

# MEMS Switch and Varicap Market

Will success in industrials markets spread to cell phone front end modules?

*Sample*

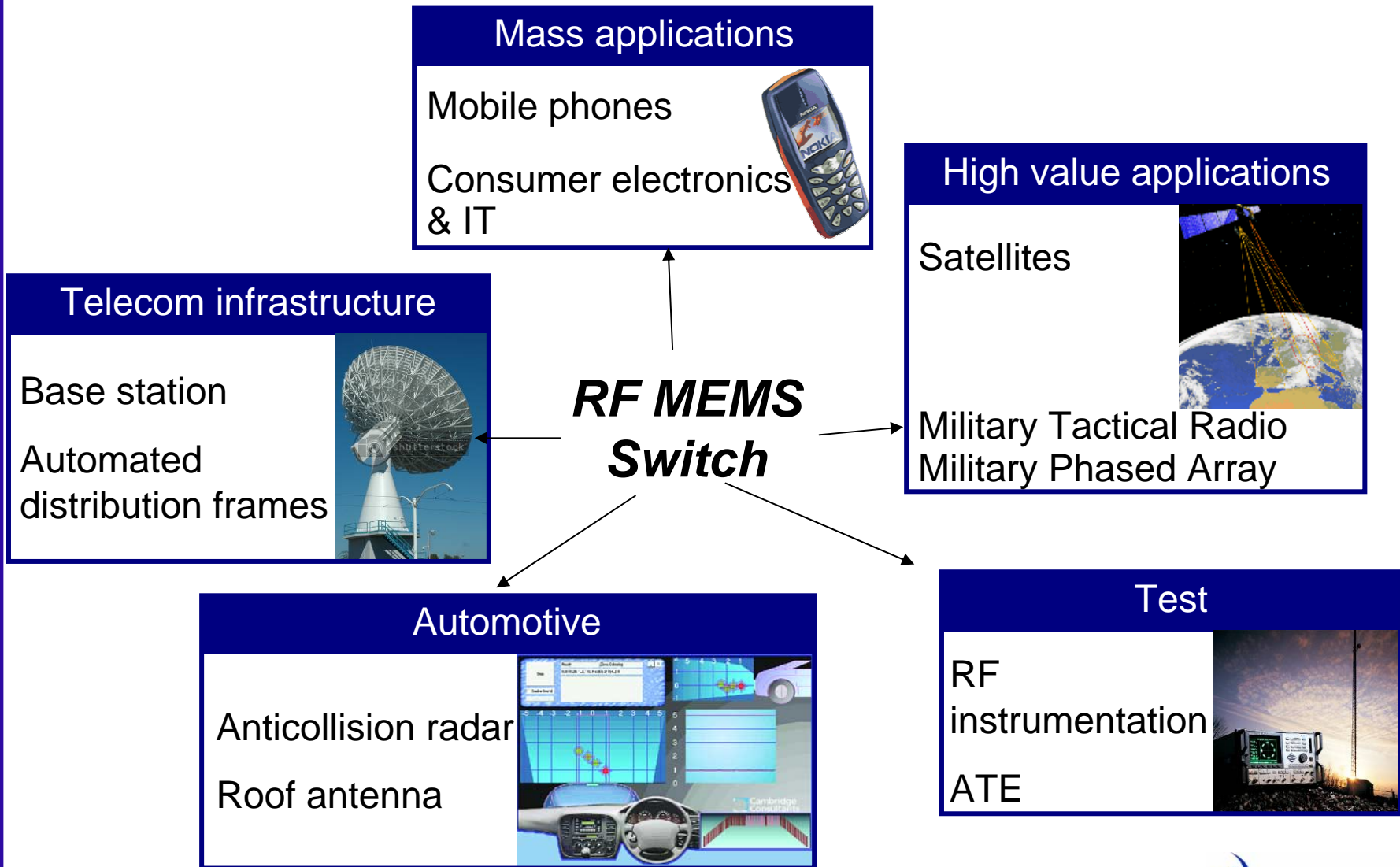


# Report content

- **Introduction**
- **Table of content**
- **Historical start of the RF MEMS switch market**
- **Overview of the RF MEMS switch market 2006-2011**
- **Activity and status of development of each MEMS players**
  - Analysis per device type
  - Analysis per industry
- **Market analysis of the business opportunity per application (2006 – 2011 analysis)**
  - **Automotive**
    - Long range radars
  - **Industrial**
    - RF instruments
    - ATE commutation boards
  - **Space**
    - Redundant circuits
    - Reconfigurable commutation matrix
  - **Military**
    - Radio telecommunications
    - Radars
  - **Telecom**
    - Base Stations
    - Automated distribution frames
    - Multiband handset Front End Modules
      - Antenna modules
      - PA modules
      - Filter modules
  - **Others applications**
- **Estimated evolution of the industry**
- **Technological evaluation of the RF MEMS products**
  - Description of existing RF MEMS structures
  - Evaluation of each player development
  - Forecasted introduction roadmap
- **Discussion on the main challenges facing the RF MEMS industry**
  - General industry challenges
  - Focus on the challenges to enter cell phone applications
- **Synthesis and conclusion**

# Scope of the report

## RF MEMS switches applications

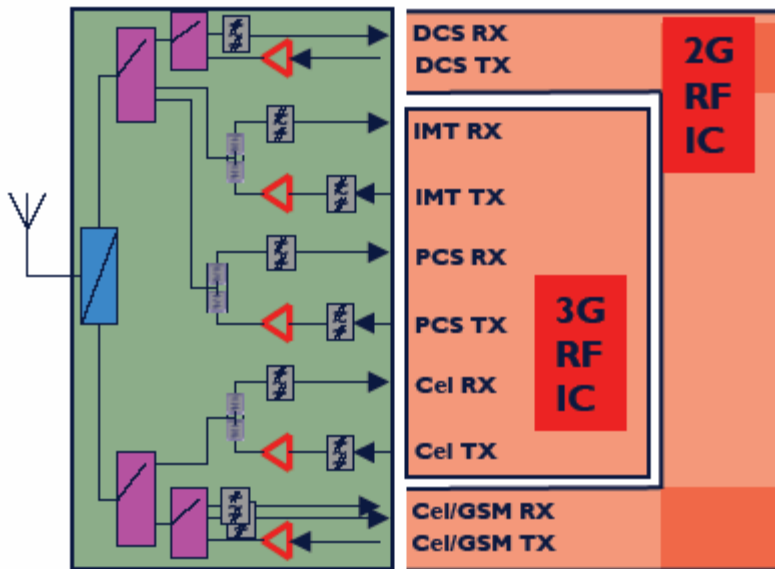


# Focus on handset applications

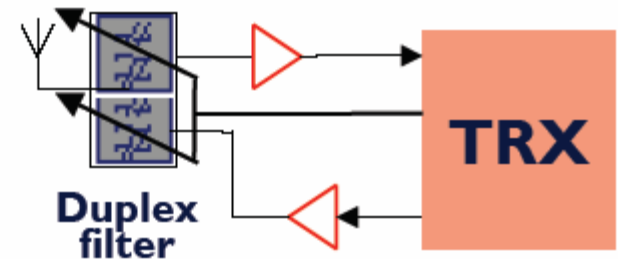
# Tunable Front-End Module

## Band switching for multi-mode/multi-band concept

- **Concept:**
  - Fixed frequency vs. tunable duplexer solution DCS

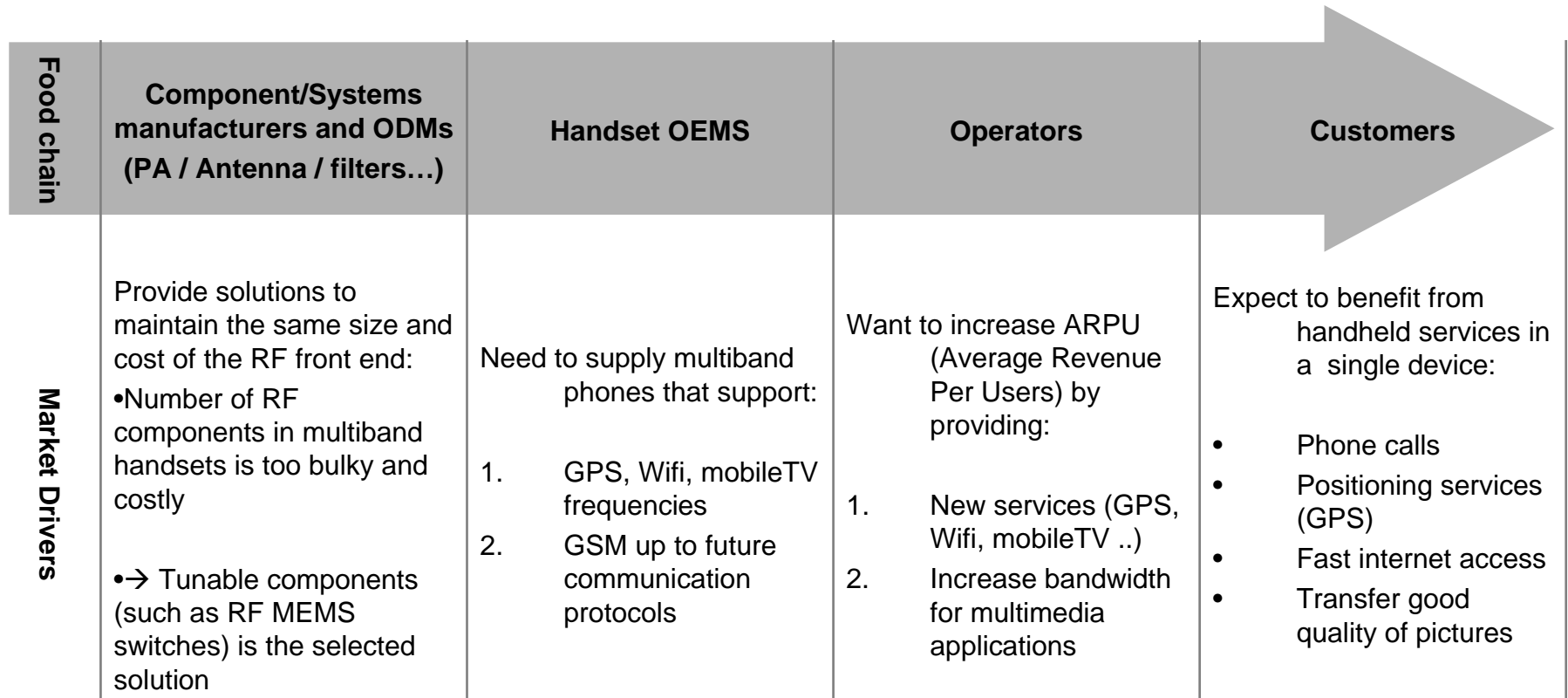


**3 band GSM/EDGE**  
**3 band UMTS**  
**MT Switches, Duplex filters**



The solution selected by the telecom industry is RF MEMS switches

# Market drivers along the food chain



# Tunable FEM answers the handset BOM and size equation

- RF front end BOM and Size should not increase in the next handset generations
  - Selective FEM architecture will not meet BOM and Space constraints
  - Using a tunable solution is the only mean
    - This example is based on the PA application (Power Amplifier)

## Selective FEM architecture

3 bands GSM/EDGE:

**8** RF devices

2PAs + 3 filters + 3 switches

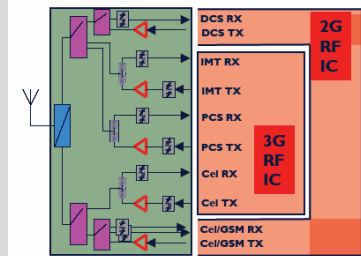
Size: +100%

Cost: +60%

6 bands GSM/EDGE/UMTS:

**22** RF devices

5PAs + 10 filters + 8 switches/duplexers



3 band GSM/EDGE  
3 band UMTS  
MT Switches, Duplex filters

2007

2010

Size: -10%

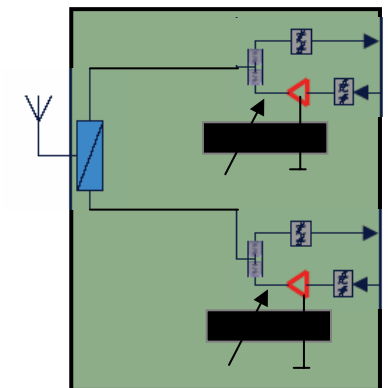
Cost: +20%

## Tunable FEM architecture

6 bands GSM/EDGE/UMTS:

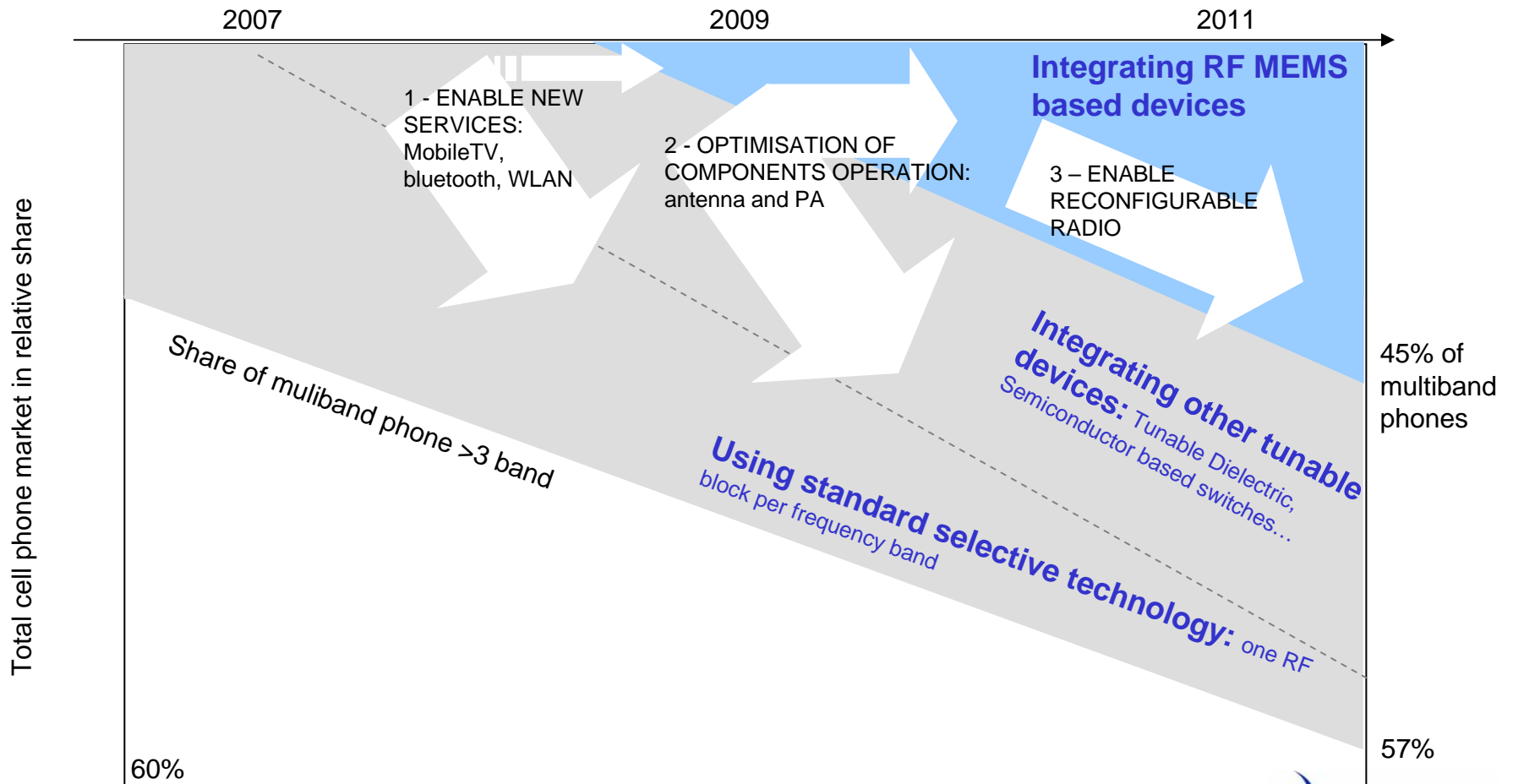
**10** RF devices

2PAs + 4 filters + 3 switches/duplexers + 2 matching networks



# Forecasted evolution of the tunable function within handsets

- **The integration of tunable devices will support 3 major features**
  - ENABLE NEW SERVICES to start in 2007-2008 for mobileTV for i.e. using existing available solution; it will potentially
  - OPTIMISATION OF COMPONENTS OPERATION
  - ENABLE RECONFIGURABLE RADIO

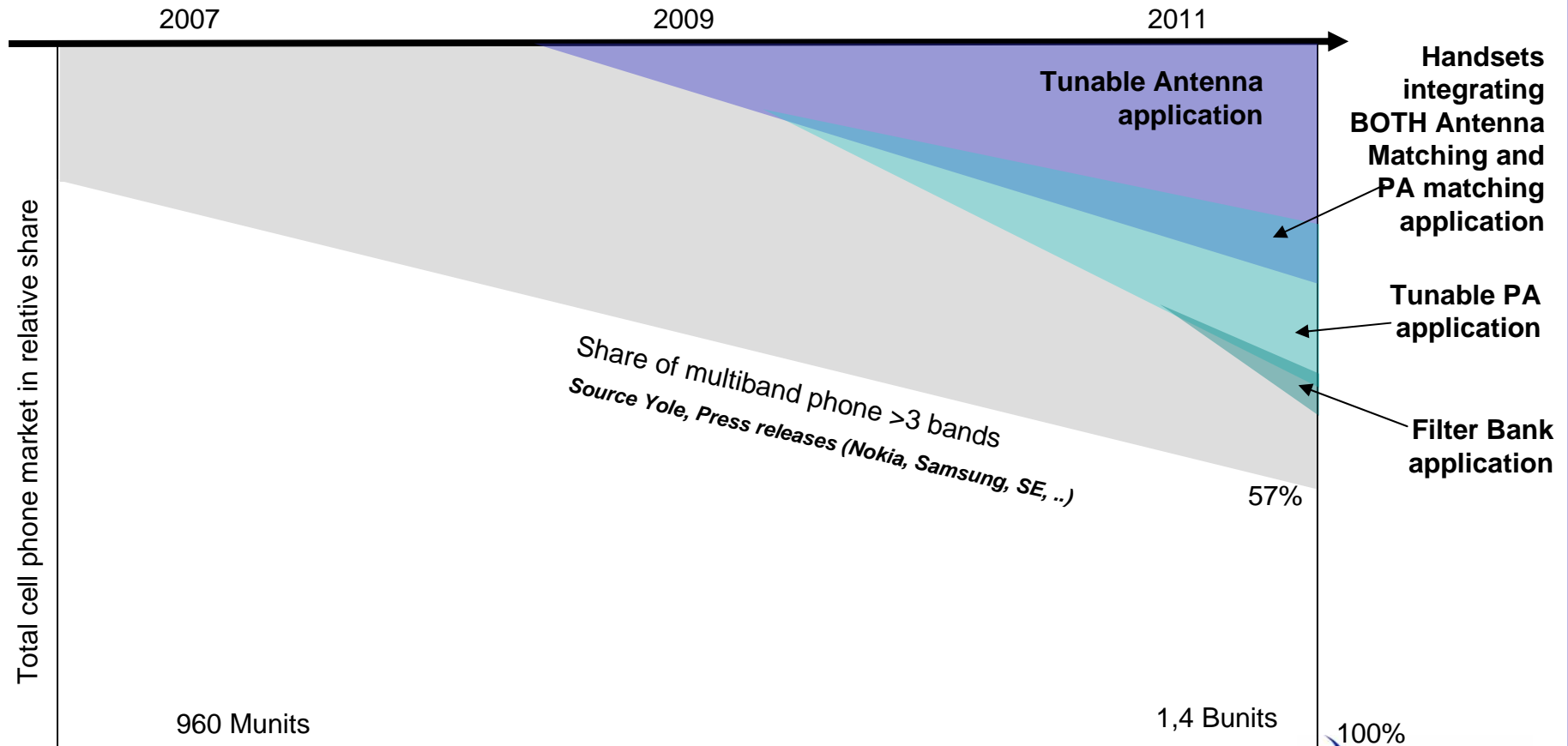


# Market Evaluation

## Penetration of each tunable application on the cell phone market

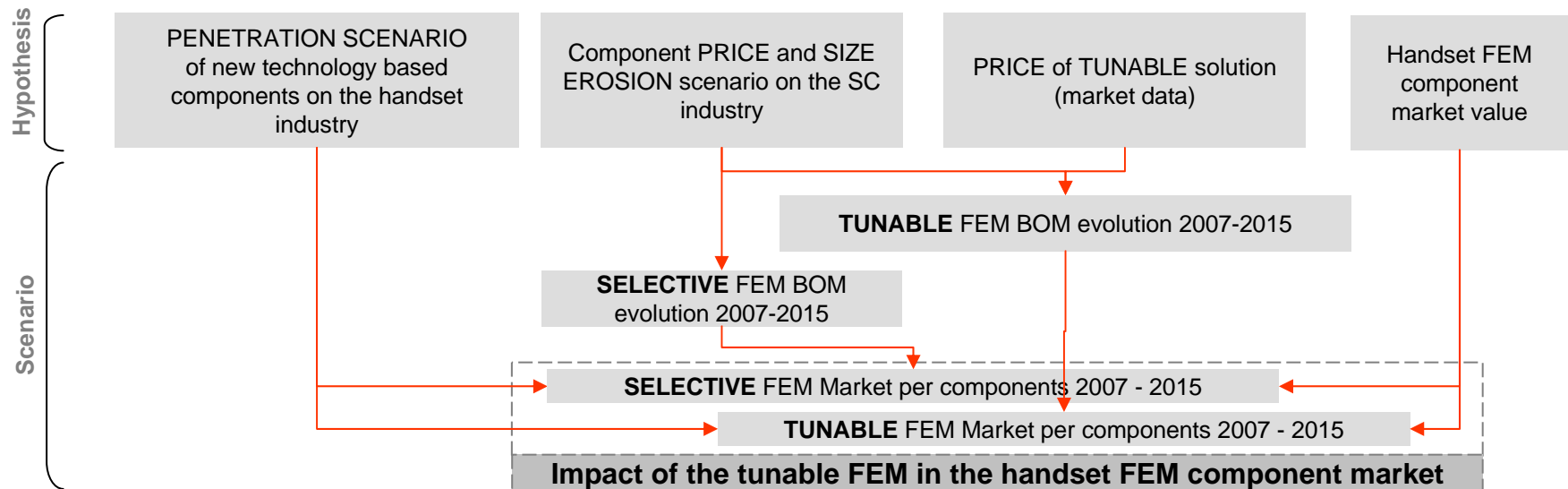
- Share of multiband phone equipped with RF MEMS based products for Antenna Matching application
- Share of multiband phone equipped with RF MEMS based products for PA Matching application

**Handsets integrating tunable function RF MEMS based**



# Market Estimation Methodology

- The market scenario is based on one assumption:
  - The market price acceptance of the tunable solution (component and module) will be validated if BOM spending fit with traditional market evolution



# Long term market estimation 2007-2015

## RF MEMS to take 23% of the FEM RF semiconductor & antenna markets by 2015

### Tunable component market among the FEM RF SC and antenna markets

