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Title	**Idle Mode Harmonization – Harmonization Ad-Hoc Consensus Contribution**
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Re:	Response to Harmonization Ad-Hoc Call for Contributions on IEEE 80.16e/D4; Response to Recirculation Ballot #14c	
Abstract	Idle Mode Harmonization – Harmonization Ad-Hoc Consensus Contribution	
Purpose	Addition of mechanics and re-write of Idle Mode function and features to enable optimized Idle Mode operation.	
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Idle Mode Harmonization

Problem:

The current Idle Mode doesn't provide optimized seamless operation of service management, location management, and network re-entry. Also, locus for control for Idle Mode operation and management are inadequately defined. The current Idle Mode requires re-entry handshaking processing similar to the normal network entry procedures when an MSS in Idle Mode comes back to Normal Mode. We introduce Idle Mode Retain Information flags which are similar, and work in concert with HO Optimization Flags. By using Idle Mode Retain Information similar to HO Process Optimization, the network re-entry handshaking process can be reduced and significant and valuable network re-entry processing latency time savings can be achieved. And we achieve the benefit using similar concept and method, in fact re-using some of the same mechanism, to the recent HO Process optimization Consensus product from the HO Ad-Hoc. For location update, MSS can use Idle Mode Retain Information and HO Process Optimization flags to update its invalid management profiles as well as its location information. Security context differentiated optimized Idle Mode Location Update Processes are provided. A complete, optimized Idle Mode Network Re-entry mechanism is provided.

Editing Notes:

[Phil Barber; 2004-8-9] Fixed some language and section naming problems identified on 2004/8/9 conference call.

[Phil Barber; 2004-8-9] Fixed a problem that BS Idle Mode System Timer not properly referenced in new 6.3.21.1 text.

[Phil Barber; 2004-8-9] Per Ronny Kim, Revised Bit#3 of Idle Mode Retain Information TLV for 6.3.2.3.42 DREG-REQ to specify Network Address not Network Address Acquisition

[Phil Barber; 2004-8-9] Per Ronny Kim, Revised language for *6.3.21.1 MSS Idle Mode Initiation* and *6.3.2.3.26 DREG-CMD* to permit BS to trigger MSS Idle Mode request by including REQ-duration TLV along with an Action Code = 0x05.

[Phil Barber; 2004-8-12] Per Pyung-Su Park, Changed name use of HO Process Optimization TLV to Idle Mode Retain Information in proposed language and table changes for *6.3.2.3.26 De/Re-register Command (DREG-CMD) message* and *11.14 DREG-CMD message encodings* to be same usage as *6.3.2.3.42 De/Re-register Request (DREG-REQ) message* and *11.15 DREG-REQ message encodings*. Fixed some of the descriptive language for Idle Mode Retain Information, all instances, to more appropriately identify activity and use.

[Phil Barber; 2004-8-12] Per Pyung-Su Park, In the proposed text in *6.3.21.10 Network Re-Entry from Idle Mode*, and all other instances in the contribution, fix all inappropriate references to 'HO'.

[Phil Barber; 2004-8-12] Per Inkyu Paek, *11.15 DREG-REQ*, for Idle Mode Retain Information Bit #3, change 'Network Address Acquisition' to 'Network Address'.

[Phil Barber; 2004-8-12] Per Inkyu Paek, Fix dyslexic transposition error on section numbering 6.3.9.21.2.2 -> 6.3.21.9.2.2.

[Phil Barber; 2004-8-27] Per Moo Ryong Jeong, make language invoking the Idle Mode Timer and Idle Mode System Timer clear as to exactly when the timers start.

[Phil Barber; 2004-8-27] Per Moo Ryong Jeong, isolate Idle Mode Timer expiration action to MSS since Paging Controller can have no knowledge of MSS timer activity.

[Phil Barber; 2004-8-27] Per Changhoi Koo, change to reporting Paging Information for RNG-RSP during Location Update, instead of reporting just Paging Group ID since MSS also needs to know the Paging Cycle and Offset for the reported Paging Group ID.

Remedy 1:

Add Expedited Network Setup language and MSS retention timer to Idle Mode Initiation. Fix minor language problem in existing text. Clarify new logical network Idle Mode control contstruct--Paging Controller.

[In 6.3.21.1 MSS Idle Mode Initiation, page 83, line60, Modify]:
6.3.21.1 MSS Idle Mode Initiation

Idle Mode Initiation may begin after MSS de-registration. During Normal Operation with its Serving BS, an MSS may signal intent to begin Idle Mode by sending a DREG-REQ with a De-registration_Request_Code = 0x01; request for MSS de-registration from Serving BS and initiation of MSS Idle Mode. Similarly, a Serving BS may signal for an MSS to begin Idle Mode by sending a DREG-CMD with an Action Code = 0x05; ~~require~~ MSS immediate de-registration from Serving BS and ~~request~~ initiation of MSS Idle Mode. The Serving BS may also include a REQ-duration TLV with an Action Code = 0x05 in the DREG-CMD, signaling for an MSS to initiate an Idle Mode request through a DREG-REQ with Action Code = 0x01, request for MSS de-registration from Serving BS and initiation of MSS Idle Mode, at REQ-duration expiration. ~~The initiation of Idle Mode may be notified over backbone network using Paging announce message.~~

For MSS terminating Normal Operation with the Serving BS and entering Idle Mode, the Paging Controller—the Serving BS or other network entity administering Idle Mode activity for the MSS—may retain certain MSS service and operational information useful for expediting a future

MSS network re-entry from Idle Mode. The MSS may request Paging Controller retention of specific MSS service and operational information for Idle Mode management purposes through inclusion of the Idle Mode Retain Information element in the DREG-REQ management message. The Serving BS shall report the likely effect on expedited future MSS network re-entry due to Paging Controller retention of MSS service and operational context by reporting the indicative Idle Mode Retain Information in DREG-CMD.

The MSS shall maintain an Idle Mode Timer and Paging Controller shall maintain an Idle Mode System Timer to provide an interval timer to prompt MSS Idle Mode Location Update activity and demonstrate MSS continued network presence to re-validate Paging Controller retention of MSS service and operational information. Idle Mode Timer and Idle Mode System Timer shall start on Serving BS transmission of DREG-CMD directing MSS transition to Idle Mode. Idle Mode Timer and Idle Mode System Timer shall recycle on any successful MSS network Idle Mode Location Update. On expiration of Idle Mode System Timer or on MSS network entry/re-entry and resumption of Normal Operation, the Paging Controller shall discard all MSS service and operational information retained for Idle Mode management purposes. On expiration of Idle Mode Timer MSS shall consider that Paging Controller has discarded all MSS service and operational information retained for Idle Mode management purposes.

Remedy 2:

Define an MSS Idle Mode Timer and a Paging Controller Idle Mode System Timer to expire and discard old MSS context

[In 10.1 Global Values, page 175, Table 340a—Parameters and Constants, Append to table]:

System	Name	Time Reference	Minimum Value	Default Value	Maximum Value
MSS	Idle Mode Timer	MSS timed interval to conduct Location Update. Set timer to MSS Idle Mode Timeout capabilities setting. Timer recycles on successful Idle Mode Location Update	128s	4096s	65536s
BS	Idle Mode System Timer	For BS acting as Paging Controller, timed interval to receive notification of MSS Idle Mode Location Update. Set timer to MSS Idle Mode Timeout. Timer recycles on successful Idle Mode Location Update	128s	4096s	65536s

Remedy 3:

Define an Idle Mode Timeout capability for MSS to report to Serving BS during REG-REQ so Paging Controller will know how long to expect before it should become concerned that MSS is no longer available in Idle Mode

[In 11.7 REG-REQ/RSP management message encodings, page 184, add new section; editor to make appropriate allocation to number mm.1 for Type]:

11.7.19 Idle Mode

11.7.19.1 Idle Mode Timeout

MSS reported default timer value for MSS Idle Mode Timer

Type	Length	Value	Scope
mm.1	2	Max time interval between MSS Idle Mode Location Updates in seconds (default = 4096s)	REG-REQ REG-RSP

Remedy 4:

An MSS may indicate to the BS its preference of kinds of information to be kept with HO Optimization when the MSS enters Idle Mode. Add Idle Mode Retain Information language to DREG-REQ when De-Registration Request Code=0x01

[In 6.3.2.3.42 De/Re-register Request (DREG-REQ) message, page 28, line 1, modify as]:
The SS shall include the following parameters in the DREG-REQ only if De-Registration_Request_Code = 0x01

      Paging Cycle Request
            PAGING_CYCLE requested by MSS

      Idle Mode Retain Information
            MSS request for Paging Controller retention of network re-entry related MAC management message MSS service and operational information to expedite future Network Re-entry from Idle Mode. For each Bit location, a value of '0' indicates the information associated with the specified MAC management message is not requested to be retained and managed, a value of '1' indicates the information is requested to be retained and managed.
              Bit #0: Retain MSS service and operational information associated with SBC-REQ/RSP MAC management messages
              Bit #1: Retain MSS service and operational information associated with PKM-REQ/RSP MAC management messages
              Bit #2: Retain MSS service and operational information associated with REG-REQ/RSP MAC management messages
              Bit #3: Retain MSS service and operational information associated with Network Address
              Bit #4: Retain MSS service and operational information associated with Time of Day

Bit #5: Retain MSS service and operational information associated with TFTP MAC management messages
Bit #6: Retain MSS service and operational information associated with Full service (MAC state machines, CS classifier information, etc…)

Remedy 5:

Put the Idle Mode Retain Information TLV info into the appropriate DREG-REQ TLV table in Section 11.

[In 11.13.26 DREG-CMD message encodings, page 201, line 53, correct incorrect section title and location; editor will make appropriate allocation of numbering nn for Type]:

11.13.2615 DREG-CMD REQ message encodings

Name	Type	Length	Value
Paging Cycle Request	*?*	2	Requested cycle in which the paging message is transmitted within the paging group.
Idle Mode Retain Information	*nn*	1	MSS request for Paging Controller retention of network re-entry related MAC management message MSS service and operational information to expedite future Network Re-entry from Idle Mode. For each Bit location, a value of '0' indicates the information associated with the specified MAC management message is not requested to be retained and managed, a value of '1' indicates the information is requested to be retained and managed. Bit #0: Retain MSS service and operational information associated with SBC-REQ/RSP MAC management messages Bit #1: Retain MSS service and operational information associated with PKM-REQ/RSP MAC management messages Bit #2: Retain MSS service and operational information associated with REG-REQ/RSP MAC management Bit #3: Retain MSS service and operational information associated with Network Address Bit #4: Retain MSS service and operational information associated with Time of Day Acquisition

			Bit #5: Retain MSS service and operational information associated with TFTP MAC management messages Bit #6: Retain MSS service and operational information associated with Full service (MAC state machines, CS classifier information, etc…)

Remedy 6:

A BS informs the MSS what kinds of information will be kept through the indicative Idle Mode Retain Information flags. In case of BS initiated Idle Mode, the BS shall include REQ-duration and the MSS can re-negotiate kinds of information to be kept, after REQ-duration expiration. Add Idle Mode Retain Information flags language to DREG-CMD when Action Code-0x05. Add Paging Controller ID language. Re-use HO Process Optimization flags and mechanics.

[In 6.3.2.3.26 De/Re-register Command (DREG-CMD) message, page 26, line 56, modify as]:
When the DREG-CMD message is sent with Action Code=0x05, the following TLV shall be included:

Paging Information (see 11.?).14)
> The Paging Information TLV defines the Paging Group ID and the PAGING_CYCLE and PAGING OFFSET parameters to be used by the MSS in IDLE modeMode

Paging Controller ID
> This is a logical network identifier for the Serving BS or other network entity retaining MSS service and operational information and/or administering paging activity for the MSS while in IDLE Mode. Paging Controller ID shall be set to BS ID when a BS is acting as Paging Controller

Idle Mode Retain Information
> Idle Mode Retain Information is provided as part of this message is indicative only. Network Re-entry from Idle Mode process requirements may change at time of actual re-entry. For each Bit location, a value of '0' indicates the information for the associated re-entry management messages shall not be retained and managed, a value of '1' indicates the information for the associated re-entry management message shall be retained and managed.
>> Bit #0: Retain MSS service and operational information associated with SBC-REQ/RSP MAC management messages
>> Bit #1: Retain MSS service and operational information associated with PKM-REQ/RSP MAC management messages
>> Bit #2: Retain MSS service and operational information associated with REG-REQ/RSP MAC management messages
>> Bit #3: Retain MSS service and operational information associated with Network Address
>> Bit #4: Retain MSS service and operational information associated with Time of Day

Bit #5: Retain MSS service and operational information associated with TFTP MAC management messages
Bit #6: Retain MSS service and operational information associated with Full service (MAC state machines, CS classifier information, etc…)

The DREG-CMD may include the following parameters encoded as TLV tuples:

REQ-duration

Waiting value for the DREG-REQ message re-transmission (measured in frames). If Serving BS includes REQ-duration in a message including an Action Code = 0x05, the MSS shall initiate an Idle Mode request through a DREG-REQ with Action Code = 0x01, request for MSS de-registration from Serving BS and initiation of MSS Idle Mode, at REQ-duration expiration.

Remedy 7:

Put the Idle Mode Retain Information and Paging Controller ID TLV info into the appropriate DREG-CMD TLV table in Section 11.

[In 11.14 DREG-CMD message encodings, page 202, line 23, append to Table; editor will make appropriate allocation of numbering oo and pp for Type]:

Name	Type	Length	Value
Paging Controller ID	*oo*	6	This is a logical network identifier for the Serving BS or other network entity retaining MSS service and operational information and/or administering paging activity for the MSS while in IDLE Mode
Idle Mode Retain Information	*pp*	1	Idle Mode Retain Information is provided as part of this message is indicative only. Network Re-entry from Idle Mode process requirements may change at time of actual re-entry. For each Bit location, a value of '0' indicates the information for the associated re-entry management messages shall not be retained and managed, a value of '1' indicates the information for the associated re-entry management message shall be retained and managed Bit #0: Retain MSS service and operational information associated with SBC-REQ/RSP MAC management messages Bit #1: Retain MSS service and operational information associated with PKM-REQ/RSP MAC management messages Bit #2: Retain MSS service and operational

			information associated with REG-REQ/RSP MAC management messages Bit #3: Retain MSS service and operational information associated with Network Address Bit #4: Retain MSS service and operational information associated with Time of Day Bit #5: Retain MSS service and operational information associated with TFTP MAC management messages Bit #6: Retain MSS service and operational information associated with Full service (MAC state machines, CS classifier information, etc…)

Remedy 8:

Add optimized Location Update language and mechanics, and optimized Idle Mode network re-entry language and mechanics, to take advantage of newly added MSS retained information and timer.
[In 6.3.21 MSS Idle Mode (optional), page 82, line 54, append new section 6.3.21.9 Location Update, and new section 6.3.21.10 Network Re-entry]:

6.3.21.9 Location Update
Location Update is comprised of condition evaluation and update processing.

6.3.21.9.1 Location Update Conditions
An MSS in Idle mode shall perform a Location Update process operation if any Location Update condition is met. There are two location update evaluation conditions: Zone Update and Timer Update. MSS may also perform Location Update process at will.

6.3.21.9.1.1 Paging Group Update
The MSS shall perform Location Update process when the MSS detects a change in paging group. The MSS shall detect the change of paging group by monitoring the paging group identifier, PG_ID, which is transmitted by the Preferred BS in the MOB_PAG-ADV broadcast message during the Transmission Interval. If the PG_ID detected does not match the Paging Group to which the MSS belongs, or if the MSS fails to detect a MOB-PAG-ADV message at the appropriate interval, the MSS shall determine that paging group has changed.

6.3.21.9.1.2 Timer Update
The MSS shall periodically perform Location Update process prior to the expiration of the Idle Mode Timer. This mechanism enables the Paging Controller to ascertain an MSS in Idle Mode continued availability without requiring active intervention by the Paging Controller. If the Paging Controller ascertains that an MSS in Idle Mode is no longer available, the Paging Controller shall delete all information for the MSS and discontinue Idle Mode Paging Control for the MSS.

6.3.21.9.2 Location Update Process

If an MSS in Idle Mode determines or elects to update its location, depending on the security association the MSS shares with the Target BS, the MSS shall use one of two processes: Secure Location Update Process or Un-secure Location Update Process. For purposes of Location Update Process, the Target BS shall be the Preferred BS.

6.3.21.9.2.1 Secure Location Update Process

If the MSS shares a valid security context with the Target BS such that the MSS may include a valid HMAC Tuple in the RNG-REQ, then the MSS shall conduct initial ranging with the Target BS by sending a RNG-REQ including HO Indication, Location Update Request and Paging Controller ID TLVs and HMAC Tuple. If the Target BS evaluates the HMAC Tuple as valid and can supply a corresponding authenticating HMAC Tuple, then the Target BS shall reply with a RNG-RSP including the Location Update Response TLV and HMAC Tuple completing the Location Update Process. If Paging Group ID has changed, then Target BS shall include Paging Group ID TLV in the RNG-RSP. If the Target BS responds with a successful Location Update Response=0x01, Success of Location Update, the Target BS shall notify the Paging Controller via the backbone of the MSS new location information, the MSS shall assume the Paging Group ID of the Target BS, and the Paging Controller may send a backbone message to inform the BS at which the MSS entered Idle Mode that the MSS has transitioned to a different Paging Group. If the Target BS evaluates the HMAC Tuple as invalid or cannot supply a corresponding authenticating HMAC Tuple, then the Target BS shall instruct the MSS to continue network re-entry using the Un-Secure Location Update process by inclusion of Location Update Response TLV in RNG-RSP with a value of 0x00= Failure of Location Update .

6.3.21.9.2.2 Un-secure Location Update Process

For MSS and Target BS that do not share current, valid security context, they shall process Location Update using the Network Re-Entry from Idle Mode method.

6.3.21.10 Network Re-Entry from Idle Mode

For the Network Re-Entry from Idle Mode method, the MSS shall initiate network re-entry with the Target BS by sending a RNG-REQ including HO Indication and Paging Controller ID TLVs.

If the MSS shares a valid security context with the Target BS such that the MSS may include a valid HMAC Tuple in the RNG-REQ, then the MSS shall conduct initial ranging with the Target BS by sending a RNG-REQ including HMAC Tuple.

If MSS RNG-REQ includes an HO Indication and Paging Controller ID TLVs, and Target BS had not previously received MSS information over the backbone, then Target BS may make an MSS information request of Paging Controller over the backbone network and Paging Controller may respond. Regardless of having received MSS information from Paging Controller, Target BS may request MSS information from another network management entity via the backbone network.

Network re-entry proceeds per 6.3.9.5 except as may be shortened by Target BS possession of MSS information obtained from Paging Controller or other network entity over the backbone network.

For the Target BS to notify an MSS seeking Network Re-entry from Idle Mode of re-entry process management messages that may be omitted during the current re-entry attempt due to the availability of MSS service and operational context information obtained over the backbone network, the Target BS shall place an HO Process Optimization TLV in the RNG-RSP indicating which re-entry management messages may be omitted. The Target BS shall not direct the omission of any re-entry process management messages that would compromise the security or integrity of Normal Operation of the communications as established through an unabridged Initial Entry.

If the Target BS evaluates a HMAC Tuple included in the RNG-REQ as valid and can supply a corresponding authenticating HMAC Tuple, then the Target BS may reply with a RNG-RSP including the valid HMAC Tuple. The Target BS shall not indicate through the HO Process Optimization TLV that the PKM-REQ/RSP management messages may be omitted in the current re-entry attempt without inclusion of a valid HMAC Tuple. If an MSS detects an invalid HMAC Tuple included as part of a RNG-RSP during Network Re-entry from Idle Mode, the MSS shall continue with network re-entry but shall process full PKM security re-keying regardless of HO Process Optimization TLV settings.

Regardless of the HO Process Optimization TLV settings, the Target BS may elect to use MSS service and operational information obtained over the backbone network to build and send unsolicited SBC-RSP and/or REG-RSP management messages to update MSS operational information, or to include 11.7 REG-RSP specific or 11.8 SBC-RSP specific message items as TLV items in the RNG-RSP. Target BS may ignore only the first corresponding REQ management message received if it sends an unsolicited SBC-RSP or unsolicited REG-RSP message. MSS is not required to send the complimentary REQ management message if it receives an unsolicited SBC-RSP or unsolicited REG-RSP management message prior to MSS attempt to send the corresponding REQ management message. Target BS re-entry unsolicited response management messages may be grouped into the same DL frame transmission and may be grouped into the same DL frame transmission with the RNG-RSP. However, unsolicited SBC-RSP and unsolicited REG-RSP may not be grouped together into the same DL frame transmission when the PKM-REQ/RSP management message process is required. The integrity of the 6.3.9.5 sequence process must be preserved.

For a security keying process that has not been determined to be omitted in the HO Process Optimization TLV settings, if MSS RNG-REQ includes HO Indication and Paging Controller ID TLVs, and Target BS has received a backbone message (see section Backbone network HO procedures) containing MSS information, MSS and Target BS shall use the embedded TLV PKM-REQ information and the re-authorization process as defined in 7.2.

If MSS RNG-REQ includes HO Indication and Paging Controller ID TLVs, and Target BS has received a backbone message (see section Backbone network HO procedures) containing MSS information, the Target BS may use MSS service and operational information obtained over the

backbone network to build and send a REG-RSP management message that includes Service Flow remapping information in New_CID, Old_CID and Connection_Info TLVs.

During network re-entry, the Target BS may notify the MSS, through the Bit#7 MSS DL data pending element of the HO Process Optimization TLV item in RNG-RSP, of post- network re-entry MSS DL data pending. Upon MSS successful re-entry at Target BS, now new Serving BS, and new Serving BS completing reception of any network re-entry pending MSS DL data retained and forwarded, MSS may re-establish IP connectivity and new Serving BS may send a backbone message to request the old Serving BS or other network entity to stop forwarding pre-HO pending MSS DL data.

Network entry/re-entry process completes with establishment of Normal Operations.

The Target BS shall notify the Paging Controller via the backbone of MSS successful network re-entry and the Paging Controller may send a backbone message to inform the BS at which the MSS entered Idle Mode that the MSS has resumed Normal Operations at the new Serving BS.

Remedy 9:

Fix unspecified method for termination of Idle Mode.
[In 6.3.21.8 Paging Availability Mode Termination, page 85, line 27, modify as]:
6.3.21.8 Paging Availability Mode Termination

Idle Mode may only be terminated through:

> MSS re-entry to the network;
> or through Paging Controller detection of MSS unavailability through repeated, unanswered paging messages;
> or through expiration of the Idle Mode System Timer.

Remedy 10:

Fix language in 6.3.21.8.1 Relocated some of this text and mechanics to new sections 6.3.21.9.1.1 and 6.3.21.9.2.1
[In 6.3.21.8.1 MSS side, page 85, line 35, modify as]:
6.3.21.8.1 MSS side
An MSS may terminate MSS Idle Mode at any time.

An MSS shall terminate Idle Mode and re-enter the network if it decodes a BS Broadcast Paging message that contains the MSS own MSS MAC Address hash and an Action Code of 10, enter network. In the event that an MSS decodes a BS Broadcast Paging message that contains the MSS own MSS MAC Address hash and an Action Code of 01, Perform Ranging, the MSS shall conduct and complete ~~Initial Ranging~~Idle Mode Location Update to establish location to the network and acknowledge message decoding. ~~Similarly, the MSS shall conduct and complete~~

Initial Ranging to establish location to the network and acknowledge message decoding in the event that it fails to find the MSS own Paging Group ID in the Broadcast Paging message. In either instance of required Initial Ranging, upon completion of the Ranging procedure the MSS shall assume the Paging Group ID of the Preferred BS.

The MSS shall exit Idle mode if it has lost synchronization with the paging message. When re-entering the network, the MSS may use the short network re-entry sequence similar to the behavior after HO or drop event.

To prevent collisions from multiple MSS trying to wake from Idle mode at the same time, the MSS shall use special initial-ranging back-off values that will be advertised in the UCD message.

Remedy 11:

Modify the text to clarify the operation, bring into line with new language and logical constructs, and identify the data delivery mechanism from the last attached BS.
[In 6.3.21.8.2 BS side, page 85, line 57, modify as]:
The BS at which the MSS re-entered the network may shall report to the BS that initiated the pagingPaging Controller via a backbone message about the MSS network re-entry via a backbone message. After MSS Network Re-entry from Idle Mode, pending MSS DL data may be forwarded from the Paging Controller or other network device to the new Serving BS. If the BS that has initiated the pagingPaging Controller is not informed about MSS re-entry into the network, it shall may initiate another additional paging sequences for the MSS. A backbone message may also be used to inform the BS at which the MSS has entered IDLE mode that the MSS has transitioned to a different Paging Group. The termination of Idle Mode may be notified over backbone network using Paging-announce message.

Remedy 12:

Fix language on HO Indication to make useful for Idle Mode Re-entry. Add Location Update Request and Paging Controller ID.
[In 6.3.2.3.5 Ranging Request (RNG_REQ) message, page 17, line 54, modify as]:
The following TLV parameter shall be included in the RNG-REQ message when the MSS is attempting to perform re-entry or handover:

    HO Indication
        Presence of item in message in combination with Serving BS ID Iindicates the MSS is currently attempting to HO; or in combination with Paging Controller ID the MSS is attempting Network Re-entry from Idle Mode to the BS.
    Location Update Request
        Presence of item in message indicates MSS action of Idle Mode Location Update Process.
    Paging Controller ID

This is a logical network identifier for the Serving BS or other network entity
retaining MSS service and operational information and/or administering paging
activity for the MSS while in Idle Mode.

Remedy 13:

Fix language on HO Indication to make useful for Idle Mode Re-entry as well and add Paging
Controller ID to 11.5 RNG-REQ TLV table.

*[In 11.5 RNG-REQ TLVs for re-establishment of Service Flows, page 183, line 43, modify and
append to Table 318a-RNG-REQ Message Encodings; editor will make appropriate allocation
of numbering qq and rr for Type]:*

Name	Type	Length	Value
HO Indication	zz	1	Presence of item in message in combination with other included information elements indicates the MSS is currently attempting to HO or Network Re-entry from Idle Mode to the BS, regardless of value
Location Update Request	qq	1	Presence of item in message indicates MSS action of Idle Mode Location Update Process, regardless of value
Paging Controller ID	rr	6	This is a logical network identifier for the Serving BS or other network entity retaining MSS service and operational information and/or administering paging activity for the MSS while in Idle Mode

Remedy 14:

Fix language on HO Indication to make useful for Idle Mode Re-entry. Add Location Update
Request and Paging Controller ID and Paging Information.

[In 6.3.2.3.6 Ranging Response (RNG-RSP) message, page 18, line 43, modify as]:
If individual AuthorizedQoSParamSet profiles are provided for multiple Service Level
Predictions, then each Service Level Prediction is specific to its associated
AuthorizedQoSParamSet profile and shall include only response options '0' or '2'.

When a BS sends a RNG-RSP message in response to a RNG-REQ message containing Paging
Controller ID, the BS shall include the following TLV parameter in the RNG-RSP message:
Location Update Response
Response to Idle Mode Location Update Request:
0x00= Failure of Idle Mode Location Update. The MSS shall perform Network
Re-entry from Idle Mode

         0x01= Success of Idle Mode Location Update
         0x10, 0x11: Reserved
   Paging Information
      New Paging Information assigned to MSS. Paging Information shall only be
      included if Location Update Response=0x01 and if Paging Information has
      changed.
   Paging Controller ID
      This is a logical network identifier for the Serving BS or other network entity
      retaining MSS service and operational information and/or administering paging
      activity for the MSS while in Idle Mode. Paging Controller ID shall only be
      included if Location Update Response=0x01 and if Paging Controller ID has
      changed.

The following parameter, necessary to expedite security authentication, shall be included in the RNG-RSP message when the BS notifies the MSS through the HO Process Optimization TLV that the PKM-REQ/RSP sequence may be omitted for the current re-entry attempt, or when the BS wishes to acknowledge a valid HMAC Tuple in the acknowledged RNG-REQ management message:

Remedy 15:

Add Location Update Response, Paging Information and Paging Controller ID to the 11.6 RNG-RSP TLV table.

[In 11.6 RNG-RSP TLVs for re-establishment of Service Flows, page 184, line 1, append to Table 320a-RNG-RSP Message Encodings; editor will make appropriate allocation of numbering ss, tt and uu for Type]:

Name	Type	Length	Value
Location Update Response	*ss*	1	0x00= Failure of Location Update. The MSS shall perform Network Re-entry from Idle Mode 0x01= Success of Location Update 0x10, 0x11: Reserved
Paging Information	*tt*	4	Paging Information shall only be included if Location Update Response=0x01 and if Paging Information has changed **Bits 15:0** - PAGING_CYCLE - Cycle in which the paging message is transmitted within the paging group **Bits 23:16** – PAGING OFFSET – Determines the frame within the cycle in

			which the paging message is transmitted. Must be smaller than PAGING CYCLE value **Bits 31:24** – Paging Group ID - ID of the paging group the MSS is assigned to
Paging Controller ID	*uu*	6	This is a logical network identifier for the Serving BS or other network entity retaining MSS service and operational information and/or administering paging activity for the MSS while in Idle Mode. Paging Controller ID shall only be included if Location Update Response=0x01 and if Paging Controller ID has changed

Remedy 16:

Fix a language constraint on use of HO Indication for HO only to allow for new use for Idle Mode re-entry as well.

[In 6.3.20.4 Network entry/re-entry, page 78, line 7, modify as]:

The MSS shall signal the Target BS of a current HO attempt by including a Serving BS ID TLV and HO Indication TLV in the RNG-REQ management message. The MSS shall not include a HO Indication TLV in the RNG-REQ management message unless actually in the process of conducting an HO or Network Re-entry from Idle Mode attempt.

Remedy 17:

Fix a language constraint on use of HO Indication for HO only to allow for new use for Idle Mode re-entry as well.

[In 6.3.2.3.8 Registration Response (REG-RSP) message, page 19, line 24, modify as]:

For mobile subscribers in normal operation, and, if the information is available to create CID update, Target BS shall include CID_update and SAID_update TLVs in the REG-RSP for MSS recognized by the Target BS as performing HO or network Network reRe-entry from Idle Mode by the presence of a Serving BS ID or Paging Controller ID and HO Indication in the RNG-REQ.