



Instructions for the preparation of the UPN QR form of registered issuers for programmers

Ljubljana, May 2017

Table of contents

1.	Introduction	3
1.1	Image of a completed UPN QR form of registered issuers.....	3
2.	Completing payment orders	4
2.1	Allowed characters	4
2.2	Fields of the form	4
2.3	Font.....	4
2.4	Positions	4
2.5	IBAN formatting.....	5
2.6	Amount.....	5
2.7	Date	5
2.8	QR code	5
3.	QR code specifications	6
3.1	Version.....	6
3.2	Data type	6
3.3	Data correction level	6
3.4	ECI - Extended Channel Interpretation.....	6
3.5	Size of the printed QR code.....	6
4.	QR code content	7
4.1	Name, street and city of the payer.....	7
4.2	Purpose of payment	7
4.3	Payment date	7
4.4	Amount.....	7
4.5	Recipient's IBAN	8
4.6	Recipient's reference.....	8
4.7	Name, street and city of the recipient	8
4.8	Checksum.....	8
4.9	Reserve	8
5.	Example.....	9
5.1	Preparation of form data.....	9
5.2	Preparation of QR code data	9
5.3	QR code content.....	10
6.	Useful links.....	11

1. Introduction

These instructions are intended for programmers who are developing software for printing UPN QR orders for registered issuers. It contains most of the information you need to create a program for printing UPN forms. You will need the following background knowledge to create a UPN QR form and to read these instructions:


- basic programming knowledge,
- basic knowledge of the technical characteristics of the QR code,
- basic knowledge of banking concepts and how to calculate control numbers.

We suggest that you also read the UPN QR Standard and the relevant attachments and check the web links described in the "Useful links" section before you develop your UPN QR software.

The most important differences between UPN with OCR line or QR code are:

- Instead of an OCR line, now prepare a QR code that contains all the data needed.
- You do not need to enter the payment due date in the field "Payment purpose" as a separate field is now available.
- Complete the fields "Name, street and city" of the payer and the receipt in separate lines.
- You can only use the characters contained in the ISO-8859-2 code table.
- The field "Statement" is no longer available.
- The maximum lengths of some fields have been changed.

1.1 Image of a completed UPN QR form of registered issuers

UPN QR - potrdilo		Koda QR	IBAN plačnika	Polog	Dvig
Ime plačnika Janez Novak Dunajska ulica 1 1000 Ljubljana				<input type="checkbox"/>	<input type="checkbox"/>
Namen in rok plačila Plačilo najemnine za marec 2017, 01.04.2017			Referenca plačnika		
Znesek EUR ***81,05			Ime, ulica in kraj plačnika Janez Novak Dunajska ulica 1 1000 Ljubljana		
IBAN in referenca prejemnika SI56 0201 7001 4356 205 SI12 1234567890120			Znesek EUR ***81,05	Datum plačila	Nujno
Ime prejemnika RentaCar d.o.o. Pohorska ulica 22 2000 Maribor		Koda namena RENT	Namen plačila Plačilo najemnine za marec 2017	Rok plačila 01.04.2017	<input type="checkbox"/>
		IBAN prejemnika SI56 0201 7001 4356 205	UPN QR		
		Referenca prejemnika SI12 1234567890120			
		Ime, ulica in kraj prejemnika RentaCar d.o.o. Pohorska ulica 22 2000 Maribor			
					Podpis plačnika (neobvezno žigi)

2. Completing payment orders

2.1 Allowed characters

Only characters supported by the ISO-8859-2 code table may be used in the form. This restriction is important because the same data is entered in the QR code where the ISO-8859-2 code table is overwritten.

2.2 Fields of the form

As you are printing an order from a registered issuer, you shall only complete the fields below. The remaining fields on the form must be left blank. Please note the maximum lengths of the individual fields.

Field name	Length	Completing
Payer's name (<i>Ime plačnika</i>)	Max. 33	Required, except for payments for humanitarian purposes.
Payer's street and No. (<i>Ulica in št. Plačnika</i>)	Max. 33	Required, except for payments for humanitarian purposes.
Payer's city (<i>Kraj plačnika</i>)	Max. 33	Required, except for payments for humanitarian purposes.
Amount (<i>Znesek</i>)	1 billion -1	Required, except for payments for humanitarian purposes. Format »***#.##0,00«.
Purpose code (<i>Koda namena</i>)	required 4	Required. From the purpose code list.
Purpose of payment (<i>Namen plačila</i>)	Max. 42	Required.
Deadline for payment (<i>Rok plačila</i>)		Optional. Format 'DD.MM.YYYYY' or blank.
Recipient's IBAN (<i>Iban prejemnika</i>)		Required with the correct control number. Format 'SI56 9999 9999 9999 999'.
Recipient's reference (<i>Referenca prejemnika</i>)	Max. 4 + 22	Required (Model and Reference). Model and reference are each in their own field. SI or RF model is allowed. Format the reference according to SI or RF formatting rules. Correct control number.
Recipient's name (<i>Ime prejemnika</i>)	Max. 33	Required.
Recipient's street and No. (<i>Ulica in št. prejemnika</i>)	Max. 33	Required.
Recipient's city (<i>Kraj prejemnika</i>)	Max. 33	Required.

In addition to the fields described above, you shall always complete a QR code with the same content as you have entered in the form. In the QR code, some fields are formatted differently.

2.3 Font

The font size shall be 'Courier New' in 12cpi, bold. For the data on the talon, use the same font size 17cpi.

2.4 Positions

Enter the content in the fields provided and align it to the left. There are also guides within most of the fields that are for manual entry only. Never enter characters between the guides for manual completion.

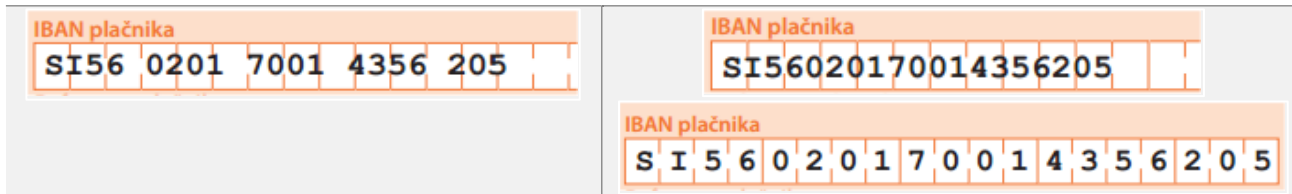
CORRECT	INCORRECT
<p>Ime, ulica in kraj plačnika</p> <p>Janez Novak</p> <p>IBAN plačnika</p> <p>SI56 0201 7001 4356 205</p>	<p>Ime, ulica in kraj plačnika</p> <p>Janez Novak</p> <p>IBAN plačnika</p> <p>SI56 0201 7001 4356 205</p> <p>IBAN plačnika</p> <p>S I 5 6 0 2 0 1 7 0 0 1 4 3 5 6 2 0 5</p>

2.5 IBAN formatting

Format the IBAN according to the IBAN formatting rules "SI56 9999 9999 9999 999".
E.g.: IBAN "SI56020170014356205" is to be printed as "SI56 0201 7001 4356 205".

CORRECT

INCORRECT



2.6 Amount

Format the amount as "***#.##0.00".
E.g.: The amount 1234.5 is to be printed as "***1.234.50".

CORRECT

INCORRECT



2.7 Date

Format the date as 'DD.MM.YYYYY'.
E.g.: The date of the first of April 2016 is to be printed as "01.04.2016".

CORRECT

INCORRECT



2.8 QR code

Always print the QR code in the required size of 32.597 mm x 32.597 mm in the field provided. Within the QR code field, there are additional guides in each corner to indicate the minimum tolerance to the edge. The content of the QR code shall be prepared according to the rules described under 'QR code content' and 'QR code specifications'.

CORRECT

INCORRECT



3. QR code specifications

The QR code specifications for the use on the UPN QR form are:

- The version is Version 15 (77x77 modules).
- The data type is Byte data (Mode Byte, Binary).
- The ECC data correction level (also ECL) is M (Error Correction Level M).
- The use of ECI (Extended Channel Interpretation) is required.
- The ECI value is 4 (ECI value 000004).
- The character set of the content is ISO-8859-2.
- The printed module shall be 0,42333 mm x 0,42333 mm.
- The size of the printed code without the required white border is 32,59676 mm x 32,59667 mm.
- The minimum print resolution shall be 600 x 600 DPI.

3.1 Version

When preparing the QR code, make sure to always use version 15. Some open-source QR code libraries do not allow you to enter a version and will choose the appropriate version based on the amount of data you enter. If you use such a library, you can use the "Reserve" field, which you should complete with enough spaces to reach the correct amount of data for version 15 (see section "QR code content - Reserve").

3.2 Data type

The data type is always binary (Mode Byte)

3.3 Data correction level

The ECC (sometimes ECL) data correction level is always M.

3.4 ECI - Extended Channel Interpretation

You shall always use the ECI, in which you enter the value '4', which represents the ISO 8859-2 (Latin 2) code table. Some open-source libraries automatically enter a value in the ECI, which is determined by an analysis of the content entered. Most often they specify the number "26", which means the UTF-8 code table, which is incorrect for us. Therefore, always make sure that you enter the value "4" in the ECI.

3.5 Size of the printed QR code

You shall always print version 15, so the size of the printed QR code, without the required white border, is fixed and is always 32.597 mm x 32.597 mm.

4. QR code content

The content of the QR code shall always be identical to the printout data. The only difference is the way the individual fields are formatted. The content is prescribed and, in the case of an order from a registered issuer, has that content:

SN	Field name	Maximum length	Content
1.	Leading style (<i>Vodilni slog</i>)	5	Constant "UPNQR".
2.	Payer's IBAN (<i>IBAN plačnika</i>)		Blank.
3.	Deposit (<i>Polog</i>)		Blank.
4.	Withdrawal (<i>Dvig</i>)		Blank.
5.	Payer's reference (<i>Referenca plačnika</i>)		Blank.
6.	Payer's name (<i>Ime plačnika()</i>)	33	Required (*). No leading or following spaces.
7.	Payers' street and No. (<i>Ulica in št. plač.</i>)	33	Required (*). No leading or following spaces.
8.	Payers' city (<i>Kraj plačnika</i>)	33	Required (*). No leading or following spaces.
9.	Amount (<i>Znesek</i>)	11	Required (**). Eleven digits.
10.	Date of payment (<i>Datum plačila</i>)		Blank.
11.	Urgent (<i>Nujno</i>)		Blank.
12.	Purpose code (<i>Koda namena</i>)	4	Required. Four capital letters (A-Z).
13.	Purpose of payment (<i>Namen plačila</i>)	42	Required. No leading or following spaces.
14.	Deadline for payment (<i>Rok plačila</i>)	10	Optional. Format 'DD.MM.YYYY' or blank.
15.	Recipient's IBAN (<i>IBAN prejemnika</i>)	34	Required. No formatting (no intervening spaces).
16.	Recipient's reference (<i>Referenca pre.</i>)	26	Required. (4+22) Model and reference together without spaces.
17.	Recipient's name (<i>Ime prejemnika</i>)	33	Required. No leading or following spaces.
18.	Recipient's street and No. (<i>Ulica in št. prejemnika</i>)	33	Required. No leading or following spaces.
19.	Recipient's city (<i>Kraj prejemnika</i>)	33	Required. No leading or following spaces.
20.	Checksum (<i>Kontrolna vsota</i>)	3	Required. Three digits.
	Reserve (<i>Rezerva</i>)		Optional. Blank or spaces, no punctuation.

For each field from 1 to 20 inclusive, always add the separator <LF> (»ASCII 10«, »hex 0x0A«, »\n«) at the end. Do not add separator in the "Reserve" field.

The space means <Space> (»ASCII 32«, »hex 0x20«).

4.1 Name, street and city of the payer (*Ime, ulica in kraj plačnika*)

These fields must not be blank or contain leading or following spaces. Only characters contained in the ISO-8859-2 code table may be used.

(*) If you are completing the order for humanitarian purposes and the payer is unknown, the fields may be left blank.

4.2 Purpose of payment (*Namen plačila*)

This field must not be blank or contain leading or trailing spaces. Only characters contained in the ISO-8859-2 code table may be used.

4.3 Payment date (*Rok plačila*)

The payment deadline may be left blank or contain a valid date, which must be formatted as

'DD.MM.YYYY'. E.g., the date 'first of April 2017' should be entered in the format '01.04.2017'.

4.4 Amount (*Znesek*)

Multiply the amount you print on the form by 100 and add leading zeros up to 11 characters long. E.g. the printed amount "***1,628.45" is entered as "00000162845".

(**) If you are completing an order for humanitarian purposes and the filed amount is left blank, enter 11 zeros "00000000000".

4.5 Recipient's IBAN (*IBAN prejemnika*)

Enter the IBAN in unformatted format, without spaces. Always check the control number.

E.g., enter the IBAN "SI56 0201 7001 4356 205" in the QR code as "SI56020170014356205".

4.6 Recipient's reference (*Referenca prejemnika*)

Enter the model and the reference separately on the form, and write them together in the QR code. Always check the reference control number for the relevant model.

E.g., the reference "SI12 1234567890120" shall be entered in the QR code as "SI121234567890120".

If you are using model "RF", which is formatted the same as the IBAN on the printout, enter it unformatted, without spaces, in the QR code.

E.g., enter the reference "RF81 352A DD05 899" in the QR code as "RF81352ADD05899".»

4.7 Name, street and city of the recipient (*Ime, ulica in kraj prejemnika*)

These fields must not be blank or contain leading or following spaces. Only characters contained in the ISO-8859-2 code table may be used.

4.8 Checksum (*Kontrolna vsota*)

To calculate the checksum, add the length of the entered fields and punctuation marks from and including field 1 up to and including field 19.

$$\text{Checksum} = \text{strlen}(N1) + \text{strlen}(N2) + \dots + \text{strlen}(N19) + 19$$

If the "Checksum" is less than 100, add a leading zero.

E.g., when the checksum is "123", enter "123". When the checksum is "98", enter "098".

4.9 Reserve (*Rezerva*)

The field may be blank or contain spaces and no punctuation. Complete this field when your QR image library does not support the entry of a specific version (required version 15), but determines it automatically based on the number of entered data.

The maximum length of the "Reserve" field is limited to a capacity of 411 characters. It is calculated by adding the length of the entered fields and punctuation marks from including field 1 to including field 20.

$$\text{Reserve length} = 411 - \text{strlen}(N1) + \text{strlen}(N2) + \dots + \text{strlen}(N20) + 20$$

When you want to complete a field, you add the calculated number of spaces at the end of the QR code content. Never add punctuation at the end. When you add spaces, double-check the total length, which must not exceed 411 characters.

5. Example

As an example, prepare a printout order of registered issuers with the following content:

Field <i>(Polje)</i>	Content
Payer <i>(Plaćnik)</i>	Janez Novak, Dunajska ulica 1, 1000 Ljubljana
Amount <i>(Znesek)</i>	81,05
Purpose code <i>(Koda namena)</i>	RENT
Purpose of payment <i>(Namen plačila)</i>	Payment of rent for March 2017
Deadline for payment <i>(Rok plačila)</i>	1.4.2017
Recipient's IBAN <i>(IBAN prejelnika)</i>	SI56 0201 7001 4356 205
Recipient's reference <i>(Referenca prejelnika)</i>	Model: SI12 Reference: 1234567890120
Recipient <i>(Prejelnik)</i>	RentaCar d.o.o., Pohorska ulica 22, 2000 Maribor

5.1 Preparation of form data

Prepare the content for printing. Make sure you complete all the required fields, use the allowed characters, the maximum length of the fields and the correct formatting.

Name of the field on the UPN QR	Content on the printout
Payer's name, street and city <i>(Ime, ulica in kraj plačnika)</i>	Janez Novak Dunajska ulica 1 1000 Ljubljana
Amount <i>(Znesek)</i>	***81,05
Purpose code <i>(Koda namena)</i>	RENT
Purpose of payment <i>(Namen plačila)</i>	Payment of rent for March 2017
Deadline for payment <i>(Rok plačila)</i>	01.04.2017
Recipient's IBAN <i>(IBAN prejelnika)</i>	SI56 0201 7001 4356 205
Recipient's reference <i>(Referenca prejelnika)</i>	SI12 1234567890120
Recipient's name, street and city <i>(Ime. Ulica in kraj prejelnika)</i>	RentaCar d.o.o. Pohorska ulica 22 2000 Maribor

5.2 Preparation of QR code data

Now you need to prepare the QR code data. Complete the fields from 1 to 19 with the relevant content and add the separator <LF> at the end of each field. In the blank fields, enter only the separator <LF>. Add the lengths and enter the result in field 20 - "'Checksum' and add <LF>.

Pay attention to the formatting of the Amount, IBAN and Reference fields, which are formatted differently in the QR code than on the printout. No field may contain leading or following spaces (except for the 'Reserve' field, which can only contain spaces).

If you want to use the 'Reserve' field, calculate the number of spaces allowed (under 'QR code content - Reserve') and add them to the end of the QR content. You must not add punctuation at the end of spaces.

5.3 QR code content

SN	Field name	Content recorded in the QR code
1.	Leading style (<i>Vodilni slog</i>)	UPNQR<LF>
2.	Payer's IBAN (<i>Iban plačnika</i>)	<LF>
3.	Deposit (<i>Polog</i>)	<LF>
4.	Withdrawal (<i>Dvig</i>)	<LF>
5.	Payer's reference (<i>Referenca plačnika</i>)	<LF>
6.	Payer's name (<i>Ime plačnika</i>)	Janez Novak<LF>
7.	Payer's Street and No. (<i>Ulica in št. plačnika</i>)	Dunajska ulica 1<LF>
8.	Payer's city (<i>Kraj plačnika</i>)	1000 Ljubljana<LF>
9.	Amount (<i>Znesek</i>)	00000008105<LF>
10.	Payment date (<i>Datum plačila</i>)	<LF>
11.	Urgent (<i>Nujno</i>)	<LF>
12.	Purpose code (<i>Koda namena</i>)	RENT<LF>
13.	Purpose of payment (<i>Namen plačila</i>)	Payment of rent for March 2017<LF>
14.	Deadline for payment (<i>Rok plačila</i>)	01.04.2017<LF>
15.	Recipient's IBAN (<i>Iban prejemnika</i>)	SI56020170014356205<LF>
16.	Recipient's reference (<i>Referenca prejemnika</i>)	SI121234567890120<LF>
17.	Recipient's name (<i>Ime prejemnika</i>)	RentaCar d.o.o.<LF>
18.	Recipient's street and No. (<i>Ulica in št. prejemnika</i>)	Pohorska ulica 22<LF>
19.	Recipient's city (<i>Kraj prejemnika</i>)	2000 Maribor<LF>
20.	Checksum (<i>Kontrolna vsota</i>)	201<LF>
	Reserve (<i>Rezerva</i>)	

Put the contents together and write them in one segment of type Mode Byte (Binary). An example of prepared content in the c# programming language would look like this:

```
string aVsebinaQR = "UPNQR\n\n\n\nJanez Novak\nDunajska ulica 1\n1000 Ljubljana\n" +
    "00000008105\n\n\nRENT\nPayment of rent for March 2017\n01.04.2017\n" +
    "SI56020170014356205\nSI121234567890120\nRentaCar d.o.o.\nPohorska ulica 22\n" +
    "2000 Maribor\n201\n";
```

Always write the content in one Mode Byte (Binary) segment. Never separate individual fields into separate segments.

Prepare the QR code image taking into account the technical requirements (version 15, ECL-M, Mode Byte, ECI value 4).

Once the QR image has been generated, print it together with the prepared printout data in the appropriate fields on the document. Make sure that all fields are in the appropriate places.

If you have followed the procedures correctly, the printed order should look similar to the image in the introduction of this document.

6. Useful links

- Standard UPN QR – www.zbs-giz.si, www.upnqr.si
- General information about the QR code -- <http://www.qrcode.com/en/>
- General information about the QR code -- https://en.wikipedia.org/wiki/QR_code
- ISO-8859-2 Code Table – https://sl.wikipedia.org/wiki/ISO_8859-2