

Remote Control of Agricultural/Construction Machinery – Communications Service Quality Test Solutions

Anritsu Network Master Pro MT1000A

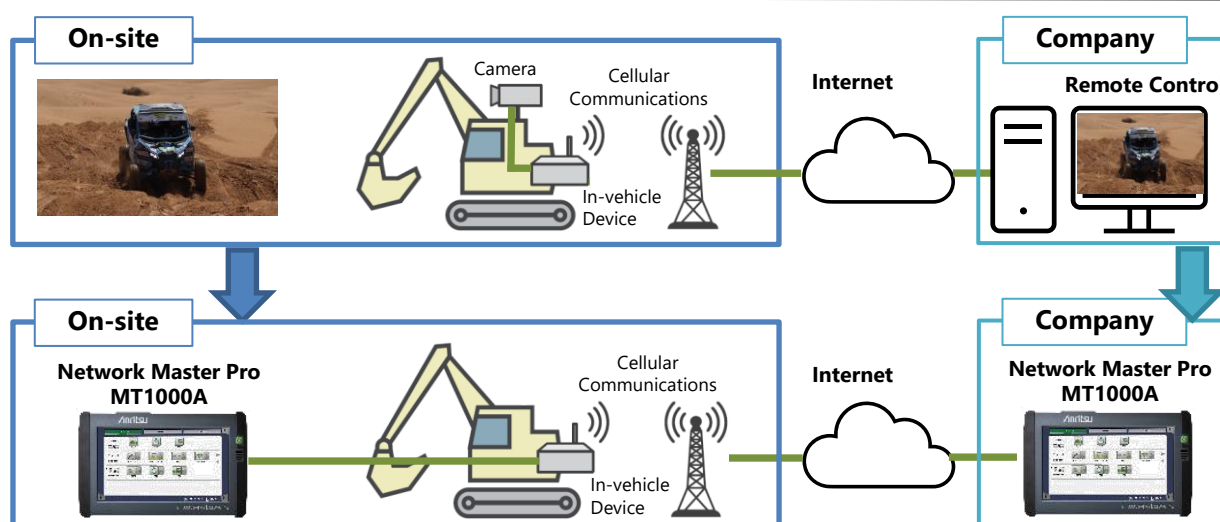
Anritsu Base Station Simulator MD8475B/MT8000A

Apposite Network Emulator Linktropy

Cameras, sensors, and cellular communication technologies are widespread, enabling communications technology to improve safety, productivity, and quality in agricultural and construction work.

Remote control of agricultural/construction equipment requires evaluation of communications quality to ensure correct control despite communications service delays or data loss impacting image quality. This leaflet explains quality-evaluation of on-site communications and laboratory definition of a Service Level Agreement (SLA).

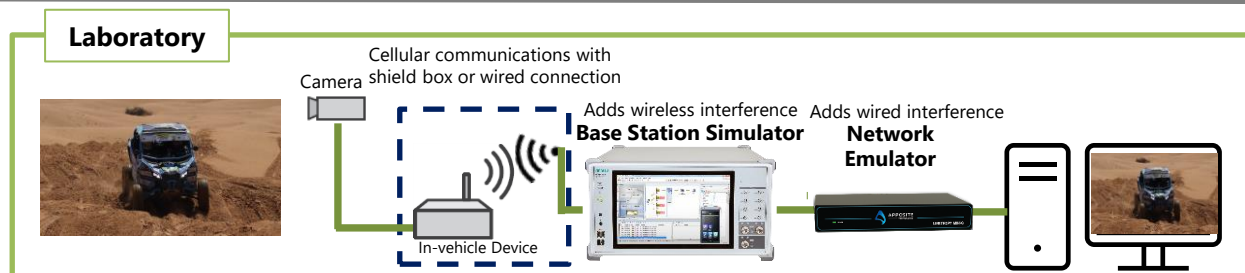
1. On-site Communications Service Quality Evaluation (Details on next page)



The Network Master Pro:

- Quantitatively assesses the impact of other communications, including time variations, for a fixed duration.
- Ensures reproducible phenomena by transmitting hardware-based constant-rate data, unlike the software-based **ping** command and **iPerf** application that transmit burst data, potentially causing higher-than-expected load.

2. Lab Testing for Service Level Agreement (SLA) (Details on next page)



This testing defines the minimum necessary service quality by reproducing it in the lab using wireless and wired interference generators. The defined quality is called the Service Level Agreement (SLA) agreed with the Mobile Network Operator (MNO).

1. On-site Communications Service Quality Evaluation

On-site communications quality can be evaluated using software like **ping** or **iPerf**, but their results depend on PC performance and may not accurately measure high-data-rate quality due to network load caused by data bursts. For industrial applications involving human lives and valuable assets, hardware-based methods like the Network Master Pro MT1000A are more reliable.

The MT1000A, which transmits and receives hardware-based data, reliably performs the following:

- Stable transmission of high-rate data reproducing expected communications conditions
- Easy long-term daily, weekly, and monthly monitoring to clarify impact of other communications
- Separate evaluation of downlink and uplink to identify bottlenecks
- Monitoring of lowest, average, and highest values, facilitating on-site identification of worst quality values and variations

2. Lab Testing for Service Level Agreement (SLA)

Although the current communications can be evaluated on-site, the minimum required quality cannot be reproduced. Therefore, a lab quality-evaluation model is built to check the minimum required quality. Combining the Base Station Simulator MD8475B (MT8000A for 5G) with the Apposite Technologies network emulator accurately reproduces impaired wireless and wired communications and defines the minimum quality. After defining the minimum required communications service quality, an SLA is concluded with the MNO to guarantee the quality. Without an SLA, daily service quality will vary, causing frequent drops in communications rates and requiring periodic on-site communications service quality evaluation.

Ordering Information

Model	Name	Function
MT1000A	Network Master Pro ^{*1}	Monitors network and captures data
MD8475B	Signalling Tester ^{*1}	Simulates 2G/3G/4G base station
MT8000A	Radio Communication Test Station ^{*1}	Simulates 5G base station
	Network Emulator ^{*2}	Emulates network including addition of interference

^{*1}: Contact Anritsu sales representative for configuration details.

^{*2}: Product of Apposite Technologies; contact Apposite for details.