

## Supplemental Exhibit 1– Two Tone IM Tests

In response to the questions posed in correspondence 6281, a two tone intermodulation test was performed on the 500 W active antenna (ref FCC ID NMFAAGSM19500M). Initial results showed the resulting intermodulation products to be unacceptably high. Two corrective actions have been taken;

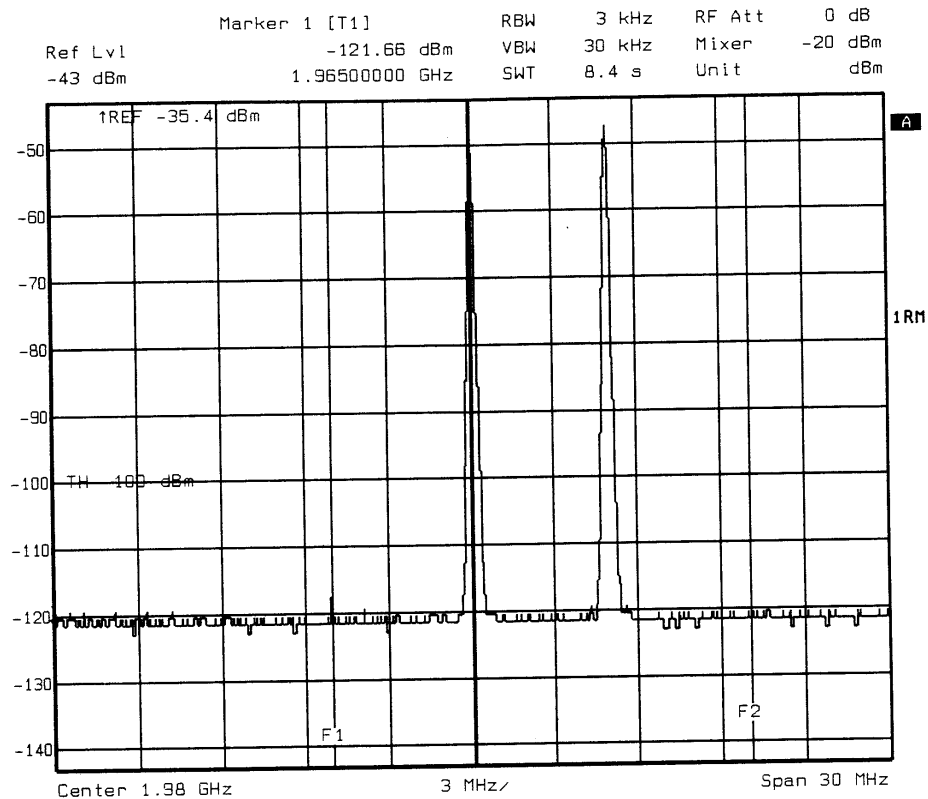
1. The calibration circuit card assemblies for the two channels (installed under the cover on the back of the antenna) have been enclosed in separate metal housings with filtered connections for dc and data lines.
2. The enclosure used to isolate the amplifiers from the radiating elements has been improved by sealing the connector openings, and applying additional RF gasketing to the edges of the radiating panels.

These design changes have been formally incorporated into the production drawings. The revised drawings have been submitted as supplemental exhibit 2.

## Test Results

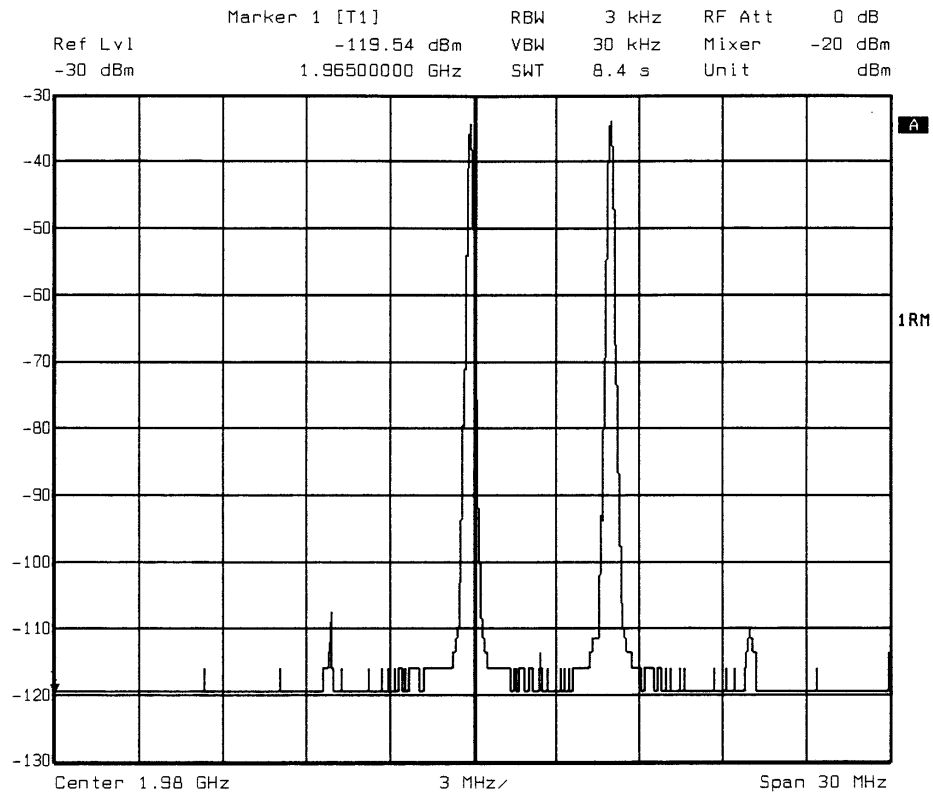
After incorporating these changes, the antenna was measured on a 400 ft far field antenna range with two, GSM modulated sources driving the active antenna at the maximum specified input power (+32.5 dBm).

Figure 1 shows the input signal. For this measurement, the two modulated sources are driving a passive, reference horn through an isolated combiner. A weak IM product is visible approximately -70 dBc on the lower side. Resolution bandwidth has been decreased to 3 kHz to reduce the noise floor.



**Figure 1 – Two Tone IM Test: Input Signals  
1979.5 & 1985.5 MHz  
3 kHz Resolution BW**

Figure 2 shows the same sources driving the active antenna. The unit under test has been outfitted with band 3 filters (20 MHz filters covering C and F blocks). The testing was performed for the C block, but the results will be identical for other bands since only the filters are changed. The two tones were placed at approximately 1980 MHz and 1985 MHz respectively, so that the third intermodulation products will appear at the edges of the band. This configuration produces the worst case emissions since the transmit filters provide no attenuation at the band edges. For this measurement, a resolution bandwidth of 1%, or 3 kHz has been used to reduce the noise floor, since the IM tone is within 1 MHz of the operating band.

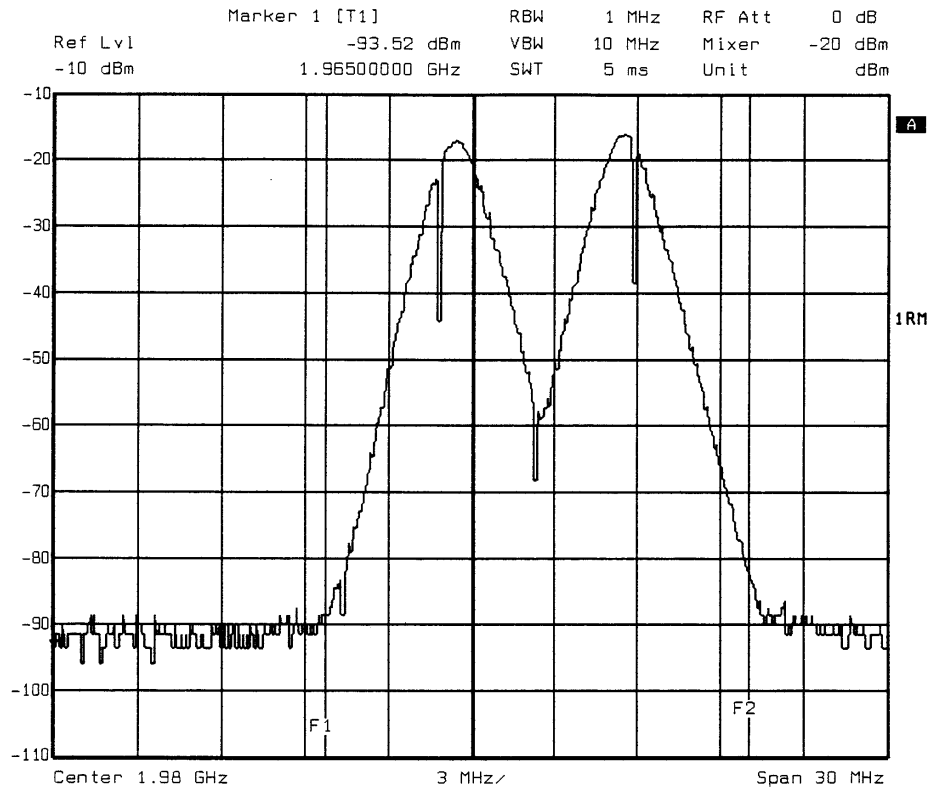


**Figure 2 – Two Tone IM Test: < 1MHz outside operating band  
1980 & 1985 MHz  
3 kHz Resolution BW ( 1% )**

The intermodulation products are visible at approximately -74 dBc. This complies with both 47CFR24.238, which requires a -53 dBc maximum on all out of band emissions, and with ANSI standard J-STD-007, which requires a -70 dBc maximum IM.

Figure 3 shows the same test configuration, but the resolution bandwidth has been increased to 1 MHz, and the test tones have been repositioned at approximately 1979.5 MHz and 1985.5 MHz respectively, to place the IM products 1 MHz outside the frequency block.

No IM products are visible in the -70 dBc range of the measurement system.



**Figure 3 – Two Tone IM Test: > 1MHz outside of operating band.  
1979.5 & 1985.5 MHz  
1 MHz Resolution BW**

These actions bring the system into compliance with both 47CFR24.238 and with the ANSI standard J-STD-007.