

**Title:** Liaison statement on Mobile Country Code and 3 digit Mobile Network Code  
**Source:** 3GPP TSG CN  
**To:** SPAN11 WP NAR, GSM Association, 3GPP PCG  
**Cc:** 3GPP TSG SA WG1  
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3GPP TSGN thanks SPAN11 WP NAR for the liaison statement in document SPAN11(01)TD048 / NP-010242 asking about consequences of potential introduction of new MCC codes or 3-digit MNC codes outside the USA.

These technically different alternatives were studied with the following outcome.

**3-digit MNC code:**

3GPP TSG CN WG1 reviewed the proposal relating to the introduction of 3 digit MNCs and provided the following observations which are supported by 3GPP TSGN:

- 3 digit MNC were first defined in R98. All implementations that are based on releases older than that do not support 3 digit MNC.
- The mixture of 2 and 3 digit MNCs in the same MCC has been explicitly defined only for the MCC codes 310-316 which have been assigned for the USA.

In general the system implications of having mixed 2-digit and 3-digit MNCs under the same MCC are significant:

1. Mobiles implemented to specifications earlier than R98, which check the validity of any received MNC, will fail these checks if 3 digit MNCs are introduced.
2. Existing Mobile stations and SIM cards would have to be either upgraded or replaced.
3. Existing mobile implementations could potentially have problems with the displaying of 2 and 3 digit MNCs
4. While the cost of incorporating these changes in new equipment is not significant, the cost of upgrading ALL legacy equipment (which is necessary to support roaming) will be significant.
5. The introduction of 3 digit MNC will cause roaming, billing, and service outages if existing equipment (mobile and network) is not upgraded.
6. Any update to existing networks will require the change to be implemented country wide, in all PLMNs, to avoid inconsistent mobile behaviour within the networks.
7. Even though the software changes required are themselves not significant, it is possible that all currently deployed GSM/GPRS equipment will have to be upgraded. This will be a daunting task.

**Introduction of new MCC code:**

**1. Using a new MCC in a country where none was used before**

This can happen when a new political country is formed but it applies to all cases where a new MCC is allocated to a country which for one or another reason did not use an MCC code before. For a mobile which is registered in a PLMN under any other MCC the new PLMNs under the new MCC will be considered to be abroad. In this scenario this will be true. So allocating an MCC to the new country causes no problems in UMTS system.

**2. Using a new MCC in a country where at least one MCC is already in use**

The use of additional MCC code(s) to a country which already has got at least one MCC will effect the operation of mobiles which have been manufactured before the addition. The following points were identified:

- **National roaming:** Periodic HPLMN search is mandatory when roaming in home country. As the old mobiles will not know that the new MCC is in the same country as the old MCC(s) of that country, they will not perform HPLMN search when it would be needed as the new MCC will be assumed to be abroad, which in this case will not be true. Periodic HPLMN search is defined already in GSM Phase 2+ Release 96 (GSM 03.22 v. 4.b.0 / 4.4.3.3) The consequence of this is that these old mobiles will not return to the HPLMN until they lose coverage from the network with the new MCC code.

- **Background scan of higher priority PLMNs:** When mobiles are roaming they perform the mandatory background scan of higher priority PLMNs in the same country. Any Mobile Network Code (MNC) will be ignored by the old mobiles if it is associated with the new MCC as it will be assumed to be in a different country. Background scan is defined for the first time in R99 specification (TS 03.22 v.3.6.0 / 4.4.3.3)  
The consequence of this is the old mobiles will not move to the higher priority PLMN until they lose coverage from the network with the new MCC code.

TSGN is aware that there are several countries to which multiple MCC codes have been allocated. But the only specified case on support of multiple MCC in one specific area corresponds to North America. This case has been explicitly covered by specific exception handling for Country Codes in range of 310 to 316 which has been defined in GSM 03.22 from R'98 onwards.

Deletion of an existing MCC was also discussed briefly and that has got no side effect on the system behaviour.

To keep behaviour of all terminals homogenous (legacy ones and new ones supporting a potential evolution of MCC meaning) before and after a PLMN starts using new MCC in area where one MCC was already in use, it will be necessary to update all legacy terminals.