

709 Compact Spectrum Monitoring System (9 kHz to 8.5 GHz)

TCI's Model 709 is the next generation Compact Spectrum Monitoring System (CSMS) to detect and locate modern signals of interest for spectrum optimization, interference mitigation, public safety and national security missions.

The 709 leverages TCI's 50+ year legacy of designing, deploying and maintaining spectrum monitoring solutions, coupled with leading-edge technology to achieve high performance, high reliability, and simple operation to meet today's spectrum monitoring challenges.

The ITU-compliant 709 is the next step in TCI's field-proven 700 series and provides lower size, weight and power (SWaP) enabling flexible deployments for fixed, transportable and mobile applications. The 709's built-in networking capabilities are the foundation for modular and scalable monitoring networks.

The 709 provides high system sensitivity, low phase noise and high dynamic range to maximize system coverage and ITU measurement capabilities. The result: fewer systems required for monitoring and geolocation across large areas.

TCI's Scorpio[™] Spectrum Monitoring Software is easy to-use and provides extensive Built-in Self-Test (BIST) to reduce maintenance and training requirements.

These features combine to minimize costs for initial procurement, installation, operations and maintenance = minimized total cost of ownership.

OPTIMIZED FOR A WIDE RANGE OF APPLICATIONS

- > ITU-compliant spectrum monitoring
- Large area/national monitoring solutions
- Interference detection and geolocation
- > Asset and event protection

BEST VALUE SOLUTION

- > High level of performance
- > Simple/low cost installations
- > Ease of operation
- > Low purchase & operating costs
- > Minimized total cost of ownership



High performance wideband processing in a compact, versatile package.

KEY OPERATIONAL FEATURES

- High system sensitivity enables lower density deployments.
- Performs 24/7 autonomous, remote, real-time monitoring.
- Minimized size, weight and power (SWaP) enable flexible deployment options.
- Built-in-self-test provides instant, remote system status.
- Able to operate effectively over low-bandwidth networks.
- > Supports real-time and scheduled tasking.
- Supports multiple users working simultaneous tasks.
- Supports hybrid AOA/TDOA geolocation as part of a hybrid monitoring network.
- > Rugged IP67 enclosure for outdoor deployment.
- > Fully interoperable with all TCI 700 series systems.

KEY TECHNICAL FEATURES

- ITU-compliant 9 kHz to 8,500 MHz signal measurements and monitoring.
- > 20 to 8,500 MHz TDOA geolocation.
- 10/80 MHz IF bandwidth supports high scanning rates and high dynamic range.
- Selectable measurement bandwidths from 100 Hz to 80 MHz.
- Easy operation via client-server architecture with built-in networking capability.
- > Signal capture in I & Q format.
- High scan-speed mode for transient signal capture.
- > Three RF inputs.
- Internal Automatic Gain Control and Manual Gain Control.
- LAN interface supports remote control and data output.
- > 2G, 3G and 4G modem options.





System Features

Compact. Lightweight. Cost-effective. The TCI Model 709 brings advanced functionality to a variety of radio monitoring applications where outstanding price/performance, effective space-saving integration and low density deployments are essential.

Covering the frequency range of 9 kHz to 8.5 GHz, the Model 709 employs a spectrum processor measuring only 2 x 12 x 10.5 inches and weighing just 10 pounds.

An exclusive wideband architecture enables the 709 to search crowded signal environments to identify and geolocate signals of interest quickly and accurately.

Selectable receiver IF bandwidth and a wide choice of processor measurement bandwidths, combined with high system sensitivity, a low noise figure and high in-band dynamic range maximize system performance.

Supports Hybrid Networks

The Model 709 employs Time Difference of Arrival (TDOA) techniques for geolocation and provides support for mixed TDOA / AOA (Angle of Arrival) spectrum monitoring networks.

High Sensitivity and Resolution

TCI's 50 years of signal processing experience and continuous product improvement ensures the Model 709 employs the lowest noise subsystems and fastest processors to provide high system sensitivity. The result is an ability to detect very weak signals while maintaining processing speed and delivering unmatched signal resolution in crowded signal environments.

Dual Instantaneous Bandwidth

The Model 709 provides two operatorselectable IFs: 10 and 80MHz. The full-wideband front end provides a highperformance receiver suitable for fast scans and working with modern signal modulations such as LTE. The narrower bandwidth front end effectively lowers the noise floor, making the system more sensitive to lowlevel signals, particularly in crowded signal environments.

Outdoor Ready

Weatherproof IP67 enclosures enable the Model 709 to withstand rain and dust when deployed outdoors for short or long-term missions. Integrated heaters can be added to facilitate operation in temperatures below -30°C.

Monitoring and Signal Analysis

TCI Model 709 systems support LAN communications with 3rd party computers and TCI's Scorpio spectrum monitoring software. When integrated with TCI Scorpio's Vector Signal Analysis option, wideband digital I&Q data can be captured by the network and replayed for further analysis, evaluation and documentation.

Ruggedized, Compact and Power Efficient

Minimal size and weight enable TCI CSMS solutions to integrate into small or large distributed systems. The low power consumption makes it practical to operate several units simultaneously, and from a variety of power sources.

Ready for Today and Tomorrow

The combination of wide frequency range, high instantaneous bandwidth, and exceptional overall performance make TCI's Model 709 ideally suited to detect, analyze and locate modern signals.

Comprehensive Reporting Capabilities

When paired with Scorpio, the Model 709's comprehensive text and graphics capabilities enable automatic report generation, and access to the data to create reports using MS Office.[™] Reports are customizable and can be based on measurements, raw trace information, carrier analysis by date or band, channel occupancy and availability statistics, message-length statistics, and channelpower statistics.

Mission Success

TCI solutions excel whether the mission involves detecting interference, monitoring transmissions, locating low power transmitters or conducting asset and event protection.

Model 709 Specifications Overview

General Receiver Specifications		
Frequency Range	20 MHz to 8.5 GHz (option to 9 kHz)	
Instantaneous Bandwidth	10/80 MHz	
IF Bandwidths	Less than 30 MHz: 0.1 kHz, 0.3 kHz, 0.5 kHz, 1 kHz, 3 kHz, 5 kHz, 6 kHz, 9 kHz, 10 kHz, 20 kHz, 25 kHz, 50 kHz, 100 kHz, 200 kHz, 500 kHz, 1 MHz, 2.5 MHz, 5 MHz, 10 MHz, 20 MHz, and 30 MHz 30 MHz to 3 GHz: 1 kHz, 3 kHz, 5 kHz, 6.25 kHz, 7.5 kHz, 8.3 kHz, 12.5 kHz, 15 kHz, 20 kHz, 25 kHz, 30 kHz, 50 kHz, 100 kHz, 200 kHz, 300 kHz, 400 kHz, 600 kHz, 1 MHz, 2 MHz, 3 MHz, 4 Mhz, 5 MHz, 6 MHz, 7 MHz, 8 MHz, 9 MHz, 10 MHz, 20 MHz, 25 MHz, 40 MHz, 40 MHz, 10 MHz, 20 MHz, 30 MHz	
Noise Figure	2 MHz to 30 MHz: 12 dB typical 20 MHz to 3000 MHz: 8 dB typical 3000 MHz to 6000 MHz: 12 dB typical	
Input 3rd Order Intercept Point (out-of-band)	15 dBm typical in urban mode 30 dBm typical in congested mode	
Phase Noise	-110 dBc/Hz @ 10 kHz offset, typical	
Tuning Speed	1 millisecond typical	
Gain Control	>120 dB	
Tuning Resolution	1 Hz	
Detection Modes	Demodulation: AM, FM, CW, LSB, USB, SSB with DSP	
A/D Resolution	16 Bits	
Client Digital Interface	1 GbE	
Time Stamp Accuracy	50 nsec typical	
Internal Storage	32 GB SD	

Physical Characteristics		
Size	30.5 cm (12 in.) wide x 26.7 cm (10.5 in.) deep x 5 cm (2 in.) high	
IP Protection Level	IP67	
Input Voltage	12 -16 VDC	
Power	27 W typical	
Weight	4.5 kg (10 lbs.)	
Operating temperature	-30 to +55° C	
Relative humidity	5 to 95%	
Network Interfaces	Gigabit Ethernet (2G, 3G and 4G modems optional)	

Measurements and Functions		
BIST	Built-In-Self-Test	
ITU Measurements (Bandwidth, Frequency, Modulation, Field Strength, Direction Finding in multi-unit configuration)	Bandwidth Measurement per ITU R SM.443 Frequency Measurement per ITU-R SM.377 Modulation Measurement per ITU R SM.328 Field Strength per ITU R SM.378	
I&Q output time stamped for TDOA	TDOA Measurement	
Spectrum Occupancy (f1-f2 and channel) including spectrum display	Spectrum Occupancy per ITU R SM.1880	



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