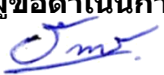

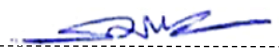
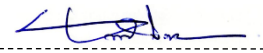


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**INTERNATIONAL CIVIL AVIATION ORGANIZATION**



**ASIA PACIFIC  
ROBEX HANDBOOK**

**Fourteenth Edition — March 2022**

**Prepared by the ICAO Asia and Pacific Office  
and Published under the Authority of the Secretary General**

## RECORD OF AMENDMENTS AND CORRIGENDA

<b>Amendments</b>			
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## Acronyms and Abbreviations

ACC	Area Control Centre
ADMIN	Administrative message
AFI	Africa-Indian Ocean Region
AFS	Aeronautical Fixed Service
AFTN	Aeronautical Fixed Telecommunication Network
AIREP	Air-report
AMHS	ATS Message Handling System
AMO	Aerodrome Meteorological Office
AMS	Aeronautical Meteorological Station
ANP	Air Navigation Plan
AOP	Aerodrome Operations
APAC	Asia Pacific Region
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ARS	Special Air-report indicator
ASIA	Asia Region
ASIA/PACIFIC	Asia and Pacific Regions
ATM	Air Traffic Management
ATS	Air Traffic Services
COM	Communications
CTA	Control Area
eDocuments	Electronic Documents
EUR	European Region
FASID	Facilities And Services Implementation Document
FIR	Flight Information Region
GML	Geography Mark-up Language
HF	High Frequency
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IROG	Inter-regional OPMET Gateway
IWXXM	ICAO Meteorological Information Exchange Model
METAR	Aerodrome Routine Meteorological Report
MET/IE WG	Meteorological Information Exchange Working Group
MID	Middle East Region
MWO	Meteorological Watch Office
NOC	National OPMET Centre
OPMET	Operational Meteorological Information
PAC	Pacific Region
PIRG	Planning and Implementation Regional Group

ROBEX	Regional OPMET Bulletin Exchange
ROC	Regional OPMET Centre
RODB	Regional OPMET Data Banks
SADIS	Secure Aviation Data Information Service
SAM	South American Region
SIGMET	Significant Meteorological Information
SPECI	Aerodrome Special Meteorological Report
SUG	SADIS User Guide
SWX	Space Weather
SWXC	Space Weather Centre
TAC	Traditional Alphanumeric Code
TAF	Aerodrome Forecast
TC	Tropical Cyclone
TCA	Tropical Cyclone Advisory
TCAC	Tropical Cyclone Advisory Centre
VA	Volcanic Ash
VAA	Volcanic Ash Advisory
VAAC	Volcanic Ash Advisory Centre
WAFC	World Area Forecast Centre
WAFS	World Area Forecast System
WG	Working Group
WIFS	WAFS Internet File Service
WMO	World Meteorology Organization
XML	Extensible Mark-up Language

## **1. INTRODUCTION**

- 1.1 The Regional Operational Meteorological (OPMET) Bulletin Exchange (ROBEX) scheme was established by the MID/SEA COM/MET Regional Planning Group at its first meeting in Bangkok, July 1972. The scheme became operational in 1974 and has since been successfully exchanging OPMET information in the ASIA/PAC (APAC) region and inter-regionally with the AFI, EUR, MID, NAM and SAM regions.
- 1.2 The ROBEX scheme was intended initially only for METAR exchange; AIREP and TAF exchanges were added to the scheme at a later stage. The operation of the ROBEX scheme included exchange of OPMET bulletins between the originating tributary offices and the bulletin compiling centres, which, according to their functions and responsibilities, were classified as Main Collection Centres or Sub-collection Centres, or TAF Collection Centres. The operational exchange has been carried out according to agreed transmission schedules; the bulletin contents were specified in the ROBEX Handbook.
- 1.3 Based on COM facilities of very limited capacity in the early seventies, the ROBEX scheme was strictly planned to accommodate only those OPMET exchanges considered vital for the flight operations. Over the years, the COM facilities have improved considerably and the ROBEX scheme has developed accordingly. The ROBEX Handbook is dynamic in nature in that it is updated regularly to reflect current communications (COM) facilities and the requirements of users for OPMET.
- 1.4 The ROBEX Handbook is the main guidance material providing detail on the procedures for OPMET exchange under the ROBEX scheme. The Handbook defines the responsibilities of the Regional OPMET Centres (ROCs) and the procedures to be followed. It also defines the content and format of the ROBEX bulletins.
- 1.5 The ROBEX Handbook is published and kept up-to-date by the ICAO APAC Office (Bangkok).
- 1.6 Although the ROBEX Handbook primarily covers the exchange of OPMET in the ASIA/PAC Region, it also provides information on the exchange of OPMET inter-regionally as agreed with the other regions.

## **2. ROBEX SCHEME – GENERAL**

### **2.1 Objective**

- 2.1.1 The main purpose of the Regional Operational Meteorological Bulletin Exchange (ROBEX) Scheme is to ensure the;
- a) Most efficient exchange of OPMET information within APAC and with the other ICAO regions to meet the requirements of the users of OPMET information; and



- b) Implementation of the OPMET-related SARPs in *Annex 3* and *Annex 10*, and the relevant provisions of the APAC Air Navigation Plan (ANP) in a highly efficient and standardized way.

## 2.2 Structure

- 2.2.1 The above objective is achieved by implementing a number of Regional OPMET Centres (ROC), Regional OPMET Data Banks (RODB), and Inter-regional OPMET Gateways (IROG). All these operational units form the ROBEX scheme. In order to ensure seamless global exchange of the required OPMET information, the ROBEX scheme is consistent with similar schemes in the other ICAO regions, as well as with the AFS distribution systems used to disseminate OPMET data.

## 2.3 Purpose

- 2.3.1 The ROBEX scheme produces and delivers to the aviation users the required OPMET information in the form of predefined bulletins. The scheme should handle all types of OPMET information in the Traditional Alphanumeric Code (TAC) and the new ICAO Meteorological Exchange (IWXXM) form and should provide facilities and services for scheduled and non-scheduled delivery of OPMET information to the users.

## 2.4 Introduction of IWXXM Exchange

- 2.4.1 ICAO Annex 3 Amendments 76, 77 and 78 provide the first steps to the transition of Traditional Alphanumeric Code (TAC) formatted OPMET data towards XML formatted data in compliance with the ICAO Meteorological Information Exchange Model (IWXXM).

**Amendment 76** (14 November 2013) enabled the bilateral exchange of XML data for those States in a position to do so.

**Amendment 77** (10 November 2016) enables the international exchange of XML-formatted METAR/SPECI, TAF, AIRMET and SIGMET, VAA and TCA.

**Amendment 78** (8 November 2018) will require the international exchange of XML-formatted METAR/SPECI, TAF, AIRMET and SIGMET, VAA and TCA to be raised to a standard, although the provisions relating specifically to IWXXM will not become applicable until 5 November 2020.

- 2.4.2 The phased transition of TAC OPMET data to IWXXM OPMET data is to be considered as a first step towards the ICAO System Wide Information Management (SWIM) concept.
- 2.4.3 This edition of the Handbook focuses largely on the exchange of OPMET in TAC form because all States currently have the ability to send and receive OPMET in TAC form. Only a limited number of States have developed the capability to send and receive OPMET in IWXXM. In addition, AMHS with FTBP has yet to be implemented in a number of APAC States. It should be noted that AFTN cannot be used to disseminate IWXXM coded OPMET. However, some information on the exchange of OPMET in IWXXM is provided in this Handbook, but detailed information on IWXXM, and the

transition from TAC to IWXXM, is provided in the document *Guidelines for the Implementation of OPMET Data Exchange using IWXXM* available on the APAC website in the MET section under APAC eDocuments (<https://www.icao.int/APAC/Pages/edocs.aspx>).

- 2.4.4 To facilitate OPMET Data Exchange using IWXXM in the APAC region, the Meteorology Sub-Group (MET SG) of APANPIRG decided to include in this handbook the following link to the online register of the status of IWXXM exchange in the APAC Region [MET SG/24, Decision MET SG/24-15 and Conclusion MET SG/24-12, refer]:

[Online Register of APAC IWXXM Exchange Status](#)

[<https://docs.google.com/spreadsheets/d/1WEcGfMRZq2dgHsfdpFhiefJEcA8OeMhfbCJHTqA7NX0/edit#gid=0>]

## 2.5 Management

- 2.5.1 Monitoring of the OPMET exchange under the ROBEX scheme and planning for improvements and preparation of proposals for any changes of the scheme that may become necessary are carried out by the ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG). In order to achieve these tasks, the ROBEX implementation status and planning is part of the agenda of the MET sub-groups of APANPIRG, and in particular, the MET Information Exchange (MET/IE) Working Group (WG).

- 2.5.2 Any proposals for amendments to the ROBEX scheme, which States or international organizations concerned consider necessary, due to changes in the operational requirements for OPMET data or to developments of the AFS system, are normally forwarded for consideration to the ICAO Asia and Pacific Office, Bangkok.

## 2.6 Requests for OPMET (Request and Reply)

- 2.6.1 The RODBs provide a request and reply facility to allow users to request OPMET on a non-regular or occasional basis. This is not intended for routine requests, which should be arranged through the implementation of a predetermined regular OPMET exchange.

- 2.6.2 Guidance on the interrogation procedures for access to the designated RODBs in the ASIA/PAC Region to request OPMET is provided in [Appendix H](#).

## 3. OPMET INFORMATION AND OPMET EXCHANGE

### 3.1 OPMET data types

- 3.1.1 The following OPMET data types should be handled by the ROBEX scheme:

Data type	Abbreviated name	WMO data type designator	
		TAC	IWXXM
Aerodrome reports	METAR	SA	LA
	SPECI	SP	LP

Data type	Abbreviated name	WMO data type designator	
		TAC	IWXXM
Aerodrome forecasts	TAF: 12 to 30 hour	FT	LT
SIGMET information	SIGMET	WS	LS
	SIGMET for TC	WC	LY
	SIGMET for VA	WV	LV
AIRMET information	AIRMET	WA	LW
Volcanic Ash and Tropical Cyclone Advisories	Volcanic Ash Advisory	FV	LU
	Tropical Cyclone Advisory	FK	LK
Air-reports	AIREP SPECIAL (ARS)	UA	N/A
Space Weather Advisory	SWX ADVISORY	FN	LN
Administrative	METNO	NO	N/A

*Note: IATA TAF requirements in the ASIA/PAC region are for TAF validity of either 24 or 30 hours. Some States issue 12- and 18-hour TAF, which don't meet IATA requirements, but are nevertheless classified as FT for the WMO data type designator.*

### 3.2 OPMET bulletins

3.2.1 The exchange of OPMET data is carried out through bulletins containing one or more meteorological messages (METAR, SPECI, TAF or other OPMET information). An OPMET bulletin contains messages of the same type.

3.2.2 The format of OPMET bulletins is determined by:

*ICAO Annex 10, Aeronautical telecommunications* - AFTN envelope of the bulletin;

*WMO-No.386, WMO Manual on the Global telecommunication System* - WMO abbreviated heading of the bulletin;

*ICAO Annex 3 and WMO-No.306, Manual on Codes* - format and coding of the information included in the bulletin.

### 3.3 Types of OPMET exchange

#### 3.3.1 Regional exchange – ROBEX scheme

3.3.1.1 The ROBEX scheme covers the exchange of OPMET information within the APAC region and to and from adjacent ICAO regions. It includes several types of exchanges as described below:

3.3.1.1.1 *Regular exchange* is a scheduled exchange that encompasses the collection of messages from the originating stations, compiling of bulletins and their dissemination according to predetermined distribution schemes. The collection and distribution are carried out at fixed times, and the bulletin content is defined in this Handbook.

3.3.1.1.2 *Non-regular exchange*

The RODBs store OPMET data and make this available on request. The procedure for requesting OPMET is provided in [Appendix H](#).

3.3.2 ***Inter-regional OPMET exchange***

3.3.2.1 Exchange of OPMET data between the APAC region and the other ICAO regions is carried out via designated centres, which serve as Inter-regional OPMET Gateways (IROG). An IROG is set up for sending and receiving specified OPMET data between the APAC region and other ICAO regions.

3.3.2.2 Inter-regional OPMET exchange via IROGs is carried out through the ground segment of the AFS (AFTN/AMHS).

3.3.3 ***Exchange of OPMET information through the Internet.***

3.3.3.1 All APAC OPMET data handled by the ROBEX scheme is relayed to the SADIS and WIFS Service Providers, allowing users to retrieve the data via SADIS and WIFS.

3.3.4 ***Other OPMET exchanges***

3.3.4.1 Where OPMET exchanges described in the above paragraphs are not sufficient, direct AFTN/AMHS addressing can be utilized by the originating centres or NOCs.

**4. THE COMPOSITION OF ROBEX**

4.1 The ROBEX scheme involves a number of aeronautical meteorological stations, aeronautical telecommunication stations, aerodrome meteorological offices and other operational units. The following operational units are considered to be components of the ROBEX scheme:

4.1.1 ***Originating station*** – an aeronautical meteorological station, aerodrome meteorological office, forecasting office, MWO, TCAC, or a VAAC. The duties and responsibilities of these originating stations are defined by the State’s meteorological authority.

4.1.2 ***National OPMET centre (NOC)***. Normally, a NOC is associated with the State’s national AFTN/AMHS COM centre. The role of the NOC is to collect all OPMET messages generated by the originating stations in the State and to send them to the responsible ROBEX bulletin-compiling centre (ROC). Some NOCs also serve as ROCs. National regulations should be developed to ensure that NOCs disseminate the international OPMET data within their own State, as necessary.

4.1.3 Regional OPMET Centre (ROC).

4.1.3.1 ROCs are responsible for the collection of OPMET messages from the originating stations or NOCs in their area of responsibility and for compiling these messages into ROBEX bulletins. *Tables A and B of the ROBEX Handbook* define the areas of responsibility (or collection areas) of the ROCs for METAR/SPECI and TAF.

4.1.3.2 The ROCs are responsible for the dissemination of bulletins compiled by them to:

- Other ROCs, according to predefined distribution lists, specific for each bulletin;
- APAC RODBs;
- NOCs or other COM or MET offices in the States in their area of responsibilities, as agreed between the ROC and the States' authorities concerned.

#### 4.1.4 **Regional OPMET Data Banks (RODB)**

4.1.4.1 Five centres have been designated by APANPIRG to serve as Regional OPMET Data Banks (Bangkok, Brisbane, Nadi, Singapore and Tokyo).

4.1.4.2 The **main responsibilities** of the RODBs are defined as follows:

- To support the ROBEX Scheme and to facilitate a regular exchange of OPMET information based on predetermined distribution within the APAC Region; and
- To provide facilities for request/response type of access to the stored OPMET data for users to obtain non-regular or occasional information.

*Note 1: The interrogation procedures applicable to the OPMET data banks and catalogues are provided in [Appendix H](#).*

*Note 2: Responsibilities of RODBs are given in 4.1.4.2, 10.2, 10.3 and 12.3*

4.1.5 **Inter-regional OPMET Gateways (IROG).** The Inter-regional OPMET Gateways in the APAC Region are the designated RODBs. Each RODB is assigned responsibility for the exchange of OPMET information with other ICAO Regions. The responsibilities of the IROGs are shown in 11.1 of this Handbook.

4.1.6 **Support to SADIS and WIFS.** The IROGs should facilitate the global exchange of OPMET data carried out through SADIS and WIFS. In order to achieve this, close liaison should be maintained between the IROGs and the corresponding SADIS and WIFS gateways. Availability of APAC data on SADIS and WIFS should be monitored, and any systematic shortfalls of data identified should be reported to the relevant ICAO regional office.

4.2 The overall structure of the ROBEX scheme is presented in [Appendix G](#).

## 5. COMMUNICATIONS - GENERAL

### 5.1 Exchange of OPMET

5.1.1 According to *Annex 3, Chapter 11, 11.1.9*, the telecommunications facilities used for the exchange of OPMET should be the aeronautical fixed service (AFS) or, for the exchange of non-time-critical OPMET, the public internet,

subject to availability, satisfactory operation and bilateral/multilateral and/or regional air navigation agreement.

*Note 1: Aeronautical fixed service Internet-based services, operated by the World Area Forecast Centres (WAFAC), support the global exchanges of OPMET.*

*Note 2: Guidance material on non-time-critical OPMET and relevant aspects of the public Internet is provided in the Guidelines on the Use of the Public Internet for Aeronautical Applications (Doc 9855).*

## 5.2 Use of AFTN/AMHS

5.2.1 The AFTN is used for the exchange of OPMET in TAC form, and AMHS is used for the exchange in IWXXM form. It is to be noted that IWXXM cannot be exchanged over the AFTN due to the character set included in IWXXM. When AMHS is used, this must be either AMHS Extended or AMHS with File Transfer Body Part (FTBP).

5.2.2 AFTN/AMHS circuits are used for the collection of OPMET messages by the ROCs, and for regional and inter-regional exchanges of OPMET bulletins. However, the exchanges are subject to the use of AFTN and AMHS, as noted in 5.2.1.

5.2.3 OPMET bulletins containing TAC or IWXXM formatted OPMET transmitted via AFTN/AMHS shall be encapsulated in the normal AFTN envelope (for TAC) and for IWXXM as described in the *Guidelines for the Implementation of OPMET Data Exchange using IWXXM* available at <https://www.icao.int/APAC/Pages/edocs.aspx>.

5.2.4 AFTN/AMHS messages and bulletins containing OPMET shall achieve transit times of less than 5 minutes unless otherwise determined by regional air navigation agreement.

5.2.5 OPMET bulletins (TAC) transmitted via AFTN shall use the following priority indicators:

FF – for SIGMET, AIREP SPECIAL, VAA, TCA and TAF AMD;

GG – for TAF, METAR and SPECI

5.2.6 For information about the transmission of OPMET bulletins (IWXXM) via AMHS, refer to the document *Guidelines for the Implementation of OPMET Data Exchange using IWXXM* available on the APAC website in the MET section under APAC eDocument (<https://www.icao.int/APAC/Pages/edocs.aspx>).

## 6. METAR/SPECI EXCHANGE

### 6.1 General

6.1.1 Routine METAR reports should be prepared for the international aerodromes listed in the *ANP, Volume I, Table AOP I-1*, and in *Volume II, Table MET II-2*. METAR should be issued hourly or half-hourly throughout the 24 hours of each day as determined by regional air navigation agreement or by agreement by individual States (refer to 6.1.2).

- 6.1.2 METAR from all international aerodromes (referred to as AOP aerodromes) listed in the Tables referred to in 6.1.1 should be included in the regular ROBEX exchange. This also includes METAR from a number of domestic aerodromes, required by the users as alternate aerodromes (referred to as non-AOP aerodromes), and should be included in the regular ROBEX exchange, if so agreed by the States concerned.

*Note: When OPMET data from non-AOP aerodromes is required by users, the corresponding State is consulted on its agreement to provide the additional information.*

- 6.1.3 A description of the ASIA/PAC METAR bulletins provided in the regular ROBEX exchange, including the responsible compiling ROC, WMO bulletin identification, list of aerodromes, observation times and AFTN distribution, is given in [Appendix A](#).
- 6.1.4 SPECI reports are included in separate bulletins and should be disseminated in the same way as the METAR reports originated by the same aerodromes. It should be noted that METAR and SPECI reports are not to be included together in a bulletin.
- 6.1.5 The exchange of METAR/SPECI messages outside the ROBEX scheme, if necessary, should be carried out by direct AFTN/AMHS addressed messages.

## 6.2 Responsibilities of originating stations and NOCs

- 6.2.1 The originating stations (aeronautical meteorological stations) and/or NOCs should prepare METAR messages for the observation times indicated in [Appendix A](#) and send them to their responsible ROC.
- 6.2.2 SPECI should be prepared between the regular observation times, following the requirements set out in Annex 3, and sent with no delay to the responsible ROC.
- 6.2.3 In preparing METAR and SPECI messages, the originating stations should follow the specifications for METAR and SPECI in Annex 3 (Chapter 4 and Appendix 3 including the template in Table A3-2) and the WMO METAR and SPECI code forms (FM 15-XII METAR and FM 16-XII SPECI, WMO – No. 306, Manual on Codes, Volume I.1, Part A – Alphanumeric Codes) strictly.
- 7.2.3 METAR messages should be sent to the responsible ROC before the cut-off time specified by the ROC to allow for timely compilation of the METAR bulletin. If, for some reason, a METAR message has not been sent before the cut-off time, the originating station/NOC should send it as soon as possible after that, as a delayed message. The originating stations/NOCs should follow strictly the schedules specified for METAR messages and keep to a minimum the number of delayed messages.
- 8.2.3 METAR and SPECI messages should be quality controlled by the originating stations/NOCs. When necessary, a corrected message should be sent immediately after an error in an already transmitted message has been identified.

*Note: Procedures applying to the corrected and delayed messages are given in [Appendix D](#).*

### **6.3 ROCs – METAR and SPECI Responsibilities**

- 6.3.1 ROCs should collect METAR messages from the aerodromes in their area of responsibility and compile METAR bulletins, according to [Appendix A](#). The content of bulletins and the order of stations in each bulletin should be kept fixed until a bulletin change is requested and coordinated according to the established procedure.
- 6.3.2 ROCs should determine a cut-off time for the reception of METAR from the stations in their area of responsibility. At the cut-off time, the ROC should compile METAR bulletin(s) containing all prescribed aerodromes, indicating any missing METAR with “NIL”.
- 6.3.3 At scheduled transmission times, ROCs should transmit the compiled METAR bulletins to other ROCs and RODBs according to the distribution lists specified for each METAR bulletin in [Appendix A](#). METAR bulletins should be filed for transmission, not later than 5 minutes after the observation time.
- 6.3.4 ROCs should transmit the METAR bulletins compiled by them, as well as bulletins received from other ROCs, as necessary, to the NOCs and/or other offices in the States in their area of responsibility, as agreed between the ROC and the meteorological authorities of the States concerned.
- 6.3.5 A SPECI, when received by a ROC, should be sent as a SPECI bulletin to the same addresses to which METAR from the issuing aerodrome are sent. Normally, a SPECI bulletin should contain a single SPECI and must not be included in any METAR bulletin.
- 6.3.6 The WMO heading of a SPECI bulletin should be constructed in the same way as the WMO heading of the METAR bulletin, which contains the aerodrome, for which the SPECI is issued, by using SP data type designator instead of SA.
- 6.3.7 A METAR message received by the ROC after the scheduled transmission of the corresponding bulletin is a delayed METAR. The ROC should send a delayed bulletin as soon as one or more delayed messages are received or at specified times after the scheduled bulletin time (e.g., the first delayed bulletin (RRA) issued 10 minutes after the regular time; the second delayed bulletin (RRB) issued 20 minutes after the regular time, etc.).
- 6.3.8 As soon as a corrected METAR or SPECI message is received from a station, the ROC should transmit it as a corrected bulletin to all recipients.

### **6.4 METAR Bulletins in TAC - Format and Content**

- 6.4.1 Each METAR message in a METAR bulletin should start with the code word METAR followed by the ICAO location indicator (CCCC) of the aerodrome and the date/time group (YYGGggZ), indicating the official time of observation. Corrected METAR messages should start with METAR COR.
- 6.4.2 The following is an example of the format to be applied in preparing a METAR bulletin by the ROCs:



<b>Parts of Message</b>	<b>ROBEX SA Bulletin</b>
<i>AFTN header</i>	
Priority Indicator and Address Date and Time of filing and Originator	GG VTBBYPYX 271304 ZBBBYPYX
<b>WMO Abbreviated Heading</b>	SACI31 ZBBB 271300
<b>METAR messages</b>	METAR ZBAA 271300Z ..... = METAR ZBTJ 271300Z ..... =
<b>AFTN Normal Ending</b>	NNNN

*Note: The inclusion of the code name METAR in front of each message in the METAR bulletin is mandatory.*

6.4.3 The rules related to the use of the BBB group in the WMO abbreviated heading, with regard to delayed or corrected bulletins, are given in [Appendix D](#).

6.4.4 For METARs, which are not available at the time of compilation of the bulletin, the word NIL should be inserted following the date/time group indicating the time of the observation.

*Example: METAR ZBTJ 271200Z NIL=*

## 6.5 SPECI Bulletins in TAC - Format and Content

6.5.1 A SPECI message included in a SPECI bulletin should start with the code word SPECI followed by the ICAO location indicator (CCCC) of the aerodrome and a date/time group (YYGGggZ) indicating the time of the observation of the meteorological conditions for which the SPECI is issued. Corrected SPECI messages should start with SPECI COR.

6.5.2 The following is an example of the format to be applied in preparing a SPECI bulletin by the ROC:

<b>Parts of Message</b>	<b>ROBEX SP Bulletin</b>
<i>AFTN header</i>	
Priority Indicator and Address Date and Time of filing and Originator	GG VTBBYPYX 081647 ZBBBYPYX
<b>WMO Abbreviated Heading</b>	SPCI31 ZBBB 081645
<b>SPECI message</b>	SPECI ZBAA 081645Z ..... =
<b>AFTN Normal Ending</b>	NNNN

## 6.6 METAR and SPECI Bulletins in IWXXM - Format and Content

- 6.6.1 Refer to the document *Guidelines for the Implementation of OPMET Data Exchange using IWXXM* available on the APAC website in the MET section under APAC eDocuments (<https://www.icao.int/APAC/Pages/edocs.aspx>).

## 7. TAF EXCHANGE

### 7.1 General

- 7.1.1 Aerodrome forecast (TAF) should be prepared by the aerodrome meteorological offices (AMO) or other meteorological offices, designated for the provision of TAF by the State's meteorological authority, for all international aerodromes, for which TAF is required (refer to the *ANP, Volume II, Table MET II-2*).

- 7.1.2 All TAFs required should be included in the regular ROBEX exchange. In addition, TAFs from a number of domestic aerodromes required by the users as alternate aerodromes should also be included in the regular ROBEX exchange, if so agreed by the States concerned.

*Note: Airline users require that TAF for all international aerodromes listed in the ANP, Volume I, Table AOP I-1, and in Volume II, Table MET II-2, should be available through regular exchange and through the Internet distribution systems SADIS and WIFS.*

- 7.1.3 TAF exchanges not covered by the ROBEX Scheme, but required operationally, should be met by means of direct addressed AFTN/AMHS messages.

- 7.1.4 The requirements for the exchange of 24 or 30-hour TAFs are listed in the *ANP, Volume II, Table MET II-2*.

### 7.2 Aerodrome meteorological offices (AMO) and NOCs responsibilities

- 7.2.1 Originating AMOs (or other designated forecasting offices) should prepare the required TAF messages for the periods of validity indicated in [Appendix B](#). TAFs from international aerodromes shall not be issued earlier than one hour prior to the beginning of its validity period. TAFs are to be sent by the AMOs or NOCs to the responsible ROC before the cut-off time determined by the centre, e.g., 5 minutes before the filing/transmission times specified in [Appendix B](#).

- 7.2.2 Aerodrome meteorological offices in preparing TAF should follow the template for TAF in *Annex 3, Appendix 5* and the WMO TAF code form (*FM 51-XII TAF, WMO – No. 306, Manual on Codes, Volume I.1, Part A – Alphanumeric Codes*).

- 7.2.3 The originating AMOs should monitor TAFs, and amended TAF (TAF AMD) should be issued according to the established criteria. Amended TAFs should be sent by the originating station to the responsible ROC with no delay. The optional group BBB should be used in the WMO abbreviated heading to indicate amended TAF in accordance with [Appendix D](#).

- 7.2.4 TAF messages should be quality controlled by the originating meteorological offices, and, when necessary, a corrected TAF (TAF COR) should be sent

immediately after an error in an already transmitted message has been identified.

### 7.3 ROCs – TAF Responsibilities

- 7.3.1 ROCs should collect TAFs from the AMOs and/or NOCs in their area of responsibility and compile TAF Bulletins according to [Appendix B](#). The areas of responsibility, as far as practicable, should group together aerodromes and their alternates. ROCs should ensure that TAFs in a single bulletin have common periods of validity.
- 7.3.2 If necessary, ROCs should prepare two or more separate TAF bulletins using different “ii” values (e.g., “31” and “32”) in the WMO heading. The content of the ROBEX TAF bulletins is specified in [Appendix B](#).
- 7.3.3 ROCs should establish a cut-off time for reception of TAFs from AMOs and/or NOCs in their area of responsibility, e.g., 5 minutes before the filing/transmission times specified in [Appendix B](#). At the cut-off time, ROCs should compile TAF bulletin(s) containing all prescribed aerodromes, indicating any missing TAF with “NIL”.
- 7.3.4 The filing/transmission times specified in [Appendix B](#) ensure the OPMET information is available to the users twenty-five (25) minutes prior to the beginning of the TAF validity period.
- 7.3.5 ROCs should transmit the compiled TAF bulletins, to other ROCs and the RODBs according to the distribution lists as specified for each TAF bulletin in [Appendix B](#).
- 7.3.6 ROCs should transmit the TAF bulletins compiled by them, as well as TAF bulletins received from other ROCs, as necessary, to the NOCs and/or other offices in the States in their area of responsibility, as agreed between the ROC and the meteorological authorities of the States concerned.
- 7.3.7 A TAF message received by a ROC after the scheduled transmission of the corresponding bulletin is a delayed TAF. The ROC should send a delayed TAF bulletin as soon as one or more delayed messages are received or at specified times after the scheduled bulletin time. The optional BBB group should be used in the WMO bulletin heading accordingly.
- 7.3.8 Amended TAF (TAF AMD) received from an AMO or NOC should be distributed with no delay as an amended TAF bulletin to all recipients in the distribution list for the TAF bulletin to which the originating aerodrome belongs. The optional BBB group should be used in the WMO bulletin heading accordingly.

### 7.4 TAF Bulletins in TAC - Format and Content

- 7.4.1 Issuance and period of validity
- 7.4.1.1 24- and 30-hour TAFs should be issued at intervals of six hours, with the period of validity beginning at one of the main synoptic hours (00, 06, 12, 18 UTC), as shown in the table below.

- 7.4.1.2 All TAFs in a ROBEX TAF bulletin should have a common period of validity. It is not permitted to mix TAF with different periods of validity in one bulletin.

Synoptic hours (UTC)	24-hour TAF		30-hour TAF	
	Period of validity	Filing time (not prior to)	Period of validity	Filing time (not prior to)
00	00-00	23 (-1)*	00-06 (+1)	23 (-1)
06	06-06	05	06-12 (+1)	05
12	12-12	11	12-18 (+1)	11
18	18-18	17	18-00 (+1)	17

\*Note: “-1” indicates the previous day and “+1” indicates the next day

- 7.4.2 Each TAF message in a TAF bulletin should start with the code word TAF followed by the ICAO location indicator (CCCC) of the aerodrome and the date/time group (YYGGggZ) indicating the official time of issuance. Corrected TAF messages should start with TAF COR. Amended forecasts should start with TAF AMD.
- 7.4.3 The use of the BBB group in the WMO heading for delayed, corrected, or amended TAFs is described in [Appendix D](#).
- 7.4.4 The following is an outline of the format to be applied by a ROC in preparing a TAF TAC bulletin containing FT TAFs (24- or 30-hour) :

Parts of Message	ROBEX FT Bulletin
<i>AFTN header</i>	
Priority Indicator and Address	GG YBBBYPYX
Date and Time of filing and Originator	271104 ZBBBYPYX
<i>WMO Abbreviated Heading</i>	FTCI31 ZBBB 271100
<i>TAF messages</i>	TAF ZBAA 271100Z 2712/2812.....= TAF ZBTJ 271100Z 2712/2812.....=
<i>AFTN Normal Ending</i>	NNNN

- 7.4.5 A missing TAF in a TAF bulletin should be indicated with “NIL”, as shown in the following example:

TAF VTBD 281000Z NIL=

- 7.4.6 A cancelled TAF in a TAF bulletin should be indicated with “CNL”, as shown in the following example:

TAF VTBD 281100Z 2812/2912 CNL=

**7.5 TAF Bulletins in IWXXM - Format and Content**

7.5.1 Refer to the document *Guidelines for the Implementation of OPMET Data Exchange using IWXXM* available on the APAC website in the MET section under APAC eDocuments (<https://www.icao.int/APAC/Pages/edocs.aspx>).

**7.6 Summary of OPMET data issuance**

7.6.1 A summary of correct methods of issuing OPMET data is provided in the following two tables:

**METAR observation, compiling and filing**

Function	Responsible Entity	Explanation of Time	Time of task (min)
METAR Observation	Originating stations (AMS, AMO, forecast office)	The State determines how often and when, e.g., 30 minutes past the hour 24/7. Examples: H+00, H+30 <i>Note that the observation time is used in the METAR report</i>	0
Send METAR observation to NOC	Originating station		<5
Send METAR observations to ROC	NOC		
Bulletin compiling and filing	ROC	Up to 5 minutes after the actual time of observation <i>Note 1: The observation time of the METAR is used in the DTG – YYGGgg of the bulletin header.</i> <i>Note 2: The filing time is used in the AFTN header and should be up to 5 minutes after the observation time given in the bulletin header, also referred to as the WMO Abbreviated Heading.</i>	
Send METAR bulletin to: ROCs (predefined distribution list) RODBs NOCs Other MET offices	ROC <i>via AFTN or AMHS</i>	Less than 5 minutes	<5
Acceptable time from observation at originating stations to reception by the user			<10

**TAF issuance, compiling and filing**

Function	Responsible Entity	Explanation of Time	Time of task (min)
TAF Issuance	AMO or NOC	<p>The State determines the time of the beginning of the validity period for four (4) scheduled TAFs each day, i.e. 00, 06, 12, 18Z.</p> <p><i>Note: That issuance time of TAF (which is not earlier than one hour prior to the beginning of its validity period) is used in the date/time group (DTG) (YYGGggZ) of TAF messages).</i></p> <p>TAF is sent to ROC before the cut-off time of accepting TAF for filing as indicated in <a href="#">Appendix B</a> (typically 5 minutes before filing).</p>	Allow enough time to reach ROC before the cut-off time
Bulletin compiling and filing	ROC	<p>Bulletins are compiled during the 15 minutes before filing.</p> <p><i>Note 1: The TAF issuance time (official filing time) is used in the DTG – YYGGgg of the bulletin header</i></p> <p><i>Note 2: The <u>actual</u> filing time is used in the AFTN header and should be after the time given in the bulletin header, also referred to as the WMO Abbreviated Heading.</i></p> <p>TAF should be filed for transmission not earlier than one hour prior to the beginning of their validity period.</p>	<15
Send TAF bulletin to: ROCs (predefined distribution list) RODBs NOCs Other MET offices	ROC <i>via AFTN or AMHS</i>	In less than 5 minutes	<5
Acceptable time for ROC compiling and filing to reception by the user			<5

## 8. EXCHANGE OF SIGMET, TCA and VAA

8.1 SIGMET should be prepared by the meteorological watch offices (MWO) designated by the State’s meteorological authority. The MWOs and their areas of responsibility are given in *ANP, Volume II, Table MET II-1*.

8.2 SIGMET messages should be distributed to all RODBs within the Region, who should also make the SIGMET messages available on request. In order to facilitate that, the originating MWOs should use the WMO headings given in the *ASIA/PAC Regional SIGMET Guide, Appendix D* for their SIGMET bulletins

*Note: The required distribution of SIGMET to MWOs and ACCs in the adjacent FIRs described in the ASIA/PAC Regional SIGMET Guide is not part of the ROBEX exchange and should be arranged by the States outside the ROBEX scheme.*

8.3 SIGMET messages should be distributed to other ICAO regions and made available for redistribution through SADIS and WIFS. This distribution should be carried out through the relevant IROGs.

8.4 Detailed information on the format of the SIGMET messages is provided in the *ASIA/PAC Regional SIGMET Guide*.

8.5 Tropical cyclone advisories (TCA) and volcanic ash advisories (VAA) should be issued by the designated tropical cyclone and volcanic ash advisory centres (TCAC and VAAC), as indicated in *FASID Table MET 3A and MET 3B*.

8.6 The TCACs and VAACs should send their advisories to the APAC RODBs. The RODBs should make TCAs and VAAs messages available on request. In order to facilitate that, the originating TCACs and VAACs should use the WMO headings given in the *ASIA/PAC Regional SIGMET Guide, Appendix D*.

8.7 VAA and TCA messages should be distributed to other ICAO regions and made available for redistribution through SADIS and WIFS. This distribution should be carried out either directly by the VAACs and TCACs or through the relevant IROGs.

## 9. DISSEMINATION OF SPACE WEATHER (SWX) ADVISORIES

### 9.1. Message Routing – Originating Region

#### Space Weather Advisory Centre (SWXC)

9.1.1. The SWXCs are the data originator. They produce the SWX Advisories in TAC form and in IWXXM form. They will send the SWX Advisories to their associated NOCs.

#### National OPMET Centre (NOC)

- 9.1.2. The role of the NOC is to gather OPMET messages, compile national data into bulletins, validate the bulletin structure and distribute them according to the regional distribution schema. As necessary, the NOC associated with the SWXC (the Originating NOC) will add the Bulletin (WMO) header and send it to all other SWXCs. The Originating NOC will also send the SWX Advisories to its associated ROC via the AFS and will distribute, or make available via agreed State briefing services, the SWX Advisories to users within its national area of responsibility (AOR).

Regional OPMET Centre (ROC)

- 9.1.3. An originating ROC is responsible for the collection of the SWX Advisories from the originating NOC and for the validation of the SWX Advisories' message format. The originating ROC will then disseminate the SWX Advisories, via AFS, to the IROGs, RODBs, and all other ROCs within its Region, and to SADIS/WIFS.

Inter-Regional OPMET Gateway (IROG)

- 9.1.4. The IROGs in the originating Regions are responsible for the collection of the SWX Advisories and dissemination of the SWX Advisories to their partner IROGs in other Regions.

9.2. **Message Routing – Receiving Region**

Inter-Regional OPMET Gateway (IROG)

- 9.2.1. The receiving IROG is responsible for the collection of the SWX Advisories and dissemination of the SWX Advisories to its associated ROCs and RODBs in its Region.

Regional OPMET Centre (ROC)

- 9.2.2. A ROC will receive SWX Advisories from other Regions via its associated IROG. In turn, the ROC will distribute the SWX Advisories to all its associated NOCs.

National OPMET Centre (NOC)

- 9.2.3. The NOC will distribute the SWX Advisories, or make them available via agreed State briefing services, to users within its national area of responsibility (AOR). The distribution may be via a "Push" service (e.g. AFTN, AMHS), a "pull" service (e.g. an internet-based briefing service) or by other methods agreed to within the State.

9.3. **Data Access**

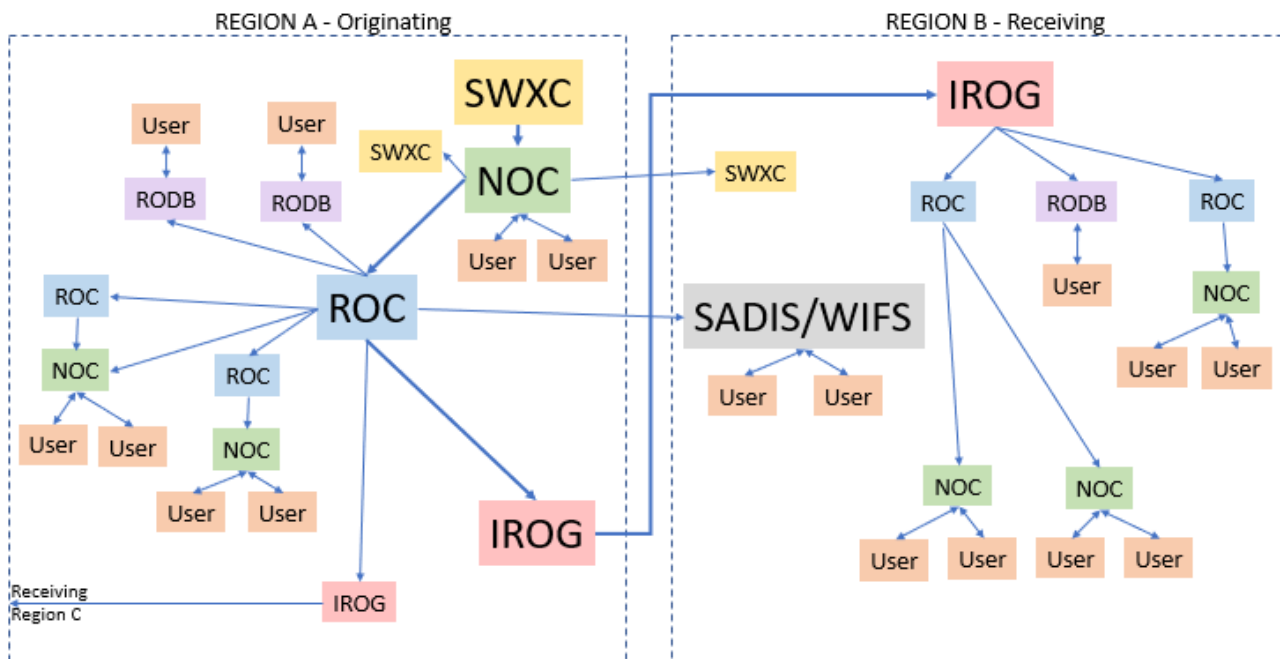
User

- 9.3.1. Users are responsible for arranging access to SWX Advisories through their associated NOC or SADIS/WIFS.

Regional OPMET Data Bank (RODB)



- 9.3.2. RODBs should provide the capability for users to interrogate information, such as SWX Advisories, through the AFS.



## 10. AIREP/AIREP SPECIAL EXCHANGE

- 10.1. Routine voice air-reports are not required and therefore are not exchanged under the ROBEX scheme (refer to *Annex 3, Appendix 4*).
- 10.2. Routine air-reports received by data-link communications should be relayed directly to the WAFCs by the ATS units.
- 10.3. Special voice air-reports received by MWOs are to be sent to WAFCs without delay.
- 10.4. Special air-reports of pre-eruption volcanic activity should also be sent to the appropriate VAAC. Special air-reports received at the meteorological watch office, which are deemed not to warrant issuance of a SIGMET, shall be disseminated in the same way as SIGMET messages.
- 10.5. When supplementary dissemination of air-reports is required to satisfy special aeronautical or meteorological requirements, such dissemination should be arranged and agreed upon between the meteorological authorities concerned.

An example AIREP SPECIAL is given below:

```
FF EGRRVANW KWBCYMYX EGZZMASI RJTDYPYX RKSIYPYX VTBBYPYX
WSZZWWBX YBBYPYX YPDNYMYX ZJSYMYX
090726 WSSSYMYX
UASR71 WSSS 090700
ARS QFA129 0328N 12831E 0639 FL380 VOLCANO DUKONO 0608-01
DRIFT OF VA SE PLUME HGT EST FL100 OR LOWER SUP INFO REPORTS
GOOD VISIBILITY=
```

**11. REGIONAL OPMET DATA BANKS (RODB)**

11.1. The ASIA/PAC Regional OPMET Data Banks and the AFTN addresses to be used for direct access to the data banks are shown below:

<b>RODB</b>	<b>AFTN ADDRESS</b>	<b>ROCs IN THE AREA OF RESPONSIBILITY</b>
Bangkok	VTBBZYX	Bangkok/VTBB Mumbai/VABB Colombo/VCCC Delhi/VIDP Karachi/OPKC Kolkata/VECC
Brisbane	YBBBYZX	Brisbane/YBBN Wellington/NZKL
Nadi	NFFNYZX	Nadi/NFFN
Singapore	WSSSYZX	Jakarta/WIII Kuala Lumpur/WMKK Singapore/WSSS
Tokyo	RJTDZYX	Beijing/ZBBB Hong Kong/VHHH Incheon/RKSI Tokyo/RJTD

**11.2. Responsibilities**

- 11.2.1. Collect OPMET bulletins from the ROCs in the area of responsibility and store them in a database.
- 11.2.2. Handle all types of OPMET bulletins, as described in 3.1.1.
- 11.2.3. Provide facilities for “request-reply” service to the authorized users.
- 11.2.4. Maintain a catalogue of bulletins and introduce changes to the bulletins when necessary according to the established procedures.
- 11.2.5. Quality-control the incoming bulletins and inform the ROCs of any discrepancies or shortfalls.
- 11.2.6. Monitor the OPMET traffic by carrying out regular tests on the availability and timeliness of the bulletins; report to the ICAO Regional Office on the results.
- 11.2.7. The interrogation procedures applicable to the designated RODBs are provided in [Appendix H](#).

- 11.2.8. Guidance on the management and quality control is provided in *Chapter 12* of this Handbook.

## 12. INTER-REGIONAL OPMET EXCHANGE

- 12.1. Inter-regional OPMET Gateways (IROGs) are designated for the purpose of exchanging OPMET data between ASIA/PAC and the other ICAO Regions, as shown in the table below.

<b>ROBEX IROG</b>	<b>For exchange of OPMET data between Regions</b>
Bangkok (VTBB)	ASIA/PAC and MID (OEJD, OBBI*) ASIA and AFI (FAPR, GOOY)
Brisbane (YBBN)	ASIA/PAC and SAM (SBBR) PAC and AFI (FAPR, GOOY)
Nadi (NFFN)	S. PAC and NAM (KWBC)
Singapore (WSSS)	ASIA/PAC and EUR (EGZZ)
Tokyo (RJTD)	ASIA/PAC and NAM (KWBC)

\* Backup to OEJD

- 12.2. IROGs arrange for relaying all ROBEX bulletins to a corresponding OPMET Gateway in the other ICAO regions concerned. In this regard, detailed OPMET exchange arrangements should be developed by each IROG based on the requirements indicated in the APAC ANP.

- 12.3. The following principles are applied to IROGs:

IROGs should;

- a) Have reliable and efficient AFTN/AMHS connection to the regions, for which they have exchange responsibilities, with adequate capacity to handle the OPMET data flow between the regions;
- b) Be associated with AFTN/AMHS relay centres capable of handling efficiently the volume of traffic anticipated; and
- c) Be capable of handling all OPMET data types, as described in 3.1.1.

- 12.4. In order to avoid duplication of the OPMET traffic and information, all inter-regional OPMET exchange should be directed through the IROGs. Inter-regional exchange via direct AFTN/AMHS addressing from the originator or ROC to recipients in the other ICAO Regions should be avoided, except when bilateral or other agreements require such direct exchanges.
- 12.5. In order to ensure the global availability of all ROBEX bulletins at the SADIS and WIFS gateways, IROG Singapore should relay all APAC bulletins to the SADIS gateway (London), and IROGs Tokyo and Nadi should relay the bulletins to the WIFS gateway (Washington).

### 13. MANAGEMENT OF OPMET EXCHANGE

#### 13.1. Changes to OPMET Bulletin Procedures

- 13.1.1. Information about changes to ROBEX bulletins should be disseminated to all ROCs, and national OPMET centres (NOC) concerned well in advance in order to allow the centres to introduce the necessary changes to their message handling systems. In this regard, a lead time of two months (or two AIRAC cycles) is considered appropriate.
- 13.1.2. The ROC planning the change should send a notification by e-mail to the ICAO Office, Bangkok, with a copy to all ROBEX Focal Points. The notification should include detailed information about the changes and the proposed time schedule. The Regional Office should inform all other ICAO Regional Offices of the changes to be introduced and the effective date of implementation.
- 13.1.3. Notification via AFTN/AMHS should be done by means of a METNO message, which is to be sent by the originating ROC to all other ROCs and to the respective IROGs in the other ICAO regions two weeks prior to the implementation date. The format of the METNO message is given in [Appendix E](#).
- 13.1.4. All requests by users for changes to ROBEX bulletins should be addressed to the ICAO Regional Office. The Regional Office should carry out the necessary coordination with the States and ROCs concerned. The duration of the coordination process should be minimized so that the period between the user request and the implementation of the change (if agreed) should normally be less than three months.

#### 13.2. Quality Management - OPMET Exchange

##### 13.2.1. Objectives and Scope

- 13.2.1.1. **Objectives:** Develop a management system that provides general guidance on procedures applied to OPMET exchange, which includes quality control aspects and introduces non-real-time monitoring for OPMET exchange.
- 13.2.1.2. **Scope:** Management of OPMET data exchange will be organized in the following sections:

<i>Quality Control</i>	<i>Data quality control applies to OPMET validation and correction during data processing and during the preparation of messages.</i>
<i>OPMET Monitoring</i>	<i>Monitor and evaluate the performance indicators for the scheduled OPMET data.</i>

### 13.2.2. **Quality Control – general requirements**

13.2.2.1. Quality control (QC) consists of the examination of OPMET data at NOCs, ROCs and RODBs to check the messages for formatting and coding errors, as well as for time and space consistency.

13.2.2.2. OPMET data should be checked in real-time or as close to it as possible, at the first point, i.e., the originator, which may be: meteorological station, aerodrome meteorological office or meteorological watch office. Errors may occur during the coding or transcription of meteorological messages by the observer or forecaster. The originating office should apply quality control procedures during data processing and preparation of messages in order to eliminate the main sources of errors.

13.2.2.3. The National OPMET centre (NOC) should apply QC procedures on the incoming messages from national sources and on the compiled national bulletins.

13.2.2.4. It is also advisable to apply QC checks at the ROC, where the ROBEX bulletins are received or compiled. If automation is available, it should be used or partly assisted by computing facilities. The principle is that every message should be checked, preferably at the various points along the data chain.

13.2.2.5. The checks that have already been performed by originating offices and ROCs are usually repeated at the OPMET data banks. Erroneous messages found by the RODB should be either rejected or corrected by reference back to the source or by the databank itself. Data corrected by the databanks should be flagged in the database for record purposes.

13.2.2.6. As a result of the quality control process described above, OPMET data of established quality will be used in the exchange and stored in the databanks. The RODBs should compile information with regard to errors that were found and compile records, such as the numbers and types of errors detected during quality control. Such non-conformities should be reported to ICAO Regional Office, Bangkok, for follow-up action.

### 13.2.3. **Quality Control Procedures**

13.2.3.1. General guidance on the quality control procedures for each type of OPMET is outlined in [Appendix F](#).

## 13.3. **OPMET Monitoring**

### 13.3.1. **Monitoring of Scheduled OPMET data**

- 13.3.1.1. The monitoring shall focus on the measurement of three performance indicators (PIs) (Compliance, Availability and Regularity indices) of the scheduled, routine METAR and TAF OPMET data (TAC - SA and FT; IWXXM – LA and LC)) exchanged in the region. The PIs are described in detail in [Appendix F](#).
- 13.3.1.2. Monitoring Reference: The monitoring shall involve the recording and analysis of data provided by the AFTN/AMHS circuit. The three PIs should be monitored against the respective ROBEX Tables.
- 13.3.1.3. Methodology: Data is monitored with reference to the procedures defined in [Appendix F](#).
- 13.3.2. **Monitoring of Non-Scheduled OPMET data**
- 13.3.2.1. Monitoring of non-routine OPMET data shall include:
- (a) TAC - TCA (FK), VAA (FV) and SIGMET (WC, WS, and WV).
  - (b) IWXXM – TCA (LK), VAA (LU), SIGMET (LY, LS, LV).
- 13.3.2.2. Monitoring of SIGMET, VAA and TCA should be performed during the scheduled regional SIGMET tests in accordance with the procedures published by the APAC Office, Bangkok.
- 13.3.2.3. Additional monitoring of SIGMET issuance may be scheduled as necessary to monitor the issuance of SIGMET in specific FIRs over specific periods when such monitoring would be useful to support the rectification of deficiencies in the provision of SIGMET services.
- 13.3.2.4. The monitoring results shall be presented in a bulletin-oriented format, one line per bulletin indicating the abbreviated header (TTAAii CCCC YGGgg), the FIR/UIR where applicable, receipt time and originator.
- 13.3.3. **Reporting OPMET monitoring results**
- 13.3.3.1. OPMET monitoring reports should provide data for all locations where OPMET is required (i.e. locations in *ANP Table MET II-1* and *Table MET II-2*) and additional locations where States have been consulted and agreed to provide this additional information.
- 13.3.3.2. OPMET monitoring reports should provide sufficient data to help States identify problems in OPMET issuance, e.g., the actual number of messages received per day at locations where OPMET monitoring identifies that the number of messages received does not meet the given percentage of the total number of messages expected.
- 13.3.3.3. Reports of the results of OPMET monitoring conducted in accordance with the guidelines in this Handbook should be presented in a format that enables ease of comparison between the reports from the various designated OPMET monitoring entities (e.g., IATA and RODBs) and ease of interpretation of the data by States and users concerned.

13.4. **ROBEX Focal Points**

- 13.4.1. In order to facilitate the exchange of information between the ROCs a system of ROBEX focal points has been developed. Contact details of the persons designated as ROBEX focal points by the relevant State's authorities are provided in [Appendix I](#).

## Appendices

### APPENDIX A - Collection and Dissemination of METAR (SA) Bulletins

#### Table A : METAR

##### Explanation of Table

- Col.1: Name and ICAO location indicator of the ROC compiling the bulletin.
- Col.2: Description of the METAR Bulletin
- Col.3: Official observation time of the bulletin
- Col.4: Time when bulletin available  
*Note: O/R indicates Bulletin available on request and NR indicates no report is available*
- Col.5: Dissemination of the bulletin to other ROCs and RODBs

- Notes: 1 *The RODB responsible for storing the bulletin is in **bold***
- 2 *Aerodromes not listed in Table AOP 1-1 indicated in italics*
- 3 *METAR included in VOLMET broadcasts are listed in APAC, ANP, VOL II, Table MET II-3, VOLMET Broadcasts*



**Table A : Collection and Dissemination of METAR (SA) Bulletins**

1		2			3	4	5		
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO		
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address	
<b>ASIA/PAC REGION</b>									
Bangkok	VTBB	SAAE31	VTBD	BANGKOK/Don Mueang Intl Airport	HH + 00		BANGKOK	VTBBYPYX	
			VTBS	BANGKOK/Suvarnabhumi Intl Airport	HH + 30			BRISBANE	YBBBYPYX
			VTBU	RAYONG/U-Taphao Intl Airport				NADI	NFFNYPYX
			VTCC	CHIANG MAI/Chiang Mai Intl. Airport				SINGAPORE	WSZZYPYM
			VTCT	CHIANG RAI/Chiang Rai Intl Airport				TOKYO	RJTDYPYX
VTSG	KRABI		Kolkata	VECCYPYX					
VTSP	PHUKET/Phuket Intl Airport		Colombo	VCCCYPYX					
VTSS	SONGKHLA/Hat Yai Intl Airport		Delhi	VIDPYPYX					
							Hong Kong	VHZZYPYX	
							Jakarta	WIZZMCMC	
							Kuala Lumpur	WMZZYPYR	
							Mumbai	VABYPYX	
							Incheon	RKSIYPYX	
		SAAE32	VDPP	PHNOM PENH	HH + 00		BANGKOK	VTBBYPYX	
			VDSR	SIEM REAP	HH + 30			BRISBANE	YBBBYPYX
			VLVT	VIENTIANE (Wattay)				NADI	NFFNYPYX
			VYMD	MANDALAY INTERNATIONAL				SINGAPORE	WSZZYPYM
			VYNT	NAYPYITAW INTERNATIONAL				TOKYO	RJTDYPYX
			VYYY	YANGON INTERNATIONAL		Collombo	VCCCYPYX		
							Delhi	VIDPYPYX	
							Hong Kong	VHZZYPYX	
							Incheon	RKSIYPYX	
							Jakarta	WIZZMCMC	
							Kolkata	VECCYPYX	
							Kuala Lumpur	WMZZYPYR	
							Mumbai	VABYPYX	
		SAAE33	VLLB	LUANG PRABANG	HH + 00	2300-1400	BANGKOK	VTBBYPYX	
			VLLN	LUANG NAMTHA				BRISBANE	YBBBYPYX
			VLPS	PAKSE				NADI	NFFNYPYX
			VLSK	SAVANNAKHET				SINGAPORE	WSZZYPYM
								TOKYO	RJTDYPYX
		SAAE34	VVCI	CAT BI	HH + 00		BANGKOK	VTBBYPYX	
			VVCR	KHANH HOA/Cam Ranh	HH + 30			NADI	NFFNYPYX
			VVCT	CAN THO				BRISBANE	YBBBYPYX
			VVDN	DA NANG				SINGAPORE	WSZZYPYM
			VVNB	HA NOI/Noi bai				TOKYO	RJTDYPYX
			VVPB	HUE/Phu Bai		Collombo	VCCCYPYX		
			VVPQ	KIEN GIANG/Phu Quoc		Delhi	VIDPYPYX		
			VVTS	HO CHI MINH/Tan Son Nhat		Hong Kong	VHZZYPYX		
						Incheon	RKSIYPYX		
						Jakarta	WIZZMCMC		
						Kolkata	VECCYPYX		
						Kuala Lumpur	WMZZYPYR		
						Mumbai	VABYPYX		
		SATH31	VTCH	MAE HONG SON	HH + 00	0000-1100	BANGKOK	VTBBYPYX	
			VTCL	LAMPANG				BRISBANE	YBBBYPYX
			VTEN	NAN				NADI	NFFNYPYX
			VTCP	PHRAE				SINGAPORE	WSZZYPYM
			VTPH	PRACHUAP KHIRI KHAN/Hua Hin				TOKYO	RJTDYPYX
			VTPO	SUKHOTHAI					

**Table A : Collection and Dissemination of METAR (SA) Bulletins**

1		2			3	4	5	
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address
			VTTP VTPB VTPM VTBO	PHITSANULOK PHETCHABUN TAK/Mae Sot TRAT/Khao Sming		2300-1400  0000-1100		
		<b>SATH32</b>	VTSB VTSC VTSE VTSF VTSM VTSR VTST	SURAT TANI NARATHIWAT CHUMPHON/Tab Gai NAKHON SI THAMMARAT SURAT THANI/Samui RANONG TRANG	HH + 00	2300-1400 0000-1100  2300-1400 2300-1400 2300-1300 0000-1100	<b>BANGKOK</b> BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYM RJTDYPYX
		<b>SATH33</b>	VTUD VTUI VTUK VTUL VTUO VTUQ VTUV VTUW VTUU	UDON THANI SAKON NAKHON/Ban Khai KHON KAEN LOEI BURI RAM NAKHON RATCHASIMA ROI ET NAKHON PHANOM UBON RATCHATHANI	HH + 00	2300-1400 2200-1500 2300-1400 2300-1200 2200-1300 2300-1400 2200-1400 0000-1400	<b>BANGKOK</b> BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYM RJTDYPYX
<b>Beijing</b>	<b>ZBBB</b>	<b>SACI31</b>	ZBAA ZBSJ ZBTJ ZBYN ZGGG ZSHC ZSPD ZSSS ZWSH ZWWW ZYTL ZYTJ	BEIJING/Capital SHIJIAZHUANG/Zhengding TIANJIN/Binhai TAIYUAN/Wusu GUANGZHOU/Baiyun HANGZHOU/Xiaoshan SHANGHAI/Pudong SHANGHAI/Hongqiao KASHI/Kashi URUMQI/Diwopu DALIAN/Zhoushuizi SHENYANG/Taoxian	HH + 00 HH + 30		<b>BANGKOK</b> BRISBANE NADI SINGAPORE <b>TOKYO</b> Hong Kong Jakarta Karachi Mumbai Incheon Ulaanbaatar	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYM RJTDYPYX VHZZYPYX WIZZMZBB OPZZYPYX VABBYPYX RKSIPYX ZMUBMYX
		<b>SACI32</b>	ZGKL ZGNN ZGOW ZGSZ ZLXY ZMCK ZMUB ZPPP ZSAM ZSFZ ZSNB ZSQD ZUUU	GUILIN/Liangjiang NANNING/Wuxu SHANTOU/Waisha SHENZHEN/Baoan XI'AN/Xianyang ULAANBAATAR / Chinggis Khaan ULAANBAATAR / Buyant-Ukhaa KUNMING/Wujiaba XIAMEN/Gaoqi FUZHOU/Changle NINGBO/Lishe QINGDAO/Liuting CHENGDU/Shuangliu	HH + 00		<b>BANGKOK</b> BRISBANE NADI SINGAPORE <b>TOKYO</b> Hong Kong Jakarta Kuala Lumpur Incheon Wellington	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYM RJTDYPYX VHZZYPYX WIZZMZBB WMZZYPYX RKSIPYX NZZZYPYX
		<b>SACI41</b>	ZBHH ZGHA ZHCC	HOHHOT/Baita CHANGSHA/Huanghua ZHENGZHOU/Xinzheng	HH + 00		<b>BANGKOK</b> BRISBANE NADI	VTBBYPYX YBBBYPYX NFFNYPYX

Table A : Collection and Dissemination of METAR (SA) Bulletins

1		2			3	4	5	
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address
			ZHHH ZJHK ZJSY ZLLL ZSNJ ZSOF ZUCK ZYCC ZYHB	WUHAN/Tianhe HAIKOU/Meilan SANYA/Phoenix LANZHOU/Zhongchuan NANJING/Lukou HEFEI/Luogang CHONGQING/Jiangbei CHANGCHUN/Longjia HARBIN/Taiping			SINGAPORE TOKYO Hong Kong Jakarta Karachi Mumbai Incheon Ulaanbaatar Wellington	WSZZYPYX RJTDYPYX VHZZYPYX WIZZMZBB OPZZYPYX VABBYPYX RKSIYPYX ZMUBMYX NZZZYPYX
Brisbane	YBBN	SAAU31	YPAD	ADELAIDE/Adelaide Intl	HH + 00		BANGKOK	VTBBYPYX
			YBBN	BRISBANE/Brisbane Intl	HH + 30		<b>BRISBANE</b>	YBBYPYX
			YBCS	CAIRNS/Cairns Intl			NADI	NFFNYPYX
			YSCB	CANBERRA			SINGAPORE	WSZZYPYX
YPDN	DARWIN/Darwin Intl			TOKYO	RJTDYPYX			
YBCG	GOLD COAST				Beijing	ZBBYPYX		
YMHB	HOBART				Hong Kong	VHZZYPYX		
YMML	MELBOURNE/Melbourne Intl				Incheon	RKSIYPYX		
YPPH	PERTH/Perth Intl				Jakarta	WIZZYPYX		
YSSY	SYDNEY/Sydney (Kingsford Smith) Intl				Manila	RPLLYPYX		
					Mumbai	VABBYPYX		
					Wellington	NZZZYPYX		
		SAAU32	YBAS	ALICE SPRINGS	HH + 00		BANGKOK	VTBBYPYX
			YMAV	AVALON	HH + 30		<b>BRISBANE</b>	YBBYPYX
			YBWW	Brisbane West Wellcamp			NADI	NFFNYPYX
			YBRM	BROOME/Broome Intl			SINGAPORE	WSZZYPYX
			YBLN	Busselton			TOKYO	RJTDYPYX
			YPXM	CHRISTMAS ISLAND			Beijing	ZBBYPYX
			YPCC	COCOS (KEELING) ISLAND Intl			Hong Kong	VHZZYPYX
			YCFS	COFFS HARBOUR			Incheon	RKSIYPYX
			YPKG	KALGOORLIE-BOULDER			Jakarta	WIZZYPYX
			YMLT	LAUNCESTON			Manila	RPLLYPYX
			YPLM	LEARMONTH			Mumbai	VABBYPYX
			YLHI	LORD HOWE ISLAND			Wellington	NZZZYPYX
			YSNF	NORFOLK ISLAND Intl				
			YPPD	PORT HEDLAND				
		YBRK	ROCKHAMPTON					
		SAAU33	YGEL	GERALDTON	HH+00		BANGKOK	VTBBYPYX
			YGLA	GLADSTONE	HH+30		<b>BRISBANE</b>	YBBYPYX
			YHID	HORN ISLAND			NADI	NFFNYPYX
			YPJT	PERTH/Jandakot			SINGAPORE	WSZZYPYX
			YPWR	WOOMERA			TOKYO	RJTDYPYX
			YSDU	DUBBO			Beijing	ZBBYPYX
			YSRI	RICHMOND, NSW			Hong Kong	VHZZYPYX
		YSTW	TAMWORTH			Incheon	RKSIYPYX	
						Jakarta	WIZZYPYX	
						Manila	RPLLYPYX	
						Mumbai	VABBYPYX	
						Wellington	NZZZYPYX	
		SAAU34	YBHM	HAMILTON ISLAND	HH+00		BANGKOK	VTBBYPYX

**Table A : Collection and Dissemination of METAR (SA) Bulletins**

1		2			3	4	5	
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address
			YBMA	MOUNT ISA	HH+30		BRISBANE NADI SINGAPORE TOKYO Hong Kong Incheon Jakarta Wellington	YBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX VHZZYPYX RKSIPYS WIZZYPYX NZZZYPYX
		SAAU35	YCIN YFRT YPKU YPGV	CURTIN FORREST KUNUNURRA GOVE	HH+00 HH+30		BANGKOK BRISBANE NADI SINGAPORE TOKYO Hong Kong Incheon Jakarta Wellington	VTBBYPYX YBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX VHZZYPYX RKSIPYS WIZZYPYX NZZZYPYX
		SAAU36	YAMB YPEA YPTN YBTL YWLM	AMBERLEY PEARCE TINDAL TOWNSVILLE/Townsville Intl WILLIAMTOWN	HH + 00 HH + 30		BANGKOK BRISBANE NADI SINGAPORE TOKYO Beijing Hong Kong Incheon Jakarta Manila Mumbai Wellington	VTBBYPYX YBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX ZBBYPYX VHZZYPYX RKSIPYS WIZZYPYX RPLLYPYX VABYPYX NZZZYPYX
		SANG31	AYPY AYWK AYVN AYNZ AYMH AYGN AYMO ANYN AGGH	PORT MORESBY Intl WEWAK VANIMO NADZAB MOUNT HAGEN GURNEY MOMOTE NAURU I. HONIARA (HENDERSON)	HH+00	NR NR NR NR NR NR	BANGKOK BRISBANE NADI SINGAPORE TOKYO Beijing Hong Kong Jakarta Wellington	VTBBYPYX YBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX ZBBYPYX VHZZYPYX WIZMIMI NZZZYPYX
Colombo	VCCC	SASB31	VCBI VCRI VCCH	BANDARANAIKE INTL AP COLOMBO MATTALA RAJAPAKSA INTERNATIONAL AIRPORT HINGURAKGODA/MINNERIYA	HH + 10		BANGKOK BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX
		SAMV31	VRMG VRMH VRMM	GAN INTERNATIONAL AIRPORT HANIMAADHOO INTERNATIONAL AIRPORT MALE INTERNATIONAL AIRPORT			Hong Kong Kuala Lumpur Mumbai	VHZZYPYX WMZZYPYR VABYPYX
Delhi	VIDP	SAIN32	VIDP VILK VIAR VEBN	DELHI/Indira Gandhi Intl LUCKNOW AMRITSAR VARANASI	HH + 00 HH + 30		BANGKOK BRISBANE NADI SINGAPORE	VTBBYPYX YBBYPYX NFFNYPYX WSZZYPYX

**Table A : Collection and Dissemination of METAR (SA) Bulletins**

1		2			3	4	5	
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address
			VIJP	JAIPUR			TOKYO	RJTDYPYX
							Kolkata	VECCYPYX
							Hong Kong	VHZZYPYX
							Karachi	OPZZYPYX
							Mumbai	VABBPYX
Hong Kong	VHHH	SAHK31	VHHH	HONG KONG/International	HH + 00	2200-1200	BANGKOK	VTBBYPYX
			RCTP	TAIBEI CITY/Taibei Intl Ap	HH + 30		BRISBANE	YBBBYPYX
			RCKH	GAOXIONG			NADI	NFFNYPYX
			RCSS	TABEI/Songshan			SINGAPORE	WSZZYPYM
			RCMQ	TAICHUNG/Qingquangang			<b>TOKYO</b>	RJTDYPYX
			RCNN	TAINAN			Beijing	ZBBBYPYX
			RCFN	TAIDONG/Fengnian			Kuala Lumpur	WMZZYPYR
			VMMC	MACAO/Intl Airport			Incheon	RKSIYPYX
			RPLL	MANILA/Ninoy Aquino Intl	HH + 00		Wellington	NZZZYPYX
			RPVM	LAPU-LAPU/Mactan-Cebu				
RPMD	DAVAO/Francisco Bangoy Intl		2200-1000					
RPLB	SUBIC BAY, Subic Bay Intl		2200-1000					
RPLI	LAOAG, Laoag Intl		2200-1000					
RPMZ	ZAMBOANGA, Zamboanga Intl		2200-1000					
Incheon	RKSI	SAKO31	RKSI	INCHEON	HH + 00		BANGKOK	VTBBYPYX
			RKSS	GIMPO	HH + 30		BRISBANE	YBBBYPYX
			RKPC	JEJU	HH + 00		NADI	NFFNYPYX
			RKPK	GIMHAE	HH + 00		SINGAPORE	WSZZYPYM
			RKTU	CHEONGJU	HH + 00		<b>TOKYO</b>	RJTDYPYX
			RKNY	YANGYANG	HH + 00		Beijing	ZBBBYPYX
			RKTN	DAEGU	HH + 00		Hong Kong	VHZZYPYX
			RKJB	MUAN	HH + 00		Singapore	WSZZYPYM
							Tokyo	RJTDYPYX
							Wellington	NZZZYPYX
			Mumbai	VABBPYX				
Jakarta	WIII	SAID31	WAAA	UJUNG PANDANG/Hasanuddin	HH + 00	2200-1700	BANGKOK	VTBBYPYX
			WABB	BLIAK/Frans Kaisiepo	HH + 30		BRISBANE	YBBBYPYX
			WIHH	JAKARTA/Halimperdana Kusuma			NADI	NFFNYPYX
			WIII	JAKARTA/Soekarno Hatta (COMM CENTER)			<b>SINGAPORE</b>	WSZZYPYM
			WIDD	BATAM/Hang Nadim			TOKYO	RJTDYPYX
			WIMM	MEDAN/Polonia			Hong Kong	VHZZYPYX
			WADD	BALI/Ngurah Rai			Kuala Lumpur	WMZZYPYR
		WARR	SURABAYA/Juanda		Wellington	NZZZYPYX		
		SAID32	WAMM	MANADO/Sam Ratulangi	HH + 00	2200-0500	BANGKOK	VTBBYPYX
			WIBB	PEKANBARU/Sultan Syarif Kasim II	HH + 30		BRISBANE	YBBBYPYX
			WIDN	TANJUNG PINANG/Kijang			NADI	NFFNYPYX
			WIEE	PANDANG/MINANGKABAU			<b>SINGAPORE</b>	WSZZYPYM
			WIOO	PONTIANAK/Supadio			TOKYO	RJTDYPYX
			WIPP	PALEMBANG/Sultan Mahmud Badaruddin II			Hong Kong	VHZZYPYX
WAOO	BANJARMASIN/Syamsuddin Noor			Kuala Lumpur	WMZZYPYR			
WALL	BALIK PAPAN/Sepinggan		Wellington	NZZZYPYX				
WADL	PRAYA/LOMBOK INTERNATIONAL							

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1		2			3	4	5	
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address
		<b>SAID33</b>	WAYY	TIMIKA/Moses Kilangin	HH + 00	2100-0800	BANGKOK	VTBBYPYX
			WAJJ	JAYAPURA/Sentani	HH + 30		2200-0500	BRISBANE
			WAKK	MERAUKE/Mopah		NADI		NFFNYPYX
			WAPP	AMBON/Pattimura		<b>SINGAPORE</b>		WSZZYPYM
			WAHS	SEMARANG/A. Yani		TOKYO	RJTDYPYX	
			WILL	BANDAR LAMPUNG/Radin Inten		Hong Kong	VHZZYPYX	
			WATT	KUPANG/EI Tari		Kuala Lumpur	WMZZYPYR	
			WAQQ	TARAKAN/Juwata		Wellington	NZZZYPYX	
						2000-1300		
Kolkata	VECC	<b>SAIN33</b>	VECC	NETAJI SUBHASH CHANDRA BOSE INTERNATIONAL AIRPORT, KOLKATA	HH + 00		<b>BANGKOK</b>	VTBBYPYX
			VEPT	PATNA	HH + 30		BRISBANE	YBBBYPYX
			VEGY	GAYA			NADI	NFFNYPYX
		VEGT	GUWAHATI		<b>SINGAPORE</b>		WSZZYPYM	
		<b>SABW31</b>	VGEG	M.A. HANNAN INTL. CHITTAGONG			TOKYO	RJTDYPYX
			VGHS	HAZRAT SHAHJALAL INTERNATIONAL AIRPORT			Colombo	VCCCYPYX
VGSY	OSMANI INTERNATIONAL AIRPORT, SYLHET			Delhi	VIDPYPYX			
<b>SAAS31</b>	VNKT	KATHMANDU		Hong Kong	VHZZYPYX			
	VQPR	PARO/Intl.		Karachi	OPZZYPYX			
						Mumbai	VABBPYX	
Karachi	OPKC	<b>SAPK31</b>	OPKC	KARACHI/Jinnah Int'l	HH + 00		<b>BANGKOK</b>	VTBBYPYX
			OPRN	ISLAMABAD/Chaklala	HH + 30		BRISBANE	YBBBYPYX
			OPLA	LAHORE/Allama Iqbal Int'l			NADI	NFFNYPYX
			OPNH	NAWABSHAH			<b>SINGAPORE</b>	WSZZYPYM
			OPGD	GWADAR			TOKYO	RJTDYPYX
			OPPS	PESHAWAR			Abu Dhabi	OMZZYPYX
			OPSK	SUKKUR			Bahrain	OBZZYPYX
							Beijing	ZBBBYPYX
							Kolkata	VECCYPYX
							Delhi	VIDDYPYX
			Hong Kong	VHZZYPYX				
			Mumbai	VABBPYX				
				Tehran	OIZZYPYX			
Kuala Lumpur	WMKK	<b>SAMS31</b>	WBGG	KUCHING/Intl	HH + 00		BANGKOK	VTBBYPYX
			WBKK	KOTA KINABALU/Intl	HH + 30		BRISBANE	YBBBYPYX
			WBSB	BRUNEI/Intl			NADI	NFFNYPYX
			WMKK	SEPANG/KL International Airport			<b>SINGAPORE</b>	WSZZYPYM
			WMKP	PENANG/Intl			TOKYO	RJTDYPYX
			WSSS	SINGAPORE/Changi			Colombo	VCCCYPYX
			WSSL	SELETAR			Hong Kong	VHZZYPYX
							Jakarta	WIZZMBMB
					Manila		RPLLYPYX	
					Mumbai		VABBPYX	
					Incheon		RKSIYPYX	
			Wellington	NZZZYPYX				
		<b>SAMS38</b>	WBGB	BINTULU	HH + 00	BANGKOK	VTBBYPYX	
			WBGR	MIRI		BRISBANE	YBBBYPYX	
			WBGS	SIBU		NADI	NFFNYPYX	
			WBKL	LABUAN		<b>SINGAPORE</b>	WSZZYPYM	

**Table A : Collection and Dissemination of METAR (SA) Bulletins**

1		2			3	4	5	
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address
			WBKS WBKW WMKD WMKL WMKM	SANDAKAN TAWAU KUANTAN PULAU LANGKAWI/Intl MALACCA			TOKYO Colombo Hong Kong Jakarta Manila Mumbai Incheon Wellington	RJTDYPYX VCCCYPYX VHZZYPYX WIZZMBMB RPLLYPYX VABBPYX RKSIPYX NZZZYPYX
Mumbai	VABB	SAIN31	VAAH VABB VANP VOMM VOTR VOTV VOHS VOBL VOCL VOCI VOCB VOML	AHMEDABAD MUMBAI/Chhatrapati Shivaji Intl. NAGPUR CHENNAI TIRUCHCHIRAPPALLI TRIVANDRUM HYDERABAD BANGALORE INTL APT CALICUT COCHIN INTERNATIONAL COIMBATORE MANGALORE	HH + 00 HH + 30		BANGKOK BRISBANE NADI SINGAPORE TOKYO Abu Dhabi Bahrain Colombo Delhi Hong Kong Karachi Kolkata Tehran	VTBBYPYX YBBBYPYX NFFNYPYX WSZZPYM RJTDYPYX OMZZYPYX OBZZYPYX VCCCYPYX VIDPYPYX VHZZYPYX OPZZYPYX VECCYPYX OIZZYPYX
Nadi	NFFN	SAPS31	NCRG NFFN NFNA NFTF NFTV NGFU NGTA NIUE NSFA NVSS NVVV PLCH NFTL	RAROTONGA Intl. NADI/Intl NAUSORI/Intl FUA'AMOTU INTL. VAVA'U FUNAFUTI/Intl TARAWA/Bonriki Intl NIUE Intl FALEOLO/Intl SANTO/Pekoa PORT VILA/Bauerfield CHRISTMAS ISLAND HA'APAI	HH+00		BANGKOK BRISBANE NADI SINGAPORE TOKYO Wellington	VTBBYPYX YBBBYPYX NFFNYPYX WSZZPYM RJTDYPYX NZZZYPYX
		SAPS32	NLWW NWWW	WALLIS HIHIFO NOUMEA LA TANTOUTA				
		SAPS33	NTAA	TAHITI FAAA				
Tokyo	RJTD	SAJP31	RJAA RJBB RJCH RJGG RJOO RJSS RJTT ROAH	NARITA Intl KANSAI Intl HAKODATE CHUBU CENTRAIR Intl OSAKA Intl SENDAI TOKYO Intl NAHA	HH + 00	22:00-11:00  20:00-11:00 21:00-12:00	BANGKOK BRISBANE NADI SINGAPORE TOKYO Beijing Guam Hong Kong Incheon London Wellington	VTBBYPYX YBBBYPYX NFFNYPYX WSZZPYM RJTDYPYX ZBBBYPYX PGUMCOAX VHZZYPYX RKSIPYX EGZMASI NZZZYPYX
		SAJP32	RJCC RJFF	SAPPORO/New Chitose FUKUOKA	HH + 00		BANGKOK BRISBANE	VTBBYPYX YBBBYPYX

**Table A : Collection and Dissemination of METAR (SA) Bulletins**

1		2			3	4	5			
ROC		METAR Bulletin			Bul. Time	Available	DISSEMINATION TO			
Name	CCCC	BUL No.	CCCC	Aerodrome			RODB/ROC	AFTN Address		
			RJFK	KAGOSHIMA		21:00-12:00	NADI	NFFNYPYX		
			RJFU	NAGASAKI		22:00-12:00	SINGAPORE	WSZZYPYM		
			RJOA	HIROSHIMA		22:00-13:00	<b>TOKYO</b>	RJTDYPYX		
			RJFT	KUMAMOTO		22:00-12:00	Beijing	ZBBYPYX		
			RJSN	NIIGATA		22:00-12:00	Guam	PGUMCOAX		
			RJFO	OITA		22:00-13:00	Hong Kong	VHZZYPYX		
			RJOB	OKAYAMA		22:00-12:00	Incheon	RKSIYPYX		
			RJOT	TAKAMATSU		22:00-12:00	London	EGZZMASI		
			RJNK	KANAZAWA/Komatsu		22:00-12:00	Wellington	NZZZYPYX		
			RJNT	TOYAMA						
			<b>SAJP38</b>	RJCK		KUSHIRO	HH + 00	22:00-11:00	BANGKOK	VTBBYPYX
				RJCM		MEMANBETSU		23:00-11:00	BRISBANE	YBBYPYX
				RJCB		OBIHIRO		23:00-11:00	NADI	NFFNYPYX
			RJOC	IZUMO		22:00-11:00	SINGAPORE	WSZZYPYM		
			RJOH	MIHO			<b>TOKYO</b>	RJTDYPYX		
			RJOK	KOCHI		22:00-11:00	Beijing	ZBBYPYX		
			RJFM	MIYAZAKI		22:00-12:00	Brasilia	SBBRYZYX		
			ROIG	NEW ISHIGAKI		21:00-11:00	Hong Kong	VHZZYPYX		
			RJNS	SHIZUOKA		23:00-12:00	Incheon	RKSIYPYX		
			RJSA	AOMORI		22:00-12:00	London	EGZZMASI		
			RJSF	FUKUSHIMA		22:00-11:00	Rayong	VTBUYMYX		
			RJOM	MATSUYAMA		22:00-12:00				
			RJEC	ASAHIKAWA		22:00-11:00				
			RJSK	AKITA		22:00-12:00				
			RJAH	HYAKURI						
			RJFR	KITAKYUSHU						
			RJFS	SAGA		22:00-14:00				
			RJSI	HANAMAKI		23:00-10:00				
Wellington	NZKL	SANZ31	NZWN	WELLINGTON Intl	HH + 00		BANGKOK	VTBBYPYX		
			NZAA	AUCKLAND Intl	HH + 30		<b>BRISBANE</b>	YBBYPYX		
			NZCH	CHRISTCHURCH Intl			NADI	NFFNYPYX		
		<b>SANZ32</b>	NZQN	QUEENSTOWN	HH + 00		SINGAPORE	WSZZYPYM		
				HH + 30		TOKYO	RJTDYPYX			
						Beijing	ZBBYPYX			
						Hong Kong	VHZZYPYX			
						Incheon	RKSIYPYX			
						Jakarta	WIZZYPYX			



APPENDIX B - Collection and Dissemination of TAF (FT) Bulletins

Table B : FT TAF

**Explanation of the Table**

Col. 1: Name and ICAO location indicator of the ROC compiling the bulletin

Col. 2: Description of the TAF Bulletin

Col. 3: Dissemination of the bulletin to other ROCs and RODBs

Notes:

- 1 *The RODB responsible for storing the bulletin is in **bold**.*
- 2 *The TAF filing time should be not earlier than 1 hour before the start of the period of validity.*
- 3 *TAF that do not meet 24- and 30-hour IATA requirements are indicated in the TAF validity column with the required validity shown in parenthesis.*
- 4 *TAF included in VOLMET broadcasts are listed in APAC, ANP, VOL II, Table MET II-3, VOLMET Broadcasts.*
- 5 *Aerodromes not listed in Table AOP 1 are indicated in italics.*

Table B : Collection and Dissemination of TAF (FT) Bulletins											
1 ROC		2 TAF Bulletin						3 Dissemination			
Name	CCCC		CCCC	Aerodrome	Filing time	Start of validity	TAF validity	RODB/ROC	AFTN address		
<b>ASIA/PAC REGION</b>											
Bangkok	VTBB	FTAE31	VTBD	BANGKOK/Don Mueang Intl Airport	0535	0600	30	BANGKOK	VTBBYPYX		
			VTBS	BANGKOK/Suvarnabhumi Intl Airport	1135	1200	30	BRISBANE	YBBBYPYX		
			VTBU	RAYONG/U-Tapao Intl	1735	1800	24	NADI	NFFNYPYX		
			VTCC	CHIANG MAI/Chiang Mai Intl. Airport	2335	0000	30	SINGAPORE	WSZZYPYX		
			VTCT	CHIANG RAI/Chiang Rai Intl Apt			24	TOKYO	RJTDYPYX		
			VTSG	KRABI			30	Abu Dhabi	OMZZYPYX		
			VTSP	PHUKET/Phuket Intl			30	Bahrain	OBZZYPYX		
			VTSS	SONGKHLA/Hat Yai Intl			24	Beijing	ZBBBYPYX		
							Beirut	OLLLLPYX			
							Hong Kong	VHZZYPYX			
							Jeddah	OEJDYPYX			
							Karachi	OPZZYPYX			
							Kuala Lumpur	WMZZYPYR			
							Mumbai	VABBYPYX			
							Incheon	RKSIYPYX			
							Tehran	OIIYPYX			
							Wellington	NZZZYPYA			
				FTAE32	VDP	PHNOM PENH	0535	0600	18 (24)	BANGKOK	VTBBYPYX
					VDSR	SIEM REAP	1135	1200	18 (24)	BRISBANE	YBBBYPYX
					VGHS	HAZRAT SHAHJALAL INTL APT	1735	1800	30	NADI	NFFNYPYX
		VLVT	VIENTIANE (Wattay)		2335	0000	24	SINGAPORE	WSZZYPYX		
		VYMD	MANDALAY INTERNATIONAL *				24	TOKYO	RJTDYPYX		
		VYNT	NAYPYITAW INTERNATIONAL				24	Bahrain	OBZZYPYX		
		VYYY	YANGON INTERNATIONAL				24	Beijing	ZBBBYPYX		
								Beirut	OLLLLPYX		
							Hong Kong	VHZZYPYX			
							Jeddah	OEJDYPYX			
							Karachi	OPZZYPYX			
							Kuala Lumpur	WMZZYPYR			
							Mumbai	VABBYPYX			
							Incheon	RKSIYPYX			
							Tehran	OIIYPYX			
							Wellington	NZZZYPYA			
		FTAE33	VLLB	LUANG PRABANG	0535	0600	18	BANGKOK	VTBBYPYX		
			VLLN	LUANG NAMTHA	1135	1200	18	BRISBANE	YBBBYPYX		
			VLPS	PAKSE	2335	0000	18	NADI	NFFNYPYX		
			VLSK	SAVANNAKHET			18	SINGAPORE	WSZZYPYX		
							TOKYO	RJTDYPYX			
							Bahrain	OBZZYPYX			
							Beijing	ZBBBYPYX			
							Beirut	OLLLLPYX			
							Hong Kong	VHZZYPYX			
							Jeddah	OEJDYPYX			
							Karachi	OPZZYPYX			
							Kuala Lumpur	WMZZYPYR			
							Mumbai	VABBYPYX			
							Incheon	RKSIYPYX			
							Tehran	OIIYPYX			
							Wellington	NZZZYPYA			
		FTAE34	VVCI	CAT BI	0535	0600	24	BANGKOK	VTBBYPYX		
			VVCR	KHANH HOA/Cam Ranh Int'l	1135	1200	30	BRISBANE	YBBBYPYX		
			VVCT	CAN THO/Can Tho Int'l	1735	1800	24	NADI	NFFNYPYX		
			VVDN	DA NANG	2335	0000	24	SINGAPORE	WSZZYPYX		
			VVNB	HA NOI/Noi Bai			24	TOKYO	RJTDYPYX		
			VVPB	HUE/Phu Bai			24	Abu Dhabi	OMZZYPYX		
			VVPQ	KIEN GIANG/Phu Quoc Int'l			24	Bahrain	OBZZYPYX		
			VVTS	HO CHI MINH/Tan Son Nhat			24	Beijing	ZBBBYPYX		
							Beirut	OLLLLPYX			
							Hong Kong	VHZZYPYX			
							Jeddah	OEJDYPYX			
							Karachi	OPZZYPYX			
							Kuala Lumpur	WMZZYPYR			
							Mumbai	VABBYPYX			
							Incheon	RKSIYPYX			
							Tehran	OIIYPYX			
							Wellington	NZZZYPYA			
		FTTH31	VTBO	TRAT/Khao Sming	0535	0600	24	BANGKOK	VTBBYPYX		

Table B : Collection and Dissemination of TAF (FT) Bulletins									
1 ROC		2 TAF Bulletin						3 Dissemination	
Name	CCCC		CCCC	Aerodrome	Filing time	Start of validity	TAF validity	RODB/ROC	AFTN address
			VTCH	MAE HONG SON	1135	1200	24	BRISBANE	YBBBYPYX
			VTCL	LAMPANG	1735	1800	24	NADI	NFFNYPYX
			VTGN	NAN	2335	0000	24	SINGAPORE	WSZZYPYX
			VTCP	PHRAE			24	TOKYO	RJTDYPYX
			VTPB	PHETCHABUN			24		
			VTPH	PRACHUAP KHIRI KHAN/Hua Hin			24		
			VTPM	TAK/MAE SOT			24		
			VTPO	SUKHOTHAI			24		
			VTPP	PHITSANULOK			24		
			VTPT	TAK			24		
		FTTH32	VTSE	CHUMPHON/Tab Gai	1735	1800	24	NADI	NFFNYPYX
			VTSM	SURAT THANI/Samui			24	TOKYO	RJTDYPYX
			VTSR	RANONG			24		
			VTST	TRANG			24		
		FTTH33	VTUD	UDON THANI	0535	0600	24	BANGKOK	VTBBYPYX
			VTUI	SAKON NAKHON/Ban Khai	1135	1200	24	BRISBANE	YBBBYPYX
			VTUK	KHON KAEN	1735	1800	24	NADI	NFFNYPYX
			VTUL	LOEI	2335	0000	24	SINGAPORE	WSZZYPYX
			VTUO	BURI RAM			24	TOKYO	RJTDYPYX
			VTUQ	NAKHON RATCHASIMA			24		
			VTUU	UBON RATCHATHANI			24		
			VTUV	ROI ET			24		
			VTUW	NAKHON PHANOM			24		
Beijing	ZBBB	FTCI31	ZBAA	BEIJING/Capital	0535	0600	30	BANGKOK	VTBBYPYX
			ZBSJ	SHIJIAZHUANG/Zhengding	1135	1200	24	BRISBANE	YBBBYPYX
			ZBTJ	TIANJIN/Binhai	1735	1800	24 (30)	NADI	NFFNYPYX
			ZBYN	TAIYUAN/Wusu	2335	0000	24	SINGAPORE	WSZZYPYX
			ZGGG	GUANGZHOU/Baiyun			30	TOKYO	RJTDYPYX
			ZSHC	HANGZHOU/Xiaoshan			24	Hong Kong	VHZZYPYX
			ZSPD	SHANGHAI/Pu Dong			30	Karachi	OPZZYPYX
			ZSSS	SHANGHAI/Hongqiao			24	Mumbai	VABBYPYX
			ZWSH	KASHI/Kashi			24 (30)	Incheon	RKSIYPYX
			ZWWW	URUMQI/Diwopu			24 (30)	Ulan Bator	ZMUBMYX
			ZYTL	DALIAN/Zhoushuizi			24	Wellington	NZZZYPYA
			ZYTX	SHENYANG/Taoxian			24		
		FTCI32	ZGKL	GUILIN/Lianjiang	0535	0600	24	BANGKOK	VTBBYPYX
			ZGNN	NANNING/Wuxu	1135	1200	24	BRISBANE	YBBBYPYX
			ZGOW	SHANTOU/Waisha	1735	1800	24	NADI	NFFNYPYX
			ZGSZ	SHENZHEN/Baoan	2335	0000	24 (30)	SINGAPORE	WSZZYPYX
			ZLXY	XI'AN/Xianyang			24	TOKYO	RJTDYPYX
			ZMCK	ULAANBAATAR/Chinggis Khaan			30	Hong Kong	VHZZYPYX
			ZMUB	ULAANBAATAR/Buyant-Ukhaa			30	Jakarta	WIZZYPYX
			ZPPP	KUNMING/Wujiaba			24 (30)	Karachi	OPZZYPYX
			ZSAM	XIAMEN/Gaoqi			24	Kuala Lumpur	WMZZYPYR
			ZSFZ	FUZHOU/Changle			24	Mumbai	VABBYPYX
			ZSNB	NINGBO/Lishe			24	Wellington	NZZZYPYA
			ZSQD	QINGDAO/Liuting			24		
			ZUUU	CHENGDU/Shuangliu			24		
		FTCI41	ZBHH	HUHHOT/Baita	0535	0600	24	BANGKOK	VTBBYPYX
			ZGHA	CHANGSHA/Huanghua	1135	1200	24	BRISBANE	YBBBYPYX
			ZHCC	ZHENGZHOU/Xinzheng	1735	1800	24	NADI	NFFNYPYX
			ZHHH	WUHAN/Tianhe	2335	0000	24	SINGAPORE	WSZZYPYX
			ZJHK	HAIKOU/Meilan			24 (30)	TOKYO	RJTDYPYX
			ZJSY	SANYA/Phoenix			24	Hong Kong	VHZZYPYX
			ZLLL	LANZHOU/Zhongchuan			24	Jakarta	WIZZYPYX
			ZSNJ	NANJING/Lukou			24	Karachi	OPZZYPYX
			ZSOF	HEFEI/Luogang			24	Mumbai	VABBYPYX
			ZUCK	CHONGQING/Jiangbei			24	Incheon	RKSIYPYX
			ZYCC	CHANGCHUN/Longjia			24	Ulan Bator	ZMUBMYX

Table B : Collection and Dissemination of TAF (FT) Bulletins											
1 ROC		2 TAF Bulletin						3 Dissemination			
Name	CCCC		CCCC	Aerodrome	Filing time	Start of validity	TAF validity	RODB/ROC	AFTN address		
			ZYHB	HARBIN/Taiping			24	Wellington	NZZZYPYX		
Brisbane	YBBN	FTAU31	YPAD	ADELAIDE/Adelaide Intl	0235	0300	30	BANGKOK	VTBBYPYX		
			YBBN	BRISBANE/Brisbane Intl	0535	0600	30	BRISBANE	YBBBYPYX		
			YBCS	CAIRNS/Cairns Intl	0835	0900	24	NADI	NFFNYPYX		
			YSCB	CANBERRA	1135	1200	24	SINGAPORE	WSZZYPYX		
			YPDN	DARWIN/Darwin Intl	1435	1500	30	TOKYO	RJTDYPYX		
			YBCG	GOLD COAST	1735	1800	24	Beijing	ZBBBYPYX		
			YMHB	HOBART	2035	2100	24	Hong Kong	VHZZYPYX		
			YMML	MELBOURNE/Melbourne Intl	2335	0000	30	Jakarta	WIZZYPYX		
			YPPH	PERTH/Perth Intl			30	Manila	RPLLYPYX		
		YSSY	SYDNEY/Sydney (Kingsford Smith) Intl			30	Mumbai	VABBYPYX			
									Wellington	NZZZYPYX	
				FTAU32	YBAS	ALICE SPRINGS	0535	0600	24	BANGKOK	VTBBYPYX
					YMAV	AVALON	1135	1200	24	BRISBANE	YBBBYPYX
					YBWW	Brisbane West Wellcamp	1735	1800	24	NADI	NFFNYPYX
					YBRM	BROOME/Broome Intl	2335	0000	24	SINGAPORE	WSZZYPYX
					YBLN	Busselton			24	TOKYO	RJTDYPYX
					YPXM	CHRISTMAS ISLAND			24	Beijing	ZBBBYPYX
					YPCC	COCOS (KEELING) ISLAND Intl			24	Hong Kong	VHZZYPYX
					YCFS	COFFS HARBOUR			24	Jakarta	WIZZYPYX
					YPKG	KALGOORLIE-BOULDER			24	Manila	RPLLYPYX
					YMLT	LAUNCESTON			24	Mumbai	VABBYPYX
					YPLM	LEARMONTH			24	Wellington	NZZZYPYX
					YLHI	LORD HOWE ISLAND			24		
					YSNF	NORFOLK ISLAND Intl			24		
					YPPD	PORT HEDLAND			24		
					YBRK	ROCKHAMPTON			24		
					FTAU33	YSDU	DUBBO	0535	0600	18	BANGKOK
				YGEL		GERALDTON	1135	1200	18	BRISBANE	YBBBYPYX
				YGLA		GLADSTONE	1735	1800	18	NADI	NFFNYPYX
				YHID		HORN ISLAND	2335	0000	18	SINGAPORE	WSZZYPYX
				YPJT		PERTH/Jandakot			18	TOKYO	RJTDYPYX
				YSRI		RICHMOND, NSW			18	Beijing	ZBBBYPYX
				YSTW		TAMWORTH			18	Hong Kong	VHZZYPYX
				YPWR		WOOMERA			18	Jakarta	WIZZYPYX
									Manila	RPLLYPYX	
									Mumbai	VABBYPYX	
									Wellington	NZZZYPYX	
				FTAU34	YBHM	HAMILTON ISLAND	0500	0600	12	BANGKOK	VTBBYPYX
					YBMA	MOUNT ISA	1100	1200	12	BRISBANE	YBBBYPYX
							1700	1800		NADI	NFFNYPYX
							2300	0000		SINGAPORE	WSZZYPYX
									TOKYO	RJTDYPYX	
									Beijing	ZBBBYPYX	
									Hong Kong	VHZZYPYX	
									Jakarta	WIZZYPYX	
									Manila	RPLLYPYX	
									Mumbai	VABBYPYX	
							Wellington	NZZZYPYX			
		FTAU35	YGIN	CURTIN	0100	0200	12	BANGKOK	VTBBYPYX		
			YFRT	FORREST	0700	0800	12	BRISBANE	YBBBYPYX		
			YPGV	GOVE	1300	1400	12	NADI	NFFNYPYX		
			YPKU	KUNUNURRA	1900	2000	12	SINGAPORE	WSZZYPYX		
								TOKYO	RJTDYPYX		
							Beijing	ZBBBYPYX			
							Hong Kong	VHZZYPYX			
							Jakarta	WIZZYPYX			
							Manila	RPLLYPYX			
							Mumbai	VABBYPYX			
							Wellington	NZZZYPYX			
		FTAU36	YAMB	AMBERLEY	0235 (M-F)	0300 (M-F)	24	BANGKOK	VTBBYPYX		
			YPEA	PEARCE	0535	0600	18	BRISBANE	YBBBYPYX		
			YPTN	TINDAL	1135	1200	24	NADI	NFFNYPYX		
			YBTL	TOWNSVILLE/Townsville Intl	1735	1800	24	SINGAPORE	WSZZYPYX		
			YWLM	WILLIAMTOWN	2035 (M-F)	2100 (M-F)	24	TOKYO	RJTDYPYX		

Table B : Collection and Dissemination of TAF (FT) Bulletins									
1 ROC		2 TAF Bulletin						3 Dissemination	
Name	CCCC		CCCC	Aerodrome	Filing time	Start of validity	TAF validity	RODB/ROC	AFTN address
					2335	0000		Beijing Hong Kong Jakarta Manila Mumbai Wellington	ZBBBYPYX VHZZYPYX WIZZYPYX RPLLYPYX VABBYPYX NZZZYPYX
		FTTM31	WPDL	DILI/Presidente Nicolau Lobato Intl	0535 1135 1735 2335	0600 1200 1800 0000	12	BANGKOK BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX
								Beijing Hong Kong Jakarta Manila Mumbai Wellington	ZBBBYPYX VHZZYPYX WIZZYPYX RPLLYPYX VABBYPYX NZZZYPYX
		FTNG31	AYPY AYWK AYVN AYNZ AYMH AYMO ANYN AGGH	PORT MORESBY Intl WEWAK VANIMO NADZAB MOUNT HAGEN MOMOTE NAURU I. HONIARA (HENDERSON)	0535 1135 1735 2335	0600 1200 1800 0000	24 24 24 24 24 24 24	BANGKOK BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX
								Beijing Hong Kong Jakarta Manila Mumbai Wellington	ZBBBYPYX VHZZYPYX WIZZYPYX RPLLYPYX VABBYPYX NZZZYPYX
Hong Kong	VHHH	FTHK31	VHHH RCTP RCKH RCSS RCMQ RCNN RCFN VMC RPLL RPVM RPM RPLB RPMZ RPLI	HONG KONG/International TAIBEI CITY/Taibei Intl Ap GAOXIONG TAIBEI/Songshan TAICHUNG/Qingquangang TAINAN TAIDONG/Fengnian MACAOU/Intl Airport MANILA/Ninoy Aquino Intl, Pasay City, Metro Manila LAPU-LAPU/Mactan, Cebu DAVAO/Francisco Bangoy Intl, Davao Del Sur SUBIC BAY, Subic Bay Intl, Olongapo City, Zambales ZAMBOANGA, Zamboanga Intl, Zamboanga Del Norte LAOAG, Laoag Intl, Ilocos Norte	0535 1135 1735 2335	0600 1200 1800 0000	30 30 30 24 24 24 30 30 30 24 24 24 24	BANGKOK BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX
								Beijing Mumbai Incheon Wellington London Washington	ZBBBYPYX VABBYPYX RKSIPYX NZZZYPYA EGZZMASI KWBCMYX
Incheon	RKSI	FTKO31	RKSI RKSS RKPC RKPK RKTU RKNY RKTN RKJB	INCHEON Intl GIMPO Intl JEJU Intl GIMHAE Intl CHEONGJU Intl YANGYANG Intl DAEGU INTL MUAN Intl	0535 1135 1735 2335	0600 1200 1800 0000	30 30 30 30 30 30 30 30	BANGKOK BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX
								Hong Kong Karachi Wellington	VHZZYPYX OPZZYPYX NZZZYPYX
Karachi	OPKC	FTPK31	OPKC OPRN OPLA OPNH OPPS OPGD OPSK	KARACHI/Jinnah Intl ISLAMABAD/Chaklala LAHORE/Allama Iqbal Int'l NAWABSHAH PESHAWAR GWADAR SUKKAR	0535 1135 1735 2335	0600 1200 1800 0000	30 30 30 30 30 24 24	BANGKOK BRISBANE NADI SINGAPORE TOKYO	VTBBYPYX YBBBYPYX NFFNYPYX WSZZYPYX RJTDYPYX
								Abu Dhabi Bahrain Beijing Beirut Hong Kong Jeddah Karachi	OMZZYPYX OBZZYPYX ZBBBYPYX OLLLYPYX VHZZYPYX OEJDYPYX OPZZYPYX

Table B : Collection and Dissemination of TAF (FT) Bulletins											
1 ROC		2 TAF Bulletin						3 Dissemination			
Name	CCCC		CCCC	Aerodrome	Filing time	Start of validity	TAF validity	RODB/ROC	AFTN address		
								Tehran	OIIIPYX		
Mumbai	VABB	FTIN31	VAAH	AHMEDABAD	0535	0600	30	BANGKOK	VTBBYPYX		
			VABB	MUMBAI/Chhatrapati Shivaji Intl.	1135	1200	30	BRISBANE	YBBBYPYX		
			VANP	NAGPUR	1735	1800	30	NADI	NFFNYPYX		
			VOBL	BANGALORE INTL APT	2335	0000	30	SINGAPORE	WSZZYPYX		
			VOCB	COIMBATORE			30	TOKYO	RJTDYPYX		
			VOCI	COCHIN INTERNATIONAL AIRPORT			30	Abu Dhabi	OMZZYPYX		
			VOCL	CALICUT			30	Bahrain	OBZZYPYX		
			VOHS	HYDERABAD INTERNATIONAL AIRPORT			30	Beijing	ZBBBYPYX		
			VOML	MANGALORE			30	Beirut	OLLLYPYX		
			VOMM	CHENNAI			30	Hong Kong	VHZZYPYX		
		VOTR	TIRUCHCHIRAPPALLI			30	Jeddah	OEJDYPYX			
		VOTV	TRIVANDRUM			30	Karachi	OPZZYPYX			
									Tehran	OIIIPYX	
				FTIN32	VIDP	DELHI/Indira Gandhi Intl	0535	0600	30		
					VEBN	VARANASI	1135	1200	30		
					VIAR	AMRITSAR	1735	1800	30		
					VIJP	JAIPUR	2335	0000	30		
					VILK	LUCKNOW			30		
				FTIN33	VECC	NETAJI SUBHASH CHANDRA BOSE INTERNATIONAL AIRPORT, KOLKATA	0535	0600	30		
					VEPT	PATNA	1135	1200	30		
					VEGY	GAYA	1735	1800	30		
					VEGT	GUWAHATI	2335	0000	30		
				FTSB31	VCBI	BANDARANAIKE INTL AP COLOMBO	0535	0600	30		
					VCRI	MATTALA RAJAPAKSA INTERNATIONAL AIRPORT	1135	1200	30		
					1735	1800					
				2335	0000						
		FTMV31	VRMG	GAN INTERNATIONAL AIRPORT	0535	0600	30				
			VRMH	HANIMAADHOO INTERNATIONAL AIRPORT	1135	1200	30				
			VRMM	MALE INTERNATIONAL AIRPORT	1735	1800	30				
				2335	0000						
Kolkata	VECC	FTBW31	VGEG	M.A. HANNAN INTL. CHITTAGONG	0535	0600	30				
			VGHS	HAZRAT SHAHJALAL INTERNATIONAL AIRPORT	1135	1200	30				
			VGSY	OSMANI INTERNATIONAL AIRPORT, SYLHET	1735	1800	30				
					2335	0000					
		FTAS31	VNKT	KATHMANDU	0535	0600	30				
				1135	1200						
				1735	1800						
				2335	0000						
Nadi	NFFN	FTPS31	NCRG	RAROTONGA INTL.	0535	0600	24	BANGKOK	VTBBYPYX		
			NFFN	NADI/Intl	1135	1200	24	BRISBANE	YBBBYPYX		
			NFTF	FUA'AMOTU INTL.	1735	1800	24	NADI	NFFNYPYX		
			NFTV	VAVA'U	2335	0000	24	SINGAPORE	WSZZYPYX		
			NGTA	TARAWA/Bonriki Intl			24	TOKYO	RJTDYPYX		
			NIUE	NIUE Intl			24	Hong Kong	VHZZYPYX		
			NVSS	SANTO/Pekoa			24	Wellington	NZZZYPYA		
			NVVV	PORT VILA/Bauerfield			24				
			PLCH	CHRISTMAS ISLAND			24				
			NFNA	NAUSOR/Intl			24				
		NSFA	FALEOLO/Intl			24					
				FTPS32	NLWW	WALLIS HIHIFO			24		
					NWWW	NOUMEA LA TANTOUTA			24		
		FTPS33	NTAA		TAHITI FAAA			24			
Singapore	WSSS	FTSR31	WSSS	SINGAPORE/Changi	0535	0600	30	BANGKOK	VTBBYPYX		
			WSAP	PAYA LEBAR (RSAF)	1135	1200	30	BRISBANE	YBBBYPYX		
			WSSL	SELETAR	1735	1800	30	NADI	NFFNYPYX		
			WAAA	UJUNG PANDANG/Hasanuddin (Comm Center)	2335	0000	30	SINGAPORE	WSZZYPYX		
			WABB	BIAK/Frans Kaisiepo			30	TOKYO	RJTDYPYX		
			WADD	BALI/Ngurah Rai			24 (30)	Abu Dhabi	OMZZYPYX		

Table B : Collection and Dissemination of TAF (FT) Bulletins									
1 ROC		2 TAF Bulletin						3 Dissemination	
Name	CCCC		CCCC	Aerodrome	Filing time	Start of validity	TAF validity	RODB/ROC	AFTN address
			WARR	SURABAYA/Juanda			24	Bahrain	OBZZYPYX
			WIHH	JAKARTA/Halimperdana Kusuma			24	Beijing	ZBBYPYX
			WIII	JAKARTA/Soekarno Hatta (COMM CENTER)			30	Beirut	OLLYPYX
			WIMM	MEDAN/Polonia			24	Colombo	VCCYPYX
								Hong Kong	VHZZYPYX
								Karachi	OPZZYPYX
								Manila	RPLYPYX
								Mumbai	VABYPYX
								Incheon	RKSIYPYX
								Tehran	OIIYPYX
								Wellington	NZZYPYA
		FTSR32	WMKJ	JOHOR BAHRU/Sultan Ismail	0535	0600	24	BANGKOK	VTBBYPYX
			WMKK	SEPANG/KL International Airport	1135	1200	30	BRISBANE	YBBYPYX
			WMKL	PULAU LANGKAWI/Intl	1735	1800	24	NADI	NFFNYPYX
			WMKM	MALACCA	2335	0000	24	SINGAPORE	WSZZYPYX
			WMKP	PENANG/Intl			24	TOKYO	RJTDYPYX
			WMSA	SUBANG/Sultan Abdul Aziz Shah			24 (30)	Beirut	OLLYPYX
								Hong Kong	VHZZYPYX
								Manila	RPLLYMYX
								Mumbai	VABYPYX
								Wellington	NZZYPYX
		FTSR33	WBSB	BRUNEI/Intl	0535	0600	30		
			WBGB	BINTULU	1135	1200	24		
			WBGG	KUCHING/Intl	1735	1800	24		
			WBGR	MIRI	2335	0000	24		
			WBSG	SIBU			24		
			WBKK	KOTA KINABALU/Intl			24		
			WBKL	LABUAN (RMAF)			24		
			WBKS	SANDAKAN			24		
			WBKW	TAWAU			24		
Tokyo	RJTD	FTJP31	RJAA	NARITA Intl	0525	0600	30	BANGKOK	VTBBYPYX
			RJBB	KANSAI Intl	1125	1200	30	BRISBANE	YBBYPYX
			RJCH	HAKODATE	1725	1800	30	NADI	NFFNYPYX
			RJGG	CHUBU CENTRAIR Intl	2325	0000	30	SINGAPORE	WSZZYPYX
			RJOO	OSAKA Intl			30	TOKYO	RJTDYPYX
			RJSS	SENDAI			30	Beijing	ZBBYPYX
			RJTT	TOKYO Intl			30	Beirut	OLLYPYX
			ROAH	NAHA			30	Brasilia	SBBRYZYX
								Colombo	VCBIYMYX
								Guam	PGUMCOAX
								Hong Kong	VHZZYPYX
								Karachi	OPZZYPYX
								London	EGZZMASI
								Mumbai	VABYPYX
								Noumea	NWCCYMYX
								Rome	LIIBYMYX
								Saipan	PGSNYMYX
								Incheon	RKSIYPYX
								Washington	KWBCYMYX
								Wellington	NZZYPYA
		FTJP32	RJCC	SAPPORO/New Chitose	0525	0600	30	BANGKOK	VTBBYPYX
			RJFF	FUKUOKA/Fukuoka	1125	1200	30	BRISBANE	YBBYPYX
			RJFK	KAGOSHIMA	1725	1800	30	NADI	NFFNYPYX
			RJFO	OITA	2325	0000	30	SINGAPORE	WSZZYPYX
			RJFT	KUMAMOTO			30	TOKYO	RJTDYPYX
			RJFU	NAGASAKI			30	Beijing	ZBBYPYX
			RJNK	KANAZAWA/Komatsu			30	Beirut	OLLYPYX
			RJNT	TOYAMA			30	Brasilia	SBBRYZYX
			RJOA	HIROSHIMA			30	Colombo	VCBIYMYX
			RJOB	OKAYAMA			30	Guam	PGUMCOAX
			RJOT	TAKAMATSU			30	Hong Kong	VHZZYPYX
			RJSN	NIIGATA			30	Incheon	RKSIYPYX
								Karachi	OPZZYPYX
								London	EGZZMASI
								Mumbai	VABYPYX
								Noumea	NWCCYMYX
								Saipan	PGSNYMYX
								Washington	KWBCYMYX
								Wellington	NZZYPYA

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APPENDIX B

Table B : Collection and Dissemination of TAF (FT) Bulletins									
1 ROC		2 TAF Bulletin						3 Dissemination	
Name	CCCC		CCCC	Aerodrome	Filing time	Start of validity	TAF validity	RODB/ROC	AFTN address
		FTJP38	RJSA	AOMORI	0525	0600	30	BANGKOK	VTBBYPYX
			RJSF	FUKUSHIMA	1125	1200	30	BRISBANE	YBBBYPYX
			RJSK	AKITA	1725	1800	30	NADI	NFFNYPYX
			RJOM	MATSUYAMA	2325	0000	30	SINGAPORE	WSZZYPYX
			RJNS	SHIZUOKA			30	TOKYO	RJTDYPYX
			RJEC	ASAHIKAWA (civil)			30	Beijing	ZBBBYPYX
			RJAH	HYAKURI			30	Incheon	RKSIYPYX
			RJCM	MEMANBETSU			30		
			RJCK	KUSHIRO			30		
			RJCB	OBIHIRO			30		
			RJOC	IZUMO			30		
			RJOH	MIHO			30		
			RJOK	KOCHI			30		
			RJFM	MIYAZAKI			30		
			ROIG	NEW ISHIGAKI			30		
			RJFR	KITAKYUSHU			30		
			RJFS	SAGA			30		
			RJSI	HANAMAKI			30		
Wellington	NZKL	FTNZ31	NZWN	WELLINGTON Intl	0535	0600	24	BANGKOK	VTBBYPYX
			NZAA	AUCKLAND Intl	1135	1200	24	BRISBANE	YBBBYPYX
			NZCH	CHRISTCHURCH Intl	1735	1800	24	NADI	NFFNYPYX
					2335	0000		SINGAPORE	WSZZYPYX
		FTNZ32	NZQN	Queenstown	1130	1200	18	TOKYO	RJTDYPYX
					1730	1800		Beijing	ZBBBYPYX
								Hong Kong	VHZZYPYX



## APPENDIX C - IROG Back-up Procedures

### 1. Introduction

1.1 In order to ensure the continuity of OPMET exchange with the European Region (EUR), and the availability of the ASIA/PAC OPMET on the SADIS Gateway, Bangkok RODB will take over the role of the Singapore RODB whenever an operational interruption occurs at the Singapore RODB.

1.2 Both RODBs, in coordination with the Secretariat and London IROG, should perform a real-time test of the procedures in order to practice and maintain regularity and currency in the event of an outage affecting OPMET exchange with EUR.

1.3 The Bangkok and Singapore RODBs have developed a mutual back-up arrangement that includes procedures for undertaking a back-up test.

### 2. Purpose

2.1 The purpose of the back-up test is to validate the dissemination process for notification messages between IROGs and ensure that the Procedures for handover and takeover of responsibility are functional.

### 3. Procedures

3.1 Singapore IROG provides the ASIA/PAC OPMET bulletins information to Bangkok IROG to establish the back-up distribution arrangement. Both IROGs are responsible for updating the distribution list as and when required.

3.2 To activate the back-up plan, both IROGs will communicate through facsimile and email.

3.3 Bangkok IROG will provide the contact points information and periodically update if required.

3.4 Both IROGs will review the back-up procedures and identify areas for improvement.

### 4. Real-time Back-up Test Procedure

4.1 As the back-up test and monitoring could consume considerable resources, both IROGs have agreed to monitor a list of selected ASIA/PAC OPMET bulletins. IROG back-up procedures are to be tested at least annually and will normally be of 6 hours duration, between 0200 and 0800 UTC.

#### 4.2 Communication test

4.2.1 The communication test between the IROGs should be conducted through facsimile and email and advised two days before the test.

#### 4.3 Real-time back-up exercise

4.3.1 On the day of exercise, Singapore IROG shall inform Bangkok IROG to take over its role when it stops sending the selected OPMET messages on the AFTN.

4.3.2 Bangkok IROG shall acknowledge the notification messages and start relaying Asia Pac OPMET Information to WAFC, London.

4.3.3 Both IROGs shall record the reception and transmission of the monitored OPMET bulletins during the exercise.

4.3.4 At the end of back-up test, both IROGs shall resume message switching as per normal after exercising stand-down procedures.

### **5. Assessment**

5.1 Both IROGs shall evaluate the monitoring result and address the following issues during the ROBEX WG meeting:

- (i) Monitoring result in terms of message throughput (comparison of the percentage of messages received against messages relayed);
- (ii) Transit time of the relayed messages;
- (iii) Undertake the necessary follow-up of issues that arose from the exercise; and
- (iv) Verify and develop existing procedures.

## APPENDIX D - Use of WMO Abbreviated Heading

(For use in ROBEX Messages and Bulletins)

1. Each ROBEX bulletin should have a WMO abbreviated heading in accordance with *WMO No. 386, Manual on the Global Telecommunication System, Part II – Operational Procedures for the GTS*. The symbolic form of the WMO abbreviated heading is as follows:

**T<sub>1</sub>T<sub>2</sub>A<sub>1</sub>A<sub>2</sub>ii CCCC YYGGgg (BBB)**

2. Explanation of the symbols
  - 2.1. **T<sub>1</sub>T<sub>2</sub>A<sub>1</sub>A<sub>2</sub>ii** – this group is used in accordance with *WMO No. 386, Manual on the Global Telecommunication System, Part II – Operational Procedures for the GTS, Attachment II-5*.
    - 2.1.1. **T<sub>1</sub>T<sub>2</sub>** - Data type designator, used for OPMET data as follows:

Data type	Abbreviated name	WMO data type designator	
		TAC	IWXXM
Aerodrome reports	METAR	SA	LA
	SPECI	SP	LP
Aerodrome forecasts	TAF: 12 to 30 hour	FT	LC
SIGMET information	SIGMET	WS	LS
	SIGMET for TC	WC	LY
	SIGMET for VA	WV	LV
AIRMET information	AIRMET	WA	LW
Volcanic Ash and Tropical Cyclone Advisories	Volcanic Ash Advisory	FV	LU
	Tropical Cyclone Advisory	FK	LK
Air-reports	AIREP SPECIAL (ARS)	UA	N/A
Space Weather Advisory	SWX Advisory	FN	LN
Administrative	METNO	NO	N/A

*Note: IATA TAF requirements in the ASIA/PAC region are for TAF validity of either 24 or 30 hours. Some States issue 12- and 18-hour TAFs, which do not meet requirements but are nevertheless classified as FT for the WMO data type designator.*

- 2.1.2. **A<sub>1</sub>A<sub>2</sub>** - Geographical designator, composed of two letters, according to *WMO No. 386, Manual on the Global Telecommunication System, Part II – Operational Procedures for the GTS, Attachment II-5, Table C1*. The following principles shall apply:
  - a) For ROBEX bulletins containing OPMET data from a single State or territory, the A<sub>1</sub>A<sub>2</sub> designator should be chosen from Table C1, Part I – Country or territory designator;

- b) For ROBEX bulletins containing OPMET data from more than one State or territory, a suitable A<sub>1</sub>A<sub>2</sub> designator should be chosen from Table C1, Part II – Area Designators;
- c) The part of the Table C1, Part II – Area Designators, which is relevant to the ROBEX scheme, is reproduced below.

<b>A<sub>1</sub>A<sub>2</sub></b>	<b>Country or territory</b>
AH	Afghanistan
AS	Asia
AU	Australia
BD	Brunei Darussalam
BM	Myanmar
BW	Bangladesh
CI	China
ER	United Arab Emirates
GM	Guam Islands
HK	Hong Kong, China
ID	Indonesia
IN	India
JP	Japan
KB	Kiribati
KO	Republic of Korea
KP	Cambodia
KR	Democratic People’s Republic of Korea
KU	Cook Islands
LA	Lao People’s Democratic Republic
MH	Marshall Islands
MS	Malaysia
MU	Macao
MV	Maldives
NC	New Caledonia
NG	Papua New Guinea
NP	Nepal
NV	Vanuatu
NW	Nauru Island
NZ	New Zealand
OC	Oceania
PA	Pacific area
PF	French Polynesia

A <sub>1</sub> A <sub>2</sub>	Country or territory
PH	Philippines
PK	Pakistan
PS	South Pacific area
QT	Qatar
SB	Sri Lanka
SD	Saudi Arabia
SO	Solomon Islands
SR	Singapore
TH	Thailand
TM	Timor
TO	Tonga
TV	Tuvalu
US	United States of America
VS	Vietnam
ZM	Western Samoa

d) For ROBEX bulletins containing SWX Advisories from the designated SWXCs, the A<sub>1</sub>A<sub>2</sub> designator XX is used (see also, paragraph 2.3.).

2.1.3. **ii - series number of the bulletin.** It shall be a number with two digits used to differentiate two or more bulletins with the same TTAA issued by an originator or a compiler of bulletins. “ii” will be unique to each bulletin.

2.1.3.1 The assignment of “ii” to bulletins should be selected from within the following sets:

- ii = 01-19 inclusive for global distribution
- ii = 20-39 inclusive for regional and inter-regional distribution
- ii = 40-89 inclusive for national and bilaterally agreed distribution

2.1.3.2 For most of the ROBEX bulletins, “ii” should be selected from the set “20 – 39”. In the case of METAR/TAF bulletins, ROCs issuing only one bulletin should use "31", whilst ROCs issuing more than one bulletin should use "31", "32", etc.

2.1.3.3 For ROBEX bulletins containing SWX Advisories from the designated SWXCs, the ii designators used are based on each impact type as follows (see also, paragraph 2.3.):

- ii = 01 for GNSS;
- ii = 02 for HF COM;
- ii = 03 for Radiation; and
- ii = 04 for SATCOM.

2.2. **CCCC** – ICAO location indicator, according to Location Indicators, ICAO Doc 7910, of the ROBEX centre preparing the ROBEX Bulletin, or of the

originator (e.g., aeronautical meteorological station, aerodrome meteorological office or NOC).

- 2.3. For ROBEX bulletins containing SWX Advisories from the designated SWXCs, the **T<sub>1</sub>T<sub>2</sub>A<sub>1</sub>A<sub>2</sub>ii CCCC** designators used, based on SWX impact type [ii], SWXC originator location indicator [CCCC], and data type/message form [T<sub>1</sub>T<sub>2</sub>], are as follows:

SWXC	SWX impact	T <sub>1</sub> T <sub>2</sub> A <sub>1</sub> A <sub>2</sub> ii CCCC	
		TAC form	IWXXM form
ACFJ – Australia	GNSS	FNXX01 YMMC	LNXX01 YMMC
	HF COM	FNXX02 YMMC	LNXX02 YMMC
	RADIATION	FNXX03 YMMC	LNXX03 YMMC
	SATCOM	FNXX04 YMMC	LNXX04 YMMC
ACFJ – France	GNSS	FNXX01 LFPW	LNXX01 LFPW
	HF COM	FNXX02 LFPW	LNXX02 LFPW
	RADIATION	FNXX03 LFPW	LNXX03 LFPW
	SATCOM	FNXX04 LFPW	LNXX04 LFPW
CRC – China	GNSS	FNXX01 ZBBB	LNXX01 ZBBB
	HF COM	FNXX02 ZBBB	LNXX02 ZBBB
	RADIATION	FNXX03 ZBBB	LNXX03 ZBBB
	SATCOM	FNXX04 ZBBB	LNXX04 ZBBB
CRC – Russian Federation	GNSS	FNXX01 UUAG	LNXX01 UUAG
	HF COM	FNXX02 UUAG	LNXX02 UUAG
	RADIATION	FNXX03 UUAG	LNXX03 UUAG
	SATCOM	FNXX04 UUAG	LNXX04 UUAG
PECASUS – Finland	GNSS	FNXX01 EFKL	LNXX01 EFKL
	HF COM	FNXX02 EFKL	LNXX02 EFKL
	RADIATION	FNXX03 EFKL	LNXX03 EFKL
	SATCOM	FNXX04 EFKL	LNXX04 EFKL
PECASUS – United Kingdom	GNSS	FNXX01 EGRR	LNXX01 EGRR
	HF COM	FNXX02 EGRR	LNXX02 EGRR
	RADIATION	FNXX03 EGRR	LNXX03 EGRR
	SATCOM	FNXX04 EGRR	LNXX04 EGRR
United States	GNSS	FNXX01 KWNP	LNXX01 KWNP
	HF COM	FNXX02 KWNP	LNXX02 KWNP
	RADIATION	FNXX03 KWNP	LNXX03 KWNP
	SATCOM	FNXX04 KWNP	LNXX04 KWNP

- 2.4. **YYGGgg** – Date-time group as follows:

2.4.1. YY – Day of the month.

2.4.2. GGgg – Hours and minutes:

- For METAR bulletins: the standard time of observation in UTC.
- For TAF bulletins: the full hour in UTC (the last two digits shall be 00) preceding the transmission time.
- For all other bulletin/messages: the time of compilation in UTC.

2.5. **BBB** – Optional group indicating an amended, corrected or delayed bulletin.

2.5.1. An abbreviated heading defined by TTA<sub>A</sub>ii CCCC YYGGgg shall be used only once. Consequently, if this abbreviated heading has to be used again for

## APPENDIX D

an addition, a correction or an amendment, it is mandatory to add an appropriate BBB indicator, which shall be added after the date-time group. The indicator BBB shall be used as follows:

- RRx - for delayed routine meteorological messages/bulletins, and for segmenting a large set of information into several bulletins;
- CCx - for corrections to previously relayed messages/bulletins;
- AAx - for amendments to TAF messages/bulletins;

The “x” above is an alphabetic character of A through X, indicating the sequential number of the irregular bulletin of a certain type. For instance, for amended TAFs, AAA is used for the first amendment, AAB for the second, AAC for the third, etc.; for delayed METARs or TAFs, RRA is used for the first delayed message, RRB for the second, etc.; and, for corrections to any OPMET bulletin, CCA is used for the first correction, CCB for the second, etc.

- 2.5.2. The current limitation of the AFTN regarding the length of the bulletins is up to 1800 characters (note that the WMO Header and spaces are counted as characters). Bulletins longer than this will be split into two parts; in such a case, the optional group RRx is used for additional or subsequent issuances of messages with the same abbreviated heading line, including the YYGGgg regardless of whether these reports are on time, late or delayed. In the ASIA/PAC Region, RRA is used for the second part of a split bulletin. An example of a split bulletin using RRA is shown below.

**Example****First Part**

```
GG WSSSYMYX
171000 VABBYMYX
FTIN32 VABB 170900
TAF VCBI 170940Z 1712/1812 23012KT 9999 SCT016 TX30/1808Z
TN27/1723Z TEMPO 1714/1718 7000 -SHRA FEW010 SCT016
TEMPO 1723/1802 7000 -SHRA SCT010 BKN016=
TAF VNKT 170900Z NIL=
TAF VOVI 170900Z 1712/1818 29005KT 4000 -RA/HZ SCT015 SCT020
FEW025CB BKN100 BECMG 1716/1717 3000 -RA/HZ TEMPO 1712/1721
1500 TSRA/SHRA SCT008 SCT012 FEW025CB OVC080 BECMG
1804/1805 30005KT 4000 HZ BECMG 1806/1807 27010KT 5000 -RA/HZ
TEMPO 1809/1815 1500 TSRA/SHRA SCT008 SCT012 FEW025CB
OVC080 BECMG 1816/1817 3000 HZ=
TAF VOCL 170900Z 1712/1818 33005KT 4000 -RA/HZ SCT015 SCT020
FEW025CB BKN100 BECMG 1716/1717 3000 -RA/HZ TEMPO 1712/1721
2000 TSRA/SHRA SCT008 SCT012 FEW025CB OVC080 BECMG
1804/1805 35005KT 5000 HZ BECMG 1806/1807 32010KT 5000 -RA/HZ
TEMPO 1809/1815 2000 TSRA/SHRA SCT008 SCT012 FEW025CB
OVC080 BECMG 1816/1817 3000 HZ=
TAF VOHS 170900Z 1712/1818 27010G20KT 6000 SCT020 SCT100
TEMPO 1712/1718 3000 -TSRA/RA SCT015 FEW025CB BKN080 TEMPO
1721/1803 3000 -TSRA/RA/HZ SCT015 FEW025CB BKN080 TEMPO
1809/1818 3000 -TSRA/RA SCT015 FEW025CB BKN080=
TAF VOHY 170900Z NIL=
```

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TAF VOMM 170900Z 1712/1818 17010KT 6000 SCT020 BKN100 TEMPO  
1712/1718 SCT015 FEW025CB BKN100 BECMG 1720/1721 21010KT  
SCT020 BECMG 1803/1804 27010KT 8000 FEW020 SCT100 BECMG  
1810/1811 13010KT TEMPO 1812/1815 SCT015 FEW025CB BKN100  
BECMG 1813/1814 6000=

TAF VOTR 170900Z 1712/1818 27010KT 6000 SCT020 SCT100 TEMPO  
1712/1715 SCT015 FEW025CB BKN100 BECMG 1716/1717 33005KT  
FEW020 BECMG 1803/1804 27010G20KT 8000 FEW020 SCT250 BECMG  
1812/1813 27005KT 6000 TEMPO 1812/1815 SCT015 FEW025CB  
BKN100=

**Second Part**

GG WSSSYMYX

171000 VABBYMYX

FTIN31 VABB 170900 **RRA**

TAF VIJP 170900Z 1712/1818 28006KT 4000 HZ FEW030 BECMG  
1803/1805 29005G15KT 3000 HZ FEW030 SCT100 TEMPO 1712/1716  
FEW030CB=

TAF VILK 170900Z 1712/1721 34005KT 6000 NSC BEC 1716/1718  
VRB02KT 5000 HZ=



## APPENDIX E – Procedure and Format of METNO bulletin for APAC ROBEX Bulletins

### 1. METNO Procedure – General rules

1.1. Modification requests to the production of national OPMET-data shall be reported by the NOC (National OPMET Centre) to the Regional OPMET Centre (ROC). The ROC then forwards the requests to the regional Focal point (FP) or regional Team for publication, evaluation and FP processing accepted changes.

1.1.1. The regional FP or regional Team verifies the conformity of the change proposal against ICAO DOC 7910 (only registered Location Indicators can be accepted), ANP Volume II – MET tables, WMO No. 386 documents, and the syntax conforms to the METNO procedure. Implementation of IWXXM data: no IWXXM without TAC will be accepted. In addition, separated bulletins will be produced for AOP airport and agreed exchanged non-AOP airports OPMET data.

1.2. Modification requests for an upcoming AIRAC date have to be sent at the latest by the preceding AIRAC date. This will guarantee that all subsequent steps can be performed in time. For planning purposes, modification requests should be provided well in advance (between 30 and 60 days before the AIRAC date) to allow full assessment by the regional FP (or regional group in charge of OPMET) and to provide confirmation to the originator that all changes will be made at the required date.

1.3. The regional FP will summarize all requests and present those via email to the regional group in charge of OPMET at the latest seven days after the preceding AIRAC date.

1.4. The regional group members will review the requests and shall communicate any comments to the FP at the latest 14 days after the preceding (14 days before the upcoming) AIRAC date. Nil comments shall be considered as a positive response.

1.5. At 21 days after the preceding (7 days before the upcoming) AIRAC date, the FP shall announce the list of accepted amendments to the ICAO Regional Office, the NOCs by means of a standard formatted METNO message for routine meteorological information sent via Aeronautical Fixed Service (AFS - SADIS and WIFS by their regional associated ROC).

1.6. The involved NOCs, in turn, shall notify users in their State about their requested modifications.

1.7. In addition, regional contacts (as agreed during regional MET meetings) will receive a confirmation by email. Motivated subscription to (or to unsubscribe from) the METNO Bulletins can be submitted via the regional MET Group or directly by utilizing the contact form provided on the regional Website (where available).

1.8. The modifications shall be implemented by all affected centres on AIRAC date, at 02:00 UTC or when a new bulletin header is created, on opening hours the day before the implementation date.

1.9. The AIRAC OPMET data updates shall be applied by: The ROCs and IROGs for routing the current OPMET data in accordance with the regional dissemination Schema.

1.10. In order to avoid difficulties in processing OPMET Data modifications during major holidays, it can be decided to skip a particular AIRAC Cycle occurring in these periods.

1.11. For urgent modification, it can be decided with the explicit agreement of the regional METNO focal point/regional team to proceed more quickly by a deviation to the normal schedule. The FP/regional team will compile AIRAC METNO, or EXTRA METNO for intermediate updates with immediate implementation of new or expiring bulletins.

1.12. Key issues to be considered for the management of AFS data traffic volumes are:

- Avoid data duplication
- Authenticated data only
- ANP required data (AOP)
- Agreed exchanged Non-AOP data

1.13. Standardized Regional OPMET Data Catalogues, including METNO-registered data, can be compiled from the database of METNO-registered OPMET data: TAC & IWXXM, on AFS:

- Regional OPMET Database (RODB) catalogue
- Regional and Global OPMET data catalogues

## **2. Format and Content of the METNO-message**

2.1. The METNO Syntax: The syntax of a METNO statement is presented hereafter. It may also include the list of AFS addressees actually used as well as examples for the various OPMET data update METNO statements.

2.2. The METNO Header: The header of the METNO bulletin is NOXX31 CCCC YYGGgg, where:

- XX is a general area designator (example: EU for EUR, AF for AFI ...)
- CCCC is the AFTN location indicator of the regional FP Centre (example: EBBR for EUR)

2.3. The METNO statements for registration and updating of OPMET / IWXXM data are:

- ADDRPT/RMVRPT: for adding/removing Routine OPMET data in an already registered bulletin
- NEWBUL/DELBUL: for registering a new/unregistering an expiring (Non-)Routine OPMET bulletin and its contained data

### **2.3.1. ADDRPT**

2.3.1.1. This statement is used when a new location indicator is added to an already registered bulletin. It can be used in combination with METAR or TAF bulletins.

2.3.1.2. Adding TAC-formatted METARs/TAFs to a registered bulletin does not automatically register the IWXXM equivalent data. TAC data can exist without an IWXXM until November 2020.

2.3.1.3. Adding IWXXM METARs/TAFs to a registered bulletin will, by default, result in adding the equivalent TAC METARs/TAFs for their parallel distribution. There can be no IWXXM data without any equivalent TAC-formatted version of the data.

### **2.3.2. RMVRPT**

2.3.2.1. This statement is used for METARs/TAFs planned to be removed from an already registered bulletin. Removed reports can possibly be registered for all locations in other existing or in newly registered bulletins.

2.3.2.2. Removing TAC-formatted METARs/TAFs from a registered bulletin will also remove the equivalent IWXXM data from the OPMET data register in case it has already been registered. There is no IWXXM data without equivalent TAC-formatted data.

2.3.2.3. Removing IWXXM METARs/TAFs will by default result in removing equivalent TAC METARs/TAFs from the OPMET data register. If the TAC data need to be continued, it has to be re-registered explicitly, using ADDRPT.

### 2.3.3. NEWBUL

2.3.3.1. This statement is used for the registration of a new bulletin. It can be used for all supported data.

2.3.3.2. The registration of a new IWXXM bulletin by default implies the introduction of the TAC equivalent.

### 2.3.4. DELBUL

2.3.4.1. This statement is used for the deletion of a registered bulletin. It can be used for all supported data types.

2.3.4.2. The deletion of a registered IWXXM bulletin automatically implies the deletion of the TAC equivalent. TAC equivalents that are meant to be continued have to be re-introduced explicitly by applying NEWBUL.

2.3.4.3. Deletion of a TAC OPMET bulletin, by default, also deletes the IWXXM equivalent.

## 3. METNO Focal Point – Prerequisites and Actions

3.1. The Focal Point (FP)/regional group prerequisites are:

- Generic email address (including FP persons and backups)
- AFS connection address
- Access to ICAO references (documents and Regional contacts)
- Data management software for processing basic lists of METNO-registered data to be shared inter-regionally in standardized international data formats (\*.csv, \*.txt)

3.2. The FP/regional group receives update requests any time by email:

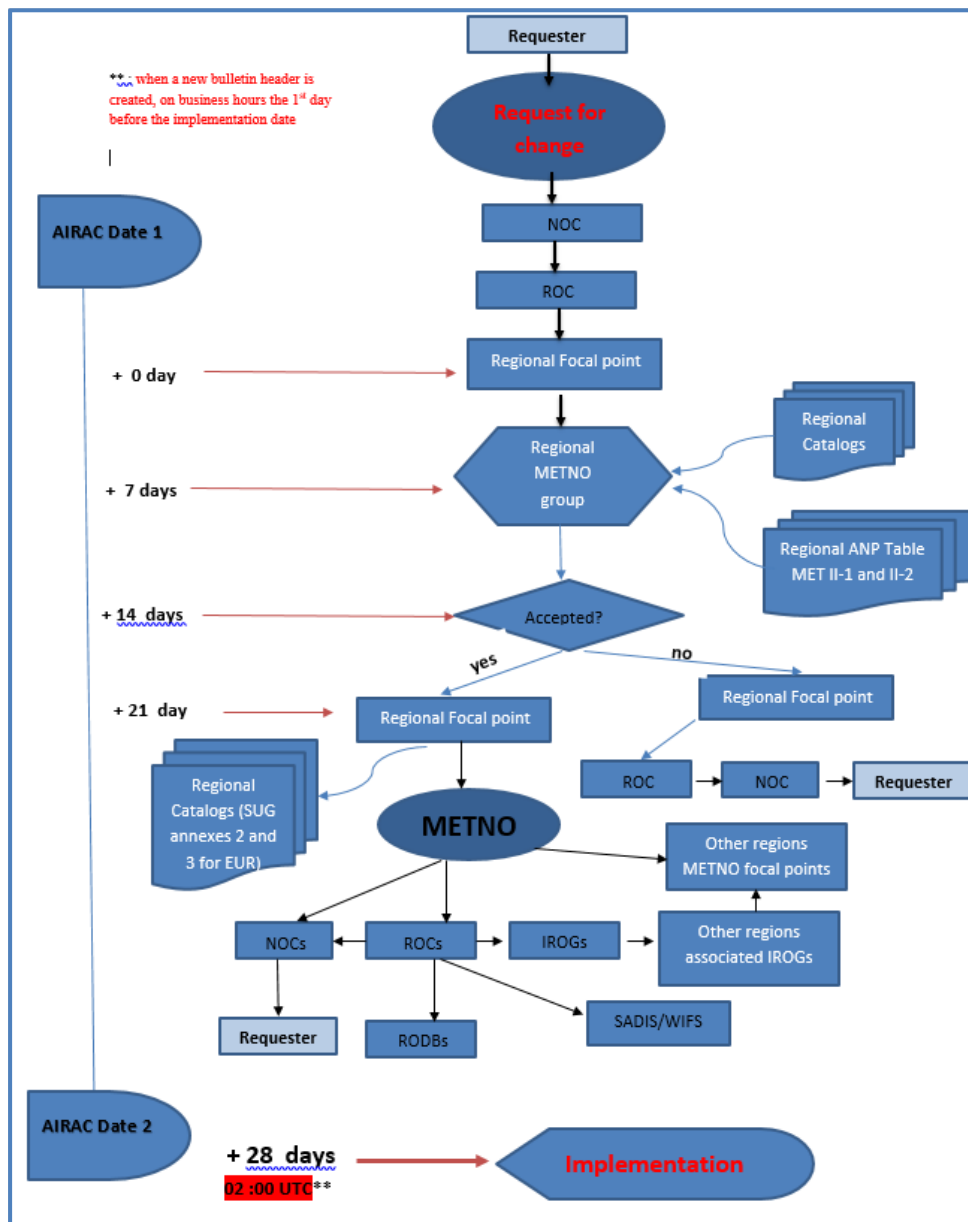
- Preferably via ROC, but also from NOCs
- After authentication, sort updates based on the suggested implementation date (AIRAC if no date proposed)
- Compiles AIRAC METNO or EXTRA METNO for intermediate updates with immediate implementation of new or expiring bulletins

3.3. Forward requests for ANP additional OPMET data via email to the Regional ICAO Office contact.

3.4. Co-ordination and evaluation of received update requests via email.

- 3.5. Compilation of AIRAC / EXTRA METNO bulletin for distribution to regional ROCs / IROGs.
- 3.6. Maintenance of regional METNOs and registered OPMET data.
- 3.7. Reports to OPMET regional group.
- 3.8. Facilitates OPMET data monitoring.
- 3.9. The regional focal point and team for management of the METNO process would include the relevant ICAO Regional Officer and ROBEX Focal Points from Australia, Hong Kong, China, Japan and Singapore.

#### 4. METNO Process Diagram



**APPENDIX F - OPMET Quality Control and Monitoring Procedures**

**1 Quality Control Procedures**

1.1 *OPMET Data Validation*

1.1.1 The ROCs and RODBs should not modify the content of the meteorological data, e.g. visibility, QNH etc., but only items contained in the WMO bulletin headings, such as location indicators or observation times.

1.1.2 WMO Abbreviated Heading (TTAAii CCCC YYGGgg BBB) Validation

TT	Message Type; shall comprise two alphabetical characters
AA	Location Indicator; shall comprise two alphabetical characters
ii	comprise two digits, from 01 to 99
CCCC	A 4-letter ICAO location indicator shall comprise four alphabetical characters.
YYGGgg	The date-time group of the bulletin shall be configured to validate it with the current time
BBB	BBB is an optional group. The use of the BBB group shall comply with the rules in the WMO abbreviated heading in regard to delayed, corrected and amended bulletins.

Examples	After QC check
METAR with incorrect YYGGgg:  SABM31 VYMD 100830 <b>UTC</b> VYMD 100830Z 18005KT 8000 FEW025 31/18 Q1000 =	SABM31 VYMD <b>100830</b> VYMD 100830Z 18005KT 8000 FEW025 31/18 Q1000 =
TAF without AHL:  112324 WIDDYMYX TAF WIDD 112324Z 1200/1224 00000KT 4000 RA BKNT017 BECMG 1203/1205 20010KT 9000 SCT017=	<b>FTID31 WIDD 112300</b> TAF WIDD 112324Z 1200/1224 00000KT 4000 RA BKNT017 BECMG 1203/1205 20010KT 9000 SCT017=
TAF with invalid BBB:  FTBN31 OBBI 030525 <b>AMD</b> TAF AMD OBBI 030525Z 0306/0406 16010KT CAVOK BECMG 0308/0312 33017KT 5000 PROB30 TEMPO 0308/0314 0800 DU=	FTBN31 OBBI 030525 <b>AAA</b> TAF AMD OBBI 030525Z 0306/0406 16010KT CAVOK BECMG 0308/0312 33017KT 5000 PROB30 TEMPO 0308/0314 0800 DU=

1.1.3 METAR/SPECI Validation

For each individual METAR or SPECI within a bulletin, the following additional fields shall be validated:

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Prefix checks	METAR METAR COR SPECI SPECI COR	SA SA SP SP
Observation Time YYGGggZ	The report shall have a valid date and time of observation, including the character 'Z'. In a SPECI bulletin, this group will be the same as (or very close to) the YYGGgg, part of the abbreviated bulletin heading.	
End-of-message format “=”	Each METAR or SPECI report shall be terminated by the "=" character.	

Examples:	After QC check
METAR with Observation Time error:  SAPK31 OPKC <b>030159</b> RRA OPKC <b>030200</b> 26004 8000 BKN020 27/23 Q1007 NOSIG=	SAPK31 OPKC <b>030200</b> RRA OPKC <b>030200</b> 26004 8000 BKN020 27/23 Q1007 NOSIG=
METAR with mistyped observation time:  SAID31 WADD <b>120100</b> METAR WADD <b>121000Z</b> 17004KT 9999 FEW018CB SCT120 BKN300 28/26 Q1005=	SAXX31 WADD <b>120100</b> METAR WADD <b>120100Z</b> 17004KT 9999 FEW018CB SCT120 BKN300 28/26 Q1005=
SPECI with incorrect Message Type, TT:  <b>SANZ31</b> NZKL 040000 <b>SPECI</b> NZWP 040000Z 17005KT 010V240 25KM FEW020 FEW020CB SCT035 BKN050 18/15 Q1018 NOSIG=	<b>SPNZ31</b> NZKL 040000 AAA <b>SPECI</b> NZWP 040000Z 17005KT 010V240 25KM FEW020 FEW020CB SCT035 BKN050 18/15 Q1018 NOSIG=

1.1.4

TAF Validation

For each individual TAF within a bulletin, the following additional items shall be validated:

Prefix checks	TAF TAF COR TAF AMD	FT or FC FT or FC FT or FC
Issue Time YYGGggZ	If the field is included, it shall have a valid date and time of origin of the forecast, including 'Z'.	
Validity Y <sub>1</sub> Y <sub>1</sub> G <sub>1</sub> G <sub>1</sub> /Y <sub>2</sub> Y <sub>2</sub> G <sub>2</sub> G <sub>2</sub>	Some TAFs are still produced with a 4-digit validity period. These shall be corrected by inserting a date consistent with the current date and the date-time group of the bulletin header. If a TAF is received without a validity period, it shall be discarded.	
End-of-Message format “=”	Each forecast shall be terminated by the "=" character.	

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Examples:	After QC check
TAF with issue time error (wrong date):  FCID31 WIII 181630 TAF WIII <b>041630Z</b> 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=	FCID31 WIII 181630 TAF WIII <b>181630Z</b> 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=
TAF with mistyped Validity Period:  FTPH31 RPLL 132200 TAF RPLC 132200Z <b>1400/1428</b> 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 –SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=	FTPH31 RPLL 132200 TAF RPLC 132200Z <b>1400/1424</b> 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 –SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=
TAF with Validity error (wrong date):  FCMS33 WMKK 170748 TAF WMKK 170700Z <b>3009/3018</b> 30005KT 9999 FEW017CB SCT140 BKN270=	FCMS33 WMKK 170748 TAF WMKK 170700Z <b>1709/1718</b> 30005KT 9999 FEW017CB SCT140 BKN270=
TAF with 4-digit Validity period:  FTXX31 WIDD 170121 TAF WIDD <b>0618</b> 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000=	FTXX31 WIDD 170121 TAF WIDD <b>1706/1718</b> 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000=

1.1.5

SIGMET Validation

CCCC on the AHL	A valid 4-letter ICAO location indicator indicating the FIR for which the SIGMET was.	
Prefix checks	SIGMET for TS, TURB, ICE, MTW, DS, SS and RDOACT CLD SIGMET for VA SIGMET for TC	WS  WV WC
Validity Period DDHHMM/DDHHMM	Shall have a valid period of validity. Validity periods may be corrected if: <ul style="list-style-type: none"> <li>• Missing VALID string</li> <li>• Incorrect SIGMET number format</li> <li>• Incorrectly formatted validity period</li> </ul>	
Note: For SIGMET validation, please refer to the format described in the ASIA/PAC Regional SIGMET Guide.		

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Examples:	After QC check
<p>SIGMET without TTAAii:</p> <p><b>SIGMET</b> OYSN 121525Z OYSC SIGMET 1 VALID 121530/122130 OYSN- SANAA FIR EMBD TS OBS/FCST OVER WESTERN AND SOUTHWESTERN MOUNTAINS AND COASTAL AREAS CB TOPS FL36 NC=</p>	<p><b>WSXX31</b> OYSN 121525Z OYSC SIGMET 1 VALID 121530/122130 OYSN- SANAA FIR EMBD TS OBS/FCST OVER WESTERN AND SOUTHWESTERN MOUNTAINS AND COASTAL AREAS CB TOPS FL36 NC=</p>
<p>SIGMET with incorrect number format</p> <p>WCPH30 RPLL 210445 SIGMET <b>NO 01</b> VALID 210000/210600 RPLL TC OBS N0830 E12900 ....=</p>	<p>WCPH30 RPLL 210445 SIGMET <b>01</b> VALID 210000/210600 RPLL TC OBS N0830 E12900 ... =</p>
<p>SIGMET with incorrectly formatted validity period:</p> <p>WSIN90 VIDP 181800 VIDP SIGMET 06 VALID <b>18/1600 TO 18/2000</b> <b>UTC</b> VIDP- DELHI FIR EMBD TS ... =</p> <p>WSSD20 OEJD 220503 OEJD SIGMET 01 VALID <b>220500 TO 220900</b> OEJN- JEDDAH FIR ....=</p>	<p>WSIN90 VIDP 181800 VIDP SIGMET 06 VALID <b>181600/182000</b> VIDP- DELHI FIR EMBD TS ... =</p> <p>WSSD20 OEJD 220503 OEJD SIGMET 01 VALID <b>220500/220900</b> OEJN- JEDDAH FIR ... =</p>

1.2

Quality Control Methods

OPMET Data	Elements Defining	Control Methods
<p>METAR METAR COR SPECI  (SA,SP)</p>	<ul style="list-style-type: none"> <li>• AHL</li> <li>• Code name</li> <li>• Observation date/time</li> </ul>	<p>Software verification</p> <p>Manual validate</p> <p>Periodic Quality Control &amp; PI Monitoring</p>
<p>TAF TAF AMD TAF COR  (FT,FC)</p>	<ul style="list-style-type: none"> <li>• AHL</li> <li>• Code name</li> <li>• Originating station ICAO location indicator</li> <li>• Date/time of issue</li> <li>• Date, time of starting, time of the end of the period the forecast refers to</li> </ul>	<p>Software verification</p> <p>Manual validate</p> <p>Periodic Quality Control &amp; PI Monitoring</p>
<p>SIGMET (WS, WC, WV)</p>	<ul style="list-style-type: none"> <li>• AHL</li> <li>• SIGMET Sequence No</li> <li>• Date/time groups indicating the period of validity</li> </ul> <p>Additional Checks (recommended):</p>	<p>Software verification</p> <p>Manual validate</p> <p>Periodic SIGMET Quality Control Monitoring</p>



	<ul style="list-style-type: none"> <li>Name of the FIR or the CTA the message is issued for</li> <li>Location indicator of the MWO originating the message</li> </ul>	
Volcanic Ash Advisory FV	<ul style="list-style-type: none"> <li>Type of message</li> <li>Issue date and time</li> </ul> <p>Additional Checks (recommended):</p> <ul style="list-style-type: none"> <li>Location indicator or name of the VAAC centre originating the message</li> </ul>	<p>Software verification</p> <p>Manual validate</p> <p>Periodic VA Quality Control Monitoring</p>
Tropical Cyclone Advisory FK	<ul style="list-style-type: none"> <li>Type of message</li> <li>Issue date and time</li> </ul> <p>Additional Checks (recommended):</p> <ul style="list-style-type: none"> <li>Location indicator or name of the TCAC centre originating the message</li> </ul>	<p>Software verification</p> <p>Manual validate</p> <p>Periodic TC Quality Control Monitoring</p>

## 2 OPMET Monitoring

### 2.1 Monitoring of Scheduled OPMET data

2.1.1 Performance Indicators (PIs). The indices to be used by the RODBs are based on those developed by the European Bulletin Management Group BMG) (refer to the *EUR OPMET Data Management Handbook, Appendix F, Output Performance Indices*).

#### *(i) Compliance Index*

The ROBEX Compliance index can be calculated from:

$$V_{bul\ compliance} = \frac{\text{No of reports received for a bulletin}}{\text{No of reports required for the bulletin}}$$

The Compliance Index is to assess the level of compliance to the ROBEX scheme. The determination of the compliance index is performed as follows:

- The total number of reports received for ROBEX bulletin during the monitoring period, including reports in the retard bulletins.
- Weed out correction and amendment bulletins, as these are re-transmitted messages, can be disregarded.

**Explanation:**

**No. of reports received for a bulletin** is the number of reports that are not “NIL.” In other words, do not count the reports that are “NIL.” In addition, do not count reports that are corrections and amendments in nature. However, the assessment should include the delayed reports in the retard bulletins.

**No. of reports required for a bulletin** is the number of reports that each RODB should expect to receive within each particular bulletin.

**Procedure:**

1. For each day, run through the aerodromes within each bulletin. Count the number of reports that do not contain optional elements and are not “NIL.” Alternatively, count the number of reports that contain “Optional RRX
2. For each day, calculate the required number of reports for each bulletin by adding the number of required reports for each aerodrome listed in each bulletin.
3. For each day, calculate the compliance index by taking the ratio of the No. of reports received for a bulletin (calculated in 1.) and the number of reports required for a bulletin (calculated in 2.).
4. To calculate the monthly compliance index, add up the compliance index (calculated in 3.) of all the days in a month and divide by the number of days in the month, e.g.,  $288/288 + 240/288 + 288/288 + \dots + 288/288 \Rightarrow$  (31 elements for 31 days)
5. Alternatively, to calculate the monthly compliance index, add up the number of reports received for a bulletin (calculated in 1.) for all the days in a month and divide by the number of reports required for a bulletin (calculated in 2.) in that month.

**Example 1:**

Bulletin SAIN33 includes six aerodromes (VECC, VEPT, VGEG, VGHS, VNKT and VQPR). For each aerodrome, the number of reports required for a bulletin equals  $2 \times 24 = 48$  reports. Because the official observation time of the bulletin is at every hour and half-hour (i.e., HH+00 and HH+30), resulting in two reports for each of the 24 hours in each day. If only on the 2nd of March, the RODB does not receive reports from one aerodrome. Calculate the compliance index for Bulletin SAIN33 in March.

**Answer:**

No. of reports received for a bulletin  
 $= (6 \text{ aerodromes} \times 48 \text{ reports} \times 30 \text{ days}) + (5 \text{ aerodromes} \times 48 \text{ reports} \times 1 \text{ day})$   
 $= 8,640 + 240$   
 $= 8,880$   
No. of reports required for a bulletin  
 $= (6 \text{ aerodromes} \times 48 \text{ reports} \times 31 \text{ days}) = 8,928$   
March compliance index  $= 8,880/8,928 = 0.9946$

**(ii) Availability Index**

The availability index measures the current coverage of the OPMET distribution against the ROBEX exchange requirements. The determination of the availability index is performed on a daily basis from the data captured during the monitoring period. If at least one non-NIL report is received from the aerodrome during the 24-hour period, that aerodrome is considered to have

been available. The daily availability index of a particular bulletin can be calculated as:

$$V_{bul\ availability} = \frac{\text{No of aerodromes for which one or more non-NIL data type are received}}{\text{No of aerodromes required in the bulletins}}$$

**NIL data type** is defined as a data element that reports there are no observations (SA) or forecasts (FT).

**Non-NIL data type** is defined as a data element that is not “NIL”, i.e. not (METAR VTBD 270200Z NIL=).

**No of aerodromes for which one or more non-NIL data types are received** is the number of aerodromes that receive one or more Non-NIL data types within a period of one day or 24 hours.

**No of aerodromes required in the bulletins** is the total number of aerodromes listed in the bulletin from which RODB should receive data.

**For example, the Bulletin SAIN33:**

SAIN33 VECC 012350  
 METAR VECC 012350Z 16004KT 2500 HZ SCT018 BKN100 28/26 Q0996  
 NOSIG=  
 METAR VEPT 012350Z NIL=  
 METAR VGEG 012350Z 14007KT 6000 SCT015 BKN100 27/26 Q0998  
 NOSIG=  
 METAR VGHS 012350Z 17005KT 4000 HZ BKN010 OVC100 28/25 Q0997  
 TEMPO RA=  
 METAR VNKT 012350Z NIL=  
 METAR VQPR 012350Z NIL=

The number of aerodromes required in the bulletin SASD31 for that particular day is 6 aerodromes.

**Procedure:**

1. For each day or the period of 24 hours, obtain the number of aerodromes required in the bulletin.
2. For each day or the period of 24 hours, run through the aerodromes within each bulletin. Count the numbers of reports received from each aerodrome that contain Non-NIL data type. If the number exceeds zero, then that aerodrome receives one point, else zero points. Add up the points of each aerodrome to obtain the number of aerodromes for which one or more non-NIL data type is received.
3. For each day, calculate the availability index by taking the ratio of the number of aerodromes for which one or more non-NIL data types are received (calculated in 2.) and the number of aerodromes required in the bulletin (calculated in 1.).
4. To calculate the monthly availability index, add up the daily availability index (calculated in 3.) of all the days in a month and divide by the number of days in the month, e.g., 6/6 + 6/6 + 6/6 + 5/6 + 4/6 + 6/6 + ..... + 2/6 => (31 elements for 31 days).

5. Alternatively, to calculate the monthly availability index, add up the number of aerodromes for which one or more non-NIL data types are received (calculated in 2.) for all the days in a month and divide by the number of aerodromes required in the bulletin (calculated in 1.) in that month.

**Example 2:**

Bulletin SAIN33 continued from example 1.  
 Calculate the availability index for Bulletin SAIN33 in March.?

**Answer:**

No. of aerodromes required in the bulletin  
 = 6 aerodromes \*31 days  
 = 186  
 No of aerodromes for which one or more non-NIL data type are received  
 = (6 aerodromes\*30 days) + (5 aerodromes\*1 day)  
 = 180 + 5  
 = 185  
 March availability index = 185/186 = 0.9946

**(iii) Regularity Index**

The regularity index measures the consistency in the number of reports provided by an aerodrome. The computation of the Regularity Index assumes that the number of reports follows a normal distribution and attempts to ascertain the distribution characteristics (mean and standard deviation) from a set of data. These characteristics are used to determine if the subsequent number of reports from an aerodrome is “regular”.

Denoting mean and standard deviation by  $\mu$  and  $\sigma$ , a threshold report numbers ( $\tau$ ) can be established as:

$$\tau = \mu - \sigma$$

The threshold is a reporting characteristic of an aerodrome. If the subsequent daily number of reports meets or exceeds the threshold, it is considered “regular”. The daily regularity index for a bulletin can be expressed as:

$$V_{bul\ regularity} = \frac{\text{No of aerodromes for which the number of reports equals or exceeds the threshold}}{\text{No of aerodromes required in the bulletin}}$$

The **threshold** is the number of reports provided by the aerodrome, which is considered “regular.” This number is defined by calculating the statistics (mean and standard deviation) of the number of reports provided by the aerodrome within a time frame, e.g., six months, one year, or five years.

**No of aerodromes which the number of reports exceeds the threshold** is the number of aerodromes that provide more than  $\tau$  reports within a period of one day or 24 hours.

**No of aerodromes required in the bulletin** is the total number of aerodromes listed in the bulletin from which RODB should receive data from.

**Procedure:**

1. Calculate the threshold for each aerodrome within the RODB's responsibility by collecting the number of reports each aerodrome receives within the given time frame.
2. For each aerodrome, find the mean (average) and standard deviation (deviation from the mean), e.g., for a time frame of five days (for simplicity), VECC provides daily 10, 7, 10, 8, and 9 reports respectively, therefore, Mean =  $(10+7+10+8+9)/5 = 8.8$  and Standard deviation =  $\sqrt{[(10-8.8)^2+(7-8.8)^2+(10-8.8)^2+(8-8.8)^2+(9-8.8)^2] / 5} = 1.304$
3. Calculate the threshold by subtracting the standard deviation from the mean. From the above example, the threshold  $\tau = 8.8-1.304 = 7.45$  reports.
4. For each day or the period of 24 hours, run through the aerodromes within each bulletin. Count the number of reports received from each. If the number exceeds  $\tau$ , then that aerodrome receives one point, else zero point. Add up the points of each aerodrome to obtain the No of aerodromes which the number of reports exceeds the threshold.
5. For each day or the period of 24 hours, obtain the number of aerodromes required in the bulletin.
6. For each day, calculate the regularity index by taking the ratio of the number of aerodromes which the number of reports exceeds the threshold (calculated in 4) and the number of aerodromes required in the bulletin (calculated in 5).
7. To calculate monthly regularity index, add up the daily availability index (calculated in 3) of all the days in a month and divide by the number of days in month, e.g.,  $6/6 + 6/6 + 6/6 + 5/6 + 4/6 + 6/6 + \dots + 2/6 \Rightarrow$  (31 elements for 31 days).
8. Alternatively, to calculate the monthly availability index, add up the number of aerodromes in which the number of reports exceeds the threshold (calculated in 4) for all the days in a month and divide by the number of aerodromes required in the bulletin (calculated in 5) in that month.

**Example 3:**

Bulletin SAIN33 continued from example 1.

Aerodrome	Threshold
VECC	10 reports
VEPT	10 reports
VGEG	10 reports
VGHS	10 reports
VNKT	10 reports
VQPR	10 reports

If on the 2<sup>nd</sup> and 15<sup>th</sup> of March, the RODB does not receive reports from VQPR and on 15<sup>th</sup> of March, the RODB does not receive reports from VGEG. On any other days, all the aerodromes provided more than ten reports. Calculate the regularity index for Bulletin SAIN33 in March.

**Answer:**

No. of aerodromes required in the bulletin = 6 aerodromes \*31 days = 186

No of aerodromes which the number of reports exceeds the threshold  
= (6 aerodromes\*29 days) + (5 aerodromes\*2 days)  
= 174 + 10 = 184

March regularity index = 184/186 = 0.9892

2.2 Monitoring of non-scheduled OPMET data

2.2.1 Monitoring of non-scheduled OPMET data should be executed for FK, FV, WC, WS, and WV types of bulletins.

2.2.2 The monitoring results should be presented in a bulletin-oriented format, one line per bulletin indicating the abbreviated header (TTAAii CCCC YGGgg), the FIR/UIR where applicable, receipt time and originator.

2.2.3 Example non-routine OPMET monitoring result file formats:

TT	AAii	CCCC	YGGgg	FIR/UIR	Rx Time	Origin
WS	PF21	NTAA	271004	NTTT	271004	NTAAYMYX
WS	IN90	VIDP	271000	VIDP	271007	VECCYMYX
WS	BW20	VGZR	271100	VGZR	271030	VGZRYMYX
WS	CI31	RCTP	271150	RCTP	271150	RCTPYMYX
WS	MS31	WMKK	272013	WBFC	272013	WMKKYMYX
WS	CI35	ZGGG	272225	ZGZU	272228	ZGGGYZYX
FV	AU01	ADRM	270323		270330	YMMCYMYX
FK	PQ30	RJTD	270500		270504	RJTDYMYX

*Explanation of the table:*

- TT: Type of bulletin FK, FV, WC, WS, WV
- AAii: Bulletin ID
- CCCC: Compiling Station
- YGGgg: Standard time of the report
- FIR/UIR: ICAO Location indicator of the FIR/UIR or blank (4 spaces) as applicable

- *RxTime: Time of receipt*
- *Origin: Originator address.*

2.2.4 Analysis of Monitoring Results:

2.2.4.1 Each RODB collects and analyses the relevant result in order to determine the effectiveness and suitability of the quality management system and to highlight any possible improvement to the ICAO Office, Bangkok.

2.3 Examples of Monitoring Results – PI Measurements

The following tables show values of Compliance, Availability and Regularity Index for ASIA/PAC OPMET bulletins compiled by the Singapore RODB in March 2005:

TABLE A	ROBEX Compliance Index		
	SA	FT	FC
AE31 VECC	0.81	--	
AS31 VABB	---	0.99	
AS31 VTBB	0.96	0.99	
SA32 VABB	--	0.98	
AS32 VTBB	--	0.85	
AU31 YBBN	1.00	0.99	0.97
AU32 YBBN	0.98	0.94	
BN31 OBBI	0.96	0.92	
BN32 OBBI	0.94	0.95	
CI31 ZBBB	0.99	0.99	
CI32 ZBBB	0.99	0.99	
CI41 ZBBB	0.93	0.99	
EG31 HECA	--	0.85	
HK31 VHHH	0.99	0.99	1.00
ID31 WIII	0.74	--	
IN31 VIDP	--	0.97	
IN31 VABB	0.74	--	0.97
IN32 VIDP	0.73	--	
IR31 OIII	0.84	0.93	
JP31 RJTD	1.00	1.00	1.00
JP32 RJTD	1.00	1.00	1.00
KO31 RKSI	1.00	0.96	
ME31 OLBA	--	0.86	
MS31 WMKK	1.00	--	
NZ31 NZKL	0.95	1.00	
PK31 OPKC	0.91	0.80	
SB31 VCCC	0.97	--	
SD31 OEJD	0.95	--	
SR31 WSSS	--	0.98	0.99
SR32 WSSS	--	1.00	
TH31 VTBB	0.67	1.00	
TH32 VTBB	0.76	0.91	
TH33 VTBB	0.75	0.94	

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**Note:** Entry dashed out ( -- ) means no reports of this type (SA or FT) are required

TABLE B	Availability Index		
	SA	FT	FC
AE31 VECC	0.98	--	
AS31 VABB	--	1.00	
AS31 VTBB	0.99	1.00	
SA32 VABB	--	0.99	
AS32 VTBB	--	0.96	
AU31 YBBN	1.00	1.00	1.00
AU32 YBBN	1.00	1.00	
BN31 OBBI	1.00	1.00	
BN32 OBBI	1.00	0.99	
CI31 ZBBB	1.00	1.00	
CI32 ZBBB	1.00	1.00	
CI41 ZBBB	1.00	1.00	
EG31 HECA	--	1.00	
HK31 VHHH	1.00	1.00	1.00
ID31 WIII	0.98	--	
IN31 VIDP	--	1.00	
IN31 VABB	1.00	--	1.00
IN32 VIDP	0.98	--	
IR31 OIII	1.00	1.00	
JP31 RJTD	1.00	1.00	1.00
JP32 RJTD	1.00	1.00	1.00
KO31 RKSI	1.00	1.00	
ME31 OLBA	--	0.99	
MS31 WMKK	1.00	--	
NZ31 NZKL	--	1.00	
PK31 OPKC	1.00	0.99	
SB31 VCCC	1.00	--	
SD31 OEJD	1.00	--	
SR31 WSSS	--	1.00	1.00
SR32 WSSS	--	1.00	
TH31 VTBB	0.97	1.00	
TH32 VTBB	0.88	1.00	
TH33 VTBB	0.83	1.00	

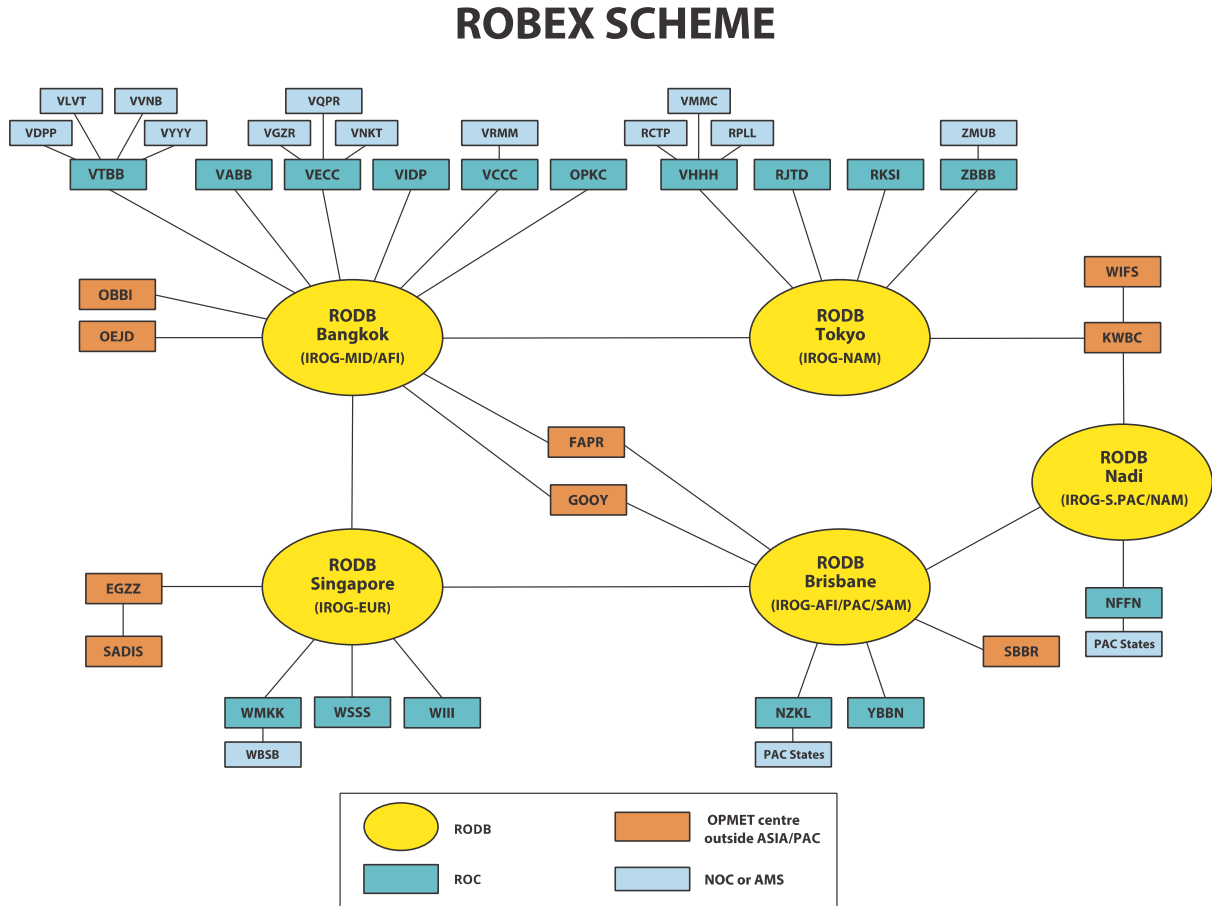
TABLE C	Regularity Index		
	SA	FT	FC
AE31 VECC	0.86	--	
AS31 VABB	--	0.96	
AS31 VTBB	0.93	0.96	
AS32 VABB	--	0.96	
AS32 VTBB	--	0.96	
AU31 YBBN	0.90	0.90	0.96
AU32 YBBN	0.93	0.91	



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<b>TABLE C</b>	<b>Regularity Index</b>		
BN31 OBBI	0.93	0.94	
BN32 OBBI	0.82	0.89	
CI31 ZBBB	0.96	0.94	
CI32 ZBBB	0.93	0.91	
CI41 ZBBB	0.94	0.97	
EG31 HECA	--	0.77	
HK31 VHHH	0.93	0.97	0.85
ID31 WIII	0.92	--	
IN31 VIDP	--	0.84	
IN31 VABB	0.84	--	0.97
IN32 VIDP	0.88	--	
IR31 OIII	0.71	1.00	
JP31 RJTD	1.00	1.00	1.00
JP32 RJTD	1.00	1.00	1.00
KO31 RKSI	0.84	1.00	
ME31 OLBA	--	0.97	
MS31 WMKK	0.98	--	
NZ31 NZKL	0.82	1.00	
PK31 OPKC	0.84	0.97	
SB31 VCCC	0.96	--	
SD31 OEJD	0.89	--	
SR31 WSSS	--	0.99	0.95
SR32 WSSS	--	0.99	
TH31 VTBB	0.92	1.00	
TH32 VTBB	0.85	0.96	
TH33 VTBB	0.89	0.94	

APPENDIX G - ROBEX Scheme Diagram



## APPENDIX H – RODB OPMET Interrogation Procedures

*This Appendix describes the standard interrogation procedures for access to the designated Regional OPMET Databanks (RODB) in the ASIA/PAC Region. This information was previously provided in the ASIA/PACIFIC OPMET DATA BANKS INTERFACE CONTROL DOCUMENT.*

*Note: The provision by RODBs of facilities for request/response type of access to the stored OPMET data is primarily for users to obtain non-regular or occasional information and is not intended for routine requests, which should be arranged through the efficient implementation of predetermined, regular OPMET exchange.*

### REQUEST/REPLY MESSAGE FORMAT

#### 1. Request messages

- 1.1 Request messages should follow the AFTN standard telecommunication procedures as defined in Annex 10, Volume II. The text part of the messages should be as defined in this Appendix.

*Note: The standard AFTN message start and end characters and alignment characters (SOH, STX and ETX for ITA-5 format or ZCZC and NNNN for ITA-2 format) have been omitted for clarity in the following examples.*

- 1.2 Request messages should use the AFTN priority **GG**.

- 1.3 The general format of the request message is as follows:

```
GG xxxxYZYX
YYGGgg yyyyyyyy
RQM/TTCCCC,(report(s)).../TTAAii, (bulletin(s))...=
RQM/TTCCCC,(report(s)).../TTAAii, (bulletin(s))...=
....
```

The meaning of the groups and symbols in the request message is as follows:

- 1.3.1 In the AFTN heading:

<b>GG</b>	priority indicator
<b>xxxxYZYX</b>	AFTN address of the databank
<b>YYGGgg</b>	date-time group specifying the filing time of the request message
<b>yyyyyyyy</b>	AFTN address of the originator of the request

1.3.2 Each data request line is composed of the following elements:

<b>RQM/</b>	indicates the start of a data request line
<b>TT</b>	WMO data type identifier ( <i>refer to 2.7</i> )
<b>CCCC</b>	4-letter location indicator (as per <i>ICAO Doc 7910 – Location Indicators</i> )
	<b>or</b>
<b>AAii</b>	bulletin identifier ( <i>WMO manual 386, table C1 for AA</i> )
<b>=</b>	indicator of the end of a request line.

1.3.3 Delimiters can be used within a request line as follows:

- , indicates more requests for reports or bulletins for the same data type or different data types for one location;
- / indicates a new data type request within the same data request line.

1.3.4 The length of the request line should not exceed 69 characters, including 'RQM' and the '=' signal. Up to ten request lines can be included in one AFTN request message unless otherwise specified by the RODB.

### 1.3.5 Examples of request types

#### 1.3.5.1 *Request for one data type at one location*

The format of the request line to obtain one meteorological data type for one location is as follows:

**RQM/TTCCCC=**

Examples:

1. RQM/SAYSSY=
2. RQM/FCWSSS=

#### 1.3.5.2 *Request for one data type at two or more locations*

The format of the request line to obtain one meteorological data type for two or more locations is as follows:

**RQM/TTCCCC<sub>1</sub>,CCCC<sub>2</sub>,.....,CCCC<sub>n</sub>=**

*Note: Up to ten locations can be included in a request line.*

Examples:

1. RQM/SAYSSY,YBBN,YMML=
2. RQM/FTNZAA,NZCH=

#### 1.3.5.3 *Request for two or more data types at one location*

The format of the request line to obtain two or more meteorological data types for one location is as follows:

**RQM/TT<sub>1</sub>CCCC,TT<sub>2</sub>,.....,TT<sub>n</sub>=**

Examples:

1. RQM/SAYMML,FC=
2. RQM/FTNFFN,SA,WC=

#### 1.3.5.4 ***Request for different data types at different locations***

The format of the request line to obtain different meteorological data types for a number of locations is as follows:

**RQM/TT<sub>1</sub>CCCC,CCCC,.../TT<sub>2</sub>CCCC,CCCC,.../...../TT<sub>n</sub>CCCC,CCCC,  
...=**

Example:

1. RQM/SAYSSY/FCYBBN,YMML/FTYMML=

#### 1.3.5.5 ***Request for a meteorological bulletin***

The format of the request line to obtain a Meteorological Bulletin is as follows:

**RQM/TTAAii=**

Examples:

1. RQM/FTAE31=
2. RQM/SATH33=

*Note: Only one bulletin can be requested in an RQM request line. Up to six bulletins can be included in a request message*

## 2. **Reply messages**

- 2.1 If the AFTN address of the originator of a request is authorised, the databank should automatically reply to the AFTN originator address given in the request message.
- 2.2 Valid requests for bulletins and/or messages should produce an answer, which should be returned in a standard WMO bulletin format embedded as text in a standard AFTN message. Each bulletin should be sent as a separate message.
- 2.3 For valid requested bulletin or message(s) belonging to the same type and concerning valid stored messages, one or more reply bulletins should be generated. Non-valid requested groups should be replied to by an appropriate *Information* or *Error* reply message.
- 2.4 In preparing the reply messages by the RODBs, the following should apply:

- 2.4.1 A reply to a METAR request should consist of the latest METAR and/or SPECI reports available for the requested station.
- 2.4.2 When a request for SIGMET of any type (WS, WC or WV) is received, the reply should contain all valid WS, WV and WC SIGMETs that are available for the FIR concerned.

2.5 **Format of the reply message**

- 2.5.1 The WMO abbreviated heading of a reply message will be constructed as:

**TTAAii CCCC YYGGgg**

where,

**TT** the requested (e.g., SA)  
**AA** **XX** : fixed geographical designator for database reply or as specified by the RODB  
**ii** **99** : fixed bulletin number for database reply or as specified by the RODB  
**CCCC** location indicator of the reply database (e.g. VTBB, WSSS, etc.)  
**YYGGgg** date-time group (DTG) depending on the original DTG of the bulletin header

*Note: For the issuing time of TAF and the observation time of METAR, the user should refer to the DTG in the reports, which might be different from the DTG in the header.*

Example:

SAXX99 VTBB 031200  
 METAR CCCC 031200Z ...  
 METAR CCCC 031200Z ...  
 ...

2.6 **Format of the *Information* and *Error* reply messages**

- 2.6.1 RODBs send to the originator of the request an *Information* or *Error* message when a RODB is not in a position to send back valid OPMET data.

2.7 **OPMET Data Types**

The following meteorological data types, as defined by the WMO data designator indicator, are stored and available on request from the RODBs:

TT	Message Type
SA	METAR
SP	SPECI
FT	12 to 30 HR TAF
WS	SIGMET
WC	Tropical Cyclone SIGMET

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WV	Volcanic Ash SIGMET
FV	Volcanic Ash Advisory (VAA)
FK	Tropical Cyclone Advisory (TCA)

APPENDIX I - ROBEX FOCAL POINTS

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	Director General of Meteorology India Meteorological Department Lodi Road, New Delhi – 110 003 India	



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