15 Timing advance and absolute delay

15.1 Definition and applicability

Timing advance (TA) is a time offset in bits as sent to the MS by the BS. The MS shall advance its transmissions to the BS by the timing advance relative to 3 timeslots behind transmissions received from the BS.

The absolute delay is the delay between a common burst reference point within the received and the transmitted RF burst.

NOTE: For normal or dummy bursts, the common burst reference point is defined to be the transition from bit 13 to bit 14 of the midamble. For an access burst it is defined to be the transition from bit 48 to bit 49 of the burst.

Equivalently the delay can be referenced to the modulator input vs. the demodulator output or to the differential encoder input vs. the differential decoder output, provided the measured delay is corrected for the additional delays in the signal path.

The requirement and this test apply to all types of DSM 900 and DCS 1 800 MS.

15.2 Conformance requirement

1) The random access burst transmission, measured at the MS antenna, shall use a TA of 0, and therefore be 3 timeslots behind the transmissions received from the BTS, with an absolute tolerance of +/- 1 bit period.
GSM 05.10, 6.4; GSM 05.10, 6.6.

2) The normal burst transmission, measured at the MS antenna, shall be 3 timeslots - TA behind the transmissions received from the BTS, with an absolute tolerance of +/- 1 bit period.
GSM 05.10, 6.4.

3) When the MS receives a new value of TA on the SACCH, it shall implement the new value of TA at the first TDMA frame belonging to the next reporting period, after the SACCH frame containing the new TA value.
GSM 05.10, 6.5.

4) The MS shall signal the used TA to the BS, in the L1 header of the uplink SACCH message.
GSM 05.10, 6.4, GSM 04.04, 7.2.

15.3 Test purpose

1) To verify that the MS uses a TA value of 0 for the access burst.

2) To verify that the MS meets the absolute receive/transmit delay requirement for the access burst.

3) To verify that the MS meets the absolute receive/transmit delay requirement for normal bursts.

4) To verify that the MS implements a new timing advance value as signalled on the SACCH as in the requirement.

5) To verify that the MS sends the TA used on the uplink SACCH as in the requirement.

15.4 Method of test

15.4.1 Initial conditions

The SS sends "MAXRETRANS = 7" and "TX-INTEGER = 3" on the BCCH.

The MS is brought into MM state "idle, updated".

15.4.2 Procedure

a) The SS pages the MS after 10 s.

b) The SS does not respond to the first 7 CHANNEL REQUEST messages from the MS. The SS responds to the 8th CHANNEL REQUEST from the MS on the RACH by sending an IMMEDIATE ASSIGNMENT message, with TA set to 0.

c) The SS continues to set up a call according to the generic call set up procedure.

d) The SS signals the TA values 10, 20, 30, 40, 50, 60, 63, and one random value other than these values to the MS in consecutive SACCH blocks.

The SS determines the TA value set in the L1 header on the uplink SACCH for each timing advance.

The SS measures the absolute delay for all bursts.

15.5 Test requirement

The measured receive/transmit delay for each burst shall equal the following nominal values with an absolute tolerance of +/- 1 bit period:

access bursts: 3 timeslots (= 45/26 ms)

normal bursts: 3 timeslots (= 45/26 ms) minus the last TA value received from the SS.

The MS shall use the new timing advance at the first TDMA frame belonging to the next reporting period after the SACCH frame containing the new TA value.

The TA field in the uplink SACCH L1 header shall contain to the most recently ordered TA value.