Audio Analyzer UPL16

Speech quality of GSM mobile phones improved by precise audio measurement

Once a yuppie status symbol, the mobile phone has now become an item of everyday use. Even fixed network subscriber lines are being replaced to an increasing extent by mobile phones. As a result, more speech quality is demanded of mobile phones. With its new model from Audio Analyzer family UPL, specially tailored to mobile phone testing in quality assurance and production, Rohde & Schwarz contributes to improving the acoustic quality of future mobile phone generations.

Acoustic measurement on GSM mobile phone using Audio Analyzer UPL16 and Radiocommunication Tester CMD55

Photo 43 158/1

Yesterday’s yuppie was quite content showing off his status symbol and making calls that were just about intelligible. But the speech quality of today’s mobile phone must stand comparison with that of a fixed network phone. In addition to various functional features, the acoustic quality of a mobile phone is consequently gaining in importance and has become a major sales argument on the highly competitive mobile phone market. This development shows in the standards, with GSM phase 2 not only defining improved and expanded measurement methods for the acoustic features of a mobile phone but also introducing enhanced methods of speech coding (enhanced full rate coders).

The new specifications make it necessary to extend existing and future test equipment for the type approval and production of mobile phones to include complex test procedures, for instance using artificial voice. Specially for these requirements, Rohde & Schwarz has developed a new model, UPL16, in its successful series of Audio Analyzers UPL [1]. This model includes a digital audio interface conforming to specifications GSM 11.10, section 36.4, phase 2, which allows all operating modes of the test interface to be selected for type-approval measurements. It also features enhanced analysis and generator functions enabling all audio tests to GSM 11.10-1, section 30, phase 2.

Audio Analyzer UPL16 can be integrated in GSM System Simulator TS8915 [2] for instance, replacing all previously used acoustic measuring devices. It is controlled from the system’s user interface via IEC/IEEE bus. Digital Radiocommunication Test Set CRtx establishes the link to the test mobile and provides the speech coder and decoder required for some of the tests. All other acoustic measurements are carried out by UPL16 alone and the results returned to the system. All results are also graphically output on the UPL16.
UPL16 can also be used in conjunction with a Radiocommunication Test Set CRTx and the matching software as a type-approval system for testing the acoustic features of mobile phones in production. This is because UPL16 not only permits standardized test cases to be carried out, but also fast functional tests specifically tailored to the needs of production which go towards efficient throughput and optimum production quality. An artificial mouth and ear are used in all applications as an acoustic interface in line with ITU-T recommendation P.57. Normally an artificial ear of type 1 is used; for special requirements ITU-T P.57 type 3.2 with defined leakage may be used. This type of ear will also be supported by future test case versions of UPL16.

The artificial mouth is controlled direct by UPL16, ie without the usual amplifier. A transformer for impedance matching of the artificial mouth is integrated for this purpose. The arbitrary function of UPL was enhanced for reproduction of complex signals. Arbitrary sequences of any length can now be output in the internal format as well as in the WAV format common in the PC world. Sequence length is only restricted by the RAM capacity in UPL16 (extendible to 64 Mbytes).

The combination of CMD and UPL16 (photo) is an ideal solution for testing the acoustic features of mobile phones in production. This is because UPL16 not only permits standardized test cases to be carried up at a keystroke.

Third-octave analysis is integrated as an additional measurement function. This is important for many acoustic measurements and is also used in a large variety of applications other than measurements on mobile phones. The third-octave analyzer conforms to IEC 1260, class 0 and consequently satisfies the most stringent of requirements. Peak levels with selectable decay time can be recorded for each third-octave band. This function is used in all tests with artificial voice.

A special, new generator function in UPL16 allows feedback of the measured analyzer signal to the generator output with selectable gain. The stability margin of a phone to acoustic feedback can thus be measured direct without any extra devices.

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Condensed data of Audio Analyzer UPL16
(functions additional to Audio Analyzer UPL)

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REFERENCES