



Ministry of Posts and Telecommunications of Cambodia (MPTC)

Workshop on Economic Aspects of Spectrum Management

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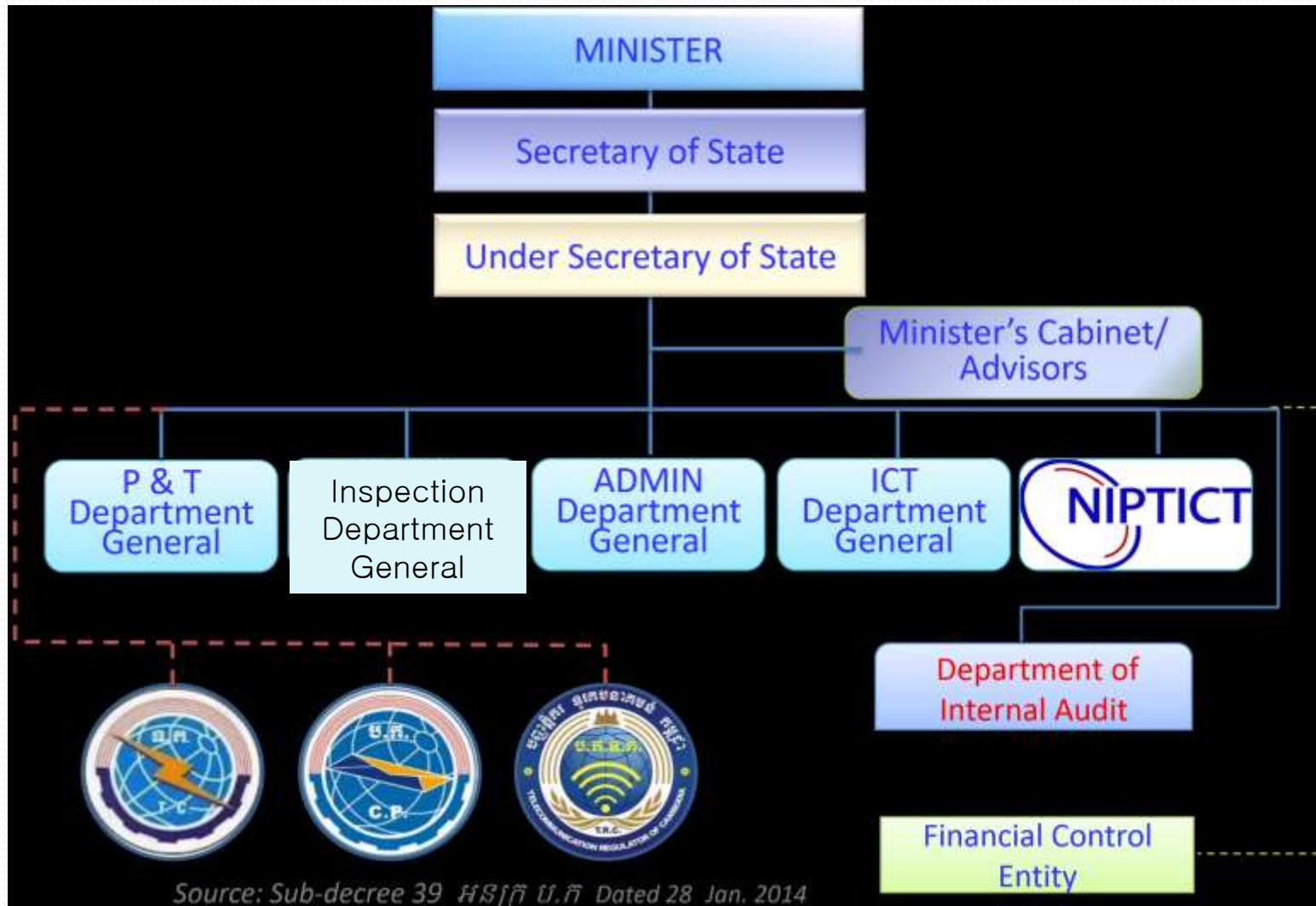
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1. General Overview

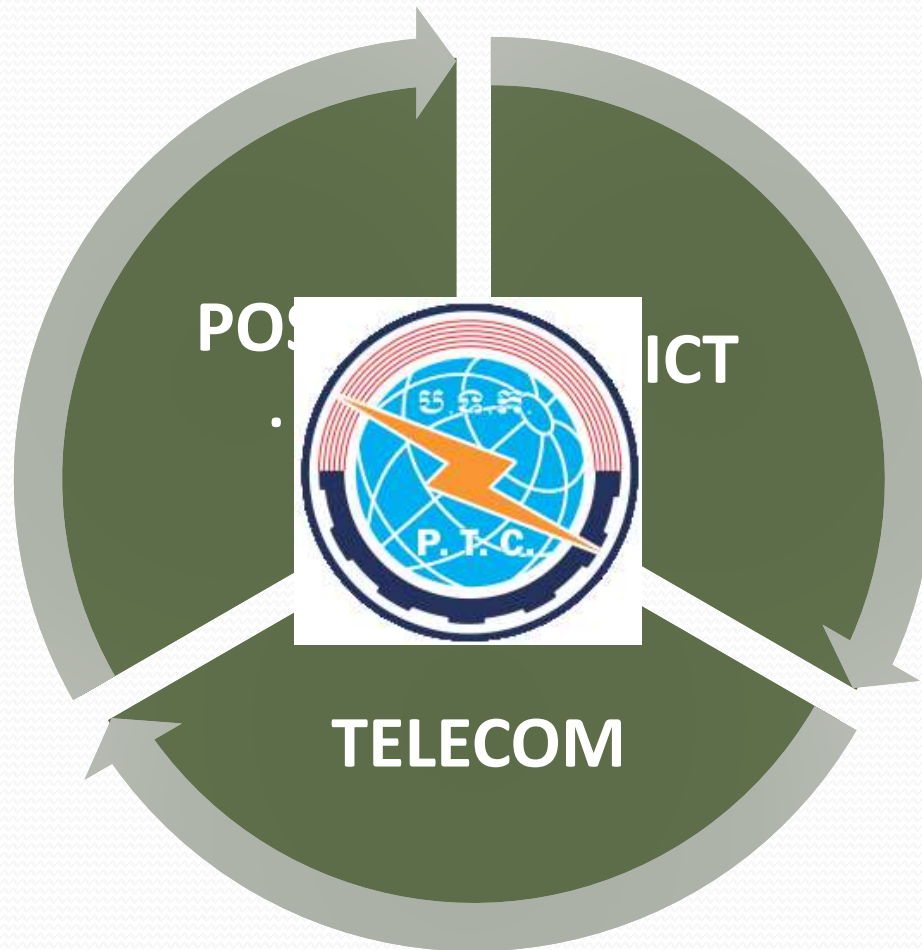
- ❖ **Official Name:** Kingdom of Cambodia
- ❖ **Capital City:** Phnom Penh
- ❖ **Landmass:** 181 035 Square Kilometers
- ❖ **Location:** Southeast Asia, bordered by
 - Thailand to the Northwest,
 - Laos to the Northeast,
 - Vietnam to the East,
 - the Gulf of Thailand to the Southwest.
- ❖ **Population:** 14 million (estimated in 2013).
- ❖ **Religion:** Buddhism.
- ❖ **Currency :** Riel
- ❖ **Contribution of GDP:** Industry 40%, Service 30%, Agriculture 30%



2. MPTC's Structure



Responsibility



3) Legal and Policy Framework

Law on Telecommunications

- Adopted in 2015
- Regulating Telecommunication Industry
- Role of MPTC and TRC
- Foundation and principles for establishing regulations on Licensing Regime, spectrum, Numbering Plan, IP and Domain name, QoS and...

Legal and Policy Framework

International Telecom/ICT Development Policy 2020	International Telecom/ICT Development Framework
<ul style="list-style-type: none">• Adopted in 2016• Roadmap for Telecommunication and ICT Development• Providing guideline and principle for Broadband policy	<ul style="list-style-type: none">• ASEAN ICT Master Plan 2020• ITU Connect 2020 Agenda

Legal and Policy Framework

- Ministry of post and telecommunication is frequency spectrum policymakers : organize spectrum regulation, national spectrum plan, frequency table of allocation , band plan
- Telecom regulator of Cambodia issue spectrum license, apparatus license and enforce licensing condition. Monitoring frequency spectrum use
- Spectrum auction required for spectrum license for mobile phone. Auction is co-organized by MPTC and Ministry of Economics and Finance
- Spectrum regulation is drafted and consulted with private sector

Legal Framework (Telecom. Law)

- **Article 47:** [...] Radio frequency spectrum shall be under the management competence of Ministry of Post and Telecommunications (MPTC). [...]

- **Article 48:** MPTC shall plan national radio frequency spectrum. [...]

T.R.C. shall issue relevant regulations of settlement from license holders for using this radio frequency in line with

the Prakas of MPTC. [...]

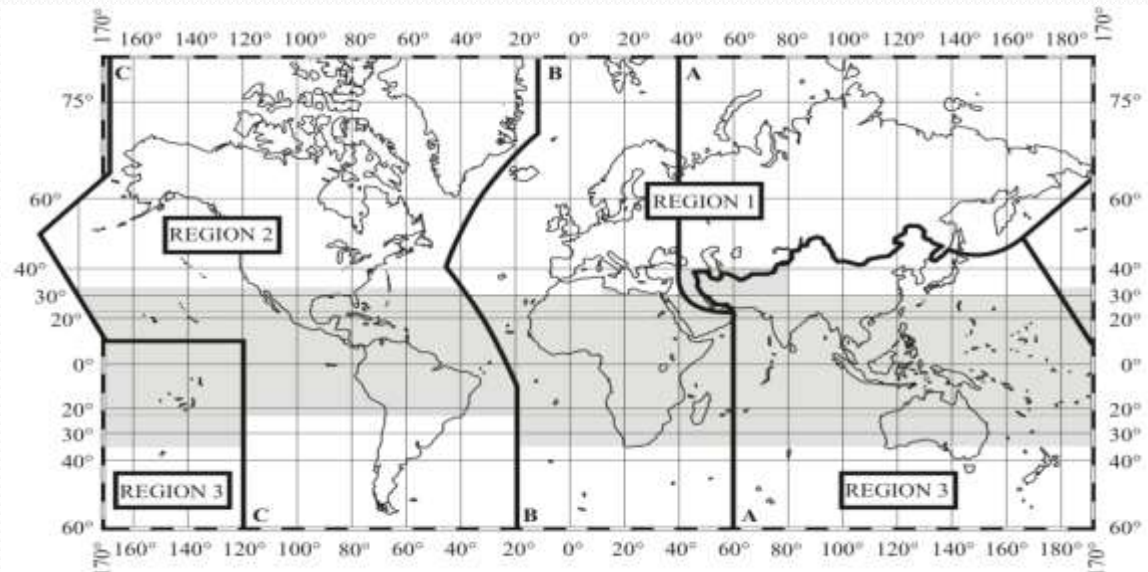


4. Spectrum Management Status

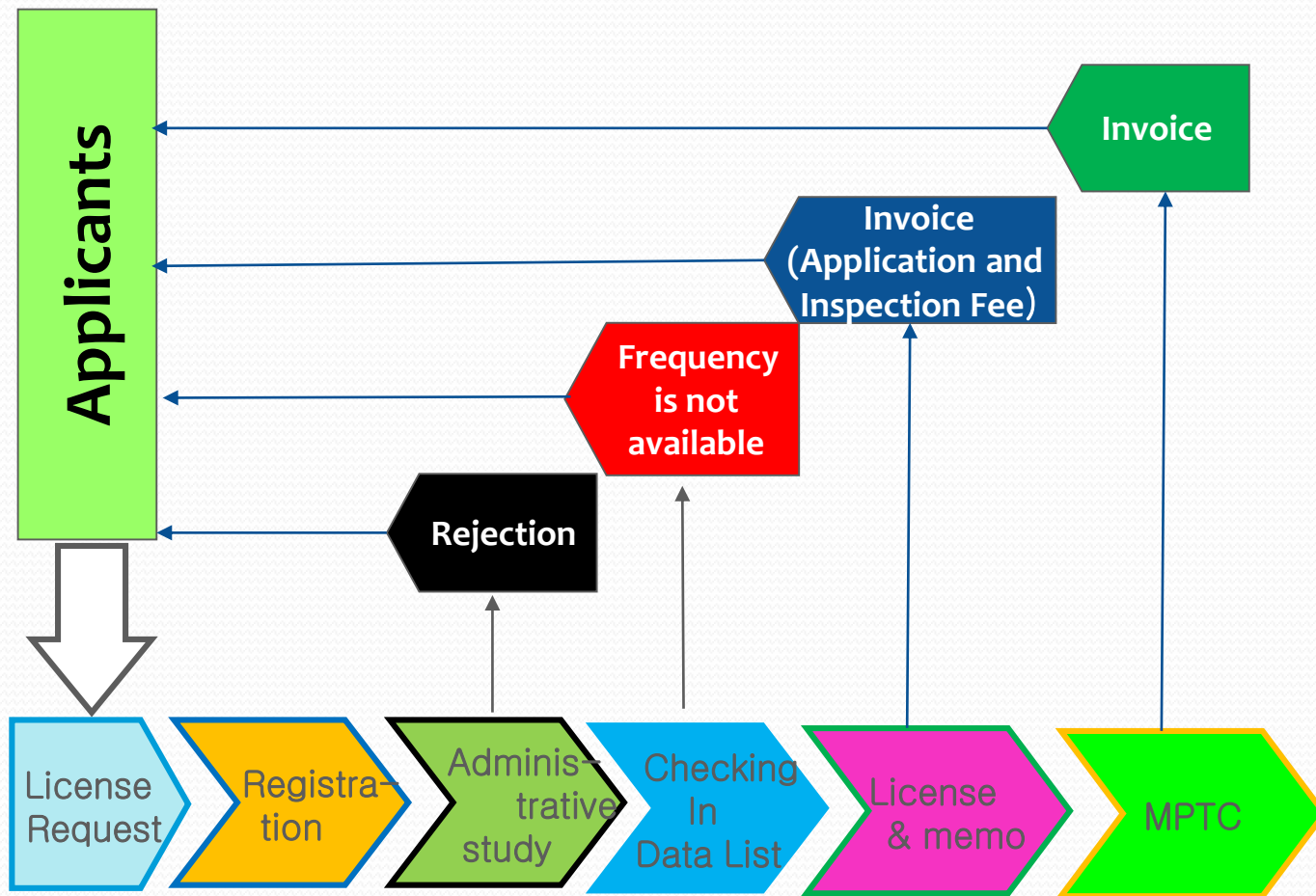
Radio Frequency Allocation

International Allocation

- ✓ ITU Radio Regulations: Article 5 (Frequency Allocations)
- ✓ National Frequency Allocation Table.



National Spectrum Licensing Workflow



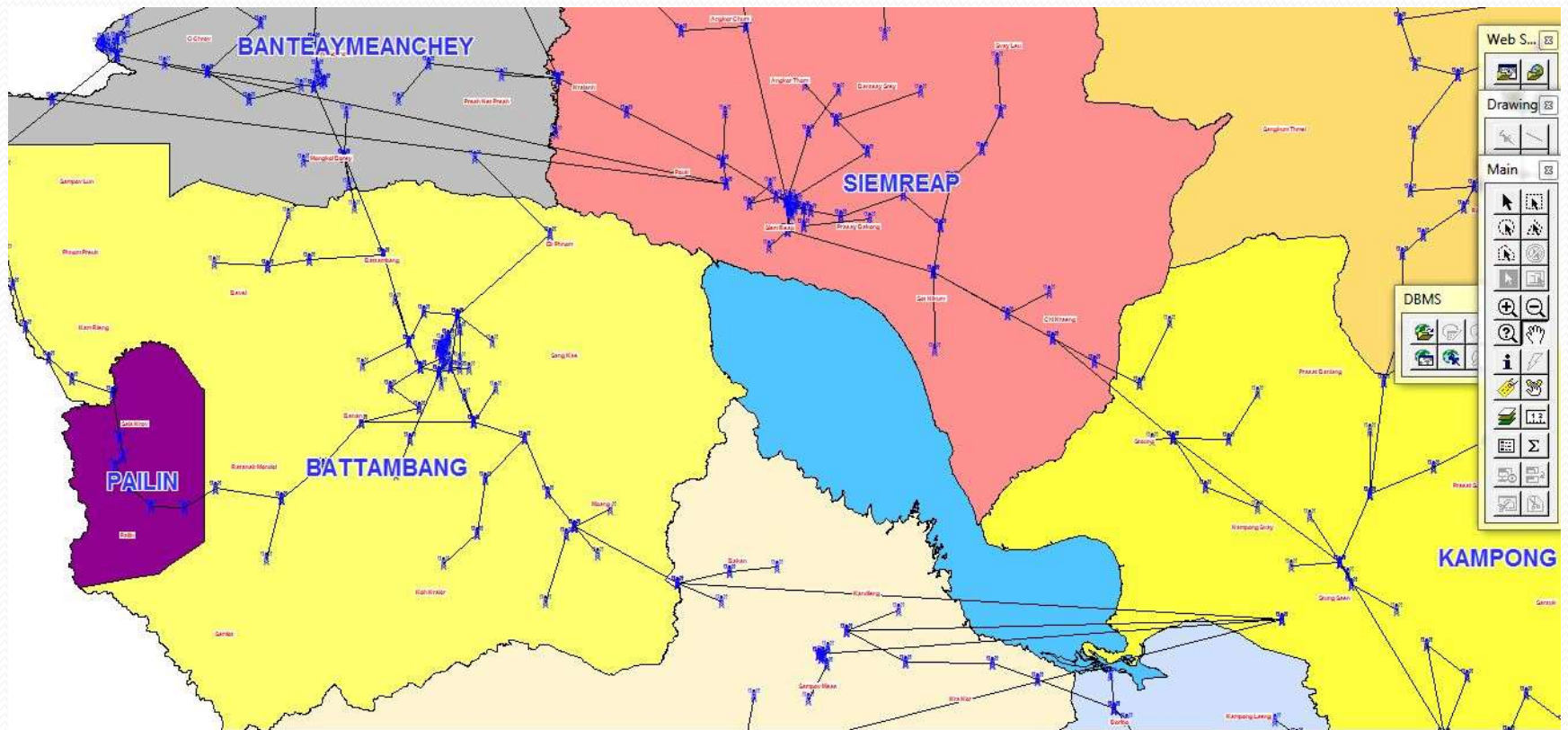
Radio Frequency Assignment Methods

1- T.R.C. selects frequency and assigns it.

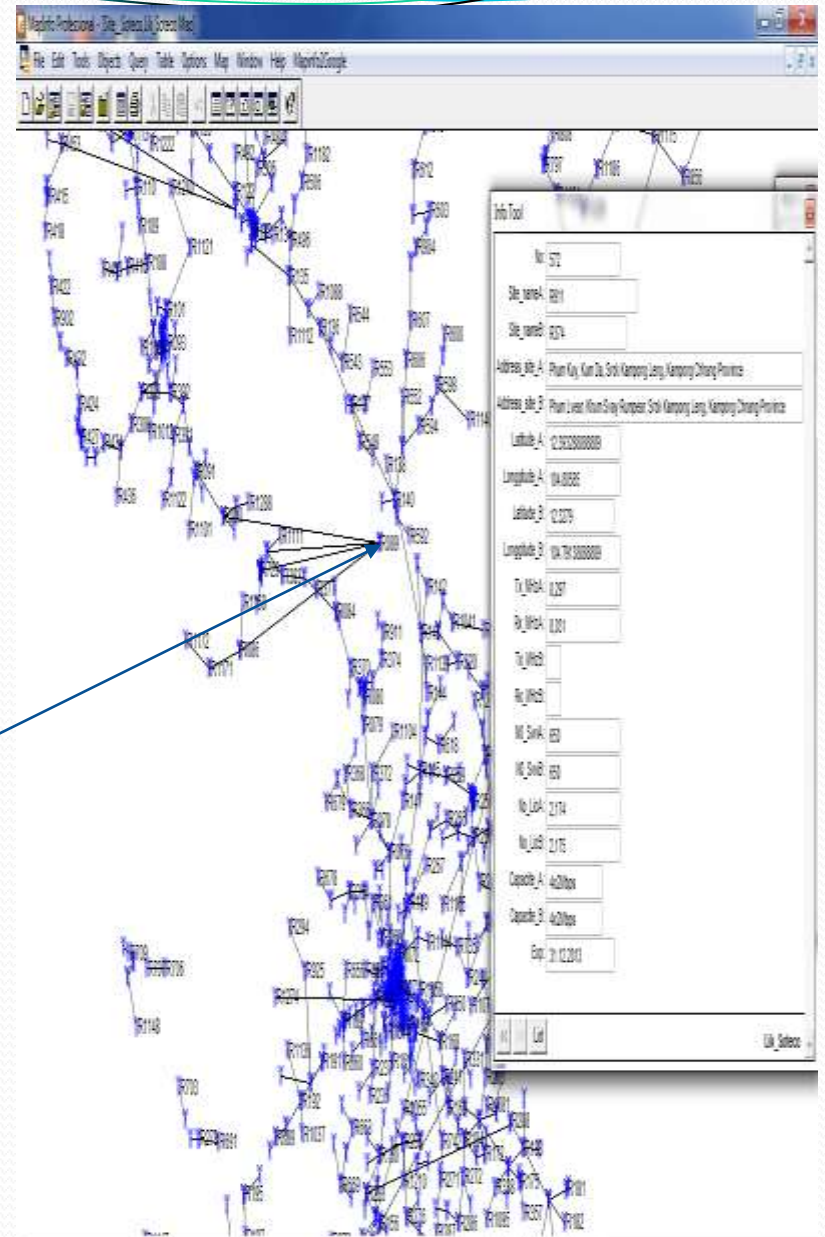
2- Applicant selects frequency, T.R.C. will verify and assign it.

3- T.R.C. certifies private entity to assist applicants in frequency selection, T.R.C. will verify and assign it.

Management on Radio Digital Microwave Network

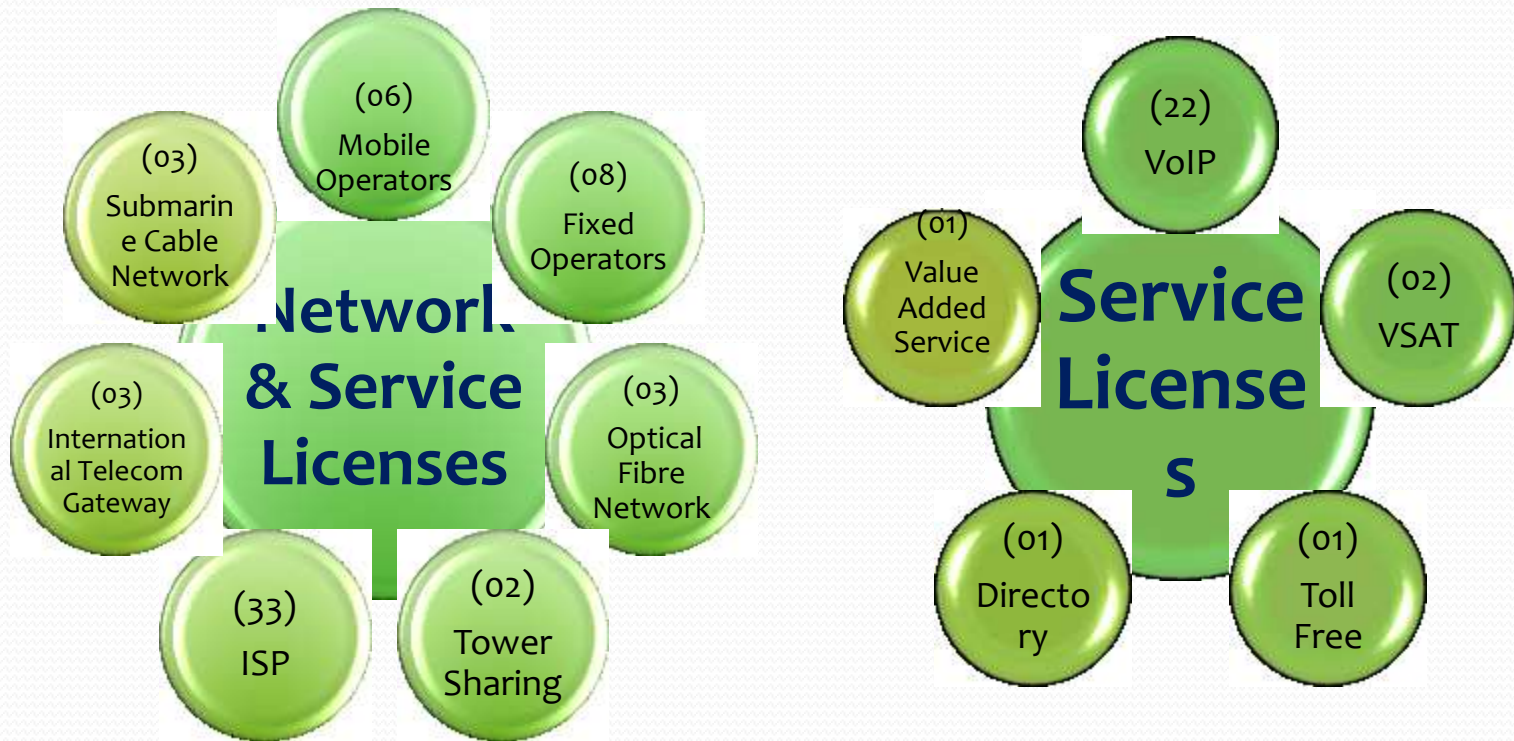


Management on Radio Digital Microwave Network



5. Telecommunications Status

- Network & Service Licenses

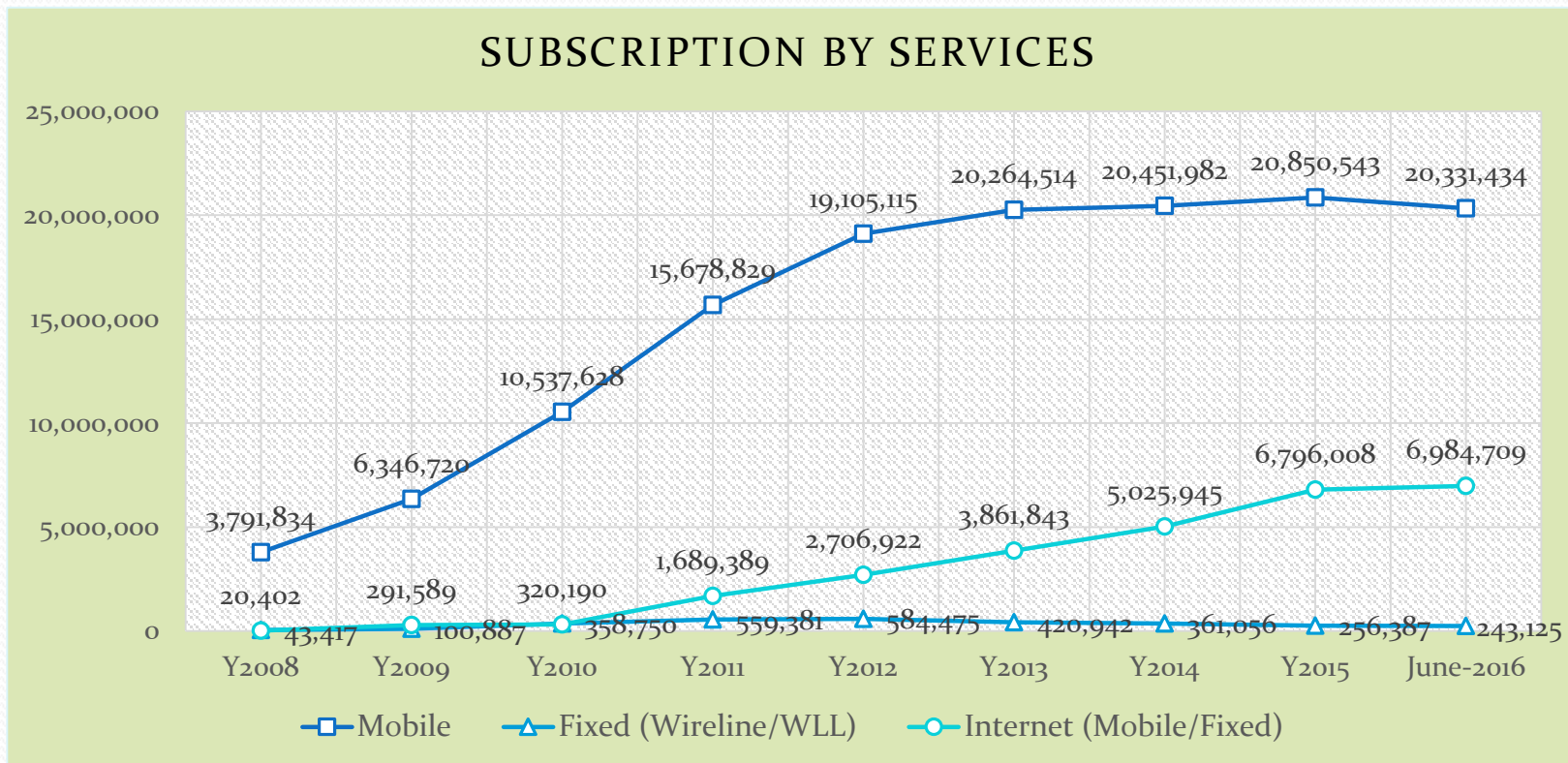


Telecom Operators & Market

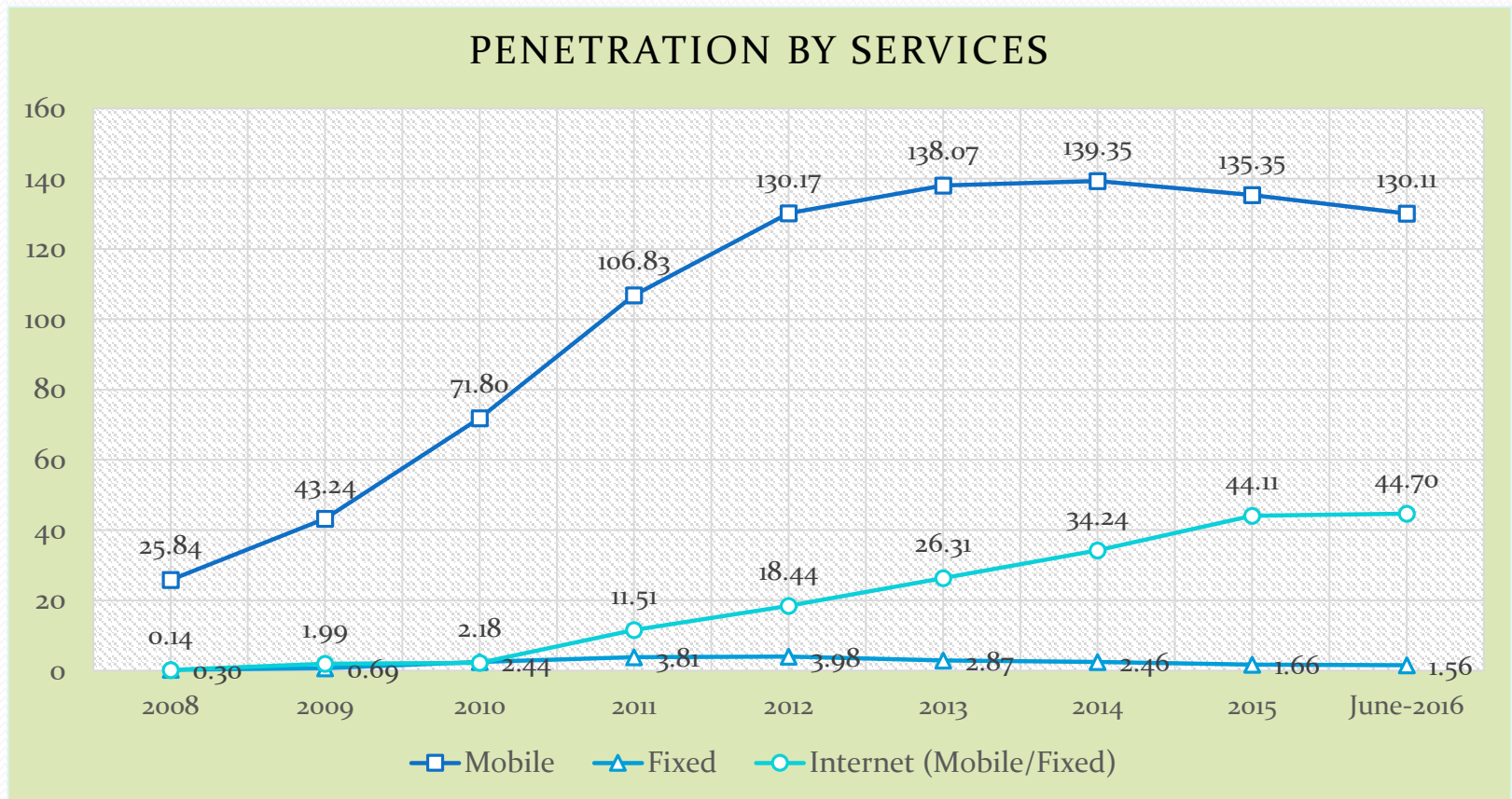
- Mobile subscription : **19.17 millions Subs.** (SIM
- Penetration: **130 %**
- Fixed and Fixed WLL : **234,799 Subs.**
- Penetration: **1.60 %**
- **Total tele-density : 150.92%**
- Internet user : **7,25 millions users**
- Penetration: **46.4 %**



Telecommunications Status



Telecommunications Status



Fiber Optic Cable Infrastructure

Company	Length Optic Cable
CFOCN	17,200 km
Viettel (Cambodia)	8,300 km
Telecom Cambodia	1,600 km
Total	27,100 km



CFOCN



Telecom Cambodia

Purpose of Frequency Management

To provide for the efficient and effective use of the scarce national spectrum resources through

- Planning, regulating and managing the efficient allocation of national resources
- Planning and coordinating of frequency usage at regional and international levels
- Monitoring and resolving radio frequency interference

National Frequency allocation Table

- Referring to Radio Regulations Article 5 of ITU edition 2012 (region 3) TRC has allocated frequency from 8.3kHz to 275GHz for services as following:
 - Fixed
 - Space
 - Mobile(Private Network, Aircraft Station, Ship Station, Cellular Telephone, Trunked Radio)
 - Broadcasting
 - Amateur Radio
 - Radio determination ect...

Spectrum Management

- Why Spectrum Management Is Essential: Spectrum Management is essential to achieve the 3 main goals of Government

1. Social Economic Benefit

2. National Security

3. National Budget

Three main means to achieve the above vision:
Harmonization, Efficiency and Availability of Spectrum

Technology & Frequency Band Assign For Commercial Operation in Cambodia

- | | |
|---------------------|---|
| 1) CamGSM | EGSM900/GSM900/GSM1800/W--CDMA2100
/BWA(WiMAX)/Optical Fiber/Microwave |
| 2) Camintel | WLL (Fixed Phone) |
| 3) CADCOMMS | WCDMA2100/3G/Optical Fiber/Microwave |
| 4) SEATEL | CDMA800/Optical Fiber/Microwave |
| 5) Smart Axiata | GSM900/GSM1800/WCDMA2100/LTE/4G/
BWA(WiMAX)/Optical Fiber/Microwave |
| 6) Vieael(Cambodia) | EGSM900/GSM900/GSM1800/WCDMA2100/
LTE/4G/Microwave |
| 7) Xinwei | TD-SCDMA |
| 8) ChuanWei, EMAXX | LTE (Not yet in operation) |

The frequency below 1GHz assigned to operators:

- 87 – 108 MHz : **Radio Sound Broadcasting (FM).**
- 138 – 174 MHz: **PTT users (Radiocom).**
- Band: (III) 174 – 230 MHz, (IV) 470 – 606 MHz, (V) 606 – 790 MHz: **ATV/DTV, broadcasting stations (TV).**
- 430 – 470 MHz, **Assigned to PTT users,** (CDMA450: 450-470MHz).
- APAC 700 MHz (698 – 806MHz) **APT Band Plan for Mobile Broadband service.**

The Frequency above 1GHz assigned to operators

- 1800 MHz , 1900 MHz, 2100MHz : **GSM, LTE, WCDMA.**
- 2300 – 2400 MHz: **03 ISP operators for operating WiMAX technology.**
- 2400 – 2483MHz: **ISM.**
- 2500 – 2690MHz: **04 LTE operators (Only one operator has deployed)**
- 3300 – 3400MHz: **08 operators for operating BWA.**
- 3400 – 4200MHz: **C-Band (Fixed Satellite Service)**
- 5230 – 5825MHz: **07 operators for operating BWA/Backhaul.**
- 7300 – 23000MHz: **Mobile operators for operating Radio Microwave Link.**

Cooperation Frequency Assignment & usage

There are four relevant Ministries as the following :

1- Ministry of Information is responsible for TV & sound Broadcasting

➤ Sound Broadcasting:

AM, SW has been allocated 535-1606.5kHz(CBG-7) & part of HF band
FM has been allocated 87 – 108 MHz(CBG 21)

➤ TV Broadcasting: The situation in these band with regard to digital dividend in Cambodia is summarized in Table :
Broadcasting and Mobile Internet in Band I, III and IV/V

Cooperation Frequency Assignment & usage

2- **Ministry of Interior** used frequency band HF, VHF & UHF for Radiocom (Push To Talk) and Radio trunked system.

3- **Ministry of Defense** used frequency band HF, VHF & UHF for Radiocom (Push To Talk)

4- **Secretary of State of Civil Aviation(SSCA)** :Operation frequency band and applica@on:

I- Navigation System: MF, VHF & UHF band for operation NDB, VOR, DME, VDF, ILS, DME...

II- Communication : VHF Airband, VHF G/Ground, HF G/Ground(USB), SAT.COM
and Trunked Radio (UHF 800MHz Band)

III- Surveillance: Interrogator and SSR Monitor (1030MHz & 1090MHz)

Type of Licenses	Number of Radio Licenses (2015)
Amateur	11
Radiocom	1183
AM	5
FM	90
TV (ATV/DTV)	176
TV (MMDS)	2
Microwave and Radiolink	2516
Radio Base	28
VSAT	7
Mobile Satellite	2
Meteorology Radar	1
BWA/WiMax	23
Total	4,044

7. Development Plan

R&S DDF205 & ADD295

Fixed Monitoring Station (1 set)

- Receiver Frequency Range from 0.3MHz to 3GHz

R&S DDF205 & ADD295

Mobile Monitoring Station (2 sets)

- Receiver Frequency Range from 0.3MHz to 3GHz

R&S DDF007 &
ADD107/207

Portable Direction Finder (1 Set)

- Receiver Frequency range from 20MHz to 6GHz

Development Plan

Anritsu MS2720T-0720

Handheld Spectrum Analyzer (1 set)

- Receiver Master Frequency Range from 3kHz to 20GHz



R&S TS-EMF

Electromagnetic Fields (1 set)

- Receiver Frequency Range from 30MHz to 3GHz

R&S PR100

Portable Receiver On-Site Radio Monitoring (1 set)

- Frequency range from 9kHz to 7.5GHz





- **A-Central Control Center**
- Phnom Penh
- **B-Regional Monitoring Center**
- Phreah Sihanouk
- Kratie
- SvayRieng
- Siem Reap
- **C-Mobile Direction Finder** : (2Vehicles)
- **Specification**
- -VHF/UHF frequency Range : 20MHz-6GHz
- -System Hardware/software

8. International Affairs

• Joint Technical Committee Meeting (JTC)

Common Border Areas

Agreement/Methods for Frequency Coordination

Cambodia - Lao PDR

- Joint Technical Committee (JTC) : 1 Meeting/Year
- Total 3 meetings held since 2007
- Avoid and resolve interference on case-by-case basis
- The frequency coordination and registration procedure was agreed.

Cambodia - Thailand

- Joint Technical Committee (JTC) : 1 Meeting/Year
- 5 meetings held since 2004
- Avoid and resolve interference on case-by-case basis
- The frequency coordination and registration procedure was agreed.

Cambodia – Vietnam

- Joint Technical Committee (JTC) : 1 Meeting/Year
- 6 meetings held since 1999 – 2015
(Preparing its 7th meeting during July 2016 at Ho Chi Minh, Vietnam)
- Avoid and resolve interference on case-by-case basis
- The frequency coordination and registration procedure was agreed

9. Challenges

- **Technical Staffs in Telecom. and ICT experiences.**
- **Standardization Regulations and Technical**
- **Laboratory Test**
- **Radio Monitoring Equipment**

The Key Action Plan

Prepare regulations on:

- Re--farming guide line and procedure of 2G
- Frequency planning and use
- Spectrum alloca@on & assignment
- Management/ Coordination to avoid Interference
- Revise on Spectrum usage and license fees
- Short Range devices (SRD)
- Type approval guideline
- Harmonized spectrum (License, 700MHz/Unlicensed, 2.4GHz & 5.8Ghz WLAN; RLAN)
- Joint cooperation for terrestrial digital TV Switch Over (TVSO)



THANK YOU

