

Directional Antenna Information and Modulating Signal Description

UMBRA

File #0314-EX-ST-2022

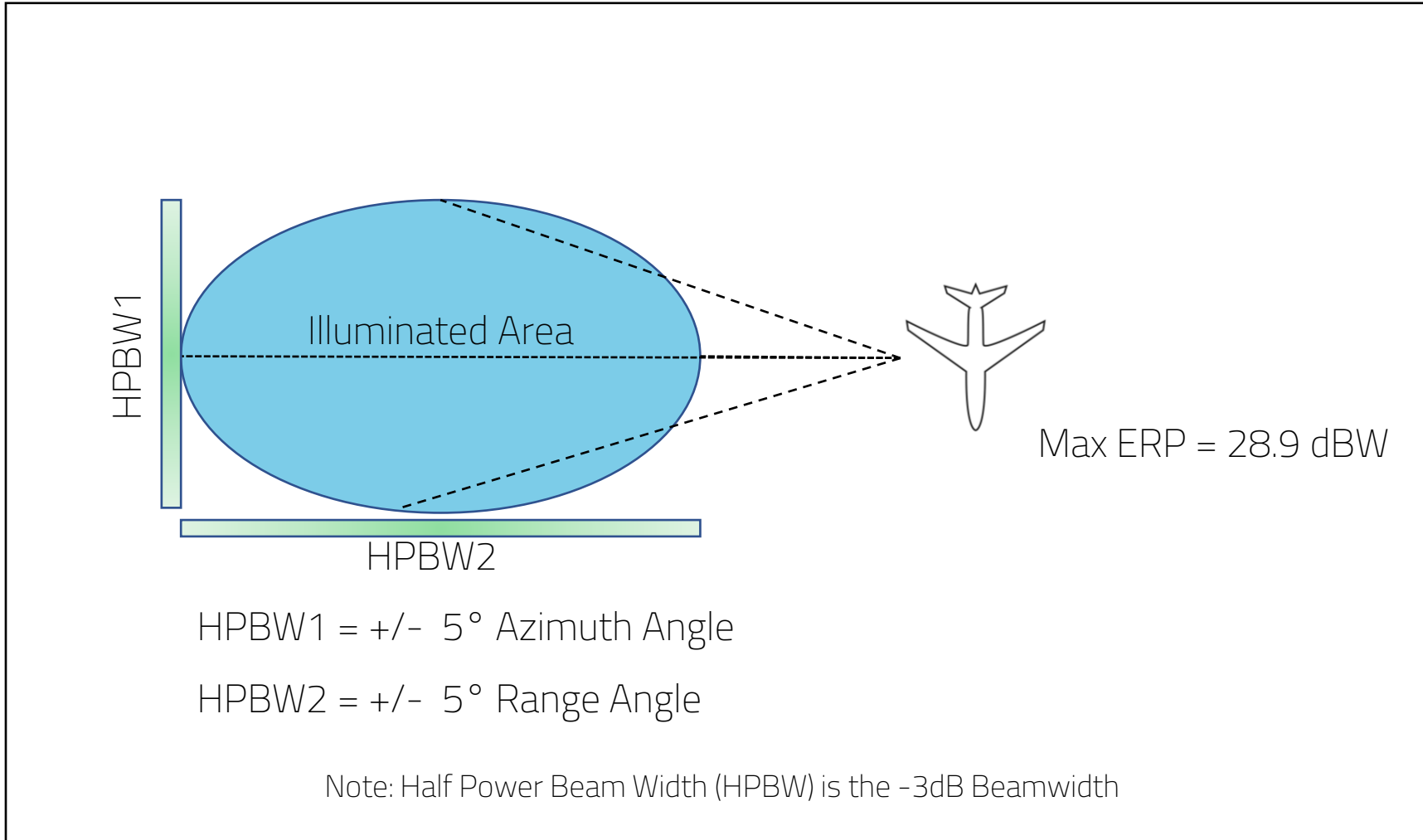
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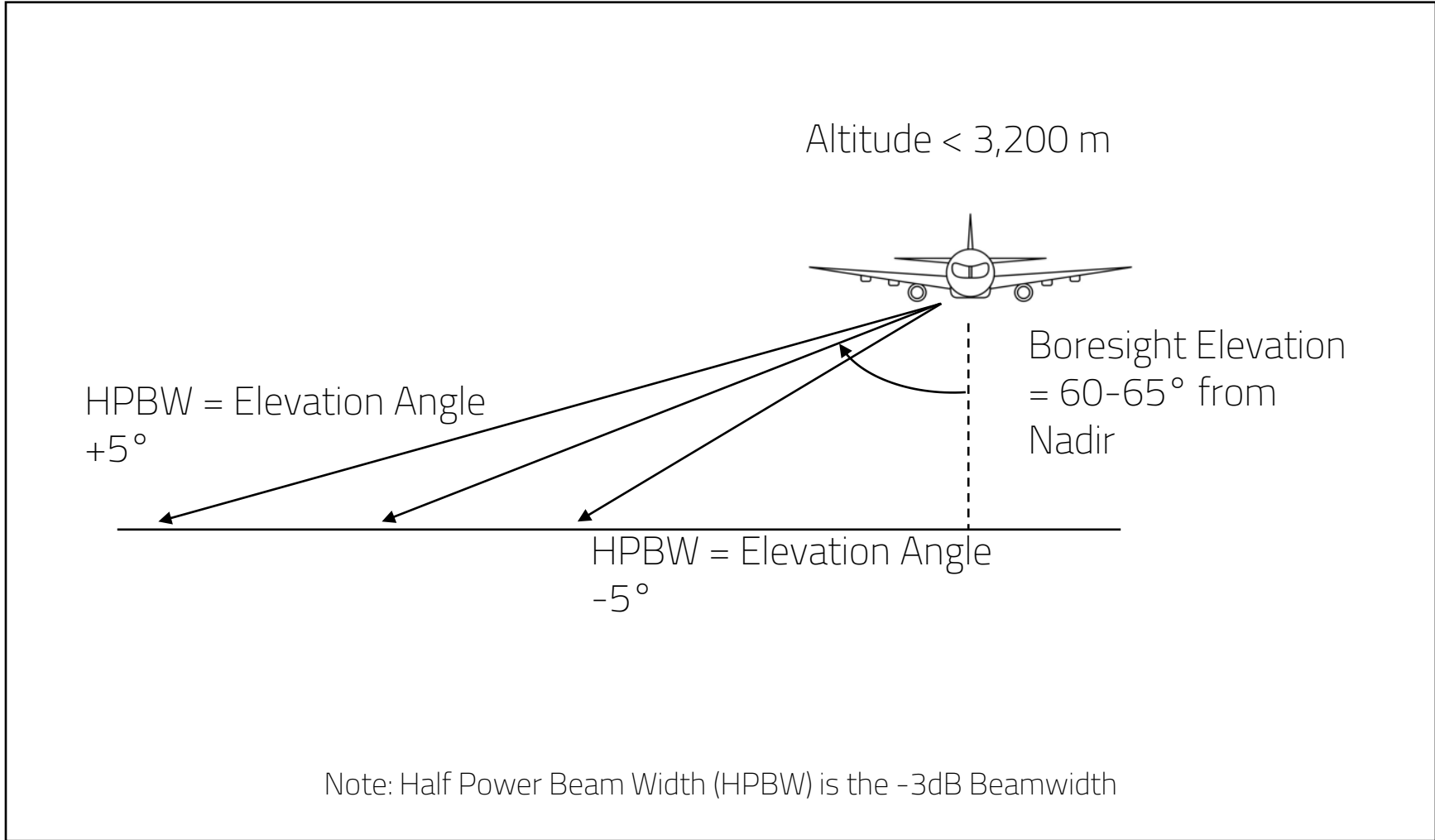
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Top Down View



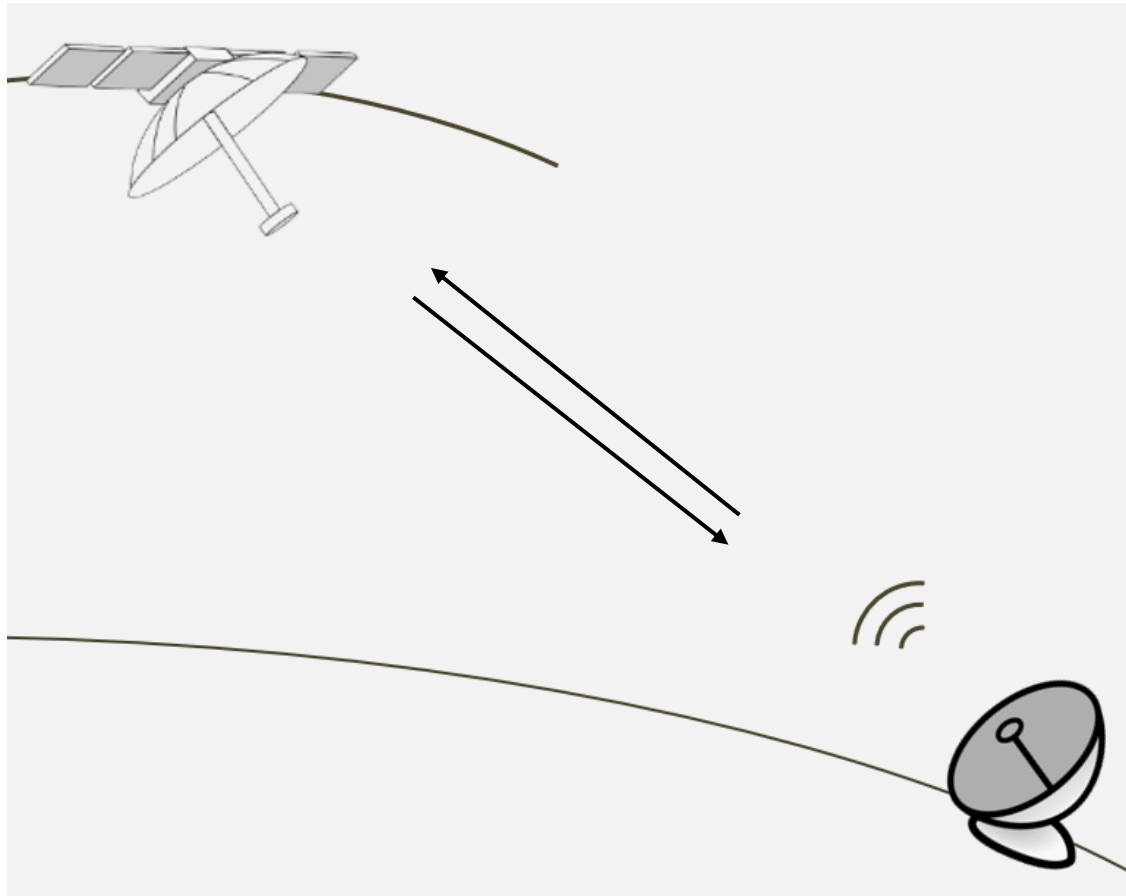
Side View

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X Band Communications

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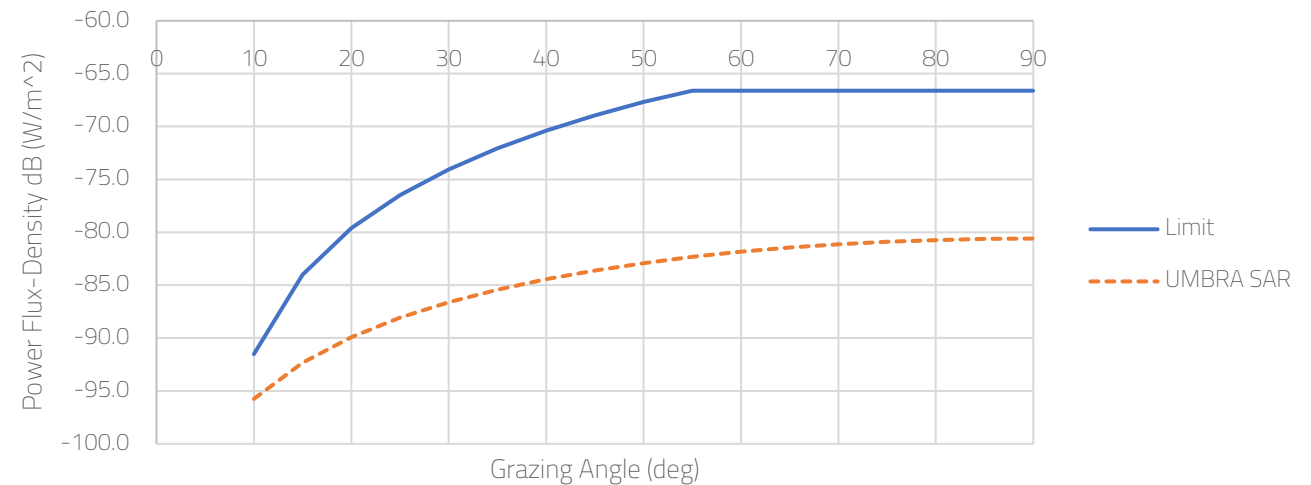


- 30 - 90° angle of transmission from ground antenna
- Transmissions lasting no longer than 5 seconds
- No more than five transmissions in a ten minute period
- 2-3 communication events over the course of requested period

Modulating Signal Description

- Modulation
 - Linear Frequency Up-chirp or Down-chirp of carrier
- Modulated Signal Bandwidth = 600 MHz baseline (1200 MHz max)
- PRF = 2,000 to 12,000 Hz
- Duty Cycle < 30%
- Power Flux Density
 - Set to well below ITU limits for the SAR Band*
 - This closely mimics our approved operation per File # 0424-EX-CN-2020

UMBRA SAR vs Power Flux-Density Limit at 9.9-10.4 GHz



*Reference Table 12-4: https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.12-2015-PDF-E.pdf