Performance Comparisons of Pilot Patterns based on Pilot Evaluation Criteria

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Venue:

IEEE 802.16m-08/024, “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.

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Simulation conditions

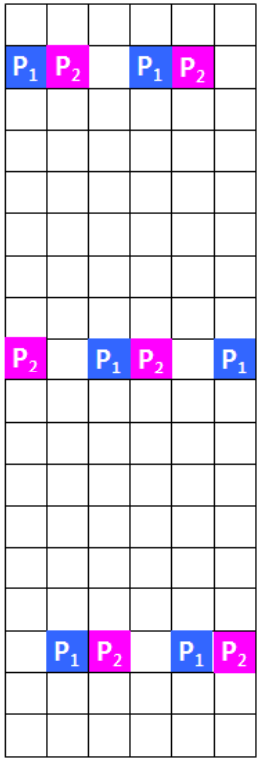
- Simulation parameters and conditions [1]

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, QPSK 3/4, 16QAM 1/2, 16QAM 3/4, 64QAM 2/3, 64QAM 3/4, 64QAM 5/6
Performance metric		Goodput vs. SNR

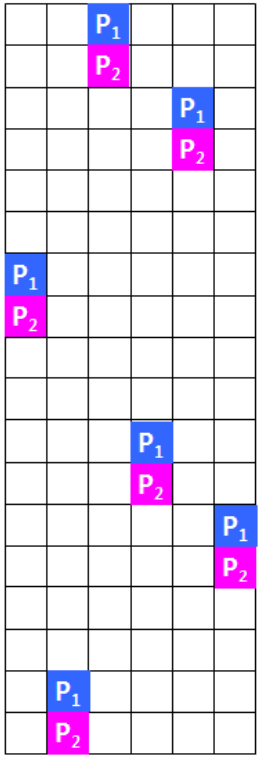
[1] refer to Pilot Evaluation criteria contained in Appendix A (C80216m-08_518)

Pilot Patterns – 2Tx

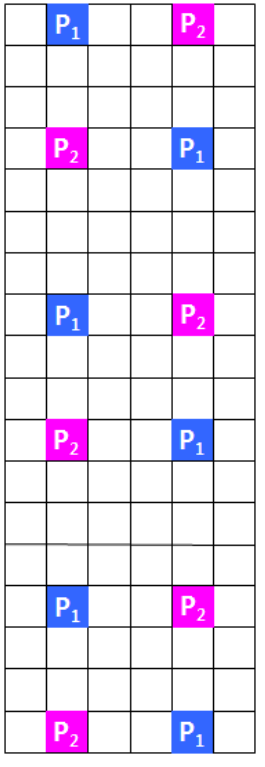
- Pilot patterns for 2Tx from other companies
  - Intel, LGE, Motorola, MediaTek, Samsung



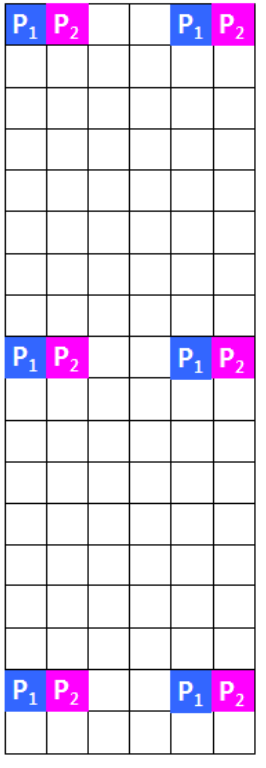
[Intel]



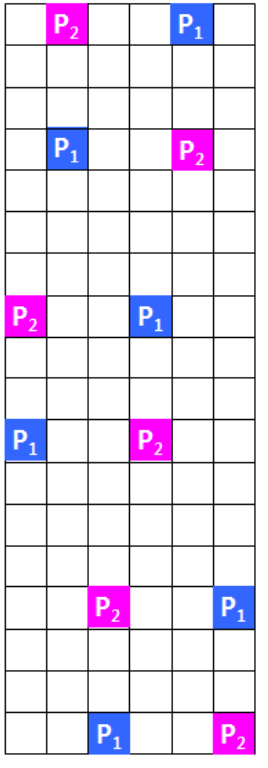
[LGE]



[Motorola]



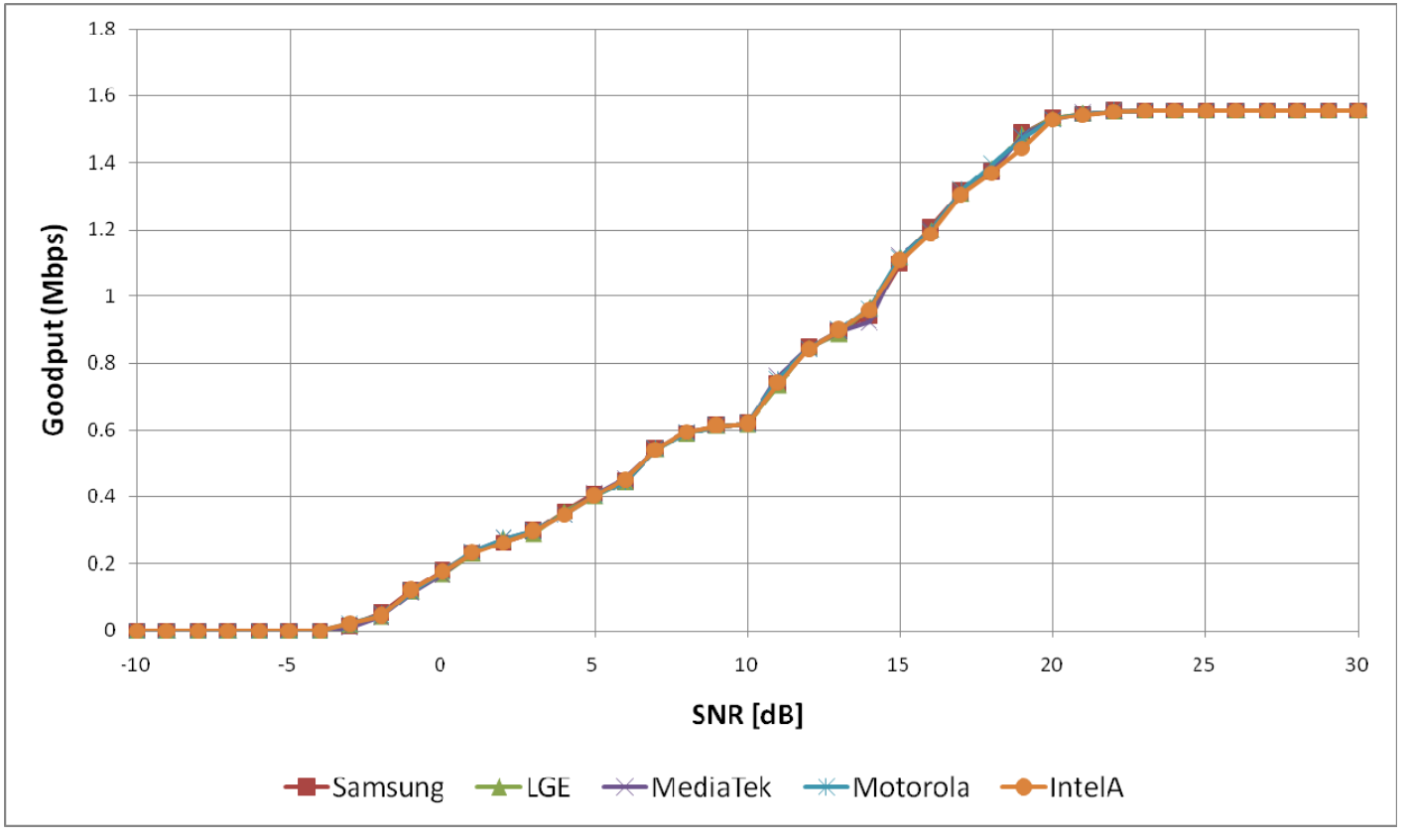
[MediaTek]



[Samsung]

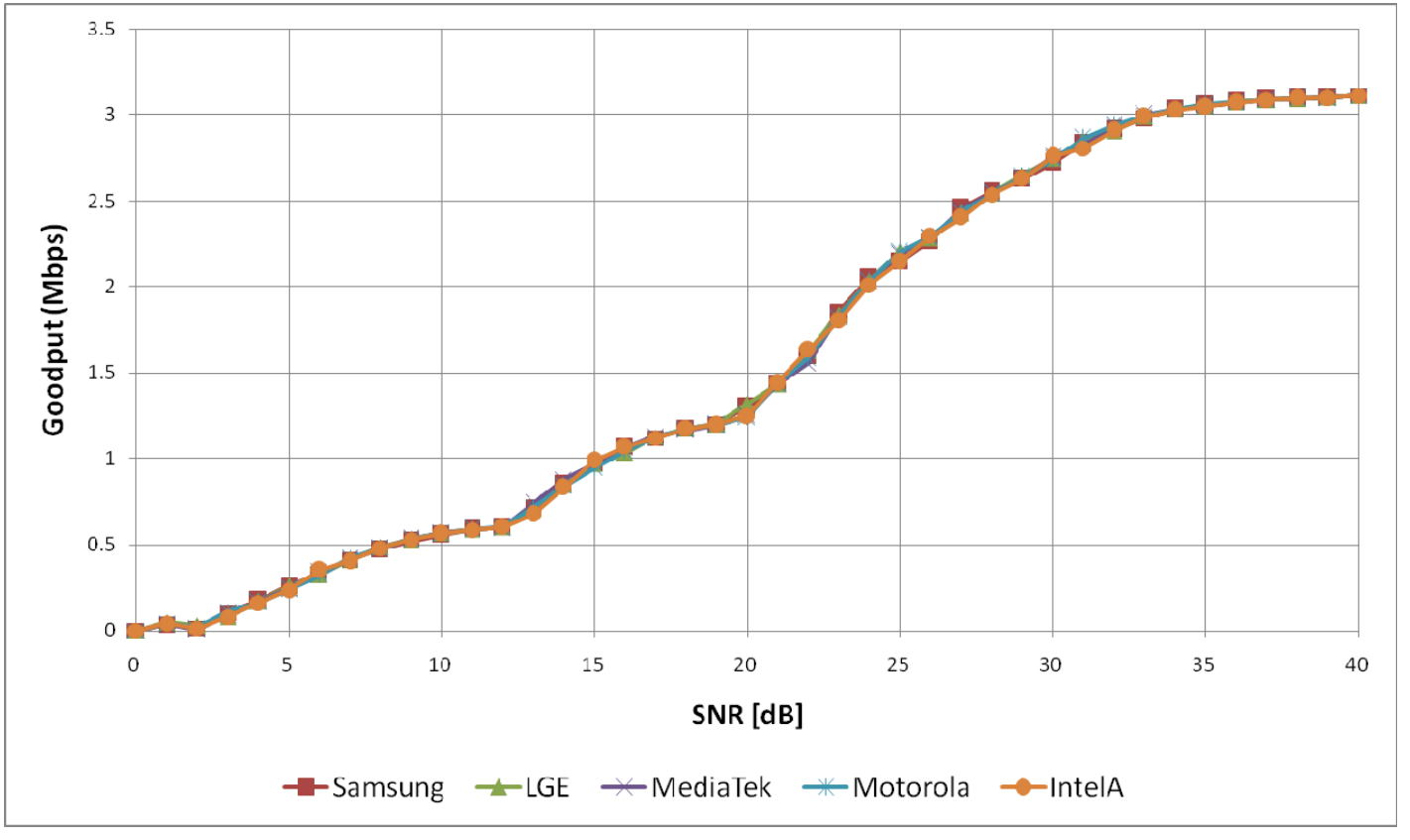
Simulation Results – 2Tx

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



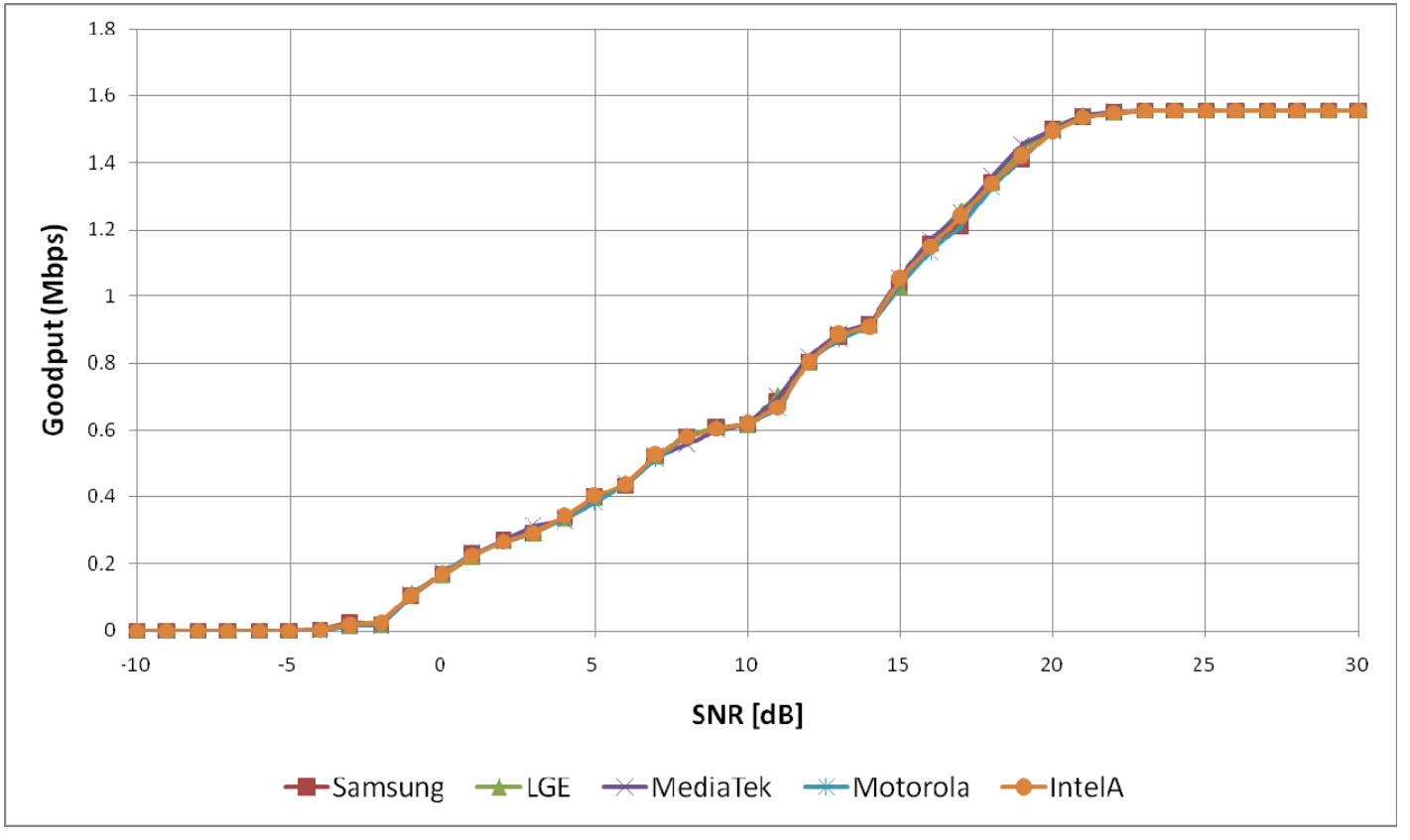
Simulation Results – 2Tx

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



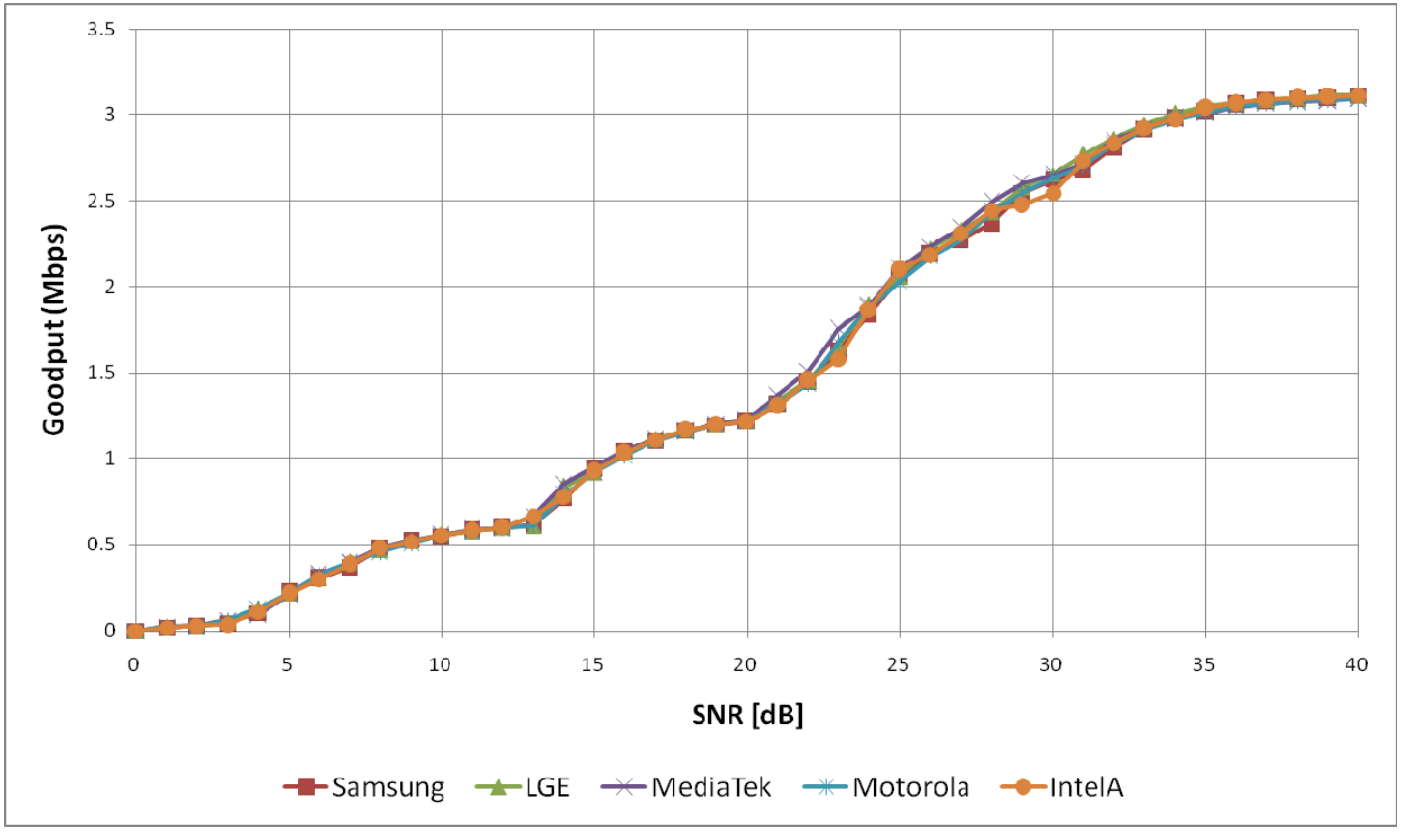
Simulation Results – 2Tx

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



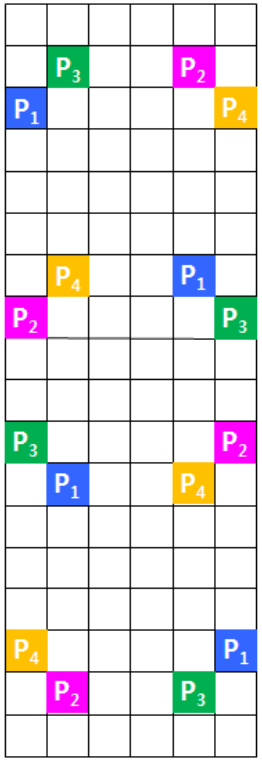
Simulation Results – 2Tx

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

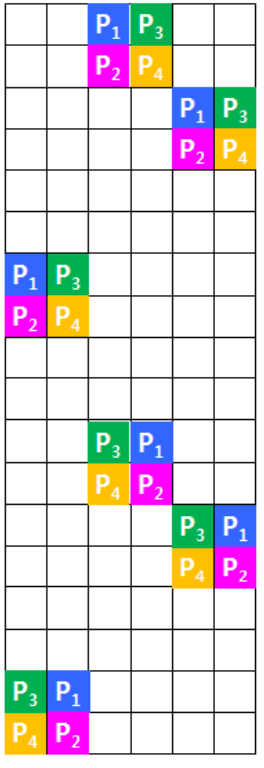


Pilot Patterns – 4Tx

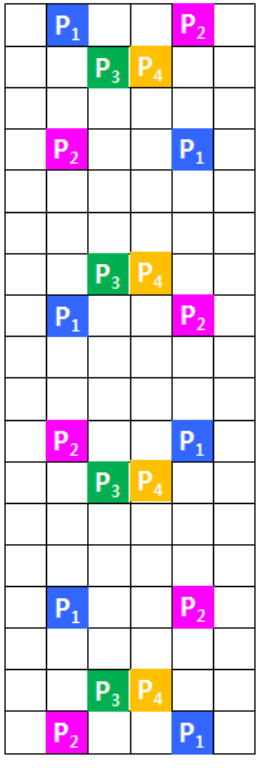
- Pilot patterns for 4Tx from other companies
  - Intel, LGE, Motorola, MediaTek, Samsung



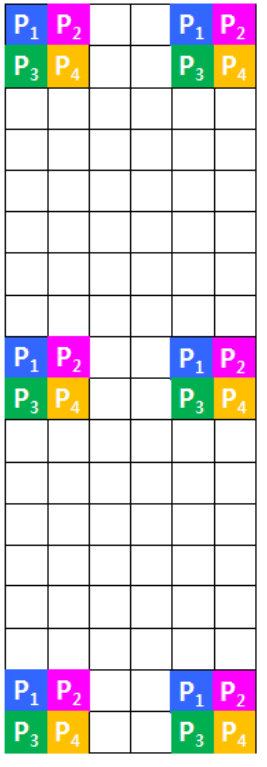
[Intel]



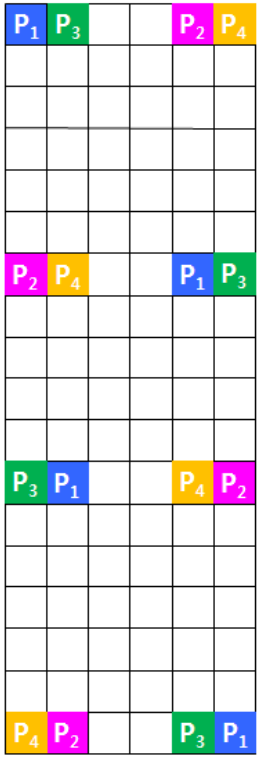
[LGE]



[Motorola]



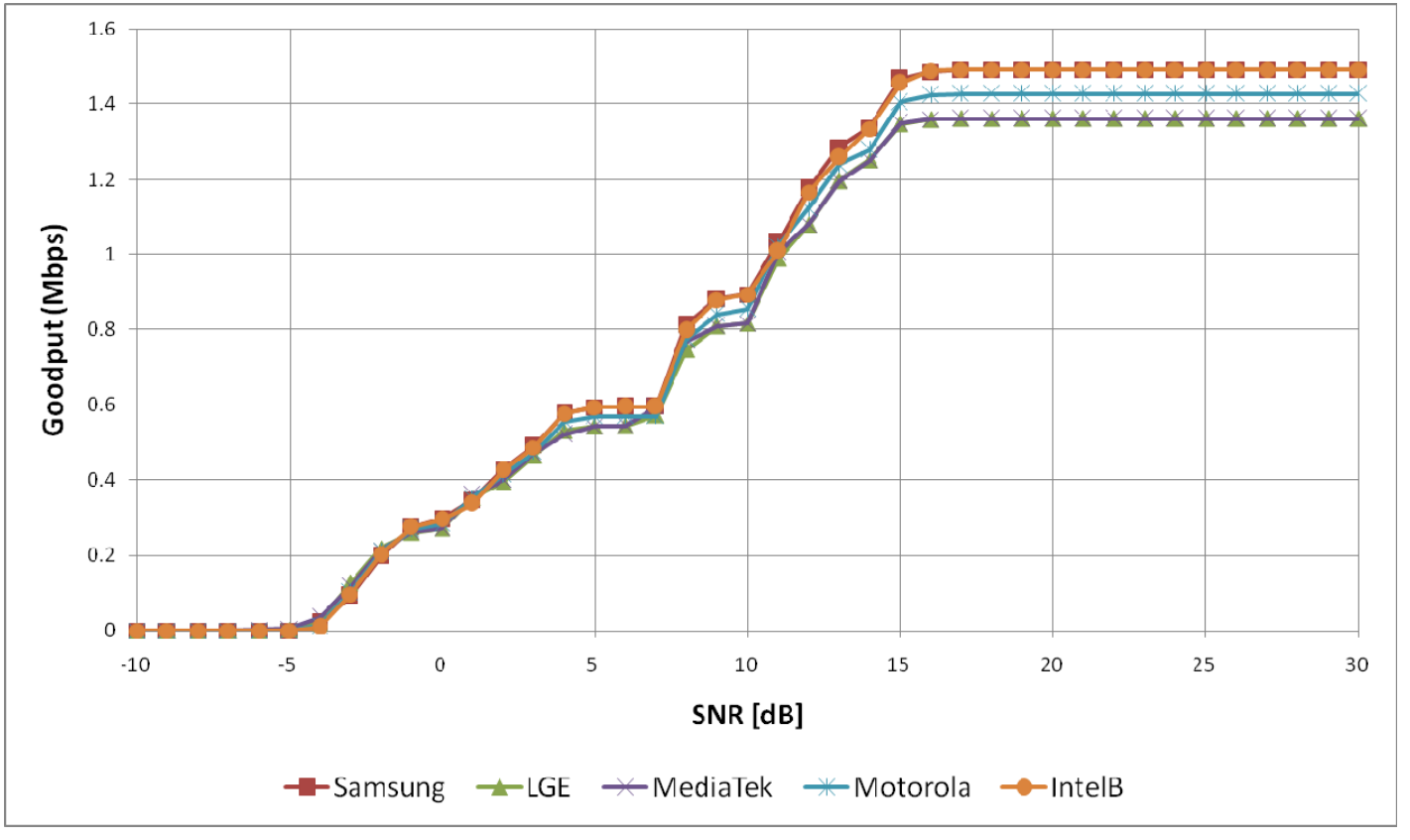
[MediaTek]



[Samsung]

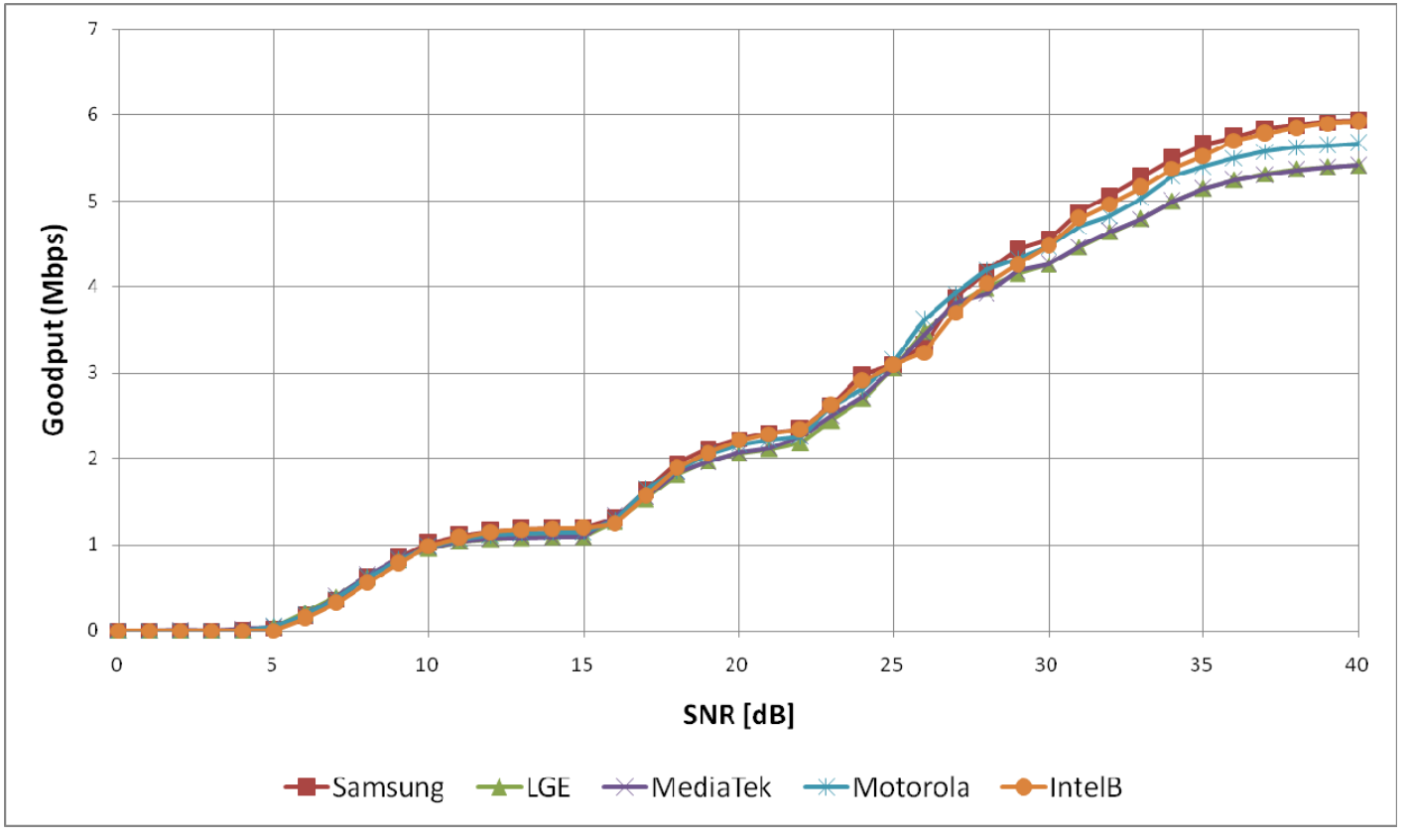
Simulation Results – 4Tx

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



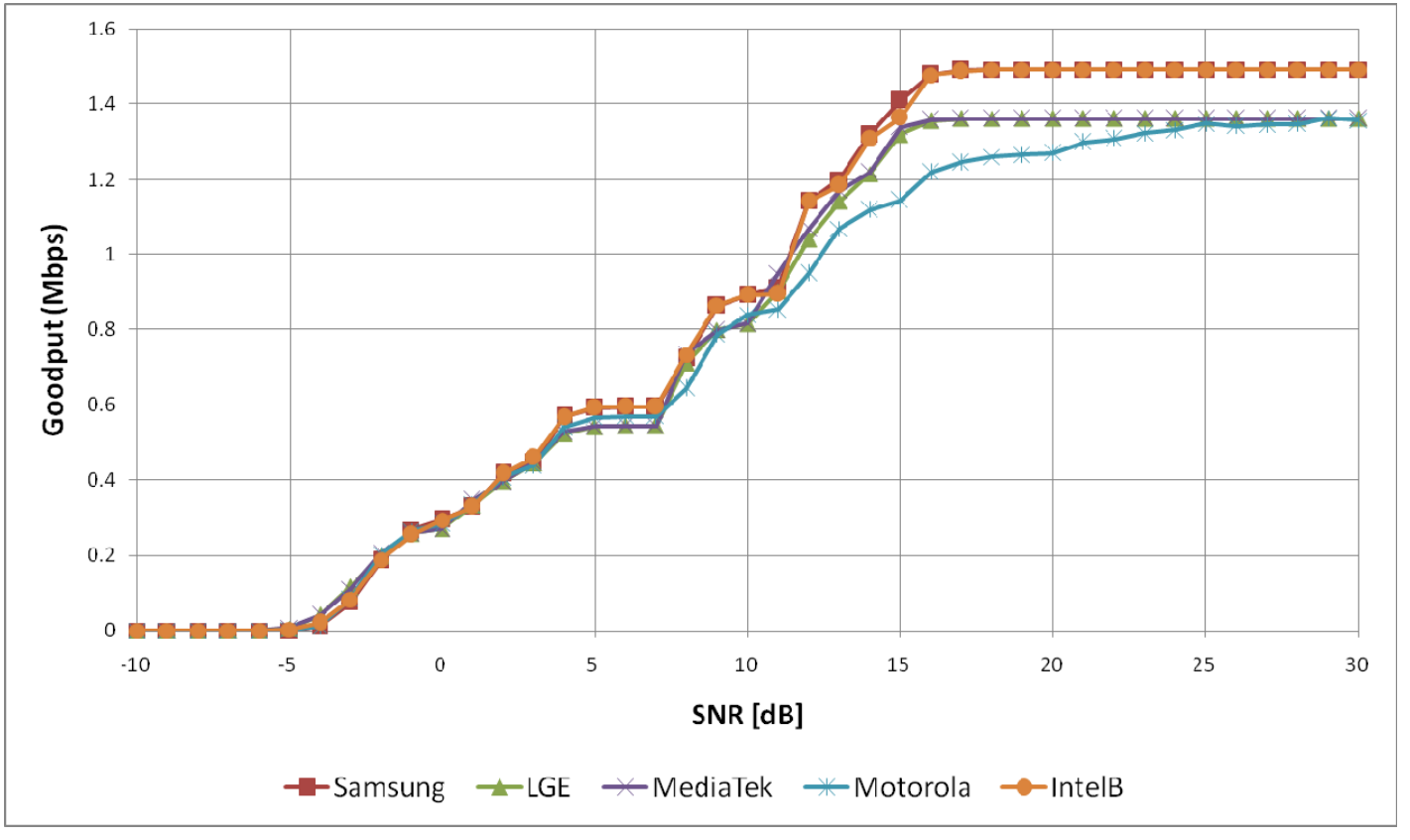
Simulation Results – 4Tx

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



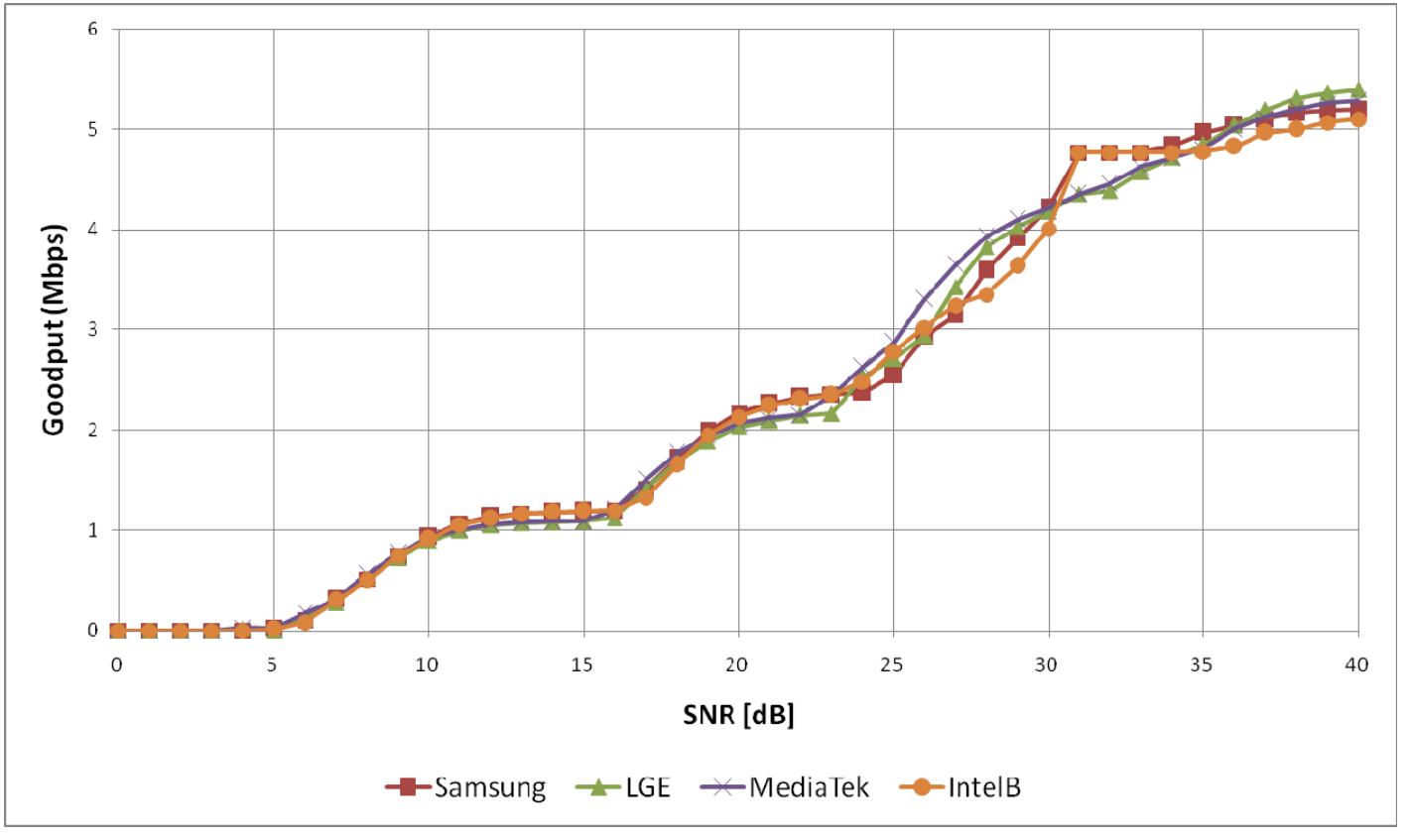
Simulation Results – 4Tx

- 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

Figure 28 presents the common/dedicated pilots in a PRU for 4 transmit antennas. In the figures, the pilot *k* denotes a pilot for transmit antenna *k*.

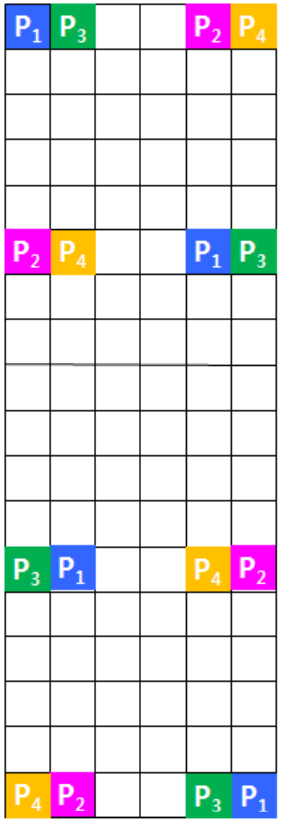


Figure 28 Pilot pattern using common pilot for 4 Tx antennas.