**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | Baseline for discussion of a response LS statement to ITU-R WP5A and WP5C |
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| Abstract | This document contains the technical tables from a LS from ITU-R WP 5A and WP 5C with suggested changes for a reply.  |
| Purpose | This is a working document which will provide guidance how proposals have to be assessed to be considered in the selection process for a Draft Standard for TG P802.15.3d. |
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# WP5A (based on the preliminary draft)

## 7.1 Close proximity mobile system (CPMS) operating in the frequency band 275-450 GHz

*[Editor’s note: This section currently addresses 2 CPMSs. Possible merger should be discussed in the future meetings, taking into account the advance of the RF device technology and potential interference issues.]*

The expected ranges of technical and operational characteristics for close proximity mobile systems planned to operate in the band 275-320 GHz and in the band 275-450 GHz are shown in Table 2.

Annex 1 proposes two examples of a radio-frequency channel arrangement for land mobile service applications operating in the frequency band 275-450 GHz. Appendix 1 to Annex 1 gives information on propagation attenuation in the frequency band 275-320 GHz.

TABLE 2

Expected technical and operational characteristics of a land mobile CPMS applications operating
in the frequency band 275-450 GHz

| Parameters | Values |
| --- | --- |
| CPRS application operating in the frequency range 275-320 GHz | CPRS application operating in the frequency range 275-450 GHz |
| Frequency band (GHz) | 275-320 | 275-450 |
| Deployment density  | Depending on outdoor usage | Depending on outdoor usage |
| Tx output power density (dBW/MHz) |  | Range TBD(calculate tx pwr/bandwidths) |
| e.i.r.p. density(dBW/MHz) |  | Range TBD (see above) |
| Duplex Method | FDD/TDD | TDD/FDD |
| Modulation | OOK/BPSK/QPSK/16QAM/64QAMBPSK-OFDM/QPSK-OFDM/ 16QAM-OFDM/32QAM-OFDM/64QAM-OFDM | OOK/BPSK/QPSK/16QAM/64QAM8PSK/8APSKBPSK-OFDM/QPSK-OFDM/ 16QAM-OFDM/32QAM-OFDM/64QAM-OFDM |
| Average distance between CPMS fixed and mobile devices (m) | 0.1 | 0.1 |
| Maximum between CPRS fixed and mobile devices (m) | 1 | 1 |
| Antenna height (m) | TBD | TBD |
| Antenna beamwidth (degree) | 3-10 | 10-90 |
| Frequency reuse  | 1 | 1 |
| Antenna pattern  | TBD | Gaussian |
| Antenna polarization  | Liner | Linear |
| Indoor CPRS fixed device deployment (%) | 90 | 90 |
| Indoor CPRS fixed device penetration loss (dB) | >100 | >100 |
| Feeder loss (dB) | 2 | 2 |
| Maximum CPRS fixed device output power (dBm) | 10 | 10 |
| Channel bandwidth (GHz) | 2.16/4.32/8.64/12.96/17.28/ 25.92/51.8 | 2.16/4.32/8.64/12.96/17.28/25.92/51.84/69.12/103,68 |
| Transmitter spectrum mask  | TBD | TBD |
| Maximum CPRS fixed device antenna gain (dBi) | 30 | 30 |
| Maximum CPRS mobile device antenna gain (dBi) | 15 | 30 |
| Maximum CRPS fixed device output power (e.i.r.p.) (dBm) | 40 | 40 |
| Maximum CRPS mobile device output power (e.i.r.p.) (dBm) | 25 | 40 |
| Average CPRS fixed device activity (%) | 20 | 20 |
| Average CPRS fixed device power (dBm (e.i.r.p)) | 20 | 20 |
| Receiver noise figure typical (dB) | 15 | 8 |

*[Editor's note: Table fields and contents have to be harmonized among use cases]*

## 7.2 Wireless links in data centers

The expected ranges of technical and operational characteristics for wireless links in data centers planned to operate in the band 275-450 GHz are shown in Table 3.

TABLE 3

Expected technical and operational characteristics of wireless links in data centers operating
in the frequency band 275-450 GHz

| Parameter | Values |
| --- | --- |
| Frequency band (GHz) | 275-450 |
| Deployment density  | TBD |
| Tx output power density (dBW/MHz) | Range TBD(calculate tx pwr/bandwidths) |
| e.i.r.p. density (dBW/MHz) | Range TBD (see above) |
| Duplex Method | TDD, FDD, SDD |
| Modulation | OOK/BPSK/QPSK/16QAM/64QAM8PSK/8APSK |
| Maximum distance between devices | 100 m |
| Antenna height (m) | TBD |
| Antenna beamwidth (degree) | < 25 (expected) |
| Frequency reuse  | 1  |
| Antenna pattern  | Gaussian |
| Antenna polarization  | Linear |
| Indoor deployment (%) | 100 |
| Indoor penetration loss (dB) | TBD |
| Maximum device output power (dBm) | 10 |
| Channel bandwidth (GHz) | 2.16/4.32/8.64/12.96/17.28/ 25.92/51.84/69.12/103,68 |
| Transmitter spectrum mask  | TBD |
| Maximum device antenna gain (dBi) | 30 |
| Maximum device output power (e.i.r.p.) (dBm) | 40 |
| Maximum device activity (%) | 100 |
| Receiver noise figure typical (dB) | 8 |

*[Editor's Note: Table fields and contents have to be harmonized among use cases]*

## 7.3 Intra-device communications

The expected ranges of technical and operational characteristics for wireless THz intra-device links planned to operate in the band 275-450 GHz are shown in Table 4.

TABLE 4

Expected technical and operational characteristics of wireless THz intra-device links operating
in the frequency band 275-450 GHz

| Parameter | Value |
| --- | --- |
| Frequency band (GHz) | 275-450 |
| Deployment density  | TBD |
| Tx output power density (dBW/MHz) | Range TBD (calculate tx pwr/bandwidths) |
| e.i.r.p. density (dBW/MHz) | Range TBD (see above) |
| Indoor Deployment (%) | TBD |
| Duplex Method | TDD, FDD, SDD |
| Modulation | OOK/BPSK/QPSK/16QAM/64QAM8PSK/8APSK |
| Maximum distance between devices | <1 m |
| Antenna height (m) | TBD |
| Antenna beamwidth (degree) | 180 -15 |
| Frequency reuse  | 1  |
| Antenna pattern  | TBD |
| Antenna polarization  | Linear |
| Maximum device output power (dBm) | 10 |
| Channel bandwidth (GHz) | 2.16/4.32/8.64/12.96/17.28//25.92/51.84/69.12/103,68 |
| Transmitter spectrum mask  | TBD |
| Maximum device antenna gain (dBi) | 20 |
| Typical expected device antenna gain (dBi) | 6 |
| Maximum device output power (e.i.r.p.) (dBm) | 30 |
| Maximum device activity (%) | 100 |
| Receiver noise figure typical (dB) | 8 |

*[Editor's Note: Table fields and contents have to be harmonized among use cases]*

# WP5C(based on the preliminary draft)

TABLE 2

Technical and operational characteristics of the fixed service applications planned to operate

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency band (GHz) | 275-316 | 275-321.84 | 380-445 |
| Duplex Method | FDD/TDD  | FDD/TDD | FDD/TDD Editor’s note: Other duplex in schemes are possible |
| Modulation  | BPSK/QPSK/16QAM/32QAM/64QAMBPSK-OFDM/QPSK-OFDM/ 16QAM-OFDM/32QAM-OFDM/64QAM-OFDM | BPSK/QPSK/16QAM/32QAM8PSK, 8APSKBPSK-OFDM/QPSK-OFDM/ 16QAM-OFDM/32QAM-OFDM | BPSK/QPSK/16QAM/32QAM8PSK, 8APSKBPSK-OFDM/QPSK-OFDM/ 16QAM-OFDM/32QAM-OFDM |
| Channel bandwidth (GHz)  | Based on 200 MHz slots[2.16/4.32/8.64/12.96/17.28/25.92/51.84] | Based on 200 MHz slots[2.16/4.32/8.64/12.96/17.28/25.92/51.84/69.12]  | Based on 200 MHz slots[2.16/4.32/8.64/12.96/17.28/25.92/51.84] |
| Tx output power range (dBW)  | -20 … 0 | -30 … 10 | -30 … 10 |
| Tx output power density range (dBW/GHz) |  -4.7 … -0.3 | TBD (calculate based on power and BW) | (calculate based on power and BW) |
| Feeder/multiplexer loss range (dB)  | 0 … 3 | 0 … 3 | 0 … 3 |
| Antenna gain range (dBi)  | 24 … 50 | 24 … 50 | 24 … 50 |
| Antenna pattern | Gaussian beam | Gaussian beam | Gaussian beam |
| Antenna height (m) | 10-20m | 10-50 | 10-50 |
| Antenna elevation | TBD | +/- 24 deg. | +/-24 deg. |
| e.i.r.p. range (dBW)  | 1 … 50 | -9… 60 | -9 … 60 |
| e.i.r.p. density range (dBW/GHz) | 2.3 …. 4.7 | calculate see above | calculate see above |
| Receiver noise figure typical (dB)  | 15 |  8 | 8 |
| Receiver noise power density typical (=*NRX*) (dBW/GHz)  |  -16 |  -106 | -106 |
| Normalized Rx input level for 1 × 10–6 BER (dBW/GHz)  | TBD  | TBD (SNR of 7.5 dB for BPSK required) | TBD (SNR of 7.5 dB for BPSK required) |
| Nominal long-term interference power density (dBW/GHz) | TBD | TBD | TBD |
| Link length (m) | 100 … 300 | 100 … 300 | 100 … 300 |
| Deployment Density | TBD | 10/km^2? | 10/km^2? |