



*LTE Workshop*  
*Wireless Test Solutions*

# LitePoint At-A-Glance



Founded:  
**May  
2000**

**20+**  
wireless  
standards  
supported  
out-of-box

**Hundreds**  
of chipset ready  
solutions

Global  
offices supporting  
**50,000+**  
systems

**Hundreds**  
of customers

Cuts per-device  
test times up to  
**10 times**

Over  
**2.5**  
**billion**  
devices tested

**1st**  
Multi-DUT cellular  
manufacturing test  
solution

# Ecosystem Support



# Touch Wireless, Touch LitePoint



# LitePoint RF Test Platforms

Solutions Purpose-built for Wireless Manufacturing

**IQxel-M**  
WiFi/BT/Zigbee



**IQnfc**  
NFC



**IQnav+**  
GPS/Glonass/Compass



**IQxel – 80/160**  
WiFi/BT/Zigbee



**IQ2010s**  
WiFi/BT/Zigbee



**IQxstream**  
Cellular



# Global Footprint, Local Support





*China LTE Market Growth*

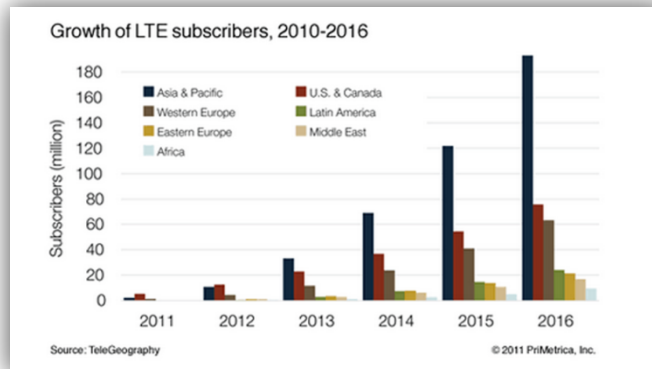


# China LTE Infrastructure

- China LTE infrastructure has had exponential growth with **~300% increase** in base station deployment over past 12 months
- **\$78B market investment** expected over next 4 years
- Infrastructure is now in place and **handsets are following the exponential growth pattern**

## Chinese LTE growth will act as a catalyst

According to ReportsnReports.com, the global LTE wireless infrastructure market is expected to reach **\$78 billion in 2018** from just \$3.9 billion in 2012. As a result, substantial investment can be expected in this market as service providers build out core networks and upgrade backhaul networks to support large data traffic volumes. Now, the infrastructure growth will lead to higher demand for Broadcom's LTE and TDS CDMA solutions that are aimed at improving the efficiency of 4G LTE networks.



## China, India Drive Cellular Growth

### China rocks TD-LTE, India rides microwave

Rick Merritt

12/23/2014 12:30 PM EST

20 comments

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SAN JOSE, Calif. — China and India drove global growth in cellular infrastructure markets in 2014, according to analysts from Dell'Oro Group. China was the top buyer of LTE base stations and India led the world in purchasing microwave backhaul systems.

The big story in cellular infrastructure in 2014 was China. The global market for the TD-LTE flavor of radio access networks used mainly in China jumped to \$6.4 billion this year from \$2.4 billion last year.

"In five quarters, China Mobile [the world's largest carrier by total subscribers] deployed 700,000 LTE base stations," said Stefan Pongratz, a director of cellular infrastructure analysis at Dell'Oro. "There's an enormous amount of energy going into China's LTE deployment," Pongratz said.

By comparison, US carriers such as Verizon or AT&T operate a total of about 40,000 to 60,000 4G base stations each that they have deployed over a period of almost four years. Revenues of the FD-LTE version of 4G base stations they and most other operators use worldwide actually declined in 2014.



# China LTE Handset Market

- China 4G LTE Handset market is large and growth is **exceeding 50-100%** per year
- China will pass the US in 2015 with LTE deployment
- Industry forecasts **150-250M handsets needed** over the next 12 months
- **LitePoint** is your cellular test partner that will enable you to **accelerate production** and gain market share with **quality products**

**BusinessWire**  
A Berkshire Hathaway Company

HOME SERVICES NEWS EDUCATION ABOUT US Search

## By the End of 2015, China LTE Subscriptions Will Exceed the United States, Reaching 500 Million, According to ABI Research

May 13, 2015 09:00 PM Eastern Daylight Time

SINGAPORE—(BUSINESS WIRE)—By the end of 2014, China gained almost 100 million LTE subscriptions in the first year of full LTE commercialization, demonstrating an accelerating growth momentum, according to ABI Research. Thanks to the first-mover advantages, China Mobile seized almost 90% share of the total LTE market in China. "Since the other two China mobile operators—China Unicom and China Telecom—were granted preferred FDD-LTE licenses in March 2015, it is expected to become the largest 4G market in the world, accumulating 500 million LTE subscriptions in 2015," comments Marina Lu, Research Analyst at ABI Research.

## How China is shaping the LTE/TD-LTE market in 2015

Benson Wu, DIGITIMES Research, Taipei [Thursday 9 April 2015]

Registration required (free) to purchase. Please [sign in](#) if you wish to continue.

Digitimes Research estimates that the global LTE market doubled in size to 445 million users in 2014 and we further forecast that annual growth in the number of LTE users will remain above 70% between 2015-2016, with the overall market reaching 1.466 billion users by 2016, representing 70% of the total number of global mobile broadband (including 3G+4G) users. Driving that growth is the Asia-Pacific region, especially China, and the region will surpass North America to become the world's largest consumer LTE market in the first half of 2015.

ABSTRACT

## Qualcomm sees strong growth ahead in China's 4G TD-LTE smartphone market

Posted: 26 Feb 2014, 23:43, by Alan F.

Tags: Wireless service +

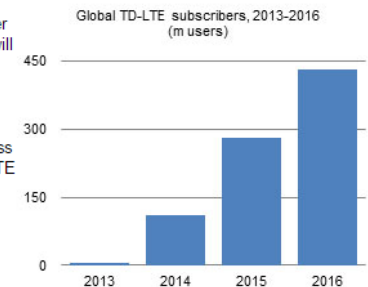


According to a published report on Thursday that cites Alex Katouzian, senior vice president of [product management](#) at Qualcomm, the silicon slinger sees strong growth ahead for China's 4G TD-LTE [smartphone](#) market. With the Chinese government licensing [carriers](#) for 4G service at the end of last year, there has been strong competition for subscribers. Prices of 4G enabled smartphones are expected to shortly drop to 1000 Yuan (\$163 USD), according to Katouzian.

According to the [Qualcomm](#) executive, hastening the drop in 4G phone prices in China will be the 50 billion Yuan (\$8.2 billion USD) that China [Mobile](#) is expected to spend this year in 4G handset subsidies. The spending by the world's largest carrier is also expected to quicken the move to 4G by Chinese consumers.

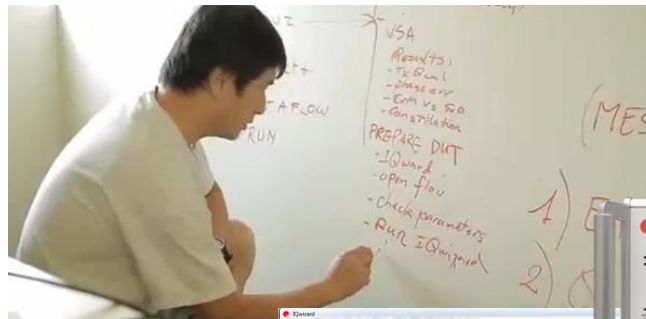
According to [iSuppli](#), the number of 4G [phones](#) shipped to China is expected to soar from 4.6 million units in 2013 to **72.6 million** this year, **144 million** in 2015, **220 million** in 2016, and **300 million** in 2017. China Mobile is a lot more optimistic. The operator expects shipments of 4G handsets in the country to reach 200 million this year. Industry watchers expect 100 million of China Mobile's 900 million subscribers to switch to a 4G plan in 2014.

that the global LTE market users in 2014 and we further the number of LTE users will 15-2016, with the overall users by 2016, representing al mobile broadband g that growth is the Asia- and the region will surpass world's largest consumer LTE

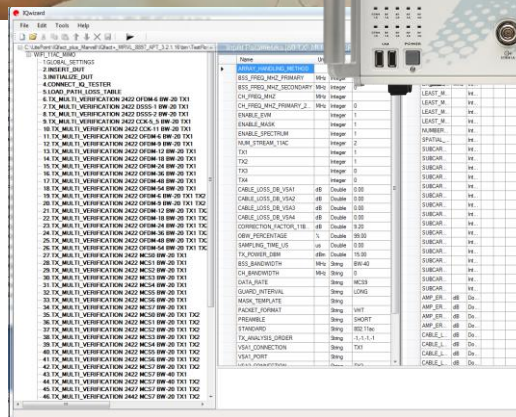


# Winning China LTE Market Share

- Rapid growth requires turn-key solutions. IQxstream + IQvector are proven solutions that enable you to ramp production quickly.
- Quality products require the highest quality test system. LitePoint is a leader wireless manufacturing test and has 1000's of cellular test systems deployed throughout Asia.
- Expertise is needed to configure your test system to insure highest throughput and lowest cost per test. LitePoint expert application engineers insure your systems are optimized for your application.



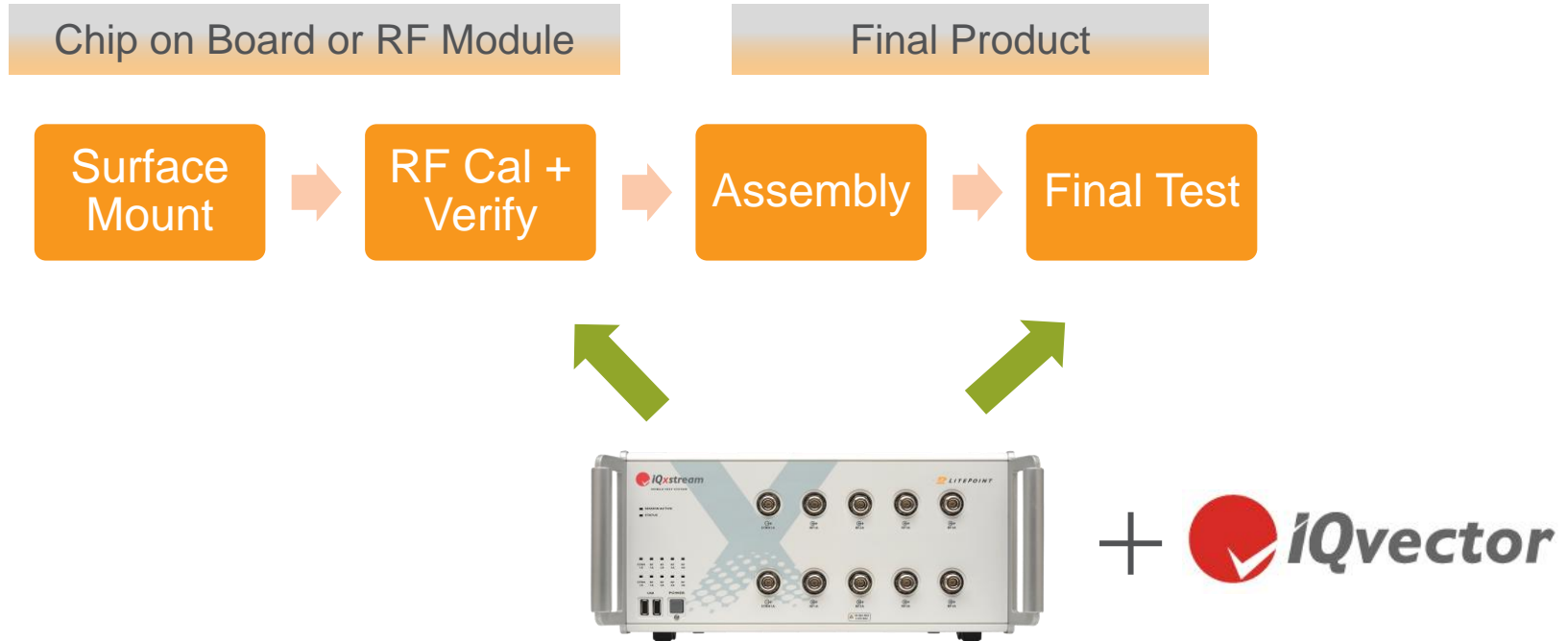
*“You focus on production and LitePoint application experts can take care of RF test”*





## RF Test in LTE Manufacturing

# LTE Production Flow



- LTE chipsets require RF Calibration
- Handsets are usually chip-on-board. Tablets or M2M may be modules
- IQxstream purpose built for manufacturing
  - RF Cal + Verify
  - RF Final Test

# LitePoint Cellular Test Solutions

## IQxstream w/LTE Option



- **Fully-integrated LTE manufacturing test solution**
  - Ruggedized **one-box tester** including VSA & VSG
  - **Simplified** setup and DUT cabling
  - Supports **LTE** + other cellular formats
- **Supports IQvector or chipset vendor specific test software**
- **Factory Efficiency feature insure lowest cost-of-test for the LTE market**

# LitePoint IQxstream

## Test Capabilities:

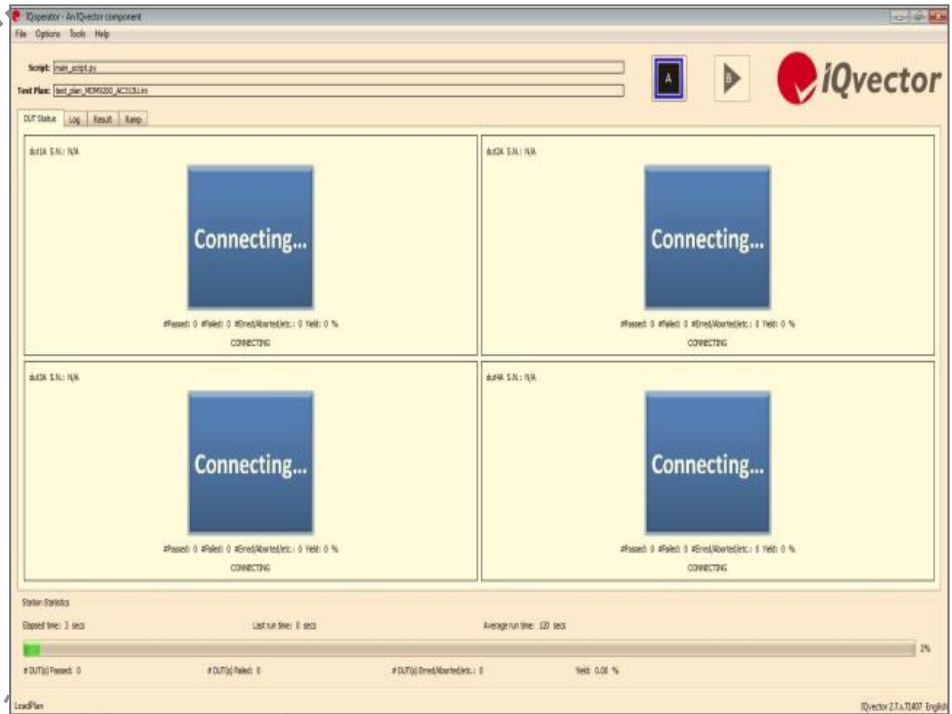
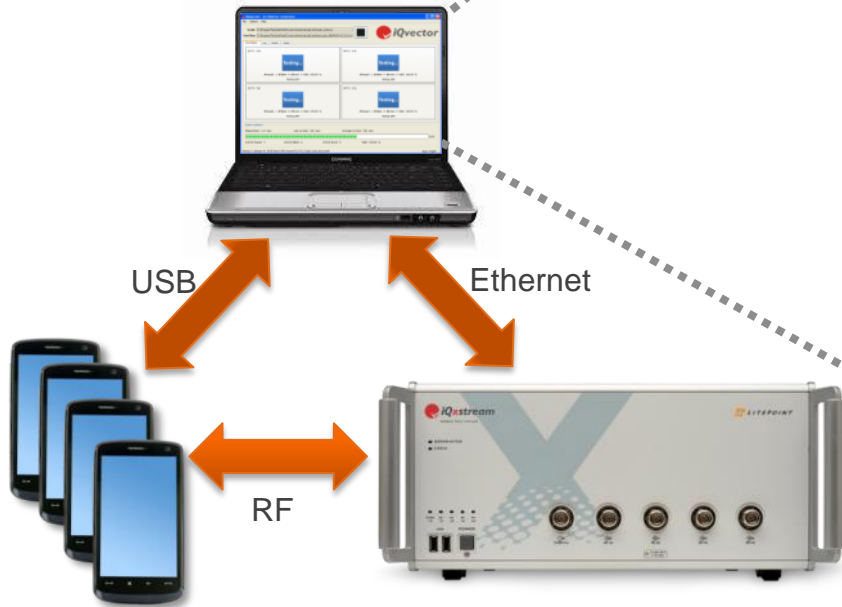
- GSM, c2k, WCDMA.
- LTE, LTE-A,
- TD-SCDMA
- GPS, GLONASS...
- 4- or 8-DUT Parallel Testing
- Band 42/43 option (TD-LTE at 3.5GHz)



Features	Benefits
Single or Dual VSA/VSG	Up to 50% faster TX measurements resulting in best-of-class test economics
Integrated, 5/10-port front-end	Per-port level control balances power to each DUT
Fast switching between technologies	Increases throughput in verification testing, relative to DSP-based systems
Coverage from 400 to 3800MHz	Support for TD-LTE in Bands 42/43
Streaming port	Use for multi-DUT test of GNSS in cellular test step (waveforms included)

# Multi DUT Testing made easy with IQvector

Turnkey solutions enable fastest deployment of multi-DUT solutions



- Built-in non-signaling support for QCOM, MTK, Intel, Spreadtrum, Altair, Sequans
- Turnkey DUT Control for multi-DUT test
- Deliver test solutions in days instead of weeks or months
- **Faster test times = Lowest Cost per Test!**

# Why Does it Work? (Example: TX Calibration)

1-DUT



2-DUT



3-DUT



4-DUT

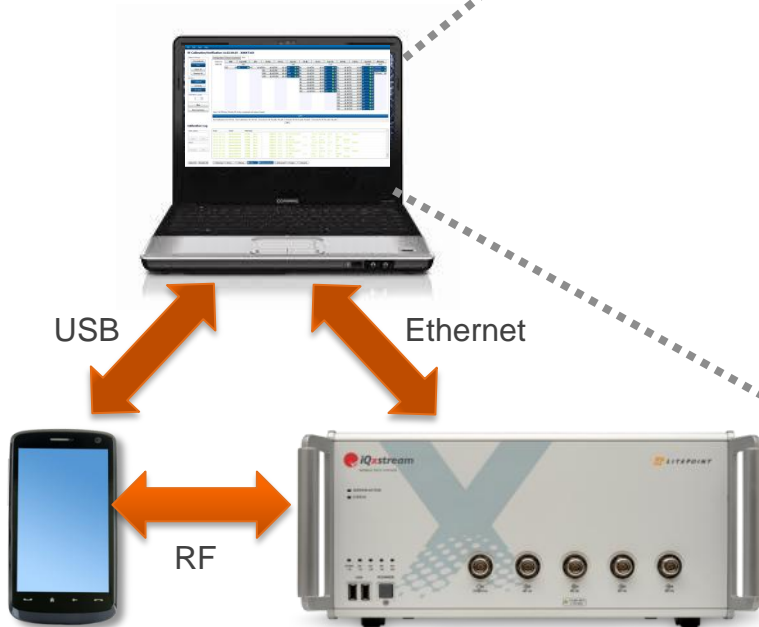




# *IQxstream is Integrated into Chipset Toolsets*

*Example: Chipset Toolkit*

Plug and play for rapid test results



The screenshot shows the RF Calibration/Verification software interface for XMM7160. The interface includes a menu bar (File, Edit, Start, Help), a toolbar with buttons for Configuration, Device Connection, and Run, and a main display area showing test results. The results are organized into columns for different test types: FBR, Fast FBR, AFC, 2G Rx, 2G Tx, Fast 2G, 3G Rx, 3G Tx, Fast 3G, LTE Rx, LTE Tx, Fast LTE, and RFVerify. The results are displayed in a table format with various status indicators (pass/fail) and numerical values. A 'Calibration Log' window is also visible, showing a list of test results with columns for Time, Type, and Message.

Total time	FBR	Fast FBR	AFC	2G Rx	2G Tx	Fast 2G	3G Rx	3G Tx	Fast 3G	LTE Rx	LTE Tx	Fast LTE	RFVerify
00:47:09	1.23					1.28			3.21			10.00	31.37

Loop 1 of RFVerify 3GVerify RF Verify completed with status Passed.

100%

Fast Calibration 2G: 2G Fast | Fast Calibration 3G: 3G Fast | Diversity Rx 2G: Rx path, Rd path | Diversity Rx 3G: Rx path, Rd path | Diversity Rx 4G: Rx path, Rd path

- Implemented by LitePoint, verified and qualified by our chipset partners
- Minimal effort required to start testing
- Working with chip makers to extend the capabilities to their toolsets to multi-DUT

# Cellular Chipset Toolset Integration



★ IQxstream is natively supported in the following chipset toolsets:

	QUALCOMM® QDART		MEDIATEK META		SPREADTRUM CFT		intel XMMcal		BROADCOM. GEM		MARVELL® ACAT	
	CAL	VER	CAL	VER	CAL	VER	CAL	VER	CAL	VER	CAL	VER
GSM / EDGE	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
W-CDMA	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
CDMA2K / EV-DO	✓	✓										
TD-SCDMA	✓	✓	✓	✓	✓	✓	✓				✓	✓
LTE FDD	✓	✓	✓	✓			✓	✓	TBD		✓	✓
LTE TDD	✓	✓	✓	✓			✓				✓	✓

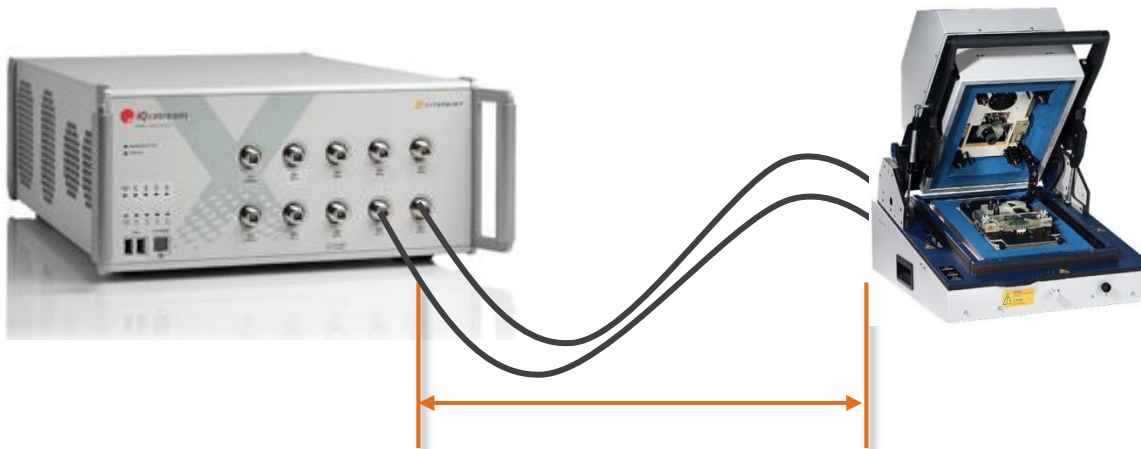
\*IQxstream is the only LTE-qualified test platform in META

■ = N/A

# Factory Efficiency Solutions

Fixture Health Check, DUT Sense, APLC

- **Fixture Health Check:** Detects changes between tester and DUT before fixture causes yield loss. Reduce frequency of station calibration.
- **DUT Sense:** Detects that the DUT is properly seated in the test fixture. Reduce / eliminate false starts and re-test due to contact issues.
- **Automatic Path Loss Calibration (APLC):** Rapidly determines the path loss between the tester and the DUT. Reduce labor hours spent during station calibration
- All features available on IQxstream test systems



# *IQxstream*



- **Lowest cost of test**
  - Leading the industry in defining how multi-DUT test is performed
  - Innovative manufacturing test techniques optimize H/W utilization
  - Industry’s fastest system architecture: **>2x faster than competition**
- **Easiest to deploy multi-DUT test solutions**
  - IQvector turnkey non-signaling solutions, native chipset “Turbo” tools
- **Ensuring highest quality test**
  - Delivering industry-leading first-pass yield
- **Trusted performance – LitePoint manufacturing leadership**
  - Designed for the manufacturing environment: simple, robust, fast
  - Over 5000 IQxstream test systems in manufacturing

# LitePoint IQvector



## Test Capabilities:

- Compliments LitePoint Test Systems
- Turn-key, complete test solution
- Optimized per chipset for highest throughput
- Designed for manufacturing and DVT



Features	Benefits
Optimized Performance	Most efficient testing possible for unique, optimized calibration routines.
Ready to Go Solutions	Fully tested on chipset reference designs and verified with all major chipset companies
User Configurable	Test lists, test limits, and more are fully configurable with simple setup file changes
Worldwide Support	Fully supported by local LitePoint personnel, often on-site, at key manufacturers worldwide.

# LitePoint IQramp

## Data Analysis and Report:

- Purpose built for analysis of wireless test data
- Designed for large datasets
- Ideal in engineering and manufacturing environments
- Addresses challenge of managing “big data”



Features	Benefits
Interactive Plots	Zoom and overlay tools available for line plots, histograms, sweep charts and X-Y plots.
Stable, Repeatable Results	When preparing for manufacturing, IQramp aids in correlation by allowing the user to easily overlay multiple datasets and analyze results.
Easy visualization and reporting	Easy to use. Purpose built to work with IQfact+ datasets

# Summary

- LTE is growing exponentially in China market and you need a trusted partner to help you capture market share
- LitePoint is a leader in LTE manufacturing test with 1000's of cellular systems deployed
- Turn-key solutions from LitePoint
  - Shortest time to market
  - Optimized test throughput
  - Eliminate weeks/months of development effort

To learn how LitePoint can help you

web: [www.LitePoint.com](http://www.LitePoint.com)

email: [sales@litepoint.com](mailto:sales@litepoint.com)

*Thank You*