This document provides clarification regarding the proper application of "keyholes" for protecting the receive channels of TV translator/LPTV stations, TV Translator Relay stations, and MVPDs. For such stations, Section 15.712(b) of the rules provides that "…receive sites located outside the protected contour of the TV station(s) being received may be registered in the TV bands database if they are no farther than 80 km outside the nearest edge of the relevant contour(s)." This section further provides that "TVBDs may not operate within an arc of +/- 30 degrees from a line between a registered receive site and the contour of the TV station being received in the direction of the station's transmitter [center line] at a distance up to 80 km from the edge of the protected contour of the received TV station for co-channel operation and up to 20 km from the registered receive site for adjacent channel operation, except that the protection distance shall not exceed the distance from the receive site to the protected contour. Outside this +/- 30 degree arc, TVBDs may not operate within 8 km from the receive site for co-channel operation and 2 km from the receive site for adjacent channel operation."

Application of keyhole protections under these rule provisions is straightforward when the protected contour of the received TV station is a convex curve and the nearest point on the contour to the receive site is 80 km or less and along the "center line" between the receive site and the transmitting station. In such cases, the keyhole extends from the receive site to the edge of the contour where the center line between the receive site and the station's transmitter intersects the contour, up to a distance of 80 km from the receive site (for waivered receive sites the distance to nearest point on the contour will be more than 80 km and the maximum keyhole range will apply).

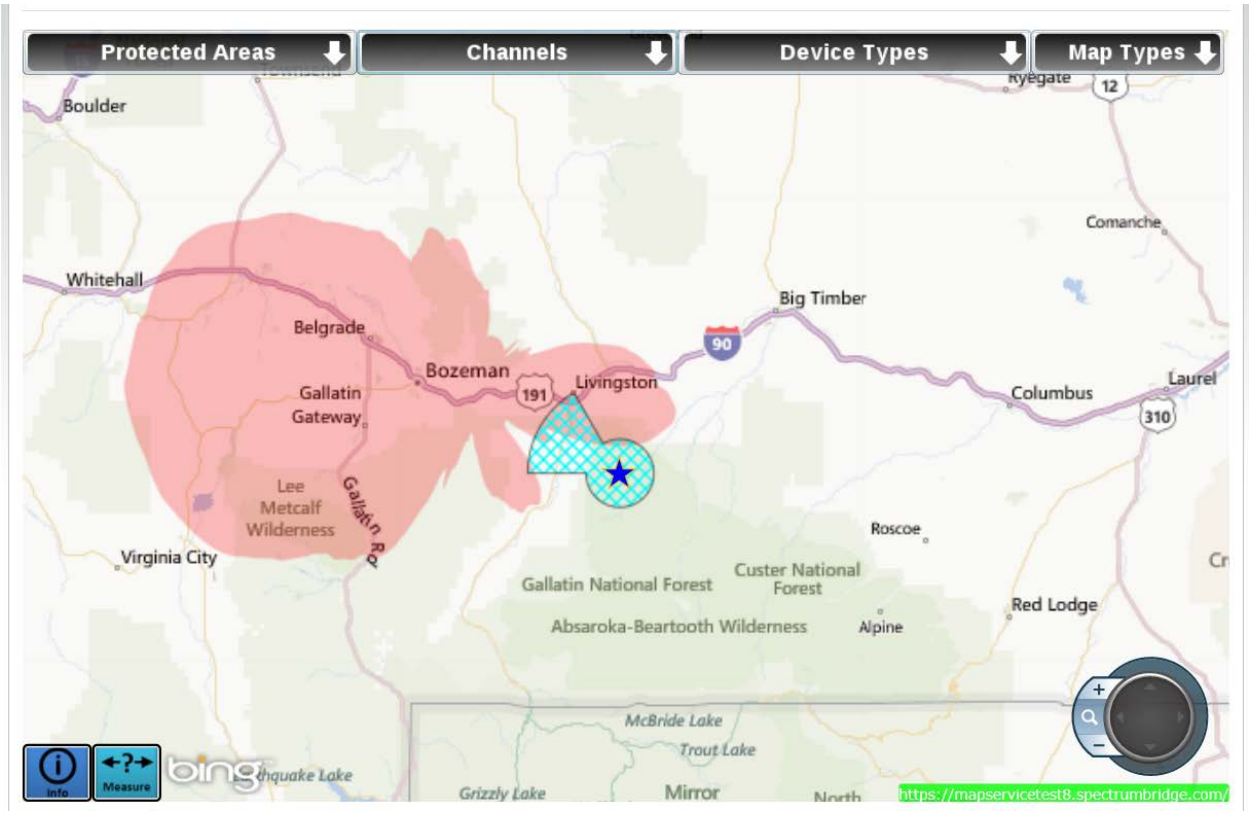
However, not all TV station protected contours are convex curves and in fact, as shown in the three examples below, there are cases where the transmitting station's protected contour is such that at points off the center line the contour is closer to the receive site than it is at the point where the contour intersects the center line. As demonstrated in these examples, to properly apply the keyhole protection in such cases, the TVWS databases should extend the keyhole protection to the station's contour at the point where the edge of the contour intersects the center line. Portions of the keyhole that are off the center line will then encompass portions of the station's protected contour. In cases where the distance to a station's contour on the center line is more than 80 km and there are locations on the contour that are 80 km or less from the receive site, keyhole protection is to be provided. In these cases the distance to the center-line intersection point on the contour will be greater than 80 km and the maximum keyhole range will apply. In other words, if the distance along the centerline is greater than 80km, a secondary check should be performed to see if an 80km keyhole intersects any portion of the transmitting station's protected contour. If there is an intersection, an 80km keyhole should be used. If there is no intersection, there should be no keyhole protection, unless it is a waivered receive site.

The TVWS databases should not extend keyholes into (inside) the contours of TV stations except in cases where portions of a station's contour not on the center line are located closer to the receive site than the distance at which the center line intersects the contour. For example, if a center line intersects a station's contour at a distance of 50 km, the databases should not extend the keyhole out to the 80 km maximum keyhole range. Note that the receive site is still protected from TVBD operations within the contour by the co-channel and adjacent channel protections provided for the transmitting station itself.

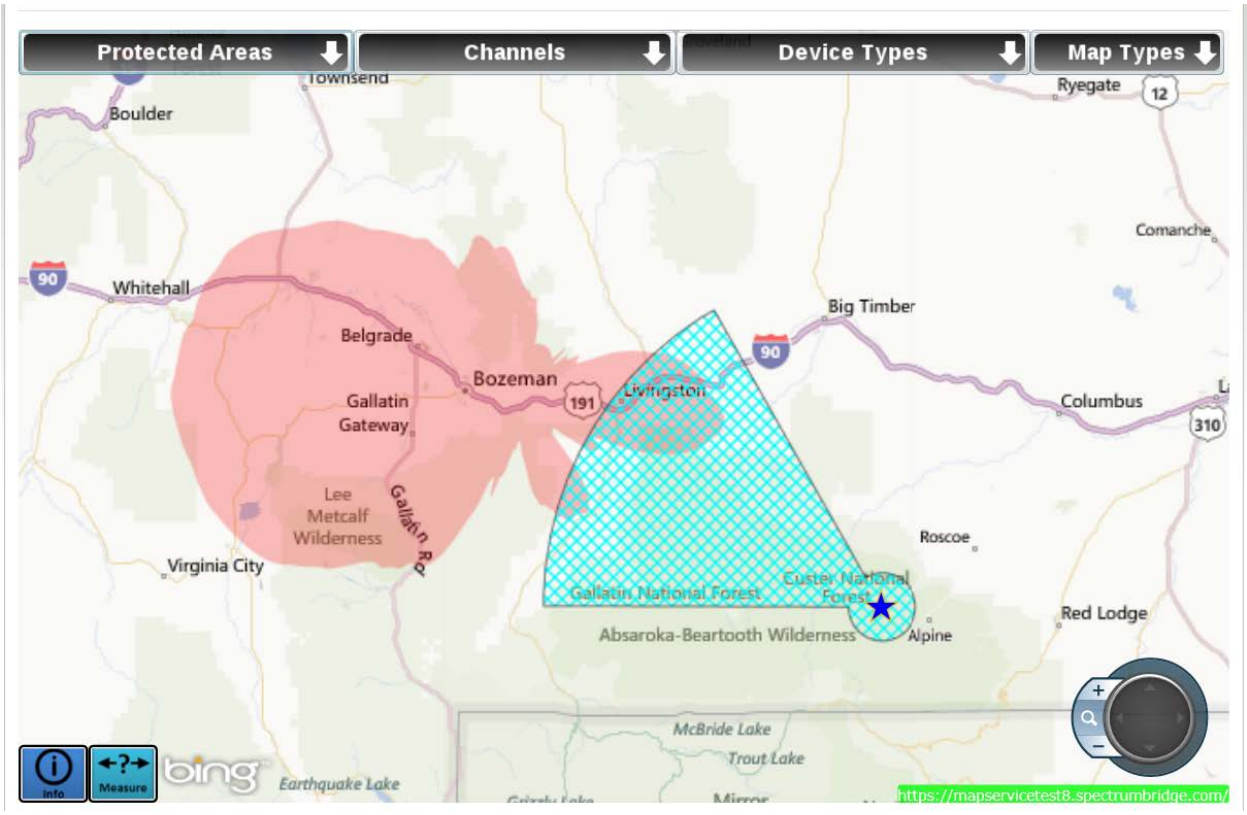
Next, for licensed and temporary BAS receive sites, Section 15.712(c) of the rules similarly provides that "TVBDs may not operate within an arc of +/- 30 degrees from a line between the BAS receive site and its associated transmitter within a distance of 80 km from the receive site for co-channel operation and 20 km for adjacent channel operation. Outside the +/- 30 degree arc, TVBDs may not operate within 8 km from the receive site for co-channels operation and 2 km from the receive site for adjacent channel operation." Service contours are not a consideration with fixed BAS operations, so in all cases keyholes should be centered on, and extend only as far as, the transmit site of the protected BAS facility.

EXAMPLES:

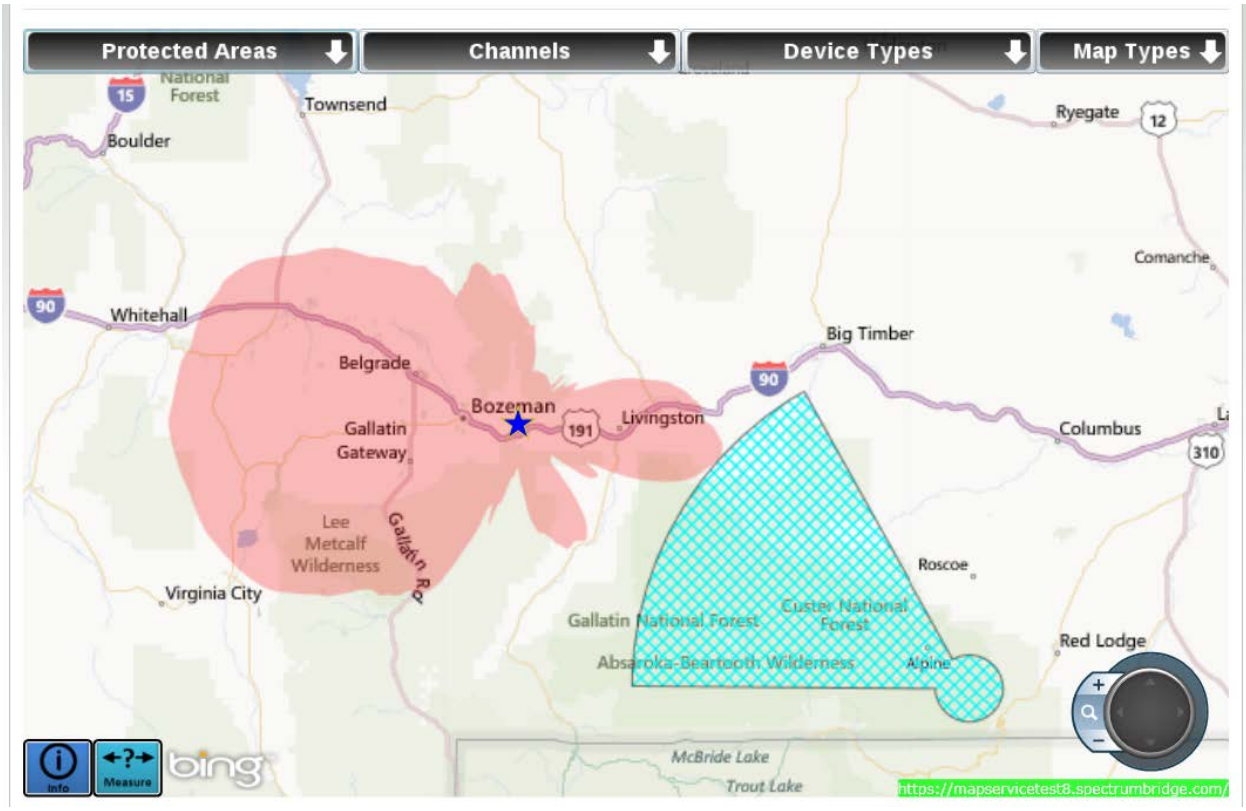
These examples show the maximum protection distances to be used as described above.



Example 1. The receive site is located at 45.4925, -110.4236, 40 km along the 120° radial from the K42BZ-D transmitter. The protection area is to extend only to the point where the center line first intersects the transmitting station's contour.



Example 2. This example shows the protection distance at the maximum of 80 km from the center line intersection with the contour. The receive site is located at 45.2275, -109.78, 80 km along the 120° radial from the K42BZ-D 120° contour point. The protection area extends around and beyond several lobes of the protected contour, to the 80 km limit at both of the +/-30° sides of the keyhole.



Example 3. This example shows the receive site at the maximum of 80 km from nearest edge of the contour. The receive site is located at 45.1121, -109.5105, 123 km along the 120° radial from K42BZ-D, but only 80 km from the nearest edge of the contour, which is at the 110° radial. TVWS devices may be authorized in the area along the center line between the keyhole and the service area (contour) of the transmitting station.