GS1 Application Identifiers:

The following Application Identifiers (AI's) are most commonly used for serialization:

- AI01 = GTIN : 14 digits fixed length numeric.
- AI21 = Serial Number : Up to 20 digits alphanumeric
- AI17 = Expiry Date : 6 digits fixed length numeric. Format is YYMMDD
- AI10 = Batch Number : Up to 20 digits alphanumeric
- AI710, AI711, AI712, AI713, AI714 = National Health Reimbursement Number : Up to 20 digits alphanumeric. AI710 is used for Germany, AI711 for France, AI712 for Spain, AI713 for Brazil and AI714 for Portugal.
- AI91 = Used in the Russian Datamatrix Code for the Crypto Key. In this instance, the length of the field is 4 digits alphanumeric. However as per the GS1 standards this field can be up to 90 digits alphanumeric.
- AI92 = Used in the Russian Datamatrix Code for the Crypto Signature. In this instance, the length of the field is 44 digits alphanumeric. However as per the GS1 standards this field can be up to 90 digits alphanumeric.

EAN (European Article Number)/ UPC (Universal Product Code): it is a way to encode product numbers with 8 or 13 digits. It follows the GS1 standard, can be also called e.g. GTIN-13 instead of EAN 13. Same for UPC code (US). But on the package it's still called EAN code.

Barcodes:

- **Data Matrix**
  - Standard Code (AI01+AI21+AI17+AI10)
  - NHRN1 Code (AI01+AI21+AI17+AI10+AI71*x*)
  - NHRN2 Code (AI01+Ai21+AI17+AI10+AI71*x*+AI71*x*)
  - Russian Code (AI01+AI21+AI91+AI92)

  AI71x = AI710, AI711, AI712, AI713, AI714

  The order in which the AI's are encoded is not fixed i.e. AI01+AI21+AI17+AI10 should provide the same information when decoded as AI21+AI17+AI01+AI10. As a general rule AI01 is encoded first but this does not need to be the case.

Resolver:

Prior to the resolver the Barcode (Datamatrix code or GS1-128, C128 etc.) needs to be decoded and the data parsed out and used in order to calculate the Anchor on the Blockchain. The following rules should be applied:

EAN/ UPC	AI01	AI21	AI17	AI10	AI71x	AI91	AI92	Comments
	x	x	x	x				Calculate Anchor using AI01 Calculate Anchor using AI01+AI10 combination
	x		x	x				Calculate Anchor using AI01 Calculate Anchor using AI01+AI10 combination
	x	x	x	x	x[1]			Calculate Anchor using AI01 Calculate Anchor using AI01+AI10 combination [1] There may be more than 1 AI71x in the code.
	x	x				x	x	Calculate Anchor using AI01 Calculate Anchor using AI01+AI21 combination To be discussed if there is a different way rather than have anchors for each serial number. Perhaps have serial numbers in the DSU and just use the Anchor for the GTIN.
x				x[2]				Calculate Anchor using the EAN/UPC Calculate Anchor using the EAN/UPC+ Batch Number. The EAN/ UPC can be found on most products. Most OTC products are not subject to serialization but contain the EAN/UPC.  Using just the EAN/UPC code to resolve the leaflet is not ideal as the EAN/UPC can be easily copied onto fake medicines. [2] The batch number is not included in the barcode but is in human readable form on the pack. However it may be worth considering how to input the batch number in order to provide some additional anti-counterfeit possibilities.

Sample Datamatrix Codes:

The following codes are created for test purposes:

Group Separator FNC1	Group Separator <GS>	Comments
		Code with AI01+AI21+AI17+AI10 AI01 = 04603695005563 AI21 = 1361655804982 AI17 = 231031 AI10 = 1234567890asdfg
		Code with AI21+AI17+AI10+AI01 AI01 = 04603695005563 AI21 = 1361655804982 AI17 = 231031 AI10 = 1234567890asdfg
		Code with AI21+AI17+AI10+AI01 AI01 = 04603695005563 AI21 = 1361655804982 AI17 = 231031 AI10 = 1234567890asdfg These codes have FNC1 and <GS> mixed as the Group Separator
		Code with AI21+AI01+AI17+AI10 AI01 = 04603695005563 AI21 = 1361655804982 AI17 = 231031 AI10 = 1234567890asdfg
		Code with AI01+AI21+AI17+AI10 AI01 = 04603695005563 AI21 = uweTebdGjgeiweloweGB AI17 = 231031 AI10 = 1234567890asdfg4567u
		Code with AI21+AI01+AI17+AI10 AI01 = 04603695005563 AI21 = uweTebdGjgeiweloweGB AI17 = 231031 AI10 = 1234567890asdfg4567u

Group Separator FNC1	Group Separator <GS>	Comments
		Code with AI21+AI01+AI17+AI10 AI01 = 04603695005563 AI21 = !%/%)'.->*=_/=&+</=(AI17 = 231031 AI10 = &&_="/!/"+/+*(/-?_<? These codes have AI21 & AI10 with special characters
		Code with AI21+AI01+AI17+AI10+AI714 AI01 = 04603695005563 AI21 = 45678123097243 AI17 = 231031 AI10 = ABC123 AI714 = NHRN1
		Code with AI21+AI01+AI17+AI10+AI714+AI712 AI01 = 04603695005563 AI21 = 45678123097243 AI17 = 231031 AI10 = ABC123 AI714 = NHRN1 AI712 = NHRN2
		*Russian* Code with AI01+AI21+AI91+AI92 AI01 = 04603695005532 AI21 = 1361655804982 AI91 = ee05 AI92 = a1234567890poiuztNewqasdfghjklmnbvcxy1234567
		*Russian* Code with AI01+AI21+AI91+AI92 AI01 = 04603695005532 AI21 = 1361655804982 AI91 = %=P8 AI92 = p3_l)j.T8Umc5e'p5(9<Yv7!:gY+.q0BN<vnoltWgs+e These codes have AI91 & AI92 with special characters
		*Russian* Code with AI01+AI21+AI91+AI92 AI01 = 04603695005532 AI21 = ;""+<;)*?%,/ AI91 = &/=% AI92 = />?!<*_-'<>(=>'%="..'",!+!,=)=!>(>*"(*)-<%() These codes have AI21, AI91 & AI92 with special characters

Sample EAN-13 Code:

The following code has been created for test purposes:

Code	Comments
	Code contains 4603695005563

Sample GS1-128 Code:

The following codes have been created for test purposes:

Code	Comments
	Code contains AI01 AI01 = 04603695005532
	Code contains AI01+AI21+AI17+AI10 AI01 = 04603695005532 AI21 = 1361655804982 AI17 = 231031 AI10 = ABC123
	Code contains AI21+AI17+AI10+ AI01 AI01 = 04603695005532 AI21 = 1361655804982 AI17 = 231031 AI10 = ABC123

Sample C128 Code:

The following code has been created for test purposes:

Code	Comments
	Code contains 85812343862534123648