



# InterLab<sup>®</sup>

## Final Report on iGate GSM32 VoIP

**Report Reference:** MUS\_USNETSERVE\_0801\_FCC15Bb

FCC Part 15b

**Date:** December 14, 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.

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## 1 Administrative Data

### 1.1 Project Data

*Project Responsible:* Oliver Wagener  
*Date Of Test Report:* 2009/12/14  
*Date of first test:* 2009/03/02  
*Date of last test:* 2009/03/02

### 1.2 Applicant Data

*Company Name:* Teles AG  
Informationstechnologien  
*Street:* Ernst-Reuter-Platz 8  
*City:* 10587 Berlin  
*Country:* Germany  
  
*Contact Person:* Mr. Martin Herrscher  
*Function:* Product Line Manager  
*Phone:* +49 30 39928 1778  
*Fax:* +49 30-39928 - 01  
*E-Mail:* m.herrscher@teles.de

### 1.3 Test Laboratory Data

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

#### 7 layers DE

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*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. DAT-P-192/99-01
Lab 2	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, 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

## 2 Test Object Data

### 2.1 General OUT Description

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

#### OUT: iGate GSM32 VoiP

Type / Model / Family:	iGate GSM32 VoiP
Product Category:	Others
<b>Manufacturer:</b>	
Company Name:	Teles AG Informationstechnologien Ernst-Reuter-Platz 8 10587 Berlin GERMANY <a href="http://www.teles.com">http://www.teles.com</a>
Street:	
City:	
Country:	
Company URL:	
Contact Person:	Martin Herrscher
Phone:	+49 30-39928 - 1778
Fax:	+49 30-39928 - 01
E-Mail:	<a href="mailto:m.herrscher@teles.de">m.herrscher@teles.de</a>

#### Ancillary Equipment: GSM Antenna

Type / Model / Family:	GSM Antenna Hirschmann MCA 1890 MH/PB/SMAm 921797-004
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## 2.2 Detailed Description of OUT Samples

### Sample : a01

<i>OUT Identifier</i>	iGate GSM32 VoIP
<i>Sample Description</i>	iGATE GSM 32 VoIP
<i>HW Status</i>	2.1
<i>SW Status</i>	14.5
<i>Date of Receipt</i>	2009/02/23
<i>Nominal Voltage</i>	120 V

### Sample : ant01

<i>OUT Identifier</i>	GSM Antenna
<i>Sample Description</i>	GSM Antenna
<i>Date of Receipt</i>	2009/02/23

## 2.3 OUT Features

### Features for OUT: iGate GSM32 VoIP

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
<b>Features for scope: FCC_v2</b>			
AC	The OUT is powered by or connected to AC Mains		
Eant	removable antenna supplied and type tested with the radio equipment, designed as an indispensable part of the equipment		
GSM850	EUT supports GSM850 band 824MHz - 849MHz		
PantC	permanent fixed antenna connector, which may be built-in, designed as an indispensable part of the equipment		
PCS1900	EUT supports PCS1900 band 1850MHz - 1910MHz		

## 2.4 Auxiliary Equipment

<i>AE No.</i>	<i>Type Designation</i>	<i>Serial No.</i>	<i>HW Status</i>	<i>SW Status</i>	<i>Description</i>
AE Keyb1	CHERRY RS 6000 USB ON	G 0000273 2P28	-	-	Keyboard
AE Laptop1	Model PTM91E- 02800TGR	87060248H	-	WinXP Prof. Ger.	Toshiba Tecra M9
AE Mouse1	RX250 810-000208	HS74115015C	-	-	Logitech
AE USBStk1	SanDisk cruzer micro 1 GB	BB0701AFPB	-	-	USB Memory Stick
AE ACDC1	Toshiba PA3378E- 3AC3	-	Date: 0719	-	AC Charger

## 2.5 Operating Mode(s)

Ref.-No.	Description
TCH190	Sample is transmitting on TCH190, GSM band 850; sample is connected to Laptop via LAN; Loop link between PRI a/b (E1/T1)
TCH661	Sample is transmitting on TCH661, GSM band 1900; sample is connected to Laptop via LAN; Loop link between PRI a/b (E1/T1)

## 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
<b>15b (Computer peripheral setup 32 identical antennas, 2 active)</b>		
Sample: ant01	GSM Antenna	AE Keyb1 Keyboard
Sample: a01	iGATE GSM 32 VoIP	AE Laptop1 Toshiba Tecra M9
		AE Mouse1 Logitech
		AE USBStk1 USB Memory Stick
		AE ACDC1 AC Charger

## 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 following test report: "MUS\_USNETSERVE\_0801\_FCC15Ba"

### 3.2 List of the Applicable Body

(Body for Scope: FCC\_v2)

Designation	Description
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>Date / Version</i>	2009/03/26 Version: 10-1-08 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>Test (condition)</i>	<i>Result</i>	<i>Date of Test</i>	<i>Lab</i> <i>Ref.</i>	<i>Setup</i>
<b>15b.1 Conducted Emissions (AC Power Line) §15.107</b>				
15b.1; Mode = transmit	Passed	2009/03/02	Lab 1	15b
operating mode: TCH190				
<b>15b.2 Spurious Radiated Emissions §15.109</b>				
15b.2; Mode = transmit	Passed	2009/03/02	Lab 2	15b
operating mode: TCH661				



### **3.5 Detailed Results**

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

**Test: 15b.1; Mode = transmit**

<i>Result:</i>	Passed
<i>Setup No.:</i>	15b
<i>Date of Test:</i>	2009/03/02 15:30
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

*Test Equipment Environmental Conditions*

<i>Temperature:</i>	25°C
<i>Air Pressure:</i>	1016hPa
<i>Rel. Humidity:</i>	33%



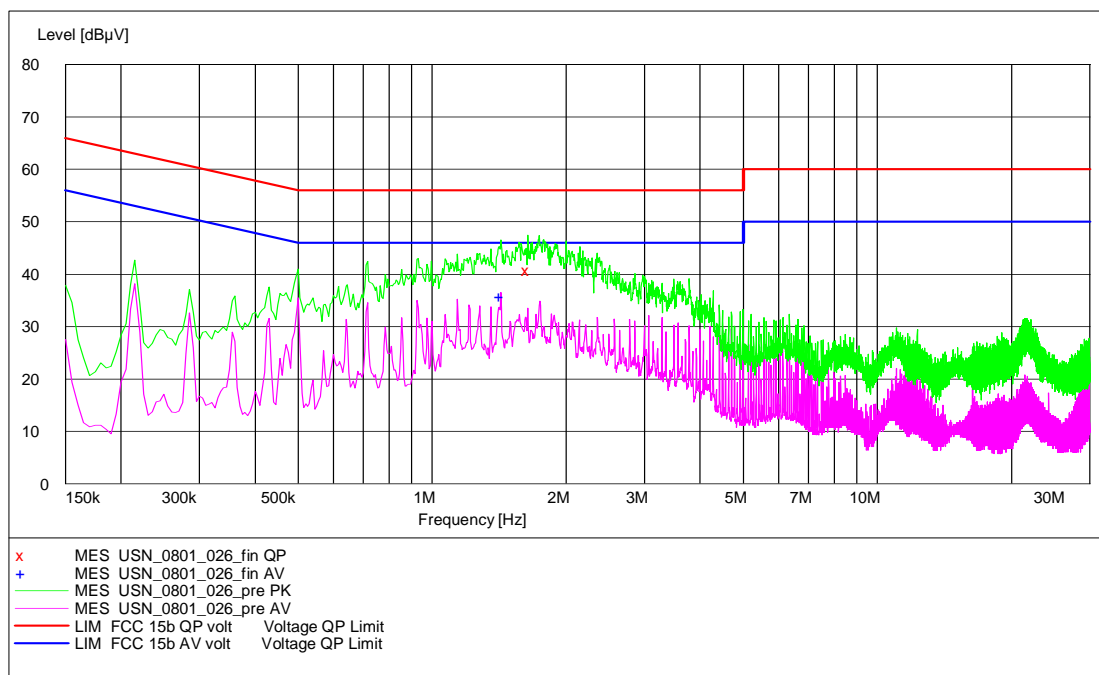
## Detailed Results:

### AC MAINS CONDUCTED

EUT: iGate GSM 32 VOIP (DQ000a01)  
 Manufacturer: Teles AG  
 Operating Condition: GSM 850 TCH 190 (Module 1), with ferrites: Würth 7427113 at ETH1 and Würth 7427111 at E1a/E1b  
 Test Site: 7 layers Ratingen  
 Operator: Sli  
 Test Specification: ANSI C63.4; FCC 15.107 / 15.207  
 Comment: Horizontal EUT position  
 Start of Test: 02.03.2009 / 16:17:51

### SCAN TABLE: "FCC Voltage"

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



### MEASUREMENT RESULT: "USN\_0801\_026\_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
1.640000	40.80	10.1	56	15.2	N	GND

### MEASUREMENT RESULT: "USN\_0801\_026\_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
1.425000	35.90	10.0	46	10.1	N	GND



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

**Test: 15b.2; Mode = transmit**

<i>Result:</i>	Passed
<i>Setup No.:</i>	15b
<i>Date of Test:</i>	2009/03/02 14:30
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15
<i>Test Equipment Environmental Conditions</i>	
<i>Temperature:</i>	25°C
<i>Air Pressure:</i>	1015hPa
<i>Rel. Humidity:</i>	35%

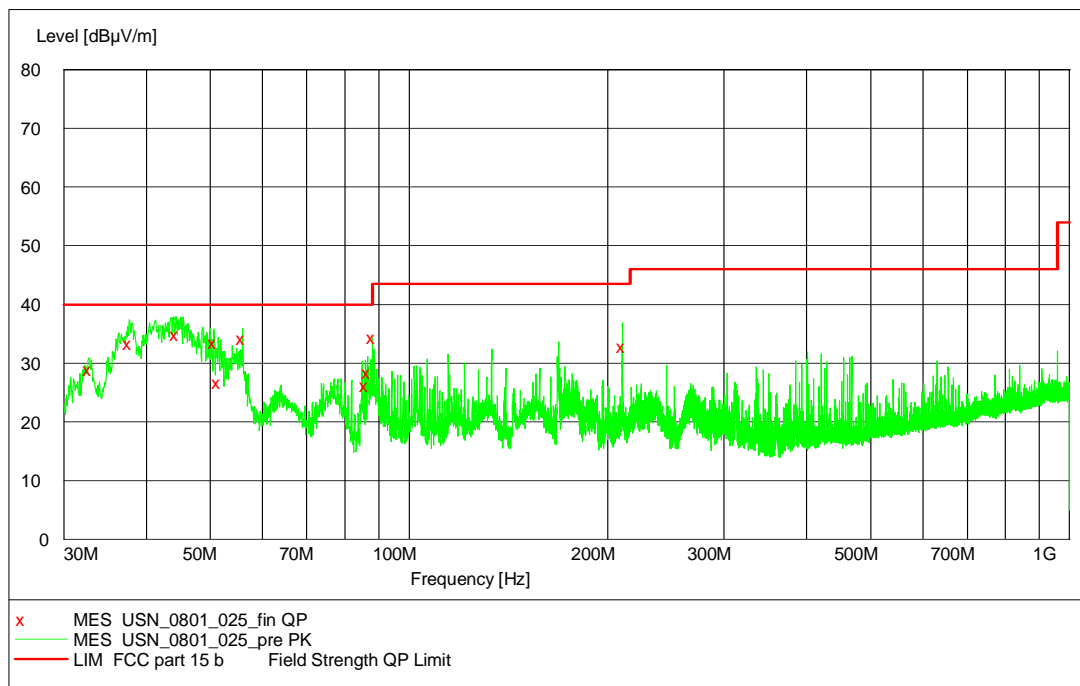
## Detailed Results:

### EMI RADIATED TEST

EUT: iGate GSM 32 VOIP (DQ000a01)  
 Manufacturer: Teles AG  
 Operating Condition: 1900 TCH 661 (Module 1), with ferrites: Würth 7427113 at ETH1 and Würth 7427111 at Ela/Elb  
 Test Site: 7 layers, Ratingen  
 Operator: Sli / Kie  
 Test Specification: FCC part 15 b  
 Comment: Horizontal EUT position  
 Start of Test: 02.03.2009 / 14:29:31

### 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: "USN\_0801\_025\_fin QP"

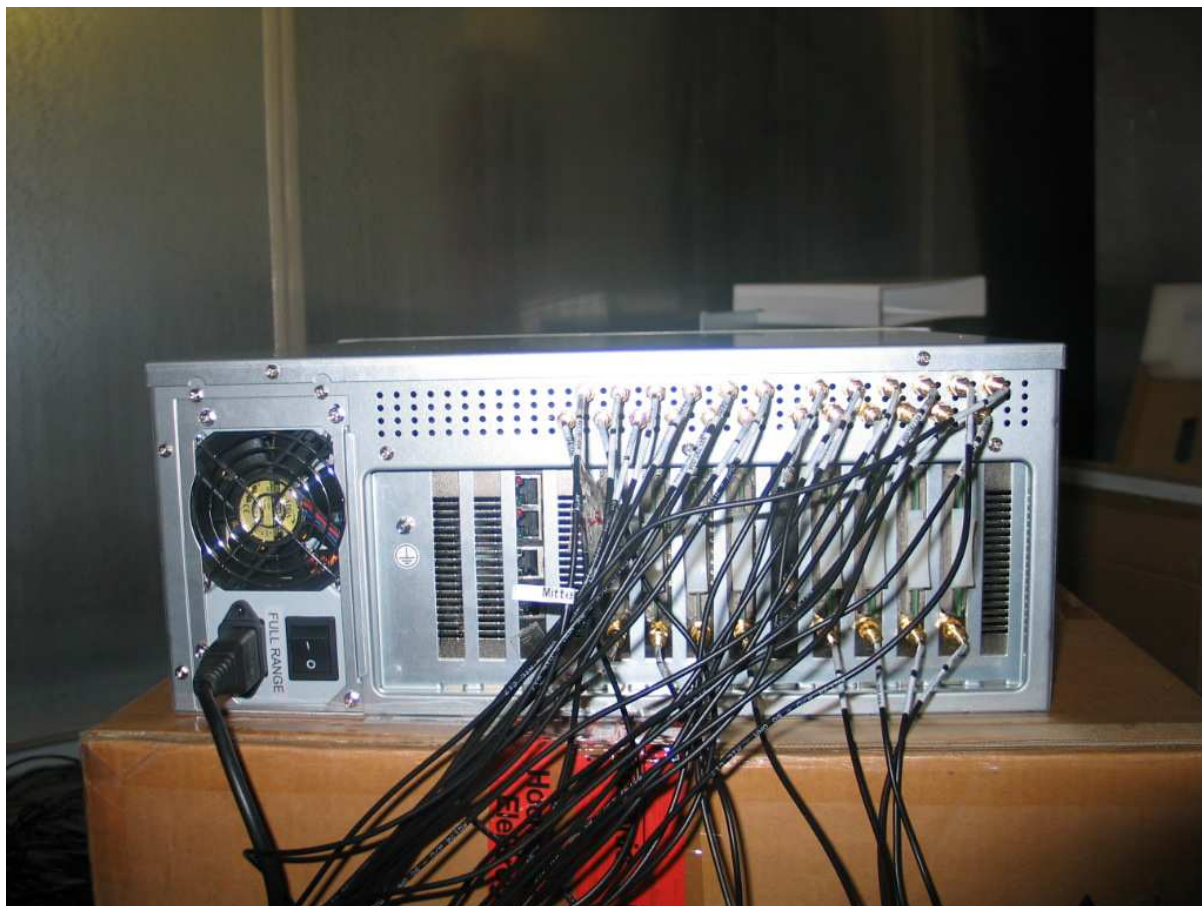
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.760000	28.90	18.4	40.0	11.1	103.0	247.00	VERTICAL
37.680000	33.40	15.5	40.0	6.6	100.0	0.00	VERTICAL
44.400000	35.00	11.7	40.0	5.0	100.0	112.00	VERTICAL
50.640000	33.50	7.5	40.0	6.5	109.0	158.00	VERTICAL
51.360000	26.80	7.0	40.0	13.2	101.0	157.00	VERTICAL
55.980000	34.30	4.2	40.0	5.7	225.0	0.00	VERTICAL
85.980000	26.30	8.8	40.0	13.7	152.0	247.00	VERTICAL
86.520000	28.40	8.9	40.0	11.6	119.0	247.00	VERTICAL
87.960000	34.40	8.9	40.0	5.6	137.0	291.00	VERTICAL
210.360000	32.90	7.9	43.5	10.6	125.0	157.00	HORIZONTAL

## 4 Annex

### 4.1 Additional Information for OUT Description



front view



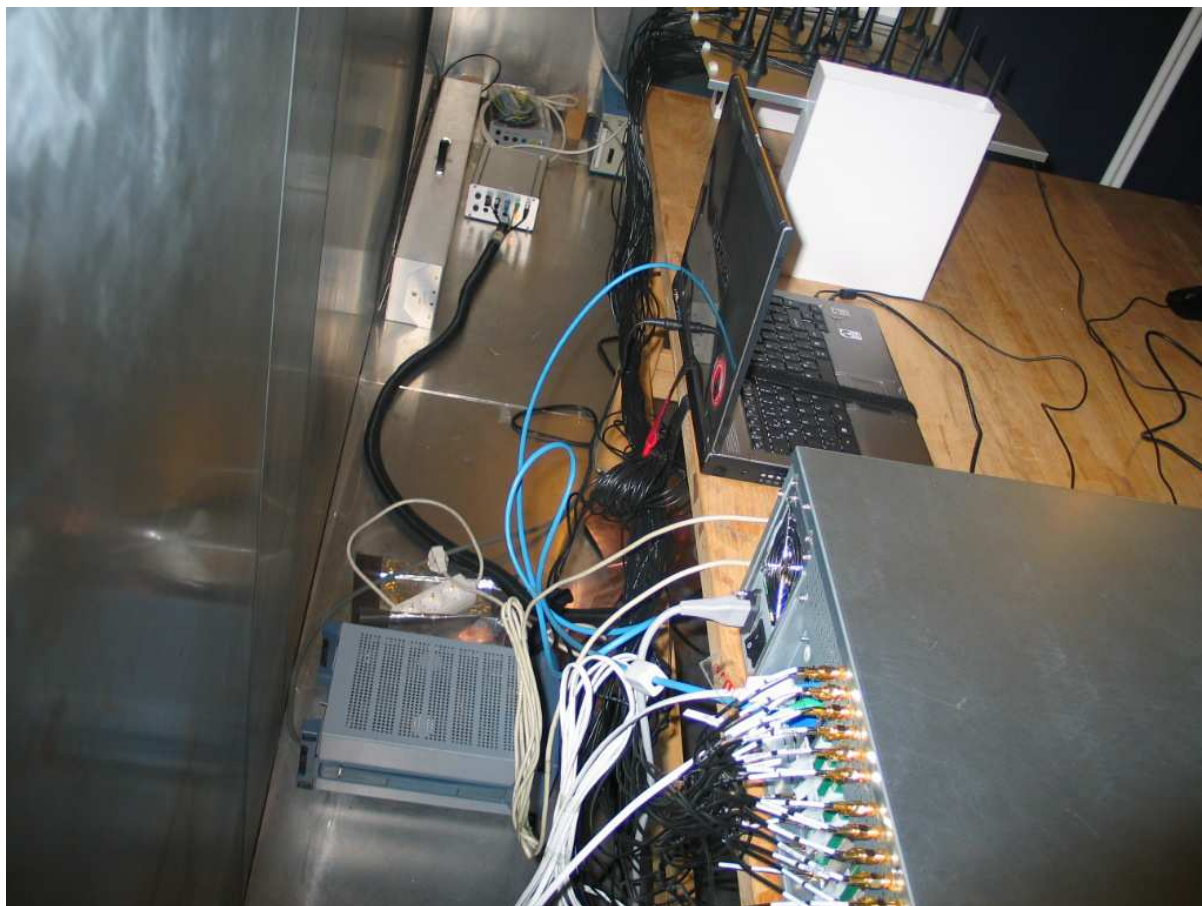
back view

## 4.2 Additional Information for Report

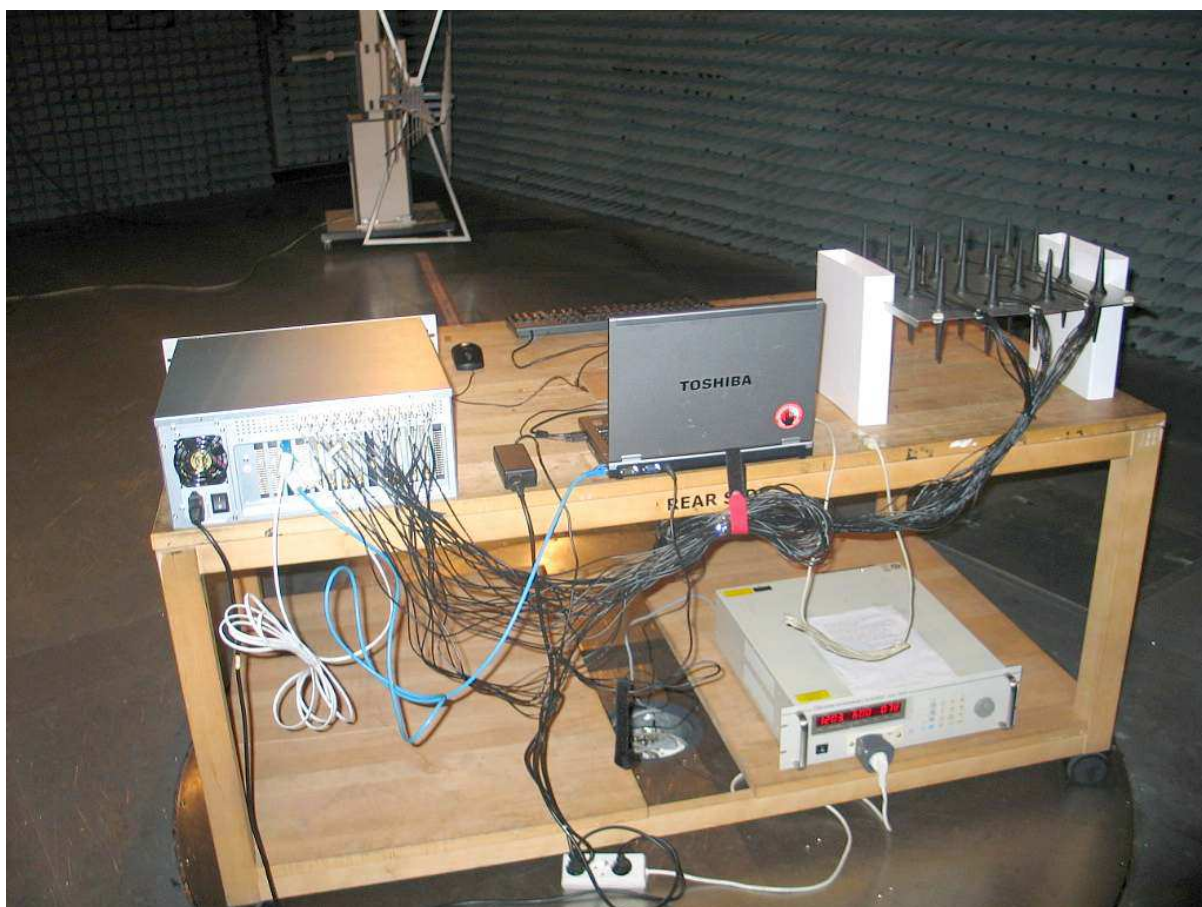


Computer peripheral set-up for conducted test





Computer peripheral set-up for conducted test (backside view)



Computer peripheral set-up for radiated test



## Test Description

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Conducted emissions (AC power line)

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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 $\mu$ 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 $\mu$ 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 (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.

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Spurious radiated emissions

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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 +/- 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

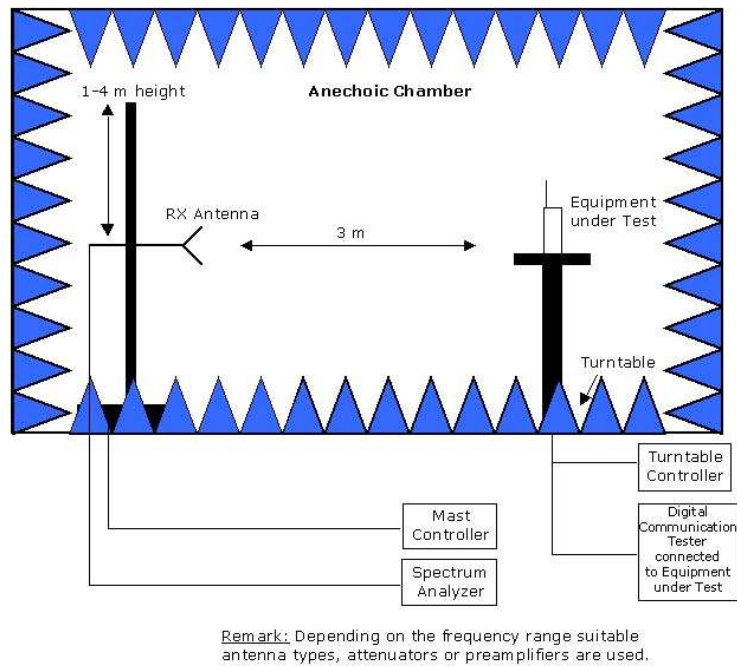
### §15.35(b)

..., 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.

## Test Equipment

### EUT Digital Signalling System

Equipment	Type	Serial No.	Manufacturer	Cal. data	Next cal.
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz	07.10.08	07.10.11
Signalling Unit for Bluetooth	PTW60	100004	Rohde & Schwarz	-	N/A *)
Universal Radio Communication Tester	CMU200	102366	Rohde & Schwarz	16.02.09	16.02.11
Universal Radio Communication Tester	CMU200	837983/052	Rohde & Schwarz	01.12.08	01.12.11
Signalling Unit for Bluetooth	CBT	100589	Rohde & Schwarz	14.08.08	N/A *)
Signalling Unit for GPS	SMU200	100912	Rohde & Schwarz	28.10.08	N/A *)
*) N/A – only used for signalling					

### EMI Test System

Equipment	Type	Serial No.	Manufacturer	Cal. data	Next cal.
EMI Analyzer	ESI 26	830482/004	Rohde & Schwarz	06.12.07	06.12.09
Signal Generator	SMR 20	846834/008	Rohde & Schwarz	05.12.07	05.12.09
AC Power Source	6404	6404000B04	Croma ATE INC.	01.06.08	01.06.11

### EMI Radiated Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer	Cal. data	Next cal.
Antenna mast 4m	MA 240	240/492	HD GmbH H. Deisel	-	-
Biconical dipole	VUBA 9117	9117108	Schwarzbeck	27.10.08	27.10.13
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32	849785	Miteq	12.11.08	12.05.09
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35	896037	Miteq	12.11.08	12.05.09
Broadband Amplifier 45MHz-27GHz	JS4-00102600-42	619368	Miteq	12.11.08	12.05.09
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01-2 W38.01-2	Kabel Kusch	12.11.08	12.05.09
Cable "ESI to Horn Antenna"	UFB311A UFB293C	W18.02-2 W38.02-2	Rosenberger-Microcoax	12.11.08	12.05.09
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz	12.05.06	12.05.09
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz	20.01.04	N/A – spare antenna
High Pass Filter	5HC3500/127 50-1.2-KK	200035008	Trilithic	12.11.08	12.05.09
High Pass Filter	5HC2700/127 50-1.5-KK	9942012	Trilithic	12.11.08	12.05.09
High Pass Filter	4HC1600/127 50-1.5-KK	9942011	Trilithic	12.11.08	12.05.09
High Pass Filter	WHKX 7.0/18G-8SS	9	Wainwright	12.11.08	12.05.09
KUEP pre amplifier	Kuep 00304000	001	7 layers AG	-	N/A – spare antenna
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz	17.05.06	17.05.09
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz	19.08.02	N/A – only used for pre-testing
Pyramidal Horn Antenna 26.5 GHz	Model 3160-09	9910-1184	EMCO	28.02.08	N/A (Stand. Gain Horn)
Pyramidal Horn Antenna 40 GHz	Model 3160-10	00086675	EMCO	18.12.07	N/A (Stand. Gain Horn)

### EMI Conducted Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer	Cal. data	Next cal.
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber+Suhner	12.11.08	12.05.09
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz	13.10.08	13.10.11
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz	-	-
Four-Line Network	ENY41	838119/004	Rohde & Schwarz	06.03.08	05.03.11

### Auxiliary Test Equipment

Equipment	Type	Serial No.	Manufacturer	Cal. data	Next cal.
Broadband Resist. Power Divider N	1506A / 93459	LM390	Weinschel	-	-
Broadband Resist. Power Divider SMA	1515 / 93459	LN673	Weinschel	-	-
Digital Multimeter	177	86670383	Fluke	01.08.08	31.07.10
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	-	-
Temperature Chamber	VT 4002	58566002150010	Vötsch	29.02.08	28.02.09
Temperature Chamber	KWP 120/70	59226012190010	Weiss	29.02.08	28.02.09
ThermoHygro Datalogger 03	Opus10 THI (8152.00)	7482	Lufft Mess- und Regeltechnik GmbH	22.01.09	21.01.10
Spectrum Analyzer 9 kHz to 3 GHz	FSP3	838164/004	Rohde & Schwarz	06.10.08	06.10.11
Spectrum Analyzer 9 kHz to 3 GHz	FSP3	836722/011	Rohde & Schwarz	06.10.08	05.10.11
Signal Analyzer 20 Hz to 26.5 GHz	FSIQ26	840061/005	Rohde & Schwarz	02.10.08	02.10.11

### Anechoic Chamber

Equipment	Type	Serial No.	Manufacturer	Cal. data	Next cal.
Air Compressor (pneumatic)			Atlas Copco	-	-
Controller	MCU	1520506	Maturo 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	-	-
ThermoHygro Datalogger 12	Opus10 THI (8152.00)	12482	Lufft Mess- und Regeltechnik GmbH	05.08.08	04.08.09
ThermoAirpressure Datalogger 13	Opus10 TPR (8253.00)	13936	Lufft Mess- und Regeltechnik GmbH	22.01.09	21.01.10

## 7 layers InterLab Bluetooth RF Test Solution - Setup C – Bluetooth BDR and EDR RF Conformance Test System

Equipment	Type	Serial No.	Manufacturer	Cal. data	Next cal.
Power Meter	NRVD	832025/059	Rohde & Schwarz	17.06.08	15.06.09
Power Sensor A	NRV-Z1	832279/013	Rohde & Schwarz	18.06.08	17.06.09
Power Supply	E3632A	MY40003776	Agilent	-	-
Power Supply	PS-2403D	-	Conrad	-	-
Power Supply	NGSM 32/10	2725	Rohde & Schwarz	28.04.08	27.04.09
Rubidium Frequency Normal	MFS	002	Datum GmbH	18.06.08	17.06.09
Signal Analyzer FSIQ26	FSIQ26	832695/007	Rohde & Schwarz	23.08.07	23.08.09
Signal Generator	SMP 03	833680/003	Rohde & Schwarz	04.07.06	04.07.09
Signal Generator	SMIQ03B	832870/017	Rohde & Schwarz	24.05.07	24.05.10
Signal Switching Unit	TOCT	030106	7 layers Inc.	-	-
Signalling Unit	CBT	100302	Rohde & Schwarz	07.05.08	06.05.09
ThermoHygro Datalogger 04	Opus10 THI (8152.00)	7481	Lufft Mess- und Regeltechnik GmbH	22.01.09	21.01.10
Temperature Chamber	KWP 120/70	59226012190010	Weiss	29.02.08	28.02.09



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