

## Scanning Erie County Communications (Jan. 2022):

As most of you know, Erie County has committed itself to the use of an “advanced” system of digital radio communications that can be difficult to monitor without the use of expensive and difficult-to-program gear that might as well be purchased from the “professional” communications vendors. Even then, there are inconsistencies in the code-plugs that frustrate those agencies authorized to use the system. Out of a recent order of four Unication G2 Pagers from Mobilecom, none were programmed correctly the first time, and even after reprogramming with the correct code-plug have difficulty receiving communications while en route and on-scene.

In the interests of transparency, public accountability, and overall public safety, the following information is presented to allow those with basic equipment (and intelligence) to monitor the initial dispatch communications in Erie County.

### **Analog Radio System Specifications and Frequencies:**

**Table 1: Dispatch Paging Channels:**

Frequency	PL	Use	Comments
453.9500	DPL 025	County Fire & EMS Paging	Does not include Millcreek or the City of Erie
462.9625	CSQ	Millcreek Fire and EMS Paging	May have actually implemented a DPL code as well.

**Table 2: On-Scene Simplex Channels:**

Frequency	PL	Use	Comments
453.1000	CSQ	On-Scene Channel 1	Although these channels are designated for on-scene simplex use, most incidents stay on the repeated (and digital) “TAC Channels” that are part of the digital radio system and cannot be monitored using a conventional scanner.
458.1000	CSQ	On-Scene Channel 2	
453.7250	CSQ	On-Scene Channel 3	
458.7250	CSQ	On-Scene Channel 4	
453.7375	CSQ	On-Scene Channel 5	
458.7375	CSQ	On-Scene Channel 6	
453.8375	CSQ	On-Scene Channel 7	
458.8375	CSQ	On-Scene Channel 8	

**Table 3: Conventional Medical Channels:**

<b>Frequency</b>	<b>PL</b>	<b>Use</b>	<b>Comments</b>
<b>462.9500</b>	141.3	MED-9 (Erie)	Most ambulance to hospital communications have moved to the digital radio system and each hospital has a digital talk group. Analog channels remain for use by out-of-county ambulances.
<b>463.1000</b>	141.3	MED-5 (Erie)	
<b>463.0250</b>	141.3	MED-2 (Corry)	
<b>155.2200</b>	103.5	Emergycare Wheelchair Vans	
<b>155.2650</b>	103.5	Stat Medevac Dispatch	
<b>159.4800</b>	103.5	Stat Medevac Operations	

***Digital Radio System Specifications and Frequencies:***

Monitoring the digital radio system is not possible using conventional scanners or radio receivers that were built for reception of narrow-band FM radio transmissions on VHF or UHF frequencies. This includes most radios manufactured prior to 2013. Further, the Erie County radio system uses a newly-developed form of digital trunking called APCO-25 Phase II TDMA, that was not even finalized when the system was developed. In its primordial state, a great many details of the implementation were left up to the radio vendors; to the extent that the system is currently “locked in” to a single vendor for radio equipment – Kenwood (the system as-implemented was actually developed by E.F. Johnson who was then acquired by Kenwood.)

The following technical details are provided for those interested in programming any of the high-end scanners now coming on the market, or even programming a Software Defined Radio (SDR) to monitor the digital radio system in Erie County. Much of this is beyond the understanding of the typical scanner enthusiast, but can be of use to those more technically inclined.

First, the system is divided into several “cells” or “sites” that provide coverage in a particular geographical area. Multiple towers (around 20 at present) simulcast the data stream that comprises the output of a particular digital repeater system. Each tower site also has multiple receivers for transmissions from field units that comprise the input for the digital repeater system. Each tower is kept in-phase by very precise timing, derived from GPS signals, that allows for time-division multiplexing of each physical radio channel. This dependence on GPS is presently one of the single-point-of-failure weaknesses in the system. If the GPS signals are disrupted, the system stops working properly. Since GPS is dependent on the goodwill of the U.S. Government, and is subject to “selective availability,” a failure of the GPS system will result in failure of this communication system.

Presently, there are four “Cells” or “Sites” in the Erie County Radio System. Future expansion will likely see at least two new sites developed, allowing for better coverage in the areas where coverage proves problematic. The present cells are (1) The City of Erie, (2) The County of Erie. (3) Edinboro, and (4) Ripley. The last two sites have actually been added since the system was initially constructed due to severe failings in maintaining adequate coverage in areas of extreme East and South portions of the county. At present, severe “dead spots” still exist in Central Erie County (just south of McKean Borough) and Southwest Erie County (Conneaut Township.)

## System Identification and Linkage:

It is both technically feasible and possibly advantageous to link multiple trunked radio systems together to provide regional or even statewide coverage, each system has an identification code that acts as a prefix to all communications. In the case of the Erie County radio system, this system identification is as follows:

**Table 4: System Identification:**

<b>System ID</b>	<b>WACN</b>
HEX: 019	0A441

## System Cells and Radio Frequency Assignments:

Each cell uses a single frequency for primary control purposes and a number of discrete frequencies for message transmission. This arrangement is somewhat arbitrary and is software selectable – in most cases, the system can reassign any of the message channels to be the control channel.

**Table 5: System Cells and Radio Frequencies:**

**Red (c)** are primary control channels **Blue (a)** are alternate control channels

RFSS	Site	Cell Name	Freqs					
1	1	Erie (City) Simulcast	460.025c	460.125a	460.250a	460.350a	460.450a	460.550a
1	2	Erie (County) Simulcast	453.050c	453.175a	453.4125a	453.550a	453.650a	453.750a
1	3	Edinboro	453.100c	453.5125a	460.0625a	460.475a		
1	4	Ripley	453.4875	453.725c	460.4125	460.600		

At launch, the original county system had only two cells: Erie City and Erie County. This proved problematic, as there was inadequate coverage in both the East County and Edinboro areas. The latter two sites were added to provide improved coverage in the problem areas without changing the overall system architecture. As non-simulcast sites, there is less of a need for expensive synchronization equipment and software. The downside is the need for more frequencies and use of more radio bandwidth. In both cases, the “squeaky wheel” gets the oil, and people in these areas complained about coverage the loudest.

In theory, the twenty-odd radio frequencies listed above could be monitored, decoded, and presented to the listener as-broadcast, but due to the way trunking works they would simply receive a cacophony of radio transmissions with no selectivity. A particular frequency might be used by an Edinboro unit at one moment and a Greenfield unit the next. Trunked radio systems divide users into “Talk Groups” that might appear on any given radio frequency at any moment. Message trunking, in particular, means that any given message might appear on any (or multiple) frequencies at any time, with the reply on yet another frequency (or frequencies) the next; all coordinated by the control channel. The precise mechanism by which the control system assigns a frequency for a given message is software-defined and isn't important right now, but a discussion of the talk groups in question is necessary for understanding how the system is supposed to work.

## System Talk Groups and Group Usage:

The basic idea of a talk group is that people who frequently communicate with one another are assigned accordingly. For instance, the fire departments in Western Erie County frequently speak to one another on an *ad hoc* basis and are grouped together. Even though you could create a talk group exclusively for the use of the Cranesville Fire Department, they wouldn't normally hear Albion's calls on initial dispatch and would have to change channels in order to communicate with members of the other department. Thus, for dispatch and mutual aid communications, the departments are grouped by region. Likewise, agencies that have more calls than average have their own talk group: Emergycare, for example.

### **Fire and EMS Talkgroups:**

DEC	HEX	Mode	Alpha Tag	Description	Tag
101	065	T	EFD Dispatch	Erie City Fire Dept Dispatch	Fire Dispatch
102	066	T	EFD Tac 1	Erie City Fire Dept Tac 1	Fire-Tac
103	067	T	EFD Tac 2	Erie City Fire Dept Tac 2	Fire-Tac
104	068	T	Millck Fire Dsp	Millcreek Fire Dispatch	Fire Dispatch
105	069	T	Millck Fire Tac1	Millcreek Fire TAC 1	Fire-Tac
106	06a	T	Millck Fire Tac2	Millcreek Fire TAC 2	Fire-Tac
107	06b	T	Millck Fire Tac3	Millcreek Fire TAC 3	Fire-Tac
108	06c	T	Millck Fire Tac4	Millcreek Fire TAC 4	Fire-Tac
109	06d	T	Co Fire East Dsp	County Fire East Disp	Fire Dispatch
110	06e	T	Co FD East Tac 1	County Fire East Tac 1	Fire-Tac
111	06f	T	Co FD East Tac 2	County Fire East Tac 2	Fire-Tac
112	070	T	Co FD East Tac 3	County Fire East Tac 3	Fire-Tac
113	071	T	Co FD East Tac 4	County Fire East Tac 4	Fire-Tac
114	072	T	Co Fire South Dp	County Fire South Disp	Fire Dispatch
115	073	T	Co FD South Tac1	County Fire South Tac 1	Fire-Tac
116	074	T	Co FD South Tac2	County Fire South Tac 2	Fire-Tac
117	075	T	Co FD South Tac3	County Fire South Tac 3	Fire-Tac
118	076	T	Co FD South Tac4	County Fire South Tac 4	Fire-Tac
119	077	T	Co FD West Dsp	County Fire West Disp	Fire Dispatch
120	078	T	Co FD West Tac 1	County Fire West Tac 1	Fire-Tac
121	079	T	Co FD West Tac 2	County Fire West Tac 2	Fire-Tac
122	07a	T	Co FD West Tac 3	County Fire West Tac 3	Fire-Tac
123	07b	T	Co FD West Tac 4	County Fire West Tac 4	Fire-Tac
124	07c	T	Co Fire Interag	Fire Interagency	Fire-Tac
212	0d4	T	Millck Special 1	Millcreek Special 1	Emergency Ops
213	0d5	T	Millck Special 2	Millcreek Special 2	Emergency Ops
217	0d9	T	East Special 1	East Special 1	Emergency Ops

DEC	HEX	Mode	Alpha Tag	Description	Tag
218	0da	T	East Special 2	East Special 2	Emergency Ops
222	0de	T	South Special 1	South Special 1	Emergency Ops
223	0df	T	South Special 2	South Special 2	Emergency Ops
227	0e3	T	West Special 1	West Special 1	Emergency Ops
228	0e4	T	West Special 2	West Special 2	Emergency Ops
231	0e7	T	Erie Special 1	Erie Special 1	Emergency Ops
232	0e8	T	Erie Special 2	Erie Special 2	Emergency Ops
301	12d	T	UPMC Hamot	UPMC Hamot	Hospital
302	12e	T	St. Vincent	St. Vincent	Hospital
303	12f	T	Millck Community	Millcreek Community	Hospital
304	130	T	Corry Memorial	Corry Memorial	Hospital
305	131	T	Emergycare Dsp	Emergycare Dispatch	EMS Dispatch
306	132	T	Emergycare Ops	Emergycare Operations	EMS Dispatch
307	133	T	Emergycare Tac	Emergycare Tac	EMS-Tac

**County Services Talkgroups:**

DEC	HEX	Mode	Alpha Tag	Description	Tag
125	07d	T	Erie Airport Ops	Erie International Airport Ops	Multi-Dispatch
403	193	T	Emer Mgmt	Emergency Management	Emergency Ops
404	194	T	Emer Mgmt Tac1	Emergency Mgmt Tac 1	Emergency Ops
407	197	T	CW Special 1	Countywide Special 1	Interop
408	198	T	CW Special 2	Countywide Special 2	Interop
409	199	T	CW Interagency	Countywide Interagency	Interop

**Interoperability Talkgroups:**

DEC	HEX	Mode	Alpha Tag	Description	Tag
500	1f4	T	Conneaut OH FD	Conneaut OH Fire	Interop
501	1f5	T	Conneaut OH PD	Conneaut OH Police	Interop
502	1f6	T	Monroe Twp OH FD	Monroe Twp OH Fire	Interop
503	1f7	T	Crawford Govt W	Crawford Co Govt West	Interop
504	1f8	T	Crawford Govt N	Crawford Co Govt North	Interop
506	1fa	T	Chautauqua Co NY	Chautauqua County NY	Interop

**Law Enforcement Talkgroups:**

DEC	HEX	Mode	Alpha Tag	Description	Tag
201	0c9	TE	Erie City Police	Erie City Police	Law Dispatch
202	0ca	TE	Erie City PDTac1	Erie City Police Tac 1	Law Tac

203	0cb	TE	Erie City PDTac2	Erie City Police Tac 2	Law Tac
204	0cc	TE	Erie City PDTac3	Erie City Police Tac 3	Law Tac
205	0cd	TE	Erie City PDTac4	Erie City Police Tac 4	Law Tac
207	0cf	TE	Erie Co Sheriff	Erie County Sheriff	Law Dispatch
208	0d0	TE	Erie Shrf Tac 1	Erie County Sheriff Tac 1	Law Tac
209	0d1	TE	Mille Twp Police	Millcreek Twp Police	Law Dispatch
210	0d2	TE	MilleTwp PD Tac1	Millcreek Twp Police Tac 1	Law Tac
211	0d3	TE	MilleTwp PD Tac2	Millcreek Twp Police Tac 2	Law Tac
214	0d6	TE	East Co PD Disp	East County Police Dispatch	Law Dispatch
215	0d7	TE	East Co PD Tac 1	East County Police Tac 1	Law Tac
216	0d8	TE	East Co PD Tac 2	East County Police Tac 2	Law Tac
219	0db	TE	South Co PD Disp	South County Police Disp	Law Dispatch
220	0dc	TE	South Co PD Tac1	South County Police Tac 1	Law Tac
221	0dd	TE	South Co PD Tac2	South County Police Tac 2	Law Tac
224	0e0	TE	West Co PD Disp	West County Police Disp	Law Dispatch
225	0e1	TE	West Co PD Tac 1	West County Police Tac 1	Law Tac
226	0e2	TE	West Co PD Tac 2	West County Police Tac 2	Law Tac
229	0e5	Te	Mercyhrst PD	Mercyhurst Univ Police	Law Dispatch
230	0e6	TE	Gannon U PD	Gannon Univ Police	Law Dispatch
233	0e9	TE	PSU Behrend PD	Penn State Behrend PD	Law Dispatch
234	0ea	TE	Edinboro Univ PD	Edinboro University Police	Law Dispatch
235	0eb	TE	PD Interagency	Police Interagency	Law Talk
236	0ec	TE	Erie Co Prison	Erie County Prison	Corrections

**Radio Testing Talkgroups:**

DEC	HEX	Mode	Alpha Tag	Description	Tag
1	001	D	Radio Test 1	Radio Testing 1	Public Works
2	002	D	Radio Test 2	Radio Testing 2	Public Works
3	003	D	Radio Test 3	Radio Testing 3	Public Works
4	004	D	Radio Test 4	Radio Testing 4	Public Works
6	006	D	Radio Test 6	Radio Testing 6	Public Works
7	007	D	Radio Test 7	Radio Testing 7	Public Works
8	008	D	Radio Test 8	Radio Testing 8	Public Works