
# TIA STANDARD

## Project 25

# Phase 2 Two-Slot TDMA Media Access Control Layer Description Addendum 1

**TIA-102.BBAC-1** **February 2013**
**(Addendum to TIA-102.BBAC)**

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# Foreword

*(This foreword is not part of this addendum.)*

This addendum is being promulgated by the TR-8.12 (Two-Slot TDMA) subcommittee and its working groups under the sponsorship of the Telecommunications Industry Association.

The Phase 2 Trunked Two-Slot Time Division Multiple Access (TDMA) Voice Services Standard, which includes definition of the new two-slot TDMA common air interface, was developed by the APIC TDMA Task Group and TIA TR-8.12 to be consistent with the APCO/NASTD/FED Project 25 Statement of Requirements (SoR) adopted by the APCO/NASTD/FED Project 25 Steering Committee. The standard used the SoR dated October 17, 2008 as input guidance to capture the relevant user needs requirements.

The two-slot TDMA Media Access Control (MAC) layer protocol specification, which is a component of the Phase 2 TDMA two-slot common air interface definition, established a TIA standard supporting the provision of trunked voice services using a two-slot TDMA modulation format within a 12.5 kHz bandwidth physical radio channel.

TIA makes no claims as to the applicability of the information contained in this document for any purpose although it is believed that the information will prove to be invaluable to implementers and operators of Phase 2 two-slot TDMA equipment. Some aspects of the information contained in this document may not have been fully operationally tested; however, a great deal of time and good faith effort has been invested in the preparation of this document to ensure the accuracy of the information it contains. While all reasonable efforts have been made to ensure the accuracy of this document, it should be understood that significant work remains to fully develop the standard series and all standard series documents will be updated as necessary.

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## ADDENDUM INTRODUCTION

The pupose of this addendum is to update information and correct errata contained in TIA-102.BBAC , “Phase 2 Two-Slot TDMA Media Access Control Layer Description”.

## OBSOLESCENCE

The reference to obsolete is used to indicate specific sections of the document which are no longer current. The term is typically used in this document to indicate that specific voice channel messages are no longer supported by the standard and have been replaced with another mechanism. The messages are left in the document as previous implementations may have made assumptions about their use and specifically the corresponding opcode may not be re-used.

## DOCUMENT REVISION HISTORY

| Version | Date | Description |
|---|---|---|
| 0.0 | November 2012 | Approved for TIA Publication |

## Addendum changes to TIA-102.BBAC start here.

Note that section numbers identified in this addendum directly translate to section numbers in TIA-102.BBAC.

### 5.1 Synchronization Sequences

There are four different synchronization sequences in the traffic channel signaling. The first is an inbound synchronization sequence that occurs in a MAC information signaling slot (clause 4) that has 22 symbols. The second occurs in an outbound signaling slot and has 21 symbols. The third and fourth kinds of synchronization sequences are in the outbound ISCH and contains 20 symbols. The sync pattern for the outbound ISCH is also mentioned in 3.3.4. The synchronization sequences are given in this subclause. The synchronization sequences are transmitted in the order from top to bottom; the top symbol is transmitted first and the bottom symbol is transmitted last.

The signed dibit symbols, in order of transmission, for the various synchronization sequences that occur in MAC signaling are shown in Table 5-1.

**Table 5-1 Synchronization Sequences**

| Symbol/Dibit Name | IEMI Sync | S-OEMI Sync | VCH S-ISCH Sync | CCH S-ISCH Sync (Informative) |
|---|---|---|---|---|
| S(21) | +3 | | | |
| S(20) | +3 | -3 | | |
| S(19) | -3 | -3 | +3 | -3 |
| S(18) | -3 | -3 | +3 | -3 |
| S(17) | +3 | -3 | +3 | -3 |
| S(16) | +3 | +3 | -3 | -3 |
| S(15) | +3 | +3 | +3 | -3 |
| S(14) | -3 | +3 | +3 | +3 |
| S(13) | +3 | +3 | -3 | -3 |
| S(12) | -3 | +3 | +3 | -3 |
| S(11) | -3 | -3 | +3 | -3 |
| S(10) | +3 | +3 | +3 | +3 |
| S(9) | +3 | -3 | +3 | +3 |
| S(8) | +3 | +3 | -3 | +3 |
| S(7) | +3 | -3 | -3 | +3 |
| S(6) | -3 | -3 | -3 | -3 |
| S(5) | +3 | +3 | +3 | +3 |
| S(4) | -3 | +3 | -3 | +3 |
| S(3) | -3 | -3 | -3 | -3 |
| S(2) | -3 | -3 | -3 | +3 |
| S(1) | -3 | +3 | -3 | +3 |
| S(0) | -3 | +3 | -3 | +3 |

### 5.2 Pilot Sequence

The pilot sequences are 8 bit fields found in inbound bursts and are composed of two sets of four symbols defined in this document and referenced in [R3]. The signed dibit symbols for the pilot sequences are defined as follows.

[P1(3) P1(2) P1(1) P1(0)] = [+1, –1, +1, –1]

[P2(3) P2(2) P2(1) P2(0)] = [–1, +1, –1, +1]

The pilot sequence P1 is sent at the beginning of the inbound bursts without sync, which is shown as the left most P in Figure 4-1, Figure 4-2, and Figure 4-3. The pilot sequence P2 is sent at the end of the inbound burst, including bursts with or without sync, which is shown as the right most P in Figure 4-1, Figure 4-2, Figure 4-3, and Figure 4-6. The first four symbols of the inbound signaling burst with sync shown in Figure 4-6 are characterized as pilot symbols, and in that specific instance the pilot symbols would correspond to the first four symbols of the inbound synchronization sequence given in Table 5-1.

### 7.2.5 Scrambling

Scrambling of specific PDUs on a TDMA channel is used to help reject messages from an interfering P25 TDMA system from being interpreted as a valid message to/from the primary system.

The inbound and outbound voice bursts (2V and 4V) are always scrambled. The signaling bursts are optionally scrambled. A description of the bits that are scrambled are provided later in this subclause.

The information used for the scrambling seed is obtained from the Network Status Broadcast message on the FDMA control channel or the Network Status Broadcast MAC message on the TDMA channel. This scrambling is only performed on the TDMA channel. The specific information and how it is used as the seed is described later in this subclause.

A scrambling sequence is generated with a 44-bit LFSR. The generator polynomial for the LFSR is:

$$G(x) = x^{44} + x^{40} + x^{35} + x^{29} + x^{24} + x^{10} + 1 \quad (4)$$

An LFSR with internal feedback points is shown in Figure 7-1. An equivalent LFSR with external feedback is shown in Figure 7-2. Both LFSR's generate the same scramble sequence out of bit 43 if they are properly initialized.

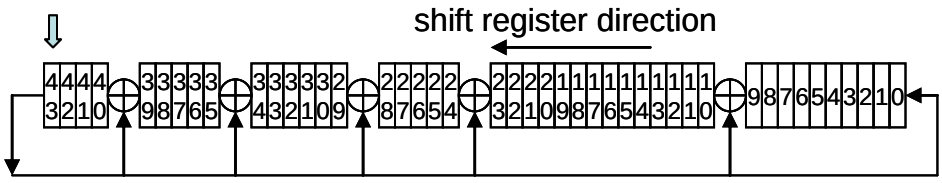



**Figure 7-1 Internal LFSR Generator of Scramble Sequence**

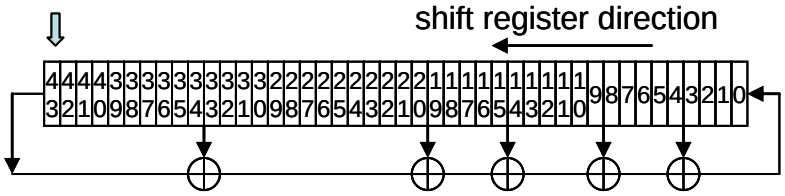



**Figure 7-2 External LFSR Generator of Scramble Sequence**

The seed for the external LFSR is computed from the WACN ID (20 bits), the System ID (12 bits), and a Color Code (CC, 12 bits). The Color Code is the same value as the NAC for Phase 1 FDMA

channels, specifically the Phase 1 FDMA Control Channel if this is used. All three values are also transmitted in the Network Status Broadcast MAC message as seen in 8.3.1.25. The calculation of the seed is given by this equation.

$$seed\_external = (a \bullet WACN\_ID + b \bullet System\_ID + c \bullet CC) \quad (5)$$

where

$a = 2^{24} = 16777216$

$b = 2^{12} = 4096$

$c = 1$

The dot ($\bullet$) represents ordinary unsigned integer multiplication.

If seed_external = 0, then set seed_external = $2^{44} - 1$.

The resulting seed calculation always obtains a result in the range of 1 to $2^{44} - 1$, inclusive. The zero value is excluded. The states of the internal and external LFSR's are related by a simple matrix multiplication.

$$State\_internal = state\_external * M \quad (6)$$

The asterisk ($*$) denotes matrix multiplication in GF(2).

The state vectors are 44-bit row vectors.

M is a 44x44 matrix given in Figure 7-3.

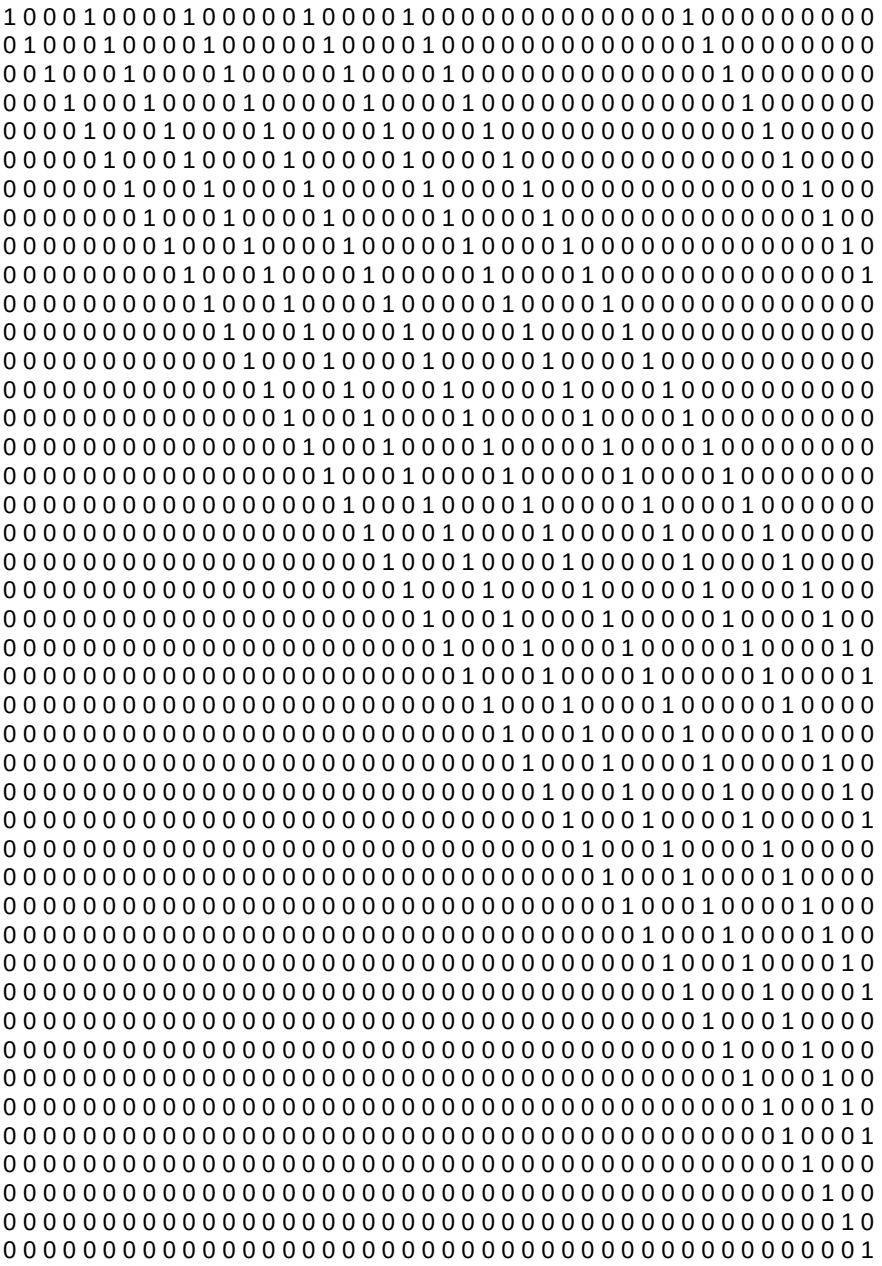


**Figure 7-3 Matrix to Convert to Internal LFSR**

The seed value to generate the scramble sequence for the outbound signals is as previously described. The scramble sequence for the inbound signals is computed by advancing the LFSR by $2^{43}$ shift cycles. This is conveniently computed by a matrix multiplication by SH($2^{43}$) given in Figure 7-4.

$$Seed\_external\_outbound = seed\_external \quad (7)$$

$$Seed\_external\_inbound = seed\_external * SH(2^{43}) \quad (8)$$

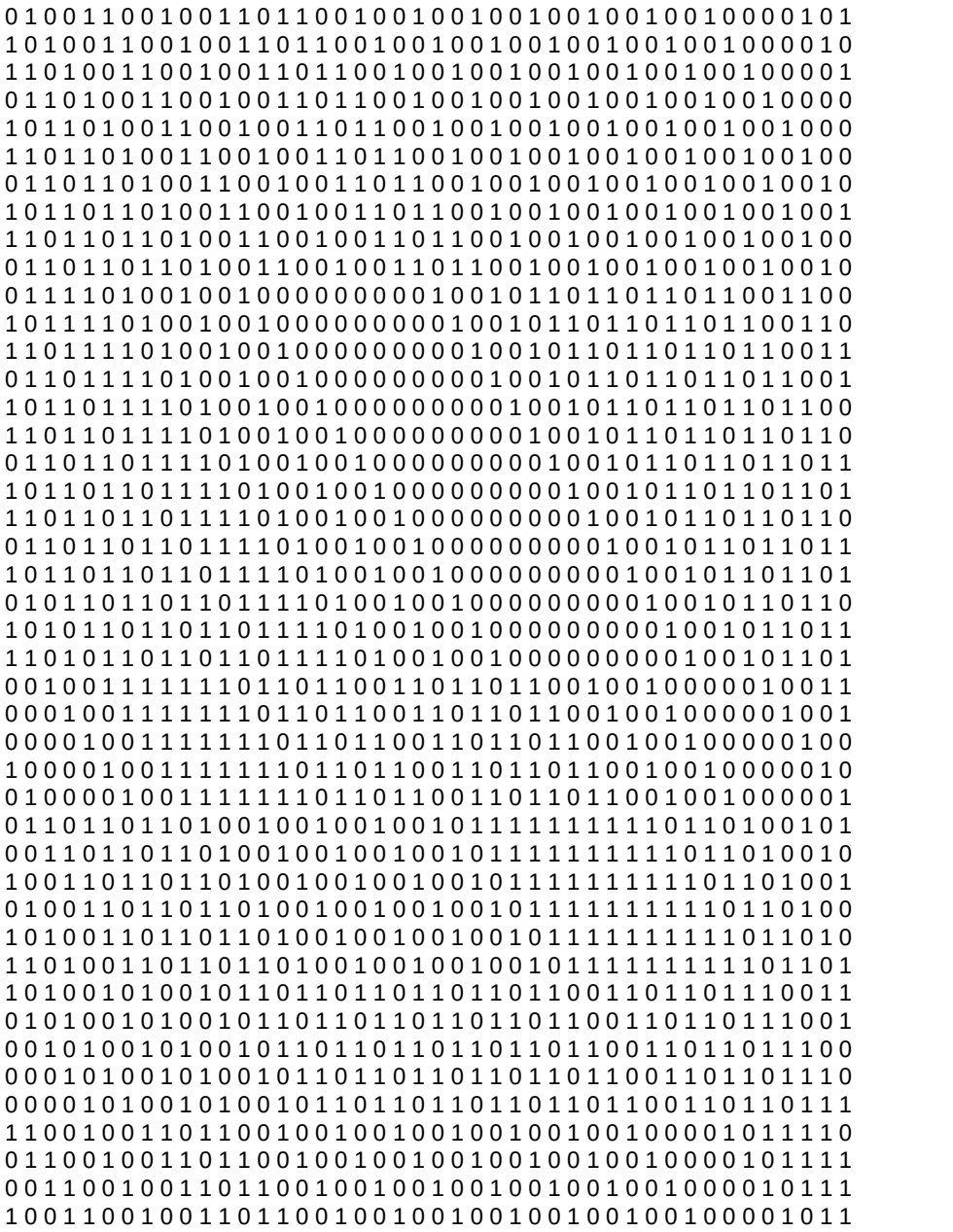


**Figure 7-4 Matrix to Advance External LFSR $2^{43}$ Shift Cycles**

The scramble sequence is long enough to scramble a superframe lasting 360 ms, or 4320 bits for two-slot TDMA. The scramble sequence consists of shifting the LFSR register with the seed value to obtain 4320 bits. The signal bits corresponding to bits to be scrambled are then exclusive-or'ed with the corresponding bits in the scramble sequence. The bits of the scramble sequence corresponding to signal bits that are not scrambled or not used are discarded.

The inbound and outbound signal bits that shall be scrambled are the bits corresponding to the voice frames and the ESS signals in the Inbound 4 Voice Burst shown in Figure 4-2, the Inbound 2 Voice /Short Signaling Burst shown in Figure 4-3, the Outbound 4 Voice Burst shown in Figure 4-4, and the Outbound 2 Voice Burst shown in Figure 4-5. All signaling bursts sent on the FACCH and SACCH shall also be scrambled except those that contain either a Network Status Broadcast MAC message or a MAC_END_PDU. Bursts that contain a MAC_END_PDU are sent unscrambled to allow identification of the color code of potential interfering systems. Signaling bursts containing the Network Status Broadcast MAC message are never scrambled as this message provides the information required for descrambling. Since there is no mechanism provided to scramble only a subset of the messages in a signaling burst, the entire signaling burst will not be scrambled in this case. The scrambled signal bits include both the information and the parity checks for any forward error correction.

The bits for Ramp and Guard times, Pilots, and DUID given in Figure 4-2 and Figure 4-3 are not scrambled. The bits for Ramp and Guard times, Sync (includes 8 pilots), and DUID given in Figure 4-6 are not scrambled. The bits for ISCH and DUID given in Figure 4-4, Figure 4-5, and Figure 4-8 are not scrambled. The bits for ISCH, DUID, and sync in Figure 4-7 are not scrambled. There is no scrambling of information on any FDMA control channel, or any FDMA traffic channel.

The DUID information bits given in Table 5-3 indicate whether or not the SACCH or FACCH bursts (IEMI, S-OEMI, and I-OEMI) are scrambled (Figure 4-6, Figure 4-7, and Figure 4-8).

The scramble sequence restarts with the seed value at the beginning of each superframe. Figure 7-5 provides the locations for the start and end of the scrambling sequence for outbound as well as the start and end location for each of the inbound bursts for both VCH0 and VCH1. Each slot corresponds to a 30 msec duration and contains one of the bursts described in Clause 4. Note that the start of the outbound superframe begins half-way through the ISCH that began in the previous slot. Offsets for the inbound bursts are given at the slot boundaries.

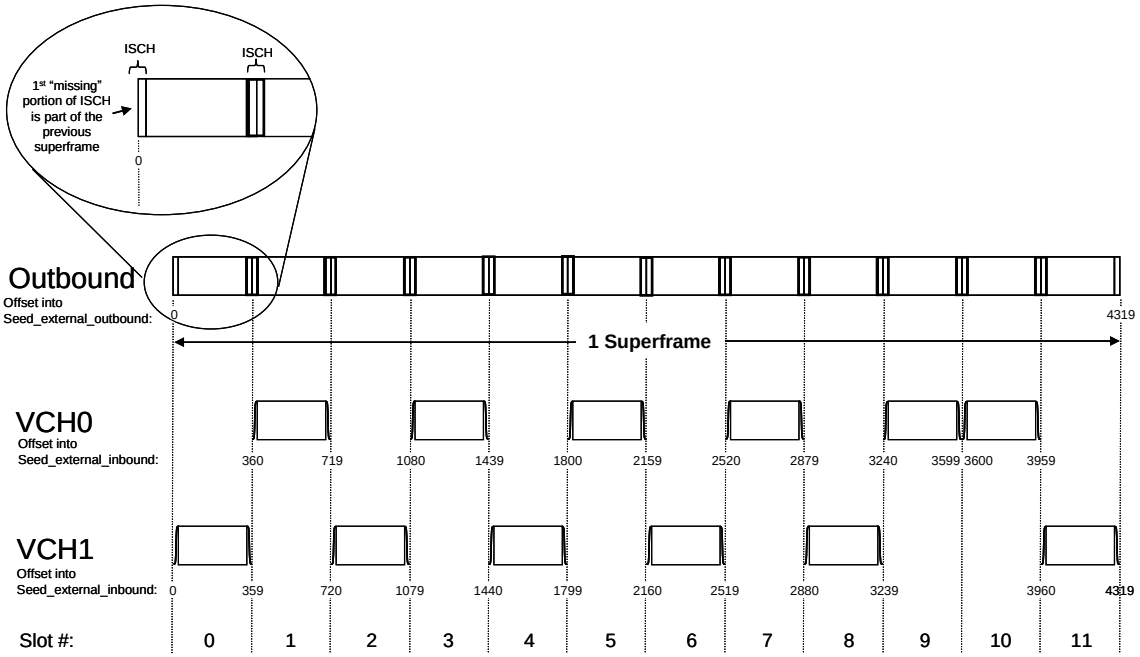



**Figure 7-5 Scrambling Sequence Offsets**

The receiver unscrambles the signal after demodulation but prior to any forward error correction or any other decoding functions. The purpose of scrambling is that interfering signals using a different scramble sequence can not decode any usable voice information.

### 7.3.1 Assigned VCH Initial Access Procedures (Call Setup)

Once a TDMA VCH has been assigned, the assigned BR shall begin sending MAC_ACTIVE PDUs in the FACCH and SACCH on the assigned RF channel and slot. The MAC_ACTIVE PDUs sent in the FACCH shall contain a voice channel user message but may contain other messages as well. Both the abbreviated and extended forms of the voice channel user messages are allowed in MAC_ACTIVE PDUs. Radios shall accept either form when validating individual call participation as described in 7.3.1. Transmitting radios shall accept either form when determining whether the FNE has selected the radio as the inbound audio source as described in 7.3.2.

The WUID is assigned during registration, and therefore may change when registration changes. Generally, if the WACN and System ID match that of the particular system being used, the WUID is the 24-bit Unit ID portion of the SUID. Under these circumstances, the "Source Address" uniquely identifies a particular subscriber, because the SUID of the subscriber can be derived from the Source Address and knowledge of the WACN and System.

When, however, the WUID is assigned to a subscriber from outside the current system, it may not, and generally does not, match the 24-bit Unit ID portion of the SUID. Therefore, an explicit identification of the unit is required for certain messages. In particular, in the outbound direction, an extended ID is required whenever the full APCO source identifier cannot be computed by concatenating the working id with the system and network ID's of the transmitting RFSS. Likewise, in the inbound direction, extended forms must be used whenever the full APCO destination identifier cannot be similarly derived.

These MAC_ACTIVE PDUs are sent until the BR either determines the call failed or has inbound audio or signaling from the talker radio to send. The voice channel user message shall contain the source and destination address/ID of the voice call, if known, and may indicate the emergency state of the call from the trunking assignment if the FNE is capable of maintaining the emergency state during emergency calls. See [R1], clause 11 for detailed procedures on group and emergency call procedures. During this phase of call setup, the MAC_ACTIVE PDUs being sent on the FACCH and SACCH of the assigned slot may contain other messages not associated with the voice channel user in addition to a voice channel user message. See 7.2.2.2 for priorities associated with the use of the outbound SACCH in this phase of the assigned call.

If the alternate slot is unassigned, the BR sends MAC_IDLE PDUs on both the FACCH and SACCH on the unassigned slot. The MAC_IDLE PDUs sent on the unassigned slot may provide general

information. See 7.2.10 for priorities associated with the use of the outbound SACCH on an unassigned slot.

After the FNE transmits a VCH grant message for a call request on the CCH, a unique radio SU has received the right to talk. After receiving an FDMA CCH grant for a requested voice service as described in [R1] the talker radio synchronizes to the assigned TDMA VCH in one of two ways as described in 7.2.4. After having acquired symbol synchronization and knowledge of the slot numbering and location within the superframe and location within the ultraframe, the talker radio is ready to send the first inbound burst. The talker radio's readiness to send the first burst may fall in any timeslot within a superframe and any superframe within an ultraframe.

The talker radio shall begin the TDMA VCH transmissions by sending two MAC_PTTs on the FACCH, and may send a MAC_PTT on the SACCH if the SACCH is adjacent to (i.e., immediately preceding or following) a FACCH that a MAC_PTT was transmitted on. When the talker radio is initiating an individual call (unit to unit or telephone interconnect), the reserved group ID of zero is used in the group address portion of the MAC_PTT PDU and the source ID is that of the talker radio.

The FNE synchronizes to the inbound transmissions of the talker radio as described in 7.2.4. Having received one or more MAC_PTT PDUs from the talker radio, the FNE shall generate one outbound MAC_PTT PDU on the outbound FACCH for each MAC_PTT PDU received on the inbound FACCH. The FNE may send an additional MAC_PTT PDU on the outbound SACCH if the SACCH is adjacent to an outbound FACCH that a MAC_PTT PDU was transmitted on. If only one MAC_PTT PDU is received by the FNE and it was received on the SACCH, the FNE shall generate the corresponding outbound MAC_PTT PDU on the outbound FACCH. Should the FNE only successfully decode one inbound MAC_PTT PDUs from the talker radio, the FNE may generate a second MAC_PTT PDU on the outbound FACCH.

At this point, the call setup mode for both the BR and talker radio is completed. Further voice procedures describing operation during the call are detailed in 7.3.2.

After receiving an FDMA CCH grant for a voice service as described in [R1] the listening radio synchronizes to the assigned TDMA VCH in one of two ways as described in 7.2.4. Having the

slot and channel numbering and knowing the location within the superframe and the location within the ultraframe, the listening radio monitors the outbound FACCH and SACCH. For group calls, radios shall check the advertised group address/ID on the VCH. If an SU determines the received group address/ID does not match the group address/ID obtained from the VCH grant message and the group address/ID is non-zero, the radio shall return to the control channel. For individual calls, radios shall check the advertised target and source addresses/IDs on the VCH. If an SU determines its own address/ID does not match either the received source or target address/ID in the advertised individual call voice channel user message on the voice channel and the addresses/IDs are non-zero, the radio shall return to the control channel.

During the call setup phase of the call, the FNE determines whether listening radios are allowed to use the inbound SACCH. The FNE controls the use of the inbound SACCH by listening radios using the FR bit contained in the I-ISCH. Listening radios shall obey use of the inbound SACCH according to the FR bit.

Reception of one or more of the MAC_PTTs in the outbound transmission completes the call setup phase for the listening radios. Further voice procedures describing operation during the call are detailed in 7.3.2.

### 7.3.2 Assigned VCH Maintenance Procedures (Traffic Mode)

After a talker radio completes the inbound transmission of the MAC_PTTs, the talker radio begins sending voice bursts and SACCHs. Voice burst types and sequencing is described in 6.1. A talker radio indicates voice framing in the offset field of MAC_ACTIVE PDUs and in any MAC_PTT PDUs transmitted.

After completing the outbound transmission of MAC_PTTs on the FACCH, the BR stops sending FACCH and begins outbound transmission of the received voice bursts associated with the call's audio source as determined by the FNE. The outbound audio source establishes voice framing and the FNE advertises the voice framing as described in 7.2.4.2. BR transmission of voice bursts constitutes the start of the outbound traffic mode phase of the call.

After completing the outbound transmission of MAC_PTTs, the FNE continues placing MAC_ACTIVE PDUs that may carry voice channel user messages in the outbound SACCH. When a talker radio at this site is the source of outbound audio, the FNE sends abbreviated or extended voice channel user messages containing the identifier of the talker radio in outbound SACCHs intended for listening radios and the talker radio. When the FNE is the source of outbound audio:

a) Abbreviated or extended voice channel user messages containing the address/ID of the FNE audio source sent by the FNE identify the FNE audio source in outbound SACCHs intended for listening radios.

b) When there is an inbound talker at this site, the outbound SACCH for the talker radio contains either an abbreviated or extended voice channel user message containing either the zero address/ID or the talker radio address/ID information.

The outbound SACCH for the talker radio containing the talker address/ID information is required at the talker radio site and optional at other sites. See 7.3.5 for procedures associated with audio preemption scenarios.

After completing the inbound transmissions of MAC_PTTs and following the ultraframe rules for the use of inbound SACCH, the talker radio uses the inbound SACCH opportunities to send information related to the assigned call itself, information related to the talker radio itself such as Talker address/ID, or information in response to messages received from the FNE in the outbound SACCH intended for the talker radio. The talker radio adheres to the ultraframe rules for sending inbound SACCH bursts as described in 3.2.2.

The FNE has a fixed SACCH ultraframe schedule as described in 3.2.2. During the traffic mode of the call, the FNE's use of the outbound SACCH is as described in 7.2.2.2. Following the rules of the SACCH ultraframe in 3.2.2 the FNE may use outbound SACCHs in an ultraframe for signaling intended for listening radios or the talker radio. When sending an abbreviated or extended VCU message in an outbound SACCH intended for listening radios the FNE inserts the address/ID of the outbound audio source in the VCU message. When sending a VCU message in an outbound SACCH intended for the talker radio, the FNE inserts the address/ID of the FNE selected inbound

audio source in the VCU message. The talker radio uses the address/ID of the FNE selected inbound audio source to determine if it should continue transmitting. If an outbound SACCH defined by the ultraframe rules as intended for the talker radio contains a zero address/ID or an address/ID matching the address/ID of the talker radio, either in a MAC_PTT PDU[1] or VCU of a MAC_ACTIVE PDU, the talker radio continues to transmit. If there is an address/ID mismatch, the talker radio has not been selected by the FNE as the inbound audio source and the talker radio shall stop transmitting, optionally sending MAC_END_PTTs per 7.3.3 before reverting to a listening radio. In cases where the address/ID in the outbound SACCH intended for the talker radio contains the reserved address/ID of zero, the talker radio continues transmitting and monitors the next outbound SACCH intended for the talker radio.

During the traffic mode of the call, listening radios may use the inbound SACCH for audio preemption signaling as described in 7.3.5.

### 7.3.3 Assigned VCH Termination (Call Teardown)

A voice sequence may be stopped at any voice burst within the voice framing sequence (See Figure C-6), i.e., it is not necessary for the talker or the BR to wait for the end of a voice sequence (superframe) to transmit the terminator message.

Upon sending the last voice burst, the talker radio shall send at least two inbound MAC_END_PTT PDUs on the FACCH but may send up to three. The talker radio may transmit an additional MAC_END_PTT PDU on the SACCH if the SACCH is adjacent (i.e., immediately preceding or following) to a FACCH that a MAC_END_PTT PDU was transmitted on.

After completion of its initial voice transmission, the SU shall remain on the channel in receive/idle mode awaiting further voice transmissions or the call termination message.

When the FNE has decided to release the assignment of the VCH, it shall send at least two MAC_END_PTT PDUs on the outbound FACCH, however the total number of MAC_END_PTTs to

[1] Normally no SACCH should contain a MAC_PTT during the maintenance portion of a call, however there may be some transitional cases where this may occur, thus the reference.

send on the FACCH is left up to the manufacturer. The FNE may transmit additional MAC_END_PTTs on the SACCH if the SACCH is adjacent to a FACCH that a MAC_END_PTT was transmitted on. For a group call, the group address in the MAC_END PTT PDU matches the call and the source address is $FFFFFF. For an individual call, the group address in the MAC_END PTT PDU is 0 and the source address is either $FFFFFF, or it matches either the source or target address of the call.

Upon receipt of a MAC_END_PTT PDU on the assigned VCH, and having verified it contains the correct color code, the SU shall return to the idle state on the control channel.

#### 7.3.3.2 Message Trunked Termination

Message trunking applies to group or individual voice services and allows multiple SUs to exchange voice messages on the assigned traffic channel, prior to the voice service being terminated. The voice service is requested and granted per the detailed procedures of the specific call type.

When the FNE detects the end of the transmission from the initiating SU or FNE audio source, the FNE shall finish transmitting any buffered audio before beginning to send MAC_HANGTIME PDUs on the outbound FACCH and SACCH. These PDUs contain messages which may include either abbreviated or extended Group Voice Channel User, abbreviated or extended Unit to Unit Voice Channel User or Telephone Interconnect Voice Channel User, (depending on call type) to signal the individual/group in use, and may include other MAC PDU messages as described in 8.2.3.

The MAC_HANGTIME PDU messages are sent until either:

a) a predetermined number of MAC_HANGTIME PDUs have been sent, or an FNE hang timer has expired. In either case the FNE shall terminate the call per the procedures in 7.3.3.1

or;

b) one of the participant SUs of the call in progress initiates another voice transmission (call continuation) Refer to 7.3.4 for procedures related to call continuation during hang time.

**7.3.4.2 Call Continuation on VCH**

The SU assigned to the traffic channel during hangtime receives MAC_HANGTIME PDUs that may contain a voice channel user message. During Hangtime, a minimum of one voice channel user message for the call shall be sent a minimum of once per superframe.

During hangtime:

a) listening SUs remain on the assigned traffic channel in the receive state until a MAC_END_PTT PDU message is received,

or

b) listening SUs may use the voice channel method of call continuation by beginning a voice transmission directly on the VCH.

When the call continuation uses the voice channel method, the talker radio begins the TDMA VCH transmissions by sending MAC_PTT PDUs per 7.3.1 before sending any voice bursts.

A talker radio shall also listen to all the outbound SACCH timeslots within the SACCH ultraframe that are dedicated to the talker. Once the talker SU decodes an outbound SACCH, the SU does one of the following:

a) If the SACCH burst intended for a talker radio carries a MAC_PTT PDU or MAC_ACTIVE PDU that contains a non-zero WUID/SUID that does not match the WUID/SUID of the talker radio, the radio SU shall consider it has lost the right to talk on this VCH and may optionally send MAC_END_PTTs on the inbound path of the VCH per 7.3.3 and optionally notify the user that the transmission failed.

b) If the SU cannot detect a SACCH burst with which to determine whether it has, or has not, won the right to talk on this VCH then it shall finish the current voice burst and send MAC_END_PTTs on the inbound path of the VCH per 7.3.3 and optionally notify the user that the transmission failed. The SU shall wait a minimum of two ultraframes before assuming it has not won the right to transmit, but may optionally wait more than two ultraframes before assuming it has not won the right to transmit.

c) If the SACCH burst intended for a talker radio carries a MAC_PTT PDU or MAC_ACTIVE PDU that contains a WUID/SUID that does match the WUID/SUID of the talker radio, the radio SU shall consider it has the right to talk on this VCH and continues to do so until some other event occurs which prompts the SU to stop transmitting (user unkey, etc.). Note that since subscribers have non-zero values for their WUID/SUID, any matching WUID/SUID is also non-zero.

Note: If the FNE detects multiple transmissions for the same call (i.e., at different sites within the system) the FNE shall select only one audio source to be routed to the sites involved in the call for repeat transmission. The method for determining which audio source to select is left to the FNE manufacturer.

**7.3.5.1.1.2 System Response**

Upon receiving an audio preemption request the FNE responds using a matching control channel or assigned voice channel method as follows:

a) Control Channel method: The FNE shall respond to the request per the detailed procedures of the specific service type. The following messages are valid responses to a voice service request, though a FNE need not generate all these messages:

- A channel grant (e.g. GRP_V_CH_GRANT) if the FNE determines that the preemption request can be granted;

- A QUE_RSP if the FNE cannot proceed with audio preemption establishment due to temporary lack of resources. The QUE_RSP shall quiet SU retries until a grant or deny is issued by the FNE. The FNE may issue a QUE_RSP before the grant while performing a forced talker preempt on the talk channel to free up the resources (see 7.3.5.1.1 for this process); or
- A DENY_RSP if the FNE determines that the audio preemption cannot be permitted.
- An ACK_RSP_FNE if the FNE wishes to quiet SU retries until a grant, queue, or deny is issued by the FNE.

The above messages are considered valid audio preemption responses if they address the WUID/SUID of the unit initiating the request.

b) Voice Channel method: The FNE may grant or deny the request and provides this response through the outbound listener SACCH using messaging defined in 8.2. The FNE shall provide a valid response in an outbound listener SACCH within one ultraframe time. The following messages are valid responses to a voice service request, though a FNE need not generate all these messages:
   - A GRANT if the FNE determines that the preemption request can be granted;
   - A DENY if the FNE determines that the audio preemption cannot be permitted.
   - An ACK_RSP_FNE if the FNE wishes to quiet SU retries until a grant or deny is issued by the FNE.

When the FNE grants a request for an audio preemption the FNE shall begin routing the audio of the newly granted SU.

**7.3.5.1.1.3 Requesting Subscriber Unit Actions**

SU actions to a valid response are as follows:

a) Control Channel method:
   - If a channel grant is received, the SU shall tune to the channel/slot specified in the channel grant message and begin transmitting MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts; or

- If a QUE_RSP is received, the SU shall wait for further signaling, and may indicate to the user the progress of the request. The QUE_RSP shall quiet SU retries until a grant or deny is issued by the FNE; or
- If a DENY_RSP is received, the SU shall return to the idle state, and may indicate to the user the reason for the failure of the audio preemption request. The SU may subsequently be directed to rejoin the call as a listener through a channel assignment update, or assignment to another SU.
- If an ACK_RSP_FNE is received, the SU shall stop retries of the current request and shall wait for further signaling from the FNE.

b) Voice Channel method:

- If a grant is received, the SU shall then tune to the transmit slot and begin transmitting MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts.
- If the request is denied the SU shall continue as a receiver in the current call, and may indicate to the user the reason for the failure of the audio preemption request.
- If the request is ACK_RSP_FNE, the SU remains in receive mode waiting for a Grant or Deny and does not retry the request. While waiting for a Grant or Deny, if the requesting SU decodes a MAC_ACTIVE PDU in an outbound SACCH intended for a talking radio that contains an abbreviated or extended voice channel user message with the requesting SUs address/ID, the SU shall assume it failed to decode the Grant and the SU shall then tune to the transmit slot and begin transmitting MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts.
- If no response is received, then the SU shall wait a minimum of one ultraframes, but may optionally wait more than two ultraframes, before determining that the FNE failed to decode the request. During this time the SU monitors the outbound transmission for either a grant or deny or Ack response, or, in the case of SU response decode failure, a MAC_ACTIVE PDU in an outbound SACCH intended for a talking radio that contains an abbreviated or extended voice channel user message with the requesting SUs address/ID that indicates that the FNE has granted the audio preemption. At the end of this period, if it is

determined that the FNE has failed to decode the request, the SU may retry the request, or indicate the failure of the audio preemption request to the user.

#### 7.3.5.1.1.4 Voice Channel Transition and Signaling

During the VCH transition time between talkers, the FNE behaves as a message trunked channel, but disallows users other than the SU requesting preemption from gaining access by using the ISCH FR bit set to zero to disallow inbound SACCH preemption requests.

The FNE signals the current talker on the voice channel that a preemption is occurring in an outbound SACCH destined for the talker. This signaling shall indicate:

- Audio preemption (C/A=1): The talker is permitted to remain on the voice channel.

During an audio preemption by FNE sourced audio, the FNE may optionally decide to either signal the talker to stop transmitting (forced audio preemption) or allow the talker to continue transmitting (unforced audio preemption) as follows:

- Forced preemption (U/F=1): The SU shall cease transmitting,
- Unforced preemption (U/F=0): The SU may continue transmitting.

The FNE may inform a talker of the audio preemption by sending a MAC_Release with U/F = 0/1 (continue/stop transmitting) and C/A = 1 (stay on the channel) in an outbound SACCH destined for the talker. The talker behaves as follows:

a) When the talker SU receives a MAC_Release with U/F=1 on the outbound SACCH, it shall end the voice bursts currently in progress and subsequently transmit MAC_END_PTTs per 7.3.3. It then begins to listen to the outbound voice channel.

b) When the talker SU receives a MAC_Release with U/F=0 on the outbound SACCH, it may still continue to transmit, or it may terminate the transmission and begin to listen to the outbound voice channel. The specific choice of action is left to the discretion of the SU manufacturer.

The voice channel audio preemption transition to the new talker begins with the FNE terminating repeat of the current transmission and sending either MAC_ACTIVE or MAC_PTT

PDUs, whichever the FNE has, followed by repeat of the new talker's transmission. The listening radios see this and pick up the new talker address/ID and new crypto sync.

- In an audio preemption, the WUID/SUID in voice channel user messages inserted into MAC_ACTIVE PDUs intended for listener radios is the WUID/SUID of the new outbound audio source.
- In an audio preemption with forced preemption, the WUID/SUID in voice channel user messages inserted into MAC_ACTIVE PDUs intended for the talker is the WUID/SUID of the new outbound audio source.
- In an audio preemption with an unforced preemption, there is only one outbound talker but there may be more than one inbound talker, each at different sites. In this scenario, the WUID/SUID in voice channel user messages inserted into MAC_ACTIVE PDUs intended for the talker is the WUID/SUID of the talker at that site.

Refer to 7.3.2 if a talker decodes a MAC_PTT or an abbreviated or extended voice channel user message containing a non-zero talker ID that does not match its address/ID.

The FNE at non-talker sites may optionally send an outbound SACCH containing MAC_Release intended for the talker.

In a forced audio preemption scenario, the FNE sends abbreviated or extended voice channel user messages containing the new talker's WUID/SUID in MAC_ACTIVE PDUs contained in outbound SACCHs intended for a talker.

In an unforced audio preemption scenario, the FNE continues sending abbreviated or extended voice channel user messages containing the original talker's WUID/SUID in MAC_ACTIVE PDUs contained in outbound SACCHs intended for the talker at the site of the original talker and abbreviated or extended voice channel user messages containing the new talker's WUID/SUID in MAC_ACTIVE PDUs contained in outbound SACCHs intended for the talker at the site of the new talker. Note that in this scenario, the WUID/SUID in voice channel user messages inserted into MAC_ACTIVE PDUs intended for listening radios is the WUID/SUID of the outbound audio source.

If the audio preemption ends before the original talker has completed its transmission, the FNE returns the outbound audio path to the original (still transmitting) radio if possible and uses the talker's WUID/SUID in voice channel user messages inserted in MAC_ACTIVE PDUs contained in the outbound SACCHs intended for both listener and talker.

#### 7.3.5.2.1.3 Requesting Subscriber Unit Actions

SU actions to a valid response are as follows:

a. Control Channel method:

- If a channel GRANT is received (e.g. GRP_V_CH_GRANT), the SU shall tune to the channel/slot specified in the channel grant message and begin transmitting MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts; or
- If a QUE_RSP is received, the SU shall wait for further signaling, and may indicate to the user the progress of the call. The QUE_RSP shall quiet SU retries until a grant or deny is issued by the FNE; or
- If a DENY_RSP is received, the SU shall return to the idle state, and may indicate to the user the reason for the failure of the call. The SU may subsequently be directed to rejoin a call as a listener through a channel assignment update, or assignment to another SU.
- If an ACK_RSP_FNE is received, the SU shall stop retries of the current request and shall wait for further signaling from the FNE.

Note that other SUs monitoring the control channel may respond to the control channel signaling and join the new call as listeners.

b. Voice Channel method:

- If a grant is received, the SU shall then tune to the transmit slot and begin transmitting MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts.

- If the request is denied the SU shall return to the state prior to the request, and may indicate to the user the reason for the failure of the call preemption request.

- If the request is ACK_RSP_FNE, the SU remains in receive mode waiting for a Grant or Deny and does not retry the request. While waiting for a Grant or Deny, if the requesting SU decodes a MAC_ACTIVE PDU in an outbound SACCH intended for a talking radio that contains an abbreviated or extended voice channel user message with the requesting SUs address/ID, the SU shall assume it failed to decode the Grant and the SU shall then tune to the transmit slot and begin transmitting MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts.

- If no response is received, then the SU shall wait a minimum of one ultraframes, but may optionally wait more than two ultraframes, before determining that the FNE failed to decode the request. During this time the SU monitors the outbound transmission for either a grant or deny or ack response, or, in the case of SU response decode failure, a MAC_ACTIVE PDU in an outbound SACCH intended for a talking radio that contains an abbreviated or extended voice channel user message with the requesting SUs address/ID that indicates that the FNE has granted the call preemption. At the end of this period, if it is determined that the FNE has failed to decode the request, the SU may retry the request, or indicate the failure of the call preemption request to the user.

#### 7.3.5.2.1.4 Voice Channel Transition and Signaling

Depending on the circumstances of the call preemption such as the relative importance of the new call and whether both talkers are at the same site, the FNE may determine to use a polite transition or an impolite transition. In either case, the voice channel call preemption transition begins with the FNE terminating repeat of the current transmission.

a) FNE polite transition signaling:

- The FNE sends MAC_END_PTT PDUs per 7.3.3.1 in the outbound FACCH and optionally the outbound listener SACCH prior to granting the preemption request
- The FNE sends a MAC_Release message with C/A=0, the forced bit set (U/F=1), and the current talker's address on the next talker outbound SACCH
- Having completed the outbound transmission of the MAC_END_PTT PDUs per 7.3.3.1 and at least one MAC_Release message, the FNE grants the call preemption request
- The FNE sends MAC_ACTIVE PDUs on the outbound FACCH containing an abbreviated or extended voice channel user message for the new call.
- The FNE sends MAC_ACTIVE PDUs on the outbound listener SACCH containing an abbreviated or extended voice channel user message with the WUID/SUID of the new outbound audio source
- The FNE begins transmission of the new outbound call beginning with MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts

b) FNE impolite transition signaling:

- The FNE grants the call preemption request
- The FNE sends MAC_ACTIVE PDUs on the outbound FACCH and outbound listener SACCH containing an abbreviated or extended voice channel user message with the WUID/SUID of the outbound audio source

- The FNE begins transmission of the new outbound call beginning with MAC_PTT PDUs per 7.3.1 containing encryption sync information followed by voice bursts

c) SU transition signaling responses:

- Upon receiving a MAC_END_PTT a listening SU shall leave the channel.
- If listening radios decode a MAC_PTT or an abbreviated or extended voice channel user message containing non-zero address/ID information that does not match the current assignment, the listening radios shall leave the voice channel. For group calls the group address/ID is to be verified. For unit to unit calls the address/ID of either the source or target is to be verified. For individual telephone interconnect calls, the Source/Target address/ID is to be verified.
- If a talker receives a MAC_Release message with Forced preemption (U/F=1) and with Call preemption (C/A=0): The talker SU shall send in two END_PTT PDUs on the inbound FACCH, stop transmitting and leave the channel.
- Refer to 7.3.2 if a talker receives an outbound talker SACCH with a MAC_PTT PDU or MAC_ACTIVE PDU with an abbreviated or extended voice channel user message containing a non-zero WUID/SUID that does not match the WUID/SUID of the talker SU.

### 8.3 MAC Message Details

MAC message lengths are determined in one of four ways:

- The message length is inherent based on the opcode (see Table 8-2)
- The message length is variable and the length is determined by parsing out additional fields in the message such as in the following messages:
    - Individual Paging Message with Priority
    - Indirect Group Paging Message without Priority
- The message length is variable and it fills out remaining space in the PDU such as in the following messages:
    - Null Information Message
    - Manufacturer's Specific Message
- A specific length octet is included in the message that contains the message length. The message length is always contained in the least significant 6 bits of the 2nd octet in the message, that is, the octet that immediately follows the B1/B2/MCO octet.

In order to avoid future compatibility problems for older SUs with new messages, all new messages added after the initial publication of this specification shall contain a length octet as is discussed in the fourth major bullet above. This allows older SUs to skip over messages in the same outbound MAC PDU that may be defined in future releases of this specification.

Note also that the Null Information Message, if included, shall always be in the last message within the PDU. Any manufacturer specific messages shall be inserted after the standard defined messages and before the null information message since an SU may not be able to decode the length of a manufacturer specific message.

## Table 8-2 MAC Message Lengths

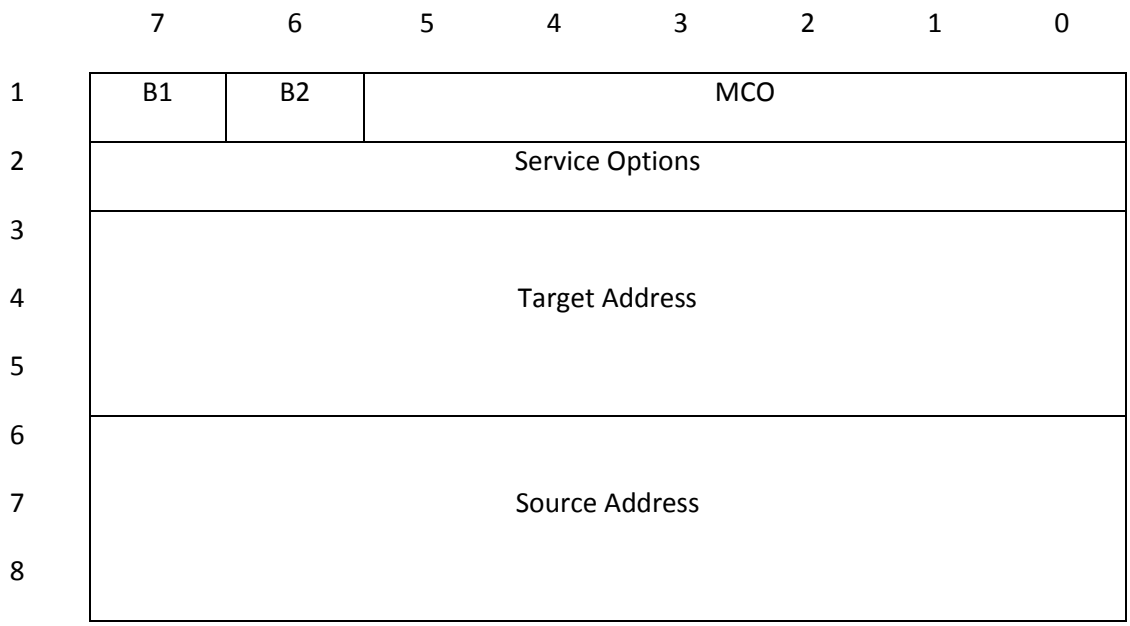
| B1 | B2 | MCO | Length | Name | Subclause |
|---|---|---|---|---|---|
| 0 | 0 | %000000 | Variable | NULL INFORMATION MESSAGE | 8.3.1.1 |
| 0 | 0 | %000001 | 7 | GROUP VOICE CHANNEL USER MESSAGE - ABBREVIATED FORMAT | 8.3.1.2 |
| 0 | 0 | %100001 | 14 | GROUP VOICE CHANNEL USER MESSAGE - EXTENDED FORMAT | 8.3.1.2 |
| 0 | 0 | %000010 | 8 | UNIT TO UNIT VOICE CHANNEL USER MESSAGE – ABBREVIATED FORMAT | 8.3.1.3 |
| 0 | 0 | %100010 | 15 | UNIT TO UNIT VOICE CHANNEL USER MESSAGE – EXTENDED FORMAT | 8.3.1.3 |
| 0 | 0 | %000011 | 7 | TELEPHONE INTERCONNECT VOICE CHANNEL USER MESSAGE | 8.3.1.4 |
| 0 | 1 | %000100 | 5 | UNIT TO UNIT VOICE REQUEST – ABBREVIATED FORMAT | 8.3.1.5 |
| 1 | 1 | %000100 | 16 | UNIT TO UNIT VOICE REQUEST – EXTENDED FORMAT | 8.3.1.5 |
| 0 | 0 | %000101 | 16 | GROUP VOICE CHANNEL GRANT UPDATE MULTIPLE | 8.3.1.6 |
| 0 | 0 | %100101 | 15 | GROUP VOICE CHANNEL GRANT UPDATE MULTIPLE - EXPLICIT | 8.3.1.6 |
| 0 | 1 | %000000 | 9 | GROUP VOICE CHANNEL GRANT - ABBREVIATED FORMAT | 8.3.1.7 |
| 1 | 1 | %000000 | 11 | GROUP VOICE CHANNEL GRANT - EXPLICIT FORMAT | 8.3.1.7 |
| 0 | 1 | %000010 | 9 | GROUP VOICE CHANNEL GRANT UPDATE | 8.3.1.8 |
| 1 | 1 | %000011 | 8 | GROUP VOICE CHANNEL GRANT UPDATE - EXPLICIT | 8.3.1.9 |
| 0 | 1 | %000100 | 9 | UNIT TO UNIT VOICE CHANNEL GRANT - ABBREVIATED FORMAT | 8.3.1.10 |
| 1 | 1 | %000100 | 15 | UNIT TO UNIT VOICE CHANNEL GRANT - EXTENDED FORMAT | 8.3.1.10 |
| 0 | 1 | %000101 | 8 | UNIT TO UNIT ANSWER REQUEST - ABBREVIATED FORMAT | 8.3.1.11 |
| 1 | 1 | %000101 | 12 | UNIT TO UNIT ANSWER REQUEST - EXTENDED FORMAT | 8.3.1.11 |

| | | | | | |
|---|---|---|---|---|---|
| 0 | 1 | %011110 | 14 | RADIO UNIT MONITOR ENHANCED COMMAND – ABBREVIATED FORMAT | 8.3.1.12 |
| 0 | 1 | %001010 | 9 | TELEPHONE INTERCONNECT ANSWER REQUEST | 8.3.1.13 |
| 0 | 1 | %000110 | 9 | UNIT TO UNIT VOICE CHANNEL GRANT UPDATE - ABBREVIATED FORMAT | 8.3.1.14 |
| 1 | 1 | %000110 | 15 | UNIT TO UNIT VOICE CHANNEL GRANT UPDATE - EXTENDED FORMAT | 8.3.1.14 |
| 0 | 1 | %100000 | 9 | ACK RESPONSE - ABBREVIATED FORMAT | 8.3.1.15 |
| 0 | 1 | %010100 | 9 | SNDCP DATA CHANNEL GRANT | 8.3.1.16 |
| 0 | 1 | %010101 | 7 | SNDCP DATA PAGE REQUEST | 8.3.1.17 |
| 1 | 1 | %010110 | 9 | SNDCP DATA CHANNEL ANNOUNCEMENT - EXPLICIT | 8.3.1.18 |
| 0 | 1 | %111100 | 9 | ADJACENT STATUS BROADCAST - ABBREVIATED FORMAT | 8.3.1.19 |
| 1 | 1 | %111100 | 11 | ADJACENT STATUS BROADCAST - EXTENDED FORMAT | 8.3.1.19 |
| 0 | 1 | %011111 | 7 | CALL ALERT - ABBREVIATED FORMAT | 8.3.1.20 |
| 1 | 1 | %011111 | 11 | CALL ALERT - EXTENDED FORMAT | 8.3.1.20 |
| 0 | 1 | %100100 | 9 | EXTENDED FUNCTION COMMAND -ABBREVIATED FORMAT | 8.3.1.21 |
| 1 | 1 | %100100 | 14 | EXTENDED FUNCTION COMMAND- EXTENDED FORMAT | 8.3.1.21 |
| 0 | 1 | %101010 | 7 | GROUP AFFILIATION QUERY - ABBREVIATED FORMAT | 8.3.1.22 |
| 1 | 1 | %101010 | 11 | GROUP AFFILIATION QUERY - EXTENDED FORMAT | 8.3.1.22 |
| 0 | 1 | %111101 | 9 | IDENTIFIER UPDATE | 8.3.1.23 |
| 0 | 1 | %110101 | 9 | TIME AND DATE ANNOUNCEMENT | 8.3.1.24 |
| 0 | 1 | %111011 | 11 | NETWORK STATUS BROADCAST - ABBREVIATED FORMAT | 8.3.1.25 |
| 1 | 1 | %111011 | 13 | NETWORK STATUS BROADCAST - EXTENDED FORMAT | 8.3.1.25 |
| 0 | 1 | %000001 | 7 | GROUP VOICE SERVICE REQUEST | 8.3.1.26 |
| 0 | 1 | %111010 | 9 | RFSS STATUS BROADCAST - ABBREVIATED FORMAT | 8.3.1.27 |
| 1 | 1 | %111010 | 11 | RFSS STATUS BROADCAST - EXTENDED FORMAT | 8.3.1.27 |

| | | | | | |
|---|---|---|---|---|---|
| 0 | 1 | %111001 | 9 | SECONDARY CONTROL CHANNEL BROADCAST | 8.3.1.28 |
| 1 | 1 | %101001 | 8 | SECONDARY CONTROL CHANNEL BROADCAST - EXPLICIT | 8.3.1.28 |
| 0 | 1 | %011010 | 7 | STATUS QUERY - ABBREVIATED FORMAT | 8.3.1.29 |
| 1 | 1 | %011010 | 11 | STATUS QUERY - EXTENDED FORMAT | 8.3.1.29 |
| 0 | 1 | %100001 | 9 | QUEUED RESPONSE | 8.3.1.30 |
| 0 | 1 | %100111 | 9 | DENY RESPONSE | 8.3.1.31 |
| 0 | 1 | %111000 | 9 | SYSTEM SERVICE BROADCAST | 8.3.1.32 |
| 0 | 1 | %101101 | 7 | UNIT REGISTRATION COMMAND - ABBREVIATED FORMAT | 8.3.1.33 |
| 0 | 1 | %011101 | 8 | RADIO UNIT MONITOR COMMAND- OBSOLETE | 8.3.1.34 |
| 0 | 1 | %110100 | 9 | IDENTIFIER UPDATE FOR VHF/UHF BANDS | 8.3.1.35 |
| 0 | 1 | %110011 | 9 | IDENTIFIER UPDATE FOR TDMA | 8.3.1.36 |
| 1 | 0 | Undefined | Variable | MANUFACTURER MESSAGE | 8.3.1.37 |
| 0 | 0 | %010010 | Variable | INDIVIDUAL PAGING MESSAGE WITH PRIORITY | 8.3.1.38 |
| 0 | 0 | %010001 | Variable | INDIRECT GROUP PAGING MESSAGE WITHOUT PRIORITY | 8.3.1.39 |
| 0 | 0 | %110000 | 5 | POWER CONTROL SIGNAL QUALITY | 8.3.1.40 |
| 0 | 0 | %110001 | 7 | MAC_Release | 8.3.1.41 |
| 0 | 1 | %011000 | 10 | STATUS UPDATE- ABBREVIATED FORMAT | 8.3.1.42 |
| 1 | 1 | %011000 | 14 | STATUS UPDATE- EXTENDED FORMAT | 8.3.1.42 |
| 0 | 1 | %011100 | 10 | MESSAGE UPDATE- ABBREVIATED FORMAT | 8.3.1.43 |
| 1 | 1 | %011100 | 14 | MESSAGE UPDATE- EXTENDED FORMAT | 8.3.1.43 |
| 0 | 1 | %001100 | 10 | RADIO UNIT MONITOR COMMAND ABBREVIATED FORMAT | 8.3.1.44 |
| 1 | 1 | %001100 | 14 | RADIO UNIT MONITOR COMMAND- EXTENDED FORMAT | 8.3.1.44 |

### 8.3.1.3 Unit to Unit Voice Channel User Message

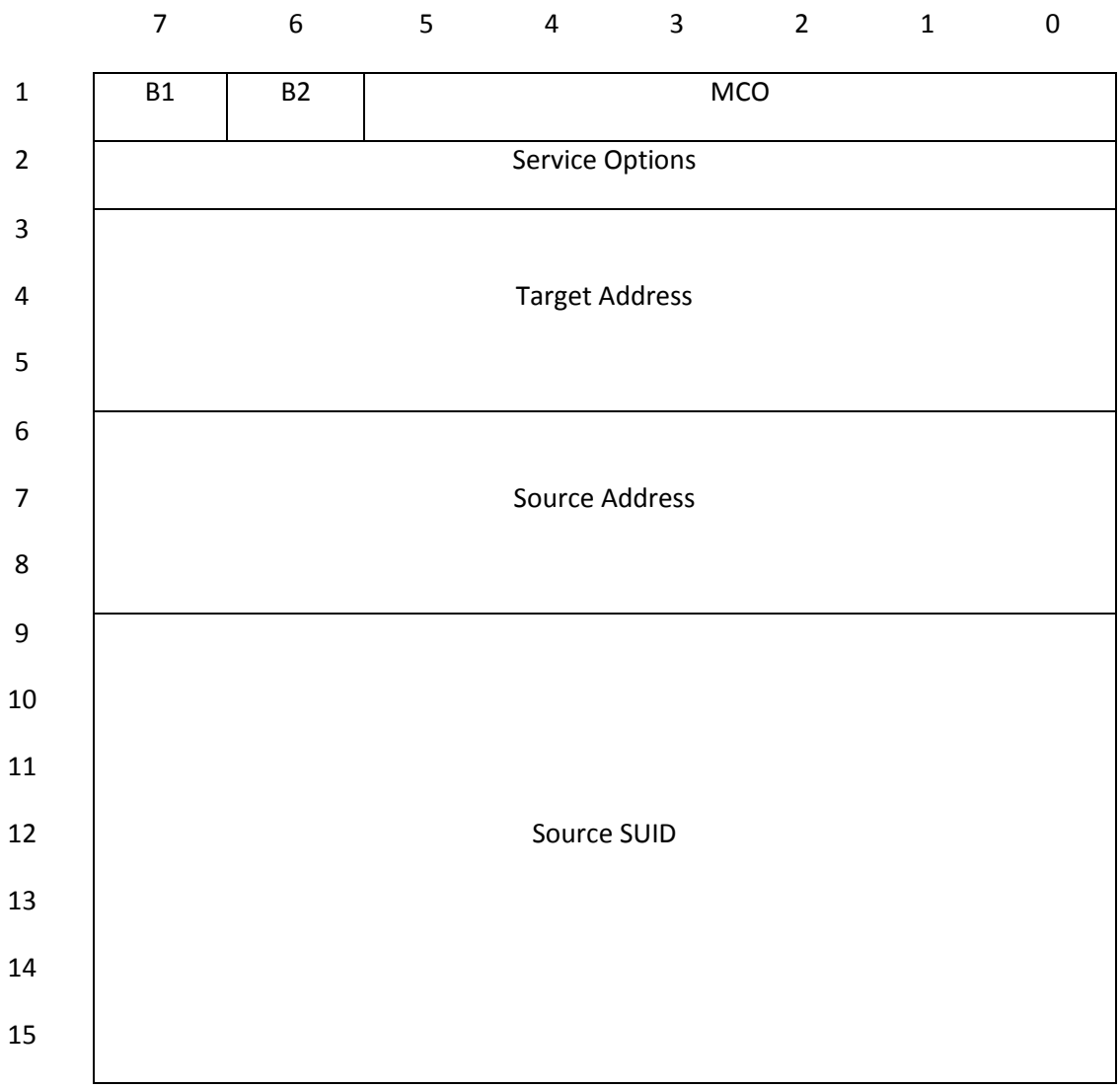
The Unit to Unit Voice Channel User messages are shown in Figure 8-15. This indicates the user of this channel for unit to unit voice traffic. This is used on both inbound and outbound messages.




B1 = 0, B2 = 0, MCO =%00 0010.

**Figure 8-15 Unit to Unit Voice Channel User Message – Abbreviated Format**

The following Extended Format shall be used when the source or destination of the message is from a different system or network than the current site. If the Target Address is unknown, the Target Address shall be 0.




B1 = 0, B2 = 0, MCO =%10 0010.

**Figure 8-16 Unit to Unit Voice Channel User Message – Extended Format**

### 8.3.1.12 Radio Unit Monitor Enhanced Command

This message is to be used to command a radio to execute an enhanced radio unit monitor operation. The target SU may initiate either a clear or encrypted unit-to-unit call, or a clear or encrypted group call. See Table 8-10 for the field definitions.

This abbreviated outbound VCH message is only used when the CCH is using the corresponding abbreviated form of the OSP.

| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 1 | B1 | B2 | MCO | | | | | |
| 2 | Target Address | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | Talkgroup ID | | | | | | | |
| 6 | | | | | | | | |
| 7 | Source Address | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | SM | TG | Reserved | | | | | |
| 11 | TX Time | | | | | | | |
| 12 | Key ID | | | | | | | |
| 13 | | | | | | | | |
| 14 | Alg ID | | | | | | | |

B1 = 0, B2 = 1. MCO = %01 1110.

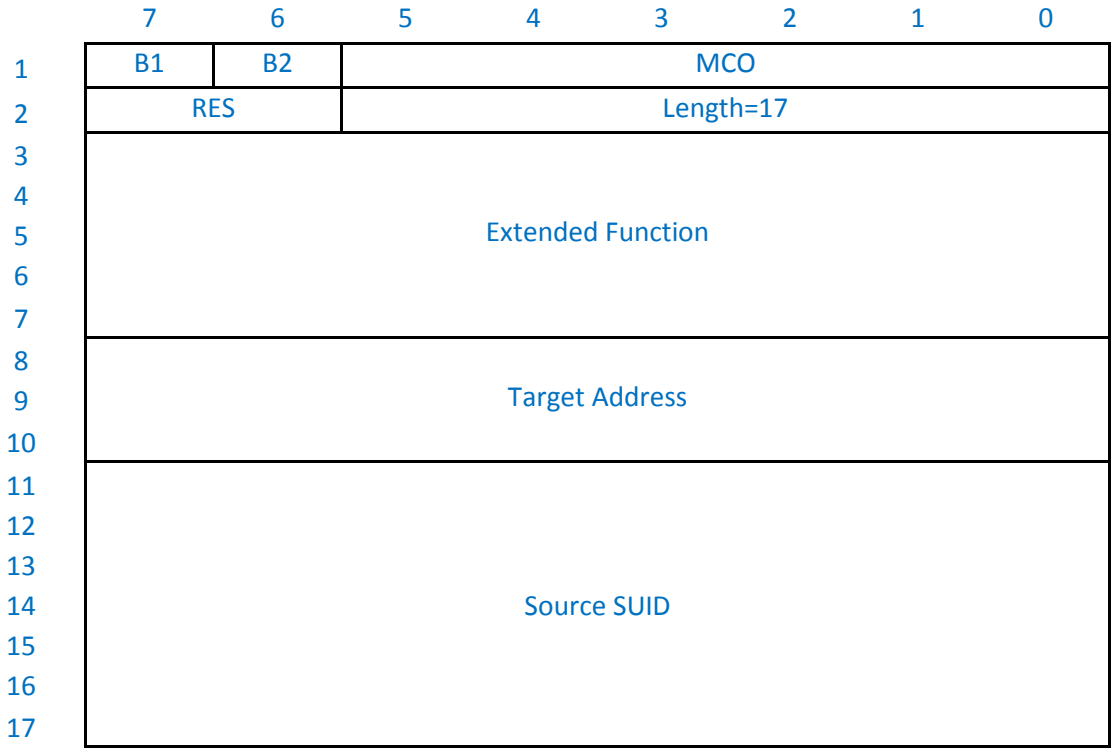
**Figure 8-30 Radio Unit Monitor Enhanced Command - Abbreviated Format**

### 8.3.1.21 Extended Function Command

This message is the transaction addressed to an SU for an extended function. See Table 8-10 for definition of the Extended Function field.


B1 = 0, B2 = 1. MCO = %10 0100.

**Figure 8-42 Extended Function Command –Abbreviated Format**




B1 = 1, B2 = 1. MCO = %10 0100.

**Figure 8-43 Extended Function Command – Extended Format**

### 8.3.1.34 Radio Unit Monitor Command-OBSOLETE

This message is used to command a radio to execute a radio unit monitor operation. See Table 8-10 for field definitions.

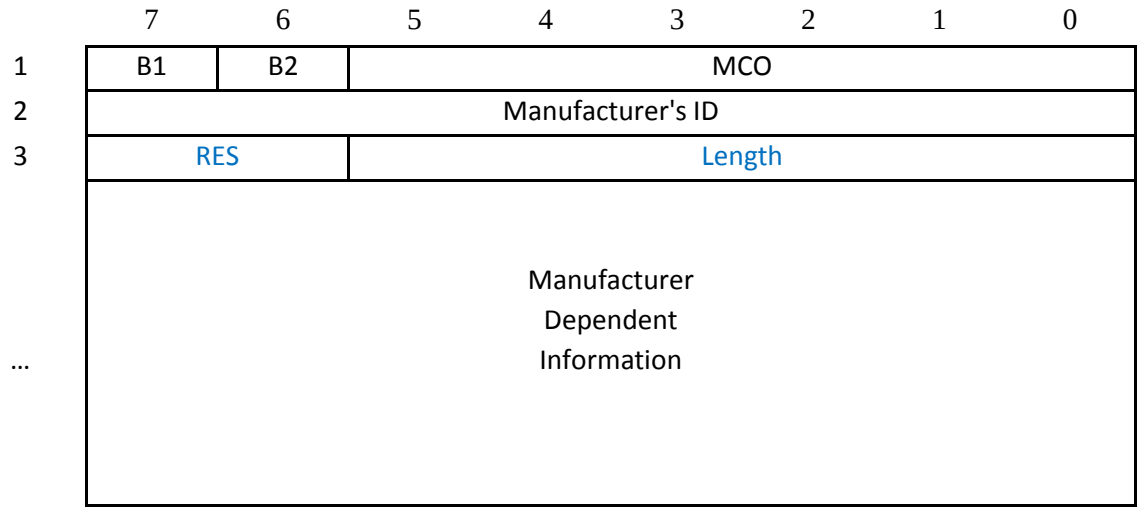
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 1 | B1 | B2 | MCO | | | | | |
| 2 | Reserved | | | | | | | Tx Mult |
| 3 | Source Address | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | Target Address | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

B1 = 0, B2 = 1. MCO = %01 11 01.

Figure 8-60 Radio Unit Monitor Command-OBSOLETE

### 8.3.1.37 Manufacturer Message

The Manufacturer message is shown in Figure 8-63. The length up to the limit of the message format, depends on the manufacturer definition.

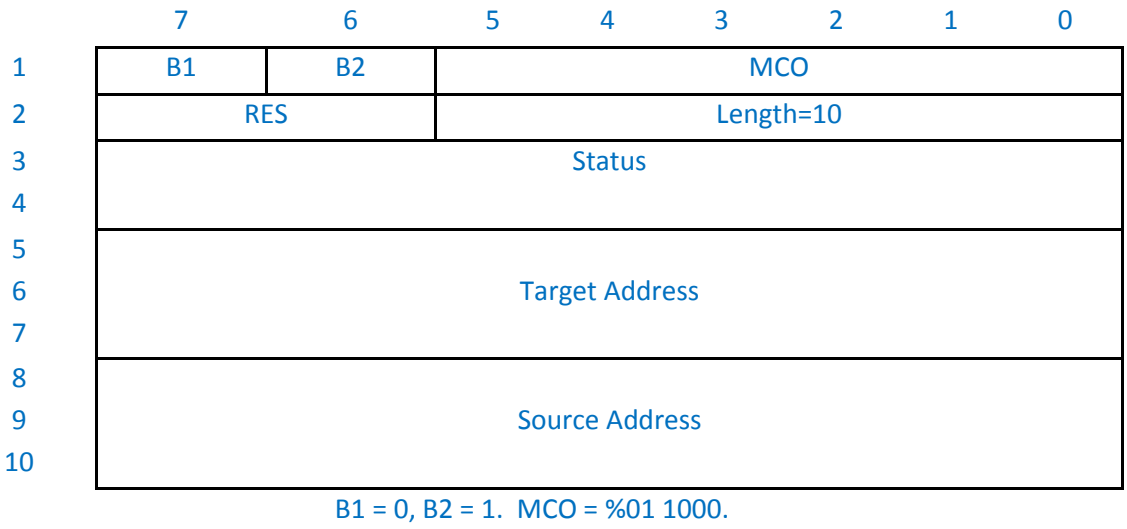



B1 = 1, B2 = 0, MCO values are defined by the manufacturer.

Figure 8-63 Manufacturer Message

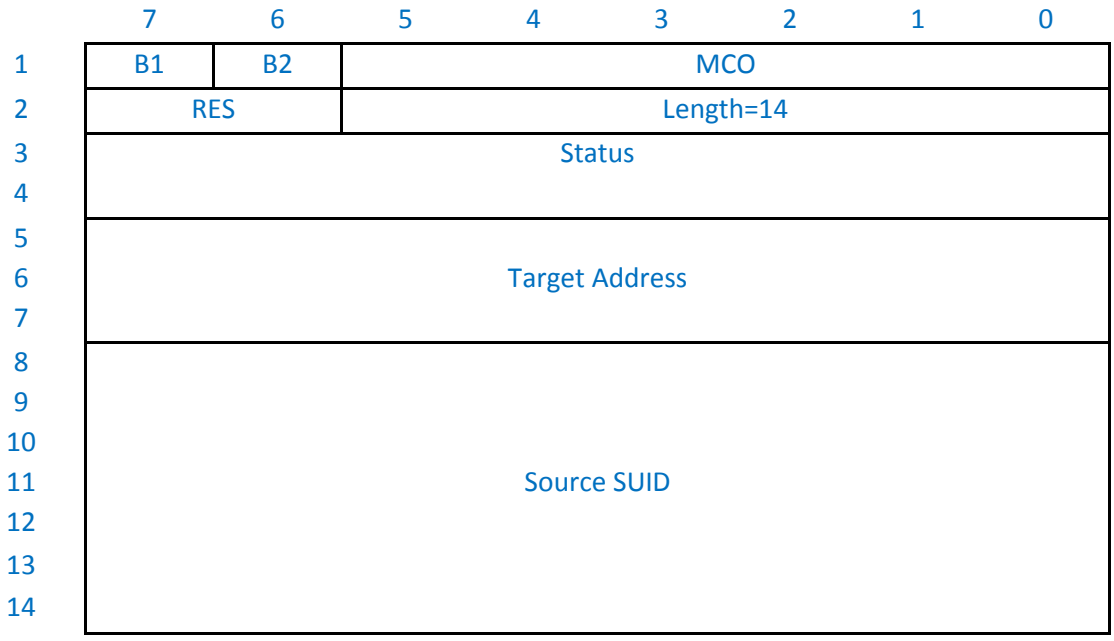
### 8.3.1.42 Status Update

This is the echo of the status update from a subscriber unit when the destination of the update is another subscriber unit via control channel signaling.




B1 = 0, B2 = 1. MCO = %01 1000.

**Figure 8-68 Status Update - Abbreviated Format**

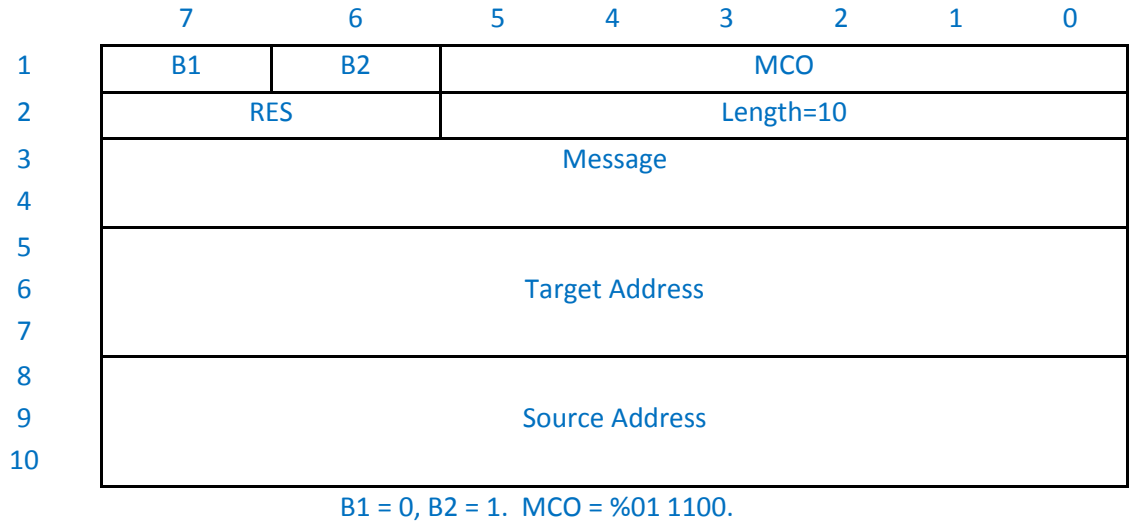



B1 = 1, B2 = 1. MCO = %01 1000.

**Figure 8-69 Status Update - Extended Format**

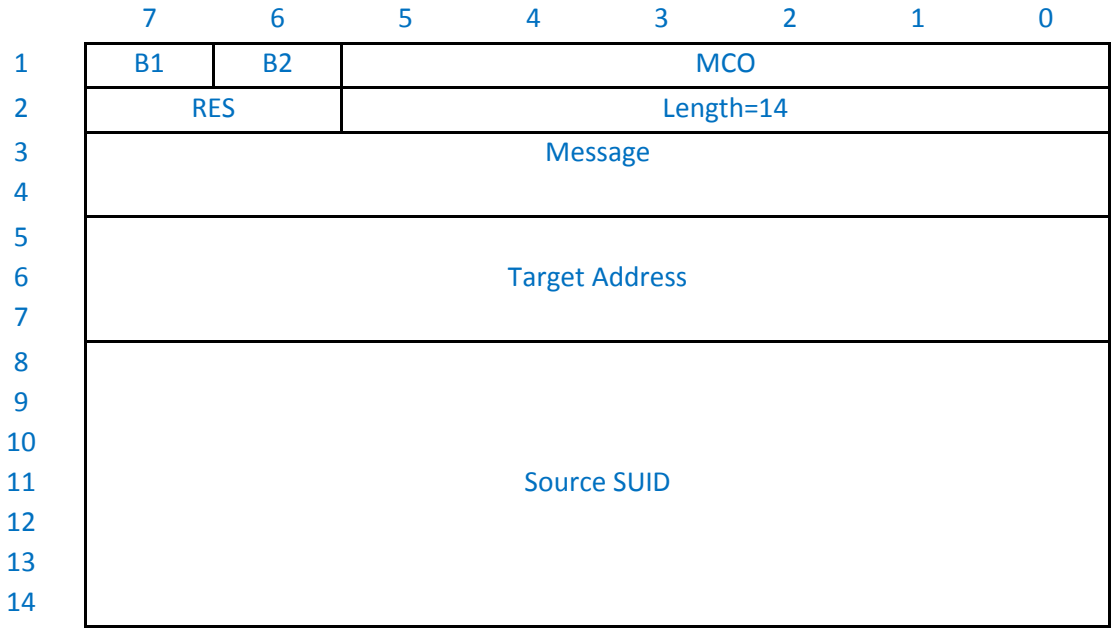
### 8.3.1.43 Message Update

This is the echo of the short data message from a subscriber unit when the destination of the message is another subscriber unit via control channel signaling.




B1 = 0, B2 = 1. MCO = %01 1100.

**Figure 8-70 Message Update- Abbreviated Format**




B1 = 1, B2 = 1. MCO = %01 1100.

**Figure 8-71 Message Update - Extended Format**

### 8.3.1.44 Radio Unit Monitor Command

This is the revised message used to command a radio to execute a radio unit monitor operation. See Table 8-10 for field definitions.

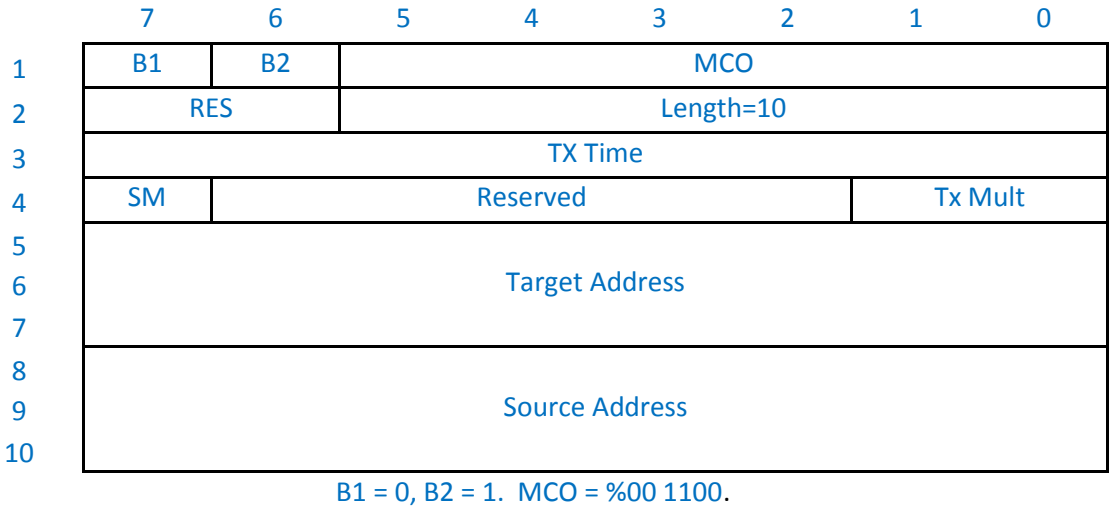
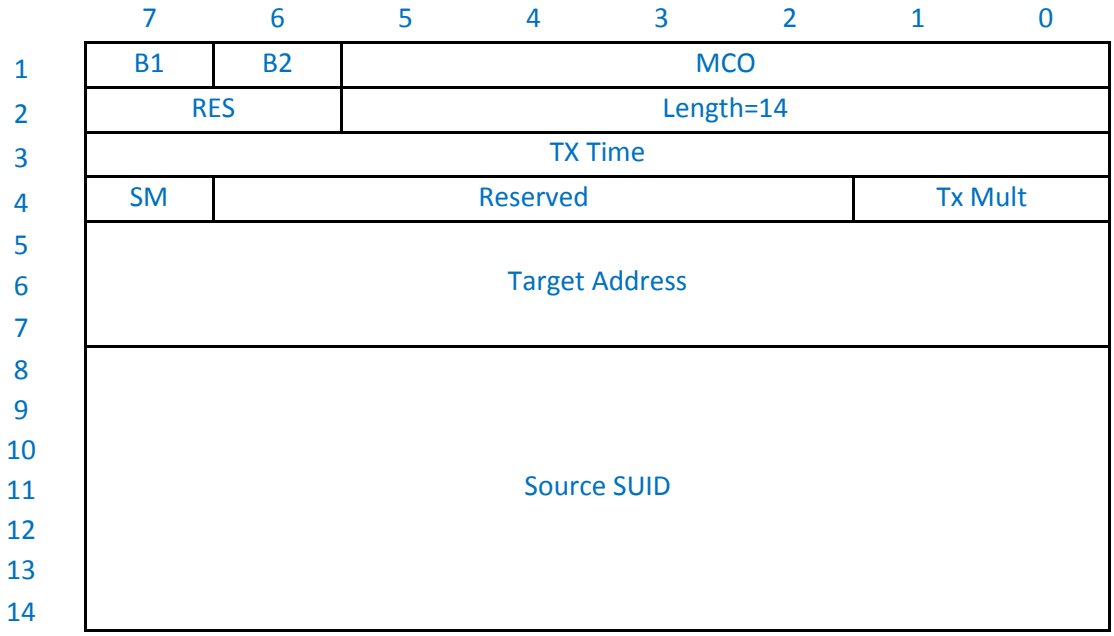



**Figure 8-72 Radio Unit Monitor Command-Abbreviated Format**




B1 = 1, B2 = 1. MCO = %00 1100.

**Figure 8-73 Radio Unit Monitor Command-Extended Format**

### 8.4.2 Offset

The offset field is a 3 bit field that that tells the number of non-SACCH bursts between the current FACCH or SACCH and the first 4V burst in the next voice frame associated with the slot the MAC_PDU occurs in. Special values are also provided for use in the random access SACCH and in cases where no voice frames are anticipated or voice framing is unknown. The offset field is present in all MAC PDUs, both on the FACCH and SACCH and for either inbound or outbound. Table 8-7 provides the valid definitions for the offset field.

**Table 8-7 Offset Values**

| Offset value | Position of the first 4V within the voice burst sequence |
|---|---|
| %000 | First 4V is in the next non-SACCH burst on this slot |
| %001 | First 4V is in the 2nd non-SACCH burst from this position on this slot |
| %010 | First 4V is in the 3rd non-SACCH burst from this position on this slot |
| %011 | First 4V is in the 4th non-SACCH burst from this position on this slot |
| %100 | First 4V is in the 5th non-SACCH burst from this position on this slot |
| %101 | Inbound: Reserved<br><br>Outbound: First 4V is in the 6th non-SACCH burst from this position on this slot |
| %110 | Inbound: For use by SUs transmitting in the Random Access SACCH<br><br>Outbound: Reserved |
| %111 | No voice framing or unknown voice framing |

Note that the offset value of %111 is used when either there is no voice framing or voice framing is not known. For outbound, this could be either during call setup prior to receiving any voice for transmission or during call hangtime when voice has ended. For inbound this value is used the when the SU is transmitting the MAC_END_PTT as no voice follows that signaling burst.

If a change a voice context occurs after it has been signaled in a FACCH or SACCH burst, such as may happen in a console interrupt of a repeated SU transmission, the voice framing is updated to reflect the voice framing of the new call audio source through the insertion of a MAC PDU with an updated offset field at the time of the audio source change.

Figure 8-74 gives examples of how the offset field defined in Table 8-7 would be applied to the full set of voice framing possibilities.

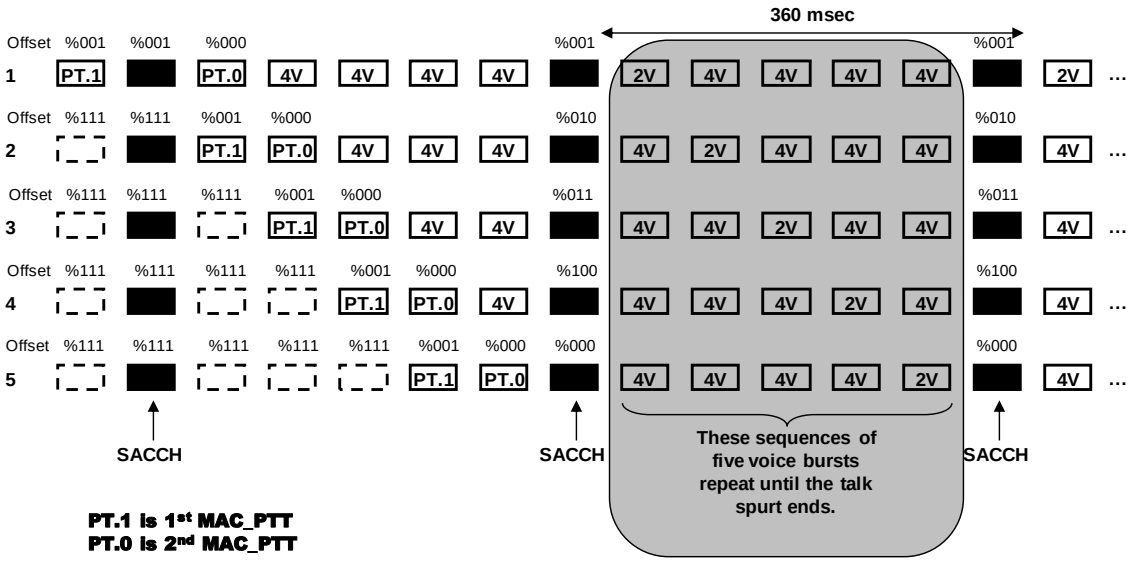



**Figure 8-74 Offset Field Usage**

# ANNEX B OSP MCO Opcode List (Informative)

Table B-1 lists the opcodes from reference [R2] for Outbound Signaling Packets (OSPs). The opcodes used as MCO values in clause 8 are listed in the right-most column with the pertinent subclause number.

**Table B- 1: Reference 2 OSP opcode summary**

| OSP List | | | |
|---|---|---|---|
| Opcode | Description | Alias | Subclause |
| %000000 | Group Voice Channel Grant | GRP_V_CH_GRANT | 8.3.1.7 |
| %000001 | Reserved | | -- |
| %000010 | Group Voice Channel Grant Update | GRP_V_CH_GRANT_UPDT | 8.3.1.8 |
| %000011 | Group Voice Channel Grant Update - Explicit | GRP_V_CH_GRANT_UPDT_EXP | 8.3.1.9 |
| %000100 | Unit To Unit Voice Channel Grant | UU_V_CH_GRANT | 8.3.1.10 |
| %000101 | Unit To Unit Answer Request | UU_ANS_REQ | 8.3.1.11 |
| %000110 | Unit To Unit Voice Channel Grant Update | UU_V_CH_GRANT_UPDT | 8.3.1.14 |
| %000111 | Reserved | | -- |
| %001000 | Telephone Interconnect Voice Channel Grant | TELE_INT_CH_GRANT | -- |
| %001001 | Telephone Interconnect Voice Channel Grant Update | TELE_INT_CH_GRANT_UPDT | -- |
| %001010 | Telephone Interconnect Answer Request | TELE_INT_ANS_REQ | 8.3.1.13 |

| | | | |
|---|---|---|---|
| %001011 | Reserved | | -- |
| %001100 | Reserved | | -- |
| %001101 | Reserved | | -- |
| %001110 | Reserved | | -- |
| %001111 | Reserved | | -- |
| %010000 | Obsolete | | -- |
| %010001 | Obsolete | | -- |
| %010010 | Obsolete | | -- |
| %010011 | Obsolete | | -- |
| %010100 | SNDCP Data Channel Grant | SN-DATA_CHN_GNT | 8.3.1.16 |
| %010101 | SNDCP Data Page Request | SN-DATA_PAGE_REQ | 8.3.1.17 |
| %010110 | SNDCP Data Channel Announcement - Explicit | SN-DATA_CHN_ANN_EXP | 8.3.1.18 |
| %010111 | Reserved | | -- |
| %011000 | Status Update | STS_UPDT | 8.3.1.42 |
| %011001 | Reserved | | -- |
| %011010 | Status Query | STS_Q | 8.3.1.29 |
| %011011 | Reserved | | -- |
| %011100 | Message Update | MSG_UPDT | 8.3.1.43 |
| %011101 | Radio Unit Monitor Command | RAD_MON_CMD | 8.3.1.34 |
| %011110 | Reserved | | -- |
| %011111 | Call Alert | CALL_ALRT | 8.3.1.20 |

**Table B - 1 (concluded)**

| OSP List | | | |
|---|---|---|---|
| Opcode | Description | Alias | Subclause |
| %100000 | Acknowledge Response - FNE | ACK_RSP_FNE | -- |
| %100001 | Queued Response | QUE_RSP | -- |
| %100010 | Reserved | | -- |
| %100011 | Reserved | | -- |
| %100100 | Extended Function Command | EXT_FNCT_CMD | 8.3.1.21 |
| %100101 | Reserved | | -- |
| %100110 | Reserved | | -- |
| %100111 | Deny Response | DENY_RSP | -- |
| %101000 | Group Affiliation Response | GRP_AFF_RSP | -- |
| %101001 | Secondary Control Channel Broadcast - Explicit | SCCB_EXP | 8.3.1.28 |
| %101010 | Group Affiliation Query | GRP_AFF_Q | 8.3.1.22 |
| %101011 | Location Registration Response | LOC_REG_RSP | -- |
| %101100 | Unit Registration Response | U_REG_RSP | -- |
| %101101 | Unit Registration Command | U_REG_CMD | 8.3.1.33 |
| %101110 | Authentication Command | AUTH_CMD | -- |
| %101111 | De-Registration Acknowledge | U_DE_REG_ACK | -- |
| %110000 | Synchronization Broadcast | SYNC_BCST | -- |
| %110001 | Authentication Demand | AUTH_DMD | -- |
| %110010 | Authentication FNE Response | AUTH_FNE_RESP | -- |

| | | | |
|---|---|---|---|
| %110011 | Identifier Update for TDMA | IDEN_UP_TDMA | 8.3.1.36 |
| %110100 | Identifier Update for VHF/UHF Bands | IDEN_UP_VU | 8.3.1.35 |
| %110101 | Time and Date Announcement | TIME_DATE_ANN | -- |
| %110110 | Roaming Address Command | ROAM_ADDR_CMD | -- |
| %110111 | Roaming Address Update | ROAM_ADDR_UPDT | -- |
| %111000 | System Service Broadcast | SYS_SRV_BCST | 8.3.1.32 |
| %111001 | Secondary Control Channel Broadcast | SCCB | 8.3.1.28 |
| %111010 | RFSS Status Broadcast | RFSS_STS_BCST | 8.3.1.27 |
| %111011 | Network Status Broadcast | NET_STS_BCST | 8.3.1.25 |
| %111100 | Adjacent Status Broadcast | ADJ_STS_BCST | 8.3.1.19 |
| %111101 | Identifier Update | IDEN_UP | 8.3.1.23 |
| %111110 | Protection Parameter Broadcast | P_PARM_BCST | -- |
| %111111 | Protection Parameter Update | P_PARM_UPDT | -- |

# Annex E Burst Bit locations (Normative)

This annex contains the precise bit allocations for each of the burst types in Table E- 1 through Table E- 9. The order in which the vocoder bits are placed in the MAC frames is identical to the output of the vocoder as specified in Annex H of TIA102.BABA-1.

**Table E- 1: Inbound 4V Burst Bit Allocations**

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | Ramp-up/Guard | Z | | | 45 | Voice Frame 1 con't | $c_2(4)$ | $c_3(0)$ |
| 1 | | Z | | | 46 | DUID 1 | DUID(3) | DUID(2) |
| 2 | | Z | | | 47 | | $c_0(23)$ | $c_0(5)$ |
| 3 | | Z | | | 48 | | $c_1(10)$ | $c_2(3)$ |
| 4 | | Z | | | 49 | | $c_0(22)$ | $c_0(4)$ |
| 5 | | Z | | | 50 | | $c_1(9)$ | $c_2(2)$ |
| 6 | Pilot | P1(3) | | | 51 | | $c_0(21)$ | $c_0(3)$ |
| 7 | | P1(2) | | | 52 | | $c_1(8)$ | $c_2(1)$ |
| 8 | | P1(1) | | | 53 | | $c_0(20)$ | $c_0(2)$ |
| 9 | | P1(0) | | | 54 | | $c_1(7)$ | $c_2(0)$ |
| 10 | | $c_0(23)$ | $c_0(5)$ | | 55 | | $c_0(19)$ | $c_0(1)$ |
| 11 | | $c_1(10)$ | $c_2(3)$ | | 56 | | $c_1(6)$ | $c_3(13)$ |
| 12 | | $c_0(22)$ | $c_0(4)$ | | 57 | | $c_0(18)$ | $c_0(0)$ |
| 13 | | $c_1(9)$ | $c_2(2)$ | | 58 | | $c_1(5)$ | $c_3(12)$ |
| 14 | | $c_0(21)$ | $c_0(3)$ | | 59 | | $c_0(17)$ | $c_1(22)$ |
| 15 | | $c_1(8)$ | $c_2(1)$ | | 60 | | $c_1(4)$ | $c_3(11)$ |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 16 | Voice Frame 1 | $c_0(20)$ | $c_0(2)$ | | 61 | Voice Frame 2 | $c_0(16)$ | $c_1(21)$ |
| 17 | | $c_1(7)$ | $c_2(0)$ | | 62 | | $c_1(3)$ | $c_3(10)$ |
| 18 | | $c_0(19)$ | $c_0(1)$ | | 63 | | $c_0(15)$ | $c_1(20)$ |
| 19 | | $c_1(6)$ | $c_3(13)$ | | 64 | | $c_1(2)$ | $c_3(9)$ |
| 20 | | $c_0(18)$ | $c_0(0)$ | | 65 | | $c_0(14)$ | $c_1(19)$ |
| 21 | | $c_1(5)$ | $c_3(12)$ | | 66 | | $c_1(1)$ | $c_3(8)$ |
| 22 | | $c_0(17)$ | $c_1(22)$ | | 67 | | $c_0(13)$ | $c_1(18)$ |
| 23 | | $c_1(4)$ | $c_3(11)$ | | 68 | | $c_1(0)$ | $c_3(7)$ |
| 24 | | $c_0(16)$ | $c_1(21)$ | | 69 | | $c_0(12)$ | $c_1(17)$ |
| 25 | | $c_1(3)$ | $c_3(10)$ | | 70 | | $c_2(10)$ | $c_3(6)$ |
| 26 | | $c_0(15)$ | $c_1(20)$ | | 71 | | $c_0(11)$ | $c_1(16)$ |
| 27 | | $c_1(2)$ | $c_3(9)$ | | 72 | | $c_2(9)$ | $c_3(5)$ |
| 28 | | $c_0(14)$ | $c_1(19)$ | | 73 | | $c_0(10)$ | $c_1(15)$ |
| 29 | | $c_1(1)$ | $c_3(8)$ | | 74 | | $c_2(8)$ | $c_3(4)$ |
| 30 | | $c_0(13)$ | $c_1(18)$ | | 75 | | $c_0(9)$ | $c_1(14)$ |
| 31 | | $c_1(0)$ | $c_3(7)$ | | 76 | | $c_2(7)$ | $c_3(3)$ |
| 32 | | $c_0(12)$ | $c_1(17)$ | | 77 | | $c_0(8)$ | $c_1(13)$ |
| 33 | | $c_2(10)$ | $c_3(6)$ | | 78 | | $c_2(6)$ | $c_3(2)$ |
| 34 | | $c_0(11)$ | $c_1(16)$ | | 79 | | $c_0(7)$ | $c_1(12)$ |
| 35 | | $c_2(9)$ | $c_3(5)$ | | 80 | | $c_2(5)$ | $c_3(1)$ |
| 36 | | $c_0(10)$ | $c_1(15)$ | | 81 | | $c_0(6)$ | $c_1(11)$ |
| 37 | | $c_2(8)$ | $c_3(4)$ | | 82 | | $c_2(4)$ | $c_3(0)$ |
| 38 | | $c_0(9)$ | $c_1(14)$ | | 83 | DUID 2 | DUID(1) | DUID(0) |
| 39 | | $c_2(7)$ | $c_3(3)$ | | 84 | ESS-B | ESS-B(23) | ESS-B(22) |
| 40 | | $c_0(8)$ | $c_1(13)$ | | 85 | | ESS-B(21) | ESS-B(20) |
| 41 | | $c_2(6)$ | $c_3(2)$ | | 86 | | ESS-B(19) | ESS-B(18) |
| 42 | | $c_0(7)$ | $c_1(12)$ | | 87 | | ESS-B(17) | ESS-B(16) |
| 43 | | $c_2(5)$ | $c_3(1)$ | | 88 | | ESS-B(15) | ESS-B(14) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 44 | | $c_0$(6) | $c_1$(11) | | 89 | | ESS-B(13) | ESS-B(12) |

**Table E- 1: Inbound 4V Burst Bit Allocations (concluded)**

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 90 | | ESS-B(11) | ESS-B(10) | | 135 | | $c_0$(22) | $c_0$(4) |
| 91 | | ESS-B(9) | ESS-B(8) | | 136 | | $c_1$(9) | $c_2$(2) |
| 92 | ESS-B con't | ESS-B(7) | ESS-B(6) | | 137 | | $c_0$(21) | $c_0$(3) |
| 93 | | ESS-B(5) | ESS-B(4) | | 138 | | $c_1$(8) | $c_2$(1) |
| 94 | | ESS-B(3) | ESS-B(2) | | 139 | | $c_0$(20) | $c_0$(2) |
| 95 | | ESS-B(1) | ESS-B(0) | | 140 | | $c_1$(7) | $c_2$(0) |
| 96 | | $c_0$(23) | $c_0$(5) | | 141 | | $c_0$(19) | $c_0$(1) |
| 97 | | $c_1$(10) | $c_2$(3) | | 142 | | $c_1$(6) | $c_3$(13) |
| 98 | | $c_0$(22) | $c_0$(4) | | 143 | | $c_0$(18) | $c_0$(0) |
| 99 | | $c_1$(9) | $c_2$(2) | | 144 | | $c_1$(5) | $c_3$(12) |
| 100 | | $c_0$(21) | $c_0$(3) | | 145 | | $c_0$(17) | $c_1$(22) |
| 101 | | $c_1$(8) | $c_2$(1) | | 146 | | $c_1$(4) | $c_3$(11) |
| 102 | | $c_0$(20) | $c_0$(2) | | 147 | | $c_0$(16) | $c_1$(21) |
| 103 | | $c_1$(7) | $c_2$(0) | | 148 | | $c_1$(3) | $c_3$(10) |
| 104 | | $c_0$(19) | $c_0$(1) | | 149 | | $c_0$(15) | $c_1$(20) |
| 105 | | $c_1$(6) | $c_3$(13) | | 150 | | $c_1$(2) | $c_3$(9) |
| 106 | | $c_0$(18) | $c_0$(0) | | 151 | | $c_0$(14) | $c_1$(19) |
| 107 | | $c_1$(5) | $c_3$(12) | | 152 | Voice Frame 4 con't | $c_1$(1) | $c_3$(8) |
| 108 | | $c_0$(17) | $c_1$(22) | | 153 | | $c_0$(13) | $c_1$(18) |
| 109 | | $c_1$(4) | $c_3$(11) | | 154 | | $c_1$(0) | $c_3$(7) |
| 110 | | $c_0$(16) | $c_1$(21) | | 155 | | $c_0$(12) | $c_1$(17) |
| 111 | | $c_1$(3) | $c_3$(10) | | 156 | | $c_2$(10) | $c_3$(6) |
| 112 | Voice Frame 3 | $c_0$(15) | $c_1$(20) | | 157 | | $c_0$(11) | $c_1$(16) |
| 113 | | $c_1$(2) | $c_3$(9) | | 158 | | $c_2$(9) | $c_3$(5) |
| 114 | | $c_0$(14) | $c_1$(19) | | 159 | | $c_0$(10) | $c_1$(15) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115 | | $c_1(1)$ | $c_3(8)$ | | 160 | | $c_2(8)$ | $c_3(4)$ |
| 116 | | $c_0(13)$ | $c_1(18)$ | | 161 | | $c_0(9)$ | $c_1(14)$ |
| 117 | | $c_1(0)$ | $c_3(7)$ | | 162 | | $c_2(7)$ | $c_3(3)$ |
| 118 | | $c_0(12)$ | $c_1(17)$ | | 163 | | $c_0(8)$ | $c_1(13)$ |
| 119 | | $c_2(10)$ | $c_3(6)$ | | 164 | | $c_2(6)$ | $c_3(2)$ |
| 120 | | $c_0(11)$ | $c_1(16)$ | | 165 | | $c_0(7)$ | $c_1(12)$ |
| 121 | | $c_2(9)$ | $c_3(5)$ | | 166 | | $c_2(5)$ | $c_3(1)$ |
| 122 | | $c_0(10)$ | $c_1(15)$ | | 167 | | $c_0(6)$ | $c_1(11)$ |
| 123 | | $c_2(8)$ | $c_3(4)$ | | 168 | | $c_2(4)$ | $c_3(0)$ |
| 124 | | $c_0(9)$ | $c_1(14)$ | | 169 | DUID 4 | DUIDparity(1) | DUIDparity(0) |
| 125 | | $c_2(7)$ | $c_3(3)$ | | 170 | | P2(3) | |
| 126 | | $c_0(8)$ | $c_1(13)$ | | 171 | | P2(2) | |
| 127 | | $c_2(6)$ | $c_3(2)$ | | 172 | Pilot | P2(1) | |
| 128 | | $c_0(7)$ | $c_1(12)$ | | 173 | | P2(0) | |
| 129 | | $c_2(5)$ | $c_3(1)$ | | 174 | | Z | |
| 130 | | $c_0(6)$ | $c_1(11)$ | | 175 | | Z | |
| 131 | | $c_2(4)$ | $c_3(0)$ | | 176 | Ramp-Down/Guard | Z | |
| 132 | DUID 3 | DUIDparity(3) | DUIDparity(2) | | 177 | | Z | |
| 133 | Voice Frame 4 | $c_0(23)$ | $c_0(5)$ | | 178 | | Z | |
| 134 | | $c_1(10)$ | $c_2(3)$ | | 179 | | Z | |

**Table E- 2:Inbound 4V Burst ESS Bit Allocations**

| Field | 4V Burst 1 | 4V Burst 2 | 4V Burst 3 | 4V Burst 4 |
|---|---|---|---|---|
| ESS-B(23) | ALGID(7) | MI(71) | MI(47) | MI(23) |
| ESS-B(22) | ALGID(6) | MI(70) | MI(46) | MI(22) |
| ESS-B(21) | ALGID(5) | MI(69) | MI(45) | MI(21) |
| ESS-B(20) | ALGID(4) | MI(68) | MI(44) | MI(20) |
| ESS-B(19) | ALGID(3) | MI(67) | MI(43) | MI(19) |
| ESS-B(18) | ALGID(2) | MI(66) | MI(42) | MI(18) |
| ESS-B(17) | ALGID(1) | MI(65) | MI(41) | MI(17) |
| ESS-B(16) | ALGID(0) | MI(64) | MI(40) | MI(16) |
| ESS-B(15) | KID(15) | MI(63) | MI(39) | MI(15) |
| ESS-B(14) | KID(14) | MI(62) | MI(38) | MI(14) |
| ESS-B(13) | KID(13) | MI(61) | MI(37) | MI(13) |
| ESS-B(12) | KID(12) | MI(60) | MI(36) | MI(12) |
| ESS-B(11) | KID(11) | MI(59) | MI(35) | MI(11) |
| ESS-B(10) | KID(10) | MI(58) | MI(34) | MI(10) |
| ESS-B(9) | KID(9) | MI(57) | MI(33) | MI(9) |
| ESS-B(8) | KID(8) | MI(56) | MI(32) | MI(8) |
| ESS-B(7) | KID(7) | MI(55) | MI(31) | MI(7) |
| ESS-B(6) | KID(6) | MI(54) | MI(30) | MI(6) |
| ESS-B(5) | KID(5) | MI(53) | MI(29) | MI(5) |
| ESS-B(4) | KID(4) | MI(52) | MI(28) | MI(4) |

| | | | | |
|---|---|---|---|---|
| ESS-B(3) | KID(3) | MI(51) | MI(27) | MI(3) |
| ESS-B(2) | KID(2) | MI(50) | MI(26) | MI(2) |
| ESS-B(1) | KID(1) | MI(49) | MI(25) | MI(1) |
| ESS-B(0) | KID(0) | MI(48) | MI(24) | MI(0) |

The ESS information contained in the inbound 4V bursts is defined in Table E- 2 by which of the four 4V bursts in the sequence as explained in 5.6.2 and 6.1.

## Table E- 3: Inbound 2V Burst Bit Allocations

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | Ramp-up/Guard | Z | | | 45 | Voice Frame 1 con't | $c_2(4)$ | $c_3(0)$ |
| 1 | | Z | | | 46 | DUID 1 | DUID(3) | DUID(2) |
| 2 | | Z | | | 47 | Voice Frame 2 | $c_0(23)$ | $c_0(5)$ |
| 3 | | Z | | | 48 | | $c_1(10)$ | $c_2(3)$ |
| 4 | | Z | | | 49 | | $c_0(22)$ | $c_0(4)$ |
| 5 | | Z | | | 50 | | $c_1(9)$ | $c_2(2)$ |
| 6 | Pilot | P1(3) | | | 51 | | $c_0(21)$ | $c_0(3)$ |
| 7 | | P1(2) | | | 52 | | $c_1(8)$ | $c_2(1)$ |
| 8 | | P1(1) | | | 53 | | $c_0(20)$ | $c_0(2)$ |
| 9 | | P1(0) | | | 54 | | $c_1(7)$ | $c_2(0)$ |
| 10 | | $c_0(23)$ | $c_0(5)$ | | 55 | | $c_0(19)$ | $c_0(1)$ |
| 11 | | $c_1(10)$ | $c_2(3)$ | | 56 | | $c_1(6)$ | $c_3(13)$ |
| 12 | | $c_0(22)$ | $c_0(4)$ | | 57 | | $c_0(18)$ | $c_0(0)$ |
| 13 | | $c_1(9)$ | $c_2(2)$ | | 58 | | $c_1(5)$ | $c_3(12)$ |
| 14 | | $c_0(21)$ | $c_0(3)$ | | 59 | | $c_0(17)$ | $c_1(22)$ |
| 15 | | $c_1(8)$ | $c_2(1)$ | | 60 | | $c_1(4)$ | $c_3(11)$ |
| 16 | | $c_0(20)$ | $c_0(2)$ | | 61 | | $c_0(16)$ | $c_1(21)$ |
| 17 | | $c_1(7)$ | $c_2(0)$ | | 62 | | $c_1(3)$ | $c_3(10)$ |
| 18 | | $c_0(19)$ | $c_0(1)$ | | 63 | | $c_0(15)$ | $c_1(20)$ |
| 19 | | $c_1(6)$ | $c_3(13)$ | | 64 | | $c_1(2)$ | $c_3(9)$ |
| 20 | | $c_0(18)$ | $c_0(0)$ | | 65 | | $c_0(14)$ | $c_1(19)$ |
| 21 | | $c_1(5)$ | $c_3(12)$ | | 66 | | $c_1(1)$ | $c_3(8)$ |
| 22 | | $c_0(17)$ | $c_1(22)$ | | 67 | | $c_0(13)$ | $c_1(18)$ |
| 23 | | $c_1(4)$ | $c_3(11)$ | | 68 | | $c_1(0)$ | $c_3(7)$ |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 24 | Voice Frame 1 | $c_0(16)$ | $c_1(21)$ | | 69 | | $c_0(12)$ | $c_1(17)$ |
| 25 | | $c_1(3)$ | $c_3(10)$ | | 70 | | $c_2(10)$ | $c_3(6)$ |
| 26 | | $c_0(15)$ | $c_1(20)$ | | 71 | | $c_0(11)$ | $c_1(16)$ |
| 27 | | $c_1(2)$ | $c_3(9)$ | | 72 | | $c_2(9)$ | $c_3(5)$ |
| 28 | | $c_0(14)$ | $c_1(19)$ | | 73 | | $c_0(10)$ | $c_1(15)$ |
| 29 | | $c_1(1)$ | $c_3(8)$ | | 74 | | $c_2(8)$ | $c_3(4)$ |
| 30 | | $c_0(13)$ | $c_1(18)$ | | 75 | | $c_0(9)$ | $c_1(14)$ |
| 31 | | $c_1(0)$ | $c_3(7)$ | | 76 | | $c_2(7)$ | $c_3(3)$ |
| 32 | | $c_0(12)$ | $c_1(17)$ | | 77 | | $c_0(8)$ | $c_1(13)$ |
| 33 | | $c_2(10)$ | $c_3(6)$ | | 78 | | $c_2(6)$ | $c_3(2)$ |
| 34 | | $c_0(11)$ | $c_1(16)$ | | 79 | | $c_0(7)$ | $c_1(12)$ |
| 35 | | $c_2(9)$ | $c_3(5)$ | | 80 | | $c_2(5)$ | $c_3(1)$ |
| 36 | | $c_0(10)$ | $c_1(15)$ | | 81 | | $c_0(6)$ | $c_1(11)$ |
| 37 | | $c_2(8)$ | $c_3(4)$ | | 82 | | $c_2(4)$ | $c_3(0)$ |
| 38 | | $c_0(9)$ | $c_1(14)$ | | 83 | DUID 2 | DUID(1) | DUID(0) |
| 39 | | $c_2(7)$ | $c_3(3)$ | | 84 | | RS_parity(167) | RS_parity(166) |
| 40 | | $c_0(8)$ | $c_1(13)$ | | 85 | | RS_parity(165) | RS_parity(164) |
| 41 | | $c_2(6)$ | $c_3(2)$ | | 86 | | RS_parity(163) | RS_parity(162) |
| 42 | | $c_0(7)$ | $c_1(12)$ | | 87 | ESS-A 1 | RS_parity(161) | RS_parity(160) |
| 43 | | $c_2(5)$ | $c_3(1)$ | | 88 | | RS_parity(159) | RS_parity(158) |
| 44 | | $c_0(6)$ | $c_1(11)$ | | 89 | | RS_parity(157) | RS_parity(156) |

**Table E- 3: Inbound 2V Burst Bit Allocations (concluded)**

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 90 | | RS_parity(155) | RS_parity(154) | | 135 | | RS_parity(67) | RS_parity(66) |
| 91 | | RS_parity(153) | RS_parity(152) | | 136 | | RS_parity(65) | RS_parity(64) |
| 92 | | RS_parity(151) | RS_parity(150) | | 137 | | RS_parity(63) | RS_parity(62) |
| 93 | | RS_parity(149) | RS_parity(148) | | 138 | | RS_parity(61) | RS_parity(60) |
| 94 | | RS_parity(147) | RS_parity(146) | | 139 | | RS_parity(59) | RS_parity(58) |
| 95 | | RS_parity(145) | RS_parity(144) | | 140 | | RS_parity(57) | RS_parity(56) |
| 96 | | RS_parity(143) | RS_parity(142) | | 141 | | RS_parity(55) | RS_parity(54) |
| 97 | | RS_parity(141) | RS_parity(140) | | 142 | | RS_parity(53) | RS_parity(52) |
| 98 | | RS_parity(139) | RS_parity(138) | | 143 | | RS_parity(51) | RS_parity(50) |
| 99 | | RS_parity(137) | RS_parity(136) | | 144 | | RS_parity(49) | RS_parity(48) |
| 100 | | RS_parity(135) | RS_parity(134) | | 145 | | RS_parity(47) | RS_parity(46) |
| 101 | | RS_parity(133) | RS_parity(132) | | 146 | | RS_parity(45) | RS_parity(44) |
| 102 | | RS_parity(131) | RS_parity(130) | | 147 | | RS_parity(43) | RS_parity(42) |
| 103 | | RS_parity(129) | RS_parity(128) | | 148 | | RS_parity(41) | RS_parity(40) |
| 104 | | RS_parity(127) | RS_parity(126) | | 149 | | RS_parity(39) | RS_parity(38) |
| 105 | | RS_parity(125) | RS_parity(124) | | 150 | | RS_parity(37) | RS_parity(36) |
| 106 | | RS_parity(123) | RS_parity(122) | | 151 | ESS-A 2 con't | RS_parity(35) | RS_parity(34) |
| 107 | | RS_parity(121) | RS_parity(120) | | 152 | | RS_parity(33) | RS_parity(32) |
| 108 | | RS_parity(119) | RS_parity(118) | | 153 | | RS_parity(31) | RS_parity(30) |
| 109 | | RS_parity(117) | RS_parity(116) | | 154 | | RS_parity(29) | RS_parity(28) |
| 110 | | RS_parity(115) | RS_parity(114) | | 155 | | RS_parity(27) | RS_parity(26) |
| 111 | ESS-A 1 con't | RS_parity(113) | RS_parity(112) | | 156 | | RS_parity(25) | RS_parity(24) |
| 112 | | RS_parity(111) | RS_parity(110) | | 157 | | RS_parity(23) | RS_parity(22) |
| 113 | | RS_parity(109) | RS_parity(108) | | 158 | | RS_parity(21) | RS_parity(20) |
| 114 | | RS_parity(107) | RS_parity(106) | | 159 | | RS_parity(19) | RS_parity(18) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115 | | RS_parity(105) | RS_parity(104) | | 160 | | RS_parity(17) | RS_parity(16) |
| 116 | | RS_parity(103) | RS_parity(102) | | 161 | | RS_parity(15) | RS_parity(14) |
| 117 | | RS_parity(101) | RS_parity(100) | | 162 | | RS_parity(13) | RS_parity(12) |
| 118 | | RS_parity(99) | RS_parity(98) | | 163 | | RS_parity(11) | RS_parity(10) |
| 119 | | RS_parity(97) | RS_parity(96) | | 164 | | RS_parity(9) | RS_parity(8) |
| 120 | | RS_parity(95) | RS_parity(94) | | 165 | | RS_parity(7) | RS_parity(6) |
| 121 | | RS_parity(93) | RS_parity(92) | | 166 | | RS_parity(5) | RS_parity(4) |
| 122 | | RS_parity(91) | RS_parity(90) | | 167 | | RS_parity(3) | RS_parity(2) |
| 123 | | RS_parity(89) | RS_parity(88) | | 168 | | RS_parity(1) | RS_parity(0) |
| 124 | | RS_parity(87) | RS_parity(86) | | 169 | DUID 4 | DUIDparity(1) | DUIDparity(0) |
| 125 | | RS_parity(85) | RS_parity(84) | | 170 | | P2(3) | |
| 126 | | RS_parity(83) | RS_parity(82) | | 171 | | **1.1.1** P2(2) | |
| 127 | | RS_parity(81) | RS_parity(80) | | 172 | Pilot | P2(1) | |
| 128 | | RS_parity(79) | RS_parity(78) | | 173 | | P2(0) | |
| 129 | | RS_parity(77) | RS_parity(76) | | 174 | | Z | |
| 130 | | RS_parity(75) | RS_parity(74) | | 175 | | Z | |
| 131 | | RS_parity(73) | RS_parity(72) | | 176 | Ramp-Down/Guard | Z | |
| 132 | DUID 3 | DUIDparity(3) | DUIDparity(2) | | 177 | | Z | |
| 133 | | RS_parity(71) | RS_parity(70) | | 178 | | Z | |
| 134 | ESS-A 2 | RS_parity(69) | RS_parity(68) | | 179 | | Z | |

## Table E- 4: Inbound Signaling with Sync Burst Bit Allocations

| Symbol | Field | Bit 1 | Bit 0 | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| 0 | Ramp-up/Guard | Z | | 45 | IEMI 1 con't | IEMI(121) | IEMI(120) |
| 1 | | Z | | 46 | DUID 1 | DUID(3) | DUID(2) |
| 2 | | Z | | 47 | IEMI 2 | IEMI(119) | IEMI(118) |
| 3 | | Z | | 48 | | IEMI(117) | IEMI(116) |
| 4 | | Z | | 49 | | IEMI(115) | IEMI(114) |
| 5 | | Z | | 50 | | IEMI(113) | IEMI(112) |
| 6 | Sync | S(21) | | 51 | | IEMI(111) | IEMI(110) |
| 7 | | S(20) | | 52 | | IEMI(109) | IEMI(108) |
| 8 | | S(19) | | 53 | | IEMI(107) | IEMI(106) |
| 9 | | S(18) | | 54 | | IEMI(105) | IEMI(104) |
| 10 | | S(17) | | 55 | | IEMI(103) | IEMI(102) |
| 11 | | S(16) | | 56 | | IEMI(101) | IEMI(100) |
| 12 | | S(15) | | 57 | | IEMI(99) | IEMI(98) |
| 13 | | S(14) | | 58 | | IEMI(97) | IEMI(96) |
| 14 | | S(13) | | 59 | | IEMI(95) | IEMI(94) |
| 15 | | S(12) | | 60 | | IEMI(93) | IEMI(92) |
| 16 | | S(11) | | 61 | | IEMI(91) | IEMI(90) |
| 17 | | S(10) | | 62 | | IEMI(89) | IEMI(88) |
| 18 | | S(9) | | 63 | | IEMI(87) | IEMI(86) |
| 19 | | S(8) | | 64 | | IEMI(85) | IEMI(84) |
| 20 | | S(7) | | 65 | | IEMI(83) | IEMI(82) |
| 21 | | S(6) | | 66 | | IEMI(81) | IEMI(80) |
| 22 | | S(5) | | 67 | | IEMI(79) | IEMI(78) |
| 23 | | S(4) | | 68 | | IEMI(77) | IEMI(76) |
| 24 | | S(3) | | 69 | | IEMI(75) | IEMI(74) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25 | | S(2) | | | 70 | | IEMI(73) | IEMI(72) |
| 26 | | S(1) | | | 71 | | IEMI(71) | IEMI(70) |
| 27 | | S(0) | | | 72 | | IEMI(69) | IEMI(68) |
| 28 | | IEMI(155) | IEMI(154) | | 73 | | IEMI(67) | IEMI(66) |
| 29 | | IEMI(153) | IEMI(152) | | 74 | | IEMI(65) | IEMI(64) |
| 30 | | IEMI(151) | IEMI(150) | | 75 | | IEMI(63) | IEMI(62) |
| 31 | | IEMI(149) | IEMI(148) | | 76 | | IEMI(61) | IEMI(60) |
| 32 | | IEMI(147) | IEMI(146) | | 77 | | IEMI(59) | IEMI(58) |
| 33 | | IEMI(145) | IEMI(144) | | 78 | | IEMI(57) | IEMI(56) |
| 34 | | IEMI(143) | IEMI(142) | | 79 | | IEMI(55) | IEMI(54) |
| 35 | | IEMI(141) | IEMI(140) | | 80 | | IEMI(53) | IEMI(52) |
| 36 | | IEMI(139) | IEMI(138) | | 81 | | IEMI(51) | IEMI(50) |
| 37 | IEMI 1 | IEMI(137) | IEMI(136) | | 82 | | IEMI(49) | IEMI(48) |
| 38 | | IEMI(135) | IEMI(134) | | 83 | DUID 2 | DUID(1) | DUID(0) |
| 39 | | IEMI(133) | IEMI(132) | | 84 | | IEMI(47) | IEMI(46) |
| 40 | | IEMI(131) | IEMI(130) | | 85 | | IEMI(45) | IEMI(44) |
| 41 | | IEMI(129) | IEMI(128) | | 86 | | IEMI(43) | IEMI(42) |
| 42 | | IEMI(127) | IEMI(126) | | 87 | IEMI 3 | IEMI(41) | IEMI(40) |
| 43 | | IEMI(125) | IEMI(124) | | 88 | | IEMI(39) | IEMI(38) |
| 44 | | IEMI(123) | IEMI(122) | | 89 | | IEMI(37) | IEMI(36) |

**Table E- 4: Inbound Signaling with Sync Burst Bit Allocations (concluded)**

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 90 | | IEMI(35) | IEMI(34) | | 135 | | RS_parity(67) | RS_parity(66) |
| 91 | | IEMI(33) | IEMI(32) | | 136 | | RS_parity(65) | RS_parity(64) |
| 92 | | IEMI(31) | IEMI(30) | | 137 | | RS_parity(63) | RS_parity(62) |
| 93 | | IEMI(29) | IEMI(28) | | 138 | | RS_parity(61) | RS_parity(60) |
| 94 | | IEMI(27) | IEMI(26) | | 139 | | RS_parity(59) | RS_parity(58) |
| 95 | | IEMI(25) | IEMI(24) | | 140 | | RS_parity(57) | RS_parity(56) |
| 96 | | IEMI(23) | IEMI(22) | | 141 | | RS_parity(55) | RS_parity(54) |
| 97 | | IEMI(21) | IEMI(20) | | 142 | | RS_parity(53) | RS_parity(52) |
| 98 | | IEMI(19) | IEMI(18) | | 143 | | RS_parity(51) | RS_parity(50) |
| 99 | | IEMI(17) | IEMI(16) | | 144 | | RS_parity(49) | RS_parity(48) |
| 100 | | IEMI(15) | IEMI(14) | | 145 | | RS_parity(47) | RS_parity(46) |
| 101 | | IEMI(13) | IEMI(12) | | 146 | | RS_parity(45) | RS_parity(44) |
| 102 | | IEMI(11) | IEMI(10) | | 147 | | RS_parity(43) | RS_parity(42) |
| 103 | | IEMI(9) | IEMI(8) | | 148 | | RS_parity(41) | RS_parity(40) |
| 104 | | IEMI(7) | IEMI(6) | | 149 | | RS_parity(39) | RS_parity(38) |
| 105 | | IEMI(5) | IEMI(4) | | 150 | | RS_parity(37) | RS_parity(36) |
| 106 | | IEMI(3) | IEMI(2) | | 151 | | RS_parity(35) | RS_parity(34) |
| 107 | | IEMI(1) | IEMI(0) | | 152 | IEMI 4 con't | RS_parity(33) | RS_parity(32) |
| 108 | | RS_parity(119) | RS_parity(118) | | 153 | | RS_parity(31) | RS_parity(30) |
| 109 | | RS_parity(117) | RS_parity(116) | | 154 | | RS_parity(29) | RS_parity(28) |
| 110 | IEMI 3 con't | RS_parity(115) | RS_parity(114) | | 155 | | RS_parity(27) | RS_parity(26) |
| 111 | | RS_parity(113) | RS_parity(112) | | 156 | | RS_parity(25) | RS_parity(24) |
| 112 | | RS_parity(111) | RS_parity(110) | | 157 | | RS_parity(23) | RS_parity(22) |
| 113 | | RS_parity(109) | RS_parity(108) | | 158 | | RS_parity(21) | RS_parity(20) |
| 114 | | RS_parity(107) | RS_parity(106) | | 159 | | RS_parity(19) | RS_parity(18) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115 | | RS_parity(105) | RS_parity(104) | | 160 | | RS_parity(17) | RS_parity(16) |
| 116 | | RS_parity(103) | RS_parity(102) | | 161 | | RS_parity(15) | RS_parity(14) |
| 117 | | RS_parity(101) | RS_parity(100) | | 162 | | RS_parity(13) | RS_parity(12) |
| 118 | | RS_parity(99) | RS_parity(98) | | 163 | | RS_parity(11) | RS_parity(10) |
| 119 | | RS_parity(97) | RS_parity(96) | | 164 | | RS_parity(9) | RS_parity(8) |
| 120 | | RS_parity(95) | RS_parity(94) | | 165 | | RS_parity(7) | RS_parity(6) |
| 121 | | RS_parity(93) | RS_parity(92) | | 166 | | RS_parity(5) | RS_parity(4) |
| 122 | | RS_parity(91) | RS_parity(90) | | 167 | | RS_parity(3) | RS_parity(2) |
| 123 | | RS_parity(89) | RS_parity(88) | | 168 | | RS_parity(1) | RS_parity(0) |
| 124 | | RS_parity(87) | RS_parity(86) | | 169 | DUID 4 | DUIDparity(1) | DUIDparity(0) |
| 125 | | RS_parity(85) | RS_parity(84) | | 170 | | P2(3) | |
| 126 | | RS_parity(83) | RS_parity(82) | | 171 | | P2(2) | |
| 127 | | RS_parity(81) | RS_parity(80) | | 172 | Pilot | P2(1) | |
| 128 | | RS_parity(79) | RS_parity(78) | | 173 | | P2(0) | |
| 129 | | RS_parity(77) | RS_parity(76) | | 174 | | Z | |
| 130 | | RS_parity(75) | RS_parity(74) | | 175 | | Z | |
| 131 | | RS_parity(73) | RS_parity(72) | | 176 | Ramp-Down/Guard | Z | |
| 132 | DUID 3 | DUIDparity(3) | DUIDparity(2) | | 177 | | Z | |
| 133 | | RS_parity(71) | RS_parity(70) | | 178 | | Z | |
| 134 | IEMI 4 | RS_parity(69) | RS_parity(68) | | 179 | | Z | |

## Table E- 5: Outbound 4V Burst Bit Allocations

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | 2nd Half of Previous burst's ISCH | ISCH(19) | ISCH(18) | | 45 | Voice Frame 1 con't | $c_0(6)$ | $c_1(11)$ |
| 1 | | ISCH(17) | ISCH(16) | | 46 | | $c_2(4)$ | $c_3(0)$ |
| 2 | | ISCH(15) | ISCH(14) | | 47 | DUID 2 | DUID(1) | DUID(0) |
| 3 | | ISCH(13) | ISCH(12) | | 48 | Voice Frame 2 | $c_0(23)$ | $c_0(5)$ |
| 4 | | ISCH(11) | ISCH(10) | | 49 | | $c_1(10)$ | $c_2(3)$ |
| 5 | | ISCH(9) | ISCH(8) | | 50 | | $c_0(22)$ | $c_0(4)$ |
| 6 | | ISCH(7) | ISCH(6) | | 51 | | $c_1(9)$ | $c_2(2)$ |
| 7 | | ISCH(5) | ISCH(4) | | 52 | | $c_0(21)$ | $c_0(3)$ |
| 8 | | ISCH(3) | ISCH(2) | | 53 | | $c_1(8)$ | $c_2(1)$ |
| 9 | | ISCH(1) | ISCH(0) | | 54 | | $c_0(20)$ | $c_0(2)$ |
| 10 | DUID 1 | DUID(3) | DUID(2) | | 55 | | $c_1(7)$ | $c_2(0)$ |
| 11 | | $c_0(23)$ | $c_0(5)$ | | 56 | | $c_0(19)$ | $c_0(1)$ |
| 12 | | $c_1(10)$ | $c_2(3)$ | | 57 | | $c_1(6)$ | $c_3(13)$ |
| 13 | | $c_0(22)$ | $c_0(4)$ | | 58 | | $c_0(18)$ | $c_0(0)$ |
| 14 | | $c_1(9)$ | $c_2(2)$ | | 59 | | $c_1(5)$ | $c_3(12)$ |
| 15 | | $c_0(21)$ | $c_0(3)$ | | 60 | | $c_0(17)$ | $c_1(22)$ |
| 16 | | $c_1(8)$ | $c_2(1)$ | | 61 | | $c_1(4)$ | $c_3(11)$ |
| 17 | | $c_0(20)$ | $c_0(2)$ | | 62 | | $c_0(16)$ | $c_1(21)$ |
| 18 | | $c_1(7)$ | $c_2(0)$ | | 63 | | $c_1(3)$ | $c_3(10)$ |
| 19 | | $c_0(19)$ | $c_0(1)$ | | 64 | | $c_0(15)$ | $c_1(20)$ |
| 20 | | $c_1(6)$ | $c_3(13)$ | | 65 | | $c_1(2)$ | $c_3(9)$ |
| 21 | | $c_0(18)$ | $c_0(0)$ | | 66 | | $c_0(14)$ | $c_1(19)$ |
| 22 | | $c_1(5)$ | $c_3(12)$ | | 67 | | $c_1(1)$ | $c_3(8)$ |
| 23 | | $c_0(17)$ | $c_1(22)$ | | 68 | | $c_0(13)$ | $c_1(18)$ |
| 24 | | $c_1(4)$ | $c_3(11)$ | | 69 | | $c_1(0)$ | $c_3(7)$ |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25 | Voice Frame 1 | $c_0(16)$ | $c_1(21)$ | | 70 | | $c_0(12)$ | $c_1(17)$ |
| 26 | | $c_1(3)$ | $c_3(10)$ | | 71 | | $c_2(10)$ | $c_3(6)$ |
| 27 | | $c_0(15)$ | $c_1(20)$ | | 72 | | $c_0(11)$ | $c_1(16)$ |
| 28 | | $c_1(2)$ | $c_3(9)$ | | 73 | | $c_2(9)$ | $c_3(5)$ |
| 29 | | $c_0(14)$ | $c_1(19)$ | | 74 | | $c_0(10)$ | $c_1(15)$ |
| 30 | | $c_1(1)$ | $c_3(8)$ | | 75 | | $c_2(8)$ | $c_3(4)$ |
| 31 | | $c_0(13)$ | $c_1(18)$ | | 76 | | $c_0(9)$ | $c_1(14)$ |
| 32 | | $c_1(0)$ | $c_3(7)$ | | 77 | | $c_2(7)$ | $c_3(3)$ |
| 33 | | $c_0(12)$ | $c_1(17)$ | | 78 | | $c_0(8)$ | $c_1(13)$ |
| 34 | | $c_2(10)$ | $c_3(6)$ | | 79 | | $c_2(6)$ | $c_3(2)$ |
| 35 | | $c_0(11)$ | $c_1(16)$ | | 80 | | $c_0(7)$ | $c_1(12)$ |
| 36 | | $c_2(9)$ | $c_3(5)$ | | 81 | | $c_2(5)$ | $c_3(1)$ |
| 37 | | $c_0(10)$ | $c_1(15)$ | | 82 | | $c_0(6)$ | $c_1(11)$ |
| 38 | | $c_2(8)$ | $c_3(4)$ | | 83 | | $c_2(4)$ | $c_3(0)$ |
| 39 | | $c_0(9)$ | $c_1(14)$ | | 84 | ESS-B | ESS-B(23) | ESS-B(22) |
| 40 | | $c_2(7)$ | $c_3(3)$ | | 85 | | ESS-B(21) | ESS-B(20) |
| 41 | | $c_0(8)$ | $c_1(13)$ | | 86 | | ESS-B(19) | ESS-B(18) |
| 42 | | $c_2(6)$ | $c_3(2)$ | | 87 | | ESS-B(17) | ESS-B(16) |
| 43 | | $c_0(7)$ | $c_1(12)$ | | 88 | | ESS-B(15) | ESS-B(14) |
| 44 | | $c_2(5)$ | $c_3(1)$ | | 89 | | ESS-B(13) | ESS-B(12) |

**Table E- 5: Outbound 4V Burst Bit Allocations (concluded)**

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 90 | ESS-B con't | ESS-B(11) | ESS-B(10) | | 135 | Voice Frame 4 con't | $c_0(22)$ | $c_0(4)$ |
| 91 | | ESS-B(9) | ESS-B(8) | | 136 | | $c_1(9)$ | $c_2(2)$ |
| 92 | | ESS-B(7) | ESS-B(6) | | 137 | | $c_0(21)$ | $c_0(3)$ |
| 93 | | ESS-B(5) | ESS-B(4) | | 138 | | $c_1(8)$ | $c_2(1)$ |
| 94 | | ESS-B(3) | ESS-B(2) | | 139 | | $c_0(20)$ | $c_0(2)$ |
| 95 | | ESS-B(1) | ESS-B(0) | | 140 | | $c_1(7)$ | $c_2(0)$ |
| 96 | Voice Frame 3 | $c_0(23)$ | $c_0(5)$ | | 141 | | $c_0(19)$ | $c_0(1)$ |
| 97 | | $c_1(10)$ | $c_2(3)$ | | 142 | | $c_1(6)$ | $c_3(13)$ |
| 98 | | $c_0(22)$ | $c_0(4)$ | | 143 | | $c_0(18)$ | $c_0(0)$ |
| 99 | | $c_1(9)$ | $c_2(2)$ | | 144 | | $c_1(5)$ | $c_3(12)$ |
| 100 | | $c_0(21)$ | $c_0(3)$ | | 145 | | $c_0(17)$ | $c_1(22)$ |
| 101 | | $c_1(8)$ | $c_2(1)$ | | 146 | | $c_1(4)$ | $c_3(11)$ |
| 102 | | $c_0(20)$ | $c_0(2)$ | | 147 | | $c_0(16)$ | $c_1(21)$ |
| 103 | | $c_1(7)$ | $c_2(0)$ | | 148 | | $c_1(3)$ | $c_3(10)$ |
| 104 | | $c_0(19)$ | $c_0(1)$ | | 149 | | $c_0(15)$ | $c_1(20)$ |
| 105 | | $c_1(6)$ | $c_3(13)$ | | 150 | | $c_1(2)$ | $c_3(9)$ |
| 106 | | $c_0(18)$ | $c_0(0)$ | | 151 | | $c_0(14)$ | $c_1(19)$ |
| 107 | | $c_1(5)$ | $c_3(12)$ | | 152 | | $c_1(1)$ | $c_3(8)$ |
| 108 | | $c_0(17)$ | $c_1(22)$ | | 153 | | $c_0(13)$ | $c_1(18)$ |
| 109 | | $c_1(4)$ | $c_3(11)$ | | 154 | | $c_1(0)$ | $c_3(7)$ |
| 110 | | $c_0(16)$ | $c_1(21)$ | | 155 | | $c_0(12)$ | $c_1(17)$ |
| 111 | | $c_1(3)$ | $c_3(10)$ | | 156 | | $c_2(10)$ | $c_3(6)$ |
| 112 | | $c_0(15)$ | $c_1(20)$ | | 157 | | $c_0(11)$ | $c_1(16)$ |
| 113 | | $c_1(2)$ | $c_3(9)$ | | 158 | | $c_2(9)$ | $c_3(5)$ |
| 114 | | $c_0(14)$ | $c_1(19)$ | | 159 | | $c_0(10)$ | $c_1(15)$ |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115 | | $c_1(1)$ | $c_3(8)$ | | 160 | | $c_2(8)$ | $c_3(4)$ |
| 116 | | $c_0(13)$ | $c_1(18)$ | | 161 | | $c_0(9)$ | $c_1(14)$ |
| 117 | | $c_1(0)$ | $c_3(7)$ | | 162 | | $c_2(7)$ | $c_3(3)$ |
| 118 | | $c_0(12)$ | $c_1(17)$ | | 163 | | $c_0(8)$ | $c_1(13)$ |
| 119 | | $c_2(10)$ | $c_3(6)$ | | 164 | | $c_2(6)$ | $c_3(2)$ |
| 120 | | $c_0(11)$ | $c_1(16)$ | | 165 | | $c_0(7)$ | $c_1(12)$ |
| 121 | | $c_2(9)$ | $c_3(5)$ | | 166 | | $c_2(5)$ | $c_3(1)$ |
| 122 | | $c_0(10)$ | $c_1(15)$ | | 167 | | $c_0(6)$ | $c_1(11)$ |
| 123 | | $c_2(8)$ | $c_3(4)$ | | 168 | | $c_2(4)$ | $c_3(0)$ |
| 124 | | $c_0(9)$ | $c_1(14)$ | | 169 | DUID 4 | DUIDparity(1) | DUIDparity(0) |
| 125 | | $c_2(7)$ | $c_3(3)$ | | 170 | | ISCH(39) | ISCH(38) |
| 126 | | $c_0(8)$ | $c_1(13)$ | | 171 | | ISCH(37) | ISCH(36) |
| 127 | | $c_2(6)$ | $c_3(2)$ | | 172 | | ISCH(35) | ISCH(34) |
| 128 | | $c_0(7)$ | $c_1(12)$ | | 173 | | ISCH(33) | ISCH(32) |
| 129 | | $c_2(5)$ | $c_3(1)$ | | 174 | First Half of this burst's ISCH | ISCH(31) | ISCH(30) |
| 130 | | $c_0(6)$ | $c_1(11)$ | | 175 | | ISCH(29) | ISCH(28) |
| 131 | | $c_2(4)$ | $c_3(0)$ | | 176 | | ISCH(27) | ISCH(26) |
| 132 | DUID 3 | DUIDparity(3) | DUIDparity(2) | | 177 | | ISCH(25) | ISCH(24) |
| 133 | Voice Frame 4 | $c_0(23)$ | $c_0(5)$ | | 178 | | ISCH(23) | ISCH(22) |
| 134 | | $c_1(10)$ | $c_2(3)$ | | 179 | | ISCH(21) | ISCH(20) |

**Table E- 6: Outbound 4V Burst ESS Bit Allocations**

| Field | 4V Burst 1 | 4V Burst 2 | 4V Burst 3 | 4V Burst 4 |
|---|---|---|---|---|
| ESS-B(23) | ALGID(7) | MI(71) | MI(47) | MI(23) |
| ESS-B(22) | ALGID(6) | MI(70) | MI(46) | MI(22) |
| ESS-B(21) | ALGID(5) | MI(69) | MI(45) | MI(21) |
| ESS-B(20) | ALGID(4) | MI(68) | MI(44) | MI(20) |
| ESS-B(19) | ALGID(3) | MI(67) | MI(43) | MI(19) |
| ESS-B(18) | ALGID(2) | MI(66) | MI(42) | MI(18) |
| ESS-B(17) | ALGID(1) | MI(65) | MI(41) | MI(17) |
| ESS-B(16) | ALGID(0) | MI(64) | MI(40) | MI(16) |
| ESS-B(15) | KID(15) | MI(63) | MI(39) | MI(15) |
| ESS-B(14) | KID(14) | MI(62) | MI(38) | MI(14) |
| ESS-B(13) | KID(13) | MI(61) | MI(37) | MI(13) |
| ESS-B(12) | KID(12) | MI(60) | MI(36) | MI(12) |
| ESS-B(11) | KID(11) | MI(59) | MI(35) | MI(11) |
| ESS-B(10) | KID(10) | MI(58) | MI(34) | MI(10) |
| ESS-B(9) | KID(9) | MI(57) | MI(33) | MI(9) |
| ESS-B(8) | KID(8) | MI(56) | MI(32) | MI(8) |
| ESS-B(7) | KID(7) | MI(55) | MI(31) | MI(7) |
| ESS-B(6) | KID(6) | MI(54) | MI(30) | MI(6) |
| ESS-B(5) | KID(5) | MI(53) | MI(29) | MI(5) |
| ESS-B(4) | KID(4) | MI(52) | MI(28) | MI(4) |

| | | | | |
|---|---|---|---|---|
| ESS-B(3) | KID(3) | MI(51) | MI(27) | MI(3) |
| ESS-B(2) | KID(2) | MI(50) | MI(26) | MI(2) |
| ESS-B(1) | KID(1) | MI(49) | MI(25) | MI(1) |
| ESS-B(0) | KID(0) | MI(48) | MI(24) | MI(0) |

The ESS information contained in the inbound 4V bursts is defined in Table E- 6 by which of the four 4V bursts in the sequence as explained in 5.6.2 and 6.1.

## Table E- 7: Outbound 2V Burst Bit Allocations

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | 2nd Half of Previous burst's ISCH | ISCH(19) | ISCH(18) | | 45 | Voice Frame 1 con't | $c_0(6)$ | $c_1(11)$ |
| 1 | | ISCH(17) | ISCH(16) | | 46 | | $c_2(4)$ | $c_3(0)$ |
| 2 | | ISCH(15) | ISCH(14) | | 47 | DUID 2 | DUID(1) | DUID(0) |
| 3 | | ISCH(13) | ISCH(12) | | 48 | Voice Frame 2 | $c_0(23)$ | $c_0(5)$ |
| 4 | | ISCH(11) | ISCH(10) | | 49 | | $c_1(10)$ | $c_2(3)$ |
| 5 | | ISCH(9) | ISCH(8) | | 50 | | $c_0(22)$ | $c_0(4)$ |
| 6 | | ISCH(7) | ISCH(6) | | 51 | | $c_1(9)$ | $c_2(2)$ |
| 7 | | ISCH(5) | ISCH(4) | | 52 | | $c_0(21)$ | $c_0(3)$ |
| 8 | | ISCH(3) | ISCH(2) | | 53 | | $c_1(8)$ | $c_2(1)$ |
| 9 | | ISCH(1) | ISCH(0) | | 54 | | $c_0(20)$ | $c_0(2)$ |
| 10 | DUID 1 | DUID(3) | DUID(2) | | 55 | | $c_1(7)$ | $c_2(0)$ |
| 11 | | $c_0(23)$ | $c_0(5)$ | | 56 | | $c_0(19)$ | $c_0(1)$ |
| 12 | | $c_1(10)$ | $c_2(3)$ | | 57 | | $c_1(6)$ | $c_3(13)$ |
| 13 | | $c_0(22)$ | $c_0(4)$ | | 58 | | $c_0(18)$ | $c_0(0)$ |
| 14 | | $c_1(9)$ | $c_2(2)$ | | 59 | | $c_1(5)$ | $c_3(12)$ |
| 15 | | $c_0(21)$ | $c_0(3)$ | | 60 | | $c_0(17)$ | $c_1(22)$ |
| 16 | | $c_1(8)$ | $c_2(1)$ | | 61 | | $c_1(4)$ | $c_3(11)$ |
| 17 | | $c_0(20)$ | $c_0(2)$ | | 62 | | $c_0(16)$ | $c_1(21)$ |
| 18 | | $c_1(7)$ | $c_2(0)$ | | 63 | | $c_1(3)$ | $c_3(10)$ |
| 19 | | $c_0(19)$ | $c_0(1)$ | | 64 | | $c_0(15)$ | $c_1(20)$ |
| 20 | | $c_1(6)$ | $c_3(13)$ | | 65 | | $c_1(2)$ | $c_3(9)$ |
| 21 | | $c_0(18)$ | $c_0(0)$ | | 66 | | $c_0(14)$ | $c_1(19)$ |
| 22 | | $c_1(5)$ | $c_3(12)$ | | 67 | | $c_1(1)$ | $c_3(8)$ |
| 23 | | $c_0(17)$ | $c_1(22)$ | | 68 | | $c_0(13)$ | $c_1(18)$ |
| 24 | | $c_1(4)$ | $c_3(11)$ | | 69 | | $c_1(0)$ | $c_3(7)$ |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25 | Voice Frame 1 | $c_0(16)$ | $c_1(21)$ | | 70 | | $c_0(12)$ | $c_1(17)$ |
| 26 | | $c_1(3)$ | $c_3(10)$ | | 71 | | $c_2(10)$ | $c_3(6)$ |
| 27 | | $c_0(15)$ | $c_1(20)$ | | 72 | | $c_0(11)$ | $c_1(16)$ |
| 28 | | $c_1(2)$ | $c_3(9)$ | | 73 | | $c_2(9)$ | $c_3(5)$ |
| 29 | | $c_0(14)$ | $c_1(19)$ | | 74 | | $c_0(10)$ | $c_1(15)$ |
| 30 | | $c_1(1)$ | $c_3(8)$ | | 75 | | $c_2(8)$ | $c_3(4)$ |
| 31 | | $c_0(13)$ | $c_1(18)$ | | 76 | | $c_0(9)$ | $c_1(14)$ |
| 32 | | $c_1(0)$ | $c_3(7)$ | | 77 | | $c_2(7)$ | $c_3(3)$ |
| 33 | | $c_0(12)$ | $c_1(17)$ | | 78 | | $c_0(8)$ | $c_1(13)$ |
| 34 | | $c_2(10)$ | $c_3(6)$ | | 79 | | $c_2(6)$ | $c_3(2)$ |
| 35 | | $c_0(11)$ | $c_1(16)$ | | 80 | | $c_0(7)$ | $c_1(12)$ |
| 36 | | $c_2(9)$ | $c_3(5)$ | | 81 | | $c_2(5)$ | $c_3(1)$ |
| 37 | | $c_0(10)$ | $c_1(15)$ | | 82 | | $c_0(6)$ | $c_1(11)$ |
| 38 | | $c_2(8)$ | $c_3(4)$ | | 83 | | $c_2(4)$ | $c_3(0)$ |
| 39 | | $c_0(9)$ | $c_1(14)$ | | 84 | ESS-A 1 | RS_parity(167) | RS_parity(166) |
| 40 | | $c_2(7)$ | $c_3(3)$ | | 85 | | RS_parity(165) | RS_parity(164) |
| 41 | | $c_0(8)$ | $c_1(13)$ | | 86 | | RS_parity(163) | RS_parity(162) |
| 42 | | $c_2(6)$ | $c_3(2)$ | | 87 | | RS_parity(161) | RS_parity(160) |
| 43 | | $c_0(7)$ | $c_1(12)$ | | 88 | | RS_parity(159) | RS_parity(158) |
| 44 | | $c_2(5)$ | $c_3(1)$ | | 89 | | RS_parity(157) | RS_parity(156) |

**Table E- 7: Outbound 2V Burst Bit Allocations (concluded)**

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 90 | | RS_parity(155) | RS_parity(154) | | 135 | | RS_parity(67) | RS_parity(66) |
| 91 | | RS_parity(153) | RS_parity(152) | | 136 | | RS_parity(65) | RS_parity(64) |
| 92 | | RS_parity(151) | RS_parity(150) | | 137 | | RS_parity(63) | RS_parity(62) |
| 93 | | RS_parity(149) | RS_parity(148) | | 138 | | RS_parity(61) | RS_parity(60) |
| 94 | | RS_parity(147) | RS_parity(146) | | 139 | | RS_parity(59) | RS_parity(58) |
| 95 | | RS_parity(145) | RS_parity(144) | | 140 | | RS_parity(57) | RS_parity(56) |
| 96 | | RS_parity(143) | RS_parity(142) | | 141 | | RS_parity(55) | RS_parity(54) |
| 97 | | RS_parity(141) | RS_parity(140) | | 142 | | RS_parity(53) | RS_parity(52) |
| 98 | | RS_parity(139) | RS_parity(138) | | 143 | | RS_parity(51) | RS_parity(50) |
| 99 | | RS_parity(137) | RS_parity(136) | | 144 | | RS_parity(49) | RS_parity(48) |
| 100 | | RS_parity(135) | RS_parity(134) | | 145 | | RS_parity(47) | RS_parity(46) |
| 101 | | RS_parity(133) | RS_parity(132) | | 146 | | RS_parity(45) | RS_parity(44) |
| 102 | | RS_parity(131) | RS_parity(130) | | 147 | | RS_parity(43) | RS_parity(42) |
| 103 | | RS_parity(129) | RS_parity(128) | | 148 | | RS_parity(41) | RS_parity(40) |
| 104 | | RS_parity(127) | RS_parity(126) | | 149 | | RS_parity(39) | RS_parity(38) |
| 105 | | RS_parity(125) | RS_parity(124) | | 150 | | RS_parity(37) | RS_parity(36) |
| 106 | | RS_parity(123) | RS_parity(122) | | 151 | ESS-A 2 con't | RS_parity(35) | RS_parity(34) |
| 107 | | RS_parity(121) | RS_parity(120) | | 152 | | RS_parity(33) | RS_parity(32) |
| 108 | | RS_parity(119) | RS_parity(118) | | 153 | | RS_parity(31) | RS_parity(30) |
| 109 | | RS_parity(117) | RS_parity(116) | | 154 | | RS_parity(29) | RS_parity(28) |
| 110 | ESS-A 1 con't | RS_parity(115) | RS_parity(114) | | 155 | | RS_parity(27) | RS_parity(26) |
| 111 | | RS_parity(113) | RS_parity(112) | | 156 | | RS_parity(25) | RS_parity(24) |
| 112 | | RS_parity(111) | RS_parity(110) | | 157 | | RS_parity(23) | RS_parity(22) |
| 113 | | RS_parity(109) | RS_parity(108) | | 158 | | RS_parity(21) | RS_parity(20) |
| 114 | | RS_parity(107) | RS_parity(106) | | 159 | | RS_parity(19) | RS_parity(18) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115 | | RS_parity(105) | RS_parity(104) | | 160 | | RS_parity(17) | RS_parity(16) |
| 116 | | RS_parity(103) | RS_parity(102) | | 161 | | RS_parity(15) | RS_parity(14) |
| 117 | | RS_parity(101) | RS_parity(100) | | 162 | | RS_parity(13) | RS_parity(12) |
| 118 | | RS_parity(99) | RS_parity(98) | | 163 | | RS_parity(11) | RS_parity(10) |
| 119 | | RS_parity(97) | RS_parity(96) | | 164 | | RS_parity(9) | RS_parity(8) |
| 120 | | RS_parity(95) | RS_parity(94) | | 165 | | RS_parity(7) | RS_parity(6) |
| 121 | | RS_parity(93) | RS_parity(92) | | 166 | | RS_parity(5) | RS_parity(4) |
| 122 | | RS_parity(91) | RS_parity(90) | | 167 | | RS_parity(3) | RS_parity(2) |
| 123 | | RS_parity(89) | RS_parity(88) | | 168 | | RS_parity(1) | RS_parity(0) |
| 124 | | RS_parity(87) | RS_parity(86) | | 169 | DUID 4 | DUIDparity(1) | DUIDparity(0) |
| 125 | | RS_parity(85) | RS_parity(84) | | 170 | | ISCH(39) | ISCH(38) |
| 126 | | RS_parity(83) | RS_parity(82) | | 171 | | ISCH(37) | ISCH(36) |
| 127 | | RS_parity(81) | RS_parity(80) | | 172 | | ISCH(35) | ISCH(34) |
| 128 | | RS_parity(79) | RS_parity(78) | | 173 | | ISCH(33) | ISCH(32) |
| 129 | | RS_parity(77) | RS_parity(76) | | 174 | First Half of this burst's ISCH | ISCH(31) | ISCH(30) |
| 130 | | RS_parity(75) | RS_parity(74) | | 175 | | ISCH(29) | ISCH(28) |
| 131 | | RS_parity(73) | RS_parity(72) | | 176 | | ISCH(27) | ISCH(26) |
| 132 | DUID 3 | DUIDparity(3) | DUIDparity(2) | | 177 | | ISCH(25) | ISCH(24) |
| 133 | | RS_parity(71) | RS_parity(70) | | 178 | | ISCH(23) | ISCH(22) |
| 134 | ESS-A 2 | RS_parity(69) | RS_parity(68) | | 179 | | ISCH(21) | ISCH(20) |

**Table E- 8: Outbound Signaling with Sync Burst Bit Allocations**

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | | ISCH(19) | ISCH(18) | | 45 | | S-OEMI(87) | S-OEMI(86) |
| 1 | | ISCH(17) | ISCH(16) | | 46 | | S-OEMI(85) | S-OEMI(84) |
| 2 | | ISCH(15) | ISCH(14) | | 47 | DUID 2 | DUID(1) | DUID(0) |
| 3 | | ISCH(13) | ISCH(12) | | 48 | | S-OEMI(83) | S-OEMI(82) |
| 4 | 2nd Half of Previous burst's ISCH | ISCH(11) | ISCH(10) | | 49 | | S-OEMI(81) | S-OEMI(80) |
| 5 | | ISCH(9) | ISCH(8) | | 50 | | S-OEMI(79) | S-OEMI(78) |
| 6 | | ISCH(7) | ISCH(6) | | 51 | | S-OEMI(77) | S-OEMI(76) |
| 7 | | ISCH(5) | ISCH(4) | | 52 | | S-OEMI(75) | S-OEMI(74) |
| 8 | | ISCH(3) | ISCH(2) | | 53 | | S-OEMI(73) | S-OEMI(72) |
| 9 | | ISCH(1) | ISCH(0) | | 54 | | S-OEMI(71) | S-OEMI(70) |
| 10 | DUID 1 | DUID(3) | DUID(2) | | 55 | | S-OEMI(69) | S-OEMI(68) |
| 11 | | S-OEMI(155) | S-OEMI(154) | | 56 | | S-OEMI(67) | S-OEMI(66) |
| 12 | | S-OEMI(153) | S-OEMI(152) | | 57 | | S-OEMI(65) | S-OEMI(64) |
| 13 | | S-OEMI(151) | S-OEMI(150) | | 58 | | S-OEMI(63) | S-OEMI(62) |
| 14 | | S-OEMI(149) | S-OEMI(148) | | 59 | | S-OEMI(61) | S-OEMI(60) |
| 15 | | S-OEMI(147) | S-OEMI(146) | | 60 | | S-OEMI(59) | S-OEMI(58) |
| 16 | | S-OEMI(145) | S-OEMI(144) | | 61 | | S-OEMI(57) | S-OEMI(56) |
| 17 | | S-OEMI(143) | S-OEMI(142) | | 62 | | S-OEMI(55) | S-OEMI(54) |
| 18 | | S-OEMI(141) | S-OEMI(140) | | 63 | | S-OEMI(53) | S-OEMI(52) |
| 19 | | S-OEMI(139) | S-OEMI(138) | | 64 | S-OEMI 2 | S-OEMI(51) | S-OEMI(50) |
| 20 | | S-OEMI(137) | S-OEMI(136) | | 65 | | S-OEMI(49) | S-OEMI(48) |
| 21 | | S-OEMI(135) | S-OEMI(134) | | 66 | | S-OEMI(47) | S-OEMI(46) |
| 22 | | S-OEMI(133) | S-OEMI(132) | | 67 | | S-OEMI(45) | S-OEMI(44) |
| 23 | | S-OEMI(131) | S-OEMI(130) | | 68 | | S-OEMI(43) | S-OEMI(42) |
| 24 | | S-OEMI(129) | S-OEMI(128) | | 69 | | S-OEMI(41) | S-OEMI(40) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25 | S-OEMI 1 | S-OEMI(127) | S-OEMI(126) | | 70 | | S-OEMI(39) | S-OEMI(38) |
| 26 | | S-OEMI(125) | S-OEMI(124) | | 71 | | S-OEMI(37) | S-OEMI(36) |
| 27 | | S-OEMI(123) | S-OEMI(122) | | 72 | | S-OEMI(35) | S-OEMI(34) |
| 28 | | S-OEMI(121) | S-OEMI(120) | | 73 | | S-OEMI(33) | S-OEMI(32) |
| 29 | | S-OEMI(119) | S-OEMI(118) | | 74 | | S-OEMI(31) | S-OEMI(30) |
| 30 | | S-OEMI(117) | S-OEMI(116) | | 75 | | S-OEMI(29) | S-OEMI(28) |
| 31 | | S-OEMI(115) | S-OEMI(114) | | 76 | | S-OEMI(27) | S-OEMI(26) |
| 32 | | S-OEMI(113) | S-OEMI(112) | | 77 | | S-OEMI(25) | S-OEMI(24) |
| 33 | | S-OEMI(111) | S-OEMI(110) | | 78 | | S-OEMI(23) | S-OEMI(22) |
| 34 | | S-OEMI(109) | S-OEMI(108) | | 79 | Sync | S(20) | |
| 35 | | S-OEMI(107) | S-OEMI(106) | | 80 | | S(19) | |
| 36 | | S-OEMI(105) | S-OEMI(104) | | 81 | | S(18) | |
| 37 | | S-OEMI(103) | S-OEMI(102) | | 82 | | S(17) | |
| 38 | | S-OEMI(101) | S-OEMI(100) | | 83 | | S(16) | |
| 39 | | S-OEMI(99) | S-OEMI(98) | | 84 | | S(15) | |
| 40 | | S-OEMI(97) | S-OEMI(96) | | 85 | | S(14) | |
| 41 | | S-OEMI(95) | S-OEMI(94) | | 86 | | S(13) | |
| 42 | | S-OEMI(93) | S-OEMI(92) | | 87 | | S(12) | |
| 43 | | S-OEMI(91) | S-OEMI(90) | | 88 | | S(11) | |
| 44 | | S-OEMI(89) | S-OEMI(88) | | 89 | | S(10) | |

**Table E- 8: Outbound Signaling with Sync Burst Bit Allocations (concluded)**

| Symbol | Field | Bit 1 | Bit 0 | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| 90 | | S(9) | | 135 | | RS_parity(67) | RS_parity(66) |
| 91 | | S(8) | | 136 | | RS_parity(65) | RS_parity(64) |
| 92 | | S(7) | | 137 | | RS_parity(63) | RS_parity(62) |
| 93 | | S(6) | | 138 | | RS_parity(61) | RS_parity(60) |
| 94 | | S(5) | | 139 | | RS_parity(59) | RS_parity(58) |
| 95 | | S(4) | | 140 | | RS_parity(57) | RS_parity(56) |
| 96 | | S(3) | | 141 | | RS_parity(55) | RS_parity(54) |
| 97 | | S(2) | | 142 | | RS_parity(53) | RS_parity(52) |
| 98 | | S(1) | | 143 | | RS_parity(51) | RS_parity(50) |
| 99 | | S(0) | | 144 | | RS_parity(49) | RS_parity(48) |
| 100 | | S-OEMI(21) | S-OEMI(20) | 145 | | RS_parity(47) | RS_parity(46) |
| 101 | | S-OEMI(19) | S-OEMI(18) | 146 | | RS_parity(45) | RS_parity(44) |
| 102 | | S-OEMI(17) | S-OEMI(16) | 147 | | RS_parity(43) | RS_parity(42) |
| 103 | | S-OEMI(15) | S-OEMI(14) | 148 | | RS_parity(41) | RS_parity(40) |
| 104 | | S-OEMI(13) | S-OEMI(12) | 149 | | RS_parity(39) | RS_parity(38) |
| 105 | | S-OEMI(11) | S-OEMI(10) | 150 | | RS_parity(37) | RS_parity(36) |
| 106 | | S-OEMI(9) | S-OEMI(8) | 151 | | RS_parity(35) | RS_parity(34) |
| 107 | | S-OEMI(7) | S-OEMI(6) | 152 | | RS_parity(33) | RS_parity(32) |
| 108 | | S-OEMI(5) | S-OEMI(4) | 153 | | RS_parity(31) | RS_parity(30) |
| 109 | | S-OEMI(3) | S-OEMI(2) | 154 | | RS_parity(29) | RS_parity(28) |
| 110 | | S-OEMI(1) | S-OEMI(0) | 155 | | RS_parity(27) | RS_parity(26) |
| 111 | | RS_parity(113) | RS_parity(112) | 156 | | RS_parity(25) | RS_parity(24) |
| 112 | | RS_parity(111) | RS_parity(110) | 157 | | RS_parity(23) | RS_parity(22) |
| 113 | | RS_parity(109) | RS_parity(108) | 158 | | RS_parity(21) | RS_parity(20) |
| 114 | | RS_parity(107) | RS_parity(106) | 159 | | RS_parity(19) | RS_parity(18) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115 | | RS_parity(105) | RS_parity(104) | | 160 | | RS_parity(17) | RS_parity(16) |
| 116 | S-OEMI 3 | RS_parity(103) | RS_parity(102) | | 161 | | RS_parity(15) | RS_parity(14) |
| 117 | | RS_parity(101) | RS_parity(100) | | 162 | | RS_parity(13) | RS_parity(12) |
| 118 | | RS_parity(99) | RS_parity(98) | | 163 | | RS_parity(11) | RS_parity(10) |
| 119 | | RS_parity(97) | RS_parity(96) | | 164 | | RS_parity(9) | RS_parity(8) |
| 120 | | RS_parity(95) | RS_parity(94) | | 165 | | RS_parity(7) | RS_parity(6) |
| 121 | | RS_parity(93) | RS_parity(92) | | 166 | | RS_parity(5) | RS_parity(4) |
| 122 | | RS_parity(91) | RS_parity(90) | | 167 | | RS_parity(3) | RS_parity(2) |
| 123 | | RS_parity(89) | RS_parity(88) | | 168 | | RS_parity(1) | RS_parity(0) |
| 124 | | RS_parity(87) | RS_parity(86) | | 169 | DUID 4 | DUIDparity(1) | DUIDparity(0) |
| 125 | | RS_parity(85) | RS_parity(84) | | 170 | | ISCH(39) | ISCH(38) |
| 126 | | RS_parity(83) | RS_parity(82) | | 171 | | ISCH(37) | ISCH(36) |
| 127 | | RS_parity(81) | RS_parity(80) | | 172 | | ISCH(35) | ISCH(34) |
| 128 | | RS_parity(79) | RS_parity(78) | | 173 | | ISCH(33) | ISCH(32) |
| 129 | | RS_parity(77) | RS_parity(76) | | 174 | First Half of this burst's ISCH | ISCH(31) | ISCH(30) |
| 130 | | RS_parity(75) | RS_parity(74) | | 175 | | ISCH(29) | ISCH(28) |
| 131 | | RS_parity(73) | RS_parity(72) | | 176 | | ISCH(27) | ISCH(26) |
| 132 | DUID3 | DUIDparity(3) | DUIDparity(2) | | 177 | | ISCH(25) | ISCH(24) |
| 133 | | RS_parity(71) | RS_parity(70) | | 178 | | ISCH(23) | ISCH(22) |
| 134 | S-OEMI 4 | RS_parity(69) | RS_parity(68) | | 179 | | ISCH(21) | ISCH(20) |

## Table E- 9: Outbound Signaling no Sync Burst Bit Allocations

| Symbol | Field | Bit 1 | Bit 0 | | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | | ISCH(19) | ISCH(18) | | 45 | I-OEMI 1 con't | I-OEMI(111) | I-OEMI(110) |
| 1 | | ISCH(17) | ISCH(16) | | 46 | | I-OEMI(109) | I-OEMI(108) |
| 2 | | ISCH(15) | ISCH(14) | | 47 | DUID 2 | DUID(1) | DUID(0) |
| 3 | | ISCH(13) | ISCH(12) | | 48 | | I-OEMI(107) | I-OEMI(106) |
| 4 | | ISCH(11) | ISCH(10) | | 49 | | I-OEMI(105) | I-OEMI(104) |
| 5 | 2nd Half of Previous burst's ISCH | ISCH(9) | ISCH(8) | | 50 | | I-OEMI(103) | I-OEMI(102) |
| 6 | | ISCH(7) | ISCH(6) | | 51 | | I-OEMI(101) | I-OEMI(100) |
| 7 | | ISCH(5) | ISCH(4) | | 52 | | I-OEMI(99) | I-OEMI(98) |
| 8 | | ISCH(3) | ISCH(2) | | 53 | | I-OEMI(97) | I-OEMI(96) |
| 9 | | ISCH(1) | ISCH(0) | | 54 | | I-OEMI(95) | I-OEMI(94) |
| 10 | DUID 1 | DUID(3) | DUID(2) | | 55 | | I-OEMI(93) | I-OEMI(92) |
| 11 | | I-OEMI(179) | I-OEMI(178) | | 56 | | I-OEMI(91) | I-OEMI(90) |
| 12 | | I-OEMI(177) | I-OEMI(176) | | 57 | | I-OEMI(89) | I-OEMI(88) |
| 13 | | I-OEMI(175) | I-OEMI(174) | | 58 | | I-OEMI(87) | I-OEMI(86) |
| 14 | | I-OEMI(173) | I-OEMI(172) | | 59 | | I-OEMI(85) | I-OEMI(84) |
| 15 | | I-OEMI(171) | I-OEMI(170) | | 60 | | I-OEMI(83) | I-OEMI(82) |
| 16 | | I-OEMI(169) | I-OEMI(168) | | 61 | | I-OEMI(81) | I-OEMI(80) |
| 17 | | I-OEMI(167) | I-OEMI(166) | | 62 | | I-OEMI(79) | I-OEMI(78) |
| 18 | | I-OEMI(165) | I-OEMI(164) | | 63 | | I-OEMI(77) | I-OEMI(76) |
| 19 | | I-OEMI(163) | I-OEMI(162) | | 64 | | I-OEMI(75) | I-OEMI(74) |
| 20 | | I-OEMI(161) | I-OEMI(160) | | 65 | | I-OEMI(73) | I-OEMI(72) |
| 21 | | I-OEMI(159) | I-OEMI(158) | | 66 | | I-OEMI(71) | I-OEMI(70) |
| 22 | | I-OEMI(157) | I-OEMI(156) | | 67 | | I-OEMI(69) | I-OEMI(68) |
| 23 | | I-OEMI(155) | I-OEMI(154) | | 68 | | I-OEMI(67) | I-OEMI(66) |
| 24 | | I-OEMI(153) | I-OEMI(152) | | 69 | | I-OEMI(65) | I-OEMI(64) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25 | I-OEMI 1 | I-OEMI(151) | I-OEMI(150) | | 70 | I-OEMI 2 | I-OEMI(63) | I-OEMI(62) |
| 26 | | I-OEMI(149) | I-OEMI(148) | | 71 | | I-OEMI(61) | I-OEMI(60) |
| 27 | | I-OEMI(147) | I-OEMI(146) | | 72 | | I-OEMI(59) | I-OEMI(58) |
| 28 | | I-OEMI(145) | I-OEMI(144) | | 73 | | I-OEMI(57) | I-OEMI(56) |
| 29 | | I-OEMI(143) | I-OEMI(142) | | 74 | | I-OEMI(55) | I-OEMI(54) |
| 30 | | I-OEMI(141) | I-OEMI(140) | | 75 | | I-OEMI(53) | I-OEMI(52) |
| 31 | | I-OEMI(139) | I-OEMI(138) | | 76 | | I-OEMI(51) | I-OEMI(50) |
| 32 | | I-OEMI(137) | I-OEMI(136) | | 77 | | I-OEMI(49) | I-OEMI(48) |
| 33 | | I-OEMI(135) | I-OEMI(134) | | 78 | | I-OEMI(47) | I-OEMI(46) |
| 34 | | I-OEMI(133) | I-OEMI(132) | | 79 | | I-OEMI(45) | I-OEMI(44) |
| 35 | | I-OEMI(131) | I-OEMI(130) | | 80 | | I-OEMI(43) | I-OEMI(42) |
| 36 | | I-OEMI(129) | I-OEMI(128) | | 81 | | I-OEMI(41) | I-OEMI(40) |
| 37 | | I-OEMI(127) | I-OEMI(126) | | 82 | | I-OEMI(39) | I-OEMI(38) |
| 38 | | I-OEMI(125) | I-OEMI(124) | | 83 | | I-OEMI(37) | I-OEMI(36) |
| 39 | | I-OEMI(123) | I-OEMI(122) | | 84 | | I-OEMI(35) | I-OEMI(34) |
| 40 | | I-OEMI(121) | I-OEMI(120) | | 85 | | I-OEMI(33) | I-OEMI(32) |
| 41 | | I-OEMI(119) | I-OEMI(118) | | 86 | | I-OEMI(31) | I-OEMI(30) |
| 42 | | I-OEMI(117) | I-OEMI(116) | | 87 | | I-OEMI(29) | I-OEMI(28) |
| 43 | | I-OEMI(115) | I-OEMI(114) | | 88 | | I-OEMI(27) | I-OEMI(26) |
| 44 | | I-OEMI(113) | I-OEMI(112) | | 89 | | I-OEMI(25) | I-OEMI(24) |

**Table E- 9: Outbound Signaling no Sync Burst Bit Allocations (concluded)**

| Symbol | Field | Bit 1 | Bit 0 | Symbol | Field | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| 90 | | I-OEMI(23) | I-OEMI(22) | 135 | | RS_parity(67) | RS_parity(66) |
| 91 | | I-OEMI(21) | I-OEMI(20) | 136 | | RS_parity(65) | RS_parity(64) |
| 92 | | I-OEMI(19) | I-OEMI(18) | 137 | | RS_parity(63) | RS_parity(62) |
| 93 | | I-OEMI(17) | I-OEMI(16) | 138 | | RS_parity(61) | RS_parity(60) |
| 94 | | I-OEMI(15) | I-OEMI(14) | 139 | | RS_parity(59) | RS_parity(58) |
| 95 | | I-OEMI(13) | I-OEMI(12) | 140 | | RS_parity(57) | RS_parity(56) |
| 96 | | I-OEMI(11) | I-OEMI(10) | 141 | | RS_parity(55) | RS_parity(54) |
| 97 | | I-OEMI(9) | I-OEMI(8) | 142 | | RS_parity(53) | RS_parity(52) |
| 98 | | I-OEMI(7) | I-OEMI(6) | 143 | | RS_parity(51) | RS_parity(50) |
| 99 | | I-OEMI(5) | I-OEMI(4) | 144 | | RS_parity(49) | RS_parity(48) |
| 100 | | I-OEMI(3) | I-OEMI(2) | 145 | | RS_parity(47) | RS_parity(46) |
| 101 | | I-OEMI(1) | I-OEMI(0) | 146 | | RS_parity(45) | RS_parity(44) |
| 102 | | RS_parity(131) | RS_parity(130) | 147 | | RS_parity(43) | RS_parity(42) |
| 103 | | RS_parity(129) | RS_parity(128) | 148 | | RS_parity(41) | RS_parity(40) |
| 104 | | RS_parity(127) | RS_parity(126) | 149 | | RS_parity(39) | RS_parity(38) |
| 105 | | RS_parity(125) | RS_parity(124) | 150 | | RS_parity(37) | RS_parity(36) |
| 106 | | RS_parity(123) | RS_parity(122) | 151 | | RS_parity(35) | RS_parity(34) |
| 107 | | RS_parity(121) | RS_parity(120) | 152 | | RS_parity(33) | RS_parity(32) |
| 108 | | RS_parity(119) | RS_parity(118) | 153 | I-OEMI 3 con't | RS_parity(31) | RS_parity(30) |
| 109 | | RS_parity(117) | RS_parity(116) | 154 | | RS_parity(29) | RS_parity(28) |
| 110 | | RS_parity(115) | RS_parity(114) | 155 | | RS_parity(27) | RS_parity(26) |
| 111 | I-OEMI 2 con't | RS_parity(113) | RS_parity(112) | 156 | | RS_parity(25) | RS_parity(24) |
| 112 | | RS_parity(111) | RS_parity(110) | 157 | | RS_parity(23) | RS_parity(22) |
| 113 | | RS_parity(109) | RS_parity(108) | 158 | | RS_parity(21) | RS_parity(20) |
| 114 | | RS_parity(107) | RS_parity(106) | 159 | | RS_parity(19) | RS_parity(18) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115 | | RS_parity(105) | RS_parity(104) | | 160 | | RS_parity(17) | RS_parity(16) |
| 116 | | RS_parity(103) | RS_parity(102) | | 161 | | RS_parity(15) | RS_parity(14) |
| 117 | | RS_parity(101) | RS_parity(100) | | 162 | | RS_parity(13) | RS_parity(12) |
| 118 | | RS_parity(99) | RS_parity(98) | | 163 | | RS_parity(11) | RS_parity(10) |
| 119 | | RS_parity(97) | RS_parity(96) | | 164 | | RS_parity(9) | RS_parity(8) |
| 120 | | RS_parity(95) | RS_parity(94) | | 165 | | RS_parity(7) | RS_parity(6) |
| 121 | | RS_parity(93) | RS_parity(92) | | 166 | | RS_parity(5) | RS_parity(4) |
| 122 | | RS_parity(91) | RS_parity(90) | | 167 | | RS_parity(3) | RS_parity(2) |
| 123 | | RS_parity(89) | RS_parity(88) | | 168 | | RS_parity(1) | RS_parity(0) |
| 124 | | RS_parity(87) | RS_parity(86) | | 169 | DUID 4 | DUIDparity(1) | DUIDparity(0) |
| 125 | | RS_parity(85) | RS_parity(84) | | 170 | | ISCH(39) | ISCH(38) |
| 126 | | RS_parity(83) | RS_parity(82) | | 171 | | ISCH(37) | ISCH(36) |
| 127 | | RS_parity(81) | RS_parity(80) | | 172 | | ISCH(35) | ISCH(34) |
| 128 | | RS_parity(79) | RS_parity(78) | | 173 | | ISCH(33) | ISCH(32) |
| 129 | | RS_parity(77) | RS_parity(76) | | 174 | First Half of this burst's ISCH | ISCH(31) | ISCH(30) |
| 130 | | RS_parity(75) | RS_parity(74) | | 175 | | ISCH(29) | ISCH(28) |
| 131 | | RS_parity(73) | RS_parity(72) | | 176 | | ISCH(27) | ISCH(26) |
| 132 | DUID 3 | DUIDparity(3) | DUIDparity(2) | | 177 | | ISCH(25) | ISCH(24) |
| 133 | | RS_parity(71) | RS_parity(70) | | 178 | | ISCH(23) | ISCH(22) |
| 134 | I-OEMI 3 | RS_parity(69) | RS_parity(68) | | 179 | | ISCH(21) | ISCH(20) |

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