



# **DIGITAL BROADCASTING TRENDS** **AND DIGITAL DIVIDEND**

## **THAILAND CASE STUDY**

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# WHAT IS THE DIGITAL DIVIDEND ?



- The amount of spectrum made available by the transition of terrestrial television broadcasting from analog to digital due to the high spectral efficiency of digital TV
  - Use less spectrum but getting more tv channels, better quality
- In general, It is related to the frequency band UHF 470 – 862 MHz
- The digital dividend can be used for
  - Broadcasting services
  - Mobile Broadband Services (IMT)
- Digital dividend for IMT
  - Digital Dividend 1: 790 – 862 MHz (WRC-07)
  - Digital Dividend 2: 698 – 790 MHz (WRC-12)

## DIGITAL DIVIDEND IS USED FOR ?

- Broadcasting service (Demand)
  - More programmes
  - High Definition, Ultra High Definition television
  - 3D television
  - Mobile television
  - Pay TV
- Mobile service (Demand)
  - Mobile broadband (IMT)
  - Mobile service has the different frequency band planning to the existing broadcasting service, therefore new frequency band planning is required and all of these will be done only after **the analog TV is already switched off.**
- The service selection also relies on the harmonization of spectrum usage with neighbor countries in order to avoid the interference in the border area

# STATUS OF SPECTRUM

# ANALOG TV BROADCASTING

- There are 6 analog TV stations operating on
  - VHF Band I (47-68 MHz) Channel 2-4
  - VHF Band III (174-230 MHz) Channel 5-12  **Digital Radio**
  - UHF Band IV, V (510-790 MHz) Channel 26-60  **Digital TV and then Digital Dividend**
- Analog TV Stations (all free-to-air)
  - CH3, Commercial TV under the concession with MCOT PLC
  - CH5, Royal Thai Army TV
  - CH7, Commercial free TV under the concession with Channel 5
  - Modern 9, State-owned TV owned and operate by MCOT PLC
  - NBT, Government TV
  - TPBS, State-agency public broadcasting TV
- Analog Switch-off will take place after the concession expired or some special agreement

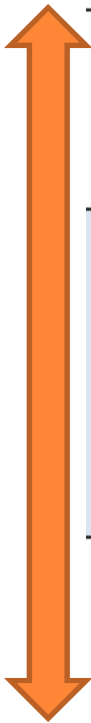
# THAILAND FREQUENCY ALLOCATION TABLE

การกำหนดให้กับกิจการ		
ประเทศไทย		เชิงอรรถของประเทศไทย
460-470	<u>กิจการประจำที่</u> <u>กิจการเคลื่อนที่</u> 5.286AA กิจการอุตุนิยมวิทยาผ่านดาวเทียม (อวกาศสุโลก) 5.287 5.289	T-unlicensed1 T-JTC T-JTC2
470-510	<u>กิจการประจำที่</u> <u>กิจการเคลื่อนที่</u>	T-unlicensed1 T-cellular T-mobile T-JTC T-JTC2
510-790	<u>กิจการกระจายเสียงและกิจการโทรทัศน์</u> <u>กิจการประจำที่</u> <u>กิจการเคลื่อนที่</u>	T-unlicensed2 T-TV
790-890	<u>กิจการประจำที่</u> <u>กิจการเคลื่อนที่</u> 5.317A  5.320	T-unlicensed2 T-cellular T-mobile T-JTC T-JTC2

**Mobile Service**

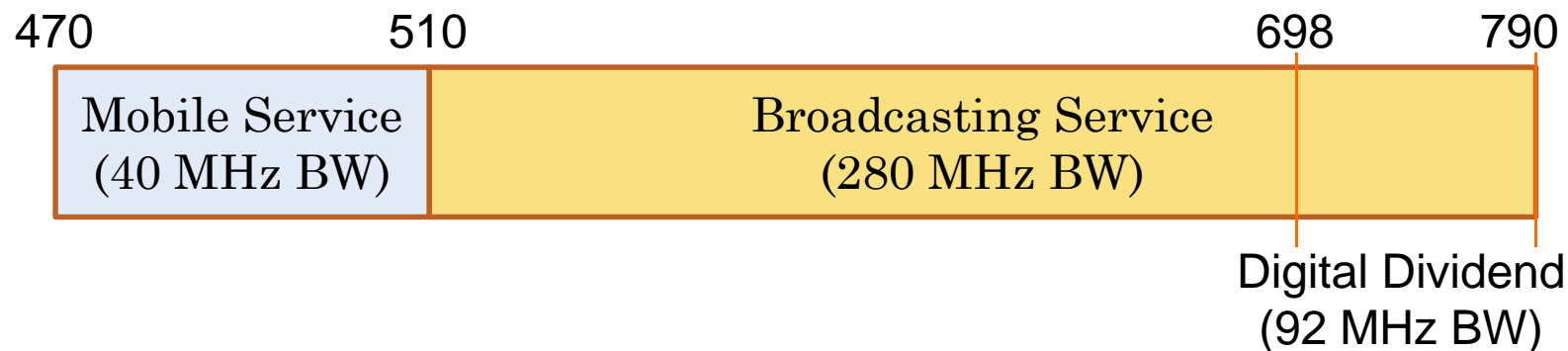
**Broadcasting Service**

**Mobile Service**



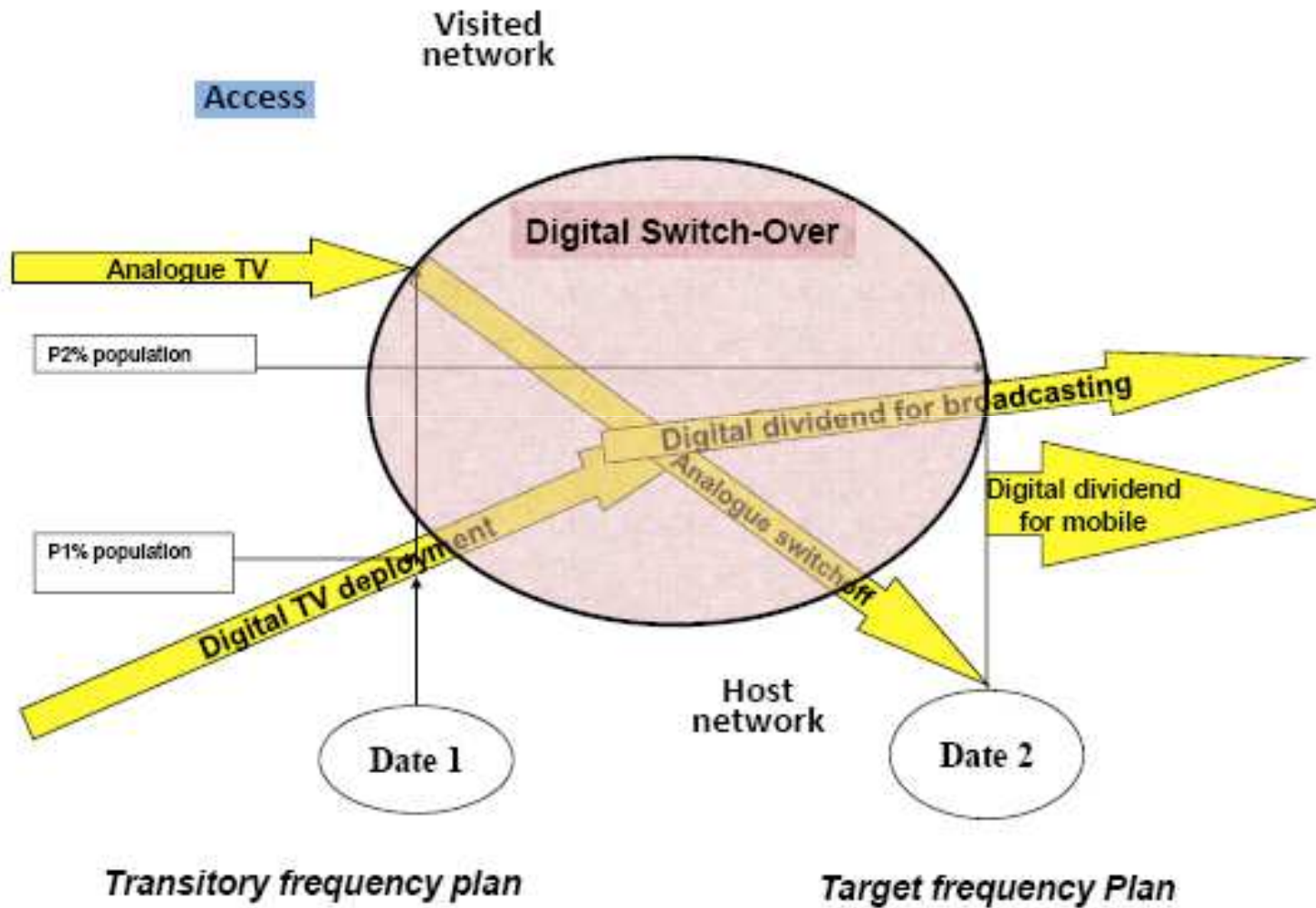
# THAILAND FREQUENCY ALLOCATION TABLE

- In most of countries, the frequency band 470 – 790 MHz is used for the broadcasting service.
- In Thailand,
  - 510 – 790 MHz is used for the broadcasting service
  - 470 – 510 MHz is used for the mobile service and the land mobile service → Obsolete technology



- 510 – 790 MHz is also used for the short range mobile devices with low power less than 10 mW. such as wireless microphone, wireless video transmission

# DIGITAL SWITCHOVER PROCESS (SPECTRUM VIEWPOINT)





# TV UHF BROADCASTING FREQUENCY (CHANNEL 26 – 60)

หมายเลข ช่องความถี่ วิทยุ	ความถี่วิทยุ (เมกะเฮิรตซ์)		ความถี่ กึ่งกลาง (center frequency)
	ขอบล่าง	ขอบบน	
26	510	518	514
27	518	526	522
28	526	534	530
29	534	542	538
30	542	550	546
31	550	558	554
32	558	566	562
33	566	574	570
34	574	582	578
35	582	590	586
36	590	598	594
37	598	606	602
38	606	614	610
39	614	622	618
40	622	630	626
41	630	638	634
42	638	646	642
43	646	654	650

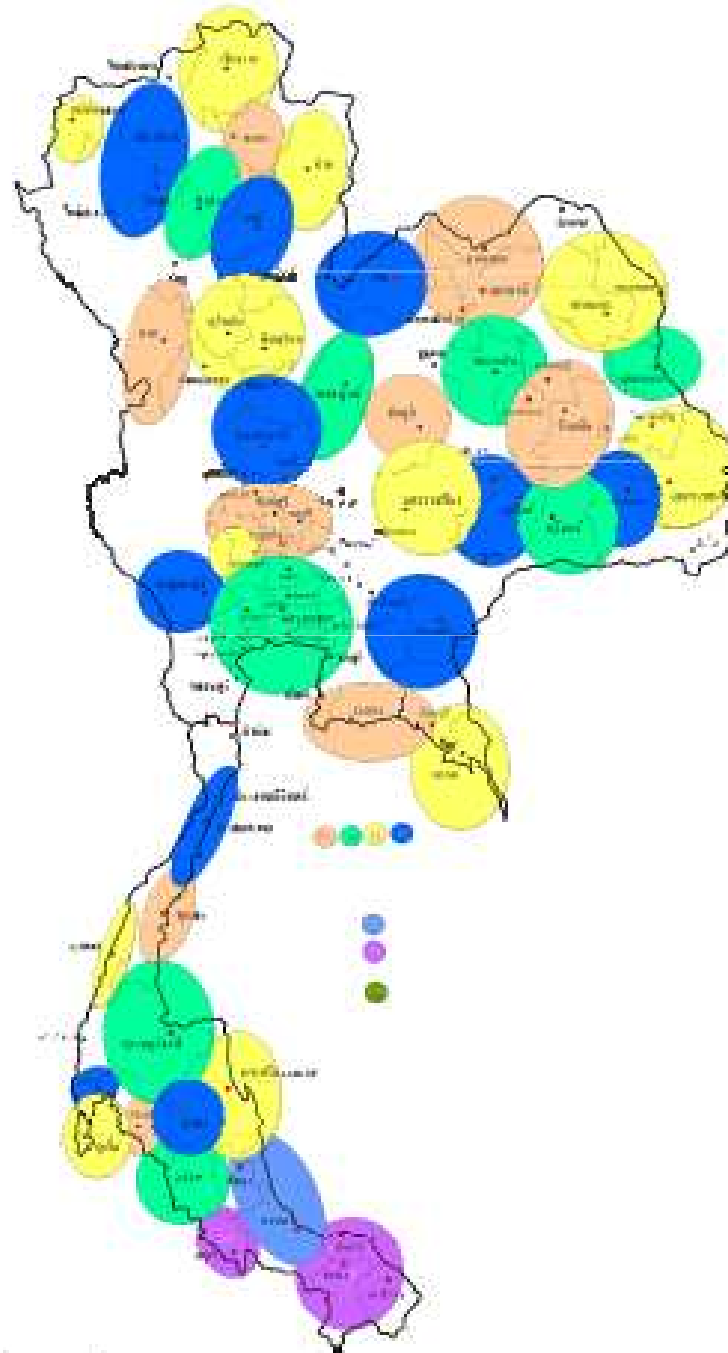
หมายเลข ช่องความถี่ วิทยุ	ความถี่วิทยุ (เมกะเฮิรตซ์)		ความถี่ กึ่งกลาง (center frequency)
	ขอบล่าง	ขอบบน	
44	654	662	658
45	662	670	666
46	670	678	674
47	678	686	682
48	686	694	690
49	694	702	698
50	702	710	706
51	710	718	714
52	718	726	722
53	726	734	730
54	734	742	738
55	742	750	746
56	750	758	754
57	758	766	762
58	766	774	770
59	774	782	778
60	782	790	786

## BROADCASTING FREQUENCY

- Channel 26 – 60 are currently used by the analogue television
- Channel 49 – 60 will be the digital dividend in the future
- Currently there are 15 analog TV stations operating on channel 49 - 60

# FREQUENCY PLAN (DSO)

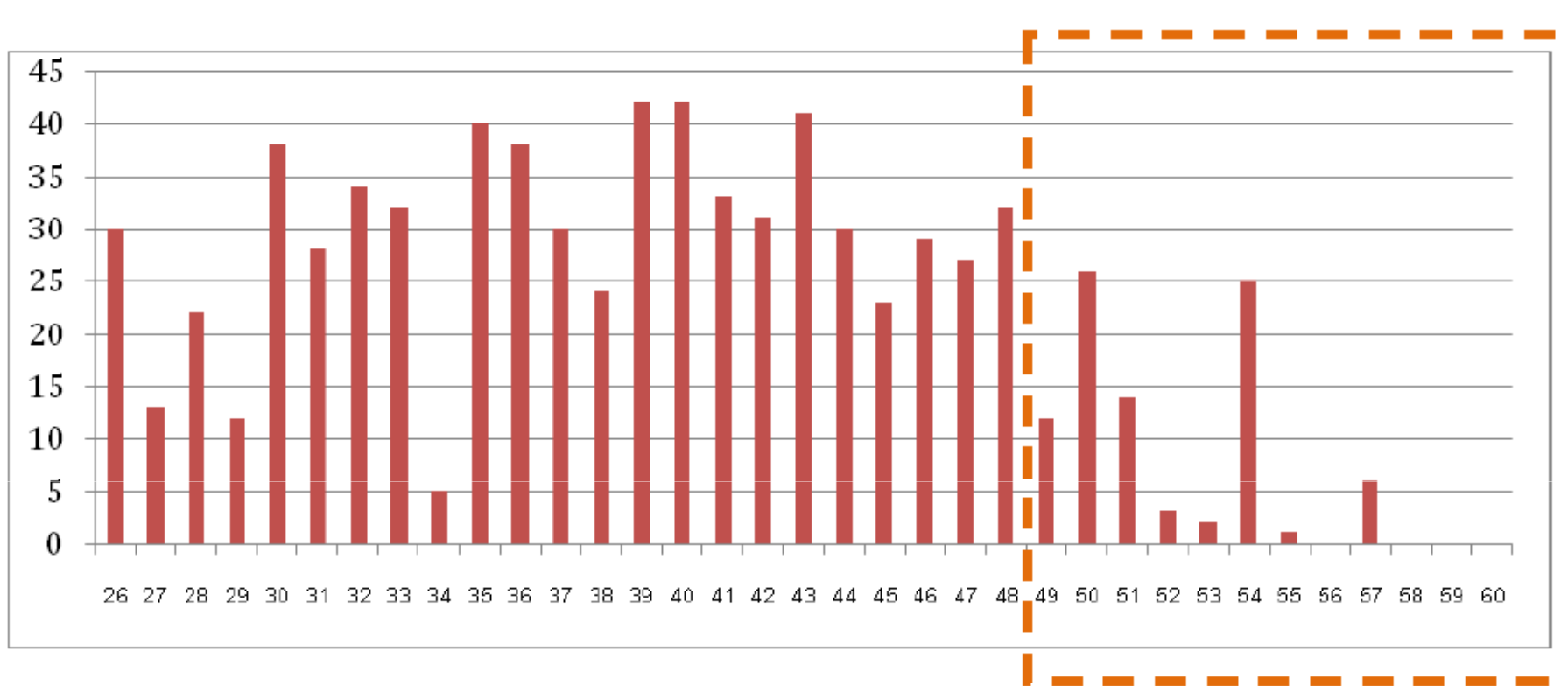
- 6 Multiplex operators
- 39 Service area based on the existing main transmitter Sites
- Use both multi-frequency and single frequency Planning
- Compatibility with existing analog tv services



# FREQUENCY GROUP (DSO)

กลุ่มช่อง ความถี่ วิทยุ	จำนวน ช่อง ความถี่	หมายเลขช่องความถี่วิทยุ															
		N-3	N	N+3	N+4	N+6	N+7	N+8	N+11	N+12	N+15	N+16	N+18	N+19	N+20	N+23	N+24
D1	7	-	28	31	-	-	35	-	39	-	43	-	-	47	-	51	-
D2	7	26	29	32	-	-	36	-	40	-	44	-	-	48	-	-	-
D3	7	27	30	33	-	-	37	-	41	-	45	-	-	49	-	-	-
D4	7	-	34	-	38	-	-	42	-	46	-	50	-	-	54	57	-
D5	3	-	52	55	-	58	-	-	-	-	-	-	-	-	-	-	-
D6	3	-	53	56	-	59	-	-	-	-	-	-	-	-	-	-	-
T-D1	7	-	26	-	30	-	-	34	-	38	-	42	-	-	46	-	50
T-D2	7	-	28	-	32	-	-	36	-	40	-	44	-	-	48	-	52

# NUMBER OF TRANSMISSION SITES IN EACH CHANNEL



- After analog switch-off, there are some strategies to clear up the digital dividend band
  - Single Frequency Network (very challenging)
  - Re-farm 470-510 MHz to broadcasting service

# FREQUENCY PLANNING OF DIGITAL DIVIDEND (APT)

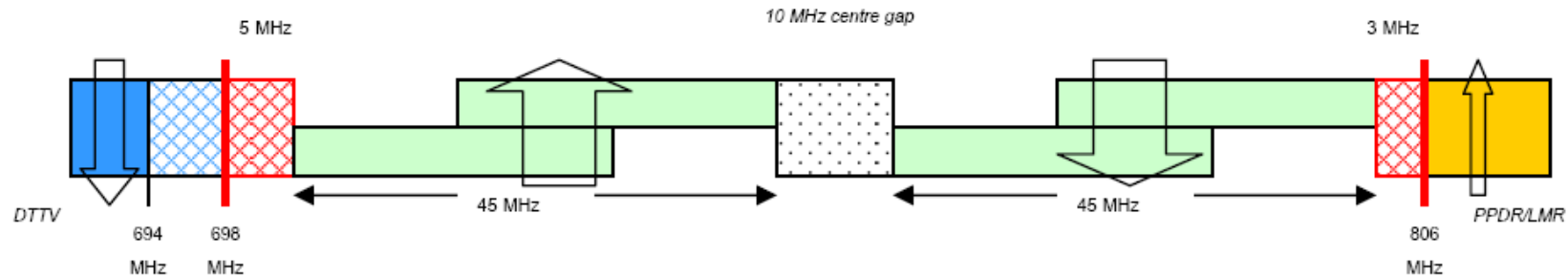


Figure 1: Harmonised FDD Arrangement of 698-806 MHz band

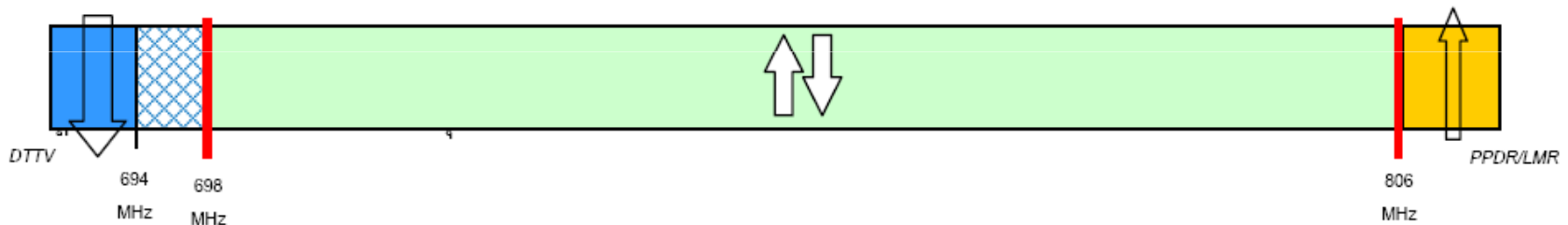


Figure 2: Harmonised all-TDD Arrangement of 698-806 MHz band

- RECOMMENDATION ITU-R M.1036-4 Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR)

## INTERNATIONAL ISSUES

- Cross-border coordination with neighboring countries (i.e., Malaysia, Lao PDR, Cambodia, Myanmar) through JTC meeting
- Agree on frequency planning and frequency usage at the border area
- Harmonized agreement among the neighboring countries on the digital dividend

# IDENTIFY THE NEED OF THE DIGITAL DIVIDEND (FEASIBILITY STUDY)

- Constitution of Kingdom of Thailand (2007)
  - Spectrum is the resource of the country, have to use it for the national benefit (i.e., both national level or local level)
  - Benefit to education, culture, national security, public interest and fair trade.
- Spectrum Management Master Plan
- Broadcasting Master Plan
- Telecommunication Master Plan
- Economy and Social Impact of Broadcasting service in 510 – 790 MHz
- Demand of Broadcasting Service
- Demand of Mobile broadband service



## THINGS TO DO TOWARD THE DIGITAL DIVIDEND

- The 700 MHz digital dividend is under the following conditions
  - After updating the Spectrum Management Master Plan and Thailand Frequency Allocation Table to be compatible to the new services in the digital dividend
  - After analog TV concession is expired
  - After analog switchoff
  - After refarming 470 – 510 MHz to broadcasting service

THANK YOU