



*Professionals
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CHANNEL 16 PROJECT

Presented by

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Channel 16 Project - Background

- Requirement of Metro NY
 - ❖ Exceeded Available Frequencies
 - ☐ VHF
 - ☐ UHF
 - ☐ UHF T-Band (Ch 14 & 15)
 - ☐ 800 MHz
- Use of Channel 16 in NY
 - ❖ Waiver
 - ❖ Permanent Allocation

Channel 16 Waiver

Channel 16 granted on March 14, 1995 to group of twelve local government public safety agencies for public safety communications by any public safety entity within the greater New York metropolitan area.

- 120 Channels distributed amongst all agencies
- Lack of radio frequency capacity in NY Metro area
- Channel 14 and 15 utilized by existing Public Safety agencies
- Temporary waiver for five years or until any broadcast licensee in the New York City metropolitan area initiates use of Channel 16 for DTV broadcast operations, whichever is longer
- Waiver made permanent April 2004 assigning channel 16 to Public Safety for land mobile communications

Channel 16 New York Metro Users

- Channel 16
 - ❖ 482 – 488 MHz
- Users
 - ❖ FDNY
 - ❖ DoITT
 - Other NYC Agencies
 - ❖ NYCTA
 - ❖ NYPD
 - ❖ Other Surrounding Jurisdictions
 - Nassau County, NY
 - Suffolk County, NY
 - Bergen County, NJ

Channel 16 Project Phases

- I. Create a technical specification of the new system to use in a Request For Proposal document (RFP).
- II. Evaluate responses to solicitation and select best solution.
- III. Manage the construction vendor during build and test all components for acceptance criteria as defined in the specifications.

Channel 16 – Needs Assessment

- Interview City Departments (requirements)
 - ❖ FDNY
 - Fire
 - EMS
 - ❖ Corrections
 - ❖ Sheriff
 - ❖ Parks & Recreation
 - ❖ Transportation
 - ❖ Health & Hospital Corp
 - ❖ Office of Emergency Management
 - ❖ Sanitation

Channel 16 – User Requirements (Cont.)

- Present Requirements
 - ❖ Coverage
 - ❖ Capacity
 - ❖ Number of Talk Groups
 - ❖ Redundancy
- Future Requirements
 - ❖ Additional Talk Groups
 - ❖ Additional Features
 - ❖ More Redundancy

NYC FDNY

Existing Communications System Overview

- 5 VHF frequencies supporting Dispatch
- One City-Wide and 1 Fire Dispatch Channel per borough (Bronx and Staten Island share 1 channel)
- Dispatch operations supported by Communication centers in each borough
- Responded to over 400,000 incidents in 2001
- Average of ten radio messages per incident
- FDNY and FDNY EMS Bureau consist of 5,400 portables and 3,800 mobile radios required to operate on the system Citywide
- Non-Dispatch handled by DoITT 800MHz Trunked System

NYC FDNY EMS Bureau

Existing Communications System Overview

- 13 radio frequencies support communications
- 1 City-Wide and 12 borough zoned channels
- Field Operations supported by a 13 position dispatch Communications center
- Respond to approx. 1.4 million calls per year
- Average of 12 radio messages per call
- 6 channel 800 MHz system used by EMS field command supervisors
- Non-Dispatch on 800 MHz DoITT Trunked System

NYC Corrections

Existing Communications System Overview

- 1 Citywide radio frequency to support the transportation of prisoners
- 29 zoned low power frequencies support facilities on and off Rikers Island communications need
- Numerous radio deadspots throughout the City
- First Responder to LaGuardia Airport incidents
- About 4,000 mixed mobile and portable radios
- All UHF

NYC Sheriffs

Communications System Overview

- 5 Talkgroups operate on the DoITT 800 MHz radio system
- One communications center supports dispatch operations
- Handle approximately 171,550 incidents yearly with an average of 8 radio messages per incident
- 170 portables on 800 MHz system. Will require the same on channel 16 network
- Carry UHF radios monitoring NYPD SOD channels for interoperability response

NYC Parks and Recreation

Existing Communications System Overview

- 2 VHF frequencies support Parks Enforcement and Parks Ranger operations Citywide
- 2 zoned frequencies support lifeguard operations
- One centralized communications center supports dispatch operations
- Respond to approximately 6,000 incidents per year with an average of 8 radio messages per incident
- Operate about 3,000 mixed portables and mobiles

NYC Transportation

Existing Communications System Overview

- 6 UHF frequencies support Traffic Engineering, Municipal parking and Meter Operations, Highway maintenance and Bridge Operations
- One centralized communications center supports emergency response operations
- 25+ yr old radio system equipment with maintenance problems and numerous radio deadspots
- Operates about 2,200 mixed portables and mobiles

Health and Hospitals Police Existing Communications System Overview

- Each hospital operates an independent local system sharing the re-use of 2 UHF frequencies
- Numerous radio deadspots and interference problems
- 1,300 security officers at 17 hospitals
- Require Citywide network to support localized incident response
- About 410 portable radios

Dept of Sanitation

Existing Communications System Overview

- Operate a 4 channel UHF system
- Radio deadspots
 - ❖ Lower Staten Island
 - ❖ Northern NJ
- Centralized dispatch communication center
- Operate in an emergency response mode from November to April to handle snow removal
- Present System
 - ❖ 2,100 mixed portable and mobile radios

Office of Emergency Management

Existing Communications System Overview

- Operate 4 groups on the DoITT 800 MHz system
- Require additional groups for logistics and specialized intelligence groups for use during declared emergencies
- Monitor all city radio frequencies (ex. NYPD, FDNY, EMS etc...) for coordination of emergency response to major incidents.
- Operate 119 portable and 97 mobile radios on their present system. (Will require the same on the Channel 16 system)

Channel 16 – User Requirements

Agency	Incidents/Year	Radio Message Average Day
FDNY		
Fire	437,000	12,000
EMS	1,400,000	46,000
Sheriff	172,000	3,800
Parks & Recreation	6,000	1,300

Growth 10% / year

Coverage

95% of Area

95% of Time

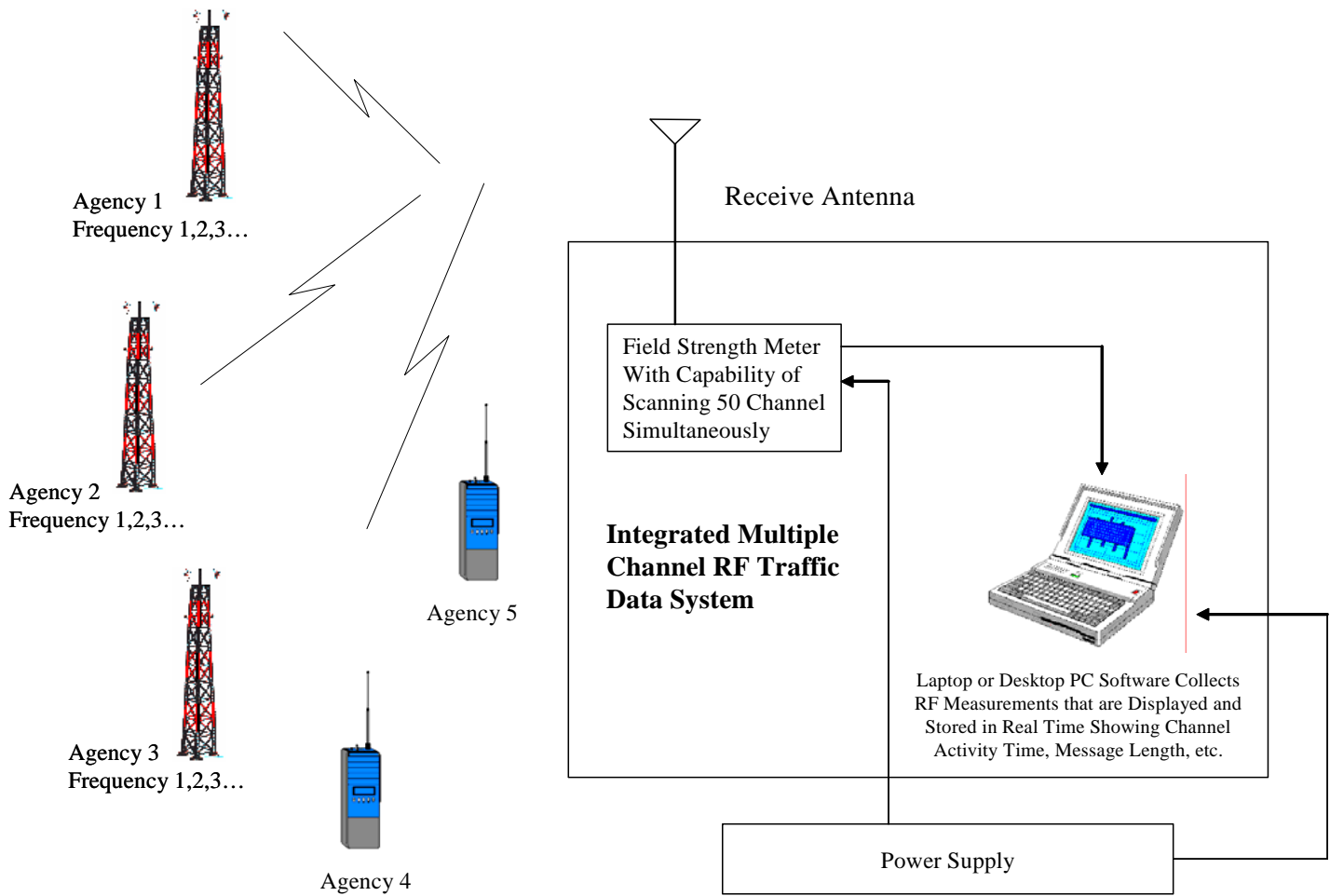
Project Tasks

- Existing radio traffic was monitored and analyzed to determine number of channels required to support all participating agencies
- Survey questionnaires were submitted and interviews held with key radio operations administrative personnel of each agency
- Systems requirement were determined

Traffic Analysis

- Radio Traffic Measurement
 - ❖ Radio Traffic Monitoring Methodology
 - RF Traffic Data Collection Test Setup
 - ❖ Radio Traffic Monitoring
 - Measurements at Several Locations
 - ✓ VHF & UHF
 - ✓ Summary
 - ✓ Agency Peak Usage
 - Usage at 800 MHz
 - ✓ Before 9/11
 - ✓ After 9/11

RF Traffic Data Collection Test Set Up



Summary of Measurements

Frequency Band	Message per Hour	Erlangs	
UHF	25.77	0.039	Average
	80.00	0.2	Maximum
	0.00	0	Minimum
VHF	116.35	0.2315	Average
	247.00	0.5090	Maximum
	16.00	0.0370	Minimum

Agency Peak Usage

Agency	Number of Channels	Average Message Length	Peak Erlangs for Average Channel
DOC	5	4.53	0.190
DOT	4	7.10	0.433
EMS	3	5.00	0.303
FDNY	3	9.90	0.636
Parks	2	5.30	0.423

DoITT 800 MHz System Before 09/11/01

➤ Usage of DoITT 800 MHz System

❖ Before 9/11/01

Agency	Number of Talk Groups	Percent Usage
DEP	7	25.8
Health	1	2.6
HPD	3	11.9
NYCHA	2	7.6
SHERIFF	1	2.9
TLC	3	19.5
Others	1	21.7

Peak Traffic 40%

❖ After 9/11/01

Peak Traffic 50% to 62%

Project Tasks

1. Developed conceptual design of the systems
2. Developed Site Construction requirements
3. Developed Detailed System Designs
4. Developed Technical Specifications document for use in Request for Proposals

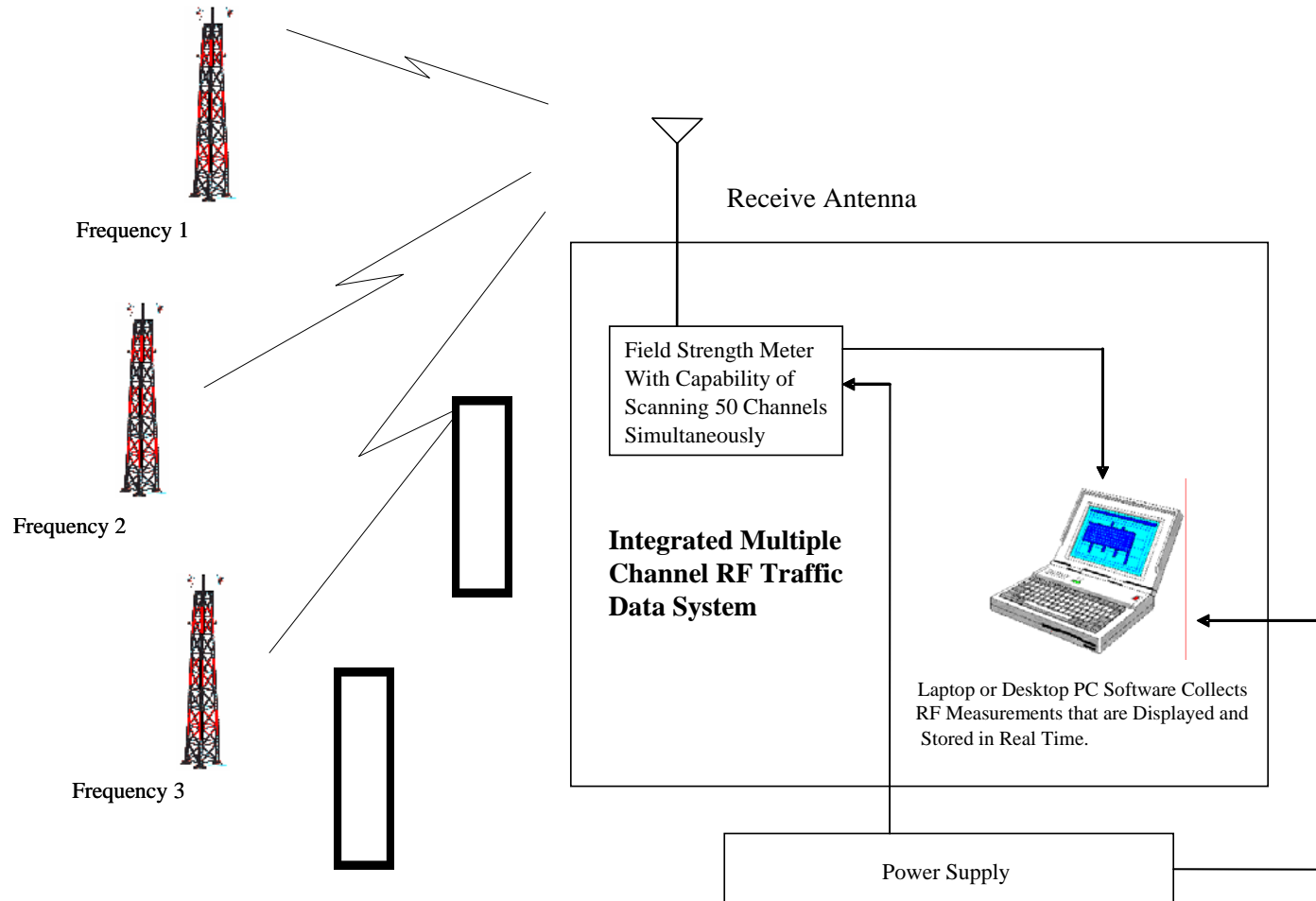
Propagation Considerations

- Drive Tests
 - ❖ Methodology
 - ❖ Test Set Up
 - ❖ Multi-Channel Reception
 - ❖ Results

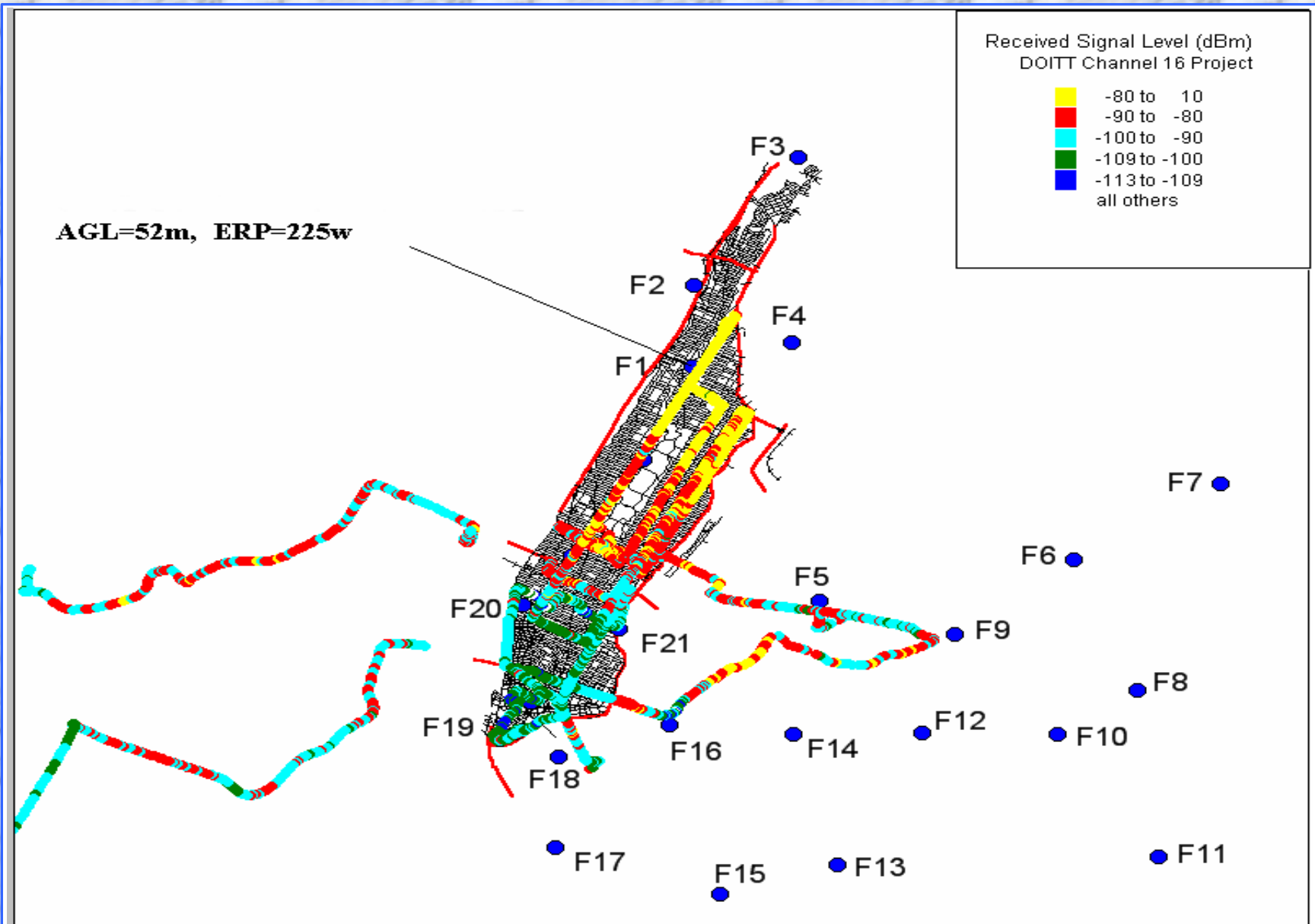
Propagation Considerations (Cont.)

- Propagation Model Comparison
 - ❖ Measured Data
 - ❖ Model for Manhattan
 - Proprietary Model
 - ✓ Building Database
 - ❖ Model for Other Boroughs
 - Okamura Suburban
 - ❖ Hata-Extended/Epstein-Peterson Diffraction
 - Correction Factors
 - From Measurement

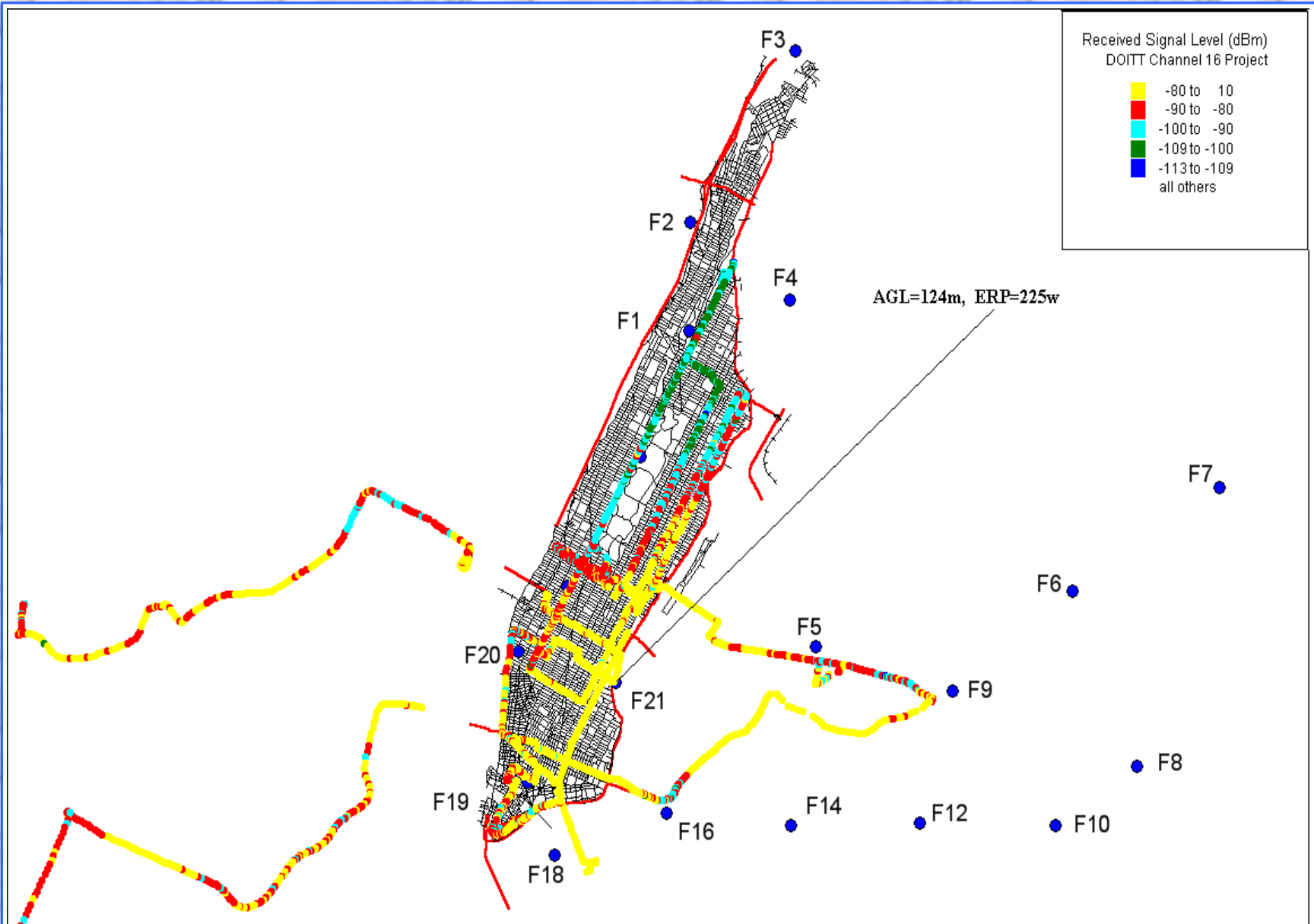
RF Drive Test Set Up



Drive Test



Drive Test



Channel 16 Project – Conceptual Design

- FDNY Systems Users
 - ❖ Fire
 - ❖ EMS

- DoITT System Users
 - ❖ DOC
 - ❖ Sheriff
 - ❖ Parks & Recreation
 - ❖ DOT
 - ❖ HHC
 - ❖ OEM

Channel 16 Project – Conceptual Design (cont.)

- FDNY
 - ❖ 20 Channel Conventional Dispatch
 - ❖ 6 Channel Trunked Non-Dispatch
- DoITT
 - ❖ 22 Channel Trunked System

Conceptual Design

FDNY **SYSTEMS**

Conceptual Design



FDNY

- ❖ Dispatch
- ❖ Non-dispatch
 - ❑ Fire Marshals/Inspectors
 - ❑ Fire/EMS Special Tactical Units
 - ❑ Fire/EMS Maintenance
 - ❑ Fire/EMS Administrative
 - ❑ etc...

System Requirements

- FDNY System Requirements
 - ❖ FDNY Traffic Requirements
 - ❑ Peak Radio Traffic Load for FDNY/Fire
 - ❑ Peak Radio Traffic Load for FDNY/EMS
 - ❑ Comparison of Present System & Channel 16 System Mixed Conventional and Trunked
 - ❑ FDNY System Capability
 - ❖ Separate Systems Considerations
 - ❑ Dispatch – 20 Channels
 - ❑ Non-Dispatch – 6 Channels
 - ❖ FDNY System Coverage
 - ❑ FDNY System Sites
 - ❑ Composite Talk Out Coverage FDNY

System Requirements (Cont.)

- Fire Dispatch
- EMS Dispatch
- Conventional Analog
- Capacity 20 Channels
- FDNY Non-Dispatch
 - ❖ Analog/Digital
 - ❖ 6 Channels

Dispatch System

- Citywide Talk Out Coverage
 - ❖ All Channels
- Citywide Talk Back Coverage
 - ❖ Two (2) Channels Fire
 - ❖ Two (2) Channels EMS
- Borough Wide Talk Back Coverage
- Channel Loading

Peak Radio Traffic Load

Borough	FDNY/Fire Peak Hour	FDNY/EMS Peak Hour	FDNY/Fire + FDNY/EMS Peak Hour
	Minutes	Minutes	Minutes/Hour
Bronx	37.2	73.5	110.7
Brooklyn	56.5	102.9	159.4
Manhattan	48.7	79.7	128.4
Queens	38.1	67.1	105.2
Staten Island	9.0	13.4	22.4
Total	189.5	336.6	526.1

20 Channel Conventional Dispatch Plan

Conventional Channel 16 Plan		
Borough	Conventional Dispatch	
	FDNY/Fire	FDNY/EMS
Bronx	1	2
Brooklyn	1	3
Manhattan	1	3
Queens	1	2
Staten Island	1	1
City-wide	2	2
Total Channels	7	13

- Improvement over Present System
- Portable Coverage
- Talk out City Wide All Channels
- Firm Dispatcher Control
- Considerable Network Discipline

FDNY Dispatch System

- Dispatch (Fire & EMS)
 - ❖ Conventional
 - ❑ Borough-wide for Fire
 - ❑ Zones for EMS
 - ❑ Simplest Transition
 - ✓ Present → Channel 16
 - ❑ City-wide Coverage
 - ❑ Borough or Zone Coverage

FDNY Dispatch System

- FDNY Coverage
 - ❖ Analog Voice
 - ❖ Each Channel
 - ☐ Heard City-wide
 - ☐ Traffic To and From
 - ✓ Dispatcher
 - ✓ All Units Assigned
 - ✓ Borough
 - ✓ Zone

FDNY Dispatch System

- Coverage
 - ❖ Analog System
 - ❖ 10 Sites TX
 - ❖ 21 Sites RX
 - ❖ Simulcast
 - ❑ In Street Portable Coverage
 - ❖ Hip Mounted Portable
 - ❑ Under Standard FDNY Coat

FDNY System

➤ Channel Requirements

❖ 25 kHz Analog

□ FDNY (Fire/EMS) Licenses

✓ Channel 16

⇒ 20 Total

— 6 Non-dispatch

14 Frequencies

✓ Channel 15

⇒ 6 Present EMS

Total: 20 Dispatch

6 Non-dispatch

FDNY Non-Dispatch System

- Non-dispatch Operations
 - ❖ Presently
 - ❑ Conventional 800 MHz Trunked
 - ❑ Two Radios Required for Personnel
 - ❖ Future
 - ❑ Separate from Dispatch
 - ❑ Trunked Non-dispatch
 - ❑ Better Management
 - ❑ Six (6) Channels Available
 - ❑ Only one Radio
 - ❑ Additional Talk Groups

FDNY Non-Dispatch System

- Non-dispatch Operations (Cont.)
 - ❖ As Separate 6 Channel Trunked
 - Needed for Peak Load
 - ✓ 2,000 Radios
 - ✓ 330 Minutes of Air-time vs. 81.6 Minutes
 - ❖ Combine with DoITT 22 Channels
 - Form 28 Channel City-wide Trunked System
 - Peak Combined Traffic 1,000 Air-time Min.
 - With 10% Growth, 68 Minutes Margin

Conceptual Design

DoITT/FDNY **TRUNKED SYSTEM**

DoITT/FDNY Trunked System

- DoITT/FDNY System Coverage
 - ❖ Parameters for Required Coverage
 - Hip Mounted Portable
 - Simulcast Trunked Citywide
 - ❖ 95% Reliability Citywide
 - ❖ Sites
 - 10 Simulcast Transmit/Receive

DoITT/FDNY Trunked System

- Channel Loading
 - ❖ Peak Traffic
 - ▣ 1000 Minutes
 - ❖ 28 Channels
- Usage Priority
- 80 Talk Groups Initially
- Subscriber Unit Requirements

DoITT/FDNY Trunked System

➤ System Usage Priorities

AGENCIES	USAGE PRIORITIES		
	High	Medium	Low
FDNY Non-dispatch	100%	0	0
OEM	100%	0	0
DOC	80%	20%	0
DOT	60%	40%	0
Parks & Recreation	60%	40%	0
Sheriff	50%	50%	0
HHC	30%	60%	10%

Institution of Priorities

- ➔ High priority users have system access over lower priority users
- ➔ Greater capacity for emergency operations

DoITT/FDNY Trunked System

- System Capacity Requirement
 - ❖ Required Air Time (10% Growth) GOS=1/100
 - ❑ 6 Agencies – 637 Minutes
 - ❑ FDNY Non Dispatch – 363 Minutes
 - ❑ Total = 1,000 Minutes
 - ❖ 28 Channels Simulcast Trunked Capacity
 - ❑ 1,068 Minutes
 - ❑ Leaves 68 Minutes Margin

Site Assessments

- Availability for City use
- Interference Analysis
 - ❖ Channel 17
 - ❖ Site Noise
- Power
- HVAC
- Radiation Hazards
- Lease Cost

Construction Requirements

- Site Quality Standards
 - ❖ Materials/General
 - ❖ Communications Equipment Shelters or Rooms
 - ❖ Physical Security and Alarm
 - ❖ Electrical Requirements
 - ❖ Signal Cables and Wires
 - ❖ DC Power Supply

Construction Requirements (Cont.)

- Grounding, Lighting, and Surge Protection
- Infrastructure Interconnection Requirements
- Towers and Antenna Mountings
- Interference Reduction
- RF Radiation Emissions
- Punch Lists

Technical RFP

- **FDNY Radio System Requirements**
 - ❖ System Features and Requirements
 - ❖ Coverage
 - ❖ Channel Loading
 - ❖ System Component and Subsystem Functions
 - ❖ Back Up Recovery Plan
 - ❖ Back Up Power Requirements
 - ❖ Back Up Recovery for a High Site in Manhattan
 - ❖ Disaster Recovery and Alternate Routing
 - ❖ Frequency Plan
 - ❖ Simulcast Operation
 - ❖ Mode of Operation
 - ❖ System Management

Technical RFP (Cont.)

- DoITT/FDNY Trunked Radio System
 - ❖ System Feature and Requirements
 - ❖ Coverage
 - ❖ Channel Loading
 - ❖ Frequency Plan
 - ❖ Simulcast Operation
 - ❖ Dual Mode Operation
 - ❖ Trunking Features
 - ❖ System Control
 - ❖ Interoperability with other City Systems

Technical RFP (Cont.)

- Interconnection of Sites
 - ❖ Communication Types
 - ❖ Point-To-Point Microwave
 - ❖ Dedicated Fiber Optic or Cable
 - ❖ Leased Circuits
 - ❖ Reliability of Site Interconnection Network

Technical RFP (Cont.)

- Performance Requirements
 - ❖ Conventional Dispatch System
 - ❖ DoITT/FDNY Trunked System
 - ❖ Microwave
 - ❖ System Alarms
- Training, Warranty, and Maintenance
 - ❖ Training
 - ❖ Warranty
 - ❖ Maintenance Plans

Technical RFP (Cont.)

- System Recovery and Redundancy
 - ❖ FDNY Conventional System
 - ❖ DoITT/FDNY Trunked System
 - ❖ Interconnection Sites
 - ❖ Back Up Power
- System Implementation & Acceptance Testing
 - ❖ Installation
 - ❖ RF Coverage and Acceptance Test Plan

Technical RFP (Cont.)

- Mobile and Portable Requirements
 - ❖ Portable Radio Requirements
 - ❖ Mobile Radio Requirements
 - ❖ Console Requirements

Questions...?



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