

**EXHIBIT C**  
**FM All-Digital Test Report**



---

**FM All-Digital IBOC Field Test Report**

---

**February 1, 2002**

**iBiquity Digital Corporation**

**8865 Stanford Boulevard, Suite 202  
Columbia, Maryland 21045  
(410) 872-1530**

**20 Independence Boulevard  
Warren, New Jersey 07059  
(908) 580-7000**

---

# 1 Overview

This report documents the results of field tests of the iBiquity FM all-digital system. This report was designed to highlight the improved performance that will be achieved by converting from the IBOC hybrid system to all-digital broadcasting.

## 1.1 IBOC Signal

The FM IBOC hybrid mode contains the analog FM signal with the IBOC digital carriers inserted on both sides. The total power of the digital carriers is 20 dB below the total power in the analog host. The IBOC signal is generated using an iBiquity FM IBOC exciter. Figure 1 depicts a spectral representation of the FM hybrid mode. The rectangular areas contain the digital subcarriers, and the triangular area represents the analog host FM signal.

In the FM all-digital mode, the analog signal is removed and additional data carriers are added. The main channel stereo audio and its associated data information is unchanged from the hybrid mode, however, the power level is increased to provide a more robust service. In the region between  $\pm 100$  kHz to  $\pm 130$  kHz, digital carriers are added to carry the digital audio backup and tuning channel as well as additional data throughput. In the region bounded between  $\pm 100$  kHz, which previously carried the analog audio, additional carriers are added to carry new secondary auxiliary services, like wireless data, surround sound and more. Figure 2 depicts a spectral representation of the IBOC FM all-digital system.

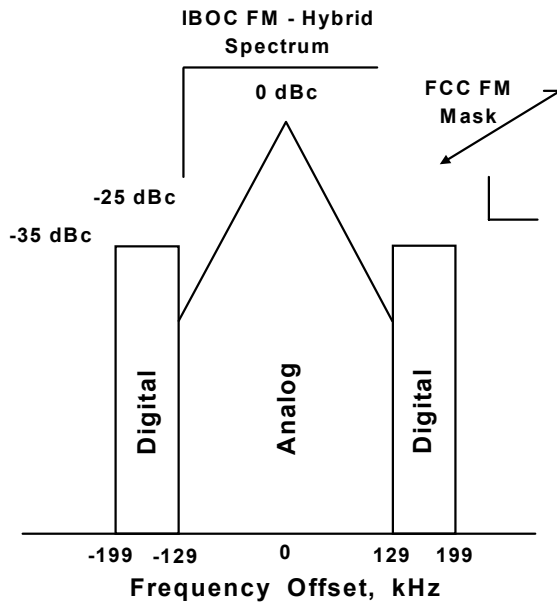


Figure 1 - FM Hybrid IBOC Spectrum

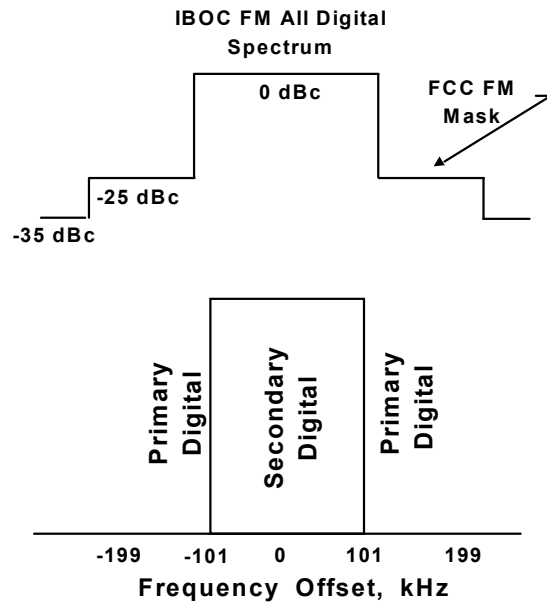


Figure 2 - FM All-Digital IBOC Spectrum

## 1.2 Transmitter Test Sites

The IBOC all-digital tests were conducted using WETA-FM, Washington, D.C. and WWIN-FM, Baltimore, Maryland.

WETA, a Class B FM commercial radio station has been continuously operating as an IBOC test station for over two years. The transmitter is located at 38° 53' 30" N latitude and 77° 07' 55" W longitude and broadcasts with 75.0 kW Effective Radiated Power ("ERP") and with a transmitter power output of 25 kW at 90.9 MHz. A report on the hybrid mode operations using WETA was included in iBiquity's 2001 test report to the NRSC.

Due to this extensive test program, iBiquity has thoroughly characterized hybrid mode performance on WETA, and this information provides an excellent benchmark for comparison to the all-digital system.

WWIN, a Class A FM commercial radio station, is located at 39° 12' 16" N latitude and 76° 34' 07" W longitude and broadcasts 3.0 kW Effective Radiated Power ("ERP"), with a transmitter power output of 3.6 kW at 95.9 MHz. It has operated as an IBOC test station for more than one year. Data from WWIN hybrid field testing also was included as part of iBiquity's 2001 test report to the NRSC. These all-digital tests show that class A facilities stand to greatly benefit from the signal robustness and audio quality that the all-digital system provides.

### 1.3 Operating Power

For these tests, iBiquity chose to operate each transmitting facility at a total power level of 10 dB below that of the reference analog carrier. It is important to note that iBiquity has not selected a final power level for the all-digital system. Nonetheless, tests at this power level provide a baseline for all-digital operations. Decreasing the power will reduce digital coverage whereas a power increase will increase digital coverage.

### 1.4 Station Configuration

WETA and WWIN were modified, as shown in Figure 3, to generate the FM all-digital IBOC signal. Unlike the hybrid IBOC transmission system, the all-digital configuration always uses a single linearized DAB transmitter. For these tests, iBiquity chose a power level 10 dB below that of the analog system. These lower power requirements result not only in energy savings for the broadcaster, but also a dramatic reduction in the human RF exposure hazard.

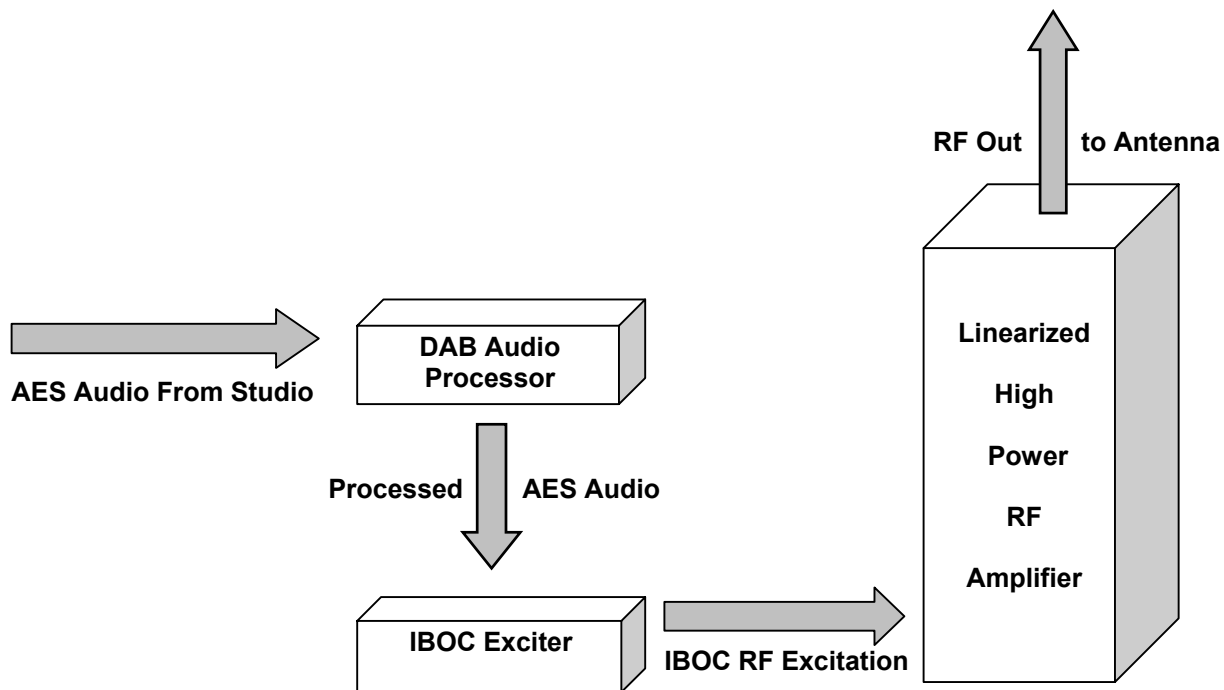


Figure 3 - Diagram of Typical IBOC All Digital FM Transmitter Setup

### 1.5 Van Configuration

The mobile test platforms used to collect field test data were identical in equipment and configuration to those used for the NRSC Hybrid IBOC FM Testing.

## 1.6 Route Selection

In order to allow for a direct comparison with the results of hybrid operations, iBiquity conducted the all-digital tests using the same test routes that were used for NRSC hybrid mode testing in 2001.

## 2 Test Results

### 2.1 WETA

The all-digital tests confirm that the all-digital system offers significantly greater digital coverage than the already extensive digital coverage offered by the hybrid mode of operation. Figure 4 illustrates the digital coverage for all-digital broadcasts using WETA. Figure 5 contains the results of NRSC hybrid testing from 2001 and is included for comparison with the all-digital results. Figure 6 overlays the digital coverage on a color-coded Longley-Rice signal level prediction matrix calculated by ComStudy software. This figure shows that the all-digital system provided coverage to the 30 dBu contour of WETA. This level of coverage significantly exceeds the station's protected contour and would completely cover the listening area where listeners would expect to receive analog coverage. It should be noted that if WETA's co-channel interferer in Philadelphia (WHYY) had been an IBOC station, coverage to the northeast would have been more limited. Figure 7 contains the hybrid mode coverage results overlay on the Longley-Rice prediction matrix to provide a basis for comparison between hybrid and all-digital coverage.

### 2.2 WWIN

Tests conducted on WWIN also demonstrate the extension of digital coverage that is obtained by adopting the all-digital mode of operation. Figure 8 profiles the all-digital coverage. This can be compared to the hybrid mode coverage from the NRSC tests that is shown in Figure 9. The all-digital results are overlaid on the Longley-Rice prediction matrix in Figure 10. This shows that a Class A station operating in the all-digital mode can attain digital coverage extending to the 35 dBu contour. The hybrid results are provided for comparison in Figure 11.

## 3 Field Test Summary

These field test results have demonstrated the enhanced performance of the iBiquity FM All Digital IBOC system in a real-world environment, and have validated the results of extensive simulations and laboratory performance tests. The Digital Coverage tests in this report illustrate that the IBOC All Digital System offers coverage superior to IBOC hybrid.

Over the past five years, iBiquity has performed detailed analyses, run exhaustive simulations, implemented its IBOC design in receivers and exciter, verified the simulations and analyses in laboratory tests, and validated all results through real-world field testing. The collective evidence from all of these sources mutually confirms the fact that the iBiquity FM IBOC system performs as designed, offering an excellent path for broadcasters and listeners into the future of radio – a digital future that is secured by the superior performance of the iBiquity IBOC system.

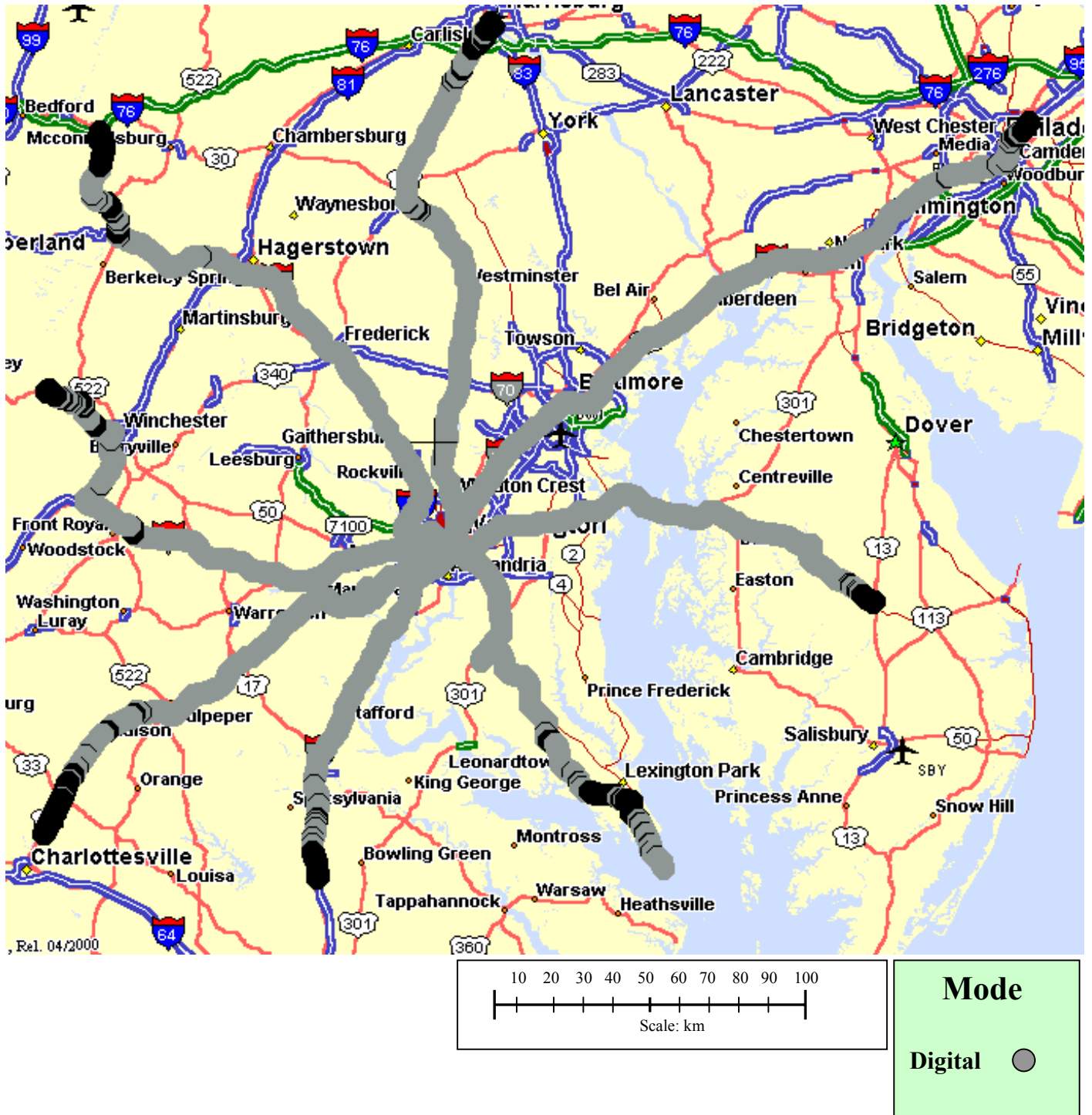


Figure 4 – WETA All-Digital Performance

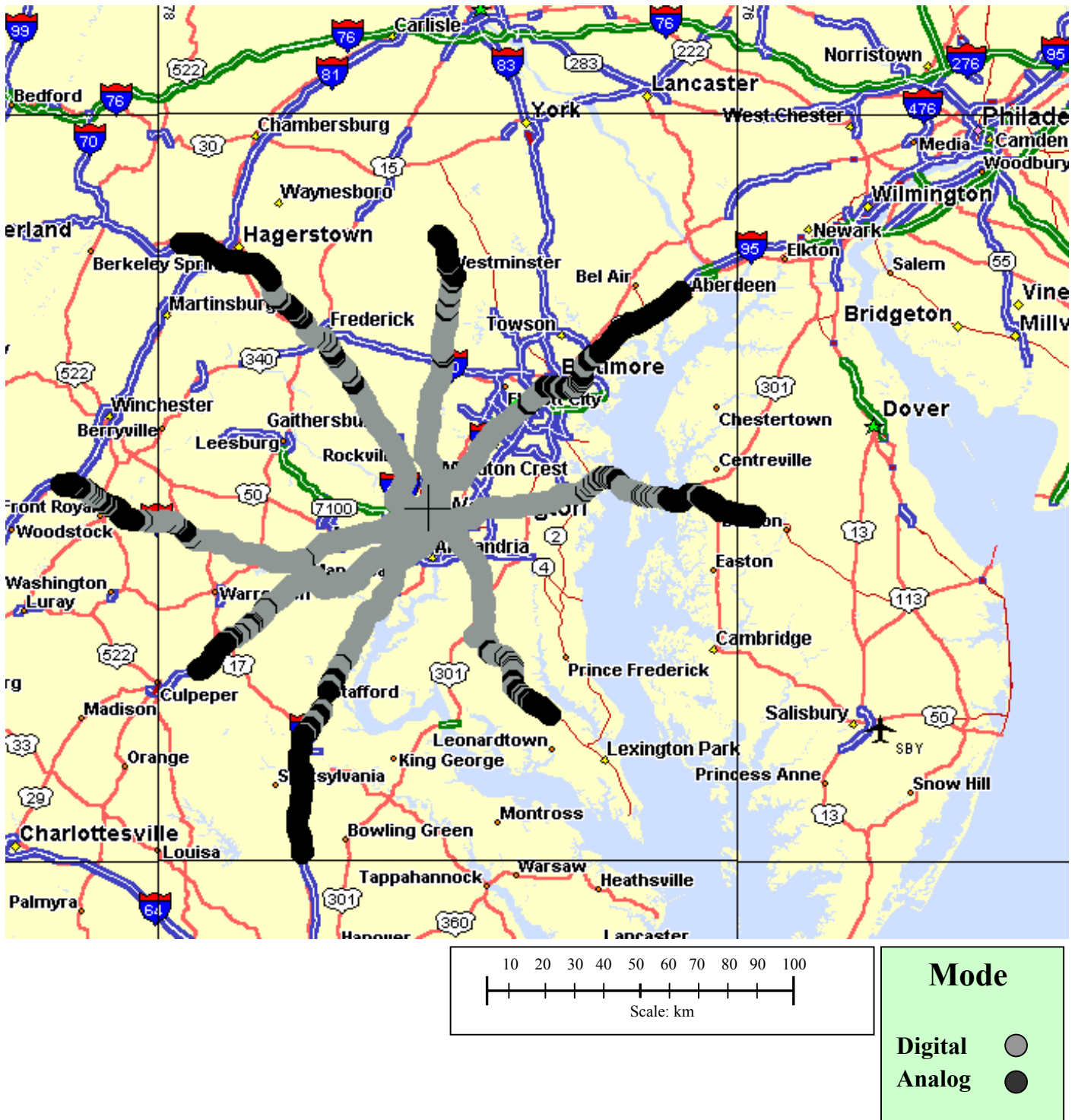


Figure 5 – WETA Hybrid Performance (from NRSC Testing)

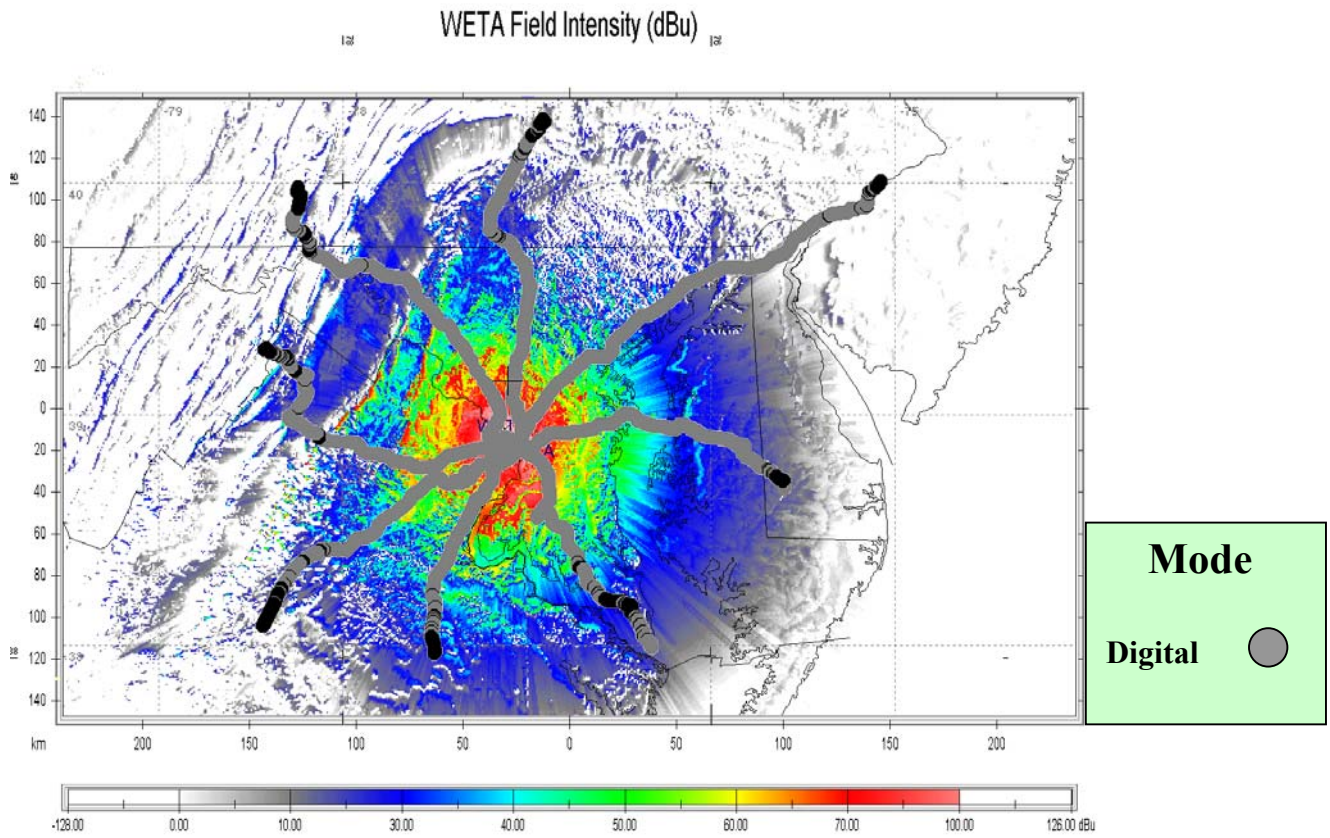


Figure 6 – WETA All Digital

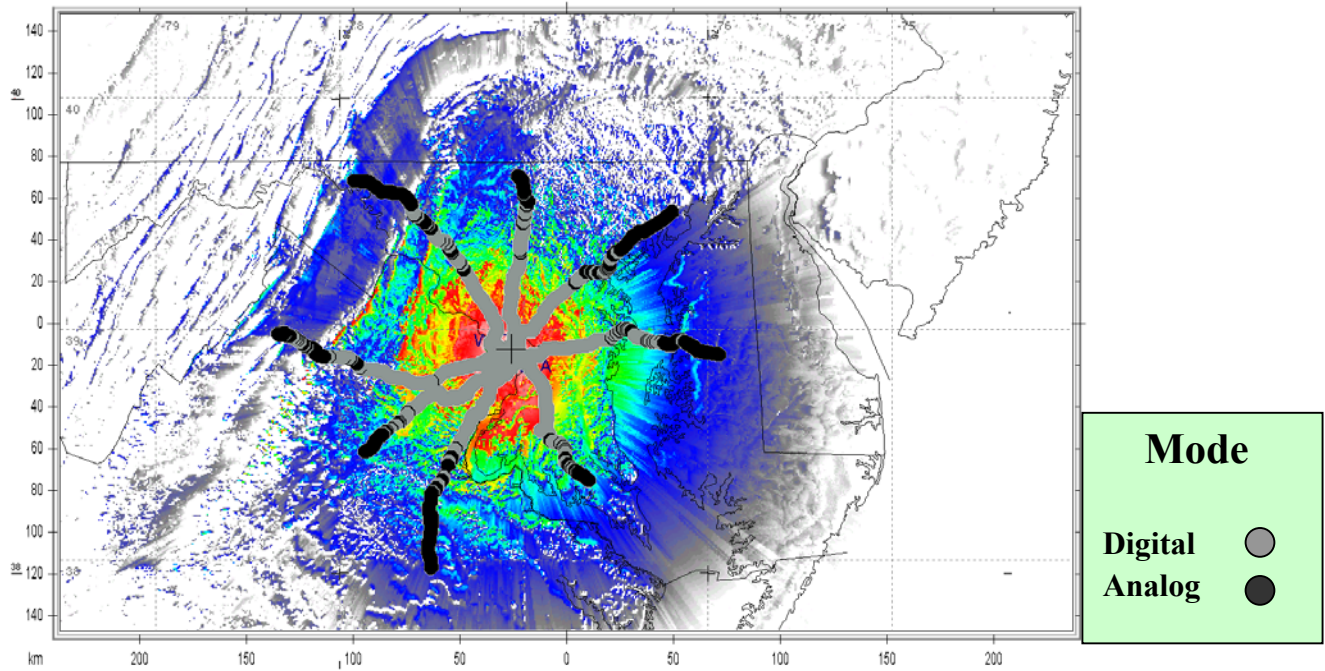


Figure 7 - WETA Hybrid Performance (from NRSC Testing)



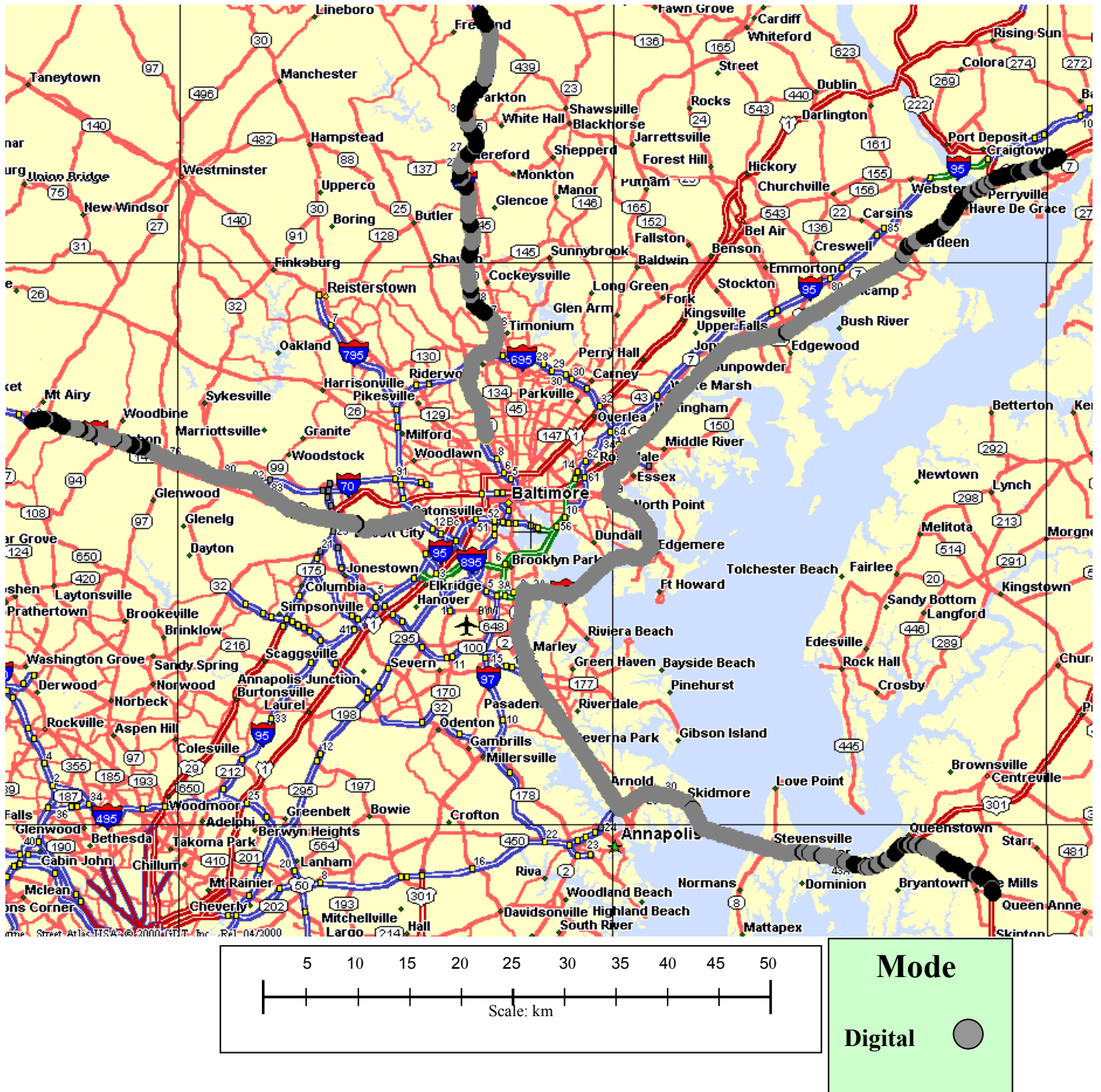


Figure 8 – WWIN All-Digital Performance



Figure 9 – WWIN Hybrid Performance (from NRSC Testing)

WWIN Field Intensity (dBu)

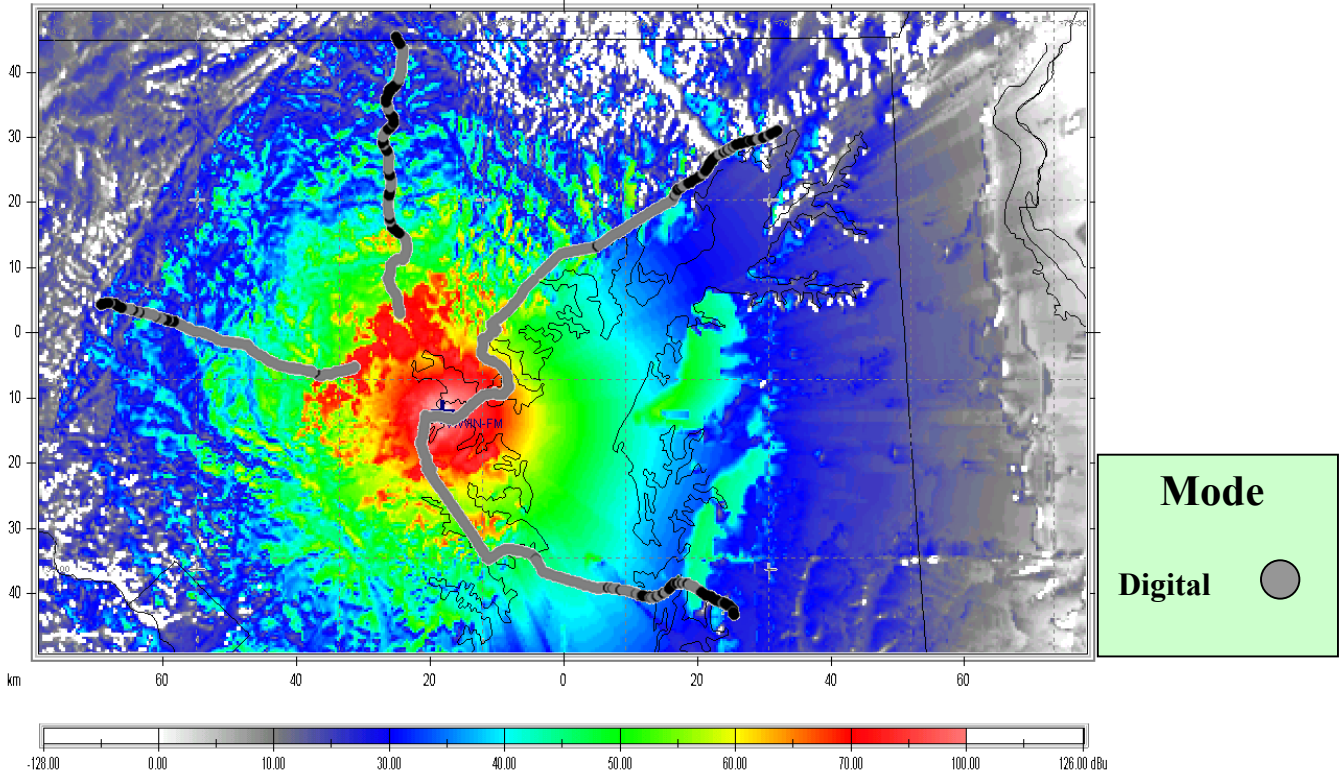


Figure 10 – WWIN All Digital

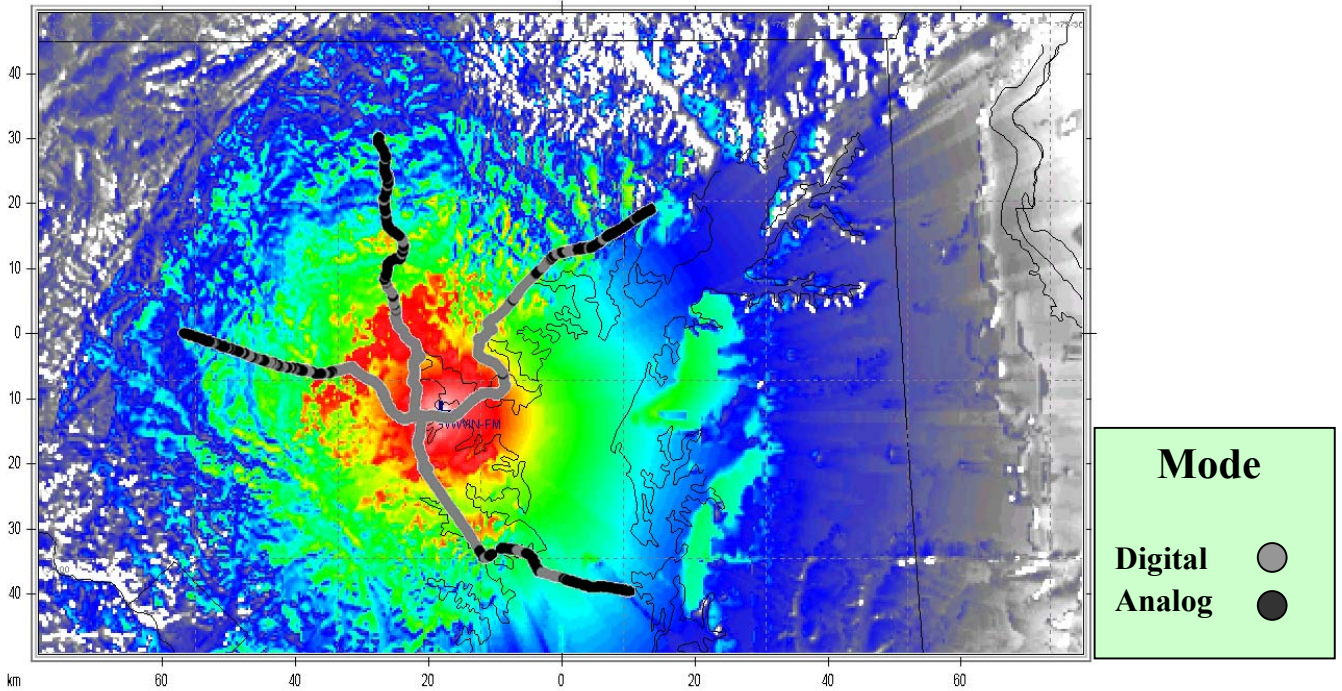


Figure 11 - WWIN Hybrid Performance (from NRSC Testing)