



Inter**Lab**<sup>®</sup>

FCC Measurement/Technical Report on

Simultaneous Transmission of GSM and  
WLAN transceivers in EUT

KYY04 (F74)

FCC ID: JOYKYY04

**Report Reference:** ODE\_MJP\_KYOCE\_1205\_FCCf

**Test Laboratory:**

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Germany  
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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 test laboratory.

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## Table of Contents

<b>0</b>	<b>Summary</b>	<b>3</b>
0.1	Technical Report Summary	3
0.2	Measurement Summary	4
<b>1</b>	<b>Administrative Data</b>	<b>5</b>
1.1	Testing Laboratory	5
1.2	Project Data	5
1.3	Applicant Data	5
1.4	Manufacturer Data	5
<b>2</b>	<b>Test object Data</b>	<b>6</b>
2.1	General EUT Description	6
2.2	EUT Main components	7
2.3	Ancillary Equipment	7
2.4	Auxiliary Equipment	7
2.5	EUT Setups	8
2.6	Operating Modes	8
2.7	Special software used for testing	9
2.8	Product labeling	9
<b>3</b>	<b>Test Results</b>	<b>10</b>
3.1	Spurious radiated emissions	10
3.2	Test Equipment	14
<b>4</b>	<b>Photo Report</b>	<b>19</b>
<b>5</b>	<b>Setup Drawings</b>	<b>20</b>
<b>6</b>	<b>Annex measurement plots</b>	<b>21</b>
6.1	Spurious radiated emissions	21



## **0 Summary**

### **0.1 Technical Report Summary**

#### **Type of Authorization**

Certification for a GSM cellular radiophone device collocated to an Intentional Radiator (Frequency Hopping Spread Spectrum and Digital Device / Spread Spectrum).

#### **Applicable FCC Rules**

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 (10-1-11 Edition).

The following parts and subparts are applicable to the results in this test report.

Part 2

Subpart J - Equipment Authorization Procedures, Certification

§ 2.1053 Measurement required: Field strength of spurious radiation

Part 22

Subpart H – Cellular Radiotelephone Service

§ 22.917 Emission limitations for cellular equipment

Part 24

Subpart E - Broadband PCS

§ 24.238 Emission limitations for Broadband PCS equipment

Note:

Instead of applying ANSI C63.4–1992 which is referenced in the FCC Public Note, the newer ANSI C63.4–2009 is applied for test according to Part 15.

#### **Summary Test Results:**

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



## 0.2 Measurement Summary

**FCC Part 22, Subpart H** § 22.917  
**FCC Part 24, Subpart E** § 24.238

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Spurious radiated emissions

The measurements were performed according to FCC §2.1053 / ANSI C63.4

10-1-11 Edition / 2009

<b>OP-Mode</b>	<b>Setup</b>	<b>Port</b>	<b>Final Result</b>
op-mode 1	Setup_01	Enclosure	passed
op-mode 2	Setup_01	Enclosure	passed

The test cases and operating modes are selected to demonstrate effects of simultaneous transmission.

Responsible for  
Accreditation Scope:

A. Fick

Responsible  
for Test Report:

M. Jullit



## 1 Administrative Data

### 1.1 Testing Laboratory

Company Name: 7Layers 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:  
Laboratory accreditation no.: DAkKS D-PL-12140-01-01

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

Report Template Version: 2012-03-14

### 1.2 Project Data

Responsible for testing and report: Dipl.-Ing. Marco Kullik  
Date of Test(s): 2012-05-25  
Date of Report: 2012-05-26

### 1.3 Applicant Data

Company Name: Kyocera Corporation  
Address: 2-1-1 Kagahara, Tsuzuki-ku  
Yokohama-shi  
Japan  
Contact Person: Mr. Yoshikazu Yamamoto

### 1.4 Manufacturer Data

Company Name: please see applicant data  
Address:  
Contact Person:



## 2 Test object Data

### 2.1 General EUT Description

<b>Equipment under Test</b>	GSM and WLAN transceivers
<b>Type Designation:</b>	FYY04 (F74)
<b>Kind of Device:</b>	Mobile phone
<b>(optional)</b>	
<b>Voltage Type:</b>	DC
<b>Voltage level:</b>	3.8 V

#### General product description:

WLAN Transceiver operating in the 2.4 GHz ISM band using Direct Sequence Spread Spectrum (DSSS) Modulation. The EUT supports the modes 802.11b (maximum data rate 11 Mbps), 802.11g (maximum data rate 54 Mbps) and 802.11n (maximum data rate = two times 54 Mbps = 108 Mbps distributed on two transmit antennas)

WLAN 5 GHz high performance WLAN equipment that is intended to operate in the frequency ranges 5 150 MHz to 5 350 MHz and 5 725 MHz to 5 825 MHz. The EUT supports the modes 802.11a (maximum data rate 54 Mbps) and 802.11n (maximum data rate = two times 54 Mbps = 108 Mbps distributed on two transmit antennas)

The EUT can also operate in the licensed cellular frequency bands 850, 900, 1800, 1900, 2100 MHz, using different technologies like GSM, CDMA2000, WCDMA.

#### The EUT provides the following ports:

##### Ports

Enclosure  
DC power / System Port  
Temporary antenna port

**The main components of the EUT are listed and described in Chapter 2.2**



## 2.2 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: DE050f01)	Mobile Phone	FYY04 (F74)	SKYIQ0000 00	1.0	000.1.0032	2012-02-15
Remark: EUT A is equipped with an integral antennas (gain = -1/0/1 dBi).						

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

## 2.3 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	Serial no.	HW Status	SW Status	FCC ID
AE 1	AC/DC converter	ACDC05100	-	-	-	-

## 2.4 Auxiliary Equipment

For the purposes of this test report, auxiliary equipment is defined as equipment which is used temporarily to enable operational and control features especially used for the tests of the EUT which is not used during normal operation or equipment that is used during the tests in combination with the EUT but is not subject of this test report. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Auxiliary Equipment can influence the test results.

Short Description	Equipment under Test	Type Designation	Serial no.	HW Status	SW Status	FCC ID
AUX1	Laptop DELL VOSTRO 1511	T932D A00	285-963- 502-23	-	WinXP Prof. Engl..	-
AUX2	AC/DC Adapter (for laptop) DELL	HA65NS2-00	CN- OMN444- 47890-85E- D6WD	REV: A01	-	-

## 2.5 EUT Setups

This chapter describes the combination of EUTs and equipment used for testing. The rationale for selecting the EUTs, ancillary and auxiliary equipment and interconnecting cables, is to test a representative configuration meeting the requirements of the referenced standards.

Setup No.	Combination of EUTs	Description and Rationale
Setup_01	EUT A + AE 1	setup for radiated measurements (AUX1 and AUX2 are used to enable the WLAN test mode)

## 2.6 Operating Modes

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

Op. Mode	Description of Operating Modes	Remarks
op-mode 1	<b>GSM:</b> Call established on Traffic Channel (TCH) 190, Carrier Frequency 836.6 MHz <b>WLAN:</b> TX-mode, the EUT transmits on channel 157 (5785 MHz)	simultaneous transmission (GSM 850 / 5 GHz WLAN)
op-mode 2	<b>GSM:</b> Call established on Traffic Channel (TCH) 661, Carrier Frequency 1880.0 MHz <b>WLAN:</b> TX-mode, the EUT transmits on channel 6 (2437 MHz)	simultaneous transmission (GSM 1900 / 2.4 GHz WLAN)

The operating modes are chosen in this way because the GSM 1900 and the WLAN 2.4 GHz transmitters are expected to be the worst-case combination for possible unwanted effects.

The combination GSM 850 and WLAN 5 GHz transmitters is chosen to check also the remaining bands.

Tests are performed in the frequency range of the licensed transmitters (30 MHz to 10 resp. 20 GHz) and emissions are compared to the limits of the licensed transmitter acc.to Part 22 resp. 24 in order to show effects in comparison to the tests without simultaneous transmission.





## **2.7 Special software used for testing**

For WLAN links, the EUT is set to local TX mode via the described laptop using the USB port. For GSM links, no special software is used.

### **2.7.1 Software to control the EUT directly**

The "ADBshell" program was used to set the required local WLAN TX modes.

### **2.7.2 Software to enable control the EUT by a signalling unit**

-

## **2.8 Product labeling**

### **2.8.1 FCC ID label**

Please refer to the documentation of the applicant.

### **2.8.2 Location of the label on the EUT**

Please refer to the documentation of the applicant.

## 3 Test Results

### 3.1 Spurious radiated emissions

**Standard** FCC Part 15, 10-1-11 Edition Subpart C

**The test was performed according to:** ANSI C63.4–2009

#### 3.1.1 Test Description

The test set-up was made in accordance to the general provisions of ANSI C63.4–2009. 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.

#### 1. Measurement up to 30 MHz

The test set-up was made in accordance to the general provisions of ANSI C63.4–2009. The Equipment Under Test (EUT) was set up on a non-conductive table in the anechoic chamber.

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. The Loop antenna HFH2-Z2 is used.

##### **Step 1:** pre-measurement

- Anechoic chamber
- Antenna distance: 10 m
- Detector: Peak-Maxhold
- Frequency range: 0.009 – 0.15 and 0.15 – 30 MHz
- Frequency steps: 0.1 kHz and 5 kHz
- IF-Bandwidth: 0.2 kHz and 10 kHz
- Measuring time / Frequency step: 100 ms

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

##### **Step 2:** final measurement

For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is to find the maximum emission level.

- Open area test side
- Antenna distance: according to the Standard
- Detector: Quasi-Peak
- Frequency range: 0.009 – 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF-Bandwidth: 200 Hz – 10 kHz
- Measuring time / Frequency step: 100 ms

## 2. Measurement above 30 MHz and up to 1 GHz

### Step 1: Preliminary scan

Preliminary test to identify the highest amplitudes relative to the limit.

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 (BT Timing 1.25 ms)
- Turntable angle range:  $-180$  to  $+180^\circ$
- Turntable step size:  $90^\circ$
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

### Step 2: second measurement

For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is, to find out the approximate turntable angle and antenna height for each frequency.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range:  $-180$  to  $+180^\circ$
- Turntable step size:  $45^\circ$
- 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):  $45^\circ$
- 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  $\pm 25$  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: 100 ms
- Turntable angle range:  $-22.5^\circ$  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 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

### 3. Measurement above 1 GHz

The following modifications apply to the measurement procedure for the frequency range above 1 GHz:

The Equipment Under Test (EUT) was set up on a non-conductive support at 1.4 m height in the fully-anechoic chamber. 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 reference level 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 are omitted. Step 1 was performed with one height of the receiving antenna only.

EMI receiver settings:

- Detector: Peak, Average
- IF Bandwidth = 1 MHz

After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

For the enhanced data rate packets the test is performed as worst-case-check in order to verify that emissions have a comparable level as found at basic data rate. Typically, the measurement for these packets is performed in the frequency range 1 to 8 GHz but it depends on the emissions found during the test for the basic data rate. Please refer to the results for the used frequency range.

#### 3.1.2 Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (d)

... In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit(dBµV/m @10m)
0.009 – 0.49	2400/F(kHz)	300	Limit (dBµV/m)+30dB
0.49 – 1.705	24000/F(kHz)	30	Limit (dBµV/m)+10dB
1.705 - 30	30	30	Limit (dBµV/m)+10dB

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit (dBµV/m)
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
above 960	500	3	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)

### 3.1.3 Test Protocol

Temperature: 27 °C  
 Air Pressure: 1017 hPa  
 Humidity: 30 %

**Op. Mode**      **Setup**                      **Port**  
 op-mode 1      Setup\_01                      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
horizontal	5300	-	-34.7	-	-	-13.0	-	21.7	-

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

**Op. Mode**      **Setup**                      **Port**  
 op-mode 2      Setup\_01                      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
horizontal	2436.9 (WLAN carrier)	-	1.26	-	-	-	-	-	-

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

### 3.1.4 Test result: Spurious radiated emissions

FCC Part 15, Subpart C	Op. Mode	Result
	op-mode 1	passed
	op-mode 2	passed



### 3.2 Test Equipment

The calibration, hardware and software states are shown for the testing period.

#### Test Equipment Anechoic Chamber

**Lab ID:** Lab 2  
**Manufacturer:** Frankonia  
**Description:** Anechoic Chamber for radiated testing  
**Type:** 10.58x6.38x6.00 m<sup>3</sup>

#### 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		2011/01/11	2014/01/10
	IC listing 3699A-1 3m		2011/02/07	2014/02/06
Controller Maturo	MCU	961208	Maturo GmbH	
EMC camera	CE-CAM/1	-	CE-SYS	
EMC camera Nr.2	CCD-400E	0005033	Mitsubishi	
Filter ISDN	B84312-C110-E1		Siemens&Matsushita	
Filter Universal 1A	BB4312-C30-H3	-	Siemens&Matsushita	

#### Test Equipment Auxiliary Equipment for Conducted emissions

**Lab ID:** Lab 1  
**Manufacturer:** Rohde & Schwarz GmbH & Co.KG  
**Description:** EMI Conducted Auxiliary Equipment

#### Single Devices for Auxiliary Equipment for Conducted emissions

Single Device Name	Type	Serial Number	Manufacturer	
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber&Suhner	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/11	2012/11/10
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz GmbH & Co. KG	
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	DKD calibration		2011/01/20	2013/01/19



## Test Equipment Auxiliary Equipment for Radiated emissions

**Lab ID:** Lab 2  
**Description:** Equipment for emission measurements  
**Serial Number:** see single devices

### Single Devices for Auxiliary Equipment for Radiated emissions

Single Device Name	Type	Serial Number	Manufacturer	
Antenna mast	AS 620 P	620/37	HD GmbH	
Biconical dipole	VUBA 9117	9117-108	Schwarzbeck	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard Calibration		2008/10/27	2013/10/26
	Standard Calibration		2012/01/18	2015/01/17
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32-5P	849785	Miteq	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4	-	Miteq	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P	896037	Miteq	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01-2+W38.01- 2	Kabel Kusch	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
Cable "ESI to Horn Antenna"	UFB311A+UFB293C	W18.02-2+W38.02- 2	Rosenberger Micro-Coax	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard Calibration		2012/05/18	2012/04/15
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14
High Pass Filter	WHKX 7.0/18G-8SS	09	Wainwright	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Path Calibration		2011/11/15	2012/05/14



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

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>	
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard Calibration		2009/05/27	2012/05/26
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<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	
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**

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>	
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		2011/10/19	2013/10/18
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 Transformatorwerke GmbH	
Notch Filter Ultra Stable (Aux)	WRCA800/960-6EEK	24	Wainwright	
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
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		2011/05/26	2013/05/25
	<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 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 ---		2007/07/16	
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 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 ---		2007/01/02	
	SW: K62, K69		2008/11/03	



### 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		2011/05/03   2012/05/02
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		2011/05/02   2012/05/01
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	standard calibration		2011/05/12   2014/05/11
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		2011/12/05   2013/12/04
	<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

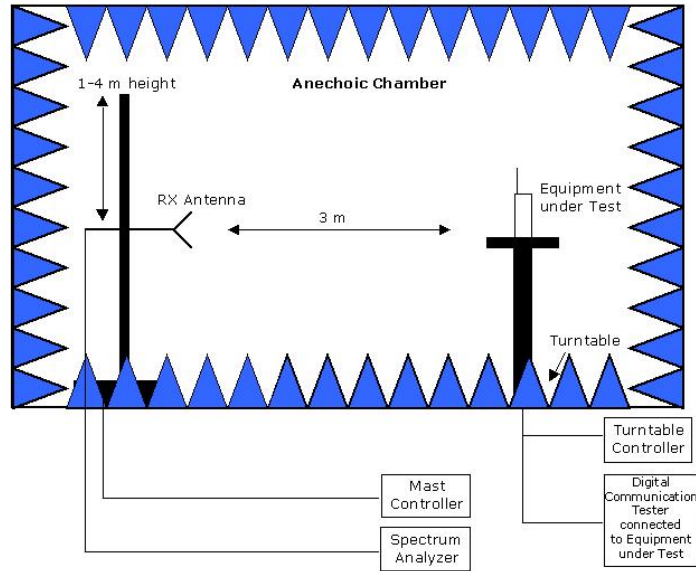
**Lab ID:** Lab 1  
**Manufacturer:** Frankonia  
**Description:** Shielded Room for conducted testing  
**Type:** 12 qm  
**Serial Number:** none



## **4 Photo Report**

Photos are included in an external report.

## 5 Setup Drawings



Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

**Drawing 1:** Setup in the Anechoic chamber:  
Measurements below 1 GHz: Semi-anechoic, conducting ground plane.  
Measurements above 1 GHz: Fully-anechoic, absorbers on all surfaces

## 6 Annex measurement plots

### 6.1 Spurious radiated emissions

#### Op. Mode

op-mode 1



## Op. Mode

op-mode 2

