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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
60/572,481	05/20/2004	Mark Webster	088245-2670

23524
FOLEY & LARDNER LLP
150 EAST GILMAN STREET
P.O. BOX 1497
MADISON, WI 53701-1497

CONFIRMATION NO. 6116
POA ACCEPTANCE LETTER



Date Mailed: 02/16/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/07/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
60/572,481	05/20/2004	Mark Webster	56162.000301

CONFIRMATION NO. 6116

POWER OF ATTORNEY NOTICE



OC000000045998958

21967
HUNTON & WILLIAMS LLP
INTELLECTUAL PROPERTY DEPARTMENT
1900 K STREET, N.W.
SUITE 1200
WASHINGTON, DC 20006-1109

Date Mailed: 02/16/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/07/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sleutchit/

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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

23524

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to the firm in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

23524

OR



Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

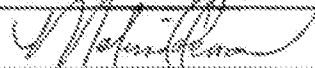
Assignee Name and Address:

XOCYST TRANSFER AG L.L.C.
 2711 Centerville Road
 Suite 400
 Wilmington, DE 19808
 USA

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/95 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	May 24, 2010
Name	Melissa Coleman	Telephone	
Title	Authorized Person for Xocyst Transfer AG L.L.C.		

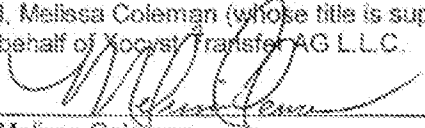
This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

MADL_2250389.1

DECLARATION REGARDING AUTHORITY TO SIGN ON BEHALF OF A LEGAL ENTITY
(37 C.F.R. 3.73(b)(2)(i))

I, Melissa Coleman (whose title is supplied below), hereby declare that I am authorized to sign on behalf of Xocyst Transfer AG L.L.C.



Melissa Coleman

Authorized Person for Xocyst Transfer AG L.L.C.

May 24, 2010
[date]

Electronic Acknowledgement Receipt

EFS ID:	9387448
Application Number:	60572481
International Application Number:	
Confirmation Number:	6116
Title of Invention:	Legacy LTS Tx diversity
First Named Inventor/Applicant Name:	Mark Webster
Customer Number:	21967
Filer:	Paul S. Hunter/Ann Laabs
Filer Authorized By:	Paul S. Hunter
Attorney Docket Number:	56162.000301
Receipt Date:	07-FEB-2011
Filing Date:	20-MAY-2004
Time Stamp:	14:00:41
Application Type:	Provisional

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2670_373b.pdf	498037	yes	3
			b240b76f508b720e0b39670618e7f6599a224af2		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Assignee showing of ownership per 37 CFR 3.73(b).	1	1
	Power of Attorney	2	3
Warnings:			
Information:			
Total Files Size (in bytes):		498037	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Seals, Michael J., Webster, Mark A.
Application No.: 60/572,481 Filed: 05/20/2004
Patent No.: _____ Issue Date: _____
Docket Number: 088245-2670
Entitled: LEGACY LTS TX DIVERSITY
Xocyst Transfer AG LLC Limited Liability Company
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title, and interest.
The extent (by percentage) of its ownership interest is: %

in the patent application/patent identified above by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel/Frame ASSMT_REEL_FRAME or for which a copy thereof is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: Seals, Michael J., Webster, Mark A. To: Conexant Systems Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 016541, Frame 0490, or for which a copy thereof is attached.

2. From: Conexant Systems, Inc. To: Xocyst Transfer AG LLC
The document was recorded in the United States Patent and Trademark Office at
Reel 022043, Frame 0607, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ Copies of assignments or other documents in the chain of title are attached.

(NOTE: A separate copy (i.e., a true copy of the original document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08)

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Paul S. Hunter/

February 7, 2011

Signature

Date

Paul S. Hunter (Reg. No. 44,787)

(608) 258-4292

Printed or Typed Name

Telephone Number

Attorney

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

052004

13281 U.S. PTO

8

Attorney Docket Number: 56162.000301

Please type a plus sign (+) inside this box →

+

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

MAIL STOP PROVISIONAL PATENT APPLICATION
COMMISSIONER OF PATENTS
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450

THIS IS A REQUEST FOR FILING A PROVISIONAL APPLICATION FOR PATENT UNDER 37 C.F.R. § 1.53(c).

22264 U.S. PTO
60/572481

052004

INVENTOR(S)/APPLICANT(S)

Given Name (first and middle (if any))	Family Name or Surname	Residence (City and Either State or Foreign Country)
Mark Michael	Webster Seals	Indian Harbor Beach, Florida Melbourne, Florida

Additional inventors are being named on page 2 attached hereto.

TITLE OF THE INVENTION (280 characters max)

LEGACY LTS Tx DIVERSITY

CORRESPONDENCE ADDRESS

Please Direct All Correspondence To:

☒ Customer No.	21967				
☐ Firm Name	Hunton & Williams LLP				
Attorney of Record	Kevin T. Duncan				
Address	Intellectual Property Department 1900 K Street, N.W., Suite 1200				
City	Washington	State	DC	Zip Code	20006-1109
Country	U.S.A.	Telephone	202-955-1500	Facsimile	202-778-2201

ENCLOSED APPLICATION PARTS (check all that apply)

☒ Specification	Number of Pages	14	☐ Small Entity Status Claimed As:
			☐ Independent Inventor
			☐ Small Business Concern
			☐ Nonprofit Organization
			☐ Non-Inventor Supporting Claim By Another
☐ Drawing(s)	Number of Sheets		☐ Other (specify) _____

METHOD OF PAYMENT OF FILING FEE FOR THIS PROVISIONAL APPLICATION

A check in the amount of ☐ \$ 160.00 ☐ \$ 80.00 is enclosed to cover the filing fee. The Commissioner is hereby authorized to charge any variance between the amount enclosed and the Patent Office charges to Deposit Account No. 50-0206

☒ The Commissioner is hereby authorized to charge the \$ 160.00 filing fee or credit any overpayment to Deposit Account No. 50-0206.

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.
☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

By

Yisun Song

Date

May 20, 2004

Telephone

202-955-1500

Registration No.

44,487



C O N E X A N T

CNXT-009

Legacy LTS Tx Diversity:

CDD vs. CAD

May 20, 2004

13281 U.S. PTO



19 21 052004

Overview

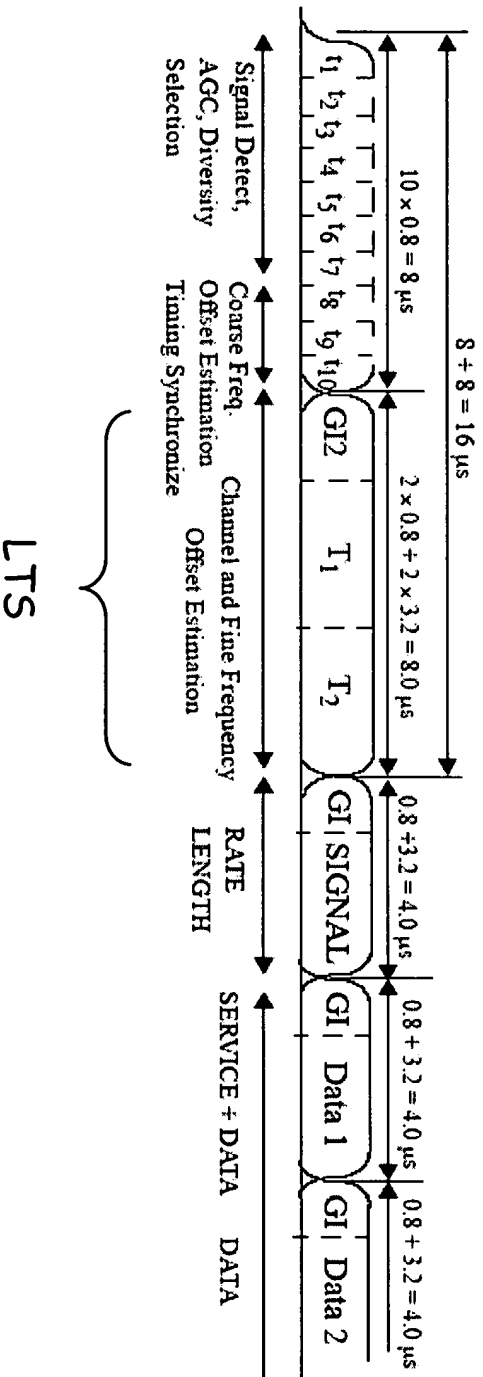


- To use multiple antennas for packet transmissions to legacy radios, cyclic shifted Tx diversity has been recommended
- This presentation considers the impact of smaller LTS cyclic shifts
 - The reaction of some legacy radios is postulated
- Two types of cyclic shifts are proposed
 - CDD: Cyclic delay diversity
 - CAD: Cyclic advance diversity
- For smaller cyclic shifts, it is surmised that CAD is preferable to CDD for FFT (fast fourier transform) misplacement tolerance
 - Assumes channel impulse response (CIR) estimate made using cyclic-shifted LTS

802.11a Packet



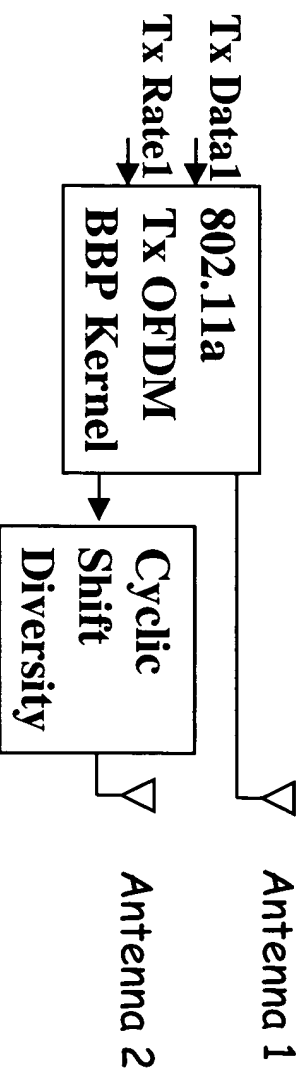
- Packet structure shown
- LTS: Long Training Symbol



Two Antenna ~~Tx Diversity~~



- BBP: Baseband Processor
- The radio would like to transmit the signal using two antennas
- However, the two signals can destructive collide at the receive
- The trick to avoid this is to use cyclic shift diversity on the 2nd antenna
 - Each OFDM symbol is cyclically shifted

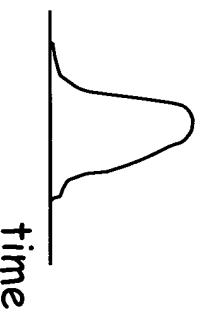


Legacy Radios and Optimal FFT Placement



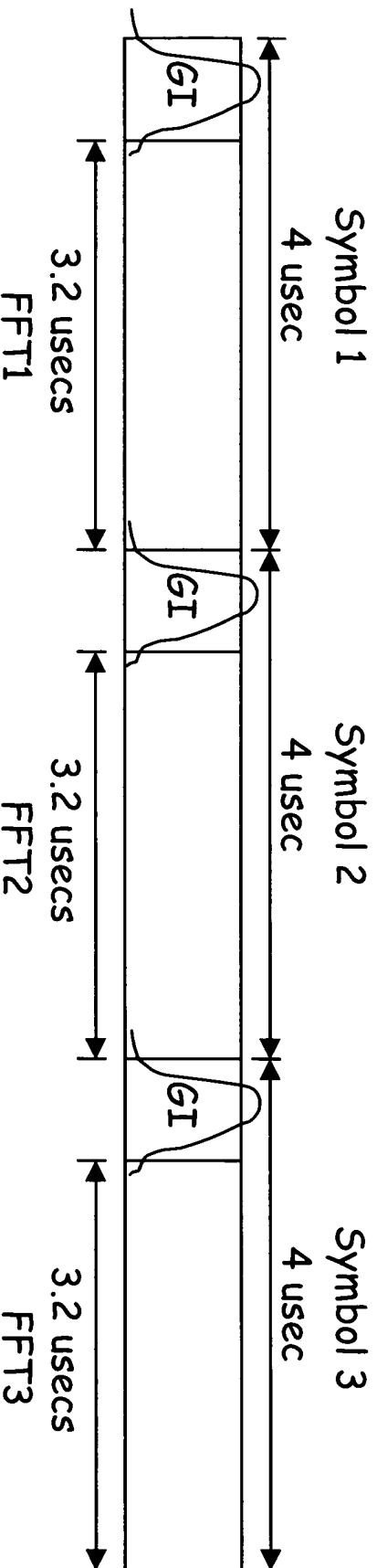
- Optimal FFT placement minimizes intersymbol interference
 - Decay transient from previous symbol
 - Start-up transient due to next symbol

End-to-End Linear Distortion
Impulse Response

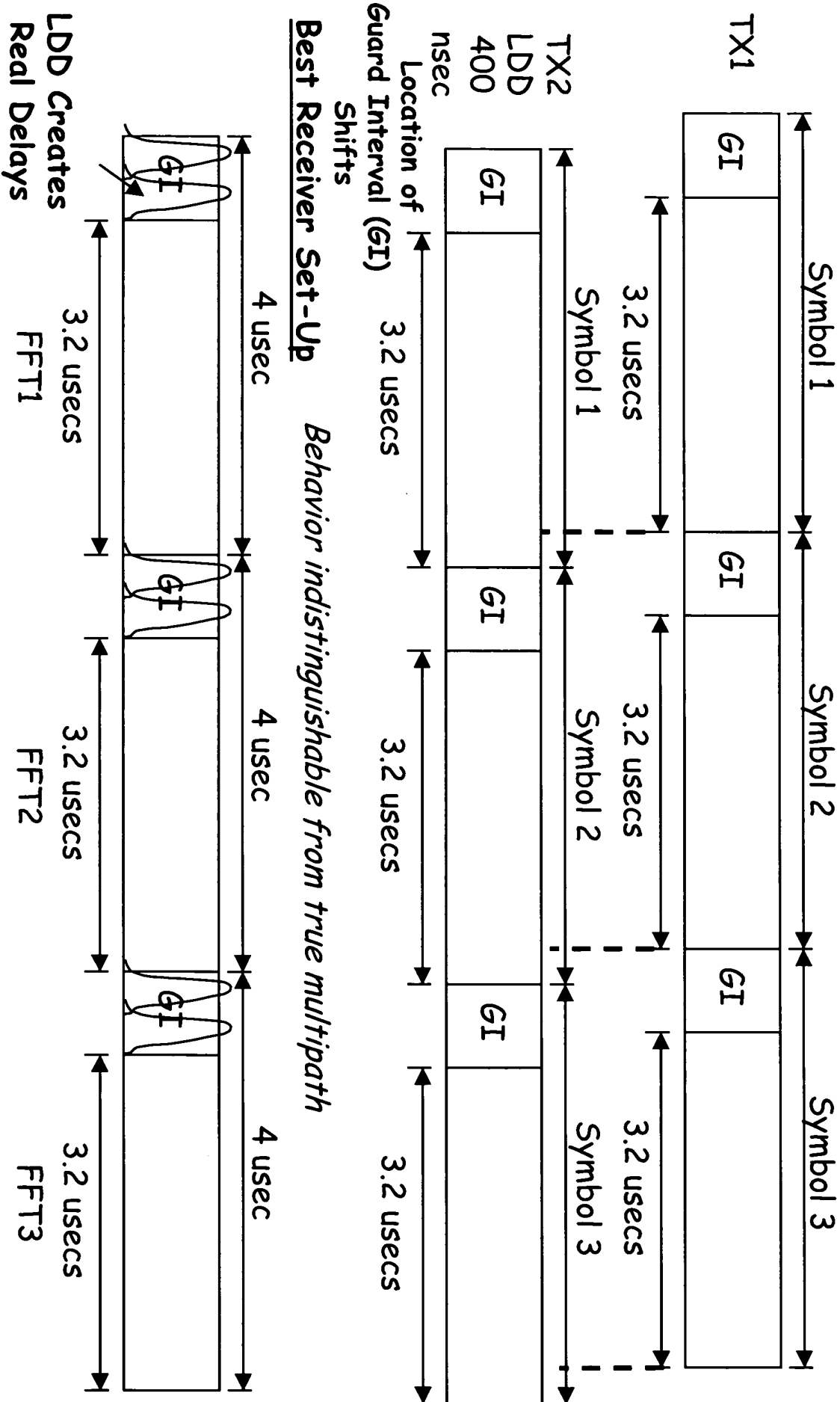


Assume receiver places FFT
Using knowledge of CIR From LTS

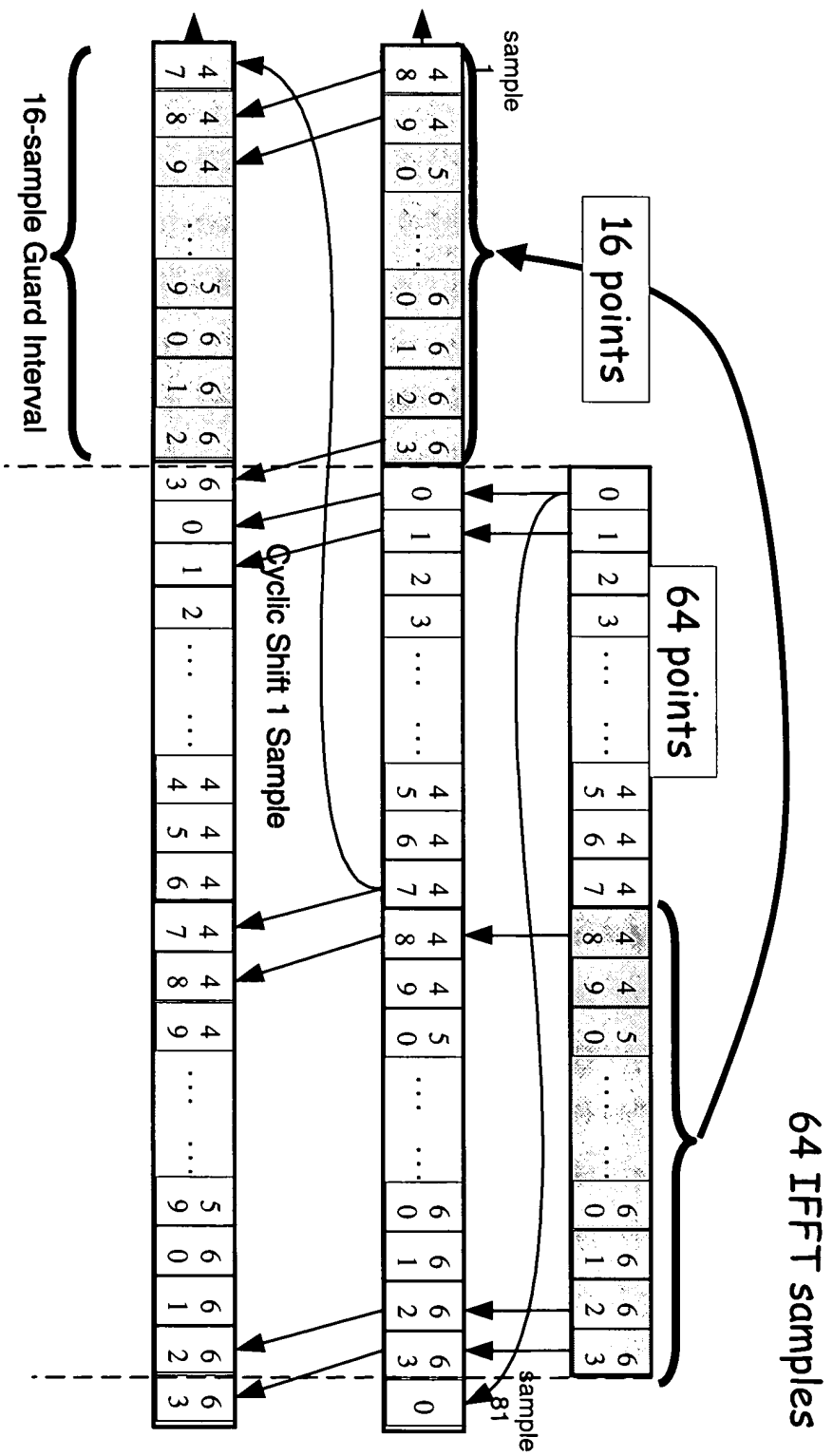
OFDM Data Symbols



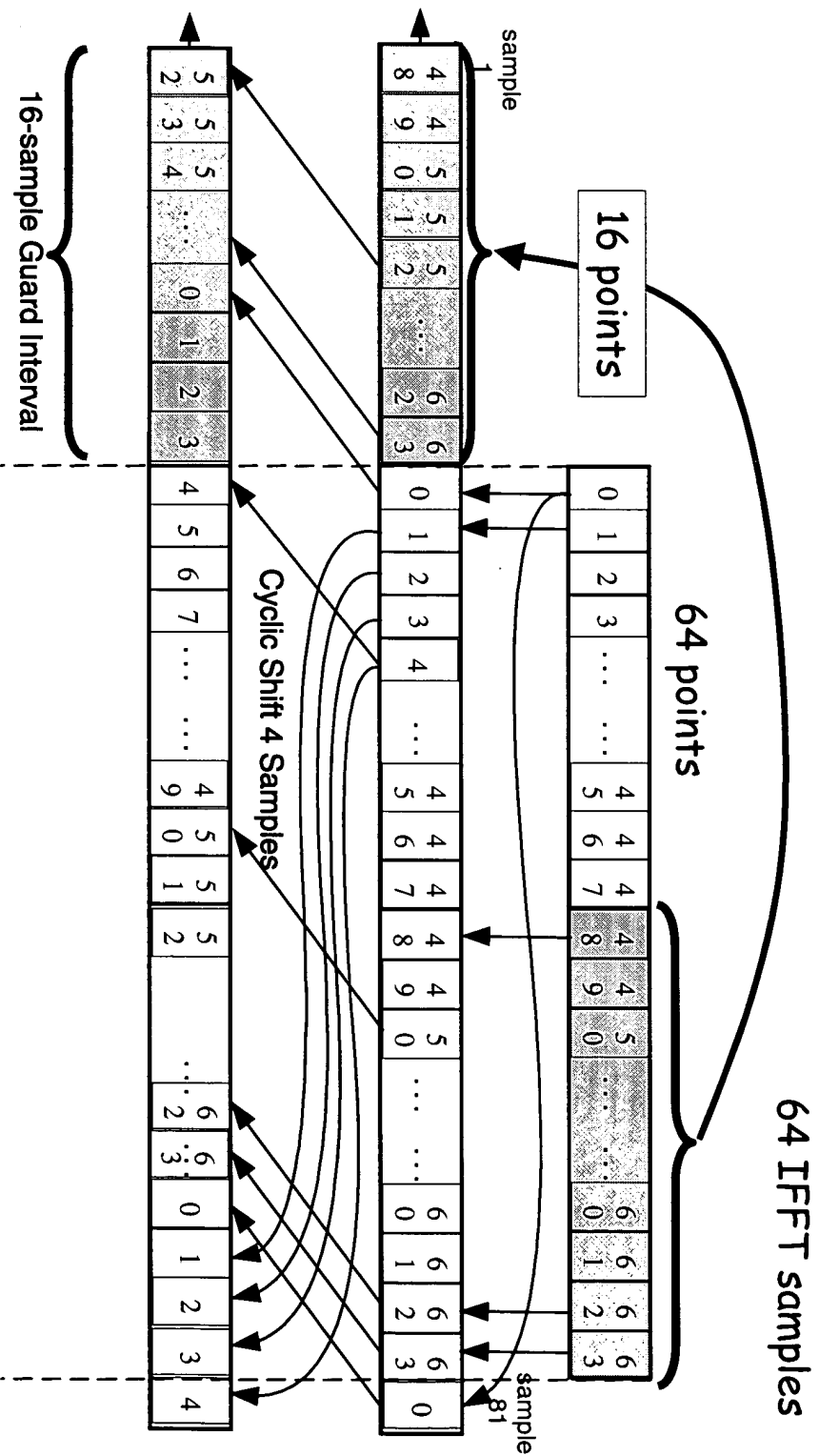
Legacy Radios and Linear Delay Diversity (LDD)



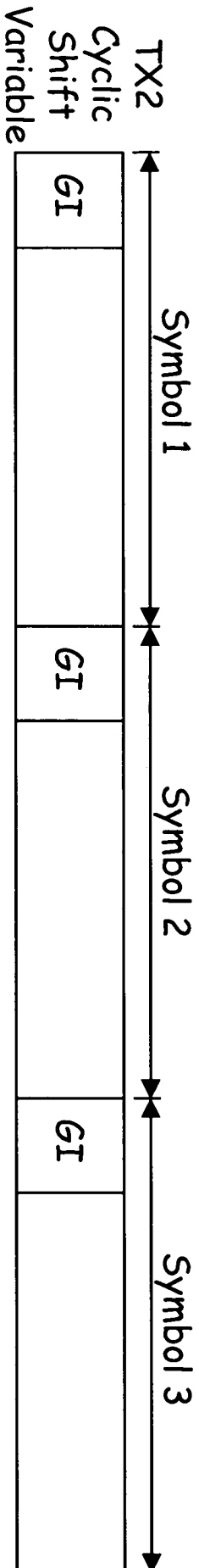
Example of Cyclic Delay Diversity: 1-sample CDD



Example of Cyclic Advance Diversity: 4-sample CAD

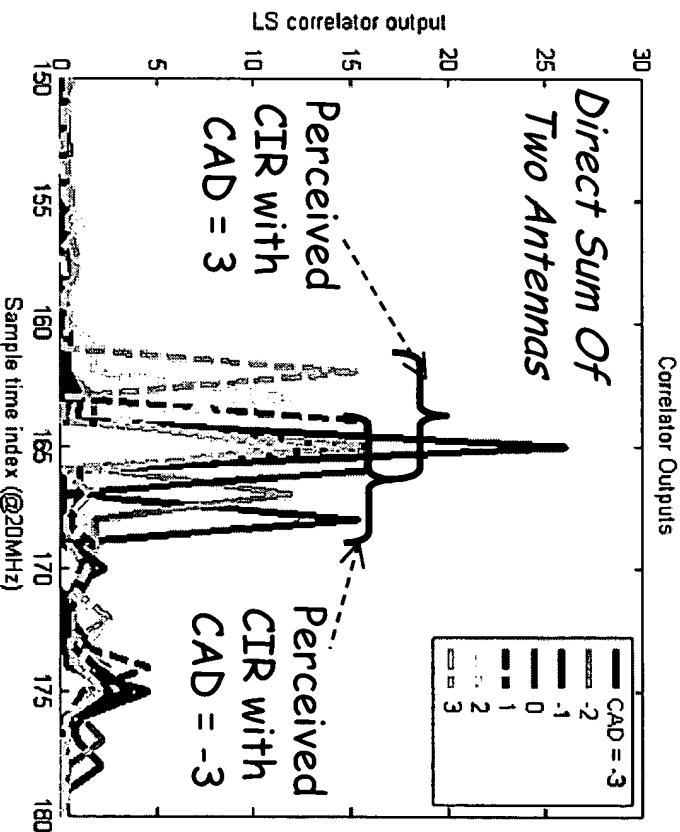
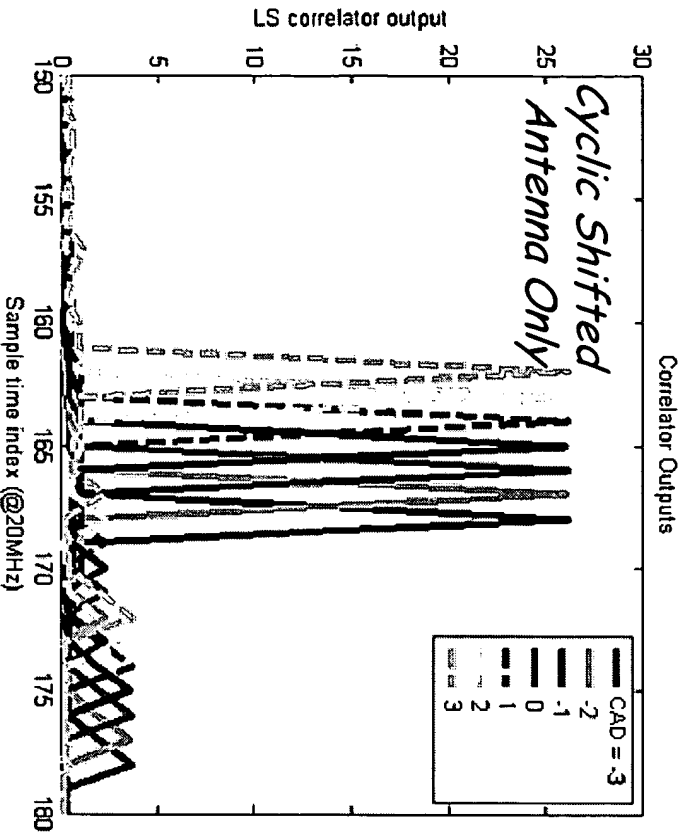


Legacy Radios and Cyclic Shift Diversity



Location of Guard Interval (GI) Held Constant

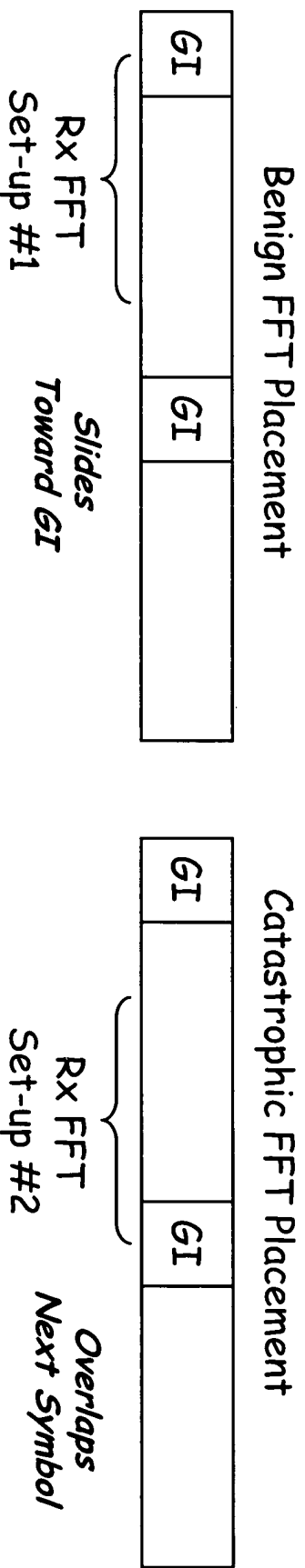
64 point Correlations for LTS



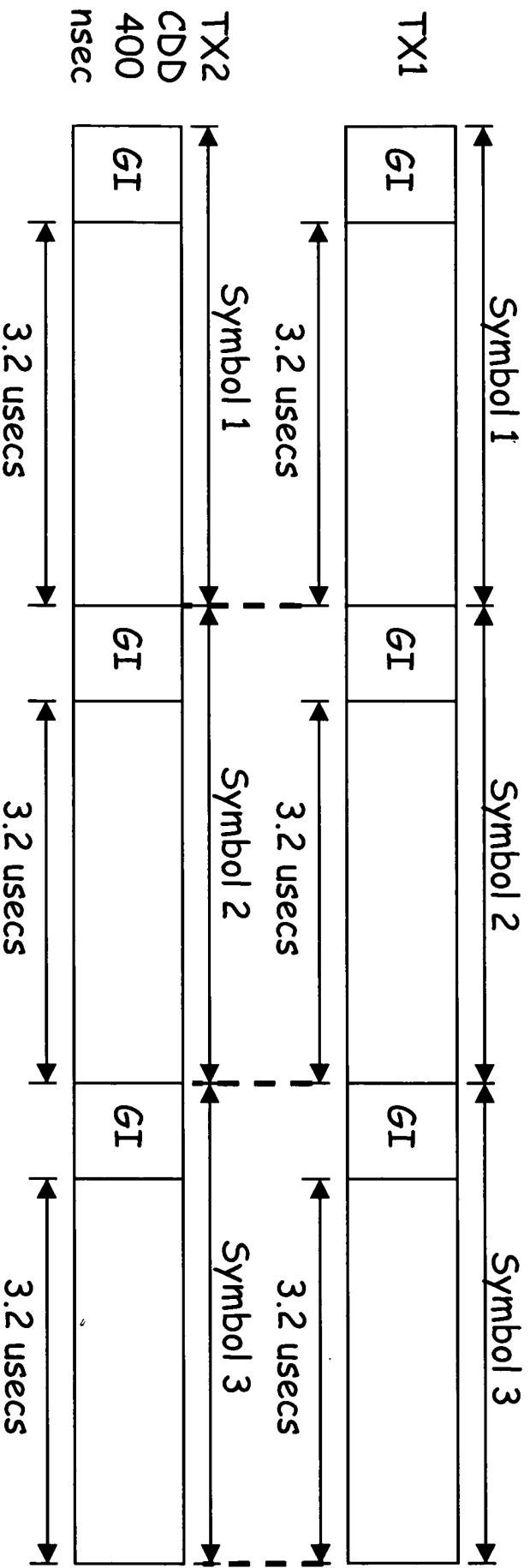
Effect of Cyclic Shifts on Legacy Radios



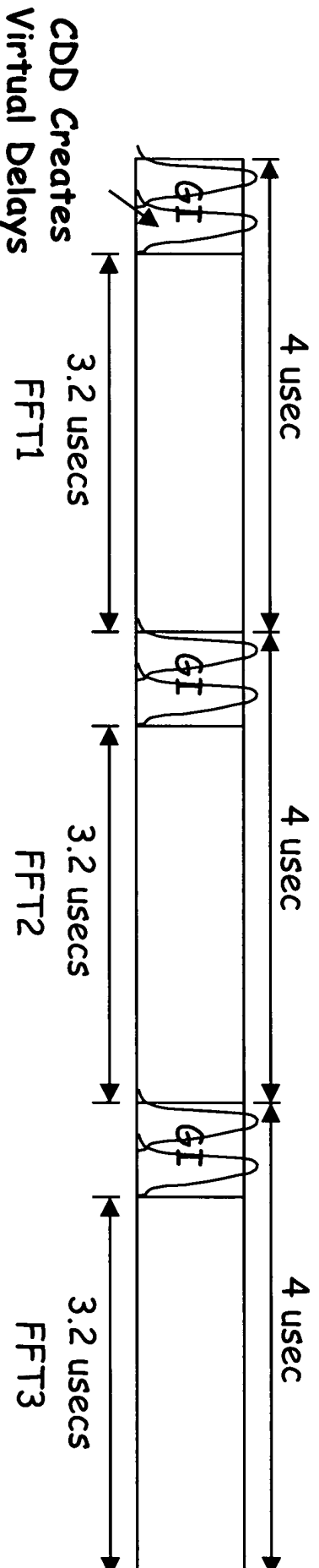
- Legacy radios sometimes perform a channel impulse response (CIR) estimate using the LTS
- The FFT placement may use this impulse response to center the GI on the transients, so ISI is minimized
- The CIR appears to shift directly with the cyclic shift
- However, the true location of the GI does not change because the transmitter is using cyclic shifts
- This can spoof the receiver so the FFT placement is erroneous
 - The FFT tends to shift erroneously in the direction of the cyclic shift



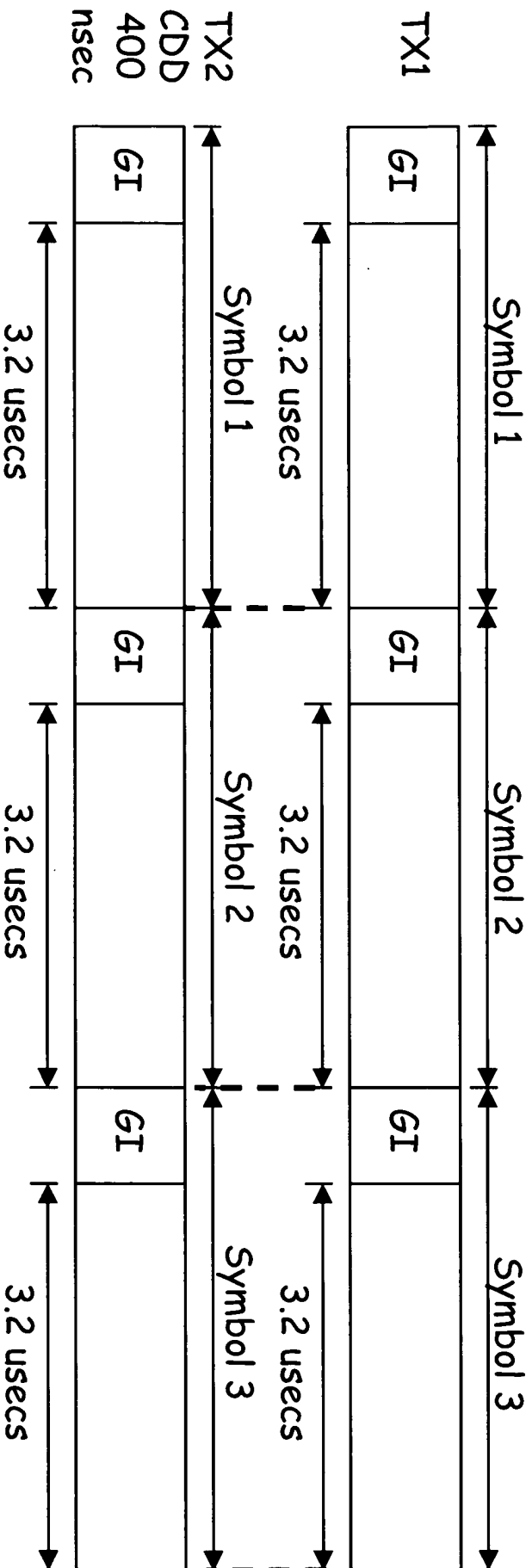
Legacy Radios and Cyclic Delay Diversity



Best Receiver Set-Up



Legacy Radios and Cyclic Shift Diversity



True Best FFT Placement

Actual FFT place

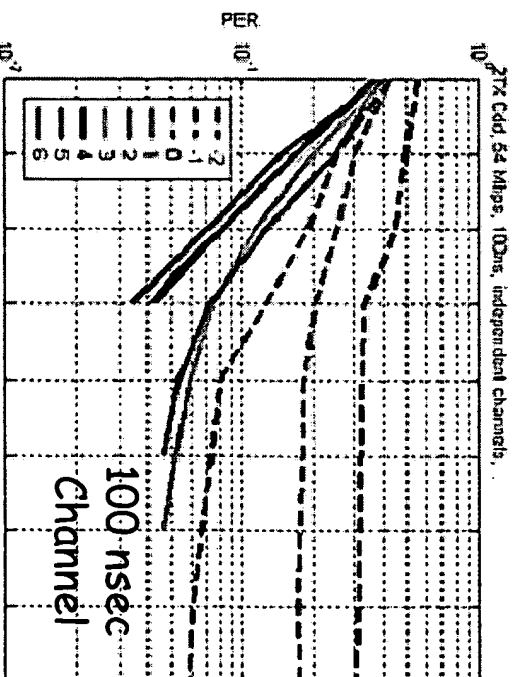
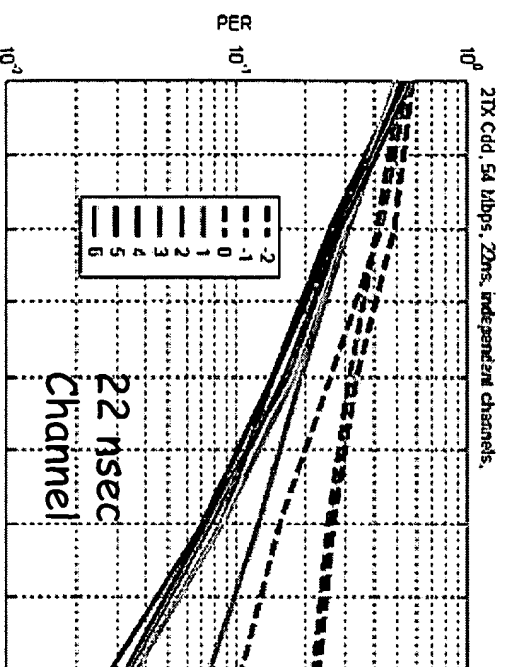
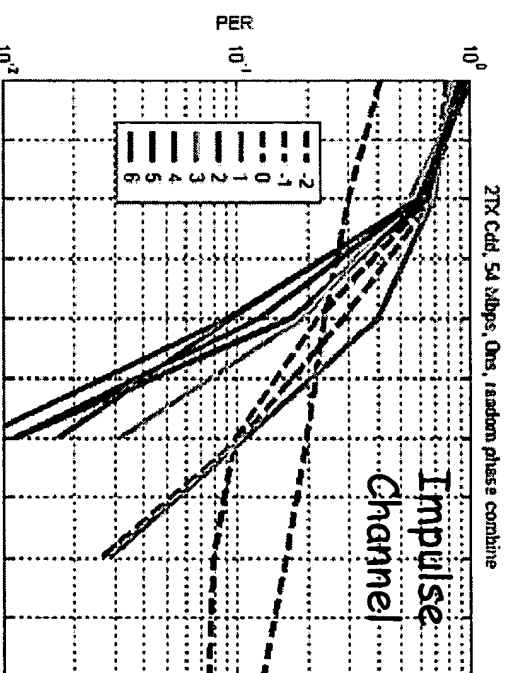
Due to perceived shift in channel impulse response

Two Antenna CDD vs. CAD for 54 Mbps PER Experiments



CONEXANT

- Set-up FFT by “centering” legacy LTS correlation spread in GI
- Legend shows CAD sample shift in 20 MHz samples
- Performance is robust with cyclic advances. Poor with delays.
- Relative average SNR shown



Conclusion



- The mixed-mode LTS still needs to be specified
- We have stated that legacy radios may prefer smaller cyclic shifts
- This presentation shows that small CAD may be better than CDD
 - With exponential decayed channels
- Testing also showed LDD was inferior to CDD
- The innovation here is to use CAD versus CDD
- CDD is described in the literature

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

05/21/2004 BSAYASI1 00000033 500206 60572481

01 FC:1005 160.00 DA

PTO-1556
(5/87)