

ACQUA

Advanced Communication Quality Analysis

Configuration Examples



Mobile Telephony:
GSM
UMTS
CDMA
AMPS

Hands-free Telephony:
Mobile & Office Type
Analog & Digital
Car Hands-free

VoIP Telephony:
IP Phones
VoIP Gateways
Echo Cancellers
DCME

Electroacoustics

Analog Telephony

Analog Network Access

Cordless Telephony:
DECT

Digital Telephony

Headsets

Hearing Aids

ACQUA – ADVANCED COMMUNICATION QUALITY ANALYSIS

The Advanced Communication Quality Analysis system ACQUA is a dual channel signal analyzer and signal generator optimized for telecommunication measurements.

ACQUA is a data acquisition, measurement and analysis system for nearly all applications in telecommunications. ACQUA is suitable for measurements and analysis of terminal equipment, network components, answering machines and complete point-to-point measurements of single networks or network configurations. In addition to meeting the requirements of international standards such as ITU-T, ETSI and IEEE, ACQUA provides a wide variety of special measurements and evaluations necessary for the development of modern telecommunication equipment.

When combining ACQUA with the HATS HMS II.3, very realistic measurement setups can be achieved allowing highly authentic simulation of real use scenarios. An outstanding feature is the ability for subjective evaluation of different test situations.

ACQUA has three main fields of application:

- Automated data acquisition and analysis of standard measurements for terminal equipment and transmission lines of bandwidth up to 20 kHz.
- Analysis of transmission systems with non-linear, time-variant transfer characteristics.
- Experimental development and optimization of terminal equipment, networks and network components.

When connected to the different front ends for signal conditioning, measurement of almost all equipment in the field of telecommunications is possible:

- Analog and digital telephones with handset (narrow-band, wide-band)
- Analog and digital hands-free equipment and conference systems (mobile, office, car ...)
- Analog and digital cordless telephones and mobile telephones (DECT, GSM, UMTS, CDMA, AMPS ...)
- Network components like speech echo cancellers, digital circuit multiplication equipment (DCME), VoIP gateways ...

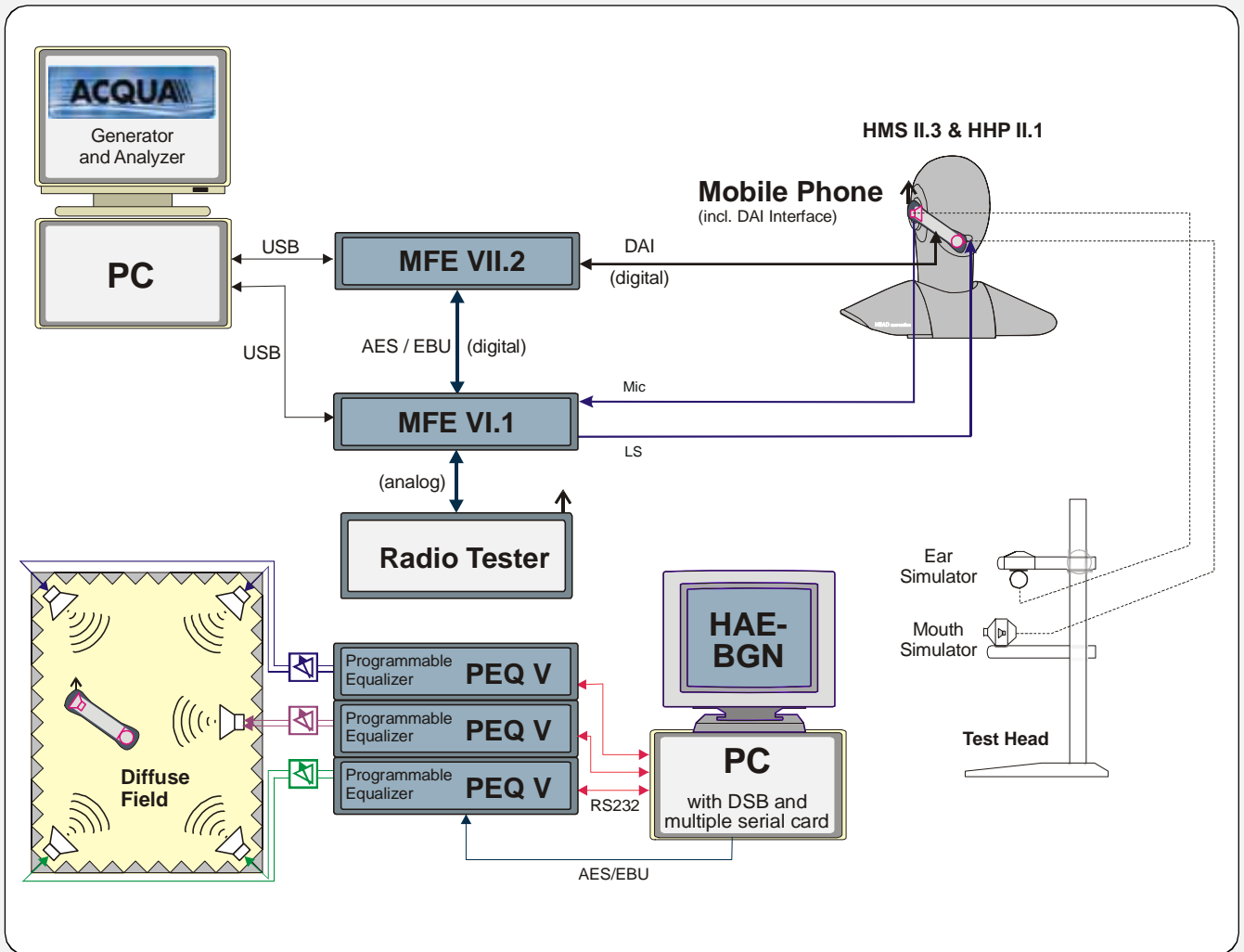
- Predefined test cases for fast, automated measurements according to standards
- Automatic report generation
- Possibility to build custom standards and measuring sequences
- Data base for archiving time signals, transfer functions, test results and test conditions
- Measurements with any test signals
- Outstanding possibilities for signal preparation and manipulation to optimize quality
- Subjective evaluation of measurement objects, especially important for non-linear, time-variant systems
- A/B comparison of different measurement objects

Key Features

- Expandable system solution for measuring acoustics and network access for different telephony scenarios:
 - GSM, UMTS, CDMA, AMPS
 - Hands-free (mobile, office, car ...)
 - Voice over IP (VoIP)
 - Echo Cancellers (EC)
 - Analog telephony
 - Analog network access
 - Digital telephony
 - Cordless (DECT)
 - Headsets (intra concha, supra concha, ...)
 - Electroacoustics
 - Headsets
 - Hearing Aids

MOBILE TELEPHONY

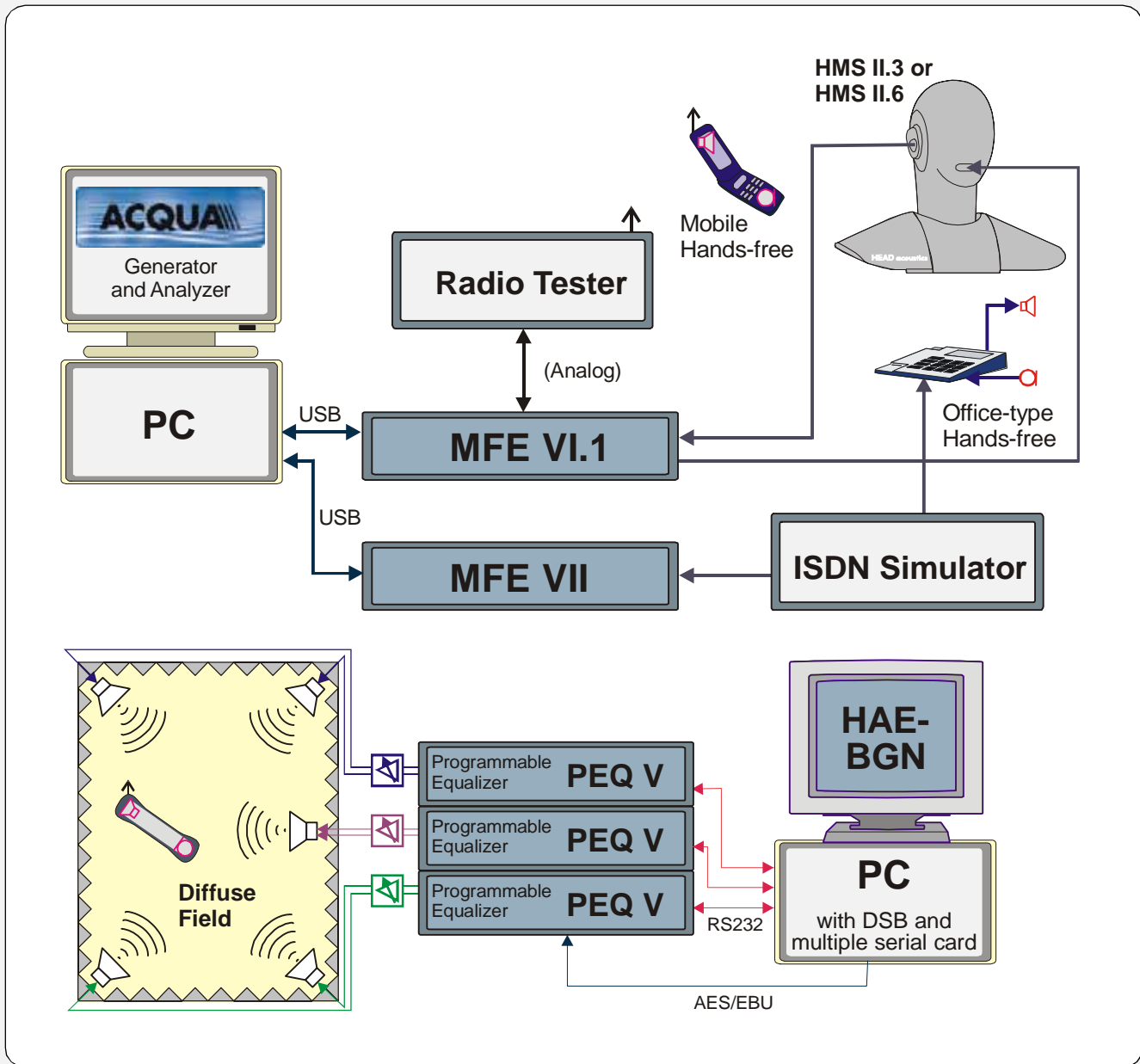
- GSM
- UMTS
- CDMA
- AMPS



Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Mobile Phone (GSM, UMTS, CDMA, AMPS)	TS 26.131, TS 26.132 EN 300 607-1 ETS 300 607-1-3 TS 51.010 TS 100 607-3 (=GSM 11.10), EN 300 903 (=GSM 03.50) CTIA Certification Program Test Plan EG 202 396-1	GSM11.10 (6742) EIA/TIA-628 (6756) HQS-mobile (6776) TS26131_32 (6777) CTIA Acoustical Performance AMPS/CDMA (6781)	ACQUA (6810) MFE VI.1 (6462) MFE VII.2 (6467) HMS II.3 (1230) with HHP II.1 (1377) HAE-BGN (6971) 3 PEQ V (2492) 3 External Power Amplifiers 4 Loudspeakers 1 Subwoofer Radio Tester, e.g. CMU 200

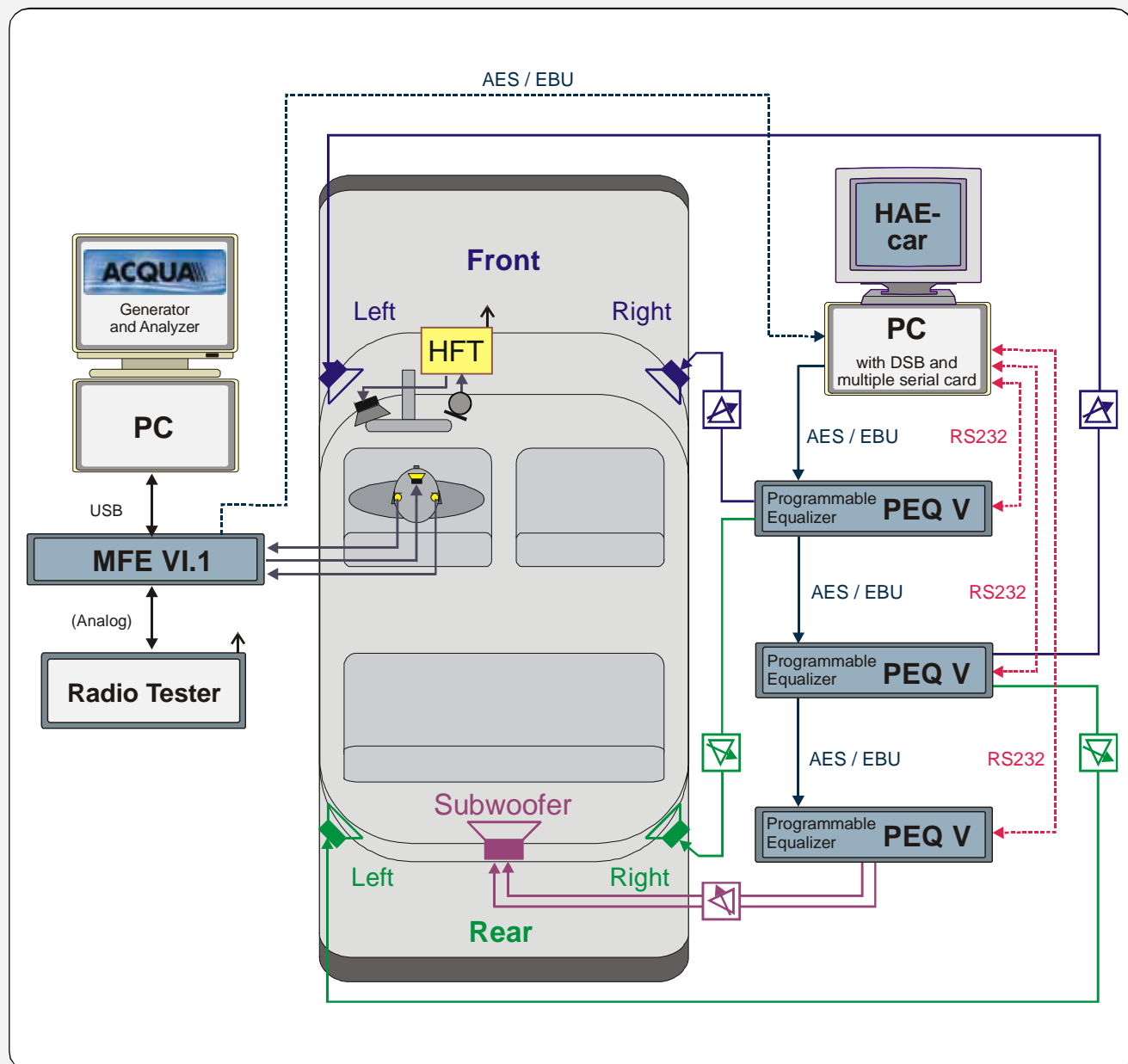
HANDS-FREE TELEPHONY (MOBILE & OFFICE TYPE)

(Available for Analog and Digital Terminals)



Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Hands-free Telephone (office or mobile type)	P.340 P.341 P.342 P.501 P.502 P.581	HQS-HFT (6764) HQS-mobile (hands-free part, 6776)	ACQUA (6810) MFE VI.1 (6462) with BEQ option MFE VII (6465) HMS II.3 (1230) or II.6 (1389) HAE-BGN (6971) 3 PEQ V (2492) 3 External Power Amplifiers 4 Loudspeakers 1 Subwoofer ISDN Simulator Radio Tester, e.g. CMU 200

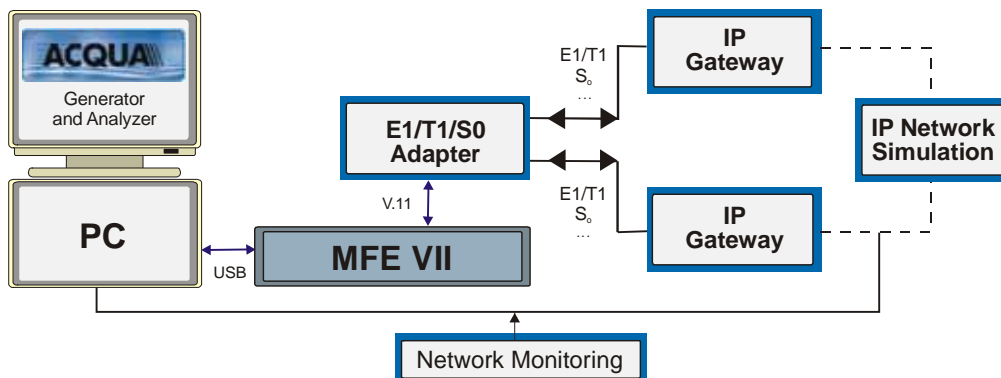
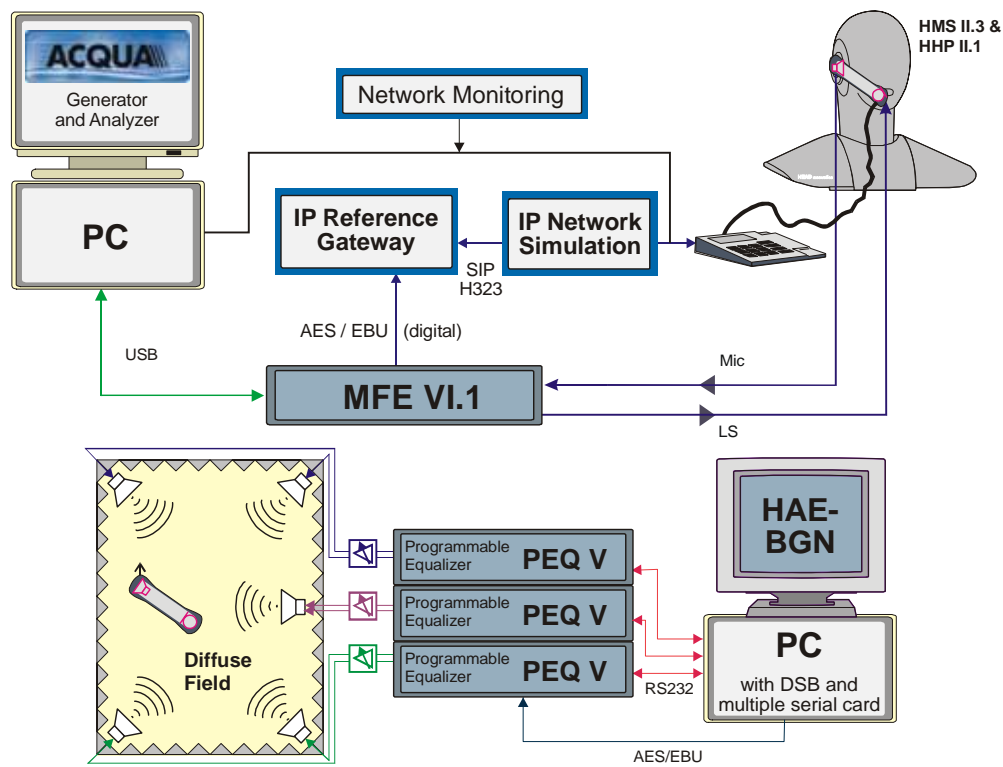
HANDS-FREE TELEPHONY (CAR)



Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Car Hands-free Terminal	P.340 P.501 P.502 P.581 VDA Specification for Car Hands-free Terminals	HQS-HFT (6764-6767) VDA-HFT (6770)	ACQUA (6810) MFE VI.1 (6462) with BEQ option HMS II.3 (1230) HIS L (1231) HAE-car (6970) 3x PEQ V (2492) 3 External Power Amplifiers 4 Loudspeakers 1 Subwoofer Radio Tester (e.g. CMU 200)

VoIP TELEPHONY

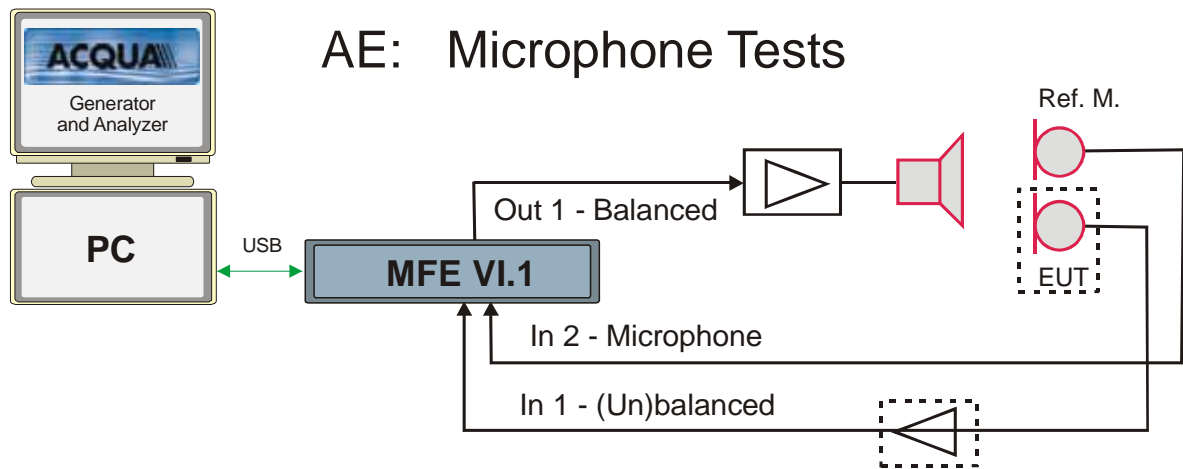
- Handset
- Hands-free
- Headset
- Gateway



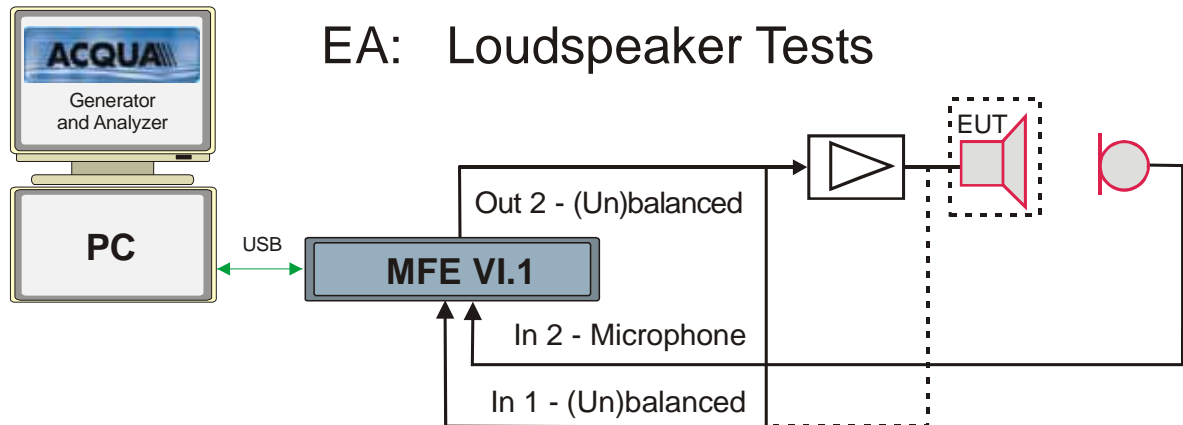
Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
IP terminals, gateways, echo cancellers, networks, DCME	TIA 810 TIA 920 G.168 P.340 EG 201 377-2 G.122 G.131	HQS-IP (6769) TIA 810 (6772) TIA 920 (6783) G.168 (6750) FZ TSEC (6751) HQS-EC (6774)	ACQUA (6810) MFE VI.1 (6462) with BEQ option MFE VII (6465) or MFE VII.1 (6467) HMS II.3 (1230) with HHP II.1 (1377) IP Reference Gateway IP Network Simulation HAE-BGN (6971) 3 PEQ V (2492) 3 External Power Amplifiers 4 Loudspeakers, 1 Subwoofer Recommended ACQUA Options: Project-oriented signal analysis (ACOPT03, 6813) TOSQA (ACOPT10, 6820) PESQ (ACOPT16, 6836) Relative Approach (ACOPT17, 6839)

ELECTROACOUSTICS IN TELEPHONE NETWORKS

AE: Microphone Tests

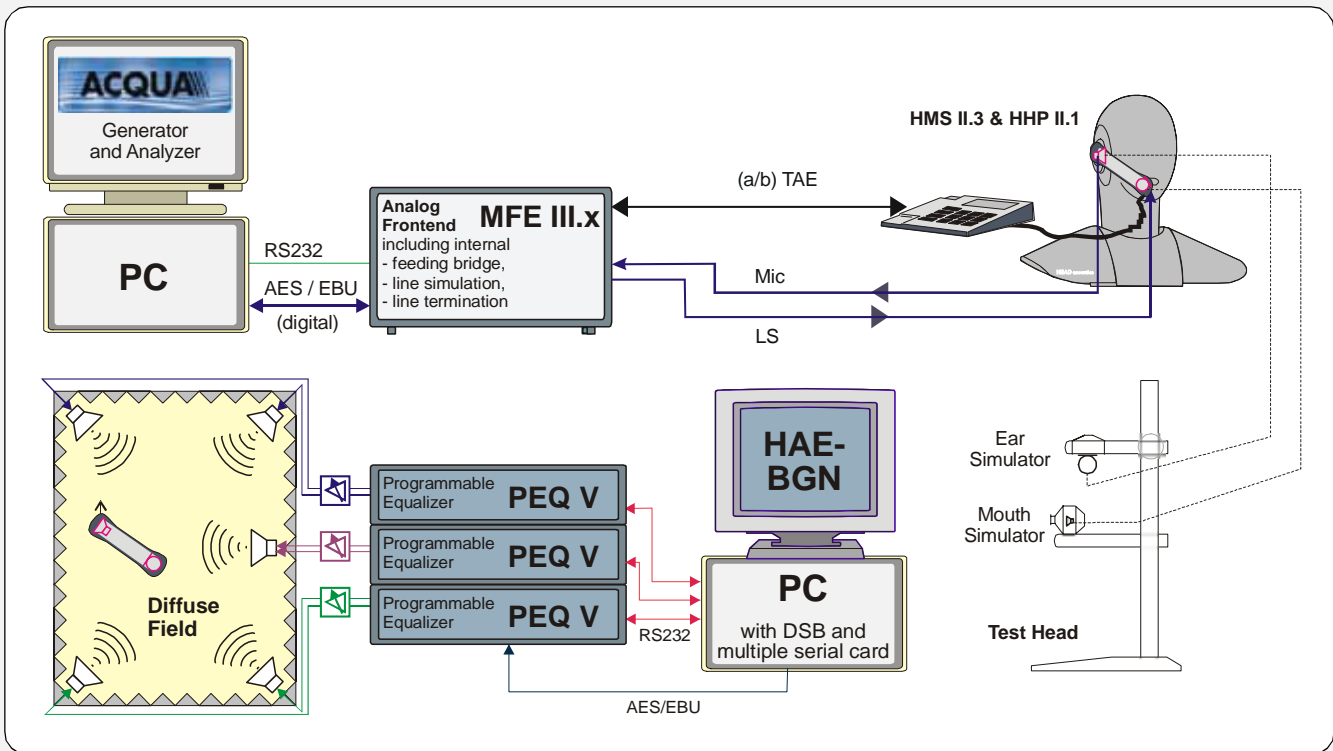


EA: Loudspeaker Tests



Equipment under Test	Relevant Standards	Available ACQUA Standard	Equipment
Loudspeaker, Microphone	SLR/RLR according to P.79 THD & Frequency Response according to DIN	HQS-EA (6773)	ACQUA EA (6835) MFE VI.1 (6462) HMS II.3 (1230) HHP II.1 (1377)

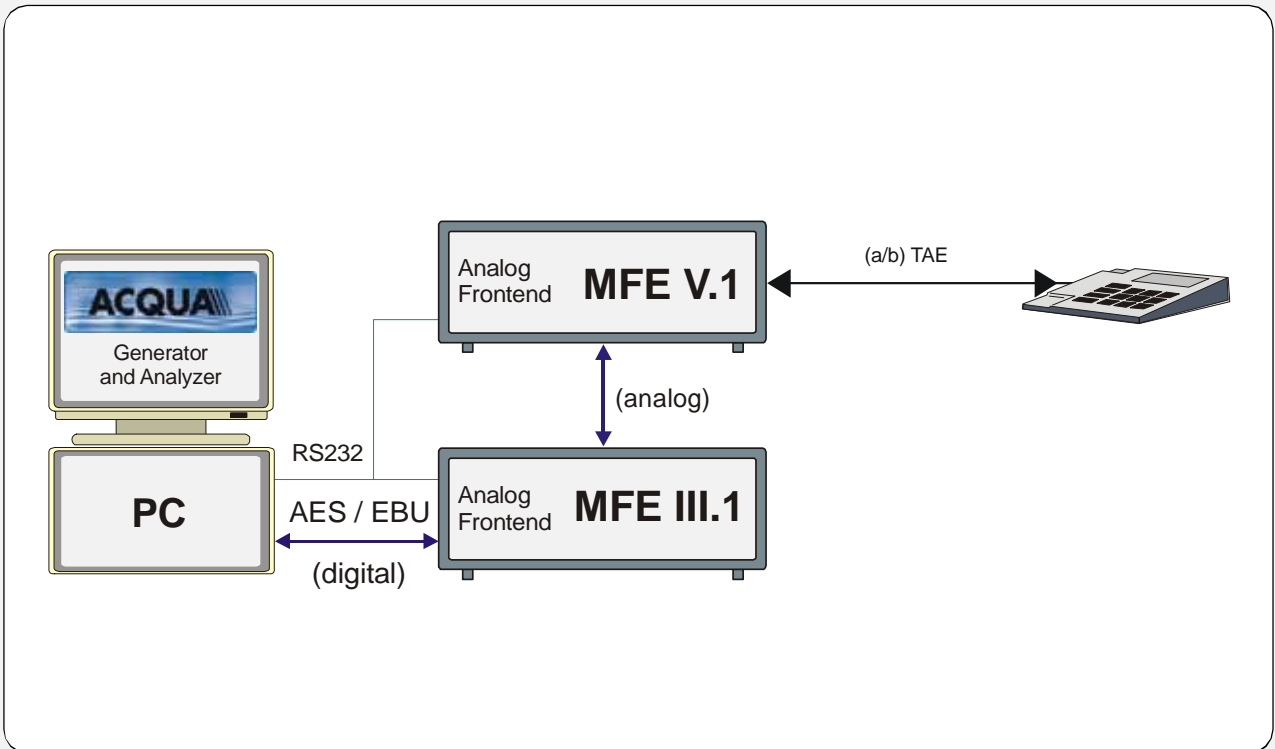
ANALOG TELEPHONY



Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Handset	ETSI - TBR 38 (Europe)	TBR38 (6741)	ACQUA (6810)
Handset	GB/T 15278-94 (China)	GBT I (6744)	MFE III.1 (6201, Version for Europe) or MFE III.2 (6202, Version for North America)
Handset	TIA EIA-470 (USA, Canada)	EIA/TIA-470 (6745)	HAE-BGN (6971) 3 PEQ V (2492) 3 External Power Amplifiers 4 Loudspeakers 1 Subwoofer

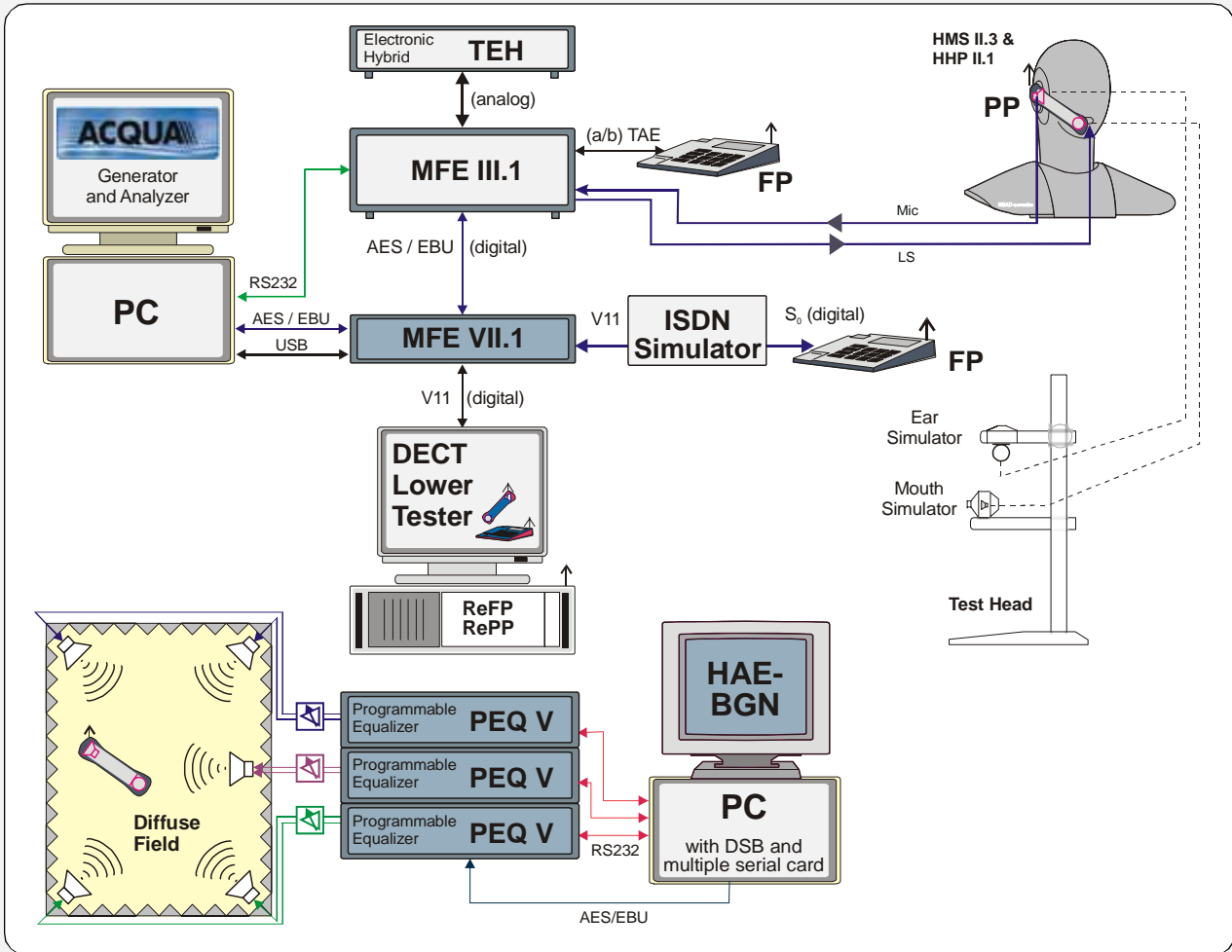
ANALOG NETWORK ACCESS

- Telephone
- FAX Machine
- Modem



Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Analog telephone	ETSI TBR 21 (Europe) I-CTR 37 EG 201 121 TS 103 021 ES 203 201 ETS 300 778-1 (CLIP)	ACOPT 14 – TBR 21 (6824) ACOPT 15 – I-CTR 37 (6825) EG 201 121 (6747) ETS 300 778-1 (CLIP) (6707)	ACQUA (6810) MFE III.1 (6201) MFE V.1 (6401)

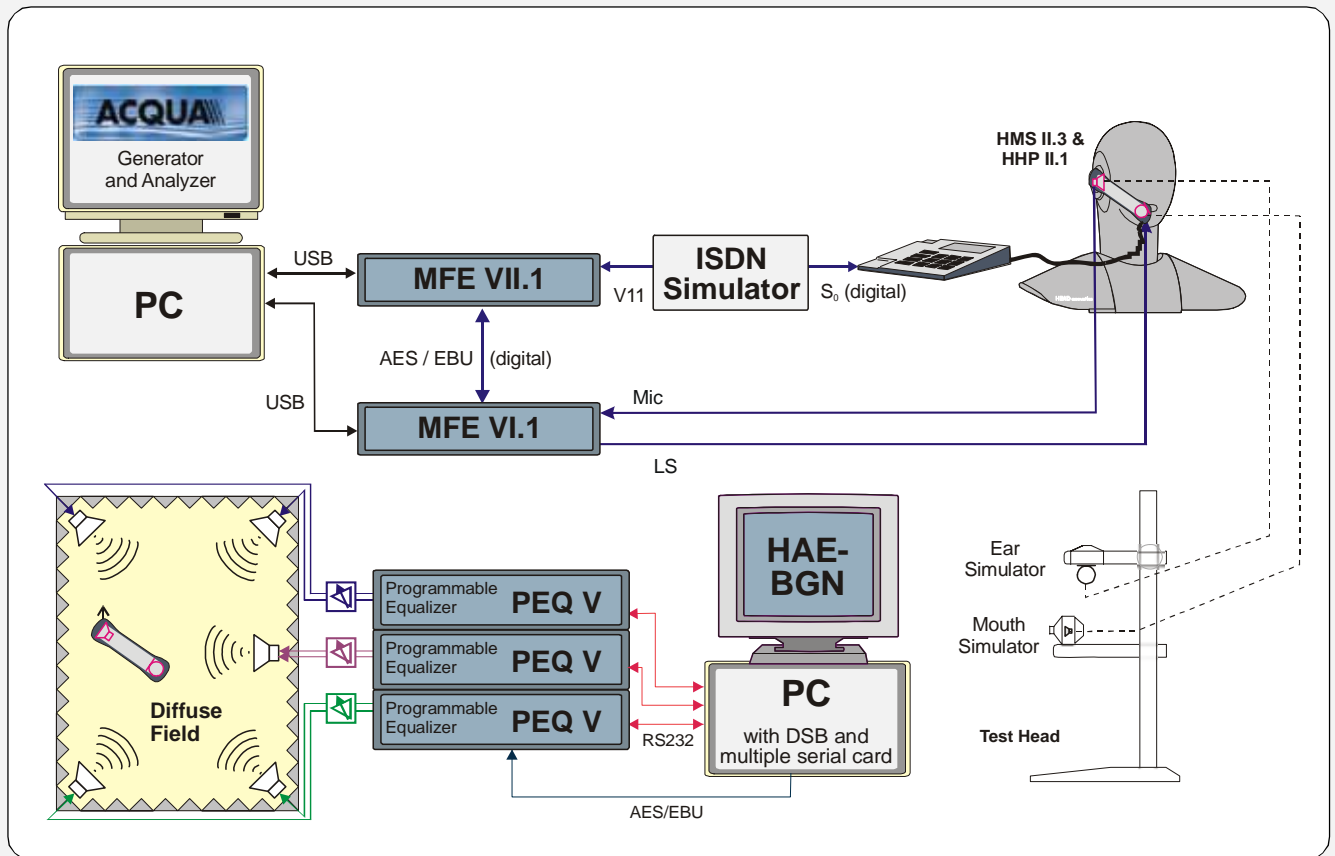
CORDLESS TELEPHONY



Equipment under Test	Relevant Standards	Available ACQUA Standard	Equipment
Cordless phones	ETSI TBR10	TBR10 (6711)	ACQUA (6810) MFE III.1 (6201) MFE VII.1 (6466) TEH I (6290) HMS II.3 (1230) HHP II.1 (1377) HAE-BGN (6971) 3 PEQ V (2492) 3 External Power Amplifiers 4 Loudspeakers 1 Subwoofer Test Head with Ear and Mouth Simulator ISDN Simulator Reference Fixed Part Reference Portable Part

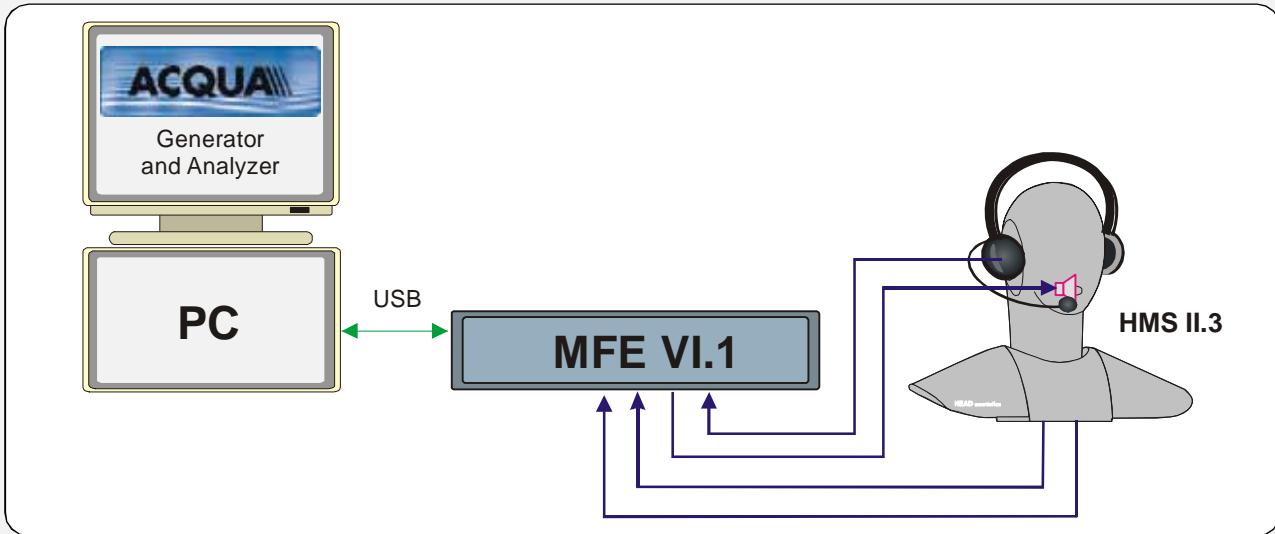
DIGITAL TELEPHONY

- Handset
- Hands-free



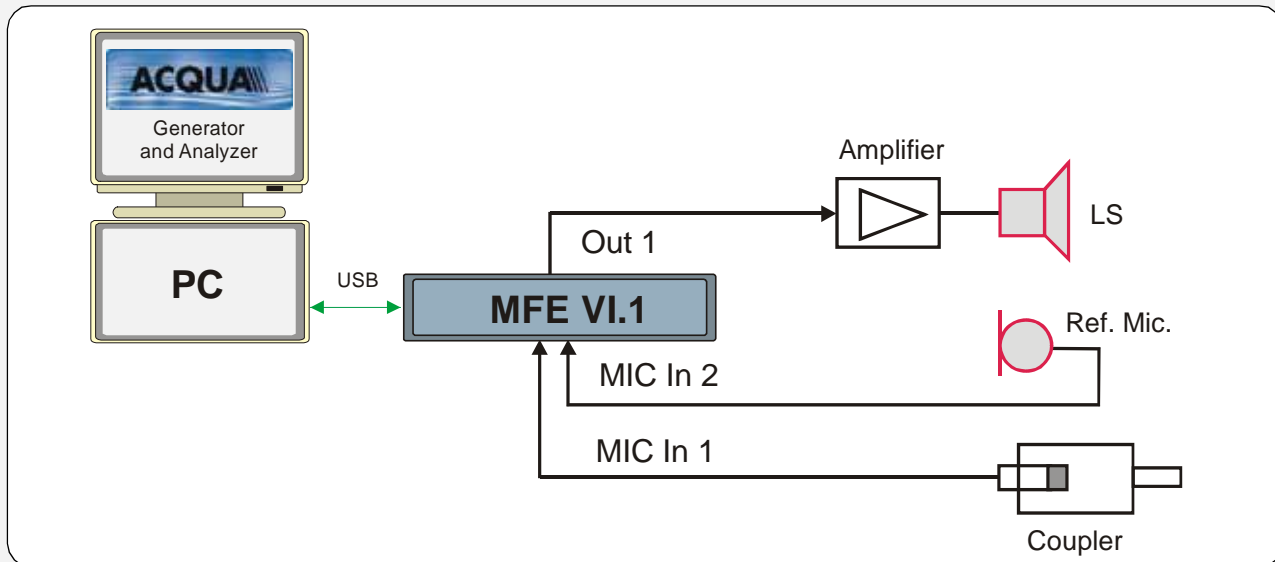
Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Handset	TBR 8 (Europe)	TBR 8 (6721)	ACQUA (6810) MFE VI.1 (6462) MFE VII.1 (6466) HMS II.3 (1230) HHP II.1 (1377)
Hands-free	ETS 300 245 part 3 (Europe)	ETS 245-3 (6712)	HAE-BGN (6971) 3x PEQ V External Power Amp. 4 Loudspeakers 1 Subwoofer ISDN Simulator

HEADSET TESTS



Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Headsets	P.360 (acoustic shock) P.380 (electroacoustics)	HQS-HSET (6780) HQS-mobile (6776) HQS-MP3 (6784)	ACQUA (6810) MFE VI.1 (6462) with BEQ option HMS II.3 (1230) HIS L (1231)

HEARING AID TESTS



Equipment under Test	Relevant Standards	Available ACQUA Standards	Equipment
Hearing Aids	N/A	HQS-HA (6775)	ACQUA (6810) MFE VI.1 (6462) HMS II.3 (1230) HEL IV/HER IV (1358/1359)