

# Radiotext plus (RTplus)

## Specification

(Version 1.0)

### 1. Foreword

RTplus has been developed jointly by the Westdeutscher Rundfunk WDR, Nokia and the Institut für Rundfunktechnik IRT. WDR is a broadcaster, Nokia is manufacturer for mobile phones and IRT is a research institute.

The RTplus specification was edited by IRT and Nokia and is maintained by IRT. If a company applies this specification in its devices, it is obliged to indicate this to IRT (contact [richter@irt.de](mailto:richter@irt.de)), so it can be informed about the latest status of the specification. The application of the specification is free of charge.

### 2. Introduction

RTplus is designed to let the listener (or user) take additional benefit from the RDS radiotext service, by enabling receivers to offer him direct access to specific elements of Radiotext messages (e.g. to the title of the currently broadcasted song, to news, to telephone numbers (e.g. for voting), to web addresses for browsing Web content offered by the radio programme provider etc.). These **RTplus information elements** carried in the **RDS radiotext (RT) messages**, are identified by its location within the RT messages and by the class code of its **content type**. So a receiver is able to store the different RTplus information elements and the listener may then select and request a specific content type from the storage at an instant in time that fits to the listeners needs. The advantage of this method is that the listener is no longer forced to watch a lot of information passing by, to pick out the desired one, he rather gets the opportunity to select specifically his favourite information to be shown on a static display. Moreover RTplus gives a chance to provide selected RT message elements to car drivers on a static display without risk of distracting the attention of the driver. Further on RTplus is well suited for mobile phones with built-in FM receivers: telephone numbers may be routed directly from the RDS RT to the dialer. Last but not least RTplus will be used for radio broadcasting via DVB-S (see 5.2). It may be adopted by DRM and DAB, too.

RTplus is based on RDS RT messages and is completely backwards compatible to the RT. All additional information necessary for implementing the RTplus service is carried in the RDS group 3A and in an appropriate RDS ODA group (see the following figure).

RTplus information elements		
RT Message	RTplus identification	RTplus Tags
RDS group 2 A/B	RDS group 3A	RDS group ODA xA

### 3. RTplus Tag

When a RT message like "You are listening to „House of the rising sun“ by Eric Burdon" is sent out, the RTplus information elements title and artist are marked by two RTplus tags.

A **RTplus Tag** consists of three elements

- RT Content Type
- Start Marker pointing to the position (inside the RT message) of the first character of that RTplus information element
- Length Marker indicating the length of that RTplus information element

The content type is taken from a list with 64 entries (see Table 1).

For the example given above the two tags are as follows:

RT Content Type	ITEM.TITLE
Start Marker	22
Length Marker	23

RT Content Type	ITEM.ARTIST
Start Marker	50
Length Marker	11

Start Marker and Length Marker can be derived from the following scheme below:

You are listening to „House of the rising sun“ by Eric Burdon  
 0----0----1----1----2----2----3----3----4----4----5----5----6---  
 0----5----0----5----0----5----0----5----0----5----0----5----0---

Note

The addresses of the RT characters range from 0 to 63, so the start marker can take the same values.

Note

The length marker is ranging from 0 to 63.

Length 0 has a special meaning (see 5.2).

## 4. RTplus information elements and data model

The content of RTplus information elements is carried in RDS RT messages. Their content is classified as content type and is given as code in the RTplus tag.

In subsequent sections the RTplus information elements are notated similar to the notation used in XML-mark-up languages, the examples given above will be written as:

<ITEM.Title>House of the rising sun</ITEM.Title>and as

<ITEM.ARTIST>Eric Burdon</ITEM.ARTIST>.

The content type of the RTplus information element as given in the RTplus, is indicated by angle brackets. The information itself (as a part of a RT message) is written between the starting and ending pair of brackets, start and end marker are ignored on this level because they are only needed for filtering the RT messages.

### 4.1. List of RT content types

The list of defined content types is given in table 1. There are 64 classes of content types available which a programme service provider can offer and the listener can select from, each with a specific class code. The classes can be grouped in the following **categories**:

- Programme  
Content types of this category are describing the programme service.
- Item  
The programme is made up of a sequence of items. In popular music programmes an item is a song, in a programme with classical music it may be a complete symphony. A speech based programme may also be assembled by different items.  
An item can be described by one, several or even all classes of this category, but for the duration of the item, the associated RTplus information element of each class has a single value, e.g. the RTplus information element classified as title will be fixed to “House of the rising sun” until the start of the next song.
- Info: Information and service  
RTplus information elements of this category carry textual service information that is more or less unrelated to the audio service, but is offering the latest and most important information to the listener, including info about alarms, advertisements and events.
- Interactivity  
Telephone numbers, SMS numbers, e-mail addresses or web addresses (URLs) are given. The listener may send contributions to chat conversations to a chat center. These

contributions are broadcast by the radio station.

Questions for voting may be sent as RTplus content. The listener may send his response to the vote center.

- Open classes

Whereas all other classes describe precisely the content type, so their interpretation by automatic routines within the terminal or by a human user is obvious, the open classes can be defined just according to the needs of a specific programme service provider by himself. The interpretation then is dependent on the programme service and may require appropriate clients on the receiver terminal.

- Descriptors

An information element belonging to one of the classes above, can be explained by one of the descriptors belonging to the category descriptor. Both, the information element and the descriptor are forming a pair of RTplus tags.

As an example: the descriptor GET\_DATA contains the url-address or the SMS number for retrieving either via a sms- or url-link more data via unicast describing the RTplus element in the first tag the descriptor is referring to. So the listener can get access to the music item, to special news, events etc.

## 4.2. Structures of RTplus information elements

Some RTplus information elements of the same content type (and class) may be constructed by a service provider following a general pattern: e.g. results of football matches may be given as content type INFO.Sport with the two parts indicating the match as one part and the result as a second part.

```
<INFO.SPORT> Bayern München:AC Milano: 5:5 </INFO.SPORT >.
```

This specification generalizes the scheme given above as follows:

The different parts are separated by two or more consecutive space/blank characters (a blank is notated in this text with “#”) – redundant spaces – so the redundant space serves as delimiter between those parts. The first part (i.e. the words before the first occurrence of redundant space characters) is called the “Key Word” and will be used primarily for explanation of the following text.

This scheme will be used for the following classes:

- PHONE.OTHER
- SMS.OTHER
- EMAIL.OTHER
- MMS.OTHER.

The key word carries an explanation for the user, the second part carries the number for the phone, the SMS or MMS or the email address.

This scheme allows also an advanced receiver to accumulate all information (carried in the sequence of tags of the same content type) to one table to be presented to the user.

For explanation the following examples are given for different classes, first line(s) indicating the structure, last line giving a specific example:

- INFO.STOCKMARKET  
[Symbol##Latest value] or more extended:  
[Symbol##Change##Latest value##High##Low##Volume] e.g.:  
<INFO.STOCKMARKET>Nok##12.27##0.41##12.31##12.15##23,332,238  
</INFO.STOCKMARKET>
- INFO.SPORT  
[Match##Result] or more extended:  
[Football##Match##Result] e.g.  
<INFO.SPORT>Bayern München:AC Milano:##5:5 </INFO.SPORT >.
- INFO.WEATHER  
[Description##Temperature] e.g.  
<INFO.WEATHER>Raining##16 Grad C</INFO.WEATHER> or  
<INFO.WEATHER>Munich##23Grad C </INFO.WEATHER>

- INTERACTIVITY.PhoneOther  
[Descriptor#Phone Number]  
<PHONE.OTHER>Deutsches Museum###089323990</PHONE.OTHER>

Note:

Alternatively the descriptor of the classes PHONE.OTHER, SMS.OTHER, EMAIL.OTHER and MMS.OTHER may be put into tag 1 and the second part, i.e. the phone number or the address, will be put to tag 2. This would allow the text editor more freedom to introduce additional glue words in the RT message that would be the basis for the RTplus classes.

RT messages may contain several space characters for optimizing layout in static displays. But if the RT messages are used in context with a RTplus service, redundant spaces in parts marked by RTplus, are only allowed for the purpose of delimiting two or more parts of the RTplus content.

### **4.3. Receiver data model**

The RTplus feature is designed to allow a broad range of receiver models with different display capabilities and memory complexity.

A simple receiver will store a small selection of RTplus information classes only. The storage will contain only the current content of the RTplus classes. The storage of a class will be overwritten by a new version of that class. The receiver may offer the choice to the listener, which RTplus class will be presented on the display to him. So a listener may want to see one or several RTplus information classes of the category ITEM simultaneously, e.g. title and artist of the currently received programme item.

More complex receivers will store not only the current content of several classes, but will use a memory to keep the information collected in the past. For reviewing e.g. the list of earlier received programme items it is essential for the receiver that it can combine the different RTplus information elements (received at different times) correctly so that elements of different items are not mixed. For that purpose an item toggle bit (sent together with every pair of RTplus tags) changes every time a new item starts.

Receivers can realize further comfort when they assemble an ordered cumulative list of all RTplus elements of a specific class, e.g. the class INFO.SPORT may be displayed as list of the football match results. This is easy to implement for those classes of the category INFO, that apply redundant space characters as delimiter between several parts of the text. The first part, the keyword, can be used to establish a table which is ordered according to the keywords. Updating is also possible, if the keyword is not changed.

The text service provider sends a clear command, if he wants such a table to be deleted. Such a clear command will also be sent if the display has to be cleared. The clear command is generally referring to a single class (according to the content type of the clear command). Only the clear command for the classes of the category ITEM is different: a single clear command to a single class must clear the display (only), however all classes of the last received item.

## **5. Coding RTplus in RDS groups**

To transmit the RTplus tags an Open Data Application (ODA, see IEC 62106 sections 3.1.4 and 3.1.5.4) is used and is being defined by this specification.

The Application Identification (AID) assigned for RTplus is 4BD7 (hex). The message bits of group 3A bear control data for the application. The information to identify the RTplus tags within the RT is conveyed in the application group. Only type A groups are used.

## 5.1. RTplus identification (RDS group 3A)

The coding of the message bits of group 3A (application identification for the ODA RTplus) is shown in figure 1.

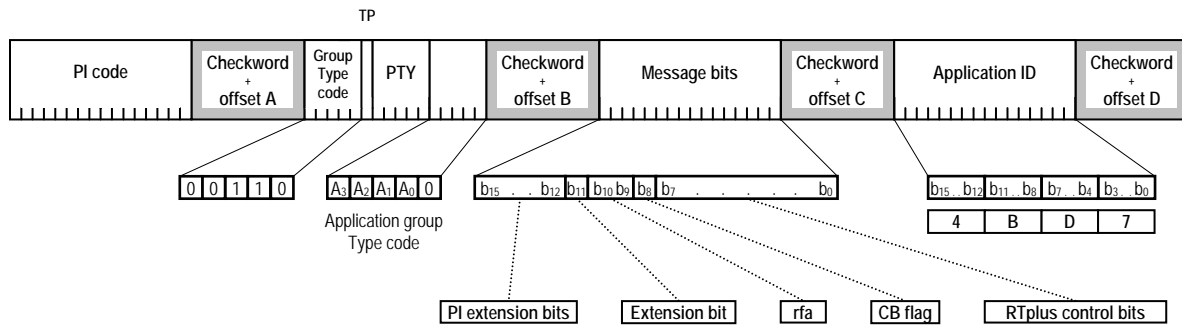


Figure 1: Bit allocation for group 3A (message bits and AID)

Application group Type code:

The group type for transmitting the RTplus application data can be chosen out of table 6, IEC 62106 section 3.1.4.1. The group type code is signaled in block 2 of RDS group 3A

The meaning of the message bits of group 3A is as follows:

PI extension bits

It may occur, that the same PI code is used repeatedly in a national area (e.g. for local program stations far away from each other). In these cases the PI Extension Bits are used together with the PI code Bits to identify a radio station nation wide uniquely. Those PI Extension bits shall be co-ordinated by the organisations which are currently already in charge to assign the PI bits.

Extension bit

The Extension bit shall indicate if in parallel to RDS on the same FM frequency data are also broadcasted via DARC (SWIFT). A receiver may first look for RDS and will find here in the extension bit the hint to look for more data in the DARC channel.

Rfa

Reserved for future additions, the functions of the other bits are not affected.

CB flag / RTplus control bits

The CB flag is the flag controlling the behaviour of the receiver regarding the following RT control bits. If CB flag is set to "0", information (8 bit) can be given directly to the receiver. This might control the "skin" of the receiver. E.g. the current radio program requires the receiver to display pop music information (title, artist) or classic music information (composition, conductor, composer)

If CB flag is set to "1", the following 8 bits are used as a pointer to some external data on a web server<sup>1</sup>. This requires the receiver to be able to download actively external data (unicast). E.g. if a radio station has its own radio client or skin, the radio station can signal to the receiver to update the client .

<sup>1</sup> To be defined

## 5.2. Coding of the RTplus tag

In the message bits of the RTplus application group a pair of RTplus tags are conveyed. All RTplus classes or content types can be put into the one or the other tag of the application group, only content types of the category Descriptors are coded exclusively as second tag of the pair; the descriptor in tag 2 gives additional information to the content type in tag 1. So descriptor in tag 2 is always referring to the content type in tag 1.

The start addresses in the tags may be chosen according to the needs during the RT generation, So the sequence of the tags in the application group does not prescribe the sequence of the information elements in the RT:

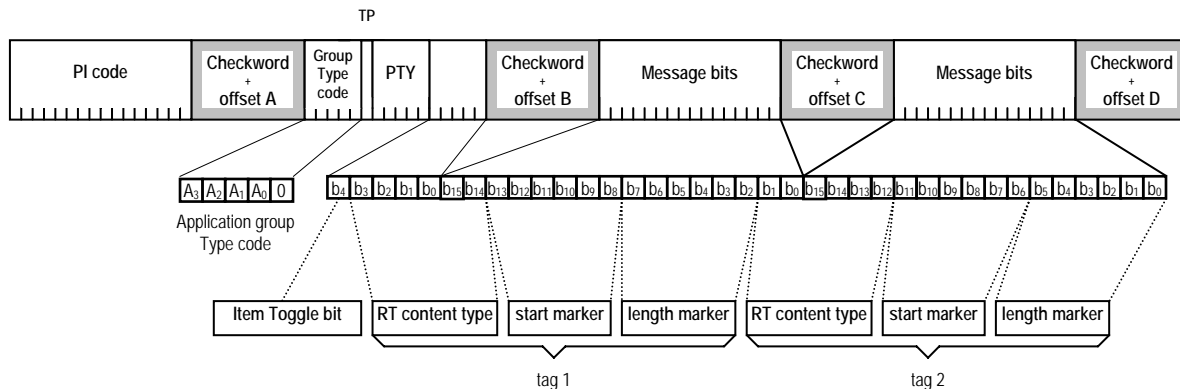


Figure 2: Coding of the message bits of the application group

The meaning of the message bits is as follows:

### Item Toggle bit

This bit shall be toggled when a new item starts. In the receiver it may be used to group all content types of category ITEM sent for one item and store them in memory (subsequently for several items) or, when storing and presenting information for only one item, to delete all information belonging to the elapsed item before starting to gather information for the new one.

### RT content type

This 6 bit value specifies the tags by assigning a content type according to the class codes given in table 1.

### Start marker

This 6 bit value indicates the position of the first character of the RTplus tag within the Radiotext. (Start marker 0: means first character in the RT)

### Length marker

This 6 bit value gives the length (number of characters) of the RTplus tag.

Length marker set to 0 may be used as a clear command for the specified content type.

If only one tag is needed tag 1 and tag 2 shall bear the same information.

### Broadcasting conventions

When RTplus information is generally available RDS 3A groups with AID = "4BD7" shall be transmitted at least every 10 seconds. During the lifetime of a Radiotext containing RTplus tags, application groups shall be sent with a minimum frequency of 0.2 groups per second. The RT A/B flag shall be toggled when the Radiotext changes and the RTplus information for the application group shall be sent to the RDS encoder immediately after the new Radiotext.

To transmit RDS data over DVB channels (e.g. for FM feeder link applications) the ancillary data field in the MPEG audio frame is used. The information may also be decoded and displayed by DVB Set Top Boxes.

Data shall be encoded in the Universal Encoder Communication Protocol (UECP, SPB 490 Version 6.01). The transmission method is described in DVB-document TM-GBS0275 and will be incorporated in Specifications EN 300 468 and TR 101 154.

If RTplus information is not only intended for FM rebroadcasting but also for DVB receivers the associated ODA application data shall be transmitted with the UECP command "ODA data" (MEC 46). For RDS encoder requirements MEC 40 respectively MEC 42 may be sent in addition.

#### Reception conventions

When the receiver detects a change in the Radiotext A/B flag (indicating a new message) decoding of RTplus content shall start not until the whole Radiotext is received.

The different RTplus information (classes) may be stored and displayed automatically or when the user recalls a certain content type. For certain content types it may make sense to save more than the current or the last information in memory ( e.g. a list of the last 10 items titles).

Category	Code	RTplus classes	MP3 id3v2	Description	
Item	0	ITEM.TITLE	TIT2	TITLE	Title of item
	1	ITEM.ALBUM	TALB	ALBUM	The collection name to which this track belongs
	2	ITEM.TRACKNUMBER	TRCK	TRACKNUM	Number of the current part of the current level
	3	ITEM.ARTIST	TPE1	ARTIST	A person or band/collective generally considered responsible for the work
	4	ITEM.COMPOSITION			A complete composition (mainly used in classical music)
	5	ITEM.MOVEMENT			A <b>movement</b> is a large division of a larger composition or musical form
	6	ITEM.CONDUCTOR	TPE3	CONDUCTOR	The artist(s) who performed the work. In classical music this would be the conductor, soloists
	7	ITEM.COMPOSER	TCOM	COMPOSER	Name of the original composer
	8	ITEM.BAND	TPE2	BAND	Band/orchestra/accompaniment/musician
	9	ITEM.COMMENT	COMM	COMMENT	Any comment related to the content
	10	ITEM.GENRE	TCON	CONTENTTYPE	The main genre of the audio or video; e.g. "classical", "ambient-house", "synthpop", "sci-fi", "drama", etc.
Info	11	INFO.NEWS			Headline
	12	INFO.NEWS.LOCAL			Local news.
	13	INFO.STOCKMARKET			Quote information
	14	INFO.SPORT			Result of a game, either as one tag "Bayern München : Borussia 5:5" or as 2 distinct tags
	15	INFO.LOTTERY			Lottery
	16	INFO.HOROSCOPE			Horoscope
	17	INFO.DAILY_DIVERSION			Daily tip / diversion / joke ...
	18	INFO.HEALTH			Information about health: Allergy alarms ...
	19	INFO.EVENT			Info about an event
	20	INFO.SZENE			Information about scene (Hot locations to be, ...)
	21	INFO.CINEMA			Information about movies in cinema
	22	INFO.TV			Information about TV-movies
	23	INFO.DATE_TIME			Information about date and time (Client to chose between date and time)
	24	INFO.WEATHER			Information about weather
	25	INFO.ALARM			An alarm information, typically an official alarm send out while the alarm flag is set
	26	INFO.ADVERTISEMENT			Info about an advertisement. May be in parallel to an audio advertisements
	27	INFO.OTHER			Other Information: Not especially specified
Programme	28	STATIONNAME.LONG			Name describing the radio station
	29	PROGRAM.NOW			EPG info program now
	30	PROGRAM.NEXT			EPG info program next
	31	PROGRAM.PART			Part of the current radio show: E.g. one of several parts of the PROGRAM.NOW
	32	PROGRAM.HOST			Name of the host of the radio show
	33	PROGRAM.EDITORIAL_STAFF			
	34	PROGRAM.RADIO			Information about radio shows: A link towards another frequency with other content (NOT AF list) May be one tag (keyword##frequency) or two distinctive tags
	35	PROGRAM.HOMEPAGE	WORS	WWWRADIOPAGE	Link to radio station homepage
Interactivity	36	PHONE.HOTLINE			The telephone number of the radio stations hotline
	37	PHONE.STUDIO			The telephone number of the radio stations studio
	38	PHONE.OTHER			Name and telephone number: Either as one tag ("keyword##phone number") or as two distinct tags
	39	SMS.STUDIO			The sms number of the radio stations studio (to send directly a sms into the studio)
	40	SMS.OTHER			Name and sms number: Either as one tag ("keyword##sms number") or as two distinct tags
	41	EMAIL.HOTLINE			The email address of the radio stations hotline
	42	EMAIL.STUDIO			The email address of the radio stations studio
	43	EMAIL.OTHER			Name and email address: Either as one tag ("keyword##phone number") or as two distinct tags
	44	MMS.OTHER			Name and mms number: Either as one tag ("keyword##mms number") or as two distinct tags
	45	CHAT			chat content: send by users to a specific address and broadcasted by the Radio Station
	46	CHAT.CENTER			Address, where contributions to the chat shall be sent (may be url or sms)
	47	VOTE.QUESTION			A question (typically binary) which can be answered by "yes" or "no" or "1" or "2"
	48	VOTE.CENTER			url or sms number to send your answer to
Open classes	49				
	50				
	51				
	52				
	53				
	54				
	55				
	56				
	57				
Descriptor	58	PLACE			Descriptor will always be the second RT tag in a message. And will describe the RT tag 1 in more detail
	59	APPOINTMENT			Adds info about date and time
	60	HOTLINE			Hotline number to call to get more info
	61	IDENTIFIER	TSRC	ISRC	Can identify any tag in RT1. For music it is the: International Standard Recording Code ( <a href="http://www.ifpi.org/isrc/">http://www.ifpi.org/isrc/</a> )
	62	PURCHASE	WPAY	WWWPAYMENT	Address where item can be purchased. Address can be an url or a sms-number
	63	GET_DATA			Retrieves either via a sms or url-link more data about tag in RT1. (Info request via Point to Point - unicast)