Standard for Interoperable QR Code

for Person-to-Person and Merchant Payments

Digital Innovation & Settlements Department
State Bank of Pakistan

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Glossary of Terms

Acquirer	The entity that onboards the merchant and issues a QR Code to it. These entities can be Banks, MFBs, EMIs etc.
Closed Loop System	A system where merchants are onboarded by an entity and QR codes are subsequently issued to them. Only the accountholders of such entity can use these QR codes for making payments to these merchants
EMV QRCPS	EMV Co's QR Code Specification for Payment Systems – Merchant Presented Mode
Issuer	The entity providing the mobile app/online portal or any other instrument to the customer(s) to process the QR Code. These entities can be Banks, MFBs, EMIs etc.
Merchant Account Information - MAI	Necessary information to identify the merchant ie. scheme, merchant ID, acquirer information and others. It is an important field in the QR Code data objects and usually issued by the scheme
Open Loop System	A system, managed by a scheme, where different participants function as acquirers and issuers. In this system, the QR Codes are issued on a standard format by the acquirers which can be used by other participants in the system
PSO/PSP	Payment System Operator/ Payment Service Provider- as defined in SBP's Rules for PSO/PSPs
QR Code Interoperability	A mechanism to standardize the features of a QR code so that it can be read, understood and processed by all other participants of the system
QRC	Quick Response Code
RFU	Reserved for Future Use
Scheme	Entities that have developed systems & rules, and serve as a platform to enable QR Code as a payment mechanism to their participants (acquirers and issuers) These schemes can be international (Visa, Mastercard, UnionPay) or Domestic (1-link/IBFT, Raast etc.)

Standard for Interoperable QR Code for Person-to-Person Payments

1. The Purpose of P2P QR Code

1.1 This standard is being issued to facilitate fund transfer transactions from one person to another in a convenient manner. The P2P QR code is a credit transfer instrument and can only be used to receive payments by the beneficiaries of fund transfer transactions

1.2 The use of P2P QR Code will enable customers to conveniently transfer funds to beneficiaries without the hassle of typing/inputting account numbers, IBAN or other such details.

2. Scope and Applicability

This standard is applicable on all regulated entities (Banks, MFBs and EMIs) that are offering Inter/Intra bank fund transfer services through the digital mechanism.

3. The Specification Template

The specification template of P2P QRC is as follows:

Tag ID	00	01	02	03	04	05	06	07	08	09	10
Description	Payload Format Indicator	Point of Initiation Method	Scheme Identifier	FI Name	IBAN	Amount	Particulars	Reserved for Future use			CRC

3.1 Data Objects under the P2P QRC

This is a proprietary template for P2P payments in Pakistan with the following data objects:

Description	ID	Format	Length (in characters)	Presence	Remarks
Payload Format Indicator	00	Number only	02	Mandatory	Value of '02' is assigned for P2P. All other values are reserved for future use
Point of Initiation Method	01	Number Only	02	Mandatory	Indicates the nature of QRC '11' for Static '12' for Dynamic
Scheme Identifier	02	Number only	02	Mandatory	Raast identifier - 30 1-Link identifier - 31
FI Name	03	String	Var. upto 25	Optional	The name of the Financial Institution holding the beneficiary's account

IBAN	04	Numbers and Alphabets only	24	Mandatory	International Bank Account Number (IBAN) of the beneficiary/ QR code holder
Amount	05	Numbers only (along with one decimal if needed)	Upto 10	Conditional	Absent if the user is prompted to input the amount. Present otherwise
Particulars	06	String	30	Optional	Particulars of the transaction. For eg. Family Support, Charity & donation, Committee savings, Tip or convenience fee, loan disbursement/repayment between two individuals, rent payment or any other purpose
Reserved	07 08 09	N/A			Reserved for Future Use by SBP
CRC	10	ans	04	Mandatory	Cyclic Redundancy Check – used to verify the integrity of entire QRC. This is placed as the last object in the QRC and calculated as defined in EMVCo QRCPS

4. QRC Generation and Usage

4.1 The FIs shall generate unique QR for their customers based on their IBAN and ensure that they are provided to their customers in all communications and product offerings; including but not limited to:

a) Mobile Applications

b) Internet Portals

c) Cheque Books

d) All written correspondences including welcome letters

e) Especially printed QR codes

f) QR Codes in digital forms that could be digitally sent to the customers for receiving payments

4.2 The customer may generate/download/photograph the QRC via the channels mentioned above which may be used to receive payments from other individuals.

4.3 The QR Code generated for this purpose must be legible and of high quality so that it can be read by ordinary cameras.

4.4 Scheme identifier ID (first two digits identifying the scheme) will be issued only to the scheme desirous of offering P2P service in Pakistan and authorized to do so by SBP. As of now, the scheme IDs are issued to only two schemes as follows:

Scheme Identifier	Details
26-29	Reserved by SBP
30	Raast P2P
31	1-Link's IBFT service
32-51	To be allocated to PSO/PSPs authorized by SBP

4.5 The FI apps / online portals reading or scanning the QR Code should be able to appropriately route the transaction for intra bank funds transfers or through the appropriate scheme for inter-bank fund transfers, as the case may be. For example:

(a) If the issuer QR Code and QR scanning App belong to the same FI, then the transaction may not be routed via a scheme

(b) If the issuer of the QR code and scanning app belong to different FIs, then the transaction may be routed via the appropriate scheme as defined at 4.4 above.

5. Customer Experience

5.1 To enhance user experience, the FIs may innovatively use this P2P QR Standard to embed in their product offerings through digital means. For this purpose, they may develop their apps and online portals accordingly.

5.2 Apart from static QR Code, the FIs can allow their customers to generate dynamic QR Codes for enhanced user experience.

Standard for Interoperable QR Code for Merchant Payments

6. Goals & Objectives

6.1. The Objective

The objective of issuing this QR Standard is to create an enabling environment for enhancing the availability and usage of low-cost acceptance points (ie. QR Codes) for establishment of a cash-lite society

6.2. The Goals

The goals of the Standard QR initiative are as follows:

a) Enable domestic payments schemes to enable QR Code payments

b) Devise a unified QR standard to support multi-scheme model (both domestic and international)

c) Promote wider adoption of QR code for different type of electronic payments (in-store, ecommerce, bill presentment & payments)

d) Encourage small and medium merchants for digital payments

e) Reduce capital as well as transactional costs for mass adoption of digital payments

f) Enable static and dynamic QRs at acceptance points

g) Allow authorized merchant aggregators/ non-bank acquirers to enter into merchant acquiring business for overall growth of QR acceptance eco system

h) Provide enabling environment to offer discounts & loyalty rewards using the QR code

i) Harmonize the practices of QR placement at merchant locations

7. Scope and Applicability

This standard is applicable on all Banks, MFBs, EMIs and PSO/PSPs in the country that are offering or desirous to offer QR Code as a mechanism for merchant payments to their customers.

8. Standard QR Specification

Below is the specification for the acquirers to generate QR Code for merchants, as well as issuers to develop their apps accordingly. As per EMVCo, the Tag IDs (02-25) are reserved for international Payment Schemes whereas 26 to 51 may be adopted by the domestic schemes. Henceforth, for the domestic payment schemes in Pakistan, the IDs are reserved as follows:

- 26-27 reserved for future use
- 28-30 reserved for Raast
- 31-51 reserved for future use

Table 1: Merchant Account Information

ID	Meaning	
02-03	Reserved for Visa	
04-05	Reserved for Mastercard	
06-08	Reserved by EMVCo	
09-10	Reserved for Discover	
11-12	Reserved for Amex	
13-14	Reserved for JCB	
15-16	Reserved for UnionPay	
17-25	Reserved by EMVCo	
26-51	Templates reserved for additional payment networks/ domestic schemes	26-27 reserved for future use
		28-30 reserved for Raast
		31-51 reserved for future use

8.1. Standard Template of QR Codes (with multiple schemes)

a) The scheme identifier (first two digits of the MAI) will be issued by State Bank of Pakistan only to those authorized PSO/PSPs which are desirous to offer QR Codes for merchant payments in the country.

b) The proposed template of Standard QR is placed below covering EMVCo Tag IDs, adjusting multiple payment schemes (international and domestic), newly reserved Tag ID for domestic schemes as well as reserved templates for future use. The details of each of these data objects is defined in Table 2 in section 9.

c) However, this is the non-exhaustive list of Data objects; and the participants can decide to include additional objects from EMVCo as per their design considerations and requirements.

d) Reference can be made to "EMV QRCPS-Merchant Presented Mode" for anything not explicitly defined in this document.

Figure 1: Standard Template of QR[*]

EMVCo Tag ID	00	01	02	04	06	26	28	52	53	54	55, 56 and 57	58	59	60	62
Desc.	PFI	POI	MAI1 Visa	MAI2 Mastercard	MAI3 UPI	MAI4 Domestic scheme1	MAI5 Domestic Scheme2	MCC	Currency	Amount	Convenience fee	Country Code	Merchant Name	Merchant City	**Additional Data Field**

EMVCo Tag ID	64	80	81	82	83	84	85	86	87	88	89-99	63
Desc.	Alternate Language	"Context of tx"	Discounts & Loyalty Programs	O2O[+]	e-Commerce	Scheme Specific			Acquirer Specific		RFU-SBP	CRC

*80-99 are unreserved IDs under EMVCo
[+]Offline-to-Online Payments

Figure 2: Additional Data Field Template (ID 62)

EMVCo Tag ID	62										
Desc.	**Additional data Field Template**										
	01	02	03	04	05	06	07	08	09	10	11
	Bill#	Mob #	Store Label	Loyalty no.	Reference Label	Customer Label	Terminal No.	Purpose	Addl. Consumer Data	Merchant Tax ID	Merchant Channel

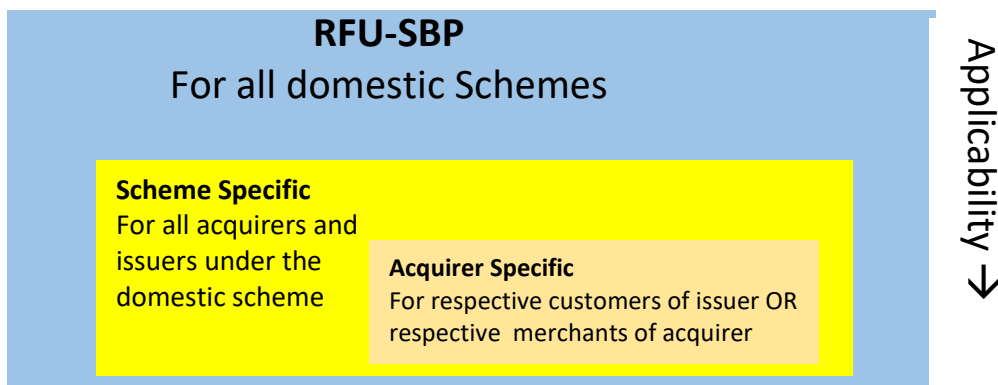| EMVCo Tag ID	62 (Contd.)				
Desc.	**Additional data Field Template***				
	50	51	52-54	55-56	57-99
	Due Date	Amount after due date	Scheme Specific	Acquirer Specific	RFU-SBP

*50-99 are unreserved IDs under EMVCo

8.2. Applicability of Reserved IDs under the Standard

Fig. 3 shows the applicability of the reserved fields, described as follows:

8.2.1. RFU-SBP: These fields are reserved by SBP for future use. Once mandated by SBP, the items under these IDs shall be followed by all domestic schemes, acquirers and issuers of QR codes in the country.

8.2.2. Scheme Specific: These fields are reserved for the schemes and can be utilized as per their design and feasibility. These will be applicable on all the acquirers and issuers working under the scheme.

8.2.3. Acquirer Specific: There will be situations when an acquirer/issuer wants to use a field for its own purposes and for its own clients (on-us transactions); these fields can be used by the acquirers/issuers for such purposes.

Figure 3: Applicability of reserved IDs

RFU-SBP
For all domestic Schemes

Scheme Specific
For all acquirers and issuers under the domestic scheme

Acquirer Specific
For respective customers of issuer OR respective merchants of acquirer

Applicability →

9. Details of the Data Objects in the Standard QR

9.1 The details of the Data Objects illustrated in figure 1 & 2 are given below:

Table 2: Details of Data Objects for Fig. 1

EMV Co Tag ID	Name	Format N-Number ans-Alphaneumeric Special S-String	Length (In characters)	Presence M-Mandatory O-Optional C-Conditional	Description
00	Payload Format Indicator	N	02	M	Default value is 01 as per EMVCo.
01	Point of Initiation Method	N	02	O	11- for Static QR 12-for Dynamic QR
Refer Table 1	Merchant Account Information (MAI) for international and domestic schemes	ans	Each var. upto 40	M	At least one MAI should be present
52	Merchant Category Code	N	04	M	The category under which merchant falls (as per ISO 18245)
53	Transaction Currency	N	03	M	Currency Code of the transaction. '586' for PKR
54	Transaction Amount	ans	var. upto 13	O	Amount of the transaction - either built into the QR (dynamic) or prompted from the customer (static)
55	Tip or convenience fee indicator	N	02	O	If required
56	Value of Convenience fee (fixed)	ans	var. upto 13	C	Any of these two is required if ID 55 is populated
57	Value of convenience fee (%)	ans	var. upto 5	C	
58	Country Code	ans	02	M	Country code of the merchant. "PK" for Pakistan
59	Merchant Name	ans	var. upto 25	M	"Doing business as" name of the merchant as per acquirer's record
60	Merchant City	ans	var. upto 15	M	City of physical presence of Merchant. If QR is generated through an online portal, then the scheme shall decide how this field should be populated
62	Additional Data Field Template	S	var. upto 99	O	This includes information that may be explicitly defined in the QR, or may be prompted to the customer. This is an optional field in EMVCo covering many sub-fields described in Table 3 below

64	Merchant Information – Language Template	S	var. upto 99	O	This allows the merchant name and city to be kept in an alternate / local language. The scheme shall decide how to populate this field in accordance with EMV QRCPS
80	Context of transaction	ans	var. upto 50	O	Context/Particulars of the Tx; may be prompted from the customer or explicitly defined in the QR
81	Discounts & Loyalty Programs	ans	var. upto 30	O	This field is reserved for Discounts & Loyalty programs by the scheme or the acquirer / issuer
82	O2O	ans	var. upto 50	O	Reserved for Offline to Online Payments. O2O is the experience where the customer scans a QR code at the merchant location which contains a URL and subsequently routes the customer to the merchant's website/portal
83	e-Commerce	ans	var. upto 40	O	Reserved for e-Commerce related transactions
84-86	Scheme Specific		var. upto 40 each	O	To be used by the domestic scheme for its participants
87-88	Acquirer Specific	ans	var. upto 40 each	O	To be used by the acquirer / issuer for onward usage of its own customers
89-99	RFU- SBP	ans	var. upto 40 each	O	Reserved for future use by SBP
63	CRC	ans	04	M	Cyclic Redundancy Check (as per EMVCo QRCPS)

a) The IDs from 80-99 are unreserved under EMVCo, few of which have been customized under this standard to be used within the country.

b) The acquirers, while generating QR Code, will ensure that the overall length of the payload should not exceed 512 characters as per EMVCo. specification.

c) Whereas ID 82 has been reserved for Offline-to-Online transactions (O2O) and already described in table 2 above; extra care should be taken in terms of its security considerations. It shall be the responsibility of the acquirer to ensure that the URL being mapped in this field pertains to the legitimate and secure website/portal of the merchant. The acquirer shall also undertake necessary measures on ongoing basis related to information security of the user for this purpose, including but not limited to; periodic checks of the URL for authenticity and ensuring that no sensitive information (any identity disclosing information, any password, OTP, or any other financial information) is asked from user on that URL at any given point of time. Since this is an optional field, the issuers may develop their apps/portals to prohibit reading / processing of this field for off-us transactions OR allow it only for on-us transactions (where the QR provider and app/portal provider is the same entity).

Table 3: Details of Data Objects for Fig. 2 : Additional Data Field Template (under ID 62)

ID	Name	Format N-Number, ans-Alphaneumeric Special, S-String	Length (In characters)	Presence M-Mandatory O-Optional C-Conditional	Description
01	Bill Number	ans	Variable upto 25	O	Bill/Invoice/Voucher number. Eg. Utility bills, school fee vouchers, challan vouchers etc.
02	Mobile Number	ans	Variable upto 15	O	Mobile number of the merchant
03	Store Label	ans	Variable upto 25	O	The branch name of the merchant
04	Loyalty Number	ans	Variable upto 25	O	The identifier assigned to a customer by a merchant/brand/business for loyalty rewards
05	Reference Label	ans	Variable upto 25	O	A label or reference number that needs to be attached to a QRC or transaction
06	Customer Label	ans	Variable upto 25	O	The consumer number of issued by the merchant to uniquely identify a customer. For eg subscriber id, student enrollment no. etc.
07	Terminal Label	ans	Variable upto 25	O	The counter ID or Till ID where the QRC is placed.
08	Purpose of Transaction	ans	Variable upto 25	O	The purpose of transaction. May be prompted from the customer or explicitly defined in the QR
09	Additional Consumer Data Request	ans	Variable upto 25	O	This includes additional data request (Address, Mobile number, email address) from the consumer which may be prompted from the user
10	Merchant Tax ID	ans	Variable upto 25	O	The identification number assigned to the merchant by federal or provincial tax authority
11	Merchant Channel	ans	03	O	The characteristics of the channel used for a particular transaction. Refer to EMV QRCPS for details
12-49	RFU for EMVCo	S	-	O	Reserved for Future Use by EMVCo.
50	Due Date	N	08	O	The due date of payment in the format DDMMYYYY. This may be

					used for Bill/Voucher payments.
51	Amount after Due Date	N	Var. upto 13	C	The amount to be paid after Due date has passed. This shall be present if "Due Date" field is populated.
52-54	Scheme Specific	S	each Upto 25	O	To be used by the domestic scheme for its participants
55-56	Acquirer Specific	S	each Upto 25	O	To be used by the acquirer / issuer for usage of its own customers
57-99	RFU-SBP	S	each Upto 25	O	Reserved for future use by SBP

Table 3 defines various data objects or sub items under the Root ID 62. It should be ensured that the overall length of data objects in ID does not exceed 99 characters as per EMV QRCPS.

9.2 Merchant Account Information (MAI)

9.2.1 MAI is the field where important information related to the merchant is stored; for example scheme information, acquirer information and merchant identification information.

9.2.2 Under this standard, it shall be the responsibility of the domestic scheme to devise and communicate the mechanism and format of the MAI to its participants including merchant ID and acquirer's identification code.

10 QR Code Interoperability (for in-store purchases)

One of the objectives of this standard is to harmonize the practices of QR Code placement at merchant locations. While devising a country-wide standard for QR codes, the possible scenarios in terms of QR generation and placement may be kept in mind at the time of merchant onboarding. The idea is to introduce interoperability of QR codes at the merchant level using multi-scheme QR template as described earlier. The following table exhibits these scenarios as well as the desired action of the acquirer at the time of merchant onboarding:

QR Placement Scenario	Description	Standard Practice		No. of QRs at Merchant Location
		Q1. Will the acquirer place a new QR at merchant location?	Q2. Will the existing QR be replaced by a new and backward compatible QR?	
Scenario 1	A merchant is being onboarded by the acquirer for the first time (on a domestic or international scheme)	Yes	N/A	One QR
Scenario 2	A merchant, already onboarded by an acquirer on an international scheme, is being onboarded by the same acquirer on another international scheme	Yes	Yes, the new QR code will be interoperable for both schemes	One QR
Scenario 3	A merchant, already onboarded by an acquirer on international scheme(s) is being onboarded by the same acquirer on a domestic scheme	Yes	Yes, the new QR will be interoperable for all previous schemes as well as new one	One QR
Scenario 4	A merchant onboarded by an acquirer on an international or domestic (or both or multiple of them) is being onboarded by a different acquirer on an international or domestic (or both or multiple of them)	Yes	There will be two QRs at merchant location in this scenario	Two QRs

In essence, there will be one QR at merchant location per acquirer. As the number of acquirers increases at this merchant, the same rise will be exhibited in number of QRs.

11 Roles & Responsibilities

The broad roles and responsibilities of respective participants are as follows:

11.1 Acquirers

i) For all the acquirers currently working or intending to undergo QR offerings, it will be mandatory for them to be onboarded with Raast as a domestic payment scheme not later than 30th June 2022. However, they may also work with international payment schemes and other domestic schemes as per their choice and feasibility.

ii) The acquirers will start to generate QR codes for newly onboarded merchants and replace existing QR Codes in compliance to this standard not later than 30th June 2022.

iii) For the situation depicted in scenario 2 and 3 in section 10 above, where an acquirer has onboarded or is onboarding the same merchant to an additional scheme; the acquirer will replace the QRC(s) at merchant locations with a unified and interoperable QR code using multi-scheme template under this standard not later than 30th June 2022.

iv) The QR acquirers are encouraged to generate dynamic QRs through online portals /apps (for e-Commerce) or digital display screens (for in-store purchases).

v) All acquirers shall offer QR codes to the merchants under a scheme only. The acquirers working in closed-loop model may continue to work until 30th June 2022 after which all closed-loop QR Codes shall cease to exist and only scheme-based (open-loop) QR codes will be operational.

vi) The acquirers may use the data objects, reserved as Acquirer Specific, for their own customers ie. where the acquirer and issuer is the same entity.

11.2 Issuers

i) The issuers of QRCs shall develop their apps and portals to be aligned with the specifications mentioned in this document, enabled to read all QRCs that have been generated in compliance to this standard, not later than 30th June 2022.

ii) For the merchant which has been onboarded on multiple schemes by an acquirer, the issuer's app will allow the customer to select between the scheme of the choice of the customer; to the extent that the scheme is recognized by the issuer. However Raast will be the default scheme for all acquirers and issuers for processing payments through QR Codes.

iii) The issuers shall enable their apps / portals to read the QR as a picture (.jpg, .png etc) from storage media, besides enabling the QR to be scanned through the camera.

11.3 Scheme

i) The PSO/PSPs, desirous of offering QRs as a payment mechanism under their scheme(s), may approach SBP to get their Merchant Account Information ID (MAI ID- first two digits) to be allocated. For this, the concerned PSO/PSP will have to submit their project plan along with respective scheme rules including fraud mitigation & management, consumer protection & dispute resolution mechanism. Once the MAI ID is issued to the PSO/PSP, it may go ahead to onboard acquirers and issuers on its QR scheme.

ii) Only the entities licensed by SBP as PSO/PSPs are entitled to allow QR Code offerings through a scheme to their participants (acquirers and issuers). This has been referred to as domestic QR scheme earlier in this document.

iii) Applications for allocation of MAI (first two digits) along with the items mentioned above may be addressed to the Director, Digital Innovation & Settlements Department, State Bank of Pakistan.

iv) The scheme operator shall devise the format of MAI and share it with the scheme participants. SBP will issue Bank Identification Codes (BICs) to the acquirers and issuers of the scheme.

v) The scheme operator shall also devise the items to be used under Scheme Specific Data objects for scheme's acquirers and issuers (if needed).

vi) The scheme operator shall establish, maintain and operate the scheme through well defined system/business rules, fraud management, consumer protection and dispute resolution mechanisms etc.

Sample QR (covering multiple schemes)

Based on the scenarios mentioned in section 10 above, a sample QR Code is placed below which shows a single QR for a merchant which has been onboarded by a single acquirer on multiple schemes.

Data Mapping for QR

Color Coding
RED: TAG ID
BLUE: TAG LENGTH
GREEN: TAG VALUE

QR Code Text

00020101021202164000123456789012041653451234567890121516634512345678901227420010A0000007360124PK73FAYS355539000000000052045999530358658 02PK5916AZIZGeneralStore6007KARACHI628901172345678543212345602110324000000003 16AZIZGeneralStore0513123876543212307124567890987656 3045376

Transposed for readability

Payload Format Indicator:	000201
Point of Initiation:	010212
MAI1 Visa:	02164000123456789012
MAI2 Mastercard:	04165345123456789012
MAI3 Unionpay:	15166345123456789012
MAI4 Raast:	2742 0010A000000736
	0124PK73FAYS3555391000000000
Merchant Category Code:	52045999
Currency:	5303586
Country Code:	5802PK
Merchant Name:	5916AZIZGeneralStore
Merchant City:	6007KARACHI
Addl. Data Template:	6289 01172345678543212345
	021103240000000
	0316AZIZGeneralStore
	05131238765432123
	0712456789098765
CRC:	63045376

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