3GPP TSG RAN WG4 meeting #6 **R4-(99)373**
26 – 29 July 1999
Scotland

Agenda Item: **8.7**
Source: **NEC, NTT DoCoMo, Panasonic, Fujitsu**
Title: **Required Eb/No for Voice channel (12.2kbps, BS for FDD)**
Document for: **Discussion & Decision**

1.Introduction

This paper is for discussion and confirmation on reference sensitivity level of Base Station (FDD). Computer simulation has been done to confirm the reference sensitivity levels when chip rate is changed from 4.096Mcps to 3.84Mcps. The resultants show that even when chip rate is changed, the reference sensitivity should be the same.

2.Discussion

Computer simulation has been done to confirm the reference sensitivity level when chip rate is changed from 4.096Mcps to 3.84Mcps. Simulation conditions are summarized in Table 1. Conditions for 4.096Mcps are as same as in [5]. As for conditions for 3.84Mcps, number of slots is changed from 16 to 15 according to the information in [5] and [6].
Fig. 1 shows the resultants of simulation. BER performances are almost same both for chip rate of 4.096Mcps and 3.84Mcps. Without antenna diversity (SD=1), required Eb/No to achieve BER of 0.1% is 4.4dB for chip rate of 4.096Mcps and 4.3dB for chip rate of 3.84Mcps respectively. Substituting these figure to the following equation with the same conditions in [5] , i.e. BW = 12.2×10^3[Hz], NF=5[dB] and M=2[dB], the reference sensitivity level is equal to –122dBm for either chip rate case. As a result, there is no difference for reference sensitivity level even when chip rate is changed from 4.096Mcps to 3.84Mcps.

$$\Pr x[dBm] = -174[dBm/Hz] + 10\log(BW[Hz]) + Eb/No[dB] + NF[dB] + M[dB] \ldots (1)$$

where
Prx: Reference sensitivity level for Base Station in FDD mode
BW: Signal band width
Eb/No: Required Eb/No derived from computer simulation
NF: Noise Figure for receiver
M: Hardware margin.

3.Conclusion

According to the simulation results, it is carried out that there is no need to make change on reference sensitivity level for voice channel in the current section in TS25.141.

Reference

[1] “FDD/FDD ACIR description document as agreed in AH 02”,Tdoc RAN4(99)136,1999
[2] “Physical channels and mapping of transport channels onto physical channels (FDD)”, TS25.211(V2.0.0) Apr.1999
[3] “Multiplexing and channel coding (FDD)”,TS25.212(V.1.0.0),Apr.1999
[4] “Spreading and modulation(FDD)”,TS25.213(V2.0.0),Apr.1999
[5] “Proposal for ‘Reference sensitivity level’ of BS in FDD mode”,Tdoc RAN4(99)204,1999
[6] “Impact of OHG harmonization recommendation on UTRA/FDD”,Tdoc. RAN4(99)329,1999
[7] “Impact of OHG harmonization recommendation on UTRA/FDD and UTRA/TDD”, Tdoc.

RAN1(99)677,1999

Table 1 **Parameters for RL(speech channel without signaling channel)**

Chip rate	4.096Mcps	3.84Mcps
Information bit rate (interleave)	12.2kbps (20ms)	12.2kbps (20ms)
Physical channel rate	DPDCH:64ksps DPCCH:16ksps 16[slot/frame]	DPDCH:60ksps DPCCH:15ksps 15[slot/frame]
Transport block size	244bit/20ms	244bit/20ms
CRC bit	16bit/20ms	16bit/20ms
Coding	Convolutional coding (244+16+8)x3	Convolutional coding (244+16+8)x3
Rate Matching	804bit>1280bit(+476bit) /20ms	804bit>1200bit(+396bit) /20ms
Inter-frame interleave	Inter-frame MIL(F=2)	Inter-frame MIL(F=2)
Intra-frame interleave	Intra-frame MIL(640bit)	Intra-frame MIL(600bit)
DPCCH-DPDCH power	-3[dB]	-3[dB]
Pilot/TPC/TFCI Per slot	6/2/2 bits	6/2/2 bits
Antenna diversity	On(SD=2) / Off (SD=1)	On(SD=2) / Off (SD=1)

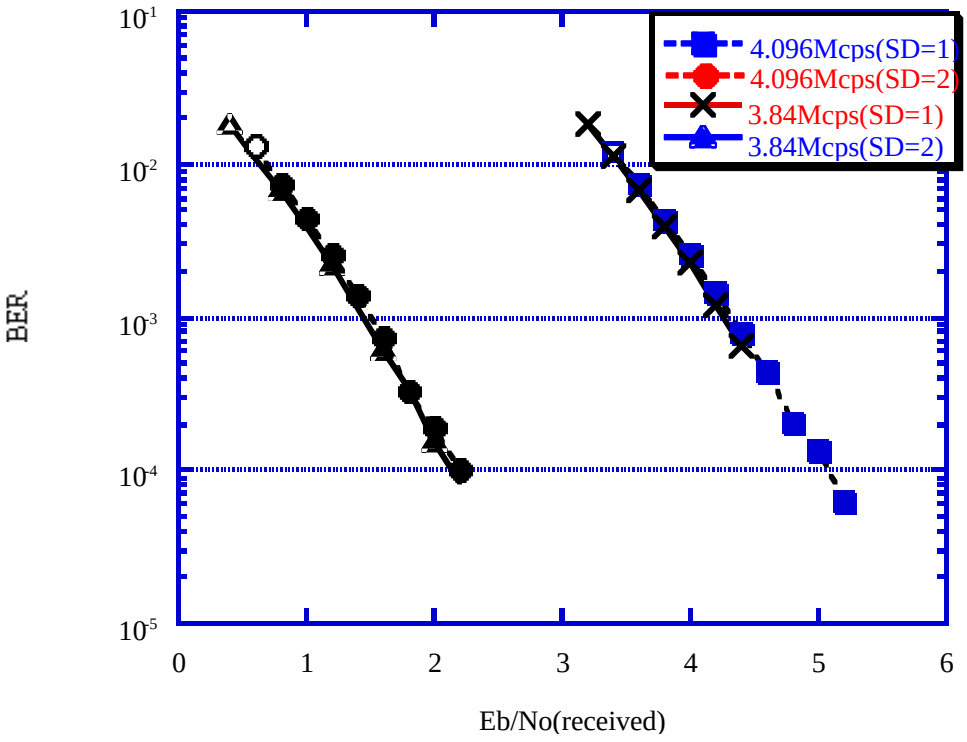

Fig. 1. Eb/Io vs. BER

Under static (AWGN) channel without power control:

Eb/No[dB]=4.3[dB] for SD=1 (Without antenna diversity)

Eb/No[dB]=1.5[dB] for SD=2 (With antenna diversity)

Where

Eb/No=(Ec/No)x(L_{chip}/L_{inf})

L_{chip}: Number of chips/frame

L_{inf}: Number of information bits (not include CRC bit) / frame.