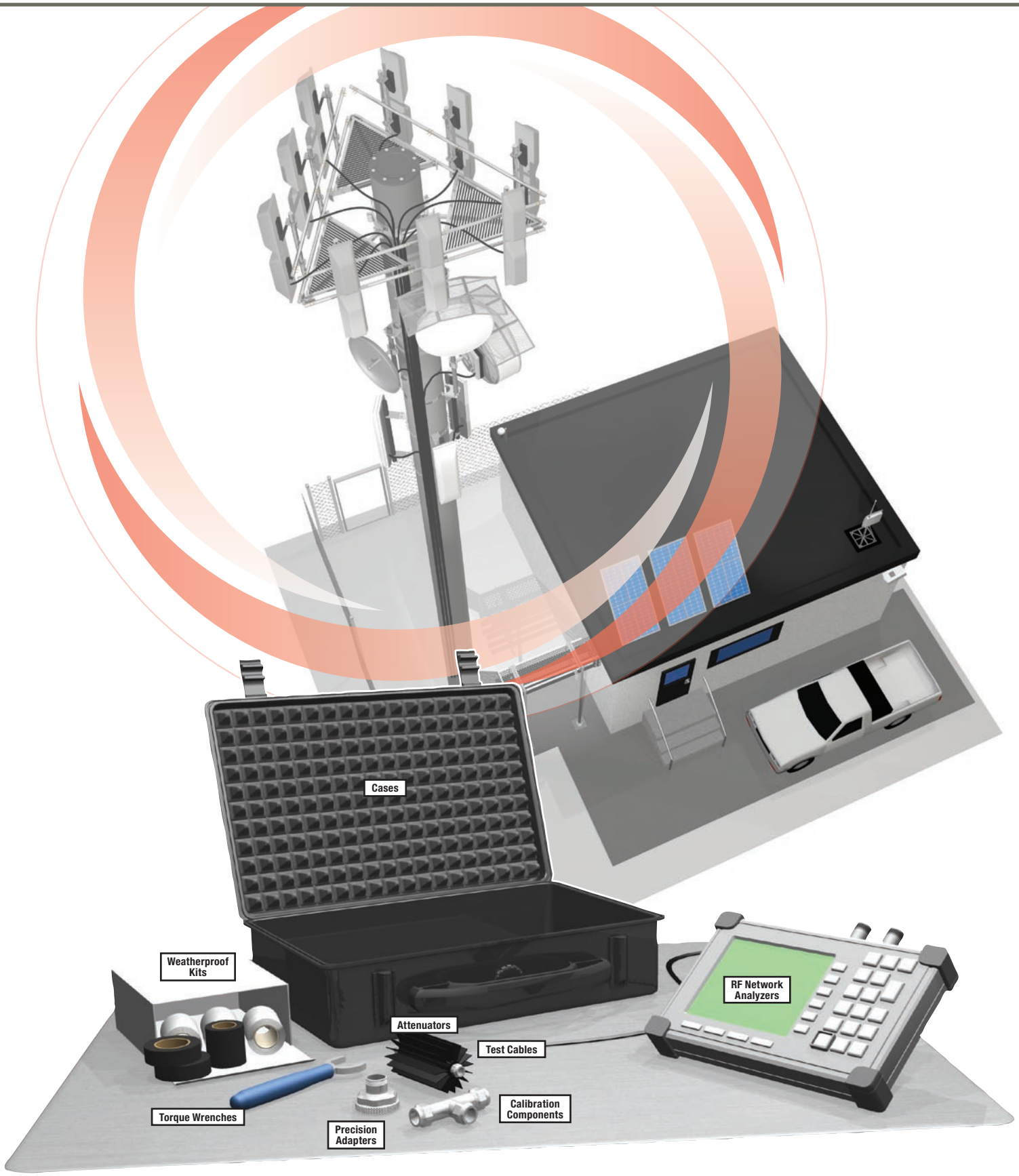
TESSCO

Solution: Network Optimization

Application: RF & Site Analysis—Transmission Systems



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Application: # RF & Site Analysis—Transmission Systems

SUMMARY

The transmission system at an RF site is the physical link from the radio to the airwaves. It must be tested and maintained to ensure optimum network performance. The transmission system includes everything from the output of the base station to the antenna, including the lightning protection, jumpers and feeder coax, grounding clips, tower-mounted amplifiers (TMA), antenna couplers, and the antenna itself. If the transmission system is not operating properly it can cause poor voice quality, dropped calls, and low throughput speeds, leading to customer complaints and lost revenue.

FEATURES

- Installation verification
- Interference analysis
- Capacity analysis
- Quality of service
- Return loss or VSWR measurement
- Impedance mismatch
- Insertion loss
- Preventative maintenance
- Equipment maintenance
- Component analysis

BENEFITS

- Reduced revenue loss from retransmission of messages
- Reduced downtime and costs
- Increased customer satisfaction
- Ability to identify decreased performance before it turns into a fault
- Saved time and money on future testing by verifying and documenting network performance

REAL WORLD EXAMPLES

Situation: A cellular contractor building new sites for their biggest carrier was having a record day cabling and connectorizing multiple sites.

Problem: Their last connector would not pass the return loss test. It looked good, but the return loss indication made it appear open.

Solution: Even though the return loss measurement was too high, the installers' distance-to-fault (DTF) data conversion revealed that the high return was at their connector. They discovered insufficient pin depth. The connector was reassembled and the problem was solved.

Situation: A cell site technician had a trouble ticket listing complaints of dropped calls and poor voice quality of the alpha sector at the tower overlooking a major highway interchange.

Problem: The receive side or the uplink side of the cell site required a tower-mounted amplifier, which was failing to provide enough gain to the signal to cover the required area.

Solution: The technician, who did not have a two-port RF network analyzer, had just purchased a spectrum analyzer with a tracking generator and an internal bias tee. Without a tower crew, she sent the tracking generator signal up the transmit side and viewed it on the spectrum analyzer from the receive side. As she powered up the bias tee, the amplifier response did not change from the "off" to "on" state. The TMA was replaced and the complaints stopped.

Situation: A customer reported that he could not send or receive calls on his trunked two-way radio. The communications technician used a wattmeter to measure output power from the radio but it indicated a problem with high reflected power. The tower climber indicated that the jumper and antenna on top of the 250-foot tower seemed fine but he replaced them anyway. The problem persisted.

Problem: A local hunter who had been taking target practice on the tower lights had hit the cable.

Solution: The local rep happened to stop by with a site analyzer with DTF conversion. Within 5 minutes, the RF network analyzer found the high reflected power because the return loss measurement was poor. The DTF conversion indicated a fault at 200 feet, where the technician found a hole through the cable. Because of the DTF indicator, they found the fault quickly, saving time and money.

ADDITIONAL CONSIDERATIONS

- What types of systems do you need to test?
- What is the highest and lowest frequency of use?
- What is the maximum power to be measured?
- Exactly what tests do you need to run?
- What connection types do you need to interface?

PRODUCTS

- RF/microwave network analyzers
- Calibration components
- Phase stable test cable
- Adapters
- Transit case
- Optional power sensor