Source:	**TSG CN WG 1**
Title:	**CR to R96 (with mirror CRs) on Work Item Multiband towards 04.08 and 24.008**
Agenda item:	**7.12**
Document for:	**APPROVAL**

Introduction:

This document contains **5** CRs, **R96 with mirror CRs to** Work Item **"Multiband"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #18 for approval.

Spec	CR #	Rev	CAT	Rel	Tdoc Title	Meeting	TDoc #	C_Version
04.08	A1129		F	R96	Coding of the "Multiband Supported" bit field in the CM3 IE	N1-26	N1-022090	5.18.1
04.08	A1131		A	R97	Coding of the "Multiband Supported" bit field in the CM3 IE	N1-26	N1-022091	6.19.0
04.08	A1133		A	R98	Coding of the "Multiband Supported" bit field in the CM3 IE	N1-26	N1-022092	7.18.0
24.008	708		A	R99	Coding of the "Multiband Supported" bit field in the CM3 IE	N1-26	N1-022093	3.13.0
24.008	709		A	Rel-4	Coding of the "Multiband Supported" bit field in the CM3 IE	N1-26	N1-022094	4.8.0

CR-Form-v7

CHANGE REQUEST

| ⌘ | **24.008** CR **708** | ⌘ rev | **-** | ⌘ | Current version: | **3.13.0** | ⌘ |

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 **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Coding of the "Multiband Supported" bit field in the CM3 IE
Source: ⌘	Siemens AG
Work item code: ⌘ Multiband	**Date:** ⌘ 20.09.2002
Category: ⌘ **A**	**Release:** ⌘ R99

Use *one* of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use *one* 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)

Reason for change: ⌘	When the IE description was transformed from table notation into CSN1 syntax the order of the bits of the " Multiband Supported" bit field has be reversed by error. In the CSN1 notation the left bit has the highest number, thus DCS 1800 which was bit 7 in table notation should be bit 3 in CSN1 and P-GSM which was bit 5 should be bit 1.
Summary of change: ⌘	The numbering of the Bit1-3 of the Multiband Supported bit field description is re-ordered in order to keep the order defined in the Phase2 specification.
Consequences if not approved: ⌘	Different bit position definitions for the Multiband Supported bit map between the phase 2 and R96 and onwards specifications, which would lead to interoperability problems if the MS and the network is assuming different meaning of the bits.

Clauses affected: ⌘	10.5.1.7

	Y	N	
Other specs ⌘		X	Other core specifications ⌘
affected:		X	Test specifications
		X	O&M Specifications

Other comments: ⌘	

10.5.1.7 Mobile Station Classmark 3

The purpose of the *Mobile Station Classmark 3* information element is to provide the network with information concerning aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station. The Mobile Station Classmark information indicates general mobile station characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

The *MS Classmark 3* is a type 4 information element with a maximum of 14 octets length.

The value part of a *MS Classmark 3* information element is coded as shown in figure 10.5.7/3GPP TS 24.008 and table 10.5.7/3GPP TS 24.008.

NOTE: The 14 octet limit is so that the CLASSMARK CHANGE message will fit in one layer 2 frame.

SEMANTIC RULE : a multiband mobile station shall provide information about all frequency bands it can support. A single band mobile station shall not indicate the band it supports in the *Multiband Supported, GSM 400 Bands Supported, GSM 850 Associated Radio Capability* or PCS *1900 Associated Radio Capability* fields in the MS Classmark 3. Due to shared radio frequency channel numbers between DCS 1800 and PCS 1900, the mobile should indicate support for either DCS 1800 band OR PCS 1900 band.

SEMANTIC RULE : a mobile station shall include the MS Measurement Capability field if the *Multi Slot Class* field contains a value of 19 or greater (see GSM 05.02).

Typically, the number of spare bits at the end is the minimum to reach an octet boundary. The receiver may add any number of bits set to "0" at the end of the received string if needed for correct decoding.

```
<Classmark 3 Value part> ::=
    < spare bit >
    {    < Multiband supported : { 000 } >
            < A5 bits >
    |    < Multiband supported : { 101 | 110 } >
            < A5 bits >
            < Associated Radio Capability 2 : bit(4) >
            < Associated Radio Capability 1 : bit(4) >
    |    < Multiband supported : { 001 | 010 | 100 } >
            < A5 bits >
            < spare bit >(4)
            < Associated Radio Capability 1 : bit(4) > }
    { 0 | 1 < R Support > }
    { 0 | 1 < Multi Slot Capability > }
    < UCS2 treatment: bit >
    < Extended Measurement Capability : bit >
    { 0 | 1 < MS measurement capability > }
    { 0 | 1 < MS Positioning Method Capability > }
    { 0 | 1 < EDGE Multi Slot Capability > }
    { 0 | 1 < EDGE Struct > }
    { 0 | 1 < GSM 400 Bands Supported : { 01 | 10 | 11 } >
            < GSM 400 Associated Radio Capability: bit(4) > }

    { 0 | 1 <GSM 850 Associated Radio Capability : bit(4) > }
    { 0 | 1 <PCS 1900 Associated Radio Capability : bit(4) > }
    < UMTS FDD Radio Access Technology Capability : bit >
    < UMTS TDD Radio Access Technology Capability : bit >
    < CDMA 2000 Radio Access Technology Capability : bit >

    { 0 | 1  < DTM GPRS Multi Slot Sub-Class : bit(2) >
            < MAC Mode Support : bit >
            { 0 | 1< DTM EGPRS Multi Slot Sub-Class : bit(2) > } }
    { 0 | 1 < Single Band Support > }
    < spare bit >** ;

< A5 bits > ::=
    < A5/7 : bit > < A5/6 : bit > < A5/5 : bit > < A5/4 : bit >  ;

<R Support>::=
    < R-GSM band Associated Radio Capability : bit(3) > ;

< Multi Slot Capability > ::=
    < Multi Slot Class : bit(5) >  ;

< MS Measurement capability > ::=
    < SMS_VALUE : bit (4) >
    < SM_VALUE : bit (4) > ;

< MS Positioning Method Capability > ::=
    < MS Positioning Method : bit(5) > ;

< EDGE Multi Slot Capability > ::=
    < EDGE Multi Slot Class : bit(5) > ;

 <EDGE Struct> : :=
    < Modulation Capability : bit >
    { 0 | 1 < EDGE RF Power Capability 1: bit(2) > }
    { 0 | 1 < EDGE RF Power Capability 2: bit(2) > } ;

< Single Band Support > ::=
    < GSMBand : bit(4) > ;
```

Figure 10.5.7/3GPP TS 24.008 *Mobile Station Classmark 3* **information element**

Table 10.5.7/3GPP TS 24.008: *Mobile Station Classmark 3* **information element**

Multiband Supported (3 bit field)

Band 1 supported ~~(third bit of the field)~~
Bit   1~~3~~
    0   P-GSM not supported
    1   P-GSM supported

Band 2 supported ~~(second bit of the field)~~
Bit~~IT~~   2
    0   E-GSM or R-GSM not supported
    1   E-GSM or R-GSM supported

Band 3 supported ~~(first bit of the field)~~
Bit   3~~1~~
    0   DCS 1800 not supported
    1   DCS 1800 supported

The indication of support of P-GSM band or E-GSM or R-GSM band is mutually exclusive.

When the 'Band 2 supported' bit indicates support of E-GSM or R-GSM, the presence of the <R Support> field, see below, indicates if the E-GSM or R-GSM band is supported.

In this version of the protocol, the sender indicates in this field either none, one or two of these 3 bands supported.

For single band mobile station or a mobile station supporting none of the GSM 900 bands(P-GSM, E-GSM and R-GSM) and DCS1800 bands, all bits are set to 0.

A5/4
Bit   1
    0   Encryption algorithm A5/4 not available
    1   Encryption algorithm A5/4 available

A5/5
Bit   1
    0   Encryption algorithm A5/5 not available
    1   Encryption algorithm A5/5 available

A5/6
Bit   1
    0   Encryption algorithm A5/6 not available
    1   Encryption algorithm A5/6 available

A5/7
    0   Encryption algorithm A5/7 not available
    1   Encryption algorithm A5/7 available

Associated Radio capability 1 and 2 (4 bit fields)

If either of P-GSM or E-GSM or R-GSM is supported, the radio capability 1 field indicates the radio capability for P-GSM, E-GSM or R-GSM, and the radio capability 2 field indicates the radio capability for DCS1800 if supported, and is spare otherwise.

If none of P-GSM or E-GSM or R-GSM are supported, the radio capability 1 field indicates the radio capability for DCS1800, and the radio capability 2 field is spare.

The radio capability contains the binary coding of the power class associated with the band indicated in multiband support bits (see GSM 05.05).

(continued...)

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3 information element*

R Support

In case where the R-GSM band is supported the R-GSM band associated radio capability field contains the binary coding of the power class associated (see GSM 05.05) (regardless of the number of GSM bands supported). A mobile station supporting the R-GSM band shall also when appropriate, (see 10.5.1.6) indicate its support in the 'FC' bit in the Mobile Station Classmark 2 information element.

Note: the coding of the power class for P-GSM, E-GSM, R-GSM and DCS 1800 in radio capability 1 and/or 2 is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

Multi Slot Class (5 bit field)

In case the MS supports the use of multiple timeslots then the Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS GSM 05.02.

UCS2 treatment (1 bit field)

This information field indicates the likely treatment by the mobile station of UCS2 encoded character strings. If not included, the value 0 shall be assumed by the receiver.
Bit   1
    0   the ME has a preference for the default alphabet (defined in GSM 03.38)
over UCS2.
    1   the ME has no preference between the use of the default alphabet and the
use of UCS2.

Extended Measurement Capability (1 bit field)

This bit indicates whether the mobile station supports 'Extended Measurements' or not
Bit   1
    0   the MS does not support Extended Measurements
    1   the MS supports Extended Measurements

SMS_VALUE (Switch-Measure-Switch) (4 bit field)
The SMS field indicates the time needed for the mobile station to switch from one radio channel to another, perform a neighbour cell power measurement, and the switch from that radio channel to another radio channel.
Bits
4 3 2 1
    0 0 0 0   1/4 timeslot (~144 microseconds)
    0 0 0 1   2/4 timeslot (~288 microseconds)
    0 0 1 0   3/4 timeslot (~433 microseconds)
     . . .
    1 1 1 1   16/4 timeslot (~2307 microseconds)

SM_VALUE (Switch-Measure) (4 bit field)
The SM field indicates the time needed for the mobile station to switch from one radio channel to another and perform a neighbour cell power measurement.
Bits
4 3 2 1
    0 0 0 0   1/4 timeslot (~144 microseconds)
    0 0 0 1   2/4 timeslot (~288 microseconds)
    0 0 1 0   3/4 timeslot (~433 microseconds)
     . . .
    1 1 1 1   16/4 timeslot (~2307 microseconds)

MS Positioning Method Capability (1 bit field)
This bit indicates whether the MS supports Positioning Method or not for the provision of Location Services.

MS Positioning Method (5 bit field)
This field indicates the Positioning Method(s) supported by the mobile station.
MS assisted E-OTD
Bit   5
    0   MS assisted E-OTD not supported
    1   MS assisted E-OTD supported

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3* information element

<u>MS based E-OTD</u>
Bit   4
    0   MS based E-OTD not supported
    1   MS based E-OTD supported

<u>MS assisted GPS</u>
Bit   3
    0   MS assisted GPS not supported
    1   MS assisted GPS supported

<u>MS based GPS</u>
Bit   2
    0   MS based GPS not supported
    1   MS based GPS supported

<u>MS conventional GPS</u>
Bit   1
    0   conventional GPS not supported
    1   conventional GPS supported

EDGE Multi Slot class (5 bit field)

In case the EDGE MS supports the use of multiple timeslots and the number of supported time slots is different from number of time slots supported for GMSK then the EDGE Multi Slot class field is included and is coded as the binary representation of the multislot class defined in 3GPP TS GSM 05.02.

Modulation Capability

Modulation Capability field indicates the supported modulation scheme by MS in addition to GMSK
Bit   1
    0   8-PSK supported for downlink reception only
    1   8-PSK supported for uplink transmission and downlink reception

EDGE RF Power Capability 1 (2 bit field)

If 8-PSK modulation is supported for both uplink and downlink, the **EDGE RF Power Capability 1** field indicates the radio capability for 8-PSK modulation in GSM400, GSM850 or GSM900.

EDGE RF Power Capability 2 (2 bit field)

If 8-PSK modulation is supported for both uplink and downlink, the **EDGE RF Power Capability 2** field indicates the radio capability for 8-PSK modulation in DCS1800 or PCS1900 if supported, and is not included otherwise.

The respective **EDGE RF Power Capability 1** and **EDGE RF Power Capability 2** fields contain the following coding of the 8-PSK modulation power class (see 3GPP TS 05.05) :
Bits   2 1
        0 0   Reserved
        0 1   Power class E1
        1 0   Power class E2
        1 1   Power class E3

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3* information element

GSM 400 Bands Supported (2 bit field)
See the semantic rule for the sending of this field.
Bits
2 1
    0 1 GSM 480 supported, GSM 450 not supported
    1 0 GSM 450 supported, GSM 480 not supported
    1 1   GSM 450 supported, GSM 480 supported

GSM 400 Associated Radio Capability (4 bit field)
If either GSM 450 or GSM 480 or both is supported, the GSM 400 Associated Radio Capability field indicates the radio capability for GSM 450 and/or GSM 480.

The radio capability contains the binary coding of the power class associated with the band indicated in GSM 400 Bands Supported bits (see GSM 05.05).

Note: the coding of the power class for GSM 450 and GSM 480 in GSM 400 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

GSM 850 Associated Radio Capability (4 bit field)

See the semantic rule for the sending of this field.This field indicates whether GSM 850 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the GSM 850 band (see GSM 05.05).

Note: the coding of the power class for GSM 850 in GSM 850 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

PCS 1900 Associated Radio Capability (4 bit field)

See the semantic rule for the sending of this field.This field indicates whether PCS 1900 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the PCS 1900 band (see GSM 05.05).

Note: the coding of the power class for PCS 1900 in PCS 1900 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3* **information element**

UMTS FDD Radio Access Technology Capability (1 bit field)
Bit   1
   0   UMTS FDD not supported
   1   UMTS FDD supported

UMTS TDD Radio Access Technology Capability (1 bit field)
Bit   1
   0   UMTS TDD not supported
   1   UMTS TDD supported

CDMA 2000 Radio Access Technology Capability (1 bit field)
Bit   1
   0   CDMA2000 not supported
   1   CDMA2000 supported

DTM GPRS Multi Slot Sub-Class (2 bit field)
This field indicates the GPRS DTM capabilities of the MS. The DTM GPRS Multi Slot Sub-Class is independent from the Multi Slot Capabilities field. It is coded as follows:

Bit   2 1
   0 0   Sub-Class 1 supported
   0 1   Sub-Class 5 supported
   1 0   Sub-Class 9 supported
   1 1   Reserved for future extension. If received, the network shall interpret this as '00'

DTM EGPRS Multi Slot Sub-Class (2 bit field)
This field indicates the EGPRS DTM capabilities of the MS. The DTM EGPRS Multi Slot Sub-Class is independent from the Multi Slot Capabilities field. This field shall be included only if the mobile station supports EGPRS DTM. This field is coded as the DTM GPRS Multi Slot Sub-Class field.

MAC Mode Support (1 bit field)
This field indicates whether the MS supports Dynamic and Fixed Allocation or only supports Exclusive Allocation. It is coded as follows:

Bit   1
   0   Dynamic and Fixed Allocation not supported
   1   Dynamic and Fixed allocation supported

Single Band Support

This field shall be sent if the mobile station supports UMTS and one and only one GSM band with the exception of R-GSM; this field shall not be sent otherwise.

GSMBand (4 bit field)
Bits
4 3 2 1
0 0 0 0   E-GSM is supported
0 0 0 1   P-GSM is supported
0 0 1 0   DCS 1800 is supported
0 0 1 1   GSM 450 is supported
0 1 0 0   GSM 480 is supported
0 1 0 1   GSM 850 is supported
0 1 1 0   PCS 1900 is supported
All other values are reserved for future use.

NOTE: When this field is received, the associated RF Power capability is found in Classmark1 or 2.

CR-Form-v7

CHANGE REQUEST

⌘ **04.08** CR **A1133** ⌘ rev **-** ⌘ Current version: **7.18.0** ⌘

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 **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Coding of the "Multiband Supported" bit field in the CM3 IE
Source: ⌘	Siemens AG
Work item code: ⌘	Multiband
Date: ⌘	20.09.2002
Category: ⌘ **A**	**Release:** ⌘ R98

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

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)

Reason for change: ⌘	When the IE description was transformed from table notation into CSN1 syntax the order of the bits of the " Multiband Supported" bit field has be reversed by error. In the CSN1 notation the left bit has the highest number, thus DCS 1800 which was bit 7 in table notation should be bit 3 in CSN1 and P-GSM which was bit 5 should be bit 1.
Summary of change: ⌘	The numbering of the Bit1-3 of the Multiband Supported bit field description is re-ordered in order to keep the order defined in the Phase2 specification.
Consequences if not approved: ⌘	Different bit position definitions for the Multiband Supported bit map between the phase 2 and R96 and onwards specifications, which would lead to interoperability problems if the MS and the network is assuming different meaning of the bits.

Clauses affected: ⌘	10.5.1.7

	Y	N	
Other specs affected: ⌘		X	Other core specifications ⌘
		X	Test specifications
		X	O&M Specifications

Other comments: ⌘	

10.5.1.7   Mobile Station Classmark 3

The purpose of the *Mobile Station Classmark 3* information element is to provide the network with information concerning aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station. The Mobile Station Classmark information indicates general mobile station characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

The *MS Classmark 3* is a type 4 information element with a maximum of 14 octets length.

The value part of a *MS Classmark 3* information element is coded as shown in figure 10.5.7/GSM 04.08 and table 10.5.7/GSM 04.08.

NOTE: The 14 octet limit is so that the CLASSMARK CHANGE message will fit in one layer 2 frame.

SEMANTIC RULE : a multiband mobile station shall provide information about all frequency bands it can support. A single band mobile station shall not indicate the band it supports in the *Multiband Supported* field in the MS Classmark 3.

SEMANTIC RULE : a mobile station shall include the MS Measurement Capability field if the *Multi Slot Class* field contains a value of 19 or greater (see GSM 05.02).

Typically, the number of spare bits at the end is the minimum to reach an octet boundary. The receiver may add any number of bits set to "0" at the end of the received string if needed for correct decoding.
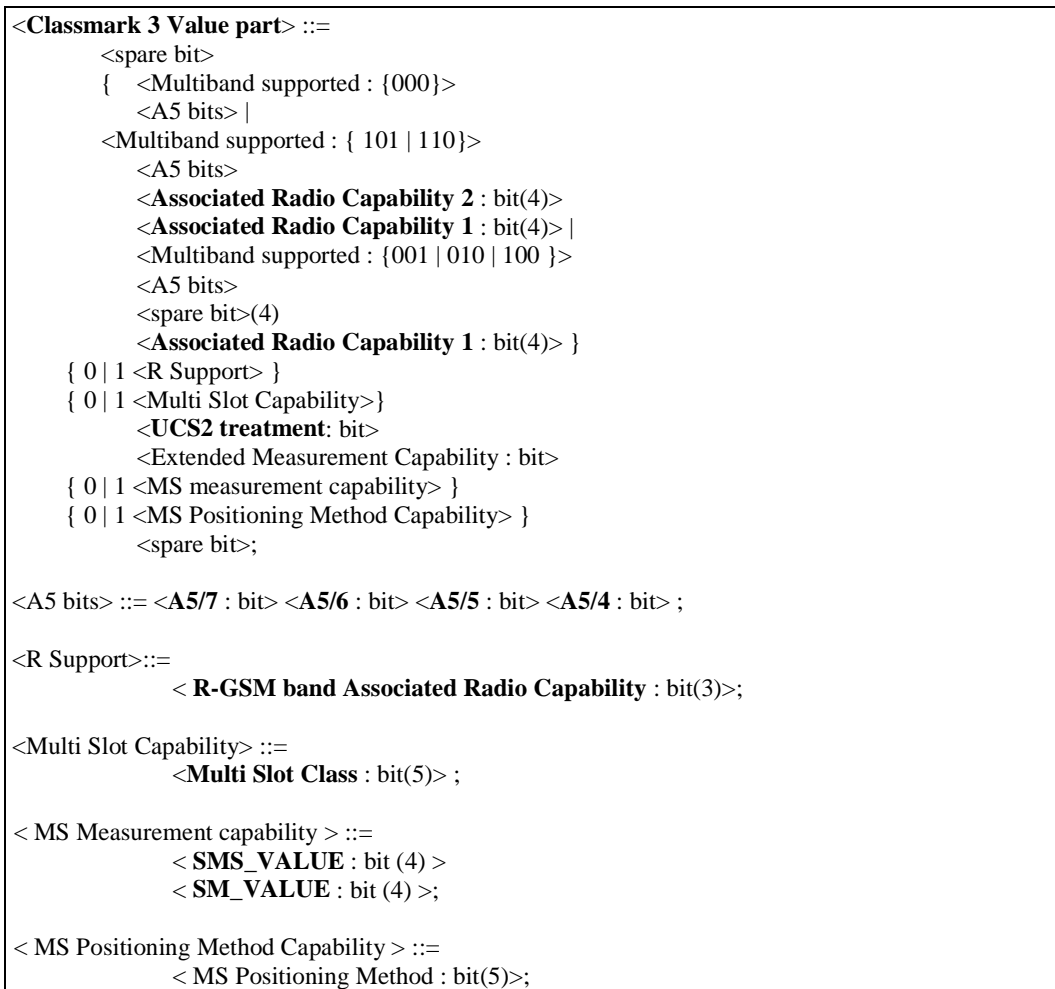
```
<Classmark 3 Value part> ::=
        <spare bit>
    {   <Multiband supported : {000}>
        <A5 bits> |
    <Multiband supported : { 101 | 110}>
        <A5 bits>
        <Associated Radio Capability 2 : bit(4)>
        <Associated Radio Capability 1 : bit(4)> |
        <Multiband supported : {001 | 010 | 100 }>
        <A5 bits>
        <spare bit>(4)
        <Associated Radio Capability 1 : bit(4)> }
    { 0 | 1 <R Support> }
    { 0 | 1 <Multi Slot Capability>}
        <UCS2 treatment: bit>
        <Extended Measurement Capability : bit>
    { 0 | 1 <MS measurement capability> }
    { 0 | 1 <MS Positioning Method Capability> }
        <spare bit>;

<A5 bits> ::= <A5/7 : bit> <A5/6 : bit> <A5/5 : bit> <A5/4 : bit> ;

<R Support>::=
                < R-GSM band Associated Radio Capability : bit(3)>;

<Multi Slot Capability> ::=
                <Multi Slot Class : bit(5)> ;

< MS Measurement capability > ::=
                < SMS_VALUE : bit (4) >
                < SM_VALUE : bit (4) >;

< MS Positioning Method Capability > ::=
                < MS Positioning Method : bit(5)>;
```

Figure 10.5.7/GSM 04.08: *Mobile Station Classmark 3* information element

Table 10.5.7/GSM 04.08: *Mobile Station Classmark 3* **information element**

Multiband Supported (3 bit field)

Band 1 supported ~~(third bit of the field)~~
Bit 1
 0   P-GSM not supported
 1   P-GSM supported

Band 2 supported ~~(second bit of the field)~~
Bit 2
 0   E-GSM or R-GSM not supported
 1   E-GSM or R-GSM supported

Band 3 supported ~~(first bit of the field)~~
Bit 3
 0   DCS 1800 not supported
 1   DCS 1800 supported

The indication of support of P-GSM band or E-GSM or R-GSM band is mutually exclusive.

When the 'Band 2 supported' bit indicates support of E-GSM or R-GSM, the presence of the <R Support> field, see below, indicates if the E-GSM or R-GSM band is supported.

In this version of the protocol, the sender indicates in this field either none or two of these 3 bands supported. However, if only one band is indicated, the receiver shall ignore the Associated Radio Capability 2.

For single band mobile station all bits are set to 0.

A5/4
 0   encryption algorithm A5/4 not available
 1   encryption algorithm A5/4 available

A5/5
 0   encryption algorithm A5/5 not available
 1   encryption algorithm A5/5 available

A5/6
 0   encryption algorithm A5/6 not available
 1   encryption algorithm A5/6 available

A5/7
 0   encryption algorithm A5/7 not available
 1   encryption algorithm A5/7 available

Associated Radio capability 1 and 2

If either of P-GSM or E-GSM or R-GSM is supported, the radio capability 1 field indicates the radio capability for P-GSM, E-GSM or R-GSM, and the radio capability 2 field indicates the radio capability for DCS1800 if supported, and is spare otherwise.

If none of P-GSM or E-GSM or R-GSM are supported, the radio capability 1 field indicates the radio capability for DCS1800, and the radio capability 2 field is spare.

The radio capability contains the binary coding of the power class associated with the band indicated in multiband support bits (see GSMß05.05).

R Support

In case where the R-GSM band is supported the R-GSM band assciated radio capability field contains the binary coding of the power class associated(see GSMß05.05). A mobile station supporting the R-GSM band shall also when appropriate, see 10.5.1.6, indicate its support in the 'FC' bit in the Mobile Station Classmark 2 information element.

Note: the coding of the power class for P-GSM, E-GSM, R-GSM and DCS 1800 in radio capability 1 and/or 2 is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

(continued...)

Table 10.5.1.7/GSM 04.08 (continued): *MS Classmark 3* **information element**

Multi Slot Class (5 bit field)

In case the MS supports the use of multiple timeslots then the Multi Slot Class field is coded as the binary representation of the multislot class defined in TS GSM 05.02.

UCS2 treatment

This information field indicates the likely treatment by the mobile station of UCS2 encoded character strings. If not included, the value 0 shall be assumed by the receiver.

0   the ME has a preference for the default alphabet (defined in GSM 03.38)
     over UCS2.

1   the ME has no preference between the use of the default alphabet and the
     use of UCS2.

Extended Measurement Capability

This bit indicates whether the mobile station supports 'Extended Measurements' or not

0   the MS does not support Extended Measurements

1   the MS supports Extended Measurements

SMS_VALUE (Switch-Measure-Switch) (4 bit field)
The SMS field indicates the time needed for the mobile station to switch from one radio channel to another, perform a neighbour cell power measurement, and the switch from that radio channel to another radio channel.

Bits
4 3 2 1
0 0 0 0   1/4 timeslot (~144 microseconds)
0 0 0 1   2/4 timeslot (~288 microseconds)
0 0 1 0   3/4 timeslot (~433 microseconds)
 . . .
1 1 1 1   16/4 timeslot (~2307 microseconds)

SM_VALUE (Switch-Measure) (4 bit field)
The SM field indicates the time needed for the mobile station to switch from one radio channel to another and perform a neighbour cell power measurement.

Bits
4 3 2 1
0 0 0 0   1/4 timeslot (~144 microseconds)
0 0 0 1   2/4 timeslot (~288 microseconds)
0 0 1 0   3/4 timeslot (~433 microseconds)
 . . .
1 1 1 1   16/4 timeslot (~2307 microseconds)

(continued)...

Table 10.5.1.7/GSM 04.08 (continued): *MS Classmark 3* **information element**

MS Positioning Method Capability
This bit indicates whether the MS supports Positioning Method or not for the provision of Location Services.
MS Positioning Method (5 bit field)
This field indicates the Positioning Method(s) supported by the mobile station.
MS assisted E-OTD
Bit 5
0:      MS assisted E-OTD not supported
1:      MS assisted E-OTD supported

MS based E-OTD
Bit 4
0:      MS based E-OTD not supported
1:      MS based E-OTD supported

MS assisted GPS
Bit 3
0:      MS assisted GPS not supported
1:      MS assisted GPS supported

MS based GPS
Bit 2
0:      MS based GPS not supported
1:      MS based GPS supported

MS conventional GPS
Bit 1
0:      conventional GPS not supported
1:      conventional GPS supported

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CHANGE REQUEST

⌘		**04.08**	CR	**A1131**	⌘ rev	**-**	⌘	Current version:	**6.19.0**	⌘

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 **X**   Radio Access Network **X**   Core Network ☐

Title: ⌘	Coding of the "Multiband Supported" bit field in the CM3 IE	
Source: ⌘	Siemens AG	
Work item code: ⌘	Multiband	***Date:*** ⌘ 20.09.2002

Category: ⌘ **A**	***Release:*** ⌘ R97

Use <u>one</u> *of the following categories:*
     F (correction)
     A (corresponds to a correction in an earlier release)
     B (addition of feature),
     C (functional modification of feature)
     D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

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)

Reason for change: ⌘	When the IE description was transformed from table notation into CSN1 syntax the order of the bits of the " Multiband Supported" bit field has be reversed by error. In the CSN1 notation the left bit has the highest number, thus DCS 1800 which was bit 7 in table notation should be bit 3 in CSN1 and P-GSM which was bit 5 should be bit 1.
Summary of change: ⌘	The numbering of the Bit1-3 of the Multiband Supported bit field description is re-ordered in order to keep the order defined in the Phase2 specification.
Consequences if not approved: ⌘	Different bit position definitions for the Multiband Supported bit map between the phase 2 and R96 and onwards specifications, which would lead to interoperability problems if the MS and the network is assuming different meaning of the bits.

Clauses affected: ⌘	10.5.1.7

	Y	**N**	
Other specs affected: ⌘		**X**	Other core specifications ⌘
		X	Test specifications
		X	O&M Specifications

Other comments: ⌘	

10.5.1.7   Mobile Station Classmark 3

The purpose of the *Mobile Station Classmark 3* information element is to provide the network with information concerning aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station. The Mobile Station Classmark information indicates general mobile station characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

The *MS Classmark 3* is a type 4 information element with a maximum of 14 octets length.

The value part of a *MS Classmark 3* information element is coded as shown in figure 10.5.7/GSM 04.08 and table 10.5.7/GSM 04.08.

   NOTE: The 14 octet limit is so that the CLASSMARK CHANGE message will fit in one layer 2 frame.

SEMANTIC RULE : a multiband mobile station shall provide information about all frequency bands it can support. A single band mobile station shall not indicate the band it supports in the *Multiband Supported* field in the MS Classmark 3.

SEMANTIC RULE : a mobile station shall include the MS Measurement Capability field if the *Multi Slot Class* field contains a value of 19 or greater (see GSM 05.02).

Typically, the number of spare bits at the end is the minimum to reach an octet boundary. The receiver may add any number of bits set to "0" at the end of the received string if needed for correct decoding.
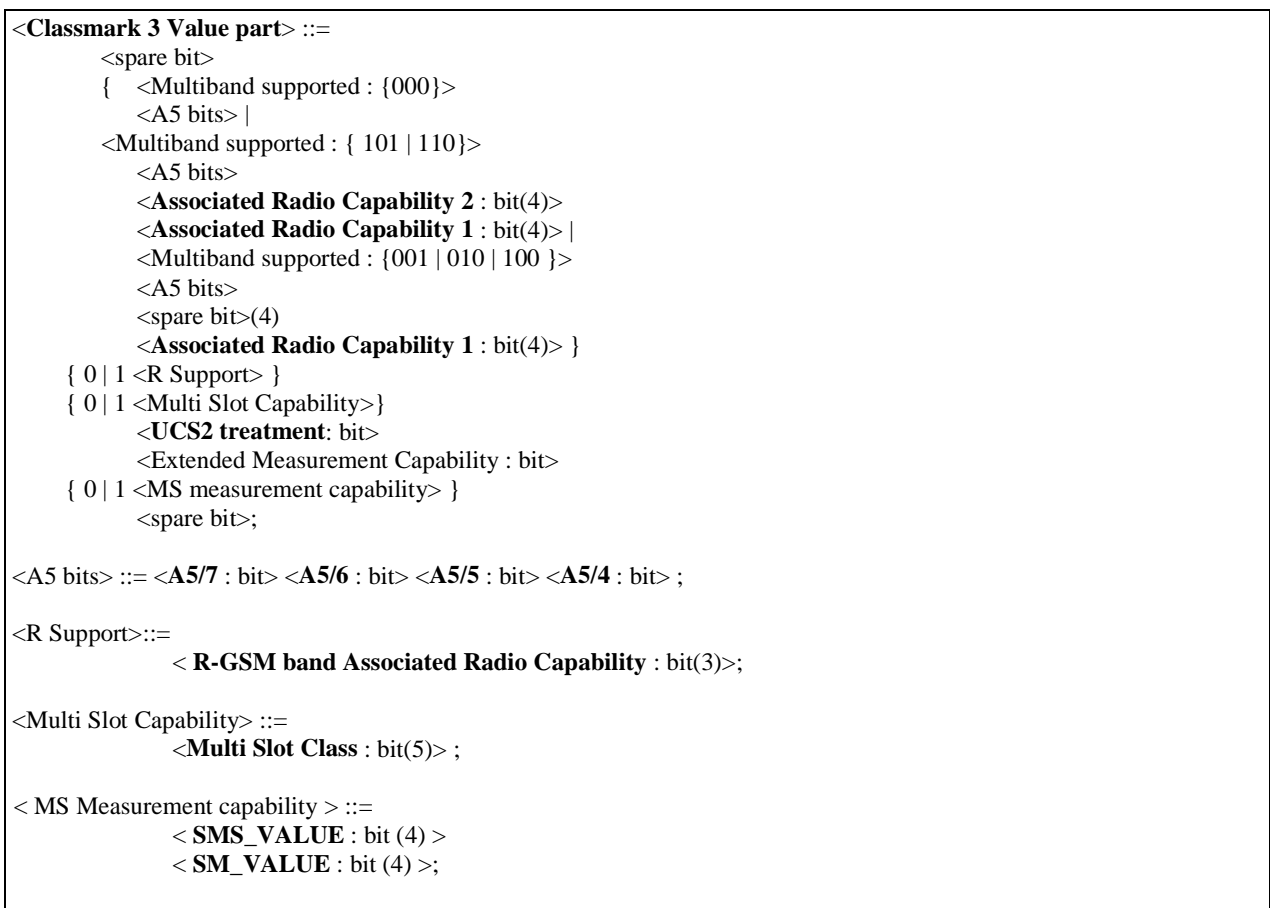
```
<Classmark 3 Value part> ::=
        <spare bit>
        {   <Multiband supported : {000}>
            <A5 bits> |
        <Multiband supported : { 101 | 110}>
            <A5 bits>
            <Associated Radio Capability 2 : bit(4)>
            <Associated Radio Capability 1 : bit(4)> |
            <Multiband supported : {001 | 010 | 100 }>
            <A5 bits>
            <spare bit>(4)
            <Associated Radio Capability 1 : bit(4)> }
    { 0 | 1 <R Support> }
    { 0 | 1 <Multi Slot Capability>}
        <UCS2 treatment: bit>
        <Extended Measurement Capability : bit>
    { 0 | 1 <MS measurement capability> }
        <spare bit>;

<A5 bits> ::= <A5/7 : bit> <A5/6 : bit> <A5/5 : bit> <A5/4 : bit> ;

<R Support>::=
            < R-GSM band Associated Radio Capability : bit(3)>;

<Multi Slot Capability> ::=
            <Multi Slot Class : bit(5)> ;

< MS Measurement capability > ::=
            < SMS_VALUE : bit (4) >
            < SM_VALUE : bit (4) >;
```

Figure 10.5.7/GSM 04.08: *Mobile Station Classmark 3* information element

Table 10.5.7/GSM 04.08: *Mobile Station Classmark 3* **information element**

Multiband Supported (3 bit field)

Band 1 supported (third bit of the field)
Bit 1
  0   P-GSM not supported
  1   P-GSM supported

Band 2 supported (second bit of the field)
Bit 2
  0   E-GSM or R-GSM not supported
  1   E-GSM or R-GSM supported

Band 3 supported (first bit of the field)
Bit 3
  0   DCS 1800 not supported
  1   DCS 1800 supported

The indication of support of P-GSM band or E-GSM or R-GSM band is mutually exclusive.

When the 'Band 2 supported' bit indicates support of E-GSM or R-GSM, the presence of the <R Support> field, see below, indicates if the E-GSM or R-GSM band is supported.

In this version of the protocol, the sender indicates in this field either none or two of these 3 bands supported. However, if only one band is indicated, the receiver shall ignore the Associated Radio Capability 2.

For single band mobile station all bits are set to 0.

A5/4
  0   encryption algorithm A5/4 not available
  1   encryption algorithm A5/4 available

A5/5
  0   encryption algorithm A5/5 not available
  1   encryption algorithm A5/5 available

A5/6
  0   encryption algorithm A5/6 not available
  1   encryption algorithm A5/6 available

A5/7
  0   encryption algorithm A5/7 not available
  1   encryption algorithm A5/7 available

Associated Radio capability 1 and 2

If either of P-GSM or E-GSM or R-GSM is supported, the radio capability 1 field indicates the radio capability for P-GSM, E-GSM or R-GSM, and the radio capability 2 field indicates the radio capability for DCS1800 if supported, and is spare otherwise.

If none of P-GSM or E-GSM or R-GSM are supported, the radio capability 1 field indicates the radio capability for DCS1800, and the radio capability 2 field is spare.

The radio capability contains the binary coding of the power class associated with the band indicated in multiband support bits (see GSMß05.05).

R Support

In case where the R-GSM band is supported the R-GSM band assciated radio capability field contains the binary coding of the power class associated(see GSMß05.05). A mobile station supporting the R-GSM band shall also when appropriate, see 10.5.1.6, indicate its support in the 'FC' bit in the Mobile Station Classmark 2 information element.

Note: the coding of the power class for P-GSM, E-GSM, R-GSM and DCS 1800 in radio capability 1 and/or 2 is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

(continued...)

Table 10.5.1.7/GSM 04.08 (continued): *MS Classmark 3* information element

Multi Slot Class (5 bit field)

In case the MS supports the use of multiple timeslots then the Multi Slot Class field is coded as the binary representation of the multislot class defined in TS GSM 05.02.

UCS2 treatment

This information field indicates the likely treatment by the mobile station of UCS2 encoded character strings. If not included, the value 0 shall be assumed by the receiver.

0   the ME has a preference for the default alphabet (defined in GSM 03.38)
    over UCS2.

1   the ME has no preference between the use of the default alphabet and the
    use of UCS2.

Extended Measurement Capability

This bit indicates whether the mobile station supports 'Extended Measurements' or not

0   the MS does not support Extended Measurements

1   the MS supports Extended Measurements

SMS_VALUE (Switch-Measure-Switch) (4 bit field)
The SMS field indicates the time needed for the mobile station to switch from one radio channel to another, perform a neighbour cell power measurement, and the switch from that radio channel to another radio channel.

Bits
4 3 2 1
0 0 0 0   1/4 timeslot (~144 microseconds)
0 0 0 1   2/4 timeslot (~288 microseconds)
0 0 1 0   3/4 timeslot (~433 microseconds)
 . . .
1 1 1 1   16/4 timeslot (~2307 microseconds)

SM_VALUE (Switch-Measure) (4 bit field)
The SM field indicates the time needed for the mobile station to switch from one radio channel to another and perform a neighbour cell power measurement.

Bits
4 3 2 1
0 0 0 0   1/4 timeslot (~144 microseconds)
0 0 0 1   2/4 timeslot (~288 microseconds)
0 0 1 0   3/4 timeslot (~433 microseconds)
 . . .
1 1 1 1   16/4 timeslot (~2307 microseconds)

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CHANGE REQUEST

| ⌘ | **04.08** CR **A1129** | ⌘ rev | **-** | ⌘ | Current version: | **5.18.1** | ⌘ |

*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 **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Coding of the "Multiband Supported" bit field in the CM3 IE	
Source: ⌘	Siemens AG	
Work item code: ⌘	Multiband	***Date:*** ⌘ 20.09.2002
Category: ⌘ **F**		***Release:*** ⌘ R96

Use <u>one</u> of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

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)*

Reason for change: ⌘	When the IE description was transformed from table notation into CSN1 syntax the order of the bits of the " Multiband Supported" bit field has be reversed by error. In the CSN1 notation the left bit has the highest number, thus DCS 1800 which was bit 7 in table notation should be bit 3 in CSN1 and P-GSM which was bit 5 should be bit 1.
Summary of change: ⌘	The numbering of the Bit1-3 of the Multiband Supported bit field description is re-ordered in order to keep the order defined in the Phase2 specification.
Consequences if not approved: ⌘	Different bit position definitions for the Multiband Supported bit map between the phase 2 and R96 and onwards specifications, which would lead to interoperability problems if the MS and the network is assuming different meaning of the bits.

Clauses affected: ⌘	10.5.1.7	

	Y	N	
Other specs affected: ⌘		X	Other core specifications ⌘
		X	Test specifications
		X	O&M Specifications

Other comments: ⌘	

10.5.1.7 Mobile Station Classmark 3

The purpose of the *Mobile Station Classmark 3* information element is to provide the network with information concerning aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station. The Mobile Station Classmark information indicates general mobile station characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

The *MS Classmark 3* is a type 4 information element with a maximum of 14 octets length.

The value part of a *MS Classmark 3* information element is coded as shown in figure 10.8/GSM 04.08 and table 10.11/GSM 04.08.

NOTE: The 14 octet limit is so that the CLASSMARK CHANGE message will fit in one layer 2 frame.

SEMANTIC RULE : a multiband mobile station shall provide information about all frequency bands it can support. A single band mobile station shall not indicate the band it supports in the *Multiband Supported* field in the MS Classmark 3.

Typically, the number of spare bits at the end is the minimum to reach an octet boundary. The receiver may add any number of bits set to "0" at the end of the received string if needed for correct decoding.
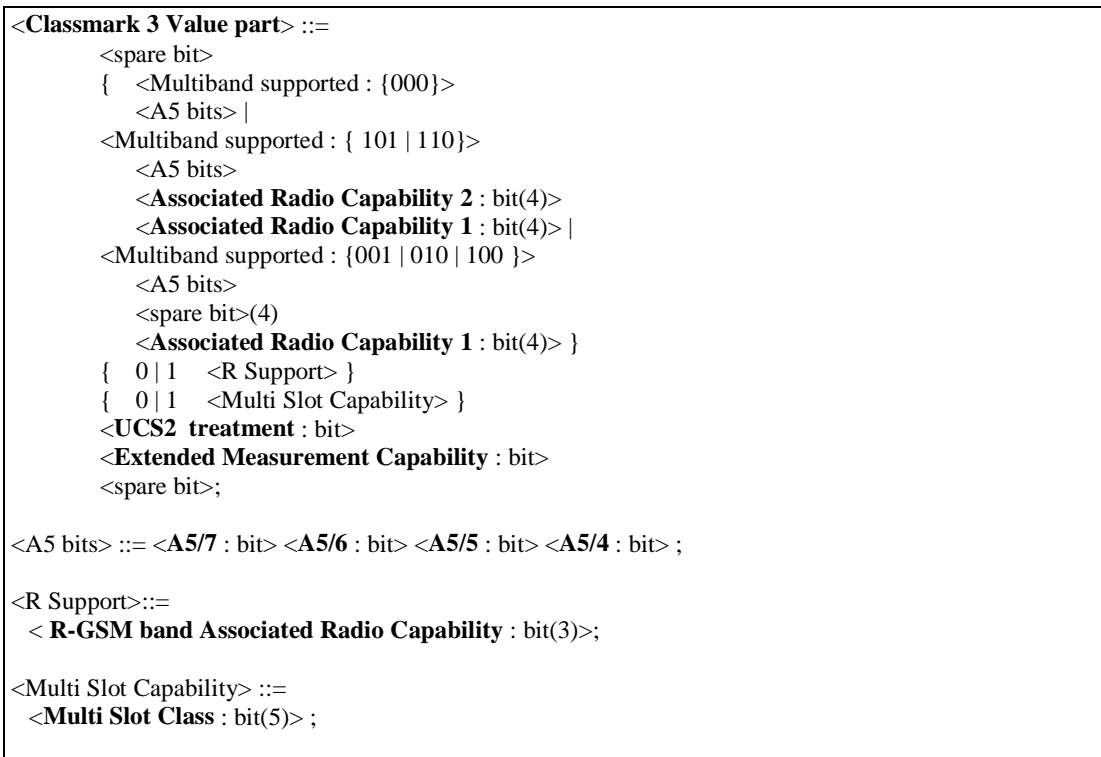
```
<Classmark 3 Value part> ::=
        <spare bit>
        {   <Multiband supported : {000}>
            <A5 bits> |
        <Multiband supported : { 101 | 110}>
            <A5 bits>
            <Associated Radio Capability 2 : bit(4)>
            <Associated Radio Capability 1 : bit(4)> |
        <Multiband supported : {001 | 010 | 100 }>
            <A5 bits>
            <spare bit>(4)
            <Associated Radio Capability 1 : bit(4)> }
        {   0 | 1   <R Support> }
        {   0 | 1   <Multi Slot Capability> }
        <UCS2  treatment : bit>
        <Extended Measurement Capability : bit>
        <spare bit>;

<A5 bits> ::= <A5/7 : bit> <A5/6 : bit> <A5/5 : bit> <A5/4 : bit> ;

<R Support>::=
  < R-GSM band Associated Radio Capability : bit(3)>;

<Multi Slot Capability> ::=
  <Multi Slot Class : bit(5)> ;
```

Figure 10.8/GSM 04.08: *Mobile Station Classmark 3* **information element**

Table 10.11/GSM 04.08: *Mobile Station Classmark 3* information element

Multiband Supported (3 bit field)
Band 1 supported (third bit of the field)
Bit 1
  0   P-GSM not supported
  1   P-GSM supported

Band 2 supported (second bit of the field)
Bit 2
  0   E-GSM or R-GSM not supported
  1   E-GSM or R-GSM supported

Band 3 supported (first bit of the field)
Bit 3
  0   DCS 1800 not supported
  1   DCS 1800 supported

The indication of support of P-GSM band or E-GSM or R-GSM band is mutually exclusive.

When the 'Band 2 supported' bit indicates support of E-GSM or R-GSM, the presence of the <R Support> field, see below, indicates if the E-GSM or R-GSM band is supported.

In this version of the protocol, the sender indicates in this field either none or two of these 3 bands supported. However, if only one band is indicated, the receiver shall ignore the Associated Radio Capability 2.

For single band mobile station all bits are set to 0.

A5/4
  0   encryption algorithm A5/4 not available
  1   encryption algorithm A5/4 available

A5/5
  0   encryption algorithm A5/5 not available
  1   encryption algorithm A5/5 available

A5/6
  0   encryption algorithm A5/6 not available
  1   encryption algorithm A5/6 available

A5/7
  0   encryption algorithm A5/7 not available
  1   encryption algorithm A5/7 available

Associated Radio capability 1 and 2

If either of P-GSM or E-GSM or R-GSM is supported, the radio capability 1 field indicates the radio capability for P-GSM, E-GSM or R-GSM, and the radio capability 2 field indicates the radio capability for DCS1800 if supported, and is spare otherwise.

If none of P-GSM or E-GSM or R-GSM are supported, the radio capability 1 field indicates the radio capability for DCS1800, and the radio capability 2 field is spare.

The radio capability contains the binary coding of the power class associated with the band indicated in multiband support bits (see GSM05.05).

R Support

In case where the R-GSM band is supported the R-GSM band associated radio capability field contains the binary coding of the power class associated(see GSM 05.05) A mobile station supporting the R-GSM band shall also when appropriate, see 10.5.1.6, indicate its support in the 'FC' bit in the Mobile Station Classmark 2 information element.

Note: the coding of the power class for P-GSM, E-GSM, R-GSM and DCS 1800 in radio capability 1 and/or 2 is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

Multi Slot Class (5 bit field)

In case the MS supports the use of multiple timeslots then the Multi Slot Class field is coded as the binary representation of the multislot class defined in TS GSM 05.02.

UCS2 treatment

This information field indicates the likely treatment by the mobile station of UCS2 encoded character strings. If not included, the value 0 shall be assumed by the receiver.

0   the ME has a preference for the default alphabet (defined in GSM 03.38)
    over UCS2.

1   the ME has no preference between the use of the default alphabet and the
     use of UCS2.

Extended Measurement Capability

This bit indicates whether the mobile station supports 'Extended Measurements' or not

0   the MS does not support Extended Measurements

1   the MS supports Extended Measurements

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CHANGE REQUEST

| ⌘ | **24.008** CR **709** | ⌘ **rev** | **-** | ⌘ | Current version: | **4.8.0** | ⌘ |

*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 **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Coding of the "Multiband Supported" bit field in the CM3 IE

Source:	⌘	Siemens AG

Work item code:	⌘	Multiband	**Date:** ⌘	20.09.2002

Category:	⌘	**A**		**Release:** ⌘	Rel-4

Use <u>one</u> of the following categories:
    F *(correction)*
    A *(corresponds to a correction in an earlier release)*
    B *(addition of feature),*
    C *(functional modification of feature)*
    D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

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)*

Reason for change:	⌘	When the IE description was transformed from table notation into CSN1 syntax the order of the bits of the " Multiband Supported" bit field has be reversed by error. In the CSN1 notation the left bit has the highest number, thus DCS 1800 which was bit 7 in table notation should be bit 3 in CSN1 and P-GSM which was bit 5 should be bit 1.

Summary of change:	⌘	The numbering of the Bit1-3 of the Multiband Supported bit field description is re-ordered in order to keep the order defined in the Phase2 specification.

Consequences if not approved:	⌘	Different bit position definitions for the Multiband Supported bit map between the phase 2 and R96 and onwards specifications, which would lead to interoperability problems if the MS and the network is assuming different meaning of the bits.

Clauses affected:	⌘	10.5.1.7

Other specs affected:	⌘	**Y**	**N**	
			X	Other core specifications ⌘
			X	Test specifications
			X	O&M Specifications

Other comments:	⌘	The corresponding correction to Rel-5 is contained in CR 24.008–698.

10.5.1.7 Mobile Station Classmark 3

The purpose of the *Mobile Station Classmark 3* information element is to provide the network with information concerning aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station. The Mobile Station Classmark information indicates general mobile station characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

The *MS Classmark 3* is a type 4 information element with a maximum of 14 octets length.

The value part of a *MS Classmark 3* information element is coded as shown in figure 10.5.7/3GPP TS 24.008 and table 10.5.7/3GPP TS 24.008.

 NOTE: The 14 octet limit is so that the CLASSMARK CHANGE message will fit in one layer 2 frame.

SEMANTIC RULE: a multiband mobile station shall provide information about all frequency bands it can support. A single band mobile station shall not indicate the band it supports in the *Multiband Supported, GSM 400 Bands Supported, GSM 700 Associated Radio Capability, GSM 850 Associated Radio Capability* or PCS *1900 Associated Radio Capability* fields in the MS Classmark 3. Due to shared radio frequency channel numbers between DCS 1800 and PCS 1900, the mobile should indicate support for either DCS 1800 band OR PCS 1900 band.

SEMANTIC RULE: a mobile station shall include the MS Measurement Capability field if the *Multi Slot Class* field contains a value of 19 or greater (see 3GPP TS 45.002 [32]).

Typically, the number of spare bits at the end is the minimum to reach an octet boundary. The receiver may add any number of bits set to "0" at the end of the received string if needed for correct decoding.

```
<Classmark 3 Value part> ::=
    < spare bit >
    {    < Multiband supported : { 000 } >
            < A5 bits >
    |    < Multiband supported : { 101 | 110 } >
            < A5 bits >
            < Associated Radio Capability 2 : bit(4) >
            < Associated Radio Capability 1 : bit(4) >
    |    < Multiband supported : { 001 | 010 | 100 } >
            < A5 bits >
            < spare bit >(4)
            < Associated Radio Capability 1 : bit(4) > }
    { 0 | 1 < R Support > }
    { 0 | 1 < Multi Slot Capability > }
    < UCS2 treatment: bit >
    < Extended Measurement Capability : bit >
    { 0 | 1 < MS measurement capability > }
    { 0 | 1 < MS Positioning Method Capability > }
    { 0 | 1 < EDGE Multi Slot Capability > }
    { 0 | 1 < EDGE Struct > }
    { 0 | 1 < GSM 400 Bands Supported : { 01 | 10 | 11 } >
            < GSM 400 Associated Radio Capability: bit(4) > }

    { 0 | 1 <GSM 850 Associated Radio Capability : bit(4) > }
    { 0 | 1 <PCS 1900 Associated Radio Capability : bit(4) > }
    < UMTS FDD Radio Access Technology Capability : bit >
    < UMTS 3.84 Mcps TDD Radio Access Technology Capability : bit >
    < CDMA 2000 Radio Access Technology Capability : bit >

    { 0 | 1  < DTM GPRS Multi Slot Class : bit(2) >
            < MAC Mode Support : bit >
            {0 | 1< DTM EGPRS Multi Slot Class : bit(2) > } }
    { 0 | 1 < Single Band Support > } -- Release 4 starts here:
    { 0 | 1 <GSM 700 Associated Radio Capability : bit(4)>}

    < UMTS 1.28 Mcps TDD Radio Access Technology Capability : bit >
    < GERAN Feature Package 1 : bit >

    { 0 | 1 < Extended DTM GPRS Multi Slot Class : bit(2) >
            < Extended DTM EGPRS Multi Slot Class : bit(2) > }

    < spare bit > ;

< A5 bits > ::=
    < A5/7 : bit > < A5/6 : bit > < A5/5 : bit > < A5/4 : bit >  ;

<R Support>::=
    < R-GSM band Associated Radio Capability : bit(3) > ;

< Multi Slot Capability > ::=
    < Multi Slot Class : bit(5) >  ;

< MS Measurement capability > ::=
    < SMS_VALUE : bit (4) >
    < SM_VALUE : bit (4) > ;

< MS Positioning Method Capability > ::=
    < MS Positioning Method : bit(5) > ;

< EDGE Multi Slot Capability > ::=
    < EDGE Multi Slot Class : bit(5) > ;

 <EDGE Struct> : :=
    < Modulation Capability : bit >
    { 0 | 1 < EDGE RF Power Capability 1: bit(2) > }
    { 0 | 1 < EDGE RF Power Capability 2: bit(2) > }
```

```
< Single Band Support > ::=
    < GSM Band : bit (4) > ;
```

Figure 10.5.7/3GPP TS 24.008 *Mobile Station Classmark 3* information element

Table 10.5.7/3GPP TS 24.008: *Mobile Station Classmark 3* **information element**

Multiband Supported (3 bit field)

Band 1 supported (third bit of the field)
Bit   13
   0   P-GSM not supported
   1   P-GSM supported

Band 2 supported (second bit of the field)
Bit   2
   0   E-GSM or R-GSM not supported
   1   E-GSM or R-GSM supported

Band 3 supported (first bit of the field)
Bit   31
   0   DCS 1800 not supported
   1   DCS 1800 supported

The indication of support of P-GSM band or E-GSM or R-GSM band is mutually exclusive.

When the 'Band 2 supported' bit indicates support of E-GSM or R-GSM, the presence of the <R Support> field, see below, indicates if the E-GSM or R-GSM band is supported.

In this version of the protocol, the sender indicates in this field either none, one or two of these 3 bands supported.

For single band mobile station or a mobile station supporting none of the GSM 900 bands(P-GSM, E-GSM and R-GSM) and DCS 1800 bands, all bits are set to 0.

A5/4
Bit   1
   0   Encryption algorithm A5/4 not available
   1   Encryption algorithm A5/4 available

A5/5
Bit   1
   0   Encryption algorithm A5/5 not available
   1   Encryption algorithm A5/5 available

A5/6
Bit   1
   0   Encryption algorithm A5/6 not available
   1   Encryption algorithm A5/6 available

A5/7
   0   Encryption algorithm A5/7 not available
   1   Encryption algorithm A5/7 available

Associated Radio capability 1 and 2 (4 bit fields)

If either of P-GSM or E-GSM or R-GSM is supported, the radio capability 1 field indicates the radio capability for P-GSM, E-GSM or R-GSM, and the radio capability 2 field indicates the radio capability for DCS1800 if supported, and is spare otherwise.

If none of P-GSM or E-GSM or R-GSM are supported, the radio capability 1 field indicates the radio capability for DCS1800, and the radio capability 2 field is spare.

The radio capability contains the binary coding of the power class associated with the band indicated in multiband support bits (see 3GPP TS 45.005 [33]).

(continued...)

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3 information element*

R Support

In case where the R-GSM band is supported the R-GSM band associated radio capability field contains the binary coding of the power class associated (see GSM 45.005) (regardless of the number of GSM bands supported). A mobile station supporting the R-GSM band shall also when appropriate, (see 10.5.1.6) indicate its support in the 'FC' bit in the Mobile Station Classmark 2 information element.

Note: the coding of the power class for P-GSM, E-GSM, R-GSM and DCS 1800 in radio capability 1 and/or 2 is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

Multi Slot Class (5 bit field)

In case the MS supports the use of multiple timeslots then the Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].

UCS2 treatment (1 bit field)

This information field indicates the likely treatment by the mobile station of UCS2 encoded character strings. If not included, the value 0 shall be assumed by the receiver.
Bit   1
     0   the ME has a preference for the default alphabet (defined in 3GPP TS 03.38)
over UCS2.
     1   the ME has no preference between the use of the default alphabet and the
use of UCS2.

Extended Measurement Capability (1 bit field)

This bit indicates whether the mobile station supports 'Extended Measurements' or not
Bit   1
     0   the MS does not support Extended Measurements
     1   the MS supports Extended Measurements

SMS_VALUE (Switch-Measure-Switch) (4 bit field)
The SMS field indicates the time needed for the mobile station to switch from one radio channel to another, perform a neighbour cell power measurement, and the switch from that radio channel to another radio channel.
Bits
4 3 2 1
     0 0 0 0   1/4 timeslot (~144 microseconds)
     0 0 0 1   2/4 timeslot (~288 microseconds)
     0 0 1 0   3/4 timeslot (~433 microseconds)
      . . .
     1 1 1 1   16/4 timeslot (~2307 microseconds)

SM_VALUE (Switch-Measure) (4 bit field)
The SM field indicates the time needed for the mobile station to switch from one radio channel to another and perform a neighbour cell power measurement.
Bits
4 3 2 1
     0 0 0 0   1/4 timeslot (~144 microseconds)
     0 0 0 1   2/4 timeslot (~288 microseconds)
     0 0 1 0   3/4 timeslot (~433 microseconds)
      . . .
     1 1 1 1   16/4 timeslot (~2307 microseconds)

MS Positioning Method Capability (1 bit field)
This bit indicates whether the MS supports Positioning Method or not for the provision of Location Services.

MS Positioning Method (5 bit field)
This field indicates the Positioning Method(s) supported by the mobile station.
MS assisted E-OTD
Bit   5
     0   MS assisted E-OTD not supported
     1   MS assisted E-OTD supported

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3* information element

MS based E-OTD
Bit   4
    0   MS based E-OTD not supported
    1   MS based E-OTD supported

MS assisted GPS
Bit   3
    0   MS assisted GPS not supported
    1   MS assisted GPS supported

MS based GPS
Bit   2
    0   MS based GPS not supported
    1   MS based GPS supported

MS conventional GPS
Bit   1
    0   conventional GPS not supported
    1   conventional GPS supported

EDGE Multi Slot class (5 bit field)

In case the EDGE MS supports the use of multiple timeslots and the number of supported time slots is different from number of time slots supported for GMSK then the EDGE Multi Slot class field is included and is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].

Modulation Capability

Modulation Capability field indicates the supported modulation scheme by MS in addition to GMSK
Bit   1
    0   8-PSK supported for downlink reception only
    1   8-PSK supported for uplink transmission and downlink reception

EDGE RF Power Capability 1 (2 bit field)
If 8-PSK is supported for both uplink and downlink, the **EDGE RF Power Capability 1** field indicates the radio capability for 8-PSK modulation in GSM 400, GSM700, GSM850 or GSM900.

EDGE RF Power Capability 2 (2 bit field)
If 8-PSK modulation is supported for both uplink and downlink, the **EDGE RF Power Capability 2** field indicates the radio capability for 8-PSK modulation in DCS1800 or PCS1900 if supported, and is not included otherwise.

The respective **EDGE RF Power Capability 1** and **EDGE RF Power Capability 2** fields contain the following coding of the 8-PSK modulation power class (see 3GPP TS 45.005 [33]):
Bits   2 1
        0 0   Reserved
        0 1   Power class E1
        1 0   Power class E2
        1 1   Power class E3

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3* information element

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GSM 400 Bands Supported (2 bit field)
See the semantic rule for the sending of this field.
Bits
2 1
   0 1 GSM 480 supported, GSM 450 not supported
   1 0 GSM 450 supported, GSM 480 not supported
   1 1   GSM 450 supported, GSM 480 supported

GSM 400 Associated Radio Capability (4 bit field)
If either GSM 450 or GSM 480 or both is supported, the GSM 400 Associated Radio Capability field indicates the radio capability for GSM 450 and/or GSM 480.

The radio capability contains the binary coding of the power class associated with the band indicated in GSM 400 Bands Supported bits (see 3GPP TS 45.005 [33]).

Note: the coding of the power class for GSM 450 and GSM 480 in GSM 400 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

GSM 850 Associated Radio Capability (4 bit field)
See the semantic rule for the sending of this field.
This field indicates whether GSM 850 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the GSM 850 band (see 3GPP TS 45.005 [33]).

Note: the coding of the power class for GSM 850 in GSM 850 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

PCS 1900 Associated Radio Capability (4 bit field)
See the semantic rule for the sending of this field.
This field indicates whether PCS 1900 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the PCS 1900 band (see 3GPP TS 45.005 [33]).

Note: the coding of the power class for PCS 1900 in PCS 1900 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

Table 10.5.1.7/3GPP TS 24.008 (continued): *MS Classmark 3* **information element**

UMTS FDD Radio Access Technology Capability (1 bit field)
Bit   1
  0   UMTS FDD not supported
  1   UMTS FDD supported

UMTS 3.84 Mcps TDD Radio Access Technology Capability (1 bit field)
Bit   1
  0   UMTS 3.84 Mcps TDD not supported
  1   UMTS 3.84 Mcps TDD supported

CDMA 2000 Radio Access Technology Capability (1 bit field)
Bit   1
  0   CDMA2000 not supported
  1   CDMA2000 supported

DTM GPRS Multi Slot Class (2 bit field)
This field indicates the GPRS DTM multislot capabilities of the MS. It is coded as follows:

Bit   2 1
  0 0   Multislot class 1 supported
  0 1   Multislot class 5 supported
  1 0   Multislot class 9 supported
  1 1   Reserved for future extension. If received, the network shall interpret this as '00'

MAC Mode Support (1 bit field)
This field indicates whether the MS supports Dynamic and Fixed Allocation or only supports Exclusive
Allocation. It is coded as follows:

Bit   1
  0   Dynamic and Fixed Allocation not supported
  1   Dynamic and Fixed allocation supported

EGPRS DTM Multi Slot Class (2 bit field)
This field indicates the EGPRS DTM multislot capabilities of the MS. This field shall be included only if the
mobile station supports EGPRS DTM. This field is coded as the DTM GPRS Multi Slot Class field.

Single Band Support
This field shall be sent if the mobile station supports UMTS and one and only one GSM band with the exception
of R-GSM; this field shall not be sent otherwise

GSM Band (4 bit field)
Bits
4 3 2 1
0 0 0 0 E-GSM is supported
0 0 0 1 P-GSM is supported
0 0 1 0 DCS 1800 is supported
0 0 1 1 GSM 450 is supported
0 1 0 0 GSM 480 is supported
0 1 0 1 GSM 850 is supported
0 1 1 0 PCS 1900 is supported
0 1 1 1 GSM 700 is supported
All other values are reserved for future use.

NOTE: When this field is received, the associated RF power capability is found in Classmark 1 or 2.

GSM 700 Associated Radio Capability (4 bit field)

See the semantic rule for the sending of this field.
This field indicates whether GSM 700 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the GSM 700 band (see
3GPP TS 45.005 [33]).

Note: the coding of the power class for GSM 700 in GSM 700 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

UMTS 1.28 Mcps TDD Radio Access Technology Capability (1 bit field)

Bit   1
    0   UMTS 1.28 Mcps TDD not supported
    1   UMTS 1.28 Mcps TDD supported

GERAN Feature Package 1 (1 bit field)
This field indicates whether the MS supports the GERAN Feature Package 1 (see 3GPP TS 44.060). It is coded as follows:

Bit   1
    0   GERAN feature package 1 not supported.
    1   GERAN feature package 1 supported.

Extended GPRS DTM Multi Slot Class (2 bit field)
This field indicates the extended GPRS DTM multislot capabilities of the MS and shall be interpreted in conjunction with the GPRS DTM Multi Slot Class field. It is coded as follows, where 'DGMSC' denotes the DTM GPRS Multi Slot Class field: