



- Signal Generator, 9 kHz – 3/6 GHz
- RF-Power Meter, 10 kHz – 6 GHz
- Directional Couplers, 10 kHz – 6 GHz
- RF-Relay Switching Unit
- EUT-monitoring
- Control of up to four external RF-Power Amplifiers
- Control of up to two external EMI-Receivers

Special Features:

- Conducted immunity tests according to IEC/EN 61000-4-6, 10 kHz – 230 MHz
- BCI-tests according to ISO 11452-5 and MIL-STD 461, CS 114
- Radiated immunity tests according to:
 - IEC/EN 61000-4-3
 - ISO 11452-2/3/4/5
 - MIL-STD 461, RS 103
- Automatic switching between up to four external power amplifiers and connected coupling units / antennas
- Automatic switching between up to two EMI-receivers, spectrum analyzers and three different antennas
- Easy integration into any control software by dII-driver
- Integrated interlock safety system

EMC Test and Control Unit – ECU-3/-6

Description

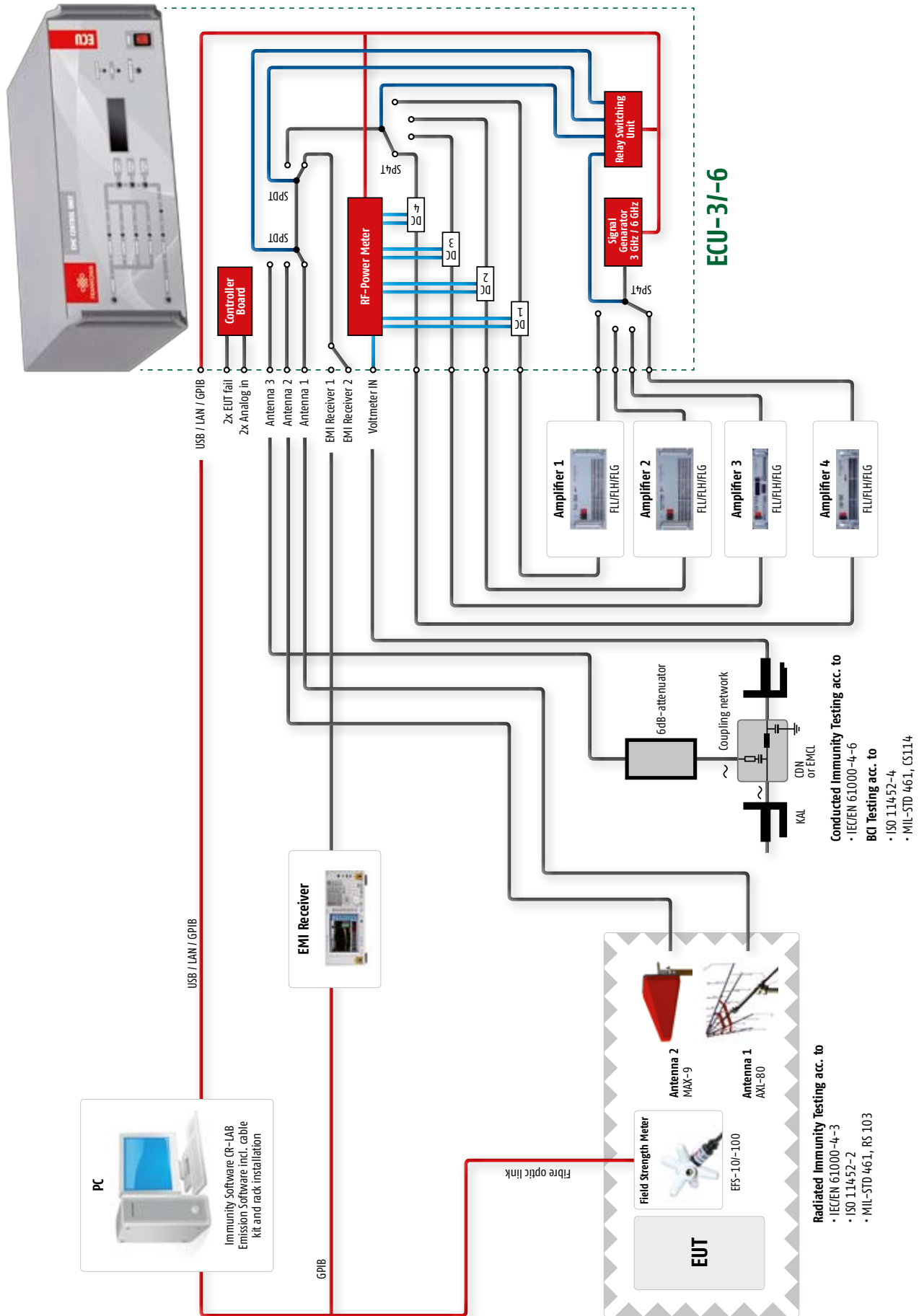
The ECU-3/-6 is a central EMC test and control unit, which combines in just one compact box many major test components like signal generator, power meter, directional couplers and relay switching unit, which are needed for EMC tests. That reduces the cabling work and possible cabling mistakes to a minimum. Furthermore it includes general functions like EUT-monitoring and an interlock safety-system. With all the functions described above, the ECU-3/-6 is a real all-rounder, which can be used for many different conducted and radiated immunity tests as well as control unit to switch between EMI-receiver and spectrum analyzer and different measuring antennas without time consuming cabling work. It allows to control and to switch automatically between up to four external amplifiers, all connected to the ECU-3/-6 and up to three different outputs for antennas or coupling devices (CDNs, EM-coupling clamp, BCI-clamps). The integrated signal generator is available to cover the frequency range from 9 kHz to 3 GHz or from 9 kHz to 6 GHz. Amplitude modulation is available with a modulation rate of 1 Hz to 30 kHz and a modulation depth of 0 % to 90 %. Pulse modulation can be switched on with a repetition frequency of 0.1 Hz to 100 kHz and a duty cycle of 1 % - 99 %. In a word, it includes all requirements according to present EMC standards and it is best prepared for possible future changes.

Technical specifications	ECU-3	ECU-6
Signal Generator		
Output	50 Ω, N male	
Output (Relay)	3 x N male	4 x N male
Frequency range	9 kHz to 3 GHz	9 kHz to 6.5 GHz
Frequency resolution	0.1 Hz	0.001 Hz
Output level range	-65 dBm to +10 dBm	-100 dBm to +13 dBm
Output level resolution	0.1 dB	
Output level accuracy	±1 dB max.	
Accuracy (frequency)	±5 ppm	±100 ppb
Harmonics	< -30 dBc	
Non harmonics	< -55 dBc	
Amplitude modulation		
Modulation rate	1 Hz to 30 kHz; resolution 0.02 Hz	1 Hz to 20 kHz; resolution 0.1 Hz
Modulation depth	0 to 90 %; resolution 1 %	0 to 90 %; resolution 1 %
Modulation waveforms	sinusoidal, triangular, square	sinusoidal, triangular, square
Pulse modulation		
On/off ratio	> 50 dB	typ. 80 dB
Repetition frequency	0.1 Hz to 100 kHz	0.1 Hz to 100 kHz
Duty cycle	1 % - 99 %; resolution 1 %	1 % - 99 %; resolution 1 %
Frequency modulation		
Modulation rate	---	300 Hz to 300 kHz

EMC Test and Control Unit - ECU-3/-6

Technical specifications	ECU-3	ECU-6
RF-Power Meter		
Number of channels	7	9
Frequency range	10 kHz - 500 MHz (channel 1,2,7) 100 kHz - 6 GHz (channel 3,4,5,6)	10 kHz - 500 MHz (channel 1,2,9) 100 kHz - 6 GHz (channel 3,4,5,6,7,8)
Measuring range	-60 dBm to +20 dBm (10 kHz ≤ f ≤ 4 GHz) -45 dBm to +20 dBm (4 GHz < f ≤ 6 GHz)	
Accuracy	± 1 dB (0.5 dB typical)	
Resolution	0.1 dB	
Max. input level	+27 dBm (= 500 mW)	
VSWR	1.15	
EUT-fail input	2 x TTL/CMOS compatible	
Input resistance	2.2 kΩ	
Level	TTL/CMOS compatible, optical decoupled	
EUT-monitor input		
Input voltage (2 x)	0 - 10 V	
Resolution	2.5 mV	
Input impedance	100 kΩ	
USB-A	Multimeter (for EUT control)	
Remote control		
USB-B	Connection to computer	
GPIOB / IEEE488	Connection to computer	
Ethernet / RJ45	option	
Display		
Displayed items	Frequency, Power levels $P_{forw.}$, $P_{rev.}$, modulation (4 lines x 16 characters)	
RF-Relay Switching Unit		
max. power up to 100 MHz	2000 W	
max. power up to 600 MHz	1000 W	
max. power up to 1 GHz	700 W	
max. power up to 3 GHz	400W	
max. power up to 6 GHz	300W	
General data		
Temperature range	0 to 40°C	
Warm-up time	15 min.	
Housing	19"-Subrack or desktop case	
Dimensions (W x H x D)	449 mm x 177 mm x 580 mm	
Weight	approx. 15 kg	
AC input	100 - 240 VAC; 50/60 Hz	

EMC Test and Control Unit - ECU-3/-6



Radiated Immunity Testing acc. to

- IEC/EN 61000-4-3
- ISO 11452-2
- MIL-STD 461, RS 103

Conducted Immunity Testing acc. to

- IEC/EN 61000-4-6

BCI Testing acc. to

- ISO 11452-4
- MIL-STD 461, CS114

Diagram no. 3
Example of a test system setup with ECU-3/-6

EMC Test and Control Unit - ECU-3/-6

Part Numbers	
ECU-3	Compact EMC control unit, basic Instrument, 9 kHz - 3 GHz
ECU-6	Compact EMC control unit, basic Instrument, 9 kHz - 6 GHz
ECU-DC1A	Directional Coupler, 10 kHz - 250 MHz, 30 dB, 100 W
ECU-DC1B	Directional Coupler, 10 kHz - 400 MHz, 30 dB, 100 W
ECU-DC1C	Directional Coupler, 10 kHz - 250 W, 30 dB, 500 W
ECU-DC2	Directional Coupler, 80 MHz - 1000 MHz, 50dB, 1500 W
ECU-DC3	Directional Coupler, 1 GHz- 4 GHz, 40 dB, 600 W
ECU-DC4	Directional Coupler, 2 GHz - 8 GHz, 40 dB, 600 W
ECU-KS2	Cable-set and GPIB-interface for immunity test systems with 2 amplifiers
ECU-KS3	Cable-set and GPIB-interface for immunity test systems with 3 amplifiers
ECU-KS4	Cable-set and GPIB-interface for immunity test systems with 4 amplifiers
ECU-LAN	Additional interface: LAN
ECU-OUT2	Switching between 2 outputs (antenna/load)
ECU-OUT3	Switching between 3 outputs (antenna/load)
ECU-PM1	RF-Power Meter / RF-milli-voltmeter, 10 kHz - 500 MHz, 1 channel
ECU-PM2	RF-Power Meter / RF-milli-voltmeter, 100 kHz - 6 GHz, 1 channel
ECU-REC1	Switching to emission path and connection of 1 measuring receiver / spectrum analyzer
ECU-REC2	Switching to emission path and connection of 2 measuring receivers / spectrum analyzers
ECU-RI	19"-Rack version
ECU-SW6	Standard software for testing acc. to IEC/EN 61000-4-6 in a system with ECU-3/-6