer
Air Compressor (pneumatic)			Atlas Copco
Controller	CO 2000	CO2000/328/12470406 /L	Innco innovative constructions GmbH
EMC Camera	CE-CAM/1		CE-SYS
EMC Camera for observation of EUT	CCD-400E	0005033	Mitsubishi
Filter ISDN	B84312-C110-E1		Siemens&Matsushita
Filter telephone systems / modem	B84312-C40-B1		Siemens&Matsushita
Filter Universal 1A	B84312-C30-H3		Siemens&Matsushita
Fully/Semi AE Chamber	10.58x6.38x6		Frankonia
Turntable	DS 420S	420/573/99	HD GmbH, H. Deisel
Valve Control Unit (pneum.)	VE 615P	615/348/99	HD GmbH, H. Deisel



*7 layers Bluetooth Full RF Test
Solution*

*Bluetooth RF Conformance
Test System TS8960*

Equipment	Type	Serial No.	Manufacturer
10 MHz Reference	MFS	5489/001	Efratom
Power Meter 832025/059	NRVD	832025/059	Rohde & Schwarz
Power Sensor A 832279/013	NRV-Z1	832279/013	Rohde & Schwarz
Power Sensor B 832279/015	NRV-Z1	832279/015	Rohde & Schwarz
Power Supply	E3632A	MY40003776	Agilent
Power Supply	PS-2403D	-	Conrad
RF Step Attenuator 833695/001	RSP	833695/001	Rohde & Schwarz
Rubidium Frequency Normal	MFS	002	Efratom
Signal Analyzer FSIQ26 832695/007	FSIQ26	832695/007	Rohde & Schwarz
Signal Generator 833680/003	SMP 03	833680/003	Rohde & Schwarz
Signal Generator A 834344/002	SMIQ03B	834344/002	Rohde & Schwarz
Signal Generator B 832870/017	SMIQ03B	832870/017	Rohde & Schwarz
Signal Switching and Conditioning Unit	SSCU	338826/005	Rohde & Schwarz
Signalling Unit PTW60 838312/014	PTW60 for TS8960	838312/014	Rohde & Schwarz
System Controller 829323/008	PSM12	829323/008	Rohde & Schwarz

6 Photo Report



Photo 1: Test setup for conducted measurements



Photo 2: Test setup for radiated measurements

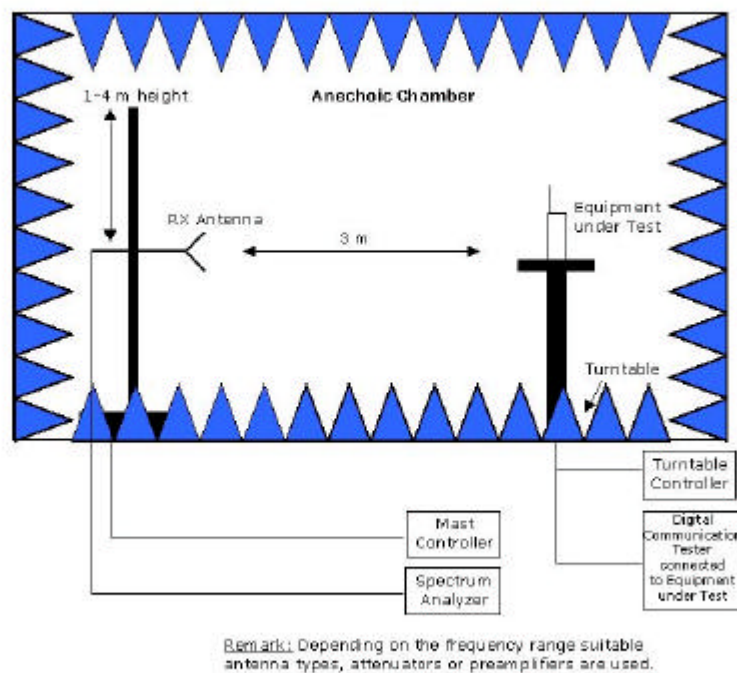


Photo 3: EUT (front side)



Photo 4: EUT (rear side)

7 Setup Drawings



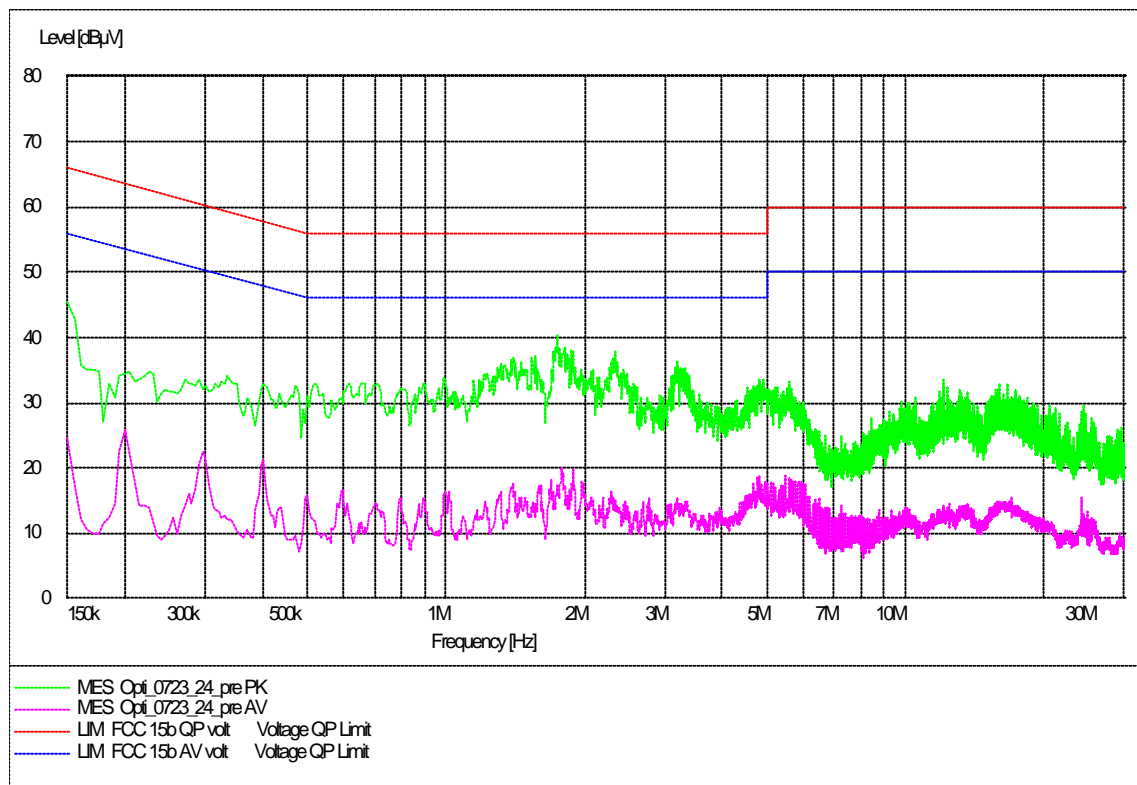
Drawing 1: Setup in the Anechoic chamber. For measurements below 1 GHz the ground was replaced by a conducting ground plane.

8 Annex measurement plots

8.1 AC Mains conducted

Op. Mode

op-mode 1



8.2 Radiated Emissions

Op. Mode

op-mode 1

