

## OsmoBTS - Bug #1575

### Correctly handle BS\_AG\_BLKES\_RES (AGCH/PCH split in DL CCCH)

02/23/2016 03:37 PM - laforge

<b>Status:</b> Stalled	<b>Start date:</b> 02/23/2016
<b>Priority:</b> Normal	<b>Due date:</b>
<b>Assignee:</b>	<b>% Done:</b> 90%
<b>Category:</b>	
<b>Target version:</b>	
<b>Spec Reference:</b>	
<b>Description</b> there are several assumptions that BS_AG_BLKES_RES==1 in the code. Fix them in order to support more AGCH slots  I think this feature may be important for larger deployments. Sooner or later you might want to have a different (but static) or a dynamic balancing between AGCH and PCH load on the downlink CCCH. For a single-TRX cell it is probably unlikely that AGCH load will be very high, but the more TRX you have (and imagine extreme situations with 2TRX and many SDCCH/8) we might run into the limitation.	
<b>Related issues:</b>	
Related to OsmoBTS - Feature #2366: OsmoBTS lacks EXTENDED BCCH support	<b>New</b> 07/15/2017
Related to OsmoBSC - Feature #1611: be more efficient in batching IMMEDIATE A...	<b>Rejected</b> 02/23/2016

#### History

##### #1 - 10/11/2016 10:00 AM - laforge

- Assignee set to msuraev

##### #2 - 10/12/2016 03:49 PM - msuraev

- Status changed from New to In Progress

- % Done changed from 0 to 10

Should I implement static or dynamic variant? What should happen if new value for "channel-description bs-ag-blks-res" is entered in OpenBSC vty?

##### #3 - 10/12/2016 04:05 PM - msuraev

Static variant sent for review as gerrit #1047. Not strictly speaking required, but handy for debugging is extended logging from gerrit #1043.

##### #4 - 10/17/2016 02:47 PM - msuraev

- % Done changed from 10 to 20

Preliminary variant sent for review in gerrit #1099. Missing bits:

- it's unclear how/if octphy support different number of AGCH (equivalent of lch\_par->agch.u8NbrOfAgch)

- it's unclear if/how we have to activate/deactivate lchan for osmo-trx (equivalent of sapi\_deactivate\_cb())

Current implementation is somewhat ugly because we 1st unconditionally activate CCCH before knowing SI3 with proper number of AGCH. When we finally receive AGCH value from SI3 we deactivate channel and then activate it again. osmo-bts-trx seems to be different in this regard - maybe we do not have to use reactivation hack in there. Also, once this early auto-activation hack is removed we can streamline this code.

##### #5 - 11/08/2016 05:37 PM - msuraev

- Status changed from In Progress to Stalled

##### #6 - 12/01/2016 05:16 PM - msuraev

- % Done changed from 20 to 50

Support for lc15 and sysmo has been merged.

Octphy: waiting for vendor response.

Osmo-trx: waiting for vendor response.

**#7 - 03/14/2017 02:23 PM - laforge**

I guess you need to follow-up with Octphy and Osmo-TRX folks regularly to make sure this doesn't stay stalled forever.

**#8 - 06/27/2017 01:22 PM - msuraev**

Related gerrit 3067 has been sent for review.

**#9 - 07/15/2017 10:42 AM - laforge**

- Related to Feature #2366: OsmoBTS lacks EXTENDED BCCH support added

**#10 - 08/29/2017 03:24 PM - laforge**

- Status changed from Stalled to In Progress

patches in gerrit under review, not stalled.

**#11 - 09/04/2017 04:10 PM - msuraev**

- Checklist item [x] support in osmo-bts-litecell15 added

Checklist item [ ] support in osmo-bts-octphy added

Checklist item [x] support in osmo-bts-sysmo added

Checklist item [x] support in osmo-bts-trx added

Checklist item [ ] support in osmo-bts-virtual added

- % Done changed from 50 to 60

**#12 - 09/22/2017 10:51 AM - msuraev**

- Status changed from In Progress to Stalled

The octphy support requires vendor cooperation.

The virtphy support is planned. Might make sense to add corresponding TTCN-3 test if time permits.

**#13 - 10/11/2017 08:32 AM - laforge**

- Checklist item deleted (support in osmo-bts-octphy)

- Priority changed from Normal to High

please add it to -virtual and extend the TTCN-3 test to cover it.

I've dropped the OCTPHY topic. I presume you had inquired them regarding this at the time you were working on the code? If not, please make sure they are aware we're waiting for them to add support to the PHY.

**#14 - 10/11/2017 11:59 AM - msuraev**

I presume you had inquired them regarding this at the time you were working on the code?

Yes, twice actually. Although it's been a while ago so I'm pretty sure they forgot about it by now. Dexter, can you please ping them again? The question is basically "how do we instruct octphy l1 that it should use X AGCH channels (as in 3GPP TS 45.002 §3.3.2.3 a)BS\_AG\_BLK\_RES)?" or "is that supported by some fw version already?".

**#15 - 10/11/2017 01:34 PM - dexter**

I wrote Jason an email, maybe he can give us more information about this or even point us to the right places in the documentaion/header files.

**#16 - 10/23/2017 09:00 PM - laforge**

- Related to Feature #1611: be more efficient in batching IMMEDIATE ASSIGN REJECT messages added

**#17 - 12/03/2017 09:57 AM - laforge**

- Checklist item [x] support in osmo-bts-octphy added

- Status changed from Stalled to In Progress

Regarding Octphy: The response was that there is no different L1 SAPI between AGCH and PCH, so we don't need to inform/instruct the PHY about where higher layers put the split.

Instead, both AGCH and PCH are leading to PH-RTS.ind of type cOCTVC1\_GSM\_SAPI\_ENUM\_PCH\_AGCH. AFAICT, in osmo-bts-octphy/l1\_if.c:chan\_nr\_by\_sapi() we map this to cbits=0x12 which is "Downlink CCCH (AGCH/PCH)". So it "should simply work".

I've pushed a change lc1038b8dc57bdaf05493cd8479355b960275ea41 that simply removes the related warning, see <https://gerrit.osmocom.org/5148>

osmo-bts-virtual (and related test case) thus remains the only open tasks here. Please get that done.

**#18 - 12/11/2017 02:56 PM - msuraev**

- Status changed from In Progress to Stalled

**#19 - 03/01/2018 11:14 PM - laforge**

- Assignee changed from msuraev to sysmocom

**#20 - 07/04/2018 01:07 PM - laforge**

- Assignee changed from sysmocom to dexter

**#21 - 08/27/2018 03:32 PM - dexter**

I have figured out how the paging and access grant channels should be laid out. I hope my understanding is correct here:

```
=====
== TDMA frame mapping for FCCH + SCH + BCCH + CCCH ==
=====
```

F = FCCH  
H = SCH  
B = BCCH  
C = CCCH  
D = SDCCH  
S = SACCH  
I = Idle

A = AGCH  
P = PCH

```
          1         2         3         4         5
012345678901234567890123456789012345678901234567890
          v         v         v
```

```
FHBBBBCCCCFHCCCCCCCCFHCCCCCCCCFHCCCCCCCCFHCCCCCCCCI
0000 11112222 33334444 55556666 77778888 (B0 ... B8)
PPPP PPPPPPPP PPPPPPPP PPPPPPPP PPPPPPPP BS_AG_BLK_RES = 0
AAAA PPPPPPPP PPPPPPPP PPPPPPPP PPPPPPPP BS_AG_BLK_RES = 1
AAAA AAAAPPPP PPPPPPPP PPPPPPPP PPPPPPPP BS_AG_BLK_RES = 2
AAAA AAAAAAAAA PPPPPPPP PPPPPPPP PPPPPPPP BS_AG_BLK_RES = 3
AAAA AAAAAAAAA AAAAPPPP PPPPPPPP PPPPPPPP BS_AG_BLK_RES = 4
AAAA AAAAAAAAA AAAAAAAAA PPPPPPPP PPPPPPPP BS_AG_BLK_RES = 5
AAAA AAAAAAAAA AAAAAAAAA AAAAPPPP PPPPPPPP BS_AG_BLK_RES = 6
AAAA AAAAAAAAA AAAAAAAAA AAAAAAAAA PPPPPPPP BS_AG_BLK_RES = 7
```

```
=====
== TDMA frame mapping for FCCH + SCH + BCCH + CCCH + SDCCH/4(0...3) + SACCH/4(0...3) ==
=====
```

F = FCCH  
H = SCH  
B = BCCH  
C = CCCH  
D = SDCCH  
S = SACCH  
I = Idle

A = AGCH  
P = PCH

```

      1       2       3       4       5       6       7       8       9       0
01234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901
      v       v       v       v       v       v       v       v       v       v

FHBBBBCCCCFHCCCCCCCFFHDDDDDDDDFHDDDDDDDDFHDDDDDDDDIFHBBBBCCCCFHCCCCCCCFFHDDDDDDDDFHDDDDDDDDFHDDDDDDDDI
0000 11112222                0000 11112222                (B0 ..
. B2)
  PPPP  PPPPPPPP                PPPP  PPPPPPPP                BS_AG_
BLKS_RES = 0
  AAAA  PPPPPPPP                PPPP  PPPPPPPP                BS_AG_
BLKS_RES = 1
  AAAA  AAAAPPPP                PPPP  PPPPPPPP                BS_AG_
BLKS_RES = 2

```

```

Example #1:
FN: MOD102: BLOCK:
165 63      B1
216 12      B1
220 16      B2
267 63      B1
271 67      B2
318 12      B1
322 16      B2
369 63      B1
372 66      B2
420 12      B1
424 16      B2
==> B0 is never used for paging ==> BS_AG_BLS_RES = 1

```

```

Example #2:
FN: MOD102: BLOCK:
573 63      B1
577 67      B2
624 12      B1
628 16      B2
675 63      B1
679 67      B2
726 12      B1
730 16      B2
777 63      B1
828 12      B1
832 16      B2
==> B0 is never used for paging ==> BS_AG_BLS_RES = 1

```

I did an experiment. I have set BS\_AG\_BLS\_RES = 2 via the osmo-bsc VTY and ran BTS\_Tests.TC\_paging\_imsi\_200percent. The result looks like BS\_AG\_BLS\_RES = 1, so there is indeed something wrong here.

**#22 - 08/30/2018 02:41 PM - dexter**

At least for the osmo-bts-trx/faketrx/trxcon case I can say that it works now. The reason why it did not work last time is that the setting for bs\_ag\_bls\_res is quite confusing. It is not set via OML, so setting it via osmo-bsc.cfg does not change anything. The parameter must be changed in BTS\_tests.ttcn as well at two places (for the test and for the SI3). Once this is changed correctly osmo-bts receives the parameter correctly and behaves accordingly.

**#23 - 08/30/2018 02:42 PM - dexter**

For the ttcn3 test I have simplified the things a bit: <https://gerrit.osmocom.org/10707>

**#24 - 08/31/2018 10:12 AM - dexter**

- Status changed from Stalled to In Progress
- % Done changed from 60 to 80

I have added now a unit-test. We see the expected behavior for all possible bs\_ag\_bls\_res settings, which is very good.

<https://gerrit.osmocom.org/#/c/osmo-bts/+10724> paging: add unit-test to check different bs\_ag\_bls\_res settings

**#25 - 08/31/2018 01:32 PM - dexter**

- Checklist item [x] support in osmo-bts-virtual set to Done
- % Done changed from 80 to 100

I have also checked the support for osmo-bts-virtual with an experiment. I have set different values for bs\_ag\_blks\_res, started osmo-bts-virtual and observed the frame number of the emitted GSMTAP frames. The frame numbers of the paging channel (dummy pagings) all fell into the correct range. I have tested with bs\_ag\_blks\_res=1 and bs\_ag\_blks\_res=2.

Since the decision when to send pagings to the phy is made in l1sap.c:l1sap\_ph\_rts\_ind() it is common code we can be very sure that the behavior of osmo-bts-virtual will not be different from other BTS. So I think we can conclude that bs\_ag\_blks\_res is correctly handled in osmo-bts-virtual.

To increase the test coverage a bit I have added a check to BTS\_Tests.ttcn that checks if the pagings on L1CTL actually fall into the PCH and not in the AGCH or even BCCH. We currently only check with bs\_ag\_blks\_res=1. See also:

<https://gerrit.osmocom.org/#/c/osmo-ttcn3-hacks/+/10726> BTS\_Tests: check paging channel fn (bs\_ag\_blks\_res)

#### #26 - 08/31/2018 04:04 PM - dexter

- % Done changed from 100 to 90

While osmo-bts-trx seems to work just fine inside the TTCN3 tests we still have problems. When I set

```
bts 1
channel-description bs-ag-blks-res 2
```

The phone does not register anymore. So I think we have another problem that is related to bs-ag-blks-res. Here is a sample from the log:

```
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802121/1359/09/36/33 Too many contiguous elapsed fn, dropping
297
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802142/1359/04/06/02 Too many contiguous elapsed fn, dropping
49
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802144/1359/06/08/04 Too many contiguous elapsed fn, dropping
420
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802175/1359/11/39/35 Too many contiguous elapsed fn, dropping
31
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802205/1359/15/18/13 Too many contiguous elapsed fn, dropping
596
Fri Aug 31 17:43:58 2018 <0000> rsl.c:2672 (bts=0,trx=0,ts=0,ss=4) (NONE) is not active . Dropping message.
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802207/1359/17/20/15 Too many contiguous elapsed fn, dropping
32
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802225/1359/09/38/33 Too many contiguous elapsed fn, dropping
584
Fri Aug 31 17:43:58 2018 <0007> scheduler.c:877 1802285/1359/17/47/45 Too many contiguous elapsed fn, dropping
143
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802337/1359/17/48/45 Too many contiguous elapsed fn, dropping
130
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802339/1359/19/50/47 Too many contiguous elapsed fn, dropping
984
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802352/1359/06/12/08 Too many contiguous elapsed fn, dropping
231
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802426/1359/02/35/30 Too many contiguous elapsed fn, dropping
74
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802446/1359/22/04/50 Too many contiguous elapsed fn, dropping
447
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802460/1359/10/18/12 Too many contiguous elapsed fn, dropping
255
Fri Aug 31 17:43:59 2018 <0000> rsl.c:2672 (bts=0,trx=0,ts=0,ss=4) (NONE) is not active . Dropping message.
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802533/1359/05/40/37 Too many contiguous elapsed fn, dropping
87
Fri Aug 31 17:43:59 2018 <0007> scheduler.c:877 1802535/1359/07/42/39 Too many contiguous elapsed fn, dropping
109
Fri Aug 31 17:44:00 2018 <0007> scheduler.c:877 1802621/1359/15/26/21 Too many contiguous elapsed fn, dropping
747
Fri Aug 31 17:44:00 2018 <0007> scheduler.c:877 1802655/1359/23/09/03 Too many contiguous elapsed fn, dropping
195
Fri Aug 31 17:44:00 2018 <0007> scheduler.c:877 1802712/1359/02/15/08 Too many contiguous elapsed fn, dropping
57
Fri Aug 31 17:44:00 2018 <0000> rsl.c:2672 (bts=0,trx=0,ts=0,ss=4) (NONE) is not active . Dropping message.
Fri Aug 31 17:44:00 2018 <0007> scheduler.c:877 1802744/1359/08/47/40 Too many contiguous elapsed fn, dropping
459
Fri Aug 31 17:44:00 2018 <0007> scheduler.c:877 1802748/1359/12/00/44 Too many contiguous elapsed fn, dropping
411
Fri Aug 31 17:44:01 2018 <0007> scheduler.c:877 1802787/1359/25/39/35 Too many contiguous elapsed fn, dropping
75
Fri Aug 31 17:44:01 2018 <0007> scheduler.c:877 1802828/1359/14/29/24 Too many contiguous elapsed fn, dropping
80
Fri Aug 31 17:44:01 2018 <0007> scheduler.c:877 1802902/1359/10/01/46 Too many contiguous elapsed fn, dropping
677
Fri Aug 31 17:44:01 2018 <0007> scheduler.c:877 1802938/1359/20/37/30 Too many contiguous elapsed fn, dropping
```

I run the following channel combinations:

```
timeslot 0
  phys_chan_config CCCH+SDCCH4
  hopping enabled 0
timeslot 1
  phys_chan_config SDCCH8
  hopping enabled 0
timeslot 2
```

bs-ag-blks-res = 2 should be a legal setting, even if I would only use CCCH+SDCCH4 with no SDCCH8. I have tested on a sysmobts as well, there it worked, but the image on that BTS is not very recent.

**#27 - 10/29/2018 01:28 PM - dexter**

- *Status changed from In Progress to Stalled*

**#28 - 09/04/2019 09:15 AM - laforge**

- *Assignee deleted (dexter)*

- *Priority changed from High to Normal*