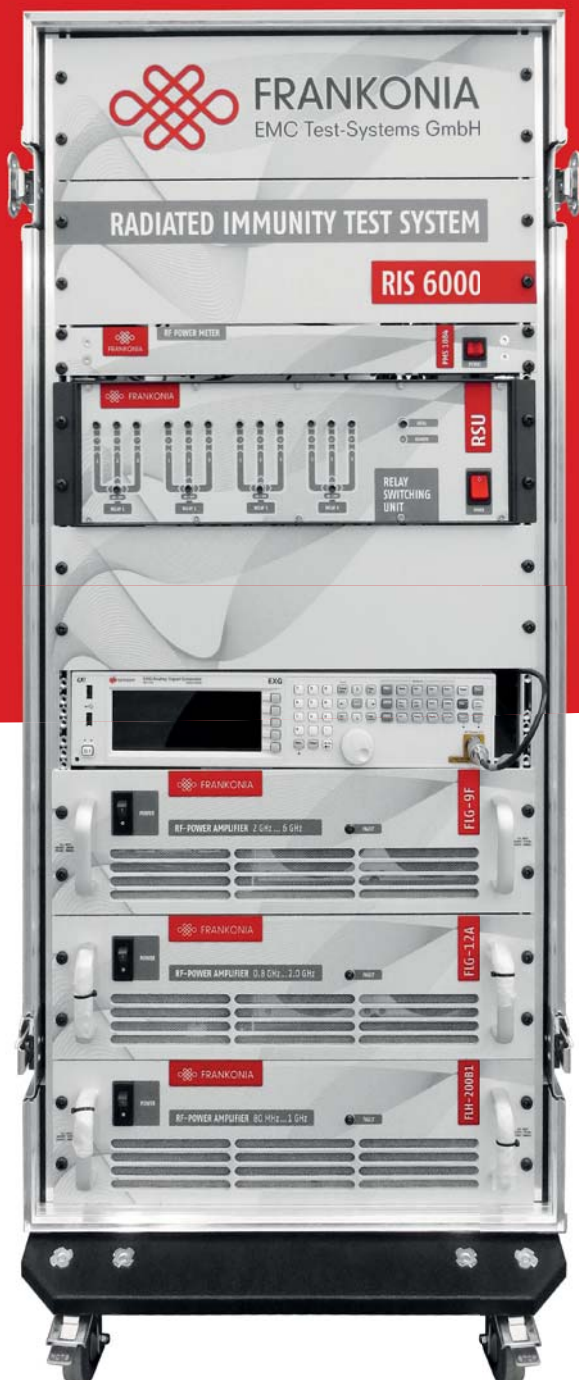




FRANKONIA

www.frankoniagroup.com

- ANECHOIC CHAMBERS & SHIELDED ROOMS
- ACCESSORIES FOR ANECHOIC CHAMBERS / SHIELDED ROOMS
- **RADIATED IMMUNITY TEST SYSTEMS**
- RF-POWER-AMPLIFIERS
- BROADBAND ANTENNAS
- EMC TEST & MEASUREMENT INSTRUMENTS
- GTEM-CELLS



RADIATED IMMUNITY TEST SYSTEMS

ACCORDING TO:

- IEC / EN 61000-4-3
- ISO 11452-2
- MIL-STD 461, RS103



Frankonia Group

The FRANKONIA GROUP was founded in 1987 as a solution provider for EMC laboratories to meet the increasing demand for highly specialized testing environments for the electronic and automotive industry. With more than 25 years of experience to date, FRANKONIA maintains its leading position in EMC solutions worldwide. Without limitations in capabilities and resources, FRANKONIA develops future-oriented concepts for EMC laboratories, which guarantees an optimal use of resources as well as the best possible customized solutions.

- FRANKONIA demonstrates a global presence in cooperation, with a well-structured network of productions, representations and service units.
- FRANKONIA strives to be the preferred partner for customized and state-of-the-art solutions.
- FRANKONIA provides fundamental knowledge to operate as a complete solution provider.
- FRANKONIA implements innovative technologies to enhance the efficiency and improve the outcomes and quality along with customers' needs.

We are proud of our highly specialized team that is putting our customers' demands into practice. It is our philosophy to improve the products, to realize new ideas, and to complete our product range within our broad scope of business. The fact that FRANKONIA is able to offer complete solutions from the first sketch to the final handover makes FRANKONIA a unique and trustworthy partner worldwide.

Frankonia's authenticity

FRANKONIA stands for latest technologies, highest quality, innovative concepts and materials and reliable solutions. Due to its easy and efficient usability along with its time-saving configuration, Frankonia's Anechoic Chambers set new standards for innovative and complete EMC testing solutions and offer a real added value to our customers.

Frankonia solutions

FRANKONIA as a turnkey solution provider and manufacturer offers a complete range of anechoic chambers and RF-shielded enclosures, test equipment, instruments, software and accessories.



- 1 Frankonia EMC Test-Systems GmbH
- 2 FRANKONIA GmbH
- 3 FRANKONIA - POLAND Sp. z o.o.
- 4 FRANKONIA Huize Co., Ltd.
- 5 Jiashan FRANKONIA EMC Co., Ltd.



RADIATED IMMUNITY TEST SYSTEM

Page

Overview	4
System components	5 - 7
Conventional set-up	8 - 9
ECU-3/-6 set-up	10 - 11
GTEM Test set-up	12 - 13
Power demand for GTEM cells	14
System Compositions - 3 V/m, 80% AM	15
System Compositions - 10 V/m, 80% AM	16 - 17
System Compositions - 20 V/m, 80% AM	18 - 19
System Compositions - 30 V/m, 80% AM	20 - 21
System Compositions - 1.0m measuring distance	22 - 27

Description

The setup of a radiated immunity test system can be done in the conventional way with many separate instruments or in a more comfortable and less risky way with our new EMC control unit, type ECU-3/-6.

In both ways the components which are needed for such a system are in principle the same:

• Signal Generator	• RF-Power Amplifier(s)
• Directional Coupler	• Antenna(s)
• RF-Power Meter	• RF-Field Strength Meter
• Relay-switching unit	• Set of RF-Cables
All included in ECU-3/6	• Control PC and Control Software



Control Computer

The controller is a standard PC with operating system Microsoft® Windows. Depending on the system layout GPIB (IEEE488) with National Instruments interface card, serial bus RS232, USB and other bus systems are supported.

Control Software

The control software is fully compliant to IEC/EN 61000-4-3, IEC/EN 61000-4-20, automotive and MIL standards. The software controls the complete test system and creates the test report. It performs measurement of the uniform area and generates reference calibration data from it. Alternatively reference data can be measured directly. Tests may be performed manually and fully automatic. A full automatic monitoring of the EUT's (Equipment Under Test) function is possible whenever its compliance can be controlled with preset tolerance limits. Up to four values can be monitored and recorded for example by means of multimeters.

Essential data of the software are:

- Microsoft® Windows platform
- Simple operator's guide
- Online help function
- Presentation of the results in online graphics and reports
- Export function of the files for further processing under Microsoft® Word, Microsoft® Excel,...
- Measurement of homogeneous field incl. evaluation
- Calculation of reference data
- 2dB saturation test on base of homogeneous field measurement compliant to standard
- Measurement of reference data with fixed test level or profile of level vs. frequency
- Permanent VSWR control during test and operator defined limitation as well as restriction of max. input level of amplifier and max. allowed output power
- Automatic multiple repetition of test
- Manual test mode
- Manual increase / decrease of test level
- Automatic test mode incl. monitoring of the EUT
- Handshake function to EUT via serial interface
- Easy and fast graphical device set-up, system layout can be printed
- Fully compliant to IEC/EN61000-4-3, IEC/EN61000-4-20, automotive- and MIL standards
- Control of the test system by GPIB, USB interfaces,...
- Customized modifications possible

Signal Generator

As signal source a commercial signal generator or the built-in signal generator of our EMC test & control unit ECU-3/-6 is used. It should cover at least the required frequency range such as 80 MHz to 6 GHz and allow amplitude modulation with a sine wave of 1 kHz and 80 %, as requested by the standards. Besides, it should meet the requirements regarding frequency step width (1 % of the preceding value). If the equipment offers further modulation depth and modes, as well as a higher frequency range and smaller steps, this might be advantageous for future applications.

Minimum requirements:

- Frequency range: 9 kHz – 3.0 GHz (6.0 GHz or higher)
- RF output: -40 dBm to +10 dBm
- Frequency resolution: 1 Hz
- Level resolution: 0.1 dB
- Amplitude modulation: 0 to 99.9 %
- Further modulation types: frequency modulation, phase modulation, pulse modulation
- Interface: GPIB (IEEE-488), RS232, USB





RF-Relay Switching Unit RSU

In most cases two or three RF-power amplifiers and two different antennas are needed to cover the whole test frequency range. It would be very time-consuming to change the cabling between the different amplifiers, antennas and power meters manually. For this purpose software controlled switching relays are used, as they work much faster and without any damage to the RF-cables, which might be caused by changing the connections manually. Furthermore, cabling mistakes cannot occur.



RF-Power Amplifier

The software controls the level of the signal generator output for each test frequency. This signal level is amplified by the power amplifier output in order to generate the required test field strength around the EUT. It depends on the testing setup, the distance between EUT and antenna (1 m – 3 m) and the test level / test field strength (3/10/100/200 V/m or special requirements) whether an amplifier output of 10 W, 30 W, 200 W – 2 kW is required. Normally, field strength of 10 V/m, with 1 kHz / 80% AM, can be obtained with a 200 W amplifier in a testing distance of 3 m.



Transmitting Antenna(s)

Broadband antennas, like our model ALX-4000, which cover the whole frequency range from 30 MHz up to 4 GHz may be used as a single-antenna-solution. The advantage of these antennas is that they can be used for immunity tests as well as for emission measurements. In order to save amplifier power and costs it is recommended to use so called double stacked log.-periodical antennas for immunity tests, like our model AXL-80. This antenna type offers a much higher gain compared to the above described broadband antennas. For our systems we recommend the following antenna types:

Antenna types:

- 30 MHz – 4 GHz, type ALX-4000
- 80MHz – 4 GHz, type AXL-80*
- 1 GHz – 6 GHz, type Max 9**

As an alternative horn antennas can be used in the GHz range if a max. uniform area of 1.0 m is sufficient.

* Emission + Immunity tests ** Immunity tests



RF-Field Strength Meter

A field strength meter is necessary for the measurement of the uniform area and the generated field-strength. It should be of small size in order to avoid disturbances of the field by the physical size of the field strength meter itself. The data transfer from the an-echoic chamber to the control room should be via fibre optic link. It makes sense to integrate the fibre optic converter directly into the sensor because long conductive cables could influence the accuracy, too. The test frequency range from 80 MHz to 3 or 6 GHz should at least be covered by the field strength meter. We suggest the use of our field strength meter type EFS-10/100 which works in the frequency range from 10 or 100 kHz up to 9.25 GHz and with a max. field strength from 0.14 V/m to 500 V/m. As alternative and for no more empty batteries we recommend our Laser powered field strength meter "EFS-Laser"



RF-Power Meter / Directional Couplers

While testing the field strength probe is replaced by the EUT. A power measurement during the test runs assures that the EUT is actually exposed to the requested test condition. Thus a directional coupler is connected with the amplifier output. A power measuring device determines the forward and reverse power up to 6 GHz or higher. Both are stored and recorded by the control software. For this purpose directional couplers are connected with the amplifier output or the built-in directional couplers of our EMC test & control unit ECU-3/-6 are used. The forward and reverse power is measured by our RF-Power Meter PMS 1084 or by the built-in power measuring channels of the ECU-3/-6. Both metering values are recorded and stored by the control software.

RF-Cabling

The RF-cabling work is a very important part of a radiated immunity test system, as the cable-attenuation could finally decide whether you reach your test level or not. All essential RF-cables are included in our systems and in the calculation according to the required amplifier output power.



System installation in a 19" Rack

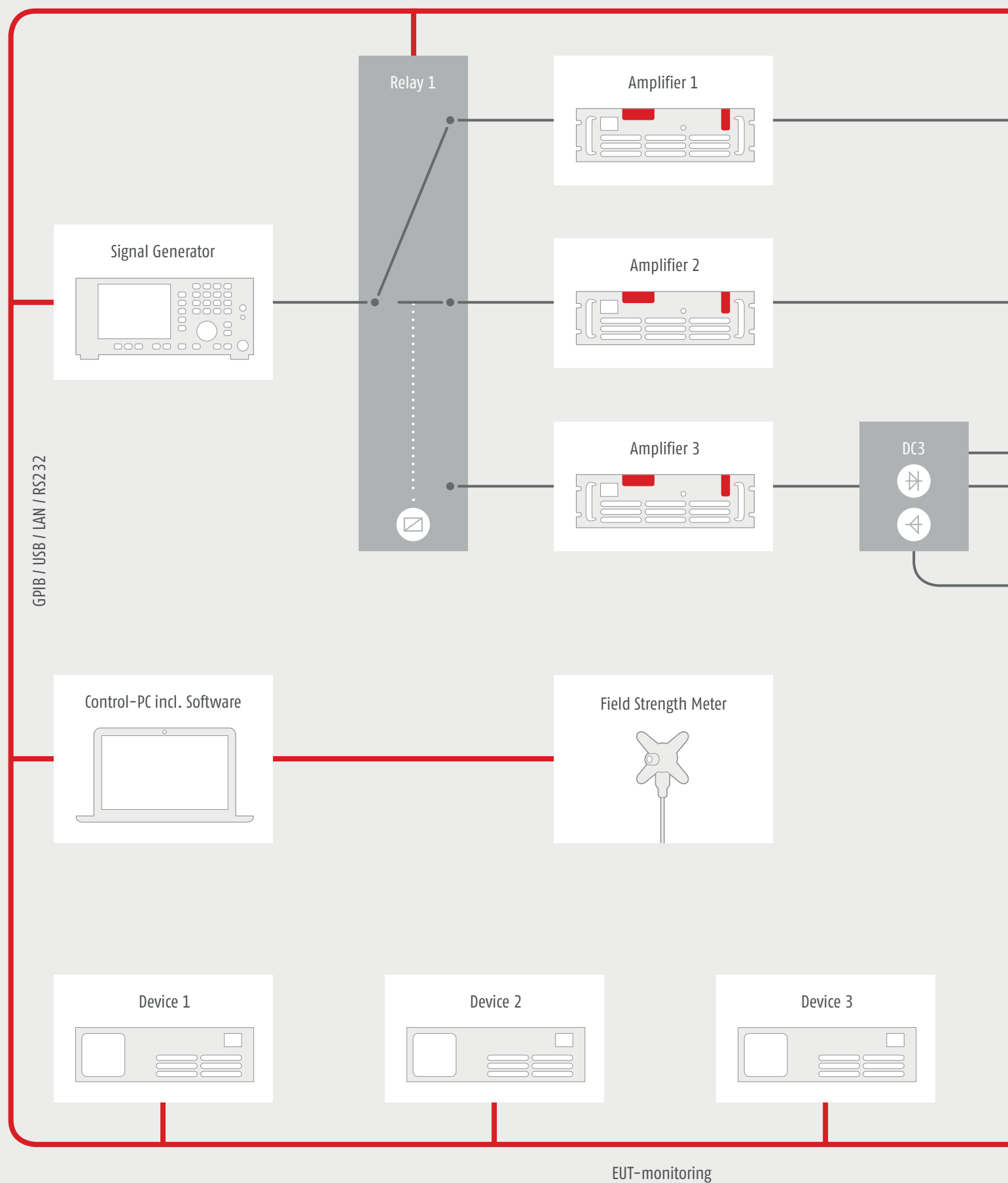
On request the test systems supplied are installed into a 19"-rack. The picture on the left shows an example of a radiated immunity test system acc. to IEC/EN 61000-4-3, type RIS 6000.

Features:

- Moveable rack (on big rubber wheels)
- Instruments are installed into rack and cabled
- Main switch
- Easy mountable cover for front and rear side of the rack included
- Typical dimensions (HxDxW): 1,270 x 710 x 540 mm
- Weight without instruments: 50kg

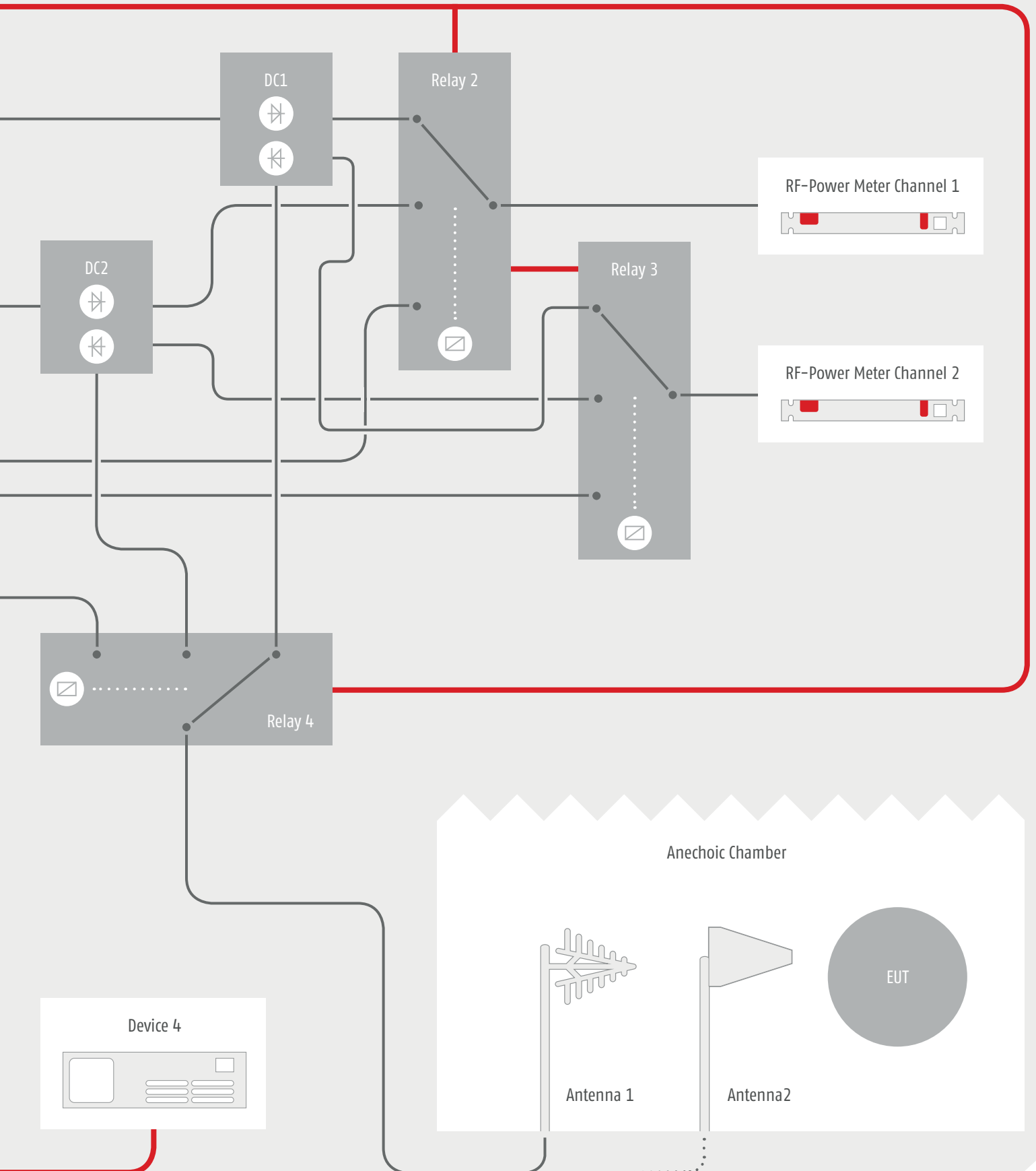
CONVENTIONAL SET-UP

OF A RADIATED IMMUNITY TEST SYSTEM BY MEANS OF SEPERATE INSTRUMENTS



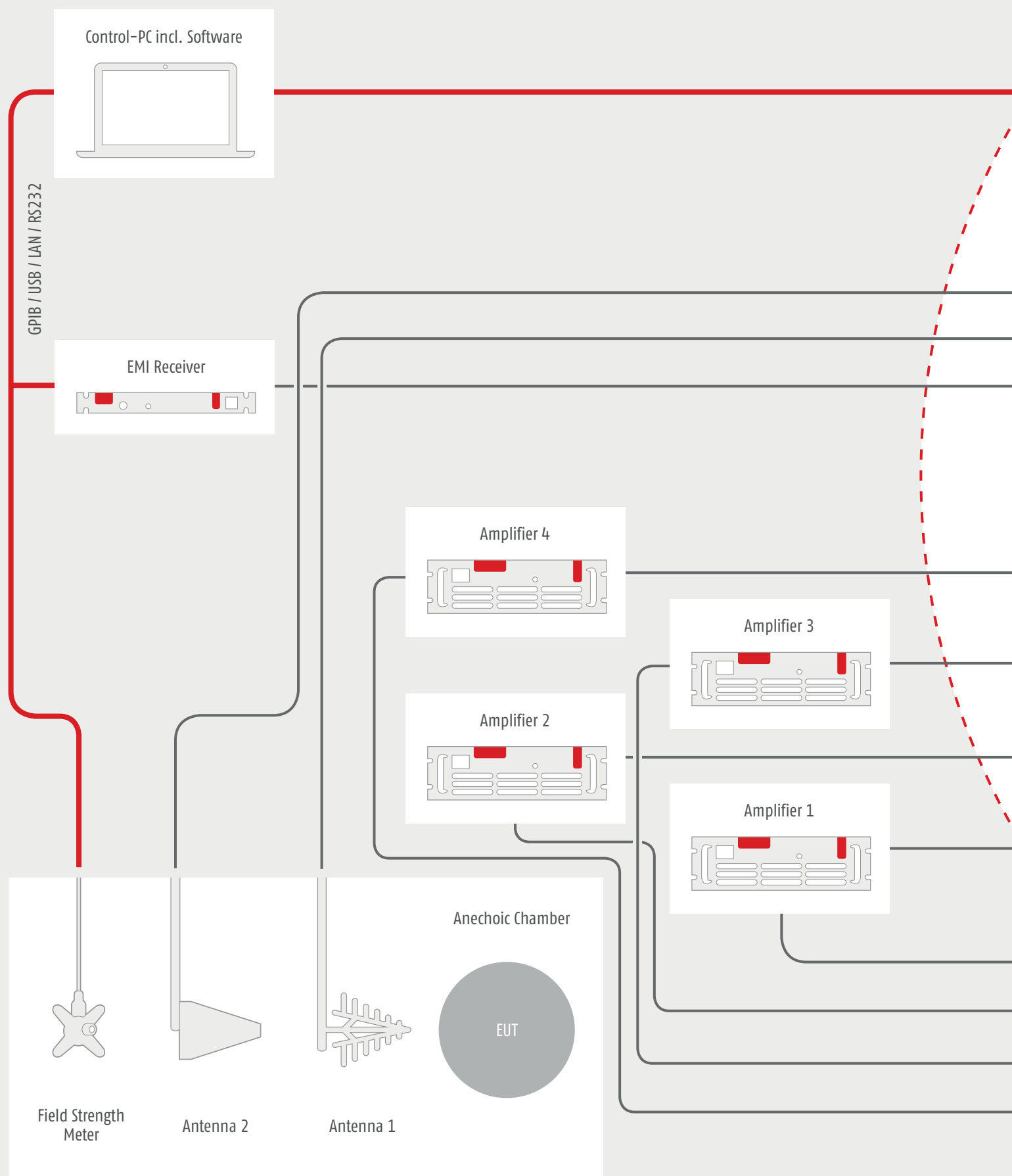
CONVENTIONAL SET-UP

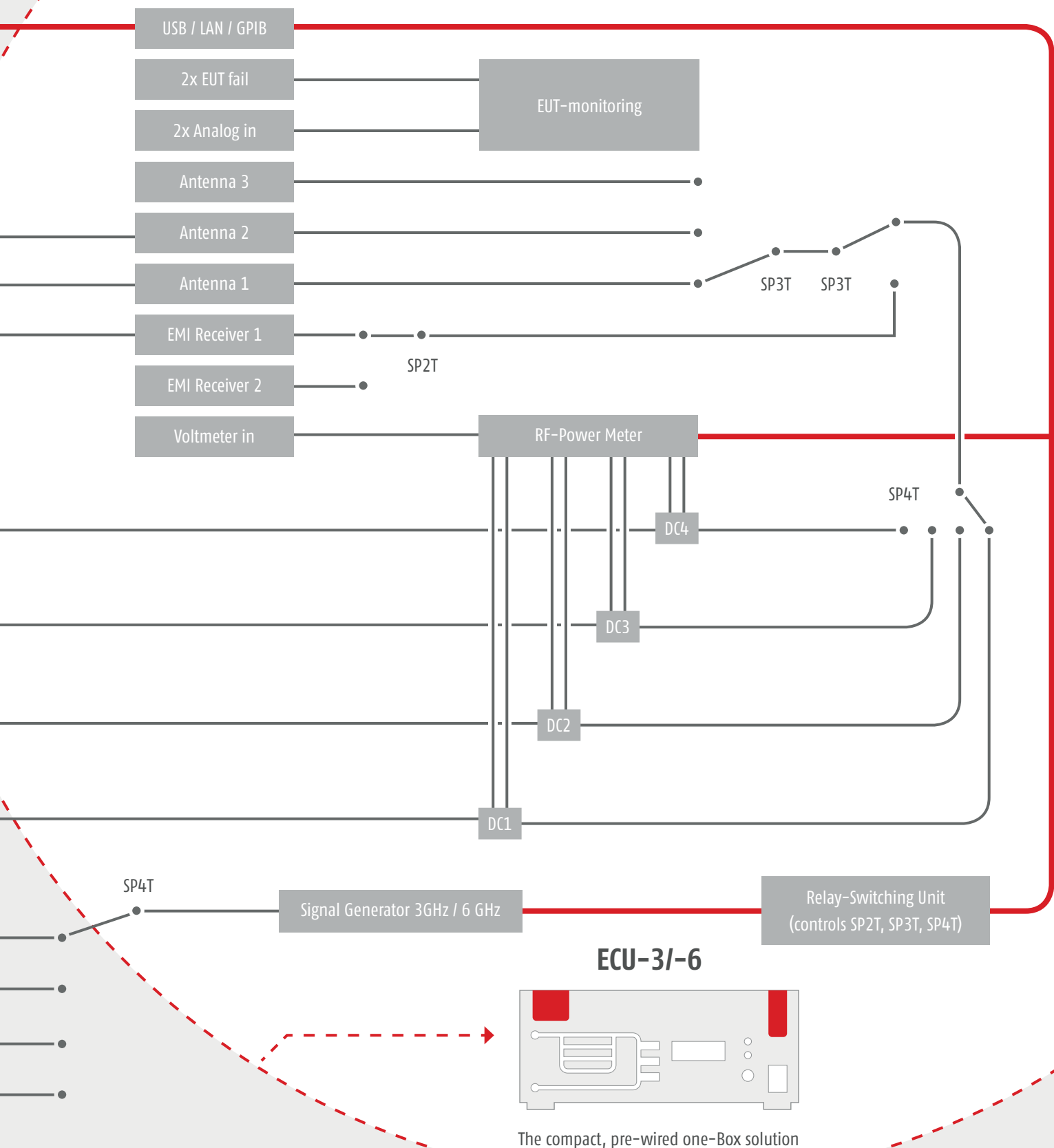
OF A RADIATED IMMUNITY TEST SYSTEM BY MEANS OF SEPERATE INSTRUMENTS



ECU-3/-6 SET-UP

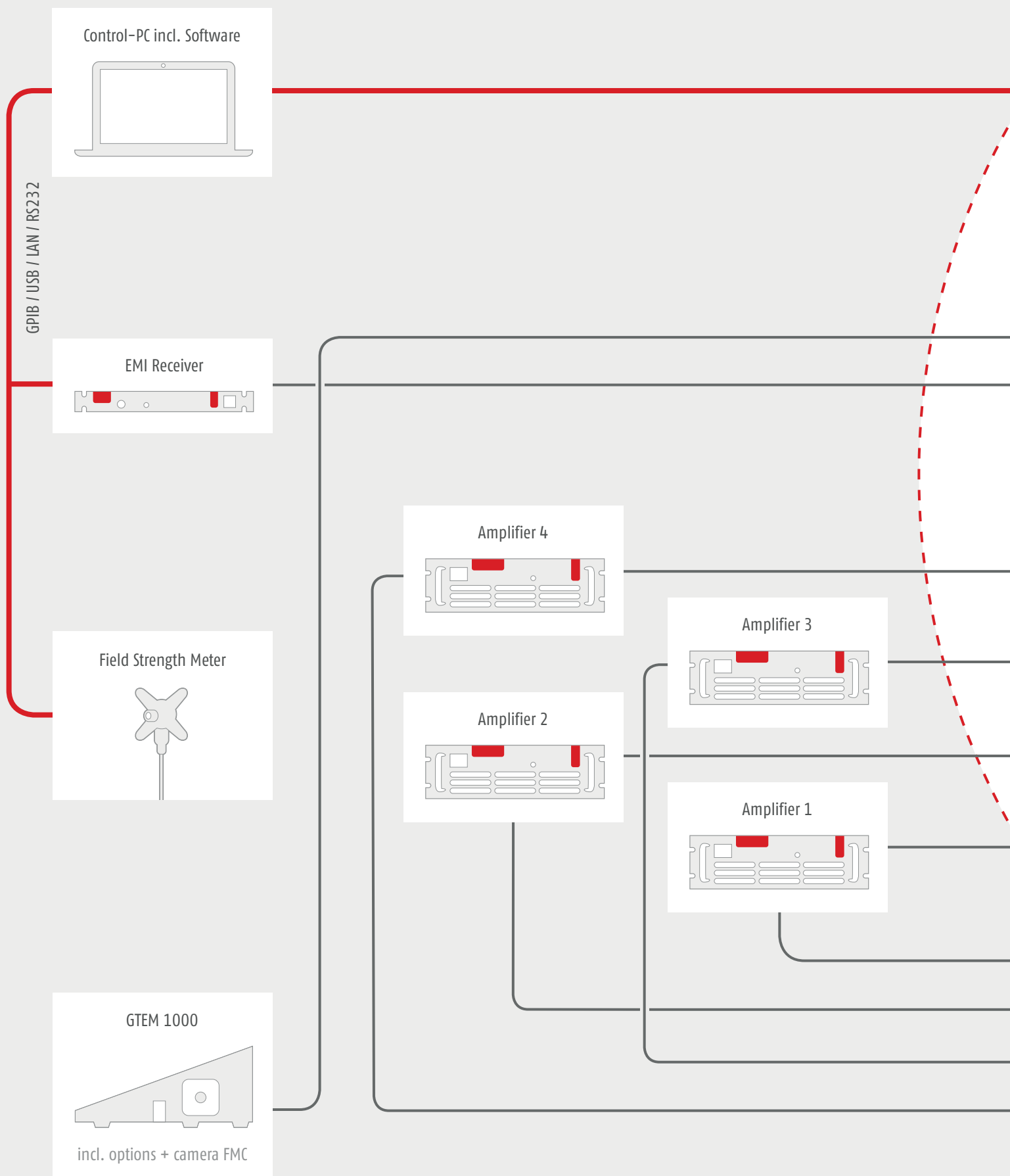
OF A RADIATED IMMUNITY TEST SYSTEM BY MEANS OF OUR EMC CONTROL UNIT, TYPE ECU-3/-6

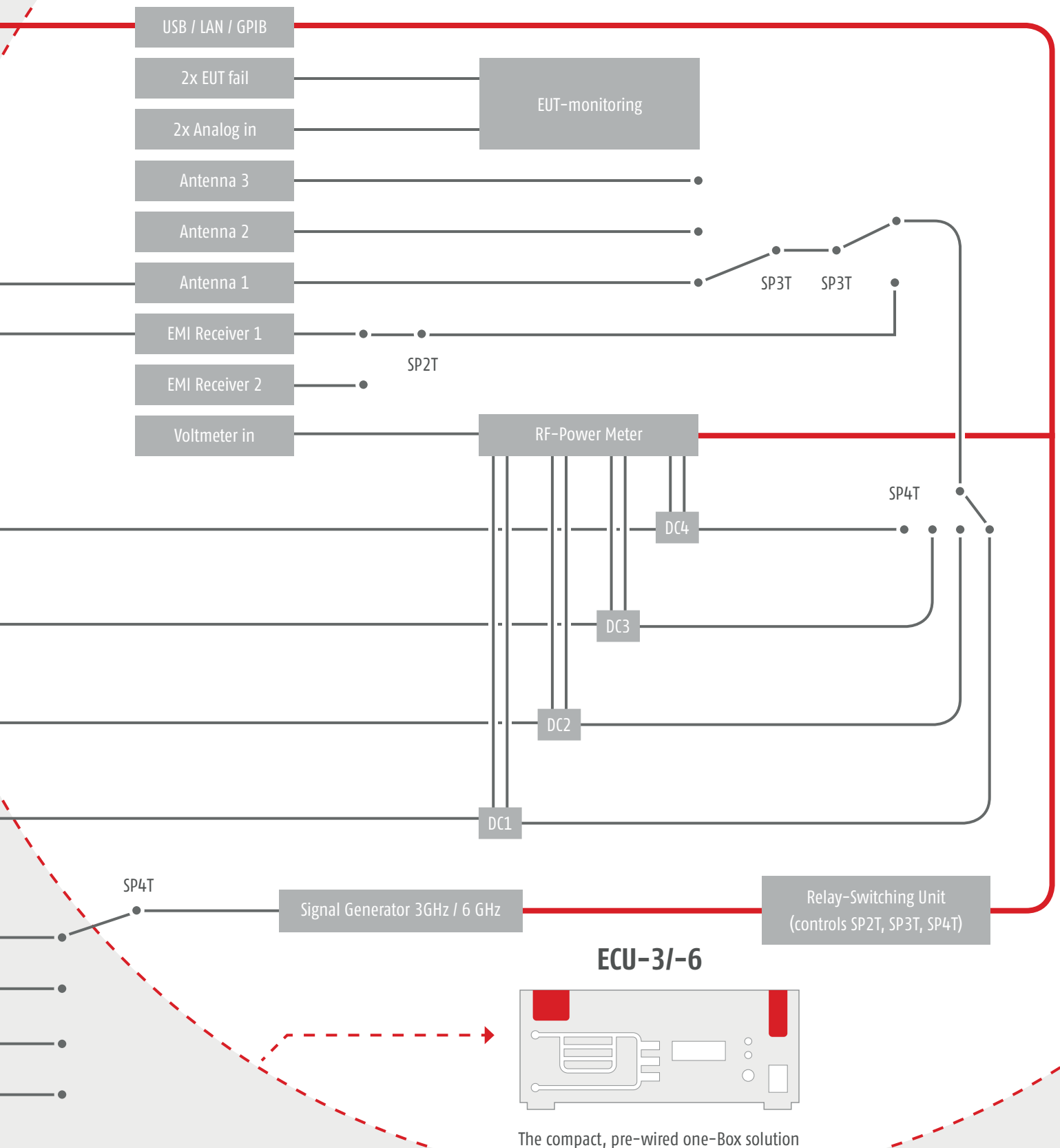




GTEM TEST SET-UP

FOR RADIATED IMMUNITY TESTS AND EMISSION MEASUREMENTS





The compact, pre-wired one-Box solution

POWER DEMAND FOR GTEM-CELLS



Power demand for GTEM-Cells depending on GTEM-size and required field strength

GTEM	3 V/m, 80% AM	10 V/m, 80 AM	20 V/m, 80% AM	30 V/m, 80% AM
250	0,07 W	0,81 W	3,24 W	7,29 W
400	0,19 W	2,07 W	8,30 W	18,66 W
500	0,29 W	3,24 W	12,96 W	29,16 W
750	0,66 W	7,29 W	29,16 W	65,61 W
1000	1,17 W	12,96 W	51,84 W	116,64 W
1250	1,82 W	20,25 W	81,00 W	182,25 W
1500	2,63 W	29,16 W	116,64 W	262,44 W
1750	3,57 W	39,69 W	158,76 W	357,21 W
2000	4,67 W	51,84 W	207,36 W	466,56 W

Frequency range:		80MHz - 1GHz	80MHz - 3GHz	80MHz - 6GHz
Test distance:		3,0m	3,0m	3,0m
Size uniform area (m):		1,5 x 1,5	1,5 x 1,5	1,5 x 1,5
Signal-generator				
Keysight EXG-501	9kHz - 1GHz AM	×		
ECU-3	9kHz - 3GHz AM/PM		×	
ECU-6	9kHz - 6,5GHz AM/PM			×
RF-Power-Meter				
PMS-1084	100kHz - 6 GHz 2-Channel	×		
ECU-PM2	100kHz - 6GHz, Integrated in ECU			
	2-Channel			
	4-Channel		×	×
	6-Channel			
Directional Couplers:				
ECU-DC2	80MHz - 1GHz, 1500W, 50dB, Integrated in ECU		×	×
C-3908	80MHz - 1GHz, 1500W, 50dB	×		
ECU-DC3	0,8GHz - 4,2GHz, 600W, 40dB, Integrated in ECU		×	
ECU-DC34	0,6GHz - 6 GHz, 100W, 30dB, Integrated in ECU			×
Relay Switching Unit				
RSU-xx	Integrated in ECU		×	×
RF-Power-amplifiers:				
FLH-70B	20MHz - 1GHz, Typ. 70W	×	×	×
FLG-30C	1GHz - 3 GHz, Typ. 30W		×	
FLG-15G	0,7GHz - 6GHz, Typ. 15W			×
Antennas:				
ALX-4000	25MHz - 4GHz	×	×	×
MAX-9	700MHz - 10,5GHz			×
Field-Strength-Meter:				
EFS-10	10kHz - 9,25 GHz	×	×	×
Control Software:				
RF-LAB		×	×	×
RF-cables (set):				
KS-1	incl. GPIB-Card	×		
ECU-KS2	incl. GPIB-Card		×	×
Accessories:				
Control PC (not included)		×	×	×
19"-Rack		×	×	×
Antenna-tripod, type FSM-2.0		×	×	×
Antenna polarization switch, FPD-01		×	×	×
Positioning tripod for EFS-10		×	×	×

Frequency range:	80MHz - 1GHz			80MHz - 3GHz			80MHz - 6GHz		
Test distance:	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m
Size uniform area 80MHz to 1GHz (m):	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5
Signal-Generator									
Keysight EXG-501 9kHz - 1GHz AM	×	×	×						
ECU-3 9kHz - 3GHz AM/PM				×	×	×			
ECU-6 9kHz - 6,5GHz AM/PM							×	×	×
RF-Power-Meter									
PMS-1084 100kHz - 6 GHz, 2-Channel	×	×	×						
ECU-PM2 100kHz - 6GHz, Integrated in ECU 2-Channel									
4-Channel				×	×	×	×	×	×
6-Channel									
Directional Couplers									
ECU-DC2 80MHz - 1GHz, 1500W, 50dB Integrated in ECU				×	×	×	×	×	×
C-3908 80MHz - 1GHz, 1500W, 50dB	×	×	×						
ECU-DC3 0,8GHz - 4,2GHz, 600W, 40dB Integrated in ECU				×	×	×			
ECU-DC34 0,6GHz - 6 GHz, 100W, 30dB Integrated in ECU							×	×	×
Relay Switching Unit									
RSU-xx Integrated in ECU				×	×	×	×	×	×
RF-Power-Amplifiers									
FLH-50A 1MHz - 1GHz, Typ. 50W			×			×			×
VLH-90B 20MHz - 1GHz, Typ. 90W		×			×			×	
FLH-200B1 80MHz - 1GHz, Typ. 200W	×			×			×		
VLH-400B1 80MHz - 1GHz, Typ. 400W									
FLG-10C 1GHz - 3GHz, Typ. 10W						×			

continue on next page

Frequency range:	80MHz - 1GHz			80MHz - 3GHz			80MHz - 6GHz		
Test distance:	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m
Size uniform area 80MHz to 1GHz (m):	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5
RF-Power-Amplifiers									
VLG-40CA 0,8GHz - 3,2GHz, Typ. 40W					×				
VLG-70CA 0,8GHz - 3,2GHz, Typ. 70W				×					
FLG-15G 0,7GHz - 6GHz, Typ. 15W									×
FLG-50G 1GHz - 6GHz, Typ. 50W								×	
VLG-70/55G 0,8GHz - 6GHz, Typ. 70/55W							×		
Antenna(s)									
ALX-4000 25MHz - 4GHz									
AXL-80 80MHz - 4GHz	×	×	×	×	×	×	×	×	×
MAX-9 700 MHz - 10,5 GHz							×	×	×
Field-Strength-Meter									
EFS-10 10kHz - 9,25GHz	×	×	×	×	×	×	×	×	×
Control Software									
RF-LAB	×	×	×	×	×	×	×	×	×
RF-Cables (set)									
KS-1 incl. GPIB-Card	×	×	×						
ECU-KS2 incl. GPIB-Card				×	×	×	×	×	×
Accessories									
Control PC (not included)	×	×	×	×	×	×	×	×	×
19"-Rack	×	×	×	×	×	×	×	×	×
Antenna-tripod, type FSM-2.0	×	×	×	×	×	×	×	×	×
Antenna polarization switch, FPD-01	×	×	×	×	×	×	×	×	×
Positioning tripod for EFS-10	×	×	×	×	×	×	×	×	×

Frequency range:	80MHz - 1GHz			80MHz - 3GHz			80MHz - 6GHz		
Test distance:	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m
Size uniform area 80MHz to 1GHz (m):	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5
Size uniform area > 1GHz				1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,0 x 1,0	1,0 x 1,0	0,5 x 0,5
Signal-Generator									
Keysight EXG-501 9kHz - 1GHz AM	×	×	×						
ECU-3 9kHz - 3GHz AM/PM				×	×	×			
ECU-6 9kHz - 6,5GHz AM/PM							×	×	×
RF-Power-Meter									
PMS-1084 100kHz - 6 GHz, 2-Channel	×	×	×						
ECU-PM2 100kHz - 6GHz, Integrated in ECU 2-Channel									
4-Channel				×	×	×	×	×	×
6-Channel									
Directional Couplers									
ECU-DC2 80MHz - 1GHz, 1500W, 50dB Integrated in ECU					×	×		×	×
C-3908 80MHz - 1GHz, 1500W, 50dB		×	×						
80MHz - 1GHz, Integrated in amplifier	×			×			×		
ECU-DC3 0,8GHz - 4,2GHz, 600W, 40dB Integrated in ECU				×	×	×			
ECU-DC34 0,6GHz - 6 GHz, 100W, 30dB Integrated in ECU							×	×	×
Relay Switching Unit									
RSU-xx Integrated in ECU				×	×	×	×	×	×
RF-Power-Amplifiers									
VLH-100B1 80MHz - 1GHz, Typ. 100W			×			×			×
VLH-400B1 80MHz - 1GHz, Typ. 400W		×			×			×	
VLH-700B1 80MHz - 1GHz, Typ. 700W	×			×			×		
FLG-30C 1GHz - 3GHz, Typ. 30W						×			
VLG-120CA 0,8GHz - 3,2GHz, Typ. 120W					×				

continue on next page

Frequency range:	80MHz - 1GHz			80MHz - 3GHz			80MHz - 6GHz		
Test distance:	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m
Size uniform area 80MHz to 1GHz (m):	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5
Size uniform area > 1GHz				1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,0 x 1,0	1,0 x 1,0	0,5 x 0,5
RF-Power-Amplifiers									
VLG-220CA 0,8GHz - 3,2GHz, Typ. 220W				×					
FLG-15G 0,7GHz - 6GHz, Typ. 15W									×
FLG-50G 1GHz - 6GHz, Typ. 50W								×	
FLG-100G 1GHz - 6GHz, Typ. 100W							×		
Antenna(s)									
ALX-4000 25MHz - 4GHz									
AXL-80 80MHz - 4GHz	×	×	×	×	×	×	×	×	×
MAX-9 700 MHz - 10,5 GHz									
HAX-6 500 MHz - 6GHz							×	×	×
Field-Strength-Meter									
EFS-10 10kHz - 9,25GHz	×	×	×	×	×	×	×	×	×
Control Software									
RF-LAB	×	×	×	×	×	×	×	×	×
RF-Cables (set)									
KS-1 incl. GPIB-Card	×	×	×						
ECU-KS2 incl. GPIB-Card				×	×	×	×	×	×
Accessories									
Control PC (not included)	×	×	×	×	×	×	×	×	×
19"-Rack	×	×	×	×	×	×	×	×	×
Antenna-tripod, type FSM-2.0	×	×	×	×	×	×	×	×	×
Antenna polarization switch, FPD-01	×	×	×	×	×	×	×	×	×
Positioning tripod for EFS-10	×	×	×	×	×	×	×	×	×

Frequency range:	80MHz - 1GHz			80MHz - 3GHz			80MHz - 6GHz		
Test distance:	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m
Size uniform area 80MHz to 1GHz (m):	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5
Size uniform area > 1GHz				1,0 x 1,0	1,0 x 1,0	0,5 x 0,5	1,0 x 1,0	1,0 x 1,0	0,5 x 0,5
Signal-Generator									
Keysight EXG-501 9kHz - 1GHz AM	×	×	×						
ECU-3 9kHz - 3GHz AM/PM				×	×	×			
ECU-6 9kHz - 6,5GHz AM/PM							×	×	×
RF-Power-Meter									
PMS-1084 100kHz - 6 GHz, 2-Channel	×	×	×						
ECU-PM2 100kHz - 6GHz, Integrated in ECU 2-Channel									
4-Channel				×	×	×		×	×
6-Channel							×		
Directional Couplers									
ECU-DC2 80MHz - 1GHz, 1500W, 50dB Integrated in ECU						×			×
C-3908 80MHz - 1GHz, 1500W, 50dB			×						
80MHz - 1GHz, Integrated in amplifier	×	×		×	×		×	×	
ECU-DC3 0,8GHz - 4,2GHz, 600W, 40dB Integrated in ECU				×	×	×	×		
ECU-DC34 0,6GHz - 6 GHz, 100W, 30dB Integrated in ECU							×	×	×
Relay Switching Unit									
RSU-xx Integrated in ECU				×	×	×	×	×	×
RF-Power-Amplifiers									
FLH-200B1 80MHz - 1GHz, Typ. 200W			×			×			×
VLH-700B1 80MHz - 1GHz, Typ. 700W		×			×			×	
VLH-1400B1 80MHz - 1GHz, Typ. 1400W	×			×			×		
FLG-200A 0,8GHz - 2GHz, Typ. 200W							×		
FLG-30C 1GHz- 3GHz, Typ. 30W						×			

continue on next page

Frequency range:	80MHz - 1GHz			80MHz - 3GHz			80MHz - 6GHz		
Test distance:	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m	3,0m	2,0m	1,0m
Size uniform area 80MHz to 1GHz (m):	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5	1,5 x 1,5	1,0 x 1,0	0,5 x 0,5
Size uniform area > 1GHz				1,0 x 1,0	1,0 x 1,0	0,5 x 0,5	1,0 x 1,0	1,0 x 1,0	0,5 x 0,5
RF-Power-Amplifiers									
VLG-120CA 0,8GHz - 3,2GHz, Typ. 120W					×				
VLG-220CA 0,8GHz - 3,2GHz, Typ. 220W				×					
VLG-40/30G 0,8GHz - 6GHz, 40/30W									×
FLG-100G 1GHz - 6 GHz, Typ. 100W								×	
VLG-180F 2GHz - 6GHz, Typ. 180W							×		
Antenna(s)									
ALX-4000 25MHz - 4GHz									
AXL-80 80MHz - 4GHz	×	×	×	×	×	×	×	×	×
MAX-9 700 MHz - 10,5 GHz									
HAX-6 500 MHz - 6GHz				×	×	×	×	×	×
Field-Strength-Meter									
EFS-10 10kHz - 9,25GHz	×	×	×	×	×	×	×	×	×
Control Software									
RF-LAB	×	×	×	×	×	×	×	×	×
RF-Cables (set)									
KS-1 incl. GPIB-Card	×	×	×						
ECU-KS2 incl. GPIB-Card				×	×	×		×	×
ECU-KS3 incl. GPIB-Card							×		
Accessories									
Control PC (not included)	×	×	×	×	×	×	×	×	×
19"-Rack	×	×	×	×	×	×	×	×	×
Antenna-tripod, type FSM-2.0	×	×	×	×	×	×	×	×	×
Antenna polarization switch, FPD-01	×	×	×	×	×	×	×	×	×
Positioning tripod for EFS-10	×	×	×	×	×	×	×	×	×

Frequency range vertical / horizontal:	200MHz - 1GHz			200MHz - 3GHz			200MHz - 6GHz		
Field strength:	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m
Signal-Generator									
Keysight EXG-501 9kHz - 1GHz AM	×	×	×						
ECU-3 9kHz - 3GHz AM/PM				×	×	×			
ECU-6 9kHz - 6,5GHz AM/PM							×	×	×
RF-Power-Meter									
PMS-1084 100kHz - 6 GHz, 2-Channel	×	×	×						
ECU-PM2 100kHz - 6GHz, Integrated in ECU									
2-Channel									
4-Channel				×	×	×	×	×	×
6-Channel									
Directional Couplers									
ECU-DC2 80MHz - 1GHz, 1500W, 50dB Integrated in ECU									
C-3908 80MHz - 1GHz, 1500W, 50dB	×	×		×	×		×	×	
80MHz - 1GHz, Integrated in amplifier			×			×			×
ECU-DC3 0,8GHz - 4,2GHz, 600W, 40dB Integrated in ECU				×	×	×			
ECU-DC9 0,9GHz - 9 GHz, 250W, 35dB Integrated in ECU							×	×	×
Relay Switching Unit									
RSU-xx Integrated in ECU				×	×	×	×	×	×
RF-Power-Amplifiers									
VLH-100B1 80MHz - 1GHz, Typ. 100W	×			×			×		
VLH-400B1 80MHz - 1GHz, Typ. 400W		×			×			×	
VLH-1400B1 80MHz - 1GHz, Typ. 1400W			×			×			×
FLG-30C 1GHz - 3GHz, Typ. 30W				×					

continue on next page →

Frequency range vertical / horizontal:	200MHz – 1GHz			200MHz – 3GHz			200MHz – 6GHz		
Field strength:	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m
RF-Power-Amplifiers									
FLG-70CA 0,8GHz – 3,2GHz					×				
VLG-220CA 0,8GHz – 3,2GHz, Typ. 220W						×			
FLG-25G 0,7GHz – 6GHz, Typ. 25W							×		
VLG-70/55G 0,8 GHz – 6GHz, Typ. 70/55W								×	
FLG-200G 1GHz – 6 GHz, Typ. 200W									×
Antenna(s)									
AXL-200 200MHz – 2,5 GHz	×	×	×	×	×	×	×	×	×
HAX-6 500 MHz – 6GHz				×	×	×	×	×	×
Field-Strength-Meter									
EFS-10 10kHz – 9,25GHz	×	×	×	×	×	×	×	×	×
Control Software									
RF-LAB	×	×	×	×	×	×	×	×	×
RF-Cables (set)									
KS-1 incl. GPIB-Card	×	×	×						
ECU-KS2 incl. GPIB-Card				×	×	×	×	×	×
Accessories									
Control PC (not included)	×	×	×	×	×	×	×	×	×
19"-Rack	×	×	×	×	×	×	×	×	×
Antenna-tripod, type FSM-2.0	×	×	×	×	×	×	×	×	×
Antenna polarization switch, FPD-01	×	×	×	×	×	×	×	×	×

Frequency range vertical:	200MHz – 1GHz			200MHz – 3GHz			200MHz – 6GHz		
Frequency range horizontal:	400MHz – 1GHz			400MHz – 3GHz			400MHz – 6GHz		
Field strength:	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m
Signal-Generator									
Keysight EXG-501 9kHz – 1GHz AM	×	×	×						
ECU-3 9kHz – 3GHz AM/PM				×	×	×			
ECU-6 9kHz – 6,5GHz AM/PM							×	×	×
RF-Power-Meter									
PMS-1084 100kHz – 6 GHz, 2-Channel	×	×	×						
ECU-PM2 100kHz – 6GHz, Integrated in ECU 2-Channel									
4-Channel				×	×	×	×	×	×
6-Channel									
Directional Couplers									
ECU-DC2 80MHz – 1GHz, 1500W, 50dB Integrated in ECU									
C-3908 80MHz – 1GHz, 1500W, 50dB 80MHz – 1GHz, Integrated in amplifier	×	×		×	×		×	×	×
ECU-DC3 0,8GHz – 4,2GHz, 600W, 40dB Integrated in ECU				×	×	×			
ECU-DC9 0,9GHz – 9 GHz, 250W, 35dB Integrated in ECU							×	×	×
Relay Switching Unit									
RSU-xx Integrated in ECU				×	×	×	×	×	×
RF-Power-Amplifiers									
FLH-70B 80MHz – 1GHz, Typ. 70W	×			×			×		
FLH-200B1 80MHz – 1GHz, Typ. 200W		×			×			×	
VLH-700B1 80MHz – 1GHz, Typ. 700W			×			×			×
FLG-30C 1GHz – 3GHz, Typ. 30W				×					

continue on next page →

RADIATED IMMUNITY TEST SYSTEM

ACC. TO ISO 11452-2 AND MIL-STD 461, RS103

SYSTEM COMPOSITIONS

1,0m measuring distance

Frequency range vertical:	200MHz – 1GHz			200MHz – 3GHz			200MHz – 6GHz		
Frequency range horizontal:	400MHz – 1GHz			400MHz – 3GHz			400MHz – 6GHz		
Field strength:	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m
RF-Power-Amplifiers									
FLG-70CA 0,8GHz – 3,2GHz					×				
VLG-220CA 0,8GHz – 3,2GHz, Typ. 220W						×			
FLG-25G 0,7GHz – 6GHz, Typ. 25W							×		
VLG-70/55G 0,8 GHz – 6GHz, Typ. 70/55W								×	
FLG-200G 1GHz – 6 GHz, Typ. 200W									×
Antenna(s)									
AXL-200 200MHz – 2,5 GHz	×	×	×	×	×	×	×	×	×
HAX-6 500 MHz – 6GHz				×	×	×	×	×	×
Field-Strength-Meter									
EFS-10 10kHz – 9,25GHz	×	×	×	×	×	×	×	×	×
Control Software									
RF-LAB	×	×	×	×	×	×	×	×	×
RF-Cables (set)									
KS-1 incl. GPIB-Card	×	×	×						
ECU-KS2 incl. GPIB-Card				×	×	×	×	×	×
Accessories									
Control PC (not included)	×	×	×	×	×	×	×	×	×
19"-Rack	×	×	×	×	×	×	×	×	×
Antenna-tripod, type FSM-2.0	×	×	×	×	×	×	×	×	×
Antenna polarization switch, FPD-01	×	×	×	×	×	×	×	×	×

Frequency range vertical:	80MHz - 3GHz			80MHz - 3GHz			80MHz - 6GHz		
Frequency range horizontal:	400(200)MHz - 1GHz			400(200)MHz - 3GHz			400(200)MHz - 6GHz		
Field strength:	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m
Signal-Generator									
Keysight EXG-501 9kHz - 1GHz AM	×	×	×						
ECU-3 9kHz - 3GHz AM/PM				×	×	×			
ECU-6 9kHz - 6,5GHz AM/PM							×	×	×
RF-Power-Meter									
PMS-1084 100kHz - 6 GHz, 2-Channel	×	×	×						
ECU-PM2 100kHz - 6GHz, Integrated in ECU 2-Channel									
4-Channel				×	×	×	×	×	×
6-Channel									
Directional Couplers									
ECU-DC2 80MHz - 1GHz, 1500W, 50dB Integrated in ECU				×	×		×	×	
C-3908 80MHz - 1GHz, 1500W, 50dB 80MHz - 1GHz, Integrated in amplifier	×	×							×
ECU-DC3 0,8GHz - 4,2GHz, 600W, 40dB Integrated in ECU				×	×	×			
ECU-DC9 0,9GHz - 9 GHz, 250W, 35dB Integrated in ECU							×	×	×
Relay Switching Unit									
RSU-xx Integrated in ECU				×	×	×	×	×	×
RF-Power-Amplifiers									
VLH-100B1 80MHz - 1GHz, Typ. 100W	×			×			×		
VLH-400B1 80MHz - 1GHz, Typ. 400W		×			×			×	
VLH-1400B1 80MHz - 1GHz, Typ. 1400W			×			×			×
FLG-30C 1GHz - 3GHz, Typ. 30W				×					

continue on next page →

RADIATED IMMUNITY TEST SYSTEM

ACC. TO ISO 11452-2 AND MIL-STD 461, RS103

SYSTEM COMPOSITIONS

1,0m measuring distance

Frequency range vertical:	80MHz - 3GHz			80MHz - 3GHz			80MHz - 6GHz		
Frequency range horizontal:	400(200)MHz - 1GHz			400(200)MHz - 3GHz			400(200)MHz - 6GHz		
Field strength:	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m	50V/m	100V/m	200V/m
RF-Power-Amplifiers									
FLG-70CA 0,8GHz - 3,2GHz					×				
VLG-220CA 0,8GHz - 3,2GHz, Typ. 220W						×			
FLG-25G 0,7GHz - 6GHz, Typ. 25W							×		
VLG-70/55G 0,8 GHz - 6GHz, Typ. 70/55W								×	
FLG-200G 1GHz - 6 GHz, Typ. 200W									×
Antenna(s)									
AXL-80ES 80MHz - 2,5GHz	×	×	×	×	×	×	×	×	×
HAX-6 500 MHz - 6GHz				×	×	×	×	×	×
Field-Strength-Meter									
EFS-10 10kHz - 9,25GHz	×	×	×	×	×	×	×	×	×
Control Software									
RF-LAB	×	×	×	×	×	×	×	×	×
RF-Cables (set)									
KS-1 incl. GPIB-Card	×	×	×						
ECU-KS2 incl. GPIB-Card				×	×	×	×	×	×
Accessories									
Control PC (not included)	×	×	×	×	×	×	×	×	×
19"-Rack	×	×	×	×	×	×	×	×	×
Antenna-tripod, type FSM-2.0	×	×	×	×	×	×	×	×	×
Antenna polarization switch, FPD-01	×	×	×	×	×	×	×	×	×



Frankonia EMC Test-Systems GmbH

Daimlerstraße 17, 91301 Forchheim, Germany

Web. www.frankoniagroup.com
Mail. sales@frankonia-emv.com

Tel.: +49 (0) 91 91 / 73 666 - 0
Fax: +49 (0) 91 91 / 73 666 - 20



FRANKONIA
www.frankoniagroup.com