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AMENDMENT 9
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Information technology — Coding of audio-visual objects

Part 3: **Audio**

AMENDMENT 9: Enhanced low delay AAC

Technologies de l'information — Codage des objets audiovisuels

Partie 3: Codage audio

AMENDEMENT 9: Retard faible amélioré AAC

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Amendment 9 to ISO/IEC 14496-3:2005 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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Information technology — Coding of audio-visual objects

Part 3:
Audio

AMENDMENT 9: Enhanced low delay AAC

In the following, changes in existing text and tables are highlighted by grey background.

In 1.5.1.1, extend Table 1.1 with the following entries:

Table 1.1 — Audio Object Type definition based on Tools/Modules

Object Type ID	Audio Object Type	gain control	block switching	window shapes - standard	window shapes – AAC LD	Low Delay Window	filterbank - standard	filterbank - SSR	TNS	LTP	intensity	coupling	frequency deomain prediction	PNS	MS	SIAQ	FSS	upsampling filter tool	quantisation&coding - AAC	quantisation&coding – TwinVQ	quantisation&coding - BSAC	AAC ER Tools	ER payload syntax	EP Tool 1)	CELP	Silence Compression	HVXC	HVXC 4kbit/s VR	SA tools	SASBF	MIDI	HILN	TTSI	SBR	Layer-1	Layer-2	Layer-3	SSC (Transient, Sinusoid, Noise)	Parametric stereo	Low Delay SBR	Remark
	…																																								
39	ER AAC ELD					X	X		X		X			X	X				X			X	X	X																X	
40-95	(reserv-ed)																																								

Before 1.5.2, add 1.5.1.2.37:

1.5.1.2.37 Error Resilient (ER) AAC ELD object type

The enhanced low delay AAC object type (ER AAC ELD) is identical to the ER AAC LD object type, plus the utilization of a Low Delay Filterbank (LDFB) and an enhanced low delay window. It also permits combinations with the PNS tool as well as the Low Delay SBR tool. The ER AAC ELD object type provides the ability to extend the usage of generic low bitrate audio coding to applications requiring a very low delay of the encoding / decoding chain (e.g. full-duplex real-time communications)."

In 1.5.2.4, insert the following new entries for the Baseline MPEG Surround Profile into Table 1.12 audioProfileLevelIndication and adapt the "reserved for ISO use" range accordingly (changes are highlighted in gray):

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Value	Profile	Level
…	…	…
0x33	High Efficiency AAC v2 Profile	L5
0x34	Low Delay AAC Profile	L1
0x35	Baseline MPEG Surround Profile (see ISO/IEC 23003-1)	L1
0x36	Baseline MPEG Surround Profile (see ISO/IEC 23003-1)	L2
0x37	Baseline MPEG Surround Profile (see ISO/IEC 23003-1)	L3
0x38	Baseline MPEG Surround Profile (see ISO/IEC 23003-1)	L4
0x39	Baseline MPEG Surround Profile (see ISO/IEC 23003-1)	L5
0x3A	Baseline MPEG Surround Profile (see ISO/IEC 23003-1)	L6
0x3B - 0x7F	reserved for ISO use	-
0x80 - 0xFD	user private	-
0xFE	no audio profile specified	-
0xFF	no audio capability required	-
NOTE — Usage of the value 0xFE indicates that the content described by this InitialObjectDescriptor does not comply to any audio profile specified in ISO/IEC 14496-3. Usage of the value 0xFF indicates that none of the audio profile capabilities are required for this content.		

In 1.6.2.1, extend Table 1.13 "AudioSpecificConfig()" as follows:

Table 1.13 — Syntax of AudioSpecificConfig()

Syntax	No. of bits	Mnemonic
AudioSpecificConfig ()		
{		
audioObjectType = GetAudioObjectType();		
samplingFrequencyIndex;	**4**	**bslbf**
if (samplingFrequencyIndex == 0xf) {		
samplingFrequency;	**24**	**uimsbf**
}		
channelConfiguration;	**4**	**bslbf**
sbrPresentFlag = -1;		
psPresentFlag = -1;		
if (audioObjectType == 5 ||		
audioObjectType == 29) {		
extensionAudioObjectType = audioObjectType;		
sbrPresentFlag = 1;		
if (audioObjectType == 29) {		
psPresentFlag = 1;		
}		
extensionSamplingFrequencyIndex;	**4**	**uimsbf**
if (extensionSamplingFrequencyIndex == 0xf)		
extensionSamplingFrequency;	**24**	**uimsbf**
audioObjectType = GetAudioObjectType();		
}		
else {		
extensionAudioObjectType = 0;		
}		
switch (audioObjectType) {		

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```
    case 1:
    case 2:
    case 3:
    case 4:
    case 6:
    case 7:
    case 17:
    case 19:
    case 20:
    case 21:
    case 22:
    case 23:
        GASpecificConfig();
        break:
    case 8:
        CelpSpecificConfig();
        break;
    case 9:
        HvxcSpecificConfig();
        break:
    case 12:
        TTSSpecificConfig();
        break;
    case 13:
    case 14:
    case 15:
    case 16:
        StructuredAudioSpecificConfig();
        break;
    case 24:
        ErrorResilientCelpSpecificConfig();
        break;
    case 25:
        ErrorResilientHvxcSpecificConfig();
        break;
    case 26:
    case 27:
        ParametricSpecificConfig();
        break;
    case 28:
        SSCSpecificConfig();
        break;
    case 32:
    case 33:
    case 34:
        MPEG_1_2_SpecificConfig();
        break;
    case 35:
        DSTSpecificConfig();
        break;
    case 36:
        fillBits;                                   5          bslbf
        ALSSpecificConfig();
        break;
    case 37:
    case 38:
        SLSSpecificConfig();
        break;
    case 39:
```

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```
            ELDSpecificConfig(channelConfiguration);
            break;
        default:
            /* reserved */
        }
        switch (audioObjectType) {
        case 17:
        case 19:
        case 20:
        case 21:
        case 22:
        case 23:
        case 24:
        case 25:
        case 26:
        case 27:
        case 39:
            epConfig;                                          2        bslbf
            if ( epConfig == 2 || epConfig == 3 ) {
                ErrorProtectionSpecificConfig();
            }
            if ( epConfig == 3 )
                directMapping;                                 1        bslbf
                if ( ! directMapping ) {
                    /* tbd */
                }
            }
        }
        if ( extensionAudioObjectType != 5 && bits_to_decode() >= 16 ) {
            syncExtensionType;                                 11       bslbf
            if (syncExtensionType == 0x2b7) {
                extensionAudioObjectType = GetAudioObjectType();
                if ( extensionAudioObjectType == 5 ) {
                    sbrPresentFlag;                            1        uimsbf
                    if (sbrPresentFlag == 1) {
                        extensionSamplingFrequencyIndex;       4        uimsbf
                        if ( extensionSamplingFrequencyIndex == 0xf ) {
                            extensionSamplingFrequency;        24       uimsbf
                        }
                    if ( bits_to_decode() >= 12 ) {
                        syncExtensionType;                     11       bslbf
                        if (syncExtensionType == 0x548) {
                            psPresentFlag;                     1        uimsbf
                        }
                    }
                }
            }
        }
    }
}
```


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In 1.6.2.2.1, extend Table 1.15 "Audio Object Types" as follows:

Table 1.15 — Audio Object Types

Object Type ID	Audio Object Type	definition of elementary stream payloads and detailed syntax	Mapping of audio payloads to access units and elementary streams
…	…	…	…
39	ER AAC ELD	ISO/IEC 14496-3 subpart 4	see subclause 1.6.2.2.2.4

Add 1.6.2.2.4 with the title "ER AAC ELD":

1.6.2.2.2.4 ER AAC ELD

The top level payload for ER AAC ELD is defined in er_raw_data_block_eld(). All definitions mentioned in subclause 1.6.2.2.2.3 are also valid for this AOT.

At the end of 1.6.5.1, add a sentence:

"NOTE: None of these signaling methods described in this subclause is allowed for AAC ELD in order to signal the low delay sbr tool. For this case the ldSbrPresentFlag in the ELDSpecificConfig is to be used"

Before 4.5, insert Tables AMD9.2 to AMD9.8:

Table AMD9.2 — Syntax of top level payload for audio object types ER AAC ELD (er_raw_data_block_eld())

Syntax	No. of bits	Mnemonic
er_raw_data_block_eld(channelConfiguration)		
{		
switch(channelConfiguration) {		
case 1:		
single_channel_element_eld();		
break;		
case 2:		
channel_pair_element_eld ();		
break;		
case 3:		
single_channel_element_eld ();		
channel_pair_element_eld ();		
break;		
case 4:		
single_channel_element_eld ();		
channel_pair_element_eld ();		
single_channel_element_eld ();		
break;		

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```
        case 5:
            single_channel_element_eld ();
            channel_pair_element_eld ();
            channel_pair_element_eld ();
            break;
        case 6:
            single_channel_element_eld ();
            channel_pair_element_eld ();
            channel_pair_element_eld ();
            lfe_channel_element_eld ();
            break;
        case 7:
            single_channel_element_eld ();
            channel_pair_element_eld ();
            channel_pair_element_eld ();
            channel_pair_element_eld ();
            lfe_channel_element_eld ();
            break;
        default:
            /* reserved */
            break;
    }
    if (ldSbrPresentFlag) {
        er_low_delay_sbr_block(channelConfiguration);
    }
    cnt = bits_to_decode() / 8;
    while ( cnt >= 1 ) {
        cnt -= extension_payload(cnt);
    }
    byte_alignment();
}
```

Table AMD9.3 — Syntax of single_channel_element_eld()

Syntax	No. of bits	Mnemonic

single_channel_element_eld()
{
  individual_channel_stream_eld (0);
}		

Table AMD9.4 — Syntax of lfe_channel_element_eld()

Syntax	No. of bits	Mnemonic

lfe_channel_element_eld()
{
  individual_channel_stream_eld (0);
}		

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Table AMD9.5 — Syntax of channel_pair_element_eld()

Syntax	No. of bits	Mnemonic
channel_pair_element_eld()		
{		
common_window = 1;		
max_sfb;	**6**	**uimsbf**
ms_mask_present;	**2**	**uimsbf**
if (ms_mask_present == 1) {		
for (sfb = 0; sfb < max_sfb; sfb++) {		
ms_used[0][sfb**];**	**1**	**uimsbf**
}		
}		
individual_channel_stream_eld (common_window);		
individual_channel_stream_eld (common_window);		
}		

Table AMD9.6 — Syntax of individual_channel_stream_eld()

Syntax	No. of bits	Mnemonic
individual_channel_stream_eld (common_window)		
{		
global_gain;	**8**	**uimsbf**
if (! common_window) {		
max_sfb;	**6**	**uimsbf**
}		
section_data ();		
scale_factor_data ();		
tns_data_present;	**1**	**uimsbf**
if (tns_data_present) {		
tns_data ();		
}		
if (! aacSpectralDataResilienceFlag) {		
spectral_data ();		
}		
else {		
length_of_reordered_spectral_data;	**14**	**uimsbf**
length_of_longest_codeword;	**6**	**uimsbf**
reordered_spectral_data ();		
}		
}		

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Table AMD9.7 — Syntax of er_low_delay_sbr_block

Syntax	No. of bits	Mnemonic
er_low_delay_sbr_block(channelConfiguration)		
{		
switch (channelConfiguration) {		
case 1:		
low_delay_sbr_data(ID_SCE, ldSbrCrcFlag, bs_amp_res);		
break;		
case 2:		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
break;		
case 3:		
low_delay_sbr_data(ID_SCE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
break;		
case 4:		
low_delay_sbr_data(ID_SCE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_SCE, ldSbrCrcFlag, bs_amp_res);		
break;		
case 5:		
low_delay_sbr_data(ID_SCE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
break;		
case 6:		
low_delay_sbr_data(ID_SCE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
break;		
case 7:		
low_delay_sbr_data(ID_SCE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
low_delay_sbr_data(ID_CPE, ldSbrCrcFlag, bs_amp_res);		
break;		
default:		
/* reserved */		
break;		
}		
}		

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Table AMD9.8 — Syntax of low_delay_sbr_data()

Syntax	No. of bits	Mnemonic

low_delay_sbr_data(id_aac, ldSbrCrcFlag, bs_amp_res)
{
if (ldSbrCrcFlag) {
bs_sbr_crc_bits;
}
 	
if (**bs_header_flag**) {
sbr_header();
}
 	
If (id_aac==ID_SCE) {
sbr_single_channel_element(bs_amp_res);
} else if (id_aac==ID_CPE) {
sbr_channel_pair_element(bs_amp_res);
}
}
 	
Note 1: bs_amp_res is in general transmitted inside sbr_header() function enclosed in the ELDSpecificConfig(). But the parameter can be updated by the sbr_header() function here.
	10
	
	1
		uimsbf

Extend Table 4.142 as followings:

Table 4.142 — AAC error sensitivity category assignment for extended payload and low delay sbr payload

extension_payload	low delay sbr payload	data_element	Function
6	-	drc_band_top	dynamic_range_info()
6	-	drc_bands_incr	dynamic_range_info()
6	-	drc_bands_present	dynamic_range_info()
6	-	drc_bands_reserved_bits	dynamic_range_info()
6	-	drc_tag_reserved_bits	dynamic_range_info()
6	-	dyn_rng_ct	dynamic_range_info()
6	-	dyn_rng_sgn	dynamic_range_info()
6	-	excluded_chns_present	dynamic_range_info()
6	-	pce_instance_tag	dynamic_range_info()
6	-	pce_tag_present	dynamic_range_info()
6	-	prog_ref_level	dynamic_range_info()
6	-	prog_ref_level_present	dynamic_range_info()
6	-	prog_ref_level_reserved_bits	dynamic_range_info()
6	-	additional_excluded_chns	excluded_channels()
6	-	exclude_mask	excluded_channels()
5	-	extension_type	Extension_payload()
5	-	data_element_version	Extension_payload()
7	-	fill_byte	Extension_payload()
7	-	fill_nibble	Extension_payload()
7	-	other_bits	Extension_payload()
8	-	dataElementLengthPart	Extension_payload()
8	-	data_element_byte	extension_payload()

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9	-	bs_sbr_crc_bits	sbr_extension_data()
9	-	bs_header_flag	sbr_extension_data()
9	-	bs_fill_bits	sbr_extension_data()
9	9	bs_amp_res	sbr_header()
9	9	bs_start_freq	sbr_header()
9	9	bs_stop_freq	sbr_header()
9	9	bs_xover_band	sbr_header()
9	9	bs_reserved	sbr_header()
9	9	bs_header_extra_1	sbr_header()
9	9	bs_header_extra_2	sbr_header()
9	9	bs_freq_scale	sbr_header()
9	9	bs_alter_scale	sbr_header()
9	9	bs_noise_bands	sbr_header()
9	9	bs_limiter_bands	sbr_header()
9	9	bs_limiter_gains	sbr_header()
9	9	bs_interpol_freq	sbr_header()
9	9	bs_smoothing_mode	sbr_header()
9	9	bs_data_extra	sbr_single_channel_element()
9	9	bs_reserved	sbr_single_channel_element()
9	10	bs_add_harmonic_flag	sbr_single_channel_element()
9	10	bs_extended_data	sbr_single_channel_element()
9	10	bs_extension_size	sbr_single_channel_element()
9	10	bs_esc_count	sbr_single_channel_element()
9	10	bs_extension_id	sbr_single_channel_element()
9	9	bs_data_extra	sbr_channel_pair_element()
9	9	bs_reserved	sbr_channel_pair_element()
9	9	bs_coupling	sbr_channel_pair_element()
9	10	bs_add_harmonic_flag	sbr_channel_pair_element()
9	10	bs_extended_data	sbr_channel_pair_element()
9	10	bs_extension_size	sbr_channel_pair_element()
9	10	bs_esc_count	sbr_channel_pair_element()
9	10	bs_extension_id	sbr_channel_pair_element()
9	-	bs_frame_class	sbr_grid()
9	-	tmp	sbr_grid()
9	-	bs_freq_res	sbr_grid()
9	-	bs_pointer	sbr_grid()
9	-	bs_var_bord_0	sbr_grid()
9	-	bs_var_bord_1	sbr_grid()
9	-	bs_num_rel_0	sbr_grid()
9	-	bs_num_rel_1	sbr_grid()
9	9	bs_df_env	sbr_dtdf()
9	9	bs_df_noise	sbr_dtdf()
9	10	bs_invf_mode	sbr_invf()
9	10	bs_env_start_value_balance	sbr_envelope()
9	10	bs_env_start_value_level	sbr_envelope()
9	10	bs_codeword	sbr_envelope()
9	10	bs_noise_start_value_balance	sbr_noise()
9	10	bs_noise_start_value_level	sbr_noise()
9	10	bs_codeword	sbr_noise()
9	10	bs_add_harmonic	sbr_sinusoidal_coding()
-	9	bs_frame_class	sbr_ld_grid()
-	9	tmp	sbr_ld_grid()
-	9	bs_freq_res	sbr_ld_grid()
-	9	bs_transient_position	sbr_ld_grid()
-	9	bs_sbr_crc_bits	low_delay_sbr_data()
-	9	bs_header_flag	low_delay_sbr_data()

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At the end of 4.5.5, add the following new Figure:

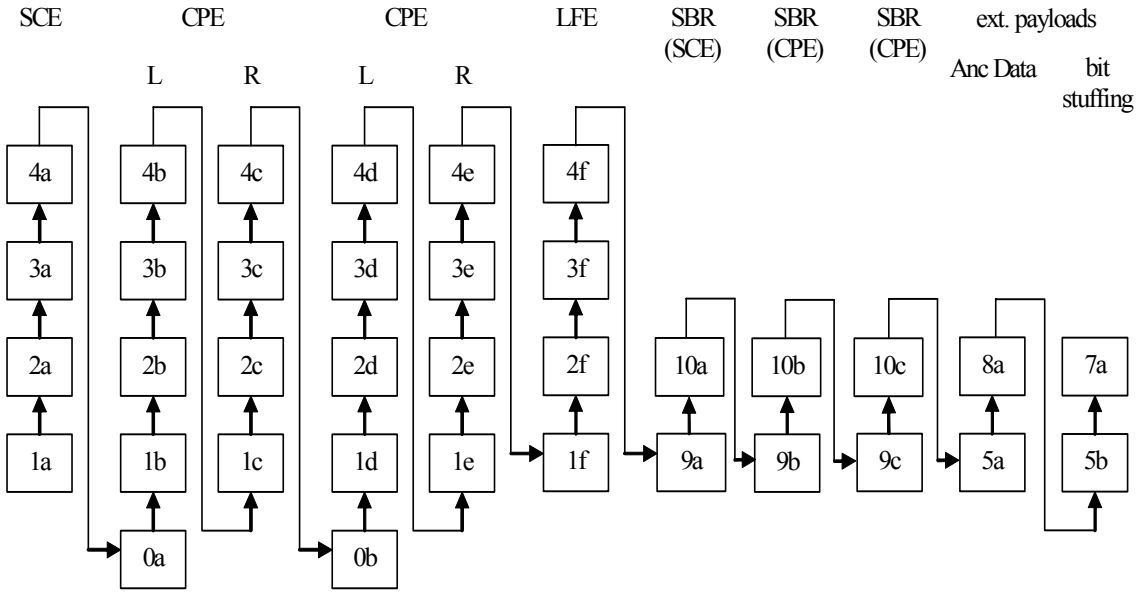


Figure AMD9.1 — Dependency structure in case of ER multichannel AAC ELD syntax (channelConfigurati == 6)

After 4.6.18, add a new subclause with the title "Low Delay SBR":

4.6.19 Low Delay SBR

4.6.19.1 Introduction

Low Delay SBR is derived from the standard SBR tool in order to be utilized as a bandwidth extension coder in communication scenarios. Thus, the algorithmic delay of this tool is minimized to achieve an overall delay low enough for bi-directional communication applications.

Summary of modifications:

- Frame length adopted to a core codec with 512 or 480 samples per frame
- Frame-locked time/frequency grid
- Minimization of delay in QMF buffer
- Utilizing a Complex Low Delay Filterbank

The low delay SBR tool is defined by the following modifications with respect to the standard algorithm (i.e. SBR audio object type). All clauses/subclauses can be found in the brackets after each headline.

4.6.19.2 Definitions, Constants and Variables

4.6.19.2.1 Definitions (changes to 4.6.18.2.1.20)

- **time slot**: finest resolution in time for SBR envelopes and noise floors. One time slot equals one subsample in the QMF domain.

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4.6.19.2.2 Constants (changes to 4.6.18.2.5)

- **RATE:** For core codec AAC ELD the constant $RATE = 1$ should be used instead of $RATE = 2$.

4.6.19.2.3 Variables (changes to 4.6.18.2.6)

- **numTimeSlots:** The number of time slots for core codec AAC ELD is $numTimeSlots = 16$, for 512 AAC frame and $numTimeSlots = 15$, for 480 AAC frame.

- t_{HFGen}: Due to the removed additional delay the offset of the HF-generation module is set to $t_{HFGen} = 2$. The following Figure Figure AMD9.2 explains the offsets for core codec AAC ELD correctly.

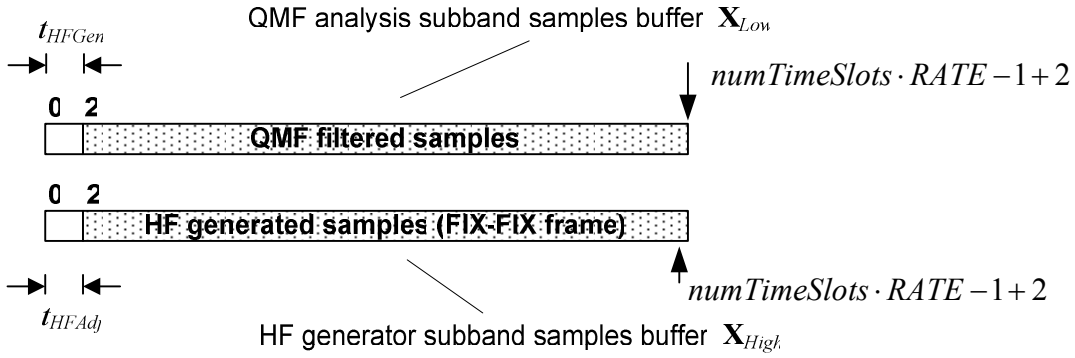


Figure AMD9.2 — Synchronization for low delay SBR

4.6.19.2.4 Inverse Filtering (changes to 4.6.18.6.2)

Due to the modified buffer management the calculation of the covariance matrix has to be changed as follows: The upper limit of n is to be changed from $numTimeSlots \cdot RATE + 6 - 1$ to $numTimeSlots \cdot RATE - 1$.

4.6.19.3 Time-Locked frequency grid

The time/frequency grid for the Low Delay SBR is specified in the following subclauses.

4.6.19.3.1 FrameClasses

Low Delay SBR uses a reduced set of frame classes which are listed in the Table below:

Table AMD9.9 — bs_frame_class

bs_frame_class	Meaning
0	FIXFIX
1	LD_TRAN

4.6.19.3.2 sbr_ld_grid()

Low Delay SBR uses a different syntax to signal the grid data. The standard sbr_grid() syntax is replaced by sbr_ld_grid(), as defined in the following:

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Table AMD9.10 — Syntax of sbr_ld_grid

Syntax	No. of bits	Mnemonic
sbr_ld_grid(ch)		
{		
switch (**bs_frame_class**) {	**1**	**uimsbf**
case FIXFIX:		
bs_num_env[ch] = 2^ **tmp**;	**2**	**uimsbf**, Note 1
if (bs_num_env[ch] == 1)		
bs_amp_res;	**1**	**uimsbf**
bs_freq_res[ch][0];	**1**	
for (env = 1; env < bs_num_env[ch]; env++)		
bs_freq_res[ch][env] = bs_freq_res[ch][0];		
break;		
case LD_TRAN:		
bs_transient_position	**4**	**uimsbf**
bs_num_env[ch] =		Note 3
LD_Envelope_Table[bs_transient_position][num_envelopes];		
for (env = 0; env < bs_num_env[ch]; env++)		
bs_freq_res[ch][env];	**1**	
break;		
if (bs_num_env[ch] > 1)		
bs_num_noise[ch] = 2;		
Else		
bs_num_noise[ch] = 1;		
}		
Note 1: bs_num_env is restricted according to subclause 4.6.18.3.		
Note 2: the Table LD_Envelope_Table is given in Table AMD9.11		

4.6.19.3.3 Calculation of $t_E(l)$ (changes to 4.6.18.3.3)

in case bs_frame_class = LD_TRAN:

$$t_E(0) = 0$$
$$t_E(L_E) = numberTimeSlots$$
$$t_E(l) = LD_EnvelopeTable[bs_transient_position][l+1] for 0 < l < (L_E)$$

4.6.19.3.4 Calculation of l_A (changes to 4.6.18.7.2)

in case bs_frame_class = LD_TRAN:

$$l_A = LD_EnvelopeTable[bs_transient_position][4]$$

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4.6.19.3.5 Envelope Lookup Table

Table AMD9.11 — Lookup Table for LD_Envelope_Table (bs_transient_position)

bs_transient_position	num_envelopes	border[1]	border[2]	transientIdx
0	2	4	-	0
1	2	5	-	0
2	3	2	6	1
3	3	3	7	1
4	3	4	8	1
5	3	5	9	1
6	3	6	10	1
7	3	7	11	1
8	3	8	12	1
9	3	9	13	1
10*	3/2	10	14/-	1
11	2	11	-	1
12	2	12	-	1
13	2	13	-	1
14	2	14	-	1
15	2	15	-	1

* in case of AAC frame = 480 use second Table entry

4.6.19.4 Low Delay SBR Filterbank (changes to 4.6.18.4)

Instead of subclause 4.6.18.4, use the description below for filterbank processing. Note, that basically the processing descibed in the flowcharts Figure 4.41, 4.42, 4.43, 4.50, 4.51, 4.52 is similar to the processing of the low-delay filterbank. Only the windowing and the modulation differ.

4.6.19.4.1 Analysis filterbank

- Shift the samples in the array **x** by 32 positions. The oldest 32 samples are discarded and 32 new samples are stored in positions 0 to 31.

- Multiply the samples of array **x** by the coefficient of window **ci**. The window coefficients **ci** are obtained by linear interpolation of the coefficients **c**, i.e. through the equation

$$ci(i) = \frac{1}{2}\left[c(2i+1) + c(2i)\right], \quad 0 \le i < 320$$

The window coefficients of **c** can be found in Table AMD9.17.

- Sum the samples according to the formula in the flowchart in Figure 4.41 to create the 64-element array **u**.

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Calculate 32 new subband samples by the matrix operation **Mu**, where

$$\mathrm{M}(k,n) = 2 \cdot \exp\left(\frac{i \cdot \pi \cdot (k+0.5) \cdot (2 \cdot n - 95)}{64}\right), \begin{cases} 0 \le k < 32 \\ 0 \le n < 64 \end{cases}$$

In the equation, exp() denotes the complex exponential function and *i* is the imaginary unit.

4.6.19.4.2 Synthesis filterbank

- Shift the samples in the array **v** by 128 positions. The oldest 128 samples are discarded.

The 64 new complex-valued subband samples are multiplied by the matrix **N**, where

$$\mathrm{N}(k,n) = \frac{1}{64} \cdot \exp\left(\frac{i \cdot \pi \cdot (k+0.5) \cdot (2 \cdot n - 63)}{128}\right), \begin{cases} 0 \le k < 64 \\ 0 \le n < 128 \end{cases}$$

In the equation, exp() denotes the complex exponential function and *i* is the imaginary unit. The real part of the output from this operation is stored in the positions 0 to 127 of array **v**.

- Extract samples from v according to the flowchart in Figure 4.42 to create the 640-element array **g**.
- Multiply the samples of array **g** by window **c** to produce array **w**. The window coefficients of **c** can be found in Table AMD9.17.
- Calculate 64 new output samples by summation of samples from array w according to the last step in the flowchart of in Figure 4.42

4.6.19.4.3 Downsampled synthesis filterbank

- Shift the samples in the array **v** by 64 positions. The oldest 64 samples are discarded.

The 32 new complex-valued subband samples are multiplied by the matrix **N**, where

$$\mathrm{N}(k,n) = \frac{1}{64} \cdot \exp\left(\frac{i \cdot \pi \cdot (k+0.5) \cdot (2 \cdot n - 31)}{64}\right), \begin{cases} 0 \le k < 32 \\ 0 \le n < 64 \end{cases}$$

In the equation, exp() denotes the complex exponential function and *i* is the imaginary unit. The real part of the output from this operation is stored in the positions 0 to 63 of array **v**.

- Extract samples from **v** according to the flowchart in Figure 4.43 to create the 320-element array **g**.
- Multiply the samples of array **g** by the coefficient of window **ci** to produce array **w**. The window coefficients **ci** are obtained by linear interpolation of the coefficients **c**, i.e. through the equation

$$ci(i) = \frac{1}{2}\left[c(2i+1) + c(2i)\right], \quad 0 \le i < 320$$

The window coefficients of **c** can be found in Table AMD9.17.

- Calculate 32 new output samples by summation of samples from array **w** according to the last step in the flowchart of Figure 4.43

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4.6.19.5 Low Power SBR Filterbank (4.6.18.8.2)

4.6.19.5.1 Real-valued analysis filterbank

- Shift the samples in the array **x** by 32 positions. The oldest 32 samples are discarded and 32 new samples are stored in positions 0 to 31.

- Multiply the samples of array **x** by the coefficient of window **ci**. The window coefficients **ci** are obtained by linear interpolation of the coefficients **c**, i.e. through the equation

$$ci(i) = \frac{1}{2}\left[c(2i+1) + c(2i)\right], \quad 0 \le i < 320$$

  The window coefficients of **c** can be found in Table Table AMD9.17.

- Sum the samples according to the formula in the flowchart to create the 64-element array **u**.

- Calculate new 32 subband samples by the matrix operation $\mathbf{M}_r\mathbf{u}$, where

$$\mathrm{M}_r(k,n) = 2 \cdot \cos\left(\frac{\pi \cdot (k+0.5) \cdot (2 \cdot n - 95)}{64}\right), \begin{cases} 0 \le k < 32 \\ 0 \le n < 64 \end{cases}$$

4.6.19.5.2 Real-valued synthesis filterbank

- Shift the samples in the array **v** by 128 positions. The oldest 128 samples are discarded.

  The 64 new subband samples are multiplied by the matrix $\mathbf{N}_r$, where

$$\mathrm{N}_r(k,n) = \frac{1}{32} \cdot \cos\left(\frac{\pi \cdot (k+0.5) \cdot (2 \cdot n - 63)}{128}\right), \begin{cases} 0 \le k < 64 \\ 0 \le n < 128 \end{cases}$$

  The output from this operation is stored in the positions 0 to 127 of array **v**.

- Extract samples from **v** according to the flowchart in Figure 4.50 to create the 640-element array **g**.

- Multiply the samples of array **g** by window **c** to produce array **w**. The window coefficients of **c** can be found in Table Table AMD9.17.

- Calculate 64 new output samples by summation of samples from array **w** according to the formula in the flowchart of Figure 4.50.

4.6.19.5.3 Downsampled real-valued synthesis filterbank

- Shift the samples in the array **v** by 64 positions. The oldest 64 samples are discarded.

  The 32 new subband samples are multiplied by the matrix $\mathbf{N}_r$, where

$$\mathrm{N}_r(k,n) = \frac{1}{32} \cdot \cos\left(\frac{\pi \cdot (k+0.5) \cdot (2 \cdot n - 31)}{64}\right), \begin{cases} 0 \le k < 32 \\ 0 \le n < 64 \end{cases}$$

  The output from this operation is stored in the positions 0 to 61 of array **v**.

- Extract samples from **v** according to the flowchart in Figure 4.51 to create the 320-element array **g**.

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- Multiply the samples of array **g** by the coefficient of window **ci** to produce array **w**. The window coefficients **ci** are obtained by linear interpolation of the coefficients **c**, i.e. through the equation

$$ci(i) = \frac{1}{2}\left[c(2i+1) + c(2i)\right], \quad 0 \le i < 320$$

The window coefficients of **c** can be found in Table Table AMD9.17.

- Calculate 32 new output samples by summation of samples from array **w** according to the formula in the flowchart of Figure 4.51.

After 4.6.19, add a new subclause with the title "Enhanced Low Delay codec":

4.6.20 Enhanced Low Delay Codec

4.6.20.1 Introduction

The Enhanced Low Delay (AAC-ELD) coding scheme provides an extension of the low delay coding functionalities described in 4.6.17. The lowest algorithmic delay for this codec is 15ms. This codec allows the usage of the Low Delay SBR tool in order to achieve a low bitrate and low delay coding scheme for communication applications.

The ER AAC ELD codec is derived from the ER AAC LD codec, described in subclause 4.6.17 (ER AAC LD). In order to achieve a sufficiently low delay, especially in combination with low delay SBR, some modifications are necessary, e.g. Low Delay Window, as defined in the following:

4.6.20.2 Low Delay Window

The synthesis filterbank is modified in order to adopt a low-delay filterbank. The core IMDCT algorithm is mostly unchanged, but with a longer window, such that n is now running up to 2N-1 (rather than up to N-1), see 4.6.11.3.1, 4.6.17.2.1 and 4.6.17.2.2.

$$x_{i,n} = -\frac{2}{N}\sum_{k=0}^{\frac{N}{2}-1} spec[i][k]\cos\left(\frac{2\pi}{N}\left(n+n_0\right)\left(k+\frac{1}{2}\right)\right) \quad for\ 0 \le n < 2N$$

where:

n = sample index
i = window index
k = spectral coefficient index
N = window length
n_0 = (-N / 2 + 1) / 2

with N = 960 or 1024.

The windowing and overlap-add is modified, compared to 4.6.11.3.2, 4.6.11.3.3, 4.6.17.2.3, in the following way:

The length N window is replaced by a length 2N window with more overlap in the past, and less overlap to the future (N/8 values are actually zero).

Windowing for the Low Delay Window:

$$z_{i,n} = w_{LD}(n) \cdot x_{i,n}$$

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Where the window now has a length of 2N, hence n=0,…,2N-1, with coefficients listed in Table AMD9.15 for N=1024 and Table AMD9.16 for N=960.

Overlap and add:

$$out_{i,n} = z_{i,n} + z_{i-1,n+\frac{N}{2}} + z_{i-2,n+N} + z_{i-3,n+N+\frac{N}{2}}$$

for 0<=n<N/2

4.6.20.3 ELDSpecificConfig

Table AMD9.12 — Syntax of ELDSpecificConfig ()

Syntax	No. of bits	Mnemonic
ELDSpecificConfig (channelConfiguration)		
{		
frameLengthFlag;	**1**	**bslbf**
aacSectionDataResilienceFlag;	**1**	**bslbf**
aacScalefactorDataResilienceFlag;	**1**	**bslbf**
aacSpectralDataResilienceFlag;	**1**	**bslbf**
ldSbrPresentFlag;	**1**	**bslbf**
If (ldSbrPresentFlag) {		
ldSbrSamplingRate;	**1**	**bslbf**
ldSbrCrcFlag;	**1**	**bslbf**
ld_sbr_header(channelConfiguration);		
}		
while (**eldExtType** != ELDEXT_TERM) {	**4**	**bslbf**
eldExtLen;	**4**	**uimsbf**
len = eldExtLen;		
if (eldExtLen == 15) {		
eldExtLenAdd;	**8**	**uimsbf**
len += eldExtLenAdd;		
}		
if (eldExtLenAdd == 255) {		
eldExtLenAddAdd;	**16**	**uimsbf**
len += eldExtLenAddAdd;		
}		
switch (eldExtType) {		
default:		
for(cnt=0; cnt<len; cnt++) {		
other_byte;	**8**	**uimsbf**
}		
break;		
/* add future eld extension configs here */		
}		
}		
}		

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Table AMD9.13 — Syntax of ld_sbr_header ()

Syntax	No. of bits	Mnemonic

ld_sbr_header(channelConfiguration)
{
switch (channelConfiguration) {
case 1:
case 2:
numSbrHeader = 1;
break;
case 3:
numSbrHeader = 2;
break;
case 4:
case 5:
case 6:
numSbrHeader = 3;
break;
case 7:
numSbrHeader = 4;
break;
default:
numSbrHeader = 0;		

break;		
}		
for (el=0; el<numSbrHeader; el++) {		
sbr_header();		
}		
}		

4.6.20.4 Decoding of ELDSpecificConfig

The sematic of the syntax elements of the ELDSpecificConfig is described below.

frameLengthFlag see GASpecificConfig() (subclause 4.5.1.1)

aacSectionDataResilienceFlag see GASpecificConfig() (subclause 4.5.1.1)

aacScalefactorDataResilienceFlag see GASpecificConfig() (subclause 4.5.1.1)

aacSpectralDataResilienceFlag see GASpecificConfig() (subclause 4.5.1.1)

ldSbrPresentFlag The ldSbrPresentFlag corresponds to the variable sbrPresentFlag used for non low delay SBR. The decoder has the same behaviour with respect to this flag.

ldSbrCrcFlag The variable ldSbrCrcFlag signals the CRC syntax for low delay SBR. The CRC calculation only includes the payload without any byte alignment bits.

ldSbrSamplingRate The ldSbrSamplingRate determines the sampling rate factor between core coder and SBR, where 0 stands for single rate and 1 for dual rate.

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eldExtType A four bit code that identifies the extension type according to Table AMD9.14.

eldExtLen Length descriptor of eld extension configuration in bytes

eldExtLenAdd First additional length field of eld extension configuration in bytes

eldExtLenAddAdd Second additional length field of eld extension configuration in bytes

other_byte Helper variable for parsing over unknown configuration payload

Table AMD9.14 — ELD extension_type

Symbol	Value of extension_type	Purpose
ELDEXT_TERM	'0000'	Termination tag
/* reserved */	'0001'	/* reserved */
…	…	…
/* reserved */	'1111'	/* reserved */

Add the following tables to 4.A.2:

Table AMD9.15 — Window coefficients wLD for low delay filterbank for N=1024

n	$w_{LD}(n)$	N	$w_{LD}(n)$	n	$w_{LD}(n)$	n	$w_{LD}(n)$
0	0,00000000	512	1,00028215	1024	0,16098974	1536	-0,01310123
1	0,00000000	513	1,00084319	1025	0,15896561	1537	-0,01306470
2	0,00000000	514	1,00140472	1026	0,15696026	1538	-0,01302556
3	0,00000000	515	1,00196665	1027	0,15497259	1539	-0,01298381
4	0,00000000	516	1,00252889	1028	0,15300151	1540	-0,01293948
5	0,00000000	517	1,00309139	1029	0,15104590	1541	-0,01289255
6	0,00000000	518	1,00365404	1030	0,14910466	1542	-0,01284305
7	0,00000000	519	1,00421679	1031	0,14717666	1543	-0,01279095
8	0,00000000	520	1,00477954	1032	0,14526081	1544	-0,01273625
9	0,00000000	521	1,00534221	1033	0,14335599	1545	-0,01267893
10	0,00000000	522	1,00590474	1034	0,14146111	1546	-0,01261897
11	0,00000000	523	1,00646713	1035	0,13957570	1547	-0,01255632
12	0,00000000	524	1,00702945	1036	0,13769993	1548	-0,01249096
13	0,00000000	525	1,00759179	1037	0,13583399	1549	-0,01242283
14	0,00000000	526	1,00815424	1038	0,13397806	1550	-0,01235190
15	0,00000000	527	1,00871678	1039	0,13213229	1551	-0,01227827
16	0,00000000	528	1,00927930	1040	0,13029682	1552	-0,01220213
17	0,00000000	529	1,00984169	1041	0,12847178	1553	-0,01212366
18	0,00000000	530	1,01040384	1042	0,12665729	1554	-0,01204304
19	0,00000000	531	1,01096575	1043	0,12485353	1555	-0,01196032
20	0,00000000	532	1,01152747	1044	0,12306074	1556	-0,01187543
21	0,00000000	533	1,01208910	1045	0,12127916	1557	-0,01178829
22	0,00000000	534	1,01265070	1046	0,11950900	1558	-0,01169884

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23	0,00000000	535	1,01321226	1047	0,11775043	1559	-0,01160718
24	0,00000000	536	1,01377365	1048	0,11600347	1560	-0,01151352
25	0,00000000	537	1,01433478	1049	0,11426820	1561	-0,01141809
26	0,00000000	538	1,01489551	1050	0,11254465	1562	-0,01132111
27	0,00000000	539	1,01545584	1051	0,11083292	1563	-0,01122272
28	0,00000000	540	1,01601582	1052	0,10913318	1564	-0,01112304
29	0,00000000	541	1,01657553	1053	0,10744559	1565	-0,01102217
30	0,00000000	542	1,01713502	1054	0,10577028	1566	-0,01092022
31	0,00000000	543	1,01769427	1055	0,10410733	1567	-0,01081730
32	0,00000000	544	1,01825316	1056	0,10245672	1568	-0,01071355
33	0,00000000	545	1,01881154	1057	0,10081842	1569	-0,01060912
34	0,00000000	546	1,01936929	1058	0,09919240	1570	-0,01050411
35	0,00000000	547	1,01992639	1059	0,09757872	1571	-0,01039854
36	0,00000000	548	1,02048289	1060	0,09597750	1572	-0,01029227
37	0,00000000	549	1,02103888	1061	0,09438884	1573	-0,01018521
38	0,00000000	550	1,02159441	1062	0,09281288	1574	-0,01007727
39	0,00000000	551	1,02214945	1063	0,09124964	1575	-0,00996859
40	0,00000000	552	1,02270387	1064	0,08969907	1576	-0,00985959
41	0,00000000	553	1,02325751	1065	0,08816111	1577	-0,00975063
42	0,00000000	554	1,02381025	1066	0,08663570	1578	-0,00964208
43	0,00000000	555	1,02436204	1067	0,08512288	1579	-0,00953420
44	0,00000000	556	1,02491295	1068	0,08362274	1580	-0,00942723
45	0,00000000	557	1,02546304	1069	0,08213540	1581	-0,00932135
46	0,00000000	558	1,02601238	1070	0,08066096	1582	-0,00921677
47	0,00000000	559	1,02656092	1071	0,07919944	1583	-0,00911364
48	0,00000000	560	1,02710853	1072	0,07775076	1584	-0,00901208
49	0,00000000	561	1,02765508	1073	0,07631484	1585	-0,00891220
50	0,00000000	562	1,02820041	1074	0,07489161	1586	-0,00881412
51	0,00000000	563	1,02874449	1075	0,07348108	1587	-0,00871792
52	0,00000000	564	1,02928737	1076	0,07208335	1588	-0,00862369
53	0,00000000	565	1,02982913	1077	0,07069851	1589	-0,00853153
54	0,00000000	566	1,03036981	1078	0,06932667	1590	-0,00844149
55	0,00000000	567	1,03090937	1079	0,06796781	1591	-0,00835360
56	0,00000000	568	1,03144768	1080	0,06662187	1592	-0,00826785
57	0,00000000	569	1,03198460	1081	0,06528874	1593	-0,00818422
58	0,00000000	570	1,03252000	1082	0,06396833	1594	-0,00810267
59	0,00000000	571	1,03305384	1083	0,06266065	1595	-0,00802312
60	0,00000000	572	1,03358617	1084	0,06136578	1596	-0,00794547
61	0,00000000	573	1,03411707	1085	0,06008380	1597	-0,00786959
62	0,00000000	574	1,03464659	1086	0,05881480	1598	-0,00779533
63	0,00000000	575	1,03517470	1087	0,05755876	1599	-0,00772165
64	0,00000000	576	1,03570128	1088	0,05631557	1600	-0,00764673
65	0,00000000	577	1,03622620	1089	0,05508511	1601	-0,00756886
66	0,00000000	578	1,03674934	1090	0,05386728	1602	-0,00748649
67	0,00000000	579	1,03727066	1091	0,05266206	1603	-0,00739905
68	0,00000000	580	1,03779024	1092	0,05146951	1604	-0,00730681
69	0,00000000	581	1,03830815	1093	0,05028971	1605	-0,00721006
70	0,00000000	582	1,03882446	1094	0,04912272	1606	-0,00710910

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71	0,00000000	583	1,03933914	1095	0,04796855	1607	-0,00700419
72	0,00000000	584	1,03985206	1096	0,04682709	1608	-0,00689559
73	0,00000000	585	1,04036312	1097	0,04569825	1609	-0,00678354
74	0,00000000	586	1,04087217	1098	0,04458194	1610	-0,00666829
75	0,00000000	587	1,04137920	1099	0,04347817	1611	-0,00655007
76	0,00000000	588	1,04188428	1100	0,04238704	1612	-0,00642916
77	0,00000000	589	1,04238748	1101	0,04130868	1613	-0,00630579
78	0,00000000	590	1,04288888	1102	0,04024318	1614	-0,00618022
79	0,00000000	591	1,04338845	1103	0,03919056	1615	-0,00605267
80	0,00000000	592	1,04388610	1104	0,03815071	1616	-0,00592333
81	0,00000000	593	1,04438170	1105	0,03712352	1617	-0,00579240
82	0,00000000	594	1,04487515	1106	0,03610890	1618	-0,00566006
83	0,00000000	595	1,04536645	1107	0,03510679	1619	-0,00552651
84	0,00000000	596	1,04585569	1108	0,03411720	1620	-0,00539194
85	0,00000000	597	1,04634297	1109	0,03314013	1621	-0,00525653
86	0,00000000	598	1,04682838	1110	0,03217560	1622	-0,00512047
87	0,00000000	599	1,04731192	1111	0,03122343	1623	-0,00498390
88	0,00000000	600	1,04779350	1112	0,03028332	1624	-0,00484693
89	0,00000000	601	1,04827303	1113	0,02935494	1625	-0,00470969
90	0,00000000	602	1,04875042	1114	0,02843799	1626	-0,00457228
91	0,00000000	603	1,04922568	1115	0,02753230	1627	-0,00443482
92	0,00000000	604	1,04969891	1116	0,02663788	1628	-0,00429746
93	0,00000000	605	1,05017022	1117	0,02575472	1629	-0,00416034
94	0,00000000	606	1,05063974	1118	0,02488283	1630	-0,00402359
95	0,00000000	607	1,05110746	1119	0,02402232	1631	-0,00388738
96	0,00000000	608	1,05157332	1120	0,02317341	1632	-0,00375185
97	0,00000000	609	1,05203721	1121	0,02233631	1633	-0,00361718
98	0,00000000	610	1,05249907	1122	0,02151124	1634	-0,00348350
99	0,00000000	611	1,05295889	1123	0,02069866	1635	-0,00335100
100	0,00000000	612	1,05341676	1124	0,01989922	1636	-0,00321991
101	0,00000000	613	1,05387277	1125	0,01911359	1637	-0,00309043
102	0,00000000	614	1,05432700	1126	0,01834241	1638	-0,00296276
103	0,00000000	615	1,05477948	1127	0,01758563	1639	-0,00283698
104	0,00000000	616	1,05523018	1128	0,01684248	1640	-0,00271307
105	0,00000000	617	1,05567906	1129	0,01611219	1641	-0,00259098
106	0,00000000	618	1,05612608	1130	0,01539398	1642	-0,00247066
107	0,00000000	619	1,05657124	1131	0,01468726	1643	-0,00235210
108	0,00000000	620	1,05701459	1132	0,01399167	1644	-0,00223531
109	0,00000000	621	1,05745616	1133	0,01330687	1645	-0,00212030
110	0,00000000	622	1,05789601	1134	0,01263250	1646	-0,00200709
111	0,00000000	623	1,05833426	1135	0,01196871	1647	-0,00189576
112	0,00000000	624	1,05877109	1136	0,01131609	1648	-0,00178647
113	0,00000000	625	1,05920669	1137	0,01067527	1649	-0,00167936
114	0,00000000	626	1,05964125	1138	0,01004684	1650	-0,00157457
115	0,00000000	627	1,06007444	1139	0,00943077	1651	-0,00147216
116	0,00000000	628	1,06050542	1140	0,00882641	1652	-0,00137205
117	0,00000000	629	1,06093335	1141	0,00823307	1653	-0,00127418
118	0,00000000	630	1,06135746	1142	0,00765011	1654	-0,00117849

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119	0,00000000	631	1,06177909	1143	0,00707735	1655	-0,00108498
120	0,00000000	632	1,06220164	1144	0,00651513	1656	-0,00099375
121	0,00000000	633	1,06262858	1145	0,00596377	1657	-0,00090486
122	0,00000000	634	1,06306309	1146	0,00542364	1658	-0,00081840
123	0,00000000	635	1,06350050	1147	0,00489514	1659	-0,00073444
124	0,00000000	636	1,06392837	1148	0,00437884	1660	-0,00065309
125	0,00000000	637	1,06433391	1149	0,00387530	1661	-0,00057445
126	0,00000000	638	1,06470443	1150	0,00338509	1662	-0,00049860
127	0,00000000	639	1,06502996	1151	0,00290795	1663	-0,00042551
128	0,00338834	640	1,06481076	1152	0,00244282	1664	-0,00035503
129	0,00567745	641	1,06469765	1153	0,00198860	1665	-0,00028700
130	0,00847677	642	1,06445004	1154	0,00154417	1666	-0,00022125
131	0,01172641	643	1,06408002	1155	0,00110825	1667	-0,00015761
132	0,01532555	644	1,06361382	1156	0,00067934	1668	-0,00009588
133	0,01917664	645	1,06307719	1157	0,00025589	1669	-0,00003583
134	0,02318809	646	1,06249453	1158	-0,00016357	1670	0,00002272
135	0,02729259	647	1,06188365	1159	-0,00057897	1671	0,00007975
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138	0,03972499	650	1,05999418	1162	-0,00178397	1674	0,00023933
139	0,04379783	651	1,05937132	1163	-0,00216547	1675	0,00028784
140	0,04783094	652	1,05874726	1164	-0,00253230	1676	0,00033342
141	0,05183357	653	1,05811486	1165	-0,00288133	1677	0,00037572
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144	0,06373173	656	1,05611070	1168	-0,00380315	1680	0,00048103
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146	0,07163937	658	1,05465735	1170	-0,00432457	1682	0,00053533
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149	0,08352024	661	1,05231578	1173	-0,00501699	1685	0,00060022
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151	0,09143035	663	1,05070811	1175	-0,00546066	1687	0,00063781
152	0,09538618	664	1,04990044	1176	-0,00568360	1688	0,00065568
153	0,09934771	665	1,04909210	1177	-0,00590821	1689	0,00067303
154	0,10331917	666	1,04828434	1178	-0,00613508	1690	0,00068991
155	0,10730456	667	1,04747647	1179	-0,00636311	1691	0,00070619
156	0,11130697	668	1,04666590	1180	-0,00658944	1692	0,00072155
157	0,11532867	669	1,04585003	1181	-0,00681117	1693	0,00073567
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159	0,12343922	671	1,04419009	1183	-0,00722982	1695	0,00075912
160	0,12753911	672	1,04333499	1184	-0,00742268	1696	0,00076811
161	0,13167705	673	1,04245452	1185	-0,00760226	1697	0,00077509
162	0,13585812	674	1,04154244	1186	-0,00776687	1698	0,00077997
163	0,14008529	675	1,04059452	1187	-0,00791580	1699	0,00078275
164	0,14435986	676	1,03960846	1188	-0,00804933	1700	0,00078351
165	0,14868291	677	1,03858207	1189	-0,00816774	1701	0,00078237
166	0,15305531	678	1,03751326	1190	-0,00827139	1702	0,00077943

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167	0,15747594	679	1,03640189	1191	-0,00836122	1703	0,00077484
168	0,16194193	680	1,03524976	1192	-0,00843882	1704	0,00076884
169	0,16645070	681	1,03405868	1193	-0,00850583	1705	0,00076160
170	0,17099991	682	1,03283047	1194	-0,00856383	1706	0,00075335
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172	0,18020600	684	1,03027574	1196	-0,00865853	1708	0,00073442
173	0,18485548	685	1,02895743	1197	-0,00869781	1709	0,00072404
174	0,18953191	686	1,02761717	1198	-0,00873344	1710	0,00071323
175	0,19423322	687	1,02625804	1199	-0,00876633	1711	0,00070209
176	0,19895800	688	1,02488222	1200	-0,00879707	1712	0,00069068
177	0,20370512	689	1,02349184	1201	-0,00882622	1713	0,00067906
178	0,20847374	690	1,02208892	1202	-0,00885433	1714	0,00066728
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180	0,21807244	692	1,01924861	1204	-0,00890652	1716	0,00064321
181	0,22290083	693	1,01781123	1205	-0,00892925	1717	0,00063086
182	0,22774742	694	1,01636229	1206	-0,00894881	1718	0,00061824
183	0,23261210	695	1,01490045	1207	-0,00896446	1719	0,00060534
184	0,23749542	696	1,01342315	1208	-0,00897541	1720	0,00059211
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187	0,25225887	699	1,00887284	1211	-0,00897234	1723	0,00055033
188	0,25721719	700	1,00730915	1212	-0,00895696	1724	0,00053566
189	0,26219330	701	1,00571882	1213	-0,00893330	1725	0,00052063
190	0,26718648	702	1,00409996	1214	-0,00890076	1726	0,00050522
191	0,27219630	703	1,00245032	1215	-0,00885914	1727	0,00048949
192	0,27722262	704	1,00076734	1216	-0,00880875	1728	0,00047349
193	0,28226514	705	0,99904842	1217	-0,00874987	1729	0,00045728
194	0,28732336	706	0,99729101	1218	-0,00868282	1730	0,00044092
195	0,29239628	707	0,99549380	1219	-0,00860825	1731	0,00042447
196	0,29748247	708	0,99365664	1220	-0,00852716	1732	0,00040803
197	0,30258055	709	0,99177946	1221	-0,00844055	1733	0,00039166
198	0,30768914	710	0,98986234	1222	-0,00834941	1734	0,00037544
199	0,31280508	711	0,98791024	1223	-0,00825485	1735	0,00035943
200	0,31792385	712	0,98593294	1224	-0,00815807	1736	0,00034371
201	0,32304172	713	0,98394037	1225	-0,00806025	1737	0,00032833
202	0,32815579	714	0,98194226	1226	-0,00796253	1738	0,00031333
203	0,33326397	715	0,97994532	1227	-0,00786519	1739	0,00029874
204	0,33836470	716	0,97795324	1228	-0,00776767	1740	0,00028452
205	0,34345661	717	0,97596955	1229	-0,00766937	1741	0,00027067
206	0,34853868	718	0,97399748	1230	-0,00756971	1742	0,00025715
207	0,35361188	719	0,97203326	1231	-0,00746790	1743	0,00024395
208	0,35867865	720	0,97006624	1232	-0,00736305	1744	0,00023104
209	0,36374072	721	0,96808546	1233	-0,00725422	1745	0,00021842
210	0,36879900	722	0,96608018	1234	-0,00714055	1746	0,00020606
211	0,37385347	723	0,96404416	1235	-0,00702161	1747	0,00019398
212	0,37890349	724	0,96197556	1236	-0,00689746	1748	0,00018218
213	0,38394836	725	0,95987276	1237	-0,00676816	1749	0,00017069
214	0,38898730	726	0,95773420	1238	-0,00663381	1750	0,00015953

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215	0,39401912	727	0,95556018	1239	-0,00649489	1751	0,00014871
216	0,39904236	728	0,95335291	1240	-0,00635230	1752	0,00013827
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219	0,41404819	731	0,94655663	1243	-0,00591116	1755	0,00010942
220	0,41902398	732	0,94424858	1244	-0,00576167	1756	0,00010067
221	0,42398423	733	0,94193055	1245	-0,00561155	1757	0,00009236
222	0,42892805	734	0,93960953	1246	-0,00546110	1758	0,00008448
223	0,43385441	735	0,93729154	1247	-0,00531037	1759	0,00007703
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225	0,44365014	737	0,93268456	1249	-0,00500732	1761	0,00006337
226	0,44851786	738	0,93040503	1250	-0,00485462	1762	0,00005714
227	0,45336632	739	0,92813771	1251	-0,00470075	1763	0,00005129
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229	0,46301302	741	0,92357910	1253	-0,00438786	1765	0,00004072
230	0,46781309	742	0,92125731	1254	-0,00422805	1766	0,00003597
231	0,47259722	743	0,91889642	1255	-0,00406594	1767	0,00003157
232	0,47736435	744	0,91649998	1256	-0,00390204	1768	0,00002752
233	0,48211365	745	0,91407191	1257	-0,00373686	1769	0,00002380
234	0,48684450	746	0,91161623	1258	-0,00357091	1770	0,00002042
235	0,49155594	747	0,90913975	1259	-0,00340448	1771	0,00001736
236	0,49624679	748	0,90665202	1260	-0,00323770	1772	0,00001461
237	0,50091636	749	0,90416271	1261	-0,00307066	1773	0,00001215
238	0,50556440	750	0,90168115	1262	-0,00290344	1774	0,00000998
239	0,51019132	751	0,89920934	1263	-0,00273610	1775	0,00000807
240	0,51479771	752	0,89674189	1264	-0,00256867	1776	0,00000641
241	0,51938391	753	0,89427312	1265	-0,00240117	1777	0,00000499
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243	0,52849587	755	0,88931147	1267	-0,00206614	1779	0,00000278
244	0,53302151	756	0,88681415	1268	-0,00189866	1780	0,00000196
245	0,53752680	757	0,88430445	1269	-0,00173123	1781	0,00000132
246	0,54201160	758	0,88178141	1270	-0,00156390	1782	0,00000082
247	0,54647575	759	0,87924528	1271	-0,00139674	1783	0,00000046
248	0,55091916	760	0,87669753	1272	-0,00122989	1784	0,00000020
249	0,55534181	761	0,87413966	1273	-0,00106351	1785	0,00000005
250	0,55974376	762	0,87157318	1274	-0,00089772	1786	-0,00000003
251	0,56412513	763	0,86899958	1275	-0,00073267	1787	-0,00000006
252	0,56848615	764	0,86642037	1276	-0,00056849	1788	-0,00000004
253	0,57282710	765	0,86383703	1277	-0,00040530	1789	-0,00000001
254	0,57714834	766	0,86125106	1278	-0,00024324	1790	0,00000001
255	0,58145030	767	0,85866393	1279	-0,00008241	1791	0,00000001
256	0,58492489	768	0,85604236	1280	0,00008214	1792	0,00000001
257	0,58918511	769	0,85344385	1281	0,00024102	1793	0,00000001
258	0,59342326	770	0,85083093	1282	0,00039922	1794	-0,00000001
259	0,59763936	771	0,84820550	1283	0,00055660	1795	-0,00000004
260	0,60183347	772	0,84556943	1284	0,00071299	1796	-0,00000005
261	0,60600561	773	0,84292458	1285	0,00086826	1797	-0,00000003
262	0,61015581	774	0,84027278	1286	0,00102224	1798	0,00000005

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263	0,61428412	775	0,83761586	1287	0,00117480	1799	0,00000020
264	0,61839056	776	0,83495565	1288	0,00132579	1800	0,00000043
265	0,62247517	777	0,83229393	1289	0,00147507	1801	0,00000077
266	0,62653799	778	0,82963243	1290	0,00162252	1802	0,00000123
267	0,63057912	779	0,82697135	1291	0,00176804	1803	0,00000183
268	0,63459872	780	0,82430933	1292	0,00191161	1804	0,00000257
269	0,63859697	781	0,82164496	1293	0,00205319	1805	0,00000348
270	0,64257403	782	0,81897669	1294	0,00219277	1806	0,00000455
271	0,64653001	783	0,81630017	1295	0,00233029	1807	0,00000581
272	0,65046495	784	0,81360822	1296	0,00246567	1808	0,00000727
273	0,65437887	785	0,81089355	1297	0,00259886	1809	0,00000893
274	0,65827181	786	0,80814924	1298	0,00272975	1810	0,00001080
275	0,66214383	787	0,80537741	1299	0,00285832	1811	0,00001290
276	0,66599499	788	0,80258920	1300	0,00298453	1812	0,00001522
277	0,66982535	789	0,79979611	1301	0,00310839	1813	0,00001778
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279	0,67742394	791	0,79423813	1303	0,00334886	1815	0,00002362
280	0,68119219	792	0,79148780	1304	0,00346494	1816	0,00002691
281	0,68493972	793	0,78876432	1305	0,00357778	1817	0,00003044
282	0,68866653	794	0,78607290	1306	0,00368706	1818	0,00003422
283	0,69237258	795	0,78340590	1307	0,00379273	1819	0,00003824
284	0,69605778	796	0,78074288	1308	0,00389501	1820	0,00004250
285	0,69972207	797	0,77806279	1309	0,00399411	1821	0,00004701
286	0,70336537	798	0,77534514	1310	0,00409020	1822	0,00005176
287	0,70698758	799	0,77258187	1311	0,00418350	1823	0,00005676
288	0,71058862	800	0,76977737	1312	0,00427419	1824	0,00006200
289	0,71416837	801	0,76693654	1313	0,00436249	1825	0,00006749
290	0,71772674	802	0,76406441	1314	0,00444858	1826	0,00007322
291	0,72126361	803	0,76116851	1315	0,00453250	1827	0,00007920
292	0,72477889	804	0,75825892	1316	0,00461411	1828	0,00008541
293	0,72827246	805	0,75534582	1317	0,00469328	1829	0,00009186
294	0,73174419	806	0,75243924	1318	0,00476988	1830	0,00009854
295	0,73519392	807	0,74954634	1319	0,00484356	1831	0,00010543
296	0,73862141	808	0,74667135	1320	0,00491375	1832	0,00011251
297	0,74202643	809	0,74381840	1321	0,00497987	1833	0,00011975
298	0,74540874	810	0,74099145	1322	0,00504139	1834	0,00012714
299	0,74876817	811	0,73819147	1323	0,00509806	1835	0,00013465
300	0,75210458	812	0,73541641	1324	0,00514990	1836	0,00014227
301	0,75541785	813	0,73266408	1325	0,00519693	1837	0,00014997
302	0,75870785	814	0,72993193	1326	0,00523920	1838	0,00015775
303	0,76197437	815	0,72720913	1327	0,00527700	1839	0,00016558
304	0,76521709	816	0,72447661	1328	0,00531083	1840	0,00017348
305	0,76843570	817	0,72171494	1329	0,00534122	1841	0,00018144
306	0,77162988	818	0,71890515	1330	0,00536864	1842	0,00018947
307	0,77479939	819	0,71603932	1331	0,00539357	1843	0,00019756
308	0,77794403	820	0,71312056	1332	0,00541649	1844	0,00020573
309	0,78106359	821	0,71015250	1333	0,00543785	1845	0,00021399
310	0,78415789	822	0,70713900	1334	0,00545809	1846	0,00022233

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311	0,78722670	823	0,70409084	1335	0,00547713	1847	0,00023076
312	0,79026979	824	0,70102565	1336	0,00549441	1848	0,00023924
313	0,79328694	825	0,69796137	1337	0,00550936	1849	0,00024773
314	0,79627791	826	0,69491556	1338	0,00552146	1850	0,00025621
315	0,79924244	827	0,69189772	1339	0,00553017	1851	0,00026462
316	0,80218027	828	0,68890931	1340	0,00553494	1852	0,00027293
317	0,80509112	829	0,68595141	1341	0,00553524	1853	0,00028108
318	0,80797472	830	0,68302498	1342	0,00553058	1854	0,00028904
319	0,81083081	831	0,68012852	1343	0,00552066	1855	0,00029675
320	0,81365915	832	0,67725801	1344	0,00550536	1856	0,00030419
321	0,81645949	833	0,67440936	1345	0,00548459	1857	0,00031132
322	0,81923160	834	0,67157841	1346	0,00545828	1858	0,00031810
323	0,82197528	835	0,66876081	1347	0,00542662	1859	0,00032453
324	0,82469037	836	0,66595195	1348	0,00539007	1860	0,00033061
325	0,82737673	837	0,66314722	1349	0,00534910	1861	0,00033633
326	0,83003419	838	0,66034194	1350	0,00530415	1862	0,00034169
327	0,83266262	839	0,65753027	1351	0,00525568	1863	0,00034672
328	0,83526186	840	0,65470525	1352	0,00520418	1864	0,00035142
329	0,83783176	841	0,65185984	1353	0,00515009	1865	0,00035580
330	0,84037217	842	0,64898709	1354	0,00509387	1866	0,00035988
331	0,84288297	843	0,64608214	1355	0,00503595	1867	0,00036369
332	0,84536401	844	0,64314221	1356	0,00497674	1868	0,00036723
333	0,84781517	845	0,64016460	1357	0,00491665	1869	0,00037053
334	0,85023632	846	0,63714680	1358	0,00485605	1870	0,00037361
335	0,85262739	847	0,63409034	1359	0,00479503	1871	0,00037647
336	0,85498836	848	0,63100082	1360	0,00473336	1872	0,00037909
337	0,85731921	849	0,62788400	1361	0,00467082	1873	0,00038145
338	0,85961993	850	0,62474577	1362	0,00460721	1874	0,00038352
339	0,86189052	851	0,62159473	1363	0,00454216	1875	0,00038527
340	0,86413101	852	0,61844225	1364	0,00447517	1876	0,00038663
341	0,86634140	853	0,61529977	1365	0,00440575	1877	0,00038757
342	0,86852173	854	0,61217866	1366	0,00433344	1878	0,00038801
343	0,87067211	855	0,60908811	1367	0,00425768	1879	0,00038790
344	0,87279275	856	0,60603510	1368	0,00417786	1880	0,00038717
345	0,87488384	857	0,60302654	1369	0,00409336	1881	0,00038572
346	0,87694559	858	0,60006916	1370	0,00400363	1882	0,00038350
347	0,87897824	859	0,59716588	1371	0,00390837	1883	0,00038044
348	0,88098206	860	0,59431580	1372	0,00380759	1884	0,00037651
349	0,88295729	861	0,59151787	1373	0,00370130	1885	0,00037170
350	0,88490423	862	0,58877068	1374	0,00358952	1886	0,00036597
351	0,88682332	863	0,58606495	1375	0,00347268	1887	0,00035936
352	0,88871519	864	0,58338353	1376	0,00335157	1888	0,00035191
353	0,89058048	865	0,58070891	1377	0,00322699	1889	0,00034370
354	0,89241984	866	0,57802356	1378	0,00309975	1890	0,00033480
355	0,89423391	867	0,57530864	1379	0,00297088	1891	0,00032531
356	0,89602338	868	0,57254404	1380	0,00284164	1892	0,00031537
357	0,89778893	869	0,56970958	1381	0,00271328	1893	0,00030512
358	0,89953126	870	0,56678577	1382	0,00258700	1894	0,00029470

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359	0,90125142	871	0,56376860	1383	0,00246328	1895	0,00028417
360	0,90295086	872	0,56066951	1384	0,00234195	1896	0,00027354
361	0,90463104	873	0,55750064	1385	0,00222281	1897	0,00026279
362	0,90629341	874	0,55427451	1386	0,00210562	1898	0,00025191
363	0,90793946	875	0,55101301	1387	0,00198958	1899	0,00024081
364	0,90957067	876	0,54774732	1388	0,00187331	1900	0,00022933
365	0,91118856	877	0,54450907	1389	0,00175546	1901	0,00021731
366	0,91279464	878	0,54132936	1390	0,00163474	1902	0,00020458
367	0,91439073	879	0,53822744	1391	0,00151020	1903	0,00019101
368	0,91597898	880	0,53521072	1392	0,00138130	1904	0,00017654
369	0,91756153	881	0,53228613	1393	0,00124750	1905	0,00016106
370	0,91914049	882	0,52945979	1394	0,00110831	1906	0,00014452
371	0,92071690	883	0,52671997	1395	0,00096411	1907	0,00012694
372	0,92229070	884	0,52403708	1396	0,00081611	1908	0,00010848
373	0,92386182	885	0,52138072	1397	0,00066554	1909	0,00008929
374	0,92542993	886	0,51872085	1398	0,00051363	1910	0,00006953
375	0,92698946	887	0,51603570	1399	0,00036134	1911	0,00004935
376	0,92852960	888	0,51331170	1400	0,00020940	1912	0,00002884
377	0,93003929	889	0,51053560	1401	0,00005853	1913	0,00000813
378	0,93150727	890	0,50769466	1402	-0,00009058	1914	-0,00001268
379	0,93291739	891	0,50478931	1403	-0,00023783	1915	-0,00003357
380	0,93424863	892	0,50183308	1404	-0,00038368	1916	-0,00005457
381	0,93547974	893	0,49884001	1405	-0,00052861	1917	-0,00007574
382	0,93658982	894	0,49582406	1406	-0,00067310	1918	-0,00009714
383	0,93756587	895	0,49279905	1407	-0,00081757	1919	-0,00011882
384	0,93894072	896	0,48985748	1408	-0,00096237	1920	-0,00014082
385	0,93922780	897	0,48679641	1409	-0,00110786	1921	-0,00016318
386	0,93955477	898	0,48379429	1410	-0,00125442	1922	-0,00018595
387	0,93991290	899	0,48085363	1411	-0,00140210	1923	-0,00020912
388	0,94029104	900	0,47796576	1412	-0,00155065	1924	-0,00023265
389	0,94067794	901	0,47512151	1413	-0,00169984	1925	-0,00025650
390	0,94106258	902	0,47231151	1414	-0,00184940	1926	-0,00028060
391	0,94144084	903	0,46952402	1415	-0,00199911	1927	-0,00030492
392	0,94181549	904	0,46674486	1416	-0,00214872	1928	-0,00032941
393	0,94218963	905	0,46395979	1417	-0,00229798	1929	-0,00035400
394	0,94256628	906	0,46115496	1418	-0,00244664	1930	-0,00037865
395	0,94294662	907	0,45832607	1419	-0,00259462	1931	-0,00040333
396	0,94332998	908	0,45547830	1420	-0,00274205	1932	-0,00042804
397	0,94371562	909	0,45261727	1421	-0,00288912	1933	-0,00045279
398	0,94410280	910	0,44974866	1422	-0,00303596	1934	-0,00047759
399	0,94449122	911	0,44688011	1423	-0,00318259	1935	-0,00050243
400	0,94488106	912	0,44402125	1424	-0,00332890	1936	-0,00052728
401	0,94527249	913	0,44118178	1425	-0,00347480	1937	-0,00055209
402	0,94566568	914	0,43837094	1426	-0,00362024	1938	-0,00057685
403	0,94606074	915	0,43558772	1427	-0,00376519	1939	-0,00060153
404	0,94645772	916	0,43282082	1428	-0,00390962	1940	-0,00062611
405	0,94685665	917	0,43005847	1429	-0,00405345	1941	-0,00065056
406	0,94725759	918	0,42728913	1430	-0,00419658	1942	-0,00067485

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407	0,94766054	919	0,42450572	1431	-0,00433902	1943	-0,00069895
408	0,94806547	920	0,42170567	1432	-0,00448085	1944	-0,00072287
409	0,94847234	921	0,41888658	1433	-0,00462219	1945	-0,00074660
410	0,94888115	922	0,41604633	1434	-0,00476309	1946	-0,00077013
411	0,94929190	923	0,41318897	1435	-0,00490357	1947	-0,00079345
412	0,94970469	924	0,41032472	1436	-0,00504361	1948	-0,00081653
413	0,95011960	925	0,40746405	1437	-0,00518321	1949	-0,00083936
414	0,95053672	926	0,40461724	1438	-0,00532243	1950	-0,00086192
415	0,95095604	927	0,40178943	1439	-0,00546132	1951	-0,00088421
416	0,95137751	928	0,39898066	1440	-0,00559988	1952	-0,00090619
417	0,95180105	929	0,39619073	1441	-0,00573811	1953	-0,00092786
418	0,95222658	930	0,39341940	1442	-0,00587602	1954	-0,00094919
419	0,95265413	931	0,39066519	1443	-0,00601363	1955	-0,00097017
420	0,95308380	932	0,38792536	1444	-0,00615094	1956	-0,00099077
421	0,95351571	933	0,38519713	1445	-0,00628795	1957	-0,00101098
422	0,95394994	934	0,38247773	1446	-0,00642466	1958	-0,00103077
423	0,95438653	935	0,37976476	1447	-0,00656111	1959	-0,00105012
424	0,95482538	936	0,37705620	1448	-0,00669737	1960	-0,00106904
425	0,95526643	937	0,37435006	1449	-0,00683352	1961	-0,00108750
426	0,95570958	938	0,37164438	1450	-0,00696963	1962	-0,00110549
427	0,95615486	939	0,36893869	1451	-0,00710578	1963	-0,00112301
428	0,95660234	940	0,36623396	1452	-0,00724208	1964	-0,00114005
429	0,95705214	941	0,36353124	1453	-0,00737862	1965	-0,00115660
430	0,95750433	942	0,36083153	1454	-0,00751554	1966	-0,00117265
431	0,95795892	943	0,35813533	1455	-0,00765295	1967	-0,00118821
432	0,95841582	944	0,35544262	1456	-0,00779098	1968	-0,00120325
433	0,95887493	945	0,35275338	1457	-0,00792976	1969	-0,00121779
434	0,95933616	946	0,35006755	1458	-0,00806941	1970	-0,00123180
435	0,95979949	947	0,34738530	1459	-0,00821006	1971	-0,00124528
436	0,96026500	948	0,34470699	1460	-0,00835183	1972	-0,00125822
437	0,96073277	949	0,34203296	1461	-0,00849485	1973	-0,00127061
438	0,96120286	950	0,33936359	1462	-0,00863926	1974	-0,00128243
439	0,96167526	951	0,33669923	1463	-0,00878522	1975	-0,00129368
440	0,96214986	952	0,33404027	1464	-0,00893293	1976	-0,00130435
441	0,96262655	953	0,33138711	1465	-0,00908260	1977	-0,00131445
442	0,96310522	954	0,32874013	1466	-0,00923444	1978	-0,00132395
443	0,96358586	955	0,32609944	1467	-0,00938864	1979	-0,00133285
444	0,96406853	956	0,32346493	1468	-0,00954537	1980	-0,00134113
445	0,96455330	957	0,32083645	1469	-0,00970482	1981	-0,00134878
446	0,96504026	958	0,31821388	1470	-0,00986715	1982	-0,00135578
447	0,96552936	959	0,31559703	1471	-0,01003173	1983	-0,00136215
448	0,96602051	960	0,31298573	1472	-0,01019711	1984	-0,00136797
449	0,96651360	961	0,31037987	1473	-0,01036164	1985	-0,00137333
450	0,96700850	962	0,30777941	1474	-0,01052357	1986	-0,00137834
451	0,96750520	963	0,30518446	1475	-0,01068184	1987	-0,00138305
452	0,96800376	964	0,30259525	1476	-0,01083622	1988	-0,00138748
453	0,96850424	965	0,30001202	1477	-0,01098652	1989	-0,00139163
454	0,96900670	966	0,29743499	1478	-0,01113252	1990	-0,00139551

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455	0,96951112	967	0,29486428	1479	-0,01127409	1991	-0,00139913
456	0,97001738	968	0,29229989	1480	-0,01141114	1992	-0,00140249
457	0,97052533	969	0,28974179	1481	-0,01154358	1993	-0,00140559
458	0,97103488	970	0,28718997	1482	-0,01167135	1994	-0,00140844
459	0,97154597	971	0,28464452	1483	-0,01179439	1995	-0,00141102
460	0,97205867	972	0,28210562	1484	-0,01191268	1996	-0,00141334
461	0,97257304	973	0,27957346	1485	-0,01202619	1997	-0,00141538
462	0,97308915	974	0,27704820	1486	-0,01213493	1998	-0,00141714
463	0,97360694	975	0,27452992	1487	-0,01223891	1999	-0,00141861
464	0,97412631	976	0,27201854	1488	-0,01233817	2000	-0,00141978
465	0,97464711	977	0,26951399	1489	-0,01243275	2001	-0,00142064
466	0,97516923	978	0,26701622	1490	-0,01252272	2002	-0,00142117
467	0,97569262	979	0,26452533	1491	-0,01260815	2003	-0,00142138
468	0,97621735	980	0,26204158	1492	-0,01268915	2004	-0,00142125
469	0,97674350	981	0,25956526	1493	-0,01276583	2005	-0,00142077
470	0,97727111	982	0,25709662	1494	-0,01283832	2006	-0,00141992
471	0,97780016	983	0,25463583	1495	-0,01290685	2007	-0,00141870
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473	0,97886205	985	0,24973798	1497	-0,01303320	2009	-0,00141510
474	0,97939463	986	0,24730100	1498	-0,01309168	2010	-0,00141268
475	0,97992823	987	0,24487207	1499	-0,01314722	2011	-0,00140986
476	0,98046291	988	0,24245133	1500	-0,01319969	2012	-0,00140663
477	0,98099875	989	0,24003893	1501	-0,01324889	2013	-0,00140301
478	0,98153580	990	0,23763500	1502	-0,01329466	2014	-0,00139900
479	0,98207405	991	0,23523959	1503	-0,01333693	2015	-0,00139460
480	0,98261337	992	0,23285262	1504	-0,01337577	2016	-0,00138981
481	0,98315364	993	0,23047401	1505	-0,01341125	2017	-0,00138464
482	0,98369474	994	0,22810369	1506	-0,01344345	2018	-0,00137908
483	0,98423664	995	0,22574170	1507	-0,01347243	2019	-0,00137313
484	0,98477941	996	0,22338818	1508	-0,01349823	2020	-0,00136680
485	0,98532311	997	0,22104329	1509	-0,01352089	2021	-0,00136010
486	0,98586780	998	0,21870719	1510	-0,01354045	2022	-0,00135301
487	0,98641348	999	0,21637986	1511	-0,01355700	2023	-0,00134555
488	0,98696003	1000	0,21406117	1512	-0,01357068	2024	-0,00133772
489	0,98750734	1001	0,21175095	1513	-0,01358164	2025	-0,00132952
490	0,98805530	1002	0,20944904	1514	-0,01359003	2026	-0,00132095
491	0,98860389	1003	0,20715535	1515	-0,01359587	2027	-0,00131201
492	0,98915320	1004	0,20486987	1516	-0,01359901	2028	-0,00130272
493	0,98970328	1005	0,20259261	1517	-0,01359931	2029	-0,00129307
494	0,99025423	1006	0,20032356	1518	-0,01359661	2030	-0,00128309
495	0,99080602	1007	0,19806259	1519	-0,01359087	2031	-0,00127277
496	0,99135855	1008	0,19580944	1520	-0,01358219	2032	-0,00126211
497	0,99191171	1009	0,19356385	1521	-0,01357065	2033	-0,00125113
498	0,99246541	1010	0,19132556	1522	-0,01355637	2034	-0,00123981
499	0,99301962	1011	0,18909442	1523	-0,01353935	2035	-0,00122817
500	0,99357443	1012	0,18687040	1524	-0,01351949	2036	-0,00121622
501	0,99412992	1013	0,18465350	1525	-0,01349670	2037	-0,00120397
502	0,99468617	1014	0,18244372	1526	-0,01347088	2038	-0,00119141

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503	0,99524320	1015	0,18024164	1527	-0,01344214	2039	-0,00117859
504	0,99580092	1016	0,17804841	1528	-0,01341078	2040	-0,00116552
505	0,99635926	1017	0,17586521	1529	-0,01337715	2041	-0,00115223
506	0,99691814	1018	0,17369322	1530	-0,01334158	2042	-0,00113877
507	0,99747748	1019	0,17153360	1531	-0,01330442	2043	-0,00112517
508	0,99803721	1020	0,16938755	1532	-0,01326601	2044	-0,00111144
509	0,99859725	1021	0,16725622	1533	-0,01322671	2045	-0,00109764
510	0,99915752	1022	0,16514081	1534	-0,01318689	2046	-0,00108377
511	0,99971793	1023	0,16304247	1535	-0,01314692	2047	-0,00106989

In 4.A.2, add the following Table:

Table AMD9.16 — Window coefficients w_{LD} for low delay filterbank for N=960

n	$w_{LD}(n)$	n	$w_{LD}(n)$	n	$w_{LD}(n)$	n	$w_{LD}(n)$
0	0,00000000	480	1,00058131	960	0,15990780	1440	-0,01308207
1	0,00000000	481	1,00118006	961	0,15776021	1441	-0,01304153
2	0,00000000	482	1,00177930	962	0,15563325	1442	-0,01299802
3	0,00000000	483	1,00237893	963	0,15352557	1443	-0,01295155
4	0,00000000	484	1,00297887	964	0,15143584	1444	-0,01290215
5	0,00000000	485	1,00357902	965	0,14936270	1445	-0,01284980
6	0,00000000	486	1,00417927	966	0,14730481	1446	-0,01279450
7	0,00000000	487	1,00477954	967	0,14526081	1447	-0,01273625
8	0,00000000	488	1,00537972	968	0,14322937	1448	-0,01267501
9	0,00000000	489	1,00597973	969	0,14120918	1449	-0,01261077
10	0,00000000	490	1,00657959	970	0,13919977	1450	-0,01254347
11	0,00000000	491	1,00717940	971	0,13720138	1451	-0,01247306
12	0,00000000	492	1,00777926	972	0,13521422	1452	-0,01239950
13	0,00000000	493	1,00837925	973	0,13323852	1453	-0,01232277
14	0,00000000	494	1,00897929	974	0,13127445	1454	-0,01224304
15	0,00000000	495	1,00957926	975	0,12932216	1455	-0,01216055
16	0,00000000	496	1,01017901	976	0,12738181	1456	-0,01207554
17	0,00000000	497	1,01077847	977	0,12545358	1457	-0,01198813
18	0,00000000	498	1,01137769	978	0,12353773	1458	-0,01189829
19	0,00000000	499	1,01197678	979	0,12163457	1459	-0,01180590
20	0,00000000	500	1,01257582	980	0,11974436	1460	-0,01171090
21	0,00000000	501	1,01317482	981	0,11786730	1461	-0,01161335
22	0,00000000	502	1,01377365	982	0,11600347	1462	-0,01151352
23	0,00000000	503	1,01437217	983	0,11415293	1463	-0,01141167
24	0,00000000	504	1,01497025	984	0,11231573	1464	-0,01130807
25	0,00000000	505	1,01556786	985	0,11049201	1465	-0,01120289
26	0,00000000	506	1,01616510	986	0,10868196	1466	-0,01109626
27	0,00000000	507	1,01676205	987	0,10688578	1467	-0,01098830
28	0,00000000	508	1,01735876	988	0,10510362	1468	-0,01087916
29	0,00000000	509	1,01795514	989	0,10333551	1469	-0,01076898
30	0,00000000	510	1,01855103	990	0,10158143	1470	-0,01065793
31	0,00000000	511	1,01914627	991	0,09984133	1471	-0,01054618
32	0,00000000	512	1,01974076	992	0,09811524	1472	-0,01043380

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33	0,00000000	513	1,02033455	993	0,09640327	1473	-0,01032068
34	0,00000000	514	1,02092772	994	0,09470556	1474	-0,01020670
35	0,00000000	515	1,02152037	995	0,09302228	1475	-0,01009171
36	0,00000000	516	1,02211247	996	0,09135347	1476	-0,00997585
37	0,00000000	517	1,02270387	997	0,08969907	1477	-0,00985959
38	0,00000000	518	1,02329439	998	0,08805903	1478	-0,00974338
39	0,00000000	519	1,02388387	999	0,08643326	1479	-0,00962765
40	0,00000000	520	1,02447229	1000	0,08482183	1480	-0,00951273
41	0,00000000	521	1,02505972	1001	0,08322486	1481	-0,00939888
42	0,00000000	522	1,02564624	1002	0,08164249	1482	-0,00928634
43	0,00000000	523	1,02623190	1003	0,08007481	1483	-0,00917534
44	0,00000000	524	1,02681660	1004	0,07852179	1484	-0,00906604
45	0,00000000	525	1,02740017	1005	0,07698335	1485	-0,00895860
46	0,00000000	526	1,02798242	1006	0,07545938	1486	-0,00885313
47	0,00000000	527	1,02856326	1007	0,07394984	1487	-0,00874977
48	0,00000000	528	1,02914272	1008	0,07245482	1488	-0,00864862
49	0,00000000	529	1,02972087	1009	0,07097444	1489	-0,00854979
50	0,00000000	530	1,03029778	1010	0,06950883	1490	-0,00845337
51	0,00000000	531	1,03087344	1011	0,06805800	1491	-0,00835939
52	0,00000000	532	1,03144768	1012	0,06662187	1492	-0,00826785
53	0,00000000	533	1,03202035	1013	0,06520031	1493	-0,00817872
54	0,00000000	534	1,03259127	1014	0,06379324	1494	-0,00809195
55	0,00000000	535	1,03316042	1015	0,06240065	1495	-0,00800745
56	0,00000000	536	1,03372788	1016	0,06102266	1496	-0,00792506
57	0,00000000	537	1,03429373	1017	0,05965936	1497	-0,00784469
58	0,00000000	538	1,03485801	1018	0,05831084	1498	-0,00776588
59	0,00000000	539	1,03542064	1019	0,05697701	1499	-0,00768695
60	0,00000000	540	1,03598146	1020	0,05565775	1500	-0,00760568
61	0,00000000	541	1,03654030	1021	0,05435290	1501	-0,00752004
62	0,00000000	542	1,03709708	1022	0,05306239	1502	-0,00742875
63	0,00000000	543	1,03765185	1023	0,05178628	1503	-0,00733186
64	0,00000000	544	1,03820470	1024	0,05052464	1504	-0,00722976
65	0,00000000	545	1,03875571	1025	0,04927758	1505	-0,00712279
66	0,00000000	546	1,03930488	1026	0,04804510	1506	-0,00701130
67	0,00000000	547	1,03985206	1027	0,04682709	1507	-0,00689559
68	0,00000000	548	1,04039712	1028	0,04562344	1508	-0,00677595
69	0,00000000	549	1,04093989	1029	0,04443405	1509	-0,00665269
70	0,00000000	550	1,04148037	1030	0,04325893	1510	-0,00652610
71	0,00000000	551	1,04201865	1031	0,04209822	1511	-0,00639649
72	0,00000000	552	1,04255481	1032	0,04095208	1512	-0,00626417
73	0,00000000	553	1,04308893	1033	0,03982059	1513	-0,00612943
74	0,00000000	554	1,04362093	1034	0,03870371	1514	-0,00599252
75	0,00000000	555	1,04415068	1035	0,03760131	1515	-0,00585368
76	0,00000000	556	1,04467803	1036	0,03651325	1516	-0,00571315
77	0,00000000	557	1,04520292	1037	0,03543944	1517	-0,00557115
78	0,00000000	558	1,04572542	1038	0,03437987	1518	-0,00542792
79	0,00000000	559	1,04624566	1039	0,03333454	1519	-0,00528367
80	0,00000000	560	1,04676376	1040	0,03230348	1520	-0,00513864

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81	0,00000000	561	1,04727974	1041	0,03128653	1521	-0,00499301
82	0,00000000	562	1,04779350	1042	0,03028332	1522	-0,00484693
83	0,00000000	563	1,04830493	1043	0,02929346	1523	-0,00470054
84	0,00000000	564	1,04881391	1044	0,02831658	1524	-0,00455395
85	0,00000000	565	1,04932048	1045	0,02735252	1525	-0,00440733
86	0,00000000	566	1,04982477	1046	0,02640127	1526	-0,00426086
87	0,00000000	567	1,05032693	1047	0,02546283	1527	-0,00411471
88	0,00000000	568	1,05082705	1048	0,02453725	1528	-0,00396904
89	0,00000000	569	1,05132510	1049	0,02362471	1529	-0,00382404
90	0,00000000	570	1,05182098	1050	0,02272547	1530	-0,00367991
91	0,00000000	571	1,05231457	1051	0,02183980	1531	-0,00353684
92	0,00000000	572	1,05280584	1052	0,02096810	1532	-0,00339502
93	0,00000000	573	1,05329485	1053	0,02011108	1533	-0,00325472
94	0,00000000	574	1,05378171	1054	0,01926957	1534	-0,00311618
95	0,00000000	575	1,05426654	1055	0,01844439	1535	-0,00297967
96	0,00000000	576	1,05474937	1056	0,01763565	1536	-0,00284531
97	0,00000000	577	1,05523018	1057	0,01684248	1537	-0,00271307
98	0,00000000	578	1,05570892	1058	0,01606394	1538	-0,00258290
99	0,00000000	579	1,05618554	1059	0,01529909	1539	-0,00245475
100	0,00000000	580	1,05666005	1060	0,01454726	1540	-0,00232860
101	0,00000000	581	1,05713251	1061	0,01380802	1541	-0,00220447
102	0,00000000	582	1,05760297	1062	0,01308092	1542	-0,00208236
103	0,00000000	583	1,05807149	1063	0,01236569	1543	-0,00196233
104	0,00000000	584	1,05853828	1064	0,01166273	1544	-0,00184450
105	0,00000000	585	1,05900355	1065	0,01097281	1545	-0,00172906
106	0,00000000	586	1,05946756	1066	0,01029671	1546	-0,00161620
107	0,00000000	587	1,05993024	1067	0,00963479	1547	-0,00150603
108	0,00000000	588	1,06039075	1068	0,00898646	1548	-0,00139852
109	0,00000000	589	1,06084806	1069	0,00835089	1549	-0,00129358
110	0,00000000	590	1,06130111	1070	0,00772725	1550	-0,00119112
111	0,00000000	591	1,06175099	1071	0,00711521	1551	-0,00109115
112	0,00000000	592	1,06220164	1072	0,00651513	1552	-0,00099375
113	0,00000000	593	1,06265732	1073	0,00592741	1553	-0,00089902
114	0,00000000	594	1,06312146	1074	0,00535249	1554	-0,00080705
115	0,00000000	595	1,06358726	1075	0,00479089	1555	-0,00071796
116	0,00000000	596	1,06403924	1076	0,00424328	1556	-0,00063185
117	0,00000000	597	1,06446186	1077	0,00371041	1557	-0,00054886
118	0,00000000	598	1,06484048	1078	0,00319271	1558	-0,00046904
119	0,00000000	599	1,06516440	1079	0,00268947	1559	-0,00039231
120	0,00101191	600	1,06527864	1080	0,00219928	1560	-0,00031845
121	0,00440397	601	1,06498077	1081	0,00172084	1561	-0,00024728
122	0,00718669	602	1,06470196	1082	0,00125271	1562	-0,00017860
123	0,01072130	603	1,06425743	1083	0,00079311	1563	-0,00011216
124	0,01459757	604	1,06372091	1084	0,00034023	1564	-0,00004772
125	0,01875954	605	1,06311464	1085	-0,00010786	1565	0,00001500
126	0,02308987	606	1,06246622	1086	-0,00055144	1566	0,00007600
127	0,02751541	607	1,06179277	1087	-0,00098865	1567	0,00013501
128	0,03198130	608	1,06110808	1088	-0,00141741	1568	0,00019176

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129	0,03643738	609	1,06042455	1089	-0,00183557	1569	0,00024595
130	0,04085290	610	1,05974495	1090	-0,00224010	1570	0,00029720
131	0,04522835	611	1,05906206	1091	-0,00262725	1571	0,00034504
132	0,04957620	612	1,05836706	1092	-0,00299314	1572	0,00038902
133	0,05390454	613	1,05765243	1093	-0,00333475	1573	0,00042881
134	0,05821503	614	1,05691470	1094	-0,00365250	1574	0,00046456
135	0,06251214	615	1,05615178	1095	-0,00394867	1575	0,00049662
136	0,06680463	616	1,05536069	1096	-0,00422533	1576	0,00052534
137	0,07109582	617	1,05454152	1097	-0,00448528	1577	0,00055114
138	0,07538014	618	1,05370030	1098	-0,00473278	1578	0,00057459
139	0,07965207	619	1,05284445	1099	-0,00497252	1579	0,00059629
140	0,08390857	620	1,05198094	1100	-0,00520916	1580	0,00061684
141	0,08815177	621	1,05111433	1101	-0,00544584	1581	0,00063660
142	0,09238785	622	1,05024634	1102	-0,00568360	1582	0,00065568
143	0,09662163	623	1,04937859	1103	-0,00592326	1583	0,00067417
144	0,10085860	624	1,04851245	1104	-0,00616547	1584	0,00069213
145	0,10510892	625	1,04764614	1105	-0,00640861	1585	0,00070935
146	0,10938110	626	1,04677586	1106	-0,00664914	1586	0,00072545
147	0,11367819	627	1,04589855	1107	-0,00688354	1587	0,00074005
148	0,11800355	628	1,04501046	1108	-0,00710845	1588	0,00075283
149	0,12236410	629	1,04410500	1109	-0,00732136	1589	0,00076356
150	0,12676834	630	1,04317417	1110	-0,00752022	1590	0,00077209
151	0,13122384	631	1,04221010	1111	-0,00770289	1591	0,00077828
152	0,13573476	632	1,04120649	1112	-0,00786789	1592	0,00078205
153	0,14030106	633	1,04016012	1113	-0,00801521	1593	0,00078350
154	0,14492340	634	1,03906851	1114	-0,00814526	1594	0,00078275
155	0,14960315	635	1,03792894	1115	-0,00825839	1595	0,00077992
156	0,15433828	636	1,03674090	1116	-0,00835563	1596	0,00077520
157	0,15912396	637	1,03550649	1117	-0,00843882	1597	0,00076884
158	0,16395663	638	1,03422800	1118	-0,00850996	1598	0,00076108
159	0,16883310	639	1,03290769	1119	-0,00857097	1599	0,00075218
160	0,17374837	640	1,03154944	1120	-0,00862360	1600	0,00074232
161	0,17869679	641	1,03015834	1121	-0,00866943	1601	0,00073170
162	0,18367394	642	1,02873938	1122	-0,00871004	1602	0,00072048
163	0,18867661	643	1,02729712	1123	-0,00874688	1603	0,00070881
164	0,19370368	644	1,02583470	1124	-0,00878091	1604	0,00069680
165	0,19875413	645	1,02435463	1125	-0,00881277	1605	0,00068450
166	0,20382641	646	1,02285952	1126	-0,00884320	1606	0,00067201
167	0,20892055	647	1,02135114	1127	-0,00887248	1607	0,00065934
168	0,21403775	648	1,01982974	1128	-0,00890002	1608	0,00064647
169	0,21917761	649	1,01829520	1129	-0,00892494	1609	0,00063335
170	0,22433899	650	1,01674752	1130	-0,00894641	1610	0,00061994
171	0,22952250	651	1,01518534	1131	-0,00896355	1611	0,00060621
172	0,23472991	652	1,01360559	1132	-0,00897541	1612	0,00059211
173	0,23996189	653	1,01200510	1133	-0,00898104	1613	0,00057763
174	0,24521859	654	1,01038076	1134	-0,00897948	1614	0,00056274
175	0,25049930	655	1,00872996	1135	-0,00896990	1615	0,00054743
176	0,25580312	656	1,00705045	1136	-0,00895149	1616	0,00053169

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177	0,26112942	657	1,00533999	1137	-0,00892346	1617	0,00051553
178	0,26647748	658	1,00359618	1138	-0,00888519	1618	0,00049897
179	0,27184703	659	1,00181613	1139	-0,00883670	1619	0,00048206
180	0,27723785	660	0,99999673	1140	-0,00877839	1620	0,00046487
181	0,28264967	661	0,99813477	1141	-0,00871058	1621	0,00044748
182	0,28808086	662	0,99622793	1142	-0,00863388	1622	0,00042996
183	0,29352832	663	0,99427571	1143	-0,00854936	1623	0,00041241
184	0,29898979	664	0,99227814	1144	-0,00845826	1624	0,00039492
185	0,30446379	665	0,99023501	1145	-0,00836179	1625	0,00037759
186	0,30994292	666	0,98815128	1146	-0,00826124	1626	0,00036049
187	0,31541664	667	0,98603857	1147	-0,00815807	1627	0,00034371
188	0,32087942	668	0,98390898	1148	-0,00805372	1628	0,00032732
189	0,32632772	669	0,98177413	1149	-0,00794953	1629	0,00031137
190	0,33176291	670	0,97964151	1150	-0,00784572	1630	0,00029587
191	0,33718641	671	0,97751528	1151	-0,00774156	1631	0,00028080
192	0,34259612	672	0,97539999	1152	-0,00763634	1632	0,00026612
193	0,34799346	673	0,97329751	1153	-0,00752929	1633	0,00025183
194	0,35338857	674	0,97119933	1154	-0,00741941	1634	0,00023789
195	0,35878843	675	0,96909179	1155	-0,00730556	1635	0,00022428
196	0,36419504	676	0,96696152	1156	-0,00718664	1636	0,00021097
197	0,36960630	677	0,96479824	1157	-0,00706184	1637	0,00019797
198	0,37501567	678	0,96259840	1158	-0,00693107	1638	0,00018530
199	0,38042067	679	0,96036028	1159	-0,00679443	1639	0,00017297
200	0,38582069	680	0,95808180	1160	-0,00665200	1640	0,00016100
201	0,39121276	681	0,95576295	1161	-0,00650428	1641	0,00014942
202	0,39659312	682	0,95340622	1162	-0,00635230	1642	0,00013827
203	0,40195993	683	0,95101436	1163	-0,00619718	1643	0,00012757
204	0,40731155	684	0,94859030	1164	-0,00603995	1644	0,00011736
205	0,41264382	685	0,94614009	1165	-0,00588133	1645	0,00010764
206	0,41795277	686	0,94367232	1166	-0,00572169	1646	0,00009841
207	0,42323670	687	0,94119555	1167	-0,00556143	1647	0,00008969
208	0,42849480	688	0,93871796	1168	-0,00540085	1648	0,00008145
209	0,43372753	689	0,93624630	1169	-0,00523988	1649	0,00007369
210	0,43893452	690	0,93378636	1170	-0,00507828	1650	0,00006641
211	0,44411398	691	0,93134465	1171	-0,00491582	1651	0,00005958
212	0,44927117	692	0,92892076	1172	-0,00475220	1652	0,00005320
213	0,45441882	693	0,92649974	1173	-0,00458693	1653	0,00004725
214	0,45956191	694	0,92406255	1174	-0,00441953	1654	0,00004171
215	0,46470167	695	0,92159041	1175	-0,00424950	1655	0,00003659
216	0,46983016	696	0,91907411	1176	-0,00407681	1656	0,00003186
217	0,47493636	697	0,91651711	1177	-0,00390204	1657	0,00002752
218	0,48001827	698	0,91392425	1178	-0,00372581	1658	0,00002357
219	0,48507480	699	0,91130056	1179	-0,00354874	1659	0,00002000
220	0,49010240	700	0,90865471	1180	-0,00337115	1660	0,00001679
221	0,49509781	701	0,90599838	1181	-0,00319318	1661	0,00001392
222	0,50005986	702	0,90334350	1182	-0,00301494	1662	0,00001140
223	0,50499037	703	0,90069934	1183	-0,00283652	1663	0,00000918
224	0,50989790	704	0,89806435	1184	-0,00265797	1664	0,00000726

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225	0,51478708	705	0,89543132	1185	-0,00247934	1665	0,00000562
226	0,51965805	706	0,89279335	1186	-0,00230066	1666	0,00000424
227	0,52450975	707	0,89014496	1187	-0,00212197	1667	0,00000309
228	0,52933955	708	0,88748403	1188	-0,00194331	1668	0,00000217
229	0,53414668	709	0,88480945	1189	-0,00176471	1669	0,00000143
230	0,53893113	710	0,88211997	1190	-0,00158620	1670	0,00000088
231	0,54369178	711	0,87941558	1191	-0,00140787	1671	0,00000048
232	0,54842731	712	0,87669794	1192	-0,00122989	1672	0,00000020
233	0,55313757	713	0,87396891	1193	-0,00105244	1673	0,00000004
234	0,55782259	714	0,87123030	1194	-0,00087567	1674	-0,00000004
235	0,56248253	715	0,86848394	1195	-0,00069976	1675	-0,00000006
236	0,56711762	716	0,86573164	1196	-0,00052487	1676	-0,00000004
237	0,57172819	717	0,86297523	1197	-0,00035115	1677	0,00000000
238	0,57631468	718	0,86021649	1198	-0,00017875	1678	0,00000002
239	0,58087761	719	0,85745725	1199	-0,00000782	1679	0,00000000
240	0,58719976	720	0,85474342	1200	0,00000779	1680	0,00000000
241	0,59173064	721	0,85193656	1201	0,00017701	1681	0,00000002
242	0,59623644	722	0,84911455	1202	0,00034552	1682	0,00000000
243	0,60071719	723	0,84627969	1203	0,00051313	1683	-0,00000004
244	0,60517294	724	0,84343424	1204	0,00067966	1684	-0,00000005
245	0,60960372	725	0,84058046	1205	0,00084492	1685	-0,00000004
246	0,61400958	726	0,83772057	1206	0,00100873	1686	0,00000004
247	0,61839056	727	0,83485680	1207	0,00117093	1687	0,00000019
248	0,62274670	728	0,83199134	1208	0,00133133	1688	0,00000045
249	0,62707805	729	0,82912621	1209	0,00148978	1689	0,00000083
250	0,63138475	730	0,82626143	1210	0,00164611	1690	0,00000134
251	0,63566700	731	0,82339529	1211	0,00180023	1691	0,00000201
252	0,63992500	732	0,82052619	1212	0,00195211	1692	0,00000285
253	0,64415895	733	0,81765147	1213	0,00210172	1693	0,00000387
254	0,64836893	734	0,81476433	1214	0,00224898	1694	0,00000510
255	0,65255499	735	0,81185593	1215	0,00239383	1695	0,00000654
256	0,65671715	736	0,80891701	1216	0,00253618	1696	0,00000821
257	0,66085548	737	0,80594452	1217	0,00267593	1697	0,00001011
258	0,66497005	738	0,80294885	1218	0,00281306	1698	0,00001227
259	0,66906094	739	0,79994431	1219	0,00294756	1699	0,00001468
260	0,67312824	740	0,79694485	1220	0,00307942	1700	0,00001735
261	0,67717199	741	0,79396166	1221	0,00320864	1701	0,00002030
262	0,68119219	742	0,79100220	1222	0,00333502	1702	0,00002352
263	0,68518882	743	0,78807349	1223	0,00345816	1703	0,00002702
264	0,68916187	744	0,78518123	1224	0,00357762	1704	0,00003080
265	0,69311129	745	0,78231422	1225	0,00369297	1705	0,00003486
266	0,69703698	746	0,77944709	1226	0,00380414	1706	0,00003918
267	0,70093884	747	0,77655407	1227	0,00391140	1707	0,00004379
268	0,70481679	748	0,77361369	1228	0,00401499	1708	0,00004866
269	0,70867071	749	0,77062281	1229	0,00411524	1709	0,00005382
270	0,71250047	750	0,76758806	1230	0,00421242	1710	0,00005924
271	0,71630596	751	0,76451506	1231	0,00430678	1711	0,00006495
272	0,72008705	752	0,76141145	1232	0,00439859	1712	0,00007093

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273	0,72384360	753	0,75828860	1233	0,00448799	1713	0,00007719
274	0,72757549	754	0,75515892	1234	0,00457487	1714	0,00008373
275	0,73128256	755	0,75203479	1235	0,00465908	1715	0,00009053
276	0,73496463	756	0,74892561	1236	0,00474045	1716	0,00009758
277	0,73862141	757	0,74583682	1237	0,00481857	1717	0,00010488
278	0,74225263	758	0,74277342	1238	0,00489277	1718	0,00011240
279	0,74585799	759	0,73974008	1239	0,00496235	1719	0,00012010
280	0,74943730	760	0,73673754	1240	0,00502666	1720	0,00012796
281	0,75299039	761	0,73376310	1241	0,00508546	1721	0,00013596
282	0,75651711	762	0,73081444	1242	0,00513877	1722	0,00014406
283	0,76001729	763	0,72788616	1243	0,00518662	1723	0,00015226
284	0,76349062	764	0,72496070	1244	0,00522904	1724	0,00016053
285	0,76693670	765	0,72201426	1245	0,00526648	1725	0,00016886
286	0,77035516	766	0,71902283	1246	0,00529956	1726	0,00017725
287	0,77374564	767	0,71596990	1247	0,00532895	1727	0,00018571
288	0,77710790	768	0,71285541	1248	0,00535532	1728	0,00019424
289	0,78044169	769	0,70968427	1249	0,00537929	1729	0,00020286
290	0,78374678	770	0,70646064	1250	0,00540141	1730	0,00021156
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292	0,79026979	772	0,69991077	1252	0,00544196	1732	0,00022928
293	0,79348715	773	0,69662714	1253	0,00545981	1733	0,00023825
294	0,79667471	774	0,69336592	1254	0,00547515	1734	0,00024724
295	0,79983215	775	0,69013742	1255	0,00548726	1735	0,00025621
296	0,80295914	776	0,68694302	1256	0,00549542	1736	0,00026509
297	0,80605536	777	0,68378420	1257	0,00549899	1737	0,00027385
298	0,80912047	778	0,68066143	1258	0,00549732	1738	0,00028241
299	0,81215417	779	0,67757157	1259	0,00548986	1739	0,00029072
300	0,81515616	780	0,67450951	1260	0,00547633	1740	0,00029874
301	0,81812616	781	0,67147030	1261	0,00545664	1741	0,00030643
302	0,82106389	782	0,66844879	1262	0,00543067	1742	0,00031374
303	0,82396915	783	0,66543949	1263	0,00539849	1743	0,00032065
304	0,82684176	784	0,66243677	1264	0,00536061	1744	0,00032715
305	0,82968154	785	0,65943505	1265	0,00531757	1745	0,00033325
306	0,83248830	786	0,65642755	1266	0,00526993	1746	0,00033895
307	0,83526186	787	0,65340591	1267	0,00521822	1747	0,00034425
308	0,83800204	788	0,65036160	1268	0,00516300	1748	0,00034917
309	0,84070866	789	0,64728630	1269	0,00510485	1749	0,00035374
310	0,84338156	790	0,64417440	1270	0,00504432	1750	0,00035796
311	0,84602058	791	0,64102268	1271	0,00498194	1751	0,00036187
312	0,84862556	792	0,63782771	1272	0,00491822	1752	0,00036549
313	0,85119636	793	0,63458757	1273	0,00485364	1753	0,00036883
314	0,85373292	794	0,63130628	1274	0,00478862	1754	0,00037194
315	0,85623523	795	0,62799109	1275	0,00472309	1755	0,00037479
316	0,85870326	796	0,62464879	1276	0,00465675	1756	0,00037736
317	0,86113701	797	0,62128816	1277	0,00458939	1757	0,00037963
318	0,86353649	798	0,61792203	1278	0,00452067	1758	0,00038154
319	0,86590173	799	0,61456438	1279	0,00445003	1759	0,00038306
320	0,86823275	800	0,61122915	1280	0,00437688	1760	0,00038411

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321	0,87052968	801	0,60792802	1281	0,00430063	1761	0,00038462
322	0,87279275	802	0,60466971	1282	0,00422062	1762	0,00038453
323	0,87502220	803	0,60146257	1283	0,00413609	1763	0,00038373
324	0,87721829	804	0,59831460	1284	0,00404632	1764	0,00038213
325	0,87938130	805	0,59522876	1285	0,00395060	1765	0,00037965
326	0,88151157	806	0,59220375	1286	0,00384863	1766	0,00037621
327	0,88360940	807	0,58923859	1287	0,00374044	1767	0,00037179
328	0,88567517	808	0,58632936	1288	0,00362600	1768	0,00036636
329	0,88770954	809	0,58346064	1289	0,00350540	1769	0,00035989
330	0,88971328	810	0,58061078	1290	0,00337934	1770	0,00035244
331	0,89168716	811	0,57775874	1291	0,00324885	1771	0,00034407
332	0,89363199	812	0,57488246	1292	0,00311486	1772	0,00033488
333	0,89554856	813	0,57195790	1293	0,00297849	1773	0,00032497
334	0,89743771	814	0,56896078	1294	0,00284122	1774	0,00031449
335	0,89930025	815	0,56586637	1295	0,00270458	1775	0,00030361
336	0,90113740	816	0,56266594	1296	0,00257013	1776	0,00029252
337	0,90295086	817	0,55937186	1297	0,00243867	1777	0,00028133
338	0,90474240	818	0,55599898	1298	0,00231005	1778	0,00027003
339	0,90651380	819	0,55256299	1299	0,00218399	1779	0,00025862
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341	0,91000335	821	0,54562376	1301	0,00193766	1781	0,00023524
342	0,91172515	822	0,54219742	1302	0,00181460	1782	0,00022297
343	0,91343416	823	0,53884728	1303	0,00168938	1783	0,00021004
344	0,91513276	824	0,53559047	1304	0,00156050	1784	0,00019626
345	0,91682357	825	0,53243453	1305	0,00142701	1785	0,00018150
346	0,91850924	826	0,52938894	1306	0,00128831	1786	0,00016566
347	0,92019170	827	0,52645052	1307	0,00114365	1787	0,00014864
348	0,92187129	828	0,52358958	1308	0,00099297	1788	0,00013041
349	0,92354778	829	0,52076862	1309	0,00083752	1789	0,00011112
350	0,92522116	830	0,51795080	1310	0,00067884	1790	0,00009096
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353	0,93013861	833	0,50927733	1313	0,00019720	1793	0,00002718
354	0,93169897	834	0,50625944	1314	0,00003813	1794	0,00000530
355	0,93319114	835	0,50317073	1315	-0,00011885	1795	-0,00001667
356	0,93458502	836	0,50002767	1316	-0,00027375	1796	-0,00003871
357	0,93587626	837	0,49685021	1317	-0,00042718	1797	-0,00006090
358	0,93694276	838	0,49364116	1318	-0,00057975	1798	-0,00008331
359	0,93825562	839	0,49048690	1319	-0,00073204	1799	-0,00010600
360	0,93882222	840	0,48726128	1320	-0,00088453	1800	-0,00012902
361	0,93910780	841	0,48404889	1321	-0,00103767	1801	-0,00015244
362	0,93944183	842	0,48090875	1322	-0,00119192	1802	-0,00017631
363	0,93981497	843	0,47783482	1323	-0,00134747	1803	-0,00020065
364	0,94021434	844	0,47481564	1324	-0,00150411	1804	-0,00022541
365	0,94062629	845	0,47184024	1325	-0,00166151	1805	-0,00025052
366	0,94103714	846	0,46889391	1326	-0,00181932	1806	-0,00027594
367	0,94144084	847	0,46595836	1327	-0,00197723	1807	-0,00030159
368	0,94184042	848	0,46301611	1328	-0,00213493	1808	-0,00032740

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369	0,94223966	849	0,46005089	1329	-0,00229210	1809	-0,00035332
370	0,94264206	850	0,45705924	1330	-0,00244849	1810	-0,00037928
371	0,94304859	851	0,45404822	1331	-0,00260415	1811	-0,00040527
372	0,94345831	852	0,45102447	1332	-0,00275928	1812	-0,00043131
373	0,94387033	853	0,44799543	1333	-0,00291410	1813	-0,00045741
374	0,94428390	854	0,44497138	1334	-0,00306879	1814	-0,00048357
375	0,94469895	855	0,44196397	1335	-0,00322332	1815	-0,00050978
376	0,94511572	856	0,43898547	1336	-0,00337759	1816	-0,00053599
377	0,94553441	857	0,43604105	1337	-0,00353145	1817	-0,00056217
378	0,94595520	858	0,43312057	1338	-0,00368470	1818	-0,00058827
379	0,94637816	859	0,43020942	1339	-0,00383722	1819	-0,00061423
380	0,94680335	860	0,42729337	1340	-0,00398892	1820	-0,00064002
381	0,94723080	861	0,42436272	1341	-0,00413972	1821	-0,00066562
382	0,94766054	862	0,42141388	1342	-0,00428967	1822	-0,00069100
383	0,94809253	863	0,41844400	1343	-0,00443889	1823	-0,00071616
384	0,94852674	864	0,41545081	1344	-0,00458749	1824	-0,00074110
385	0,94896314	865	0,41244014	1345	-0,00473571	1825	-0,00076584
386	0,94940178	866	0,40942464	1346	-0,00488366	1826	-0,00079036
387	0,94984276	867	0,40641716	1347	-0,00503137	1827	-0,00081465
388	0,95028618	868	0,40342874	1348	-0,00517887	1828	-0,00083869
389	0,95073213	869	0,40046292	1349	-0,00532610	1829	-0,00086245
390	0,95118056	870	0,39751923	1350	-0,00547302	1830	-0,00088590
391	0,95163139	871	0,39459758	1351	-0,00561965	1831	-0,00090901
392	0,95208451	872	0,39169692	1352	-0,00576598	1832	-0,00093176
393	0,95253992	873	0,38881435	1353	-0,00591199	1833	-0,00095413
394	0,95299770	874	0,38594643	1354	-0,00605766	1834	-0,00097608
395	0,95345799	875	0,38308980	1355	-0,00620300	1835	-0,00099758
396	0,95392092	876	0,38024146	1356	-0,00634801	1836	-0,00101862
397	0,95438653	877	0,37739896	1357	-0,00649273	1837	-0,00103918
398	0,95485472	878	0,37455986	1358	-0,00663727	1838	-0,00105924
399	0,95532539	879	0,37172187	1359	-0,00678170	1839	-0,00107879
400	0,95579847	880	0,36888463	1360	-0,00692617	1840	-0,00109783
401	0,95627397	881	0,36604937	1361	-0,00707084	1841	-0,00111635
402	0,95675201	882	0,36321735	1362	-0,00721583	1842	-0,00113434
403	0,95723273	883	0,36038967	1363	-0,00736129	1843	-0,00115181
404	0,95771618	884	0,35756668	1364	-0,00750735	1844	-0,00116873
405	0,95820232	885	0,35474832	1365	-0,00765415	1845	-0,00118510
406	0,95869103	886	0,35193455	1366	-0,00780184	1846	-0,00120091
407	0,95918218	887	0,34912542	1367	-0,00795060	1847	-0,00121615
408	0,95967573	888	0,34632129	1368	-0,00810058	1848	-0,00123082
409	0,96017172	889	0,34352258	1369	-0,00825195	1849	-0,00124490
410	0,96067026	890	0,34072974	1370	-0,00840487	1850	-0,00125838
411	0,96117144	891	0,33794323	1371	-0,00855950	1851	-0,00127125
412	0,96167526	892	0,33516354	1372	-0,00871607	1852	-0,00128350
413	0,96218157	893	0,33239114	1373	-0,00887480	1853	-0,00129511
414	0,96269026	894	0,32962648	1374	-0,00903596	1854	-0,00130610
415	0,96320119	895	0,32686967	1375	-0,00919978	1855	-0,00131643
416	0,96371437	896	0,32412042	1376	-0,00936650	1856	-0,00132610

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417	0,96422988	897	0,32137919	1377	-0,00953635	1857	-0,00133509
418	0,96474782	898	0,31864044	1378	-0,00970931	1858	-0,00134334
419	0,96526824	899	0,31588373	1379	-0,00988421	1859	-0,00135069
420	0,96579106	900	0,31309909	1380	-0,01005916	1860	-0,00135711
421	0,96631614	901	0,31028631	1381	-0,01023208	1861	-0,00136272
422	0,96684334	902	0,30745528	1382	-0,01040130	1862	-0,00136768
423	0,96737257	903	0,30462678	1383	-0,01056627	1863	-0,00137225
424	0,96790390	904	0,30180656	1384	-0,01072678	1864	-0,00137649
425	0,96843740	905	0,29899424	1385	-0,01088259	1865	-0,00138042
426	0,96897315	906	0,29619082	1386	-0,01103348	1866	-0,00138404
427	0,96951112	907	0,29339717	1387	-0,01117933	1867	-0,00138737
428	0,97005119	908	0,29061333	1388	-0,01132004	1868	-0,00139041
429	0,97059318	909	0,28783935	1389	-0,01145552	1869	-0,00139317
430	0,97113697	910	0,28507563	1390	-0,01158573	1870	-0,00139565
431	0,97168253	911	0,28232266	1391	-0,01171065	1871	-0,00139785
432	0,97222994	912	0,27958067	1392	-0,01183025	1872	-0,00139976
433	0,97277928	913	0,27684984	1393	-0,01194454	1873	-0,00140137
434	0,97333058	914	0,27413017	1394	-0,01205352	1874	-0,00140267
435	0,97388375	915	0,27142157	1395	-0,01215722	1875	-0,00140366
436	0,97443863	916	0,26872396	1396	-0,01225572	1876	-0,00140432
437	0,97499505	917	0,26603737	1397	-0,01234911	1877	-0,00140464
438	0,97555292	918	0,26336211	1398	-0,01243749	1878	-0,00140461
439	0,97611230	919	0,26069855	1399	-0,01252102	1879	-0,00140423
440	0,97667326	920	0,25804700	1400	-0,01259985	1880	-0,00140347
441	0,97723589	921	0,25540830	1401	-0,01267419	1881	-0,00140235
442	0,97780016	922	0,25278329	1402	-0,01274437	1882	-0,00140084
443	0,97836592	923	0,25017211	1403	-0,01281078	1883	-0,00139894
444	0,97893300	924	0,24757451	1404	-0,01287379	1884	-0,00139664
445	0,97950127	925	0,24498713	1405	-0,01293350	1885	-0,00139388
446	0,98007071	926	0,24240740	1406	-0,01298972	1886	-0,00139065
447	0,98064139	927	0,23983550	1407	-0,01304224	1887	-0,00138694
448	0,98121342	928	0,23727200	1408	-0,01309086	1888	-0,00138278
449	0,98178684	929	0,23471866	1409	-0,01313556	1889	-0,00137818
450	0,98236156	930	0,23217624	1410	-0,01317644	1890	-0,00137317
451	0,98293743	931	0,22964458	1411	-0,01321357	1891	-0,00136772
452	0,98351428	932	0,22712346	1412	-0,01324707	1892	-0,00136185
453	0,98409205	933	0,22461258	1413	-0,01327697	1893	-0,00135556
454	0,98467078	934	0,22211202	1414	-0,01330334	1894	-0,00134884
455	0,98525056	935	0,21962197	1415	-0,01332622	1895	-0,00134170
456	0,98583146	936	0,21714290	1416	-0,01334570	1896	-0,00133415
457	0,98641348	937	0,21467522	1417	-0,01336194	1897	-0,00132619
458	0,98699650	938	0,21221877	1418	-0,01337510	1898	-0,00131784
459	0,98758037	939	0,20977323	1419	-0,01338538	1899	-0,00130908
460	0,98816497	940	0,20733693	1420	-0,01339276	1900	-0,00129991
461	0,98875030	941	0,20490860	1421	-0,01339708	1901	-0,00129031
462	0,98933647	942	0,20248823	1422	-0,01339816	1902	-0,00128031
463	0,98992356	943	0,20007615	1423	-0,01339584	1903	-0,00126990
464	0,99051163	944	0,19767358	1424	-0,01339014	1904	-0,00125912

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465	0,99110062	945	0,19528091	1425	-0,01338116	1905	-0,00124797
466	0,99169038	946	0,19289781	1426	-0,01336903	1906	-0,00123645
467	0,99228079	947	0,19052347	1427	-0,01335382	1907	-0,00122458
468	0,99287177	948	0,18815661	1428	-0,01333545	1908	-0,00121233
469	0,99346341	949	0,18579693	1429	-0,01331381	1909	-0,00119972
470	0,99405581	950	0,18344441	1430	-0,01328876	1910	-0,00118676
471	0,99464907	951	0,18110010	1431	-0,01326033	1911	-0,00117347
472	0,99524320	952	0,17876595	1432	-0,01322880	1912	-0,00115988
473	0,99583812	953	0,17644344	1433	-0,01319457	1913	-0,00114605
474	0,99643375	954	0,17413400	1434	-0,01315806	1914	-0,00113200
475	0,99702997	955	0,17183905	1435	-0,01311968	1915	-0,00111778
476	0,99762671	956	0,16956003	1436	-0,01307987	1916	-0,00110343
477	0,99822386	957	0,16729836	1437	-0,01303906	1917	-0,00108898
478	0,99882134	958	0,16505547	1438	-0,01299769	1918	-0,00107448
479	0,99941903	959	0,16283278	1439	-0,01295623	1919	-0,00105995

In 4.A.6, add the following Table:

Table AMD9.17 — Coefficients c[i] of the CLDFB window

i	c[i]	i	c[i]	i	c[i]	i	c[i]
0	1.129580193872797e-002	**160**	-2.726484300186575e-002	**320**	-3.597475533950260e-003	**480**	2.666444630171025e-004
1	2.353059744904218e-002	**161**	-1.711323992709580e-002	**321**	-3.318857985461042e-003	**481**	7.872592352725688e-005
2	3.450718748721251e-002	**162**	-7.298197371320593e-003	**322**	-3.000422543655664e-003	**482**	7.095886893185526e-005
3	4.634695977000525e-002	**163**	2.184256929356781e-003	**323**	-2.658042081080524e-003	**483**	5.643103068471008e-005
4	5.918677345174197e-002	**164**	1.132324047372148e-002	**324**	-2.292813563887493e-003	**484**	6.904415362098980e-005
5	7.325978412117062e-002	**165**	2.012236990754980e-002	**325**	-1.914114740669928e-003	**485**	4.694251739991356e-005
6	8.829745229234007e-002	**166**	2.857528272530154e-002	**326**	-1.525818616748839e-003	**486**	3.367998338617662e-005
7	1.042033024802571e-001	**167**	3.666942822678171e-002	**327**	-1.156680209049319e-003	**487**	6.481921021601837e-005
8	1.206924277410051e-001	**168**	4.439683978044157e-002	**328**	-7.804546272743493e-004	**488**	6.582328030188790e-005
9	1.376149808913910e-001	**169**	5.177964768870787e-002	**329**	-4.268574601396473e-004	**489**	-4.256442530773449e-005
10	1.547461142258783e-001	**170**	5.881296711410786e-002	**330**	-1.324291707264515e-004	**490**	4.939392400898679e-005
11	1.719726384566089e-001	**171**	6.550209046893848e-002	**331**	1.218226450050751e-004	**491**	5.272982009116034e-005
12	1.891590407342011e-001	**172**	7.184073822817207e-002	**332**	3.189336138130849e-004	**492**	4.005269212731273e-005
13	2.062605107774960e-001	**173**	7.783299328224960e-002	**333**	4.749931197951235e-004	**493**	2.461876679726978e-005
14	2.232276864673650e-001	**174**	8.347150698567406e-002	**334**	5.970696819774243e-004	**494**	4.469729032194765e-006
15	2.400768261284114e-001	**175**	8.875756217893037e-002	**335**	6.673250213055329e-004	**495**	3.798519731621893e-007
16	2.568176309566753e-001	**176**	9.368651761350569e-002	**336**	6.887783835812338e-004	**496**	1.374896222030490e-006
17	2.734977190313227e-001	**177**	9.826251129465624e-002	**337**	6.766320515830324e-004	**497**	3.965363805500215e-006
18	2.901491317310591e-001	**178**	1.024804711677230e-001	**338**	6.944123176012471e-004	**498**	7.300588863934780e-006
19	3.068186515423912e-001	**179**	1.063454554357498e-001	**339**	7.139919634325070e-004	**499**	1.168894474770061e-005
20	3.235298682841570e-001	**180**	1.098551252869576e-001	**340**	7.154123487609100e-004	**500**	8.563819899447630e-006
21	3.403074146062977e-001	**181**	1.130180022553412e-001	**341**	7.376101027486600e-004	**501**	8.975977837330335e-006
22	3.571527896130669e-001	**182**	1.158358935177899e-001	**342**	6.976561203768226e-004	**502**	2.800455533708622e-005
23	3.740643974275026e-001	**183**	1.183233335449968e-001	**343**	5.721223454434728e-004	**503**	2.015445311139832e-005
24	3.910243970160607e-001	**184**	1.204854506722672e-001	**344**	2.934875643581191e-004	**504**	1.125134651175812e-005
25	4.080154903861317e-001	**185**	1.223371395264402e-001	**345**	1.092526149391273e-004	**505**	5.869707265615299e-006
26	4.250144186334534e-001	**186**	1.238868653862843e-001	**346**	6.415402443848103e-004	**506**	1.013259758329981e-005

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27	4.420013942269341e-001	**187**	1.251477258491527e-001	**347**	1.194730618383423e-003	**507**	1.088325131492173e-005
28	4.589582896478246e-001	**188**	1.261262023246478e-001	**348**	1.557112059887280e-003	**508**	7.167101260771279e-006
29	4.758753745532750e-001	**189**	1.268280540744526e-001	**349**	1.891971801393744e-003	**509**	4.840577540089826e-006
30	4.927463828072591e-001	**190**	1.272498700590511e-001	**350**	2.225524159129023e-003	**510**	-1.469933448634890e-005
31	5.095720854151864e-001	**191**	1.273590703506806e-001	**351**	2.530906981099261e-003	**511**	-8.010079089953001e-006
32	5.263554446856779e-001	**192**	1.274567595465545e-001	**352**	2.719749515067397e-003	**512**	-3.299004046633323e-005
33	5.430990601899994e-001	**193**	1.275561350483646e-001	**353**	2.729136737522100e-003	**513**	-4.373302115187172e-005
34	5.598052330684253e-001	**194**	1.273648326872248e-001	**354**	2.703019498899013e-003	**514**	-3.177468256997963e-005
35	5.764734796907189e-001	**195**	1.269415772180714e-001	**355**	2.630471852319136e-003	**515**	-2.976824036182567e-005
36	5.930981800982896e-001	**196**	1.262995646340671e-001	**356**	2.470456304276468e-003	**516**	-2.464228015326852e-005
37	6.096690552916387e-001	**197**	1.254605188749804e-001	**357**	2.239142906871446e-003	**517**	-1.606050838620834e-005
38	6.261725236758639e-001	**198**	1.244269583009826e-001	**358**	2.033465291493264e-003	**518**	-6.261944255489322e-006
39	6.425939632009995e-001	**199**	1.232131583108813e-001	**359**	1.948069005335563e-003	**519**	4.591009581217994e-007
40	6.589148753746076e-001	**200**	1.218183974842866e-001	**360**	1.725029670030533e-003	**520**	1.395220723090848e-005
41	6.751199626157149e-001	**201**	1.202545652840080e-001	**361**	1.417366709895927e-003	**521**	1.622786214398703e-005
42	6.911981575264606e-001	**202**	1.185243106889108e-001	**362**	1.127141815310061e-003	**522**	-2.043464113212971e-006
43	7.071447728928043e-001	**203**	1.166399102636992e-001	**363**	8.089811988213151e-004	**523**	-1.653463907257247e-006
44	7.229599104052475e-001	**204**	1.146042249339280e-001	**364**	4.708009521678285e-004	**524**	-1.551250801467300e-008
45	7.386515025302785e-001	**205**	1.124296184976912e-001	**365**	7.882620739833088e-005	**525**	-1.907927361317977e-006
46	7.542294504292890e-001	**206**	1.101215600923314e-001	**366**	-2.998739993995956e-004	**526**	-9.607068622268791e-007
47	7.697093346240386e-001	**207**	1.076972053405737e-001	**367**	-4.733148292475610e-004	**527**	-4.636105364510011e-007
48	7.851012620144958e-001	**208**	1.051641975499523e-001	**368**	-5.791145447913150e-004	**528**	-2.765649762593200e-007
49	8.004165237845137e-001	**209**	1.025397604985405e-001	**369**	-6.754935404082003e-004	**529**	-1.922074581855119e-006
50	8.156523162880560e-001	**210**	9.982957934346254e-002	**370**	-8.029620210721900e-004	**530**	-9.897194091136331e-007
51	8.308039608112368e-001	**211**	9.705239536075722e-002	**371**	-9.726698841994444e-004	**531**	-7.873304717454037e-008
52	8.458450064727010e-001	**212**	9.421624116597689e-002	**372**	-1.196637962311630e-003	**532**	2.945239208477290e-008
53	8.607492455327098e-001	**213**	9.133590931873967e-002	**373**	-1.292865844760059e-003	**533**	-2.757610624807679e-006
54	8.754640719350776e-001	**214**	8.841813387276727e-002	**374**	-1.146268465739874e-003	**534**	-1.402925247695813e-005
55	8.899474405744183e-001	**215**	8.547715661443602e-002	**375**	-1.040598055074471e-003	**535**	-9.388962780643742e-006
56	9.041286138017367e-001	**216**	8.251962055343706e-002	**376**	-9.767709065548874e-004	**536**	2.068297421740023e-005
57	9.179666107725365e-001	**217**	7.955570759229536e-002	**377**	-9.294665200453614e-004	**537**	1.496435902895210e-007
58	9.313874086278087e-001	**218**	7.657649751612349e-002	**378**	-9.862027119530482e-004	**538**	6.757014945674924e-009
59	9.443802853939540e-001	**219**	7.360559211914287e-002	**379**	-1.047654674829846e-003	**539**	-2.778618354859861e-007
60	9.568885413848645e-001	**220**	7.064948295960993e-002	**380**	-1.099000599887377e-003	**540**	-1.569003268449803e-006
61	9.690016637782843e-001	**221**	6.771675107480543e-002	**381**	-1.151795860160292e-003	**541**	-1.089500601234349e-006
62	9.807691702375303e-001	**222**	6.480448458935215e-002	**382**	-1.194743370333155e-003	**542**	-9.870547653835426e-007
63	9.927543720639498e-001	**223**	6.192692754258131e-002	**383**	-1.250742797799558e-003	**543**	3.867483283567218e-005
64	1.001463112557766e+000	**224**	5.911363249658311e-002	**384**	1.287819050086379e-003	**544**	-1.232693496472088e-005
65	1.006893331637123e+000	**225**	5.637219228757212e-002	**385**	1.263569296641556e-003	**545**	9.464782951082177e-007
66	1.012508393574432e+000	**226**	5.368313072045600e-002	**386**	1.226113111394085e-003	**546**	8.254429452094225e-007
67	1.017729040219375e+000	**227**	5.105620793438655e-002	**387**	1.177515087338257e-003	**547**	4.883304950437536e-007
68	1.022470190536100e+000	**228**	4.849284995895640e-002	**388**	1.122503050159859e-003	**548**	-2.066961713890010e-007
69	1.026615653698808e+000	**229**	4.599068181839981e-002	**389**	1.089428846944533e-003	**549**	5.158212471036245e-009
70	1.030198648769593e+000	**230**	4.355568588898841e-002	**390**	1.054963366189962e-003	**550**	2.267731106642486e-007
71	1.033205850580933e+000	**231**	4.125570251909672e-002	**391**	9.019128558297515e-004	**551**	-4.880844550713951e-008
72	1.035694432087486e+000	**232**	3.907137550527191e-002	**392**	7.847839620863715e-004	**552**	3.361682183852576e-006
73	1.037683165297586e+000	**233**	3.696342556744636e-002	**393**	6.205675927856794e-004	**553**	4.677015459111491e-006
74	1.039227995800217e+000	**234**	3.493300140502248e-002	**394**	3.157663628445906e-004	**554**	2.820292122791583e-008

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75	1.040349586463588e+000	**235**	3.298151059524886e-002	**395**	2.556449844935384e-004	**555**	5.143614846654519e-007
76	1.041086497214721e+000	**236**	3.110861245410919e-002	**396**	2.520606580606257e-004	**556**	3.818588614859347e-009
77	1.041443375950143e+000	**237**	2.931525594774175e-002	**397**	2.346980949474655e-004	**557**	1.737276553950212e-007
78	1.041434355650865e+000	**238**	2.760090729801069e-002	**398**	2.060394037017961e-004	**558**	1.876022048145804e-007
79	1.041043184216171e+000	**239**	2.597956638848436e-002	**399**	1.635905995590986e-004	**559**	-2.986488593070417e-009
80	1.040262316588456e+000	**240**	2.443433592149451e-002	**400**	1.176237128375623e-004	**560**	-1.409927495646886e-008
81	1.039061496136853e+000	**241**	2.296470793543091e-002	**401**	6.193369904730005e-005	**561**	-6.977078748707401e-008
82	1.037422300157921e+000	**242**	2.156304510969632e-002	**402**	3.568554800150508e-005	**562**	-1.280675520205100e-008
83	1.035311720204252e+000	**243**	2.023524610221679e-002	**403**	2.443161189273522e-005	**563**	-2.222072007942510e-009
84	1.032712952177121e+000	**244**	1.897505817503749e-002	**404**	1.334090914042349e-005	**564**	-1.775191290895584e-009
85	1.029600494883906e+000	**245**	1.778248750467421e-002	**405**	2.853437194757816e-006	**565**	-1.686136654621906e-009
86	1.025966756910904e+000	**246**	1.665187994388476e-002	**406**	-1.039263591111469e-004	**566**	5.818594642226675e-006
87	1.021798805583990e+000	**247**	1.557759513377242e-002	**407**	5.144969377044875e-005	**567**	2.150883991167946e-006
88	1.017100128250049e+000	**248**	1.456208586604537e-002	**408**	9.711681816385056e-005	**568**	2.714879009950152e-007
89	1.011867706519706e+000	**249**	1.361072086117313e-002	**409**	2.472023910553232e-005	**569**	-2.567964804401197e-008
90	1.006109248754940e+000	**250**	1.270747042064656e-002	**410**	5.397064424090302e-005	**570**	2.041128570435378e-006
91	9.998285752401580e-001	**251**	1.186210743261470e-002	**411**	6.487880719449901e-005	**571**	3.262753594084781e-006
92	9.930379854679836e-001	**252**	1.106958962776399e-002	**412**	-5.192444140699947e-005	**572**	3.567581483749161e-006
93	9.857387823493258e-001	**253**	1.033126278863177e-002	**413**	-9.204876089551197e-005	**573**	4.083718802566134e-006
94	9.779405164766706e-001	**254**	9.640298325700842e-003	**414**	-1.815837353167847e-004	**574**	5.364807253588177e-006
95	9.696426101291272e-001	**255**	8.996371481700806e-003	**415**	-3.595054179561440e-004	**575**	4.178050149840223e-006
96	9.608519516143015e-001	**256**	-8.407748878436545e-003	**416**	-5.901617707607606e-007	**576**	5.189086332701670e-006
97	9.515674613550604e-001	**257**	-7.876393114319395e-003	**417**	1.831121301698088e-004	**577**	3.357218747491756e-006
98	9.417975696327747e-001	**258**	-7.380543918629573e-003	**418**	9.755685190624611e-005	**578**	6.310207878018869e-006
99	9.315442093447622e-001	**259**	-6.925141135202262e-003	**419**	6.606461762989423e-005	**579**	5.924001540927652e-006
100	9.208194746232827e-001	**260**	-6.500502521462604e-003	**420**	3.799971890923797e-005	**580**	5.161606640348293e-006
101	9.096310803629866e-001	**261**	-6.109178606718115e-003	**421**	4.150075391929448e-005	**581**	3.377814811745950e-006
102	8.979959173503500e-001	**262**	-5.741103163221257e-003	**422**	5.021905476506264e-005	**582**	1.323267689777069e-006
103	8.859232320517536e-001	**263**	-5.394569608919965e-003	**423**	5.861800137434713e-005	**583**	-1.074716688428712e-007
104	8.734366852542127e-001	**264**	-5.063851046064050e-003	**424**	2.126364641291926e-005	**584**	-3.561585382456484e-006
105	8.605542791988831e-001	**265**	-4.754191853611012e-003	**425**	1.181077582797280e-004	**585**	-4.518603099564185e-006
106	8.472987145504696e-001	**266**	-4.448993249380505e-003	**426**	9.990757789944374e-005	**586**	7.301956971603966e-007
107	8.336863467961255e-001	**267**	-4.133639756278191e-003	**427**	1.035782617124906e-004	**587**	5.891904775161025e-007
108	8.197387292306723e-001	**268**	-3.811612348723333e-003	**428**	8.870181845310037e-005	**588**	2.801882088134371e-008
109	8.054701312929008e-001	**269**	-3.505531318950422e-003	**429**	5.533953373249822e-005	**589**	6.322770332405526e-007
110	7.908995350037713e-001	**270**	-3.209092846617964e-003	**430**	1.580188994455254e-005	**590**	2.542598385847351e-007
111	7.760385598209244e-001	**271**	-2.927159436740159e-003	**431**	1.277184430250593e-006	**591**	1.272704908592385e-007
112	7.609051036128973e-001	**272**	-2.653818578698405e-003	**432**	5.009913312943629e-006	**592**	8.226599990523664e-008
113	7.455111681431031e-001	**273**	-2.396404013961463e-003	**433**	1.499170392246774e-005	**593**	5.433718768789140e-007
114	7.298745530879272e-001	**274**	-2.152379960589273e-003	**434**	2.241545750231630e-005	**594**	4.211177232106135e-007
115	7.140087729493950e-001	**275**	-1.924844672908215e-003	**435**	3.628511258723260e-005	**595**	3.552991527555180e-008
116	6.979336851549095e-001	**276**	-1.699160580023900e-003	**436**	2.406516798531014e-005	**596**	-1.398913109540774e-008
117	6.816667882498023e-001	**277**	-1.480542563288228e-003	**437**	2.515118233957011e-005	**597**	1.356727552196146e-006
118	6.652304141388827e-001	**278**	-1.283280633901446e-003	**438**	3.759629789955498e-005	**598**	-1.706941020342299e-005
119	6.486437667370537e-001	**279**	-1.131859661378862e-003	**439**	5.408154543124121e-005	**599**	1.013575160981381e-005
120	6.319284031798550e-001	**280**	-9.730460256556873e-004	**440**	4.493916063285122e-005	**600**	-2.285562946018590e-005
121	6.151031151692835e-001	**281**	-7.677634115875747e-004	**441**	2.806963579578946e-005	**601**	-8.908041185396514e-008
122	5.981877665956570e-001	**282**	-5.599347984905645e-004	**442**	2.364518513682831e-005	**602**	-9.597515277415496e-009

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123	5.811992722116214e-001	**283**	-3.337966579125254e-004	**443**	1.260639764582286e-005	**603**	-3.225913527455964e-007
124	5.641522833259215e-001	**284**	-9.099722643476421e-005	**444**	-2.599467772603631e-008	**604**	1.070242712585309e-006
125	5.470652177576862e-001	**285**	1.498231621816041e-004	**445**	-1.774108392496017e-005	**605**	6.293002327021578e-007
126	5.299509559653194e-001	**286**	4.366447012116811e-004	**446**	-5.889276659458115e-006	**606**	3.575650976036433e-007
127	5.128557121424191e-001	**287**	6.307841647560053e-004	**447**	-4.663777919108619e-005	**607**	2.722295965060517e-005
128	-4.956175421414453e-001	**288**	6.150316826138937e-004	**448**	-2.078886359425321e-004	**608**	8.676848186676888e-006
129	-4.782650346610896e-001	**289**	8.990255827053560e-004	**449**	-2.131405580107761e-004	**609**	3.428660858940255e-007
130	-4.609828932783459e-001	**290**	1.232134364570107e-003	**450**	-1.784192600231068e-004	**610**	4.767793949944890e-007
131	-4.437530233023859e-001	**291**	1.471167206249042e-003	**451**	-1.744841754193053e-004	**611**	3.330981930777764e-007
132	-4.265950246465440e-001	**292**	1.697652664777771e-003	**452**	-1.728672507238372e-004	**612**	2.399696144635756e-007
133	-4.095160467543179e-001	**293**	1.985825255428654e-003	**453**	-1.885286127508226e-004	**613**	7.326611439066549e-009
134	-3.925409172155113e-001	**294**	2.172866052963961e-003	**454**	-2.078299015661617e-004	**614**	1.349943693297681e-007
135	-3.756821671788237e-001	**295**	1.812176023993582e-003	**455**	-2.123671573189573e-004	**615**	-5.393555749348494e-008
136	-3.589626517817934e-001	**296**	1.344657262814793e-003	**456**	-2.415166002501312e-004	**616**	3.629067065524143e-006
137	-3.423942311297658e-001	**297**	9.373975348172919e-004	**457**	-2.217025456251449e-004	**617**	-5.690530948134642e-006
138	-3.259993851088293e-001	**298**	5.621720998949145e-004	**458**	-9.907630821710970e-005	**618**	1.387566465624550e-008
139	-3.097861805973821e-001	**299**	2.048498552413189e-004	**459**	-8.039231481768845e-005	**619**	2.443085172403935e-007
140	-2.937724988593393e-001	**300**	-2.004822830002534e-004	**460**	-7.934509417722400e-005	**620**	1.723217058490933e-009
141	-2.779637821990255e-001	**301**	-6.169854804735951e-004	**461**	-5.874199358780108e-005	**621**	7.391973323448250e-008
142	-2.623749159488041e-001	**302**	-1.061498982103114e-003	**462**	-5.449816072329412e-005	**622**	5.303527922331415e-008
143	-2.470098299603623e-001	**303**	-1.594860949611097e-003	**463**	-4.489491034408147e-005	**623**	-8.883499047404846e-010
144	-2.318815478758375e-001	**304**	-2.124647831574725e-003	**464**	-3.498285982359981e-005	**624**	-3.870536804891648e-009
145	-2.169925682529340e-001	**305**	-2.621537051750861e-003	**465**	-1.748284921486958e-005	**625**	-1.846547564287500e-008
146	-2.023548005388463e-001	**306**	-3.064311083207632e-003	**466**	-9.075430772832575e-006	**626**	-4.244090917065736e-009
147	-1.879711746686855e-001	**307**	-3.460362845825662e-003	**467**	-1.052707430241351e-005	**627**	-4.013524925634108e-009
148	-1.738542127021508e-001	**308**	-3.794425324215804e-003	**468**	-6.538878366985722e-006	**628**	-6.325664562585882e-010
149	-1.600061812296078e-001	**309**	-4.091032597247918e-003	**469**	2.206341308073472e-005	**629**	-6.025110605409611e-010
150	-1.464389150679625e-001	**310**	-4.369553676668050e-003	**470**	1.769261935287328e-004	**630**	1.620171502086309e-006
151	-1.331544923127771e-001	**311**	-4.554811297024067e-003	**471**	6.418658561385058e-005	**631**	5.490569954646963e-007
152	-1.201628679722633e-001	**312**	-4.663276675479689e-003	**472**	-8.882305312548962e-005	**632**	6.355303179925355e-008
153	-1.074630704470568e-001	**313**	-4.722567636185647e-003	**473**	-1.721347222211949e-005	**633**	-5.426597100684762e-009
154	-9.506966959632511e-002	**314**	-4.704321497976561e-003	**474**	-6.093372716385583e-005	**634**	4.292861814894369e-007
155	-8.298103104739203e-002	**315**	-4.636227793039124e-003	**475**	-7.679955330373515e-005	**635**	6.834209542421138e-007
156	-7.120356992726613e-002	**316**	-4.517190210387324e-003	**476**	7.194151087015007e-005	**636**	7.099633014995863e-007
157	-5.973741829536090e-002	**317**	-4.351667566540186e-003	**477**	7.245095937243279e-005	**637**	8.109951846981774e-007
158	-4.859005767016811e-002	**318**	-4.135130493071822e-003	**478**	7.870354371072524e-005	**638**	4.118359768898598e-007
159	-3.775928110298274e-002	**319**	-3.870851645947402e-003	**479**	5.822201682995846e-004	**639**	6.571760029213382e-007

After 4.B.18, add the following subclause:

4.B.19 Low Delay SBR

4.B.19.1 General

The encoder part of the Low Delay SBR tool is derived from the standard encoder part of the SBR, despite the following changes applied:

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4.B.19.2 Time/Frequency Grid Generation

Modifications in time grid generation apply to the combination of ER AAC ELD and SBR. In contrast to the regular SBR tool, only two frame classes exist.

FIXFIX - Both leading and trailing time borders equal nominal frame boundaries. All SBR envelope time borders in the frame are uniformly distributed in time.

LD_TRAN - Both leading and trailing time borders equal nominal frame boundaries. The envelope distribution inside SBR frame is determined by the transient position which is transmitted in the bitstream.

Time grid extraction is supposed to be dependent on the presence/absence of transients in the current frame. By choosing frame class LD_TRAN in the first case, optimal parameter extraction can be done by specifying the transient position via **bs_transient_position**. There are no restrictions on SBR class transitions, i.e. any sequence of classes is allowed.

4.B.19.3 CLDFB Analysis Filterbank

The processing of the CLDFB as the analysis filterbank is basically similar to the classic one described in 4.B.18.2. Note, that the processing described in the flowchart Figure 4.B.12 is also basically similar to the processing of the low delay filterbank. Only the windowing and the modulation differ.

- Shift the samples in the array $\mathbf{x}$ by 64 positions. The oldest 64 samples are discarded and 64 new samples are stored in positions 0 to 63.
- Multiply the samples of array $\mathbf{x(n)}$ by window $\mathbf{c(n)}$, for $\mathbf{n}$=0..639. The window coefficients are found in Table AMD9.17.
- Sum the samples according to the formula in the flowchart to create the 128-element array $\mathbf{u}$.
- Calculate 64 new subband samples by the matrix operation $\mathbf{Mu}$, where

$$M(k,n) = \exp\left(\frac{i \cdot \pi \cdot (k+0.5) \cdot (2 \cdot n - 191)}{128}\right), \begin{cases} 0 \le k < 64 \\ 0 \le n < 128 \end{cases}$$

  In the equation, $\exp()$ denotes the complex exponential function and i is the imaginary unit.

4.B.19.4 Synchronization of low delay SBR

Basically, the low delay SBR encoder can use either the classic SBR QMF filterbank as defined in 4.B.18.2 or the CLDFB defined in 4.B.19.3. If the CLDFB is used, the synchronization between core coder and SBR is equal to the HE-AAC case. If the SBR QMF is used, an additional delay of 256 samples for the SBR encoder has to be taken into account.

After 4.B.19, add a new subclause:

4.B.20 Enhanced Low Delay Codec

4.B.20.1 Introduction

The ER AAC ELD codec is derived from the ER AAC LD codec. The analysis filterbank is modified in order to adopt a low-delay filterbank.

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4.B.20.2 Low Delay Window

This subclause describes the Low Delay MDCT filterbank utilized in the AAC ELD encoder. The core MDCT algorithm is mostly unchanged, but with a longer window, such that n is now running from –N to N-1 (rather than from 0 to N-1)

The spectral coefficient, $X_{i,k}$, are defined as follows:

$$X_{i,k} = -2 \cdot \sum_{n=-N}^{N-1} z_{i,n} \cos\left(\frac{2\pi}{N}(n+n_0)\left(k+\frac{1}{2}\right)\right) \quad for\ 0 \le k < N/2$$

where:

z_{in} = windowed input sequence
N = sample index
K = spectral coefficient index
I = block index
N = window length
n_0 = (-N / 2 + 1) / 2

The window length N (based on the sine window) is 1024 or 960.

The window length of the low-delay window is 2*N. The windowing is extended to the past in the following way:

$$z_{i,n} = w_{LD}(N-1-n) \cdot x'_{i,n}$$

for n=-N,…,N-1, with the synthesis window w used as the analysis window by inverting the order.

Add the following subclause:

4.B.21 Delayless Mixing using AAC ELD

4.B.21.1 Introduction

This feature of delayless mixing is highly attractive for building a multi-point telephone conferencing system with lowest possible delay. In this annex a detailed description of the delayless mixing capability is given, as it is supported by AAC-ELD. The description is motivated by real-world application scenarios.

AAC-ELD allows a delayless mixing in frequency domain when all streams are operated at the same sampling frequency. This constitutes an important capability in its application field, especially for multipoint communication such as teleconferencing. The ability for immediate spectral combination reduces both the overall delay and provides a significant reduction of the complexity of the MCU a mixing process.

Low Delay

If the MCU applies a trivial mixing process (complete de-/encoding), the overall transmission comprises two complete encoding and decoding steps, and thus the overall delay is twice the codec delay.

If the MCU applies mixing in frequency domain, no additional delay is introduced by the MCU, and thus the overall delay is the same as the codec delay. Therefore, the multipoint connection does not have more algorithmic delay than a point-to-point connection.

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Low Complexity

In a multipoint connection with N participants, N decoders and N encoders have to run in parallel. Typical value for N is up to 80. Thus it is very important that the complexity is kept as low as possible. With the mixing in frequency domain this is achieved by omitting all the forward and inverse MDCTs.

4.B.21.2 Applications

An important application field for AAC-ELD is high-quality interactive communication, two or more parties communicate using an audio-only or an audio-visual connection (audio or audiovisual teleconferencing). Especially the case of 3 or more parties is commercially relevant, and requires a central “communication hub”, i.e. a so-called “Multi-point control unit” (MCU) which, for each participant, provides the downstream audio by combining the audio streams of all other participants. This is shown in Figure AMD9.3 below:

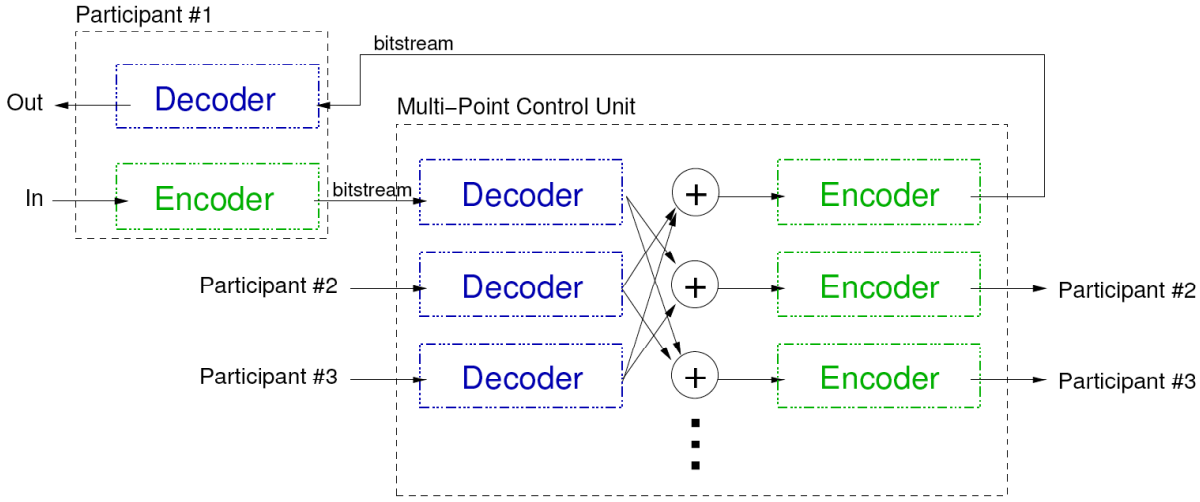


Figure AMD9.3 — Mixing of bitstreams in an MCU

The central functionality of the MCU is thus an addition or mixing of two or more, possibly low bitrate coded streams, into a single output stream. Besides providing good audio output quality, the two main requirements to this process are a *low processing delay* and *low computational complexity*. Other examples of communication systems where streams of several talkers can be active at the same time are wireless conference systems (e.g. for parliaments) and wireless intercoms (e.g. backstage of broadcasting studios).

4.B.21.3 Mixing of signals - The trivial solution

The trivial solution for mixing two or more signals is to decode them, mix them together and encode this downmix again.

For a transform-based perceptual codec, this is illustrated in the following Figure:

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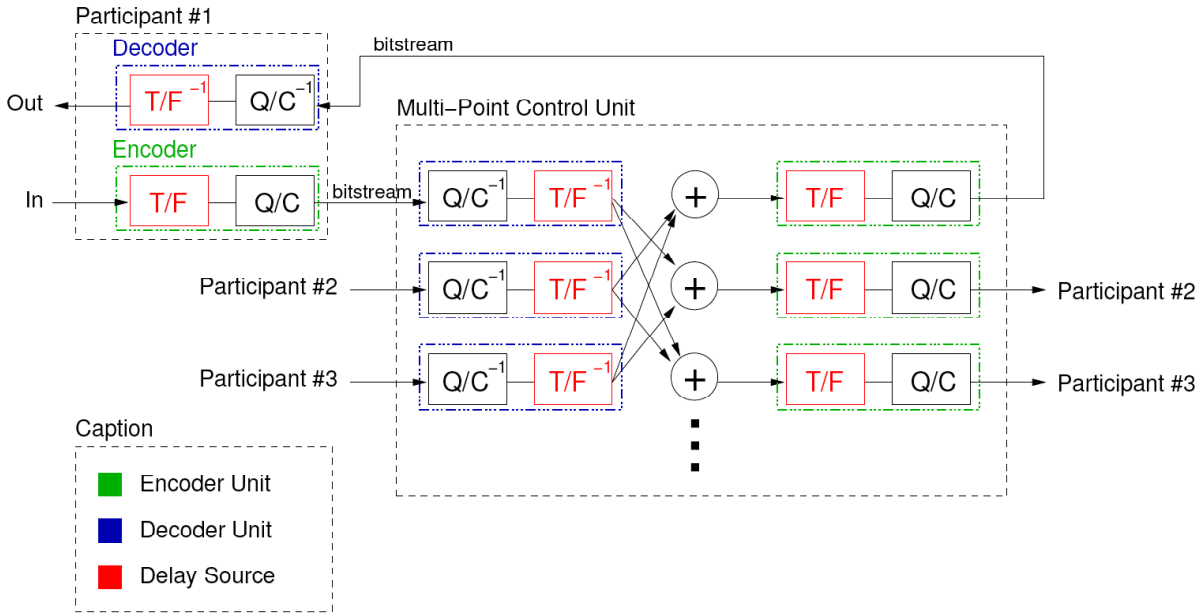


Figure AMD9.4 — Trivial solution for mixing of bitstreams

Obviously, this approach has some drawbacks, namely:

High additional delay

Utilizing a full chain of decoder and encoder introduces a delay from both processing steps, i.e. the *algorithmic delay of the utilized codec is doubled* in the whole transmission chain.

High Complexity

In this trivial approach all the input streams have to be fully decoded and the downmix has to be encoded again. This causes a considerable amount of complexity, especially for a high number of input streams.

4.B.21.4 Mixing of signals in frequency domain

In order to eliminate the drawbacks mentioned above, a mixing of signals in frequency domain is desirable. This can only be achieved if the inverse transform steps in the decoders and the forward transform steps in the encoder can be omitted using a common spectral representation. To this end, it is assumed in the following that both signals are encoded using the same sampling frequency. Then, the resulting process can be illustrated in the following Figure:

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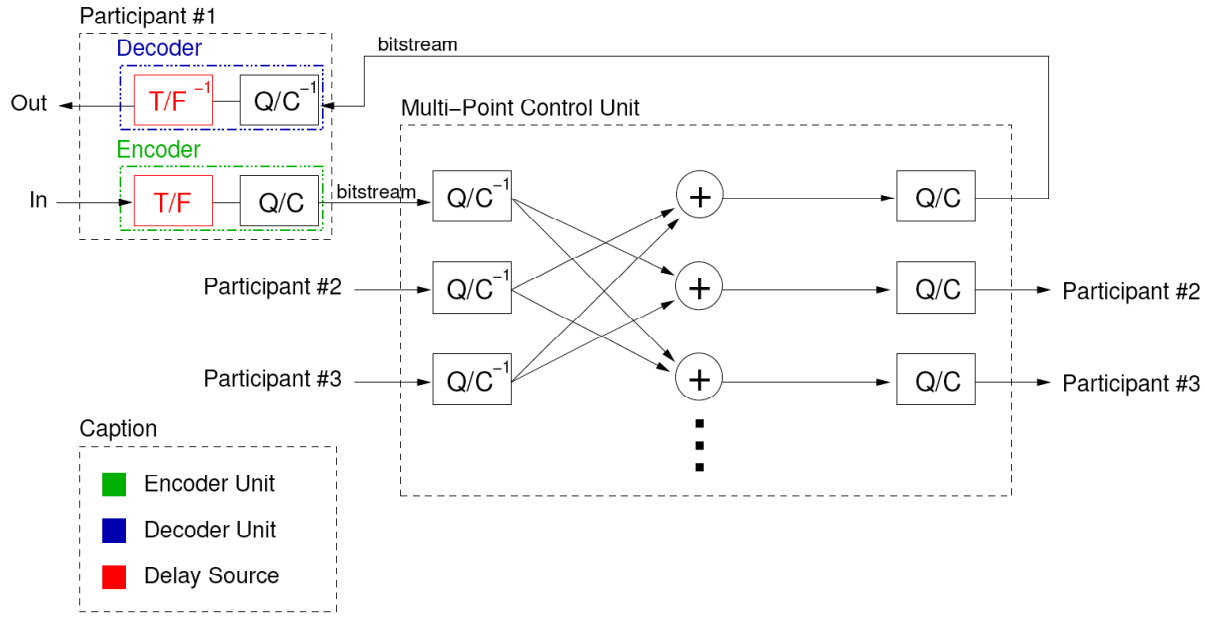


Figure AMD9.5 — Mixing of bitstreams in frequency domain

The advantages of this approach are:

No additional delay

By applying the mixing in frequency domain, *no additional delay* is introduced by the mixing process. All filterbank operations involving delay in a full decoder/encoder are avoided.

Low Complexity

As no filterbank operations are involved, a large contribution to the complexity of a full decoder/encoder is avoided, thus resulting in a *considerably lower complexity* than the trivial mixing approach.

4.B.21.5 Mixing of signals using AAC-ELD

4.B.21.5.1 Mixing in ELD core codec

For the advantageous mixing in the frequency domain as outlined above, the coded streams to be added have to use a common / unified spectral representation. The low delay filterbank (LD-MDCT) serves as a universal filterbank for all kinds of input signals. Thus, this efficient mixing in frequency can be utilized for AAC-ELD.

In case of block switching utilized, the delayless mixing is still possible but causes an impact on complexity and quality. If transparent audio quality is need by the application, it is recommended to disable block switching.

4.B.21.5.2 Mixing in SBR part

For the SBR part of the signal, the same holds true for merging several SBR-coded streams. As is known from MPEG-4 SBR, all parameters pertaining to SBR are estimated and applied on a fixed QMF time/frequency-grid. Hence, when mixing different streams, all the parameters can be mapped to a common time/frequency grid and a new set of parameters corresponding to the combination of the streams can be estimated.

The following outlines the general principle on how SBR data streams can be merged in the parameter domain.

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4.B.21.5.2.1 Inverse filtering and Additional harmonics

The inverse filtering is combined from the channels by taking the maximum inverse filtering value from the incoming streams. The additional sinusoids in the merged mono bitstream are the union of the additional sinusoids present in the channels.

4.B.21.5.2.2 Envelope time borders

The merging of the time envelope grid is explained by using t_E which contains all start/stop borders for all SBR envelopes in the current SBR frame.

Merging the two t_E into one is done in the following sequence

1. The union of all borders for the streams is added to the merged t_E.
2. All envelopes smaller than two time slots are removed from the merged t_E. This is achieved by starting from the beginning of t_E and remove all stop borders that are closer than 2 from the start border.
3. If there are more than the maximum allowed envelopes, the number of envelopes is reduced..
4. The index t_E as used in the HF adjustment of the SBR signal have to be merged into one. This is done by selecting the one of the different t_E that is different form -1, and if all are different from -1, the smallest value is chosen.

4.B.21.5.2.3 Noise time borders

The number of noise floors and the start/stop borders for the noise vector of the merged data is calculated according to the following. The number of noise floors is chosen to be the maximum of the number of noise floors for the streams. Given the number of borders in the merged noise-border vector, for all borders in the merged vector, the border with the highest value from the streams, is chosen as the merged border. When this is done, it is possible that the middle noise floor border does not coincide with any SBR envelope time border. If this is the case the middle noise floor border is set equal to the closest time envelope border in the upwards direction.

4.B.21.5.2.4 Envelope data and Noise floor data

The envelope and noise floor data is mapped to a common time and frequency resolution, by calculating new average values for the merged regions in the QMF time/frequency plane, from the values given for the corresponding time and frequency region for the streams. Hence, if for a certain time and frequency region for a first stream two envelope values are given, and for the same time and frequency region for a second stream, one envelope value is given. The single value of the second stream is mapped to two regions being the same regions covered by the two envelope values of the first stream, and so on for all streams. The merged envelope data is subsequently calculated as the average data for the different regions, of the streams. The similar principle applies for the noise floor data.

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