



# Nlmf Location

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## OpenAPI

OpenAPI Version: 3.0.0

## Info

**Version:** '1.0.0'  
**Title:** 'LMF Location'  
**Description:** 'LMF Location Service'

## Servers

**URL:** '{apiRoot}/nlmf-loc/v1'  
**Variables:**  
  **API Root:**  
    **Default:** https://example.com  
    **Description:** apiRoot as defined in subclause subclause 4.4 of 3GPP TS 29.501

## Security

- {}

```
- oAuth2ClientCredentials:
  - nlmf-loc
```

# Paths

## /determine-location

**Method:** Post

**Summary:** Determine Location of an UE

**Operation ID:** DetermineLocation

**Tags:**

- Determine Location

**Request Body:**

**Content:**

**Application/JSON:**

**Schema:**

**Reference:** '#/components/schemas/InputData'

**Required/Optional:** true

**Responses:**

'200':

**Description:** Expected response to a valid request

**Content:**

**Application/JSON:**

**Schema:**

**Reference:** '#/components/schemas/LocationData'

'400':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/415'

'500':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/503'

**Default:**

**Reference:** 'TS29571\_CommonData.yaml#/components/responses/default'

# Components

```

securitySchemes:
  oAuth2ClientCredentials:
    Type: oauth2
    Flows:
      clientCredentials:
        tokenUrl: '{nrfApiRoot}/oauth2/token'
        scopes:
          nlmf-loc: Access to the Nlmf_Location API

schemas:
# COMPLEX TYPES
InputData:
  Type: object
  not:
    Required: [ ecgi, ncgi ]
  Properties:
    externalClientType:
      Reference: '#/components/schemas/ExternalClientType'
    correlationID:
      Reference: '#/components/schemas/CorrelationID'
    amfId:
      Reference: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    locationQoS:
      Reference: '#/components/schemas/LocationQoS'
    supportedGADShapes:
      Type: array
      Items:
        Reference: '#/components/schemas/SupportedGADShapes'
      minItems: 1
    supi:
      Reference: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    pei:
      Reference: 'TS29571_CommonData.yaml#/components/schemas/Pei'
    gpsi:
      Reference: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    ecgi:
      Reference: 'TS29571_CommonData.yaml#/components/schemas/Ecgi'
    ncgi:
      Reference: 'TS29571_CommonData.yaml#/components/schemas/Ncgi'
    priority:
      Reference: '#/components/schemas/LcsPriority'
    velocityRequested:
      Reference: '#/components/schemas/VelocityRequested'
LocationData:
  Type: object
  Required:
    - locationEstimate

```

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Properties:
  locationEstimate:
    Reference: '#/components/schemas/GeographicArea'
  accuracyFulfilmentIndicator:
    Reference: '#/components/schemas/AccuracyFulfilmentIndicator'
  ageOfLocationEstimate:
    Reference: '#/components/schemas/AgeOfLocationEstimate'
  velocityEstimate:
    Reference: '#/components/schemas/VelocityEstimate'
  civicAddress:
    Reference: '#/components/schemas/CivicAddress'
  positioningDataList:
    Type: array
    Items:
      Reference: '#/components/schemas/PositioningMethodAndUsage'
    minItems: 1
  gnssPositioningDataList:
    Type: array
    Items:
      Reference: '#/components/schemas/GnssPositioningMethodAndUsage'
    minItems: 1
  ecgi:
    Reference: 'TS29571_CommonData.yaml#/components/schemas/Ecgi'
  ncgi:
    Reference: 'TS29571_CommonData.yaml#/components/schemas/Ncgi'
  altitude:
    Reference: '#/components/schemas/Altitude'
  barometricPressure:
    Reference: '#/components/schemas/BarometricPressure'
GeographicArea:
  oneOf:
  - $ref: '#/components/schemas/Point'
  - $ref: '#/components/schemas/PointUncertaintyCircle'
  - $ref: '#/components/schemas/PointUncertaintyEllipse'
  - $ref: '#/components/schemas/Polygon'
  - $ref: '#/components/schemas/PointAltitude'
  - $ref: '#/components/schemas/PointAltitudeUncertainty'
  - $ref: '#/components/schemas/EllipsoidArc'
GADShape:
  Type: object
  Required:
  - shape
  Properties:
  shape:
    Reference: '#/components/schemas/SupportedGADShapes'
  discriminator:
  propertyName: shape
  mapping:
  POINT: '#/components/schemas/Point'
  POINT_UNCERTAINTY_CIRCLE: '#/components/schemas/PointUncertaintyCircle'
  POINT_UNCERTAINTY_ELLIPSE: '#/components/schemas/PointUncertaintyEllipse'
  POLYGON: '#/components/schemas/Polygon'
  POINT_ALTITUDE: '#/components/schemas/PointAltitude'

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POINT_ALTITUDE_UNCERTAINTY: '#/components/schemas/PointAltitudeUncertainty'
ELLIPSOID_ARC: '#/components/schemas/EllipsoidArc'
Point:
  allOf:
    - $ref: '#/components/schemas/GADShape'
    - type: object
    Required:
      - point
    Properties:
      point:
        Reference: '#/components/schemas/GeographicalCoordinates'
PointUncertaintyCircle:
  allOf:
    - $ref: '#/components/schemas/GADShape'
    - type: object
    Required:
      - point
      - uncertainty
    Properties:
      point:
        Reference: '#/components/schemas/GeographicalCoordinates'
      uncertainty:
        Reference: '#/components/schemas/Uncertainty'
PointUncertaintyEllipse:
  allOf:
    - $ref: '#/components/schemas/GADShape'
    - type: object
    Required:
      - point
      - uncertaintyEllipse
      - confidence
    Properties:
      point:
        Reference: '#/components/schemas/GeographicalCoordinates'
      uncertaintyEllipse:
        Reference: '#/components/schemas/UncertaintyEllipse'
      confidence:
        Reference: '#/components/schemas/Confidence'
Polygon:
  allOf:
    - $ref: '#/components/schemas/GADShape'
    - type: object
    Required:
      - pointList
    Properties:
      pointList:
        Reference: '#/components/schemas/PointList'
PointAltitude:
  allOf:
    - $ref: '#/components/schemas/GADShape'
    - type: object
    Required:
      - point
      - altitude
    Properties:

```

```

    point:
      Reference: '#/components/schemas/GeographicalCoordinates'
    altitude:
      Reference: '#/components/schemas/Altitude'
PointAltitudeUncertainty:
  allOf:
    - $ref: '#/components/schemas/GADShape'
    - type: object
    Required:
      - point
      - altitude
      - uncertaintyEllipse
      - uncertaintyAltitude
      - confidence
    Properties:
      point:
        Reference: '#/components/schemas/GeographicalCoordinates'
      altitude:
        Reference: '#/components/schemas/Altitude'
      uncertaintyEllipse:
        Reference: '#/components/schemas/UncertaintyEllipse'
      uncertaintyAltitude:
        Reference: '#/components/schemas/Uncertainty'
      confidence:
        Reference: '#/components/schemas/Confidence'
EllipsoidArc:
  allOf:
    - $ref: '#/components/schemas/GADShape'
    - type: object
    Required:
      - point
      - innerRadius
      - uncertaintyRadius
      - offsetAngle
      - includedAngle
      - confidence
    Properties:
      point:
        Reference: '#/components/schemas/GeographicalCoordinates'
      innerRadius:
        Reference: '#/components/schemas/InnerRadius'
      uncertaintyRadius:
        Reference: '#/components/schemas/Uncertainty'
      offsetAngle:
        Reference: '#/components/schemas/Angle'
      includedAngle:
        Reference: '#/components/schemas/Angle'
      confidence:
        Reference: '#/components/schemas/Confidence'
GeographicalCoordinates:
  Type: object
  Required:
    - lon
    - lat
  Properties:

```

```
lon:
  Type: number
  format: float
  Minimum: -180
  Maximum: 180
lat:
  Type: number
  format: float
  Minimum: -90
  Maximum: 90
UncertaintyEllipse:
  Type: object
  Required:
    - semiMajor
    - semiMinor
    - orientationMajor
  Properties:
    semiMajor:
      Reference: '#/components/schemas/Uncertainty'
    semiMinor:
      Reference: '#/components/schemas/Uncertainty'
    orientationMajor:
      Reference: '#/components/schemas/Orientation'
PointList:
  Type: array
  Items:
    Reference: '#/components/schemas/GeographicalCoordinates'
  minItems: 3
  maxItems: 15
LocationQoS:
  Type: object
  Properties:
    hAccuracy:
      Reference: '#/components/schemas/Accuracy'
    vAccuracy:
      Reference: '#/components/schemas/Accuracy'
    verticalRequested:
      Type: boolean
    responseTime:
      Reference: '#/components/schemas/ResponseTime'
PositioningMethodAndUsage:
  Type: object
  Required:
    - method
    - mode
    - usage
  Properties:
    method:
      Reference: '#/components/schemas/PositioningMethod'
    mode:
      Reference: '#/components/schemas/PositioningMode'
    usage:
      Reference: '#/components/schemas/Usage'
```

**GnssPositioningMethodAndUsage:****Type:** object**Required:**

- mode
- gnss
- usage

**Properties:****mode:****Reference:** '#/components/schemas/PositioningMode'**gnss:****Reference:** '#/components/schemas/GnssId'**usage:****Reference:** '#/components/schemas/Usage'**CivicAddress:****Type:** object**Properties:****country:****Type:** string**A1:****Type:** string**A2:****Type:** string**A3:****Type:** string**A4:****Type:** string**A5:****Type:** string**A6:****Type:** string**PRD:****Type:** string**POD:****Type:** string**STS:****Type:** string**HNO:****Type:** string**HNS:****Type:** string**LMK:****Type:** string**LOC:****Type:** string**NAM:****Type:** string**PC:****Type:** string**BLD:****Type:** string**UNIT:****Type:** string



```

ROOM:
  Type: string
PLC:
  Type: string
PCN:
  Type: string
POBOX:
  Type: string
ADDCODE:
  Type: string
SEAT:
  Type: string
RD:
  Type: string
RDSEC:
  Type: string
RDBR:
  Type: string
RDSUBBR:
  Type: string
PRM:
  Type: string
POM:
  Type: string
VelocityEstimate:
  oneOf:
    - $ref: '#/components/schemas/HorizontalVelocity'
    - $ref: '#/components/schemas/HorizontalWithVerticalVelocity'
    - $ref: '#/components/schemas/HorizontalVelocityWithUncertainty'
    - $ref: '#/components/schemas/HorizontalWithVerticalVelocityAndUncertainty'
HorizontalVelocity:
  Type: object
  Required:
    - hSpeed
    - bearing
  Properties:
    hSpeed:
      Reference: '#/components/schemas/HorizontalSpeed'
    bearing:
      Reference: '#/components/schemas/Angle'
HorizontalWithVerticalVelocity:
  Type: object
  Required:
    - hSpeed
    - bearing
    - vSpeed
    - vDirection
  Properties:
    hSpeed:
      Reference: '#/components/schemas/HorizontalSpeed'
    bearing:
      Reference: '#/components/schemas/Angle'
    vSpeed:

```

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    Reference: '#/components/schemas/VerticalSpeed'
vDirection:
    Reference: '#/components/schemas/VerticalDirection'
HorizontalVelocityWithUncertainty:
Type: object
Required:
  - hSpeed
  - bearing
  - hUncertainty
Properties:
  hSpeed:
    Reference: '#/components/schemas/HorizontalSpeed'
  bearing:
    Reference: '#/components/schemas/Angle'
  hUncertainty:
    Reference: '#/components/schemas/SpeedUncertainty'
HorizontalWithVerticalVelocityAndUncertainty:
Type: object
Required:
  - hSpeed
  - bearing
  - vSpeed
  - vDirection
  - hUncertainty
  - vUncertainty
Properties:
  hSpeed:
    Reference: '#/components/schemas/HorizontalSpeed'
  bearing:
    Reference: '#/components/schemas/Angle'
  vSpeed:
    Reference: '#/components/schemas/VerticalSpeed'
  vDirection:
    Reference: '#/components/schemas/VerticalDirection'
  hUncertainty:
    Reference: '#/components/schemas/SpeedUncertainty'
  vUncertainty:
    Reference: '#/components/schemas/SpeedUncertainty'
# SIMPLE TYPES
Altitude:
Type: number
format: float
Minimum: -32767
Maximum: 32767
Angle:
Type: integer
Minimum: 0
Maximum: 360
Uncertainty:
Type: number
format: float
Minimum: 0
Orientation:

```

```
    Type: integer
    Minimum: 0
    Maximum: 180
Confidence:
    Type: integer
    Minimum: 0
    Maximum: 100
Accuracy:
    Type: number
    format: float
    Minimum: 0
InnerRadius:
    Type: integer
    format: int32
    Minimum: 0
CorrelationID:
    Type: string
    minLength: 1
    maxLength: 255
AgeOfLocationEstimate:
    Type: integer
    Minimum: 0
    Maximum: 32767
HorizontalSpeed:
    Type: number
    format: float
    Minimum: 0
    Maximum: 2047
VerticalSpeed:
    Type: number
    format: float
    Minimum: 0
    Maximum: 255
SpeedUncertainty:
    Type: number
    format: float
    Minimum: 0
    Maximum: 255
BarometricPressure:
    Type: integer
    Minimum: 30000
    Maximum: 115000
# ENUMS
ExternalClientType:
  anyOf:
    - type: string
      enum:
        - EMERGENCY_SERVICES
        - VALUE_ADDED_SERVICES
        - PLMN_OPERATOR_SERVICES
        - LAWFUL_INTERCEPT_SERVICES
        - PLMN_OPERATOR_BROADCAST_SERVICES
        - PLMN_OPERATOR_OM
```

```

- PLMN_OPERATOR_ANONYMOUS_STATISTICS
- PLMN_OPERATOR_TARGET_MS_SERVICE_SUPPORT
- type: string
SupportedGADShapes:
anyOf:
- type: string
  enum:
  - POINT
  - POINT_UNCERTAINTY_CIRCLE
  - POINT_UNCERTAINTY_ELLIPSE
  - POLYGON
  - POINT_ALTITUDE
  - POINT_ALTITUDE_UNCERTAINTY
  - ELLIPSOID_ARC
- type: string
ResponseTime:
anyOf:
- type: string
  enum:
  - LOW_DELAY
  - DELAY_TOLERANT
- type: string
PositioningMethod:
anyOf:
- type: string
  enum:
  - CELLID
  - ECID
  - OTDOA
  - BAROMETRIC_PRESSURE
  - WLAN
  - BLUETOOTH
  - MBS
- type: string
PositioningMode:
anyOf:
- type: string
  enum:
  - UE_BASED
  - UE_ASSISTED
  - CONVENTIONAL
- type: string
GnssId:
anyOf:
- type: string
  enum:
  - GPS
  - GALILEO
  - SBAS
  - MODERNIZED_GPS
  - QZSS
  - GLONASS
- type: string
Usage:
anyOf:
- type: string
  enum:
  - UNSUCCESS
  - SUCCESS_RESULTS_NOT_USED
  - SUCCESS_RESULTS_USED_TO_VERIFY_LOCATION

```

```
    - SUCCESS_RESULTS_USED_TO_GENERATE_LOCATION
    - SUCCESS_METHOD_NOT_DETERMINED
  - type: string
LcsPriority:
  anyOf:
    - type: string
    enum:
      - HIGHEST_PRIORITY
      - NORMAL_PRIORITY
    - type: string
VelocityRequested:
  anyOf:
    - type: string
    enum:
      - VELOCITY_IS_NOT_REQUESTED
      - VELOCITY_IS_REQUESTED
    - type: string
AccuracyFulfilmentIndicator:
  anyOf:
    - type: string
    enum:
      - REQUESTED_ACCURACY_FULFILLED
      - REQUESTED_ACCURACY_NOT_FULFILLED
    - type: string
VerticalDirection:
  Type: string
  enum:
    - UPWARD
    - DOWNWARD
```

## External Docs

**Description:** 3GPP TS 29.572 V15.2.0; 5G System; Location Management Services; Stage 3

**URL:** '[http://www.3gpp.org/ftp/Specs/archive/29\\_series/29.572/](http://www.3gpp.org/ftp/Specs/archive/29_series/29.572/)'

