SLM900(model name)
Operational Description

For WWAN

The equipment under test (EUT) is the smart module of Model SLM900(Model name). It supports Triple-bandGSM/GPRSsolution(GSM850 ,PCS1900),GPRS/EDGE Class 12 Triple-band UMTS (B2,B4,B5)HSDPA（Category 24）,HSUPA（Category 6）also supportsIEEE802.11a/b/g/n/ac，Bluetooth version2.1+EDR,BT3.0+EDR,BT5.0,GPS operating frequency is 1.57542GHz.

The equipment under test (EUT) is the transmitter of SDR660, It supports LTE Band 2/4/5/7/12/13/17/25/26, Release 10,Cat 4 and not support CA.

The module use Qualcomm's SDM660 chip which include Digital Baseband controller, Analog Baseband controller and Modem Processing subsystems; The PMIC is PM660 Chip; the UMTS and LTE Power Amplifier Modules are SKY77638-11, and SKY77912-61,respectively.

The remainders of the major radio components are the SAW filters, and crystal. There is also a combination PCM memory IC and other peripherals such as BT, and etc.. The system is powered by a rechargeable lithium-ion battery with a nominal voltage of 3.8 volts. The 38.4MHZsystem clock is generated by a 38.4MHz TCXO via PM660's clock Buffer, then connect to SDM660 Chip.

The Qualcomm device incorporates the UMTS/LTE technology — the technology for RF transceivers(SDR660) that converts received signals directly from RF-to-baseband and transmits signals directly from baseband-to-RF (known as direct conversion or zero intermediate frequency (ZIF) processing). This technique eliminates the need for large IF surface acoustic wave (SAW) filters and supporting IF and LO circuits, thereby reducing the handset parts count and facilitating multiband, multimode handsets that can be produced in smaller form factors.

RF transmitter
The RF transmitters are capable to perform as well as UMTS and HSPAmodulation signals with excellent noise performance, thus no interstate filter in between transceiver and PA is required:
   Triple-band UMTS, with one low band and two high bands selected from:
   Low band
Band 5 (826 to 836 MHz)
  High band
Band 2 (1852 -1907 MHz)
Band 4 (1712 -1752 MHz)

   Triple-band GSM
Low band
– GSM 850 (824 to 849 MHz)
   High band
– PCS 1900 (1930 to 1989 MHz)

LTE Band 2/4/5/7/12/13/17/25/26
– Band 2 (1850-1910 MHz)
– Band 4 (1710 -1755MHz)
– Band 5 (824 - 849 MHz)
– Band 7 (2500 - 2570 MHz)

–Band 12 (699-716MHz)
–Band 13 (777-787 MHz)
–Band 17 (704-716 MHz)
–Band25 (1820-1915 MHz)
Band26 (814-849 MHz)

The transmit signal paths include a shared set of baseband amplifiers, a dedicated quadrature upconversion for each band type (low and high), gain control RF amplification, and multiple output driver amplifiers for each band type. Three UMTS output drivers support one low band and Two high bands; LTE support Bands:2/4/5/7/12/13/17/25/26;

Numerous secondary Tx functions are also integrated: a reference for the transmit DACs, the Tx phase-locked loop (PLL), the Tx local oscillator circuit, the Tx LO generation and distribution circuits, an RMS Tx power detector, and various interface, control, and status circuits.

The RF transmitter interfaces internally with the baseband circuits for its analog baseband input and status and control signaling. Power reduction features controlled by baseband circuits (such as selective circuit powerdown, gain control, and transmit puncturing) extend handset talk time. The driver amplifier outputs are routed externally to the final stages of the transmit chains, culminating with the antenna switch whose output drives the antenna. Sophisticated Tx LO circuits implement the frequency plan and are completely integrated on-chip. All Tx LO signals are generated by the on-chip Tx local oscillator under the control of its PLL.

RF receivers

For the main RX section the IC features7 RX inputs, which can be used for multi-mode receive, this means they can be used for LTE and UMTS according to the operating bands for each system.

Triple-band UMTS, with one low band and two high bands selected from:
– Low band
Band 5 (869-894 MHz)
High band
Band 2 (1932-1987MHz)
Band 4 (2112-2152MHz)

LTE Band 2/4/5/7/12/13/17/25/26:
— Band 2 (1930-1990 MHz)
– Band 4 (2110 -2155MHz)
– Band 5 (869 - 894 MHz)
– Band 7 (2620 - 2690 MHz)

–Band 12 (729-746MHz)
–Band 13 (746-756 MHz)
–Band 17 (734-746 MHz)
–Band25 (1930-1995 MHz)

Band26 (859-894 MHz)

The on-chip receive signal paths are functionally identical for each mode (UMTS or LTE) and each band type (low or high). The external circuitry includes the antenna switch module and a filter function, either a duplexer or a bandpass filter.

All RF Rx inputs use a single-ended configuration to maximize common-mode rejection, Tx isolation, out-of-band suppression, and second-order intermodulation performance.
The downconverters output drive analog baseband filters and buffer circuits that are programmed to support the active operating mode's waveforms (WCDMA or LTE). The analog baseband signals are then digitized by analog-to-digital converters (ADCs) whose outputs are routed to the digital baseband circuits for further processing.
Numerous secondary Rx functions are also integrated: Rx frequency synthesizers (each having their own PLL and local oscillator circuits), LO generation and distribution circuits, reference and clock circuits for the ADCs, and various interface, control, and status circuits. Power reduction features (such as selective circuit powerdown, gain control, and bias control) extend handset standby time.
Like the Tx LO, all Rx LO circuits are completely integrated. All received LO signals are generated by the on-chip Rx local oscillators under control of their PLLs.

For BT/WIFI
The 3-in-1 module WCN3980 integrates Bluetooth , WLAN and in one chip. The WLAN function follow IEEE 802.11a/b/g/n/ac standard. The Bluetooth function follow Bluetooth standard Bluetooth version 2.1+EDR,BT3.0+EDR,BT5.0.The function support receiver only.
WIFI:

WCN3980 supports 1/2/5.5/11/6/9/12/18/24/36/48/54 Mbps for WIFI2.4GHz b/g WIFI 5G a and MCS0~MCS7 for WIFI2.4G 5G n-20/40MHzof transmitting speed and operating frequency is2412MHz~2462MHz with 11 channels and 5180~5825MHZ with 25 channels.The device of RF carrier is DSSS (DBPSK / DQPSK / CCK) and OFDM (BPSK / QPSK / 16QAM / 64QAM).The device adapts direct sequence spread spectrum modulation.

WCN3980is an IEEE 802.11a/b/g/n/ac Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4/5G Hz Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency Division Multiplexing (OFDM) radio transmission,this device transfers data at speeds up to 64/128-bit Wired Equivalent Protection(WEP) algorithm and the new industrial-strength WPA (Wi-Fi Protected AccessTM) security is used. In addition, its standard compliance ensures that it can communicate with any 802.11a/b/g/n network.

BT:
The WCN3980chipset is compliant with Bluetooth Core Specification Version 2.1+EDR,BT3.0+EDR,BT5.0and provides excellent Bluetooth connectivity performance.

The WCN3980device consists of an core, a BT core, and system modules.
It processes with the GFSK, π/4-DQPSK, or 8DPSK modulation in both directions
The operating frequency is 2402MHz to 2480MHz with 79 channels.
WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.