

OsmoBTS - Bug #1622

OsmoBTS power control non-compliant to TS 05.08 and TS 08.58

02/23/2016 04:30 PM - laforge

Status: Resolved	Start date: 02/23/2016
Priority: Normal	Due date:
Assignee: pespin	% Done: 100%
Category:	
Target version:	
Spec Reference:	
Description	
The way how OsmoBTS interprets the A-bis RSL information elements regarding MS and BS power control is wrong. For a description of the current behavior, see http://openbsc.osmocom.org/trac/wiki/GsmPowerControl Furthermore, even the actual power control loop is completely simplistic, results in oscillations and doesn't implement any of the configurable averaging as specified in TS 05.08. What needs to be done is: correctly parse and interpret the various MS / BS power related IEs on RSL implement Annex A of TS 05.08 (measurement averaging, MS power control)	
Related issues:	
Related to OsmoBTS - Feature #1851: generalize power control and TA loop code	In Progress 11/18/2016
Related to OsmoBTS - Feature #3750: Extension of BTS_Tests.ttcn test coverage	In Progress 01/08/2019

History

#1 - 02/23/2016 04:30 PM - laforge

migrated to <https://projects.osmocom.org/issues/1622>

#2 - 08/17/2017 06:48 AM - laforge

#3 - 12/11/2018 01:38 PM - laforge

- Assignee set to *sysmocom*

- Priority changed from *Normal* to *High*

#4 - 12/12/2018 06:40 AM - laforge

- Assignee changed from *sysmocom* to *dexter*

assigning to [dexter](#)

#5 - 12/12/2018 10:04 PM - laforge

- Related to Feature #1851: generalize power control and TA loop code added

#6 - 12/12/2018 10:07 PM - laforge

See `src/osmo-bts-trx/loops.c`, where `'ms_power_diff()'` computes the difference between the MS receive power target value and store it in `lchan->ms_power_ctrl.current`.

Admittedly, `loops.c` is one of the parts of the `osmo-bts` code bases that are rather hard to read and of bad structure. See [#1851](#) for another related issue to generalize and refactor those loops, particularly also across `BTS` models.

The code in `src/common/l1sap.c:l1sap_ph_rts_ind()` then patches this value into the L1 header of every downlink SACCH block:

```
p0 = lchan->ms_power_ctrl.current
```

Since the function that sets the MS power level `bts_model_adjst_ms_pwr()` is

a stub. This function is called by power_control.c and by rsl.c when the BSC wants to set the MS power level via an MS POWER CONTROL message.

Yes, but the very same function also changes lchan->ms_power_ctrl.current before. As osmo-bts-trx automatically uses that value during every DL SACCH transmission, I would actually expect it to work.

The explicit bts_model_adjst_ms_pwr() function is just required for proprietary PHYs that have their own TDMA scheduler and maintain that state in the PHY, where hence we have to actively tell the PHY that the MS power level has changed.

So the first step from my point of view is to implement tests for this in BTS_Tests.ttcn, considering cases like:

- MS POWER IE present in RSL CHAN ACT
- MS POWER IE being sent using a "RSL MS POWER CONTROL" message for an already-active logicel channel

and then running those tests with OsmocomBB against osmo-bts-trx, osmo-bts-sysmo, etc.

From my reading of the code, the feature "static MS power control" is looking for **should** already work if the level is communicated via the RSL MS POWER CONTROL message, and not via the RSL CHANNEL ACTIVATE, as the former is setting lchan->ms_power_ctrl.fixed = 1 where the latter is setting it to 0. Having TTCN3 tests for this would allow us to ascertain this for sure and ensure it keeps working.

#7 - 12/21/2018 05:50 PM - dexter

There is now a TTCN3 test that sends RSL MS POWER CONTROL and simultaneously checks that the L1 header of the SACCH channel contains the expected power level. From what I can see so far in the tests the external power control should work fine.

See also: <https://gerrit.osmocom.org/#/c/osmo-ttcn3-hacks/+12391/>

#8 - 05/22/2019 02:28 PM - laforge

- Related to Feature #3750: Extension of BTS_Tests.ttcn test coverage added

#9 - 05/22/2019 02:29 PM - laforge

- Assignee changed from dexter to laforge

#10 - 05/24/2019 07:37 PM - laforge

- Checklist item [] fix behavior on BSC side (always send MS power parameters in RSL CHAN ACT) added
Checklist item [] fix behavior on BTS side: autonomous UL power control only if MS power parameters IE was sent added
Checklist item [] TTCN3 tests for static MS power level in RSL CHAN ACT added
Checklist item [] TTCN3 tests for static MS power level in MS POWER CONTROL added
Checklist item [] TTCN3 test for autonomous MS power control after RSL CHAN ACT added
Checklist item [] TTCN3 test for autonomous MS power control after MS POWER CONTROL added
- % Done changed from 0 to 20

In <https://gerrit.osmocom.org/#/c/osmo-bts/+14155/> I'm fixing the logic/handling when the BSC sends an explicit "MS POWER CONTROL" message:

- if the optional MS power parameters IE is present (we don't care about contents), the BTS performs MS power control autonomously
- if the optional MS power parameters IE is absent, we switch to static MS power according to the MS Power IE.

#11 - 05/28/2019 11:01 AM - Hoernchen

- Checklist item [x] TTCN3 tests for static MS power level in MS POWER CONTROL set to Done

#12 - 05/28/2019 11:01 AM - Hoernchen

currently tested by TC_rsl_ms_pwr_ctrl

#13 - 05/29/2019 10:54 AM - Hoernchen

- Checklist item [x] TTCN3 tests for static MS power level in RSL CHAN ACT set to Done

#14 - 05/31/2019 10:01 PM - Hoernchen

#15 - 05/31/2019 10:02 PM - Hoernchen

- Checklist item [] Ensure the ms power level is actually interpreted as the maximum allowable power level if a ms power parameters IE is present added

As the spec states "If the MS Power Parameters element is present it indicates that the MS power control is to be performed by TRX. The MS Power element then indicates the maximum MS power to be used. "

This is currently not working at all, the loop will just ignore this maximum ms power.

#16 - 06/12/2019 05:15 PM - Hoernchen

- Checklist item [x] TTCN3 test for autonomous MS power control after RSL CHAN ACT set to Done

Checklist item [x] TTCN3 test for autonomous MS power control after MS POWER CONTROL set to Done

#17 - 07/18/2019 05:15 AM - laforge

- Priority changed from High to Normal

#18 - 10/28/2019 10:25 AM - pespin

- Checklist item [x] Ensure the ms power level is actually interpreted as the maximum allowable power level if a ms power parameters IE is present set to Done

"Ensure the ms power level is actually interpreted as the maximum allowable power level if a ms power parameters IE is present added"

Fixed by:

<https://gerrit.osmocom.org/c/osmo-bts/+15877> bts-trx: loops.c: Take into account RSL CHAN ACT ms power level limits

<https://gerrit.osmocom.org/c/osmo-bts/+15884> power_control.c: Take into account RSL CHAN ACT ms power level limits

#19 - 10/28/2019 10:58 AM - pespin

If I understand correctly, current code already does this correctly:

"fix behavior on BTS side: autonomous UL power control only if MS power parameters IE was sent added"

It was fixed in <https://gerrit.osmocom.org/#/c/osmo-bts/+14155/>

And same fix is also done during RSL CHAN ACT received in rsl_rx_chan_activ().

#20 - 10/28/2019 12:53 PM - pespin

Regarding "fix behavior on BSC side (always send MS power parameters in RSL CHAN ACT) added", it should be done here:

<https://gerrit.osmocom.org/c/osmo-bsc/+15882> rsl: Send IE MS Power Param during CHAN ACT and MS PWR CTRL messages

and tested here:

<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+15881> bsc: Verify RSL IE MS Power Parameters is send upon CHAN ACT

so I think all boxes in the task should be marked as DONE and ticket closed.

#21 - 10/28/2019 08:56 PM - laforge

- Assignee changed from laforge to pespin

#22 - 11/13/2019 08:56 AM - pespin

- Checklist item [x] fix behavior on BSC side (always send MS power parameters in RSL CHAN ACT) set to Done

Checklist item [x] fix behavior on BTS side: autonomous UL power control only if MS power parameters IE was sent set to Done

- Status changed from New to Resolved

- % Done changed from 20 to 100