G.711 Speech Codec

Test Report

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Revision History

Version	Date	Changes
1.0	November 23, 2005	Original

Contents

1. Introduction

1.1 Motivation

The ITU G.711 converts digitized, linear PCM input signals (16 bit PCM) sampled at a 8 kHz sampling rate into 64 kbps alaw/ulaw encoded bit stream using the priciple of non-linear quantization.

This document describes the test process and result for the ITU-T G.711 codec on ARM9E series of processors.

1.2 Scope

The scope of this document covers the test criteria, testing procedure and the test results for ITU-T G.711.

1.3 Glossary

ITU	International Telecommunications Union.
PESQ	Perceptual Evaluation of Speech Quality.
MOS	Mean Object Score.
IEC	International Electro-technical Commission.

2. Test Description

2.1 Test Objective

The following tests will be carried out to test Ittiam ITU-T based G.711 codec.

- **Conformance Test:** This is to test conformance of Ittiam ITU-T based G.711 codec against a set of reference files.
- **Quality Test:** The G.711 implementation on the ARM9E has been tested with Speech and tones in addition to the test vectors for quality degradation if any.

2.2 Test Criteria

2.2.1 Conformance Test

According to the conformance testing document from ITU-T, both the encoder and the decoder have to be ***bit-exact*** with respect to some reference files provided by the ITU-T committee.

2.2.2 Quality Test

The G.711 implementation on the ARM9E has been tested with Speech and tones in addition to the test vectors. The MOS as measured by the PESQ/ITU P.862 (Perceptual Evaluation of Speech Quality) tool between the reference file and the encoded / decoded file will be tabulated for few hand-picked test cases.

3. Test Results

3.1 Results

3.1.1 Conformance Test

Following table summarizes the conformance test results for Ittiam ITU-T based G.711 Codec.

G.711	Input File	Reference Outp	Conversion type	Test Result
Encoder	input_alaw.pcm	alaw.bit	alaw (0)	Bit Compliant
Encoder	input_ulaw.pcm	ulaw.bit	ulaw (1)	Bit Compliant
Decoder	alaw.bit	output_alaw.pcm	alaw (0)	Bit Compliant
Decoder	ulaw.bit	output_ulaw.pcm	ulaw (1)	Bit Compliant

3.1.2 Quality Test

Following table summarizes the robustness test results for Ittiam ITU-T based G.711 Codec.

Input Type	Input File	PESQ MOS
Speech	Female2.wav (a_law)	4.279
Speech	Female2.wav (u_law)	4.314
Speech	Speech2.wav (a_law)	4.464
Speech	Speech2.wav (u_law)	4.463
Tone (DTMF)	DTMFSignals.wav (a_law)	3.014
Tone (DTMF)	DTMFSignals.wav (u_law)	3.011

3.1.3 Interruptebility Test

Ittiam ITU-T G.711 based codec was successfully tested for interrupts upto 192ns for ***bit-exactness***.

4. Conclusion

The results in section 3.3.1 show that Ittiam ITU-T G.711 based codec implementation is fully compliant to ITU-T specifications. The quality test results ensure that the encoding – decoding process in not degrading the quality for any arbitrary input including tones and speech.