Plenary Meeting #9, Oahu, Hawaii
20th – 22nd September 2000.

Source: **TSG_N WG 3**

Title: **CRs to R99 Work Item T.E.I (multimedia) part 2 of 2**

Agenda item: **8.6.3**

Document for: **APPROVAL**

<u>**Introduction**</u>**:**

This document contains **6** CRs on **R99** Work Item **T.E.I (multimedia)**, that has been agreed by **TSG_N WG3**, and is forwarded to TSG_N Plenary meeting #9 for approval.

Doc-2nd-	Spec	CR	Rev	Phase	Subject	Cat	Version-Current
N3-000480	23.910	014		R99	3.1kHz multimedia at 33.6kbit/s	F	3.1.0
N3-000481	23.910	017		R00	3.1kHz multimedia at 33.6kbit/s	A	3.1.0
N3-000479	27.001	034		R00	3.1kHz multimedia at 33.6kbit/s	A	4.0.0
N3-000478	27.001	039		R99	3.1kHz multimedia at 33.6kbit/s	F	3.5.0
N3-000477	29 007	026		R00	3.1kHz multimedia at 33.6kbit/s	A	3.5.0
N3-000476	29 007	027		R99	3.1kHz multimedia at 33.6kbit/s	F	3.5.0

CHANGE REQUEST

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23.910	CR	**014**	Current Version:	**3.1.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to:	**TSG_N #9**	for approval	**X**	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG   *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects:
(at least one should be marked with an X)

(U)SIM		ME		UTRAN / Radio		Core Network	**X**

Source:	TSG_N3		**Date:**	28/08/2000

Subject:	3.1 kHz multimedia calls at 33.6 kbit/s data rate

Work item:	Technical enhancements and improvements (TEI)

Category:

(only one category Shall be marked With an X)

				Release:		
F	Correction	**X**		Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	**X**
				Release 00	

Reason for change:	The 3.1 kHz multimedia service at the specified setup rate of 33.6 kbit/s is made usable.

Clauses affected:	Section 5.1.1

Other specs Affected:	Other 3G core specifications	**X**	→ List of CRs:	24.008, 27.001CR039, 29.007CR027
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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5.1.1 Transparent Data

This service is distinguished by the following BC-IE parameters:

- ITC = UDI or 3.1 kHz audio or Other ITC = RDI.

- CE = transparent.

This service may also be used for multimedia, in which case:

- Other rate adaptation = H.223 and H.245.

For this service ~~the setup of~~ the FNUR at the setup is restricted to:

- 64 kbit/s, in case ITC = UDI.

- 56 kbit/s in case Other ITC = RDI.

- 33.6 kbit/s, in case ITC = 3,1 kHz audio.

- 28.8 kbit/s, in case ITC = 3.1 kHz audio.

- 32 kbit/s, in case ITC = UDI.

NOTE 1: ITU-T V.90 [16] is not supported in transparent mode, because asymmetric user rates are not supported in transparent mode.

NOTE 2: Transmission rates 31.2 and 28.8 kbit/s negotiated by the modems in a 3.1 kHz multimedia call may be used with a rate adaptation to 33.6 kbit/s between the UE and the IWF (ref. to 3GTS 27.001 and 29.007). The negotiated values shall be provided by the MSC by way of a MODIFY message.

5.2.2 Transparent Data, including Multimedia

Service identified by the BC IE	Transparent data and BS for support of multimedia service	Comments
Traffic Class	Conversational	Subject to operator tuning
Maximum bit rate	= guaranteed bit rate	
Guaranteed bit rate	FNUR = 64 .. 28.8 kbit/s (Note 2)	GBR for FNUR=56 kbit/s is 64 kbit/s (Note 1)
Delivery Order	Yes	
Maximum SDU size	640 .. 280 bits (depending on the FNUR)	Maximum SDU size for FNUR=56 kbit/s is 640 bits
Transfer Delay	< 200 ms	Subject to operator tuning
Traffic Handling Priority	-	Not applicable for the conversational traffic class
Source statistics descriptor	Unknown	
SDU Parameters		
SDU error ratio	-	Not applicable

Service identified by the BC IE		Transparent data and BS for support of multimedia service	Comments
	Residual bit error ratio	10^{-4}	Subject to operator tuning according to 3G TS 23.107. Operator may also choose different value for Multimedia and other transparent data services.
	Delivery of erroneous SDUs	-	No error detection in the core network

NOTE 1: In case the FNUR = 56 kbit/s, the GBR is set to 64 kbit/s. Last bit in each data octet is set to 1.

NOTE 2: If the FNUR is changed as a result of a MODIFY procedure during the call, the guaranteed bit rate is not changed.

Service identified by the BC IE	Transparent data and BS for support of multimedia service	Comments

CHANGE REQUEST

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23.910	CR	**017**	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to:	TSG_N #9	for approval	X	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic		*use only)*

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Proposed change affects:
(at least one should be marked with an X)

(U)SIM ☐   ME ☐   UTRAN / Radio ☐   Core Network **X**

Source:	TSG_N3		**Date:**	28/08/2000

Subject:	3.1 kHz multimedia calls at 33.6 kbit/s data rate

Work item:	Technical enhancements and improvements (TEI)

Category:

(only one category Shall be marked With an X)

	F	Correction		**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release	X		Release 96	
	B	Addition of feature			Release 97	
	C	Functional modification of feature			Release 98	
	D	Editorial modification			Release 99	
					Release 00	**X**

Reason for change:	The 3.1 kHz multimedia service at the specified setup rate of 33.6 kbit/s is made usable.

Clauses affected:	Section 5.1.1

Other specs Affected:	Other 3G core specifications	X	→ List of CRs:	24.008, 27.001,CR034 29.007CR026
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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5.1.1 Transparent Data

This service is distinguished by the following BC-IE parameters:

- ITC = UDI or 3.1 kHz audio or Other ITC = RDI.

- CE = transparent.

This service may also be used for multimedia, in which case:

- Other rate adaptation = H.223 and H.245.

For this service ~~the setup of~~ the FNUR at the setup is restricted to:

- 64 kbit/s, in case ITC = UDI.

- 56 kbit/s in case Other ITC = RDI.

- 33.6 kbit/s, in case ITC = 3,1 kHz audio.

- 28.8 kbit/s, in case ITC = 3.1 kHz audio.

- 32 kbit/s, in case ITC = UDI.

NOTE 1: ITU-T V.90 [16] is not supported in transparent mode, because asymmetric user rates are not supported in transparent mode.

NOTE 2: Transmission rates 31.2 and 28.8 kbit/s negotiated by the modems in a 3.1 kHz multimedia call may be used with a rate adaptation to 33.6 kbit/s between the UE and the IWF (ref. to 3GTS 27.001 and 29.007). The negotiated values shall be provided by the MSC by way of a MODIFY message.

5.2.2 Transparent Data, including Multimedia

Service identified by the BC IE	Transparent data and BS for support of multimedia service	Comments
Traffic Class	Conversational	Subject to operator tuning
Maximum bit rate	= guaranteed bit rate	
Guaranteed bit rate	FNUR = 64 .. 28.8 kbit/s (Note 2)	GBR for FNUR=56 kbit/s is 64 kbit/s (Note 1)
Delivery Order	Yes	
Maximum SDU size	640 .. 280 bits (depending on the FNUR)	Maximum SDU size for FNUR=56 kbit/s is 640 bits
Transfer Delay	< 200 ms	Subject to operator tuning
Traffic Handling Priority	-	Not applicable for the conversational traffic class
Source statistics descriptor	Unknown	
SDU Parameters		
SDU error ratio	-	Not applicable

Service identified by the BC IE	Transparent data and BS for support of multimedia service	Comments
Residual bit error ratio	10^{-4}	Subject to operator tuning according to 3G TS 23.107. Operator may also choose different value for Multimedia and other transparent data services.
Delivery of erroneous SDUs	-	No error detection in the core network

NOTE 1: In case the FNUR = 56 kbit/s, the GBR is set to 64 kbit/s. Last bit in each data octet is set to 1.

NOTE 2: If the FNUR is changed as a result of a MODIFY procedure during the call, the guaranteed bit rate is not changed.

Service identified by the BC IE	Transparent data and BS for support of multimedia service	Comments

CHANGE REQUEST

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27.001	**CR**	**034**	Current Version:	**4.0.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to: **TSG_N #9**   for approval   **X**   strategic   ☐   *(for SMG*
list expected approval meeting # here ↑   for information   ☐   non-strategic   ☐   *use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

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Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network **X**
(at least one should be marked with an X)

Source: TSG_N3   **Date:**   28/08/00

Subject: 3.1 kHz multimedia calls at 33.6 kbit/s data rate

Work item: Technical enhancements and improvements (TEI)

Category: F   Correction   **Release:**   Phase 2   ☐
          A   Corresponds to a correction in an earlier release   **X**   Release 96   ☐
(only one category   B   Addition of feature   Release 97   ☐
Shall be marked   C   Functional modification of feature   Release 98   ☐
With an X)   D   Editorial modification   Release 99   ☐
                                                                                                              Release 00   **X**

Reason for change: The 3.1 kHz multimedia service at the specified setup rate of 33.6 kbit/s is made usable.

Clauses affected: 2 and 8.

Other specs   Other 3G core specifications   **X**   → List of CRs: 23.910CR015, 24.008,
Affected: 29.007CR026
          Other GSM core specifications   ☐   → List of CRs:
          MS test specifications   ☐   → List of CRs:
          BSS test specifications   ☐   → List of CRs:
          O&M specifications   ☐   → List of CRs:

Other comments:

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2 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.

[1] GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2] 3G TS 22.002: "Digital cellular telecommunication system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[3] GSM 02.03: "Digital cellular telecommunication system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[4] 3G TS 23.002: "Network architecture".

[5] GSM 03.10: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) connection types".

[6] GSM 04.02: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[7] 3G TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols -Stage 3".

[8] GSM 04.21: "Digital cellular telecommunication system (Phase 2+); Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".

[9] 3G TS 24.022: "Radio Link Protocol (RLP) for Circuit Switched Bearer and Teleservices".

[10] GSM 05.05: "Digital cellular telecommunication system (Phase 2+); Radio transmission and reception".

[11] 3G TS 27.002: "Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

[12] 3G TS 27.003: "Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[13] 3G TS 27.005: "Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".

[14] 3G TS 27.007: "AT command set for 3GPP User Equipment (UE)".

[15] Void.

[16] 3G TS 29.002: "Mobile Application Part (MAP) specification".

[17] Void.

[18] Void.

[19] Void.

[20] GSM 09.06: "Digital cellular telecommunication system (Phase 2+); Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".

[21] 3G TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[22] GSM 09.08: "Digital cellular telecommunication system (Phase 2+); Application of the Base Station System management Application Part (BSSMAP) on the E-interface".

[23] 3G TS 29.010: "Information element mapping between Mobile Station - Base Station System and BSS - Mobile-services Switching Centre (MS - BSS - MSC) Signalling procedures and the Mobile Application Part (MAP)".

[24] 3G TS 29.011: "Signalling interworking for supplementary services".

[25] GSM 09.90: "Digital cellular telecommunication system (Phase 2+); Interworking between Phase 1 infrastructure and Phase 2+ Mobile Stations (MS)".

[26] ITU-T Series V Recommendations: "Data communication over the Telephone network".

[27] ITU-T Series V.42bis: "Data Compression for Data Circuit Terminating Equipment (DCE) using Error Correction Procedures".

[28] ITU-T Series X Recommendations: "Data Communication networks".

[29] ITU-T Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit - terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[30] ITU-T Recommendation X.150: "Data Communication Networks: Transmission, Signalling and Switching, Network Aspects, Maintenance and Administrative Arrangements".

[31] ITU-T Recommendation V.25bis: "Automatic Calling and/or Answering Equipment on the General Switched Telephone Network (GSTN) using the 100-Series Interchange Circuits".

[32] ITU-T Recommendation V.250: "Serial asynchronous automatic dialling and control".

[33] ITU-T Recommendation V.54: "Loop Test Devices for Modems".

[34] ITU-T Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[35] ITU-T Recommendation I.460-I.464: "ISDN Overall Network Aspects and Functions, User Network Interfaces".

[36] ITU-T Recommendation Q.931 (05/98): "DSS 1 - ISDN user network interface layer 3 specification for basic call control".

[37] ETR 018: "Integrated Services Digital Network (ISDN), Application of the BC-, HLC-, LLC-Information elements by terminals supporting ISDN services".

[38] ISO/IEC 6429: "Information technology - Control functions for coded character sets".

[39] Personal Computer Memory Card Association: "PCMCIA 2.1 or PC-Card 3.0 electrical specification or later revisions".

[40] IrDA "IrPHY Physical signalling standard".

[41] TIA-617: "Data Transmission Systems and Equipment - In-Band DCE Control".

[42] ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[43]		GSM 03.34:"Digital cellular telecommunication system (Phase 2+); High Speed Circuit Switched Data (HSCSD); Stage 2 Service description".

[44]		ISO/IEC 3309: "Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures - Frame structure".

[45]		IETF RFC 1662: "PPP in HDLC-like framing".

[46]		3G TS 21.905: "3G Vocabulary".

[47]		3G TS 25.990: "Vocabulary for UTRAN".

[48]		3G TS 25.322: "Radio Link Control (RLC) Protocol Specification".

[49]		3G TS 25.415: "UTRAN Iu interface user plane protocols".

[50]		Mobile Internet Access Forum: "PIAFS Specification Ver. 1.1, 2.1".

[51]		ITU-T Recommendation V.80: "In-band DCE control and synchronous data modes for asynchronous DTE".

8   Functions common to all interfaces

8.3   Terminal Compatibility Decision

The establishment of a mobile terminated connection depends on a positive decision on the terminal compatibility. The Mobile Station (MS) contributes to this process by performing (depending on the individual call set-up condition):

- a compatibility check;

- the selection of the appropriate terminal function; and

- the indication of compatibility requirements to the PLMN;

initiated by a call set-up request from the PLMN. The aforementioned functions shall be carried out as follows.

8.3.1   Compatibility Check

Annex B of 3G TS 24.008 applies, particularly paragraphs B.3, B.3.1 and B.3.2. As regards the therein mentioned user-to-user compatibility checking the following applies:

When the calling user requests a service with user-to-user compatibility significance indicated by the presence of HLC and LLC information element in the call set-up request, the MS shall check that the service supported by the called user matches concerning the contents of the HLC/LLC information element. If a mismatch is detected, then the MS shall reject the offered call using the cause No.88 "Incompatible Destination".

8.3.2   Selection of Appropriate Terminal Function

The MS shall select the appropriate terminal functions following a positive result of the compatibility check and/or forwarding the indication of compatibility requirements to the PLMN.

8.3.3   Indication of Compatibility Requirements to the PLMN

8.3.3.1   Indication in case of Mobile terminating calls

In support of:

- PSTN originated calls, and

- ISDN originated calls using 3.1 kHz audio Bearer Capability (BC), as well as

- ISDN originated calls using unrestricted digital Bearer Capability but not specifying all parameters for deducing a Bearer Service.

Mobile specific requirements to be dealt with in the Bearer Capability information element the call confirmed message has been introduced in the call control protocol (3G TS 24.008). This also allows for renegotiation of specific parameters at the beginning of the connection set-up process. The specific parameters are:

a) mobile specific requirements:

- Connection element (transparent/non transparent);

- Structure (note 1);

- Synchronous/Asynchronous (note 8);

- Rate adaptation/other rate adaptation (note 9);

- User information layer 2 protocol (note 1);

- Intermediate rate (note 2), (note 3);

- Modem Type (note 1), (note 3);

- User Rate (note 3);

- Compression ,

- Fixed network user rate, (note 3) (note 4);

- Other modem type, (note 3) (note 4);

- User initiated modification indication (note 4).

The following parameters are indicated by the MS to the network, only:

- Acceptable channel codings (note 5);

- Maximum number of traffic channels, (note 5);

- Wanted air interface user rate (note 6) (note 7);

- Asymmetry preference indication (note 7).

NOTE 1: This parameter is correlated with the value of the parameter connection element.

NOTE 2: For non-transparent services this parameter is correlated with the value of the parameter negotiation of intermediate rate requested.

NOTE 3: Modification of these parameters may be proposed by the MS. The Network may accept it or not.

NOTE 4: This parameter shall be included by the MS only in case it was received from the network.

NOTE 5: This parameter shall be included only in case the parameter 'fixed network user rate' is included.

NOTE 6: This parameter shall be included only for non-transparent services and in case the parameter 'fixed network user rate' is included.

NOTE 7: This parameter has to be included if EDGE channel coding(s) are included in Acceptable channel codings. In cases where this parameter would not otherwise be included, the value is set to 'Air interface user rate not applicable' or 'User initiated modification not requested' or "No preference".

NOTE 8: For FTM and PIAFS, this parameter may be negotiated as in Table B.4e. How the subscription for BS20 is assured, is an operator matter.

NOTE 9: For FTM, PIAFS or Multimedia, this parameter may be negotiated as in Table B.4f.

b) requirements with effects at the partner terminal:

- Number of data bits;

- Number of stop bits;

- Parity.

The MS indicates the radio channel requirement in the call confirmed message. If the MS indicates the support of "dual" (HR and FR channels) the final decision, which radio channel is chosen, is done by the network in an RR message. The radio channel requirement is ignored in UMTS, see Table B.5a in Annex B.

If the network proposes optional support of both transparent and non transparent connection elements but does not indicate a user information layer 2 protocol, the MS shall set the appropriate value, if choosing non transparent in the call confirmed message and out-band flow control is not requested, see B.1.1.2.

Additionally the values of the parameters structure, modem type and intermediate rate have to be set in conformance with the values of the parameters radio channel requirements, negotiation of intermediate rate requested and connection element.

Subclause B.1.1.2 and table B.1 in the annex B describe the negotiation procedure. Annex B table B.4 describes the selection of the modem type and the dependence on the value of the parameter connection element. Annex B table B.4 describes the selection of the intermediate rate and user rate and their dependence upon the value of the NIRR parameter and the equipment capabilities.

The following MT cases can be deduced from the individual call set-up request conditions:

a) If the set-up does not contain a BC information element, the MS in the call confirmed message shall include any BC information (single or multiple BC-IE). In case of multiple BC-IEs one BC-IE must indicate the information transfer capability "speech". A speech BC-IE together with a 3.1kHz multimedia BC-IE indicates the support of a fallback to speech (ref. to TS 29.007 and TS 24.008).

b) If the set-up message contains a single BC-IE, the MS in the call confirm message shall use either a single BC-IE, if it wants to negotiate mobile specific parameter values, or, unless otherwise specified in annex B, no BC-IE, if it agrees with the requested ones.

c) If the set-up contains a multiple BC-IE, the MS in the call confirmed message shall use either a multiple BC-IE, if it wants to negotiate mobile specific parameter values, or, unless otherwise specified in annex B, no BC-IE, if it agrees with the requested ones. In case of a 3.1kHz multimedia setup the MS can either accept the possibility of a fallback to speech by responding with two BC-IEs or with no BC-IEs or turn the call to a speech call by sending only a speech BC-IE in the call confirm message or turn the call to a multimedia only call (i.e. no fallback to speech allowed) by sending only a multimedia BC-IE in the call confirm message. Alternatively a single BC-IE containing fax group 3 only shall be used if a multiple BC-IE requesting speech alternate fax group 3 is received and the MS is not able to support the speech capability. Annex B, table B.7, describes the negotiation rules.

If the BC-IE contains 3.1 kHz ex PLMN, the MS is allowed to negotiate all mobile specific parameter values listed above. If the BC-IE contains facsimile group 3, the MS is allowed to negotiate the connection element (transparent/non transparent) only. In any case, if the set-up message requests a "single service", the MS must not answer in the call confirmed message requesting a "dual service" and vice versa.

However, for dual services with repeat indicator set to circular (alternate) the MS may change the sequence of dual BC-IEs within the call confirmed message (preceded by the same value of the repeat indicator), if it wants to start with a different Bearer Capability than proposed by the network as the initial one.

In addition, the MS may propose to the network to modify User Rate, Modem Type and Intermediate Rate in the CALL CONFIRMED message. The network may accept or release the call.

If the BC-IE received from the network contains the parameters 'fixed network user rate', 'other modem type' and possibly the 'user initiated modification', the MS can either:

a) if in GSM, discard these parameters, or

b) include the possibly modified values for the 'fixed network user rate' and 'other modem type' in the BC-IE of the call confirmed message. The network might accept or reject the modified values. In this case the MS shall also include the parameters 'maximum number of traffic channels' and 'acceptable channel codings'. Additionally for non-transparent services, the MS shall also include the parameters 'wanted air interface user rate' and the 'user initiated modification indication'.

In case a),The MS shall use the fall-back bearer service indicated by the remaining parameters of the BC-IE on a single slot configuration (reference GSM 04.21).

In GSM case b), a single slot configuration shall be used by the MS, in case the 'maximum number of traffic channels' is set to "1 TCH" and the 'user initiated modification indication' is set either to "user initiated modification not required" or to "user initiated modification up to 1TCH may be requested"; other wise the MS shall use a multislot configuration (reference GSM 04.21).

In case the 'acceptable channel codings' is indicated by the MS, the decision which channel coding is used is done by the network and indicated to the mobile station with an RR message. This RR message may also assign an asymmetric channel coding. The 'acceptable channel codings' parameter takes precedence over the 'negotiation of intermediate rate

requested' parameter for non-transparent services. Also the intermediate rate and user rate per traffic channel in a multislot configuration are not indicated by the 'intermediate rate' and 'user rate' parameters of the BC-IE, but depend on the chosen channel coding only.

If the parameters 'fixed network user rate', 'other modem type' were not included in the BC-IE received, or no BC-IE was received, the MS shall not include these parameters in the CALL CONFIRMED message (i.e. octets 6d, 6e, 6f, and 6g ref. to 3G TS 24.008).

If FNUR = 33.6 kbit/s is agreed on in the setup of a 3.1 kHz multimedia call, the modems may handshake to 31.2 or 28.8 kbit/s. In this case the MS receives a MODIFY message from the MSC ~~IWF~~ to indicate the new data rate, and shall respond with a MODIFY COMPLETE message (ref. to 3GTS 24.008), if it supports the requested modification. If the MS does not support the requested modification, it shall respond with a MODIFY REJECT message. The MT shall indicate the new data rate to the TE (e.g. using the ITU-T V.80 inband signaling) in order to cause the TE to use stuffing ~~lag stuffing is used~~ to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the TE and IWF.

8.3.3.2　　Indication in case of Mobile originating calls

In support of mobile originating calls the values of BC-IE parameters are requested in the set-up message from the MS. If the MS indicates the support of both transparent and non transparent connection elements the network shall return its choice in the call proceeding message. The MS is not allowed to indicate support of both transparent and non transparent, if the MS also requests out-band flow control, i.e. it does not indicate a layer 2 protocol.

Additionally the value of the parameter modem type has to be set depending on the value of the parameter connection element as described in annex B, table B.4a.

The set-up message contains a single or multiple BC-IE. In case of multiple BC-IEs one BC-IE must indicate the information transfer capability "speech".

In case of a multimedia call the setup message contains either a multimedia BC-IE indicating a multimedia only call request (i.e. no fallback to speech allowed) or both a speech BC-IE and a 3.1kHz multimedia BC-IE to indicate the support/request of a fallback to speech (ref. to TS 29.007 and TS 24.008).

If the set-up message requests a "single service", the network must not answer in the call proceeding message requesting a "dual service" and vice versa. Alternatively the network shall answer with a single BC-IE containing fax group 3 if a multiple BC-IE requesting speech alternate fax group 3 is received but the network does not allow the use of this alternate service. Annex B, table B.7, describes the negotiation rules. If the MS requests a "dual service" the network is not allowed to change the sequence of the service.

If the set-up message is indicates that negotiation of intermediate rate is requested then the network shall behave as described in annex B, table B.4b.

Unless otherwise specified in annex B, if no BC-IE parameter needs negotiation it is up to the network if it sends a CALL PROC message (with or without a BC-IE) towards the MS or not.

For multislot, TCH/F14.4, and EDGE operations and in UMTS the MS shall include an appropriate set of the parameters 'fixed network user rate', 'other modem type', 'maximum number of TCH' and 'acceptable channel codings' in the BC-IE of the SETUP message. If EDGE channel coding(s) are included in ACC in case of transparent calls, the 'Wanted air interface user rate'-parameter shall be set to 'Air interface user rate not applicable' and the 'User initiated modification indication'-parameter to 'User initiated modification not requested'. In a non-transparent multislot operation, the MS shall also include the parameters 'wanted air interface user rate' and 'user initiated modification indication' in the BC-IE of the SETUP message. In a non-transparent TCH/F14.4 or EDGE operation or in UMTS the MS shall also include the parameter 'wanted air interface user rate'. In non-transparent EDGE operation the MS shall also include the parameter 'asymmetry preference indication'. It shall also set the other parameters of the BC-IE (i.e. 'user rate') to values identifying fall-back values. Depending on the network two situations can be distinguished:

a) The network supports the requested operation:

In this case the network must include the parameter 'fixed network user rate', 'other modem type' and possibly 'user initiated modification' in the BC-IE(s) of the CALL PROCEEDING message, irrespective whether or not they contain modified values or just a copy of the received ones.

The 'acceptable channel codings' indicated by the MS in the SETUP message takes precedence over the 'negotiation of intermediate rate requested' parameter for non-transparent services. The intermediate rate per

traffic channel and the user rate per traffic channel is dependent on the chosen channel coding only. The chosen channel coding is indicated to the mobile station by the network with an RR message.

b) The network does not support the requested operation:

In this case, in GSM, the BC-IE of the CALL PROCEEDING message will not contain the parameters fixed network user rate' and 'other modem type' or no BC-IE will be included in the CALL PROCEEDING message at all. The mobile station shall then discard the parameters 'fixed network user rate', 'other modem type', 'maximum number of TCH', 'acceptable channel codings' 'wanted air interface user rate' and 'user initiated modification indication' sent with the SETUP message and apply the fall-back bearer service.

In case a), a single slot configuration shall be used by the MS, in case the 'maximum number of traffic channels' is set to "1 TCH" and the 'user initiated modification indication' is set either to "user initiated modification not requested" or to "user initiated modification up to 1TCH may be requested".

In case b), The MS shall use the fall-back bearer service indicated by the remaining parameters of the BC-IE on a single slot configuration (reference GSM 04.21).

~~If FNUR = 33.6 kbit/s is agreed on in the setup of a 3.1 kHz multimedia call, the modems may handshake to 31.2 or 28.8 kbit/s. In this case the MS receives a MODIFY message from the MSC IWF to indicate the new data rate, and shall respond with a MODIFY COMPLETE message (ref. to TS 24.008). lag stuffing is used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the mobile station and the IWF.~~

If FNUR = 33.6 kbit/s is agreed on in the setup of a 3.1 kHz multimedia call, the modems may handshake to 31.2 or 28.8 kbit/s. In this case the MS receives a MODIFY message from the MSC to indicate the new data rate, and shall respond with a MODIFY COMPLETE message (ref. to 3GTS 24.008), if it supports the requested modification. If the MS does not support the requested modification, it shall respond with a MODIFY REJECT message. The MT shall indicate the new data rate to the TE (e.g. using the ITU-T V.80 inband signaling) in order to cause the TE to use stuffing to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the TE and IWF.

8.3.3.3   Differences in validity of BC parameter values in GSM and UMTS

The validity of a BC parameter value, either in the SETUP or CALL CONFIRM message, may differ from GSM to UMTS. Certain parameters are irrelevant in UMTS and any value given is valid and ignored. These parameters may be available in the BC IE. For those parameters that are relevant in UMTS and GSM, certain values may be invalid in one of the systems. Invalid parameter values may cause rejection of the BC and subsequent release of the call.

Parameters that are ignored in UMTS may be set to default values, or to specific values in view of an eventual handover to GSM. Parameter values that are invalid in one system may result in unsuccessful handover from the other system.

Table B.5a in Annex B, lists parameters that are ignored in UMTS and parameter values which validity is different in GSM and UMTS.

8.4   Test Loops

In principle, both V.-series and X.-series interfaces allow for an activation of local or remote test loops by the terminal (ref. ITU-T V.54/X.150). A comprehensive solution of such test loops in a PLMN system has to consider the special conditions of the interface between the terminal (part of the MS) and the transmission equipment (part of the modem pool of a particular IWF within the MSC). In addition, the impact of the radiolink is to be taken into account with respect to the test objectives. Due to those special conditions a PLMN system is not capable to support remote test loops. It is an implementation choice to what extent the activation of local test loops by the terminal is supported in the MT.

8.5   Alternate speech/facsimile group 3

Editor's note: V.25bis is outdated. References to V.25 bis procedures need to replaced by corresponding procedures based on V.250 and 3G TS 27.007.

These alternate services may be initiated by either V.25 bis or manual procedures. In the former case, standard call establishment procedures will apply. In the latter case, CT106, CT107, CT108.2 and CT109 are in the OFF condition.

Selection of the data phase (from the speech phase) will be by manual intervention via the MS causing ICM by means of CT108.2 going to ON condition, refer to GSM 03.45 or 3G TS 23.146. The ensuing data phase shall follow all the operational procedures as described in 3G 27-series.

Selection of the speech phase (from the data phase) will be by manual intervention via the MS causing ICM (phone off-hook condition at the MT and data call end condition at the TE).

During the ensuing speech phases, CT107, CT106 and CT109 will be maintained in the OFF condition.

Subsequent re-selection of the data phase will be by manual intervention via the MS causing CT108.2 going to ON condition initiating ICM. At this point, re-synchronization will take place as described in subclause 8.1 above.

8.6 Multislot configuration split/combine function

In multislot configurations using multiple parallel channels the data flow is split into substreams between the Spit/Combine-function in the TAF and the network.

8.6.1 Non-transparent data

In non-transparent data operations the N(S)-numbering in the RLP-header is used for controlling the order of the data in the substreames (reference 3G TS 24.022).

8.6.2 Transparent data

In transparent multislot configurations (TCH/F9.6 or TCH/F4.8) status bits S1, S3 and the X-bit between the D12 and D13 are used for transferring substream numbering information. This S4-bit is used for frame synchronization between the parallel substreames (reference GSM 04.21).

In case of a transparent multislot configuration using TCH/F14.4 channel coding, bit M1 in the 290-bit radio interface block is used for frame synchronization between the parallel substreams, whereas bit M2 carries status information, NIC codes and substream numbering as described in GSM 04.21.

In transparent TCH/F28.8 channels, bits M1 and M2 are used as described above for transparent TCH/F14.4 channels.

8.7 EDGE multiplexing function

In EDGE configurations the number of channels across the air interface and that of substreams between BTS and MSC do not necessarily match. In such cases a multiplexing function is included at MS and BTS (GSM 04.21 and GSM 08.20). These functions distribute data between the substreams and radio channels.

8.8 Seamless data rate change

If the modems change the data rate during an ongoing multimedia call (using the ITU-T V.34 seamless data rate change mechanism), the MSC initiates a MODIFY message (ref. to 3GTS 24.008) to indicate the new data rate to the MS. The MT shall indicate the new data rate to the TE (e.g. using the ITU-T V.80 inband signaling) in order to cause the TE to use stuffing to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the TE and IWF.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

27.001	**CR**	**039**	Current Version:	**3.5.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to: **TSG_N #9**   for approval **X**   strategic ☐   *(for SMG*
list expected approval meeting # here ↑   for information ☐   non-strategic ☐   *use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

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Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network **X**
(at least one should be marked with an X)

Source: TSG_N3   **Date:**   28/08/00

Subject: 3.1 kHz multimedia calls at 33.6 kbit/s data rate

Work item: Technical enhancements and improvements (TEI)

Category: F   Correction   **X**   **Release:**   Phase 2   ☐
              A   Corresponds to a correction in an earlier release   ☐   Release 96   ☐
(only one category   B   Addition of feature   ☐   Release 97   ☐
Shall be marked   C   Functional modification of feature   ☐   Release 98   ☐
With an X)   D   Editorial modification   ☐   Release 99   **X**
                                                                                            Release 00   ☐

Reason for change: The 3.1 kHz multimedia service at the specified setup rate of 33.6 kbit/s is made usable.

Clauses affected: 2 and 8.

Other specs   Other 3G core specifications   **X**   → List of CRs: 23.910 CR 014, 24.008, 29.007
Affected: CR 039
              Other GSM core specifications   ☐   → List of CRs:
              MS test specifications   ☐   → List of CRs:
              BSS test specifications   ☐   → List of CRs:
              O&M specifications   ☐   → List of CRs:

Other comments:

help.doc

<---------- double-click here for help and instructions on how to create a CR.

2 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.

[1] GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2] 3G TS 22.002: "Digital cellular telecommunication system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[3] GSM 02.03: "Digital cellular telecommunication system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[4] 3G TS 23.002: "Network architecture".

[5] GSM 03.10: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) connection types".

[6] GSM 04.02: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[7] 3G TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols -Stage 3".

[8] GSM 04.21: "Digital cellular telecommunication system (Phase 2+); Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".

[9] 3G TS 24.022: "Radio Link Protocol (RLP) for Circuit Switched Bearer and Teleservices".

[10] GSM 05.05: "Digital cellular telecommunication system (Phase 2+); Radio transmission and reception".

[11] 3G TS 27.002: "Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

[12] 3G TS 27.003: "Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[13] 3G TS 27.005: "Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".

[14] 3G TS 27.007: "AT command set for 3GPP User Equipment (UE)".

[15] Void.

[16] 3G TS 29.002: "Mobile Application Part (MAP) specification".

[17] Void.

[18] Void.

[19] Void.

[20] GSM 09.06: "Digital cellular telecommunication system (Phase 2+); Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".

[21] 3G TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[22] GSM 09.08: "Digital cellular telecommunication system (Phase 2+); Application of the Base Station System management Application Part (BSSMAP) on the E-interface".

[23] 3G TS 29.010: "Information element mapping between Mobile Station - Base Station System and BSS - Mobile-services Switching Centre (MS - BSS - MSC) Signalling procedures and the Mobile Application Part (MAP)".

[24] 3G TS 29.011: "Signalling interworking for supplementary services".

[25] GSM 09.90: "Digital cellular telecommunication system (Phase 2+); Interworking between Phase 1 infrastructure and Phase 2+ Mobile Stations (MS)".

[26] ITU-T Series V Recommendations: "Data communication over the Telephone network".

[27] ITU-T Series V.42bis: "Data Compression for Data Circuit Terminating Equipment (DCE) using Error Correction Procedures".

[28] ITU-T Series X Recommendations: "Data Communication networks".

[29] ITU-T Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit - terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[30] ITU-T Recommendation X.150: "Data Communication Networks: Transmission, Signalling and Switching, Network Aspects, Maintenance and Administrative Arrangements".

[31] ITU-T Recommendation V.25bis: "Automatic Calling and/or Answering Equipment on the General Switched Telephone Network (GSTN) using the 100-Series Interchange Circuits".

[32] ITU-T Recommendation V.250: "Serial asynchronous automatic dialling and control".

[33] ITU-T Recommendation V.54: "Loop Test Devices for Modems".

[34] ITU-T Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[35] ITU-T Recommendation I.460-I.464: "ISDN Overall Network Aspects and Functions, User Network Interfaces".

[36] ITU-T Recommendation Q.931 (05/98): "DSS 1 - ISDN user network interface layer 3 specification for basic call control".

[37] ETR 018: "Integrated Services Digital Network (ISDN), Application of the BC-, HLC-, LLC-Information elements by terminals supporting ISDN services".

[38] ISO/IEC 6429: "Information technology - Control functions for coded character sets".

[39] Personal Computer Memory Card Association: "PCMCIA 2.1 or PC-Card 3.0 electrical specification or later revisions".

[40] IrDA "IrPHY Physical signalling standard".

[41] TIA-617: "Data Transmission Systems and Equipment - In-Band DCE Control".

[42] ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[43]   GSM 03.34:"Digital cellular telecommunication system (Phase 2+); High Speed Circuit Switched Data (HSCSD); Stage 2 Service description".

[44]   ISO/IEC 3309: "Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures - Frame structure".

[45]   IETF RFC 1662: "PPP in HDLC-like framing".

[46]   3G TS 21.905: "3G Vocabulary".

[47]   3G TS 25.990: "Vocabulary for UTRAN".

[48]   3G TS 25.322: "Radio Link Control (RLC) Protocol Specification".

[49]   3G TS 25.415: "UTRAN Iu interface user plane protocols".

[50]   Mobile Internet Access Forum: "PIAFS Specification Ver. 1.1, 2.1".

[51]   ITU-T Recommendation V.80: "In-band DCE control and synchronous data modes for asynchronous DTE".

8 Functions common to all interfaces

8.3 Terminal Compatibility Decision

The establishment of a mobile terminated connection depends on a positive decision on the terminal compatibility. The Mobile Station (MS) contributes to this process by performing (depending on the individual call set-up condition):

- a compatibility check;

- the selection of the appropriate terminal function; and

- the indication of compatibility requirements to the PLMN;

initiated by a call set-up request from the PLMN. The aforementioned functions shall be carried out as follows.

8.3.1 Compatibility Check

Annex B of 3G TS 24.008 applies, particularly paragraphs B.3, B.3.1 and B.3.2. As regards the therein mentioned user-to-user compatibility checking the following applies:

When the calling user requests a service with user-to-user compatibility significance indicated by the presence of HLC and LLC information element in the call set-up request, the MS shall check that the service supported by the called user matches concerning the contents of the HLC/LLC information element. If a mismatch is detected, then the MS shall reject the offered call using the cause No.88 "Incompatible Destination".

8.3.2 Selection of Appropriate Terminal Function

The MS shall select the appropriate terminal functions following a positive result of the compatibility check and/or forwarding the indication of compatibility requirements to the PLMN.

8.3.3 Indication of Compatibility Requirements to the PLMN

8.3.3.1 Indication in case of Mobile terminating calls

In support of:

- PSTN originated calls, and

- ISDN originated calls using 3.1 kHz audio Bearer Capability (BC), as well as

- ISDN originated calls using unrestricted digital Bearer Capability but not specifying all parameters for deducing a Bearer Service.

Mobile specific requirements to be dealt with in the Bearer Capability information element the call confirmed message has been introduced in the call control protocol (3G TS 24.008). This also allows for renegotiation of specific parameters at the beginning of the connection set-up process. The specific parameters are:

a) mobile specific requirements:

- Connection element (transparent/non transparent);

- Structure (note 1);

- Synchronous/Asynchronous (note 8);

- Rate adaptation/other rate adaptation (note 9);

- User information layer 2 protocol (note 1);

- Intermediate rate (note 2), (note 3);

- Modem Type (note 1), (note 3);

- User Rate (note 3);

- Compression ,

- Fixed network user rate, (note 3) (note 4);

- Other modem type, (note 3) (note 4);

- User initiated modification indication (note 4).

The following parameters are indicated by the MS to the network, only:

- Acceptable channel codings (note 5);

- Maximum number of traffic channels, (note 5);

- Wanted air interface user rate (note 6) (note 7);

- Asymmetry preference indication (note 7).

NOTE 1: This parameter is correlated with the value of the parameter connection element.

NOTE 2: For non-transparent services this parameter is correlated with the value of the parameter negotiation of intermediate rate requested.

NOTE 3: Modification of these parameters may be proposed by the MS. The Network may accept it or not.

NOTE 4: This parameter shall be included by the MS only in case it was received from the network.

NOTE 5: This parameter shall be included only in case the parameter 'fixed network user rate' is included.

NOTE 6: This parameter shall be included only for non-transparent services and in case the parameter 'fixed network user rate' is included.

NOTE 7: This parameter has to be included if EDGE channel coding(s) are included in Acceptable channel codings. In cases where this parameter would not otherwise be included, the value is set to 'Air interface user rate not applicable' or 'User initiated modification not requested' or "No preference".

NOTE 8: For FTM and PIAFS, this parameter may be negotiated as in Table B.4e. How the subscription for BS20 is assured, is an operator matter.

NOTE 9: For FTM, PIAFS or Multimedia, this parameter may be negotiated as in Table B.4f.

b) requirements with effects at the partner terminal:

- Number of data bits;

- Number of stop bits;

- Parity.

The MS indicates the radio channel requirement in the call confirmed message. If the MS indicates the support of "dual" (HR and FR channels) the final decision, which radio channel is chosen, is done by the network in an RR message. The radio channel requirement is ignored in UMTS, see Table B.5a in Annex B.

If the network proposes optional support of both transparent and non transparent connection elements but does not indicate a user information layer 2 protocol, the MS shall set the appropriate value, if choosing non transparent in the call confirmed message and out-band flow control is not requested, see B.1.1.2.

Additionally the values of the parameters structure, modem type and intermediate rate have to be set in conformance with the values of the parameters radio channel requirements, negotiation of intermediate rate requested and connection element.

Subclause B.1.1.2 and table B.1 in the annex B describe the negotiation procedure. Annex B table B.4 describes the selection of the modem type and the dependence on the value of the parameter connection element. Annex B table B.4 describes the selection of the intermediate rate and user rate and their dependence upon the value of the NIRR parameter and the equipment capabilities.

The following MT cases can be deduced from the individual call set-up request conditions:

   a) If the set-up does not contain a BC information element, the MS in the call confirmed message shall include any BC information (single or multiple BC-IE). In case of multiple BC-IEs one BC-IE must indicate the information transfer capability "speech". A speech BC-IE together with a 3.1kHz multimedia BC-IE indicates the support of a fallback to speech (ref. to TS 29.007 and TS 24.008).

   b) If the set-up message contains a single BC-IE, the MS in the call confirm message shall use either a single BC-IE, if it wants to negotiate mobile specific parameter values, or, unless otherwise specified in annex B, no BC-IE, if it agrees with the requested ones.

   c) If the set-up contains a multiple BC-IE, the MS in the call confirmed message shall use either a multiple BC-IE, if it wants to negotiate mobile specific parameter values, or, unless otherwise specified in annex B, no BC-IE, if it agrees with the requested ones. In case of a 3.1kHz multimedia setup the MS can either accept the possibility of a fallback to speech by responding with two BC-IEs or with no BC-IEs or turn the call to a speech call by sending only a speech BC-IE in the call confirm message or turn the call to a multimedia only call (i.e. no fallback to speech allowed) by sending only a multimedia BC-IE in the call confirm message. Alternatively a single BC-IE containing fax group 3 only shall be used if a multiple BC-IE requesting speech alternate fax group 3 is received and the MS is not able to support the speech capability. Annex B, table B.7, describes the negotiation rules.

If the BC-IE contains 3.1 kHz ex PLMN, the MS is allowed to negotiate all mobile specific parameter values listed above. If the BC-IE contains facsimile group 3, the MS is allowed to negotiate the connection element (transparent/non transparent) only. In any case, if the set-up message requests a "single service", the MS must not answer in the call confirmed message requesting a "dual service" and vice versa.

However, for dual services with repeat indicator set to circular (alternate) the MS may change the sequence of dual BC-IEs within the call confirmed message (preceded by the same value of the repeat indicator), if it wants to start with a different Bearer Capability than proposed by the network as the initial one.

In addition, the MS may propose to the network to modify User Rate, Modem Type and Intermediate Rate in the CALL CONFIRMED message. The network may accept or release the call.

If the BC-IE received from the network contains the parameters 'fixed network user rate', 'other modem type' and possibly the 'user initiated modification', the MS can either:

   a) if in GSM, discard these parameters, or

   b) include the possibly modified values for the 'fixed network user rate' and 'other modem type' in the BC-IE of the call confirmed message. The network might accept or reject the modified values. In this case the MS shall also include the parameters 'maximum number of traffic channels' and 'acceptable channel codings'. Additionally for non-transparent services, the MS shall also include the parameters 'wanted air interface user rate' and the 'user initiated modification indication'.

In case a),The MS shall use the fall-back bearer service indicated by the remaining parameters of the BC-IE on a single slot configuration (reference GSM 04.21).

In GSM case b), a single slot configuration shall be used by the MS, in case the 'maximum number of traffic channels' is set to "1 TCH" and the 'user initiated modification indication' is set either to "user initiated modification not required" or to "user initiated modification up to 1TCH may be requested"; other wise the MS shall use a multislot configuration (reference GSM 04.21).

In case the 'acceptable channel codings' is indicated by the MS, the decision which channel coding is used is done by the network and indicated to the mobile station with an RR message. This RR message may also assign an asymmetric channel coding. The 'acceptable channel codings' parameter takes precedence over the 'negotiation of intermediate rate

requested' parameter for non-transparent services. Also the intermediate rate and user rate per traffic channel in a multislot configuration are not indicated by the 'intermediate rate' and 'user rate' parameters of the BC-IE, but depend on the chosen channel coding only.

If the parameters 'fixed network user rate', 'other modem type' were not included in the BC-IE received, or no BC-IE was received, the MS shall not include these parameters in the CALL CONFIRMED message (i.e. octets 6d, 6e, 6f, and 6g ref. to 3G TS 24.008).

If FNUR = 33.6 kbit/s is agreed on in the setup of a 3.1 kHz multimedia call, the modems may handshake to 31.2 or 28.8 kbit/s. In this case the MS receives a MODIFY message from the MSC ~~IWF~~ to indicate the new data rate, and shall respond with a MODIFY COMPLETE message (ref. to 3GTS 24.008), if it supports the requested modification. If the MS does not support the requested modification, it shall respond with a MODIFY REJECT message. The MT shall indicate the new data rate to the TE (e.g. using the ITU-T V.80 inband signaling) in order to cause the TE to use stuffing ~~lag stuffing is used~~ to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the TE and IWF.

8.3.3.2   Indication in case of Mobile originating calls

In support of mobile originating calls the values of BC-IE parameters are requested in the set-up message from the MS. If the MS indicates the support of both transparent and non transparent connection elements the network shall return its choice in the call proceeding message. The MS is not allowed to indicate support of both transparent and non transparent, if the MS also requests out-band flow control, i.e. it does not indicate a layer 2 protocol.

Additionally the value of the parameter modem type has to be set depending on the value of the parameter connection element as described in annex B, table B.4a.

The set-up message contains a single or multiple BC-IE. In case of multiple BC-IEs one BC-IE must indicate the information transfer capability "speech".

In case of a multimedia call the setup message contains either a multimedia BC-IE indicating a multimedia only call request (i.e. no fallback to speech allowed) or both a speech BC-IE and a 3.1kHz multimedia BC-IE to indicate the support/request of a fallback to speech (ref. to TS 29.007 and TS 24.008).

If the set-up message requests a "single service", the network must not answer in the call proceeding message requesting a "dual service" and vice versa. Alternatively the network shall answer with a single BC-IE containing fax group 3 if a multiple BC-IE requesting speech alternate fax group 3 is received but the network does not allow the use of this alternate service. Annex B, table B.7, describes the negotiation rules. If the MS requests a "dual service" the network is not allowed to change the sequence of the service.

If the set-up message is indicates that negotiation of intermediate rate is requested then the network shall behave as described in annex B, table B.4b.

Unless otherwise specified in annex B, if no BC-IE parameter needs negotiation it is up to the network if it sends a CALL PROC message (with or without a BC-IE) towards the MS or not.

For multislot, TCH/F14.4, and EDGE operations and in UMTS the MS shall include an appropriate set of the parameters 'fixed network user rate', 'other modem type', 'maximum number of TCH' and 'acceptable channel codings' in the BC-IE of the SETUP message. If EDGE channel coding(s) are included in ACC in case of transparent calls, the 'Wanted air interface user rate'-parameter shall be set to 'Air interface user rate not applicable' and the 'User initiated modification indication'-parameter to 'User initiated modification not requested'. In a non-transparent multislot operation, the MS shall also include the parameters 'wanted air interface user rate' and 'user initiated modification indication' in the BC-IE of the SETUP message. In a non-transparent TCH/F14.4 or EDGE operation or in UMTS the MS shall also include the parameter 'wanted air interface user rate'. In non-transparent EDGE operation the MS shall also include the parameter 'asymmetry preference indication'. It shall also set the other parameters of the BC-IE (i.e. 'user rate') to values identifying fall-back values. Depending on the network two situations can be distinguished:

a) The network supports the requested operation:

In this case the network must include the parameter 'fixed network user rate', 'other modem type' and possibly 'user initiated modification' in the BC-IE(s) of the CALL PROCEEDING message, irrespective whether or not they contain modified values or just a copy of the received ones.

The 'acceptable channel codings' indicated by the MS in the SETUP message takes precedence over the 'negotiation of intermediate rate requested' parameter for non-transparent services. The intermediate rate per

traffic channel and the user rate per traffic channel is dependent on the chosen channel coding only. The chosen channel coding is indicated to the mobile station by the network with an RR message.

b) The network does not support the requested operation:

In this case, in GSM, the BC-IE of the CALL PROCEEDING message will not contain the parameters fixed network user rate' and 'other modem type' or no BC-IE will be included in the CALL PROCEEDING message at all. The mobile station shall then discard the parameters 'fixed network user rate', 'other modem type', 'maximum number of TCH', 'acceptable channel codings' 'wanted air interface user rate' and 'user initiated modification indication' sent with the SETUP message and apply the fall-back bearer service.

In case a), a single slot configuration shall be used by the MS, in case the 'maximum number of traffic channels' is set to "1 TCH" and the 'user initiated modification indication' is set either to "user initiated modification not requested" or to "user initiated modification up to 1TCH may be requested".

In case b), The MS shall use the fall-back bearer service indicated by the remaining parameters of the BC-IE on a single slot configuration (reference GSM 04.21).

~~If FNUR = 33.6 kbit/s is agreed on in the setup of a 3.1 kHz multimedia call, the modems may handshake to 31.2 or 28.8 kbit/s. In this case the MS receives a MODIFY message from the MSC IWF to indicate the new data rate, and shall respond with a MODIFY COMPLETE message (ref. to TS 24.008). lag stuffing is used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the mobile station and the IWF.~~

If FNUR = 33.6 kbit/s is agreed on in the setup of a 3.1 kHz multimedia call, the modems may handshake to 31.2 or 28.8 kbit/s. In this case the MS receives a MODIFY message from the MSC to indicate the new data rate, and shall respond with a MODIFY COMPLETE message (ref. to 3GTS 24.008), if it supports the requested modification. If the MS does not support the requested modification, it shall respond with a MODIFY REJECT message. The MT shall indicate the new data rate to the TE (e.g. using the ITU-T V.80 inband signaling) in order to cause the TE to use stuffing to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the TE and IWF.

8.3.3.3   Differences in validity of BC parameter values in GSM and UMTS

The validity of a BC parameter value, either in the SETUP or CALL CONFIRM message, may differ from GSM to UMTS. Certain parameters are irrelevant in UMTS and any value given is valid and ignored. These parameters may be available in the BC IE. For those parameters that are relevant in UMTS and GSM, certain values may be invalid in one of the systems. Invalid parameter values may cause rejection of the BC and subsequent release of the call.

Parameters that are ignored in UMTS may be set to default values, or to specific values in view of an eventual handover to GSM. Parameter values that are invalid in one system may result in unsuccessful handover from the other system.

Table B.5a in Annex B, lists parameters that are ignored in UMTS and parameter values which validity is different in GSM and UMTS.

8.4   Test Loops

In principle, both V.-series and X.-series interfaces allow for an activation of local or remote test loops by the terminal (ref. ITU-T V.54/X.150). A comprehensive solution of such test loops in a PLMN system has to consider the special conditions of the interface between the terminal (part of the MS) and the transmission equipment (part of the modem pool of a particular IWF within the MSC). In addition, the impact of the radiolink is to be taken into account with respect to the test objectives. Due to those special conditions a PLMN system is not capable to support remote test loops. It is an implementation choice to what extent the activation of local test loops by the terminal is supported in the MT.

8.5   Alternate speech/facsimile group 3

Editor's note: V.25bis is outdated. References to V.25 bis procedures need to replaced by corresponding procedures based on V.250 and 3G TS 27.007.

These alternate services may be initiated by either V.25 bis or manual procedures. In the former case, standard call establishment procedures will apply. In the latter case, CT106, CT107, CT108.2 and CT109 are in the OFF condition.

Selection of the data phase (from the speech phase) will be by manual intervention via the MS causing ICM by means of CT108.2 going to ON condition, refer to GSM 03.45 or 3G TS 23.146. The ensuing data phase shall follow all the operational procedures as described in 3G 27-series.

Selection of the speech phase (from the data phase) will be by manual intervention via the MS causing ICM (phone off-hook condition at the MT and data call end condition at the TE).

During the ensuing speech phases, CT107, CT106 and CT109 will be maintained in the OFF condition.

Subsequent re-selection of the data phase will be by manual intervention via the MS causing CT108.2 going to ON condition initiating ICM. At this point, re-synchronization will take place as described in subclause 8.1 above.

8.6 Multislot configuration split/combine function

In multislot configurations using multiple parallel channels the data flow is split into substreams between the Spit/Combine-function in the TAF and the network.

8.6.1 Non-transparent data

In non-transparent data operations the N(S)-numbering in the RLP-header is used for controlling the order of the data in the substreames (reference 3G TS 24.022).

8.6.2 Transparent data

In transparent multislot configurations (TCH/F9.6 or TCH/F4.8) status bits S1, S3 and the X-bit between the D12 and D13 are used for transferring substream numbering information. This S4-bit is used for frame synchronization between the parallel substreames (reference GSM 04.21).

In case of a transparent multislot configuration using TCH/F14.4 channel coding, bit M1 in the 290-bit radio interface block is used for frame synchronization between the parallel substreams, whereas bit M2 carries status information, NIC codes and substream numbering as described in GSM 04.21.

In transparent TCH/F28.8 channels, bits M1 and M2 are used as described above for transparent TCH/F14.4 channels.

8.7 EDGE multiplexing function

In EDGE configurations the number of channels across the air interface and that of substreams between BTS and MSC do not necessarily match. In such cases a multiplexing function is included at MS and BTS (GSM 04.21 and GSM 08.20). These functions distribute data between the substreams and radio channels.

8.8 Seamless data rate change

If the modems change the data rate during an ongoing multimedia call (using the ITU-T V.34 seamless data rate change mechanism), the MSC initiates a MODIFY message (ref. to 3GTS 24.008) to indicate the new data rate to the MS. The MT shall indicate the new data rate to the TE (e.g. using the ITU-T V.80 inband signaling) in order to cause the TE to use stuffing to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the TE and IWF.

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29.007	**CR**	**026**	Current Version:	3.5.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to:	TSG_N #9	for approval	**X**		strategic		*(for SMG*
list expected approval meeting # here ↑		for information			non-strategic		*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

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Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network **X**
(at least one should be marked with an X)

Source:	TSG_N3		**Date:**	28/08/00

Subject: 3.1 kHz multimedia calls at 33.6 kbit/s data rate

Work item: Technical enhancements and improvements (TEI)

Category:
F   Correction
A   Corresponds to a correction in an earlier release   **X**
B   Addition of feature
C   Functional modification of feature
D   Editorial modification

(only one category
Shall be marked
With an X)

Release:
Phase 2
Release 96
Release 97
Release 98
Release 99
Release 00   **X**

Reason for change: The 3.1 kHz multimedia service at the specified setup rate of 33.6 kbit/s is made usable.

Clauses affected: 2 and 9.4

Other specs	Other 3G core specifications	**X**	→ List of CRs:	23.910 CR014, 24.008, 27.001 CR 039
Affected:	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

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2　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.

[1]　　　ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

[2]　　　ITU-T Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".

[3]　　　ITU-T Recommendation I.464: "Multiplexing, rate adaption and support of existing interfaces for restricted 64 kbit/s transfer capability".

[4]　　　ITU-T Recommendation Q.922 (1992): "DSS 1 Data link layer: ISDN data link layer specification for frame mode bearer services".

[5]　　　ITU-T Recommendation Q.931 (05/98): "DSS 1 - ISDN user network interface layer 3 specification for basic call control".

[6]　　　ITU-T Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[7]　　　ITU-T Recommendation V.24: "List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)".

[8]　　　ITU-T Recommendation V.25: "Automatic answering equipment and/or parallel automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls".

[9]　　　ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".

[10]　　　ITU-T Recommendation V.32bis: "A duplex modem operating at data signalling rates of up to 14 400 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits"

[11]　　　ITU-T Recommendation V.34: "A modem operating at data signalling rates of up to 33 600 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits".

[12]　　　ITU-T Recommendation V.42: "Error-correcting procedures for DCEs using asynchronous-to-synchronous conversion".

[13]　　　ITU-T Recommendation V.42bis: "Data Compression for Data Circuit Terminating Equipment (DCE) using Error Correction Procedures".

[14]　　　ITU-T Recommendation V.90: "A digital modem and analogue modem pair for use on the Public Switched Telephone Network (PSTN) at data signalling rates of up to 56 000 bit/s downstream and up to 33 600 bit/s upstream".

[15]　　　ITU-T Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[16]   ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[17]   ETR 018: "Integrated Services Digital Network (ISDN); Application of the Bearer Capability (BC), High Layer Compatibility (HLC) and Low Layer Compatibility (LLC) information elements by terminals supporting ISDN services".

[18]   ETS 300 102-1 Edition 1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[19]   EN 300 403-1 V1.2.2 (1998-04): "Integrated Services Digital Network (ISDN); Digital Sunscriber Signalling System No. One (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification".

[20]   GSM 01.01: "Digital cellular telecommunication system (Phase 2+); GSM Release 1999 Specifications".

[21]   GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[22]   GSM 02.01: "Digital cellular telecommunication system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[23]   GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[24]   GSM 03.10: "Digital cellular telecommunications system (Phase 2+); GSM PLMN Connection types".

[25]   GSM 03.45: "Digital cellular telecommunications system (Phase 2+); Technical realization of facsimile group 3 transparent".

[26]   GSM 03.50: "Digital cellular telecommunications system (Phase 2+); Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system".

[27]   GSM 04.21: "Digital cellular telecommunications system (Phase 2+); Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".

[28]   GSM 08.20: "Digital cellular telecommunication system (Phase 2+); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[29]   GSM 08.60: "Digital cellular telecommunications system (Phase 2+); Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels".

[30]   GSM 09.02 version 3.x.y: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[31]   GSM 09.03: "Digital cellular telecommunication system (Phase 2+); Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".

[32]   3G TS 21.101: "3rd Generation Partnership Project; Technical Specification Group: Release 1999 Specifications".

[33]   3G TS 22.002: " Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[34]   3G TS 22.004: "General on supplementary services".

[35]   3G TS 23.003: "Numbering, addressing and identification".

[36]   3G TS 23.008: "Organization of subscriber data".

[37]   3G TS 23.011: "Technical realization of supplementary services".

[38]   3G TS 23.046: "Technical realization of facsimile group 3 non-transparent".

[39]   3G TS 23.054: "Description for the use of a Shared Inter Working Function in a GSM PLMN; Stage 2".

[40]   3G TS 24.008: " Mobile radio interface layer 3 specification".

[41]   3G TS 24.022: "Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[42]   3G TS 25.415: "Iu Interface CN-UTRAN User Plane Protocols".

[43]   3G TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[44]   3G TS 27.002: "Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

[45]   3G TS 27.003: "Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[46]   3G TS 29.002: "Mobile Application Part (MAP) specification".

[47]   3G TS 29.006: "Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".

[48]   ISO/IEC 3309: "Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures - Frame structure".

[49]   IETF RFC 1662: "PPP in HDLC-like framing".

[50]   Mobile Internet Access Forum: "PIAFS Specification Ver. 1.1, 2.1".

[51]   ITU-T Recommendation V.8: "Procedures for starting sessions of data transmission over the public switched telephone network".

[52]   TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324".

[53]   3G TR 23.910: " Circuit Switched Data Bearer Services".

[54]   ITU-T Recommendation H.223: "Multiplexing protocol for low bit rate multimedia communication".

[55]   ITU-T Recommendation H.223, Annex A: "Multiplexing protocol for low bit rate multimedia communication over low error-prone channels".

[56]   ITU-T Recommendation H.223, Annex B: "Multiplexing protocol for low bit rate multimedia communication over moderate error-prone channels".

[57]   ITU-T Recommendation H.223, Annex C: "Multiplexing protocol for low bit rate multimedia communication over highly error-prone channels".

[58]   ITU-T Recommendation H.324: "Terminal for low bit-rate multimedia communication".

9.4 3G-H.324/M calls over 3.1kHz audio

In case of 3G-H.324/M calls over 3.1kHz audio, the IWF shall provide the V.34 modem modulation and the V.8 procedure with the indication of H.324 support in the call function category of the V.8 handshaking. H.223 & H.245 flow is not terminated in the modem function.

The performance of V.8bis by the modem function is FFS.

9.4.1 Mobile originated multimedia call

9.4.1.1 Call setup

The setup message sent by the MS contains either a multimedia BC-IE indicating a multimedia only call request (i.e. no fallback to speech allowed) or both a speech BC-IE and a 3.1kHz multimedia BC-IE to indicate the support of a fallback to speech (ref. to TS 27.001 and TS 24.008).

The MSC shall not accept a requested service to which the user has no subscription. On the condition the user has the required subscriptions (i.e. to multimedia and/or speech) the following applies:

- In case of a multimedia only BC-IE the MSC may accept the setup as such or with modifications sent to the MS in the call proceeding message (ref. to TS 27.001).

- In case of both a speech BC-IE and a 3.1kHz multimedia BC-IE the MSC may either accept the possibility of a fallback to speech by responding with two BC-IEs or with no BC-IEs or turn the call to a speech call by sending only a speech BC-IE in the call confirm message or turn the call to a multimedia only call by sending only a multimedia BC-IE in the call confirm message (Ref. to TS 27.001).

The IWF V.34 modem shall initiate the ITU-T V.8 handshaking and indicate the support of H.324/M in the call function category of the V.8 handshaking. If the called party's modem does not indicate a H.324 support in its V.8 inband signalling response, the IWF may clear the call. If the called party responds with a modem answering tone but there is no V.8 response at all, the IWF shall clear the call.

If FNUR = 33.6 kbit/s is agreed on in the setup, the IWF shall configure its V.34 modem to operate in automode with an upper data rate limit of 33.6 kbit/s and a lower data rate limit of 28.8 kbit/s. If the modems handshake to 31.2 or 28.8 kbit/s, the MSC shall initiates a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. If the MS responds with a MODIFY COMPLETE message, HDLC flag stuffing or the stuffing mode defined in ITU-T recommendation H.223 (Annexes A, B and C) isshall be used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. In order to be able to use the correct stuffing pattern, the IWF shall detect the stuffing mode patterns exchanged between the multimedia terminals after the traffic channel setup (ref. to ITU-T recommendation H.324). The IWF may start the stuffing immediately after the detection of the used method. In downlink stuffing the IWF inserts stuffing patterns between the H.223 frames. In uplink stuffing the IWF removes stuffing patterns from between the H.223 frames received from the MS. If the MS responds with a MODIFY REJECT message, the MSC shall clears the call.

9.4.1.2 Fallback to speech after setup

If the MSC has accepted the possibility of a fallback to speech and the IWF modem does not recognize the answering tone of the called modem within the expiration of a timer started at the reception of the answer message, the MSC IWF shall initiate an In Call Modification procedure (ref. to TS 24.008) in order to fall back to a speech mode. As a result of the procedure the IWF resource shall be released and a speech channel shall be set up between the calling MS and the fixed network. If the fallback fails e.g. due to a failing In Call Modification procedure, the IWF shall clear the call.

A recommended minimum value for the timer is 3 seconds (ref. to the ITU-T V.25 recommendation).

9.4.2　Mobile terminated multimedia call

9.4.2.1　Call setup

If the user has a subscription to both the multimedia bearer service and the speech teleservice and if the network supports both services and the fallback functionality, the MSC shall send both a multimedia BC-IE and a speech BC-IE in the setup message to the mobile station. If the user has a subscription only to the multimedia bearer service the MSC shall send only a multimedia BC-IE.

In case of both a speech BC-IE and a 3.1 kHz multimedia BC-IE in the setup the mobile station may either accept the possibility of a fallback to speech by responding with two BC-IEs or with no BC-IEs or turn the call to a speech call by sending only a speech BC-IE in the call confirm message or to a multimedia only call (i.e. no fallback to speech allowed) by sending only a multimedia BC-IE in the call confirm message. In case of a multimedia only BC-IE in the setup the MS may accept the setup as such or with modifications sent to the MSC in the call confirm message.

If no service definition is available in the network, the MSC shall send no BC-IE(s) to the mobile station in the call setup. The MSC shall perform a subscription check to the multimedia and/or speech service(s) requested by the mobile station in the call confirm message and shall not accept a requested service to which the user has no subscription.

The IWF V.34 modem shall await the ITU-T V.8 handshaking to be initiated by the calling party's modem and shall recognize the support of H.324 in the call function category of the incoming V.8 handshaking. If the calling party's modem does not indicate a H.324 support in its V.8 inband signalling, the IWF may clear the call. If the calling modem tries to handshake another than V.34 modem scheme, the IWF shall clear the call.

~~If FNUR = 33.6 kbit/s is agreed on in the setup, the IWF configures its V.34 modem to operate in automode with an upper data rate limit o 33.6 kbit/s and a lower data rate limit of 28.8 kbit/s. If the modems handshake to 31.2 or 28.8 kbit/s, the MSC IWF initiates a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. If the MS responds with a MODIFY COMPLETE message, flag stuffing is used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. If the MS responds with a MODIFY REJECT message, the MSC IWF clears the call.~~

If FNUR = 33.6 kbit/s is agreed on in the setup, the IWF shall configure its V.34 modem to operate in automode with an upper data rate limit of 33.6 kbit/s and a lower data rate limit of 28.8 kbit/s. If the modems handshake to 31.2 or 28.8 kbit/s, the MSC shall initiate a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. HDLC flag stuffing or the stuffing mode defined in ITU-T recommendation H.223 (Annexes A, B and C) shall be used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. In order to be able to use the correct stuffing pattern, the IWF shall detect the stuffing mode patterns exchanged between the multimedia terminals after the traffic channel setup (ref. to ITU-T recommendation H.324). The IWF may start the stuffing immediately after the detection of the used method. In downlink stuffing the IWF inserts stuffing patterns between the H.223 frames. In uplink stuffing the IWF removes stuffing patterns from between the H.223 frames received from the MS. If the MS responds with a MODIFY REJECT message, the MSC shall clear the call.

9.4.2.2　Fallback to speech after setup

If the MSC supports a fallback to speech and the user has a subscription to the speech service and the mobile station accepts the possibility of a fallback to speech in the call confirm message and the IWF modem does not recognize a call tone nor a V.8 Call Indication nor a V.8 Call Menu within the expiration of a timer started at the sending of the ANSam answer tone (i.e. the calling party is not a V.34 modem), the IWF shall initiate an In Call Modification procedure (ref. to TS 24.008) in order to fall back to a speech mode. As a result of the procedure the IWF resource shall be released and a speech channel shall be set up between the called MS and the fixed network. If the fallback fails e.g. due to a missing subscription to speech or a failing In Call Modification procedure, the IWF shall clear the call.

A recommended minimum timer value is 3 seconds (ref. to the ITU-T V.8 recommendation).

9.4.3　Seamless data rate change

If the modems change the data rate during an ongoing multimedia call (using the ITU-T V.34 seamless data rate change mechanism), the MSC ~~IWF~~ shall initiate~~s~~ a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. ~~lag stuffing is used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and~~

~~the IWF.~~ HDLC flag stuffing or the stuffing mode defined in ITU-T recommendation H.223 (Annexes A, B and C) shall be used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. The stuffing pattern found out during the traffic channel setup (ref. to subclauses Call setup) is used. The IWF may start the stuffing immediately after the detection of the data rate change by the modems.

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29.007	CR	**027**	Current Version:	3.5.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to:	TSG_N #9	for approval	**X**	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic		*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM ☐ ME **X** UTRAN / Radio ☐ Core Network **X**
(at least one should be marked with an X)

Source:	TSG_N3		**Date:**	28/08/00

Subject:	3.1 kHz multimedia calls at 33.6 kbit/s data rate

Work item:	Technical enhancements and improvements (TEI)

Category:

	F	Correction	**X**	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
Shall be marked	C	Functional modification of feature			Release 98	
With an X)	D	Editorial modification			Release 99	**X**
					Release 00	

Reason for change:	The 3.1 kHz multimedia service at the specified setup rate of 33.6 kbit/s is made usable.

Clauses affected:	2 and 9.4

Other specs Affected:	Other 3G core specifications	**X**	→ List of CRs:	23.910 CR014, 24.008 CR, 27.001 CR039
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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2 References

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- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

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[1]   ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

[2]   ITU-T Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".

[3]   ITU-T Recommendation I.464: "Multiplexing, rate adaption and support of existing interfaces for restricted 64 kbit/s transfer capability".

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[9]   ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".

[10]   ITU-T Recommendation V.32bis: "A duplex modem operating at data signalling rates of up to 14 400 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits"

[11]   ITU-T Recommendation V.34: "A modem operating at data signalling rates of up to 33 600 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits".

[12]   ITU-T Recommendation V.42: "Error-correcting procedures for DCEs using asynchronous-to-synchronous conversion".

[13]   ITU-T Recommendation V.42bis: "Data Compression for Data Circuit Terminating Equipment (DCE) using Error Correction Procedures".

[14]   ITU-T Recommendation V.90: "A digital modem and analogue modem pair for use on the Public Switched Telephone Network (PSTN) at data signalling rates of up to 56 000 bit/s downstream and up to 33 600 bit/s upstream".

[15]   ITU-T Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[16]   ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[17]   ETR 018: "Integrated Services Digital Network (ISDN); Application of the Bearer Capability (BC), High Layer Compatibility (HLC) and Low Layer Compatibility (LLC) information elements by terminals supporting ISDN services".

[18]   ETS 300 102-1 Edition 1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[19]   EN 300 403-1 V1.2.2 (1998-04): "Integrated Services Digital Network (ISDN); Digital Sunscriber Signalling System No. One (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification".

[20]   GSM 01.01: "Digital cellular telecommunication system (Phase 2+); GSM Release 1999 Specifications".

[21]   GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[22]   GSM 02.01: "Digital cellular telecommunication system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[23]   GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[24]   GSM 03.10: "Digital cellular telecommunications system (Phase 2+); GSM PLMN Connection types".

[25]   GSM 03.45: "Digital cellular telecommunications system (Phase 2+); Technical realization of facsimile group 3 transparent".

[26]   GSM 03.50: "Digital cellular telecommunications system (Phase 2+); Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system".

[27]   GSM 04.21: "Digital cellular telecommunications system (Phase 2+); Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".

[28]   GSM 08.20: "Digital cellular telecommunication system (Phase 2+); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[29]   GSM 08.60: "Digital cellular telecommunications system (Phase 2+); Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels".

[30]   GSM 09.02 version 3.x.y: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[31]   GSM 09.03: "Digital cellular telecommunication system (Phase 2+); Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".

[32]   3G TS 21.101: "3rd Generation Partnership Project; Technical Specification Group: Release 1999 Specifications".

[33]   3G TS 22.002: " Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[34]   3G TS 22.004: "General on supplementary services".

[35]   3G TS 23.003: "Numbering, addressing and identification".

[36]   3G TS 23.008: "Organization of subscriber data".

[37]   3G TS 23.011: "Technical realization of supplementary services".

[38]   3G TS 23.046: "Technical realization of facsimile group 3 non-transparent".

[39]   3G TS 23.054: "Description for the use of a Shared Inter Working Function in a GSM PLMN; Stage 2".

[40]   3G TS 24.008: " Mobile radio interface layer 3 specification".

[41]   3G TS 24.022: "Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[42]   3G TS 25.415: "Iu Interface CN-UTRAN User Plane Protocols".

[43]   3G TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[44]   3G TS 27.002: "Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

[45]   3G TS 27.003: "Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[46]   3G TS 29.002: "Mobile Application Part (MAP) specification".

[47]   3G TS 29.006: "Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".

[48]   ISO/IEC 3309: "Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures - Frame structure".

[49]   IETF RFC 1662: "PPP in HDLC-like framing".

[50]   Mobile Internet Access Forum: "PIAFS Specification Ver. 1.1, 2.1".

[51]   ITU-T Recommendation V.8: "Procedures for starting sessions of data transmission over the public switched telephone network".

[52]   TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324".

[53]   3G TR 23.910: " Circuit Switched Data Bearer Services".

[54]   ITU-T Recommendation H.223: "Multiplexing protocol for low bit rate multimedia communication".

[55]   ITU-T Recommendation H.223, Annex A: "Multiplexing protocol for low bit rate multimedia communication over low error-prone channels".

[56]   ITU-T Recommendation H.223, Annex B: "Multiplexing protocol for low bit rate multimedia communication over moderate error-prone channels".

[57]   ITU-T Recommendation H.223, Annex C: "Multiplexing protocol for low bit rate multimedia communication over highly error-prone channels".

[58]   ITU-T Recommendation H.324: "Terminal for low bit-rate multimedia communication".

9.4   3G-H.324/M calls over 3.1kHz audio

In case of 3G-H.324/M calls over 3.1kHz audio, the IWF shall provide the V.34 modem modulation and the V.8 procedure with the indication of H.324 support in the call function category of the V.8 handshaking. H.223 & H.245 flow is not terminated in the modem function.

The performance of V.8bis by the modem function is FFS.

9.4.1   Mobile originated multimedia call

9.4.1.1   Call setup

The setup message sent by the MS contains either a multimedia BC-IE indicating a multimedia only call request (i.e. no fallback to speech allowed) or both a speech BC-IE and a 3.1kHz multimedia BC-IE to indicate the support of a fallback to speech (ref. to TS 27.001 and TS 24.008).

The MSC shall not accept a requested service to which the user has no subscription. On the condition the user has the required subscriptions (i.e. to multimedia and/or speech) the following applies:

- In case of a multimedia only BC-IE the MSC may accept the setup as such or with modifications sent to the MS in the call proceeding message (ref. to TS 27.001).

- In case of both a speech BC-IE and a 3.1kHz multimedia BC-IE the MSC may either accept the possibility of a fallback to speech by responding with two BC-IEs or with no BC-IEs or turn the call to a speech call by sending only a speech BC-IE in the call confirm message or turn the call to a multimedia only call by sending only a multimedia BC-IE in the call confirm message (Ref. to TS 27.001).

The IWF V.34 modem shall initiate the ITU-T V.8 handshaking and indicate the support of H.324/M in the call function category of the V.8 handshaking. If the called party's modem does not indicate a H.324 support in its V.8 inband signalling response, the IWF may clear the call. If the called party responds with a modem answering tone but there is no V.8 response at all, the IWF shall clear the call.

If FNUR = 33.6 kbit/s is agreed on in the setup, the IWF shall configure its V.34 modem to operate in automode with an upper data rate limit of 33.6 kbit/s and a lower data rate limit of 28.8 kbit/s. If the modems handshake to 31.2 or 28.8 kbit/s, the MSC shall initiates a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. If the MS responds with a MODIFY COMPLETE message, HDLC flag stuffing or the stuffing mode defined in ITU-T recommendation H.223 (Annexes A, B and C) isshall be used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. In order to be able to use the correct stuffing pattern, the IWF shall detect the stuffing mode patterns exchanged between the multimedia terminals after the traffic channel setup (ref. to ITU-T recommendation H.324). The IWF may start the stuffing immediately after the detection of the used method. In downlink stuffing the IWF inserts stuffing patterns between the H.223 frames. In uplink stuffing the IWF removes stuffing patterns from between the H.223 frames received from the MS. If the MS responds with a MODIFY REJECT message, the MSC shall clears the call.

9.4.1.2   Fallback to speech after setup

If the MSC has accepted the possibility of a fallback to speech and the IWF modem does not recognize the answering tone of the called modem within the expiration of a timer started at the reception of the answer message, the MSC IWF shall initiate an In Call Modification procedure (ref. to TS 24.008) in order to fall back to a speech mode. As a result of the procedure the IWF resource shall be released and a speech channel shall be set up between the calling MS and the fixed network. If the fallback fails e.g. due to a failing In Call Modification procedure, the IWF shall clear the call.

A recommended minimum value for the timer is 3 seconds (ref. to the ITU-T V.25 recommendation).

9.4.2   Mobile terminated multimedia call

9.4.2.1   Call setup

If the user has a subscription to both the multimedia bearer service and the speech teleservice and if the network supports both services and the fallback functionality, the MSC shall send both a multimedia BC-IE and a speech BC-IE in the setup message to the mobile station. If the user has a subscription only to the multimedia bearer service the MSC shall send only a multimedia BC-IE.

In case of both a speech BC-IE and a 3.1 kHz multimedia BC-IE in the setup the mobile station may either accept the possibility of a fallback to speech by responding with two BC-IEs or with no BC-IEs or turn the call to a speech call by sending only a speech BC-IE in the call confirm message or to a multimedia only call (i.e. no fallback to speech allowed) by sending only a multimedia BC-IE in the call confirm message. In case of a multimedia only BC-IE in the setup the MS may accept the setup as such or with modifications sent to the MSC in the call confirm message.

If no service definition is available in the network, the MSC shall send no BC-IE(s) to the mobile station in the call setup. The MSC shall perform a subscription check to the multimedia and/or speech service(s) requested by the mobile station in the call confirm message and shall not accept a requested service to which the user has no subscription.

The IWF V.34 modem shall await the ITU-T V.8 handshaking to be initiated by the calling party's modem and shall recognize the support of H.324 in the call function category of the incoming V.8 handshaking. If the calling party's modem does not indicate a H.324 support in its V.8 inband signalling, the IWF may clear the call. If the calling modem tries to handshake another than V.34 modem scheme, the IWF shall clear the call.

~~If FNUR = 33.6 kbit/s is agreed on in the setup, the IWF configures its V.34 modem to operate in automode with an upper data rate limit o 33.6 kbit/s and a lower data rate limit of 28.8 kbit/s. If the modems handshake to 31.2 or 28.8 kbit/s, the MSC IWF initiates a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. If the MS responds with a MODIFY COMPLETE message, flag stuffing is used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. If the MS responds with a MODIFY REJECT message, the MSC IWF clears the call.~~

If FNUR = 33.6 kbit/s is agreed on in the setup, the IWF shall configure its V.34 modem to operate in automode with an upper data rate limit of 33.6 kbit/s and a lower data rate limit of 28.8 kbit/s. If the modems handshake to 31.2 or 28.8 kbit/s, the MSC shall initiate a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. HDLC flag stuffing or the stuffing mode defined in ITU-T recommendation H.223 (Annexes A, B and C) shall be used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. In order to be able to use the correct stuffing pattern, the IWF shall detect the stuffing mode patterns exchanged between the multimedia terminals after the traffic channel setup (ref. to ITU-T recommendation H.324). The IWF may start the stuffing immediately after the detection of the used method. In downlink stuffing the IWF inserts stuffing patterns between the H.223 frames. In uplink stuffing the IWF removes stuffing patterns from between the H.223 frames received from the MS. If the MS responds with a MODIFY REJECT message, the MSC shall clear the call.

9.4.2.2   Fallback to speech after setup

If the MSC supports a fallback to speech and the user has a subscription to the speech service and the mobile station accepts the possibility of a fallback to speech in the call confirm message and the IWF modem does not recognize a call tone nor a V.8 Call Indication nor a V.8 Call Menu within the expiration of a timer started at the sending of the ANSam answer tone (i.e. the calling party is not a V.34 modem), the IWF shall initiate an In Call Modification procedure (ref. to TS 24.008) in order to fall back to a speech mode. As a result of the procedure the IWF resource shall be released and a speech channel shall be set up between the called MS and the fixed network. If the fallback fails e.g. due to a missing subscription to speech or a failing In Call Modification procedure, the IWF shall clear the call.

A recommended minimum timer value is 3 seconds (ref. to the ITU-T V.8 recommendation).

9.4.3   Seamless data rate change

If the modems change the data rate during an ongoing multimedia call (using the ITU-T V.34 seamless data rate change mechanism), the MSC ~~IWF~~ shall initiate~~s~~ a MODIFY message (ref. to TS 24.008) to indicate the new data rate to the MS. ~~lag stuffing is used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and~~

the IWF. HDLC flag stuffing or the stuffing mode defined in ITU-T recommendation H.223 (Annexes A, B and C) shall be used to adapt the 31.2 or 28.8 kbit/s data rate to the 33.6 kbit/s traffic channel between the MS and the IWF. The stuffing pattern found out during the traffic channel setup (ref. to subclauses Call setup) is used. The IWF may start the stuffing immediately after the detection of the data rate change by the modems.