

**Source:** TSG CN WG 1  
**Title:** CR to R99, Rel-4 and Rel-5 on Work Item GPRS towards 24.008  
**Agenda item:** 7.3  
**Document for:** APPROVAL

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**Introduction:**

This document contains 3 CRs on **R99, Rel-4 and Rel-5** on Work Item "GPRS", that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version-New	Meeting-2nd-Level	Doc-2nd-Level
24.008	637	1	R99	Alternative coding of radio access capabilities	F	3.11.0	3.12.0	N1-24	N1-021396
24.008	638	1	Rel-4	Alternative coding of radio access capabilities	A	4.6.0	4.7.0	N1-24	N1-021397
24.008	639	1	Rel-5	Alternative coding of radio access capabilities	A	5.3.0	5.4.0	N1-24	N1-021398

Budapest, Hungary, 13. – 17. May 2002

CR-Form-v5

**CHANGE REQUEST**⌘ **24.008 CR 637** ⌘ rev **1** ⌘ Current version: **3.11.0** ⌘For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.Proposed change affects: ⌘ (U)SIM  ME/UE  Radio Access Network  Core Network 

<b>Title:</b>	⌘ Alternative coding of radio access capabilities		
<b>Source:</b>	⌘ Siemens AG		
<b>Work item code:</b>	⌘ GPRS	<b>Date:</b>	⌘ 14.05.02
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		<b>2</b> (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		<b>R96</b> (Release 1996)
	<b>B</b> (addition of feature),		<b>R97</b> (Release 1997)
	<b>C</b> (functional modification of feature)		<b>R98</b> (Release 1998)
	<b>D</b> (editorial modification)		<b>R99</b> (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		<b>REL-4</b> (Release 4)
			<b>REL-5</b> (Release 5)

**Reason for change:** ⌘ The MS Radio Access capability IE is included in GMM messages and in RLC/MAC control messages. Due to the introduction of new fields in R99 which are included for each supported band, the overall length of the binary coded IE has significantly increased. If the MS Radio Access Capabilities have to be included in the Packet Resource Request message for RLC/MAC in GPRS mode, there are only **78** bits left for the coding of the MS RA capability value part (for Rel99, Rel-4 and Rel-5). This leads to the problem that maximal two bands could be included.

In order to decrease this length an alternative coding for the indication of the supported bands is proposed.

Furthermore the conditions under which bands must be included in the IE are clarified.

It has been found that there is a number of CS parameters that the CS specific parameters A5bits, HSCSD, ECSD, SMS\_VALUE and SM\_VALUE included in the MS RAC IE are neither used by the BSS nor by the SGSN. In the current specification, it is not obvious that the MS is allowed to exclude those parameters. If these parameters are excluded, it will be possible to report more bands to the network.

**Summary of change:** ⌘ A new list of Additional access technologies struct is introduced. It contains just those capabilities which are different from Access technology to Access Technology. This structure contains always the Access Technology Type, the GMSK Power Capability and the 8PSK Power Capability.

It is proposed to define that the MS is allowed to exclude the CS parameters: A5bits, HSCSD, ECSD, SMS\_VALUE and SM\_VALUE.

**Consequences if not approved:** ⌘ In GPRS the MS will from R99 onwards be able to include in maximum two of its supported bands during the TBF establishment and in consequence the network can't assign certain radio resources even the MS would support these.

**Clauses affected:** ⌘ 10.5.5.12a

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

**Other comments:** ⌘

### 10.5.5.12a MS Radio Access capability

The purpose of the *MS RA capability* information element is to provide the radio part of the network with information concerning radio aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station.

The *MS RA capability* is a type 4 information element, with a maximum length of 52 octets.

The value part of a *MS RA capability* information element is coded as shown in table 10.5.146/3GPP TS 24.008.

~~— SEMANTIC RULE : Among the three Access Technology Types GSM 900-P, GSM 900-E and GSM 900-R only one shall be present.~~

~~— The MS shall indicate supported Access Technology Types, e.g. [450, 480, 900, 1800, UMTS] or [850, 1900] MHz bands during a single MM procedure.~~

For the indication of the Access Technology Types the following conditions shall apply:

- Among the three Access Technology Types GSM 900-P, GSM 900-E and GSM 900-R only one shall be present.
- Due to shared radio frequency channel numbers between GSM 1800 and GSM 1900, the mobile station should provide the relevant radio access capability for either GSM 1800 band OR GSM 1900 band, not both.
- The MS shall indicate its supported Access Technology Types during a single MM procedure.
- If the alternative coding by using the Additional access technologies struct is chosen by the mobile station, the mobile station shall indicate its radio access capability for the serving BCCH frequency band in the first included Access capabilities struct.
- **The first Access Technology Type shall not be set to "1111".**

For error handling the following shall apply:

- ~~Error handling~~ - If a received Access Technology Type is unknown to the receiver, it shall ignore all the corresponding fields;
- If within a known Access Technology Type a receiver recognizes an unknown field it shall ignore it.
- ~~See~~ For more details about error handling of MS radio access capability ~~in~~ see 3GPP TS GSM 08.18.
- ~~Due to shared radio frequency channel numbers between 1800 and 1900, the mobile should provide the relevant MS Radio Access capability for either 1800 band OR 1900 band, not both.~~

NOTE: The MS should not add spare bits following the <Content> field for the Access capabilities of an Access Technology Type, i.e. the MS should encode the <Length> field of the < Access capabilities struct > as the length in bits of <Content> only.

**Table 10.5.146/3GPP TS 24.008 : Mobile Station Radio Access Capability Information Element**

```

<MS Radio Access capability IE> ::=
<MS Radio Access capability IEI : 00100100>
<Length of MS RA capability: <octet>> -- length in octets of MS RA capability value part and spare bits
<MS RA capability -value part : <MS RA capability value part struct>>
<spare bits>**; -- may be used for future enhancements

<MS RA capability -value part struct> ::= --recursive structure allows any number of Access technologies
{ 1 < Access Technology Type: bit (4) exclude 1111>
_____ < Access capabilities : <Access capabilities struct> > }

_____ | 1 < Access Technology Type: bit (4) == 1111 > -- structure adding Access technologies with same
capabilities
_____ < Length : bit (7) > -- length in bits of list of Additional access technologies and spare bits
_____ { 1 < Additional access technologies: < Additional access technologies struct >> } ** 0
_____ <spare bits>** }

_____ { 0 | 1 <MS RA capability -value part struct> } ;

< Additional access technologies struct > ::=
_____ < Access Technology Type : bit (4) >
_____ < GMSK Power Class : bit (3) >
_____ < 8PSK Power Class : bit (2) >;

< Access capabilities struct > ::=
_____ < Length : bit (7) > -- length in bits of Content and spare bits
_____ <Access capabilities : <Content>>
_____ <spare bits>** ; -- expands to the indicated length
_____ -- may be used for future enhancements

< Content > ::=
_____ < RF Power Capability : bit (3) >
_____ { 0 | 1 <A5 bits : <A5 bits> > } -- zero means that the same values apply for parameters as in the immediately
preceding Access capabilities field within this IE
_____ The presence of the A5 bits is mandatory in the 1st Access capabilities struct
within this IE.
_____ < ES IND : bit >
_____ < PS : bit >
_____ < VGCS : bit >
_____ < VBS : bit >
_____ { 0 | 1 < Multislot capability : Multislot capability struct > } -- zero means that the
same values for multislot parameters as given in an earlier Access capabilities field within this IE apply also here
-- Additions in release 99
_____ { 0 | 1 < 8PSK Power Capability : bit(2) > } -- '1' also means 8PSK modulation capability in uplink.
_____ < COMPACT Interference Measurement Capability : bit >
_____ < Revision Level Indicator : bit >
_____ < UMTS FDD Radio Access Technology Capability : bit > _____ -- 3G RAT
_____ < UMTS 3.84 Mcps TDD Radio Access Technology Capability : bit > _____ -- 3G RAT
_____ < CDMA 2000 Radio Access Technology Capability : bit >; _____ -- 3G RAT
error: struct too short, assume features do not exist
_____ -- error: struct too long, ignore data and jump to next Access technology

```

**Table 10.5.146/3GPP TS 24.008 (continued): Mobile Station Radio Access Capability IE**

```

< Multislot capability struct > ::=
  { 0 | 1 < HSCSD multislot class : bit (5) > }
  { 0 | 1 < GPRS multislot class : bit (5) > < GPRS Extended Dynamic Allocation Capability : bit > }
  { 0 | 1 < SMS_VALUE : bit (4) > < SM_VALUE : bit (4) > }
-- Additions in release 99
  { 0 | 1 < ECSD multislot class : bit (5) > }
  { 0 | 1 < EGPRS multislot class : bit (5) > < EGPRS Extended Dynamic Allocation 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)> } } ;
-- error: struct too short, assume features do not exist

```

<A5 bits> ::= < A5/1 : bit> <A5/2 : bit> <A5/3 : bit> <A5/4 : bit> <A5/5 : bit> <A5/6 : bit> <A5/7 : bit>; -- bits for circuit mode ciphering algorithms. These fields are not used by the network and may be excluded by the MS.

**Access Technology Type**

This field indicates the access technology type to be associated with the following access capabilities.

Bits  
 4 3 2 1  
 0 0 0 0 GSM P  
 0 0 0 1 GSM E --note that GSM E covers GSM P  
 0 0 1 0 GSM R --note that GSM R covers GSM E and GSM P  
 0 0 1 1 GSM 1800  
 0 1 0 0 GSM 1900  
 0 1 0 1 GSM 450  
 0 1 1 0 GSM 480  
 0 1 1 1 GSM 850  
 1 1 1 1 Indicates the presence of a list of Additional access technologies

All other values are treated as unknown by the receiver.

**RF Power Capability, GMSK Power Class (3 bit field)**

This field is coded as radio capability in Classmark 3 for the indicated band: it contains the binary coding of the power class used for GMSK associated with the indicated Access Technology Type (see 3GPP TS 05.05). ~~(see GSM 05.05 paragraph 4.1 output power and paragraph 4.1.1 Mobile Station).~~

**8PSK Power Capability (2 bit field)**

If 8-PSK modulation is supported for uplink, this field indicates the radio capability for 8-PSK modulation. The following coding is used (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

**8PSK Power Class (2 bit field)**

This field indicates the radio capability for 8-PSK modulation. The following coding is used (see 3GPP TS 05.05):

Bits 2 1  
 0 0 8PSK modulation not supported for uplink  
 0 1 Power class E1  
 1 0 Power class E2  
 1 1 Power class E3

**Additional access technologies struct**

This structure contains the GMSK Power Class and 8PSK Power Class for an additional Access Technology. All other capabilities for this indicated Access Technology are the same as the capabilities indicated by the preceding Access capabilities struct.

**A5/1**

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

**A5/2**

0 encryption algorithm A5/2 not available  
 1 encryption algorithm A5/2 available

**A5/3**

- 0 encryption algorithm A5/3 not available
- 1 encryption algorithm A5/3 available

**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

**ES IND** – (Controlled early Classmark Sending)

- 0 "controlled early Classmark Sending" option is not implemented
- 1 "controlled early Classmark Sending" option is implemented

**Table 10.5.146/3GPP TS 24.008 (concluded): Mobile Station Radio Access Capability Information Element**

**PS** – (Pseudo Synchronisation)

- 0 PS capability not present
- 1 PS capability present

**VGCS** – (Voice Group Call Service)

- 0 no VGCS capability or no notifications wanted
- 1 VGCS capability and notifications wanted.

**VBS** – (Voice Broadcast Service)

- 0 no VBS capability or no notifications wanted
- 1 VBS capability and notifications wanted

**HSCSD Multi Slot Class**

The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS GSM 05.02. This field is not used by the network and may be excluded by the MS. Range 1 to 18, all other values are reserved.

**GPRS Multi Slot Class**

The GPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS GSM 05.02.

**ECSD Multi Slot Class**

The presence of this field indicates ECSD capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS GSM 05.02. This field is not used by the network and may be excluded by the MS. Range 1 to 18, all other values are reserved.

**EGPRS Multi Slot Class**

The presence of this field indicates EGPRS capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The EGPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS GSM 05.02.

**GPRS Extended Dynamic Allocation Capability**

- 0 Extended Dynamic Allocation Capability for GPRS is not implemented
- 1 Extended Dynamic Allocation Capability for GPRS is implemented

**EGPRS Extended Dynamic Allocation Capability**

- 0 Extended Dynamic Allocation Capability for EGPRS is not implemented
- 1 Extended Dynamic Allocation Capability for EGPRS is implemented

**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. This field is

not used by the network and may be excluded by the MS.

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. This field is not used by the network and may be excluded by the MS.

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)



**DTM GPRS Multi Slot Sub-Class (2 bit field)**

**DTM GPRS Multi Slot Sub-Class (2 bit field)**

This field indicates the GPRS DTM capabilities of the MS. The GPRS DTM Multi Slot Sub-Class is independent from the Multi Slot Capabilities field.

Bits

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)**

**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 Multislot Sub-Class field.

**MAC Mode Support (1 bit field)**

**MAC Mode Support (1 bit field)**

This field indicates whether the MS supports Dynamic and Fixed Allocation or only supports Exclusive Allocation.

Bits

4

0 Dynamic and Fixed Allocation not supported

1 Dynamic and Fixed allocation supported

**COMPACT Interference Measurement Capability (1 bit field)**

**COMPACT Interference Measurement Capability**

Bit

0 COMPACT Interference Measurement Capability is not implemented

1 COMPACT Interference Measurement Capability is implemented

~~0 COMPACT Interference Measurement Capability is not implemented~~

~~1 COMPACT Interference Measurement Capability is implemented~~

**Revision Level Indicator (1 bit field)**

Bit

0 The ME is Release '98 or older

1 The ME is Release '99 onwards

**UMTS FDD Radio Access Technology Capability (1 bit field)**

Bit

0 UMTS FDD not supported

1 UMTS FDD supported

**UMTS 3.84 Mcps TDD Radio Access Technology Capability (1 bit field)**

Bit

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

0 CDMA2000 not supported

1 CDMA2000 supported

Budapest, Hungary, 13. – 17. May 2002

CR-Form-v5

**CHANGE REQUEST**⌘ **24.008 CR 638** ⌘ rev **1** ⌘ Current version: **4.6.0** ⌘For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.Proposed change affects: ⌘ (U)SIM  ME/UE  Radio Access Network  Core Network 

<b>Title:</b>	⌘ Alternative coding of radio access capabilities		
<b>Source:</b>	⌘ Siemens AG		
<b>Work item code:</b>	⌘ GPRS	<b>Date:</b>	⌘ 14.05.02
<b>Category:</b>	⌘ <b>A</b>	<b>Release:</b>	⌘ REL-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		<b>2</b> (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		<b>R96</b> (Release 1996)
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	<b>C</b> (functional modification of feature)		<b>R98</b> (Release 1998)
	<b>D</b> (editorial modification)		<b>R99</b> (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		<b>REL-4</b> (Release 4)
			<b>REL-5</b> (Release 5)

**Reason for change:** ⌘ The MS Radio Access capability IE is included in GMM messages and in RLC/MAC control messages. Due to the introduction of new fields in R99 which are included for each supported band, the overall length of the binary coded IE has significantly increased. If the MS Radio Access Capabilities have to be included in the Packet Resource Request message for RLC/MAC in GPRS mode, there are only **78** bits left for the coding of the MS RA capability value part (for Rel99, Rel-4 and Rel-5). This leads to the problem that maximal two bands could be included.

In order to decrease this length an alternative coding for the indication of the supported bands is proposed.

Furthermore the conditions under which bands must be included in the IE are clarified.

It has been found that there is a number of CS parameters that the CS specific parameters A5bits, HSCSD, ECSD, SMS\_VALUE and SM\_VALUE included in the MS RAC IE are neither used by the BSS nor by the SGSN. In the current specification, it is not obvious that the MS is allowed to exclude those parameters. If these parameters are excluded, it will be possible to report more bands to the network.

**Summary of change:** ⌘ A new list of Additional access technologies struct is introduced. It contains just those capabilities which are different from Access technology to Access Technology. This structure contains always the Access Technology Type, the GMSK Power Capability and the 8PSK Power Capability.

It is proposed to define that the MS is allowed to exclude the CS parameters: A5bits, HSCSD, ECSD, SMS\_VALUE and SM\_VALUE.

**Consequences if not approved:** ⌘ In GPRS the MS will from R99 onwards be able to include in maximum two of its supported bands during the TBF establishment and in consequence the network can't assign certain radio resources even the MS would support these.

**Clauses affected:** ⌘ 10.5.5.12a

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

**Other comments:** ⌘

### 10.5.5.12a MS Radio Access capability

The purpose of the *MS RA capability* information element is to provide the radio part of the network with information concerning radio aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station.

The *MS RA capability* is a type 4 information element, with a maximum length of 52 octets.

The value part of a *MS RA capability* information element is coded as shown in table 10.5.146/3GPP TS 24.008.

- ~~— SEMANTIC RULE: Among the three Access Type Technologies GSM 900-P, GSM 900-E and GSM 900-R only one shall be present.~~
- ~~— The MS shall indicate supported Access Technology Types, e.g. [450, 480, 900, 1800, UMTS] or [700, 850, 1900] MHz bands during a single MM procedure.~~

For the indication of the Access Technology Types the following conditions shall apply:

- Among the three Access Type Technologies GSM 900-P, GSM 900-E and GSM 900-R only one shall be present.
- Due to shared radio frequency channel numbers between GSM 1800 and GSM 1900, the mobile station should provide the relevant radio access capability for either GSM 1800 band OR GSM 1900 band, not both.
- The MS shall indicate its supported Access Technology Types during a single MM procedure.
- If the alternative coding by using the Additional access technologies struct is chosen by the mobile station, the mobile station shall indicate its radio access capability for the serving BCCH frequency band in the first included Access capabilities struct.
- The first Access Technology Type shall not be set to "1111".

For error handling the following shall apply:

- ~~- Error handling: If a received Access Technology Type is unknown to the receiver, it shall ignore all the corresponding fields.~~
- ~~- If within a known Access Technology Type a receiver recognizes an unknown field it shall ignore it.~~
- ~~- See For more details about error handling of MS radio access capability in see 3GPP TS 48.018 [86].~~
- ~~— Due to shared radio frequency channel numbers between 1800 and 1900, the mobile should provide the relevant MS Radio Access capability for either 1800 band OR 1900 band, not both.~~

**Table 10.5.146/3GPP TS 24.008: Mobile Station Radio Access Capability Information Element**

```

<MS Radio Access capability IE> ::=
<MS Radio Access capability IEI : 00100100 >
<Length of MS RA capability: <octet>> -- length in octets of MS RA capability value part and spare bits
<MS RA capability value part : <MS RA capability value part struct >>
<spare bits>**; -- may be used for future enhancements

<MS RA capability value part struct > ::= --recursive structure allows any number of Access technologies
{ { < Access Technology Type: bit (4) exclude 1111 >
  < Access capabilities : <Access capabilities struct > } }

| { < Access Technology Type: bit (4) == 1111 > -- structure adding Access technologies with same
capabilities
  < Length : bit (7) > -- length in bits of list of Additional access technologies and spare bits
  { 1 < Additional access technologies: < Additional access technologies struct > } ** 0
  <spare bits>** } }

{ 0 | 1 <MS RA capability value part struct > } ;

< Additional access technologies struct > ::=
  < Access Technology Type : bit (4) >
  < GMSK Power Class : bit (3) >
  < 8PSK Power Class : bit (2) >;

< Access capabilities struct > ::=
  < Length : bit (7) > -- length in bits of Content and spare bits
  <Access capabilities : <Content>>
  <spare bits>** ; -- expands to the indicated length
  -- may be used for future enhancements

< Content > ::=
  < RF Power Capability : bit (3) >
  { 0 | 1 <A5 bits : <A5 bits > } -- zero means that the same values apply for parameters as in the immediately
preceding Access capabilities field within this IE
  The presence of the A5 bits is mandatory in the 1st Access capabilities struct
within this IE.
  < ES IND : bit >
  < PS : bit >
  < VGCS : bit >
  < VBS : bit >
  { 0 | 1 < Multislot capability : Multislot capability struct > } -- zero means that the same values for multislot
parameters as given in an earlier Access capabilities field within this IE apply also here
-- Additions in release 99
  { 0 | 1 < 8PSK Power Capability : bit(2) > } -- '1' also means 8PSK modulation capability in uplink.
  < COMPACT Interference Measurement Capability : bit >
  < Revision Level Indicator : bit >
  < UMTS FDD Radio Access Technology Capability : bit > --- 3G RAT
  < UMTS 3.84 Mcps TDD Radio Access Technology Capability : bit > --- 3G RAT
  < CDMA 2000 Radio Access Technology Capability : bit > --- 3G RAT
-- Additions in release 4
  < UMTS 1.28 Mcps TDD Radio Access Technology Capability: bit > --- 3G RAT
-- Additions in release 4
  < GERAN Feature Package 1 : bit >
  { 0 | 1 < Extended DTM GPRS Multi Slot Class : bit(2) >
    < Extended DTM EGPRS Multi Slot Class : bit(2) > };
  -- error: struct too short, assume features do not exist
  -- error: struct too long, ignore data and jump to next Access technology

```

**Table 10.5.146/3GPP TS 24.008 (continued): Mobile Station Radio Access Capability IE**

```

< Multislot capability struct > ::=
  { 0 | 1 < HSCSD multislot class : bit (5) > }
  { 0 | 1 < GPRS multislot class : bit (5) > < GPRS Extended Dynamic Allocation Capability : bit > }
  { 0 | 1 < SMS_VALUE : bit (4) > < SM_VALUE : bit (4) > }
-- Additions in release 99
  { 0 | 1 < ECSD multislot class : bit (5) > }
  { 0 | 1 < EGPRS multislot class : bit (5) > < EGPRS Extended Dynamic Allocation Capability : bit > }
  { 0 | 1 < DTM GPRS Multi Slot Class: bit(2)>
    <MAC Mode Support : bit>
    { 0 | 1 <EGPRS DTM Multi Slot Class : bit(2)> } } ;
-- error: struct too short, assume features do not exist

```

<A5 bits> ::= < A5/1 : bit> <A5/2 : bit> <A5/3 : bit> <A5/4 : bit> <A5/5 : bit> <A5/6 : bit> <A5/7 : bit>; -- bits for circuit mode ciphering algorithms. These fields are not used by the network and may be excluded by the MS.

**Access Technology Type**

This field indicates the access technology type to be associated with the following access capabilities.

Bits

4 3 2 1	
0 0 0 0	GSM P
0 0 0 1	GSM E --note that GSM E covers GSM P
0 0 1 0	GSM R --note that GSM R covers GSM E and GSM P
0 0 1 1	GSM 1800
0 1 0 0	GSM 1900
0 1 0 1	GSM 450
0 1 1 0	GSM 480
0 1 1 1	GSM 850
1 0 0 0	GSM 700

1 1 1 1 Indicates the presence of a list of Additional access technologies

All other values are treated as unknown by the receiver.

**RF Power Capability, GMSK Power Class (3 bit field)**

This field is coded as radio capability in Classmark 3 for the indicated band: it contains the binary coding of the power class used for GMSK associated with the indicated Access Technology Type (see 3GPP TS 45.005). (see 3GPP TS 45.005 [33] paragraph 4.1 output power and paragraph 4.1.1 Mobile Station).

**8PSK Power Capability(2 bit field)**

If 8-PSK modulation is supported for uplink, this field indicates the radio capability for 8-PSK modulation. The following coding is used (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

**8PSK Power Class (2 bit field)**

This field indicates the radio capability for 8-PSK modulation. The following coding is used (see 3GPP TS 05.05):

Bits	2 1	
	0 0	8PSK modulation not supported for uplink
	0 1	Power class E1
	1 0	Power class E2
	1 1	Power class E3

**Additional access technologies struct**

This structure contains the GMSK Power Class and 8PSK Power Class for an additional Access Technology. All other capabilities for this indicated Access Technology are the same as the capabilities indicated by the preceding Access capabilities struct.

**A5/1**

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

**A5/2**

0 encryption algorithm A5/2 not available

1 encryption algorithm A5/2 available

**A5/3**

0 encryption algorithm A5/3 not available

1 encryption algorithm A5/3 available

**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

**ES IND – (Controlled early Classmark Sending)**

0 "controlled early Classmark Sending" option is not implemented

1 "controlled early Classmark Sending" option is implemented

**Table 10.5.146/3GPP TS 24.008 (concluded): Mobile Station Radio Access Capability Information Element**

<p><b>PS</b> – (Pseudo Synchronisation)  0 PS capability not present  1 PS capability present</p> <p><b>VGCS</b> – (Voice Group Call Service)  0 no VGCS capability or no notifications wanted  1 VGCS capability and notifications wanted.</p> <p><b>VBS</b> – (Voice Broadcast Service)  0 no VBS capability or no notifications wanted  1 VBS capability and notifications wanted</p> <p><b>HSCSD Multi Slot Class</b>  The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32]. <u>This field is not used by the network and may be excluded by the MS.</u>  Range 1 to 18, all other values are reserved.</p> <p><b>GPRS Multi Slot Class</b>  The GPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].</p> <p>-- Additions in release 99</p> <p><b>ECSD Multi Slot Class</b>  The presence of this field indicates ECSD capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32]. <u>This field is not used by the network and may be excluded by the MS.</u>  Range 1 to 18, all other values are reserved.</p> <p><b>EGPRS Multi Slot Class</b>  The presence of this field indicates EGPRS capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The EGPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].</p> <p><b>GPRS Extended Dynamic Allocation Capability</b>  0 Extended Dynamic Allocation Capability for GPRS is not implemented  1 Extended Dynamic Allocation Capability for GPRS is implemented</p> <p><b>EGPRS Extended Dynamic Allocation Capability</b>  0 Extended Dynamic Allocation Capability for EGPRS is not implemented  1 Extended Dynamic Allocation Capability for EGPRS is implemented</p> <p><b>SMS_VALUE</b> (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. <u>This field is not used by the network and may be excluded by the MS.</u></p> <p>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)</p> <p><b>(SM_VALUE) Switch-Measure</b> (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. <u>This field is not used by the network and may be excluded by the MS.</u></p> <p>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)</p>
--





**DTM GPRS Multi Slot Class (2 bit field)**

This field indicates the GPRS DTM multislot capabilities of the MS. It is coded as follows:

Bits

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)**

~~MAC Mode Support (1 bit field)~~

This field indicates whether the MS supports Dynamic and Fixed Allocation or only supports Exclusive Allocation

Bits

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 multislot Class field.

**COMPACT Interference Measurement Capability (1 bit field)**

~~COMPACT Interference Measurement Capability~~

~~Bit~~

~~0 COMPACT Interference Measurement Capability is not implemented~~

~~1 COMPACT Interference Measurement Capability is implemented~~

~~0 COMPACT Interference Measurement Capability is not implemented~~

~~1 COMPACT Interference Measurement Capability is implemented~~

**Revision Level Indicator(1 bit field)**

Bit

0 The ME is Release '98 or older

1 The ME is Release '99 onwards

**UMTS FDD Radio Access Technology Capability (1 bit field)**

Bit

0 UMTS FDD not supported

1 UMTS FDD supported

**UMTS 3.84 Mcps TDD Radio Access Technology Capability (1 bit field)**

Bit

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

0 CDMA2000 not supported

1 CDMA2000 supported

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

Bit

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

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 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 multislot class field:

DGMSC Bit 2 1 **Bit 2 1**

0 0 **0 0** Multislot class 2 supported

0 0	0 1	Multislot class 3 supported
0 0	1 0	Multislot class 4 supported
0 0	1 1	Multislot class 8 supported
0 1	0 0	Multislot class 5 supported
0 1	0 1	Multislot class 6 supported
0 1	1 0	Multislot class 7 supported
0 1	1 1	Spare. If received, the network shall interpret it as '01 00'.
1 0	0 0	Multislot class 9 supported
1 0	0 1	Multislot class 10 supported
1 0	1 0	Multislot class 11 supported
1 0	1 1	Multislot class 12 supported

The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink. When this field is not present, the MS supports the multislot class indicated by the *DTM GPRS Multi Slot Class* field.

**Extended EGPRS DTM Multislot Class (2 bit field)**

This field is not considered when the EGPRS DTM Multislot Class field is not included. This field indicates the extended EGPRS DTM multislot capabilities of the MS and shall be interpreted in conjunction with the EGPRS DTM Multislot Class field. This field is coded as the Extended DTM GPRS Multislot Class field. The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink. When this field is not present, the MS supports the multislot class indicated by the *DTM GPRS Multi Slot Class* field.

Budapest, Hungary, 13. – 17. May 2002

CR-Form-v5

**CHANGE REQUEST**⌘ **24.008 CR 639** ⌘ rev **1** ⌘ Current version: **5.3.0** ⌘For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.Proposed change affects: ⌘ (U)SIM  ME/UE  Radio Access Network  Core Network 

<b>Title:</b>	⌘ Alternative coding of radio access capabilities		
<b>Source:</b>	⌘ Siemens AG		
<b>Work item code:</b>	⌘ GPRS	<b>Date:</b>	⌘ 14.05.02
<b>Category:</b>	⌘ <b>A</b>	<b>Release:</b>	⌘ REL-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		<b>2</b> (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		<b>R96</b> (Release 1996)
	<b>B</b> (addition of feature),		<b>R97</b> (Release 1997)
	<b>C</b> (functional modification of feature)		<b>R98</b> (Release 1998)
	<b>D</b> (editorial modification)		<b>R99</b> (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		<b>REL-4</b> (Release 4)
			<b>REL-5</b> (Release 5)

**Reason for change:** ⌘ The MS Radio Access capability IE is included in GMM messages and in RLC/MAC control messages. Due to the introduction of new fields in R99 which are included for each supported band, the overall length of the binary coded IE has significantly increased. If the MS Radio Access Capabilities have to be included in the Packet Resource Request message for RLC/MAC in GPRS mode, there are only **78** bits left for the coding of the MS RA capability value part (for Rel99, Rel-4 and Rel-5). This leads to the problem that maximal two bands could be included.

In order to decrease this length an alternative coding for the indication of the supported bands is proposed.

Furthermore the conditions under which bands must be included in the IE are clarified.

It has been found that there is a number of CS parameters that the CS specific parameters A5bits, HSCSD, ECSD, SMS\_VALUE and SM\_VALUE included in the MS RAC IE are neither used by the BSS nor by the SGSN. In the current specification, it is not obvious that the MS is allowed to exclude those parameters. If these parameters are excluded, it will be possible to report more bands to the network.

**Summary of change:** ⌘ A new list of Additional access technologies struct is introduced. It contains just those capabilities which are different from Access technology to Access Technology. This structure contains always the Access Technology Type, the GMSK Power Capability and the 8PSK Power Capability.

It is proposed to define that the MS is allowed to exclude the CS parameters: A5bits, HSCSD, ECSD, SMS\_VALUE and SM\_VALUE.

**Consequences if not approved:** ⌘ In GPRS the MS will from R99 onwards be able to include in maximum two of its supported bands during the TBF establishment and in consequence the network can't assign certain radio resources even the MS would support these.

**Clauses affected:** ⌘ 10.5.5.12a

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

**Other comments:** ⌘

### 10.5.5.12a MS Radio Access capability

The purpose of the *MS RA capability* information element is to provide the radio part of the network with information concerning radio aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station.

The *MS RA capability* is a type 4 information element, with a maximum length of 52 octets.

The value part of a *MS RA capability* information element is coded as shown in table 10.5.146/3GPP TS 24.008.

- ~~— SEMANTIC RULE: Among the three Access Type Technologies GSM 900-P, GSM 900-E and GSM 900-R only one shall be present.~~
- ~~— The MS shall indicate supported Access Technology Types, e.g. [450, 480, 900, 1800, UMTS] or [700, 850, 1900] MHz bands during a single MM procedure.~~

For the indication of the Access Technology Types the following conditions shall apply:

- Among the three Access Type Technologies GSM 900-P, GSM 900-E and GSM 900-R only one shall be present.
- Due to shared radio frequency channel numbers between GSM 1800 and GSM 1900, the mobile station should provide the relevant radio access capability for either GSM 1800 band OR GSM 1900 band, not both.
- The MS shall indicate its supported Access Technology Types during a single MM procedure.
- If the alternative coding by using the Additional access technologies struct is chosen by the mobile station, the mobile station shall indicate its radio access capability for the serving BCCH frequency band in the first included Access capabilities struct.
- The first Access Technology Type shall not be set to "1111".

For error handling the following shall apply:

- ~~– Error handling: If a received Access Technology Type is unknown to the receiver, it shall ignore all the corresponding fields.~~
- ~~– If within a known Access Technology Type a receiver recognizes an unknown field it shall ignore it.~~
- ~~– See For more details about error handling of MS radio access capability in 3GPP TS 48.018 [86].~~
- ~~— Due to shared radio frequency channel numbers between 1800 and 1900, the mobile should provide the relevant MS Radio Access capability for either 1800 band OR 1900 band, not both.~~

**Table 10.5.146/3GPP TS 24.008: Mobile Station Radio Access Capability Information Element**

```

<MS Radio Access capability IE> ::=
<MS Radio Access capability IEI : 00100100 >
<Length of MS RA capability: <octet>> -- length in octets of MS RA capability value part and spare bits
<MS RA capability value part : <MS RA capability value part struct >>
<spare bits>**; -- may be used for future enhancements

<MS RA capability value part struct > ::= --recursive structure allows any number of Access technologies
{ { < Access Technology Type: bit (4) exclude 1111 >
  < Access capabilities : <Access capabilities struct > } }

| { < Access Technology Type: bit (4) == 1111 > -- structure adding Access technologies with same
capabilities
  < Length : bit (7) > -- length in bits of list of Additional access technologies and spare bits
  { 1 < Additional access technologies: < Additional access technologies struct > } ** 0
  <spare bits>** } }

{ 0 | 1 <MS RA capability value part struct > } ;

< Additional access technologies struct > ::=
  < Access Technology Type : bit (4) >
  < GMSK Power Class : bit (3) >
  < 8PSK Power Class : bit (2) >;

< Access capabilities struct > ::=
  < Length : bit (7) > -- length in bits of Content and spare bits
  <Access capabilities : <Content>>
  <spare bits>** ; -- expands to the indicated length
  -- may be used for future enhancements

< Content > ::=
  < RF Power Capability : bit (3) >
  { 0 | 1 <A5 bits : <A5 bits > > } -- zero means that the same values apply for parameters as in the immediately
preceding Access capabilities field within this IE
  The presence of the A5 bits is mandatory in the 1st Access capabilities struct
within this IE.
  < ES IND : bit >
  < PS : bit >
  < VGCS : bit >
  < VBS : bit >
  { 0 | 1 < Multislot capability : Multislot capability struct > } -- zero means that the same values for multislot
parameters as given in an earlier Access capabilities field within this IE apply also here
-- Additions in release 99
  { 0 | 1 < 8PSK Power Capability : bit(2) > } -- '1' also means 8PSK modulation capability in uplink.
  < COMPACT Interference Measurement Capability : bit >
  < Revision Level Indicator : bit >
  < UMTS FDD Radio Access Technology Capability : bit > ----- 3G RAT
  < UMTS 3.84 Mcps TDD Radio Access Technology Capability : bit > ----- 3G RAT
  < CDMA 2000 Radio Access Technology Capability : bit > ----- 3G RAT
-- Additions in release 4
  < UMTS 1.28 Mcps TDD Radio Access Technology Capability: bit > ----- 3G RAT
-- Additions in release 4
  < GERAN Feature Package 1 : bit >
  { 0 | 1 < Extended DTM GPRS Multi Slot Class : bit(2) >
    < Extended DTM EGPRS Multi Slot Class : bit(2) > };
  -- error: struct too short, assume features do not exist
  -- error: struct too long, ignore data and jump to next Access technology

```

**Table 10.5.146/3GPP TS 24.008 (continued): Mobile Station Radio Access Capability IE**

```

< Multislot capability struct > ::=
  { 0 | 1 < HSCSD multislot class : bit (5) > }
  { 0 | 1 < GPRS multislot class : bit (5) > < GPRS Extended Dynamic Allocation Capability : bit > }
  { 0 | 1 < SMS_VALUE : bit (4) > < SM_VALUE : bit (4) > }
-- Additions in release 99
  { 0 | 1 < ECSD multislot class : bit (5) > }
  { 0 | 1 < EGPRS multislot class : bit (5) > < EGPRS Extended Dynamic Allocation Capability : bit > }
  { 0 | 1 < DTM GPRS Multi Slot Class: bit(2)>
    <MAC Mode Support : bit>
    { 0 | 1 <EGPRS DTM Multi Slot Class : bit(2)> } } ;
-- error: struct too short, assume features do not exist

```

<A5 bits> ::= < A5/1 : bit> <A5/2 : bit> <A5/3 : bit> <A5/4 : bit> <A5/5 : bit> <A5/6 : bit> <A5/7 : bit>; -- bits for circuit mode ciphering algorithms. These fields are not used by the network and may be excluded by the MS.

**Access Technology Type**

This field indicates the access technology type to be associated with the following access capabilities.

Bits

4 3 2 1

- 0 0 0 0 GSM P
- 0 0 0 1 GSM E --note that GSM E covers GSM P
- 0 0 1 0 GSM R --note that GSM R covers GSM E and GSM P
- 0 0 1 1 GSM 1800
- 0 1 0 0 GSM 1900
- 0 1 0 1 GSM 450
- 0 1 1 0 GSM 480
- 0 1 1 1 GSM 850
- 1 0 0 0 GSM 700

1 1 1 1 Indicates the presence of a list of Additional access technologies

All other values are treated as unknown by the receiver.

**RF Power Capability, GMSK Power Class (3 bit field)**

~~This field is coded as radio capability in Classmark 3 for the indicated band: it contains the binary coding of the power class used for GMSK associated with the indicated Access Technology Type (see 3GPP TS 45.005). (see 3GPP TS 45.005 [33] paragraph 4.1 output power and paragraph 4.1.1 Mobile Station).~~

**8PSK Power Capability (2 bit field)**

If 8-PSK modulation is supported for uplink, this field indicates the radio capability for 8-PSK modulation. The following coding is used (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 |

**8PSK Power Class (2 bit field)**

This field indicates the radio capability for 8-PSK modulation. The following coding is used (see 3GPP TS 05.05):

- |      |     |  |
|------|-----|--|
| Bits | 2 1 |  |
|      | 0 0 | 8PSK modulation not supported for uplink |
|      | 0 1 | Power class E1                           |
|      | 1 0 | Power class E2                           |
|      | 1 1 | Power class E3                           |

**Additional access technologies struct**

This structure contains the GMSK Power Class and 8PSK Power Class for an additional Access Technology. All other capabilities for this indicated Access Technology are the same as the capabilities indicated by the preceding Access capabilities struct.

**A5/1**

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

**A5/2**

- 0 encryption algorithm A5/2 not available



1 encryption algorithm A5/2 available

**A5/3**

0 encryption algorithm A5/3 not available

1 encryption algorithm A5/3 available

**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

**ES IND – (Controlled early Classmark Sending)**

0 "controlled early Classmark Sending" option is not implemented

1 "controlled early Classmark Sending" option is implemented

**Table 10.5.146/3GPP TS 24.008 (concluded): Mobile Station Radio Access Capability Information Element**

<p><b>PS</b> – (Pseudo Synchronisation)  0 PS capability not present  1 PS capability present</p> <p><b>VGCS</b> – (Voice Group Call Service)  0 no VGCS capability or no notifications wanted  1 VGCS capability and notifications wanted.</p> <p><b>VBS</b> – (Voice Broadcast Service)  0 no VBS capability or no notifications wanted  1 VBS capability and notifications wanted</p> <p><b>HSCSD Multi Slot Class</b>  The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32]. <u>This field is not used by the network and may be excluded by the MS.</u>  Range 1 to 18, all other values are reserved.</p> <p><b>GPRS Multi Slot Class</b>  The GPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].</p> <p>-- Additions in release 99</p> <p><b>ECSD Multi Slot Class</b>  The presence of this field indicates ECSD capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32]. <u>This field is not used by the network and may be excluded by the MS.</u>  Range 1 to 18, all other values are reserved.</p> <p><b>EGPRS Multi Slot Class</b>  The presence of this field indicates EGPRS capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The EGPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].</p> <p><b>GPRS Extended Dynamic Allocation Capability</b>  0 Extended Dynamic Allocation Capability for GPRS is not implemented  1 Extended Dynamic Allocation Capability for GPRS is implemented</p> <p><b>EGPRS Extended Dynamic Allocation Capability</b>  0 Extended Dynamic Allocation Capability for EGPRS is not implemented  1 Extended Dynamic Allocation Capability for EGPRS is implemented</p> <p><b>SMS_VALUE</b> (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 neighbor cell power measurement, and the switch from that radio channel to another radio channel. <u>This field is not used by the network and may be excluded by the MS.</u></p> <p>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)</p> <p><b>(SM_VALUE) Switch-Measure</b> (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. <u>This field is not used by the network and may be excluded by the MS.</u></p> <p>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)</p>
---



**DTM GPRS Multi Slot Class (2 bit field)**

This field indicates the GPRS DTM multislot capabilities of the MS. It is coded as follows:

Bits

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

Bits

4

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 multislot Class field.

**COMPACT Interference Measurement Capability (1 bit field)**

~~COMPACT Interference Measurement Capability~~

~~0 COMPACT Interference Measurement Capability is not implemented~~

~~1 COMPACT Interference Measurement Capability is implemented~~

~~0 COMPACT Interference Measurement Capability is not implemented~~

~~1 COMPACT Interference Measurement Capability is implemented~~

**Revision Level Indicator (1 bit field)**

Bit

0 The ME is Release '98 or older

1 The ME is Release '99 onwards

**UMTS FDD Radio Access Technology Capability (1 bit field)**

Bit

0 UMTS FDD not supported

1 UMTS FDD supported

**UMTS 3.84 Mcps TDD Radio Access Technology Capability (1 bit field)**

Bit

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

0 CDMA2000 not supported

1 CDMA2000 supported

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

Bit

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:

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 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 multislot class field:

DGMSC Bit 2 1 **Bit 2 1**

0 0 **0 0** Multislot class 2 supported

0 0 **0 1** Multislot class 3 supported

0 0 **1 0** Multislot class 4 supported

0 0 **1 1** Multislot class 8 supported

0 1	<b>0 0</b>	Multislot class 5 supported
0 1	<b>0 1</b>	Multislot class 6 supported
0 1	<b>1 0</b>	Multislot class 7 supported
0 1	<b>1 1</b>	Spare. If received, the network shall interpret it as '01 <b>00</b> '.
1 0	<b>0 0</b>	Multislot class 9 supported
1 0	<b>0 1</b>	Multislot class 10 supported
1 0	<b>1 0</b>	Multislot class 11 supported
1 0	<b>1 1</b>	Multislot class 12 supported

The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink. When this field is not present, the MS supports the multislot class indicated by the *DTM GPRS Multi Slot Class* field.

**Extended EGPRS DTM Multislot Class** (2 bit field)

This field is not considered when the EGPRS DTM Multislot Class field is not included. This field indicates the extended EGPRS DTM multislot capabilities of the MS and shall be interpreted in conjunction with the EGPRS DTM Multislot Class field. This field is coded as the Extended DTM GPRS Multislot Class field. The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink. When this field is not present, the MS supports the multislot class indicated by the *DTM GPRS Multi Slot Class* field.