STMicroelectronics has introduced a new IPAD thick-copper process delivering high-performance, low-cost and space-efficient RF devices such as couplers, baluns, diplexers and filters. With a copper on insulated glass substrate, ST offers the best-in-class RF performance for wireless communication devices and integrated RF modules. Applications benefitting from the new technology include multimode/multiband 3G cellular phones and broadband wireless access such as WiMax, WLAN and Bluetooth.

**Main functions**

**Wideband coupler**
Wideband high-directivity couplers are designed to measure forward and reverse power at the RF antenna in GSM/3G applications. These devices are customized for wideband operating frequencies with less than 0.2 dB insertion losses in transmission bands (824 to 1980 MHz) and are housed in flip-chip packages.

**Balan with integrated matched network**
ST baluns are designed to be easily implemented in RF designs with no need for external discrete components. The level of integration offered by ST RF IPAD technology provides a high-quality matching network to optimize power transmission efficiency. Housed in a small CSP package, they offer over 60% space saving versus usual LTCC solutions. ST baluns are optimized in terms of insertion losses, amplitude and phase imbalance for connectivity or multiband phone applications.

**Low-loss diplexer**
ST’s low-loss frequency diplexers split signals from a common port (antenna) to two other ports (LB and HB paths). It targets multiband cell phones sharing the same antenna for CEL, EGSM, DCS, PCS, and WCDMA Band I operation. It is optimized to reduce insertion losses in each path for higher transmit power efficiency and improved sensitivity.

**Power-amplifier harmonic filter**
Low-pass filters are developed to filter out harmonics generated by power amplifiers in GSM/3G applications. ST’s LPF devices are customized for low-band (EGSM and CEL) and high-band frequencies (PCS and DCS). These devices are delivered as bare die mounted on a film frame (ready for pick and place assembly of a PA module).

**Key benefits**
- High RF performance substrate
- High accuracy simulation models
- Up to 80% board space saving
- Reduces component count and system cost
- Custom and standard product approach
- Standalone or wafer mode delivery

**Main applications**
- Multiband/multimode 3G phones
  - PA power control
  - Front-end modules
  - RF transceiver modules
- Broadband connectivity: Bluetooth, WLAN, GPS, WiMax, UWB, TransferJet™

www.st.com/ipad
Application diagram

Wideband application demonstrator

Dual-band IEEE 802.11, a/bg, Rx balun
Dual-band IEEE 802.11, a/bg, Tx diplexer
Dual-band IEEE 802.11, a/bg, Tx balun

Wideband high directivity coupler
WMax 2.3 - 2.7 GHz balanced BPF
WMax 2G/3G diplexer
WMax 3.3 - 3.9 GHz balanced BPF

Band group 1, UWB balun

Product example

Wideband coupler with matching
Dual-band balun
Balun with complex matching
Harmonic low-pass filter
Penta-band balun + matching + filter

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