LCRA’s Telecommunications Network Consists of Radios and Wired Network Communication

**RADIO SYSTEM**
Carries push-to-talk voice communications and data services

**TRANSPORT NETWORK**
Carries data for LCRA and customers using cables, fiber and microwave; also used by the radio system

We provide private mission-critical data and voice services to LCRA and customers in our service territory
LCRA’s Radio System

• More than 180 cities, counties, electric utilities and other public safety entities use the LCRA radio system

• Uses both the 700-megahertz and 900-MHz frequency spectrums

• Radio coverage reaches more than 55,000 square miles
  – Second largest 900-MHz radio network in Texas
  – Second largest shared 700-MHz radio network in Texas by geographic footprint, and one of the top five public safety service providers by user count

• 700-MHz spectrum is limited to public safety-related uses
Radio Spectrum With 700-MHz and 900-MHz Frequencies

Maritime radio, navigation
Maritime radio, navigation
AM radio, aviation, radio navigation
Shortwave radio
VHF television, FM radio
UHF television, mobile phones, GPS, Wi-Fi, 4G
Microwave
Satellite communications, Wi-Fi
Radio astronomy, satellite, communications

Lower frequency
3 kHz  30 kHz  300 kHz  30 MHz  300 MHz  3 GHz  30 GHz  300 GHz

Higher frequency

Higher frequencies provide faster information (data) transfer

kHz: kilohertz
MHz: megahertz
GHz: gigahertz
Are We Talking About Broadband?

- Broadband can refer to newer radio technology or fiber or copper wires
- The broadband we’re talking about today is radio technology
- The term “broadband” also is used when talking about fiber
  - We’ll discuss the status of our fiber broadband business in a later meeting
900-MHz Radio Use

• We use an older, “narrowband” technology in the spectrum, called OpenSky

• 900-MHz band is used for day-to-day and emergency operations for LCRA, as well as for more than 100 external customers
  – LCRA operations
  – LCRA Hydromet system (more than 275 sites)
  – Electric cooperatives
  – Cities, schools and colleges
  – Transit authorities

• Radios provide many talk groups (channels) that can be used anywhere in the footprint

7,800 radios in 61 counties and more than 50,000 square miles
# Current Radio Users
(700-MHz and 900-MHz users)

<table>
<thead>
<tr>
<th>Category of customer</th>
<th>Number of customers</th>
<th>700-MHz radios</th>
<th>900-MHz radios</th>
<th>Total number of radios</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCRA</td>
<td>1</td>
<td>168</td>
<td>1,913</td>
<td>2,081</td>
</tr>
<tr>
<td>(14% of total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First responders</td>
<td>158</td>
<td>5,047</td>
<td>1,009</td>
<td>6,056</td>
</tr>
<tr>
<td>Cities</td>
<td>54</td>
<td>387</td>
<td>231</td>
<td>618</td>
</tr>
<tr>
<td>School districts/colleges</td>
<td>12</td>
<td>146</td>
<td>1,334</td>
<td>1,480</td>
</tr>
<tr>
<td>Transit authorities</td>
<td>2</td>
<td>-</td>
<td>1,735</td>
<td>1,735</td>
</tr>
<tr>
<td>Electric cooperatives</td>
<td>12</td>
<td>24</td>
<td>1,519</td>
<td>1,543</td>
</tr>
<tr>
<td>Counties</td>
<td>21</td>
<td>1,824</td>
<td>51</td>
<td>1,875</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>260</strong></td>
<td><strong>7,596</strong></td>
<td><strong>7,792</strong></td>
<td><strong>15,388</strong></td>
</tr>
</tbody>
</table>

*Additional non-LCRA radios that can use our radio network*  

<table>
<thead>
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<tr>
<td>15,091</td>
<td>33</td>
<td><strong>15,124</strong></td>
<td></td>
</tr>
</tbody>
</table>

Numbers as of about Jan. 20, 2023
How LCRA’s Radio System Works
The 900-MHz Challenge

• In 2020, the Federal Communications Commission – which regulates the radio spectrum – repurposed the 900-MHz band that we use; these changes affect us
  – Designated portions of the 900-MHz narrowband spectrum to be realigned to allow for broadband use, specifically 3G LTE (third generation long-term evolution)

• 3G LTE provides for high data transfer speeds
  – Our radio technology in use now – narrowband – has very slow data transfer speeds (almost equal to voice and like an old computer modem)
  – 3G LTE has much faster data transfer speeds, but still slower than needed to stream full-motion video
The 900-MHz Challenge (Continued)

• The FCC exempted LCRA, along with nine other electric utilities across the country, from mandatory realignment to LTE
  – However, we cannot expand our 900-MHz footprint. The FCC will not grant any new, additional narrowband licenses

• Five of those exempted utilities already are transitioning to 900-MHz LTE use
  – Only LCRA and four other utilities have not moved to LTE
  – Two other major utilities have leased spectrum for private LTE even though they had no prior operations in the spectrum
The 900-MHz Challenge (Continued)

• We believe the FCC will eventually remove this exemption
  – Likely would result in LCRA being required to move off 900 MHz or realign its 900-MHz narrowband spectrum to allow broadband use

• There is no “do nothing” option for the future
  – We must eventually transition all or part of our 900-MHz narrowband use to another solution(s)
  – Currently, the 900-MHz narrowband spectrum we own does not allow us to use it for broadband LTE operations

• Operating LTE broadband would require LCRA to trade or buy channels to realign our spectrum