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## 2. Specification

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### 2-1. GSM General Specification

| Item                              |               | GSM 850                | EGSM 900               | DCS1800                | PCS1900                |
|-----------------------------------|---------------|------------------------|------------------------|------------------------|------------------------|
| Freq. Band[MHz]                   |               | 824~849                | 880~915                | 1710~1785              | 1850~1910              |
| Uplink/Downlink                   |               | 869~894                | 925~960                | 1805~1880              | 1930~1990              |
| ARFCN range                       |               | 128~251                | 0~124 & 975~1023       | 512~885                | 512~810                |
| Tx/Rx spacing                     |               | 45MHz                  | 45MHz                  | 95MHz                  | 80MHz                  |
| Mod. Bit rate/<br>Bit Period      |               | 270.833kbps<br>3.692us | 270.833kbps<br>3.692us | 270.833kbps<br>3.692us | 270.833kbps<br>3.692us |
| Time Slot Period/<br>Frame Period |               | 576.9us<br>4.615ms     | 576.9us<br>4.615ms     | 576.9us<br>4.615ms     | 576.9us<br>4.615ms     |
| Modulation                        | GSM/<br>EGPRS | GMSK/<br>8PSK          | GMSK/<br>8PSK          | GMSK/<br>8PSK          | GMSK/<br>8PSK          |
| MS Power                          |               | 33dBm~5dBm             | 33dBm~5dBm             | 30dBm~0dBm             | 30dBm~0dBm             |
| Power Class                       |               | 4(GMSK)<br>E2(8PSK)    | 4(GMSK)<br>E2(8PSK)    | 1(GMSK)<br>E2(8PSK)    | 1(GMSK)<br>E2(8PSK)    |
| Sensitivity                       |               | -102dBm                | -102dBm                | -100dBm                | -100dBm                |
| TDMA Mux                          |               | 8                      | 8                      | 8                      | 8                      |

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### 2-2. GSM Tx Power Class

| TX Power<br>control level | GSM850   | TX Power<br>control level | EGSM900  | TX Power<br>control level | DCS1800  | TX Power<br>control level | PCS1900  |
|---------------------------|----------|---------------------------|----------|---------------------------|----------|---------------------------|----------|
| 5                         | 33±2 dBm | 5                         | 33±2 dBm | 0                         | 30±3 dBm | 0                         | 30±3 dBm |
| 6                         | 31±2 dBm | 6                         | 31±2 dBm | 1                         | 28±3 dBm | 1                         | 28±3 dBm |
| 7                         | 29±2 dBm | 7                         | 29±2 dBm | 2                         | 26±3 dBm | 2                         | 26±3 dBm |
| 8                         | 27±2 dBm | 8                         | 27±2 dBm | 3                         | 24±3 dBm | 3                         | 24±3 dBm |
| 9                         | 25±2 dBm | 9                         | 25±2 dBm | 4                         | 22±3 dBm | 4                         | 22±3 dBm |
| 10                        | 23±2 dBm | 10                        | 23±2 dBm | 5                         | 20±3 dBm | 5                         | 20±3 dBm |
| 11                        | 21±2 dBm | 11                        | 21±2 dBm | 6                         | 18±3 dBm | 6                         | 18±3 dBm |
| 12                        | 19±2 dBm | 12                        | 19±2 dBm | 7                         | 16±3 dBm | 7                         | 16±3 dBm |
| 13                        | 17±2 dBm | 13                        | 17±2 dBm | 8                         | 14±3 dBm | 8                         | 14±3 dBm |
| 14                        | 15±2 dBm | 14                        | 15±2 dBm | 9                         | 12±4 dBm | 9                         | 12±4 dBm |
| 15                        | 13±2 dBm | 15                        | 13±2 dBm | 10                        | 10±4 dBm | 10                        | 10±4 dBm |
| 16                        | 11±3 dBm | 16                        | 11±3 dBm | 11                        | 8±4 dBm  | 11                        | 8±4 dBm  |
| 17                        | 9±3 dBm  | 17                        | 9±3 dBm  | 12                        | 6±4 dBm  | 12                        | 6±4 dBm  |
| 18                        | 7±3 dBm  | 18                        | 7±3 dBm  | 13                        | 4±4 dBm  | 13                        | 4±4 dBm  |
| 19                        | 5±3 dBm  | 19                        | 5±3 dBm  | 14                        | 2±5 dBm  | 14                        | 2±5 dBm  |
| -                         | -        | -                         | -        | 15                        | 0±5 dBm  | 15                        | 0±5 dBm  |

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### 2-3. WCDMA General Specification

|                                      | WCDMA2100(B1)                                | WCDMA1900(B2)                                | WCDMA850(B5)                                 | WCDMA900(B8)                                 | WCDMA1700(B4<br>LTE-ROW)                     |
|--------------------------------------|--|--|--|--|--|
| Freq.<br>Band[MHz]                   | 1920~1980                                    | 1850~1910                                    | 824~849                                      | 880~915                                      | 1710~1755                                    |
| Uplink/Downlink                      | 2110~2170                                    | 1930~1990                                    | 869~894                                      | 925~960                                      | 2110~2155                                    |
| ARFCN range                          | UL: 9612~9888<br>DL: 10562~10838             | UL: 9262~9538<br>DL: 9662~9938               | UL: 4132~4233<br>DL: 4357~4458               | UL: 2712~2868<br>DL: 2937~3088               | UL: 1312~1513<br>DL: 1537~1738               |
| Tx/Rx spacing                        | 190MHz                                       | 80MHz  | 45MHz  | 45MHz  | 400MHz                                       |
| Mod. Bit rate/<br>Bit Period         | 42.2Mbps(DL)<br>5.42Mbps(UL)                 | 42.2Mbps(DL)<br>5.42Mbps(UL)                 | 42.2Mbps(DL)<br>5.42Mbps(UL)                 | 42.2Mbps(DL)<br>5.42Mbps(UL)                 | 42.2Mbps(DL)<br>5.42Mbps(UL)                 |
| Time Slot<br>Period/<br>Frame Period | WCDMA<br>10ms/0.667ms<br>HSPA<br>2ms/0.667ms | WCDMA<br>10ms/0.667ms<br>HSPA<br>2ms/0.667ms | WCDMA<br>10ms/0.667ms<br>HSPA<br>2ms/0.667ms | WCDMA<br>10ms/0.667ms<br>HSPA<br>2ms/0.667ms | WCDMA<br>10ms/0.667ms<br>HSPA<br>2ms/0.667ms |
| Modulation                           | QPSK<br>16QAM<br>64QAM                       | QPSK<br>16QAM<br>64QAM                       | QPSK<br>16QAM<br>64QAM                       | QPSK<br>16QAM<br>64QAM                       | QPSK<br>16QAM<br>64QAM                       |
| MS Power<br>(dBm)                    | 25.7 ~ -49(↓)                                | 25.7 ~ -49(↓)                                | 25.7 ~ -49(↓)                                | 25.7 ~ -49(↓)                                | 25.7 ~ -49(↓)                                |
| Power Class                          | 3(max+24dBm)                                 | 3(max+24dBm)                                 | 3(max+24dBm)                                 | 3(max+24dBm)                                 | 3(max+24dBm)                                 |
| Sensitivity                          | dBm  | dBm  | dBm  | dBm  | dBm  |

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### 2-4. LTE General Specification

|   | LTE Band1                        | LTE Band2                        | LTE Band3                        | LTE Band4<br>LTE_BA1             | LTE Band5                        | LTE Band7                        |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Freq.<br>Band[MHz]                              | 1920~1980                        | 1850~1910                        | 1710~1785                        | 1710~1755                        | 824~849                          | 2500~2570                        |
| Uplink/Downlink                                 | 2110~2170                        | 1930~1990                        | 1805~1880                        | 2110~2155                        | 869~894                          | 2620~2690                        |
| ARFCN range                                     | UL:18000~18599<br>DL:0~599       | UL:18600~19199<br>DL:600~1199    | UL:19200~19949<br>DL:1200~1949   | UL:19950~20399<br>DL:1950~2399   | UL:20400~20649<br>DL:2400~2649   | UL:20750~21449<br>DL:2750~3449   |
| Tx/Rx spacing<br>(MHz)                          | 190                              | 80                               | 95                               | 400                              | 45                               | 120                              |
| Channel<br>Bandwidth<br>(MHz)                   | 5/10/15/20                       | 1.4/3/5/10/15/20                 | 1.4/3/5/10/15/20                 | 1.4/3/5/10/15/20                 | 1.4/3/5/10                       | 5/10/15/20                       |
| Modulation                                      | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) |
| MS Power<br>(dBm)                               | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                      |
| Sensitivity<br>(QPSK, BW<br>10MHz)<br><br>(dBm) |                                  |                                  |                                  |                                  |                                  |                                  |

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|   | LTE Band8                        | LTE Band12<br>LTE_BA1            | LTE Band13<br>LTE_BA1            | LTE Band17<br>LTE_BA1            | LTE Band20                       | LTE Band28                       |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Freq.<br>Band[MHz]                          | 880~915                          | 699~716                          | 777~787<br>746~756               | 704-716                          | 832-862                          | 703-748                          |
| Uplink/Downlink                             | 925~960                          | 729~746                          |                                  | 734-746                          | 791-821                          | 758-803                          |
| ARFCN range                                 | UL:21450-21799<br>DL:3450-3799   | UL:23010-23179<br>DL:5010-5179   | UL:23180-23279<br>DL:5180-5279   | UL:23730-23849<br>DL:5370-5849   | UL:24150-24449<br>DL:6150-6449   | UL:27210-27659<br>DL:9210-9659   |
| Tx/Rx spacing<br>(MHz)                      | 45                               | 30                               | 31                               | 30                               | 41                               | 55                               |
| Channel<br>Bandwidth<br>(MHz)               | 1.4/3/5/10                       | 1.4/3/5/10                       | 5/10                             | 5/10                             | 5/10/15/20                       | 3/5/10/15/20                     |
| Modulation                                  | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) |
| MS Power<br>(dBm)                           | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-<br>39(↓)                  | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                      |
| Sensitivity<br>(QPSK, BW<br>10MHz)<br>(dBm) |                                  |                                  |                                  |                                  |                                  |                                  |

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|  | <b>LTE Band34<br/>LTE-AA1</b>    | <b>LTE Band38</b>                | <b>LTE Band39<br/>LTE-AA1</b>    | <b>LTE Band40</b>                | <b>LTE Band41</b>                | <b>LTE Band66<br/>LTE-BA1</b>      |
|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| Freq.<br>Band[MHz]<br><br>Uplink/Downlink            | 2010~2025                        | 2570~2620                        | 1880~1920                        | 2300~2400                        | 2496~2690                        | 1710~1780<br><br>2110~2180         |
| ARFCN range  | UL/DL:36200 ~<br>36349           | UL/DL:37750 ~<br>38249           | UL/DL:38250 ~<br>38649           | UL/DL:38650 ~<br>39649           | UL/DL:39650 ~<br>41589           | UL:20750~21449<br><br>DL:2750~3449 |
| Tx/Rx spacing<br><br>(MHz)                           | 0                                | 0                                | 0                                | 0                                | 0                                | 400                                |
| Channel<br>Bandwidth<br><br>(MHz)                    | 5/10/15                          | 5/10/15/20                       | 5/10/15/20                       | 5/10/15/20                       | 5/10/15/20                       | 5/10/15/20                         |
| Modulation   | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only) | QPSK,16/64QAM<br>256QAM(DL only)   |
| MS Power<br><br>(dBm)                                | 24~-39(↓)                        | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                      | 25.7~-39(↓)                        |
| Sensitivity<br><br>(QPSK, BW<br>10MHz)<br><br>(dBm)) |                                  |                                  |                                  |                                  |                                  |                                    |

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### 2-5. TDSCDMA General Specification

|                                    | TDSCDMA2010(A )<br>LTE-AA1 | TDSCDMA1880(F)<br>LTE-AA1 |
|------------------------------------|----------------------------|---------------------------|
| Chip rate                          | 1.28 Mcps                  | 1.28 Mcps                 |
| OBW                                | 1.6 MHz                    | 1.6 MHz                   |
| Freq. Band[MHz]<br>Uplink/Downlink | 2010~2025                  | 1880~1920                 |
| ARFCN range                        | 10054~10121                | 9404~9596                 |
| Tx/Rx spacing<br>(MHz)             | 0                          | 0                         |
| MS Power<br>(dBm)                  | 25.7 ~ -48(↓)              | 25.7 ~ -48(↓)             |
| Power Class                        | 2(max+24dBm)               | 2(max+24dBm)              |
| Sensitivity<br>(dBm /1.28 MHz)     |                            |                           |