CASE STUDY

# SGS Leverages MVG Antenna Test System For Rapid Automotive Antenna Testing

SGS

**Ervin Li**
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**"MVG has an incredible R&D team and has been instrumental in providing additional technical support as we have built out new automotive antenna test techniques using the MVG chamber."**


mvg
Microwave Vision Group


## INTRODUCTION

The demand for enhanced telematics features that rely on communication antennas is growing year over year. From autonomous vehicles to everyday commuter or commercial vehicles, a variety of communication links, including cellular, WiFi, navigation (GNSS/GPS/Beidou/GLONASS), UWB etc, are now becoming standard for new vehicles. Of course, these antennas and vehicle platforms all need to be tested during the prototyping phase, and ultimately, require certification testing before they can legally be sold in the regions containing the world's largest markets.

SGS-CSTC Standards Technical Services Co. Ltd. (SGS), has been at the forefront of wireless standards testing for Asian-Pacific markets (APAC), and worldwide, for over 3 decades. As automotive antenna prototype testing and certification testing began emerging as a customer need, SGS sought out the best solution to provide automobile, electronics, communication, and reliability testing. After exhaustive research and inquiry, SGS purchased a MVG SG 3000, the premier full scale vehicle antenna measurement system, to provide extremely rapid testing for their customers, who consist of all of the major automotive OEMs and newer Asian automotive OEMs. "We chose MVG as our antenna test chamber supplier because test efficiency was absolutely critical for us," shared Ervin Li, Wireless Laboratory Manager, Connectivity & Products at SGS, "MVG's proven track record and extensive experience with vehicle antenna testing helped to close the deal!"

Over nearly 2 years of ownership has seen SGS satisfied with MVG's antenna chamber performance, efficiency, product support, and additional technical support to tackle the challenges of an emerging and ever-changing automotive antenna market.

## SGS: DELIVERING SUPERIOR WIRELESS & ANTENNA TESTING SERVICES

SGS is an enormous network of over 200 laboratories, 90 branches, and 16,000 professionals dedicated to providing a diverse range of customers with testing, inspection, and certification services. SGS-CSTC was founded as a joint venture between SGS Group and China Standard Science and Technology Group in 1991. A major facet of SGS business has historically been wireless testing, mainly mobile phone testing, including antenna and over-the-air (OTA) testing.

At the turn of the decade, SGS noticed the increased need of their automotive customers to test vehicle antennas for both prototype/tuning and for certification testing. The major OEMs are developing internal standards for their vehicle antennas, while they also need to comply with the regional certification requirements for the markets they serve. This new demand put SGS in an ideal position to provide antenna testing services to their existing and future customers in every major market, including the US, Europe, Japan, and China.

The capabilities in demand are in-vehicle networking terminal testing, and out-vehicle networking terminal testing. This includes 4G/5G regulatory certification for mobile communications such as CE, FCC, IC, MIC, and ITA, which covers over 180 countries. Additional sought out testing capabilities include operator testing requirements like GCF and PTCRB.

Additionally, there are a host of other automotive specific testing capabilities that are advantageous to provide complete over-the-air automotive wireless communication system and related system testing:

1. **Emergency call (eCall)**
2. **Vehicle-to-Everything (V2X), including cellular V2X (C-V2X)**
3. **Logo certification (Bluetooth, Wi-Fi, UWB, USB Type-C, HDMI, etc.)**
4. **Product compatibility and cosite interference**
5. **Interoperability (Carplay, Android Auto)**
6. **Voice recognition**
7. **Signal measurement**
8. **Software verification**
9. **Global telecom operator network entry certification**
10. **Other wireless technologies and related RF testing**
11. **Automotive safety and mechanical reliability**
12. **Environmental simulation verification**
13. **Automotive EMC**

Originally, SGS's automotive antenna customers requested only passive antenna testing. As the performance requirements and features of these antenna systems have steadily increased, there is now a demand for active OTA testing. "We have been promoting active OTA testing to automotive OEMs for years," Ervin shared, "There are still only a few OEMs doing active OTA testing in full vehicle level, but this will likely change over time as antenna technology becomes more prevalent in vehicles."

It is predicted that this testing demand will grow in quantity as well as sophistication over time, a trend that follows with the wireless technology integration trends into automotive systems. This is corroborated by many of the automotive OEMs building out their own vehicle antenna testing standards and facilities. This also includes several governments, such as the Asian governments.

## THE HUNT FOR A SUITABLE AUTOMOTIVE ANTENNA TEST CHAMBER

To fulfill this need, SGS began the search for an extremely reliable antenna test chamber that was large enough to accommodate entire vehicles and automotive platforms. Moreover, a crux of SGS business is providing rapid testing services to their customers.

The SGS business approach of providing rapid testing ensures that they remain competitive and lucrative even while offering extremely cost competitive rates per hourly service. The only way this is possible is by using wireless test chamber technology that is both highly efficient and accurate. This minimizes the time needed to test and the possibility of having to retest due to errors or malfunctions. This also means that chamber down-time is a factor that SGS must minimize and directly impacts their customer relationships and bottom line. Having an antenna test chamber that is more reliable and delivers test results more rapidly would justify a premium in capital expense, as the net value of the superior chamber would quickly outweigh a higher initial cost.

"Many of SGS's customers do R&D testing to tune their antenna and communications electronics, and they need to have a very fast turn around on this type of testing," Ervin shared, "If the test takes 3-4 hours to get a result, that slows down the process." Ervin explained, "The faster a test system can deliver the results, the higher efficiency of R&D testing we can offer to our clients."

With this in mind, SGS endeavored to find the ideal antenna test chamber for their business needs. After exhaustively examining every major antenna test chamber provider, there was one left standing. MVG has had a long history of providing antenna test chambers for automotive customers. Moreover, MVG's antenna test chamber technology is built to offer the highest levels of reliability and efficiency in testing. Part of this aspect is the advanced test approach MVG chambers are built around. For instance, the SG 3000 is a multiprobe electronically scanned system that can much more rapidly and accurately conduct a full spherical measurement compared to legacy test chambers with single probe mechanically scanned technology.

SGS is the world's first and only third-party multi-probe full vehicle OTA laboratory to support OEMs and Tier 1 suppliers operating in the connected vehicle market. The facility supports OTA measurements for 5G FR1 NSA/SA, GNSS, C-V2X and the emerging UWB technologies for automobiles in compliance with the 5GAA Vehicular Antenna Test Methodology (VATM) Standard. Specifically, the SG 3000 is capable of verifying vehicle 2/3/4/5G, GPS/Beidou/Galileo/Glonass, C-V2X, UWB, and a host of other common wireless technologies (Bluetooth, Wi-Fi, etc) deployed on automotive platforms operating between 400 MHz and 10 GHz.

"At the time, we were looking to develop a new business in vehicle antenna testing," Ervin shared," We talked with all the major antenna test chamber providers and finally chose MVG, mainly due to the extremely high testing efficiency." This decision required SGS to investigate the needs of their potential automotive antenna clients, where SGS discovered that one of their clients was already using the exact antenna test chamber (SG 3000) from MVG that SGS was considering. Not only did this help to establish the credibility of MVG's antenna test chamber solutions for SGS, but also allowed for the enhancement of a business relationship between a potential customer with a compatible chamber solution.

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"I appreciated MVG's support during the construction of this huge antenna test chamber and all of their subsequent support," Ervin detailed, "Beyond product support, which has been exceptional, MVG has also gone out of their way and aided us in solving a related software challenge."

## CONCLUSION

After nearly 2 years of ownership of a MVG SG 3000, SGS has been able to consistently and reliably deliver high efficiency automotive antenna test services to a diverse range of customers, including every major automotive OEM and many Chinese automotive manufacturers. SGS predicts the growing adoption of electric vehicles (EVs) and the additional wireless control and communication electronics present on these platforms will only lead to a greater need for advanced automotive antenna testing. This clearly justifies SGS's investment in an MVG antenna test chamber, and MVG's ongoing support has aided SGS in addressing new business needs by developing new techniques and ensuring rapid testing services for SGS's customers.