

Version
01.00March
2006

Signal generators and spectrum analyzers go for TD-SCDMA (3GPP TDD LCR)

Time Division Synchronous CDMA (TD-SCDMA) was proposed by China Wireless Telecommunication Standards group (CWTS) and approved as a 3G technology by ITU in 1999. When it comes to evaluating components, power amplifiers, digital baseband receiver chips and RF receivers in user equipment and base stations, Rohde & Schwarz offers the ideal package containing a signal generator and a spectrum analyzer. Generation and analysis can be performed on realtime, fully coded (transport and physical layer) TD-SCDMA (3GPP TDD LCR) signals.

TD-SCDMA signals can be generated by different types of signal generators such as the R&S®SMU, R&S®SMJ and R&S®SMATE. Depending on your application (see below), you can install the R&S®SMx-K50 option or a combination of R&S®SMx-K50 and R&S®SMx-K51 on the appropriate signal generator.

R&S®SMU-K50 TD-SCDMA (3GPP TDD LCR)

- ◆ Simulation of up to four TD-SCDMA cells (offline via the ARB)
- ◆ Uplink and downlink
- ◆ Variable setting of switching points between uplink and downlink
- ◆ Downlink and uplink pilot timeslot
- ◆ User-selectable channel table for each of the seven slots
- ◆ Generation of all channel types defined in the standard (HSDPA with R&S®SMU-K51) at the physical level
- ◆ Simulation of PRACH
- ◆ QPSK and 8PSK modulation
- ◆ Slot format, spreading factor, spreading code and user data selectable for each code channel
- ◆ Display of code domain of each slot
- ◆ Realtime clipping to limit crest factor

R&S®SMU-K51 enhanced features and HSDPA for TD-SCDMA

- ◆ Realtime signal generation for P-CCPCH and several DPCHs
- ◆ Channel coding of reference measurement channels RMC 12.2 kbps to RMC 2048 kbps
- ◆ Channel coding of BCH with consecutive system frame number
- ◆ Simulation of HSDPA channels
- ◆ Channel coding of HSDPA reference measurement channels
- ◆ Bit and block error insertion

Spectral measurements	R&S®SMU-K50	R&S®SMJ-K50	R&S®SMATE-K50
Single carrier	✓	✓	✓
Multicarrier with baseband	✓	✓	✓
Multicarrier with second RF in one box	✓	–	✓

Receiver ¹⁾ characteristics	R&S®SMU-K50 + R&S®SMU-K51	R&S®SMJ-K50 + R&S®SMJ-K51	R&S®SMATE-K50 + R&S®SMATE-K51
RMC with BER/BLER insertion	✓	✓	✓
RMC with extra fading option	✓	–	–
Reference sensitivity level	✓	✓	✓
Dynamic range	✓	✓	✓
Adjacent channel selectivity (ACS)	✓	✓	✓
Blocking characteristics	✓	(✓)	✓
Intermodulation characteristics	✓	(✓)	✓

¹⁾ The receiver tests above are an extract from the standard. For most of the receiver tests, the two-path concept of the R&S®SMU/SMATE is a major advantage (no synchronization problems or missing cabling).

Performance ²⁾ requirements (fading is an extra option)	R&S®SMU-K50 + R&S®SMU-K51	R&S®SMJ-K50 + R&S®SMJ-K51	R&S®SMATE-K50 + R&S®SMATE-K51
Demodulation in static propagation conditions	✓	(✓)	✓
Demodulation of DCH in multipath fading conditions	✓	–	–
Demodulation of DCH in moving propagation conditions	✓	–	–
Demodulation of DCH in birth/death propagation conditions	✓	–	–

²⁾ The performance tests above are an extract from the standard. For all performance tests, the two-path concept of the R&S®SMU with internal fading is a major advantage (one-box solution).

TD-SCDMA signal analysis capabilities can be installed on any R&S® FSU/FSP or R&S® FSQ. The R&S® FS-K76 option provides the functionalities for base station testing, and the R&S® FS-K77 option allows measurement on user equipment. All functions are available in manual operation or via remote control.

R&S® FSU/FSQ/FSP

- ◆ Code domain power and modulation quality measurement
 - Error vector magnitude (EVM)
 - Peak code domain error (PCDE)
- ◆ Power versus slot
- ◆ Power versus symbol
- ◆ Automatic detection of active channels, their modulation format and data rate
- ◆ Spectrum emission mask
- ◆ Adjacent-channel leakage ratio (ACLR)
- ◆ ACLR measurements in time domain (fast ACLR) for reduced test time
- ◆ Display of demodulated bits
- ◆ Composite constellation diagram
- ◆ Symbol constellation diagram
- ◆ Measurement of I/Q offset and I/Q imbalance
- ◆ Full remote-control capability

Measurement	R&S® FSU/FSP/FSQ	R&S® FSU/FSP/FSQ with R&S® FS-K76	R&S® FSU/FSP/FSQ with R&S® FS-K77
Maximum output power	✓	✓	✓
Frequency error	–	✓	✓
P-CCPCH power	–	✓	N/A
Power control dynamic range	–	✓	✓
Total power dynamic range	–	✓	✓
Occupied bandwidth	✓	✓	✓
Spectrum emission mask	–	✓	✓
ACLR	✓	✓	✓
Spurious emissions	✓	✓	✓
ρ	–	✓	✓
Error vector magnitude	–	✓	✓
Peak code domain error	–	✓	✓
Power versus time	–	✓	✓

More details about signal generators and spectrum analyzers at www.rohde-schwarz.com.

Ordering information

TD-SCDMA options for the Signal Generators R&S®SMU, R&S®SMJ or R&S®SMATE

Designation	Type	Order No.
Digital Standard TD-SCDMA	R&S®SMU-K50	1161.0966.02
Enhanced TD-SCDMA	R&S®SMU-K51	1161.1062.02
Digital Standard TD-SCDMA	R&S®SMJ-K50	1404.1660.02
Enhanced TD-SCDMA	R&S®SMJ-K51	1404.1760.02
Digital Standard TD-SCDMA	R&S®SMATE-K50	1404.7100.02
Enhanced TD-SCDMA	R&S®SMATE-K51	1404.7200.02

TD-SCDMA options for the Spectrum Analyzers R&S®FSQ, R&S®FSU or R&S®FSP

Designation	Type	Order No.
TD-SCDMA Base Station Test Application Firmware	R&S®FS-K76	1300.7291.02
TD-SCDMA Mobile Station Test Application Firmware	R&S®FS-K77	1300.8100.02



More information at
www.rohde-schwarz.com
(search term: TD-SCDMA)



www.rohde-schwarz.com

Europe: +49 1805 12 4242, customersupport@rohde-schwarz.com
USA and Canada: 1-888-837-8772, customer.support@rsa.rohde-schwarz.com
Asia: +65 65130488, customersupport.asia@rohde-schwarz.com