Agenda item: **5.1.3**

Source: **TSG_N WG1**

Title: **CR on Work Item EDGE/ source SMG2**

Introduction:

This document contains **"1"** CRs <u>not presented</u> to **TSG_N WG1** and forwarded directly to **TSG_N Plenary** meeting **#6** for approval. It was <u>approved by SMG2</u> and forwarded to TSGN WG1.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
2-99J79	24.008	063	2	B	R99	3.1.0	3.2.0	Mobile Station Classmark 850 and 1900 band included

CHANGE REQUEST

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

24.008	CR	A063r2	**Current Version:**	**3.1.0**

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

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

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

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

Source:	**Nokia**		**Date:**	**23.11.1999**

Subject: **Mobile Station Classmark 850 and 1900 band included**

Work item: **EDGE Compact and support for EGPRS in ANSI-136 networks**

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

Reason for change: **New GSM bands need to be added into MS Classmark information elements**

Clauses affected:

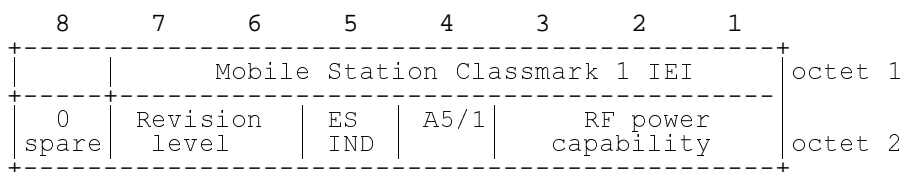| Other specs affected:				
	Other 3G core specifications	☐	→ **List of CRs:**	
	Other GSM core specifications	☐	→ **List of CRs:**	
	MS test specifications	☐	→ **List of CRs:**	
	BSS test specifications	☐	→ **List of CRs:**	
	O&M specifications	☐	→ **List of CRs:**	

Other comments:

help.doc

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

10.5.1.5   Mobile Station Classmark 1

The purpose of the *Mobile Station Classmark 1* information element is to provide the network with information concerning aspects of high priority of the mobile station equipment. This affects 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 *Mobile Station Classmark 1* information element is coded as shown in figure 10.5.5/TS 24.008 and table 10.5.5/TS 24.008.

The *Mobile Station Classmark 1* is a type 3 information element with 2 octets length.

```
  8       7       6       5       4       3       2       1
+-----------------------------------------------------------+
|       |          Mobile Station Classmark 1 IEI           |octet 1
+-------+-----------------+-------+-----------------+--------+
|   0   |    Revision     |  ES   | A5/1  |      RF power    |
| spare |    level        |  IND  |       |      capability  |octet 2
+-----------------------------------------------------------+
```

Figure 10.5.5/TS 24.008 *Mobile Station Classmark 1* information element

Table 10.5.5/TS 24.008: *Mobile Station Classmark 1* **information element**

Revision level (octet 2)

 Bits
 7 6
 0 0 Reserved for phase 1
 0 1 Used by phase 2 mobile stations

All other values are reserved for future use.

ES IND (octet 2, bit 5) "Controlled Early Classmark Sending" option implementation

 0 "Controlled Early Classmark Sending" option is not implemented in the MS

 1 "Controlled Early Classmark Sending" option is implemented in the MS

NOTE: The value of the ES IND gives the implementation in the MS. It's value is **not** dependent on the broadcast SI 3 Rest Octet <Early Classmark Sending Control> value.

 1   encryption algorithm A5/1 not available

RF power capability (octet 2)

When the GSM 450, GSM 480, GSM 850, GSM P, E [or R] 900 band is used (for exceptions see 3.4.18):
 Bits
 3 2 1
 0 0 0   class 1
 0 0 1   class 2
 0 1 0   class 3
 0 1 1   class 4
 1 0 0   class 5

All other values are reserved.

When the DCS 1800 or PCS 1900 band is used (for exceptions see 3.4.18):
 Bits
 3 2 1
 0 0 0   class 1
 0 0 1   class 2
 0 1 0   class 3

All other values are reserved.

10.5.1.6   Mobile Station Classmark 2

The purpose of the *Mobile Station Classmark 2* information element is to provide the network with information concerning aspects of both high and low priority of the mobile station equipment. This affects 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 *Mobile Station Classmark 2* information element is coded as shown in figure 10.5.6/TS 24.008, table 10.5.6a/TS 24.008 and table 10.5.6b/TS 24.008.

The *Mobile Station Classmark 2* is a type 4 information element with 5 octets length.

```
         8     7     6     5     4     3     2     1
      +-------------------------------------------------+
      |     |        Mobile station classmark 2 IEI     |  octet 1
      +-------------------------------------------------+
      |                                                 |
      |  Length of mobile station classmark 2 contents  |  octet 2
      +-------------------------------------------------+
      |  0  | Revision   | ES  | A5/1|    RF power       |
      |spare| level      | IND |     |    capability     |  octet 3
      +-----+------------------+-----+-----------------+
      |  0  | PS  | SS Screen. |SM ca| VBS | VGCS |  FC  |
      |spare|capa.| Indicator  |pabi.|     |      |      |  octet 4
      +-----+-----+------------+-----+-----+------+-----+
      | CM3 |  0      0      0 |SoLSA| CMSP | A5/3 | A5/2 |
      |     |        spare     |     |      |      |      |  octet 5
      +-------------------------------------------------+
```

Figure 10.5.6/TS 24.008 *Mobile Station Classmark 2* **information element**

NOTE: Owing to backward compatibility problems, bit 8 of octet 4 should not be used unless it is also checked that the bits 8, 7 and 6 of octet 3 are not "0 0 0".

Table 10.5.6a/TS 24.008: *Mobile Station Classmark 2* **information element**

Revision level (octet 3)
 Bits
 7 6
 0 0 Reserved for phase 1
 0 1 Used by phase 2 mobile stations

All other values are reserved for future use

ES IND (octet 3, bit 5) "Controlled Early Classmark Sending" option implementation

 0 "Controlled Early Classmark Sending" option is not implemented in the MS
 1 "Controlled Early Classmark Sending" option is implemented in the MS

NOTE: The value of the ES IND gives the implementation in the MS. It's value is **not** dependent on the broadcast SI 3 Rest Octet <Early Classmark Sending Control> value.

A5/1 algorithm supported (octet 3, bit 4)

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

RF Power Capability (Octet 3)
When GSM 450, GSM 480, GSM 850, GSM 900 P, E [or R] band is used (for exceptions see 3.4.18):
 Bits
 3 2 1
 0 0 0   class 1
 0 0 1   class 2
 0 1 0   class 3
 0 1 1   class 4
 1 0 0   class 5

All other values are reserved.

When the DCS 1800 or PCS 1900 band is used (for exceptions see 3.4.18):
 Bits
 3 2 1
 0 0 0   class 1
 0 0 1   class 2
 0 1 0   class 3

All other values are reserved.

PS capability (pseudo-synchronization capability) (octet 4)
Bit **7**
 0   PS capability not present
 1   PS capability present

SS Screening Indicator (octet 4)
Bits
 6 5
 0 0   defined in TS 24.080
 0 1   defined in TS 24.080
 1 0   defined in TS 24.080
 1 1   defined in TS 24.080

SM capability (MT SMS pt to pt capability) (octet 4)
 Bit **4**
0   Mobile station does not support mobile terminated point to point SMS
1   Mobile station supports mobile terminated point to point SMS

Table 10.5.6b/TS 24.008: *Mobile Station Classmark 2* information element

VBS notification reception (octet 4)
Bit **3**
0   no VBS capability or no notifications wanted
1   VBS capability and notifications wanted

VGCS notification reception (octet 4)
Bit **2**
0   no VGCS capability or no notifications wanted
1   VGCS capability and notifications wanted

FC Frequency Capability (octet 4)
When GSM 400 band is used (for exceptions see 3.4.18):
Bit **1**
0   Reserved for future use (for definition of frequency bands see GSM 05.05)

Note: This bit conveys no information about support or non support of the E-GSM or R-GSM
band when transmitted on a GSM 400 channel.

When GSM 850 band is used (for exceptions see 3.4.18):
Bit **1**
0   Reserved for future use (for definition of frequency bands see GSM 05.05)

Note: This bit conveys no information about support or non support of the E-GSM or R-GSM
band when transmitted on a GSM 850 channel.

When a GSM 900 band is used (for exceptions see 3.4.18):
Bit **1**
0   The MS does not support the E-GSM or R-GSM band (For definition of frequency bands
see GSM 05.05)

1   The MS does support the E-GSM or R-GSM (For definition of frequency bands see
GSM 05.05)
Note : For mobile station supporting the R-GSM band further information can be found in MS
Classmark 3.

When the DCS 1800 band is used (for exceptions see 3.4.18):
Bit **1**
0   Reserved for future use (for definition of frequency bands see GSM 05.05)

Note: This bit conveys no information about support or non support of the E-GSM or R-GSM
band when transmitted on a DCS 1800 channel.

When the PCS 1900 band is used (for exceptions see 3.4.18):
Bit **1**
0   Reserved for future use (for definition of frequency bands see GSM 05.05)

Note: This bit conveys no information about support or non support of the E-GSM or R-GSM
band when transmitted on a PCS 1900 channel.

CM3 (octet 5, bit 8)
0   The MS does not support any options that are indicated in CM3
1   The MS supports options that are indicated in classmark 3 IE

SoLSA (octet 5, bit 4**)**
0   The ME does not support SoLSA.
1   The ME supports SoLSA.

CMSP: CM Service Prompt (octet 5, bit 3) $(CCBS)$
0   "Network initiated MO CM connection request" not supported.
1   "Network initiated MO CM connection request" supported for at least one CM
    protocol.

A5/3 algorithm supported (octet 5, bit 2)
0   encryption algorithm A5/3 not available
1   encryption algorithm A5/3 available

A5/2 algorithm supported (octet 5, bit 1)
0   encryption algorithm A5/2 not available
1   encryption algorithm A5/2 available

NOTE: Additional mobile station capability information might be obtained by invoking the classmark interrogation procedure.

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/TS 24.008 and table 10.5.7/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 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 <EDGE Multi Slot Capability>}
     {0  | 1 <EDGE Struct>}
        <Additional Bands Supported : bit(4)>
        <Associated Radio Capability 3 : bit(4)>
        <spare bit>(4)
     {0 | 1 <GSM 850 Associated Radio Capability : bit(4)>}
      {0 | 1 <PCS 1900 Associated Radio Capability : bit(4)>}
```

_____<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) >;
<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)>}

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

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

```
Multiband Supported (3 bit field)

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

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

Band 3 supported (first bit of the field)
  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. 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/TS 24.008 (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)

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 TS GSM 05.02.

Modulation Capability

Modulation Capability field indicates the supported modulation scheme by MS in
addition to GMSK

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 GSM900.

The radio capability contains the binary coding of the EDGE power class(see GSMß05.05).

EDGE RF Power Capability 2 (2 bit field)

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

The radio capability contains the binary coding of the EDGE power class (see GSM 05.05).

```
Additional Bands Supported (4 bit field)

Band 4 supported (fourth bit of the field)
   0    GSM 450 not supported
   1    GSM 450 supported

Band 5 supported (third bit of the field)
   0    GSM 480 not supported
   1    GSM 480 supported

Other two bits in this field are reserved for future use.

In this version of the protocol, the sender indicates in this field either none,
one or two of these 2 bands supported.

Associated Radio Capability 3

If either GSM 450 or GSM 480 or both is supported, the radio capability 3 field
indicates the radio capability for GSM 450 and GSM 480.

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

Note: the coding of the power class for GSM 450 and GSM 480 in radio capability
3 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)

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)

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.
```