Status of the active devices

**CNTs devices:**
- CNT filter
- CNT antenna
- CNT switch
- CNT interconnect
- CNT FET
Simulation/design

Fabrication

Measure

Next step: New RF measurement after CNTs growth optimisation

Target performance

Central frequency: 2 to 80GHz

Bandwidth: 5MHz

Insertion Loss < 2dB

State of the art

Resonance at 10GHz
CNT Antenna

Simulation/design

Fabrication

Measure

Target performance

Frequency: 60 GHz
Return Loss S11: -20dB

Frequency: 2 to 80GHz
Return Loss S11: -30dB
Bandwidth: 40-60GHz

Next Step: Measure RF performance of optimized CNT antenna (CNT height)
**Simulation/design**

- **Device 1**
- **Device 2**


**Fabrication**

- **RF Switch**
- **DC Switch**


**Measure**

- **DC measurement:** Demonstration of the actuation at 50V
- **RF Measurement:**
  - Insertion Loss: 0.2dB at 10GHz
  - Isolation: 23dB at 10GHz


**State of the art**

**Target performance**

- Isolation: > 35dB
- Insertion Loss: 0.1dB

**Next Step**:
- RF measurement with optimized design
- Development of the experimental setup for RF measurement
Fabrication

- Via depth: >200µm
- Density: $10^{12}$ cm$^{-2}$
- Resistivity: ~5mOhm.cm

Measure

- Via depth: 300µm
- Density: Achieved
- Resistivity: ~2mOhm.cm

Target performance

- Via depth: >200µm
- Density: $10^{12}$ cm$^{-2}$
- Resistivity: ~5mOhm.cm

Next Step: RF performance measurement
CNT FET

Simulation/design

Fabrication

Measure

Next Step: Measure RF performance of optimized CNTFET's

OK

OK

OK

Fmax : > 10GHz
Density of CNTs >10CNTs/µm

Improvement of the CNT density

RF performance pending on high-k devices
Density of CNTs 11CNTs/µm

Target performance

CNTFET 2F 4SD 100W
Graphene devices:

- Graphene Antenna
- Graphene detector
- Graphene FET
Graphene antenna

Simulation/design

Fabrication

Measure

Target performance
Returnb Loss : < 20dB
Bandwidth : 70deg

Next step: New fabrication and measurement after design optimisation
Graphene FET

Simulation/design

Fabrication

Material: Graphene on SiC
Size 15x15mm

Measure

RF performance pending on high-k devices

Target performance

Fmax: > 10GHz
Density of CNTs >10CNTs/µm

Next Step: Measure RF performance of optimized CNTFET's
Graphene detector

**Simulation/design**

**Fabrication**

**Measure**

**Target performance**

→ OK

→ OK

Cut-off: 35 GHz
Responsivity: 10V/Watt
Fabrication yield: high

Cut-off: 60 GHz
Responsivity: 1V/Watt
Fabrication yield: high