

Wireless Indoor Solutions

WLAN in the RF Spotlight

As wireless local area networks explode onto the world mobile data scene, a spot of 'RF contouring' promises the perfect coverage solution.

The rigours of contemporary business practices are demanding more and more out of communications systems. Once-coveted technologies such as e-mail and mobile telephony are now often taken for granted, their place on the technology frontier usurped by the need for mobile data access. Both third generation (3G) cellular technologies and wireless local area networks (WLAN) promise high bandwidth data services. However, while each has its strengths and weaknesses, WLAN technology is the more ready of the two, with the number of users escalating daily. This furious rate of deployment has for the moment placed WLAN firmly in the spotlight. Originally designed for extending the networks of private enterprises, WLANs provide high-speed data coverage to mobile wireless devices such as laptop computers and personal digital assistants (PDAs). Public WLAN access points, or 'hotspots', are materializing in all manner of locations where people are spending time: airport lounges, hotel lobbies, restaurants, university libraries, conference facilities-anywhere that Internet access might be required or desired.

RF Options

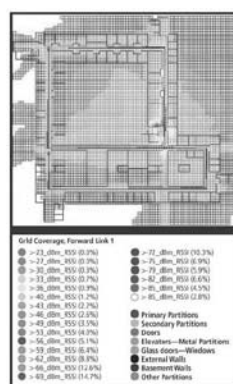
The majority of private and public WLAN deployments adhere to the global IEEE 802.11b standard, operating in the license-free 2.4 GHz band and delivering a maximum throughput of 11 megabits per second. Coverage is provided by a radio access point, similar in principle to a cellular base station, which sustains an RF link with one or more mobile clients over a distance of up to 100 meters. One popular deployment option is to install a separate point source antenna close to the access point. Accessory kits containing the required components are widely available and relatively simple to install. For small areas, point source antenna solutions are ideal; but there are some situations where a passive distributed antenna system provides a more sophisticated solution. A passive distribution system might involve a network of small point source antennas, connected via feeders to the main radio source. Alternatively, radiating cables-or leaky feeders-distribute the RF signal through thousands of slots along the cable length. Both systems permit extension of coverage area by rationalizing the RF power output across a larger number of emission points, while retaining a single radio source. For enterprise applications, where mobile wireless data terminals provide real-time batching and tracking to the main computer system, this type of solution is ideal.

Coverage Contouring

Passive distribution systems in the form of radiating cables also offer precise 'contouring' of the RF coverage. One can better control the coverage using a radiating cable than one can with a point source antenna. RF contouring minimizes the risk of co-channel interference between adjacent access points in larger systems, by preventing overlap of coverage zones. The WLAN systems of large campuses-such as hotels, universities and airports-require multiple access points to achieve the required coverage and capacity of the network. Depending on channel allocation and re-use, any overlap in coverage between zones or 'cells' will result in co-channel interference and increased bit error rates, unless the channels are separated adequately. Containing the RF signal to prevent interference is difficult using point source antennas, which have 'hot' spots at their source with decreasing RF signal strength further away. Radiating cable, on the other hand, can be laid out where coverage is required, dramatically increasing the

number of effective RF emission points, and reducing the average distance between the source and wireless client. The power distribution of the WLAN is thereby tailored and kept optimally low to minimize the potential for interference.

The above plot illustrates the RF power distribution throughout the engineering quadrant of a major North



American university. Utilizing about 330 meters of RFS radiating cable, the passive distribution system was designed around an existing access point. The RF power distribution extends from around -35 dBm at points nearest to the amplifier, to a minimum of around -80 dBm at the outside walls. Since minimum receiver sensitivity is typically -90 to -100 dBm, RFS designed the university WLAN system for a worst case at the outside walls of -85 dBm. Tailoring the RF coverage to this extent using radiating cable minimizes the potential for co-channel interference, and provides the university with maximum flexibility in channel allocations. Overall performance-for example, data rate-is also improved using radiating cable, which provides more direct 'line of sight' coverage to client devices than point-source antennas. This minimizes the impact of RF obstructions-such as steel filing cabinets and bookcases. Combined with the low emitting power used in radiating cable, the shorter signal path also reduces the effects of multi-path interference, which occurs due to 'out of phase' reflections of the RF signal.

WLAN Kit

WLAN Series

The transition from the wired local area network (LAN) to wireless LAN (WLAN) is performed by a device which is called Radio Access Point (RAP). Those RAPs support usually either built-in omni-directional antennas or provide a RF port to connect an external removable point antenna. In both cases the field strength of the RF coverage is more or less equally distributed in all directions.

In many WLAN applications the communication between the client and the RAP via an antenna does not satisfy the need of coverage of a specifically shaped area. Buildings are often rectangular, and it is more efficient to cover those floors using a radiating cable (A radiating cable can be seen as a long antenna and is built like a coax cable but with slots in the outer conductor for distribution of the radio frequency).

Package content:

1 pc of 50 m ring of radiating cable, RCF12-50, assembled ready for use with a N connector at one end and a termination cap at the other end,

50 pcs of plastic cable ties

installation instruction

Optional adapters:

N to SMA: ADAPTER_N(F)-SMA(M)

N to TNC: ADAPTER_N(F)-TNC(M)

- Smooth and equal coverage on both sides of the radiating cable for WLAN at 2.4 GHz, 5.2 GHz and 5.8 GHz
- Well-defined and controlled area of coverage
- Larger coverage area than using point antennas
- More security by avoiding undesired coverage, e.g. outside the building



Package of the WLAN-RCF12KIT

SPECIFICATIONS	WLAN-RCF12KIT
Application	Indoor
Frequency Range, MHz	800 - 6000
Connectors	N, other optional
Input Connector Type	N male
Impedance, Ohm	50
Coupling Value, dB	2.4 GHz - 70/82 @50%/95% reception; 5.2 GHz - 75/87 @50%/95% reception; 5.8 GHz - 75/87 @50%/95% reception
Weight, kg (lb)	13 (28.7)
Environmental Class	IP 65