

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.

FILED/ACCEPTED

DEC 11 2006

Federal Communications Commission
Office of the Secretary

*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. 1 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") discussed four representative markets in detail and demonstrated that the XM terrestrial repeater network operating in each of them is critical to XM's ability to provide service and therefore qualifies for grant of the above-referenced STA.¹ In that filing, XM stated its intention to file supplements providing comparable analyses for the additional markets it serves, pursuant to the request of Commission staff. This supplement analyzes five more markets – Nashville, Atlanta, New York City, Los Angeles, and Raleigh. *In each and every one of these markets, XM is currently authorized to build a repeater network that is larger, more powerful, and has the potential to cause more interference than the network for which it now seeks authorization.* In other words, XM seeks Commission approval temporarily to continue operating a network that better meets all of the Commission's goals than the currently authorized network. Such approval should be promptly granted.

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

A. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN NASHVILLE

XM is currently *authorized to operate 21 repeaters in the Nashville market – in fact it has deployed only 14*. More specifically, in order to ensure seamless coverage and high-quality service in that market, the Commission authorized 2 high-power repeaters (10 kW and above) and 12 medium-power repeaters (between 2 and 10 kW) in Nashville. But *XM has deployed only 1 of the 2 authorized high-power repeaters and 5 of the 12 authorized medium-power repeaters*. The remaining repeaters all operate at 2 kW or below. As with XM's repeater network as whole, the network in the Nashville market is therefore much smaller, less powerful, and less likely to cause interference than the network the XM is authorized to build.

Similar to the networks in every other market described in this Supplement, the Nashville network is smaller and less intrusive only because it varies in some respects from the as-authorized network. Seven of XM's fourteen repeaters in Nashville exhibit some kind of variance, although none of the differences impacts the STA analysis.

- Three of the seven variant repeaters (NAS009, NAS017, and NAS038) vary because they have been installed at locations other than their authorized locations by distances ranging from 2,496 feet to 4,913 feet. Of these, NAS038 also varies in orientation (30 degrees), and NAS009 also varies in antenna orientation (30 degrees) and downtilt (8 degrees).
- Two of the variant repeaters (NAS001 and NAS508) vary in downtilt, by 8 degrees and 3 degrees, respectively. Of these, NAS001 also varies in antenna type (from a 12 dB gain panel to a 15 dB gain panel) and orientation (40 degrees).
- One of the variant repeaters (NAS020) varies in average EIRP (from 3 kW to 25 kW).
- The final variant repeater (NAS042) 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.

The Commission should begin its assessment of whether to grant an STA for the Nashville market with the understanding that it has already approved a much more powerful network including two high-power repeaters and twelve medium-power repeaters. None of the extraordinary circumstances or public interest considerations has diminished since the Commission issued the original authorization. To the contrary, the public interest considerations have intensified markedly because the existing network now actively serves thousands of XM's consumers in the market.

Turning off the variant repeaters would adversely affect service for consumers and harm the public interest. If the Commission were to require that XM shut down repeaters in this market, the population benefiting from repeater coverage would be reduced by more than 140,000 people (measured by resident location). In other words, shutting down the variant repeaters would shrink the repeater-coverage footprint by 39 percent (again, measured by resident population). In addition, turning off these repeaters would disrupt, and some areas eliminate, service on four major commuter routes – I-24, I-40, I-65, and I-440 – that collectively serve more than 200,000 vehicles every day. Nashville Plot 1 (repeater coverage with the variant repeaters on) and Nashville Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shut down's impact on repeater coverage. *See Exhibits 1-1 and 1-2.*

When turned on, XM's repeaters in this market work together with the XM satellite system to provide seamless coverage and excellent service quality throughout the Nashville area. Turning them off would severely degrade service in the heart of the city and on major commuter routes, resulting in genuine consumer harm. By contrast, granting the STA and authorizing the smaller and less powerful network would harm no

one. The Commission should therefore issue an STA authorizing all of XM's repeaters in the Nashville market. Declining to grant the STA, by contrast, would result in serious and immediate consumer harm.

B. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN ATLANTA

XM is authorized to deploy 46 repeaters in the Atlanta market -- it has deployed only 45. Of the repeaters XM is authorized to operate in this market, one is permitted to operate at high power and ten are permitted to operate at medium power. In fact, XM has deployed zero high-power repeaters and only 9 of the 10 authorized medium-power repeaters. The remainder all operate at 2 kW or less. Thus, as with XM's entire network, the terrestrial repeater network covering Atlanta is much smaller, less powerful, and less likely to cause interference than the network the Commission authorized XM to build.

The Atlanta network is smaller and less intrusive only because it varies in some respects from the as-authorized network. Eighteen of XM's 45 repeaters in Atlanta differ from the STA in at least one respect, although none of the differences impacts the STA analysis.

- Six of the eighteen variant repeaters (ATL003, ATL016, ATL024, ATL063, ATL064, and ATL069) vary because they have been installed at locations varying from authorized locations by distances ranging from 753 feet to 1792 feet. One of these (ATL064) also varies in antenna downtilt (from 6 degrees to 0 degrees). Another (ATL024) also varies in antenna type (from 6-degree electrical downtilt to 2-degree electrical downtilt).
- Five repeaters vary only in antenna type. Four of these (ATL007, ATL030, ATL068, and ATL535) vary from 6-degree electrical downtilt to 2-degree electrical downtilt, and one (ATL046) varies by employing an omni-directional antenna with a 11.5 dB gain instead of 10.0 dB gain.
- The remaining seven repeaters (ATL009, ATL010, ATL012, ATL043, ATL067, ATL095, and ATL110) vary in downtilt, with variances ranging from three to six

degrees. One of these (ATL010) also varies in azimuth (110 degrees) and antenna height (4 feet); another (ATL043) also varies in antenna height (105 feet); and a third (ATL110) also varies in orientation (110 degrees).

Each of the factors that justified the Commission's decision to grant the original STA for the Atlanta network applies even more strongly to this as-built network. None of the extraordinary circumstances or public interest considerations has diminished since the Commission issued the original authorization. Indeed, the variances between the authorized and as-built networks have relatively little significance beyond one extremely salient fact: they allow XM to operate a network that is much less likely to cause interference than the network the Commission originally authorized.

Shutting down the variant repeaters would inflict immediate and grave harm on the public interest. XM's variant repeaters cover 42 percent of the Atlanta market (as measured by resident location). Shutting the variant repeaters down would therefore reduce the population benefiting from repeater coverage by nearly 550,000 (again, measured by resident location). A shut down would also lead to significant coverage losses on five major commuter routes – I-20, I-75, I-85, I-285, and Route 400 – that collectively serve more than 715,000 vehicles every day. Atlanta Plot 1 (repeater coverage with the variant repeaters on) and Atlanta Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shut down's impact on repeater coverage. *See Exhibits 1-3 and 1-4.*

When the variant repeaters are turned on, they work together with the XM satellite system to provide seamless coverage and excellent service quality throughout the Atlanta market. Turning them off would degrade – and even eliminate – service in core downtown areas and on major commuter routes, resulting in genuine consumer harm. By contrast, granting the STA and authorizing the smaller and less powerful network would

not harm anyone. Accordingly, the Commission should issue an STA authorizing all of XM's repeaters in the Atlanta market.

C. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN NEW YORK

XM is authorized to deploy 109 repeaters in the New York market – but it has deployed only 91. More specifically, in order to ensure seamless coverage and high-quality service, the Commission authorized eleven high-power repeaters and nine medium-power repeaters. *But XM has deployed only 3 of the 11 authorized high power repeaters, and only twelve medium-power repeaters.* In effect, therefore, XM has deployed 9 fewer high-power repeaters in return for deploying 3 extra medium-power repeaters. The remaining repeaters all operate at 2 kW or below. Again, as with the XM network as whole, the network in the New York market is much smaller, less powerful, and less likely to cause interference than the network the XM was authorized to build.

Similar to the networks in every other market described in this Supplement, the New York network can be smaller and less intrusive only by varying in some respects from the as-authorized network. Thirty-five of XM's ninety-one repeaters in New York exhibit some kind of variance, although none of the differences impacts the Commission's original STA analysis.

- Six of the thirty-five variant repeaters (NYC008, NYC009, NYC031, NYC141, NYC195, and NYC614) vary only because they have been installed a locations other than their authorized locations. Four of the six (NYC009, NYC031, NYC141, and NYC 195) vary by distances ranging from 454 feet to 706 feet. NYC008 varies by 2351 feet. Finally, due to a clerical error in the original STA notification, one repeater (NYC614) varies by 220,661 feet from the initial STA authorization.²

² This error, misstating the repeater's location by 4 degrees of longitude, was apparently due to a data entry mistake in entering the station's coordinates into XM's original STA application. The obviously inadvertent nature of the error is demonstrated by the fact that if the repeater's coordinates were correct

- Eight of the thirty-five variant repeaters (NYC017, NYC027, NYC028, NYC070, NYC132, NYC136, NYC161, and NYC611) vary by antenna height. All of these vary by three feet or less, except for NYC017, which varies by twenty-seven feet. In addition, NYC070 varies in location by 945 feet, NYC027 varies by azimuth (110 degrees), and NYC132 varies by azimuth (190 degrees) and location (374,554 feet due to a clerical error in the original STA).³
- Three of the thirty-five variant repeaters (NYC010, NYC019, and NYC192) vary only in azimuth (25, 120, and 75 degrees respectively).
- Five of the thirty-five variant repeaters (NYC053, NYC055, NYC058, NYC193, and NYC222) vary only by 4-degrees electrical downtilt.
- Ten of the remaining variant repeaters (NYC003, NYC004, NYC012, NYC020, NYC035, NYC046, NYC172, NYC200, NYC205, and NYC214) vary at least in part in antenna design. One (NYC004) employs an omni-directional rather than panel antenna, while six (NYC012, NYC035, NYC046, NYC172, NYC200, and NYC205) employ panel antennas instead of omni-directional antennas. (NYC046 employs two panel antennas.) NYC004 also varies in location by 1302 feet, and NYC035 also varies by azimuth (210 degrees) and downtilt (4 degrees). NYC012 and NYC172 also vary in orientation (by 35 degrees and 100 degrees respectively) and EIRP (by 4013 watts and 1159 watts respectively). NYC205 also varies in antenna height (by 10 feet), downtilt (by 2 degrees), and EIRP (by 2131 Watts). One of these ten repeaters (NYC020) varies in that it employs two high-power panel antennas and one medium-power antenna rather than one high-power panel antenna. Another (NYC214) varies by employing a medium-power panel antenna in addition to a high-power panel antenna. And another (NYC003) varies in location (1498 feet), antenna height (242 feet), orientation (30 degrees), and downtilt (13 degrees), and employs a 60 degree panel antenna rather than a 120 degree panel antenna.
- The final three variant repeaters (NYC123, NYC163, and NYC630) were constructed at locations that the STA did not clearly identify. This does not mean that these are extra repeaters, but simply that none of the eighteen unused repeater locations clearly applies to them.

The Commission should begin its consideration of whether to grant the STA for this market by recognizing that it has already approved a much more powerful network

as filed, it would be located in a heavily wooded area 60 miles southeast of Pittsburgh, PA, rather than in the New York City market.

³ This error, misstating the repeater's location by 1 degree of latitude, was apparently due to a data entry mistake in entering the station's coordinates into XM's original STA application. The obviously inadvertent nature of the error is demonstrated by the fact that if the repeater's coordinates were correct as filed, it would be located in the Atlantic Ocean, 14 miles off the New Jersey coast.

including eleven high-power repeaters. None of the extraordinary circumstances or public interest considerations has diminished since the Commission issued the original authorization. To the contrary, the public interest considerations have intensified markedly because the existing network is now serving thousands of consumers in the market.

Indeed, turning off the variant repeaters would devastate service quality for thousands of consumers and harm the public interest. Any Commission-ordered shut down would reduce the population benefiting from repeater coverage by more than 2 million people (measured by resident location). In addition, shutting down the variant repeaters would disrupt – and in some areas eliminate – service on seven major commuter routes – I-78, I-80, I-95, I-195, I-287, I-684, and the Garden State Parkway – that collectively serve more than 543,000 vehicles every day. New York Plot 1 (repeater coverage with the variant repeaters on) and New York Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shut down’s impact on repeater coverage. *See* Exhibits 1-5 and 1-6.

When the variant repeaters are turned on, they work together with the XM satellite system to provide seamless coverage and excellent service quality throughout the New York metropolitan area. Turning them off would severely degrade service in the heart of the city and on major commuter routes, resulting in genuine consumer harm. By contrast, granting the STA and authorizing the smaller and less powerful network would not harm anyone. The Commission should therefore issue an STA authorizing all of XM’s repeaters in the New York market. Declining to grant the STA, by contrast, would result in serious and immediate consumer harm.

D. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN LOS ANGELES

XM holds authorizations to deploy 49 repeaters in the Los Angeles market – but it has deployed only 39. Of the 49 authorized repeaters, the Commission permitted XM to operate two high-power repeaters and 34 medium-power repeaters. In fact, XM has installed the two authorized high-power repeaters and only 15 of the authorized 34 medium-power repeaters. All the other repeaters in Los Angeles operate at 2 kW or below. Thus, as with the network as a whole, XM's Los Angeles repeater network is smaller, less powerful, and less likely to cause interference than the network XM is authorized to operate.

Of course, the fact that the Los Angeles network is smaller and less likely to cause interference means that it varies in some respects from the as-authorized network.

Twenty-three of XM's 39 repeaters in Los Angeles differ from the STA in at least one respect, although none of the differences impacts the Commission's original STA analysis and most of the differences are quite small.

- Seven of the 39 variant repeaters (LAX018, LAX101, LAX105, LAX110, LAX116, LAX117, and LAX130) vary because they have been installed at locations other than their authorized locations by distances ranging from 510 to 841 feet. Three of these repeaters (LAX018, LAX105, and LAX117) also vary in downtilt, from 8 degrees to 2 degrees, from 3 degrees to 0 degrees, and from 6 degrees to 0 degrees, respectively. Another one of these (LAX101) also varies in height by 32 feet. And another (LAX110) also varies in antenna type (from high power omni-directional to medium power panel), orientation (from 180 degrees to 135), and orientation (from 3 to 0 degrees).
- Four more (LAX014, LAX037, LAX109, and LAX113) vary in antenna type – from panel to omni-directional, from panel to omni-directional, from 16dB gain panel to 14dB gain panel, and from high-power panel to medium-power panel, respectively. Three of these (LAX014, LAX037, and LAX113) also vary in orientation (from 270 degrees to 0 degrees, from 135 degrees to 0 degrees, and from 80 degrees to 135 degrees, respectively) and downtilt (from 3 degrees to 0 degrees, from 8 degrees to 0 degrees, and from 3 degrees to 8 degrees, respectively).

- Eleven of the variant repeaters (LAX001, LAX011, LAX012, LAX020, LAX024, LAX028, LAX103, LAX108, LAX 118, LAX126, and LAX144) vary in downtilt or antenna downtilt design. Six of these (LAX011, LAX012, LAX020, LAX108, LAX126, LAX144) also vary in antenna design (from 8 degrees downtilt to 0 degrees downtilt); two (LAX001 and LAX118) vary in antenna downtilt from 6 degrees electrical downtilts to 2 degree electrical downtilts; and three (LAX024, LAX028, and LAX103) vary in antenna downtilt, from 8 degrees to 2 degrees, from 9 degrees to 0 degrees, and from 3 degrees to 6 degrees, respectively.
- The final variant repeater (LAX645) varies only in antenna orientation (from 75 degrees to 180 degrees).

The justification for granting the original STA covering Los Angeles applies even more strongly to this less-powerful as-built network. None of the extraordinary circumstances or public interest considerations has diminished since the Commission issued the original authorization. Indeed, the variances between the authorized and as-built networks have relatively little significance beyond the fundamental fact that they enable XM to operate a network that is much less likely to cause interference than the network the Commission originally authorized.

Shutting down the variant repeaters in Los Angeles would have a drastic and adverse impact on the public interest. XM's variant repeaters cover 83 percent of the Los Angeles market (as measured by resident location). Shutting them down would reduce the population benefiting from repeater coverage by more than 5.2 million people (again, measured by resident location). A shut down would also cause significant coverage losses for motorists, which is a critical concern in a city with as many car commuters as Los Angeles. Indeed, a shutdown would degrade service substantially on eight major commuter routes – I-5, I-10, I-110, I-210, I-405, I-710, Route 60, and Route 101 – that collectively serve nearly 960,000 vehicles every day. Los Angeles Plot 1 (repeater coverage with the variant repeaters on) and Los Angeles Plot 2 (repeater coverage with

the variant repeaters off) provide a graphical representation of a shut down's impact on repeater coverage. See Exhibits 1-7 and 1-8.

When turned on, the variant repeaters work together with XM's direct satellite signals to provide seamless coverage and excellent service quality throughout the Los Angeles market. Turning them off would degrade – and even eliminate – service in core downtown areas and on major commuter routes, resulting in widespread consumer harm. By contrast, granting the STA and authorizing XM's smaller and less powerful network would not cause any harm to anyone. The Commission should therefore issue an STA authorizing all of XM's repeaters in Los Angeles. Declining to do so would have a severe impact on thousands of consumers.

E. AN STA SHOULD BE GRANTED FOR XM'S REPEATERS IN RALEIGH

XM is authorized to deploy 20 repeaters in the Raleigh, NC market – but it has deployed only 18. In particular, the Commission authorized two high-power repeaters and eleven medium-power repeaters in order to provide seamless coverage across the market. In fact, XM has installed only 1 of the 2 authorized high-power repeater and only 9 of the 11 authorized medium-power repeaters. The remaining repeaters all operate at 2 kW or below. Thus, as with the other markets discussed here, the terrestrial repeater network covering Raleigh is much smaller, less powerful, and less likely to cause interference than the network the Commission authorized XM to build.

The fact that the Raleigh network is smaller and less likely to cause interference means that it varies in some respects from the as-authorized network. Ten of XM's eighteen repeaters in Raleigh differ from the STA in at least one respect, although none of the differences impacts the Commission's original STA analysis.

- Two of the ten variant repeaters (RAL004 and RAL007) vary because they have been installed at locations other than their authorized locations. RAL004 varies by 5,997 feet. Due to a clerical error in the notification process, RAL007 varies by 246,225 feet.⁴
- Three (RAL009, RAL017 and RAL021) vary only in downtilt, by 3 degrees, 2 degrees, and 3 degrees respectively. Of these, RAL017 also varies in antenna type, from a 10.5 dB gain omni-directional to a 11.5 dB gain omni-directional.
- Two more (RAL016 and RAL029) vary only in orientation, by 25 degrees and 30 degrees respectively.
- Two more (RAL022 and RAL028) vary only in antenna height, by 302 feet and 10 feet respectively.
- The final variant repeater (RAL011) was constructed at a location that 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.

All of the justifications for granting the original STA for Raleigh apply even more strongly to this less-powerful as-built network. None of the extraordinary circumstances or public interest considerations has diminished since the Commission issued the original authorization. Indeed, the variances between the authorized and as-built networks have relatively little significance beyond a single key fact: they enable XM to operate a network that is much less likely to cause interference than the network the Commission originally authorized.

Shutting down the variant repeaters in Raleigh would have a severe impact on the public interest. XM's variant repeaters cover 42 percent of the Raleigh market (as measured by resident location). Shutting them down would reduce the population benefiting from repeater coverage by more than 230,000 people (again, measured by

⁴ This error, misstating the repeater's location by 50 minutes of longitude, was apparently due to a data entry mistake in entering the station's coordinates into XM's original STA application. The obviously inadvertent nature of the error is demonstrated by the fact that if the repeater's coordinates were correct as filed, it would be located in a non-residential area 35 miles northeast of Raleigh, in the middle of farm land.

resident location). A shut down would also degrade service substantially on four major commuter routes – I-40, I-85, I-440, and Route 15/501 – that collectively serve nearly 175,000 vehicles every day. Raleigh Plot 1 (repeater coverage with the variant repeaters on) and Raleigh Plot 2 (repeater coverage with the variant repeaters off) provide a graphical representation of a shut down’s impact on repeater coverage. *See Exhibits 1-9 and 1-10.*

When they are operating, the variant repeaters work together with XM’s direct satellite signals to provide seamless coverage and excellent service quality throughout the Raleigh market. Turning them off would degrade – and even eliminate – service in core downtown areas and on major commuter routes, resulting in widespread consumer harm. By contrast, granting the STA and authorizing XM’s smaller and less powerful network would not cause any harm to anyone. The Commission should therefore issue an STA authorizing all of XM’s repeaters in Raleigh.

CONCLUSION

Looking at the Nashville, Atlanta, New York City, Los Angeles, and Raleigh markets clearly demonstrates that XM should be granted an STA covering its entire repeater networks in those markets – and nationally. XM is seeking nothing more than temporary authorization to keep operating a network that is smaller, less powerful and has less interference potential than the network it is authorized to build. Granting an STA for these five markets, and for the entire network, will harm no one. Denying the STA will harm tens of thousands of consumers in these markets and elsewhere. In these circumstances the public interest practically mandates that the STA Request be granted.

Respectfully submitted,

Scott Blake Harris

James S. Blitz
V.P., Regulatory Counsel
XM RADIO INC.
1500 Eckington Place, N.W.
Washington, DC 2002
(202) 380-1383

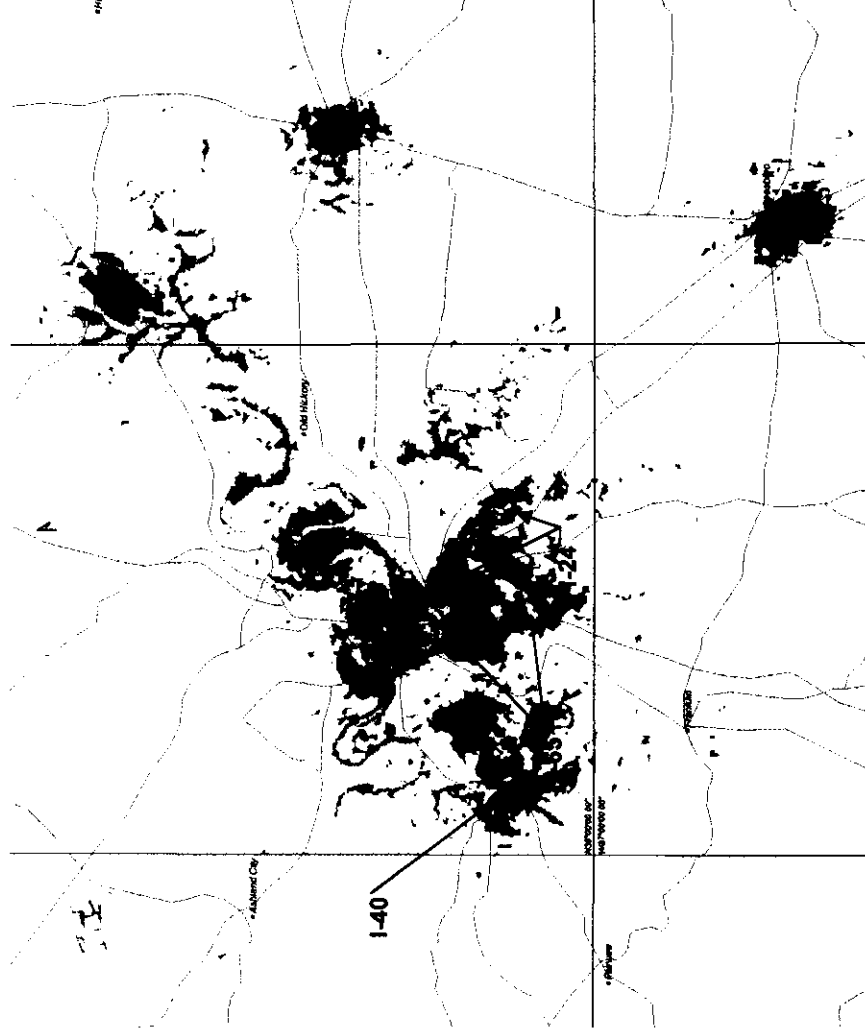
Scott Blake Harris
Chad Breckinridge
HARRIS, WILTSHIRE & GRANNIS LLP
1200 18th Street, N.W., Suite 1200
Washington, DC 20036
(202) 730-1300

Counsel to XM Radio Inc.

11 December 2006

Exhibit 1-1

Nashville Plot 1 Current Repeater Coverage

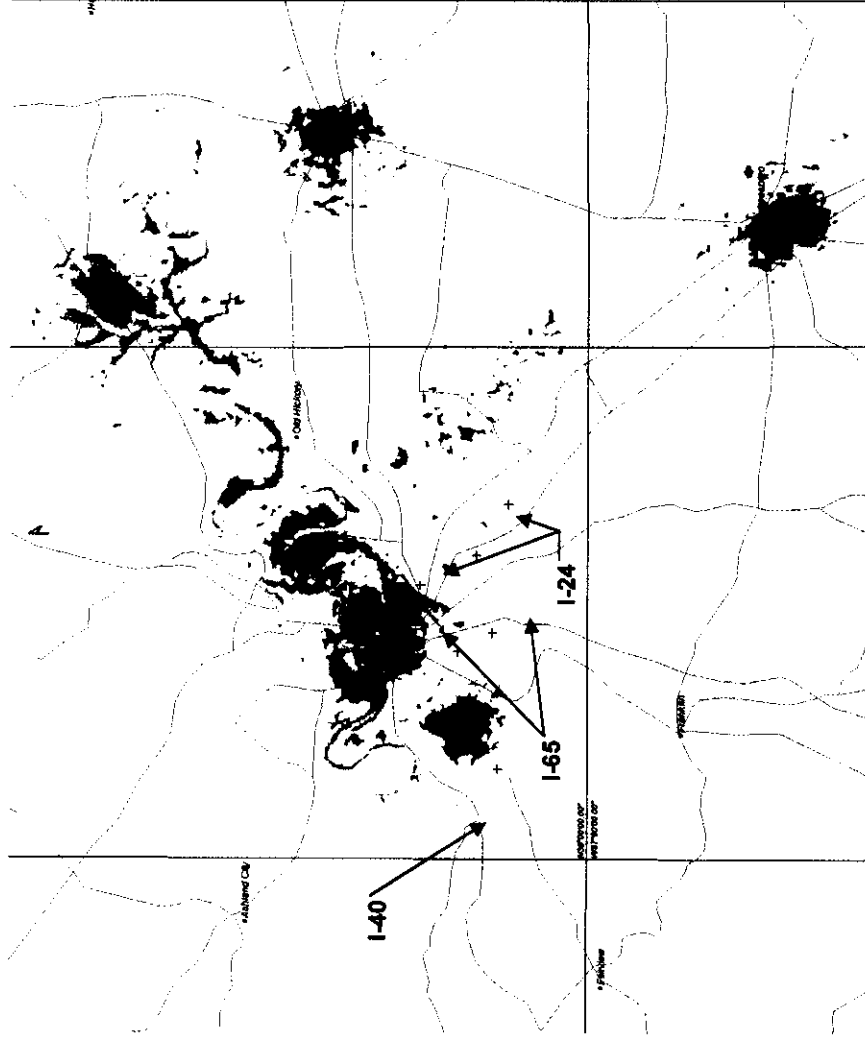


Privileged and Confidential
Prepared in Anticipation of Litigation
Attorney – Client Work Product

DRAFT

Exhibit 1-2

Nashville Plot 2 Coverage with Variant Repeaters Off

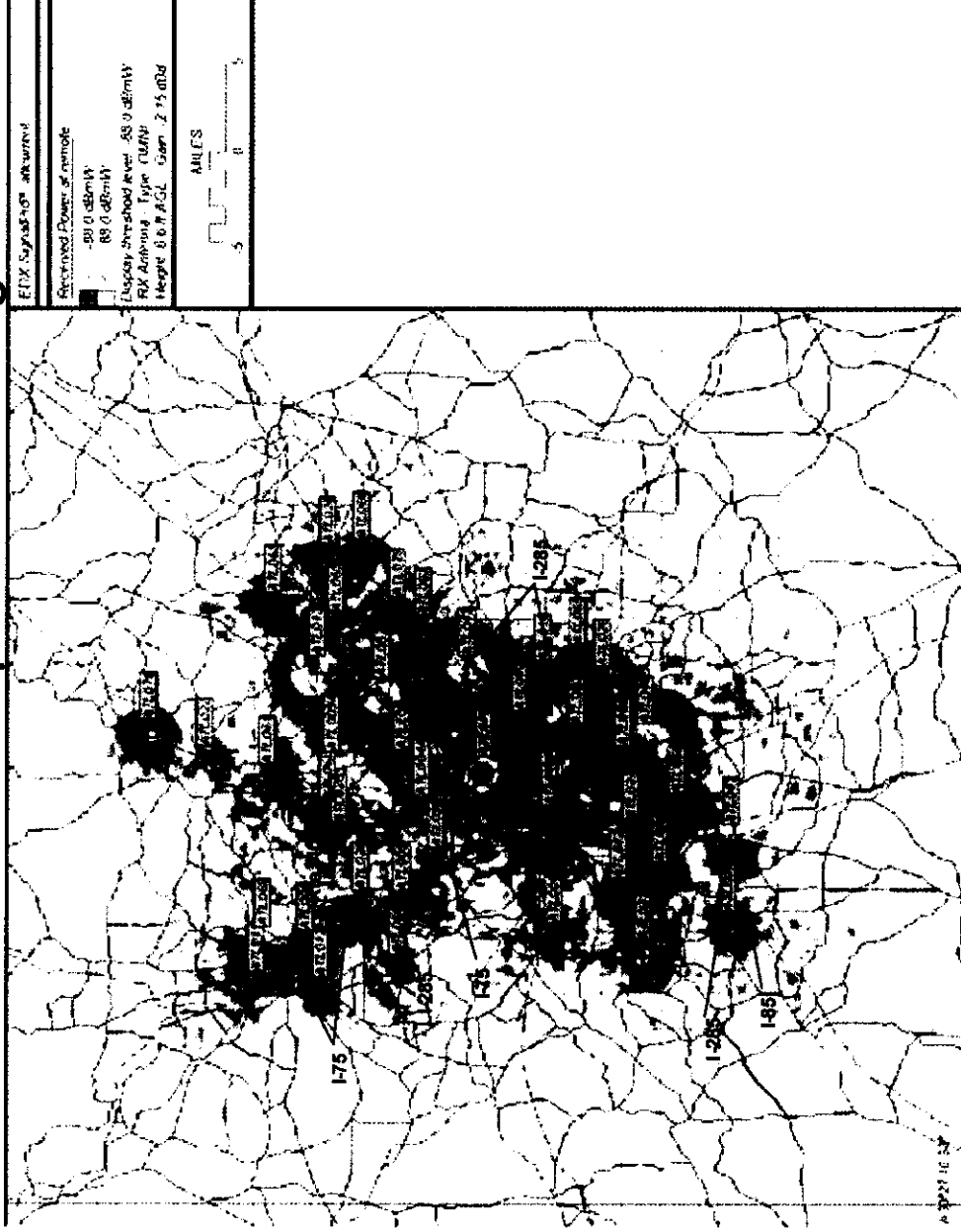


Privileged and Confidential
Prepared in Anticipation of Litigation
Attorney – Client Work Product

DRAFT

Exhibit 1-3

Atlanta Plot 1 Current Repeater Coverage

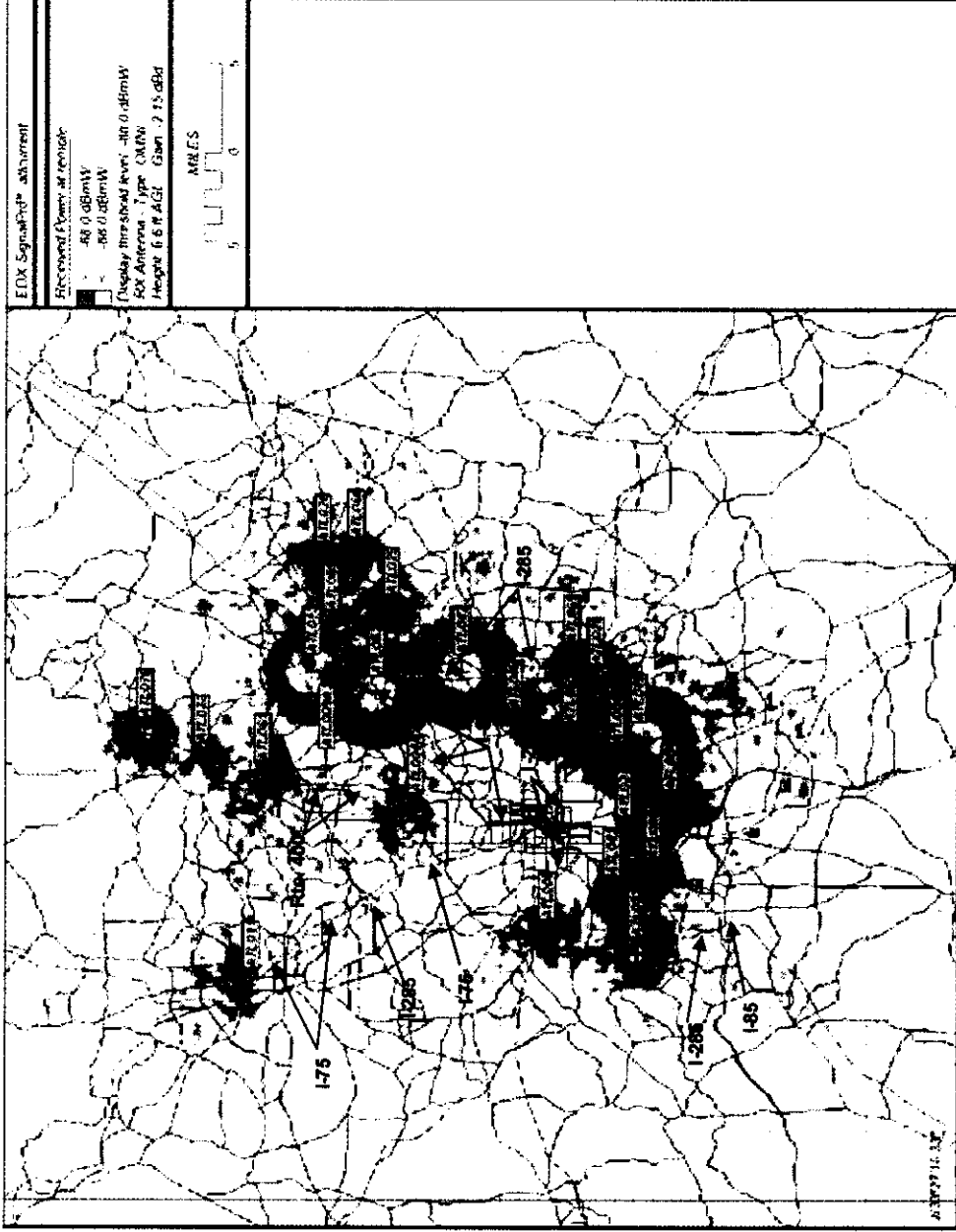


Draft

Privileged and Confidential. Prepared in anticipation of litigation. Attorney-client work product.

Exhibit 1-4

Atlanta Plot 2 Coverage with Variant Repeaters Off

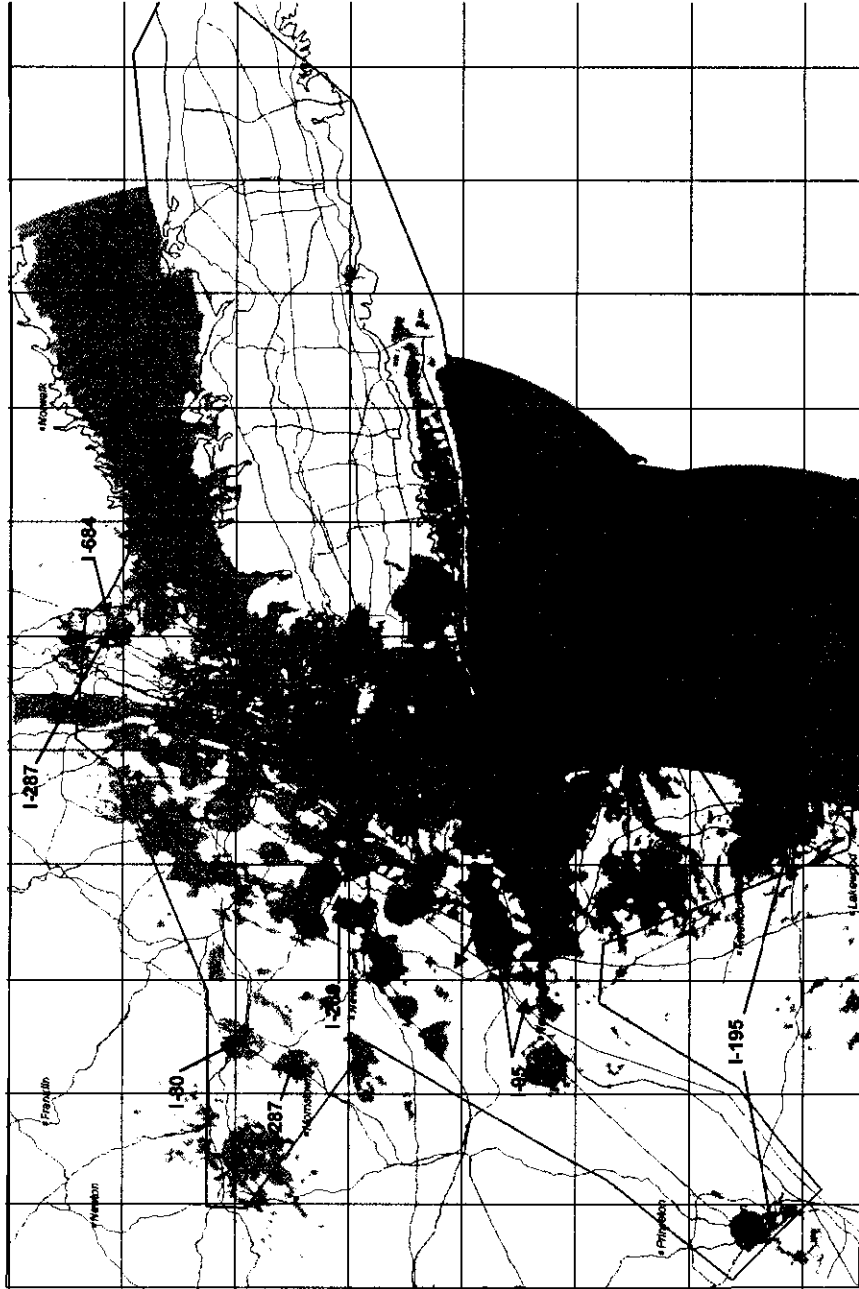


Draft

Privileged and Confidential. Prepared in anticipation of litigation. Attorney-client work product.

Exhibit 1-5

New York Plot 1 Current Repeater Coverage



Privileged and Confidential. Prepared in anticipation of litigation. Attorney-client work product.

Draft

Exhibit 1-6

New York Plot 2 Coverage with Variant Repeaters Off



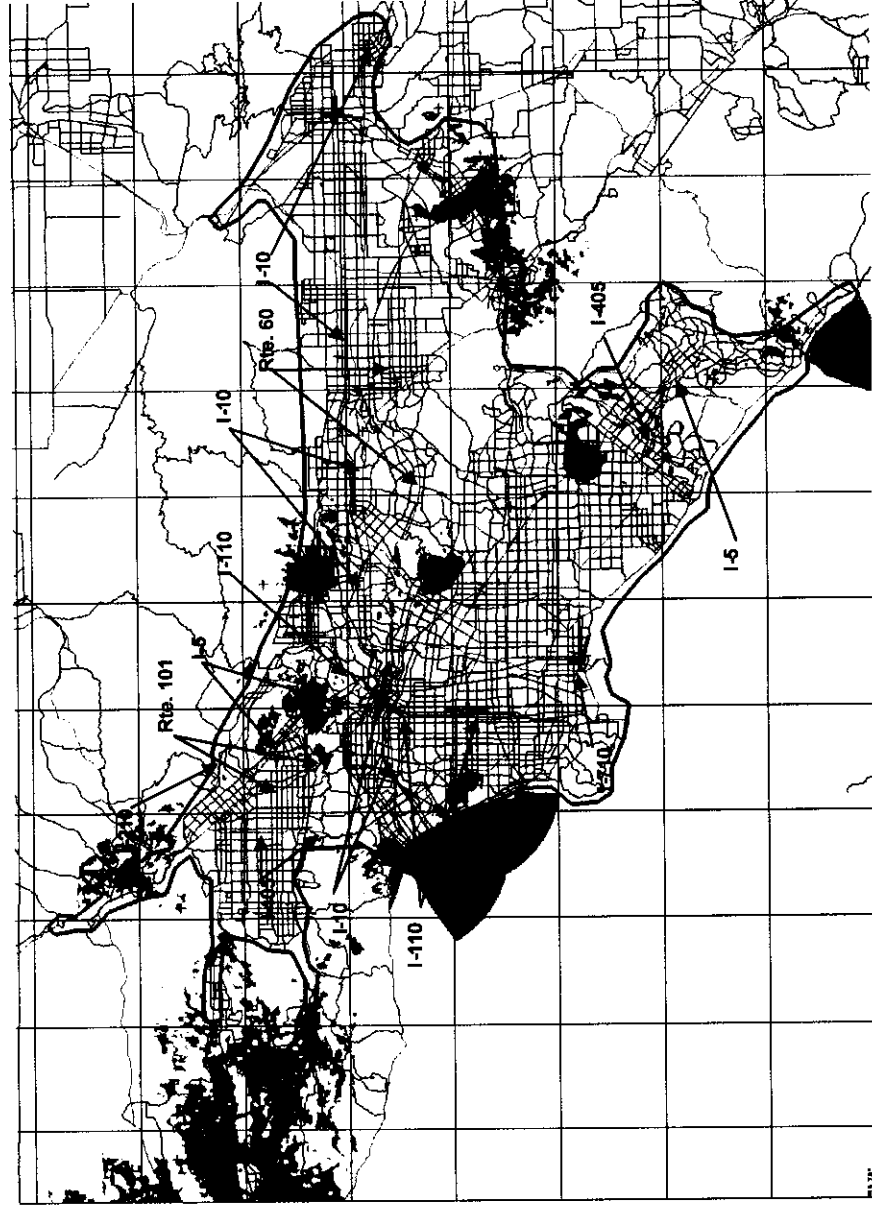
Draft

Privileged and Confidential. Prepared in anticipation of litigation. Attorney-client work product.

Exhibit 1-7

Exhibit 1-8

Los Angeles Plot 2 Coverage with Variant Repeaters Off

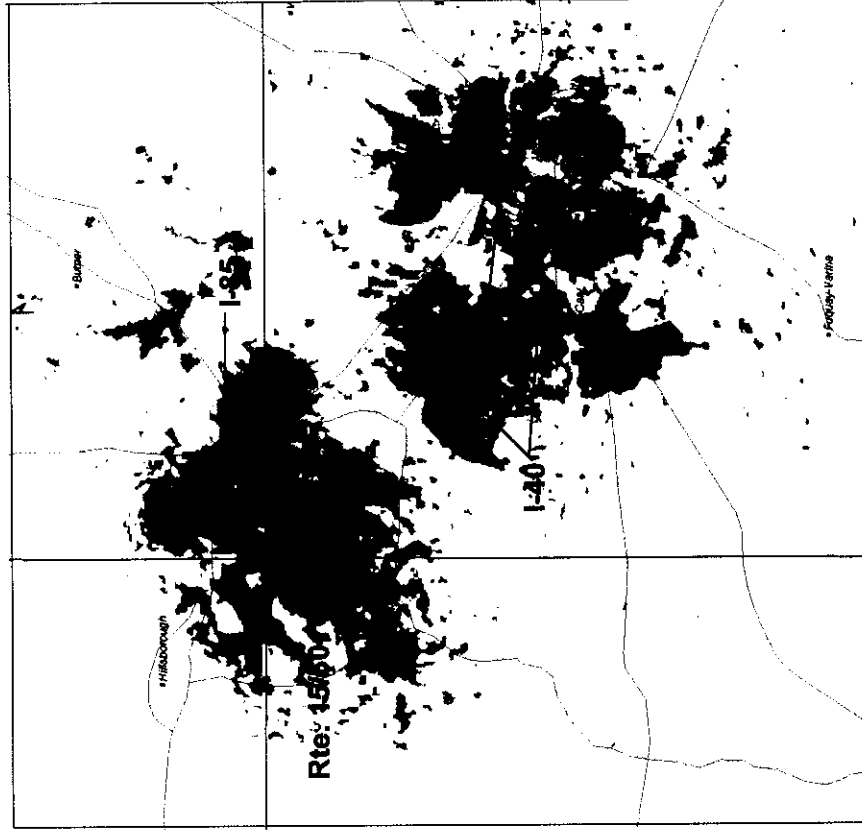


Draft

Privileged and Confidential. Prepared in anticipation of litigation. Attorney-client work product.

Exhibit 1-9

Raleigh Plot 1 Current Repeater Coverage

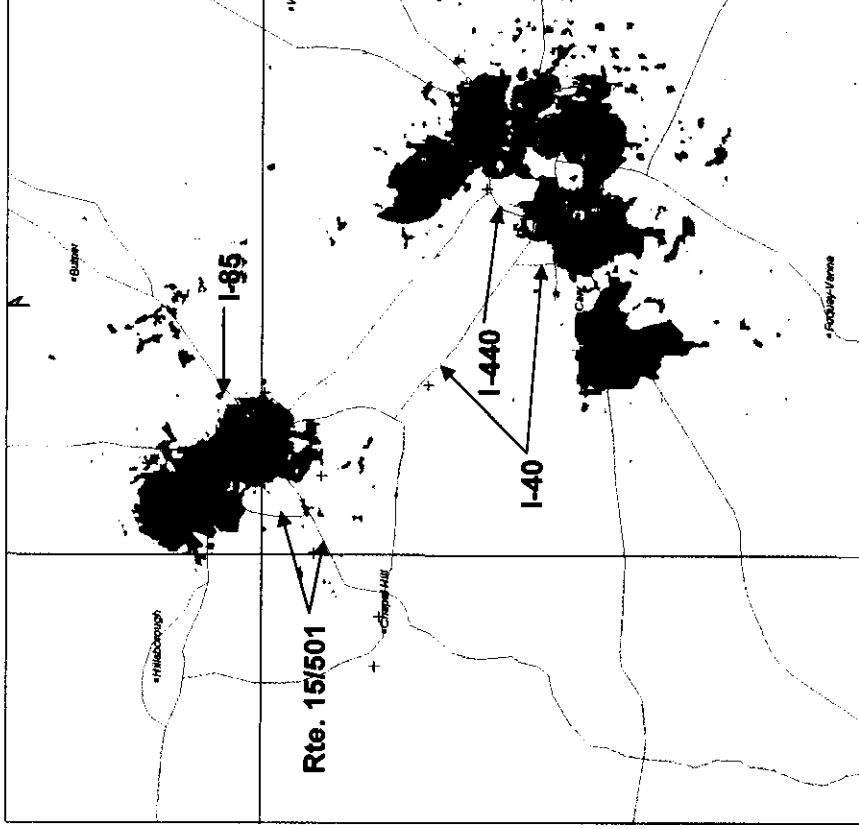


Privileged and Confidential
Prepared in Anticipation of Litigation
Attorney – Client Work Product

DRAFT

Exhibit 1-10

Raleigh Plot 2 Coverage with Variant Repeaters Off



Privileged and Confidential
Prepared in Anticipation of Litigation
Attorney – Client Work Product

DRAFT