NENA
Recommended Formats & Protocols
For Data Exchange

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EXHIBITS (cont.)

INTRODUCTION

1.1   Purpose

This document sets forth NENA standard formats for Automatic Location Identification (ALI) data exchange between Service Providers and Data Base Maintenance System Providers.

Movement of ALI data between Service Providers and/or Data Base Management System Providers is a necessary and common activity for the activation of E9-1-1 systems. Means of moving such data is varied and many. This document contains data exchange formats and data protocols recommended for creation and transporting of 9-1-1 data.

This recommendation advocates the use of one of two common protocols (KERMIT and NDM) for use in the near term and with a move toward one common protocol (TCP/IP) in the future. The recommendation unfolded in this manner with the recognition that as a goal NENA acknowledges the advantage of one protocol, but that existing systems are in place so an evolution plan must be put in place and that no single protocol can satisfy all applications.

1.2   Copyright and Responsibility

This practice was written by the NENA Data Technical Committee. The NENA Executive Board has recommended this practice for industry acceptance and use. For more information about this practice, contact:

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> 47849 Papermill Road
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1.3   Disclaimer

This document has been prepared solely for the voluntary use of E9-1-1 Service Providers, E9-1-1 equipment vendors, and participating Service Providers. By using this practice, the user agrees that the National Emergency Number Association (NENA) will have no liability for any consequential, incidental, special, or punitive damages that may result.

1.4   Overview

The original version 1 Data Exchange format was created in June 1991 to provide established formats for exchange of 9-1-1 data between Service Providers and the Data Base Management System Providers. The format was created in a fixed format with 232 characters available within the record format for ALI data.

Version 2 Data Exchange Formats were updated in June 1998 to Version 2.1, to provide for exchange of additional data fields, expanding of specific fields to allow for increased characters and data fields for X,Y,Z coordinates. Version 2 has been changed to Version 2.1 to reflect new fields which reflect the "year 2000" date identification and definition of the **"Alt #"** field for the "ALT#" associated with Interim Number Portability, to identify the Function Code indicators of "U"nlock and "M"igrate for Local Number Portability and to reflect current terminology in format description fields. This will be the last update to Version 2.

Version three (3) Data Exchange Formats were added June 1998 due to the difficulty in modifying Version 2 standards. Version 3 has been created to reflect data formats utilizing a "Tag Data" concept, which creates a variable length record dependent upon the data fields being utilized between Service Providers and Data Base Management System Providers. Version 3 should support the data needs of 9-1-1 for many years.

1.5   Reason for Reissue

June 1998: NENA 02-001 standard has been reissued due to addition of a version 3 Data Exchange Format, utilizing a "Tagged Data with field labels" concept and includes additional fields and has updated field names to better reflect industry trends. Version 1 has been changed to reflect current terminology in format description fields. Version 2 has been changed to Version 2.1 to reflect new fields which reflect the "year 2000" date identification and definition of the **"Alt #"** field for the "ALT#" associated with Interim Number Portability, to identify the Function Code indicators of "U"nlock and "M"igrate for Local Number Portability and to reflect current terminology in format description fields. This will be the last update to Version 2.

May 1999: This standard has been created to merge and replace the original NENA 02-001 *NENA Recommended Formats For Data Exchange and* NENA 02-003 *NENA Recommended Protocols For Data Exchange* into a common document to facilitate ease of use based upon the user community. There has been no intentional change made to the existing standards. The original standards documents 02-001 and 02-003 will be removed from service.

1.6   Year 2000 Compliance

All systems or any part of a system that are associated with the 9-1-1 process shall be designed and engineered to ensure that no detrimental or other noticeable impact of any kind, will occur as a result of the date change to the year 2000 or any date subsequent thereto. This shall include embedded application, computer based or any other type application.

To ensure true compliance the manufacturer shall provide verifiable test results to an industry acceptable test plan such as BellCore GR-2945 or equivalent.

1.7 Acronyms/Terms

Acronyms and terms are those utilized within this document and also reside within the NENA Master Glossary of 9-1-1 Terminology NENA-01-002.

Term	Definition
Automatic Location Identification (ALI)	The automatic display at the PSAP of the caller's telephone number, the address/location of the telephone and supplementary emergency services information.
Data Base Management System (DBMS)	A system of manual procedures and computer programs used to create, store and update the data required to provide Selective Routing and/or Automatic Location Identification for 9-1-1 systems.
Data Base Management System Provider	Entity providing Selective Routing (SR) and/or Automatic Location Identification (ALI) data services.
Emergency Service Number (ESN)/Emergency Service Zone (ESZ)	An ESN is a three to five digit number representing a unique combination of emergency service agencies (Law Enforcement, Fire, and Emergency Medical Service) designated to serve a specific range of addresses within a particular geographical area, or Emergency Service Zones (ESZ). The ESN facilitates selective routing and selective transfer, if required, to the appropriate PSAP and the dispatching of the proper service agency(ies).
Emergency Service Routing Digit (ESRD)	(see Pseudo Automatic Number identification) (pANI))
Enhanced 9-1-1 (E9-1-1)	An emergency telephone system which includes network switching, database and CPE elements capable of providing Selective Routing, Selective Transfer, Fixed Transfer, ANI and ALI.

Enhanced 9-1-1 (E9-1-1) Control Office	The Central Office that provides the tandem switching of 9-1-1 calls. It controls delivery of the voice call with ANI to the PSAP and provides Selective Routing, Speed Calling, Selective Transfer, Fixed Transfer and certain maintenance functions for each PSAP. Also known as 9-1-1 Selective Routing Tandem or Selective Router.
Local Exchange Carrier (LEC)	A Telecommunications Carrier (TC) under the state/local Public Utilities Act that provide local exchange telecommunications services. Also known as Incumbent Service Providers (ILECs), Alternate Service Providers (ALECs), Competitive Service Providers (CLECs), Competitive Assess Providers (CAPs), Certified Service Providers (CLECs), and Local Service Providers (LSPs).
Local Number Portability (LNP)	A process by which a telephone number may be reassigned from one Local Exchange Carrier to another.
Master Street Address Guide (MSAG)	A data base of street names and house number ranges within their associated communities defining Emergency Service Zones (ESZs) and their associated Emergency Service Numbers (ESNs) to enable proper routing of 9-1-1 calls.
National Emergency Number Association (NENA)	The National Emergency Number Association is a not-for-profit corporation established in 1982 to further the goal of "one Nation-One-Number." NENA is a networking source and promotes research, planning and training. NENA strives to educate, set standards and provide certification programs, legislative representation and technical assistance for implementing and managing systems.
Selective Routing (SR)	The routing of a 9-1-1 call to the proper PSAP based upon the location of the caller. Selective Routing is controlled by the ESN which is derived from the customer location.
Service Address	The physical location of a subscriber access line. Service Address is the recommended address for 9-1-1 use. (May be different from the listed address or the billing address).
Service Order	Local Exchange Carrier document used for additions, changes or removals of telephone service.
Service Provider	An entity providing one or more of the following 9-1-1 elements: network, CPE or data base service.
Tag	A unique label that precedes the data for the data element associated with the tag.
Tag Data	A method of identifying data elements of varying lengths within a data record.
Tag Data Record	A record of varying length, comprised of pre-defined tag labels and their associated data elements.

1.8   Types of Data Exchange Formats

All data exchange formats utilize ASCII characters. The NENA Data Technical Committee has established 3 versions of standard data formats for use by Service Providers and Data Base Management System Providers when exchanging E9-1-1 data base information. Three (3) versions of standard format have been defined for each of the following:
- ALI data exchange
- MSAG data exchange
- Header and trailer records

Version 1 formats are the original NENA recommended formats utilizing the 240 character format for Data Exchange; 160 character format for MSAG Data Exchange and 160 character format for Header and Trailer records.

Version 2 formats recognize that the original formats needed to be expanded to accommodate additional data fields critical to some data providers and also recognizing that NENA must position the standard

record for the future. Version 2 formats contain all data fields resident in Version 1 formats utilizing a 512 character format for Data Exchange; 200 character format for MSAG Data Exchange and 200 character formats for Header and Trailer records.

Version 3 formats recognize that the previous formats were limiting distribution of data as technology evolved and   the Data Technical Committee, after much discussion, arrived at the present NENA Version 3 format, included in this document. This format takes a "Tag Data" approach to information exchange for both wireline and wireless data distribution. Benefits include flexibility, faster programming changes, more efficient data transmission and smaller file sizes. It is strongly recommended that all Service Providers implement the NENA 3 data exchange format by January 1, 2000 including the defined NENA 3 Header and Trailer records.

The NENA Data Technical Committee requires that Service Providers maintain consistency by utilizing formats consistent to one version. i.e., Header and Trailer records must be the same version format as the Data or MSAG Exchange formats utilized.

1.9   Reasons to Implement
Industry adoption of the standard will:
- Minimize costs incurred in providing E9-1-1 data base services.
- Ensure timely activation of E9-1-1 data base systems.
- Ensure consistent provision of ALI data.
- Enable data compatibility for system integration of E9-1-1 products and services.
- Minimize set-up time
- Aid companies in future planning

1.10   When to Implement

Since many Service Providers, Data Base Management System Providers and equipment vendors are currently utilizing the original Version 1 and 2 data exchange formats defined herein, it is strongly recommended that Version 3 formats be implemented to provide for future data needs. Service Providers and the respective Data Base Management System Provider must jointly determine the data format most relevant to the system software being utilized.

A goal of January 1, 2000 is recommended as the date when Service Providers are capable of sending data utilizing the revised Version 2 format and Version 3 format to the Data Base Management System Providers and they be capable of receiving the revised Version 2 and new Version 3 formats on January 1, 2000.

It is further understood that many in-service data flows may be unable to conform to the NENA formats by the target date, but the Data Technical Committee strongly recommends that every effort be made to conform to at least one of the recommended data exchange formats by January 1, 2000.

July 1, 1994 was established as the date when Service Providers and Data Base Maintenance Service Providers should be capable of using the transmission protocol options. All future plans should include the ability to use these options.

1.11   Data Content Considerations

Common Considerations:
- All data exchange formats utilize ASCII characters.
- Data Base Management System Providers should document how they utilize versions 1, 2 and 3 and the fields that their software systems can utilize.
- The "General Use" field may be used when exchange partners agree to exchange information not defined
- All data exchange formats utilize maximum numbers of characters for each field.

- Header and Trailer records must be the same version format as the Data or MSAG Exchange formats utilized.

Version 1 & 2 formats:
- Standard field location.
- Fixed record lengths.
- Data exchange formats require that complete data records be exchanged.
- All data fields are treated as "left-justified" with trailing spaces.
- Unused fields are space-filled.

Version 3 data formats:
- A tag data record is a record of varying length, comprised of pre-defined tag labels and the associated data elements.
- There is no particular sequence of the tag/data combinations within a Tag Data Record.
- Each tag and its associated data is separated from all other tag/data combinations by a pre-defined field separator.
- Each Tag Data Record is followed by a pre-defined End of Record character.
- The receiving Data Base Management System Provider will specify the minimum set of tag/data elements required by that system to uniquely identify and process the record.
- If the field is not being used (I.E: "Street Suffix", "Post Directional", "Customer Code") then the label is not used.
- Data Technical Committee authorized new tags may be added to the record without changing the file format.
- Header records will employ cycle counting to ensure a cycle of updates is not missed.
- Trailer records will employ record counting to ensure a record within an update file is not missed.

Tag Data Processing Logic: Action taken on a field in an existing data base record where incoming Version 3 record's Function of Change (FOC) is change "C".

INCOMING VERSION 3 FIELD	ACTION TAKEN ON EXISTING ALI RECORD
Tag not sent	Field unchanged
Tag, no data	Field cleared
Tag, with data	Field changed

1.12 Security

Security is an inherent component of data transfer and is necessary to provide assurance of the integrity of the computer system. It could be considered a legal requirement, not only for privacy considerations, but in addition, for accuracy of the information. Collection, creation, manipulation, storage, retrieval, display, and transmission of customer records expose that information to modification or destruction.

The reliability of hardware, software, communications, application and human factors are considerations in the selection, design, and implementation of any system for data transfer. Security controls such as segmentation, redundancy, and password levels are some features that may be necessary for neutralization of the possibility for data modification or destruction. Realistic methods of minimizing or eliminating risks are the responsibility of the receiving parties by mutual agreement.

In support of the foregoing responsibilities of the ALI Service Provider, it is recommended that all requested security procedures for data transfer be honored.

1.13 Acknowledgments, Current Members
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EXHIBIT 1
VERSION 1 FORMAT FOR DATA EXCHANGE

FIELD NAME	POSITION	BYTES	TYPE	DESCRIPTION
Function Code	1	1	A	Type of activity the record is being submitted for. Valid entries: C Change D Delete I Insert
NPA	2-4	3	N	Three digit area code of the Calling Number
Calling Number	5-11	7	N	Seven digit telephone number of the Calling Number
House Number	12-21	10	AN	House Number. The field should be space filled if no house number is available. *NOTE: Although the House Number field is ten characters, it is understood that telephone companies may only support up to 8 characters.*
House Number Suffix	22-25	4	AN	House number extension (e.g. /2). The field should be spaced filled if no suffix applies.
Prefix Directional	26-27	2	A	Leading street direction prefix. The field should be space filled if no prefix applies. Valid entries: N S E W NE NW SE SW
Street Name	28-67	40	AN	Valid service address of the Calling Number.
Street Suffix	68-71	4	A	Valid street abbreviation, as defined by the U.S. Postal Service Publication 28. (e.g. AVE)
Post Directional	72-73	2	A	Trailing street direction suffix. The field should be space filled if no suffix applies. Valid entries: N S E W NE NW SE SW
Community Name	74-105	32	A	Valid service community of the street name/house number as designated by the MSAG.
State	106-107	2	A	Alpha state abbreviation (e.g. TX)
Location	108-127	20	AN	Additional address information (free formatted) describing the exact location of the Calling Number (e.g. Apt 718)
Customer Name	128-159	32	AN	Subscriber name associated with the Calling Number.
Class of Service	160	1	AN	Value of: 1=Residence 6=Coin 1 Way out 2=Business 7=Coin 2 Way 3=Residence PBX 8=Mobile 4=Business PBX 9 = Residence OPX 5=Centrex 0=Residence OPX
Type of Service	161	1	N	Value of: 0=Not FX nor Non-Published 1=FX in 911 serving area 2=FX outside 911 serving area 3=Non-Published 4=Non-Published FX in serving area 5=Non-Published FX outside 911 serving area
Exchange	162-165	4	AN	Local Exchange Carrier exchange identifier for the serving telephone office of the customer.

EXHIBIT 1
VERSION 1 FORMAT FOR DATA EXCHANGE

FIELD NAME	POSITION	BYTES	TYPE	DESCRIPTION
ESN	166-170	5	AN	Emergency Service Number associated with the House Number and Street Name. *NOTE: ESN field may be space filled when the Data Base Management System Provider is validating the address. The Service Provider providing the E9-1-1 Selective Routing will provide a list of ESN's available for assignment.*
Main NPA	171-173	3	N	Three-digit area code of the Main Number associated with the Calling Number.
Main Number	174-180	7	N	Seven Digit telephone number of the Main Number associated with the Calling Number.
Order Number	181-190	10	AN	Service order number for the activity establishing this record.
Extract Date	191-196	6	N	Date on which the record was created in the format. MMDDYY
County ID	197-200	4	AN	County Identification code (usually the FIPS code) *NOTE: County Identification field is used to identify the county of call origination . The Subcommittee recommends use of the FIPS code assigned to each county by the U S Census Bureau.*
Company ID	201-205	5	AN	NENA registered Company Identification code.
Source ID	206	1	AN	Code which indicates whether data is part of the initial data base creation process or part of the daily update process. Daily = Space, Initial Load = C
Zip Code	207-211	5	AN	Postal Zip Code
Zip + 4	212-215	4	AN	Postal Zip Code Extension
General Use	216-226	11	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
Reserved	227-239	13	AN	This field is reserved for the Data Base Management Systems Provider's use.
End of Record	240	1	AN	Always an asterisk (*).

NOTE: All fields are left-justified, with trailing spaces.

The Service Provider providing E9-1-1 Selective Routing must provide the governmental entity with a list of ESN's available for assignment by MSAG development personnel.

EXHIBIT 2
VERSION 1 FORMAT FOR MSAG DATA EXCHANGE

NAME	POSITION	BYTES	TYPE
Prefix Directional	1-2	2	AN
Street Name	3-42	40	AN
Street Suffix	43-46	4	AN
Post Directional	47-48	2	AN
Low Range	49-58	10	AN
High Range	59-68	10	AN
Community Name	69-100	32	A
State	101-102	2	A
Odd/Even	103	1	O, E OR B
ESN	104-108	5	AN
Extract Date	109-114	6	MMDDYY
PSAP ID	115-118	4	AN
County ID	119-122	4	AN
Exchange	123-126	4	AN
General Use	127-146	20	AN
Reserved	147-159	13	AN
End of Record	160	1	Always "*"

NOTE: All fields are left-justified, with trailing spaces.

EXHIBIT 3
VERSION 1 HEADER FORMAT FOR DATA EXCHANGE

NAME	POSITION	BYTES	TYPE
Header Indicator	1-5	5	"UHL"
Extract Date	6-11	6	MMDDYY
Company Name	12-61	50	AN
Cycle Counter	62-67	6	N
County ID	68-71	4	AN
State	72-73	2	A
General Use	74-93	20	AN
Reserved	94-159	66	AN
End of Record	160	1	Always "*"

NOTE: *All fields are left-justified, with trailing spaces, except the Cycle Counter, this field will be right-justified with leading spaces.*

Header records will employ cycle counting to ensure a cycle of updates is not missed.

When used with an ALI data file, the Reserved field will be expanded to 145 bytes.

EXHIBIT 4
VERSION 1 TRAILER FORMAT FOR DATA EXCHANGE

NAME	POSITION	BYTES	TYPE
Trailer Indicator	1-5	5	"UTL"
Extract Date	6-11	6	MMDDYY
Company Name	12-61	50	AN
Record Count	62-70	9	N
Reserved	71-159	89	AN
End of Record	160	1	Always "*"

NOTE: All fields are left-justified, with trailing spaces, except for the Record Count, this field will be right-justified with leading spaces.

Trailer records will employ record counting to ensure a record within an update file is not missed.

When used with an ALI data file, the Reserved field will be expanded to 168 bytes.

EXHIBIT 5
VERSION 2.0 FORMAT FOR DATA EXCHANGE

VERSION 2.0 FORMAT FOR MSAG DATA EXCHANGE

VERSION 2.0 HEADER FORMAT FOR DATA EXCHANGE

VERSION 2.0 TRAILER FORMAT FOR DATA EXCHANGE

Have Been Replaced by Version 2.1 Formats
See Exhibits 6 through 9

EXHIBIT 6
VERSION 2.1 FORMAT FOR DATA EXCHANGE

FIELD NAME	POSITION	BYTES	TYPE	DESCRIPTION
Function Code	1	1	A	Type of activity the record is being submitted for. Valid entries: C Change D Delete I Insert U Unlock M Migrate
NPA	2-4	3	N	Three digit area code of the Calling Number.
Calling Number	5-11	7	N	Seven digit telephone number of the Calling Number.
House Number	12-21	10	AN	House number. The field should be space filled is no house number is available. *NOTE: Although the House Number field is ten characters, it is understood that telephone companies may only support up to 8 characters.*
House Number Suffix	22-25	4	AN	House number extension (e.g. /2). The field should be space filled if no suffix applies.
Prefix Directional	26-27	2	A	Leading street direction prefix. The field should be space filled if no prefix applies. Valid entries: N S E W NE NW SE SW
Street Name	28-87	60	AN	Valid service address of the Calling Number.
Street Suffix	88-91	4	A	Valid street abbreviation, as defined by the U. S. Postal Service Publication 28. (e.g. AVE)
Post Directional	92-93	2	A	Trailing street direction suffix. The field should be space filled if no suffix applies. Valid entries: N S E W NE NW SE SW
Community Name	94-125	32	A	Valid service community of the street name/house number as designated by the MSAG.
State	126-127	2	A	Alpha state abbreviation (e.g. TX)
Location	128-187	60	AN	Additional address information (free formatted) describing the exact location of the Calling Number (e.g. Apt 718).
Customer Name	188-219	32	AN	Subscriber name associated with the Calling Number.
Class of Service	220	1	AN	Value of: 1=Residence 7=Coin 2 Way 2=Business 8=Wireless 3=Residence PBX 9=Residence OPX 4=Business PBX 0=Business OPX 5=Centrex A=Customer Owned Coin 6=Coin 1Way out Telephone (COCT)

EXHIBIT 6
VERSION 2.1 FORMAT FOR DATA EXCHANGE

FIELD NAME	POSITION	BYTES	TYPE	DESCRIPTION
Type of Service	221	1	N	Value of: 0=Not FX nor Non-Published 1=FX in 911 serving area 2=FX outside 911 serving area 3=Non-Published 4=Non-Published FX in 911 serving are 5=Non-Published outside 911 serving area 6=Local Ported Number (LNP) 7=Interim Ported Number
Exchange	222-225	4	AN	Local Exchange Carrier exchange identifier for the serving telephone office of the customer.
ESN	226-230	5	AN	Emergency Service Number associated with the House number and Street Name. *NOTE: ESN field may be space filled when the Data Base Management System Provider is validating the address. The Service Provider providing the E9-1-1 Selective Routing will provide a list of ESN's available for assignment.*
Main NPA	231-233	3	N	Three digit area code of the Main Number associated with the Calling Number.
Main Number	234-240	7	N	Seven Digit telephone number of the Main Number associated with the Calling Number.
Order Number	241-250	10	AN	Service order number for the activity establishing this record.
Extract Date	251-256	6	N	Date on which the record was created in the format MMDDYY
County ID	257-260	4	AN	County Identification Code (usually the FIPS code) *NOTE: County Identification field is used to identify the county of call origination. The Subcommittee recommends use of the FIPS code assigned to each county by the U S Census Bureau.*
Company ID	261-265	5	AN	NENA registered Company Identification code
Source ID	266	1	AN	Code which indicates whether data is part of the initial data base creation process or part of the daily update process. Daily = Space, Initial Load = C
Zip Code	267-271	5	AN	Postal Zip Code
Zip + 4	272-275	4	AN	Postal Zip Code Extension
General Use	276-286	11	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
Customer Code	287-289	3	AN	Code used to uniquely identify a customer.
Comments	290-319	30	AN	Optional notes, may be displayed at PSAP
X Coordinate	320-328	9	AN	Longitude/ X coordinate
Y Coordinate	329-337	9	AN	Latitude/ Y coordinate
Z Coordinate	338-342	5	AN	Structure elevation
Cell ID	343-348	6	AN	Identification number indicating a geographic region of cellular coverage.
Sector ID	349	1	AN	Sub set/section of a cell.
TAR Code	350-355	6	AN	Taxing Area Rate Code

EXHIBIT 6
VERSION 2.1 FORMAT FOR DATA EXCHANGE

FIELD NAME	POSITION	BYTES	TYPE	DESCRIPTION
Reserved	356-376	21	AN	This field is reserved for the Data Base Management Systems Providers 's use.
ALT #	377-386	10	N	Customer Number being remote call forwarded in Interim Number Portability service.
Expanded Extract Date	387-394	8	N	Date on which the record was created in the format YYYYMMDD
NENA Reserved	395-480	86	AN	This field is reserved for NENA Data Technical Committee Assignment
Reserved	481-511	31	AN	This field is reserved for the Data Base Management Systems Providers 's use.
End of Record	512	1	AN	Always an asterisk (*).

    NOTE: *All fields are left-justified, with trailing spaces.*

            The Service Provider providing E9-1-1 Selective Routing must provide the governmental entity with a list of ESN's available for assignment by MSAG development personnel.

EXHIBIT 7
VERSION 2.1 FORMAT FOR MSAG DATA EXCHANGE

NAME	POSITION	BYTES	TYPE
Prefix Directional	1-2	2	AN
Street name	3-62	60	AN
Street Suffix	63-66	4	AN
Post Directional	67-68	2	AN
Low Range	69-78	10	AN
High Range	79-88	10	AN
Community Name	89-120	32	A
State	121-122	2	A
Odd/Even	123	1	O, E or B
ESN	124-128	5	AN
Extract Date	129-134	6	MMDDYY
PSAP ID	135-138	4	AN
County ID	139-142	4	AN
Exchange	143-146	4	AN
General Use	147-166	20	AN
TAR Code	167-172	6	AN
Reserved	172-191	19	AN
Expanded Extract Date	192-199	8	N
End of record	200	1	Always "*"

NOTE: All fields are left-justified, with trailing spaces.

EXHIBIT 8
VERSION 2.1 HEADER FORMAT FOR DATA EXCHANGE

NAME	POSITION	BYTES	TYPE
Header Indicator	1-5	5	"UHL"
Extract Date	6-11	6	MMDDYY
Company Name	12-61	50	AN
Cycle Counter	62-67	6	N
County ID	68-71	4	AN
State	72-73	2	A
General Use	74-93	20	AN
Release Number	94-96	3	N
Format Version	97	1	N
Expanded Extract Date	98-105	8	N
Reserved	106-199	94	AN
End of Record	200	1	Always "*"

NOTE: *All fields are left-justified, with trailing spaces, except the Cycle Counter, this field will be right-justified with leading spaces.*

Header records will employ cycle counting to ensure a cycle of updates is not is missed.

When used with an ALI data file, the Reserved field will be expanded to 414 bytes.

EXHIBIT 9
VERSION 2.1 TRAILER FORMAT FOR DATA EXCHANGE

NAME	POSITION	BYTES	TYPE
Trailer Indicator	1-5	5	"UTL
Extract Date	6-11	6	MMDDYY
Company Name	12-61	50	AN
Record Count	62-70	9	N
Expanded Extract Date	71-78	8	N
Reserved	79-199	121	AN
End of Record	200	1	Always "*"

NOTE: *All fields are left-justified, with trailing spaces, except for the Record Count, this field will be right-justified with leading spaces.*

Trailer records will employ record counting to ensure a record within an update file is not missed.

When used with an ALI data file, the Reserved field will be expanded to 441 bytes.

EXHIBIT 10
VERSION 3 FORMAT FOR DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DESCRIPTION
Record Type	DAT or RTN	0		Indicates start of data record (label only, no data follows). Valid labels: DAT = Data Record sent from the Service Provider to the Data Base Management System Provider RTN = Data record returned from the Data Base Management System Provider to the Service Provider
Status Indicator	STI	1	AN	Record status indicator. Valid entries: E = Error C = Completed P = Pending U = Unprocessed Gateway received but not sent to processing, (future date)
Function Code	FOC	1	A	Type of activity the record is being submitted for. Valid entries: C = Change D = Delete I = Insert U = Unlock M = Migrate
Calling Telephone Number	CTN	10	N	Ten digit telephone number of the Calling Telephone Number. NPANXXXXXX
House Number	HNO	10	AN	House Number. *Footnote* [1] [2]
House Number Suffix	HNS	4	AN	House number extension (e.g. 1/2). *Footnote 1,2*
Prefix Directional	PRD	2	A	Leading street direction prefix. *Footnote 1,2* Valid Entries: N S E W NE NW SE SW
Street Name	STN	60	AN	Valid service address of the Calling Telephone Number. *Footnote 1,2*
Street Suffix	STS	4	A	Valid street abbreviation, as defined by the U S Postal Service Publication 28. (e.g. AVE) *Footnote 1,2*
Post Directional	POD	2	A	Trailing street direction suffix. *Footnote 1,2* Valid entries: N S E W NE NW SE SW
MSAG Community Name	MCN	32	A	Valid service community name as identified by the MSAG. *Footnote 1,2*
Postal Community Name	PCN	32	A	Valid service community name as identified by the U S Postal Service.
State	STA	2	A	Alpha state abbreviation (e.g., TX) *Footnote 1,2*
Location	LOC	60	AN	Additional address information (free formatted) describing the exact location of the Calling Telephone Number (e.g., Apt 718) *Footnote 2* *This information may be displayed at the PSAP*
Also Rings At Address	ARA	60	AN	Secondary address for the Calling Telephone Number that rings at 2 locations. Not validated against the MSAG. *This information may be displayed at the PSAP*
Customer Name	NAM	32	AN	Subscriber name associated with the Calling Telephone Number.

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[1] *Where an MSAG exists, must fit the MSAG entry.*
[2] Primary a*ddress associated with the Calling Telephone Number*

EXHIBIT 10
VERSION 3 FORMAT FOR DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DESCRIPTION
Class of Service	CLS	1	AN	Value of: 1 = Residence 7 = Coin 2Way 2 = Business 8 = Wireless 3 = Residence PBX 9 = Residence OPX 4 = Business PBX 0 = Business OPX 5 = Centrex A = Customer Owned 6 = Coin 1Way out Coin Telephone (COCT)
Type of Service	TYS	1	AN	Value of: 0 = Not FX nor Non-Published 1 = FX in 911 serving area 2 = FX outside 911 serving area 3 = Non-Published 4 = Non-Published FX in 911 serving area 5 = Non-Published FX outside 911 serving area 6 = Local Ported Number (LNP) 7 = Interim Ported Number (INP)
Exchange	EXC	4	AN	Switching entity which provides dial tone.
Emergency Service Number (ESN)	ESN	5	AN	Emergency Service Number associated with the House Number and Street Name and Community Name. *Note:. The Service Provider, providing the E9-1-1 Selective Routing will assign ESN's.*
Main Telephone Number	MTN	10	N	Ten-digit telephone number of the Main Billing Number associated with the Calling Telephone Number. NPANXXXXXX
Order Number	ORD	10	AN	Service order number for the activity associated with this record.
Completion Date	CPD	8	N	Service order completion date. YYYYMMDD
County ID	COI	5	AN	County Identification code (usually the FIPS code). *Note: County Identification field is used to identify the county of call origination. The Committee recommends use of the FIPS code assigned to each county by the U S Census Bureau.*
Company ID 1	CPF	5	AN	NENA registered Company Identification code for Service Provider providing facilities for dial tone to the customer.
Company ID 2	CPS	5	AN	NENA registered Company Identification code for Service Provider/Reseller/Private Switch supplying ALI record source information.
Zip Code	ZIP	5	AN	Postal Zip Code
Zip + 4	ZP4	6	AN	Postal Zip Code Extension
Customer Code	CUS	3	AN	Code used to uniquely identify a customer
Comments	CMT	30	AN	Optional notes, may be displayed at PSAP
TAR Code	TAR	6	AN	Taxing Area Rate Code
Alternate Telephone Number	ALT	10	N	Remote Call Forwarding number used during Interim Number Portability-NPANXXXXXX

EXHIBIT 10
VERSION 3 FORMAT FOR DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DESCRIPTION
Return Code 1	RC1	3	N	Code indicating specific processing error code or processing completed successfully. Valid entries: Not present (or 000 if used) = processing completed successfully XXX = Valid NENA Standard Error Code
Return Code 2	RC2	3	N	Code indicating specific processing error code or processing completed successfully. Valid entries: Not present (or 000 if used) = processing completed successfully XXX = Valid NENA Standard Error Code
Return Code 3	RC3	3	N	Code indicating specific processing error code or processing completed successfully. Valid entries: Not present (or 000 if used) = processing completed successfully XXX = Valid NENA Standard Error Code
Non Voice Indicator	NVC	1	AN	Non-Voice type calls. Valid entries: 1 = TTY call
General Use 1	GU1	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 2	GU2	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 3	GU3	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 4	GU4	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 5	GU5	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 6	GU6	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 7	GU7	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 8	GU8	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.

EXHIBIT 10
VERSION 3 FORMAT FOR DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DESCRIPTION
X Coordinate	XCD	11	AN	Longitude/X coordinate. Right Justified: pad field with zeros to left of decimal degrees. +long: east of Greenwich; -long: west of Greenwich. Sample: +000.000000
Y Coordinate	YCD	11	AN	Latitude/Y coordinate. Right Justified; pad field with zeros to left of decimal degrees. +lat: north of equator; -lat: south of equator. Sample: +000.######
Z Coordinate	ZCD	5	AN	Altitude indicated as mean sea level, measured in meters. Blank record indicates data not available. Sample: ####
Cell Site ID	CEL	6	AN	Identification number indicating a geographic region of cellular coverage.
Sector ID	SEC	1	AN	Sub set/section of a cell.

The items below do not require a "Label" only the symbol shown

Field Separator		1	AN	A "pipe" is to be utilized for the field separator (ASCII HEX-7C)
End of record NL		1	AN	The NEW LINE character is a single character that identifies the end of record in all cases for all records.(ASCII HEX-0A)

Data Record Format Example:

DAT|FOC.|CTN..........|HNO..........|PRD..|STN....................|STS....|COM....................|STA..|
LOC...........................|NAM...|CLS.|TYS.|MTN..........|CPD........|C
PI.....|NL

> *NOTE: If the field is not being used (I.E: "Street Suffix", "Post Directional", "Customer Code") then the label is not used. It is also not necessary for the labels to be in any particular order. Fields may be added to the record without changing the file format.*
>
> *The Service Provider, providing E9-1-1 Selective Routing must provide the governmental entity with a list of ESN's available for assignment by MSAG development personnel.*

EXHIBIT 11
VERSION 3 FORMAT FOR MSAG DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DESCRIPTION
Record Type	MSG	0		Indicates start of MSAG record (label only, no data follows)
Function Code	FOC	1	A	Type of activity the record is being submitted for. Valid entries: C = Change D = Delete I = Insert
Prefix Directional	PRD	2	AN	Leading street direction prefix. _Footnote 1,2_ Valid Entries: N S E W NE NW SE SW
Street Name	STN	60	AN	Valid service address of the Calling Telephone Number. _Footnote 1,2_
Street Suffix	STS	4	AN	Valid street abbreviation, as defined by the U S Postal Service Publication 28. (e.g. AVE) _Footnote 1,2_
Post Directional	POD	2	AN	Trailing street direction suffix. _Footnote 1,2_ Valid entries: N S E W NE NW SE SW
Low Range	LOR	10	AN	The lowest house number that is included in this ESN definition
High Range	HIR	10	AN	The highest house number that is included in this ESN definition
MSAG Community Name	MCN	32	A	Valid service community name as defined by the MSAG
Postal Community Name	PCN	32	A	Valid service community name as defined by the U S Postal Service
State	STA	2	A	Alpha state abbreviation (e.g., TX) _Footnote 1,2_
Odd/Even	OEN	1	A	Valid entries: O = Odd numbering only E = Even numbering only B = both odd and even numbering
Emergency Service Number (ESN)	ESN	5	AN	Emergency Service Number associated with this House Number range, Street Name and Community Name.
Completion Date	CPD	8	N	YYYYMMDD
PSAP ID	PSI	4	AN	Code identifying the PSAP associated with the assigned ESN
County ID	COI	5	AN	County Identification code (usually the FIPS code). _Note: County Identification field is used to identify the county of call origination. The Committee recommends use of the FIPS code assigned to each county by the U S Census Bureau._
Exchange	EXC	4	AN	Switching entity which provides dial tone.

EXHIBIT 11
VERSION 3 FORMAT FOR MSAG DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DESCRIPTION
TAR Code	TAR	6	AN	Taxing Area Rate Code associated with this House Number range, Street Name and Community Name
E9-1-1 Control Office	SRT	11	AN	9-1-1 Control Office CLLI as identified in the Bellcore LERG
General Use 1	GU1	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
General Use 2	GU2	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.

The items below do not require a "Label" only the symbol shown

Field Separator	|			A "pipe" is to be utilized for the field separator (ASCII HEX-7C)
End of record	NL			A NEW LINE character is a single character that identifies the end of record in all cases for all records. (ASCII HEX-0A)

MSAG Record Format Example:

**MSG|FOC.|PRD..|STN.....................................|STS....|LOR..........|HIR..........|MCN.............
...................|PCN...............................|STA..|OEN.|ESN.....|CPD........|EXC....|SRT...........|G
U1..|NL**

> *NOTE:* *If the field is not being used (I.E: General Use) then the label is not used. It is also not necessary for the labels to be in any particular order. Fields may be added to the record without changing the file format.*

EXHIBIT 12
VERSION 3 HEADER FORMAT FOR DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DATA DESCRIPTION
Record Type	HDR	0		Indicates start of header record (label only, no data follows)
Extract Date	EXD	8	N	Year, Month, Day the data was processed, YYYYMMDD
Company Name	CON	50	AN	Name of Company forwarding file
Cycle Counter	CYC	9	N	Sequential number, 1-999,999,999
Record Count	REC	9	N	Number of records by record type in file, does not include Header and Trailer records
General Use	GEN	20	AN	Field to be utilized by sender/receiver company's to provide additional information

The items below do not require a "Label" only the symbol shown

Field Separator		1	AN	A "pipe" is to be utilized for the field separator (ASCII HEX-7C)
End of record NL		1	AN	The NEW LINE character is a single character that identifies the end of record In all cases for all records. (ASCII HEX-0A)

Header Record Format Example:

**HDR|EXDYYYYMMDD|CON...|CYC.........|REC.........|GEN....
................|NL**

> *NOTE:* *If the field is not being used (I.E: General Use) then the label is not used. It is also not necessary for the labels to be in any particular order, except for the Record Type indicator which must be first. Fields may be added to the record without changing the file format.*
>
> *Header records will employ cycle counting to ensure a cycle of updates is not missed.*

EXHIBIT 13
VERSION 3 TRAILER FORMAT FOR DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DATA DESCRIPTION
Record Type	TLR	0		Indicates start of Trailer record (label only, no data follows)
Record Count	REC	9	N	Number of records by record type in file, does not include Header and Trailer records

The items below do not require a "Label" only the symbol shown

Field Separator		1	AN	A "pipe" is to be utilized for the field separator (ASCII HEX-7C)
End of record		1	AN	A NEW LINE character identifies the end of record value in all cases for all records. (ASCII HEX-0A)

Trailer Record Format Example:

TLR|REC.........|NL

> *NOTE:*   *Fields may be added to the record without changing the file format, Because a record consists of the data found between one new line and the next, labels need not follow in sequence though checking for duplicate labels within a single record would be prudent.*
>
> *Trailer records will employ record counting to ensure a record within an update file is not missed.*

EXHIBIT 14
VERSION 3 FORMAT FOR WIRELESS DATA EXCHANGE

NAME	LABEL	MAX # BYTES	TYPE	DESCRIPTION
Call-Back Number	CBN	10	AN	Telephone Number that can be dialed to reach a specific Wireless Calling party. Minimum 10 digits.
MOBILE ID (MIN)	MIN	10	AN	Mobile Identification number of the cellular wireless device.
Roamer Port	RPT	10	AN	Temporarily assigned "roamer" call back number.
Channel	RCC	3	AN	Channel signal received on.
X Coordinate	XCD	11	N	Longitude/X coordinate. Right Justified; pad field with zeros to left of decimal degrees. +long: east of Greenwich; -long: west of Greenwich. Sample: +000.######
Y Coordinate	YCD	11	N	Latitude/Y coordinate. Right Justified; pad field with zeros to left of decimal degrees. +lat: north of equator; -lat: south of equator. Sample: +000.######
Z Coordinate	ZCD	5	N	Altitude indicated as mean sea level, measured in meters. Blank record indicates data not available. Sample: ####
P-ANI/Default	PNI	10	AN	Pseudo ANI or locally specific code identifying the receiving antenna for the wireless 9-1-1 call for default routing purposes.
Location Valid Flag	LVD	1	N	Valid data indicator (1=OK;0=Invalid).
Datum	NDA	2	AN	A code consisting of two digits. The code 83 will be the default, identifying WGS84/NAD83; Other codes will be developed as additional datum become available through authorized entities.
LDT Confidence	COF	4	N	Sphere of confidence measured as a radius from the coordinate point generated by the LDT provider. The measurement in meters is to be calculated by LDT provider within the industry specified minimum standard. Also referred to as confidence interval.
LDT Confidence %	CO%	2	N	Degree of freedom within which the confidence interval falls.
LDT Provider ID	LDT	8	AN	LDT Provider Identification Code. Codes to be developed and held by NENA.
LDT Technology	LTY	4	AN	Location Determination Technology type used to determine specific point location.
Time Stamp	TME	8	AN	Universal Time Coordinate (UTC) indicating milliseconds into UTC day.
Time Stamp (DAY)	DAY	7	N	Year and Julian date. (UTC Date). Sample: 1996187 (YYYYDDD).
Speed (in KPH)	SPD	3	N	Speed of travel in kilometers per hour.
Heading (in degrees)	HDG	3	N	Direction of travel, decimal degrees from true north. Never higher than 359.

Wireless Data Format Example:

CBN..........|MIN..........|RPT...........|RCC...|XCD...........|YCD...........|ZCD......|PNI..........|LVD.|NDA..|COF....|CO%..|LDT........|LTY....|TME........|DAY.......|SPD...|HDG...|NL

EXHIBIT 15
DATA DICTIONARY

LABEL	NAME	MAX# BYTES	TYPE	DESCRIPTION
DAT HDR MSG RTN TLR	Record Type	0	A	Indicates the start of a data record (Label only, No Data follows): Valid Labels: DAT = Data Record sent from the Service Provider to the Data Base Management System Provider HDR = Indicates start of Header Record MSG = Indicates start of MSAG Record RTN = Data Record returned from the Data Base Management System Provider to the Service Provider TLR = Indicates start of Trailer Record
ALT	Alternate Telephone Number	10	N	Remote Call Forwarding number used during Interim Number Portability - NPANXXXXXX
ARA	Also Rings At Address	60	AN	Secondary address for the Calling Telephone Number that rings at 2 locations. Not validated against the MSAG. *This information may be displayed at the PSAP*
CBN	Call-Back Number	10	V	TN that can be dialed to reach a specific Wireless Calling party. Minimum 10 digits.
CEL	Cell Site ID	6	AN	Identification number indicating a geographic region of wireless coverage.
CLS	Class of Service	1	AN	Value of: 1 = Residence 7 = Coin 2 Way 2 = Business 8 = Wireless 3 = Residence PBX 9 = Residence OPX 4 = Business PBX 0 = Business OPX 5 = Centrex A = Customer owned Coin 6 = Coin 1Way out Telephone (COCT)
CMT	Comments	30	AN	Optional notes; may be displayed at PSAP
CO%	LDT Confidence %	2	N	The degree of freedom within which the confidence interval fails.
COF	LDT Confidence	4	N	Sphere of confidence measured as a radius from the coordinate point generated by the LDT provider. The measurement in meters is to be calculated by LDT provider within the industry specified minimum standard. Also referred to as confidence interval.
COI	County ID	4	AN	County Identification Code - (Usually FIPS code. *Note: County Identification field is used to identify the county of call origination. The committee recommends use of the FIPS code assigned to each county by the Census Bureau.*
CON	Company Name	50	AN	Name of Company forwarding file.
CPD	Completion Date	8	N	Service Order Completion Date. YYYYMMDD
CPF	Company ID 1	5	AN	NENA Registered Company Identification code for Service Provider providing facilities for dial tone to the customer.
CPS	Company ID 2	5	AN	NENA Registered Company Identification Code for Service Provider/Reseller/Private Switch supplying ALI record source information.
CTN	Calling Telephone Number	10	N	Ten Digit telephone number of the Wireline Calling Telephone Number. NPA-NXX-XXXX
CUS	Customer Code	3	AN	Code used to uniquely identify a customer
CYC	Cycle Counter	9	N	Sequential Number, 1-999,999,999
DAY	Time Stamp (DAY)	7	N	Year and Julian date. (UTC Date). Sample: 1996187 (YYYYDDD).

EXHIBIT 15
DATA DICTIONARY

LABEL	NAME	MAX# BYTES	TYPE	DESCRIPTION
ESN	Emergency Service Number (ESN)	5	AN	Emergency Service Number associated with the House Number and Street Name. *Note: The Service Provider, providing the E9-1-1 Selective Routing will assign ESN's.*
EXC	Exchange	4	AN	Switching entity which provides dial tone.
EXD	Extract Date	8	N	Year, Month, Day the data was processed, YYYYMMDD
FOC	Function Code	1	A	Type of activity the record is being submitted for. Valid entries: C = Change D = Delete I = Insert U = Unlock M = Migrate
GEN	General Use	20	AN	Field to be utilized by sender/receiver companies to provide additional data
GU1	General Use 1	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
GU2	General Use 2	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
GU3	General Use 3	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
GU4	General Use 4	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
GU5	General Use 5	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
GU6	General Use 6	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
GU7	General Use 7	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
GU8	General Use 8	60	AN	This field will be mutually used by data exchange partners to pass information not defined in previous fields.
HDG	Heading (in degrees)	3	N	Direction of travel, decimal degrees from true north. Never higher than 359.
HIR	High Range	10	AN	The highest house number that is included in this ESN definition.
HNO	House Number	10	AN	House Number.
HNS	House Number Suffix	4	AN	House number extension (e.g. 1/2). *Footnote 1,2*
LDT	LDT Provider ID	8	AN	LDT Provider Identification Code. Codes to be developed and held by NENA.
LOC	Location	60	AN	Additional address information (free formatted) describing the exact location of the Calling Telephone Number (e.g., Apt 718) *Footnote 2. This information may be displayed at the PSAP.*
LOR	Low Range	10	AN	The lowest house number that is included in this ESN definition.
LTY	LDT Technology	4	AN	Location Determination Technology type used to determine specific point location.
LVD	Location Valid Flag	1	N	Valid data indicator (1=OK;0=Invalid).
MCN	MSAG Community Name	32	A	Valid service community name as identified by the MSAG.

EXHIBIT 15
DATA DICTIONARY

LABEL	NAME	MAX# BYTES	TYPE	DESCRIPTION
MIN	Mobile Identification Number	10	AN	Mobile Identification Number of the cellular wireless device.
MTN	Main Telephone Number	10	N	Ten digit telephone number of the Main Billing Number associated with the Calling Telephone Number. NPANXXXXXX
NAM	Customer Name	32	AN	Subscriber name associated with the Calling Telephone Number.
NDA	Datum	2	AN	A code consisting of two digits. The code 83 will be the default, identifying WGS84/NAD83; Other codes will be developed as additional datum become available through authorized entities.
NVC	Non Voice Indicator	1	AN	Non-Voice type calls. Valid entries: 1 = TTY call
OEN	Odd/Even	1	A	Valid entries: O = odd numbering only E = even numbering only B = both odd and even numbering
ORD	Order Number	10	AN	Service order number for the activity associated with this record.
PCN	Postal Community Name	32	A	Valid service community name as identified by the U S Postal Service.
PNI	P-ANI/Default	10	AN	Pseudo ANI or locally specific code identifying the receiving antenna for the wireless 9-1-1 call for default routing purposes.
POD	Post Directional	2	A	Trailing street direction suffix. *Footnote 1,2* Valid entries: N S E W NE NW SE SW
PRD	Prefix Directional	2	A	Leading street direction prefix. *Footnote 1,2* Valid Entries: N S E W NE NW SE SW
PSI	PSAP ID	4	AN	Code identifying the PSAP associated with the assigned ESN.
RC1	Return Code 1	3	N	Code indicating specific processing error code or processing completed successfully. Valid entries: Not present (or 000 if used) = processing completed successfully XXX = specific processing error code
RC2	Return Code 2	3	N	Code indicating specific processing error code or processing completed successfully. Valid entries: Not present (or 000 if used) = processing completed successfully XXX = specific processing error code
RC3	Return Code 3	3	N	Code indicating specific processing error code or processing completed successfully. Valid entries: Not present (or 000 if used) = processing completed successfully XXX = specific processing error code
RCC	Channel	3	AN	Channel signal received on

EXHIBIT 15
DATA DICTIONARY

LABEL	NAME	MAX# BYTES	TYPE	DESCRIPTION
REC	Record Count	9	N	Number of records by record type in file, does not include Header and Trailer records
RPT	Roamer Port	10	AN	Temporarily assigned "roamer" call back number
SEC	Sector ID	1	AN	Sub set/section of a cell.
SPD	Speed (in KPH)	3	N	Speed of travel in kilometers per hour.
SRT	9-1-1 Control Office	11	AN	9-1-1 Control Office CLLI as identified in the Bellcore LERG
STA	State	2	A	Alpha state abbreviation (e.g., TX) *Footnote 1,2*
STI	Status Indicator	1	AN	Record status indicator. Valid entries: E = Error C = Completed P = Pending U = Unprocessed Gateway received but not sent to processing, (future date)
STN	Street Name	60	AN	Valid service address of the Calling Telephone Number. *Footnote 1,2*
STS	Street Suffix	4	A	Valid street abbreviation, as defined by the U S Postal Service Publication 28. (e.g. AVE) *Footnote 1,2*
TAR	TAR Code	6	AN	Taxing Area Rate Code
TME	Time Stamp	8	AN	Universal Time Coordinate (UTC) indicating milliseconds into UTC day.
TYS	Type of Service	1	AN	Value of: 0 = Not FX nor Non-Published 1 = FX in 911 serving area 2 = FX outside 911 serving area 3 = Non-Published 4 = Non-Published FX in 911 serving area 5 = Non-Published FX outside 911 serving area 6 = Local Ported Number (LNP) 7 = Interim Ported Number (INP)
XCD	X Coordinate	11	AN	Longitude/X coordinate. Right Justified; pad field with zeros to left of decimal degrees. +long: east of Greenwich; -long: west of Greenwich. Sample: +000.######
YCD	Y Coordinate	11	AN	Latitude/Y coordinate. Right Justified; pad field with zeros to left of decimal degrees. +lat: north of equator; -lat: south of equator. Sample: +000.######
ZCD	Z Coordinate	5	N	Altitude indicated as mean sea level, measured in meters. Blank record indicates data not available. Sample: ####
ZIP	Zip Code	5	AN	Postal Zip Code
ZP4	Zip + 4	6	AN	Postal Zip Code Extension
| 'pipe"	Field Separator	1	AN	A "pipe" is to be utilized for the field separator (ASCII HEX-7C)
(nl) new line	End of record	1	AN	A NEW LINE character identifies the end of record value in all cases for all records. (ASCII HEX-0A)

EXHIBIT 16
KERMIT PROTOCOL

16 A.   Protocol Description

The KERMIT protocol was developed by the University of Columbia in 1981 in order to transfer files reliably to/from the university mainframe computer from/to the newly emerging IBM-PCs and from there onto their floppy disks.

Using KERMIT file transfer protocol a file can be sent from one computer to a second by running a KERMIT program on each system. The two KERMIT programs on the two systems send messages (packets) back and forth to each other. The KERMIT protocol breaks the data file into small pieces called packets and reliably sends each packet to the KERMIT program residing on the other system. Each packet consists of a header, a certain piece of the data file to be sent, and a trailer indicating the end of the packet. All three components of the KERMIT packet are printable characters, making for simple protocol analyzing and de-bugging. KERMIT transfers the data (packets) as discrete characters, this makes it a character-oriented protocol.

Sending an ALI file data file always follows a strict procedure for both KERMIT programs. For each packet transmitted by the sending system the receiving system sends an appropriate response packet back in acknowledgment, in other words the sending system gets a positive response for each packet sent. If a packet does not arrive correctly or fails to arrive at all, the sending KERMIT system does not receive the appropriate acknowledgment packet and resends the same packet again. This insures that the data transferred is complete, correct, and reliable.

The sending KERMIT system initiates the KERMIT conversation by sending an initiation packet which the receiving KERMIT system responds to with an acknowledgment packet. Next the sending KERMIT system sends a packet containing the file name, to which the receiving system responds with an acknowledgment packet. After the acknowledgment packet is received the sending program sends data packets until the entire file is transferred. Following the last data packet the KERMIT protocol sends an "End of File" packet, to which the receiving system sends and acknowledgment packet. Finally, the sending system transmits a completion packet to request an end of session, to which the receiving system responds and the file transfer process ends.

16 B.   Benefits

The KERMIT protocol is a popular file transfer process, especially among PC users. The KERMIT protocol is very simple because it was designed for older vintage PCs that did not have much computing power or much memory. This simplicity has its good and bad points. A benefit of simplicity is that it is well adapted to many platforms - PCs with memory restrictions to mainframe computing systems. The simplicity means that unsophisticated computer users should have an easy and short learning curve. But, support is limited for the KERMIT software because it is free with the purchase of a manual.

16 B.   Benefits (cont.)

A bad point to its simplicity is that it is slow in transferring files, when compared to the other file transfer protocols described within this recommendation. Also, KERMIT was designed to be a manually controlled process. Manual control means that a human operator is expected to initiate the process and observe the outcome. The other file transfer protocols were designed to be automated.

16 C.   Compatibility

The KERMIT file transfer process has been implemented on a large number of systems. Below is a partial list of hardware platforms, operating systems, and languages that have successfully implemented:

*   MS-DOS and PC-DOS on various IBM compatible PC systems

*   UNIX on VAX, SUN and many others running V7, 4.xBSD, System II&V operating systems written in C language

*   Turbo Pascal on MS-DOS, Apple II DOS

*   Cray-1 written in FORTRAN-77 language

*   DEC VAX-11 with VMS operating system written in C and FORTRAN language

*   HP 1000 and 3000 written in FORTRAN language

*   IBM with VMS operating system written in C language

*   Tandem with Guardian operating system written in TAL

*   Atari Home computer running DOS written in Action!

As can be seen by the list which was compiled in 1987, KERMIT can be used in a large variety of environments. The KERMIT protocol was intended to be used over dedicated point to point links connected via modems, but KERMIT can be used in network environments.

EXHIBIT 17
NETWORK DATAMOVER PROTOCOL (NDM)

17 A.   **Protocol Description**

Network DataMover (NDM) is a family of data transfer products produced by System Center, Inc. The software automates data transfer and systems integration functions among multiple mainframes, minicomputer, and personal computers in diverse operating system environments. NDM supports direct transmission of most major file types, media, and record formats. This software is used primarily for bulk data interchange among large data centers running the same or different types of software systems on different hardware platforms.

17 B.   **Benefits**

NDM has included within its package a number of beneficial features:

- It has a scheduler which allows file transfer to be run in an automated fashion. Ancillary functions such as tape mount requests can also be automated with NDM.

- NDM supports a large number of file types, eliminating the need to reformat data before and after file transfers.

- NDM maintains statistics and audit trails for data security to assist in identifying any attempted violations.

17 C.   **Compatibility**

NDM software provides standard file transfer services for the following operating systems:

- IBM Systems Network Architecture (SNA) environment:

  - MVS, VM, VSE, and OS/400.

- VAX/VMS

- Tandem Guardian

- PC-DOS

- OS/2

- UNIX:

  - DECRISC - ULTRIX 4.2

  - HP 9000 - HP-UX 8.07

  - IBM RS/6000 - AIX 3.2

  - NCR 3000 - UNIX SVR4.0

  - SUN Sparcstation - SunOS4.1.2

EXHIBIT 17
NETWORK DATAMOVER PROTOCOL (NDM)

17 C.   Compatibility (cont.)

NDM also provides multiple connections between platforms (SNA(LU0,LU1,LU2,LU6.2,SNAX,SNA-over-X.25), NETEX,X.25,TCP/IP). NDM allows various file types, source code, object code, and load libraries to be transmitted among participating NDM system (SAM,VSAM,PDS,ISAM,BDAM,GDG,FDR volumes,DFDSS volumes,CMS (MACLIB),CMS set of files, and PC-DOS). NDM also supports multiple records formats including fixed, undefined, spanned, and variable.

**EXHIBIT 18
TCP/IP PROTOCOL**

18 A.   Protocol Description

Transmission Control Protocol/INTERNET Protocol, or commonly known as TCP/IP, is a layered set of protocols used to connect dissimilar computers together. The protocol layers consist of:

1. Application Protocol:
    Provides services used by the application client, e.g. computer operator. An example of an application protocol is File Transfer Protocol (FTP), which provides such services as writing a file to a distant computer.

2. Transmission Control Protocol (TCP):
    Provides the transport service required by the application layer. TCP layers in the two host computers that are sending files will communicate to each other to insure reliable data packet transport.

3. INTERNET Protocol (IP):
    Provides the service used to deliver the datagram (similar to a packet) to its destination. This layer provides the routing through the network and the error messages should the datagram be undeliverable.

4. The physical medium protocol:
    Defines the physical connection used by the TCP/IP system. Such as x.25, Ethernet, and point-to-point protocol (PPP) (i.e. serial links using RS-232 interfaces).

TCP/IP is designed to route messages through an INTERNET network which is used to connect a large number of independent networks together. Each computer on an INTERNET network registers for an assigned unique 32-bit address. To gain access to another company's computer, the sender only requires the other's IP address.

On top of the TCP/IP layers resides several possible services of interest to the application client. The services of interest to NENA clients are:

•   File Transport Protocol (FTP):
    The file transfer protocol is used to send and receive files between dissimilar computer systems. FTP requires the client to log on to the host system in which they plan to get or send a file. The log on security is the responsibility of the host computer. The protocol assumes that both host systems are connected to an INTERNET network and each host has knowledge (i.e. IP address) of the other.

    There are other services available through TCP/IP, however for the purpose of the recommendation the discussion has been limited to the above protocols.

EXHIBIT 18
TCP/IP PROTOCOL

18 B.   Benefits

TCP/IP has been used in government and academic communities since the early 1970's. The protocol is gaining wide acceptance in commercial use. For example, Windows NT will use TCP/IP as a standard part of its communication functionality. TCP/IP is a standard with UNIX, BSD UNIX, SunOS, Solaris, and all of the other UNIX like operating systems.

TCP/IP is available from most computer manufacturers and a large number of third party vendors, so ongoing support is a big benefit for this protocol.

The application services are simple in design and for PC users some packages make use of Windows for ease of use.

18 C.   Compatibility

TCP/IP was developed by the Defense Advanced Research Projects Agency (DARP). The University of Southern California's Information Science Institute is responsible for ongoing documentation and support of the TCP/IP protocol suite. Any TCP/IP package that adheres to these standards will be able to communicate with any other TCP/IP package that adheres to the same standard.