



CARBONICS

Company Overview

February 2015



Abundance
the carbon era



Integration
silicon meets carbon



Evolution
escape all limits

The Carbonics Story

Carbonics will revolutionize traditional electronics by employing earth-abundant carbon nanomaterials to vastly improve the power consumption and performance of wireless products that include smartphone and wearable devices.

- Raised \$5.5M investment
- Driven by KACST, SRC, US AirForce, USC, UCLA
- Fabless model with internal test facility
- Headquarters in Marina Del Rey, CA



Users want...

Increased Battery Life

Increased Power Efficiency

Less Heat

Increased Power Efficiency

Reduced Weight

Less Power Demand
Consolidate Components

Reduced Cost

Integrating Components

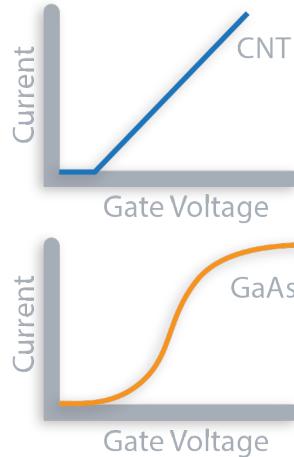
Sustainability

Natural abundant carbon
Fair Trade

Increased Data Rates

Wide Bandwidth, Low Noise
Higher Frequency

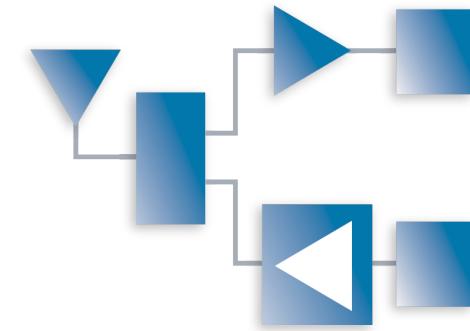
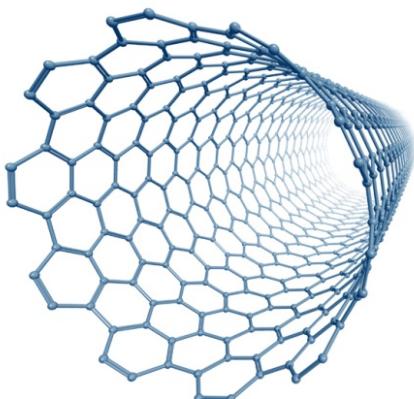




Carbon Performance
superior linearity characteristics,
low noise

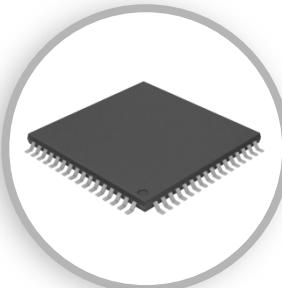
Carbon Era

full integration,
Si meets carbon,
Si compatible
processing



Wireless Design
RF + digital integration,
consolidation of radios

Carbon Nanotech
quasi ballistic transport 99%,
semiconductor purity,
7x times higher Vsat



Front End Modules

Wide bandwidth to accommodate 5G & 802.11ad (>60GHz)

Market Growth >12% per year to \$13B in 2018



Wearables

New functionality to accommodate flexible embedded RF chips

Market Growth 24% per year to \$11B in 2020



Vehicular Communication Systems

Higher frequency to accommodate 63-64GHz communications

Market Growth 11% per year to \$30B in 2019

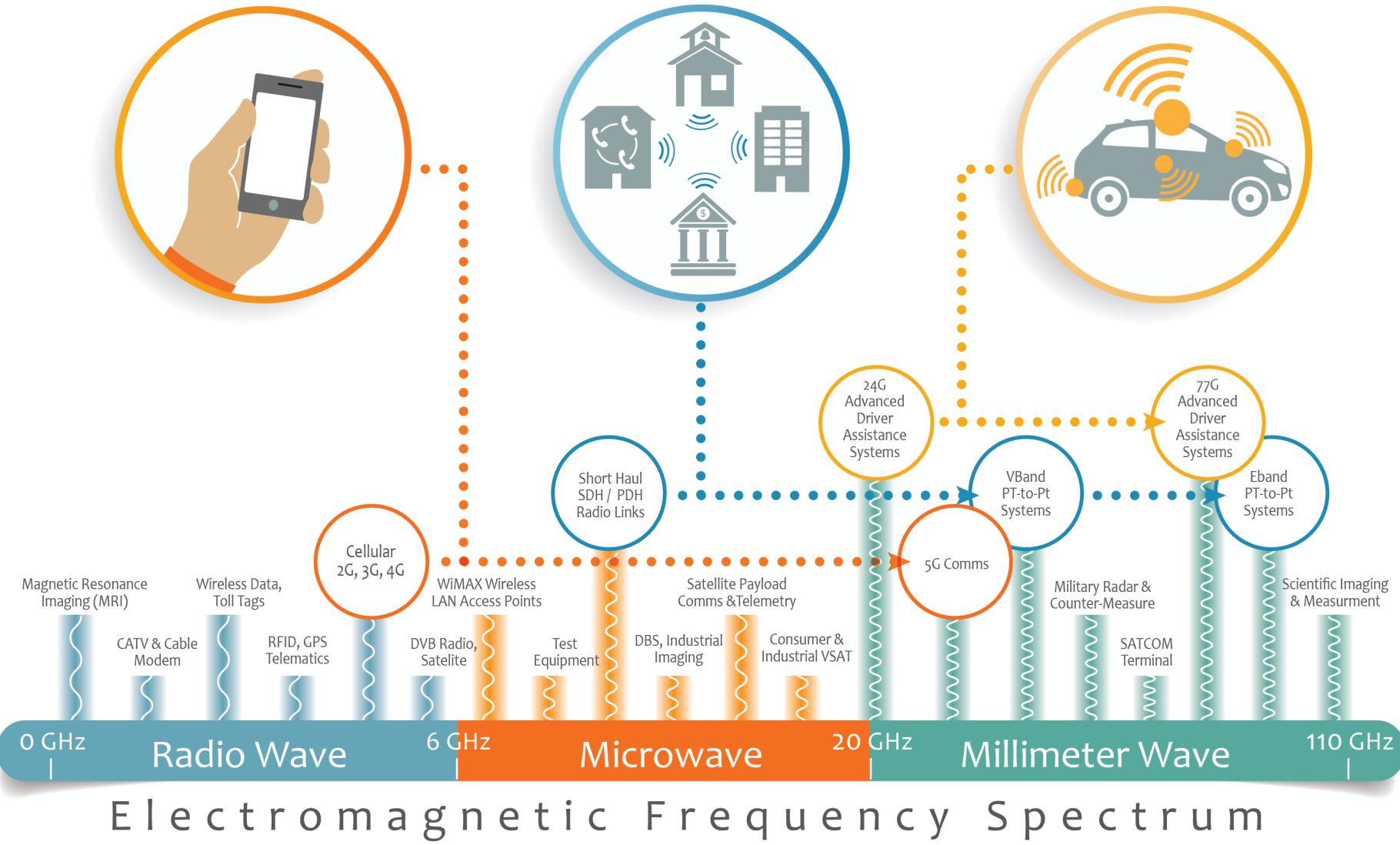


Internet of Things

Low power and higher frequency, RFID, WiGig, E-band and ISM (GHz)

Market – too big, touches all product segments

Trends to Higher Frequency



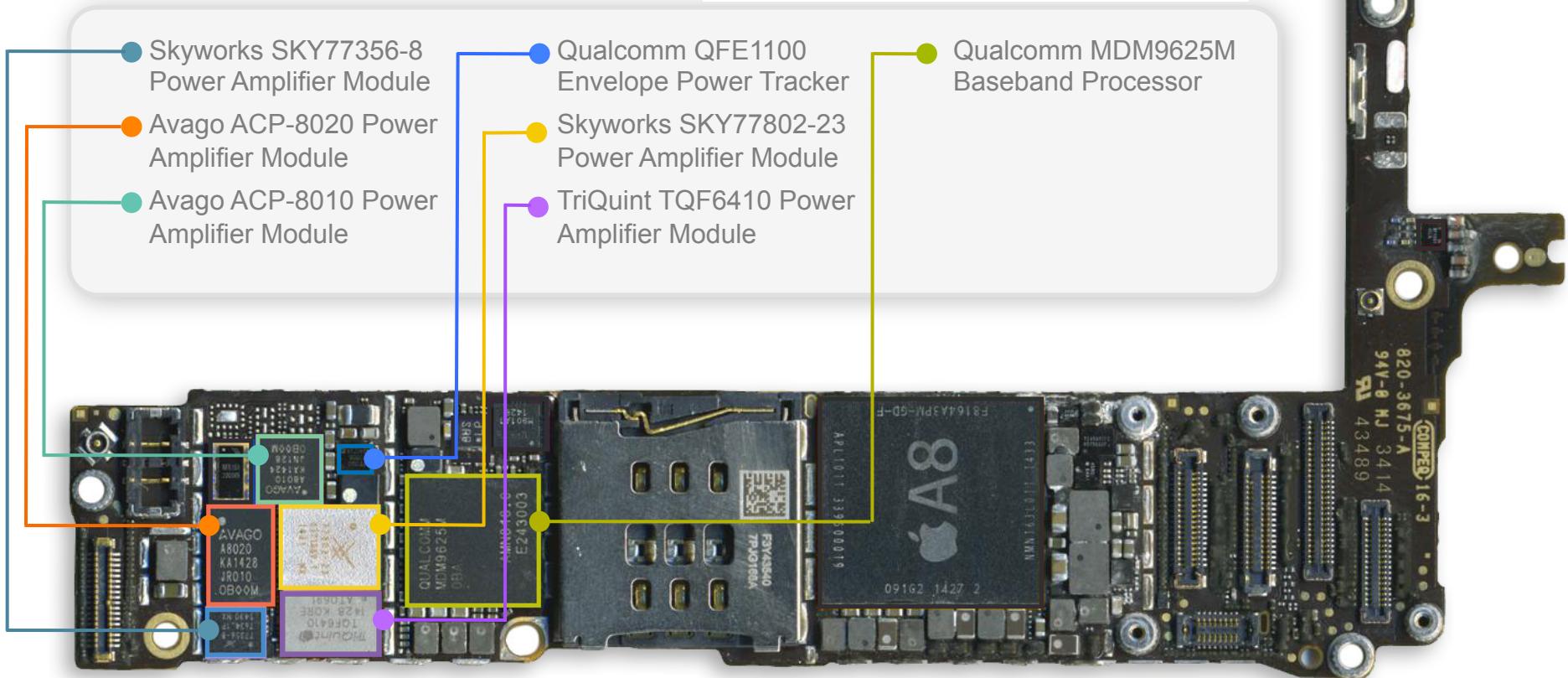
Example: iPhone

Incumbent Technology (III-V & Si)

- Power loss in OFF state (both DC & RF)
- Lack of super linear devices to consolidate radios
- Inability to Monolithically Integrate (III-V with Si) towards 5G

Carbon Platform

- ✓ RF + DC platform integration (carbon + Si)
- ✓ Reduce chip count
- ✓ Higher linearity, wider bandwidth, lower noise
- ✓ Higher frequency operation towards 5G



Ecosystem



Foundry

RFIC (MMIC)

Distributors

OEM

NORTHROP GRUMMAN

CREE

Avago
TECHNOLOGIES

MACNICA
AMERICAS

FOXCONN

TOWERJazz

TriQuint
Reach Further • Reach Faster™

SKYWORKS
BREAKTHROUGH!

BOEING

SAMSUNG

IBM

LAPIS

Hittite
MICROWAVE CORPORATION

ARROW

FUTURE
ELECTRONICS

ERICSSON

NOKIA

umt

MagnaChip

Peregrine
Semiconductor

Digi-Key
CORPORATION

muRata

iwin

tsmc

GLOBAL
FOUNDRIES

AVNET®

Raytheon

Silanna

NORTHROP GRUMMAN



CARBONICS

Board of Directors



Kos Galatsis

CEO

Emerging tech ambassador, problem-solution innovator and nanotechnologist. Over 10 years managing and directing emerging technology mega-programs for the semiconductor and defense industries.



Hani Enaya

Board Member

Energy and semiconductor technologist with experience in structured finance and international development. Hani brings depth to global strategy, business development and venture capital.



Patrick Suel

Board Member

A seasoned corporate venture capitalist for over 20 years specializing in Nanotechnologies, Materials and Semiconductors.



Kang L Wang

Board Member

A pioneering scientist in semiconductors and nanoelectronics holding the prestigious Raytheon Chair Professor at UCLA.



Chris Tubis

Board Member

A silicon valley entrepreneur with over 30 years of experience in wireless, semiconductor, manufacturing and management.



Chongwu Zhou

Scientific Board Chairman

A champion of carbon nanoelectronics, credited for many advancements in the carbon field. Holds joint appointments in physics and chemistry at USC.



CARBONICS

www.carboncисinc.com