

**TSG-RAN Meeting #27**  
**Tokyo, Japan, 09-11 March 2005**

**RP-050078**  
**Agenda item 9.4**

Source: TSG-RAN WG2

Title: 25.321 CR to Rel-6 on MBMS

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.321	204	-	Rel-6	Correction to MBMS header for MBMS	F	6.3.0	6.4.0	R2-050655	MBMS-RAN

## CHANGE REQUEST

# **25.321 CR 204** # rev - # Current version: **6.3.0** #

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

**Proposed change affects:** UICC apps#  ME  Radio Access Network  Core Network

<b>Title:</b>	# Correction to MBMS header for MBMS		
<b>Source:</b>	# RAN WG2		
<b>Work item code:</b>	# MBMS-RAN	<b>Date:</b>	# 18/02/2005
<b>Category:</b>	# <b>F</b>	<b>Release:</b>	# REL-6
	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

<b>Reason for change:</b>	# The MAC header structure for MBMS remains to be open in the current spec.
<b>Summary of change:</b>	# <ol style="list-style-type: none"> <li>1. In 4.2.3.1 and 4.2.3.1b, 'when present' is removed because MBMS-Id is always needed for the MAC header for MTCH.</li> <li>2. In 9.2.1, 'Note' is removed because the indicated open issue is closed.</li> <li>3. In 9.2.1.7, description and figure of MAC PDU format for MCCH is modified.</li> <li>4. In 9.2.1.9, description and figure of MAC PDU format for MSCH is modified.</li> </ol>
<b>Consequences if not approved:</b>	# The MAC header structure for MBMS will remain to be not specified.

<b>Clauses affected:</b>	# 4.2.3.1, 4.2.3.1b, 9.2.1								
<b>Other specs affected:</b>	<table style="display: inline-table; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">Y</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">N</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">#</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">X</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">#</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">X</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px; text-align: center;">#</td> <td style="border: 1px solid black; padding: 2px; text-align: center;">X</td> </tr> </table> Other core specifications # Test specifications # O&M Specifications #	Y	N	#	X	#	X	#	X
Y	N								
#	X								
#	X								
#	X								
<b>Other comments:</b>	#								

**How to create CRs using this form:**

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

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

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

### 4.2.3.1 MAC-c/sh/m entity – UE Side

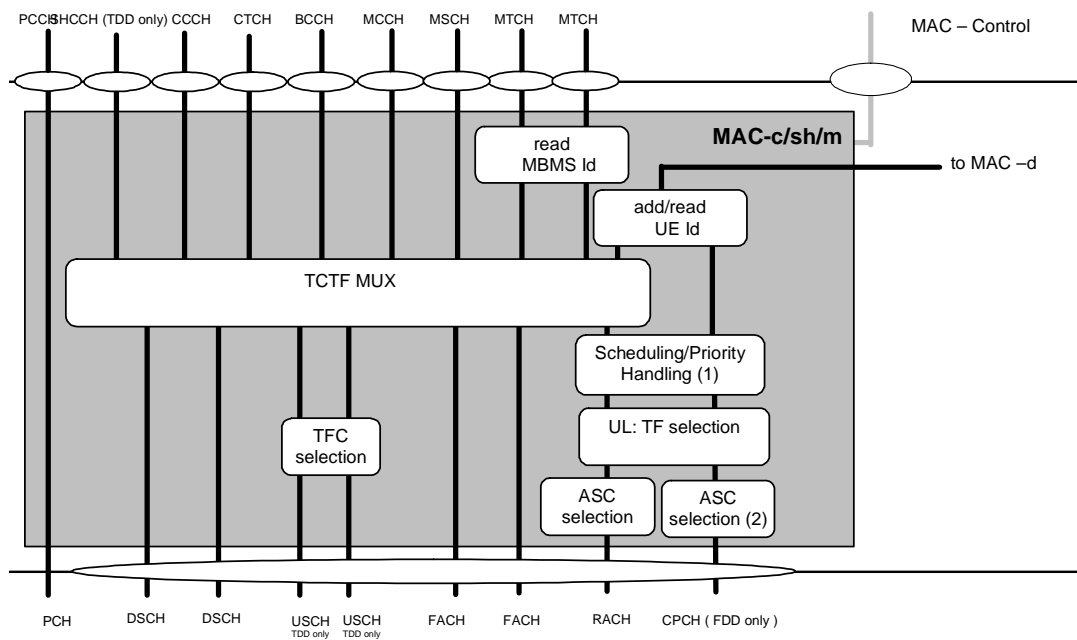
Figure 4.2.3.1.1 shows the UE side MAC-c/sh/m entity.

The following functionality is covered:

- TCTF MUX:
  - this function represents the handling (insertion for uplink channels and detection and deletion for downlink channels) of the TCTF field in the MAC header, and the respective mapping between logical and transport channels.  
The TCTF field indicates the common logical channel type, or if a dedicated logical channel is used;
- add/read UE Id:
  - the UE Id is added for CPCH and RACH transmissions;
  - the UE Id, when present, identifies data to this UE.
- read MBMS Id:
  - the MBMS Id is read in case of MTCH reception;
  - the MBMS Id, ~~when present~~, identifies received data to an MBMS service.
- UL: TF selection:
  - in the uplink, the possibility of transport format selection exists.  
In case of CPCH transmission, a TF is selected based on TF availability determined from status information on the CSICH;
- ASC selection:
  - For RACH, MAC indicates the ASC associated with the PDU to the physical layer. For CPCH, MAC may indicate the ASC associated with the PDU to the Physical Layer. This is to ensure that RACH and CPCH messages associated with a given Access Service Class (ASC) are sent on the appropriate signature(s) and time slot(s). MAC also applies the appropriate back-off parameter(s) associated with the given ASC. When sending an RRC CONNECTION REQUEST message, RRC will determine the ASC; in all other cases MAC selects the ASC;
- scheduling /priority handling
  - this functionality is used to transmit the information received from MAC-d on RACH and CPCH based on logical channel priorities. This function is related to TF selection.
- TFC selection
  - transport format and transport format combination selection according to the transport format combination set (or transport format combination subset) configured by RRC is performed,

The RLC provides RLC-PDUs to the MAC, which fit into the available transport blocks on the transport channels.

There is one MAC-c/sh/m entity in each UE.



Note 1: Scheduling /Priority handling is applicable for CPCH.  
 Note 2: In case of CPCH, ASC selection may be applicable for AP preamble.

**Figure 4.2.3.1.1: UE side MAC architecture / MAC-c/sh/m details**

#### 4.2.3.1b MAC-m entity – UE Side

Figure 4.2.3.1b.1 shows the UE side MAC-m entity.

The following functionality is covered:

- TCTF DEMUX:
  - this function represents the handling (detection and deletion for downlink channels) of the TCTF field in the MAC header, and the respective mapping between logical and transport channels. The TCTF field indicates the common logical channel type;
- read MBMS Id
  - the MBMS Id is read in case of MTCH reception;
  - the MBMS Id, ~~when present~~, identifies received data to an MBMS service.

The MAC Control SAP is used to transfer control information to MAC-m.

If MTCH channels are selectively combined, the MAC-m entity exists in the UE. Otherwise, the MAC-m entity does not exist.

In case of selective combining of MTCH channels from multiple cells, there are one MAC-c/sh/m for the current cell and one MAC-m entity for each neighboring cell in the UE.

**<Cut until the next modified section>**

## 9.2 Formats and parameters

NOTE: MAC header field encodings as specified in this clause with designation "Reserved" are forbidden to be used by a sender in this version of the protocol.

### 9.2.1 MAC PDU: Parameters of the MAC PDU header (not HS-DSCH or E-DCH) and MAC-d PDU header (HS-DSCH and E-DCH)

~~NOTE: In this subclause coding and format of MAC header fields for MBMS need to be further studied e.g. based on multiplexing options.~~

The following fields are defined for the MAC header for transport channels other than HS-DSCH and for the MAC-d PDU header for HS-DSCH:

- Target Channel Type Field

The TCTF field is a flag that provides identification of the logical channel class on FACH and RACH transport channels, i.e. whether it carries BCCH, CCCH, CTCH, SHCCH, MCCH, MTCH, MSCH or dedicated logical channel information. The size and coding of TCTF for FDD and TDD are shown in tables 9.2.1.1, 9.2.1.2, 9.2.1.3, 9.2.1.4 and 9.2.1.5. Note that the size of the TCTF field of FACH for FDD is 2,4 or 8 bits and for TDD is either 3 or 5 bits depending on the value of the 3 most significant bits. The TCTF of the RACH for TDD is either 2 or 4 bits depending on the value of the 2 most significant bits.

**Table 9.2.1.1: Coding of the Target Channel Type Field on FACH for TDD**

TCTF	Designation
000	BCCH
001	CCCH
010	CTCH
01100	DCCH or DTCH over FACH
01101	MCCH
01110	MTCH
01111	MSCH
100	SHCCH
101-111	Reserved (PDUs with this coding will be discarded by this version of the protocol)

**Table 9.2.1.2: Coding of the Target Channel Type Field on FACH for FDD**

<b>TCTF</b>	<b>Designation</b>
00	BCCH
01000000	CCCH
01000001- 01001111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
01010000	MCCH
01010001- 01011110	Reserved (PDUs with this coding will be discarded by this version of the protocol)
01011111	MSCH
0110	MTCH
0111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
10000000	CTCH
10000001- 10111111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
11	DCCH or DTCH over FACH

**Table 9.2.1.3: Coding of the Target Channel Type Field on USCH or DSCH (TDD only)**

<b>TCTF</b>	<b>Designation</b>
0	SHCCH
1	DCCH or DTCH over USCH or DSCH

**Table 9.2.1.4: Coding of the Target Channel Type Field on RACH for FDD**

<b>TCTF</b>	<b>Designation</b>
00	CCCH
01	DCCH or DTCH over RACH
10-11	Reserved (PDUs with this coding will be discarded by this version of the protocol)

**Table 9.2.1.5: Coding of the Target Channel Type Field on RACH for TDD**

<b>TCTF</b>	<b>Designation</b>
00	CCCH
0100	DCCH or DTCH Over RACH
0101- 0111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
10	SHCCH
11	Reserved (PDUs with this coding will be discarded by this version of the protocol)

- C/T field

The C/T field provides identification of the logical channel instance when multiple logical channels are carried on the same transport channel (other than HS-DSCH) or same MAC-d flow (HS-DSCH). The C/T field is used also to provide identification of the logical channel type on dedicated transport channels and on FACH and RACH when used for user data transmission. The size of the C/T field is fixed to 4 bits for both common transport channels and dedicated transport channels. Table 9.2.1.5a shows the 4-bit C/T field.

**Table 9.2.1.5a: Structure of the C/T field**

C/T field	Designation
0000	Logical channel 1
0001	Logical channel 2
...	...
1110	Logical channel 15
1111	Reserved (PDUs with this coding will be discarded by this version of the protocol)

- UE-Id

The UE-Id field provides an identifier of the UE on common transport channels. The following types of UE-Id used on MAC are defined:

- UTRAN Radio Network Temporary Identity (U-RNTI) may be used in the MAC header of DCCH using RLC UM (SRB1), when mapped onto common transport channels in downlink direction; the U-RNTI is never used in uplink direction;
- Cell Radio Network Temporary Identity (C-RNTI) is used on DTCH and DCCH in uplink, and may be used on DCCH in downlink and is used on DTCH in downlink when mapped onto common transport channels, except when mapped onto DSCH transport channel;
- In FDD, DSCH Radio Network Temporary Identity (DSCH-RNTI) is used on DTCH and DCCH in downlink when mapped onto DSCH transport channel;- the UE id to be used by MAC is configured through the MAC control SAP. The lengths of the UE-id field of the MAC header are given in table 9.2.1.6.

**Table 9.2.1.6: Lengths of UE Id field**

UE Id type	Length of UE Id field
U-RNTI	32 bits
C-RNTI	16 bits
DSCH-RNTI	16 bits

- UE-Id Type

The UE-Id Type field is needed to ensure correct decoding of the UE-Id field in MAC Headers.

**Table 9.2.1.7: UE-Id Type field definition**

UE-Id Type field 2 bits	UE-Id Type
00	U-RNTI
01	C-RNTI or DSCH-RNTI
10	Reserved (PDUs with this coding will be discarded by this version of the protocol)
11	Reserved (PDUs with this coding will be discarded by this version of the protocol)

- MBMS-Id

The MBMS-Id field provides an identifier of MTCH for an MBMS service carried on FACH. The MBMS-Id is used in the MAC header of MTCH mapped onto FACH in downlink direction; the MBMS-Id is never used in uplink direction. The MBMS Id to be used by MAC is configured through the MAC control SAP. The length of the MBMS-Id field is 4 bits. Table 9.2.1.7a shows the 4-bit MBMS-Id field.

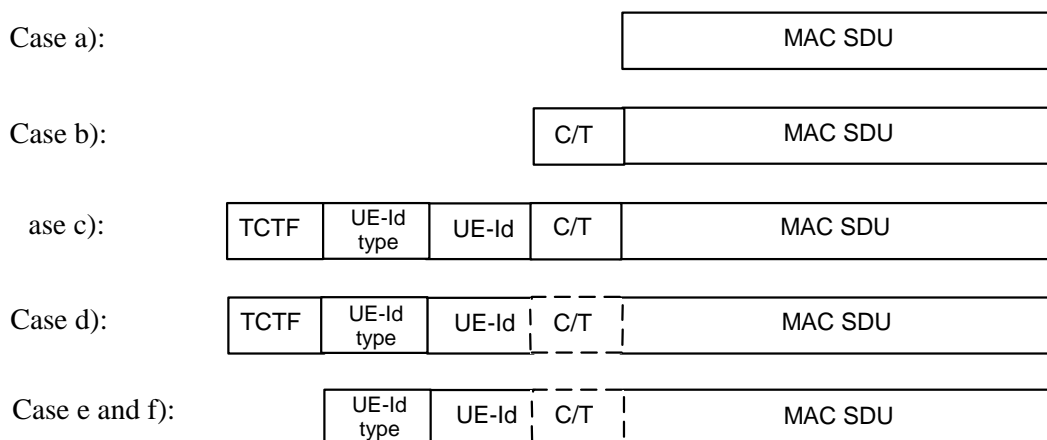


**Table 9.2.1.8: Structure of the MBMS-Id field**

MBMS-Id field	Designation
0000	MBMS service 1
0001	MBMS service 2
...	...
1110	MBMS service 15
1111	Reserved (PDUs with this coding will be discarded by this version of the protocol)

### 9.2.1.1 MAC header for DTCH and DCCH (not mapped on HS-DSCH or E-DCH)

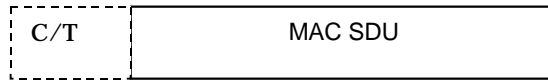
- a) DTCH or DCCH mapped to DCH, no multiplexing of dedicated channels on MAC:
- no MAC header is required.
- b) DTCH or DCCH mapped to DCH, with multiplexing of dedicated channels on MAC:
- C/T field is included in MAC header.
- c) DTCH or DCCH mapped to RACH/FACH:
- TCTF field, C/T field, UE-Id type field and UE-Id are included in the MAC header. For FACH, the UE-Id type field used is the C-RNTI or U-RNTI. For RACH, the UE-Id type field used is the C-RNTI.
- d) DTCH or DCCH mapped to DSCH or USCH:
- the TCTF field is included in the MAC header for TDD only. The UE-Id type and UE-Id are included in the MAC header for FDD only. The UE-Id type field used is the DSCH-RNTI. The C/T field is included if multiplexing on MAC is applied.
- e) DTCH or DCCH mapped to DSCH or USCH where DTCH or DCCH are the only logical channels:
- the UE-Id type and UE-Id are included in the MAC header for FDD only. The UE-Id type field used is the DSCH-RNTI. The C/T field is included in the MAC header if multiplexing on MAC is applied.
- f) DTCH or DCCH mapped to CPCH:
- UE-Id type field and UE-Id are included in the MAC header. The C/T field is included in the MAC header if multiplexing on MAC is applied. The UE-Id type field used is the C-RNTI.

**Figure 9.2.1.1.1: MAC PDU formats for DTCH and DCCH**

### 9.2.1.1a MAC-d Header for DTCH and DCCH (mapped on HS-DSCH)

The MAC-d PDU header for DTCH and DCCH mapped on HS-DSCH is as shown in figure 9.2.1.1a.1.

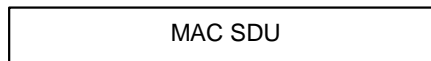
- C/T field is included in the MAC-d PDU header if multiplexing on MAC is applied.



**Figure 9.2.1.1a.1 MAC-d PDU format for DTCH and DCCH mapped on HS-DSCH**

### 9.2.1.1b MAC-d Header for DTCH and DCCH (mapped on E-DCH)

For DTCH and DCCH mapped on E-DCH there is no need for a MAC-d header. Therefore, the MAC-d PDUs will be as shown in figure 9.2.1.1a.1.

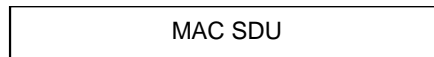


**Figure 9.2.1.1b.1 MAC-d PDU format for DTCH and DCCH mapped on E-DCH**

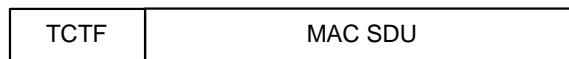
### 9.2.1.2 MAC header for BCCH

- BCCH mapped to BCH:
  - no MAC header is included.
- BCCH mapped to FACH:
  - the TCTF field is included in MAC header.

Case a):



Case b):



**Figure 9.2.1.2.1: MAC PDU formats for BCCH**

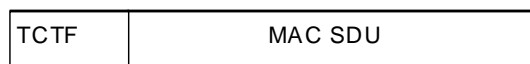
### 9.2.1.3 MAC header for PCCH

There is no MAC header for PCCH.

### 9.2.1.4 MAC header for CCCH

CCCH mapped to RACH/FACH:

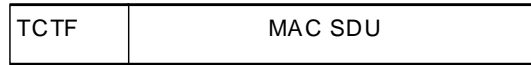
- TCTF field is included in MAC header.



**Figure 9.2.1.4.1: MAC PDU formats for CCCH**

### 9.2.1.5 MAC Header for CTCH

The TCTF field is included as MAC header for CTCH as shown in figure 9.2.1.5.1.

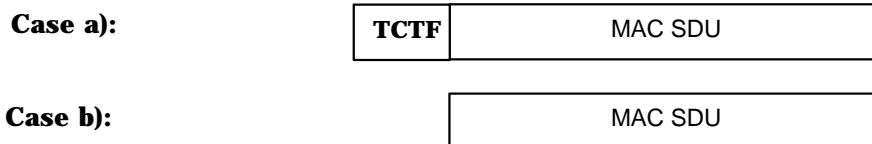


**Figure 9.2.1.5.1: MAC PDU format for CTCH**

### 9.2.1.6 MAC Header for SHCCH

The MAC header for SHCCH is as shown in figure 9.2.1.6.1.

- a) SHCCH mapped to RACH and USCH/FACH and DSCH:
  - TCTF has to be included.
- b) SHCCH mapped to RACH and USCH/FACH and DSCH, where SHCCH is the only channel.



**Figure 9.2.1.6.1: MAC PDU format for SHCCH**

### 9.2.1.7 MAC Header for MCCH

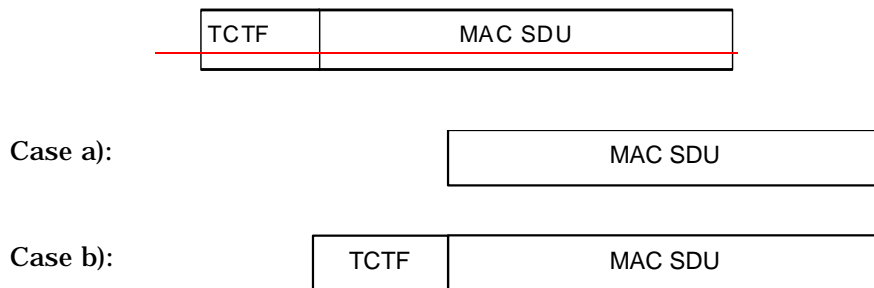
The MAC PDU format for MCCH is as shown in figure 9.2.1.7.1.

- a) If the MAC header for MCCH is not configured through the MAC control SAP:
  - there is no MAC header for MCCH.

- b) If the MAC header for MCCH is configured through the MAC control SAP:
  - TCTF field is included in the MAC header for MCCH.

NOTE: If MCCH is not the only channel on the FACH, the MAC header shall be configured for the MCCH.

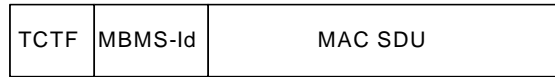
~~The TCTF field is included as MAC header for MCCH as shown in figure 9.2.1.7.1.~~



**Figure 9.2.1.7.1: MAC PDU format for MCCH**

### 9.2.1.8 MAC Header for MTCH

The TCTF field and MBMS-Id field are included in the MAC header for MTCH as shown in figure 9.2.1.8.1.



**Figure 9.2.1.8.1: MAC PDU format for MTCH**

### 9.2.1.9 MAC Header for MSCH

The MAC PDU format for MSCH is as shown in figure 9.2.1.9.1.

a) If the MAC header for MSCH is not configured through the MAC control SAP:

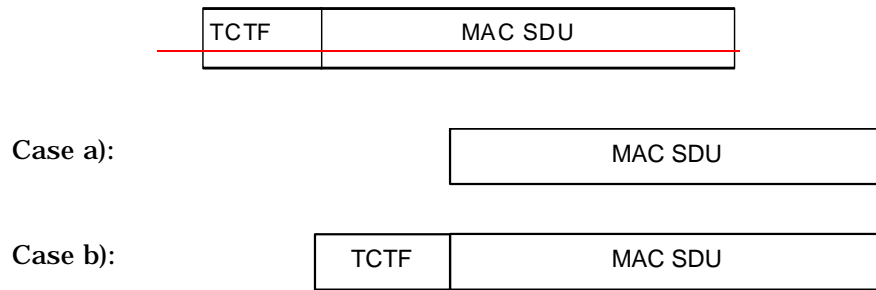
- there is no MAC header for MSCH.

b) If the MAC header for MSCH is configured through the MAC control SAP:

- TCTF field is included in the MAC header for MSCH.

NOTE: If MSCH is not the only channel on the FACH, the MAC header shall be configured for the MSCH.

~~The TCTF field is included in the MAC header for MSCH as shown in figure 9.2.1.9.1.~~



**Figure 9.2.1.9.1: MAC PDU format for MSCH**