STATE OF CONNECTICUT
SITING COUNCIL

North Atlantic Towers, LLC and
New Cingular Wireless PCS, LLC Application : DOCKET #427
for a Certificate of Environmental
Compatibility and Public Need
for a Telecommunications Facility Located :
at 171 Short Beach Road or 82 Short Beach Road
East Haven or Branford, Connecticut.

: JULY 03, 2012

TOWN OF BRANFORD'S PRE-FILED TESTIMONY

The Town of Branford hereby provides the following testimony of David Maxson, WCP, of Isotrope, LLC:

Statement of Qualifications

I, David Maxson, WCP, am a municipal wireless consultant. My work is known to the Connecticut Siting Council. I am experienced in radio propagation modeling, signal test and measurement, and radio frequency emissions safety assessment, as well as in the processes that regulate wireless facilities, including such activities as developing and evaluating alternatives in the siting of proposed wireless facilities. For example, recently in a rural New England town, my independent analysis identified an alternative location for a proposed AT&T tower that did not require a zoning variance and was palatable to the residents of the community, which was accepted by AT&T and approved by the town.

Since 1995, I have from time to time testified before the Council on matters relating to the placement, construction, and modification of personal wireless service facilities in Connecticut. I have appended as Exhibit 1 my *curriculum vitae*. Of recent note, I have earned by examination the only independent certification available for experts in wireless communications engineering and technology – the

IEEE Wireless Communications Professional® certification issued by the Communications Society of the International Institute of Electrical and Electronics Engineers. The certification demonstrates my expertise in the seven subject areas of wireless communications engineering technology. I am a Senior Member of the Institute of Electrical and Electronics Engineers. I also represent my company, Isotrope, LLC, as a member of the PCIA (the wireless infrastructure association) DAS Forum. The DAS Forum is an organization of stakeholders in the distributed antenna system segment of the wireless industry. As a participant on several DAS Forum working committees, I am involved in the DAS Forum's work to reduce regulatory barriers to the use of DAS networks to provide wireless service, particularly in places where one or more new towers may not be the most effective solution.

In the December 2011 issue of *Above Ground Level* magazine ("AGL") I published an article explaining the federal State Broadband Initiative ("SBI") in the context of an intensive survey of wireless data communications I conducted for the State of Utah that was funded by federal broadband money. AGL is the industry trade journal of wireless infrastructure.

My resume is attached as Exhibit A.

1. **Have you reviewed materials associated with this Docket and formulated opinions regarding which of the two proposed sites would best fulfill the Applicant's and the Council's requirements?**

ANSWER:

Yes. I have reviewed the Application, Verizon's responses to the Council's Interrogatories and I have performed some in-house coverage analysis. As a result of the review and analysis, I have determined that the public need would best be served by the East Haven location at 82 Short Beach Road and the East Haven location would

also be more environmentally compatible from a viewshed impact point of view.

2. **With regard to environmental compatibility, can you explain the relative impacts of the two proposed locations?**

ANSWER:

While Rte 142 is not designated as a scenic road, the portion of the road and the surrounding shoreline area is notable for its scenic qualities, which are reflected in the property value and intrinsic value of the area. This is the result of the harmonious land use, resulting in an unspoiled, unblighted viewshed. The Applicant's viewshed analysis at Attachment 4c page 54 indicates that there will be near shore views of the tower at a number of sensitive receptors including Branford Point, Branford Harbor, Lamphier Cove, Indian Neck Point, Dugg's Cover, Stanley Point, and Horton Point.

By contrast, the East Haven facility will have only distant Long Island Sound views over open water (Application Attachment 5c).

Even the statistics bear out the greater impact posed by the Branford location. According to the Application, only 35 homes will have year round views of the East Haven tower, while 54 homes would have such views of the Branford tower– a 54% increase in residential impacts. Moreover, the lower height of the East Haven tower makes the quality of the year-round impacts less imposing. In addition, there are an additional 17% more homes impacted by the Branford facility overall than the East Haven facility (83 versus 71 homes) and about 600 more acres of viewshed impact according to Attachment 4c and 5c.

3. **With regard to the public need or coverage, could you explain the relative benefits of the two locations and why the East Haven location better serves to provide coverage for the wireless providers in this docket?**

ANSWER:

My coverage analysis of the Branford location at 171 Short Beach Road is mapped out in the attached color-coded maps. (See Exhibits B, C, D and E) You will note that more than adequate coverage for AT&T can be obtained from that location at 80 feet, so the applied for height is excessive. Meanwhile, essentially the same coverage is obtained by AT&T from the shorter proposed tower at 82 Short Beach Road.

In contrast, Verizon's coverage analysis makes a clear distinction in favor of the higher public benefits of Verizon using the 82 Short Beach Road site (described at Cellco Response to Council Question #2, page 2, dated June 19, 2012). Examining the Verizon coverage maps, it is clear that that the East Haven location delivers greater overall coverage and leaves fewer gaps than the Branford location. This means the East Haven location should be preferred for serving the public need.

In addition, since the East Haven tower is lower in height, reducing its impact where it is visible. Moreover, the East Haven tower is seen from a significantly smaller area of Long Island Sound than the Branford tower. From close in and from a distance, the shorter height of the East Haven tower diminishes the angle of view, thereby reducing a sense of looming and disproportion that towers create.

4. **What stealth applications should be considered at the East Haven location for the proposed tower?**

ANSWER:

Typically, the goal is to balance intrusiveness against performance. Fortunately, the least intrusive option is also the overall best performing one: 82 Short Beach

Road. To minimize the intrusion of a tower in the Sort Beach area two characteristics (in addition to minimizing height) are to be considered- visual mass and visual clutter. Broad antenna mounts such as platforms, frames and T-arms expose substantial surface area (visual mass) and individual materials and components (visual clutter), and are the least preferable method in the current context. A reduced-diameter antenna array, using "flush-mount" techniques reduces visual mass, but does not eliminate visual clutter because the antennas, cables and mounts remain exposed (flush mount visual clutter is reduced by requiring all components to be painted the same color as the tower, which should be a dark color like brown or green to minimize the contrasts created by shadows). To eliminate visual clutter on the tower, the preferred method is to use a concealed-antenna monopole (sometimes called a "flagpole" or a "unipole") which conceals antennas, cables and hardware within the continuous skin of the tower. A less satisfying form of concealment is to use surface-mount antennas and wrap them in a cylindrical radome that is wider than the tower. Based on the foregoing, a white flagpole/unipole installation is the most preferable.

A common argument against the use of narrow antenna arrays says the loss of horizontal antenna space must be made up for with greater height and greater vertical space. At best, this is a crude rule of thumb, while at worst it is simply incorrect. The use of multi-band antennas is now commonplace because many cell sites are space-constrained. The number of panel antennas per sector is reduced when a carrier's signals in several licensed bands are combined onto a common antenna. Exhibit F is a manufacturer's product sheet on one model of multiband antenna.

Another reaction to the use of multiband antennas involves the ability to individually manage the tilt of each signal. This ability is constrained when signals share a common antenna; however in the present context, with the lay of the terrain

and land use being what it is, this constraint is not a substantial concern.

Finally, sometimes it is said that there is significant power loss when combining multiple signals on a common antenna line. There are low loss techniques that are employed to perform the combining of signals, and if a particular set of conditions requires signal boosting to compensate, such equipment is readily available to wireless network operators.

The proposed facility could also take advantage of reducing the vertical spacing of antennas, if necessary to maximize co-location of multiple carriers. While it has long been customary to assign a ten-foot vertical space to each carrier in Connecticut, outside of Connecticut where the laws of physics work precisely the same, the very same carriers often will interlace antennas or reduce the vertical separation of antennas in order to achieve tower sharing on shorter structures.

Since there exists a well-vetted site at 82 Short Beach Road which provides greater coverage (See Verizon's responses to questions referenced above) and which poses lesser impact (see answer to # 2 above), the Branford location need not be considered further.

5. Are there alternatives to a stand alone monopole which could provide coverage for the targeted service area?

ANSWER:

Yes. AT&T has recently advocated for the use of distributed antenna systems in Palo Alto, California to provide general coverage with far less visual impact than a tower. That position is well articulated by AT&T at the following web address http://wireless4paloalto.att.com/das/. DAS has been and can be successfully deployed to provide coverage in relatively small in-fill applications with well defined

moderately dense development, like the target area in this docket.

Respectfully Submitted,

The Town of Branford,

By Keith R. Ainsworth

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Date: 2012.07.03 13:36:46 -04'00'

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CERTIFICATE OF SERVICE

This is to certify that a true copy of the foregoing was deposited in the United States mail, first-class, postage pre-paid this 3rd day of July, 2012 and addressed to:

Ms. Linda Roberts, Executive Director, Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051 (1 orig, 15 copies, plus 1 electronic) (US Mail/electronic).

North Atlantic Tower/New Cingular, LLC c/o Lucia Ciocchio, Esq., Christopher Fisher, Esq., Cuddy & Feder, LLP, 445 Hamilton Avenue, 14th floor, White Plains, NY 10601 (203) 761-1300, (914) 761-5372 fax cfisher@cuddyfeder.com lchiocchio@cuddyfeder.com (electronic and US Mail)

Sarah Pierson, Intervenor, 63 Hilton Avenue, East Haven, CT 06512 sarahpierson@att.net (us mail) (20) 215-6635

Cellco/Verizon c/o Kenneth Baldwin, Esq, Robinson & Cole, LLP, 280 Trumbull Street, Hartford, CT 06103-3597 kbaldwin@rc.com (860) 275-8345 (us mail)

Keith R. Ainsworth

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DN: cn=Keith R. Ainsworth, o=Evans, Feldman and Ainsworth, ou=EFA, email=krainsworth@snet.net, c=US
Date: 2012.07.03 13:37:09 -04'00'

Keith R. Ainsworth, Esq.

David P. Maxson, WCP®
Curriculum Vitae

Isotrope, LLC, Medfield, Massachusetts, 1982*-present — Founder, CEO

a) Municipal guidance in wireless planning and regulation
b) Evaluation of radio frequency facilities for compliance with technical and regulatory standards
c) Research and development on digital media initiatives
d) Safety planning and evaluation of communications facilities, safety protocol development
e) Communications facility design and construction
f) Radio frequency interference remediation

*Note – The wireless consulting business of the former Broadcast Signal Lab, LLP is now Isotrope, LLC. David has been an owner of the business since co-founding it in 1982. Isotrope was incorporated in 2009.

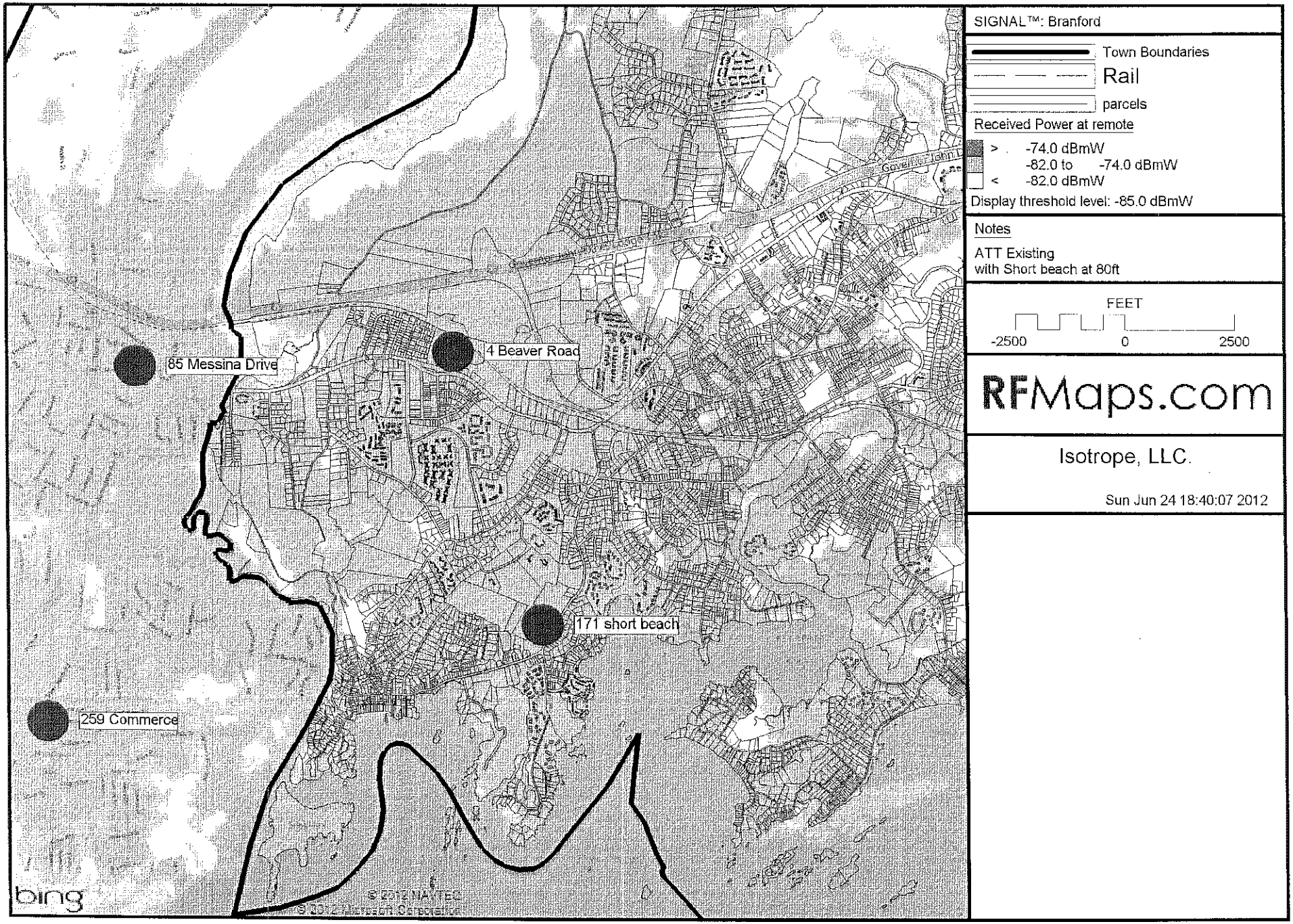
Charles River Broadcasting Company, Waltham, Massachusetts, 1978-1998.
Vice President, Director of Engineering and Technical Operations

Affiliations and Accomplishments

- Certified by the Institute of Electrical and Electronics Engineers ("IEEE") Communications Society Wireless Communications Engineering Technology program as a Wireless Communications Professional, demonstrating "a thorough understanding of different key technologies in the wireless arena." (ieee-wcet.org)
- Project Reviewer - NTIA Broadband Technology Opportunities Program and USDA Rural Utilities Service Broadband Initiatives Program – American Recovery and Reinvestment Act, 2009.
- Delegate to the National Radio Systems Committee, Digital Audio Broadcasting Subcommittee, 1998-present.
- Member of the PCIA's DAS Forum (the wireless infrastructure association's distributed antenna system group)
- Qualified expert on wireless communications matters before federal and state courts.
- Testimony, US House of Representatives Commerce Committee Telecommunications Subcommittee in the matter of Low Power FM Broadcasting, February 2000.
- Wireless facility evaluation and planning consultant to the Cape Cod Commission as well as to over a hundred municipalities in New England and beyond, 1999 to present.
- Appointed member of Massachusetts Department of Public Health ad hoc committee on revisions to electromagnetic energy safety regulations 105 CMR §122, 1997.
- Senior Member, IEEE; Certified Broadcast Radio Engineer, Society of Broadcast Engineers; FCC General Class Radiotelephone License with Radar Endorsement; Bachelor of Science, Boston University, 1977; Massachusetts Licensed Construction Supervisor #CS073481.

Publications

- Author, *The IBOC Handbook— Understanding HD Radio Technology*, 2007, Focal Press.
- Author, Chapter 2.5, *Managing Workplace and Environmental Hazards,* NAB Engineering Handbook, 10th Edition, 2007.
- Article, *Evaluating Emissions of Your New IBOC Transmitter*, Radio World Engineering Extra, June 2005.
- Article, *Posting Hazard Communications Signs at Your Radio Transmission Plant,* Radio Guide, April 2005.
- Published Paper: *Interference Potential of Hybrid Digital Transmission: An IBOC Occupied Bandwidth Case Study*, Proceedings of the National Association of Broadcasters Broadcast Engineering Conference ("NAB-BEC"), 2004.
- Published Paper: *Integrating ANSI-Compliant RF Signs Into Corporate RF Safety Programs*, NAB-BEC 2004.
- Published Paper, co-author: *Applying the Principles of Data Communications to the Development of an Open and Universal IBOC Data Protocol,* NAB-BEC 2003.



SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
with Short beach at 80ft

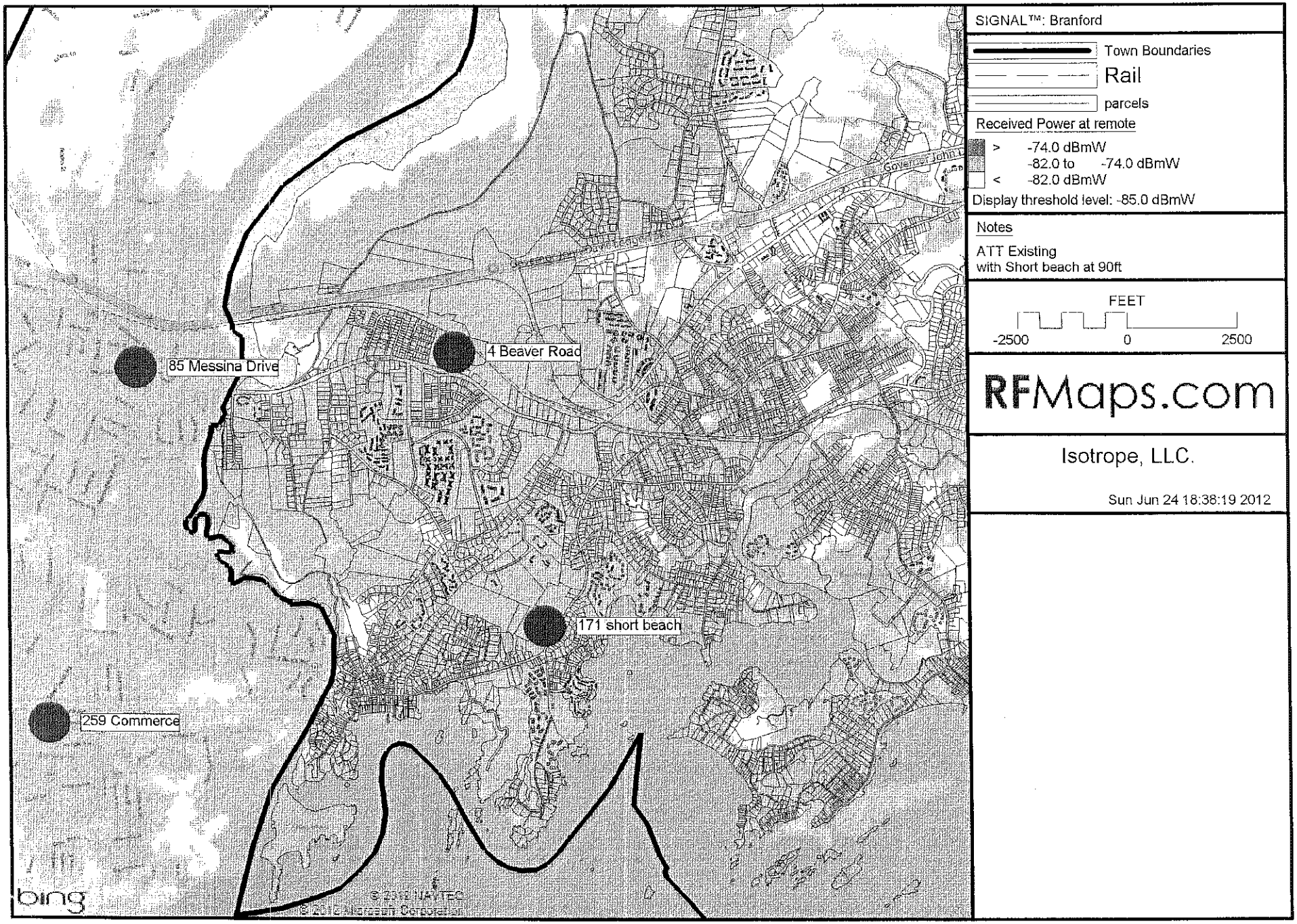
FEET

-2500 0 2500

RFMaps.com

Isotrope, LLC.

Sun Jun 24 18:40:07 2012



SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
with Short beach at 90ft

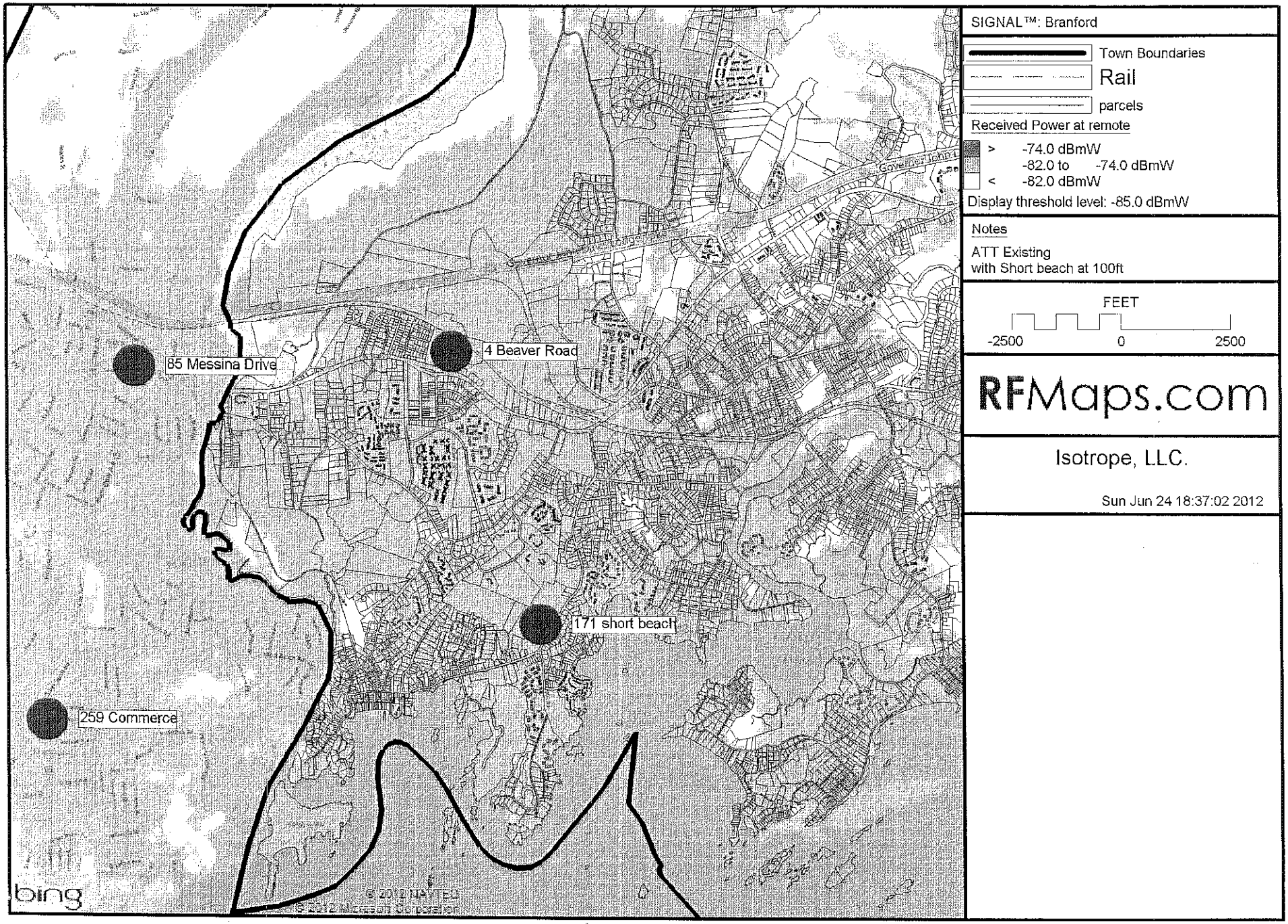
FEET

-2500 0 2500

RFMaps.com

Isotrope, LLC.

Sun Jun 24 18:38:19 2012



SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
with Short beach at 100ft

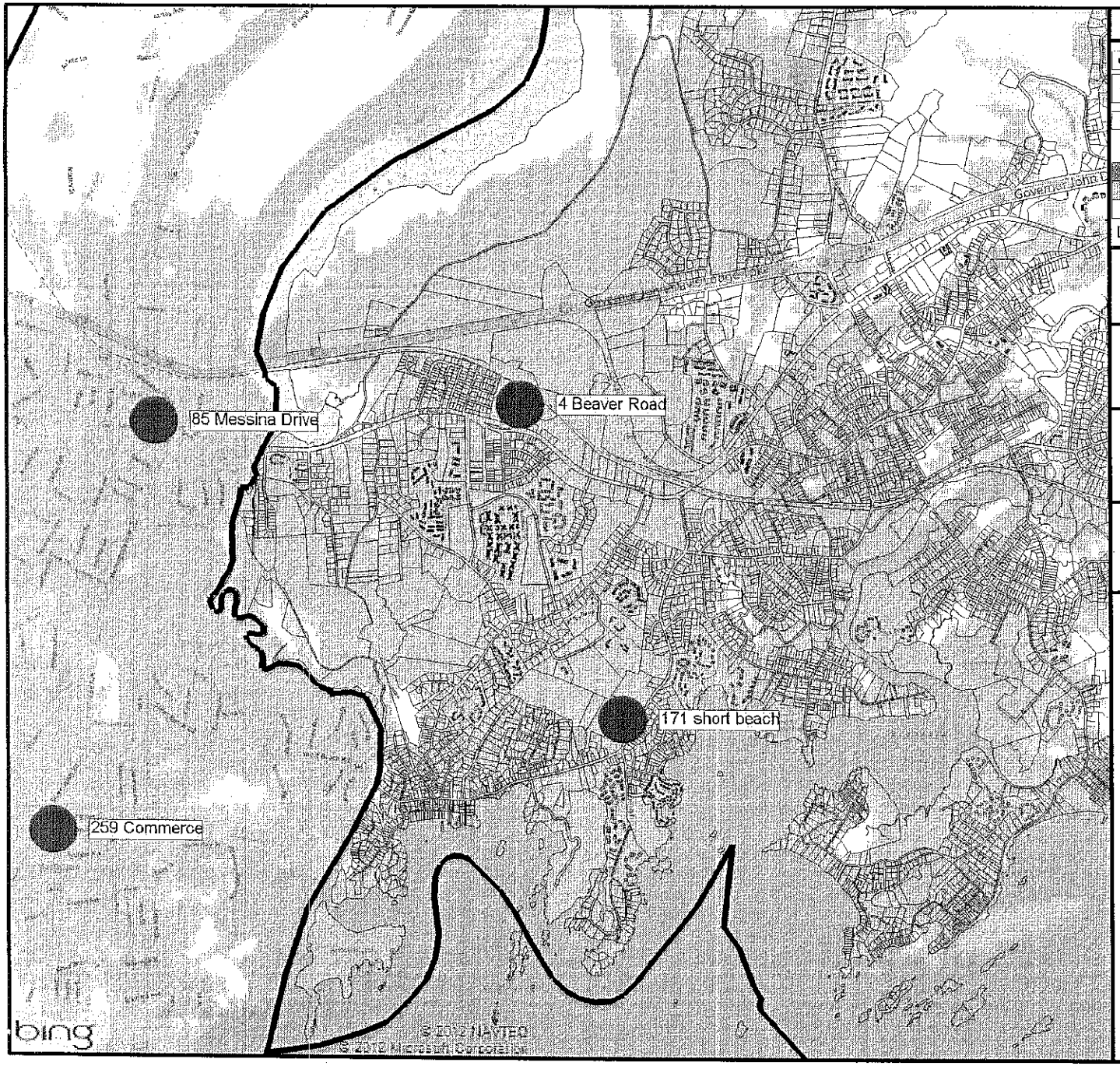
FEET

-2500 0 2500

RFMaps.com

Isotrope, LLC.

Sun Jun 24 18:37:02 2012



SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
with Short beach at 120'

FEET

-2500 0 2500

RFMaps.com

Isotrope, LLC.

Sun Jun 24 18:35:42 2012

SIGNAL™: Branford

Town Boundaries

Rail

parcels

Received Power at remote

> -74.0 dBmW

-82.0 to -74.0 dBmW

< -82.0 dBmW

Display threshold level: -85.0 dBmW

Notes

ATT Existing
with 82 Short beach at 100ft

FEET

-2500 0 2500

RFMaps.com

Isotrope, LLC.

Tue Jun 26 20:43:24 2012

Product Specifications

COMMSCOPE®

on the go

Andrew Solutions

DBXDH-6565B-VTM

DualPol® Dual Band Teletilt® Antenna, 790–960 and 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Two DualPol® antennas under one radome
- Low band is LTE 800 (Digital Dividend) ready

Electrical Specifications

Frequency Band, MHz	**790–896**	**870–960**	**1710–1880**	**1850–1990**	**1920–2180**
Gain, dBi	15.8	17.0	18.7	18.6	18.3
Beamwidth, Horizontal, degrees	66	65	65	63	63
Beamwidth, Vertical, degrees	10.0	9.2	5.2	5.0	4.8
Beam Tilt, degrees	2–12	2–12	1–8	1–8	1–8
USLS, typical, dB	15	15	15	15	15
Front-to-Back Ratio at 180°, dB	28	29	33	32	31
Isolation, dB	30	30	30	30	30
Isolation, Intersystem, dB	37	35	40	40	40
VSWR | Return Loss, dB	1.5:1 | 14.0	1.5:1 | 14.0	1.5:1 | 14.0	1.5:1 | 14.0	1.5:1 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-150	-150	-150	-150	-150
Input Power per Port, maximum, watts	500	500	400	400	400
Polarization	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm
Lightning Protection	dc Ground	dc Ground	dc Ground	dc Ground	dc Ground

Mechanical Specifications

Color | Radome Material	Light gray | Fiberglass, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 4
Wind Loading, maximum	681.0 N @ 150 km/h 153.1 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1998.00 mm | 78.66 in
Width	301.00 mm | 11.85 in
Net Weight	22.80 kg | 50.27 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	DBXDH-6565B-R2M
Model with Factory Installed AISG 2.0 Actuator	DBXDH-6565B-A2M

Regulatory Compliance/Certifications

Agency	**Classification**
RoHS 2002/95/EC	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.