

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
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*XM Radio Inc. Request for Special
Temporary Authority to Operate Satellite
Digital Audio Radio Service Terrestrial
Repeaters for 30 Days*

SAT-STA-20061002-00114

Federal Communications Commission
Office of the Secretary

**SUPPLEMENT NO. 2 TO XM RADIO INC.'S
MEMORANDUM IN SUPPORT OF STA REQUEST**

In its Memorandum in Support of its 30-Day STA Request, XM Radio Inc. ("XM") stated that, pursuant to a request from Commission staff, it would analyze each market in which it operates terrestrial repeaters to demonstrate that it qualifies for an STA in each of them.¹ XM analyzed four markets in the Memorandum,² and it detailed five more in a supplement filed on December 11, 2006.³ This supplement justifies the need for an STA – and the critical importance of XM's repeaters – in twenty-five more markets.⁴ As the following market-specific analyses show, XM has deployed a network that meets the Commission's goals, and obviates the concerns raised by parties objecting to XM's STA, more fully than the network the Commission has already authorized, and grant of the requested STA is therefore warranted.

¹ See *XM Ex Parte Memorandum in Support of STA Request*, File No. SAT-STA-20061002-00114 (filed Nov. 21, 2006).

² See *id.* at 14-22 (analyzing Boston, Buffalo, Detroit, and Providence).

³ See *Supplement No. 1 to XM Radio Inc.'s Memorandum in Support of STA Request*, File No. SAT-STA-20061002-00114 (filed Dec. 11, 2006) (analyzing Atlanta, Los Angeles, Nashville, New York, and Raleigh).

⁴ This supplement analyzes the following markets: Akron, OH; Albany, NY; Albuquerque, NM; Birmingham, AL; Charlotte, NC; Cincinnati, OH; Cleveland, OH; Columbus, OH; Dallas, TX; Dayton, OH; Greensboro, NC; Greenville, SC; Harrisburg, PA; Hartford, CT; Houston, TX; Indianapolis, IN; Jacksonville, FL; Miami, FL; Minneapolis, MN; Philadelphia, PA; Pittsburgh, PA; Seattle, WA; Springfield, MA; St. Louis, MO; and Washington, DC.

XM's repeaters work together with the XM satellite system to provide excellent coverage and service quality throughout these twenty-five markets and across the entire XM network. Requiring XM to turn off the variant repeaters in these markets would severely degrade service in the heart of these cities and on their major commuter routes, resulting in immediate and palpable consumer harm. By contrast, granting the STA would harm no one.

The Commission should also recognize that XM cannot simply reconfigure its as-built network to conform to the original STA, as the WCS Coalition has suggested.⁵ One can't merely pick up a repeater site and relocate it down the block. And if one could, it would require many other network changes to account for the move. As the WCS Coalition must know, reconfiguring XM's terrestrial network would be a very complicated process involving hundreds of complex and interrelated tasks, such as obtaining new tower leases, deploying new facilities, dismantling antennas, and reorienting panels. Since XM's single-frequency network must operate on a carefully coordinated basis to avoid intersignal interference, these changes would also require further modifications to compliant repeaters. In all, this process would take months if not years to complete – and to provide equivalent service the rebuilt network would be a bigger, more power-intensive, and more likely to produce interference than the existing network. Rather than requiring changes of this magnitude that would result in a less effective network more prone to creating interference, the Commission should promptly issue the requested STA, authorizing all of XM's repeaters in each of the markets discussed below – and nationwide.

⁵ See *WCS Coalition Ex Parte Letter* at 3-4, SAT-STA-20061002-00114 (filed Dec. 13, 2006).

A. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN AKRON, OH

XM is currently authorized to operate six repeaters in the Akron market -- it has deployed only three. More significantly, the Commission authorized one high-power repeater (10 kW and above) and five medium-power repeaters (between 2 and 10 kW). XM has deployed zero high-power repeaters and only two of the five authorized medium-power repeaters. The remaining repeater operates at less than 2 kW.

Two of XM's three repeaters in the Akron market exhibit some kind of variance:

- AKR004 varies only in orientation (from 135 degrees to 310 degrees).
- AKR002 varies in antenna type (from a 12dB gain panel antenna to a 10dB gain omni-directional antenna) and orientation (from 160 degrees to 0 degrees).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Akron market population benefiting from repeater coverage by more than 112,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 84 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and some areas eliminate, service on three major commuter routes – I-76, I-77, and I-277 – that collectively serve nearly 150,000 vehicles every day. Akron Plot 1 (repeater coverage with the variant repeaters on) and Akron Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-1 and 2-2.

B. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN ALBANY, NY

XM is currently authorized to operate eleven repeaters in the Albany market -- it has deployed only six. More significantly, the Commission authorized five high-power repeaters and two medium-power repeaters. *XM has actually deployed only one of the five authorized high-power repeaters and only one of the two authorized medium-power repeaters.* XM's remaining repeaters in Albany all operate at 2 kW or below.

Two of XM's six repeaters in the Albany market exhibit some kind of variance:

- ALB006 varies only in antenna height (increasing from 91 feet to 104 feet).
- ALB013 varies in antenna type (from a 15dB gain panel antenna to a 17dB gain panel antenna), orientation (from 160 degrees to 40 degrees), and antenna height (difference of only 2 feet, decreasing from 110 feet to 108 feet).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Albany market population benefiting from repeater coverage by nearly 85,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 24 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on three major commuter routes – I-87, I-90, and I-787 – that collectively serve more than 120,000 vehicles every day. Albany Plot 1 (repeater coverage with the variant repeaters on) and Albany Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-3 and 2-4.

C. AN STA SHOULD BE GRANTED FOR XM'S REPEATER IN ALBUQUERQUE, NM

XM is currently authorized to operate one repeater – a high-power repeater – in the Albuquerque market. In keeping with that authorization, XM has deployed only a single, high-power repeater in the market (ALQ004). XM's Albuquerque repeater varies from the authorized repeater. Significantly, *ALQ004 varies only in antenna downtilt*, from 0 degrees to 6 degrees. This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA.

Shutting down this repeater would eliminate the repeater-coverage footprint in the Albuquerque market, thereby reducing the population benefiting from repeater coverage by more than 577,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on two major commuter routes – I-25 and I-40 – that together serve more than 132,000 vehicles every day. Albuquerque Plot 1 (repeater coverage with the variant repeaters on) and Albuquerque Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See Exhibits 2-5 and 2-6.*

D. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN BIRMINGHAM, AL

XM is currently authorized to operate eight repeaters in the Birmingham market, including five medium-power repeaters and three low-power repeaters. XM has deployed the five medium-power repeaters as authorized, and it has deployed four low-power repeaters. In other words, in this market it has installed one extra repeater – but it is a low-power repeater to which even the WCS Coalition does not seem to object.⁶

⁶ The additional low-power repeater does not present any interference concerns. Indeed, the WCS Coalition has stated that it does not oppose the deployment of additional low-power repeaters. *See, e.g., Letter from Paul J. Sinderbrand, Counsel to the WCS Coalition, to Marlene H. Dortch at 6-8, File No. SAT-STA-20061002-00114 (filed Nov. 30, 2006).*

Two of XM's repeaters in the Birmingham market exhibit some kind of variance:

- BIR006 varies in location (by 967 feet) and downtilt (from 6 degrees to 0 degrees).
- BIR008 varies because it was not included in the original STA. BIR008 is the "extra" low-power repeater identified above, however, and, as explained above, it does not present any interference concerns.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Birmingham market population benefiting from repeater coverage by nearly 50,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 18 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes -- I-20, I-59, I-459, and Route 280 -- that collectively serve more than 170,000 vehicles every day. Birmingham Plot 1 (repeater coverage with the variant repeaters on) and Birmingham Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-7 and 2-8.

E. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN CHARLOTTE, NC

XM is currently authorized to operate twenty repeaters in the Charlotte market -- it has deployed only sixteen. More significantly, the Commission authorized one high-power repeater and sixteen medium-power repeaters. XM has deployed the one authorized high-power repeater and only eleven of the sixteen authorized medium-power repeaters. XM's remaining repeaters in the market all operate at 2 kW or below.

Six of XM's sixteen repeaters in the Charlotte market exhibit some kind of variance:

- Two of the six (CHA009 and CHA038) vary only in antenna height (decreased from 119 feet to 109 feet, and from 180 feet to 170 feet, respectively).
- The other four (CHA007, CHA015, CHA021, and CHA037) vary only in antenna downtilt, from 0 degrees to 6 degrees.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Charlotte market population benefiting from repeater coverage by more than 73,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 12 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on five major commuter routes – I-77, I-85, I-485, Route 74, and Route 521 – that collectively serve more than 240,000 vehicles every day. Charlotte Plot 1 (repeater coverage with the variant repeaters on) and Charlotte Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-9 and 2-10.

F. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN CINCINNATI, OH

XM is currently authorized to operate eleven repeaters in the Cincinnati market -- it has deployed only eight. More significantly, the Commission authorized one high-power repeater and six medium-power repeaters. XM has deployed the one authorized high-power repeater and only five of the six authorized medium-power repeaters. The other two repeaters operate at 2 kW or below.

Three of XM's eight repeaters in the Cincinnati market exhibit some kind of variance:

- One of the variant repeaters (CIN041) varies only in antenna downtilt, from 0 degrees to 4 degrees.

- Another (CIN025) varies in antenna type (from a 10dB gain antenna to an 11.5dB gain antenna), orientation (from 270 degrees to 0 degrees), and antenna downtilt (from 2 degrees to 0 degrees).
- The final variant repeater (CIN039) was constructed at a location that the STA did not clearly identify. This does not mean this is an extra repeater, but simply that none of the unused authorizations clearly applies to it.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Cincinnati market population benefiting from repeater coverage by more than 478,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 67 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes – I-71, I-74, I-75, and I-471 – that collectively serve more than 225,000 vehicles every day.

Cincinnati Plot 1 (repeater coverage with the variant repeaters on) and Cincinnati Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-11 and 2-12.

G. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN CLEVELAND, OH

XM is currently authorized to operate ten repeaters in the Cleveland market -- it has deployed only seven. More significantly, the Commission authorized four high-power repeaters and five medium-power repeaters. XM has deployed only two of the four authorized high-power repeaters and only four of the five authorized medium-power repeaters. The remaining repeater operates at less than 2 kW.

Five of XM's seven repeaters in the Cleveland market exhibit some kind of variance:

- Three of the five (CLE002, CLE006, and CLE027) vary because they have been installed at locations other than their authorized locations. CLE006 varies by 1658 feet. CLE027 varies by 945 feet, and it also varies in orientation (from 180 degrees to 135 degrees) and downtilt (from 0 degrees to 2 degrees).⁷ Due to a clerical error in the original STA notification CLE002 varies by 178,807 feet.⁸ CLE002 also varies in antenna height (increasing from 620 feet to 648 feet).
- The fourth (CLE005) varies in antenna type (from a 10dB gain omni-directional antenna to a 15dB gain panel antenna) and orientation (from 270 degrees to 130 degrees).
- The final variant repeater (CLE029) was constructed at a location that the STA did not clearly identify. This does not mean this is an extra repeater, but simply that none of the unused authorizations clearly applies to it.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Cleveland market population benefiting from repeater coverage by more than 250,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 39 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on six major commuter routes – I-77, I-90, I-271, I-480, I-490, and Route 2 – that collectively serve more than 328,000 vehicles every day. Cleveland Plot 1 (repeater coverage with the variant repeaters on) and Cleveland Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-13 and 2-14.

⁷ CLE027 varies in antenna type as well – but only in the most formalistic sense – because the original STA did not identify the antenna's beamwidth. CLE027 uses the same type of antenna that the Commission originally authorized.

⁸ This error – misstating the repeater's location by 30 minutes of latitude – was apparently due to a data entry mistake in entering the station's coordinates into XM's original STA application. The inadvertent nature of the error is demonstrated by the fact that the repeater's authorized coordinates would place it at an electrical power distribution plant located 28 miles southwest of Cleveland and 10 miles west of Akron.

H. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN COLUMBUS, OH

XM is currently authorized to operate eight repeaters in the Columbus market -- it has deployed only four. More significantly, the Commission authorized five medium-power repeaters and three low-power repeaters. XM has deployed only one of the five authorized medium-power repeaters, and it has not deployed any high-power repeaters.

Its remaining repeaters all operate at 2 kW or below.

Two of XM's four repeaters in the Columbus market exhibit some kind of variance:

- One of the two (COL020) varies only in antenna type (from one panel antenna to two panel antennas).
- The other (COL501) varies in antenna type (from an 18dB gain panel antenna to a 14dB gain panel antenna), orientation (from 45 degrees to 330 degrees), and downtilt (from 6 degrees to 0 degrees).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Columbus market population benefiting from repeater coverage by more than 81,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 22 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on two major commuter routes – I-70 and I-270 – that collectively serve more than 93,000 vehicles every day. Columbus Plot 1 (repeater coverage with the variant repeaters on) and Columbus Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-15 and 2-16.

I. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN DALLAS, TX

XM is currently authorized to operate fourteen repeaters in the Dallas market -- it has deployed only nine. More significantly, the Commission authorized twelve medium-power repeaters and two low-power repeaters. *XM has deployed only six of the twelve authorized medium-power repeaters, and it has not deployed any high-power repeaters.*

Its remaining repeaters all operate at 2 kW or below.

Three of XM's nine repeaters in the Dallas market exhibit some kind of variance:

- Two of the three (DFW001 and DFW507) vary only in antenna downtilt, from 2 degrees to 0 degrees and from 4 degrees to 0 degrees respectively.
- The third (DFW011) varies in antenna type (from a 15dB gain panel antenna to a 10dB gain omni-directional antenna) and orientation (from 230 degrees to 0 degrees).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Dallas market population benefiting from repeater coverage by more than 560,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 69 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on six major commuter routes – I-30, I-35E, I-35W, I45, Route 175, and Route 287 – that collectively serve approximately 367,000 vehicles every day. Dallas Plot 1 (repeater coverage with the variant repeaters on) and Dallas Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-17 and 2-18.

J. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN DAYTON, OH

XM is currently authorized to operate eight repeaters in the Dayton market -- it has deployed only four. More significantly, the Commission authorized five medium-power repeaters and three low-power repeaters. XM has deployed only one of the five authorized medium-power repeaters, and it has not deployed any high-power repeaters.

Its remaining repeaters all operate at 2 kW or below.

Two of XM's four repeaters in the Dayton market exhibit some kind of variance:

- One of the two (DAY011) varies in antenna type (from a 10dB gain omni-directional antenna to an 11.5dB gain omni-directional antenna), orientation (from 45 degrees to 0 degrees), and downtilt (from 2 degrees to 0 degrees).
- The other (DAY013) varies in antenna type (from a 10dB gain omni-directional antenna to a 15dB gain panel antenna) and orientation (from 0 degrees to 150 degrees).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Dayton market population benefiting from repeater coverage by more than 436,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 81 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes – I-70, I-75, I-675, and Route 35 – that collectively serve nearly 140,000 vehicles every day. Dayton Plot 1 (repeater coverage with the variant repeaters on) and Dayton Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-19 and 2-20.

K. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN GREENSBORO, NC

XM is currently authorized to operate nine repeaters in the Greensboro market -- it has deployed only seven. More significantly, the Commission authorized two high-power repeaters and six medium-power repeaters. XM has deployed only one of the two authorized high-power repeaters and only four of the six authorized medium-power repeaters. Both of XM's other repeaters in the market operate at 2 kW or below.

One of XM's seven repeaters in the Greensboro market varies from the original authorization. Specifically, GRE003 varies in antenna type (from one 15dB gain panel antenna to two 15dB gain panel antennas) and downtilt (from 0 degrees to 3 degrees). However, this variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA.

Shutting this repeater down would reduce the Greensboro market population benefiting from repeater coverage by more than 100,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 22 percent (again, measured by resident population). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on I-85, a major commuter route that serves more than 23,000 vehicles every day. Greensboro Plot 1 (repeater coverage with the variant repeaters on) and Greensboro Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-21 and 2-22.

L. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN GREENVILLE, SC

XM is currently authorized to operate twelve low-power repeaters in the Greenville market and, in keeping with that authorization, XM has deployed twelve low-

power repeaters in the market. It has not deployed any high-power repeaters or medium-power repeaters.

Two of XM's twelve repeaters in the Greenville market exhibit some kind of variance:

- One of the two (GRV005) varies only in antenna type (from one 15dB gain panel antenna to two 15dB gain panel antennas).
- The other (GRV027) varies because it was installed at a location other than its authorized locations. Due to a clerical error in the original STA notification, GRV027 varies by 598,837 feet.⁹

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Greenville market population benefiting from repeater coverage by more than 70,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 24 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on two major commuter routes – I-385 and Route 276 – that together serve more than 79,000 vehicles every day. Greenville Plot 1 (repeater coverage with the variant repeaters on) and Greenville Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See Exhibits 2-23 and 2-24.* Since there are only low power repeaters in Greenville, and even the WCS Coalition has repeatedly said it does not object to low power repeaters, there is no reason not to grant the STA for Greenville.

⁹ This error – misstating the repeater's location by 2 degrees of latitude – was apparently due to a data entry mistake in entering the station's coordinates into XM's original STA application. The inadvertent nature of the error is demonstrated by the fact that the repeater's authorized coordinates would place it in farmland 90 miles east of Greenville, 40 miles from the closest highway, and 2 miles from the North Carolina border.

M. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN HARRISBURG, PA

XM is currently authorized to operate nine repeaters in the Harrisburg market -- it has deployed only eight. More significantly, the Commission authorized four medium-power repeaters and five low-power repeaters. XM has deployed only three of the four authorized medium-power repeaters, and it has not deployed any high-power repeaters.

The rest of its repeaters in the market operate at 2 kW or below.

Two of XM's eight repeaters in the Harrisburg market exhibit some kind of variance:

- One of the two (HAB008) varies only in antenna type (from a 6 degree electrical downtilt to a 2 degree electrical downtilt).
- The other (HAB014) varies only in location (by 1359 feet).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Harrisburg market population benefiting from repeater coverage by more than 92,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 21 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes -- I-83, I-283, Route 30, and Route 283 -- that collectively serve more than 125,000 vehicles every day. Harrisburg Plot 1 (repeater coverage with the variant repeaters on) and Harrisburg Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-25 and 2-26.

N. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN HARTFORD, CT

XM is currently authorized to operate thirty repeaters in the Hartford market -- it has deployed only ten. More significantly, the Commission authorized ten high-power repeaters and thirteen medium-power repeaters. *XM has not deployed any of the ten authorized high-power repeaters and only three of the thirteen authorized medium-power repeaters.* XM's remaining repeaters in the market operate at 2 kW or below.

One of XM's ten repeaters in the Hartford market varies from the original authorization. Specifically, HAR035 varies only in antenna height, and only by five feet (decreasing from 175 feet to 170 feet). However, this variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA.

Shutting this repeater down would reduce the Hartford market population benefiting from repeater coverage by more than 20,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on Route 15, a commuter route that serves more than 19,000 vehicles every day. Hartford Plot 1 (repeater coverage with the variant repeaters on) and Hartford Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-27 and 2-28.

O. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN HOUSTON, TX

XM is currently authorized to operate nineteen repeaters in the Houston market -- it has deployed only eleven. More significantly, the Commission authorized three high-power repeaters and twelve medium-power repeaters. *XM deployed only one of the three authorized high-power repeaters and only five of the twelve authorized medium-power repeaters.* XM's remaining repeaters in the market operate at 2 kW or below.

One of XM's eleven repeaters in the Houston market varies from the original authorization. Specifically, HOU020 varies in antenna type (from a 12dB gain panel antenna to a 10dB gain omni-directional antenna) and orientation (from 160 degrees to 0 degrees). However, this variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA.

Shutting this repeater down would reduce the Houston market population benefiting from repeater coverage by more than 32,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on I-45, a commuter route that serves more than 37,000 vehicles every day. Houston Plot 1 (repeater coverage with the variant repeaters on) and Houston Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-29 and 2-30.

P. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN INDIANAPOLIS, IN

XM is currently authorized to operate one repeater -- a high-power repeater -- in the Indianapolis market. In keeping with that authorization, XM has deployed only a single, high-power repeater in the market (IND002). XM's Indianapolis repeater varies from the authorized repeater. Specifically, IND002 varies in location (by 2662 feet), antenna type (from a 10dB gain omni-directional antenna to an 11.5dB gain omni-directional antenna), height (decreasing from 840 feet to 828 feet), and downtilt (from 2 degrees to 0 degrees). However, this variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA.

Shutting down this repeater would completely eliminate the repeater-coverage footprint in the Indianapolis market, thereby reducing the population benefiting from

repeater coverage by more than 779,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on four major commuter routes – I-65, I-70, I-74, and I-465– that collectively serve more than 292,000 vehicles every day. Indianapolis Plot 1 (repeater coverage with the variant repeaters on) and Indianapolis Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown’s impact on repeater coverage. See Exhibits 2-31 and 2-32.

Q. AN STA SHOULD BE GRANTED FOR XM’S REPEATERS IN JACKSONVILLE, FL

XM is currently authorized to operate six repeaters in the Jacksonville market. In fact, *it has deployed only five*. More significantly, the Commission authorized three medium-power repeaters and three low-power repeaters. *XM has deployed only two of the three authorized medium-power repeaters, and it has not deployed any high-power repeaters*. Its remaining repeaters all operate at 2 kW or below.

Two of XM’s five repeaters in the Jacksonville market exhibit some sort of variance:

- The first (JAC009) varies only in antenna height (increasing from 168 feet to 200 feet).
- The second (JAC012) varies, technically speaking, in antenna type because XM deployed a TA2350-T6 antenna in place of the authorized TA-2350-DAB-T6 antenna. These are actually the same type of antenna, meaning there is no material variance.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission’s analysis of the STA.

Shutting down these repeaters would reduce the Jacksonville market population benefiting from repeater coverage by more than 60,000 people (measured by resident

location), thereby shrinking the repeater-coverage footprint in the market by 21 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes – I-95, I-295, Route 104, and Route 14 – that collectively serve approximately 156,000 vehicles every day. Jacksonville Plot 1 (repeater coverage with the variant repeaters on) and Jacksonville Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown’s impact on repeater coverage. See Exhibits 2-33 and 2-34.

R. AN STA SHOULD BE GRANTED FOR XM’S REPEATERS IN MIAMI, FL

XM is currently authorized to operate twenty-four repeaters in the Miami market - it has actually deployed twenty-three. More significantly, the Commission authorized one high-power repeater and twenty-two medium-power repeaters. *XM has deployed zero high-power repeaters and only nineteen of the twenty-two authorized medium-power repeaters.* The remaining repeaters all operate at 2 kW or below.

Ten of XM’s twenty-three repeaters in the Miami market exhibit some kind of variance:

- Four of the ten variant repeaters (MIA005, MIA009, MIA010, and MIA029) vary only because they have been installed at locations other than their authorized locations. Three of the six (MIA 009, MIA 010, and MIA 029) vary by distances ranging from 1232 feet to 3417 feet. Due to a clerical error in the original STA notification, one repeater (MIA005) varies by 392,970 feet from the initial STA authorization.¹⁰
- Two more (MIA007 and MIA019) vary only in orientation, by 20 and 30 degrees respectively.
- Another (MIA008) varies in antenna height only, decreasing from 428 feet to 379 feet.

¹⁰ This error – misstating the repeater’s location by 5 minutes latitude and 6 minutes longitude – was apparently due to a data entry mistake in entering the station’s coordinates into XM’s original STA application. The inadvertent nature of the error is demonstrated by the fact that the repeater’s authorized coordinates would place it 6 miles west of I-95 in wetlands, far from populated areas.

- Two others (MIA022 and MIA101) vary in antenna type only, from high power panel to medium power omni-directional and from 10dB gain omni-directional to 11.5dB gain omni-directional, respectively.
- The final variant repeater (MIA003) varies only in panel quantity, from 1 high-power panel to 2 high-power panels.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Miami market population benefiting from repeater coverage by more than 1,650,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 68 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on eight major commuter routes – I-75, I-95, I-195, I-395, I-595, Rte. 1, Route 826, and the Florida Turnpike – that collectively serve over 610,000 vehicles every day. Miami Plot 1 (repeater coverage with the variant repeaters on) and Miami Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-35 and 2-36.

S. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN MINNEAPOLIS, MN

XM is currently authorized to operate seventeen repeaters in the Minneapolis market -- it has deployed only eleven. More significantly, the Commission authorized zero high-power repeaters and thirteen medium-power repeaters. XM has deployed zero high-power repeaters and only five of the thirteen authorized medium-power repeaters.

The remaining repeaters all operate at 2 kW or below.

Six of XM's eleven repeaters in the Minneapolis market exhibit some kind of variance:

- Five of the six variant repeaters (MIN012, MIN014, MIN016, MIN027, and MIN 030) vary by location only. Four (MIN014, MIN016, MIN027, and MIN 030) vary by 992 to 1590 feet. MIN012 varies by 4157 feet.
- The sixth (MIN005) varies in that it was constructed at a location the STA did not clearly identify. But this is not an extra repeater, it is simply that none of the unused repeater authorizations clearly applies to it.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Minneapolis market population benefiting from repeater coverage by more than 205,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 30 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on five major commuter routes – I-35E, I-94, I-495, I-694, and Rte. 272 – that collectively serve nearly 315,000 vehicles every day. Minneapolis Plot 1 (repeater coverage with the variant repeaters on) and Minneapolis Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-37 and 2-38.

T. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN PHILADELPHIA, PA

XM is currently authorized to operate forty-two repeaters in the Philadelphia market -- it has deployed only thirty-three. More significantly, the Commission authorized zero high-power repeaters and seventeen medium-power repeaters. XM has deployed zero high-power repeaters and only six of the seventeen authorized medium-power repeaters. The remaining repeaters all operate at 2 kW or below.

Two of XM's thirty-three repeaters in the Philadelphia market exhibit some kind of variance. Specifically, PHI002 and PHI049 vary in location only, by 772 feet and 511

feet respectively. However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Philadelphia market population benefiting from repeater coverage by nearly 90,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 14 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on three major commuter routes – I-95, I-276, and Route 309 – that collectively serve over 120,000 vehicles every day.

Philadelphia Plot 1 (repeater coverage with the variant repeaters on) and Philadelphia Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-39 and 2-40.

U. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN PITTSBURGH, PA

XM is currently authorized to operate thirty-eight repeaters in the Pittsburgh market -- it has deployed only thirty-one. More significantly, the Commission authorized two high-power repeaters and twenty medium-power repeaters. XM has deployed only one of the two authorized high-power repeaters and only ten of the twenty authorized medium-power repeaters. The remaining repeaters all operate at 2 kW or below.

Eight of XM's thirty-one repeaters in the Pittsburgh market exhibit some kind of variance:

- Three of the variant repeaters (PIT002, PIT033, and PIT042) vary in location only, by distances ranging from 570 feet to 1297 feet.
- Another (PIT011) varies in orientation, from 145 degrees to 140 degrees.
- One of the variant repeaters (PIT037) varies only in panel quantity, from 1 high power panel to 2 high power panels.

- And another (PIT019) varies only in type, from 6 degree electrical downtilt to 2 degree electrical downtilt.
- The last two (PIT004 and PIT046) vary in EIRP (from 437 watts to 780 watts, and from 907 watts to 1970 watts), although both continue to operate at less than 2 kW. PIT004 also varies in antenna type (from high-power omni-directional antenna to a medium-power panel antenna) and orientation (from 0 degrees to 135 degrees) and downtilt (from 0 degrees to 8 degrees).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Pittsburgh market population benefiting from repeater coverage by more than 44,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 12 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes – Route 28, Route 837, Route 51, and Route 30 – that collectively serve over 102,000 vehicles every day. Pittsburgh Plot 1 (repeater coverage with the variant repeaters on) and Pittsburgh Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-41 and 2-42.

V. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SEATTLE, WA

XM is currently authorized to operate forty-two repeaters in the Seattle market -- it has deployed only thirty-four. More significantly, the Commission authorized four high-power repeaters and thirty-six medium-power repeaters. *XM has deployed only one of the four authorized high-power repeaters and only twenty-one of the thirty-six authorized medium-power repeaters.* The remaining repeaters all operate at 2 kW or below.

Fourteen of XM's thirty-four repeaters in the Seattle market exhibit some kind of variance:

- Ten of the fourteen variant repeaters (SEA001, SEA007, SEA011, SEA016, SEA021, SEA033, SEA034, SEA050, SEA053, and SEA056) vary in location. Nine (SEA001, SEA007, SEA011, SEA016, SEA021, SEA033, SEA034, SEA050, and SEA053) vary by distances ranging from 368 feet to 4668 feet. SEA050 also varies in antenna height (decreasing from 260 feet to 128 feet), and SEA011 also varies in antenna type (from 10dB gain to 11.5dB gain) and downtilt (from 2 degrees to 0 degrees). Due to a clerical error in the original STA notification, one repeater (SEA056) varies by 365,819 feet from the initial STA authorization.¹¹
- Four repeaters (SEA002, SEA012, SEA014, and SEA019) vary in antenna design. Two (SEA002 and SEA019) vary in height, increasing from 630 feet to 938 feet and decreasing from 120 feet to 70 feet, respectively. SEA014 varies in type only (from 15dB gain panel to 16dB gain panel). SEA012 varies in type (15dB gain panel to 16dB gain panel) and orientation (from 0 degrees to 90 degrees).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Seattle market population benefiting from repeater coverage by more than 575,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 61 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes – I-5, I-90, I-405, and Route 99 – that collectively serve over 337,000 vehicles every day. Seattle Plot 1 (repeater coverage with the variant repeaters on) and Seattle Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-43 and 2-44.

¹¹ This error – misstating the repeater's location by 1 degree latitude – was apparently due to a data entry mistake in entering the station's coordinates into XM's original STA application. The inadvertent nature of the error is demonstrated by the fact that the repeater's authorized coordinates would place it 30 miles south of Seattle in the forest of a mountainous area. The closest highway (I-5) is over 24 miles away.

W. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SPRINGFIELD, MA

XM is currently authorized to operate five repeaters in the Springfield market -- it has deployed only two. More significantly, the Commission authorized two high-power repeaters and three medium-power repeaters. XM has not deployed any of the authorized high-power repeaters, and it has deployed only two of the three authorized medium-power repeaters.

Both of XM's repeaters in the Springfield market exhibit some kind of variance:

- One of the two (SPR001) varies in antenna design (from one 15dB gain panel antenna to two 15dB gain panel antennas).
- The other (SPR003) varies in antenna design (from one 15dB gain panel antenna to two 15dB gain panel antennas) and downtilt (from 6 degrees to 0 degrees).

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Springfield market population benefiting from repeater coverage by more than 158,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 64 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on four major commuter routes – I-90, I-91, I-291, and Route 5 – that collectively serve more than 163,000 vehicles every day. Springfield Plot 1 (repeater coverage with the variant repeaters on) and Springfield Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-45 and 2-46.

X. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN ST. LOUIS, MO

XM is currently authorized to operate eighteen repeaters in the St. Louis market -- it has deployed only eleven. More significantly, the Commission authorized zero high-

power repeaters and sixteen medium-power repeaters. *XM has deployed zero high-power repeaters and only five of the sixteen authorized medium-power repeaters.* The remaining repeaters all operate at 2 kW or below.

Nine of XM's eleven repeaters in the St. Louis market exhibit some kind of variance:

- Seven of the varying repeaters (STL001, STL003, STL006, STL012, STL017, STL020, and STL023) vary in location. Six of these (STL003, STL006, STL012, STL017, STL020, and STL023) vary by distances ranging from 689 feet to 4786 feet. Due to a clerical error in the original STA notification, one repeater (STL056) varies by 117,708 feet from the initial STA authorization.¹² STL012 also varies in antenna height (increasing from 105 feet to 113 feet), and STL023 also varies in antenna orientation (from 0 degrees to 30 degrees).
- STL009 varies only in antenna type, from 13dB gain panel to 15dB gain panel.
- STL005 varies in that it was constructed at a location the STA did not clearly identify. But this is not an extra repeater, it is simply that none of the unused repeater authorizations clearly applies to it.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the St. Louis market population benefiting from repeater coverage by more than 570,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 92 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on six major commuter routes – I-44, I-55, I-64, I-70, I-170, and I-270 – that collectively serve nearly 510,000 vehicles every day. St. Louis Plot 1 (repeater coverage with the variant repeaters on) and St. Louis Plot 2

¹² This error – misstating the repeater's location by 20 minutes latitude – was apparently due to a data entry mistake in entering the station's coordinates into XM's original STA application. The inadvertent nature of the error is demonstrated by the fact that the repeater's authorized coordinates would place it in a hilly area 20 miles from St. Louis, far from any residential development.

(repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-47 and 2-48.

Y. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN WASHINGTON, DC

XM is currently authorized to operate eighty-two repeaters in the Washington market -- it has deployed only fifty-five. More significantly, the Commission authorized eight high-power repeaters and thirty-one medium-power repeaters. *XM has deployed zero high-power repeaters and only seventeen of the thirty-one authorized medium-power repeaters.* The remaining repeaters all operate at 2 kW or below.

Twenty-seven of XM's fifty-five repeaters in the Washington market exhibit some kind of variance:

- Nine of the variant repeaters (WDC202, WDC223, WDC329, WDC313, WDC401, WDC405, WDC409, WDC501, and WDC515) vary in location by distances ranging from 449 feet to 5803 feet. WDC409 also varies in downtilt (6 degrees to 0 degrees), and WDC313 also varies in antenna type (from 120 degree panel to 60 degree panel), antenna orientation (170 degrees to 195 degrees), and downtilt (from 0 degrees to 6 degrees).
- Three repeaters (WDC203, WDC307, and WDC519) vary in orientation only, from 0 degrees to 210 degrees, from 280 degrees to 0 degrees, and from 0 degrees to 210 degrees, respectively.
- One repeater (WDC314) varies only in height (by 5 feet, increasing from 175 feet to 180 feet).
- Another (WDC227) varies only in quantity, from one omni-directional to two omni-directionals.
- Nine more (WDC105, WDC215, WDC220, WDC230, WDC232, WDC325, WDC430, WDC502, and WDC513) vary in downtilt (from 8 degrees to 5 degrees, from 8 degrees to 4 degrees, from 9 degrees to 0 degrees, from 6 degrees to 5 degrees, from 6 degrees to 2 degrees, from 0 degrees to 6 degrees, from 0 degrees to 3 degrees, from 6 degrees to 2 degrees, and from 2 degrees to 0 degrees, respectively). Of these, WDC105 and WDC513 also vary in type (from a 17dB gain panel antenna to a 15dB gain panel antenna, and from a panel antenna to an omni-directional antenna, respectively), orientation (40 degrees to 20 degrees and 210 degrees to 200 degrees, respectively), and height (decreasing from 300 feet to 207 feet, and decreasing from 280 feet to 270 feet, respectively).

WDC215 also varies in orientation (from 0 to 130 degrees) and height (increasing from 385 feet to 410 feet). WDC220 also varies in type (120 degree panel to omni-directional) and downtilt (9 degrees to 0 degrees) and orientation (from 210 degrees to 125 degrees). WDC230 also varies in orientation (0 to 225 degrees) and EIRP (694 watts to 3120 watts). WDC325 also varies in orientation (0 degrees to 50 degrees), and WDC502 also varies in antenna type (from medium-power to high-power omni-directional antenna).

- Three (WDC102, WDC222, WDC500) vary by antenna type, from a medium-power omni-directional to a high-power omni-directional, from 120 degree panel to 60 degree panel, and from high power omni-directional to medium power omni-directional, respectively. WDC222 also varies by azimuth (240 degrees to 0 degrees). WDC500 also varies in orientation (135 degrees to 0 degrees) and height (decreasing from 167 feet to 113 feet).
- Finally, WDC418 varies in that it was constructed at a location the STA did not clearly identify. But this is not an extra repeater, it is simply that none of the unused repeater authorizations clearly applies to it.

However, these variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting down these repeaters would reduce the Washington market population benefiting from repeater coverage by more than 746,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 35 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on eight major commuter routes – I-66, I-95, I-83, I-295, I-270, I-395, I-495, and Route 267 – that collectively serve approximately 657,000 vehicles every day. Washington Plot 1 (repeater coverage with the variant repeaters on) and Washington Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. See Exhibits 2-49 and 2-50.

CONCLUSION

Assessing the repeaters that XM uses in each of these twenty-five markets demonstrates clearly that XM's network merits an STA in each market and across the country. Requiring XM to shut off these repeaters would adversely affect reception to XM's customers in each of these 25 markets. XM seeks temporary authorization only so that it can continue to operate a nationwide network that is, in the aggregate, considerably smaller than the network the Commission has already authorized, operates with much less overall power output, is less likely to cause interference, and currently interferes with no one. Notwithstanding the WCS Coalition's argument to the contrary, XM cannot simply reconfigure the variant repeaters to conform to the existing STA. Doing so would require extensive redesign, disrupt service to consumers for years and result in a bigger, more powerful network that is more likely to cause interference than the network the Commission has already authorized.

Granting an STA for these markets and for the entire network would not harm anyone. Denying the STA request, by contrast, would harm thousands of consumers in these markets and elsewhere. For these reasons, the Commission should promptly grant the requested STA in its entirety.

Respectfully submitted,

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18 December 2006

Exhibit 2-1

Akron Plot 1 Current Repeater Coverage

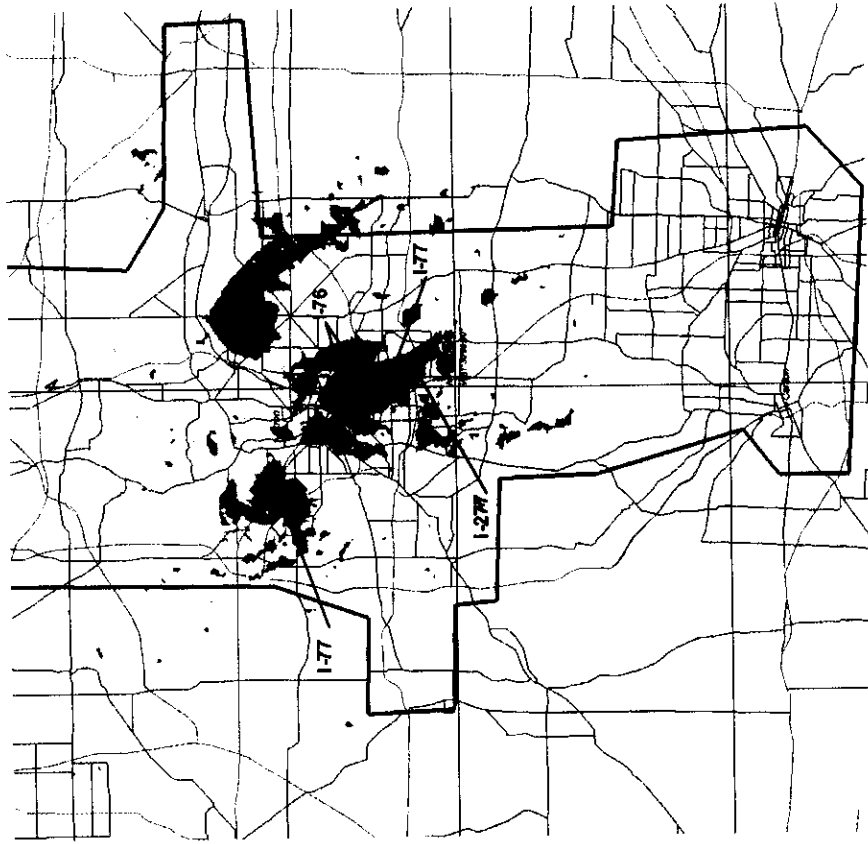


Exhibit 2-2

Akron Plot 2 Coverage with Variant Repeaters Off

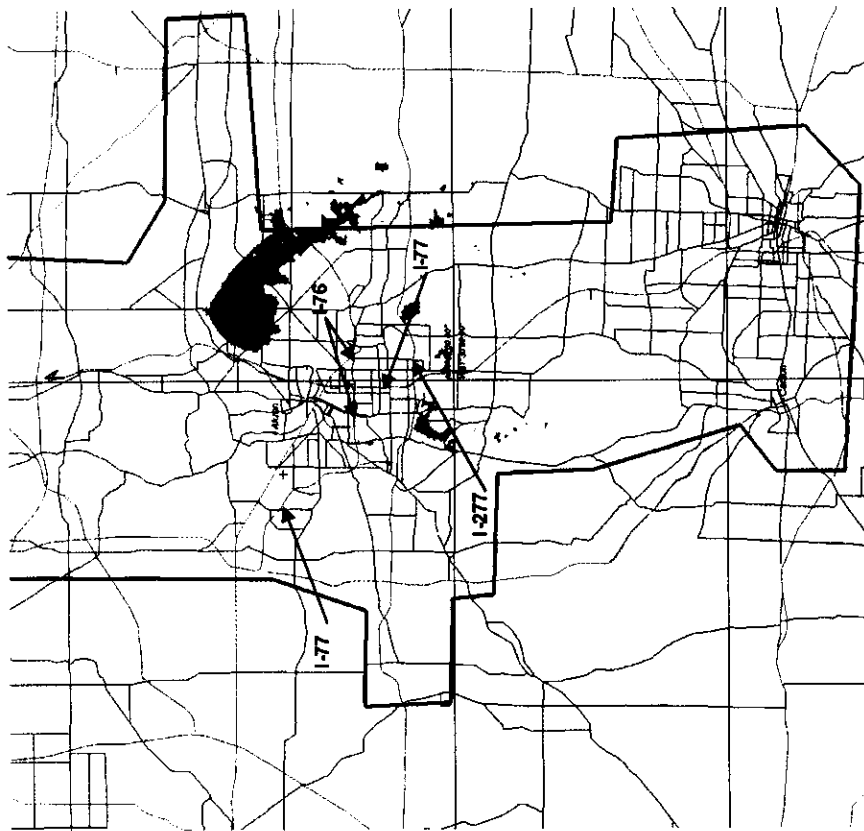


Exhibit 2-3

Albany Plot 1
Current Repeater Coverage

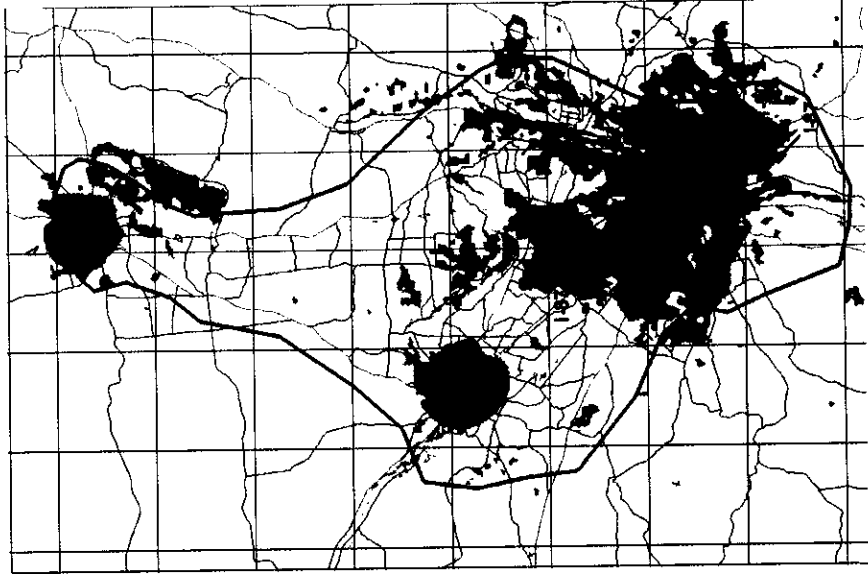


Exhibit 2-4

Albany Plot 2 Coverage with Variant Repeaters Off



Exhibit 2-5

Albuquerque Plot 1 Current Repeater Coverage



Exhibit 2-6

Albuquerque Plot 2 Coverage with Variant Repeaters Off

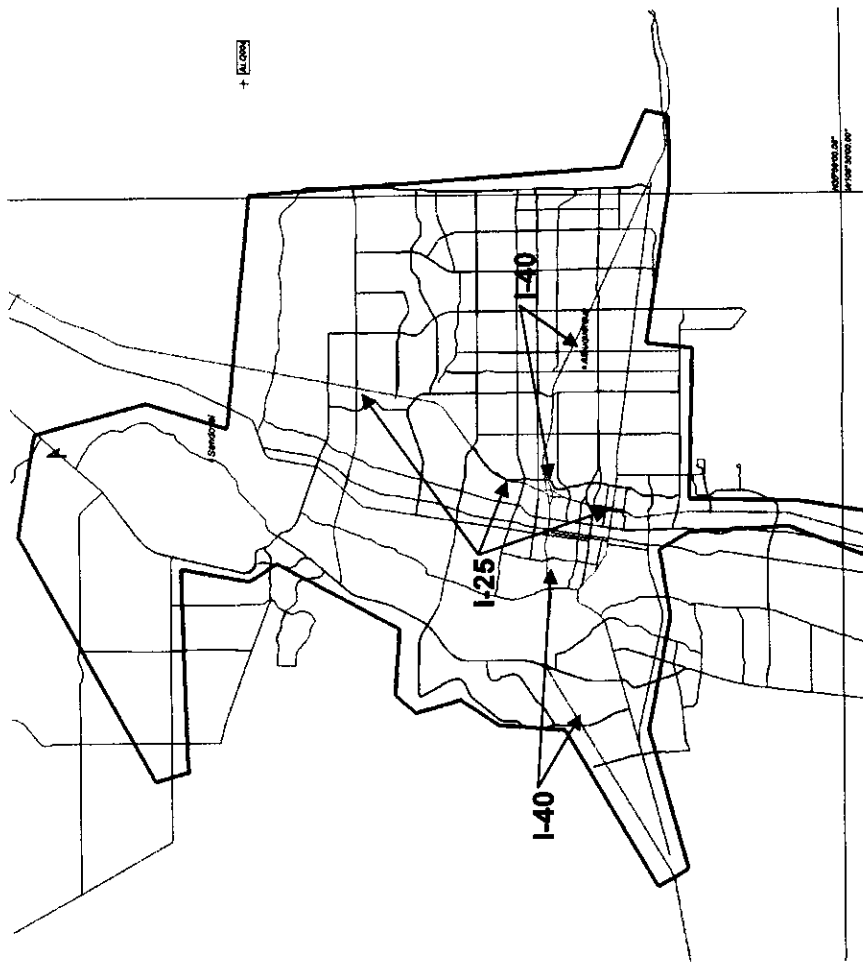


Exhibit 2-7

Birmingham Plot 1 Current Repeater Coverage

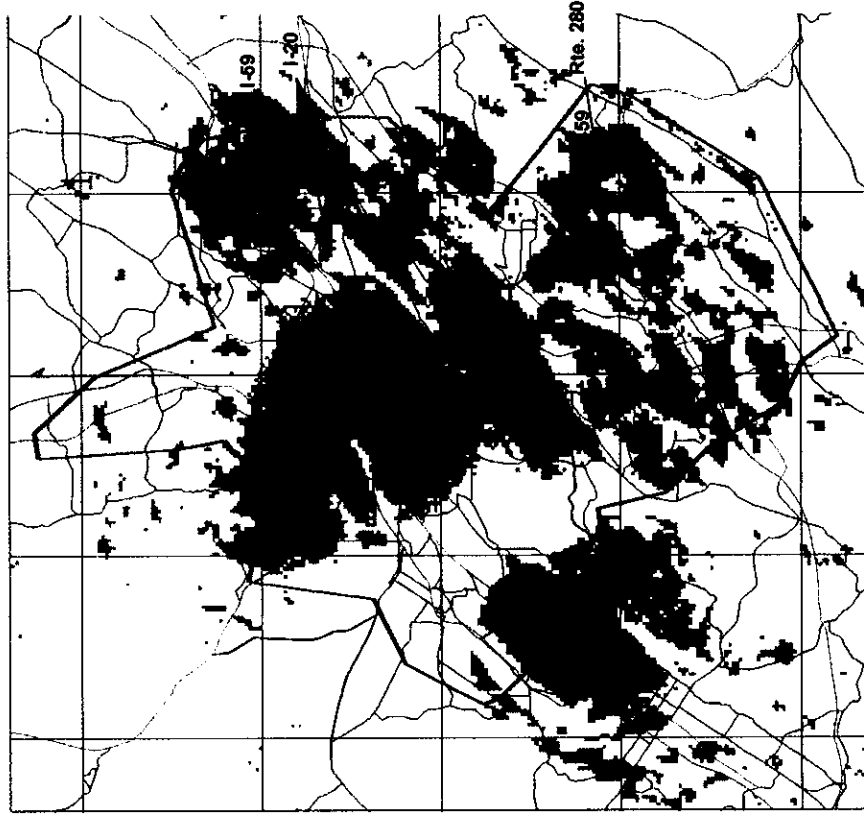


Exhibit 2-8

Birmingham Plot 2 Coverage with Variant Repeaters Off

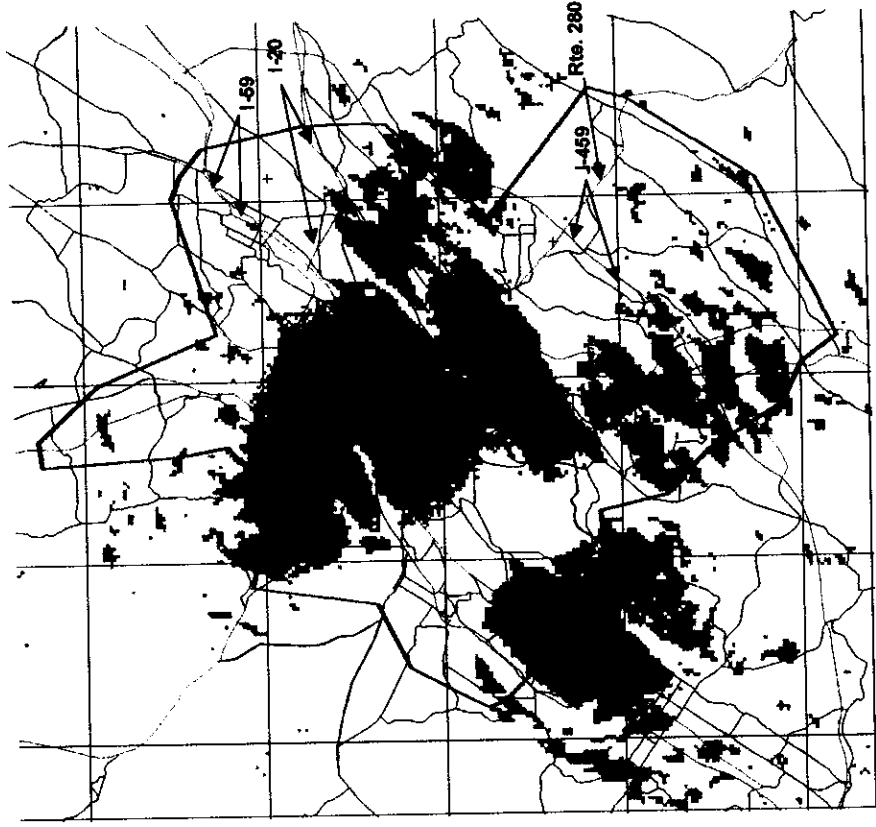


Exhibit 2-9

Charlotte Plot 1 Current Repeater Coverage

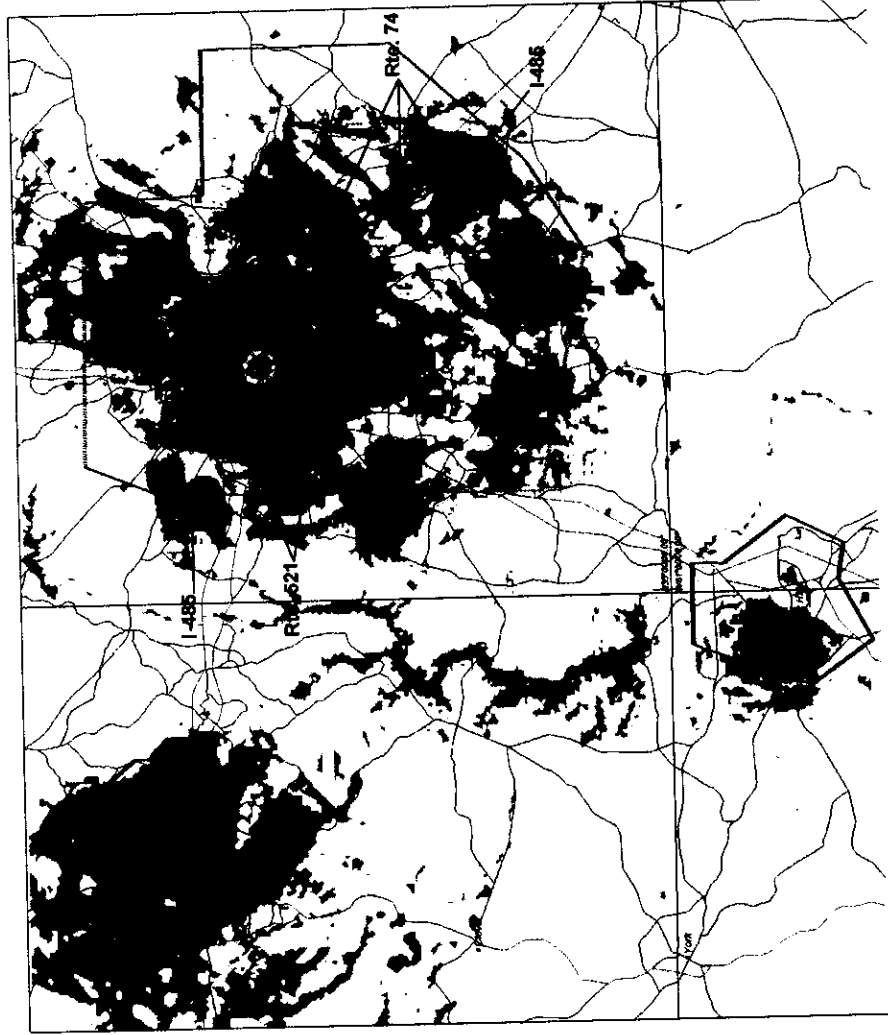


Exhibit 2-10

Charlotte Plot 2 Coverage with Variant Repeaters Off

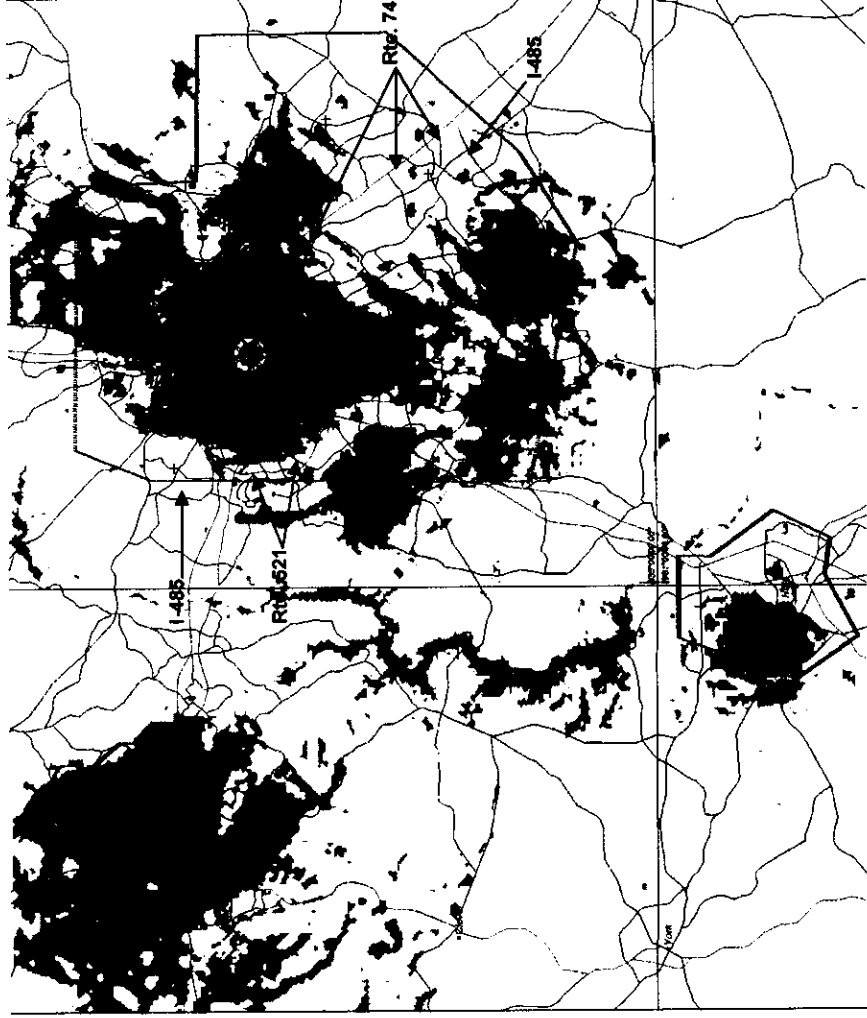


Exhibit 2-11

Cincinnati Plot 1 Current Repeater Coverage

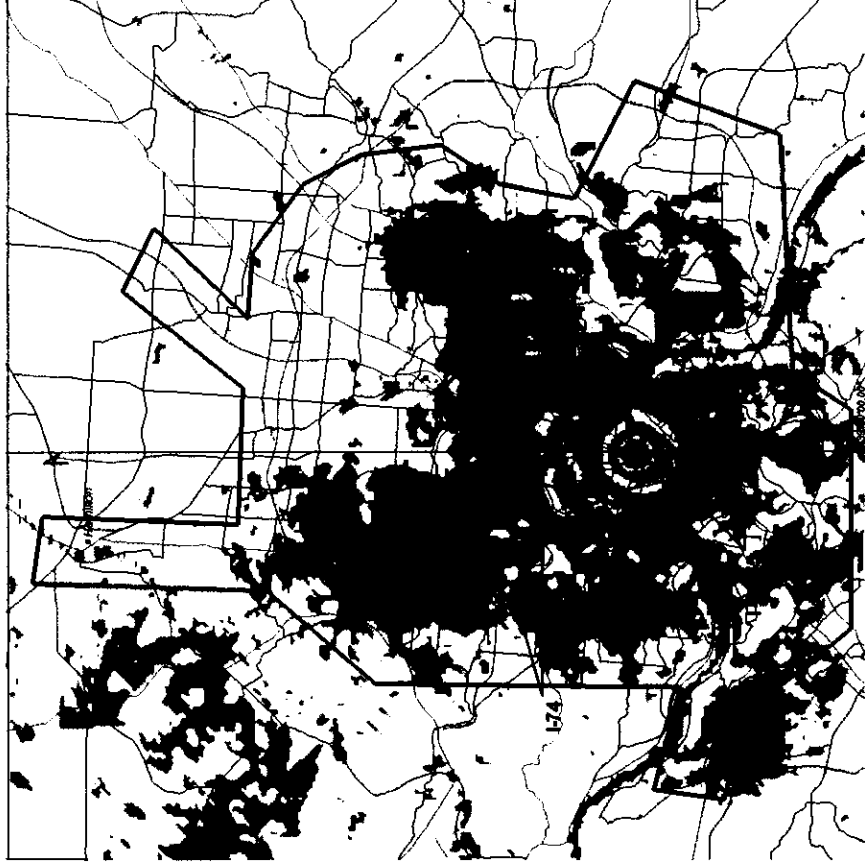


Exhibit 2-12

Cincinnati Plot 2

Coverage with Variant Repeaters Off

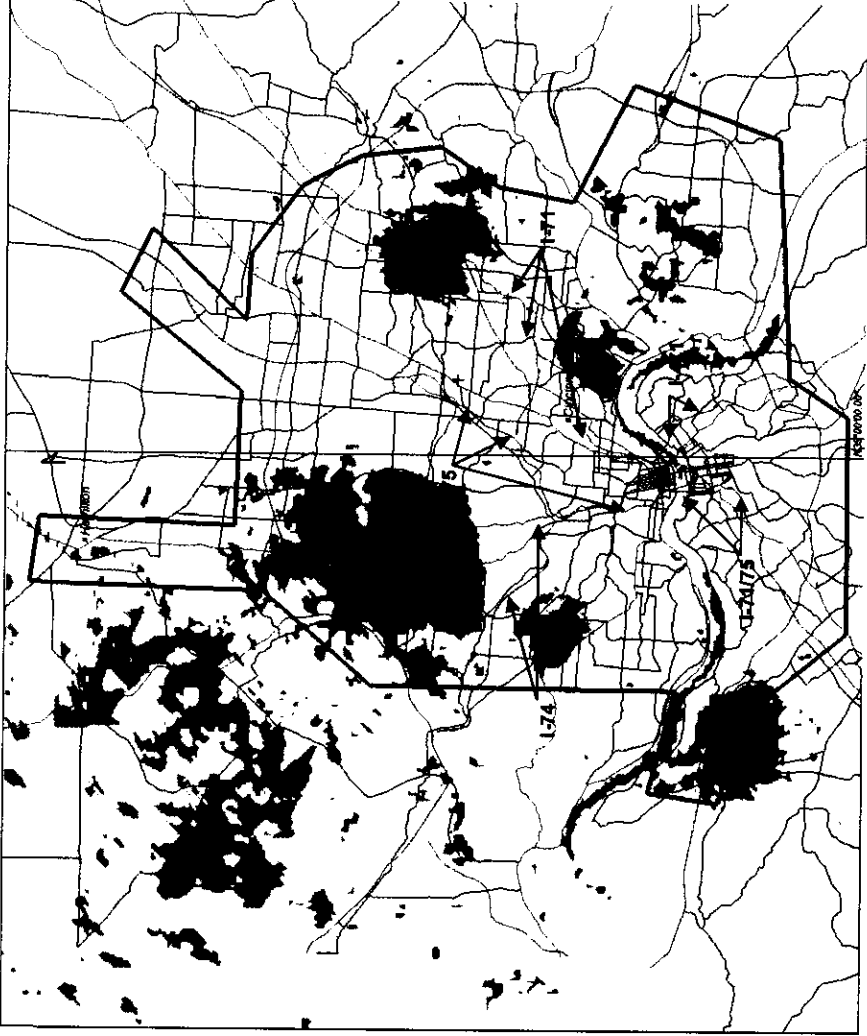


Exhibit 2-13

Cleveland Plot 1 Current Repeater Coverage

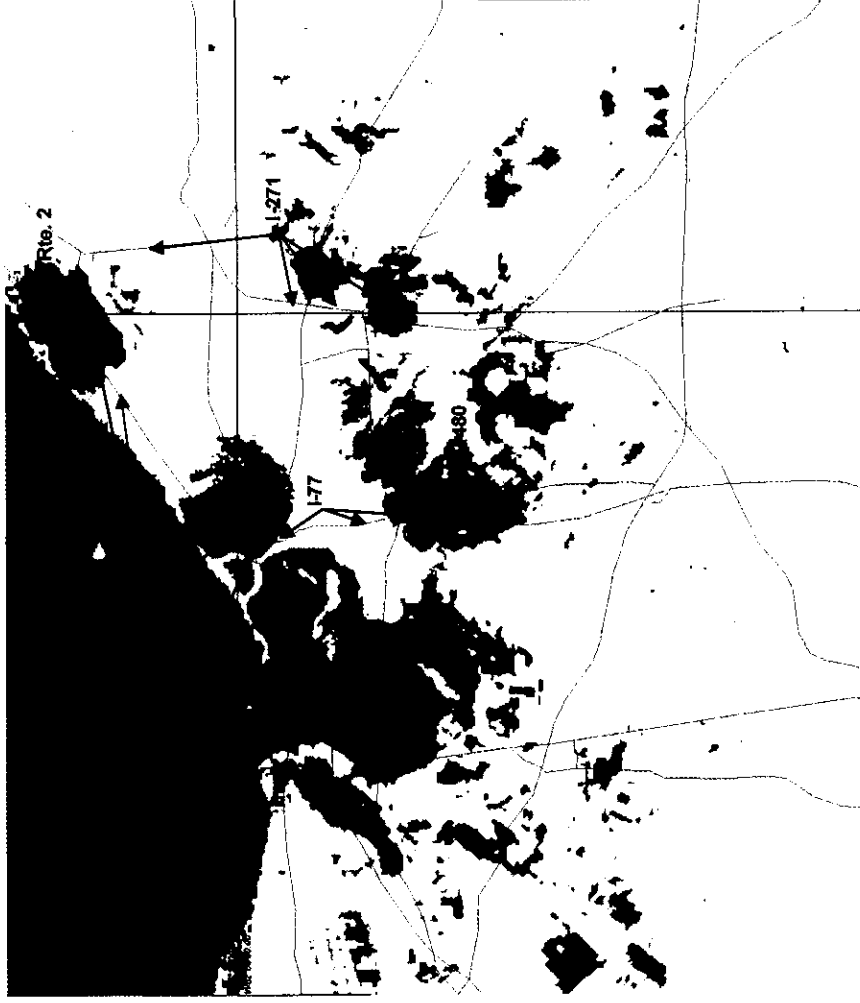


Exhibit 2-14

Cleveland Plot 2

Coverage with Variant Repeaters Off

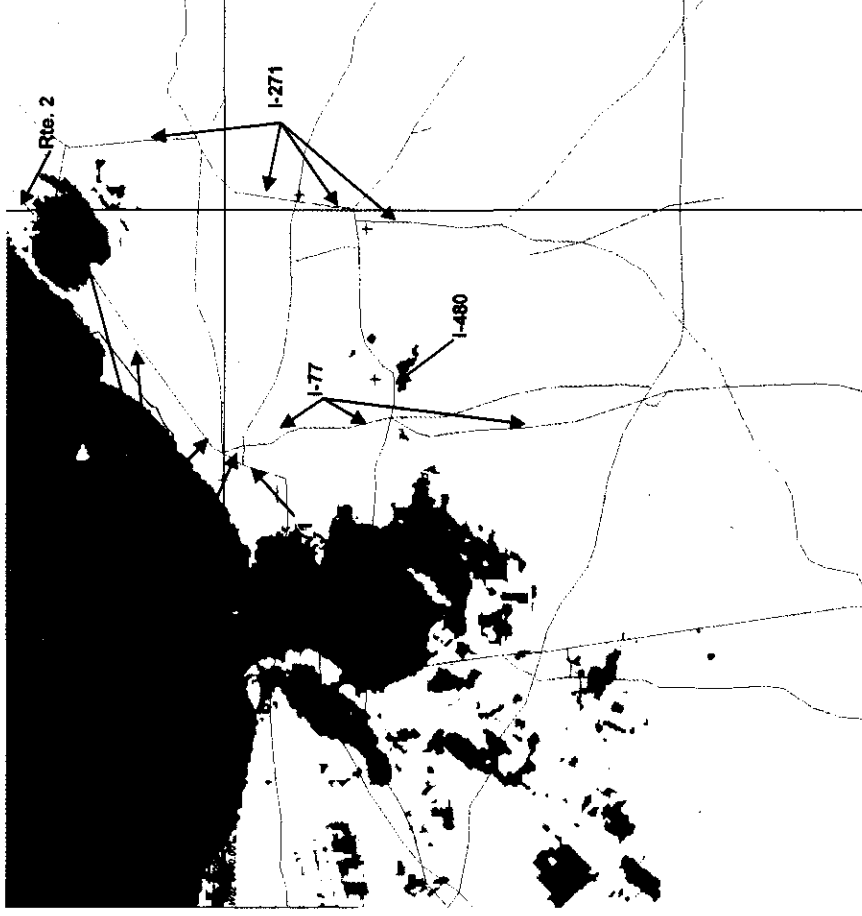


Exhibit 2-15

Columbus Plot 1 Current Repeater Coverage



Exhibit 2-16

Columbus Plot 2 Coverage with Variant Repeaters Off

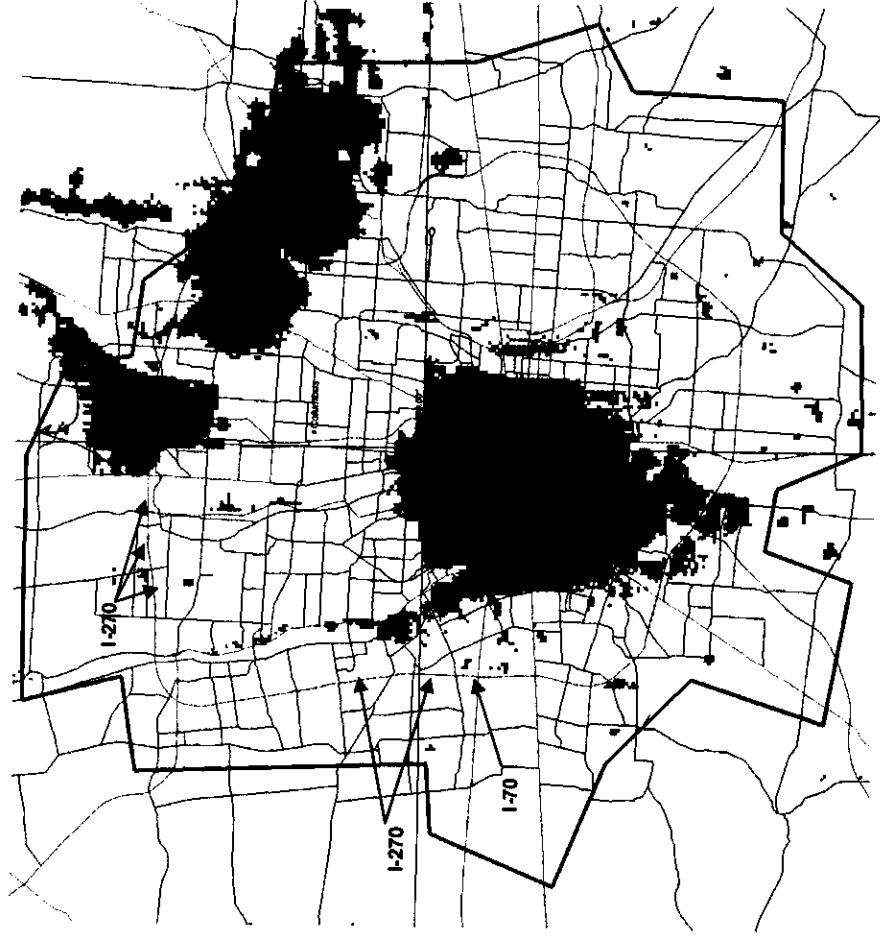


Exhibit 2-17

Dallas Plot 1

Current Repeater Coverage

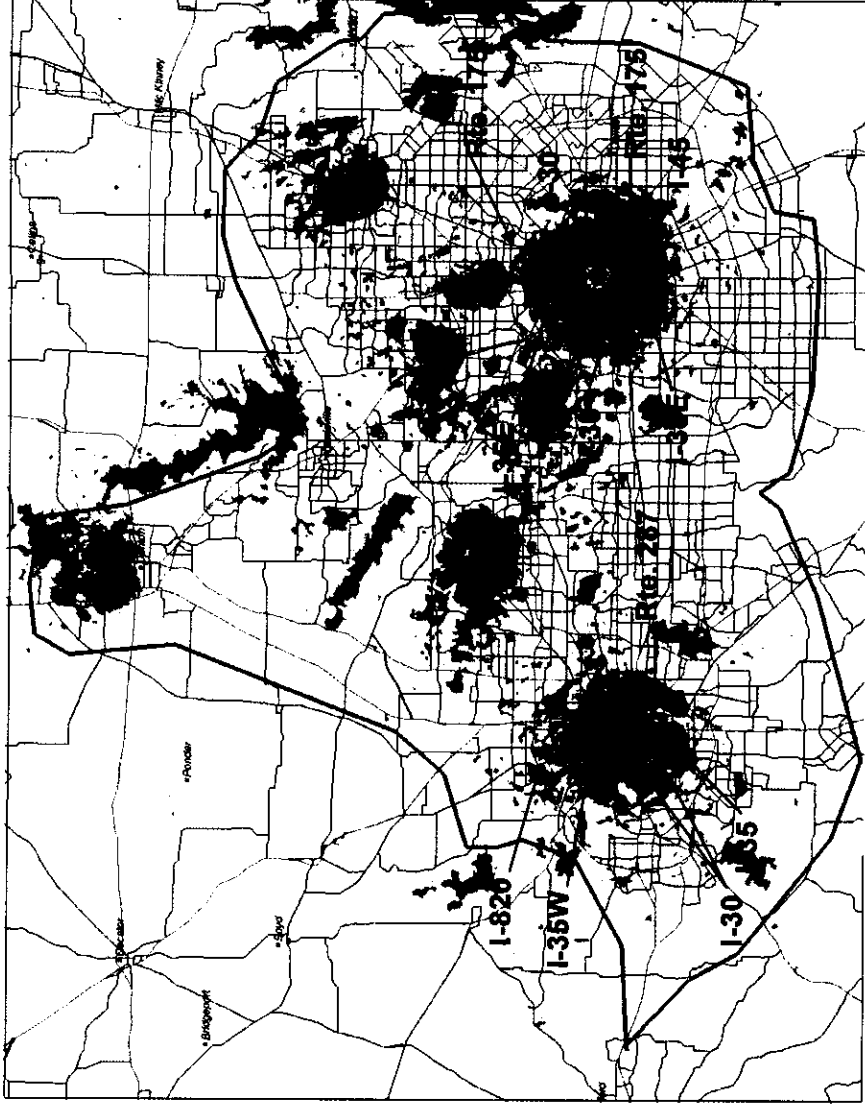


Exhibit 2-18

Dallas Plot 2

Coverage with Variant Repeaters Off

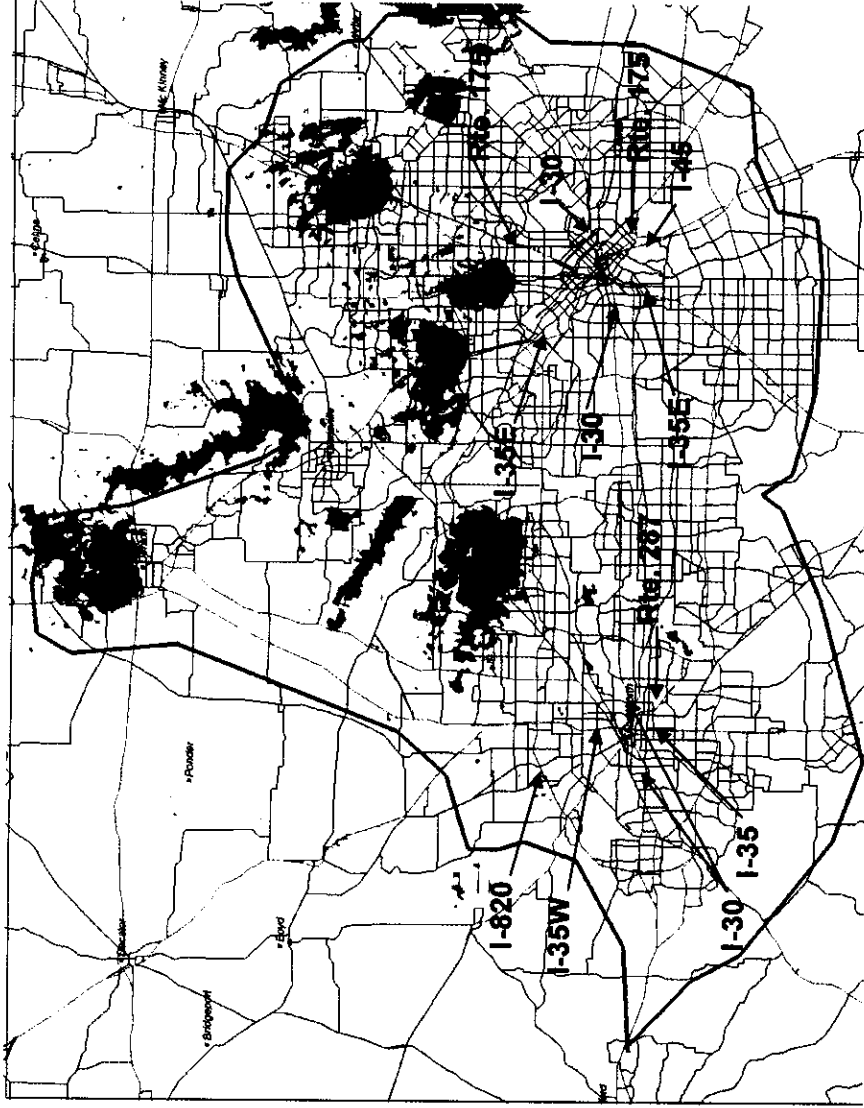


Exhibit 2-19

Dayton Plot 1 Current Repeater Coverage

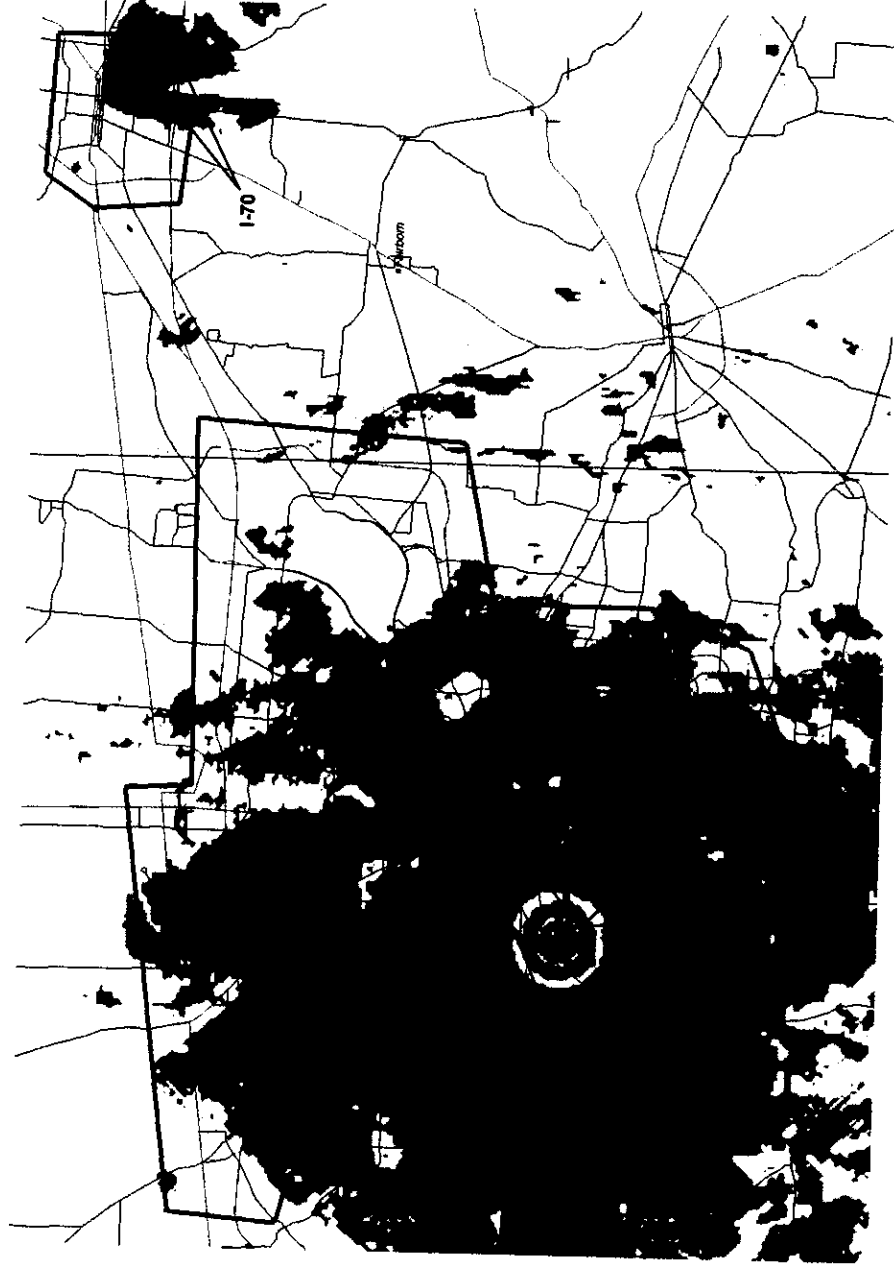


Exhibit 2-20

Dayton Plot 2 Coverage with Variant Repeaters Off

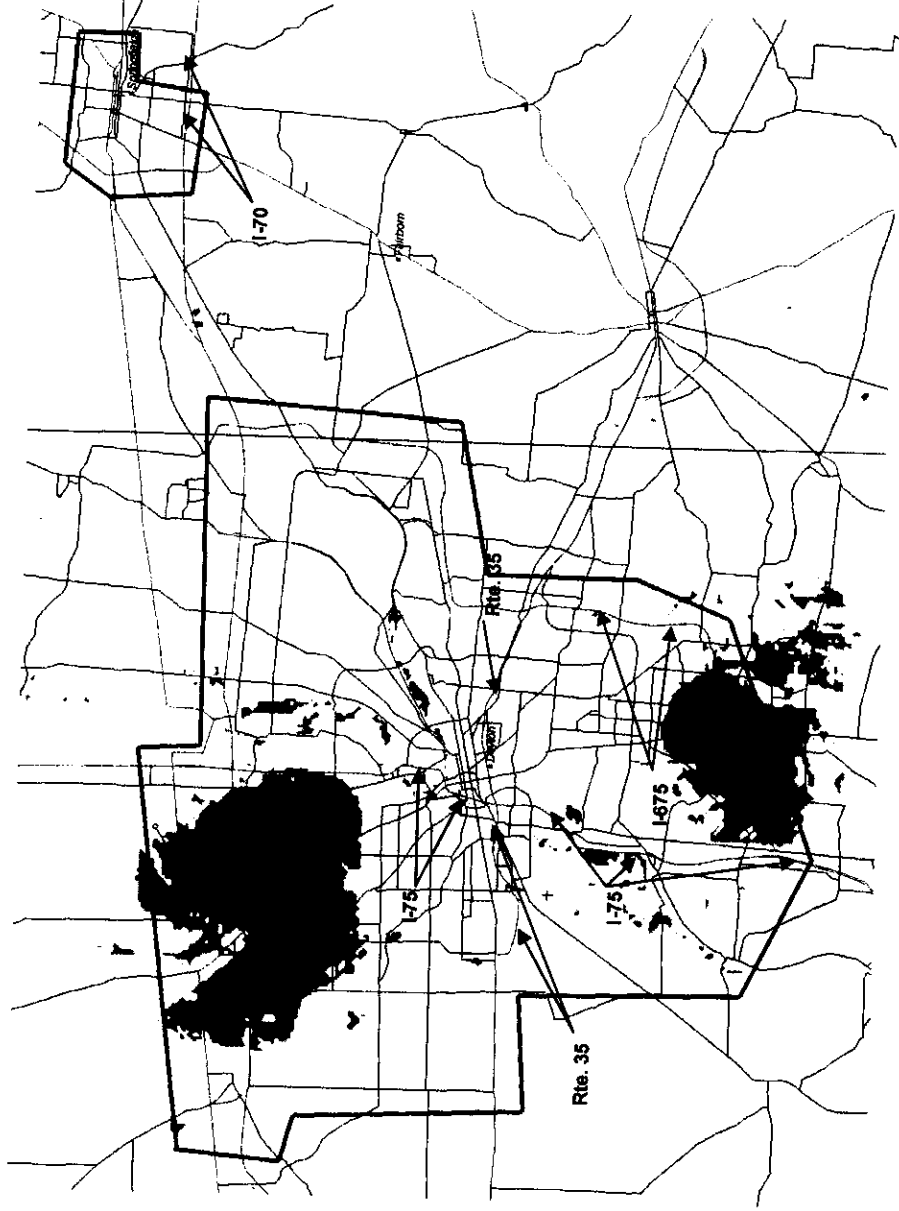


Exhibit 2-21

Greensboro Plot 1 Current Repeater Coverage

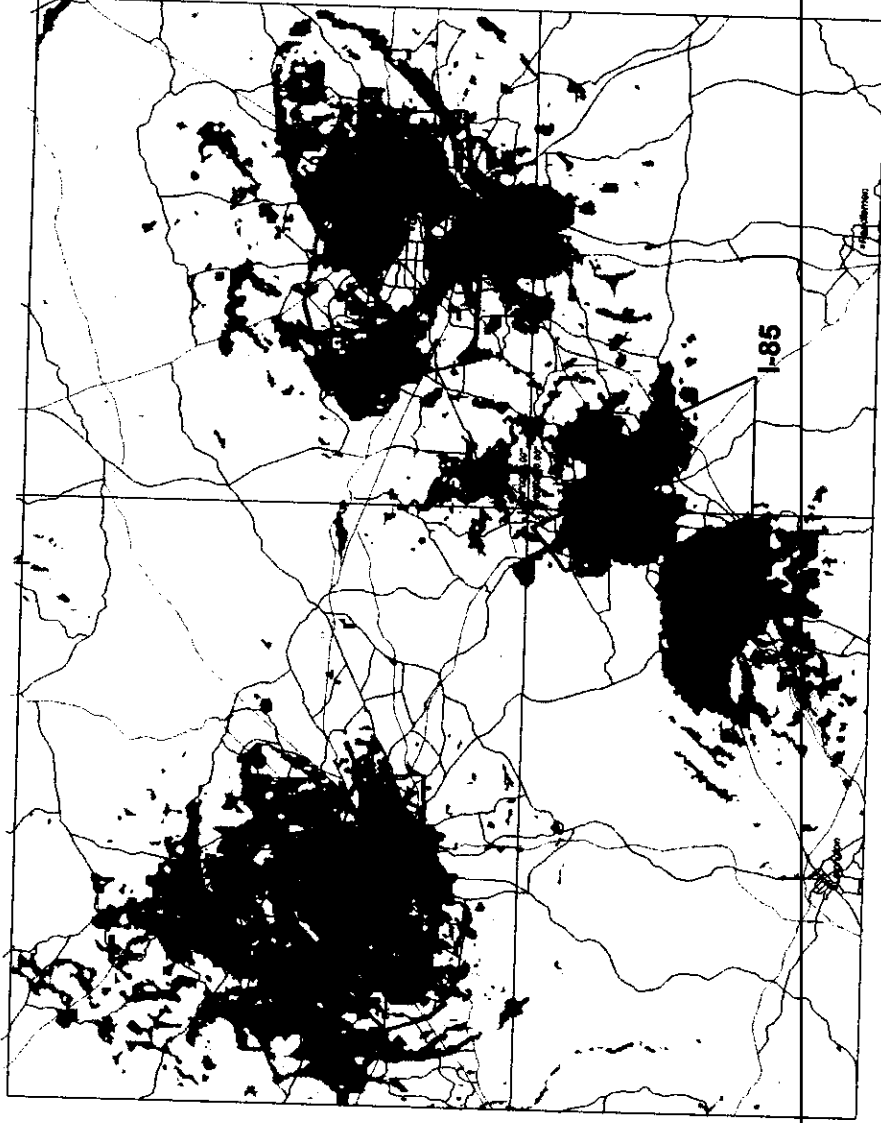


Exhibit 2-22

Greensboro Plot 2 Coverage with Variant Repeaters Off

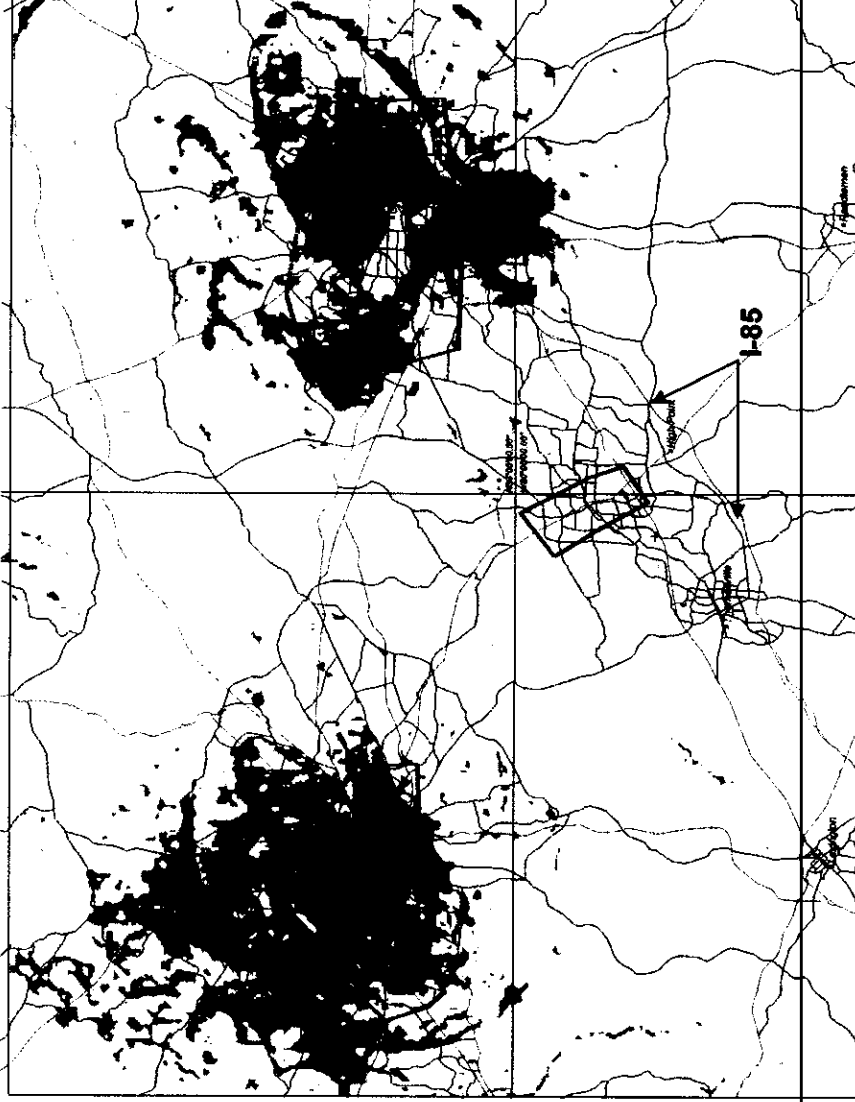


Exhibit 2-23

Greenville Plot 1 Current Repeater Coverage

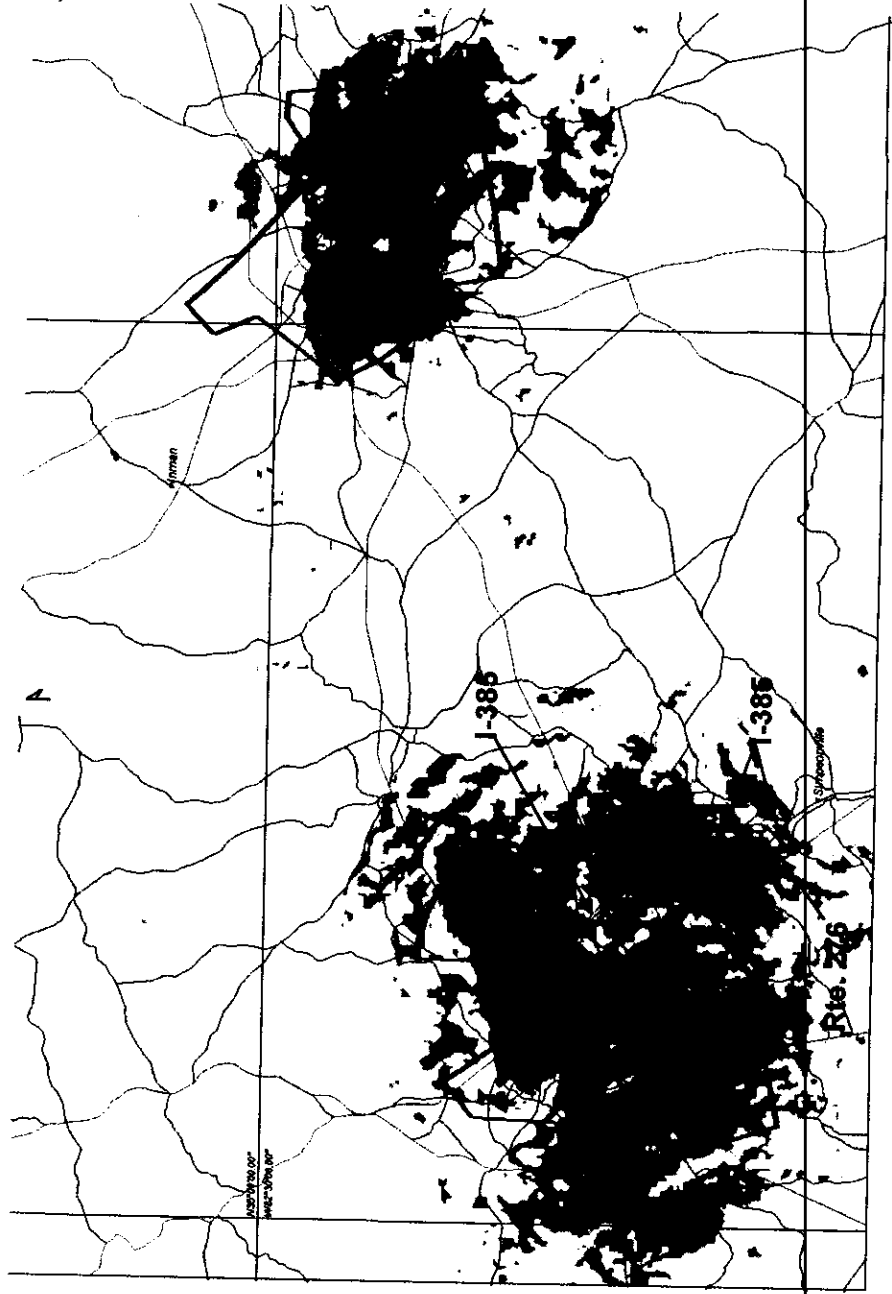


Exhibit 2-24

Greenville Plot 2 Coverage with Variant Repeaters Off

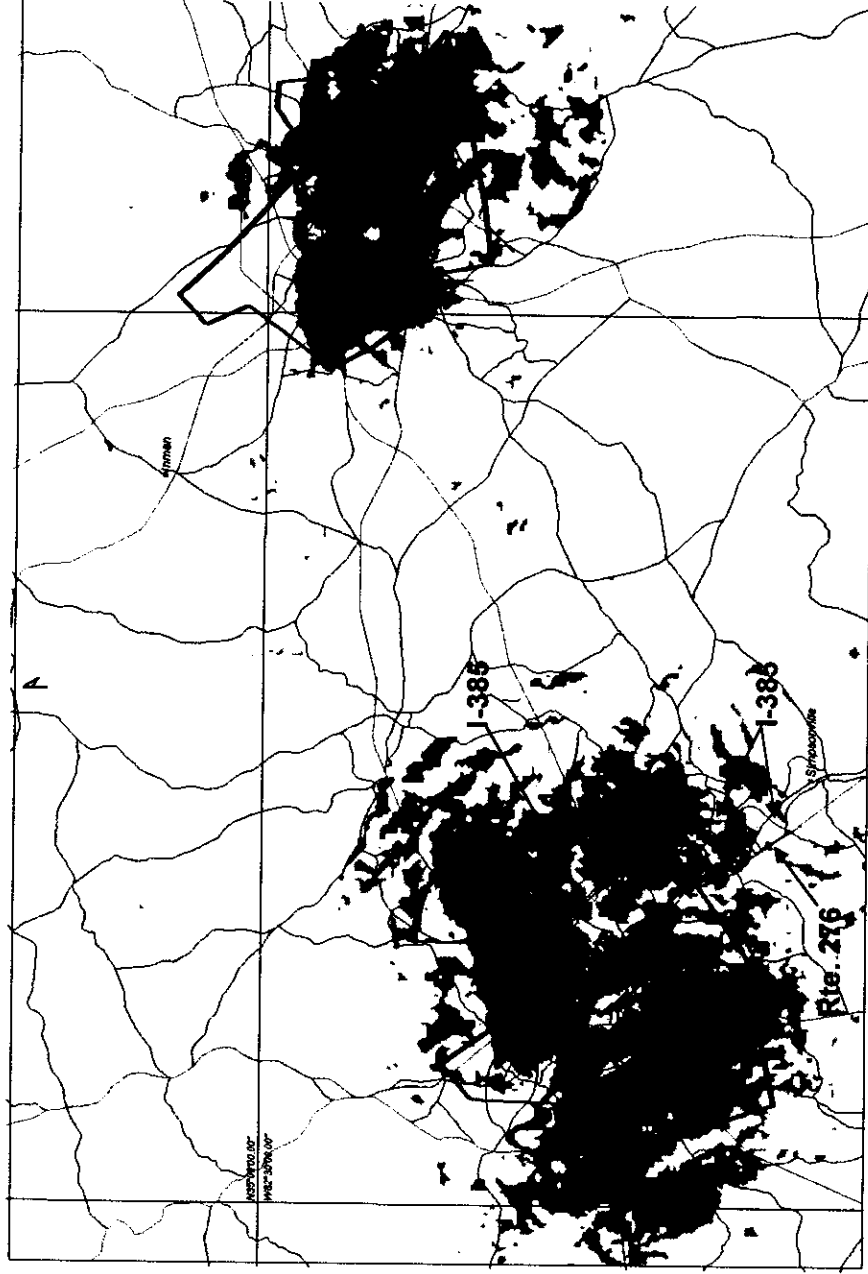


Exhibit 2-25

Harrisburg Plot 1 Current Repeater Coverage

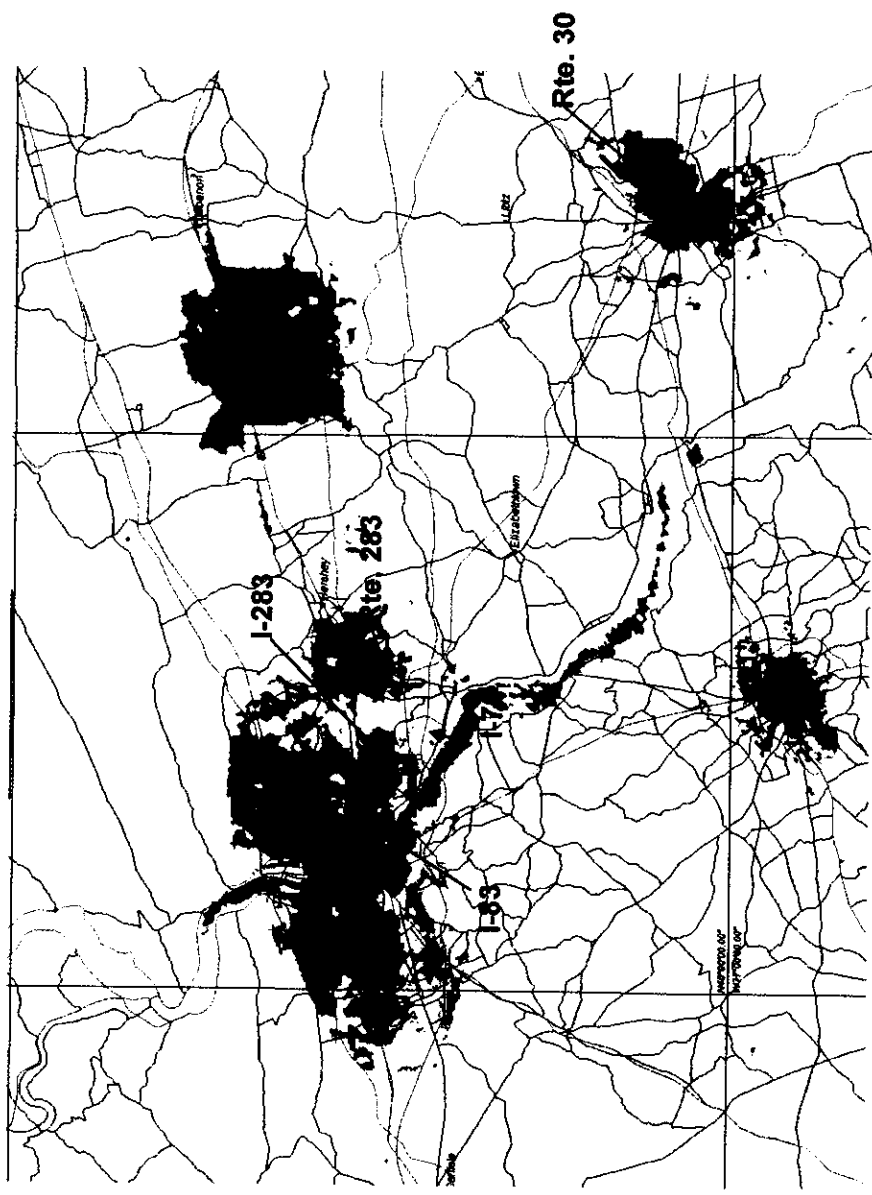


Exhibit 2-26

Harrisburg Plot 2 Coverage with Variant Repeaters Off

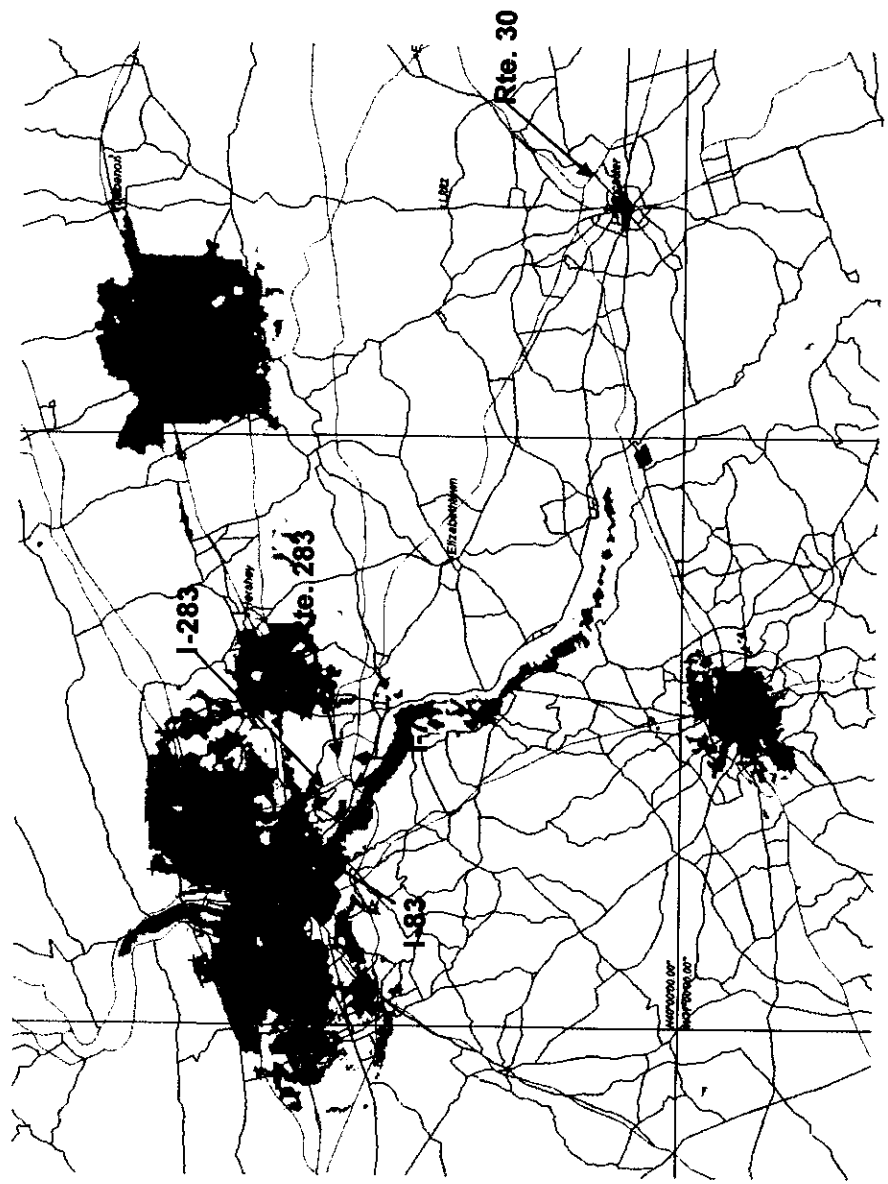


Exhibit 2-27

Hartford Plot 1 Current Repeater Coverage

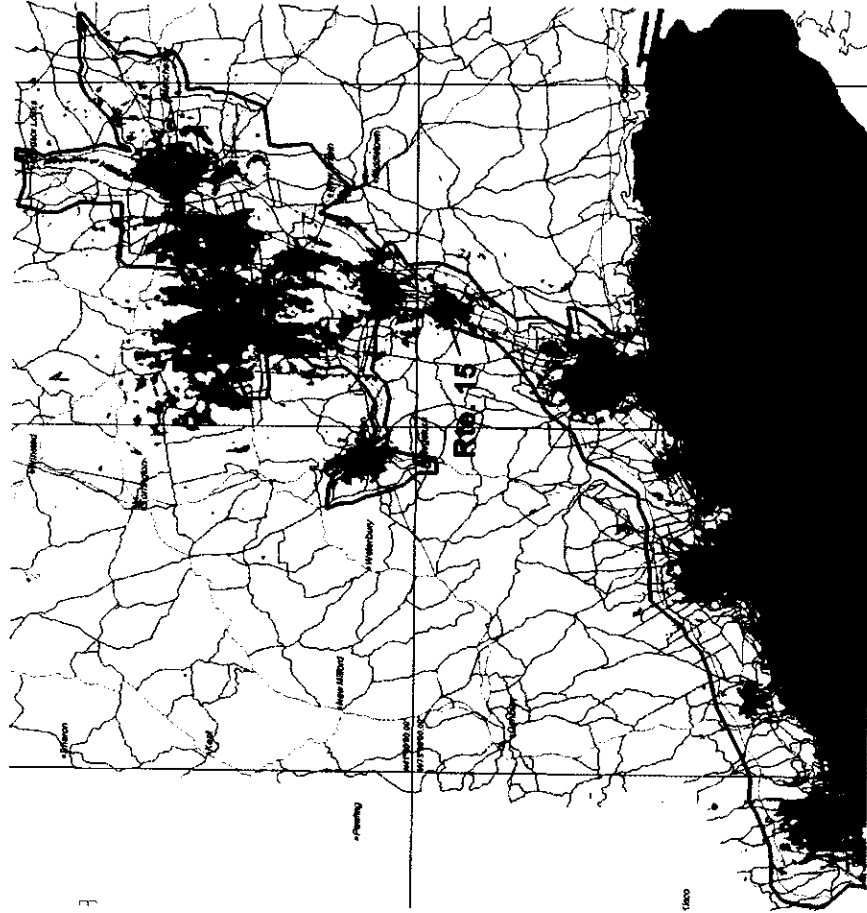


Exhibit 2-28

Hartford Plot 2 Coverage with Variant Repeaters Off

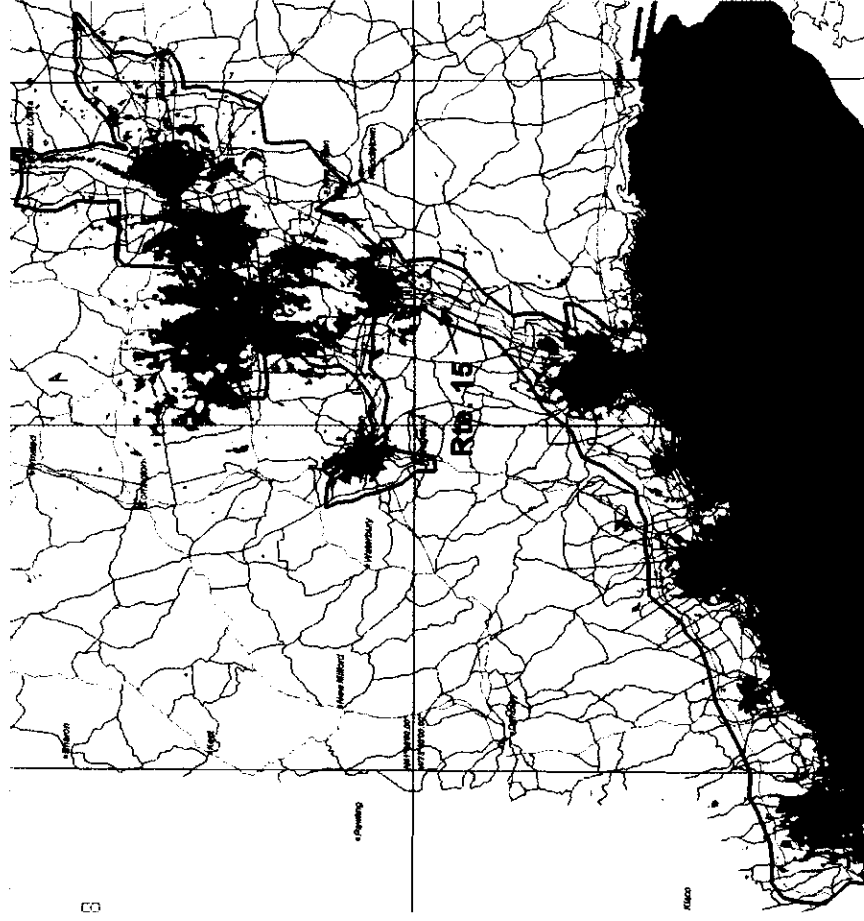


Exhibit 2-29

Houston Plot 1 Current Repeater Coverage

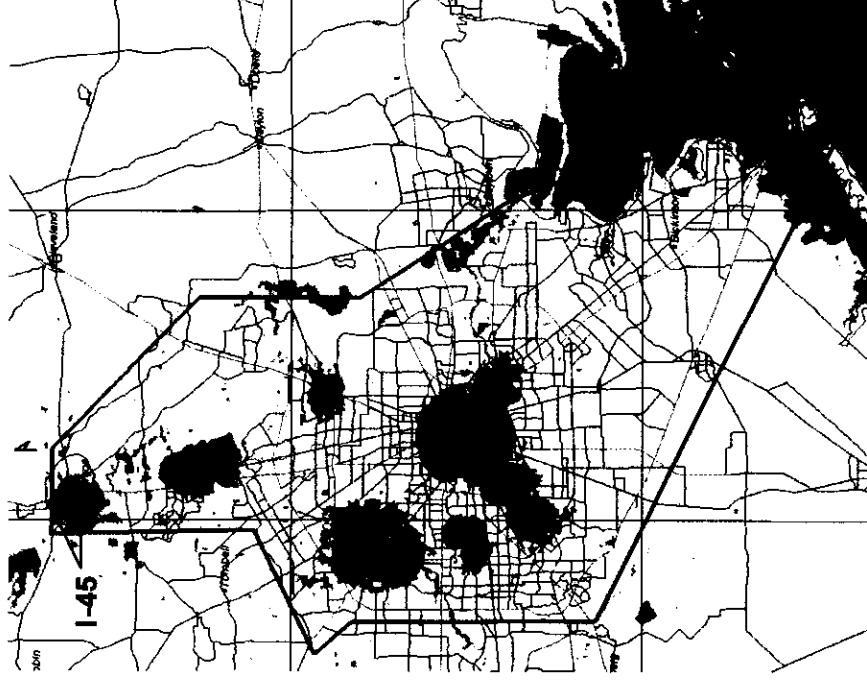


Exhibit 2-30

Houston Plot 2 Coverage with Variant Repeaters Off

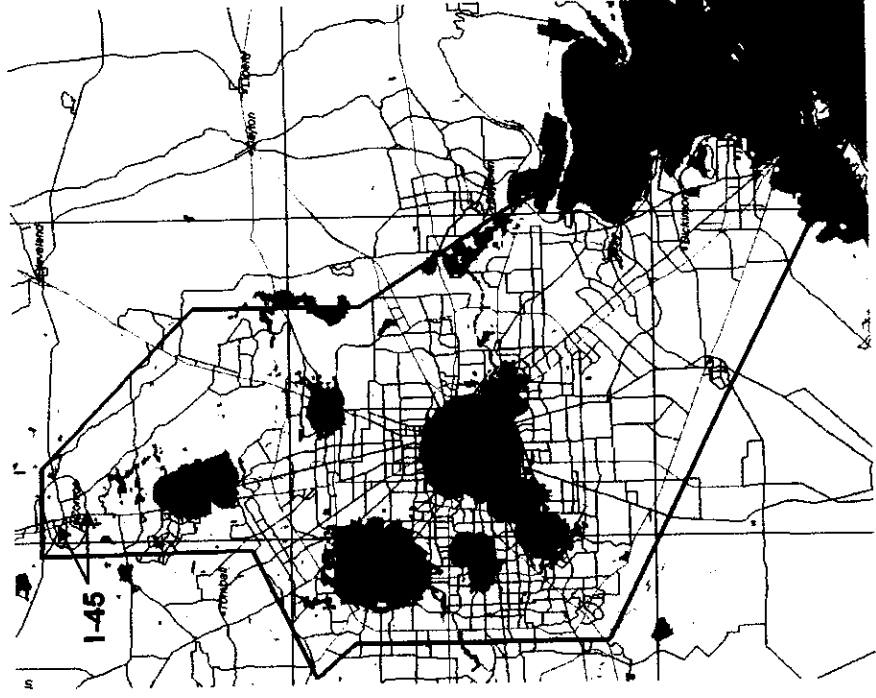


Exhibit 2-31

Indianapolis Plot 1 Current Repeater Coverage

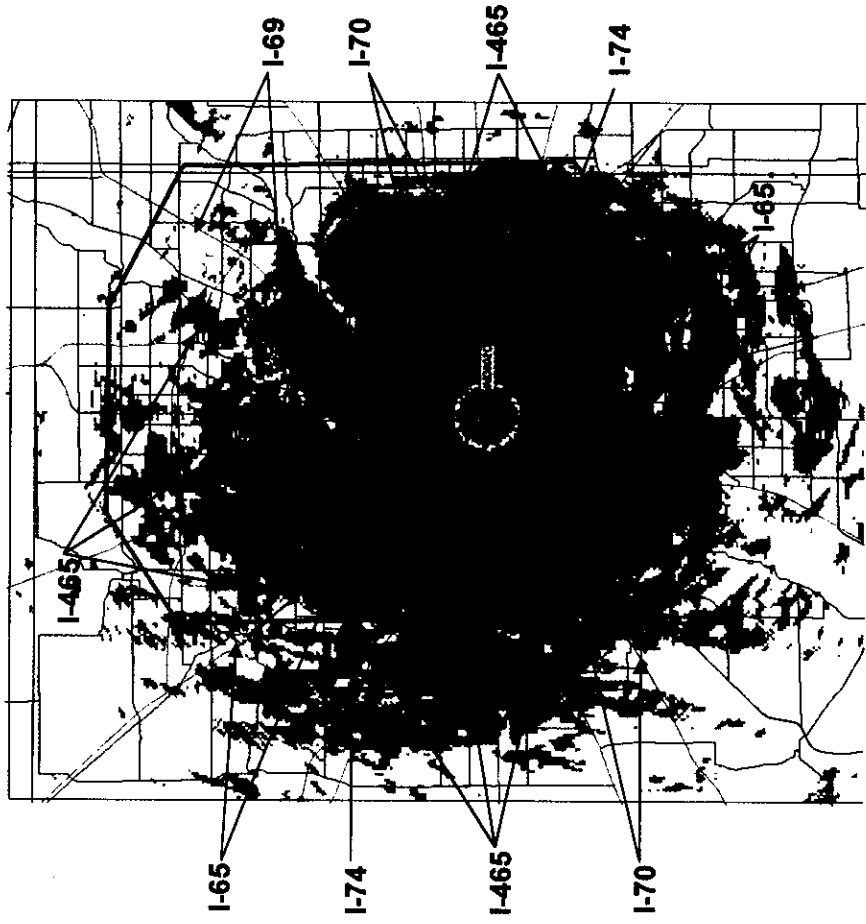


Exhibit 2-32

Indianapolis Plot 2 Coverage with Variant Repeaters Off

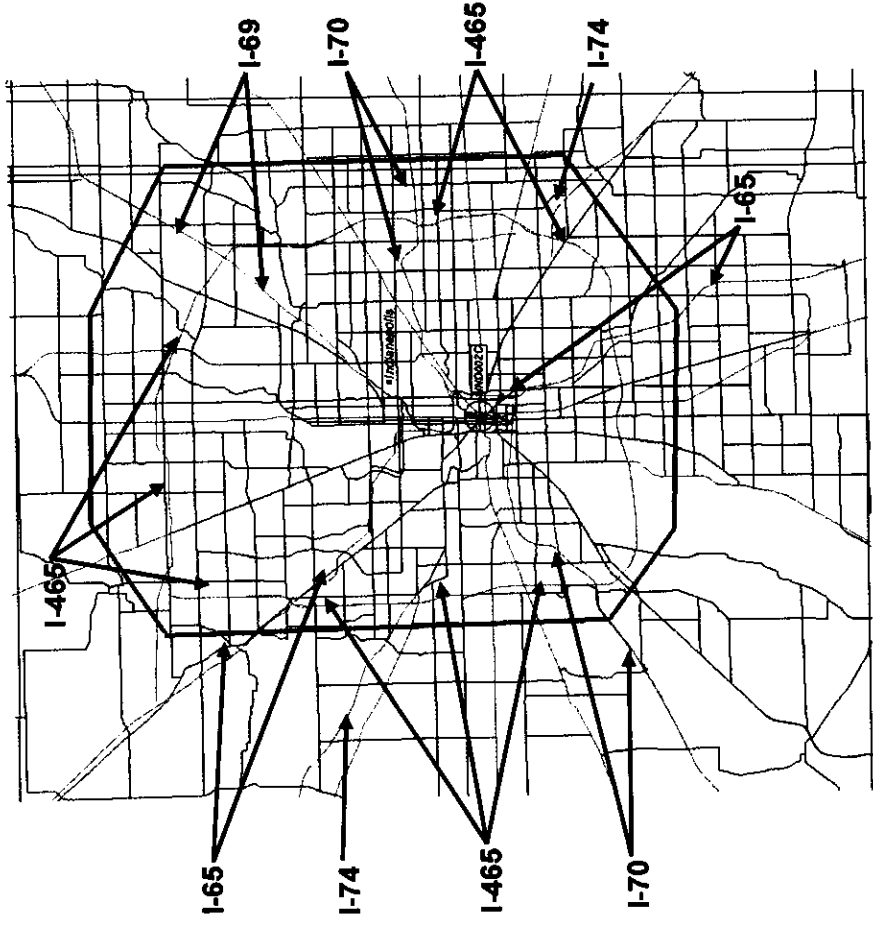


Exhibit 2-33

Jacksonville Plot 1 Current Repeater Coverage

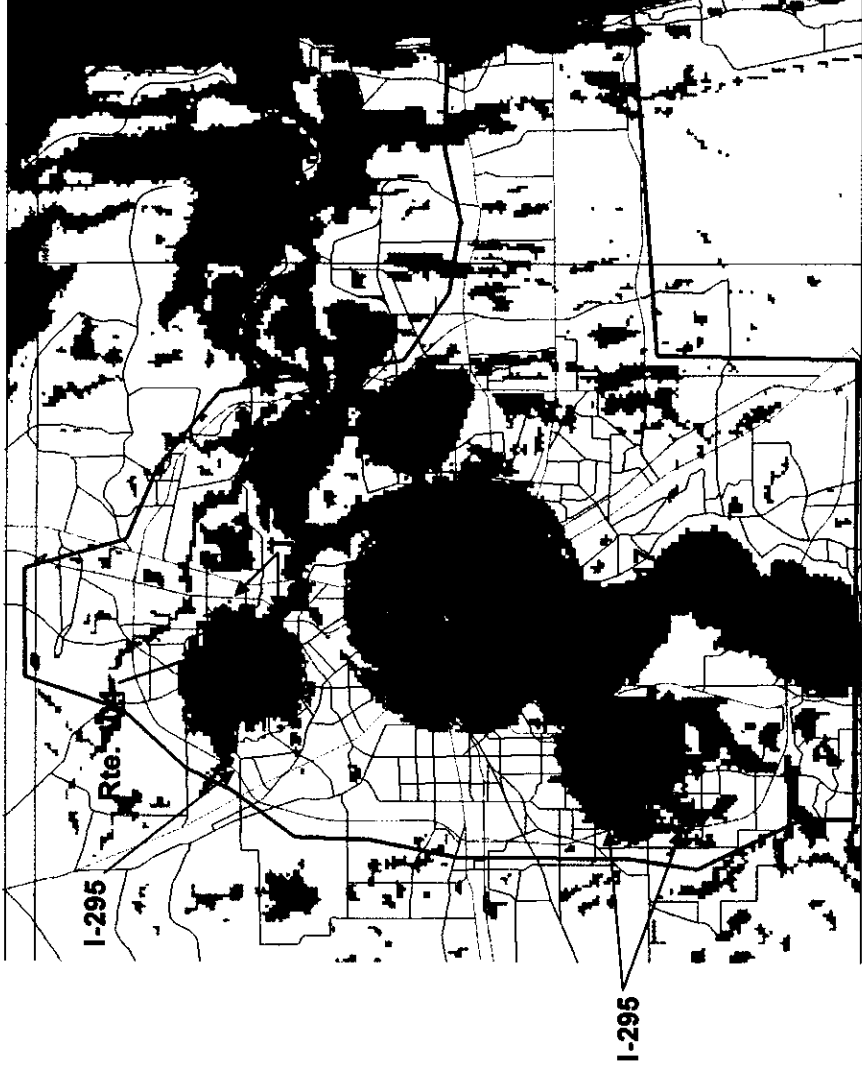


Exhibit 2-34

Jacksonville Plot 2

Coverage with Variant Repeaters Off



Exhibit 2-35

Miami Plot 1

Current Repeater Coverage

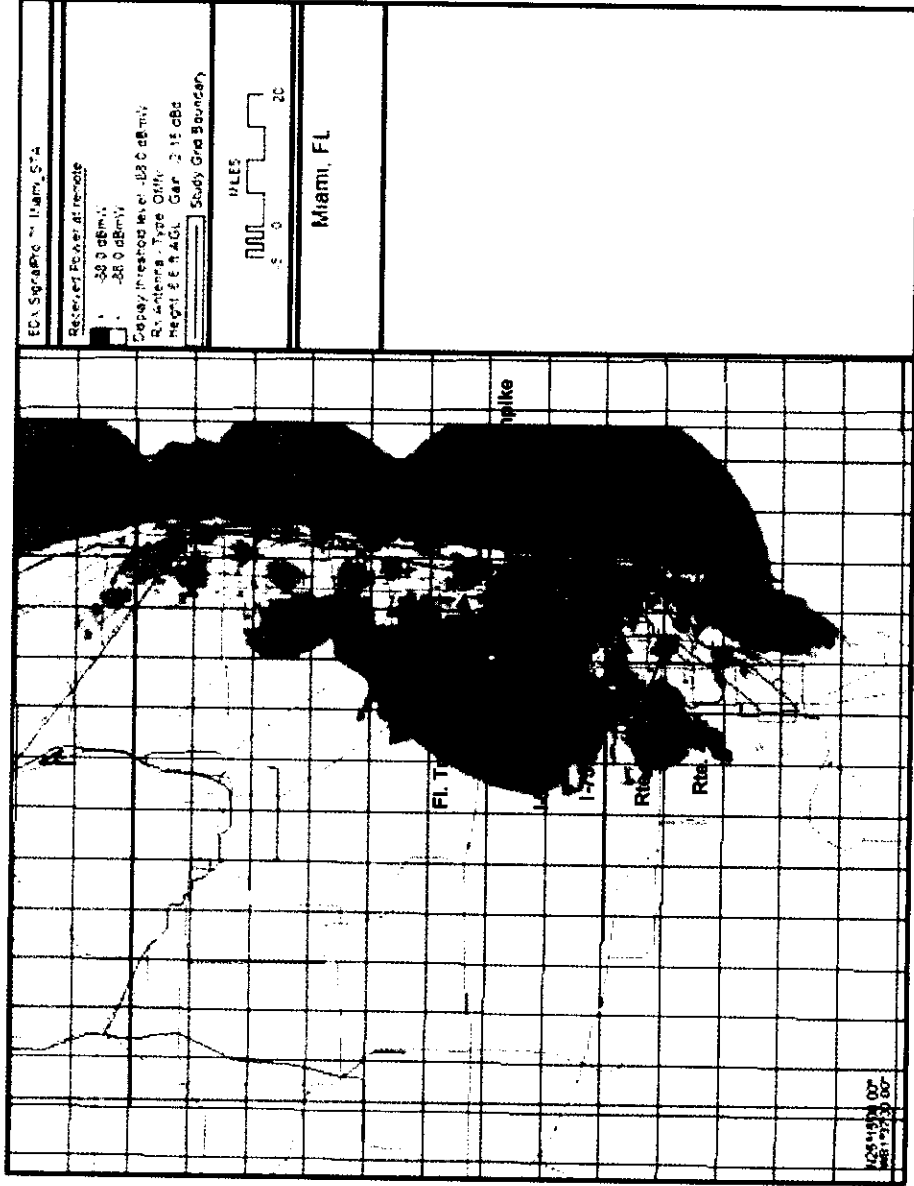


Exhibit 2-36

Miami Plot 2 Coverage with Variant Repeaters Off

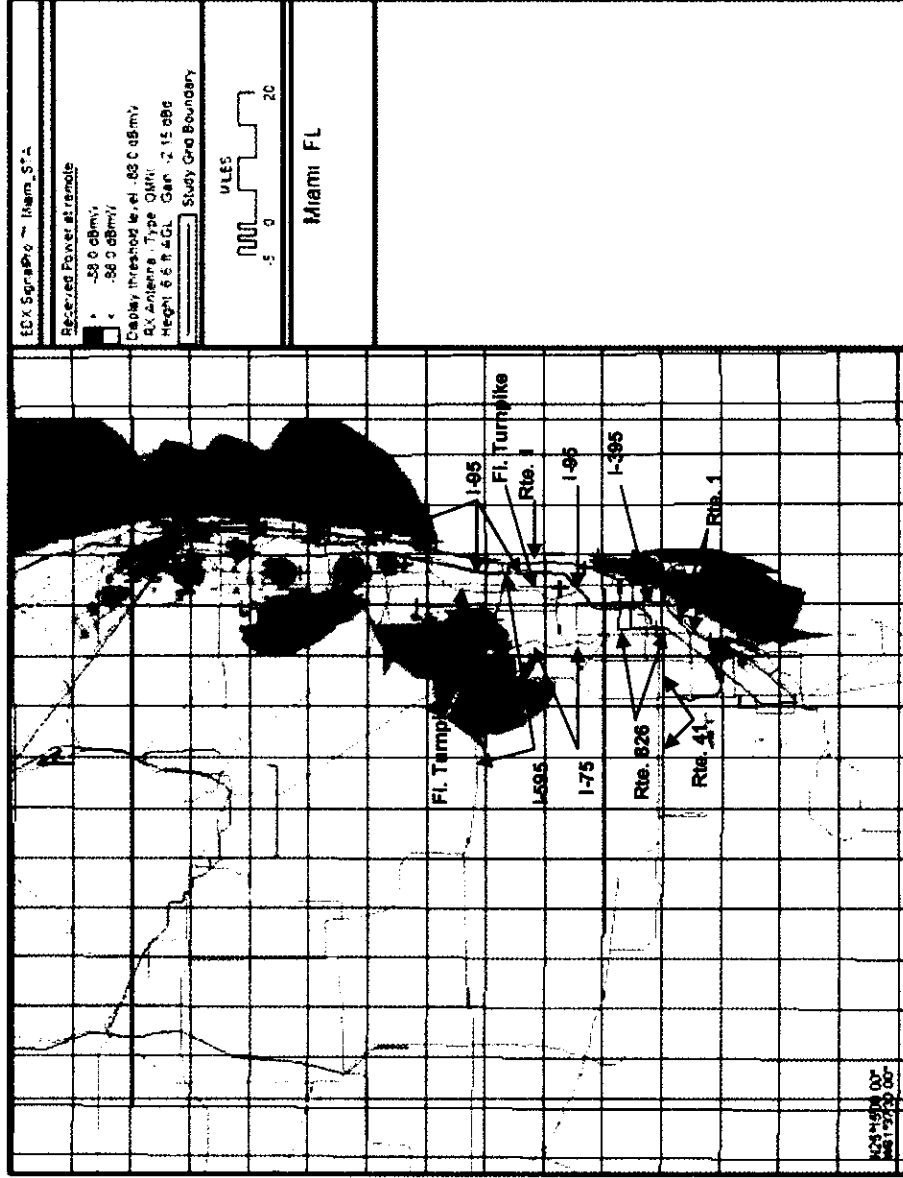


Exhibit 2-37

Exhibit 2-38

Minneapolis Plot 2 Coverage with Variant Repeaters Off



Exhibit 2-39

Philadelphia Plot 1 Current Repeater Coverage

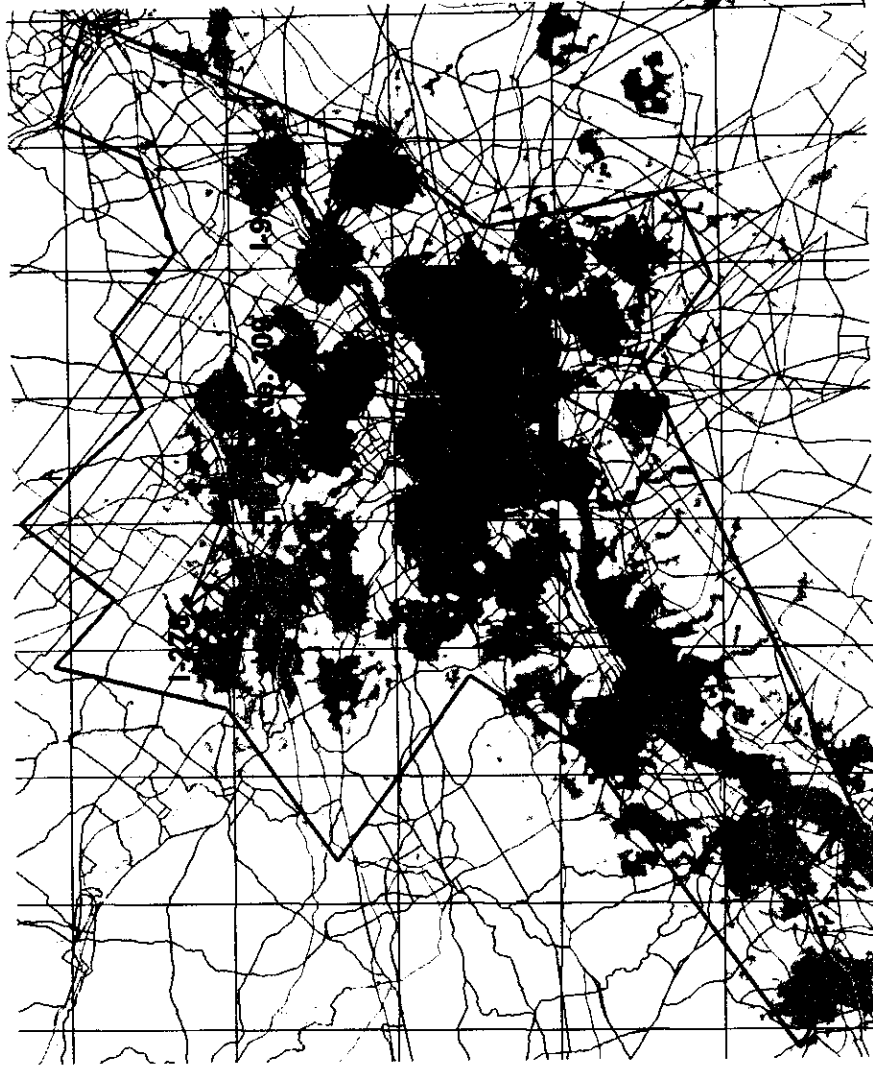


Exhibit 2-40

Philadelphia Plot 2 Coverage with Variant Repeaters Off

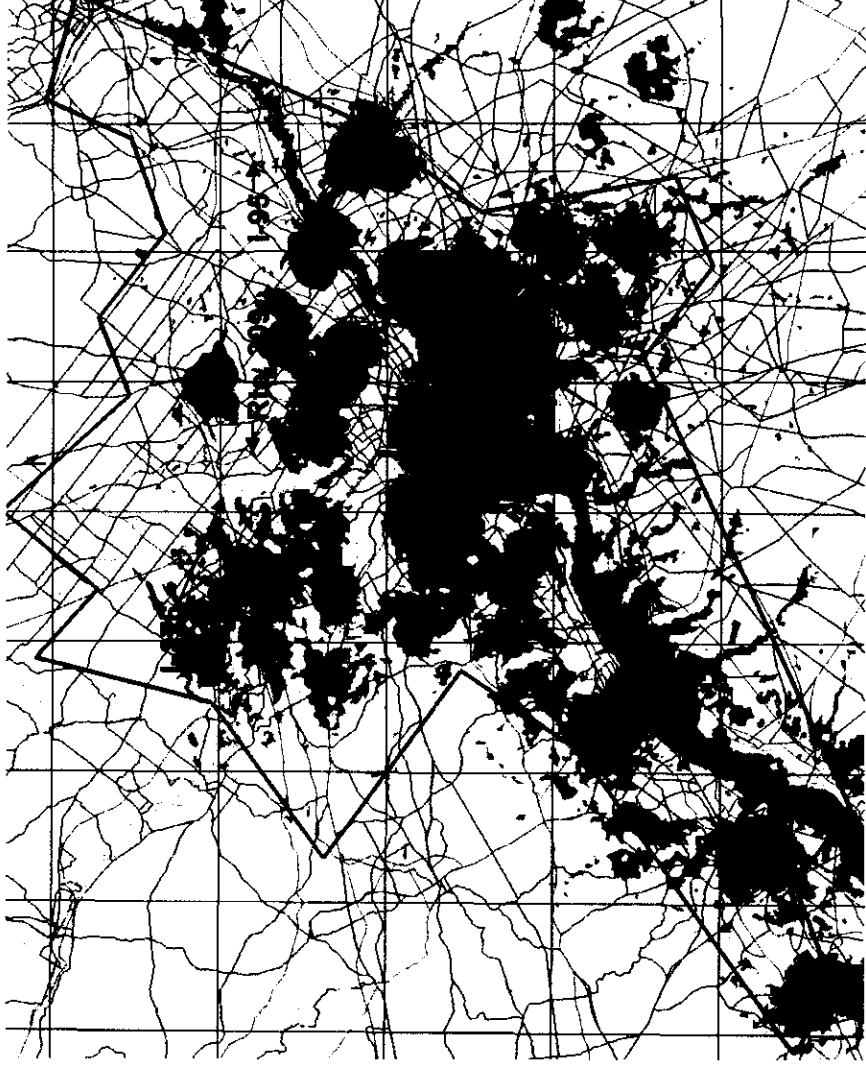


Exhibit 2-41

Pittsburgh Plot 1

Current Repeater Coverage

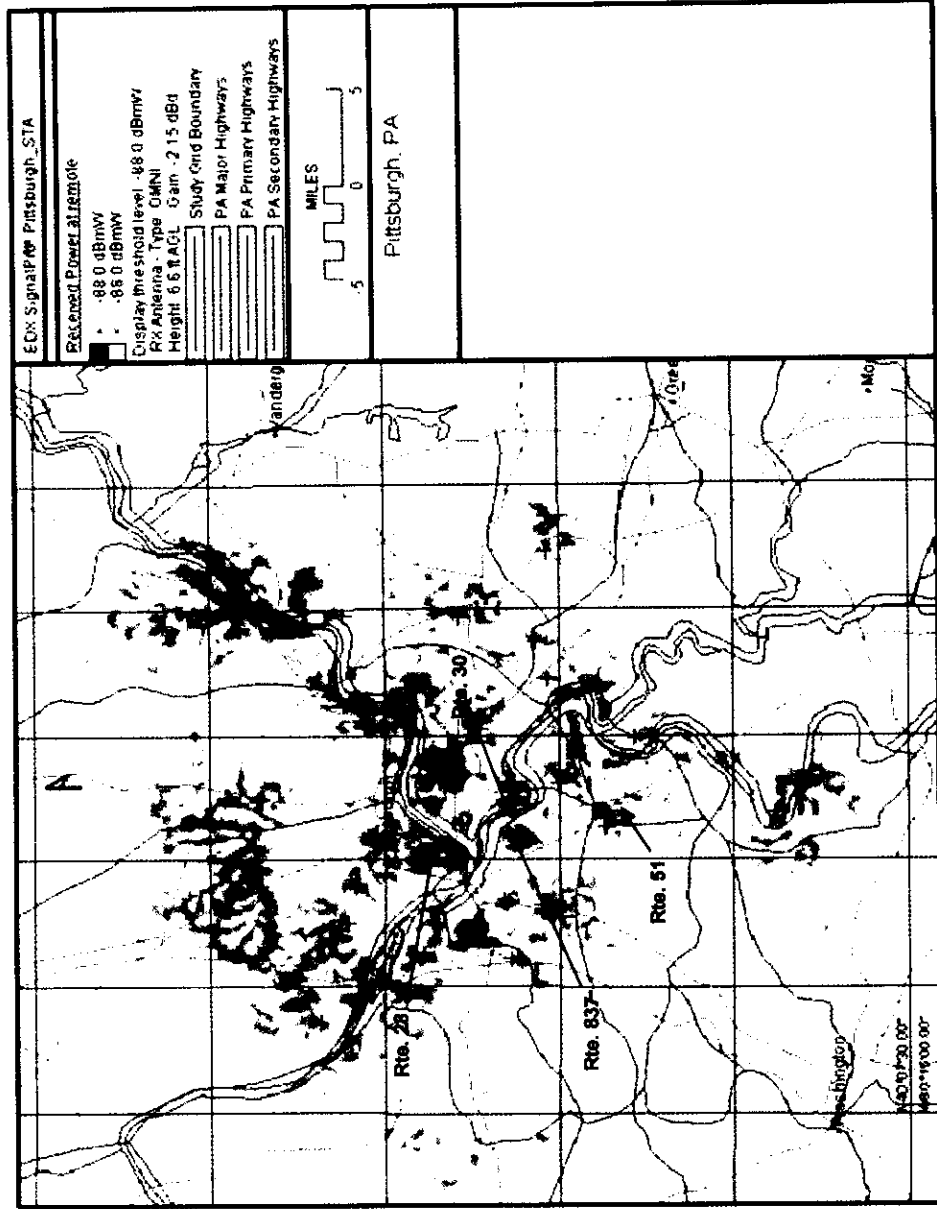


Exhibit 2-42

Pittsburgh Plot 2 Coverage with Variant Repeaters Off

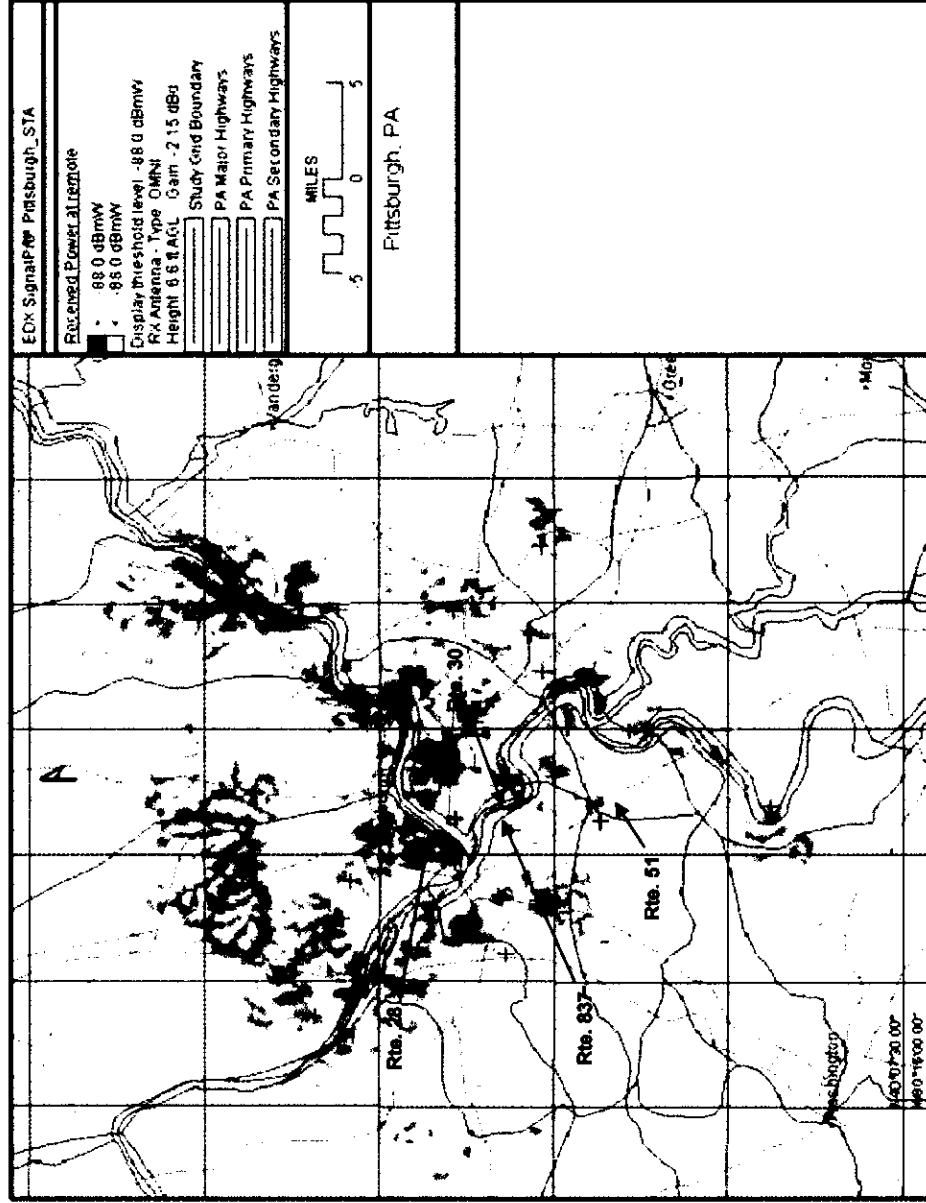


Exhibit 2-43

Exhibit 2-44

Exhibit 2-45

Springfield Plot 1 Current Repeater Coverage

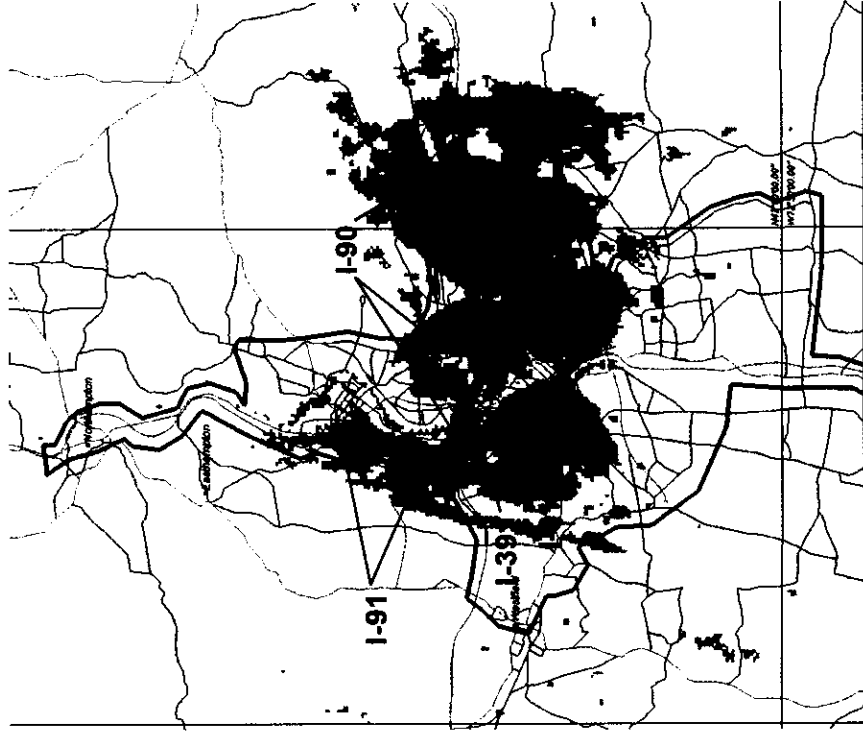


Exhibit 2-46

Springfield Plot 2 Coverage with Variant Repeaters Off

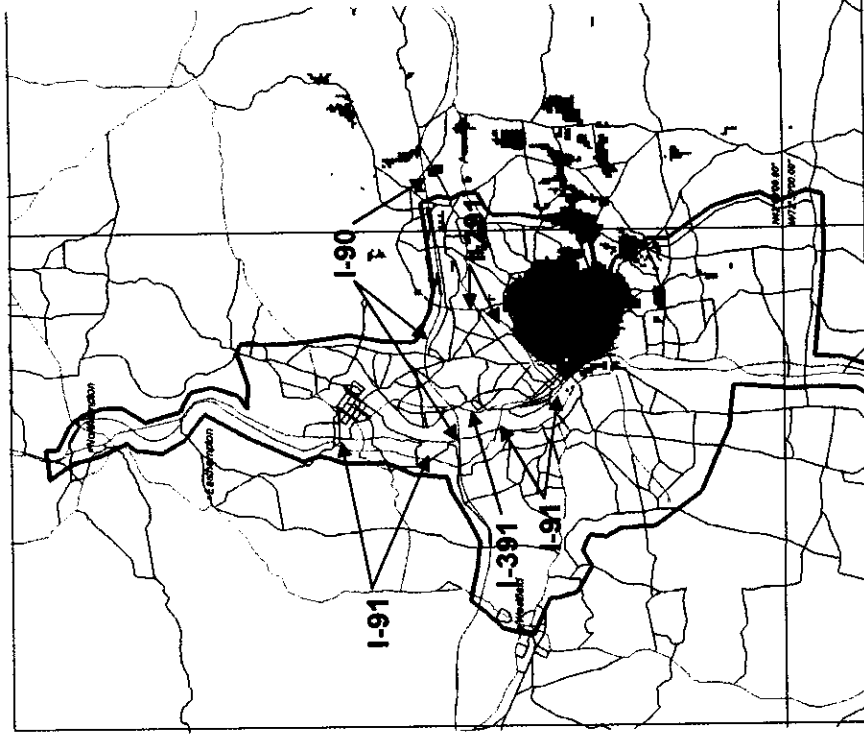


Exhibit 2-47

St. Louis Plot 1 Current Repeater Coverage

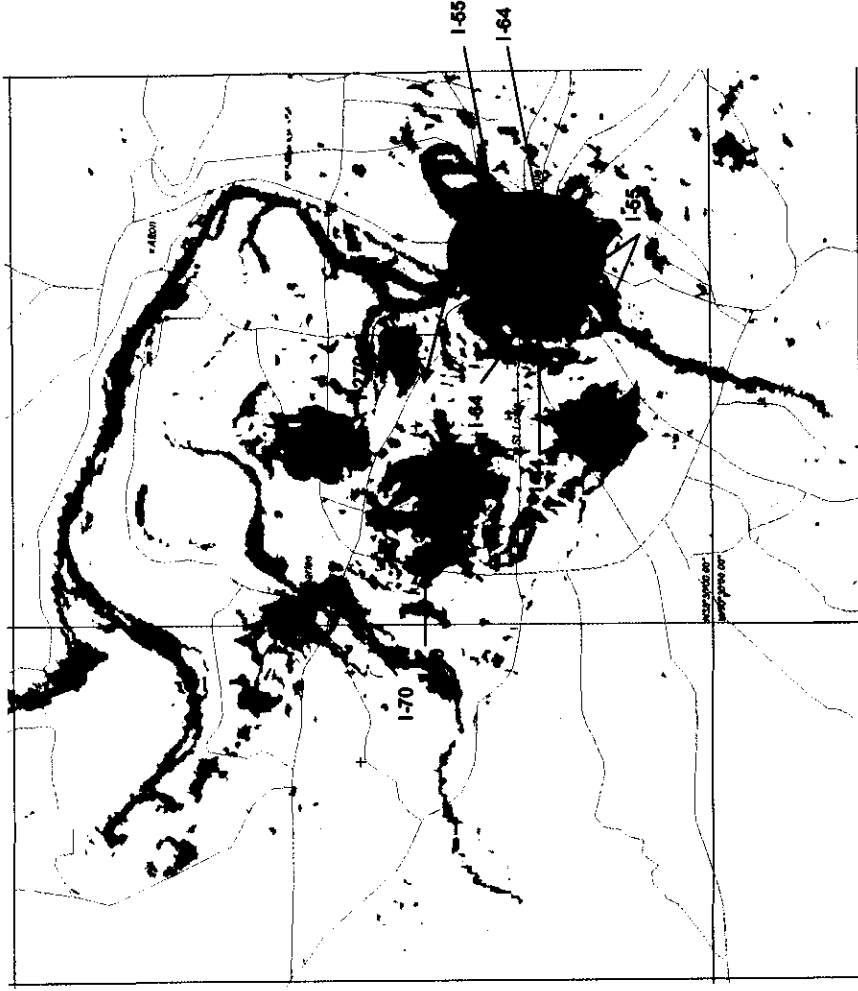


Exhibit 2-48

St. Louis Plot 2 Coverage with Variant Repeaters Off

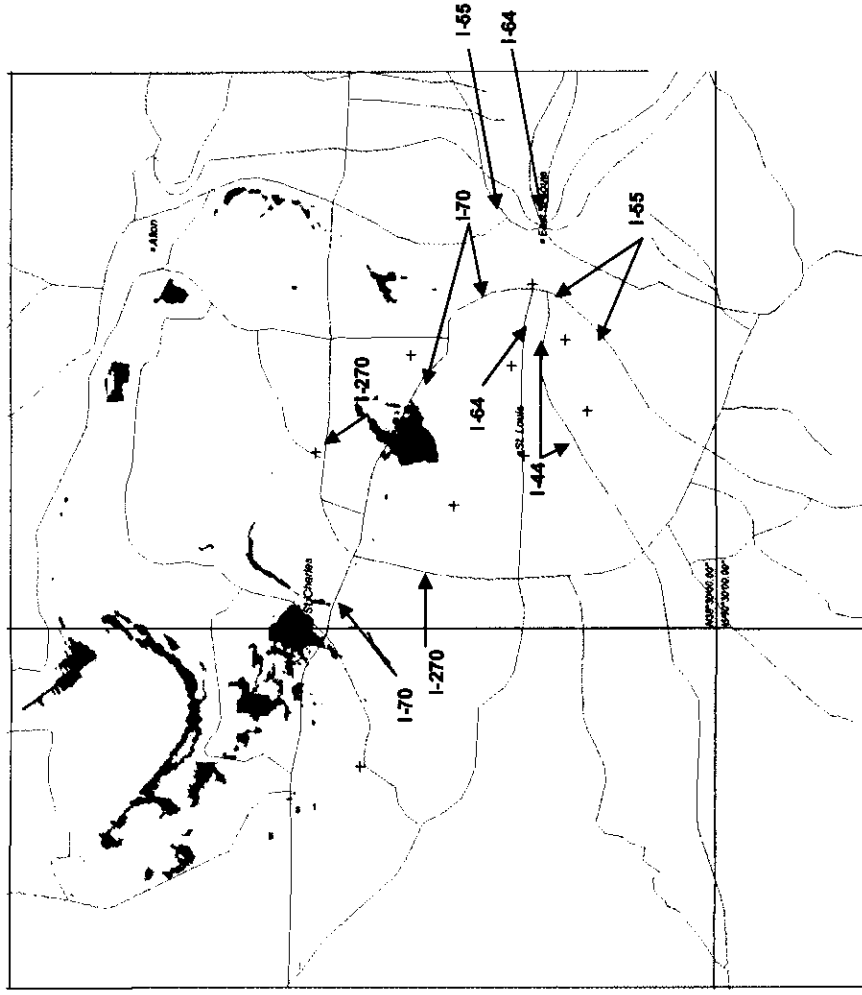


Exhibit 2-49

Washington DC Plot 1

Current Repeater Coverage

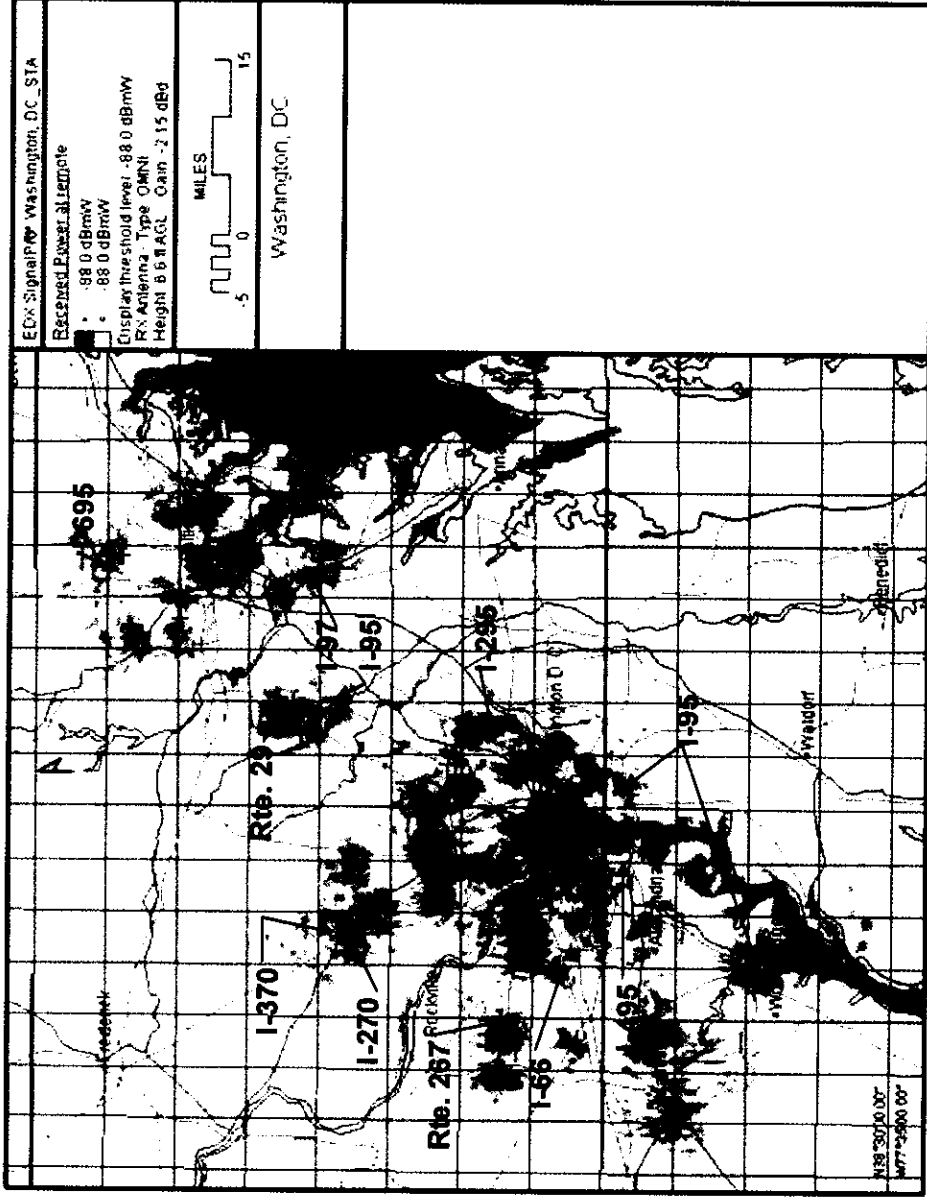


Exhibit 2-50

