

INTERNATIONAL STANDARD

**Radio data system (RDS) – VHF/FM sound broadcasting in the frequency range
from 64,0 MHz to 108,0 MHz –
Part 3: Usage and registration of Open Data Applications (ODAs)**





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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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IEC 62106-3

Edition 1.0 2018-09

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**Radio data system (RDS) – VHF/FM sound broadcasting in the frequency range
from 64,0 MHz to 108,0 MHz –
Part 3: Usage and registration of Open Data Applications (ODAs)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.160.40

ISBN 978-2-8322-6068-5

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RADIO DATA SYSTEM (RDS) –
VHF/FM SOUND BROADCASTING IN THE FREQUENCY
RANGE FROM 64,0 MHz TO 108,0 MHz –****Part 3: Usage and registration of Open Data Applications (ODAs)**

FOREWORD

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International Standard IEC 62106-3 has been prepared by technical area 1: Terminals for audio, video and data services and contents, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This first edition, together with IEC 62106-1, IEC 62106-2, IEC 62106-4, IEC 62106-5 and IEC 62106-6, cancels and replaces IEC 62106:2015, and constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 62106:2015:

- Provision has been made to carry RDS on multiple data-streams (RDS2).
- For Open Data Applications, in addition to the already existing 37-bit and 21-bit data group structures a new 56-bit or 7-byte data group structure has been added.

- New are AF coding below 87,6 MHz (down to 64,1 MHz) using ODA-AID. RT+ can now be used with RT and eRT, 0x6365, see IEC 62106-6.

The text of this standard is based on the following documents:

CDV	Report on voting
100/2911/CDV	100/3057/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62106 series, published under the general title *Radio data system (RDS) – VHF/FM sound broadcasting in the frequency range from 64,0 MHz to 108,0 MHz*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

Since the mid-1980s a fascinating development has taken place. Most of the multimedia applications and standards have been created or redefined significantly. Hardware has become extremely powerful with dedicated software and middleware. In the mid-1980s, Internet as well as its protocols did not exist. Navigation systems became affordable in the late 1990s, and a full range of attractive smartphones now exist. The computing power of all these new products is comparable with that of the mainframe installations in that era.

Listener expectations have grown faster than the technology. Visual experience is now very important, like the Internet look and feel. Scrolling text or delivering just audio is nowadays perceived as insufficient for FM radio, specifically for smartphone users. New types of radio receivers with added value features are therefore required. RDS has so far proven to be very successful.

FM radio with RDS is an analogue-digital hybrid system, which is still a valid data transmission technology and only the applications need adaptation. Now the time has come to solve the only disadvantage, the lack of sufficient data capacity. With RDS2, the need to increase the data capacity can be fulfilled.

RDS was introduced in the early 1980s. During the introductory phase in Europe, the car industry became very involved and that was the start of an extremely successful roll-out. Shortly afterwards, RDS (RBDS) was launched in the USA [1, 2, 3, 4, 5]¹.

The RDS Forum has investigated a solution to the issue of limited data capacity. For RDS2, both sidebands around the RDS 57 kHz subcarrier can be repeated a few times, up to three, centred on additional subcarriers higher up in the FM multiplex while still remaining compatible with the ITU Recommendations.

The core elements of RDS2 are the additional subcarriers, which will enable a significant increase of RDS data capacity to be achieved, and then only new additional data applications will have to be created, using the RDS-ODA feature, which has been part of the RDS standard for many years.

In order to update IEC 62106:2015 to the specifications of RDS2, IEC 62106 has been restructured as follows:

Part 1: Modulation characteristics and baseband coding

Part 2: RDS message format, coding and definition of RDS features

Part 3: Coding and registration of Open Data Applications ODAs

Part 4: Registered code tables

Part 5: Marking of RDS and RDS2 devices

Part 6: Compilation of technical specifications for Open Data Applications in the public domain

The following future parts are planned:

Part 7: RBDS

Part 8: Universal Encoder Communication Protocol UECP

¹ Numbers in square brackets refer to the Bibliography.

The original specifications of the RDS system have been maintained and the extra functionalities of RDS2 have been added.

Obsolete or unused functions from the original RDS standard IEC 62106:2015 have been deleted. The presentation in Parts 1, 2 and 3 follows the OSI basic reference model for information processing systems [6].

RADIO DATA SYSTEM (RDS) – VHF/FM SOUND BROADCASTING IN THE FREQUENCY RANGE FROM 64,0 MHz TO 108,0 MHz –

Part 3: Usage and registration of Open Data Applications (ODAs)

1 Scope

This part of IEC 62106 defines the Open Data Application (ODA) feature of the Radio Data System (RDS).

The ODA feature in essence allows raw data to be transmitted via a transparent data channel from a service provider to a suitably equipped receiver without there being any prior knowledge of the data content by the IEC 62106 standard. This document defines the method of packaging the data within the RDS group structure and the identification of the data (using the Application Identification, AID) such that it can be addressed by an appropriate decoder on the receiver.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62106 (all parts), *Radio Data System (RDS) – VHF/FM sound broadcasting in the frequency range from 64,0 MHz to 108,0 MHz*

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62106-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.2 Abbreviated terms

For the purposes of this document, the abbreviated terms given in IEC 62106-1 and IEC 62106-2 apply.

3.3 Notation and conventions

The notation and conventions given in IEC 62106-1 apply.

4 ODA usage

4.1 General

ODAs are a very effective and flexible way for adding additional applications to an RDS service.

A number of different ODAs may exist on any service, subject to capacity.

ODAs now fall into two categories: legacy 37-bit and 21-bit ODAs using group types A or B and the new higher capacity 56-bit or 7-byte ODA exclusively carried in group type C on data-streams 1, 2 and 3. The legacy 37-bit and 21-bit ODAs use group type 3A to indicate the allocated group carrying the ODA, whereas the new 56-bit or 7-byte ODA uses a special channel allocation mechanism to indicate which channel on data-streams 1, 2 and 3 carries the ODA. Further information on the coding of group types A, B and C used to convey ODAs, as well as the tunnelling mechanism for carrying legacy group types A and B within a group type C on data-streams 1, 2 and 3, can be found in IEC 62106-2.

All ODAs are registered at the appropriate RDS Registration Office and appear in the Open Data Applications Directory (see Annex A). Each ODA needs to be used in accordance with the registration details in the ODA Directory.

4.2 ODA group structures

Open Data Applications shall use the format shown in Figure 1 for 37-bit ODA group type A, Figure 2 for 21-bit ODA group type B and Figure 3 for 56-bit or 7-byte ODA group type C.

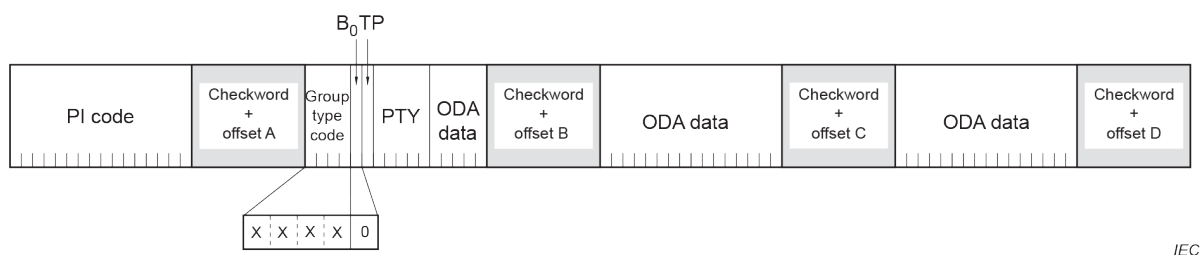


Figure 1 – 37-bit ODA group type A structure

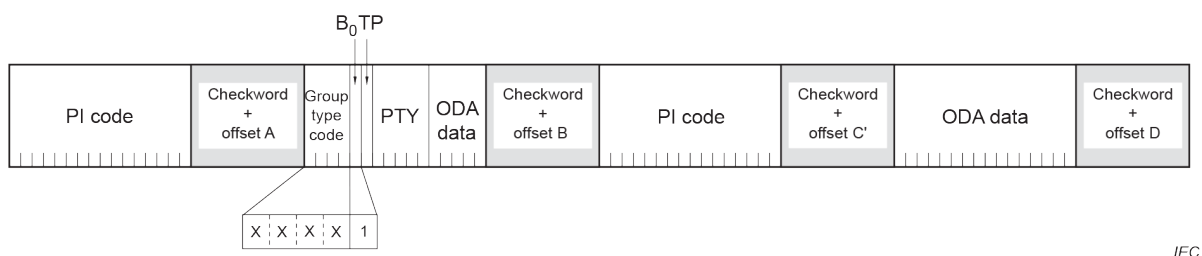


Figure 2 – 21-bit ODA group type B structure

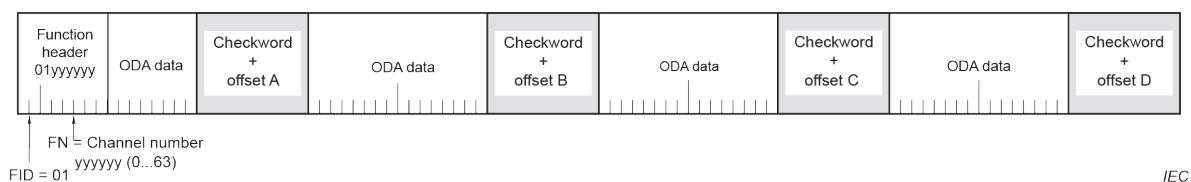


Figure 3 – 56-bit or 7-byte ODA group type C structure

4.3 ODA coding for group type A or B

4.3.1 General

The specific group type used by the ODA (defined by its Application Identification) in any particular transmission is signalled in group type 3A.

Legacy ODAs can use either 37-bit or 21-bit group type A or B structures as shown in Figures 1 and 2.

ODAs shall not be designed to operate with a specific application group type code.

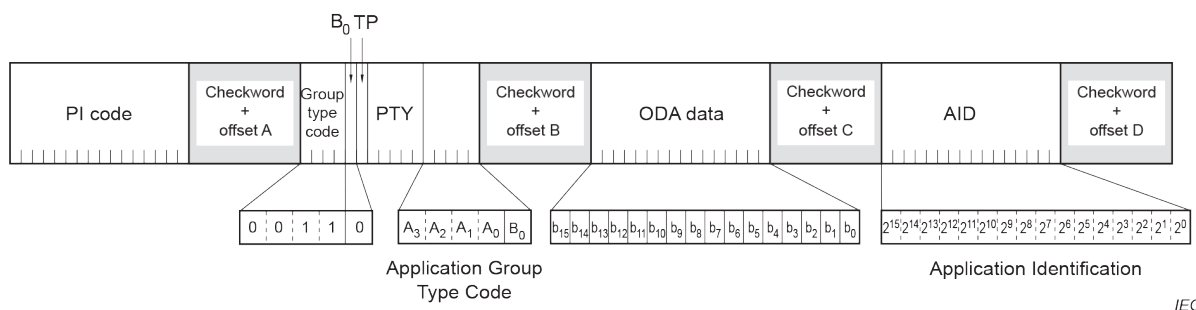
The application group type code for legacy RDS data will be chosen by the transmission operator and will be signalled by the AID group 3A.

A single ODA AID can only be associated with a single application group type code. For example, a single ODA (defined by an AID) may be associated with group type 5A. This means the ODA only uses group type 5A and that group type 5A is exclusively reserved for this ODA.

The 3A group additionally provides 16 bits of application data. ODAs that only require these 16 bits of application data can signal this by setting the application group type code to 3A indicating no other group is referenced by the ODA.

4.3.2 Group type 3A: ODA Application Identification (AID)

Figure 4 shows the format of type 3A groups. These groups are used to identify the Open Data Application in use, on a legacy RDS transmission.



IEC

Figure 4 – Group type 3A for Application group type code, AID and 16-bits of ODA data

The group type 3A conveys, to a receiver, information about which Open Data Applications are carried on a particular transmission and in which groups they will be found. Group type 3A comprises three elements: the Application Group Type Code used by that application, 16 bits of application data for that ODA and the Application Identification code (AID).

The Application Group Type Code indicates the group type used in the particular transmission to carry the specified ODA.

Table 1 specifies the permitted group types for legacy data. The Application Group Type Code comprises 5 bits, four for the group type and one for the version A or B. Two special conditions may be indicated:

- binary 00000 – not carried in associated application group;
- binary 11111 – temporary data fault (encoder status) which means that incoming data to the encoder cannot be transmitted.

The AID determines which software handler a receiver needs to use.

This method of allocating and defining Open Data Applications in an RDS transmission allows the addition and subtraction of ODAs, without constraint or the need to await the publication of new standards.

For each group type addressed by the application group type codes of a particular transmission, only one application may be identified as the current user of the group.

Application Identification codes 0x0001 to 0xFFFF in group type 3A indicate applications as specified in the ODA directory (see Annex A).

The AID in group type 3A indicates that a particular ODA is carried in a transmission. Each application will have unique requirements for transmission of its respective AID, in terms of repetition rate and timing. These requirements shall be detailed in the respective ODA specification. The specification shall also detail the AID signalling requirements for such times when an application assumes or ceases the use of a group type channel. Some applications may not allow reconfiguration in this way.

4.3.3 ODA group availability signalled in group type 3A for legacy data

Table 1 shows the group types A and B that may be assigned by the transmission operator to an ODA. Group types not shown in Table 1 are unavailable for ODA usage.

Table 1 – ODA group availability signalled in group type 3A for legacy ODAs

Application group type code	Associated group type	Description
00000		Special meaning: not carried in associated application group "00000"
00011	1B	Open Data Applications
00110	3A	Open Data Applications that have no associated group
00111	3B	Open Data Applications
01001	4B	Open Data Applications
01010	5A	Open Data Applications
01011	5B	Open Data Applications
01100	6A	Open Data Applications
01101	6B	Open Data Applications
01110	7A	Open Data Applications
01111	7B	Open Data Applications
10000	8A	Open Data Applications: Traffic Message Channel or if not used any other ODA
10001	8B	Open Data Applications
10010	9A	Open Data Applications
10011	9B	Open Data Applications
10101	10B	Open Data Applications
10110	11A	Open Data Applications
10111	11B	Open Data Applications
11000	12A	Open Data Applications
11001	12B	Open Data Applications
11010	13A	Open Data Applications
11011	13B	Open Data Applications
11111		Special meaning: temporary data fault (encoder status); not carried in associated application group "11111"

NOTE Group type 15A is no longer available for ODA.

4.4 ODA coding for group type C on data-streams 1, 2 and 3

4.4.1 General

On data-streams 1, 2 and 3 only the group type C structure can be used. This structure allows for 56 bits (7 bytes) of ODA data as shown in Figure 3. Group types A and B are possible, but these have to be tunnelled within the group type C structure, see IEC 62106-2.

The channel used within the group type C structure by the ODA (defined by its Application Identification) in any particular transmission is signalled by an AID to channel number assignment mechanism (FID = 10, FN = 000000). The channel number assigned to a specific AID is chosen by the transmission operator.

A single ODA AID can only be assigned to a single channel number. For example, a single ODA (defined by an AID) may be assigned to channel 6. This means the ODA only uses channel 6 and that channel 6 is exclusively reserved for this ODA.

If a specific ODA (defined by an AID) is transmitted on more than one of the data-streams 1, 2 and 3, each data-stream conveying the ODA has to separately signal the AID to channel number assignment mechanism (FID 10, FN 000000) in order to make the data-stream in question self-contained.

4.4.2 Group type C ODA Application Identification (AID) to channel number assignment on data-streams 1, 2 and 3

There are four assignment methods available using group type C Function Identifier (FID) = 10 with Function Number (FN) = 000000. These assignment methods cater for the allocation of a single AID or sequential AIDs to a single channel number or multiple channel numbers as appropriate, as well as conveying a small amount of AID specific data similar to legacy ODA group type 3A messages, see IEC 62106-2.

A total of 64 channels (0 to 63) are available across all data-streams 1-3. The specific channel number to AID assignment on one data-stream is also valid on the other data-streams 1-3. For example, a single ODA (defined by an AID) may be signalled on data-stream 1 to be assigned to channel number 8. The same ODA may also be transmitted on data-streams 2 and/or 3, but it will also use channel number 8 on these data-streams. Channel 8 on any data-stream 1-3 will be exclusively reserved and assigned to this ODA.

For the details of coding see IEC 62106-2.

5 ODA registration

5.1 General

Open Data Applications are subject to a registration process. Registered applications are listed in the ODA Directory (see Annex A). The ODA specifications may be specifications in the public domain, e.g. TMC (see ISO 14819 [7]) and the AF ODA, eRT or RT+ (see IEC 62106-6) or privately owned (and not in the public domain). The terms public and private do not imply the degree of access to services provided by an application, for example a public domain service may well include encryption, as in TMC for example.

ODAs, whether public or private, shall conform to all requirements of IEC 62106 (all parts). Nothing in any ODA may require any aspect of a primary RDS feature to be changed or not to be transmitted in accordance with the other parts of IEC 62106. This is to ensure that the transmission of an ODA cannot adversely affect devices built in accordance with the other parts of IEC 62106.

5.2 ODA-AID codes reserved for testing with no registration being required

Any AID within the range 0xFFC0 to 0xFFFF may be used for temporary ODA testing or development, on a self-allocation basis. A transmission operator may choose the AID from this reserved range without the need for registration, but then the ODA in question will be only specific for testing the ODA on their locally controlled broadcast.

ODAs with such an AID shall not be part of any commercial end-user client device.

Annex A (informative)

Open data registration

Every data application using the Open Data Applications (ODA) feature shall be transmitted together with an Application Identification (AID) number:

- The AID number, for each ODA to be used primarily outside of the United States, is allocated by the RDS Forum (RDS Registrations Office at the address shown on the RDS Forum web site at URL <http://www.rds.org.uk/>);
- For ODAs to be used primarily in the United States, the AID number is allocated by the National Association of Broadcasters (NAB, RDS Registrations Office at the address shown on the National Radio Systems Committee, NRSC, website at URL <http://www.nrscstandards.org>).

Forms shall be completed fully and sent to the appropriate RDS Registration Office (every question shall be answered – the RDS Registrations Office will advise, if difficulty is experienced) together with the nominal fee, published on the websites of the RDS Forum and the NRSC, which is payable with the application. Subject to satisfactory completion, an AID number will be allocated, and a copy of the form will be returned to the applicant. The allocations are coordinated between the ODA Registrations Offices of the RDS Forum and the NAB to avoid that the same allocation is made twice.

Transmissions carrying an AID shall adhere fully to the details, specifications and references of the relevant registration. Any subsequent updates that do not change the fundamental requirements for the transmission of that ODA may allow continued use of the same AID, but advice should be sought from the appropriate RDS Registrations Office.

Details will be kept in the RDS Forum and NRSC ODA Directories, which will be regularly published. An up-to-date version of the Directory will be maintained on both the RDS Forum website and the NRSC website.

Users of an AID must satisfy themselves as to the validity of using it and the accuracy of all related information and must accept all due consequence. The RDS Registrations Office is not liable for any incidental, special or consequential damages arising out of the use or inability to use an AID, whether in transmission or reception equipment.

Note that AID codes are internationally allocated and recognized.

RDS Open Data Applications – Registration Form
FOR ODAs USED PRIMARILY OUTSIDE OF THE U.S.
This form will be published in full, except last two answers, if not specifically permitted.

To:	RDS Registrations Office For the address and e-mail see http://www.rds.org.uk/	Application Date:
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Question	Information	Comment
Applicant Name:		Title/Name of contact
Organization:		Company Name
Organization Address:		Street 1
		Street 2
		Town/City
		Area/County
		Postal Code
		Country
Application Name:		5 or 6 words, maximum
Application Description:	<i>Please use additional pages if desired.</i>	Give as much detail as possible.
Will the application use the ODA 37-bit group structure – A type the ODA 21-bit group structure – B type or the ODA 56-bit group structure – C type	Tick [] [] []	
ODA details, specifications and references:	Tick, if publication not permitted [] <i>Please attach additional pages.</i>	Give <i>all</i> details, proprietary documents and references.
Capacity requirement for both the ODA and AID groups:	Tick, if publication not permitted [] a) ODA groups per second b) AID groups per minute <i>Please use additional pages if desired.</i>	Indicate: ODA groups per second <i>and</i> AID groups per minute. Describe any constraints.

Open Data Application designers need to consider a number of questions regarding their application and the RDS system interface, so that the RDS bearer is kept in conformity with best implementation practice. The following questions shall be carefully considered (and the following check list shall be completed and attached to all applications. the RDS Registrations Office will advise, if difficulty is experienced).

RDS Open Data Applications – Check List

This check list will not be published.

Question	Considered	Notes
Does the application behave correctly when not all RDS groups are received?	Tick, if considered []	Necessary for mobile RDS applications
Does the application provide the means to identify the Service Provider?	Tick, if considered []	
Does the application allow for future proofing, by upgrading?	Tick, if considered []	
Does the application require sub-sets of associated applications?	Tick, if considered []	Use of variant codes and/or other groups (e.g. clock-time)
Does the application include provision to reference other transmissions carrying the same service?	Tick, if considered []	PI and AF
Does the application include an additional layer of error protection?	Tick, if considered []	RDS already has considerable capability
Does the application include encryption?	Tick, if considered []	
Does the application include data compression?	Tick, if considered []	
Have you defined the capacity requirements for the application?	Tick, if considered []	
Have you defined the capacity requirements for the AID under normal conditions?	Tick, if considered []	
Is your application able to assume and lose the use of a group type?	Tick, if considered []	
If so, have you defined the AID signalling when use of a channel is assumed, e.g. full of emergency info?	Tick, if considered []	
If so, have you defined the AID signalling when use of the channel ceases, e.g. idle without emergency information?	Tick, if considered []	

Applicant represents and warrants that it is the owner of all rights in and to the application described herein, and that the application does not infringe any rights, whether common law, statutory, legal or equitable, of any third party.

The RDS Forum Office shall not be liable for disclosure of Confidential Information if made in response to an order of a court or authorized agency of government; provided that when possible notice shall first be given to the applicant/registrant so that a protective order, if desired, may be sought by that party.

Applicant hereby agrees to defend, indemnify and hold the RDS Forum Office and the officers, directors, employees, agents and assigns of any of them (hereinafter "the indemnified parties") harmless against any and all claims, liabilities, judgments, penalties, and taxes, civil and criminal, and all costs and expenses, including reasonable attorneys' fees, which may arise out of or are related to Applicant's representations, warranties, application and/or registration thereof or the actions or failure to act of the indemnified parties with regard to same.

The application/registration system of the RDS Forum Office in Switzerland shall be governed in accordance with the substantive law of Switzerland.

APPLICANT SIGNATURE	DATE
APPLICANT PRINTED NAME	

**RDS Open Data Applications – Registration Form
FOR ODAs USED PRIMARILY IN THE U.S.**

This form will be published in full, except last two answers, if not specifically permitted.

To:	RDS Registrations Office For the address and e-mail see http://www.nrscstandards.org/	Application Date:
-----	---	-------------------

Question	Information	Comment
Applicant Name:		Title/Name of contact
Organization:		Company Name
Organization Address:		Street 1
		Street 2
		Town/City
		Area/County
		Postal Code
		Country
Application Name:		5 or 6 words, maximum
Application Description:	<i>Please use additional pages if desired.</i>	Give as much detail as possible.
Will the application use the ODA 37-bit group structure – A type the ODA 21-bit group structure – B type or the ODA 56-bit group structure – C type	Tick [] [] []	
ODA details, specifications and references:	Tick, if publication not permitted [] <i>Please attach additional pages.</i>	Give <i>all</i> details, proprietary documents and references.
Capacity requirement for both the ODA and AID groups:	Tick, if publication not permitted [] a) ODA groups per second b) AID groups per minute <i>Please use additional pages if desired.</i>	Indicate: ODA groups per second <i>and</i> AID groups per minute. Describe any constraints.

Open Data Application designers need to consider a number of questions regarding their application and the RDS system interface, so that the RDS bearer is kept in conformity with best implementation practice. The following questions should be carefully considered, and the following check list shall be completed and attached to all applications. The RDS Registrations Office will advise, if difficulty is experienced.

<p>RDS Open Data Applications – Check List</p> <p>This check list will not be published.</p>

Question	Considered	Notes
Does the application behave correctly when not all RDS groups are received?	Tick, if considered []	Necessary for mobile RDS applications
Does the application provide the means to identify the Service Provider?	Tick, if considered []	
Does the application allow for future proofing, by upgrading?	Tick, if considered []	
Does the application require sub-sets of associated applications?	Tick, if considered []	Use of variant codes and/or other groups (e.g. clock-time)
Does the application include provision to reference other transmissions carrying the same service?	Tick, if considered []	PI and AF
Does the application include an additional layer of error protection?	Tick, if considered []	RDS already has considerable capability
Does the application include encryption?	Tick, if considered []	
Does the application include data compression?	Tick, if considered []	
Have you defined the capacity requirements for the application?	Tick, if considered []	
Have you defined the capacity requirements for the AID under normal conditions?	Tick, if considered []	
Is your application able to assume and lose the use of a group type?	Tick, if considered []	
If so, have you defined the AID signalling when use of a channel is assumed, e.g. full of emergency info?	Tick, if considered []	
If so, have you defined the AID signalling when use of the channel ceases, e.g. idle without emergency information?	Tick, if considered []	

Applicant represents and warrants that it is the owner of all rights in and to the application described herein, and that the application does not infringe any rights, whether common law, statutory, legal or equitable, of any third party.

Neither NAB, CTA, nor the NRSC shall be liable for disclosure of Confidential Information if made in response to an order of a court or authorized agency of government; provided that when possible notice shall first be given to the applicant/registrant so that a protective order, if desired, may be sought by that party.

Applicant hereby agrees to defend, indemnify and hold NAB, CTA, the NRSC and the officers, directors, employees, agents and assigns of any of them (hereinafter "the indemnified parties") harmless against any and all claims, liabilities, judgments, penalties, and taxes, civil and criminal, and all costs and expenses, including reasonable attorneys' fees, which may arise out of or are related to Applicant's representations, warranties, application and/or registration thereof or the actions or failure to act of the indemnified parties with regard to same.

The application/registration system in the United States shall be governed in accordance with the substantive law of the District of Columbia.

APPLICANT SIGNATURE	DATE
APPLICANT PRINTED NAME	

Bibliography

- [1] EBU, *Specifications of the radio data system RDS for VHF/FM sound broadcasting*. Doc. Tech 3244 and Supplements 1 to 4. European Broadcasting Union, 1984
- [2] WRIGHT, S. *The Broadcaster's Guide to RDS*. Focal Press, Boston, Oxford, Johannesburg, Melbourne, New Delhi, Singapore, 1997, ISBN 0-240-80278-0
- [3] KOPITZ, D. and MARKS, B., *RDS – The Radio Data System*. Artech House Publishers, Boston and London, 1999, ISBN 0-89006-744-9
- [4] EN 50067:1998, *Specification of the radio data system (RDS for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz*
- [5] US NRSC-4-B, *United States RBDS standard – Specification of the radio broadcast data system (RBDS)*, 2011
- [6] ISO 7498 (all parts), *Information processing systems – Open Systems Interconnection – Basic Reference Model*
- [7] ISO 14819 (all parts), *Intelligent transport systems – Traffic and travel information messages via traffic message coding*

See also www.rds.org.uk/.

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
Fax: + 41 22 919 03 00
info@iec.ch
www.iec.ch