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

Submission Title: [Multipath Characteristics and Antenna Beam Width]
Date Submitted: [July 13, 2006]
Source: [Zhiguo Lai, University of Massachusetts, zhlai@ecs.umass.edu]
[Abbie Mathew, NewLANS, amathew@newlans.com]

Re: []

Abstract: [Update of activities in the channel modeling sub-group and call for participation]

Purpose: [Contribution to 802.15 TG3c]

15-06-0307-00-003c-multipath-characteristics-and-antenna-beam-width

Objective

- Presentation [06-216] showed that narrow beam circular polarized antenna suppressed multipath
- Proposed AWGN channel model
- TG requested for more measured data to compare multipath characteristics between narrow beam and broad beam antennas

Antenna

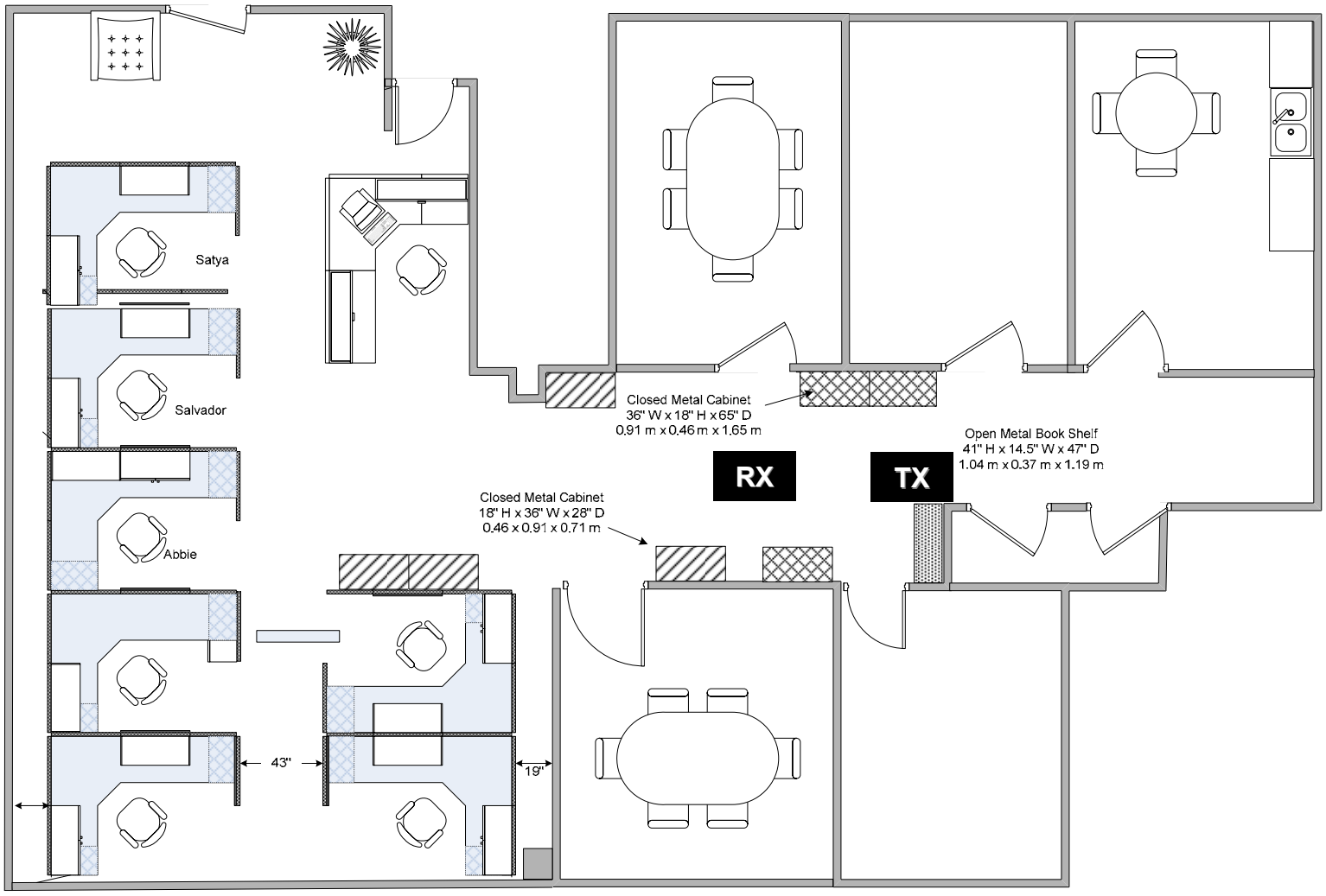
	Gain	3 dB Beam Width	Polarization
Omni	~2 dBi	E_L = +40°, -10° A_Z = 360°	Linear (V)
Conical	23 dBi	10.5°	Linear (V)
Rectangular	21 dBi	13°	Circular (RH)

Measurement

Measurement	Tx	Rx	Comments
13A	Omni	Conical	▪ Tx antenna is fixed ▪ Rx antenna is rotated over 360° in 1.98° steps
13D	Rectangular	Rectangular	

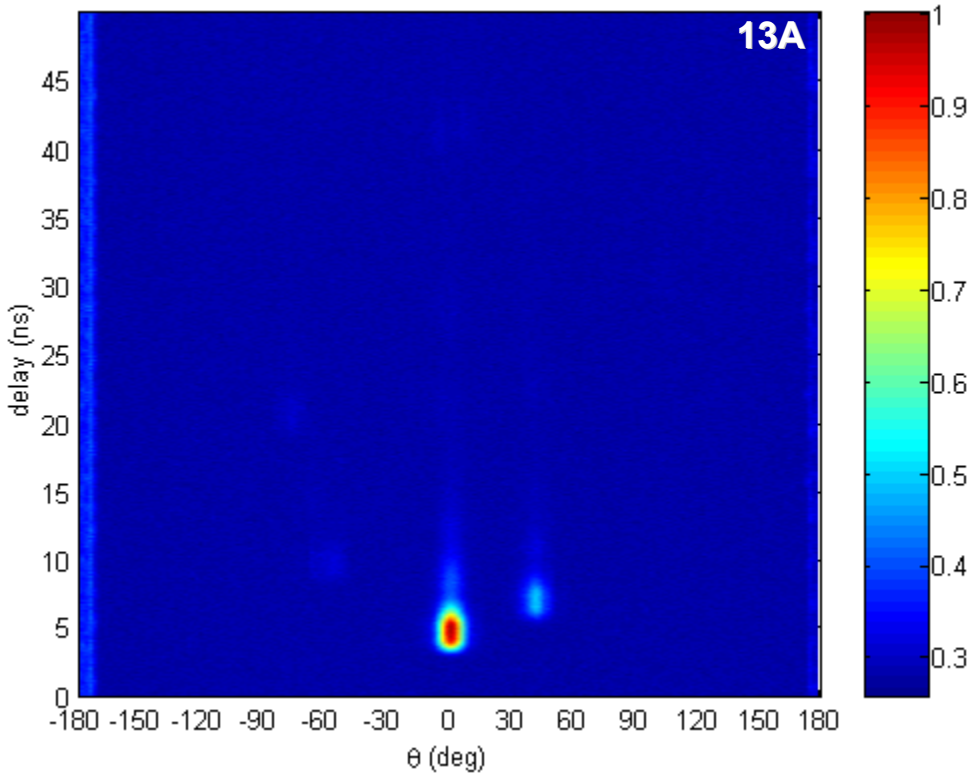
TX and RX separated by 1.49 m (58.5”)

Floor Plan

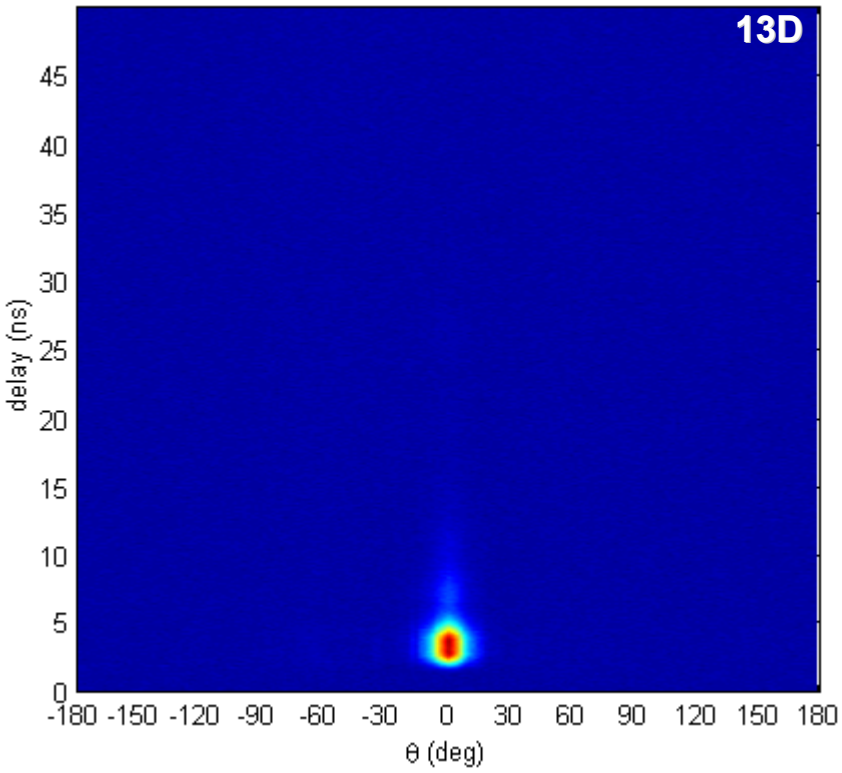

Satya
Salvador
Abbie
Closed Metal Cabinet
36" W x 18" H x 65" D
0.91 m x 0.46 m x 1.65 m
Open Metal Book Shelf
41" H x 14.5" W x 47" D
1.04 m x 0.37 m x 1.19 m
RX
TX
Closed Metal Cabinet
18" H x 36" W x 28" D
0.46 x 0.91 x 0.71 m
43"
19"

Results

Omni Vertical ► Conical Vertical



Rectangular RH ► Rectangular RH



Need more pre-detection gain blocks

Further Activity

More measurements will be made over the week end and results submitted in San Diego

References

- Manabe, Sato, Masuzano, Taira, Ihara, Kasashima, Yamaki, "*Polarization dependence of multipath propagation and high speed transmission characteristics of indoor millimeter channel at 60GHz*", *IEEE Transaction on Vehicular Technology*, Vol. 44, No. 2, May 1995.

- Sato, Manabe, Ihara, Saito, Sato, Masuzano, Taira, Ihara, Kasashima, Yamaki, "*Measurements of reflection and transmission of office building in the 60 GHz band*", *IEEE Transaction on Antennas and Propagation*, Vol. 45, No. 12, December 1992.

- Manabe, Taira, Sato, Ihara, Kasashima, Yamaki, "*Multipath measurement at 60 GHz for indoor wireless communication systems*", *IEEE* 1994.