

Analysis of E-MBS Zone Specific Pilot (15.3.5.4.3)

IEEE 802.16 Presentation Submission Template (Rev. 9)

Document Number:

IEEE C80216m-09_2380r1

Date Submitted:

2009-11-06

Source:

DongCheol Kim, Jinsoo Choi, HanGyu Cho, Wookbong Lee, Jin Sam Kwak

{DongCheol.Kim, emptylie}@lge.com

LG Electronics

Re: Comment on P802.16m/D2 for recirculation of #30a

Purpose: To discuss and adopt in TGm

Notice:

This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups. It represents only the views of the participants listed in the "Source(s)" field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein.

Release:

The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.

Patent Policy:

The contributor is familiar with the IEEE-SA Patent Policy and Procedures:

<<http://standards.ieee.org/guides/bylaws/sect6-7.html#6>> and <<http://standards.ieee.org/guides/opman/sect6.html#6.3>>.

Further information is located at <<http://standards.ieee.org/board/pat/pat-material.html>> and <<http://standards.ieee.org/board/pat>>.

Evaluated pilot patterns

ITRI

Samsung

Intel

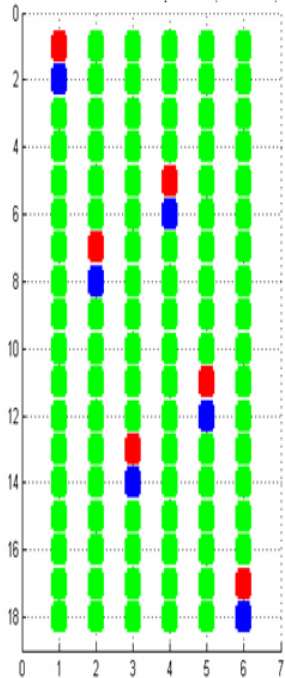
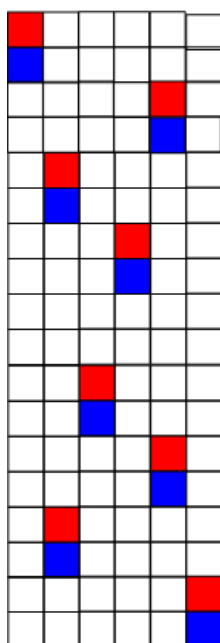
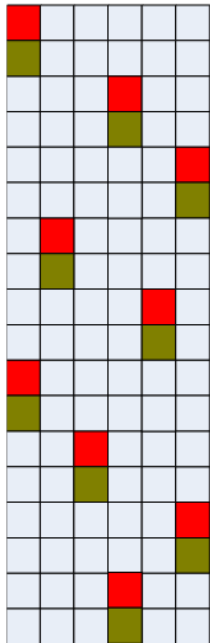
LG 1

LG 2

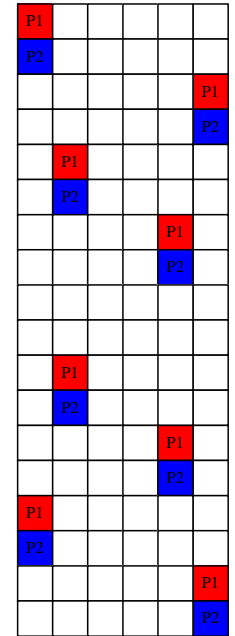
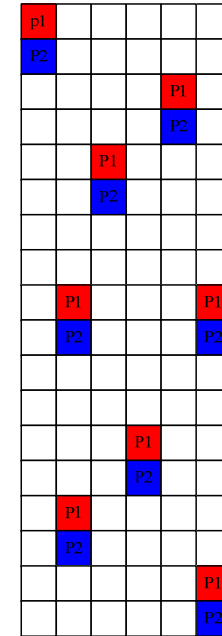
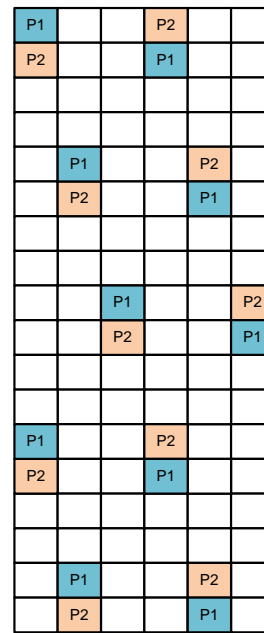
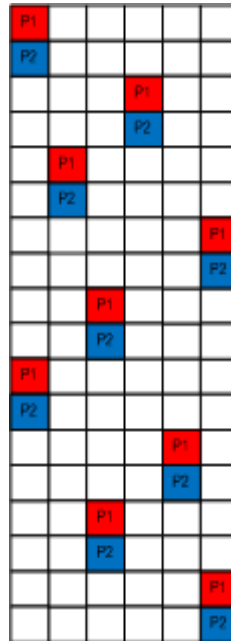
ZTE 1

ZTE 2

Samsung
7.41% pilot density per
antenna



-Modified*

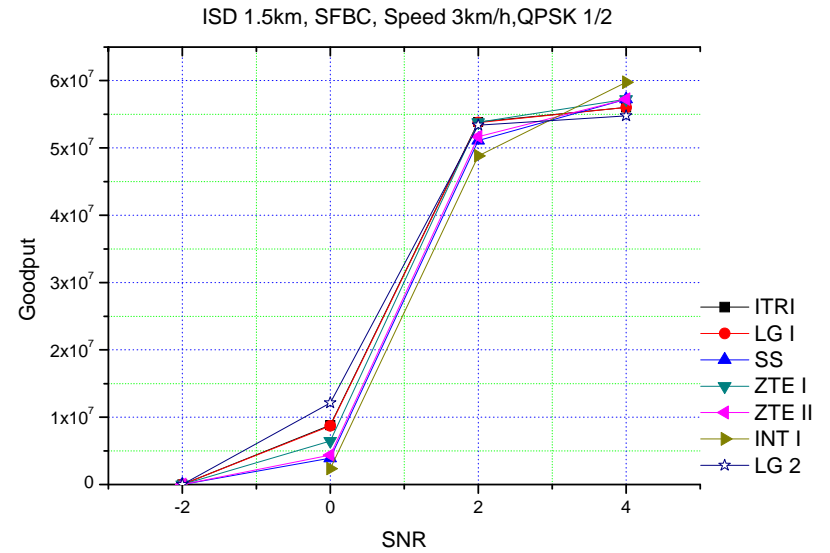
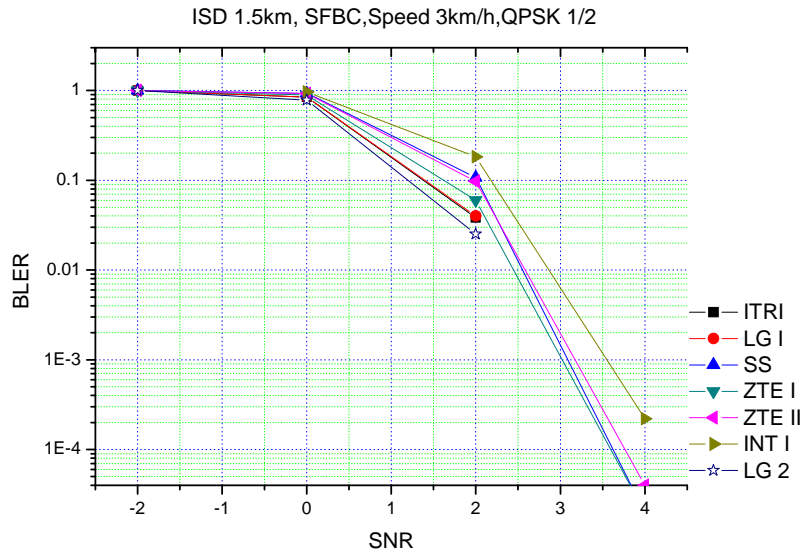


* LG1 was a little modified. The performance between the original and modified shows a very similar trend and the modified version has a more simple design structure in the implementation point of view.

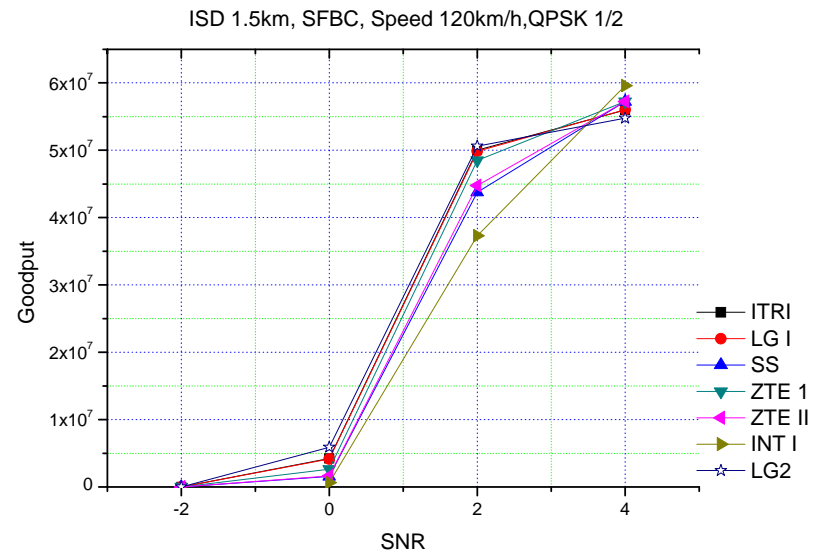
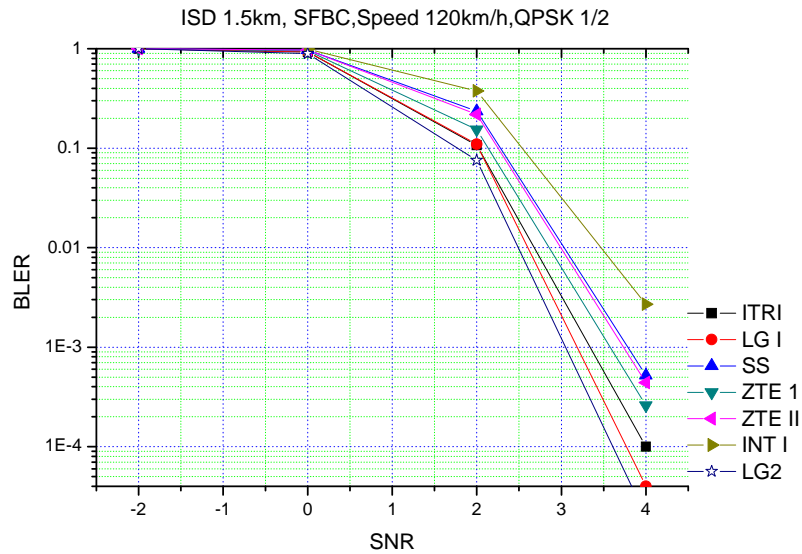
Simulation Conditions

Parameter	Values
Channel Bandwidth	10MHz
Over-sampling Factor	28/25
FFT Size	1024
Cyclic Prefix (CP) ratio	1/8
Resource Unit	RU (18x6)
Permutation	Tone-pair Logical DRU
Data Size	4PRU
Channel Code	16e CTC
MCS	QPSK 1/2, 3/4; 16QAM 3/4; 64QAM 1/2
Channel decoding	Max-log-Map, max 8 iteration
Channel condition	ISD1500m and ISD5Km, 3km/h and 120km/h
Channel estimation method	2D-MMSE, Window size = 3PRU
The number of antennas	2Tx, 2Rx
MIMO schemes	Rate-1 SFBC@ISD1500&ISD5000 Rate-2 SM@ISD1500 only
MIMO Receiver	MRC (SFBC), Soft-MMSE (SM)
Scenarios	Noise limited
Pilot boosting	No boosting, 5dB boosting
Performance matrix	BLER Vs SNR and SE Vs SNR

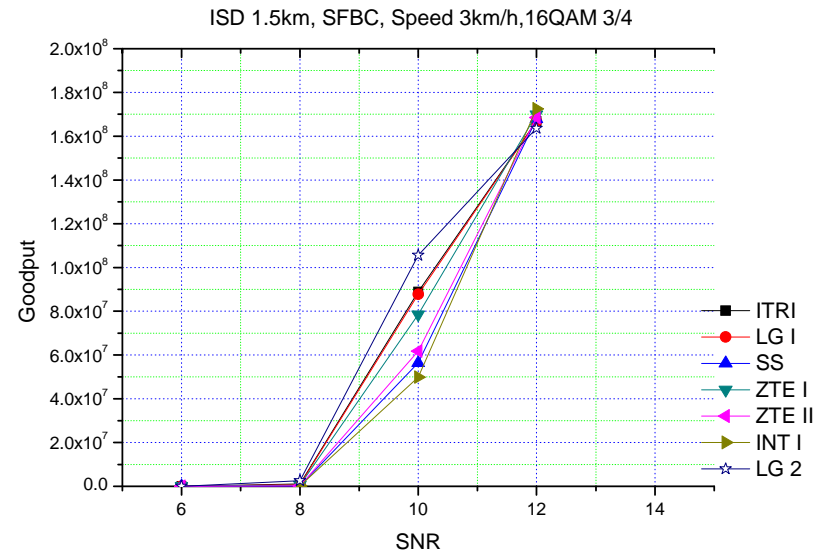
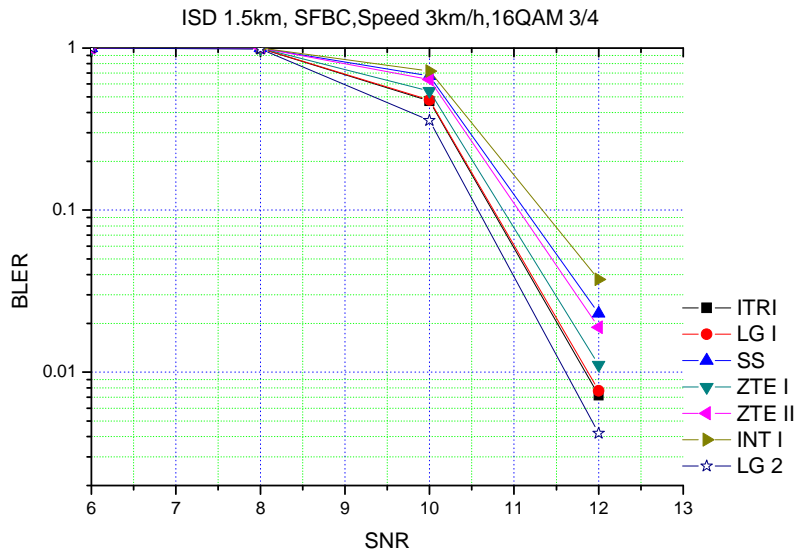
ISD 1.5km, SFBC, Speed 3kmph, QPSK1/2



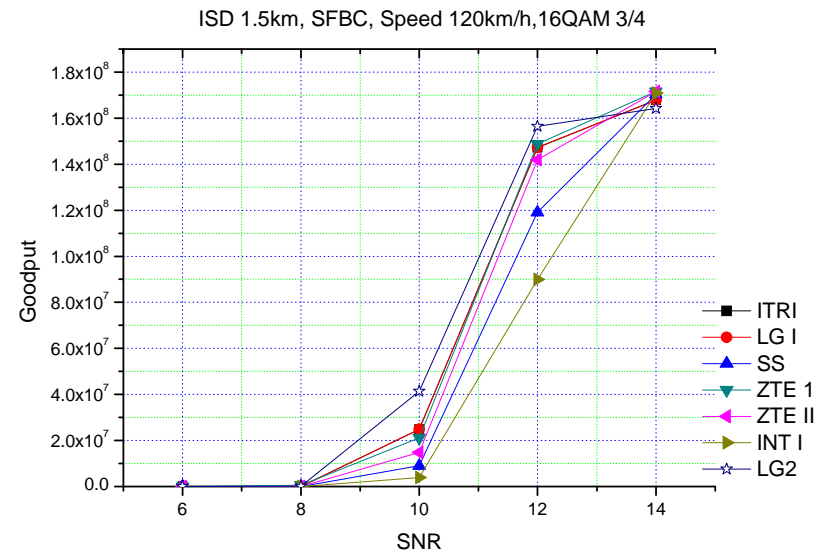
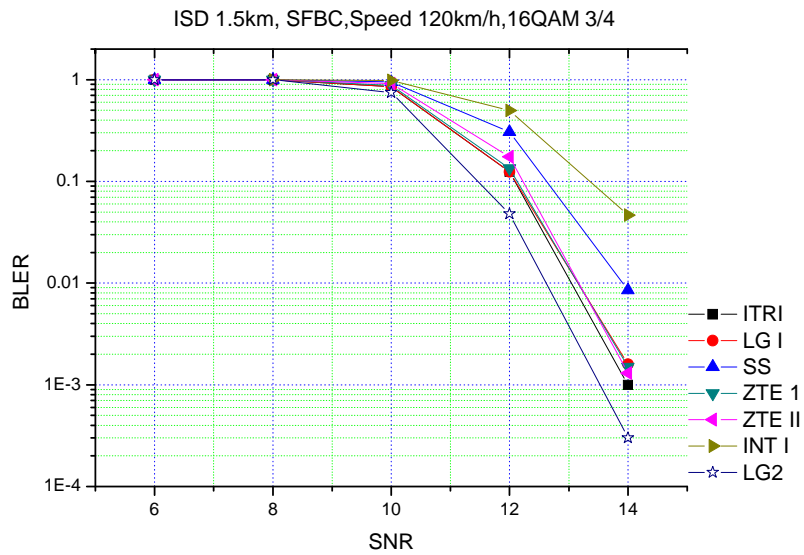
ISD 1.5km, SFBC, Speed 120kmph, QPSK1/2



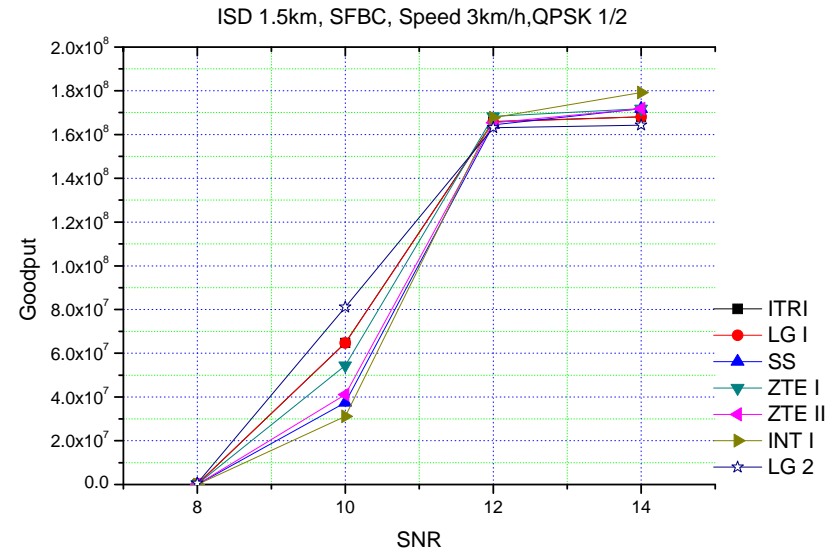
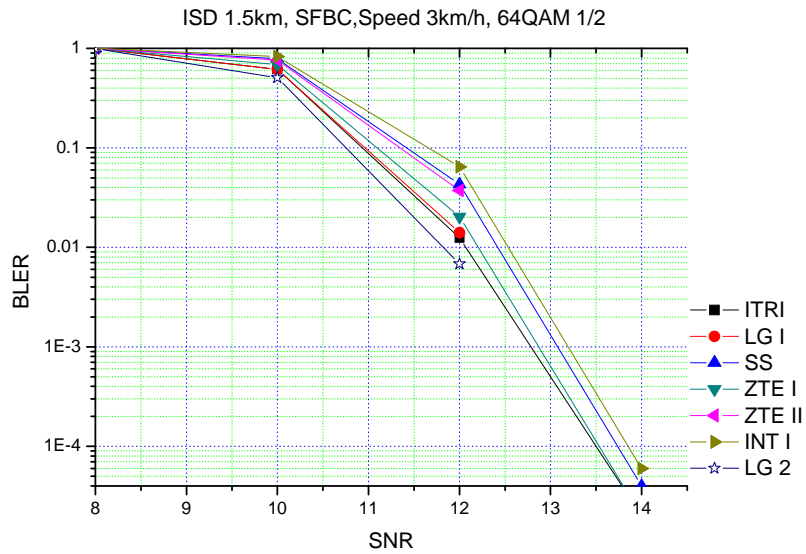
ISD 1.5km, SFBC, Speed 3kmph, 16QAM3/4



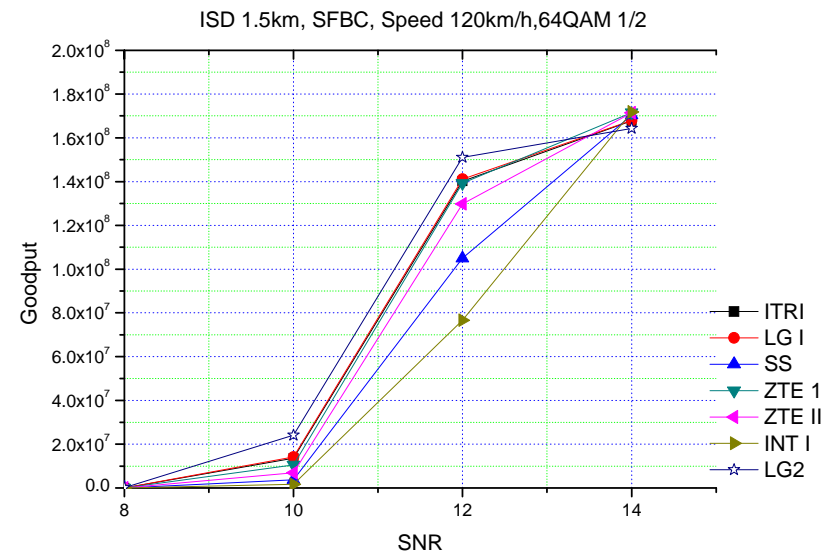
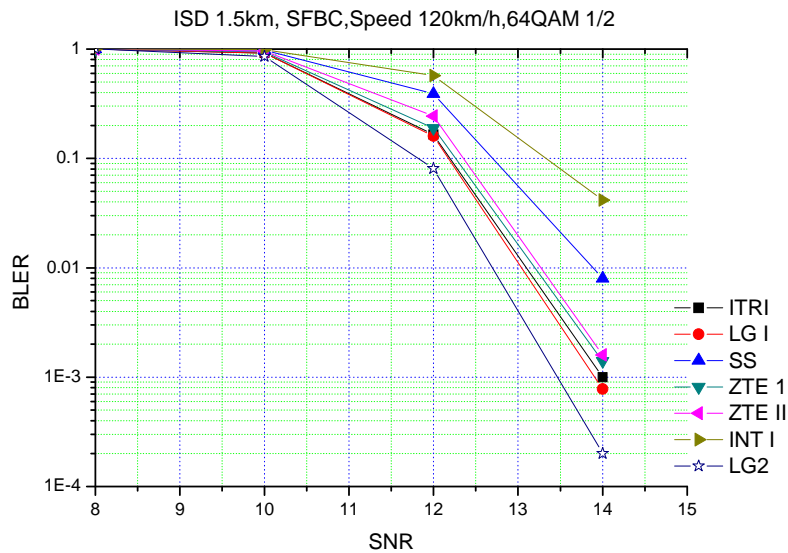
ISD 1.5km, SFBC, Speed 120kmph, 16QAM3/4



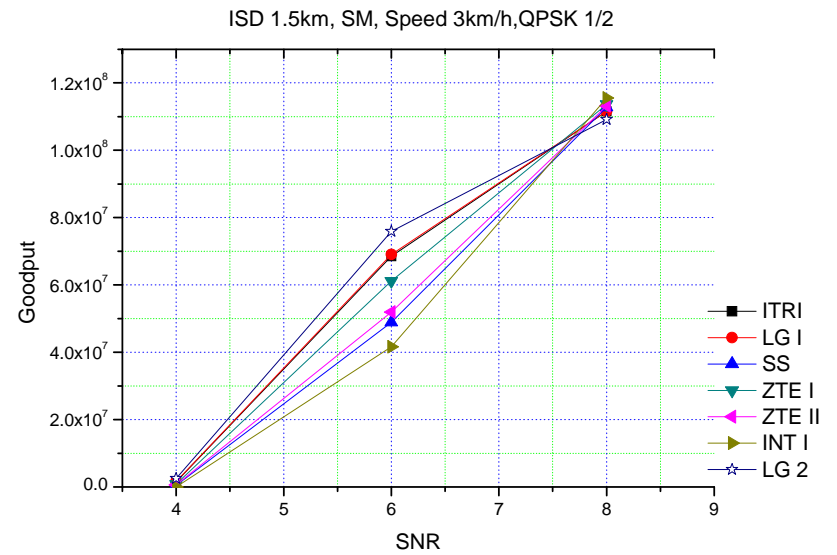
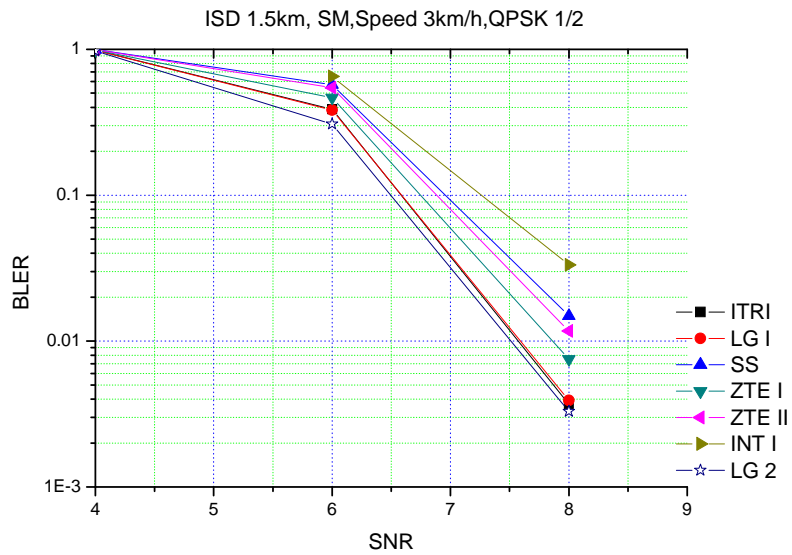
ISD 1.5km, SFBC, Speed 3kmph, 64QAM1/2



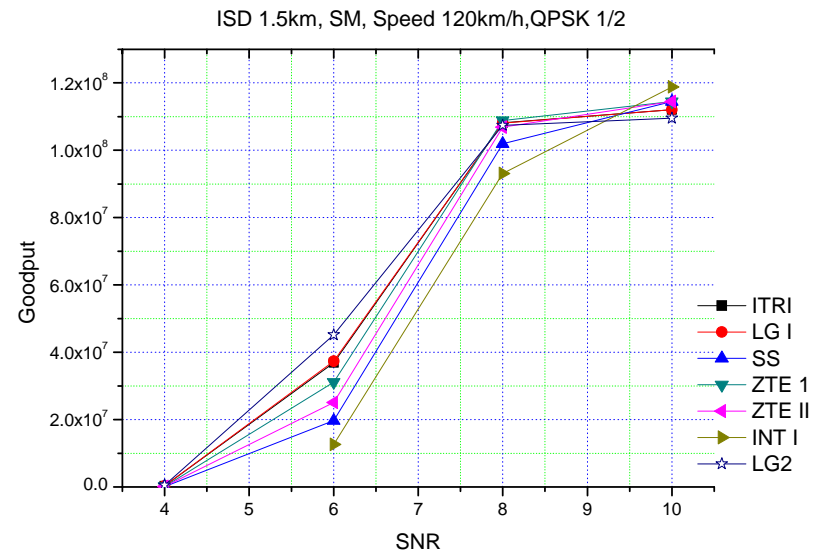
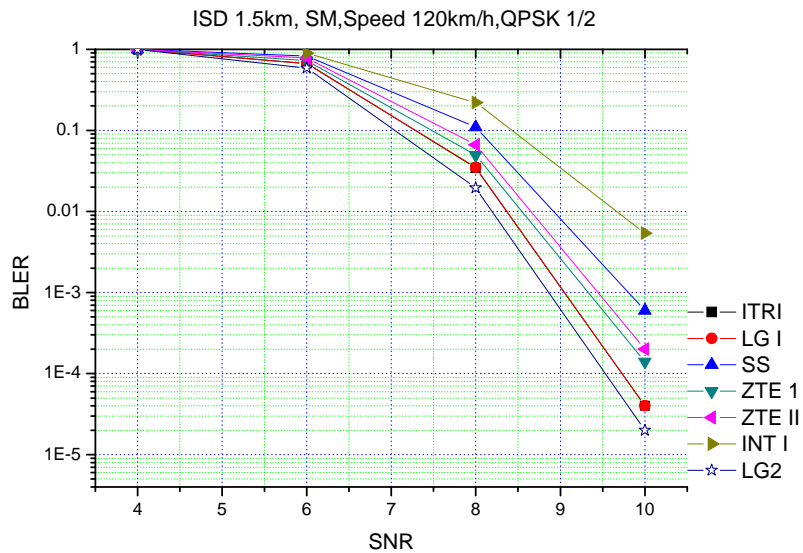
ISD 1.5km, SFBC, Speed 120kmph, 64QAM1/2



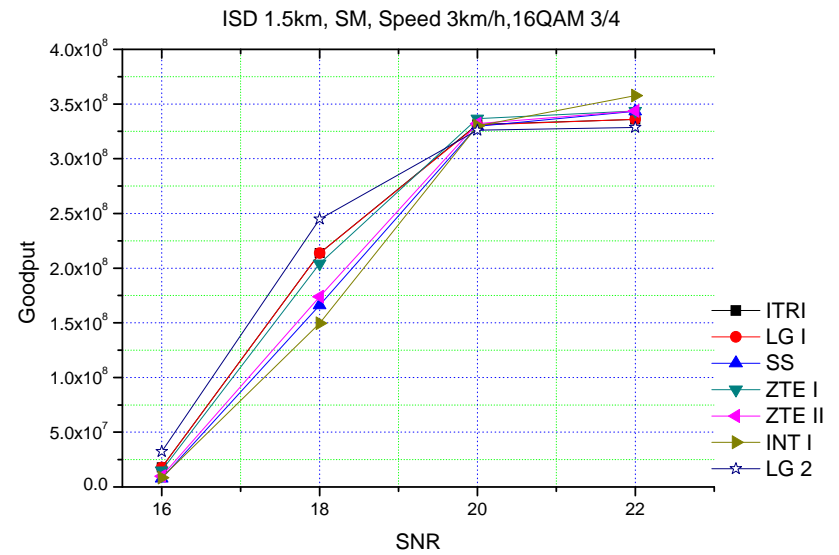
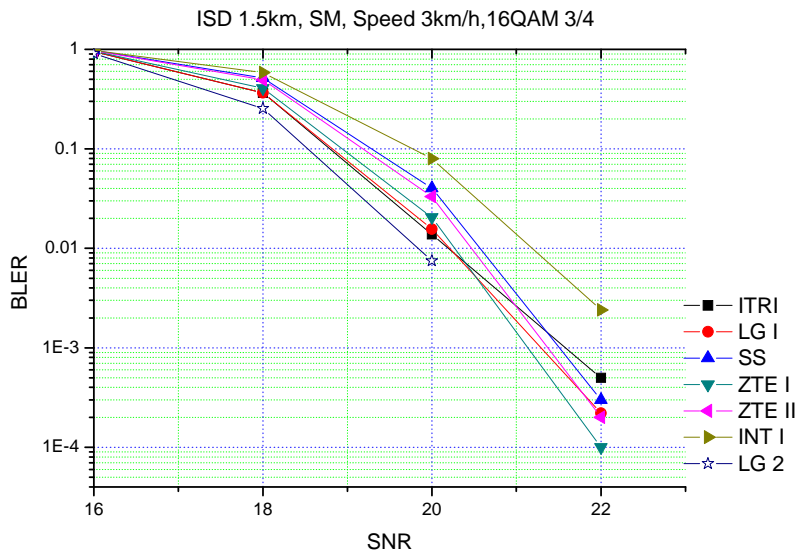
ISD 1.5km, SM, Speed 3kmph, QPSK1/2



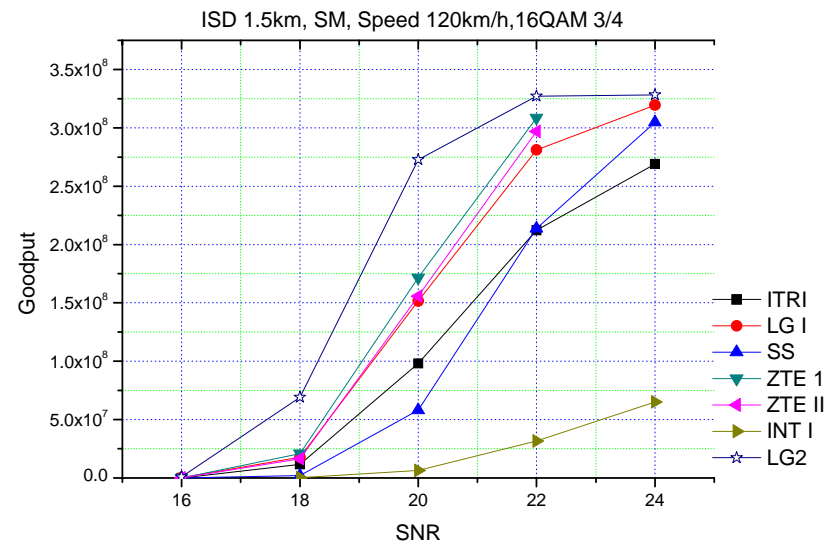
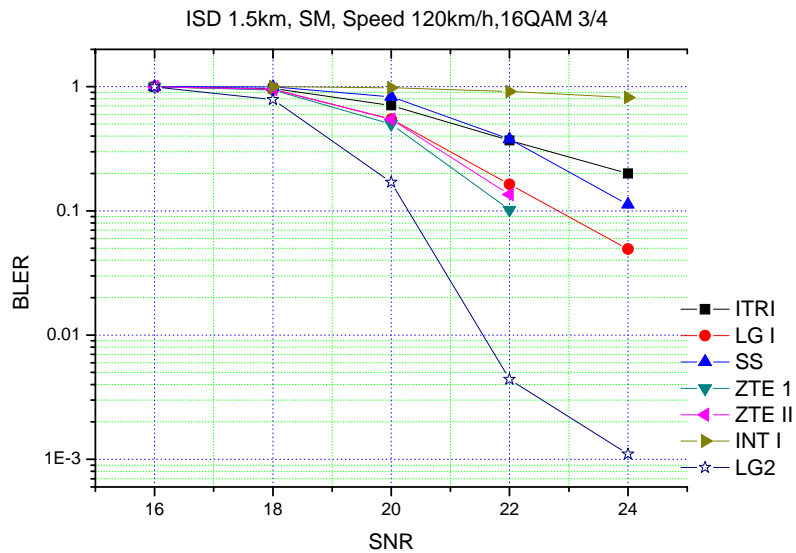
ISD 1.5km, SM, Speed 120kmph, QPSK1/2



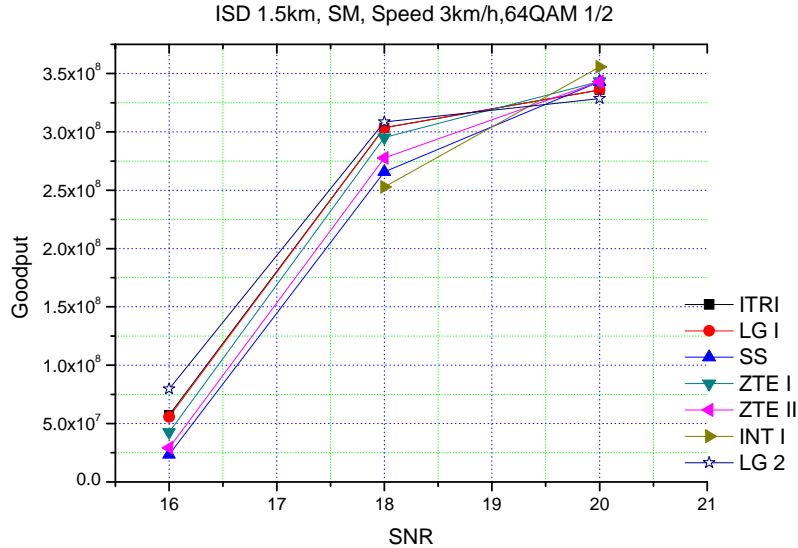
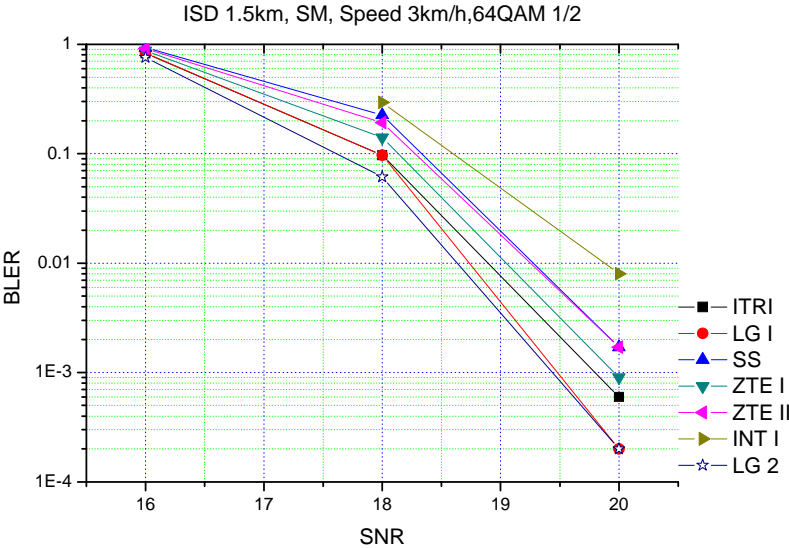
ISD 1.5km, SM, Speed 3kmph, 16QAM3/4



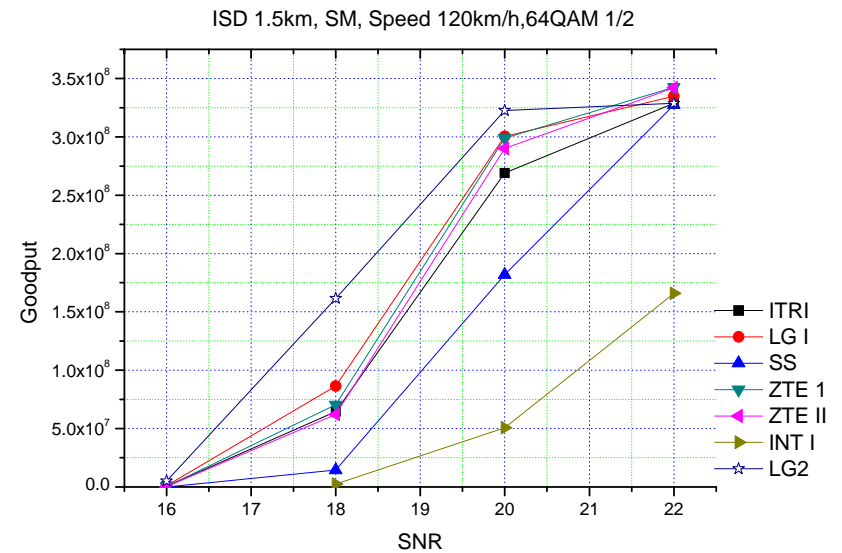
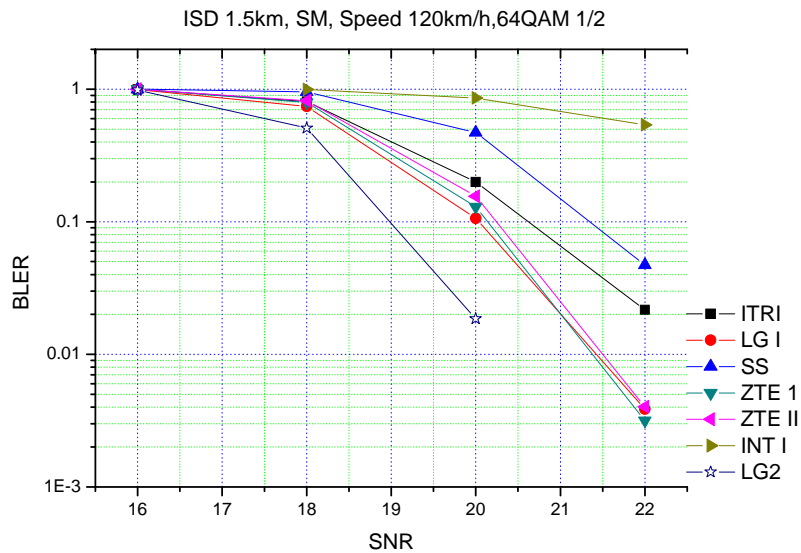
ISD 1.5km, SM, Speed 120kmph, 16QAM3/4



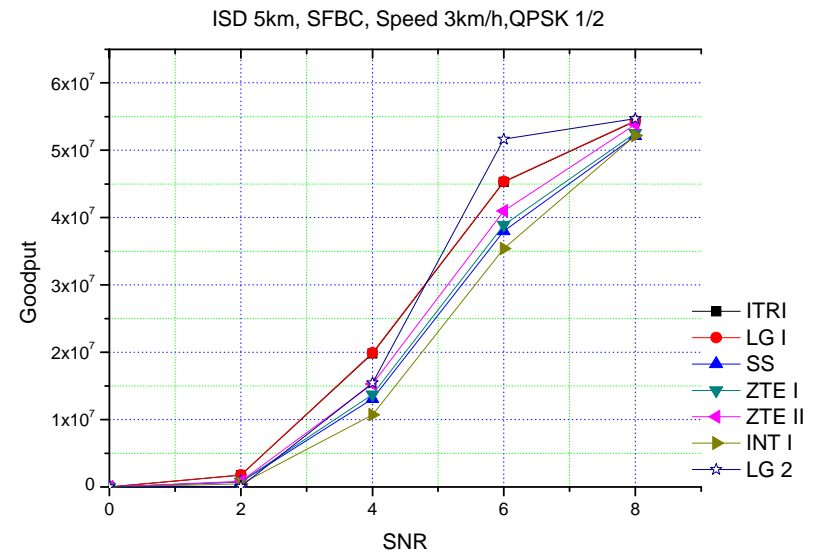
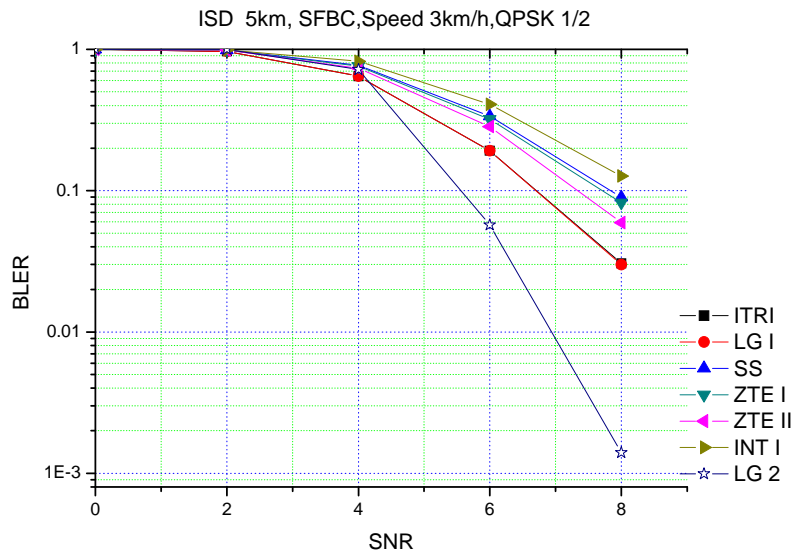
ISD 1.5km, SM, Speed 3kmph, 64QAM1/2



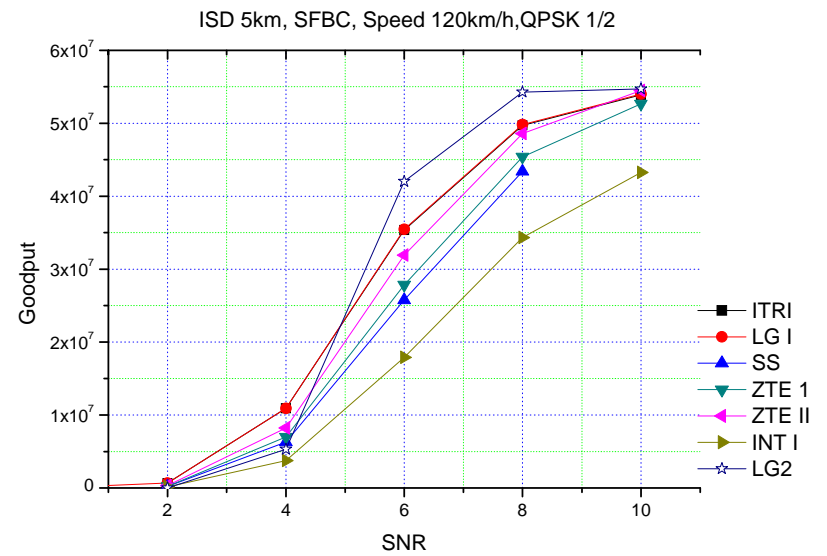
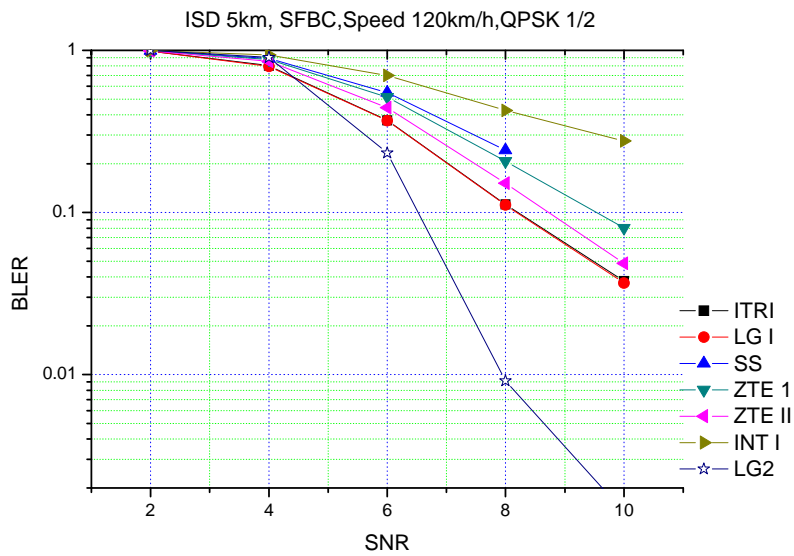
ISD 1.5km, SM, Speed 120kmph, 64QAM1/2



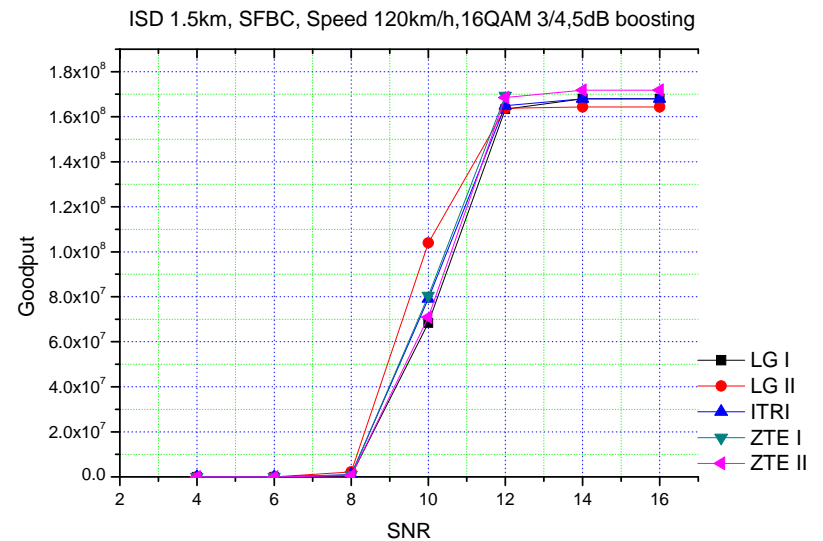
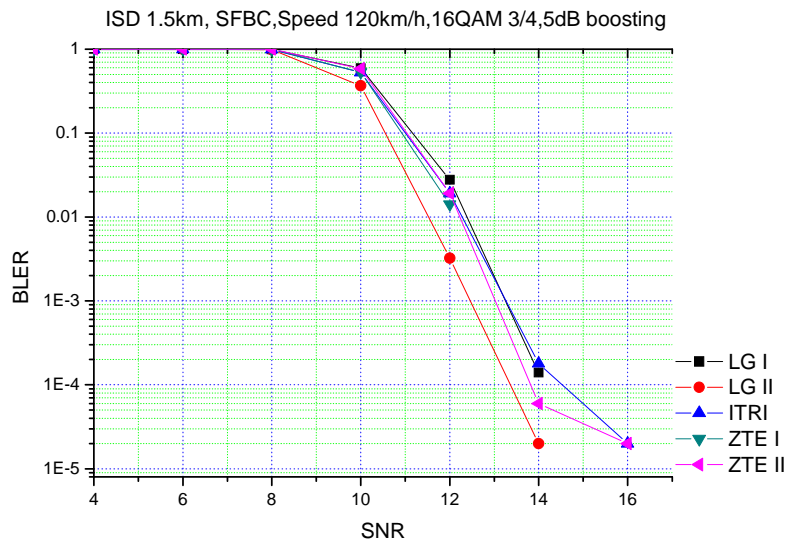
ISD 5km, SFBC, Speed 3kmph, QPSK1/2



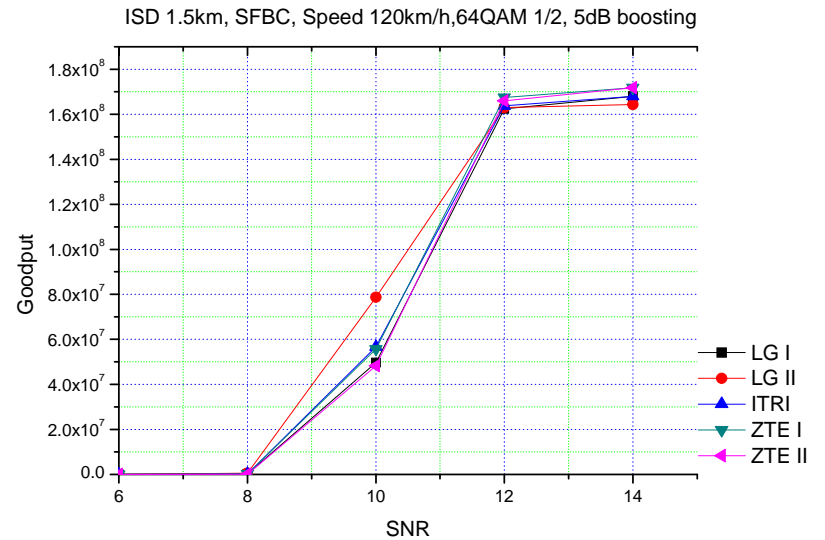
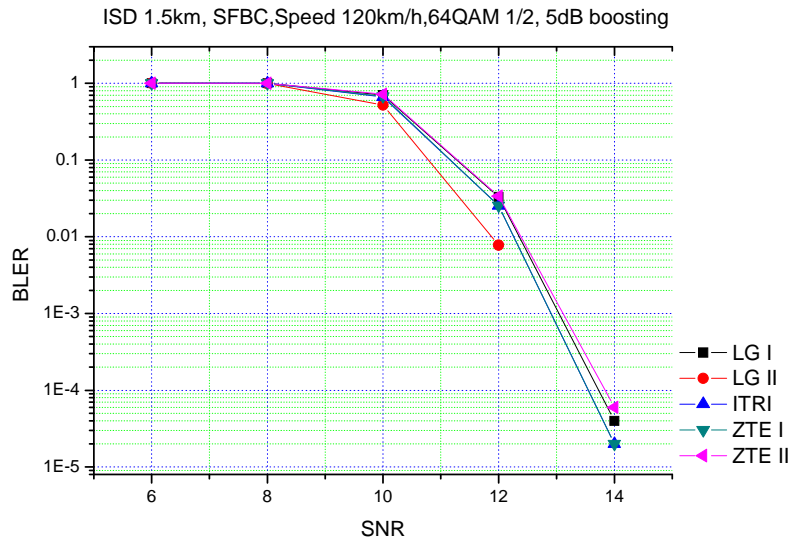
ISD 5km, SFBC, Speed 120kmph, QPSK1/2



ISD 1.5km, SFBC, Speed 120kmph, 16QAM3/4 (w 5dB boosting for cross-check)



ISD 1.5km, SFBC, Speed 120kmph, 64QAM1/2 (w 5dB boosting for cross-check)



Summary

- LG2 shows best performance if we assume the operating point as 1% FER.
- If we assume a different operating point (e.g. lower than 1% FER), LG1 and ITRI can be a good candidate in overall environment. In some region, it is shown that ZTE1 or 2 is a best candidate.

Proposed text

Modify the description in line 43 of page 312 of P802.16m/D2 as following

----- *Text start* -----

The structures of the E-MBS zone specific pilot pattern are shown in **FFS** [Figure xxx](#).

P1			P2		
P2			P1		
	P1			P2	
	P2			P1	
		P1			P2
		P2			P1
P1			P2		
P2			P1		
	P1			P2	
	P2			P1	

<Figure xxx –E-MBS zone specific pilot pattern>

----- *Text end* -----