

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Letter Ballot 13 Comment Addendum</b>	
Date Submitted	<b>2003-10-30</b>	
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Re:	Letter Ballot 13 on document <i>IEEE P802.16-REVd/D1-2003</i>	
Abstract	Additional letter ballot comments too large or detailed for inclusion under Commentary	
Purpose	Contains text and editing instructions referenced by author's Commentary comment submission	
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# Letter Ballot #13

## Comments Addendum

*Bob Nelson*  
*MacPhy Technologies*

### CORRECTIONS FOR FULL STC AND TDMA SUPPORT

**Summary:** *A previous change that moved preamble configuration information to the DCD channel parameter list disabled the ability to specify preambles on a burst-by-burst basis for support of of STC or TDMA operation on the downlink. The following restores this facility by defining an extended IE that specifies the parameters necessary to terminate one TDM burst set and initiate another. In addition, the discussion of frame structure is clarified to remove ambiguities and align term usage with other parts of the document.*

=====  
**Page 359, Line 8, Section 8.3, Change feature list as shown**

Elements within this PHY include:

- TDD and FDD support.
- TDMA uplink.
- TDM or TDMA downlink.
- Block adaptive modulation and FEC coding for both uplink and downlink.
- Framing elements that enable improved equalization and channel estimation performance over NLOS and extended delay spread environments.
- Symbol-unit granularity in ~~packet~~ burst sizes.
- Concatenated FEC using Reed–Solomon and pragmatic trellis coded modulation (TCM) with optional interleaving.
- FEC option using BTC and CTC.
- No-FEC option using ARQ for error control.
- Space time coding (STC) transmit diversity option.
- Parameter settings and MAC/PHY messages that facilitate optional AAS implementations.

=====  
**Page 359, Line 31, Insert the following before Section 8.3.1,**

Within the discussion of the WirelessMAN-SCa PHY, five terms (payload, burst, burst set, burst frame, and MAC frame) are used in discussion of the organization of transmissions.

Payload refers to individual units of transmission content that are of interest to some entity at the receiver.

A burst contains payload data and is formed according to the rules specified by the burst profile associated with the burst. The existence of the burst is made known to the receiver through the contents of either the uplink or downlink maps. For uplink, a burst is a complete unit of transmission which includes a leading preamble, encoded payload, and trailing termination sequence.

A burst set is a self-contained transmission entity consisting of a preamble, one or more concatenated bursts, and a trailing termination sequence. For uplink, burst set is synonymous with burst.

A burst frame contains all information included in a single transmission. It consists of one or more burst sets.

A MAC frame refers to the fixed bandwidth intervals reserved for data exchange. For TDD, a MAC frame consists of one downlink and one uplink subframe, delimited by the TTG. For FDD, the MAC frame corresponds to the maximum length of the downlink subframe. FDD uplink subframes operate concurrently on an adjacent channel. The downlink and uplink subframes each hold a burst frame.

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*Page 359, Line 31, Section 8.3.1, Change first paragraph as shown*

Figure 167 illustrates the steps involved in transmit processing. Source data shall first be randomized, and then FEC encoded and mapped to QAM symbols. The QAM symbols shall next be framed within a ~~message~~ burst, which typically introduces additional framing symbols. The burst symbols shall then be multiplexed into a duplex frame, which may contain multiple bursts. The I and Q symbols components shall be injected into pulse shaping filters, quadrature modulated up to a carrier frequency, and amplified with power control so that the proper output power is transmitted.

=====  
*Page 360, Line 1, Section 8.3.1.1, Change first paragraph/sentence as shown*

Source bits, i.e., the original information bits prior to FEC encoding, shall be randomized during transmissions.

=====  
*Page 362, Change section 8.3.1.3 as shown*

~~Broadcast messages~~ FCH payloads shall be encoded in accordance with section 8.3.1.5.3. Adaptive modulation and the concatenated FEC of 8.3.1.2.1 shall be supported for ~~non-broadcast messages~~ all other payloads. The support of 8.3.1.3.3 as FEC as well as omitting the FEC and relying solely on ARQ for error control (see 8.3.1.3.2) is optional for ~~non-broadcast messages~~ payloads carried outside of the FCH.

=====  
*Page 363, Line 63, Section 8.3.1.3.1.1 Change (last sentence of page) as shown*

However, ~~messages~~ payloads that cannot be modified by burst profiles changes, such as the contents of the FCH, shall not be punctured.

=====  
*Page 364, Line 11, Section 8.3.1.3.1.2 Change as shown*

Interleaving shall not be ~~used in broadcast burst profiles~~ defined in the FCH burst profile.

=====  
*Page 380, Line 8, Section 8.3.1.4 Change as shown*

**8.3.1.4 Burst set framing**

Both downlink and uplink data shall be formatted into bursts sets that use the Framed Burst format. The downlink shall support the most general case of TDM bursts, while the uplink shall support TDMA bursts.

TDMA burst and continuous downlink operational modes are subclasses of the TDM burst downlink mode of operation, and should be realizable using equipment designed for general TDM operation. The coordination of uplink and downlink bursts used to implement a TDD or FDD system is specified in 8.3.1.5.

8.3.1.4.1 Fundamental burst **set** framing elements

As Figure 187 illustrates, a burst **set** consists of three fundamental framing elements: a **B**urst **set** **P**reamble that includes ramp-up; a **P**ayload **one or more bursts**; and a Receiver Delay Spread Clearing **Interval** (RxDS) interval that includes ramp-down.

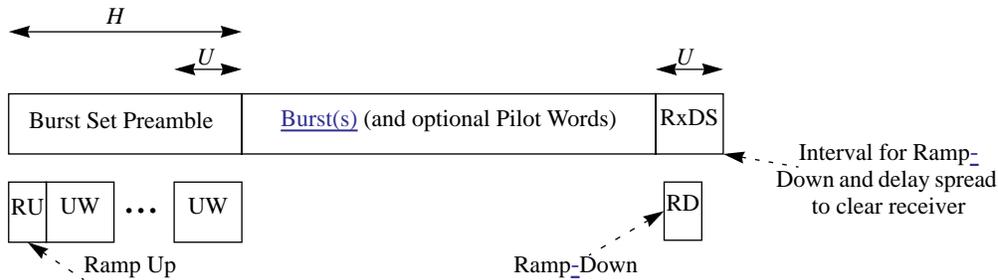


Figure 187—Fundamental burst **set** framing elements

=====  
 Page 381, Line 43, Section 8.3.1.4.1.1 Change as shown

8.3.1.4.1.1 Burst **set** preamble

A burst **set** preamble shall consist of a ramp-up region followed by a preamble body. Burst profile ([on uplink](#)) or [extended IE \(on downlink\)](#) parameters shall specify  $R_r$ , the length of the ramp-up region in symbols, and  $m$ , the number of Unique Words composing the preamble body. The ~~burst-profile~~ [preamble specification](#) shall also **specify include**  $U$ , the number of symbols in a Unique Word.

A burst **set** preamble shall be constructed from the last  $R_r$  symbols of a Unique Word (see Table 165) followed by an integer multiple of Unique Words, each Unique Word being  $U$  symbols in length. Figure 188 illustrates this requirement.

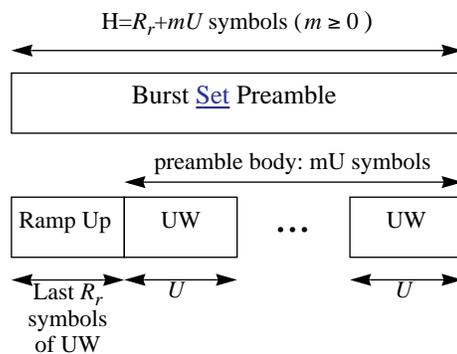


Figure 188—Burst **Set** Preamble composition

=====  
 Page 382, Line 18, Section 8.3.1.4.1.2 Change as shown

8.3.1.4.1.2 Burst **payload**

The burst **payload** block depicted in Figure 187 contains payload data. The burst **payload** block may also contain periodically inserted Pilot Words (see 8.3.1.4.1.4), if the burst profile ([for uplink](#)) or [extended IE \(for downlink\)](#) specifies

their inclusion. The capability to demodulate payloads of arbitrary length and symbol-unit granularity is mandatory. The capability to insert Pilot Words at the transmitter and remove them at the receiver is also mandatory.

A downlink burst set may contain time division multiplexed messages bursts that are adaptively modulated for the intended message recipients. When ~~a MAC frame control message~~ an FCH is to be transmitted within a downlink ~~burst sub-frame~~, it shall always appear as the first burst in the first burst set, and shall be encoded in accordance with section 8.3.1.5.3. Subsequent messages bursts within the burst set shall be sequenced in decreasing order of modulation robustness, beginning with the most robust modulation that is supported at the transmitter. The capability to transition between modulation types on any symbol boundary within a burst set shall be supported. FEC blocks shall be terminated at every such transition.

One exception to the modulation sequencing rule is null payload fill, which if used, shall always appear as the final message burst in a burst set, and shall be transmitted using QPSK.

An uplink burst set contains a single message burst, ~~and uses a single modulation format within a burst. However, different bursts may have different modulation formats.~~

Burst profiles are used to specify the modulation and coding for each message burst. In changing from the preamble to a burst profile or in changing from one burst profile (e.g. modulation type) to another, the BS or SS shall use one of two power adjustment rules: maintaining constant constellation peak power (power adjustment rule=0), or maintaining constant constellation mean power (power adjustment rule=1). The power adjustment rule is configurable through the DCD Channel Encoding parameters (11.1.2.1) and UCD Channel Encoding parameters (11.1.1.1).

=====  
*Page 383, Line 1, Change section 8.3.1.4.1.3 as shown*

#### 8.3.1.4.1.3 Null payload fill

When additional payload data is necessary to fill the end of a burst frame, e.g., when a continuous downlink does not have enough data to fill a MAC frame, null payload fill may be inserted. The capability to insert null payload fill at a transmitter and discard it at a receiver is mandatory.

Null payload fill shall use the null fill data type. A MAC Frame control (map) message treats the null fill data type as an adaptive modulation type, and therefore shall indicate when and for how long this data type shall be transmitted within a burst set. Null payload fill data shall also be subject to pilot word patterning within a burst set.

The null fill data type is defined as zero-valued source bits that are randomized (see 8.3.1.1) and mapped directly to QPSK symbols using the Gray code map in Figure 180. The randomizer shall run (without reset) through both the preceding burst payload and the null payload fill, but null payload fill shall not be covered (in the MAC) by a CRC code. During null payload fill transmission, a transmitter's output power may be reduced.

=====  
*Page 383, Line 21, Change section 8.3.1.4.1.4 as shown*

#### 8.3.1.4.1.4 Pilot Words

A Pilot Word is a contiguous sequence of symbols composed of an integer multiple of Unique Words, which may periodically pattern a burst set. As Figure 189 illustrates, the period of a Pilot Word,  $F$  (in symbols), is defined to include the length,  $P$ , of the Pilot Word. For the first downlink burst set, both  $F$  and  $n$  are parameters specified by the DL-MAP Pilot Word Interval Extended IE (Section. 8.3.1.5.5.2). If the IE is not included in the DL-MAP, no Pilot words shall be patterned in the corresponding downlink frame burst set. For all other burst sets, pilot word parameters appear in the Burst Set Delimiter Extended IE.

When Pilot Words are patterned within a burst set,  $F$  for that burst set shall be constant, and the first symbol of the first Pilot Word shall commence  $F-P+1$  symbols into the burst set. As Figure 189 illustrates, Pilot Word patterning shall cease when  $F-P$  or less payload data symbols remain in the burst set.

=====  
 Page 383, Line 52, Change section 8.3.1.4.1.5 as shown

#### 8.3.1.4.1.5 RxDS

The RxDS illustrated in Figure 187 is a quiet period during which the transmitter ramps down, and the receiver collects delay-spread versions of symbols at the end of the burst set. The capability to insert the RxDS at the transmitter is mandatory. The length of the RxDS shall always be the length of a Unique Word, unless it is suppressed (i.e., set to length zero). ~~One instance where the RxDS is automatically suppressed is when bursts are concatenated.~~

If the RxDS is nonzero in length, a transmitter shall ramp\_down during this RxDS by inserting zero inputs into the transmit filter memory following the last intended data symbol, and allowing the natural response of the filter to drive the filter output to zero.

=====  
 Page 386, Line 7, Change section 8.3.1.5.1.1 as shown

#### 8.3.1.5.1.1 FDD with burst downlink

An example FDD system with TDM downlink is illustrated in Figure 190. As Figure 190 illustrates, downlink and uplink subframes shall coincide in length, and shall repeat at regular (MAC defined) constant intervals.

A downlink burst frame shall not exceed the length of a downlink subframe, but it need not fill the entire downlink subframe. Also, although not illustrated in Figure 190, the capability to support several downlink burst sets within a downlink subframe is mandatory.

The first burst set in each downlink subframe shall commence with a burst set preamble (BP), and shall be directly followed by a Frame Control Header (FCH), a ~~broadcast~~ payload that may contain DCD, UCD and MAPs. Only the first burst set in a downlink subframe shall contain the FCH.

~~The first  $X_{FCH}$  source bytes of the FCH shall be outer encoded using a shortened RS code word specified by  $RS(N = X_{FCH} + 16, K = X_{FCH})$ . This shortened code block shall then be inner encoded, and the inner code terminated at the end of the code block. The remainder of the FCH payload shall be encoded within one or more  $RS(N=255, K=239)$  code words, with the last code word shortened to  $RS(K_{last} + 16, K_{last})$  if  $K_{last} < 239$ .~~

~~$X_{FCH}$  is constant. Its value shall include the content of the DL-MAP message (including MAC header) up to and including the second downlink IE. The decoded content of these  $X_{FCH}$  bytes is sufficient to determine of the length and location of a future downlink subframe's entire FCH.~~

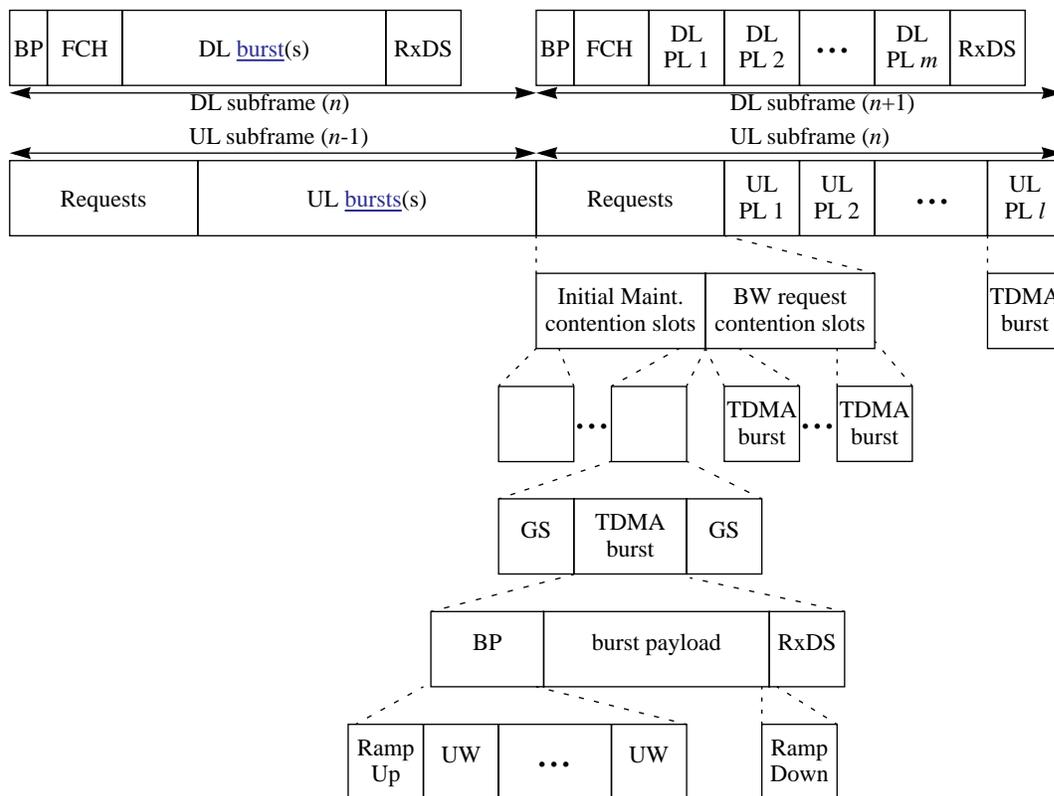


Figure 190—Example of FDD frame format

Time division multiplexed downlink **payload data bursts** may follow the FCH. A downlink burst **set** concludes with an RxDS to allow delay spread to clear the receiver. In the event that a downlink MAC frame is entirely filled with data, bursts may be concatenated and the RxDS suppressed. In other words, an RxDS of zero length shall be used, so that no ramp<sub>down</sub> occurs, and the preamble of the next MAC frame may immediately commence. The preamble of that next MAC frame shall then use a ramp<sub>up</sub> parameter  $R_r$  of zero, so that no ramp<sub>up</sub> occurs.

When more than one burst **set** is to be transmitted within a single downlink MAC subframe, the DL-MAP **of the first payload in the follow-up burst shall have a burst profile with its DLdownlink burst transition gap (DLBTG) entry enabled. The DLBTG is a burst profile parameter. When enabled, the DLBTG also indicates the length of the gap between bursts. The DLBTG includes the RxDS terminating such a burst, and thus, when enabled, shall be specified to be at least as long as the RxDS.** shall include a Burst Delimiter Extended IE after the last data grant IE of each burst set and before the first data grant IE of the burst set's successor. The IE specifies the size of the gap (DLBTG) separating the burst sets. The gap includes the RxDS. As a result, the minimum length of the DLBTG is the length of the RxDS.

An uplink subframe contains three categories of bursts:

- Initial Ranging Contention Slots that are transmitted in contention slots reserved for station initial ranging;
- Bandwidth Request Contention Slots that are transmitted in contention slots reserved for response to multicast and broadcast polls for bandwidth needs;
- Grants of bandwidth that are specifically allocated to individual SSs.

As Figure 190 illustrates, uplink burst **sets** are TDMA, and shall be constructed from a burst **set** preamble (BP), including ramp<sub>up</sub>; a burst **payload**; and an RxDS, including ramp<sub>down</sub>. SSTGs separate the burst **set** transmissions

of the various SSs using the uplink. An SSTG specification includes the length of the RxDS, along with any additional guard symbols that may be inserted between uplink bursts to reflect reference time uncertainties.

As shown in the uplink subframe of Figure 190, the Initial Ranging and Bandwidth Request Contention Slots shall always be grouped contiguously as Request Slots. To insure interoperability, these request slots shall use uplink burst profiles that all BSs and SSs can support. All uplink burst [sets](#) excluding Initial Ranging slots shall use an SSTG (between bursts) that is specified as a UCD Channel Descriptor parameter. Since larger time uncertainties may be experienced on the Initial Ranging slots, a special Initial Ranging SSTG Channel Descriptor parameter shall be associated with the Initial Ranging slots. The Initial Ranging SSTG specification includes both the length of the RxDS and additional guard symbols. The additional guard symbols used by the Initial Ranging SSTG are designated by 'GS' in Figure 190.

The UL-MAP in the downlink FCH governs the location, burst size, and burst profiles for exclusive bandwidth grants to SSs. Burst profile selection may be based on the effects of distance, interference and environmental factors on transmission from the SS.

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*Page 388, Line 22, Change section 8.3.1.5.1.2 as shown*

### 8.3.1.5.1.2 Generating a continuous downlink from a burst downlink

A continuous downlink may be derived from a burst downlink by null payload filling the end of a burst [frame](#), to insure that it spans an entire downlink frame. By so doing, a burst downlink is forced to suppress both the RxDS and ramp\_up burst elements, because burst downlinks are mandated to suppress these elements when a downlink MAC [subframe](#) is full. To insert null payload fill, the last entry in the DL-MAP of an FCH shall specify the burst profile for the null fill data type. Details on the null payload fill data type can be found in 8.3.1.4.1.3.

=====  
*Page 389, Line 39, Change section 8.3.1.5.2 as shown*

### 8.3.1.5.2 TDD

TDD multiplexes the uplink and downlink on the same carrier, over different time intervals within the same MAC frame.

Figure 191 illustrates TDD operation with a single burst [set](#) on the TDM downlink. In TDD, the downlink and uplink alternate, ~~between~~ occupying a shared frame, with the downlink subframe preceding the uplink subframe. The size of [the](#) shared frame shall be constant; however, the downlink and uplink subframe sizes within the shared frame shall vary according to allocations directed by the FCH. Although Figure 191 illustrates a single TDM burst [set](#) per downlink subframe, the capability to accommodate several TDM burst [sets](#) is mandatory, with the first burst [set](#) in the downlink duplex subframe containing the FCH.

When more than one burst [set](#) is to be transmitted within a single downlink subframe, the DL-MAP ~~of the first payload in the follow-up burst shall have a burst profile with its DL-BTG-DLBTG entry enabled. The DL-BTG-DLBTG is a burst profile parameter. When enabled, the DL-BTG-DLBTG also indicates the length of the gap between bursts. The DL-BTG-DLBTG includes the RxDS terminating such a burst, and thus, when enabled, shall be specified to be at least as long as the RxDS.~~ shall include a Burst Delimiter Extended IE after the last data grant IE of each burst set and before the first data grant IE of the burst set's successor. The Burst Delimiter Extended IE specifies the size of the gap (DLBTG) separating the burst sets. The gap includes the RxDS. As a result, the minimum length of the DLBTG is the length of the RxDS.

Most framing elements within TDD are found in FDD and perform the same functions; therefore, for descriptions of these elements, consult 8.3.1.5.1.1. The only frame elements in TDD not found in FDD are TTG and RTG.

After the TTG, the BS receiver shall look for the first symbols of the uplink burst subframe. This gap is an integer number of PS durations and starts on a PS boundary.

After the RTG, SS receivers shall look for the first symbols of modulated data in the downlink burst subframe. This gap is an integer number of PS durations and starts on a PS boundary.

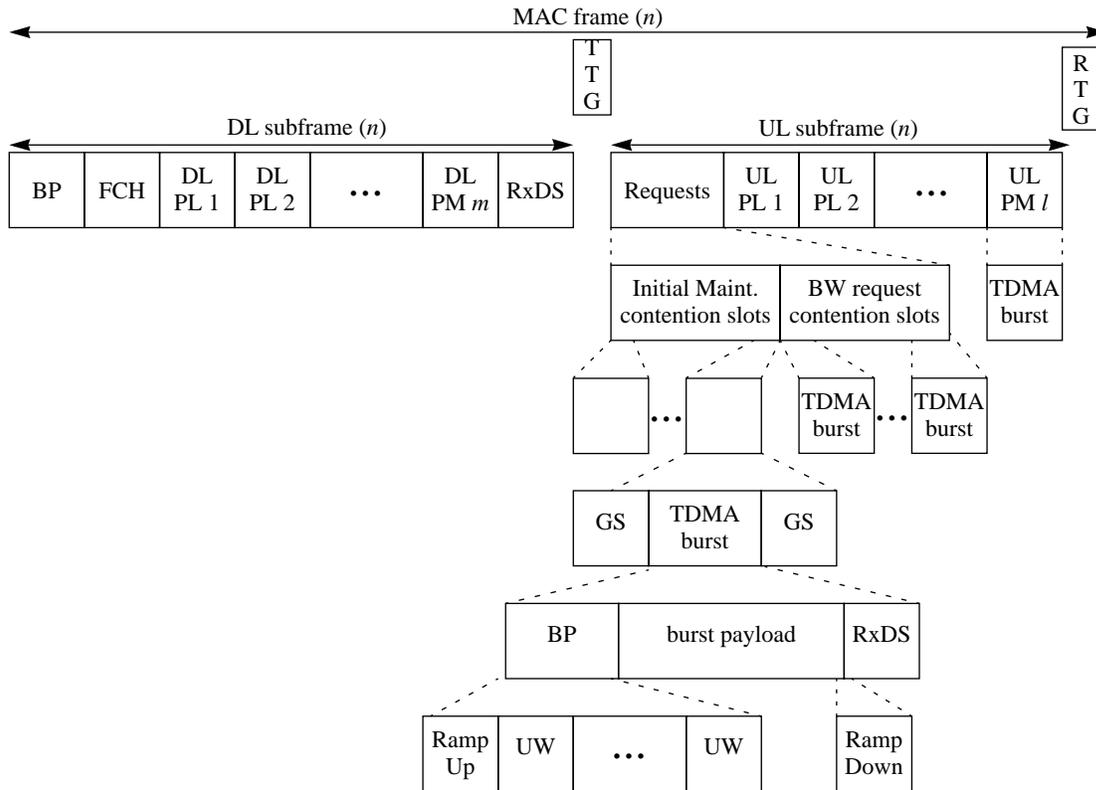


Figure 191—Example of TDD frame format

=====  
 Page 393, Line 5, Table 169, Rename table title

from: Table 169—DCD channel profile setting for Broadcast FCH message

to: Table 169—Channel settings for FCH burst

=====  
 Page 393, Line 26, Table 170, Renamte table title

from: Table 170—DCD burst profile settings for DLdownlink burst containing Broadcast FCH

to: Table 170—Burst profile settings for FCH burst

=====  
 Page 393, Line 47, Insert following text after Table 170

The first  $X_{FCH}$  source bytes of the FCH shall be outer encoded using a shortened RS code word specified by  $RS(N = X_{FCH} + 16, K = X_{FCH})$ . This shortened code block shall then be inner encoded, and the inner code terminated at the end of the code block. The remainder of the FCH payload shall be encoded within one or more  $RS(N=255, K=239)$  code words, with the last code word shortened to  $RS(K_{last}+16, K_{last})$  if  $K_{last} < 239$ .

$X_{FCH}$  is constant. Its value shall span the content of the DL-MAP message (including MAC header) up to and including the downlink IE providing the location of the end of the target frame's FCH. The decoded content of these  $X_{FCH}$  bytes is sufficient to determine of the length and location of a future downlink subframe's entire FCH.

=====  
 Page 398, Change section 8.3.1.5.2.3 as shown

### 8.3.1.5.2.3 Pilot Word Information Extended IE Format

The inclusion of pilot words at fixed intervals from the start of the frame is accomplished by using an extended IE with the subcode set to 0x01 (see Table 1). When included, this IE shall appear as the first element in the DL-MAP IE list. Pilot word insertion specified by this IE is in force until the termination of the burst set by either the end of the downlink frame or the initiation of another burst set.

**Table 1—SCa Pilot Word Interval extended IE format**

Syntax	Size	Notes
Pilot_Word_IE() {		
<b>Subcode</b>	4 bits	PWI = 0x01
<b>Length</b>	4 bits	Length = 1
<b>Pilot Word interval</b>	4 bits	<u>(including Pilot Word Length)</u> <u>1 = 128 symbols, 2 = 256 symbols,</u> <u>3 = 512 symbols, 4 = 1024 symbols,</u> <u>5 = 2048 symbols, 6 = 4096 symbols,</u> <u>7 - 15 reserved</u>
<b>Pilot Word length</b>	4 bits	Number of contiguous Unique Words composing a Pilot Word (1 to 15)
}		

=====

*Page 398, Insert the following as section 8.3.1.5.5.2.4*

#### 8.3.1.5.5.2.4 Burst Set Delimiter Extended IE Format

Termination of one burst set and the start of another is specified by the inclusion of the burst set delimiter extended IE. This IE (subcode = 3) specifies the size of the DLBTG which terminates the previous burst set as well as the preamble, unique word, and pilot word settings that shall apply to the next burst set defined in the map. A length of two, indicates that the parameter values in force for the previous burst set shall remain in effect for the new burst set. In this case, only the Offset field follows the Length specification.

**Table 2—SCa Burst Set Delimiter extended IE format**

Syntax	Size	Notes
Burst_Set_Delimiter_IE() {		
<b>Subcode</b>	4 bits	BSD = 0x03
<b>Length</b>	4 bits	Length = 6 or 2 to reuse settings from previous burst set
<b>Offset</b>	16 bits	Offset (in PS) from start of frame to start of DLBTG
<b>DLBTG</b>	8 bits	The time, expressed in PSs, between the end of a BS burst set and the beginning of the next burst set within the same MAC downlink frame. The minimum (and default) length of the DLBTG shall be at least one RxDS interval, so that ramp-down can occur and delay spread can clear receivers.
<b>Transmit-diversity</b>	1 bit	0 = no Tx diversity, 1 = STC Tx diversity
<b>Unique Word length</b>	3 bits	Number of symbols in a Unique Word: 0 = 16 symbols, 1 = 64 symbols, 2 = 256 symbols
<b>Preamble length</b>	4 bits	Number of Unique Words in preamble (0 - 7)
<b>Preamble ramp-up</b>	4 bits	Number of PSs in preamble ramp-up (0 - 15)
<b>Pilot Word interval</b>	4 bits	[regular bursts, Transmit-diversity = 0] (Pilot word's length in symbols included in interval). 0= no pilot words, 1 = 128 symbols, 2 = 256 symbols, 3 = 512 symbols, 4 = 1024 symbols, 5 = 2048 symbols, 6 = 4096 symbols, 7 - 15 reserved [STC-encoded bursts, Transmit-diversity = 1] 0=no pilot words, 1-15 = number of paired blocks between pilot words
<b>Pilot Word length</b>	4 bits	Number of contiguous Unique Words composing a Pilot Word (1 to 15)
<b>Roll-off</b>	4 bits	0 = 0.15, 2 = 0.18, 2 =.25, 3-15 = <i>Reserved</i>
}		

=====  
 Page 409, Line 52, Change section 8.3.3.1.5 as shown

**8.3.3.1.5 STC burst set elements**

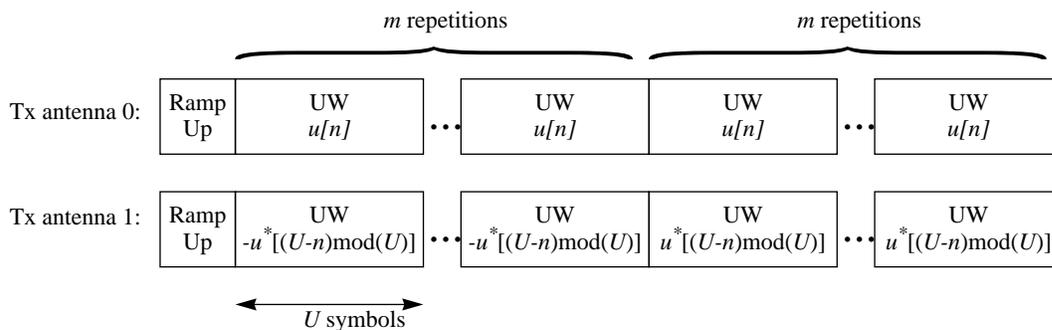
A STC burst set shall consist of a preamble, followed by a payload, which may consist of multiple pairs of STC blocks.

Unlike conventional burst sets, an RxDS element shall not appear at the conclusion of a STC burst set.

=====  
 Page 410, Line 1, Change section 8.3.3.1.5.1 as shown

**8.3.3.1.5.1 Burst set preamble**

Figure 195 illustrates that the burst ~~frame~~ set preamble shall be used for burst sets utilizing STC transmit diversity encoding. The number of UW Unique Word blocks composing a STC burst set preamble is a ~~burst profile~~ parameter of the Burst Set Delimiter Extended IE (for downlink) or burst profile (for uplink), ~~through reuse of the general burst profile encoding for the number of UWs in a preamble~~. However, since two channels shall be estimated, the total number of UWs used to construct an STC burst set preamble shall be twice the ~~number~~ parameter value specified ~~in the burst profile encoding~~.



**Figure 195—STC ~~frame~~ burst set preamble**

Note that this preamble structure may also be inserted within a transmission as a group of contiguous Pilot Words, to assist in channel estimation and updating within a burst set.

=====  
 Page 410, Line 39, Change section 8.3.3.1.5.2 as shown

**8.3.3.1.5.2 Burst payload data**

Payload data within an STC-encoded burst shall be formatted into block pairs, with each block pair possessing one of the block pair profiles described in 8.3.3.1.4. If insufficient data is available to fill the last block pair, then the payload shall be filled with null payload fill, as specified in 8.3.1.4.1.1. Except for the payload fill, modulations are sequenced in terms of decreasing modulation robustness on the Tx Ant 0 channel. The preamble structure of Figure 195, minus the ramp\_up symbols, may also be inserted within a transmission, as a group of contiguous Pilot Words to assist in channel estimation and updates within in a burst set. In such an instance, this contiguous pilot symbol structure is considered external to the paired STC payload data blocks illustrated in Figure 193, although the pilots may appear after every V<sup>th</sup> paired payload block, where K is an integer greater than or equal to 1. The pilot word repetition inter-

val, and the number of UWs composing a pilot word ~~is a burst profile parameter~~ are parameters of the Burst Set Delimiter Extended IE (for downlink) or the burst profile (for uplink) defining the start of the STC-encoded burst set.

=====  
*Page 411, Line 1, Change section 8.3.3.2 as shown*

**8.3.3.2 Interoperability with non-STC-encoded bursts**

For interoperability reasons, STC-encoded data and conventionally-encoded data, shall not be time division multiplexed within the same burst set. Instead, the STC data shall be encapsulated within its own burst set, and preamble.

All bursts with different STC pair block sizes, *F*, shall also be segregated, although they may share the same preamble.

=====  
*Page 411, Line 60, Change section 8.3.4.7 as shown*

**8.3.4.7 Spurious emissions during burst on/off transients**

A transmitter shall control spurious emissions to conform with applicable regulatory requirements. This includes prior to and during ramp-up, during and following ramp-down, and before and after a burst set in a TDM/TDMA scheme.

=====  
*Page 569, Line 38, Table 284, Delete entry for Preamble Length*

=====  
*Page 569, Line 43, Table 284, Delete entry for Unique Word Length*

=====  
*Page 571, Line 26, Table 286, Delete entry for Rolloff*

=====  
*Page 571, Line 32, Table 286, Delete entry for Pilot Word Parameters*

=====  
*Page 571, Line 50, Table 286, Delete entry for Transmit Diversity Type*

=====  
*Page 571, Line 7, Table 286, Delete entry for DLBTG*

**DISABLING OF DUPLEXED SERVICE FLOW OPERATIONS**

**Summary:** Remove references allowing concurrent action on one uplink and downlink service flow with DSA or DSC dialogs.

=====  
**Page 80, Line 48, Section 6.4.2.3.10, Change as shown**

A DSA-REQ message shall not contain parameters for more than one service flow ~~in each direction, i.e., a DSA-REQ message shall contain parameters for either a single uplink service flow, or for a single downlink service flow, or for one uplink and one downlink service flow.~~

=====  
**Page 83, Line 55, Section 6.4.2.3.13, Change as shown**

A DSC-REQ message shall not carry parameters for more than one service flow ~~in each direction, i.e., a DSC-REQ message shall contain parameters for either a single uplink service flow, or for a single downlink service flow, or for one uplink and one downlink service flow. A DSC-REQ shall contain the following:~~

=====  
**Page 220, Line 51, Section 6.4.13.7.2, Change as shown**

Service flows may be created by the DSA process as well as through the procedure outlined in 6.4.13.7.1. The DSA may be initiated by either the SS or the BS and may create one uplink ~~and/or~~ one downlink dynamic service flow(s). A three-way handshake is used to create service flows.

=====  
**Page 221, Line 29, Section 6.4.13.7.2.2, Change as shown**

A DSA-REQ from a BS contains SFID(s) for one uplink ~~and/or~~ one downlink Service flow, possibly ~~their~~ its associated CIDs, and set(s) of active or admitted QoS Parameters. The protocol is illustrated in Figure 101 and is described in detail in 6.4.13.8.3.3.

=====  
**Page 230, Line 39, Section 6.4.13.8.3.1, Change as shown**

An SS wishing to create an uplink ~~and/or~~ downlink service flow sends a request to the BS using a DSA-REQ message. The BS checks the integrity of the message and, if the message is intact, sends a message received (DSX-RVD) response to the SS. The BS checks the SS's authorization for the requested service(s) and whether the QoS requirements can be supported, generating an appropriate response using a DSA-RSP message. The SS concludes the transaction with an acknowledgment message (DSA-ACK). This process is illustrated in Table 100.

**Table 100—DSA initiated from SS**

SS		BS
New service flow(s) needed		
Check if resources are available		
Send DSA-REQ Set Timers T7 and T14	--DSA-REQ-->	Receive DSA-REQ
Timer T14 Stops	<-- DSX-RVD--	DSA-REQ integrity valid

**Table 100—DSA initiated from SS (Continued)**

SS	BS
	Check whether SS is authorized for Service(s) <sup>a</sup>
	Check whether service flow(s) QoS can be supported
	Create SFID(s)
	If uplink AdmittedQoSParamSet is non-null, map service flow to CID
	If uplink ActiveQoSParamSet is non-null, Enable reception of data on new uplink service flow
Receive DSA-RSP Timer T7 Stops	<--DSA-RSP-->
	Send DSA-RSP
If ActiveQoSParamSet is non-null, Enable transmission and/or reception of data on new service flow(s)	
Send DSA-ACK	---DSA-ACK-->
	Receive DSA-ACK
	If downlink ActiveQoSParamSet is non-null, Enable transmission of data on new downlink service flow

a. Authorization happens prior to the DSA-REQ being received by the BS. The details of BS signalling to anticipate a DSA-REQ are beyond the scope of this specification.

*In order to facilitate a common admission response, an uplink and a downlink service flow can be included in a single DSA-REQ. Both service flows are either accepted or rejected together.*

=====  
*Page 232, Line 40, Section 6.4.13.8.3.2, Change as shown*

A BS wishing to establish an uplink **and**/or a downlink dynamic service flow(s) with an SS performs the following operations. The BS checks the authorization of the destination SS for the requested class of service and to determine whether the QoS requirements can be supported. If the service can be supported, the BS generates new SFID(s) with the required class of service and informs the SS using a DSA-REQ message. If the SS checks that it can support the service, it responds using a DSA message. The transaction completes with the BS sending the acknowledge message (DSA-ACK). This process is illustrated in Table 101.

**Table 101—DSA initiated from BS**

SS	BS
	New service flow(s) required for SS
	Check whether SS is authorized for Service(s)
	Check whether service flow(s) QoS can be supported
	Create SFID(s)

**Table 101—DSA initiated from BS (Continued)**

SS		BS
Receive DSA-REQ	<--DSA-REQ---	If AdmittedQoSParamSet is non-null, map service flow to CID Send DSA-REQ Set Timer T7
Confirm that SS can support service flow(s) Add Downlink SFID (if present) Enable reception on any new downlink service flow		
Send DSA-RSP	--DSA-RSP-->	Receive DSA-RSP Timer T7 Stops Enable transmission (downlink) or reception (uplink) of data on new service flow
Receive DSA-ACK	<--DSA-ACK---	Send DSA-ACK
Enable transmission on new uplink service flow		

=====

*Page 242, Line 7, Section 6.4.13.8.4, Change as shown*

A single DSC message exchange can modify the parameters of one downlink service flow ~~and~~ or one uplink service flow.

**ALTERATIONS FOR FULL DUPLEX DSx SUPPORT**

**Summary:** *Removed transaction ID and confirmation code values from all DSx messages. Message and TLV usage descriptions were altered to specify that the Transaction ID is encoded as a TLV in each service flow set. With this change, the Confirmation Code only appears in error sets. A status of "success" is implicit whenever an RSP/ACK is received for which there is no error set TLV included in the message.*

=====

**Page 80, Line 29, Section 6.4.2.3.10, Delete row entry for Transaction ID from Table 37 and the definition of Transaction ID (line 42-43) from the parameter list following Table 37**

-----

**Page 80, Line 56, Section 6.4.2.3.10, (in Service Flow Parameters definition)**

**Replace:** "Specification of the service flow's traffic characteristics and scheduling requirements."

**With:** "Specification of the service flow's traffic characteristics and scheduling requirements.  
The parameter set shall also include the transaction ID(s) assigned to the add operation(s)."

-----

**Page 81, Line 33, Section 6.4.2.3.11, Delete row entries for Transaction ID and confirmation code from Table 38 and the associated entries from the parameter list descriptions following Table 38**

-----

**Page 81, Line 54, Section 6.4.2.3.11, Immediately after "All other parameters are coded as TLV tuples." insert the following as a new paragraph**

The DSA-RSP shall contain the following:

**Transaction ID(s)**

Transaction ID(s) from the corresponding DSA-REQ message uniquely identifying the appropriate uplink and/or downlink add service flow dialog(s). If no other service flow information is included in the message, each transaction ID is encapsulated as the single parameter of a service flow parameter set. If the message carries information for only an uplink operation, the transaction ID shall be encoded in the uplink service flow parameter set. If the the message carries information only for a downlink operation, the transaction ID shall be encoded in the downlink service flow parameter set. If the message carries information for both an uplink and downlink operation, the transaction ID for each operation is encoded as part of the corresponding service flow parameter set.

-----

**Page 81, Line 55, Section 6.4.2.3.11,**

**replace** "If the transaction is successful, the DSA-RSP may contain the following:"

**with** "For each add transaction that is successful, the DSA-RSP may contain the following:"

-----

**Page 81, Line 64, Section 6.4.2.3.11,**

**replace** "If the transaction is unsuccessful, the DSA-RSP shall include:"

**with** "For each add transaction that is unsuccessful, the DSA-RSP shall include:"

-----

**Page 82, Line 30, Section 6.4.2.3.11.1, (replace "the transaction" with "a transaction")**

**replace** "If **the** transaction is unsuccessful, the BS shall use the original service flow reference to identify the failed parameters in the DSA-RSP."

**with** "If **a** transaction is unsuccessful, the BS shall use the original service flow reference to identify the failed parameters in the DSA-RSP."

-----  
*Page 82, Line 36, Section 6.4.2.3.11.2, (replace “the transaction” with “a transaction”)*  
*replace*

“If **the** transaction is unsuccessful, the SS shall use the SFID to identify the failed parameters in the DSA-RSP.”  
*with*

“If **a** transaction is unsuccessful, the SS shall use the SFID to identify the failed parameters in the DSA-RSP.”

-----  
*Page 82, Line 54, Section 6.4.2.3.12, Delete row entries for Transaction ID and confirmation code from Table 39 and the associated entries from the parameter list following Table 39*

-----  
*Page 83, Line 11, Section 6.4.2.3.12, Immediately after “All other parameters are coded as TLV tuples.” insert the following as a new paragraph*

The DSA-ACK shall contain the following:

**Transaction ID(s)**

Transaction ID(s) from the corresponding DSA-RSP message uniquely identifying the appropriate uplink and/or downlink add service flow dialog(s). If no other service flow information is included in the message, each transaction ID is encapsulated as the single parameter of a service flow parameter set. If the message carries information for only an uplink operation, the transaction ID shall be encoded in the uplink service flow parameter set. If the the message carries information only for a downlink operation, the transaction ID shall be encoded in the downlink service flow parameter set. If the message carries information for both an uplink and downlink operation, the transaction ID for each operation is encoded as part of the corresponding service flow parameter set.

=====  
*Page 83, Line 48, Section 6.4.2.3.13, Delete row entry for Transaction ID from Table 40 and the definition of Transaction ID from the parameter list following Table 40*

-----  
*Page 84, Line 1, Section 6.4.2.3.13, (in Service Flow Parameters definition)*

*replace:* “If included, the service flow parameters shall contain a SFID.”

*with:* “If included, each service flow parameter set shall contain the service flow’s SFID and the transaction ID assigned to the change operation.”

=====  
*Page 84, Line 22, Section 6.4.2.3.14, Delete row entries for Transaction ID and confirmation code from Table 41 and the associated entries from the parameter list following Table 41*

-----  
*Page 84, Line 43, Section 6.4.2.3.14, Immediately after “All other parameters are coded as TLV tuples.” insert the following as a new paragraph*

The DSC-RSP shall contain the following:

**Transaction ID(s)**

Transaction ID(s) from the corresponding DSC-REQ message uniquely identifying the appropriate uplink and/or downlink change service flow dialog(s). If no other service flow information is included in the message, each transaction ID is encapsulated as the single parameter of a service flow parameter set. If the message carries information for only an uplink operation, the transaction ID shall be encoded in the uplink service flow parameter set. If the the message carries information only for a downlink operation,

the transaction ID shall be encoded in the downlink service flow parameter set. If the message carries information for both an uplink and downlink operation, the transaction ID for each operation is encoded as part of the corresponding service flow parameter set.

-----  
**Page 84 Line 44, Section 6.4.2.3.14,**

**replace** “If the transaction is successful, the DSC-RSP may contain the following:“

**with** “For each change transaction that is successful, the DSC-RSP may contain the following:“

-----  
**Page 84, Line 61, Section 6.4.2.3.14,**

**replace** “If the transaction is unsuccessful, the DSC-RSP shall include:“

**with** “For each change transaction that is unsuccessful, the DSC-RSP shall include:“

=====  
**Page 85, Line 30, Section 6.4.2.3.15, Delete row entries for Transaction ID and confirmation code from Table 42 and the associated entries from the parameter list following Table 42**

-----  
**Page 85, Line 50, Section 6.4.2.3.15, Immediately after** “All other parameters are coded as TLV tuples.“ **insert the following as a new paragraph**

**Transaction ID(s)**

Transaction ID(s) from the corresponding DSC-RSP message uniquely identifying the appropriate uplink and/or downlink add service flow dialog(s). If no other service flow information is included in the message, each transaction ID is encapsulated as the single parameter of a service flow parameter set. If the message carries information for only an uplink operation, the transaction ID shall be encoded in the uplink service flow parameter set. If the the message carries information only for a downlink operation, the transaction ID shall be encoded in the downlink service flow parameter set. If the message carries information for both an uplink and downlink operation, the transaction ID for each operation is encoded as part of the corresponding service flow parameter set.

=====  
**Page 86, Line 3, Section 6.4.2.3.16, Replace first paragraph**

A DSD-REQ is sent by an SS or BS to delete an existing service flow. The format of a DSD-REQ shall be as shown in Table 43.

**with**

A DSD-REQ is sent by an SS or BS to delete existing service flows. Information for one uplink and/or one downlink service flow may be provided. The format of a DSD-REQ shall be as shown in Table 43.

-----  
**Page 86, Line 15, Section 6.4.2.3.16, Delete row entry for Transaction ID and Service Flow Id from Table 43 and the associated entries from the parameter list following Table 43**

-----  
*Page 86, Line 36, Section 6.4.2.3.16,*

*after:* "All other parameters are coded as TLV tuples."

*and before:* "HMAC Tuple"

*insert:* "Service Flow Parameters (see 11.4.9)

Service flow ID of service flow to be deleted and unique Transaction ID assigned to the specific operation. A single DSD-REQ message shall not contain more than one one uplink and one downlink parameter set.

=====  
*Page 86, Line 56, Section 6.4.2.3.17, Delete row entry for Transaction ID, Confirmation Code, and Service Flow Id from Table 44 and the associated entries from the parameter list following Table 44*

-----  
*Page 87, Line 16, Section 6.4.2.3.17,*

*after:* "All other parameters are coded as TLV tuples."

*and before:* "HMAC Tuple"

*insert:* "Service Flow Parameters (see 11.4.9)

ID of service flow to be deleted, confirmation code indicating the result of the deletion attempt and unique Transaction ID specified in the DSD-REQ message for the operation. A single DSD-REQ message shall not contain more than one one uplink and one downlink parameter set.

=====  
*Page 93, Line 54, Section 6.4.2.3.27, Delete row entry for Transaction ID and Confirmation Code from Table 55 and the associated entries from the parameter list following Table 55*

-----  
*Page 94, Line 8, Section 6.4.2.3.27, Insert the following at the end of the section*

All other parameters are coded as TLV tuples.

**Transaction ID(s)**

Transaction ID(s) from the corresponding DSx-REQ message uniquely identifying the appropriate uplink or downlink add/change service flow dialog associated with the host message. If no other service flow information is included in the message, each transaction ID is encapsulated as the single parameter of a service flow parameter set. If the message carries information for only an uplink operation, the transaction ID shall be encoded in the uplink service flow parameter set. If the the message carries information only for a downlink operation, the transaction ID shall be encoded in the downlink service flow parameter set. If the message carries information for both an uplink and downlink operation, the transaction ID for each operation is encoded as part of the corresponding service flow parameter set.

For each transaction in the request that could not be honored, the DSx-RVD shall include:

**Service Flow Error Set** (see 11.4.9.4)

A Service Flow Error Set identifying the transaction and supplying the reason for rejection (confirmation code) shall be included for every rejected transaction in the corresponding DSx-REQ message.

The following entry shall be included at the end of each message:

**HMAC Tuple** (see 11.4.11)

The HMAC Tuple attribute contains a keyed message digest (to authenticate the sender).  
 The HMAC Tuple attribute shall be the final attribute in the DSx message’s attribute list.

=====  
*Page 605, Line 50, Add an entry for “Transaction ID” to table 307*

**Table 307—Service flow encodings**

Type	Parameter
1	Transaction Identifier

-----  
*Page 606, Line 28, Insert the following before the current 11.4.9.1 and renumber the subsequent sections appropriately*

**11.4.9.1 Transaction identifier**

The transaction identifier is assigned by the originator of a DSA-REQ, DSC-REQ, or DSD-REQ message to uniquely identify the service operation initiated by the transmission of the message on an individual service flow. In later RVD, ACK and RSP responses, the value is included to identify the specific add/change/delete operation to which the response or acknowledgement refers.

Type	Length	Value	Scope
[25/24].1	16	SS originated REQ: 0x0000 - 0x7FFF BS originated REQ: 0x8000 - 0xFFFF	DSx-REQ DSx-RVD DSx-RSP DSx-ACK

=====  
*Page 607, Line 64, Section 11.4.9.4,  
 Replace fifth paragraph*

“On success of the entire transaction, the RSP or ACK message shall not include a Service Flow Error Parameter Set.”

*with the following:*

On success of a transaction, the RSP or ACK message shall not include a Service Flow Error Parameter Set. Absence of a service Flow Error Parameter Set shall indicate a status of *OK* or *Success*

=====  
*Page 632, Line 30, Section 11.4.13,*

*Replace first sentence* “The CC indicates the status for the dynamic service (DSx-xxx) messages.”

*with the following:*

The CC is included as an element of a service flow error set and identifies the specific error detected during a dynamic service (DSx-xxx) message dialog.

-----  
*Page 632, Line 41, Remove the entry for “OK/Success from table 311*