

Absolutely! Let's dive **in-depth into TTQ — Terminal Transaction Qualifiers** — a crucial concept in **EMV contactless transactions**, and an often misunderstood piece of the flow.

◆ What is TTQ?

- **Tag:** 9F66
- **Length:** 4 bytes (32 bits)
- **Format:** Binary
- **Purpose:** TTQ tells the card what the terminal **supports and is requesting** in terms of transaction capabilities during a contactless EMV transaction.

It acts like a **capability declaration** by the terminal:

“Here’s what I support; let me know what you (card) support too.”

This is compared against **CTQ (Card Transaction Qualifiers)**, returned by the card, to decide how the transaction should proceed.

◆ Structure: TTQ Bit Layout

Let’s break down all **32 bits (4 bytes)**:

■ Byte 1 – Terminal Capabilities (Basic)

Bit	Description	Meaning
8	Contactless EMV mode supported	Terminal supports full EMV contactless
7	Contactless Magnetic Stripe mode supported	Terminal supports Magstripe-mode contactless (MSD)
6	Contact chip supported	Terminal can accept contact chip cards
5	Offline-only reader	No online capability
4	Online PIN supported	Terminal supports online PIN
3	Signature supported	Terminal supports signature CVM
2	Offline PIN supported	Terminal supports offline PIN

Bit Description	Meaning
1 No CVM required	Terminal supports No CVM flow

Byte 2 – Consumer Device CVM & Other CVMs

Bit Description

- 8 Consumer Device CVM supported (e.g., mobile device auth)
 - 7 Contactless EMV transaction supported
 - 6 Reader supports cash transactions
 - 5 Reader supports goods transactions
 - 4 Reader supports services transactions
 - 3 Reader supports cashback transactions
 - 2 Reader supports bill payment transactions
 - 1 Reader supports transit transactions
-

Byte 3 – Terminal Risk Management / Decision Logic

Bit Description

- 8 Terminal supports EMV mode if CVM is not required
 - 7 Terminal supports online cryptogram if CVM not required
 - 6 Terminal supports EMV contactless for online-only cards
 - 5 Terminal supports magstripe contactless for online-only cards
 - 4 Terminal can process CDCVM results
 - 3 Terminal will not prompt for a CVM for CDCVM-verified transactions
 - 2 Terminal supports deferred authorization
 - 1 RFU (Reserved for future use)
-

■ Byte 4 – Reserved / Private Use / RFU

- Most schemes (Visa, Mastercard, etc.) have proprietary use or leave these reserved.

◆ Example TTQ and Interpretation

Let's say:





ini

CopyEdit



TTQ = E0 20 C0 00

Breakdown:




Byte 1 (E0 = 11100000):

- Bit 8:  Contactless EMV supported
- Bit 7:  Magstripe supported
- Bit 6:  Contact chip supported
- Bits 5–1:  Not supported (e.g., offline-only, CVM methods)

Byte 2 (20 = 00100000):

- Bit 6:  Reader supports goods transactions
- Others: 

Byte 3 (C0 = 11000000):

- Bit 8:  Terminal supports EMV mode if CVM not required
- Bit 7:  Online cryptogram without CVM
- Bits 6–1: 

So this terminal:

- Supports full EMV and magstripe contactless
- Allows contact chip fallback
- Supports goods transactions
- Can do EMV with no CVM

- Can do online cryptogram even without CVM

◆ TTQ in Transaction Flow

When is TTQ Used?

During **GET PROCESSING OPTIONS (GPO)** phase of contactless flow:

1. Terminal sends TTQ to card inside PDOL (Processing Data Object List).
2. Card compares TTQ with its CTQ (Card Transaction Qualifiers).
3. Based on this:
 - Card decides if EMV or magstripe mode is used
 - Whether CVM is needed
 - Whether transaction can be offline approved, or must go online

◆ TTQ vs CTQ – Who Decides What?

TTQ (Terminal)

CTQ (Card)

What the terminal **supports** What the card **allows or wants**

Proposes options

Responds with allowed mode

Used in GPO

Returned in GPO response or GENERATE AC

→ **Card makes the final decision**, using TTQ + CTQ + AIP (Application Interchange Profile)

◆ TTQ and TVR Interaction

Certain TTQ bits **influence** whether terminal performs checks that could set **TVR bits**:

TTQ Capability

TVR Impact

EMV supported (Byte 1, Bit 8)

Enables ODA, affects Byte 1 of TVR

Offline PIN supported

Enables offline PIN CVM → affects Byte 3

Online PIN supported

If PIN pad missing, TVR Byte 3 Bit 5 gets set

TTQ Capability

TVR Impact

Floor limit risk checks supported Affects Byte 4 of TVR

No CVM support

Impacts whether CVM failures trigger TVR bits

Deferred auth supported

May reduce need to set online-needed TVR bits

◆ Summary Table

Component	TTQ
-----------	-----

Tag	9F66
-----	------

Length	4 bytes
--------	---------

Direction	Terminal → Card (sent in GPO)
-----------	-------------------------------

Purpose	Declares terminal capability in contactless context
---------	---

Compared With CTQ

Influences	CVM method, ODA, TVR bits, online/offline path
------------	--

Important In	EMV Contactless, especially PayWave, PayPass, ExpressPay
--------------	--

Wrap-up

If you understand TTQ, you can:

- Predict how a contactless transaction will behave
- Troubleshoot why a transaction went online or failed offline
- Map TVR outcomes based on terminal capability declarations
- Tune terminal profiles for different business models (offline, fast transit, unattended, etc.)