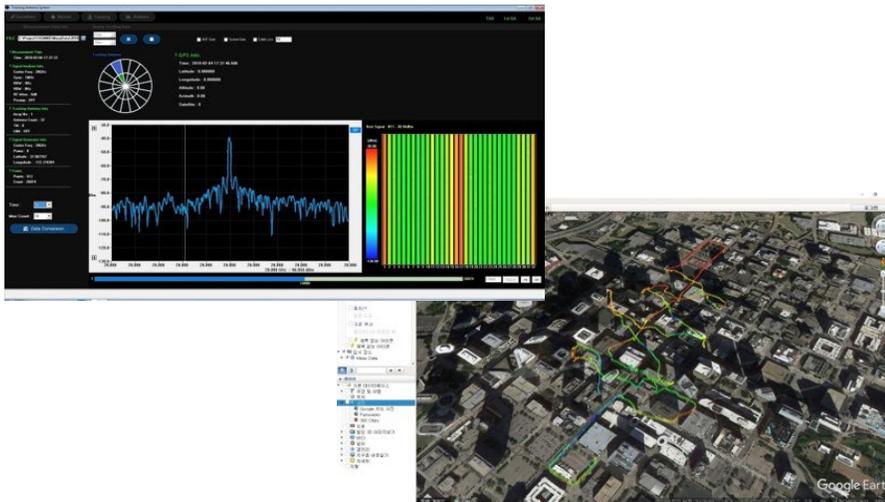


# 5G Network Mobile Field Testing

Keysight Technologies and  
TA Engineering, Inc.

Increase the accuracy of your 5G network  
with wideband tracking antennas for full-  
directional FFT-based spectrum analysis

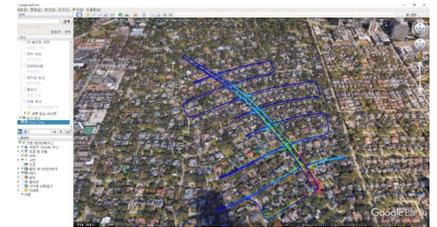
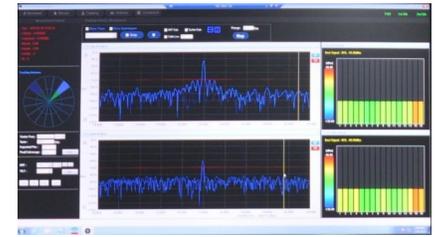
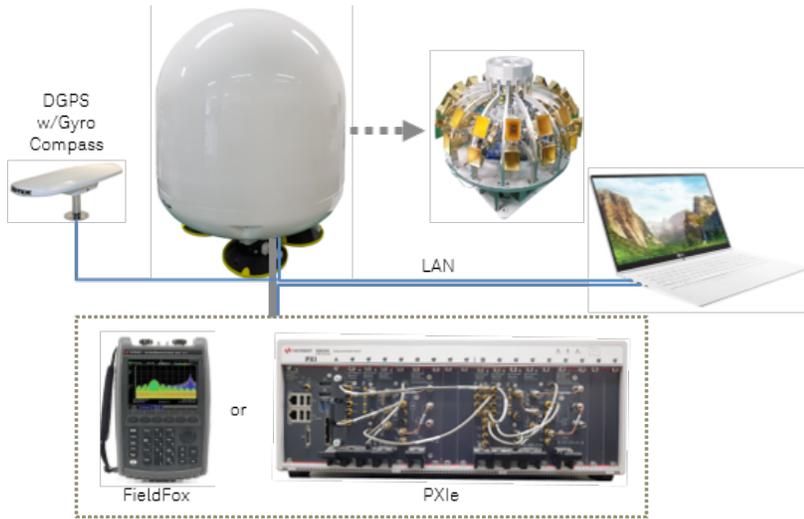


- Tx frequency 26 – 40 GHz with full-azimuth 360° signal reception.
- FFT-based spectrum data acquisition of 512 points > 600 times/s for 16 antenna array with the Keysight PXIe vector signal analyzer.
- The maximum Rx power level and direction of incoming signals are displayed in color on the Google map
- Real-time spectrum and spectrogram display during FFT data acquisition.
- Automatic adjustment of antenna's vertical position (up to 30° 2-bay or 45° 1-bay array) with adjustable tilt.

The wideband signal tracking antenna system is optimized for measuring the real-time wireless channel network environment in the 26 to 40 GHz range including the 5G frequency band. Frequency characteristic analysis using the mathematical model alone is inadequate for the new 5G band (28 GHz, 39 GHz), so analysis of the wireless channel through field measurement is essential. When wireless channel measurement is performed with a millimeter-wave omni-directional antenna, it is difficult to obtain sufficient gain, so the horn antenna with a specific beam-width must be applied. TA Engineering, Inc. has adopted two types of horn antennas with beam widths of 18° to 22.5° or 45°. In most millimeter wave field measurement systems, the directional steerable horn antenna is attached to a rotator, but this does not provide enough valid data to ensure accurate measurements. TA Engineering has arranged the horn antenna in a circular shape with 8x1, 8x2, 16x1, and 16x2 antennas, a high-speed MW switch (20 nsec) is used to automatically select antennas and collect the Fast Fourier Transformation (FFT)-based spectrum data from the incoming signal.



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## Optimized for Keysight PXIe high-performance and Fieldfox handheld signal generators

This product is optimized for the PXIe high-performance vector signal analyzer from Keysight Technologies, Inc. The PXIe collects the full-directional FFT (512 points) based spectrum at more than 600 times per second for a 2 MHz span with a 16 antenna (1 channel) configuration and stores it to a PC. The stored data includes FFT spectrum data and the location information for each antenna collected during mobile field testing, so that the direction of the transmission point can be displayed on the map according to the maximum transmit (Tx) power level. In addition, it can perform moving average and distance binning conversion by extracting the best signal from each antenna for a specific time using the measured data, or implement equally spaced coverage display on the map.

Up to 32 Rx antennas can be arranged horizontally with 8 or 16 antennas in a 2-bay array with one or two configured outputs. A control program, which is downloaded to the Keysight PXIe controller, provides device control. This makes it possible to vertically move a 1-bay antenna array by 45° or a 2-bay antenna array by 30°. Typical system gain is 35 dB and the DGPS receiver accuracy 0.6 m.

This product can be easily mounted on the roof of a vehicle making it suitable for mobile millimeter-wave signal acquisition. It includes an antenna enclosure for weatherproof mounting in harsh environments. It's powered with a portable DC battery or the 12-volt power outlet of your vehicle.

The wideband signal tracking antenna is focused on collecting a lot of data per second to ensure the validity of the measured FFT spectrum data. Keysight Technologies' PXIe high performance vector signal analyzer is used to acquire the high-speed FFT spectrum data.

The operating program for this equipment is loaded into the PXIe's built-in program controller. You can connect the PXIe's program controller to an external laptop to remotely monitor the device settings and activity. If you are using a handheld signal analyzer (FieldFox N9952A) with relatively slow signal acquisition speed, you can connect a notebook directly to FieldFox to operate the program.

## Key Functions

- Simultaneous measurement and data acquisition for two channels (e.g. 28 GHz, 39 GHz) with two signal analyzers
- Antenna selection to measure from 16 (or 8) antennas
- Displays the route tracking movement during measurement
- The function of measurement information input during analysis (e.g. Tx height, Tx direction, Tx antenna information, memo function for recording the surrounding, etc.)
- Moving average conversion function according to arbitrary time
- Distance binning conversion function to find the best signal per second (or desired time) for each antenna, and equal interval display
- BRSRP measurement with Keysight VSA software

## System Components

### Keysight Technologies

N9952A	FieldFox handheld microwave analyzer (50 GHz)
or	
M9393A	PXIe performance vector signal analyzer (50 GHz)
M9037A	PXIe high-performance embedded controller

### TA Engineering

TAS322640A	wideband signal tracking antenna (16 x 2 array)	2 output ports
TAS162640A	wideband signal tracking antenna (16 x 1 array)	1 output port
TAS162640B	wideband signal tracking antenna (8 x 2 array)	2 output ports
TAS082640A	wideband signal tracking antenna (8 x 1 array)	1 output port

### Options

DGPS	SI-TEX Vector Pro G1 Compass
Receiver type	1, C/A code, with carrier phase smoothing
Channels	Two 12-channel parallel tracking (Two 10 channel when tracking SBAS)
Update rate	10 Hz
Horizontal accuracy	<1.0 m (DGPS)
Heading accuracy	0.6°
Interface cable	2 m (for connecting with TAS)
Mounting kits for roof top of the vehicle	

To learn how this solution can address your specific needs please contact

Keysight's solutions partner,  
TA Engineering, Inc.  
[www.taeng.co.kr](http://www.taeng.co.kr)



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TA Engineering is a Korean company that aims to provide the best high-end systems and products to customers in the RF/MW field. It concentrates on the development and production of RF MW signal collection and analysis, and component-based products, such as mmWave SGH antenna and RF/MW switch modules.

[www.taeng.co.kr](http://www.taeng.co.kr)

For information on Keysight Technologies' products, applications and services, go to

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