

Agenda Item:

Source: Samsung Electronics Research Institute
Title: Proposed Liaison statement on Physical Layer Service Implementation Capabilities
To: TSG T WG2
Cc: TSG RAN WG2

TSG RAN WG1 has considered the liaison statement from TSG T WG2 requesting the identification of physical layer service implementation capabilities. RAN WG1 has identified the following service implementation capabilities that are required in addition to the baseline implementation capabilities, to support speech and circuit switched data services with rates up to 64 kbps. TSG T WG2 is requested to note that the tables below are an initial indication of what is required to support the identified services, and are subject to revision based upon further work carried out within this group. This liaison statement is copied to TSG RAN WG2 to help ensure consistency in responses between R1 and R2. TSG RAN WG1 would welcome feedback from TSG T WG2 and TSG RAN WG2 on the identified service implementation capabilities. Tables 1 and 2 show physical layer implementation capabilities for FDD and TDD modes respectively.

Table 1. FDD mode Physical Layer Service implementation capabilities for support of the default speech service and of CS data services up to 64 kbps

| Service Implementation Capability | Specification | Section(s) ¹ | Comments |
|---|------------------|-----------------------------------|---|
| Physical Layer UE procedures and measurements: | | | |
| Handover | 25.231 | 5.1.1, 5.1.2, 5.1.3, 5.1.4 | Support of soft handover is mandatory for all terminals supporting CS services. Support of Inter-Frequency handover is mandatory for all terminals. Support of intra-frequency hard handover is FFS. |
| Power control | 25.214 25.231 | 5.1.2, 5.2.3 7.3 | Support of closed loop power control is mandatory for all terminals. Not yet decided if there is a need to standardise measurements in relation to power control. |
| Multiplexing and Channel Coding | 25.212 | 4.2.3.2, 4.2.4 – 4.2.15, 4.3, 4.4 | Turbo coding to be used for BER requirement of less than 10 ⁻³ . Channel coding requirements to support the default speech service depend on a decision on whether or not Unequal Error Protection is used for AMR. Support of DL compressed mode is mandatory for all terminals supporting CS data. Support of UL compressed mode is mandatory for dual mode FDD/TDD and dual system FDD/GSM 1800/1900 terminals. |
| Modulation | 25.213 | 4.4.3 | |

¹ The list of references to the 25.2 series should not be considered exhaustive. References will need to be refined and updated as the standard is further elaborated.

| | | | |
|---|------------------|-----------------|--|
| Spreading and Scrambling Code Generation | 25.213 | 4.3 | Required Spreading Factor is dependent on channel coding rate, and on whether services are to be supported simultaneously. Terminals shall support all spreading factors between the maximum (256) and minimum (SFs of 16 & 64 are required for support of individual 64 kbps and 16 kbps services respectively). Compressed mode requires the minimum Spreading Factor to be halved. The Spreading Factor required to support the default speech service may depend on whether or not Unequal Error Protection is used for AMR. |
| Code de-spreading and de-scrambling | 25.213 | 5.2 | |
| Support for downlink Transmit Diversity | 25.211 25.214 | 5.3.2 8 | Support of feedback mode transmit diversity is mandatory in Terminals supporting dedicated channels. |
| Support for Site Selection Diversity Transmission | 25.214 | 5.3.2.4 | Support of SSST is mandatory for all terminals supporting soft handover. |
| Transport channels required: | | | |
| Dedicated channel (DCH) | 25.211 | 4.1.1, 6 | |
| Physical channels required: | | | |
| Dedicated Physical Data Channel (DPDCH) | 25.211 | 5.2.1, 5.3.2, 6 | |
| Dedicated Physical Control Channel (DPCCH) | 25.211 | 5.2.1, 5.3.2, 6 | |

Table 2. TDD mode Physical Layer Service implementation capabilities for support of the default speech service and of CS data services up to 64 kbps

| Baseline Implementation Capability | Specification | Section(s) ² | Comments |
|---|------------------|------------------------------|--|
| Physical Layer UE procedures and measurements: | | | |
| Handover | 25.231 | 5.1.5, 5.1.6, 5.1.7 | Support of Intra and Inter Frequency hard handover is mandatory for all terminals. |
| Dynamic Channel Allocation | 25.231 | 5.4 | Terminals shall support measurement of SIR in different timeslots. |
| Power control | 25.224 25.231 | 4.3 | Support of closed loop control for DL power. Support of open loop control for UL power. |
| Multiplexing and Channel Coding | 25.222 | 6.2.3.2, 6.2.4 – 6.2.11, 6.3 | Turbo coding to be used for BER requirement of less than 10^{-3} . Channel coding requirements to support the default speech service depend on a decision on whether or not Unequal Error Protection is used for AMR. |
| Spreading and Scrambling Code Generation | 25.223 | 6 | Terminals shall support spreading factors 8 and 16 for uplink transmission of speech and data services up to 16 kbps. SF4 shall be supported by Terminals supporting 64 kbps data. Simultaneous transmission of up to two codes shall be supported. |
| Code de-spreading and de-scrambling | 25.223 | 6 | Terminals shall support reception of up to 2 codes using spreading factor 16 simultaneously for speech. Up to 5 codes with SF 16 shall be supported simultaneously by terminals supporting 64 kbps. |
| Support for Downlink Transmit diversity | 25.221 25.224 | 5.2.4 4.8 | Support channel estimation on different midambles |
| Timing Advance | 25.224 | 4.4 | Support of TA adjustment according to higher layer signalling |
| Discontinuous transmission | 25.224 | 4.7 | |
| Transport channels necessary for the above: | | | |
| DCH | 25.221 | 4.1.1, 6 | |
| USCH | 25.221 | 6.2.8 | The requirement for USCH in the case of CS connections is for further study. |
| Physical channels necessary for above: | | | |
| Dedicated Physical CHannel (DPCH) | 25.221 | 5.2, 6 | |
| PUSCH | 25.221 | 5.5 | The requirement for USCH in the case of CS connections is for further study. |

² The list of references to the 25.2 series should not be considered exhaustive. References will need to be refined and updated as the standard is further elaborated.