

Agenda Item: TDD Ad Hoc
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Title:

Usage of Dummy Burst in DTX (TDD mode)

1 Introduction

At WG1 meeting #10 in Beijing, China, it was proposed in TDoc 3GPP TSG RAN WG1(00)0075 to transmit a Dummy Burst in UL during DTX periods to avoid erroneous detection of 'Out-of-Synch'-status. In this proposal we want to discuss which useful information can be transmitted inside this Dummy Burst.

It should be emphasised, that this proposal aims only at the content of this Dummy Burst and not at the presence of the Dummy Burst itself. In other words, this proposal is an advantageous add-on, but it has to be clear that first the Out-of-Synch procedure should be finalised before making decisions on the content of the Dummy Burst used in this procedure.

2 General Proposal for Usage of Dummy Burst

As the content of the Dummy Burst is arbitrary, several schemes for reusing the available bits for L1 purposes are conceivable. We propose the following usage by Layer 1:

- Inclusion of an 8 bit L1-header declaring the content type (Dummy Burst Header)
- Inclusion of a 64 bit L1-data field (Dummy Burst Data Field)

This proposal gives sufficient flexibility for future releases and allows for immediate application, as proposed in section below. Other contents of header and data field are for further study and may be introduced when required.

3 Proposed Application for Dummy Burst

To introduce the first application for Dummy Burst, we propose to define an L1-Power Request message. This is achieved by:

- Dummy Burst Header is indicating 01x
- Dummy Burst Data Field contains a 64-bit number that provides the DL power requested by the UE. The value refers to the power offset compared to P-CCPCH power of the active cell.

This proposal takes into account, that DL power control is suffering when DTX is applied. By reusing Dummy Burst for power control purposes, this drawback can be overcome partly.

4 Details of L1-Messaging in Dummy Burst

For a more detailed view, we briefly describe the proposed procedure:

During DTX in UL, i.e. when no Transport Blocks are available for the current TTI, and when the Dummy Burst has to be sent, the corresponding TFCI shall be transmitted as usual. In other words this TFCI is only transmitted (and thus indicates) in Dummy Burst. Instead of transmitting arbitrary data, as proposed in TDoc 3GPP TSG RAN WG1(00) 0075, the following contents are set by Layer 1:

- 8 bit Dummy Burst Header, 64-bit Dummy Burst Data Field

A CRC is applied to both, Dummy Bust Header and Data. Then these contents are rate 1/3 encoded and rate matching is applied up to the size of the corresponding physical channel. This coding scheme can thus reuse the encoders/decoders available from legacy TrCH-multiplexing.

At the receiver in Node B, the TFCI indicates that no user or higher layer data was sent. The decoder is then in the position to hand the decoded data to L1 evaluation algorithm.

If for instance L1-Power Request as depicted in section 3 is indicated by the header, the Node B power control algorithm may use this message to adjust the DL transmission power. However, the Node B can also choose to skip this L1-message if no usage in power control algorithm is foreseen or if requirements from other users have higher priority.

5 Conclusion

In this contribution we presented a scheme how the data bits available in Dummy Burst during DTX in UL can be used for e.g. enhancing power control. If this scheme is considered as advantageous, proponents will provide a more detailed scheme and corresponding change requests.