

# OsmoPCU - Bug #1548

## 11bit RACH support

02/23/2016 03:05 PM - laforge

<b>Status:</b>	Resolved	<b>Start date:</b>	02/23/2016
<b>Priority:</b>	Normal	<b>Due date:</b>	
<b>Assignee:</b>	fixeria	<b>% Done:</b>	100%
<b>Category:</b>			
<b>Target version:</b>			
<b>Spec Reference:</b>	3GPP TS 44.004, section 7.4a; 3GPP TS 44.060, sections 11.2.5 and 11.2.5a		

### Description

This is currently not supported/implemented. Having 11bit RACH gives us more information on the cause of channel establishment, especially when GSM + GPRS are used together.

### Related issues:

Related to OsmoBTS - Bug #1854: 11-bit RACH support breaks default 8-bit RACH...	<b>Resolved</b>	<b>11/18/2016</b>
Related to OsmoTRX - Feature #3054: Extended (11-bit) RACH support in OsmoTRX	<b>Stalled</b>	<b>03/10/2018</b>
Related to OsmoPCU - Feature #3014: fix re-apply patches reverted by #3013, r...	<b>Resolved</b>	<b>02/27/2018</b>
Related to OsmoPCU - Bug #4338: Add EGPRS tests toTTCN3 PCU_Tests_RAW	<b>In Progress</b>	<b>12/23/2019</b>
Has duplicate OsmoPCU - Bug #1834: Extended (11-bit) RACH is not properly han...	<b>Closed</b>	<b>10/25/2016</b>

### History

#### #1 - 11/09/2016 10:01 AM - laforge

- Status changed from New to In Progress
- Assignee set to arvind.sirsikar

11bit RACH is actually being worked on, assigning this to aravind. It might even be complete for some BTS models by now.

#### #2 - 11/09/2016 12:13 PM - arvind.sirsikar

Currently it is supported and integration tested for NuRAN LC1.5 and LC1.0. However there is no support for osmo-trx.

#### #4 - 08/17/2017 06:53 AM - laforge

- Assignee changed from arvind.sirsikar to sysmocom

#### #5 - 10/11/2017 01:12 AM - laforge

- Status changed from In Progress to New
- Assignee changed from sysmocom to msuraev

#### #6 - 10/11/2017 08:34 AM - laforge

- Priority changed from Normal to High

#### #7 - 11/28/2017 05:23 PM - msuraev

- Status changed from New to In Progress
- % Done changed from 0 to 10

Encoding/decoding support for 11-bit RACH for libosmocoding is available in gerrit 5062.

#### #8 - 12/04/2017 11:02 AM - msuraev

- Related to Bug #1854: 11-bit RACH support breaks default 8-bit RACH: collisions are possible added

#### #9 - 12/11/2017 02:51 PM - msuraev

- Status changed from In Progress to Stalled

- % Done changed from 10 to 20

Gerrit 5062 has been merged. Have to verify whether 11-bit RACH is supported on sysmoBTS.

**#10 - 02/21/2018 11:36 PM - msuraev**

Test with "gprs 11bit\_rach\_support\_for\_egprs" failed - seems like smth wasn't merged/missing. See related BTS bug.

**#11 - 03/01/2018 11:13 PM - laforge**

- Assignee changed from msuraev to sysmocom

**#12 - 04/10/2018 05:34 PM - laforge**

- Assignee changed from sysmocom to lynxis

**#13 - 09/25/2018 07:16 PM - fixeria**

The following patch should implement 11-bit RACH support of osmo-bts-trx:

<https://gerrit.osmocom.org/#/c/osmo-bts/+6315/>

but should be properly tested.

**#14 - 10/17/2018 10:26 AM - laforge**

- Assignee changed from lynxis to msuraev

**#15 - 11/01/2018 01:41 PM - msuraev**

- Has duplicate Bug #1834: Extended (11-bit) RACH is not properly handled added

**#16 - 11/01/2018 01:42 PM - msuraev**

- Related to Feature #3054: Extended (11-bit) RACH support in OsmoTRX added

**#17 - 02/14/2019 04:37 PM - msuraev**

- Related to Feature #3014: fix re-apply patches reverted by #3013, related: UL and DL packet assignment, and Timing Advance added

**#18 - 05/19/2019 07:43 AM - laforge**

- Assignee changed from msuraev to fixeria

**#19 - 10/04/2019 11:15 PM - fixeria**

- Assignee deleted (fixeria)

Both osmo-trx and osmo-bts-trx do support 11-bit encoded Access Bursts now. We also have a TTCN-3 test case for that (see BTS\_Tests.TC\_pcu\_ext\_rach\_content) and it passes. However, all my attempts to test the network with the real phones have been unsuccessful. Unfortunately, I have no time to investigate further now.

**#20 - 01/21/2020 01:23 PM - laforge**

- Assignee set to daniel

- Priority changed from High to Normal

**#21 - 01/22/2020 02:52 PM - pespin**

- Related to Bug #4338: Add EGPRS tests toTTCN3 PCU\_Tests\_RAW added

**#22 - 01/22/2020 02:54 PM - pespin**

I'm trying to add some TTCN3 tests with 11bit RACH support for osmo-pcu in PCU\_Tests\_RAW as part of [#4338](#). I'd say that's all what's missing here.

**#23 - 01/22/2020 07:32 PM - fixeria**

I'd say that's all what's missing here.

I don't think so. OsmoPCU does not seem to handle 11-bit RACH correctly when running with osmo-trx and osmo-bts-trx.

#### #24 - 03/24/2020 09:44 PM - fixeria

- *Spec Reference set to 3GPP TS 44.004, section 7.4a; 3GPP TS 44.060, sections 11.2.5 and 11.2.5a*

#### #25 - 03/31/2020 06:39 PM - fixeria

OsmoPCU does not seem to handle 11-bit RACH correctly when running with osmo-trx and osmo-bts-trx.

<https://gerrit.osmocom.org/c/libosmocore/+17692/> tests/coding: add 11-bit Access Burst samples from a real phone  
<https://gerrit.osmocom.org/c/libosmocore/+17693/> coding: fix bit ordering in 11-bit RACH coding functions

With this fix applied, OsmoPCU works much better when running with osmo-bts-trx.  
I also have a (draft) TTCN-3 test case for OsmoPCU.

#### #26 - 04/01/2020 07:45 PM - fixeria

I also have a (draft) TTCN-3 test case for OsmoPCU.

<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+17704/> library/RLCMAC\_CSN1\_Types: add EGPRS Packet Channel Request definition  
<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+17706/> PCU: add test cases for EGPRS Packet Channel Request

For some reason, TITAN decodes different extended RA value in IA Rest Octets...  
Any help would be appreciated. Wireshark shows that everything is ok (as expected).

#### #27 - 05/05/2020 11:01 AM - fixeria

- *% Done changed from 20 to 60*

TTCN-3 test cases have been merged and, as can be seen, they're passing in Jenkins.

Though I am still not satisfied by some code parts handling 11 bit EGPRS Packet Channel Request in osmo-pcu, for example:

```
static inline uint16_t mslot_class_from_ra(uint16_t ra, bool is_11bit)
{
    if (is_11bit)
        return (ra & 0x3e0) >> 5;

    /* set multislot class to 0 for 8-bit RACH, since we don't know it yet */
    return 0;
}
```

The way we parse the multislot class does not seem to be correct, because it's optional and its presence depends on type of EGPRS Packet Channel Request. I believe we should implement proper parsing, and here is a draft change for that: <https://gerrit.osmocom.org/c/osmo-pcu/+17718>.

#### #28 - 05/12/2020 12:03 PM - laforge

- *Assignee changed from daniel to fixeria*

#### #29 - 05/21/2020 08:13 AM - fixeria

- *Status changed from Stalled to In Progress*

I just realized that RR Immediate Assignment Reject (IAR Rest Octets) should also contain *Extended RA*, when sent in response to EGPRS Packet Access Request. More details can be found in 3GPP TS 44.018, section 10.5.2.17.

#### #30 - 05/21/2020 08:20 AM - fixeria

Actually, Encoding::write\_immediate\_assignment\_reject() does support writing IAR Rest Octets with Extended RA. We just need a TTCN-3 test case.

**#31 - 05/22/2020 01:57 PM - fixeria**

- % Done changed from 60 to 80

Actually, Encoding::write\_immediate\_assignment\_reject() does support writing IAR Rest Octets with Extended RA. We just need a TTCN-3 test case.

<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18420/> library/GSM\_RR\_Types: fix definition of FeatureIndicator  
<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18421/> library/GSM\_RR\_Types: add IAR Rest Octets definition  
<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18422/> library/GSM\_RR\_Types: add receive templates for IMM ASS Reject  
<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18423/> PCU: introduce TC\_egprs\_pkt\_chan\_req\_reject\_content  
<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18424/> PCU: introduce TC\_egprs\_pkt\_chan\_req\_reject\_emergency

**#32 - 05/22/2020 03:02 PM - fixeria**

<https://gerrit.osmocom.org/c/osmo-ttcn3-hacks/+18425/> PCU: introduce TC\_egprs\_pkt\_chan\_req\_reject\_exhaustion

**#33 - 05/23/2020 12:59 PM - fixeria**

While working on EGPRS Packet Channel Request coding support, I discovered and fixed some problems in CSN.1 codec:

<https://gerrit.osmocom.org/c/osmo-pcu/+18430/> csn1: fix M\_CHOICE: restrict maximum length of the choice list  
<https://gerrit.osmocom.org/c/osmo-pcu/+18431/> csn1: fix csnStreamEncoder(): also check length of the choice list  
<https://gerrit.osmocom.org/c/osmo-pcu/+18432/> csn1: fix csnStreamEncoder(): always check the choice index  
<https://gerrit.osmocom.org/c/osmo-pcu/+18433/> csn1: fix: never use enumerated types in codec structures

**#34 - 06/01/2020 11:46 AM - fixeria**

- Status changed from In Progress to Feedback

- % Done changed from 80 to 100

All previously submitted changes have been merged. These two new changes are waiting for review:

<https://gerrit.osmocom.org/c/osmo-pcu/+18386/> bts: refactor handling and parsing of RACH.ind  
<https://gerrit.osmocom.org/c/osmo-pcu/+18387/> BTS::parse\_rach\_ind(): properly handle EGPRS Packet Channel Request

as soon as they're merged, we can finally close this ticket.

**#35 - 06/03/2020 01:58 PM - fixeria**

- Status changed from Feedback to Resolved

All patches have been merged.