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TIA STANDARD

Project 25

Common Air Interface Reserved Values

TIA-102.BAAC-A

Revision of TIA/EIA-102.BAAC)

TELECOMMUNICATIONS INDUSTRY ASSOCIATION



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1. Scope

This document is a supplement to the *Common Air Interface*, reference [1], that lists all of the reserved values for the fields of information. This is intended to be interpreted with the *Common Air Interface* and is not intended to be understood by itself.

1.1 Conventions

The *Common Air Interface* defines the following fields with special reserved values.

Name	Abbrev.	Size (bits)
Network Access Code	NAC	12
Link Control Format	LCF	8
Manufacturer's ID	MFID	8
Source ID		24
Destination ID		24
Talk Group ID	TGID	16
Message Indicator	MI	72
Key ID	KID	16
Algorithm ID	ALGID	8
Service Access Point	SAP	6
Emergency Indicator	E	1
Data Unit ID	DUID	4

Some of these fields have values that are reserved for future standard definitions. There are also some values that are defined for standard operation in this document.

Throughout this document the values that are inserted into the fields are represented as hexadecimal or binary numbers. This is done to make it convenient to compare the value in a machine representation. The hexadecimal numbers are represented with a leading '\$' sign to signify the radix for the number. Binary numbers are represented with a leading '%' sign. For some values a familiar form is also given in decimal. The familiar form is used as a displayed value in some applications while the hexadecimal representation is meant to represent the value within a computer process inside a radio. When a decimal representation is used it is given in the customary format, without a leading '\$' sign or '%' sign.

1.2 Default Values

Many of the fields have default values defined for them. The purpose of a default value is to define a value that may be safely used in normal operation without explicit programming by the user of the radio equipment. Default values may be programmed at the time of manufacture and used until a particular value is assigned or programmed by the radio user.

1.3 Revision History

January 25, 1993, P25.930125.1.0, contained original values for voice.
April 8, 1993, P25.930125.1.1, revised so that this is no longer an appendix to the *Common Air Interface*.
July 12, 1993, P25.930125.1.2, revised to add SAP and ALGID values.
December 13, 1993, P25.930125.1.3, revised to add more SAP values and 16-bit talk group IDs.
June 2, 1994, final revision for publication. An MFID is assigned for Transcript.
Version A, February 6, 1995, revised Algorithm IDs and SAP values. Also added definition of the Emergency bit.
Version B, June 22, 1995, revised the MFID list to include more manufacturers, published as revision A.
Version 1.0, 21 May, 1999, revised to remove references to analog carrier squelch, and add new access code definitions.
Version 1.1, 24 June, 1999, defines NAC codes \$F7E and \$F7F.
Version 1.2, addendum 1, 31 January 2001, defines SNDCP SAP value.
Version 2.0, 26 March 2003, defines Data Unit ID values.
Version 2.1, 22 July 2003, corrections from letter ballot.

1.4 Normative References

The following documents contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. ANSI and TIA maintain registers of currently valid national standards published by them.

- [1] *Project 25 FDMA Common Air Interface*, June 1999, TIA102.BAAA-A.
- [2] *Project 25 Block Encryption Protocol*, July 2002, TIA102.AAAD.

1.5 Informative References

- [6] *MFID Manufacturers Identification Number Assignment Guide and Procedures*, April 2001, see the TIA web page, TR-8.15 committee.
- [7] *Project 25 Link Control Word Formats and Messages*, May 1996, TSB102.AABF, and addendum December 2002, TSB102.AABF-1.

2. Values

2.1 Network Access Code

The default NAC is \$293. The value of \$F7E is defined to allow a receiver to open upon receipt of any NAC. The value of \$F7F is defined to allow a repeater to receive and retransmit any NAC. All of these values are tabulated below.

Standard NAC Values

NAC	Explanation
\$293	DEFAULT
\$F7E	Receiver to open on any NAC
\$F7F	Repeater to receive and retransmit any NAC

This document advises implementations not to transmit the NAC values \$F7E or \$F7F. These values are intended for use in receivers.

2.2 Link Control Format

The LCF shown in the *Common Air Interface* document, reference [1], uses four values tabulated below. Other values are also defined for this field in the *Link Control Word Formats* document, reference [7].

Standard LCF Values

LCF	Meaning
\$00	Defines the format for Group Calls. The LC contains an Emergency bit, TGID, and a Source ID.
\$03	Defines the format for Individual Calls. The LC contains a Source ID and a Destination ID.
\$80	Encrypted LC information, with same contents as \$00.
\$83	Encrypted LC information, with same contents as \$03.

2.3 Manufacturer's ID

The MFID uses a Standard Value of \$00 or a Standard Value of \$01 to represent operation in conformance to the standard. Other values are defined in reference [6].

The MFID Standard Value of \$01 was added to the standard on April 18, 2001. The standard used MFID \$00 exclusively prior to that date. All parts of the standard that derive from definitions in the Project 25 standard prior to April 18, 2001 shall use MFID \$00 for compliance to the standard. New definitions in the standard may use MFID \$01 in cases where MFID \$00 cannot be used, perhaps because of exhaustion of opcode values or for other reasons, and they should clearly define the circumstances where the new value is used for compliance to the standard.

2.4 Source and Destination ID

The identifier numbers for individual radio units are placed in the fields for Source ID and Destination ID. Data packets have an analogous field called the Logical Link ID, which also contains the identifier numbers for individual radio units. There is one standardized value that is used to signify 'no one', i.e., no radio in a system is assigned to this reserved value. There are also standardized values to signify group addresses. The 'no one' and group addresses may be used as destination addresses for data packets, but never as source addresses unless anonymity is required. The standardized values are given below.

Standard Source ID and Destination ID Values

Destination ID		
Source ID	Familiar Decimal	Meaning
\$000000	0	No one
	This value is never assigned to a radio unit	
\$000001 - \$98967F	1 - 999 9999	For general use.
\$989680 - \$FFFFFFE	1000 0000 - 1677 7214	For talk group use or other special purposes.
\$FFFFFFF	1677 7215	Designates Everyone

2.5 Talk Group ID

The TGID has one reserved value to denote 'no one' just as the source and destination ID. There is also a reserved value to denote 'everyone' in the radio network. There is also a default TGID to be used in cases where no other talk groups are specifically defined. The default value is used in systems which do not intend to provide any talk group partitioning.

Standard TGID Values

TGID	Familiar Decimal	Meaning
\$0000	0	No one
\$0001	1	Default Talk Group
\$FFFF	65535	Everyone

2.6 Message Indicator

The MI has only one standardized value, which is used for unencrypted messages. This is the null (\$000000...0) value. The null value is never used for encrypted messages.

2.7 Key ID

The KID has only one standardized value, which is used for either unencrypted messages, or as a default value for encrypted messages. This value is the null (\$0000) value. The reader is referred to the *Block Encryption Protocol* document, reference [2], for further explanation of the operation of KID.

2.8 Algorithm ID

The ALGID has a standard value for unencrypted messages, which is \$80. This value may be used as a default for equipment which is not equipped with encryption. The ALGID also has a standard value to signify the DES algorithm, the triple DES algorithm, and the AES algorithm for encryption, as specified in the *Block Encryption Protocol* document, reference [2]. Other ALGID values are defined for Type 1 algorithms.

Standard ALGID Values

ALGID	#	Meaning
\$00	0	ACCORDION 1.3
\$01	1	BATON (Auto Even)
\$02	2	FIREFLY Type 1
\$03	3	MAYFLY Type 1
\$04	4	SAVILLE
\$41	65	BATON (Auto Odd)
\$80	128	Unencrypted message (no encryption algorithm)
\$81	129	DES encryption algorithm
\$83	131	3-key triple DES encryption algorithm
\$84	132	AES encryption algorithm

2.9 Service Access Point

The standard SAP values are used by the data system to distinguish services for different data packets.

Standard SAP Values

SAP	#	Meaning
\$00	0	Unencrypted User Data
\$01	1	Encrypted User Data
\$02	2	Circuit Data
\$03	3	Circuit Data Control
\$04	4	Packet Data
\$05	5	Address Resolution Protocol (ARP)
\$06	6	SNDCP Packet Data Control
\$1F	31	Extended Address -- for symmetric addressing
\$20	32	Registration and Authorization
\$21	33	Channel Re-assignment
\$22	34	System Configuration
\$23	35	MR Loop-Back
\$24	36	MR Statistics
\$25	37	MR Out-of-Service
\$26	38	MR Paging
\$27	39	MR Configuration
\$28	40	Unencrypted Key Management message
\$29	41	Encrypted Key Management message
\$3D	61	Trunking Control
\$3F	63	Protected Trunking Control

2.10 Emergency Indicator

The Emergency indicator bit is embedded in voice messages in the Link Control word to indicate an emergency condition.

Emergency Indicator Values

E	#	Meaning
%0	0	Routine, non-emergency condition
%1	1	Emergency condition

2.11 Data Unit ID

The Data Unit ID codes for the 6 different data units for the FDMA CAI standard (reference [1]) are given in the following table, together with 10 additional values that are defined here in this document. The 6 DUID values used in the FDMA CAI are marked with a "Y" in the CAI column of the table. The P bit is the last (64-th) parity bit in the Network ID code word.

Data Unit ID Values

<u>Data Unit ID</u>	<u>CAI</u>	<u>P</u>	<u>Data Unit Usage</u>
%0000	Y	0	Header Data Unit
%0001	-	1	Reserved
%0010	-	1	Reserved
%0011	Y	0	Terminator without subsequent Link Control
%0100	-	0	Reserved
%0101	Y	1	Logical Link Data Unit 1
%0110	-	1	Reserved
%0111	-	0	Trunking Signaling Data Unit
%1000	-	0	Reserved
%1001	-	1	Reserved
%1010	Y	1	Logical Link Data Unit 2
%1011	-	0	Reserved
%1100	Y	0	Packet Data Unit
%1101	-	1	Reserved
%1110	-	1	Reserved
%1111	Y	0	Terminator with subsequent Link Control

