

**UMTS Terrestrial Radio Access Network (UTRAN);
UTRA FDD: Additional features description
(UMTS XX.08 version 1.0.0)**

UMTS

Universal Mobile
Telecommunications System



Reference

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ETSI

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Internet

secretariat@etsi.fr
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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Special Mobile Group (SMG). The present document provides an overview of the additional and optional features for UTRA. The contents of the present document are subject to continuing work within SMG2 and SMG2 UMTS Layer 1 Expert Group and may change following approval by either of these two groups.

1 Scope

This Technical Report is to collate the key additional and optional features considered and agreed to be included as part of the UTRA System Description during the course of UTRA discussion within the Layer 1 Expert Group. Additional and optional features are features which are optional for but fully compatible to UTRA and could improve system performance when applied appropriately. These features are usually not mandatory in nature.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] UTRA Physical Layer Description, FDD parts, V 0.4, Tdoc SMG2 UMTS L1 221/98.

[2] UTRA Physical Layer Description, TDD parts, V 0.2.1, Tdoc UMTS L1 274/98.

3 Definitions symbols and abbreviations

3.1 Definitions

For the purposes of the present document the following terms and definitions apply:

Definition 1: to be completed

3.2 Symbols

For the purposes of the present document the following symbols apply:

3.3 Abbreviations

CCPCH	Common Control Physical Channels
DPCH	Dedicated Physical Channels
FDD	Frequency Division Duplex
FEC	Forward Error Correction (coding)
MS	Mobile Stations
OTD	Orthogonal Transmit Diversity
SCH	Synchronisation Channels
STD	Selection Transmit Diversity
STTD	Space Time Transmit Diversity
TDOA	Time Difference of Arrival
TDTD	Time Division Transmit Diversity
TSTD	Time Switched Transmit Diversity
TS	Time Slot

4 Status

There is currently no working assumptions on additional features. All existing descriptions were derived from the previous combined FDD description.

4.1 Transmit Diversity

Transmit diversity shall be optional for the base station and fffs for all types of UE.6.2 Positioning.

A downlink positioning proposal from Ericsson was submitted to the Stockholm L1 meeting. It proposed to cease transmission in the serving BS for short intervals in order to improve the MSs chances of detecting other BSs. The accuracy is directly related to the uncertainty of the location, prior to positioning, of the MS in the cell, which is in turn related to the cell size.

5 Adaptive antennas

Adaptive antennas are recognised as a way to enhance capacity and coverage of the system. Solutions employing adaptive antennas are already supported in the UTRA/FDD concept through the use of connection-dedicated pilot bits on both uplink and downlink.

6 Multi-user detection

UTRA/FDD is designed to work without requiring joint detection of multiple user signals. However, the potential capacity gains of such receivers in a UTRA/FDD system have been recognised and taken into account in the design of the concept. In the uplink the possibility to use only short codes facilitates will require more advanced receiver structures with reasonable complexity.

7 Downlink transmit diversity

Transmit diversity shall be optional for the base station and for further study for all types of User Equipment

7.1 Open loop transmit diversity

See XX.03 and XX.07.

7.2 Closed loop transmit diversity

See XX.03 and XX.07. Locationing function support.

The wideband nature of the UTRA/FDD facilitates the high resolution in position location as the resolution achievable is directly proportional to the channel symbol rate, in this case chip rate. The duration of one chip corresponds to approximately 73 meters in propagation distance and if the delay estimation operates on the accuracy of samples/chip then the achievable maximum accuracy is approximately 18 meters with the 4.096 Mcps chip rate. Naturally there are other inaccuracies that will cause degradation to the positioning but 18 meters can be considered as a lower bound for the positioning performance. With a higher sampling rate or chip rate the bound will be lower.

With the UTRA/FDD concept the position location has been discussed in several ETSI/SMG2 input documents. One example solution to use is the proposed power up function (PUF) which when a MS is required to be heard by several base stations it will increase the transmission power over short interval. Other aspects of the position mechanism are how the issue of actual measurement is done and whether that is based on round trip delay or on Time Difference Of Arrival (TDOA) or other measures.

History

Document history		
Date	Version	Comment
15-8-1998	0.0.1	Proposed first draft with text adopted from UTRA Physical Layer Description, FDD parts, expected revised version of Tdoc SMG2 UMTS L1 221/98
15-9-1998	0.0.2	Version as approved at the Helsinki L1 Group Meeting for presentation to SMG2.
19-11-1998	0.1.0	Version as approved at the Sophia Antipolis L1 meeting and submitted to the Dresden SMG2 meeting. Status section added. Other sections unchanged.
21-12-1998	0.2.0	Text on STTD as approved at the Espoo December L1 Meeting is included in Section 9.1.2. The Status Section is amended to reflect the changes.
20-1-1999	0.3.0	Section 9 on transmit diversity was revised based on decision of Jan '99 L1 Meeting in Espoo. Main changes are on referring both open loop and closed loop transmit diversity to XX.03 and XX.07 and transmit diversity is optional for the base station and ffs for all UE. Status section is updated to reflect the decision on transmit diversity.
<p>Editor for UMTS XX.08 is :</p> <p>Stanley Chia</p> <p>AirTouch Communications</p> <p>Tel: +1.925.210.3470; Fax: +1.925.210.3485; Email: stanley.chia@airtouch.com</p>		
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