Telrad’s Focus and Mission

• Deliver the industry’s best End2End TDD - LTE solutions optimized for “Fixed” Broadband Wireless Access at a price that enables the quickest ROI possible.
Telrad Networks: A 60+ Year Telecom Legacy

• Founded in 1951
• HQ in Lod, Israel
• Backed by Fortissimo Capital
• Part of the Telrad Group
Telrad

60+ Years in Telecom

400+ Employees

3 Million Wireless Links Deployed

300+ Commercial Deployments

2 subsidiaries
Goals for Fixed LTE - Broadband Wireless Access

• Offer competitive xDSL/Fiber-like broadband services for small business/residential/under-served areas
• Deliver 5Mbps to 25Mbps service to meet capacity demands
  ▸ Streaming HD, 4K,
  ▸ Standard Data
  ▸ High quality Data, Voice
  ▸ No data caps
• CapEx model that supports a valid business case
  ▸ Pay as you grow
• ROI in months - not years
**Fixed vs. Mobile LTE**

### BWA Fixed

- **Wireless-DSL:** Wireline Replacement
- **Always-on:** 99.999 Service Level
- **Differentiated:** Committed to SLA
- **DSL Level:** 1-30 mbps Continuous

### Service Experience

#### Broadband Cellular Mobile

- “Connected-Everywhere”
- “Adjust to Your Bar” Level – 70-90% Service
- “Best-Effort” Level
- “Peak Rate, Where you Can”
Telrad E2E Fixed BWA Solution

CPE7000 + SIM

BreezeCOMPACT eNodeB

Embedded EPC BreezeWAY 1010

Network Management Performance Management

Centralized EPC BreezeWAY 2020

CPE Management (ACS)

PDN/ WWW

BreezeRADIUS

AAA

3rd Party HSS
LTE Orientation by Frequency & Application

RF Duplexing Method

TDD

FDD

BWA

Mobile

1.9 GHz 2.3 GHz 2.5 GHz 3.8 GHz 5.8 GHz

BWA Bands 40, 41, 42 & 43

BWA / Mobile (Future)
Broadband Options

• **ADSL2+**
  - Provides up to a 6Mbps DL service
  - Requires fiber to a DSLAM at 15kft or less from the subscriber

• **VDSL**
  - Provides true broadband of 25Mbps
  - Requires fiber to a DSLAM at 5kft or less from the subscriber

• **FTTH**
  - Services of up to 1Gbps currently offered
  - Major investment in providing fiber to the customer premise
**High Cost of xDSL and Fiber**

- **Fiber construction**
  - $25k - $50k per mile
  - Trenching is not possible in some cases
  - Aerial may also be overly complicated in areas
  - FTTH may not provide an acceptable ROI

- **DSL approach**
  - Still requires fiber close to the subscriber
  - Dependent on the quality of existing copper
  - Example 300-sub area
    - Typical investment of $400k - $700k
    - $1,400 - $2,400 per subscriber average cost
The Fixed LTE Alternative – Broadband with an ROI

- Capable of delivering quality broadband
  - 5Mbps – 25Mbps services (depending on avail spectrum)
  - Consistent “wireline like” performance
- Fiber or wireless backhaul to fewer locations
  - Providing backhaul only
  - One connection for every 150-300 subscribers
- Lower average cost per user than fiber and xDSL
  - $650 - $750 per subscriber in most cases
  - Lower OPEX and installation costs
Telrad is THE Solution for Fixed LTE

• More relevant base station technology
  ▸ Small cell form factor with macro cell performance
  ▸ 4x4 outperforms competitive 2x2 and 8x8 solutions in fixed deployments

• Relevant core solution
  ▸ Distributed, centralized, or mixed
  ▸ Future virtualized capabilities that leverage current EPC

• Consistent performance and user experience
  ▸ Reuse strategies that work for fixed
  ▸ Highest bit/Hz to deliver maximum capacity

• Features appropriate for fixed
  ▸ Layer 2 and static IP services, IPCRF, AAA radius
  ▸ Fixed-focused feature set at a more appropriate cost
Servicing a Global Customer Base
LTE Milestones – Evolution

“EXPANDING CAPACITY”

2014
- Telrad LTE Solution Launch
  - LTE RAN – BreezeCOMPACT eNodeB family
  - LTE CORE – BreezeWAY 2020 (MC-EPC)
  - CPE7000 – Indoor/Outdoor CPE (WiMAX/LTE Rel. 9)
  - New NMS – BreezeVIEW

2015
- Focus on Fixed BWA
  - LTE BWA E2E solution/capabilities
  - Embedded LTE Core – BreezeWAY 1010
  - Performance enhancements
  - WiMAX → LTE transition

2016
- BWA LTE-Advanced
  - LTE Rel. 10
  - Carrier Aggregation
  - MU-MIMO
  - MIMO 4x4
  - LTE CPE Cat. 5/6 CPE

2017
- BreezeCOMPACT eRAN Solution
  - LTE Rel. 11 & Beyond
  - Cloud RAN Solution
  - Small Radio
  - eICIC, COMP, Relay

2018

*NOTE: Current plan
Thank You!

www.telrad.com