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Presentation of Equipment Specification

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**THE SCHOOL OF ELECTRICAL AND COMPUTER
ENGINEERING OF APPLIED STUDIES**



**DIGITAL BROADCASTING AND BROADBAND
TECHNOLOGIES**



- **Laboratory equipment** (measuring equipment, signal generators, DVB receivers, computers, etc.) 11500 EUR
- **TV studio equipment** (video mixer, lighting, cameras, audio equipment, etc) 7000 EUR
- **The teaching equipment** (projector, notebooks, boards, etc.) 4000 EUR
- **Software** 3500 EUR
- **Literature** 3000 EUR



#	Type	Specification	pcs	Price EUR
1	Field strength meter and spectrum analyzer	as Televes H45 Measurement and analysis of DVB-T, DVB-C, DVB-S/S2, DVB-T2, WLAN, fiber optics.	1	3000
2	Bi-directional couplers and its termination	50Ω, up to 100W, 800 to 2500 MHz, Applications • PCS/DCS/UMTS • power leveling & monitoring • VSWR measurement	1	150
3	Low noise amplifier and coaxial bias-tee	• Extremely wideband, 0.5 to 8 GHz • Low Noise, 1.4 dB @ 2 GHz • High IP3, +34 dBm • Excellent gain flatness ±0.9 dB over 0.5 to 7 GHz @6V	1	200
4	RF cathcer	70 MHz to 6 GHz, resolution 1kHz, signals including Radio (FM, DAB...), IOT (Internet of Things), TV broadcast (DVB-T/T2, C/C2, S/S2, ISDB-T, etc...), cellular, Wi-Fi.	1	

#	Type	Specification	pcs	Price EUR
1	Modulator	DTA-215-T2-SP USB-2 VHF/UHF modulator USB-2 based multi-standard modulator with support for most QAM-, OFDM- and VSB-based modulation standard. Playout of I/Q sample files up to 9.14Msamp/s.	1	2500
2	Multiplexer	Professional DVB TS multiplexer ASI/TS Multiplexer 8 ASI in ASI out	1	1000
3	Tuners	<ul style="list-style-type: none"> DVB-T2 PCTV nanostick HDTV tuner Supported TV standards: DVB-T2, DVB-T, DVB-C Antenna input: MCX connector PC-interface: USB 2.0 (Hi-Speed) <ul style="list-style-type: none"> TBS6910 DVB-S2 Dual Tuner Dual CI PCIe Card 	2	500
4	Signal receivers	<ul style="list-style-type: none"> ScreenService PRO RX-T2 DVB-T/T2 RF INTEX TV/FM USB DVB-T/T2 HDTV Amiko mini HD combo receiver DVB-T2 DVB-C satellite receiver combo DVB-S2+T2+C HD WiFi 	3	400

#	Type	Specification	pcs	Price EUR
5	DVB-T DVB-T2 Measurement Receiver	<p>ENENSYS ReFeree II</p> <p>Complete DVB-T and DVB-T2 Analysis, from RF down to the Video</p> <ul style="list-style-type: none"> • monitoring of DVB-T2 parameters (RF, T2 frame, L1 pre/post signaling, PLP parameters) • monitoring of DVB-T parameters (RF, TPS, MIP) • simultaneous monitoring of RF signal & Transport Stream content • live stream capture capabilities for baseband stream (T2-MI or MPEG2-TS) recording • integrates a video decoder enabling real-time decoding of any unencrypted services (H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3...) 	1	2500
6	DiviCatch RF-T/C T2/C2, DVB-T DVB-C DVB-T2 DVB-C2 Professional RF Analyzer	<p>The DiviCatch RF-T/C T2/C2 is a pocket analyzer cumulating DVB-T/T2/T2 Lite and DVB-C/C2 live reception with MPEG2-TS real-time analysis, recording and playing.</p>	1	800

#	Type	Specification	pcs	Price EUR
7	DiviSuite Software Suite	<p>DiviSuite Software Suite is an Digital TV signal Analyzer tool, enabling both RF and baseband analysis.</p> <p>Default Package:</p> <ul style="list-style-type: none"> - TS Recorder: record the analyzed TS to file - TS Player: play file-based TS to ASI Output - TS IP Forward: forward the analyzed TS to the PC's IP interface - Audio/Video Output: service decoding, H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3 support - Bitrate monitoring: Overall, Net, PID bitrate alarms - Log files - TS input: file-based (offline analysis), ASI Input, PC's IP interface 	1	3500

#	Type	Specification	pcs	Price EUR
7	DiviSuite Software Suite	<p>RF Scope Plugin: provides real-time, accurate RF signal measures (Level, MER, SNR, BER) and indicates the modulation parameters, constellation, Channel Impulse Response as well as the SFN synchronization.</p> <p>TS Analyzer Plugin: provides validation of the 3 priority levels of ETSI TR 101 290.</p> <p>T2MI Analyzer Plugin: provides single & multi-PLP complete analysis.</p> <p>Specific DVB-T2 analysis: T2 L1 pre/post signaling, PLP allocation (BB frame, TS, padding/overflow), T2 timestamp, BB frame, ISSY field, PLP extraction.</p> <p>Specific DVB-C2 analysis: L1 specific screen, C2 frame composition, data slice parameters.</p> <p>Test Coverage Plugin: activates the internal GPS receiver enabling GPS/Glonass localization information</p>		

TV studio equipment - video equipment

#	Type	Specification	pcs	Price EUR
1	Digital Camera	<p>Panasonic Lumix DMC-GH4 Mirrorless Micro Four Thirds Digital Camera with Interface Unit</p> <p>Lens Mount Micro Four Thirds</p> <p>Camera Format Micro Four Thirds (2x Crop Factor)</p> <p>Pixels Actual: 17.2 Megapixel Effective: 16.05 Megapixel</p> <p>Max Resolution 4608 x 3456</p> <p>Sensor Type / Size MOS, 17.3 x 13.0 mm</p> <p>File Formats Still Images: JPEG, MPO, RAW Movies: MOV, MP4, MPEG-4 AVCHD</p> <p>Audio: AAC, Dolby Digital 2ch, Linear PCM</p>	2	2400
2	Battery Pack	<ul style="list-style-type: none"> • Panasonic DMW-BLF19 Rechargeable Lithium-Ion Battery Pack (7.2V, 1860mAh) (4) • Canon LP-E8 Rechargeable Lithium-Ion Battery Pack (7.2V, 1120mAh) (4) 	8	270
3	Tripod	Velbon Videomate 638 Aluminum Tripod	4	225

TV studio equipment - video equipment

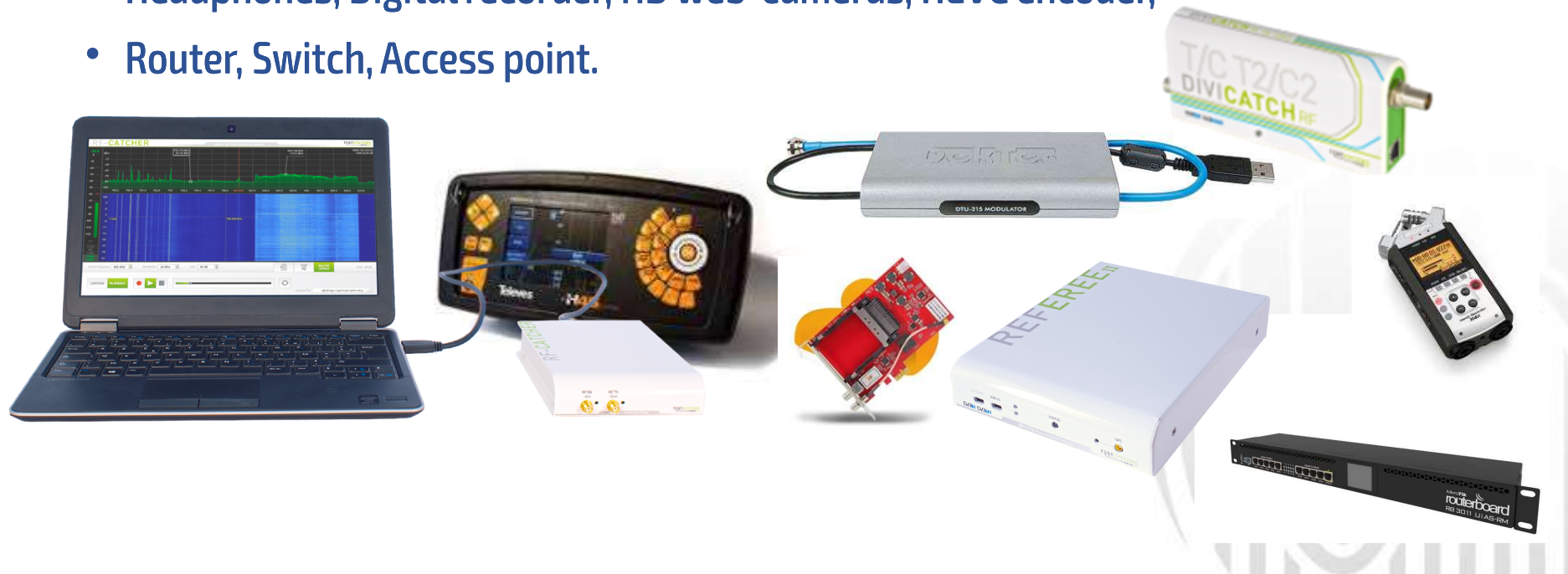
#	Type	Specification	pcs	Price EUR
4	Lens	<ul style="list-style-type: none"> Olympus M.ZUIKO Digital ED 8mm f/1.8 Fisheye PRO Lens (1) Panasonic LUMIX G 20mm f/1.7 II ASPH. Lens (Black) (1) Panasonic Lumix G X Vario 12-35mm f/2.8 Asph. Lens for Micro 4/3 (2) 	4	1800
5	Zoom Lens	Panasonic 35-100mm f/2.8 Lumix G Vario Zoom Lens	1	640
6	Lights	High CRI 90+ Led Video Studio Light w Filters + Customized Carry Bag for 3 Lights + Battery Charger + Battery Packs	2	800
7	Photo Video Light Stands	High Quality 260cm Photo Video Light Stands Photography Studio Light Stand Tripod Photo Studio Accessories Hot Selling	6	140
8	Memory Card	<ul style="list-style-type: none"> SanDisk 32GB Extreme Pro UHS-I SDHC U3 Memory Card (Class 10) (24) Panasonic 32GB F-Series P2 Memory Card (2) 	26	860
9	Microphone	Shure Beta 58A, dynamic vocal microphone	2	220

#	Type	Specification	pcs	Price EUR
1	Headphones	Connector 2 x 3,5mm for desktop or laptop Sound pressure level (SPL) 118 dB Sensitivity in free field, no load (1kHz) -38 dBV/Pa Frequency response (headphones) 17 - 22000 Hz Frequency response (microphone) 80 - 15000 Hz Pick-up pattern noise cancelling	10	500
2	Digital recorder	Four-track simultaneous recording Built-in X/Y stereo mic Onboard MS decoding	1	150
3	HD web-cameras	HD 720p video calling and HD video recording: Video capture: Up to 1280 x 720 pixels Logitech Fluid Crystal™ Technology Photos: Up to 3.0 megapixels (software enhanced) Built-in mic with noise reduction Universal clip fits laptops, LCD or CRT monitors	10	350
4	HEVC encoder	HEVC H.265 encoder H.264 HDMI Encoder IPTV encoder streaming encoder	1	1000

#	Type	Specification	pcs	Price EUR
1	Router	RB3011 with 10 Gigabit ports divided in two switch groups, an SFP cage and with SuperSpeed full size USB 3.0 port, for adding storage or an external 3G/4G modem.	1	200
2	Switch	<ul style="list-style-type: none"> • Ethernet, Fiber, or 4G (with optional USB modem) gateway connection to Internet • RouterOS gateway/firewall/VPN router with passive cooling • up to 25 gigabit switch ports (1xSFP and 24xRJ45) 	1	150
3	Access point	<ul style="list-style-type: none"> • wAP • Gigabit Ethernet port • supports 802.11ac technology • can work at both the 2.4GHz and 5GHz frequencies simultaneously 	1	100

#	Type	Specification	pcs	Price EUR
1	Computer	iMac 21.5, 2.8GHz 2,8 GHz quad-core Intel Core i5 Turbo Boost do 3.3GHz 8 GB (2x4GB) memory 1TB Hard Disk drive Intel Iris Pro graphics 6200 2x Thunderbolt port	1	1600
2	Laptops	Processor: at least 2 cores, 4 threads Display: at least 15", Resolution at least 1920x1080 RAM memory: at least 8GB Hard disk: at least 1TB + NAND flash at least 8GB Optical drive: without optical drive Mass: no more than 2,5kg	2	2000
3	Literature	Textbooks in the field of Digital Broadcast and Broadband Technologies in accordance to the curriculum		1000

- **Laboratory equipment 13500 EUR**
 - Field strength meter and spectrum analyzer, Bi-directional couplers and its termination, Low noise amplifier and coaxial bias-tee,
 - Modulator, Multiplexer, Tuners, Signal receivers, DVB-T DVB-T2 Measurement Receiver, DiviCatch RF-T/C T2/C2, DVB-T DVB-C DVB-T2 DVB-C2 Professional RF Analyzer,
 - Headphones, Digital recorder, HD web-cameras, HEVC encoder,
 - Router, Switch, Access point.



- TV studio equipment 7400 EUR
 - Digital Camera,
 - Battery Pack , Tripod, Lens, Zoom Lens, Lights, Photo Video Light Stands, Memory Cards, Microphone.
- The teaching equipment (Computer, Laptops) 3600 EUR
- Software (DiviSuite Software Suite) 3500 EUR
- Literature 1000 EUR

