

## OsmoBTS - Feature #3075

### do not transmit SI13 when the PCU is not connected

03/19/2018 12:17 AM - neels

<b>Status:</b> Resolved	<b>Start date:</b> 03/19/2018
<b>Priority:</b> Normal	<b>Due date:</b>
<b>Assignee:</b> laforge	<b>% Done:</b> 100%
<b>Category:</b>	
<b>Target version:</b>	
<b>Spec Reference:</b>	
<b>Description</b> Looking at the scenario described in <a href="#">#3042</a> : <ul style="list-style-type: none"><li>• two BTS, both configured for GPRS.</li><li>• none of them having an osmo-pcu running along.</li><li>• result: subscriber continuously does Location Updates between the two in an attempt to establish working data service. Do not send SI13 when the PCU is not connected, and see if that stops the cell hopping in the lack of a PCU.</li></ul>	
<b>Related issues:</b>	
Related to Cellular Network Infrastructure - Bug #3042: in the presence of tw...	<b>Rejected</b> 03/08/2018
Related to OsmoBTS - Bug #4032: RLL/LAPDm ABM has no TTCN3 tests	<b>Resolved</b> 05/29/2019

#### Associated revisions

##### Revision [fdf8b7b1](#) - 01/12/2019 09:51 AM - Stefan Sperling

port arfcn range encode support from osmo-bsc

As part of fixing issue OS#3075, we want to migrate support for encoding system information from osmo-bsc to libosmocore.

This change ports one of the prerequisites for doing so: osmo-bsc code for range-encoding ARFCNs, including tests.

An osmo\_gsm48\_ prefix has been prepended to public symbols in order to avoid clashes with existing symbols in osmo-bsc code.

Change-Id: [Ia220764fba451be5e975ae7c5eefb1a25ac2bf2c](#)  
Related: OS#3075

##### Revision [bd6e7a9f](#) - 01/12/2019 09:51 AM - Stefan Sperling

port rest octets encoding code from osmo-bsc

As part of fixing issue OS#3075, we want to migrate support for encoding system information from osmo-bsc to libosmocore.

This change ports osmo-bsc code for encoding SI rest octets.

The conversion was a bit tricky in some places because some functions receive a 'struct gsm\_bts' parameter in osmo-bsc. In this libosmocore version, such functions expect parameters which correspond to the individual fields of 'struct gsm\_bts' which are used by these functions.

Several structs from osmo-bsc's system\_information.h are now also declared in libosmocore headers, with an added osmo\_ prefix to avoid collisions with existing definitions in osmo-bsc.

Some helpers were ported from osmo-bsc's system\_information.c to libosmocore's gsm48\_rest\_octets.c. Contrary to osmo-bsc's implementation they are now only visible within this file.

Unfortunately, this code ported from osmo-bsc lacks unit tests.

Change-Id: [I47888965ab11bba1186c21987f1365c9270abeab](#)  
Related: OS#3075

**Revision 1e96e31c - 05/28/2019 05:59 PM - laforge**

clear GPRS indicator in SI3 while PCU is disconnected

osmo-bts cannot provide GPRS service while osmo-pcu is not connected.  
The BSC has no knowledge of the PCU connection state. Prevent MSs from trying to register for GPRS while the PCU is disconnected by erasing the GPRS Indicator in SI3.

Change-Id: I1a6f5c636c0fe098ee31c280d4572a3f8122b44b  
Depends: I690cf308311f910005a325d50f5d5d825678d2b2 (libosmocore.git)  
Depends: I08e0ca9a8d13c7aa40b9d90f34f0e13adb87d4e0 (libosmocore.git)  
Depends: I8b1ee2405f6338507e9dfb5f1f437c4c2db2e330 (libosmocore.git)  
Related: OS#3075

**Revision 1276c17b - 05/28/2019 06:02 PM - laforge**

rest\_octets: Use correct symbols names for range encoder

As gsm48\_rest\_octets.c is not listed in the Makefile.am, it's never actually compiled and we never noticed that it's calling functions by symbol names that don't exist ./

Change-Id: I7b1e436f70e0c60979261db87606f38271ec47d3  
Related: OS#3075

**Revision f85b33f6 - 05/28/2019 06:02 PM - laforge**

rest\_octets: Add function to parse SI3 rest octets

Change-Id: I690cf308311f910005a325d50f5d5d825678d2b2  
Related: OS#3075  
Related: OS#4023

**Revision 5e1cd5e4 - 10/15/2020 06:01 AM - laforge**

gsm48\_rest\_octets: Add parser for SI4 rest octets

Introduces osmo\_gsm48\_rest\_octets\_si4\_decode()

Change-Id: I9d6ed06731ae15fdcef1a1f397d6ac2b7b1ca980  
Related: OS#3075

**Revision 1ab64126 - 10/15/2020 06:07 AM - laforge**

sysinfo: Only send SI13 if PCU is connected

If no PCU is connected, we cannot be providing GPRS services, and hence should not transmit SI13.

Change-Id: I54320cf8073a33ed9e35b365921df178005e8967  
Closes: OS#3075

**Revision 9a7acc17 - 10/15/2020 11:29 AM - laforge**

sysinfo: Don't broadcast SI4 GPRS INDICATOR if PCU is disconnected

Depends: libosmocore.git I9d6ed06731ae15fdcef1a1f397d6ac2b7b1ca980  
Change-Id: I1fd513ea03297918d15d4b28ed454f9b6dd6ebfa  
Related: OS#3075

**Revision 3f6a282a - 12/23/2020 12:39 PM - Pau Espin Pedrol**

Revert "rest\_octets: fix encoding of 3G Early Classmark Sending Restriction"

This reverts commit c9eab828ea4a9f508a013cf5cc1e0384a0e62e4c.

The initial code was correct, which has also been used in osmo-bsc until recently, where it moved to use this function from libosmocore and errors started to show up in TTCN3 tests.

See 3GPP TS 44.018 Section 10.5.2.34 / Table 10.5.2.34.1: "SI 3 Rest Octets information element":

\*\*\*\*

<SI3 Rest Octet> ::=

...  
<3G Early Classmark Sending Restriction>

<3G Early Classmark Sending Restriction>::= L | H;

Change-Id: I0ee48d3240c62c4d2e15063b26da7a2a617f383e  
Related: OS#3075  
Related: SYS#4021

### Revision 129cb515 - 01/02/2021 11:46 PM - laforge

sysinfo.c: Fix SI4 GPRS patching which overwrote CBCH IE

In Change-Id I1fd513ea03297918d15d4b28ed454f9b6dd6ebfa we introduced patching of SI4 to indicate GPRS presence in terms of PCU connection status. Unfortauntely this didn't account for optional IEs being present in SI4, and hence overwrote any CBCH related information elements, if present.

This in turn meant that since the above-mentioned commit, you could have either a GPRS-capable, network, or a Cell Broadcast capable one.

Change-Id: I0ee0cf736e2fb74a6759a68101f699b4ec2ef54e  
Related: OS#3075

## History

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### #1 - 03/19/2018 12:17 AM - neels

- Related to Bug #3042: in the presence of two BTS, a subscribed phone seems compelled to repeatedly Location Update every ~15 seconds added

### #2 - 03/19/2018 11:30 AM - laforge

Even more important than not sending SI13 is to not send the indication that SI13 is present (In SI3 or SI4, AFAIR).

### #3 - 06/23/2018 06:51 PM - laforge

- Assignee set to stsp

### #4 - 07/20/2018 01:56 PM - stsp

neels wrote:

Do not send SI13 when the PCU is not connected

As far as I understand, `rs_l_rx_bcch_info()` attempts to tell the PCU to send SI13, which will always fail as long as the PCU socket is disconnected. Once the PCU comes up, `pcu_rx_txt_ind()` will immediately ask the PCU to send SI13.

laforge wrote:

Even more important than not sending SI13 is to not send the indication that SI13 is present (In SI3 or SI4, AFAIR).

This indication is present in SI3 (see `gsm_generate_si()` in `osmo-bsc/system_information.c`).

However, the code which generates SI3 lives in `osmo-bsc`, based on the `gprs` type of the BTS. There doesn't seem to be a way to monitor the PCU socket status from `osmo-bsc`, Is that possible somehow? Or should the BTS be modifying the SI3 which was provided by the BSC?

### #5 - 07/20/2018 01:56 PM - stsp

- Status changed from New to In Progress

### #6 - 07/20/2018 02:47 PM - neels

Ok I see, depending on 'gprs mode (none|gprs|egprs)', `osmo-bsc` composes an SI3 to indicate GPRS service. So the situation is about a failing GPRS service, where `osmo-bsc` expects the PCU to work, but it crashed/is broken/unreachable.

My personal intuition would be that osmo-bts masks the SI3 to indicate no GPRS as long as the PCU isn't connected.

But I'm not sure if that's a good idea semantically, it's a bit of a layering violation.

Maybe some custom non-standard message could tell the BSC that the PCU is down and osmo-bsc masks the SI3 instead?

Patching over SI3 in osmo-bts is certainly the easiest.

...not sure...

On the need to fix: at first I thought it's not critically important, but when in practice a GPRS service breaks down, it would potentially also take down voice with it, because all the phones would start to constantly LU at different cells, trying to catch a working PCU, which would load the network and could disrupt service. So I think in terms of infrastructure stability it's pretty bad to indicate GPRS presence if the BTS knows that the PCU is down.

#### **#7 - 07/26/2018 03:05 PM - stsp**

I don't think coupling this behaviour to osmo-bsc would be wise.

What if osmo-bts runs with a BSC from another vendor?

This patch makes the BTS override the GPRS indicator in SI3: <https://gerrit.osmocom.org/#/c/osmo-bts/+/10170>

Parsing SI3 rest octets is a bit ugly but I don't see a better solution.

#### **#8 - 07/27/2018 10:49 AM - stsp**

To make the proposed patch nice we'll need to port some code from osmo-bsc to libosmocore first.

This is step one of that porting process: <https://gerrit.osmocom.org/c/libosmocore/+/10185>

#### **#9 - 07/27/2018 01:09 PM - neels**

just noticing, there's also a GPRS presence indicator in the rest octets in SI4

#### **#10 - 07/27/2018 02:25 PM - stsp**

This patch ports rest-octet encoding from osmo-bsc to libosmocore: <https://gerrit.osmocom.org/#/c/libosmocore/+/10189>

#### **#11 - 08/07/2018 10:11 AM - stsp**

This issue is currently waiting for confirmation from several authors to allow us to re-licence their code from AGPL to GPLv2+.

#### **#12 - 10/09/2018 06:43 AM - stsp**

This issue is still waiting for a response from Jolly to our question about the license change.

#### **#13 - 11/20/2018 09:11 AM - stsp**

We haven't received a written statement by Jolly yet. Still waiting.

#### **#14 - 12/30/2018 12:28 PM - stsp**

Got permission from Jolly :)

#### **#15 - 02/14/2019 11:11 AM - laforge**

#### **#16 - 05/08/2019 06:10 PM - laforge**

- Status changed from In Progress to Stalled

- Assignee changed from stsp to sysmocom

- % Done changed from 0 to 20

#### **#17 - 05/28/2019 10:36 PM - laforge**

- Status changed from Stalled to In Progress

- Assignee changed from sysmocom to laforge
- % Done changed from 20 to 80

A new, updated patch has been submitted as <https://gerrit.osmocom.org/#/c/osmo-bts/+10170/> and tested using newly-developed TTCN-3 tests from <https://gerrit.osmocom.org/#/c/osmo-ttcn3-hacks/+14215/>

#### #18 - 05/29/2019 02:10 PM - laforge

- Status changed from In Progress to Resolved
- % Done changed from 80 to 100

both patch and test have been merged.

#### #19 - 05/29/2019 02:19 PM - laforge

- Related to Bug #4032: RLL/LAPDm ABM has no TTCN3 tests added

#### #20 - 03/29/2020 01:18 PM - fixeria

- Status changed from Resolved to New
- % Done changed from 100 to 80

I just noticed that **System Information Type 4** still contains GPRS Indicator while osmo-pcu is not connected. Also, **System Information Type 13** is still being transmitted by osmo-bts-trx (is it expected?). **System Information Type 3** contains no GPRS Indicator as expected.

Updated by neels over 1 year ago  
just noticing, there's also a GPRS presence indicator in the rest octets in SI4

#### #21 - 05/04/2020 06:26 PM - fixeria

- % Done changed from 80 to 90

I've extended the existing TTCN-3 test cases to check GPRS Indicator in SI4 Rest Octets too, see:

- <https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18027> BTS: manually compose Rest Octets for SI Type 3 and 4
- <https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18028> BTS: fix missing GPRS Indicator in SI4 Rest Octets
- <https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18029> BTS: refactor f\_get\_si3(), so it can be used to get SI4
- <https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18030> BTS: verify presence of GPRS Indicator in SI4 Rest Octets

#### #22 - 05/04/2020 06:45 PM - fixeria

- File si3\_rest\_octets.pcapng.gz added

I also noticed that osmo-bts changes unrelated "3G Early Classmark Sending Restriction" field in SI3 Rest Octets:

SI 3 Rest Octets

```
L... .... = Selection Parameters: Not Present
.L... .... = Optional Power Offset: Not Present
..L... .... = SYSTEM INFORMATION TYPE 2ter: Not available
...L... .... = Early Classmark Sending: Not Allowed
.... L... = Scheduling if and where: Not Present
.... .H.. = GPRS Indicator: Present
GPRS Indicator
.... ..00 0... .... = GPRS RA Colour: 0
..0... .... = SI13 Position: SYSTEM INFORMATION TYPE 13 message is sent on BCCH Norm (0)
..L... .... = 3G Early Classmark Sending Restriction: Neither UTRAN, CDMA2000 nor GERAN IU MODE CLASSMARK CHANGE message shall be sent with the Early classmark sending
...L... .... = SI2quater Indicator: Not Present
.... L... = SI21 Indicator: Not Present
Padding Bits: default padding
```

vs

SI 3 Rest Octets

```
L... .... = Selection Parameters: Not Present
.L... .... = Optional Power Offset: Not Present
..L... .... = SYSTEM INFORMATION TYPE 2ter: Not available
...L... .... = Early Classmark Sending: Not Allowed
.... L... = Scheduling if and where: Not Present
```

```
.... .L.. = GPRS Indicator: Not Present
.... ..H. = 3G Early Classmark Sending Restriction: The sending of UTRAN,CDMA2000 and GERAN IU MODE CL
ASSMARK CHANGE messages are controlled by the Early Classmark Sending Control parameter
.... ...L = SI2quater Indicator: Not Present
0... .... = SI13alt Position: If Iu mode is supported in the cell, SYSTEM INFORMATION TYPE 13alt messa
ge is sent on BCCH Norm
.L... .... = SI21 Indicator: Not Present
Padding Bits: default padding
```

**#23 - 05/04/2020 07:05 PM - fixeria**

I also noticed that osmo-bts changes unrelated "3G Early Classmark Sending Restriction" field in SI3 Rest Octets:

<https://gerrit.osmocom.org/c/libosmocore/+/18036> rest\_octets: fix encoding of 3G Early Classmark Sending Restriction

**#24 - 10/11/2020 07:20 PM - laforge**

- <https://gerrit.osmocom.org/c/libosmocore/+/20541>
- <https://gerrit.osmocom.org/c/osmo-bts/+/20542>
- <https://gerrit.osmocom.org/c/osmo-bts/+/20542>

**#25 - 02/06/2021 11:14 AM - laforge**

- Status changed from New to Resolved

- % Done changed from 90 to 100

all patches merged

**Files**

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si3_rest_octets.pcapng.gz	443 Bytes	05/04/2020	fixeria
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