RESONANT®

EXPLORING 5G

MAY 2019

SAFE HARBOR STATEMENT

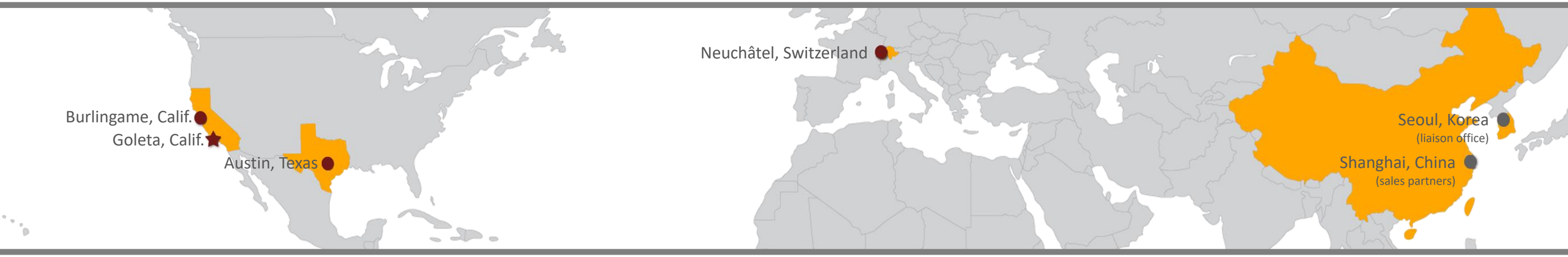
This document contains forward-looking statements. The words "believe," "may," "will," "potentially," "estimate," "continue," "anticipate," "intend," "could," "would," "project," "plan," "expect" and similar expressions that convey uncertainty of future events or outcomes are intended to identify forward-looking statements. Forward-looking statements may address the following subjects among others: the status of filter designs under development, the prospects for licensing filter designs upon completion of development, plans for other filter designs not currently in development, potential customers for our designs, the timing and amount of future royalty streams, the expected duration of our capital resources, our hiring plans, the impact of our designs on the mobile device market, and our business strategy. Forward-looking statements are inherently subject to risks and uncertainties which could cause actual results to differ materially from those in the forward-looking statements, including, without limitation, the following: our limited operating history; our ability to complete designs that meet customer specifications; the ability of our customers (or their manufacturers) to fabricate our designs in commercial quantities; the ability of our customers to sell products incorporating our designs to OEMs; our dependence on a small number of customers; the ability of our designs to significantly lower costs as compared to other designs and solutions; the risk that the intense competition and rapid technological change in our industry renders our designs less useful or obsolete; our ability to find, recruit and retain the highly skilled personnel required for our design process in sufficient numbers to support our growth; our ability to manage growth; and general market, economic and business conditions. Additional factors that could cause actual results to differ materially from those anticipated by our forward-looking statements are under the captions "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our most recent Annual Report (Form 10-K) or Quarterly Report (Form 10-Q) filed with the Securities and Exchange Commission. Forward-looking statements are made as of the date of this document, and we expressly disclaim any obligation or undertaking to update forward-looking statements.

We may refer to information regarding potential markets for products and other industry data. We believe that all such information has been obtained from reliable sources that are customarily relied upon by companies in our industry. However, we have not independently verified any such information.

Summary of Company Stats

Corporate Overview

Founded:	May 2012
IPO:	May 2014
Employees:	70+ employees
Cash, cash equivalents & investments:	$15.2 M *as of March 31, 2019*
Business Model:	Licensing-Per Unit Royalty
Customers:	11 customers
Foundry Partners:	7 partners
Market Validation:	75+ devices contracted
Patents:	>165 filed or issued



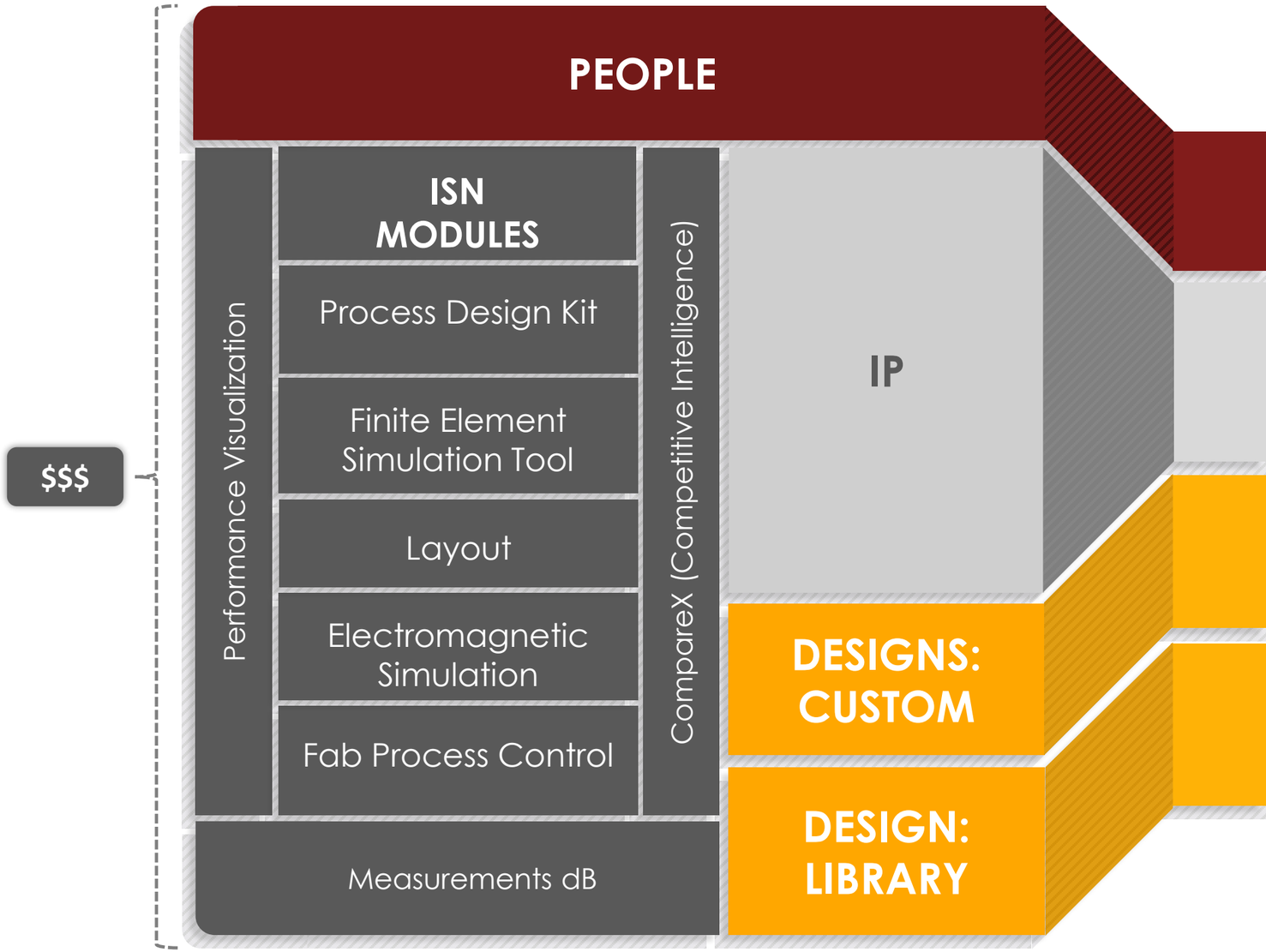
Resonant is the Only Pure Play Software & IP Growth Opportunity Focused on Mobile Filter Market

- **Filter market** is $12B today **growing to $28B** by 2025
  - Market will require **>3x number of filters**
  - **5G** is ramping
  - Filter companies are **constrained** by designer availability

- **Infinite Synthesized Networks® (ISN®) software** creates designs faster, better, and cheaper
  - Design efficiency is up to **5x greater** than other filter designers
  - Design turns **reduced** by up to **10x**

- **IP and Trade Secrets** creating core value
  - Latest development **targeting 5G**

- **Business model**
  - **Licensing** based on filter sales

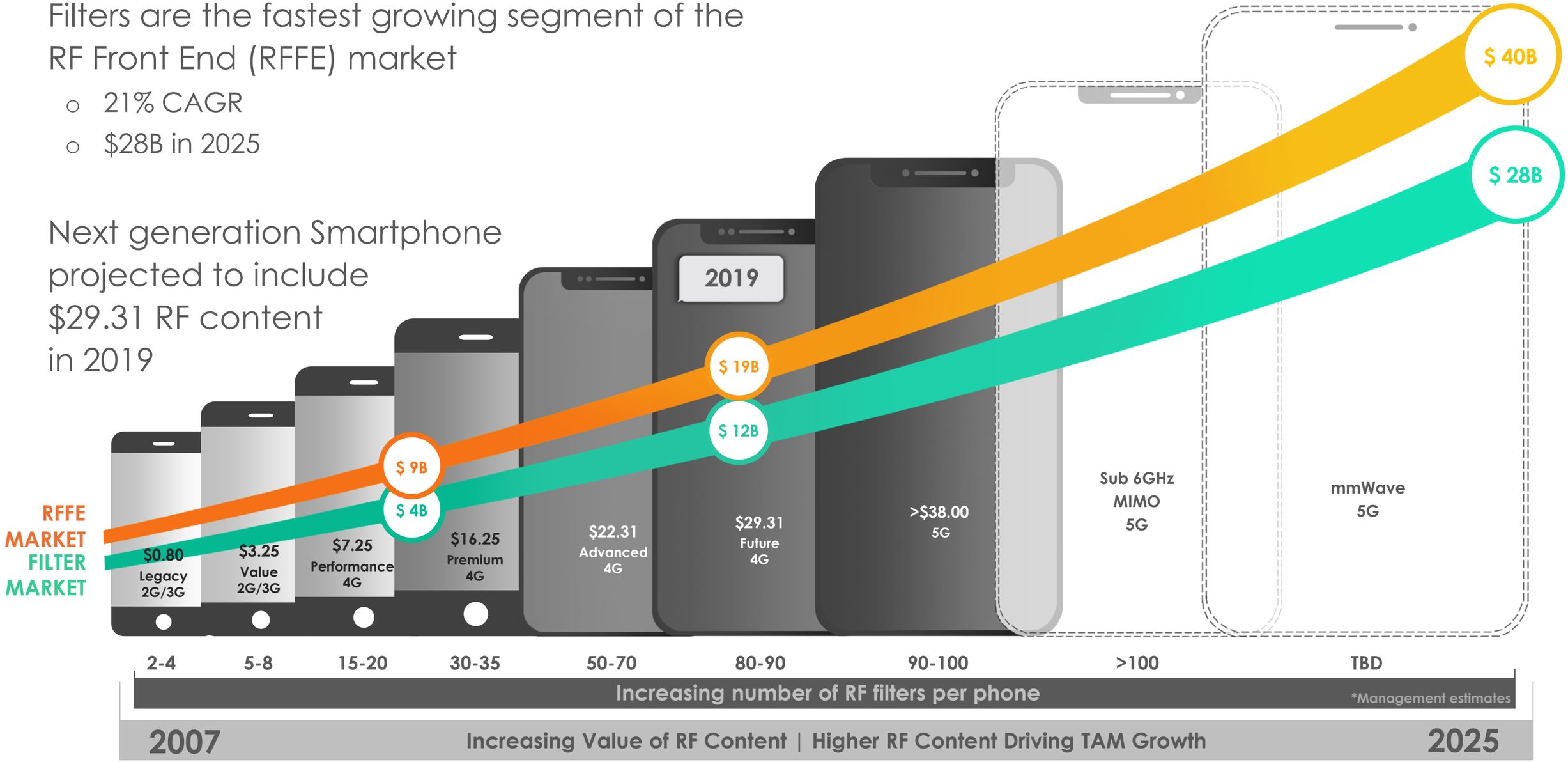


Sources: Yole Developpement

RF Front End Enables Mobile Phone Growth

- Filters are the fastest growing segment of the RF Front End (RFFE) market
  - 21% CAGR
  - $28B in 2025

- Next generation Smartphone projected to include $29.31 RF content in 2019



Sources: Yole Developpement, Navian, Barclays, Management Estimates

5G's Impact on the RF Front End – Design Capacity

Design capacity must increase by up to 8x by 2025 to maintain share

Design capacity constrains market[1]

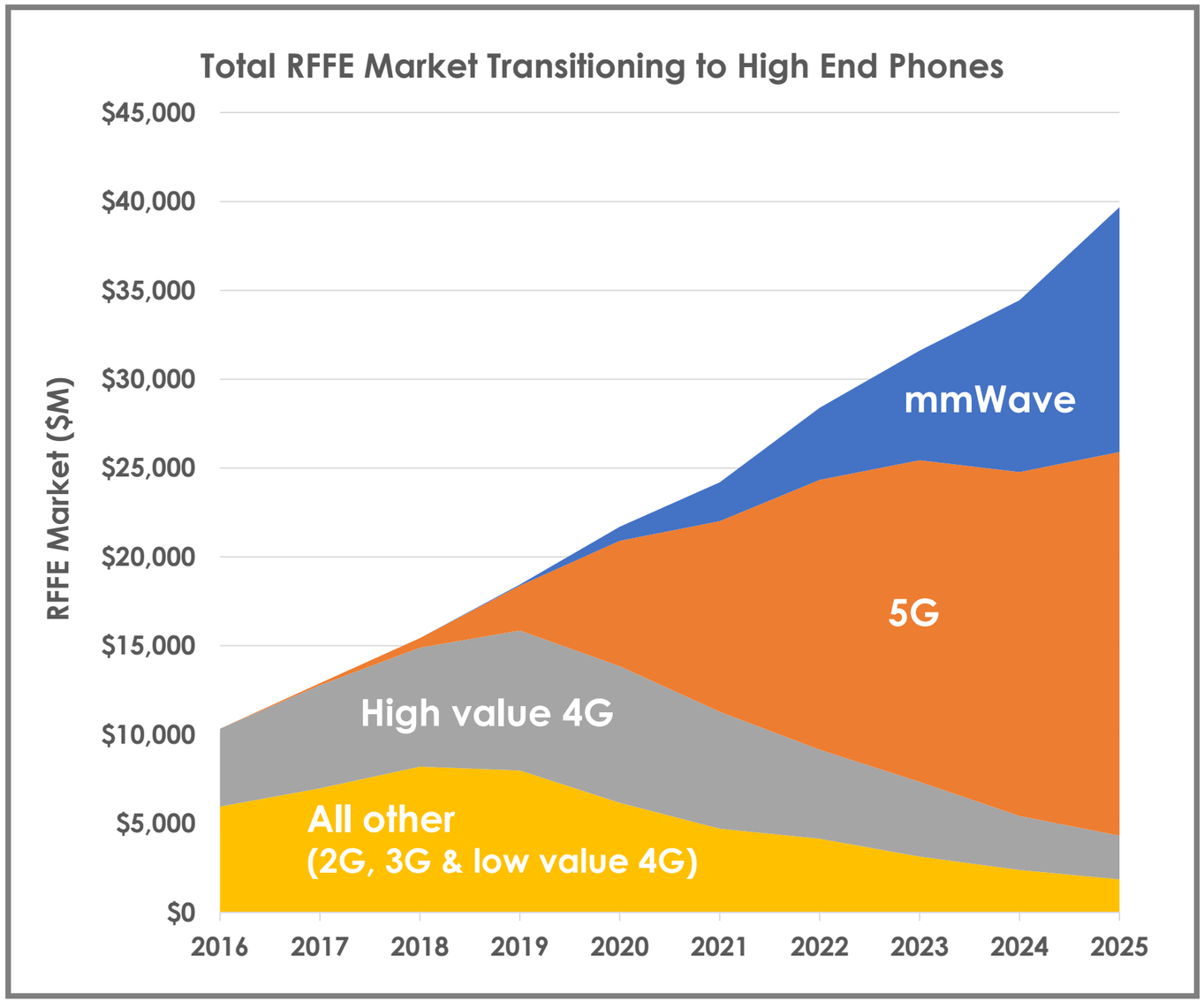
- Resonant is positioned to support entire RF spectrum with ISN platform; improving design efficiency by up to 5x

Legacy design methodology increases costs and slows development by utilizing fab turns to deliver designs

- Resonant's ISN platform enables fewer turns (up to 1-2) to deliver functional designs

High value 4G continues to be meaningful

- Resonant's Filter IP Standard Library of products enables new customer and suppliers to enter market



Sources: Yole Developpement, Management Estimates

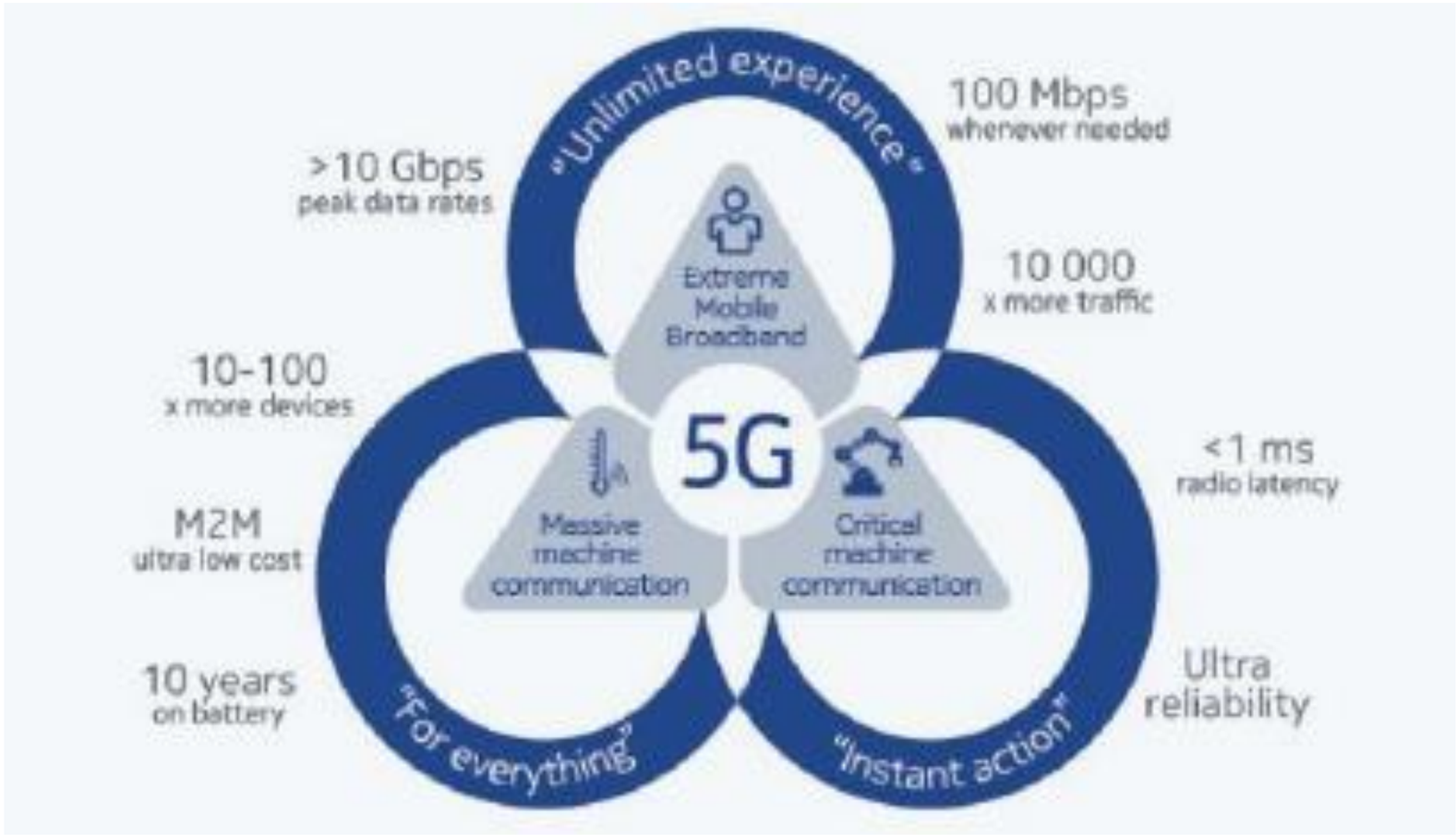
1. Design capacity increase assumes for customer targeting current share in new phone market which has 3-4x greater filters per phone

5G : Use Cases and Requirements

What is 5G ?

3 Different Use Cases

1) Extreme Mobile Broadband
   a) HD Video
2) Massive MTM Communication
   a) IoT
3) Critical Machine Communication
   a) High reliability



Source: Nokia

Focus : Mobile Broadband Market

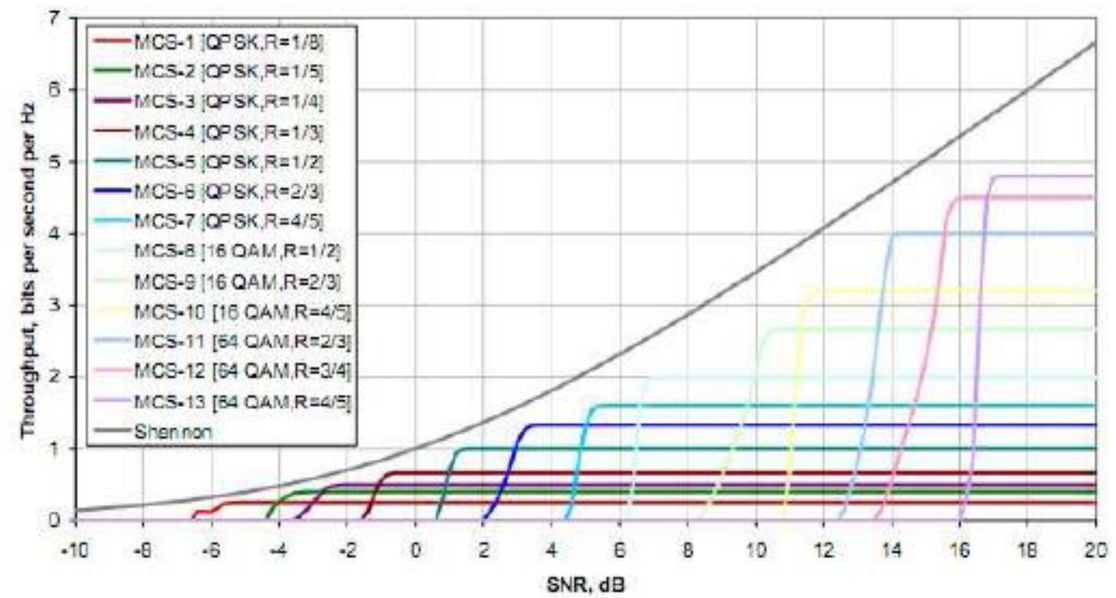
5G's Impact on the RF Front End – Date-Rate

Shannon Theory

Maximum Wireless Data-Rate

Shannon Theory : $C = M^* H * \log_2 (1+SINR)$

	Description
C	Channel Capacity in bits/second
M	Number of Channels
H	Bandwidth
SINR	Signal to (Interference + Noise) Ratio



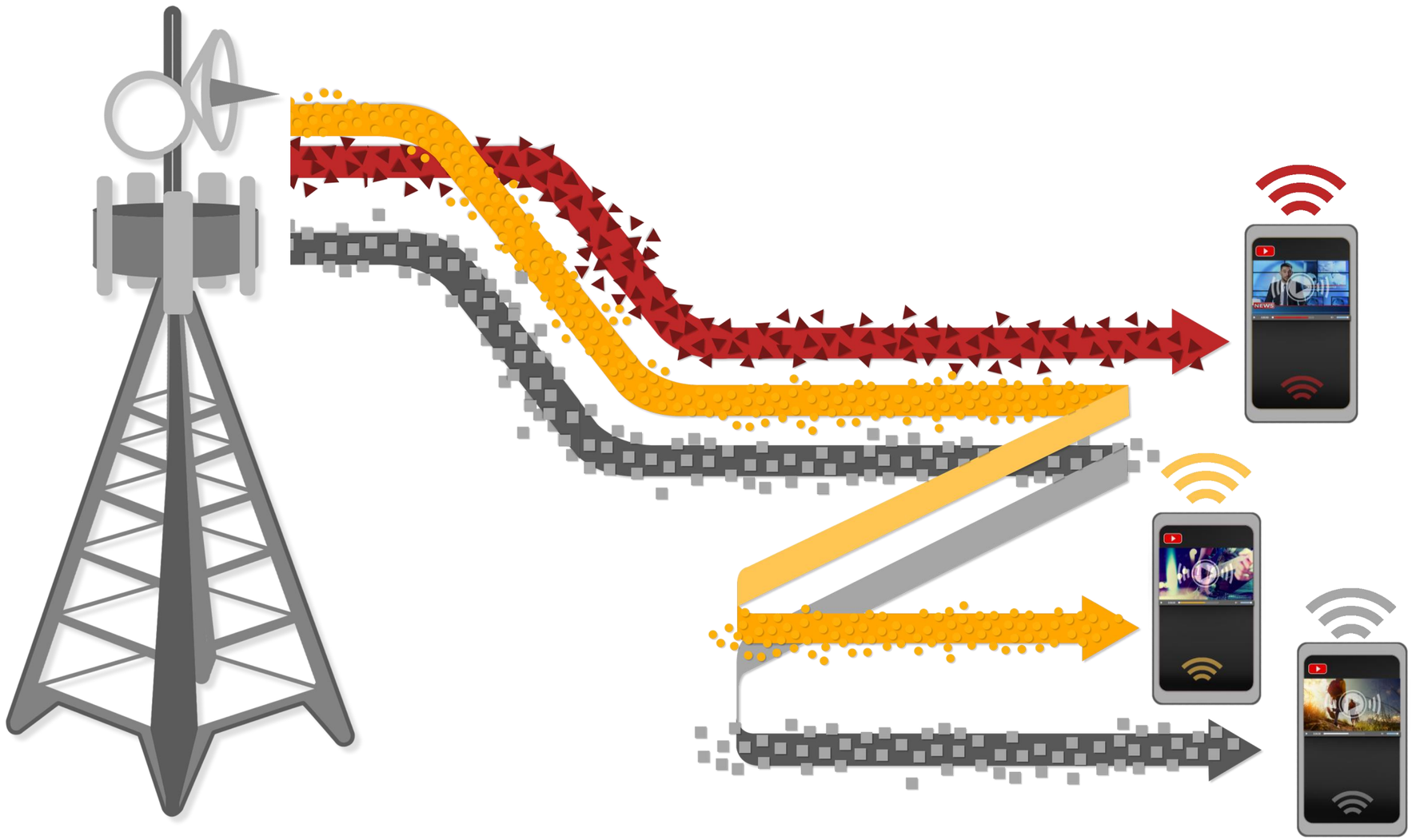
Key parameters to Increase data rate :

1) Increase bandwidth (H)
2) Increase number of channels (M)
3) Improve SINR
   a) By increasing transmit power at the user
   b) By decreasing Noise

This is achieved in 5G by:

1) More instantaneous bandwidth (n77, n79..) & aggregation of spectrum
2) More antennas (MIMO)
3) Densification of the network
4) Higher order modulation schemes

Next Generation Phones Are Dependent upon Increasing Demand for Bandwidth



RF Front End (RFFE) Ensures Voice, Data and Video Calls Are Delivered Correctly

Resonant is transforming the way RFFEs are Designed and Delivered

ISN®: Next Generation Design Platform

RESONANT
FUNDAMENTAL | RIGOROUS | SCALABLE | DEFENDABLE

CURRENT FILTER DESIGN
UTILIZED BY MOST MANUFACTURERS

Image Design
Acoustic Wave Ladder

Modern Filter Theory

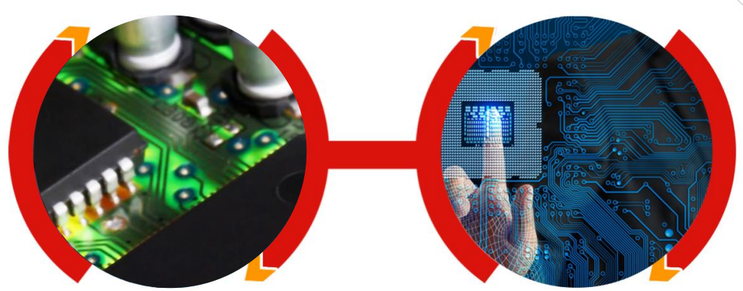
Coupling of Modes Model | COM
Empirical Optimization & Simulation

Aggregated Physical Properties
Velocity of Surface Waves
Reflectivity of Surface Waves

1900s — 1950s — 2000s

Acoustic Wave Network Synthesis

RF Circuit Models — **Optimization**



Fundamental Physical Models — **Simulation**

RF Circuits
Inductance | Voltage
→ RF Circuit Integration

Fundamental Physical Properties
Density | Dimensions
→ Fab Integration

Today

Current filter design process:
- Many iterations: long / expensive
- Limited design space: Bandwidth, power
- Limited to "captive" fab

ISN Value:
Order of Magnitude Improvement in:
- Development time
- Cost

5G's Impact on the RF Front End – Technology

5G demands larger bandwidth that is only available at higher frequency

5G Requirements	XBAR
Large bandwidth *100's of MHz vs. 10's of MHz*	✓
High frequency (3GHz - 80GHz) *Only frequencies where large bandwidths are available*	✓
Power handling *High frequency = less propagation* *Overcome with higher power to increase coverage*	✓
High quality factor, Q, of resonator structure *Determines rejection and loss of the filter* *Particularly challenging at high frequency*	✓

Based upon simulation results
Initial measured verification in process

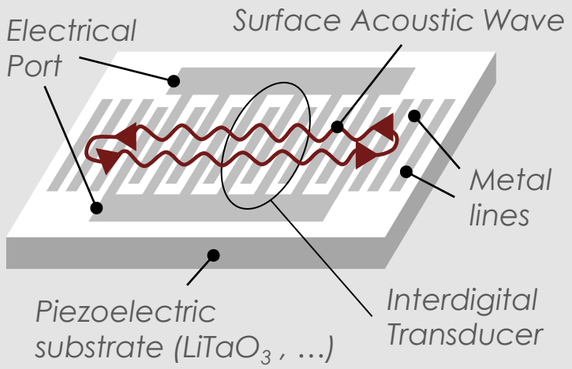
What is XBAR?

- Proprietary resonator structure based on existing process technologies developed using ISN
  - IP/ XBAR based library products for 5G

Acoustic Wave Filter Technologies

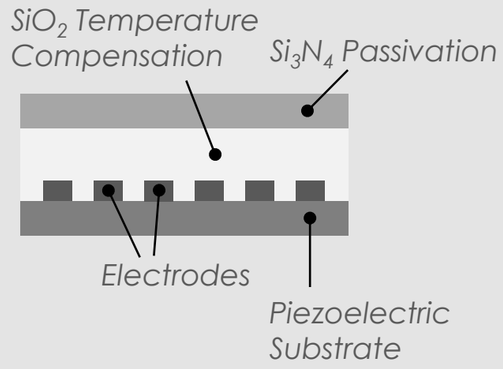
SAW
Surface Acoustic Wave

*Acoustic wave propagates in a **lateral** direction*



TC-SAW
Temperature-Compensated SAW

*Acoustic wave propagates in a **lateral** direction*

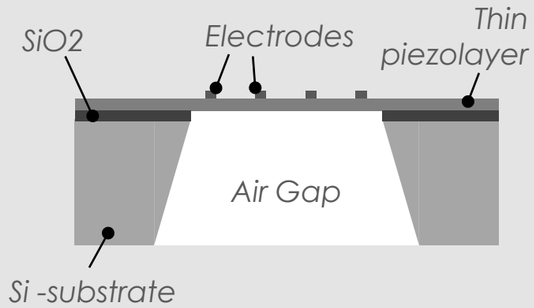


FBAR
Bulk Acoustic Wave

Acoustic wave propagates in a vertical direction

BAW – XBAR™
Bulk Acoustic Wave

*Acoustic wave propagates in a **vertical** direction*



3G & 4G	**4G**	**4G**	**4G & 5G**
COST			
Simple, low cost	Relatively low cost process	Complex, high cost process	Leverages standard industry process
PROCESS STEPS			
			
PERFORMANCE			
Best performance requires precise process control and improved design	Improves temperature stability	Low loss and high rejection	Best in class performance Ultra-wideband

5G and WiFi Coexistence Problem

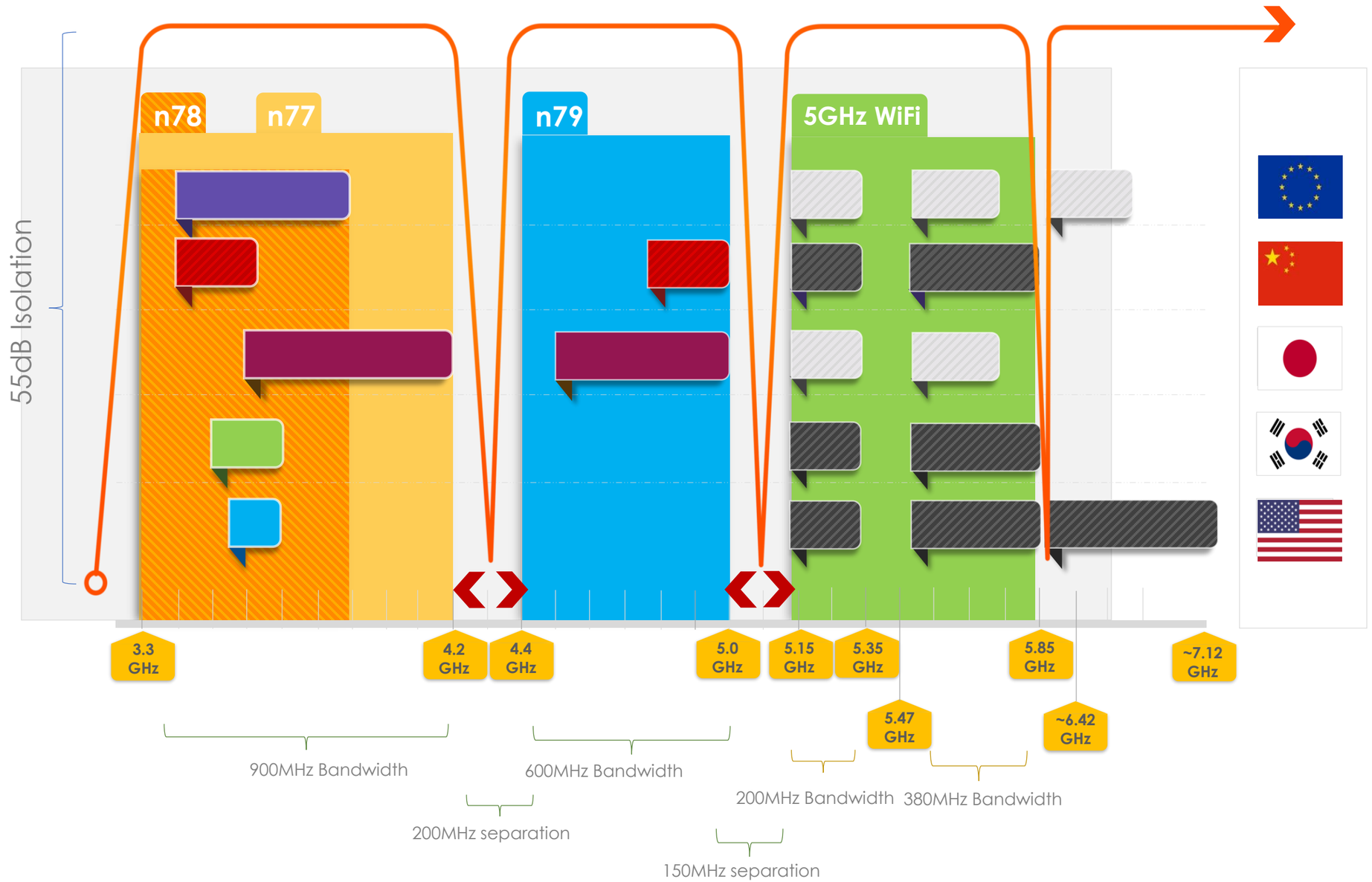
Problem:

- 5G (sub 6GHz) and 5GHz/6GHz WiFi need to operate together in 5G phones
- Massive potential interference problem

Requirements:

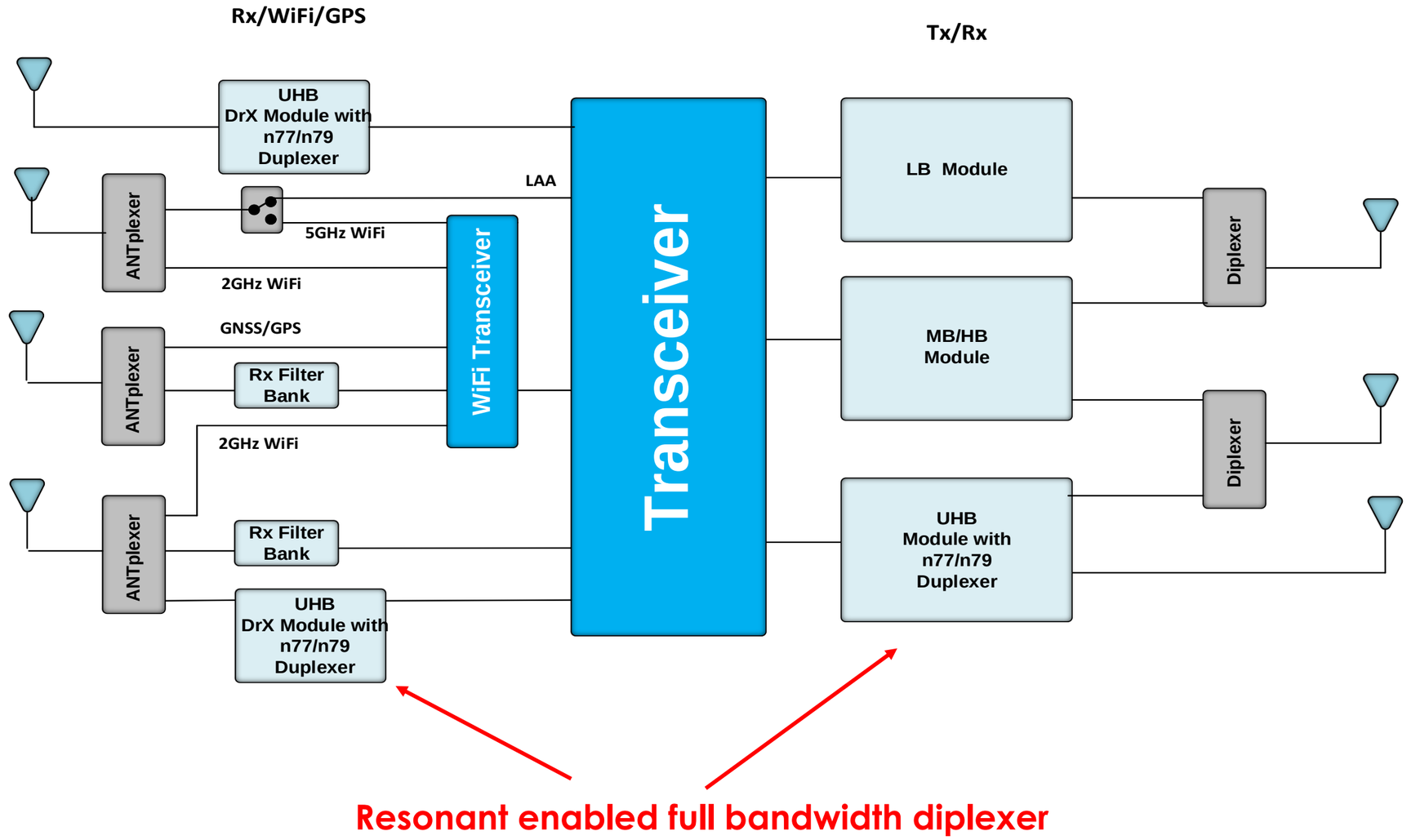
- Large bandwidths
- High isolation/rejection
- Low loss
- High Power
- Small and thin die size

Significantly different from 4G



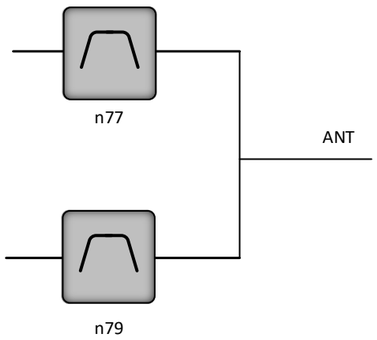
XBAR DIPLEXER IMPACT ON 5G RF FRONT-END ARCHITECTURE

- Maximum data-rate possible
- Allows aggregation of n77 & n79 on the same antenna
  - 1.5GHz of Spectrum
  - Comparable to entire 4G spectrum
- Simplifies architecture
- n77/n79 duplexer requires XBAR



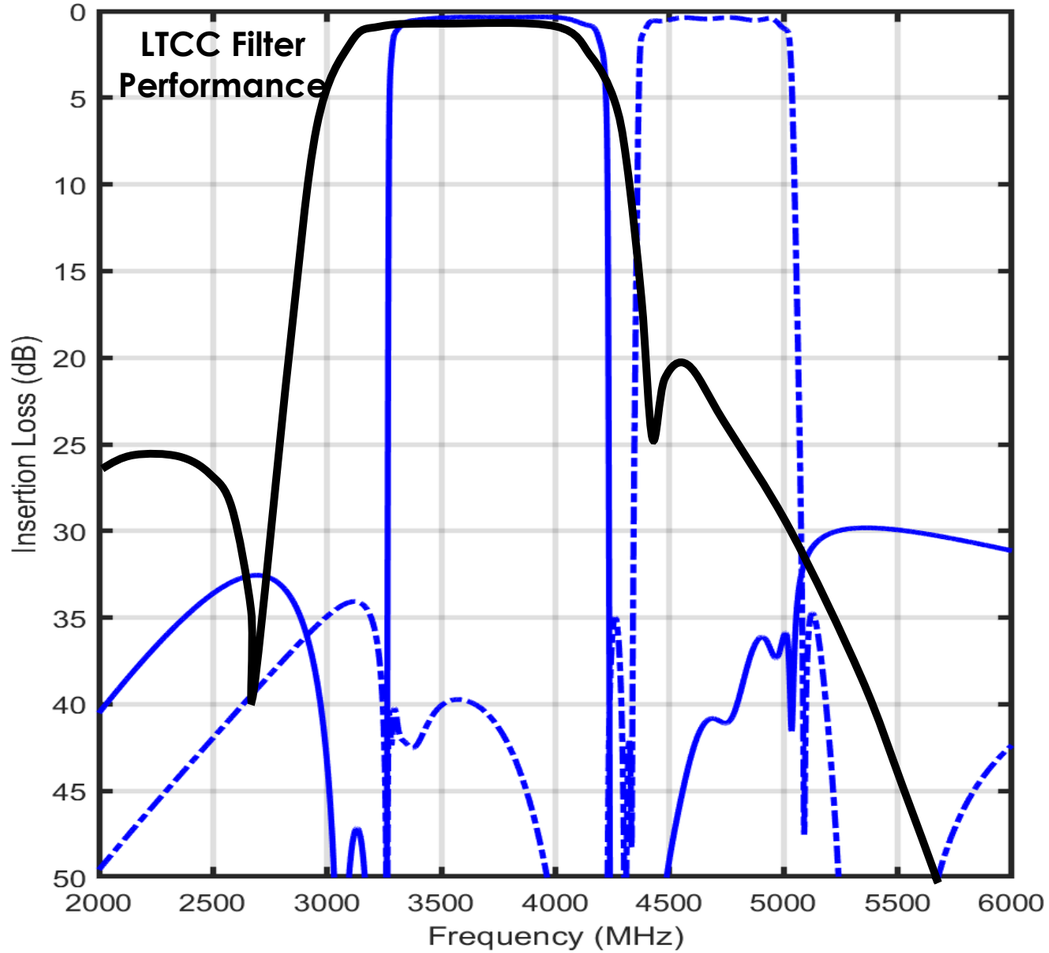
XBAR n77/n79 Diplexer Performance for Ultra-Wideband CA

XBAR Diplexer



- Allows aggregation of n77 and n79 (1.5GHz of spectrum)
- Rejection to each band and 5GHz WiFi
- Low passband Insertion Loss
- Wide bandwidth capability of XBAR key
- Package thickness is going to be key <0.4mm

Simulation

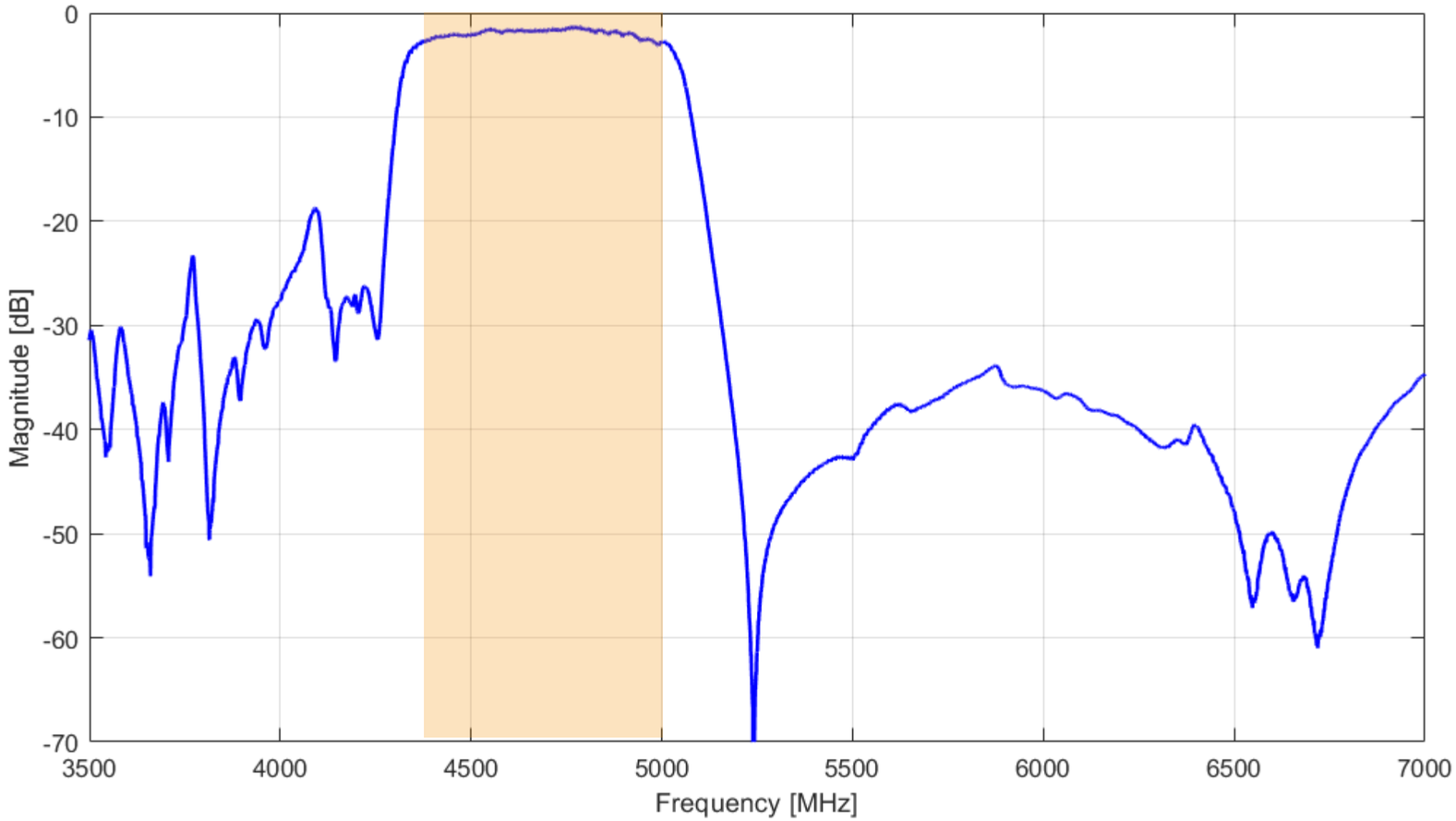


- Insufficient rejection
- High band-edge loss
- Narrow bandwidth
- Large size

XBAR n79 Filter – Measured Performance

- 600MHz bandwidth
- "Clean" passband
- >30dB rejection to WiFi
- >31 dBm power handling
  - More than 1W

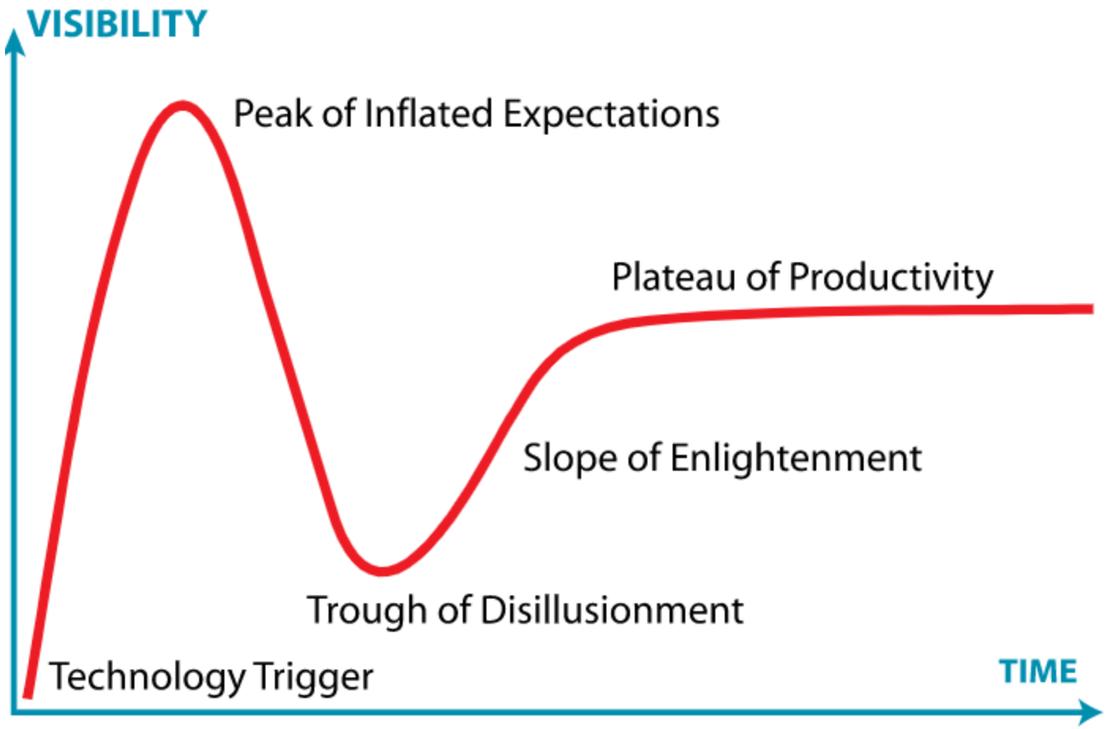
Measured filter performance



XBAR Filter Demonstrating Performance Requirements for Next Generation (5G) Filters

5G & the Diffusions of Innovations Theory – Hype Cycle

- Summary of things to look out for when evaluating new filter technologies targeted for 5G
  - Warning Signs:
    - Missing specifications
    - Fancy graphs without labels
    - Lack of market numbers, or mis-leading market numbers
    - Continual pivots, following the hype
    - Technology applied to new market, rather than fundamentally disruptive



Executive Team

George Holmes

CEO & Director

30+ years leadership in sales & marketing and management

energous

agere systems

ORTEL A DIVISION OF EMCORE

SolarBridge Technologies

Symmetricom

Marty McDermut

CFO

30+ years in financial and accounting management; CPA

applied micro

VITESSE

Bob Hammond

CTO
& Co-founder

20+ years as Founder and CTO of STI;
Physics Ph.D. Caltech

STI SUPERCONDUCTOR TECHNOLOGIES INC.

Los Alamos NATIONAL LABORATORY

Caltech

Neal Fenzi

Executive Vice President of Engineering & Co-Founder

20+ years in engineering, operations and marketing positions at STI; BSEE

STI SUPERCONDUCTOR TECHNOLOGIES INC.

HUGHES SPACE & COMMUNICATIONS

INDEPENDENT BOARD MEMBERS

John Major	Brett Conrad	Janet Cooper	Michael Fox	Alan Howe	Jack Jacobs	Josh Jacobs	Jean Rankin	Bob Tirva
Chairman & Independent Director	Independent Director	Independent Director	Independent Director	Independent Director	Independent Director	Independent Director	Independent Director	Independent Director
Multiple board memberships with public and private high-tech companies	Experience in building and selling companies. Capital markets expertise	Financial expertise in capital markets, audit, tax, accounting, treasury and risk-management	Financial expertise in capital markets, shareholder interests and strategy	Operational, corporate finance, business devt. and leadership exp. Strategic in-depth knowledge of the wireless, telecom, high technology and software industries	Public company, corporate governance and leadership experience	Extensive experience commercializing technologies	Governance, compliance, regulatory and licensing expertise within the semiconductor industry	Extensive corporate and managerial finance experience in IT & services and semiconductor industries

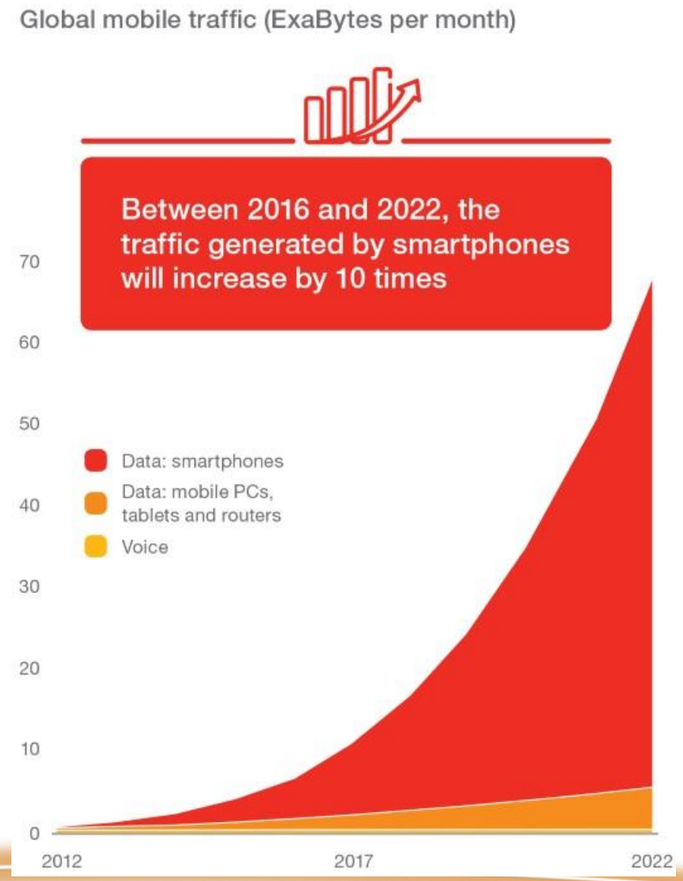
Summary Financial Information

Mar 31, 2019		
		($ in M)
Cash, cash equivalents & investments	$	15.2
Other current assets		0.5
Long-term assets		7.3
Total assets	$	23.0
Liabilities	$	2.7
Operating lease liabilities		3.1
Stockholders' equity		17.2
Total liabilities and stockholders' equity	$	23.0
Shares outstanding		27.6 M

no debt

SUMMARY

- Starting 2019 Strong
  - Cash, cash equivalents & investments $15.2M *(Mar 31, 2019)*
  - More than 10 devices have shipped for royalty revenue; devices are in distribution and sampling to OEM's
  - Greater than 20 devices accepted by customers; acceptance criteria include handset testing
  - Complete ISN software suite: ISN supports SAW, TC-SAW & BAW with new cutting-edge IP focused on 5G – XBAR resonators
- Market continues to grow, 21% CAGR; RF front-end industry is undergoing dramatic increases in filter demand and complexity for bandwidth driven by:
  - Band Proliferation
  - Carrier Aggregation
  - 5G
- Resonant is a strategically positioned pure play equipped to take advantage of 5G
  - As the market continues to commoditize, working with Resonant and its industry-changing ISN platform will enable companies to maintain market share and remain competitive
  - Resonant's new BAW / XBAR technology for ultra-wide, instantaneous bandwidth has the potential to become the technology standard against which all others are measured



Sources: Yole Developpement, Cisco


RESONANT®