

Performance Comparisons of Pilot Patterns based on Pilot Evaluation Criteria

IEEE 802.16 Presentation Submission Template (Rev. 9)

Document Number:

IEEE C802.16m-08/672

Date Submitted:

2008-07-07

Source:

Taeyoung Kim, Sangheon Kim, Jungho Park, Jaeweon Cho,
Hokyu Choi , Heewon Kang

Voice: +82-31-279-0202

E-mail: ty33.kim@samsung.com

Samsung Electronics Co., Ltd.

416 Maetan-3, Suwon, 443-770, Korea

Venue:

IEEE 802.16m-08/003r3, "Call for Comments and Contributions on Project 802.16m System Description Document (SDD)".

Target topic: "DL Physical Structure

Base Contribution:

None

Purpose:

To be discussed and adopted by TGM for the 802.16m SDD.

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 a n 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 IE EE'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 thi s 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>>.

Simulation conditions

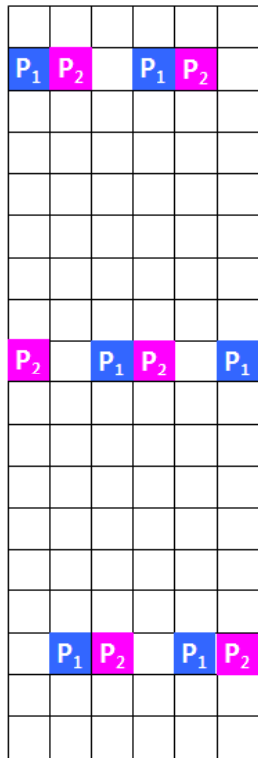
- Simulation parameters and conditions [1]

Configuration		Value
Antenna configuration		2 or 4 Tx antenna with zero correlation
Transmission schemes		Open-loop with common pilot
Interference type		Noise limited
Channel Model		PedB 3km/h, VehA 120km/h
Receiver type	CH. Est.	Narrowband MMSE over on PRU, 0dB Pilot boosting
	Data detection	MMSE for SFBC and SM
Number of resource units		Two LRUs
MCS level (7 levels)		QPSK 1/2, 64QAM 2/3, QPSK 3/4, 64QAM 3/4, 16QAM 1/2, 64QAM 5/6 16QAM 3/4,
Performance metric		Goodput vs. SNR

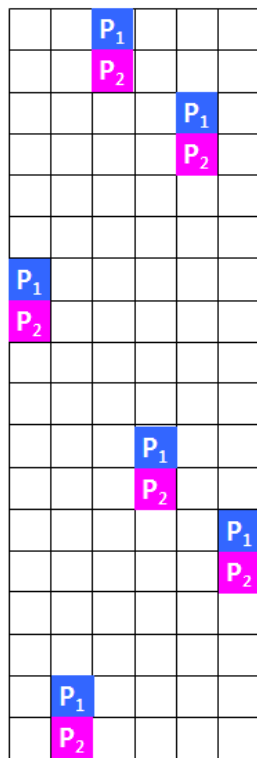
[1] refer to Pilot Evaluation criteria contained in Appendix A (C80216m-08_518)

Pilot Patterns – 2Tx

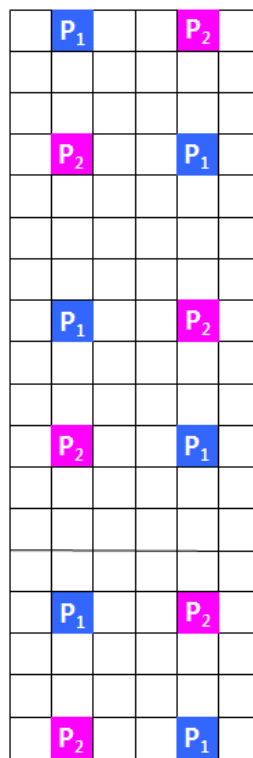
- Pilot patterns for 2Tx from other companies
 - Intel, LGE, Motorola, MediaTek, Samsung



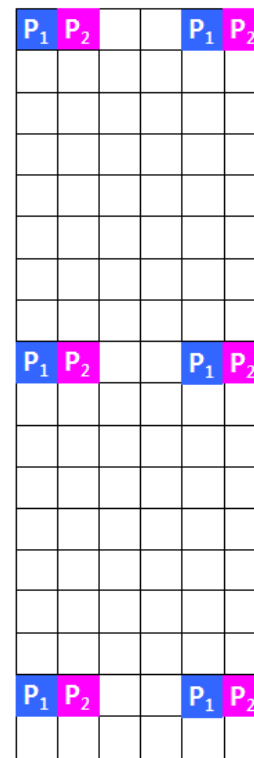
[Intel]



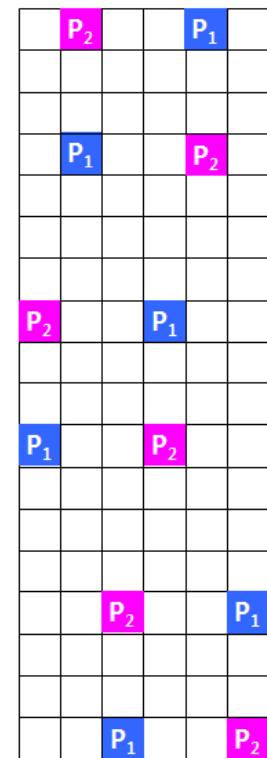
[LGE]



[Motorola]



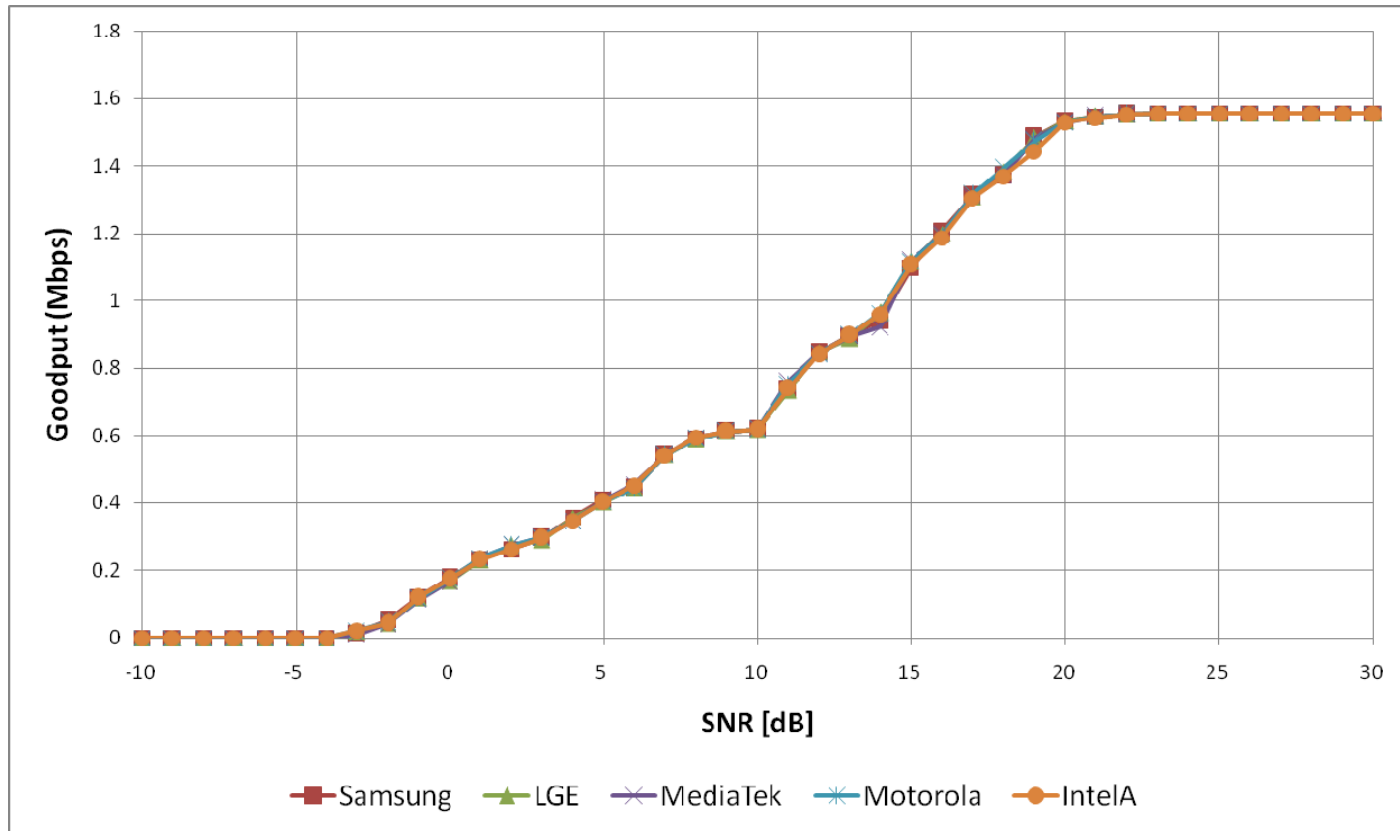
[MediaTek]



[Samsung]

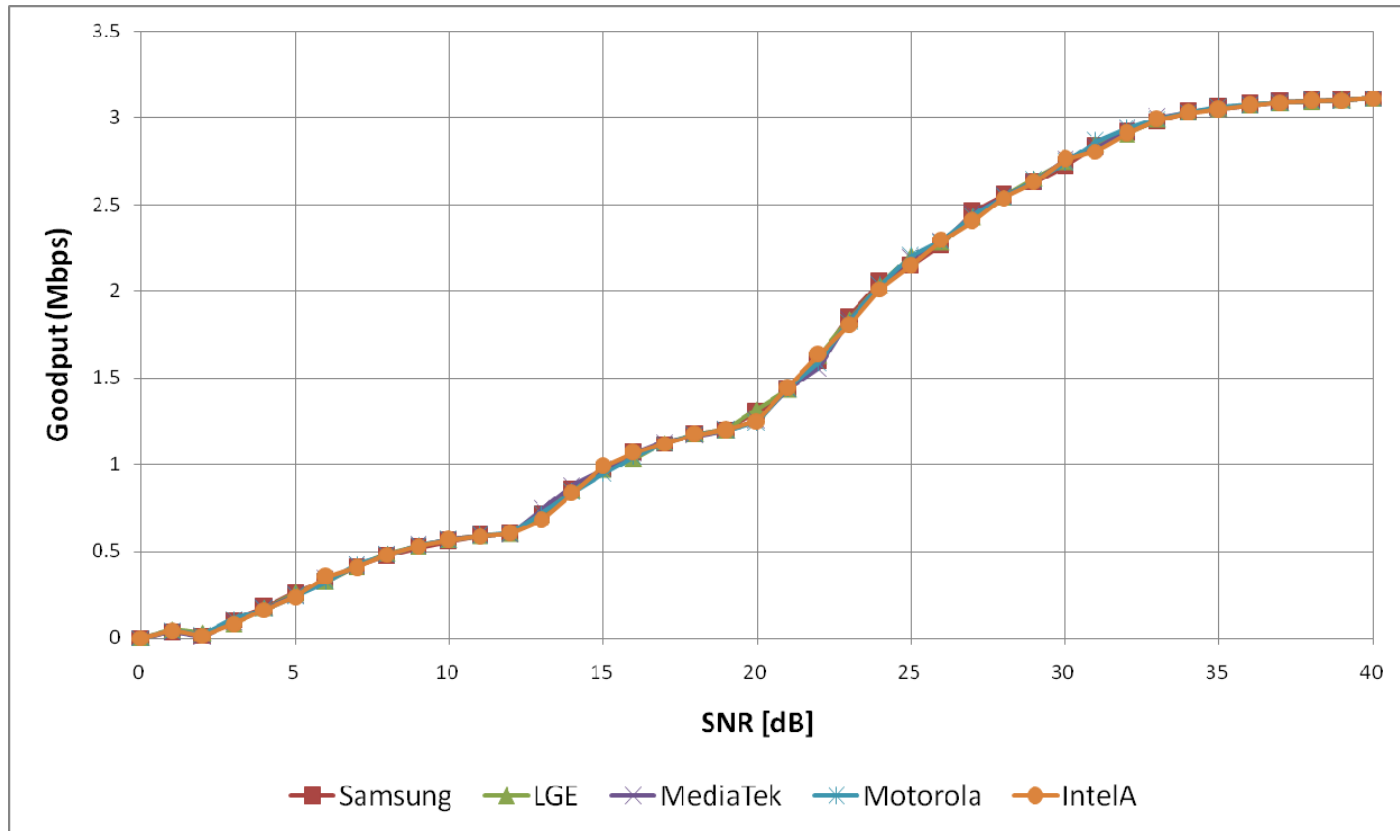
Simulation Results – 2Tx

- 2x2 SFBC
 - Ped B, 3km/h



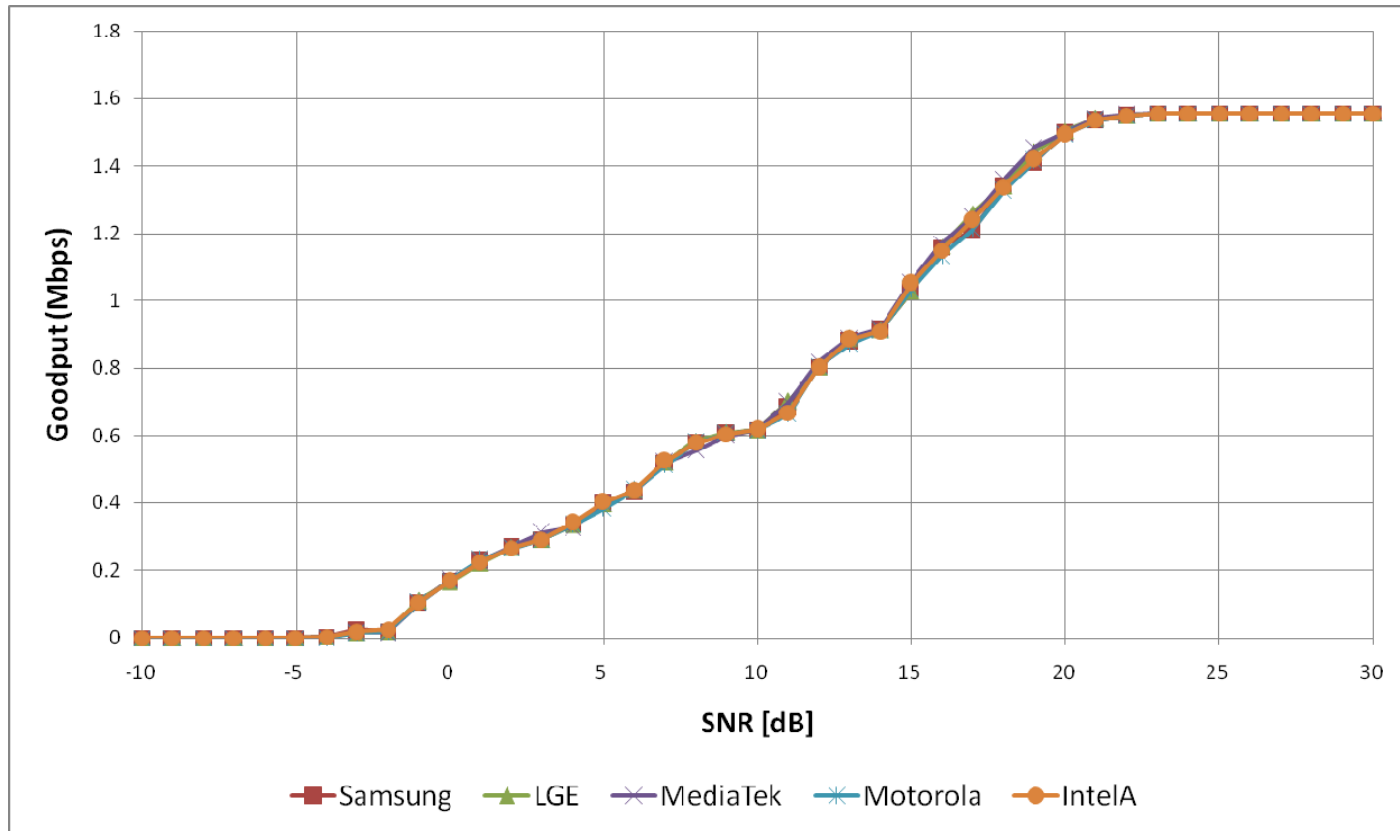
Simulation Results – 2Tx

- 2x2 SM
 - Ped B, 3km/h



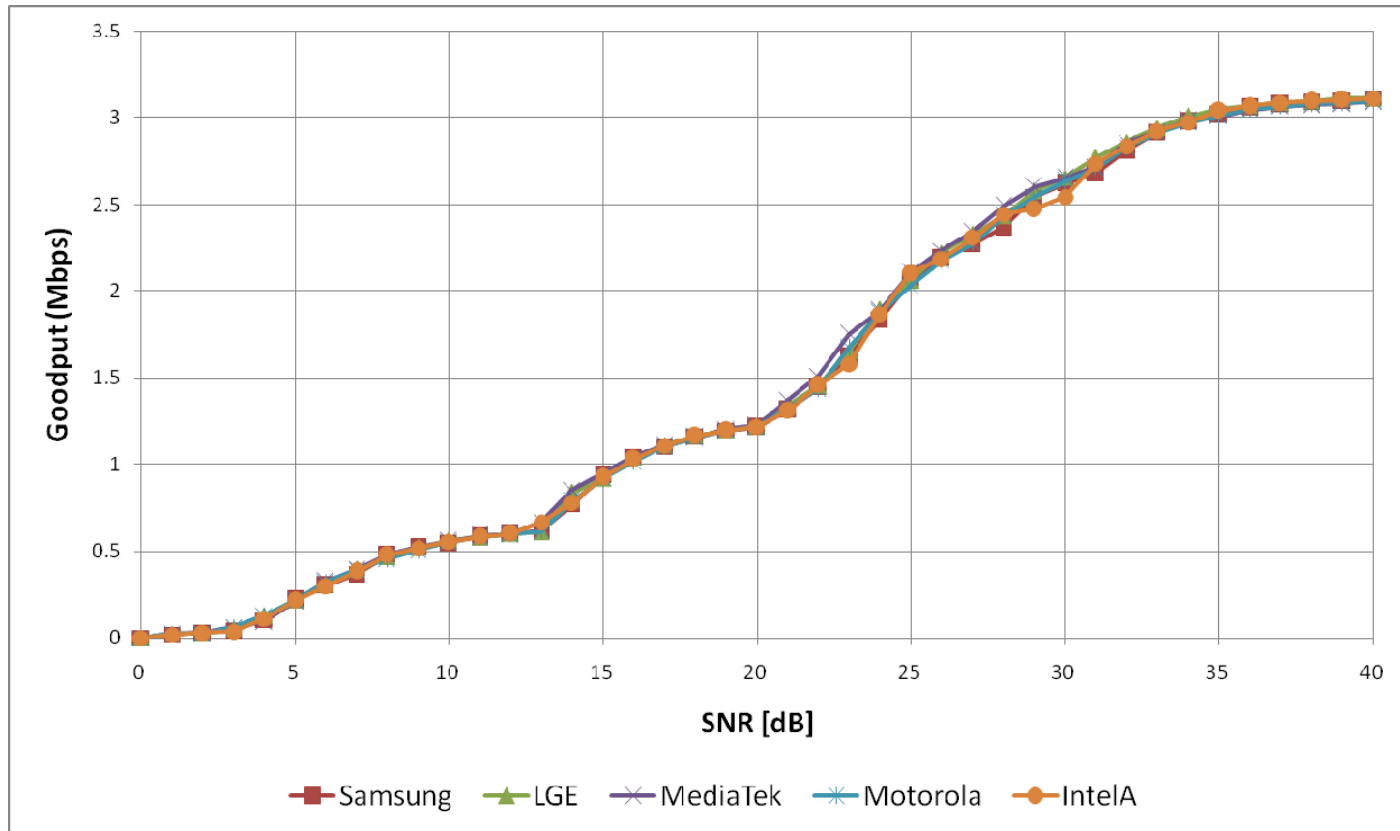
Simulation Results – 2Tx

- 2x2 SFBC
 - Veh A, 120km/h



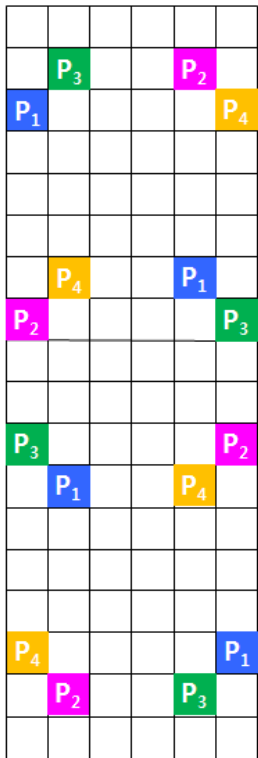
Simulation Results – 2Tx

- 2x2 SM
 - Veh A, 120km/h

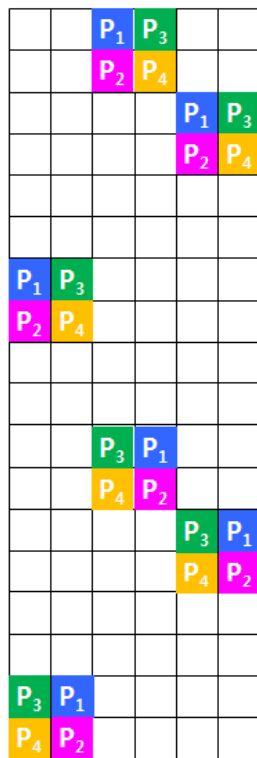


Pilot Patterns – 4Tx

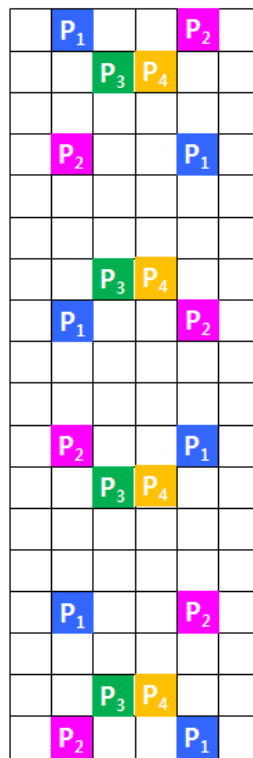
- Pilot patterns for 4Tx from other companies
 - Intel, LGE, Motorola, MediaTek, Samsung



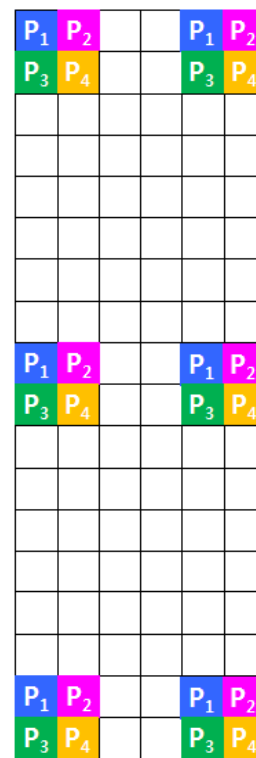
[Intel]



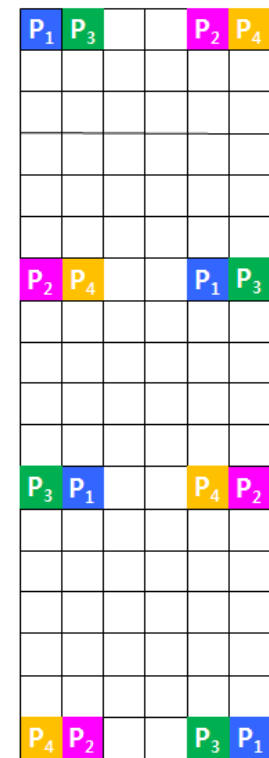
[LGE]



[Motorola]



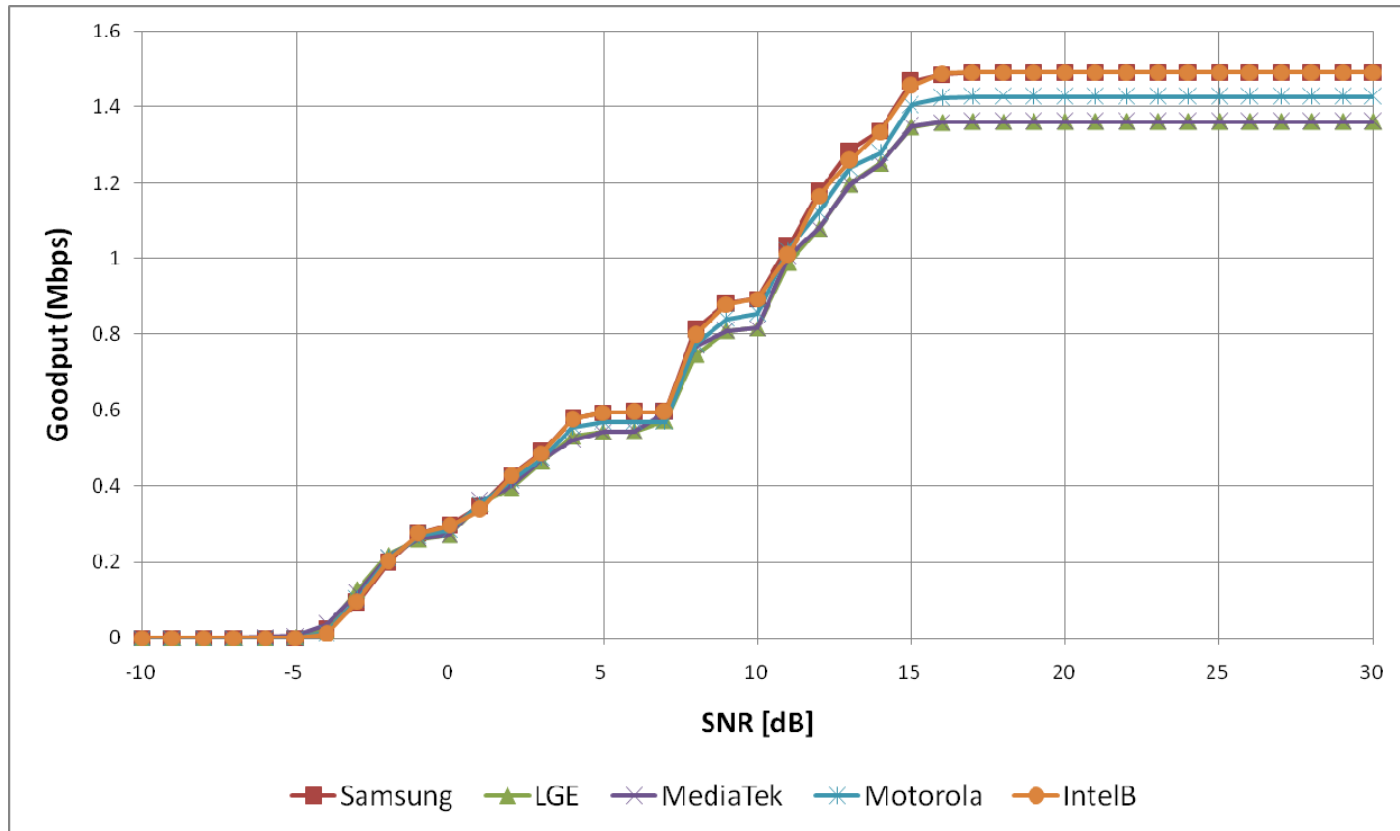
[MediaTek]



[Samsung]

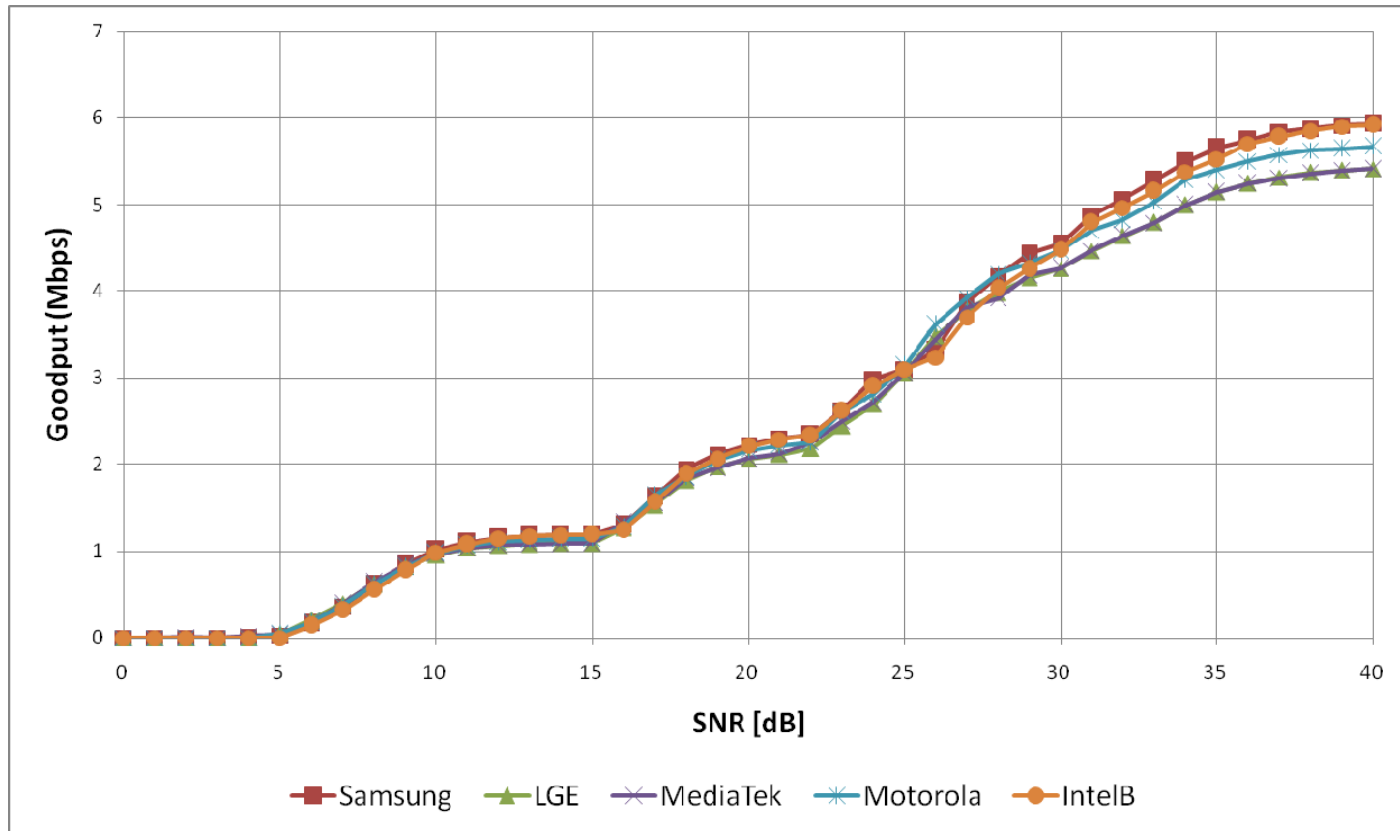
Simulation Results – 4Tx

- 4x4 SFBC
 - Ped B, 3km/h



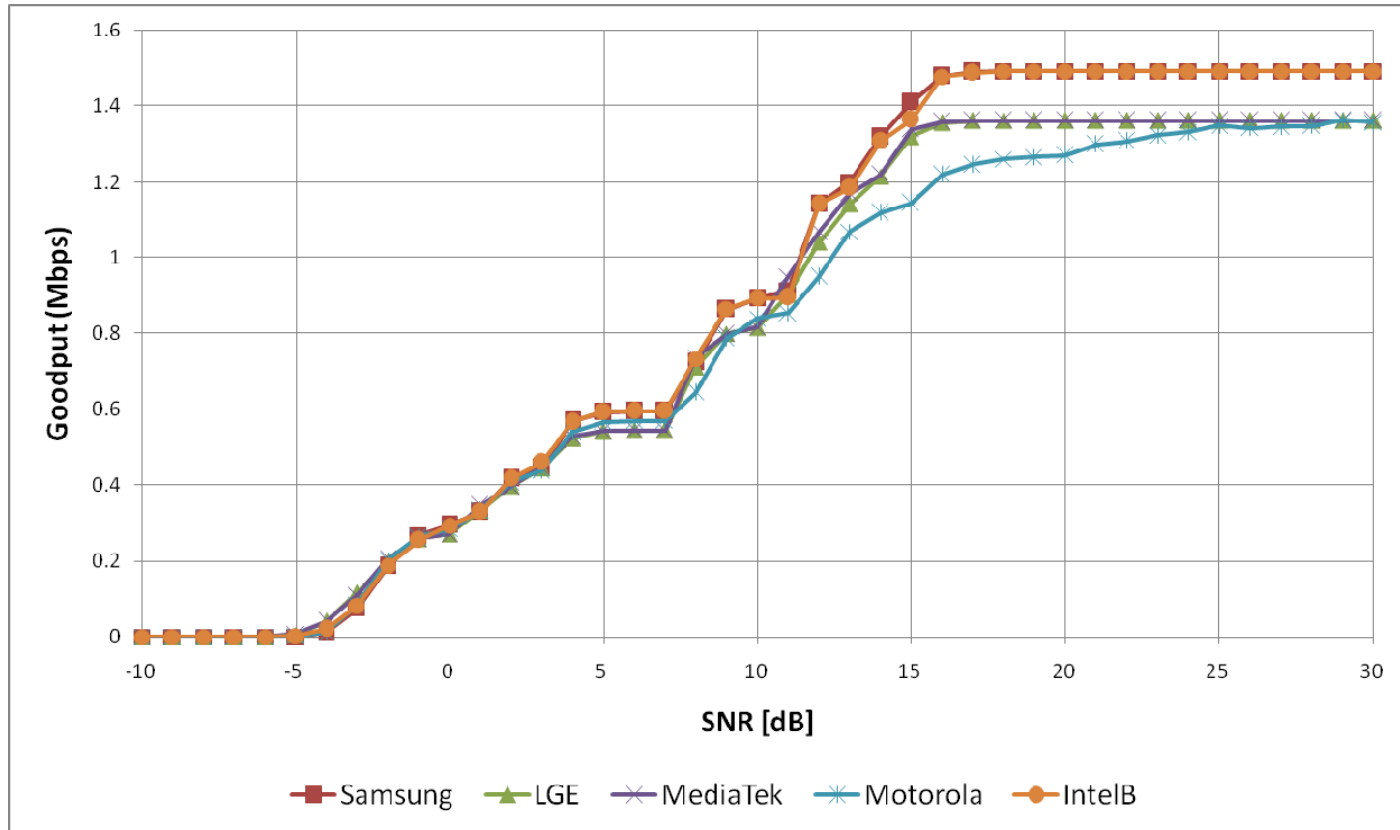
Simulation Results – 4Tx

- 4x4 SM
 - Ped B, 3km/h



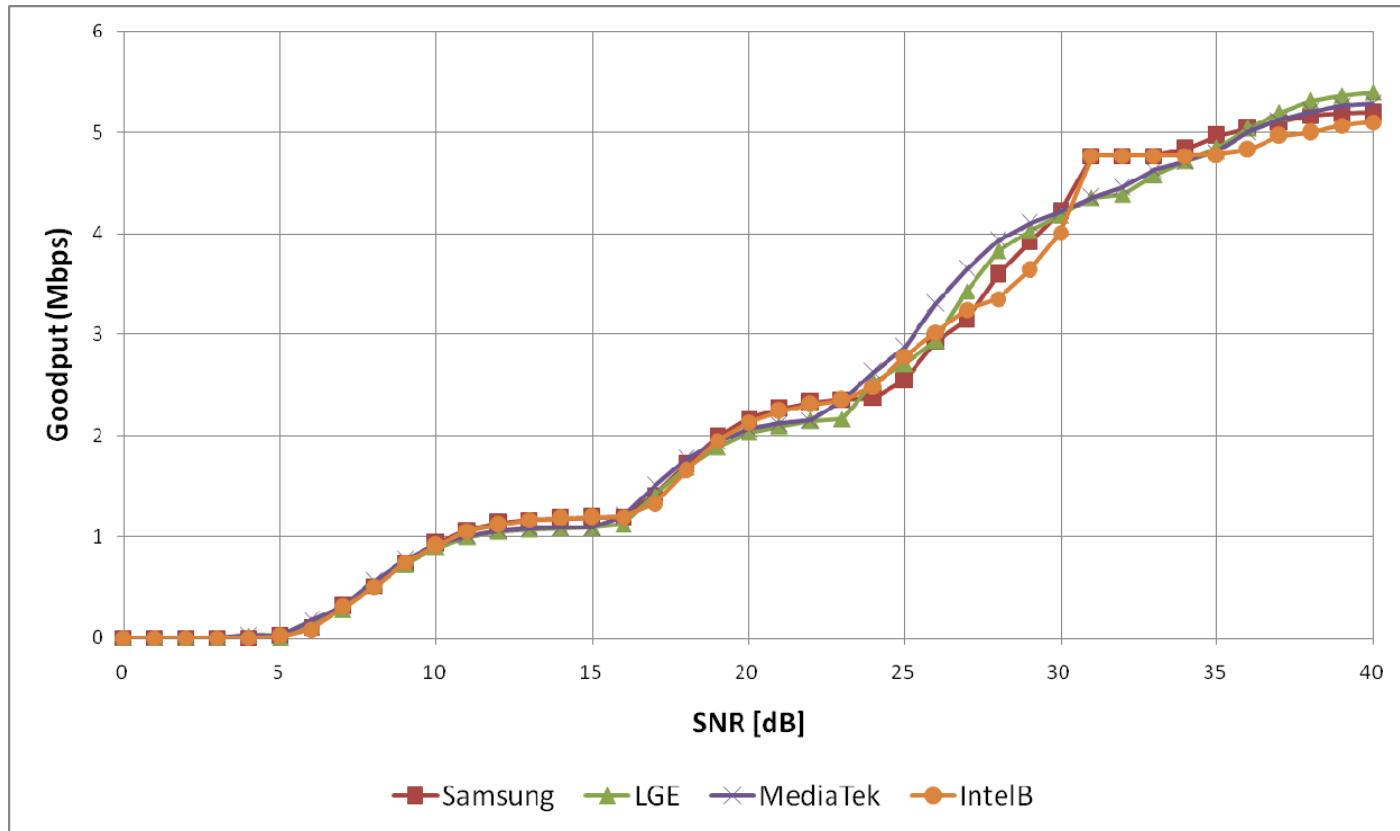
Simulation Results – 4Tx

- 4x4 SFBC
 - Veh A, 120km/h



Simulation Results – 4Tx

- 4x4 SM
 - Veh A, 120km/h



Summary

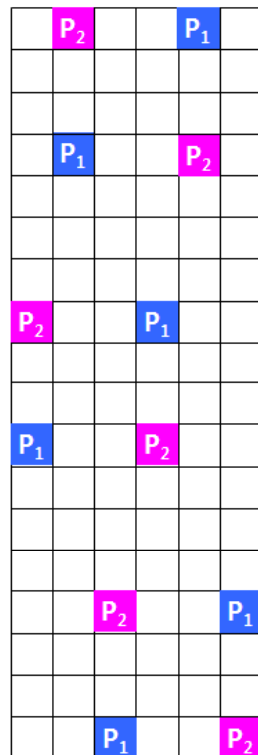
- In case of 2 Tx antennas,
 - Most of pilot patterns show the almost same performance with respect to goodput
- In case of 4 Tx antennas
 - Pilot pattern with lower pilot density (Samsung, Intel) shows slightly better goodput performance than those with higher pilot density (LGE, MediaTek, Motorola)

Proposed Text for SDD

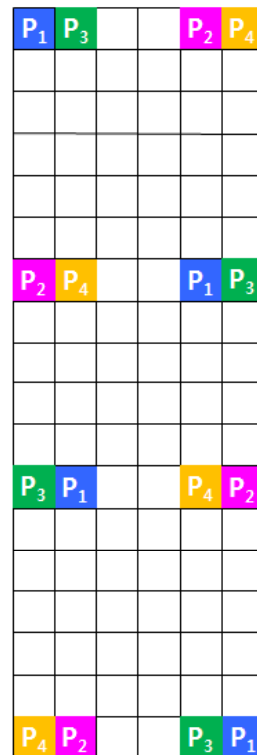
Insert the following text into SDD Section 11 in IEEE 802.16m-08/003r3

- Section 11.5.3.1: Common pilot structure

Figure 28 presents the common pilots, which are not pre-coded, in a PRU for 2 and 4 transmit antennas, respectively. In the figures, the pilot k denotes a common pilot for transmit antenna k .



(a) 2 Tx antenna case



(b) 4 Tx antenna case

Figure 28 Pilot pattern using common pilot for 2 and 4 Tx antennas.