

# **REPORT FROM**

# **ORARI**

PRESENTED AT

THE 14<sup>TH</sup> IARU REGION 3 CONFERENCE

CHRISTCHURCH, NEW ZEALAND 12 – 14 OCTOBER 2009

# ORARI'S REPORT PRESENTED AT THE 14<sup>th</sup> IARU REGION III CONFERENCE

CHRISTCHURCH, NEW ZEALAND, 12 – 16 OCTOBER 2009

# I. <u>INTRODUCTION</u>

This report covers significant ORARI activities arising for the reporting period of October 2006 until June 2009.

The highlights of activities during the period under review are as follows:

# II. ORGANIZATION

The 8<sup>th</sup> ORARI National Conference was held in Bali on September 2006 attented by 30 ORARI officials from the 31 ORARI Region (Provincial based).

Several amendments of ORARI constitution and a five year strategic and developmentt plan were adopted. Priority for the s strategic and development plan is to enhance amateur technical capability and enlarge the number of member and to promote and give better understanding and information to the public to become qualified amateur radio.

In this National Conference, the new office bearers for ORARI Advisory Council and National Heaquarter for 2006 - 2011 term were elected.

The bearers are as follows:

#### **ORARI National Advisory Council:**

H. Harsono YBØPHM Chairman

Drs. Hadiono Badjuri YBØTZ Secretary and member
Dr. Yos S. Soejoso Sp, Rad YB2SV Vice Secretary and Member

Ir. Yana Koryana MP YB1AR Member
Ir. H. Maharyanto YB3BM Member
Ir. H. Syahrani Syahrin SE, MM YB7OKE Member
Dr. Ir. Rachmad Sofyan Patadjai YB8KHR Member

## **ORARI National Headquater:**

Dr. (Hc) H. Sutiyoso YBØST President
Dr. (Hc) IGK. Manila YBØAA Vice President

Bambang Sugiarto YBØYJ Chief of Organization Affairs Budi Rianto Halim YBØHD Chief of Operations and Technical

Suryo Susilo YBØJTR Secretary General Wisnu Widjaja YBØAZ Vice Secretary General,

International Affair Coordinator and

IARU Liaison

Harianto Badjuri YCØHB General Treasurer Anna Rudhiantiana YCØRSA Vice Treasurer

Agus Hadi Yunanto YBØDJH
Onno W. Purbo YCØMLC
Ruhut Sitompul YCØRHS
Gjellani Joostman Sutama YB1GJS
Research and Development Coordinator
Education and Training Coordinator
Law and Advocacy Coordinator
QSL & Award Bureau Coordinator

Triadi P. Suparta YBØKVN Public Service Coordinator

#### a. **MEMBERSHIP**

At the time of this report, ORARI membership stood at 19.966 made up of 1.342 Advance class; 4.474 General class; 13.961 Novice class; and 189 No Code License members.

The statistics details is as follows:

CLASS	PREFIX	2006	New / Upgrade	Expired	Jun-09
Advance	YB / YE	1.359	95	112	1.342
General	YC / YF	5.655	36	1.217	4.474
Novice	YD / YG	20.519	3.209	9.767	13.961
No. Code	YH	282	50	143	189
TOTAL		27.815	3.390	11.239	19.966

ORARI member was decreasing because of several factors, such as:

- Communication technology is improving rapidly and more affordable; and this make the interest ORARI members change to cell phone, internet, entertainment technology, and so forth.
- Indonesia economic conditions have not been properly recovered and this make some members of the ORARI not extend their membership.

This is obvious fact that may let its impetus to decrease of ORARI member whereas the utilization of more handy and practical means of communications is easier to get and to be operated rather than to face all the amateur radio examinations and some burdensome administrative measures.

#### **b.** MEMBERSHIP FEES

ORARI membership fees cover operations costs of ORARI Headquarter and the IARU fees as decided in the 8<sup>th</sup> National Conference ORARI is remain unchanged since 1996, which is Rp1.000 (one thousand Rupiah) per member per month. In 1996 exchange rate of rupiah against the U.S. Dollar is Rp2.400 for one U.S. Dollar; in 2009, exchange rate of rupiah against the U.S. Dollar around Rp10.500 for one U.S. Dollar.

In the meantime, operational costs of the organization increased and further costs of some activities were bear by all persons in charge in the organization; this is situation makes ORARI difficult to pay IARU membership fees as it should be.

# III. <u>ACTIVITIES</u>

#### a. CONTEST

A lot of Contest Communication activities that have been conducted within the years 2006 - 2009, whether they are regular and temporary. Activities that are conducted on a regular basis are:

Jakarta	Kebon Jeruk	2 <sup>nd</sup> week of June
	Kebayoran	2 <sup>nd</sup> week of December
	Jatinegara	3 <sup>rd</sup> week of November
West Java	Merdeka Contest	16 - 17 August
Central Java	Kartini contest	3 <sup>rd</sup> week of April
East Java	Malang Sprint contest	1 <sup>st</sup> & 3 <sup>rd</sup> week of May
	Pahlawan Contest	2 <sup>nd</sup> week of November
Bali	Bali Contest	2 <sup>nd</sup> week of August
Riau	Old & New	1st week of January
West Kalimantan	Kalbar contest	3 <sup>rd</sup> week of December

#### b. AWARD and QSL

#### Organisasi Amatir Radio Indonesia (ORARI) issued Awards,

Jakarta Award	issued by ORARI Headquarter
Worked All Indonesia Award	issued by ORARI Headquarter
Worked the Equator Award	issued by ORARI Headquarter
Bandar Sunda Kelapa VHF Award	issued by ORARI DKI Jakarta Province
Borobudur Award	issued by ORARI Central Java Province
Danau Toba Award	issued by ORARI North Sumatra Province
Pahlawan Award	issued by ORARI East Java Province
100 <sup>th</sup> Asia Africa Summit	period 2005 by ORARI Headquarter
Visit Indonesia Award	period 2008/2009 by ORARI Headquarter

# Awards Apply,

Jakarta Award	Last Award Number 748
Worked All Indonesia Award	Last Award Number 861
Worked the Equator Award	Last Award Number 536
Visit Indonesia Award	Last Award Number 099

Difficulty in doing Apply Award for amateur colleagues outside Indonesia because the fee award should send physically direct through PO.Box, so it is difficult to be received in a good condition as well as Postal Giro in future have been replaced with the Bank Pos. In some areas in Indonesia have started to apply this method as well.

Visit Indonesia Award is a Temporary Award issued by ORARI Center in order to celebrate the 40<sup>th</sup> ORARI Annyversary and to participate Indonesia Visit Year 2008 which extend up to the end of the year 2009.

# **QSL**

At this time, traffic QSL-ing drastically decrease because of several factors, among which,

- Propagation that often less good at this time, the result difficult to make communication (QSO), which results in low delivery of QSL Card.
- At this time, delivery cost of QSL Card consider very high, due to increasing fuel prices impact on the delivery cost (transportation), and atleast the two U.S. Dollar charge to be applied for each delivery of QSL direct, where the exchange rate U.S. Dollar against IDR relatively high.

- Traffic QSL via the Bureau consider very slow so that ORARI members rarely do delivery via QSL-Bureau, mostly ORARI members use services QSL-Manager, which is very effective in the Management QSL-ing, or direct delivery to Foreign Affairs Bureau.
- Not only the United States Dollar exchange rate is very high, but the IRC (International Replay Coupon) is also very difficult to obtain in each region / Post Office in Indonesia

With various difficulties as described above, then to overcome QSL traffic, many amateur radio use eQSL, although until that time is not valid for Award claim purposes, but the user community eQSL also create Award themselves.

#### c. HAM FESTIVAL (HAMFEST)

Ham Festival activities that have been implemented years 2006 - 2009 are:

Train resulvar activities that ha	ve been implemented ye	ais 2000 - 2007 aic.
All Indonesia Ham Festival	09 September 2006	Denpasar, Bali
All Indonesia Ham Festival	12 July 2007	Jakarta
All Sulawesi Ham Festival	28 July 2007	South East Sulawesi
Gorontalo Ham Festival	November 2007	Gorontalo
Saburay Ham Festival	15 March 2008	Lampung
Kapuas Ham Festival	15 March 2008	East Kalimantan
Bandung Ham Festival	19 April 2008	Jawa Barat
Bandung Ham Festival	19 April 2008	West Java
Malang Ham Festival	03 May 2008	East Java
Kebon Jeruk Ham Festival	07 June 2008	Jakarta
Kramat Jati Ham Festival	21 June 2008	Jakarta
All Borneo Ham Festival	26 July 2008	West Kalimantan
Bekasi Ham Festival	29 June 2008	West Java
Cimahi Ham Festival	06 July 2008	West Java
Bantul Ham Festival	23 August 2008	Yogyakarta
Sidoardjo Ham Festival	24 August 2008	East Java
Star Ham Festival	September 2008	Central Sulawesi
Jakarta Ham Festival	12 July 2009	Jakarta

#### **d.** Island On The Air (IOTA)

Berhala Island	(Riau Islands)	Year 2007
Rupat Island	(Riau)	Year 2007
Laut Kalimantan island	(South Kalimantan)	Year 2008
Payong-payongan Island	(South Kalimantan)	Year 2009

#### e. MONITORING SISTEM

ORARI Monitoring system activities such as operation inspection on the use of frequency by illegal stations continue to be carried out, and the results have been reported to the government.

#### f. **DISASTER RELIEF**

## 1) Communication Support for Earthquake occurred in Provinces

West Java,	Central Java,	Yogyakarta,
East Java,	Jambi,	Bengkulu,
West Sumatra,	North Sumatra,	Aceh Nangroe Ds,
South Sulawesi,	Southeast Sulawesi,	Central Sulawesi,

North Sulawesi, Gorontalo, Maluku,

North Maluku, West Nusa Tenggara, East Nusa Tenggara, and Papua

# 2) Communication Support for mountain eruption

Mount Soputan	North Sulawesi	2008
Mount Merapi,	Central Java	2007
Mount Talang	West Sumatera	2007

# 3) Communication Support for Flood

Implemented in almost all Provinces

# 4) Support Communication for Landslide

West Java, Central Java, East Java, Lampung, West Sumatra, Riau, North Sumatra, Aceh Nangroe Daerussalam, NTB, Papua

# 5) Communication Support for Aircraft Accident

5 May	2006	Trigana	Service	Airlines	Wamena,	Papua

1 January 2007 Adam Air South Sulawesi Sea / West

6 March 2007 Garuda Indonesia Yogyakarta

# 6) Communication Support for Ship Accident

001111111111111111111111111111111111111	apport for Simp recording
11 January 2009	KM Teratai Prima drowned atTanjung Baturoro, Sendana,
	Majene, West Sulawesi;
28 August 2008	KM Dharma Ferry 3 on fires at the dock at Port Semayang
	around 11:00.
May 18 2008	KM Dharma Kencana on fires at about 20 miles from the
	port of Sampit East Kalimantan
18 October 2007	KM Asita III drowned in the Kadatua, about 10 miles from
	city Baubau, Buton Island, Southeast Sulawesi,
11 July 2007	KM Sinar Medina drowned in the waters of the Sea Village
	South Hu'u, Dompu regency, West Nusa Tenggara province.
11 July 2007	KM Wahai Star drowned in the sea between the island of
	Buru and Ambon.
22 February 2007	KM Levina I on fires and drowned in the Sunda gulf
30 Dec 2006	KMP Senopati Nusantara drowned in the northern island of
	Mundanika, South Kalimantan
	28 August 2008  May 18 2008  18 October 2007  11 July 2007  11 July 2007  22 February 2007

Tristar KM Tristar I drowned in the Bangka gulf.

#### 7) Tsunami Drill Exercises

28 Dec 2006

2006 in Denpasar, 2007 in Cilegon

in Padang and Banda Aceh

# g. COMMUNICATION SUPPORT NOT DISASTER

Communication support for local general elections 200	06, 2007, 2008 & 2009
Communication Support for Lebaran Transportation 200	06, 2007, 2008 & 2009
Communication Support for UNFCCC in Bali 200	07
Communication support for the National Sports Week, East Ka	dimantan 2008
Support Communication WOC in Manado	2009
Support Communication Elections President, Legislative Elect	ion 2009

#### IV. AMATEUR RADIO PROMOTIONS

1) Bakornas PBP

#### **GOVERMENT**

	Coordination and Cooperation Charter.
2) Dept. Transportation	Coordination on Implementation support communication Transport for Lebaran, Christmas & New Year's as well as Land, Sea and Air accidents.
3) Dept. Marine and Fisheries	Tutor Request from ORARI on Digital communication, especially 2.4 GHz.
4) Dept. Forestry	ORARI as tutor for 300 operators of the Radio communication Dept. Forestry.
5) Dept. Forestry	ORARI as tutor for 70 operators radio communication of Quick Response Team on Disaster Relief of Dept. Domestic Affairs.
6) Directorate General of Poste	l Coordination on the implementation of guiding

Implementation

Radio amateur and completion of various

Disaster

of

Management

telecommunications regulations.

7) Search and Rescue Hq Coordination on training and implementation of

disaster response operations.

Coordination early information about whether in 8) BMG

relation to weather and earthquake.

9) National Institue of -Producing of the 1st Indonesian Amsat satellite Aeronatics and Space -Coordination on monitoring missile launching.

10) National Crypto Agency ORARI tutor request on digital communication

and radio packet.

11) Local Government Coordination and implementation of disaster and

communication support for local general elections,

Regional Tourism Promotion etc.

#### b. NON GOVERNMENT INSTITUTION

1) Scout Training Coordination for Indonesian Scout

member activities (Jamboree On The Air).

2) Global Rescue Training Coordination for operation and Disaster

Relief.

3) Indonesia Red Cross (PMI) Training Coordination for PMI member in the

operation and coordination of disaster.

Coordinating of forwarding information 4) Radio Republic of Indonesia on

> implementation disasters, support on transportation for Aidilfitri (Lebaran), Christmas

and New Year.

5) Several Universities

#### **ORARI WEBSTITE**

ORARI website address: http://www.orari.or.id/ containing the organization information and information activities related to amateur radio activities.

#### d. ORARI MAGAZINE

ORARI magazine published every three months and it is free for all members. ORARI magazine includes information on:

- Organization of events
- Regulations relating to the amateur radio
- Radio electronics and technical information.
- Various information relating to the amateur radio

#### V. REGULATION

#### a. COMPLETION REGULATION OF AMATEUR RADIO IN INDONESIA

The Government of Indonesia has issued Government Regulation Number 38, 2007 to manage authority of the Central Government, Provincial and Regency / City.

This Government regulation has a big influence on amateur radio activity, especially on the Implementation of Examination and Licensing process.

ORARI Center and has been submitted a proposal to the Directorate General of Post and Telecommunication for new regulations on amateur radio activities, with addition of facilities for amateur radio, such as:

- Removal of Morse Code testing on Novice Class
- To accept Novice Class to do DX'ing Communication with Phone mode.
- To accept Frequency 7,100 until 7,300 MHz under Secondary status
- To add Power Limitation for Novice Class to 100 watts max General Class to 500 watts max Advance to 1.000 watts max
- Using 4 letter Suffix, etc

# **b.** UHF FREQUENCY MATTERS

The Government has implemented restructuring the use of frequency, particularly UHF frequency, which result in most of band 430 until 440 MHz to be used for government and non government purposes.

Amateur Radio on that band is under secondary status and with this situation makes amateur radio have no space because those institutions under primary status have their own activities almost 24 hours.

# VI. <u>OTHERS</u>

#### a. SATELLITE

ORARI in cooperation with National Institue of Aeronatics and Space (LAPAN) develop the 1st Indonesian Amateur Radio Satellite with Voice Repeater, APRS digipeater, Image Sensor and Laser Pointer payloads. It is scheduled to launch in the year 2011. With this satellite ORARI can use the facilities on the allocation frequency satellite communication at amateur radio bands 145.800-146.000 MHz (VHF) and 435.000-436.000 MHz (UHF).

#### **b.** Automatic Position Reporting System (APRS)

APRS development in Indonesia is quite good but not evenly. Despite almost all provincies have their own APRS station, but not all provinces have APRS Internet Gateway.

To support the use of APRS in Indonesia it has been built a local server named aprs.orari.or.id:14580 and jakarta.aprs2.net:14580.

APRS unit has been used in Communication support for Aidilfitri (Lebaran) Transportation, Tsunami Drill, Searcg and Rescue, etc.

Crisis Center Post of West Sumatera Province has been using APRS and eQSO as an early warning information on earthquake and tsunami disaster. Those APRS & eQSO devices has been made and donated by ORARI.

### c. eQSO

eQSO technology application in Indonesia is quite a lot and almost in all provinces but eQSO Gateway existence not evenly.

It has been built a local server eqso.orari.or.id in order to support eQSO application in Indonesia.

The device interface for Gateway is entirely Homebrew.

Communication with eQSO have been used in Communications support and other purposes.

#### VII. SUGGESTIONS

Amateur Radio activities in Indonesia have a very difficult position in the UHF frequency segment 430-440 MHz (secondary) so it is necessary to disscuss in ITU Conference that amateur radio able to have primary status in that frequency segment.

#### VIII. APPENDIX

Band Pland segmentation defined by ORARI under current Government Regulation.

-				<b>-</b>			<u> </u>
				1,800 -	2,000 MHz	CW	
	MF	1,800	- 2,000	1,830 -	1,835 MHz	CW DX Window	
				1,835 -	1,850 MHz	Phone DX Window	
				1,850 -	2,000 MHz	Phone	
ŀ				3,500 -	3,900 MHz	CW	
				3,300	3,300 141112	CVV	
		3,500	- 3,900	3,500 -	3,510 MHz	CW DX Window	
	HF			3,510 -	3,775 MHz	Phone	
				3,775 -	3,805 MHz	Phone DX Window	
				3,805 -	3,900 MHz	Phone	
					3,830 MHz	ORARI Net	
L							

		7,000 -	7,100 MHz	CW	a lot of intereference
	7.000 - 7,100	7,025 -	7,040 MHz	Data	from pirate stations
HF		7,040 -	7,080 MHz	Phone	
		7,080 -	7,100 MHz	Phone DX Window	
			7,055 MHz	ORARI Net	
		10,100 -	10,150 MHz	CW	a lot of intereference
HF	1,800 - 2,000	10,140 -	10,150 MHz	Data	from pirate stations
			10,150 MHz	RTTY Call Freq	
		14,000 -	14,350 MHz	CW	a lot of intereference
	14.000 – 14.350	14,070 -	14,112 MHz	Data	from pirate stations ±14,1 Mc
HF		14,112 -	14,350 MHz	Phone	
			14.100 MHz	Int'l Beacon	
			14.150 MHz	Int'l SSTV	
		18,068 -	18,168 MHz	CW	
HF	18.068 – 18.168	18,100 -	18,110 MHz	Data	
		18,110 -	18,168 MHz	Phone	
		21,000 -	21,450 MHz	CW	
	21.000 – 21.450	21,070 -	21,150 MHz	Data	
HF		21,150 -	21,450 MHz	Phone	
			21,150 MHz	Int'l Beacon	
			21,340 MHz	Int'l SSTV	
			21,350 MHz	ORARI Net	
		24,890 -	24,990 MHz	CW	
HF	24.890 – 24.990	24,920 -	24,930 MHz	Data	
		24,930 -	24,990 MHz	Phone	
		28,000 -	29,700 MHz	CW	
		28,050 -	28,150 MHz	Data	
HF	28.000 – 29.700	28,150 -	28,300 MHz	International Beacon	
		28,300 -	29,300 MHz	Phone	
		29,300 -	29,510 MHz	SATELLITE	
		I.			1

HF	28.000 – 29.700	29,510 - 29,580 MHz Repeater Input			
		29,580 - 29,620 MHz FM Simplex			
		29,620 - 29,680 MHz Repeater Output			
		29,680 - 29,700 MHz FM Simplex			
		28,090 MHz RTTY Call Freq			
		28,190 MHz Int'l Beacon			
		28.680 MHz Int'l SSTV			
		28,510 MHz Satellite Beacon			
		50,000 - 54,000 MHz CW			
		50,000 - 50,100 MHz Beacon			
VHF	50.000 – 54.000	50,100 - 51,000 MHz Phone			
		51,000 - 52,000 MHz Data			
		52,000 - 54,000 MHz Phone			
		144,000 - 148,000 MHz CW	a lot of intereference		
		144,000 - 144,100 MHz E.M.E			
		144,100 - 144,200 MHz Data			
		144,200 - 144,280 MHz Experiment	from pirate and CB stations		
		144,280 - 144,380 MHz SSB Phone			
		144,400 - 144,480 MHz FM Simplex			
VHF	144.000 – 148.000	- 145,000 MHz Call Channel			
		145,020 - 145,780 MHz Organization Use			
		145,800 - 146,000 MHz SATELLITE			
		146,020 - 146,280 MHz Repeater Input			
		146,300 - 146,600 MHz FM Simplex			
		146,820 - 146,880 MHz Repeater Output			
		146,900 - 148,000 MHz FM Simplex			
		430,000 - 440,000 MHz CW			
	430.000 – 440.000	430,000 - 431,000 MHz SSB			
UHF		432,000 - 432,080 MHz Data			
		432,100 - 433,000 MHz E.M.E Beacon			

438,020 - 438,320 MHz Repeater Input   1gnored.   438,340 - 438,660 MHz FM Simplex   438,660 MHz FM Simplex   438,660 MHz FM Simplex   439,000 MHz Auxelary Repeater   439,000 MHz Link FM Simplex   1,240 - 1,300 GHz Repeater Output   1,246 - 1,254 GHz Phone Simplex   1,254 - 1,260 GHz Repeater Input   1,260 - 1,270 GHz SATELLITE   1,270 - 1,275 GHz Phone   1,275 GHz Phone   1,280 GHz Repeater Input   1,280 - 1,285 GHz FM Simplex   1,285 - 1,290 GHz Repeater Output   1,290 - 1,300 GHz Data   2,300 - 2,450 GHz CW   2,340 - 2,450 GHz CW   2,340 - 2,450 GHz To be defined later   5,660 - 5,680 GHz   5,660 - 5,680 GHz To be defined later   24,000 - 24,250 GHz   24,000 - 24,250 GHz To be defined later   24,000 - 47,200 GHz   47,000 - 47,200 GHz To be defined later   47,000 - 47,200 GHz   47,000 - 47,200 GHz To be defined later   75,500 - 81,000 GHz   142,000 GHz To be defined later   75,500 - 81,000 GHz   142,000 GHz To be defined later   75,500 - 81,000 GHz   142,000 GHz To be defined later   75,500 - 81,000 GHz To be defined l			433,020 -	433,320 MHz	Repeater Input	
UHF			433,340 -	433,660 MHz	Repeater Output	
UHF			433,680 -	433,800 MHz	FM Simplex	station whom continuously operate to be used together. Amateur Radio has been
UHF			433,820 -	434,000 MHz	Repeater Output	
435,000 - 438,000 MHz   SATELLITE	UHF	430.000 – 440.000	434.020 -			
Amateur Radio has been   Information   Amateur Radio has been   Information   Info					·	
438,340 - 438,660 MHz FM Simplex  438,680 - 439,000 MHz Auxelary Repeater  439,020 - 440,000 MHz Link FM Simplex  1,240 - 1,300 GHz Repeater Output  1,246 - 1,254 GHz Phone Simplex  1,254 - 1,260 GHz Repeater Input  1,260 - 1,270 GHz SATELLITE  1,270 - 1,275 GHz Phone  1,280 - 1,285 GHz FM Simplex  1,280 - 1,285 GHz FM Simplex  1,285 - 1,290 GHz Repeater Input  1,290 - 1,300 GHz Data  2,300 - 2,450 GHz CW  UHF 2,300 - 2450						
438,680 - 439,000 MHz   Auxelary Repeater   439,020 - 440,000 MHz   Link FM Simplex   1,240 - 1,300 GHz   Repeater Output   1,246 - 1,254 GHz   Phone Simplex   1,254 - 1,260 GHz   Repeater Input   1,260 - 1,270 GHz   SATELLITE   1,270 - 1,275 GHz   Phone   SATELLITE   1,270 - 1,285 GHz   FM Simplex   1,280 - 1,285 GHz   FM Simplex   1,285 - 1,290 GHz   Repeater Output   1,290 - 1,300 GHz   Data   2,300 - 2,450 GHz   CW   CW   CW   CW   CW   CW   CW   C						
Harmonia   Harmonia					·	
1,240 - 1,300 GHz Repeater Output  1,246 - 1,254 GHz Phone Simplex  1,254 - 1,260 GHz Repeater Input  1,260 - 1,270 GHz SATELLITE  1,270 - 1,275 GHz Phone  1,280 GHz Repeater Input  1,280 - 1,285 GHz Phone  1,280 - 1,285 GHz Repeater Input  1,280 - 1,285 GHz Repeater Input  1,280 - 1,285 GHz Repeater Output  1,290 - 1,300 GHz Data  2,300 - 2,450 GHz CW  UHF 2,300 - 2450 2,340 - 2,450 GHz CW  UHF 2,300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later  5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  5,660 - 10,500 GHz 10,000 - 10,500 GHz To be defined later  24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF 142,000 - 149,000 GHz 159,000 GHz To be defined later			438,680 -			
1,246 - 1,254 GHz Phone Simplex  1,254 - 1,260 GHz Repeater Input  1,260 - 1,270 GHz SATELLITE  1,270 - 1,275 GHz Phone  1,280 - 1,285 GHz Repeater Input  1,280 - 1,285 GHz Repeater Input  1,280 - 1,285 GHz Repeater Input  1,280 - 1,285 GHz FM Simplex  1,290 - 1,300 GHz Data  2,300 - 2,450 GHz CW  UHF 2,300 - 2450 2,340 - 2,450 GHz CW  UHF 2,300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later  5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  5,660 - 10,500 GHz 10,000 - 10,500 GHz To be defined later  24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 10,000 GHz To be defined later  142,000 - 149,000 GHz To be defined later			439,020 -	440,000 MHz	Link FM Simplex	
1,254 - 1,260 GHz Repeater Input 1,260 - 1,270 GHz SATELLITE 1,270 - 1,275 GHz Phone  1,275 - 1,280 GHz Repeater Input 1,280 - 1,285 GHz FM Simplex 1,285 - 1,290 GHz Repeater Output 1,290 - 1,300 GHz Data  UHF 2.300 - 2450 2,340 - 2,450 GHz CW  UHF 2.300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later 5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  SHF 10,000 - 10,500 GHz 10,000 - 10,500 GHz To be defined later 24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later 47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later 75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later			1,240 -	1,300 GHz	Repeater Output	
1,260 - 1,270 GHz SATELLITE  1,270 - 1,275 GHz Phone  1,285 - 1,280 GHz Repeater Input  1,285 - 1,290 GHz Repeater Output  1,290 - 1,300 GHz Data  UHF  2,300 - 2,450 GHz CW  UHF  2,300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later  5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  SHF  10,000 - 10,500 GHz 10,000 - 10,500 GHz To be defined later  47,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  142,000 - 149,000 GHz To be defined later  75,500 - 81,000 GHz To be defined later  142,000 - 149,000 GHz To be defined later			1,246 -	1,254 GHz	Phone Simplex	
1,270 - 1,275 GHz   Phone			1,254 -	1,260 GHz	Repeater Input	
UHF       1.240 – 1.300       1,275 - 1,280 GHz Repeater Input         1,280 - 1,285 GHz FM Simplex       1,285 - 1,290 GHz Repeater Output         1,290 - 1,300 GHz Data       2,300 - 2,450 GHz CW         UHF       2.300 - 2450       2,340 - 2,450 GHz Phone         3,300 - 3,500 GHz 5,660 - 5,680 GHz To be defined later       5,660 - 5,680 GHz To be defined later         SHF       10,000 - 10,500 GHz 10,000 - 10,500 GHz To be defined later         24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later         47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later         FHF       142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later         To be defined later         To be defined later         To be defined later			1,260 -	1,270 GHz	SATELLITE	
1,280 - 1,285 GHz FM Simplex  1,285 - 1,290 GHz Repeater Output  1,290 - 1,300 GHz Data  2,300 - 2,450 GHz CW  UHF 2.300 - 2450 2,340 - 2,450 GHz Phone  3,300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later  5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  SHF 10,000 - 10,500 GHz 10,000 - 10,500 GHz To be defined later  24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later			1,270 -	1,275 GHz	Phone	
1,285 - 1,290 GHz Repeater Output  1,290 - 1,300 GHz Data  2,300 - 2,450 GHz CW  UHF 2.300 - 2450 2,340 - 2,450 GHz Phone  3,300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later  5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  SHF 10,000 - 10,500 GHz 10,000 - 10,500 GHz To be defined later  24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later	UHF	1.240 – 1.300	1,275 -	1,280 GHz	Repeater Input	
1,290 - 1,300 GHz Data  2,300 - 2,450 GHz CW  UHF  2.300 - 2450  2,340 - 2,450 GHz Phone  3,300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later  5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  SHF  10,000 - 10,500 GHz 10,000 - 10,500 GHz To be defined later  24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF  142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later			1,280 -	1,285 GHz	FM Simplex	
2,300 - 2,450 GHz CW   2,340 - 2,450 GHz Phone   3,300 - 3,500 GHz   3,300 - 3,500 GHz   To be defined later   5,660 - 5,680 GHz   To be defined later   SHF   10,000 - 10,500 GHz   10,000 - 10,500 GHz   To be defined later   24,000 - 24,250 GHz   24,000 - 24,250 GHz   To be defined later   47,000 - 47,200 GHz   47,000 - 47,200 GHz   To be defined later   To be defined l			1,285 -	1,290 GHz	Repeater Output	
UHF       2.300 - 2450       2,340 -       2,450 GHz       Phone         3,300 -       3,500 GHz       3,300 -       3,500 GHz       To be defined later         5,660 -       5,680 GHz       5,660 -       5,680 GHz       To be defined later         SHF       10,000 -       10,500 GHz       10,000 -       10,500 GHz       To be defined later         24,000 -       24,250 GHz       24,000 -       24,250 GHz       To be defined later         47,000 -       47,200 GHz       47,000 -       47,200 GHz       To be defined later         FHF       142,000 -       149,000 GHz       142,000 -       149,000 GHz       To be defined later			1,290 -	1,300 GHz	Data	
3,300 - 3,500 GHz 3,300 - 3,500 GHz To be defined later  5,660 - 5,680 GHz 5,660 - 5,680 GHz To be defined later  SHF 10,000 - 10,500 GHz 10,000 - 10,500 GHz To be defined later  24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later			2,300 -	2,450 GHz	CW	
5,660 -       5,680 GHz       5,660 -       5,680 GHz       To be defined later         SHF       10,000 -       10,500 GHz       10,500 GHz       To be defined later         24,000 -       24,250 GHz       24,000 -       24,250 GHz       To be defined later         47,000 -       47,200 GHz       47,200 GHz       To be defined later         75,500 -       81,000 GHz       75,500 -       81,000 GHz       To be defined later         EHF       142,000 -       149,000 GHz       142,000 -       149,000 GHz       To be defined later	UHF	2.300 - 2450	2,340 -	2,450 GHz	Phone	
SHF       10,000 -       10,500 GHz       10,000 -       10,500 GHz       To be defined later         24,000 -       24,250 GHz       24,000 -       24,250 GHz       To be defined later         47,000 -       47,200 GHz       47,200 GHz       To be defined later         75,500 -       81,000 GHz       75,500 -       81,000 GHz       To be defined later         EHF       142,000 -       149,000 GHz       To be defined later		3,300 - 3,500 GHz	3,300 -	3,500 GHz	To be defined later	
24,000 - 24,250 GHz 24,000 - 24,250 GHz To be defined later  47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later		5,660 - 5,680 GHz	5,660 -	5,680 GHz	To be defined later	
47,000 - 47,200 GHz 47,000 - 47,200 GHz To be defined later  75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later	SHF	10,000 - 10,500 GHz	10,000 -	10,500 GHz	To be defined later	
75,500 - 81,000 GHz 75,500 - 81,000 GHz To be defined later  EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later		24,000 - 24,250 GHz	24,000 -	24,250 GHz	To be defined later	
EHF 142,000 - 149,000 GHz 142,000 - 149,000 GHz To be defined later		47,000 - 47,200 GHz	47,000 -	47,200 GHz	To be defined later	
		75,500 - 81,000 GHz	75,500 -	81,000 GHz	To be defined later	
241,000 - 250,000 GHz 241,000 - 250,000 GHz To be defined later	EHF	142,000 - 149,000 GHz	142,000 -	149,000 GHz	To be defined later	
2 12,555 2 112 2 12,555 2 12 10 be defined later		241,000 - 250,000 GHz	241,000 -	250,000 GHz	To be defined later	