COVINGTON

BEIJING BRUSSELS LONDON LOS ANGELES
NEW YORK SAN FRANCISCO SEOUL
SHANGHAI SILICON VALLEY WASHINGTON

Covington & Burling LLP
One CityCenter
850 Tenth Street, NW
Washington, DC 20001-4956
T +1 202 662 6000

December 16, 2015

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: RM-11681; IB Docket No. 12-340; IBFS File Nos. SAT-MOD-20120928-00160; SAT-MOD-20120928-00161; SES-MOD-20121001-00872

Dear Ms. Dortch:

In January and April 2014, LightSquared submitted reports emanating from a study performed by Alion Science and Technology ("Alion") concerning the compatibility of commercial wireless operations with NOAA's uses of the 1675-1680 MHz band. The Alion study, which was recommended by NOAA and funded by LightSquared, concluded that compatibility is achievable through the relocation of certain NOAA radiosondes and the establishment of defined protection and coordination zones.[1] The Alion study thus showed that it was possible to obtain the substantial public interest benefits resulting from shared access to the band.

In recent months, NOAA expressed a desire to evaluate the potential for anomalous propagation from LTE operations in the 1675-1680 MHz band impacting future GOES Rebroadcast ("GOES-R GRB") stations in the 1680.6-1692.6 spectrum band. While the Alion Report studied anomalous propagation for NOAA's Sensor Data Link (1673.4-1678.6 MHz), it did not perform a similar study for the GRB link, which was studied for the potential effects of aggregate interference. When this new concern was brought to the company's attention, it analyzed anomalous propagation for NOAA's identified GRB receive stations using the same software tools and input parameters as were used in the 2014 Alion study.

The results of this analysis, presented in the attached slide deck, show that relatively small protection zones (shown in green and red in the attached slide deck) would fully protect NOAA's GRB operations from the potential impacts of anomalous propagation. In many cases,

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[1] *See* Letter from John P. Janka to Marlene H. Dortch, RM-11681 (Jan. 30, 2014) (submitting Alion Task 1 Report); Letter from Jeff Carlisle to Marlene H. Dortch, IB Docket No. 12-340, RM 11-11681 (Apr. 14, 2014) (submitting Alion Task 2 Reports).

these new protection zones are situated entirely within previous protection zones calculated by Alion (shown in white circles in the slide deck) for the multi-site (aggregate) interference analysis that they performed for GRB receive locations.

This study was shared with NOAA as a courtesy prior to its submission to the Commission. Similarly, the "Assessment of the 1675-1680 MHz Band Report," which was submitted on November 5, 2015, also was shared with NOAA in advance of its submission to the Commission, though we did not receive any comment from NOAA on either document. The Commission should analyze use of this band with a robust record, and that is why the Commission promptly should issue a Public Notice so that all stakeholders—not just NOAA, but actual users—can comment. That will give the Commission the information it needs to include a discussion of legitimate remedial measures as a license condition in future proceedings to make this band available for shared commercial use.

Respectfully submitted,

/s/Gerard J. Waldron
Gerard J. Waldron
Paul Swain
Counsel to New LightSquared

cc: NOAA

Attachment

LightSquared

Single Entry GOES-R GRB Analysis

12/10/2015

Purpose of Analysis

- NOAA has expressed a desire to evaluate the potential for anomalous propagation from LTE operations in the 1675-1680 MHz band impacting future GOES-R GRB (GOES Rebroadcast) stations in the 1680.6-1692.6 spectrum band.
- While the Alion report released in 2014 studied anomalous propagation for NOAA's Sensor Data Link (1673.4-1678.6 MHz), it did not perform a similar study for the GRB link*.
- LightSquared has performed an anomalous propagation analysis for NOAA's identified GRB receive stations using the same software tools and input parameters as were used in the 2014 Alion report
- The results of this analysis, presented in the following slides, show that relatively small protection zones would fully protect NOAA's GRB operations from the potential impacts of anomalous propagation
- In many cases, these new protection zones are situated entirely within previous protection zones calculated by Alion for the multi-site (aggregate) interference analysis that they performed for GRB receive locations.

* For the GRB link, Alion performed an analysis that measured the potential effects of aggregate interference coming from multiple site locations based on CSMAC WG-5 site layout. Aggregate interference analyses do not consider anomalous propagation, which does not occur from multiple sites simultaneously.

Key Analysis Parameters

Parameter	Value*	Description
P-Value	0.025%	The time percentage which the Long Term Interference Threshold (*see below)* must not exceed. This value is equivalent to a probability of occurrence that equals about 2 hours per year.
Center Frequencies	GRB: 1686.6 MHz LTE: 1675 MHz	Center frequency of the GRB channel, which is within the channel bandwidth of 1680.6, to 1692.6 MHz. Center frequency of the proposed LTE channel, which will be within the channel bandwidth of 1670-1680 MHz.
Satellites	75W and 137W	These are the assigned orbital positions for the GOES-R satellites that will be transmitting the GRB channel.
Antenna Pattern	ITU-R S465-5; Wallops pattern	With the exception of Wallops Island, the GRB receive antennas are characterized by the ITU-R S465-5 antenna model. Wallops Island uses a unique antenna that is structurally strengthened to withstand hurricane-force winds, with the resulting bracing impacting its antenna pattern so that it is significantly different from the ITU model. Accordingly, NOAA provided the actual pattern for this facility in the Alion report, and the pattern was utilized in this analysis for Wallops Island.
Propagation Model	ITU-R P452-15	This is the propagation model that has been used in all of the Alion analyses for this spectrum band, with the parameters adjusted accordingly for this specific analysis as detailed in this table. These analyses were run using Visualyse Professional software release 7.924 from Transfinite Systems.
Terrain Files	3 arc second (except AK where 30 arc second data was used)	Propagation modeling is greatly affected by the surrounding terrain. This analysis used high resolution 3 arc second files, which averages terrain data that is taken at roughly 90 meter intervals. This data is not available for Alaska, where 30 arc-second data was used instead -- and which corresponds to data collection at roughly 900 meter intervals. This is consistent with the approach used by Alion in its analyses.

* All values listed in table are equivalent to the values in the previous Alion studies of the band unless otherwise noted.

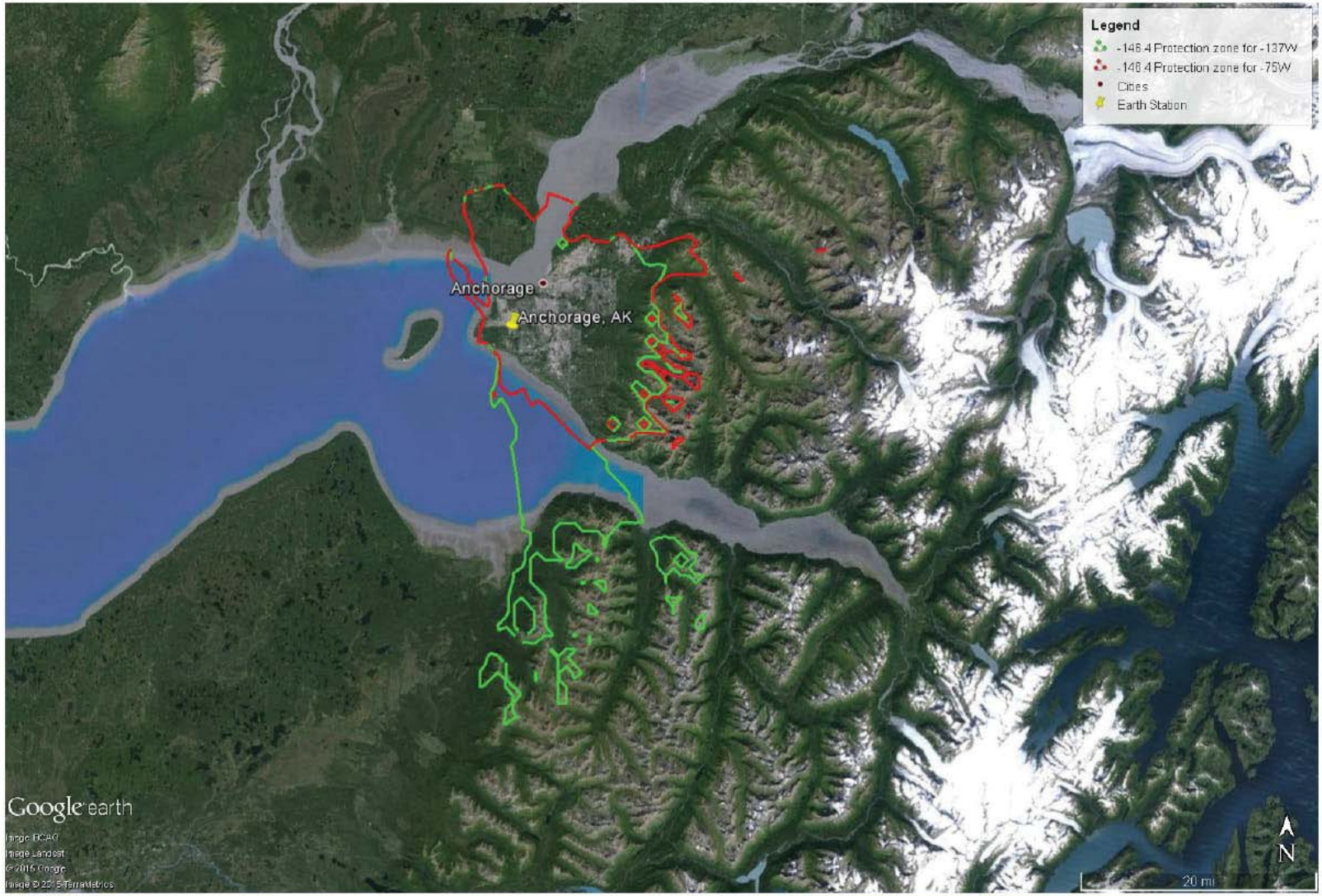
Key Analysis Parameters

Parameter	Value*	Description
Long-Term Interference Threshold	-146.4 dBW	The Interference Threshold is the receive power level used to define harmful interference. Separate values can be used to characterize ongoing interference (long-term) versus short duration (short-term) events. The Alion analyses used both long-term and short-term interference thresholds, with the short term limits being less stringent. For the purpose of this analysis, only the Long-Term value was utilized which is the most conservative approach and results in larger protection zones than if short-term values were considered. This long term interference value was originally derived by Alion using an interference to noise ration (I/N) of -10 dB.
Frequency-Dependent Rejection	51.5 dB	This is a measure of the ability of a receiver to reject adjacent band transmissions and is a function of: a) the emissions mask of the transmitting signal, b) the types of filtering resident in the receiver and c) the spectral separation between the transmitted and desired receive signal being analyzed.
Cell Tower Height	45 meters	All towers were assumed to be at a height of 45 meters which is consistent with the values used by Alion in their single-entry analysis of the Sensor Data Links.
Cell Antenna Orientation	At receiver boresight	This analysis assumes that the transmitting LTE site always is oriented with the antenna's maximum gain pointed directly at the receive station being analyzed. This results in the highest possible power being assumed, even though the typical cell site orientations would actually have reduced power levels being received when the transmit antennas are not directly pointed at the receive station.

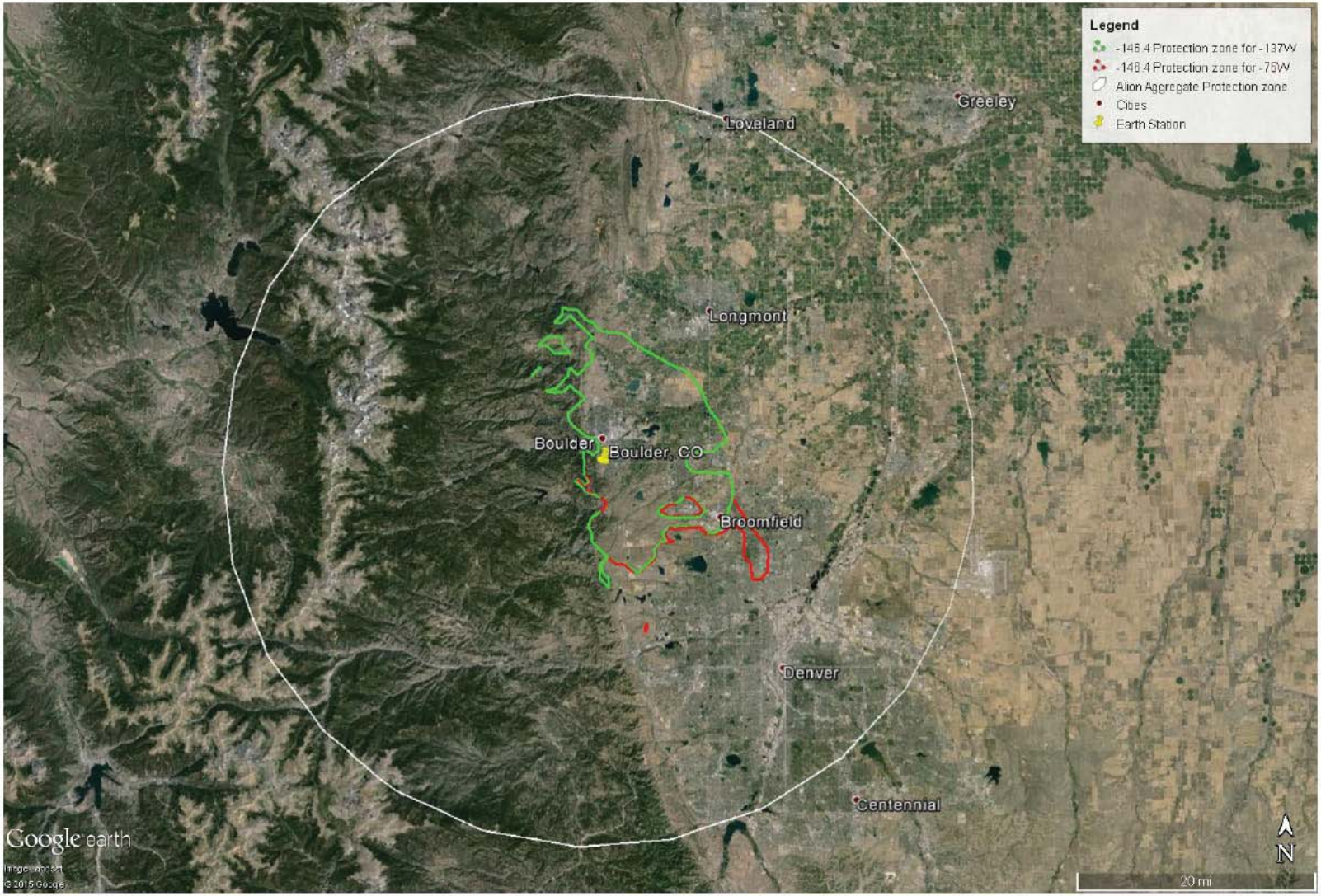
* All values listed in table are equivalent to the values in the previous Alion studies of the band except where otherwise noted.

Calculated Protection Zone Contours for Planned NOAA GRB Receive Sites

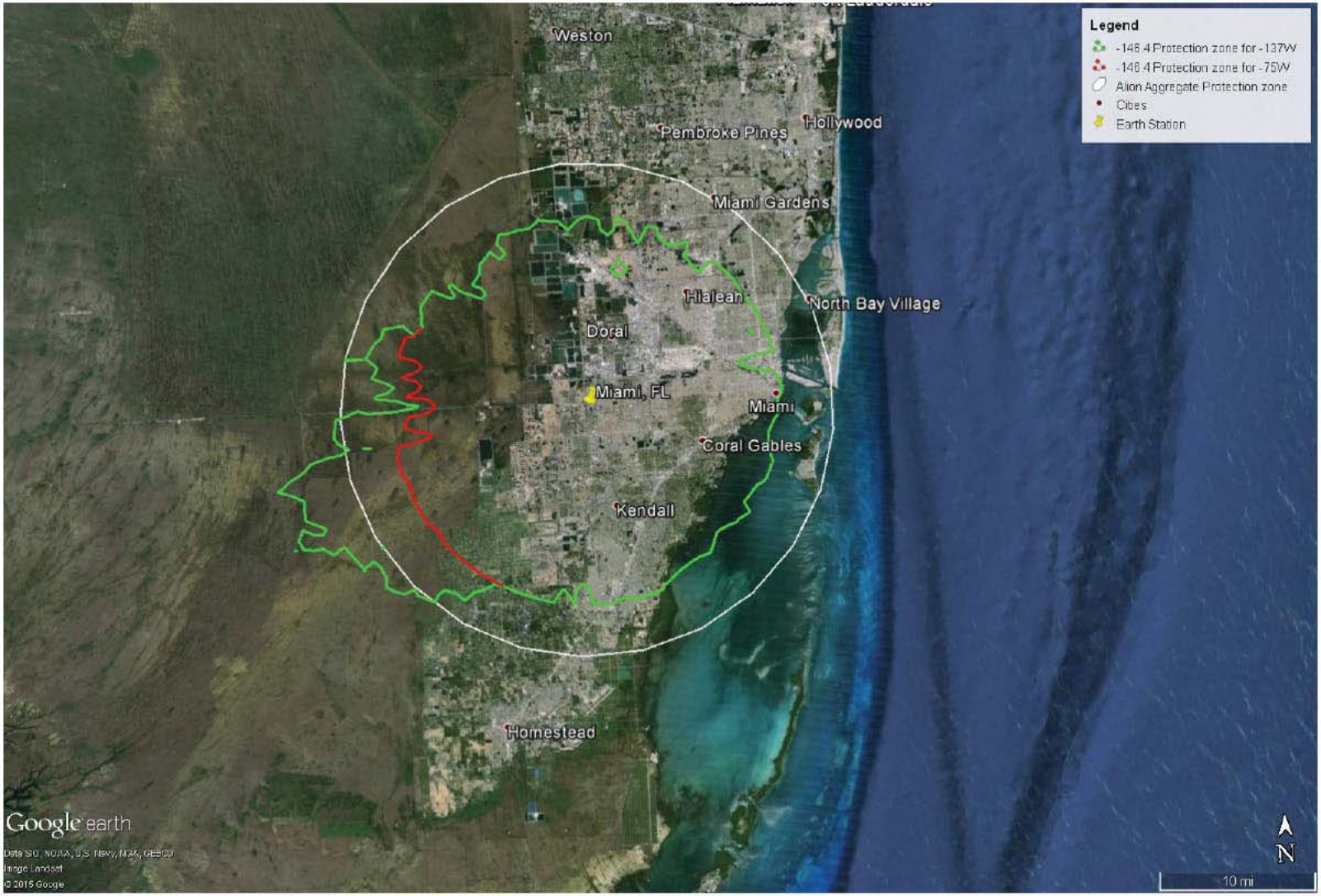
Anchorage, AK Protection Contours



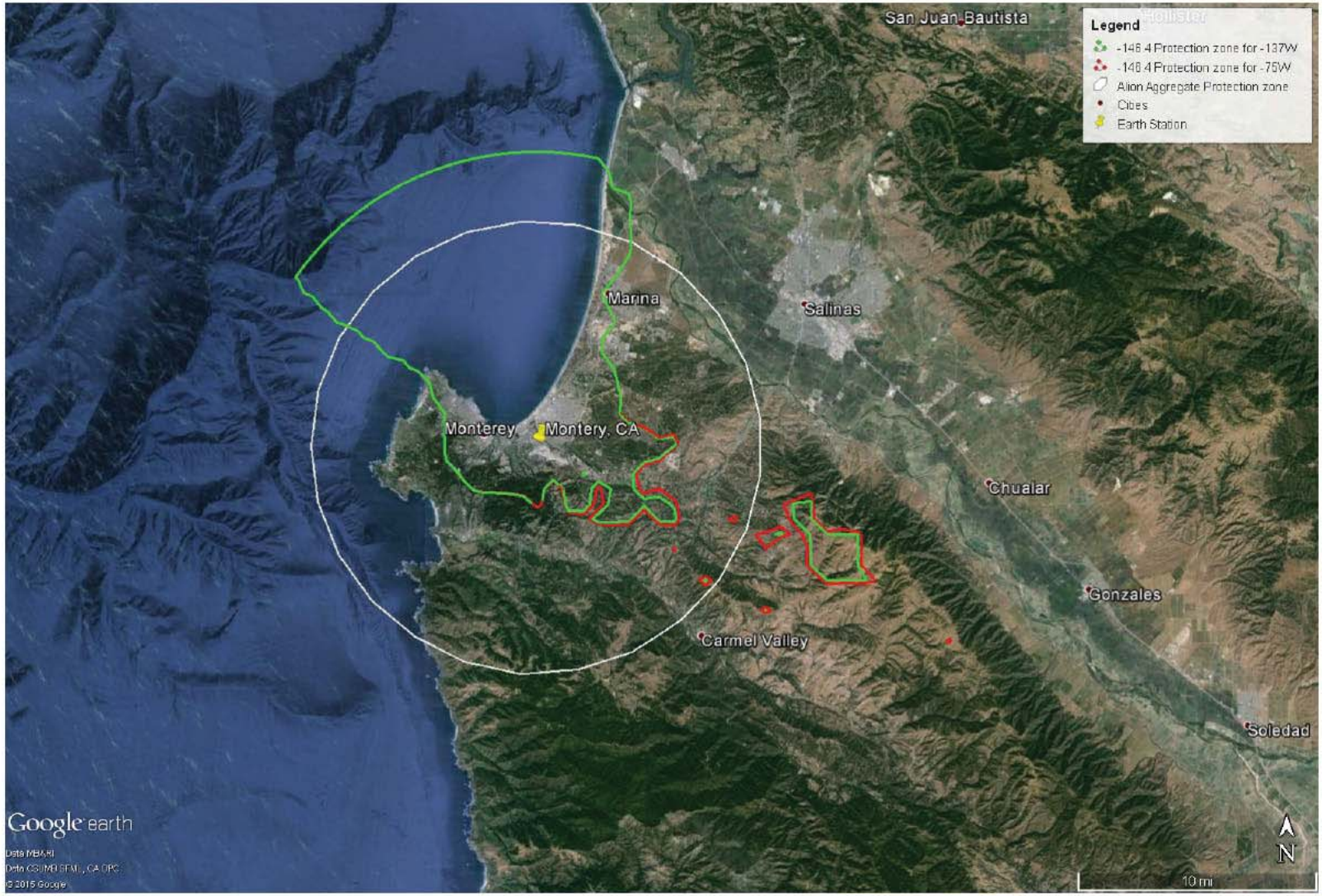
Boulder, CO Protection Contours



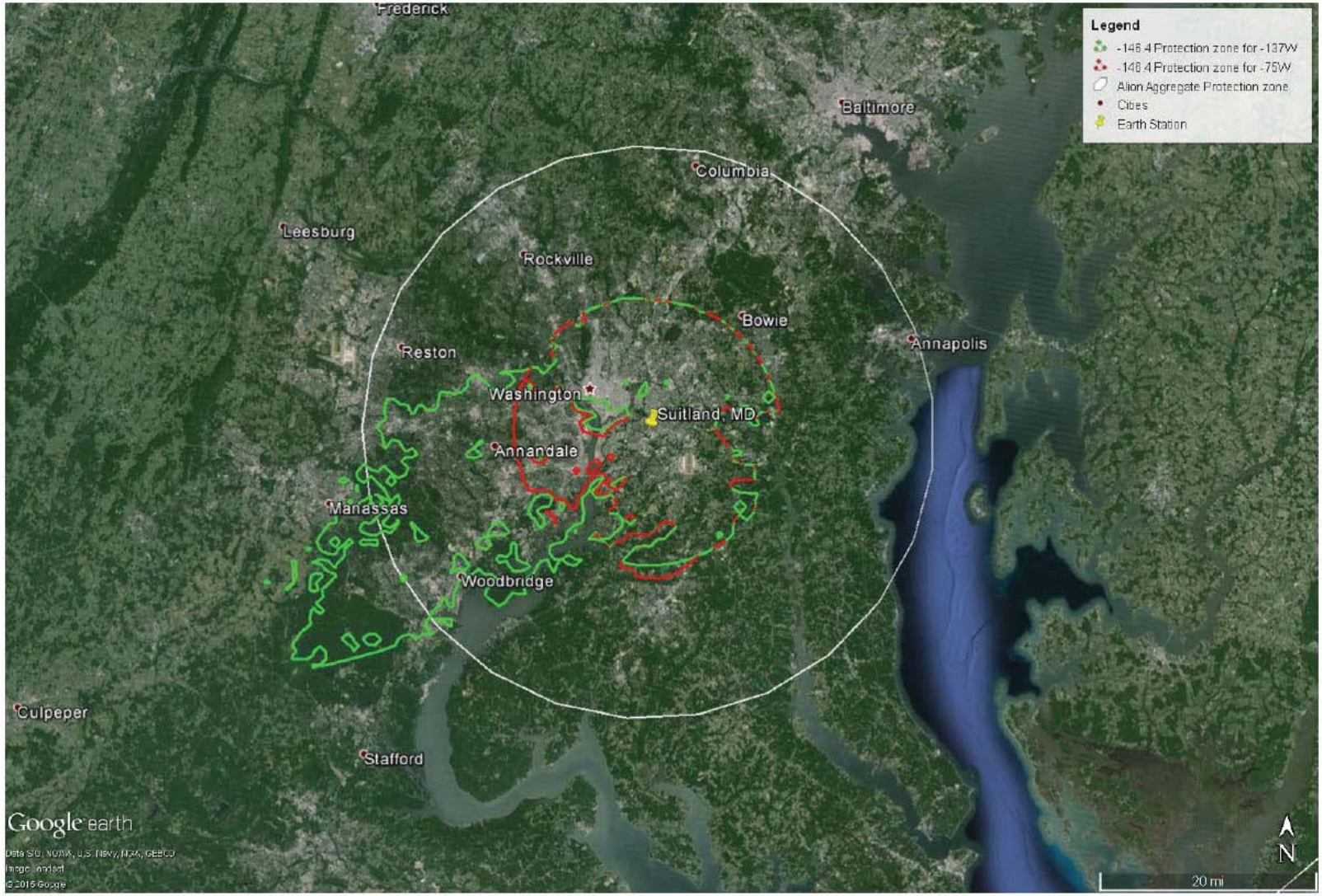
Miami, FL Protection Contours



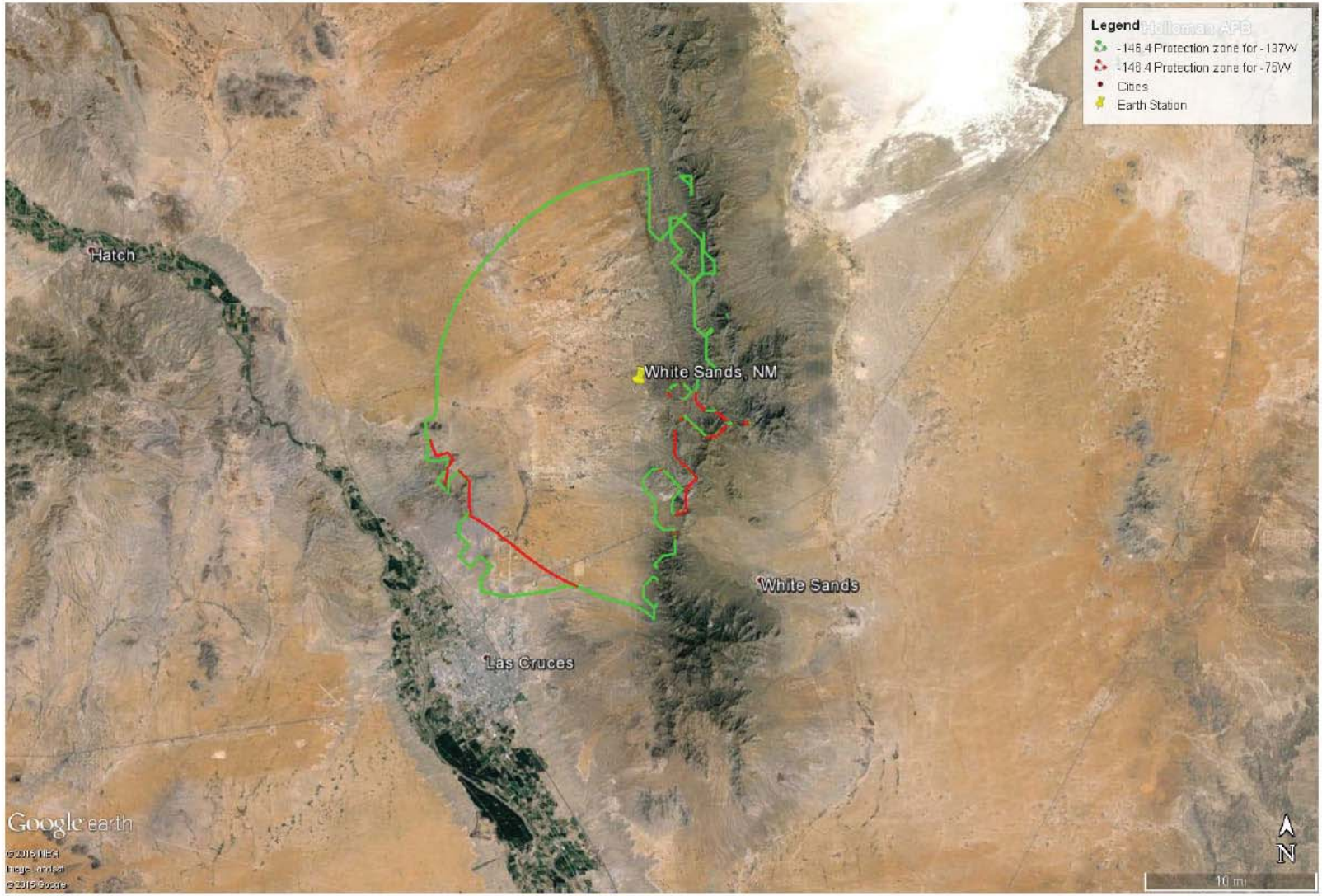
Monterey, CA Protection Contours



Suitland, MD Protection Contours

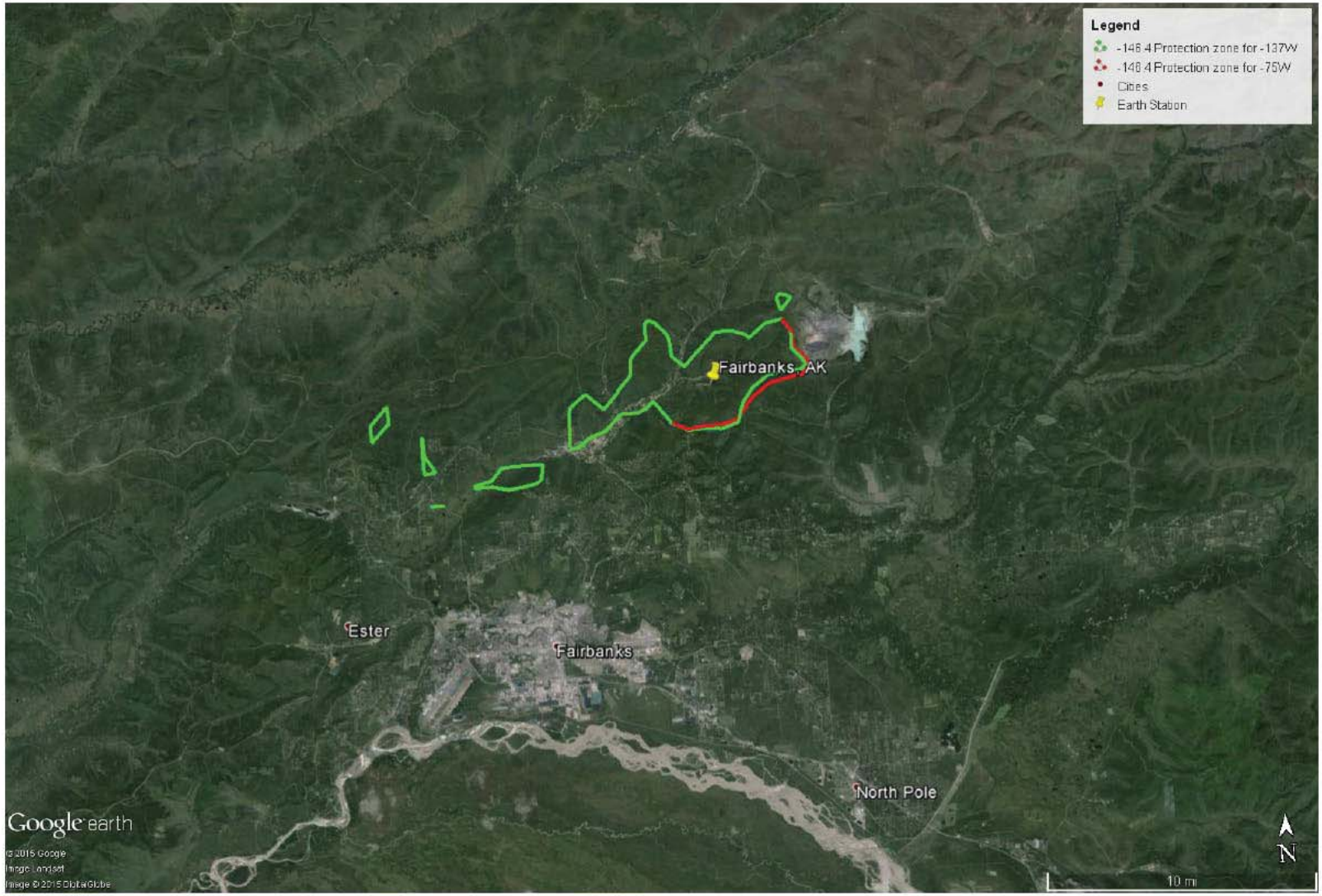


White Sands, NM Protection Contours

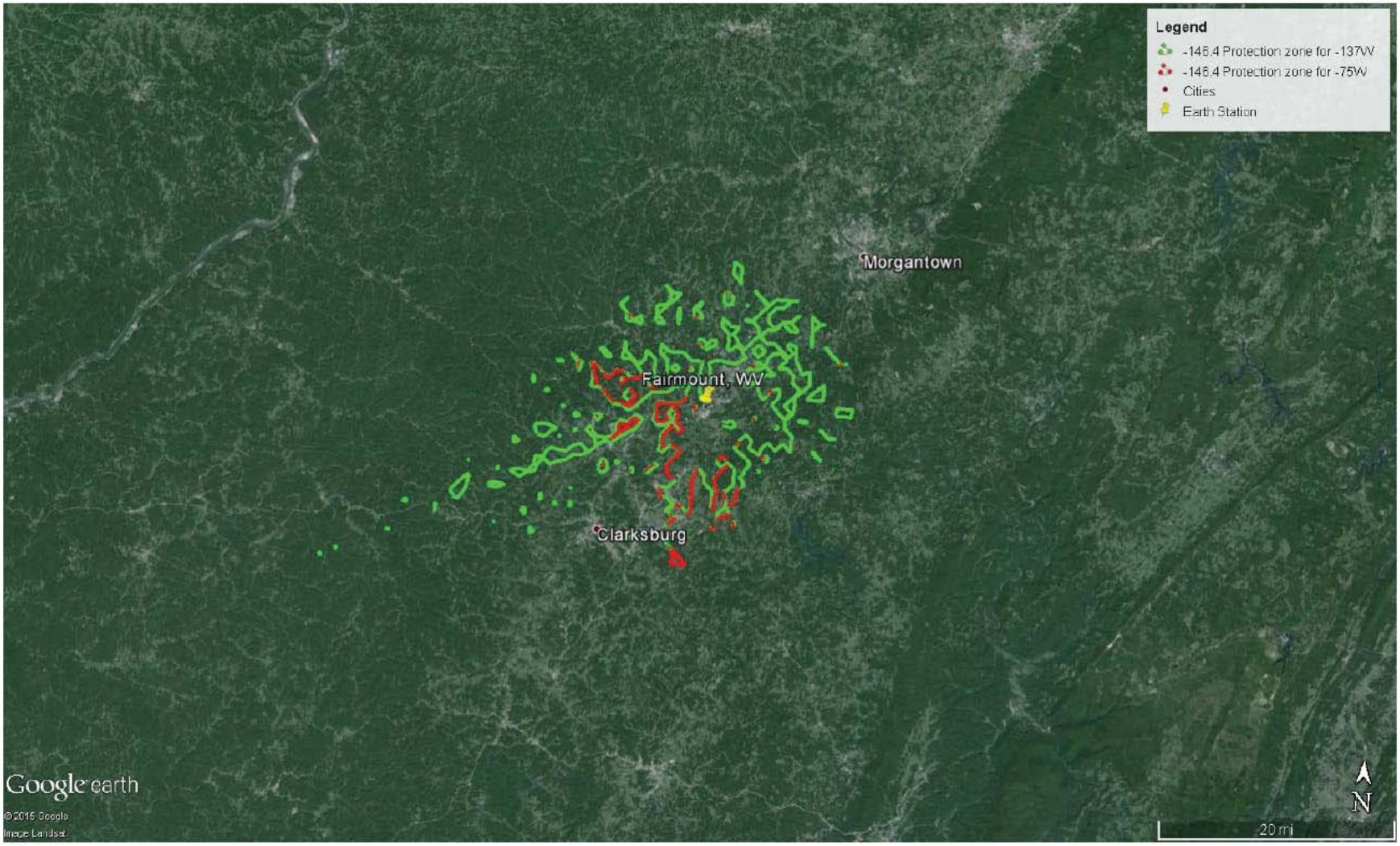


Calculated Protection Zone Contours for Possible Future NOAA GRB Receive Sites

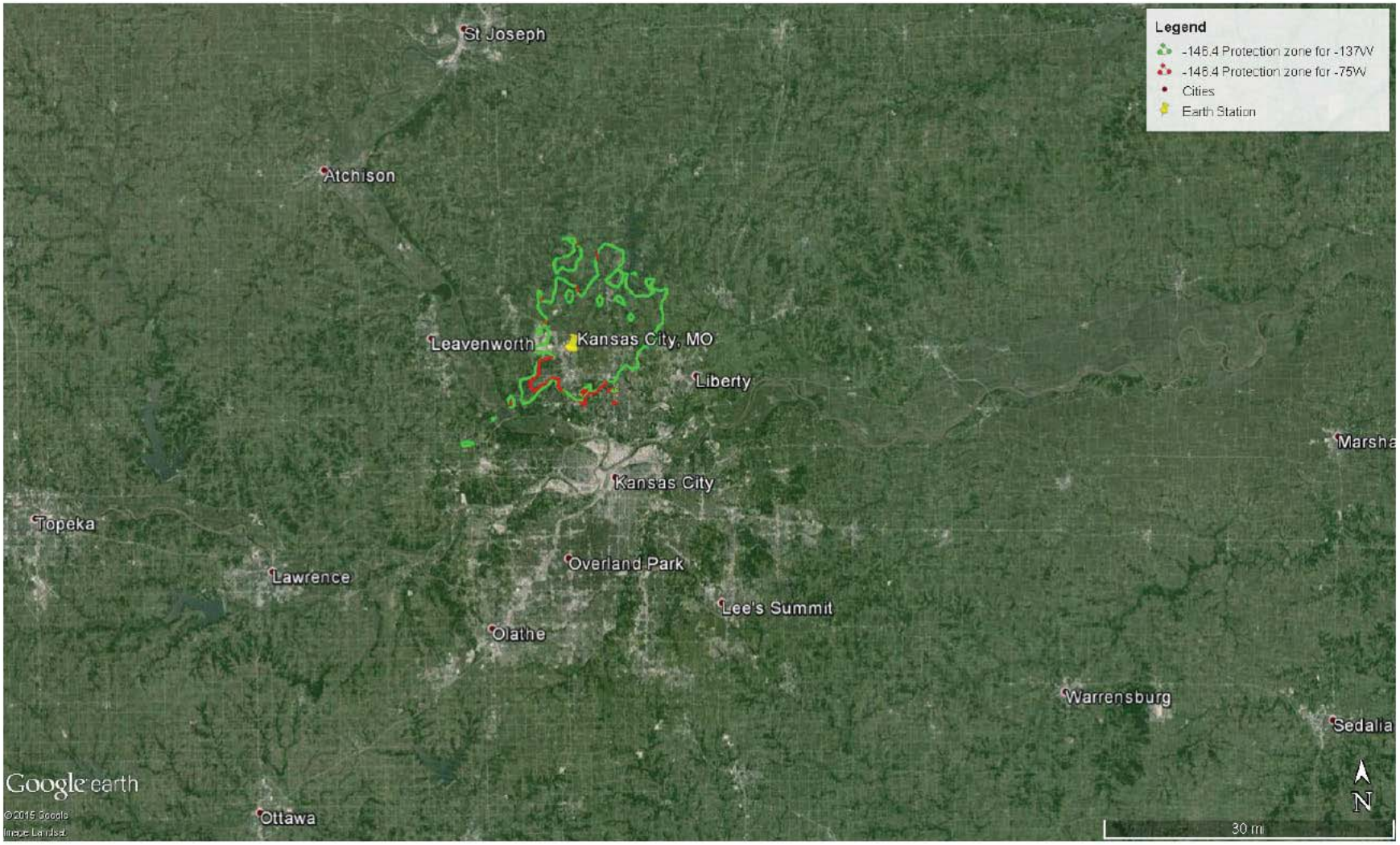
Fairbanks, AK Protection Contours



Fairmont, WV Protection Contours



Kansas City, MO Protection Contours



Wallops, VA Protection Contours