

Development of a Satellite TV receiver for fibre optic distribution system

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What's the problem?

- You've won a contract to provide satellite TV reception to every room of a large block of flats
- How do you wire up the building?



Legacy install

Coax cabling can not carry satellite TV bandwidth. Need one cable per satellite band to switch matrix

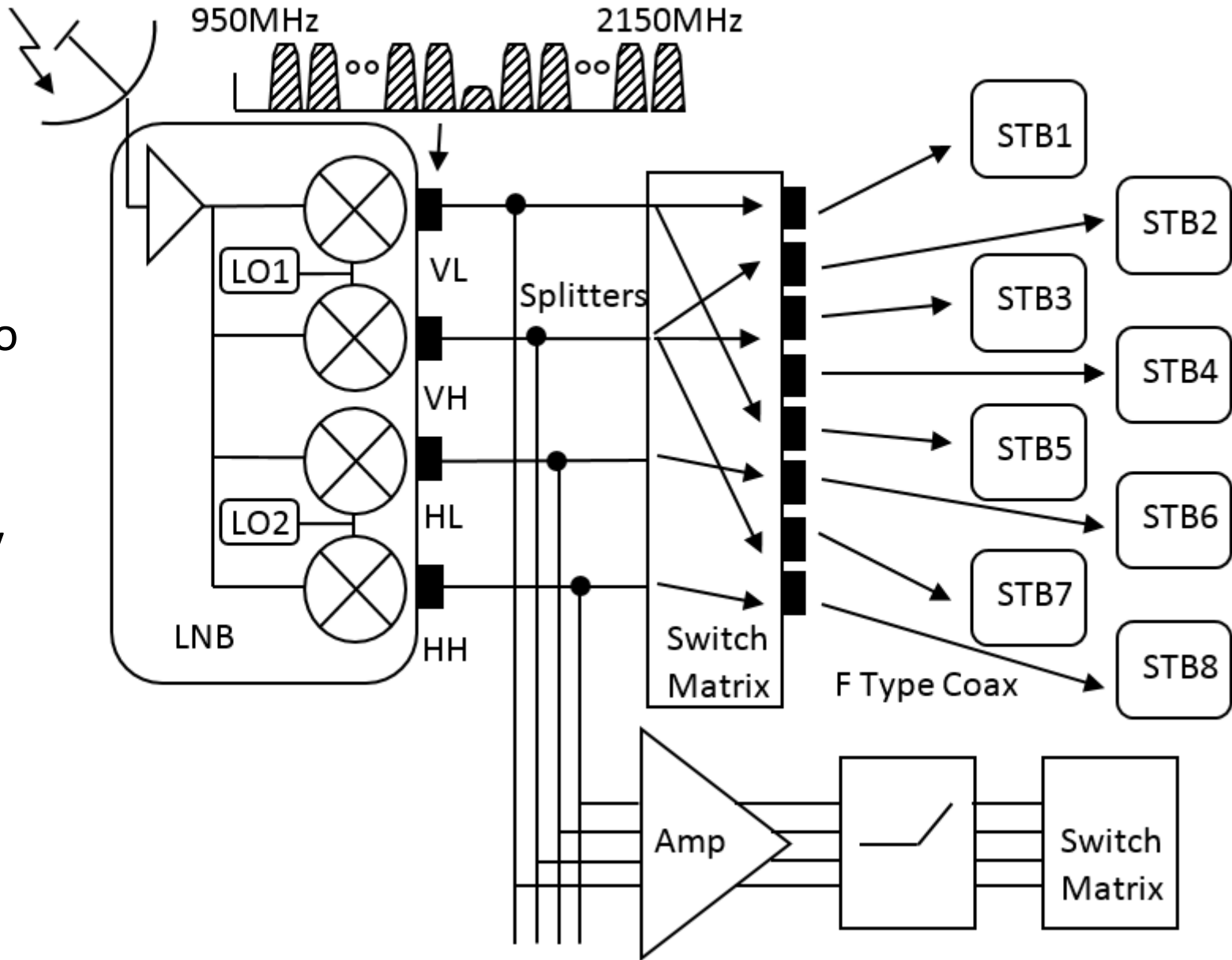
Significant loss and frequency tilt in long cable runs

Gain stages needed to maintain C/N



10.70 ~ 12.75 GHz

~30Mbaud. 8PSK / QPSK for consumer applications



The untidy install looks like this...



Proposed Solution

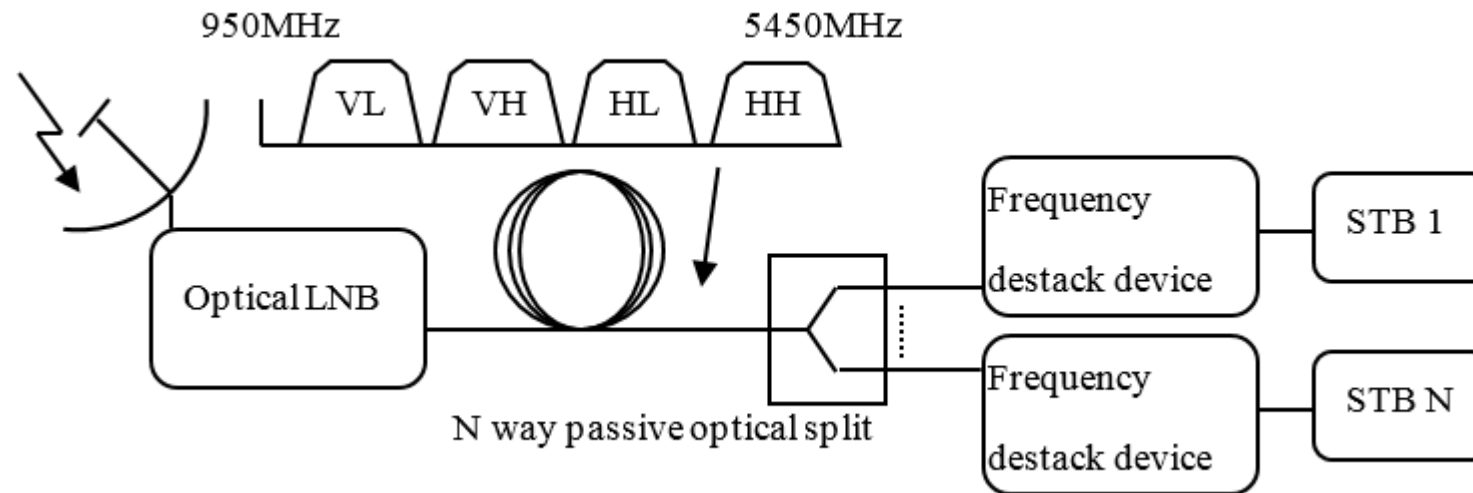
Frequency stack all satellite TV bands on low loss fibre optic.

System pioneered by Global Invacom.

Passive split optical signal. Fibre optic immune to electrical interference.

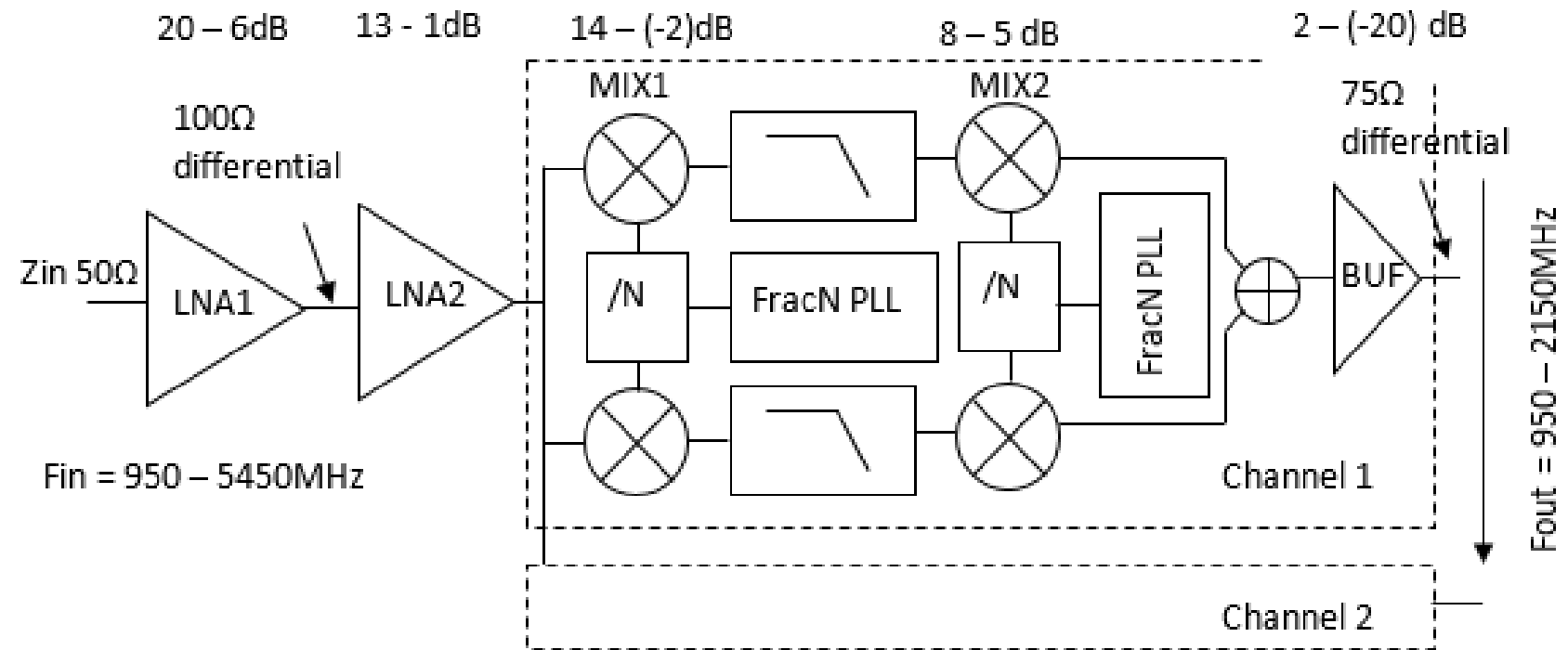
Frequency destack device powered by set top box

Frequency bands must appear to STB as if directly connected to LNB

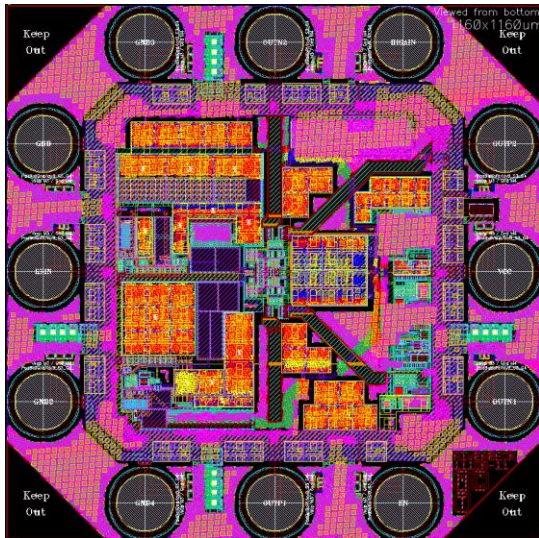


Architecture

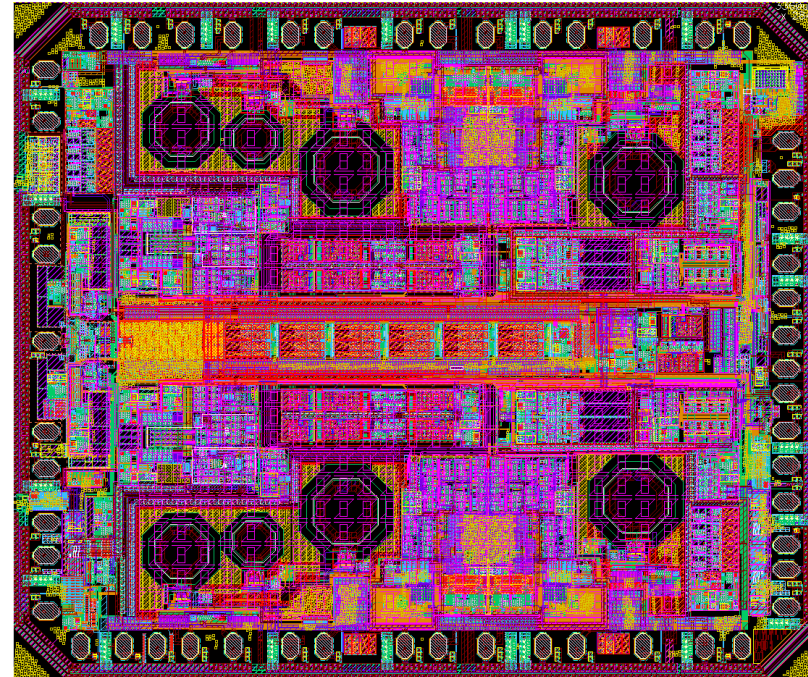
- Homodyne down conversion
- Wideband continuous time filter to clean spectrum
- Homodyne up conversion and output buffer



Chip Floorplan



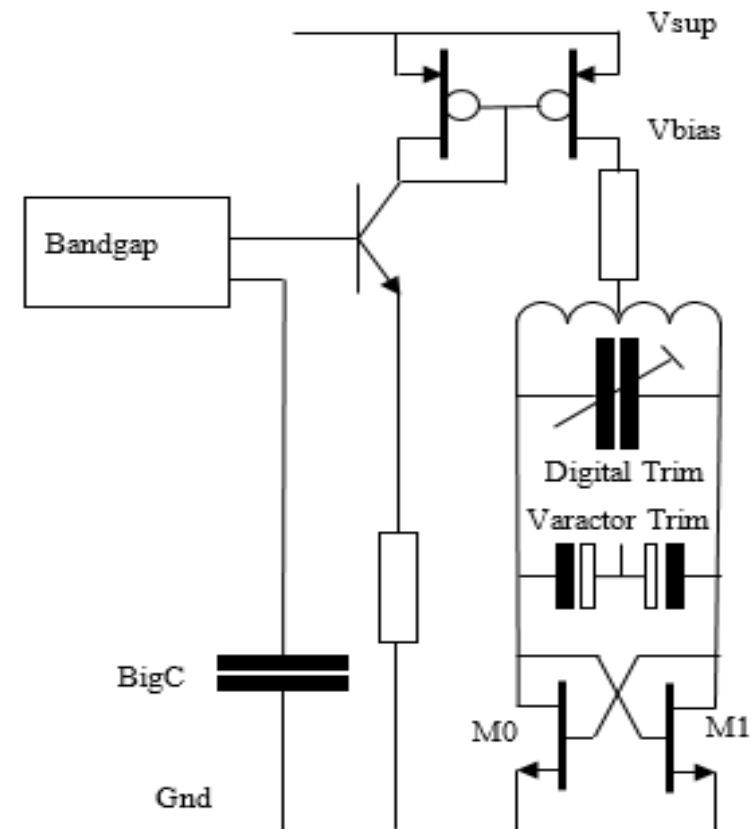
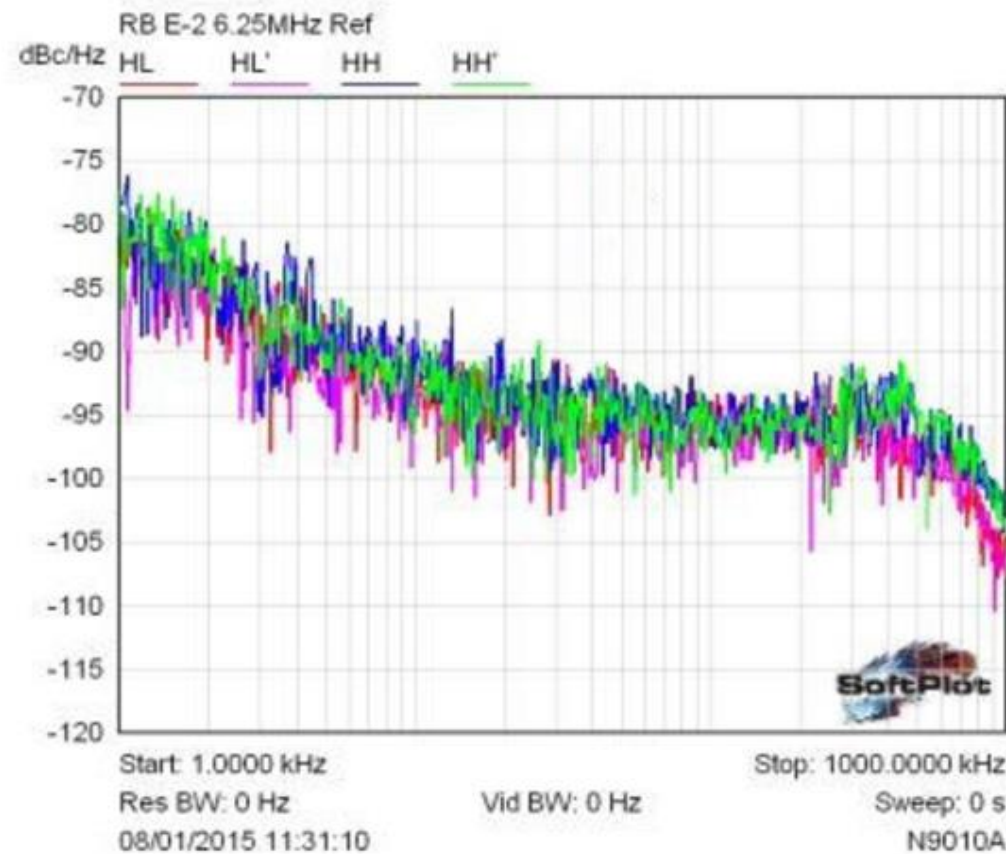
FC-QFN12



QFN40 with 12 downbonds

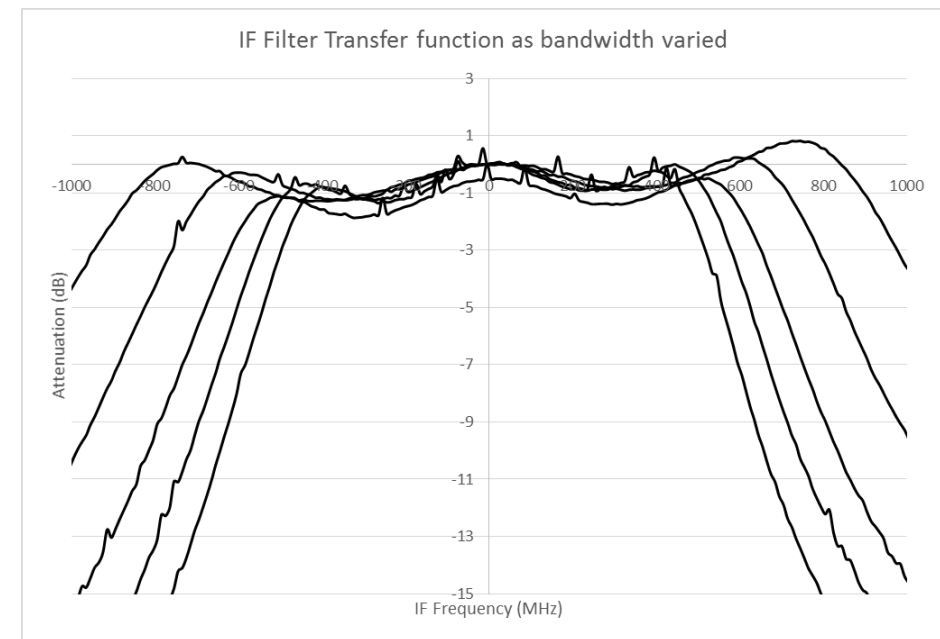
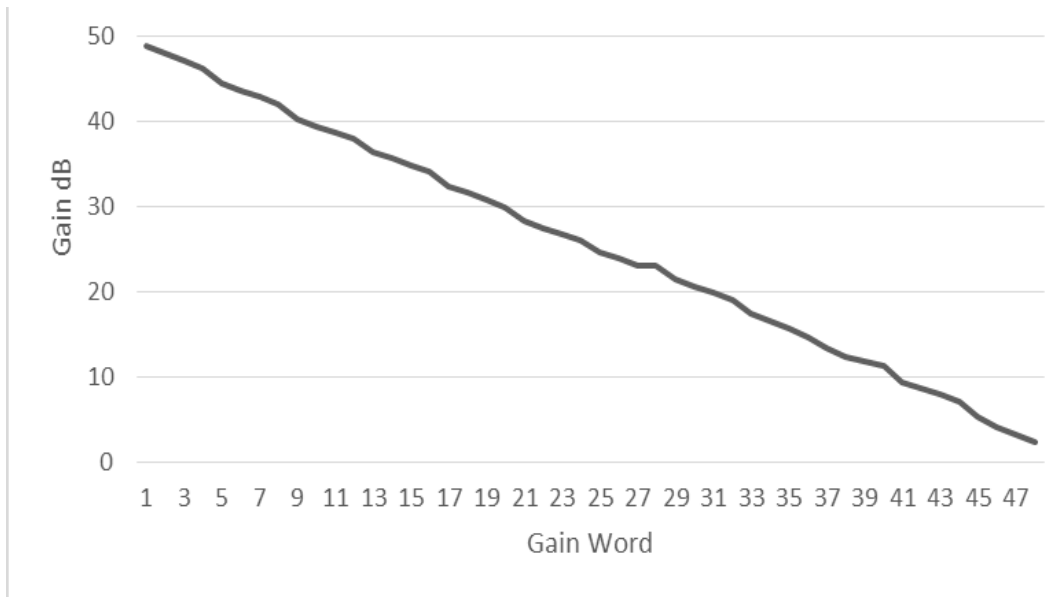
Oscillator / PLL

- Fractional N charge pump based phased lock loop RX LO 1.45GHz – 4.925GHz
TX LO 1.45GHz – 1.625GHz



Gain / Filter stages

- Gain disturbed in multiple stages. 15dB - >45dB
- Channel Filter. 3rd order Butterworth. Fc 500 MHz – 720 MHz



Up integration of circuits

- At project start first generation product already in market
- Riverbeck contracted to integrate RF / analogue functionality to
 - Reduce cost
 - Protect IP
 - Reduce form factor
 - Lower power consumption



A successful up integration project

