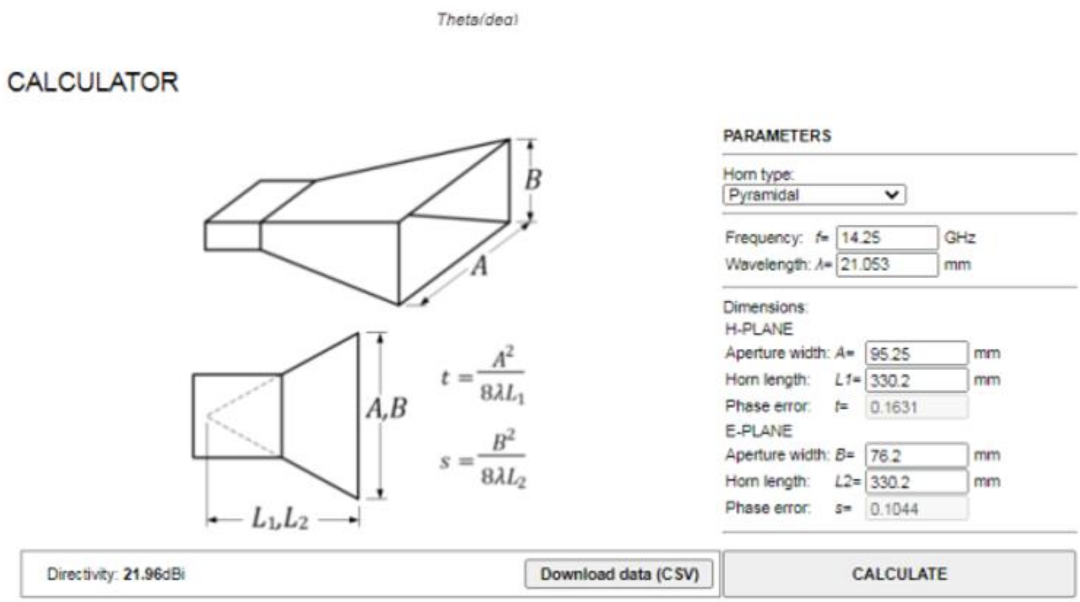
For the two antennas, the sidelobes and the nulls are defined by the aperture [the Bessel function]. So the shapes of the peaks and nulls will be pretty similar. But, the only two measurements that matter with respect to the mask are a) the bore-site gain and b) the sidelobe peaks.

We are using a standard gain, pyramidical horn. As described above, the shape of the pattern is defined by a Bessel function and thus can be modeled. We used antennahorncalculator.blogspot.com. It is shown below and is the basis for the power density plot shown below. It calculates 22 dBi;

We used 23 dBi to be conservative.The purpose of the horn is to provide a standard gain reference. The array antenna is made by higher ground. This allows some comparison.

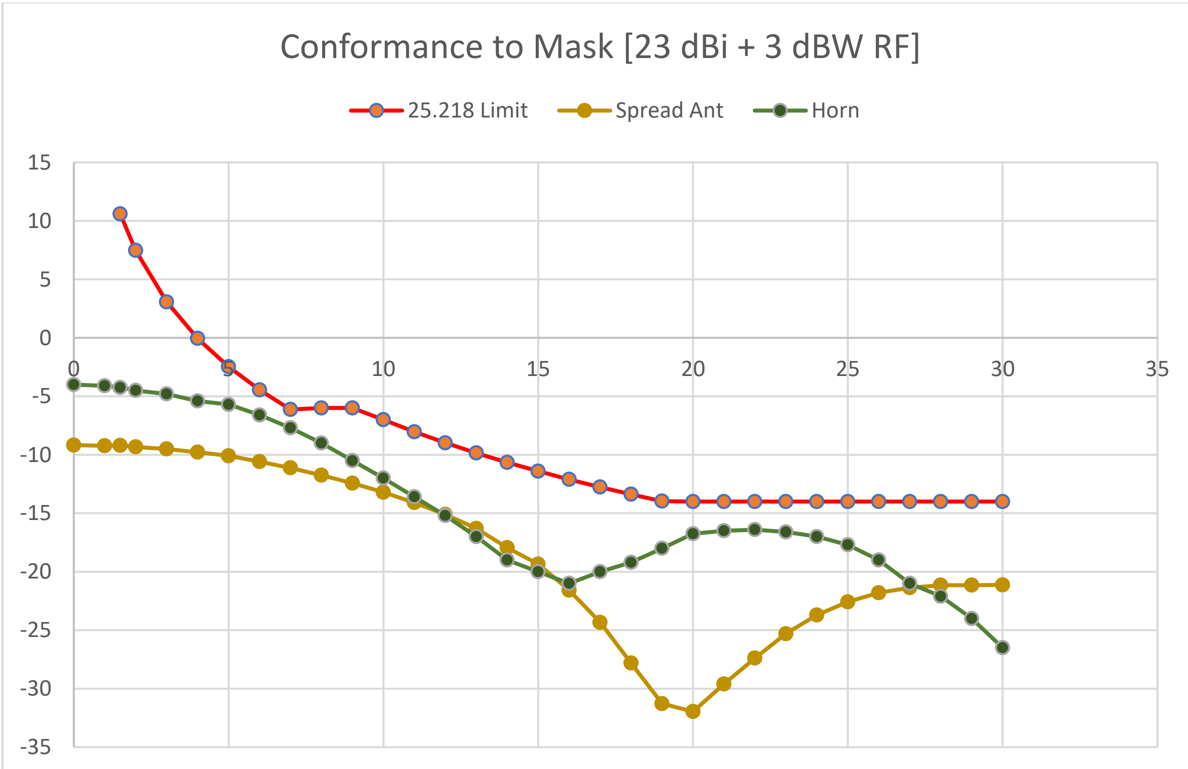


The quick power calculation is: we have 3dBW of RF power, which goes in to the 22 dBi antenna. This output power is 25 dBW or 316 W EIRP. The application showed 400 watts or 26 dBW. We added an extra dB over our real numbers to show that we don’t cross the mask even with the additional margin.

The density at boresight is then 10 log10(400W) - 10 log10(4e6 Hz) + 10 log10(4e3 Hz) = -4 dBW / 4kHz. This is just what we show in the plot below.

In the real test, none of these elements work at their ideal gain. We have waveguide adapters and transmission cables that back off these numbers by greater than 1 dB. This gives us at least 2 dB of headroom from the mask shown below.

There is nothing in our system, power amp or antenna which can cause us to exceed the mask since our signal is spread over the 4 MHz bandwidth identified in the emission designator.



Conformance to Mask [23 dBi + 3 dBW RF]
25.218 Limit
Spread Ant
Horn
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
0
5
10
15
20
25
30
35