

X-TEL PROFESSIONAL SERVICES TESTING AND VERIFICATION

E911

X-TEL's E911 Accuracy Verification

X-TEL, a leader in the wireless industry, develops and manufactures some of the most innovative and useful testing and verification systems for wireless operators. Systems developed by X-TEL test and validate AMPS, TDMA, GSM/GPRS, CDMA and iDEN networks around the world.

X-TEL's E911 testing and accuracy verification follows the recommendations made in the FCC OET Bulletin No. 71 - Guidelines for Network Based Location Technologies. The recommended biannual validation of accuracy service includes:

- Test Plan Definition
- Live Field Testing and Data Collection
- Data Matching and Analysis
- Comprehensive Reporting

X-TEL Test Plan Definition

X-TEL works with the E911 team to define the coverage area, whether testing treats all locations in a service area as equally important or instead testing concentrates on locations where 911 calls are most likely to be made. The test plan incorporates street level, in-building and campus routes.



Collection metrics include:

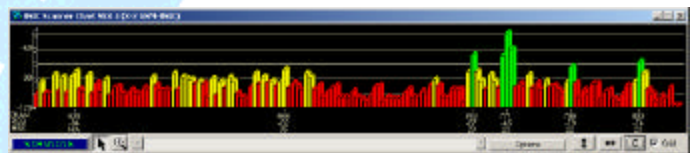
- Uncompleted Calls: either failed originations or dropped calls
- Time of Position: time for first fix at PSAP (including Phase I) and time for location fix. An acceptable time limit is defined by the service provider (typically less than 30 seconds).
- Motion: testing is performed both at stationary locations and from vehicles traveling at highway speeds

X-TEL's Field Measurement

X-TEL's E911 testing and verification service provides turnkey verification of network based location technologies. X-TEL's modular field measurement tool is designed for testing the TDMA, CDMA, GSM, iDEN and AMPS air interfaces of 850, 900, 1800, and 1900 MHz networks.

#	On	Phone #	Success	Call Length	Error Rate	...
1	✓	8309060490	0	0	0	10
2	✓	555-1212	100	0	60	10
17	✓	8309060490	0	0	0	10
18	✓	555-1212	100	0	60	10

The data collection system makes simultaneous calls across all test mobiles and logs the GPS position of each call. This information is compared to location information provided to the PSAP.



High speed scanners record signal levels from TDMA, CDMA, GSM, iDEN and AMPS networks to show best sector and neighbor signal coverage.

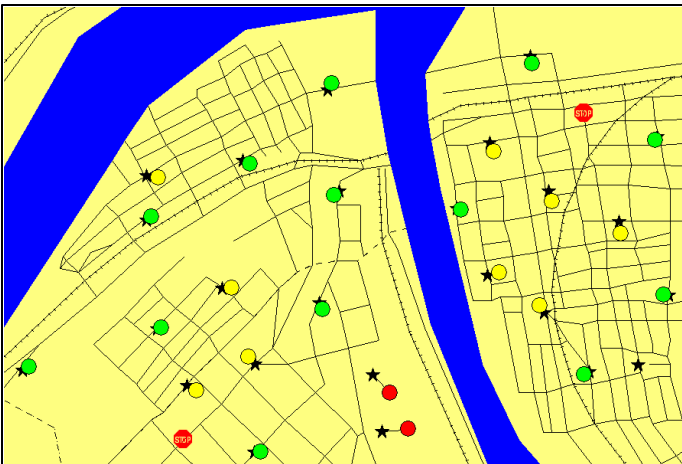
X-TEL collects a sufficient number of points across the defined region to establish compliance with the FCC accuracy requirements with a statistical confidence of at least 90 percent.

E911 Testing - Analysis

Accuracy measurements are made at each point of a sample set of locations. X-TEL then performs tests at each of these sample locations to determine the distance between the actual location and the location reported by the Automatic Location Information (ALI) system.

Maps for the collection area include color coded results showing test calls that comply with Phase I and Phase II accuracy requirements or locations where calls could not be made. Other available analysis maps include color coded "Time of Position" maps that show the delay for first location fix and coverage maps that plot the received signal strength of the phone. Maps of uplink received signal level from the serving sector may also be included.

Green points represent Phase I and II compliance, yellow points represent Phase I compliance only and the red points show locations where the location fix exceeded the



limits of Phase I and Phase II. Call Failures indicate either unsuccessful originations or dropped calls.

Comprehensive Test Report

Empirical testing is a direct way to verify compliance with the accuracy standards. An accuracy measurement is made at each point of a sample set of locations randomly selected throughout a data set representing 911 call locations.

Empirical Testing for Compliance		
PSAP Service Area	Phase I Compliance	Phase II Compliance
Allegheny County	Green	Green
Washington County	Green	Green
Beaver County	Green	Red
Greene County	Green	Green
Fayette County	Green	Green

X-TEL's comprehensive test report includes empirical testing for each PSAP service area are derived from test results and stated for a 90% level of confidence. The compliance tables are supplemented with maps showing the individual test points and coverage areas to assist the engineering team in improving compliance.

Why X-TEL?

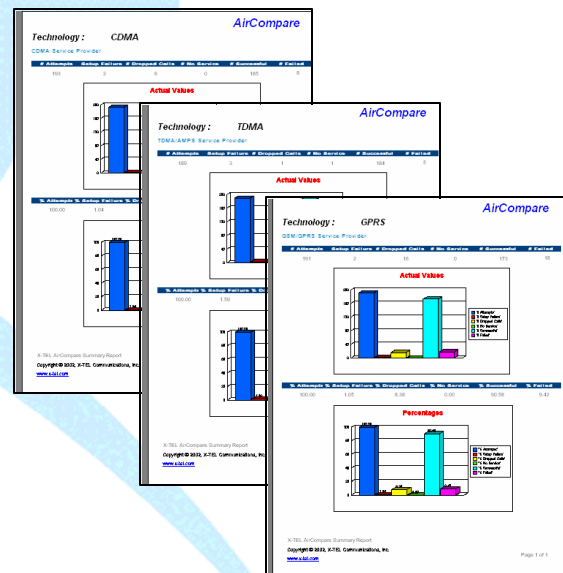
X-TEL is a recognized leader in the wireless engineering field with over 12 years consulting and system development experience. XTEL's testing and validation methods are comprehensive and reflect the FCC's policy of technical and competitive neutrality.

X-TEL E911 Benefits

- Measurement Precision
- Statistical Confidence
- Systematic Errors Identified
- In-building / Campus Testing
- Unbiased Evaluation
- Post-processing and report generation

X-TEL E911 Tool Specifications

- Supported Frequency Ranges: 850 MHz, 900 MHz, 1800 MHz, 1900 MHz
- Supported Technologies: AMPS, TDMA, CDMA, GSM, iDEN
- Calibrated Signal Accuracy: +/- 1 dB
- Location Accuracy: GPS



X-TEL's comprehensive E911 testing and verification services provide compliance reports and detailed RF and system metrics that identify underlying causes of non-compliance.

Contact X-TEL for more information at (630) 705-9090 or via email at info@x-tel.com.