OAI UE Project 1B Achievements

Fabrice Nabet
BUPT OpenAir Workshop,
April 28 2017, Beijing
OAI 1B OBJECTIVES

• Project 1B = Basic UE LTE Rel9-10 Functionalities

• Enable the community to use the UE in e2e projects

• Necessary steps:
  – Stability and minimum R8 / R10 features completion

• Targetting:
  – Interoperability with commercial NW in SISO mode : FDD/TDD, 5/10/20 Mhz
  – MIMO support : MIMO DL 2x2
  – Carrier Aggregation : CA DL only, 2 CCs
  – TDD : at least 2 configurations, SISO, MIMO, CA
OAI 1B CONSTRUCTION KEY DATES

• 2016 May 17-18: Eurecom OAI Workshop
  – Presentation of UE required features and call for contributors

• 2016 May 30-31: TCL 5G Workshop Shanghai
  – Internal Roadmap and Resource Estimation

• 2016 July 12: Official Project 1B Kick-Off to the community
  – Project Management Committee (PMC) constitution
  – Feature roadmap proposal
  – Test and Integration Process proposal
  – July 20: First OAI 1B periodic dev meeting

• 2016 Oct 16: Project Management Committee
  – New Feature roadmap to adapt to current needs and resources
  – Interoperability test targets
OAI UE ACHIEVEMENT SUMMARY

- Better Performances (status on 2017 week16)

<table>
<thead>
<tr>
<th>KPI (GPP 4 cores + SDR USRP B210)</th>
<th>SISO BW</th>
<th>MIMO 2x2 BW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>FDD</td>
<td>TDD</td>
</tr>
<tr>
<td>DL Tput E2E (Mbit/s)</td>
<td>16</td>
<td>6.4 *</td>
</tr>
<tr>
<td>UL Tput E2E (Mbit/s)</td>
<td>9</td>
<td>3.6</td>
</tr>
<tr>
<td>Robustness (hours)</td>
<td>10</td>
<td>4</td>
</tr>
</tbody>
</table>

* TDD lower performances: aligning features, performances and stability on FDD is now on track

- New Features put to OAI UE : 10 & 20 MHz support, SRS, Periodic CQI, MAC BSR, MIMO, TDD configuration 1 & 3, DRB RLC AM
- Stability and minimum R8 / R10 features completion
- Interoperability with third-party eNB/EPC : R&S CMW500, Sunada eNB, Amarisoft ENB, Ericsson EPC+ENB live test NW
- Testing coverage extension : Automatic Tests UE
- Contribution to OAI SW quality and process integration improvement:
  - Set up new integration process & workflow
  - Project tracking
  - Documentation (UE Tutorials)
- → More users of OAI UE within the OAI community!
OAI UE ACHIEVEMENTS

1st Inter Op. Tests on LTE commercial NW (Dec 16)

Max FDD SISO 10Mhz Tput achieved

Max FDD SISO 20Mhz Tput achieved

SRS, Periodic CQI, BSR

1st Inter Op. Tests on commercial NW

FDD 10 Mhz

MIMO DL TM3 FDD

RLC AM

SISO FDD 20Mhz DL

Max E2E Tput 5Mhz:
Robustness > 4 hours

Max E2E Tput 10Mhz:
Robustness > 10 hours

MIMO FDD 5/10Mhz:
SISO 20 Mhz : 70 Mbps DL

TDD SISO 20Mhz
TDD MIMO

New Features
BENEFITS TO CONTRIBUTE TO OAI CODEBASE

• Companies A & B contribute their changes to the main development branch, they benefit from:
  - continuous integration tests
  - community bug-fixes
  - new community features

• Company C makes changes to private branch
  - no test & bug fix benefit
  - Unable to use new features
  => dead end

Commits since Jan 1st 2017 (3 months) : 897

New & planned features: SRS, TM3, Paging, AM mode, 10MHz, 20MHz, NB-IoT, LAA, etc…

Open Source benefits start with contributions to the code base
OAI eNB / OAI UE WORKFLOW

- https://gitlab.eurecom.fr/oai/openairinterface5g/wikis/GitLabWorkFlow

!! Use develop instead of master !!!
CONCLUSIONS

- OAI UE is now fully mature and interoperable
  - Interoperable with test equipment and commercial eNodeB
  - Performances at theoretical limits
  - Stable up to 10h

- Framework for efficiently adding bugfixes or new features
  - OAI eNB/UE Workflow: easy and clean process
  - Minimum test coverage available

- Ready for e2e projects & 5G !!
谢谢

TCL通讯科技控股有限公司
www.tclmobile.com.cn
@TCL通讯