



Malaysian Communications and Multimedia Commission
Suruhanjaya Komunikasi dan Multimedia Malaysia

Public Inquiry

Allocation of spectrum bands for mobile
broadband service in Malaysia

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This Public Inquiry was prepared in fulfilment of Sections 58 and 61 of the Communications and Multimedia Act 1998.

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1 Introduction

- 1.1 Mobile broadband subscriptions in Malaysia have doubled over the last five years to reach 38.8 million in 1st Quarter of 2019¹ from 17.6 million in 2014. In terms of population coverage, as of 31 December 2018, mobile broadband service is at 94.7% for 3G technology and 79.7% for 4G/Long Term Evolution (“LTE”) technology².
- 1.2 The emergence of next generation mobile technology such as 5G technology enables gigabit speeds and offers low latency with high reliability for multiple types of use cases. In order to support these use cases, different spectrum bands are required.
- 1.3 In light of the growing demand for data and high speed mobile broadband services and to support new technologies, spectrum resources have to be planned and managed efficiently.
- 1.4 An effective spectrum allocation strategy is also critical to ensure national policy objectives and the targets of National Fiberisation and Connectivity Plan (“NFCP”) initiative can be achieved. The NFCP sets out, among others, the target of an average speed of 30 Mbps in 98% of populated areas by 2023.
- 1.5 In addition, the spectrum allocation strategy will address other objectives such as maximising the economic and social benefits from the use of the spectrum resource, improvements in quality of service (“QoS”), enhancement of coverage and providing affordable digital connectivity, as well as encouraging innovation.
- 1.6 In this regard, this Public Inquiry (“PI”) intends to seek views from the industry, interested parties and members of the public on some proposals on the timeframe, implementation, technical matters and spectrum fees related to the allocation of the 700 MHz, 2300 MHz and 2600 MHz bands in Malaysia.

¹ MCMC, *Communication and Multimedia Facts and Figures 1Q 2019*

² MCMC, *Connectivity Key to Digital Transformation: Industry Performance Report 2018*

2 Mobile Market in Malaysia

2.1 There are currently six spectrum bands, namely 850 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2600 MHz bands, which have been assigned or allowed to be used by operators to provide mobile broadband service.

2.2 The operators are as shown in Table 2.1 below:

No.	Operators	Remark
1.	Altel Communications Sdn Bhd ("Altel")	-
2.	Asiaspace Broadband Sdn Bhd ("Asiaspace")	-
3.	Celcom Axiata Berhad	Collectively will be referred to as "Celcom"
4.	Celcom Mobile Sdn Bhd	
5.	Digi Telecommunications Sdn Bhd ("Digi")	-
6.	Maxis Broadband Sdn Bhd ("Maxis")	-
7.	REDtone Engineering & Network Services Sdn Bhd	Collectively will be referred to as "Redtone" ³
8.	SEA Telco Engineering Services Sdn Bhd	
9.	U Mobile Sdn Bhd ("U Mobile")	-
10.	Telekom Malaysia Berhad ("TM")	Collectively will be referred to as "TM/Webe"
11.	Webe Digital Sdn Bhd ("Webe") ⁴	
12.	YTL Communications Sdn Bhd ("YTLC")	-

Table 2.1: List of operators

³ REDtone Engineering & Network Services Sdn Bhd and SEA Telco Engineering Services Sdn Bhd are subsidiaries of REDtone International Berhad

⁴ Webe Digital Sdn Bhd is a subsidiary of Telekom Malaysia Berhad

2.3 The amount of spectrum holdings by each operator is shown in Figure 2.2.

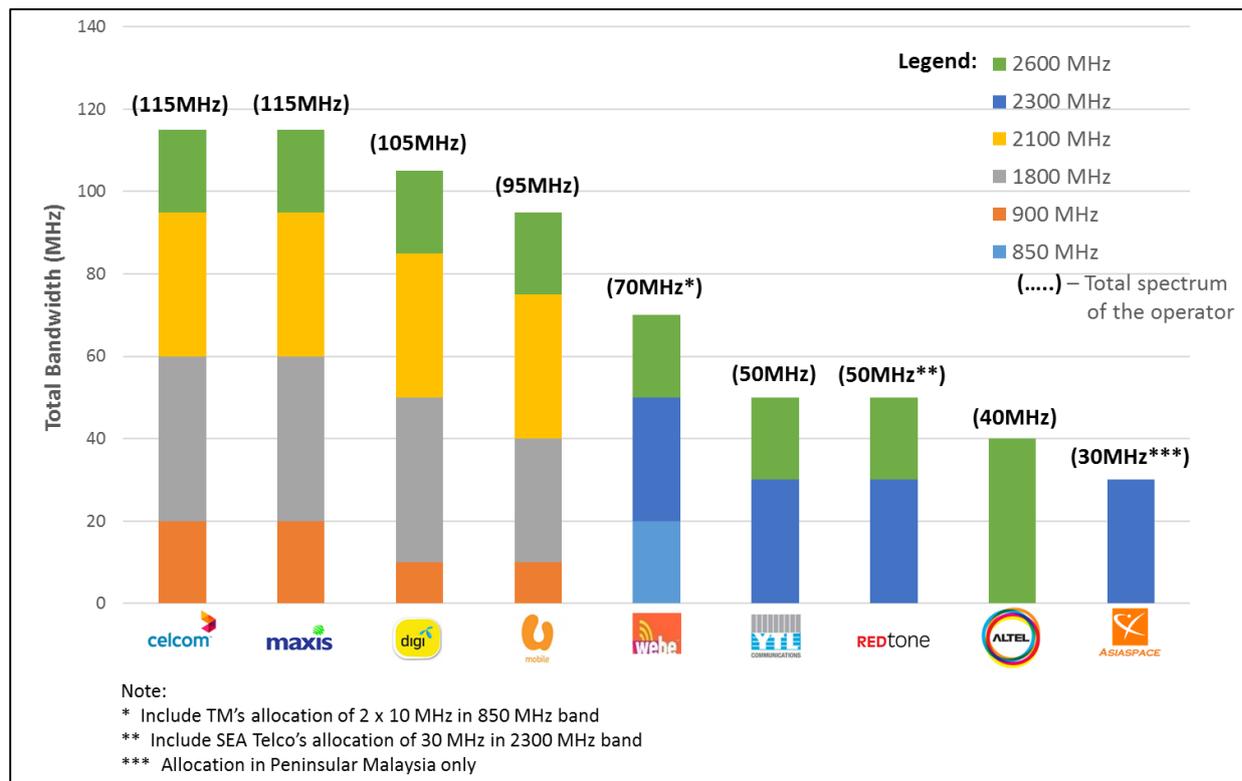


Figure 2.2: Spectrum holdings by operators

2.4 There are spectrum sharing arrangements between operators in the following spectrum bands:

- a) 850 MHz band:
 - Between TM and Webe on the use of 2x10 MHz spectrum held by TM.
- b) 2300 MHz band:
 - Between YTLC and Asiaspace on the use of 30 MHz spectrum held by Asiaspace.
- c) 2600 MHz band:
 - Between Celcom and Altel on the use of 2x10 MHz spectrum held by Altel;
 - Between Digi and Altel on the use of 2x10 MHz spectrum held by Altel; and
 - Between Maxis and Redtone on the use of 2x10 MHz spectrum held by Redtone.

- 2.5 Celcom, Digi, Maxis, U Mobile and TM/Webe hold approximately 74% of all the spectrum available for mobile broadband service.
- 2.6 Celcom, Digi and Maxis have provided mobile service coverage of at least 85% of the population with the deployment of their 2G, 3G and 4G/LTE technologies.

3 Spectrum Allocation/Re-farming

3.1 700 MHz band

3.1.1 Background

3.1.1.1 Terrestrial television (“TV”) service is currently being migrated out of the 700 MHz band. The analogue switch-off (“ASO”) is expected to be completed by 3rd Quarter of 2019.

3.1.1.2 The current status of the 700 MHz band in Malaysia is summarised in Table 3.1.

Current status in 700 MHz band	
Frequencies	703 MHz to 743 MHz paired with 758 MHz to 798 MHz (3GPP Band 28)
Current status	Digital Terrestrial TV (“DTT”) switchover in progress
Current use	Analogue and digital TV broadcasting
Amount of spectrum available for mobile broadband service	2x40 MHz

Table 3.1: Current status in 700 MHz band

3.1.1.3 Globally, the 700 MHz band is one of the key sub 1 GHz band for LTE coverage. In Malaysia, this band is being planned for the provision of mobile broadband service after ASO.

3.1.1.4 The allocation of the 700 MHz band for mobile broadband service in Malaysia is important to enhance coverage and capacity especially in rural and remote areas due to its propagation characteristics. Therefore, the timely release of the 700 MHz band is an important component towards achieving the relevant NFCP targets.

3.1.1.5 As of November 2018, the 700 MHz band (3GPP Band 28) has a reasonably well-supported ecosystem with approximately 1,500 devices. The number of devices is expected to increase rapidly with the deployment of the 700 MHz band in Europe over the next few years.

3.1.2 Proposed Award Mechanism

3.1.2.1 The 700 MHz band is a valuable band given its propagation characteristics and is an ideal band to enhance coverage.

3.1.2.2 Typically, the 700 MHz band is awarded through an auction process in most countries due to its value and benefits⁵. However, the auction process may inflate the spectrum price and may restrict operators' ability to invest in network deployment.

3.1.2.3 As such, the Malaysian Communications and Multimedia Commission ("MCMC") is considering to allocate the 700 MHz band by way of Spectrum Assignment ("SA") through a tender (beauty contest) process.

3.1.2.4 In order to maximise performance of LTE, 3GPP has set a maximum channel bandwidth of 2x20 MHz. This means the 700 MHz band can only be assigned to two operators. However, based on international benchmarks, it is possible to support up to four operators in the 700 MHz band by assigning a channel bandwidth of 2x10 MHz per operator.

3.1.2.5 An assignment of less than 2x10 MHz spectrum may not be ideal to deliver high data rate and this may affect the ability of operators to achieve the NFCP targets and ensure improvements of QoS.

3.1.2.6 The spectrum blocks for SA in 700 MHz band are as follows:

Spectrum Block	Frequency Range	Bandwidth
A	703 MHz to 713 MHz paired with 758 MHz to 768 MHz	2x10 MHz
B	713 MHz to 723 MHz paired with 768 MHz to 778 MHz	2x10 MHz
C	723 MHz to 733 MHz paired with 778 MHz to 788 MHz	2x10 MHz
D	733 MHz to 743 MHz paired with 788 MHz to 798 MHz	2x10 MHz

Table 3.2: Proposed bandwidth for the 700 MHz band

⁵ Countries that carried out auction of the 700MHz band such as Sweden (2018), Italy (2018), Australia (2017), Singapore (2017), Germany (2015) etc.

3.1.3 Proposed Timeline for Assignment

3.1.3.1 Considering the ASO process and also the preparation and planning for the assignment of the 700 MHz band, the assignment process of the 700 MHz band is expected to commence in the 4th Quarter of 2019 and targeted to be completed by the 2nd Quarter of 2020. The 700 MHz band will be available to be used for mobile broadband service at the earliest in the 3rd Quarter of 2020.

Question 1: MCMC would like to seek views on the proposed allocation plan for the 700 MHz band, in particular on:

- i) Award mechanism
- ii) Timeline for assignment

Question 2: MCMC would like to seek views on the optimum spectrum block per operator for assignment of the 700 MHz band.

3.2 2300 MHz band

3.2.1 Background

3.2.1.1 The 2300 MHz band is assigned to four operators, namely Asiaspace, Redtone, TM/Webe and YTLC for the provision of broadband wireless access.

3.2.1.2 The current status of the 2300 MHz band in Malaysia is summarised in Table 3.3.

Current status in 2300 MHz band	
Frequencies	2300-2390 MHz (3GPP Band 40)
Current status	By way of apparatus assignment ("AA") (Annual renewal)
Current use	LTE and Worldwide Interoperability for Microwave Access ("WiMAX")
Available spectrum for mobile broadband service	90 MHz

Table 3.3: Current status in 2300 MHz band

3.2.1.3 The current operators in the 2300 MHz band are shown in Table 3.4 below.

Operators	Frequency Range	Bandwidth	Area
Asiaspace	2300 MHz to 2330 MHz	30 MHz	Peninsular Malaysia
Redtone	2300 MHz to 2330 MHz	30 MHz	Sabah and Sarawak
YTLC	2330 MHz to 2360 MHz	30 MHz	Nationwide
TM/Webe	2360 MHz to 2390 MHz	30 MHz	Nationwide

Table 3.4: Current operators in 2300 MHz band

3.2.1.4 YTLC is utilising the 2300 MHz to 2330 MHz band allocated to Asiaspace by way of third party authorisation. Therefore, the actual utilisation by YTLC in Peninsular Malaysia is 60 MHz.

3.2.1.5 The 2300 MHz band is one of the key spectrum bands used to support the capacity requirement in the provision of services.

3.2.1.6 As of November 2018, there is a well-developed ecosystem for the 2300 MHz band (3GPP Band 40) with more than 4,000 devices.

3.2.2 Proposed Award Mechanism

- 3.2.2.1 MCMC is considering to vacate and reassign the 2300 MHz band. This is to ensure efficient use of spectrum and to provide opportunities to implement a more flexible band plan based on 10 MHz or 20 MHz bandwidth.
- 3.2.2.2 MCMC is also cognisant of the fact that such a reassignment may cause disruption to the existing subscribers in the 2300 MHz band. Although some operators may have alternative frequency bands (i.e. the 2600 MHz band) to migrate their subscribers to, the transition process may require time and have cost implications.
- 3.2.2.3 It is proposed that the current allocation based on regional distinctions (Peninsular/Sabah and Sarawak) will be removed and the new assignments will be on a nationwide basis.
- 3.2.2.4 The reassignment of the 2300 MHz band will be by way of SA through a tender (beauty contest) process. A tender with a fixed price is deemed suitable rather than auction in this case to incentivise operators to enhance speeds and QoS.
- 3.2.2.5 An assignment based on a channel bandwidth of 20 MHz is preferred as this is the optimum bandwidth required for the deployment of LTE technology.
- 3.2.2.6 The spectrum blocks for SA in 2300 MHz band are as follows:

Spectrum Block	Frequency Range	Bandwidth
A	2300 MHz to 2310 MHz	10 MHz
B	2310 MHz to 2320 MHz	10 MHz
C	2320 MHz to 2330 MHz	10 MHz
D	2330 MHz to 2340 MHz	10 MHz
E	2340 MHz to 2350 MHz	10 MHz
F	2350 MHz to 2360 MHz	10 MHz
G	2360 MHz to 2370 MHz	10 MHz
H	2370 MHz to 2380 MHz	10 MHz
I	2380 MHz to 2390 MHz	10 MHz

Table 3.5: Proposed bandwidth for the 2300 MHz band

3.2.3 Proposed Timeline for Assignment

3.2.3.1 The assignment process of the 2300 MHz band is expected to commence in the 4th Quarter of 2019 and targeted to be completed by the 3rd Quarter of 2020. The 2300 MHz band will be assigned by way of SA at the earliest in the 4th Quarter of 2020.

Question 3: MCMC would like to seek views on the proposed allocation plan for the 2300 MHz band, in particular on:

- i) Award mechanism
- ii) Timeline for assignment

Question 4: MCMC would like to seek views on the optimum spectrum block per operator for assignment of the 2300 MHz band.

3.3 2600 MHz band

3.3.1 Background

3.3.1.1 Eight operators were assigned or allowed to use the 2600 MHz band in 2012. The relevant arrangements on the use of the 2600 MHz band are outlined in para 2.4.

3.3.1.2 The current status of the 2600 MHz band in Malaysia is summarised in Table 3.6.

Current status in 2600 MHz band	
Frequencies	i) 2500 MHz to 2570 MHz paired with 2620 MHz to 2690 MHz (Frequency Division Duplex ("FDD")) (3GPP Band 7) ii) 2575 MHz to 2615 MHz (Time Division Duplex ("TDD")) (3GPP Band 38)
Current status	AA expires on 31 December 2019
Current use	Mobile/fixed wireless using LTE
Amount of spectrum available for mobile broadband service	i) 2×70 MHz (FDD) ii) 40 MHz (TDD)

Table 3.6: Current status in 2600 MHz band

3.3.1.3 The current manner in which the 2600 MHz band has been assigned or allowed to be used is shown in Table 3.7:

Operators	Frequency Range	Bandwidth
Redtone	2500 MHz to 2510 MHz paired with 2620 MHz to 2630 MHz	2x10 MHz
Maxis	2510 MHz to 2520 MHz paired with 2630 MHz to 2640 MHz	2x10 MHz
U Mobile	2520 MHz to 2530 MHz paired with 2640 MHz to 2650 MHz	2x10 MHz
Celcom	2530 MHz to 2540 MHz paired with 2650 MHz to 2660 MHz	2x10 MHz
Altel	2540 MHz to 2560 MHz paired with 2660 MHz to 2680 MHz	2x20 MHz
Digi	2560 MHz to 2570 MHz paired with 2680 MHz to 2690 MHz	2x10 MHz
TM/Webe	2575 MHz to 2595 MHz	20 MHz
YTLC	2595 MHz to 2615 MHz	20 MHz

Table 3.7: Current operators in 2600 MHz band

3.3.1.4 The actual utilisation according to spectrum sharing arrangements between the operators is shown in Table 3.8.

Operators	Actual frequency utilisation	Bandwidth
Maxis (sharing arrangement with Redtone)	2500 MHz to 2520 MHz paired with 2620 MHz to 2640 MHz	2x20 MHz
U Mobile	2520 MHz to 2530 MHz paired with 2640 MHz to 2650 MHz	2x10 MHz
Celcom (Sharing arrangement with Altel)	2530 MHz to 2550 MHz paired with 2650 MHz to 2670 MHz	2x20 MHz
Digi (Sharing arrangement with Altel)	2550 MHz to 2570 MHz paired with 2670 MHz to 2690 MHz	2x20 MHz
TM/Webe	2575 MHz to 2595 MHz	20 MHz
YTLC	2595 MHz to 2615 MHz	20 MHz

Table 3.8: Actual usage in 2600 MHz band

3.3.1.5 The current band plan for the 2600MHz band (3GPP Band 7 and Band 38) is used in many countries.

3.3.1.6 The 3GPP Band 7 is seen as an important band to provide additional capacity to mobile broadband networks particularly in dense urban areas where there is likely to be congestion. There is a well-developed ecosystem around this band with more than 7,900 LTE devices, as of November 2018.

3.3.1.7 Similar to 3GPP Band 7, the 3GPP Band 38 is also a global LTE band. However, the deployment is not as wide as 3GPP Band 7. The device ecosystem for 3GPP Band 38 is fairly well developed with more than 3,400 LTE devices as of November 2018.

3.3.1.8 The bandwidth of 20 MHz for deployment of LTE technology is considered ideal since the 2600 MHz band is used primarily as a capacity band. Based on international benchmarks, the typical amount of bandwidth assigned per operator is 2x20 MHz, although there are also assignments of 2x15 MHz and 2x10 MHz in some countries. 10 MHz bandwidth is the minimum required for the provision of high data rate service, and anything less would be sub-optimal.

3.3.2 Proposed Award Mechanism

- 3.3.2.1 The current utilisation in 2600 MHz band based on sharing arrangements is considered efficient and similar to utilisation in most countries.
- 3.3.2.2 MCMC is considering the reassignment of the 2600 MHz band through SA based on actual utilisation. This will involve direct conversion of current AAs held by Maxis, Celcom, U Mobile, Digi, TM/Webe and YTLC, to SA.
- 3.3.2.3 MCMC foresees that there will be no disruption of services with the proposed reassignment.
- 3.3.2.4 It should be noted that, there may be a potential interference issue between the FDD and TDD spectrum blocks in the 2600 MHz band, which would require coordination between operators to facilitate efficient spectrum utilisation.

3.3.3 Proposed Timeline for Assignment

- 3.3.3.1 The conversion process of the 2600 MHz band is expected to commence in the 4th Quarter of 2019 and targeted to be completed by the 2nd Quarter of 2020. The 2600 MHz band will be assigned by way of SA at the earliest in the 3rd Quarter of 2020.

Question 5: MCMC would like to seek views on the proposed allocation plan for the 2600 MHz band, in particular on:

- i) Award mechanism
- ii) Timeline for assignment

Question 6: MCMC seeks suggestions on approaches to mitigate interference between FDD and TDD blocks to facilitate efficient spectrum utilisation in the 2600 MHz band.

4 General principles - spectrum pricing

- 4.1 MCMC intends to set fees for the relevant spectrum bands on the basis of, among others, ensuring optimal use of the spectrum resources to meet the national policy objectives and achieve relevant targets while also giving benefits to the consumers. The fees for SA consist of the following components⁶:
- (i) a price component ("price component"); and
 - (ii) an annual fee component for maintenance of the spectrum underlying the assignment ("annual fee component").
- 4.2 Any decision on the spectrum pricing, which reflects the value of the spectrum, would consider the need to incentivise efficient use of the spectrum, promote investment in network deployment, ensure widespread communications services and ensure that retail prices charged to subscribers will be affordable.

Question 7: MCMC would like to seek views on the appropriate range (per MHz) for SA fees (price component and annual fee component) and the rationale for the proposed fees, for the following spectrum bands:

- i) 700 MHz;
- ii) 2300 MHz; and
- iii) 2600 MHz.

/end

⁶ Refer to Regulation 16 of the Communications and Multimedia (Spectrum) Regulations 2000

ANNEX

A. Responding to this inquiry

Submission of responses

A.1 MCMC invites comments on all proposals put forward in this document and in particular on the specific questions, by **12 noon, 30 August 2019**.

A.2 Please ensure the following:

- Responses must relate to the questions stated in the order in which they appear in this document;
- Indicate the specific point (by reference to the paragraph number) to which a comment relates to;
- Provide clear rationale for suggestions and opinions; and
- Provide evidence to support the views given, where applicable.

A.3 Submissions of the responses and comments should be made in both hardcopy and softcopy and should be addressed to:

The Chairman
Malaysian Communications and Multimedia Commission
MCMC Tower 1
Jalan Impact, Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
Malaysia
(Attention: Spectrum Planning Division)

Email: spectrumplanning@mcmc.gov.my

All submissions should be accompanied by a cover letter signed by an authorised person from the organisation providing the response.

A.4 All responses and comments will be published and made available to the public in MCMC's website.

- A.5 Confidential treatment may be requested on any part of the submission that is believed to be proprietary, confidential or commercially sensitive with supporting justification for MCMC's consideration. In such cases, the submission must be provided in a non-confidential form suitable for publication, with any confidential information redacted as necessary and placed instead in a separate annex and clearly marked as **"CONFIDENTIAL"**.
- A.6 If MCMC grants confidential treatment, it will consider, but will not publicly disclose the information. However, if MCMC rejects the request, the information will be returned and not be considered as part of the submission.
- A.7 Any submission that requests confidential treatment for all, or a substantial part of the submission, will not be accepted by the MCMC.

B. List of questions

Spectrum Band	Questions
700 MHz	<p>Question 1: MCMC would like to seek views on the proposed allocation plan for the 700 MHz band, in particular on:</p> <ul style="list-style-type: none"> i) Award mechanism ii) Timeline for assignment <p>Question 2: MCMC would like to seek views on the optimum spectrum block per operator for assignment of the 700 MHz band.</p>
2300 MHz	<p>Question 3: MCMC would like to seek views on the proposed allocation plan for the 2300 MHz band, in particular on:</p> <ul style="list-style-type: none"> i) Award mechanism ii) Timeline for assignment <p>Question 4: MCMC would like to seek views on the optimum spectrum block per operator for assignment of the 2300 MHz band.</p>
2600 MHz	<p>Question 5: MCMC would like to seek views on the proposed allocation plan for the 2600 MHz band, in particular on:</p> <ul style="list-style-type: none"> i) Award mechanism ii) Timeline for assignment <p>Question 6: MCMC seeks suggestions on approaches to mitigate interference between FDD and TDD blocks to facilitate efficient spectrum utilisation in the 2600 MHz band.</p>
Spectrum price	<p>Question 7: MCMC would like to seek views on the appropriate range (per MHz) for SA fees (price component and annual fee component) and the rationale for the proposed fees, for the following spectrum bands:</p> <ul style="list-style-type: none"> i) 700 MHz; ii) 2300 MHz; and iii) 2600 MHz.

C. Template for response

- Please provides the comments/responses in the Table below:

Question	Comments/Responses
1.	
2.	
3.	
4.	
5.	
6.	
7.	

D. Glossary of terms

2G	Second-generation wireless technology
3G	Third-generation wireless technology
3GPP	3rd Generation Partnership Project
4G	Fourth-generation wireless technology
5G	Fifth-Generation wireless technology
AA	Apparatus Assignment
ASO	Analogue Switch Off
CMA 1998	Communications and Multimedia Commission Act 1998
DTT	Digital Terrestrial Television
FDD	Frequency Division Duplex
GHz	Gigahertz
LTE	Long Term Evolution
Mbps	Megabit per second
MCMC	Malaysian Communications and Multimedia Commission
MHz	Megahertz
NFCP	National Fibreisation and Connectivity Plan
PI	Public Inquiry
QoS	Quality of Service
SA	Spectrum Assignment
TDD	Time Division Duplex
TV	Television
WiMAX	Worldwide Interoperability for Microwave Access

