



## 2 Equipment Characteristics for Fixed Service Systems in the 2500-2690 MHz Band

### 2.1 Fixed Base Station Characteristics

TABLE 2.1.1

**Typical IEEE 802.16-2004 Fixed Base Station receive parameters**

Cell size (km radius)	56	3 to 10
Antenna type	Omni or sectored	Sectored
Max antenna gain (dBi) including feeder loss	18	18
Downtilt angle (deg)	.5	1
Antenna height (m) HAAT	1000	50
Polarization	Linear	Linear
Receiver Noise Figure (dB)	3	3
Receiver Thermal Noise (dBW/MHz)	-141	-141
Interference criteria (Isat/Nth) (dB)	-10	-10
Adjacent Channel Selectivity	FDD: Varies * TDD: Varies *	FDD: Varies * TDD: Varies *

\* Varies by supplier

TABLE 2.1.2

**Typical IEEE 802.16-2004 Fixed Base Station transmit parameters**

Cell size (km radius)	56	3 to 10
Maximum Transmit Power for a 5.5 and 6 MHz channel (dBm) (standards) ( <i>See Note 2 in Attachment 1</i> )	63	63
Typical Transmit power for 5.5 and 6 MHz channel (dBm)	47	43
Operating bandwidth (MHz)	5 to 6	5 to 6
Antenna type	Omni or Sectored	Sectored
Max antenna gain (dBi) including feeder loss	18	18
Downtilt angle (deg)	.5	1
Antenna height (m) HAAT	1000	50
Polarization	Linear	Linear

ACLR (See Note 1 in Attachment 1)	The maximum out-of-band power is attenuated at the channel edges at least 25 dB relative to the average 6 MHz channel power level, then attenuated along a linear slope from that level to at least 40 dB at 250 kHz above or below the channel edges, then attenuated along a linear slope from that level to at least 60 dB at 3 MHz above the upper and below the lower channel edges, and attenuated at least 60 dB at all other frequencies.
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## 2.2 Fixed Subscriber Station Characteristics

TABLE 2.2.1

### Typical IEEE 802.16-2004 Fixed Subscriber Station receive parameters

Cell size (km radius)	56	3 to 10
Antenna type	Omni or directional	Omni or directional
Max antenna gain (dBi)	16 dBi	7 dBi
Antenna feed loss (dB)	.5	0
Antenna height (m)	100	1.5
Polarization	Linear	Linear
Receiver Noise Figure (dB)	3 dB	4.5 dB
Receiver Thermal Noise (dBW/MHz)	-141	-139.5
Interference criteria (I/Nth) (dB)	-10	-10
ACS	Typical 40 dB	Typical 40 dB

TABLE 2.2.2

### Typical IEEE 802.16-2004 Fixed Subscriber Station transmit parameters

Cell size (km radius)	56	3 to 10
Average Transmit Power (dBm)	23 dBm	17 dBm
Average Transmit Power (dBm) in TDD including 50% activity factor	Activity factor = 3 to 10 dB	Activity factor = 3 to 10 dB
Operating bandwidth (MHz)	5 to 6	5 to 6
Antenna type	Omni or directional	Omni or directional
Max antenna gain (dBi)	16	7
Antenna feed loss (dB)	.5	0
Antenna height (m)	100	1.5
Polarization	Linear	Linear

<p>ACLR (See Note 1 in Attachment 1)</p>	<p>The maximum out-of band power is attenuated at the channel edges at least 25 dB relative to the average 6 MHz channel power level, then attenuated along a linear slope to at least 40 dB at 250 kHz beyond the nearest channel edge, then attenuated along a linear slope from that level to at least 60 dB at 3 MHz above the upper and below the lower licensed channel edges, and attenuated at least 60 dB at all other frequencies.</p>	<p>The maximum out-of- band power shall be attenuated at the channel edges at least 25 dB relative to the average 6 MHz channel transmitter output power level (P), then attenuated along a linear slope to at least 40 dB or <math>33+10\log(P)</math> dB, whichever is the lesser attenuation, at 250 kHz beyond the nearest channel edge, then attenuated along a linear slope from that level to at least 60 dB or <math>43+10\log(P)</math> dB, whichever is the lesser attenuation, at 3 MHz above the upper and below the lower licensed channel edges, and attenuated at least 60 dB or <math>43+10\log(P)</math> dB, whichever is the lesser attenuation, at all other frequencies.</p>
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### 3 Equipment Characteristics for 802.16e Mobile Systems in the 2500-2690 MHz Band

#### 3.1 802.16e Mobile Base Station Characteristics

TABLE 3.1.1  
802.16e Mobile Base Station receive parameters

Cell size (km radius)	3 to 10
Antenna type	Sectored
Max antenna gain (dBi) including feeder loss	18
Downtilt angle (deg)	1
Antenna height (m) HAAT	50
Polarization	Linear
Receiver Noise Figure (dB)	3
Receiver Thermal Noise (dBW/MHz)	-141
Interference criteria (Isat/Nth) (dB)	-10
Adjacent Channel Selectivity	FDD: Varies * TDD: Varies *

\* Varies by supplier

TABLE 3.1.2

**802.16e Mobile Base Station transmit parameters**

Cell size (km radius)	3 to 10
Maximum Transmit Power for a 5.5 or 6 MHz channel (dBm) (standards) <i>(See Note 2 in Attachment 1)</i>	63
Typical Transmit power for a 5 MHz channel (dBm)	43
Operating bandwidth (MHz)	5 to 6
Antenna type	Sectored
Max antenna gain (dBi) including feeder loss	18
Downtilt angle (deg)	1
Antenna height (m) HAAT	50
Polarization	Linear

**3.2 802.16e Mobile Station Characteristics**

TABLE 3.2.1

**802.16e Mobile Station receive parameters**

Cell size (km radius)	3 to 10
Antenna type	Omni or directional
Max antenna gain (dBi)	4 dBi
Antenna feed loss (dB)	0
Antenna height (m)	1.5
Polarization	Linear
Receiver Noise Figure (dB)	5 dB
Receiver Thermal Noise (dBW/MHz)	-139
Interference criteria (I/Nth) (dB)	-10
ACS	Typical 40 dB

TABLE 3.2.2

**802.16e Mobile Station transmit parameters**

Cell size (km radius)	3 to 10
Average Transmit Power (dBm)	24 dBm
Average Transmit Power (dBm) in TDD, including 50% activity factor	Activity factor = 3 to 10 dB
Maximum Transmit Power E.I.R.P.(dBm)	33 dBm
Operating bandwidth (MHz)	5 to 6 MHz
Antenna type	Omni or directional
Max antenna gain (dBi)	4
Antenna feed loss (dB)	0
Antenna height (m)	1.5
Polarization	Linear
ACLR ( <i>See Note 1 in Attachment 1</i> )	The maximum out-of- band power shall be attenuated at the channel edges at least 25 dB relative to the average 6 MHz channel transmitter output power level (P), then attenuated along a linear slope to at least 40 dB or $33+10\log(P)$ dB, whichever is the lesser attenuation, at 250 kHz beyond the nearest channel edge, then attenuated along a linear slope from that level to at least 60 dB or $43+10\log(P)$ dB, whichever is the lesser attenuation, at 3 MHz above the upper and below the lower licensed channel edges, and attenuated at least 60 dB or $43+10\log(P)$ dB, whichever is the lesser attenuation, at all other frequencies.

**4. Proposal**

IEEE proposes that the parameters outlined in the aforementioned tables be used in the sharing studies conducted by JTG 6-8-9.

## Attachment 1

In the USA, the FCC has adopted a Report and Order and Further Notice of Proposed Rulemaking which will result in new rules for the 2496-2690 MHz band. This will result in changes to the ACLR requirements and the power limit requirements and channel bandwidths as described in Note 1 and Note 2 below.

### Note 1:

In the USA, the FCC has adopted a Report and Order and Further Notice of Proposed Rulemaking which will result in new rules for the 2496-2690 MHz band. The new rules are expected to be in force in early 2005 and will change the ACLR requirements as follows:

#### **§ 27.53 Emission limits.**

(2) For fixed and temporary fixed digital stations, the attenuation shall be not less than  $43 + 10 \log(P)$  dB, unless a documented interference complaint is received from an adjacent channel licensee. Provided that the complaint cannot be mutually resolved between the parties, both licensees of existing and new systems shall reduce their out-of-band emissions by at least  $67 + 10 \log(P)$  dB measured at 3 MHz from their channel's edges for distances between stations exceeding 1.5 km. For stations separated by less than 1.5 km, the new licensee shall reduce attenuation at least  $67 + 10 \log(P) - 20 \log(D\text{km}/1.5)$ , or when colocated, limit the undesired signal level at the affected licensee's base station receiver(s) at the collocation site to no more than -107 dBm.

### Note 2:

In the USA, the FCC has adopted a Report and Order and Further Notice of Proposed Rulemaking which will result in new rules for the 2496 -2690 MHz band. The new rules are expected to be in force in early 2005 and will change the power limit requirements and channel bandwidths as follows:

#### **§ 27.50 Power limits.**

(h) The following power limits shall apply in the BRS and EBS:

(1) *Main, booster and base stations.*

(i) The maximum EIRP of a main, booster or base station shall not exceed  $33 \text{ dBW} + 10 \log(X/Y) \text{ dBW}$ , where X is the actual channel width in MHz and Y is either (i) 6 MHz if prior to transition or the station is in the MBS following transition or (ii) 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in subparagraph (ii) of this section.

(ii) If a main or booster station sectorizes or otherwise uses one or more transmitting antennas with a non-omnidirectional horizontal plane radiation pattern, the maximum EIRP in dBW in a given direction shall be determined by the following formula:

$EIRP = 33 \text{ dBW} + 10 \log(X/Y) \text{ dBW} + 10 \log(360/\text{beamwidth}) \text{ dBW}$ , where X is the actual channel width in MHz, Y is either (i) 6 MHz if prior to transition or the station is in the MBS following transition or (ii) 5.5 MHz if the station is in the LBS and UBS following transition, and beamwidth is the total horizontal plane beamwidth of the individual transmitting antenna for the station or any sector measured at the half-power points.

- (2) *Mobile and other user stations.* Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.
- (3) For television transmission, the peak power of the accompanying aural signal must not exceed 10 percent of the peak visual power of the transmitter. The Commission may order a reduction in aural signal power to diminish the potential for harmful interference.
- (4) For main, booster and response stations utilizing digital emissions with non-uniform power spectral density (e.g. unfiltered QPSK), the power measured within any 100 kHz resolution bandwidth within the 6 MHz channel occupied by the non-uniform emission cannot exceed the power permitted within any 100 kHz resolution bandwidth within the 6 MHz channel if it were occupied by an emission with uniform power spectral density, i.e., if the maximum permissible power of a station utilizing a perfectly uniform power spectral density across a 6 MHz channel were 2000 watts EIRP, this would result in a maximum permissible power flux density for the station of  $2000/60 = 33.3$  watts EIRP per 100 kHz bandwidth. If a non-uniform emission were substituted at the station, station power would still be limited to a maximum of 33.3 watts EIRP within any 100 kHz segment of the 6 MHz channel, irrespective of the fact that this would result in a total 6 MHz channel power of less than 2000 watts EIRP.
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