APPENDIX D

APPENDIX D – The Radio Spectrum – An Overview

Following this page is a fold-out diagrammatic representation of the electromagnetic spectrum.

The purpose of the chart is to provide a simple, high-level view of typical uses of the various frequency ranges which comprise the radio spectrum. It shows:

- 1. that the radio spectrum, which is regulated by the ODTR, is a small fraction of the total electromagnetic spectrum;
- that the radio spectrum is traditionally divided into different bands, such as VLF (Very Low Frequency) and UHF (Ultra High Frequency), based on wavelengths, i.e. the shorter the wavelength the higher the frequency;
- 3. typical services and systems found in each of the different bands;
- 4. the current limit of 300GHz above which the spectrum has not yet been allocated to specific services.

Following the general overview of the radio spectrum in Appendix D there is a more detailed fold-out view of the UHF and SHF frequency bands in:

THE RADIO SPECTRUM – An Overview

Key Features and Use

In general terms:

- •
- (Integrated Circuits, antennas, etc).

Hertz													
	Radio Waves	Infra-red V		Visible Light	Ultra-violet		X-rays	Ga	m				
	V		LF	MF		HF	VHF	UHF	SHF	_			
	(Very Low Frequency)		(Low Frequency)	(Medium Frequ	ency)	(High Frequency)	(Very High Frequency)	(Ultra High Frequency)	(Super High Frequency)	(
	Long Distand Con Time Signals Submarine Co Short Range .	ce mmunications ommunications Devices	Long Distance Communicati Navigation Beacons Broadcasting (Longwa	ons Broadcasting (Medium Maritime Communi- ve) Military Communi-	n Wave) ications cations	Long Distance Communications Maritime & Aeronautical Communications Amateur Communications Broadcasting (Short Wave)	Aeronautical Communications Business Radio Cordless Telephones Broadcasting: Radio & TV Point-to-point links	Mobile Satellite Communications Mobile Cellular Phones Short Range Devices Broadcasting: TV Point-to-point links	Satellite News Gathering Radar Fixed Wireless Access Satellite Broadcasting				
31	kHz → Typical Se	30 ervices and syst	kHz tems found in the free	300kHz quency range (not ai	3MHz 30MHz 300MHz 3GHz 30G								

The Electromagnetic Spectrum (not to scale)

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APPENDIX D

Characteristics of the Radio Spectrum

• The *higher* the frequency the *greater* the available bandwidth (information carrying capacity). Optical fibers use light waves hence have far greater bandwidth than a radio link. As frequency increases (VHF and above) radio waves behave more like light waves, i.e., they travel in straight lines, penetration of buildings becomes more difficult, they are reflected or obstructed by surfaces. Above 3 GHz a clear line of sight is generally needed. Frequencies in the VHF and UHF bands are ideal for mobile communications (e.g., mobile phones, emergency services, business radio (e.g. taxis, etc), aeronautical communications, broadcasting) - they offer a good match of propagation characteristics and component sizes

		Tera-H	ertz,
mma Ra	ųvs		949
El (Extra Hi	H F gh Frequency)		
· Point-to- Radio As Short Ra Multimed	point links tronomy nge Devices lia Wireless Systems	Spectrum not allocated to specific servic	yet es.
GHz	300	GHz 30	00GHz