Central Bank of Kenya

Kenya Quick Response Code Standard
May 2023

KE-QR CODE

CONTENTS

Revision History

Version	Date	Detail
1.0	May 2023	Initial Publication

Related Documents

Document Name	Version	Date	Document Status/Comments
EMVCo-Merchant-Presented-QR-Specification	1.1	Nov 2020	

Abbreviations

AID	Application Identifier
AML	Anti-Money Laundering
API	Application Programming Interface
ATM	Automated Teller Machine
B2B	Business-to-Business
BRS	Business Registration Service
C	Conditional
C2B	Customer-to-Business
CBK	Central Bank of Kenya
CRC	Cyclic Redundancy Check
DBA	Doing Business As
DFSP	Digital Financial Service Provider
EDW	Enterprise Data Warehouse
EMVCo	Europay MasterCard Visa Company
GPS	Global Positioning System
GUID	Globally Unique Identifier
HQ	Head Office
ID	Identification
IEC	International Electrotechnical Commission
IPRS	Integrated Population Registration System
ISO	International Organization for Standardization
JCB	Japan Credit Bureau
ke-qr	Kenya Quick Response
KES	Kenya Shilling
KPLC	Kenya Power and Lighting Company
KYC	Know Your Customer

M	Mandatory
MCC	Merchant Category Code
MFI	Microfinance Institution
MNOs	Mobile Network Operators
O	Optional
PCI DSS	Payment Card Industry Data Security Standard
PIN	Personal Identification Number
PIX	Project Information Exchange
PLC	Private Limited Company
POI	Point of Initiation
POS	Point of Sale
PSP	Payment Service Provider
QR	Quick Response
QRCPS	QR Code Payment Specification
RFU	Reserved for Future Use
RID	Registered Application Provider
SMS	Short Message Service
STK	Sim Took Kit
UK	United Kingdom
USD	United States Dollar
USSD	Unstructured Supplementary Service Data
UUID	Universally Unique Identifier
VAR.	Variable

EXECUTIVE SUMMARY

This executive summary provides a brief overview of this QR Code Standard which has been developed by the Central Bank of Kenya in collaboration with the payments industry stakeholders. The Standard is based on the EMVCo QR Code Specifications, and aims at promoting customer convenience, security, and interoperability among different payment service provider platforms. It aligns with the National Payments Strategy 2022-2025 (the strategy) objectives, including trust, security, usefulness, choice, and innovation. More importantly, it aligns with the strategy's vision of a secure, fast, efficient, and collaborative payments system that supports financial inclusion and innovations that benefit Kenyans.

Kenya's Standard QR Code will be known as the Kenya QR Code abbreviated as "KE-QR". The Code will promote customer convenience and security, as well as support future interoperability amongst different payment service provider platforms. QR Codes are a standardised mechanism for exchanging important data between payment service providers to facilitate faster payment experiences between merchants and customers. The codes usually contain the merchant's information such as the merchant's business name, unique identifiers for merchants' payment service providers, and transaction currency and amount. With the KE-QR code, where necessary, additional data enrichment fields will be utilised to provide more data on transactions for future data analysis and decision-making purposes. Customer privacy will be protected by not exchanging private information such as mobile numbers, identity numbers, and email addresses with the merchant by default.

The standard is based on the EMVCo QR Code Specifications – Merchant Presented Mode. The detailed technical specification Section provides information on the technical aspects of the KE-QR Code Standard. It includes information on QR Code Data Format, Unique Identifiers for Sub-Templates within KE-QR Standard, Merchant Account Information Templates, Criteria for additional schemes payment systems to provide merchant identifiers, and Merchant Common Data Harmonisation, among others.

Other benefits that will accrue from the adoption of the QR code payment methods will include providing an additional payment initiation method in Kenya, increasing usability and growth of consumer adoption of digital payments, harmonization of future domestic merchant payment scheme design, and providing a secure environment to manage risks associated with the growth of merchant payments linked to QR payment initiation. However, it is important to note that QR code payments pose several risks such as phishing attacks, limited acceptance locations, connectivity issues, inadequate consumer training, and poor customer journey experience. To mitigate these risks, measures such as consumer training, improved payment connectivity, increased QR code acceptance, improved QR code security, and clear data handling policies will be implemented. Overall, the KE-QR Code Standard aims at enhancing Kenya's global leadership in digital payments while ensuring that QR code payments are safe, reliable, and widely accepted.

Dr. Patrick Njoroge
Governor, Central Bank of Kenya

1 Citation and issuance

This QR Code Standard will be known as the Kenya Quick Response (QR) Code Standard 2023, in short "*KE-QR Code Standard 2023,*" or simply, "*the Standard.*" The Standard is issued by the Central Bank of Kenya (CBK). Any queries regarding the Standard should be addressed to the Director, Banking and Payment Services Department, Central Bank of Kenya. The CBK shall undertake review of the Standard from time to time in consultation with the industry stakeholders, and issue revisions as the need arises.

2 Introduction

Over the years, CBK has implemented various initiatives to improve the efficiency, effectiveness, and stability of the National Payment System (NPS) in Kenya. In particular, and with consultation with players in the payments ecosystem, a number of measures have been undertaken that have resulted in launch of innovative solutions that have increased the relevance, affordability and convenience with which Kenyans make payments transactions, both large-value, retail, and cross-border.

We have enhanced the capabilities and operations large-value payment system to support large-value and time-critical payments. The CBK continues to authorise more Payment Service Providers (PSPs) in order to offer increased choice and convenience, particularly for retail payments. Major milestones have been achieved in the migration towards the ISO 20022 standard, with cross-border payments, cheques and EFTs now being fully compliant. And together with players in the ecosystem, CBK-regulated entities are launching innovative products and services in order to meet diverse needs of Kenyan corporates, small businesses and citizens. Kenyan payment institutions have also extended their operations to countries in the region and beyond, attesting to the investment and quality of supervision in our market.

To build on these gains, the CBK in collaboration with stakeholders in the payment's ecosystem, developed and launched the National Payments Strategy 2022 - 2025. The Strategy aims to achieve the vision of "*a secure, fast, efficient and collaborative payments system that supports financial inclusion and innovations that benefit Kenyans*." Implementation is anchored on five core principles, namely: trust, security, usefulness, choice, and innovation.

One of the strategic goals of the Strategy is: To enhance the safety and security of the payments system through the adoption of relevant industry and global standards. The issuance of this Standard is therefore a major step in enabling the NPS on the basis of emerging best practice and global standards, including use of technologies that can increase convenience, choice and adoption of digital payments. At its heart, the KE-QR Code Standard 2023 is aimed providing a standard developing and generating a unified QR Code, to be known by the acronym **Kenya QR Code (KE-QR)**. In the immediate period, the Standard will promote customer convenience, choice, security, and interoperability among various payment institutions and players.

Ultimately, as we have seen in other jurisdictions, the Standard will spur new and centre-centric innovation and utilisation of QR's on other aspects of life such as scanning to access online documents, scanning for access to locations, scanning to access web pages etc.

The QR Code provides a valuable additional user experience for initiating and accepting payments between customers and merchants. In particular, the CBK expects that adoption of the Standard will bring practical benefits to providers and customers in a number of ways. These include:

- First, simplifying the process of initiating and making payment transactions. This will be most impactful particularly at outlets that have the widest customer reach such as supermarkets, shops, grocery and pharmacy stores, and so on.
- Secondly, use of QR codes is expected to increase the safety and security of payment transactions by direct data capture that avoids payment mistakes.
- Thirdly, use of QR codes will unify payment modes across the entire industry, so that customers do not have to go through the process of memorising different merchant payment numbers every time they make purchases.

In summary, the picture of successful adoption of the Standard is one characterised by *simplicity, convenience* and *security* of making digital payments in Kenya.

The Standard is based on the EMVCo® merchant presented specification published by EMVCo as a communication protocol. Therefore, the notational conventions used in this Standard are those referenced from the EMV QR Code Payment Specification (QRCPS). EMVCo does not provide certification or approval for QR codes. The EMVCo Specifications are available to all retail payments industry participants on a royalty-free basis and are designed to promote global interoperability. In institution seeking to implement this specification has the responsibility of determining whether its activities require a license to any such technology, including patents on public key encryption technology.

3 KE-QR CODE Data Specification

3.1 Purpose

This KE-QR Code Standard provides guidance on how data should be presented by the merchant including what fields are mandatory/optional. Customer scanning apps must interpret the data according to this standard. The Standard is based on the international standards adopted from EMV® QR Code Specification for Payment Systems (EMV® QRCPS) Merchant-Presented Mode v1.1, 27 Nov 2020.

3.2 Overview of the Standard

The Standard provides a unified mechanism for presentation and capture of merchant information, to facilitate faster and convenient payments by consumers.
The Code will be presented by the payee (the merchant) and scanned by the payer (the consumer). All transactions using this standard will be initiated by the consumer through scanning the Code presented by the merchant. The Code will not contain any customer information but will fully represent:

3.2.1 Merchant Information

The Code will contain information such as the merchant's business name, location, payment credentials (e.g., till number, pay bill number, etc.), and industry segment for purpose of payments.

This will allow for the merchant to be properly identified and will simplify the consumer experience by correctly identifying the recipient of the payment.

3.2.3 Transaction Value Information

To facilitate payment initiation by the consumer, the Code will contain transaction currency and amount as well as provide for additional information fields such as convenience fees and tip amounts, where these values must be correctly captured into the final transaction value.

3.2.4 Additional Data Exchange Enrichment Information

Additional data enrichment provides the financial ecosystem with more data on the transaction, for example where the Code is presented (ecommerce, ATM, retail, etc), and can include purpose of transaction and detailed store identifiers. This richness of data is central for future fraud prevention anomaly detection measures, economic uptake analysis, as well as advanced use case information exchange (required for many bill payment innovation scenarios). Additional data fields will also support the merchants in supplying additional pre-filled fields to the customer's payment provider for certain use cases, such as bill number, and can ensure that payment transactions are routed correctly following transaction success, through the exchange of merchant terminal information at the point of initiation.

When scanning the Code, customer privacy is protected; personal information such as mobile numbers, identity numbers & email addresses are not exchanged with the merchant by default. Where additional data exchange includes consumer personal information, the payment service provider will comply with the Data Protection Act 2019. Such personal information may include customer mobile number(s) or email (for example, for the purpose of delivering e-vouchers).

4   Customer and Merchant Journey

4.1   Customer Journey

Customers will be onboarded by their payment service providers as per the existing mobile banking or mobile money wallet onboarding processes. QR codes will be scanned using customers' smartphone applications provided to them by their payment service providers. For the QR payment:
- The customer will be presented with an option to pay using QR at a merchant point of sale. The QR code at the merchant store will be displayed conspicuously via a sticker or on a POS device;
- The customer will then scan the QR Code, check to confirm the merchant business name and transaction value before accepting the payment request;
- If the transaction value is not specified in the merchant QR Code, then the customer will input the amount required;
- Once all the necessary payment details are captured, the customer will initiate the payment by authenticating the transaction via their normal payment service provider process, for example by entering their PIN;
- The customer's payment service provider will initiate the payment transaction to the merchant's payment service provider, using existing payment transaction rails; and

- Upon completion of payment, the customer will be notified via SMS, In App or in such ways as provided by their financial service provider (Bank, MNO or PSP).

4.2 Merchant Journey

The merchant will be onboarded as per existing processes of the payment service provider. For the QR Code payment:
- Merchants will be enabled to accept QR Code payments through presentment of the QR Code provided by the payment service provider to the customer for scanning. The QR codes will be issued by a merchant's payment service provider.
- The merchant will present the QR Code to the customer for payment and wait for the customer to initiate the transaction.
- The merchant's payment service provider must be able to respond to the payment transaction and accept or decline the transaction on real-time basis.
- The merchant will receive a payment confirmation from their payment service provider (Bank, MNO or PSP) as soon as the transaction is complete.

5 Implementation Road Map

5.1 Phase 1 – QR Code Standardization

- Formulate a Standard for the generation of a QR Code for the retail payments industry;
- The initial objective is to enable each merchant payment service provider to generate a unified QR code using the Standard. Each merchant will be uniquely identified using a combination of their existing merchant PSP ID and their own merchant identifier, as defined by their PSP within the technical specification under Section 7. The Code format is laid out in Section 7.

5.2 Phase 2 – Interoperable and Ubiquitous QR payments

- During this phase, CBK and PSPs will resolve industry identified frictions in phase 1 to achieve seamless and customer centric interoperability.

6 Responsibility of Industry Players

The payment service providers will be required to:
i) Review the KE-QR Code standard document and understand it;
ii) Update their QR Code to comply with the Standard within the period provided for in the CBK circular; and
iii) Commit to the QR Code implementation roadmap in Section 5 herein.

7 Detailed Technical Specification

7.1 EMVCo

This is a brief description of the EMV® QR Code Payment Specification (EMV® QRCPS) Merchant-Presented Mode v1.1, 27 Nov 2020. The specification guide is available at:
https://www.emvco.com/emv-technologies/qr-codes/

7.1.1 Terminologies and Conventions

The following words are used often in this specification and have a specific meaning:

Word	Meaning
Shall	Defines a product or system capability which is mandatory
May	Defines a product or system capability which is optional or a statement which is informative only and is out of scope for this specification
Should	Defines a product or system capability which is recommended

These are the standard short form of words obtained from EMV® QR Code Specification for Payment Systems which will be used in the KE-QR Code standard.

Abbreviation	Description
RFU	Reserved for Future Use. While the QR Code is required to not contain data objects that are RFU, the mobile application shall ignore RFU data object IDs and data object values if present in the QR Code
CRC	Cyclic Redundancy Check
ID	Identifier of Data Object
Var.	Variable
M: Mandatory	Data objects that are labelled [M] shall be present under the root of the QR Code
C: Conditional	Shall be present under certain conditions
O: Optional	May be present

The value of a data object encoded in the EMV Merchant-Presented QR Code has one of the formats listed:

Format(s)	Description
Numeric (N)	Values that can be represented by all digits, from "0" to "9". The numeric alphabet includes ten (10) characters in total
Alphanumeric Special (Ans)	The Alphanumeric Special alphabet includes ninety-six (96) characters in total and includes the numeric alphabet and punctuation. The permitted characters and their coding are shown in the Common Character Set table.
String (S)	Values represented by any precomposed character(s) defined in Unicode (universal character encoding standard)

When referencing characters to include in the EMV Merchant-Presented QR Code, this specification encloses the characters in double quotes, for instance "Test@123". A character can be represented by its hexadecimal value. Single quotes are used to indicate the hexadecimal value, for instance '42' to represent the character "B"

Characters from the numeric (N) and the Alphanumeric Special alphabet (ans), as defined in Table 1.3, are always 1 byte long.

7.2 QR Code Data Format Overview

This section unpacks the interpretation of this data according to the KE-QR Standard.

Each data object is composed of three individual fields. First is an identifier (ID) which acts as a reference for data objects. The second is a length field which explicitly indicates the number of characters included in the third field. The third field is the value field:
1. ID Field: two digit numeric value field with a value ranging from "00"-"99".
2. Length field: two digit numeric value, with a value ranging from "01"-"99". Length shall be equal to the number of characters in the value field.
3. Value field: contains a minimum length of one character and a maximum length of 99 characters.

The content of the QR Code includes the following types of information:

Data Object Group	Description
QR-code conventions ("00", "01" & "63")	This is basic introductory information on whether the QR code is static, or dynamic & some checks that help ensure the QR code data hasn't been corrupted in transit ("Cyclic Redundancy Check") - this checksum is calculated over all the data objects included in the QR Code.
Merchant Account Information ("02" to "51")	A common QR Code may support multiple merchant identifiers in a single scan; one for each payment system/scheme. This data group is primarily for payment routing purposes. Routing information is based on merchant IDs for a payment system/scheme & does not include any bank account details or mobile money account details.

The format and value contained within this field is unique and specific to a payment system/scheme and not defined in this standard. Both global EMVCo and domestic non-EMVCo payment systems can be assigned an entry they can customise for their merchant identifiers.

Each system that uniquely identifies the merchant may define their own structures of merchant account information in addition to the harmonised merchant data fields presented in the standard.

There will be an entry for every merchant ID the merchant has been issued (one per payment system/scheme for unique routing). |

Data Object Group	Description
Additional Merchant Information ("52", "58" to "61" & "64")	These fields allow for additional (mandatory) data on the merchant to be included in the payment transaction, for example the Merchant Name.

These fields change infrequently and are present in both static and dynamic codes.   They include Merchant Category Code, Country Code, Merchant Name and Merchant Location information.

Merchant Name & Location information can inform the customer sufficiently to give them confidence they are paying the right organisation.

For an ecosystem that prioritises fraud minimisation, this data should be harmonised amongst industry players. Data harmonisation according to the standard is described in detail later in this document. |
| Transaction Value ("53" to "57") | The transaction value contains primarily the amount the merchant is requesting the customer to pay. It can contain additional information used by traditional Point of Sale (POS) devices for the set-up of additional tip information .

Note that the final amount the customer is debited may include additional fees for some providers; and the amount the merchant receives may be less any fees they are charged. This is a competitive space and is regulated by payment system schemes. The QR code will not contain this information on ultimate fees to be charged and ultimate value debited/credited; it is focused on the interaction between customer and merchant.

This data group includes the value and currency of the payment in the EMVCo® standard; all transactions in Kenya are expected to be in Kenya Shillings (KES).

In the case of static QR codes, this data can be absent from the QR code and is instead input by the customer; or it can be a static value. For dynamic QR codes this will be specified by the merchant system before the QR is generated & will be included in the QR code. |

Data Object Group	Description
Additional Data (IDs "62")	This section is valuable for future innovation purposes, allowing simple, fast & convenient sharing of enriched information between merchant technology systems and consumer device through a dynamic QR, with optional fields which can add functionality and increase the value of the QR code to both consumer and merchant. This provides ultimate flexibility to support a use case roadmap. It allows for cases where the merchant can prompt the user for additional input programmatically, where a use case requests it. It also enriches the financial system with more data on the transaction, for example where the QR was presented (ecommerce, ATM, retail, etc), and can include purpose of transaction, detailed store identifiers. This richness of data is central to future fraud prevention anomaly detection measures. For example: Bill number, Mobile number, Store label, Loyalty Number, Reference Label, Customer label, Terminal Label, Purpose of Transaction, Additional consumer data, Merchant Tax ID, Merchant transaction category (ecommerce, bill payment, retail, etc).
Domestic Localisation "80-99"	Entries are available for domestic localisation of the standard where the common EMVCo® format does not adequately cover the needs of the standard. An example usage: • Location information not covered by City/Postal Code above • Support for USSD Merchant ID Harmonisation • Timestamps for distributed systems to understand when the QR was issued • Security mechanisms such as public key sharing

7.3 Kenya Payload: Merchant Presented QR

Table 7.3 below describes KE-QR Code Standard for Merchant Presented QR (both static and dynamic).

The table 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 7.3: KE-QR Standard

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
00	QR Code Conventions	Payload Format Indicator	N	02	M	The Payload Format Indicator defines the version of the merchant QR Code template and the conventions on the identifiers, lengths, and values contained within. If the consumer QR application encounters a Payload Format Indicator that it does not recognize, the consumer QR application should discontinue processing of the merchant QR Code. This field must always contain "01", all other values are reserved for future use (RFU).	"0002**01**"
01	QR Code Conventions	Point of Initiation Method	N	02	M	Identifies whether the data is static or dynamic. The Point of Initiation Method has a value of "11" for static QR Codes and a value of "12" for dynamic QR Codes. The value of "11" is used when the same QR Code is shown for more than one transaction. The value of "12" is used when a new QR Code is shown for each transaction Note that this is Mandatory for the Kenya specification (but not in the baseline EMVCo specification).	"0102**11**"

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
02-51	Merchant Account information	Merchant Payment Address	N	Each entry is variable up to "99"	M	There will be at least 1 entry of this section in the QR and there can be several (one for each payment system/scheme the merchant can accept). The data in this entry (up to 99 characters) is interpreted by the payment network to uniquely identify a merchant account via a merchant identifier. The payment system providing merchant identifiers shall further customize the format of the Merchant Account Information IDs details. The Merchant Account Information data objects with IDs "02"-25" are used by global networks such as Mastercard & Visa. "26" – "51" are reserved for additional domestic payments systems and allocated by CBK. The template data detail and current allocation is outlined in more detail later in this document in Section 7.5.	"2813001555666777" This indicates "payment network 28", with unique identifier "0001", knows this merchant uniquely with merchant template information: "555666777"
52	Additional Merchant Information	Merchant Category Code (MCC)	N	04	O	An MCC reflects the primary category in which a merchant does business. For static merchant QR this should be harmonized across multiple payment systems/schemes for any given merchant. This should be a value defined by [ISO 18245][2] and assigned at the point of merchant registration by the Merchant's DFSP.	"52045251" "5251" is the MCC value for a hardware store

[2]ISO 18245 Merchant category codes can be found at https://www.iso.org/standard/33365.html and https://en.wikipedia.org/wiki/Merchant_category_code

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
53	Transaction Value	Transaction Currency	N	03	M	Indicates the currency code of the transaction. The value should indicate the transaction currency in which the merchant transacts. This value will be used by the mobile application to display a recognizable currency to the consumer whenever an amount is being displayed or whenever the consumer is prompted to enter an amount. This is defined by [ISO 4217][3]. For all domestic transactions in Kenya Shillings the alphabetic code will be [KES] and the numeric code used by the QR is [404]. No other domestic currency codes are authorized for merchant QR acceptance e.g. [USD] – [840]	"5303404" For Kenya shillings
54	Transaction Value	Transaction Amount	Ans	14	C	The transaction amount is the amount the merchant is requesting (excluding tips and convenience fees), if known. Absent if the mobile application is to prompt the consumer to enter the transaction amount. Present otherwise. The EMVCo specification allows for decimal places. For instance, "99.34". When using Kenya shillings, the request amount will not include decimal places. If present, this value is displayed to the consumer by the mobile application when processing the transaction. If this data object is not present, the consumer is prompted to input the transaction amount to be paid to the merchant	"54041000" To charge KES1000

[3]https://www.iso.org/iso-4217-currency-codes.html

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
55	Transaction Value	Tip or Convenience Indicator	N	02	O	Indicates whether the consumer will be prompted to enter a tip or whether the merchant has determined that a flat, or percentage convenience fee to be charged. Tips can be a fixed value or a percentage, specified in 2 separate fields (56 & 57). If present shall contain a value of "01" for prompt the consumer to enter a tip to be paid to the merchant. Value "02" shall be used to indicate in ID "56" and Value "03" shall be used to indicate in ID "57". Most applications in Kenya are expected to not present this data. When it is present, the customer's mobile app must adequately display this data, including processing of data entries 56 & 57 and the payment initiator must correctly interpret it into the transaction value.	

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
56	Transaction Value	Value of Convenience Fee Fixed	Ans	Var up to "13"	C	Presence depends on the presence and value of the Tip or Convenience Indicator (ID "55"). The fixed amount convenience fee when 'Tip or Convenience Indicator' indicates a flat convenience fee. This data object shall be absent if no fixed convenience fee is to be added. This field should only contain numeric digits and may contain a single "." to denote the decimal point. For example, "9.85", indicating that this fixed amount (in the transaction currency) will be charged on top of the transaction amount. The number of digits after the decimal mark should align with the currency exponent associated to the currency code defined in [ISO 4217], which for the Kenyan Shilling is 2 decimal points. The field must not contain any other characters.	
57	Transaction Value	Value of Convenience Fee Percentage	Ans	Var up to "05"	C	Presence depends on the presence and value of the Tip or Convenience Indicator (ID "55"). The percentage convenience fee when 'Tip or Convenience Indicator' indicates a percentage convenience fee. This data object shall be absent if no percentage convenience fee is to be added. For example, "3.00" indicating that a convenience fee of 3%, of the transaction amount, will be charged on top of the transaction amount. Only values between "0.01" and "99.99" shall be used. This field should only contain numeric digits and may contain a single "." to denote the decimal point.	

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
58	Additional Merchant Information	Country Code	Ans	02	M	Indicates the country of the merchant acceptance device. For all merchants in Kenya domestic schemes this will be "KE" , as defined by [ISO 3166-1 alpha 2][4] The country may be displayed to the consumer by the mobile application when processing the transaction but is not essential for domestic payments.	
59		Merchant Name	Ans	var. up to "25"	M	The "doing business as" name for the merchant, recognizable to the consumer. This name shall be displayed to the consumer by the mobile application when processing the transaction.	"5912ABC HARDWARE"

[4] https://en.wikipedia.org/wiki/ISO_3166-1_alpha-2

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
60		Merchant City	Ans	var. up to "15"	O	Town/City of operations for the merchant. The DFSP registering the merchant shall be responsible for assigning the correct location of each merchant outlet. A merchant must use its principal place of business as the merchant outlet location for static QR transactions. Note that this should be the place of business/trading, and not assumed to be the place a business has headquarters unless for remote transactions. This location may be displayed to the consumer by the mobile application when processing the transaction. The same location (city) may be disclosed to the consumer at the time of the transaction, used throughout the transaction life cycle and be accurately reflected in fulfilling any merchant reporting requirements. Some merchants do not operate from a fixed location. In this scenario a choice of places that the merchant may use as the merchant location for the purposes of the transaction can be managed.	"6006KITALE"
61		Postal Code	Ans	2	O	A more specific location for operations for the merchant. This should be regularly validated as correct. Kenya does not have a postal code system & this field is restricted to up to 10 characters, so this field will default to "00" for Kenya.	"610200"

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
62		Additional Data Field Template	S	var. up to "99"	O	The Additional Data Field Template includes information that may be provided by the Merchant or may be populated by the mobile application to enable or facilitate **ENHANCED** use cases particularly for dynamically generated codes. For the list of data objects that can be included in this template, please refer to Section 7.9.	
63		CRC	Ans	"04"	M	Checksum calculated over all the data objects included in the QR code.

The checksum guidelines are provided under Section 7.10 – checksum calculation guidelines. | |
64		Merchant Information — Language Template	S	var. up to "99"	O	The Merchant Information— Language Template includes merchant information in an alternate language to that set above and can be used by the customer's display if set. It provides an alternative to the merchant information above, for example if an Arabic character set is needed. If this data is present, the customer's DFSP mobile application may present the alternate language to the customer.	
"65" – "79"		RFU for EMVCo	S	EACH var. up to "99"	O		
"80"	Merchant Account information	Merchant Premises Location	N	Each entry is variable up to "99"	O	Information that allows a merchant to be geolocated to good precision.	

ID	Data Object Group	Content	Format	Length	Mandatory or Optional	Usage	Example
"81"	Merchant Account information	Merchant USSD Displayed Code	N	Each entry is variable up to "99"	M	Contains information that would be displayed on any accompanying physical QR Sticker for USSD users to initiate payment, for information purposes. The format is indicated in the field guidelines in Section 7.5.	
"82"	Domestic Localisation	QR Timestamp Information	Ans	var. up to "99"	M	Timestamp information related to the QR – including issuing time and expiry time information. The format is indicated in the field guidelines in Section 7.15. This is a good way to historically review all dynamic QRs to know the time at which they were issued. This could also be useful for Static QR multi-network update. The data is useful for validating a QR expiry time & for reconciliation and dispute management purposes.	
83	Domestic Localisation	Reserved for Safaricom PLC	S	EACH var. up to "99"			Note that this field shall be moved to field 29 in the future – to be utilized under the PSP specific reserve templates
"84" – "99"	Domestic Localisation	Unreserved Templates	S	EACH var. up to "99"	O		

7.4 Globally Unique Identifiers for Sub-Templates within KE-QR Code Standard

Many sub-templates in the QR Code Standard required an international approach of always starting with a Globally Unique Identifier in data object with ID "00" in one of the following formats:
- An Application Identifier (AID) consisting of a RID registered with ISO and, optionally, a PIX, as defined by [ISO 7816-4[5]]. For example, "D840000000".
- A [UUID] without the hyphen (-) separators. For example, "581b314e257f41bfbbdc6384daa31d16".
- A reverse domain name. For example, "com.psp.name".

The Globally Unique identifier helps in setting the context of the data that follows. The meaning of the other data objects in that portion of the QR Data is context specific to the payment network and requirements are defined by that payment network.

Guidelines for KE-QR Code Standard on setting the Globally Unique Identifier:

The Kenya default Globally Unique Identifier will be "ke.go.qr" & throughout this document this is used for harmonised information. This will apply to all data in template 28, template 29, template 81 & template 82.

Name	ID	Format	Length	Presence	Usage
Globally Unique Identifier	"00"	Ans	VAR. up to "32"	M	The value of the Globally Unique Identifier sets the context for the remainder of the template that follows. This field identifies the payment scheme that the merchant is enrolled in.
Data in format defined by the Organisation above	"01"- "99"	S	Var.	O	Data in the format required by the Payment System/scheme, with an annex provided on how to use.

7.5 Merchant Account Information Templates ("02" to "51")

This data group manages merchant identifiers that are used for the purpose of routing. It answers the question: "Who has enabled this merchant to accept payment?"

At least one Merchant Account Information data object in the range "02" to "51" shall be present in a QR code, but more will be present if a merchant has multiple merchant identifiers with multiple payment systems/schemes.

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[5]https://en.wikipedia.org/wiki/ISO/IEC_7816

Table 7.5: Guide for Usage/Allocation in Kenya

ID	Scheme
"02"-"03"	Reserved for Visa
"04"-"05"	Reserved for Mastercard
"06 – "08"	Reserved for EMVCo®
"09" – "10"	Reserved for Discover
"11" – "12"	Reserved for Amex
"13" – "14"	Reserved for JCB
"15"- "16"	Reserved for UnionPay
"17" – "25"	Reserved for EMVCo®
"26"-"27"	Reserved for National & Regional Payment System discussions & usage in Kenya (FUTURE)
"28"	Used for a domestic PSP account identifier created as part of this standard to be used for QR payments following this standard
"29"	Used for a domestic bank wallet identifier created as part of this standard to be used for QR payments following this standard
"30" – "51"	Reserved for Central Bank of Kenya future usage for additional licensed domestic payment schemes/systems
"83"	Reserved for Safaricom

Data Objects "01"- "25" are used by existing global payment schemes to identify merchants.

It is expected that all banks in Kenya will be able to issue QR codes via one of these schemes but are not excluded from also identifying a merchant via a domestic merchant identifier via a domestic scheme.

Data Objects "26"- "27" will be reserved for use by Central Bank of Kenya in connection with future national and regional interoperability initiatives.

Data Object "28" will be used for a PSP merchant account identifier to be used for QR payments following this standard. This object will form the basis of a future common merchant domestic merchant identifier.

Data Object "29" will be used for a bank wallet merchant account identifier to be used for QR payments following this standard. This object will form the basis of a future common merchant domestic merchant identifier.

Data Objects "30"- "51" will be reserved for future use for assignment to additional domestic schemes. More information on how to apply for use of these fields is outlined later in this document.

7.5.1 Usage Guidelines for Template ID "28"

All licensed PSPs providing merchant accounts will be uniquely identified.

PSPs who operate as switching providers, payments processing providers, POS technology providers and do not offer accounts holding merchant funds directly will not generate QR Codes directly via their own PSP ID within Data Object 28.

Each PSP will be referenced in the template by their Unique ID as laid out in the Table provided [here](#)[6]. This table will be updated from time to time, based on the CBK Enterprise Data Warehouse (EDW) PSP allocated Unique Identifier numbers.

Any other participant will be included upon readiness of their solution as per the guidelines in this document.

The initial aim is for each merchant account provider institution to generate a valid QR code using the KE-QR code standard. Each merchant will be uniquely identified using a combination of their existing PSP ID and their own merchant identifier, as defined by their PSP within this data object.

7.5.2 Usage Guidelines for Template ID "29"

All licensed banks providing merchant accounts will be uniquely identified.

Banks who operate as switching providers, payments processing providers, POS technology providers and do not offer accounts holding merchant funds directly will not generate QR Codes directly via their own bank ID within Data Object 29.

Each bank will be referenced in the template by their Unique ID as laid out in the Table provided [here](#)[6]. This table will be updated from time to time, based on the CBK Enterprise Data Warehouse (EDW) bank allocated Unique Identifier numbers.

7.6 Merchant Common Data Harmonisation ("52, "58" to "61")

Having an accurate and single representation across the industry on merchants is an important element in delivering the Design Principle of Security, AML & anti-fraud prevention at scale as an industry. Most of the change required to implement the standard will be in processes that govern key risks around QR Code usage and potential merchant fraud at scale.

The QR code is being issued a single time and references multiple schemes; it is essential that there is a common harmonised understanding of key data used in the customer experience.

This will ensure trust in the QR code validity and accuracy and create a strong foundation for future merchant transaction volumes and use cases.

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[6]CBK Unique IDs reference table for PSPs and banks:
https://www·centralbank·go·ke/wp-content/uploads/2023/04/QR-Code-Unique-Identifiers-Directory-of-Banks-and-Authorized-Payment-Service-Providers·pdf

Common Data Harmonisation elements:
1. Merchant Name
2. MCC
3. Location Information (City, Postal Code)
4. Use of Merchant Channel information to identify the nature of the scan.

The data will support enhanced usability, consumer confidence, and proactively reduce the need for dispute management and chargeback management.

7.6.1 MCC Harmonisation

The KE-QR code standard has an optional field for "MCC" – Merchant Category Code. This will be harmonised and improved as part of QR rollout. This should be a value defined by [ISO 18245][7] and assigned at the point of new merchant registration by the Merchant's DFSP. It will be retrospectively harmonised for existing merchants[8].

For organizations not passing through the schemes and use the standard libraries, they are advised to use the MCC code 0000. This will apply to MNOs.

7.6.2 Merchant Postal Code

Expected trading location information is vital data for future AML and monitoring. This field is designed to provide more granular accuracy on trading premises for the given merchant.

It also helps with usability features: for example, in the UK many bank providers can show the location of a store accurately in their statement details for a transaction and this helps reduce the number of queries raised by customers who cannot remember making a purchase.

However, Kenya does not have a postal code system. Even in a market without a postal code system, this can be achieved using tools like what3words[9] or Google Plus Codes[10] as a globally accurate addressing system, or designing the standard for use of a common GPS coordinate for every trading outlet with a QR.
Because merchant location for all merchants is mandatory in the international EMVCo® standard on which the Kenya standard is based, this field shall contain the entry "00". In its place a Kenya specific location field will be harmonised as part of optional field ID "80".

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[7]ISO 1825Merchant category codes can be found at https://www.iso.org/standard/33365.html and https://en.wikipedia.org/wiki/Merchant_category_code

[8]The following rules apply for major card schemes to the assignment of MCCs. It should be possible to harmonise for domestic merchant usage also. https://usa.visa.com/content/dam/VCOM/download/merchants/visa-merchant-data-standards-manual.pdf provides recommendations & lists MCC options.

[9]https://what3words.com/about what3words is much faster to set up and more cost-efficient than any regular street addressing system, as every 3-word address has already been pre-assigned, providing an instant, scalable solution. what3words works offline. what3words is the only addressing system optimised for voice, making it the ideal location system for the voice-enabled solutions of the future. and simplicity needed by drones, voice-controlled devices, and driverless cars. Around the world, emergency services and NGOs are using what3words to find and help people in need."

[10]https://maps.google.com/pluscodes/

7.6.3 Merchant Name Harmonisation

As part of the of QR market launch roadmap, all merchants will have a merchant "doing business as" name, also described as an "alias". This will not change the formal KYC registration requirements, rather is additive.

The KE-QR code standard has a mandatory field for "merchant name". This will be the "doing business as" merchant name and will be common for the merchant across all DFSPs providing account services to the merchant and used in all communications from the DFSP to the consumer.

Currently, most merchants are known by their legal name (business or person), rather than name of the business they use with customers. The legal name does not create consumer confidence if used as part of the user experience:
- A small trader will often be signed up for basic merchant services with their personal name held at IPRS.
- A larger merchant with multiple merchant outlets needs to be able to identify those outlet locations in the identifier to the customer rather than their HQ trading address
- Online shops often have a brand that is different to their company name that they display on their website.

The merchant's name is the most important factor in customer recognition of transactions. Using the right name will help create trustworthiness via "confirmation of payee" at an outlet. Reducing disputes proactively is a key pillar of this design; correct use helps to minimize dispute requests resulting from unrecognizable merchant names and will reduce servicing costs to DFSPs and merchants.

By using a "doing business as" name and not a legal identifier in the transaction flow, it ensures personal identity is protected from business identity for the informal sector and ensures the customer can trust the payee is correct for all sectors (particularly where the trading premises is not the same as the collection account headquarters).

This should be created, verifiable and updated in a trustworthy manner with appropriate business processes:
- The "doing business as" name will be used in the QR Standard Merchant Name field and shall be a name recognizable to the consumer:
  - the merchant's name must be the name most prominently displayed by the merchant and by which customers recognize the merchant (while also reflecting the merchant's "Doing Business As" (DBA) name).
  - This can be a self-declared shop name for a small trader using IPRS, that protects her privacy and can be vetted for trustworthiness.
  - It is expected to be the trustworthy name the merchant displays at her store for customers to see
- The "doing business as" name should be part of the single source of truth via a common QR Merchant maintained amongst participants, so that it is common & harmonised across all payment systems/schemes for which the merchant is registered. It should be updated through

formal processes on request of the merchant. *More examples on a standard for Merchant Name are provided in the footnotes[11]*

- Static QRs (and associated merchant name aliases) can be issued to the outlet and POI level uniquely – multiple QRs for a single business – by using the additional data fields to indicate more information about the outlet. The data fields are described in section 10.2.

7.7   Transaction Value Usage ("54")

If present, 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.

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

7.8   Tip & Convenience fee usage ("55" "56" & "57")

The KE-QR code Standard allows for a Transaction value and an optional additional tip or convenience fee. Tips can be a fixed value or a percentage, specified in 2 separate fields (56 & 57). Applications in Kenya are not expected to present or process this data at launch.

Only when this element of the standard has been implemented by all customer scanning app providers. If present, it shall contain:
- Value "01" to prompt the consumer to enter a tip to be paid to the merchant.
- Value "02" shall be used to indicate a fixed value is in field in ID "56"
- Value "03" shall be used to indicate a percentage value is in ID "57".

When it is present, the customer's mobile app must adequately display this data, including processing of data entries 56 and 57 and the payment initiator must correctly interpret it into the transaction value and ensure:
- the total debit transaction value is updated to include the tip (fixed amount or percentage, with rounding according to the scheme rounding rules).
- the original QR request (value + fee) is stored for later dispute management.

The Value of Convenience Fee Percentage shall be present if the data object Tip or Convenience Indicator (ID "55") is present with a value of "03" and only values between "00.01" and "99.99" shall be used. Otherwise, this data object shall be absent.

If present, the Value of Convenience Fee Percentage shall only include (numeric) digits "0" to "9" and may contain a single "." character as the decimal mark.

When the Value of the Convenience Fee Percentage 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.

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[11] Visa standard on defining a merchant name here:
https://usa·visa·com/content/dam/VCOM/download/merchants/visa-merchant-data-standards-manual·pdf

The Value of Convenience Fee Percentage shall not contain any other characters. For example, the "%" character must not be included. The above describes the only acceptable format for the Value of Convenience Fee Percentage.

7.9   Data Enrichment Template Usage ("62")

The Additional Data Field Template (ID "62") provides a valuable mechanism for enriching fast and dynamic data exchange between the merchant device and the consumer device and can be used for multiple use cases.

It also helps enrich the data and can help payment system/scheme interoperability rule decisions by making fields mandatory and processed effectively. As each use case is launched, industry players will work to define what is mandatory/optional/conditional for each use case.

If present, the Additional Data Field Template shall contain at least 1 data object defined below.
As the maximum data size of this Additional Data Field Template (ID "62") is only 99 characters, it is highly recommended that the operators make use of the pre-defined additional data objects and avoid defining their own additional data objects in this template to prevent data overflow when QR codes of several payment system/schemes are combined into one common QR Code.

There are 3 categories of data under Additional Data Field Template (ID "62"):
–   Industry Enriched data (useful for analytics & customer redress risk rule design)
–   Bill Specific Information (useful for adding additional reconciliation clarity for 3rd party biller systems)
–   Additional data request from the customer (useful for reducing what the customer needs to specify manually)

7.9.1 Industry Enriched Usage Information ("62":"10" – "11)

Name	ID	Format	Length	Presence	Usage
Merchant Tax ID	"10"	Ans	VAR. UP TO "20"	O	Used for Kenya's IPRS (small merchant) or BRS (larger merchant), used as a unique identifier in a QR registry. It is possible that the Merchant Tax ID may be used by the consumer mobile application for receipt display.

Name	ID	Format	Length	Presence	Usage
Merchant Channel	"11"	Ans	"03"	O	If present, each of the three positions in the field identifies a characteristic of the channel used for a particular transaction. Field 1: media (print/electronic) Field 2: Scan Location Field 3: Attended/Unattended Checkout For example: – "001" is a sticker at a merchant premises, attended point of sale. – "601" is an unattended app/screen at a merchant premises – "801" is an ATM screen at merchant premises, unattended – The values defined and meaning of the values are listed in Table 7.9.1 below. All other values not explicitly listed in the tables shall be RFU

The values defined and meaning of the values for Merchant Channel Data are listed below. All other values not explicitly listed in the tables shall be RFU.

Character 1 – Media		Character 2 – Scan Location		Character 3 – Merchant Presence	
Value	Meaning	Value	Meaning	Value	Meaning
"0"	Print – merchant sticker	"0"	'At Merchant premises / registered address'	"0"	Attended POI
"1"	Print – Bill/Invoice	"1"	'Not at Merchant premises / registered address'	"1"	Unattended
"2"	Print – Magazine/ Poster	"2"	'Remote Commerce'	"2"	Semi-attended (self-checkout)
"3"	Print – Other	"3"	Other	"3"	Other
"4"	Screen/Electronic – Merchant POS/POI				
"5"	Screen/Electronic - Website				
"6"	Screen/Electronic – App				

Character 1 – Media		Character 2 – Scan Location		Character 3 – Merchant Presence	
"7"	Screen/Electronic – Other				
"8"	Screen/Electronic - ATM				

Each of the data objects with IDs "01" to "08" below can be used in two ways:
  i) MODE A: The merchant's QR generator can provide meaningful additional data for the consumer & consumer DFSP to initiate the transaction use case effectively, in a manner that supports valuable reconciliation automation; and
  ii) MODE B: The merchant can include the ID with a special value to have the mobile application prompt the consumer to input required additional information dynamically.

If present, the content of the data object value for IDs "01" to "08" shall be either "***" or a value defined by the merchant.
  i) 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 "***". The presence of "***" indicates that the mobile application is responsible for obtaining the necessary information.
  ii) 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 the table below.

This will place requirements on the consumer's DFSP mobile application & on payment initiation:
  • The scanning mobile application on the customer smartphone to support creating additional prompts as part of reading the QR.
  • The captured data post-transaction initiation to be passed back to the merchant systems.

Name	ID	Format	Length	Presence	Usage
Bill Number	"01"	Ans	VAR. UP TO "25"	O	The invoice number or bill number. This number could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a Bill Number. For example, the Bill Number may be required when the QR Code is used for bill payment.

Name	ID	Format	Length	Presence	Usage
Mobile Number	"02"	Ans	VAR. UP TO "25"	O	The mobile number could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a Mobile Number. The merchant is free to use this as her merchant contact number where desired. For data protection & data minimization reasons, the merchant may only request the mobile number from a customer when the use case requires it, such as mobile top up.
Mobile Number	"02"	Ans	VAR. UP TO "25"	O	The mobile number could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a Mobile Number. The merchant is free to use this as her merchant contact number where desired. For data protection & data minimization reasons, the merchant may only request the mobile number from a customer when the use case requires it, such as mobile top up.

Name	ID	Format	Length	Presence	Usage
Store Label	"03"	Ans	VAR. UP TO "25"	O	Where a single merchant collection account is used by multiple stores, this allows the QR to be made specific to the store being credited, it is a distinctive value associated to a store, understood by the merchant POS systems. This value could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a Store-specific number. For example, the Store Label may be displayed to the consumer on the mobile application identifying a specific store. This data may help ensure notifications of successful transactions are routed to the correct place.
Terminal Label	"07"	Ans	VAR. UP TO "25"	O	A distinctive value associated to a terminal in the store. This value could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a Terminal Label. For example, the Terminal Label may be displayed to the consumer on the mobile application identifying a specific terminal. This data may help ensure notifications of successful transactions are routed to the correct place.

Name	ID	Format	Length	Presence	Usage
Reference Label	"05"	Ans	VAR. UP TO "25"	O	Any value as defined by the merchant or merchant DFSP to identify the transaction. For example, the Reference Label may be used by the consumer mobile application for transaction logging or receipt display. This value could be provided by the merchant or could be an indication for the mobile app to prompt the consumer to input a transaction Reference Label.
Customer Label	"06"	Ans	VAR. UP TO "25"	O	Any value identifying a specific consumer. For example, the Customer Label may be a subscriber ID for subscription services, a student enrolment number, government benefits identifier, etc. This value could be provided by the merchant (if known) or could be an indication for the mobile application to prompt the consumer to input their Customer Label. This value should not give customer personally identifiable information in a manner that breaches data privacy regulations.
Purpose of Transaction	"08"	Ans	VAR. UP TO "25"	O	Any value defining the purpose of the transaction. For example, the Purpose of Transaction may have the value "International Data Package" for display on the mobile application. This value could be provided by the merchant or could be an indication for the mobile application to prompt the consumer to input a value describing the purpose of the transaction.

7.9.3 Additional Consumer Data Request from Merchant ("62":"09")

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 Payment Initiator, and the consumer should not be unnecessarily prompted for the data.

For data protection and data minimization reasons, the merchant may only request this data if the use case requires it and with the customer consent held with their account provider, for example for the delivery of digital goods (such as electricity vouchers) or physical goods, in support of the customer not providing the same information multiple times unnecessarily.

If present, 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.

Table 7.9.3: Additional Consumer Data Request

Name	ID	Format	Length	Presence	Usage
Additional Consumer Data Request	"09"	Ans	VAR. UP TO "03"	O	A combination of "A" "M" and "E". Note that each unique character should appear only once. 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. Possible values: (A,M,E,AM,AE,ME,AME)

7.9.4 Future Usage

ID	Usage
"12" – "49"	RFU for EMVCo
"52" – "99"	Payment System Specific templates.

Future versions of the standard can specify additional data enrichment fields via data ID "52" to data ID "99" – "Payment System Specific Templates".

Usage guideline:

If present, the same GUID defined in section 0 shall be used in data object ID "00". The payment system/ scheme will provide an annex to this standard document to define how the data shall be interpreted. Expected usage:

This can contain additional data objects defined by merchants and their merchant service providers & acquirers such as application deep links, for example for receipt download. This will be specified in full for payment system/scheme specific usage separately to this standard.

7.10   Checksum calculation guidelines ("63")

The checksum shall be calculated according to [ISO/IEC 13239] using the polynomial '1021' hexadecimal (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).

Following the calculation of the checksum, the resulting 2-byte hex value shall be encoded as a 4-character Alphanumeric Special value by converting each nibble to the corresponding Alphanumeric Special character. A nibble with hex value '0' is converted to "0" (= hex value '30'), a nibble with hex value '1' is converted to "1" (= hex value '31') and so on. Hex values 'A' to 'F' must be converted to uppercase characters "A" to "F" (= hex values '41' to '46').

Example: a CRC with a two-byte hexadecimal value of '007B' is converted to "007B" and included in the QR Code as "6304007B"

7.11   Additional Language for Merchant Name/City ("64")

The data standard provides for merchant routing via available payment systems/schemes in Kenya.

The Merchant Information— Language Template provides a mechanism to present merchant common information in an alternate language and may use a character set different from the Common Character Set (to support Arabic characters, for example). This allows the merchant store name to be displayable in multiple languages, for example.

The following data objects may be used to present the merchant information in an alternate language on the consumer mobile application:

Name	ID	Format	Length	Presence	Usage
Language Preference	"00"	Ans	"02"	M	The value should represent the single language used to encode the data encapsulated in this template. Language Preference shall contain 2 alphabetical characters coded to a value defined by [ISO 639].
Merchant Name—Alternate Language	"01"	S	VAR. up to "25"	M	The Merchant Name—Alternate Language should indicate the "doing business as" name for the merchant in the merchant's local language. This is additive to the merchant information already mandatory. It is possible they can contain a different character set to the original variant.
Merchant City—Alternate Language	"02"	S	Var. up to "15"	O	The Merchant City —Alternate Language should indicate the merchant's city in the merchant's local language. This is additive to the merchant information already mandatory. It is possible they can contain a different character set to the original variant.
RFU for EMVCo	"03"-"99"	S	Var.	Reserved for EMVCo	

If this template is present, it shall contain the Language Preference (ID "00") and Merchant Name—Alternate Language (ID "01"). It may contain the Merchant City—Alternate Language (ID "02"). All other IDs within the Merchant Information—Language Template are RFU for EMVCo.

7.12 Merchant Premises Location ("80")

The following definitions are provided for Scan Location as part of enriched data. To use the data effectively a location for the merchant premises is provided in this field. The merchant premises location should be used in collaboration with the Scan Location field to fully represent the merchant scan location described in section 7.3.

Merchant Channel: Second Character – Transaction Location

Value	Meaning
"0"	At Merchant premises/registered address
"1"	Not at Merchant premises/registered address
"2"	Remote Commerce
"3"	Other

The location may be used for purposes including consumer confidence to pay the right person and can be displayed by the consumer's mobile application following scan.

It also allows for harmonised geolocation data reporting over time, as well as fraud prevention measures through a harmonised approach. It is a better mechanism for location information harmonisation than Postal Code.

If present, the Merchant Premises Location Field Template shall contain the data defined below.

Location data within a QR is not mandatory for fully online merchants & billers operating nationally.

Name	ID	Format	Length	Presence	Usage
Merchant Main Trading Location Data Provider	"01"	N	2	O	Type of Location information: 01 – GPS COORDINATES 02 – WHAT3WORDS 03 – GOOGLE PLUS CODES
Merchant Main Trading Location Data	"02"	Ans	VAR. UP TO "50"	O	The location data in the format attributed to the scheme above
Usage Location Accuracy	"03"	N	VAR. UP TO "3"	O	If present, indicates a radius (in metres) for location accuracy of the given data. This allows for roaming QRs to be accurately marked with a large radius of usage.

7.13 QR Timestamp Information ("82")

Template with tag ID "82" will be used to indicate the date/time at which the QR was generated and optionally when it will expire. This field shall be used to implement payment system/scheme rule validation checks and reconciliation/dispute management and is valuable for dynamic QR interoperability as well as events requiring static QR code refresh.

The timestamp format will be DDMMYYYYTHHMMSS and will be in UTC time zone. The data fields within this Template are defined as follows:

Name	ID	Length	Mandatory/ Optional	Example	Explanation
Globally Unique Identifier	"00"	8	M	ke.go.qr	Defines the data following is in the format defined by KE-QR
Generation Date and Time	"01"	Var. up to 35	M	19000101T000000	To be used to identify a date and time generated or created the QR and not the time that the financial message is sent.
Expiration time Date and Time	"02"	Var. up to 35	O	19000101T000000	To be used to identify a date and time of QR Code expiration.

7.14 Reserved Template (83)

This template shall be defined by the Safaricom Technical team.

7.15 Locally Reserved Templates ("81, 84 - 99")

Templates "81, 84 - 99" are locally reserved for future use.

8 Risk Mitigation

With rising cases of security issues around new and emerging technologies, it is important to ensure that solutions being presented to consumers address the most important aspect on how consumers can feel safe and comfortable using such technologies. Blow is a list of some of the key issues around QR code payments and possible mitigation measures that can be taken to ensure consumers are comfortable when using QR as a payment method.

Risks

1. Phishing attacks
    i)   QR Codes have become an easy target for phishing attacks with consumers largely getting hit by such attacks; and
    ii) Phishing attacks in QR codes can occur in many ways with consumers getting tricked to scan the wrong QR code that pose a very major threat during the payments journey. A malicious attacker could trick a user on opening a page or completing a payment to a wrong recipient without the actual user knowing they are being attacked.
2. Limited acceptance locations
    i)   Despite QR Codes being largely in use globally, there is still low acceptance in many locations where consumers can make payments; and
    ii) Having limited acceptance points hinders the growth of adoption thus limiting consumers who may be interested to make payments using QR code as payment method.
3. Connectivity issues
    i)   Network connectivity is required to make QR code payments, majority of users would be challenged to complete payments using QR Codes for cases where connectivity is low or poor thus causing a poor checkout experience.
4. Small merchant privacy is not protected whilst merchant name harmonisation work is incomplete

5. Scaled fraud prevention measures not possible whilst merchant harmonisation and merchant onboarding scheme measures are incomplete
6. Lack of ubiquitous and reliable push payments interoperability can lead to customers losing trust in the service.
7. Lack of implementation of fee/tip features in an industry-wide fashion can lead to consumer trust issues in payment value calculations
8. Lack of adoption of location and merchant channel data enrichment fields for centralised reporting leads to lack of information on customer uptake nationally.
9. USSD-only customers are not served as QR payments require customers to have a smartphone
10. Inadequate consumer training
    i) Majority of consumers still lack the proper understanding on how QR codes work thereby ending up resorting to other forms to complete payments. Despite QR codes witnessing wide usage globally, majority of users have not been given proper guidance or training on how they can utilize QR Code payments to make payments with little ease at stores; and
    ii) Without proper training on how customers can utilize QR Codes as a means of payments, many consumers end up shying away from using it as a payment method thus leading to less adoption of QR codes as a means of payment.
11. Poor customer journey experience
    i) With various players in the industry offering different solutions via QR Codes, the various players end up developing different customer journey experiences in regard to scanning of QR Codes. As a result of this, majority of QR code providers end up adding a complicated experience on the overall scanning experience thus complicating the entire checkout experience.

Mitigation

1. Consumer training
   There is need to introduce consumer training sessions that can be helpful in guiding and showing consumers how they can use QR Codes as a payment method when checking out or making payments at merchant points. Training can be delivered using various mediums such as guided videos, graphics, live Q&A sessions, In-App notifications, articles, webinars, social media among many other forms.
2. New and improved payment connectivity experience. This can be achieved by:
   i) Ensuring both merchant and consumer connection is stable before making payments;
   ii) Ensuring that the scanning applications and/ apps are up to date and well updated with the latest software versions;
   iii) Proper testing of different QR code use cases and ensuring customers are provided with valid and tested QR Codes; and
   iv) Providing customers with better alternative options in case QR code scanning fails e.g., the option to complete a payment via USSD.
3. Increase QR code acceptance. This can be achieved by:
   i) Building better incentives to merchants e.g., better pricing plans for QR Code transactions, branding support etc;
   ii) Training merchants on the advantages of QR codes as means to faster payments;
   iii) Implementing of better administration tools for merchants to easily verify QR transactions;
   iv) Implementing simple and easier payment steps when making QR code payments for both consumers and merchants when generating QR codes;
   v) Implementing best PCI DSS security standards (where applicable) to ensure integrity and security of QR codes being generated in different markets;

vi) Implementing simple and easy issue resolution processes to address any issues that might arise when generating, scanning, or processing QR Code payments; and

vii) Industry-wide partnerships with other players in the industry to foster wider QR Code payment acceptance initiatives.

4. Improved QR code security. This can be achieved by:

   i) Working with industry players in coming up with policies and guidelines on how to improve payment security for different channels;

   ii) Better use of technology to detect fraudulent transactions;

   iii) Implementation of better dispute resolution processes to help consumers in case they have been victims of QR Code payment phishing attacks;

   iv) Better consumer education on how to identify tampered QR codes; and

   v) Implementing security measures like encryption to ensure only authorized devices can decode QR Code data.

5. Use of clear data handling policies. This can be achieved by:

   i) Encouraging QR code providers to use clear policies that are well illustrated and easy to understand by both consumers and merchants; and

   ii) Consumer and merchant awareness on the use of scanned data will give confidence to the users of QR Codes as a means of payment while at the same time ensuring no privately identifiable information is coded on the QR Codes.

9. Annexes

9.1 Definitions

Term	Description
DFSP	**Digital Financial Service Provider** This is a subset of "Payment Service Provider" (PSP) licensed entities in Kenya and refers to any regulated entity (bank or non-bank e.g., a wallet provider) that provides formal transaction account service (including cash in/cash out) to a customer or a merchant. When they are providing an account to the consumer, they are often known as the Issuer. In this document they are also referred to as the Customer's DFSP. When they are providing an account to the merchant, they are often known as the acquirer in card services. In this document they are also referred to as the Merchant's DFSP. Where they are joined to a scheme (such as Visa/Mastercard) they are also referred to as a participant.

Term	Description
Customer	The person who wishes to use the QR service to make purchases or otherwise exchange funds/value. This could be an individual (C2B) or a business (B2B).
Customer's DFSP / Issuer	The Bank, MFI, Mobile Money Operator or other regulated financial services provider that holds the customer's funds on deposit, is registered as a participating DFSP with the Scheme Operator and is able to initiate a funds transfer through the Scheme on behalf of the customer. **Is the one who facilitate scanning & validation of a merchant presented National QR Code.**
Merchant	The legal entity wishing to deliver goods or services to the Customer in exchange for funds. **Merchant is the catch-all inclusive term for any business or government department who needs to accept payments.** In this document, merchant is used extensively to describe the **payee account holder**. It is envisaged early use of the standard will enable small merchants for face-to-face transactions and will rapidly progress to more use cases. This will include B2B merchant interactions.
Merchant's DFSP / Acquirer	The Bank, MFI, Mobile Money Operator, or other financial services provider that holds the merchant's funds on deposit and is able to receive funds transfers interoperably from any participating financial services provider on behalf of the merchant. Responsible for enrolling merchants, assigning merchant IDs for a scheme, maintaining merchant records/accounts and settling funds to merchants. Is the one who facilitate generation of merchant presented National QR Code. Network Facilitator or Payment Scheme – Responsible for routing transactions between the respective institutions when the issuer and acquirer are different.
Merchant Scheme / Merchant Identifier Provider	Merchants are identified in a network via a merchant identifier. These are often issued within an open loop merchant scheme such as Visa/Mastercard to facilitate interoperability routing to a specific merchant collection account; they are also issued within closed loop systems and domestic interoperable merchant schemes.
EMVCo®	EMVCo® is an international organization comprised of several global card schemes - American Express, Discover, JCB, Mastercard, UnionPay, Visa – and therefore, extensive partnerships around the world with banks and financial institutions. It does this by managing and evolving the EMVCo® specifications. EMVCO®'s QR specifications pertain to the use of QR codes for payment purposes and ensure interoperable and secure QR-enabled payments.
EMV® QRCPS	EMV® QR Code Specification for Payment Systems There are 2 modes: – Consumer-presented mode – Merchant-presented mode The specification can be found here: https://www.emvco.com/emv-technologies/qr-codes/

Term	Description
Switch & Switch Operator	A switch is a technology that connects system participants and supports the passing of transaction data for payments interoperability. Operators of this technology may be called switch operators, clearing houses, hubs, payment system operators, aggregators, and other similar terms. Often, they use common addressing identifiers such as merchant IDs to facilitate efficient routing to the correct DFSP. The term "switch operator" is used to refer to the owner and operator of this technology, which may be the same as the scheme manager. For example, Visa and Mastercard are the owner and operator behind the scheme. The duties of a switch operator involve transmitting, reconciling, confirming, and netting transactions between participants (collectively referred to as clearing), and submitting instructions for the transfer of final funds (settlement initiation) Kenya has multiple switches and aggregators that can facilitate moving money between financial institutions; however not all of them will facilitate QR payments routing.

10. KE-QR Common Usage Guidelines

A Merchant-presented QR Code enables a merchant (payee) to present encoded payment details to a customer (payer), who can then verify the decoded payment details and make the payment if satisfied that the payment information is correct.

10.1 Static QR Code

A static QR Code always contains the same information and is intended to be used for multiple transactions. It is often presented as a printed code, laminated, and fixed to the merchant's wall, window or elsewhere it can be readily accessed by customers.

Consumers scan the QR code using a mobile application to initiate the payment. The merchant's information, such as shop name, is displayed on the mobile device for verification. The consumer will be prompted to enter a payment amount.

Step 4:
Customer DFSP reads the QR data, works out the final transaction value, holds the customer funds and routes the payment request to the correct DFSP

Customer DFSP

Step 5:
Merchant DFSP validates the incoming QR is valid, validates whether the transaction can be accepted, credits the merchant account.

Step 6:
Merchant DFSP informs Custoemr DFSP the transaction is successful

Merchant DFSP

Step 3:
Mobile app sends the collected transaction information to the Customer DFSP for payment initiation

How much do you want to pay "ABC Hardware Kisumu"

kSH

OK   Cancel

Step 2:
Madlyne sees the store details in her mobile app and confirms its the merchant she wants to pay. She enters the amount that the merchant infroms her to pay.

Step 0:
Madlyne is provided with a mobile banking app that can scan Payment QR

Step 0: Jane opened a merchant account for Isoko Trading at her DFSP and was issued a QR Code sign for her shop.

Step 1:
Madlyne wants to buy goods from ABC Hardware. She sees a merchant QR on the wall & scans it with her mobile banking app.

Madlyne is a banking customer & has a smartphone.

Jane is a small trader with a mobile money merchant account
she calls her business "ABC Hardware" and she is based in Kisumu. She uses USSD & SMS on her feature phone to interact with her mobile money account digitally.

AW3523 Successful. YOU HAVE RECEIVED Ksh 1000 at 10:20 am on 22/03/2022.

Payment to ABC Hardware Kisumu Successful!

Click here to add a picture of your purchase.

Step 7:
Customer DFSP informs the Madlyne of the transaction outcome to her app.

Step 7:
Merchant DFSP informs Jan of the transaction outcome v SMS

Green - Pre-requisites before QR Payment
Red   - Governed by QR Standard - Data Specification & UX Guidelines
Black - Standard Push Payment enhanced by additional QR data availability and Merchant Harmonisation Conventions
Blue- Standard Push Payment noitification mechanisms (competitive space governed by Push Payment notification UX guidelines

transaction flow that assumes a bilateral connection between merchant DFSP and customer DFSP is described below:
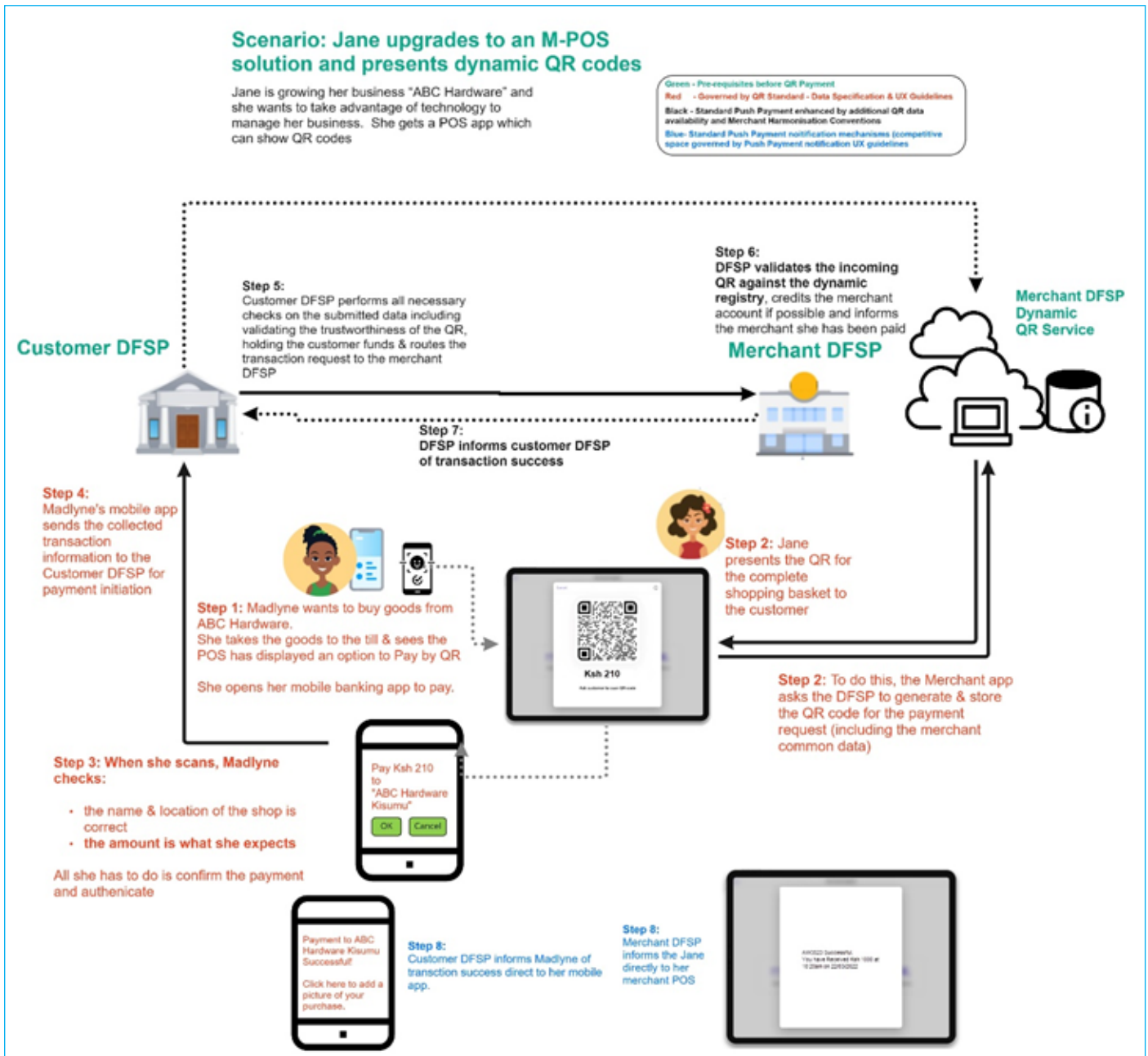
10.2 Dynamic QR Code

A dynamic QR code refers to the case when a different code is generated specifically for each payment request. This allows the QR code to be personalised to the payment request, including additional data, such as:
–   Invoice Reference
–   Transaction Amount

A dynamic QR code typically has an expiry time and is only valid for one payment, so consequently the risk from fraud through copying and sharing is much reduced, and there is a customer convenience element of not having to type in the payment amount; just scan, view the details, enter PIN/scan

biometric to approve payment. Dynamic QR codes with a long expiry may be printed on electricity bills, gas bills and other utility bills to make payments to the respective collection account. At a retail outlet, it will require both participants in the transaction to own a smartphone or POS device capable to show the newly generated QR for the particular transaction.

Scenario: Jane upgrades to an M-POS solution and presents dynamic QR codes

Jane is growing her business "ABC Hardware" and she wants to take advantage of technology to manage her business. She gets a POS app which can show QR codes

10.3 KE-QR Standard for QR Code Display (Merchant Payments)

QR Layout Specification

This covers the basic structure of a QR display. It provides specifications of the QR display layout. Acquirers shall observe the position and location of each part.
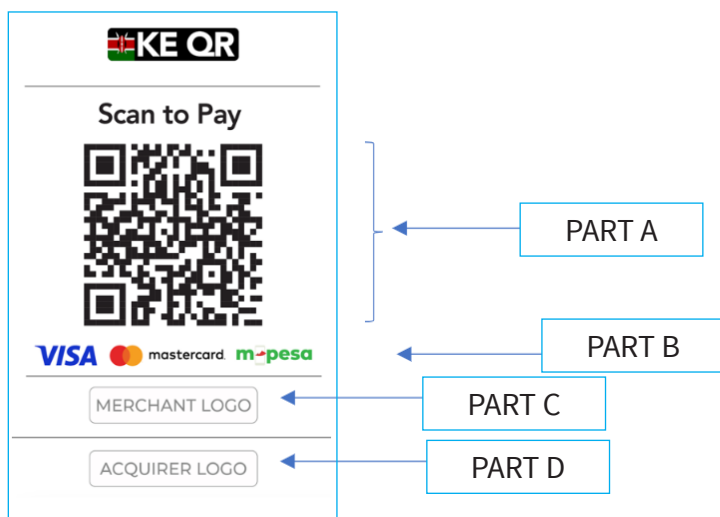
Part A – QR Code (mandatory)

This is the area of QR code image for customer to scan.
The table below shows the ISO paper standard size of A, B and C series and the expected QR size.

Paper Size	Width (cm)	Height (cm)	Paper Area cm²	Min. QR% Ration	QR Area cm²	QR-Width (cm)	QR-Height (cm)
A8	5.2	7.4	38.48	11.00%	4.233	2.0574	2.0574
C8	5.7	8.1	46.17	11.00%	5.079	2.2536	2.2536
B8	6.2	8.8	54.56	11.00%	6.002	2.4498	2.4498
A7	7.4	10.5	77.70	11.00%	8.547	2.9235	2.9235
C7	8.1	11.4	92.34	11.00%	10.157	3.1871	3.1871
B7	8.8	12.5	110.00	11.00%	12.100	3.4785	3.4785
A6	10.5	14.8	155.4	11.00%	17.094	4.1345	4.1345
C6	11.4	16.2	184.68	11.00%	20.315	4.5072	4.5072
B6	12.5	17.6	220.00	11.00%	24.200	4.9193	4.9193
A5	14.8	21	310.80	11.00%	34.188	5.8471	5.8471
C5	16.2	22.9	370.98	11.00%	40.808	6.3881	6.3881
B5	17.6	25	440.00	11.00%	48.400	6.9570	6.9570
A4	21	29.7	623.70	11.00%	68.607	8.2829	8.2829
C4	22.9	32.4	741.96	11.00%	81.616	9.0341	9.0341
B4	25	35.3	882.50	11.00%	97.075	9.8527	9.8527
A3	29.7	42	1247.40	11.00%	137.214	11.7138	11.7138

The recommended minimum size is A8 and ratio of QR image area size is 11% for easy and clear scanning. It is recommended that, as the paper expands the ratio may be reduced to keep a good view of the QR image. Other paper size may be used depending on the nature of uses, but the layout structure should look the same.

Part B – Acceptance Logos (mandatory)

Part B contains all recognised brands to showcase to customers what payment acceptance will be possible on scanning the QR code in Part A.

Long term: It is envisioned that a new common QR code can provide consumer confidence in full domestic acceptance. In addition, globally recognised scheme marks such as Visa & Mastercard will help with payment acceptance recognition by international travellers to Kenya.

There is no limit or fixed size/length on this part, ensure the logo(s) is/are visible and have look and feel for customers to understand.

Part C – Merchant Details (Part C) (mandatory)

This part should clearly have the "Doing Business As" merchant name also contained within the QR Code. The Merchant Name and Merchant ID must be visible and have good fonts and colours easy for customers to read.

Part D – Acquirer Logo (Part D) (optional)

This area displays the logo of the acquirer i.e Bank or Payment service provider

10.4 Example Specific use of KE-QR Code by DFSP

The domestic standard will use the domain name "ke.go.qr" as a globally unique identifier to indicate the data following defines how KE-QR uses the template.
Example

The following table showcases how a full Static QR will be formed within Template 28 for a merchant acquired by Safaricom (with PSP ID 01 and 02). The harmonised merchant public data available in the scan is also shown for completeness.

00020101021102081234567828370008ke.
go.qr010801888880020901KPLCPRE5204490053034045802KE5912KPLC

ID	Sample Value	Description
00	000201	Format Indicator (Version 01)
01	010211	QR Static Code (All Consumers)
02	020812345678	Visa Credential 12345678
28	28370008ke. go.qr010801888880020901KPLCPRE	00 – KE QR Sub-Domain Name (ke. go.qr)
01 – Safaricom PSP ID with Merchant ID as (888880)		
02 – Airtel PSP ID with Merchant ID as (KPLCPRE)		
52	52044900	M.C.C for Utility service (4900)
53	5303404	Currency is Kenya Shillings – KES (404)
58	5802KE	Country Code (KE for Kenya)
59	5912KPLC PREPAID	Merchant Name: KPLC PREPAID
60	6006KITALE	Kitale
61	610200	Postcode ABSENT ("00")
62	6221030800112349070511002	Store Label – 00112349
Terminal Label - 11002		
80	[tbd]	Merchant USSD Common Display Data
82	8218011420221101T1143	Time of QR generation – 2022/11/01 11:43
63	63047D47	Cyclic Redundancy Check - Checksum

Entry 28 above is interpreted in the following manner:

Name	ID	Length	Example	Explanation
Globally Unique Identifier for KE-QR	"00"	11	ke.go.qr	This field is formed from a combination of the PSP ID issued by CBK and a globally unique domain identifier. Indicating the domestic merchant identifier for QR is provided by Safaricom

Name	ID	Length	Example	Explanation
PSP Merchant Information	"01" –"99"	Variable and defined by the PSP The full length of the template must remain less than 99 characters. PSPs must design their PSP-specific format cognisant to this.	0106234434	Indicating the merchant is enabled/acquired by Safaricom PSP ID 01 with merchant ID as 234434. The length of the merchant ID is added to form the full tag

Notes:
- This current specific example does not show multiple merchant accounts to be identified within Template 28.   Template 28 in a harmonised scheme with a single printed QR will indicate the merchant's preferred PSP for domestic payments; a Visa/Mastercard additional route can also be included in the same QR via templates 02-05. The format of data in those templates is defined by the schemes.
- Multiple merchant identifier entries could all refer to the same physical merchant store. The QR does not mandate uniqueness via this merchant identifier used for routing, rather via the harmonised merchant data initiative described in section 5.3 for entries 52-62.

Example Data in the QR	Template ID	Length of merchant identifier	Nested Template (format as defined by the PSP.	PSP-Specific Merchant Identifier			Comments
				SP ID	Length	Merchant ID	
"28220008ke. go.qr0106234434"	28	10	0106234434	01	06	234434	Merchant with ID 234434 acquired by Safaricom whose PSP ID is 01
"28230008ke. go.qr02070443535"	28	09	02070443535	02	07	0443535	Merchant with ID 0443535 acquired by Airtel whose PSP ID is 02
"28230008ke. go.qr03070443535"	28	09	02070443535	03	07	0443535	Merchant with ID 0443535 acquired by Equity Bank, whose PSP ID is 03

Annex: Glossary of Terms

Value	Meaning
Term	Definition
Quick Response (QR) Code	A machine-readable code consisting of an array of black and white squares, typically used for storing URLs or other information for reading by the camera on a smartphone.
EMVCo	This is a global technical body that facilitates worldwide interoperability and acceptance of secure payment transactions by managing and evolving the EMV Specifications and related testing processes.
Point of Sale (POS)	This is a device that is used to process transactions by retail customers.
Mobile Network Operator (MNO)	This is a telecommunications service provider organization that provides wireless voice and data communication for its subscribed mobile users.
Payment Service Provider (PSP)	This is a third-party company that grants businesses access to the electronic payment methods that their customers want. These are most commonly credit and debit card payments but can include digital wallets, bank transfers, direct debit functions and more.
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Central Bank of Kenya