

Signal Generators R&S®SMx

WLAN 802.11: Signals for development, production and service

WLAN is an established radio technology for the wireless networking of computer systems based on the IEEE 802.11 standard. Virtually every modern PC or notebook supports this standard. With the new R&S®SMU-K48 option, signal generators of the R&S®SMx family with firmware version 1.35 or later can generate IEEE 802.11-conforming WLAN signals without requiring an external PC.

More information and data sheet at www.rohde-schwarz.com (search term: SMU)

The Signal Generators R&S®SMx are ideally complemented by the high-end Signal Analyzer R&S®FSQ including the R&S®FSQ-K90 / -K91 WLAN options (see page 40). Rohde & Schwarz thus offers a single-source, all-in-one solution on the WLAN T&M market.

All-in-one WLAN solutions

Rohde & Schwarz has been offering T&M technology for WLAN applications for some time. In particular, Simulation Software R&S WinIQSIM™ has proven to be a successful tool for generating WLAN signals. The software runs on an external PC, which controls the arbitrary waveform memory of a signal generator, e. g. the R&S®AMIQ or a generator of the R&S®SMx family.

With the new R&S®SMU-K48 option, the Signal Generators R&S®SMU200A, R&S®SMJ100A and R&S®SMATE200A with firmware version 1.35 or later can now generate IEEE 802.11-conforming WLAN signals without requiring any external equipment.

WLAN tests made easy

With an R&S®SMx generator, you can create WLAN test signals for IEEE 802.11 receiver tests in just a couple of steps. The generators support the standards 802.11a (OFDM with up to 54 Mbit/s) and 802.11b (DSSS CCK / PBCC modulation with up to 11 Mbit/s) in the physical layer (PHY incl. PLCP sublayer) and the MAC layer, and in addition 802.11g, which may be regarded as a combination of the two aforementioned standards.

A two-path R&S®SMU200A can also supply OFDM-modulated interference signals, which is vital to determining adjacent-channel rejection by means of only one instrument. An AWGN module (option R&S®SMU-K62) adds channel noise that is as precise as required for this measurement. More-

over, the optional Fading Simulator R&S®SMU-B14 allows you to perform tests under fading conditions.

The generators offer predefined test settings (predefined frames, FIG 1), but also allow you to configure the wide variety of WLAN parameters in as much detail as required for your application. You can set the transmission rate in steps from 1 Mbit/s to 54 Mbit/s, and select a packet size up to 4095 bytes. Moreover, packets can be assigned any desired data contents – from standard pseudo-random sequences and configurable patterns up to user-definable data lists. Scrambler and interleaver stages can also be controlled (FIG 2). You can define a MAC header as well as an optional frame check sequence (FCS) (FIG 3). You can even configure the sequence control parameters to simulate packet retransmission.

Full remote control capability

With automatic test systems, remote control capability of your signal generator is of vital importance. SCPI commands are available for all WLAN signal parameters; the R&S®SMx generators are, therefore, fully remote-controllable via an IEC bus (IEEE 488) or LAN (VXI-11, TCP/IP) and thus an ideal choice not only for applications in development and service but also for use in production.

Markus Höck

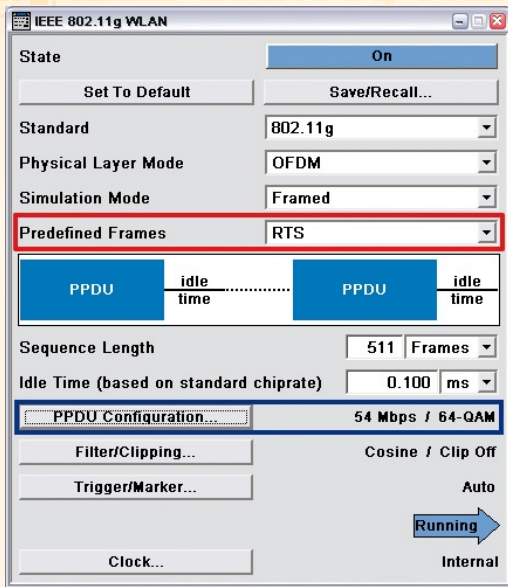
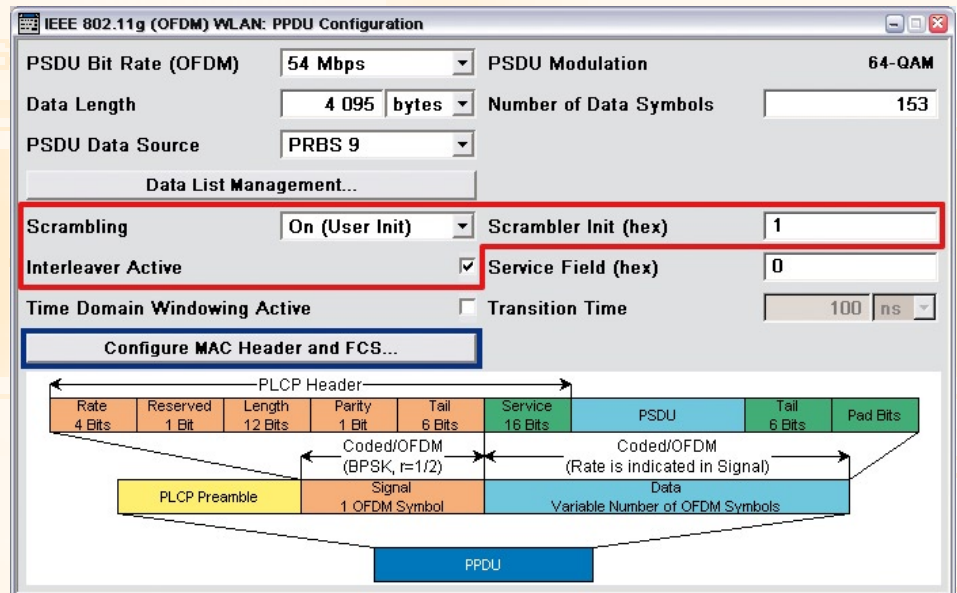


FIG 1 IEEE 802.11 WLAN standard main menu of the R&S®SMU200A.

Abbreviations

AWGN	Additive white Gaussian noise
CCK	Complementary code keying
DSSS	Direct sequence spread spectrum
FCS	Frame check sequence
IEEE 802.11a	WLAN specification, OFDM with up to 54 Mbit/s in 5 GHz band
IEEE 802.11b	WLAN specification, DSSS CCK/PBCC modulation with up to 11 Mbit/s in 2.4 GHz band
IEEE 802.11g	WLAN specification, OFDM and DSSS CCK/PBCC modulation with up to 54 Mbit/s in 2.4 GHz band
MAC	Medium access control layer
OFDM	Orthogonal frequency division multiplexing
PBCC	Packet binary convolutional coding
PHY	Physical layer
PLCP	Physical layer convergence protocol
PPDU	PLCP protocol data unit

FIG 2 PPDU frame packet configuration menu.



Options for the R&S®SMx generators for testing WLAN applications.

R&S®SMU-K48	Digital Standard IEEE WLAN 802.11 (a/b/g)
R&S®SMU-K62	Additive White Gaussian Noise (AWGN)
R&S®SMU-B14	Fading Simulator
R&S®SMU-B203	RF Path B, 100 kHz to 3 GHz

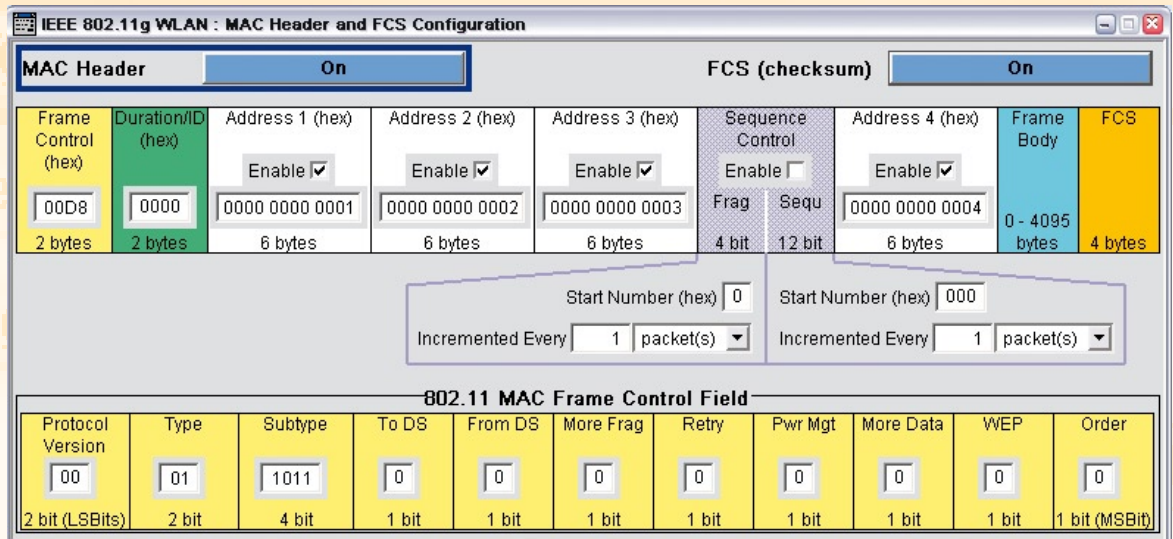


FIG 3 MAC header and FCS configuration menu.