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

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Re: []

Abstract: [Proposal for geometry applicable to 15.3c usage models 2, 3 and 4]

Purpose: [To be considered in 15.3c Usage Model Document]

Proposal for geometry applicable to usage models 2, 3 and 4

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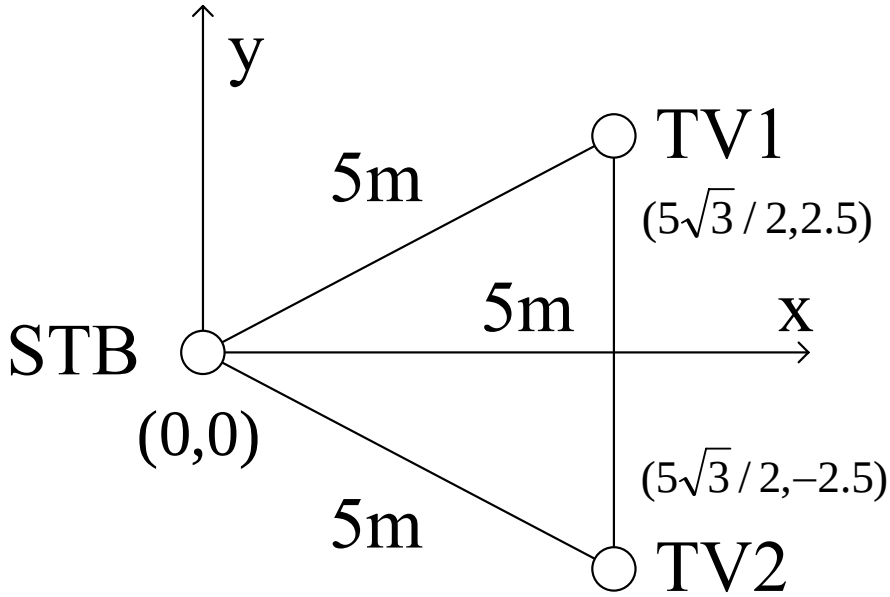
Summary

- This is to propose a 2-dimensional geometry for usage model (UM) 4 as well as UMs 2 and 3, since no channel model dealing with 3-dimensional geometry is currently available.

Purpose of this document

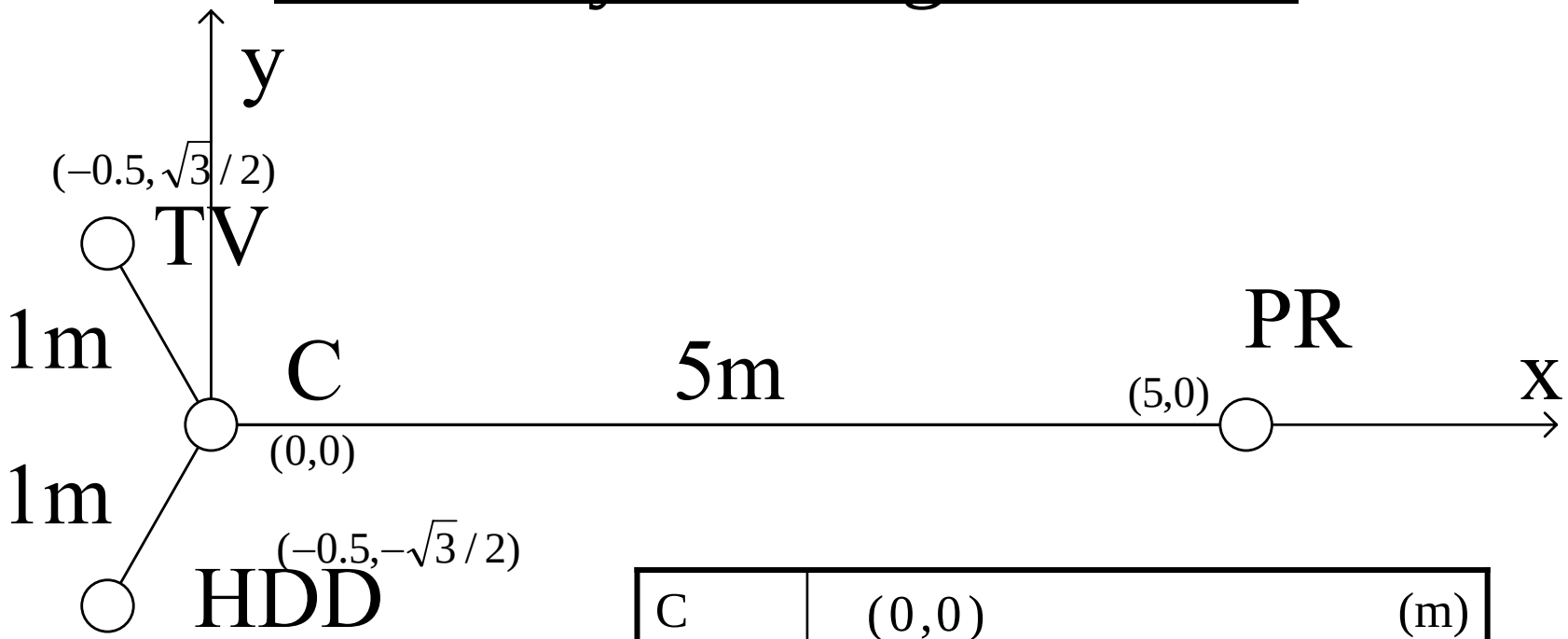
- To provide simulation parameters for UMs 2, 3, and 4 geometry.

Geometry for usage model 2



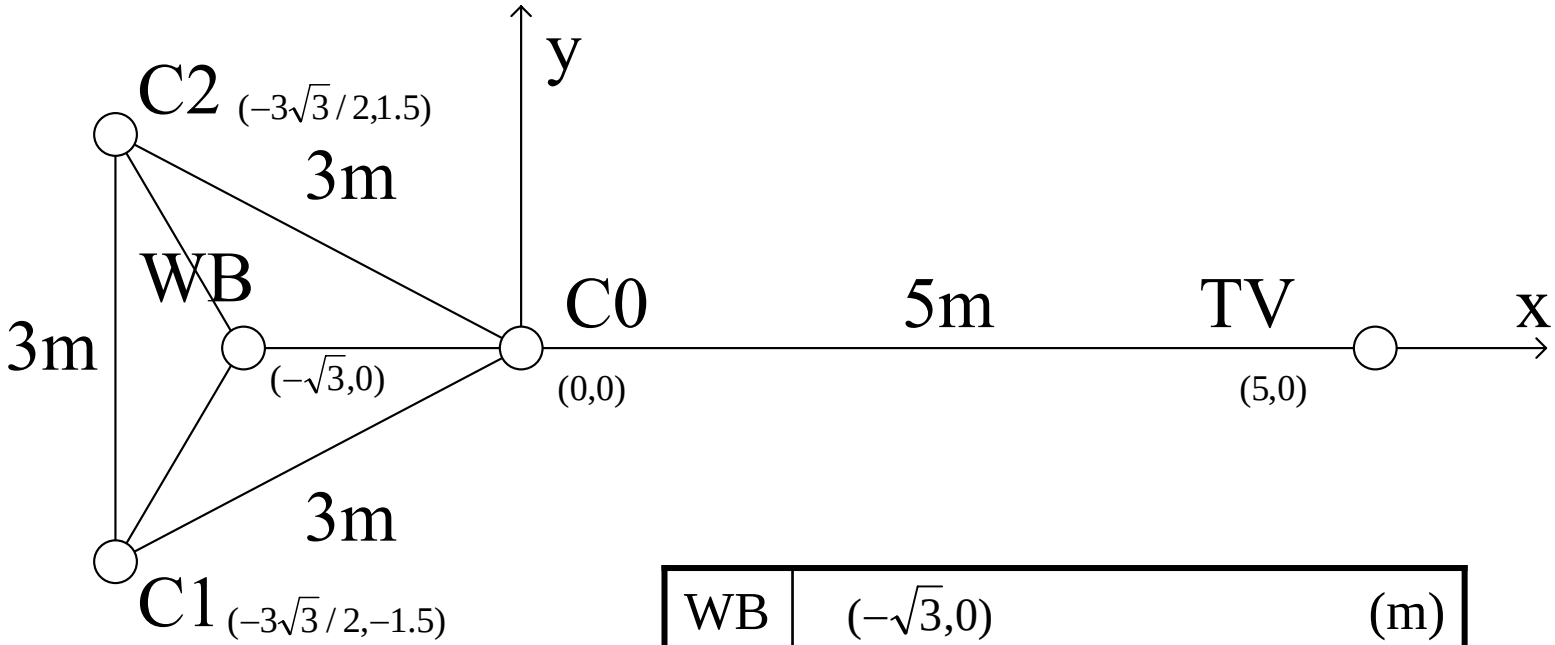
STB	(0,0)	(m)
TV1	(5√3 / 2,2.5)	
TV2	(5√3 / 2,–2.5)	

Geometry for usage model 3



C	(0,0) (m)
TV	$(-0.5, \sqrt{3}/2)$
HDD	$(-0.5, -\sqrt{3}/2)$
PR	(5,0)

Geometry for usage model 4



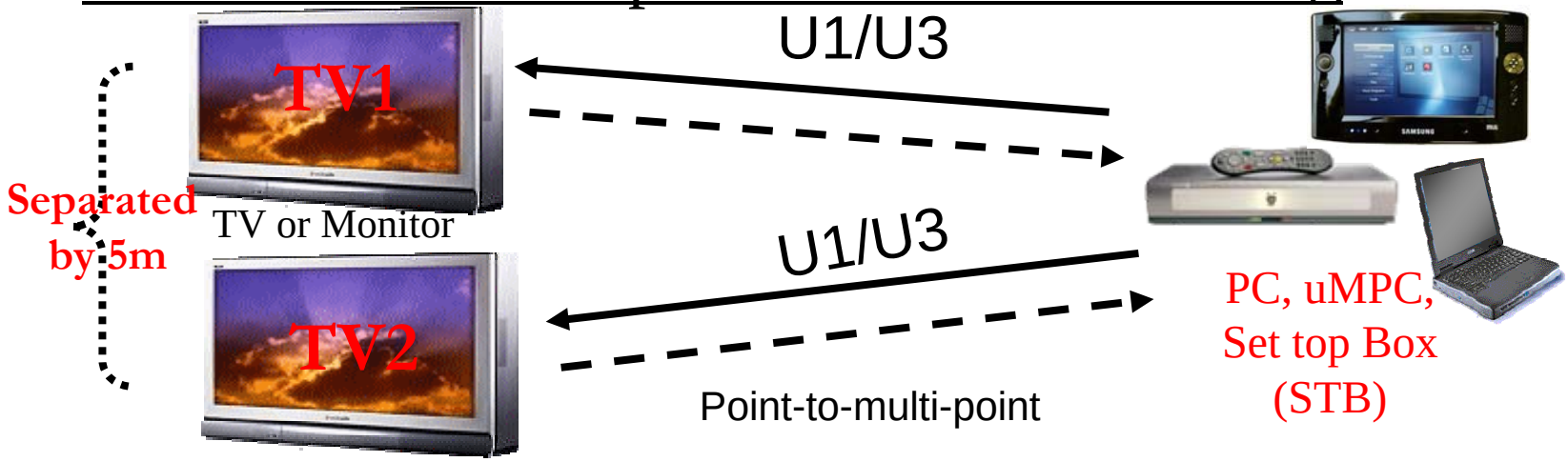
WB	(–√3,0) (m)
C0	(0,0)
C1	(–3√3 / 2,–1.5)
C2	(–3√3 / 2,1.5)
TV	(5,0)

Conclusions

- A 2-dimensional geometry for UM4 is proposed as well as UM2 and 3, since no channel model dealing with 3-dimensional geometry is currently available.

Appendix: Usage models

UM2 multi Uncompressed Video Streaming



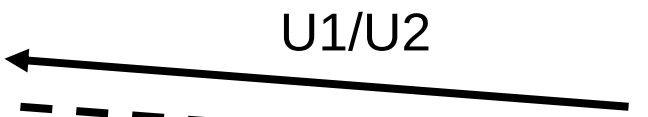
Environment	Throughput MAC SAP	BER/PiER	Distance	Note
Residential TV1:LOS TV2:NLOS	TV1: 1.75 Gbps 1.49, W/O Blk Stream 1080i, 24, 60 TV2: 0.62 Gbps 0.497, W/O Blk Stream 720x480p, 24,60	10^{-6} BER for PHY Simulations *Justification for this value is needed	STB-TV1 & STB-TV2 5 m TV1-TV2 5 m	■No data retransmission required ■Unidirectional data transmission noted by solid line for U1 ■Low bitrate reverse link ■TV1-TV2 are not co-located, separation 5 m ■Different video content transmitted on each link ■Target of 10^{-9} PiER for HDMI ■Pixel is RGB, 24 bits

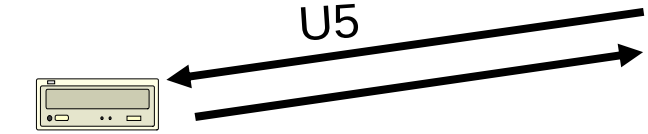
UM2 multi Uncompressed Video Streaming Continue

Environment	Throughput MAC SAP	BER/PiER	Distance	Note
Residential TV1:LOS TV2:NLOS	TV1: 0.62 Gbps 0.497, W/O Blk Stream 720x480p, 24,60	10^{-6} BER for PHY Simulations *Justification for this value is needed	STB-TV1 & STB-TV2 5 m TV1-TV2 5 m	■No data retransmission required ■Unidirectional data transmission noted by solid line for U1 ■Low bitrate reverse link ■TV1-TV2 are not co-located, separation 5 m ■Different video content transmitted on each link ■Target of 10^{-9} PiER for HDMI ■Pixel is RGB, 24 bits
	TV2: 0.62 Gbps 0.497, W/O Blk Stream 720x480p, 24,60			

UM3 Office Desktop

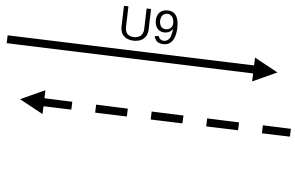
TV or Monitor





HDD

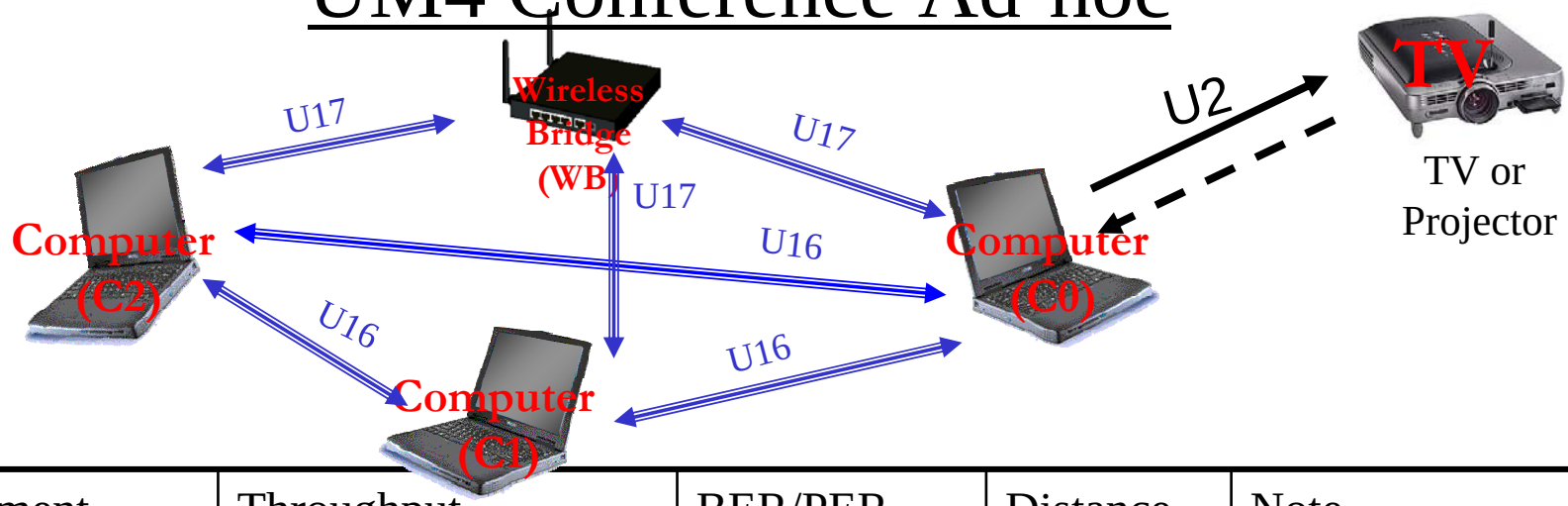
Computer (C)



Printer (PR)

Environment	Throughput MAC SAP	BER/PER	Distance	Note
NLOS, Desktop (C-TV) LOS, Desktop (C-HDD) NLOS, Office (C-PR)	3.56 Gbps 2.98, W/O Blk Stream, 1080p, 24, 60 And/or 1.75 Gbps 1.49, W/O Blk Stream 1080i, 24, 60	10^{-6} BER for PHY Simulations *Justification for this value is needed	1 m	■No data retransmission required for TV ■Unidirectional data transmission noted by solid line for U1 & U9 ■Low bitrate reverse link for unidirectional link ■TV, HDD, PR are not co-located, separation by 120 deg. ■Target of 10^{-9} PiER for HDMI ■Pixel is RGB, 24 bits ■One simulation for this Usage Model
	0.25 Gbps, average async. Each direction for HDD	8% PER before retransmission 2K Byte	1 m	
	0.5 Gbps, average async.	8% PER before retransmission 2K Byte	5 m	

UM4 Conference Ad-hoc



Environment	Throughput MAC SAP	BER/PER	Distance	Note
LOS, office. (C0-TV) LOS, Desktop (C0-C1-C2) LOS, office (C0,C1,C2)-WB	1.75 Gbps 1.49, W/O Blk Stream 1080i, 24, 60	10^{-6} BER for PHY Simulations *Justification for this value is needed	5 m	■No data retransmission required for TV1 ■Unidirectional data transmission noted by solid line for U1 ■Low bitrate reverse link for unidirectional link ■device are not co-located, geometry TBD ■Target of 10^{-9} PiER for HDMI ■Pixel is RGB, 24 bits ■One simulation for this Usage Model ■Total Async throughput of 1 Gbps
	0.0416 Gbps, , average async. Each direction	8% PER before retransmission 2K Byte	1 m	
	0.125 Gbps, , average async. Each direction for WB	8% PER before retransmission 2K Byte	3 m	