On the value of reducing CRS transmission in LTE

Telstra

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DRAFT

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CRS interference limits LTE performance

Downlink SINR is shaped by CRS power

– Traffic loading of course also degrades SINR, but fulltime CRS transmission dominates downlink geometry

In real networks, site loading and traffic profiles are strongly heterogeneous

– Traffic is distributed very unevenly and typically only a small percentage of sites show high loading

– Even in areas of high loading, traffic is bursty and bursts are typically uncorrelated between sites

CRS interference is the major limiting factor to LTE network capacity

– Many techniques (eg ICIC flavours) improve uplink capacity, but do little to improve downlink SINR / capacity

– Anything that improves downlink SINR is a high priority

We have seen positive results from CRS muting strategies

Telstra has started trials with an Ericsson feature to reduce CRS transmission when possible

- We see improvements in PDSCH SINR, user throughput and higher order modulation use
- Considerably improves the usefulness of 256QAM in a macro environment

Signals Research Group commented:

> **"The Forward-Looking View**. Our analysis of Ericsson Lean Carrier (ELC) – Telstra enabled and disabled the feature at our request – suggests that even higher availability of 256 QAM is likely."

- http://signalsresearch.com/issue/how-fast-is-that-kangaroo-in-the-window/

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A standardised lean carrier would increase CRS muting potential

Proprietary CRS muting solutions are limited to what can be done within the constraints of current standards

– A standardised solution would provide greater scope for muting

Backwards compatibility with legacy UEs is essential

– Imperative that a lean carrier can also support legacy UEs

– Muting can be increased over time as UE capability improves

Conclusion: a lean carrier for LTE would be very valuable

Observation:

– CRS interference is the major limiting factor to LTE network capacity

Observation:

– Heterogeneous site loading and traffic bursting leads to excellent opportunities for SINR improvement through CRS transmission reduction

Proposal:

– A lean carrier for LTE should be introduced into R14