TRANSCOM INSTRUMENTS
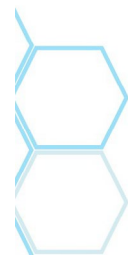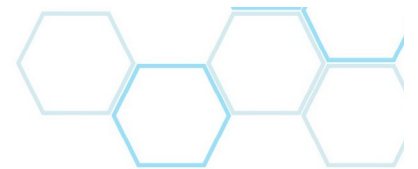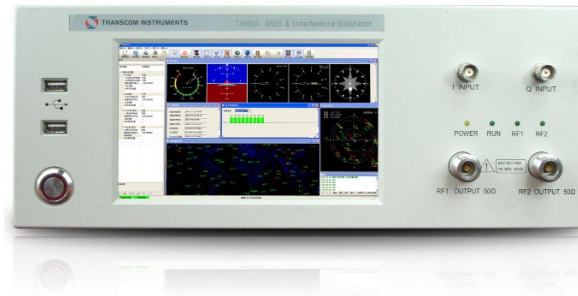## Product Brochure

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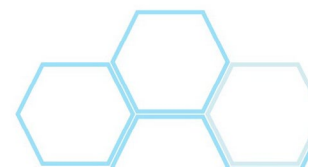
GNSS Signal & Interference Simulator T3900A

Overview

T3900A of TRANSCOM is equipped with two independent channels of signal output. The two channels can be respectively used to simulate the real-time Beidou/GPS/GLONASS system signals and generate simulation and digital modulation signals. Therefore, a solution with integration of real-time simulation of navigation signals and generation of suppressing interference signals and professional deception interference signals is provided for navigation product manufacturers, which can reduce the costs of research, development and production and improve the efficiency of testing and verification.

T3900A has the functions of constellation simulation, trajectory simulation, environment simulation, anomaly simulation and interactive simulation control, and can be used to simulate the satellite signal environment received by the receiver, based on the test scenes. The following items are defined in the test scenes: receiver location at the given time of simulation, motion state, satellite/constellation parameters, parameters of ionosphere and troposphere, multi-path, shade, interference and other kinds of environmental impact.

Excellent Tradition and Performance

TRANSCOM focuses on the wireless communication and RF microwave test instruments, and has the independent brands and a series of core patented technologies of wireless communication and RF microwave test instruments. It is a state-level high-tech enterprise and one of Shanghai "Little Giant" Enterprises, engaged in research, development, production and sales and with independent intellectual property rights. It has undertaken a number of development tasks of major subjects of the "new generation of broadband wireless mobile communication network" and construction tasks of Shanghai Research Center of Wireless Communication Test Instrument Engineering Technology.

The Engineering Research Center of Satellite Navigation and Positioning Technology, affiliated to National University of Defense Technology, is professionally engaged in the engineering research and building of independent satellite navigation systems of China. It is a core research unit of China in Beidou navigation systems, satellite loads, ground motion control, application systems, etc., and a special expert team leader of major technology in China. It is leading in the navigation and positioning technology in China and has made significant contribution to building of independent satellite navigation systems.

T3900A is jointly developed by TRANSCOM and the 4th Institute of National University of Defense Technology, based on the broadband vector signal source platform. It supports Beidou/GPS/GLONASS system simulation. The 4th Institute of National University of Defense Technology is one of supporting institutes engaged in overall design, key technology development and engineering construction of the Beidou system of China. The Beidou navigation simulation technology is authoritative and widely applied in various military units and national and regional test centers, which guarantees that T3900A is professionally and technologically leading in the navigation signal simulation source field.

Powerful Combination and Two-In-One

It is an integrated signal simulation source which can output satellite navigation signals and interference signals at the same time. This is a kind of design concept for customers seeking affinity. T3900A is developed based on the signal and interference source requirements, and the simulator and interference source are simulated simultaneously by two channels to provide a complex and repeatable electromagnetic environment and a convenient channel for batch tests.

▌ Real-time navigation signal simulation

• Support the commonly used carrier of the Beidou/GPS/GLONASS system.

• Support the customization of test scenes and reciver trajectories.

• The scene and power can be adjusted rapidly to improve the test efficiency of production, research and development.

• The dual-channel technology has the powerful function of interference signal simulation.

• Support the sharing of interface protocols, facilitating system integration.

▌ Common vector signal generation

• High-performance RF continuous wave output (resolution: 250 kHz to 6GHz/0.01Hz).

• High-precision amplitude output (resolution: -110dBm to +15dBm/0.01dB).

• Wide modulation bandwidth (LTE-A 100MHz and 802.11ac 160MHz).

• Analog modulation and pulse modulation such as AM, FM and PM.

• Digital modulation such as BPSK, QPSK, 16QAM, 64QAM and ASK.

• 3GPP LTE signal.

Various Application Scenes

T3900A has the functions of constellation simulation, trajectory simulation, environment simulation, anomaly simulation, interference modulation and interactive simulation control. It can not only be used to simulate the Beidou satellite signal environment received by the receiver, based on the test scenes, but also can simulate challenging true scenes, including weak signal conditions, strong interference conditions and highly dynamic and multi-path interference, so as to test the receiver performance in the extreme environment. The simulator can also be used to simulate the anomaly of the satellite navigation system to test the receiver performance in the wrong environment and provide powerful support for research, development and production of receivers.

T3900A has a wide range of frequency coverage and power regulation and can be used to simulate various kinds of suppressing and deception interference, continuous wave signals, frequency sweep signals, analog/digital modulation signals, broadband noise and custom interference. The interference mode of suppression first and then deception can be perfectly fitted with actual field interference applications, and plays an important role in the interference test, unattended monitoring, major activity guarantee, electronic countermeasure, etc.

Frequency	
Frequency Range	10MHz ～ 4GHz
Minimum Frequency	10MHz
Resolution	0.01Hz

Frequency Switch Time	
Continuous-wave Mode	ALC on ≤ 10ms ALC off ≤ 100μs
Sweep Mode	≤10ms
Digital Modulation Mode	≤10ms

Reference Clock			
Internal Clock Accuracy	Aging		<±2×10-8/year
	Resolution		<5×10-8
	Temperature Effect		<±3×10-9/year (-40℃～ +80℃)
	Line Voltage Effect		<±0.3×10-9/year （±5% change）
Internal Reference Output	Frequency		10MHz
	Amplitude		+2dBm ～ +6dBm
	Impedance		50Ω
	Waveform		sin
External Reference Input	Input Frequency		10MHz
	Input Amplitude		-3dBm ～ +10dBm
	Input Impedance		50Ω
	Waveform		sin/square

Output Power	
Power Range	-110 ～ +15dBm
Resolution	0.01dB
Step Anttenuator	0 ～ 100dB，in 10dB step
Connector	N type，50Ω

Absolute Level Accuracy (continuous-wave mode,ALC open)			
	+15 ～ -60dBm	<-60 ～ -100dBm	<-100 ～ -110dBm
10MHz ～ 250MHz	±1.0dB	±1.2B	±1.5dB
>250MHz ～ 4GHz	±1.0dB	±1.2dB	±1.5dB
Absolute Level Accuracy (continuous-wave mode,ALC off)			
10MHz ～ 4GHz	±1dB		
Absolute Level Accuracy (digital I/Q mode,ALC open)			
300MHz ～ 4GHz	±1dB		

Standard Absolute SSB Phase Noise（dBc/Hz，CW 10dBm）			
Frequency	1kHz	10kHz	100kHz
249MHz	-115	-123	-127
250.1MHz	-133	-133	-139
500MHz	-130	-127	-131
1GHz	-117	-121	-124
2GHz	-111	-115	-119
3GHz	-107	-112	-117
4GHz	-105	-109	-115
6GHz	-100	-106	-113

I/Q Modulator External Input	
Bandwidth	100MHz
Input Drive Range	0.5V，50Ω

Internal I/Q Output

Impedance	50Ω，nominal value
Mode	singel ended or difference
Maximum Single Output Voltage	±0.5Vp-p
Bandwidth	0.1～100MHz
Common Mode I/Q Offset	0V

Baseband Generator

Channel Numbers	2[I+/I- and Q+/Q-]
Resolution	16 bit
Sampling Ratio	400MSa/s
RF Bandwidth	100MHz

Any Custom Modulation Mode

Modulation	QPSK
Symbol Rate	100ksps～100Msps
Filter Type	RRC filter
Data	random

LTE-TDD ACPR（≤2dBm）

Offset	Configuration	Frequency	Index
Adjacent 20MHz	20MHz	2.3GHz	-50dBc
Interval 40MHz			-50dBc

EVM Perfromance（Correction Function Off）

Format	LTE-TDD			
Modulation Mode	QPSK			
Modulation Rate	20MHz			
Frequency	300MHz～6GHz			
EVM Level	≤7dBm			
EVM	2.5 %			
Format	QPSK			
Modulation Rate	4Msps（RRC filter, α=0.25）		100Msps（RRC filter, α=0.25）	
Frequency	≤3GHz	≤6GHz	≤3GHz	≤6GHz
EVM Level	≤4dBm	≤4dBm	≤4dBm	≤4dBm
EVM	1.3%	2.0%	6.8%	7.5%

Navigation Signal Simulation

Selectable Frequency	BDS: B1 / GPS: L1 / GLONASS: R1 / GALILEO: E1
Signal Range	channel numbers(per carrier)：BDS 18 GPS/GLOANSS/GALILEO 12 multipath signal numbers(per carrier)：24
Dynamic	maximum speed ±120,000m/s maximum acceleration ±3,600 m/s2 maximum accelerated acceleration ±5,000 m/s3
Accurac	pseudo-range：±0.01m pseudo-range rate accuracy：±0.001m/s channel match：0.1ns
Signal Quality	in-band stray： -60dBc harmonic power: -40dBc
Signal Level	standard：-120dBm（CM signal）、-80dBm（high power signal） range：±20dB resolution：0.1dB accuracy：0.8dB

General	
Remote Programme	
Interface	LAN 1000BaseT LAN
Control Protocol	SCPI 1997.0
AC Power	220～240VAC, 50/60Hz, 300W
Operating Temperature	0～40℃
Storage Temperature	-10～55℃
Weight	≤20kg
Dimensions	176mm(H)×420mm(W)×520mm(L)
Front Panel Interface	
RF Output	N type (female)
I/Q Input	BNC input, 50Ω, maximum 1Vp-p
USB 2.0	
Back Panel Interface	
I/Q Output	BNC output, the analog I/Q modulation signal from internal baseband generator,impedance 50Ω,
AM	external AM input, BNC/50Ω
FM	external FM input, BNC/50Ω
Pulse	external pulse modulation input, BNC/50Ω, low level 0V, high level +1V。
REF IN	10MHz/50Ω, power range -3～+10dBm, sin or square
REF OUT	10MHz/50Ω, power +2dBm～+6dBm, sin
VGA	external display
USB(A)/ USB(B)	
LAN	support remote programme function

Keep innovating for excellence!

About Transcom

Shanghai Transcom Instrument Co., Ltd. (NEEQ: 831961), established in 2005, independently research and develop high-end radio frequency communication testing instruments and is a professional provider of overall testing solutions. Starting from 2009, Transcom, titled as National High-Tech Enterprise and the fostered enterprise by Shanghai Little Giant Project, has undertaken the tasks of development for National "New-Generation Broadband Wireless Mobile Communication Network" and the construction of Shanghai Engineering Research Center for Wireless Communication Testing Instruments.

In 2015, Transcom officially announced its new five-year development strategy "1+3". In detail, Transcom will continue to enhance its potential to be the national team for domestic wireless communication instruments, and develop security software for mobile communication network (network communication/data mining), wireless signal (spectrum monitoring/situation analysis) and Beidou navigation (signal monitoring for satellite navigation/mobile anti-jam verification platform). The strategy has now been implemented systematically with progressive achievements in Shanghai, Guangdong and other cities.

Keep innovating for excellence!

ISO9001   ISO14001

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