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PA Support and Performance of Power Class 2 in Band 41

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UE Power Class 2 for Band 41

- Motivation
- Industry Checkpoint
  - Current technology – do we need invention?
- Beyond B41
  - Additional bands
  - CA support
- Ecosystem
  - Chipset and RFFE support

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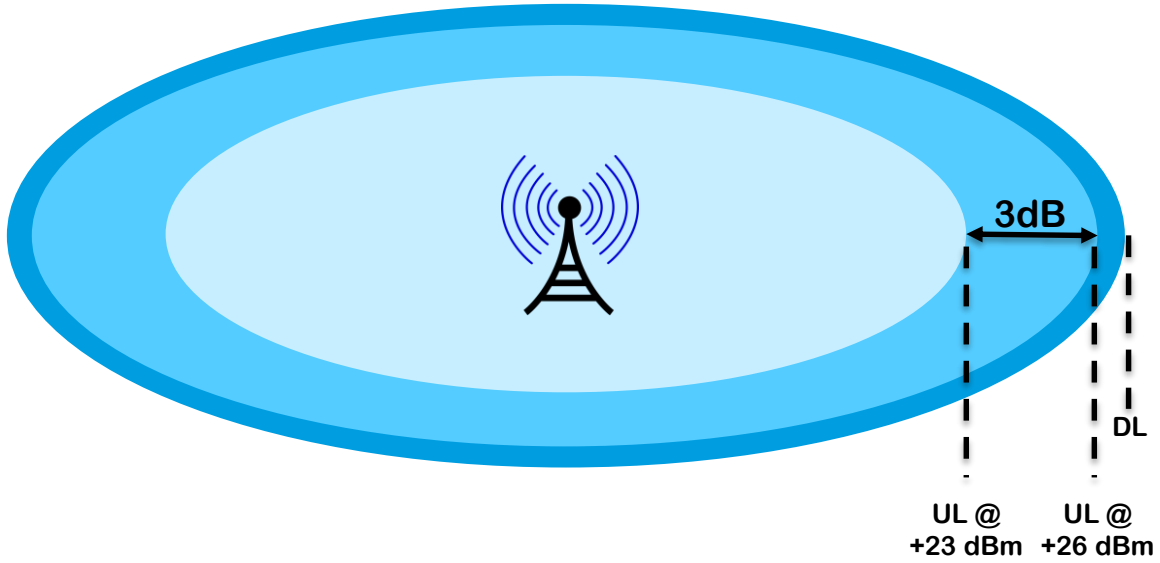
UE Power Class 2 for Band 41

Motivation and Sponsors

- **Motivation**
  - Improve overall coverage in Band 41 by increasing UE UL power by a nominal 3 dB
  - LTE performance is limited by UL
  - Even with 3 dB increase, will remain UL limited as the DL has more than 3 dB better coverage.



- **Sponsors**
  - WID – New band 41 power class supporting +26dBm
  - RB-150591 at 3GPP RAN Plenary #68 Malmo, Sweden (June 2015)
  - Sprint, CMCC, Alcatel-Lucent and Softbank

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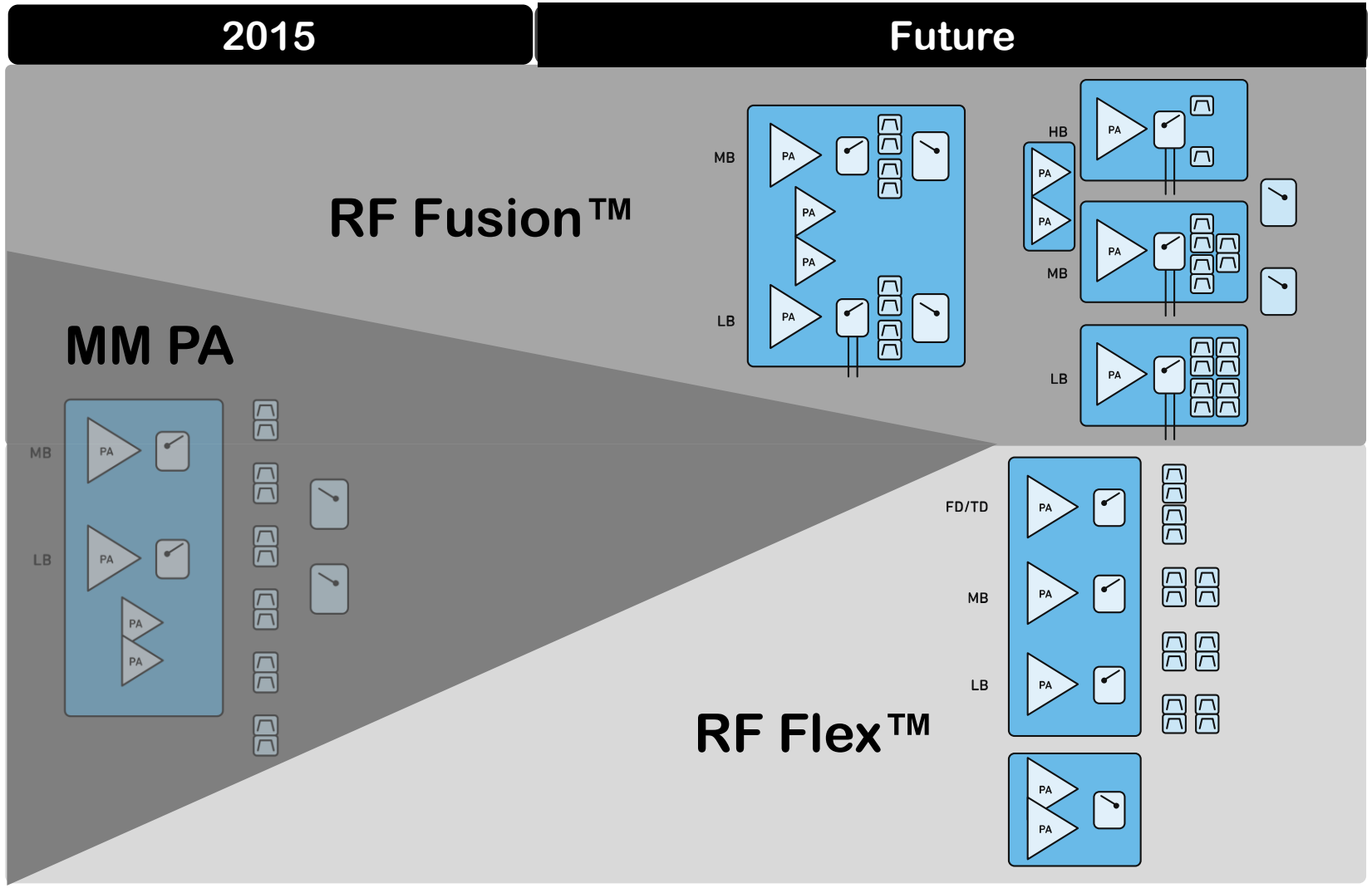
Industry Checkpoint

Architecture Trend Towards Integration



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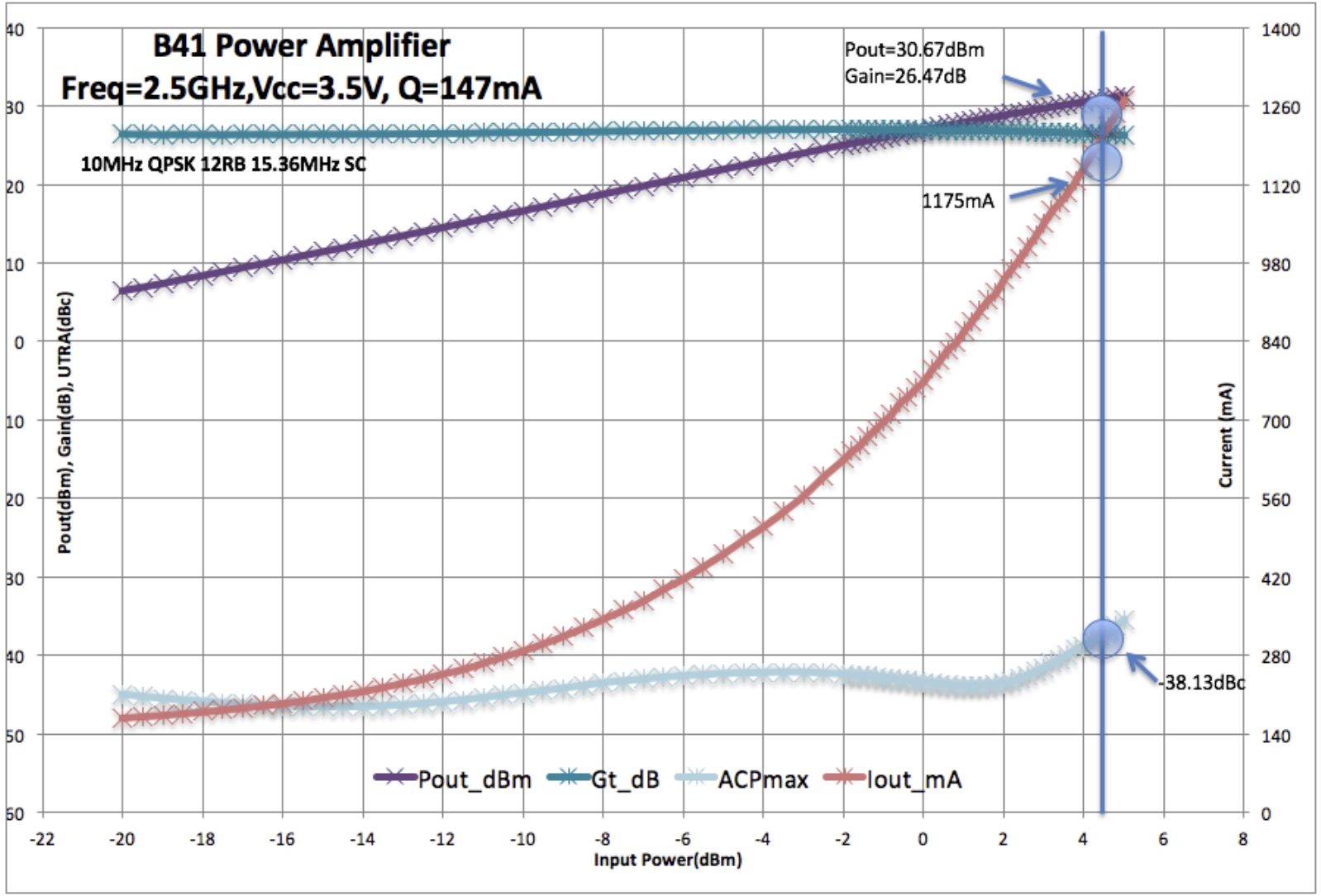
Industry Checkpoint

Measured data - QPSK

- Measured data on Qorvo's latest 2 stage PA TDD product intended for Power Class 3
- Load pulled to optimize to -38dBc ACLR with Power Class 2 Pout = +30.7dBm
- Proves Qorvo's GaAs HBT process technology is Power Class 2 capable
- Re-designed circuit with existing manufacturing technology will optimize PAE and gain while meeting 3GPP 36.101 UE constraints



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Industry Checkpoint

Pieces are in place

- Current manufacturing process technologies are in place to support B41 Power Class 2
  - BAW acoustic filter technology can support 3dB more power
  - PA GaAs HBT technology meets requirement
  - Circuit re-design is needed

- Final, integrated product may need additional work
  - Possible load switch
  - Size/layout may change
  - No innovation required to support

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Beyond Band 41

What is next?

- Additional support of Power Class 2 in other bands
  - B39, B40
  - Performance should be similar
- Band 7 performance should not be affected
- Carrier aggregation
  - Behavior model to be started
  - Cautiously optimistic that performance should be acceptable

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Ecosystem Support

Industry support across the front end

- Chipset alignment for power class 2
  - Numerous chipset vendors – may or may not supply 3dB more drive power
  - If not, then linear PA can be designed to provide 3dB more gain
- Other RF vendors can also develop similar parts
  - No single source
  - Technology is available across vendors

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Summary

RF Front End can and will support higher power in B41

- Technology is ready
- Measured data supports the initiative
- Some development needed to package products
- CA investigation to be done

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Thank You

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