

# Speech-Degradations Manual

## Summary

This document gives an overview over the degradation's aka distortions that can be applied to create one test Condition and on the syntax how they are specified to be specified. There are in total 13 degradation/distortions that can be applied, distortions can have additional parameters, there are 19 additional parameters. A distortion will be applied if in the cell of the corresponding degradation column is marked with an x and if the cells of the additional parameter columns have valid values.

## Degradation / Distortions

### (filter) Filter

Explanation: Defines frequency filters that are allied to the signals, either no (see filter inactive), or if active of the highpass, lowpass or bandpass variety.

**Distortion Column Header:** 'filter'

filter active Cell Values: either 'highpass', 'lowpass', 'bandpass'

filter inactive Cell Value: '-'

**First Parameter Column Header:** 'pb\_high'

#Only set if filter\_cellValue is **lowpass** or **bandpass**

pb\_high set cell Value: 0 - 20000 # pb\_high has to be bigger than pb\_low cellvalue)

pb\_high no set cellValue: 'NaN'

**Second Parameter Column Header:** 'pb\_low'

#Only set if filter\_cellValue is **high pass** or **bandpass**

pb\_low set cell value: 0 - 20000 # pb\_low has to be smaller than pb\_high cell value

pb\_low not set cell value: 'NaN'

## (arb\_filter) Arbitrary Filter

Explanation: If set applies an arbitrary frequency filter, Boolean either on or off

Distortion Column Header: 'arb\_filter'

arb\_filter active Cell Value: 'x'

arb\_filter inactive Cell Value: '-'

## (timeclipping) Time Clipping

If allied, parts of the Signal are cut (clipped) which results in a discontinuous stuttering signal, intensity and duration can be adjusted with frame error rate and max number of cut frames.

Distortion Column Header: 'timeclipping'

timeclipping active Cell Value: 'x'

timeclipping inactive Cell Value: '-'

First Parameter Column Header: 'tc\_fer'

#Frame error rate in %

tc\_fer Cell Value: 0 – 100 | should be bigger than 0

tc\_fer not set value: NaN

Second Parameter Column Header: tc\_nburst

#maximal number of consecutive lost frames

tc\_nburst set Cell Value: *Number*

tc\_burst not Set value: 'NaN'

## White Background Noise (wbgn)

If set, white background noise is applied to the signal according to a signal to noise ration in dB that has to be provided.

Distortion Column Header: 'wbgn'

timeclipping active cell Value: 'x'

timeclipping inactive cell value: '-'

First Parameter Column Header: 'wbgn\_snr'

# Signal to Noise Rate in dB (Required)

wbgn\_snr set Cell Value: *Number*

wbgn\_snr not set Cell Value: 'NaN'

## Modulated Reference Unit Noise (p50mnru)

If set, MNRU noise is applied according to the ratio, in dB, of speech power to modulated noise power.

Distortion Column Header: 'p50mnru'

p50mnru active cell value: 'x'

p50mnru inactive cell value: '-'

First Parameter Column Header: 'p50\_q'

#Ratio of Speech Power to modulated noise power in dB

p50\_q set cell Value: *Number*

p50\_q not set cell value: 'NaN'

## Active Noise Level of speech input (asl\_in)

Active speech level is set before applying any degradation, if 'no' asl level will be unchanged, if anything else level will be set to -26dbo

Distortion Column Header: 'asl\_in:'

asl\_in active cell Value: 'x'

asl\_in inactive cell Value: '-'

First Parameter Column Header: 'asl\_in\_level'

asl\_in\_level set: *Number*

asl\_in\_level not set: 'NaN'

## Active Speech Level of degraded output (asl\_out)

The active speech level set after all degradations have been applied in dBo

Degradation Column Header: 'asl\_out'

asl\_out active cell value: 'x'

asl\_out inactive cell value: '-'

First Parameter Column Header: 'asl\_out\_level'

asl\_out\_level set cell value: *Number*

asl\_out\_level not set: 'NaN'

## Clipping (clipping)

If set clipping is applied to values if there are beyond a provided threshold

Degradation Column Header: 'clipping'

clipping active cell value: 'x'

clipping inactive cell value: '-'

First Parameter Column Header: 'cl\_th'

cl\_th is set: *Number* #Range between 0 and 1 |  $0 < \text{Number} < 1$

cl\_th not set: 'NaN'

## Background Noise From File (bgn)

If set and no additional parameters are set a random noise out of the noise folder is applied with a given SNR, otherwise if filename of background noise in noise folder is given then it is applied with a given SNR.

Degradation Column Header: 'bgn'

bgn active cell value: 'x'

bgn inactive cell value: '-'

First Parameter Column Header: 'bgn\_file'

bgn\_file set cell value: *Text* #Filename of the noise file in

bgn\_file not set cell value: '-'

Second Parameter Column Header:

bgn\_snr set: *Number*

bgn not set: 'NaN'

## Speech Codecs (codec1, codec2, codec3)

The degradation toll can apply up to three speech codecs in sequence, they have their own parameters but share the same settings pool.

Degradation Column Header: 'codec1'

codec1 active cell values: 'amrnb', 'amrwb', 'evs', 'opus', 'g711', 'g722' #name of the codec

cocec1 inactive cell values: 'skip'

First Parameter Column Header: 'bMode1'

# Each Codec has its specific set of valid values bMode1 can have

bMode1 active values for codec1 is **amrnb**: Integer 1- 8

bMode Value	Explanation, true bit-rate
1	AMR 4.75 kbit/sec
2	AMR 5.15 kbit/sec
3	AMR 5.90 kbit/sec
4	AMR 6.70 kbit/sec
5	AMR 7.40 kbit/sec
6	AMR 7.95 kbit/sec
7	AMR 10.2 kbit/sec
8	AMR 12.2 kbit/sec

bMode1 values for codec1 is **amrwb**: Integer 1-9

bMode Value	Explanation
1	AMR-WB 6.60 kbit/sec
2	AMR-WB 8.85 kbit/sec
3	AMR-WB 12.65 kbit/sec
4	AMR-WB 14.25 kbit/sec

5	AMR-WB 15.85 kbit/sec
6	AMR-WB 18.25 kbit/sec
7	AMR-WB 19.85 kbit/sec
8	AMR-WB 23.05 kbit/sec

bMode1 cell values if codec is **evs**: *Integer between 1-12*

BMode Value	Explanation, true bit-rate
1	5.9 kbit/sec
2	7.2 kbit/sec
3	8.0 kbit/sec
4	9.6 kbit/sec
5	13.2 kbit/sec
6	16.4 kbit/sec
7	24.4 kbit/sec
8	32.0 kbit/sec
9	48.0 kbit/sec
10	64.0 kbit/sec
11	128.0 kbit/sec
12	128.0 kbit/sec

bMode1 cell values if codec is **opus**: *Number (float) between 6-256 # bitrate in kbit/s*

bMode1 cell values if codec is **g722**: *Integer between 1-3*

bMode1 cell values if codec is **g711**: 1

bMode1 not set cell value: 'NaN'

Second Parameter column header: 'plcMode1'

plcMode1 set cell values: 'random' or 'bursty' or 'noloss' #noloss is default

plcMode1 not set cell values: '-'

Third Parameter column header: 'FER1'

Frame error rate as rate not percent, default 0

FER1 set cell values: Float 0 - 1 # example 0.02 would equal 2% frame error rate  
FER1 not set cell values: 'NaN'

## Second Speech Codec

Degradation Column Header: 'codec2'

codec2 active cell values: same as "codec1 active cell values"

codec2 inactive cell value: 'skip'

First Parameter Column Header 'bMode2'

# bitmode of the second codec, if used cell values are the same as defined in bMode1

Second Parameter Column Header: 'plcMode2'

plcMode2 set cell values: same as plcMode1 se set cell values

plcMode2 not set cell value: '-'

Third Parameter Column Header 'FER2'

FER2 set cell values: same as 'FER1'

FER2 not set cell value: '-'

## Third Speech Codec

Degradation Column Header: 'codec3'

codec3 active cell values: same as codec1 active cell values

First Parameter Column Header: 'bMode2'

#bitmode of the second codec (if used) cell values are the same as defined in bMode1

Second Parameter Column Header: 'plcMode3'

plcMode3 set cell value same as plcMode1 set cell values

Third Parameter Column Header: 'FER3'

FER3 set cell values same as FER1 cell Values

FER3 not set cell value same as FER1 not set cell values