

Public Safety 4.9 GHz Event

On May 18, 2005, Terabeam Wireless, Inc. participated in an exercise in conjunction with several other suppliers and the City of Long Beach, California for the purpose of demonstrating wireless radios and antennas developed for the new 4.9 GHz frequency recently made available free of any license charge by the FCC, specifically for Public Safety use. Other objectives accomplished at this event included testing for range and interference from adjacent as well as overlapping channels within the available 4.9 GHz spectrum allocation, from both ground and airborne 4.9 GHz systems.

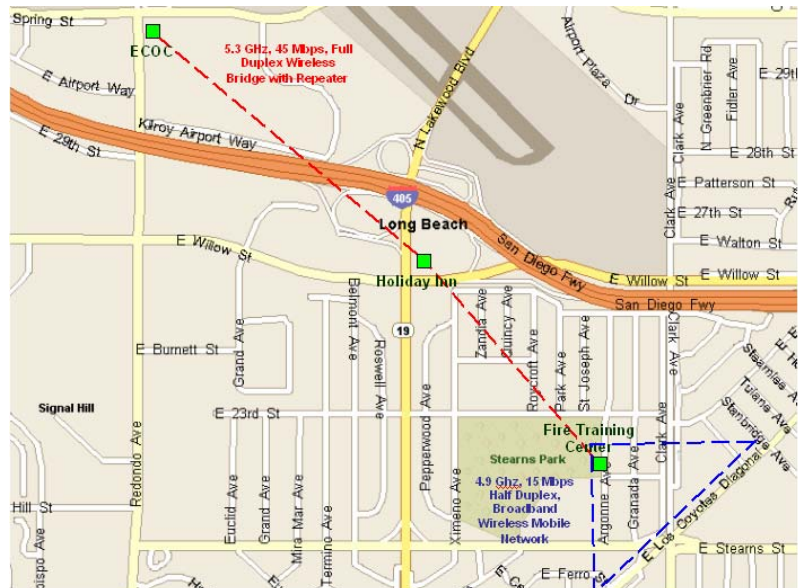
The Tactical Exercise was held at two locations – the ECOC and the Fire Department Training Center – in order to accommodate the collocation of all participating supplier's equipment and to make use of the facilities at the fire training center for a mock fire and first responder incident which was recorded and displayed at the ECOC.



Terabeam Sponsored Network

As a participating member of the 4.9 GHz event, Terabeam sponsored a 4.9 GHz broadband network for remote camera surveillance and real time connectivity from the incident site – the Fire Training Center – to the ECOC. All equipment and system network was installed, tested, and activated by *Alico Systems of Torrance, California*.

Terabeam also sponsored a 45 Mbps, full duplex high-speed backhaul, which was the primary connection between the Fire Training Center and the ECOC. This backhaul was used to send all of the data, voice, and video captured by various network frequencies at the Fire Training Center, to the ECOC for real time display.



The 4.9 mobile network at the Fire Training Center consists of a 4.9 GHz Access Point running the Terabeam renowned TurboCell software and a 90-degree sector antenna located at the top of the training tower.

**MARQUEE 4.9 GHz
18 MBPS HALF
DUPLEX POINT-TO-
MULTIPOINT
ACCESS POINT**



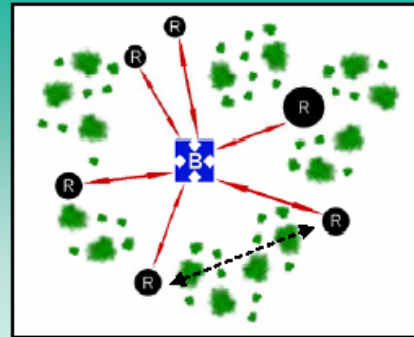
**TERABRIDGE 5.3
GHz 45 MBPS FULL
DUPLEX BRIDGE
WITH FLAT PANEL
ANTENNA**



Event Goals

- Promote public safety 4.9 GHz and Wireless Broadband awareness
- Demonstrate 4.9 GHz integration with Personal Area Network (PAN)
- Perform an emergency exercise scenario using Wireless Broadband technology
- Provide seminars on 4.9 GHz Wireless Broadband technology
- Demonstrate Wireless Broadband technologies
 - 4.9 GHz Point-to-Point
 - 4.9 GHz Point-to-Multipoint
 - 4.9 GHz Airborne Video
 - 802.11g
- Wireless Helmet video cameras
- Demonstrate Wireless Broadband applications for public safety
- Test for interference between 4.9 GHz Airborne Video and 4.9 GHz Multipoint
- Develop test data for FCC waiver applications for 4.9 GHz Airborne Video
- Develop test data to assist the 4.9 GHz regional planning committees, California Statewide Interoperability Executive Committee Wireless Data working group, NPTSC Broadband working group, TIA TR-8.8 Broadband Data Systems standards subcommittee, L.A. City, L.A. County, and Long Beach to develop their 4.9 GHz plans.

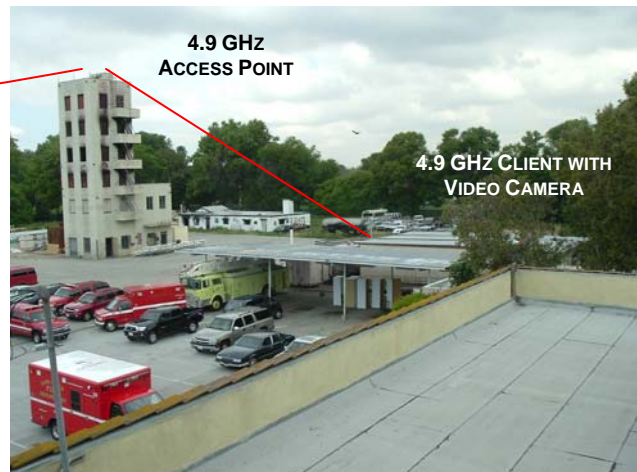
TurboCell™ Feature	Benefit
Adaptive Dynamic Polling Mechanism	Eliminates 802.11 hidden node problems No more mid-air packet collisions or network self-interference Robust, high-performance building-to-building communications
Bandwidth Allocation At The Client	Scales automatically for up to 64 remote buildings per base station Optimizes wireless performance for any size network Prevents bandwidth hogs from dominating the network
SuperPacket Aggregation	Combines small packets into more efficient SuperPackets Efficient, reliable transport for data, voice & video
Centralized Management GUI	Easily configure and monitor your entire network from a single, convenient application



802.11 Hidden Node Transmitter Problem
In a typical scenario, remote buildings can link with the base station but are hidden from one another due to terrain & trees. With standard 802.11 products, this will cause packet collisions, dropped connections, and poor network performance.
TurboCell's polling algorithm prevents hidden nodes from causing self-interference. This dramatically improves reliability, scalability, and overall network performance.



5.3 GHz BRIDGE



4.9 GHz ACCESS POINT

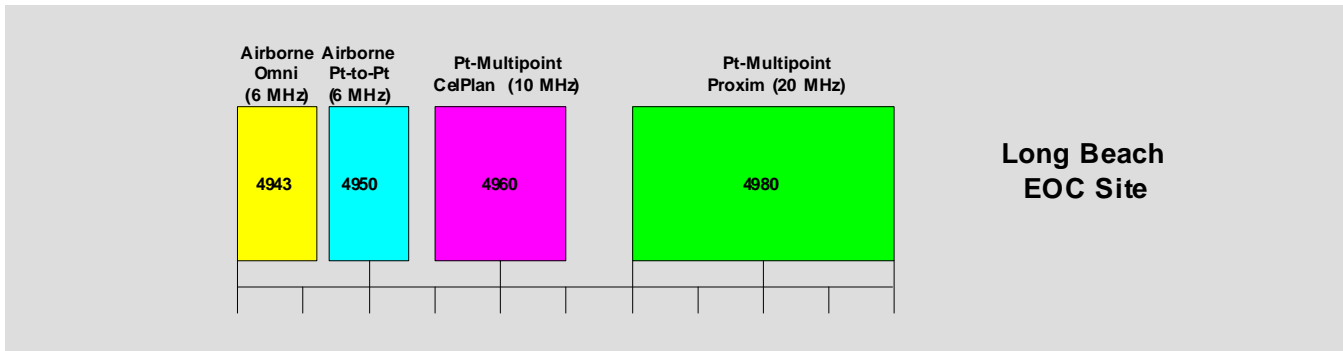
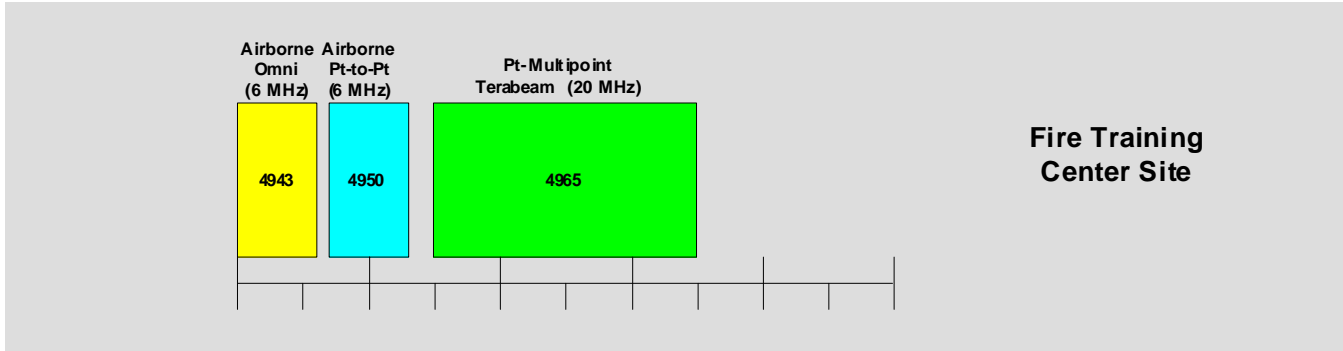
4.9 GHz CLIENT WITH VIDEO CAMERA

Test Results

Interference Testing

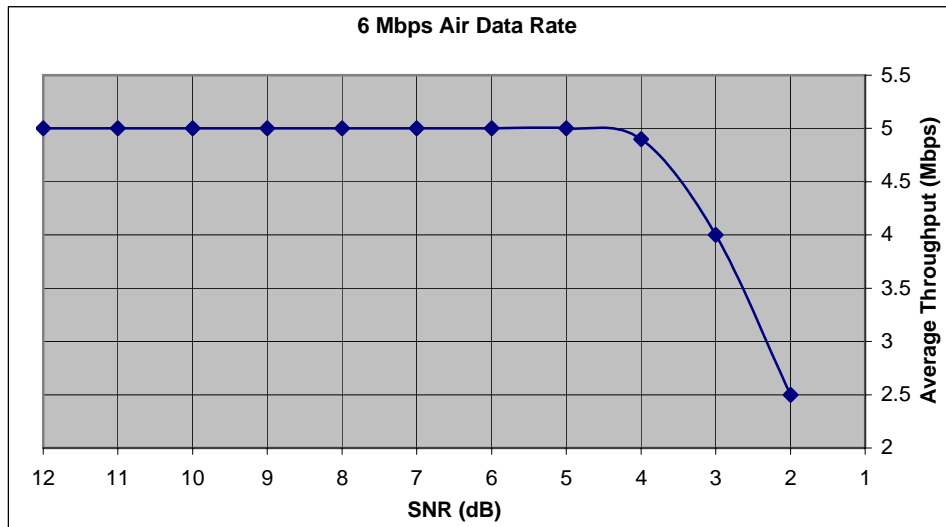
As part of the interference testing, two different 4.9 GHz Airborne video cameras were flown overhead of the Terabeam 4.9 GHz Point-to-Multipoint network. The antenna for the airborne video equipment was mounted on helicopters, which hovered overhead while a series of readings were taken from the Terabeam System Manager. The results were as follows:

Parameter	Reading with No Helicopter		Reading with MRC Radio		Reading with GMS Radio	
	Base Station	Remote Client	Base Station	Remote Client	Base Station	Remote Client
Test Conditions						
Radio Modulation	OFDM					
Radio Operation	TDD					
Transmit Output Power	+20 dBm					
Receiver Sensitivity	-90 dBm @ 6 Mbps; -81 dBm @ 24 Mbps					
Max Receiver Level	-20 dBm					
Base Station Antenna	16 dBi 90 Degree Sector					
Client / Remote Antenna	10 dBi 90 Degree Sector					
Height of Antenna	70 Feet	12'				
Horizontal Distance from Base Station	25 yards					
Data Rate Setting - Over the Air rate	6 Mbps	6 Mbps	6 Mbps	6 Mbps	6 Mbps	6 Mbps
SNR	32	35	33	35	12	19
Signal	-85 dBm	-82 dBm	-85 dBm	-82 dBm	-81 dBm	-79 dBm
Noise	-95 dBm	-95 dBm	-95 dBm	-95 dBm	-92 dBm	-91 dBm
Packet Transfer	100%	99%	100%	99%	100%	96%
Total Packets	507	509	227	229	136	141
Packets Received	507	507	227	227	136	136
Packets Lost	0	2	0	2	0	5
Data Transfer Detail						
Maximum Transfer Rate (bits/sec)	4,917,472		4,804,687		4,123,680	
Average Transfer Rate (bits/sec)	4,831,329		4,798,559		4,078,176	
Minimum Round Trip (Milliseconds)	15		15		16	
Maximum Round Trip (Milliseconds)	1,132		1,128		1,234	
Packets Transferred in Previous Second	366		369		388	
Transfer Rate Previous Second (bits/sec)	4,432,992		4,542,714		4,099,456	
Packets Qued for Transmission	2,152		2,123		2,031	
Packets Received Correctly	2,152		2,123		2,009	
Packets Received with Errors	-		-		18	
Packets Dropped	-		-		22	
Total Bytes Sent	3,258,128		3,227,349		3,074,934	
Total Bytes Receives	3,258,128		3,227,349		3,041,626	
Test Running Time (seconds)	10		10		10	
Packet Size (Bytes)	1,514		1,514		1,514	



Summary

Due to the bands used by the airborne video, there was no significant interference from the adjacent channels. Greater interference was experienced with the GSM radio but network connectivity was negligibly affected. The robustness of the network connection is likely due to the low data rate setting used – 6 Mbps. At this setting the receiver sensitivity is at it's highest and requires an SNR of only 5 dB.



During the Event, video quality captured through the Terabeam 4.9 GHz Point-to-Multipoint network and relayed to the ECOC via the Terabeam 45 Mbps 5.3 GHz wireless bridge, was excellent and uninterrupted.

Terabeam's next generation of 4.9 GHz radios, due to be generally available in late July, early August of 2005 is expected to allow up to 3 channels in combinations of 5 MHz, 10 MHz, or 20 MHz.

About Terabeam Wireless

Terabeam Wireless is the business name of YDI Wireless, Inc. Terabeam Wireless is a world leader in providing extended range, license-free wireless data equipment and is a leading designer of turnkey long distance wireless systems ranging from 9600 bps to 1.42 Gbps for applications such as wireless Internet, wireless video, wireless LANs, wireless WANs, wireless MANs, and wireless virtual private networks. Additional information about Terabeam Wireless as well as its complete product line can be found at the company's website located at <http://www.terabeam.com> or by contacting the company by telephone at 408-617-8150.

About Alico Systems

Alico Systems is involved in the development of wireless and mobile network solutions for enterprises. Our area of expertise includes Local, Wide Area, Satellite and Ad-hoc Wireless Networks for voice, video and data. Technologies include ATM, IP, MPLS, VoIP, Gigabit Ethernet, Wireless Networking & design for QoS in networks. Alico is leader in the architecture and development of wireless networks supporting mobile computing applications including SATCOM On The Move solutions. Product development expertise at Alico includes SATCOM On The Move terminals, Wireless Sensor Networks and Network Management Systems. Alico has extensive experience in the integration and deployment of wireless broadband networks providing point to point, point to multipoint and mesh network solutions... www.alicosystems.com