International Civil Aviation Organization

THE EIGHTH MEETING OF AERONAUTICAL TELECOMMUNICATION NETWORK (ATN) IMPLEMENTATION CO-ORDINATION GROUP OF APANPIRG (ATNICG/8)

Jakarta, Indonesia, 18 - 21 March 2013

Ministry Of Transportation
Republic of Indonesia

Agenda Item 3: Review States' ATN/AMHS Implementation Status, Transition and Operational Issues

INTEROPERABILITY TESTS BETWEEN BANGKOK, THAILAND AND HONG KONG, CHINA

(Jointly presented by Thailand & Hong Kong, China)

SUMMARY

This Working Paper presents the AMHS interoperability test (IOT) procedures and results that had been carried out between Bangkok, Thailand and Hong Kong, China in the period 8-16 January 2013.

This paper relates to:

Strategic Objectives:
A – Safety

Global Plan Initiatives:
GPI 22 – Communication Infrastructure

1. INTRODUCTION

1.1 A Type A Gateway had been put into operational use between Bangkok and Hong Kong, China since 2003 where AFTN message was encapsulated into CLNP packet and exchange across ATN Router. To move a step forward and upon availability of AMHS system by both ends, a kick-off meeting was held at Hong Kong, China on 18 September 2012 and agreed to launch the necessary IOT according to a 24-week implementation programme. Subsequently, the IOT was conducted in mid January 2013 with successful result.

1.2 The IOT was based on the latest Annexes of APAC AMHS Manual for ATN Router Test (Annex C) and AMHS Conformance Test (Annex E) using IP SNDCF over VPN connections.

1.3 VPN was temporarily deployed instead of a permanent leased line to link up both sides to set up the required test environment. The schematic diagram and VPN configuration setting is given in Figure 1.

2. AMHS INTEROPERABILITY TEST

2.1 As the purpose of the IOT was to verify the interoperability of the AMHS at Bangkok and Hong Kong, China before establishing a new AMHS/ATN circuit, the test therefore mainly focused on the test cases described in Annex E.

2.2 It would be better to setup the test environment as close as possible to the operational environment, after coordination with Thailand, configuration and addressing scheme as given in Table 1.

2.3 All the test cases were carried out in according to Annex E and in some test cases, additional descriptions were given to provide further details on expected observations based on previous test experience. These are documented in Table 2.

2.4 Comments were included in some test cases of Annex E including 3.1; 3.2; 4.1; 4.2 and 6.1 so as to highlight findings which may be of interest to other States conduct similar test.

3. ADDITIONAL TEST

3.1 Test on DR handling was added as an additional test during IOT to ensure the receiving AMHS generates Delivery Report to those IPM set with report-request. This additional test set is given in Table 3.

4. THE WAY FORWARD

4.1 In view of the successful IOT, it is planned that ATN/AMHS link will be put into service by Q2 2013 upon completion of tri-partite ATN router test over VPN to ensure seamless implementation of the ATN/AMHS circuit which will operate harmoniously with existing operational ATN/AMHS connections.

4.2 To ensure minimal interruption to the existing operational ATN Type A gateway connection, it is planned to acquire a new IPLC circuit between HKG and BKK for testing of the new ATN/OSI interconnection and to conduct parallel trial prior to cutover.

5. ACTION BY THE MEETING

5.1 The meeting is invited to take note of :

(a) successful IOT test conducted between Thailand and Hong Kong, China;

(b) comment to some test cases given in Table 2; and

(c) additional test for DR handling presented in Table 3 of this paper.

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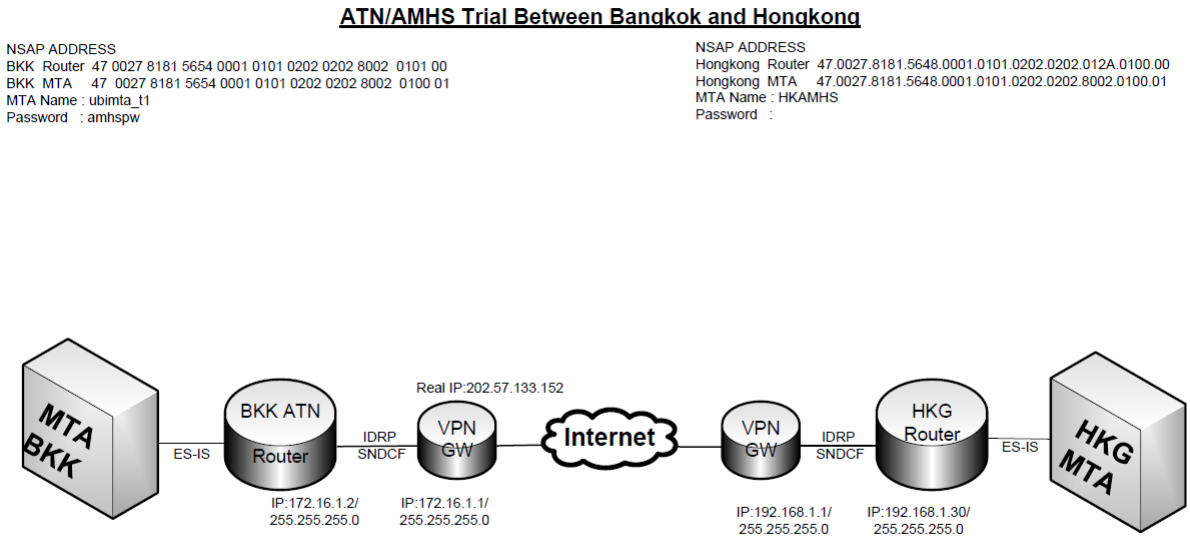
Figure 1:
Conceptual Diagram of the Test Environment of Bangkok – Hong Kong IOT



VPN configuration setting between HK and BKK

	HK VPN Gateway	**BKK VPN Gateway**
Remote End point	To be advise by BKK during test	To be advise by HKG during test
Local IP address	192.168.0.1– 192.168.0.254	100.100.100.1 – 100.100.100.254
Remote IP address	100.100.100.1 – 100.100.100.254	192.168.0.1– 192.168.0.254
Key exchange	IKE	IKE
IKE SA Parameters		
IKE direction	Both ways	Both ways
IKE Authentication method	Pre-shared Key	Pre-shared Key
Pre-shared Key	1234567890	1234567890
IKE Authentication algorithm	MD5	MD5
IKE Encryption	DES	DES
IKE Exchange mode	Main Mode	Main Mode
DH Group	Group 1 (768 bit)	Group 1 (768 bit)
IKE SA life time	28800 sec	28800 sec
IKE PFS	Disable	Disable
IPSec SA Parameters		
IPSec SA Life time	300 sec	300 sec
IPSec PFS	Disabled	Disabled
AH authentication	Disabled	Disabled
ESP authentication	Enable/SHA-1	Enable/SHA-1
ESP encryption	Enable/DES	Enable/DES

Table 1
Configuration and Addressing for IOT

Configuration Setup

Communication Parameters of Application Layer for AMHS:

Parameter Settings of Application Layer

No	Item	HONGKONG	BANGKOK
1	MTA Name	**HKAMHS**	ubimta_t1
2	T-selector	0x4D4853 (“MHS”)	0x4D4853 (“MHS”)
3	S-selector	not used	not used
4	P-selector	not used	not used
5	mode (1988, 1984, 1988/84 RTSE)	1988	1988
6	RTSE Window Size	4	4
7	RTSE Checkpoint Size	8 KB	8 KB
8	RTSE Transfer Time	0 (no limit)	0 (no limit)
9	RTSE Recovery Time	70 sec	70 sec
10	Time between RTORQ *	20 sec	20 sec
11	Time before Unbind	not set	not set
12	Dialog mode	0	0
13	Check Trace	Off	Off
14	passwords	amhspw	amhspw
15	Retry Times	20	20
16	Time between retries	60 sec	60 sec

- The RTORQ is the interval at which the MTA will try to reestablish a connection.

Parameter Settings of TP4 and CLNP

No.	Item	HONGKONG	BANGKOK
1	Maximum size of TPDU	1024 octets	1024 octets
2	Inactivity timer	180 sec	180 sec
3	Window timer	20 sec	20 sec
4	Retransmit timer	20 sec	20 sec
5	Acknowledgement time	100 msec	100 msec
6	Maximum number of transmissions	8	8
7	Credit [default]	4	4
8	Additional option selection parameter	0	0
9	Priority parameter	6	6

Addressing

User Addresses

Below are the configuration of addresses to be used in the IOT:

Thailand

CAAS addresses:
C=XX, ADMD=ICAO, PRMD=THAILAND, O=VTBB, OU1=VTBB, CN=VTBB[+4 chars]

Hong Kong

CAAS addresses:
C=XX, ADMD=ICAO, PRMD=HONGKONG, O=HKGCAD, OU1=VHHH, CN=VHHH[+4 chars]

XF addresses:
Hong Kong uses CAAS addressing scheme in operations. However, Hong Kong is capable and willing to configure XF addresses for further testing if Bangkok wants to test the XF addressing capability of their system.

Distribution Lists

Space has been left to allow for the actual distribution list addresses to be included as needed.

Distribution Addresses of AMHS-A (Bangkok)

Distribution List name	Addresses included in the DL	Remarks
VTBBDLLO	VHHHFTNA VHHHFTNB VHHHMHSA	
VTBBDLRE	VTBBFTNA VTBBFTNB VTBBMHSA	

Distribution Addresses of AMHS-B (Hong Kong)

Distribution List name	Addresses included in the DL	Remarks
VHHHDLLO	VTBBFTNA VTBBFTNB VTBBMHSA	
VHHHDLRE	VHHHFTNA VHHHFTNB VHHHMHSA	

AFTN and X.400 Routing Tables

Space has been left to allow for the actual routing indicators to be included as needed.

AFTN Routing Table of AMHS-A (Bangkok) (Bangkok)

AFTN Routing Indicator	Routing direction	Remarks
VTBBFT*	AFTN Terminal	
VTBB*	MTCU	
VHHH*	MTCU	

X.400 Routing Table of AMHS-A (Bangkok)

X.400 Routing Indicator	Routing direction	Remarks
/C=XX/A=ICAO/P=THAILAND /O=THAICAB/OU1=VTBB/CN=VTBBMHSA/	UA AMHS-A	If CAAS "single "O" type
/C=XX/A=ICAO/P=THAILAND /O=THAICAB/OU1=VTBB/CN=VTBBMHSB/	UA AMHS-A	If CAAS "single "O" type
/C=XX/A=ICAO/P=THAILAND /O=THAICAB/OU1=VTBB/CN=VTBBMHSC/	UA AMHS-A	If CAAS "single "O" type
/C=XX/A=ICAO/P=THAILAND /O=AFTN/OU1=VTBBMHSA/	UA AMHS-A	If "XF" type
/C=XX/A=ICAO/P=THAILAND /O=AFTN/OU1=VTBBMHSB/	UA AMHS-A	If "XF" type
/C=XX/A=ICAO/P=THAILAND /O=AFTN/OU1=VTBBMHSC/	UA AMHS-A	If "XF" type
/C=XX/A=ICAO/P=THAILAND	MTCU	
/C=XX/A=ICAO/P=THAILAND	MTCU	
/C=XX/A=ICAO/P=HONGKONG	MTA - HONGKONG	

AFTN Routing Table of AMHS-B (Hong Kong)

AFTN Routing Indicator	Routing direction	Remarks
VHHHFT*	AFTN Terminal	
VTBB*	MTCU	
VHHH*	MTCU	

X.400 Routing Table of AMHS-B (Hong Kong)

X.400 Routing Indicator	Routing direction	Remarks
/C=XX/A=ICAO/P=HONGKONG /O=HKGCAD/OU1=VHHH/CN=VHHHMHSA/	UA AMHS-B	If CAAS "single "O" type
/C=XX/A=ICAO/P=HONGKONG /O=HKGCAD/OU1=VHHH/CN=VHHHMHSB/	UA AMHS-B	If CAAS "single "O" type
/C=XX/A=ICAO/P=HONGKONG /O=HKGCAD/OU1=VHHH/CN=VHHHMHSC/	UA AMHS-B	If CAAS "single "O" type
/C=XX/A=ICAO/P=HONGKONG	MTCU	
/C=XX/A=ICAO/P=THAILAND	MTA-THAILAND	

Lookup Tables

Generic look-up table for all AMHS systems (CAAS single "O" type)

AFTN address	O/R Address (CAAS single "O" type)
VTBBFTN*	/C=XX/A=ICAO/P=THAILAND/O=THAICAB/OU1=VTBB/
VTBBFTA*	/C=XX/A=ICAO/P=THAILAND/O=THAICAB/OU1=VTBB/
VTBBMHSA	/C=XX/A=ICAO/P=THAILAND/O=THAICAB/OU1=VTBB/CN=VTBBMHSA/
VTBBMHSB	/C=XX/A=ICAO/P=THAILAND/O=THAICAB/OU1=VTBB/CN=VTBBMHSB/
VTBBMHSC	/C=XX/A=ICAO/P=THAILAND/O=THAICAB/OU1=VTBB/CN=VTBBMHSC/
VTBBDLLO	/C=XX/A=ICAO/P=THAILAND/O=THAICAB/OU1=VTBB/CN=VTBBDLLO/
VTBBDLRE	/C=XX/A=ICAO/P=THAILAND/O=THAICAB/OU1=VTBB/CN=VTBBDLRE/
VHHHFTN*	/C=XX/A=ICAO/P=HONGKONG/O=HKGCAD/OU1=VHHH/
VHHHFTA*	/C=XX/A=ICAO/P=HONGKONG/O=HKGCAD/OU1=VHHH/
VHHHMHSA	/C=XX/A=ICAO/P=HONGKONG/O=HKGCAD/OU1=VHHH/CN=VHHHMHSA/
VHHHMHSB	/C=XX/A=ICAO/P=HONGKONG/O=HKGCAD/OU1=VHHH/CN=VHHHMHSB/
VHHHMHSC	/C=XX/A=ICAO/P=HONGKONG/O=HKGCAD/OU1=VHHH/CN=VHHHMHSC/
VHHHDLLO	/C=XX/A=ICAO/P=HONGKONG/O=HKGCAD/OU1=VHHH/CN=VHHHDLLO/
VHHHDLRE	/C=XX/A=ICAO/P=HONGKONG/O=HKGCAD/OU1=VHHH/CN=VHHHDLRE/

Generic look-up table for all AMHS systems ("XF" type)

AFTN address	O/R Address ("XF" type)
VTBBFTN*	/C=XX/A=ICAO/P=THAILAND/
VTBBFTA*	/C=XX/A=ICAO/P=THAILAND/
VTBBMHSA	/C=XX/A=ICAO/P=THAILAND/O=AFTN/OU1=VTBBMHSA/
VTBBMHSB	/C=XX/A=ICAO/P=THAILAND/O=AFTN/OU1=VTBBMHSB/
VTBBMHSC	/C=XX/A=ICAO/P=THAILAND/O=AFTN/OU1=VTBBMHSC/
VTBBDLLO	/C=XX/A=ICAO/P=THAILAND/O=AFTN/OU1=VTBBDLLO/
VTBBDLRE	/C=XX/A=ICAO/P=THAILAND/O=AFTN/OU1=VTBBDLRE/

Table 2
AMHS Conformance Test Procedure (Annex E)
(with enriched descriptions)

1 Submission, Transfer and Delivery Operation (AMHS to AMHS)

1.1 Submit, transfer and deliver an IPM (UA AMHS-A (Bangkok) to UA AMHS-B (Hong Kong))

TEST DESCRIPTION: This test is successful if the MTA of the sending AMHS transfers the submitted ATS messages (IPM) correctly to a peer MTA which delivers the ATS messages (IPM) to the UA of the receiving AMHS.

BKK UA --> BKK AMHS --> HKG AMHS --> HKG UA

DOCUMENT REF: ***4.1.1,*** Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 20, ***IT101***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 25; ***3.1 (ATS Message User Agent Specification), 3.2 (ATS Message Server Specification), 3.3.3.3 (AMHS addresses)*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

Each message shall have different ATS-filing-time and ATS-message- text. The *optional-heading-information* element shall be empty.

PROCEDURES:

SET 1: Message has ATS-message-priority KK.
STEP 1: From the UA of AMHS-A (Bangkok) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-B (Hong Kong). The message should be as follows:

PRI: KK
FT: <FT> OHI:
TEST IT101/TC01
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 2: Message has ATS-message-priority GG.

STEP 1: From the UA of AMHS-A (Bangkok) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-B (Hong Kong). The message should be as follows:

PRI: GG

FT: <FT> OHI:

TEST IT101/TC02
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 3: Message has ATS-message-priority FF.
STEP 1: From the UA of AMHS-A (Bangkok) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-B (Hong Kong). The message should be as follows:

PRI: FF
FT: <FT> OHI:
TEST IT101/TC03
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 4: Message has ATS-message-priority DD.
STEP 1: From the UA of AMHS-A (Bangkok) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-B (Hong Kong). The message should be as follows:

PRI: DD
FT: <FT> OHI:
TEST IT101/TC04
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 5: Message has ATS-message-priority SS.
STEP 1: From the UA of AMHS-A (Bangkok) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-B (Hong Kong). The message should be as follows:

PRI: SS
FT: <FT> OHI:
TEST IT101/TC05
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

STEP 3: Verify the receipt notification (RN) is received by the origin UA.

EXPECTED RESULTS:
SET 1,2,3,4,5:
STEP 1: An ATS message (IPM) is sent from the UA of AMHS-A (Bangkok) to the AMHS addressing a remote AMHS user in the peer AMHS-B (Hong Kong).
STEP 2: The message is received by the remote UA. The message contains the correct ATS-message-priority, ATS-message-filing-time, and ATS-message-text.
STEP 3 (for SET 5 only): The RN is received by the origin UA.

SET 1:	**OK**	**SET 2:**	**OK**	**SET3:**	**OK**	**SET 4:**	**OK**	**SET 5:**	**OK**

COMMENTS:

1.2 Submit, transfer and deliver an IPM (UA AMHS-B (Hong Kong) to UA AMHS-A (Bangkok))

TEST DESCRIPTION: This test is successful if the MTA of the sending AMHS transfers the submitted ATS messages (IPM) correctly to a peer MTA which delivers the ATS messages (IPM) to the UA of the receiving AMHS.

HKG UA --> HKG AMHS --> BKK AMHS --> BKK UA

DOCUMENT REF: ***4.1.2,*** Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 22, ***IT102***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 26; ***3.1 (ATS Message User Agent Specification), 3.2 (ATS Message Server Specification), 3.3.3.3 (AMHS addresses)*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

Each message shall have different ATS-filing-time and ATS-message- text. The *optional-heading-information* element shall be empty.

PROCEDURES:

SET 1: Message has ATS-message-priority KK.
STEP 1: From the UA of AMHS-B (Hong Kong) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-A (Bangkok). The message should be as follows:

PRI: KK
FT: <FT> OHI:
TEST IT102/TC01
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 2: Message has ATS-message-priority GG.

STEP 1: From the UA of AMHS-B (Hong Kong) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-A (Bangkok). The message should be as follows:

PRI: GG

FT: <FT> OHI:

TEST IT102/TC02
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 3: Message has ATS-message-priority FF.

STEP 1: From the UA of AMHS-B (Hong Kong) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-A (Bangkok). The message should be as follows:

PRI: FF

FT: <FT> OHI:

TEST IT102/TC03
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 4: Message has ATS-message-priority DD.

STEP 1: From the UA of AMHS-B (Hong Kong) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-A (Bangkok). The message should be as follows:

PRI: DD

FT: <FT> OHI:

TEST IT102/TC04
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

SET 5: Message has ATS-message-priority SS.

STEP 1: From the UA of AMHS-B (Hong Kong) send an ATS message (IPM) to the AMHS addressing a remote AMHS user in the peer AMHS-A (Bangkok). The message should be as follows:

PRI: SS

FT: <FT> OHI:

TEST IT102/TC05
(followed by 3 lines of text)

STEP 2: Verify the message is received by the remote UA. Verify ATS-message-priority, ATS-message-filing-time, and ATS-message-text for the message.

STEP 3: Verify the receipt notification (RN) is received by the origin UA.

EXPECTED RESULTS:
SET 1,2,3,4,5:
STEP 1: An ATS message (IPM) is sent from the UA of AMHS-B (Hong Kong) to the AMHS addressing a remote AMHS user in the peer AMHS-A (Bangkok).
STEP 2: The message is received by the remote UA. The message contains the correct ATS-message-priority, ATS-message-filing-time, and ATS-message-text.
STEP 3 (for SET 5 only): The RN is received by the origin UA.

SET 1: OK	**SET 2: OK**	**SET3: OK**	**SET 4: OK**	**SET 5: OK**

COMMENTS:

2. Gateway Operations (AFTN to AMHS)

2.1 Convert an AFTN message to AMHS format (AMHS-A (Bangkok))

TEST DESCRIPTION: This test is successful if the sending AMHS converts AFTN messages correctly to AMHS messages (IPM).

BKK AFTN --> BKK AMHS --> HKG AMHS --> HKG UA

DOCUMENT REF: ***4.2.1,*** Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 22, ***IT201***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 27; ***4.4.2 (Conversion of AFTN messages),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

The filing time shall be different in each message and the OHI field of each message shall be empty.

PROCEDURES:

SET 1: AFTN message has priority KK
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

KK VHHHMHSA
<FT> VTBBFTNA
TEST IT201/TC01
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:

- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 2: AFTN message has priority GG
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

GG VHHHMHSA
<FT> VTBBFTNA
TEST IT201/TC02
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:

- the message has a different ATS-filing-time to the other test sets;

- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 3: AFTN message has priority FF
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

FF VHHHMHSA
<FT> VTBBFTNA
TEST IT201/TC03
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:
- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 4: AFTN message has priority DD
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

DD VHHHMHSA
<FT> VTBBFTNA
TEST IT201/TC04
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:
- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 5: AFTN message has priority SS
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

SS VHHHMHSA
<FT> VTBBFTNA
TEST IT201/TC04
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:

- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

STEP 3: Check the RN returned by remote AMHS is correctly converted into a AFTN SS acknowledgement and that the acknowledgement is received by the origin AFTN.

EXPECTED RESULTS:

SET 1,2,3,4,5:

STEP 1: An AFTN message is sent from the AMHS to a remote AMHS user.

STEP 2: The message is received by the remote AMHS user in the receiving AMHS. The message has been converted properly with the following:

- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

STEP 3 (for SET 5 only): The RN is converted in AFTN SS acknowledgement, and the acknowledgement is received by the origin AFTN.

SET 1: OK **SET 2: OK** **SET3: OK** **SET 4: OK** **SET 5: OK**

COMMENTS:

2.2 Convert an AFTN message to AMHS format (AMHS-B (Hong Kong))

TEST DESCRIPTION: This test is successful if the sending AMHS converts AFTN messages correctly to AMHS messages (IPM).

HKG AFTN --> HKG AMHS --> BKK AMHS --> BKK UA

DOCUMENT REF: 4.2.2, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 23, ***IT202***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 28; ***4.4.2 (Conversion of AFTN messages),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

The filing time shall be different in each message and the OHI field of each message shall be empty.

PROCEDURES:

SET 1: AFTN message has priority KK
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

KK VTBBMHSA
<FT> VHHHFTNA
TEST IT202/TC01
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:

- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 2: AFTN message has priority GG
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

GG VTBBMHSA
<FT> VHHHFTNA
TEST IT202/TC02
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:

- the message has a different ATS-filing-time to the other test sets;

- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 3: AFTN message has priority FF
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

FF VTBBMHSA
<FT> VHHHFTNA
TEST IT202/TC03
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:
- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 4: AFTN message has priority DD
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

DD VTBBMHSA
<FT> VHHHFTNA
TEST IT202/TC04
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:
- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

SET 5: AFTN message has priority SS
STEP 1: From the sending AMHS send an AFTN message addressing a remote AMHS user. The message should be as follows:

SS VTBBMHSA
<FT> VHHHFTNA
TEST IT202/TC05
(followed by 3 lines of text)

STEP 2: Check the IPMs that the AMHS user receives in the receiving AMHS. Verify that the AMHS has converted the messages correctly with the following:

- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

STEP 3: Check the RN returned by remote AMHS is correctly converted into a AFTN SS acknowledgement and that the acknowledgement is received by the origin AFTN.

EXPECTED RESULTS:

SET 1,2,3,4,5:

STEP 1: An AFTN message is sent from the AMHS to a remote AMHS user.

STEP 2: The message is received by the remote AMHS user in the receiving AMHS. The message has been converted properly with the following:

- the message has a different ATS-filing-time to the other test sets;
- the optional-heading-information element is empty;
- the correct format of the ATS message;
- the ATS-message-priority and the related message transfer priority;
- the ATS-message-text is identical to the original AFTN message text.

STEP 3 (for SET 5 only): The RN is converted in AFTN SS acknowledgement, and the acknowledgement is received by the origin AFTN.

SET 1: OK **SET 2: OK** **SET3: OK** **SET 4: OK** **SET 5: OK**

COMMENTS:

3. Gateway Operations (AMHS to AFTN)

3.1 Convert an IPM to AFTN format (AMHS-B (Hong Kong))

TEST DESCRIPTION: This test is successful if the receiving AMHS converts IPMs correctly into AFTN format.

BKK UA --> BKK AMHS --> HKG AMHS --> HKG AFTN

DOCUMENT REF: 4.3.1, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 24, ***IT301***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 29; ***4.5.2 (AMHS IPM Conversion),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

Each message shall have different ATS-filing-time and ATS-message- text. The *optional heading-information* element shall be empty. The implicit-conversion-prohibited attribute of the AMHS message must be set to "false".

PROCEDURES:

SET 1: ATS message has priority KK
STEP 1: From the AMHS-A (Bangkok) (UA) send an ATS message (IPM) to the AMHS-B (Hong Kong), addressing an AFTN terminal. The message should be as follows:

PRI: KK
FT: <FT> OHI:
TEST IT301/TC01
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 2: ATS message has priority GG
STEP 1: From the AMHS-A (Bangkok) (UA) send an ATS message (IPM) to the AMHS-B (Hong Kong), addressing an AFTN terminal. The message should be as follows:

PRI: GG
FT: <FT> OHI:
TEST IT301/TC02
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 3: ATS message has priority FF
STEP 1: From the AMHS-A (Bangkok) (UA) send an ATS message (IPM) to the AMHS-B (Hong Kong), addressing an AFTN terminal. The message should be as follows:

PRI: FF
FT: <FT> OHI:
TEST IT301/TC03
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 4: ATS message has priority DD
STEP 1: From the AMHS-A (Bangkok) (UA) send an ATS message (IPM) to the AMHS-B (Hong Kong), addressing an AFTN terminal. The message should be as follows:

PRI: DD
FT: <FT> OHI:
TEST IT301/TC04
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 5: ATS message has priority SS
STEP 1: From the AMHS-A (Bangkok) (UA) send an ATS message (IPM) to the AMHS-B (Hong Kong), addressing an AFTN terminal. The message should be as follows:

PRI: SS
FT: <FT> OHI:
TEST IT301/TC05
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

STEP 3: Check the AFTN SS acknowledgement returned by the remote AFTN is correctly converted into a RN and that this RN is received by the origin UA.

EXPECTED RESULTS:
SET 1,2,3,4,5:
STEP 1: An ATS message (IPM) is sent from the AMHS-A (Bangkok) (UA) to the AMHS-B (Hong Kong), addressing an AFTN terminal.
STEP 2: The received message has the correct format, with the proper AFTN priority and filing time. The AFTN message text is identical to the original ATS-message-text.
STEP 3 (for SET 5 only): The AFTN SS acknowledgement is converted into a RN, and the RN is received by the origin UA.

SET 1: OK SET 2: OK SET3: OK SET 4: OK SET 5: OK

COMMENTS:

Observation:

The receipt-time element in the IPN from HKG was “10-digits + Z” instead of “12-digits + Z” as stated in Doc 9880 para. 4.4.3.2.4 (Doc 9705 edition 3 para. 3.1.2.3.4.3.2.4).

Though there was deviation in the receipt-time element, the RN was successfully converted to AFTN SS ACK at BKK.

3.2 Convert an IPM to AFTN format (AMHS-A (Bangkok))

TEST DESCRIPTION: This test is successful if the receiving AMHS converts IPMs correctly into AFTN format.

HKG UA --> HKG AMHS --> BKK AMHS --> BKK AFTN

DOCUMENT REF: ***IT302***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 30; ***4.5.2 (AMHS IPM Conversion),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

Each message shall have different ATS-filing-time and ATS-message- text. The *optional heading-information* element shall be empty. The implicit-conversion-prohibited attribute of the AMHS message must be set to "false".

PROCEDURES:

SET 1: ATS message has priority KK
STEP 1: From the AMHS-B (Hong Kong) (UA) send an ATS message (IPM) to the AMHS-A (Bangkok), addressing an AFTN terminal. The message should be as follows:

PRI: KK
FT: <FT> OHI:
TEST IT302/TC01
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 2: ATS message has priority GG
STEP 1: From the AMHS-B (Hong Kong) (UA) send an ATS message (IPM) to the AMHS-A (Bangkok), addressing an AFTN terminal. The message should be as follows:

PRI: GG
FT: <FT> OHI:
TEST IT302/TC02
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 3: ATS message has priority FF
STEP 1: From the AMHS-B (Hong Kong) (UA) send an ATS message (IPM) to the AMHS-A (Bangkok), addressing an AFTN terminal. The message should be as follows:

PRI: FF

FT: <FT> OHI:
TEST IT302/TC03
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 4: ATS message has priority DD
STEP 1: From the AMHS-B (Hong Kong) (UA) send an ATS message (IPM) to the AMHS-A (Bangkok), addressing an AFTN terminal. The message should be as follows:

PRI: DD
FT: <FT> OHI:
TEST IT302/TC04
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

SET 5: ATS message has priority SS
STEP 1: From the AMHS-B (Hong Kong) (UA) send an ATS message (IPM) to the AMHS-A (Bangkok), addressing an AFTN terminal. The message should be as follows:

PRI: SS
FT: <FT> OHI:
TEST IT302/TC05
(followed by 3 lines of text)

STEP 2: Check the correct format of the AFTN message. Verify the AFTN priority and filing time for the received message. Compare the AFTN message text with the original ATS-message-text.

STEP 3: Check the AFTN SS acknowledgement returned by the remote AFTN is correctly converted into a RN and that this RN is received by the origin UA.

EXPECTED RESULTS:
SET 1,2,3,4,5:
STEP 1: An ATS message (IPM) is sent from the AMHS-B (Hong Kong) (UA) to the AMHS-A (Bangkok), addressing an AFTN terminal.
STEP 2: The received message has the correct format, with the proper AFTN priority and filing time. The AFTN message text is identical to the original ATS-message-text.
STEP 3 (for SET 5 only): The AFTN SS acknowledgement is converted into a RN, and the RN is received by the origin UA.

SET 1: OK SET 2: OK SET3: OK SET 4: OK SET 5: OK

COMMENTS:

There was no ipn-originator element in the IPN from BKK.

It was observed that the ipn-originator was present in the IPN if the urgent IPM was intended for UA recipients, but no ipn-originator in the IPN if the urgent IPM was intended for AFTN recipients.

Though there was no ipn-originator element, the RN was successfully converted to AFTN SS ACK at HKG.

4. Gateway Operations (AFTN to AMHS to AFTN)

4.1 Convert an AFTN message to AMHS and back to AFTN format (AMHS-B (Hong Kong))

TEST DESCRIPTION: This test is successful if the sending AMHS-A (Bangkok) converts AFTN user messages correctly to AMHS messages (IPM) and the IPMs are converted back to AFTN in AMHS-B (Hong Kong).

BKK AFTN --> BKK AMHS --> HKG AMHS --> HKG AFTN

DOCUMENT REF: ***4.4.1,*** Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 25, ***IT401***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 31; **4.4.2 (Conversion of AFTN messages)**, ***4.5.2 (AMHS IPM Conversion),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

The filing time shall be different in each message and the OHI field of each message shall be empty.

PROCEDURES:

SET 1: AFTN message has priority KK
STEP 1: From the AMHS-A (Bangkok) send an AFTN message to the AMHS-B (Hong Kong), addressing a remote AFTN user in AMHS-B (Hong Kong). The message should be as follows:

KK VHHHFTNA
<FT> VTBBFTNA
TEST IT401/TC01
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-B (Hong Kong). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 2: AFTN message has priority GG
STEP 1: From the AMHS-A (Bangkok) send an AFTN message to the AMHS-B (Hong Kong), addressing a remote AFTN user in AMHS-B (Hong Kong). The message should be as follows:

GG VHHHFTNA
<FT> VTBBFTNA
TEST IT401/TC02

(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-B (Hong Kong). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 3: AFTN message has priority FF
STEP 1: From the AMHS-A (Bangkok) send an AFTN message to the AMHS-B (Hong Kong), addressing a remote AFTN user in AMHS-B (Hong Kong). The message should be as follows:

FF VHHHFTNA
<FT> VTBBFTNA
TEST IT401/TC03
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-B (Hong Kong). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 4: AFTN message has priority DD
STEP 1: From the AMHS-A (Bangkok) send an AFTN message to the AMHS-B (Hong Kong), addressing a remote AFTN user in AMHS-B (Hong Kong). The message should be as follows:

DD VHHHFTNA
<FT> VTBBFTNA
TEST IT401/TC04
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-B (Hong Kong). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 5: AFTN message has priority SS
STEP 1: From the AMHS-A (Bangkok) send an AFTN message to the AMHS-B (Hong Kong), addressing a remote AFTN user in AMHS-B (Hong Kong). The message should be as follows:

SS VHHHFTNA
<FT> VTBBFTNA
TEST IT401/TC05
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-B (Hong Kong). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

STEP 3: Check the AFTN SS acknowledgement returned by remote AFTN is converted into a RN by the remote AMHS, and this RN is received by the origin AMHS and then converted back into an AFTN SS acknowledgement, and this AFTN SS acknowledgement is received by the origin AFTN.

EXPECTED RESULTS:

SET 1,2,3,4,5:

STEP 1: An AFTN message is sent from the AMHS-A (Bangkok) to the AMHS-B (Hong Kong), addressing a remote AFTN user in AMHS-B (Hong Kong).

STEP 2: The AFTN message is received by the AFTN user in the AMHS-B (Hong Kong). The message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

STEP 3 (for SET 5 only): The AFTN SS acknowledgement is converted into a RN at the remote AMHS and then converted back to AFTN SS acknowledgement at the origin AMHS, this acknowledgement is received by the origin AFTN.

SET 1: OK **SET 2: OK** **SET3: OK** **SET 4: OK** **SET 5: OK**

COMMENTS:

Observation:

The receipt-time element in the IPN from HKG was “10-digits + Z” instead of “12-digits + Z” as stated in Doc 9880 para. 4.4.3.2.4 (Doc 9705 edition 3 para. 3.1.2.3.4.3.2.4).

Though there was deviation in the receipt-time element, the RN was successfully converted to AFTN SS ACK at BKK.

4.2 Convert an AFTN message to AMHS and back to AFTN format (AMHS-A (Bangkok))

TEST DESCRIPTION: This test is successful if the sending AMHS-B (Hong Kong) converts AFTN user messages correctly to AMHS messages (IPM) and the IPMs are converted back to AFTN in AMHS-A (Bangkok).

HKG AFTN --> HKG AMHS --> BKK AMHS --> BKK AFTN

DOCUMENT REF: 4.4.2, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 26, ***IT402***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 32; **4.4.2 (Conversion of AFTN messages)**, ***4.5.2 (AMHS IPM Conversion),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

The filing time shall be different in each message and the OHI field of each message shall be empty.

PROCEDURES:

SET 1: AFTN message has priority KK
STEP 1: From the AMHS-B (Hong Kong) send an AFTN message to the AMHS-A (Bangkok), addressing a remote AFTN user in AMHS-A (Bangkok). The message should be as follows:

KK VTBBFTNA
<FT> VHHHFTNA
TEST IT402/TC01
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-A (Bangkok). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 2: AFTN message has priority GG
STEP 1: From the AMHS-B (Hong Kong) send an AFTN message to the AMHS-A (Bangkok), addressing a remote AFTN user in AMHS-A (Bangkok). The message should be as follows:

GG VTBBFTNA
<FT> VHHHFTNA
TEST IT402/TC02
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-A (Bangkok). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 3: AFTN message has priority FF
STEP 1: From the AMHS-B (Hong Kong) send an AFTN message to the AMHS-A (Bangkok), addressing a remote AFTN user in AMHS-A (Bangkok). The message should be as follows:

FF VTBBFTNA
<FT> VHHHFTNA
TEST IT402/TC03
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-A (Bangkok). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 4: AFTN message has priority DD
STEP 1: From the AMHS-B (Hong Kong) send an AFTN message to the AMHS-A (Bangkok), addressing a remote AFTN user in AMHS-A (Bangkok). The message should be as follows:

DD VTBBFTNA
<FT> VHHHFTNA
TEST IT402/TC04
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-A (Bangkok). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

SET 5: AFTN message has priority SS
STEP 1: From the AMHS-B (Hong Kong) send an AFTN message to the AMHS-A (Bangkok), addressing a remote AFTN user in AMHS-A (Bangkok). The message should be as follows:

SS VTBBFTNA

<FT> VHHHFTNA
TEST IT402/TC05
(followed by 3 lines of text)

STEP 2: Check the AFTN message received by the AFTN user in the AMHS-A (Bangkok). Verify that the message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

STEP 3: Check the AFTN SS acknowledgement returned by remote AFTN is converted into a RN by the remote AMHS, and this RN is received by the origin AMHS and then converted back into an AFTN SS acknowledgement, and this AFTN SS acknowledgement is received by the origin AFTN.

EXPECTED RESULTS:
SET 1,2,3,4,5:
STEP 1: An AFTN message is sent from the AMHS-B (Hong Kong) to the AMHS-A (Bangkok), addressing a remote AFTN user in AMHS-A (Bangkok).
STEP 2: The AFTN message is received by the AFTN user in the AMHS-A (Bangkok). The message has the following:

- the correct format of the AFTN message;
- the message has an original filing time;
- the message has an empty OHI;
- the correct AFTN priority for the message;
- the AFTN message text is identical to the original AFTN message text.

STEP 3 (for SET 5 only): The AFTN SS acknowledgement is converted into a RN at the remote AMHS and then converted back to AFTN SS acknowledgement at the origin AMHS, this acknowledgement is received by the origin AFTN.

SET 1: OK SET 2: OK SET3: OK SET 4: OK SET 5: OK

COMMENTS:

Observation:

There was no ipn-originator element in the IPN from BKK.

It was observed that the ipn-originator was present in the IPN if the urgent IPM was intended for UA recipients, but no ipn-originator in the IPN if the urgent IPM was intended for AFTN recipients.

Though there was no ipn-originator element, the RN was successfully converted to AFTN SS ACK at HKG.

5. Gateway Operations – Special Case Scenarios

5.1 Distribute an IPM to AMHS and AFTN users

TEST DESCRIPTION: This test is successful if the receiving AMHS distributes an IPM addressing both an AMHS and an AFTN user correctly.

DOCUMENT REF: ***4.5.1***, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 27, ***IT501***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 33; ***3.1 (ATS Message User Agent Specification), 3.2 (ATS Message Server Specification)***, ***4.5.2 (AMHS IPM Conversion),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

PROCEDURES:

SET 1: IPM sent from AMHS-A (Bangkok) contains two primary recipients (one AMHS and one AFTN user)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM), addressing both AMHS and AFTN users, at the receiving AMHS-B (Hong Kong). The IPM Heading of the message shall contain two primary recipients, which are one AMHS and one AFTN user.

From VTBBMHSA send the following message to:

Primary Recipients: VHHHMHSA and VHHHFTNA
PRI: FF
FT: <FT>
TEST IT501/TC01
(followed by 3 lines of text)

STEP 2: Verify that all the users, whose addresses have been included in the IPM, receive the message correctly.

SET 2: IPM sent from AMHS-B (Hong Kong) contains two primary recipients (one AMHS and one AFTN user)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM), addressing both AMHS and AFTN users, at the receiving AMHS-A (Bangkok). The IPM Heading of the message shall contain two primary recipients, which are one AMHS and one AFTN user.

From VHHHMHSA send the following message to:

Primary Recipients: VTBBMHSA and VTBBFTNA
PRI: FF
FT: <FT>
TEST IT501/TC02
(followed by 3 lines of text)

STEP 2: Verify that all the users, whose addresses have been included in the IPM, receive the message correctly.

SET 3: IPM sent from AMHS-A (Bangkok) contains two primary recipients (one AMHS and one AFTN user), and two copy recipients (one AMHS and one AFTN user)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM), addressing both AMHS and AFTN users, at the receiving AMHS-B (Hong Kong). The IPM Heading of the message shall contain two primary recipients, which are one AMHS and one AFTN user and additionally, two copy recipients, which are also one AMHS and one AFTN user.

From VTBBMHSA send the following message to:

Primary Recipients: VHHHMHSA and VHHHFTNA
Copy Recipients: VHHHMHSB and VHHHFTNB
PRI: FF
FT: <FT>
TEST IT501/TC03
(followed by 3 lines of text)

STEP 2: Verify that all the users, whose addresses have been included in the IPM, receive the message correctly.

SET 4: IPM sent from AMHS-B (Hong Kong) contains two primary recipients (one AMHS and one AFTN user), and two copy recipients (one AMHS and one AFTN user)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM), addressing both AMHS and AFTN users, at the receiving AMHS-A (Bangkok). The IPM Heading of the message shall contain two primary recipients, which are one AMHS and one AFTN user and additionally, two copy recipients, which are also one AMHS and one AFTN user.

From VHHHMHSA send the following message to:

Primary Recipients: VTBBMHSA and VTBBFTNA
Copy Recipients: VTBBMHSB and VTBBFTNB
PRI: FF
FT: <FT>
TEST IT501/TC04
(followed by 3 lines of text)

STEP 2: Verify that all the users, whose addresses have been included in the IPM, receive the message correctly.

SET 5: IPM sent from AMHS-A (Bangkok) contains two primary recipients (one AMHS and one AFTN user), two copy recipients (one AMHS and one AFTN user), and two blind copy recipients (one AMHS and one AFTN user)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM), addressing both AMHS and AFTN users, at the receiving AMHS-B (Hong Kong). The IPM Heading of the message shall

contain two primary recipients (one AMHS and one AFTN user), two copy recipients (one AMHS and one AFTN user) and two blind copy recipients (one AMHS and one AFTN user).

From VTBBMHSA send the following message to:

Primary Recipients: VHHHMHSA and VHHHFTNA
Copy Recipients: VHHHMHSB and VHHHFTNB
Blind Copy Recipients: VHHHMHSC and VHHHFTNC
PRI: FF
FT: <FT>
TEST IT501/TC05
(followed by 3 lines of text)

STEP 2: Check that at the AFTN Station of IUT-B one message with addresses VHHHFTNA, VHHHFTNB and another message with the address VHHHFTNC is received.
STEP 3: Check that at the UA VHHHMHSA one IPM is received which contains the Primary Recipients VHHHMHSA, VHHHFTNA and the Copy Recipients VHHHMHSB, VHHHFTNB, but no Blind Copy Recipients.
STEP 4: Check that at the UA VHHHMHSC one IPM is received which contains the Primary Recipients VHHHMHSA, VHHHFTNA, the Copy Recipients VHHHMHSB, VHHHFTNB and one Blind Copy Recipient VHHHMHSC.

SET 6: IPM sent from AMHS-B (Hong Kong) contains two primary recipients (one AMHS and one AFTN user), two copy recipients (one AMHS and one AFTN user), and two blind copy recipients (one AMHS and one AFTN user)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM), addressing both AMHS and AFTN users, at the receiving AMHS-A (Bangkok). The IPM Heading of the message shall contain two primary recipients (one AMHS and one AFTN user), two copy recipients (one AMHS and one AFTN user) and two blind copy recipients (one AMHS and one AFTN user).

From VHHHMHSA send the following message to:

Primary Recipients: VTBBMHSA and VTBBFTNA
Copy Recipients: VTBBMHSB and VTBBFTNB
Blind Copy Recipients: VTBBMHSC and VTBBFTNC
PRI: FF
FT: <FT>
TEST IT501/TC06
(followed by 3 lines of text)

STEP 2: Check that at the AFTN Station of AMHS-A (Bangkok) one message with addresses VTBBFTNA, VTBBFTNB and another message with the address VTBBFTNC is received.
STEP 3: Check that at the UA VTBBMHSA one IPM is received which contains the Primary Recipients VTBBMHSA, VTBBFTNA and the Copy Recipients VTBBMHSB, VTBBFTNB, but no Blind Copy Recipients.
STEP 4: Check that at the UA VTBBMHSC one IPM is received which contains the Primary Recipients VTBBMHSA, VTBBFTNA, the Copy Recipients VTBBMHSB, VTBBFTNB and one Blind Copy Recipient VTBBMHSC.

EXPECTED RESULTS:
SET 1,2,3,4:
STEP 1: An ATS message (IPM) is sent from the sending AMHS to the receiving AMHS, addressing both AMHS and AFTN users.
STEP 2: All users, whose addresses have been included in the IPM, receive the messages correctly.

SET 5,6:
STEP 1: An ATS message (IPM) is sent from the sending AMHS to the receiving AMHS, addressing both AMHS and AFTN users.
STEP 2: All users, whose addresses have been included in the IPM, receive the messages correctly.
STEP 3: All users, whose addresses have been included in the IPM, receive the messages correctly.
STEP 4: All users, whose addresses have been included in the IPM, receive the messages correctly.

SET 1: OK SET 2: OK SET3: OK SET 4: OK SET 5: OK SET 6: OK

COMMENTS:

5.2 Expand a DL addressing both AMHS and AFTN users

TEST DESCRIPTION: This test is successful if the AMHS distributes an IPM addressing both an AMHS and AFTN users in a distribution list correctly.

DOCUMENT REF: 4.5.2, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 28, ***IT502***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 34; ***3.2.2.1 (P1 and upper layer requirements), 4.5.2 (AMHS IPM Conversion),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

The message shall have the *dl-expansion-prohibited* attribute set to "false".

VTBBDLLO must be configured as a local DL entry in AMHS-A (Bangkok) containing the addresses
VHHHFTNA, VHHHFTNB and VHHHMHSA.
VHHHDLLO must be configured as a local DL entry in AMHS-B (Hong Kong) containing the addresses VTBBFTNA, VTBBFTNB and VTBBMHSA.
VHHHDLRE must be configured as a local DL entry in AMHS-B (Hong Kong) containing the addresses VHHHFTNA, VHHHFTNB and VHHHMHSA.
VTBBDLRE must be configured as a local DL entry in AMHS-A (Bangkok) containing the addresses VTBBFTNA, VTBBFTNB and VTBBMHSA.

PROCEDURES:

SET 1: Distribution list expanded locally in AMHS-A (Bangkok) and sent to AMHS-B (Hong Kong)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM) to AMHS-B (Hong Kong). The recipient contained in the MTE addresses distribution list VTBBDLLO, for which the sending AMHS is responsible. The distribution list shall have the addresses of one AMHS user and two AFTN users as members (i.e. VHHHMHSA, VHHHFTNA, VHHHFTNB).

From VTBBMHSA send the following message to VTBBDLLO:

PRI: FF
FT: <FT>
TEST IT502/TC01
(followed by 3 lines of text)

STEP 2: Check the messages received by each user verifying that each one contains its corresponding address.

SET 2: Distribution list expanded locally in AMHS-B (Hong Kong) and sent to AMHS-A (Bangkok)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM) to AMHS-A (Bangkok). The recipient contained in the MTE addresses distribution list VHHHDLLO, for which the sending AMHS is responsible. The distribution list shall have the addresses of one AMHS user and two AFTN users as members (ie. VTBBMHSA, VTBBFTNA, VTBBFTNB).

From VHHHMHSA send the following message to VHHHDLLO:

PRI: FF
FT: <FT>
TEST IT502/TC02
(followed by 3 lines of text)

STEP 2: Check the messages received by each user verifying that each one contains its corresponding address.

SET 3: Distribution list expanded remotely from AMHS-A (Bangkok) and sent to AMHS-B (Hong Kong)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM) to AMHS-B (Hong Kong). The recipient contained in the MTE addresses distribution list VHHHDLRE, for which the receiving AMHS is responsible. The distribution list shall have the addresses of one AMHS user and two AFTN users as members (ie. VHHHFTNA, VHHHFTNB and VHHHMHSA).

From VTBBMHSA send the following message to VHHHDLRE:

PRI: FF
FT: <FT>
TEST IT502/TC03
(followed by 3 lines of text)

STEP 2: Check the messages received by each user verifying that each one contains its corresponding address.

SET 4: Distribution list expanded remotely from AMHS-B (Hong Kong) and sent to AMHS-A (Bangkok)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM) to AMHS-A (Bangkok). The recipient contained in the MTE addresses distribution list VTBBDLRE, for which the receiving AMHS is responsible. The distribution list shall have the addresses of one AMHS user and two AFTN users as members (ie. VTBBFTNA, VTBBFTNB and VTBBMHSA).

From VHHHMHSA send the following message to VTBBDLRE:

PRI: FF
FT: <FT>
TEST IT502/TC04
(followed by 3 lines of text)

STEP 2: Check the messages received by each user verifying that each one contains its corresponding address.

EXPECTED RESULTS:
SET 1,2:
STEP 1: An ATS message (IPM) containing a distribution list is sent from the sending AMHS to the receiving AMHS, addressing both AMHS and AFTN users. This distribution list is expanded locally before being sent to the remote AMHS system.
STEP 2: All users receive the messages correctly on the remote AMHS.

SET 3,4:
STEP 1: An ATS message (IPM) containing a distribution list is sent from the sending AMHS to the receiving AMHS, addressing both AMHS and AFTN users. This distribution list is expanded remotely before being processed by the remote AMHS system.
STEP 2: All users receive the messages correctly on the remote AMHS.

SET 1: OK	**SET 2: OK**	**SET 3: OK**	**SET 4: OK**

COMMENTS:

5.3 Convert or reject an IPM, if the ATS-message-text contains more than 1800 characters

TEST DESCRIPTION: This test is successful if the AMHS, when it receives an ATS message with ATS-message-text longer than 1800 characters:
a) rejects the message and returns a NDR, or
b) splits the received IPM into several messages and converts the resulting messages into AFTN format as specified in ICAO Annex 10.

Note. – The AMHS technical specifications (4.5.2.1.7) specify that the message can be rejected (case a) or split into several messages (case b).

DOCUMENT REF: ***4.5.3***, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 28, ***IT503***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 35; ***4.5.2.1.7 (Initial processing of AMHS messages),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

PROCEDURES:

SET 1: Sending message of 4500 characters from AMHS-A (Bangkok) to AMHS-B (Hong Kong)
STEP 1: From the sending AMHS send an ATS message (IPM) containing ATS-message-text of 4500 characters to an AFTN recipient of the receiving AMHS.

From UA VTBBMHSA of AMHS-A (Bangkok) send the following message to the AFTN terminal VHHHFTNA:

PRI: FF
FT: <FT>
OHI:
TEST IT503/TC01
TEXT 4500 CHARACTERS
123456789012345678901234567890123456789012345678901234567890123456789
123456789012345678901234567890123456789012345678901234567890123456789
123456789012345678901234567890123456789012345678901234567890123456789
…
123456789012345678901234567890123456789012345678901234567890123456789
END

STEP 2: If case a) is implemented: Verify that the receiving AMHS does not convert the IPM into AFTN format, but returns a NDR. Check the NDR contents received at the sending User Agent. Verify that the NDR contains the following elements:

- Actual-recipient-name: MF-form address of VHHHFTNA
- "unable-to-transfer" for the non-delivery-reason-code;
- "content-too-long" for the non-delivery-diagnostic-code; and
- "unable to convert to AFTN due to message text length" for the supplementary-information.

If case b) is implemented:
Verify that (at least) three AFTN messages are received by the AFTN recipient. Check the correct format of the AFTN messages. Check the text field of all received AFTN messages. Verify that the text is complete and unchanged, i.e. compare the received data with the ATS-message-text provided in the original IPM. Verify that the received messages contain the sequence indicators as specified in Attm. B of ICAO Annex 10, Vol. II

SET 2: Sending message of 4500 characters from AMHS-B (Hong Kong) to AMHS-A (Bangkok)
STEP 1: From the sending AMHS send an ATS message (IPM) containing ATS-message-text of 4500 characters to an AFTN recipient of the receiving AMHS.

From UA VHHHMHSA of AMHS-B (Hong Kong) send the following message to the AFTN terminal VTBBFTNA:

PRI: FF
FT: <FT>
OHI:
TEST IT503/TC01
TEXT 4500 CHARACTERS
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
…
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
END

STEP 2: If case a) is implemented: Verify that the receiving AMHS does not convert the IPM into AFTN format, but returns a NDR. Check the NDR contents received at the sending User Agent. Verify that the NDR contains the following elements:
- Actual-recipient-name: MF-form address of VTBBFTNA
- "unable-to-transfer" for the non-delivery-reason-code;
- "content-too-long" for the non-delivery-diagnostic-code; and
- "unable to convert to AFTN due to message text length" for the supplementary-information.

If case b) is implemented:
Verify that (at least) three AFTN messages are received by the AFTN recipient. Check the correct format of the AFTN messages. Check the text field of all received AFTN messages. Verify that the text is complete and unchanged, i.e. compare the received data with the ATS-message-text provided in the original IPM. Verify that the received messages contain the sequence indicators as specified in Attm. B of ICAO Annex 10, Vol. II

EXPECTED RESULTS:
SET 1:
STEP 1: An ATS message (IPM) containing ATS-message-text of 4500 characters is sent from AMHS-A (Bangkok) send to an AFTN recipient of AMHS-B (Hong Kong).
STEP 2: <will updated depending on method used>

SET 2:
STEP 1: An ATS message (IPM) containing ATS-message-text of 4500 characters is sent from AMHS-B (Hong Kong) send to an AFTN recipient of AMHS-A (Bangkok).

STEP 2: <will updated depending on method used>
SET 1: OK **SET 2: OK**
COMMENTS:

5.4 Split an incoming IPM addressing more than 21 AFTN users

TEST DESCRIPTION: This test is successful if the receiving AMHS receives an ATS message (IPM) addressing more than 21 AFTN users and splits the received IPM into several messages each addressing 21 or less AFTN users.

DOCUMENT REF: 4.5.4, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 30, ***IT504***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 36; ***4.5.2.1.8 (Initial processing of AMHS messages),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

PROCEDURES:

SET 1: Send a message with 50 recipients from AMHS-A (Bangkok) to AMHS-B (Hong Kong)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM) to AMHS-B (Hong Kong). The message shall address 50 (primary) recipients.

From VTBBMHSA send the following message to the following addressees (all recipients in the corresponding MF-Form):

VHHHFTNA, VHHHFTNB, VHHHFTNC, VHHHFTND, VHHHFTNE, VHHHFTNF, VHHHFTNG, VHHHFTNH, VHHHFTNI, VHHHFTNJ, VHHHFTNK, VHHHFTNL, VHHHFTNM, VHHHFTNN, VHHHFTNO, VHHHFTNP, VHHHFTNQ, VHHHFTNR, VHHHFTNS, VHHHFTNT, VHHHFTNU, VHHHFTNV, VHHHFTNW, VHHHFTNX, VHHHFTNY, VHHHFTAA, VHHHFTAB, VHHHFTAC, VHHHFTAD, VHHHFTAE, VHHHFTAF, VHHHFTAG, VHHHFTAH, VHHHFTAI, VHHHFTAJ, VHHHFTAK, VHHHFTAL, VHHHFTAM, VHHHFTAN, VHHHFTAO, VHHHFTAP, VHHHFTAQ, VHHHFTAR, VHHHFTAS, VHHHFTAT, VHHHFTAU, VHHHFTAV, VHHHFTAW, VHHHFTAX, VHHHFTAY

PRI: FF
FT: <FT>
OHI:
TEST IT504/TC01
(followed by 3 lines of text)

STEP 2: Verify that AMHS-B (Hong Kong) converts the IPM into AFTN format and sends three AFTN messages to its AFTN component. Check the addressee indicators contained in the AFTN messages. Verify that no AFTN recipient is lost and the total number of AFTN addressee indicators contained in all three messages is 50 (ie. first AFTN message = 21 recipients, second AFTN message = 21 recipients, third AFTN message = 8 recipients)

SET 2: Send a message with 50 recipients from AMHS-B (Hong Kong) to AMHS-A (Bangkok)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM) to AMHS-A (Bangkok). The message shall address 50 (primary) recipients.

From VHHHMHSA send the following message to the following addressees (all recipients in the

corresponding MF-Form):

VTBBFTNA, VTBBFTNB, VTBBFTNC, VTBBFTND, VTBBFTNE, VTBBFTNF, VTBBFTNG, VTBBFTNH, VTBBFTNI, VTBBFTNJ, VTBBFTNK, VTBBFTNL, VTBBFTNM, VTBBFTNN, VTBBFTNO, VTBBFTNP, VTBBFTNQ, VTBBFTNR, VTBBFTNS, VTBBFTNT, VTBBFTNU, VTBBFTNV, VTBBFTNW, VTBBFTNX, VTBBFTNY, VTBBFTAA, VTBBFTAB, VTBBFTAC, VTBBFTAD, VTBBFTAE, VTBBFTAF, VTBBFTAG, VTBBFTAH, VTBBFTAI, VTBBFTAJ, VTBBFTAK, VTBBFTAL, VTBBFTAM, VTBBFTAN, VTBBFTAO, VTBBFTAP, VTBBFTAQ, VTBBFTAR, VTBBFTAS, VTBBFTAT, VTBBFTAU, VTBBFTAV, VTBBFTAW, VTBBFTAX, VTBBFTAY

PRI: FF
FT: <FT>
OHI:
TEST IT504/TC02
(followed by 3 lines of text)

STEP 2: Verify that the AMHS-A (Bangkok) converts the IPM into AFTN format and sends three AFTN messages to its AFTN component. Check the addressee indicators contained in the AFTN messages. Verify that no AFTN recipient is lost and the total number of AFTN addressee indicators contained in all three messages is 50 (ie. first AFTN message = 21 recipients, second AFTN message = 21 recipients, third AFTN message = 8 recipients)

EXPECTED RESULTS:

SET 1:

STEP 1: An ATS message (IPM) addressing 50 recipients is sent from AMHS-A (Bangkok) to an AFTN recipient of AMHS-B (Hong Kong).

STEP 2: The AMHS-B (Hong Kong) converts the IPM into AFTN format and sends three AFTN messages to its AFTN component. No AFTN recipient is lost and the total number of AFTN addressee indicators contained in all three messages is 50 (ie. first AFTN message = 21 recipients, second AFTN message = 21 recipients, third AFTN message = 8 recipients)

SET 2:

STEP 1: An ATS message (IPM) addressing 50 recipients is sent from AMHS-B (Hong Kong) to an AFTN recipient of AMHS-A (Bangkok).

STEP 2: The AMHS-A (Bangkok) converts the IPM into AFTN format and sends three AFTN messages to its AFTN component. No AFTN recipient is lost and the total number of AFTN addressee indicators contained in all three messages is 50 (ie. first AFTN message = 21 recipients, second AFTN message = 21 recipients, third AFTN message = 8 recipients)

SET 1: OK **SET 2: OK**

COMMENTS:

5.5 Probe Conveyance Test

TEST DESCRIPTION: This test is successful if the receiving AMHS generates a report (DR or NDR), when it receives a probe with AFTN users as intended recipients.

DOCUMENT REF: 4.5.5, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 31, ***IT505***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 37; ***4.5.5 (Action upon reception of AMHS probe), 4.5.6.2.27 (Generation of report transfer envelope and content),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

PROCEDURES:

SET 1: Probe sent from AMHS-A (Bangkok) to AMHS-B (Hong Kong) with two AFTN recipients and one AMHS recipient
STEP 1: From AMHS-A (Bangkok) (ie. VTBBMHSA) send an AMHS probe to AMHS-B (Hong Kong) addressing two AFTN recipients (ie. VHHHFTNA, VHHHFTNB) and one AMHS recipient (ie. VHHHMHSA).
STEP 2: Verify that AMHS-B (Hong Kong) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-A (Bangkok). Verify that the DR reporting about the AFTN addresses contains the supplementary information "This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient".

SET 2: Probe sent from AMHS-B (Hong Kong) to AMHS-A (Bangkok) with two AFTN recipients and one AMHS recipient
STEP 1: From AMHS-B (Hong Kong) (ie. VHHHMHSA) send an AMHS probe to AMHS-A (Bangkok) addressing two AFTN recipients (ie. VTBBFTNA, VTBBFTNB) and one AMHS recipient (ie. VTBBMHSA).
STEP 2: Verify that AMHS-A (Bangkok) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-B (Hong Kong). Verify that the DR reporting about the AFTN addresses contains the supplementary information "This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient".

SET 3: Probe sent from AMHS-A (Bangkok) to AMHS-B (Hong Kong) with two AFTN recipients , one that can be mapped and one that cannot be mapped
STEP 1: From AMHS-A (Bangkok) (ie. VTBBMHSA) send an AMHS probe to AMHS-B (Hong Kong) addressing two AFTN recipients, one of which can be mapped (ie. VHHHFTNA) and one of which cannot be mapped onto a valid AFTN address (ie. VHHHFTUU - address is not provided in the look-up table of AMHS-B (Hong Kong)).
STEP 2: Verify that AMHS-B (Hong Kong) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-A (Bangkok). Verify that the DR reporting about the AFTN addressee (ie. VHHHFTNA) contains the supplementary information "This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient".
STEP 3: Verify that a NDR, containing the reported recipient VHHHFTUU, is received with the

following:

- *non-delivery-reason-code* set to “unable-to-transfer”,
- *non-delivery-diagnostic-code* set to “unrecognized-OR-name”

SET 4: Probe sent from AMHS-B (Hong Kong) to AMHS-A (Bangkok) with two AFTN recipients , one that can be mapped and one that cannot be mapped
STEP 1: From AMHS-B (Hong Kong) (ie. VHHHMHSA) send an AMHS probe to AMHS-A (Bangkok) addressing two AFTN recipients, one of which can be mapped (ie. VTBBFTNA) and one of which cannot be mapped onto a valid AFTN address (ie. VTBBFTUU - address is not provided in the look-up table of AMHS-A (Bangkok)).
STEP 2: Verify that AMHS-A (Bangkok) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-A (Bangkok). Verify that the DR reporting about the AFTN addressee (ie. VTBBFTNA) contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.
STEP 3: Verify that a NDR, containing the reported recipient VHHHFTUU, is received with the following:

- *non-delivery-reason-code* set to “unable-to-transfer”,
- *non-delivery-diagnostic-code* set to “unrecognized-OR-name”

EXPECTED RESULTS:

SET 1:
STEP 1: An AMHS probe is sent from AMHS-A (Bangkok) to AMHS-B (Hong Kong) addressing two AFTN recipients and one AMHS recipient.
STEP 2: AMHS-B (Hong Kong) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-A (Bangkok). The DR reporting about the AFTN addresses contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.

SET 2:
STEP 1: An AMHS probe is sent from AMHS-B (Hong Kong) to AMHS-A (Bangkok) addressing two AFTN recipients and one AMHS recipient.
STEP 2: AMHS-A (Bangkok) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-B (Hong Kong). The DR reporting about the AFTN addresses contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.

SET 3:
STEP 1: An AMHS probe is sent from AMHS-A (Bangkok) to AMHS-B (Hong Kong) addressing two AFTN recipients, one of which can be mapped and one of which cannot be mapped onto a valid AFTN address.

STEP 2: AMHS-B (Hong Kong) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-A (Bangkok). The DR reporting about the AFTN addressee contains the supplementary information “This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient”.
STEP 3: An NDR, containing the reported recipient, is received with the following:

- non-delivery-reason-code set to “unable-to-transfer”,
- non-delivery-diagnostic-code set to “unrecognized-OR-name”

SET 4:
STEP 1: An AMHS probe is sent from AMHS-B (Hong Kong) to AMHS-A (Bangkok) addressing two AFTN recipients, one of which can be mapped and one of which cannot be mapped onto a valid AFTN address.
STEP 2: AMHS-A (Bangkok) returns one Delivery Report (DR) with 2 AFTN recipients from the MTCU and one DR with one recipient from the MTA to AMHS-B (Hong Kong). The DR reporting about the AFTN addressee contains the supplementary information "This report only indicates successful (potential) conversion to AFTN, not delivery to a recipient".
STEP 3: An NDR, containing the reported recipient, is received with the following:

- non-delivery-reason-code set to "unable-to-transfer",
- non-delivery-diagnostic-code set to "unrecognized-OR-name"

SET 1: OK	**SET 2: OK**	**SET 3: OK**	**SET 4: OK**

COMMENTS:

6. Stress Traffic Situations

6.1 Stress Load

TEST DESCRIPTION: This test is successful if both AMHS systems perform AMHS traffic interchange correctly for a number of messages queued in advance.

DOCUMENT REF: 4.6.1, Asia/ Pacific AMHS Manual Appendix E, ver 3.0, pg. 32, ***IT601***, EUR Doc 020 AMHS Manual Appendix E, ver 5.0, pg. 38

SETUP: Refer to Configuration and Addressing Setup for specific details.

PROCEDURES:

SET 1: Transmit 100 messages simultaneously from both AMHS systems

STEP 1: Interrupt the connection between AMHS-A (Bangkok) and AMHS-B (Hong Kong) by disabling the physical connector used to send information to the underlying network in one of the AMHS systems. When reconnecting, the messages queued in both AMHS systems will be sent simultaneously from the two sites, the rate being defined by the line speed of the interconnection, as well as the process followed by each system.

STEP 2: Select from the database or generated by the UA and/or the AFTN terminal 100 messages in both AMHS systems. For example, from VTBBFTNA send 100 messages to VHHHFTNA, VHHHMHSA, and from VHHHFTNA send 100 messages to VTBBFTNA, VTBBMHSA. In the result on AMHS-A (Bangkok) and AMHS-B (Hong Kong) there are 100 messages queued in direction to the peer AMHS.

STEP 3: Re-establish the connection between AMHS-A (Bangkok) and AMHS-B (Hong Kong). The queued messages will be sent simultaneously from both AMHS systems. No errors due to malfunction of the AMHS systems should be observed during the interchange period.

STEP 4: Fill in the enclosed form with all relevant information for SET 1.

SET 2: Transmit 200 messages simultaneously from both AMHS systems

STEP 1: Interrupt the connection between AMHS-A (Bangkok) and AMHS-B (Hong Kong) by disabling the physical connector used to send information to the underlying network in one of the AMHS systems. When reconnecting, the messages queued in both AMHS systems will be sent simultaneously from the two sites, the rate being defined by the line speed of the interconnection, as well as the process followed by each system.

STEP 2: Select from the database or generated by the UA and/or the AFTN terminal 200 messages in both AMHS systems. For example, from VTBBFTNA send 200 messages to VHHHFTNA, VHHHMHSA, and from VHHHFTNA send 200 messages to VTBBFTNA, VTBBMHSA. In the result on AMHS-A (Bangkok) and AMHS-B (Hong Kong) there are 200 messages queued in direction to the peer AMHS.

STEP 3: Re-establish the connection between AMHS-A (Bangkok) and AMHS-B (Hong Kong). The queued messages will be sent simultaneously from both AMHS systems. No errors due to malfunction of the AMHS systems should be observed during the interchange period.

STEP 4: Fill in the enclosed form with all relevant information for SET 1.

SET 3: Transmit 400 messages simultaneously from both AMHS systems

STEP 1: Interrupt the connection between AMHS-A (Bangkok) and AMHS-B (Hong Kong) by disabling the physical connector used to send information to the underlying network in one of the AMHS systems. When reconnecting, the messages queued in both AMHS systems will be sent simultaneously from the two sites, the rate being defined by the line speed of the interconnection, as well as the process followed by each system.

STEP 2: Select from the database or generated by the UA and/or the AFTN terminal 400 messages in both AMHS systems. For example, from VTBBFTNA send 400 messages to VHHHFTNA, VHHHMHSA, and from VHHHFTNA send 400 messages to VTBBFTNA, VTBBMHSA. In the result on AMHS-A (Bangkok) and AMHS-B (Hong Kong) there are 400 messages queued in direction to the peer AMHS.

STEP 3: Re-establish the connection between AMHS-A (Bangkok) and AMHS-B (Hong Kong). The queued messages will be sent simultaneously from both AMHS systems. No errors due to malfunction of the AMHS systems should be observed during the interchange period.

STEP 4: Fill in the enclosed form with all relevant information for SET 1.

EXPECTED RESULTS:

SET 1,2,3:

STEP 1: The connection is interrupted between the AMHS-A (Bangkok) and AMHS-B (Hong Kong) by disabling the physical connector used to send information to the underlying network in one of the AMHS systems. When reconnected, the messages queued in both AMHS systems are sent simultaneously from the two sites, the rate being defined by the line speed of the interconnection, as well as the process followed by each system.

STEP 2: Messages are selected from the database or generated by the UA and/or the AFTN terminal in both AMHS systems.

STEP 3: The connection is re-established between AMHS-A (Bangkok) and AMHS-B (Hong Kong). The queued messages are sent simultaneously from both AMHS systems. No errors due to malfunction of the AMHS systems are observed during the interchange period.

STEP 4: The form is completed with the information filled in.

Test Control	**SET 1 Result**	**SET 2 Result**	**SET 3 Result**
1. Notice the time of re-establishing the connection sending direction.	0317:33 (hhmm:ss)	0358:38	0610:51
2. Notice the time of sending the first message.	0317:33	0358:39	0610:51
3. Notice the time of sending the last message.	0318:38	0401:00	0614:46
4. Notice the time of re-establishing the connection receiving direction.	0317:30	0358:23	0609:58
5. Notice the time of receiving the first message.	0317:31	0358:23	0609:58
6. Notice the time of receiving the last message.	0318:11	0402:39	0614:59
7. Notice the number of messages received (shall be equal to the number of messages expected.)	100	200	400

8. Check the event logging of the system for abnormalities in the area of AMHS / X.400 / AFTN/AMHS Gateway.	NIL Abnormality	NIL Abnormality	NIL Abnormality
9. Check the event logging / traffic traces for NDRs. (No NDRs are awaited.)	NIL problem	NIL problem	NIL problem
10.Check for Control Position events. (No related events are awaited.)	NIL problem	NIL problem	NIL problem
11.Check the X.400 / AMHS diagnostics, check the number of associations used (in particular possible hanging/unused associations).	1 (see comment)	1 (see comment)	1 (see comment)
12.Monitor the underlying network infrastructure (network specialist).			
13.At both sides note the amount of time needed to flush the queues. (Unacceptable delays shall be treated as "FAILED")	NIL delay	NIL delay	NIL delay

SET 1: OK **SET 2: OK** **SET 3: OK**

COMMENTS:

The number of characters in the content of each message was 150.

During all the 3 stress load tests, it was observed that the maximum binding association was only 1 in the receiving direction and only 1 in the sending direction. However, the recommended maximum association was 5.

Table 3
Additional Test for DR Handling

DR Handling

TEST DESCRIPTION: This test is successful if the receiving AMHS generates Delivery report (DR) to those IPM set with report-request correctly.

DOCUMENT REF: ***4.5.6 (Generation of AMHS reports),*** ICAO Doc 9880-AN/466: Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols, Part IIB – Ground-ground applications, ATS message handling service (ATSMHS), 1st edition (unedited)

SETUP: Refer to Configuration and Addressing Setup for specific details.

PROCEDURES:

SET 1: IPM sent from AMHS-A (Bangkok) contains one primary recipient (one AMHS user)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM), addressing AMHS user, at the receiving AMHS-B (Hong Kong). The IPM Heading of the message shall contain one primary recipient, which is AMHS user, and the IPM shall be set with originator-report-request with abstract-value "report".

From VTBBMHSA send the following message to:

Primary Recipients: VHHHMHSA
PRI: FF
FT: <FT>
TEST DR
(followed by 3 lines of text)

STEP 2: Verify that the user, whose address have been included in the IPM, receives the message correctly.

STEP 3: Verify that a delivery report (DR) for the AMHS recipient is generated by the receiving MTA to the originator of the IPM.

SET 2: IPM sent from AMHS-B (Hong Kong) contains one primary recipient (one AMHS user)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM), addressing AMHS user, at the receiving AMHS-A (Bangkok). The IPM Heading of the message shall contain one primary recipient, which is AMHS user, and the IPM shall be set with originator-report-request with abstract-value "report".

From VHHHMHSA send the following message to:

Primary Recipients: VTBBMHSA
PRI: FF
FT: <FT>
TEST DR
(followed by 3 lines of text)

STEP 2: Verify that the user, whose address have been included in the IPM, receives the message correctly.

STEP 3: Verify that a delivery report (DR) for the AMHS recipient is generated by the receiving MTA to the originator of the IPM.

SET 3: IPM sent from AMHS-A (Bangkok) contains one primary recipient (one AFTN user)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM), addressing AFTN user, at the receiving AMHS-B (Hong Kong). The IPM Heading of the message shall contain one primary recipient, which is AFTN user, and the IPM shall be set with originator-report-request with abstract-value "report".

From VTBBMHSA send the following message to:

Primary Recipients: VHHHFTNA
PRI: FF
FT: <FT>
TEST DR
(followed by 3 lines of text)

STEP 2: Verify that the user, whose address have been included in the IPM, receives the message correctly.

STEP 3: Verify that a delivery report (DR) for the AFTN recipient is generated by the receiving MTCU to the originator of the IPM.

SET 4: IPM sent from AMHS-B (Hong Kong) contains one primary recipient (one AFTN user)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM), addressing AFTN user, at the receiving AMHS-A (Bangkok). The IPM Heading of the message shall contain one primary recipient, which is AFTN user, and the IPM shall be set with originator-report-request with abstract-value "report".

From VHHHMHSA send the following message to:

Primary Recipients: VTBBFTNA
PRI: FF
FT: <FT>
TEST DR
(followed by 3 lines of text)

STEP 2: Verify that the user, whose address have been included in the IPM, receives the message correctly.

STEP 3: Verify that a delivery report (DR) for the AFTN recipient is generated by the receiving MTCU to the originator of the IPM.

SET 5: IPM sent from AMHS-A (Bangkok) contains four primary recipients (two AMHS users and two AFTN users)
STEP 1: From AMHS-A (Bangkok) send an ATS message (IPM), addressing AMHS and AFTN users, at the receiving AMHS-B (Hong Kong). The IPM Heading of the message shall contain four primary recipients, which are two AMHS users and two AFTN users, and the IPM shall be set with originator-report-request with abstract-value "report".

From VTBBMHSA send the following message to:

Primary Recipients: VHHHMHSA VHHHMHSB VHHHFTNA VHHHFTNB
PRI: FF
FT: <FT>
TEST DR
(followed by 3 lines of text)

STEP 2: Verify that the users, whose address have been included in the IPM, receives the message correctly.

STEP 3: Verify that delivery reports for the AMHS and AFTN recipients are generated by the receiving MTA and MTCU to the originator of the IPM.

SET 6: IPM sent from AMHS-B (Hong Kong) contains four primary recipients (two AMHS users and two AFTN users)
STEP 1: From AMHS-B (Hong Kong) send an ATS message (IPM), addressing AMHS and AFTN users, at the receiving AMHS-A (Bangkok). The IPM Heading of the message shall contain four primary recipients, which are two AMHS users and two AFTN users, and the IPM shall be set with originator-report-request with abstract-value "report".

From VHHHMHSA send the following message to:

Primary Recipients: VTBBMHSA VTBBMHSB VTBBFTNA VTBBFTNB
PRI: FF
FT: <FT>
TEST DR
(followed by 3 lines of text)

STEP 2: Verify that the users, whose address have been included in the IPM, receives the message correctly.

STEP 3: Verify that delivery reports for the AMHS and AFTN recipients are generated by the receiving MTA and MTCU to the originator of the IPM.

EXPECTED RESULTS:
SET 1,2,3,4,5,6:
STEP 1: An ATS message (IPM) is sent from the sending AMHS to the receiving AMHS, addressing either AMHS or AFTN user or both.
STEP 2: All users, whose addresses have been included in the IPM, receive the messages correctly.
STEP 3: Delivery report(s) for AMHS recipient(s) and/or AFTN recipient(s) are generated by the receiving MTA or MTCU to the originator of the IPM.

SET 1: OK	**SET 2: OK**	**SET3: OK**	**SET 4: OK**	**SET 5: OK**	**SET 6: OK**

COMMENTS: