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

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Source: [Fumihide Kojima¹, Yozo Shoji¹, Shuzo Kato¹, Chang-Soon Choi¹, Hirokazu Sawada¹, Ichihiko Toyoda², Kenichi Kawasaki³, Yasuyuki Oishi⁴, Kazuaki Takahashi⁵, Hiroyuki Nakase⁶]

Company [NICT¹, NTT², SONY³, FUJITSU⁴, Panasonic(Matsushita)⁵, Tohoku University⁶]

Address¹[3-4 Hikari-no-oka, Yokosuka-shi, Kanagawa 239-0847, Japan]²[1-1 Hikari-no-oka, Yokosuka-shi, Kanagawa 239-0847, Japan]³[6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo 141-0001, Japan] ⁴[5-5 Hikari-no-Oka, Yokosuka-shi, Kanagawa 239-0847, Japan] ⁵[4-12-4, Higashi-Shinagawa, Shinagawa-ku, Tokyo 140-8587, Japan] ⁶[2-1-1 Katahira, Aoba-ku, Sendai-shi, Miyagi 980-8577, Japan]

Voice:[+81-46-847-5295¹, +81-46-859-2366², +81-3-5795-7879³, +81-46-839-5373⁴, +81-3-6710-2029⁶, +81-22-217-5531⁶]

FAX: [+81-46-847-5440¹, +81-46-855-1497², +81-3-5795-7385³, +81-46-839-5560⁴, +81-3-6710-3915⁶, +81-22-217-5533⁶]

E-Mail:[f-kojima@nict.go.jp¹, shoji@nict.go.jp¹, shu.kato@nict.go.jp¹, cschoi@nict.go.jp¹, sawahiro@nict.go.jp¹, toyoda.ichihiko@lab.ntt.co.jp², Kenichi.Kawasaki@jp.sony.com³, yasu@labs.fujitsu.com⁴, takahashi.kazu@jp.panasonic.com⁵, nakase@riec.tohoku.ac.jp⁶]

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]

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

Fumihide Kojima, Yozo Shoji, Shuzo Kato, Chang-Soon Choi,
(NiCT)

Ichihiko Toyoda(NTT)

Kenichi Kawasaki (Sony)

Yasuyuki Oishi (FUJITSU)

Kazuaki Takahashi(Panasonic(Matsushita))

Hiroyuki Nakase (Tohoku University)

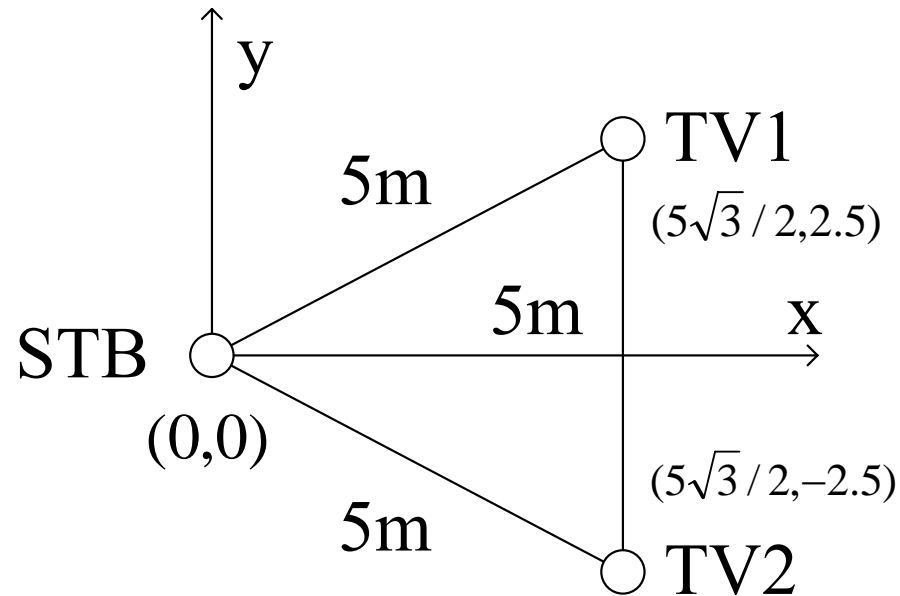
Summary

- 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

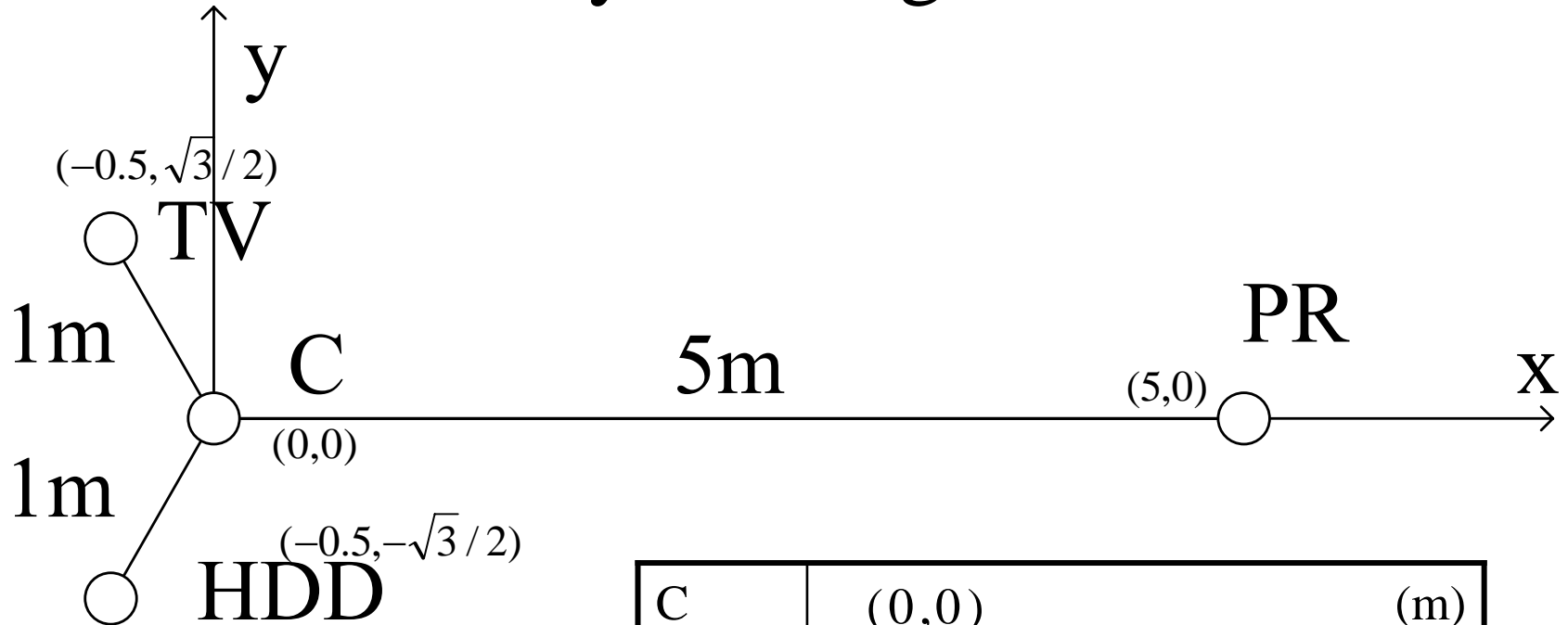
- To provide simulation parameters for UMs 2, 3, and 4 geometry.

Geometry for usage model 2



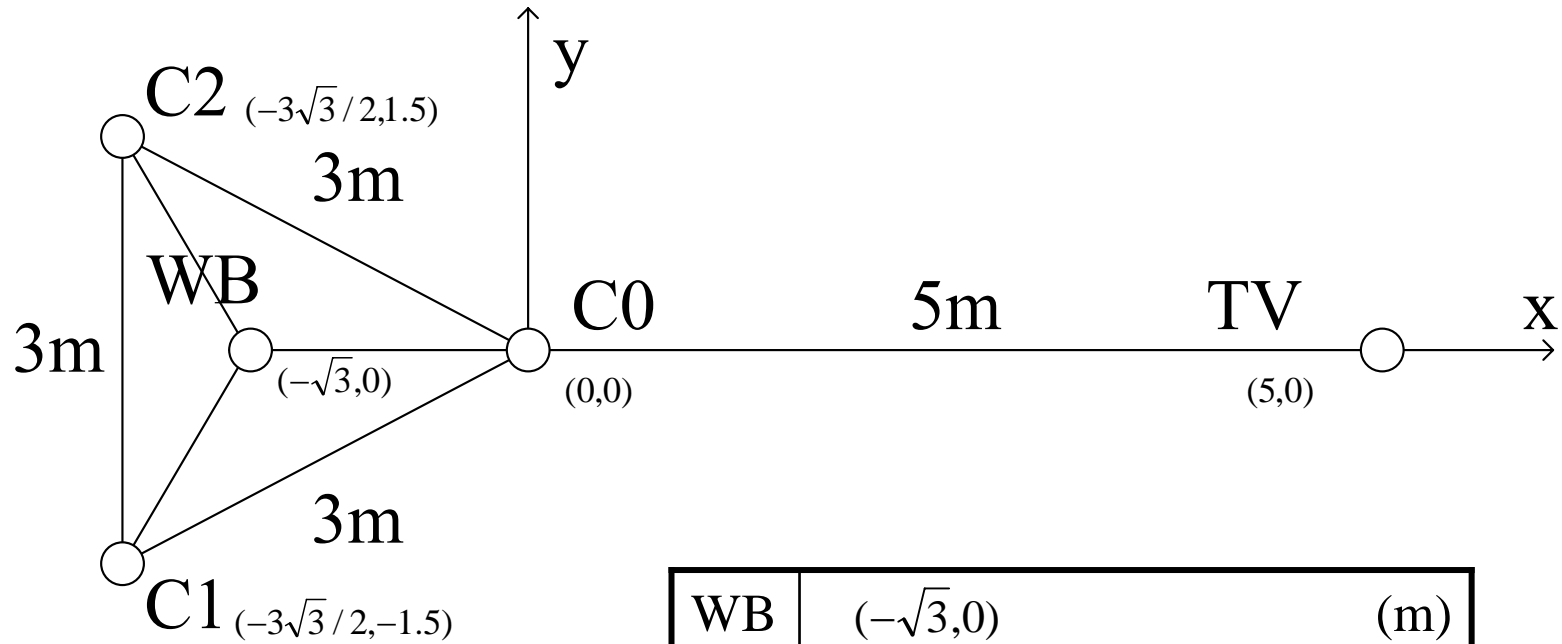
STB	(0,0)	(m)
TV1	$(5\sqrt{3}/2, 2.5)$	
TV2	$(5\sqrt{3}/2, -2.5)$	

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



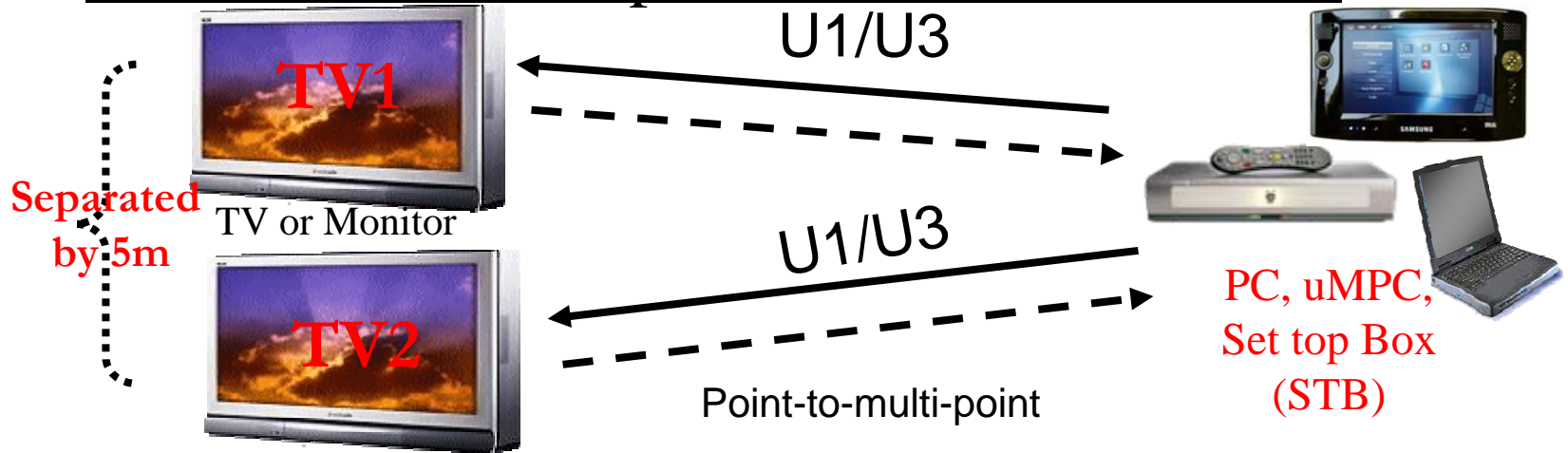
WB	$(-\sqrt{3}, 0)$	(m)
C0	$(0, 0)$	
C1	$(-3\sqrt{3}/2, -1.5)$	
C2	$(-3\sqrt{3}/2, 1.5)$	
TV	$(5, 0)$	

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



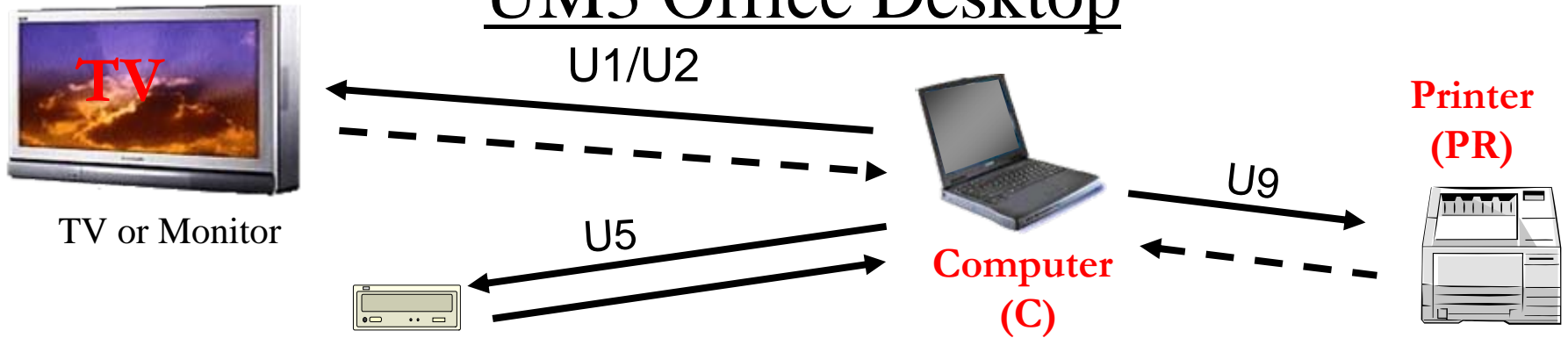
Environment	Throughput MAC SAP	BER/PiER	Distance	Note
Residential TV1:LOS TV2:NLOS	TV1: 1.75 Gbps 1.49, W/O Blk Stream 1080i, 24, 60 TV2: 0.62 Gbps 0.497, W/O Blk Stream	10 ⁻⁶ BER for PHY Simulations *Justification for this value is needed	STB-TV1 & STB-TV2 5 m TV1-TV2 5 m	<ul style="list-style-type: none"> ■ 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
Submission	720x480p, 24,60	Slide 10		Fumihide Kojima

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	<ul style="list-style-type: none"> ■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			

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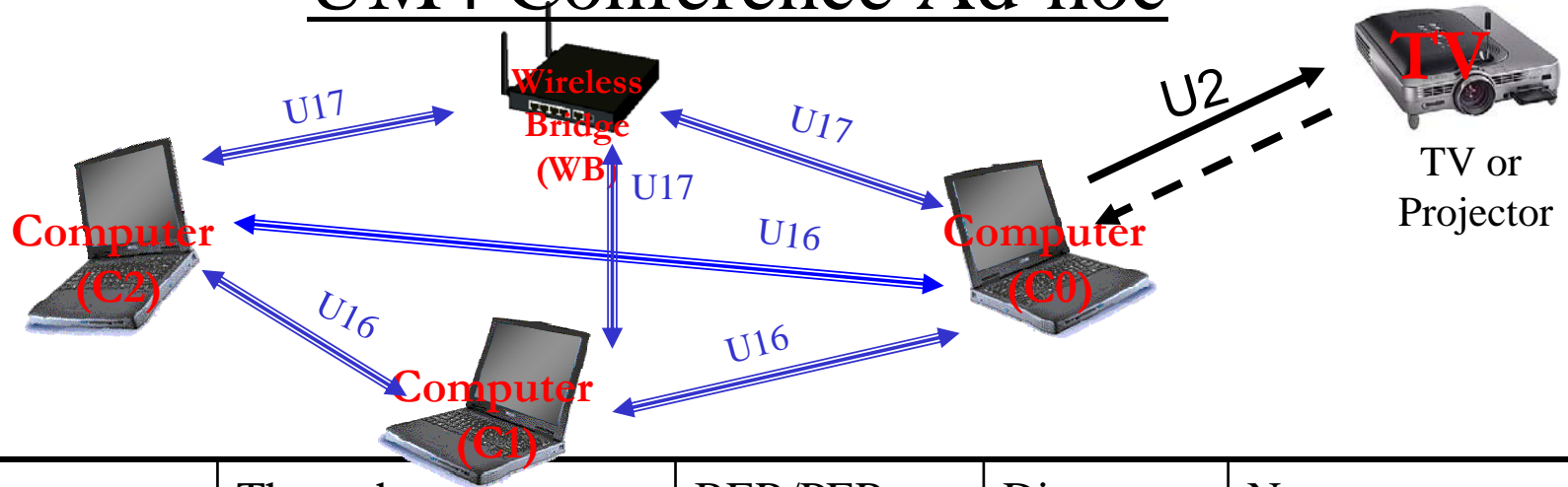
UM3 Office Desktop



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	<ul style="list-style-type: none"> ■ 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	
Submission		Slide 12		Fumihide Kojima

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UM4 Conference Ad-hoc



Environment	Throughput MAC SAP	BER/PER	Distance	Note
LOS, office. (C0-TV)	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	<ul style="list-style-type: none"> ■ No data retransmission required for TV1 ■ Unidirectional data transmission noted by solid line for U1
LOS, Desktop (C0-C1-C2)	0.0416 Gbps, , average async. Each direction	8% PER before retransmission 2K Byte	1 m	<ul style="list-style-type: none"> ■ Low bitrate reverse link for unidirectional link
LOS, office (C0,C1,C2)-WB	0.125 Gbps, , average async. Each direction for WB	8% PER before retransmission 2K Byte	3 m	<ul style="list-style-type: none"> ■ 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 Fumihide Kojima
Submission		Slide 13		