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Title

Paging Concept Paper

Source

Lucent

Abstract

This contribution proposes a concept paper for paging. It uses the following three-part template adopted in GAHW-010241: identify requirements, recommend concept, and identify impact on specifications.

The requirements section uses the model proposed by Alan Cooper in *The Inmates are Running the Asylum – Why High-Tech Products Drive Us Crazy and How to Restore the Sanity*.

Comments appear within angled brackets, *e.g.*, <comment>.

This contribution is available in Acrobat and Word formats. The Acrobat format is smaller and has fewer display artifacts.

Recommendation

For information.

Contents

1. Requirements

This document presents paging-related requirements. Based on these requirements, it develops concepts, and from the concepts, assesses the impact on new and existing standards. To focus requirements, it proposes persona, as suggested by Alan Cooper in *The Inmates are Running the Asylum* [1].

1.1 Persona

Lloyd sells specialty automotive parts for Merit, a multinational supplier. His customers include autobody shops, garages, trucking companies, fleet operators, and auto-parts retailers.

Lloyd's key objective is customer service: customers should be able to phone him at any time and get through to Lloyd or his voice mail. From 08:00 to 19:00, seven days a week, Lloyd returns calls within 2 hours.

Lloyd uses two wireless devices:

- A small handset exclusively used for voice.
  The handset is on 24 hours a day, 7 days a week. It is Lloyd's key communication device. This handset complies with release-99 specifications for voice terminals. It does not support GPRS.

- A laptop computer for checking stock and processing orders.
  This laptop contains a GPRS PC card that allows wireless data access to Merit's servers. The computer is only on when Lloyd is entering new orders or checking status of outstanding orders. Lloyd seldom uses e-mail: he prefers to talk to his customers by phone or meet with them in person.

In the future, Lloyd may want a single device that allows him to perform everything he does now. This document assumes the future is now.

1.2 User-based requirements

To increase battery life, paging shall support discontinuous reception.

Incoming voice calls shall be processed whether or not a data session is active.

Incoming data transfers shall be processed whether or not a voice call is active.

1.3 System-based requirements

<This section incorporates agreements documented in GP-010975. Each requirement in this section should indicate why the requirement exists.>

Any mobile station that supports *Iu mode* shall camp on a PCCCH if present. <Why?>

If a PCCCH is present, the mobile station shall monitor it in *RRC Idle* and *RRC Connected* modes.

So the core network and GERAN can establish a signalling link with a mobile station, two types of paging shall be supported: GERAN-initiated and CN-initiated. The mobile station shall be able to determine which network (GERAN or CN) initiated the page.

A single PACKET PAGING REQUEST shall be able to contain pages for *A/Gb-mode* and *Iu-mode* mobile stations.

A mobile station may respond to a page via a dedicated control channel or via a TBF.

Iu-mode paging shall comply with the concepts in this document.

A/Gb-mode paging shall comply with the concepts in 43.064.

1.4 User-based scenarios

The following scenarios will be used to develop the paging concepts in § 2:

- Lloyd receives a voice call.
- Lloyd receives a voice call while checking the status of a customer's order.
- Lloyd receives an e-mail order confirmation.
- Lloyd receives an e-mail order confirmation while engaged in a voice call.

1.5 System-based scenarios

GERAN shall initiate a page for the following purposes:

- Locate a mobile station to its serving cell.
- Activate a radio bearer.

The CN shall initiate a page for the following purposes:

- Locate a mobile station to its serving BSS.
- Activate a radio access bearer.

2. Concept

Figures in this section contain sequence diagrams. A table following each figure describes each message event in the sequence, including the values of directly relevant information elements.

2.1 User-based sequences

These sequences derive from the user-based requirements of § 1.2 and the scenarios of §1.4.

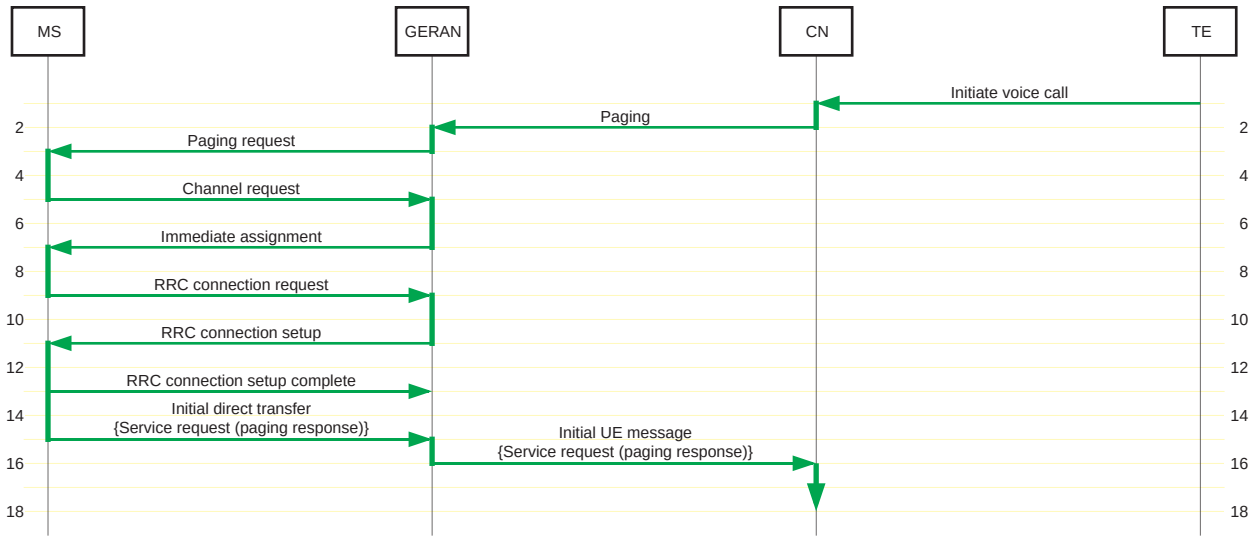
2.1.1 Incoming voice call – *RRC Idle,* CCCH, assign dedicated channel

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call.

Figure 1 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC Idle* state.
- Mobile station is camped on a CCCH.
- GERAN will assign a dedicated channel.

Figure 1: Incoming voice call – *RRC Idle*, CCCH, assign dedicated channel



Line	Description	Protocol and Channel
1	Initiate voice call Lloyd's customer calls. The customer's terminal equipment initiates the voice call.	
2	Paging *{CN domain indicator, permanent NAS UE identity, temporary UE identity, paging area ID, paging cause, non-searching indication, DRX cycle-length coefficient}* The CN non-access stratum requests paging in each GERAN in which the mobile station could be located. *CN domain indicator* indicates *circuit domain*. *Permanent NAS UE identity* is the IMSI. *Temporary UE identity*, if included, is the TMSI. *Paging area ID*, if included, is the LAI. If the message contains no *paging area ID*, GERAN will page in all cells under its control. *Paging cause*, if included, indicates *terminating conversational call*. *Non-searching indication*, if included, indicates whether or not paging is coordinated between domains. These sequences assume the default value: coordinated paging. *DRX cycle-length coefficient*, if included, is used to calculate when the mobile station may be paged.	RANAP *Iu-cs*
3	Paging request *{page mode, channel needed, mobile identity, P1 rest octets}* Since the GERAN RRC is in *Idle* state for this IMSI, it does not know where the mobile station is. It therefore sends a *paging request* on all paging channels the mobile station could monitor. Upon receipt of the *paging request*, the MS RRC informs its non-access stratum that the core network has paged it. The MS NAS responds to the page. *Channel needed* indicates SDCCH. *Mobile identity* is the mobile station's IMSI, or if available, TMSI. <UTRAN requires that *paging cause* be transparently transferred to the UE. Are we going to do this? How does the mobile station know which core-network domain initiated the page? How does the mobile station know the CN, and not GERAN, initiated the page?>	RRC CCCH (PCH)
5	Channel request *{establishment cause, random reference}* The MS RRC requests a channel to respond to the page. *Establishment cause* indicates *answer to paging*.	RRC CCCH (RACH)
7	Immediate assignment *{page mode, dedicated mode or TBF, channel description, request reference, timing advance, mobile allocation, starting time, IA rest octets (frequency parameters before time)}* The GERAN RRC assigns an SDCCH. *Dedicated mode or TBF* indicates *dedicated mode*. *Channel description* specifies parameters for the SDCCH.	RRC CCCH (AGCH)

9	RRC connection request *{initial UE identity, establishment cause}* Since the MS RRC is in *Idle* state, it needs to establish an RRC connection with its GERAN peer. It therefore sends an *RRC connection request.* *Initial UE identity* indicates IMSI, or if available, TMSI. *Establishment cause* indicates *terminating conversational call.*	RRC SDCCH
11	RRC connection setup *{initial UE identity, RRC transaction identifier, new G-RNTI, RRC state indicator, UTRAN DRX cycle-length coefficient, signalling RB information setup list}* The GERAN RRC provides the information needed to support the RRC connection. *Initial UE identity* indicates IMSI, or if available, TMSI. *RRC transaction identifier* identifies the transaction. Subsequent messages in the transaction will use this identifier. *New G-RNTI* <in UTRAN, U-RNTI> provides the new GERAN Radio Network Temporary Identifier <how's that for redundantly redundant terminology>. The identifier applies for the duration of the RRC connection. *RRC state indicator* specifies that the mobile station enter *RRC Cell Dedicated* state. *Signalling RB information setup list* configures the four signaling radio bearers.	RRC SDCCH
13	RRC connection setup complete *{RRC transaction identifier, START list, UE radio access capability}* The MS RRC confirms setup of the RRC connection. The following radio bearers now exist: RB1 (unacknowledged access-stratum signalling), RB2 (acknowledged access-stratum signalling), RB3 (acknowledged high-priority non-access-stratum signalling), and RB4 (acknowledged low-priority non-access-stratum signalling). *RRC transaction identifier* is the value sent in the *RRC connection setup* message. *START list* identifies the CN domain (circuit) and initializes the 20 most-significant bits of the hyperframe numbers. *UE radio-access capability* indicates the mobile station's capabilities with respect to the *Um* interface, *e.g.,* PDCP capability, RLC capability, RF capability.	RRC RB2 (SDCCH)
15	Initial direct transfer *{CN domain identity, intra-domain NAS node selector, NAS message}* The MS RRC initiates a signaling connection to the circuit CN and forwards the MS NAS paging response. *CN domain identity* indicates *circuit domain. Intra-domain NAS node selector* indicates the NAS node to which the MS wants to establish a connection. *NAS message* contains the *service request* message indicating *paging response.* <24.008 § 9.4.20 specifies that P-TMSI identify the mobile station in the *service request* message. Why would a circuit connection use P-TSMI?>	RRC RB3 (SDCCH)
16	Initial UE message *{CN domain indicator, LAI, SAI, NAS-PDU, Iu signalling-connection identifier, Global RNC-ID}* GERAN forwards the page response to the CN. *CN domain indicator* indicates *circuit domain. LAI* indicates the location area in which the RRC connection exists. SAI indicates the service area where the mobile station is consuming resources. *Iu signalling-connection identifier* is assigned by GERAN and stored by the CN for the duration of the *Iu* connection. *Global RNC-ID* uniquely identifies this GERAN.	RANAP *Iu-cs*

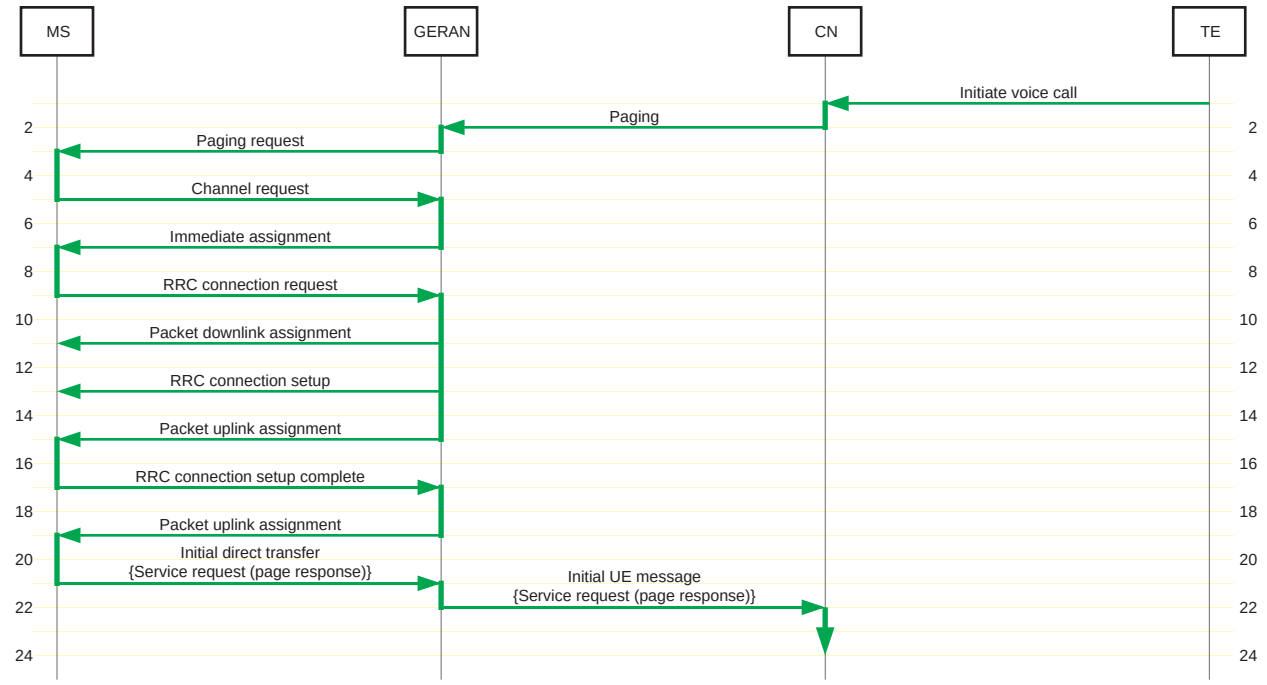
2.1.2 Incoming voice call – *RRC Idle,* CCCH, assign TBF

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call.

Figure 2 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC Idle* state.
- Mobile station is camped on a CCCH.
- GERAN will assign a temporary block flow.

Figure 2: Incoming voice call – *RRC Idle*, CCCH, assign TBF



Line	Description	Protocol and Channel
1	Initiate voice call Lloyd's customer calls. The customer's terminal equipment initiates the voice call.	
2	Paging *{CN domain indicator, permanent NAS UE identity, temporary UE identity, paging area ID, paging cause, non-searching indication, DRX cycle-length coefficient}* Same as § 2.1.1 line 2.	RANAP *Iu-cs*
3	Paging request *{page mode, channel needed, mobile identity, P1 rest octets}* Since the GERAN RRC is in *Idle* state for this IMSI, it does not know where the mobile station is. It therefore sends a *paging request* on all paging channels the mobile station could monitor. Upon receipt of the *paging request*, the MS RRC informs its non-access stratum that the core network has paged it. The MS NAS responds to the page. *Channel needed* indicates *any channel*. The mobile station ignores this value. *Mobile identity* is the mobile station's IMSI, or if available, TMSI. <44.018 does not presently allow establishment of a TBF when paging with TMSI: IMSI or PTMSI is required. If IMSI is used, *P1 rest octets* indicates a packet page. If PTMSI is used, a packet page is assumed. <UTRAN requires that *paging cause* be transparently transferred to the UE. Are we going to do this? How does the mobile station know which core-network domain initiated the page? How does the mobile station know the CN, and not GERAN, initiated the page?>	RRC CCCH (PCH)
5	Channel request *{establishment cause, random reference}* The MS RRC requests a channel to respond to the page. *Establishment cause* indicates *one-phase packet access*.	RRC CCCH (RACH)
7	Immediate assignment *{page mode, dedicated mode or TBF, packet-channel description, request reference, timing advance, mobile allocation, starting time, IA rest octets (Packet uplink assignment)}* The GERAN RRC assigns a PDCH. *Dedicated mode or TBF* indicates *TBF*. *Packet-channel description* specifies parameters for the PDCH. *Request reference* contains the contents of the *channel request* message and the frame number in which the *channel request* message was received. *IA rest octets* contains a *packet uplink assignment*.	RRC CCCH (AGCH)

9	RRC connection request *{initial UE identity, establishment cause}* Same as § 2.1.1 line 9.	RRC PDTCH
11	Packet downlink assignment *{page mode, persistence level, global TFI, MAC mode, RLC mode, control ack, timeslot allocation, packet timing advance, P0, BTS pwr-control mode, PR mode, frequency parameters, downlink TFI assignment, power-control parameters, TBF starting time, measurement mapping}* Under control of the GERAN RRC, the GERAN MAC allocates a downlink TBF so that the GERAN RRC can reply to the *RRC connection request.* *Global TFI* is the uplink TFI assigned in line 7. It is used to address the mobile station. *MAC mode* indicates any of the four allocation modes. *RLC mode* indicates *acknowledged. Downlink TFI assignment* assigns a TFI for the downlink TBF.	MAC PACCH
13	RRC connection setup *{initial UE identity, RRC transaction identifier, new G-RNTI, RRC state indicator, UTRAN DRX cycle-length coefficient, signalling RB information setup list}* Same as § 2.1.1 line 11 except for the following: • *RRC state indicator* specifies that the mobile station enter *RRC Cell Shared* state.	RRC PDTCH
15	Packet uplink assignment *{page mode, persistence level, global TFI, channel-coding command, TLLI-block channel coding, packet timing advance, frequency parameters,* allocation *(uplink TFI assignment)}* Under control of the GERAN RRC, the GERAN MAC allocates an uplink TBF so the MS RRC can send an *RRC connection setup complete*. *Global TFI* is the downlink TFI assigned in line 11. *Uplink TFI assignment* assigns a TFI for the uplink TBF.	MAC PACCH
17	RRC connection setup complete *{RRC transaction identifier, START list, UE radio access capability}* Same as § 2.1.1 line 13.	RRC RB2 (PDTCH)
19	Packet uplink assignment {*page mode, persistence level, global TFI, channel-coding command, TLLI-block channel coding, packet timing advance, frequency parameters,* allocation *(uplink TFI assignment)*} Under control of the GERAN RRC, the GERAN MAC allocates an uplink TBF so the MS RRC can send an *Initial direct transfer*. *Global TFI* is the uplink TFI assigned in line 15.	MAC PACCH
21	Initial direct transfer *{CN domain identity, intra-domain NAS node selector, NAS message}* Same as § 2.1.1 line 15.	RRC RB3 (PDTCH)
22	Initial UE message *{CN domain indicator, LAI, SAI, NAS-PDU, Iu signalling-connection identifier, Global RNC-ID}* Same as § 2.1.1 line 16.	RANAP *Iu-cs*

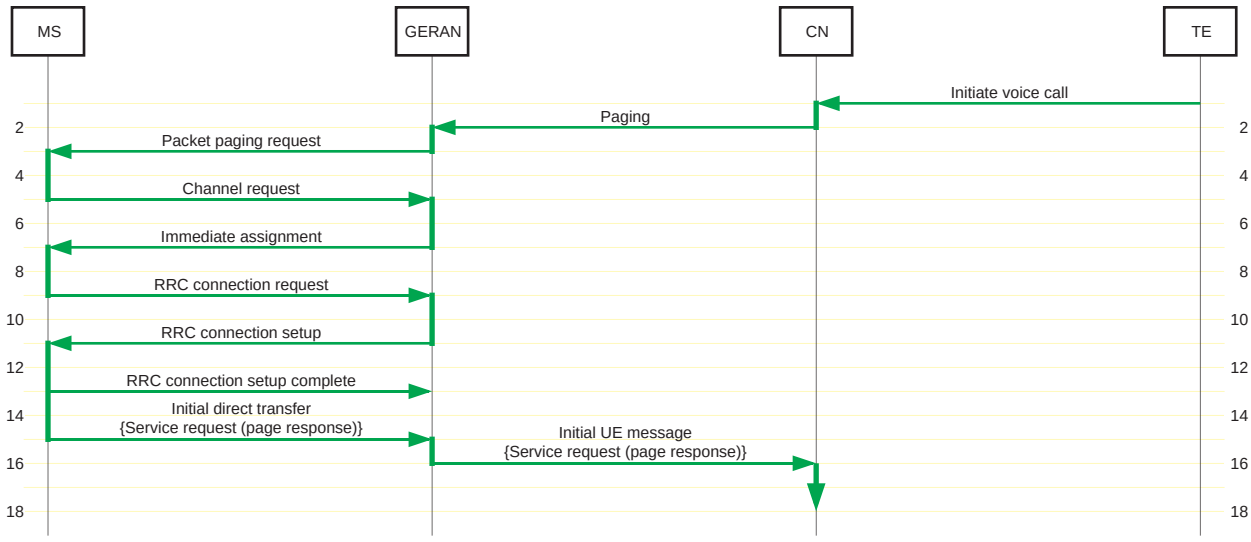
2.1.3 Incoming voice call – *RRC Idle,* PCCCH, assign dedicated channel

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call.

Figure 3 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC Idle* state.
- Mobile station is camped on a PCCCH.
- GERAN will assign a dedicated channel.

Figure 3: Incoming voice call – *RRC Idle*, PCCCH, assign dedicated channel



Line	Description	Protocol and Channel
1	Initiate voice call Lloyd's customer calls. The customer's terminal equipment initiates the voice call.	
2	Paging *{CN domain indicator, permanent NAS UE identity, temporary UE identity, paging area ID, paging cause, non-searching indication, DRX cycle-length coefficient}* Same as § 2.1.1 line 2 except for the following: • *Paging area ID*, if included, is the RAI. <How does the circuit CN know RAI? Maybe LAI should be used.> If the message contains no *paging area ID*, GERAN will page in all cells under its control.	RANAP *Iu-cs*
3	Packet paging request *{page mode, persistence level, NLN, page info (TBF or dedicated, mobile identity, channel needed)}* Since the GERAN RRC is in *Idle* state for this IMSI, it does not know where the mobile station is. It therefore has MAC send a *packet paging request* on all paging channels the mobile station could monitor. Upon receipt of the *packet paging request*, the MS MAC informs its non-access stratum that the core network has paged it. The MS NAS responds to the page. *TBF or dedicated* indicates establishment of a dedicated connection. *Mobile identity* is the mobile station's IMSI, or if available, TMSI. *Channel needed* indicates SDCCH. <UTRAN requires that *paging cause* be transparently transferred to the UE. Are we going to do this? How does the mobile station know which core-network domain initiated the page? How does the mobile station know the CN, and not GERAN, initiated the page?>	MAC PCCCH (PPCH)
5	Channel request *{establishment cause, random reference}* Same as § 2.1.1 line 5.	RRC CCCH (RACH)
7	Immediate assignment *{page mode, dedicated mode or TBF, channel description, request reference, timing advance, mobile allocation, starting time, IA rest octets (frequency parameters before time)}* Same as § 2.1.1 line 7.	RRC CCCH (AGCH)
9	RRC connection request *{initial UE identity, establishment cause}* Same as § 2.1.1 line 9.	RRC SDCCH
11	RRC connection setup *{initial UE identity, RRC transaction identifier, new G-RNTI, RRC state indicator, UTRAN DRX cycle-length coefficient, signalling RB information setup list}* Same as § 2.1.1 line 11.	RRC SDCCH

13	RRC connection setup complete *{RRC transaction identifier, START list, UE radio access capability}* Same as § 2.1.1 line 13.	RRC RB2 (SDCCH)
15	Initial direct transfer *{CN domain identity, intra-domain NAS node selector, NAS message}* Same as § 2.1.1 line 15.	RRC RB3 (SDCCH)
16	Initial UE message *{CN domain indicator, LAI, SAI, NAS-PDU, Iu signalling-connection identifier, Global RNC-ID}* Same as § 2.1.1 line 16.	RANAP *Iu-cs*

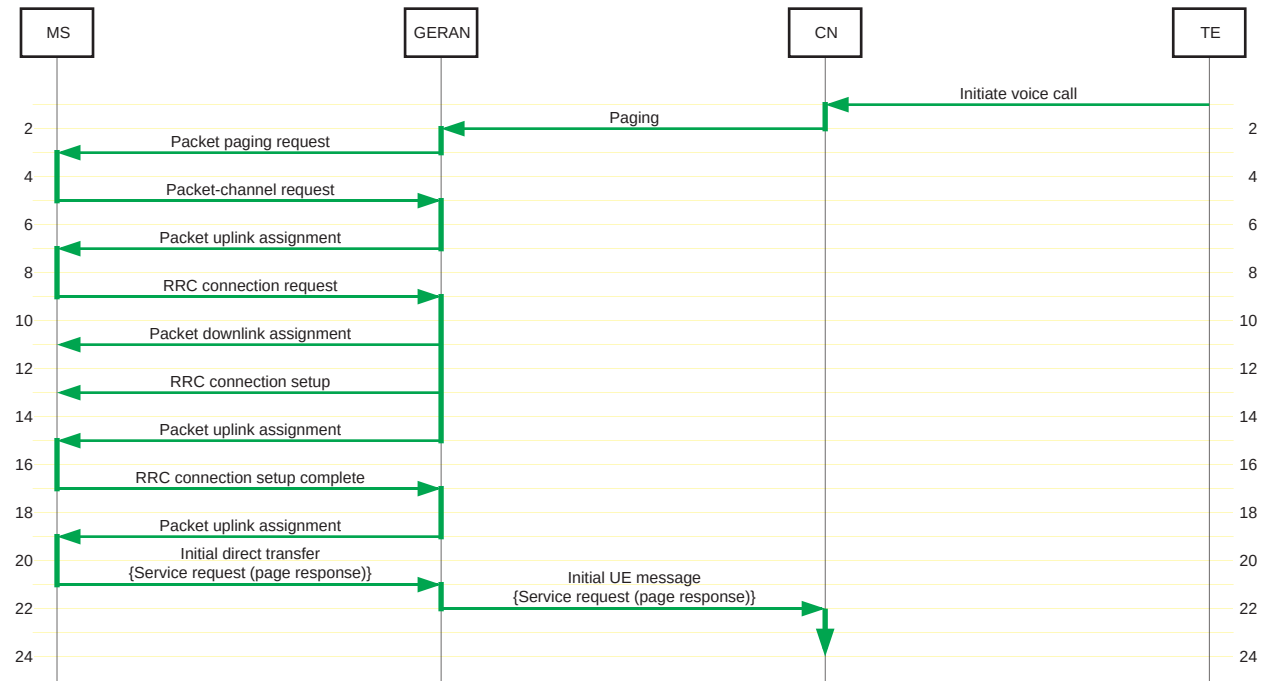
2.1.4 Incoming voice call – *RRC Idle,* PCCCH, assign TBF

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call.

Figure 4 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC Idle* state.
- Mobile station is camped on a PCCCH.
- GERAN will assign a temporary block flow.

Figure 4: Incoming voice call – *RRC Idle,* PCCCH, assign TBF



Line	Description	Protocol and Channel
1	Initiate voice call Lloyd's customer calls. The customer's terminal equipment initiates the voice call.	
2	Paging *{CN domain indicator, permanent NAS UE identity, temporary UE identity, paging area ID, paging cause, non-searching indication, DRX cycle-length coefficient}* Same as § 2.1.3 1 line 2.	RANAP *Iu-cs*
3	Packet paging request *{page mode, persistence level, NLN, page info (TBF or dedicated, mobile identity)}* Same as § 2.1.3 line 3 except the following: • *TBF or dedicated* indicates establishment of a TBF. • *Channel needed* is not used. <44.060 does not presently allow paging with TMSI for TBF establishment.>	RRC PCCCH (PPCH)
5	Packet channel request *{establishment cause, random bits}* Under control of the MS RRC, the MS MAC requests a channel to respond to the page. *Establishment cause* indicates *page response*.	MAC PCCCH (PRACH)
7	Packet uplink assignment *{page mode, persistence level, packet-request reference, channel-coding command, TLLI-block channel coding, packet timing advance, frequency parameters, allocation (uplink TFI assignment)}* Under control of the GERAN RRC, the GERAN MAC allocates an uplink TBF so the MS RRC can send an *RRC connection setup complete.* *Packet-request reference* contains the *establishment cause* from the *packet channel request* and the frame number in which the GERAN MAC received the *packet channel request.* It is used to address the mobile station. *Uplink TFI assignment* assigns a TFI for the uplink TBF.	MAC PCCCH (PAGCH)
9	RRC connection request *{initial UE identity, establishment cause}* Same as § 2.1.2 line 9.	RRC PDTCH

11	Packet downlink assignment *{page mode, persistence level, global TFI, MAC mode, RLC mode, control ack, timeslot allocation, packet timing advance, P0, BTS pwr-control mode, PR mode, frequency parameters, downlink TFI assignment, power-control parameters, TBF starting time, measurement mapping}* Same as § 2.1.2 line 11.	MAC PACCH
13	RRC connection setup *{initial UE identity, RRC transaction identifier, new G-RNTI, RRC state indicator, UTRAN DRX cycle-length coefficient, signalling RB information setup list}* Same as § 2.1.2 line 13.	RRC PDTCH
15	Packet uplink assignment *{page mode, persistence level, global TFI, channel-coding command, TLLI-block channel coding, packet timing advance, frequency parameters, allocation (uplink TFI assignment)}* Same as § 2.1.2 line 15.	MAC PACCH
17	RRC connection setup complete *{RRC transaction identifier, START list, UE radio access capability}* Same as § 2.1.2 line 17.	RRC RB2 (PDTCH)
19	Packet uplink assignment *{page mode, persistence level, global TFI, channel-coding command, TLLI-block channel coding, packet timing advance, frequency parameters, allocation (uplink TFI assignment)}* Same as § 2.1.2 line 19.	MAC PACCH
21	Initial direct transfer *{CN domain identity, intra-domain NAS node selector, NAS message}* Same as § 2.1.2 line 21.	RRC RB3 (PDTCH)
22	Initial UE message *{CN domain indicator, LAI, SAI, NAS-PDU, Iu signalling-connection identifier, Global RNC-ID}* Same as § 2.1.2 line 22.	RANAP *Iu-cs*

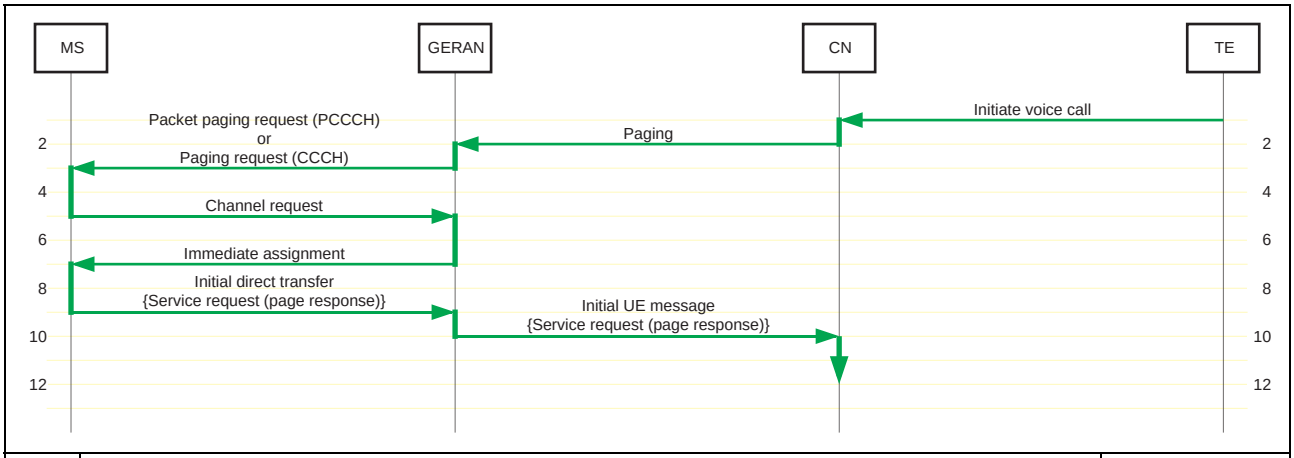
2.1.5 Incoming voice call – *RRC Cell Shared,* assign dedicated channel

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call while checking the status of a customer's order.

Figure 5 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC Cell Shared* state.
- Mobile station is camped on a CCCH or a PCCCH.
- GERAN will assign a dedicated channel.

Figure 5: Incoming voice call – *RRC Cell Shared,* assign dedicated channel



Line	Description	Protocol and Channel
1	Initiate voice call Lloyd's customer calls while Lloyd is checking the status of a customer order. The customer's terminal equipment initiates the voice call.	
2	Paging *{CN domain indicator, permanent NAS UE identity, temporary UE identity, paging area ID, paging cause, non-searching indication, DRX cycle-length coefficient}* Same as § 2.1.1 1 line 2.	RANAP *Iu-cs*
3	Paging request *{page mode, channel needed, mobile identity, P1 rest octets}* Since the GERAN RRC is in *RRC cell shared* state for this IMSI, it knows where the mobile station is. It therefore sends a *paging request* on the paging channel the mobile station is monitoring. Upon receipt of the *paging request*, the MS RRC informs its non-access stratum that the core network has paged it. The MS NAS responds to the page. *Channel needed* indicates *any channel*. The mobile station ignores this value. *Mobile identity* is the G-RNTI. <44.018 does not presently allow paging with G-RNTI.>	RRC CCCH (PCH)
3	Packet paging request *{page mode, persistence level, NLN, page info (TBF or dedicated, mobile identity, channel needed)}* Since the GERAN RRC is in *RRC cell shared* state for this IMSI, it knows where the mobile station is. It therefore has MAC send a *packet paging request* on the paging channel the mobile station is monitoring. Upon receipt of the *packet paging request*, the MS MAC informs its non-access stratum that the core network has paged it. The MS NAS responds to the page. *TBF or dedicated* indicates establishment of a dedicated connection. *Mobile identity* is the G-RNTI. <44.060 does not presently allow paging with G-RNTI.> *Channel needed* indicates SDCCH.	MAC PCCCH (PPCH)
5	Channel request *{establishment cause, random reference}* Same as § 2.1.1 line 5.	RRC CCCH (RACH)
7	Immediate assignment *{page mode, dedicated mode or TBF, channel description, request reference, timing advance, mobile allocation, starting time, IA rest octets (frequency parameters before time)}* Same as § 2.1.1 line 7.	RRC CCCH (AGCH)
9	Initial direct transfer *{CN domain identity, intra-domain NAS node selector, NAS message}* Same as § 2.1.1 line 15. <How does RB3, which was being carried over a shared physical subchannel and was being used to signal the packet CN, now get carried over an SDCCH for signalling the circuit CN?>	RRC RB3 (SDCCH)
10	Initial UE message *{CN domain indicator, LAI, SAI, NAS-PDU, Iu signalling-connection identifier, Global RNC-ID}*	RANAP *Iu-cs*

2.1.6 Incoming voice call – *RRC Cell Shared,* PCCCH, assign TBF

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call while checking the status of a customer's order.

Figure 6 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC Cell Shared* state.
- Mobile station is camped on a PCCCH.
- GERAN will assign a temporary block flow.

Figure 6: Incoming voice call – *RRC Cell Shared,* PCCCH, assign TBF

Line	Description	Protocol and Channel

2.1.7 Incoming voice call – *RRC Cell Shared,* PACCH, assign TBF

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call while checking the status of a customer's order.

Figure 7 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC Cell Shared* state.
- Mobile station is monitoring a PACCH.
- GERAN will assign a temporary block flow.

Figure 7: Incoming voice call – *RRC Cell Shared,* PACCH, assign TBF

Line	Description	Protocol and Channel

2.1.8 Incoming voice call – *RRC GRA_PCH*, assign dedicated channel

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call.

Figure 8 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC GRA_PCH* state.
- Mobile station is monitoring a CCCH or a PCCCH.
- GERAN will assign a dedicated channel.

Figure 8: Incoming voice call – *RRC GRA_PCH,* assign dedicated channel

Line	Description	Protocol and Channel

2.1.9 Incoming voice call – *RRC GRA_PCH*, assign TBF

This sequence corresponds to the following user-based scenario: Lloyd receives a voice call.

Figure 9 shows the paging-related portion of an incoming voice call under the following conditions:

- RRC is in *RRC GRA_PCH* state.
- Mobile station is monitoring a CCCH or a PCCCH.
- GERAN will assign a temporary block flow.

Figure 9: Incoming voice call – *RRC GRA_PCH,* assign TBF

Line	Description	Protocol and Channel

2.1.10 Incoming data transfer – *RRC Idle*

<tbd>

2.1.11 Incoming data transfer – *RRC Dedicated*

<tbd>

2.2 System-based sequences

These sequences derive from the system-based requirements of § 1.3 and the scenarios of § 1.5. This section only includes sequences that do not directly derive from user-based scenarios.

2.3 Miscellaneous

Clarify Network Operation Mode I and II in *Iu mode*. Mode II implies no PBCCH and coordinated paging between MSC and SGSN. In *Iu mode*, we have a PBCCH and the BSS coordinates paging, so if we want to keep Network Operation Mode II in *Iu mode*, we will have to redefine it. One option may be to exclude Network Operation Mode II in *Iu mode*.

3. Impact on Specifications

3.1 Changes to 24.008

<tbd>

3.2 Changes to 25.413

<tbd>

3.3 Changes to 44.018

<tbd>

3.4 Changes to 44.060

<tbd>

4. References

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