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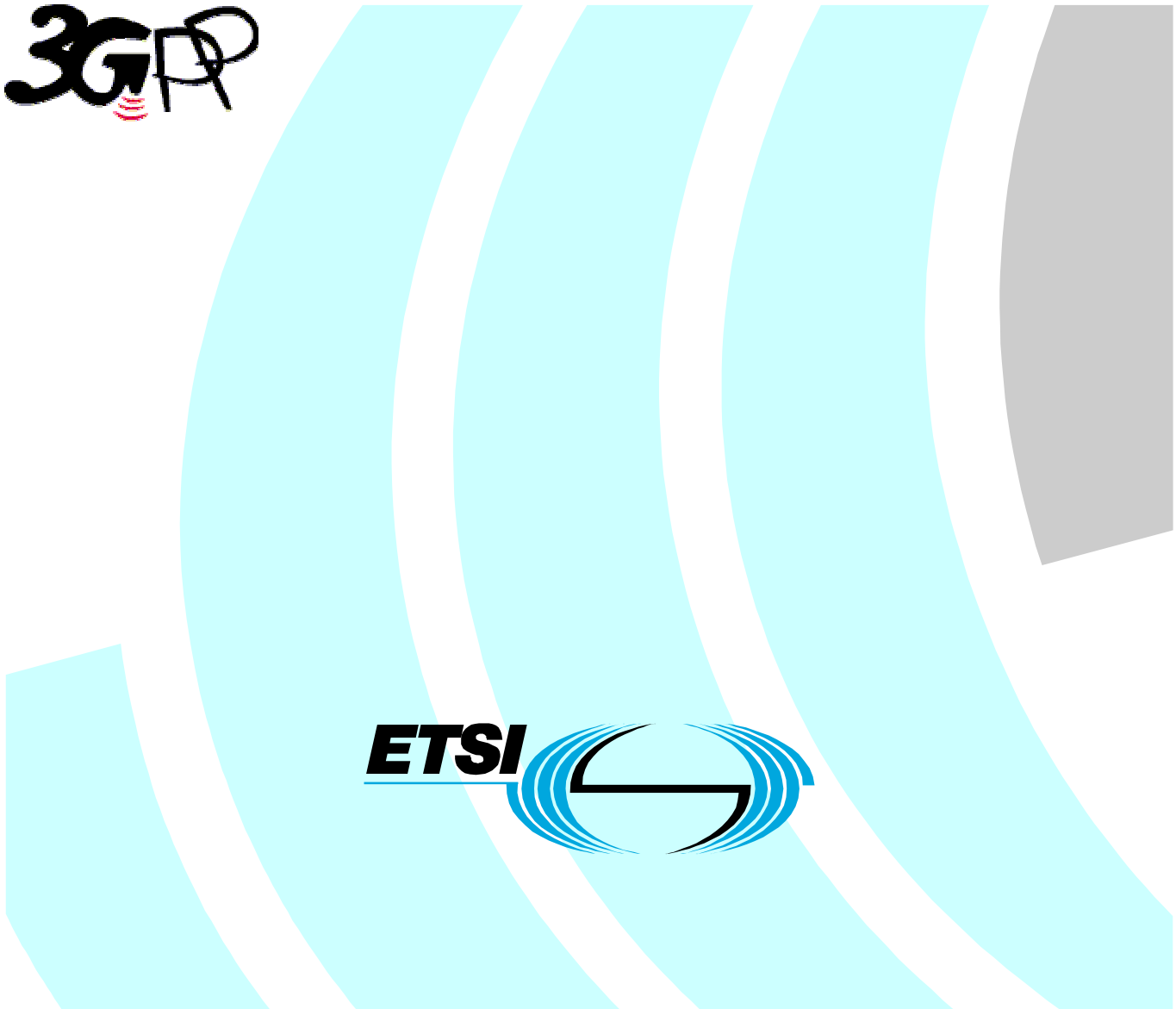
Technical Specification

Universal Mobile Telecommunications System (UMTS);
Speech Codec List for GSM and UMTS
(3GPP TS 26.103 version 4.2.0 Release 4)



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Foreword

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Contents

Intellectual Property Rights 2
Foreword 2
Foreword 4
1 Scope 5
2 Normative references 5
3 Definitions and Abbreviations 5
3.1 Definitions 5
3.2 Abbreviations 6
4 General 6
5 3GPP Codec List for OoBTC 7
5.1 GSM Full Rate Codec Type (GSM FR) 7
5.2 GSM Half Rate Codec Type (GSM HR) 7
5.3 GSM Enhanced Full Rate Codec Type (GSM EFR) 8
5.4 Four Adaptive Multi-Rate Codec Types (FR AMR, HR AMR, UMTS AMR, UMTS AMR 2) 8
5.5 TDMA Enhanced Full Rate Codec Type (TDMA EFR) 11
5.6 PDC Enhanced Full Rate Codec Type (PDC_EFR) 11
6 Codec List for the Call Control Protocol 11
6.1 System Identifiers for GSM and UMTS 11
6.2 Codec Bitmap 11
6.3 Selected Codec Type 12
Annex A (informative): Example Codec List for UMTS 13
Annex B (informative) : Change history 14
History 15

Foreword

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1 Scope

The present Technical Specification outlines the Codec Lists in 3GPP including both systems, GSM and UMTS, to be used by the Out of Band Transcoder Control (OoBTC) protocol to set up a call or modify a call in **Tr**anscoder **F**ree **O**peration (TrFO) and in "transcoder at the edge" scenarios.

The TS further specifies the coding of the Supported Codec List Information Elements for the UMTS radio access technology.

The Supported Codec List IE includes Codec_Types from the TDMA and PDC systems, to support TFO or TrFO between UMTS and TDMA, or UMTS and PDC.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TS 26.090: "Mandatory Speech Codec speech processing functions; AMR Speech Codec; Transcoding functions".

[2] 3GPP TS 26.093: "Mandatory Speech Codec speech processing functions; AMR Speech Codec; Source Controlled Rate operation".

[3] 3GPP TS 26.101: "Mandatory Speech Codec speech processing functions; AMR Speech Codec; Frame Structure".

[4] 3GPP 46.0xx: "Enhanced Full Rate Codec Recommendations".

[5] 3GPP 26.0xx: "Adaptive Multi-Rate Codec Recommendations".

[6] ITU-T Recommendation Q.765.5: "Application transport mechanism - Bearer independent call control (BICC)".

[7] 3GPP TS 28.062: "Inband Tandem Free Operation (TFO) of Speech Codecs; Service Description; Stage 3".

[8] 3GPP TS 23.153: "Out of Band Transcoder Control; Stage 2".

[9] 3GPP TS 24.008: "Mobile Radio Interface - Layer 3 MM/CC Specification".

3 Definitions and Abbreviations

3.1 Definitions

Codec Type: defines a specific type of speech Coding algorithms (e.g. GSM FR, GSM FR AMR)

Codec Mode: defines a specific mode of a Codec Type (e.g. 12,2 kBit/s Mode of the GSM FR AMR)

Organisation Identifier (OID): identifies the standard organisation (e.g. 3GPP) producing a specification for a Codec List. ITU-T is responsible for maintaining the list of Organisation Identifiers

System Identifier (SysID): identifies the radio access technology (e.g. GSM or UMTS) for which the supported Codec List is defined

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CoID	Codec IDentifier
DTX	Discontinuous Transmission
GSM	Global System for Mobile communication
OID	Organisation IDentifier (e.g. ITU-T, 3GPP)
OoBTC	Out of Band Transcoder Control
PDC	Personal Digital Communication (synonym for ...)
RX	Receive
SCR	Source Controlled Rate operation (synonym to DTX)
SID	Silence Descriptor
SysID	System Identifier
TDMA	Time Division Multiple Access (synonym for ...)
TFO	**T**andem **F**ree **O**peration (also sometimes called "Transcoder-Through" or "Codec-Bypass")
TrFO	**Tr**anscoder **F**ree **O**peration
TX	Transmit
UMTS	Universal Mobile Telecommunications System

4 General

The present Technical Specification outlines the 3GPP internal Codec Lists for both, GSM and UMTS, to be used by the Out of Band Transcoder Control (OoBTC) protocol to set up a call or modify a call in Transcoder Free Operation (TrFO).

It further specifies the coding of the Supported Codec List Information Elements as defined in 3GPP TS 24.008 for the UMTS radio access technology.

Transcoder Free Operation allows the transport of speech signals in the coded domain from one user equipment (UE) to the other user equipment through the radio access network (RAN) and core network (CN), possibly through a transit network (TN). This enables high speech quality, low transmission costs and high flexibility.

The necessary Codec Type selection and resource allocation are negotiated out of band **before** and after call setup. Possible Codec (re-)configuration, Rate Control and DTX signalling may be performed after call setup by additional inband signalling or a combination of inband and out-of-band signalling.

Up to release ´99 GSM does not support Transcoder Free Operation, but specifies the Tandem Free Operation (TFO). Tandem Free Operation enables similar advantages, but is based on pure inband signalling **after** call setup.
The parameters defined in this Technical Specification allow interaction between TrFO and TFO. They further provide an evolutionary path for GSM towards Transcoder Free Operation.

The GSM and UMTS standards define currently nine different Codec Types: GSM Full Rate, GSM Half Rate, GSM Enhanced Full Rate, Full Rate Adaptive Multi-Rate, Half Rate Adaptive Multi-Rate, UMTS Adaptive Multi-Rate, UMTS Adaptive Multi-Rate 2, TDMA EFR and PDC EFR. Within each radio access technology the following Codec Types may be used, see table 4.1.

Table 4.1: Support of Codec Types in Radio Access Technologies

	TDMA EFR	UMTS AMR2	UMTS AMR	FR AMR	HR AMR	GSM EFR	GSM HR	GSM FR
GSM	not defined	not possible	Not possible	yes (4 modes)	yes (4 modes)	yes	yes	yes
UMTS	yes	yes (8 modes)	Yes (8 modes)	yes (8 modes)	yes, but use FR AMR	yes	not defined	not defined

								PDC EFR
GSM								not defined
UMTS								yes

5 3GPP Codec List for OoBTC

The definition of the common Codec List for Out of Band Transcoder Control (3GPP TS 23.153 [8]) in 3GPP for GSM and UMTS follows the specifications given in ITU Q.765.5 [6]: The most preferred Codec Type is listed first, followed by the second preferred one, and so on. An informative example for a codec list for UMTS can be found in Annex A.

5.1 GSM Full Rate Codec Type (GSM FR)

The Codec IDentification (CoID) code is defined to be: FR_CoID := 0x0000.0000.

The GSM Full Rate Codec Type has no additional parameters.

For information (for exact details see GSM Recommendations):

The GSM Full Rate Codec Type supports one fixed Codec Mode with 13.0 kBit/s.

DTX may be enabled in uplink and in downlink independently of each other. DTX on or off is defined by the network on a cell basis and can not be negotiated at call setup or during the call. The DTX scheme uses one SID frame to mark the end of a speech burst and to start Comfort Noise Generation. Identical SID frames for comfort noise updates are sent in speech pauses about every 480 ms, aligned with the cell´s TDMA frame structure. The defined Tandem Free Operation allows the reception of GSM FR DTX information for the downlink direction in all cases. The TFO respectively TrFO partner is prepared to receive DTX information as well.

5.2 GSM Half Rate Codec Type (GSM HR)

The Codec IDentification (CoID) code is defined to be: HR_CoID := 0x0000.0001.

The GSM Half Rate Codec Type has no additional parameters.

For information (for exact details see GSM Recommendations):

The GSM Half Rate Codec Type supports one fixed Codec Mode with 5.60 kBit/s.

DTX may be enabled in uplink and in downlink independently of each other. DTX on or off is defined by the network on a cell basis and can not be negotiated at call setup or during the call. The DTX scheme uses one SID frame to mark the end of a speech burst and to start Comfort Noise Generation. Identical SID frames for comfort noise updates are sent in speech pauses about every 480 ms, aligned with the cell´s TDMA frame structure. The defined Tandem Free Operation allows the reception of GSM HR DTX information for the downlink direction in all cases. The TFO respectively TrFO partner shall be prepared to receive DTX information as well.

5.3 GSM Enhanced Full Rate Codec Type (GSM EFR)

The Codec IDentification (CoID) code is defined to be: EFR_CoID := 0x0000.0010.

The GSM Enhanced Full Rate Codec Type has no additional parameters.

For information (for exact details see GSM Recommendations):

The GSM Enhanced Full Rate Codec Type supports one fixed Codec Mode with 12.2 kBit/s.

DTX may be enabled in uplink and in downlink independently of each other. DTX on or off is defined by the network on a cell basis and can not be negotiated at call setup or during the call. The DTX scheme uses one SID frame to mark the end of a speech burst and to start Comfort Noise Generation. It is important to note that the Comfort Noise parameters for this start of the comfort noise generation are calculated at transmitter side from the previous eight speech frames. A DTX hangover period needs to be applied therefore at transmitter side before sending the first SID frame. SID frames with incremental information for comfort noise updates are sent in speech pauses about every 480 ms, aligned with the cell´s TDMA frame structure. The defined Tandem Free Operation allows the reception of GSM EFR DTX information for the downlink direction in all cases. The TFO respectively TrFO partner shall be prepared to receive DTX information as well.

5.4 Four Adaptive Multi-Rate Codec Types (FR AMR, HR AMR, UMTS AMR, UMTS AMR 2)

The Adaptive Multi-Rate Codec algorithm is applied in GSM and UMTS in four different Codec Types.
The Codec IDentification (CoID) codes are defined to be:
FR_AMR_CoID := 0x0000.0011.
HR_AMR_CoID := 0x0000.0100.
UMTS_AMR_CoID := 0x0000.0101.
UMTS_AMR_2_CoID := 0x0000.0110.

The AMR may have several additional parameters. These parameters are optional at originating side, but mandatory for the terminating side:

Active Codec Set, ACS: eight bits.

When applied in GSM then for the FR AMR and the HR AMR up to four modes may be selected by setting the corresponding bits to "1";

In HR AMR only four out of the lower six modes can be selected;

When applied in UMTS then for the FR AMR, UMTS AMR and UMTS AMR 2 up to all eight modes may be selected.

If the ACS is not specified at originating side, then all modes are supported there.

If ACS is not provided, then SCS and MACS can not be provided as well.

Supported Codec Set, SCS: eight bits.

In FR AMR, UMTS AMR and UMTS AMR 2 up to eight modes may be selected by setting the corresponding bits to "1".

In HR AMR only the lower six modes may be selected.

If the SCS is not specified at originating side, then all modes are supported there.

If SCS is not provided, then MACS can not be provided as well.

Maximal number of Codec Modes, MACS: three bits.

When applied in GSM then for the FR AMR and the HR AMR one to four Codec Modes are allowed within the ACS.

Coding: "001: one, "010": two, "011": three, "100": four Codec modes allowed.

When applied in UMTS then for the FR AMR, the UMTS AMR and the UMTS AMR 2 one up to eight Codec Modes are allowed within the ACS.

Coding: "001: one, "010": two, … "111": seven, "000" eight Codec modes allowed.
If MACS is not specified at originating side, then the maximum of modes is supported there.

Optimisation Mode for ACS , OM: one bit.
Coding: "0": Optimisation of the ACS not supported, "1": Optimisation of the ACS supported.
The Optimisation Mode indicates in TFO, whether the sending side supports the modification (optimisation) of its ACS for the needs of the distant side. This parameter is necessary in UMTS OoBTC to support TFO in "transcoders at the edge" scenarios. In case the OM is set to "not supported" the offered ACS can not be altered.
Only Rate Control can then be used to restrict the modes within the ACS.
The use of the Optimisation Mode parameter for TrFO is defined in 3GPP TS 23.153 [9].

The Length Indicator field (LI) is set to 3, 4, 5 or 6 at originating side, depending on how many parameters are specified. The terminating side shall return the selected Codec with a full set of parameters. Hence LI shall be set to 6 always by the terminating side. If any node in the path from originating side to terminating side does not support the parameter set offered by the originating side, it may restrict it. If necessary the missing, optional parameter octets may have to be inserted then.
The "Single Codec" information element consists of 5 to 8 octets in case of the AMR Codec Types (table 5.4):

Table 5.4: Coding of "Single Codec" for the Adaptive Multi-Rate Codec Types

Octet	Parameter	MSB 8	7	6	5	4	3	2	1 LSB
1 m	Single Codec	Single Codec (see ITU-T Q.765.5 [6])							
2 m	Length Indication	6							
3 m	Compat. Info	Compatibility Information							
4 m	OID	ETSI OID (See ITU-T Q.765.5 [6])							
5 m	CoID	FR_AMR_CoID, HR_AMR_CoID, UMTS_AMR_CoID or UMTS_AMR_2_CoID							
6 o	ACS	12.2	10.2	7.95	7.40	6.70	5.90	5.15	4.75
7 o	SCS	12.2	10.2	7.95	7.40	6.70	5.90	5.15	4.75
8 o	OM, MACS	(spare)	(spare)	(spare)	(spare)	OM	MACS		

with "m" = mandatory and "o" = optional

For information on GSM procedures (for exact details see GSM Recommendations):

The GSM AMR Codec Types comprise eight (Full Rate), respectively six (Half Rate) different Codec Modes: 12,2 … 4,75 kBit/s.

The active Codec Mode is selected from the Active Codec Set (ACS) by the network (Codec Mode Command) with assistance by the mobile station (Codec Mode Request). This Codec Mode Adaptation, also termed Rate Control, can be performed every 40 ms by going one Codec Mode up or down within the ACS. The Codec Modes in uplink and downlink at one radio leg may be different. In Tandem Free Operation both radio legs (A and B) are considered for the optimal selection of the active Codec Mode in each direction (uplink A and then downlink B, respectively vice versa) by the "Distributed Rate Decision" algorithm. The worst of both radio legs determines the highest allowed Codec Mode, respectively the maximally allowed rate ("Maximum Rate Control"). All rate control commands are transmitted inband: on the radio interface, the BTS-TRAU interface and the TRAU-TRAU interface.

The Active Codec Set is configured at call setup or reconfigured during the call. It consists of one up to maximally four Codec Modes (MACS) at a given time, selected from the Supported Codec Set. The maximal number of Codec Modes and the Supported Codec Set may be constrained by the network to consider resources and radio conditions.
The Active Codec Sets in uplink and downlink are typically identical.
First, at start up of Tandem Free Operation both Active Codec Sets, the Supported Codec Sets, the MACSs and the OMs are taken into account to determine the optimal common Active Codec Set. In a later phase the Codec Lists of both radio legs may be taken into account to find the optimum configuration. For exact details see 3GPP TS 28.062. All configuration data and update protocols are transmitted inband.

The DTX scheme of the Adaptive Multi-Rate Codec Type marks with a specific SID_FIRST frame the end of a speech burst. SID_FIRST does not contain Comfort Noise parameters. This SID_FIRST starts the comfort noise generation with parameters that are calculated at receiver side (!) from the latest received seven speech frames. A DTX hangover period needs to be applied therefore at transmitter side before sending of this SID_FIRST.
Absolutely coded SID_UPDATE frames follow about every eighth frame (160 ms) in speech pauses. SID_UPDATE frames are sent independently of the cell´s TDMA frame structure and are related only to the source signal.
An ONSET frame (typically) precedes in uplink direction the beginning of a new speech burst. DTX on or off is defined by the network on a cell basis. The defined Tandem Free Operation allows the reception of GSM-AMR DTX information for the downlink direction in all cases.

Note: The DTX scheme of the Enhanced Full Rate Codec Type is not compatible with the DTX scheme of the Adaptive Multi-Rate Codec Type in Codec Mode 12.2 kBit/s, although the speech modes of these two Codec Types are bit exact identical.

Normative for UMTS: The FR AMR, the UMTS AMR and the UMTS AMR 2 Codec Types comprise eight different Codec Modes: 12,2 … 4,75 kBit/s. If the UMTS AMR 2 is available then only the UMTS AMR 2 shall be indicated in the Codec List, because it is compatible to all AMR Codec Types. If the UMTS_AMR 2 is not available, then UMTS AMR shall be indicated, together with FR AMR, if FR AMR is available.

For information on UMTS procedures (for exact details see 3GPP TS 28.062 (TFO) and 3GPP TS 23.153 (TrFO):

The active Codec Mode is selected from the Active Codec Set (ACS) by the network. This Codec Mode Adaptation, also termed Rate Control, can be performed for the UMTS AMR every 20 ms by going to another Codec Mode within the ACS. For the UMTS AMR 2 this Codec Mode Adaptation can be performed every 20ms for the downlink traffic channel, but only every 40ms for the uplink radio channel. The UE selects at call setup one of the two possible phases for Codec Mode Adaptation (odd or even frames). During the call changes of the Codec Mode in uplink direction are only allowed in this selected phase. Rate Control commands received in downlink direction are considered at the next possible phase. By this definition the UMTS AMR 2 Codec Type is TFO and TrFO compatible to the FR AMR, HR AMR, UMTS AMR and UMTS AMR 2 Codec Types.

The Codec Modes in uplink and downlink at one radio leg may be different. In Tandem Free Operation or Transcoder Free Operation both radio legs (A and B) are considered for the optimal selection of the active Codec Mode in each direction (uplink A and then downlink B, respectively vice versa) by a "Distributed Rate Decision" algorithm. The worst of both radio legs determine the highest allowed Codec Mode, respectively the maximally allowed rate. All rate control commands are transmitted inband on the Iu and Nb interfaces and out of band on the radio interface.

The Active Codec Set is configured at call setup or reconfigured during the call. It consists of one up to maximally eight Codec Modes (MACS) at a given time, selected from the Supported Codec Set. The maximal number of Codec Modes and the Supported Codec Set may be constrained by the network to consider resources and radio conditions.
The Active Codec Sets in uplink and downlink are typically identical.
At call setup the Originating Side sends the AMR parameter set (included in the Codec List). The Terminating side then selects a suitable ACS from the given information and sends it back. In case the terminating side does not support TrFO a transcoder is allocated in the path at a suitable position, preferably as close as possible to the terminating side. This transcoder may by inband signalling install a Tandem Free Operation after call setup. Then, at start up of Tandem Free Operation, both Active Codec Sets, the Supported Codec Sets, the MACSs and the OMs are taken into account to determine the optimal common Active Codec Set. In a later phase the Codec Lists of both radio legs may be taken into account to find the optimum configuration. All configuration data and update protocols are transmitted inband on the TFO interface, but out of band within the UMTS network. For information on Tandem Free Operation see 3GPP TS 28.062 and on Transcoder Free Operation see 3GPP TS 23.153.

The SCR scheme of the Adaptive Multi-Rate Codec Types mark with a specific SID_FIRST frame the end of a speech burst. SID_FIRST does not contain Comfort Noise parameters. This SID_FIRST starts the comfort noise generation with parameters that are calculated at receiver side (!) from the latest received seven speech frames. A DTX hangover period needs to be applied therefore at transmitter side before sending of this SID_FIRST.
Absolutely coded SID_UPDATE frames follow about every eighth frame (160 ms) in speech pauses. SID_UPDATE frames are sent independently of the cell´s timing structure and are related only to the source signal.
An ONSET frame does (typically) not exist in UMTS networks, but may be received in TFO from the distant partner. It marks the beginning of a speech burst. "SCR on" is always defined by the network. The defined Tandem Free Operation and Transcoder Free Operation allows the reception of AMR SCR information for the downlink direction in all cases.

The SCR schemes of the UMTS AMR, the UMTS AMR 2 and the FR AMR Codec Types in UMTS are fully compatible to the DTX schemes of FR AMR and HR AMR in GSM.

5.5 TDMA Enhanced Full Rate Codec Type (TDMA EFR)

The Codec IDentification (CoID) code is defined to be: TDMA_EFR_CoID := 0x0000.0111.

The TDMA Enhanced Full Rate Codec Type has no additional parameters.

For information (for exact details see TDMA Recommendations):

The TDMA Enhanced Full Rate Codec Type supports one fixed Codec Mode with 7.4 kBit/s. This codec mode is bit exact identical with AMR codec mode at 7.4 kBit/s.

In a TDMA system DTX may be enabled in uplink, but not in downlink. The DTX scheme uses one SID frame to mark the end of a speech burst and to start or continue Comfort Noise Generation.

The defined Tandem Free Operation allows the reception of TDMA EFR DTX information for the downlink direction in all cases. In TDMA systems the transcoder has to generate comfort noise in speech like frames to be sent downlink. In UMTS the downlink DTX shall always be supported and the transcoder can therefore stay transparently in TFO.

5.6 PDC Enhanced Full Rate Codec Type (PDC_EFR)

The Codec IDentification (CoID) code is defined to be: TDMA_EFR_CoID := 0x0000.1000.

The PDC Enhanced Full Rate Codec Type has no additional parameters.

For information (for exact details see PDC Recommendations):

The PDC Enhanced Full Rate Codec Type supports one fixed Codec Mode with 6.7 kBit/s. This codec mode is bit exact identical with AMR codec mode at 6.7 kBit/s.

In a PDC system DTX may be enabled in uplink, but not in downlink. The DTX scheme uses one SID frame to mark the end of a speech burst and to start or continue Comfort Noise Generation.

The Tandem Free Operation allows the reception of PDC EFR DTX information for the downlink direction in all cases. In PDC systems the transcoder has to generate comfort noise in speech like frames to be sent downlink.
In UMTS the downlink DTX shall always be supported and the transcoder can therefore stay transparently in TFO.

6 Codec List for the Call Control Protocol

For call control on the air interface the Codec Lists need to be specified for each radio access technology separately, because it can not be expected that an UE supports the same Codec Types in different radio access technologies.

3GPP TS 24.008 [9] *defines the call control signalling and how to use the "Supported Codec List* Information Element" (IE). It contains Codec Lists (in form of Codec Bitmaps) for each supported radio access technology (identified by a SysID).

The coding of this is IE is given here. It is also used for TFO in 3GPP TS 28.062 [7].

6.1 System Identifiers for GSM and UMTS

The system identifiers for the radio access technologies supported by this specification are:

SysID for GSM: 0x0000.0000 (bit 8 .. bit 1)

SysID for UMTS: 0x0000.0100 (bit 8 .. bit 1)

These values are selected in accordance with [7] (3GPP TS 28.062).

6.2 Codec Bitmap

The Codec Types are coded in the first and second octet of the Codec List Bitmap as follows:

8	7	6	5	4	3	2	bit 1	
TDMA EFR	UMTS AMR 2	UMTS AMR	HR AMR	FR AMR	GSM EFR	GSM HR	GSM FR	Octet 1

bit 16	15	14	13	12	11	10	bit 9	
(reserved)	(reserved)	(reserved)	(reserved)	(reserved)	(reserved)	(reserved)	PDC EFR	Octet 2

A Codec Type is supported, if the corresponding bit is set to "1". All reserved bits shall be set to "0".

6.3 Selected Codec Type

The Selected Codec Type is coded as shown in Table 6.3-1. The same coding is used also in 3GPP TS 28.062 [7].

Table 6.3-1: Coding of the selected Codec_Type (long form)

Bit 8…Bit 1 CoID	**Codec_Type**	**Name**
0000.0000	GSM Full Rate (13.0 kBit/s)	GSM FR
0000.0001	GSM Half Rate (5.6 kBit/s)	GSM HR
0000.0010	GSM Enhanced Full Rate (12.2 kBit/s)	GSM EFR
0000.0011	Full Rate Adaptive Multi-Rate	FR AMR
0000.0100	Half Rate Adaptive Multi-Rate	HR AMR
0000.0101	UMTS Adaptive Multi-Rate	UMTS AMR
0000.0110	UMTS Adaptive Multi-Rate 2	UMTS AMR 2
0000.0111	TDMA Enhanced Full Rate (7.4 kBit/s)	TDMA EFR
0000.1000	PDC Enhanced Full Rate (6.7 kBit/s)	PDC EFR
other codes	reserved for future use.	

Annex A (informative): Example Codec List for UMTS

This Annex gives some informative examples how the Codec List for UMTS may look like for the OoBTC protocol. UMTS does support: UMTS AMR, FR AMR and HR AMR. It may support also GSM EFR, TDMA EFR and PDC EFR.
One list (with arbitrarily selected Codec Type preference) could look at Originating side like:

Octet	Parameter	MSB 8	7	6	5	4	3	2	1 LSB
1	Codec List	Codec List (see ITU-T Q.765.5 [6])							
2	Length Indication (LI)	30							
3	Compat. Info	Compatibility Information							
4	Single Codec	Single Codec (see ITU-T Q.765.5 [6])							
5	LI	6							
6	Compat. Info	Compatibility Information							
7	OID	ETSI OID (See ITU-T Q.765.5 [6])							
8	CoID	UMTS_AMR_CoID							
9 o	ACS	12.2	10.2	7.95	7.40	6.70	5.90	5.15	4.75
10 o	SCS	12.2	10.2	7.95	7.40	6.70	5.90	5.15	4.75
11 o	MACS	(spare)	(spare)	(spare)	(spare)	OM	MACS		
12	Single Codec	Single Codec (see ITU-T Q.765.5 [6])							
13	LI	6							
14	Compat. Info	Compatibility Information							
15	OID	ETSI OID (See ITU-T Q.765.5 [6])							
16	CoID	FR_AMR_CoID							
17 o	ACS	12.2	10.2	7.95	7.40	6.70	5.90	5.15	4.75
18 o	SCS	12.2	10.2	7.95	7.40	6.70	5.90	5.15	4.75
19 o	MACS	(spare)	(spare)	(spare)	(spare)	OM	MACS		
20	Single Codec	Single Codec (see ITU-T Q.765.5 [6])							
21	LI	6							
22	Compat. Info	Compatibility Information							
23	OID	ETSI OID (See ITU-T Q.765.5 [6])							
24	CoID	HR_AMR_CoID							
25 o	ACS	(spare)	(spare)	7.95	7.40	6.70	5.90	5.15	4.75
26 o	SCS	(spare)	(spare)	7.95	7.40	6.70	5.90	5.15	4.75
27 o	MACS	(spare)	(spare)	(spare)	(spare)	OM	MACS		
28	Single Codec	Single Codec (see ITU-T Q.765.5 [6])							
29	LI	3							
30	Compat. Info	Compatibility Information							
31	OID	ETSI OID (See ITU-T Q.765.5 [6])							
32	CoID	EFR_CoID							

with "o" = optional octet

The Terminating Side selects one of the Codec Types and returns it, together with the selected codec attributes.

The AMR Codec Types may have very similar, if not identical codec attributes at Originating side. The UMTS as Originating side can, however, already decide, which configuration would be preferred in case the Terminating side is UMTS, or GSM FR or GSM HR. A GSM as Originating side can not offer UMTS AMR and the Codec attributes for FR AMR and HR AMR may be quite different.

Annex B (informative) : Change history

Change history							
Date	**TSG SA#**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
12-2000	10	SP-000576	004		Introduction of Codec Type Bit-Map for Codec Negotiation	3.0.0	4.0.0
12-2000	10	SP-000576	005		Introduction of Selected Codec Type for Codec Negotiation	3.0.0	4.0.0
12-2000	10	SP-000576	006		Clarification for the use of the Codec List Information Element	3.0.0	4.0.0
03-2001	11	SP-010104	007		Simplification of the Optimisation Mode Field	4.0.0	4.1.0
03-2001	11	SP-010199	008	3	Introduction of UMTS_AMR_2	4.0.0	4.1.0
12-2001	14	SP-010698	010		Removal of AMR-WB codec type	4.1.0	4.2.0

History

Document history		
V4.1.0	March 2001	Publication
V4.2.0	December 2001	Publication