

# 中华人民共和国通信行业标准

YD/T 2483.2-2013

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## 2GHz TD-SCDMA/WCDMA 数字蜂窝移动通信网 家庭基站网络管理技术要求 第2部分：基于CORBA技术的 信息模型设计

2GHz TD-SCDMA/WCDMA digital cell mobile communications  
network home NodeB subsystem management technical  
specification—Part 2: CORBA based information model design

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## 目 次

前 言	II
1 范围	1
2 规范性引用文件	1
3 缩略语	1
4 配置网络资源模型设计	2
4.1 通用配置资源模型的IDL定义	2
4.2 HNS网络资源模型的IDL定义	2
5 性能网络资源模型设计	11
5.1 性能管理资源模型的IDL定义	11
5.2 数据类型的IDL定义	15
6 性能管理接口功能相关的文件	21
6.1 性能测量数据文件的Schema定义<measCollec.xsd>	21
6.2 性能测量数据文件的XML header定义	25
附录A（规范性附录） Schema文档补充说明	26
附录B（资料性附录） 性能管理功能相关XML文件示例	28
参考文献	31

## 前 言

本标准是《2GHz TD-SCDMA/WCDMA 数字蜂窝移动通信网家庭基站网络管理技术要求》系列标准中的一项标准。该系列标准的名称预计如下：

- 1) 2GHz TD-SCDMA/WCDMA 数字蜂窝移动通信网家庭基站网络管理技术要求 第1部分：信息模型
- 2) 2GHz TD-SCDMA/WCDMA 数字蜂窝移动通信网家庭基站网络管理技术要求 第2部分：基于CORBA技术的网络资源模型设计

本标准按照GB/T 1.1-2009给出的规则起草。

本标准由中国通信标准化协会提出并归口。

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广东省网络空间安全协会受控资料

# 2GHz TD-SCDMA/WCDMA数字蜂窝移动通信网

## 家庭基站网络管理技术要求

### 第2部分：基于CORBA技术的信息模型设计

#### 1 范围

本标准规定了TD-SCDMA/WCDMA的2GHz数字蜂窝移动通信网家庭基站的网络管理接口中信息模型的IDL定义。

本标准适用于对采用TD-SCDMA/WCDMA 的2GHz数字蜂窝移动通信网家庭基站。

#### 2 规范性引用文件

下列文件对于本文件的应用是必不可少的。凡是注日期的引用文件，仅所注日期的版本适用于本文件。凡是不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

YD/T 1586.3-2007 2GHz WCDMA数字蜂窝移动通信网网络管理技术要求(第一阶段) 第3部分：基于CORBA技术的网络资源模型设计

YD/T 2483.1-2013 2GHz TD-SCDMA/WCDMA数字蜂窝移动通信网家庭基站网络管理技术要求 第1部分：信息模型

#### 3 缩略语

下列缩略语适用于本文件。

CSG	Closed Subscriber Group	封闭用户组
DN	Distinguished Name	可识别名
EMS	Element Management System	网元管理系统
EPC	Evolved Packet Core	演进型分组域核心网
E-UTRAN	Evolved UTRAN	演进型通用陆地无线接入网络
HNB	Home NodeB	家庭基站
HNB GW	Home NodeB Gateway	家庭基站网关
HNS	Home NodeB SubSystem	家庭基站子系统
HeNB	Home eNodeB	演进型家庭基站
HeNB GW	Home eNodeB Gateway	演进型家庭基站网关
HeNS	Home eNodeB SubSystem	演进型家庭基站子系统
H(e)NB	HNB and HeNB	家庭基站和演进型家庭基站
H(e)NB GW	HNB GW and H(e)NB GW	家庭基站网关和演进型家庭基站网关
H(e)NS	HNS and HeNS	家庭基站子系统和演进型家庭基站子系统
HMS	Home NodeB Management System	家庭基站管理系统
HeMS	Home eNodeB Management System	演进型家庭基站管理系统
HNB-GW MS	Home NodeB Gateway Management System	家庭基站网关管理系统

LTE	Long Term Evolution	3GPP 长期演进项目
MME	Mobile Management Entity	移动管理实体
QCI	QoS Class Identifier	Qos 类别标识
S-GW	Serving Gateway	服务网关

#### 4 配置网络资源模型设计

配置网络资源模型设计中有3类idl文件,这3类文档及其用途如下:

1) xxxNRMDefs.idl, 包括GenericNRMDefs.idl、IMDataDefs.idl和HnsNRMDefs.idl, 用来定义配置网络资源对象及其属性名称;

2) xxxNRMSystem.idl, 包括GenericNRMSystem.idl和 HnsNRMSystem.idl, 用来定义配置网络资源对象的属性使用的数据类型;

3) xxxNRMProfile.idl, 包括GenericNRMProfile.idl、IMDataProfile.idl和 HnsNRMProfile.idl, 只是用来描述配置网络资源对象的属性名称及其数据类型的对应关系, 实现时并不使用此类idl文件。

##### 4.1 通用配置资源模型的 IDL 定义

见YD/T 1586.3-2007中4.1给出的定义。

##### 4.2 HNS 网络资源模型的 IDL 定义

###### 4.2.1 HnsNRMSystem

```

#ifndef HnsNRMSystem_idl
#define HnsNRMSystem_idl

#include "GenericNRMSystem.idl"

// #pragma prefix "3gppsa5.org"

module HnsNRMSystem
{
    /**
     * This module adds datatype definitions for types
     * used in the Hns NRM which are not basic datatypes defined
     * already in CORBA and datatypes defined already in
     * GenericNRMSystem.
     */

    typedef string IPAddress;

    typedef sequence < IPAddress > IPAddressListType;

```



```

enum AdministrativeStateType {Locked, Unlocked, ShuttingDown};

enum OperationalStateType {Enabled, Disabled};

enum SignTransMeidaType {Optic, Electric};

enum IuhLinkStateType {Activated, Inactivated};

enum IuhSignLinkTpStateType {UNESTABLISH, ESTABLISHED, INACTIVE, ACTIVE};

struct IpConfigType
{
    string ipAdEntAddr;
    string ipAdEntNetMask;
    string defaultGateway;
};
typedef sequence <IpConfigType> IpConfigInfoType;

struct SctpAssocType
{
    string addrType;
    string addr;
};
typedef sequence <SctpAssocType> SctpAssocListType;

struct SctpAssocAddrType
{
    unsigned long portId;
    SctpAssocListType SctpAssocList;
};

};
#endif

```

#### 4.2.2 HnsNRMDefs

```

//File "HnsNRMDefs.idl"
//The IRP document version number is "HNS NRM V1.0"

```

```
#ifndef HnsNRMDefs_idl
#define HnsNRMDefs_idl

#include "GenericNRMDefs.idl"

#pragma prefix "3gppsa5.org"

/**
 * This module defines constants for each MO class name and
 * the attribute names for each defined MO class.
 */
module HnsNRMDefs
{

//Definitions for MO class HnbGwFunction

interface HnbGwFunction : GenericNRMDefs::ManagedFunction
{
    const string CLASS = " HnbGwFunction ";

    // including all Attribute Names from
    // MO Class GenericNRMDefs::ManagedFunction
    // additional Attribute Names is as follows.
    //
    const string Id = "Id";
    const string HnbGwId = " HnbGwId ";
    const string IpConfigInfo = " IpConfigInfo ";
    const string MaxNbrHnbRegistered = " MaxNbrHnbRegistered ";
    const string MaxPacketCapability = " MaxPacketCapability ";

};

//Definitions for MO class Port

interface Port : GenericNRMDefs::Top
{
    const string CLASS = " Port ";
```

```
// including all Attribute Names from
// MO Class GenericNRMDefs::Top
// additional Attribute Names is as follows.

const string PortId = " PortId ";
const string PortRate = " PortRate ";
const string AdministrativeState = " AdministrativeState ";
const string OperationalState = " OperationalState ";
const string PortLocation = " PortLocation ";
const string FarPortLocation = " FarPortLocation ";
const string SignTransMeida = " SignTransMeida ";

};

//Definitions for MO class EthernetPort

interface EthernetPort : HnsNRMSysyem::Port
{
    const string CLASS = " EthernetPort ";

    // including all Attribute Names from
    // MO Class HnsNRMSysyem::Port
    // additional Attribute Names is as follows.
    //
const string MacAddress = " MacAddress ";
    const string IpAddressList = " IpAddressList ";

};

//Definitions for MO class Ep_Iuh

interface Ep_Iuh : GenericNRMDefs::Top
{
    const string CLASS = " Ep_Iuh ";

    // including all Attribute Names from
    // MO Class GenericNRMDefs::Top
```



```
// additional Attribute Names is as follows.
//
const string Id = "Id";
const string FarEndEntity = " FarEndEntity ";
const string FarEndNeIpAddr = " FarEndNeIpAddr ";
const string IuhLinkState = " IuhLinkState ";

};

//Definitions for MO class IuhSignLinkTp

interface IuhSignLinkTp : GenericNRMDefs::Top
{
    const string CLASS = " IuhSignLinkTp ";

    // including all Attribute Names from
    // MO Class GenericNRMDefs::Top
    // additional Attribute Names is as follows.
    //
    const string IuhSignLinkTpId = " IuhSignLinkTpId ";
    const string IuhSignLinkTpState = " IuhSignLinkTpState ";
    const string SctpAssocLocalAddr = " SctpAssocLocalAddr ";
    const string SctpAssocRemoteAddr = " SctpAssocRemoteAddr ";
    const string FarEndEntity = " FarEndEntity ";

};

//Definitions for MO class HmsFunction

interface HmsFunction : GenericNRMDefs::ManagedFunction
{
    const string CLASS = " HmsFunction ";

    // including all Attribute Names from
    // MO Class GenericNRMDefs::ManagedFunction
    // additional Attribute Names is as follows.
    //
```

```

    const string Id = " Id";

};

//Definitions for MO class HnbProfile

interface HnbProfile : GenericNRMDefs::ManagedFunction
{
    const string CLASS = " HnbProfile ";

    // including all Attribute Names from
    // MO Class GenericNRMDefs::ManagedFunction
    // additional Attribute Names is as follows.
    //
    const string Id = " Id";
    const string Configuration = " Configuration ";
    const string Criterion = " Criterion ";

};

};
#endif

```

#### 4.2.3 HnsNRMPProfile

```

//File "HnsNRMPProfile.idl"
//The IRP document version number is "HNS NRM V1.0"
#ifndef HnsNRMPProfile_idl
#define HnsNRMPProfile_idl

#include "GenericNRMPProfile.idl"
#include "GenericNRMDefs.idl"
#include "HnsNRMSystem.idl"

//#pragma prefix "3gppsa5.org"

/**
 * This module defines the attribute names and

```

```
* corresponding attribute types for all defined
* MO class in Hns network. This module is
* used for reference.
*/
module HnsNRMPProfile
{
    interface HnbGwFunction : GenericNRMPProfile::ManagedFunction
    {
        readonly attribute GenericNRMSystem::ObjectIdType Id;
        readonly attribute unsigned long HnbGwId;
        readonly attribute HnsNRMSystem:: IpConfigInfoType IpConfigInfo;
        readonly attribute unsigned long MaxNbrHnbRegistered;
        readonly attribute unsigned long MaxPacketCapability;

        // The following notifications may be sent from this MO,
        // notifyObjectCreation
        // notifyObjectDeletion
        // notifyAttributeValueChange
        // notifyAckStateChanged
        // notifyChangedAlarm
        // notifyClearedAlarm
        // notifyNewAlarm
        // notifyComments
        // notifyAlarmListRebuilt
        // notifyPotentialFaultyAlarmList
    };

    interface Port : GenericNRMDefs::Top
    {
        readonly attribute GenericNRMSystem::ObjectIdType PortId;
        attribute float PortRate;
        attribute HnsNRMSystem:: AdministrativeStateType AdministrativeState;
        attribute HnsNRMSystem:: OperationalStateType OperationalState;
        readonly attribute string PortLocation;
        readonly attribute string FarPortLocation;
        readonly attribute HnsNRMSystem:: SignTransMeidaType SignTransMeida;
    };
};
```

```
};

interface EthernetPort : HnsNRMSystem::Port
{
    readonly attribute string MacAddress;
    readonly attribute HnsNRMSystem:: IPAddressListType IpAddressList;

    // The following notifications may be sent from this MO,
    // notifyObjectCreation
    // notifyObjectDeletion
    // notifyAttributeValueChange
    // notifyAckStateChanged
    // notifyChangedAlarm
    // notifyClearedAlarm
    // notifyNewAlarm

};

interface Ep_Iuh : GenericNRMDefs::Top
{
    readonly attribute GenericNRMSystem::ObjectIdType Id;
    readonly attribute GenericNRMSystem::DN FarEndEntity;
    attribute HnsNRMSystem:: IPAddress FarEndNeIpAddr;
    readonly attribute HnsNRMSystem:: IuhLinkStateType IuhLinkState;

    // The following notifications may be sent from this MO,
    //notifyObjectCreation
    //notifyObjectDeletion
    //notifyAttributeValueChange
    //notifyAckStateChanged
    //notifyChangedAlarm
    //notifyClearedAlarm
    //notifyNewAlarm
    //notifyComments
    //notifyAlarmListRebuilt
    //notifyPotentialFaultyAlarmList

};
```

```
interface IuhSignLinkTp : GenericNRMDefs::Top
{
    readonly attribute GenericNRMSystem::ObjectIdType IuhSignLinkTpId;
    attribute HnsNRMSystem:: IuhSignLinkTpStateType IuhSignLinkTpState;
    readonly attribute HnsNRMSystem:: SctpAssocAddrType SctpAssocLocalAddr;
    readonly attribute HnsNRMSystem:: SctpAssocAddrType SctpAssocRemoteAddr;
    readonly attribute GenericNRMSystem::DN FarEndEntity;

    // The following notifications may be sent from this MO,
    // notifyObjectCreation
    // notifyObjectDeletion
    // notifyAttributeValueChange
    // notifyAckStateChanged
    // notifyChangedAlarm
    // notifyClearedAlarm
    // notifyNewAlarm
    // notifyComments
    // notifyAlarmListRebuilt
    // notifyPotentialFaultyAlarmList
};

interface HmsFunction : GenericNRMDefs::ManagedFunction
{
    readonly attribute GenericNRMSystem::ObjectIdType Id;

    // The following notifications may be sent from this MO,
    // notifyObjectCreation
    // notifyObjectDeletion
    // notifyAttributeValueChange
    // notifyAckStateChanged
    // notifyChangedAlarm
    // notifyClearedAlarm
    // notifyNewAlarm
    // notifyComments
    // notifyAlarmListRebuilt
    // notifyPotentialFaultyAlarmList
}
```

```

};

interface HnbProfile : GenericNRMDefs::ManagedFunction
{
    readonly attribute GenericNRMSystem::ObjectIdType Id;
    readonly attribute string Configuration;
    readonly attribute string Criterion;

    // The following notifications may be sent from this MO,
    // notifyObjectCreation
    // notifyObjectDeletion
    // notifyAttributeValueChange
    // notifyAckStateChanged
    // notifyChangedAlarm
    // notifyClearedAlarm
    // notifyNewAlarm
    // notifyComments
};

};
#endif

```

## 5 性能网络资源模型设计

### 5.1 性能管理资源模型的 IDL 定义

下面的IDL文件为每个family定义了一个独立的module。

- "family.measurementName.subcounter"可用于获取一个MeasurementType的某个subcounter值;
- "family.measurementName" 可用于获取一个MeasurementType的值。如果该MeasurementType有subcounters, 那么所有subcounters的值都应该返回;

- "family" 可用于获取该family下的所有MeasurementType的值。

其中, family为YD/T 2483.1-2013第5章HNS性能测量参数中的英文表名; subcounter设置时选相应的整数值(取值见下节数据类型的IDL定义“HNSNRMMMeasurementSystem.idl”中的定义)。

例如,

(1) "IUH. FailHnbReg.\_HnbId.\_Cause " 可用于获取" FailHnbReg.\_HnbId.\_Cause "的所有subcounters的值;

(2) "IUH. AttHnbReg.\_HnbId " 可用于获取" AttHnbReg.\_HnbId "的值;

(3) "IUH "可用于获取该family下的所有MeasurementType的值。



```
//File HNSNRMMMeasurementDefs.idl
#ifndef HNSNRMMMeasurementDefs_idl
#define HNSNRMMMeasurementDefs_idl

// #pragma prefix "3gppsa5.org"

/**
 * This module defines measurementType names constants
 */

module HNSNRMMMeasurementDefs
{
    // HNB-GW measurement
    module BQPT
    {
        //
        const string CpuUsageMean = " CpuUsageMean ";
        const string MacOctSent = " MacOctSent ";
        const string MacOctRecieved = " MacOctRecieved ";
    };

    // Iuh measurement
    module IUH
    {
        //
        const string AttHnbReg_HnbId = " AttHnbReg._HnbId ";
        const string SuccHnbReg_HnbId = " SuccHnbReg._HnbId ";
        const string FailHnbReg_HnbId_Cause = " FailHnbReg._HnbId._Cause ";
        const string FailHnbReg_HnbIdSum = " FailHnbReg._HnbId.Sum ";
        const string SuccHnbDeRegHnb_Cause = " SuccHnbDeRegHnb._Cause ";
        const string SuccHnbDeRegHnbSum = " SuccHnbDeRegHnb.Sum ";
        const string SuccHnbDeRegHnbGw_Cause = " SuccHnbDeRegHnbGw._Cause ";
        const string SuccHnbDeRegHnbGwSum = " SuccHnbDeRegHnbGw.Sum ";

        const string AttUeReg = " AttUeReg ";
        const string SuccUeReg = " SuccUeReg ";
        const string FailUeReg_Cause = " FailUeReg._Cause ";
    };
};
```

```

const string FailUeRegSum = " FailUeReg.Sum ";
const string SuccUeDeRegHnb_Cause = " SuccUeDeRegHnb._Cause ";
const string SuccUeDeRegHnbSum = " SuccUeDeRegHnb.Sum ";
const string SuccUeDeRegHnbGw_Cause = " SuccUeDeRegHnbGw._Cause ";
const string SuccUeDeRegHnbGwSum = " SuccUeDeRegHnbGw.Sum ";

const string IncSctpPkt = " IncSctpPkt ";
const string OutSctpPkt = " OutSctpPkt ";
const string IncSctpOct = " IncSctpOct ";
const string OutSctpOct = " OutSctpOct ";

const string IncIuUpCsPkt = " IncIuUpCsPkt ";
const string OutIuUpCsPkt = " OutIuUpCsPkt ";
const string IncIuUpCsOct = " IncIuUpCsOct ";
const string OutIuUpCsOct = " OutIuUpCsOct ";
const string IncIuUpPsPkt = " IncIuUpPsPkt ";
const string OutIuUpPsPkt = " OutIuUpPsPkt ";
const string IncIuUpPsOct = " IncIuUpPsOct ";
const string OutIuUpPsOct = " OutIuUpPsOct ";
};

// HNB measurement
module CSG
{
    //
    const string MeanNbrUsr = " MeanNbrUsr ";
    const string AttInboundMobility = " AttInboundMobility ";
    const string SuccInboundMobility = " SuccInboundMobility ";
    const string FailInboundMobility = " FailInboundMobility ";
};

module RAB
{
    //
    const string AttEstabCsConv_UD = " AttEstabCs.Conv.<U><D> ";
    const string AttEstabCsStrm = " AttEstabCs.Strm ";
    const string AttEstabCsIntact = " AttEstabCs.Intact ";
};

```

```

const string AttEstabCsBgrd = " AttEstabCs.Bgrd ";
const string SuccEstabCsConv_UD = " SuccEstabCs.Conv.<U><D> ";
const string SuccEstabCsStrm = " SuccEstabCs.Strm ";
const string SuccEstabCsIntact = " SuccEstabCs.Intact ";
const string SuccEstabCsBgrd = " SuccEstabCs.Bgrd ";
const string FailEstabCs_Cause = " FailEstabCs._Cause ";
const string AttEstabPsConv = " AttEstabPs.Conv ";
const string AttEstabPsStrm_UD = " AttEstabPsStrm.<U><D> ";
const string AttEstabPsIntact = " AttEstabPs.Intact ";
const string AttEstabPsBgrd = " AttEstabPs.Bgrd ";
const string SuccEstabPsConv = " SuccEstabPs.Conv ";
const string SuccEstabPsStrm_UD = " SuccEstabPs.Strm.<U><D> ";
const string SuccEstabPsIntact = " SuccEstabPs.Intact ";
const string SuccEstabPsBgrd = " SuccEstabPs.Bgrd ";
const string FailEstabPs_Cause = " FailEstabPs._Cause ";
const string RelReqCs_Cause = " RelReqCs._Cause ";
const string RelReqPs_Cause = " RelReqPs._Cause ";
const string NbrIuRelReqCsConv = " NbrIuRelReqCs.Conv ";
const string NbrIuRelReqCsStrm = " NbrIuRelReqCs.Strm ";
const string NbrIuRelReqCsIntact = " NbrIuRelReqCs.Intact ";
const string NbrIuRelReqCsBgrd = " NbrIuRelReqCs.Bgrd ";
const string NbrIuRelReqPsConv = " NbrIuRelReqPs.Conv ";
const string NbrIuRelReqPsStrm = " NbrIuRelReqPs.Strm ";
const string NbrIuRelReqPsIntact = " NbrIuRelReqPs.Intact ";
const string NbrIuRelReqPsBgrd = " NbrIuRelReqPs.Bgrd ";

};

module RRC
{
    //
    const string AttConnEstab_Cause = " AttConnEstab._Cause ";
    const string AttConnEstabSum = " AttConnEstab.Sum ";
    const string FailConnEstab_Cause = " FailConnEstab._Cause ";
    const string FailConnEstabSum = " FailConnEstab.Sum ";
    const string SuccConnEstab_Cause = " SuccConnEstab._Cause ";
    const string SuccConnEstabSum = " SuccConnEstab.Sum ";

};

```

```

module HO
{
    //
    const string SuccHnbUmtsIntraFreq = " SuccHnbUmtsIntraFreq ";
    const string SuccHnbUmtsInterFreq = " SuccHnbUmtsInterFreq ";
    const string AttHnbUmtsIntraFreq = " AttHnbUmtsIntraFreq ";
    const string AttHnbUmtsInterFreq = " AttHnbUmtsInterFreq ";
    const string Att3GMacroToHnbHo = " Att3GMacroToHnbHo ";
    const string Succ3GMacroToHnbHo = " Succ3GMacroToHnbHo ";
    const string Att2GMacroToHnbHo = " Att2GMacroToHnbHo ";
    const string Succ2GMacroToHnbHo = " Succ2GMacroToHnbHo ";
};

};

#endif

```

## 5.2 数据类型的 IDL 定义

```

//File "HNSNRMMMeasurementSystem.idl"
#ifndef HNSNRMMMeasurementSystem_idl
#define HNSNRMMMeasurementSystem_idl

// #pragma prefix "3gppsa5.org"

/**
 * This module defines type definitions for performance measurements
 */
module HNSNRMMMeasurementSystem
{
    // typedef unsigned long CountType;
    typedef unsigned long HNSMeasurementType1;
    typedef float HNSMeasurementType2;

    typedef unsigned short CauseType;
    const CauseType sum = 0;
    const CauseType other = 65535;
    const CauseType noResponse = 65534;

```

```
// The following HNBAP causes are defined in the section 9.2.15 of 3GPP TS 25.469 va10.
```

```
typedef CauseType HNBAPCause;
```

```
// Radio Network Layer Cause
```

```
const HNBAPCause overload = 1;  
const HNBAPCause unauthorizedLocation = 2;  
const HNBAPCause unauthorizedHNB = 3;  
const HNBAPCause HNBParameter = 4;  
const HNBAPCause mismatch = 5;  
const HNBAPCause InvalidUEidentity = 6;  
const HNBAPCause UEnotallowedonthisHNB = 7;  
const HNBAPCause UEunauthorised = 8;  
const HNBAPCause ConnectionwithUElost = 9;  
const HNBAPCause UERRCRelease = 10;  
const HNBAPCause HNBnotregistered = 11;  
const HNBAPCause unspecified = 12;  
const HNBAPCause Normal = 13;  
const HNBAPCause UERelocated = 14;  
const HNBAPCause UERegisteredinanotherHNB = 15;  
const HNBAPCause NoNeighbourInformationavailable = 16;  
const HNBAPCause IurhconnectiontothatNeighbournotAllowed = 17;
```

```
// Transport Layer Cause
```

```
const HNBAPCause TransportResourceUnavailable = 26;  
//const HNBAPCause Unspecified = 27;
```

```
//Protocol Cause
```

```
const HNBAPCause TransferSyntaxErrorAbstractSyntaxError = 58;  
const HNBAPCause AbstractSyntaxErrorIgnoreandNotify = 59;  
const HNBAPCause MessagenotComatiblewithReceiverState = 60;  
const HNBAPCause SemanticError = 61;  
//const HNBAPCause Unspecified = 62;  
const HNBAPCause AbstractSyntaxErrorFalselyConstructedMessage = 63;
```

```
//Misc Cause
```

```
const HNBAPCause ProcessingOverload = 74;
```



```
const HNBAPCause HardwareFailure = 75;
const HNBAPCause OandMIntervention = 76;
//const HNBAPCause Unspecified = 77;

// The following RANAP causes are defined in the section 9.2.1.4 of 3GPP TS 25.413 v5.5.0.
typedef CauseType RANAPCause;

//Radio Network Layer Cause. Value range is 1 - 64.
const RANAPCause rabPreempted = 1;
const RANAPCause trelocoverallExpiry = 2;
const RANAPCause trelocprepExpiry = 3;
const RANAPCause treloccompleteExpiry = 4;
const RANAPCause tqueingExpiry = 5;
const RANAPCause relocationTriggered = 6;
const RANAPCause trelocallocExpiry = 7;
const RANAPCause unableToEstablishDuringRelocation = 8;
const RANAPCause unknownTargetRnc = 9;
const RANAPCause relocationCancelled = 10;
const RANAPCause successfulRelocation = 11;
const RANAPCause requestedCipheringAndOrIntegrityProtectionAlgorithmsNotSupported = 12;
const RANAPCause conflictWithAlreadyExistingIntegrityProtectionAndOrCipheringInformation = 13;
const RANAPCause failureInTheRadioInterfaceProcedure = 14;
const RANAPCause releaseDueToUtranGeneratedReason = 15;
const RANAPCause userInactivity_RANAP = 16;
const RANAPCause timeCriticalRelocation = 17;
const RANAPCause requestedTrafficClassNotAvailable = 18;
const RANAPCause invalidRABParametersValue = 19;
const RANAPCause requestedMaximumBitRateNotAvailable = 20;
const RANAPCause requestedGuaranteedBitRateNotAvailable = 21;
const RANAPCause requestedTransferDelayNotAchievable = 22;
const RANAPCause invalidRabParametersCombination = 23;
const RANAPCause conditionViolationForSduParameters = 24;
const RANAPCause conditionViolationForTrafficHandlingPriority = 25;
const RANAPCause conditionViolationForGuaranteedBitRate = 26;
const RANAPCause userPlaneVersionsNotSupported = 27;
const RANAPCause iuUpFailure = 28;
const RANAPCause relocationFailureInTargetCnRncOrTargetSystem = 29;
```



```
const RANAPCause invalidRabId = 30;
const RANAPCause noRemainingRab = 31;
const RANAPCause interactionWithOtherProcedure = 32;
const RANAPCause requestedMaximumBitRateForDINotAvailable = 33;
const RANAPCause requestedMaximumBitRateForUINotAvailable = 34;
const RANAPCause requestedGuaranteedBitRateForDINotAvailable = 35;
const RANAPCause requestedGuaranteedBitRateForUINotAvailable = 36;
const RANAPCause repeatedIntegrityCheckingFailure = 37;
const RANAPCause requestedRequestTypeNotSupported = 38;
const RANAPCause requestSuperseded = 39;
const RANAPCause releaseDueToUeGeneratedSignallingConnectionRelease = 40;
const RANAPCause resourceOptimisationRelocation = 41;
const RANAPCause requestedInformationNotAvailable = 42;
const RANAPCause relocationDesirableForRadioReasons = 43;
const RANAPCause relocationNotSupportedInTargetRncOrTargetSystem = 44;
const RANAPCause directedRetry = 45;
const RANAPCause radioConnectionWithUeLost = 46;
const RANAPCause rncUnableToEstablishAllRfcs = 47;
const RANAPCause decipheringKeysNotAvailable = 48;
const RANAPCause dedicatedAssistanceDataNotAvailable = 49;
const RANAPCause relocationTargetNotAllowed = 50;
const RANAPCause locationReportingCongestion = 51;
const RANAPCause reduceLoadInServingCell = 52;
const RANAPCause noRadioResourcesAvailableInTargetCell = 53;
const RANAPCause geranIuModeFailure = 54;
const RANAPCause accessRestrictedDueToSharedNetworks = 55;
const RANAPCause incomingRelocationNotSupportedDueToPuesbineFeature = 56;

//Transport Layer Cause. Value range is 65 - 80.
const RANAPCause signallingTransportResourceFailure = 65;
const RANAPCause iuTransportConnectionFailedToEstablish = 66;

//NAS Cause. Value range is 81 - 96.
const RANAPCause userRestrictionStartIndication = 81;
const RANAPCause userRestrictionEndIndication = 82;
const RANAPCause normalRelease = 83;
```

```
//Protocol Cause. Value range is 97 - 112.
const RANAPCause transferSyntaxError_RANAP = 97;
const RANAPCause semanticError_RANAP = 98;
const RANAPCause messageNotCompatibleWithReceiverState_RANAP = 99;
const RANAPCause abstractSyntaxErrorReject_RANAP = 100;
const RANAPCause abstractSyntaxErrorIgnoreAndNotify_RANAP = 101;
const RANAPCause abstractSyntaxErrorFalselyConstructedMessage_RANAP = 102;

//Miscellaneous Cause. Value range is 113 - 128.
const RANAPCause operationAndMaintenanceIntervention_RANAP = 113;
const RANAPCause noResourceAvailable = 114;
const RANAPCause unspecifiedFailure = 115;
const RANAPCause networkOptimisation = 116;

// The following cell update causes are defined in the section 10.3.3.3 of 3GPP TS 25.331 v5.5.0.
typedef CauseType CellUpdateCause;
const CellUpdateCause cellReselection = 1;
const CellUpdateCause periodicalCellUpdate = 2;
const CellUpdateCause uplinkDataTransmission = 3;
const CellUpdateCause pagingResponse = 4;
const CellUpdateCause reenteredServiceArea = 5;
const CellUpdateCause radioLinkFailure = 6;
const CellUpdateCause rlcUnrecoverableError = 7;

// The following establishment causes are defined in the section 10.3.3.11 of 3GPP TS 25.331 v5.5.0.
typedef CauseType EstablishmentCause;
const EstablishmentCause originatingConversationalCall = 1;
const EstablishmentCause originatingStreamingCall = 2;
const EstablishmentCause originatingInteractiveCall = 3;
const EstablishmentCause originatingBackgroundCall = 4;
const EstablishmentCause originatingSubscribedTrafficCall = 5;
const EstablishmentCause terminatingConversationalCall = 6;
const EstablishmentCause terminatingStreamingCall = 7;
const EstablishmentCause terminatingInteractiveCall = 8;
const EstablishmentCause terminatingBackgroundCall = 9;
const EstablishmentCause emergencyCall = 10;
const EstablishmentCause interRatCellReselection = 11;
```

```
const EstablishmentCause interRatCellChangeOrder = 12;
const EstablishmentCause registration = 13;
const EstablishmentCause detach = 14;
const EstablishmentCause originatingHighPrioritySignalling = 15;
const EstablishmentCause originatingLowPrioritySignalling = 16;
const EstablishmentCause callReestablishment = 17;
const EstablishmentCause terminatingHighPrioritySignalling = 18;
const EstablishmentCause terminatingLowPrioritySignalling = 19;
const EstablishmentCause terminatingCauseUnknown = 20;

// The following failure causes are defined in the section 10.3.3.13 of 3GPP TS 25.331 v5.5.0.
typedef CauseType FailureCause;
const FailureCause configurationUnsupported = 1;
const FailureCause physicalChannelFailure_Failure = 2;
const FailureCause incompatibleSimultaneousReconfiguration = 3;
const FailureCause protocolError_Failure = 4;
const FailureCause compressedModeRuntimeError = 5;
const FailureCause cellUpdateOccurred = 6;
const FailureCause invalidConfiguration = 7;
const FailureCause configurationIncomplete = 8;
const FailureCause unsupportedMeasurement = 9;

// The following rejection causes are defined in the section 10.3.3.31 of 3GPP TS 25.331 v5.5.0.
typedef CauseType RejectionCause;
const RejectionCause congestion_Reject = 1;
const RejectionCause unspecified_Reject = 2;

// The following release causes are defined in the section 10.3.3.32 of 3GPP TS 25.331 v5.5.0.
typedef CauseType ReleaseCause;
const ReleaseCause normalEvent = 1;
const ReleaseCause preemptiveRelease = 2;
const ReleaseCause congestion_Release = 3;
const ReleaseCause reestablishmentReject = 4;
const ReleaseCause userInactivity_Release = 5;
const ReleaseCause directedSignallingConnectionReestablishment = 6;
const ReleaseCause unspecified_Release = 7;
```

```
// The following inter-RAT change failure causes are defined in the section 10.3.8.5 of 3GPP TS
25.331 v5.5.0.
```

```
typedef CauseType InterRatChangeFailureCause;
const InterRatChangeFailureCause configurationUnacceptable_IRATChange = 1;
const InterRatChangeFailureCause physicalChannelFailure_IRATChange = 2;
const InterRatChangeFailureCause protocolError_IRATChange = 3;
const InterRatChangeFailureCause unspecified_IRATChange = 4;
```

```
// The following inter-RAT handover failure causes are defined in the section 10.3.8.6 of 3GPP TS
25.331 v5.5.0.
```

```
typedef CauseType InterRatHandoverFailureCause;
const InterRatHandoverFailureCause configurationUnacceptable_IRATHo = 1;
const InterRatHandoverFailureCause physicalChannelFailure_IRATHo = 2;
const InterRatHandoverFailureCause protocolError_IRATHo = 3;
const InterRatHandoverFailureCause interRatProtocolError = 4;
const InterRatHandoverFailureCause unspecified_IRATHo = 5;
```

```
};
#endif
```

## 6 性能管理接口功能相关的文件

### 6.1 性能测量数据文件的 Schema 定义<measCollec.xsd>

下面的 Schema 文件中用到的字段的说明见附录 A，示例参见附录 B。

版本号：PM FILE V1.0

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Measurement collection data file XML schema measCollec.xsd -->
<schema targetNamespace="http://latest/nmc-omc/cmNrm.doc#measCollec" elementFormDefault="qualified"
xmlns="http://www.w3.org/2001/XMLSchema" xmlns:mc="http://latest/nmc-omc/cmNrm.doc#measCollec">
  <!-- Measurement collection data file root XML element -->
  <element name="measCollecFile">
    <complexType>
      <sequence>
        <element name="fileHeader">
          <complexType>
            <sequence>
              <element name="fileSender">
```



```

        <complexType>
            <attribute name="localDn" type="string" use="optional"/>
            <attribute name="elementType" type="string" use="optional"/>
        </complexType>
    </element>
    <element name="measCollec">
        <complexType>
            <attribute name="beginTime" type="dateTime" use="required"/>
        </complexType>
    </element>
</sequence>
<attribute name="fileFormatVersion" type="string" use="required"/>
<attribute name="vendorName" type="string" use="optional"/>
<attribute name="dnPrefix" type="string" use="optional"/>
</complexType>
</element>
<element name="measData" minOccurs="0" maxOccurs="unbounded">
    <complexType>
        <sequence>
            <element name="managedElement">
                <complexType>
                    <attribute name="localDn" type="string" use="optional"/>
                    <attribute name="userLabel" type="string" use="optional"/>
                    <attribute name="swVersion" type="string" use="optional"/>
                </complexType>
            </element>
            <element name="measInfo" minOccurs="0" maxOccurs="unbounded">
                <complexType>
                    <sequence>
                        <element name="job" minOccurs="0">
                            <complexType>
                                <attribute name="jobId" type="string"
use="required"/>
                            </complexType>
                        </element>
                        <element name="granPeriod">
                            <complexType>

```

```

        <attribute name="duration" type="duration"
use="required"/>
        <attribute name="endTime" type="dateTime"
use="required"/>
    </complexType>
</element>
<element name="repPeriod" minOccurs="0">
    <complexType>
        <attribute name="duration" type="duration"
use="required"/>
    </complexType>
</element>
<choice>
    <element name="measTypes">
        <simpleType>
            <list itemType="mc:measName"/>
        </simpleType>
    </element>
    <element name="measType" minOccurs="0"
maxOccurs="unbounded">
        <complexType>
            <simpleContent>
                <extension base="mc:measName">
                    <attribute name="p"
type="positiveInteger" use="required"/>
                </extension>
            </simpleContent>
        </complexType>
    </element>
</choice>
<element name="measValue" minOccurs="0"
maxOccurs="unbounded">
    <complexType>
        <sequence>
            <choice>
                <element name="measResults">
                    <simpleType>

```



```

itemType="mc:measResultType"/>
maxOccurs="unbounded">
base="mc:measResultType">
type="positiveInteger" use="required"/>
minOccurs="0"/>
use="required"/>
<list
</simpleType>
</element>
<element name="r" minOccurs="0"
<complexType>
<simpleContent>
<extension
<attribute name="p"
</extension>
</simpleContent>
</complexType>
</element>
</choice>
<element name="suspect" type="boolean"
</sequence>
<attribute name="measObjLdn" type="string"
</complexType>
</element>
</sequence>
</complexType>
</element>
</sequence>
</complexType>
</element>
<element name="fileFooter">
<complexType>
<sequence>
<element name="measCollec">
<complexType>
<attribute name="endTime" type="dateTime" use="required"/>
</complexType>

```

```

        </element>
      </sequence>
    </complexType>
  </element>
</sequence>
</complexType>
</element>
<simpleType name="measNameWithSubCounter">
  <restriction base="string">
  </restriction>
</simpleType>
<simpleType name="measNameWithoutSubCounter">
  <restriction base="string">
  </restriction>
</simpleType>
<simpleType name="measName">
  <union memberTypes="mc:measNameWithSubCounter mc:measNameWithoutSubCounter"/>
</simpleType>
<simpleType name="measResultType">
  <union memberTypes="decimal">
    <simpleType>
      <restriction base="string">
        <enumeration value="NIL"/>
      </restriction>
    </simpleType>
  </union>
</simpleType>
</schema>

```

## 6.2 性能测量数据文件的 XML header 定义

在实际性能测量数据文件中应该使用下面的XML header定义:

```

<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
<measCollecFile
  xmlns=
" http://latest/nmc-omc/cmNrm.doc#measCollec "
>

```

附录 A  
(规范性附录)  
Schema 文档补充说明

A.1 XML Schema文档结构标记约定

XML Schema文档结构标记约定如图A.1所示。

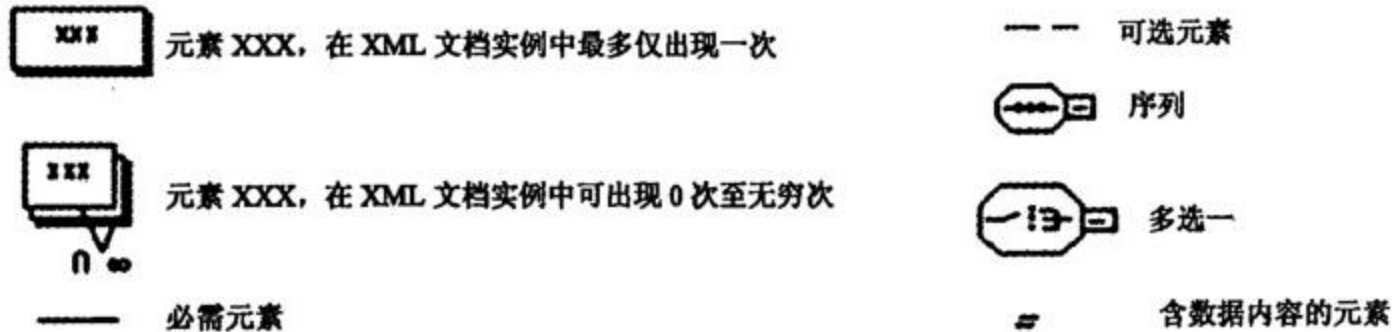


图 A.1 XML Schema 文档结构标记约定

A.2 性能测量数据文件的Schema定义<measCollec.xsd>

a) XML Schema 文档结构如图 A.2 所示。

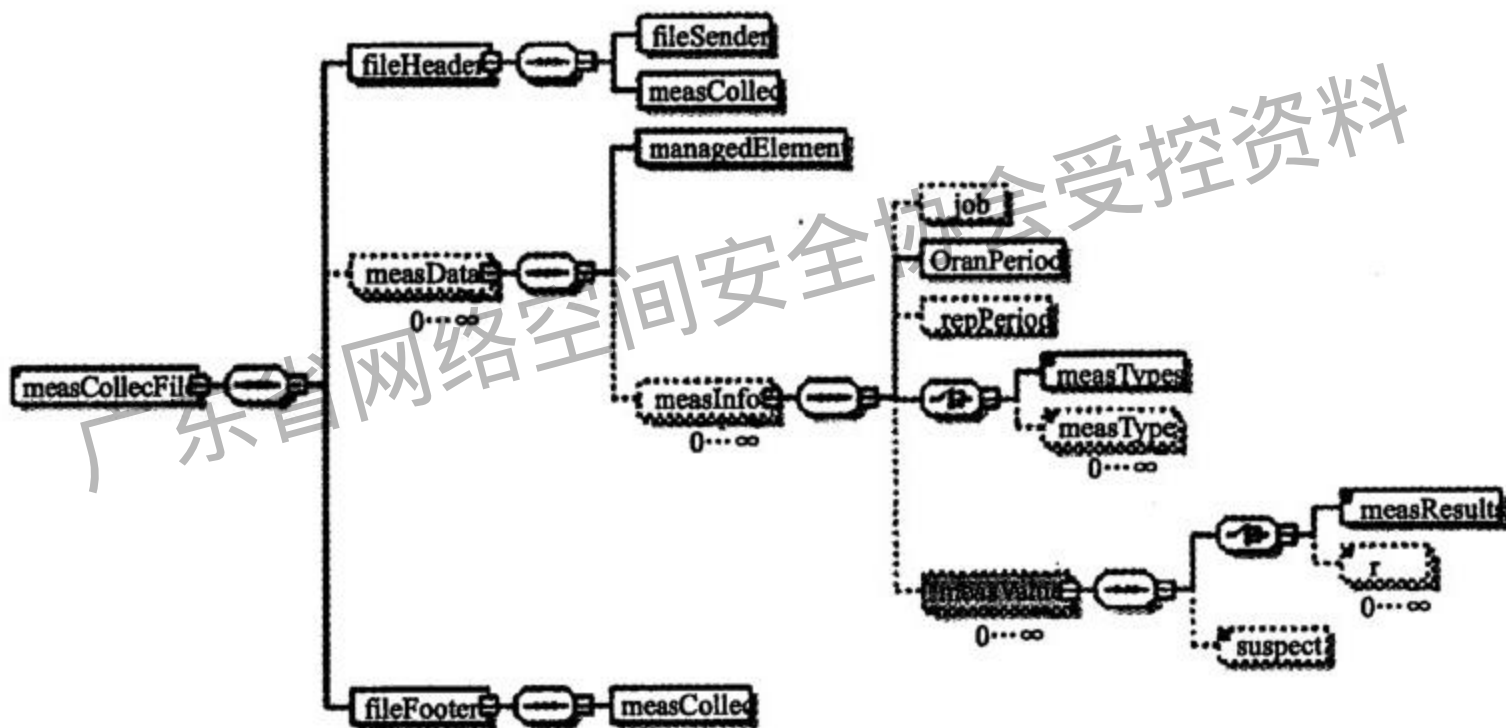


图 A.2 XML Schema 文档结构

b) XML Schema 文档元素/属性说明见表 A.1。

表 A.1 XML Schema 文档元素/属性说明

measCollecFile		性能数据采集文件。是该 Schema 的根元素。由三个子元素组成：文件头部 (fileHeader)、采集数据(measData)以及文件尾部(FileFooter)
fileHeader	fileFormatVersion	文件头部。由两个子元素组成：文件发送方 (fileSender)、测量采集开始时间 (measCollec)。自身包含三个属性：文件格式版本 (fileFormatVersion)、制造商名称 (vendorName) 和识别名前缀 (dnPrefix)
	vendorName	
	dnPrefix	
measData		性能测量数据。在一份采集上报文件中可出现零 (未采集到数据) 至多次。由两个子元素组成：管理网元(managedElement)及其性能采集结果(measInfo)
fileFooter		文件尾部。包含子元素测量采集结束时间 (measCollec)
fileSender	localDn	文件发送发。包含两个属性：本地识别名 (localDN)、网元类型 (elementType)
	elementType	

表 A.1 (续)

managedElement	localDn	被管网元。包括三个属性本地识别名 (localDn)、用户友好名 (userLabel)、软件版本 (swVersion)
	userLabel	
	swVersion	
measInfo		测量信息。由四个子元素组成: 测量任务 (job)、测量粒度周期 (granPeriod)、测量上报周期 (repPeriod)、测量类型 (measType/ measTypes) 和测量值 (measValue)
job		测量任务。该元素为可选元素。由其类型 JobID 唯一标识
granPeriod	duration	测量粒度周期。包含两个属性: 持续时间 (duration)、结束时间 (endTime)
	endTime	
repPeriod	duration	测量上报周期。该元素为可选元素。包含唯一属性: 持续时间 (duration)
measTypes/measType		采集类型。均由 measName 扩展而来。在 XML 文件实例中, 两个元素择一使用。不同的是 measTypes 是以列表方式呈现, 且只出现一次; measType 可出现多次, 由属性值为非负数的 p 加以区分
measType p		p 为属性限定。属性用于区分不同的 measType
measResults/r		采集结果。均由 measResultType 扩展而来。在 XML 文件实例中, 两个元素择一使用。值为空表示该采集项的取值无法获得。不同的是 measResults 是以列表方式呈现, 且只出现一次; r 可出现多次, 由属性值为非负数的 p 加以区分。r 的 p 属性应与 measType 的 p 属性一一对应
r p		p 为属性限定。表示对 <measType p> 的一个采集结果应答。<r p> 需和 <measType p> 一一对应
measValue	measObjLdn	采集值。由两个子元素组成: 采集结果列表 (measResults/r) 和一个标记采集数据是否可信的标志位 (suspect)。本身还包含一个属性: 测量对象本地识别名 (measObjLdn)
suspect		用于标记采集值是否可信。默认值为 False (即可信)
measCollec	beginTime	性能采集开始时间
	endTime	性能采集结束时间
measName		性能测量项名称。分为包含 SubCounter (measNameWithSubCounter) 和不含 SubCounter (measNameWithoutSubCounter) 两类。从 3GPP 规范中扩展而来
measNameWithSubCounter		含 SubCounter 的数据测量项名称。表示为 familyname.measurename.subcounter 形式。从 3GPP 规范中扩展而来
measNameWithoutSubCounter		不含 SubCounter 的数据测量项名称。表示为 familyname.measurename 形式。从 3GPP 规范中扩展而来

附 录 B  
(资料性附录)

性能管理功能相关 XML 文件示例

B.1 性能管理功能相关XML文件示例 1

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>
```

```
<!-- The following is an example of a XML schema based XML measurement report file without use of optional
positioning attributes on measurement types and results -->
```

```
<measCollecFile xmlns="http://latest/nmc-omc/cmNrm.doc#measCollec"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://latest/nmc-omc/cmNrm.doc#measCollec
D:\Downloads\GB\WCDMAM~2.XSD">
```

```

    <fileHeader fileFormatVersion="PM FILE V1.0" vendorName="Company NN"
dnPrefix="DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1">
        <fileSender localDn="SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1"
elementType="RNC"/>
        <measCollec beginTime="2000-03-01T14:00:00+02:00"/>
    </fileHeader>
    <measData>
        <managedElement
localDn="SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1" userLabel="RNC
Telecomville"/>
        <measInfo>
            <job jobId="1231"/>
            <granPeriod duration="PT900S" endTime="2000-03-01T14:14:30+02:00"/>
            <repPeriod duration="PT1800S"/>
            <measTypes>mscBasicMeasurement.failImsiAttachsPerCause.50000
hardHandoverInterSystemMeasurement.failRelocOutInterSysPsPerCause.0
mobileManagementMeasurement.failIntraSgsnRaUpdatePerCause.22222
mobileManagementMeasurement.failIntraSgsnRaUpdatePerCause.1 </measTypes>
            <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-997">
                <measResults>234 345 567 789</measResults>
            </measValue>
            <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-998">
```



```

        <measResults>890 901 123 234</measResults>
    </measValue>
    <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-999">
        <measResults>456 567 678 789</measResults>
        <suspect>true</suspect>
    </measValue>
</measInfo>
</measData>
<fileFooter>
    <measCollec endTime="2000-03-01T14:15:00+02:00"/>
</fileFooter>
</measCollecFile>

```

## B.2 性能管理功能相关XML文件示例 2

```

<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="MeasDataCollection.xsl"?>

<!-- The following is an example of a XML schema based XML measurement report file with use of optional
positioning attributes on measurement types and results -->

<measCollecFile xmlns="http://latest/nmc-omc/cmNrm.doc#measCollec"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://latest/nmc-omc/cmNrm.doc#measCollec
D:\Downloads\GB\WCDMAM~2.XSD">

    <fileHeader fileFormatVersion="PM FILE V1.0" vendorName="Company NN"
dnPrefix="DC=a1.companyNN.com,SubNetwork=1,IRPAgent=1">
        <fileSender localDn="SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1"
elementType="RNC"/>
        <measCollec beginTime="2000-03-01T14:00:00+02:00"/>
    </fileHeader>
    <measData>
        <managedElement
localDn="SubNetwork=CountryNN,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1" userLabel="RNC
Telecomville"/>
        <measInfo>
            <job jobId="1231"/>

```



```

    <granPeriod duration="PT900S" endTime="2000-03-01T14:14:30+02:00"/>
    <repPeriod duration="PT1800S"/>
    <measType p="1">mscBasicMeasurement.attGetRoutingInfo</measType>
    <measType
p="2">hardHandoverInterSystemMeasurement.failRelocOutInterSysPsPerCause.0</measType>
    <measType
p="3">cellRrcConnectionMeasurement.failRrcConnReestabPerCause.50000</measType>
    <measType
p="5">hardHandoverInterSystemMeasurement.failRelocOutInterSysPsPerCause.5</measType>
    <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-997">
        <r p="1">234</r>
        <r p="2">345</r>
        <r p="3">567</r>
        <r p="4">789</r>
    </measValue>
    <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-998">
        <r p="1">890</r>
        <r p="2">901</r>
        <r p="3">123</r>
        <r p="4">234</r>
    </measValue>
    <measValue measObjLdn="RncFunction=RF-1,UtranCell=Gbg-999">
        <r p="1">456</r>
        <r p="2">567</r>
        <r p="3">678</r>
        <r p="4">789</r>
        <suspect>true</suspect>
    </measValue>
    </measInfo>
</measData>
<fileFooter>
    <measCollec endTime="2000-03-01T14:15:00+02:00"/>
</fileFooter>
</measCollecFile>

```

## 参 考 文 献

- [1] 3GPP TS 25.467 UTRAN architecture for 3G Home Node B (HNB); Stage 2
- [2] 3GPP TS 25.468 UTRAN Iuh Interface RANAP User Adaption (RUA) signalling
- [3] 3GPP TS 25.469 UTRAN Iuh interface Home Node B (HNB) Application Part (HNBAP) signalling
- [4] 3GPP TS 22.011 Service accessibility
- [5] 3GPP TS 25.367 Mobility procedures for Home Node B (HNB); Overall description; Stage 2
- [6] TR32.821 Telecommunication Management; Study of Self-Organizing Networks (SON) Related OAM Interfaces for Home NodeB
- [7] 3GPP TR R3.020 Home (e)NodeB;Network aspects (Release 8) V0.9.01 (2008-0911)
- [8] TS 22.220 Service Requirements for Home NodeB (HNB) and Home eNodeB (HeNB)
- [9] TS 32.771 Telecommunication management; Home Node B (HNB) access network Integration Reference Point (IRP); Requirements
- [10] TS 32.772 Telecommunication management; Home Node B (HNB) access network Integration Reference Point (IRP); Network Resource Model (NRM)
- [11] TS32.581 Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Concepts and requirements for Type 1 interface HNB to HNB Management System (HMS)
- [12] TS 32.582 Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Information model for Type 1 interface HNB to HNB Management System (HMS)
- [13] TS 32.583 Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Procedure flows for Type 1 interface HNB to HNB Management System (HMS)
- [14] TS 32.584 Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); XML definitions for Type 1 interface HNB to HNB Management System (HMS)
- [15] 3GPP TS 25.367 Mobility procedures for Home Node B (HNB); Overall description; Stage 2
- [16] 3GPP TS 25.331 Radio Resource Control (RRC); Protocol specification
- [17] 3GPP TS 25.413 UTRAN Iu interface Radio Access Network Application Part (RANAP) signalling

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