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Tieline Technology



Offices in Indianapolis, IN and
Ft. Worth, TX

Audio over IP for Remotes...

Audio over IP for Remotes...

**Continuing the Remote
Broadcast revolution!**

Audio over IP for Remotes...

**Continuing the Remote
Broadcast revolution!**

**Tieline began developing IP
audio in 2003.**

Audio over IP for Remotes...

**Continuing the Remote
Broadcast revolution!**

**Tieline delivered IP audio to
customers in December 2005.**

Audio over IP for Remotes...

**Continuing the Remote
Broadcast revolution!**

**Tieline delivered Wireless IP
Module to customers in
August 2006.**

Audio over IP for Remotes...

How have you prepared?

Audio over IP for Remotes...

**Have you prepared for IP Remote
Broadcasts?**

Audio over IP for Remotes...

Have you prepared for IP Remote Broadcasts?

Wireless Remote Revolution

Audio over IP for Remotes...

Have you prepared for IP Remote Broadcasts?

Wireless IP Remote Broadcasts represent the single most important advancement in broadcasting in the last 40 years.

G3



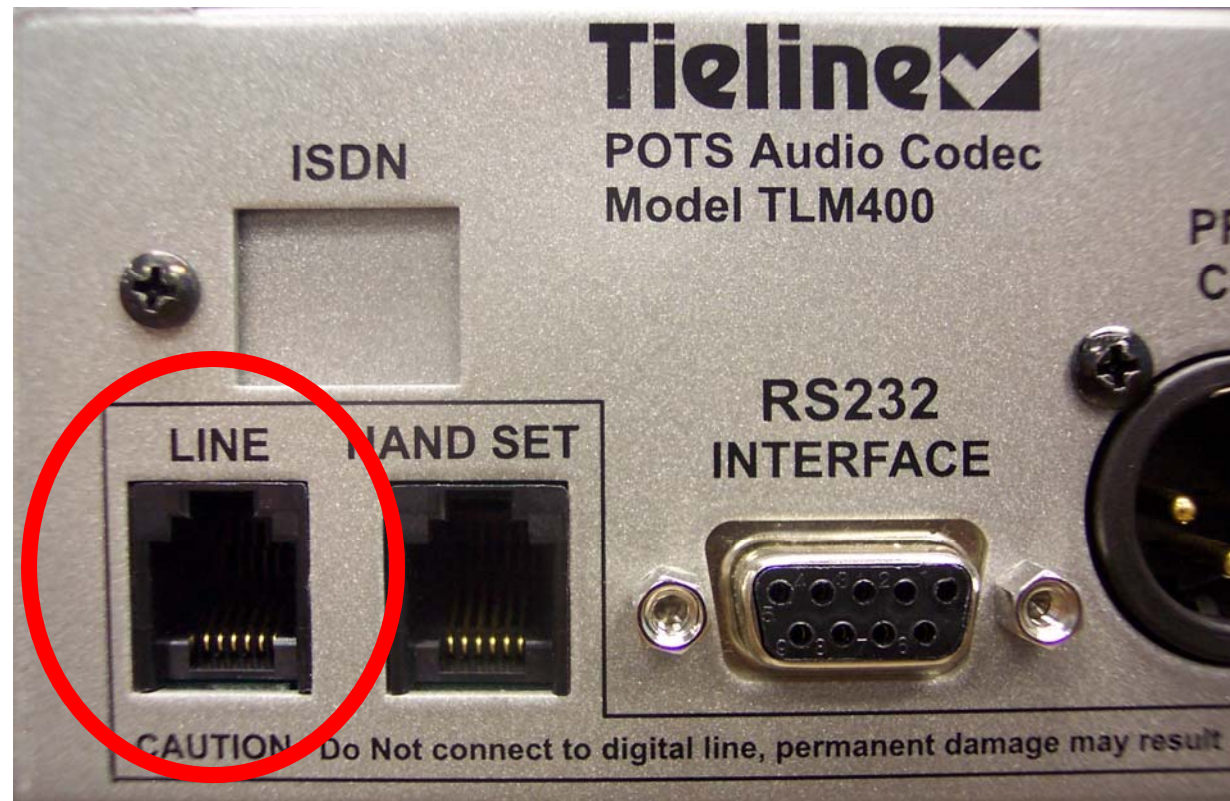
REPLAY

Which
Solution
Will you Choose?

- > Audio over IP
- > Free Demo
- > Where to buy
- > Support Centre

Brief Overview

POTS modems send digital information over a plain phone line.



Brief Overview

Stable POTS modem quality.



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15kHz FM-Quality audio over a plain phone line.



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Stable enough to be used as *primary* Studio-To-Transmitter Links over plain phone lines.



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One connection, multiple years stayed connected.

WXIN TV59 Indianapolis – 7 years, CKUA-Edmonton – 3+ years, Aboriginal Radio Australia (across Outback) – 9+ years

Brief Overview

ISDN capable codec for multiple connection options.



Brief Overview

ISDN capable codec for multiple connection options.

20kHz Stereo over single B Channel.



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Algorithms:



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Tieline Music



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Tieline Music
MusicPLUS



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Tieline Music
MusicPLUS
MPEG Layer II



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MusicPLUS

MPEG Layer II (single, bonded, joint stereo)



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MPEG Layer II (single, bonded, joint stereo)

G.722, G.711



Brief Overview

High Speed Wireless
20kHz Stereo / Mono
/Dual Mono over cellular
networks (Verizon, Sprint
AT&T, Alltel).



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15kHz Mono – 24kbps

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15kHz Mono – 24kbps
15kHz Stereo – 48 kbps

Brief Overview

High Speed Wireless
20kHz Stereo / Mono
/Dual Mono over cellular
networks (Verizon, Sprint
AT&T, Alltel).



15kHz Mono – 24kbps
15kHz Stereo – 48 kbps
15kHz Dual Mono – 48kbps

Brief Overview

High Speed Wireless
20kHz Stereo / Mono
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- 15kHz Mono – 24kbps
- 15kHz Stereo – 48 kbps
- 15kHz Dual Mono – 48kbps
- 20kHz Mono – 48kbps

Brief Overview

High Speed Wireless
20kHz Stereo / Mono
/Dual Mono over cellular
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- 15kHz Mono – 24kbps
- 15kHz Stereo – 48 kbps
- 15kHz Dual Mono – 48kbps

- 20kHz Mono – 48kbps
- 20kHz Stereo – 96kbps

Brief Overview

High Speed Wireless
20kHz Stereo / Mono
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15kHz Mono – 24kbps
15kHz Stereo – 48 kbps
15kHz Dual Mono – 48kbps

20kHz Mono – 48kbps
20kHz Stereo – 96kbps
20kHz Dual Mono – 96kbps

Brief Overview

BGAN Satellite capable.



Brief Overview

BGAN Satellite capable.

15kHz Mono or 7kHz
Dual Channel over
32kbps IP data channel.



Brief Overview

BGAN Satellite capable.

15kHz Mono or 7kHz
Dual Channel over
32kbps IP data channel.

20kHz Mono or 15kHz
Stereo/Dual Channel
over 64kbps IP data
channel.



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Streaming 32K = \$ 2.90/minute -or- \$174/one hour

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Streaming 64K = \$ 6.00/minute -or- \$360/one hour

Brief Overview

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Brief Overview

BGAN Satellite capable.



“Mackay tested Tielines using different terminals, both the Hughes HNS9201 and the Thrane & Thrane Explorer 700.”

BGAN Satellite capable.



“The codecs sounded great. My management was very, very impressed with the demos,” said Grady Jeffries with the Mackay Communications technical team.

Brief Overview

BGAN Satellite capable.



“We get customers all the time that say they want to use a codec and now we can recommend they buy Tielines and we can tell them we know exactly how to set it up and make it work,” said Jeffries.

Brief Overview

BGAN Satellite capable.



IP is Here

IP Functionality

Configuring IP

Hardware

Software

Products

IP Codec Features to Look For:



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IP Codec Features:

TRULY SUPERIOR ALGORITHM



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IP Codec Features:



TRULY SUPERIOR ALGORITHM

IP must have a stable algorithm for solid connections.

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IP Codec Features:

MULTIPLE BACKUP PATHS



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IP Codec Features:



MULTIPLE BACKUP PATHS

Just in case primary path fails, especially important for wireless.

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IP Codec Features:

LEAST CODEC LATENCY



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IP Codec Features:

SUPERIOR AUDIO QUALITY



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IP Codec Features:

SUPERIOR AUDIO QUALITY

Able to sound good on HD stations.



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IP Codec Features:



SUPERIOR AUDIO QUALITY

Able to sound good on HD stations.

Listen for yourself with an A-B comparison!

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IP Codec Features:



SUPERIOR AUDIO QUALITY

Able to sound good on HD stations.

Listen for yourself with an A-B comparison!

Listen to and compare voice only audio.

Then listen to music with clean sonic production,
percussive elements and a clear vocal.

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IP Codec Features:

SUPERIOR AUDIO QUALITY

Able to sound good on HD stations.

Listen for yourself with an A-B comparison!

Listen to and compare voice only audio.

Then listen to music with clean sonic production,
percussive elements and a clear vocal.

Compare all this against other codecs. Then decide.

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IP Codec Features:

AUTO RECONNECT



IP is Here

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IP Codec Features:

SIMPLE OPERATION



IP is Here

IP Functionality

Configuring IP

Hardware

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IP Codec Features:

SIMPLE OPERATION

ONE-BUTTON CONNECTION



IP is Here

IP Functionality

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IP Codec Features:

SIMPLE OPERATION

ONE-BUTTON CONNECTION

ZERO BUTTON CONNECTION



IP is Here

IP Functionality

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IP Codec Features:

SIMPLE OPERATION



IP is Here

IP Functionality

Configuring IP

Hardware

Software

Products

IP Codec Features:

SIMPLE OPERATION

FULLY REMOTE CONTROLLABLE



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IP Codec Features:



SIMPLE OPERATION

FULLY REMOTE CONTROLLABLE

Control field unit's audio input level and other settings from studio.

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IP Codec Features:

SIMPLE OPERATION

FULLY REMOTE CONTROLLABLE

Control field unit's audio input level and other settings from studio.

Virtually remote control both studio and field unit from a third location from anywhere in the world.

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IP Codec Features:

SIMPLE OPERATION

FULLY REMOTE CONTROLLABLE

Control field unit's audio input level and other settings from studio.

Virtually remote control both studio and field unit from a third location from anywhere in the world.

Relay inputs and outputs allow single or multiple macro commands to be executed from codec to codec (studio-to-field / field-to-studio).

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IP Codec Features:



NETWORK CONDITION DISPLAYED ON SCREEN

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IP Codec Features:



NETWORK CONDITION DISPLAYED ON SCREEN

You know where you stand before going on the air and while on air.

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IP Codec Features:



NETWORK CONDITION DISPLAYED ON SCREEN

You know where you stand before going on the air and while on air.

Alerts you to network changes.

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IP Codec Features:



NETWORK CONDITION DISPLAYED ON SCREEN

You know where you stand before going on the air and while on air.

Alerts you to network changes.

Automatically changes if desired (new development!).

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IP Codec Features:

NEW DEVELOPMENT:



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IP Functionality

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IP Codec Features:



NEW DEVELOPMENT:

DYNAMIC "AUTO JITTER ADAPT" BUFFER

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IP Codec Features:



NEW DEVELOPMENT:

DYNAMIC “AUTO JITTER ADAPT” BUFFER (INTELLIGENT JITTER BUFFER)

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IP Codec Features:



NEW DEVELOPMENT:

DYNAMIC “AUTO JITTER ADAPT” BUFFER

(INTELLIGENT JITTER BUFFER)

6 Settings that each automatically adjust for least jitter buffer for the least delay (latency).

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“Learns” each connection and keeps learning and adjusting every second so each connection is uniquely buffered.

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Changes to meet challenging networks and conditions.

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IP Codec Features:



A range of algorithms offering broadcast quality:

- 7.5kHz mono as low as 9.6Kbps
 - 15kHz mono at 24Kbps
 - 15kHz stereo at 48Kbps
- New 20kHz Stereo MusicPLUS
- 20kHz Mono @ 48kbps and 20kHz Stereo @ 96kbps

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IP Codec Features:



A range of algorithms offering broadcast quality:

Linear Uncompressed 23kHz Stereo
“True STL-Quality” audio - wired controlled LAN

23kHz audio

- Only 5ms latency

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Wireless Networks



**If you're thinking wireless....
you should also be thinking....**

REDUNDANCY

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Fox News scores a first in Internet transmission during Bush visit to Africa

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Pool producers Jessica Curtis and Kirstin McNary

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Fox News scores a first in Internet transmission during Bush visit to Africa

–Fox News Radio fed the press pool this time down in Africa for President Bush's visit this week. But in Tanzania, there are no ISDN lines. Fox News found a solution and was able to transmit the broadcasts over the Internet and provide that ability to the other networks-ABC, AP, CBS, NPR and VOA.

This is the first time that a network news pool had access to an internet transmission. Says Mitch Davis, VP/Fox News Radio Network: "This is actually a set up routine for presidential trips overseas-the participating radio networks take turns feeding the transmission. Everything where we were set up was

intermittent and unreliable-from electrical to phones. AT&T provides connectivity for the traveling press on these trips. They told us flat out they couldn't provide an ISDN hookup in Tanzania. So instead of settling for lesser service or have to spend an excess of money on satellite time, we've been using some hardware that gives us IT connectivity we used on a previous trip just for ourselves. We managed to move forward into the 21st Century and do this via Internet, because in many third world countries they don't have the traditional copper-based phone systems or ISDN." The gear was the Tieline Commander G3.

RBR observation: Even in third world countries, digital technology comes to the rescue. Now that the internet has proven itself worthy of use during presidential visits, these codecs may get even more use for important global press events-they're dependable and money-saving



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3G = Generic term for high speed wireless data

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Rogers – GSM network using HSDPA (HSDA)

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HSDPA = “High Speed Downlink Packet Access”

3G = Generic term for high speed wireless data

**Rogers – GSM network using HSDPA (HSDA)
HSDPA = “High Speed Downlink Packet Access”**

Bell Canada, Telus, SaskTel – EVDO networks

3G = Generic term for high speed wireless data

Rogers – GSM network using HSDPA (HSDA)

HSDPA = “High Speed Downlink Packet Access”

Bell Canada, Telus, SaskTel – EVDO networks

**EVDO = “Evolution-Data Optimized” or
“Evolution-Data only”**

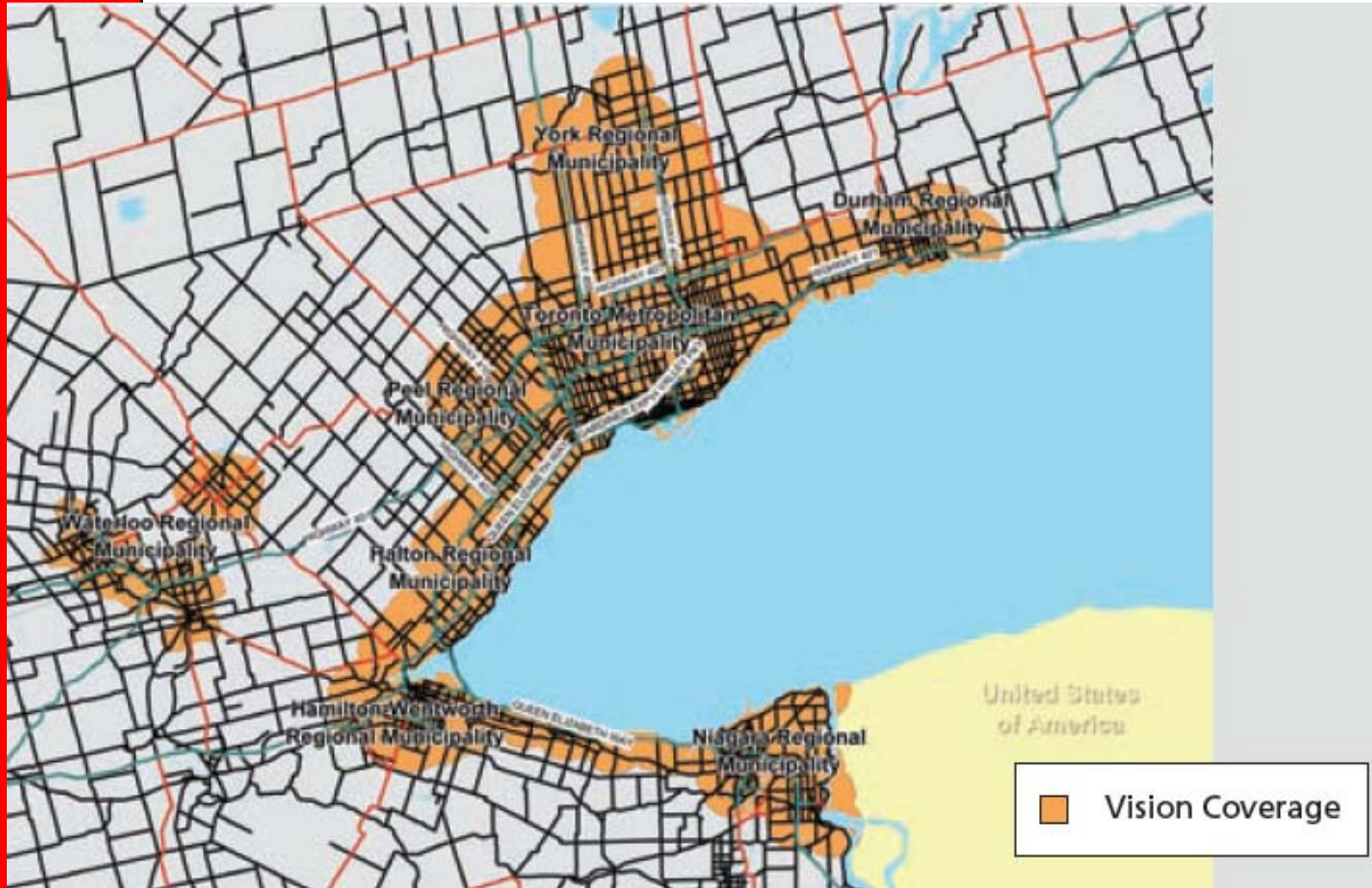
3G = Generic term for high speed wireless data

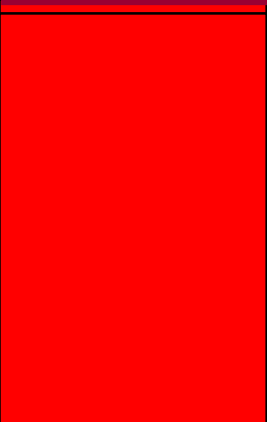
**Rogers – GSM network using HSDPA (HSDA)
HSDPA = “High Speed Downlink Packet Access”**

Bell Canada, Telus, SaskTel – EVDO networks

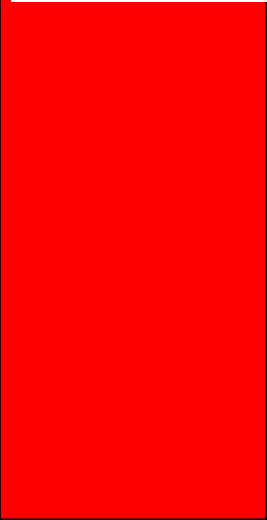
**EVDO = “Evolution-Data Optimized” or
“Evolution-Data only”**

Desired EVDO Speeds = “Rev 0” or “Rev A”





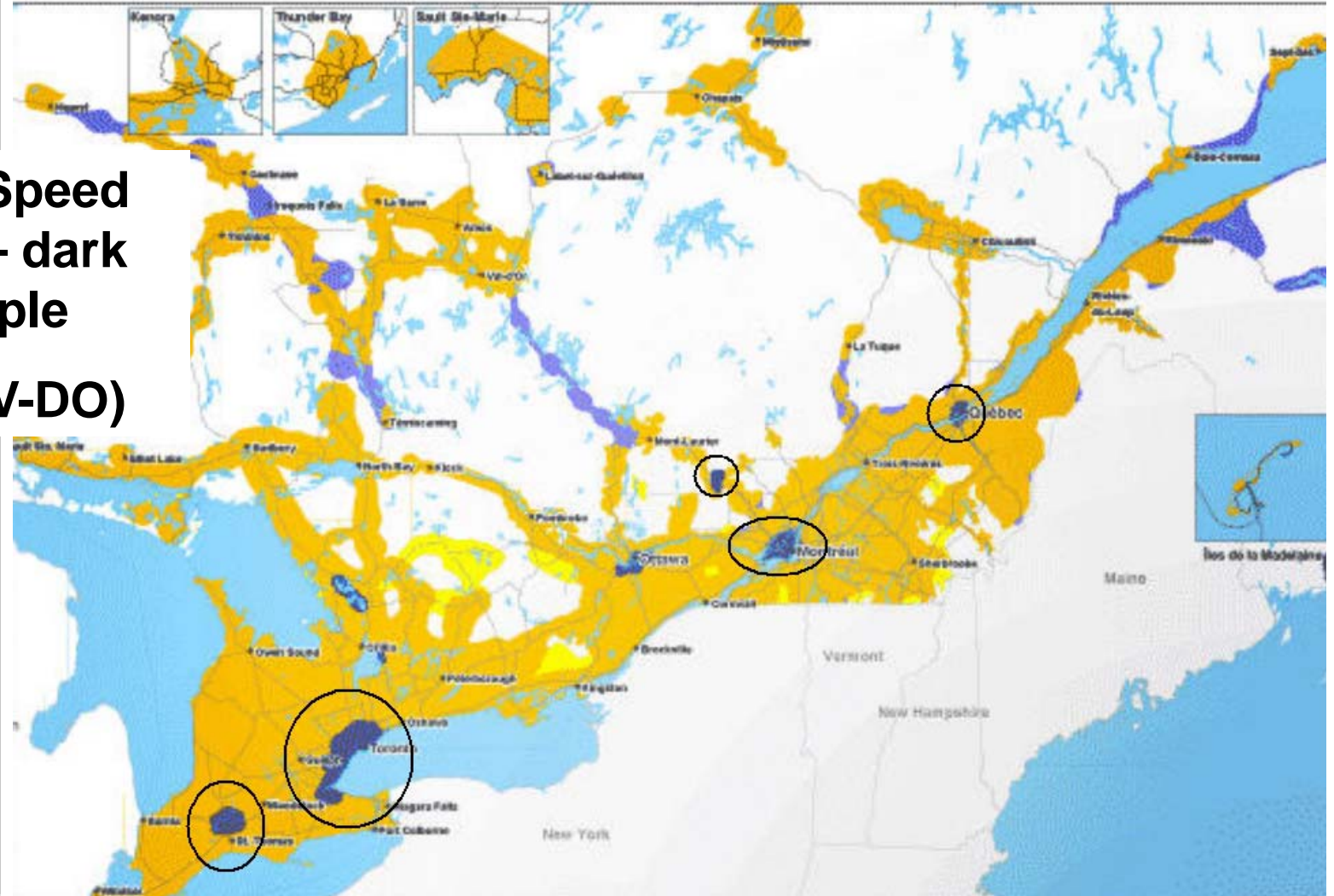
High Speed Data - light orange



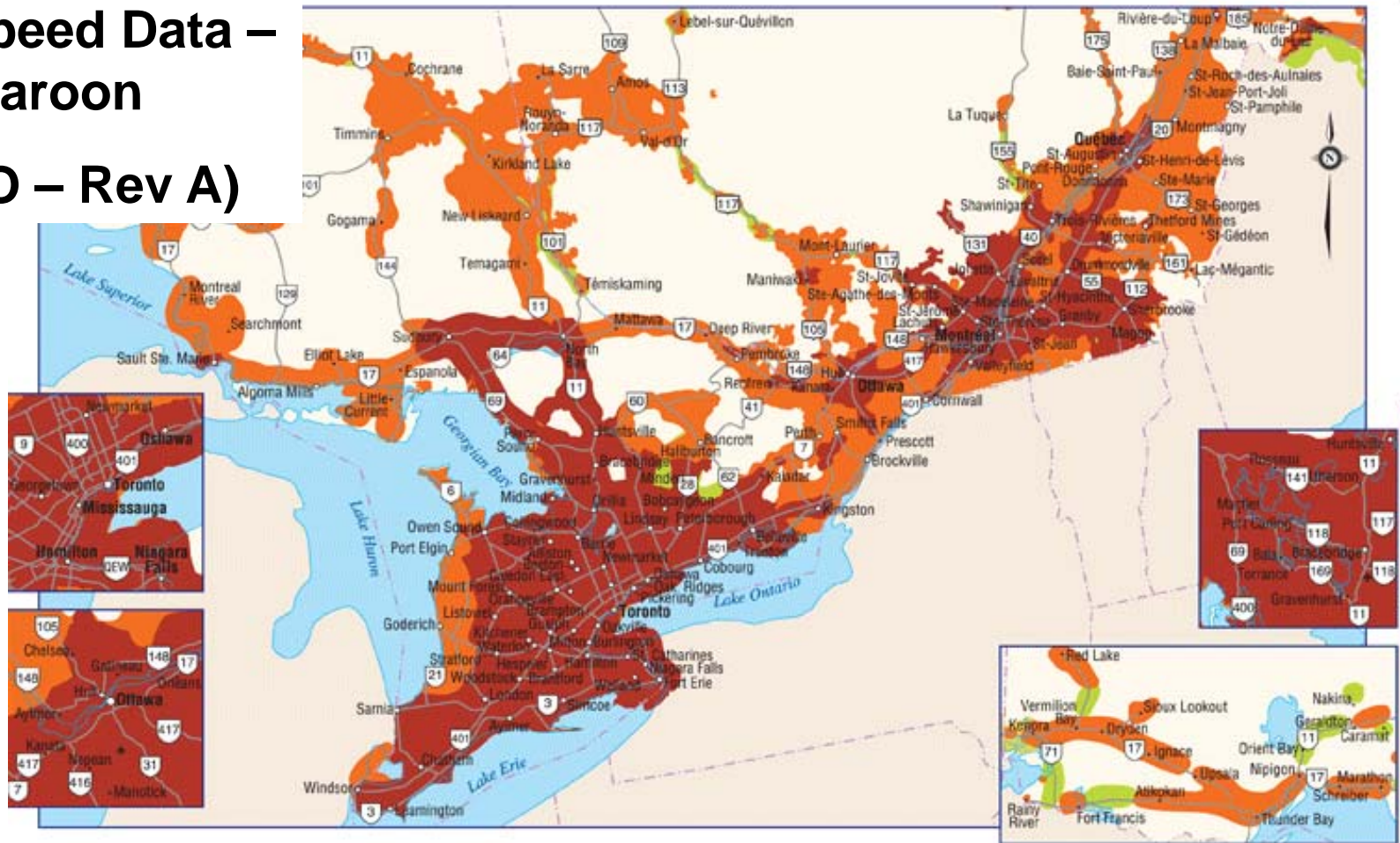
Coverage Area:
Ontario



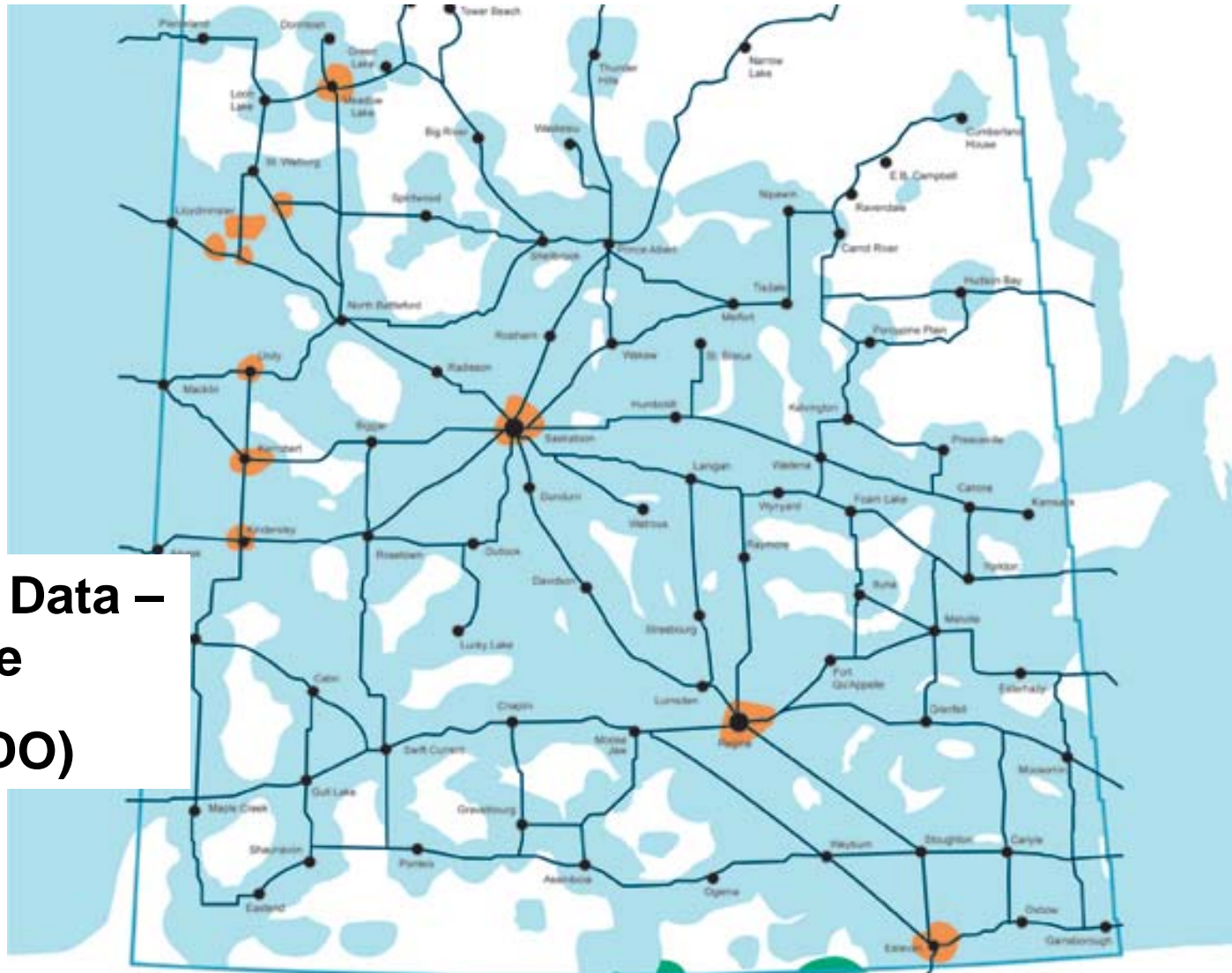
**High Speed
Data – dark
purple
(1X-EV-DO)**



**High Speed Data –
maroon
(EVDO – Rev A)**



Note: Coverage areas are approximate. Actual coverage and network service may vary and are subject to change.



**High Speed Data –
orange
(1X-EV-DO)**

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CONCLUSION

IP broadcasting is not just the way of the future....it has already arrived.

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IP broadcasting is not just the way of the future....it has already arrived.

It is inevitable that Telcos will switch to VoIP rendering POTS lines less viable.

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IP broadcasting is not just the way of the future....it has already arrived.

It is inevitable that Telcos will switch to VoIP rendering POTS lines less viable.

POTS will increasingly be replaced with broadband Internet, Wi-Fi and high speed cell phone networks.

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You must compare Wired and Wireless IP codecs

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Side-by-Side comparisons are best

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Choose carefully

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Side-by-Side comparisons are best

Choose carefully

Make sure codec has multiple redundancy paths

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You must compare Wired and Wireless IP codecs

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Make sure codec has multiple redundancy paths

DEMO A CODEC

More IP info can be found at:

www.tieline.com