Original Parameters between PHS and DECT

The following tables are comparison between PHS and DECT mainly from technical view points.

1. Original Basic system parameters

System	DECT	PHS	Comment
Access technique	MC/TDMA/TDD	MC/TDMA/TDD	
Carrier spacing	1.728 MHz	300 kHz	
Traffic channels / single radio TRX	12	3-4	PHS offers (nx4)-1 traffic channels per site; n= number of TRX per site.
Control carriers	no control carrier (dynamic)	fixed	Fixed control channels can be detected easily by portable. For PHS the control carriers do not have to be searched, less complex technology, handsets more cost efficient, lower power consumption.
Average RF power (base station)	10 mW	10 mW - 500 mW	PHS offers a wide selection of output power for the equipment.
Average RF power (portable)	10 mW	10 mW	
Peak RF power (base station)	250 mW	80 mW - 4 W	
Peak RF power (portable)	250 mW	80 mW	PHS is safer to medical equipment, human body and other systems.
Frame duration	10 ms	5 ms	PHS has smaller frame duration, therefore diversity is more effective.
Speech codec	32 kbps ADPCM	32 kbps ADPCM	
Traveling speed	good walking speed vehicle: limited to line-of-sight only	better due to higher tolerance to delay spread. walking speed vehicle: both line-of-sight / non-line-of- sight	Due to more robustness of PHS (delay spread) the handover-break is more than compensated. Mobility on down-town car-speed proven in commercial service.
Ease of planning, tolerance to traffic variations	equal (n x 12 channels/cell)	equal (3 - 15 chan-nels/cell)	Collocation of base stations possible for PHS. 12 channels per DECT- basestation provides excessive traffic capacity for public service.
Authentication	yes	yes	

System	DECT	PHS	Comment
Ciphering	yes	yes	PHS has a more secure algorithms than only scrambling: ciphering with key changed on call to call basis.
Coexistence of un-coordinated system installations	good	good In Japan, commercial operation by 3 operators in same area.	Both systems suffer from un-coordinated frames (unsynchronised systems) on air-interface. But because PHS has more channels per MHz than DECT, PHS's capacity reduction is less than DECT.

2. Spectrum usage efficiency

System	DECT	PHS	Comment
Modulation	GFSK (BT = 0.5)	$\pi/4$DQPSK	PHS is about 2 times efficient than DECT in frequency use (channels per MHz) PHS: 26.6 ch/MHz DECT: 13.7 ch/MHz
Needed amount of spectrum in a C/I limited environment		PHS is 100 % better in channels/MHz, about 50 % better in channels/MHz/-km^2	
Spectrum efficiency in a high capacity C/I limited environment	good	very good	50 % better efficiency in C/I limited environment for PHS.

C/I: Carrier-to-Interference Ratio

3. Area coverage capability

System	DECT	PHS	Comment
Average RF power (portable)	10 mW	10 mW	
Average RF power (base station)	10 mW	10 - 500 mW	PHS offers a wide selection of output power for the equipment. Hence, PHS coverage planning is more flexible than with DECT. - Infrastructure cost will be minimized with PHS. - PHS can easily expand the service coverage using high power base stations.
Sensitivity	-86 dBm (GAP) at 0.1% BER	typically better than -95 dBm	
Basic link budget	110 dB (good)	114 dB - 131 dB (better)	PHS uses high power output and high sensitivity pre-amplifier for the CS - PHS has bigger radio range. - Smaller infrastructure costs.
Tolerance to delay spread	223 ns theoretical 175 ns experimental (2 ray selection diversity, bit error rate 10^{-3})	460 ns theoretical 300 ns experimental (2 ray selection diversity, bit error rate 10^{-3})	PHS is more robust, can provide better speech quality due to greater tolerance to time dispersion. The grater this tolerance, - the faster the PS traveling speed can be, - the larger cell sizes are possible. Equalizer has high complexity, portable and infrastructure costs will rise. Equalizer has high power con-sumption, hence, battery backup time is further shortened.
Transmission link quality	Very bad at large cells due to small tolerance to time dispersion.	Very good at large cells due to high tolerance to time dispersion. Handover breaks do not disturb fax, internet.	PHS is better for large cells.