MTK Android 11/10 各制式信号格数判断标准

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基于平台：MTK 6762
Android 版本：Android 11、Android 10
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注：文中信号强度值对应的信号格数分别如下：

SIGNAL_STRENGTH_NONE_OR_UNKNOWN=0
SIGNAL_STRENGTH_POOR=1
SIGNAL_STRENGTH_MODERATE=2
SIGNAL_STRENGTH_GOOD=3
SIGNAL_STRENGTH_GREAT=4

总结各制式信号格数判断标准：

a)、LTE:信号格数通常取 RSRP、RSRQ、RSSNR 等级的最小值。

b)、CDMA:信号格数取 RSSI 和 ECIO、EVDO RSSI、Evdo Snr 中的最小值。

c)、GSM：信号格数由 RSSI 直接决定。

RSSI >-93	4 格
-103<RSSI<-93	3 格
-107< RSSI <-103	2 格
-109<RSSI<-113	1 格

一、LTE:信号格数取 RSRP RSRQ RSSNR 其中的最小值。

具体：1、先取 RSRP 和 RSRQ 中的最小值，然后和 RSSNR 比较,谁最小取谁。
2、如果第一步获取的值是 Integer.MAX_VALUE 则直接采用 RSSI 的值。

1.1、RSRP RSRQ RSSNR 判断逻辑

```
int rsrpLevel = SignalStrength.INVALID;
int rsrqLevel = SignalStrength.INVALID;
```

```
int rssnrLevel = SignalStrength.INVALID;

if (isLevelForParameter(USE_RSRP)) {
    rsrpLevel = updateLevelWithMeasure(rsrp, rsrpThresholds);
    if (DBG) {
        Rlog.i(LOG_TAG, "Updated 4G LTE RSRP Level: " + rsrpLevel);
    }
}
if (isLevelForParameter(USE_RSRQ)) {
    rsrqLevel = updateLevelWithMeasure(mRsrq, rsrqThresholds);
    if (DBG) {
        Rlog.i(LOG_TAG, "Updated 4G LTE RSRQ Level: " + rsrqLevel);
    }
}
if (isLevelForParameter(USE_RSSNR)) {
    rssnrLevel = updateLevelWithMeasure(mRssnr, rssnrThresholds);
    if (DBG) {
        Rlog.i(LOG_TAG, "Updated 4G LTE RSSNR Level: " + rssnrLevel);
    }
}
// Apply the smaller value among three levels of three measures.
mLevel = Math.min(Math.min(rsrpLevel, rsrqLevel), rssnrLevel);

if (mLevel == SignalStrength.INVALID) {
    int rssiLevel;
    if (mRssi > -51) {
        rssiLevel = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
    } else if (mRssi >= -89) {
        rssiLevel = SIGNAL_STRENGTH_GREAT;
    } else if (mRssi >= -97) {
        rssiLevel = SIGNAL_STRENGTH_GOOD;
    } else if (mRssi >= -103) {
        rssiLevel = SIGNAL_STRENGTH_MODERATE;
    } else if (mRssi >= -113) {
        rssiLevel = SIGNAL_STRENGTH_POOR;
    } else {
        rssiLevel = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
    }
    if (DBG) log("getLteLevel - rssi:" + mRssi + " rssiIconLevel:" + rssiLevel);
    mLevel = rssiLevel;
}
```

1.2 RSRP 数值对应的等级

```
// Lifted from Default carrier configs and max range of RSRP
```

```
private static final int[] sRsrpThresholds = new int[] {
        -124, /* SIGNAL_STRENGTH_POOR */
        -122, /* SIGNAL_STRENGTH_MODERATE */
        -120,   /* SIGNAL_STRENGTH_GOOD */
        -112    /* SIGNAL_STRENGTH_GREAT */
};
```

1.3 RSRQ 数值对应的等级

```
// Lifted from Default carrier configs and max range of RSRQ
private static final int[] sRsrqThresholds = new int[] {
        -19, /* SIGNAL_STRENGTH_POOR */
        -17, /* SIGNAL_STRENGTH_MODERATE */
        -14, /* SIGNAL_STRENGTH_GOOD */
        -12   /* SIGNAL_STRENGTH_GREAT */
};
```

1.4 RSSNR 数值对应的等级

```
// Lifted from Default carrier configs and max range of RSSNR
private static final int[] sRssnrThresholds = new int[] {
        -3, /* SIGNAL_STRENGTH_POOR */
        1,   /* SIGNAL_STRENGTH_MODERATE */
        5,   /* SIGNAL_STRENGTH_GOOD */
        13   /* SIGNAL_STRENGTH_GREAT */
};
```

1.5 RSSI 数值对应的等级

```
if (mRssi > -51) {
    rssiLevel = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
} else if (mRssi >= -89) {
    rssiLevel = SIGNAL_STRENGTH_GREAT;
} else if (mRssi >= -97) {
    rssiLevel = SIGNAL_STRENGTH_GOOD;
} else if (mRssi >= -103) {
    rssiLevel = SIGNAL_STRENGTH_MODERATE;
} else if (mRssi >= -113) {
    rssiLevel = SIGNAL_STRENGTH_POOR;
} else {
    rssiLevel = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
}
```

二、CDMA:信号格数同时由 getCdmaLevel() 和 getEvdoLevel() 确定，谁小取谁。

具体：getCdmaLevel() 是获取 RSSI 和 ECIO 的值谁小取谁，
getEvdoLevel()是获取 EVDO RSSI 值和 Evdo Snr ，也是谁小取谁。

2.1、getCdmaLevel 方法根据 RSSI 数值等级和 ECIO 数值等级去取最小值：

1)确定 RSSI 数值等级

```
    public int getCdmaLevel() {
        final int cdmaDbm = getCdmaDbm();
        final int cdmaEcio = getCdmaEcio();
        int levelDbm;
        int levelEcio;

        if (cdmaDbm == CellInfo.UNAVAILABLE) levelDbm =
SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
        else if (cdmaDbm >= -90) levelDbm = SIGNAL_STRENGTH_GREAT;
        else if (cdmaDbm >= -102) levelDbm = SIGNAL_STRENGTH_GOOD;
        else if (cdmaDbm >= -105) levelDbm = SIGNAL_STRENGTH_MODERATE;
        else if (cdmaDbm >= -107) levelDbm = SIGNAL_STRENGTH_POOR;
        else levelDbm = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
```

2)获取 ECIO 的等级：

```
        // Ec/Io are in dB*10
        if (cdmaEcio == CellInfo.UNAVAILABLE) levelEcio =
SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
        else if (cdmaEcio >= -90) levelEcio = SIGNAL_STRENGTH_GREAT;
        else if (cdmaEcio >= -110) levelEcio = SIGNAL_STRENGTH_GOOD;
        else if (cdmaEcio >= -130) levelEcio = SIGNAL_STRENGTH_MODERATE;
        else if (cdmaEcio >= -150) levelEcio = SIGNAL_STRENGTH_POOR;
        else levelEcio = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;

        int level = (levelDbm < levelEcio) ? levelDbm : levelEcio;
        if (DBG) log("getCdmaLevel=" + level);
        return level;
    }
```

2.2、getEvdoLevel 方法根据 EVDO RSSI 数值等级和 EvdoSnr 数值等级取最小值：

1)确定 EVDO RSSI 数值等级

```
    public int getEvdoLevel() {
        int evdoDbm = getEvdoDbm();
        int evdoSnr = getEvdoSnr();
        int levelEvdoDbm;
        int levelEvdoSnr;

        if (evdoDbm == CellInfo.UNAVAILABLE) levelEvdoDbm =
SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
        else if (evdoDbm >= -65) levelEvdoDbm = SIGNAL_STRENGTH_GREAT;
```

```
            else if (evdoDbm >= -75) levelEvdoDbm = SIGNAL_STRENGTH_GOOD;
            else if (evdoDbm >= -90) levelEvdoDbm = SIGNAL_STRENGTH_MODERATE;
            else if (evdoDbm >= -105) levelEvdoDbm = SIGNAL_STRENGTH_POOR;
            else levelEvdoDbm = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
```

2）确定 Evdo SNR 数值等级

```
        if (evdoSnr == CellInfo.UNAVAILABLE) levelEvdoSnr =
SIGNAL_STRENGTH_NONE_OR_UNKNOWN;
            else if (evdoSnr >= 7) levelEvdoSnr = SIGNAL_STRENGTH_GREAT;
            else if (evdoSnr >= 5) levelEvdoSnr = SIGNAL_STRENGTH_GOOD;
            else if (evdoSnr >= 3) levelEvdoSnr = SIGNAL_STRENGTH_MODERATE;
            else if (evdoSnr >= 1) levelEvdoSnr = SIGNAL_STRENGTH_POOR;
            else levelEvdoSnr = SIGNAL_STRENGTH_NONE_OR_UNKNOWN;

            int level = (levelEvdoDbm < levelEvdoSnr) ? levelEvdoDbm : levelEvdoSnr;
            if (DBG) log("getEvdoLevel=" + level);
            return level;
    }
```

三、GSM 信号格数直接根据 RSSI 数值判断

RSSI >-93　　4 格
-103<RSSI<-93　　3 格
-107< RSSI <-103　　2 格
-109<RSSI<-113　　1 格

本文参考代码：

frameworks\base\telephony\java\android\telephony\CellSignalStrengthLte.java
frameworks\base\telephony\java\android\telephony\CellSignalStrengthCdma.java
frameworks\base\telephony\java\android\telephony\CellSignalStrengthGsm.java