

As a leader in wireless broadband communications experimentation and deployment, Digital Sail has spent the last four years serving residential and small to medium business customers in the Florida Keys via various new-generation technology platforms. Serving customers in an environment characterized by dense tropical vegetation, hurricane-proof building construction, and immense and diverse sources of RF interference, Digital Sail has developed uncommon insight into actual radio-frequency challenges faced in real-world testing and deployment of wireless broadband systems.

Program Description

Digital Sail requests authorization to test two separate wireless broadband access systems operating in the 3650-3700 MHz frequency range in connection with a telemedicine network designed by Digital Sail and its partners that will allow hospitals, clinics, and patients to exchange medical data via wireless broadband connections. Digital Sail's wide area, point-to-point, and local area broadband wireless architecture will provide health professionals and patients with the unique ability to connect at virtually any location within the service area without the limiting requirement of fixed-location connections.

Objectives

To test and examine the wide-area wireless portion of the network, Digital Sail requests authorization to test two separate WiMax-class point-to-multipoint OFDM systems. Each of the two systems will utilize one 7 MHz channel within the 3650-3700 MHz range (we prefer to test the entire range). Each base station will be fixed-location and will transmit via 90-degree sector antenna at a maximum EIRP of 40 dBm (10 watts) with a maximum range of 30 miles (see Exhibit 1 for detailed equipment descriptions and specifications). Each base station will communicate with up to 30 CPEs of varying configurations and form factors including indoor, outdoor, fixed, nomadic, LOS (line-of-site), Near LOS, and PCMCIA.

Digital Sail requests the instant authorization in order to conduct performance testing and examination of the propagation and data carriage characteristics of WiMax equipment in the 3650-3700 MHz frequency range to determine its utility for the delivery of broadband telemedicine. Digital Sail intends to test the capabilities of these wireless broadband access systems to maintain the high-quality, high-bandwidth connections required to support the transmission of VoIP and medical data, such as still and video imaging, to fixed and portable wireless clients within a medical facility and to patients' residences in nearby residential neighborhoods. Digital Sail will also test for potential interference to co-channel and adjacent-channel operators, such as FSS. Although a search of the IBFS database revealed no FSS facilities in or near the proposed coverage area, should the

experimental operations result in interference to any existing authorized facilities, testing will be suspended immediately pending resolution of the interference.

Digital Sail is in the business of designing, building, deploying and maintaining wireless infrastructure capable of delivering commercial grade broadband to businesses and telemedicine providers. In order to test the effectiveness of delivering bandwidth in the 3650-3700 MHz frequency, Digital Sail is requesting authorization from the FCC to conduct performance trials in Arkansas in that frequency.

The objective of the system trials is to determine the feasibility and optimum equipment configurations for the utilization of the 3650-3700 MHz band in the deployment of high speed LOS and Near LOS wireless data services to providers of medical services in Arkansas. Additionally, these system trials will help ascertain the impact on existing co-channel and adjacent channel FSS facilities of interference resulting from system transmissions, as well as various interference mitigating protocols used in the modulation. The results of these tests will be used to establish the minimum system parameters and hardware required to provide reliable, affordable high speed wireless services with no adverse impact on existing FSS operations or on additional band users as outlined in the Commission's Report and Order in ET Docket No. 04-151 (the "Report and Order").

Digital Sail proposes to utilize 7 MHz-wide channels utilizing Quadrature Amplitude Modulation with an EIRP not to exceed 40 dBm (10 watts). All transmission devices will be located within a 15 km radius area. Primary base stations and remote equipment for these trials will be the AN-100u system developed by Redline Communications and configured by the manufacturer for transmissions in the 3650 MHz band. The base stations utilized by Digital Sail for these tests will be professionally installed and will operate in compliance with Part 90 of the Commission's Rules and within the parameters and power levels in the Report and Order. Information provided by the manufacturer for the antennas and transmission equipment is attached for reference as Exhibit 1 and Exhibit 2.

A search of the IBFS database revealed no FCC earth stations or federal government operations in the 3650-3700 MHz band located within 180 km of the proposed service area. This separation distance is the maximum radius of the Protection Zones as defined in the Report and Order. The results of the database study are attached as Exhibit 3.

As demonstrated by the database search, the nearest facilities were more than 300 km away, well outside the protection zones identified in the Report and Order. Due to the distance separation of the proposed operations to the existing facilities in the database, no interference to FSS earth stations or federal government operations is expected to occur.

Digital Sail acknowledges that the equipment proposed does not presently meet the "letter of the law" regarding the "contention-based" protocol requirement currently under reconsideration by the Commission. However, it does meet the Commission's intent of "Interference Mitigation," and has an excellent compliance record in connection with its

use in the licensed 3.6 GHz bands outside the United States. In addition, it is hoped that data gathered from the proposed trial and turned over to the FCC will be sufficient to allow the Commission to act on those petitions for reconsideration that are currently pending concerning the mandatory requirement for use of "contention-based" protocols.

Another specific goal of these tests is to monitor for interference in the adjacent frequency bands. From these tests, Digital Sail can determine if additional filtering at the band edges is necessary to avoid adjacent channel interference problems. Should interference to existing adjacent channel users of this band occur, Digital Sail will take immediate action, including discontinuance of operation, to eliminate the interference.

An important aspect of these trials is to determine the coverage capabilities of this band for fixed Digital Sail-type wireless communications services to both indoor and outdoor user installations. As this band is currently being used for this type of service in Europe, the results will be used to establish the minimum system design specifications required to achieve reliable coverage in the typical rural and suburban areas of the United States under recently released changes to Part 90 of the Commission's Rules.

Parameters to be determined by the system tests will include the following:

- Maximum coverage area from a single hub site
- Signal reliability over time
- Signal penetration losses through foliage and buildings
- Changes in signal propagation due to weather conditions
- System durability based on the number of users simultaneously accessing the network
- Quality of Service reliability based on new technologies such as VoIP, and Video over IP

Up to 25 test sites may be utilized at various distances from each of the two base stations. Once service at a test site is verified, the trial at that site will continue on a 24-hour basis for at least 1000 hours. Among other collection procedures, participants in the testing will report on results to enable Digital Sail to determine system performance and reliability.

Digital Sail has significant experience providing wireless broadband to customers in other frequency bands in a variety of markets, and has learned how the local topography, foliage, building structures and weather patterns affect the propagation and interference characteristics of diverse platforms. Digital Sail has also learned the business and communication demands of its commercial clientele within these service areas. Based on both its technical and marketing experience, Digital Sail is uniquely qualified to operate in the 3650-3700 MHz spectrum to determine the likelihood of that band to provide the reliability and quality of service expected by participants in telemedicine.

Upon successful completion of these trials, Digital Sail will report its data and other findings from its tests to the Commission.

With regards to Digital Sail's selected trial areas of Little Rock and Russellville, Arkansas, the Commission is advised that these markets represent a typical area of planned deployment by typical Wireless Internet Service Providers across the United States. As a result, Digital Sail views these market areas as essential to the 3650-3700 MHz trial.

Exhibits

1. Main Radio Equipment
2. Tower Locations and Antennas
3. FSS and Government Operations
4. Request for Expedited Processing

Exhibit 1

Main Radio Equipment

1. Redline Communications RedMAX Base Station (AN-100u) Description

The RedMAX Base Station (AN-100U) is a WiMAX Forum Certified™ broadband wireless solution capable of delivering high bandwidth voice, video and data transfer services and applications.

Designed to be completely interoperable with WiMAX Forum Certified™ products, this carrier-class, point-to-multipoint (PMP) base station provides a scalable solution for any WiMAX access network. The RedMAX Base Station can be deployed in clusters of up to six (60 degree) sectors (up to six RedMAX BS can be co-located to form high capacity multi-sector cell deployments). The GPS time synchronization feature facilitates tight frequency reuse to make the most efficient use of available spectrum and channels, reducing interference when operating Time Division Duplexing (TDD) radios in close proximity.

The hardware is fully upgradeable in the field by software download, to accommodate future enhancements including IPv6 support, scalability, additional classifiers, alternative encryption standards, and continued development of the 802.16 standard. Adherence to stringent carrier-class NEBS Level 3 requirements provide high-reliability for mission critical deployments. Like all of Redline's 802.16-2004 products, the RedMAX Base Station addresses all of the relevant access frequency bands with ease and flexibility.

RedMAX Base Station (AN-100u) System Specifications:

System Capability:	LOS, Optical LOS, non LOS Cell-based point-to-multipoint
RF Band:	3.4-3.6 GHz
Channel Size:	3.5 MHz, 7 MHz
RF Dynamic Range:	> 40 dB
Spectral Efficiency:	Up to 5 bps/Hz (over the air)
Over The Air Rate:	Up to 35 Mbps (7 MHz channel, rates depend on channel size)
Ethernet Data Rate:	Up to 23 Mbps (7 MHz channel)
Latency:	6-18 msec (depends on channel size, OFDM frame duration)
Maximum Tx Power:	+23 dBm across all modulation/coding levels (region specific)
Rx Sensitivity:	Better than -93 dBm @ BPSK 1/2 (based on BER of 1x10e-6)
IF Cable:	Maximum length up to 984 ft (300 m) using Redline recommended high-grade IF cable
Network Attributes:	Transparent bridge

	802.1Q, TOS/DSCP and L2/L3 address, traffic classification DHCP client, client pass-through
Modulation/Coding Rates:	Auto-select modulation: BPSK, QPSK, 16 QAM, 64 QAM Auto-select coding: 1/2, 2/3, 3/4
Over the Air Encryption:	DES and AES*
MAC:	Cell-based PMP deployment 802.16-2004 compliant PMP 802.16-2004 packet convergence sub-layer mode TDMA Access
Range:	Automatic repeat request (ARQ) error correction* Over 28 mi (45 km) LOS; 12mi (20 km) PMP Over 2 mi (3 km) non LOS
Duplex Technique:	TDD (time division duplex) HD-FDD (half duplex frequency division duplex)
Wireless Transmission (PHY):	256 FFT Orthogonal Frequency Division Multiplexing (OFDM) (Orthogonal Frequency Division Multiplexing)
Network Connections:	Standard: 10/100 Ethernet (RJ-45)
System Configuration:	HTTP (Web) interface, SNMP CLI via Telnet and Local Console Network Management: SNMP, standard and proprietary MIBs Full management by RedMAX Management Suite (RMS)
Power Requirements:	Auto-sensing 110/220/240 VAC 50/60 Hz Auto-sensing 18-72 VDC, 80 W maximum
Redundant Power:	Optional dual AC or dual DC power supply (dual cord) with automatic fail-over
Compliance:	EMC: EN 301 489-1, EN 301 489-4, EN 55022/CISPR 22 RF: EN 302 326, Industry Canada: RSS-192 Safety: IEC 60950-1, UL 60950-1
Operating Temperature:	IDU: 0 C to 40 C ODU: -40 C to 60 C
Dimensions	17x12x1.75 in (431.8x304.8x44.45 mm) Weight: 5.5 lb (2.5kg)
Humidity:	Up to 90% non-condensing

Exhibit 2

Tower Locations and Antennas

1. Location A:

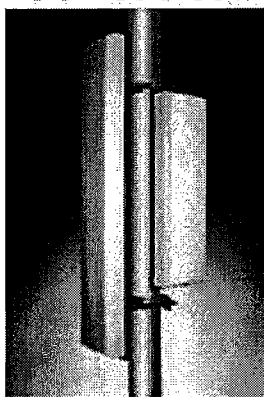
Address: 10325 West 36th St
Little Rock, AR 72204
Coordinates: 34 43 9.90 N 92 23 26.8 W
Radius of operations: 10 km
Tower height: 46.33 m monopole
Antenna tip height: 44.19 m
Ground elevation: 98.14 m amsl
Distance to nearest airport: 15.8 km

2. Location B:

Address: 610 West E Street
Russellville, AR 72801
Coordinates: 35 16 56.2 N 93 8 13.9 W
Radius of operations: 10 km
Tower height: 57.61 m monopole
Antenna tip height: 51.81 m
Ground elevation: 105.46 m amsl
Distance to nearest airport: 4.3 km

Antenna System: Radiowaves SEC-35-90-16

90° 3.4-3.6 GHz Sector Antennas



PRODUCT FEATURES

- **Antenna dimensions:**
 - SEC-35D-90-16 41.5 x 8.5 x 7.5" (105 x 21.6 x 19 cm)
 - SEC-35V-90-16 25.5 x 8.5 x 7.5" (65 x 21.6 x 19 cm)
 - SEC-35H-90-16 25.5 x 8.5 x 7.5" (65 x 21.6 x 19 cm)
- **Flat panel design**
- **RF Connector Interface:** Type "N" female
- **Lightweight and rugged design**
- **Meets ETSI EN 302 085 Class "CS2"**
- **Low windloads**
- **Easily installed**
- **Plane or Dual Polarized**
- **Standard antenna mount accommodates a 2.5" to 4.5" diameter pipe**
- **Optional 15° mechanical downtilt**

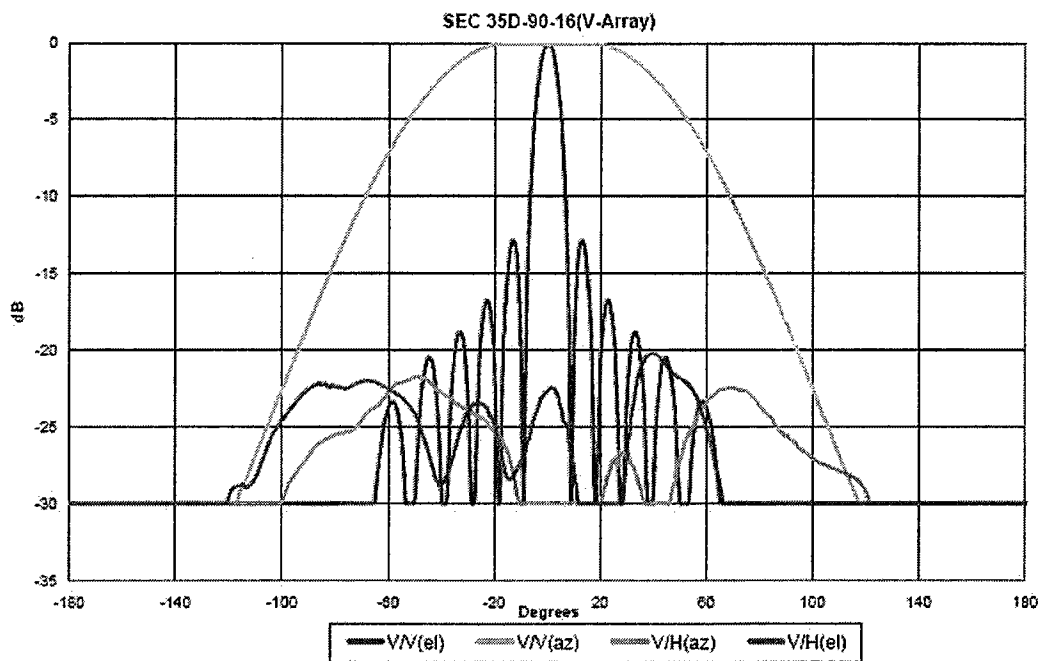
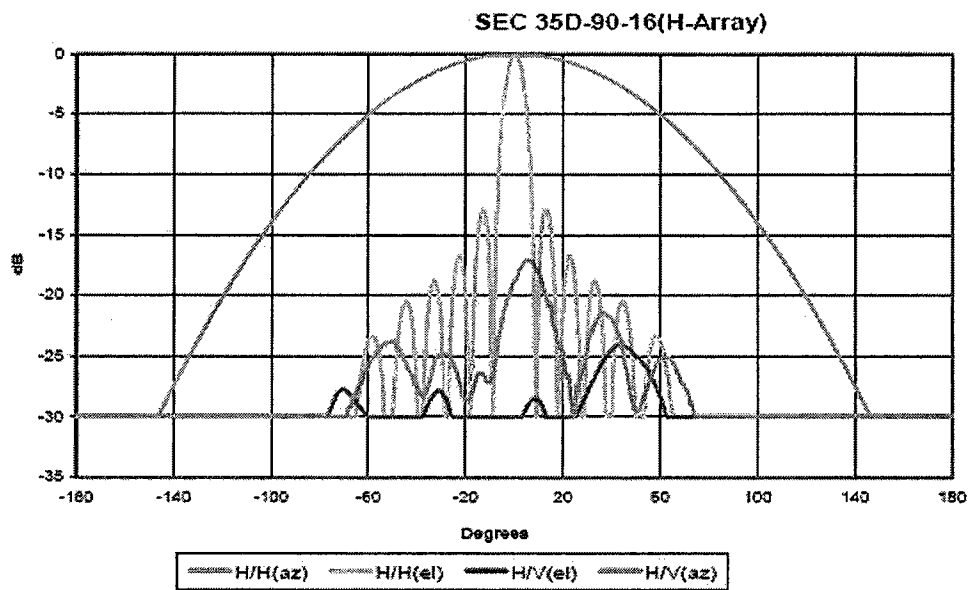


Exhibit 3

Map of Protection Zones

Exhibit 3: Location of FSS Protection Zones as depicted in the FCC's Report and Order and Memorandum Opinion and Order released March 16, 2005 (FCC-05-56). A search of the IBFS database revealed that all zones are more than 180 km from Little Rock and Russellville, Arkansas.

Protection Zones: 3650 to 3700 MHz



Small dark gray circles = Federal Government stations
Large light gray circles = Grandfathered FSS stations
Not displayed, Guam FSS stations

Federal Communications Commis
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Exhibit 4

Request for Expedited Processing

Digital Sail hereby requests expedited treatment of this application for experimental authorization. As explained in its application, Digital Sail is seeking to demonstrate, through experimental operation, that the 3650-3700 MHz band is suitable for the operation of unlicensed devices, in this case, in connection with a telemedicine network. Digital Sail seeks expedited from the Commission so that it may immediately commence its experimental operation and collect real-world data that the Commission may use as it ponders the pending petitions for reconsideration. Such real-world data on performance in the 3650-3700 MHz band should prove invaluable to the Commission as it considers the rules to be applicable to that spectrum. Accordingly, an expedited grant of the instant application is both necessary and in the public interest.