



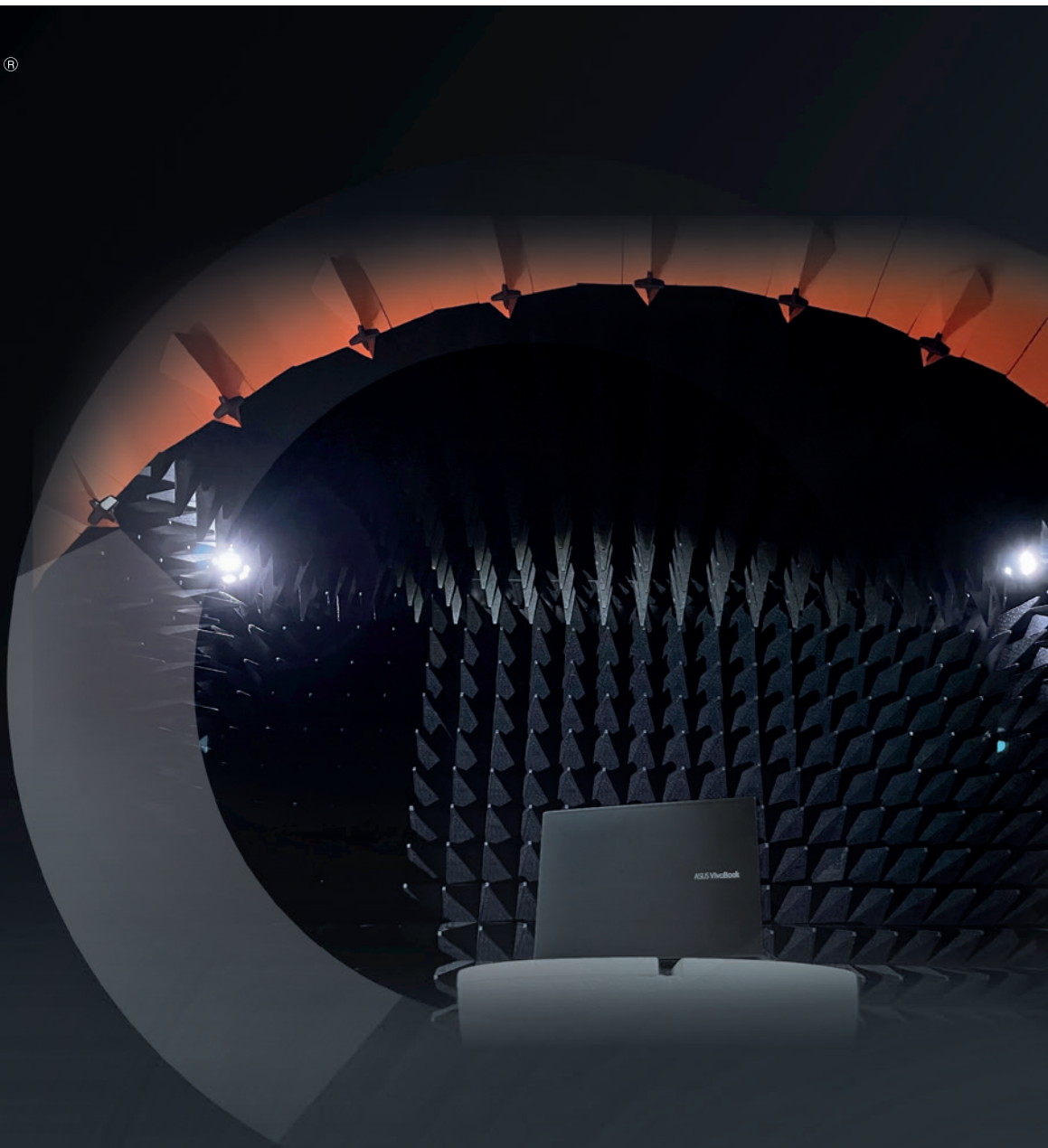
Fast Wi-Fi 6E Testing for New ASUS Laptops and AiO PC

ASUS[®]
IN SEARCH OF INCREDIBLE



Dr. Su Saou-Wen
Director for ASUS
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“ With this new SG 24 combined with WaveStudio, not only can we measure higher frequencies, but also test more devices at faster rates, saving up to 50% of time: a strong asset in a highly competitive environment.”



+ THE CHALLENGE

ASUS, one of the world's leading technology enterprises, pursues innovation to offer a portfolio of digital products that meet the highest levels of quality standards. A multinational company, ASUS is known for the world's best motherboards and high-quality personal computers, monitors, graphics cards, routers and other technology solutions.



We were experiencing a bottleneck in the development of our latest Wi-Fi 6E laptop products because our existing test system could not test in frequency bands above 6 GHz. We needed to upgrade the system so that we could continue to verify our product designs quickly and with assured accuracy during the development process.”

A key part of its growth is the bringing to market of next-generation smart technologies, using the latest connectivity standards.

The laptops and All-in-One (AiO) PC are ASUS' most iconic products and are therefore subject to ongoing product development in line with the latest technological advances and available communication protocols.

When ASUS began developing laptops capable of supporting Wi-Fi 6E, the team quickly realized that testing devices in the relevant frequency bands and surely further 5G advancements would not be possible in their existing test and measurement system. Their current system had reached its limits at 6 GHz. A system upgrade was necessary if they were to continue to be able to verify new product designs in line with the rapid time-to-market demands of the industry.

Unlike Wi-Fi 6 and previous generations that were limited to the 2.4 GHz to 5 GHz radio bands, Wi-Fi 6E will use bandwidth up to the new 6 GHz band, providing non-overlapping channels for less congestion in areas where lots of networks are operating, thus offering better connection and improved speeds.

In particular, Wi-Fi 6E allows for 14 additional 80 MHz channels or seven additional 160 MHz channels, extending the upper frequency from 5.8 GHz to 7.2 GHz, meaning passive testing of new computers must be conducted in operating frequencies up to that point.

A second, important consideration when upgrading the test system was the size of the DUT. The new test system needed to be compact enough to be located onsite at ASUS Headquarters, Taipei, while being able to accommodate the new laptops which are bigger than their predecessors at 60 cm in length and AiO computers.

With the increasing need for fast iteration testing of products in development, and the quantity of tests they required to conduct daily, the system needed to be fast. The measurement speed and accuracy of the system would enhance the overall performance and rate of new product development.

The ASUS engineers were also keen to identify a system software suite that offered an intuitive interface and was easy to set up and navigate.



ONSITE TESTING FOR SPEED AND CONFIDENTIALITY

To meet the testing requirements of the new 6E connectivity standards, ASUS could have used a third-party laboratory, or taken their new products to the antenna manufacturer's testing facility.

The time-to-market window for a new ASUS laptops is several months, making time savings essential. The team needed an onsite solution in order to verify their developments quickly and get from prototypes to production and meet those demands.

When developing cutting-edge technologies in a highly competitive marketplace, confidentiality is another important consideration. Taking yet-to-be-released products to a third-party testing facility opens the risk for the latest laptops or AiO designs to be photographed and leaked on social media before an official launch to market. These are issues ASUS were extremely keen to avoid.

+ OUR SOLUTION

As a longstanding customer of MVG, ASUS was quick to turn to its regional MVG team for support and recommendations on this important system upgrade.

Before the additional measurement challenges of 6E connectivity, ASUS was using a MVG spherical near-field multi-probe array system, to test and validate prototypes throughout their R&D phase. Suitable for testing devices operating in frequency bands between 0.4 and 6 GHz, this system, serving them well since 2007, was in need of an upgrade if they were to test the higher frequency of Wi-Fi 6E (7.2 GHz).

Considering the measurements required, the size of the DUT, and the team's objectives for time savings, MVG recommended upgrading to the SG 24 with extended capabilities to cover frequencies up to 10 GHz. With this new system, not only could they test higher frequencies, but they could test more devices at faster rates up to 2 times faster than other systems.

The SG 24 is a compact spherical near-field multi-probe array test system, particularly suited to perform a range of antenna measurements, such as radiation patterns, gain, and antenna efficiency. This device would meet ASUS's need to perform fast and accurate measurements for even the larger consumer electronic devices they are developing.

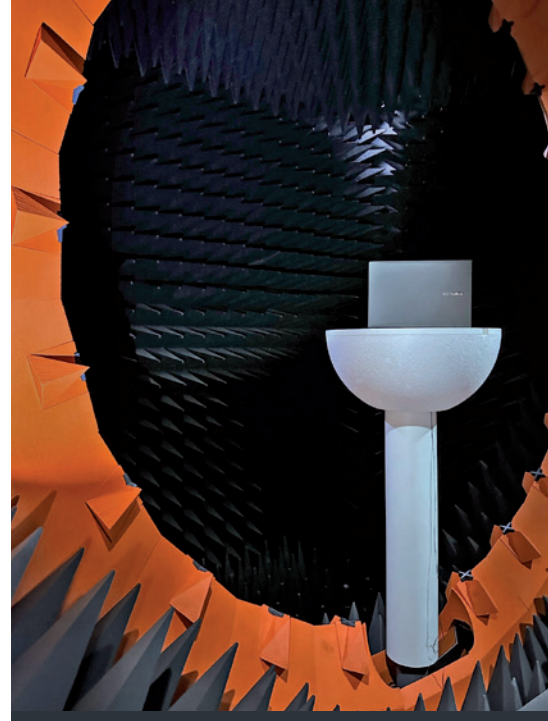
+ A MORE INTUITIVE INTERFACE

Since ASUS purchased its original system more than ten years ago, MVG has developed a new automated software suite, MVG WaveStudio. Designed to drive MVG measurement systems using an intuitive, user-friendly interface, WaveStudio performs fast and accurate antenna and OTA measurements, offers advanced post-processing capabilities and can generate reports in accordance with standardization bodies such as CTIA and 3GPP.

The engineers at ASUS have expressed their fondness for WaveStudio software suite compared to the preceding software SatEnv, stating that the interface is intuitive, simple to understand, and programming commands is straightforward and fast: a time-saving asset in a highly competitive environment.

+ THE FUTURE OF THE ASUS LAPTOPS AND ALL-IN-ONE COMPUTERS

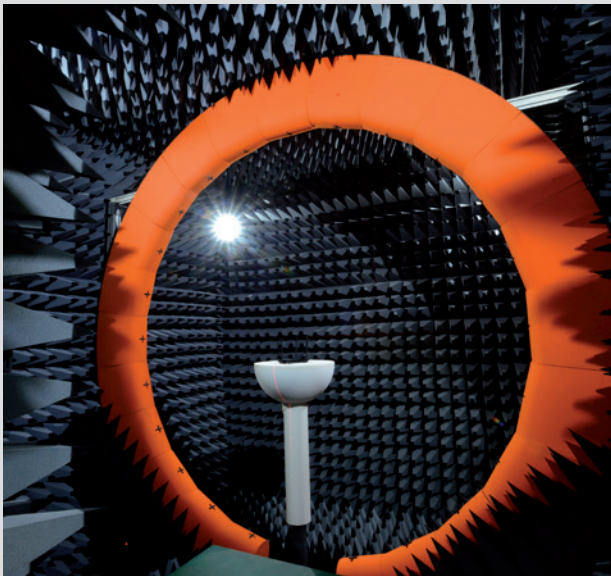
At present, the most state-of-the-art ASUS laptops and AiO PC have between two and four antennas which are tested and verified separately for MIMO 11n or 11ax performance. In the future, the company is looking to add more antenna elements to improve speed, reliability and ultimate, user experience. It is anticipated that a 5G laptop could encase at least six antennas. At that point, ASUS will appreciate the possible 5G options and extensions of the SG24 to allow them to continue to meet time-to-market constraints. An extension available at any time with the MVG licenses for 5G FR1.



The SG 24

Developed for testing antennas and wireless devices, MVG's SG systems are the most accurate solutions on the market for measuring stand-alone antennas, antennas integrated into subsystems, or large consumer electronic devices.

SG 24 offers a wide range of measurement capabilities including gain, directivity, beamwidth, cross-polar discrimination, sidelobe levels, radiation patterns, antenna efficiency as well as TRP, TIS, EIRP and EIS OTA testing, covering all state-of-the-art protocols. It has a typical dynamic range of 70 dB, oversampling capability, and can comfortably accommodate a DUT of up to 1.15m at 10 GHz. It is ideal for CTIA measurements.



MVG WaveStudio



The WaveStudio automated software suite has been developed to support both antenna measurements and OTA testing of wireless devices. It performs fast and accurate passive and active measurements, has advanced post-processing capabilities, and generates reports per the requirements set forth by standards bodies such as CTIA & 3GPP. WaveStudio offers significant time-saving features: batching and batch cloning from a pre-measurement configuration console, advanced predictive algorithms, and a free results viewer.

