**3GPP TSG-CT WG1 Meeting #142C1-233567**

**Bratislava, 22-26 May 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **23.122** | **CR** |  **1109** | **rev** | **-** | **Current version:** | **18.2.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps | **X** | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:***  | Clarification for SENSE applicability considering RAT type of the EFOCST in the USIM |
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| ***Source to WG:*** | LG Electronics |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | SENSE |  | ***Date:*** | 2023-05-15 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | According to the current specification, following is considered that UE is applicable for SENSE feature.An MS supporting any, or a combination, of NB-IoT, GERAN EC-GSM-IoT and Category M1 or M2 of E-UTRA shall apply signal level enhanced network selection if the following conditions are fulfilled:1) The MS is in automatic PLMN selection mode;2) The MS supports the "Operator controlled signal threshold per access technology" as specified in 3GPP TS 22.011 [19];3) The MS is configured for using signal level enhanced network selection as specified in 3GPP TS 24.368 [50]; and4) The "Operator controlled signal threshold per access technology" is configured in the USIM.NOTE 1: The usage of the "Operator controlled signal threshold per access technology" is intended only for IoT stationary devices (see 3GPP TS 22.011 [19]).NOTE 2: "Operator controlled signal threshold per access technology" is not expected to be supported by non-IoT devices.In the applicability of SENSE feature, it is checked whether the “Operator controlled signal threshold per access technology” is configured in the USIM. However, this is unclear. Because, “Operator controlled signal threshold per access technology” configured in the USIM is configured as EFOCST. EFOCST consists of the “SENSE enabled by operator” which indicates SENSE applicable and the lists of threshold value and the Access Technology which is coded as EFPLMNwACT. Even though “SENSE enabled by operator” is set to 1, the UE has to check whether for a UE supporting a specific IoT RAT, at least one of all access technologies in the access technology list of EFOCST must be a corresponding IoT-related RAT. Let’s assume following cases.1. MS supporting only GERAN EC-GSM-IoT, not supporting NB-IoT and Category M1 or M2 of E-UTRA

EFOCST{ SENSE enabled by operator : 1,Number of list : 1Access Technology : 00000000 (1st octec), 10000100(2st octet) : GSM without EC-GSM-IoT }For case 1, eventhough it is configured to SENSE enabled by operator, the configuarion is invalid, it has to be considered as if UE is not applicable for SENSE feature.Because, **Extended Coverage in GSM for Internet of Things (EC-GSM-IoT):** Extended coverage in GSM for IoT is a feature which enables extended coverage operation. See 3GPP TS 43.064 [55]. NW also has to support EC-GSM-IoT.1. MS supporting only NB-IoT, not supporting GERAN EC-GSM-IoT and Category M1 or M2 of E-UTRA

EFOCST{ SENSE enabled by operator : 1,Number of list : 1Access Technology : 01100000 (1st octec), 00000000(2st octet) : E-UTRAN in WB-S1 mode only }For case 2, eventhough it is configured to SENSE enabled by operator, the configuration is invalid, it has to be considered as if UE is not applicable for SENSE feature.**In NB-N1 mode:** Indicates this paragraph applies only to a system which operates in NB-N1 mode. For a multi-access system this case applies if the current serving radio access network provides access to 5G network services via E-UTRA connected to 5GCN by NB-IoT (see 3GPP TS 36.300 [56], 3GPP TS 36.331 [42], 3GPP TS 36.306 [54]).**In WB-N1 mode**: Indicates this paragraph applies only to a system which operates in WB-N1 mode. For a multi-access system this case applies if the system operates in N1 mode with E-UTRA connected to 5GCN, but not in NB-N1 mode.So, we propose that the UE has to check whether for a UE supporting a specific IoT RAT, at least one of all access technologies in the access technology list of EFOCST must be a corresponding IoT-related RAT.Also, current specification mentioned how to configure with an "Operator controlled signal threshold per access technology" stored in the USIM (see 3GPP TS 31.102 [40]) for the UE. Current specification mentioned only one or more list of threshold value and access technology. It is not mentioned “SENSE enable by operator”. So, we would like to add “SENSE enable by operator” in the "Operator controlled signal threshold per access technology" stored in the USIM. |
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| ***Summary of change:*** | When the UE checks applicable for SENSE feature with “Operator Controlled signal threshold per access technology in the USIM, the UE check whether for a UE supporting a specific IoT RAT, at least one of all access technologies in the access technology list of EFOCST must be a corresponding IoT-related RAT. It is added “SENSE enable by operator” in the "Operator controlled signal threshold per access technology" stored in the USIM. |
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| ***Consequences if not approved:*** | If all of access technologies in the access technology list of EFOCST are set to not related to IoT RAT, it is unclear whether to apply SENSE feaure. |
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| ***Clauses affected:*** | 3.11 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* First change \*\*\*

## 3.11 Signal level enhanced network selection

Signal level enhanced network selection applies only to NB-IoT, GERAN EC-GSM-IoT and Category M1 or M2 of E-UTRA. An MS supporting any, or a combination, of NB-IoT, GERAN EC-GSM-IoT and Category M1 or M2 of E-UTRA shall apply signal level enhanced network selection if the following conditions are fulfilled:

1) The MS is in automatic PLMN selection mode;

2) The MS supports the "Operator controlled signal threshold per access technology" as specified in 3GPP TS 22.011 [19];

3) The MS is configured for using signal level enhanced network selection as specified in 3GPP TS 24.368 [50]; and

4) In the USIM:

- the "Operator controlled signal threshold per access technology" is configured in the USIM;

- "SENSE enable by operator" is configured to indicate Operator has configured UE to use SENSE; and

- Operator controlled signal threshold per access technology is configured for one or more access technologies which signal level enhanced network selection apply to.

NOTE 1: The usage of the "Operator controlled signal threshold per access technology" is intended only for IoT stationary devices (see 3GPP TS 22.011 [19]).

NOTE 2: "Operator controlled signal threshold per access technology" is not expected to be supported by non-IoT devices.

The MS can be configured with an "Operator controlled signal threshold per access technology" stored in the USIM (see 3GPP TS 31.102 [40]) consisting of a "SENSE enabled by operator" indication and one or more entries, each containing:

a) a home operator controlled signal threshold; and

b) an access technology.

The "Operator controlled signal threshold per access technology" is specific for a certain access technology and when applicable, applies to all allowable PLMNs with the corresponding access technology combination.

Editor's note (WI SENSE, CR 0952): It is FFS whether HPLMN can use CP-SOR procedure to update the signal level enhanced network selection in the USIM.

\*\*\* End of change \*\*\*