Technical Specification Group Services and System Aspects **TSGS#28(05)0252**
Meeting #28, Quebec, Canada
6-9 June 2005

**Source: TSG-SA WG4**

**Title: CRs TS 26.273 & TS 26.290 & TS 26.304 on Corrections to Extended AMR-WB+ codec specifications (Release 6)**

**Document for: Approval**

**Agenda Item: 7.4.3**

The following CRs, agreed at the TSG-SA WG4 meeting #35, are presented to TSG SA #28 for approval.

| Spec | CR | Rev | Phase | Subject | Cat | Vers | WG | Meeting | S4 doc |
|---|---|---|---|---|---|---|---|---|---|
| 26.273 | 001 | | Rel-6 | Prevent an access outside a buffer when simulating frame erasures | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050277 |
| 26.273 | 002 | 1 | Rel-6 | Remove unused code | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050417 |
| 26.273 | 003 | | Rel-6 | Remove IF2 header in AMR-WB bitstream | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050279 |
| 26.273 | 004 | | Rel-6 | Prevent an access outside a buffer in Reconst_spect function | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050280 |
| 26.273 | 005 | | Rel-6 | Decoder synchronization after frame erasures | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050281 |
| 26.273 | 006 | | Rel-6 | Correction of mode switching using configuration file | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050294 |
| 26.273 | 007 | | Rel-6 | Prevent encoding end of wave file information | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050295 |
| 26.273 | 008 | | Rel-6 | Correction of library function for 3GP file format | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050314 |
| 26.273 | 009 | | Rel-6 | Support for input files with sampling frequency other than 48 kHz | F | 6.0.0 | S4 | TSG-SA WG4#35 | S4-050416 |
| 26.290 | 006 | | Rel-6 | Correction of a value in Table 21 | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050286 |
| 26.304 | 026 | | Rel-6 | Correction of DTX handling in AMR-WB modes | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050274 |
| 26.304 | 027 | | Rel-6 | Remove IF2 header in AMR-WB bitstream | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050275 |
| 26.304 | 028 | | Rel-6 | Decoder synchronization after frame erasures | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050276 |
| 26.304 | 029 | | Rel-6 | Correction for buffer reading in low complexity encoder | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050284 |
| 26.304 | 030 | | Rel-6 | Correction to a wrong function call | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050291 |
| 26.304 | 031 | | Rel-6 | Correction of mode switching using configuration file | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050292 |
| 26.304 | 032 | | Rel-6 | Correction of information printed by decoder in DTX frames | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050293 |
| 26.304 | 033 | | Rel-6 | Correction of library function for 3GP file format | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050313 |
| 26.304 | 034 | | Rel-6 | Support for input files with sampling frequency other than 48 kHz | F | 6.2.0 | S4 | TSG-SA WG4#35 | S4-050415 |

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050277***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.273** **CR** **001** ⌘**rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Prevent an access outside a buffer when simulating frame erasures |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | To simulate a frame erasure, a file is parsed with the function *fscanf* with the parameter %d. The function *fscanf* with *%d* returns a integer (32bits). However, a *short* (16bits) is passed to receive what's found by *fscanf*. A temporary variable needs to be used with the call of fscanf and then put the result in the initial short array. |
| ***Summary of change:*** | ⌘ | Assure to use an integer instead of a short to receive the output of *fscanf*. |
| ***Consequences if not approved:*** | ⌘ | Access outside a buffer. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | dec_wbplus_fx.c |

| | | Y | N | | |
|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | | X | Other core specifications | ⌘ |
| | | | X | Test specifications | |
| | | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *dec_wbplus_fx.c*

### Line 373

**Before the change:**

```
  Word32 old_bitrate;
```

**After the change:**

```
  Word32 old_bitrate, tmpbfi;
```

### Line 525-538

**Before the change:**

```
  if(conf.fer_sim)
    {
        if(conf.extension > 0)
         {
             for(i=0;i<4;i++)
             {
                fscanf(f_fer,"%d",&bfi[i]);
             }
         }
         else
         {
             fscanf(f_fer,"%d",&bfi[tfi]);
         }
    }
```

**After the change:**

```
if(conf.fer_sim)
    {
        if(conf.extension > 0)
         {
             for(i=0;i<4;i++)
             {
                fscanf(f_fer,"%d",&tmpbfi);
                bfi[i] = tmpbfi;
             }
         }
         else
         {
             fscanf(f_fer,"%d",&tmpbfi);
             bfi[tfi] = tmpbfi;

         }
    }
```

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# CHANGE REQUEST

⌘ **26.273** **CR** **002** ⌘ **rev** **1** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☒

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Remove usnused code |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
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| | |
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| *Ph2* | *(GSM Phase 2)* |
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| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Clean up unused code. |
| ***Summary of change:*** | ⌘ | Remove unused code.<br>Remove duplicated file util_stereo_x_fx.c from c-code. |
| ***Consequences if not approved:*** | ⌘ | May be confusing if unused code is present.<br>May result in unnecessary porting of unused code. |
| ***Clauses affected:*** | ⌘ | cod_lf_b_fx.c, options_fx.h, util_stereo_x_fx.c, prot_func_fx.h |

| | Y | N | | |
|---|---|---|---|---|
| ***Other specs affected:*** ⌘ | | X | Other core specifications | ⌘ |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *cod_lf_b_fx.c*

Line 883 to be removed

**Remove the following line:**

```
#ifdef PATCH_EXC
```

Line 892 to be removed

**Remove the following line**

```
#endif
```

## *2.* How the code is changed in the file *options_fx.h*

Lines 10-11 to be removed

**Remove the following lines**

```
#define PATCH_EXC   /* Prevent reading outside a buffer see cod_lf_b_fx.c */
                    /* May affect BE with cr20G when -mi >10 & option -lc is
activated */
```

# *3.* How the code is changed in the file *util_stereo_x_fx.c*

## Lines 165-205 to be removed

**Remove the following lines**

```
void Pmsvq_inv(Word16 *y_fx, Word16 *prm, Word16 *old_y_fx, const Word16 bfi,
         const PMSVQ_fx *filt_hi_pmsvq)
{

  /* A concatenation of pmsvq_inv and mspq_inv*/
  const Word16 **cb = filt_hi_pmsvq->msvq.cbs;
  const Word16 *cbm = filt_hi_pmsvq->mean;
  const Word16 a =filt_hi_pmsvq->a;
  const Word16 vdim =filt_hi_pmsvq->msvq.vdim;
  const Word16 stages = filt_hi_pmsvq->msvq.nstages;
  Word16 eq[HI_FILT_ORDER];
  Word16 i,l;

  test();
  if (!bfi)
  {
    for (i=0;i<vdim;i++)
    {
      eq[i] = cb[0][prm[0] * vdim + i];   move16();

      for (l=1;l<stages;l++)
      {
        eq[i] = add(eq[i],cb[l][prm[l] * vdim + i]);    move16();
      }
    }
  }
  else
  {
    for (i=0;i<vdim;i++)
    {
      eq[i] = 0;    move16();
    }
  }

  for(i=0;i<vdim;i++)
  {
    old_y_fx[i] = round(L_mac(L_mult(eq[i], 32767),old_y_fx[i],a));
         move16();
    y_fx[i] = add(old_y_fx[i],cbm[i]);                move16();

  }
}
```

## Line 550 to be removed

**Remove the following line**

```
  const Word16 stages = Gain_hi_pmsvq_fx->msvq.nstages;
```

## Line 552

**Before the change:**

```
      Word16 i,l;
```

**After the change:**

```
      Word16 i;
```

## Lines 561-564 to be removed

**Remove the following lines**

```
   for (l=1;l<stages;l++)
   {
     eq[i] = add(eq[i],cb[l][prm[l] * vdim + i]);    move16();
   }
```

## Lines 716-724 to be removed

**Remove the following lines**

```
  test();test();
  if (sub(lg,192) == 0)
  {
    inv_lg16 = 1365;    move16();
  }
  else if (sub(lg, 96) ==0)
  {
    inv_lg16 = 2731;   move16();
  }
  else
```

# *4.* How the code is changed in the file *prot_func_fx.h*

## Line 228 to be removed

**Remove the following line**

```
void Pmsvq_inv(Word16 *y_fx, short *prm, Word16 *old_y_fx, const Word16 bfi,
               const PMSVQ_fx *filt_hi_pmsvq);
```

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# CHANGE REQUEST

⌘ **26.273** **CR** **003** ⌘**rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Remove IF2 header in AMR-WB bitstream |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
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***A*** *(corresponds to a correction in an earlier release)*
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| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Remove unnecessary byte in the bitstream of AMR-WB modes to comform with TS 26.290 (Table 21). |
| ***Summary of change:*** | ⌘ | In AMR-WB modes, remove IF2 header before writing the bitstream. Insert IF2 header after reading AMR-WB bitstream. The modification is bit exact. |
| ***Consequences if not approved:*** | ⌘ | Bitstream has 1 byte more than specified in TS 26.290 Table 21. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | cod_lf_b_fx.c, options_fx.h, util_stereo_x_fx.c, prot_func_fx.h |

| ***Other specs affected:*** | Y | N | | |
|---|---|---|---|---|
| ⌘ | | X | Other core specifications | ⌘ |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

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# Changes to the C-code

## *1.* How the code is changed in the file *Bitstream_fx.c*

### Lines 90-105

**Before the change:**

```
#ifdef IF2
  UWord8 *ptc_serial, *ptc_serial_old, ctemp;
  Word16 i;
  ptc_serial = (UWord8*) serial;
  ptc_serial_old = (UWord8*) serial - 1;
  /* erease IF2 Header -> left shift 5 bits */
  for(i = 0; i < length-1; i++)
  {
    ctemp =  (UWord8)(*ptc_serial & 0x7)<<5;  /* save 3 lsb */
    ptc_serial++;
    ptc_serial_old++;
    ctemp +=  ((UWord8)(*ptc_serial & 0xF8)>>3); /* save 5 msb */
    *ptc_serial_old = ctemp;
  }
  ptc_serial_old++;
  *ptc_serial_old =  (UWord8)(*ptc_serial & 0x7)<<5;   /* save 3 lsb */
#endif
  fwrite(serial, sizeof(UWord8), length, f_serial);
```

**After the change:**

```
  unsigned char *ptc_serial, *ptc_serial_old;
  short i;

  /* Remove IF2 header */

  ptc_serial = (unsigned char *) serial + 1;
  ptc_serial_old = (unsigned char *) serial;
  for(i = 0; i < length-1; i++)
  {
    *ptc_serial_old = (unsigned char)(*ptc_serial) ;
    ptc_serial++;
    ptc_serial_old++;

  }
  fwrite(serial, sizeof(unsigned char), length - 1, f_serial);
```

## Lines 258-305

**Before the change:**

```
Word16 ReadBitstream(Word16 nb_byte, UWord8 *serialAmrwb, FILE * f_serial)
{
#ifdef IF2
  UWord8 *ptc_serial, *ptc_serial_new;
  Word16 i;
#endif
  Word16 n;
  UWord8 ctemp;

  if (nb_byte == 1) /* DTX case, test if info is in the bitstream or not */
  {
      n = fread(&ctemp, sizeof(unsigned char), nb_byte, f_serial);
      if(ctemp != 0x7C) /* Not in Bitstream */
      {
        fseek(f_serial, -1, SEEK_CUR);
        ctemp = 0x7C;
      }
      serialAmrwb[0] = ctemp;
  }
  else
  {
      /* update mode changes */
      n = fread(serialAmrwb, sizeof(unsigned char), nb_byte, f_serial);
  }
#ifdef IF2
  ptc_serial = serialAmrwb + nb_byte - 1;
  ptc_serial_new = serialAmrwb + nb_byte ;

  /* right shift of 5 bits and add IF2 Header */
  for(i = 0; i < nb_byte - 1; i++)
  {
    ctemp =  ((unsigned char)(*ptc_serial & 0xE0)>>5);  /* Get 3 lsb */
    ptc_serial--;
    ptc_serial_new--;
    ctemp +=  ((unsigned char)(*ptc_serial & 0x1F)<<3);  /* Get5 msb */
    *ptc_serial_new = ctemp;
  }
  ptc_serial_new--;
  ctemp =  ((unsigned char)(*ptc_serial & 0xE0)>>5);/*Get last 3 lsb */
  /* add IF2 Header */
  ctemp += (unsigned char)(1<<3);               /* FQI            */
  ctemp +=  (unsigned char)(mode <<4);          /* Get Frame Type */
  *ptc_serial_new = ctemp;
#endif
  return n;
}
```

**After the change:**

```
Word16 ReadBitstream(Word16 nb_byte, UWord8 *serialAmrwb, Word16 mode, FILE *
f_serial)
{
  unsigned char *ptc_serial, ctemp;
  unsigned char *ptc_serial_new;

  short n, i;
  /* update mode changes */
  n = fread(serialAmrwb, sizeof(unsigned char), nb_byte - 1, f_serial);
```

```
  ptc_serial = serialAmrwb + nb_byte - 2;
  ptc_serial_new = serialAmrwb + nb_byte - 1;

  for(i = 0; i < nb_byte - 1; i++)
  {
    *ptc_serial_new = *ptc_serial;

    ptc_serial--;
    ptc_serial_new--;
  }
  /* add IF2 Header */
  ctemp = (unsigned char)(1<<2);               /* Add FQI        */
  ctemp +=  (unsigned char)(mode <<3);         /* Add Frame Type */


  *ptc_serial_new = ctemp;

  return n;
}
```

## Lines 295-318

**Before the change:**

```
  n = fread(serialAmrwb, sizeof(unsigned char), nb_byte, f_serial);
#ifdef IF2
  ptc_serial = serialAmrwb + nb_byte - 1;
  ptc_serial_new = serialAmrwb + nb_byte ;

  /* right shift of 5 bits and add IF2 Header */
  for(i = 0; i < nb_byte - 1; i++)
  {
    ctemp =  ((unsigned char)(*ptc_serial & 0xE0)>>5);       /* Get 3 lsb */
    ptc_serial--;
    ptc_serial_new--;
    ctemp +=  ((unsigned char)(*ptc_serial & 0x1F)<<3);   /* Get5 msb */
    *ptc_serial_new = ctemp;
  }
  ptc_serial_new--;
  ctemp =  ((unsigned char)(*ptc_serial & 0xE0)>>5);  /* Get last 3 lsb */
  /* add IF2 Header */
  ctemp += (unsigned char)(1<<3);               /* FQI            */
  ctemp +=  (unsigned char)(mode <<4);          /* Get Frame Type */
  *ptc_serial_new = ctemp;
#endif
```

**After the change:**

```
  n = fread(serialAmrwb, sizeof(unsigned char), nb_byte - 1, f_serial);

  ptc_serial = serialAmrwb + nb_byte - 2;
  ptc_serial_new = serialAmrwb + nb_byte - 1;

  for(i = 0; i < nb_byte - 1; i++)
  {
    *ptc_serial_new = *ptc_serial;

    ptc_serial--;
    ptc_serial_new--;
  }
  /* add IF2 Header */
  ctemp = (unsigned char)(1<<2);               /* Add FQI        */
```

```
  ctemp +=  (unsigned char)(mode <<3);         /* Add Frame Type */


  *ptc_serial_new = ctemp;
```

### Line 336

**Before the change:**

```
   n = ReadBitstream(nb_byte,(unsigned char*) serial, f_serial);
```

**After the change:**

```
   n = ReadBitstream(nb_byte,(unsigned char*) serial, *mode, f_serial);
```

### Line 343-345

**Before the change:**

```
   if (*mode == 15)
   {   /* Read 1 more byte DTX Information  (NO DATA)*/
      nb_byte = block_size[*mode];
      n = ReadBitstream(nb_byte,(unsigned char*) serial, f_serial);
   }
```

**After the change:**

```
   {   /* DTX FRAME (NO DATA)*/
      ((unsigned char*)serial)[0] = 0x7C; /* need in AMR WB */
   }
```

## *2.* How the code is changed in the file *prot_func_fx.h*

### Line 943

**Before the change:**

```
Word16 ReadBitstream(Word16 nb_byte, UWord8 *serialAmrwb, FILE * f_serial);
```

**After the change:**

```
Word16 ReadBitstream(Word16 nb_byte, UWord8 *serialAmrwb, Word16 mode, FILE *
f_serial);
```

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**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050280***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.273** **CR** **004** ⌘**rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Prevent an access outside a buffer in Reconst_spect function |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | There is possibility to access outside a buffer at the decoder when reconstructing the spectrum in a TCX lost frames. The spectrum reconstruction function needs to compute an arctangent, which is extrapolated from a table that contains piece-wise arctangent. The extrapolation is done differently depending on certain thresholds. One threshold was wrongly defined, which allowed an access outside a buffer. |
| ***Summary of change:*** | ⌘ | The problematic threshold was corrected. |
| ***Consequences if not approved:*** | ⌘ | May result in access outside a buffer in case of TXC lost frame concealment. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | dec_lf_fx.c |

| ***Other specs affected:*** ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|
| | | X | Other core specifications | |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *dec_lf_fx.c*

### Line 566

**Before the change:**

```
    else if (sub(ent_frac, 24)> 0) /* 24< y/x < 88*/
```

**After the change:**

```
    else if (sub(ent_frac, 24)>= 0) /* 24<= y/x < 88*/
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050281***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.273** **CR** **005** ⌘**rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Decoder synchronization after frame erasures |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
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*Use one of the following releases:*
*Ph2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*
*Rel-7 (Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The TCX seed is used in the random generator to create random noise injected in unquantized subbands. When a bad frame occurs, the decoder may choose a wrong decoding mode. For example, if the lost frame was a TCX frame and the last good frame was an ACELP, the decoder will perform concealment in the ACELP domain. In that case, the TCX seed will not be activated and the synchronization between the synthesis of concealed frame and a clean synthesis will be lost. This loss of synchronization doesn't affect the subjective quality of the synthesis but affects the indication of quality obtained by an objective tool like PEAQ. To solve the issue, we propose to generate the seed from bitstream parameters instead of keeping in memory the last value of the random generator. |
| ***Summary of change:*** | ⌘ | In the proposed change, a new seed is generated based on bitstream parameters instead of keeping in memory the last value of the random generator. The seed will be computed from parameters index and will be the same at both encoder and decoder. |
| ***Consequences if not approved:*** | ⌘ | Difficult to use objective tools in the comparison of quality of a synthesis containing lost frames to a clean reference synthesis. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | dec_lf_fx.c |

| | | Y | N | | |
|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | | X | Other core specifications | ⌘ |
| | | | X | Test specifications | |
| | | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *dec_lf_fx.c*

### Line 213

**Before the change:**

```
Dpisf_2s_46b_2(prm, isfnew_,st->wpast_isfq, st->wisfold, st->wisf_buf, bfi,
                    bfi_2nd_st, 1);
```

**After the change:**

```
Dpisf_2s_46b_2(prm, isfnew_,st->wpast_isfq, st->wisfold, st->wisf_buf, bfi,
                   bfi_2nd_st, 1);


test();

if(bfi == 0)

{

    st->seed_tcx = extract_l(L_shl(L_mac(L_mult(prm[0], prm[1]),
                   prm[4],prm[5]),7));  move16();

}
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050294***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.273** **CR** **006** ⌘**rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of mode switching using configuration file |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | To ensure the encoder does not switch the configuration when it's not needed. Remove duplicated lines of code. |
| ***Summary of change:*** | ⌘ | Chose a "quantized" fscale to ensure there is no switching when it is not needed. |
| ***Consequences if not approved:*** | ⌘ | Artefacts may arise from unnecessary switching. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | enc_wbplus_fx.c |

| | Y | N | | |
|---|---|---|---|---|
| ***Other specs affected:*** ⌘ | | X | Other core specifications | ⌘ |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *enc_wbplus_fx.c*

### Line 851

**Before the change:**

```
  fst = extract_l(t[3]);
```

**After the change:**

```
  fst = extract_l(t[3]);
  get_isf_index(&fst);      /* Use "fst from index" */
```

### Lines 834-836 to be removed

**Remove the follwing lines:**

```
test();test();
if (numOfChannels == 2)
{
```

### Lines 852-878 to be removed

**Remove the follwing lines:**

```
}
else if (sub(tmp_modeIndex, 24) <0)
{
   test();
   if (extension == 0)
   {
      mode  = tmp_modeIndex;   move16();
      st_mode = -1;              move16();
      conf.mode = tmp_modeIndex;   move16();
      conf.st_mode = -1;  move16();
      conf.mode_index = tmp_modeIndex; move16();
   }
   else
   {
      conf.mode_index = tmp_modeIndex;        move16();
      get_raw_3gp_mode(&(conf.mode), &(conf.st_mode),conf.mode_index, extension
);
   }
   fst = extract_l(t[3]);
   test();
   if(sub(conf.mode,16) >= 0)
   {
      test();move16();
      if(fst == 0)
         fst = FSCALE_DENOM;
   }
}
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050295***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.273** **CR** **007** ⌘**rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Prevent encoding end of wav file information |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
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***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
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| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | If a wav file has a header at the end of the file, the fixed point encoder will encode this header. |
| ***Summary of change:*** | ⌘ | Take end wav file header into account. |
| ***Consequences if not approved:*** | ⌘ | When the end file header is coded, an artefact is produce in the synthesis. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | enc_wbplus_fx.c |

| Y | N | | |
|---|---|---|---|
| | X | Other core specifications | ⌘ |
| | X | Test specifications | |
| | X | O&M Specifications | |

***Other specs affected:*** ⌘

***Other comments:*** ⌘

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *enc_wbplus.c*

### Add line 626

```
Word16 Chan2mult;
```

### Lines 815-816

**Before the change:**

```
  test(); test();
  while (lg != 0 || frame == 0)
```

**After the change:**

```
  Chan2mult = sub(numOfChannels,1);
  dataSize = L_shl(dataSize,Chan2mult);
  dataSize = L_sub(dataSize, lg);

  test(); test();
  while (lg != 0 || frame == 0)
```

### Lines 899

**Before the change:**

```
  lg = Read_data(f_speech, channel_right+nb_hold, (numOfChannels*(L_frame-
nb_hold)));
```

**After the change:**

```
   lg = Read_data(f_speech, channel_right+nb_hold, (numOfChannels*(L_frame-
nb_hold)));

   dataSize = L_sub(dataSize, lg);
   test();
   if(dataSize<0) /* prevent reading end file wav header */
   {
      break;
   }
```

**3GPP TSG-SA4 Meeting #35**
**San Diego, USA, 09-13 May 2005**

***Tdoc ⌘S4-050314***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.273** **CR** **008** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of library function for 3GP file format |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
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*Use one of the following releases:*

| | |
|---|---|
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| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In mode 10, 11, 12 and 13 the ISF was not defined in 3GP mode, the result was an invalid access when computed the duration of the file. |
| ***Summary of change:*** | ⌘ | Add a value to the ISF table of the 3GP format to prevent an invalid access in modes 10 to 13. |
| ***Consequences if not approved:*** | ⌘ | Invalid access is committed when the duration of the file is computed in modes 10 to 13. |
| ***Clauses affected:*** | ⌘ | Affected files:<br>c-code\3gplib\debug\3gplib_fx.lib<br>c-code\3gplib\release\3gplib_fx.lib |

| ***Other specs affected:*** | ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|---|
| | | | X | Other core specifications | |
| | | | X | Test specifications | |
| | | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

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# Changes to the libraries:

## How the code is changed in the file *3gpformat.c (Used to create the libraries)*

### Lines 20

**Before the change:**

```
static int TsTicks[13]={2880,
2560,2304,2160,1920,1728,1536,1440,1280,1152,1080,1024,960};
```

**After the change:**

```
static int TsTicks[14]={1440,2880,
2560,2304,2160,1920,1728,1536,1440,1280,1152,1080,1024,960};
```

### Lines 301

**Before the change:**

```
SampleDuration = SampleDuration + 4*TsTicks[conf.fscale_index-1];
```

**After the change:**

```
SampleDuration = SampleDuration + 4*TsTicks[conf.fscale_index];
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050416***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.273** **CR** **009** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Support for input files with sampling frequency other than 48 kHz |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
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***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
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*Use one of the following releases:*
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*R98* *(Release 1998)*
*R99* *(Release 1999)*
*Rel-4* *(Release 4)*
*Rel-5* *(Release 5)*
*Rel-6* *(Release 6)*
*Rel-7* *(Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The current version of the encoder does not support sampling frequencies other than 48, 16 and 8 kHz. Furthermore, sampling frequencies of 16 and 8 kHz are only supported in special modes. The objective of the modification is to make the encoder friendlier to use in removing the constraint on the sampling frequency usage. This will simplify the integration of the codec in platforms where sampling frequencies other than 48 kHz are supported. After the change, the supported sampling frequencies will be 8, 16, 24, 32, 48, 11.025, 22.5, and 44.1 kHz. |
| ***Summary of change:*** | ⌘ | The proposed change adds 1 filtering table and 1 conditional filtering operation at the encoder and at the decoder, to allow working at all sampling frequencies mentioned above. The encoder core works at certain internal sampling frequency (ISF); where a resampling filter performs down-sampling from 48 kHz to ISF KHz. With the suggested modification, the encoder input sampled at 8, 16, 24 or 32 kHz will be upsampled to 48 kHz and then down-sampled to ISF kHz (core working frequency). Alternatively, if the encoder input is sampled at 11.025 or 22.1 kHz, it will be up-sampled to 44.1 kHz and then down-sampled, with a new filter, to the core working frequency (ISF kHz). At the decoder, the synthesis will be first up-sampled to 48 or to 44.1 kHz (depending on the desired output sampling frequency) and then down-sampled to a sub-multiple if needed. Hence, the proposed change involves adding, both at the encoder and the decoder, a new, conditionnaly used, filtering table and a new, conditionnaly applied, filtering operation with its own filtering table. The proposed change does not affect the bitexactness for the previously supported sampling frequencies, and adds new supported input and output sampling frequencies. |

| | | |
|---|---|---|
| ***Consequences if not approved:*** | ⌘ | May be confusing to the users when they use input files with other sampling rates and get an error message.<br>Cumbersome offline sampling conversion will be needed before processing files with other sampling frequency and may result in bad performance if users do not perform these conversions properly. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | Common_fx\decim_split_fx.c<br>Common_fx\join_split_fx.c<br>Include_fx\proto_func_fx.h<br>Include_fx\cnst_fx.h<br>Include_fx\table_decl_fx.h<br>Include_fx\options_fx.h<br>Encoder_fx\cod_main_p_fx.c<br>Encoder_fx\enc_wbplus_fx.c<br>Encoder_fx\dec_wbplus_fx.c<br>Decoder_fx\dec_main_s_fx.c<br>Common_fx\table_plus_fx.c<br>Create : Common_fx\over_fs_fx.c | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N**<br>**X** Other core specifications<br>**X** Test specifications<br>**X** O&M Specifications | ⌘ | | |
| ***Other comments:*** | ⌘ | | | | |

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file options_*fx.h*

### Line 15

**Add these lines:**

```
/* AMR-WB+ input/output sampling rate filters */
/* Choice of filter should be selected according to the hardware specification
        */
/* Both can be selected if required */
/* FILTER_44khz allow 11025, 22050 and 44100 Hz sampling rates */
/* FILTER_48khz allow 8, 16, 24, 32 and 48 kHz sampling rates */
#define FILTER_44kHz
#define FILTER_48kHz
```

## *2.* How the code is changed in the file *decim_split_fx.c*

### Lines 19-25

**Code before change:**

```
Word16 Decim_split_12k8(  /* number of sample decimated */
  Word16 sig_fs[],        /* (i)  : signal to decimate  */
  Word16 sig12k8_lf[], /*(o)  : LF decimated signal */
  Word16 sig12k8_hf[],    /* (o)  : HF decimated signal */
  Word16 lg,              /* (i)  : length of LF and HF */
  Word16 fac_fs,          /* (i)  : at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  Word16 mem[],     /* (i/o): mem[L_MEM_DECIM_SPLIT] */
  Word16 *frac_mem  /* (i/o): interpol fraction memory */
)
```

**Code after change:**

```
Word16 Decim_split_12k8(  /* number of sample decimated */
  Word16 sig_fs[],        /* (i)  : signal to decimate  */
  Word16 lg_input,   /* input:  2*L_FRAME44k if 44kHz*/
  Word16 sig12k8_lf[], /*(o)  : LF decimated signal */
  Word16 sig12k8_hf[],    /* (o)  : HF decimated signal */
  Word16 lg,              /* (i)  : length of LF and HF */
  Word16 fac_fs,          /* (i)  : at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  Word16 mem[],     /* (i/o): mem[L_MEM_DECIM_SPLIT] */
  Word16 *frac_mem  /* (i/o): interpol fraction memory */
)
```

### Lines 36-38

**Code before change:**

```
  fac_up = fac_fs;      move16();
  fac_down = 180;       move16();  /* 23040 >> 7*/
  filter = Filter_LP180;
```

**Code after change:**

```
  Word16 n_fac_down;
#ifdef FILTER_44kHz
  test();
  if (L_sub(lg_input,(2*L_FRAME44k)) == 0)
  {
    fac_up = shl(fac_fs,3);
    fac_down = 3*441;      move16();
    n_fac_down = 17199;     move16();
    filter = (Word16 *)Filter_LP165;      move16();
  }
#endif
#ifdef FILTER_48kHz
  test();
  if (L_sub(lg_input,(2*L_FRAME48k)) == 0)
  {
    fac_up = shl(fac_fs,3);
    fac_down = 180*8;       move16();
    n_fac_down = 18720;     move16();
    filter = (Word16*)Filter_LP180;      move16();
  }
#endif
```

## Lines 45-46

**Code before change:**

```
ncoef = div_s(9360, m_fu);    /* 9360 = (180*(L_FILT_OVER+1))<<2 */
ncoef = shr(ncoef, sub(15+2, exp_u));
```

**Code after change:**

```
  test();
  if(sub(n_fac_down, m_fu) >0)
  {
    n_fac_down = shr(n_fac_down,1);
    ncoef = div_s(n_fac_down, m_fu);    /* 18720 = (180*(L_FILT_OVER+1))<<1 */
    ncoef = shr(ncoef, sub(15-1, exp_u));
  }
  else
  {
    ncoef = div_s(n_fac_down, m_fu);    /* 18720 = (180*(L_FILT_OVER+1))<<1 */
    ncoef = shr(ncoef, sub(15, exp_u));
  }
```

## Line 48

**Code before change:**

```
gain = div_s(shl(fac_up,7), 23040);   /* gain in Q15 */
```

**Code after change:**

```
gain = div_s(shl(fac_fs,7), 23040);   /* gain in Q15 */
```

# *3.* How the code is changed in the file *join_split_fx.c*

## Lines 20-26

**Code before change:**

```
Word16 Join_over_12k8(/* (o): number of sample oversampled*/
  Word16 sig12k8_lf[],/* (i): LF signal (fs=12k8)   */
  Word16 sig12k8_hf[],/* (i)   : HF signal (fs=12k8)  */
  Word16 lg,          /* (i)   : length of LF and HF */
  Word16 sig_fs[],    /* (o)   : oversampled signal  */
  Word16 fac_fs,      /* (i)   : >= 32 (32 = base fs)*/
  Word16 mem[],       /* (i/o) : mem[L_MEM_JOIN_OVER] */
  Word16 *frac_mem    /* (i/o) : interpol fraction memory*/
)
```

**Code after change:**

```
Word16 Join_over_12k8(/* (o): number of sample oversampled*/
  Word16 sig12k8_lf[],/* (i): LF signal (fs=12k8)   */
  Word16 sig12k8_hf[],/* (i)   : HF signal (fs=12k8)  */
  Word16 lg,          /* (i)   : length of LF and HF */
  Word16 sig_fs[],    /* (o)   : oversampled signal  */
  Word16 lg_output,   /* (i)   : L_FRAME44k if 44kHz */
  Word16 fac_fs,      /* (i)   : >= 32 (32 = base fs)*/
  Word16 mem[],       /* (i/o) : mem[L_MEM_JOIN_OVER] */
  Word16 *frac_mem    /* (i/o) : interpol fraction memory*/
)
```

## Lines 36-38

**Code before change:**

```
  fac_up = 180;                    move16();
  fac_down = fac_fs;               move16();
  filter = (Word16 *)Filter_LP180;  move16();
```

**Code after change:**

```
#ifdef FILTER_44kHz
  test();
  if (L_sub(lg_output,L_FRAME44k) == 0)
  {
    fac_up = 3*441;             move16();
    fac_down = shl(fac_fs,3);
    filter = (Word16*)Filter_LP165;        move16();
  }
#endif
#ifdef FILTER_48kHz
  test();
  if (L_sub(lg_output,(L_FRAME48k)) == 0)
  {
    fac_up = 180*8;        move16();
    fac_down = shl(fac_fs,3);
    filter = (Word16 *)Filter_LP180;        move16();
  }
#endif
```

## After line 157

**Add this code:**

```
Word16 frac_d, fac_up_d;
```

## After line 177

**Add this code:**

```
fac_up_d = shr(fac_up, 3);
```

## Lines 184-185

**Before the change:**

```
    c1 = &filter[frac]; move16();
    c2 = &filter[fac_up-frac];  move16();
```

**After the change:**

```
    frac_d = shr(frac, 3);
    c1 = &filter[frac_d];           move16();
    c2 = &filter[fac_up_d-frac_d];  move16();
```

## Lines 187

**Before the change:**

```
    for(j=0; j<nb_coef; j++, c1+=fac_up, c2+=fac_up)
```

**After the change:**

```
    for(j=0; j<nb_coef; j++, c1+=fac_up_d, c2+=fac_up_d)
```

# *4.* How the code is changed in the file *proto_func_fx.h*

## After line 518

**Add following prototypes:**

```
Word16 Over_fs(   /* number of sample oversampled       */
  Word16 sig_in[],/* input:  signal to oversample       */
  Word16 sig_out[],/* output: signal oversampled         */
  Word16 lg,       /* input:  length of output           */
  Word16 fac_down, /* input:  fs*12/fac_down = 44k/48k   */
  Word16 mem[],    /* in/out: mem[2*L_FILT_OVER_FS]      */
  Word16 *frac_mem /* in/out: interpol fraction memory   */
);
Word16 Decim_fs(   /* number of sample decimated       */
  Word16 sig_in[],/* input:  signal to decimate         */
  Word16 lg,      /* input:  length of input            */
  Word16 sig_out[],/* output: signal decimated           */
  Word16 fac_up,   /* input:  44k/48k *fac_up/12 = fs    */
  Word16 mem[],    /* in/out: mem[2*L_FILT_DECIM_FS]     */
  Word16 *frac_mem /* in/out: interpol fraction memory   */
);
```

## Lines 519-526

**Code before change:**

```
Word16 Join_over_12k8(/* (o): number of sample oversampled*/
  Word16 sig12k8_lf[],/* (i): LF signal (fs=12k8)   */
  Word16 sig12k8_hf[],/* (i)   : HF signal (fs=12k8)  */
  Word16 lg,          /* (i)   : length of LF and HF */
  Word16 sig_fs[],    /* (o)   : oversampled signal  */
  Word16 fac_fs,      /* (i)   : >= 32 (32 = base fs)*/
  Word16 mem[],       /* (i/o) : mem[L_MEM_JOIN_OVER] */
```

```
  Word16 *frac_mem    /* (i/o) : interpol fraction memory*/
);
```

**Code after change:**

```
Word16 Join_over_12k8(/* (o): number of sample oversampled*/
  Word16 sig12k8_lf[],/* (i): LF signal (fs=12k8)   */
  Word16 sig12k8_hf[],/* (i)   : HF signal (fs=12k8)  */
  Word16 lg,          /* (i)   : length of LF and HF */
  Word16 sig_fs[],    /* (o)   : oversampled signal  */
  Word16 lg_output,   /* (i)   : L_FRAME44k if 44kHz */
  Word16 fac_fs,      /* (i)   : >= 32 (32 = base fs)*/
  Word16 mem[],       /* (i/o) : mem[L_MEM_JOIN_OVER] */
  Word16 *frac_mem    /* (i/o) : interpol fraction memory*/
);
```

## Lines 564-572

**Code before change:**

```
Word16 Decim_split_12k8(  /* number of sample decimated */
  Word16 sig_fs[],        /* (i)  : signal to decimate  */
  Word16 sig12k8_lf[], /*(o)  : LF decimated signal */
  Word16 sig12k8_hf[],    /* (o)  : HF decimated signal */
  Word16 lg,              /* (i)  : length of LF and HF */
  Word16 fac_fs,          /* (i)  : at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  Word16 mem[],     /* (i/o): mem[L_MEM_DECIM_SPLIT] */
  Word16 *frac_mem  /* (i/o): interpol fraction memory */
);
```

**Code after change:**

```
Word16 Decim_split_12k8(  /* number of sample decimated */
  Word16 sig_fs[],        /* (i)  : signal to decimate  */
  Word16 lg_input,   /* input:  2*L_FRAME44k if 44kHz*/
  Word16 sig12k8_lf[], /*(o)  : LF decimated signal */
  Word16 sig12k8_hf[],    /* (o)  : HF decimated signal */
  Word16 lg,              /* (i)  : length of LF and HF */
  Word16 fac_fs,          /* (i)  : at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  Word16 mem[],     /* (i/o): mem[L_MEM_DECIM_SPLIT] */
  Word16 *frac_mem  /* (i/o): interpol fraction memory */
);
```

# *5.* How the code is changed in the file table_decl_*fx.h*

## Line 112

**Before change:**

```
extern const Word16 Filter_LP180[1+((12+1)*180)];
```

**After change:**

```
#ifdef FILTER_48kHz
extern const Word16 Filter_LP180[1+((12+1)*180)];
#endif
```

## After line 149

**Add these lines:**

```
extern const Word16 Filter_LP12[1+(L_FILT_OVER_FS*12)];
```

```
#ifdef FILTER_44kHz
extern const Word16 Filter_LP165[1+((12+1)*165)];
#endif
```

# *6.* How the code is changed in the file cnst_*fx.h*

## After line 43

**Add these lines:**

```
#define L_FRAME11k    ((L_FRAME_PLUS/512)*441)
#define L_FILT_DECIM_FS  (L_FILT_OVER_FS*6)
#define L_FILT_OVER_FS   12
```

# *7.* How the code is changed in the file cod_main_p_fx.c

## Line 231

**Code before the change:**

```
Decim_split_12k8(wchannel_left, new_speech+L_FRAME_PLUS-L_NEXT_ST,
         wchannel_left,
```

**Code after the change:**

```
Decim_split_12k8(wchannel_left, L_frame, new_speech+L_FRAME_PLUS-L_NEXT_ST,
         wchannel_left,
```

## Line 235

**Code before the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, sig_right+L_FRAME_PLUS-L_NEXT_ST,
         wchannel_right,
```

**Code after the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, L_frame, sig_right+L_FRAME_PLUS-
         L_NEXT_ST, wchannel_right,
```

## Line 288

**Code before the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, new_speech+L_FRAME_PLUS-L_NEXT,
         wchannel_right,
```

**Code after the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, L_frame, new_speech+L_FRAME_PLUS-
         L_NEXT, wchannel_right,
```

## Line 482

**Code before the change:**

```
Decim_split_12k8(wchannel_left, wsig_left, wchannel_left,
```

**Code after the change:**

```
Decim_split_12k8(wchannel_left, L_frame, wsig_left, wchannel_left,
```

## Line 484

**Code before the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, sig_right, wchannel_right,
```

**Code after the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, L_frame, sig_right, wchannel_right,
```

## Line 837

**Code before the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, new_speech, wchannel_right,
```

**Code after the change:**

```
nb_samp = Decim_split_12k8(wchannel_right, L_frame, new_speech, wchannel_right,
```

# *8.* How the code is changed in the file dec_main_s_fx.c

## Lines 298-301

**Code before the change:**

```
nb_samp = Join_over_12k8(sig_left, channel_left, L_FRAME_PLUS, channel_left,
         upsamp_fscale, st->left.wmem_oversamp, &(st->left.wover_frac));


nb_samp = Join_over_12k8(synth, channel_right, L_FRAME_PLUS, channel_right,
         upsamp_fscale, st->right.wmem_oversamp, &(st->right.wover_frac));
```

**Code after the change:**

```
nb_samp = Join_over_12k8(sig_left, channel_left, L_FRAME_PLUS,
         channel_left,L_frame, upsamp_fscale, st->left.wmem_oversamp, &(st-
         >left.wover_frac));


nb_samp = Join_over_12k8(synth, channel_right, L_FRAME_PLUS,
         channel_right,L_frame, upsamp_fscale, st->right.wmem_oversamp, &(st-
         >right.wover_frac));
```

## Lines 318-319

**Code before the change:**

```
nb_samp = Join_over_12k8(synth, channel_right, L_FRAME_PLUS, channel_right,
         upsamp_fscale, st->right.wmem_oversamp, &(st->right.wover_frac));
```

**Code after the change:**

```
nb_samp = Join_over_12k8(synth, channel_right, L_FRAME_PLUS,
         channel_right,L_frame,upsamp_fscale, st->right.wmem_oversamp, &(st-
         >right.wover_frac));
```

# *9.* How the code is changed in the file *over_fs_fx.c*

**Add these 3 functions into that file:**

```
#include <stdio.h>
#include <stdlib.h>
#include <assert.h>

#include "amr_plus_fx.h"



#include "typedef.h"
#include "basic_op.h"
#include "oper_32b.h"
#include "count.h"


#define L_FRAME_MAX   (L_FRAME48k)

static void mInterpol_mem(
  Word16 *signal,         /* (i)  : Signal    */
  Word16 *signal_int, /* (o)  : interpolated signal */
  Word16 L_frame_int, /* (i)  : Length of interpolated */
  const Word16 *filter, /* (i)  : Filter      Q14 */
  Word16 nb_coef,     /* (i)  : Number of coeff  */
  Word16 fac_up,      /* (i)  : Upsampling factor */
  Word16 fac_down,    /* (i)  : Denumerator on numerator */
  Word16 gain,        /* (i)  : Gain to apply  */
  Word16 *mem_frac    /* (i/o): Fraction memory   */
);

Word16 Decim_fs(   /* number of sample decimated       */
  Word16 sig_in[], /* input:  signal to decimate         */
  Word16 lg,       /* input:  length of input            */
  Word16 sig_out[],/* output: signal decimated           */
  Word16 fac_up,   /* input:  44k/48k *fac_up/12 = fs    */
  Word16 mem[],    /* in/out: mem[2*L_FILT_DECIM_FS]     */
  Word16 *frac_mem /* in/out: interpol fraction memory   */
)
{
  Word16 i, ncoef, L_frame, L_frame_int;
  Word16 signal[(2*L_FILT_DECIM_FS)+2*L_FRAME_MAX];
  Word16 *filter, gain;
  Word16 fac_down, tmp16, exp_u, m_fu;
  Word32 Ltmp;


  test();
  if(sub(fac_up,12)>=0) return(lg);

  fac_down = 12;      move16();
  exp_u = norm_s(fac_up);
  m_fu = shl(fac_up, exp_u);


  /* ncoef = L_FILT_OVER_FS*fac_down/fac_up;*/
  ncoef = div_s(((12*12)<<6), m_fu);
  ncoef = shr(ncoef, sub(15+6, exp_u));
```

```
  /* gain = ((float)fac_up) / ((float)fac_down);*/
  gain = div_s(m_fu, 24576);   /* gain in Q15 */
  gain = shl(gain, sub(11,exp_u));

  filter = (Word16*)Filter_LP12;

  L_frame = lg;
  /*L_frame_int = ((lg*fac_up)-(*frac_mem)+(fac_down-1))/fac_down;*/
  Ltmp = L_mult(L_frame, fac_up);
  Ltmp = L_mac(Ltmp, sub(fac_down, add(1, *frac_mem)), 1);

  i = 11;        move16();   /*norm_s(fac_down = 12); */

  L_frame_int = div_s(extract_h(L_shl(Ltmp, i)), 24576/*shl(fac_down, i)*/);

  tmp16 = add(L_frame_int, 1);
  Ltmp = L_msu(Ltmp, tmp16, fac_down);
  test();
  if (Ltmp >= 0)
  {
    L_frame_int = tmp16;            move16();
  }

  /* load buffer & update memory */

  for (i=0; i<(2*L_FILT_DECIM_FS); i++)
  {
    signal[i] = mem[i];         move16();
  }

  for (i=0; i<L_frame; i++)
  {
    signal[i+(2*L_FILT_DECIM_FS)] = sig_in[i];      move16();
  }

  for (i=0; i<(2*L_FILT_DECIM_FS); i++)
  {
    mem[i] = signal[i+L_frame];         move16();
  }

  /* decimation from 44.1/48khz to fs_output */

  mInterpol_mem(signal+ncoef-1, sig_out, L_frame_int, filter, ncoef, fac_up,
         fac_down, gain, frac_mem);


  return(L_frame_int);
}

Word16 Over_fs(    /* number of sample oversampled       */
  Word16 sig_in[], /* input:  signal to oversample       */
  Word16 sig_out[],/* output: signal oversampled         */
  Word16 lg,       /* input:  length of output           */
  Word16 fac_down, /* input:  fs*12/fac_down = 44k/48k   */
  Word16 mem[],    /* in/out: mem[2*L_FILT_OVER_FS]      */
  Word16 *frac_mem /* in/out: interpol fraction memory   */
)
{
  Word16  i, ncoef, L_frame, L_frame_int;
  Word16  signal[(2*L_FILT_OVER_FS)+2*L_FRAME_MAX];
  Word16 *filter, gain;
  Word16 fac_up, tmp16;
```

```
  Word32 Ltmp;

  test();
  if(sub(fac_down,12)>= 0) return (lg);

  fac_up = 12;      move16();

  filter = (Word16*)Filter_LP12;        move16();

  ncoef = L_FILT_OVER_FS;             move16();
  gain = 32767;      move16();

  L_frame_int = lg;     move16();

  /*L_frame = ((lg*fac_down)+(*frac_mem)) / fac_up;*/
  Ltmp = L_mult(L_frame_int, fac_down);
  Ltmp = L_mac(Ltmp, *frac_mem, 1);

  L_frame = div_s(extract_h(L_shl(Ltmp, 11)), 24576);

  tmp16 = add(L_frame, 1);
  Ltmp = L_msu(Ltmp, tmp16, fac_up);
  test();
  if (Ltmp >= 0)
  {
    L_frame = tmp16;            move16();
  }


  /* load buffer & update memory */

  for (i=0; i<(2*L_FILT_OVER_FS); i++)
  {
    signal[i] = mem[i];         move16();
  }
  for (i=0; i<L_frame; i++)
  {
    signal[i+(2*L_FILT_OVER_FS)] = sig_in[i];           move16();
  }

  for (i=0; i<(2*L_FILT_OVER_FS); i++)
  {
    mem[i] = signal[i+L_frame];                         move16();
  }

  /* oversample to 44.1/48 khz */

  mInterpol_mem(signal+ncoef-1, sig_out, L_frame_int, filter, ncoef, fac_up,
         fac_down, gain, frac_mem);

  return(L_frame);
}

static void mInterpol_mem(
  Word16 *signal,     /* (i)  : Signal    */
  Word16 *signal_int, /* (o)  : interpolated signal */
  Word16 L_frame_int, /* (i)  : Length of interpolated */
  const Word16 *filter, /* (i)  : Filter    Q14 */
  Word16 nb_coef,  /* (i)  : Number of coeff  */
  Word16 fac_up,   /* (i)  : Upsampling factor   */
  Word16 fac_down, /* (i)  : Denumerator on numerator */
  Word16 gain,     /* (i)  : Gain to apply */
  Word16 *mem_frac /* (i/o): Fraction memory   */
```

```
)
{
  Word16 i, j, frac, frac_step, pos, pos_step;
  Word16 pos_step_plus_one, fac_up_minus_frac_step;
  Word16 *x1, *x2;
  const Word16 *c1, *c2;
  Word32 s;

  /* pos_step = fac_down / fac_up; */
  pos_step = 0;        move16();
  i = fac_down;        move16();
  test();
  while (sub(i, fac_up) >= 0)
  {
    test();
    i = sub(i, fac_up);
    pos_step = add(pos_step, 1);
  }

  pos_step_plus_one = add(pos_step, 1);

  frac_step = sub(fac_down, extract_l(L_shr(L_mult(pos_step,fac_up),1)));
  fac_up_minus_frac_step = sub(fac_up,frac_step);

  pos = 0;             move16();
  frac = *mem_frac;    move16();
  for(i=0; i<L_frame_int; i++)
  {
    x1 = signal+pos;    move16();
    x2 = x1+1;          move16();
    c1 = &filter[frac]; move16();
    c2 = &filter[fac_up-frac];  move16();
    s = 0;    move32();
    for(j=0; j<nb_coef; j++, c1+=fac_up, c2+=fac_up)
    {
      /*s += (*x1--) * (*c1) + (*x2++) * (*c2);*/
      s = L_mac(s, *x1-- , *c1);
      s = L_mac(s, *x2++ , *c2);
    }
    /* in decim and imterpol split, gain is always <= 1*/
    signal_int[i] = shl(mult_r(round(s),gain),1);    move16(); /* Apply gain
         before left shift to prevent overflow when used in decim_split*/

    test();
    if (sub(frac,fac_up_minus_frac_step) >= 0)
    {
      pos = add(pos, pos_step_plus_one);
      frac = sub(frac, fac_up_minus_frac_step);
    }
    else
    {
      pos = add(pos, pos_step);
      frac = add(frac, frac_step);
    }

  }

  *mem_frac = frac;   move16();
  return;
}
```

# *10.* How the code is changed in the file enc_wbplus_fx.c

## Lines 391-461

**Code before the change:**

```
  switch (samplingRate)
  {
    test();test();test();test();test();test();
    case 8000:
      test();
      if(fscale==0)
      {
        *L_frame = L_FRAME8k;       move16();
        *L_next = L_NEXT8k;         move16();
        *L_next_st = L_NEXT_ST8k;   move16();
        *invsamplingRate = 16777;   move16(); /*Q15+12*/
      }
      else
      {
        fprintf(stderr, "8kHz files are allowed only without fsratio(isf) -mi <=
         14  \n");
        exit(EXIT_FAILURE);
      }
    break;

    case 16000:
      test();
      if(fscale==0)
      {
        *L_frame = L_FRAME16kPLUS;          move16();
        *L_next = L_NEXT16k;                move16();
        *L_next_st = L_NEXT_ST16k;          move16();
        *invsamplingRate = 8389;   move16(); /*Q15+12*/
      }
      else
      {
        fprintf(stderr, "16kHz files are allowed only without fsratio(isf) -mi
         <= 14  \n");
        exit(EXIT_FAILURE);
      }
    break;

    case 24000:
      test();
      if(fscale==0)
      {
        *L_frame = L_FRAME24k;              move16();
        *L_next = L_NEXT24k;               move16();
        *L_next_st = L_NEXT_ST24k;         move16();
        *invsamplingRate = 5592;   move16(); /*Q15+12*/
      }
      else
      {
        fprintf(stderr, "24kHz files are allowed only without fsratio(isf) -mi
         <= 14  \n");
        exit(EXIT_FAILURE);
      }
    break;

    case 32000:
      test();
```

```
      if (sub(fscale,FSCALE_DENOM) == 0)
      {
        *L_frame = L_FRAME32k;    move16();
        *invsamplingRate = 4194;   move16(); /*Q15+12*/
      }
      else
      {
        printf( "32kHz WAV files are allowed only at fsratio=1.\n" );
        exit(EXIT_FAILURE);
      }
    break;
    case 48000:
      *L_frame = 2*L_FRAME48k;      move16();
      *invsamplingRate = 2796;   move16(); /*Q15+12*/
    break;

    default:
        fprintf(stderr,"error in sampling freq: use 16, 24, 32 or 48 kHz \n");
      exit(EXIT_FAILURE);
    break;
  }
```

**Code after the change:**

```
   test();
   if (fscale != 0)
   {
     test();test();test();test();test();test();test();test();
      switch (samplingRate)
      {
#ifdef FILTER_48kHz
      case 8000:
      case 16000:
      case 24000:
      case 32000:
      case 48000:
        *L_frame = 2 * L_FRAME48k;      move16();
        break;
#endif
#ifdef FILTER_44kHz
      case 11025:
      case 22050:
      case 44100:
        *L_frame = 2 * L_FRAME44k;    move16();
        break;
#endif
      default:
         fprintf(stderr, "error in sampling frequency.  choice of filter are:
         \n");
#ifdef FILTER_44kHz
         fprintf(stderr, "     11, 22, 44 kHz \n");
#endif
#ifdef FILTER_48kHz
         fprintf(stderr, "     8, 16, 24, 32, 48 kHz \n");
#endif
         exit(EXIT_FAILURE);
         break;
      }
   }
   else
   {
     test();test();test();
     switch (samplingRate)
     {
```

```
     case 8000:
        *L_frame = L_FRAME8k;     move16();
        *L_next = L_NEXT8k;     move16();
        *L_next_st = L_NEXT_ST8k;     move16();
        break;
     case 16000:
        *L_frame = L_FRAME16kPLUS;     move16();
        *L_next = L_NEXT16k;     move16();
        *L_next_st = L_NEXT_ST16k;     move16();
        break;
     case 24000:
        *L_frame = L_FRAME24k;     move16();
        *L_next = L_NEXT24k;     move16();
        *L_next_st = L_NEXT_ST24k;     move16();
        break;
     default:
        fprintf(stderr, "error in sampling freq: without fsratio(isf) only 8,
        16 or 24 kHz are allowed\n");
        exit(EXIT_FAILURE);
        break;
     }
  }
```

## After line 602

**Add this code:**

```
  Word16 mem_up_right[2* L_FILT_OVER_FS], mem_up_left[2* L_FILT_OVER_FS];
  Word16 frac_up_right, frac_up_left, tmp16;
  Word16 fac_up, fac_down, nb_samp_fs;
```

## Lines 717-724

**Code before changes:**

```
  /* set fscale=1.0 when fs = 32000 or 48000 */
  test();test();test();
  if (((L_sub(samplingRate,32000) == 0) || (L_sub(samplingRate,48000) == 0))
        && (conf.fscale == 0))
  {
    conf.fscale = FSCALE_DENOM;         move16();
    conf.fscale_index = 8;          move16();
  }
```

**Code after changes:**

```
   fac_up = fac_down = 12;     move16();/* no oversampling by default */
    test();
   if (conf.fscale != 0)
   {
     test();test();test();test();test();test();
     switch (samplingRate) {
     case 8000:
       fac_down = 2;            move16();
       samplingRate  = 48000;   move16();
       invsamplingRate = 16777;   move16(); /*Q15+12*/
       break;
     case 16000:
       fac_down = 4;   move16();
       samplingRate  = 48000;   move16();
       invsamplingRate = 8389;   move16(); /*Q15+12*/
       break;
     case 24000:
       fac_down = 6;   move16();
```

```
      samplingRate  = 48000;   move16();
      invsamplingRate = 5592;   move16(); /*Q15+12*/
      break;
    case 32000:
      fac_down = 8;   move16();
      samplingRate  = 48000;   move16();
       invsamplingRate = 4194;   move16(); /*Q15+12*/

      break;
    case 11025:
      fac_down = 3;   move16();
      samplingRate  = 44100;   move16();
      invsamplingRate = 12174;   move16(); /*Q15+12*/

      break;
    case 22050:
      fac_down = 6;   move16();
      samplingRate  = 44100;   move16();
      invsamplingRate = 6087;   move16(); /*Q15+12*/

      break;
    }
    Set_zero(mem_up_right, 2*L_FILT_OVER_FS);
    Set_zero(mem_up_left, 2*L_FILT_OVER_FS);
  }
  frac_up_right = 0;   move16();
  frac_up_left = 0;   move16();
```

## Lines 752-754

**Code before changes:**

```
  lg = Read_data(f_speech, channel_right, (numOfChannels*L_frame));
  test();
  if (L_sub(lg, L_shr(L_mult(numOfChannels,L_frame),1)) != (0))
```

**Code after changes:**

```
   /* number of sample per channel to read from file */
   /*nb_samp_fs = ((L_frame*fac_down)+frac_up_right) / fac_up;*/
   Ltmp = L_mult(L_frame, fac_down);
   Ltmp = L_mac(Ltmp, frac_up_right, 1);

   nb_samp_fs = div_s(extract_h(L_shl(Ltmp, 11)), 24576);

   tmp16 = add(nb_samp_fs, 1);
   Ltmp = L_msu(Ltmp, tmp16, fac_up);
   test();
   if (Ltmp >= 0)
   {
     nb_samp_fs = tmp16;            move16();
   }

   lg = Read_data(f_speech, channel_right, (numOfChannels * nb_samp_fs));
   if (L_sub(L_shl(lg,1),L_mult(numOfChannels, nb_samp_fs)) != 0)
```

## Lines 762-763

**Code before changes:**

```
/* remove interleave of left and right samples */
deinterleave(channel_right,channel_left,channel_right,L_frame);
```

**Code after changes:**

```
/* remove interleave of left and right samples */
deinterleave(channel_right,channel_left,channel_right,nb_samp_fs);
Over_fs(channel_left, channel_left, L_frame, fac_down, mem_up_left,
         &frac_up_left);
```

## After Line 764

**Add this line:**

```
Over_fs(channel_right, channel_right, L_frame, fac_down, mem_up_right,
         &frac_up_right);
```

## After Line 798

**Add these line:**

```
    if(sub(fac_down,12)!=0)
    {
      fprintf(stderr, "Must have 16kHz (to switch amr-wb -> wb+ (mode 10@13))\n"
        "or 48kHz (wb+) input\n\n");
      exit(EXIT_FAILURE);
    }

    if(sub(numOfChannels,1)==0)
    {
      fprintf(stderr, "** Warning **\nDo not switch to stereo... \nyou have mono
         input\n\n");
    }
```

## Lines 899

**Code before changes:**

```
lg = Read_data(f_speech, channel_right+nb_hold, (numOfChannels*(L_frame-
         nb_hold)));
```

**Code after changes:**

```
/* number of sample per channel to read from file */
/*nb_samp_fs = ((L_frame*fac_down)+frac_up_right) / fac_up;*/
Ltmp = L_mult(nb_samp, fac_down);
Ltmp = L_mac(Ltmp, frac_up_right, 1);

nb_samp_fs = div_s(extract_h(L_shl(Ltmp, 11)), 24576);

tmp16 = add(nb_samp_fs, 1);
Ltmp = L_msu(Ltmp, tmp16, fac_up);
test();
if (Ltmp >= 0)
{
   nb_samp_fs = tmp16;            move16();
}

lg = Read_data(f_speech, channel_right+nb_hold, (numOfChannels * nb_samp_fs));
```

## Lines 907

**Code before changes:**

```
deinterleave(channel_right+nb_hold,channel_left+nb_hold,channel_right+nb_hold,L_
         frame-nb_hold);
```

**Code after changes:**

```
deinterleave(channel_right+nb_hold, channel_left+nb_hold, channel_right+nb_hold,
         nb_samp_fs);
Over_fs(channel_left+nb_hold, channel_left+nb_hold, nb_samp, fac_down,
         mem_up_left, &frac_up_left);
```

### After Lines 908

**Add this line:**

```
Over_fs(channel_right + nb_hold, channel_right + nb_hold, nb_samp, fac_down,
         mem_up_right, &frac_up_right);
```

## *11.* How the code is changed in the file dec_wbplus_fx.c

### Lines 192

**Code before changes:**

```
if (L_sub(conf->fs,48000) != 0)
```

**Code after changes:**

```
if ((L_sub(conf->fs,44100)!=0) && (L_sub(conf->fs,48000) != 0) )
```

### After Lines 226

**Code before changes:**

```
    case 48000:
      *L_frame = L_FRAME48k;

      break;
```

**Code after changes:**

```
#ifdef FILTER_44kHz
case 44100:
  *L_frame = L_FRAME44k;     move16();
  break;
#endif
#ifdef FILTER_48kHz
    case 48000:
      *L_frame = L_FRAME48k;

      break;
#endif
```

### After Lines 351

**Add these lines:**

```
Word16 mem_down_right[2*L_FILT_DECIM_FS], mem_down_left[2*L_FILT_DECIM_FS];
Word16 frac_down_right, frac_down_left;
Word16 fac_up, fac_down, nb_samp_fs, last_scaling;
Word32 fs_output;
```

## After Lines 413

**Add these lines:**

```
/* default sampling rate if undefined */
   test();
   if (conf.fs == 0)
   {
     test();test();
      if (conf.extension == 0)
      {
         conf.fs = 16000;     move16();
      }
      else if (conf.fscale == 0)
      {
         conf.fs = 24000;   move16();
      }
      else
      {
#ifdef FILTER_44kHz
         conf.fs = 44100;   move16();
#endif
#ifdef FILTER_48kHz
         conf.fs = 48000;   move16();
#endif
      }
   }
   fs_output = conf.fs;   move16();

   fac_up = fac_down = 12;     move16(); /* no oversampling by default */

   test();
   if (conf.fscale != 0)
   {
     test();test();test();test();test();test();
     switch (conf.fs)
     {
     case 8000:
       fac_up = 2;      move16();
       conf.fs = 48000;   move16();
       break;
     case 16000:
       fac_up = 4;   move16();
       conf.fs = 48000;   move16();
       break;
     case 24000:
       fac_up = 6;   move16();
       conf.fs = 48000;   move16();
       break;
     case 32000:
       fac_up = 8;   move16();
       conf.fs = 48000;   move16();
       break;
     case 11025:
       fac_up = 3;   move16();
       conf.fs = 44100;   move16();
       break;
     case 22050:
       fac_up = 6;   move16();
       conf.fs = 44100;   move16();
       break;
     }
     Set_zero(mem_down_right, 2*L_FILT_DECIM_FS);
```

```
    Set_zero(mem_down_left, 2*L_FILT_DECIM_FS);
  }
  frac_down_right = 0;     move16();
  frac_down_left = 0;      move16();
  last_scaling = 0;        move16();
```

## Lines 442

**Code before changes:**

```
if ((f_syn = Wave_Fopen(output_filename, "wb", &num_channels, &(conf.fs),
```

**Code after changes:**

```
if ((f_syn = Wave_Fopen(output_filename, "wb", &num_channels, &fs_output,
```

## Lines 608-610

**Code before changes:**

```
/* interleave of left and right samples (stereo file format) */
Interleave(channel_right,channel_left,channel_right,nb_samp);
Writ_data(channel_right, shl(nb_samp,1), f_syn, Frame_Q);
```

**Code after changes:**

```
Scale_sig(mem_down_right,2*L_FILT_DECIM_FS, sub(last_scaling,Frame_Q));
Scale_sig(mem_down_left,2*L_FILT_DECIM_FS, sub(last_scaling,Frame_Q));
last_scaling = Frame_Q;   move16();

nb_samp_fs = Decim_fs(channel_right, nb_samp, channel_right, fac_up,
         mem_down_right, &frac_down_right);
nb_samp_fs = Decim_fs(channel_left, nb_samp, channel_left, fac_up,
         mem_down_left, &frac_down_left);

/* interleave of left and right samples (stereo file format) */
Interleave(channel_right,channel_left,channel_right,nb_samp_fs);
Writ_data(channel_right, shl(nb_samp_fs,1), f_syn, Frame_Q);
```

## Line 623

**Code before changes:**

```
Writ_data(channel_right, nb_samp, f_syn, Frame_Q);
```

**Code after changes:**

```
Scale_sig(mem_down_right,2*L_FILT_DECIM_FS, sub(Frame_Q, last_scaling));
last_scaling = Frame_Q;   move16();

nb_samp_fs = Decim_fs(channel_right, nb_samp, channel_right, fac_up,
         mem_down_right, &frac_down_right);
Writ_data(channel_right, nb_samp_fs, f_syn, Frame_Q);
```

# *12.* How the code is changed in the file table_plus_fx.c

## After line 2940

**Add following tables :**
**#ifdef FILTER_44kHz**

```
const Word16 Filter_LP165[1+((12+1)*165)] = { /*Q14*/
 16384,  16383,  16380,  16375,  16368,  16359,  16348,  16335,
 16320,  16303,  16284,  16263,  16240,  16215,  16189,  16160,
 16129,  16096,  16062,  16025,  15987,  15946,  15904,  15860,
```

```
15814,  15766,  15716,  15665,  15611,  15556,  15499,  15440,
15379,  15317,  15252,  15186,  15119,  15049,  14978,  14905,
14830,  14754,  14676,  14597,  14516,  14433,  14349,  14263,
14176,  14087,  13997,  13905,  13812,  13717,  13621,  13524,
13425,  13325,  13223,  13120,  13016,  12911,  12804,  12696,
12587,  12477,  12366,  12253,  12140,  12025,  11910,  11793,
11675,  11557,  11437,  11316,  11195,  11073,  10950,  10826,
10701,  10575,  10449,  10322,  10195,  10066,  9937,  9808,
9678,  9547,  9416,  9284,  9152,  9019,  8886,  8753,
8619,  8485,  8350,  8216,  8081,  7946,  7810,  7675,
7539,  7403,  7267,  7131,  6995,  6859,  6723,  6587,
6451,  6316,  6180,  6045,  5909,  5774,  5639,  5505,
5370,  5236,  5103,  4969,  4836,  4704,  4572,  4440,
4309,  4178,  4048,  3919,  3790,  3662,  3534,  3407,
3280,  3155,  3030,  2905,  2782,  2659,  2537,  2416,
2296,  2177,  2058,  1941,  1824,  1708,  1593,  1480,
1367,  1255,  1144,  1035,  926,  819,  712,  607,
503,  400,  298,  198,  98,  0,  -97,  -193,
-287,  -380,  -472,  -563,  -653,  -741,  -827,  -913,
-997,  -1080,  -1161,  -1241,  -1320,  -1397,  -1473,  -1547,
-1620,  -1692,  -1762,  -1831,  -1898,  -1964,  -2029,  -2092,
-2153,  -2213,  -2272,  -2329,  -2385,  -2439,  -2492,  -2543,
-2593,  -2642,  -2689,  -2734,  -2778,  -2821,  -2862,  -2901,
-2940,  -2976,  -3012,  -3045,  -3078,  -3109,  -3138,  -3166,
-3193,  -3218,  -3242,  -3264,  -3285,  -3305,  -3323,  -3340,
-3355,  -3369,  -3382,  -3393,  -3403,  -3412,  -3419,  -3425,
-3430,  -3433,  -3435,  -3436,  -3436,  -3434,  -3431,  -3427,
-3422,  -3415,  -3408,  -3399,  -3389,  -3377,  -3365,  -3352,
-3337,  -3321,  -3305,  -3287,  -3268,  -3248,  -3227,  -3205,
-3182,  -3159,  -3134,  -3108,  -3081,  -3054,  -3025,  -2996,
-2966,  -2935,  -2903,  -2871,  -2837,  -2803,  -2768,  -2732,
-2696,  -2659,  -2621,  -2583,  -2544,  -2504,  -2464,  -2423,
-2382,  -2340,  -2297,  -2255,  -2211,  -2167,  -2123,  -2078,
-2033,  -1987,  -1941,  -1895,  -1848,  -1801,  -1754,  -1706,
-1658,  -1610,  -1562,  -1513,  -1465,  -1416,  -1367,  -1317,
-1268,  -1219,  -1169,  -1119,  -1070,  -1020,  -971,  -921,
-871,  -822,  -772,  -723,  -673,  -624,  -575,  -526,
-477,  -428,  -380,  -331,  -283,  -235,  -188,  -140,
-93,  -46,  0,  46,  92,  137,  183,  227,
272,  316,  359,  402,  445,  487,  529,  570,
611,  651,  691,  730,  769,  807,  845,  882,
919,  955,  990,  1025,  1059,  1093,  1126,  1158,
1190,  1221,  1251,  1281,  1310,  1339,  1366,  1393,
1420,  1446,  1471,  1495,  1519,  1541,  1564,  1585,
1606,  1626,  1645,  1664,  1682,  1699,  1716,  1731,
1746,  1761,  1774,  1787,  1799,  1810,  1821,  1831,
1840,  1848,  1856,  1863,  1869,  1875,  1880,  1884,
1887,  1890,  1892,  1893,  1893,  1893,  1892,  1891,
1889,  1886,  1882,  1878,  1873,  1868,  1861,  1855,
1847,  1839,  1830,  1821,  1811,  1800,  1789,  1778,
1765,  1752,  1739,  1725,  1710,  1695,  1679,  1663,
1647,  1629,  1612,  1593,  1575,  1556,  1536,  1516,
1496,  1475,  1453,  1432,  1409,  1387,  1364,  1341,
1317,  1293,  1269,  1244,  1219,  1194,  1168,  1142,
1116,  1090,  1063,  1036,  1009,  982,  954,  926,
898,  870,  842,  814,  785,  756,  728,  699,
670,  641,  611,  582,  553,  523,  494,  465,
435,  406,  376,  347,  318,  288,  259,  230,
201,  172,  143,  114,  85,  57,  28,  0,
-28,  -56,  -84,  -112,  -139,  -166,  -194,  -220,
-247,  -273,  -300,  -326,  -351,  -377,  -402,  -427,
-451,  -475,  -499,  -523,  -546,  -569,  -592,  -614,
-636,  -658,  -679,  -700,  -721,  -741,  -761,  -780,
```

```
-799,  -818,  -836,  -854,  -872,  -889,  -905,  -922,
-938,  -953,  -968,  -982,  -996,  -1010,  -1023,  -1036,
-1048,  -1060,  -1072,  -1083,  -1093,  -1103,  -1113,  -1122,
-1131,  -1139,  -1147,  -1154,  -1161,  -1167,  -1173,  -1179,
-1184,  -1188,  -1193,  -1196,  -1199,  -1202,  -1204,  -1206,
-1208,  -1209,  -1209,  -1209,  -1209,  -1208,  -1206,  -1205,
-1203,  -1200,  -1197,  -1194,  -1190,  -1185,  -1181,  -1176,
-1170,  -1164,  -1158,  -1151,  -1144,  -1137,  -1129,  -1121,
-1112,  -1103,  -1094,  -1084,  -1074,  -1064,  -1053,  -1042,
-1031,  -1019,  -1007,  -995,  -982,  -969,  -956,  -942,
-929,  -915,  -900,  -886,  -871,  -856,  -841,  -825,
-809,  -793,  -777,  -761,  -744,  -727,  -710,  -693,
-676,  -658,  -641,  -623,  -605,  -587,  -569,  -551,
-532,  -514,  -495,  -476,  -457,  -439,  -420,  -401,
-382,  -362,  -343,  -324,  -305,  -286,  -267,  -247,
-228,  -209,  -190,  -170,  -151,  -132,  -113,  -94,
-75,  -56,  -37,  -19,  0,  19,  37,  55,
74,  92,  110,  128,  146,  163,  181,  198,
215,  232,  249,  266,  282,  298,  315,  330,
346,  362,  377,  392,  407,  422,  436,  450,
464,  478,  492,  505,  518,  531,  543,  555,
567,  579,  590,  602,  613,  623,  633,  644,
653,  663,  672,  681,  689,  698,  706,  714,
721,  728,  735,  741,  748,  753,  759,  764,
769,  774,  778,  783,  786,  790,  793,  796,
798,  800,  802,  804,  805,  806,  807,  808,
808,  807,  807,  806,  805,  804,  802,  800,
798,  796,  793,  790,  786,  783,  779,  775,
770,  766,  761,  756,  750,  744,  739,  732,
726,  719,  712,  705,  698,  690,  683,  675,
666,  658,  649,  641,  632,  622,  613,  604,
594,  584,  574,  564,  553,  543,  532,  521,
510,  499,  488,  476,  465,  453,  442,  430,
418,  406,  394,  382,  369,  357,  345,  332,
320,  307,  294,  282,  269,  256,  243,  230,
218,  205,  192,  179,  166,  153,  140,  127,
114,  102,  89,  76,  63,  50,  38,  25,
13,  0,  -12,  -25,  -37,  -49,  -62,  -74,
-86,  -98,  -110,  -121,  -133,  -144,  -156,  -167,
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-538,  -539,  -540,  -540,  -541,  -541,  -540,  -540,
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80,  88,  95,  103,  110,  118,  125,  132,
139,  146,  153,  160,  167,  174,  180,  187,
193,  199,  205,  211,  217,  223,  229,  234,
240,  245,  250,  255,  260,  265,  270,  275,
```

```
279,  283,  288,  292,  296,  300,  303,  307,
310,  314,  317,  320,  323,  325,  328,  331,
333,  335,  337,  339,  341,  343,  344,  346,
347,  348,  349,  350,  351,  351,  352,  352,
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349,  348,  347,  346,  345,  343,  342,  340,
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228,  223,  219,  214,  209,  204,  199,  194,
189,  184,  179,  173,  168,  163,  158,  152,
147,  141,  136,  131,  125,  120,  114,  109,
103,  98,  92,  87,  81,  76,  70,  65,
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-101,  -105,  -109,  -113,  -117,  -121,  -125,  -129,
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-211,  -212,  -213,  -214,  -214,  -215,  -216,  -216,
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-203,  -202,  -200,  -199,  -197,  -195,  -194,  -192,
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-172,  -170,  -168,  -165,  -163,  -160,  -157,  -155,
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110,  109,  108,  107,  106,  105,  103,  102,
101,  100,  99,  97,  96,  94,  93,  92,
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-51,  -51,  -52,  -52,  -53,  -54,  -54,  -55,
```

```
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```

```
 0,  0,  0,  0,  0,  0,  0,  0,
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 0,  0,  0,  0,  0,  0,  0,  0,
 0,  0,  0,  0,  0,  0,  0,  0,
 0,  0
 };
#endif

const Word16 Filter_LP12[1+(L_FILT_OVER_FS*12)] = { /*Q14*/

 16384,  16196,  15638,  14735,  13524,  12054,  10386,  8585,
 6723,  4870,  3092,  1451,  0,  -1221,  -2183,  -2872,
 -3285,  -3435,  -3344,  -3047,  -2583,  -1999,  -1342,  -661,
 0,  601,  1109,  1501,  1761,  1883,  1871,  1735,
 1496,  1175,  799,  399,  0,  -370,  -690,  -941,
 -1113,  -1199,  -1199,  -1119,  -969,  -765,  -523,  -262,
 0,  245,  457,  626,  741,  800,  801,  749,
 649,  513,  351,  176,  0,  -164,  -307,  -420,
 -497,  -536,  -536,  -500,  -433,  -342,  -233,  -117,
 0,  109,  202,  276,  325,  350,  349,  324,
 280,  220,  150,  74,  0,  -69,  -127,  -173,
 -203,  -217,  -215,  -198,  -170,  -133,  -90,  -44,
 0,  40,  74,  99,  116,  122,  120,  110,
 93,  72,  48,  23,  0,  -21,  -37,  -49,
 -57,  -59,  -57,  -51,  -42,  -32,  -21,  -10,
 0,  8,  14,  19,  20,  20,  19,  16,
 13,  9,  6,  2,  0,  -2,  -3,  -3,
 -3,  -3,  -2,  -1,  -1,  0,  0,  0,
 0
 };
```

## Before line 907

**Add following line :**
**#ifdef FILTER_48kHz**

## After line 1203

**Add following line :**
**#endif**

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050286***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.290** **CR** **006** ⌘**rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME [X] Radio Access Network ☐ Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of a value in Table 21. |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The number of data octets for SID frames is not correct. |
| ***Summary of change:*** | ⌘ | Replace the value 6 by 5 in the raw corresponding to index 9. |
| ***Consequences if not approved:*** | ⌘ | May result in wrong RTP payload implementations. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 8.1 |

| ***Other specs affected:*** | ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|---|
| | | | X | Other core specifications | |
| | | | X | Test specifications | |
| | | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## 8.1 Available Modes and Bitrates

The AMR-WB+ format contains the AMR-WB modes and a set of AMR-WB+ extension modes.
The AMR-WB+ codec includes the AMR-WB modes, as shown in Table 21 below.

**Table 21: AMR-WB+ modes.**

| Index | *Mode* | *Sampling rate (kHz)* | *Mono/Stereo* | *Number of data octets per frame (AMR-WB modes zero-padded)* |
|---|---|---|---|---|
| 0 | AMR-WB 6.60 kbit/s | 16 | Mono | 17 |
| 1 | AMR-WB 8.85 kbit/s | 16 | Mono | 23 |
| 2 | AMR-WB 12.65 kbit/s | 16 | Mono | 32 |
| 3 | AMR-WB 14.25 kbit/s | 16 | Mono | 36 |
| 4 | AMR-WB 15.85 kbit/s | 16 | Mono | 40 |
| 5 | AMR-WB 18.25 kbit/s | 16 | Mono | 46 |
| 6 | AMR-WB 19.85 kbit/s | 16 | Mono | 50 |
| 7 | AMR-WB 23.05 kbit/s | 16 | Mono | 58 |
| 8 | AMR-WB 23.85 kbit/s | 16 | Mono | 60 |
| 9 | AMR-WB SID | 16 | Mono | ~~6~~5 |
| 10 | AMR-WB+ 13.6 kbit/s | 16/24 | Mono | 34 |
| 11 | AMR-WB+ 18 kbit/s | 16/24 | Stereo | 45 |
| 12 | AMR-WB+ 24 kbit/s | 16/24 | Mono | 60 |
| 13 | AMR-WB+ 24 kbit/s | 16/24 | Stereo | 60 |
| 14 | FRAME_ERASURE | - | - | 0 |
| 15 | NO_DATA | - | - | 0 |

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050274***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **026** ⌘**rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of DTX handling in AMR-WB modes |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The code of Extended AMR-WB in 26.304 cannot handle AMR-WB modes containing DTX frames. |
| ***Summary of change:*** | ⌘ | In the files dec_if.c, enc_if.c, enc_main.c, enc_dtx.c:<br>Change the value of constant MRDTX from 9 to 10. |
| ***Consequences if not approved:*** | ⌘ | Extended AMR-WB cannot handle AMR-WB mode with DTX operation. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | dec_if.c, enc_if.c, enc_main.c, enc_dtx.c |

| ***Other specs affected:*** ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|
| | | X | Other core specifications | |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *dec_if.c*

### Lines 22

**Before the change:**

```
#define MRDTX          9
```

**After the change:**

```
#define MRDTX          10
```

## *2.* How the code is changed in the file *enc_if.c*

### Lines 23

**Before the change:**

```
#define MRDTX          9
```

**After the change:**

```
#define MRDTX          10
```

## *3.* How the code is changed in the file *enc_main.c*

### Lines 48

**Before the change:**

```
#define MRDTX          9
```

**After the change:**

```
#define MRDTX          10
```

## *4.* How the code is changed in the file *enc_dtx.c*

### Lines 19

**Before the change:**

```
#define MRDTX          9
```

**After the change:**

```
#define MRDTX          10
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050275***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **027** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Remove IF2 header in AMR-WB bitstream |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Remove unnecessary byte in the bitstream of AMR-WB modes to comform with TS 26.290 (Table 21). |
| ***Summary of change:*** | ⌘ | In AMR-WB modes, remove IF2 header before writing the bitstream. Insert IF2 header after reading AMR-WB bitstream. The modification is bit exact. |
| ***Consequences if not approved:*** | ⌘ | Bitstream has 1 byte more than specified in TS 26.290 Table 21. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | bitstream.c |

| ***Other specs affected:*** ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|
| | | X | Other core specifications | |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *Bitstream.c*

### Lines 94-112

**Before the change:**

```
#ifdef IF2
  unsigned char *ptc_serial, *ptc_serial_old, ctemp;
  short i;
  ptc_serial = (unsigned char *) serial;
  ptc_serial_old = (unsigned char *) serial - 1;
  /* erease IF2 Header -> left shift 5 bits */
  for(i = 0; i < length-1; i++)
  {
    ctemp =  (unsigned char)(*ptc_serial & 0x7)<<5;   /* save 3 lsb*/
    ptc_serial++;
    ptc_serial_old++;
    ctemp +=  ((unsigned char)(*ptc_serial & 0xF8)>>3);/* save 5 msb */
    *ptc_serial_old = ctemp;
  }
  ptc_serial_old++;
  *ptc_serial_old =(unsigned char)(*ptc_serial & 0x7)<<5; /*save3 msb*/
#endif

  fwrite(serial, sizeof(unsigned char), length, f_serial);
```

**After the change:**

```
  unsigned char *ptc_serial, *ptc_serial_old;
  short i;

  /* Remove IF2 header */

  ptc_serial = (unsigned char *) serial + 1;
  ptc_serial_old = (unsigned char *) serial;
  for(i = 0; i < length-1; i++)
  {
    *ptc_serial_old = (unsigned char)(*ptc_serial) ;
    ptc_serial++;
    ptc_serial_old++;

  }
  fwrite(serial, sizeof(unsigned char), length - 1, f_serial);
```

## Lines 146-192

**Before the change:**

```
      if (*extension == 1) /* wb+ concealment */
      {
         if (mode_index == 14)
         {
            bfi[offset] = 1;
            nb_read += fread(&byte, sizeof(unsigned char), 1, f_serial); /* read
one more byte to ensure empty header */
            if (byte == 15)
            {
                *tfi  = ((*tfi+1)%4); /* assuming 1 frame increment */
                return NO_DATA;
            }
            *tfi = (byte & 0xc0)>>6;

         }
         else if (mode_index != 14)
         {
             bfi[offset] = 1;
             *tfi =((*tfi+1)%4); /* assuming 1 frame increment */
             return NO_DATA;
         }
      }
      else
      {
        /* If mode_index unknown, frame is ereased  or NO_DATA */
        if (mode_index == 14)
        {
            *mode = 14;
            nb_read += fread(&byte, sizeof(unsigned char), 1, f_serial); /* read
one more byte to ensure empty header */
            if (byte == 15)
            {
                *tfi  = ((*tfi+1)%4); /* assuming 1 frame increment */
                bfi[*tfi] = 1;
                return NO_DATA;
            }
            *tfi = (byte & 0xc0)>>6;
            bfi[*tfi] = 1;
        }
        else
        {
          *mode = 15;
          *tfi =((*tfi+1)%4); /* assuming 1 frame increment */
          bfi[*tfi] = 1;
          return NO_DATA;
        }

      }
      return nb_read;
```

**After the change:**

```
    nb_read += fread(&byte, sizeof(unsigned char), 1, f_serial); /* read one
more byte to ensure empty header */
    *tfi = (byte & 0xc0)>>6;   /* tfi extrapolated by RTP packetizer */
    fst_index = (byte & 0x1F);
    *fst = isfIndex[fst_index];

    if(mode_index == 14)  /* frame lost WB or WB+*/
```

```
    {
        bfi[*tfi] = 1;
    }
    else if (mode_index == 15)
    {
        bfi[*tfi] = 0;    /* DTX in WB reset BFI vector */
    }
    *mode  = mode_index;
    return NO_DATA;         /* There is no more data to read */
```

## Lines 295-318

**Before the change:**

```
  n = fread(serialAmrwb, sizeof(unsigned char), nb_byte, f_serial);
#ifdef IF2
  ptc_serial = serialAmrwb + nb_byte - 1;
  ptc_serial_new = serialAmrwb + nb_byte ;

  /* right shift of 5 bits and add IF2 Header */
  for(i = 0; i < nb_byte - 1; i++)
  {
    ctemp =  ((unsigned char)(*ptc_serial & 0xE0)>>5);       /* Get 3 lsb */
    ptc_serial--;
    ptc_serial_new--;
    ctemp +=  ((unsigned char)(*ptc_serial & 0x1F)<<3);   /* Get5 msb */
    *ptc_serial_new = ctemp;
  }
  ptc_serial_new--;
  ctemp =  ((unsigned char)(*ptc_serial & 0xE0)>>5);  /* Get last 3 lsb */
  /* add IF2 Header */
  ctemp += (unsigned char)(1<<3);               /* FQI            */
  ctemp +=  (unsigned char)(mode <<4);          /* Get Frame Type */
  *ptc_serial_new = ctemp;
#endif
```

**After the change:**

```
  n = fread(serialAmrwb, sizeof(unsigned char), nb_byte - 1, f_serial);

  ptc_serial = serialAmrwb + nb_byte - 2;
  ptc_serial_new = serialAmrwb + nb_byte - 1;

  for(i = 0; i < nb_byte - 1; i++)
  {
    *ptc_serial_new = *ptc_serial;

    ptc_serial--;
    ptc_serial_new--;
  }
  /* add IF2 Header */
  ctemp = (unsigned char)(1<<2);               /* Add FQI        */
  ctemp +=  (unsigned char)(mode <<3);         /* Add Frame Type */


  *ptc_serial_new = ctemp;
```

## Lines 324-354

**Before the change:**

```
  short i, n = 0, nb_bits, nb_byte, *pt_serial, *ptr, retval;
  pt_serial = (short *) serial;
  for (i = 0; i < 4; i++)
  {
      retval = ReadHeader(tfi, bfi, conf->FileFormat, extension, mode, st_mode,
fst, i, f_serial);
      if(!retval)
        break;

      /* assume there is no amrwb -> wb+ switching inside superframe */
      conf->mode = *mode;
      conf->st_mode = *st_mode;
      if(*extension >0)
      {
        if (retval != NO_DATA)
        {
            nb_bits = get_nb_bits(*extension, *mode, *st_mode);
            ptr = &pt_serial[i * (nb_bits / 4)];

            nb_byte = ((nb_bits / 4) + 7 ) / 8;
            n = ReadBitstreamPlus(nb_bits, nb_byte, pt_serial, f_serial, i);
            if (n != nb_byte)
              break;
        }
      }
      else
      {
          nb_byte = block_size[*mode];
          n = ReadBitstream(nb_byte,(unsigned char*) serial, *mode, f_serial);
          break;
      }
  }
  return n;
```

**After the change:**

```
  short i, n = 0, nb_bits, nb_byte, *pt_serial, *ptr;
  pt_serial = (short *) serial;
  for (i = 0; i < 4; i++)
  {
      n = ReadHeader(tfi, bfi, conf->FileFormat, extension, mode, st_mode, fst,
i, f_serial);
      if(!n)
        break;

      /* assume there is no amrwb -> wb+ switching inside superframe */
      if (n != NO_DATA)
      {
          /* update mode and st_mode only if mode_index != (14 ||15) */
          conf->mode = *mode;
          conf->st_mode = *st_mode;
          if(*extension >0)
          {
              nb_bits = get_nb_bits(*extension, *mode, *st_mode);
              ptr = &pt_serial[i * (nb_bits / 4)];

              nb_byte = ((nb_bits / 4) + 7 ) / 8;
              n = ReadBitstreamPlus(nb_bits, nb_byte, pt_serial, f_serial, i);
              if (n != nb_byte)
```

```
                  break;
            }
            else
            {
                nb_byte = block_size[*mode];
                n = ReadBitstream(nb_byte, (unsigned char*) serial, *mode,
f_serial);
                break;
            }
        }
        else if (*extension == 0)
        {
            if (*mode == 15)
            {   /* DTX FRAME (NO DATA)*/
                ((unsigned char*)serial)[0] = 0x7C; /* need in AMR WB */
            }
            else if (*mode == 14) /* Frame lost */
                ((unsigned char*)serial)[0] = 0x74; /* need in AMR WB */
            break;
        }
    }
    return n;
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050276***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **028** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Decoder synchronization after frame erasure |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*Ph2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*
*Rel-7 (Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The TCX seed is used in the random generator to create random noise injected in unquantized subbands. When a bad frame occurs, the decoder may choose a wrong decoding mode. For example, if the lost frame was a TCX frame and the last good frame was an ACELP, the decoder will perform concealment in the ACELP domain. In that case, the TCX seed will not be activated and the synchronization between the synthesis of concealed frame and a clean synthesis will be lost. This loss of synchronization doesn't affect the subjective quality of the synthesis but affects the indication of quality obtained by an objective tool like PEAQ. To solve the issue, we propose to generate the seed from bitstream parameters instead of keeping in memory the last value of the random generator. |
| ***Summary of change:*** | ⌘ | In the proposed change, a new seed is generated based on bitstream parameters instead of keeping in memory the last value of the random generator. The seed will be computed from parameters index and will be the same at both encoder and decoder. |
| ***Consequences if not approved:*** | ⌘ | Difficult to use objective tools in the comparison of quality of a synthesis containing lost frames to a clean reference synthesis. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | dec_lf.c |

| ***Other specs affected:*** ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|
| | | X | Other core specifications | |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *dec_lf.c*

### Line 122

**Before the change:**

```
dpisf_2s_46b(prm,isfnew,st->past_isfq,st->isfold,st->isf_buf,  bfi,
              bfi_2nd_st, 1);
```

**After the change:**

```
dpisf_2s_46b(prm, isfnew, st->past_isfq, st->isfold, st->isf_buf, bfi,
                    bfi_2nd_st, 1);


if (!bfi)

    st->seed_tcx = (short)( (prm[0]*prm[1] + prm[4]*prm[5])*256);
```

**3GPP TSG-SA4 Meeting #35**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050284***

*CR-Form-v7*

# CHANGE REQUEST

⌘ **TS 26.304 CR 029** ⌘**rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction for buffer reading in low complexity encoder |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | REL-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | When mode TCX 20ms is chosen, a reading outside a buffer occurs |
| ***Summary of change:*** | ⌘ | Prevent a reading outside a buffer |
| ***Consequences if not approved:*** | ⌘ | Read outside a buffer causes wrong data to be read in the low-complexity encoder. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | cod_lf_b.c |

| | | Y | N | | |
|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | | X | Other core specifications | ⌘ |
| | | | X | Test specifications | |
| | | | X | O&M Specifications | |

***Other comments:*** ⌘

# 1) Change in cod_lf_b.c

## Lines 496-506

### Before the change:

```
mvr2r(wovlp_tcx, &wovlp[(k+ndiv)*128], 128);

mvr2r(&synth_tcx[ndiv*L_DIV], &mem_syn[(k+ndiv)*M], M);

mvr2r(exc_tcx+(ndiv*L_DIV)-(PIT_MAX_MAX+L_INTERPOL), old_exc,
PIT_MAX_MAX+L_INTERPOL);

mvi2i(prm_tcx_buf, prm, nprm_tcx);
```

### After the change:

```
if (ndiv == 1) {

   mvr2r(&old_exc[L_DIV], old_exc, (PIT_MAX_MAX + L_INTERPOL)- L_DIV );

   mvr2r(exc_tcx, old_exc+PIT_MAX_MAX+L_INTERPOL - L_DIV , L_DIV);

}

else {

   mvr2r(exc_tcx+(ndiv*L_DIV)-(PIT_MAX_MAX+L_INTERPOL), old_exc,
PIT_MAX_MAX+L_INTERPOL);

}

mvr2r(wovlp_tcx, &wovlp[(k+ndiv)*128], 128);

mvr2r(&synth_tcx[ndiv*L_DIV], &mem_syn[(k+ndiv)*M], M);

mvi2i(prm_tcx_buf, prm, nprm_tcx);
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050291***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **030** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction to a wrong function call |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | function is called with one extra parameter not defined in the prototype. |
| ***Summary of change:*** | ⌘ | Remove the parameter not used in the function and not defined in the prototype. |
| ***Consequences if not approved:*** | ⌘ | May cause an invalid access when switching from AMR-WB to AMR-WB+ modes. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | dec_cp_state.c |

| | Y | N | | |
|---|---|---|---|---|
| ***Other specs affected:*** ⌘ | | X | Other core specifications | ⌘ |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file dec_cp_state.*c*

Line 35

**Before the change:**

```
init_decoder_amrwb_plus(wbP, 1, 0, 0, 1);
```

**After the change:**

```
init_decoder_amrwb_plus(wbP, 1, 0, 1);
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050292***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **031** ⌘**rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☒

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of mode switching using configuration file |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | To ensure the encoder does not switch the configuration when it's not needed. Remove duplicated lines of code. |
| ***Summary of change:*** | ⌘ | Chose a "quantized" fscale to ensure there is no switching when it is not needed. |
| ***Consequences if not approved:*** | ⌘ | Artefacts may arise from unnecessary switching. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | enc_wbplus.c |

| | Y | N | | |
|---|---|---|---|---|
| ***Other specs affected:*** ⌘ | | X | Other core specifications | ⌘ |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *enc_wbplus.c*

### Line 777

**Before the change:**

```
fst = (short)(t[3]*FSCALE_DENOM+0.5);
```

**After the change:**

```
fst = (short)(t[3]*FSCALE_DENOM+0.5);
get_isf_index(&fst);      /* Use "fscale from index" */
```

### Line 762 to be removed

**Remove the following line**

```
if (numOfChannels == 2)
```

### Lines 777-795 to be removed

**Remove the following lines**

```
else if(tmp_mode_index < 24) /* prevent stereo switching on a mono file */
{
   if (extension == 0) {
      mode  = tmp_mode_index;
      st_mode = -1;
      conf.mode = tmp_mode_index;
      conf.st_mode = -1;
      conf.mode_index = tmp_mode_index;
   }
   else
   {
      conf.mode_index = tmp_mode_index;
      get_raw_3gp_mode(&(conf.mode), &(conf.st_mode),conf.mode_index, extension
);
   }
   fst = (short)(t[3]*FSCALE_DENOM+0.5);
   if(conf.mode>=16)
      if(fst == 0) fst = FSCALE_DENOM;
}
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050293***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **032** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of information printed by decoder in DTX frames |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Decoder prints a bad bit rate information in DTX frames. |
| ***Summary of change:*** | ⌘ | Prevent reading outside a buffer and print a DTX message in DTX frames. |
| ***Consequences if not approved:*** | ⌘ | Read outside a buffer, and wrong bit rate information displayed in DTX frames. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | dec_wbplus.c, util.c |

| | Y | N | | |
|---|---|---|---|---|
| ***Other specs affected:*** ⌘ | | X | Other core specifications | ⌘ |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

***Other comments:*** ⌘

**How to create CRs using this form:**
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *dec_wbplus.c*

Lines 493-495

**Before the change:**

```
     old_bitrate = get_bitrate(&conf);
     fprintf(stderr, "Decoding @ %6.2fkbps\n", get_bitrate(&conf));
```

**After the change:**

```
     old_bitrate = get_bitrate(&conf);

     if (old_bitrate != 0)
        fprintf(stderr, "Decoding @ %6.2fkbps\n", old_bitrate);
     else
       /* DTX frame return a bit rate of 0 kbps */
        fprintf(stderr, "Decoding         DTX\n");
```

## *2.* How the code is changed in the file *util.c*

Lines 115-126

**Before the change:**

```
   if(extension != 0)
   {
     nb_bits = NBITS_CORE[mode] + NBITS_BWE;
     if (st_mode >= 0)
     {
        nb_bits += (StereoNbits[st_mode] + NBITS_BWE);
     }
   }
   else
   {
      nb_bits = NBITS_CORE_AMR_WB[mode];
   }
```

**After the change:**

```
   if (mode != 14 && mode != 15) /*prevent reading outside NBITS_CORE_AMR_WB
buffer */
   {
     if(extension != 0)
     {
       nb_bits = NBITS_CORE[mode] + NBITS_BWE;
       if (st_mode >= 0)
       {
          nb_bits += (StereoNbits[st_mode] + NBITS_BWE);
       }
     }
     else
     {
        nb_bits = NBITS_CORE_AMR_WB[mode];
     }
   }
   else
   {
     nb_bits = 0;
   }
```

**3GPP TSG-SA4 Meeting #35**
**San Diego, USA, 09-13 May 2005**

***Tdoc ⌘S4-050313***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **033** ⌘**rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of library function for 3GP file format |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *Ph2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |
| *Rel-7* | *(Release 7)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In mode 10, 11, 12 and 13 the ISF was not defined in 3GP mode, the result was an invalid access when computed the duration of the file. |
| ***Summary of change:*** | ⌘ | Add a value to the ISF table of the 3GP format to prevent an invalid access in modes 10 to 13. |
| ***Consequences if not approved:*** | ⌘ | Invalid access is committed when the duration of the file is computed in modes 10 to 13. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | Affected files:<br>c-code\3gplib\debug\3gplib.lib<br>c-code\3gplib\release\3gplib.lib |

| ***Other specs affected:*** | ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|---|
| | | | X | Other core specifications | |
| | | | X | Test specifications | |
| | | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

**How to create CRs using this form:**
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the libraries:

## How the code is changed in the file *3gpformat.c (Used to create the libraries)*

### Lines 20

**Before the change:**

```
static int TsTicks[13]={2880,
2560,2304,2160,1920,1728,1536,1440,1280,1152,1080,1024,960};
```

**After the change:**

```
static int TsTicks[14]={1440,2880,
2560,2304,2160,1920,1728,1536,1440,1280,1152,1080,1024,960};
```

### Lines 301

**Before the change:**

```
SampleDuration = SampleDuration + 4*TsTicks[conf.fscale_index-1];
```

**After the change:**

```
SampleDuration = SampleDuration + 4*TsTicks[conf.fscale_index];
```

**3GPP TSG-SA4 Meeting #34**
**San Diego, US, 9-13 May 2005**

***Tdoc ⌘S4-050415***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **26.304** **CR** **034** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Support for input files with sampling frequency other than 48 kHz |
| ***Source:*** | ⌘ | TSG SA WG4 Codec |
| ***Work item code:*** | ⌘ | AMR-WB+ |
| ***Date:*** | ⌘ | 06/06/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*Ph2* *(GSM Phase 2)*
*R96* *(Release 1996)*
*R97* *(Release 1997)*
*R98* *(Release 1998)*
*R99* *(Release 1999)*
*Rel-4* *(Release 4)*
*Rel-5* *(Release 5)*
*Rel-6* *(Release 6)*
*Rel-7* *(Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The current version of the encoder does not support sampling frequencies other than 48, 16 and 8 kHz. Furthermore, sampling frequencies of 16 and 8 kHz are only supported in special modes. The objective of the modification is to make the encoder friendlier to use in removing the constraint on the sampling frequency usage. This will simplify the integration of the codec in platforms where sampling frequencies other than 48 kHz are supported. After the change, the supported sampling frequencies will be 8, 16, 24, 32, 48, 11.025, 22.5, and 44.1 kHz. |
| ***Summary of change:*** | ⌘ | The proposed change adds 1 filtering table and 1 conditional filtering operation at the encoder and at the decoder, to allow working at all sampling frequencies mentioned above. The encoder core works at certain internal sampling frequency (ISF); where a resampling filter performs down-sampling from 48 kHz to ISF KHz. With the suggested modification, the encoder input sampled at 8, 16, 24 or 32 kHz will be upsampled to 48 kHz and then down-sampled to ISF kHz (core working frequency). Alternatively, if the encoder input is sampled at 11.025 or 22.1 kHz, it will be up-sampled to 44.1 kHz and then down-sampled, with a new filter, to the core working frequency (ISF kHz). At the decoder, the synthesis will be first up-sampled to 48 or to 44.1 kHz (depending on the desired output sampling frequency) and then down-sampled to a sub-multiple if needed. Hence, the proposed change involves adding, both at the encoder and the decoder, a new, conditionnaly used, filtering table and a new, conditionnaly applied, filtering operation with its own filtering table. The proposed change does not affect the bitexactness for the previously supported sampling frequencies, and adds new supported input and output sampling frequencies. |

| | | |
|---|---|---|
| ***Consequences if not approved:*** | ⌘ | May be confusing to the users when they use input files with other sampling rates and get an error message.<br>Cumbersome offline sampling conversion will be needed before processing files with other sampling frequency and may result in bad performance if users do not perform these conversions properly. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | Common\decim_split.c<br>include\proto_func.h<br>include\cnst.h<br>include\table_decl.h<br>include\options.h<br>encoder\cod_main.c<br>encoder\enc_wbplus.c<br>decoder\dec_main_s.c<br>decoder\dec_wbplus.c<br>Common\table_plus.c<br>Create file: common\over_fs.c |

| | | Y | N | | | |
|---|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | | X | Other core specifications | ⌘ | |
| | | | X | Test specifications | | |
| | | | X | O&M Specifications | | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# Changes to the C-code

## *1.* How the code is changed in the file *option.h*

Line 14

**Add following code:**

```
/* AMR-WB+ input/output sampling rate filters */
/* Choice of filter should be selected according to the hardware specification
*/
/* Both can be selected if required */
/* FILTER_44khz allow 11025, 22050 and 44100 Hz sampling rates */
/* FILTER_48khz allow 8, 16, 24, 32 and 48 kHz sampling rates */
#define FILTER_44kHz
#define FILTER_48kHz
```

## *2.* How the code is changed in the file *decim_split.c*

Lines 21-24

**Code before change:**

```
int decim_split_12k8(/* number of sample decimated */
  float sig_fs[],     /* input:  signal to decimate*/
  float sig12k8_lf[], /* output: LF decimated signal*/
  float sig12k8_hf[], /* output: HF decimated signal */
  int lg,             /* input:  length of LF and HF */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_DECIM_SPLIT] */
  int *frac_mem       /* in/out: interpol fraction memory*/
)
```

**Code after change:**

```
int decim_split_12k8( /* number of sample decimated  */
  float sig_fs[],     /* input:  signal to decimate  */
  int lg_input,       /* input:  2*L_FRAME44k if 44kHz*/
  float sig12k8_lf[], /* output: LF decimated signal  */
  float sig12k8_hf[], /* output: HF decimated signal  */
  int lg,             /* input:  length of LF and HF  */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_DECIM_SPLIT] */
  int *frac_mem       /* in/out: interpol fraction memory*/
)
```

## Lines 31-33

**Code before change:**

```
  fac_up = fac_fs;
  fac_down = 180;
  filter = (float *)filter_LP180;
```

**Code after change:**

```
#ifdef FILTER_44kHz
  if (lg_input == (2*L_FRAME44k))
  {
    fac_up = fac_fs*8;
    fac_down = 3*441;
    filter = (float *)filter_LP165;
  }
#endif
#ifdef FILTER_48kHz
  if (lg_input == (2*L_FRAME48k))
  {
    fac_up = fac_fs*8;
    fac_down = 180*8;
    filter = (float *)filter_LP180;
  }
#endif
```

## Lines 74-81

**Code before change:**

```
int join_over_12k8(   /* number of sample oversampled  */
  float sig12k8_lf[], /* input:  LF signal (fs=12k8)   */
  float sig12k8_hf[], /* input:  HF signal (fs=12k8)  */
  int lg,             /* input:  length of LF and HF  */
  float sig_fs[],     /* output: oversampled signal   */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_JOIN_OVER]  */
  int *frac_mem       /* in/out: interpol fraction memory*/
)
```

**Code after change:**

```
int join_over_12k8(   /* number of sample oversampled  */
  float sig12k8_lf[], /* input:  LF signal (fs=12k8)   */
  float sig12k8_hf[], /* input:  HF signal (fs=12k8)  */
  int lg,             /* input:  length of LF and HF  */
  float sig_fs[],     /* output: oversampled signal   */
  int lg_output,      /* input:  L_FRAME44k if 44kHz */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_JOIN_OVER]  */
  int *frac_mem       /* in/out: interpol fraction memory*/
)
```

## Lines 89-91

**Code before change:**

```
  fac_up = 180;
  fac_down = fac_fs;
  filter = (float *)filter_LP180;
```

**Code after change:**

```
#ifdef FILTER_44kHz
  if (lg_output == L_FRAME44k)
  {
    fac_up = 3*441;
    fac_down = fac_fs*8;
    filter = (float *)filter_LP165;
  }
#endif
#ifdef FILTER_48kHz
  if (lg_output == L_FRAME48k)
  {
    fac_up = 180*8;
    fac_down = fac_fs*8;
    filter = (float *)filter_LP180;
  }
#endif
```

## Line 160

**Add this code:**

```
int frac_d, fac_up_d;
```

## Line 168

**Add this code:**

```
fac_up_d = fac_up >> 3;
```

## Lines 171-172

**Code before change:**

```
    c1 = &filter[frac];

    c2 = &filter[fac_up-frac];
```

**Code after change:**

```
    frac_d = frac >> 3;

    c1 = &filter[frac_d];

    c2 = &filter[fac_up_d-frac_d];
```

Line 174

**Code before change:**

```
    for(j=0; j<nb_coef; j++, c1+=fac_up, c2+=fac_up)
```

**Code after change:**

```
    for(j=0; j<nb_coef; j++, c1+=fac_up_d, c2+=fac_up_d)
```

## *3.* How the code is changed in the file *over_fs.c*

**Add these 3 functions into that file:**

```
#include <stdio.h>
#include <stdlib.h>
#include <assert.h>
#include "../include/amr_plus.h"

#define L_FRAME_MAX   (L_FRAME48k)


/* local function */
static void interpol_mem(
  float *signal,
  float *signal_int,
  int L_frame_int,
  float *filter,
  int nb_coef,
  int fac_up,
  int fac_down,
  float gain,
  int *mem_frac);

int over_fs(      /* number of sample oversampled       */
  float sig_in[],/* input:  signal to oversample       */
  float sig_out[],/* output: signal oversampled         */
  int lg,         /* input:  length of output           */
  int fac_down,   /* input:  fs*12/fac_down = 44k/48k   */
  float mem[],    /* in/out: mem[2*L_FILT_OVER_FS]      */
  int *frac_mem   /* in/out: interpol fraction memory   */
)
{
  int i, ncoef, L_frame, L_frame_int;
  float signal[(2*L_FILT_OVER_FS)+2*L_FRAME_MAX];
  float *filter, gain;
  int fac_up;

  if (fac_down >= 12) return(lg);

  fac_up = 12;
  filter = (float *)filter_LP12;

  ncoef = L_FILT_OVER_FS;
  gain = 1.0f;
  L_frame = ((lg*fac_down)+(*frac_mem)) / fac_up;
  L_frame_int = lg;
```

```
  /* load buffer & update memory */

  for (i=0; i<(2*L_FILT_OVER_FS); i++)
  {
    signal[i] = mem[i];
  }
  for (i=0; i<L_frame; i++)
  {
    signal[i+(2*L_FILT_OVER_FS)] = sig_in[i];
  }

  for (i=0; i<(2*L_FILT_OVER_FS); i++)
  {
    mem[i] = signal[i+L_frame];
  }

  /* oversample to 44.1/48 khz */

  interpol_mem(signal+ncoef-1, sig_out, L_frame_int, filter, ncoef,
                 fac_up, fac_down, gain, frac_mem);

  return(L_frame);
}


int decim_fs(    /* number of sample decimated       */
  float sig_in[], /* input:  signal to decimate         */
  int lg,         /* input:  length of input            */
  float sig_out[],/* output: signal decimated           */
  int fac_up,     /* input:  44k/48k *fac_up/12 = fs    */
  float mem[],    /* in/out: mem[2*L_FILT_DECIM_FS]     */
  int *frac_mem   /* in/out: interpol fraction memory   */
)
{
  int i, ncoef, L_frame, L_frame_int;
  float signal[(2*L_FILT_DECIM_FS)+2*L_FRAME_MAX];
  float *filter, gain;
  int fac_down;

  if (fac_down >= 12) return(lg);

  fac_down = 12;
  filter = (float *)filter_LP12;

  ncoef = L_FILT_OVER_FS*fac_down/fac_up;
  gain = ((float)fac_up) / ((float)fac_down);
  L_frame = lg;
  L_frame_int = ((lg*fac_up)-(*frac_mem)+(fac_down-1))/fac_down;

  /* load buffer & update memory */

  for (i=0; i<(2*L_FILT_DECIM_FS); i++)
  {
    signal[i] = mem[i];
  }

  for (i=0; i<L_frame; i++)
  {
    signal[i+(2*L_FILT_DECIM_FS)] = sig_in[i];
  }

  for (i=0; i<(2*L_FILT_DECIM_FS); i++)
  {
    mem[i] = signal[i+L_frame];
```

```
  }

  /* decimation from 44.1/48khz to fs_output */

  interpol_mem(signal+ncoef-1, sig_out, L_frame_int, filter, ncoef,
                  fac_up, fac_down, gain, frac_mem);

  return(L_frame_int);
}


static void interpol_mem(
  float *signal,
  float *signal_int,
  int L_frame_int,
  float *filter,
  int nb_coef,

  int fac_up,
  int fac_down,
  float gain,
  int *mem_frac)
{
  int i, j, frac, frac_step, pos, pos_step;
  int pos_step_plus_one, fac_up_minus_frac_step;
  float s, *x1, *x2, *c1, *c2;

  pos_step = fac_down / fac_up;
  pos_step_plus_one = pos_step + 1;

  frac_step = fac_down - (pos_step*fac_up);
  fac_up_minus_frac_step = fac_up-frac_step;

  pos = 0;
  frac = *mem_frac;

  for(i=0; i<L_frame_int; i++)
  {
    x1 = signal+pos;
    x2 = x1+1;
    c1 = &filter[frac];
    c2 = &filter[fac_up-frac];
    s = 0.0;

    for(j=0; j<nb_coef; j++, c1+=fac_up, c2+=fac_up)
    {
       s += (*x1--) * (*c1) + (*x2++) * (*c2);
    }
    signal_int[i] = gain*s;

    if (frac >= fac_up_minus_frac_step)
    {
      pos += pos_step_plus_one;
      frac -= fac_up_minus_frac_step;
    }
    else
    {
      pos += pos_step;
      frac += frac_step;
    }
  }
  *mem_frac = frac;
  return;
}
```

# *4.* How the code is changed in the file *proto_func.h*

## Line 40

**Add following prototypes:**

```
int over_fs(       /* number of sample oversampled       */
  float sig_in[],  /* input:  signal to oversample       */
  float sig_out[],/* output: signal oversampled         */
  int lg,         /* input:  length of output           */
   int fac_down,       /* input:  fs*12/fac_down = 44k/48k   */
  float mem[],    /* in/out: mem[2*L_FILT_OVER_FS]      */
  int *frac_mem   /* in/out: interpol fraction memory   */
);
int decim_fs(     /* number of sample decimated       */
  float sig_in[],/* input:  signal to decimate         */
  int lg,        /* input:  length of input            */
  float sig_out[], /* output: signal decimated           */
   int fac_up,         /* input:  44k/48k *fac_up/12 = fs    */
  float mem[],    /* in/out: mem[2*L_FILT_DECIM_FS]     */
  int *frac_mem   /* in/out: interpol fraction memory   */
);
```

## Lines 42-49

**Code before change:**

```
int decim_split_12k8(/* number of sample decimated */
  float sig_fs[],     /* input:  signal to decimate*/
  float sig12k8_lf[], /* output: LF decimated signal*/
  float sig12k8_hf[], /* output: HF decimated signal */
  int lg,             /* input:  length of LF and HF */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_DECIM_SPLIT] */
  int *frac_mem       /* in/out: interpol fraction memory*/
);
```

**Code after change:**

```
int decim_split_12k8( /* number of sample decimated  */
  float sig_fs[],     /* input:  signal to decimate  */
  int lg_input,       /* input:  2*L_FRAME44k if 44kHz*/
  float sig12k8_lf[], /* output: LF decimated signal  */
  float sig12k8_hf[], /* output: HF decimated signal  */
  int lg,             /* input:  length of LF and HF  */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_DECIM_SPLIT] */
  int *frac_mem       /* in/out: interpol fraction memory*/
);
```

Lines 51-57

**Code before change:**

```
int join_over_12k8(   /* number of sample oversampled  */
  float sig12k8_lf[], /* input:  LF signal (fs=12k8)   */
  float sig12k8_hf[], /* input:  HF signal (fs=12k8)  */
  int lg,             /* input:  length of LF and HF  */
  float sig_fs[],     /* output: oversampled signal   */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_JOIN_OVER]  */
  int *frac_mem       /* in/out: interpol fraction memory*/
);
```

**Code after change:**

```
int join_over_12k8(   /* number of sample oversampled  */
  float sig12k8_lf[], /* input:  LF signal (fs=12k8)   */
  float sig12k8_hf[], /* input:  HF signal (fs=12k8)  */
  int lg,             /* input:  length of LF and HF  */
  float sig_fs[],     /* output: oversampled signal   */
  int lg_output,      /* input:  L_FRAME44k if 44kHz */
  int fac_fs,         /* input:  at 48kHz, scale fac = fac_fs/FSCALE_DENOM */
  float mem[],        /* in/out: mem[L_MEM_JOIN_OVER]  */
  int *frac_mem       /* in/out: interpol fraction memory*/
);
```

## *5.* How the code is changed in the file *cnst.h*

Line 34

**Add following code:**

```
  #define L_FRAME11k   ((L_FRAME_PLUS/512)*441)
  #define L_FILT_DECIM_FS   (L_FILT_OVER_FS*6)
  #define L_FILT_OVER_FS    12
```

## *6.* How the code is changed in the file *table_decl.h*

Line 131

**Before change:**

```
extern const float filter_LP180[1+((12+1)*180)];
```

**After change:**

```
#ifdef FILTER_48kHz
extern const float filter_LP180[1+((12+1)*180)];
#endif
extern const float filter_LP12[1+(L_FILT_OVER_FS*12)];
#ifdef FILTER_44kHz
extern const float filter_LP165[1+((12+1)*165)];
#endif
```

# *7.* How the code is changed in the cod_main.c

## Line 142

**Code before the change:**

```
decim_split_12k8(channel_left, new_speech+L_FRAME_PLUS-L_NEXT_ST, channel_left,
```

**Code after the change:**

```
decim_split_12k8(channel_left, L_frame, new_speech+L_FRAME_PLUS-L_NEXT_ST,
                 channel_left,
```

## Line 144

**Code before the change:**

```
nb_samp = decim_split_12k8(channel_right, sig_right+L_FRAME_PLUS-L_NEXT_ST,
                 channel_right,
```

**Code after the change:**

```
nb_samp = decim_split_12k8(channel_right, L_frame, sig_right+L_FRAME_PLUS-
                 L_NEXT_ST, channel_right,
```

## Line 176

**Code before the change:**

```
nb_samp = decim_split_12k8(channel_right, new_speech+L_FRAME_PLUS-L_NEXT,
                 channel_right,
```

**Code after the change:**

```
nb_samp = decim_split_12k8(channel_right, L_frame, new_speech+L_FRAME_PLUS-
                 L_NEXT, channel_right,
```

## Line 317

**Code before the change:**

```
decim_split_12k8(channel_left, sig_left, channel_left,
```

**Code after the change:**

```
decim_split_12k8(channel_left, L_frame, sig_left, channel_left,
```

## Line 319

**Code before the change:**

```
nb_samp = decim_split_12k8(channel_right, sig_right, channel_right,
```

**Code after the change:**

```
nb_samp = decim_split_12k8(channel_right, L_frame, sig_right, channel_right,
```

### Line 568

**Code before the change:**

```
nb_samp = decim_split_12k8(channel_right, new_speech, channel_right,
```

**Code after the change:**

```
nb_samp = decim_split_12k8(channel_right, L_frame, new_speech, channel_right,
```

## *8.* How the code is changed in the dec_main_s.c

### Lines 229-234

**Code before change :**

```
/* band join and oversampling (HF into channel_left/right) */
fac_fs = (L_FRAME48k*upsamp_fscale)/L_frame;
join_over_12k8(sig_left, channel_left, L_FRAME_PLUS, channel_left,fac_fs, st-
         >left.mem_oversamp, &(st->left.over_frac));
nb_samp = join_over_12k8(synth, channel_right, L_FRAME_PLUS, channel_right,
         fac_fs, st->right.mem_oversamp, &(st->right.over_frac));
```

**Code after change :**

```
/* band join and oversampling (HF into channel_left/right) */
if (L_frame == L_FRAME44k)
  fac_fs = upsamp_fscale;
else
  fac_fs = (L_FRAME48k*upsamp_fscale)/L_frame;

join_over_12k8(sig_left, channel_left, L_FRAME_PLUS, channel_left,L_frame,
         fac_fs, st->left.mem_oversamp, &(st->left.over_frac));

nb_samp = join_over_12k8(synth, channel_right, L_FRAME_PLUS,
         channel_right,L_frame,fac_fs, st->right.mem_oversamp, &(st-
         >right.over_frac));
```

### Lines 246-249

**Code before change :**

```
/* band join and oversampling (HF into channel_left/right) */
fac_fs = (L_FRAME48k*upsamp_fscale)/L_frame;
nb_samp = join_over_12k8(synth, channel_right, L_FRAME_PLUS, channel_right,
         fac_fs, st->right.mem_oversamp, &(st->right.over_frac));
```

**Code after change :**

```
/* band join and oversampling (HF into channel_left/right) */
if (L_frame == L_FRAME44k)
  fac_fs = upsamp_fscale;
else
  fac_fs = (L_FRAME48k*upsamp_fscale)/L_frame;

nb_samp = join_over_12k8(synth, channel_right, L_FRAME_PLUS,
         channel_right,L_frame, fac_fs, st->right.mem_oversamp, &(st-
         >right.over_frac));
```

# *9.* How the code is changed in the enc_wbplus.c

## Lines 404-464

**Code before change :**

```
   switch (samplingRate)
   {
   case 8000:
      if (fscale == 0)
      {
         *L_frame = L_FRAME8k;
         *L_next = L_NEXT8k;
         *L_next_st = L_NEXT_ST8k;
      }
      else
      {
         fprintf(stderr, "16kHz files are allowed only without fsratio(isf)
         \n");
         exit(EXIT_FAILURE);
      }
      break;
   case 16000:
      if (fscale == 0)
      {
         *L_frame = L_FRAME16kPLUS;
         *L_next = L_NEXT16k;
         *L_next_st = L_NEXT_ST16k;
      }
      else
      {
         fprintf(stderr, "16kHz files are allowed only without fsratio(isf)\n");
         exit(EXIT_FAILURE);
      }
      break;
   case 24000:
      if (fscale == 0)
      {
         *L_frame = L_FRAME24k;
         *L_next = L_NEXT24k;
         *L_next_st = L_NEXT_ST24k;
      }
      else
      {
         fprintf(stderr, "24kHz files are allowed only without fsratio(isf)
         \n");
         exit(EXIT_FAILURE);
      }
      break;
   case 32000:
      if (fscale == FSCALE_DENOM)
      {
         *L_frame = L_FRAME32k;
      }
      else
      {
         printf("32kHz WAV files are allowed only at fsratio=1.\n");
         exit(EXIT_FAILURE);
      }
      break;
   case 48000:
      *L_frame = 2 * L_FRAME48k;
```

```
      break;
   default:
      fprintf(stderr, "error in sampling freq: use 16, 24, 32 or 48 kHz \n");
      exit(EXIT_FAILURE);
      break;
   }
```

**Code after change :**

```
   if (fscale != 0)
   {
      switch (samplingRate)
      {
#ifdef FILTER_48kHz
      case 8000:
      case 16000:
      case 24000:
      case 32000:
      case 48000:
        *L_frame = 2 * L_FRAME48k;
        break;
#endif
#ifdef FILTER_44kHz
      case 11025:
      case 22050:
      case 44100:
        *L_frame = 2 * L_FRAME44k;
        break;
#endif
      default:
         fprintf(stderr, "error in sampling frequency.  choice of filter are:
         \n");
#ifdef FILTER_44kHz
         fprintf(stderr, "     11, 22, 44 kHz \n");
#endif
#ifdef FILTER_48kHz
         fprintf(stderr, "     8, 16, 24, 32, 48 kHz \n");
#endif
         exit(EXIT_FAILURE);
         break;
      }
   }
   else {
      switch (samplingRate)
      {
      case 8000:
         *L_frame = L_FRAME8k;
         *L_next = L_NEXT8k;
         *L_next_st = L_NEXT_ST8k;
         break;
      case 16000:
         *L_frame = L_FRAME16kPLUS;
         *L_next = L_NEXT16k;
         *L_next_st = L_NEXT_ST16k;
         break;
      case 24000:
         *L_frame = L_FRAME24k;
         *L_next = L_NEXT24k;
         *L_next_st = L_NEXT_ST24k;
         break;
      default:
         fprintf(stderr, "error in sampling freq: without fsratio(isf) only 8,
         16 or 24 kHz are allowed\n");
```

```
         exit(EXIT_FAILURE);
         break;
      }
   }
```

## After line 571

**Add this code :**

```
   float mem_up_right[2* L_FILT_OVER_FS], mem_up_left[2* L_FILT_OVER_FS];
   int frac_up_right, frac_up_left;
   int fac_up, fac_down, nb_samp_fs;
```

## Lines 673-679

**Code before the changes :**

```
   /* set fscale=1.0 when fs = 32000 or 48000 */
   if (((samplingRate == 32000) || (samplingRate == 48000))
       && (conf.fscale == 0))
   {
      conf.fscale = FSCALE_DENOM;
      conf.fscale_index = 8;
   }
```

**Code after the changes :**

```
 fac_up = fac_down = 12;   /* no oversampling by default */

   if (conf.fscale != 0)
   {
     switch (samplingRate) {
     case 8000:
       fac_down = 2;
       samplingRate  = 48000;
       break;
     case 16000:
       fac_down = 4;
       samplingRate  = 48000;
       break;
     case 24000:
       fac_down = 6;
       samplingRate  = 48000;
       break;
     case 32000:
       fac_down = 8;
       samplingRate  = 48000;
       break;
     case 11025:
       fac_down = 3;
       samplingRate  = 44100;
       break;
     case 22050:
       fac_down = 6;
       samplingRate  = 44100;
       break;
     }
     set_zero(mem_up_right, 2* L_FILT_OVER_FS);
     set_zero(mem_up_left, 2* L_FILT_OVER_FS);
   }
   frac_up_right = 0;
   frac_up_left = 0;
```

## Lines 693-694

**Code before the changes :**

```
   lg = read_data(f_speech, channel_right, (numOfChannels * L_frame));
   if (lg != (numOfChannels * L_frame))
```

**Code after the changes :**

```
   /* number of sample per channel to read from file */
   nb_samp_fs = ((L_frame*fac_down)+frac_up_right) / fac_up;

   lg = read_data(f_speech, channel_right, (numOfChannels * nb_samp_fs));
   if (lg != (numOfChannels * nb_samp_fs))
```

## Lines 701-703

**Code before the changes :**

```
      /* remove interleave of left and right samples */
      deinterleave(channel_right, channel_left, channel_right, L_frame);
   }
```

**Code after the changes :**

```
      deinterleave(channel_right, channel_right, channel_right, nb_samp_fs);

      over_fs(channel_left, channel_left, L_frame,
              fac_down, mem_up_left, &frac_up_left);
   }
   over_fs(channel_right, channel_right, L_frame,
           fac_down, mem_up_right, &frac_up_right);
```

## After line 736

**Add this code:**

```
    if(fac_down != 12)
    {
      fprintf(stderr, "Must have 16kHz (to switch amr-wb -> wb+ (mode 10@13))\n"
        "or 48kHz (wb+) input\n\n");
      exit(EXIT_FAILURE);
    }

    if( numOfChannels == 1)
    {
      fprintf(stderr, "** Warning **\nDo not switch to stereo... \nyou have mono
         input\n\n");
    }
```

## Lines 814-816

**Code before the changes :**

```
lg =  read_data(f_speech, channel_right + nb_hold,
                  (numOfChannels * (L_frame - nb_hold)));
```

**Code after the changes :**

```
      /* number of sample per channel to read from file */
nb_samp_fs = ((nb_samp*fac_down)+frac_up_right) / fac_up;
lg =  read_data(f_speech, channel_right + nb_hold,
                  (numOfChannels * nb_samp_fs));
```

### Lines 826-827

**Code before the changes :**

```
deinterleave(channel_right + nb_hold, channel_left+nb_hold,
                channel_right+nb_hold, L_frame-nb_hold);
```

**Code after the changes :**

```
deinterleave(channel_right + nb_hold, channel_left+nb_hold,
                      channel_right + nb_hold, nb_samp_fs);


over_fs(channel_left+nb_hold, channel_left+nb_hold, nb_samp, fac_down,
         mem_up_left, &frac_up_left);
```

### After Line 828

**Add this code:**

```
over_fs(channel_right+nb_hold, channel_right+nb_hold, nb_samp, fac_down,
                  mem_up_right, &frac_up_right);
```

## *10.* How the code is changed in the dec_wbplus.c

### Line 166

**Code before change :**

```
if (conf->fs != 48000)
```

**Code after change :**

```
if ((conf->fs!=44100) && (conf->fs!=48000))
```

### After line 190

**Code before change:**

```
   case 48000:
      *L_frame = L_FRAME48k;
      break;
```

**Code after change:**

```
#ifdef FILTER_44kHz
    case 44100:
      *L_frame = L_FRAME44k;
      break;
#endif
```

```
#ifdef FILTER_48kHz

   case 48000:

      *L_frame = L_FRAME48k;

      break;

#endif
```

## After line 275

**Add this code:**

```
float mem_down_right[2*L_FILT_DECIM_FS], mem_down_left[2*L_FILT_DECIM_FS];

int frac_down_right, frac_down_left;

int fac_up, fac_down, nb_samp_fs, fs_output;
```

## After line 323

**Add this code:**

```
   /* default sampling rate if undefined */
   if (conf.fs == 0)
   {
      if (conf.extension == 0)
         conf.fs = 16000;
      else if (conf.fscale == 0)
         conf.fs = 24000;
      else
#ifdef FILTER_44kHz
         conf.fs = 44100;
#else
         conf.fs = 48000;
#endif
   }
   fs_output = conf.fs;

   fac_up = fac_down = 12;     /* no oversampling by default */
   frac_down_right = 0;
   frac_down_left = 0;

   if (conf.fscale != 0)
   {
     switch (conf.fs) {
     case 8000:
       fac_up = 2;
       conf.fs = 48000;
       break;
     case 16000:
       fac_up = 4;
       conf.fs = 48000;
       break;
     case 24000:
       fac_up = 6;
       conf.fs = 48000;
       break;
     case 32000:
       fac_up = 8;
       conf.fs = 48000;
```

```
      break;
    case 11025:
      fac_up = 3;
      conf.fs = 44100;
      break;
    case 22050:
      fac_up = 6;
      conf.fs = 44100;
      break;
    }
    set_zero(mem_down_right, 2*L_FILT_DECIM_FS);
    set_zero(mem_down_left, 2*L_FILT_DECIM_FS);
  }
```

## Line 342

**Code before change :**

```
if ((f_syn = Wave_fopen(output_filename, "wb", &num_channels, &(conf.fs),
```

**Code after change :**

```
if ((f_syn = Wave_fopen(output_filename, "wb", &num_channels, &fs_output,
```

## Line 473-475

**Code before change :**

```
/* interleave of left and right samples (stereo file format) */
interleave(channel_right, channel_left, channel_right, nb_samp);
writ_data(channel_right, 2 * nb_samp, f_syn);
```

**Code after change :**

```
nb_samp_fs = decim_fs(channel_right, nb_samp,channel_right, fac_up,
         mem_down_right, &frac_down_right);
nb_samp_fs = decim_fs(channel_left, nb_samp, channel_left, fac_up,
         mem_down_left, &frac_down_left);

/* interleave of left and right samples (stereo file format) */
interleave(channel_right, channel_left, channel_right, nb_samp_fs);
writ_data(channel_right, 2 * nb_samp_fs, f_syn);
```

## Line 482

**Code before change :**

```
writ_data(channel_right, nb_samp, f_syn);
```

**Code after change :**

```
nb_samp_fs = decim_fs(channel_right, nb_samp,channel_right, fac_up,
                  mem_down_right, &frac_down_right);

writ_data(channel_right, nb_samp_fs, f_syn);
```

# *11.* How the code is changed in the table_plus.c

**Add the following tables**

```
/* filter for 8/16/24/32 and 11/22 kHz interpolation */
const float filter_LP12[1+(L_FILT_OVER_FS*12)] = {
1.000000f,  0.988498f,  0.954475f,  0.899352f,  0.825420f,  0.735720f,
0.633897f,  0.524013f,
0.410356f,  0.297222f,  0.188722f,  0.088586f,  0.000000f, -0.074528f, -
0.133262f, -0.175285f,
-0.200514f, -0.209655f, -0.204130f, -0.185965f, -0.157650f, -0.121985f, -
0.081907f, -0.040334f,
0.000000f,  0.036676f,  0.067704f,  0.091606f,  0.107459f,  0.114914f,
0.114168f,  0.105919f,
0.091282f,  0.071691f,  0.048793f,  0.024325f,  0.000000f, -0.022598f, -
0.042107f, -0.057459f,
-0.067929f, -0.073158f, -0.073155f, -0.068270f, -0.059152f, -0.046684f, -
0.031913f, -0.015973f,
0.000000f,  0.014940f,  0.027917f,  0.038192f,  0.045250f,  0.048826f,
0.048902f,  0.045698f,
0.039637f,  0.031308f,  0.021415f,  0.010723f,  0.000000f, -0.010029f, -
0.018736f, -0.025618f,
-0.030331f, -0.032699f, -0.032714f, -0.030532f, -0.026443f, -0.020852f, -
0.014237f, -0.007114f,
0.000000f,  0.006624f,  0.012342f,  0.016829f,  0.019866f,  0.021350f,
0.021289f,  0.019799f,
0.017085f,  0.013420f,  0.009125f,  0.004540f,  0.000000f, -0.004188f, -
0.007765f, -0.010533f,
-0.012367f, -0.013215f, -0.013100f, -0.012108f, -0.010380f, -0.008099f, -
0.005468f, -0.002701f,
0.000000f,  0.002452f,  0.004509f,  0.006063f,  0.007053f,  0.007465f,
0.007326f,  0.006700f,
0.005681f,  0.004381f,  0.002923f,  0.001425f,  0.000000f, -0.001259f, -
0.002281f, -0.003019f,
-0.003455f, -0.003593f, -0.003462f, -0.003105f, -0.002579f, -0.001945f, -
0.001267f, -0.000603f,
0.000000f,  0.000504f,  0.000884f,  0.001132f,  0.001250f,  0.001250f,
0.001154f,  0.000988f,
0.000779f,  0.000556f,  0.000340f,  0.000151f,  0.000000f, -0.000107f, -
0.000169f, -0.000192f,
-0.000185f, -0.000157f, -0.000118f, -0.000079f, -0.000045f, -0.000021f, -
0.000006f, -0.000001f,
0.000000f};

#ifdef FILTER_44kHz
/* filter for 44.1 kHz interpolation */
const float filter_LP165[1+((12+1)*165)] = {
1.000000f,  0.999939f,  0.999756f,  0.999451f,  0.999023f,  0.998474f,
0.997804f,  0.997011f,
0.996098f,  0.995062f,  0.993906f,  0.992630f,  0.991232f,  0.989715f,
0.988078f,  0.986321f,
0.984446f,  0.982451f,  0.980339f,  0.978108f,  0.975761f,  0.973297f,
0.970716f,  0.968021f,
0.965210f,  0.962284f,  0.959245f,  0.956093f,  0.952829f,  0.949453f,
0.945966f,  0.942369f,
0.938663f,  0.934848f,  0.930926f,  0.926897f,  0.922762f,  0.918522f,
0.914178f,  0.909730f,
0.905181f,  0.900531f,  0.895780f,  0.890931f,  0.885983f,  0.880939f,
0.875799f,  0.870564f,
0.865236f,  0.859815f,  0.854303f,  0.848702f,  0.843011f,  0.837233f,
0.831369f,  0.825420f,
```

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0.668312f,  0.660747f,
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0.526058f,  0.517872f,  0.509667f,  0.501445f,  0.493208f,  0.484957f,
0.476694f,  0.468420f,
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0.344199f,  0.335983f,
0.327785f,  0.319605f,  0.311446f,  0.303310f,  0.295196f,  0.287108f,
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0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,
0.000000f,  0.000000f,
0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,
0.000000f,  0.000000f,
0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,
0.000000f,  0.000000f,
0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,
0.000000f,  0.000000f,
0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,
0.000000f,  0.000000f,
0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,  0.000000f,
0.000000f,  0.000000f,
0.000000f,  0.000000f};
#endif
```

## Before line 2697

**Add following line :**
**#ifdef FILTER_48kHz**

## After line 2991

**Add following line :**
**#endif**