

Annex: Product Specification of Equipment Under Test

Product Specification	
Brand Name	CAT
Model Name	S31
GSM Operating Band(s)	GSM 850 / 1900 MHz
GPRS Multi-Slot Class	GPRS Class 33, EGPRS Class 33, DTM Class 11
WCDMA Operating Band(s)	FDD Band 2 / 4 / 5
WCDMA Release, Category	HSDPA Rel. 99, Cat. 24 / HSUPA Rel. 99, Cat. 6
LTE Operating Band(s)	FDD Band 2, Bandwidth: 1.4 M / 3 M / 5 M / 10 M / 15 M / 20 M FDD Band 4, Bandwidth: 1.4 M / 3 M / 5 M / 10 M / 15 M / 20 M FDD Band 5, Bandwidth: 1.4 M / 3 M / 5 M / 10 M FDD Band 7, Bandwidth: 5 M / 10 M / 15 M / 20 M FDD Band 12, Bandwidth: 1.4 M / 3 M / 5 M / 10 M FDD Band 17, Bandwidth: 5 M / 10 M
LTE Release, Category	Rel. 9, Cat. 4
Wi-Fi Specification	802.11b/g/n HT20
Bluetooth Version	Bluetooth v3.0 EDR , Bluetooth LE
Antenna Type / Gain	WWAN: PIFA + Coupling Type (LDS) Antenna GSM 850MHz: -0.84 dBi GSM 1900MHz: 1.17 dBi WCDMA: PIFA + Coupling Type (LDS) Antenna FDD Band 2: 1.17 dBi FDD Band 4: 0.26 dBi FDD Band 5: -0.84 dBi LTE: PIFA + Coupling Type (LDS) Antenna FDD Band 2: 1.17 dBi FDD Band 4: 0.26 dBi FDD Band 5: -0.84 dBi FDD Band 7: 1.27 dBi FDD Band 12: -3.43 dBi FDD Band 17: -3.43 dBi WLAN: PIFA Antenna WLAN 2400~2483.5MHz: 1.13 dBi Bluetooth: PIFA Antenna Bluetooth: 1.13 dBi GPS / Glonass / BDS: PIFA Antenna
Type of Modulation	GSM / GPRS: GMSK EGPRS: GMSK for MCS 0 ~ 4 & 8PSK for MCS5 ~9 WCDMA: QPSK (Uplink) HSDPA: 64QAM (Downlink) / HSUPA : QPSK (Uplink) CDMA 2000: QPSK LTE: QPSK / 16QAM Bluetooth: GFSK, $\pi/4$ -DQPSK, 8-DPSK WLAN 802.11b: DSSS (DBPSK / DQPSK / CCK) WLAN 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) GPS / Glonass / BDS: BPSK

Transmitter Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band 2: 1852.4 MHz ~ 1907.6 MHz WCDMA Band 4: 1712.4 MHz ~ 1752.6 MHz WCDMA Band 5: 826.4 MHz ~ 846.6 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz WLAN 802.11b/g/n: 2412 MHz ~ 2472 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Receiver Frequency Range	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band 2: 1932.4 MHz ~ 1987.6 MHz WCDMA Band 4: 2112.4 MHz ~ 2152.6 MHz WCDMA Band 5: 871.4 MHz ~ 891.6 MHz LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 7 : 2622.5 MHz ~ 2687.5 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz WLAN 802.11b/g/n: 2412 MHz ~ 2472 MHz Bluetooth: 2402 MHz ~ 2480 MHz GPS: 1.57542 GHz Glonass: 1602 MHz + $n \times 0.5625\text{MHz}$ ($n=-7,-6,-5,\dots,0,\dots,6$)