Agenda Item: 8.2

Source: Nokia

Title: Text proposals for Tx Diversity

Document for: Approval

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1. INTRODUCTION

In last AH01 physical meeting in Amsterdam Nokia proposed modifications to TX Diversity testing assumptions [1]. It was agreed in Amsterdam that one week is allowed for comments on reflector before the document will be approved. No comments were sent during the allowed time and now the modifications presented in [1] need to be included into TS 25.101 [2]. This document provides text proposal for TS25.101 to align specification with approved Tx diversity simulation assumptions. In addition to this, this document includes text proposal, which suggest minor editorial changes to tables describing test parameters and requirements when Tx diversity is being used.

2. TEXT PROPOSALS

2.1 Proposal 1

ANNEX C (NORMATIVE): DOWNLINK PHYSICAL CHANNELS

C.1 General

This Normative annex specifies the downlink physical channels that are needed for setting a connection and channels that are needed during a connection.

C.2 Connection Set-up

Table C.2 describes the downlink Physical Channels that are required for connection set up.

Table C.2. Downlink Physical Channels required for connection set-up

Physical Channel
CPICH
PCCPCH
SCH
SCCPCH
PICH
AICH
DPCH

C.3. During connection

C.3.1 Connection without Tx diversity

Table C.3 describes the downlink Physical Channels that are transmitted during a connection i.e., when measurements are done. The offset between DPCH and SCH should be zero chips at base station meaning that SCH is overlapping with the first symbols in DPCH in the beginning of DPCH slot structure.

Table C.3. Downlink Physical Channels transmitted during a connection.[1]

Physical Channel	Power
CPICH	CPICH_Ec/Ior = -10 dB
PCCPCH	PCCPCH_Ec/Ior = -12 dB
SCH	PCCPCH_Ec/Ior = -12 dB
PICH	PICH_Ec/Ior = -15 dB
DPCH	The power needed to meet the BER/BLER target
OCNS	Necessary power so that total transmit power spectral density of BS (Ior) adds to one

C.3.2 Connection with open-loop transmit diversity mode

Table C.4 describes the downlink Physical Channels that are transmitted during a connection i.e., when measurements are done. The offset between DPCH and SCH should be zero chips at base station meaning that SCH is overlapping with the first symbols in DPCH in the beginning of DPCH slot structure.

Table C.4. Downlink Physical Channels transmitted during a connection.[2]

Physical Channel	Power	Comments
CPICH (antenna 1)	CPICH_Ec1/Ior = -13 dB	
CPICH (antenna 2)	CPICH_Ec2/Ior = -13 dB	Total CPICH_Ec/Ior = -10 dB
PCCPCH (antenna 1)	PCCPCH_Ec1/Ior = -15 dB	STTD applied
PCCPCH (antenna 2)	PCCPCH_Ec2/Ior = -15 dB	STTD applied, total PCCPCH_Ec/Ior = -12 dB
SCH (antenna 1 / 2)	SCH_Ec/Ior = -12 dB	Hopping between antennas (TSTD)
PICH (antenna 1)	PICH_Ec1/Ior = -18 dB	STTD applied
PICH (antenna 2)	PICH_Ec2/Ior = -18 dB	STTD applied, total PICH_Ec/Ior = -15 dB
DPCH	Total power from both antennas needed to meet the BLER target	STTD applied
OCNS	Necessary power so that total transmit power spectral density of BS (Ior) adds to one	This power shall be divided between antennas

C.3.3 Connection with feedback transmit diversity mode

Table C.5 describes the downlink Physical Channels that are transmitted during a connection i.e., when measurements are done. The offset between DPCH and SCH should be zero chips at base station meaning that SCH is overlapping with the first symbols in DPCH in the beginning of DPCH slot structure.

1 Power levels are based on the assumption that multipath propagation conditions and noise source representing interference from other cells Ioc are turned on after the call set-up phase.

2 Power levels are based on the assumption that multipath propagation conditions and noise source representing interference from other cells Ioc are turned on after the call set-up phase.

Table C.5. Downlink Physical Channels transmitted during a connection.[3]

Physical Channel	Power	Comments
CPICH (antenna 1)	CPICH_Ec1/Ior = -13 dB	
CPICH (antenna 2)	CPICH_Ec2/Ior = -13 dB	Total CPICH_Ec/Ior = -10 dB
PCCPCH (antenna 1)	PCCPCH_Ec1/Ior = -15 dB	STTD applied
PCCPCH (antenna 2)	PCCPCH_Ec2/Ior = -15 dB	STTD applied, total PCCPCH_Ec/Ior = -12 dB
SCH (antenna 1 / 2)	SCH_Ec/Ior = -12 dB	Hopping between antennas (TSTD)
PICH (antenna 1)	PICH_Ec1/Ior = -18 dB	STTD applied
PICH (antenna 2)	PICH_Ec2/Ior = -18 dB	STTD applied, total PICH_Ec/Ior = -15 dB
DPCH	Total power from both antennas needed to meet the BLER target	
OCNS	Necessary power so that total transmit power spectral density of BS (Ior) adds to one	This power shall be divided between antennas

2.2 Proposal 2

This text proposal provides minor editorial changes to Tables in Section 8.6.1 and 8.6.2. Same sort of changes have been previously made to other tables in Section 8. Also feedback (FBI) error rate (4 %), which was introduced in AH01 meeting in Amsterdam, has been added as one of the test parameters for tests in feedback transmit diversity mode.

8.6 Demodulation of DCH in Base Station Transmit diversity modes

8.6.1 Demodulation of DCH in open-loop transmit diversity mode

The receive characteristic of the Dedicated Channel (DCH) in open loop transmit diversity mode is determined by the Block Error Rate (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH)

8.6.1.1 Minimum requirement

For the parameters specified in Table 35 the BLER shall not exceed the associated piece-wise linear BLER curve specified by the points in Table 36

Table 35: Test parameters for DCH reception in an open loop transmit diversity scheme. (Propagation condition: Case 1)

Parameter	Unit	Test 1
$\frac{DPCH\_E_c}{I_{or}}$ ~~(Antenna 1)~~	~~dB~~	~~[ ]~~
$\frac{DPCH\_E_c}{I_{or}}$ ~~(Antenna 2)~~	~~dB~~	~~[ ]~~
$\hat{I}_{or}/I_{oc}$	dB	[ ]
I_{oc}	dBm/3.84 MHz	-60
Information data rate	kbps	12.2
~~DCH_E_b/N_t~~	~~dB~~	~~[ ]~~

[3] Power levels are based on the assumption that multipath propagation conditions and noise source representing interference from other cells Ioc are turned on after the call set-up phase.

Table 36: Test requirements for DCH reception in open loop transmit diversity scheme.

Test Number	~~DCH_E_b/N_t~~ $\frac{DPCH\_E_c}{I_{or}}$ (Antenna 1 / 2)	BLER
1		

8.6.2 Demodulation of DCH in feedback transmit diversity mode

The receive characteristic of the dedicated channel (DCH) in feedback transmit diversity mode is determined by the Block Error Rate (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH).

8.6.2.1 Minimum requirement

For the parameters specified in Table 37 the BLER shall not exceed the associated piece-wise linear BLER curves specified by the points in Table 38.

Table 37: Test Parameters for DCH Reception in feedback transmit diversity mode
(Propagation condition: Case 1)

Parameter	Unit	Test 1 (Mode 1)	Test 2 (Mode 2)
~~$\frac{PCCPCH\_E_c}{I_{or}}$ (Antenna 1)~~	~~dB~~	~~-10~~	~~-10~~
~~$\frac{PCCPCH\_E_c}{I_{or}}$ (Antenna 2)~~	~~dB~~	~~-10~~	~~-10~~
~~$\frac{DPCH\_E_c}{I_{or}}$ (4)~~	~~dB~~	~~[ ]~~	~~[ ]~~
$\hat{I}_{or}/I_{oc}$	dB	[ ]	[ ]
I_{oc}	dBm/3.84 MHz	-60	-60
Information data rate	kbps	12.2	12.2
Feedback error rate	%	4	4
~~DCH_E_b/N_t~~	~~dB~~	~~[ ]~~	~~[ ]~~

Table 38: Test requirements for DCH reception in feedback transmit diversity mode.

Test Number	~~DCH_E_b/N_t~~ $\frac{DPCH\_E_c}{I_{or}}$ (5)	BLER
1		
2		

~~4 This is the total power from both antennas. Power sharing between antennas are feedback mode dependent as specified in TS25.214~~

5 This is the total power from both antennas. Power sharing between antennas are feedback mode dependent as specified in TS25.214

3. CONCLUSIONS

Two text proposals were presented in this document. First proposal provides changes to physical channels during Tx diversity modes as was discussed and agreed in AH01 meeting in Amsterdam. Second proposal provides minor editorial changes to tables describing test parameters and test requirements when Tx Diversity is used.

REFERENCES

[1] TSGR4(99)583. Modifications to Tx Diversity testing assumptions. Nokia.

[2] TS 25.101 v3.0.0 (1999-10). UE Radio transmission and reception (FDD)