



**SUBJECT TO PROTECTIVE ORDER IN WT DOCKET NO. 15-262
BEFORE THE FEDERAL COMMUNICATIONS COMMISSION**

[REDACTED VERSION – AVAILABLE FOR PUBLIC INSPECTION]

June 20, 2016

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

**Re: *Applications of Sprint Corporation and Cellco Partnerships d/b/a Verizon
Wireless for Consent to Assignment Licenses (WT Docket No. 16-175)***

Dear Ms. Dortch:

On behalf of its wholly-owned subsidiaries, Sprint Corporation (“Sprint”), hereby submits its initial response to the June 6, 2016 Information Request from the Federal Communications Commission (“FCC”) in the above-referenced proceeding.¹ This response satisfies Information Request items 1 and 2.

Enclosed, please find:

- For Information Request item 1, an attached narrative response. Portions of this response have been redacted as confidential and not for public inspection.
- For Information Request item 2, a password protected CD labeled Confidential Information Subject to Protective Order in WT Docket No. 16-175 Before the Federal Communications Commission, Sprint Corporation Response to Information Request Question 2, June 6, 2016, containing ESRI shapefiles representing Sprint’s geographic coverage in the three CMAs which were requested;

In addition, in response to Information Request item 2, attached to this letter Sprint hereby provides all assumptions, methodology (*e.g.*, propagation, projection, field measurements) and data (*e.g.*, terrain, morphology, buildings) used in the production of the polygons, and identifies the propagation tool used, the propagation model used within that tool, including but not limited to, the coefficients used in the model and any additions, corrections, or modifications made to the model. A portion of this response has been redacted as confidential and not for public inspection.

¹ Letter from Jon Wilkins, Chief, Wireless Telecommunications Bureau, FCC, to James B. Goldstein, Sprint Corporation, WT Docket No. 16-175 (June 6, 2016) (“Information Request”).

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Because this submission contains electronic material that is Confidential, Sprint is filing this cover letter and its enclosures pursuant to the procedures established in the Protective Order that was issued on June 6, 2016 in this docket.² This submission is being delivered by hand to the Secretary's Office, and two additional copies are being delivered to Scott Patrick of the Wireless Telecommunications Bureau. Sprint also is filing a copy of this cover letter for public inspection in the FCC's Electronic Comment Filing System. If you have any questions, please contact the undersigned.

Respectfully submitted,

/s/ James B. Goldstein

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cc: Scott Patrick
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² In the Matter of Applications of Sprint Corporation and Cellco Partnership d/b/a Verizon Wireless for Consent to Assign Licenses, Protective Order, June 6, 2016.

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RESPONSES

- 1. On page 2 of the Public Interest Statement, the Applicants maintain that the proposed transaction would lead to “more efficient operations that would result from larger blocks of contiguous spectrum, allowing both service providers to provide more robust services to meet the needs of their customers, by providing additional spectrum capacity in certain markets to help meet the demands of their customers for broadband wireless services” and “[i]n the case of BTA 444, Sprint’s total attributable spectrum holdings increase 5 MHz as a result of the proposed transaction.” Our review indicates that in those seven counties in all or parts of three CMAs – CMA 48 (Toledo, Ohio), CMA 585 (Ohio 1 – Williams), and CMA 586 (Ohio 2 – Sandusky) in which Sprint would realize a net gain in its PCS spectrum holdings, it would hold a maximum of 230.5 megahertz of spectrum in total post-transaction.**
 - a. Provide a detailed description of how the Company would use the spectrum that it would acquire under the Proposed Transaction on a standalone basis and/or in conjunction with any other of the Company’s spectrum holdings, and how it would improve spectrum capacity and efficiency of operations.**

The spectrum exchanges between Sprint and Verizon are intended to rationalize each Applicant’s spectrum assets by improving the contiguous spectrum available to each Applicant’s licenses in multiple markets across the country. By rationalizing existing license holdings for both Sprint and Verizon in each market, the proposed transaction will benefit both carriers, their consumers and competition. Following the transaction, Sprint and Verizon will each hold larger blocks of contiguous spectrum in the 1.9 GHz PCS bands than these companies did prior to the proposed assignments, which will enable greater use of the spectrum, wider bandwidth operations and faster data speeds than they would using smaller bandwidth channels.

The Sprint – Verizon spectrum exchanges currently before the Commission implicate 59 Cellular Market Areas (“CMAs”) across the country.³ In thirty-two of these fifty-nine CMAs neither Applicant realizes a spectrum gain, with each Applicant assigning to the other an equal amount of spectrum in each market.⁴ In eight CMAs Verizon realizes a spectrum gain (while Sprint experiences a reduction of spectrum), while in nine CMAs Sprint realizes a spectrum gain (while Verizon experiences a reduction of spectrum). The Verizon gains are between 2.5 MHz and 20

³ The Joint Sprint – Verizon Public Interest Statement identified 29 “markets” using Basic Trading Areas (“BTAs”) as the geographic definition for “markets” since the 1.9 GHz PCS band typically uses BTAs for licensing. To aid the Commission in its review, in this Information Request Sprint will re-define “markets” as Cellular Market Areas (“CMAs”).

⁴ The spectrum exchanges in these 32 markets enables each party to improve its spectrum contiguity even where neither Applicant gains additional spectrum.

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MHz of spectrum in the eight CMAs, while Sprint's gains are between 5 and 15 MHz in the nine CMAs.

Despite gaining as much as 20 MHz in a single market,⁵ in the eight CMAs where Verizon realizes a spectrum gain, Verizon's post-transaction spectrum holdings do not exceed the Commission's spectrum screen of 199 MHz.

Of the nine CMAs where Sprint realizes a spectrum gain, Sprint does not exceed the Commission's 199 MHz spectrum screen in six markets.⁶ In the three remaining CMAs -- CMA 48 (Toledo, Ohio), CMA 585 (Ohio 1 – Williams), and CMA 586 (Ohio 2 – Sandusky) Sprint exceeded the Commission's 199 MHz spectrum screen prior to the transaction.⁷ As a result of the spectrum exchanges post-transaction, Sprint's attributable spectrum holdings would have a *de minimis* increase in these three CMAs from 225.5 MHz to 230.5 MHz through the acquisition of a 2.5 MHz (uplink) x 2.5 MHz (downlink) block of spectrum.

⁵ As part of this transaction, Verizon will acquire 20 MHz of AWS-1 spectrum in CMA157 (Charlottesville, VA). Sprint agreed to divest 20 MHz of AWS spectrum in seven CMAs in Virginia, including Charlottesville, as a condition of approval for its spectrum acquisition of 1.9 GHz and 2.5 GHz spectrum by Sprint from NTELOS. *See* In the Matter of SprintCom, Inc., Shendandoah Personal Communications, LLC and NTELOS Holdings Corp., *Memorandum Opinion and Order*, ___ FCC Rcd ___, WT Docket 15-262 (April 15, 2016). Sprint agreed to file applications to assign these AWS-1 licenses within six months of Commission approval of the Sprint – NTELOS spectrum transaction. Thus, the instant Sprint – Verizon spectrum exchange is part of Sprint's efforts to comply with the Commission's Sprint – NTELOS approval *Memorandum Opinion and Order*.

⁶ Post-transaction Sprint's spectrum holdings (where it gains spectrum) will be below the Commission's 199 MHz spectrum screen in CMA 261 (Albany), CMA 379 (GA 9 – Marion), CMA 380 (GA 10 – Bleckley), CMA 381 (GA 11 – Toombs), CMA 383 (GA 13 – Early), CMA 384 (GA 14 – Worth). Post-transaction Sprint's spectrum holdings in these markets will range between 110.7 MHz and 191.9 MHz.

⁷ In 2014, the Commission adopted a revised spectrum screen which increased the amount of "high-band" 2.5 GHz spectrum that would be counted in the spectrum screen. This modification of the spectrum screen caused many Sprint markets to be above the Commission's 199 MHz spectrum screen, even before transactions are considered. *See* Policies Regarding Mobile Spectrum Holdings; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, WT Docket No. 12-269, GN Docket No. 12-268, *Report and Order*, 29 FCC Rcd 6133 (2014) ("*Spectrum Holdings Order*"), *recon. denied, Order on Reconsideration*, 30 FCC Rcd 8635 (2015). The Commission noted, however, "the revised screen would not "prevent" any transactions; it is a screen, not a cap, and the Commission retains the authority to approve proposed transactions that are in the public interest, even if those transactions trigger the spectrum screen." *Spectrum Holdings Order* at ¶ 277. The Commission also noted "applications involving small amounts of high-band spectrum, particularly EBS spectrum, likely would present limited potential for public interest harms." *Id.* ¶ 289.

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The Commission’s request for further information requests information on the operational impact to Sprint in these three Toledo, Ohio area CMAs. To evaluate this impact in these three CMAs, Sprint will (1) compare and contrast Sprint’s pre-exchange spectrum position with its post-exchange spectrum position; and (2) provide the context of performing the spectrum exchanges both nationwide and at the local CMA level.

Prior to the spectrum exchange, Sprint has a combination of low-band, mid-band and high-band spectrum assets on which to deploy 3G voice (CDMA) and 3G data service (EV-DO) as well as 4G LTE broadband services.⁸ In the three CMAs (CMA 48, CMA 585 and CMA 586) Sprint currently has access to 14 MHz of attributed “low-band” (below-1-GHz) 800 MHz spectrum, 55 MHz of “mid-band” 1.9 GHz spectrum, and 156.5 MHz of attributed “high-band” 2.5 GHz spectrum (leased and directly licensed) for a total of 225.5 MHz of spectrum.⁹

Sprint currently provides 3G voice (CDMA), 3G data (EV-DO) and 4G LTE in the 1.9 GHz band, and provides 4G LTE-TD in the 2.5 GHz band.¹⁰ Sprint is completing work in these markets to deploy its 800 MHz spectrum for 3G voice CDMA and eventually 4G LTE. The 800 MHz spectrum only became available for Sprint after completion of 800 MHz band reconfiguration in Michigan and Ohio in 2014.¹¹

⁸ Low-band spectrum is typically advantageous for greater coverage due to enhanced propagation characteristics of low-band spectrum, while mid-band spectrum is beneficial for both coverage and capacity. Higher-band spectrum provides opportunities for even greater capacity and data speeds due to larger blocks of spectrum, but due to propagation challenges the higher-band spectrum requires a more dense deployment.

⁹ Sprint is attributed with 210.5 MHz of total spectrum in Monroe County, Michigan within CMA048. The other five counties in CMA048 (Fulton, Lucas, Ottawa and Wood) have 225.5 MHz of spectrum pre-exchange.

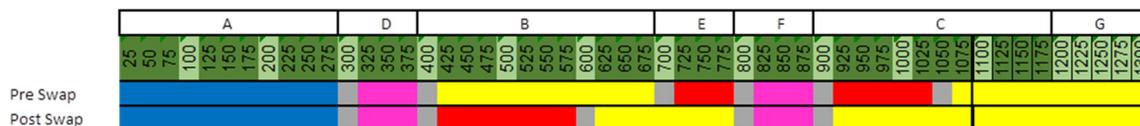
¹⁰ Sprint transitioned from WiMAX to 4G LTE in the 2.5 GHz band in March 2016 with the decommissioning of the WiMAX Network. **[Begin confidential information]**

[End confidential information]

¹¹ Sprint currently has limited use of its 14 MHz of 800 MHz band spectrum in the three Ohio CMAs because these counties are located within 100 km of the US – Canada Border. This proximity to the US – Canada Border requires additional planning to ensure compliance with international technical requirements since a portion of the 800 MHz spectrum block (821 – 824 MHz/866 - 869 MHz) is not US primary spectrum. Therefore, use of the 800 MHz band for 4G LTE requires more extensive technical planning along the border prior to use. Thus, while Sprint is attributed with this 14 MHz of spectrum in the three Ohio CMAs, in six of the seven counties that exceed the 199 MHz spectrum screen, the 800 MHz spectrum is not yet deployed by Sprint.

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The attached chart of the 1.9 GHz PCS band shows the pre-exchange and post-exchange spectrum positions of Sprint, as well as Sprint’s nationwide facilities-based competitors (AT&T, Verizon and T-Mobile) in these three markets.¹²



As this chart demonstrates, Sprint’s pre-exchange 1.9 GHz PCS spectrum position in these markets consists of a 15 x 15 MHz spectrum block (B Block), 7.5 x 7.5 MHz spectrum block (C Block), and Sprint’s nationwide 5 x 5 MHz block (G Block). Sprint’s 1.9 GHz spectrum is thus, located in two portions of the 1.9 GHz band – the B Block, and a portion of the C Block with the adjacent G Block.¹³

Each 1.25 MHz channel block within the 1.9 GHz band is suitable for 3G CDMA (voice) or 3G EV-DO (data) or channels can be combined to form wider bandwidth 4G LTE carriers. 4G LTE carriers require combinations of channel blocks to create either a 5 x 5 MHz, 10 x 10 MHz, 15 x 15 MHz or 20 x 20 MHz channels. Thus, 1.25 MHz channel blocks that fall outside these 4G LTE sized bandwidths have less utility to Sprint given its move towards 4G LTE deployment nationwide.

In Sprint’s pre-exchange spectrum portfolio, as the above chart shows, channel 1075 is a 1.25 x 1.25 MHz “stranded” channel (aka a channel “fragment”). While channel 1075 can presently be used for 3G CDMA or 3G EV-DO, given Sprint’s current spectrum position in the C Block and G Block, this single channel cannot be combined to form a 5 x 5 MHz, 10 x 10 MHz, 15 x 15 MHz or 20 x 20 MHz LTE channel. In other words, once Sprint utilizes channels 1100 through 1300 for 4G LTE, the 1075 channel can only be used for 3G CDMA or 3G EV-DO.¹⁴ This is why Sprint considers this channel “stranded.”

Given these pre-exchange spectrum conditions, Sprint negotiated with Verizon to rationalize and improve its spectrum position in various markets across the country, including the Toledo, Ohio area. Sprint’s overall goals were to:

¹² In the chart, AT&T is in blue, T-Mobile is in magenta, Verizon is in red and Sprint is in yellow. Grey colored channels between each carriers operations are “guard band” channels. Each “block” is a 1.25 MHz channel block suitable for 3G CDMA or 3G EV-DO or can be combined with adjacent channels to form a wider bandwidth 4G LTE channel.

¹³ Verizon’s pre-exchange spectrum is also in two separated portions of the 1.9 GHz band (E Block and portion of C Block).

¹⁴ In addition channel 1050 is set aside as a “guard band” channel between Sprint and Verizon’s current operations.

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1. Obtain or create more contiguous spectrum to aid in 4G LTE deployments;
2. Obtain or create larger blocks of contiguous spectrum through a combination of C Block and G Block (where Sprint has a nationwide spectrum position) to aid in 4G LTE deployments; and/or
3. Rationalize/eliminate the less usable spectrum “fragments” or “stranded” channels.

As part of the nationwide spectrum exchange Sprint sought to achieve the three goals listed above in each market-area with a willing licensee who presumably sought to achieve similar spectrum efficiency goals. As indicated above, more than fifty percent of the markets were spectrum neutral with no gains or losses for either party but still with an improvement in contiguous spectrum position. In the remaining markets, the exchanges of spectrum resulted in a circumstance where Sprint realized a *de minimis* spectrum gain in the three Toledo area CMAs, while Sprint realized a loss of spectrum in comparable CMAs.¹⁵

The instant transaction achieves the three goals Sprint set out to accomplish in the 59 CMAs across the country, including the three Toledo area CMAs. Sprint achieves greater overall contiguous spectrum, creates contiguous spectrum in its preferred block of spectrum (through a combination of C Block and G Block) and eliminates a “stranded” channel to enhance its long term 4G LTE deployment.¹⁶ This is explained further below.

¹⁵ In performing spectrum exchanges such as the instant transaction Sprint attempts to balance the value of the spectrum being assigned to Sprint and from Sprint. Sprint attempted to equalize the exchanges across multiple markets. In this case, Verizon sought additional spectrum in another market (Delaware) to improve its spectrum position, and to make up for that loss in spectrum to Sprint in Delaware, the parties identified Toledo as a comparable market in which Verizon was willing to reduce its mid-band 1.9 GHz spectrum to provide comparable spectrum value in the exchange. In the Delaware 1 – Kent (CMA359) and Maryland – Kent (CMA468) Sprint reduced its spectrum holdings through the assignment of a similarly “stranded” which lowered its attributable spectrum in these CMAs from 131.8 to 129.3 MHz. Similarly, in CMA217 (Anderson, IN) and CMA408 (IN 6 - Randolph), Sprint lowered its attributable spectrum holdings from 225.5 MHz to 220.5 MHz while Verizon experiences a net gain of 5 MHz.

¹⁶ Despite a 5 MHz loss in spectrum in these three CMAs, Verizon also improves its overall spectrum position in these three CMAs. While Verizon’s pre-existing 1.9 GHz spectrum total is reduced from a total of 25 MHz to 20 MHz, the Verizon post-exchange spectrum position in the 1.9 GHz B Block is a contiguous block of spectrum (10 x 10 MHz) which enables continued 3G CDMA/3G EV-DO or 4G LTE capabilities. Like Sprint, Verizon also eliminates “stranded” channels through the spectrum exchange and consolidates its separated spectrum into a single contiguous block of spectrum. Verizon also retains access to other 1.7 GHz AWS “mid-band” spectrum in these markets. Post-exchange Verizon will be licensed for 60 MHz of mid-band spectrum (the same as Sprint) and 72 or 47 MHz of low-band spectrum in each CMA (3x or 5x as much low-band spectrum as Sprint).

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[Begin confidential information]

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[End confidential information]

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- b. Provide a detailed explanation of why this additional aggregation of spectrum is necessary to provide the Company’s customers with broadband wireless services, and why this additional aggregation of spectrum above the general spectrum screen does not raise any competitive concerns.**

As described above, Sprint’s post-transaction total spectrum holdings in the three Toledo area CMAs would rise from a *de minimis* amount from 225.5 MHz to 230.5 MHz. Sprint explained in its response to Question 1(a) the benefits it would achieve with greater contiguous spectrum and a long term deployment of 4G LTE on larger blocks of contiguous spectrum, especially after the sunset of 3G CDMA/EV-DO given the newly created contiguous spectrum block.

This transaction does not involve any transfer of customers. It is purely a spectrum based transaction. Both Sprint and Verizon will continue to provide service to their respective customers in the markets where they are exchanging spectrum. Thus, there will be no reduction in the number of actual competitors providing service. Moreover, there are numerous other carriers holding CMRS spectrum in the three markets in which Sprints realizes a minor gain in attributable spectrum. *See* Exhibits 3A and 3B to the Joint Sprint – Verizon Public Interest Statement showing Verizon, AT&T, T-Mobile, as well as Dish, 2014 AWS Spectrum Bidco Corporation and Cavalier License Group as existing and potential competitors in these three Ohio CMAs.

In terms of “mid-band” spectrum at issue, each of Sprint’s nationwide competitors holds ample and comparable mid-band spectrum totals in these three CMAs even after the assignment of 2.5 MHz (uplink) x 2.5 MHz (downlink) MHz from Verizon to Sprint. In the three CMAs at issue, in the seven counties where Sprint is above the Commission’s 199 MHz spectrum screen, post-transaction Sprint will be licensed for 60 MHz of mid-band spectrum. AT&T will be licensed for between 60 MHz and 80 MHz in the same counties (including AWS-3), T-Mobile will be licensed for between 40 MHz and 60 MHz in these seven counties and Verizon will be licensed for 60 MHz in these seven counties.¹⁷ Overall, each carrier has a mix of low, mid and high band spectrum in which to provide and maintain service. This is reflected in the post-exchange spectrum chart below.

¹⁷ In addition to all four nationwide carriers having nearly identical amounts of mid-band spectrum post-transaction, both Verizon and AT&T will still have more low-band spectrum than Sprint in the three CMAs. While Sprint acknowledges it has a greater amount of high-band spectrum than its competitors in these markets, Sprint provided ample documentation in the *Spectrum Holdings* proceeding that higher-band spectrum requires a greater number of sites (and capital investment) to deploy.

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POPS 2010	CMA	CMA NAME	Sprint LB	Sprint MB	Sprint UB	AT&T LB	AT&T MB	AT&T UB	T-Mobile LB	T-Mobile MB	T-Mobile UB	Verizon LB	Verizon MB	Verizon UB
152624	CMA048	Toledo	14	40	156.5	30	60	20	12	80	0	72	80	0
42737	CMA048	Toledo	14	60	156.5	30	60	20	12	60	0	72	60	0
456587	CMA048	Toledo	14	60	156.5	30	60	20	12	60	0	72	60	0
41174	CMA048	Toledo	14	60	156.5	30	60	20	12	60	0	72	60	0
126852	CMA048	Toledo	14	60	156.5	30	60	20	12	60	0	72	60	0
38552	CMA585	OH 1 - Williams	14	40	156.5	55	90	20	12	60	0	47	50	0
28629	CMA585	OH 1 - Williams	14	60	156.5	55	80	20	12	40	0	47	60	0
19364	CMA585	OH 1 - Williams	14	40	156.5	55	90	20	12	60	0	47	50	0
37730	CMA585	OH 1 - Williams	14	60	156.5	55	80	20	12	40	0	47	60	0
77140	CMA586	OH 2 - Sandusky	14	40	147.4	43	80	20	12	80	0	47	50	0
60072	CMA586	OH 2 - Sandusky	14	40	67.5	43	80	20	12	80	0	47	50	0
60308	CMA586	OH 2 - Sandusky	14	60	156.5	18	60	20	12	60	0	47	60	0
56078	CMA586	OH 2 - Sandusky	14	40	94	18	90	20	12	60	0	47	50	0

As discussed above, Sprint’s addition of 2.5 x 2.5 MHz of mid-band spectrum will allow it to improve its 4G LTE deployment without harming competition in these markets.

Provide all documents relied on in preparing the responses to 1(a) and 1(b).

None

Provide separate responses to each of 1(a) and 1(b).

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Question 2. Provide polygons in an ESRI shapefile format representing geographic coverage for Sprint in Toledo, Ohio, Ohio 1 – Williams, and Ohio 2 - Sandusky, including each mobile broadband network technology (e.g., CDMA, EV-DO, EV-DO Rev. A, GSM, EDGE, UMTS, HSPA, HSPA+, LTE) deployed in each frequency band (e.g., Lower 700 MHz, Cellular, SMR, AWS-1, PCS, BRS/EBS). Provide all assumptions, methodology (e.g., propagation, projection, field measurements), calculations (including link budgets), tools (e.g., predictive and field measurements) and data (e.g., terrain, morphology, buildings) used in the production of the polygons, and identify the propagation tool used, the propagation model used within that tool, including but not limited to, the coefficients used in the model and any additions, corrections or modifications made to the model.

For Information Request item 2 a password protected CD labeled Confidential Information Subject to Protective Order in WT Docket No. 16-175 Before the Federal Communications Commission, Sprint Corporation Response to Information Request Questions 2, June 6, 2016 containing ESRI shapefiles representing Sprint’s geographic coverage in the three CMAs which were requested.

All polygons were generated by InfoVista’s Mentum PlaNet propagation modeling tool, which is utilized by all Sprint Markets in its ordinary course of its business to create all technology/spectrum signal level files (RSSI & RSRP values).

The various criteria inputs to the propagation tool include; cell site location, antenna height, antenna downtilt, antenna azimuth (direction antenna is pointed in degrees), antenna pattern (shape of respective antenna propagation characteristics), site/sector signal power, topographical and terrain factors, clutter (the physical land use/vegetation obstructions) which impact the propagation of radio waves aside from the area topography.

Sprint customizes the InfoVista Mentum PlaNet propagation tool primarily through the use of a library of area-specific “propagation models.” These leverage current geographic terrain, clutter information and drive test data inputs. Market specific Geodata is also used in this process. Sprint uses the following signal strength measurements for its own coverage depiction:

[Begin Confidential Information]



[End Confidential Information]