TSG-RAN Working Group 1 meeting #9
Dresden, Germany
November 30 – December 3, 1999

TSGR1#9(99)i62

Agenda item:

Source: Ericsson

Title: CR 25.213-008: Updated modulation description

Document for: Decision

In earlier versions of TS 25.213, e.g. V2.1.0, there were figures describing the QPSK modulation step. From the figures it was clear that the real part of the spread signal shall be modulated with $\cos(\omega t)$, while the imaginary part shall be modulated with $-\sin(\omega t)$. This information has since then been removed, and is currently missing.

To re-introduce this information, this CR has been generated.

3GPP TSG RAN WG1 Meeting #9
Dresden, Germany, Nov 30 – Dec 3, 1999

Document ????99???
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.213	**CR**	**008**	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: TSG-RAN #6 *list expected approval meeting # here ↑*

for approval	X	strategic		*(for SMG use only)*
for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*

(U)SIM		ME	X	UTRAN / Radio	X	Core Network	

Source: Ericsson **Date:** 1999-11-18

Subject: Updated modulation description

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: In earlier versions of TS 25.213, e.g. V2.1.0, there were figures describing the QPSK modulation step. From the figures it was clear that the real part of the spread signal shall be modulated with cos(ωt), while the imaginary part shall be modulated with -sin(ωt). This information has since then been removed, and is currently missing. This CR reintroduces this information, which is essential to have a non-ambiguous specification.

Clauses affected: 2, 4.4.2, 5.3.1, 5.3.2

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

1 Scope

The present document describes spreading and modulation for UTRA Physical Layer FDD mode.

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.

[1] TS 25.201: "Physical layer - general description".

[2] TS 25.101: " UE Radio transmission and Reception (FDD)".

[3] TS 25.104: " UTRA (BS) FDD; Radio transmission and Reception".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

3.2 Symbols

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

$C_{ch,SF,n}$: n:th channelisation code with spreading factor SF
C_{scramb}: scrambling code for uplink
$C_{sig,s}$: RACH signature code.
$S_{ul,n}$: UL scrambling code for desicated channels
$S_{r\text{-}pre,n}$: RACH preamble scrambling code
$S_{r\text{-}msg,n}$: RACH message scrambling code
$S_{c\text{-}acc}$: CPCH access preamble scrambling code
$S_{c\text{-}cd}$: CPCH CD preamble scrambling code
$S_{c\text{-}msg,n}$: CPCH message scrambling code
$S_{dl,n}$: DL scrambling code
$C_{sch,n}$: n:th SCH code (primary or secondary)
C_{psc}: PSC code
$C_{ssc,n}$: n:th SSC code

4.3.4.4 Scrambling code for the CPCH message part

In addition to spreading, the message part is also subject to scrambling with a 10 ms complex code. The scrambling code is cell-specific and has a one-to-one correspondence to the scrambling code used for the preamble part.

$S_{c\text{-}msg,n} = C_{scramb,n}$,for chip indexes 8192…46591 of $C_{scramb,n}$.

In the case when the access resources are shared between the RACH and CPCH,

$S_{c\text{-}msg,n} = C_{scramb,n}$,for chip indexes 4096…42495 of $C_{scramb,n}$.

The generation of these codes is explained in 4.3.2.2. The mapping of these codes to provide a complex scrambling code is also the same as for the dedicated uplink channels and is described in 4.3.2.1.

NOTE: Use of short scrambling code for CPCH message part is ffs.

4.4 Modulation

4.4.1 Modulating chip rate

The modulating chip rate is 3.84 Mcps.

4.4.2 Modulation

In the uplink, the complex-valued chip sequence generated by the spreading process is QPSK modulated as shown in Figure 8 below. ~~modulation of both DPCCH and DPDCH is BPSK.~~

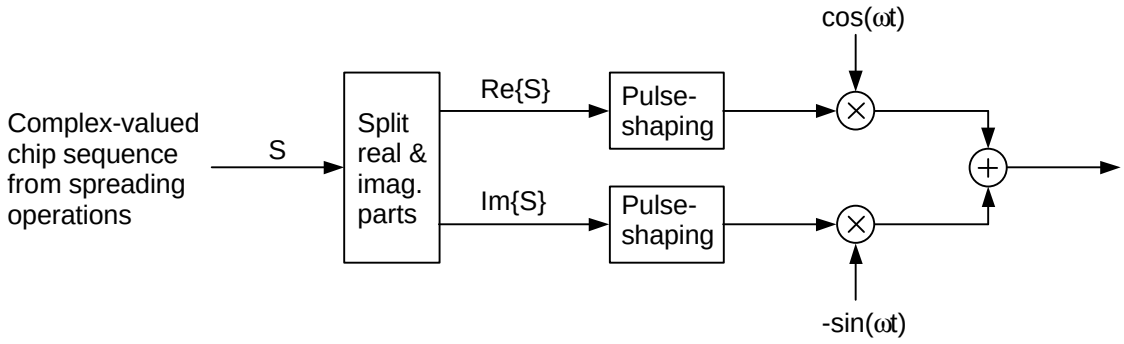

Figure 8: Uplink modulation.

The pulse-shaping characteristics are described in [2].

Group 51	3	10	10	15	16	5	4	6	16	4	3	15	9	6	9
Group 52	3	13	11	5	4	12	4	11	6	6	5	3	14	13	12
Group 53	3	14	7	9	14	10	13	8	7	8	10	4	4	13	9
Group 54	5	5	8	14	16	13	6	14	13	7	8	15	6	15	7
Group 55	5	6	11	7	10	8	5	8	7	12	12	10	6	9	11
Group 56	5	6	13	8	13	5	7	7	6	16	14	15	8	16	15
Group 57	5	7	9	10	7	11	6	12	9	12	11	8	8	6	10
Group 58	5	9	6	8	10	9	8	12	5	11	10	11	12	7	7
Group 59	5	10	10	12	8	11	9	7	8	9	5	12	6	7	6
Group 60	5	10	12	6	5	12	8	9	7	6	7	8	11	11	9
Group 61	5	13	15	15	14	8	6	7	16	8	7	13	14	5	16
Group 62	9	10	13	10	11	15	15	9	16	12	14	13	16	14	11
Group 63	9	11	12	15	12	9	13	13	11	14	10	16	15	14	16
Group 64	9	12	10	15	13	14	9	14	15	11	11	13	12	16	10

5.3 Modulation

5.3.1 Modulating chip rate

The m~~QA~~odulating chip rate is 3.84 Mcps.

5.3.2 Modulation

~~QPSK modulation is used.~~ In the downlink, the complex-valued chip sequence generated by the spreading process is QPSK modulated as shown in Figure 11 below.

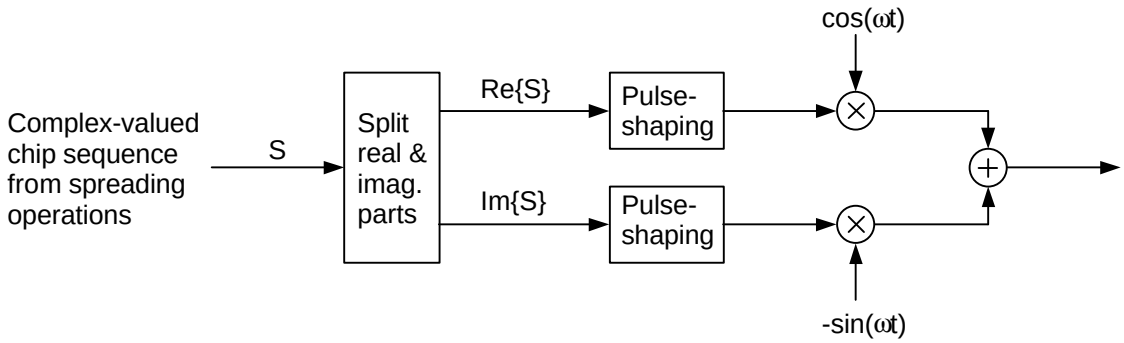

Figure 11: Downlink modulation.

The pulse-shaping characteristics are described in [3].