

SAFARI™ RAPTOR

HIGH CAPACITY NLOS* NETWORK INFRASTRUCTURE COGNITIVE RADIO



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SPECTRUM DYNAMIC NETWORKING

The SAFARI™ Raptor is a network-based, multi-band white space cognitive radio system capable of creating broadband local, wide-area, and in-building networks in the newly opened VHF and UHF TV bands.

SAFARI™ Raptor is a new generation of unlicensed frequency-agile full-duplex broadband radio networking solutions based on the United States Federal Communications Commission's (FCC) decision on September 23, 2010, to allow communications systems to use the spare capacity of VHF and UHF TV bands for unlicensed use on a secondary basis.

The SAFARI™ Raptor acquires operating channel spectrum either through a public/private database or by dynamically scanning, sensing and evaluating the local spectrum environment and identifying clear channels to automatically establish connectivity between Raptor infrastructure and client devices.

Scheduled for revenue release the fourth quarter (Q4) 2012, the SAFARI™ Raptor networking radio provides point-to-point and multipoint full-duplex payload rates in excess of 50 mbps (25 mbps each direction). The SAFARI™ Raptor's integrated ad-hoc mesh network architecture Level 3 Router and interference avoidance algorithms provides communications planners with a powerful new tool to build local and wide-area robust, multi-user fixed and mobile systems supporting revenue and enterprise video, VoIP and internal solutions.

STANDARD FEATURES

- **Standard VHF and UHF operation:** 54-72, 76-88, 174-216 and 512-698 MHz. **Other bands available upon request.**
- **Total compatibility with FCC White Space database provider**
- Proprietary channel management system maintains **uninterrupted service to avoid interference**
- **Continuous spectrum sensing system** to avoid signal degradation and minimize payload loss
- **Integrated infrastructure and last mile/kilometer network connectivity**
- Maximum FCC allowable output: 30 dBm (higher output levels for export use)
- Three independent channels assure reliability

APPLICATIONS

PUBLIC SAFETY, HEALTH AND EDUCATION

Integrated wide and local area networks

DEFENSE

Quick reaction, fixed, mobile, and transportable networks for both emergency and temporary deployment

INDUSTRIAL

High-capacity, ultra-reliable backhaul and redundant infrastructure for reaction and critical operations

COMMERCIAL

Wider broadband area coverage for line-of-site (LOS) and non-line-of-site (NLOS) networks, ideal for external to internal structural communications

HOSPITALITY

One-to-many video, audio, and data distribution networks reduces deployment costs to maximize content delivery to guests

NLOS*: "NON-LINE-OF-SIGHT"

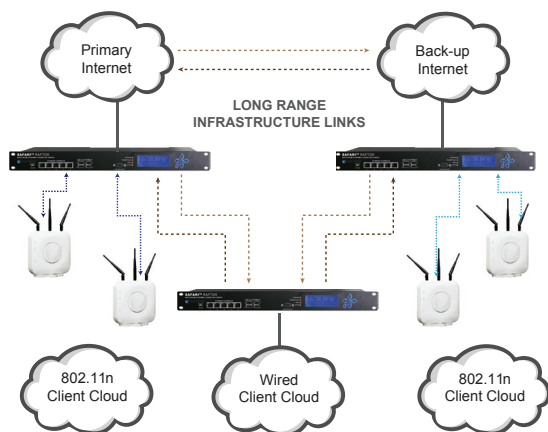
BENEFITS

- Tolerant of **non-line-of-sight infrastructure links**
- **Less equipment needed** than 2.4 or 5.8 GHz networks
- Dynamically **resistant to interference**
- **Efficiently operates in forested and wooded areas**

CAPABILITIES

- Operation in authorized VHF and UHF channels provides **over 350 MHz of potential usable spectrum** for short and long range services
- **Combines LOS and NLOS applications** for complex applications
- **Nominal 50 mbps full duplex operations** between SAFARI™ Raptor nodes in dual-channel 6 MHz full duplex mode
- Spectrum discovery method: **geolocation database** or **optional spectrum discovery** covered by one or more U.S. and Canadian patents
- **Policy-based spectrum controls** allow operator-tailored revenue networks
- Offers **integrated wide-area infrastructure and enterprise wireless** support with less **infrastructure investment** and on-going maintenance

FIGURE 1: NETWORK CONFIGURATION DIAGRAM



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Please note: this data sheet is for informational purposes only. The Raptor has not yet been certified by the FCC for sale in the U.S. Certification submission is planned for 2012. Export Applications do not require FCC approval but may require local and/or national approval for use. The Raptor will be certified in the following classes: (1) WS2 (White Space device with sensing modes) and (2) WS2 (White Space device with application mode).

TECHNICAL SPECIFICATIONS

Operating Spectrum	Option 1: All-band VHF and UHF (54-72, 76-88, 174-216 and 512-698 MHz) Option 2: VHF only standard (54-72, 76-88 and 174-216 MHz) Option 3: UHF only standard (512-698 MHz) Option 4: UHF extended (250 to 850 MHz), for international use only
Output Power Options	Standard Power Output Option Option 1: VHF and UHF (30 dBm) Option 2: VHF and UHF (36 dBm), for export only Option 3: Optional power amplifiers to 50 watts, for export only
Standard Modulation Formats	Modulation format OFDM spread spectrum
Data Throughput Rates (Payload Throughput)	5 to 30 Mbps, as a function of operating frequency, bandwidth, power, and antenna
Standard RF Operating Bandwidth Options	5, 6, 7, and 8 MHz
Network Interface Configuration	10/1000 Base-T Ethernet interfaces RS-232 administration port Optional fiber interfaces
Sensor and Control Interfaces	Optional digital I/O and analog I/O interfaces
Network Support Controls	SAFARIVIEW Network Configuration Suite for complete system administration, management, and configuration
General Specifications	Supported network routing protocols, including OLSR, OSPFv3, OSPF-NG (IPv6), RIPv2, RIP-NG (IPv6), BGP, IS-IS, Manet Ad Hoc Mesh Networking Linux® V26 real-time operating system Dimensions: 1U Weight: 7 lbs. (3.175 kg) Enclosure: steel, enamel Power: 90 - 240 VAC, 50-60 Hz Harsh environment IP67 models available

HOW MUCH WHITE SPACE SPECTRUM IS THERE?

In the U.S., White Space spectrum is geographically allocated via a secure white space FCC database. In export applications each spectrum coordinating agency allocates available spectrum.

ARE THERE ENOUGH CHANNELS?

For example, in an urban area like San Diego, CA, a check of the FCC database indicates TV channels 2, 5, 6, 12, 14, and 15, along with 11 UHF channels provide a total of an available 108 MHz of spectrum or over 400 mbps potential bandwidth. Operating in a portable configuration at lower power provides 19 additional channels or 115 MHz of potential usable UHF bandwidth. The Raptor automatically queries the FCC database and uses its proprietary internal sensing system to discover, categorize, and utilize White Space spectrum efficiently.

Please visit <http://www.fcc.gov/encyclopedia/white-space-database-administration> for more information.

