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Agenda item:

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Title: Text changes to 25.212 & 25.231 for fixed duplex spacing terminals

Document for: Decision

1 Abstract

This paper contains a text proposal change to documents 25.212 & 25.231 in an attempt to better support the concept of terminals with fixed duplex spacing in 3gpp

2 Introduction

In [1] it is stated that “UTRA/FDD can support both fixed and variable transmit to receive frequency separation”. Consequently there is a requirement on the WG1 technical specifications to provide a means to allow realisation of terminals which support only fixed transmit to receive separation (fixed duplex spacing). This contribution address the changes that need to be made to the current specification to support this.

3 Interfrequency measurements using compressed mode

There is a requirement on UTRA/FDD terminals to be able to monitor channels on other frequencies than that of the current serving basestation when a dedicated link is established. There are several UE architectures that could be employed to achieve this:

1. Dual independent receiver architecture
2. Single receiver with variable duplex spacing making use of compressed mode on the forward link only
3. Single receiver with fixed duplex spacing making use of compressed mode on both the forward and reverse links

Options 1 & 2 above are catered for already in the specifications, but option 3 is not so well defined.

In document 25.212 [2] there is a section that describes the use of compressed mode, and it states that the reverse link enters into compressed mode when measurements are to be done at frequencies close to the FDD uplink band. This is of course true, but there needs also to be some text indicating that both links will enter into compressed mode when the UE is limited to fixed duplex spaced operation.

Also in document 25.212, there is a sentence which states “For uplink compressed mode, smaller transmission gap lengths could be used for single receivers”. This sentence is unclear and should be removed as it could lead to confusion.

In document 25.231 [3] there is the statement “Every UE shall support uplink compressed mode, when monitoring frequencies which are close to the uplink transmission frequency (i.e. frequencies in the TDD or GSM 1800/1900 bands).”

Again this suggest that this is the only reason that a UE would need to use uplink compressed mode, so there needs to be text added here to cater for fixed duplex spaced terminals.

4 Text proposal for TS 25.212

4.4 Coding of compressed mode

To support interfrequency measurements downlink transmission may, on network command, enter compressed mode. Uplink transmission may also enter compressed mode, on network command, if measurements ~~are to~~will be made at frequencies close to FDD uplink band ~~or the UE supports only fixed duplex spacing.~~

In compressed mode, slots N_{first} to N_{last} are not used for transmission of data. As illustrated in Figure 4-14, which shows the example of fixed idle length position with single frame method (see section 4.4.3), the instantaneous transmit power is increased in the compressed frame in order to keep the quality (BER, FER, etc.) unaffected by the reduced processing gain. The amount of power increase depends on the transmission time reduction method (see section 4.4.2). What frames are compressed, are decided by the network. When in compressed mode, compressed frames can occur periodically, as illustrated in Figure 4-14, or requested on demand. The rate of and type of compressed frames is variable and depends on the environment and the measurement requirements.

~~For uplink compressed mode, smaller transmission gap lengths could be used for single receivers. Uplink compressed mode could be used regardless of downlink for dual receivers.~~

5 Text proposal for TS 25.231

7.1.3.3.1 Use of compressed mode/dual receiver for monitoring

A UE shall, on upper layers commands, monitor cells on other frequencies (FDD, TDD, GSM). To allow the UE to perform measurements, upper layers shall command that the UE enters in compressed mode, depending on the UE capabilities.

In case of compressed mode decision, UTRAN shall communicate to the UE the parameters of the compressed mode, described in reference [2], 25.212.

A UE with a single receiver shall support downlink compressed mode.

Every UE shall support uplink compressed mode, when monitoring frequencies which are close to the uplink transmission frequency (i.e. frequencies in the TDD or GSM 1800/1900 bands).

All UEs that only support fixed duplex spacing shall support both downlink and uplink compressed modes to allow interfrequency and intersystem measurements.

< WG1's note : the use of uplink compressed mode for single receiver UE when monitoring frequencies outside TDD and GSM 1800/1900 bands is for further study >

UE with dual receivers can perform independent measurements, with the use of a "monitoring branch" receiver, that can operate independently from the UTRA FDD receiver branch. Such UE do not need to support downlink compressed mode.

6 References

- [1] TSG RAN WG4, "TS 25.101 UE Radio Transmission and Reception (FDD)"
- [2] TSG RAN WG1, "TS 25.212 Multiplexing and channel coding"
- [3] TSG RAN WG1, "TS 25.231 Physical Layer – Measurements"