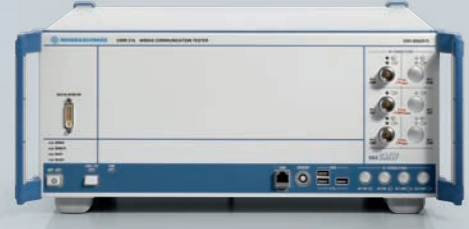


## System Overview

### Selection of T&M products for WiMAX



**R&S®CMW270 WiMAX communication tester**  
 | First and scalable all-in-one solution  
 | Frequency range up to 6 GHz  
 | Realtime full signaling



**R&S®TS8970 WiMAX radio conformance test system (RCTT)**  
 | RCTT selected by WiMAX Forum  
 | Fully automated test setup  
 | Modular system concept (IEEE 802.16e, Wave1/Wave2, BS/MS)  
 | Continuous implementation of latest specifications



**R&S®FSQ signal analyzer**  
 | WiMAX Wave2 solution integrated  
 | Fast speed and highest accuracy  
 | 120 MHz demodulation bandwidth  
 | Best dynamic range



**R&S®SMU200A signal generator**  
 | Two signal generators in one  
 | Outstanding signal quality  
 | MIMO testing option implemented  
 | Unique internal fading simulation



**WiMAX FORUM**  
 MEMBER COMPANY

The Mobile WiMAX™ (worldwide interoperability for microwave access) air interface is based on the IEEE 802.16e-2005 standard. It applies the latest transmission technologies, including OFDMA and MIMO, to increase the data rate and robustness. The WiMAX Forum® (WMF) has defined a range of profiles and conformance test procedures to ensure compatibility and interoperability of different WiMAX products.

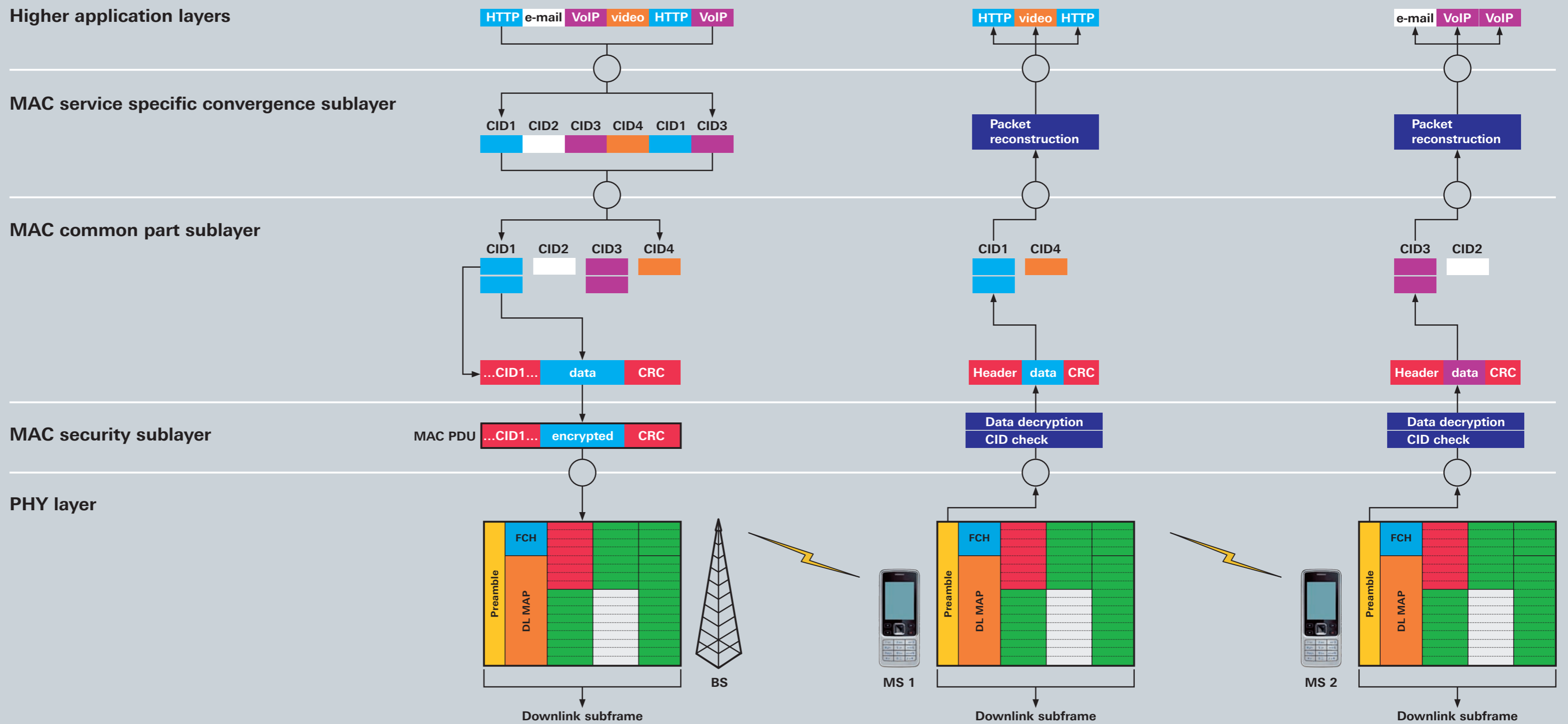
By applying WiMAX, the Internet goes mobile, offering high-speed access anywhere at any time. High data rate is achieved by applying adaptive modulation, which also allows reliable transmission even over long distances.

Rohde&Schwarz supports WiMAX with the widest range of T&M products and provides unique solutions for MIMO and production testing.

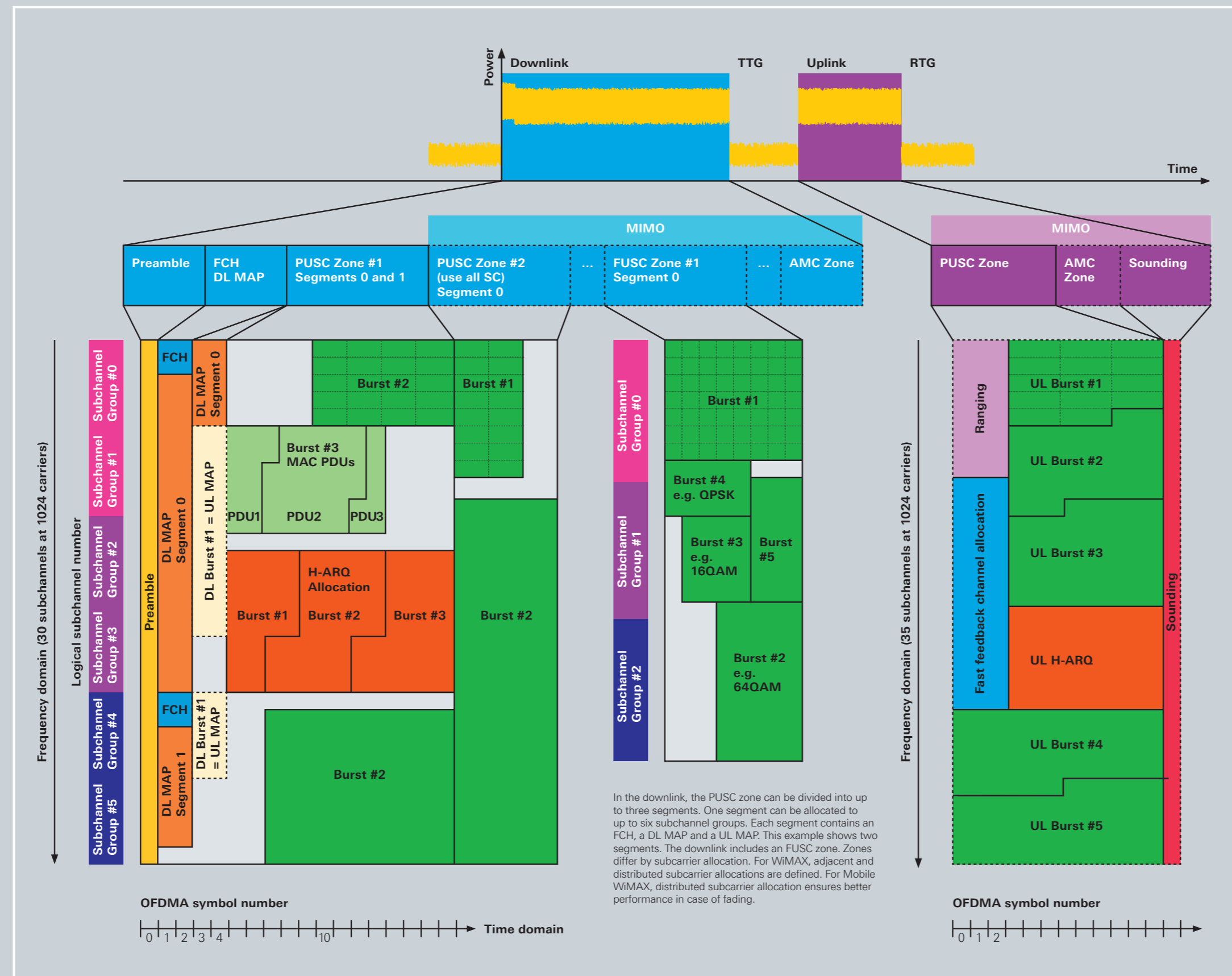
The IEEE 802.16 WiMAX standard describes the two lowest layers of the open system interconnection (OSI) reference model for communications, also known as the PHY(sical) layer and MAC (media access control) layer. WiMAX operates package-switched and connection-oriented – each package is assigned to a connection ID (CID), and each connection is described by the quality of service (QoS).

The basic tasks of the MAC and PHY layers are shown below.

### MAC layer overview



### PHY layer overview



### WiMAX parameters

Properties	IEEE 802.16e-2005
Frequency range	2 GHz to 11 GHz
Modulation	BPSK, QPSK, 16QAM, 64QAM
Multiple access	scalable OFDMA 128 to 2048 FFT, TDMA, OFDM 256 FFT, SC
Duplex (DL / UL)	TDD / FDD
Channel bandwidth	1.25 MHz to 28 MHz in line with local regulations
Peak data rate	114 Mbit/s (DL, 20 MHz, 2x2 MIMO, TDD)
Mobility	60 km/h
Communications distance	1 km to 5 km typ., 30 km max.

### WiMAX Forum profiles

Band class index	Frequency range	Channel bandwidth	FFT size	Duplexing mode	Profile name	
1	2.3 GHz to 2.4 GHz	5 MHz	512	TDD	1B	
		10 MHz	1024	TDD		
		8.75 MHz	1024	TDD	1A	
2	2.305 GHz to 2.320 GHz	3.5 MHz	512	TDD	2A	
		2.345 GHz to 2.360 GHz	5 MHz	512	TDD	2B
		10 MHz	1024	TDD	2C	
3	2.496 GHz to 2.690 GHz	5 MHz	512	TDD	3A	
		10 MHz	1024	TDD		
4	3.3 GHz to 3.4 GHz	5 MHz	512	TDD	4A	
		7 MHz	1024	TDD	4B	
		10 MHz	1024	TDD	4C	
		5 MHz	512	TDD	5A	
		7 MHz	1024	TDD	5B	
5	3.4 GHz to 3.8 GHz	5 MHz	512	TDD	5A	
		7 MHz	1024	TDD	5B	
		10 MHz	1024	TDD	5C	
		3.4 GHz to 3.6 GHz	5 MHz	512	TDD	5AL
		7 MHz	1024	TDD	5BL	
6	3.6 GHz to 3.8 GHz	5 MHz	512	TDD	5AH	
		7 MHz	1024	TDD	5BH	
		10 MHz	1024	TDD	5CH	

### WiMAX glossary

**AAS** = Adaptive Antenna System; **ACK** = Acknowledgment; **AMC** = Advanced Modulation and Coding; **BS** = Base Station; **BT** = Block Turbo Coding; **BPSK** = Binary Phase Shift Keying; **BRS** = Broadband Radio Service; **BW** = Bandwidth; **BWA** = Broadband Wireless Access; **CC** = Convolutional Code; **CID** = Connection ID; **CINR** = Carrier to Interferer Noise Ratio; **CP** = Cyclic Prefix; **CRC** = Cyclic Redundancy Check; **CTC** = Convolutional Turbo Coding; **DCD** = Downlink Channel Descriptor; **DFS** = Dynamic Frequency Selection; **DL** = Downlink; **DLFP** = Downlink Frame Prefix (FCH); **FCH** = Frame Control Header (DLFP); **FDD** = Frequency Division Duplex; **FUSC** = Fully Used Sub-channelization; **H-ARQ** = Hybrid Automatic Repeat Request; **HFDD** = Hybrid Frequency Division Duplex; **IE** = Information Element; **ISI** = Intersymbol Interference; **LDPC** = Low Density Parity Check Code; **LLC** = Logical Link Control; **MAC** = Media Access Control; **MIMO** = Multiple Input Multiple Output; **MMDS** = Multichannel Multipoint Distribution System; **MS** = Mobile Station; **OFDM** = Orthogonal Frequency Division Multiplex; **OFDMA** = Orthogonal Frequency Division Multiple Access; **PDU** = Protocol Data Unit; **PICT** = Product Implementation Conformance Statement; **PUSC** = Partly Used Subchannelization; **QPSK** = Quadrature Phase Shift Keying; **RCT** = Radio Conformance Test; **RSI** = Received Signal Strength Indicator; **RTG** = Receive Transition Gap; **SC** = Single Carrier; **SOFDMA** = Scalable Orthogonal Frequency Division Multiple Access; **TDD** = Time Division Duplex; **TDMA** = Time Division Multiple Access; **TSS&TP** = Test Suite Structure & Test Purpose; **TTG** = Transmit Transition Gap; **UCD** = Uplink Channel Descriptor; **ULIC** = Uplink Interval Usage Code; **UL** = Uplink; **UL-IL** = Uplink Interference; **WCS** = Wireless Communications Services; **WiBro** = Wireless Broadband; **WiMAX** = Worldwide Interoperability for Microwave Access. WiMAX and Mobile WiMAX are trademarks of the WiMAX Forum.