Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: Bluetooth Interference with 802.11 DS: MAC Simulation Results
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Abstract: Bluetooth Interference with 802.11 DS: MAC Simulation Results

Purpose: The information in this document should be used to further TG2 coexistence studies.

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IEEE P802.15 Working Group for Wireless Personal Area Networks

Bluetooth Interference with 802.11 DS: MAC Simulation Results

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Outline

- Simulation Experiment Setup
  - Topology
  - Parameters
  - Traffic models
- Results
- Summary

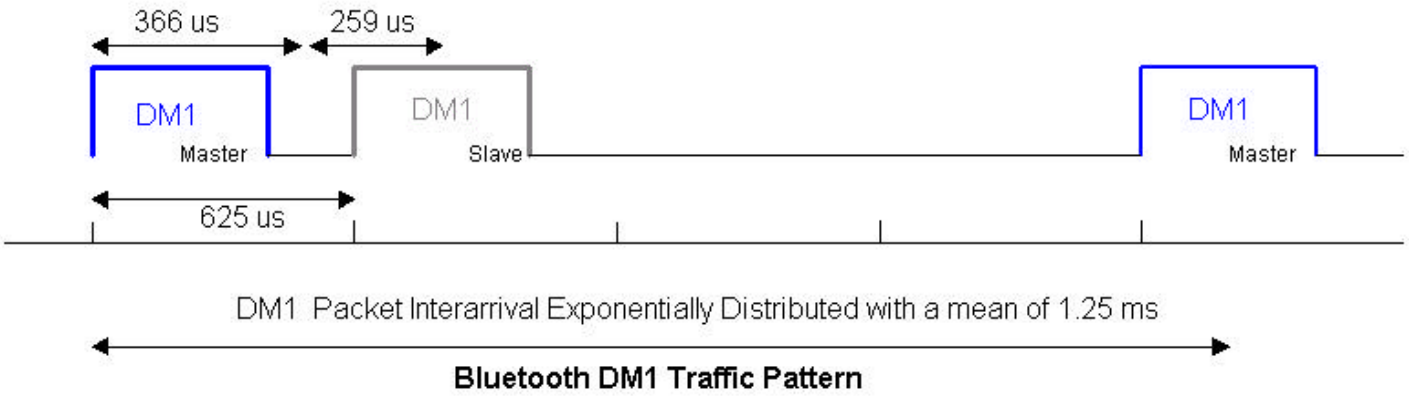
Simulation Parameters for Bluetooth Interference on 802.11 DS (11 Mbits/s)

Length of Simulation Run		**30 seconds**	
Bluetooth Parameters		**WLAN Parameters**	
DM1 Packet Interarrival Time	**1.25 ms**	**Packet Interarrival Time**	**1.86ms**
Load	**50%**	**Load**	**50%**
HV1 Packet		**Transmitted Power**	**25 mW**
Transmitted Power	**1mW**	**AP Coordinates (Source)**	**(0,15)**
Master Coordinates	**(1,0)**	**Mobile Coordinates (Sink)**	**(0,d)**
Slave Coordinates	**(0,0)**	**Packet Header**	**224 bits**
		Slot Time	**20 us**
		SIFS	**10 us**
		DIFS	**50 us**
		CW_min	**31**
		CW_max	**1023**
		RTS	**None**

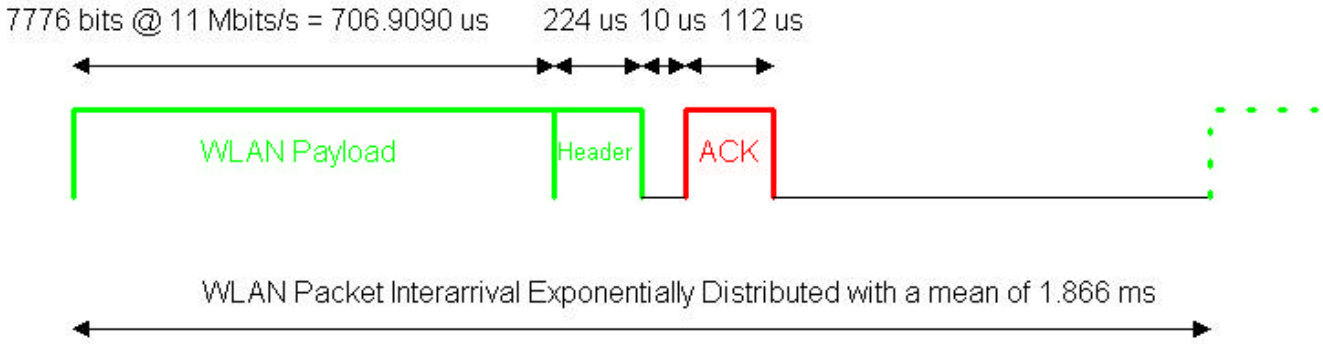
Simulation Parameters for 802.11 DS (11 Mbits/s) Interference on Bluetooth

Length of Simulation Run		30 seconds	
Bluetooth Parameters		**WLAN Parameters**	
DM1 Packet Interarrival Time	1.25 ms	Packet Interarrival Time	1.86ms
Load	50%	Load	50%
HV1 Packet		Transmitted Power	25 mW
Transmitted Power	1mW	AP Coordinates (Sink)	(0,15)
Slave Coordinates	(0,0)	Mobile Coordinates (Source)	(0,d)
Master Coordinates	(7,0)	Packet Header	224 bits
		Slot Time	20 us
		SIFS	10 us
		DIFS	50 us
		CW_min	31
		CW_max	1023
		RTS	None

Traffic Model



Bluetooth DM1 Traffic Pattern

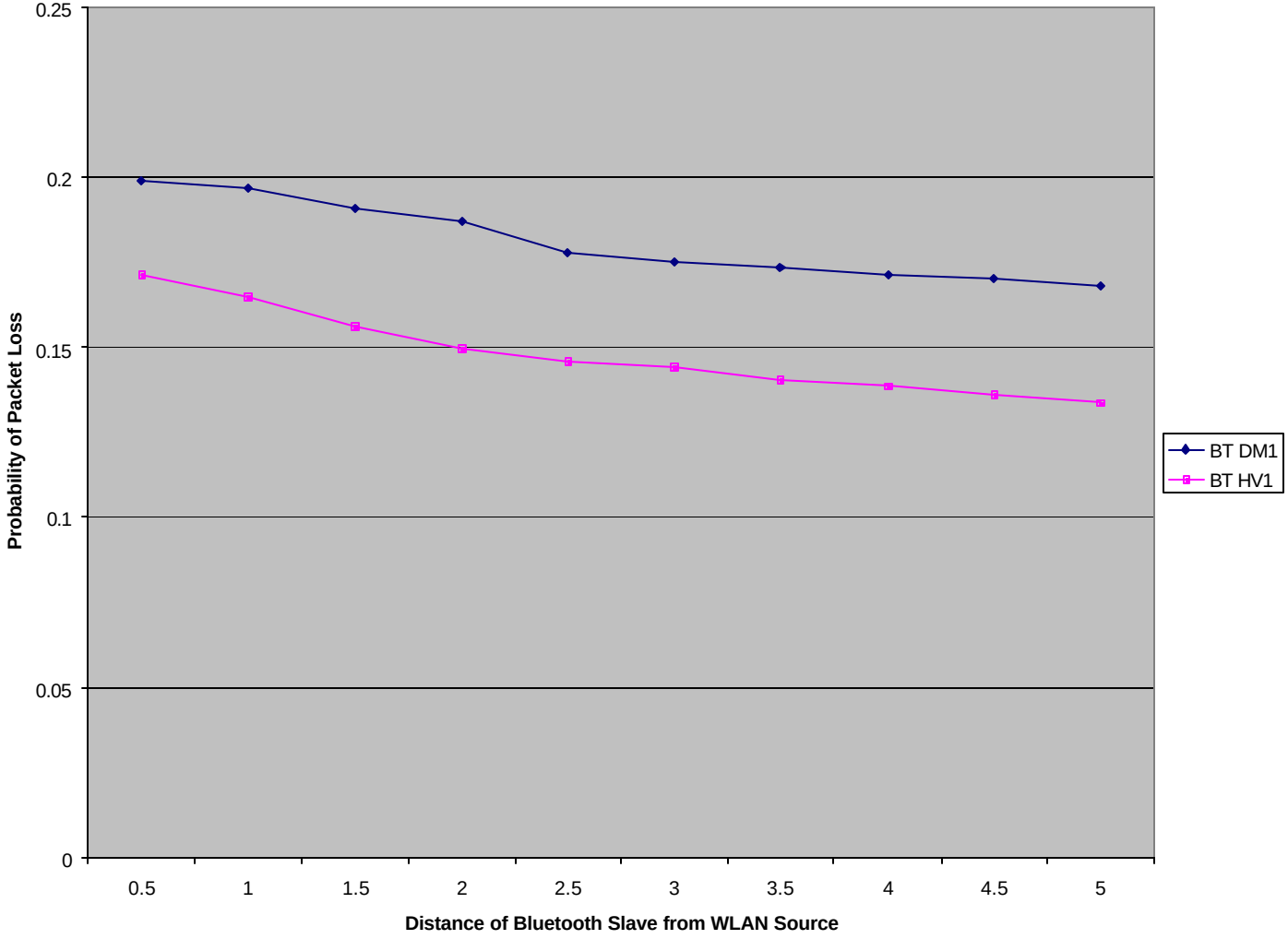


WLAN Traffic Pattern

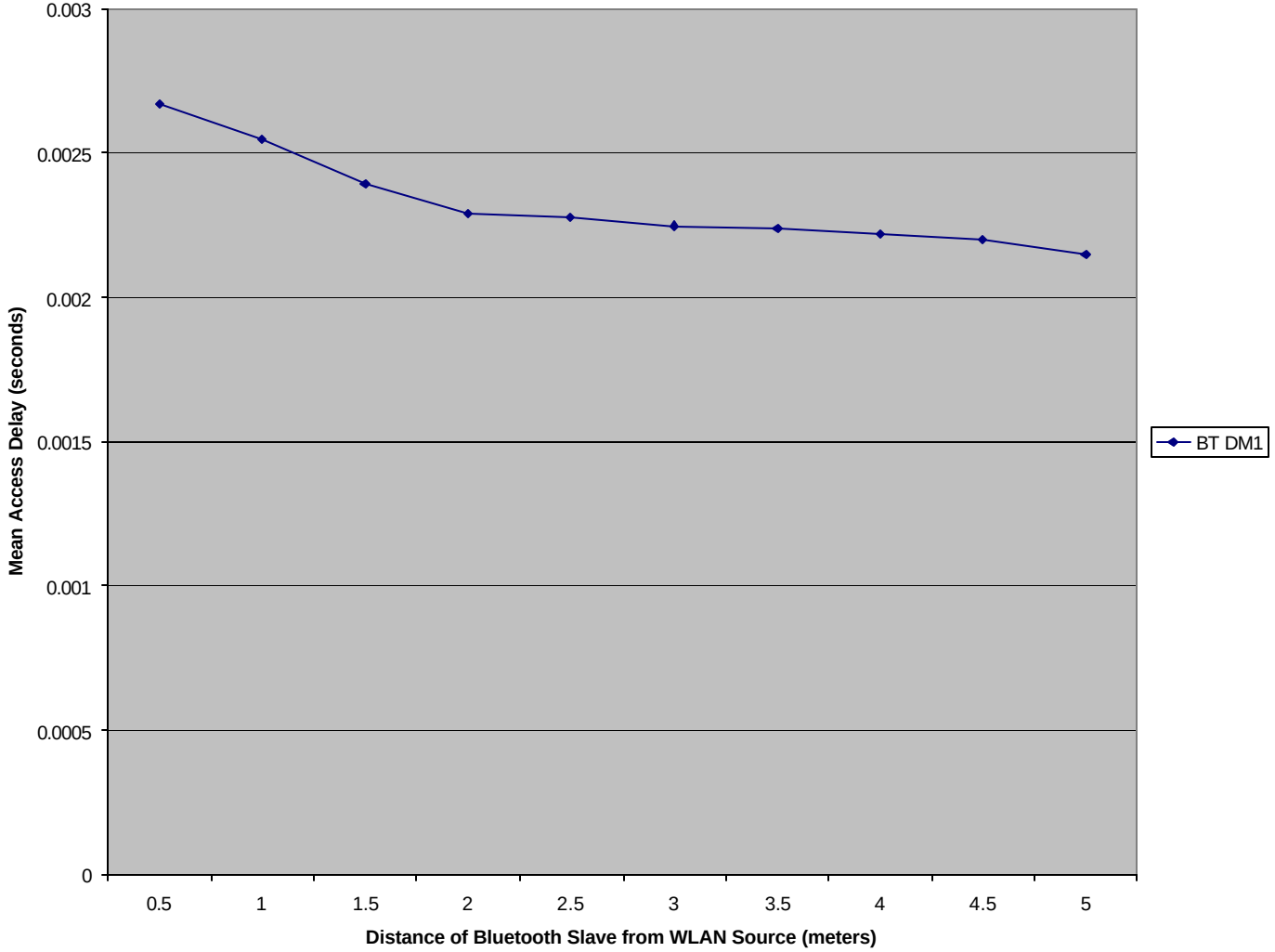
Performance Measurements

- Measurements are performed at the Baseband:
  - Probability of packet loss
  - Mean access delay
  - Residual number of errors in Bluetooth voice packets.

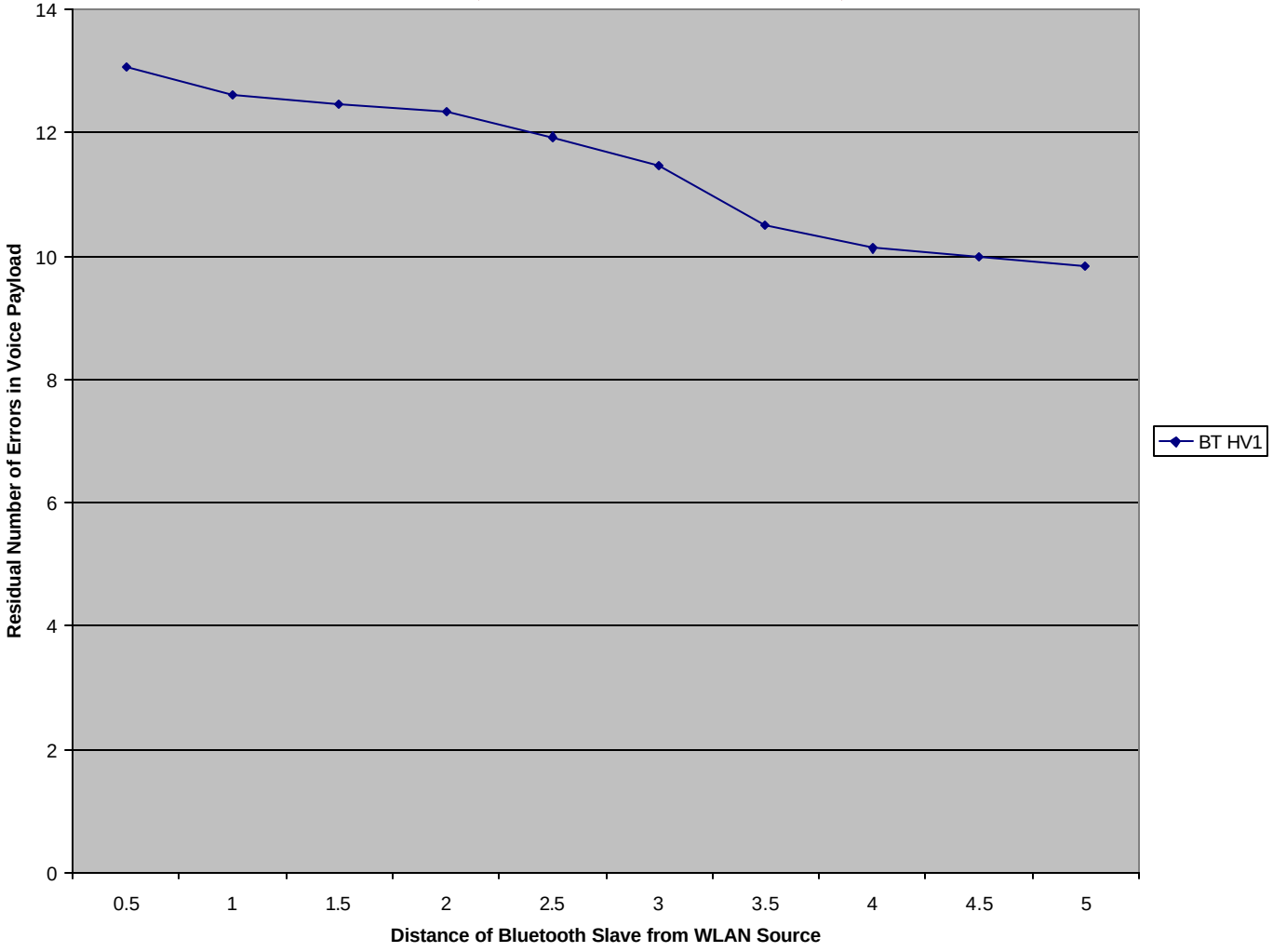
Packet Loss at Bluetooth Slave with 802.11 DS Interference



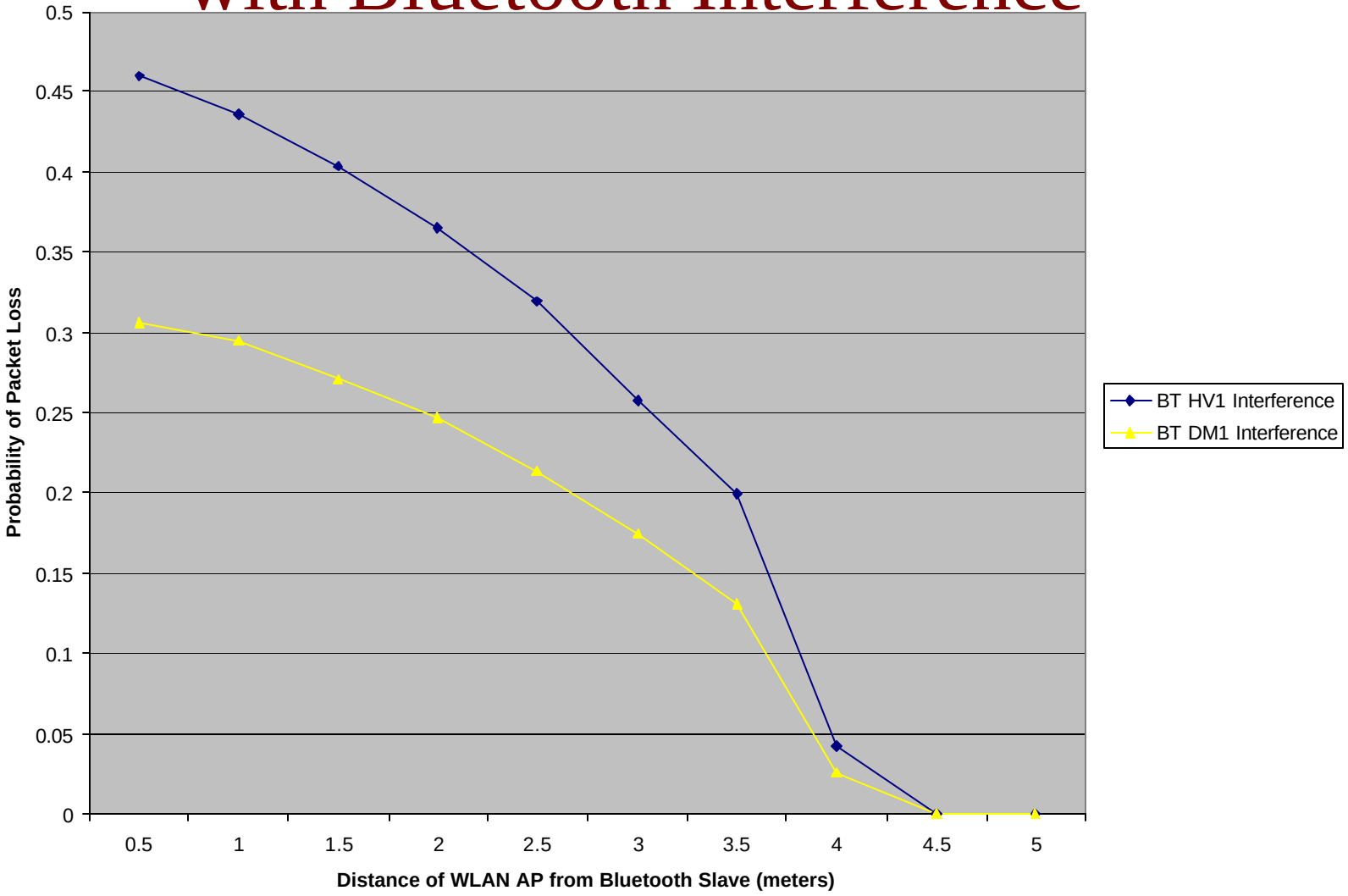
Access Delay for Bluetooth Slave with 802.11 (11Mbits/s) Interference



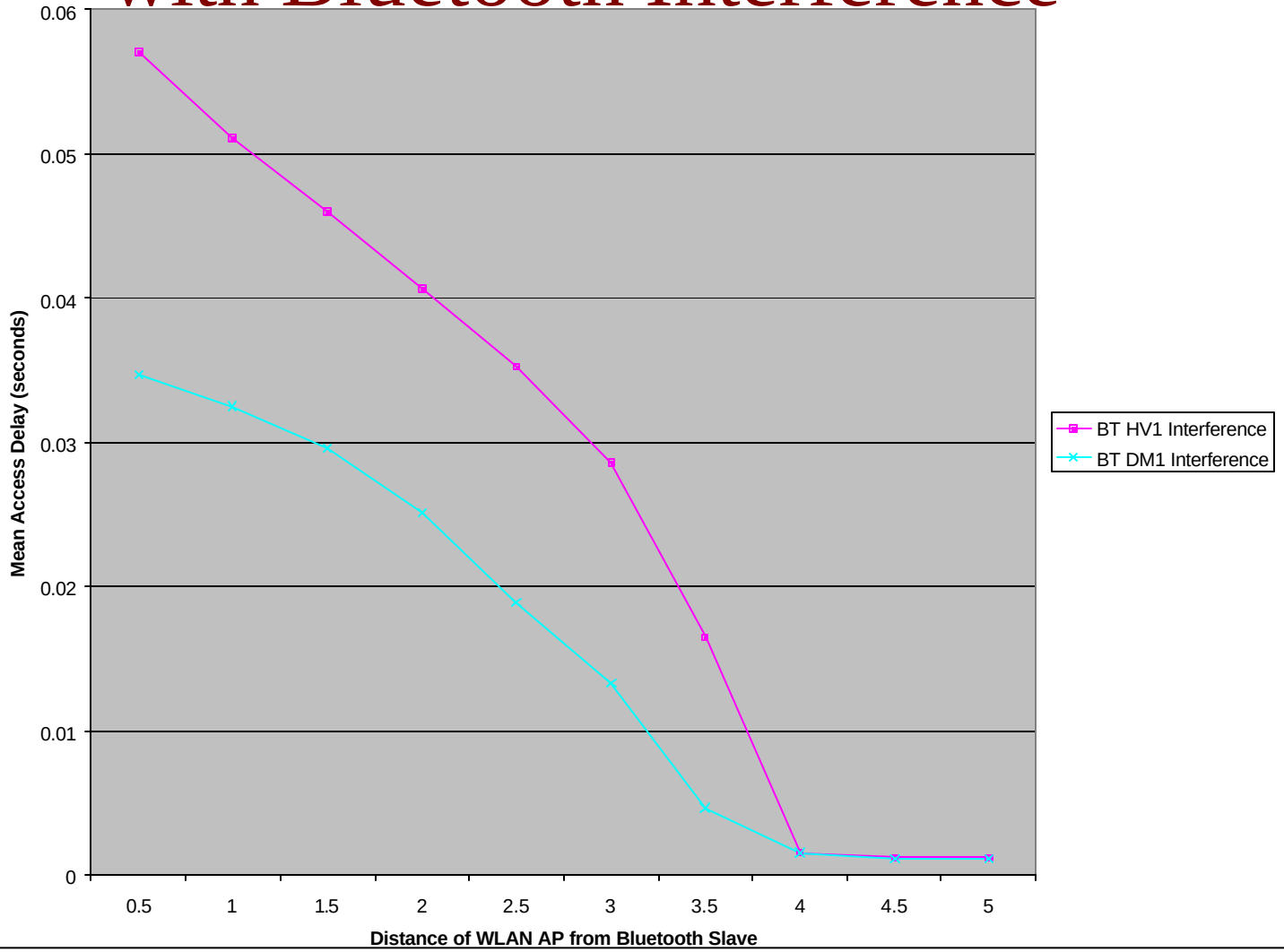
Residual Number of Errors for Bluetooth Slave with 802.11 (11Mbits/s) Interference



Packet Loss for 802.11 (11 Mbits/s) with Bluetooth Interference



Access Delay for 802.11 (11 Mbits/s) with Bluetooth Interference



Next Step

- Complete MAC Simulation Results for the following devices:
  - Bluetooth (LD, Viterbi ?)
  - WLAN Direct Seqence (1, 11 Mbits/s)
  - WLAN Frequency Hopping (1 Mbits/s)