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PHY Nomenclature
Session #17, Levi

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Target Audience & Objectives

- **Intended Users**
  - — **Regulatory and Licensing Authorities**
  - — **Infrastructure Providers & Spectrum Licensees**
  - — **BWA Equipment Vendors and Deployment Planners / Contractors**
  - — **BWA Service Providers**
  - — **BWA CPE Retailers**
  - — **BWA CPE Customers / Purchasers / Recyclers**
- **Objectives**
  - — **Provide a clear, unambiguous set of references which can be called up by the Intended Users to specify their requirements / capabilities in relation to the relevant air interface(s).**
  - — **Facilitate clear identification of specific BWA equipment which defines its compatibility / interoperability with other BWA equipment at a standard air interface.**

Multi — Element Reference

- **Basic Elements**
  - — **Name of Standard : IEEE802.16a-2002 WirelessMAN WMAN**
    - ¥ **Implies the Common MAC layer (with applicable options, parameters, etc)**
  - — **Frequency Range / Band / Licensing Authority etc**
    - ¥ **10-66GHz, Licensed (various bands, blocks, licensing rules)**
    - ¥ **2 — 11GHz Licensed (various bands, blocks, licensing rules)**
    - ¥ **2 — 11GHz License Exempt (various bands, blocks, technical rules)**
  - — **PHY Types : WMAN1 WMAN2 WMA N3**
    - ¥ **Technology (SC, OFDM, OFDMA, etc), combined with**
    - ¥ **Multiple Assignment / Dynamic Allocation Techniques (TDMA, OFDMA, SDMA, DFS etc)**
    - ¥ **Topology (Point-to-Multipoint, Mesh, etc)**
- **Optional Modes** **WMANxA WMANxB WMANxB**
  - — **Duplexing Method (FDD, TDD, HFDD)**
  - — **Advanced Antenna Support (Path Diversity, Adaptive Arrays, Adaptive MultiBeam etc)**
- **Operating Parameters** **(e.g. FFT, FEC, Coding, Modulation etc)**
  - — **Mandatory**
  - — **Optional**
  - — **Fixed and/or Variable**

Initial Proposal

A full specification would therefore read :

IEEE802.16a:2002 WirelessMAN2B/PMP (FDD,MIMO) Or, more simply IEEE WMAN2B/PMP (FDD,MIMO)

Users of the specification would then need to associate the relevant details concerning specific frequency band, regulatory regime, power levels, frequency reuse plan, modulation rates and other engineering / deployment parameters supported by the particular air interface standard and licensing / interoperability options.

Table www : 802.16 PHY Types and Supported Options

PHY TYPE		*Included Techniques*		*Options*	
		Modulation	**MA**	**Duplex**	**AAS**
WMAN1 (10-66GHz L)	**A/PMP**	SC	TDMA	TDD,FDD,HFDD	n/a
	A/MESH	*SC*	*TBD*	*TBD*	*Included*
WMAN2 (2-11GHz L)	**A/PMP**	SC	TDMA	TDD,FDD,HFDD	Optional
	B/PMP	OFDM	TDMA	TDD,FDD	Optional
	C/PMP	OFDMA-DVB	TDMA+FDMA	TDD,FDD	Optional
	D/PMP	OFDMA-AMB	TDMA+FDMA+SDMA	TDD	Included
WMAN3 (2-11GHz LE)	**B/MESH**	OFDM	TDMA	TDD	Included
	B/PMP	OFDM	TDMA	TDD	Optional
	C/PMP	OFDMA-DVB	TDMA+FDMA	TDD,FDD	Optional
WMAN4	***X/XXX***	*TBD*	*TBD*	*TBD*	*TBD*

Alternative Proposal (1)

The WMAN1,2,3,4 des ignation could refer to the modulation technology (SC, OFDM, OFDMA-DVB, OFDMA-AMB), followed by the Frequency Bands (A=10-66GHz, licensed), B=2-11GHZ, licensed), C=2-11GHz, unlicensed etc. These would be followed by the applicable topology scheme (PMP, Mesh).

Table xxx : 802.16 PHY Types and Supported Options

PHY TYPE		*Included Techniques*		*Options*	
		Frequency	**MA**	**Duplex**	**AAS**
WMAN1 (SC)	**A/PMP**	10-66GHz L	TDMA	TDD,FDD,HFDD	n/a
	B/PMP	2-11GHz L			
	A/MESH	10-66GHz L	*TBD*	*TBD*	*Included*
WMAN2 (OFDM)	**B/PMP**	2-11GHz L	TDMA	TDD,FDD,HFDD	Optional
	C/MESH	2-11GHz LE	TDMA	TDD	Included
WMAN3 (OFDMA-DVB)	**B/PMP** **C/PMP**	2-11GHz L 2-11GHz LE	TDMA+FDMA TDMA+FDMA	TDD,FDD TDD	Optional Optional
WMAN4 (OFDMA-AMB)	**B/PMP**	2-11GHz L	TDMA+FDMA+SDMA	TDD	Included

Alternative Proposal (2)

The WMAN1,2, designation could refer to the topology (PMP, Mesh), followed by the Frequency Bands (A=10-66GHz, licensed), B=2-11GHZ, licensed), C=2-11GHz, unlicensed etc. These would be followed by the modulation technology (SC, OFDM, OFDMA-DVB, OFDMA-AMB).

Table yyy : 802.16 PHY Types and Supported Options

PHY TYPE		*Included Techniques*		*Options*	
		Frequency	**MA**	**Duplex**	**AAS**
WMAN1 (PMP)	**A/SC**	10-66GHz L	TDMA	TDD,FDD,HFDD	n/a
	B/SC	2-11GHz L	TDMA	TDD,FDD,HFDD	Optional
	B/OFDM	2-11GHz L	TDMA	TDD,FDD,HFDD	Optional
	B/DVB	2-11GHz L	TDMA + FDMA	TDD,FDD	Optional
	B/AMB	2-11GHz L	TDMA+FDMA+SDMA	TDD	Included
WMAN2 (Mesh)	***A/SC***	*10-66GHz L*	*TBD*	*TBD*	*Included*
	C/OFDM	2-11GHz LE	TDMA	TDD	Included

Conclusions / Recommendations

- **Pick the Simplest / Clearest Sch eme for the Intended Users**
- **For consistency, apply the scheme retrospectively to TG1 air interface with the 802.16a Amendment**
- **Clarify Base-station compatibility and interoperability / coexistence factors**
- **Clarify CPE compatibility and interoperability / coexistence factors and any handshaking / etiquette requirements**
- **Clarify IEEE 802.11/ 802.16 and interoperability / coe xistence factors for license-exempt bands**

¥ **Clarify AAS Options and interoperability / coexistence factors for licensed bands**