BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.

XM Radio Inc. Request for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Terrestrial Repeaters for 30 Days	SAT-STA-20061002-00114

SUPPLEMENT NO. 3 TO XM RADIO INC.'S MEMORANDUM IN SUPPORT OF STA REQUEST

Pursuant to the request of Commission staff, XM Radio Inc. ("XM") has justified the need for the above-captioned 30-day STA by filing a Memorandum and a series of Supplements analyzing XM's use of terrestrial repeaters in each market in which it operates repeaters that vary from the Commission's original STA. XM discussed four markets in its initial Memorandum,[1] it detailed five more markets in a supplement filed December 11, 2006,[2] and it covered another twenty-five markets in a second supplement filed December 18, 2006.[3] This third supplement justifies the need for an STA – and describes the critical importance of XM's repeaters – in twenty-five additional markets,[4]

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1 *See XM Ex Parte Memorandum in Support of STA Request*, File No. SAT-STA-20061002-00114, at 14-22 (filed Nov. 21, 2006) (analyzing Boston, Buffalo, Detroit, and Providence markets).

2 *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, GA; Los Angeles, CA; Nashville, TN; New York, NY; and Raleigh, NC markets).

3 *See Supplement No. 2 to XM Radio Inc.'s Memorandum in Support of STA Request*, File No. SAT-STA-20061002-00114 (filed Dec. 18, 2006) (analyzing 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 markets).

4 This supplement analyzes the following markets: Austin, TX; Chicago, IL; Kansas City, MO; Knoxville, TN; Las Vegas, NV; Louisville, KY; Memphis, TN; Monterey, CA; New Orleans, LA; Norfolk, VA; Oklahoma City, OK; Orlando, FL; Phoenix, AZ; Portland, OR; Richmond, VA; Rochester, NY; Sacramento, CA; Salt Lake City, UT; San Antonio, TX; San Diego, CA; San Francisco, CA; Syracuse, NY; Tampa, FL; Toledo, OH; and Tulsa, OK.

meaning that XM has now provided market-specific analyses for each of the fifty-nine markets in which it operates one or more variant repeaters.[5] In the aggregate, XM has deployed a network that meets the Commission's goals (*i.e.*, advancing the public interest by providing diverse programming via a high-quality nationwide service) 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.

In the fifty-nine markets with at least one variant repeater, XM is authorized to build a total of 1,075 repeaters. *In fact, it has deployed only 791, 284 (26.4 percent) fewer than authorized.* Even more notably, *XM has deployed only 31 of the 117 authorized high-power repeaters in these markets (74 percent fewer than authorized) and 326 of 576 authorized medium-power repeaters (43 percent fewer than authorized).* Requiring XM to turn off the variant repeaters in any of the fifty-nine markets would severely degrade service in the heart of these cities and on major commuter routes, resulting in immediate and palpable consumer harm. In particular, *shutting down the variant repeaters would shrink the repeater-coverage footprint in the markets by 42 percent (measured by resident location), substantially reducing the population benefiting from repeater coverage in these markets*. In addition, *shutting down the variant repeaters in these markets would degrade service quality on commuter routes that serve more than 14.5 million vehicles every day, a point highlighted by the support of three major automakers for XM's STA request.*[6] Refusing to grant the STA would have a quick

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[5] XM operates completely compliant repeater networks in four markets: Denver, CO; Fresno, CA; Little Rock, AR; and Milwaukee, WI.

[6] *See* Letter from GM, Toyota, and Honda, File No. SAT-STA-20061002-00114 (filed Dec. 15, 2006).

and demonstrable adverse affect on consumers. By contrast, granting the STA would harm no one. The Commission should therefore issue the requested STA promptly.

A. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN AUSTIN, TX

In keeping with its authorization, XM operates a single medium-power repeater (between 2 and 10 kW) in the Austin market.[7] That repeater (AUS003) varies from the original authorization in antenna type (from a 10dB gain omni-directional antenna to a 13dB gain panel antenna), orientation (from 0 degrees to 90 degrees), and antenna height (decreasing from 900 feet to 490 feet). These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA.

Shutting this repeater down would eliminate the repeater-coverage footprint in the Austin market, thereby reducing the population potentially benefiting from repeater coverage by more than 132,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on three commuter routes – I-35, Route 1, and Route 183 – that collectively serve approximately 275,000 vehicles every day. Austin Plot 1 (repeater coverage with the variant repeaters on) and Austin Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-1 and 3-2.

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[7] For purposes of its repeater network and all of XM's filings in this proceeding, XM has consistently provided power figures in terms of average EIRP. *See, e.g.*, Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band, IB Docket No. 95-91, *Consolidated Reply Comments of XM Radio Inc.* (filed July 15, 2005); *XM Radio Inc. Request for Special Temporary Authority*, File No. SAT-STA-20061002-00114, Exhibit A (filed Oct. 2, 2006) ("XM 30-Day STA Request") (identifying average power for each repeater).

B. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN CHICAGO, IL

XM is currently authorized to operate thirty-seven repeaters in the Chicago market. *It has deployed only thirty-three.* More significantly, the Commission authorized four high-power repeaters (10kW and above) and twenty-five medium-power repeaters (between 2 and 10kW). *XM has deployed only one of the four authorized high-power repeaters and only twenty-two of the twenty-five authorized medium-power repeaters*. The remaining repeaters operate at low power (2kW and below).

Twenty-three of XM's thirty-three repeaters in the Chicago market exhibit some kind of variance:

- Seventeen of the variant repeaters vary in antenna height (CHI106, CHI115, CHI116, CHI118, CHI121, CHI123, CHI133, CHI136, CHI140, CHI142, CHI213, CHI225, CHI238, CHI241, CHI250, CHI255, and CHI 604). Five of these (CHI121, CHI213, CHI238, CHI241, and CHI 604) exhibit only minor height variances of 8 feet or less (decreasing from 272 feet to 268 feet, decreasing from 280 feet to 275 feet, decreasing from 222 feet to 214 feet, decreasing from 183 feet to 178 feet, and increasing from 85 feet to 92 feet, respectively),[8] and six more (CHI115, CHI118, CHI136, CHI142, CHI225, and CHI255) vary only by 37 feet or less (decreasing from 209 feet to 198 feet, increasing from 147 feet to 172 feet, decreasing from 270 feet to 245 feet, increasing from 132 feet to 158 feet, decreasing from 178 feet to 167 feet, and decreasing from 200 feet to 163 feet, respectively). CHI123 varies only because, due to a clerical error, XM's original STA request did not identify an antenna height; the as-built antenna height is 205 feet. Four of these (CHI116, CHI133, CHI140, and CHI250) vary in antenna height (increasing from 209 feet to 210 feet, decreasing from 172 feet to 168 feet, decreasing from 140 feet to 139 feet, and decreasing from 165 feet to 159 feet, respectively) and by location (by 5863 feet, 1378 feet, 1754 feet, and 2956 feet, respectively). In addition, CHI106 varies in antenna height (decreasing from 200 feet to 138 feet), antenna type (from 1 panel antenna to 2 panel antennas), and downtilt (from 2 degrees to 0 degrees).

- Four more of the variant repeaters (CHI125, CHI201, CHI222, and CHI251) vary by location. CHI125 varies by 6564 feet. CHI201 varies by 899 feet, and it also varies in antenna quantity (from 1 high-power panel to 2 high-power panels) and downtilt (from 0 degrees to 2 degrees). Due to a clerical error in the original STA

[8] Due to a clerical error, XM's original STA request did not include latitude or longitude coordinates for CHI604 and, as a result, neither did the STA.

request, CHI222 varies by 58,867 feet. CHI251 varies by 3975 feet and also in antenna type (from a 6-degree electrical downtilt to a 2-degree electrical downtilt).

- One of the variant repeaters (CHI137) varies only in downtilt (from 0 degrees to 3 degrees).
- The final variant repeater (CHI134) varies only in antenna quantity (from 1 high-power panel to 2 high-power panels).

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting down these repeaters would reduce the Chicago market population potentially benefiting from repeater coverage by more than 1,012,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 61 percent (again, measured by resident location). In addition, turning off these repeaters would disrupt, and some areas eliminate, service on seven commuter routes – I-55, I-57, I-88, I-90, I-94, I-290, I-294 – that collectively serve more than 617,000 vehicles every day. Chicago Plot 1 (repeater coverage with the variant repeaters on) and Chicago Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-3 and 3-4.

C. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN KANSAS CITY, MO

In keeping with its authorization, XM operates six repeaters – five medium-power repeaters and one low-power repeater – in the Kansas City market. Four of these repeaters exhibit some kind of variance:

- One of the four variant repeaters (KAC022) varies only in antenna type (from a 12.5dB gain panel antenna to a 15dB gain panel antenna).
- The other three (KAC025, KACB25, and KACC25) vary in antenna type (from a 15dB gain panel antenna to a 13dB gain panel antenna in each case), orientation (from 0 to 60 degrees, from 120 to 180 degrees, and from 240 to 300 degrees,

respectively), and antenna height (decreasing from 635 feet to 630 feet in each case).

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting down these repeaters would reduce the Kansas City market population potentially benefiting from repeater coverage by more than 347,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 82 percent (again, measured by resident location). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on six commuter routes – I-29, I-35, I-70, I-435, I-635, and I-670 – that collectively serve more than 348,000 vehicles every day. Kansas City Plot 1 (repeater coverage with the variant repeaters on) and Kansas City Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-5 and 3-6.

D. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN KNOXVILLE, TN

In keeping with its authorization, XM operates eleven repeaters in the Knoxville market. Rather than operate one medium-power repeater and ten low-power repeaters as authorized, however, *all of XM's repeaters in the Knoxville market operate at low power.*

Only one of XM's eleven repeaters in the market varies from the original authorization and, significantly, that repeater (KNO001) varies only in location (by 1517 feet).[9] This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA request.

[9] KNO007 was previously identified as variant in antenna orientation. Upon further investigation, XM has determined that KNO007 operates at 0 degrees orientation, as authorized.

Shutting this repeater down would reduce the Knoxville market population potentially benefiting from repeater coverage by more than 18,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on three commuter routes – I-75, I-275, and I-640 – that collectively serve more than 71,000 vehicles every day. Knoxville Plot 1 (repeater coverage with the variant repeaters on) and Knoxville Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-7 and 3-8.

E. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN LAS VEGAS, NV

In keeping with its authorization, XM operates five repeaters in the Las Vegas market. Rather than operate three medium-power repeaters as authorized, however, *XM operates only two medium-power repeaters*. The remaining repeaters operate at low power. Only one of XM's five repeaters in the market varies from the original authorization and, significantly, that repeater (LVX003) *varies only in downtilt* (from 5 degrees to 0 degrees). This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA request.

Shutting this repeater down would reduce the Las Vegas market population potentially benefiting from repeater coverage by more than 22,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on four commuter routes – I-15, I-215, Route 604, and Route 562 – that collectively serve more than 210,000 vehicles every day. Las Vegas Plot 1 (repeater coverage with the variant repeaters on) and Las Vegas Plot 2 (repeater coverage with the

variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-9 and 3-10.

F. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN LOUISVILLE, KY

XM is currently authorized to operate eleven repeaters in the Louisville market. *It has deployed only eight.* More significantly, the Commission authorized five medium-power repeaters and six low-power repeaters. *XM has deployed only four of the five authorized medium-power repeaters, and it has not deployed any high-power repeaters.* Its remaining repeaters all operate at low power.

Three of XM's eight repeaters in the Louisville market vary from the original authorization. Significantly, each of the three (LOU005, LOU007, and LOU009) varies only in antenna configuration, from one-panel antennas to two-panel antennas in each case. These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Louisville market population potentially benefiting from repeater coverage by more than 111,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 28 percent (again, measured by resident location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on two commuter routes – I-64 and I-264 – that together serve more than 139,000 vehicles every day. Louisville Plot 1 (repeater coverage with the variant repeaters on) and Louisville Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-11 and 3-12.

G. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN MEMPHIS, TN

XM is currently authorized to operate ten repeaters in the Memphis market. *It has deployed only seven*. More significantly, the Commission authorized one high-power repeater and four medium-power repeaters. *XM has not deployed the authorized high-power repeater, and it has deployed only two of the four authorized medium-power repeaters*. Its remaining repeaters all operate at low power.

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

- MEM003 varies only in antenna height, increasing from 120 feet to 165 feet.
- MEM011 varies in antenna type (from a 15dB gain panel antenna to a 10dB gain panel antenna) and downtilt (from 2 degrees to 0 degrees).

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Memphis market population potentially benefiting from repeater coverage by more than 113,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 27 percent (again, measured by resident location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on two commuter routes – I-55 and I-240 – that together serve more than 117,000 vehicles every day. Memphis Plot 1 (repeater coverage with the variant repeaters on) and Memphis Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-13 and 3-14.

H. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN MONTEREY, CA

In keeping with its authorization, XM operates eight repeaters – three medium-power repeaters and five low-power repeaters – in the Monterey market. Two of these repeaters vary from the original authorization:

- The first (MON001) varies only in antenna type (from a 17dB gain panel antenna to an 18dB gain panel antenna).
- The second (MON008) varies only in location, by 627 feet.

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting down these repeaters would reduce the Monterey market population potentially benefiting from repeater coverage by more than 55,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 28 percent (again, measured by resident location). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on Route 101, a commuter route that serves more than 30,000 vehicles every day. Monterey Plot 1 (repeater coverage with the variant repeaters on) and Monterey Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-15 and 3-16.

I. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN NEW ORLEANS, LA

XM is currently authorized to operate ten repeaters in the New Orleans market. *It has deployed only six*. More significantly, the Commission authorized seven medium-power repeaters and three low-power repeaters. *XM has deployed only two of the seven authorized medium-power repeaters, and it has not deployed any high-power repeaters.* Its remaining repeaters all operate at low power.

Only one of XM's six repeaters in the New Orleans market varies from the original authorization and, significantly, that repeater (NOX004) *varies only in antenna orientation* (from 300 degrees to 275 degrees). This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA request.

Shutting this repeater down would reduce the New Orleans market population potentially benefiting from repeater coverage by more than 11,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on Route 90, a commuter route that serves more than 21,000 vehicles every day. New Orleans Plot 1 (repeater coverage with the variant repeaters on) and New Orleans Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-17 and 3-18.

J. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN NORFOLK, VA

XM is currently authorized to operate eleven repeaters in the Norfolk market. *It has deployed only nine*. More significantly, the Commission authorized two high-power repeaters and eight medium-power repeaters. *XM has not deployed either of the two authorized high-power repeaters, and it has deployed only six of the eight authorized medium-power repeaters*. Its remaining repeaters all operate at low power.

Only one of XM's six repeaters in the Norfolk market varies from the original authorization and, significantly, that repeater (NOR003) *varies only in location* (by 1517 feet). This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA request.

Shutting this repeater down would reduce the Norfolk market population potentially benefiting from repeater coverage by more than 14,000 people (measured by

resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on three commuter routes – I-264, Route 58, and Route 60 – that collectively serve more than 75,000 vehicles every day. Norfolk Plot 1 (repeater coverage with the variant repeaters on) and Norfolk Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-19 and 3-20.

K. AN STA SHOULD BE GRANTED FOR XM'S REPEATER IN OKLAHOMA CITY, OK

XM is currently authorized to operate three repeaters (one high-power, one medium-power, and one low-power) in the Oklahoma City market. *It has deployed only a single high-power repeater.* That repeater (OKC001) varies from the original authorization but, significantly, *it varies only in antenna design* (from one high-power panel antenna to two high-power panel antennas). This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA request.

Shutting this repeater down would eliminate the repeater-coverage footprint in the Oklahoma City market, thereby reducing the population potentially benefiting from repeater coverage by more than 240,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on five commuter routes – I-35, I-40, I-44, I-235, and Route 77 – that collectively serve more than 215,000 vehicles every day. Oklahoma City Plot 1 (repeater coverage with the variant repeaters on) and Oklahoma City Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-21 and 3-22.

L. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN ORLANDO, FL

In keeping with its authorization, XM operates five repeaters – four medium-power repeaters and one low-power repeater – in the Orlando market. Two of these repeaters exhibit some kind of variance:

- One of the two (ORL001) varies only in antenna height and only by four feet (increasing from 236 feet to 240 feet).
- The other (ORL005) varies only in antenna downtilt (from 4 degrees to 9 degrees).

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting down these repeaters would reduce the Orlando market population potentially benefiting from repeater coverage by more than 137,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 33 percent (again, measured by resident location). In addition, turning off these repeaters would disrupt, and in some areas eliminate, service on three commuter routes – I-4, Route 17, and Route 528 – that collectively serve more than 86,000 vehicles every day. Orlando Plot 1 (repeater coverage with the variant repeaters on) and Orlando Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-23 and 3-24.

M. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN PHOENIX, AZ

XM is currently authorized to operate eleven repeaters in the Phoenix market. *It has deployed only four*. More significantly, the Commission authorized two high-power repeaters and nine medium-power repeaters. XM has deployed two high-power repeaters as authorized, *but it has deployed only one of the nine authorized medium-power repeaters*. Its other repeater in the market operates at low power.

Two of XM's four repeaters in the Phoenix market vary from the original authorization. Both of them (PHO006 and PHO101) vary in antenna height, decreasing from 80 feet to 60 feet, and decreasing from 80 feet to 30 feet, respectively. These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Phoenix market population potentially benefiting from repeater coverage by more than 280,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 79 percent (again, measured by resident location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on four commuter routes – I-10, I-17, I-19, and Route 51 – that collectively serve more than 363,000 vehicles every day. Phoenix Plot 1 (repeater coverage with the variant repeaters on) and Phoenix Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-25 and 3-26.

N. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN PORTLAND, OR

XM is currently authorized to operate twenty repeaters in the Portland market. *It has deployed only sixteen*. More significantly, the Commission authorized one high-power repeater and sixteen medium-power repeaters. *XM has not deployed the authorized high-power repeater and it has deployed only eleven of the sixteen authorized medium-power repeaters*. The remaining repeaters all operate at low power.

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

- Four of these (POR017, POR028, POR030, and POR035) vary only in location, by 462 feet, 697 feet, 423 feet, and 1274 feet, respectively.

- Another (POR003) varies only in antenna type, from a 10dB gain omni-directional antenna to an 11.5dB gain omni-directional antenna.
- The final variant repeater (POR021) varies in antenna orientation (from 90 degrees to 120 degrees) and in antenna height by just one foot (decreasing from 126 feet to 125 feet).

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting down these repeaters would reduce the Portland market population potentially benefiting from repeater coverage by more than 676,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 49 percent (again, measured by resident location). In addition, turning off these repeaters would disrupt, and some areas eliminate, service on five commuter routes – I-5, I-84, I-205, I-405, and Route 26 – that collectively serve more than 334,000 vehicles every day. Portland Plot 1 (repeater coverage with the variant repeaters on) and Portland Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-27 and 3-28.

O. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN RICHMOND, VA

XM is currently authorized to operate nine repeaters in the Richmond market. *It has deployed only seven*. More significantly, the Commission authorized one high-power repeater and eight medium-power repeaters. XM has deployed one high-power repeater as authorized, *but it has deployed only five of the eight authorized medium-power repeaters*. Its other repeater in the market operates at low power.

Four of XM's seven repeaters in the Richmond market vary from the original authorization. Each of the four (RIC008, RIC020, RIC033, and RIC034) varies only in

location (by 574 feet, 1446 feet, 6098 feet, and 490 feet, respectively).[10] These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Richmond market population potentially benefiting from repeater coverage by more than 96,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 30 percent (again, measured by resident location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on five commuter routes – I-64, I-95, Route 60, Route 150, and Route 360 – that collectively serve more than 222,000 vehicles every day. Richmond Plot 1 (repeater coverage with the variant repeaters on) and Richmond Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-29 and 3-30.

P. AN STA SHOULD BE GRANTED FOR XM'S REPEATER IN ROCHESTER, NY

XM is currently authorized two repeaters – both high power – in the Rochester market. *XM has deployed only one, and it is a medium-power repeater.* That repeater (ROC002) varies from the original authorization in antenna type (from a 10dB gain omni-directional antenna to a 15dB gain panel antenna), orientation (from 0 degrees to 120 degrees), and antenna height (decreasing from 397 feet to 300 feet). These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

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

[10] RIC009 was previously identified as variant in antenna type. Upon further investigation, XM has determined that the installed antenna differs from the authorization only with respect to its transmission line connection because the installed antenna employs an internal power divider.

coverage by more than 132,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on three commuter routes – I-390, I-490, and Route 15 – that collectively serve more than 161,000 vehicles every day. Rochester Plot 1 (repeater coverage with the variant repeaters on) and Rochester Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-31 and 3-32.

Q. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SACRAMENTO, CA

XM is currently authorized to operate seven repeaters in the Sacramento market. *It has deployed only five*. More significantly, the Commission authorized two high-power repeaters and four medium-power repeaters. XM has deployed two high-power repeaters as authorized, *but it has deployed only two of the four authorized medium-power repeaters*. Its other repeater in the market operates at low power.

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

- One of the two (SAC001) varies only in EIRP, from 3170 Watts to 10,900 Watts.
- The other (SAC006) varies only in antenna type, from 10dB gain antenna to an 11.5dB gain antenna.

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Sacramento market population potentially 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 location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on three commuter routes – I-80,

Route 50, and Route 99 – that collectively serve approximately 234,000 vehicles every day. Sacramento Plot 1 (repeater coverage with the variant repeaters on) and Sacramento Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-33 and 3-34.

R. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SALT LAKE CITY, UT

XM is currently authorized to operate six repeaters in the Salt Lake City market. *It has deployed only four.* More significantly, the Commission authorized two high-power repeaters and four medium-power repeaters. XM has deployed two high-power repeaters as authorized, *but it has deployed only two of the four authorized medium-power repeaters.*

Two of XM's four repeaters in the Salt Lake City market vary from the original authorization. Both of them (SLC001 and SLC004) vary only in location, by 3782 feet and 5721 feet, respectively. These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Salt Lake City market population potentially benefiting from repeater coverage by more than 178,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 14 percent (again, measured by resident location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on two commuter routes – I-15 and Route 89 – that together serve more than 83,000 vehicles every day. Salt Lake City Plot 1 (repeater coverage with the variant repeaters on) and Salt Lake City Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-35 and 3-36.

S. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SAN ANTONIO, TX

XM is currently authorized to operate eleven repeaters in the Louisville market. *It has deployed only nine*. More significantly, the Commission authorized nine medium-power repeaters and two low-power repeaters. *XM has deployed only seven of the nine authorized medium-power repeaters, and it has not deployed any high-power repeaters.* Its remaining repeaters operate at low power.

Only one of XM's eight repeaters in the San Antonio market varies from the original authorization and, significantly, that repeater (SAN001) varies only in antenna height (increasing from 170 feet to 195 feet). This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA request.

Shutting this repeater down would reduce the San Antonio market population potentially benefiting from repeater coverage by more than 22,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on three commuter routes – I-10, I-410, and Route 87 – that collectively serve more than 72,000 vehicles every day. San Antonio Plot 1 (repeater coverage with the variant repeaters on) and San Antonio Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-37 and 3-38.

T. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SAN DIEGO, CA

XM is currently authorized to operate sixteen repeaters in the San Diego market. *It has deployed only six – which is 63 percent fewer than authorized*. More significantly, the Commission authorized one high-power repeater and fifteen medium-power repeaters. XM has deployed the high-power repeater as authorized, *but it has deployed*

only four of the fifteen authorized medium-power repeaters. Its remaining repeater operates at low power.

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

- The first (SDX002) varies in antenna type (from a 12dB gain panel antenna to a 10dB gain omni-directional antenna), orientation (from 270 degrees to 0 degrees), antenna height (increasing from 359 feet to 387 feet), and downtilt (from 3 degrees to 0 degrees).
- The second (SDX019) varies only in location, by 949 feet.

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting down these repeaters would reduce the San Diego market population potentially benefiting from repeater coverage by more than 141,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 46 percent (again, measured by resident location). In addition, turning off these repeaters would disrupt, and some areas eliminate, service on three commuter routes – I-5, I-805, and Route 163 – that collectively serve more than 295,000 vehicles every day. San Diego Plot 1 (repeater coverage with the variant repeaters on) and San Diego Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-39 and 3-40.

U. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SAN FRANCISCO, CA

XM is currently authorized to operate fifty-seven repeaters in the San Francisco market. *It has deployed only thirty – which is 47 percent fewer than authorized.* More significantly, the Commission authorized two high-power repeaters and fifty medium-power repeaters. *XM has not deployed either of the authorized high-power repeaters,*

and it has deployed only eighteen of the fifty authorized medium-power repeaters. The remaining repeaters all operate at low power.

Twelve of XM's thirty repeaters in the San Francisco market exhibit some kind of variance:

- Six of these (SFX005, SFX058, SFX064, SFX117, SFX139, and SFX250) vary in location, by 429 feet, 1600 feet, 548 feet, 1081 feet, 2321 feet, and 4658 feet, respectively. One of these (SFX139) also varies in orientation (from 170 degrees to 210 degrees) and antenna height (increasing from 85 feet to 148 feet).
- Four repeaters (SFX007, SFX009, SFX214, and SFX716) vary in antenna type, from a 10dB gain antenna to an 11.5dB gain antenna, from a 6 degree electrical downtilt antenna to a 0 degree electrical downtilt antenna, from a 13dB gain antenna to a 15dB gain antenna, and from a high-power panel antenna to medium-power panel antenna, respectively.
- Another (SFX152) varies in EIRP, from 2108 Watts to 6750 Watts.
- The final variant repeater (SFX251) was constructed at a location that the original 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.

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting down these repeaters would reduce the San Francisco market population potentially benefiting from repeater coverage by more than 858,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 58 percent (again, measured by resident location). In addition, turning off these repeaters would disrupt, and some areas eliminate, service on six commuter routes – I-80, I-280, I-580, I-680, I-880, and Route 101 – that collectively serve more than 566,000 vehicles every day. San Francisco Plot 1 (repeater coverage with the variant repeaters on) and San Francisco Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-41 and 3-42.

V. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN SYRACUSE, NY

XM is currently authorized to operate seven repeaters in the Syracuse market. *It has deployed only three*. More significantly, the Commission authorized two high-power repeaters and five medium-power repeaters. *XM has not deployed any high-power repeaters, and it has deployed only two of the five authorized medium-power repeaters*. Its remaining repeater operates at low power.

Two of XM's three repeaters in the Syracuse market vary from the original authorization. Both of them (SYR004 and SYR008) vary only in antenna height, decreasing from 270 feet to 248 and decreasing from 73 feet to 69 feet, respectively. These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Syracuse market population potentially benefiting from repeater coverage by more than 75,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 61 percent (again, measured by resident location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on three commuter routes – I-81, I-90, and I-690 – that collectively serve more than 122,000 vehicles every day. Syracuse Plot 1 (repeater coverage with the variant repeaters on) and Syracuse Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-43 and 3-44.

W. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN TAMPA, FL

XM is currently authorized to operate seventeen repeaters in the Tampa market. *It has deployed only thirteen*. More significantly, the Commission authorized fifteen

medium-power repeaters and two low-power repeaters. *XM has deployed only eight of the fifteen authorized medium-power repeaters, and it has not deployed any high-power repeaters*. Its remaining repeaters operate at low power.

Nine of XM's thirteen repeaters in the Tampa market exhibit some kind of variance:

- Two of these (TAM001 and TAM011) varies in location, by 437 feet and 1019 feet respectively. TAM001 also varies in downtilt, from 3 degrees to 0 degrees.
- Four more (TAM003, TAM008, TAM009, and TAM015) vary only in downtilt, from 3 degrees to 0 degrees, from 6 degrees to 0 degrees, from 3 degrees to 0 degrees, and from 3 degrees to 0 degrees, respectively.
- The remaining three (TAM002, TAM013, and TAM014) vary by antenna type (from a 12.5dB gain panel antenna to a 14dB gain panel antenna, from a 12dB gain panel antenna to an 18dB gain panel antenna, and from a 10.5dB gain panel antenna to a 16dB gain panel antenna, respectively). TAM002 also varies in downtilt, from 3 degrees to 0 degrees; TAM013 also varies in orientation (from 90 degrees to 120 degrees) and downtilt (from 5 degrees to 0 degrees); and TAM014 also varies in orientation (from 90 degrees to 110 degrees).

These variances neither lessen the need for granting the STA nor should they impact the Commission's analysis of the STA request.

Shutting these repeaters down would reduce the Tampa market population potentially benefiting from repeater coverage by more than 328,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 64 percent (again, measured by resident location). In addition, turning these repeaters off would disrupt, and in some areas eliminate, service on five commuter routes – I-4, I-75, I-275, Route 19, and Route 92 – that collectively serve more than 219,000 vehicles every day. Tampa Plot 1 (repeater coverage with the variant repeaters on) and Tampa Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-45 and 3-46.

X. AN STA SHOULD BE GRANTED FOR XM'S REPEATER IN TOLEDO, OH

XM is currently authorized to operate five repeaters in the Toledo market. *It has deployed only two*. More significantly, the Commission authorized two medium-power repeaters and three low-power repeaters. *Both of XM's repeaters in the market operate at low power*.

One of XM's repeaters in the Toledo market varies from the original authorization and, that repeater (TOL005) varies only in location, by 1019 feet. This variance neither lessens the need for granting the STA nor should it impact the Commission's analysis of the STA request.

Shutting this repeater down would reduce the Toledo market population potentially benefiting from repeater coverage by more than 50,000 people (measured by resident location), thereby shrinking the repeater-coverage footprint in the market by 25 percent (again, measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on three commuter routes – I-75, I-475, and Route 24 – that collectively serve more than 106,000 vehicles every day. Toledo Plot 1 (repeater coverage with the variant repeaters on) and Toledo Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-47 and 3-48.

Y. AN STA SHOULD BE GRANTED FOR XM'S REPEATER IN TULSA, OK

In keeping with its authorization, XM operates a single high-power repeater in the Tulsa market. That repeater (TUL001) varies from the original authorization, but *only*

because of a clerical error that misidentified the correct location by 265,340 feet.[11] 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 eliminate the repeater-coverage footprint in the Tulsa market, thereby reducing the population potentially benefiting from repeater coverage by more than 161,000 people (measured by resident location). In addition, turning this repeater off would disrupt, and in some areas eliminate, service on five commuter routes – I-44, I-244, I-444, Route 412, and Route 75 – that collectively serve more than 200,000 vehicles every day. Tulsa Plot 1 (repeater coverage with the variant repeaters on) and Tulsa Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shutdown's impact on repeater coverage. *See* Exhibits 3-49 and 3-50.

CONCLUSION

Evaluating the repeaters that XM uses in each of its markets clearly demonstrates that XM's network merits grant of the requested STA. Requiring XM to shut off any variant repeaters would adversely affect reception to XM's customers in these 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.

[11] This error was apparently due to a data entry mistake in entering the repeater's coordinates in 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 heavily wooded area 50 miles east of Tulsa.

In sum, granting the requested STA would not harm anyone. Denying the STA request, by contrast, would harm 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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Counsel to XM Radio Inc.

4 January 2007

Exhibit 3-1

Austin Plot 1
Current Repeater Coverage

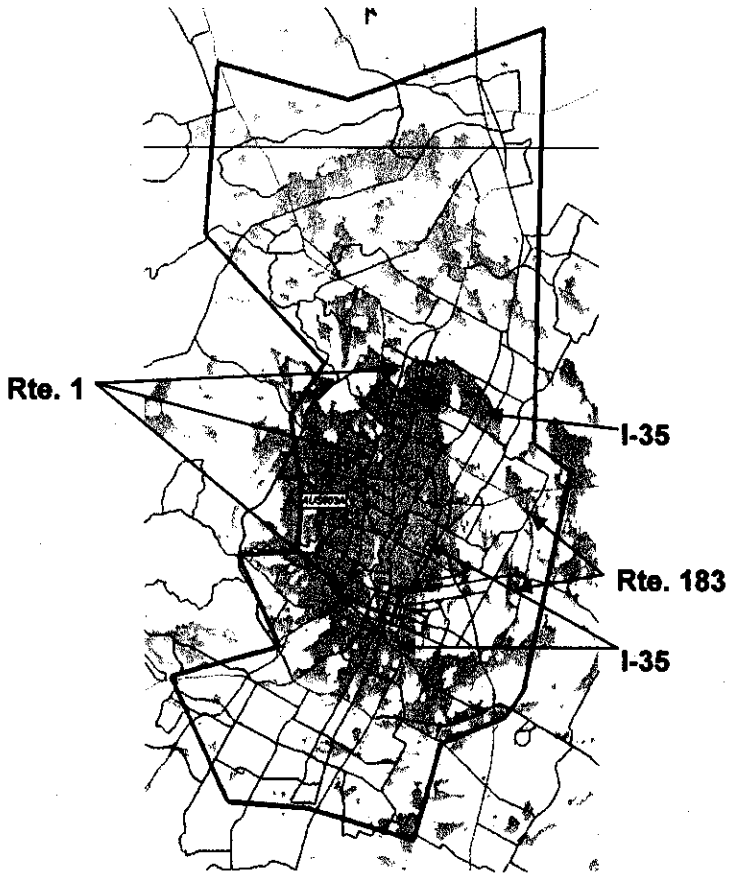

Exhibit 3-2

Austin Plot 2
Coverage with Variant Repeaters Off

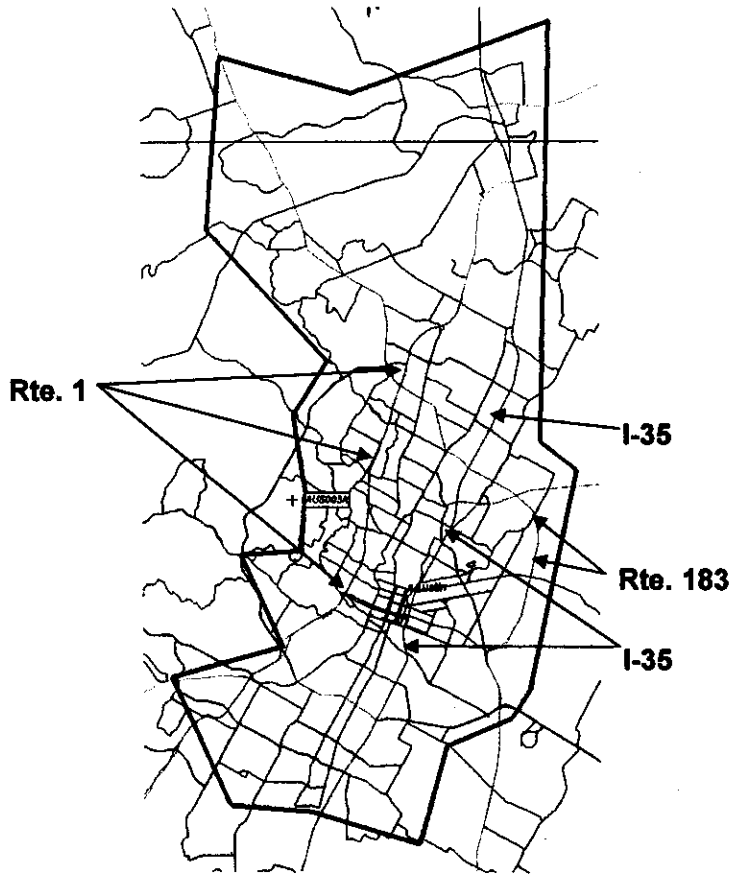

Exhibit 3-3

Chicago Plot 1
Current Repeater Coverage

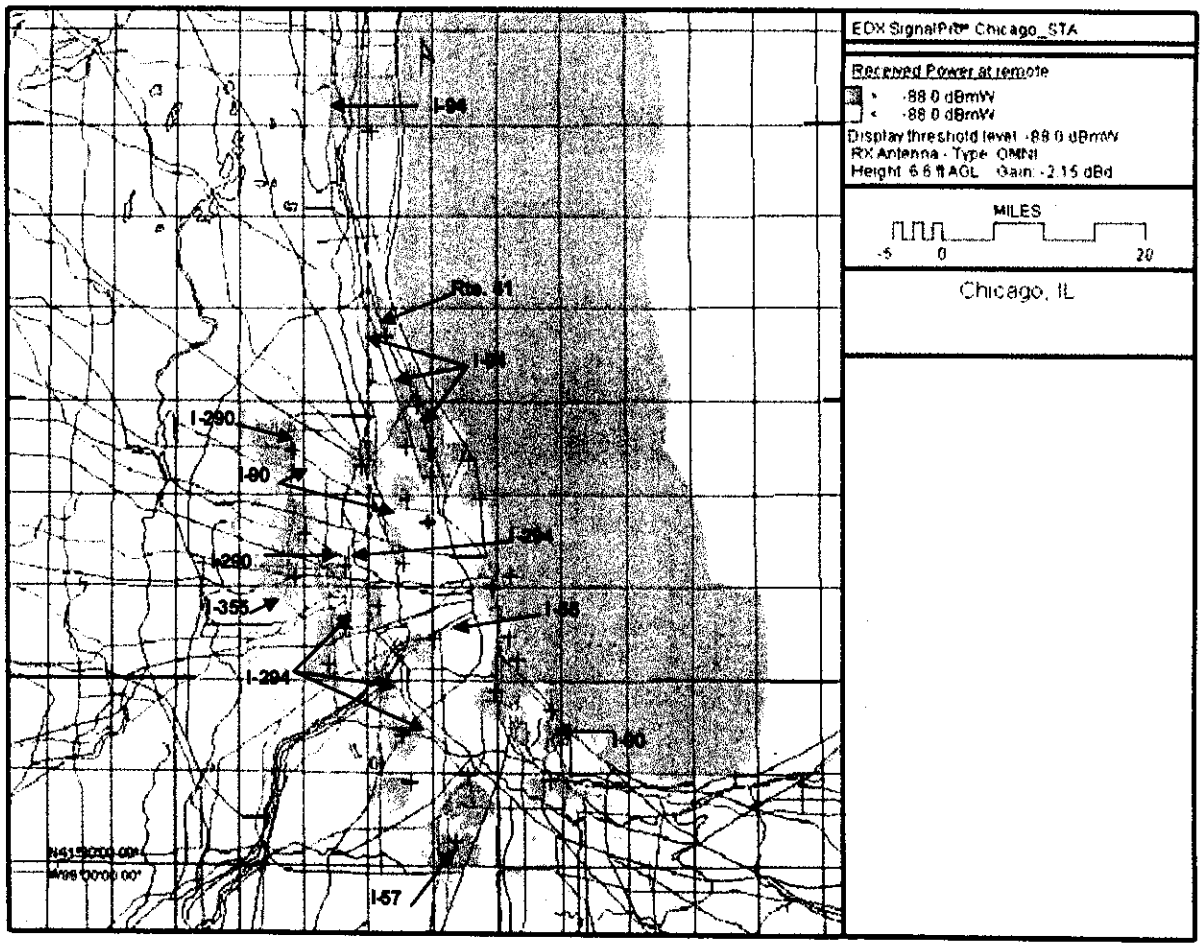

Exhibit 3-4

Chicago Plot 2
Coverage with Variant Repeaters Off

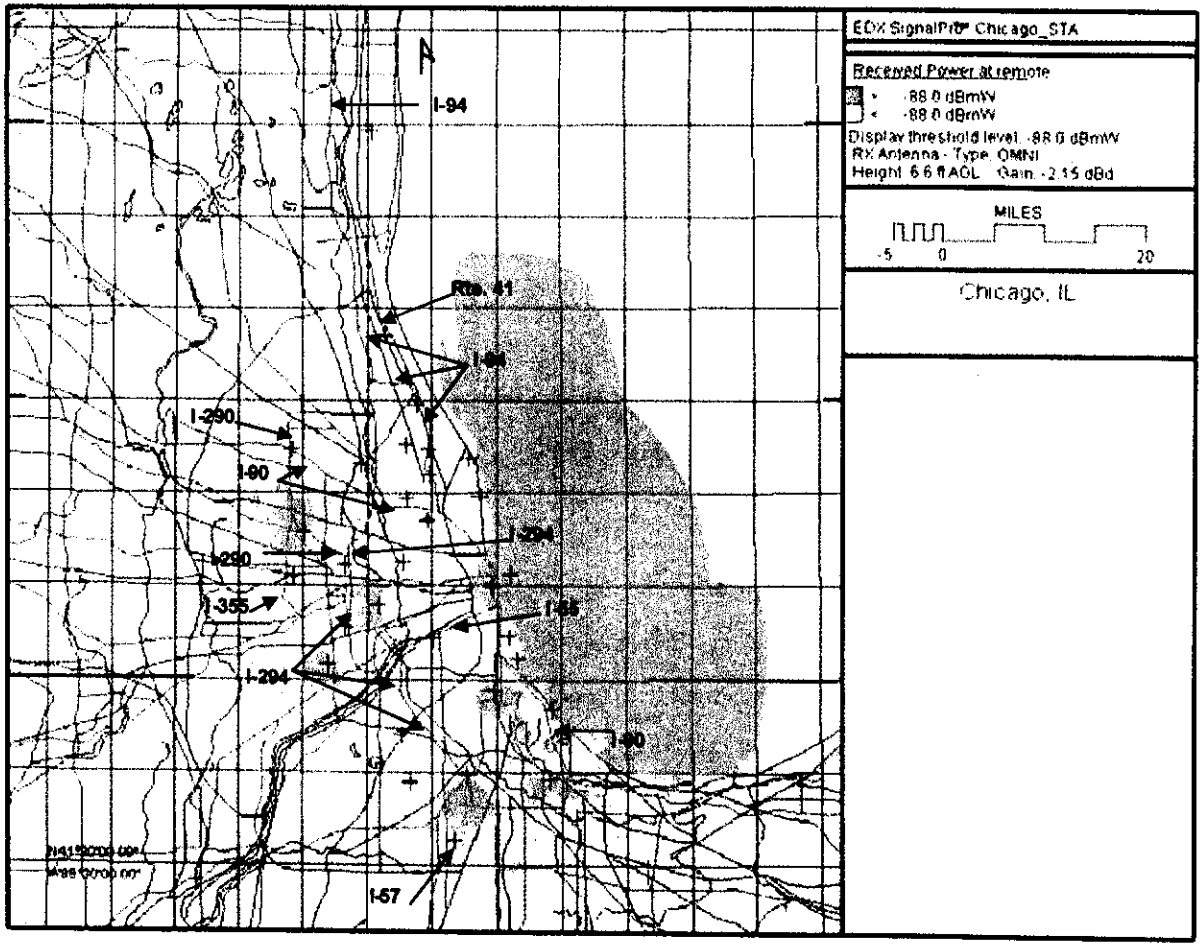

Exhibit 3-5

Kansas City Plot 1
Current Repeater Coverage

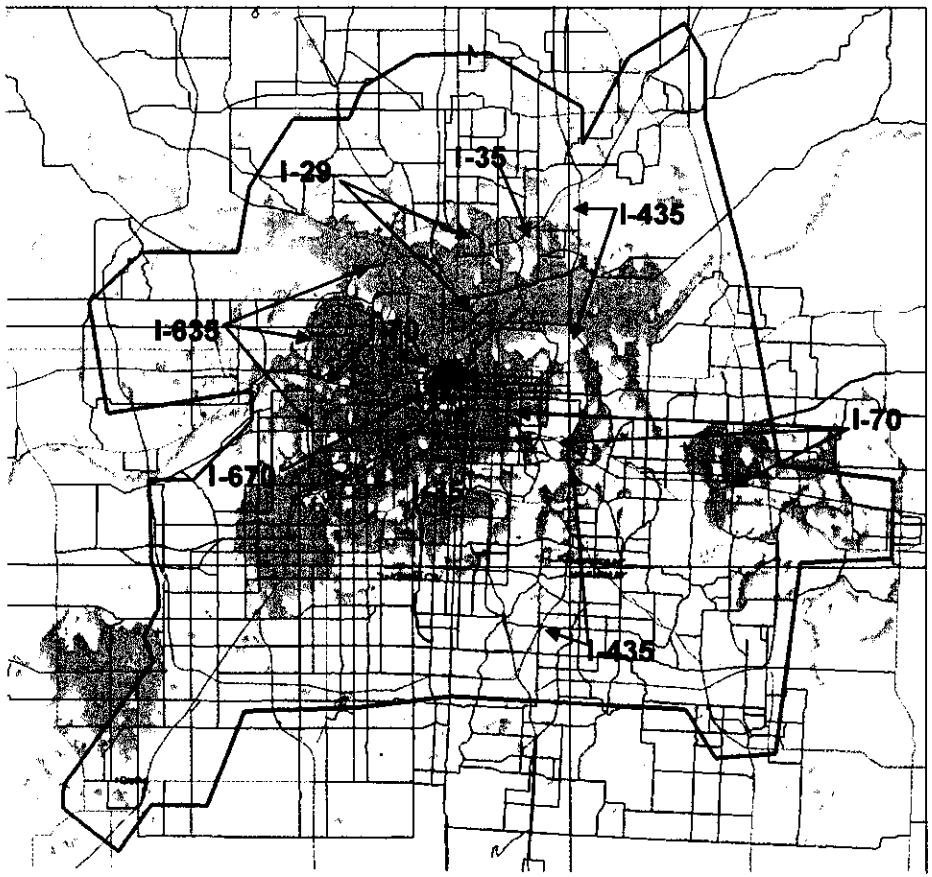

Exhibit 3-6

Kansas City Plot 2
Coverage with Variant Repeaters Off

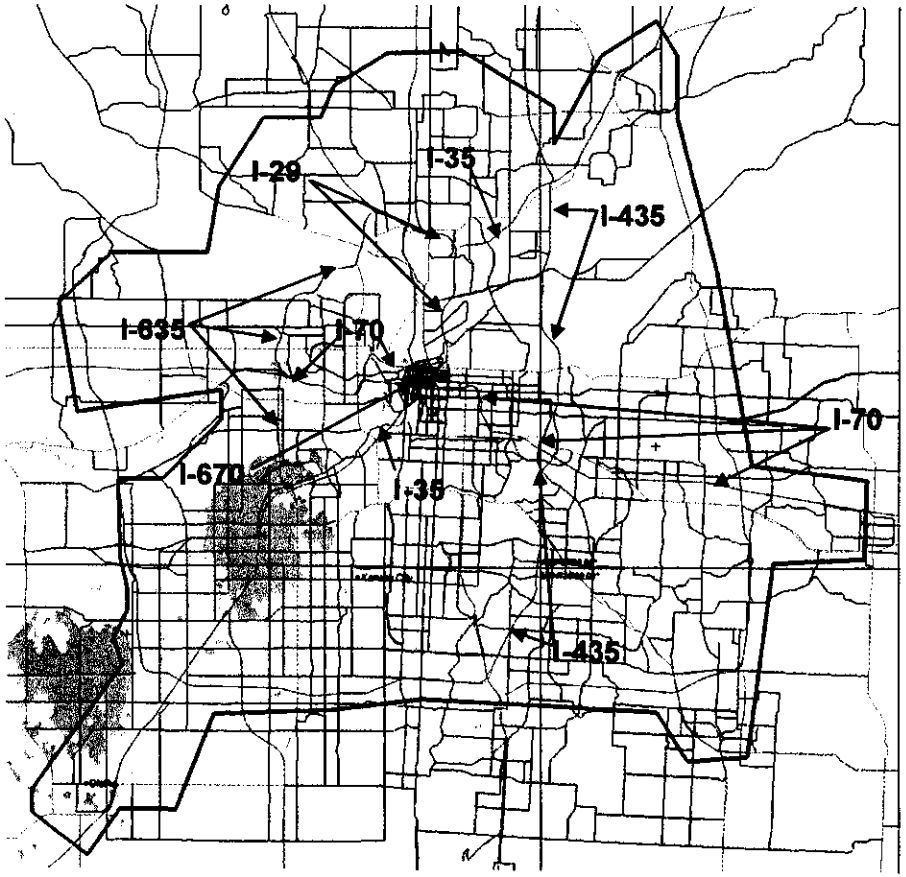

Exhibit 3-7

Knoxville Plot 1
Current Repeater Coverage

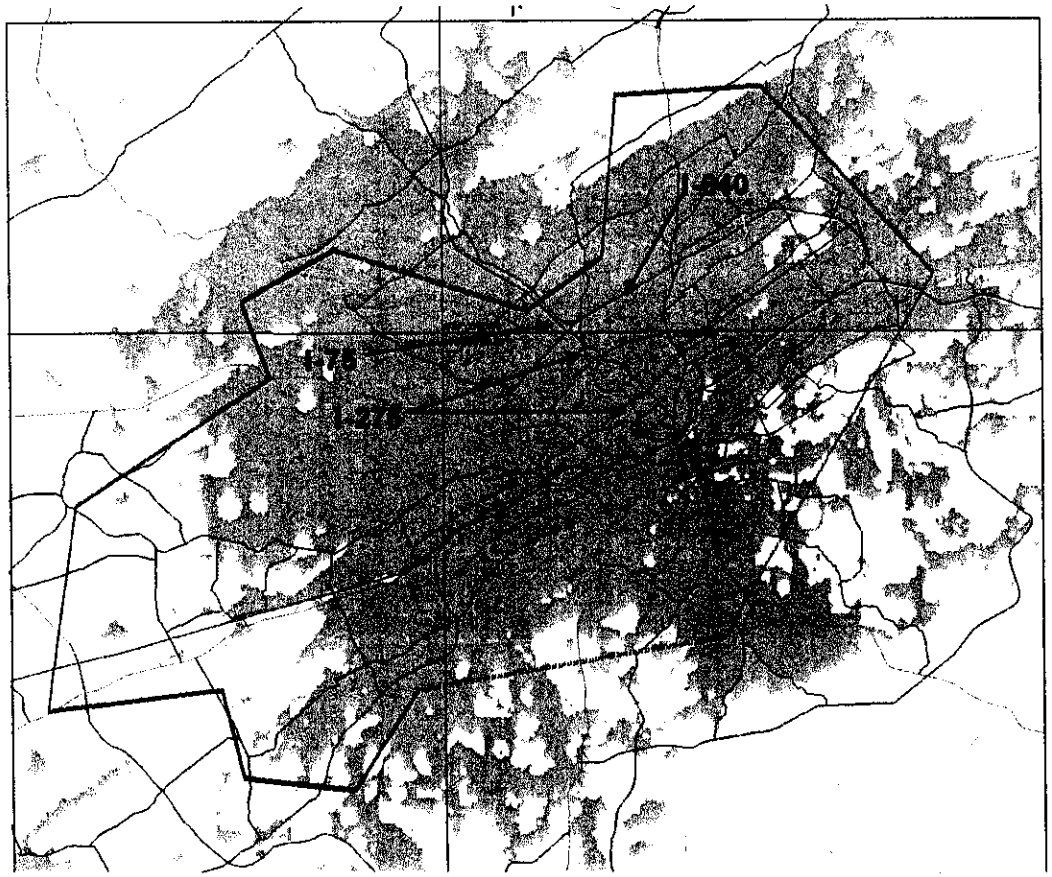

Exhibit 3-8

Knoxville Plot 2
Coverage with Variant Repeaters Off

Exhibit 3-9

Las Vegas City Plot 1
Current Repeater Coverage

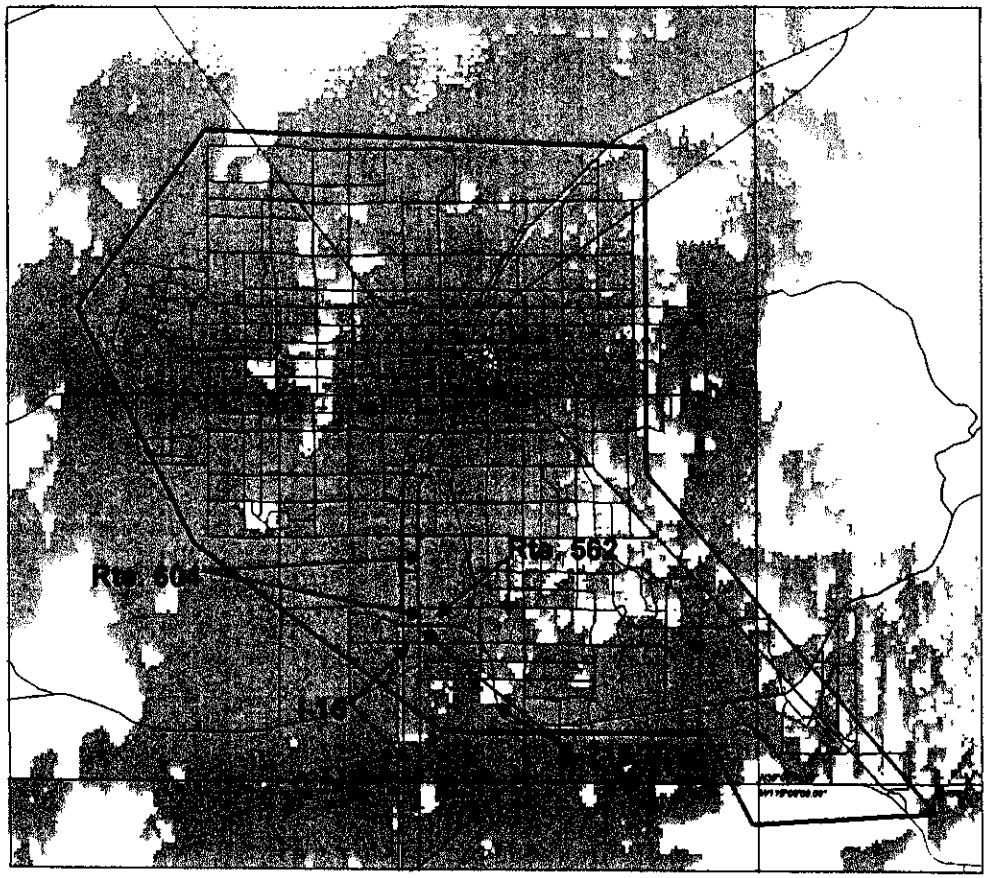

Exhibit 3-10

Las Vegas City Plot 2
Coverage with Variant Repeaters Off

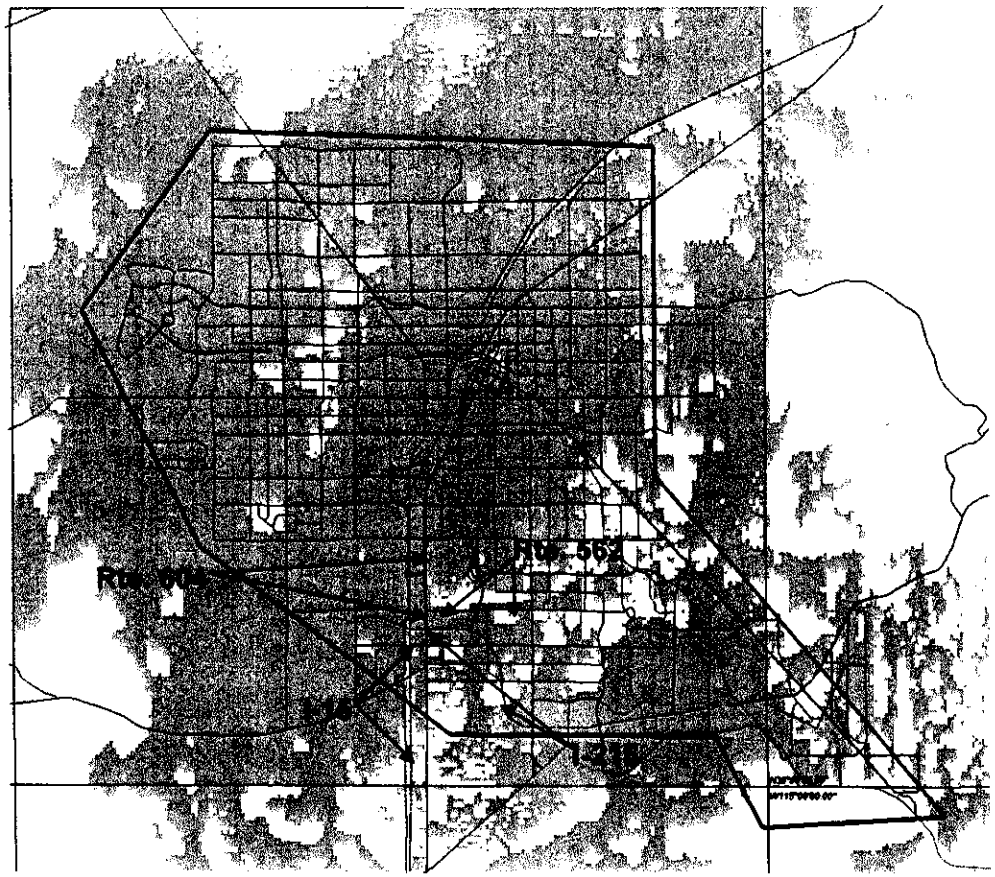

Exhibit 3-11

Louisville Plot 1
Current Repeater Coverage

Exhibit 3-12

Louisville Plot 2
Coverage with Variant Repeaters Off

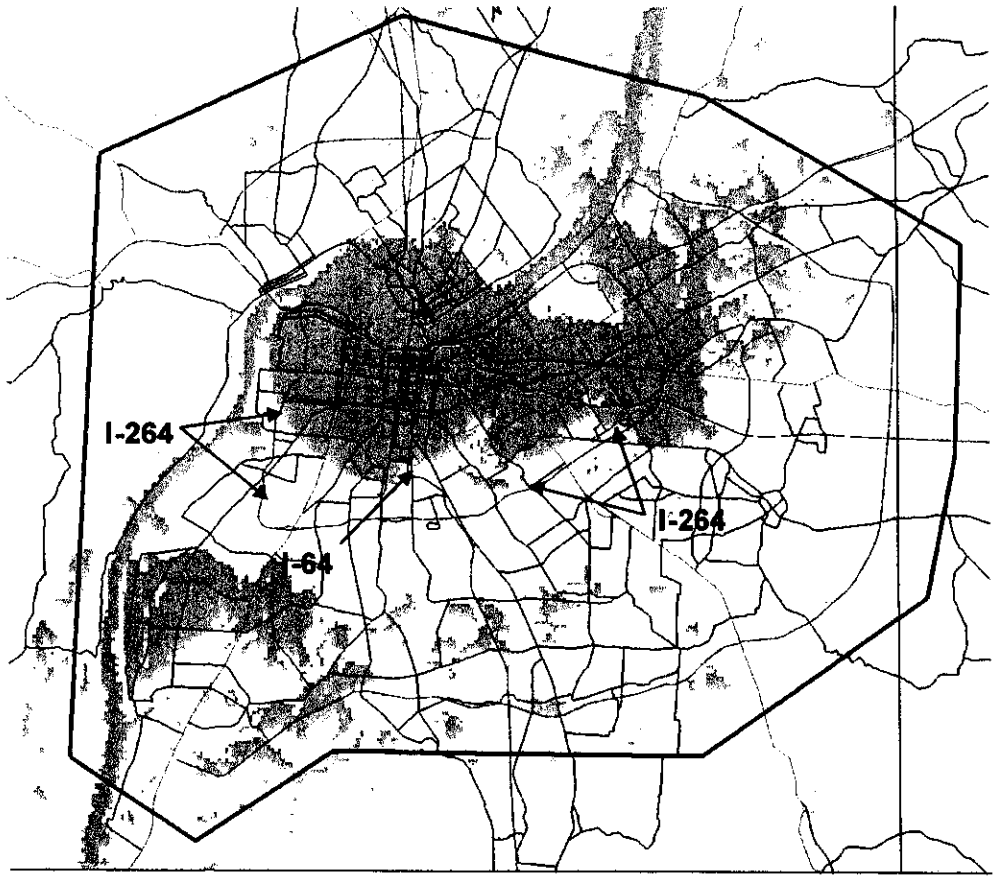

Exhibit 3-13

Memphis City Plot 1
Current Repeater Coverage

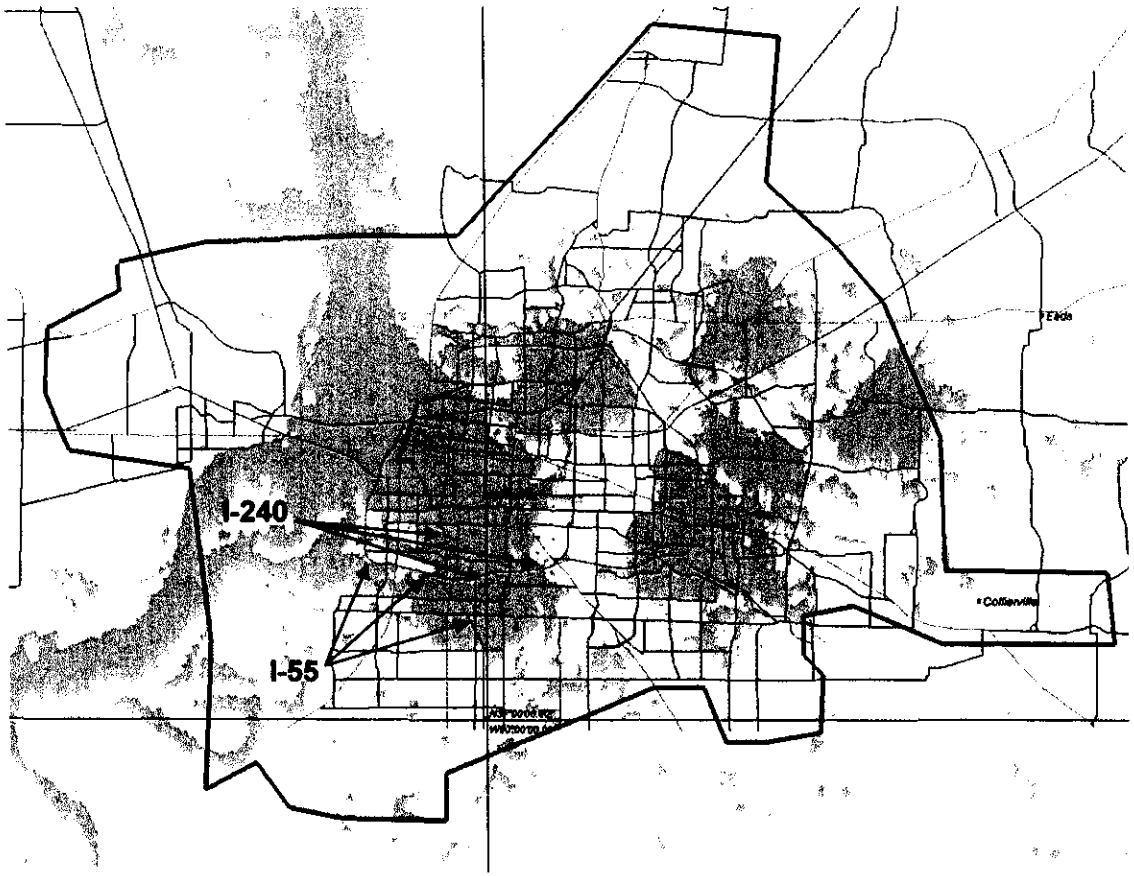

Exhibit 3-14

Memphis City Plot 2
Coverage with Variant Repeaters Off

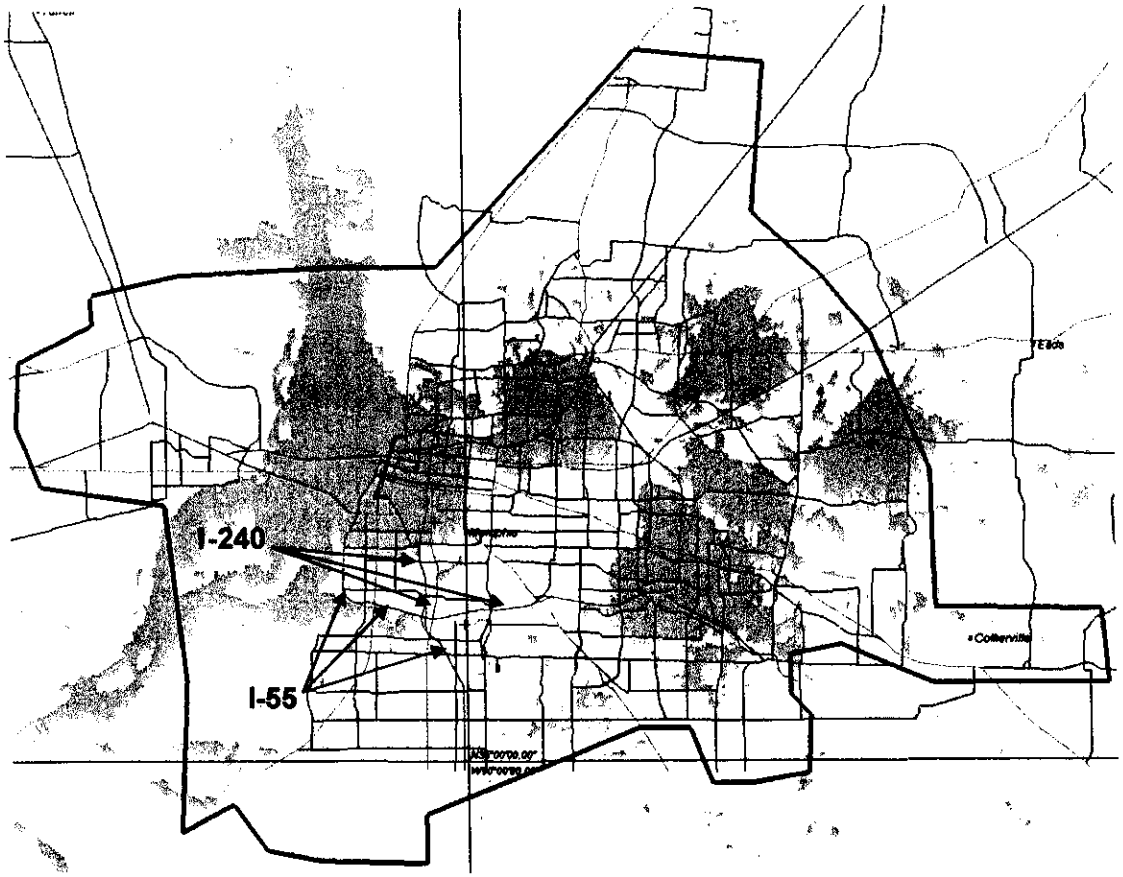

Exhibit 3-15

Monterey Plot 1
Current Repeater Coverage

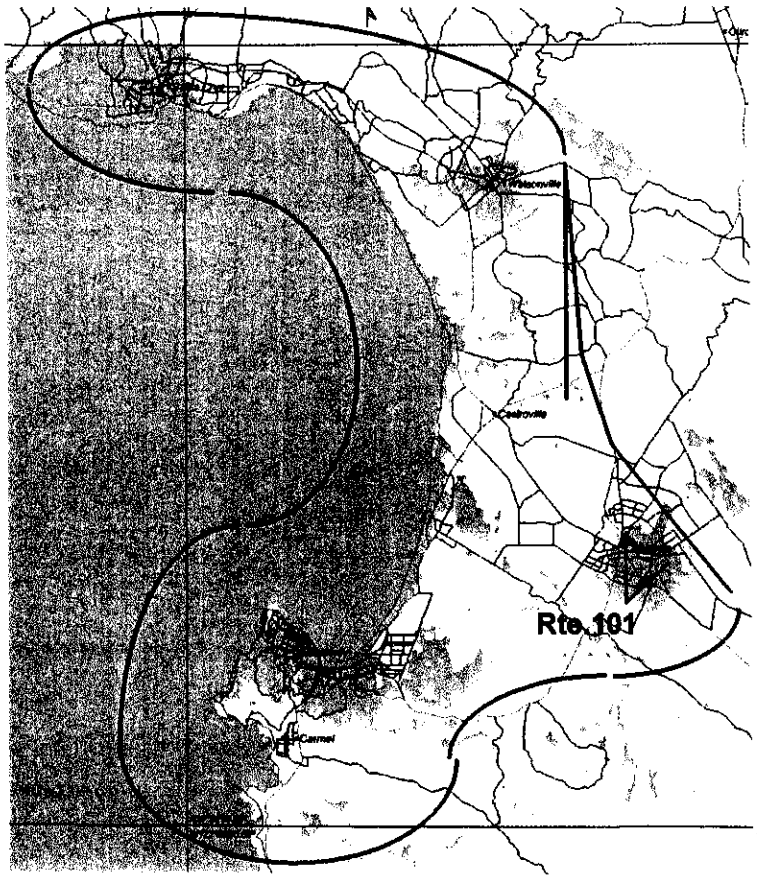

Exhibit 3-16

Monterey Plot 2
Coverage with Variant Repeaters Off

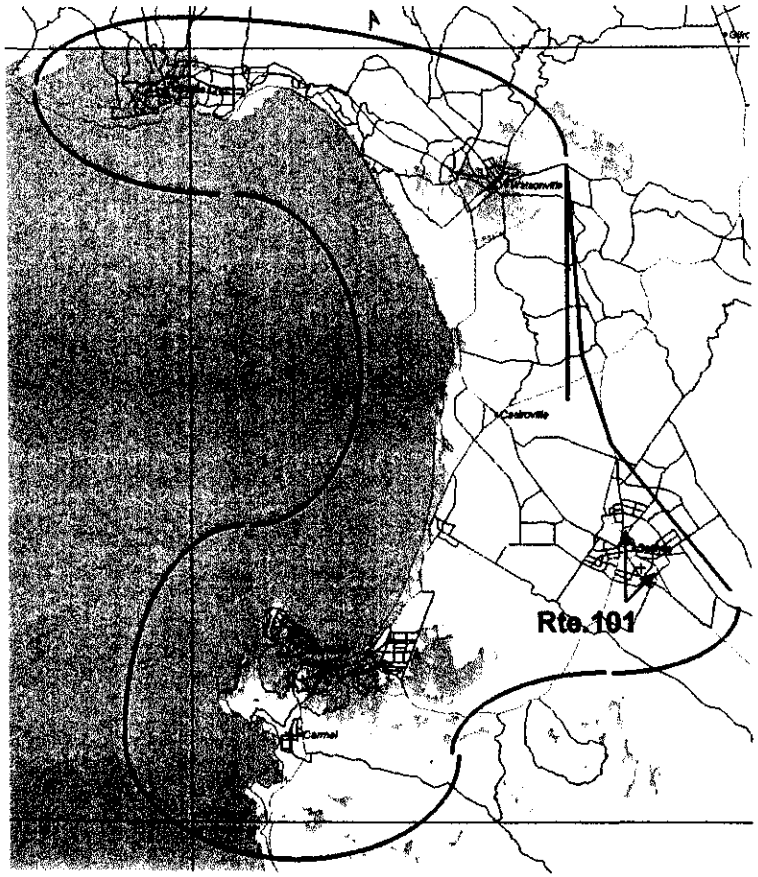

Exhibit 3-17

New Orleans Plot 1
Current Repeater Coverage

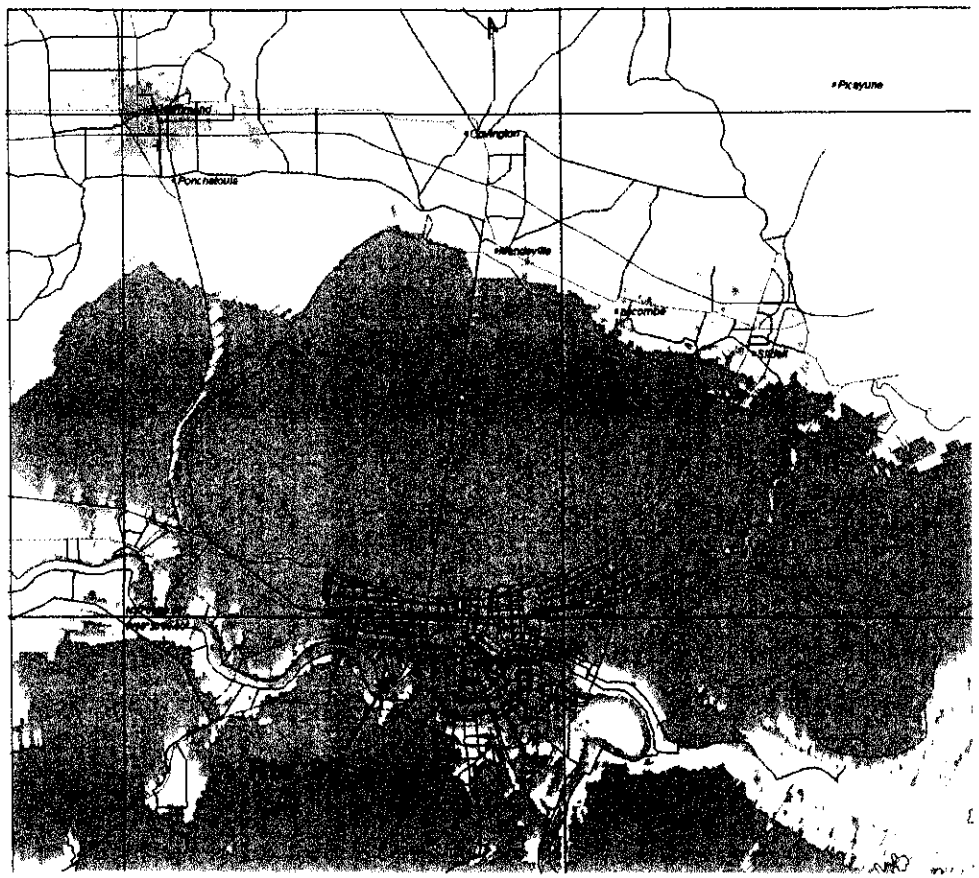

Exhibit 3-18

New Orleans Plot 2
Coverage with Variant Repeaters Off

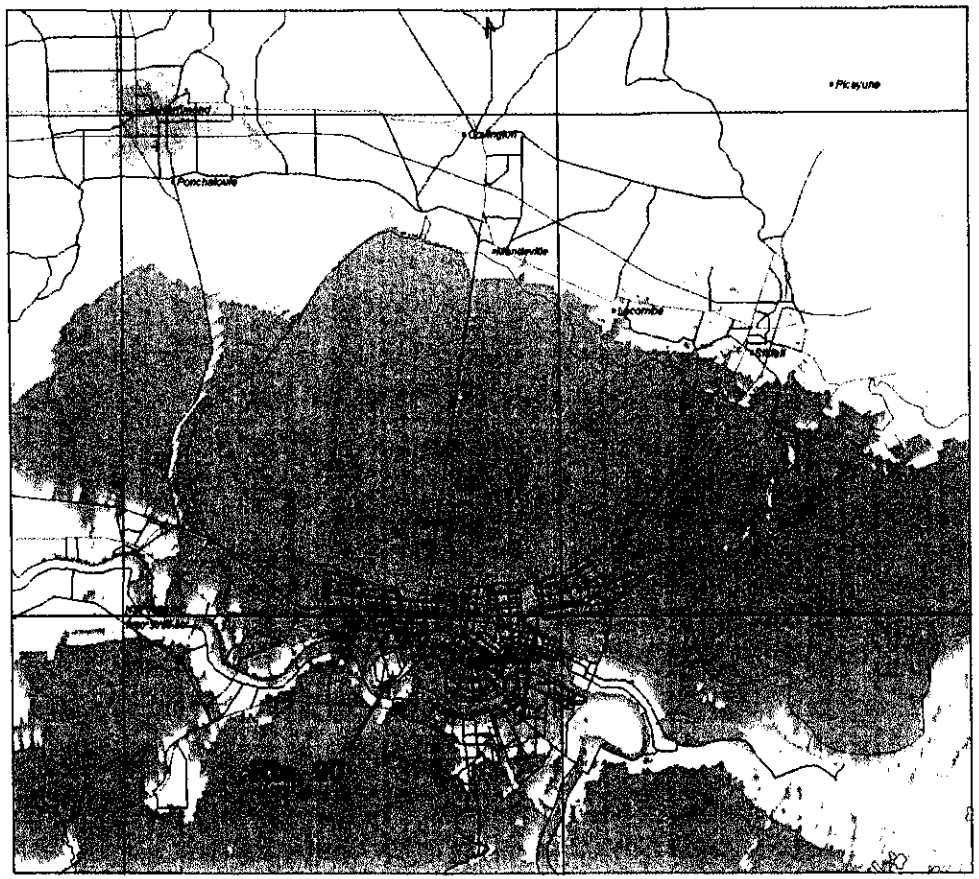

Exhibit 3-19

Norfolk City Plot 1
Current Repeater Coverage

Exhibit 3-20

Norfolk City Plot 2
Coverage with Variant Repeaters Off

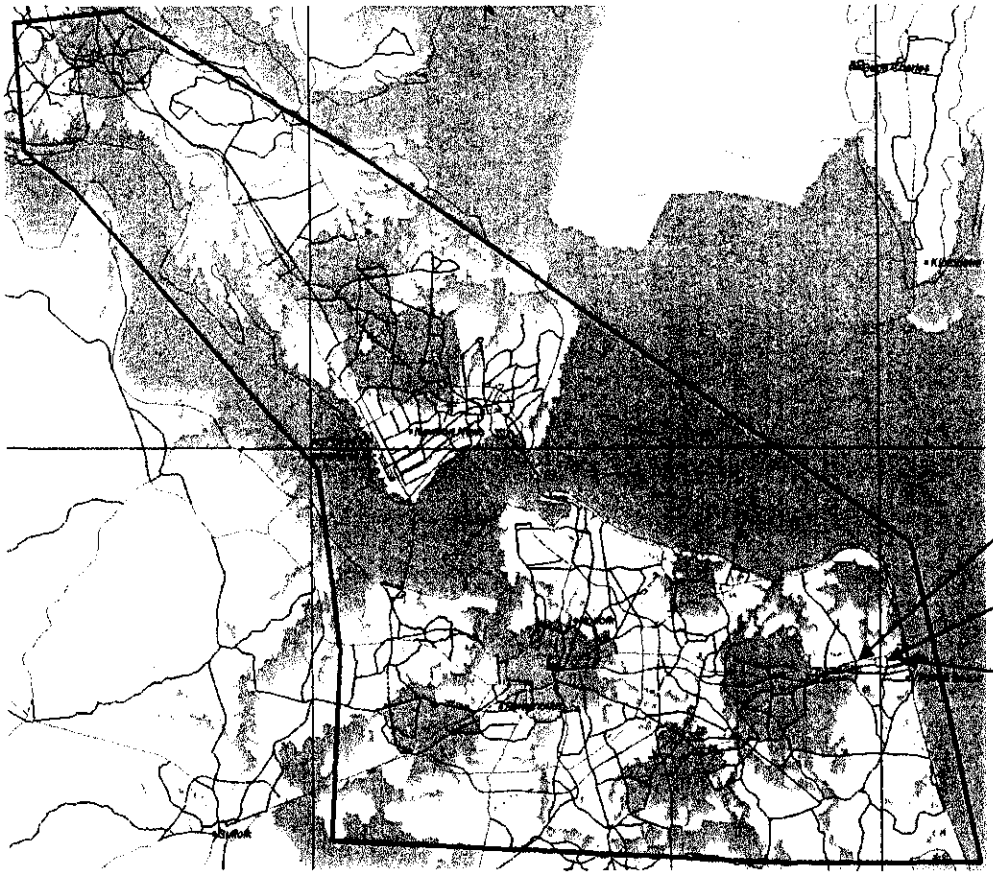

Exhibit 3-21

Oklahoma City Plot 1
Current Repeater Coverage

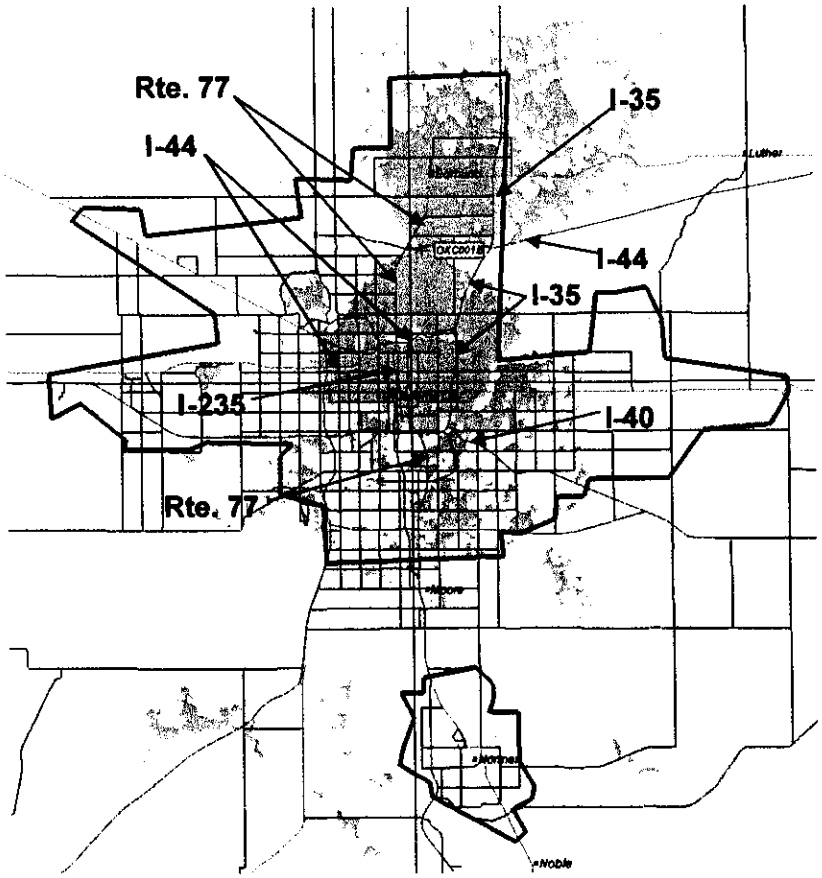

Exhibit 3-22

Oklahoma City Plot 2
Coverage with Variant Repeaters Off

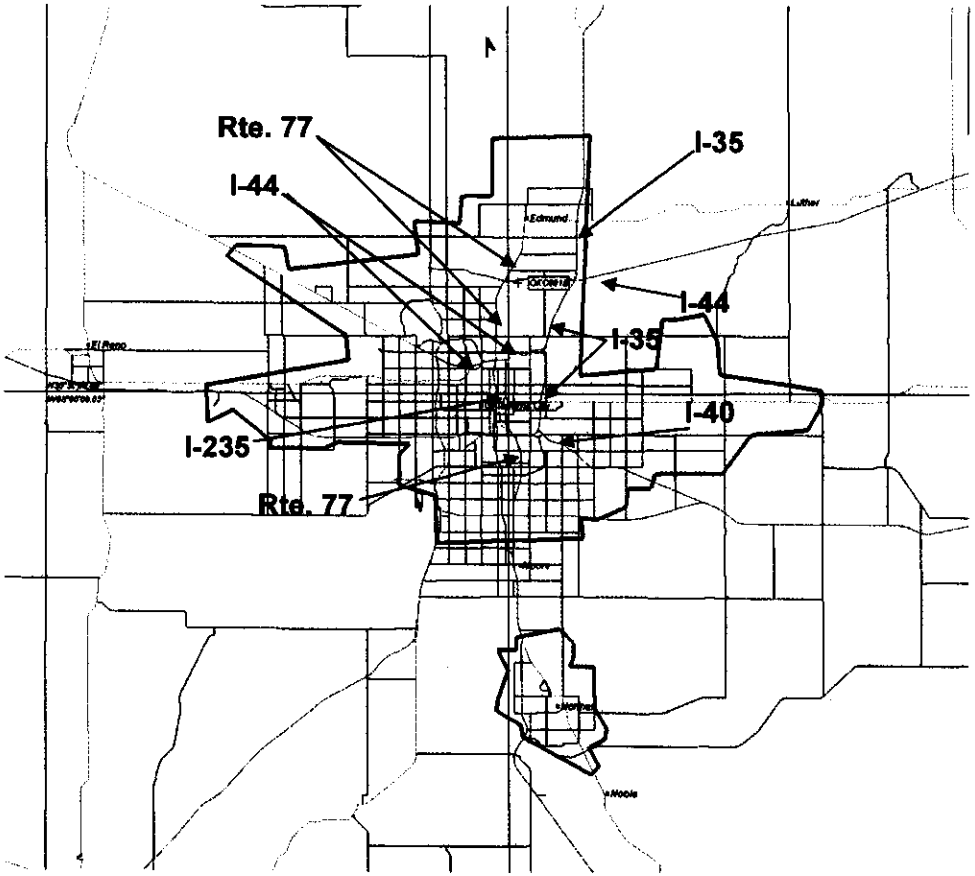

Exhibit 3-23

Orlando Plot 1
Current Repeater Coverage

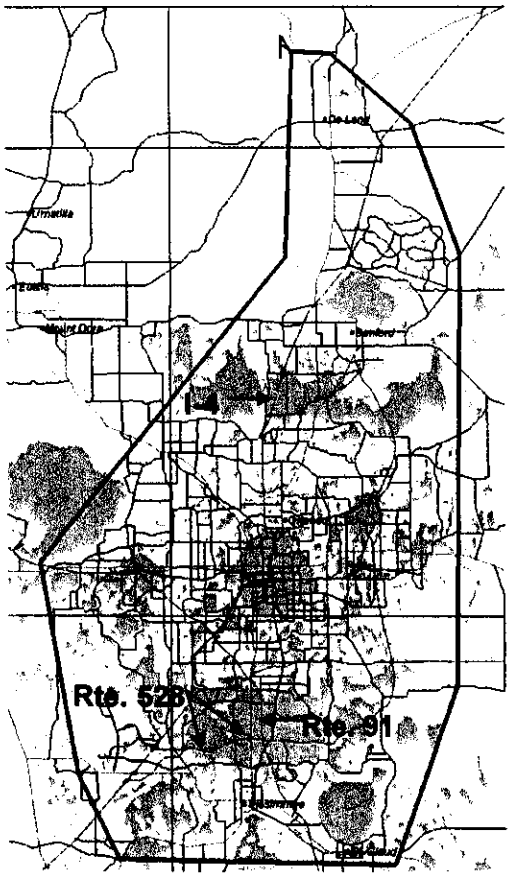

Exhibit 3-24

Orlando Plot 2
Coverage with Variant Repeaters Off

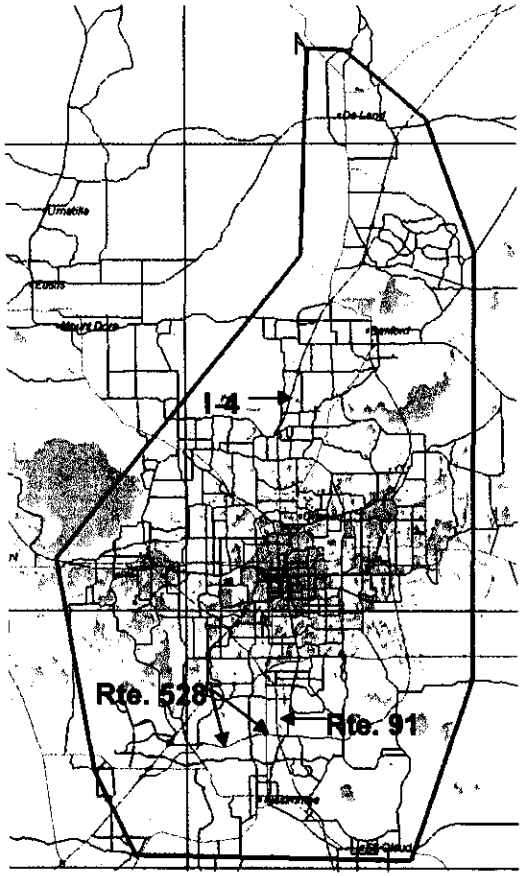

Exhibit 3-25

Phoenix City Plot 1
Current Repeater Coverage

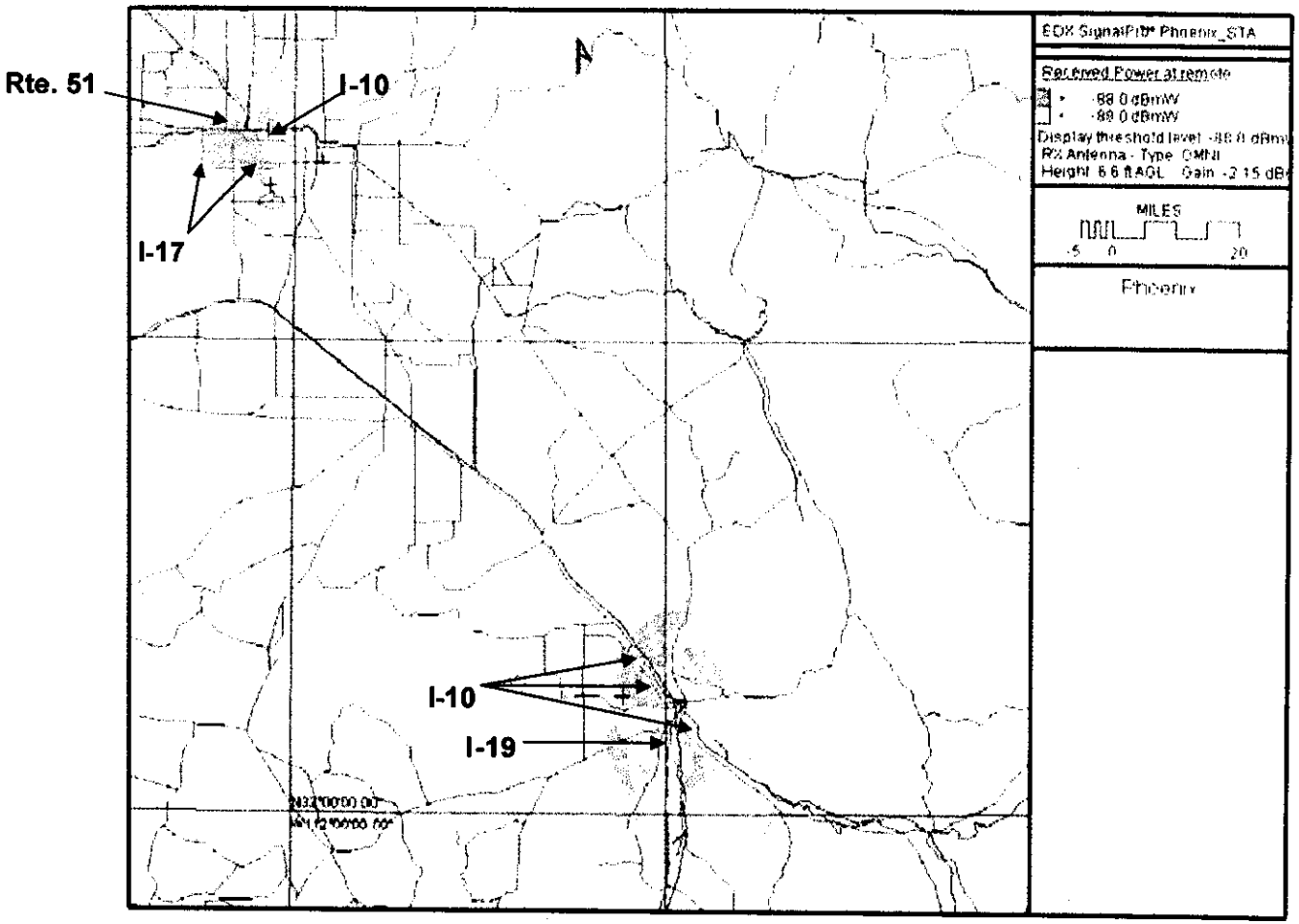

Exhibit 3-26

Phoenix City Plot 2
Coverage with Variant Repeaters Off

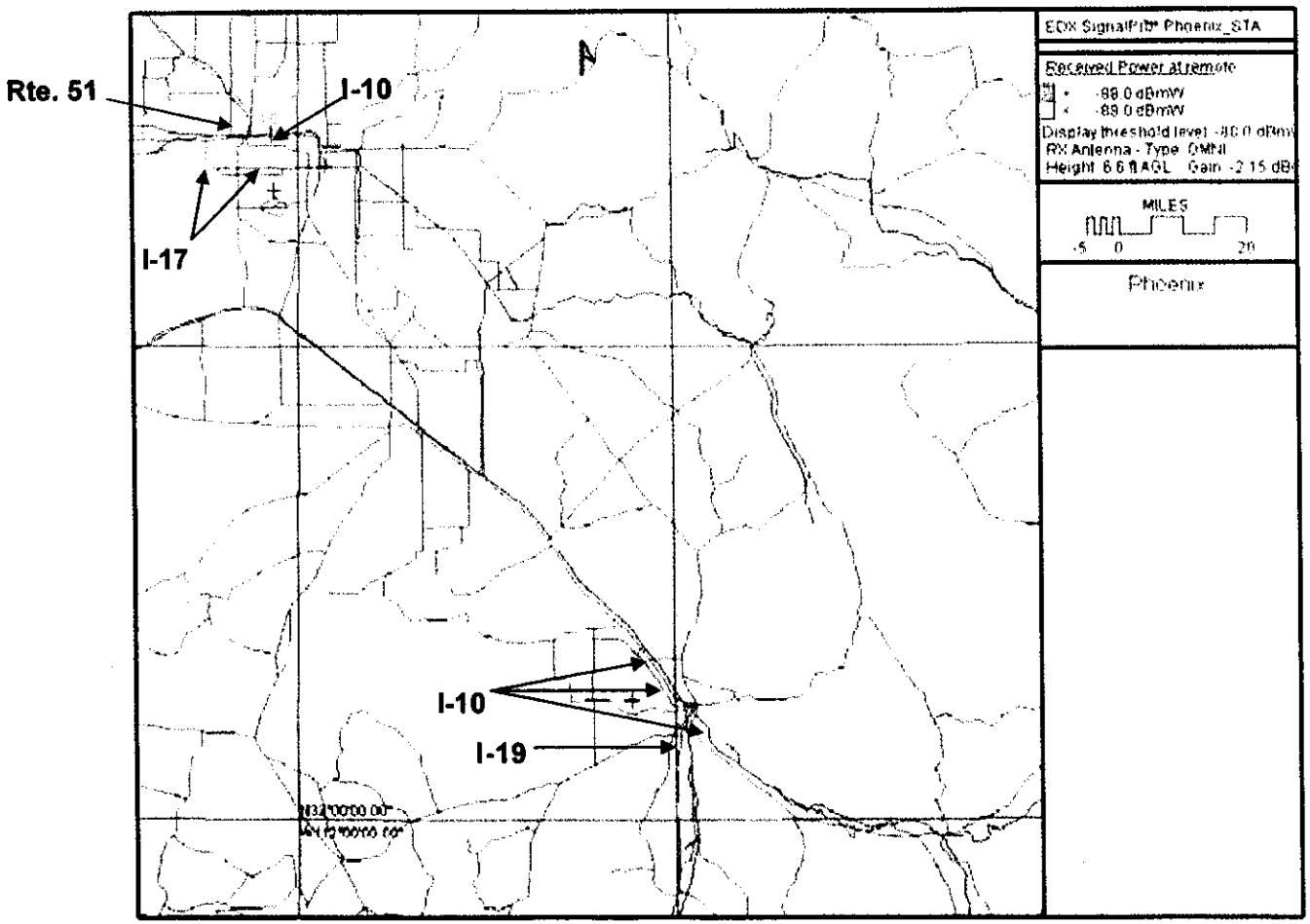

Exhibit 3-27

Portland City Plot 1
Current Repeater Coverage

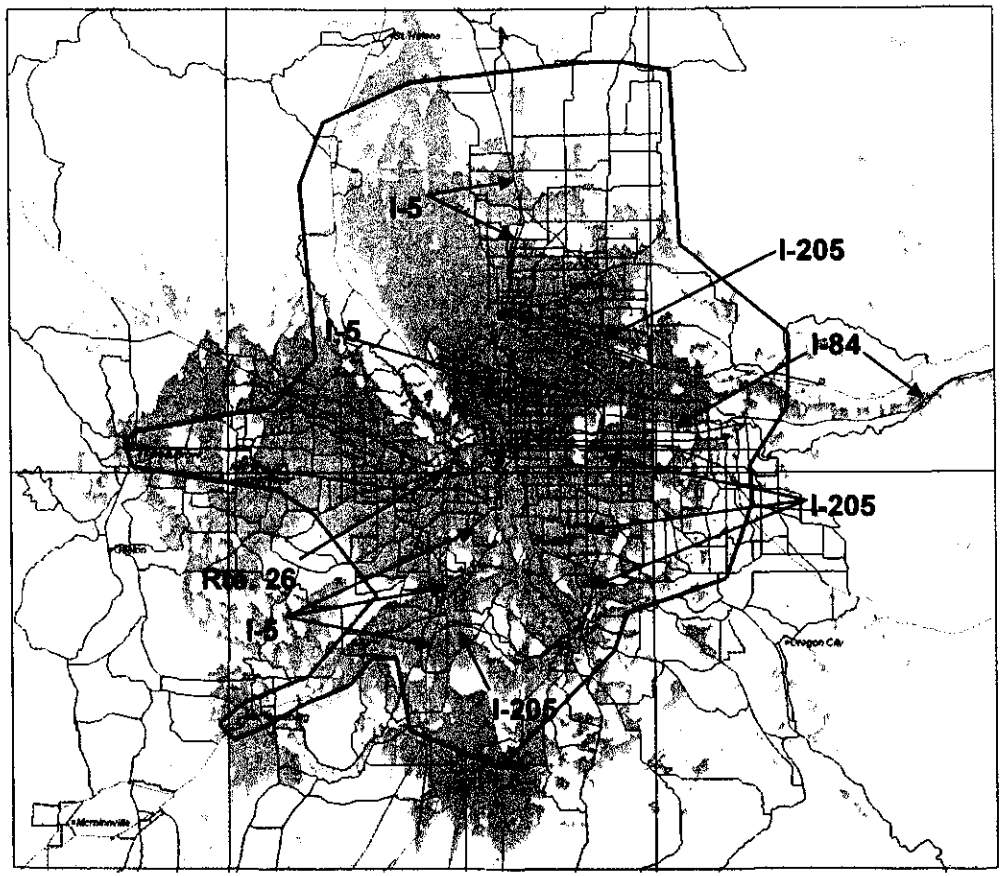

Exhibit 3-28

Portland City Plot 2
Coverage with Variant Repeaters Off

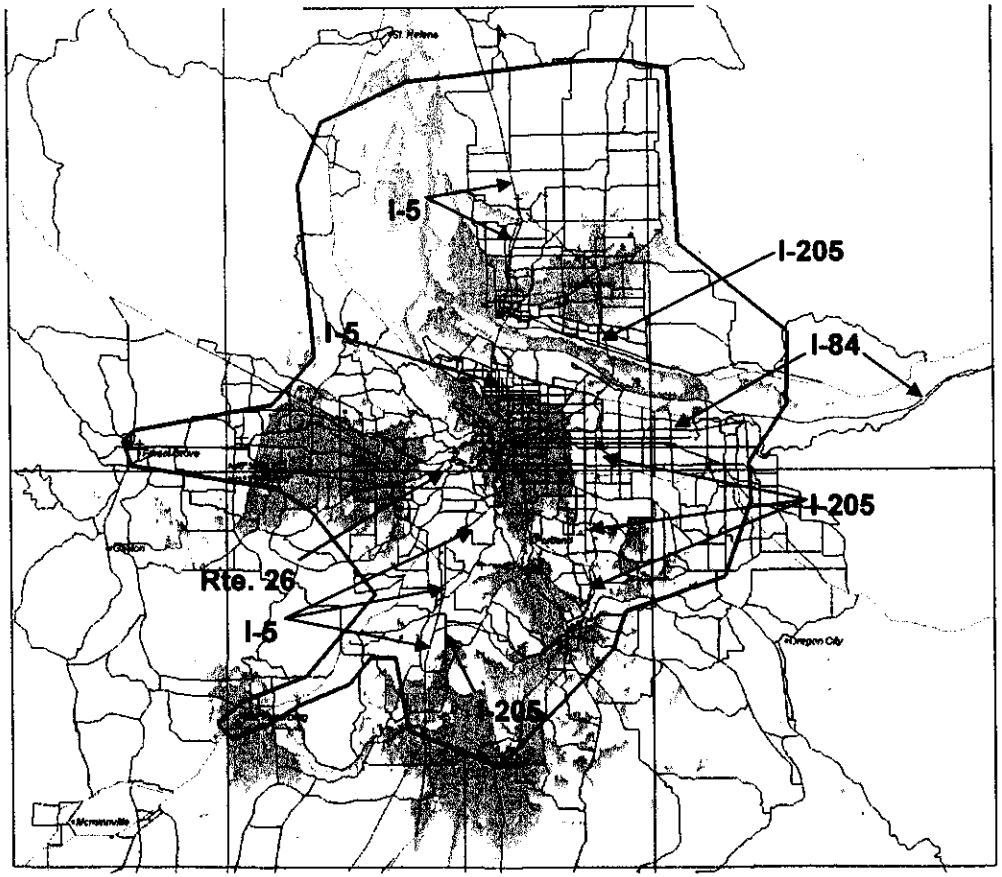

Exhibit 3-29

Richmond Plot 1
Current Repeater Coverage

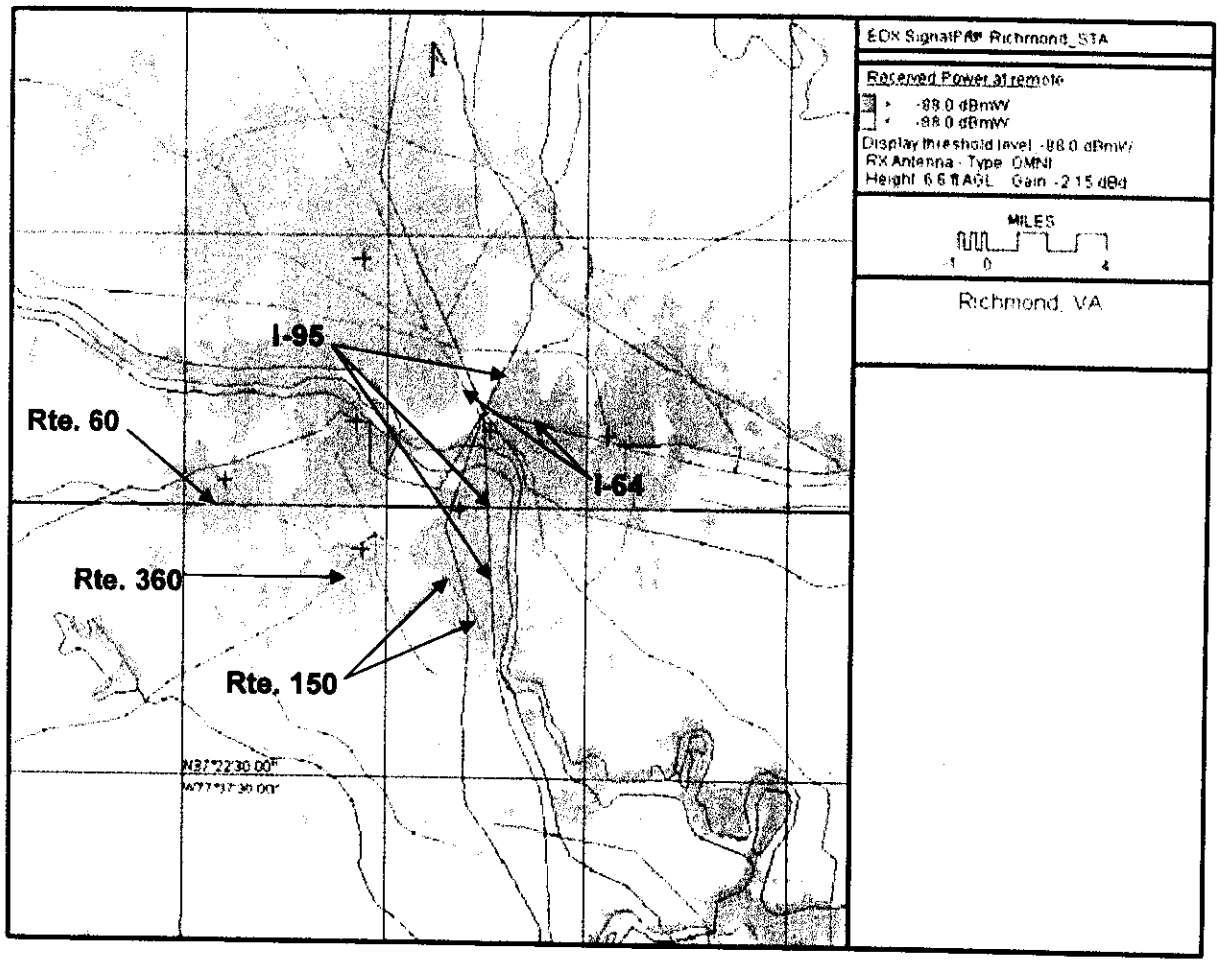

Exhibit 3-30

Richmond Plot 2
Coverage with Variant Repeaters Off

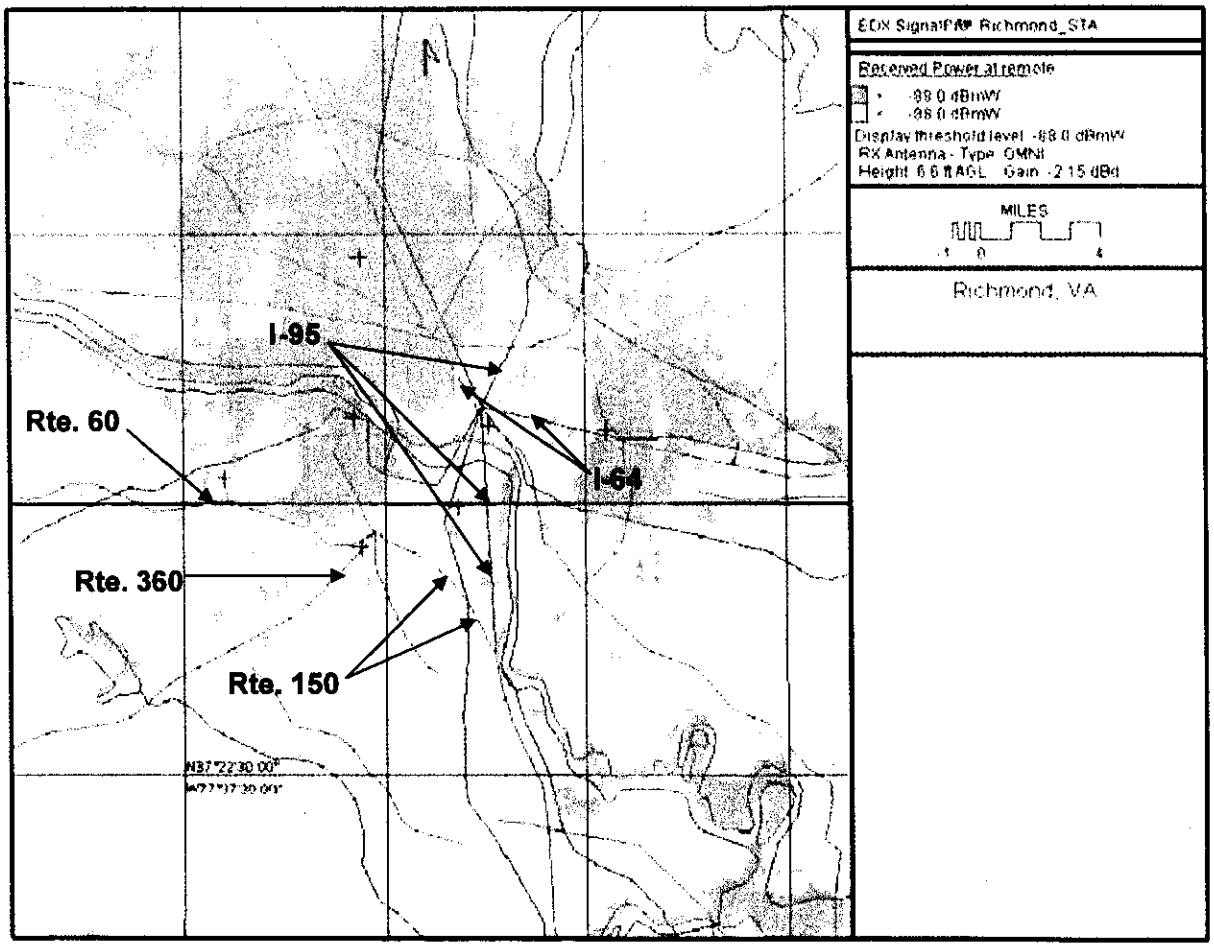

Exhibit 3-31

Rochester Plot 1
Current Repeater Coverage

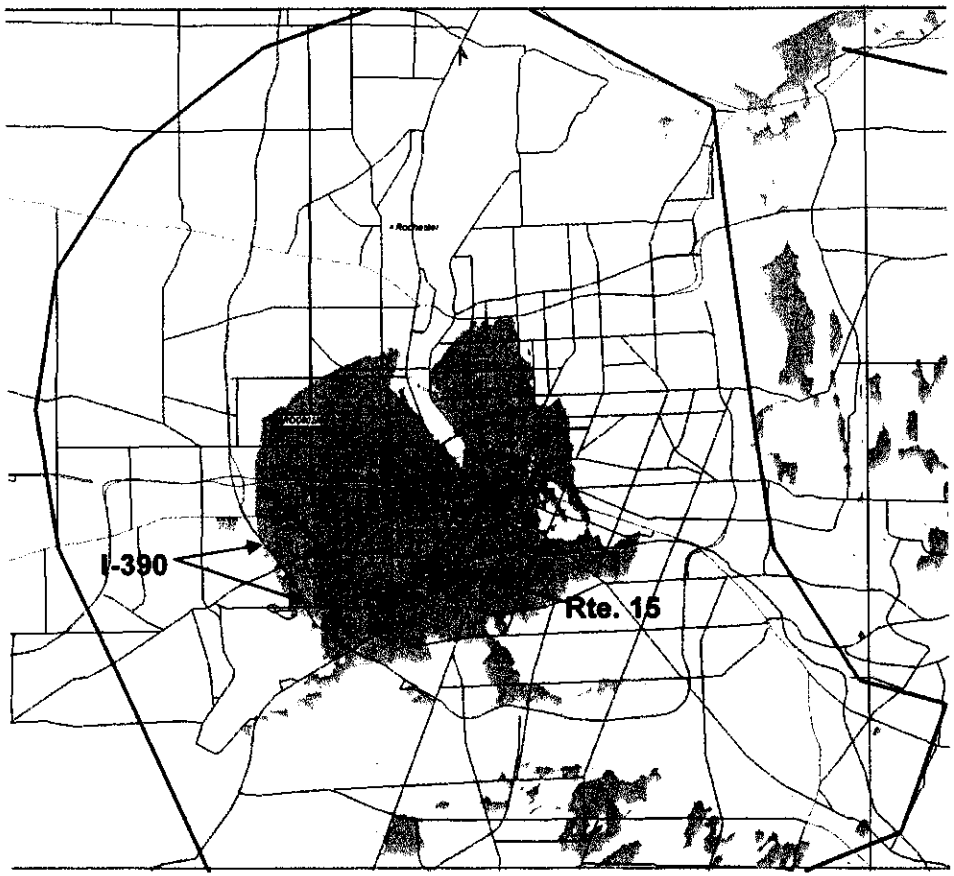

Exhibit 3-32

Rochester Plot 2
Coverage with Variant Repeaters Off

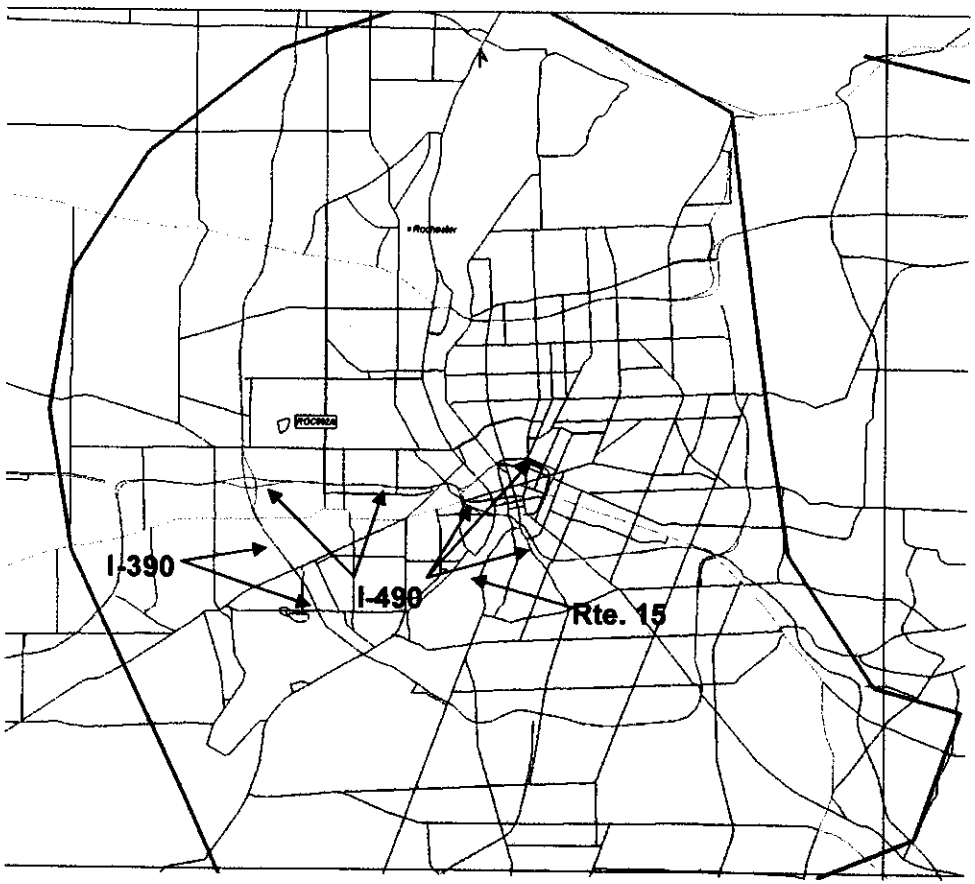

Exhibit 3-33

Sacramento Plot 1
Current Repeater Coverage

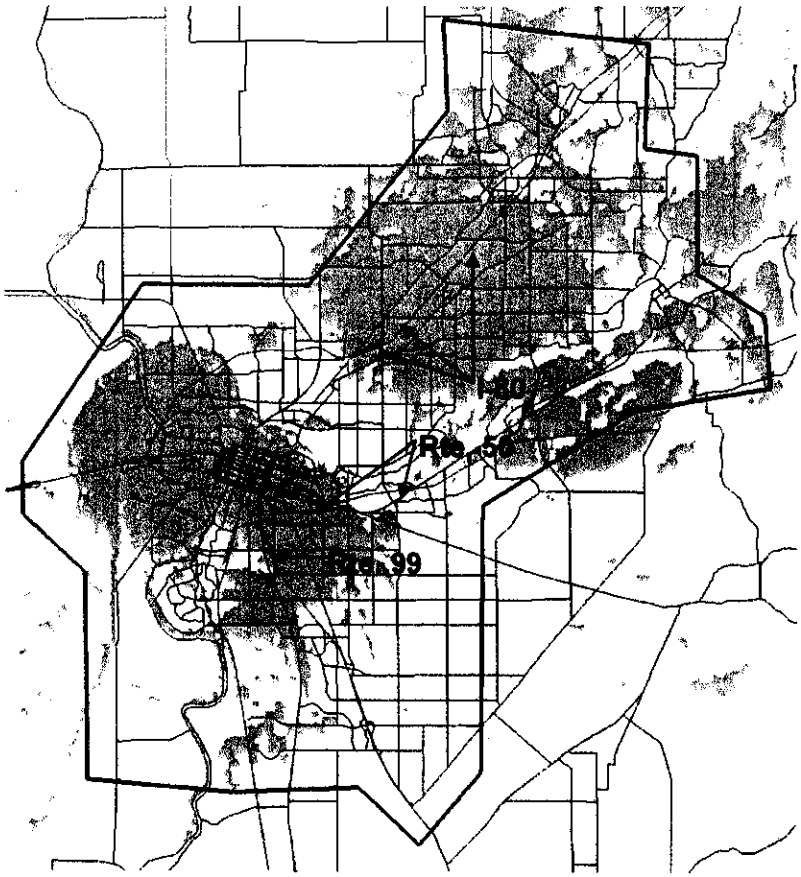

Exhibit 3-34

Sacramento Plot 2
Coverage with Variant Repeaters Off

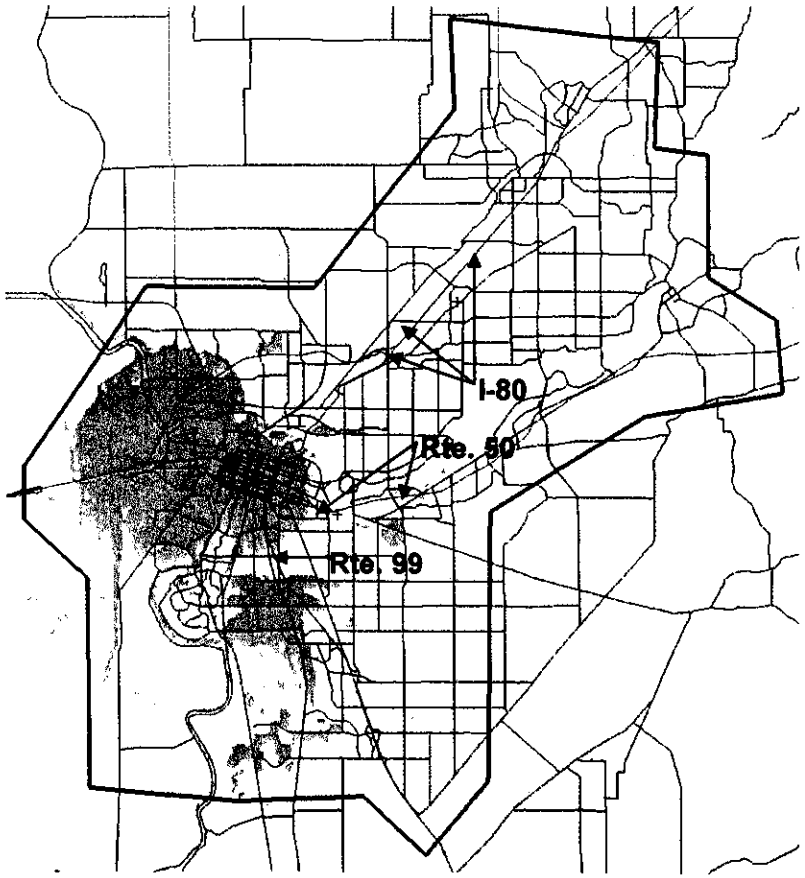

Exhibit 3-35

Salt Lake City Plot 1
Current Repeater Coverage

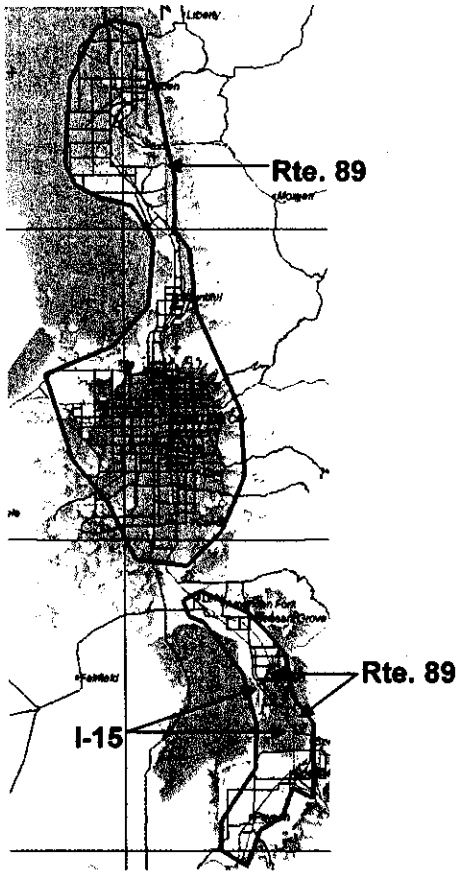

Exhibit 3-36

Salt Lake City Plot 2
Coverage with Variant Repeaters Off

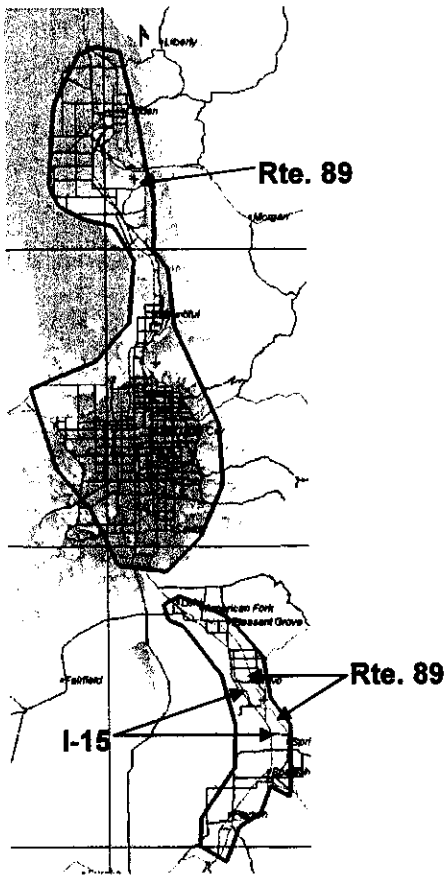

Exhibit 3-37

San Antonio Plot 1
Current Repeater Coverage

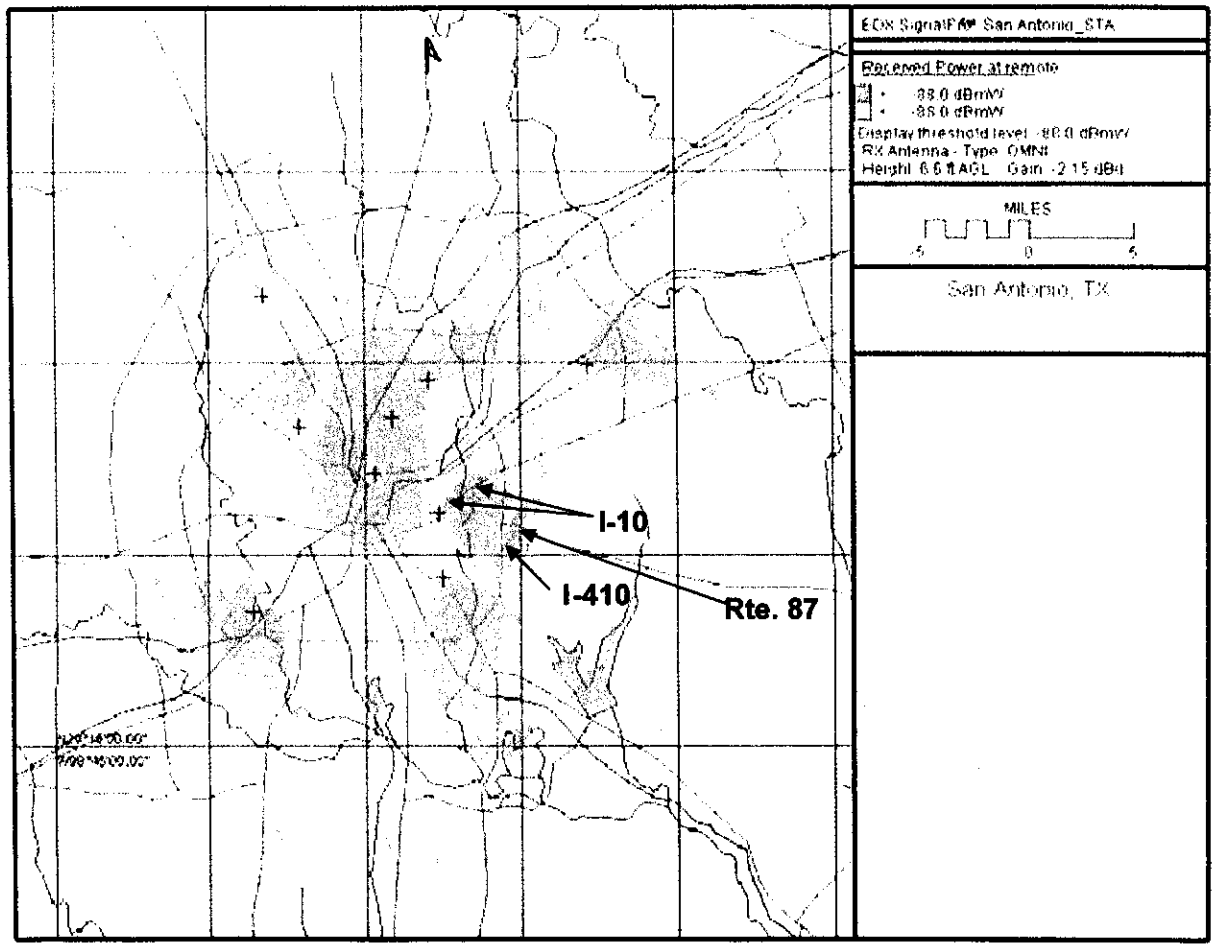

Exhibit 3-38

San Antonio Plot 2
Coverage with Variant Repeaters Off

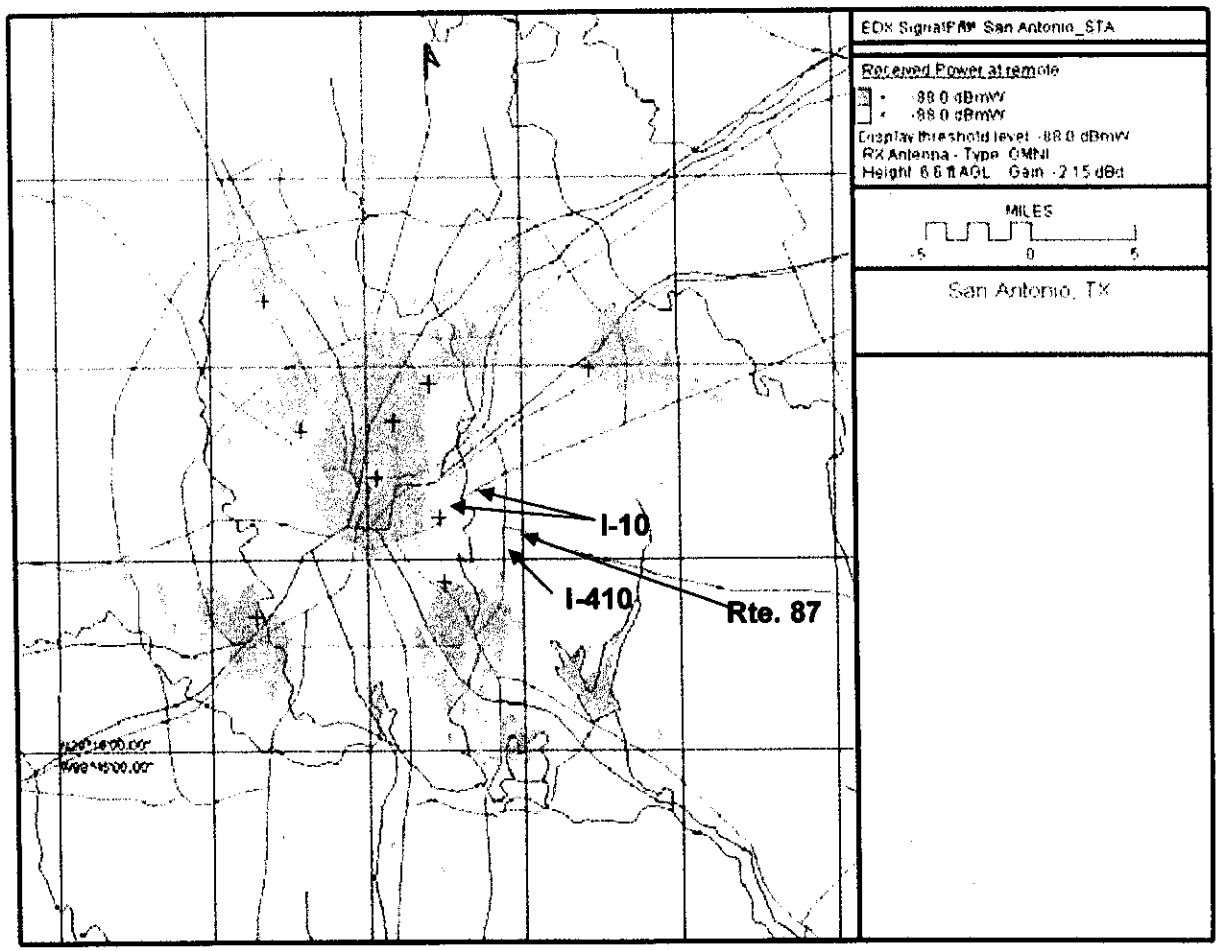

Exhibit 3-39

San Diego Plot 1
Current Repeater Coverage

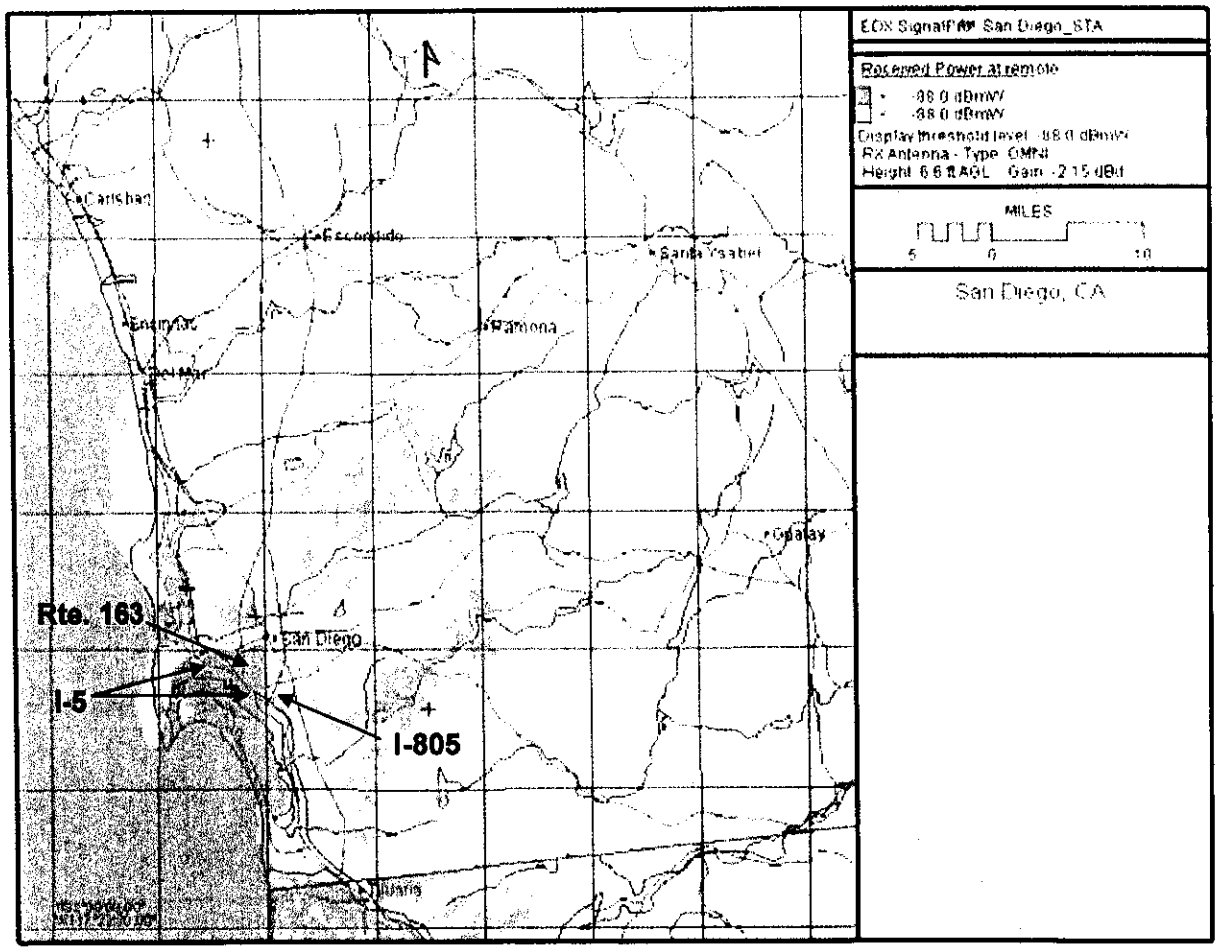

Exhibit 3-40

San Diego Plot 2
Coverage with Variant Repeaters Off

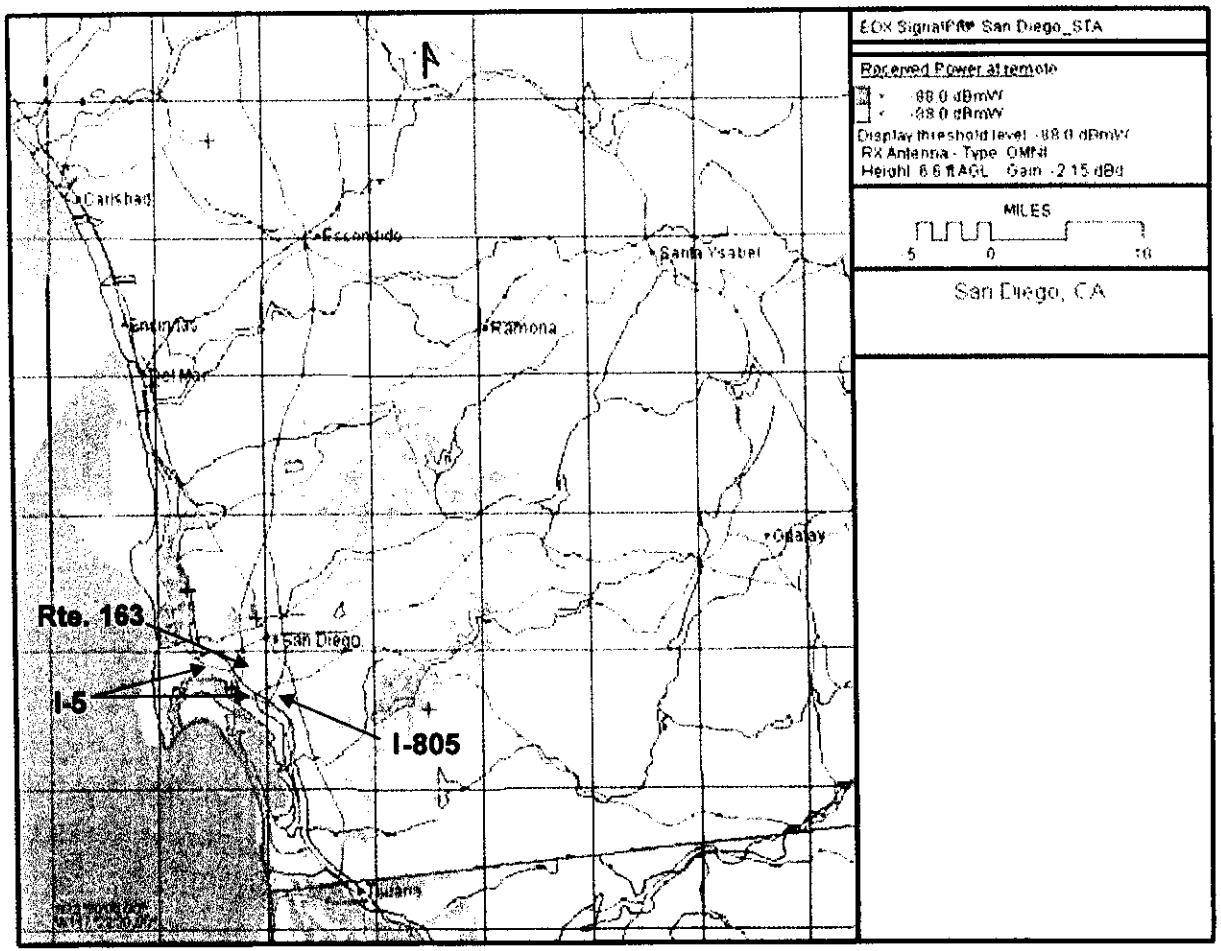

Exhibit 3-41

San Francisco Plot 1
Current Repeater Coverage

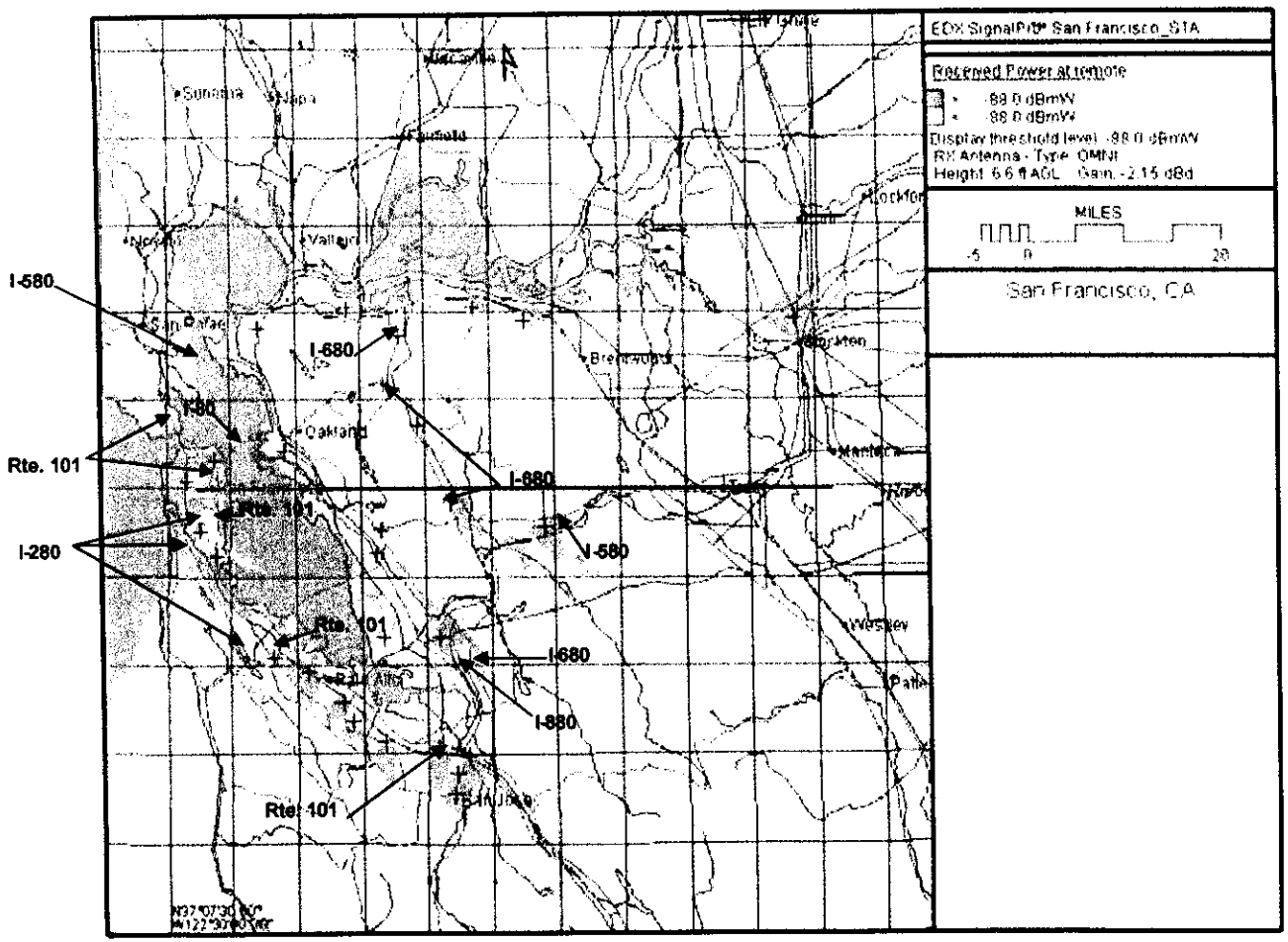

Exhibit 3-42

San Francisco Plot 2
Coverage with Variant Repeaters Off

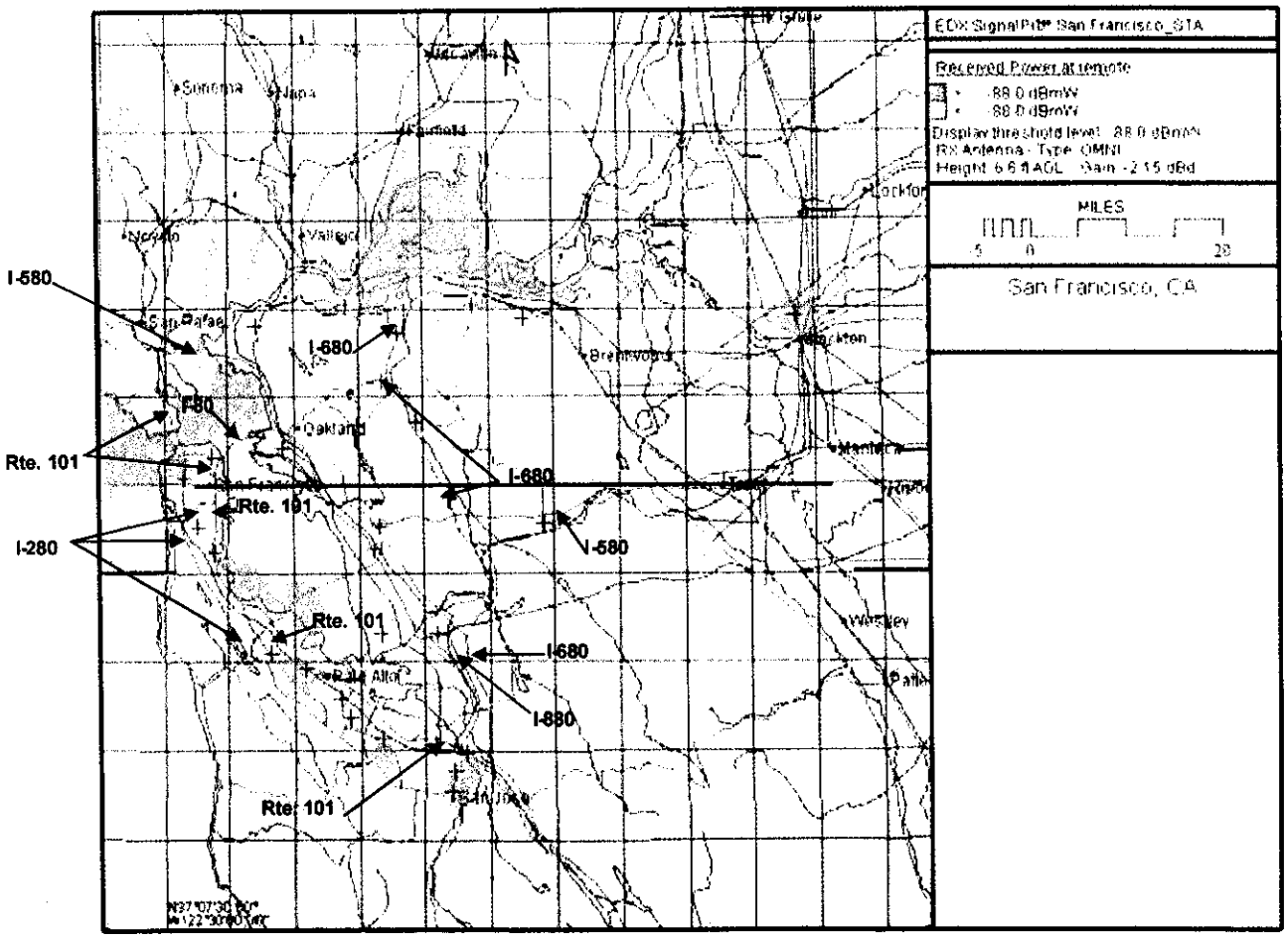

Exhibit 3-43

Syracuse Plot 1
Current Repeater Coverage

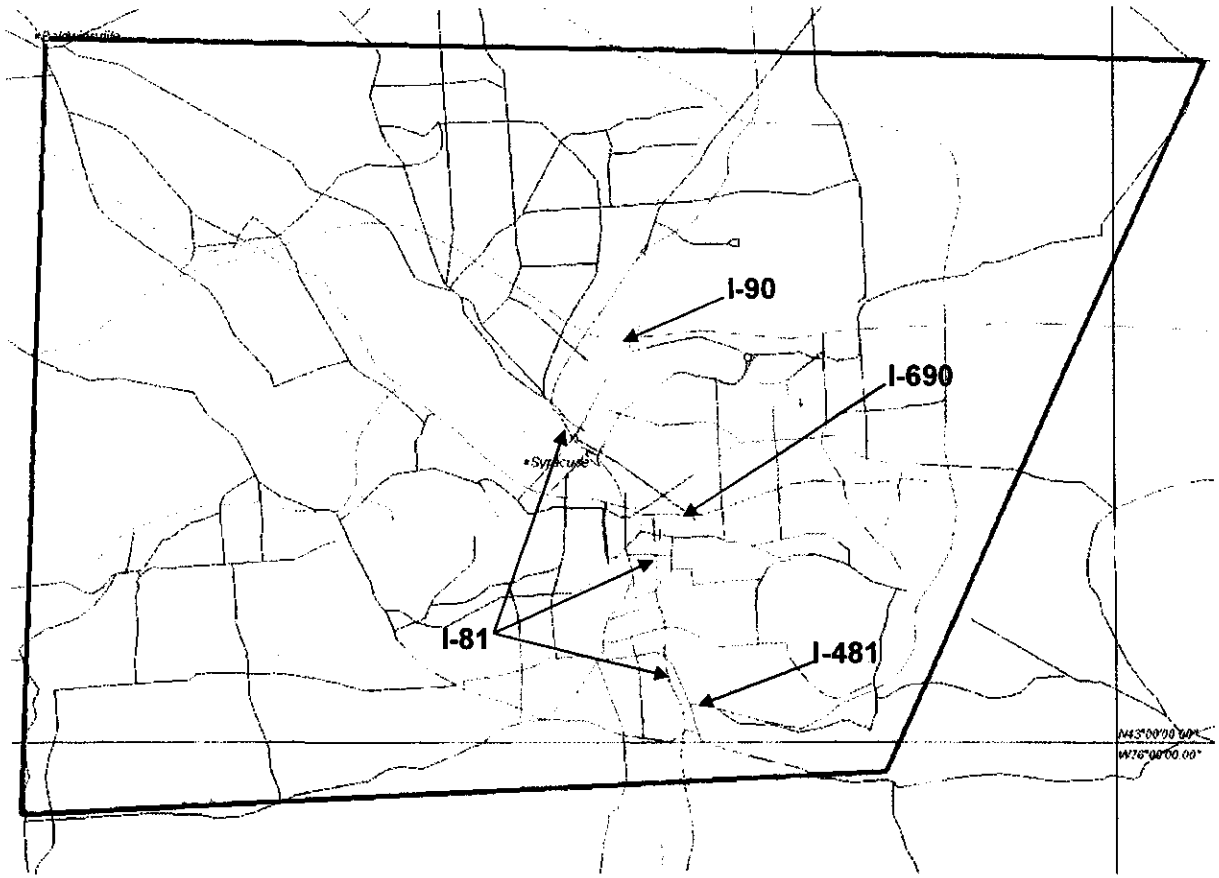

Exhibit 3-44

Syracuse Plot 2
Coverage with Variant Repeaters Off

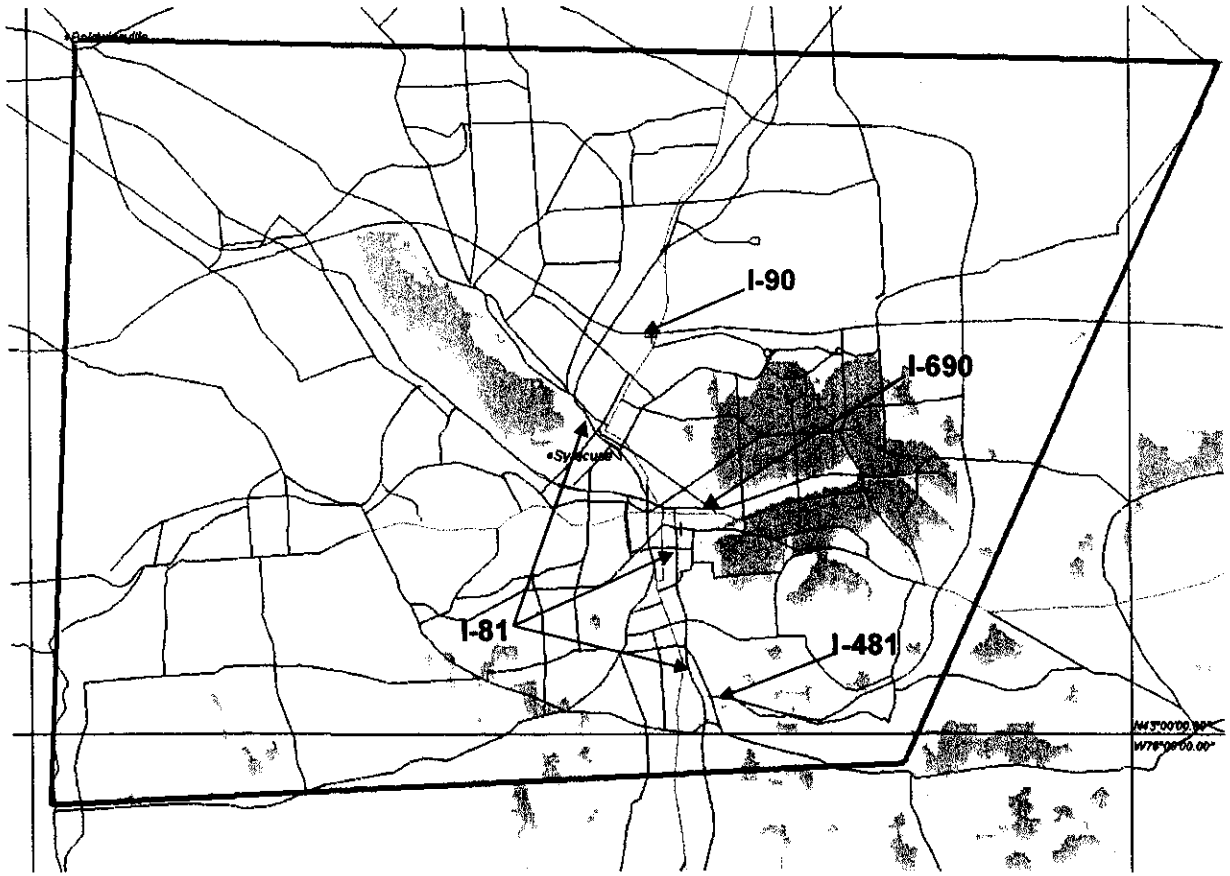

Exhibit 3-45

Tampa Plot 1
Current Repeater Coverage

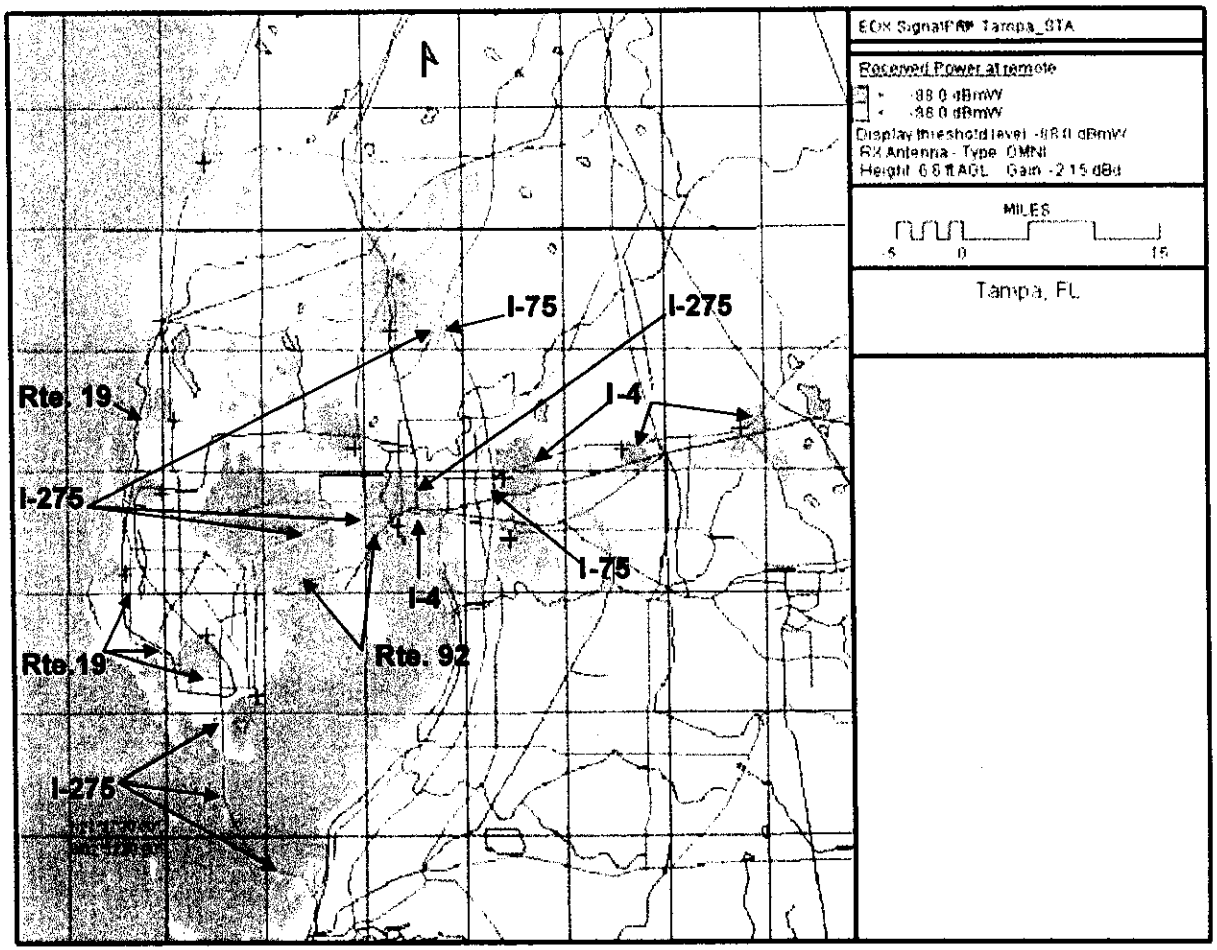

Exhibit 3-46

Tampa Plot 2
Coverage with Variant Repeaters Off

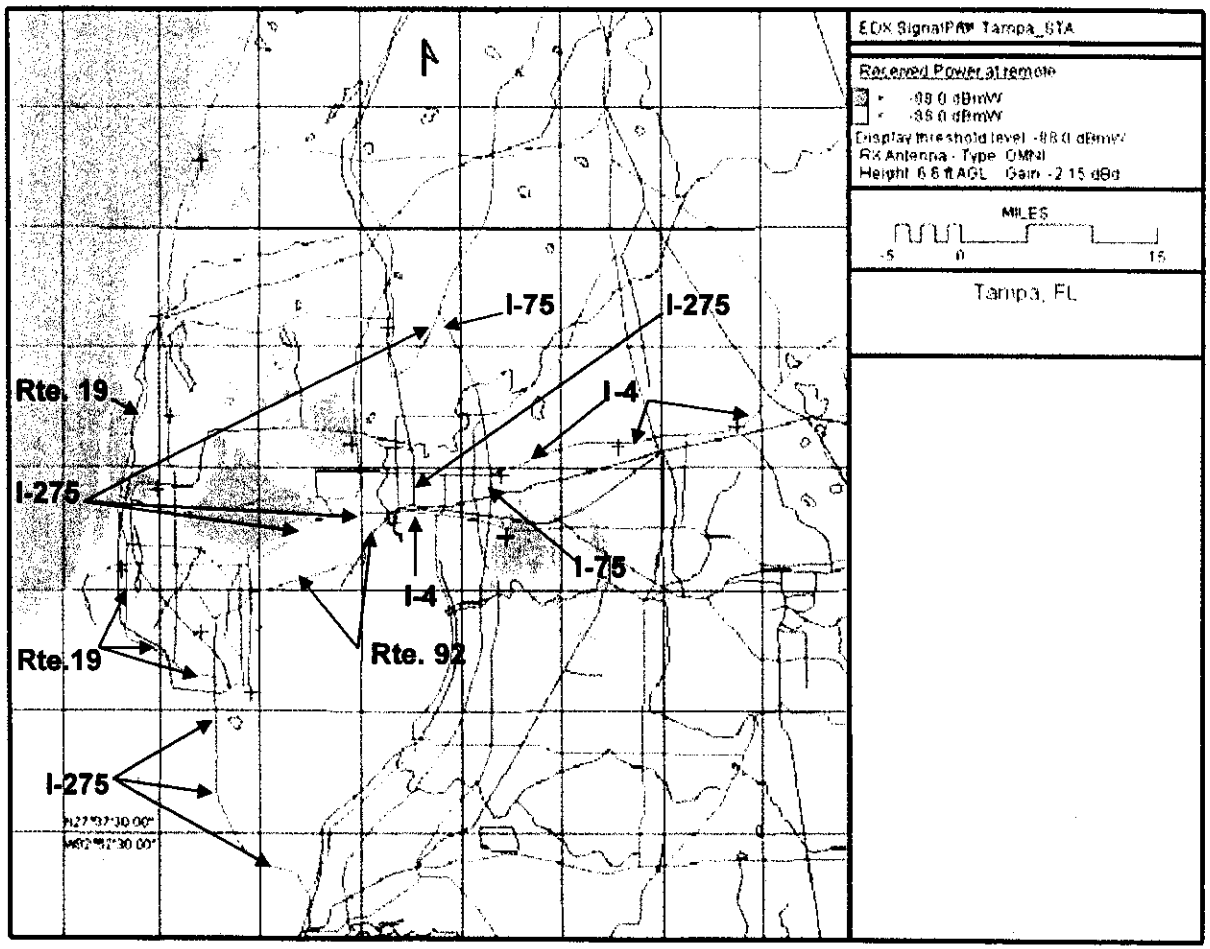

Exhibit 3-47

Toledo Plot 1
Current Repeater Coverage

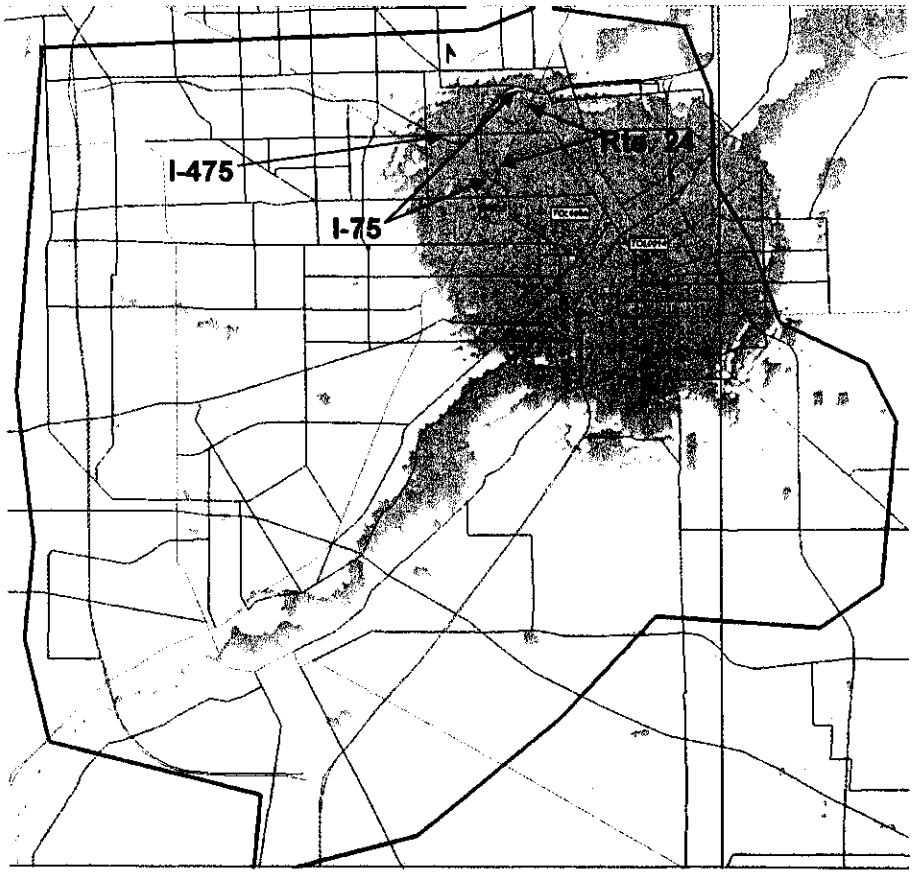

Exhibit 3-48

Toledo Plot 2
Coverage with Variant Repeaters Off

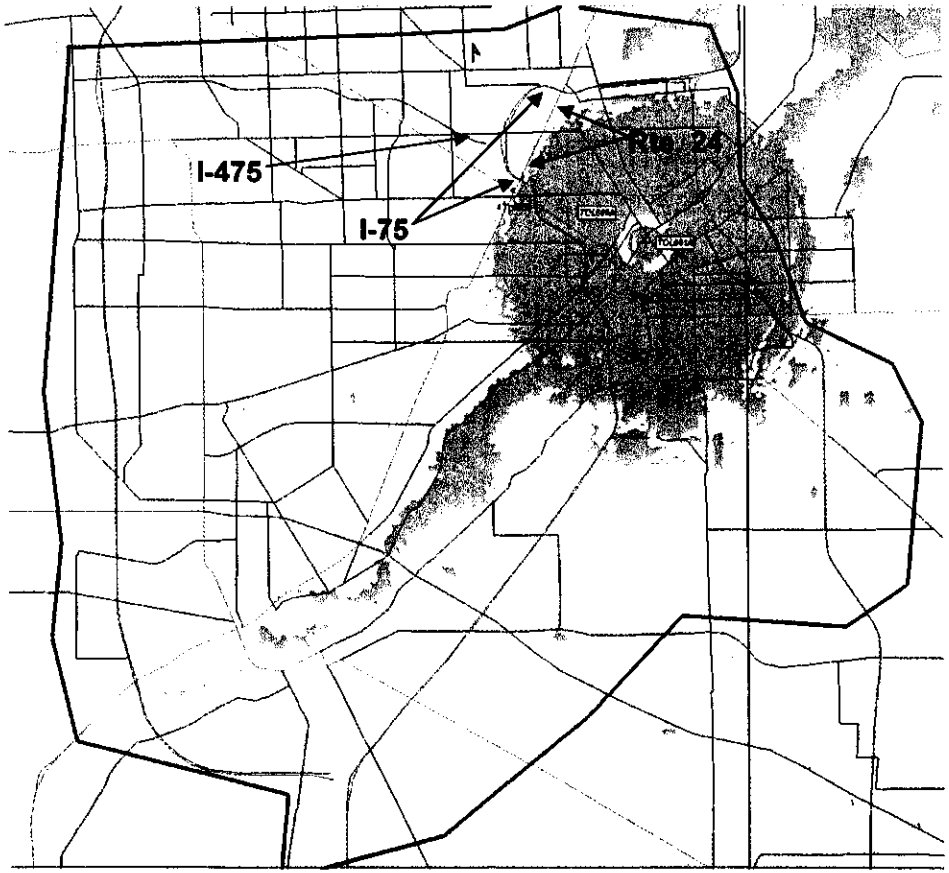

Exhibit 3-49

Tulsa Plot 1
Current Repeater Coverage

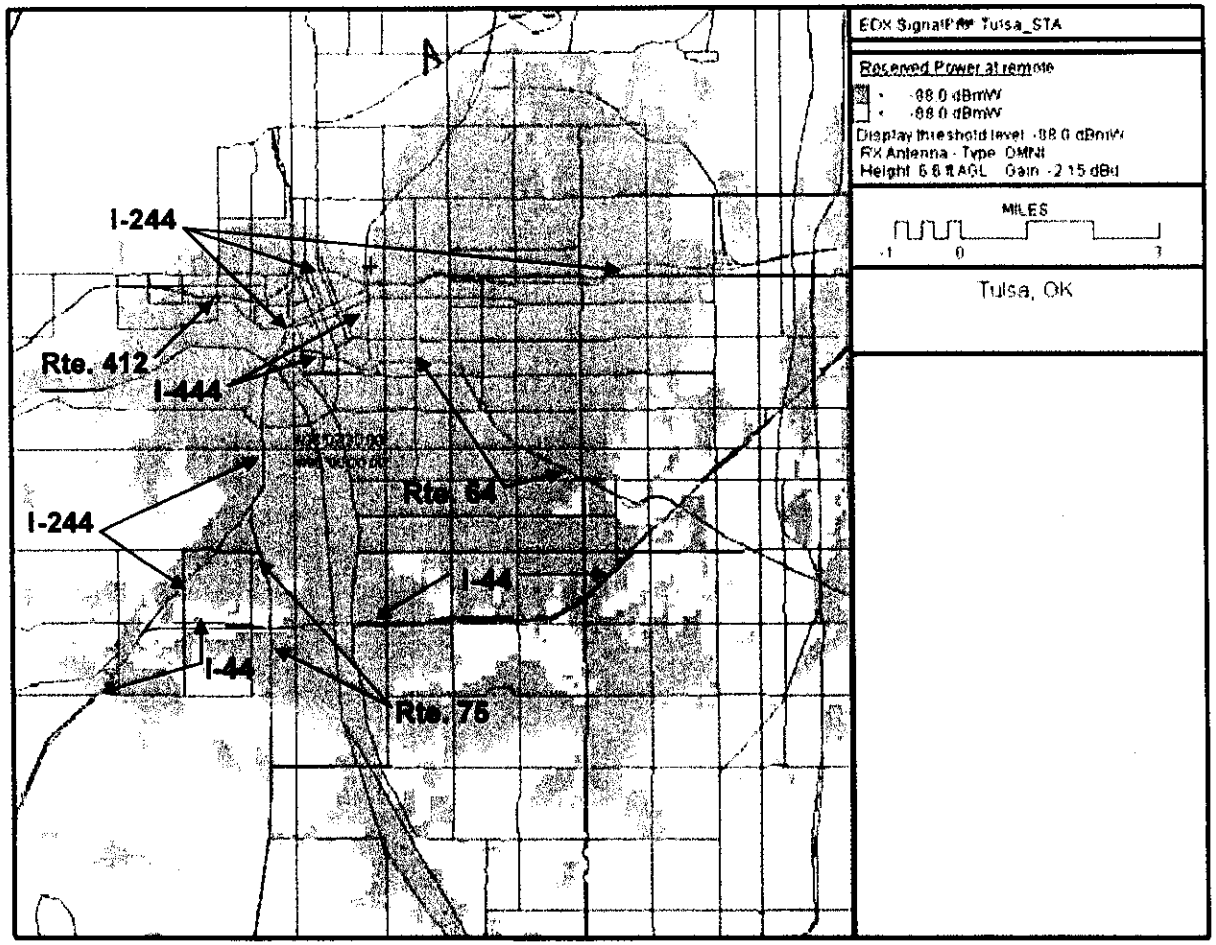

Exhibit 3-50

Tulsa Plot 2
Coverage with Variant Repeaters Off