

Next Generation Direct Communications

Enhancing ProSe to Meet the Needs of First Responders

Direct communication is a cardinal requirement of public safety communication systems

- Used by First Responders in network coverage for tactical situations
- Provides communication services for out of coverage situations as an adhoc communication capability

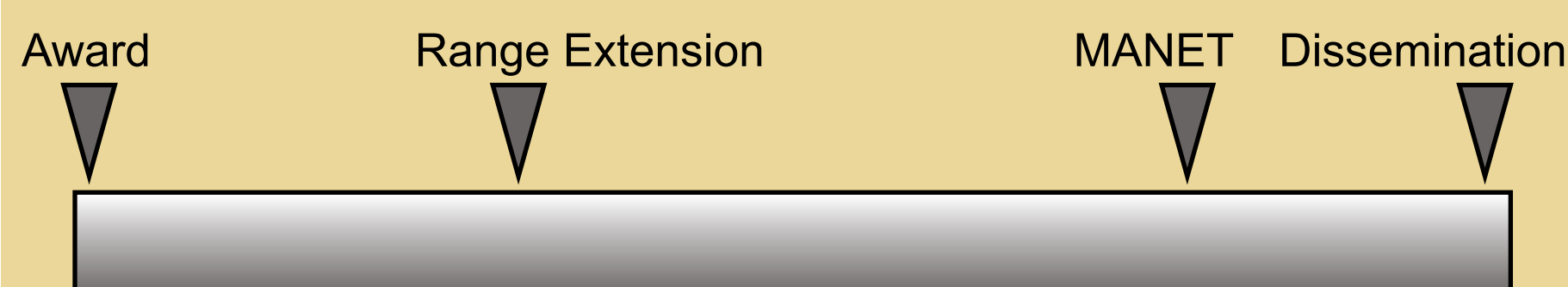
ProSe and particularly its Public Safety modes have not been vetted

- To match or exceed the capabilities of existing LMR direct mode (P25 CAI)
- To manage devices that operate and transition between cellular networks and mobile adhoc networks
- While providing users with a predictable, reliable communication experience



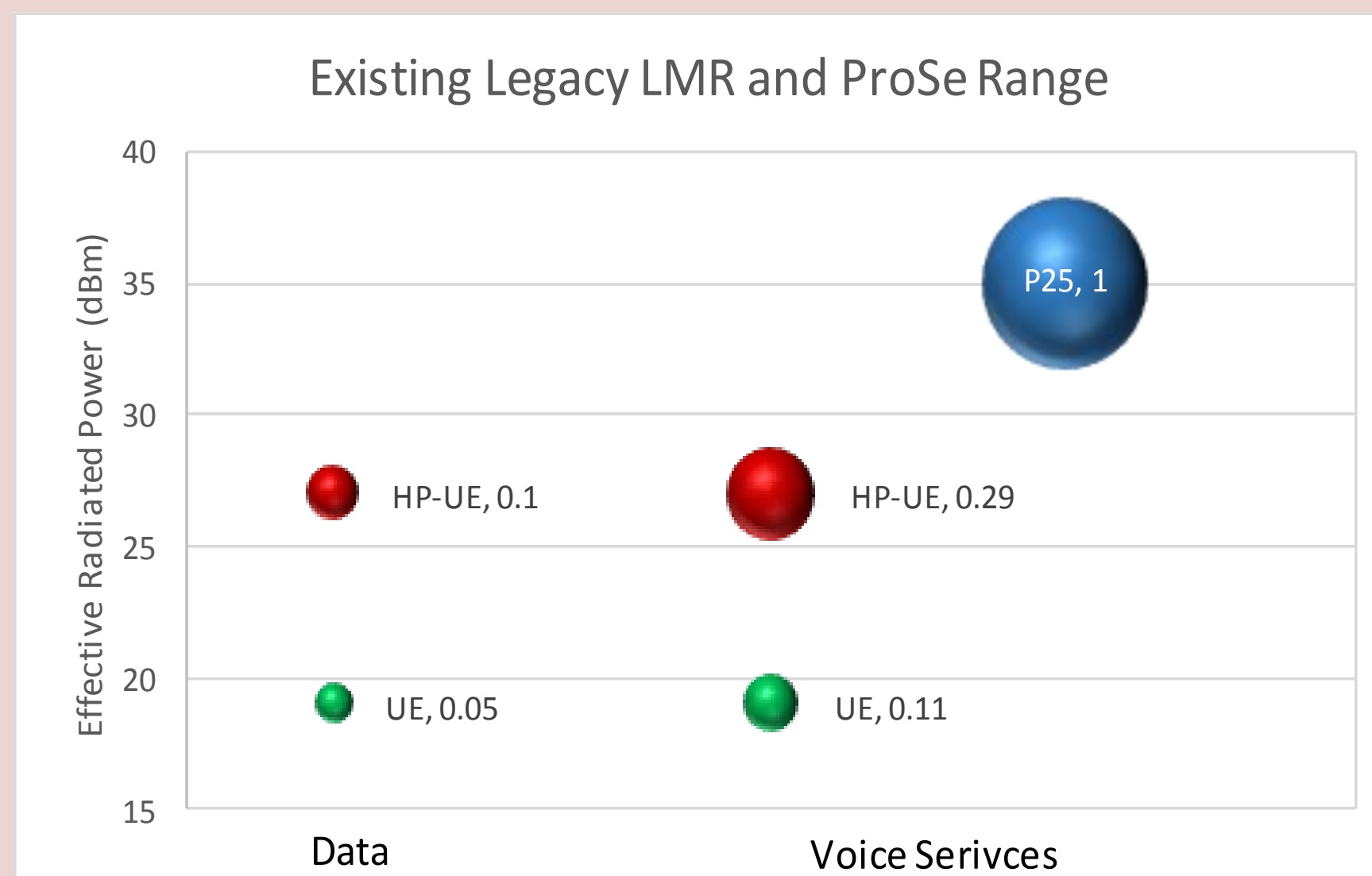
Program Plan

- Identifying use cases to:
 - Address communication range expectations
 - Management of adhoc and hybrid networks
- Baseline simulation and development hardware capabilities
- Extending the existing range of ProSe.
- Improving co-existence of ProSe with network operations.
- Adhoc network management
- Simulated and physical testing
- Dissemination of project outcomes



ProSe Range Limitations

- Range is a significant issue with legacy LMR operations
- ProSe range is more limited than LMR P25
- Intensive data applications further reduce range



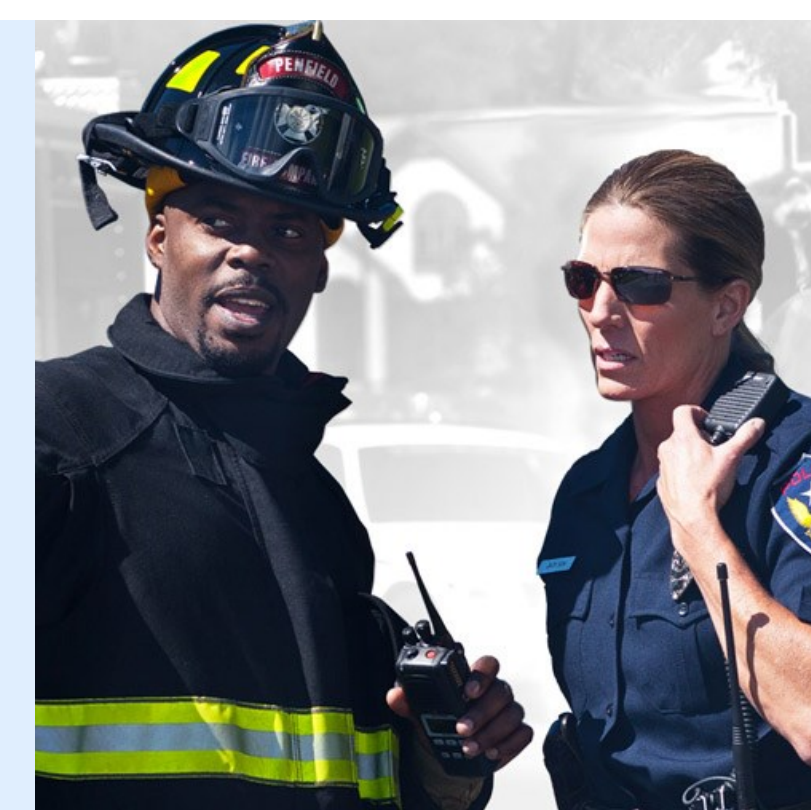
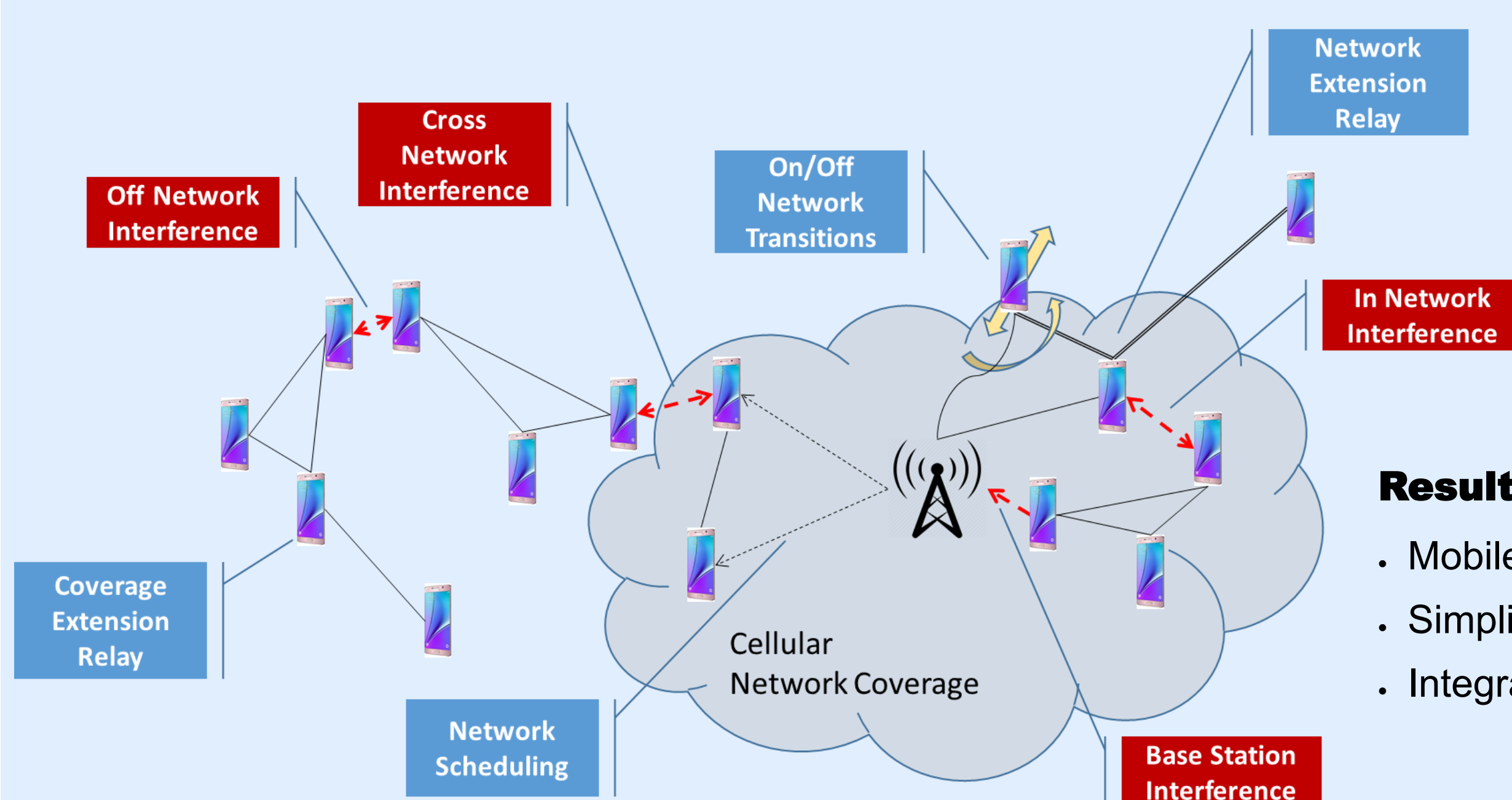
	P25 Portable	Portable	HP-UE Portable
Nominal Tx Power	35	23	31
MIMO	1x1	1x2	1x2
Rx Effective IF Bandwidth (kHz)	6	360	360
Rx Noise Figure (dB)	6	7	7
Faded Performance Threshold DAQ3.4 (dB)	17.7	-2.2	-2.2
Maximum RF Coupling Loss (dB)	147.5	136.6	144.6
Antenna Efficiency. (dB)	0	-4	-4
Maximum Link Loss	147.5	128.6	136.6
Radial Coverage Relative	1.00	0.34	0.53
Area Coverage Relative	1.00	0.11	0.29

Results

- Achievable range extension
- Tradeoffs for greater range

ProSe Management

- Ease of operation for users and administrators
- Link life cycle management
- Co-existence of on network and off network devices
- Cellular extension and adhoc coverage extension relays
- Continuity of on/ off network transitions
- Hybrid communications groups: cellular and adhoc members
- Airlink scheduling and resource allocations



Results

- Mobile adhoc network for public safety
- Simplified use and management
- Integration of on/ off network and relay operation

Outcome

A next generation direct communication capability that:

- Extends legacy range
- Supports data services
- Supplies ease of use and administration
- Provides continuity of network and adhoc communications