A76xx Series Open SDK _ 网络注册_应用指导

LTE 模组

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名称：	A76xx Series Open SDK_网络注册_应用指导
版本：	V1.01
类别：	应用文档
状态：	已发布

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Version History

Version	Date	Owner	What is new
V1.00	2022-10-26		第一版
V1.01	2024-10-23		添加 1.1 sAPI_NetworkInit()初始化网络接口

About this Document

本文档适用于 A1803S open 系列、A160X open 系列。

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缩略语

LAC Location Area Code
TAC Tracking Area Code
RSRP Reference Signal Receiving Power
RSRQ Reference Signal Received Quality
RSSI Received Signal Strength Indicator
RXLEV Received signal level
SINR Signal to Interference plus Noise Ratio

1API 介绍

1.1 sAPI_NetworkInit()初始化网络接口

接口:	void sAPI_NetworkInit(void)
输入:	无
输出:	无
返回值:	无
NOTE:	初始化网络接口，使用以下任意网络接口前执行一次即可

1.2 sAPI_NetworkSetCnmp 配置网络制式

接口:	unsigned int sAPI_NetworkSetCnmp(int CnmpValue)
输入:	CnmpValue：int 整型，2:auto mode 13:GSM 38:LTE
输出:	无
返回值:	成功：0 失败：-1
NOTE:	配置网络制式

1.3 sAPI_NetworkGetCnmp 获取网络制式

接口:	unsigned int sAPI_NetworkGetCnmp(int *pCnmp)
输入:	无
输出:	*pCnmp：int 整型，2:auto mode 13:GSM 38:LTE
返回值:	成功：0 失败：-1
NOTE:	获取网络制式

1.4 sAPI_NetworkGetCpsi 获取当前注网状态和运营商信息

接口:	unsigned int sAPI_NetworkGetCpsi(SCcpsiParm *pStr)
输入:	无
输出:	*pStr：返回当前注网状态和运营商信息，见 SCcpsiParm
返回值:	成功：0 失败：-1
NOTE:	获取当前注网状态和运营商信息

1.5 sAPI_NetworkGetCgreg 获取当前 GPRS 状态

接口:	unsigned int sAPI_NetworkGetCgreg(int* pGreg)
输入:	无
输出:	* pGreg：获取 PS 状态，见<stat>
返回值:	成功：0 失败：-1
NOTE:	获取 PS 状态，判断数据业务能否使用

1.6 sAPI_NetworkGetCsq 获取 csq 信号强度

接口:	unsigned int sAPI_NetworkGetCsq(UINT8 *pCsq)
输入:	无
输出:	*pCsq：返回 csq 信号强度，见<rssi>
返回值:	成功：0 失败：-1
NOTE:	获取 csq 信号强度

1.7 sAPI_NetworkGetCnetci 获取邻近小区信息

接口:	unsigned int sAPI_NetworkGetCnetci(SCcnetciParm *pStr)
输入:	无
输出:	*pStr：返回邻小区信息，见 SCcnetciParm
返回值:	成功：0 失败：-1
NOTE:	获取同频和异频小区信息

1.8 sAPI_NetworkGetCfun 获取 cfun 的值

接口:	unsigned int sAPI_NetworkGetCfun(UINT8 *pCfun)
输入:	无
输出:	*pCfun：0：最小功能 1：全功能 4：飞行模式
返回值:	成功：0 失败：-1
NOTE:	获取 cfun 的值

1.9 sAPI_NetworkSetCfun 设置 cfun

接口:	unsigned int sAPI_NetworkSetCfun(int CfunValue)
输入:	CfunValue：0：最小功能 1：全功能 4：飞行模式 0XFF: 重启（会保存一次历史频点）
输出:	无
返回值:	成功：0 失败：-1
NOTE:	设置 cfun 的值

2 变量定义

2.1 SCcpsiParm

```
typedef struct{
    char networkmode[40];          //当前网络状态
    char Mnc_Mcc[20];              //运营商信息，PLMN
    int LAC;                       //位置区号,GSM 参数
    int CellID;                    //基站编号
    char GSMBandStr[20];           //GSM 下频段
    char LTEBandStr[20];           //LTE 下频段
    int TAC;                       //跟踪区域编号，LTE 参数
    int Rsrp;                      //参考信号接收功率
    int Rsrq;                      //参考信号接收质量
    int Rssi;                      //接收信号的强度指示
    int RXLEV;                     //接收信号电平
    int TA;                        //跟踪区，GSM 参数
    int SINR;                      //信噪比
    int dlEuArfcn;                 //频点
    int subframeAssignment;        //上下行子帧配比，TDD 参数
    int systemFrameNumber;         //系统帧号
    int pCellID;                   //物理小区编号，LTE 参数
}SCcpsiParm;
```

2.2 <stat>

0 not registered, ME is not currently searching an operator to register to
1 registered, home network
2 not registered, but ME is currently trying to attach or searching an operator to register to
3 registration denied
4 unknown
5 registered, roaming
6 registered for "SMS only", home network
11 attached for emergency bearer services only

2.3 <rssi>

0 - 113 dBm or less

1 - 111 dBm

2...30 - 109... - 53 dBm

31 - 51 dBm or greater

99 not known or not detectable

2.4 SCcnetciParm

```
typedef struct{
    char Mnc_Mcc[20];          //运营商信息，PLMN
    int CellID;                //基站编号
    int TAC;                   //跟踪区域编号
    int Rsrp;                  //参考信号接收功率
    int Rsrq;                  //参考信号接收质量
    int RXSIGLEVEL;            //接收信号电平
}SCcnetciParm;
```

3 参考

3.1 示例

（详细代码请参考 cus_application\sc_demo\src\demo_network.c）

3.1.1 编译 demo

```
void NetWorkDemo(void)
{
    UINT8 csq;
    UINT8 ret;
    int creg,cgreg;
    SCcpsiParm Scpsi = {0};
    SCcnetciParm Snetci[12];
    UINT8 cpin;
    char imsi[50]={0};
    char NetResp[1000]={0};
    SIM_MSG_T optionMsg ={0,0,0,NULL};
    int opt = 0;
    int APInum;
    SCcgpaddrParm cgpaddrParm;
    SCdialapnparm dialapnparm[6];
    SCdialapnparm apnparm = {0};

    INT8 *note = "\r\nPlease select an option to test from the items listed below.\r\n";
    INT8 *options_list[] = {
        "1. Query signal quality(CSQ)",
        "2. CS domain(CREG)",
        "3. PS domain(CGREG)",
        "4. system information(CPSI)",
        "5. mode selection(CNMP)",
        "6. Operator selection(COPS)",
        "7. PDP context",
        "8. act or deact(CGACT)",
        "9. attach or detach(CGATT)",
        "10.phone functionality(CFUN)",
        "11.CPIN",
        "12.IMSI",
        "13.Ipaddr",
```

```
K:\>make A7670C_LANV_V701
gnumake -C K:/cus_application/out/A7670C_LANV_V701/
gnumake[1]: Entering directory `K:/cus_application/out/A7670C_LANV_V701'
gnumake[2]: Entering directory `K:/cus_application/out/A7670C_LANV_V701'
gnumake[3]: Entering directory `K:/cus_application/out/A7670C_LANV_V701'
gnumake[3]: Leaving directory `K:/cus_application/out/A7670C_LANV_V701'
[ 89%] Built target sc_demo
gnumake[3]: Entering directory `K:/cus_application/out/A7670C_LANV_V701'
gnumake[3]: Leaving directory `K:/cus_application/out/A7670C_LANV_V701'
[ 96%] Built target sc_lib
gnumake[3]: Entering directory `K:/cus_application/out/A7670C_LANV_V701'
gnumake[3]: Leaving directory `K:/cus_application/out/A7670C_LANV_V701'
[100%] Built target userspace
gnumake[2]: Leaving directory `K:/cus_application/out/A7670C_LANV_V701'
gnumake[1]: Leaving directory `K:/cus_application/out/A7670C_LANV_V701'
arm-none-eabi-objcopy -O binary K:/cus_application/out/A7670C_LANV_V701/customer_app.elf K:/cus_a
ANV_V701/customer_app.bin
crc_set K:/cus_application/out/A7670C_LANV_V701/customer_app.bin K:/cus_application/out/A7670C_LA
C.bin
```

3.1.2 烧入模块

从串口 ui 使用 demo

```
************************************************************
1. NETWORK                      2. SIMCARD
3. SMS                          4. UART
5. USB                          6. GPIO
7. PMU                          8. I2C
9. AUDIO                        10. FILE SYSTEM
11. TCPIP                       12. HTTP
13. FTP                         14. MQTT
15. SSL                         16. FOTA
17. LBS                         18. NTP
19. HTP                         20. INTERNET SERVICE
21. TTS                         22. CALL
23. WIFI                        24. LCD
26. RTC                         27. FLASH
29. SPI                         30. CAM
31. LE CLIENT                   32. SPI NOR
33. APP DOWNLOAD
************************************************************

Please select an option to test from the items listed below.

************************************************************
1. Query signal quality(CSQ)  2. CS domain(CREG)
3. PS domain(CGREG)           4. system information(CPSI)
5. mode selection(CNMP)       6. Operator selection(COPS)
7. PDP context                8. act or deact(CGACT)
9. attach or detach(CGATT)    10.phone functionality(CFUN)
11.CPIN                       12.IMSI
13.Ipaddr                     14.test GPRS
15.test voice call            16.platform connection
17. Adjacent base station information(CNETCI)99.back
************************************************************
```

3.2 API demo

3.2.1 配置和获取网络制式

```
Set cnmp 2 success.!

1.GET CNMP   2.SET CNMP:2   13.SET CNMP:13   38.SET CNMP:38
99.back.

Get cnmp success. cnmp:2!

1.GET CNMP   2.SET CNMP:2   13.SET CNMP:13   38.SET CNMP:38
99.back.
```

3.2.2 获取当前注网状态和运营商信息

```
************************************************************

Get cpsi success. NEmode=LTE,Online,MM=460-
01,LAC=0,CELL=64604546,Gband=,Lband=EUTRAN-
BAND3,TAC=39519,RSRP=42,RXLEV=0,TA=0,SINR=4,rsrq=22,rssi=44!

Please select an option to test from the items listed below.
.....
************************************************************

Get cgreg success. cgreg=1!

Please select an option to test from the items listed below.

************************************************************
```

3.2.3 获取 csq 信号强度

```
************************************************************

Get csq success. csq:22!

Please select an option to test from the items listed below.
.....
```

3.2.4 获取邻近小区信息

```
.....

 i=0,MM=460-11,TAC=39519,CELL=84937125,RSRP=57,RSRQ=18,RXSIGLEVEL=0
 i=1,MM=460-01,TAC=39519,CELL=80954882,RSRP=34,RSRQ=0,RXSIGLEVEL=0
 i=2,MM=000-00,TAC=0,CELL=-1,RSRP=26,RSRQ=0,RXSIGLEVEL=0
 i=3,MM=460-11,TAC=39519,CELL=84937136,RSRP=44,RSRQ=4,RXSIGLEVEL=0
 i=4,MM=000-00,TAC=0,CELL=-1,RSRP=39,RSRQ=0,RXSIGLEVEL=0
 i=5,MM=000-00,TAC=0,CELL=-1,RSRP=44,RSRQ=0,RXSIGLEVEL=0
 i=6,MM=000-00,TAC=0,CELL=318,RSRP=31,RSRQ=0,RXSIGLEVEL=0
 i=7,MM=000-00,TAC=0,CELL=303,RSRP=27,RSRQ=0,RXSIGLEVEL=0
Please select an option to test from the items listed below.
```

3.2.5 获取和设置 cfun

```
.....

1.GET CFUN   2.SET CFUN 1   3.SET CFUN 0   4.SET CFUN 4  99.back.

Get Cfun success. Cfun=1!

1.GET CFUN   2.SET CFUN 1   3.SET CFUN 0   4.SET CFUN 4  99.back.

Set cfun 1 success.!

1.GET CFUN   2.SET CFUN 1   3.SET CFUN 0   4.SET CFUN 4  99.back.
```