**3GPP TSG-RAN Meeting #15** ***RP-020047***
**Jeju, Korea, 5 – 8, March, 2002**

**Title:** **Agreed CRs (R99 and Rel-4 Category A) to TS 25.214**

**Source:** **TSG-RAN WG1**

**Agenda item:** **7.1.3**

| No. | Spec | CR | Rev | R1 T-doc | Subject | Release | Cat | Workitem | V_old | V_new |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 25.214 | 226 | - | R1-02-0305 | Clarification on DPCCH dedicated pilot bits with closed loop mode 1 | R99 | F | TEI | 3.9.0 | 3.10.0 |
| 2 | 25.214 | 227 | - | R1-02-0305 | Clarification on DPCCH dedicated pilot bits with closed loop mode 1 | Rel-4 | A | TEI | 4.3.0 | 4.4.0 |
| 3 | 25.214 | 230 | 1 | R1-02-0487 | Qth threshold parameter in SSDT | R99 | F | TEI | 3.9.0 | 3.10.0 |
| 4 | 25.214 | 231 | 1 | R1-02-0487 | Qth threshold parameter in SSDT | Rel-4 | A | TEI | 4.3.0 | 4.4.0 |
| 5 | 25.214 | 239 | 1 | R1-02-0488 | TPC procedure in UE when SSDT is activated | R99 | F | TEI | 3.9.0 | 3.10.0 |
| 6 | 25.214 | 240 | 1 | R1-02-0488 | TPC procedure in UE when SSDT is activated | Rel-4 | A | TEI | 4.3.0 | 4.4.0 |

3GPP TSG RAN Meeting #15
Jeju, Korea, 5 – 8, March, 2002

**R1-02-0305**

CR-Form-v5

# CHANGE REQUEST

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ⌘ | **25.214** | **CR** | **226** | ⌘ **rev** | **-** | ⌘ | Current version: | **3.9.0** ⌘ |

*For* ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

| | | | | |
|---|---|---|---|---|
| ***Title:*** | ⌘ | Clarification on DPCCH dedicated pilot bits with closed loop mode 1 | | |
| ***Source:*** | ⌘ | TSG RAN WG1 | | |
| ***Work item code:*** | ⌘ | TEI | ***Date:*** ⌘ | 13-02-02 |
| ***Category:*** | ⌘ | **F** | ***Release:*** ⌘ | R99 |
| | | *Use one of the following categories:*<br>***F*** *(correction)*<br>***A*** *(corresponds to a correction in an earlier release)*<br>***B*** *(addition of feature),*<br>***C*** *(functional modification of feature)*<br>***D*** *(editorial modification)*<br>Detailed explanations of the above categories can be found in 3GPP TR 21.900. | | *Use one of the following releases:*<br>*2 (GSM Phase 2)*<br>*R96 (Release 1996)*<br>*R97 (Release 1997)*<br>*R98 (Release 1998)*<br>*R99 (Release 1999)*<br>*REL-4 (Release 4)*<br>*REL-5 (Release 5)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | According to the section 5.3.2.2 of TS 25.211, in closed loop mode 1, non orthogonal pilot patterns (when $N_{pilot}$ = 2) may be used between the transmit antennas in closed loop mode 1.<br>Section 7 of the current version of TS 25.214 specifies that different (orthogonal) pilot bit patterns may be used. The wording "different (orthogonal)" is incorrect. |
| ***Summary of change:*** | ⌘ | This CR clarifies that non orthogonal dedicated pilot bits of DPCCH may be sent over the two antennas when $N_{pilot}$ = 2 and closed loop mode 1 is used. |
| ***Consequences if not approved:*** | ⌘ | The text in TS 25.214 related to the use of the pilot bit patterns in closed loop mode 1 would remain incorrect and not aligned with TS 25.211. |

| | | | |
|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 7 | |
| ***Other specs affected:*** | ⌘ | [ ] Other core specifications ⌘<br>[ ] Test specifications<br>[ ] O&M Specifications | |
| ***Other comments:*** | ⌘ | - | |

## How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 7 Closed loop mode transmit diversity

The general transmitter structure to support closed loop mode transmit diversity for DPCH transmission is shown in figure 3. Channel coding, interleaving and spreading are done as in non-diversity mode. The spread complex valued signal is fed to both TX antenna branches, and weighted with antenna specific weight factors $w_1$ and $w_2$. The weight factors are complex valued signals (i.e., $w_i = a_i + jb_i$), in general.

The weight factors (actually the corresponding phase adjustments in closed loop mode 1 and phase/amplitude adjustments in closed loop mode 2) are determined by the UE, and signalled to the UTRAN access point (=cell transceiver) using the D sub-field of the FBI field of uplink DPCCH.

For the closed loop mode 1 different (orthogonal when $N_{pilot} > 2$) dedicated pilot symbols in the DPCCH are sent on the 2 different antennas. For closed loop mode 2 the same dedicated pilot symbols in the DPCCH are sent on both antennas.

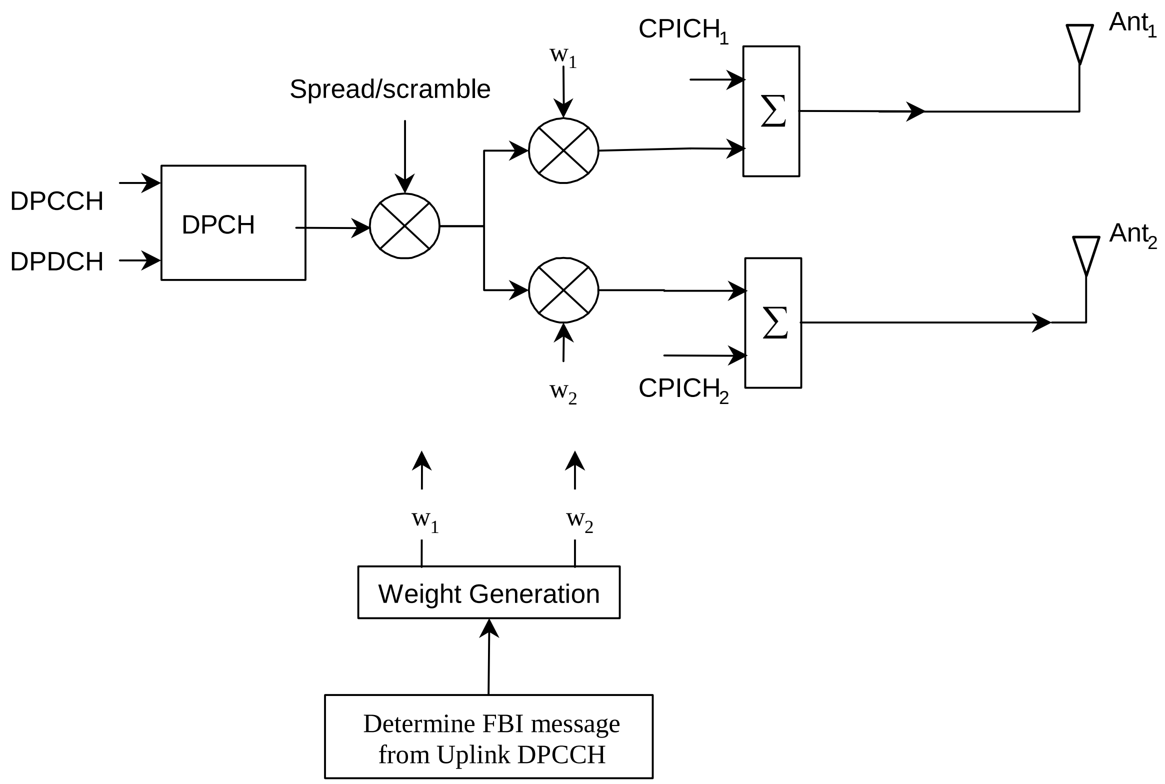


**Figure 3: The generic downlink transmitter structure to support closed loop mode transmit diversity for DPCH transmission**

There are two closed loop modes whose characteristics are summarised in the table 8. The use of the modes is controlled via higher layer signalling.

**Table 8: Summary of number of feedback information bits per slot, $N_{FBD}$, feedback command length in slots, $N_W$, feedback command rate, feedback bit rate, number of phase bits, $N_{ph}$, per signalling word, number of amplitude bits, $N_{po}$, per signalling word and amount of constellation rotation at UE for the two closed loop modes**

| Closed loop mode | $N_{FBD}$ | $N_W$ | Update rate | Feedback bit rate | $N_{po}$ | $N_{ph}$ | Constellation rotation |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1500 Hz | 1500 bps | 0 | 1 | $\pi/2$ |
| 2 | 1 | 4 | 1500 Hz | 1500 bps | 1 | 3 | N/A |

**3GPP TSG RAN Meeting #15**
**Jeju, Korea, 5 – 8, March, 2002**

***R1-02-0305***

*CR-Form-v5*

# CHANGE REQUEST

| | | | | | | |
|---|---|---|---|---|---|---|
| ⌘ | **25.214** | **CR 227** | ⌘ **rev** | **-** | ⌘ Current version: | **4.3.0** ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Clarification on DPCCH dedicated pilot bits with closed loop mode 1 |
| ***Source:*** | ⌘ | TSG RAN WG1 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 13-02-02 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | REL-4 |

*Use one of the following categories:*
*__F__ (correction)*
*__A__ (corresponds to a correction in an earlier release)*
*__B__ (addition of feature),*
*__C__ (functional modification of feature)*
*__D__ (editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*REL-4 (Release 4)*
*REL-5 (Release 5)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | According to the section 5.3.2.2 of TS 25.211, in closed loop mode 1, non orthogonal pilot patterns (when $N_{pilot}$ = 2) may be used between the transmit antennas in closed loop mode 1.<br>Section 7 of the current version of TS 25.214 specifies that different (orthogonal) pilot bit patterns may be used. The wording “different (orthogonal)” is incorrect. |
| ***Summary of change:*** | ⌘ | This CR clarifies that non orthogonal dedicated pilot bits of DPCCH may be sent over the two antennas when $N_{pilot}$ = 2 and closed loop mode 1 is used. |
| ***Consequences if not approved:*** | ⌘ | The text in TS 25.214 related to the use of the pilot bit patterns in closed loop mode 1 would remain incorrect and not aligned with TS 25.211. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 7 |
| ***Other specs affected:*** | ⌘ | [ ] Other core specifications ⌘<br>[ ] Test specifications<br>[ ] O&M Specifications |
| ***Other comments:*** | ⌘ | - |

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 7 Closed loop mode transmit diversity

The general transmitter structure to support closed loop mode transmit diversity for DPCH transmission is shown in figure 3. Channel coding, interleaving and spreading are done as in non-diversity mode. The spread complex valued signal is fed to both TX antenna branches, and weighted with antenna specific weight factors $w_1$ and $w_2$. The weight factors are complex valued signals (i.e., $w_i = a_i + jb_i$), in general.

The weight factors (actually the corresponding phase adjustments in closed loop mode 1 and phase/amplitude adjustments in closed loop mode 2) are determined by the UE, and signalled to the UTRAN access point (=cell transceiver) using the D sub-field of the FBI field of uplink DPCCH.

For the closed loop mode 1 different (orthogonal when $N_{pilot} > 2$) dedicated pilot symbols in the DPCCH are sent on the 2 different antennas. For closed loop mode 2 the same dedicated pilot symbols in the DPCCH are sent on both antennas.

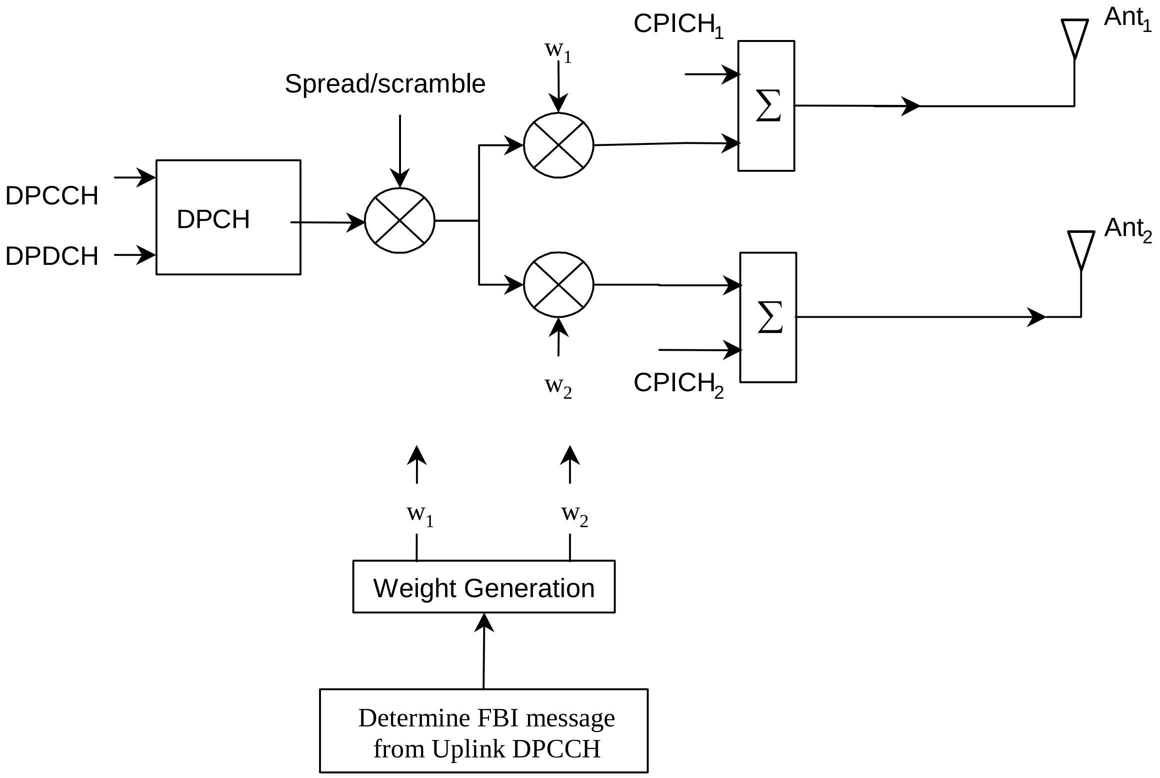


**Figure 3: The generic downlink transmitter structure to support closed loop mode transmit diversity for DPCH transmission**

There are two closed loop modes whose characteristics are summarised in the table 8. The use of the modes is controlled via higher layer signalling.

**Table 8: Summary of number of feedback information bits per slot, $N_{FBD}$, feedback command length in slots, $N_W$, feedback command rate, feedback bit rate, number of phase bits, $N_{ph}$, per signalling word, number of amplitude bits, $N_{po}$, per signalling word and amount of constellation rotation at UE for the two closed loop modes**

| Closed loop mode | $N_{FBD}$ | $N_W$ | Update rate | Feedback bit rate | $N_{po}$ | $N_{ph}$ | Constellation rotation |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1500 Hz | 1500 bps | 0 | 1 | $\pi/2$ |
| 2 | 1 | 4 | 1500 Hz | 1500 bps | 1 | 3 | N/A |

**3GPP TSG RAN Meeting #15**
**Jeju, Korea, 5 – 8, March, 2002**

***R1-02-0487***

*CR-Form-v5*

# CHANGE REQUEST

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ⌘ | **25.214** | **CR** | **230** | ⌘ **rev** | **1** | ⌘ | Current version: | **3.9.0** ⌘ |

*For* ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

| | | | | |
|---|---|---|---|---|
| ***Title:*** | ⌘ | Qth threshold parameter in SSDT | | |
| ***Source:*** | ⌘ | TSG RAN WG1 | | |
| ***Work item code:*** | ⌘ | TEI | ***Date:*** ⌘ | 21.02.2002 |
| ***Category:*** | ⌘ | **F** | ***Release:*** ⌘ | R99 |
| | | *Use one of the following categories:*<br>***F*** *(correction)*<br>***A*** *(corresponds to a correction in an earlier release)*<br>***B*** *(addition of feature),*<br>***C*** *(functional modification of feature)*<br>***D*** *(editorial modification)*<br>Detailed explanations of the above categories can be found in 3GPP TR 21.900. | | *Use one of the following releases:*<br>*2 (GSM Phase 2)*<br>*R96 (Release 1996)*<br>*R97 (Release 1997)*<br>*R98 (Release 1998)*<br>*R99 (Release 1999)*<br>*REL-4 (Release 4)*<br>*REL-5 (Release 5)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The current UTRAN Specifications and Physical Layer Specifications appear to be mis-aligned concerning $Q_{th}$ parameter in SSDT. Physical Layer Specifications define Qth parameter as a parameter that is controlled by UTRAN, however in UTRAN Specifications the Qth is not supported over the Iub/Iur. This is so because, RAN3 had decided that Qth is an OAM parameter. |
| ***Summary of change:*** | ⌘ | In section 5.2.1.4.4 text implying that the $Q_{th}$ parameter is controlled by UTRAN is removed. |
| ***Consequences if not approved:*** | ⌘ | Ambiguous definition of Qth parameter is remains in the specifications. |

| | | | |
|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5.2.1.4.4 | |
| ***Other specs affected:*** | ⌘ | [ ] Other core specifications<br>[ ] Test specifications<br>[ ] O&M Specifications | ⌘ |
| ***Other comments:*** | ⌘ | Isolated impact: This CR will not impact the use of any other R99 feature besides SSDT operation. | |

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

#### 5.2.1.4.4 Delivery of primary cell ID

The UE periodically sends the ID code of the primary cell via portion of the uplink FBI field assigned for SSDT use (FBI S field). A cell recognises its state as non-primary if at least the following conditions are fulfilled simultaneously:

- The received ID code does not match with the own ID code.

- ~~The received uplink signal quality satisfies a quality threshold, Qth a parameter defined by the network~~.

- If uplink compressed mode is used, and less than $\lfloor N_{ID}/3 \rfloor$ bits are lost from the ID code (as a result of uplink compressed mode), where $N_{ID}$ is the number of bits in the ID code (after puncturing according to clause 5.2.1.4.1.1, if puncturing has been done).

Otherwise the cell recognises its state as primary.

The state of the cells (primary or non-primary) in the active set is updated synchronously. If a cell receives the last portion of the coded ID in uplink slot j, the state of cell is updated in downlink slot $(j+1+T_{os})$ mod 15, where $T_{os}$ is defined as a constant of 2 time slots. The updating of the cell state is not influenced by the operation of downlink compressed mode.

At the UE, the primary ID code to be sent to the cells is segmented into a number of portions. These portions are distributed in the uplink FBI S-field. The cell in SSDT collects the distributed portions of the primary ID code and then detects the transmitted ID. The period of the primary cell update depends on the settings of the code length and the number of FBI bits assigned for SSDT use as shown in table 5.

**Table 5: Period of primary cell update**

| code length | The number of FBI bits per slot assigned for SSDT | |
|---|---|---|
| | **1** | **2** |
| "long" | 1 update per frame | 2 updates per frame |
| "medium" | 2 updates per frame | 4 updates per frame |
| "short" | 3 updates per frame | 5 updates per frame |

**3GPP TSG RAN Meeting #15**
**Jeju, Korea, 5 – 8, March, 2002**

***R1-02-0487***

*CR-Form-v5*

# CHANGE REQUEST

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|---|---|---|---|---|---|---|
| ⌘ **25.214** | **CR 231** | ⌘ **rev** | **1** | ⌘ | Current version: **4.3.0** | ⌘ |

*For* ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

| | | | | |
|---|---|---|---|---|
| ***Title:*** ⌘ | Qth threshold parameter in SSDT | | | |
| ***Source:*** ⌘ | TSG RAN WG1 | | | |
| ***Work item code:*** ⌘ | TEI | | ***Date:*** ⌘ | 21.02.2002 |
| ***Category:*** ⌘ | **A** | | ***Release:*** ⌘ | REL-4 |
| | *Use one of the following categories:*<br>***F*** *(correction)*<br>***A*** *(corresponds to a correction in an earlier release)*<br>***B*** *(addition of feature),*<br>***C*** *(functional modification of feature)*<br>***D*** *(editorial modification)*<br>Detailed explanations of the above categories can be found in 3GPP TR 21.900. | | | *Use one of the following releases:*<br>*2 (GSM Phase 2)*<br>*R96 (Release 1996)*<br>*R97 (Release 1997)*<br>*R98 (Release 1998)*<br>*R99 (Release 1999)*<br>*REL-4 (Release 4)*<br>*REL-5 (Release 5)* |

| | |
|---|---|
| ***Reason for change:*** ⌘ | The current UTRAN Specifications and Physical Layer Specifications appear to be mis-aligned concerning $Q_{th}$ parameter in SSDT. Physical Layer Specifications define Qth parameter as a parameter that is controlled by UTRAN, however in UTRAN Specifications the Qth is not supported over the Iub/Iur. This is so because, RAN3 had decided that Qth is an OAM parameter. |
| ***Summary of change:*** ⌘ | In section 5.2.1.4.4 text implying that the $Q_{th}$ parameter is controlled by UTRAN is removed. |
| ***Consequences if not approved:*** ⌘ | Ambiguous definition of Qth parameter remains in the specifications. |

| | | |
|---|---|---|
| ***Clauses affected:*** ⌘ | 5.2.1.4.4 | |
| ***Other specs affected:*** ⌘ | [ ] Other core specifications ⌘<br>[ ] Test specifications<br>[ ] O&M Specifications | |
| ***Other comments:*** ⌘ | Isolated impact: This CR will not impact the use of any other Rel-4 feature besides SSDT and DSCH operation. | |

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#### 5.2.1.4.4 Delivery of primary cell ID

The UE periodically sends the ID code of the primary cell via portion of the uplink FBI field assigned for SSDT use (FBI S field). A cell recognises its state as non-primary if at least the following conditions are fulfilled simultaneously:

- The received ID code does not match with the own ID code.
- ~~The received uplink signal quality satisfies a quality threshold, Qth a parameter defined by the network~~.
- If uplink compressed mode is used, and less than $\lfloor N_{ID}/3 \rfloor$ bits are lost from the ID code (as a result of uplink compressed mode), where $N_{ID}$ is the number of bits in the ID code (after puncturing according to clause 5.2.1.4.1.1, if puncturing has been done).

Otherwise the cell recognises its state as primary.

The state of the cells (primary or non-primary) in the active set is updated synchronously. If a cell receives the last portion of the coded ID in uplink slot j, the state of cell is updated in downlink slot $(j+1+T_{os})$ mod 15, where $T_{os}$ is defined as a constant of 2 time slots. The updating of the cell state is not influenced by the operation of downlink compressed mode.

At the UE, the primary ID code to be sent to the cells is segmented into a number of portions. These portions are distributed in the uplink FBI S-field. The cell in SSDT collects the distributed portions of the primary ID code and then detects the transmitted ID. The period of the primary cell update depends on the settings of the code length and the number of FBI bits assigned for SSDT use as shown in table 5.

**Table 5: Period of primary cell update**

| code length | The number of FBI bits per slot assigned for SSDT | |
|---|---|---|
| | 1 | 2 |
| "long" | 1 update per frame | 2 updates per frame |
| "medium" | 2 updates per frame | 4 updates per frame |
| "short" | 3 updates per frame | 5 updates per frame |

**3GPP TSG RAN Meeting #15**
**Jeju, Korea, 5 – 8, March, 2002**

***R1-02-0488***

*CR-Form-v5*

# CHANGE REQUEST

| ⌘ | **25.214** | **CR** | **239** | ⌘ **rev** | **1** | ⌘ | Current version: | **3.9.0** | ⌘ |
|---|---|---|---|---|---|---|---|---|---|

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

| | | | |
|---|---|---|---|
| ***Title:*** ⌘ | TPC procedure in UE when SSDT is activated | | |
| ***Source:*** ⌘ | TSG RAN WG1 | | |
| ***Work item code:*** ⌘ | TEI | ***Date:*** ⌘ | 21.02.2002 |
| ***Category:*** ⌘ | **F** | ***Release:*** ⌘ | R99 |
| | *Use one of the following categories:*<br>***F*** *(correction)*<br>***A*** *(corresponds to a correction in an earlier release)*<br>***B*** *(addition of feature),*<br>***C*** *(functional modification of feature)*<br>***D*** *(editorial modification)*<br>Detailed explanations of the above categories can be found in 3GPP TR 21.900. | | *Use one of the following releases:*<br>*2 (GSM Phase 2)*<br>*R96 (Release 1996)*<br>*R97 (Release 1997)*<br>*R98 (Release 1998)*<br>*R99 (Release 1999)*<br>*REL-4 (Release 4)*<br>*REL-5 (Release 5)* |

| | |
|---|---|
| ***Reason for change:*** ⌘ | Due to unclear description of TPC procedure in UE when SSDT is activated only one solution is listed in normative part of specification. In addition, it is described that SSDT is only applicable with DPC_MODE = 0. |
| ***Summary of change:*** ⌘ | There is only one solution for UE to make SIRest estimation when SSDT is activated which is listed in normative part of specification. SSDT is only applicable with DPC_MODE = 0. |
| ***Consequences if not approved:*** ⌘ | Specifications is left unclear in terms of SIRest in UE when SSDT is activated. |

| | |
|---|---|
| ***Clauses affected:*** ⌘ | 5.2.1.4.2, 5.2.1.4.4, B2 |
| ***Other specs affected:*** ⌘ | [ ] Other core specifications ⌘<br>[ ] Test specifications<br>[ ] O&M Specifications |
| ***Other comments:*** ⌘ | This CR is considered to have isolated impact: Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

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**Table 3: Settings of ID codes for 1 bit FBI**

| ID label | ID code "long" | "medium" | "short" |
|---|---|---|---|
| a | 000000000000000 | (0)0000000 | 00000 |
| b | 101010101010101 | (0)1010101 | 01001 |
| c | 011001100110011 | (0)0110011 | 11011 |
| d | 110011001100110 | (0)1100110 | 10010 |
| e | 000111100001111 | (0)0001111 | 00111 |
| f | 101101001011010 | (0)1011010 | 01110 |
| g | 011110000111100 | (0)0111100 | 11100 |
| h | 110100101101001 | (0)1101001 | 10101 |

**Table 4: Settings of ID codes for 2 bit FBI**

| ID label | ID code (Column and Row denote slot position and FBI-bit position.) "long" | "medium" | "short" |
|---|---|---|---|
| a | (0)0000000<br>(0)0000000 | (0)000<br>(0)000 | 000<br>000 |
| b | (0)0000000<br>(1)1111111 | (0)000<br>(1)111 | 000<br>111 |
| c | (0)1010101<br>(0)1010101 | (0)101<br>(0)101 | 101<br>101 |
| d | (0)1010101<br>(1)0101010 | (0)101<br>(1)010 | 101<br>010 |
| e | (0)0110011<br>(0)0110011 | (0)011<br>(0)011 | 011<br>011 |
| f | (0)0110011<br>(1)1001100 | (0)011<br>(1)100 | 011<br>100 |
| g | (0)1100110<br>(0)1100110 | (0)110<br>(0)110 | 110<br>110 |
| h | (0)1100110<br>(1)0011001 | (0)110<br>(1)001 | 110<br>001 |

The ID code bits shown in table 3 and table 4 are transmitted from left to right. In table 4, the first row gives the first FBI bit in each slot, the second row gives the 2nd FBI bit in each slot. The ID code(s) are transmitted aligned to the radio frame structure (i.e. ID codes shall be terminated within a frame). If FBI space for sending the last ID code within a frame cannot be obtained, the first bit(s) from that ID code are punctured. The bit(s) to be punctured are shown in brackets in table 3 and table 4.

The alignment of the ID codes to the radio frame structure is not affected by transmission gaps resulting from uplink compressed mode.

### 5.2.1.4.2 TPC procedure in UE

The UE shall generate TPC commands to control the network transmit power and send them in the TPC field of the uplink DPCCH based on the downlink signals from the primary cell as selected by the UE ~~only~~. An example on how to derive the TPC commands is given in Annex B.2.

### 5.2.1.4.3 Selection of primary cell

The UE selects a primary cell periodically by measuring the RSCP of P-CPICHs transmitted by the active cells. The cell with the highest P-CPICH RSCP is detected as a primary cell.

### 5.2.1.4.4 Delivery of primary cell ID

The UE periodically sends the ID code of the primary cell via portion of the uplink FBI field assigned for SSDT use (FBI S field). A cell recognises its state as non-primary if the following conditions are fulfilled simultaneously:

- The received ID code does not match with the own ID code.

- The received uplink signal quality satisfies a quality threshold, Qth, a parameter defined by the network.

- If uplink compressed mode is used, and less than $\lfloor N_{ID}/3 \rfloor$ bits are lost from the ID code (as a result of uplink compressed mode), where $N_{ID}$ is the number of bits in the ID code (after puncturing according to clause 5.2.1.4.1.1, if puncturing has been done).

Otherwise the cell recognises its state as primary.

The state of the cells (primary or non-primary) in the active set is updated synchronously. If a cell receives the last portion of the coded ID in uplink slot j, the state of cell is updated in downlink slot (j+1+$T_{os}$) mod 15, where $T_{os}$ is defined as a constant of 2 time slots. The updating of the cell state is not influenced by the operation of downlink compressed mode.

At the UE, the primary ID code to be sent to the cells is segmented into a number of portions. These portions are distributed in the uplink FBI S-field. The cell in SSDT collects the distributed portions of the primary ID code and then detects the transmitted ID. The period of the primary cell update depends on the settings of the code length and the number of FBI bits assigned for SSDT use as shown in table 5. However, SSDT is only applicable with DPC_MODE = 0.

**Table 5: Period of primary cell update**

| code length | The number of FBI bits per slot assigned for SSDT | |
|---|---|---|
| | 1 | 2 |
| "long" | 1 update per frame | 2 updates per frame |
| "medium" | 2 updates per frame | 4 updates per frame |
| "short" | 3 updates per frame | 5 updates per frame |

#### 5.2.1.4.5 TPC procedure in the network

In SSDT, a non-primary cell can switch off its DPDCH output (i.e. no transmissions).

The cell manages two downlink transmission power levels, P1, and P2. Power level P1 is used for downlink DPCCH transmission power level and this level is updated in the same way with the downlink DPCCH power adjustment specified in 5.2.1.2.2 (for normal mode) and 5.2.1.3 (for compressed mode) regardless of the selected state (primary or non-primary). The actual transmission power of TFCI, TPC and pilot fields of DPCCH is set by adding P1 and the offsets PO1, PO2 and PO3, respectively, as specified in 5.2.1.1. P2 is used for downlink DPDCH transmission power level and this level is set to P1 if the cell is selected as primary, otherwise P2 is switched off. The cell updates P1 first and P2 next, and then the two power settings P1 and P2 are maintained within the power control dynamic range. Table 6 summarizes the updating method of P1 and P2.

**Table 6: Updating of P1 and P2**

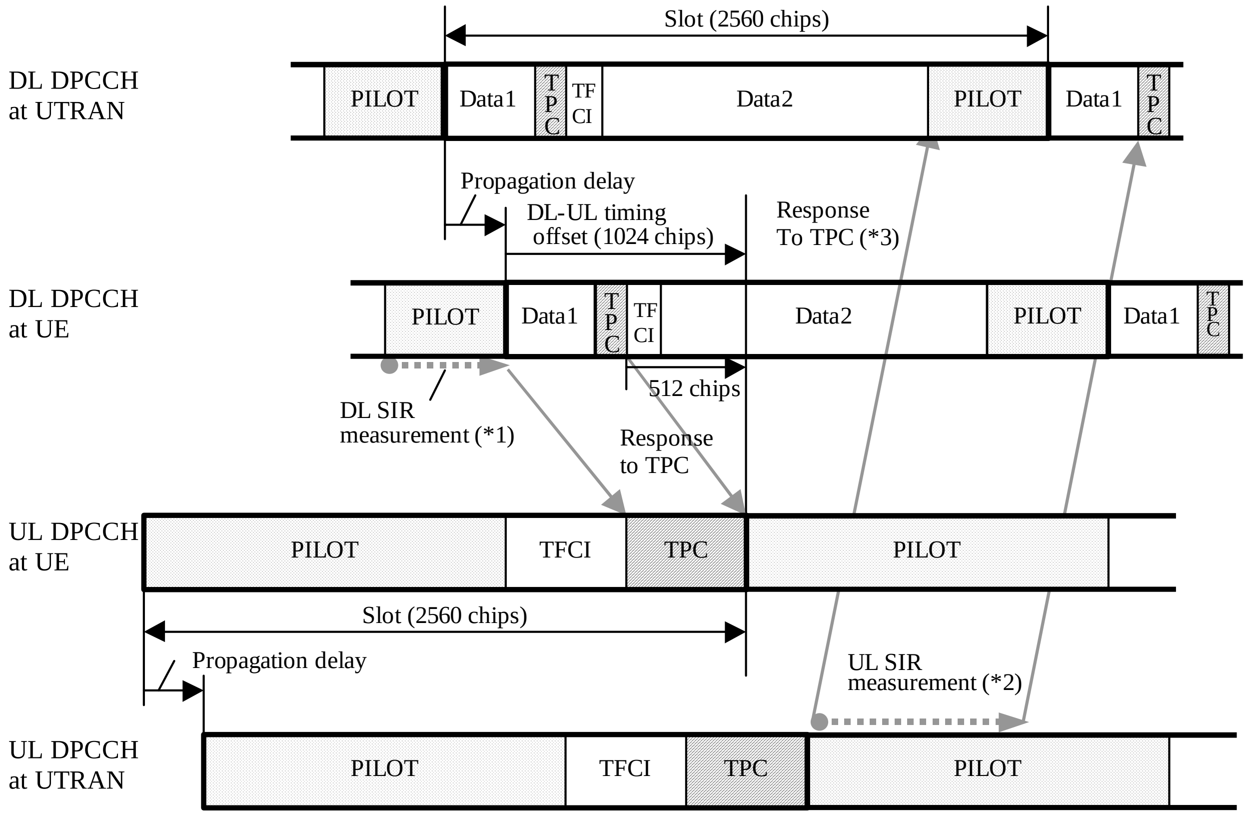
| State of cell | P1 (DPCCH) | P2 (DPDCH) |
|---|---|---|
| non primary | Updated in the same way with the downlink DPCCH power adjustment specified in 5.2.1.2.2 and 5.2.1.3 | Switched off |
| primary | | = P1 |

## 5.2.2 PDSCH

The PDSCH power control can be based on the following solutions, which are selectable, by the network:

- Inner-loop power control based on the power control commands sent by the UE on the uplink DPCCH.

- Slow power control.




1,2 The SIR measurement periods illustrated here are examples. Other ways of measurement are allowed to achieve accurate SIR estimation.

3 If there is not enough time for UTRAN to respond to the TPC, the action can be delayed until the next slot.

**Figure B.1: Transmitter power control timing**

# B.2 Example of implementation in the UE

The downlink inner-loop power control adjusts the network transmit power in order to keep the received downlink SIR at a given SIR target, $SIR_{target}$. A higher layer outer loop adjusts $SIR_{target}$ independently for each connection.

The UE should estimate the received downlink DPCCH/DPDCH power of the connection to be power controlled. Simultaneously, the UE should estimate the received interference and calculate the signal-to-interference ratio, $SIR_{est}$. $SIR_{est}$ can be calculated as RSCP/ISCP, where RSCP refers to the received signal code power on one code and ISCP refers to the non-orthogonal interference signal code power of the received signal on one code. Note that due to the specific SIR target offsets described in [5] that can be applied during compressed frames, the spreading factor shall not be considered in the calculation of $SIR_{est}$.

The obtained SIR estimate $SIR_{est}$ is then used by the UE to generate TPC commands according to the following rule: if $SIR_{est} > SIR_{target}$ then the TPC command to transmit is "0", requesting a transmit power decrease, while if $SIR_{est} < SIR_{target}$ then the TPC command to transmit is "1", requesting a transmit power increase.

When the UE is in soft handover and SSDT is not activated, the UE should estimate $SIR_{est}$ from the downlink signals of all cells in the active set.

When SSDT is activated, the UE should estimate $SIR_{est}$ from the downlink signals of the primary cell as described in 5.2.1.4.2 . If the state of the cells (primary or non-primary) in the active set is changed and the UE sends the last portion of the coded ID in uplink slot j, the UE should change the basis for the estimation of $SIR_{est}$ at the beginning of downlink slot $(j+1+T_{os})$ mod 15, where $T_{os}$ is defined as a constant of 2 time slots.

**3GPP TSG RAN Meeting #15**
**Jeju, Korea, 5 – 8, March, 2002**

***R1-02-0488***

CR-Form-v5

# CHANGE REQUEST

| | | | | | |
|---|---|---|---|---|---|
| ⌘ **25.214** | **CR 240** | ⌘ **rev** | **1** ⌘ | Current version: | **4.3.0** ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

| | | | |
|---|---|---|---|
| ***Title:*** ⌘ | TPC procedure in UE when SSDT is activated | | |
| ***Source:*** ⌘ | TSG RAN WG1 | | |
| ***Work item code:*** ⌘ | TEI | ***Date:*** ⌘ | 21.02.2002 |
| ***Category:*** ⌘ | **A** | ***Release:*** ⌘ | REL-4 |
| | *Use one of the following categories:*<br>***F*** *(correction)*<br>***A*** *(corresponds to a correction in an earlier release)*<br>***B*** *(addition of feature),*<br>***C*** *(functional modification of feature)*<br>***D*** *(editorial modification)*<br>Detailed explanations of the above categories can be found in 3GPP TR 21.900. | | *Use one of the following releases:*<br>*2 (GSM Phase 2)*<br>*R96 (Release 1996)*<br>*R97 (Release 1997)*<br>*R98 (Release 1998)*<br>*R99 (Release 1999)*<br>*REL-4 (Release 4)*<br>*REL-5 (Release 5)* |

| | |
|---|---|
| ***Reason for change:*** ⌘ | Due to unclear description of TPC procedure in UE when SSDT is activated only one solution is listed in normative part of specification. In addition, it is described that SSDT is only applicable with DPC_MODE = 0. |
| ***Summary of change:*** ⌘ | There is only one solution for UE to make SIRest estimation when SSDT is activated which is listed in normative part of specification. SSDT is only applicable with DPC_MODE = 0. |
| ***Consequences if not approved:*** ⌘ | Specifications is left unclear in terms of SIRest in UE when SSDT is activated. |

| | |
|---|---|
| ***Clauses affected:*** ⌘ | 5.2.1.4.2, 5.2.1.4.4, B2 |
| ***Other specs affected:*** ⌘ | [ ] Other core specifications ⌘<br>[ ] Test specifications<br>[ ] O&M Specifications |
| ***Other comments:*** ⌘ | This CR is considered to have isolated impact: Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

## How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest

version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change reques

**Table 3: Settings of ID codes for 1 bit FBI**

| ID label | ID code "long" | "medium" | "short" |
|---|---|---|---|
| a | 000000000000000 | (0)0000000 | 00000 |
| b | 101010101010101 | (0)1010101 | 01001 |
| c | 011001100110011 | (0)0110011 | 11011 |
| d | 110011001100110 | (0)1100110 | 10010 |
| e | 000111100001111 | (0)0001111 | 00111 |
| f | 101101001011010 | (0)1011010 | 01110 |
| g | 011110000111100 | (0)0111100 | 11100 |
| h | 110100101101001 | (0)1101001 | 10101 |

**Table 4: Settings of ID codes for 2 bit FBI**

| ID label | ID code (Column and Row denote slot position and FBI-bit position.) "long" | "medium" | "short" |
|---|---|---|---|
| a | (0)0000000<br>(0)0000000 | (0)000<br>(0)000 | 000<br>000 |
| b | (0)0000000<br>(1)1111111 | (0)000<br>(1)111 | 000<br>111 |
| c | (0)1010101<br>(0)1010101 | (0)101<br>(0)101 | 101<br>101 |
| d | (0)1010101<br>(1)0101010 | (0)101<br>(1)010 | 101<br>010 |
| e | (0)0110011<br>(0)0110011 | (0)011<br>(0)011 | 011<br>011 |
| f | (0)0110011<br>(1)1001100 | (0)011<br>(1)100 | 011<br>100 |
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| h | (0)1100110<br>(1)0011001 | (0)110<br>(1)001 | 110<br>001 |

The ID code bits shown in table 3 and table 4 are transmitted from left to right. In table 4, the first row gives the first FBI bit in each slot, the second row gives the 2nd FBI bit in each slot. The ID code(s) are transmitted aligned to the radio frame structure (i.e. ID codes shall be terminated within a frame). If FBI space for sending the last ID code within a frame cannot be obtained, the first bit(s) from that ID code are punctured. The bit(s) to be punctured are shown in brackets in table 3 and table 4.

The alignment of the ID codes to the radio frame structure is not affected by transmission gaps resulting from uplink compressed mode.

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The UE shall generate TPC commands to control the network transmit power and send them in the TPC field of the uplink DPCCH based on the downlink signals from the primary cell as selected by the UE ~~only~~. An example on how to derive the TPC commands is given in Annex B.2.

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Otherwise the cell recognises its state as primary.

The state of the cells (primary or non-primary) in the active set is updated synchronously. If a cell receives the last portion of the coded ID in uplink slot j, the state of cell is updated in downlink slot $(j+1+T_{os})$ mod 15, where $T_{os}$ is defined as a constant of 2 time slots. The updating of the cell state is not influenced by the operation of downlink compressed mode.

At the UE, the primary ID code to be sent to the cells is segmented into a number of portions. These portions are distributed in the uplink FBI S-field. The cell in SSDT collects the distributed portions of the primary ID code and then detects the transmitted ID. The period of the primary cell update depends on the settings of the code length and the number of FBI bits assigned for SSDT use as shown in table 5. However, SSDT is only applicable with DPC_MODE = 0.

**Table 5: Period of primary cell update**

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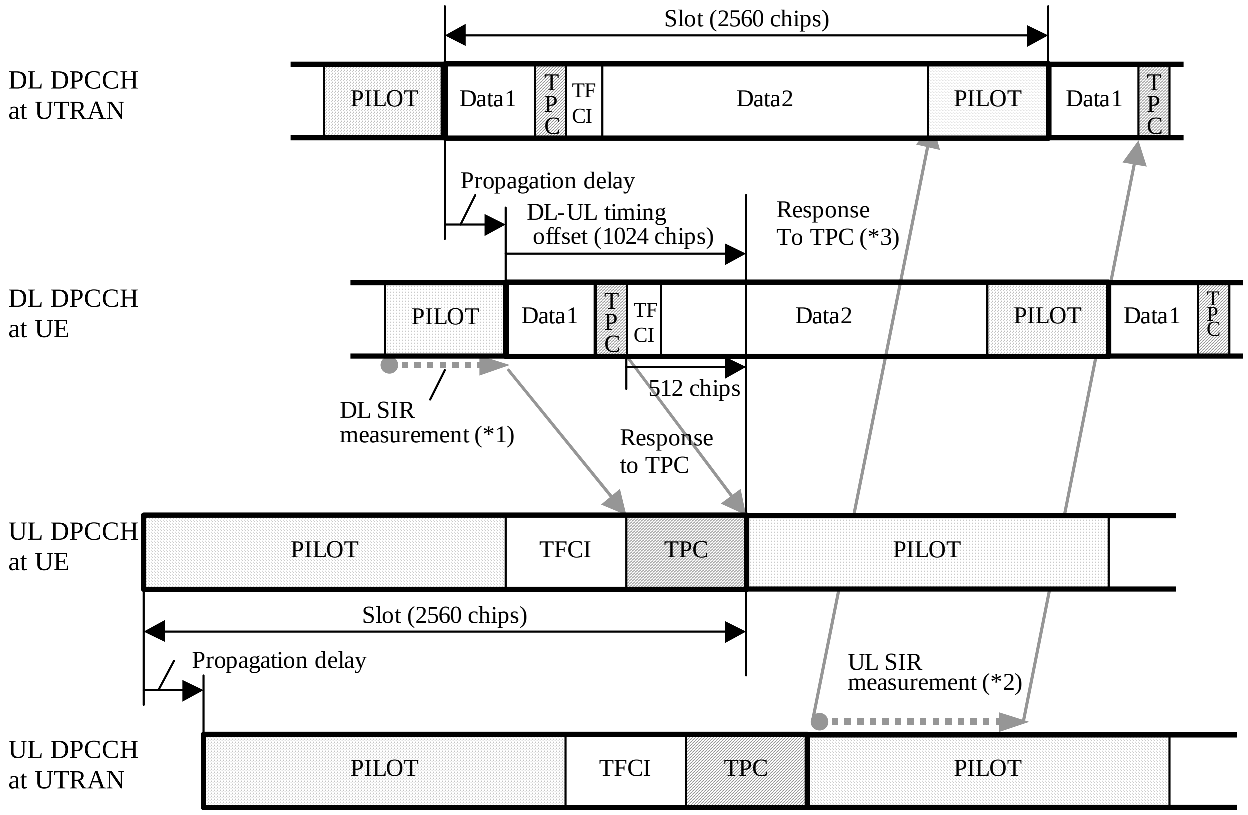


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The UE should estimate the received downlink DPCCH/DPDCH power of the connection to be power controlled. Simultaneously, the UE should estimate the received interference and calculate the signal-to-interference ratio, $SIR_{est}$. $SIR_{est}$ can be calculated as RSCP/ISCP, where RSCP refers to the received signal code power on one code and ISCP refers to the non-orthogonal interference signal code power of the received signal on one code. Note that due to the specific SIR target offsets described in [5] that can be applied during compressed frames, the spreading factor shall not be considered in the calculation of $SIR_{est}$.

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