



## **Existing Systems Report**

# **Public Safety Communications System Assessment and Design**

Broome, New York

Report

June 28, 2012



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# 1 Overview

The following report provides a review of the system operations of Broome County. Blue Wing believes an important component of system review and design is a strong operational understanding. Blue Wing operational review begins by reviewing the operations of the client and proceeds to reviewing the resources and technology used to achieve the operations. The current operational review and the technology review provide insight into the future solution required by the County.

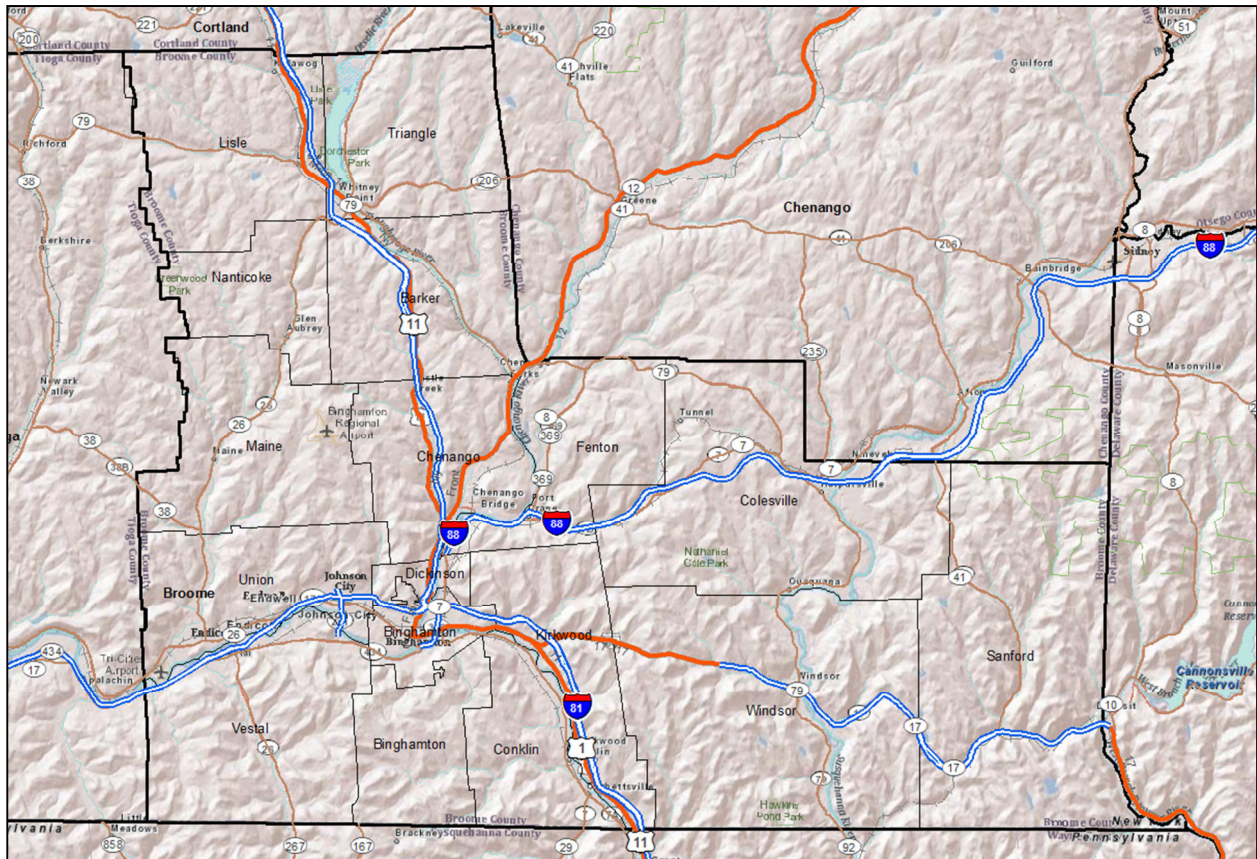


Figure 1-1: Broome County

## 1.1 Operational Review

The user operational review was conducted as a two-step process. The first step involved observing the communications center, visiting the primary tower site,



and associated receiver sites. During the site review process operational information was collected as a base line of issues and needs. The second step consisted of meeting key stakeholders from law enforcement, EMS and fire. The group interviews reinforced the themes that were presented in the surveys.

## 1.2 Operations Overview

The Broome County system is very similar to many legacy systems that have developed through a progression of iterative improvements over 20 to 30 years. As dispatch and operational requirements have changed so too has the communications systems that support communications.

The various public safety services are operating on number of bands. Broome County and the cities within are similar to many New York counties, has law enforcement operating on VHF-high-band, fire on VHF-low-band, VHF high-band and UHF and EMS on VHF-high-band and UHF. County Security and the Broome County Community College are on UHF. The sites are connected to the communications center with microwave.

Broome County dispatch is consolidated at the Public Safety Building (PSB) communication center and is managed by the Broome County Department of Emergency Services.

The radio system infrastructure represents the design and specification standards of the time when the equipment was installed. The system provides a basic pragmatic radio system with aging infrastructure and while providing good communications it lacks functionality and features that could improve the operational effectiveness of responders.

Overall, the Broome County radio system represents a pragmatic aging radio system that will not provide the County with dependable and efficient service for the next 20 years. All aspects of the radio system, with some exceptions, would require upgrading and replacement to support a new and enhanced public safety radio system. The extent of the proposed changes will depend on the operational needs identified during the operational needs enhancement process.

## 1.3 Operational Methods

### 1.3.1 Field Operations Overview





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Broome County operates in a manner consistent with other County public safety agencies with similarly aged systems expect that there is more fragmentation between users both within a service and between services.

The County operates with wide-area (tower site) channels that are used for dispatch and wide-area communications.



## 2 Users

### 2.1 Primary

The Broome County 911 Communications System supports all law enforcement, fire, and EMS agencies in Broome County.

These agencies include:

#### Fire

- Binghamton Fire
- Deposit Fire
- Lisle Fire
- Whitney Pt Fire
- Endicott Fire
- Johnson City Fire
- Windsor Fire
- West Corners Fire
- Endwell Fire
- Vestal Fire
- Maine Fire
- West Endicott Fire
- Port Dickinson Fire
- Killawog Fire
- Port Crane Fire
- Kirkwood Fire
- Chenango Bridge Fire
- EIT Emergency Services
- Binghamton University Public Safety
- Harpursville Fire
- Chenango Forks Fire



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- Conklin Fire
  - Glen Aubrey Fire
  - Nanticoke Fire
  - Sanitaria Springs Fire
  - West Colesville Fire
  - Ouaquaga Fire
  - Union Center Fire
  - West Windsor Fire
  - Hillcrest Fire
  - East Maine Fire
  - Choconut Center Fire
  - Town of Binghamton Fire
  - Five Mile Point Fire
  - Triangle Fire
  - Link Field Fire
  - Prospect Terrace Fire
  - Chenango Fire

#### **Emergency Medical Service**

- Broome Ambulance
- Chenango Ambulance
- Colesville Ambulance
- Deposit Ambulance
- Harpurs Ferry Ambulance
- Superior Ambulance
- Union Ambulance
- Vestal Ambulance
- Windsor Ambulance



- Maine Ambulance

### **Law Enforcement**

- Broome County College Public Safety
- Binghamton Police
- Binghamton University Police
- Broome County District Attorney's Office
- Broome County Office of Emergency Services
- Broome County Probation
- Broome County Security
- Broome County Sheriff
- Deposit Police
- Endicott Police
- Johnson City Police
- New York State Environmental Conservation Police
- New York State Forest Rangers
- New York State Park Police
- New York State Police
- Port Dickinson Police
- Railroad Police
- Vestal Police

## **2.2 Secondary Users**

Secondary users are those that do not routinely use the County radio system but do so for special operations or mutual aid. These agencies would include:

### **Fire Service**



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- Mutual aid responders from New York State Counties of Chenango, Cortland, Delaware and Tioga Counties. Pennsylvania Counties of Susquehanna and Wayne.

#### **EMS**

- Mutual aid responders from New York State Counties of Chenango, Cortland, Delaware and Tioga Counties; SUNY Binghamton and the Pennsylvania Counties of Susquehanna and Wayne.

#### **Law Enforcement**

- Mutual aid responders from New York State Counties of Chenango, Cortland, Delaware and Tioga Counties; SUNY Binghamton and Pennsylvania Counties of Susquehanna and Wayne.



### 3 Radio Operations

#### 3.1 Existing Features and Functions

The County has basic conventional systems that do not support advanced features and functions. The County has no enhanced features or functions with the exception that some users have Unit ID. Enhancements could include features and functions such as voice security, Unit ID, emergency alerting, and automatic vehicle location (AVL). These are features and enhancements that may add operational efficiency. The County needs to closely review the operational benefits of future enhancements. The following table lists the features and functions the County’s radio system supports.

Feature or Function	Comments
Channel monitoring/scan	Radio users use priority scan to monitor traffic on the dispatch channels when operating on a tactical channel
Voice security - scrambling, encryption	The County does not have voice security ability
Caller Recognition - emergency, caller ID	A limited number of units have caller ID
Caller Location – GPS, AVL	The County does not have GPS/AVL capabilities.
Messaging – SMU, codes, or text messaging	The County does not have messaging capabilities
Alerting – paging, horn and lights	The County currently does analog voice paging
Data – NCIC and CAD	The County does not have CAD capabilities to the field units

Table 3-1: Existing Features and Functions

#### 3.2 Communications

There are multiple frequencies used by law enforcement, fire, and EMS. Expect for the Western Broome Fire Departments, The City of Binghamton and the Village of Johnston City VHF low-band is used for dispatch (paging and communications with the Communications Center). The Western Broome Fire Departments use VHF high-band for dispatch. The City of Binghamton and the Village of Johnson City fire departments use UHF.

All of the EMS agencies use VHF high-band except for the SUNY EMS squad – Harpurs Ferry Ambulance which uses UHF.

The Sheriff’s Department and all of the municipal police departments use VHF High-band. Broome County Security and the Broome County Community College Office of Public Safety use UHF.

Broome County transit operates in the UHF band while County Highway uses VHF High-band.



### **3.3 Paging**

There are multiple frequencies used for fire and EMS alerting pagers and siren activation. Expect for the Western Broome Fire Departments VHF Low-band is used. The Western Broome Departments use VHF High-band. County EMS agencies use VHF High-band. Tone and voice paging is used.

The dispatcher must select the appropriate tower(s) for the agencies to be alerted. In a few instances more than one tower site must be used to alert the response agencies.

### **3.4 Data**

Mobile data systems are currently used by law enforcement. Verizon AirCards from the commercial wireless carrier are used for transport. Mobile data functionality is supported by the New World CAD system.

### **3.5 Interoperability Requirements**

Broome County, similar to most counties operating on older legacy systems, has a combination of county, department, and mutual-aid channels used to access other neighboring counties' radio systems. Typically, arrangements are established on a department to department basis. In general, the channel plans and channel naming convention varies greatly from department to department. In the future, the County needs to provide a deterministic interoperability plan for within the county, border regions and for state/national events. The plan needs to define how the radio system will be operated in various conditions and define the naming of channels and programming conventions. The table below outlines the various services and the agencies with which the services interact and the bands those services interact on.



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**Occurrence of Interoperability**

<b>Occurrence of Interoperability</b>					
Service	County Fire	County EMS	County Fire	Binghamton Fire	Johnston City Fire
	VHF Low-band		Western Broome VHF HB		
<b>Local</b>					
<b>County</b>					
Tioga	Weekly	Weekly	Weekly	Never	Never
Chenango	Weekly	Weekly	Weekly	Never	Never
Delaware	Weekly	Weekly	Weekly	Never	Never
Cortland	Weekly	Weekly	Weekly	Never	Never
Wayne, PA	Never	Never	Never	Never	Never
Susquehanna, PA	Never	Weekly	Never	Never	Never
<b>State</b>					
Police	Never	Never	Never	Never	Never
State Probation	Never	Never	Never	Never	Never
State Parole	Never	Never	Never	Never	Never
Parks	Never	Never	Never	Never	Never
DEC-Rangers	Never	Never	Never	Never	Never
DEC-Police	Never	Never	Never	Never	Never
ABC	Never	Never	Never	Never	Never
State Health	Never	Yearly	Never	Never	Never
State DOT	Never	Never	Never	Never	Never
State Fire	Yearly	Never	Yearly	Yearly	Yearly
SEMO	Yearly	Never	Never	Never	Never
<b>Federal</b>					
FBI	Yearly	Yearly	Yearly	Yearly	Yearly
Postal	Yearly	Yearly	Yearly	Yearly	Yearly
ATF	Yearly	Yearly	Yearly	Yearly	Yearly
Marshals	Yearly	Yearly	Yearly	Yearly	Yearly
FEMA	Yearly	Yearly	Yearly	Yearly	Yearly
Utilities	Yearly	Yearly	Yearly	Yearly	Yearly
<b>Commercial</b>					
Commercial EMS	Never	Daily	Never	Never	Never
Utilities	Never	Never	Never	Never	Never
Train	Never	Never	Never	Never	Never
Bus	Never	Never	Never	Never	Never





Occurrence of Interoperability						
Service	Law Enforcement	Law Enforcement	Law Enforcement	Law Enforcement	Law Enforcement	Law Enforcement
	County	Binghamton	Endicott	Vestal	Johnson City	Deposit
<b>Local</b>						
<b>County</b>						
Tioga	Yearly	Yearly	Yearly	Yearly	Yearly	N/A
Chenango	Yearly	Yearly	Yearly	Yearly	Yearly	N/A
Delaware	Yearly	Yearly	Yearly	Yearly	Yearly	N/A
Cortland	Yearly	Yearly	Yearly	Yearly	Yearly	N/A
Wayne, PA	Never	Never	Never	Never	Never	N/A
Susquehanna, PA	Never	Never	Never	Never	Never	N/A
<b>State</b>						
Police	Daily	N/A	N/A	N/A	Never	N/A
State Probation	Monthly	N/A	N/A	N/A	Never	N/A
State Parole	Monthly	N/A	N/A	N/A	Never	N/A
Parks	Daily	N/A	N/A	N/A	Never	N/A
DEC-Rangers	Daily	N/A	N/A	N/A	Never	N/A
DEC-Police	Daily	N/A	N/A	N/A	Never	N/A
ABC	Never	N/A	N/A	N/A	Never	N/A
State Health	Monthly	N/A	N/A	N/A	Never	N/A
State DOT	Never	N/A	N/A	N/A	Never	N/A
State Fire	Never	N/A	N/A	N/A	Never	N/A
SEMO	Yearly	N/A	N/A	N/A	Never	N/A
<b>Federal</b>						
FBI	Yearly	N/A	N/A	N/A	Never	N/A
Postal	Never	N/A	N/A	N/A	Never	N/A
ATF	Never	N/A	N/A	N/A	Never	N/A
Marshals	Yearly	N/A	N/A	N/A	Never	N/A
FEMA	Phone	N/A	N/A	N/A	Never	N/A
Utilities	Phone	N/A	N/A	N/A	Never	N/A
<b>Commercial</b>						
Commercial						
EMS	Never	N/A	N/A	N/A	Never	N/A
Utilities	Never	N/A	N/A	N/A	Never	N/A
Train	Never	N/A	N/A	N/A	Never	N/A
Bus	Never	N/A	N/A	N/A	Never	N/A

Table 3-2: Operational Interoperability Occurrences



## **4 Current Dispatch Operations Review Overview**

Broome County's currently has an aging radio system. Some of which will require to comply with FCC mandated narrow banding. Broome County is in the process of reviewing its radio system status, operational needs and potential solutions to meet its current and future operational requirements. The evaluation process is broken into four parts; with phase one of the process consisting of reviewing the current operations and base lining the current status. The report provides a baseline of the operations status as well as the equipment status that supports the dispatch operations. In addition, the report also highlights areas of concern that are recommended to be reviewed to better understand the future user needs. The second phase will examine the operational enhancements required to meet current and future user needs. The third phase is an evaluation and recommendations of the communications center operations. The fourth phase is an engineering design and recommendation report on how to achieve the required features and functions.

### **4.1 User Groups**

The Broome County communications system is currently used for County and Local Law Enforcement, Fire and EMS. The primary responsibility is for 9-1-1 call taking and dispatch of appropriate responders.

### **4.2 Dispatch System Features and Functions**

#### **4.2.1 Dispatch System – Main Center**

The main dispatch center is located on the first floor of the Public Safety Facility at Lt. Van Winkle Drive in Binghamton. The communications room has 17 positions. Several radio and CAD positions are also located at multiple other locations in the county.

Each position is dedicated to a primary call taking / dispatch function.

1. Supervisor
2. Binghamton PD
3. Binghamton PD
4. Johnson City PD and part time law



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5. Law – Spare
  6. Endicott PD and part time Law
  7. County Law
  8. Fire – Spare
  9. EMS (Backup for Positions 10 and 16)
  10. Binghamton FD, Johnson City FD
  11. Fire – Spare
  12. Call Taker
  13. Call Taker
  14. Call Taker
  15. Call Taker
  16. Low-band Fire (all other fire & EMS)
  17. Vestal PD



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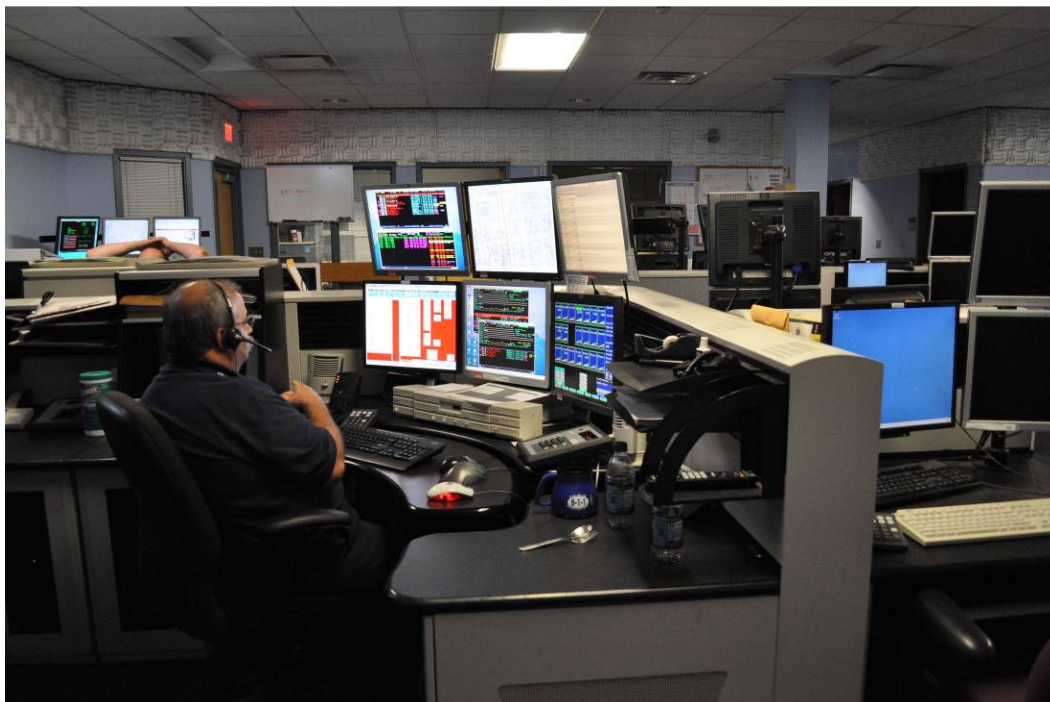


Figure 4-1: EMS Position



Figure 4-2: Local PD Grouping

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The furniture was updated in 2006.

The following equipment is being used in the communications center:

9-1-1:

- 17 Positions
- Plant/ CML Patriot (installed 2010)
- 67 line appearances
  - 12 9-1-1 Centrex type wire line
  - 20 9-1-1 Centrex type wireless
  - 35 7-digit lines and other
- ACD (by functional grouping)
- Use Nice Logger for recall function
- 1 Monitor
- The 9-1-1 System is maintained by Verizon
- PBX access through the Plant desktop
- Call Taker only positions
  - Typically use Handsets

CAD / RMS:

- 17 Positions in Dispatch Room
- 21 Remote Positions (10 Backup Center, 11 in County)
- New World AS400 (installed 1992, last updated in 2011)
- CAD Anywhere through VPN
- Maintained by New World and County IT
- RMS for each Law agency
- JMS for the Jail
- County GIS Mapping
- Pictometry
- AVL
- I am Responding



- Rip and Run (email)
- EMD ProQA
- Text Messaging
- Automatic Paging through Zetron 25
- Mobile Data (Verizon)
  - RMS access (All)
  - Mobile dispatch (part time)
  - Mobile reporting
  - AVL (50-60 mobiles on Law)
- County Intranet (Managed Access - NCIC, eJustice, email, weather)
- 4 Monitors (including IAR), 3 for Law positions
- Numeric keypad extension

Radio:

- 13 positions (2 additional in the Directors and Communications Supervisor's offices)
- Motorola Centracom II Plus (installed 1998)
  - 4 speakers
  - Footswitch
  - Headsets
    - Both wired and wireless
    - Mandatory headset use
    - note: only supervisor has a microphone
- Maintained by Tri-County Communications
- Back up Paging for Zetron 25
- Recall uses NICE system
- 1 Monitor

For Fire & EMS, the six monitors are laid out as follows:

Unit Status	Map	I Am Responding
Phone	CAD	Radio



---

Law uses five monitors – same layout except for IAR

Logging Recorder:

- NICE – 120 channel (2004)
  - 32 telephone lines with Caller ID
  - 55 Radio channels / sites / monitors
  - 17 Position audio
  - Voice only
- 3 Playback licenses
  - All senior, Shift supervisor
- Planned replacement in 2012
- This recorder will move to the backup dispatch center.

Other Equipment:

- NYSPIN Terminal
- NY Alert Access at the Director, PSAP Supervisor, CAD Supervisor and 2 supervisor's positions
- Mobile at supervisor (VHF)
- EAS (backup)
- VHF, UHF, DPW mobiles in equipment room
- Alarms for local building, generator
- CCTV – not used much (mostly broken)
  - Hallway, front door, back cage, highway
  - Mostly non-operational
- 3 large status monitors on Wall
  - Used for pending incidents, weather, and road closures, etc.
  - Controlled by supervisor
- 2 TVs



Figure 4-3: Typical Position Arrangement

#### **4.2.2 Dispatch System – Backup Center**

A backup 9-1-1 center is located at Broome County Public Library

- 10 Positions (2010)
- Plant / CML 9-1-1 (same as Main Center)
  - ACD works the same (by login)
- New World CAD (same as Main Center)
  - Mapping
  - ProQA
- Backup server for CAD
- Two Workstations (9-1-1 & CAD), 3 monitors
- Radio Access by mobile (1 position)
- Also used as a training center





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Figure 4-4: Backup Center

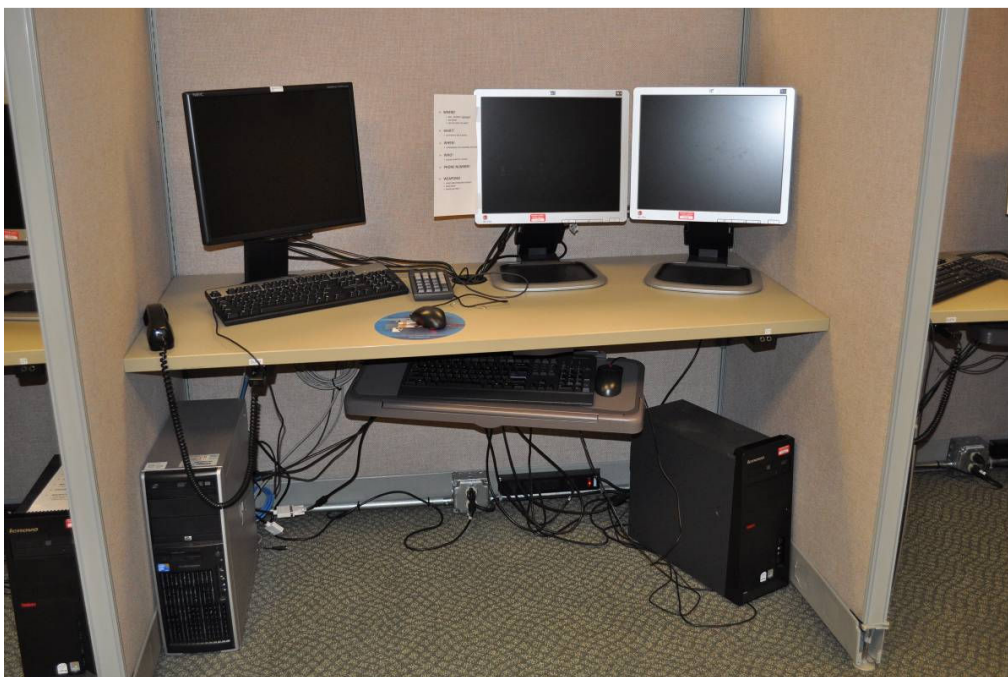


Figure 4-5: Backup Center Position



#### **4.2.3 Other Backups / Shared Access**

##### Union Tower Site:

- 2 Positions
- Motorola Centracom II (connected to tower only)
  - LB Fire / EMS Capability
- CAD / Mapping

##### Communications Van:

- 2 Positions
- Motorola MIP 5000
  - Plug into Hawkins or Ingram Towers
  - (LB Fire / EMS capability only at Hawkins)
  - Several Stack of Mobiles – all bands
- Laptops for CAD
  - Use Commercial Wireless Services for Access
- Regularly used 12-15 times per year

##### Airport:

- 1 Position
- Centracom
  - 3 Radios
  - LB Fire / EMS Capability
- CAD / Mapping

##### Johnson City PD:

- 1 CAD Position
- NYSPN
- Fire / EMS Capability

##### Vestal:

- 1 CAD Position (Entry for Fire)
- Local FD Dispatch 8am to midnight M-F



- Fire Capability

Endicott PD:

- Manned 24/7
- Have Dispatch Capability
  - Fire / EMS Capability
- CAD

Binghamton PD:

- Manned 24/7
- Have Dispatch Capability
  - Fire / EMS Capability
- CAD

NYSP – Kirkwood:

- 1 CAD Position

Broome Security:

- 1 CAD Position
- Has Local Dispatch

BCC Public Safety:

- 1 CAD Position
- Has Local Dispatch

EMS Agencies:

- All EMS Agencies have each other frequencies in their radios

#### **4.2.4 Dispatch Configuration Screens - Main**

All of the Dispatch Positions have the same radio access. There are approximately 57 channel resources / icons available for display. All dispatchers have the capability of modifying their own configurations and screen layouts.

Cross-Patching is rarely used. Multi Select is used for Receive purpose only. Three Alert tones are available, two are regularly used. For Fire, A1 is used to cancel. A2 is used for Mayday, Man Down, or Evacuations. For Law, A1 is used for attempt to locate, or to clear the air. A2 is used for hi priority 9-1-1 calls.



The consoles receive Unit IDs using MDC-1200. They do have the ability to use Radio Check, but the feature is rarely used.



Figure 4-6: Typical Dispatch Screen

### 4.3 System Access

#### 4.3.1 Radio Access – Main Center

Low-band Fire has 5 frequencies available, with some or all frequencies available at up to 5 towers, (with a 6th being added). These frequencies are used for all County Fire. The main dispatch and paging channel is F1. F2 and F3 are assigned for operations. F4 is used for Fire Police and F5 is used for the Fast Team. Most of the county is dispatch of the low-band channels with the exception of several cities. Inter-County, 45.88 is also available.



Paging for Fire is done through the CAD system. The consoles do have full paging capability for backup purposes.

	FREQ	INGRAHAM	HAWKINS	TUSCARORA	UNION	LOCAL	(PEASE)
<b>COUNTY FIRE CHANNELS</b>							
CONFIG							
FIRE CH1 DISP	33.90	X	X	X	X	X	X
FIRE CH2 FG	33.94	X	X	X	X		X
FIRE CH3 FG	33.98	X	X			X	X
FIRE CH4 FG	33.82		X				X
FIRE CH5 FG	33.86	X	X			X	X
INTER-COUNTY	45.88		X				

Binghamton FD and Johnson City FD each have their own UHF dispatch frequencies. Vestal FD, West Corners FD, Endwell FD, West Endicott and Endicott FD are all available on the West Broome Fire Radio System, which is a simulcast / voted system. Four frequencies are available with F1 being the primary dispatch channel. Vestal FD OPS is on F2. West Corners FD, Endwell FD and West Endicott FD OPS are on F3. Endicott FD OPS are on F4. There is also a spare 8 frequency UHF mobile available which has access to some other fire frequencies.

	FREQ	ANDREWS	UNION	ELY PARK	INGRAHAM
<b>LOCAL FIRE CHANNELS</b>					
CONFIG					
WB BROOME F1 DISP	154.310	S	S		
WB BROOME F2 VESTAL FD	154.355		X		
WB BROOME F3 WEST CORNERS, ENDWELL, WEST ENDICOTT	154.190		X		
WB BROOME F4 ENDICOTT	154.370		X		
BINGHAMTON FD	460.575			X	
JOHNSON CITY FD	460.625				X
SPARE UHF (8 FREQS)					



All four of the commercial EMS services have their own VHF dispatch channels; Broome, Superior, Union, and Vestal. Dispatch also has access to SUNY on UHF. All other EMS is dispatched over the LB Fire Channel.

EMS CHANNELS	FREQ	OLD STATE	INGRAHAM	UNION	ANDREWS
CONFIG					
BROOME EMS	155.1600	X			
SUPERIOR EMS	155.2200		X		
UNION EMS	155.1750			X	
VESTAL EMS	156.1950				X
SUNY EMS	460.4125		X		

County Law which includes the Sheriff’s Department, NYSP, and other agencies, is dispatched over the primary VHF Law channel. Inter-Agency, 155.370 is also available and monitored. With the exception of Endicott, Johnson City, Vestal, and Binghamton, all other local law is dispatched on the main channel. Both Broome County Security and BCC Public Safety are dispatched on their own UHF channel.

COUNTY LAW CHANNELS	FREQ	INGRAHAM	TUSCARORA	HAWKINS	AIRPORT	UNION	(PEASE)
CONFIG							
LAW	154.800	X	X	X	X		X
INTERSYS IA	155.370			X			
BROOME SECURITY	458.400	X	X	X		X	

Endicott PD, Vestal PD, Johnson City PD, and Binghamton PD and Detectives have their own VHF frequencies for Dispatch.



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<b>LOCAL law Channels</b>	<b>Freq</b>	<b>ROUNDTOP</b>	<b>ANDREWS</b>	<b>INGRAHAM</b>	<b>ELY PARKX</b>
CONFIG					
ENDICOTT PD	155.130	X			
VESTAL PD	155.310		X		
JOHNSON CITY PD	155.430			X	
BINGHAMTON PD	155.850				X
BINGHAMTON DET	154.875		X		

Several other channels are available to the dispatchers for Local Government, Interoperability, and several miscellaneous UHF channels. There is also the console to console intercom, typically used by the supervisor.

<b>OTHER CHANNELS</b>	<b>FREQ</b>	<b>HAWKINS</b>	<b>AIRPORT</b>	<b>INGRAM</b>	<b>TUSCAROR</b>	<b>UNION</b>
CONFIG						
SEMO	45.320	X				
VCALL10	155.7525					X
LOC GOV LB	45.40		X			
LOC GOV UHF	458.875			X	X	X
SPARE UHF (8F)	UHF			8F		
INTERCOM (CONS)						



The Dispatchers can monitor several other channels, and have audio feeds for either of the two TVs located in the communications room.

RECEIVE ONLY	FREQ	UNION			
CONFIG					
LAW		X			
NYSP					
SPECTRA					
SCANNER					
TV1, TV2					

**4.3.2 Radio Access – Backup Center**

Currently the Backup Center only has a mobile for radio access.

Most of the frequencies are covered by the numerous other local communications centers and agencies within the county.

**4.4 Dispatch Operations**

**4.4.1 County Overview**

Broome County has a population of about 200,000 and a geographical area of 707 square miles. The population density is about 284 persons per square mile, a medium population density. Broome County has one metropolitan area within its boundaries, Binghamton

**4.4.2 Dispatch Responsibilities**

The main dispatch center is manned on a 7 day 24 hour basis, typically with 9 dispatchers available per shift. Broome has an available staff of 36 full time dispatchers, 16 part time dispatchers, and 6 supervisors. The dispatchers work a mix of 12, 10 and 8 hours shifts. From 7am to 3am, typically there are 7 dispatchers on a 12 hours shift and 2 dispatchers on an 8 or 10 hour shift. From 3am to 7am Thursday-Sunday, there are at least 8 dispatchers on duty.

All dispatchers are combined call-taking and dispatch by the area they are assigned to. There are 4 call-taking only positions available for busy times or large incidents.





The dispatchers have some other responsibilities besides their normal call-taking / dispatch function.

They are responsible for after hour calls for County DPW, City DPW, and the Health Dept., and paging for the coroners.

On a rotating basis, they are responsible for NYSPIN Entries for Vestal (Sherriff orders, prosecutor entries, warrants, APBs, stolen property, etc.)

There are also several alarms for the County, Chenango, and water well alarm.

The supervisors also have access to NY-ALERT, and respond to 2nd alarm for Binghamton Fire.

All 9-1-1 calls come into the main dispatch center. Broome County rolls over to NYSP – Sydney and receives rollovers from Tioga County

#### **4.4.3 Dispatch Operations Tasks**

9-1-1 uses ACD by groups; calls will go to appropriate positions by group, and dispatcher login. Dispatchers login by name and type (i.e. Law, Fire, etc.).

Different areas of the communications room and positions are grouped by their responsibilities.

- 1 Supervisor position
- 4 call-takers only positions
- 1 County Law position
- 5 Local Law positions + 1 Law Spare position
- 1 EMS position
- 2 Fire positions + 2 Fire Spare position

Call takers will initiate the CAD record for the incident.

#### **4.4.4 Dispatch Operations Overview**

##### Law:

Broome County is responsible for Dispatch for the County Sherriff, New York State Police, and interacts with other agencies such as Park Police, ENCON Police, and the Forest Rangers. Other US Agencies such as FBI, US Marshalls and US Probation may also interact at times.



Broome also dispatches for Binghamton PD, Vestal PD, Endicott PD, Johnson City PD, Port Dickinson PD, and Deposit PD. All the local agencies operate 24 / 7 with the exception of Deposit which is 20 hour.

Dispatch also handles after hours calls for Broome County Security and BCC Public Safety.

AVL is available for Sherriff's Office, Binghamton PD, Vestal PD and Endicott PD; approximately 50-60 mobiles are equipped.

Typical Units available are around 40 during the day, with about 34 at night.

**Typical Number of Units per Agency**

Agency	Day	Night
Binghamton PD	12	12
Vestal PD	4	4
Endicott PD	4	4
Johnson City PD	3	3
Port Dickinson PD	1	1
Deposit PD	1	1
NYSP	12	8
Park Police	1-2	1
ENCON	1	0
Forest Rangers	1	0

Table 4-1: Typical Number of Units per Agency

Law uses 5 positions with an additional position available as a spare.

Positions 2 and 3 both dispatch for Binghamton PD, on 1 primary channel.

Position 4 dispatches for Johnson City PD full time on 1 primary channel. Position 4 also dispatches for Broome Security from midnight to 5 am, and BCC Public Safety from 6 pm to 6 am. Both security agencies operate on one channel.

Position 6 dispatches for Endicott PD full time on 1 primary channel. Position 6 also share dispatch responsibility with position 4 for Broome Security from midnight to 5 am. Position 6 dispatches BCC Public Safety from 6 am to 6 pm.

Position 17 dispatches for Vestal PD full time on 1 primary channel.

Position 7 dispatches the Sherriff's Office and NYSP over the primary County channel on 4 towers. Port Dickinson PD and Deposit PD also are dispatched on this channel. All other agencies use this channel, or the Inter-Agency channel.

Position 5 is a spare law position.



For the County Law channel, dispatchers will poll for units through a response list provided by the CAD system. Available Units in the area may also call in their availability for an incident.

Local PD calls are dispatched to the assigned unit.

### Fire:

Broome County dispatches for 36 Fire Departments encompassing 56 stations. One out of county department, Great Bend FD is also used on occasion.

Position 16 is the primary county Fire Dispatch position. It dispatches for all Fire Departments with the exceptions of Binghamton and Johnson City. The primary Fire channels are on Low-band, with the exception of the West Broome Simulcast System which is used for 5 Fire departments.

On the main LB Fire Channel, F1 is used for dispatch and paging. F2 and F3 are assigned for Operations as needed. The fire frequencies are currently on 4 different towers, with a fifth being added.

Vestal FD, West Corners FD, Endwell FD, West Endicott FD and Endicott FD are on the VHF West Broome Channels, which are simulcast and voted. F1 is the primary dispatch channel, with F2-F4 being used as dedicated Operations channels. Vestal has a dispatch operation.

Position 10 dispatches for Binghamton FD and Johnson City FD, each with their own dedicated channels.

Positions 8 and 11 are available as spares.

The Procedure for making a Fire Dispatch is common to all (with a minor exception for Binghamton).

- Send text message
- CAD makes recommendation
- Send rip & run – Binghamton, (some agencies with email)
- Pre announce with address
- Send page(s)
- Announce twice with details
- Announce Cross streets & time
- Response by radio or IAR



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EMS:

Broome County has two Fire/Rescue units at Deposit FD (BLS only) and Windsor FD. Binghamton FD has Ambulance. Chenango, Colesville and Maine have separate ambulance agencies.

There are 4 Private/Commercial service are used in the County: Broome, Union, Vestal and Superior.

There are three main hospitals within the County, Binghamton, Lourdes and Wilson. Wilson is a Level 2 Trauma Center.

At least 90-95% of transports is in county, but may go as far as Sydney, Walton or Cortland.

Three helicopter transport services are available, NYSP, Life Net, and Mercy Flight. Most are dispatched by Telephone, but they do have EMS channels available.

Position 9 is the EMS Position. Each of the four primary private services has their own VHF Channel. Other Ambulances use the primary Fire Channel. Position 9 also does backup for Fire positions 10 and 16 as needed.

The Procedure for EMS Dispatch is similar to Fire Dispatch.

- Use ProQA for response
- CAD make recommendation on Unit
- Send Text
- Pre-announce with address
- Send Page
- Announce two times with detail and Pro Q/A code
- Announce cross streets & time
- AMB responds by Radio or IAR
- 5 minute timer for BLS, less for ALS, dispatcher discretion
- No other action by dispatcher until case cleared



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## **5 System and Subscriber Equipment**

Blue Wing reviewed the current system equipment in use by Broome County. The information below gives a basic overview of the County's radio system.

### **5.1 Site and Tower Review**

Blue Wing has completed a preliminary visit of the various tower sites. The communication sites visited were Tuscarora, Hawkins Hill, Old State Road, Ely Park, Union, Round Top, Andrews Road and the Public Safety Building (PSB).

All of the sites are in fair to good repair and are consistent with the construction techniques of the time of construction. Recently the Pease Hill site was added. The Pease Hill site was not visited. The sites support the existing systems requirements. However, it should be anticipated that in the future buildings, towers and sites will need to be constructed to support the next-generation radio system that would have a projected 20-year life span.

Blue Wing collected GPS coordinate data at each site. The field collected data was compared to the FCC data. Blue Wing has plotted the radio sites to confirm their locations. The following diagram depicts the configuration of the Broome County fire, EMS, and law enforcement radio systems.

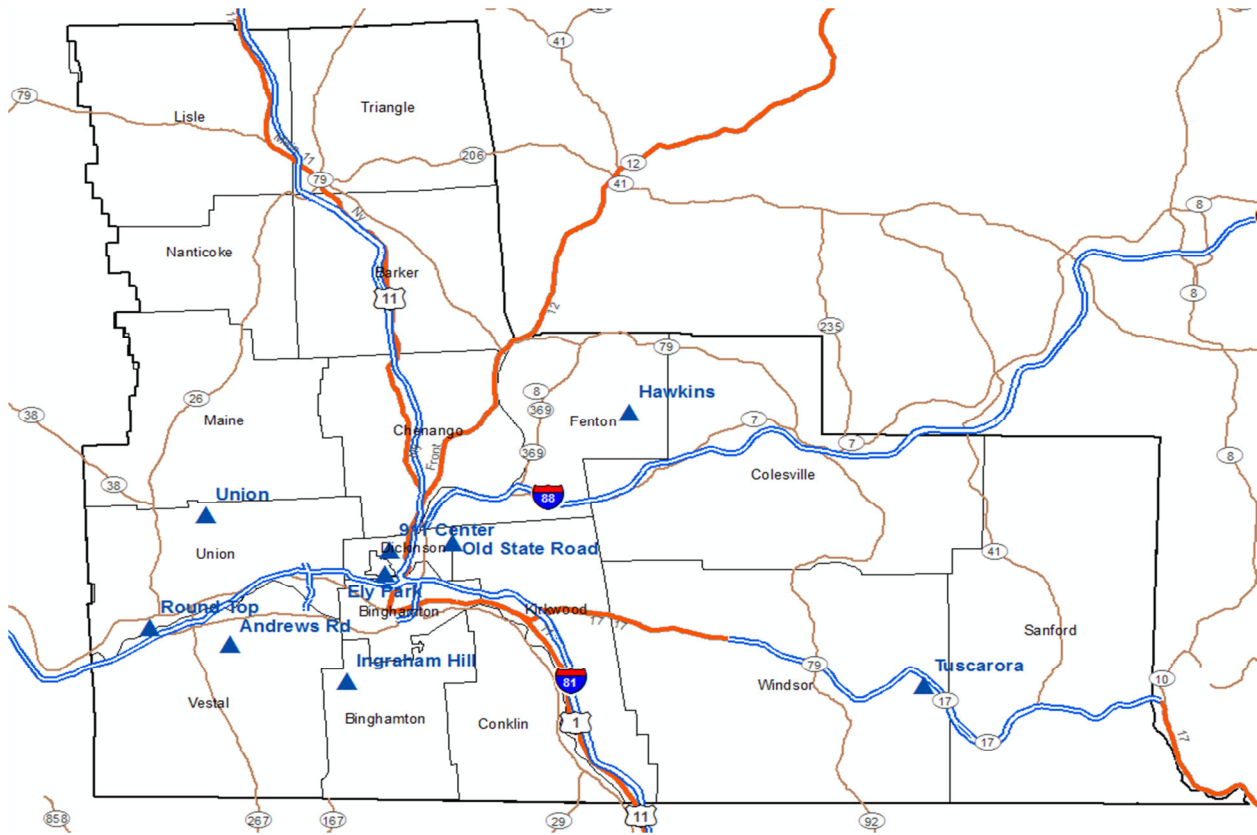


Figure 5-1: Broome County Radio Sites

The following coordinate matrix compares data from the FCC database and field measured data. The data in bold has been correlated with mapping and is used for the coverage plots which follow:

**Site Matrix**

Common Name	AKA	Source	Latitude	Longitude
Tuscarora	No	GPS (BW)	42-03-43.03	75-34-12.03
Hawkins Hill	No	GPS (BW)	42-12-24.73	75-45-43.57
Old State Road	No	GPS (BW)	42-08-11.14	75-52-33.27
Ely Park	No	GPS (BW)	42-07-09.73	75-55-10.23
Union Tower	Twist Run	GPS (BW)	42-09-00.71	76-02-07.22
Round Top	No	GPS (BW)	42-05-21.14	76-04-16.15
Andrews Road	No	GPS (BW)	42-04-51.09	76-01-07.24
Local Tower	PSB	GPS (BW)	42-07-55.56	75-54-59.90
Ingraham	No	GPS (BW)	42-03-43.02	75-56-34.58
Broome Co. Airport	No	GPS (BW)	42-12-26.96	75-59-03.66
Crash Fire Rescue at Airport	CFR	NA	N/A	N/A
Pease (New Site) LB	No	FCC	42-17-49	75-57-02



Common Name	AKA	Source	Latitude	Longitude
Fire/Sheriff				
JC Middle School - Rx for JC PD	No	NA	N/A	N/A
Binghamton High School - Rx for Bng PD	No	NA	N/A	N/A
General Hospital - Rx for Bng PD	No	NA	N/A	N/A
Lourdes Hospital - Rx for Bng PD	No	NA	N/A	N/A
Wilson Hospital - Rx for Bng and JC PD	No	NA	N/A	N/A

Table 5-1: Tower Sites

The following are representative of the Broome County radio sites.

**Tuscarora**



Figure 5-2: Tuscarora Access Road



Figure 5-3: Tuscarora Shelters



Figure 5-4: Tuscarora Interior Equipment





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## Hawkins Hill



Figure 5-5: Hawkins Hill Shelters



Figure 5-6: Hawkins Hill Tower



Figure 5-7: Hawkins Hill Equipment

### Old State Road



Figure 5-8: Old State Road Site



Figure 5-9: Old State Road Equipment

### Ely Park Site



Figure 5-10: Ely Park Site



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Figure 5-11: Ely Park Tower



Figure 5-12: Ely Park Equipment

### Union Tower



Figure 5-13: Union Tower Site



Figure 5-14: Union Shelter



Figure 5-15: Union Equipment



Figure 5-16: Union Equipment



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## Round Top



Figure 5-17: Round Top Site



Figure 5-18: Round Top Tower



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Figure 5-19: Round Top Equipment

### Andrews Road Site



Figure 5-20: Andrews Road Shelter





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### Local (Public Safety Building) Site



Figure 5-21: Local Tower



Figure 5-22: Local Tower



Figure 5-23: Local Equipment

### Ingraham Site



Figure 5-24: Ingraham Site



Figure 5-25: Ingraham Tower



Figure 5-26: Ingraham Equipment



Figure 5-27: Ingraham Equipment

### Broome County Airport



Figure 5-28: Airport (Site Abandoned)



Figure 5-29: Airport Shelter (Site Abandoned)

### Crash Fire Rescue (Back Up Communications)



Figure 5-30: CFR - Back Up Communications



## 5.2 Services by Site

The following services are located at the indicated site:

Name	Type of Operation	Sites
Sheriff	Law	Pease, Tuscarora, Hawkins, Ingraham Hill
Interagency	Law	Airport
Mobile Data	Law	Tuscarora, Hawkins, Ingraham
Broome Security	Security	Tuscarora, Hawkins, Ingraham Hill
FBI	Law	Hawkins, Ingraham Hill
Vestal PD	Law	Andrews Road
Binghamton PD	Law	Ely Park, State Office Bldg - rx, Binghamton High School - Rx only, General Hospital - Rx only, Lourdes Hospital - Rx only
Binghamton PD - Detectives	Law	Ely Park
Endicott Police	Law	Round Top
Johnson City PD	Law	JC Middle School - Rx only, Ingraham
FBI	Law	Hawkins, Ingraham Hill
Vestal PD	Law	Andrews Road
Local Gov.	Local Gov.	Airport, Tuscarora, Ingraham Hill
Fire F-1	Fire	Tuscarora, Hawkins, local, Ingraham Hill, Union, Pease
Fire F-2	Fire	Tuscarora, Hawkins, CFR, local, Ingraham Hill
Fire F-3	Fire	Tuscarora, Hawkins, CFR, local, Ingraham Hill
Fire F-4	Fire	Tuscarora, Hawkins, CFR, local, Ingraham Hill
Binghamton FD	Fire	Ely Park,
Endicott Fire	Fire	CFR
Johnson City FD	Fire	Ingraham Hill
InterCo Fire	Fire	Hawkins
Vestal FD	Fire	Andrews Road, CFR
Vestal EMS	EMS	Andrews Road
Broome EMS		Old State Road
Co. Highway	Highway	Hawkins
NYS DOT	State DOT	Hawkins
SEMO	State SEMO	Hawkins
Red Cross	Red Cross	Hawkins, Andrews
Red Cross	Red Cross	Hawkins
Red Cross	Red Cross	Andrews Road
NYS DEC	Fire	Ingraham Hill
General Hospital	HEAR	Ingraham Hill

Table 5-2: Service by Site



### 5.3 System Backbone Equipment

Blue Wing reviewed the equipment at the sites on the initial visit. As with the sites, with the lifecycle of the future system backbone system should be designed for 15 to 20 years. The County may extend the use of some of the low-band equipment dependent on the direction of the future system. The County provided list below outlines the system backbone equipment.

#### System Back Bone Equipment

SITE & QUAN	DESCRIPTION
<b>AIRPORT</b>	
1	Radio Digital Multiplex Unit
2	4.9 GHZ Microwave
1	Site Linked Alarm System
1	5.8 GHZ Canopy Data Link To Old Maintenance Building
1	5.8 GHZ Canopy Data Link To Airport Terminal Building
1	Local Govt Low-band , Motorola (Parks)
1	Quantar High-band Rptr -Broome Sheriff, Motorola
1	High-band Base, Motorola - Intersystem
1	UHF Repeater - Local Gov - GE
<b>TUSCARORA</b>	
1	4.9 GHZ Microwave
1	Radio Digital Multiplex Unit
1	Site Linked Alarm System
1	UHF Repeater---Local Govt, Motorola
1	High-band Repeater Quantar--Broome Sheriff
1	UHF Band Rptr MTR2000--BR Security , Motorola
1	Low-band Base, CO Fire, Micor 4 Rcvr, Motorola
<b>INGRAHAM</b>	
1	4.9 GHZ Microwave
1	Radio Digital Multiplex Unit
1	Site Linked Alarm System
1	High-band Repeater Quantar--Broome Sheriff
1	Low-band Fire---T44R, Motorola
1	UPS---Battery Backup
1	MTR2000---JCPD, Motorola
1	Voting Comparator JC Police
1	UHF Band Base - MTR2000---Bing Fire Paging
1	Hi Band MTR2000---Bing Detectives, Motorola
1	Hi Band BASE - MTR2000---Superior Amb, Motorola
1	IFLOWS, Maxion Store & Forward Repeater
1	UHF Repeater Quantar – Broome Security
1	UHF Repeater - MSR2000---JC Fire , Motorola
1	MTR2000 UHF Local Govt Battery Backup, Motorola
1	MTR2000---Bing Fire UHF Control Pt, Motorola
1	High-band Micor, Hospital Base Station



SITE & QUAN UNION	DESCRIPTION
3	4.9 GHZ Microwave
1	Radio Digital Multiplex Unit
1	Site Linked Alarm System
1	UPS, Simulcast & Voter, Small Unit
1	Simulcast & Related Equipment for WB Fire
1	High-band MTR2000---Repeater, Western Broome Fire
1	Low-band Fire---T22R, Motorola
1	High-band MTR2000---VFD Cntrl Pt T2R2, Motorola
1	High-band MTR2000---VFD Ch 2, Motorola
1	High-band MTR2000---Vestal EMS, Motorola
1	High-band MTR2000---Endicott Fire Base, Motorola
1	High-band MTR2000---Union Amb, Motorola
1	High-band MTR2000 Recver---W.Crnrs Fire, Motorola
1	UHF Repeater---Local Govt., GE Master II
1	MTR2000---Harpur's Ferry, Motorola
1	UHF Repeater MTR2000--Br Security Battery Backup
2	Centracom Consoles W/Ceb, Motorola
1	Orbacom Encoder
1	Ratheon Voter Unit W/6 Site Modules
<b>ANDREWS RD</b>	
2	4.9 GHZ Microwave System
1	Radio Digital Multiplex Unit
1	MTR2000 Repeater, Western Broome Fire
1	Simulcast & Related Equipment For WB Fire
<b>ROUNDTOP</b>	
1	4.9 GHZ Microwave System
1	Radio Digital Multiplex Unit
1	Satellite Receiver - Western Broome Fire New 11/10
1	Satellite Receiver - Broome Sheriff
<b>HAWKINS</b>	
1	4.9 GHZ Microwave System
1	Radio Digital Multiplex Unit
1	Site Linked Alarm System
1	Data Ring Wireless Link Network to Landfill
1	Low-band Base Radio Emerg Man - T2R2
1	Low-band Base Radio Inter-county Fire ---T1R1
1	Radio Repeater Quantar---Sheriff, Motorola
1	Low-band Base, Co Fire- ICOM
1	UHF Repeater MTR2000 UHF Security, Motorola
<b>OLD STATE RD</b>	
4	4.9 GHZ Microwave W/Hot Standby
1	Radio Digital Multiplex Unit
1	Site Linked Alarm System





SITE & QUAN	DESCRIPTION
2	5.8 GHZ Canopy Data Link to Sheriff SIU (BOTH ENDS)
1	High-band Base - MTR2000...Broome Ambulance, Motorola
<b>MICROWAVE RM</b>	<b>AT PUBLIC SAFETY</b>
2	4.9 GHZ Microwave -Hot Standby
1	Radio Digital Multiplex Unit
1	Site Linked Alarm System
1	GE Mastr II...Local 33.90 & 33.86
1	Mitrek Consolette...33.98 & 33.82
1	High-band Micor...154.800 MRD
<b>CEEB ROOM &amp; DISPATCH</b>	
15	Centracom II + Dispatch System Consoles
	CEEB Rack with 16 Position CRT
1	Netclock System Satellite Receiver
1	Zetron 2000 Series Paging Terminal
1	Site Linked Alarm System – Complete
1	CDM-1550 Base Station With Power Supply - Ham Room - UHF
1	CDM-1550 Base Station With Power Supply - Ham Room - High-band
1	CDM-1550 Base Station With Power Supply - Senior Dispatch Consol - High-band
1	Low-band Max-Trac W/Power Supply - Red Cross
1	Portable UHF CDM Repeater, Motorola
1	Portable High-band CDM Repeater, Motorola
1	Off Hour Service On Console System
<b>ELY PARK</b>	
1	4.9 GHZ Microwave
1	Radio Digital Multiplex Unit
1	Site Linked Alarm System
1	900 Canopy to SOB, Lourdes, General
1	High-band Repeater, Motorola – Binghamton Police
1	Voting Comparator - Binghamton Police 9/2/2002
1	MTR-2000 UHF Repeater – Binghamton Fire 10/5/99
2	UPS For BGM Fire and BGM Police

Table 5-3: System Back Bone Equipment



## 6 User Interviews and Surveys

### 6.1 Overview

The users meeting agenda and surveys consisted of the following areas:

- General Operational Information
- Land mobile radio coverage
- Paging system coverage
- Dispatch issues
- Channel loading and congestion
- Interoperability
  - In County
  - Outside of the County
- System and Radio Performance
- Future System and Radio Performance
- Enhanced Features
  - Voice Security
  - Messaging, unit location, and unit ID
  - Emergency notification
  - Data

#### **Operational Use**

The County's conventional radio system operation is similar to the many other Counties' operations with the following highlights or exceptions

- There is overlap of volunteer fire departments and EMS volunteer operations
- Fire and EMS mutual-aid operations occur with adjoining county departments
- Interaction between law enforcement agencies including – sheriff, local and state police.
- County Highway is an integral provider of support services.



## 6.2 System Coverage

- Radio Coverage – Many respondents highlighted poor and inconsistent two-way portable radio and pager coverage.
- Radio Coverage – The law enforcement community has very limited portable coverage.
- Paging Coverage - Numerous areas have poor to no pager coverage.

## 6.3 System and Radio Performance

There were 6 law enforcement, 19 Fire/EMS and 1 EMS only survey respondents. Note: not all respondents answered all questions.

### Law Enforcement

- The overall rating of the systems was 6.6 on a 10 point scale.
- The mobile coverage rating was 5.75 on a 10 point scale.

### Fire/EMS

- The overall rating of the systems was 6.3 on a 10 point scale.
- The mobile coverage rating was 6.5 on a 10 point scale.

### EMS

- The overall rating of the systems was 5 on a 10 point scale.
- The mobile coverage rating was 6 on a 10 point scale.
- The EMS and fire service indicate a variety of issues with many being potentially caused by coverage issues. These include: missed calls because of poor pager coverage, poor on-scene coordination, and poor coordination in mutual aid operations because of lack of communications interoperability.
- Training of radio users in basic operations. There seems to be a great variety of equipment and radio programming methods that have caused complications to the understanding of the radio.

## 6.4 Future System and Radio Performance

The survey respondents also provided comments on future requirements and concerns. These included:



- Better coverage for in-building, paging, portable, and mobile operations is desired
- The cost of future radio equipment is a concern
- Add channels to reduce the crowding on fire dispatch frequency and the ability to have more fire and law enforcement tactical channels
- Ability to use features such as radio ID, emergency, GPS and the ability to interoperate between fire, EMS and law enforcement
- Ease of use and a common platform
- Relieve channel congestion by moving fire alerting and dispatch to another frequency perhaps on a frequency band such as VHF-high-band or UHF.

Overall, the users’ concerns are very consistent with other New York State users that are operating on similar radio systems and platforms. The users’ future enhancements desires are very reasonable – better coverage, less congestion, and using a low-cost subscriber radio on an uncomplicated system. In general, the users are looking for a good basic radio system.

The following matrix provides detailed information on the survey comments and inventory:

The following table shows the respondents overall system rating, reliability, congestion, coverage, and existing issues and future needs.

## 6.5 Survey Information

### 6.5.1 Law Enforcement Survey Information

Service	Police	Police	Police	Police	Police
Department	Broome County Security	Broome County Sheriff's Office	Deposit Police Dept.	Johnson City	Endicott Police Dept.
No. of Personnel	94	236	8	31	35
No. of Radio Users	89	236	8	31	35
Radios in use at one time	48	35	4	6	No
Radios					
VHF Low					
Portables	0	0	0	0	0
Mobiles	0	0	0	0	0



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Service	Police	Police	Police	Police	Police
Control Stns	0	0	0	0	0
Pagers	0	0	0	0	0
<b>VHF High</b>					
Portables	0	161	8	0	35
Mobiles	0	92	4	0	20
Control Stns	0	4	1	1	4
Pagers	0	0	0	0	0
<b>UHF</b>					
Portables	124	0	0	0	0
Mobiles	18	0	0	0	0
Control Stns	3	0	0	0	0
Pagers	0	0	0	0	0
<b>800 MHz</b>					
Portables	0	0	0	0	0
Mobiles	0	0	0	0	0
Control Stns	0	0	0	0	0
Pagers	0	0	0	0	0
Area of Ops	N/A	N/A	Village of Deposit	Village of Johnson City	Village of Endicott
<b>Mutual Aid Partners</b>					
In-County	Broome County Sheriff, NYSP, Endicott, Vestal, Binghamton, Johnson City	All local police agencies and NYSP	Broome County Sheriff/NYSP	Binghamton PD, Broome County Sheriff, NYSP, Vestal PD	All County and municipal agencies
Out-of-County	Tioga County Sheriff	Any police agency within NYS	Delaware County Sheriff/NYSP	No	No
<b>Communications Method</b>					
In-County	County UFH System	Dispatch, IA, other agencies freq	Rely through dispatch	Other freqs, cell phone, relay through dispatch	IA
Out-of-County	State IA, local PD	Dispatch or IA	Rely through dispatch	No	IA
<b>Frequency of Mutual Aid</b>					
In-County	Daily	Daily	N/A	Weekly	Daily



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Service	Police	Police	Police	Police	Police
Out-of-County	Never	Yearly	N/A	No	Weekly
Over all primary system rating	8	8	N/A	N/A	4
Positive attributes					
1	Good performance	County centralized dispatch	N/A	N/A	N/A
2	Sound quality	New simulcast project	N/A	N/A	N/A
3	Mobility	Dispatchers that are very proactive in the LA frequently assigned to work county law	N/A	N/A	N/A
Negative attributes					
1	Dead spots	Poor portable coverage	N/A	Dead spots	Poor coverage
2	Difficulty reaching repeaters	Too many users	N/A	N/A	Front desk console unreadable
3	N/A	911 polling takes too long - congestion	N/A	N/A	Occasionally
How often is system busy	Seldom	Frequently	N/A	Seldom	N/A
Subscriber equipment					
Portable positive features					
1	Compact	N/A	N/A	N/A	N/A
2	Sound quality	N/A	N/A	N/A	N/A
3	Battery life	N/A	N/A	N/A	N/A
Portable Negative attributes					
1	Tx/rx dead spots	N/A	N/A	N/A	N/A
2	Reaching repeaters	N/A	N/A	N/A	N/A



Service	Police	Police	Police	Police	Police
3	N/A	N/A	N/A	N/A	N/A
Mobile Positive features					
1	Mobility	N/A	N/A	N/A	N/A
2	Sound quality	N/A	N/A	N/A	N/A
3	Tx/rx ability to get out	N/A	N/A	N/A	N/A
Mobile Negative features					
1	Bulky	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A
Back up to communications center radio systems	Cell Phone	Cell phone	N/A	MDT's/Cell phones	Cell phone
Back up to operational radio systems	Cell Phone	Cell phone	N/A	MDT's/Cell phones	Cell phone
Features Currently Used					
Scan	Yes	Yes	N/A	Yes	Yes
Emergency Button	Yes	Yes	N/A	Yes	Yes
Radio ID	Yes	Yes	N/A	No	Yes
Mobile data use?	No	Yes	N/A	Yes	Yes
County Radio System					
Over all primary system rating	6	8	N/A	7	2
Mobile Coverage					
Mobile Coverage Issues	All County parks, inside certain facilities - library, DSS, GBRTC, mental health	Generally good. Some coverage issues.	N/A	Under Rte 17, Under N. Broad St.	Poor coverage
Portable Coverage Issues	County parks	Coverage issues	N/A	In ability to talk between mobiles and portables (not clear if it is a coverage or configuration issues)	Poor coverage



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Service	Police	Police	Police	Police	Police
In-Building Coverage Issues	Social Services, Mental Health, Library and Bus Station	Coverage issues	N/A	Oakdale Mall, Wilson Hospital, 301 Main Street	No coverage
Future System					
Desired Improvements					
1	Signal strength	Additional remote rx	N/A	Better coverage	A repeater to boost coverage
2	N/A	Moving other agencies off of the County law freq	N/A	N/A	N/A
3	N/A	Mobile data to reduce voice traffic	N/A	N/A	N/A
Desired Capabilities					
1	Wide area coverage	Reduce the number of users	N/A	Better coverage	No
2	In-building coverage	Improve coverage	N/A	N/A	No
3	N/A	Add secondary/Tac channels	N/A	N/A	No
Concerns					
1	Cost	Cost	N/A	Cost	Narrow Banding destroyed transmissions
2	Maintenance	Improve interop	N/A	Maintenance	N/A
3	Battery life	Maintain dedicated dispatcher for Sheriff	N/A	Interop	N/A
Previous Trouble Reports	N/A	Yes	N/A	N/A	Yes

Table 6-1: Law Enforcement Survey Information





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### 6.5.2 Fire/EMS Service Survey Information

Service	Fire_EMS First Response	Fire_EMS First Response	Fire_EMS	Fire_EMS First Response	Fire
Department	Chenango Bridge Fire Co. Inc.	Chenango	East Maine Fire Co.	Endwell Fire	Fire Mile Point
Number of Personnel	50	40	18	85	40
Number of Radio Users	30	20	18	70	40
Radios in use at one time	15	10	10	25	15
<b>Radios</b>					
<b>VHF Low</b>					
Portables	8	40	20	6	14
Mobiles	12	25	12	0	11
Control Stns	2	2	2	3	2
Pagers	50	66	24	0	55
Siren Monitors	2	1	1	0	1
<b>VHF High</b>					
Portables	12	0	0	34	0
Mobiles	1	1	0	13	0
Control Stns	0	0	0	3	0
Pagers	0	0	0	90	0
Siren Monitors	0	0	0	3	0
<b>UHF</b>					
Portables	0	13	0	4	12
Mobiles	0	6	0	0	4
Control Stns	0	0	0	0	0
Pagers	0	0	0	0	0
Siren Monitors	0	0	0	0	0
<b>800 MHz</b>					
Portables	0	0	0	0	0
Mobiles	0	0	0	0	0
Control Stns	0	0	0	0	0
Pagers	0	0	0	0	0
Siren Monitors	0	0	0	0	0
Area of Ops	Chenango Bridge - Central Broome County	Town of Barker and Town of Chenango	Town of Maine, Union, Glen Aubrey, Endwell, Endicott	Western Broome	Northern part of Town of Kirkwood
<b>Mutual Aid Partners</b>					
In-County	Chenango, Hillcrest, Port Crane, Chenango Forks, Port	Port Dickenson, Prospect Terrance, Choconut Center,	Regional Airport, Maine, Choc Ctr, Glen Aubrey, Union, Endwell,	Endicott, Johnson City, E. Maine, Vestal, Union Center, West	City of Binghamton, Kirkwood, Conklin, West Windsor,



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Service	Fire_EMS First Response	Fire_EMS First Response	Fire_EMS	Fire_EMS First Response	Fire
	Dickinson, Harpursville	Chenango Bridge, Chenango Forks, Whitney Point, Glen Aubery	Endicott and Johnson City	Chenango, Choconut Center, Maine	Windsor, Hillcrest, Port Dickinson, Port Crane, West Colesville
Out-of-County	Greene - Chenango County	No	No	Village of Owego - Tioga County	Great Bend and Susquehanna, PA
Which County Radio Systems used	County VHF Low	County VHF Low	County VHF Low	County VHF High - Western Broome	VHF Low
Over all primary system rating	7	8	7	8	7
<b>Positive attributes</b>					
1	Distance	Good coverage	Long Range	Repeater for clarity and range	East to use
2	N/A	Low maintenance	All Equipment Co. owned	Multi Ops freqs for fire ground	N/A
3	N/A	Easy to use	N/A	Less Skip	N/A
<b>Negative attributes</b>					
1	Interference - missed msgs	Poor in building	Lack of coverage	Users not going to an ops channel	Dead spots
2	Poor interop with VHF High	Poor coverage in valley	Lack of interop	Interference from PA	Radio traffic during large incidents
3	Inadequate back up	Size of radio	Poor portable performance	Inability to communicate with VHF Low	N/A
How often is system busy	Seldom	Seldom	Seldom	Occasionally	Seldom
<b>Subscriber equipment</b>					
<b>Portable positive features</b>					
1	Use of vehicle repeater	Dependable	Paid for	Program'able	East to use
2	N/A	Low maintenance	Ample quantity	Digital display	Durable
3	N/A	Easy to use	N/A	Newer radios	N/A
<b>Portable Negative attributes</b>					
1	Use repeater only allows use of 1 channel	Poor transmission	Some getting old	Small buttons	Limited range
2	If repeater fails	Poor reception	N/A	Difficulty	Unable to get



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Service	Fire_EMS First Response	Fire_EMS First Response	Fire_EMS	Fire_EMS First Response	Fire
	Loss of communications			changing between banks	out of buildings
3	VHF Low spotty	Large size	N/A	N/A	N/A
Mobile Positive features					
1	Good coverage	Durable	Paid for	Digital display	Easy to use
2	N/A	Low maintenance	In all necessary vehicles	ID's for transmitting radio	Open range
3	N/A	Good voice quality	Easy to use	N/A	Very few repairs needed
Mobile Negative features					
1	Unable to scan	Bulky	Some do not scan	No	Cost of repairs/replacement
2	No identifiers assigned	Expensive	N/A	No	No interop with law/EMS
3	N/A	Large antenna	N/A	No	N/A
Alternative paging methods	Text Msg/I am Responding	E-mail	I am responding	Text messaging	I am responding
Use of 'I am responding'	Yes	Yes	Yes	Yes	Yes
Back up to communications center radio systems	Cell phone	Phone	Phone	Go to VHF Low, call station to phone county	Phone
Back up to operation radio systems	Cell phone	No	Phone	N/A	UHF Tac
Features Currently Used				Yes	
Scan	Yes	Yes	Yes	Yes	Yes
Emergency Button	No	No	No	Yes	No
Radio ID	No	No	No	No	No
Mobile data use?	Yes	N/A	No	N/A	N/A
County Radio System					
Mobile Coverage	8	7	7	9	7
Mobile Coverage Issues	No problem	No	N/A	No	No
Portable Coverage Issues	Poor signal/audio	Dunham Hill Road, Brooks Road, Perry Road	Coverage - airport/Knapp-Flint Road	No	Loughlin Rd/Haskin Rd
Paging Coverage Issues	Some missed transmissions	No	N/A	No	Loughlin Rd/Haskin Rd
In-Building Coverage Issues	N/A	901 Upper Front St, BCC,	Airport	No	Frito Lay, NYSEG, L-3



Service	Fire_EMS First Response	Fire_EMS First Response	Fire_EMS	Fire_EMS First Response	Fire
		all buildings			
Future System					
Desired Improvements					
1	No need for repeaters	Dispatch channel	Interop	Countywide capability	Dispatch Channel
2	Agency specific channel for Co. to monitor	Ops channel	Portable coverage	Monitor Countywide	Command Channel
3	Interoperability	Interoperability	N/A	N/A	N/A
Desired Capabilities					
1	EA Button	In building coverage	Interop	Interop with other fire, EMS, PD, DPW, etc.	In building coverage
2	Identifiers	Interop w/EMS	Inside Building Coverage	N/A	Interop with law and EMS
3	Better in-building	Coverage area	N/A	N/A	N/A
Concerns					
1	Cost	Cost	Cost	Cost	Cost
2	Interoperability - need for common equipment	Ease of use	N/A	User training	Training required to use the systems
3	Cost of maintenance	Maintenance	N/A	N/A	N/A
Previous Trouble Reports		No	No	No	No

Service	Fire_EMS First Response	Fire_EMS	Fire_EMS	Fire_EMS First Response	Fire_EMS First Response
Department	Binghamton Airport - ARFF	Harpursville Fire Dept.	Hillcrest Fire Dept.	Johnson City Fire	Lisle Fire & Medical Team
Number of Personnel	10	28	25	26	6
Number of Radio Users	10	18	25	26	4
Radios in use at one time	6	12	15	20	2
Radios					
VHF Low					
Portables	3	0	18	0	4
Mobiles	3	14	7	0	2
Control Stns	1	2	1	0	0
Pagers	8	28	35	0	4
Siren Monitors	No	1	1	0	0
VHF High					



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Service	Fire_EMS First Response	Fire_EMS	Fire_EMS	Fire_EMS First Response	Fire_EMS First Response
<b>Department</b>	<b>Binghamton Airport - ARFF</b>	<b>Harpursville Fire Dept.</b>	<b>Hillcrest Fire Dept.</b>	<b>Johnson City Fire</b>	<b>Lisle Fire &amp; Medical Team</b>
Portables	0	0	4	0	0
Mobiles	0	2	0	0	0
Control Stns	0	2		0	1
Pagers	0	0	0	0	0
Siren Monitors	0	0	0	0	0
<b>UHF</b>					
Portables	20	15	0	28	0
Mobiles	20	12	0	10	0
Control Stns	1	2	0	2	0
Pagers	0	0	0	28	0
Siren Monitors	0	0	0	0	0
<b>800 MHz</b>					
Portables	0	0	0	0	0
Mobiles	0	0	0	0	0
Control Stns	0	0	0	0	0
Pagers	0	0	0	0	0
Siren Monitors	0	0	0	0	0
Notes		17 VHF HB/UHF dual band portables			
Area of Ops	Greater Binghamton Airport	Town of Colesville - Broome Co., part of Town of Afton - Chenango Co.	Town of Fenton/Village of Port Dickenson	Village of Johnson City/Westover Fire Protection District	Village & Town of Lisle
<b>Mutual Aid Partners</b>					
In-County	Nearly all fire and EMS	Sanitaria Springs, West Colesville, Ouaquaga, Port Crane, Windsor, West Windsor, Deposit	N/A	Endicott, Vestal, Endwell, Prospect Terrace, Binghamton	Killawog, W.P., Triangle
Out-of-County	No	Afton, Coventry, Greene	No	No	No
Which County Radio Systems used	VHF Low	VHF Low	VHF Low	UHF - JCFD	VHF Low
Over all primary system rating	3	6	8	7	5
<b>Positive attributes</b>					
1	No	Already exists	N/A	Seldom total system failure	Calls are clear
2	No	Only cost to	N/A		Repeating the



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Service	Fire_EMS First Response	Fire_EMS	Fire_EMS	Fire_EMS First Response	Fire_EMS First Response
Department	Binghamton Airport - ARFF	Harpursville Fire Dept.	Hillcrest Fire Dept.	Johnson City Fire	Lisle Fire & Medical Team
		maintain			call is beneficial
3	No		N/A		Easier to understand
Negative attributes					
1	Poor range	Poor coverage	N/A	System cuts out during transmissions of alarms from dispatch	No
2	No	Even poorer pager coverage	N/A	Bad reception in Wilson Hospital and other large buildings	No
3	No	Shadowing	N/A		No
How often is system busy	Never	Occasionally	Seldom	Seldom	Occasionally
Subscriber equipment					
Portable positive features					
1	No	UHF portable use cross band repeat	Ease of use	N/A	N/A
2	No	N/A	N/A	N/A	N/A
3	No	N/A	N/A	N/A	N/A
Portable Negative attributes					
1	Bulky antenna	Poor coverage	N/A	N/A	Intermittent
2	No	N/A	N/A	N/A	Work only outside
3	No	N/A	N/A	N/A	Poor inside performance
Mobile Positive features					
1	No	Works well	N/A	N/A	Work good
2	No	N/A	N/A	N/A	Broome usually hears the 1st time
3	No	N/A	N/A	N/A	Not much back ground noise
Mobile Negative features					
1	No	Very little radio discipline	N/A	N/A	N/A
2	No	N/A	N/A	N/A	N/A



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Service	Fire_EMS First Response	Fire_EMS	Fire_EMS	Fire_EMS First Response	Fire_EMS First Response
<b>Department</b>	<b>Binghamton Airport - ARFF</b>	<b>Harpurville Fire Dept.</b>	<b>Hillcrest Fire Dept.</b>	<b>Johnson City Fire</b>	<b>Lisle Fire &amp; Medical Team</b>
3	No	N/A	N/A	N/A	N/A
Alternative paging methods	No	Txt msg via I am responding	Cellular	Cell phone/Txt msgs	Cell phone/I am responding
Use of 'I am responding'	No	Yes	Yes	Yes	Yes
Back up to communications center radio systems	Phone	Land line and cell phone	Cellular	Phone	Cell phone
Back up to operation radio systems	No	Town wide UHF system	N/A	No	Hand held radios
<b>Features Currently Used</b>					
Scan	Yes	Yes	Yes	Yes	No
Emergency Button	No	No	No	Yes	No
Radio ID	No	Yes	No	No	No
Mobile data use?	N/A	No	No	Chief only	No
<b>County Radio System</b>					
Mobile Coverage	3	6	8	8	4
Mobile Coverage Issues	N/A	Route 79 in Centerville/M Maple Street	N/A	No	Route 70 between Lisle and Richford
Portable Coverage Issues	N/A	Same	N/A	Poor coverage in hospital/large EJ bldgs. between Main and Grand Ave.	Village of Lisle
Paging Coverage Issues	N/A	Many areas	N/A	N/A	N/A
In-Building Coverage Issues	No in building communications possible	School bldgs., 54 Main Street	N/A	Wilson Hospital, Hill Top Nursing Home, EJ Buildings, Schools	Auction Barn in Manringville
<b>Future System</b>					
<b>Desired Improvements</b>					
1	Better range	Better coverage	N/A	Move repeater to Ely Park Hill	N/A
2	N/A	N/A	N/A	Add repeater at Wilson Hospital	N/A
3	N/A	N/A	N/A		N/A
<b>Desired Capabilities</b>					
1	N/A	Move to UHF	N/A	In building coverage	In building coverage



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Service	Fire_EMS First Response	Fire_EMS	Fire_EMS	Fire_EMS First Response	Fire_EMS First Response
Department	Binghamton Airport - ARFF	Harpursville Fire Dept.	Hillcrest Fire Dept.	Johnson City Fire	Lisle Fire & Medical Team
2	N/A	Interoperability	N/A	Interoperability	Wide area coverage
3	N/A	N/A	N/A	N/A	Easy to use
Concerns					
1	Cost	Better discipline	N/A	Interoperability	Cost
2	N/A	Time out timers	N/A	Cost	Maintenance
3	N/A	N/A	N/A	N/A	Training
Previous Trouble Reports	No	No	N/A	N/A	No

Service	Fire_EMS First Response	Fire	Fire	Fire_EMS
Department	Nanticoke Fire Dept.	Ouaquaga Fire	Port Dickinson	Sanitaria Springs Fire Co
Number of Personnel	13	15	20	42
Number of Radio Users	5	15	15	25
Radios in use at one time	3	0	12	15
Radios				
VHF Low				
Portables	5	0	16	5
Mobiles	8	6	5	11
Control Stns	1	1	2	2
Pagers	15	15	25	30
Siren Monitors	1	0	1	0
VHF High				
Portables	0	18	0	0
Mobiles	0	0	0	0
Control Stns	0	0	0	0
Pagers	0	0	0	0
Siren Monitors	0	0	0	0
UHF				
Portables	0	0	0	22
Mobiles	0	0	0	4
Control Stns	0	0	0	2
Pagers	0	0	0	0
Siren Monitors	0	0	0	0
800 MHz				
Portables	0	0	0	0
Mobiles	0	0	0	0
Control Stns	0	0	0	0
Pagers	0	0	0	0





Service	Fire_EMS First Response	Fire	Fire	Fire_EMS
Department	Nanticoke Fire Dept.	Ouaquaga Fire	Port Dickinson	Sanitaria Springs Fire Co
Siren Monitors	0	0	0	0
Note		Use VHF High repeater for fire ground ops		VHF Low and numerous UHF vehicle repeater and tac freqs, including U-Call/Tac
Area of Ops	Nanticoke	Towns of Windsor and Colesville	Village of Port Dickinson & part of Town of Dickinson	Towns of Colesville and Fenton
Mutual Aid Partners				
In-County	Glen Aubrey, Lisle	Windsor, Harpursville, West Colesville, Sanitaria Springs	Hillcrest, Chenango Bridge, Port Crane, Chenango, Chenango Forks, Five Mile Point, Prospect Terrace, Choconut Center	Harpursville, West Colesville, Ouaquaga, Port Crane, West Windsor Depts., Colesville EMS
Out-of-County	Tioga County	No	No	No
Which County Radio Systems used	VHF Low	VHF Low	VHF Low	VHF Low
Over all primary system rating	1	8	9	5
Positive attributes				
1	Can talk Countywide	Works well most of the time	Generally good	Works well for distance
2	N/A	N/A	Pagers always trip	N/A
3	N/A	N/A	N/A	N/A
Negative attributes				
1	Poor portable performance	Coverage gaps	Skip	Poor pager and portable coverage
2	Limited cell service for backup	N/A	Huge antennas	Busy during storms
3	N/A	N/A	Portable problems	Dispatch channel is also the command channel
How often is system busy	Occasionally	Seldom	Seldom	Occasionally
Subscriber equipment				
Portable positive features				
1	Talk to County and other departments	New repeater give move flexibility	No	No
2	N/A	Better safety for personnel	No	N/A
3	N/A	N/A	No	N/A



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Service	Fire_EMS First Response	Fire	Fire	Fire_EMS
Department	Nanticoke Fire Dept.	Ouaquaga Fire	Port Dickinson	Sanitaria Springs Fire Co
Portable Negative attributes				
1	N/A	N/A	Coverage	Poor coverage
2	N/A	N/A	Huge antennas	Bulky antennas
3	N/A	N/A	No	Poor in-building
Mobile Positive features				
1	N/A	N/A	Works well	Works well for long distances
2	N/A	N/A	No	N/A
3	N/A	N/A	No	N/A
Mobile Negative features				
1	N/A	N/A	Skip	Bulky antennas
2	N/A	N/A	No	N/A
3	N/A	N/A	No	N/A
Alternative paging methods	Cell/I am responding	Limited txt msging	Cell phone/Txt msg	Txt msg/I am responding
Use of 'I am responding'	Yes	No	Yes	Yes
Back up to communications center radio systems	N/A	Yes	Phone	Phone
Back up to operation radio systems	N/A	Yes	Local TAC channels	Town-wide UHF/phone
Features Currently Used				
Scan	No	N/A	Yes	Yes
Emergency Button	No	N/A	No	No
Radio ID	N/A	N/A	Some	Yes
Mobile data use?	No	N/A	No	No
County Radio System				
Mobile Coverage	4	9	9	6
Mobile Coverage Issues	Poor coverage in west. Poor in houses/trailers.	N/A	No	Works well
Portable Coverage Issues	Poor coverage in west	Poor coverage in valleys	Areas of poor coverage	Talk out is OK, talk back can be a problem
Paging Coverage Issues	Poor coverage	N/A	No issues	Same as portables but more so
In-Building Coverage Issues	Homes	N/A	PD Elementary School, Basement of PD Baptist	Fire station at 811 NY 7



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Service	Fire_EMS First Response	Fire	Fire	Fire_EMS
Department	Nanticoke Fire Dept.	Ouaquaga Fire	Port Dickinson Church	Sanitaria Springs Fire Co
Future System				
Desired Improvements				
1	Dispatch us with calls	N/A	Eliminate skip	Better paging
2	Talk back to county	N/A	N/A	Better portable to dispatch and in-building coverage
3	N/A	N/A	N/A	Separate channels for command and dispatch
Desired Capabilities				
1	No	N/A	Simulcast	See above - In-building and pager coverage
2	No	N/A	N/A	Interop with other fire, EMS, law
3	No	N/A	N/A	Discrete talk groups
Concerns				
1	Cost	Cost	Cost	Cost
2	N/A	N/A	N/A	Interop
3	N/A	N/A	N/A	Coverage
Previous Trouble Reports	Yes	No		No

Service	Fire	Fire_EMS First Response	Fire_EMS
Department	Vestal Fire Dept.	West Windsor Fire Co	Windsor Fire Co
Number of Personnel	175	32	35
Number of Radio Users	75	32	25
Radios in use at one time	25	6	25
Radios			
VHF Low			
Portables	1	6	10
Mobiles	2	10	15
Control Stns	0	1	2
Pagers	0	36	35
Siren Monitors	0	0	2
VHF High			
Portables	75	5	30
Mobiles	58	0	2



Service	Fire	Fire_EMS First Response	Fire_EMS
Department	Vestal Fire Dept.	West Windsor Fire Co	Windsor Fire Co
Control Stns	8	0	1
Pagers	175	0	0
Siren Monitors	4	0	0
<b>UHF</b>			
Portables	8	18	30
Mobiles	2	2	10
Control Stns	1	0	0
Pagers	0	0	0
Siren Monitors	0	0	0
<b>800 MHz</b>			
Portables	0	0	0
Mobiles	0	0	0
Control Stns	0	0	0
Pagers	0	0	0
Siren Monitors	0	0	0
<b>Note</b>			
Area of Ops	Town of Vestal	District #2 - Town of Windsor	Town and Village of Windsor
<b>Mutual Aid Partners</b>			
In-County	Town of Binghamton, City of Binghamton, Johnson City, Endicott, Endwell	Colesville, Windsor, Fire Mile Point	Deposit, Ouauga, Harpursville, West Windsor, West Colesville, Five Mile Point, Sanitaria Springs
Out-of-County	Choconut, Little Medowns, PA; Apalachin, NY	No	Great Bend, Susquehanna PA; Hancock, NY
Which County Radio Systems used	Western Broome/VHF High - Vestal EMS	VHF Low	VHF Low
Over all primary system rating	10	8	0
<b>Positive attributes</b>			
1	98 % of Town portable coverage	Range	No
2	In building	Inter op	No
3	Channel capacity	N/A	No
<b>Negative attributes</b>			
1	Poor coverage in So. Vestal	Congestion	Poor pager coverage
2	Simulcast reduced coverage in So. Vestal	Need for more channels	Poor portable coverage
3	Endicott FD EMS calls on dispatch channel		Poor in-building coverage
How often is system busy	Seldom	Seldom	Frequently
<b>Subscriber equipment</b>			
Portable positive			



Service	Fire	Fire_EMS First Response	Fire_EMS
Department	Vestal Fire Dept.	West Windsor Fire Co	Windsor Fire Co
features			
1	Capability	No	No
2	Size	No	No
3	Display on HT1250	No	No
Portable Negative attributes			
1	HT750 - Capacity	No	Bulky
2	N/A	No	Poor coverage
3	N/A	No	N/A
Mobile Positive features			
1	CDM 1250/1550 Capacity	No	Good for transmit/receive
2	Display	No	N/A
3	N/A	No	N/A
Mobile Negative features			
1	Audio output in narrowband	No	Limited to VHF Low
2	N/A	No	N/A
3	N/A	No	N/A
Alternative paging methods	I am responding	Txt msging	Txt msg/I am responding
Use of 'I am responding'	Yes	Yes	Yes
Back up to communications center radio systems	Western Broome channel 2	Land line/txtng	Telephone
Back up to operation radio systems	Town of Vestal Emergency Repeater	Yes	Town highway
Features Currently Used			
Scan	Yes	No	Yes
Emergency Button	Yes	No	No
Radio ID	Yes	No	No
Mobile data use?	Yes		N/A
County Radio System			
Mobile Coverage	9	7	0
Mobile Coverage Issues	South Vestal, Vestal Center - Colman Rd, Powerhouse Rd, Stateline Rd	South Eastern Town of Windsor	South Windsor/Lanesboro-state line Road; Village of Windsor - Honey Hollow Rd, Blachley Rd, Phillips to White
Portable Coverage Issues	Very few	Towns of Windsor - Trim St & South area's	Poor in most of district
Paging Coverage Issues	N/A	Good if correct tower used	Poor in most of district



Service	Fire	Fire_EMS First Response	Fire_EMS
<b>Department</b>	<b>Vestal Fire Dept.</b>	<b>West Windsor Fire Co</b>	<b>Windsor Fire Co</b>
In-Building Coverage Issues	BU, Vestal School on African Road	No	Poor in middle/high school, medical center, shopping plaza
<b>Future System</b>			
<b>Desired Improvements</b>			
1	Digital UHF	More frequencies	800 MHz repeater
2	Capacity	Co. grids for operating freq	Interop
3	Coverage		Separate channels for responding, fire ground, command
<b>Desired Capabilities</b>			
1	Interop with law, EMS, fire	Interop	Interop
2	Town wide portable coverage	Wide area	In-building
3	In building, emergency ID	Coverage, in-building, features	Pager coverage
<b>Concerns</b>			
1	Cost	Cost	Cost
2	Interop with law, EMS, fire	Ease of use	Ease of use
3	In building/emergency ID	Interoperability	Training
Previous Trouble Reports	Yes	No	No

Table 6-2: Fire/EMS Service Survey Information

### 6.5.3 EMS Survey Information

Service	EMS Transport
<b>Department</b>	<b>Colesville Vol. Ambulance</b>
Number of Personnel	28
Number of Radio Users	23
Radios in use at one time	Varies
<b>Radios</b>	
VHF Low	
Portables	3
Mobiles	5
Control Stns	1
Pagers	25
Siren Monitors	0
VHF High	
Portables	0
Mobiles	2
Control Stns	0
Pagers	0
Siren Monitors	0



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Service	EMS Transport
Department	Colesville Vol. Ambulance
UHF	
Portables	0
Mobiles	0
Control Stns	0
Pagers	0
Siren Monitors	0
800 MHz	
Portables	0
Mobiles	0
Control Stns	0
Pagers	0
Siren Monitors	0
Area of Ops	Town of Colesville
Mutual Aid Partners	
In-County	Broome VA, Superior, Windsor, Chenango
Out-of-County	Afton, Coventry, Bainbridge
Communications Method	
In-County	Direct
Out-of-County	Use Chenango and Broome CC Freq
Occurrence of Mutual Aid	
In-County	Weekly
Out-of-County	Monthly
Which County Radio Systems used	County VHF Low-band
Over all primary system rating	5
Positive attributes	
1	N/A
2	N/A
3	N/A
Negative attributes	
1	N/A
2	N/A
3	N/A
How often is system busy	Seldom
Subscriber equipment	
Portable positive features	
1	N/A
2	N/A
3	N/A
Portable Negative attributes	
1	N/A
2	N/A
3	N/A
Mobile Positive features	
1	N/A
2	N/A



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Service	EMS Transport
Department	Colesville Vol. Ambulance
3	N/A
Mobile Negative features	
1	N/A
2	N/A
3	N/A
Alternative paging methods	Text Paging
Use of 'I am responding'	Yes
Back up to communications center radio systems	Cell phone
Back up to operational radio systems	N/A
Features Currently Used	
Scan	N/A
Emergency Button	N/A
Radio ID	N/A
Mobile data use?	N/A
County Radio System	
Mobile Coverage	6
Mobile Coverage Issues	Varies
Portable Coverage Issues	Varies
Paging Coverage Issues	N/A
In-Building Coverage Issues	N/A
Future System	
Desired Improvements	
1	N/A
2	N/A
3	N/A
Desired Capabilities	
1	Interop
2	Wide area coverage
3	In-Building
Concerns	
1	Cost
2	Ease of use
3	N/A
Previous Trouble Reports	No

Table 6-3: EMS Survey Information





## 7 Spectrum Use

The County and individual agencies use local channels for on-scene tactical communications channels. The County operates on a multiple channels for dispatch. Spectrum issue ranges from congestion during heavy communications and paging activity to a lack of situational awareness because of the diversity of channels. The table below provided by the Office of Emergency Services outlines the channels used by the various services.

### 7.1 Broome County User Frequencies and Operations

Function	Call Sign	Location	Frequency
Local Gov. System	WXK-787	Gov. Plaza	458.8750
Local Gov. System	WXK-787	Gov. Plaza	453.6750
Local Gov. System	WXK-787	911 Center	458.8750
Local Gov. System	WXK-787	911 Center	453.6750
Vestal PD Inpt	WQKJ-693	Union Twr	159.0900
Vestal FD Inpt	WQKJ-693	Union Twr	155.9850
Vestal Amb	WQKJ-693	Union Twr	155.2350
Harp Ferry Amb	WQKJ-693	Union Twr	155.2050
Union Amb	WQKJ-693	Union Twr	155.1750
Sheriff Rptr	WQKJ-693	Union Twr	154.8000
Ves FD Chan 2	WQKJ-693	Union Twr	154.3550
WC FD Chan 2	WQKJ-693	Union Twr	154.1900
Alarm System Data	WQKJ-693	State Road	453.4250
Broome Amb	WQKJ-693	State Road	155.1600
Alarm System Data	WQKJ-693	Round Top	453.4250
Alarm System Data	WQKJ-693	Pease Hill	453.4250
Sheriff Rptr	WQKJ-693	Pease Hill	154.8000
Co Fire	WQKJ-693	Pease Hill	33.9800
Co Fire	WQKJ-693	Pease Hill	33.9400
Co Fire	WQKJ-693	Pease Hill	33.9000
Co Fire	WQKJ-693	Pease Hill	33.8600
Co Fire	WQKJ-693	Pease Hill	33.8200
Superior Amb	WQKJ-693	Ingraham Hill	155.2200
Alarm System Data	WQKJ-693	Andrews Road	453.4250
Dorchester Pk Relay Security	WQJR-275	Whitney Point	458.4000



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Function	Call Sign	Location	Frequency
Greenwood Park Relay Security	WQJR-275	Lisle	458.4000
Cole Park Relay Security	WQJR-275	Harpusville	458.4000
BCC to Sec Ing relay	WQJR-275	BCC	453.9000
Rptr Output Jail	WPMD-227	Jail Rptr Out	151.3175
Rptr Input Jail	WPMD-227	Jail Moble/Port	158.8800
Medical	WNAZ-708	Twist Run	463.0000
Medical	WNAZ-708	Twist Run	463.0250
Medical	WNAZ-708	Twist Run	463.0500
Medical	WNAZ-708	Twist Run	463.0750
Medical	WNAZ-708	Twist Run	463.1000
Medical	WNAZ-708	Twist Run	463.1250
Medical	WNAZ-708	Twist Run	463.1500
Medical	WNAZ-708	Twist Run	463.1750
Medical	WNAZ-708	Twist Run	462.9500
Medical	WNAZ-708	Twist Run	462.9750
Medical	WNAZ-708	Tuscarora Mtn	463.0000
Medical	WNAZ-708	Tuscarora Mtn	463.0250
Medical	WNAZ-708	Tuscarora Mtn	463.0500
Medical	WNAZ-708	Tuscarora Mtn	463.0750
Medical	WNAZ-708	Tuscarora Mtn	463.1000
Medical	WNAZ-708	Tuscarora Mtn	463.1250
Medical	WNAZ-708	Tuscarora Mtn	463.1500
Medical	WNAZ-708	Tuscarora Mtn	463.1750
Medical	WNAZ-708	Tuscarora Mtn	462.9500
Medical	WNAZ-708	Tuscarora Mtn	462.9750
Medical	WNAZ-708	Ingraham Hill	463.0000
Medical	WNAZ-708	Ingraham Hill	463.0250
Medical	WNAZ-708	Ingraham Hill	463.0500
Medical	WNAZ-708	Ingraham Hill	463.0750
Medical	WNAZ-708	Ingraham Hill	463.1000
Medical	WNAZ-708	Ingraham Hill	463.1250
Medical	WNAZ-708	Ingraham Hill	463.1500
Medical	WNAZ-708	Ingraham Hill	463.1750
Medical	WNAZ-708	Ingraham Hill	462.9500
Medical	WNAZ-708	Ingraham Hill	462.9750
Medical	WNAZ-708	Hawkins Hill	463.0000
Medical	WNAZ-708	Hawkins Hill	463.0250



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Function	Call Sign	Location	Frequency
Medical	WNAZ-708	Hawkins Hill	463.0500
Medical	WNAZ-708	Hawkins Hill	463.0750
Medical	WNAZ-708	Hawkins Hill	463.1000
Medical	WNAZ-708	Hawkins Hill	463.1250
Medical	WNAZ-708	Hawkins Hill	463.1500
Medical	WNAZ-708	Hawkins Hill	463.1750
Medical	WNAZ-708	Hawkins Hill	462.9500
Medical	WNAZ-708	Hawkins Hill	462.9750
Medical	WNAZ-708	Airport	463.0000
Medical	WNAZ-708	Airport	463.0250
Medical	WNAZ-708	Airport	463.0500
Medical	WNAZ-708	Airport	463.0750
Medical	WNAZ-708	Airport	463.1000
Medical	WNAZ-708	Airport	463.1250
Medical	WNAZ-708	Airport	463.1500
Medical	WNAZ-708	Airport	463.1750
Medical	WNAZ-708	Airport	462.9500
Medical	WNAZ-708	Airport	462.9750
Medical	WNAZ-708	911 Center	463.0000
Medical	WNAZ-708	911 Center	463.0250
Medical	WNAZ-708	911 Center	463.0500
Medical	WNAZ-708	911 Center	463.0750
Medical	WNAZ-708	911 Center	463.1000
Medical	WNAZ-708	911 Center	463.1250
Medical	WNAZ-708	911 Center	463.1500
Medical	WNAZ-708	911 Center	463.1750
Medical	WNAZ-708	911 Center	462.9500
Medical	WNAZ-708	911 Center	462.9750
Local Gov. Rptr	WDT-328	Tuscarora Mtn	453.8750
SEMO	WDT-328	MO	45.3200
SEMO	WDT-328	MO	45.4000
SEMO	WDT-328	MO	45.4800
SEMO	WDT-328	MO	45.6000
SEMO	WDT-328	MO	45.3200
SEMO	WDT-328	MO	45.4000
SEMO	WDT-328	MO	45.4800
SEMO	WDT-328	MO	45.6000



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Function	Call Sign	Location	Frequency
County TA	WDT-328	MO	453.6750
County LG Repeater Input	WDT-328	MO	458.8750
N/A	WDT-328	MO	458.4250
N/A	WDT-328	MO	458.3000
Local Gov. Rptr	WDT-328	Ingraham Hill	453.8750
SEMO	WDT-328	Hawkins Hill	45.3200
SEMO	WDT-328	Hawkins Hill	45.4000
SEMO	WDT-328	Hawkins Hill	45.6000
Co Parks	WDT-328	Airport	45.4000
Airport Ops Repeater	WDT-328	Airport	453.8750
Alarm System Data	KKL-552	Twist Run	453.4250
Broome Security Rptr	KKL-552	Twist Run	453.4000
Interop Freq	KKL-552	Twist Run	453.2125
Interop Freq	KKL-552	Twist Run	155.7525
Endicott Fire	KKL-552	Twist Run	154.3700
Vestal Fire	KKL-552	Twist Run	154.3100
Co Fire	KKL-552	Twist Run	33.9400
Co Fire	KKL-552	Twist Run	33.9000
Alarm System Data	KKL-552	Tuscarora Mtn	453.4250
Broome Security Rptr	KKL-552	Tuscarora Mtn	453.4000
Interop Freq	KKL-552	Tuscarora Mtn	453.2125
Interop Freq	KKL-552	Tuscarora Mtn	155.7525
Co Fire	KKL-552	Tuscarora Mtn	33.9400
Co Fire	KKL-552	Tuscarora Mtn	33.9000
Interop Freq	KKL-552	MO	458.8625
Interop Freq	KKL-552	MO	458.7125
Interop Freq	KKL-552	MO	458.4625
N/A	KKL-552	MO	458.4250
Broome Security Rptr Input	KKL-552	MO	458.4000
Interop Freq	KKL-552	MO	458.2125
Binghamton Fire - Fireground	KKL-552	MO	453.9250
Interop Freq	KKL-552	MO	453.8625
Interop Freq	KKL-552	MO	453.7125
Interop Freq	KKL-552	MO	453.4625
Binghamton Fire - TAC 3	KKL-552	MO	453.2500
Interop Freq	KKL-552	MO	159.4725
BGM Det Input	KKL-552	MO	158.9550



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Function	Call Sign	Location	Frequency
BGM Detective	KKL-552	MO	158.9550
Interop Freq	KKL-552	MO	158.7375
Interop Freq	KKL-552	MO	155.7525
Interop Freq	KKL-552	MO	154.4525
Endicott Fire	KKL-552	MO	154.3700
Vestal Fire	KKL-552	MO	154.3100
Interop Freq	KKL-552	MO	151.1375
Inter County	KKL-552	MO	45.8800
Co Fire	KKL-552	MO	33.9800
Co Fire	KKL-552	MO	33.9400
Co Fire	KKL-552	MO	33.9000
Co Fire	KKL-552	MO	33.8600
Co Fire	KKL-552	MO	33.8200
Alarm System Data	KKL-552	Ingraham Hill	453.4250
Broome Security Rptr	KKL-552	Ingraham Hill	453.4000
Inter County	KKL-552	Ingraham Hill	45.8800
Co Fire	KKL-552	Ingraham Hill	33.9800
Co Fire	KKL-552	Ingraham Hill	33.9400
Co Fire	KKL-552	Ingraham Hill	33.9000
Co Fire	KKL-552	Ingraham Hill	33.8600
Co Fire	KKL-552	Ingraham Hill	33.8200
Alarm System Data	KKL-552	Hawkins Hill	453.4250
Broome Security Rptr	KKL-552	Hawkins Hill	453.4000
Interop Freq	KKL-552	Hawkins Hill	453.2125
Interop Freq	KKL-552	Hawkins Hill	155.7525
Inter County	KKL-552	Hawkins Hill	45.8800
Co Fire	KKL-552	Hawkins Hill	33.9400
Co Fire	KKL-552	Hawkins Hill	33.9000
BGM Detective	KKL-552	Gov. Plaza	154.8750
Alarm System Data	KKL-552	911 Center	453.4250
Endicott Fire	KKL-552	911 Center	154.3700
Vestal Fire	KKL-552	911 Center	154.3100
Co Fire	KKL-552	911 Center	33.9800
Co Fire	KKL-552	911 Center	33.9400
Co Fire	KKL-552	911 Center	33.9000
Co Fire	KKL-552	911 Center	33.8600
Co Fire	KKL-552	911 Center	33.8200



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Function	Call Sign	Location	Frequency
Sheriff Rptr	KED-639	Tuscarora Mtn	154.8000
Sheriff C2C	KED-639	MO	154.8000
Interagency	KED-639	MO	155.3700
Rptr Input	KED-639	MO	158.7300
Sheriff Rptr	KED-639	Ingraham Hill	154.8000
Sheriff Rptr	KED-639	Hawkins Hill	154.8000
Point to Point	KED-639	Airport	39.4600
Sheriff Rptr	KED-639	Airport	154.8000
Interagency	KED-639	Airport	155.3700
Sheriff Rptr	KED-639	911 Center	154.8000
Interagency	KED-639	911 Center	155.3700

Table 7-1: Broome County User Frequencies and Operations

## 8 Connectivity

The PSAP located at the Binghamton PSB is connected to remote sites by microwave circuits.

The Broome County microwave system is configured as follows:

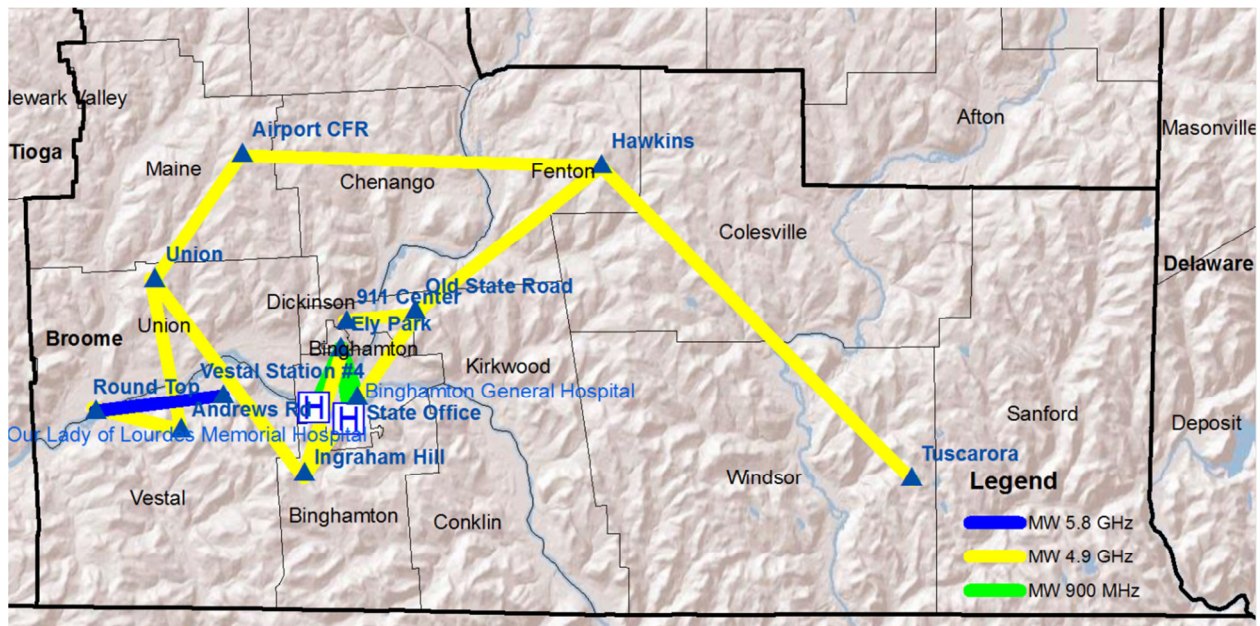


Figure 8-1: Diagram – Microwave Configuration



## 9 Coverage Capabilities

As can be determined from the user surveys the coverage from existing systems is problematic. In particular is pager and portable coverage for both in-building and outdoor operations.

### 9.1 Introduction

Propagation predictions for Broome County are created for VHF LB and VHF HB existing radio systems. The sites, propagation parameters, and the propagation predictions for County area coverage are detailed in this analysis.

### 9.2 Radio Systems

The radio systems that propagation predictions are created for are follows.

Radio System	Frequency (MHz)	Sites	Transmitter Power (Watts)
Sheriff	154.8000	Pease, Tuscarora, Hawkins, Ingraham Hill	100
County Fire	33.9000	Pease, Hawkins, Local, Ingraham Hill	100
Western Broome Fire	154.3100	Andrews Road, Union	Andrews Road (60), Union (40)
Broome EMS	155.1600	Old State Road	100

Table 9-1: Radio Systems

### 9.3 Sites

The sites and parameters employed in the propagation predictions for the radio systems are given in the following table. The coordinates have been reviewed by Blue Wing for accuracy and the antenna heights are estimates. An "NA" in any Table Column in this document stands for not applicable.





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Site	Latitude (NAD83)	Longitude (NAD83)	Estimated Antenna Height (Feet)	Antenna	VHF HB Antenna Gain (dBd)	VHF LB Antenna Gain (dBd)
Andrews Road	42-04-51.09	76-01-07.24	90	Omni	6	NA
Hawkins	42-12-24.73	75-45-43.57	90	Omni	6	0
Ingraham Hill	42-03-43.02	75-56-34.58	70	Omni	6	0
Local	42-07-55.56	75-54-59.90	90	Omni	NA	0
Old State Road	42-08-11.14	75-52-33.27	100	Omni	6	
Pease	42-17-49.00	75-57-02.00	100	Omni	6	0
Tuscarora	42-03-43.03	75-34-12.03	90	Omni	6	
Union	42-09-00.71	76-02-07.22	80	Omni	6	

Table 9-2: Sites



### 9.4 VHF Propagation Parameters

The major VHF HB propagation parameters employed follow table 9-3 and VHF LB propagation parameters are given in table 9-4.

Parameter	Value
Propagation Model	Longley-Rice v1.2.2
Mode	Mobile
Location, Time, Situation	50%
Land Use Land Clutter	TSB-88
Study Point Spacing	≈300 Feet
Technology	Analog ± 5kHz (25 kHz)
Mobile Antenna Height	2 Meters
Mobile Antenna System Gain	-1 dB
Delivered Audio Quality (DAQ)	3.4
Reliability	95%
Mobile Area Study Type	Received power at remote (Talk Out)
Mobile Faded Signal Level Threshold (Talk Out)	-102 dBm
Mobile Confidence Margin <sup>1</sup>	16 dB (Includes 5 dB of attenuation for model adjustment.)
Portable Transmit Power	5 Watts
Portable Area Study Type	Received power at best base (Talk In)
Portable Talk In Height	1.8 Meters
Portable Antenna System Gain (Talk In)	-11.3 db
Portable Faded Signal Level Threshold (Talk In)	-102 dBm
Portable Confidence Margin <sup>1</sup>	13 dB (Includes 5 dB of attenuation for model adjustment.)
Pager Antenna Height	1 Meter
Pager Antenna Gain	-17.6 dB
Pager Faded Signal Level Threshold (Talk Out)	-102 dBm
Pager Confidence Margin <sup>1</sup>	32 dB (Includes 5 dB of attenuation for model adjustment.)

Table 9-3: VHF HB Propagation Parameters

<sup>1</sup>Confidence margin includes reliability, environmental noise, antenna system, and miscellaneous adjustments.

Parameter	Value
Propagation Model	Longley-Rice v1.2.2
Mode	Mobile
Location, Time, Situation	50%
Land Use Land Clutter	TSB-88
Study Point Spacing	≈300 Feet
Technology	Analog ± 5kHz (25 kHz)
Mobile Antenna Height	2 Meters
Mobile Antenna System Gain	-0.5 dB



Parameter	Value
Delivered Audio Quality (DAQ)	3.4
Reliability	95%
Mobile Area Study Type	Received power at remote (Talk Out)
Mobile Faded Signal Level Threshold (Talk Out)	-102 dBm
Mobile Confidence Margin <sup>1</sup>	32 dB (Includes 5 dB of attenuation for model adjustment.)
Portable Transmit Power	5 Watts
Portable Area Study Type	Received power at best base (Talk In)
Portable Talk In Height	1.8 Meters
Portable Antenna System Gain (Talk In)	-11.3 db
Portable Faded Signal Level Threshold (Talk In)	-102 dBm
Portable Confidence Margin <sup>1</sup>	32 dB (Includes 5 dB of attenuation for model adjustment.)
Pager Antenna Height	1 Meter
Pager Antenna Gain	-17.6 dB
Pager Faded Signal Level Threshold (Talk Out)	-102 dBm
Pager Confidence Margin <sup>1</sup>	48 dB (Includes 5 dB of attenuation for model adjustment.)

Table 9-4: VHF LB Propagation Parameters

<sup>1</sup>Confidence margin includes reliability, environmental noise, antenna system, and miscellaneous adjustments.

### 9.5 VHF High-band Mobile Propagation Plots

The propagation plots for mobile talk out operations for the VHF High-band radio systems, Sheriff, Western Broome Fire, and Broome EMS are shown in the Figures that follow. Predictions are shown for a median RF environmental noise case and one where the noise is 10 dB higher. Noise from sources such as power lines, cable television, microprocessors, and other electronic devices has a negative impact on radio communications. The net impact is to make receivers appear to be less sensitive. To model the impact of the noise additional attenuation has been added to the model. Coverage percentages for the County are given in table 9-5. **Error! Reference source not found..**

Radio System	Area Coverage % (Median Noise)	Area Coverage % (10 dB Noise Increase)
Sheriff	98.5	91.6
Western Broome Fire	69.0	47.9
Broome EMS	79.2	58.8

Table 9-5: VHF HB County Coverage Percentages



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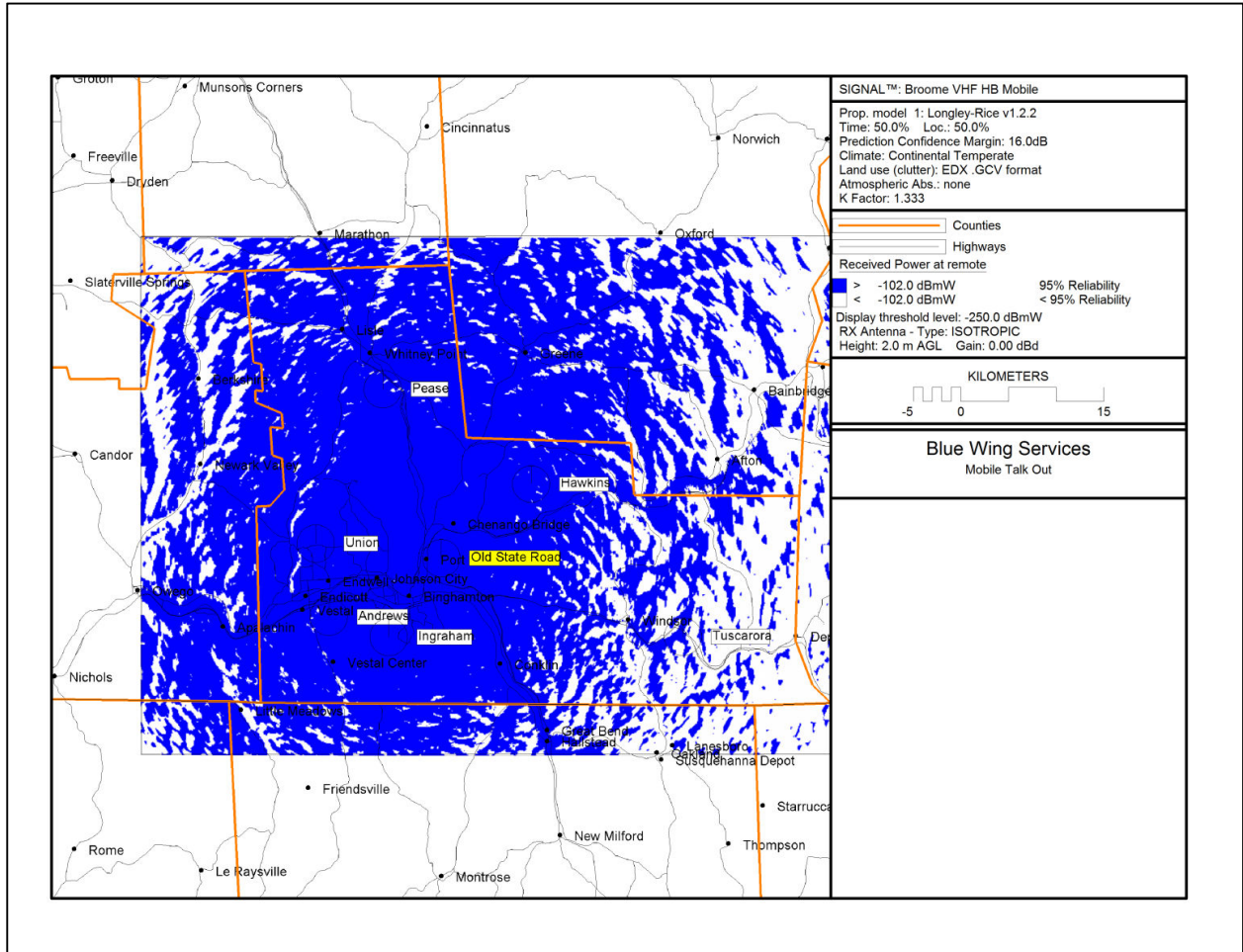


Figure 9-1: Broome EMS Mobile Talk Out Median Noise



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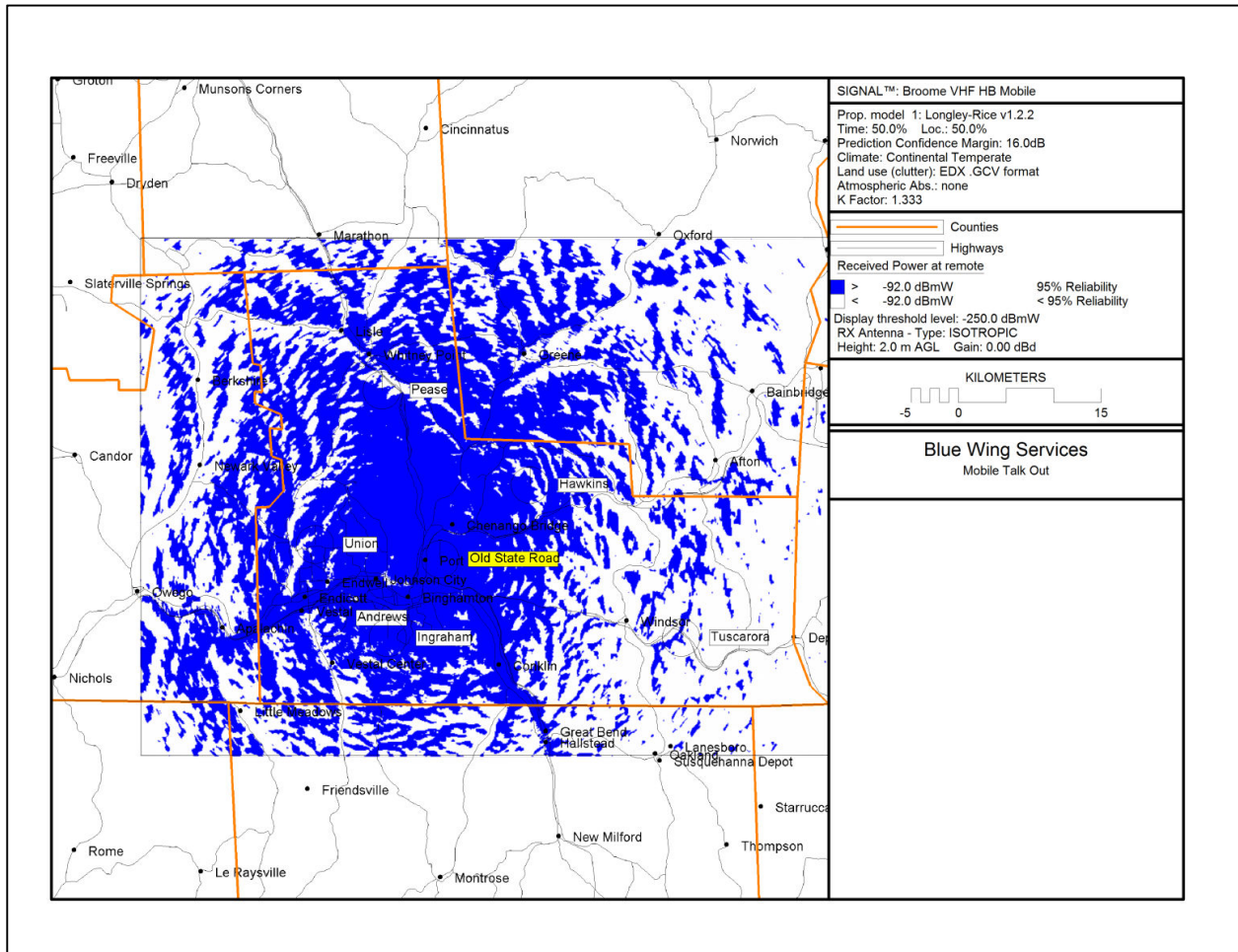


Figure 9-2: Broome EMS Mobile Talk Out 10 dB Noise



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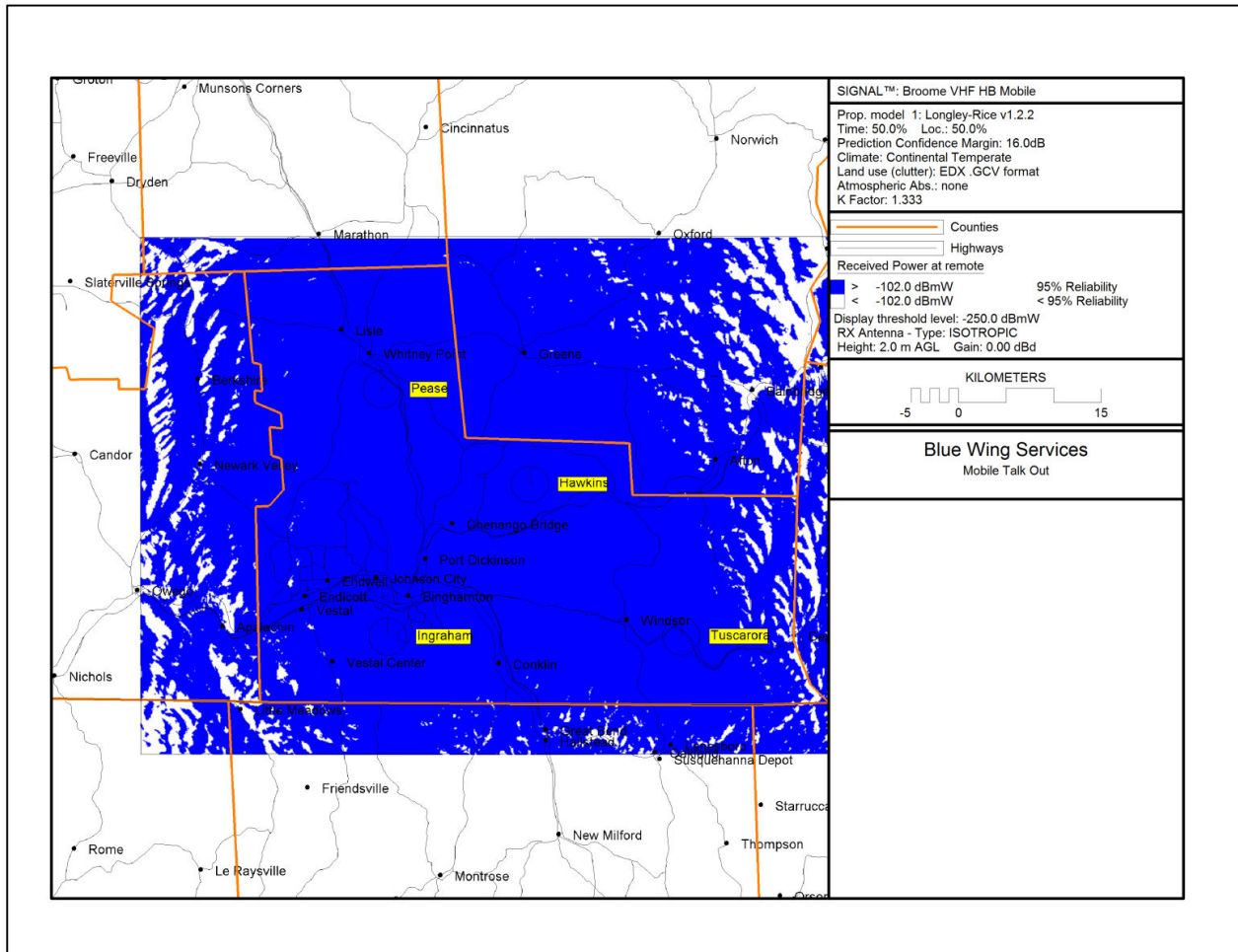


Figure 9-3: Sheriff Mobile Talk Out Median Noise



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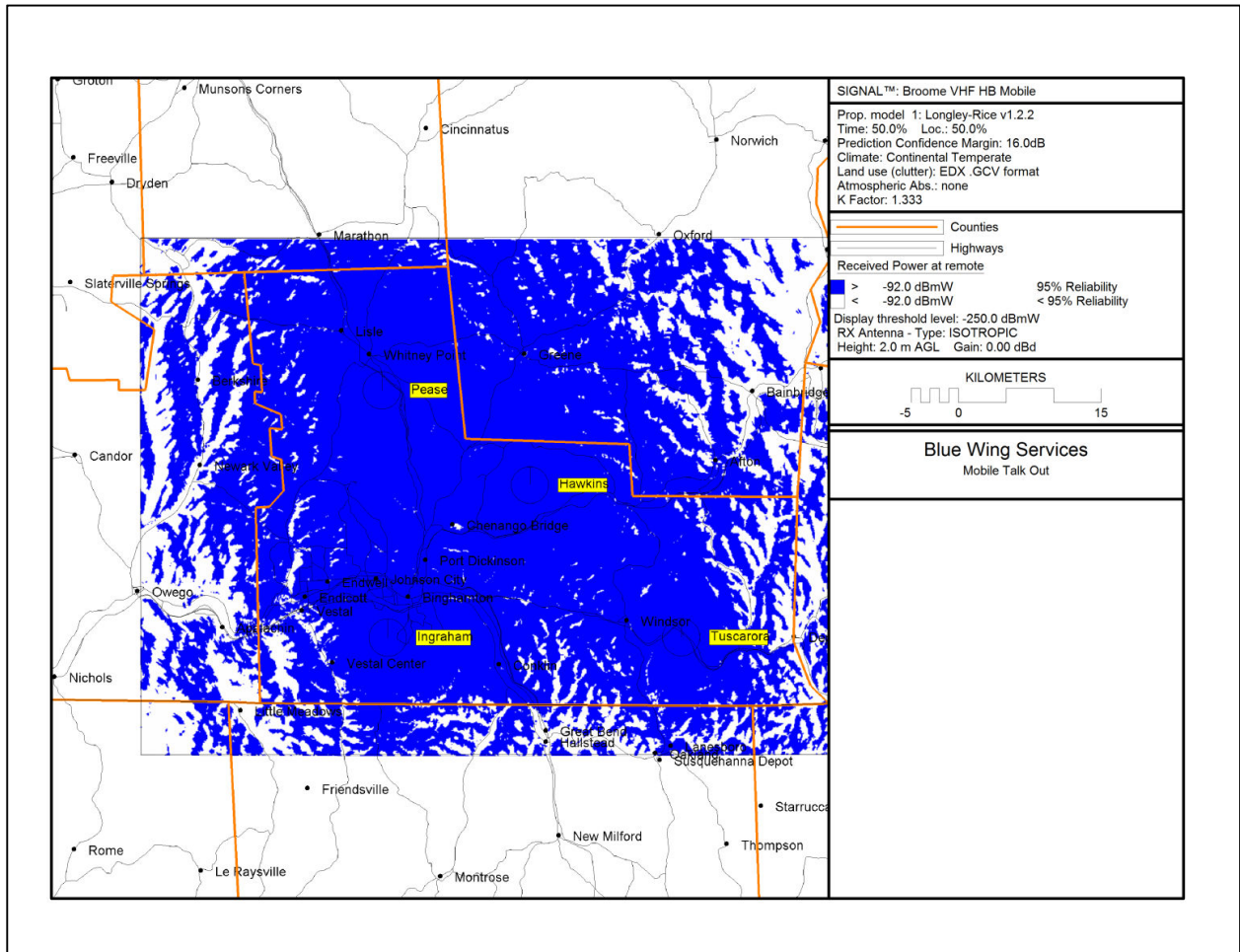


Figure 9-4: Sheriff Mobile Talk Out 10 dB Noise

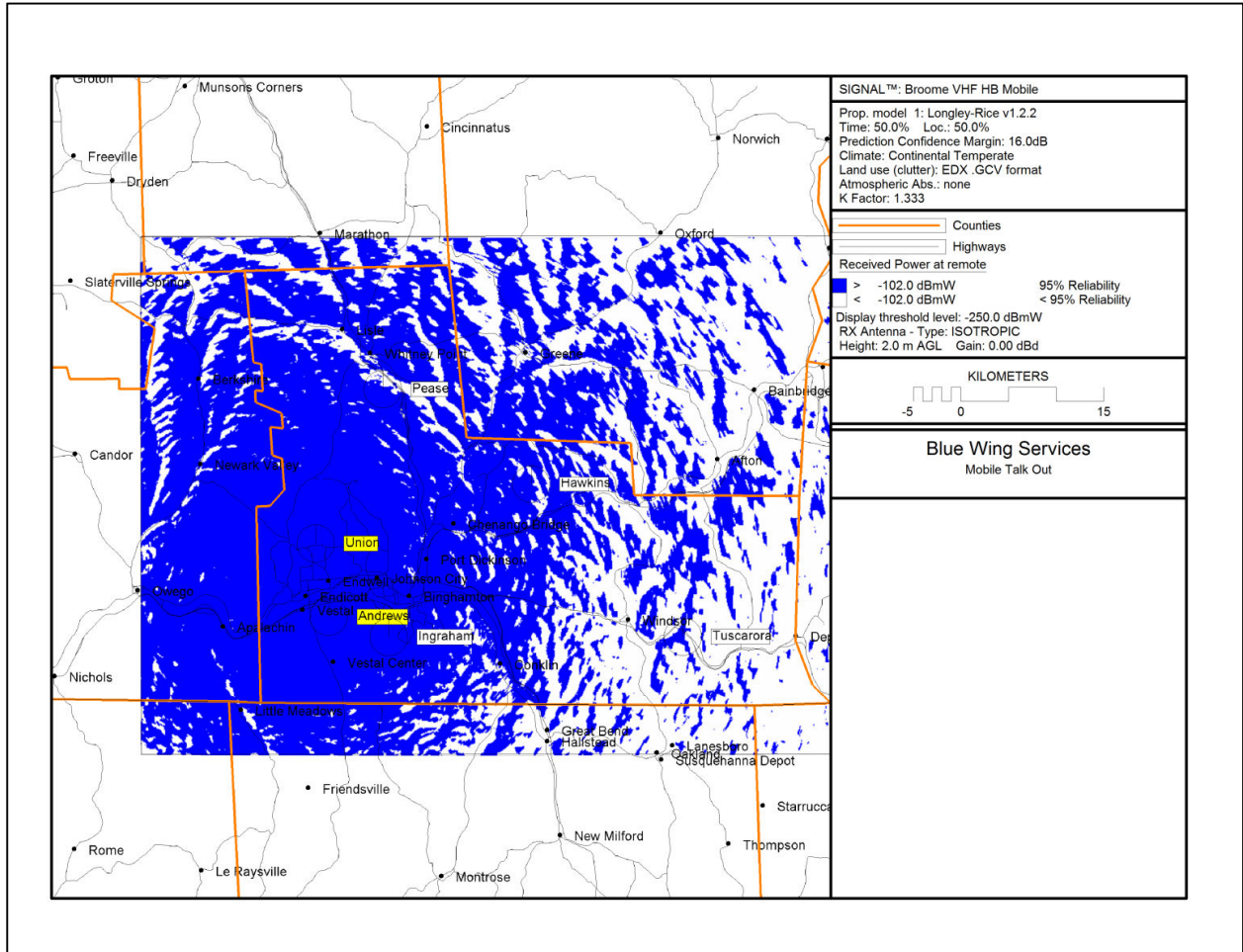


Figure 9-5: Western Broome Fire Mobile Talk Out Median Noise



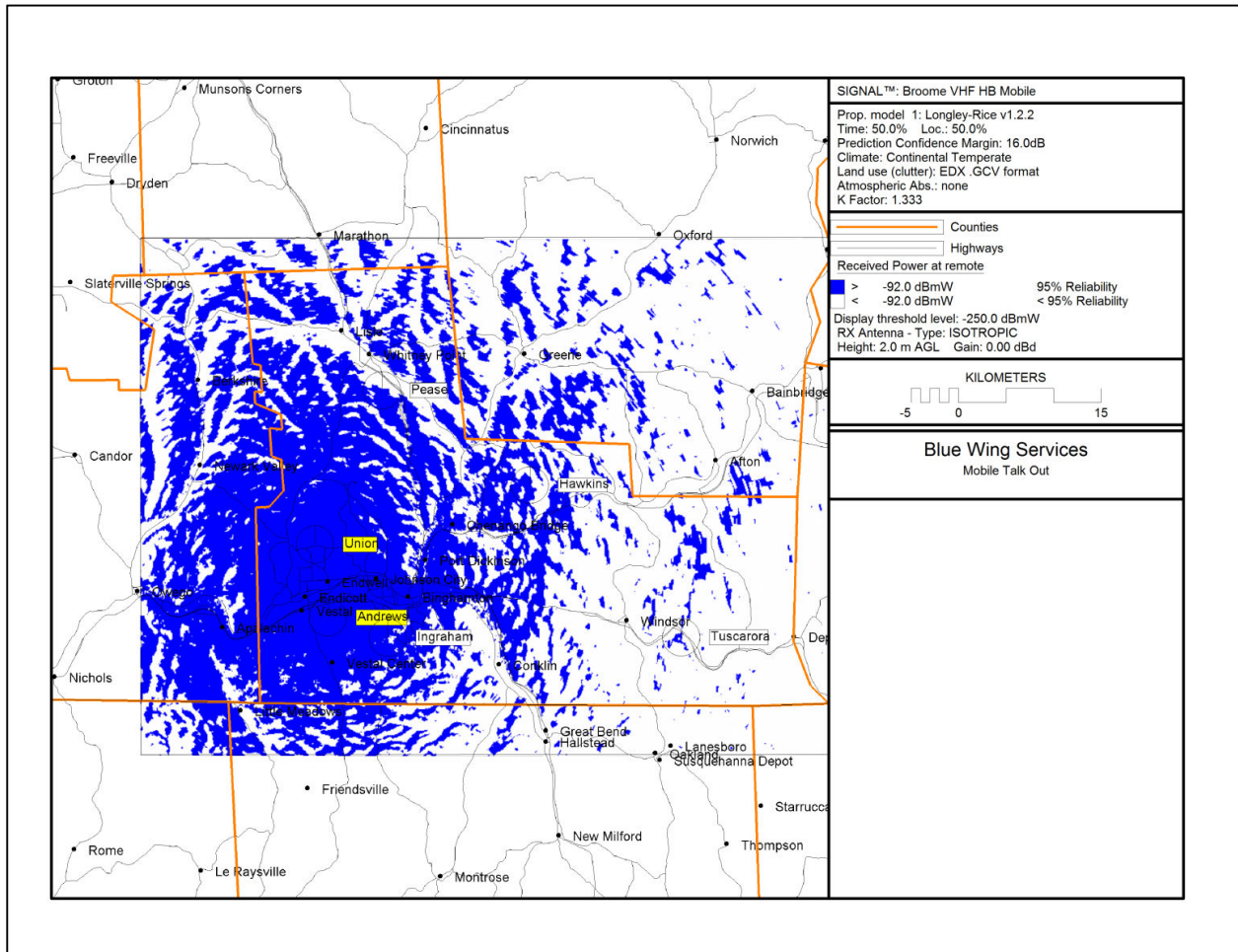


Figure 9-6: Western Broome Fire Mobile Talk Out 10 dB Noise

### 9.6 VHF HB Portable and Pager Propagation Plots

The propagation plots for outdoor portable talk in (weakest communication link) and in-building (medium building loss, 20 dB) pager operations for the VHF High-band radio systems, Western Broome Fire, and Broome EMS are shown in the Figures that follow. Predictions for portable operations are shown for a median RF environmental noise case and one where the noise is 10 dB higher. Coverage percentages for the County are given in table 9-6.



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Radio System	Portable Area Coverage % (Median Noise)	Portable Area Coverage % (10 dB Noise Increase)	Pager Area Coverage % (Median Noise, In-Building)	Pager Area Coverage % (Median Noise, Outdoors)
Sheriff	75.4	45.4	NA	NA
Western Broome Fire	35.4	18.8	9.0	33.8
Broome EMS	37.4	16.7	8.5	43.0

Table 9-6: VHF High-band County Coverage Percentages

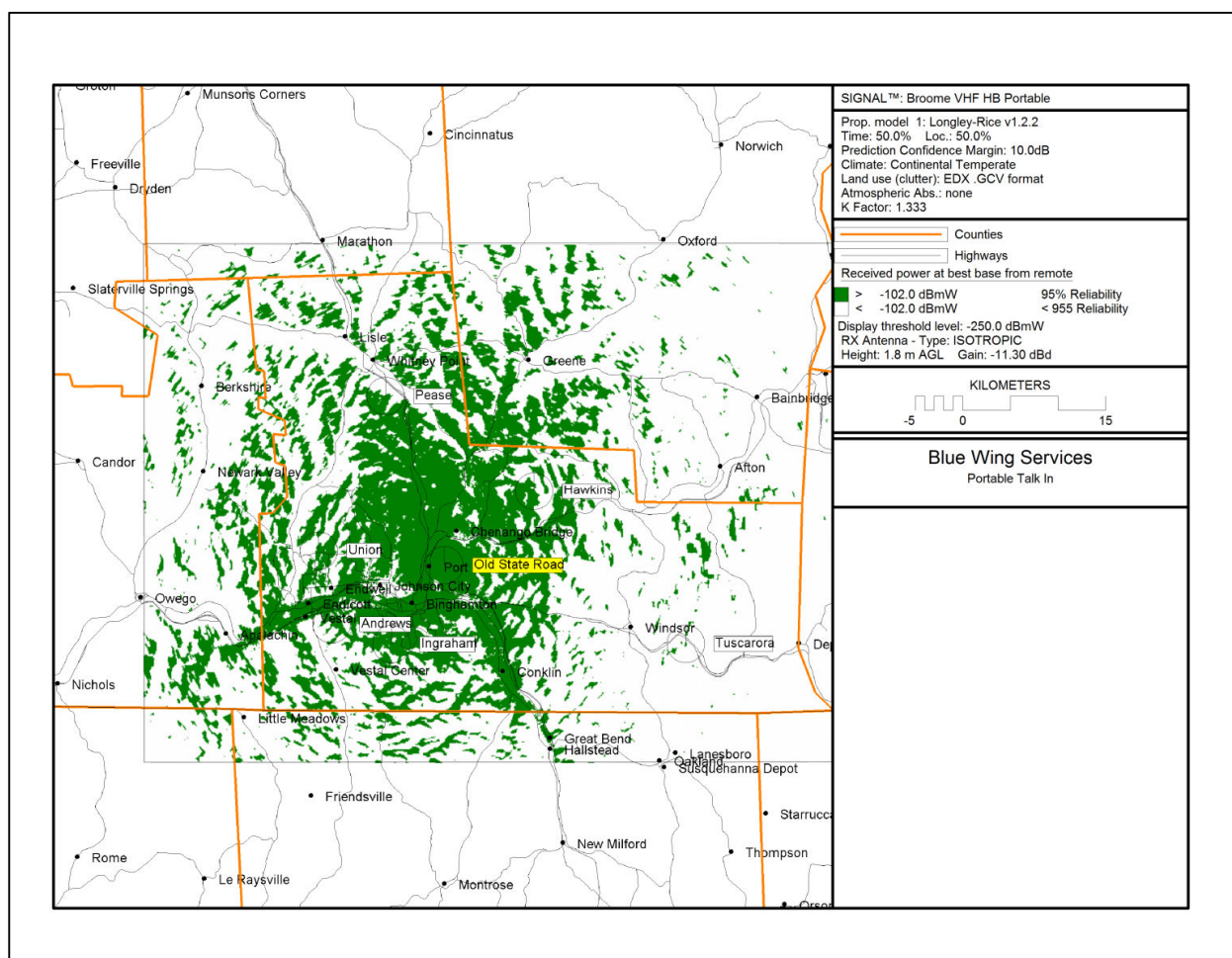


Figure 9-7: Broome EMS Portable Talk In Median Noise



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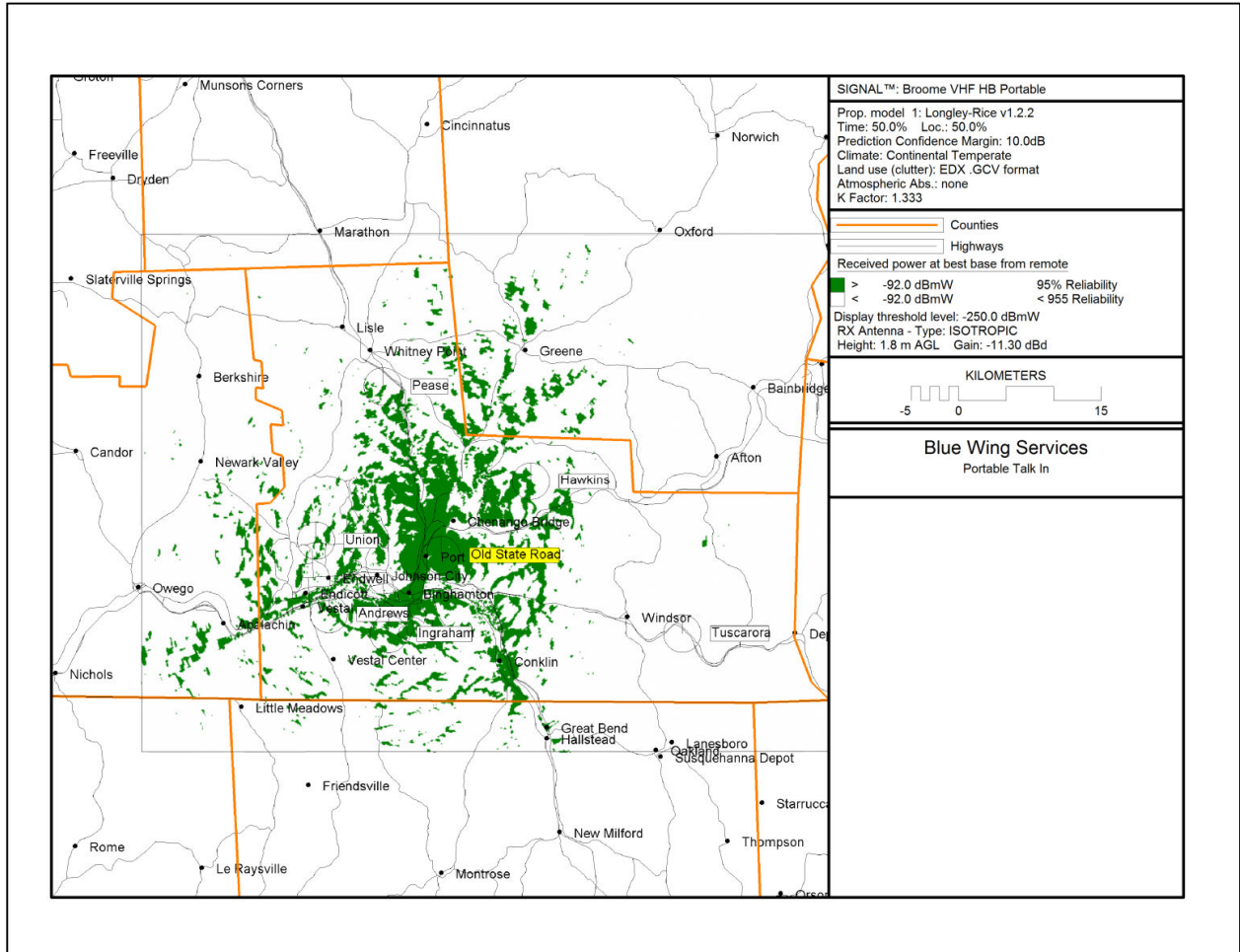


Figure 9-8: Broome EMS Portable Talk In 10 dB Noise



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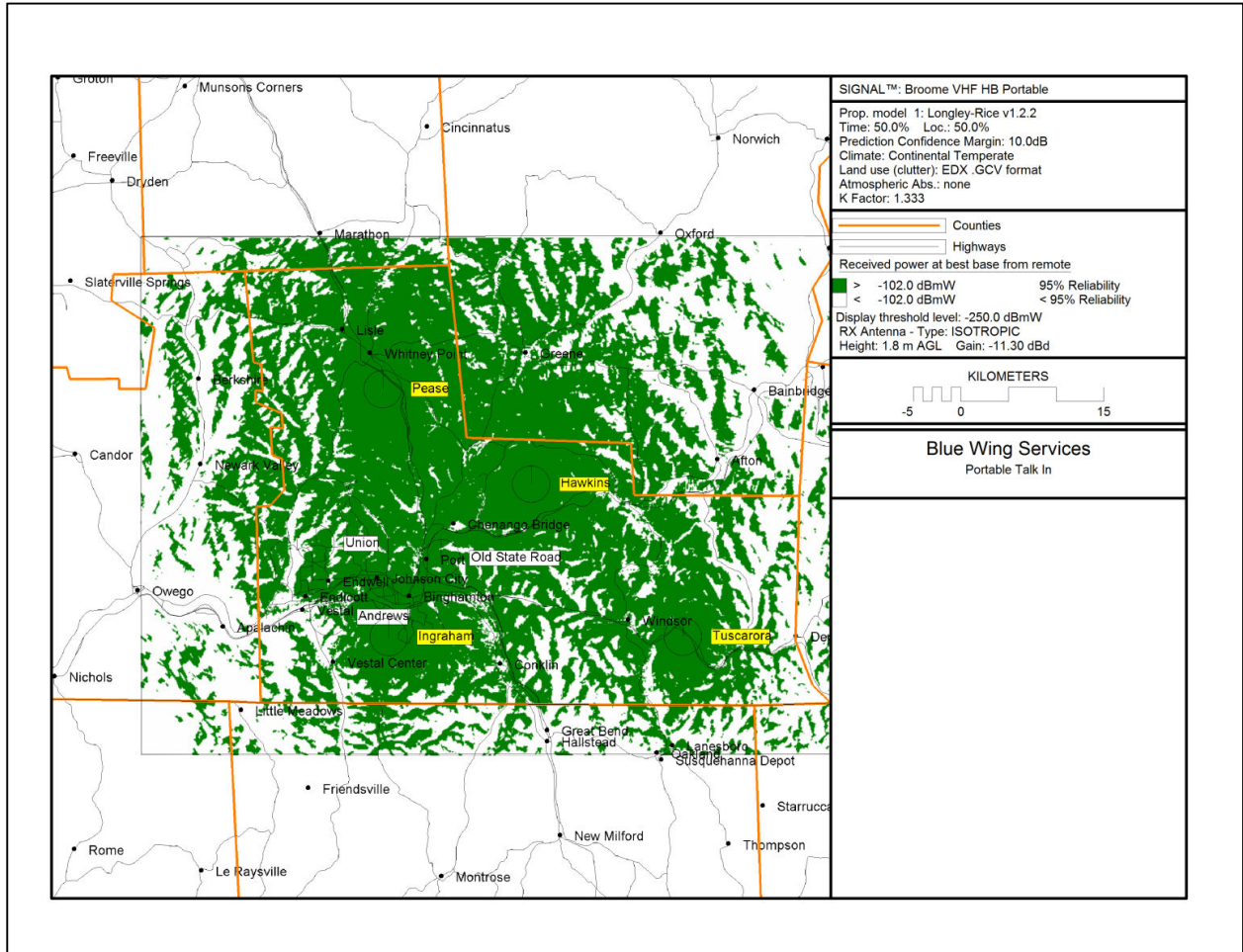


Figure 9-9: Sheriff Portable Talk In Median Noise



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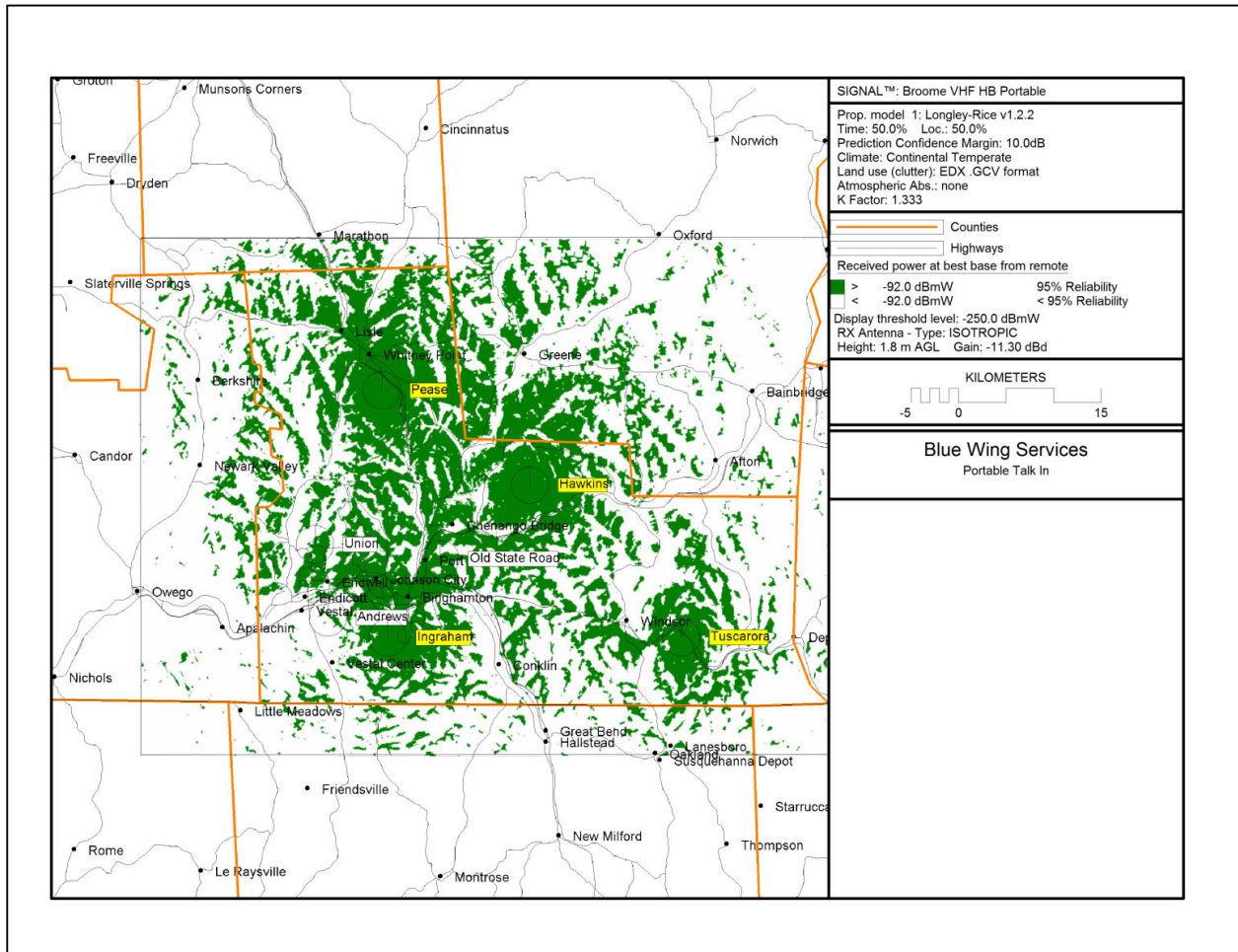


Figure 9-10: Sheriff Portable Talk In 10 dB Noise



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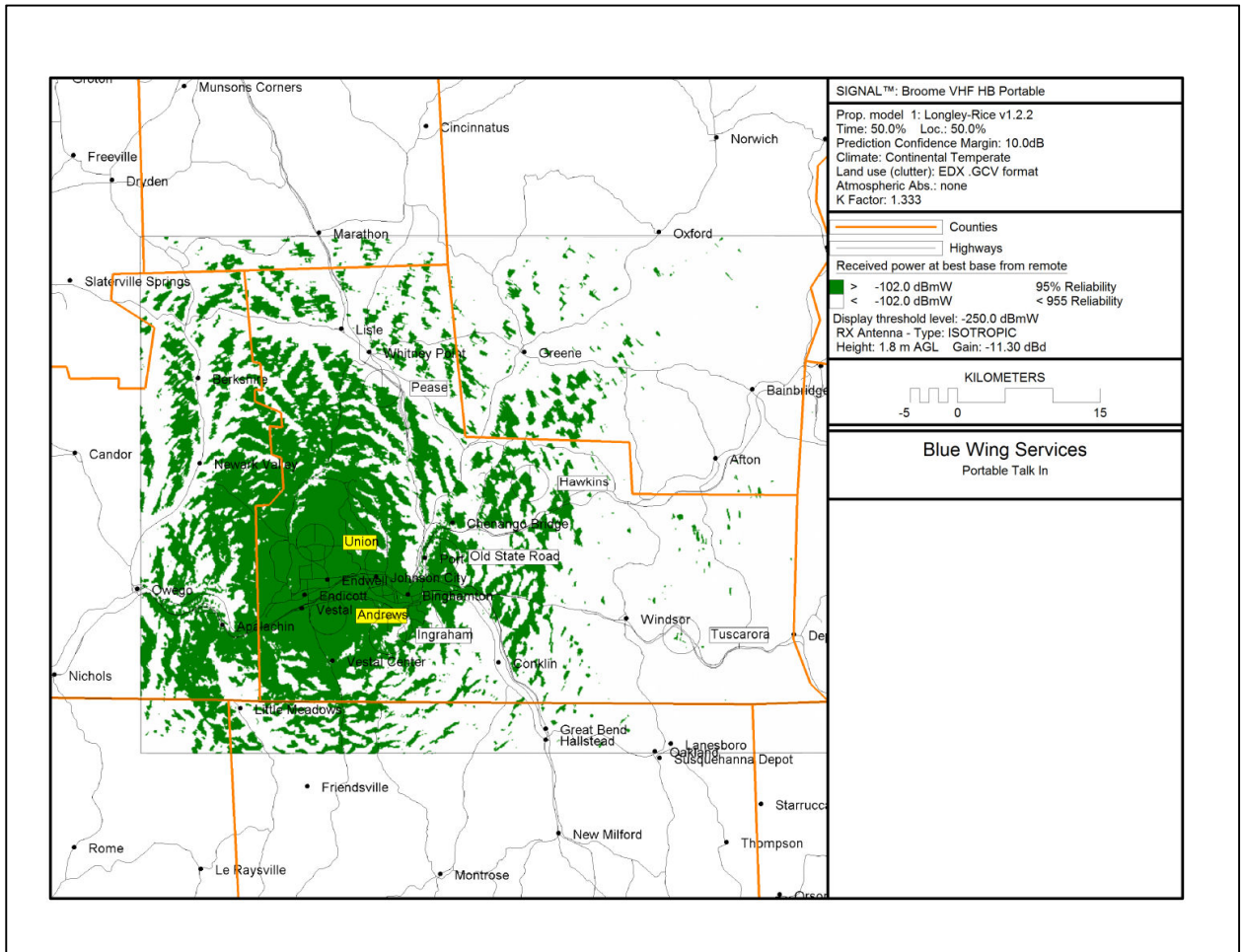


Figure 9-11: Western Broome Fire Portable Talk In Median Noise

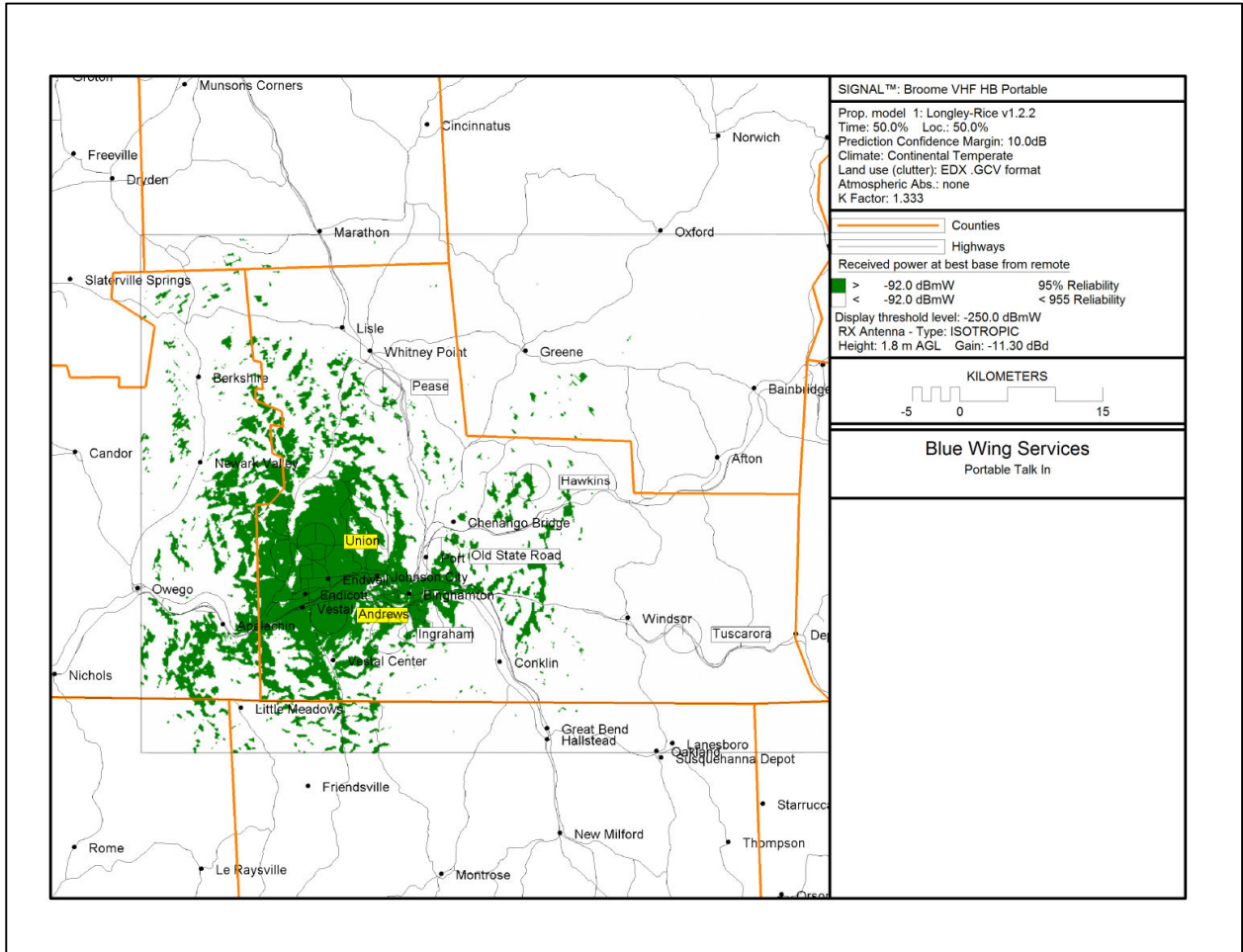


Figure 9-12: Western Broome Fire Portable Talk In 10 dB Noise

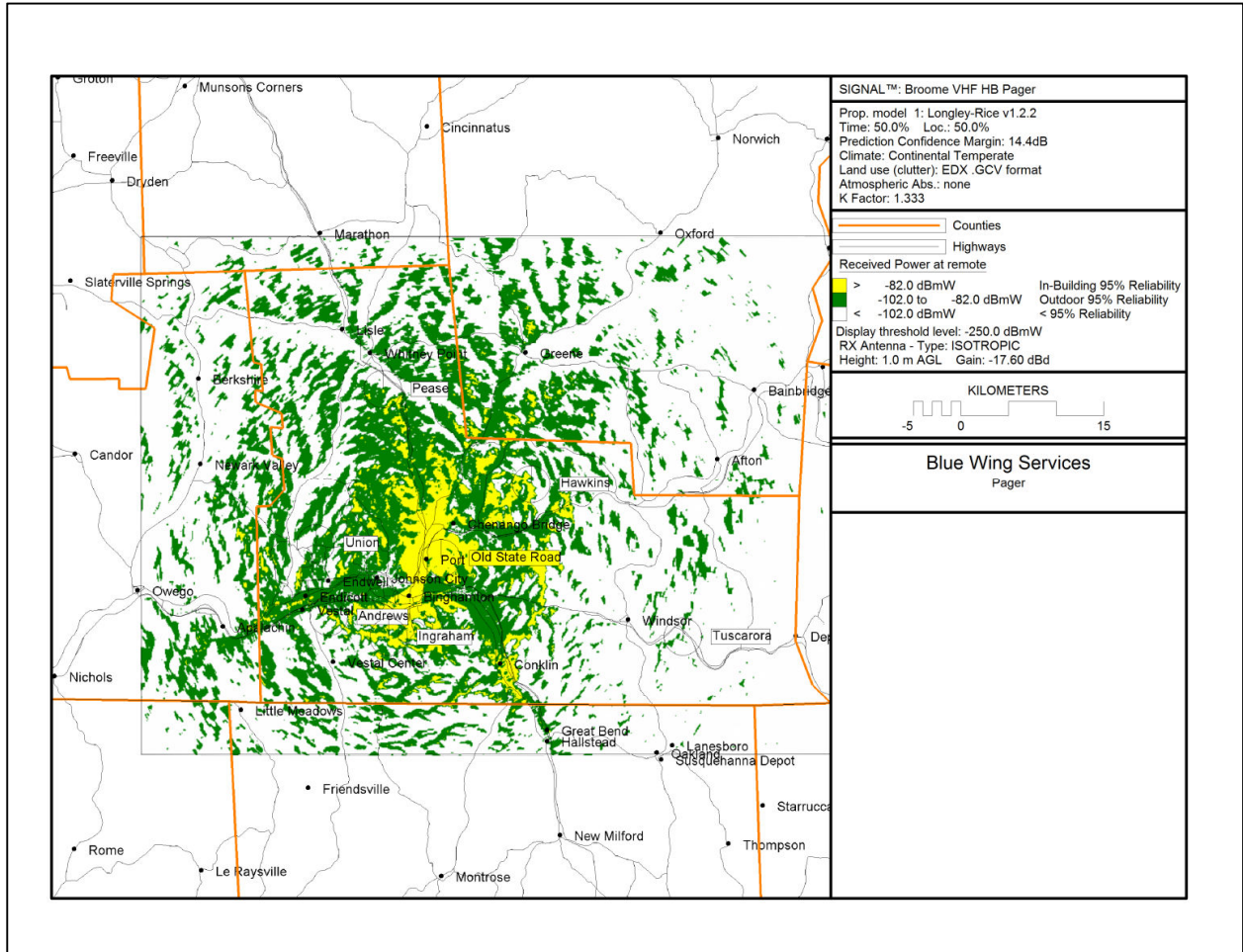


Figure 9-13: Broome EMS Pager



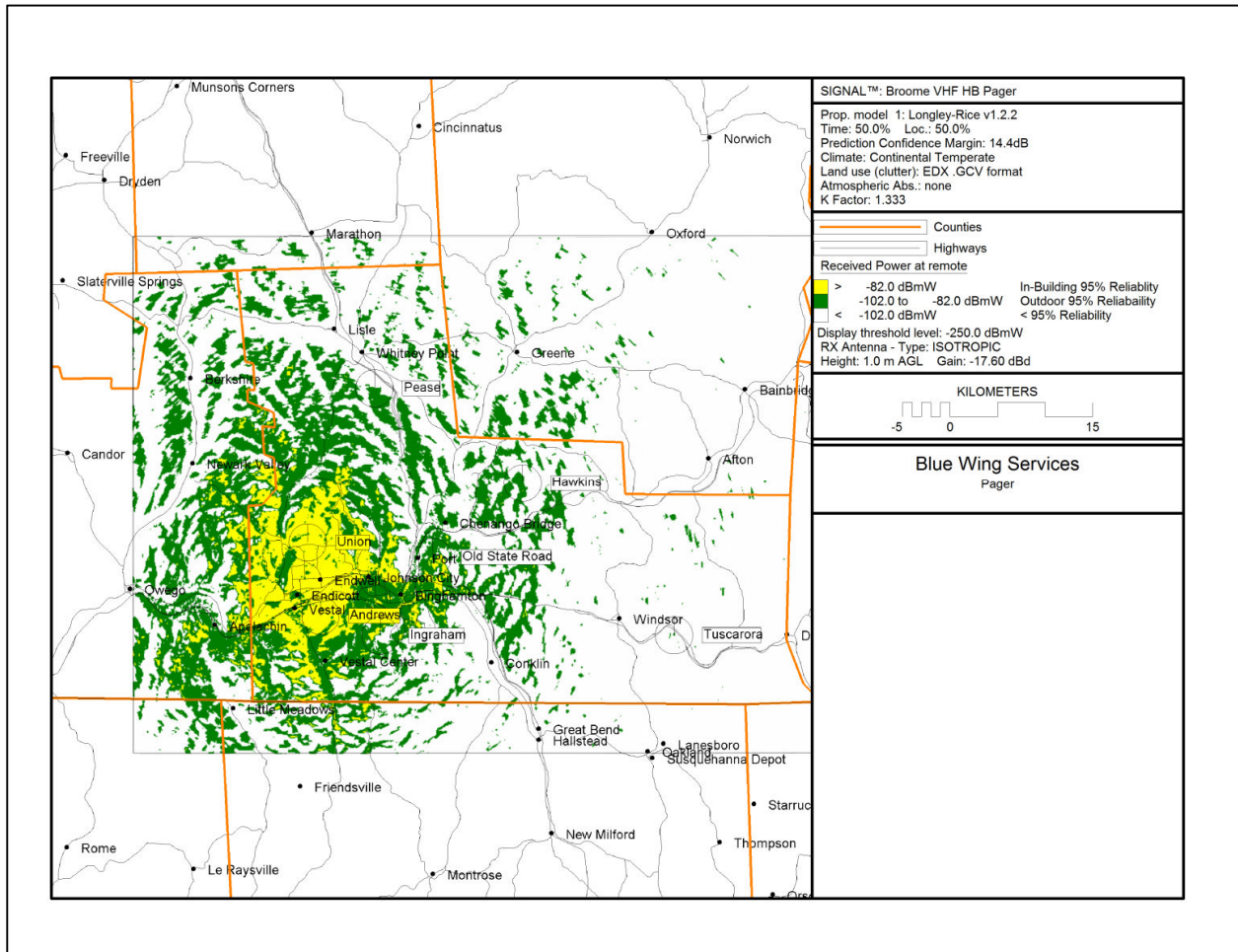


Figure 9-14: West Broome Fire Pager Median Noise, Outdoor and In-Building

### 9.7 VHF Low-band Mobile Propagation Plots

The propagation plots for mobile talk out operations for the VHF Low-band County Fire radio system are shown in the Figures that follow. Predictions are shown for a median RF environmental noise case and one where the noise is 20 dB higher. Noise from sources such as power lines, cable television, microprocessors, and other electronic devices has a negative impact on radio communications. The net impact is to make receivers appear to be less sensitive. To model the impact of the noise additional attenuation has been added to the model. Coverage percentages for the County are found in table 9-7..



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Radio System	Area Coverage % (Median Noise)	Area Coverage % (20 dB Noise Increase)
County Fire	77.3	29.1

Table 9-7: VHF LB County Coverage Percentages

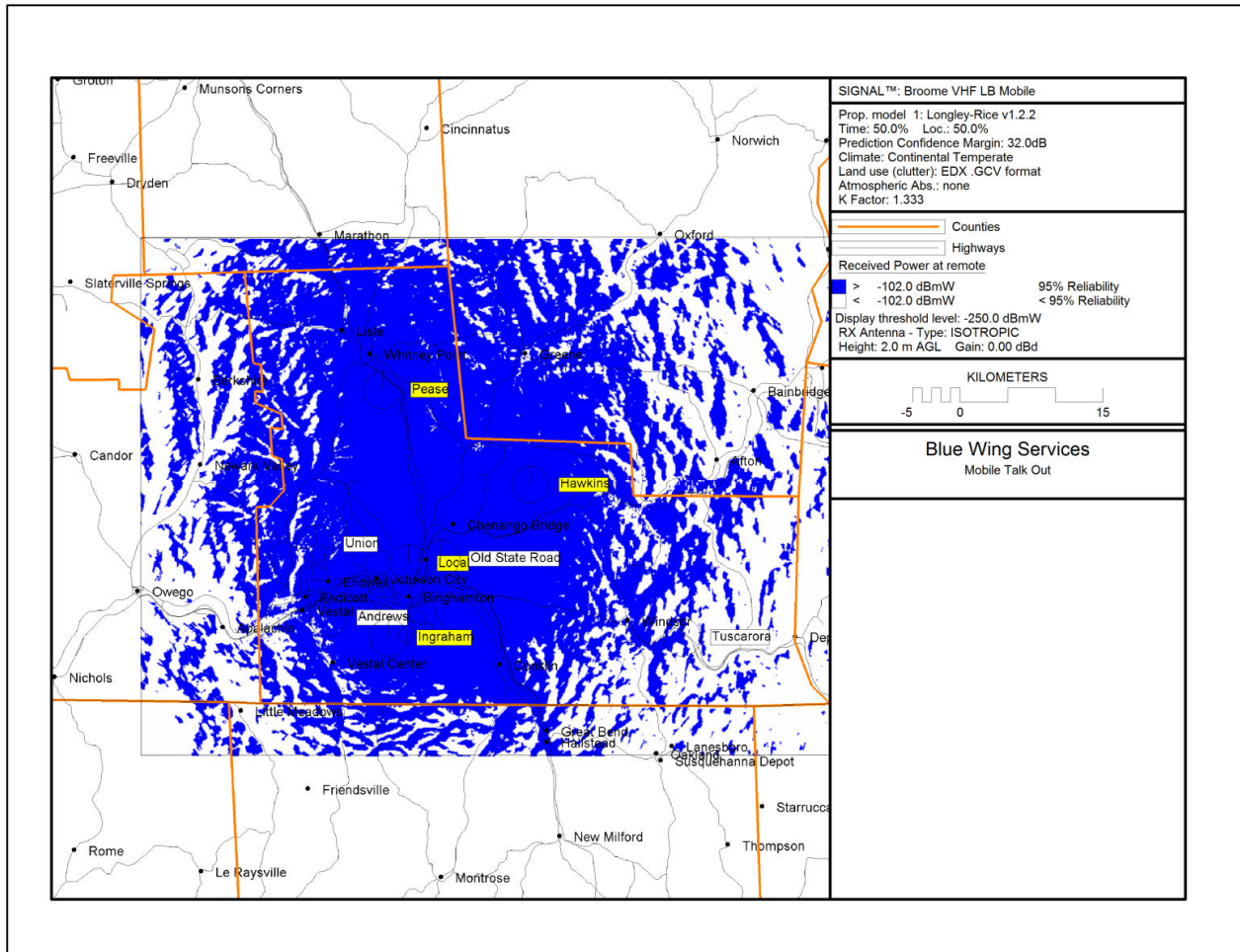


Figure 9-15: County Fire Mobile Talk Out Median Noise

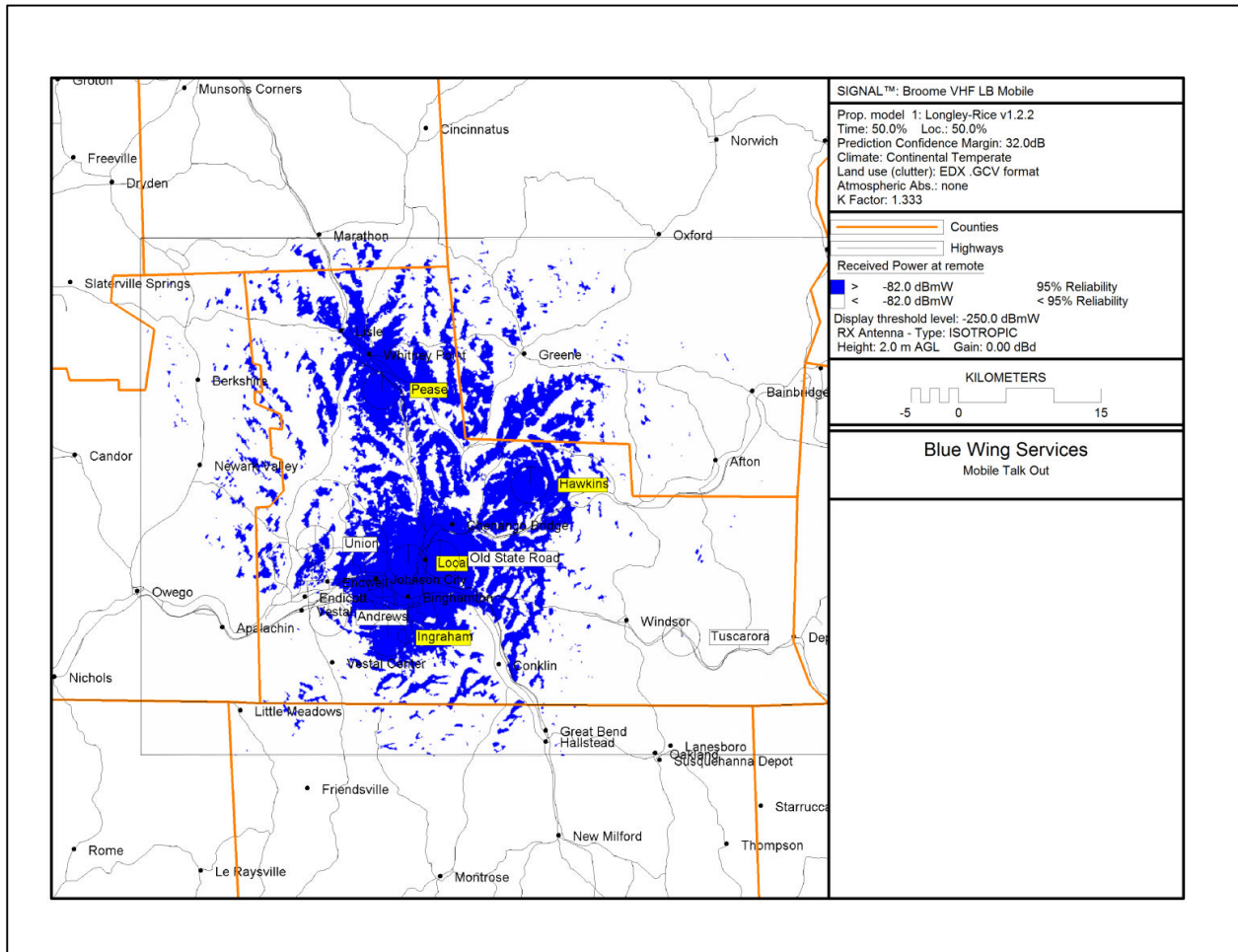


Figure 9-16: County Fire Mobile Talk Out 20 dB Noise

### 9.8 VHF Low-band Portable and Pager Propagation Plots

The propagation plots for outdoor portable talk in (weakest communication link) and in-building (medium building loss, 24 dB) pager operations for the County Fire VHF LB radio systems are shown in the Figures that follow. Predictions for portable operations are shown for a median RF environmental noise case and one where the noise is 20 dB higher. Coverage percentages for the County are given in table 9-8.



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Radio System	Portable Area Coverage % (Median Noise)	Portable Area Coverage % (20 dB Noise Increase)	Pager Area Coverage % (Median Noise, In-Building)	Pager Area Coverage % (Median Noise, Outdoors)
County Fire	20.4	0.7	1.6	37.2

Table 9-8: VHF LB County Coverage Percentages

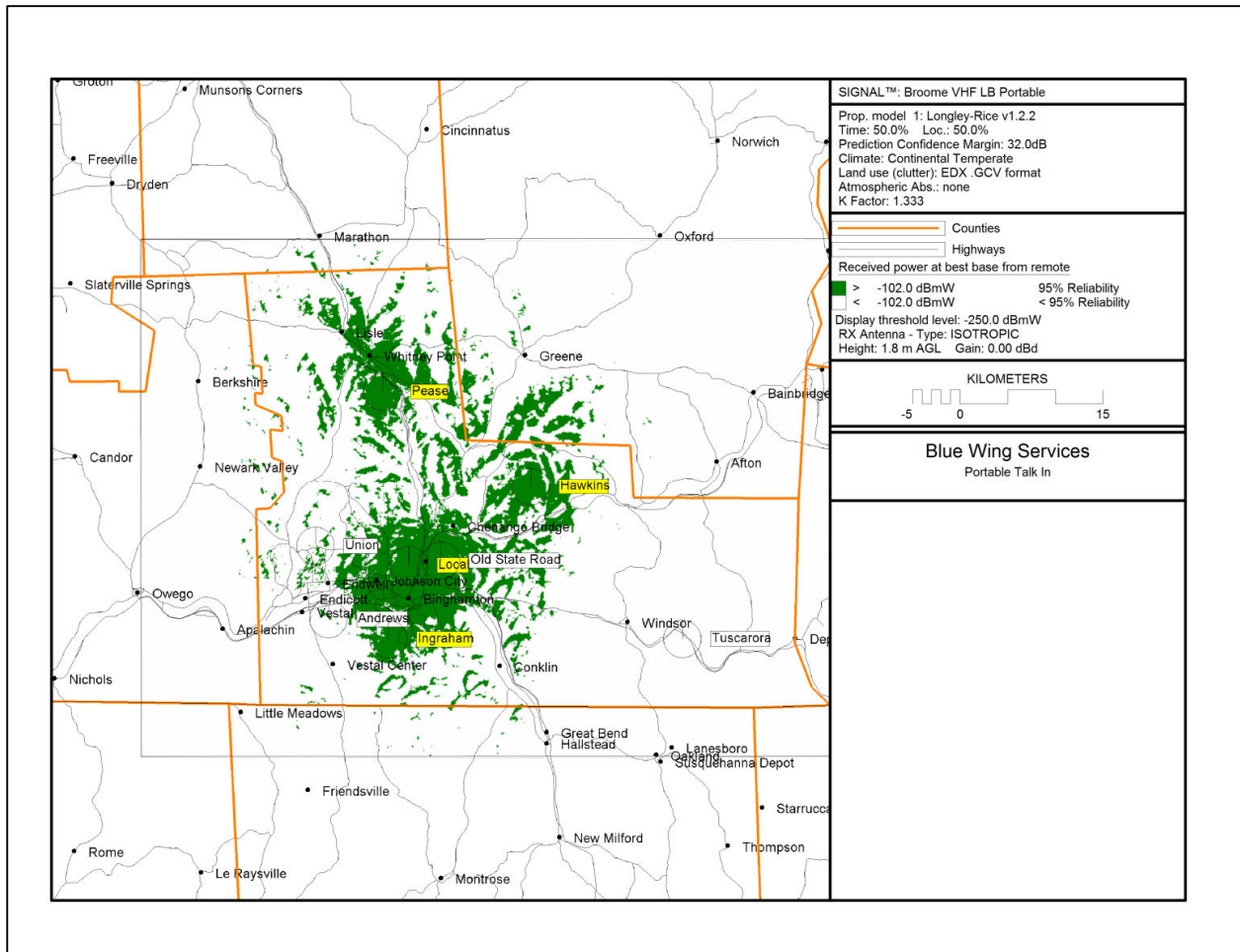


Figure 9-17: County Fire Portable Talk In Median Noise



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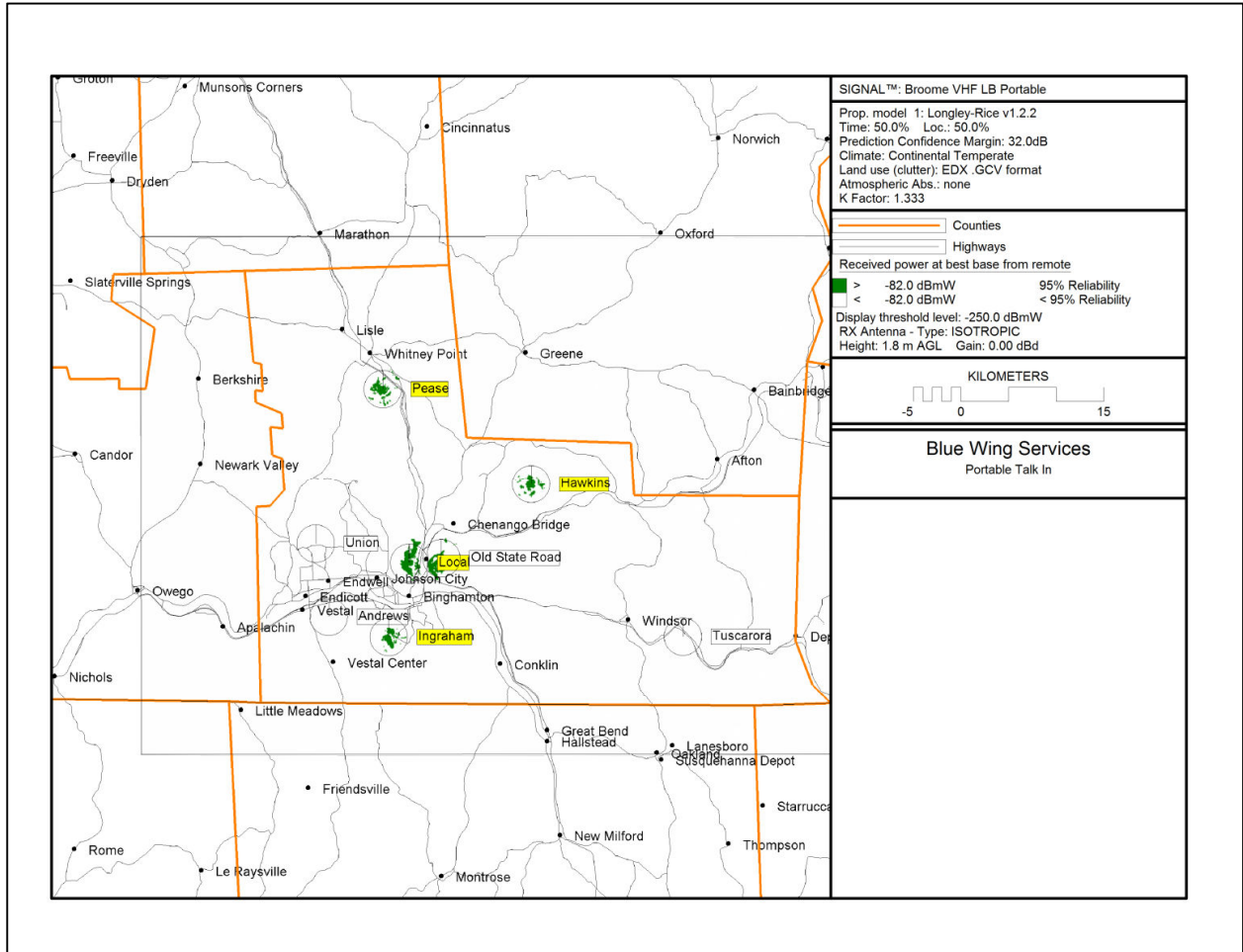


Figure 9-18: County Fire Portable Talk In 20 dB Noise

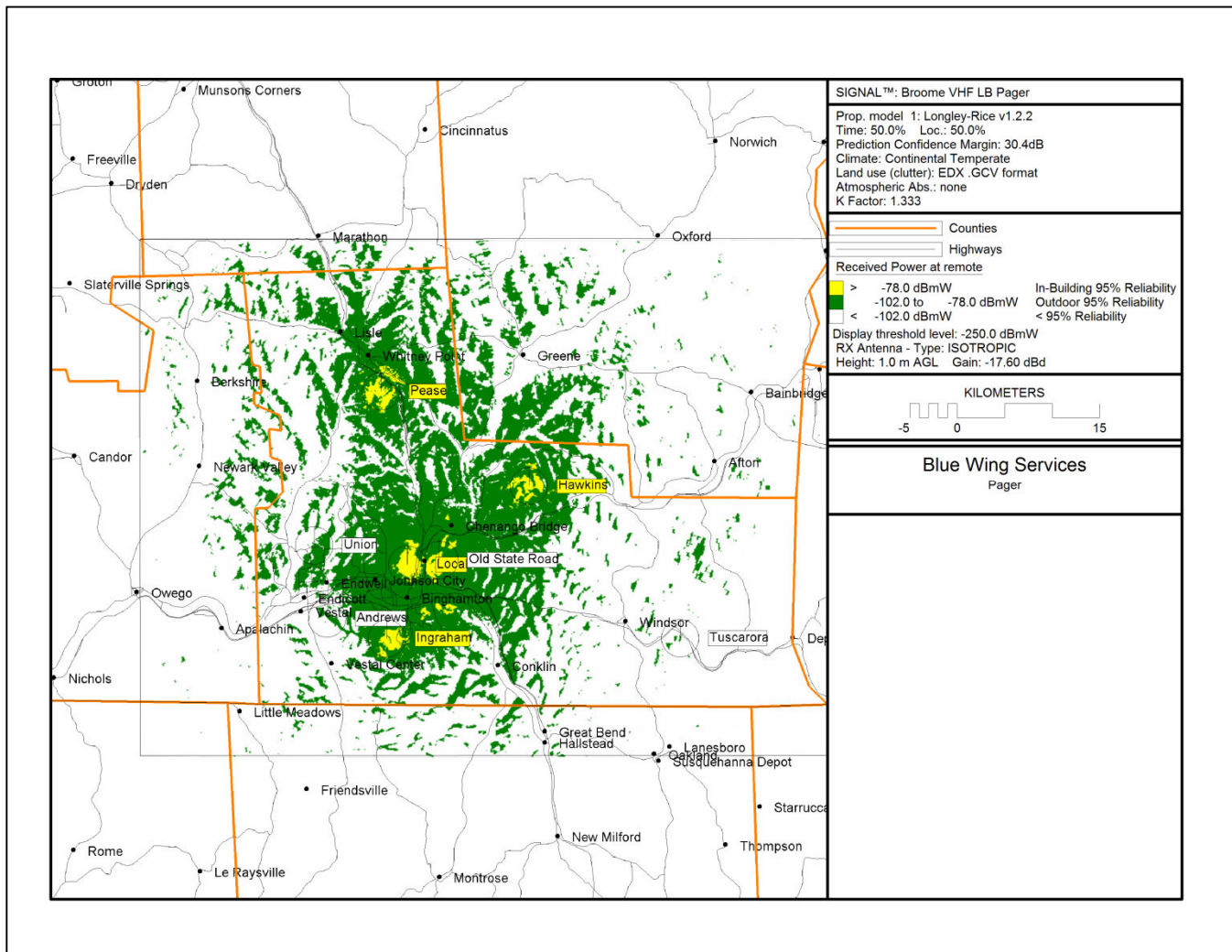


Figure 9-19: County Fire Pager Median Noise, Outdoor and In-Building