A04856 Bluetooth and WiFi Theory of Operation

The EUT is a portable device that incorporates wireless data transfer using the WiFi, Bluetooth, and BLE protocols.

WI-FI
TRANSCEIVER: Synaptics BCM43456
MODULATION: 802.11 B/G/N(20,40)/AC(80)
CLOCKS: 26MHz
ANTENNA: Heat Stake (2.4MHz: 3.4dBi, 5GHz: 4.2dBi)
FREQUENCY: 2412 – 2462MHz, 5180 – 5240MHz, 5745 – 5805MHz
POWER SOURCE: 4.1VDC Li-ion battery / 5V external USB / 5V powered mount

BLUETOOTH/BLE
TRANSCEIVER: Synaptics BCM43456
MODULATION: GFSK, GMSK
CLOCKS: 26MHz
ANTENNA: Heat Stake (2.4MHz: 3.4dBi)
FREQUENCY: 2402 – 2480MHz
POWER SOURCE: 4.1VDC Li-ion battery / 5V external USB / 5V powered mount

The Transmitter IC has both transmit and receive capabilities. The IC receives several inputs and requires a 3.5 ~ 4.2V supply, a 1.8V I/O supply. The IC creates 1.35V via switching supply and 3.3V, 2.5V, and 1.2V supplies by internal LDO. The IC is supplied by a 26MHz TCXO input for operation and uses an internal PLL to generate a high frequency clocks (~2.4 and ~5GHz) for receiving and transmitting.

The 2.4GHz transmitting signal is amplified by the IC before being sent through pass band filter to reduce signal strength of spurious emissions. Both Bluetooth and 2.4GHz WiFi are multiplexed onto the same RF path. Bluetooth and 2.4GHz WiFi cannot transmit simultaneously. The transmitted RF signal then proceeds to the diplexer.

The 5GHz transmitting signal is amplified by the IC before being sent out to the diplexer. Both 2.4 and 5 GHz RF signals go through the diplexer and use the same antenna.

Antenna photos: