



“Impact of a Digital RF Transmitter”

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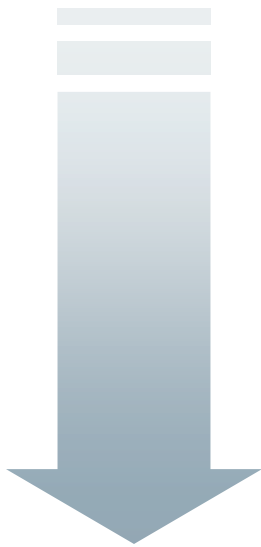
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Class M Power – Digital MCPA Module

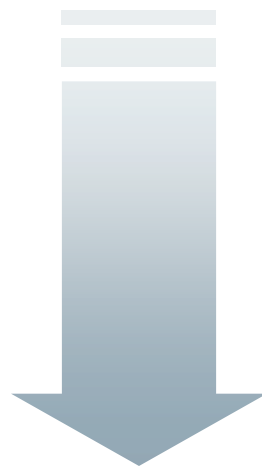


Infrastructure Faces Numerous Issues

Lower
CAPEX



Decrease
OPEX



Shrink
Footprint



Minimize
Complexity

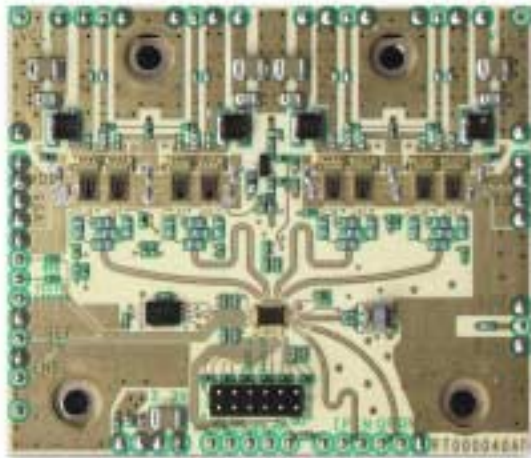


CDMA2000 1X, 1xEV-DO Rev 0/Rev A/ Rev B

3G raises burden on power amplifier

Enables a 20% BTS Cost Reduction!

Class M Power™ Digital MCPA Module

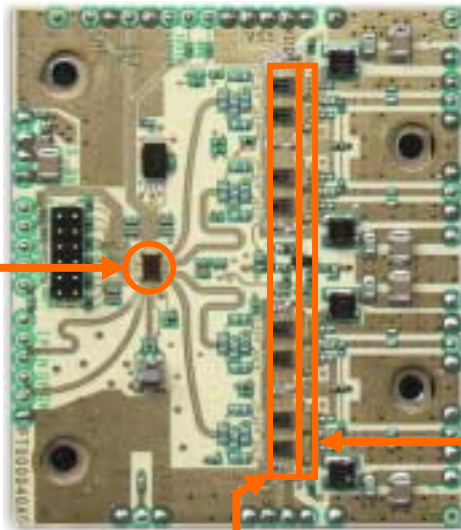


100 W Peak Power
25% Efficiency
2.25" x 2.75"
60 mm x 70 mm
<\$200

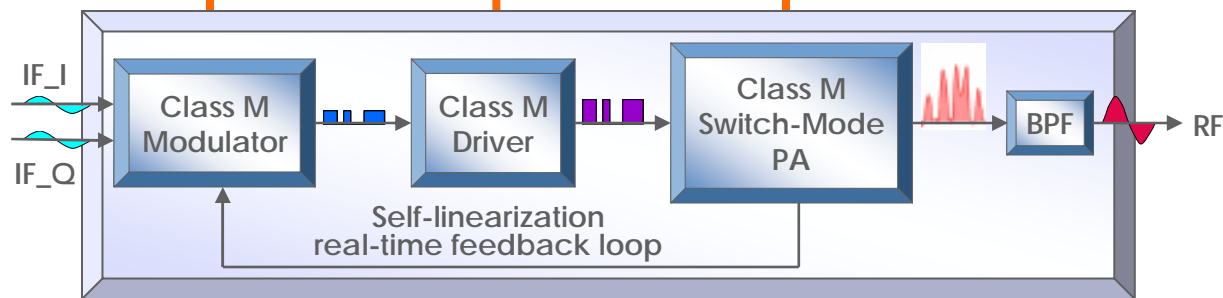
- ▶ 40% of BTS cost is MCPA
- ▶ Cutting MCPA cost 50% reduces BTS cost 20%
- ▶ Increase efficiency 40%
- ▶ Shrink size 50%
- ▶ Decrease complexity 50%

In the Digital Domain Class M Power™ Simplifies Design and Adds Functionality

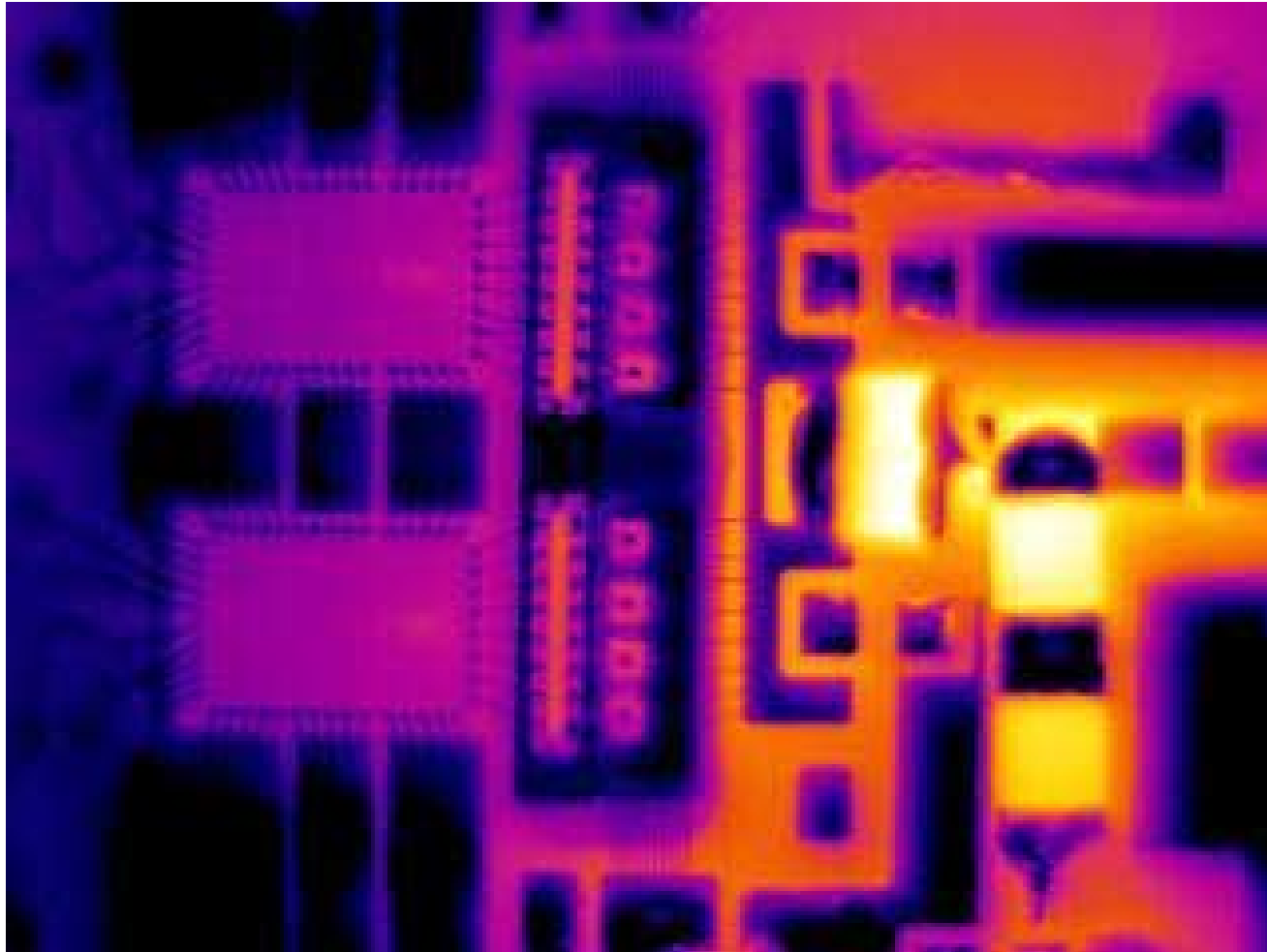
Digital MCPA Module
20 W average power
25% efficiency



- ▶ 80% reduction in parts
- ▶ Functionality includes
 - ▶▶ Upconverter
 - ▶▶ Linearizer
 - » Real-time feedback
 - ▶▶ Digitizer
 - ▶▶ Digital power amplifier



Switch-Mode PAs Run Cool

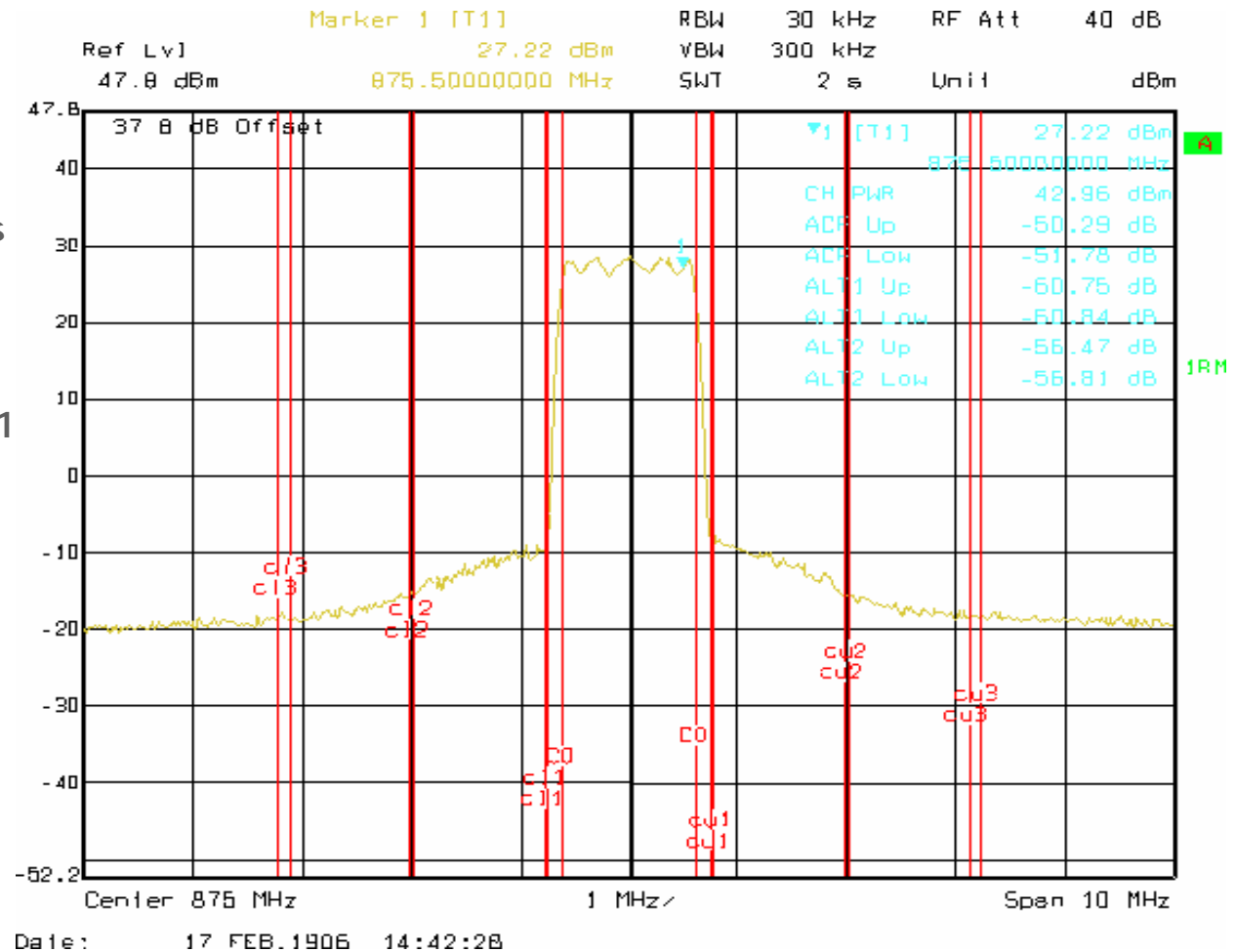


Class M Power™ High Level Specs

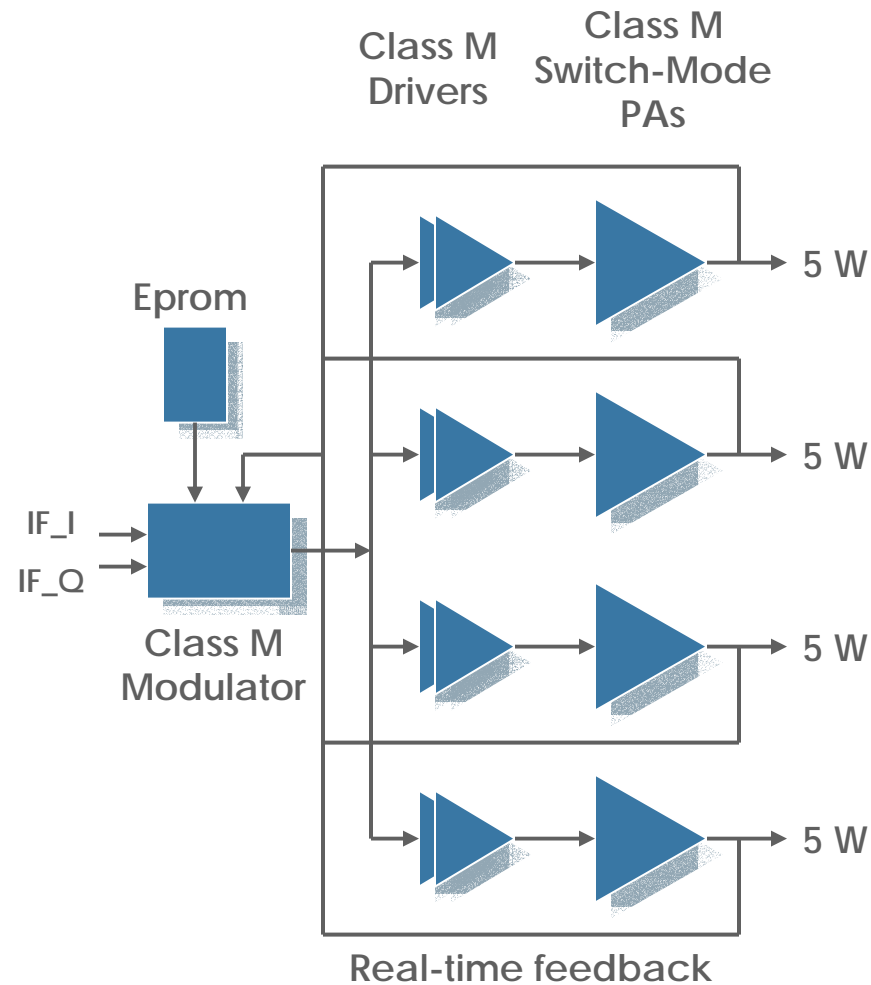
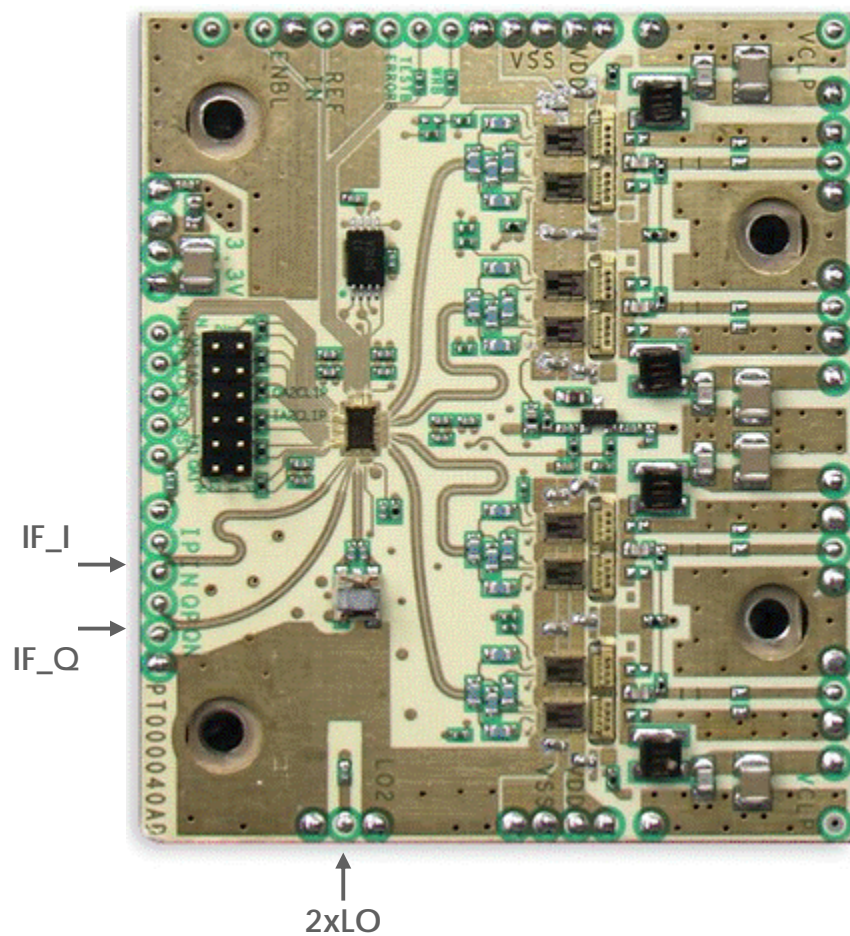
Parameter	Specification
Output Freq	869-894MHz
Input Freq	39.3216MHz
Input	differential I / Q
LO Freq	2 x (Output– Input Freq)
Operational BW	25MHz
Instantaneous BW	14MHz
Peak Power	100W
ACLR	60dBc
Post Filter required	5th order

Class M Power™ Prototype Performance

Vdd = 10v, 10.44 Amps
 P (DC) = 109.9 watts
 P (RF) = 20 Watts
 Module Efficiency = 18.1
 PAR = 6.7 dB



Class M Power™ Block Diagram

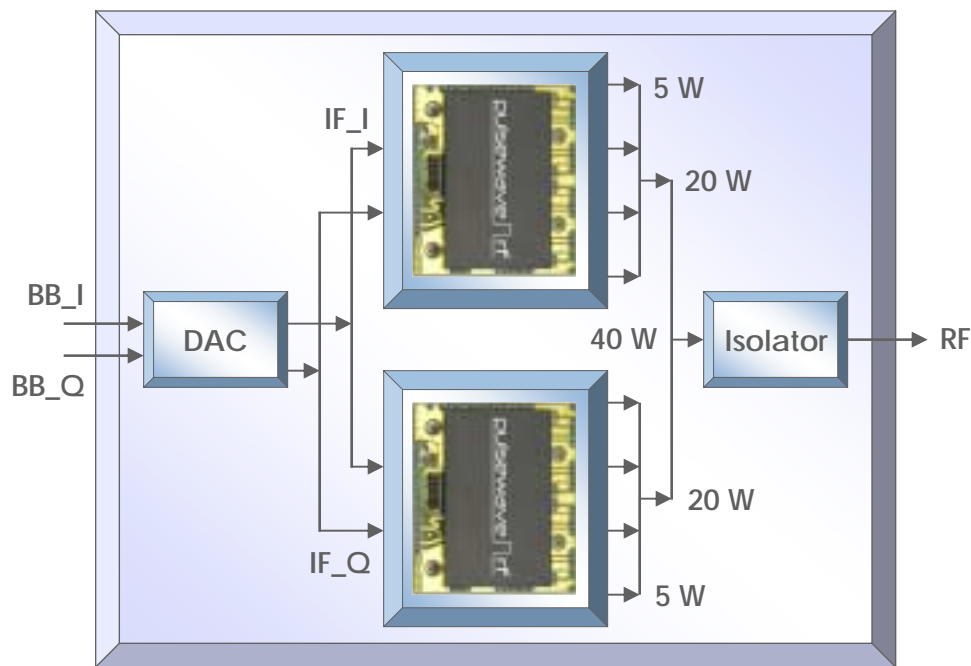


Digital Control of Module Parameters Simplifies Phase and Gain Matching



Module Approach, Simple To Use Enables Baseband to RF Transmitters

Baseband to RF Transmitter
40 W average power
22% overall efficiency



Scalable Linear Power
Module: 5 → 20 W
Parallel Combining: 20 → 160 W

- ▶ Scalable linear power
 - ▶▶ Macrocells
 - ▶▶ Microcells
 - ▶▶ Picocells
 - ▶▶ Remote radio heads
 - ▶▶ Repeaters
- ▶ Soft-fail architecture
- ▶ Simple implementation



Digital
Multi-Carrier Power Amplifier
Modules