



**TECHNICAL SPECIFICATIONS ON
NAPAS QR SWITCHING
<Apply for Member Institution>**

PART IV: QR CODE FORMAT

NATIONAL PAYMENT CORPORATION OF VIETNAM

Hanoi, January 2021

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1 Audience

“Technical Specifications on NAPAS QR Switching” document is intended for the Member Organizations (MO) of NAPAS include but not limited to Member Banks of NAPAS and Payment Intermediaries that directly connected to QR switching service.

2 Scope

This document describes the message format of QR switching that NAPAS deploys to Member Institutions.

3 Terms and Acronyms

The following table describes the terminologies and acronyms used on this document:

No.	Terms/Acronyms	Description
1	SW	Switching system (Switch) of NAPAS
2	ACQ	Acquirer
3	ISS	Issuer
4	BNB	Beneficiary Bank
5	PMI	Payment Intermediary
6	MI	Member Institution
7	MO	Member Organization (include Member Institution and Payment Intermediary)

4 Change history

Date	Version	Description
2018-08-06	1.0	1st release
2018-10-11	1.1	Update detail about MCC at section 5.2.4 – Merchant Category Code (ID 52)
2018-10-29	1.2	Change Merchant Account Information Template from ID 26 to ID 38 at following sections : <ul style="list-style-type: none"> - Section 5.2.3.2 Merchant Account Information Template ID 26 - 51 - Section 6. QR code example
2018-11-20	1.3	Change AID at section 5.2.3.2. Merchant Account Information Template (ID 26 – 51) New AID value is : <ul style="list-style-type: none"> - AID: always is “A000000727”
2019-01-30	1.4	<ul style="list-style-type: none"> - Add Service ID value for ATM cash withdrawal service by QR is QRCASH in tag 38 - Add tag 52 - MCC for QR on ATM - Add example for QR Cash - Add description of tag 62 for QR Cash
2021-01-11	1.5	<ul style="list-style-type: none"> - Add Service ID value for IBFT service by QR is QRIBFT in tag 38 - Add Benefit ID, Consumer ID description for IBFT by QR in tag 38 - Add example for QR IBFT - Update tag 58 with more detail about Country Code - Update tag 53 with more detail about Currency Code - Add tag 62 description for QR IBFT
2021-03-03	1.5.1	<ul style="list-style-type: none"> - Update Service ID for IBFT by QR with values as QRIBFTTC and QRIBFTTA in tag 38 to differentiate between IBFT service to card and account. - Add example for QRIBFTTC and QRIBFTTA
2021-04-21	1.5.2	<ul style="list-style-type: none"> - Correct example to create CRC and QR - Describe more detail about tag 38

5 Data Organization

The transactions are processing by Switching QR compliant with EMV QR Code Merchant Presented.

5.1 Data Object Root

The data contained within a QR Code is organized as follows. Each data object is made up of three individual fields. The first field is an identifier (ID) by which the data object can be referenced. The next field is a length field that explicitly indicates the number of characters included in the third field: the value field. A data object is then represented as an ID / Length / Value combination, where:

- The ID is coded as a two-digit numeric value, with a value ranging from "00" to "99",
- The length is coded as a two-digit numeric value, with a value ranging from "01" to "99",
- The value field has a minimum length of one character and maximum length of 99 characters.

A data object that is not encapsulated within a template is said to be under the root of the QR Code.

The value of an ID is not unique and the data object to which it refers is context specific. If the ID is not under the root, the context of an ID is defined by the encapsulating template.

As an example: ID "01" that is under the root of the QR Code refers to the Point of Initiation Method, while ID "01" refers to the Bill Number when it is under the Additional Data Field Template (that is, within ID "62").

The Payload Format Indicator (ID "00") is the first data object under the root and allows the mobile application to determine the data representation of the remaining data included in the QR Code and how to parse the data. The CRC (ID "63") is the last object under the root and allows the mobile application to check the integrity of the data scanned without having to parse all of the data objects. The position of all other data objects under the root or within templates is arbitrary and may appear in any order.

The format of a value field in a data object as follows:

- Numeric (N), data object has numeric format [N] can be represented by all digits, from "0" to "9". Each numeric alphabet in QR Code includes ten (10) characters defined in [Unicode].
- Alphanumeric Special (ans), can be represented by the Common Character Set as defined in [EMV Book 4]. Each Alphanumeric Special alphabet in QR code binary characters defined in [Unicode]

- String (S), represented by any precomposed character(s) defined in [Unicode]. Each coding character in QR code includes binary characters defined in [Unicode].

Note: the numeric type is a subset of special characters and special characters are a subset of String.

Table 1,

Table 2 and Table 3 lists the name of the data object, the ID of the data object, the format of the value field of the data object, the length of the value field of the data object, and whether the presence of the data object at the root level of the QR Code is Mandatory (M), Conditional (C), or Optional (O)

Table 1 - Data Objects Under the Root of a QR PUSH

Data Object	ID	Format	Length	Presence
Payload Format Indicator	"00"	N	"02"	M
Point of Initiation Method	"01"	N	"02"	O
Merchant Account Information	"02"- "51"	S	Var. up to "99"	M
Merchant Category Code	"52"	N	"04"	M
Transaction Currency	"53"	N	"03"	M
Transaction Amount	"54"	S	Var. up to "13"	C
Tip or Convenience Indicator	"55"	N	"02"	O
Value of Convenience Fee Fixed	"56"	S	Var. up to "13"	C
Value of Convenience Fee Percentage	"57"	S	Var. up to "05"	C
Country Code	"58"	S	"02"	M
Merchant Name	"59"	ans	Var. up to "25"	M
Merchant City	"60"	ans	Var. up to "15"	M
Postal Code	"61"	ans	Var. up to "10"	O
Additional Data Field Template	"62"	ans	Var. up to "99"	O
Merchant Information - Language Template	"64"	ans	Var. up to "99"	O
RFU for EMVCo	"65"- "79"	ans	Var. up to "99"	O

Unreserved Templates	"80"- "99"	ans	Var. up to "99"	O
CRC (Cyclic Redundancy Check)	"63"	ans	"04"	M

Table 2 - Data Objects Under the Root of a QR CASH

Data Object	ID	Format	Length	Presence
Payload Format Indicator	"00"	N	"02"	M
Point of Initiation Method	"01"	N	"02"	M
Merchant Account Information	"02"- "51"	S	Var. up to "99"	M
Merchant Category Code	"52"	N	"04"	M
Transaction Currency	"53"	N	"03"	M
Transaction Amount	"54"	S	Var. up to "13"	C
Tip or Convenience Indicator	"55"	N	"02"	O
Value of Convenience Fee Fixed	"56"	S	Var. up to "13"	C
Value of Convenience Fee Percentage	"57"	S	Var. up to "05"	C
Country Code	"58"	S	"02"	M
Merchant Name	"59"	ans	Var. up to "25" ký tự	M
Merchant City	"60"	ans	Var. up to "15"	M
Postal Code	"61"	ans	Var. up to "10"	O
Additional Data Field Template	"62"	ans	Var. up to "99"	M
Merchant Information - Language Template	"64"	ans	Var. up to "99"	O
RFU for EMVCo	"65"- "79"	ans	Var. up to "99"	O
Unreserved Templates	"80"- "99"	ans	Var. up to "99"	O
CRC (Cyclic Redundancy Check)	"63"	ans	"04"	M

Table 3 – Data Object Under the Root of a QR IBFT

Data Object	ID	Format	Length	Presence
Payload Format Indicator	"00"	N	"02"	M
Point of Initiation Method	"01"	N	"02"	M
Merchant Account Information	"02"- "51"	S	Var. up to "99"	M
Merchant Category Code	"52"	N	"04"	O
Transaction Currency	"53"	N	"03"	M
Transaction Amount	"54"	S	Var. up to "13"	C
Tip or Convenience Indicator	"55"	N	"02"	O
Value of Convenience Fee Fixed	"56"	S	Var. up to "13"	O
Value of Convenience Fee Percentage	"57"	S	Var. up to "05"	O
Country Code	"58"	S	"02"	M
Merchant Name	"59"	ans	Var. up to "25"	O
Merchant City	"60"	ans	Var. up to "15"	O
Postal Code	"61"	ans	Var. up to "10"	O
Additional Data Field Template	"62"	ans	Var. up to "99"	C
Merchant Information - Language Template	"64"	ans	Var. up to "99"	O
RFU for EMVCo	"65"- "79"	ans	Var. up to "99"	O
Unreserved Templates	"80"- "99"	ans	Var. up to "99"	O
CRC (Cyclic Redundancy Check)	"63"	ans	"04"	M

Table 4, Table 5 and Table 6 list the name of the data object, the ID of the data object, the value field format of the data object, the value field length of the data object and whether the presence of the data object within the Additional Data Field Template (ID "62") of the QR Code are Mandatory (M), Conditional (C), or Optional (O).

Table 4 – Data Object of Additional Data Field Template (ID “62”) of a QR PUSH

Data Object	ID	Format	Length	Presense
Bill Number	"01"	ans	Up to "25"	C
Mobile Number	"02"	ans	Up to "25"	O
Store Label	"03"	ans	Up to "25" characters	C
Loyalty Number	"04"	ans	Up to "25"	O
Reference Label	"05"	ans	Up to "25"	C
Customer Label	"06"	ans	Up to "25"	O
Terminal Label	"07"	ans	Up to "25"	C
Purpose of Transaction	"08"	ans	Up to "25"	C
Additional Consumer Data Request	"09"	ans	Up to "03"	O
RFU for EMVCo	"10"-"49"	ans		O
Payment System specific templates.	"50"-"99"	ans		O

Table 5– Data Object of Additional Data Field Template (ID “62”) of a QR CASH

Data Object	ID	Format	Length	Presense
Bill Number	"01"	ans	Up to "25"	O
Mobile Number	"02"	ans	Up to "25"	O
Store Label	"03"	ans	Up to "25" characters	O
Loyalty Number	"04"	ans	Up to "25"	O
Reference Label	"05"	ans	Up to "25"	M

Customer Label	"06"	ans	Up to "25"	O
Terminal Label	"07"	ans	Up to "25"	M
Purpose of Transaction	"08"	ans	Up to "25"	O
Additional Consumer Data Request	"09"	ans	Up to "03"	O
RFU for EMVCo	"10"-"49"	ans		O
Payment System specific templates.	"50"-"99"	ans		O

Table 6 - Data Object of Additional Data Field Template (ID "62") of a QR IBFT

Data Object	ID	Format	Length	Presense
Bill Number	"01"	ans	Up to "25"	C
Mobile Number	"02"	ans	Up to "25"	C
Store Label	"03"	ans	Up to "25" characters	O
Loyalty Number	"04"	ans	Up to "25"	O
Reference Label	"05"	ans	Up to "25"	C
Customer Label	"06"	ans	Up to "25"	C
Terminal Label	"07"	ans	Up to "25"	O
Purpose of Transaction	"08"	ans	Up to "25"	C
Additional Consumer Data Request	"09"	ans	Up to "03"	O
RFU for EMVCo	"10"-"49"	ans		O
Payment System specific templates.	"50"-"99"	ans		O

Each of the data objects with IDs "01" to "08" in Table 6 can be used in two ways: either *the merchant* can provide both the ID and its meaningful value, or *the merchant* can include

the ID with a special value to have the mobile application prompt the consumer to input this information.

To prompt the consumer for one or more of these values, the merchant includes the respective IDs in this template each with a length of "03" and with a value equal to "****".

When the consumer is prompted by the mobile application to enter a value for any of these data objects, the length of the value to be entered should not exceed the length as indicated in Table 6.

The data object with the ID "09" contains one or more values that indicate to the mobile application the data to provide as part of the transaction initiation request. This data should already be known by the mobile application, and the consumer should not be unnecessarily prompted for the data.

One or more of the following characters may appear in the Additional Consumer Data Request (ID "09"), to indicate that the corresponding data should be provided in the transaction initiation to complete the transaction:

- "A" = Address of the consumer
- "M" = Mobile number of the consumer
- "E" = Email address of the consumer

If more than one character is included, it means that each data object corresponding to the character is required to complete the transaction. Note that each unique character should appear only once.

Table 7 lists the name of the data object, the ID of the data object, the value field format of the data object, the value field length of the data object, and whether the presence of the data object within the Merchant Information—Language Template (ID "64") of the QR Code is Mandatory (M), Conditional (C), or Optional (O).

These data objects may be used by a mobile application to present the merchant information in an alternate language.

Table 7 - Data Objects for Merchant Information—Language Template (ID "64")

Data Object	ID	Format	Length	Presense
Language Preference	"00"	ans	"02"	M
Merchant Name - Alternate Language	"01"	S	Var. up to "25"	M
Merchant City - Alternate Language	"02"	S	Var. up to "15"	O
RFU for EMVCo	"03"-"99"	S	Var. up to "99"	

The data objects with IDs "01" and "02" are used as an addition to the merchant information under the root. While the equivalent data objects under the root are defined with a format

of Alphanumeric Special, and as such can only contain the Common Character Set, these data objects, if present, are defined with a format of String, so therefore may contain a different character set.

5.2 Data Objects - Root

5.2.1 Payload Format Indicator (ID 00)

Format: N

Length: 2

Presense: Mandatory

Description: Payload Format Indicator is the first data object in QR code, indicate the QR format indicator and conventions about ID, Length, Value. The Payload Format Indicator shall contain a value of "01". All other values are RFU.

5.2.2 Point of Initiation Method (ID 01)

Format: N

Length: 2

Presense: Optional

Description: Initiation method indicates interface technology and data differentiation is dynamic or static.

- "11" = Static QR – apply when allows a QR code to process more than one transaction.
- "12" = Dynamic QR – apply when allow a QR code to process only one transaction.

5.2.3 Merchant Account Information (ID 02-51)

Format: S

Length: var. up to 99

Presense: Mandatory

Description: Merchant Account Information indicates a specific merchant. QR IBFT indicates beneficial consumer and beneficial bank.

5.2.3.1 Primitive Payment System Merchant Account Information (ID 02-25)

ID 02-25 are registered for International Organization, include:

ID 02-03: Reserved for Visa;

ID 04-05: Reserved for Mastercard;

ID 06-08: Reserved for EMVCo;

ID 09-10: Reserved for Discover;

ID 11-12: Reserved for Amex;

ID 13-14: Reserved for JCB;

ID 15-16: Reserved for UnionPay;

ID 17-25: Reserved for EMVCo.

5.2.3.2 Merchant Account Information Template (ID 26 – 51)

ID 26-51 are used for Payment Intermediaries or Other banks outside above Payment Institution listed at ID 02-25. **ID 38 is used for QR code service on NAPAS system.**

Table 8 - Data Object ID Allocation in Merchant Account Information Template

Name	ID	Format	Length	Presense	Comment												
Global Unique Identifier - GUID	"00"	S	Var. up to "32"	M	An identifier that sets the context of the data as follows: - AID: always has value as "A000000727".												
Payment network specific (Member banks, Payment Intermediaries)	"01"	S		M	Association of data objects to IDs and type of data object is specified to the Globally Unique Identifier.												
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Service Code	“02”	S	“10”	C	<p>Identify data of each service, in case of QR have no service code with meaning as QRPUSH service:</p> <ul style="list-style-type: none"> - QRPUSH: Product payment service by QR - QRCASH: Cash withdrawl service at ATM by QR - QRIBFTTC: Inter-Bank Fund Transfer 24/7 to Card service by QR - QRIBFTTA: Inter-Bank Fund Transfer 24/7 to Account service by QR
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5.2.3.2.1 Global Unique Identifier - GUID (ID 00):

Has format as numeric with length up to 32 characters, specifically NAPAS AID is **A000000727**.

5.2.3.2.2 Payment network specific (ID 01):

Include 02 parts:

- ACQ ID/BNB ID: Banks in Vietnam can use BIN code that was registered by State Bank of Vietnam. For example: 970403.
- Merchant ID/Consumer ID: alphanumeric special (ans) with length upto 19 characters. Merchant ID value may be Tax identification number, Business code, Business registration number or Identification number, optional string character according to specified by acquirer bank. Consumer ID value is an account number of customer open at Beneficial bank (BNB ID).

5.2.3.2.3 Service code (ID 02):

Identify data of each service, in case of QR have no service code with meaning as QRPUSH service.

Value	Meaning
QRPUSH	Payment service code by QR
QRCASH	Cash withdrawl service code at ATM by QR

QRIBFTTC	Inter-Bank Fund Transfer 24/7 to Card service code by QR
QRIBFTTA	Inter-Bank Fund Transfer 24/7 to Account service code by QR

5.2.3.2.4 Example:

Example 1: QRPUSH service

38580010A00000072701300006970403011621129950446040250206QRPUSH

Name	ID	Length	Value			
Global Unique Identifier - GUID	00	10	A000000727			
Payment network specific (Member bank, Payment Intermediaries)	01	30	Sub tab	Length	Value	Description
			00	06	970403	ACQ ID
			01	16	2112995044604025	Merchant ID belong to ACQ ID
Service code	02	06	QRPUSH			

Example 2: QRCASH service

“38500010A000000727012200069704030108123456780206QRCASH”

Name	ID	Length	Value			
Global Unique Identifier - GUID	00	10	A000000727			
Payment network specific (Member bank, Payment Intermediaries)	01	22	Sub tab	Length	Value	Description
			00	06	970403	ACQ ID
			01	08	12345678	ATM ID

Service code	02	06	QRCASH
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Example 3: Inter-Bank Fund Transfer 24/7 to Account service code by QR

38570010A00000072701270006970468011300110099504460208QRIBFTTA

Name	ID	Length	Value			
Global Unique Identifier - GUID	00	10	A000000727			
Payment network specific (Member bank, Payment Intermediaries)	01	27	Sub tab	Length	Value	Description
			00	06	970468	BNB ID
			01	13	0011009950446	Consumer ID
Service code	02	08	QRIBFTTA			

5.2.4 Merchant Category Code (ID 52)

Format: N

Length: 4

Presence: Mandatory

Description: Merchant Category Code as defined by ISO 18245 and assigned by Payment Institution. This MCC should indicate the Merchant Category Code of the merchant.

List of MCC as follows:

Table 9 – List of MCCs

MCC	Meaning
5139	Commercial Footwear
5192	Books, Periodicals, and Newspapers
5231	Glass, Paint, Wallpaper Stores
5411	Supermarkets, Grocery Stores

5611	Men’s and Boy’s Clothing and Accessories Stores
5621	Women’s Ready-to-Wear Stores
5631	Women’s Accessory and Specialty Shops
5641	Children’s and Infant’s Wear Stores
5651	Family Clothing Stores
5661	Shoe Stores
5691	Men’s and Women’s Clothing Stores
5734	Computer Software Stores
5812	Eating places and Restaurants
5813	Drinking Places (Alcoholic Beverages), Bars, Taverns, Cocktail lounges, Nightclubs and Discotheques
5814	Fast Food Restaurants
5912	Drug Stores and Pharmacies
5921	Package Stores – Beer, Wine, and Liquor
5832	Antique Shops – Sales, Repairs, and Restoration Services
5940	Bicycle Shops – Sales and Service
5941	Sporting Goods Stores
5942	Book Stores
5943	Stationery Stores, Office and School Supply Stores
5944	Watch, Clock, Jewelry, and Silverware Stores
5945	Hobby, Toy, and Game Shops
5946	Camera and Photographic Supply Stores
5947	Card Shops, Gift, Novelty, and Souvenir Shops
5977	Cosmetic Stores
5992	Florists

5995	Pet Shops, Pet Foods, and Supplies Stores
6011	Financial Institutions – Manual Cash Disbursements
7011	Lodging – Hotels, Motels, Resorts, Central Reservation Services (not elsewhere classified)
7211	Laundry Services - Family and Commercial
7216	Dry Cleaners
7298	Health and Beauty Shops
8062	Hospitals

5.2.5 Transaction Currency (ID 53)

Format: N

Length: 3

Presence: Mandatory

Description: The Transaction Currency shall conform to [ISO 4217] and shall contain the 3-digit numeric representation of the currency. The value should indicate the transaction currency that consumer can recognize by mobile application while transaction amount is presented or consumer inputs the transaction amount.

Table 10 – List of currency code

Currency Code		Meaning
JPY	392	Japanese Yen
KRW	410	Korean Won
MYR	458	Malaysian Ringgit
CNY	156	Chinese yuan
IDR	360	Indonesian Rupiah
PHP	608	Philippine Peso
SGD	702	Singapore Dollar
THB	764	Thai Baht

VND	704	Vietnamese Dong
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5.2.6 Transaction Amount (ID 54)

Format: S

Length: var. up to 13

Presence: Conditional option

Description:

If present, transaction amount is represented for consumers on mobile application. The Transaction Amount shall be different from zero, shall only include (numeric) digits "0" to "9" and may contain a single "." character as the decimal mark. When the amount includes decimals, the "." character shall be used to separate the decimals from the integer value and the "." character may be present even if there are no decimals.

The number of digits after the decimal mark should align with the currency exponent associated to the currency code defined in ISO 4217.

The above describes the only acceptable format for the Transaction Amount. It cannot contain any other characters (for example, no space character can be used to separate thousands).

For example: valid Transaction Amounts: "50000", "50000."

Invalid Transaction Amounts: "50 000"

If The Transaction Amount shall not be available on the mobile application, then consumer will input the Transaction Amount.

5.2.7 Tip or Convenience Indicator (ID 55)

Format: N

Length: 2

Presence: Conditional option

Description: If present, the Tip or Convenience Indicator shall contain a value of "01", "02" or "03". All other values are RFU.

A value of "01" shall be used if the mobile application should prompt the consumer to enter a tip to be paid to the merchant.

A value of "02" shall be used to indicate inclusion of the data object Value of Convenience Fee Fixed (ID "56").

A value of "03" shall be used to indicate inclusion of the data object Value of Convenience Fee Percentage (ID "57").

Note that even if the Transaction Amount is not present in the QR Code, this data object may still be present.

5.2.8 Value of Convenience Fee Fixed (ID 56)

Format: S

Length: var. up to 13

Presense: Conditional option

Description:

If the data object Tip or Convenience Indicator (ID "55") is present with a value of "02" then this data object shall be absent, then the Value of Convenience Fee Fixed shall be present. Value of Convenience Fee Fixed will be presented for consumer by mobile application. The Value of Convenience Fee Fixed is different from zero, only include (numeric) digits "0" to "9" and may contain a single "." character as the decimal mark. When the Value of the Convenience Fee Fixed includes decimals, the "." character shall be used to separate the decimals from the integer value.

If ID "55" has value other than "02" then ID 56 shall not be presented.

5.2.9 Value of Convenience Fee Percentage (ID 57)

Format: S

Length: var. up to 5

Presense: Conditional option

Description:

If the data object Tip or Convenience Indicator (ID "55") is present with a value of "03" then The Value of Convenience Fee Percentage shall be present and only values between "00.01" and "99.99" shall be used. The Value of Convenience Fee Percentage shall only include (numeric) digits "0" to "9" and may contain a single "." character as the decimal mark. The "." character shall be used to separate the decimals from the integer value and the "." character may be present even if there are no decimals.

The Value of Convenience Fee Percentage shall not contain any other characters. For example, the "%" character must not be included.

If ID 55 has value other than "03" then ID shall not be presented.

5.2.10 Country Code (ID 58)

Format: S

Length: 02 characters

Presense: Mandatory

Description: The Country Code shall contain a value as defined by [ISO 3166-1 alpha 2]. The Country Code should indicate the country in which the merchant transacts.

Table 11 – List of country code

Country Code	Meaning
JP	Japan
KR	Korea
MY	Malaysia
RC	China
RI	Indonesia
RP	Philippines
SG	Singapore
TH	Thailand
VN	Viet Nam

5.2.11 Merchant Name (ID 59)

Format: ans

Length: var. up to 25

Presense: Mandatory

Description: The Merchant Name shall be present, should display to customer on mobile application during transaction processing.

5.2.12 Merchant City (ID 60)

Format: ans

Length: var. up to 15

Presense: Mandatory

Description: The Merchant City should indicate the city of the merchant's physical location.

5.2.13 Postal Code (ID 61)

Format: ans

Length: var. up to 10

Presense: Optional

Description: If present, the Postal Code should indicate the postal code of the merchant’s physical location. Depending on the country, the Postal code is the Zip code or PIN code or Postal code of the merchant.

5.2.14 Additional Data Field Template (ID 62)

Format: ans

Length: var. up to 99 characters

Presense: Optional

Description: the Additional Data Field Template shall provide additional data in differencnt cases and contain at least 1 data object.

Table 12- Additional Data Field Template

Name	ID	Format	Length	Presense	Description
Bill Number	"01"	ans	Var. up to "25"	O	The invoice number or bill number is provided by merchant or consumer input into mobile application.
Mobile Number	"02"	ans	Var. up to "25"	O	Mobile phone number shall be provided by merchant or consumer input.
Store Label	"03"	ans	Var. up to "25"	O	A distinctive number associated to a store. This value shall be provided by merchant or consumer input.
Loyalty Number	"04"	ans	Var. up to "25"	O	As typically loyalty card number. This number shall be provided by merchant or consumer inputs their loyalty card number.
Reference Label	"05"	ans	Var. up to "25"	O	Any value as defined by the merchant or acquirer in order to identify the transaction.

Customer Label	"06"	ans	Var. up to "25"	O	This value could be identification, mobile phone number or invoice number of consumer
Terminal Label	"07"	ans	Var. up to "25"	O	A distinctive number associated to a terminal in the store.
Purpose of Transaction	"08"	ans	Var. up to "25"	O	Any value in order to define the purpose of the transaction, for example: billing, topup or purchase, etc...
Additional Consumer Data Request	"09"	ans	Var. up to "03" characters	O	One or more following characters may appear, indicate that the corresponding data shall be provided during transaction initialization: <ul style="list-style-type: none"> • "A" = Consumer address • "M" = Consumer mobile phone number • "E" = Consumer email address
RFU for EMVCo	"10"- "49"	S		O	Templates reserved for EMVCo
Payment System specific templates.	"50"- "99"	S		O	

- If present, Additional Data Field Template (ID 62) will include at least a data object and total of length of all data objects in ID 62 not exceed 99 characters
- If present, the content of the data object value for IDs "01" to "08" shall be either "***" or a value defined by the merchant. The presence of "***" indicates that the mobile application is responsible for obtaining the necessary information.

- the Additional Consumer Data Request (ID "09") shall contain any combination of the characters: "A", "M" and/or "E", and there shall only be a single instance of each of these characters.
- If a Payment System Specific Template (ID50-99) appears then it shall contain a primitive Globally Unique Identifier data object with a data object ID "00" as follows:
 - An AID consisting of a RID registered with ISO/IEC 7816-5, and optional, a PIX as defined by ISO 7816-4
For example: "A000000727".
 - An UUID without the hyphen (-) separators.
For example: "581b314e257f41bfbbdc6384daa31d16".
 - A reverse domain name.
For example: "vn.com.napas.qrcodeservice".

5.2.15 CRC (ID 63)

Format: ans

Length: var. up to 4

Presense: Mandatory

Description: The checksum shall be calculated according to [ISO/IEC 13239] using the polynomial '1021' (hex) and initial value 'FFFF' (hex). The data over which the checksum is calculated shall cover all data objects, including their ID, Length and Value, to be included in the QR Code, in their respective order, as well as the ID and Length of the CRC itself (but excluding its Value). Refer to CRC creation at Section 6.

5.2.16 Data Objects – Merchant Information – Language Template (ID 64)

Format: ans

Length: var. up to 99

Presense: Optional

Description: Merchant Information – it shall contain the Language Preference and Merchant Name—Alternate Language using a character set different with a common character set.

Table 13 – Merchant Information – Language Template

Name	ID	Format	Length	Presense
Language Preference	"00"	ans	"02"	M
Merchant Name - Alternate Language	"01"	S	Var. up to "25"	M

Merchant City - Alternate Language	"02"	S	Var. up to "15"	O
RFU for EMVCo	"03"–"99"	S	Var. up to "99"	

5.2.16.1 Language Preference (ID 00)

Format: ans

Length: 2

Presense: Mandatory

Description: Language Preference shall contain 2 alphabetical characters coded to a value defined by [ISO 639]. The value should represent the single language used to encode the Merchant Name - Alternate Language and the optional Merchant City - Alternate Language.

5.2.16.2 Merchant Name—Alternate Language (ID 01)

Format: S

Length: tối đa 25

Presense: Mandatory

Description: Merchant Name is in the merchant's local language.

5.2.16.3 Merchant City—Alternate Language (ID 02)

Format: S

Length: var. up to 15 characters

Presense: Optional

Description: Merchant City is in the merchant's local language.

5.2.17 Data Objects—RFU for EMVCo (ID 65-79)

Format: ans

Length: var. up to 99

Presense: Optional

Description: Data objects in this range are reserved for future use for EMVCo.

5.2.18 Data Objects—Unreserved Templates (ID 80-99)

Format: ans

Length: var. up to 99

Presense: Optional

Description:

- QR code may contains zero or more Unreserved Templates.
- Unreserved Templates can be allocated and used by other parties, such as (domestic) payment systems and value-added service providers, for their own products. They can then define the meaning, representation and format. Each payment system provider or value-added service provider puts their data in a separate Unreserved Template ID. For example, the first set of data is placed in ID “80”, the second set of data is placed in ID “81”, and so on.

Table 14 - Data Object ID Allocation in Unreserved Templates

Name	ID	Format	Length	Presense	Comment
Globally Unique Identifier-GUID	"00"	ans	Var. up to "32" characters	M	An identifier that sets the context of the data that follows: <ul style="list-style-type: none"> - AID - UUID without the hyphen (-) separator; - A reverse domain name.
Context specific data	"01"- "99"	S		O	Association of data objects to IDs and type of data object is specific to the Globally Unique Identifier

If present, an Unreserverd Template shall contain following data:

- GUID (ID “00”) contains one of following data:
 - An Application Identifier (AID) consisting of a RID registered with ISO 7816-5 and, optionally, a PIX, as defined by ISO 7816-4.
For example: "A000000727".
 - A [UUID] without the hyphen (-) separators.
For example: “581b314e257f41bfbbdc6384daa31d16”.
 - A reverse domain name.
For example: “vn.com.napas.qrcodeservice”

Specific range data (ID “01” – “99”): a combination of data object with ID and specific data type with GUID.

6 QR code example

6.1 QR PUSH Payment

6.1.1 Static QR with no service code

00020101021138480010A00000072701300006970403011621129950446040255204581253037045802VN5910PHUONG CAC6005HANOI62110307NPS6869630492296304**5802**

Data Object	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	11
Merchant Account Information	38	48	0010A000000727 0130000697040301162112995044 604025
Merchant Category Code	52	04	5812
Transaction Currency	53	03	704
Country Code	58	02	VN
Merchant Name	59	10	PHUONG CAC
Merchant City	60	05	HANOI
Additional Data Field Template	62	11	0307NPS6869
CRC (Cyclic Redundancy Check)	63	04	5802

QR generation steps:

Steps	Input	Expected result
Generate CRC http://www.lammertbies.nl/	00020101021138480010A0 00000727013000069704030 11621129950446040255204 581253037045802VN5910P	5802

comm/info/crc-calculation.html	HUONG CAC6005HANOI62110307 NPS68696304	
Generate QR code https://www.the-qr-code-generator.com/	00020101021138480010A0 00000727013000069704030 11621129950446040255204 581253037045802VN5910P HUONG CAC6005HANOI62110307 NPS68696304 5802	


6.1.2 Static QR with service code

00020101021138580010A00000072701300006970403011621129950446040250206QRPUS
H5204581253037045802VN5910PHUONG
CAC6005HANOI62110307NPS6869630492296304**3820**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	11
Merchant Account Information	38	58	0010A000000727 01300006970403011621129 95044604025 0206QRPUSH
Merchant Category Code	52	04	5812
Transaction Currency	53	03	704
Country Code	58	02	VN
Merchant Name	59	10	PHUONG CAC
Merchant City	60	05	HANOI
Additional Data Field Template	62	11	0307NPS6869

CRC (Cyclic Redundancy Check)	63	04	3820
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QR generation steps:

Steps	Input	Expected result
Generate CRC http://www.lammertbies.nl/comm/info/crc-calculation.html	00020101021138580010A0 00000727013000069704030 11621129950446040250206 QRPUSH520458125303704 5802VN5910PHUONG CAC6005HANOI62110307 NPS68696304	3820
Generate QR code https://www.the-qrcode-generator.com/	00020101021138580010A0 00000727013000069704030 11621129950446040250206 QRPUSH520458125303704 5802VN5910PHUONG CAC6005HANOI62110307 NPS68696304 3820	


6.1.3 Dynamic QR with no service code

00020101021238480010A000000727013000069704030116211299504460402552045812530370454061800005802VN5910PHUONG CAC6005HANOI62110307NPS68696304**79EE**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	12
Merchant Account Information	38	48	0010A000000727 013000069704030116211299504 4604025
Merchant Category Code	52	04	5812
Transaction Currency	53	03	704
Transaction Amount	54	06	180000
Country Code	58	02	VN
Merchant Name	59	10	PHUONG CAC

Merchant City	60	05	HANOI
Additional Data Field Template	62	11	0307NPS6869
CRC (Cyclic Redundancy Check)	63	04	79EE

QR generation steps:

Steps	Input	Expected result
Generate CRC http://www.lammertbies.nl/comm/info/crc-calculation.html	00020101021238480010A000 000727013000069704030116 2112995044604025520458125 30370454061800005802VN591 OPHUONG CAC6005HANOI 62110307NPS68696304	79EE
Generate QR code https://www.the-qrcode-generator.com/	00020101021238480010A000 000727013000069704030116 2112995044604025520458125 30370454061800005802VN591 OPHUONG CAC6005HANOI 62110307NPS68696304 79EE	


6.1.4 Dynamic QR with service code

00020101021238580010A00000072701300006970403011621129950446040250206QR
PUSH52045812530370454061800005802VN591OPHUONG
CAC6005HANOI62110307NPS68696304**7C1B**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	12
Merchant Account Information	38	58	0010A000000727 0130 00069704030116 211299504 4604025

			0206QRPUSH
Merchant Category Code	52	04	5812
Transaction Currency	53	03	704
Transaction Amount	54	06	180000
Country Code	58	02	VN
Merchant Name	59	10	PHUONG CAC
Merchant City	60	05	HANOI
Additional Data Field Template	62	11	0307NPS6869
CRC (Cyclic Redundancy Check)	63	04	7C1B

QR generation steps:

Steps	Input	Expected result
Generate CRC http://www.lammertbics.nl/comm/info/crc-calculation.html	00020101021238580010A000 000727013000069704030116 21129950446040250206QRP USH520458125303704540618 00005802VN5910PHUONG CAC6005HANOI62110307N PS68696304	7C1B
Generate QR code https://www.the-qr-code-generator.com/	00020101021238580010A000 000727013000069704030116 21129950446040250206QRP USH520458125303704540618 00005802VN5910PHUONG CAC6005HANOI62110307N PS68696304 7C1B	


6.2 QR Cash

00020101021238500010A000000727012200069704030108123456780206QRCASH52046011
53037045802VN5915NGUYEN HUU
HUAN6005HANOI623705212019010915571422838470708000011116304**1009**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	12
Merchant Account Information	38	50	0010A000000727 01220006970403010812345678 0206QRCASH
Merchant Category Code	52	04	6011
Transaction Currency	53	03	704
Country Code	58	02	VN
Merchant Name	59	15	NGUYEN HUU HUAN
Merchant City	60	05	HANOI
Additional Data Field Template	62	37	0521201901091557142283847 0708000011111
CRC (Cyclic Redundancy Check)	63	04	1009

QR generation steps:

Steps	Input	Expected result
Generate CRC http://www.lammertbies.nl/comm/info/crc-calculation.html	00020101021238500010A000 000727012200069704030108 123456780206QRCASH5204 601153037045802VN5915N GUYEN HUU HUAN6005HANOI62370521 201901091557142283847070 8000011116304	1009

<p>Generate QR code https://www.the-qr-code-generator.com/</p>	<p>00020101021238500010A000 000727012200069704030108 123456780206QRCASH5204 601153037045802VN5915N GUYEN HUU HUAN6005HANOI62370521 201901091557142283847070 80000111163041009</p>	
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6.3 QR IBFT


6.3.1 Static QR IBFT to Account

00020101021138570010A00000072701270006970403011200110123456780208QRIBFTTA53037045802VN6304**F4E5**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	11
Consumer Account Information	38	57	0010A000000727 0127000697040301130011012345678 0208QRIBFTTA
Transaction Currency	53	03	704
Country Code	58	02	VN
CRC (Cyclic Redundancy Check)	63	04	F4E5

QR generation steps:

Steps	Input	Expected result
Generate CRC http://www.lammertbies.nl/comm/info/crc-calculation.html	00020101021138570010A000 000727012700069704030112 00110123456780208QRIBFT TA53037045802VN6304	F4E5

<p>Generate QR code https://www.the-qr-code-generator.com/</p>	<p>00020101021138570010A000 000727012700069704030112 00110123456780208QRIBFT TA53037045802VN6304F4E 5</p>	
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6.3.2 Static QR IBFT to Card

00020101021138600010A00000072701300006970403011697040311012345670208QRI
BFTTC53037045802VN6304**4F52**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	11
Consumer Account Information	38	60	0010A000000727 0130000697040301169704031101 234567 0208QRIBFTTC
Transaction Currency	53	03	704
Country Code	58	02	VN
CRC (Cyclic Redundancy Check)	63	04	4F52

QR generation steps:

Steps	Input	Expected result
<p>Generate CRC http://www.lammertbics.nl/comm/info/crc-calculation.html</p>	<p>00020101021138600010A000 000727013000069704030116 97040311012345670208QRI BFTTC53037045802VN6304</p>	4F52

<p>Generate QR code https://www.the-qr-code-generator.com/</p>	<p>00020101021138600010A000 000727013000069704030116 97040311012345670208QRI BFTTC53037045802VN 63044F52</p>	
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6.3.3 Dynamic QR IBFT to Account

00020101021238570010A00000072701270006970403011300110123456780208QRIBFTTA530370454061800005802VN62340107NPS68690819thanh toan don hang6304**2E2E**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	12
Consumer Account Information	38	57	0010A000000727 0127000697040301130011012345678 0208QRIBFTTA
Transaction Currency	53	03	704
Transaction Amount	54	06	180000
Country Code	58	02	VN
Additional Data Field Template	62	34	0107NPS6869 0819thanh toan don hang
CRC (Cyclic Redundancy Check)	63	04	2E2E

QR generation steps:

Steps	Input	Expected result
Generate CRC http://www.lammertbics.nl/	00020101021238570010A000 000727012700069704030113 00110123456780208QRIBFT TA530370454061800005802	2E2E

comm/info/crc-calculation.html	VN62340107NPS68690819th anh toan don hang6304	
Generate QR code https://www.the-qrcode-generator.com/	00020101021238570010A000 000727012700069704030113 00110123456780208QRIBFT TA530370454061800005802 VN62340107NPS68690819th anh toan don hang6304 2E2E	


6.3.4 Dynamic QR IBFT to Card

00020101021138600010A00000072701300006970403011697040311012345670208QRI
BFTTC53037045802VN6304**A203**

Name	ID	Length	Value
Payload Format Indicator	00	02	01
Point of Initiation Method	01	02	12
Consumer Account Information	38	60	0010A000000727 0130000697040301169704031101 234567 0208QRIBFTTC
Transaction Currency	53	03	704
Transaction Amount	54	06	180000
Country Code	58	02	VN
Additional Data Field Template	62	34	0107NPS6869 0819thanh toan don hang
CRC (Cyclic Redundancy Check)	63	04	A203

QR generation steps:

Steps	Input	Expected result
Generate CRC	00020101021238600010A000 0007270130000697040301169 7040311012345670208QRIBF	A203

http://www.lammertbies.nl/comm/info/crc-calculation.html	TTC530370454061800005802 VN62340107NPS68690819thanh toan don hang6304	
Generate QR code https://www.the-qrcode-generator.com/	00020101021238600010A000 00072701300006970403011697040311012345670208QRIBF TTC530370454061800005802 VN62340107NPS68690819thanh toan don hang6304 A203	

7 Effective document

The Technical Specification takes effect from **2021**.