PESQ Test Application

An objective audio test solution with the E5515C

Technical Overview

![E5515C](image)

*Figure 1. E5515C*

**Features**

- The unique one-box tester for mobile perceptual evaluation of speech quality (PESQ) test
- Provides simplified test procedures without an external audio analyzer
- Time-saving and cost-saving audio test solution replaces subjective method
- Used on production lines, in quality assurance (QA) stations, and R&D development
- One license, E1999A-301, covers both UMTS and cdma2000® mobile phone test
Until now, the preferred method for calculating the perceived speech quality of cellular telephones was through subjective testing. Now, using PESQ, there is an objective measurement to predict speech quality: PESQ. The PESQ measurement method was published by the International Telecommunications Union in 2001 as recommendation ITU-T P.862.

PESQ enables measurements to be made on speech signals that are transmitted at low bit rates using high compression psychoacoustic coding methods. PESQ employs an algorithm that enables these signals to be evaluated by comparing them with reference signals.

After the PESQ analysis, a score is given ranging from –0.5 to 4.5. The higher the score, the better the speech quality.

Compared to the subjective method of predicting speech quality, such as mean opinion score (MOS), PESQ saves both time and cost.

The Aglient E5515C wireless communications test set supports three modes for PESQ measurement: uplink audio, downlink audio, and simultaneous uplink and downlink. Figures 1 and 2 provide the measurement details.
Now the PESQ application can be applied to three scenarios: production line final test, mobile QA test, and R&D test of mobile phone audio.

Currently, at the production line, some operators are employed for final audio test. They usually dial a free phone number such as “112” then listen to the auto-reply voice to evaluate the phone’s audio quality. If the operator thinks the audio is good, then the phone test passes. This is a simple but very subjective method for phone audio quality evaluation. Additionally, with this approach, only the downlink audio quality can be evaluated since the operator can not listen to his own voice.

The PESQ test application used with the E5515C is a perfect solution to remove the subjectivity while ensuring the quality of the uplink because the test application can make uplink and downlink audio tests objectively. As Figure 3 illustrates, the uplink and downlink PESQ score can also be obtained at the same time.

At the R&D phase of a new model phone, audio test is very important. The audio conformance test system is expensive and it can be difficult for R&D engineer to gain time for testing. The PESQ test application with the E5515C is a good substitute. With only one feature option license, E1999A-301, you can get the PESQ measurement functionality for UMTS and CDMA phones.

The PESQ test application with the E5515C is a compact solution for phone audio quality objective test and there are many customer benefits:

**For production**
- Saves test time with ability to automatically test uplink and downlink simultaneously
- Provides consistent, objective, and accurate results
- Reduces labor costs

**For QA:**
- Ensures phone audio quality through new methods’ effectiveness
- Logs test result for analysis

**For R&D:**
- Verifies the audio quality of R&D products with use of a simple tool
Advantages of E5515C/PESQ solution

- The E5515C is the only radio tester with PESQ capability in the industry
- Only one license, E1999A-301, activates the functionality for all 2G and 3G phone testing
- Innovative audio test solution for cellular phone production, QA, and R&D
- One-box solution; no external audio generator and analyzer required

![Figure 3. PESQ measurement result with E5515C](image-url)

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