

(http://hl7.org/fhir) **Current Build**

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## 4.30 Resource WaveForm - Content (waveform.html#4.30)

Health Care Devices (http://www.hl7.org/Special/committees/healthcareddevices/index.cfm) Work Group	Maturity Level (resource.html#maturity): 0	Compartments (compartments.html): Patient (compartment-patient.html)
---	--	---




Representation of a waveform measurement on a patient, For Example: ECG.


### 4.30.1 Scope and Usage (waveform.html#bnc)

Todo

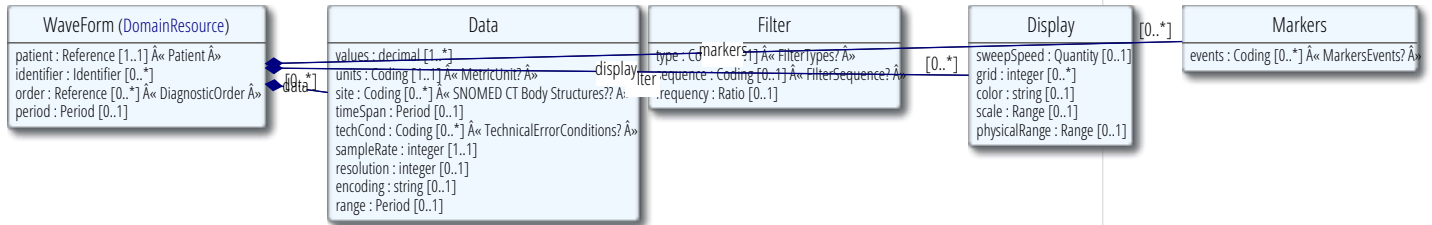
### 4.30.2 Resource Content (waveform.html#resource)

Structure	UML	XML	JSON	All
<b>Structure</b>				
Name (formats.html#table)	Flags (formats.html#table)	Card. (formats.html#table)	Type (formats.html#table)	Description & Constraints (formats.html#table)
WaveForm (waveform-definitions.html#WaveForm)			DomainResource (domainresource.html)	Waveform measurement
patient (waveform-definitions.html#WaveForm.patient)		1..1	Reference (references.html) (Patient (patient.html))	Who the waveform is about
identifier (waveform-definitions.html#WaveForm.identifier)		0..*	Identifier (datatypes.html#Identifier)	Other identifiers for this waveform
order (waveform-definitions.html#WaveForm.order)		0..*	Reference (references.html) (DiagnosticOrder (diagnosticorder.html))	Order
period (waveform-definitions.html#WaveForm.period)		0..1	Period (datatypes.html#Period)	Time sample was taken
data (waveform-definitions.html#WaveForm.data)		0..*	BackboneElement (backboneelement.html)	Waveform data
values (waveform-definitions.html#WaveForm.data.values)		1..*	decimal (datatypes.html#decimal)	Waveform values
units (waveform-definitions.html#WaveForm.data.units)		1..1	Coding (datatypes.html#Coding)	Measurement units
site (waveform-definitions.html#WaveForm.data.site)		0..*	Coding (datatypes.html#Coding)	MetricUnit (https://rtmms.nist.gov/rtmms) (Preferred terminologies.html) Where taken
timeSpan (waveform-definitions.html#WaveForm.data.timeSpan)		0..1	Period (datatypes.html#Period)	SNOMED CT Body Structures (terminologies.html#example) Period for bounded waveforms
techCond (waveform-definitions.html#WaveForm.data.techCond)		0..*	Coding (datatypes.html#Coding)	Technical error condition
sampleRate (waveform-definitions.html#WaveForm.data.sampleRate)		1..1	integer (datatypes.html#integer)	TechnicalErrorConditions (https://rtmms.nist.gov/rtmms) (Preferred terminologies.html) Number of samples per unit time
resolution (waveform-definitions.html#WaveForm.data.resolution)		0..1	integer (datatypes.html#integer)	Measurement resolution
encoding (waveform-definitions.html#WaveForm.data.encoding)		0..1	string (datatypes.html#string)	Encoding used
range (waveform-definitions.html#WaveForm.data.range)		0..1	Period (datatypes.html#Period)	Sample range
filter (waveform-definitions.html#WaveForm.data.filter)		0..*	BackboneElement (backboneelement.html)	Filter applied to the data
type (waveform-definitions.html#WaveForm.data.filter.type)		1..1	Coding (datatypes.html#Coding)	Containment hierarchy
sequence (waveform-definitions.html#WaveForm.data.filter.sequence)		0..1	Coding (datatypes.html#Coding)	FilterTypes (https://rtmms.nist.gov/rtmms) (terminologies.html#preferred) Filter Sequence type
frequency (waveform-definitions.html#WaveForm.data.filter.frequency)		0..1	Ratio (datatypes.html#Ratio)	FilterSequence (https://rtmms.nist.gov/rtmms) (Preferred terminologies.html) Filter frequency
display (waveform-definitions.html#WaveForm.display)		0..*	BackboneElement (backboneelement.html)	Display attributes
sweepSpeed (waveform-definitions.html#WaveForm.display.sweepSpeed)		0..1	Quantity (datatypes.html#Quantity)	Display sweep speed
grid (waveform-definitions.html#WaveForm.display.grid)		0..*	integer (datatypes.html#integer)	Horizontal position
color (waveform-definitions.html#WaveForm.display.color)		0..1	string (datatypes.html#string)	Color for line
scale (waveform-definitions.html#WaveForm.display.scale)		0..1	Range (datatypes.html#Range)	Display scale range

 physicalRange (waveform-definitions.html#WaveForm.display.physicalRange)	0..1	Range (datatypes.html#Range)	Physiological range
 markers (waveform-definitions.html#WaveForm.markers)	0..*	BackboneElement (backboneelement.html)	Additional Markers and Events
 events (waveform-definitions.html#WaveForm.markers.events)	0..*	Coding (datatypes.html#Coding)	Markers and events MarkersEvents <a href="https://rtmms.nist.gov/rtmms">https://rtmms.nist.gov/rtmms</a> (Preferred (terminologies.html

 Documentation for this format (formats.html#table)

#### UML Diagram



#### XML Template

```
<WaveForm (waveform-definitions.html#WaveForm) xmlns="http://hl7.org/fhir"
  <!-- from Resource (resource.html): id (resource.html#id), meta (resource.html#meta), implicitRules (resource.html#implicitRules), and language (resource.html#language) -->
  <!-- from DomainResource (domainresource.html): text (narrative.html#Narrative), contained (references.html#contained), extension (extensibility.html), and modifierExtension (extensibility.html#modifierExtension) -->
  <patient (waveform-definitions.html#WaveForm.patient)><!-- 1.1 Reference (references.html#Reference) (Patient (patient.html#Patient)) Who the waveform is about (terminologies.html#unbound) --></patient>
  <identifier (waveform-definitions.html#WaveForm.identifier)><!-- 0..* Identifier (datatypes.html#Identifier) Other identifiers for this waveform (terminologies.html#unbound) --></identifier>
  <order (waveform-definitions.html#WaveForm.order)><!-- 0..* Reference (references.html#Reference) (DiagnosticOrder (diagnosticorder.html#DiagnosticOrder)) Order (terminologies.html#unbound) --></order>
  <period (waveform-definitions.html#WaveForm.period)><!-- 0..1 Period (datatypes.html#Period) Time sample was taken (terminologies.html#unbound) --></period>
  <data (waveform-definitions.html#WaveForm.data)> <!-- 0..* Waveform data -->
    <values (waveform-definitions.html#WaveForm.data.values) value="[decimal (datatypes.html#decimal)]"/>
    <!-- 1..* Waveform values (terminologies.html#unbound) -->
    <units (waveform-definitions.html#WaveForm.data.units)><!-- 1.1 Coding (datatypes.html#Coding) Measurement units (https://rtmms.nist.gov/rtmms/index.htm#units) --></units>
    <site (waveform-definitions.html#WaveForm.data.site)><!-- 0..* Coding (datatypes.html#Coding) Where taken (valueset-body-site.html) --></site>
    <timeSpan (waveform-definitions.html#WaveForm.data.timeSpan)><!-- 0..1 Period (datatypes.html#Period) Period for bounded waveforms (terminologies.html#unbound) --></timeSpan>
    <techCond (waveform-definitions.html#WaveForm.data.techCond)><!-- 0..* Coding (datatypes.html#Coding) Technical error condition (https://rtmms.nist.gov/rtmms/index.htm#technicalErrorConditions) --></techCond>
    <sampleRate (waveform-definitions.html#WaveForm.data.sampleRate) value="[integer (datatypes.html#integer)]"/><!-- 1.1 Number of samples per unit time (terminologies.html#unbound) -->
    <resolution (waveform-definitions.html#WaveForm.data.resolution) value="[integer (datatypes.html#integer)]"/><!-- 0..1 Measurement resolution (terminologies.html#unbound) -->
    <encoding (waveform-definitions.html#WaveForm.data.encoding) value="[string (datatypes.html#string)]"/>
    <!-- 0..1 Encoding used (terminologies.html#unbound) -->
    <range (waveform-definitions.html#WaveForm.data.range)><!-- 0..1 Period (datatypes.html#Period) Sample range (terminologies.html#unbound) --></range>
    <filter (waveform-definitions.html#WaveForm.data.filter)> <!-- 0..* Filter applied to the data -->
      <type (waveform-definitions.html#WaveForm.data.filter.type)><!-- 1.1 Coding (datatypes.html#Coding) Containment hierarchy (https://rtmms.nist.gov/rtmms/index.htm#FilterTypes) --></type>
      <sequence (waveform-definitions.html#WaveForm.data.filter.sequence)><!-- 0..1 Coding (datatypes.html#Coding) Filter Sequence type (https://rtmms.nist.gov/rtmms/index.htm#FilterSequence) --></sequence>
      <frequency (waveform-definitions.html#WaveForm.data.filter.frequency)><!-- 0..1 Ratio (datatypes.html#Ratio) Filter frequency (terminologies.html#unbound) --></frequency>
    </filter>
  </data>
  <display (waveform-definitions.html#WaveForm.display)> <!-- 0..* Display attributes -->
    <sweepSpeed (waveform-definitions.html#WaveForm.display.sweepSpeed)><!-- 0..1 Quantity (datatypes.html#Quantity) Display sweep speed (terminologies.html#unbound) --></sweepSpeed>
    <grid (waveform-definitions.html#WaveForm.display.grid) value="[integer (datatypes.html#integer)]"/><!-- 0..* Horizontal position (terminologies.html#unbound) -->
    <color (waveform-definitions.html#WaveForm.display.color) value="[string (datatypes.html#string)]"/><!-- 0..1 Color for line (terminologies.html#unbound) -->
    <scale (waveform-definitions.html#WaveForm.display.scale)><!-- 0..1 Range (datatypes.html#Range) Display scale range (terminologies.html#unbound) --></scale>
    <physicalRange (waveform-definitions.html#WaveForm.display.physicalRange)><!-- 0..1 Range (datatypes.html#Range) Physiological range (terminologies.html#unbound) --></physicalRange>
  </display>
  <markers (waveform-definitions.html#WaveForm.markers)> <!-- 0..* Additional Markers and Events -->
    <events (waveform-definitions.html#WaveForm.markers.events)><!-- 0..* Coding (datatypes.html#Coding) Markers and events (https://rtmms.nist.gov/rtmms/index.htm#MarkersEvents) --></events>
  </markers>
</WaveForm>
```

#### JSON Template

```
{
  "resourceType": "WaveForm (waveform-definitions.html#WaveForm)",
  // from Resource (resource.html): id (resource.html#id), meta (resource.html#meta), implicitRules (resource.html#implicitRules), and language (resource.html#language)
  // from DomainResource (domainresource.html): text (narrative.html#Narrative), contained (references.html#contained), extension (extensibility.html), and modifierExtension (extensibility.html#modifierExtension)
  "patient (waveform-definitions.html#WaveForm.patient)": { Reference (references.html#Reference)(Patient (patient.html#Patient)) }, // R! Who the waveform is about (terminologies.html#unbound)
  "identifier (waveform-definitions.html#WaveForm.identifier)": [{ Identifier (datatypes.html#Identifier) }], // Other identifiers for this waveform (terminologies.html#unbound)
  "order (waveform-definitions.html#WaveForm.order)": [{ Reference (references.html#Reference)(DiagnosticOrder (diagnosticorder.html#DiagnosticOrder)) }], // Order (terminologies.html#unbound)
  "period (waveform-definitions.html#WaveForm.period)": { Period (datatypes.html#Period) }, // Time sample was taken (terminologies.html#unbound)
  "data (waveform-definitions.html#WaveForm.data)": [{ // Waveform data (terminologies.html#unbound)
    "values (waveform-definitions.html#WaveForm.data.values)": [<decimal (datatypes.html#decimal)>], // R! Waveform values (terminologies.html#unbound)
    "units (waveform-definitions.html#WaveForm.data.units)": { Coding (datatypes.html#Coding) }, // R! Measurement units (https://rtmms.nist.gov/rtmms/index.htm#!units)
    "site (waveform-definitions.html#WaveForm.data.site)": [{ Coding (datatypes.html#Coding) }], // Where taken (valueset-body-site.html)
    "timeSpan (waveform-definitions.html#WaveForm.data.timeSpan)": { Period (datatypes.html#Period) }, // Period for bounded waveforms (terminologies.html#unbound)
    "techCond (waveform-definitions.html#WaveForm.data.techCond)": [{ Coding (datatypes.html#Coding) }], // Technical error condition (https://rtmms.nist.gov/rtmms/index.htm#!technicalErrorConditions)
    "sampleRate (waveform-definitions.html#WaveForm.data.sampleRate)": <integer (datatypes.html#integer)>, // R! Number of samples per unit time (terminologies.html#unbound)
    "resolution (waveform-definitions.html#WaveForm.data.resolution)": <integer (datatypes.html#integer)>, // Measurement resolution (terminologies.html#unbound)
    "encoding (waveform-definitions.html#WaveForm.data.encoding)": "<string (datatypes.html#string)>", // Encoding used (terminologies.html#unbound)
    "range (waveform-definitions.html#WaveForm.data.range)": { Period (datatypes.html#Period) }, // Sample range (terminologies.html#unbound)
    "filter (waveform-definitions.html#WaveForm.data.filter)": [{ // Filter applied to the data (terminologies.html#unbound)
      "type (waveform-definitions.html#WaveForm.data.filter.type)": { Coding (datatypes.html#Coding) }, // R! Containment hierarchy (https://rtmms.nist.gov/rtmms/index.htm#!FilterTypes)
      "sequence (waveform-definitions.html#WaveForm.data.filter.sequence)": { Coding (datatypes.html#Coding) }, // Filter Sequence type (https://rtmms.nist.gov/rtmms/index.htm#!FilterSequence)
      "frequency (waveform-definitions.html#WaveForm.data.filter.frequency)": { Ratio (datatypes.html#Ratio) } // Filter frequency (terminologies.html#unbound)
    }]
  }],
  "display (waveform-definitions.html#WaveForm.display)": [{ // Display attributes (terminologies.html#unbound)
    "sweepSpeed (waveform-definitions.html#WaveForm.display.sweepSpeed)": { Quantity (datatypes.html#Quantity) }, // Display sweep speed (terminologies.html#unbound)
    "grid (waveform-definitions.html#WaveForm.display.grid)": [<integer (datatypes.html#integer)>], // Horizontal position (terminologies.html#unbound)
    "color (waveform-definitions.html#WaveForm.display.color)": "<string (datatypes.html#string)>", // Color for line (terminologies.html#unbound)
    "scale (waveform-definitions.html#WaveForm.display.scale)": { Range (datatypes.html#Range) }, // Display scale range (terminologies.html#unbound)
    "physicalRange (waveform-definitions.html#WaveForm.display.physicalRange)": { Range (datatypes.html#Range) } // Physiological range (terminologies.html#unbound)
  }],
  "markers (waveform-definitions.html#WaveForm.markers)": [{ // Additional Markers and Events (terminologies.html#unbound)
    "events (waveform-definitions.html#WaveForm.markers.events)": [{ Coding (datatypes.html#Coding) }], // Markers and events (https://rtmms.nist.gov/rtmms/index.htm#!MarkersEvents)
  }]
}
```

Alternate definitions: Schema (waveform.xsd)/Schematron (waveform.sch), Resource Profile (XML (waveform.profile.xml.html), JSON (waveform.profile.json.html)), Questionnaire (waveform-questionnaire.html)

#### 4.30.2.1 Terminology Bindings (waveform.html#tx)


Path	Definition	Type	Reference
WaveForm.data.units	Describes the unit of metric	Preferred (terminologies.html#preferred)	IEEE 11073-10101 (https://rtmms.nist.gov/rtmms/index.htm#!units)
WaveForm.data.site	Codes describing anatomical locations.	Example (terminologies.html#example)	SNOMED CT Body Structures (valueset-body-site.html)
WaveForm.data.techCond	Technical Error Conditions	Preferred (terminologies.html#preferred)	IEEE 11073-10101 (https://rtmms.nist.gov/rtmms/index.htm#!technicalErrorConditions)
WaveForm.data.filter.type	Filter types	Preferred (terminologies.html#preferred)	IEEE 11073-10101 (https://rtmms.nist.gov/rtmms/index.htm#!FilterTypes)
WaveForm.data.filter.sequence	Filter	Preferred	IEEE 11073-10101 (https://rtmms.nist.gov/rtmms/index.htm#!FilterSequence)

	Sequence	(terminologies.html#preferred)	(https://rtmms.nist.gov/rtmms/index.htm#!FilterSequence)
WaveForm.markers.events	Markers and Events	Preferred (terminologies.html#preferred)	IEEE 11073-10101 <a href="#">↗</a> (https://rtmms.nist.gov/rtmms/index.htm#!MarkersEvents)

4.30.3 Search Parameters 🌐 (waveform.html#search)

Search parameters for this resource. The common parameters (search.html#all) also apply. See Searching (search.html) for more information about searching in REST, messaging, and services.

Name	Type	Description	Paths
patient	reference (search.html#reference)	Who the waveform is about	WaveForm.patient

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