

OnGo Alliance Identifier Administration Guidelines for Shared HNI



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1 Introduction and Scope

This document describes how unique LTE and 5G NR network and device identifiers necessary to properly manage OnGo systems deployed by using Shared HNI(s) can be obtained. The document describes these identifiers, and provides the administrative guidelines necessary to obtain them from the OnGo Alliance:

- CBRS-NID Network ID
- 5GC-NID 5G NR Network ID with Assignment Mode (AM) 2.
- OnGo MMEGI MME Group ID portion of GUMMEI
- OnGo eNB ID portion of ECGI
- OnGo Managed TAC The TAC portion of TAI

2 Document Conventions

- #d. A number followed by the letter 'd' indicates a number of decimal digits.
- #b. A number followed by the letter 'b' indicates a number of bits.
- #h. A number followed by the letter 'h' indicates a number of hexadecimal digits ('0'-'9', 'A'-'F').

3 References

- [1] OnGo Alliance. Identifier Guidelines for Shared HNI Technical Report. OnGo-TR-0100.
- [2] OnGo Alliance. Network Services Stage 2 and 3 Specifications. OnGo-TS-1002.
- [3] iconectiv. CBRS Forms. http://imsiadmin.com/forms
- ITU-T. The international identification plan for public networks and subscriptions, Appendix III: Shared ITU-T E.212 mobile country code (MCC) 999 for internal use within a private network. 2018 Jul. https://www.itu.int/rec/T-REC-E.212-201807-I!Amd1/en
- [5] 3GPP TS 23.501. System Architecture for the 5G System (5GS); Stage 2.
- [6] 3GPP TS 23.003. Numbering, addressing and identification.

4 Definition and Abbreviations

Term	Definition
5GC-NID ¹	The Network ID (NID) for 5G NR systems as defined in 3GPP TS 23.501.
AMF	Access and Mobility Function.

¹ The term 'NID' was used by CBRS Alliance to describe its usage of the LTE CSG-ID and now is used by 3GPP to define the Network ID for 5G NR systems. To avoid confusion CBRS Alliance documents will refer to CBRS-NID, and 5GC-NID to refer to the new NID for 5G NR systems.



Assignee	An entity that has applied for or has received one or more OnGo identifiers from the OnGo Identifier Administrator.		
CBRS	3.5 GHz Band Citizens Broadband Radio Service.		
CBRSA	CBRS Alliance. Former name of the OnGo Alliance.		
CBRS-NID	CBRS Network ID. 27-bit number.		
ECGI	EUTRAN Cell Global Identifier. Intended to globally and uniquely identify an eNodeB/Cell. Composed of SHNI + eNB ID + Code		
eNB ID	Portion of ECGI that identifies a group of cells and is assigned by the OnGo Alliance. Also called the Macro eNB ID.		
GUAMI	Global Unique AMF ID.		
GUMMEI	Globally Unique MME Identifier. Composed of SHNI+MMEGI+MMEC		
IBN	IMSI Block Number. 4 BCD Digits.		
IMSI	International Mobile Subscription Identity. Composed of MCC + MNC + MSIN		
LTE	Long Term Evolution. The 3GPP 4G wireless interface.		
МСС	Mobile Country Code.		
MME	Mobility Management Entity.		
MMEC	MME Code.		
MMEGI	MME Group ID.		
MNC	Mobile Network Code.		
MSIN	Mobile Subscriber Identity. In the case of a Shared HNI, composed of IBN + UIN		
NR	New Radio. The 3GPP 5G wireless interface.		
OnGo Identifier Administrator	The organization/individual appointed by the OnGo Alliance to manage identifiers under their control		
OnGoA	OnGo Alliance. Formerly the CBRSA.		
OnGo Operator ("operator")	An operator of a system within the US 3.5GHz CBRS band that uses OnGo Alliance Specifications and LTE or 5G NR to provide service.		
SHNI	Shared HNI, composed of MCC and MNC. Assigned to the CBRS industry by the US IMSI Administrator.		
TAC	Tracking Area Code		
TAI	Tracking Area ID		
UIN	User Identity Number. 5 BCD Digits. Allows one OnGo operator to assign 100,000 globally unique IMSI to their subscribers.		
USIM	Universal Subscription Identity Module. A 'smart card' for 4G services.		



US IMSI Administrator ("IMSI Admin") The organization appointed by ATIS IOC to assign and manage IMSI codes within the USA. See: http://imsiadmin.com

5 OnGo Identifiers

This section describes the LTE and 5G NR identifiers that are important for OnGo systems, and which part of the identifiers are managed by the US IMSI Administrator, by the OnGo Alliance, or by the OnGo Operator.

Idoptifior	Assigned by				Quantity
Identifier	IMSI Admin	OnGoA	OnGo Operator	Identifies	Qualitity
IMSI	MCC+MNC (SHNI) + IBN		UIN	Subscription	10,000 IBN x 100,000 UIN per SHNI
CBRS-NID (LTE & NR ²)		CBRS-NID (Conditional ³)		Network	2 ²⁷ per SHNI ⁴
GUMMEI (LTE Only)	SHNI	MMEGI	MMEC	MME	2 ¹⁶ MMEGI x 2 ⁸ MMEC per SHNI
ECGI (LTE Only)	SHNI	eNB ID	Cell Identity	Cell or sector (eNodeB)	2 ²⁰ eNB ID x 2 ⁸ Cell Identity per SHNI
TAI/TAC (LTE Only)	SHNI	Optional (see §5.7.2)	IBN-derived TAC (see §5.7.1)	Tracking area	65,534 per region of overlap

 Table 1:
 OnGo Identifiers Summary

Portions of identifiers that need to be managed are described in the following sections:

5.1 Shared HNI (SHNI)

An SHNI is composed of a 3-digit MCC (Mobile Country Code) and 3-digit MNC (Mobile Network Code). Value **315-010** has been assigned by the US IMSI Administrator for shared use for all CBRS spectrum users implementing networks that require IMSI (e.g., LTE or 5G-NR). It is also known as the Shared HNI. SHNI is the prefix for IMSI, GUMMEI, ECGI and TAI. When using the CBRS SHNI, the use of managed identifiers is needed to ensure that the GUMMEI, ECGI, and TAI are globally unique.

5.2 IMSI Block Number (IBN)

The IMSI Block Number is assigned within an SHNI by the US IMSI Administrator to a CBRS operator. This leaves 5 digits, known as the UIN (User Identification Number) to be assigned by the CBRS operator to generate IMSI codes to uniquely identify subscriptions (e.g., programmed into a USIM). The resulting 15-digit IMSI format is SHNI (6d) + IBN (4d) + UIN (5d).

² 5G NR Standalone Non-Public Networks may use the CBRS-NID for the value of the 5GC-NID in Assignment Mode 2.

³ CBRS-NID is mandatory in the support of CBRS NHN architecture as defined per [2], but optional for all other deployments including private enterprise deployments and NHN as per 3GPP MOCN

⁴ It may not be possible to re-use the same CBRS-NID in multiple SHNI, in which case this would be a global quantity.



The IBN may also be used to produce six globally unique Tracking Area Codes (TAC, see below). It is recommended that operators obtain an IBN for this purpose, even if they do not intend to assign IMSIs.

IBN codes are obtained from the US IMSI Administrator. [2]

5.3 CBRS-NID – CBRS Network ID

The Network ID is a 27-bit number assigned to a single OnGo network by the OnGo Alliance. The Network ID allows a mobile receiving an SHNI broadcast as a system identity, to identify the network uniquely. An OnGo network using the Neutral Host Network (NHN) architecture defined by the OnGo Alliance in [2], must obtain and use a CBRS-NID to identify the NHN.

5.4 [5G] 5GC-NID – 3GPP 5G NR NID

For 5G NR, 3GPP has introduced a new identifier, the 44-bit NID ('5GC-NID'), which has a similar function to the 27-bit CBRS-NID, but is larger. There are three types based on the first 4 bits, known as the Assignment Mode (AM):

- AM=0. This 5GC-NID format is globally unique based on its inclusion of an 8-hex-digit (32 bit) IANA Private Enterprise Number, and does not require a PLMN-ID to make it unique. There are 8 more bits that would allow the identification of up to 256 networks for each IANA Private Enterprise Number.
- AM=1. The format, apart from the first 4 bits, is chosen by the operator, and thus is not globally unique. Use by OnGo systems is not recommended.
- AM=2. This format can incorporate an assigned CBRS-NID. When combined with an individually assigned or shared PLMN-ID (e.g., the CBRS Shared HNI 315-010) global uniqueness is assured. The reserved bits can be used to expand the identifier in the future, or to support other types of 5GC-NID. The embedded CBRS-NID will be allocated from the same pool of numbers as in §5.3. The format is:

Portion	AM	Reserved	Identifier
Content	'0010' (2)	'0000 0000 0000 0'	CBRS-NID
Size In Bits	4	13	27

Table 2:	5GC-NID Assignment Mode 2 CBRS-NID Format

5.5 [LTE] MMEGI – MME Group ID (part of GUMMEI)

The MME Group ID identifies a group of MMEs (Mobile Management Entities) within an SHNI. This will be assigned by the OnGo Alliance and will leave 8 bits (MMEC) to be assigned by the operator. The full GUMMEI format is SHNI (6d/24b) + MMEGI (4h/16b) + MMEC (2h/8b).

5.6 [LTE] eNB ID (part of ECGI)

The eNB ID within the ECGI identifies a group of cells within an SHNI. This will be assigned by the OnGo Alliance and will leave 8 bits to be assigned by the operator to identify individual cells. The full ECGI format is SHNI (6d/24b) + eNB ID (5h/20b) + Cell Identity (2h/8b).



5.7 [LTE] TAC – Tracking Area Code (part of TAI)

The Tracking Area Identity (TAI) is used to coordinate between neighboring OnGo LTE systems. When using a Shared HNI, operators need to coordinate the TAI. The TAI is composed of the HNI plus a 16-bit TAC (Tracking Area Code). Coordination of TACs within the Shared HNI is essential for the UE rejection mechanisms as per OnGo Alliance specification [2] §5.5.3.1 to work properly.

5.7.1 IBN-Derived TACs

The Tracking Area Code is assigned by the operator, not by the OnGo Alliance, and should be locally unique (i.e., not used by any other nearby network broadcasting an SHNI). The full TAI format is SHNI (6d/24b) + TAC (4h/16b). The OnGo Alliance does recommend the following method to define 6 TAC codes that will produce TAI codes that will not conflict with any other OnGo network using the same method:

- 1. The first TAC is the 16-bit binary code for the numeric value of the network's assigned IBN.
- 2. This code plus 10,000.
- 3. This code plus 20,000.
- 4. This code plus 30,000.
- 5. This code plus 40,000.
- 6. This code plus 50,000.

For example, for the IBN code 1234, the six TAC values will be 01234, 11234, 21234, 31234, 41234 and 51234.

The highest possible code is 59999 with the above scheme, smaller than the highest 16-bit value of 65535. The TACs above this 59999 ceiling are managed by the OnGo Alliance.

5.7.2 Managed TACs (Optional)

For some deployments, the 6 TACs associated with an IBN will not be sufficient. For example, a network may have multiple isolated "islands" of coverage, which each need their own TAI/TAC. If they do not have a large number of subscribers, acquiring additional IBNs would consume the available domain of IBNs unnecessarily.

To address this circumstance, the pool of TACs between 60,000 and 65,535, which is otherwise unused by the above system of deriving TACs from the IBN, is managed by the OnGo Alliance. OnGo Network Operators may request Managed TACs from this pool when they need or desire additional TACs.

TACs only need to be locally unique. Therefore, re-use of Managed TACs is possible. If the pool of Managed TACs is determined to be depleting too quickly (e.g., faster than the available pool of IBNs is being depleted), the OnGo Identifier Administrator may begin tracking the geographic state or states where the Managed TAC are being used. Managed TACs can then be re-used for networks that will be deployed in geographically distant states. If further re-use is needed, the OnGo Identifier Administrator may begin tracking those TACs for networks that will be deployed in geographically distant counties. All location information will be treated confidentially.

5.8 [5G] ITU-T MCC 999

The use of the ITU-T Mobile Country Code MCC=999 has been considered by some operators, however ITU-T has defined this code (E.212) "for internal use within a private network...Mobile network codes (MNCs) under





this MCC are not subject to assignment and may not be globally unique." This means that the use of AM=2 would not create global uniqueness when a PLMN-ID based on MCC=999 and a NID are used together. The use of MCC=999 is only recommended with AM=0.

5.9 [5G] Other 5G-NR Identifiers

There is no need for the OnGo Alliance to coordinate other 5G-NR identifiers because 5G NR will broadcast the 5GC-NID to provide a unique network identifier (PLMN-ID plus 5GC-NID). These include:

- AMF-ID (GUAMI).
- NR Cell Global Identity (NR CGI).
- 5G Tracking Area Identity (TAI) and Tracking Area Code (TAC).

6 Assignee Rights and Responsibilities

These requirements apply to Assignees of CBRS-NID, MMEGI, eNB ID, and Managed TAC codes. The Assignee shall:

- 6.1: Certify that they are authorized to operate a network transmitting in the CBRS frequency band within the United States.
- 6.2: Certify that are, or soon will be, using 3GPP LTE or 5G NR protocols using 3GPP or OnGoA specifications.
- 6.3: Establish an online "OnGo Account" and maintain contact information for at least 3 staff members.
- 6.4: Pay any fees associated with identifier assignment and annual maintenance.
- 6.5: Promptly report any changes associated with identifier assignments, including company address, contact personnel, contact information, and company name.
- 6.6: Use only assigned values for the identifiers.
- 6.7: Return any unused codes.
- 6.8: Accept that assignment of a code does not imply ownership of the numbering resource.

7 OnGo Alliance Rights and Responsibilities

- 7.1: Appoint a OnGo Identifier Administrator.
- 7.2: Maintain the OnGo Identifier Guidelines for Shared HNI and post them on the OnGo Alliance website.
- 7.3: Provide 60 days' notice before any change of guidelines, except in case of an emergency.
- 7.4: Respond to any appeals of OnGo Identifier Administrator decisions.



8 OnGo Identifier Administrator Rights and Responsibilities

- 8.1: Provide a web-accessible interface to establish an account, request identifier assignments, maintain contact information, and view current identifier assignments.
- 8.2: Provide online customer service (e.g., email, web form or phone) for any actions that cannot be completed through the web interface (such as merging or splitting companies or returning codes).
- 8.3: Provide reasons for denial of any assignment request.
- 8.4: Provide minimal subsets of assignment data in a machine-readable form to various industry segments (e.g., test equipment manufacturers, E911 providers, SAS operators).
- 8.5: Provide information to law enforcement upon presentation of a valid warrant.
- 8.6: Maintain confidentiality of assigned identifiers: only providing aggregate information to the OnGoA, and only communicating or publishing information about the identifiers associated with a given company with their permission.
- 8.7: Aid in resolving identifier collisions and related problems in the field by facilitating communications with other relevant assignees, consistent with maintaining confidentiality as noted above.

9 Identifier Guidelines

9.1 SHNI/Shared HNI

- 9.1.1: The first SHNI has been assigned by the US IMSI Administrator: 315-010.
- 9.1.2: Additional SHNI codes may be assigned in the future.
- 9.1.3: SHNI is not assigned by the OnGo Alliance.

9.2 IBN – IMSI Block Number

- 9.2.1: The IBN is assigned by the US IMSI administrator, not by the OnGo Alliance.
- 9.2.2: An operator may report their IBN(s) to the OnGo Alliance, plus associated routing information, which will be useful in the provision of roaming services.
- 9.2.3: The operator is responsible for the accuracy of IBN information stored by the OnGo Alliance.

9.3 CBRS-NID – Network ID

- 9.3.1: Within an SHNI a CBRS-NID code will be uniquely assigned to a single OnGo account.
- 9.3.2: An operator can decide whether to use one CBRS-NID for each OnGo network site, or to use one CBRS-NID across multiple sites. Note that if ownership of a site (e.g., campus, mall, office building) can be transferred independently from other sites, it is beneficial to use a separate CBRS-NID.
- 9.3.3: The operator is responsible for any applicable fees, for each CBRS-NID and other identifiers assigned.



9.3.4: The CBRS-NID may be used as the entire identifier for LTE 4G systems or as the rightmost 27 bits of a 5GC-NID with AM=2 by operators that maintain both 4G and 5G networks.

9.4 MMEGI – MME Group ID

- 9.4.1: When a new OnGoA account is established, a single MMEGI may be assigned, that can identify up to 256 MMEs.
- 9.4.2: An OnGoA account can request additional MMEGIs.
- 9.4.3: Multiple OnGo networks connected to the same OnGoA Account can share a single MMEGI.
- 9.4.4: Multiple OnGo networks connected to the same OnGoA Account can share a single GUMMEI if they share a single MME.
- 9.4.5: The MCC+MNC portion of the GUMMEI must correspond with the SHNI broadcast by the network.
- 9.4.6: An account must have at least one CBRS-NID to receive an MMEGI.

9.5 ECGI eNB ID

- 9.5.1: An OnGoA Account should not request assignment of eNB IDs beyond what they anticipate utilizing in the next year.
- 9.5.2: An OnGoA account can request additional eNB IDs at any time.
- 9.5.3: The MCC+MNC portion of the ECGI must correspond with the SHNI broadcast by the network.
- 9.5.3: An account must have at least one CBRS-NID to receive an eNB ID.

9.6 Managed TACs

- 9.6.1: When a new OnGoA account is established, one or more Managed TACs from the managed pool may be assigned.
- 9.6.2: An OnGoA account can request additional Managed TACs.
- 9.6.3: The Managed TACs may be re-used by the operator in multiple locations the operator is responsible for ensuring that such re-use does not cause collision issues within their network.
- 9.6.4: When requesting managed TACs, the states and/or counties that the TACs will be used in will be provided by the operator.
- 9.6.5: The operator will notify the OnGo Identifier Administrator of changes when the states and/or counties where the TACs are in use are modified.
- 9.6.6: The MCC+MNC portion of the TAI must correspond with the SHNI broadcast by the network.
- 9.6.7: An account must have at least one CBRS-NID to receive a Managed TAC.

10 Auditing

10.1: The OnGo Identifier Administrator will normally allow self-certification of information provided to it from OnGo account holders.



- 10.2: The OnGo Identifier Administrator can request documentation, particularly when a request for assignments is particularly large, requests occur unusually frequently, or if some information about the request cannot be validated.
- 10.3: The OnGo Identifier Administrator can withhold processing identifier assignments until audit requests are satisfactorily answered.

11 Fees for Identifiers

Contact the OnGo Identifier Administrator.

12 Contact Information for OnGo Identifier Administrator

Email: shni@ongoalliance.org Web: https://ongoalliance.org



Appendices

Appendix A: Change History

Table 3: Change History

Version	Date	Description
v1.0	2019-01-21	Initial approved version.
v1.2.0	2021-07-29	Updated to add managed TAC pool. Added confidentiality clauses.