Board Designing for Wireless Systems

Aftek Limited

Aftek's Experience

- Dual mode mobile phone based on GSM/GPRS (with support for dual SIM slot), Wi-Fi and Bluetooth was the first phone of its kind and was demonstrated at CeBIT 2004.
- Biomedical equipment with integrated GSM allowing remote connectivity to physician.
- GSM gateway for VoIP applications. This device is a USB powered device where SuperCAP is used to provide local power supply for GSM engine.
- Wireless console unit supporting Wi-Fi 802.11 b/g compliance.
- Standalone Wi-Fi SDIO card with 802.11 b/g support
- Standalone ZigBee solution for home automation system which includes PAN coordinator, FFD (fully functional device like routers) and RFD (reduced function device like remote control) to create a mesh network.

Overview

Every one of us wants to have our gadgets / appliances free from wires wireless. This can be experienced from fast pace of developments that took place in wireless technologies over past couple of decades. We can notice corresponding applications in today's mobile phones & accessories, wireless media devices and solutions for remote tracking, remote automation & control etc.

Aftek's Expertise

Aftek understands the need and potential of wireless technology in today's era & has developed a rich expertise in technologies like GSM / GPRS, Wi-Fi, Bluetooth, GPS, RFID, proprietary RF and ZigBee. Aftek provides services for design, development and testing of products and solutions based on these wireless technologies.

Wireless Component Selection

- Selection of appropriate wireless chipset based on application requirement.
- Selection of analog amplifier based on range requirement.
- Selection of a suitable balun for antenna matching.

Few examples of chipsets that Aftek has worked with

- Wi-Fi: Intersil Prism, Philips BGW, Marvell, Atheros with interfaces like PCMCIA, SPI, SDIO
- Bluetooth: CSR Bluecore series, Broadcom, Samsung
- ZigBee: TI Chipcon
- GSM / GPRS: Texas Instruments, Siemens, Wavecom, CMCS
- RF (433 MHz, 2.4 Ghz): TI Chipcon

Antenna Design, Selection and Filter Design

- Selection of suitable external antenna like whip, helical, loop etc. depending upon range requirements and space constraints.
- Design of micro-strip PCB antenna to reduce cost.
- Design of band pass / low pass filters using passive components.

RF Board Layout Design

- PCB layout design of RF critical components with throughout 50 ohm impedance matching.
- Provision of ground shielding, wherever necessary.
- Marking of no plane zone under antenna geometry.
- Orthogonal placement of multiple on-board antennas sharing same band.
- Stitching of RF vias around the perimeter of RF components. RF signal strength improvement through proper PCB layout.
- Careful routing to guard RF signals and circuits to reduce radiated and intentional emissions.

Power Supply / Battery Management

- Considerations for efficient design of power supply for RF transceivers.
- Design of USB based power supply for GSM applications.
- Improvement in noise immunity by using passive components for power supply filtering.
- Computation of ideal value of decoupling capacitor to reduce noise.

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