The ongoing challenge of every over-the-air data acquisition system is the ever increasing need for faster bit rates and more reliable transmission and reception. With the unrelenting need for timely reporting to maximize system operations, XetaWave has developed and released a new generation of 900 MHz Licensed Band protocols which offers the highest performance within the industry.

XetaWave Enhanced Multi-Point (XetaEMP) XetaEMP is a completely revamped protocol designed to provide both fully dynamic timing and transfer as well as eliminating much of the overhead time that is required in a less than fully dynamic radio network. This provides dynamic data transfer slots in all directions based on data transfer needs of the AP and EP's, yielding **30% greater bidirectional aggregate throughput** over historic rates from XetaWave and its competitors. XetaEMP also provides XetaWave customers with lower latency as seen in the **20% faster ping times** over the competition. This increased performance has been achieved with a minimal loss of sensitivity. **XetaWave's new XetaEMP protocol completely outperforms comparable products** from other radio manufacturers and standard XetaWave Point to Multi-point (PTMP) in both throughput and latency, while still leveraging industry standard modulations.

The following sections outline the testing setup, standard parameters, and the criteria used in the testing of the products as well as the outcomes of the testing performed for 900 MHz (XetaEMP is available for other frequencies). The test setup was done in such a way that only the radio hardware (XetaWave and Brand-4) was swapped out. Ethernet connectivity, test computers and the cabling system remained static throughout the testing.

XetaEMP

Test System

A basic, cabled test system was set up and identical tests were done using Xeta9 with the new EMP modes, and Brand-4 radios, all in Licensed mode with identical parameters.

Xeta9 PTMP and EMP Testing Setup
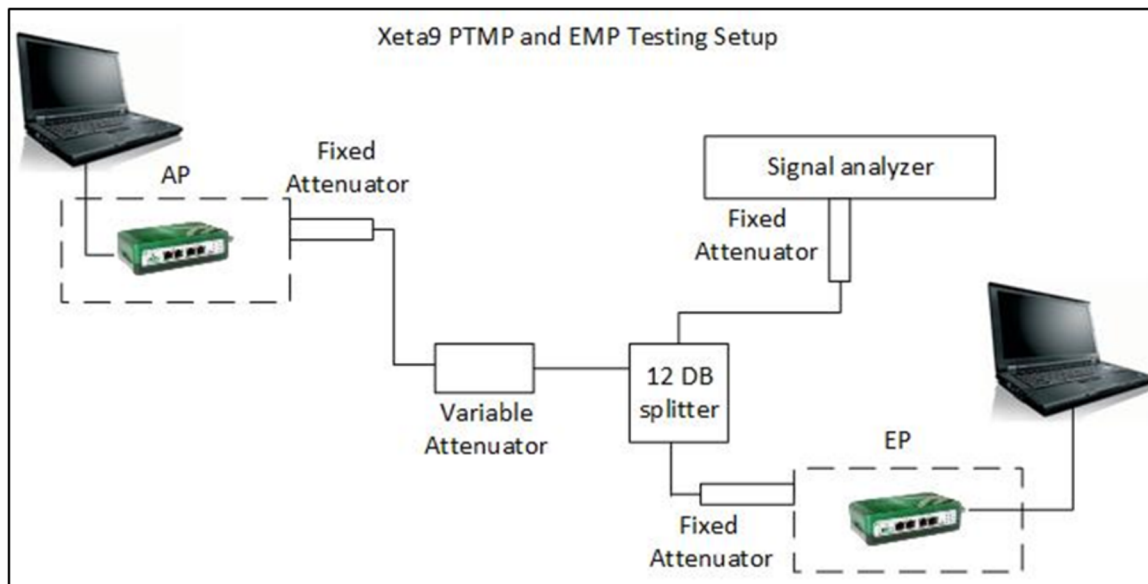
Radio Parameters

Payload size	1024
Modulation	
Brand -4	64 QAM, 60 kbps
Xeta9 EMP	32 QAM, 57 kbps
Xeta9 EMP	64 QAM, 68 kbps
Bench set up for an RSSI of -80 dBm	
Compression off (or pre-compressed data file)	
500 mW / 27 dBm transmit power	
AP Xmt Freq	950 MHz
EP Xmt Freq	953 MHz
Error Correction	Off

Tests Performed

- 100, 32 byte Windows pings
- jPerf tests of 30 second IP transfers in each direction and bidirectional using pre-compressed (zip) data files
- Sensitivity testing at max modulation

XetaEMP

Results

The following three tables show the results of testing of Brand-4 and XetaWave's new EMP radios. For each table, the first 5 columns are values for throughput in kbps. The final two columns are ping times reported in milliseconds. Again, the only change to the testing setup is the insertion of the radios under test.

Throughput in kbps					In ms	
Brand-4 Stats: @ 64 QAM		Bidirectional			100 count pings	
AP to EP	EP to AP	AP	EP	Aggregate	AP to EP	EP to AP
32.8	28.9	17.8	16.1	33.9	96.0	99.0

Throughput in kbps					In ms	
Xeta9 EMP @ 32 QAM		Bidirectional			100 count pings	
AP to EP	EP to AP	AP	EP	Aggregate	AP to EP	EP to AP
47.6	46.6	25	25.6	50.6	82	82

Xeta9 EMP @ 64 QAM		Bidirectional			100 count pings	
AP to EP	EP to AP	AP	EP	Aggregate	AP to EP	EP to AP
55.8	56.4	30.2	29.9	60.1	80.0	81.0

As can be seen, the new XetaEMP protocol provides a marked increase in throughput and decrease in ping times over Brand-4's highest available performance settings. Additionally, where Brand-4 only leverages 50% of the max available throughput in a one way transfer and 60% in an aggregated bi-directional transfer, the new XetaEMP leverages 80% in one-way and 70% in bi-directional transfers. This performance increase and higher utilization factor ensures that customers achieve the most optimized 900 MHz radio network.

Conclusion

The ongoing challenge of every over-the-air data acquisition system is the ever increasing need for faster bit rates and lower latency. The best way to help achieve this goal is to optimize both the transfer balance and to utilize as much of the theoretical maximum bandwidth as is possible while maintaining the fastest possible response times for queries. As seen from the test results, XetaWave's new XetaEMP protocol delivers in both aspects and significantly raises the bar against the competition.