

# Economy Microwave Spectrum Analyzers

MS2717B MS2718B MS2719B

9 kHz to 7.1 GHz 9 kHz to 13 GHz

9 kHz to 20 GHz



# Advanced Spectrum Analysis for Manufacturing, R & D and General Purpose Testing

Manufacturing and design engineers face extraordinary pressure to ship lower cost RF and microwave components. Anritsu's new MS271xB Economy Microwave Spectrum Analyzers offer superior performance and advanced capabilities. Covering the 9 kHz to 7.1, 13 and 20 GHz ranges, the MS271xB family easily handles most RF and microwave spectrum analyzer needs. The hallmark of the MS271xB family is the exceptional phase noise performance. The superior dynamic range of 100 dB means fast and precise testing of wireless components that require exceptional linearity. As shown in the following table, the wide 10 MHz demodulation bandwidth supports optional GSM, CDMA, W-CDMA, W-CDMA/HSDPA, EVDO, WiMAX and TD-SCDMA measurements. Best of all, the MS271xB family is ergonomically designed so controls are easy-to-learn and easy-to-use for improved productivity in manufacturing, R&D and general purpose testing.

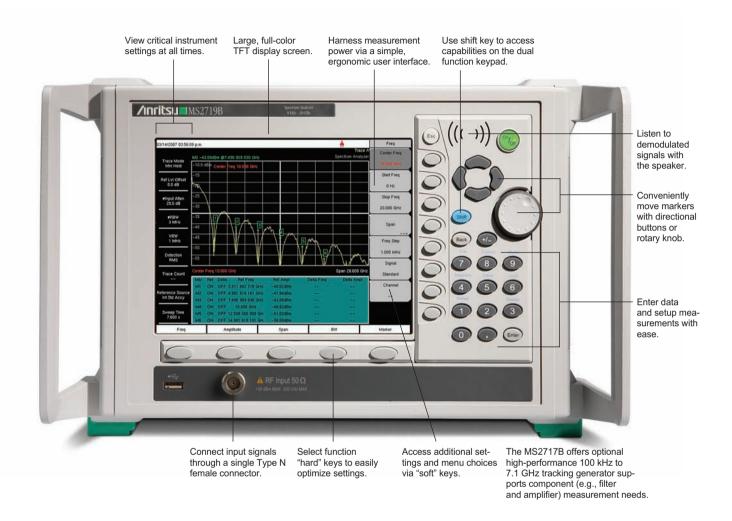
MOOZ-D Fil- Misselve - Onti-	Wireless Signal Analysis														
MS27xB-Family Wireless Options	GSM/ GPRS/EDGE W-CDMA/H			SDPA	CD	MA	EVDO		Fixed WiMAX		Mobile WiMAX		TD-SCDMA		
Options	40	41	44	45	65	42	43	62	63	46	47	66	67	60	61
RF Measurements	•		•			•		•		•		•		•	
Demodulation Measurements		•		•	•		•		•		•		•		•

With fifteen wireless protocol test options to choose from, the MS271xB Economy Microwave Spectrum Analyzer can enhance your test capabilities in production.

Don't let the small footprint fool you. These instruments are packed with performance and features designed to improve productivity, increase production yields, and lower cost-of-test. And now they can be enhanced with up to 15 wireless options for testing protocols from GSM to Mobile WiMAX. RF measurement and demodulation options for each protocol enable testing of both transmitter outputs and modulation quality for surprising versatility in the economy class of spectrum analyzers. Whether you're involved with testing in manufacturing, R&D, or service, you'll find they deliver advanced spectrum analysis with outstanding value.

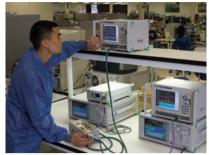
Feature	Benefit
Three models offering 9 kHz to 7.1, 13, and 20 GHz frequency ranges	Embrace most of the wireless communications and defense RF and Microwave testing needs.
Wide, 100 dB dynamic range	Enables faster testing of wireless components that require exceptional linearity
Excellent spectral purity, with typical phase noise of –110 dBc/Hz at 10 kHz offset (MS2717B)	Increased repeatability and throughput of local oscillator testing
Wide, 10 MHz demodulation bandwidth supports fifteen wireless test options	Reduce cost-of-test in production of wireless RF components
Ergonomically designed controls	Easy-to-learn and easy-to-use to optimize operator productivity
Surprisingly affordable price	Outstanding value for lowering cost-of-test and reducing capital equipment expenditures

# Introducing the MS271xB Economy Microwave Spectrum Analyzer Family



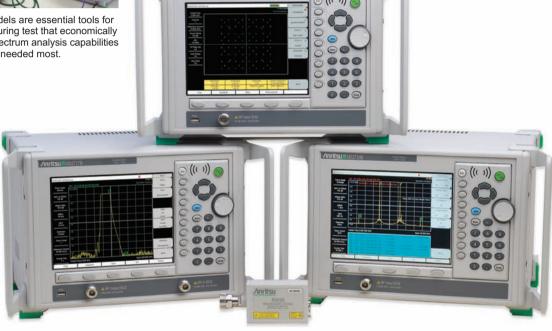
Feature	Benefit
Light weight and small footprint	Operators can safely optimize working environments for maximum space
Large 8.4 inch full-color TFT display screen	At-a-glance results and instrument settings improve operator productivity
Type N female RF connector	Easy-to-connect with proven reliability in severe manufacturing environments
Soft keys, directional buttons and rotary knob	Tactile feedback enables precise control of instrument settings and measurement results
USB 2.0 (full-speed) connections and USB host connection	Supports Anritsu's PSN50 High Accuracy Power Sensors and USB Flash Drives
LAN and GPIB connections	Latest connections to networks and PCs for remote programming and transfer of data
Rear-panel BNC connectors for hookup of external trigger and timebase synchronization	Easily integrates into existing manufacturing environments
256 MB internal storage plus convenient external storage via the compact flash and USB interfaces	Store and easily access more than 4,000 traces and 4,000 measurement setups

### Manufacturing Environments Demand Economical Spectrum Analysis Solutions



The MS271xB models are essential tools for low-cost manufacturing test that economically deliver superior spectrum analysis capabilities at a time when it's needed most.

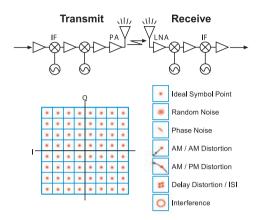
Manufacturing engineers in search of test solutions judge economy in terms of cost-of-test and cost-of-ownership. Other low-cost instruments sacrifice performance to slash cost-of-test of wireless RF components. No sacrifices are necessary with the MS271xB Economy Microwave Spectrum Analyzer Family. Production lines everywhere can upgrade their capabilities and lower their costs.



#### Here's a quick look at some of the manufacturing benefits:

Feature	Benefit
Rugged design, proven technology and room to upgrade	Lower cost-of-ownership with excellent reliability, ensuring minimal downtime on production lines
An input damage level of +43 dBm	Supports both infrastructure and mobile-device signal levels for nearly indestructible capabilities in manufacturing
Built-in 7.1 GHz Tracking Generator Option for the MS2717B.	Supports transmission measurements of components to over 100 dB dynamic range
Third-order intercept (TOI) to +12 dBm DANL (with preamp): -160 dBm, normalized to 1 Hz Low phase noise of -110 dBc/Hz at 10 kHz offsets Typical amplitude accuracy of ± 1 dB to 20 GHz	Lower cost-of-test with outstanding spectrum analysis performance that increases repeatability and offers increased margins for "money" specifications
Resolution bandwidths (RBWs) of 1 Hz to 3 MHz. When quasi-peak detector is selected, 200 Hz, 9 kHz, 120 kHz CISPR bandwidths are available	Lower cost-of-test by using superior dynamic range to increase resolution bandwidth and overall throughput
Eight built-in languages	Improves operator productivity anywhere by choosing popular local languages for the user interface
Modern connectivity, including LAN, GPIB, USB Host, and Compact Flash	Simplify storage, remote control, data transfer, and firmware upgrades

# Engineering Environments Require Advanced Capabilities and Flexibility



Higher data-rate transmit and receive designs utilize amplifiers, mixers, oscillators, and power amplifiers that can distort signals if not designed and manufactured to high standards.

With all of its measurement performance and capability, the MS271xB Economy Microwave Spectrum Analyzer Family is hardly limited to the production floor. General purpose test users throughout the world are facing increased bandwidths and data rates for systems with higher-order modulation formats using in-phase (I) and quadrature (Q) techniques. But even though competitive markets are demanding RF and microwave components for less, they must still provide high performance for these systems. And instrument makers are challenged to test and verify component performance faster and at lower costs. Fortunately, with its superior performance, engineers can precisely characterize their designs in terms of both spectral responses and transmitter quality using a single instrument. The same instrument used to validate design performance can simply and easily verify manufacturing performance. The advanced capabilities and affordable performance of the MS271xB Economy Microwave Spectrum Analyzers ensure a smooth transition from design to production, improving not only time-to-market but time-tovolume profitability.



#### Benefits for the R & D environment:

Feature	Benefit
Excellent dynamic range and phase noise performance	Precisely characterize linearity of active devices and performance of local oscillators
Superior spectrum and optional modulation analysis capabilities	Affordable instrumentation for general purpose or production recommendations in verifying linearity specifications
A total of 65 dB attenuation in 5 dB steps	Optimize dynamic range for best accuracy and overall throughput
Smart W-CDMA/HSDPA, WiMAX RF, and TD-SCDMA and demodulation measurements	One button measurements for accurate W-CDMA, WiMAX RF and TD-SCDMA and demodulator measurements
Total marker flexibility: 6 markers, 9 marker modes, and marker table display	Sophisticated marker functions offer flexible options to quickly extract measurement results
Save output displays in JPG file formats	Record displays in popular small file types for later presentation and distribution
Front Panel USB 2.0 Host connector	Supports PSN50 High Accuracy Power Sensors and USB Flash Drives

# Enhance Your Measurement Capabilities with Powerful Wireless Test Options

The MS271xB Economy Microwave Spectrum Analyzers are much more than a general purpose spectrum analyzers. The versatility to also perform specialized wireless tests in the R&D lab or on the production floor with a single instrument offers you an alternative to replace a much more expensive vector signal analyzer and spectrum analyzer setup. With these versatile measurement capabilities, the MS271xB family of spectrum analyzers satisfies the broad range of wireless protocol testing described in the following table.

MS271xB-Family Available Functional Tests by Option		Wireless Signal Analysis														
		GSM/GPRS/ EDGE		W-CDMA/HSDPA			CDMA		EVDO		Fixed WiMAX		Mobile WiMAX		TD-SCDMA	
Options		40	41	44	45	65	42	43	62	63	46	47	66	67	60	61
Options		RF	Demod	RF	Demod	Demod	RF	Demod	RF	Demod	RF	Demod	RF	Demod	RF	Demod
	Spectrum	•		•			•		•		•		•		•	
	Power vs. Time	•							•		•		•		•	
RF	ACLR/ACPR			•			•		•		•		•			
Measurements	Spectral Emission Mask			•												
	Spurious Emission						•		•							
	RF Summary	•		•			•		•		•		•		•	
	Code Domain Power (CDP), CDP Table				•	•		•		•						•
	Codogram				•	•										
	I/Q Constellation		•			•						•		•		
Demodulation Measurements	EVM vs Sub Carrier, EVM vs Symbol											•		•		•
	Spectral Flatness											•		•		
	DL-MAP													•		
	Demodulation Summary		•		•	•		•		•		•		•		
Pass/Fail Mode		•	•	•	•	•	•	•	•	•	•	•	•	•		•

The trend for higher data rates is increasing the sophistication of wireless protocols and the cost of the instruments that reveal their performance—until now. Wireless engineers and technicians can now support emerging protocols such as Mobile WiMAX, legacy systems such as GSM, and everything in between. We will simply amaze you with our stellar general purpose performance and easy-to-use measurement displays, especially when characterizing RF and modulation performance.

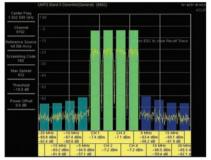
#### Check out these modulation analysis benefits:

Feature	Benefit					
Supports both Fixed and Mobile WiMAX	Comprehensive testing of emerging protocols lowers cost-of-test					
Optional support of most popular wireless protocols	Simplify training by using a single turnkey solution for testing everything between GSM and Mobile WiMAX					
Smart measurement displays that reveal the RF and modulation performance	Increase operator productivity with fewer keystrokes and insightful displays					
Wide 10 MHz capture bandwidth Typical residual ACLR of –60 dB (W-CDMA) Typical residual EVM of 2.5% (W-CDMA) True RMS detection	Use the general purpose spectrum analyzer to also conduct the specialized RF and modulation tests of wireless protocols					
Testing algorithms and displays that conform to industry standards	Accurately and quickly determine whether systems are operating within specification					
Pass/Fail testing	Simplify production with clear identification of pass/fail results next to measurement results and min/max thresholds					

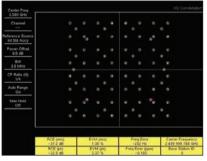
## RF and Modulation Measurements Rival Upper Class Spectrum Analyzers



The MG3700A Vector Signal Generator is a cost-effective companion for digital modulation performance testing in both R&D and production.



Automated Adjacent Channel Leakage Ratio (ACLR) measurements simplify complex setups.



Constellations of some demodulation signals are possible with the MS271xB.



Quickly verify performance using summary and pass/fail displays.

#### **Analyze Spectral Performance and Modulation Quality**

With fifteen wireless test options now available for the MS271xB family, you can extend your general purpose test performance to six common wireless systems; GSM/GPRS/EDGE, W-CDMA/HSDPA, CDMA, EVDO, TD-SCDMA and the new "last mile" functions of Fixed and Mobile WiMAX. Whether you want RF and/or modulation analysis, the MS271xB offers stellar general purpose performance and latest wireless capabilities. Truly an amazing value that you need to evaluate in order to believe!

#### **RF Measurements Characterize Wireless Spectral Performance**

The RF Measurements options organize the spectral measurements into easy-to-read results: spectrum, power versus time, power ratio, spectral emission mask, spurious emission, and RF summary. Use these automated displays to simplify setups, eliminate keystrokes, and decrease test times. For example, choose Adjacent Channel Leakage Ratio (ACLR) to observe main channel power as well as the power levels of adjacent channels according to industry standards; in fact, you can use this setup for multi-channel measurements up to four channels. These smart measurements can improve productivity and lower cost-of-test.

#### **Demodulator Measurements Analyze System Data Performance**

The MS271xB family provides the demodulation tools to precisely evaluate the modulation quality of your wireless system technologies: code domain power, codogram, constellation, error vector magnitude (EVM), and demodulation summary. For example, choose constellation to observe demodulation data symbols over one frame. For WiMAX, the constellation is color coded to show QPSK, 16-QAM, and 64-QAM. With the demodulation options of the MS271xB family, you now have the power to comprehensively measure modulation quality factors to ensure the highest quality of voice and data traffic.

#### Pass/Fail Display Provides Comprehensive Test Results at a Glance

Replace operator-intensive compliance testing with the MS271xB's automated PASS/FAIL mode. After selecting one of the available test models, an operator can view a test summary with clear PASS/FAIL indications, min/max thresholds, and actual measurement results. In addition, use Master Software Tools to create and download a custom test list into the unit. The clear and concise summary feedback allows an operator to quickly determine wireless system compliance or isolate problematic performance areas for further diagnostic testing.

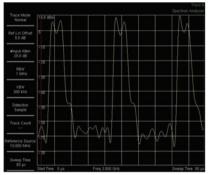
# Characterize your Microwave Signals for a Wide Variety of System Technologies



A fast switching signal simulator like the MS37020A Signal Generator gives the microwave engineer a powerful test bench.

#### Microwave Signals Need High Performance Measurements

The microwave frequency region to 20 GHz is populated with an amazing diversity of systems working in critical applications and transmission technologies. Engineers find themselves working on all types of radar systems, satellite and terrestrial communications, and aerospace and defense electronics. In all these systems, engineers depend on exploiting the best RF transmission and modulation performance to achieve their strategic purpose. Equally important is the spectrum analyzer, typically better in performance than their application, chosen to verify that system parameters are operating within specification in both R&D and production environments. Usually this additional performance commands a premium that is beyond normal capital equipment budgets. Until now!



Observe performance of defense electronic signals, such as pulse signals, using zero span mode and markers with time readout.

### **Economical Solution Delivers Surprising Performance for Demanding Microwave Tests**

Anritsu's MS271xB family of Economy Microwave Spectrum Analyzers is ideally suited for testing sophisticated microwave system signals. With an attractive blend of price and performance, the MS271xB offers features and specifications normally found only on higher performing spectrum analyzers. For example, a typical dynamic range of 100 dB allows simultaneous measurement of both large and small signals in intermodulation distortion measurements. With typical spectral purity of -110 dBc/Hz at 10 kHz offset, the MS271xB now permits affordable evaluation of your most challenging local oscillator specifications. These are just the highlights of the most popular measurements capabilities of the MS271xB Economy Microwave Spectrum Analyzer.

#### Benefits for general purpose microwave measurements:

Feature	Benefit
Choose 7.1, 13.0 or 20 GHz models	Models correspond to popular microwave frequency ranges
Excellent RF & microwave specifications	Surprisingly affordable spectrum analyzer performance for most general purpose applications
Feature rich spectrum analysis	Increase operator productivity with fewer keystrokes and insightful displays
Ethernet connectivity for remote control	Automate repetitive tasks in production to lower cost-of-test of frequently performed microwave measurements
Attractive blend of price and performance	Outstanding value to replace premium with economy instruments
Combine with an Anritsu ideal microwave signal generator for added value	High performance microwave setup offers accurate and repeatable test for demanding microwave tests

### Software-Aided Spectrum Analysis

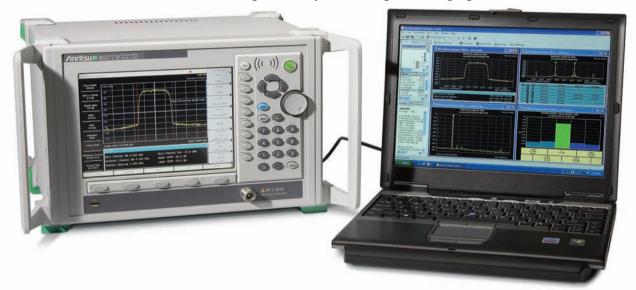
#### **Phase Noise Measurement Software**

Phase Noise Measurement, Part Number 2300-517, provides displays of Single-Sideband Phase Noise versus Frequency Offset with a logarithmic frequency axis. Marker functions provide Integrated noise in seconds, degrees, or Hz.

### Enlist Master Software Tools and a PC for expanded measurement functionality

Each instrument ships with a test assistant: a copy of Anritsu's Master Software Tools™ for Windows® 2000/XP. This allows an operator to add the processing capabilities of a PC and this software to the MS271xB Economy Microwave Spectrum Analyzers to form a powerful and flexible measurement solution.

Download a new LabVIEW® instrument driver to automate repetitive tests using an industry standard high-level language.



#### Benefits of Master Software Tools with the MS271xB Economy Microwave Spectrum Analyzers:

Feature	Benefit
Powerful data management tool for storing and sifting through measurement results	Simple-to-learn software transfers, manages, prints and archives displays and setups
Store an unlimited number of setups, traces and JPEGs (limited only by PC memory)	Develop libraries of frequently used setups and typical results
Overlay traces and further optimize displays	Easy post-processing capabilities offer versatility to further optimize results
Add, edit, and manage limit lines using Master Software Tools	Powerful Pass/Fail assistant
Connect to a PC using Ethernet LAN or Direct Ethernet	Flexible connectivity ensures an easy connection to the Economy Microwave Spectrum Analyzer
Update with the latest firmware	Easily access and upgrade with the newest features from www.us.anritsu.com

LabVIEW® is a registered trademark of National Instruments Corporation.

### MS271xB Economy Microwave Spectrum Analyzer Specification Summary (see the MS271xB Family Technical Data Sheet for complete specifications)

Frequency	
Frequency Range	MS2717B 9 kHz to 7.1 GHz; MS2718B 9 kHz to 13.0 GHz; MS2719B 9 kHz to 20.0 GHz
Tuning Resolution	1 Hz
Frequency Span	10 Hz to full frequency range plus 0 Hz (zero span)
Resolution Bandwidth	(-3 dB width) 1 Hz to 3 MHz in 1-3 sequence ±10%
Video Bandwidth	(-3 dB) 1 Hz to 3 MHz in 1-3 sequence
SSB Phase Noise	-100 dBc/Hz max at 10, 20 & 30 kHz offset from carrier -102 dBc/Hz max at 100 kHz offset from carrier
Demodulation Bandwidth	10 MHz
Amplitude	
Measurement Range	DANL to +30 dBm
Maximum Continuous Input	10 dB attenuation, +30 dBm, ±50 VDC
Interfaces	Type N female RF Connector BNC female connectors for external reference and external trigger RJ45 connector for Ethernet 10/100-Base T USB 2.0 (full-speed) Compact Flash 2.5 mm 3-wire cellular headset connector USB 2.0 Host connector used with PSN50 High Accuracy Power Meter and USB Flash Drives
Power Requirements	90 to 250 VAC, 47-63 Hz, 35 VA maximum
Size	14.7 x 9.6 x 13.4 in. (372 x 242 x 339 mm)
Weight	< 12 lbs. (5.6 kg) typical

### **Ordering Information**

#### **Ordering Information**

All models include standard 1 year warranty plus Certificate of Calibration and Conformance

MS2717B Economy Microwave Spectrum Analyzer

9 kHz to 7.1 GHz, including preamplifier

MS2718B Economy Microwave Spectrum Analyzer

9 kHz to 13.0 GHz, including preamplifier

MS2719B Economy Microwave Spectrum Analyzer

9 kHz to 20.0 GHz, including preamplifier

**Options** 

MS271xB-001 Rack Mount (No Slides)
MS271xB-007 Secure Data Operation

MS271xB-009 RF and Demodulation Hardware

MS271xB-017 GPIB Interface

MS271xB-019 High Accuracy Power Meter Functionality
MS2717B-020 Tracking Generator (MS2717B only)

MS2718B-089 IF Output MS2719B-089 IF Output

**Calibration Options** 

MS271xB/98 Z540/ISO Guide 25 Calibration

MS271xB/99 Premium Calibration

Wireless Options (require Option 009)

MS271xB-040 GSM/GPRS/EDGE RF Measurements MS271xB-041 GSM/GPRS/EDGE Measurements

MS271xB-042 CDMA RF Measurements

MS271xB-043 cdmaOne and CDMA2000 1xRTT Demodulator

MS271xB-044 W-CDMA/HSDPA RF Measurements

MS271xB-045 W-CDMA Demodulator

MS271xB-046 Fixed WiMAX RF Measurements
MS271xB-047 Fixed WiMAX Demodulator
MS271xB-060 TD-SCDMA Measurements
MS271xB-061 TD-SCDMA Demodulator
MS271xB-062 EVDO RF Measurements
MS271xB-063 EVDO Demodulator

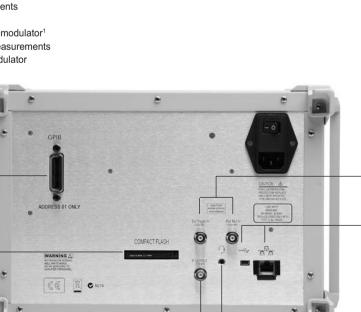
MS271xB-065 W-CDMA/HSDPA Demodulator<sup>1</sup>
MS271xB-066 Mobile WiMax RF Measurements
MS271xB-067 Mobile WiMax Demodulator

1: Option 065 includes Option 045

Lightweight: 5.6 kg
Small footprint:
372 x 242 x 339 mm

**GPIB** Interface

Use higher capacity compact flash cards to increase storage capacity for traces and setups.



IF Output-



10580-00181 Anritsu User's Guide, Models MS271xB

3-2000-1498 USB A-mini B cable 2000-1371 RJ45 Ethernet Cable 3-2000-1500 256 MB Compact Flash 2000-1520-R 2 GB USB Flash Drive

1091-27 Type-N male to SMA Female Adapter 1091-172 Type-N male to BNC Female Adapter

**Optional Accessories** 

PSN50 High Accuracy Power Sensor
MA24106A USB Power Sensor, 50 MHz to 6 GHz
760-244-R MS271xB Transit Case (includes wheels)

Literature

10580-00181 Anritsu User Guide, Models MS271xB

10580-00182 Anritsu Programming Manual, Models MS271xB

11410-00417 MS271xB Family Technical Data Sheet

Software

2300-498 Master Software Tools CD ROM

2300-517 Phase Noise Software CD ROM and Key

Rear-panel female BNC connectors for an external reference source and external trigger.

Simple PC and network hookups with a five-pin Mini-B USB 2.0 port and an Ethernet 10/100 Base-T local area network (LAN) RJ45 connector.

Popular 2.5 mm

3-wire cellular headset connector for listening to demodulated signals.



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